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Minnesota Department of Commerce
Energy Environmental Review and Analysis

Final Environmental Impact Statement
Line 3 Project

Docket Nos. PPL-15-137/CN-14-916

August 17, 2017

MINNESOTA

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Line 3 Project Final EIS Cover Sheet

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Abstract

Enbridge Energy, Limited Partnership (Enbridge, or Applicant) has proposed to construct and operate 340 miles of new 36-inch-diameter pipeline in Minnesota with an annual average capacity of 760,000 barrels per day (bpd) and to abandon in place 282 miles of the existing 34-inch-diameter, 390,000-bpd operating capacity, Line 3 pipeline (Line 3 Project, or Project). The existing Line 3 pipeline originates in Canada and crosses the U.S.-Canada border near Neche, North Dakota. It continues through North Dakota and Minnesota and terminates at the Enbridge Superior Station and Terminal Facility (Superior terminal) near Superior, Wisconsin. As proposed by Enbridge, the new pipeline would generally parallel the existing Line 3 pipeline along the Enbridge Mainline system right-of-way from the North Dakota-Minnesota border in Kittson County to the Clearbrook terminal in Clearwater County. From Clearbrook to the terminal in Superior, Wisconsin, the proposed pipeline would diverge from the existing Line 3 corridor.

Enbridge's proposed project requires two separate approvals from the Minnesota Public Utilities Commission (Commission) – a certificate of need (CN) and a route permit. The Commission's docket numbers for these approvals are PL9/CN-14-916 and PL9/PPL-15-137.

Department of Commerce, Energy Environmental Review and Analysis (DOC-EERA) staff is responsible for conducting environmental review for CN and route permit applications submitted to the Commission. This environmental impact statement (EIS) has been prepared to meet the requirements of both review processes.

This Final EIS addresses the issues identified in DOC-EERA's scoping decision of September 21, 2016. It evaluates the potential impacts of Enbridge's proposed Project and alternatives to the proposed Project, as well as possible mitigation measures for these impacts. It also provides responses to substantive comments on the Draft EIS submitted during the public review period following issuance of the Draft EIS on May 15, 2017. The proposed Project route and alternatives to the proposed Project route pass through the following counties in Minnesota: Aitkin, Beltrami, Benton, Carlton, Cass, Clearwater, Crow

Wing, Hubbard, Itasca, Kanabec, Kittson, Marshall, Mille Lacs, Morrison, Pennington, Pine, Polk, Red Lake, St Louis, Todd, and Wadena.

Public Information Meetings and Comment Period

The Draft EIS was issued on May 15, 2017. Comments on the Draft EIS were accepted through July 10, 2017. Public information meetings on the Draft EIS were held at the following locations and times:

Week of June 5th – June 9th	**Week of June 12th – June 16th**	**Week of June 19th – June 23rd**
Tuesday, June 6 10:00 AM – 1:00 PM Rice Lake Community Center 13830 Community Loop Bagley, MN 56621	Monday, June 12 10:00 AM – 1:00 PM Grand Casino Hinkley 777 Lady Luck Drive Hinckley, MN 55037	Tuesday, June 20 10:00 AM – 1:00 PM Marshall County Central Schools 310 West Minnesota Avenue Newfolden, MN 56738
Tuesday, June 6 6:00 PM – 9:00 PM IRA Civic Center 1401 NW 3rd Avenue Grand Rapids, MN 55744	Monday, June 12 6:00 PM – 9:00 PM East Lake Community Center 36666 State Hwy 65 McGregor, MN 56718	Tuesday, June 20 6:00 PM – 9:00 PM Hallock City Hall 163 3rd Street SE Hallock, MN 56728
Wednesday, June 7 10:00 AM – 1:00 PM Park Rapids High School Cafetorium 401 Huntsinger Avenue Park Rapids, MN 56470	Tuesday, June 13 10:00 AM – 1:00 PM Fond du Lac Community College 2101 14th Street Cloquet, MN 55720	Wednesday, June 21 10:00 AM – 1:00 PM Ralph Engelstad Arena, Imperial Room 525 Brooks Avenue North Thief River Falls, MN 56701
Wednesday, June 7 6:00 PM – 9:00 PM Palace Casino Hotel 16599 69th Avenue NW Cass Lake, MN 56633	Tuesday, June 13 6:00 PM – 9:00 PM Intercontinental Hotel Saint Paul 11 E. Kellogg Boulevard St. Paul, MN 55101	Wednesday, June 21 6:00 PM – 9:00 PM Plummer Senior Citizen Center 185 Minnesota Street Plummer, MN 56748
Thursday, June 8 10:00 AM – 1:00 PM Downtown Fair Center 107 W. 7th Avenue Floodwood, MN 55736	Wednesday, June 14 11:00 AM – 2:00 PM Staples Community Center 425 6th Street NE Staples, MN 56479	Thursday, June 22 10:00 AM – 1:00 PM Gully Community Center 120 Main Street Gully, MN 56646
Thursday, June 8 6:00 PM – 9:00 PM Central Lakes College Classroom E54 501 West College Drive Brainerd, MN 56401	Wednesday, June 14 6:00 PM – 9:00 PM Initiative Foundation 405 1st Street SE Little Falls, MN 56345	Thursday, June 22 6:00 PM – 9:00 PM Sanford Center and George W. Nielson Convention Center 1111 Event Center Drive NE Bemidji, MN 56601
Friday, June 9 11:00 AM – 1:00 PM Maslowski Wellness & Research Ctr. 17 5th Street Southwest Wadena, MN 56482	Thursday, June 15 10:00 AM – 1:00 PM Henry's Catering and Banquet Hall 6774 MN-25 Foley, MN 56329	
	Thursday, June 15 6:00 PM – 9:00 PM Phoenix Hotel & Banquet Center 210 MN-23 Milaca, MN 56353	
	Friday, June 16 10:00 AM – 1:00 PM The Grand Event Center 2025 Rowland Road Mora, MN 55051	

Additional Information

Additional information on the Project is available in the Project application listed in the References chapter of this Final EIS.

Other material related to this docket is available online at: https://mn.gov//commerce/energyfacilities/line3/ or on the eDockets website at: https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showeDocketsSearch&showEdocket=true&userType=public. To retrieve materials related to this docket via the eDockets website, use the steps below.

Certificate of Need (CN) documents:

- For Docket Number, select "14" from the Year dropdown box and enter "916" in the Docket Lookup box.
- Select "Certificate of Need" from the Docket Type dropdown box.
- Select "Search."

Petroleum Pipeline (PPL) Route Permit documents:

- For Docket Number, select "15" from the Year dropdown box and enter "137" in the Docket Lookup box.
- Select "Petroleum Pipeline" from the Docket Type dropdown box.
- Select "Search."

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ACRONYMS AND ABBREVIATIONS

Acronym	Definition
°F	Degrees Fahrenheit
µg/m^3	micrograms per cubic meter
AADT	annual average daily traffic
ACS	American Community Survey
ADW	Animal Diversity Web
AEO	Annual Energy Outlook
AMA	Aquatic Management Area
AER	Alberta Energy Regulator
AFF	annual failure frequency
ALJ	administrative law judge
AMA	Aquatic Management Area
ANSI	American National Standards Institute
AOI	area of interest
API	American Petroleum Institute
APP	Agricultural Protection Plan
Applicant	Enbridge Energy
AQI	Air Quality Index
ASME	American Society of Mechanical Engineers
ATWS	additional temporary workspace(s)
bbl	barrel(s)
BCC	birds of conservation concern
BGEPA	Bald and Golden Eagles Protection Act
BIA	Bureau of Indian Affairs

Acronym	Definition
BLM	Bureau of Land Management
BMP	best management practice
BNSF	Burlington Northern Santa Fe
BO	Biological Opinion
bpd	barrels per day
BTEX	benzene, toluene, ethylbenzene, and xylenes
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CN	Certificate of Need
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon-dioxide equivalent
Commission	Minnesota Public Utilities Commission
Control Center	Enbridge Control Center
CSW	construction stormwater
CWA	Clean Water Act
dB	decibel(s)
dBA	A-weighted decibel(s)
DDT	Dichlorodiphenyltrichloroethane
dilbit	diluted bitumen
DNR	Department of Natural Resources
DOC-EERA	Department of Commerce, Energy Environmental Review and Analysis
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior

Acronym	Definition
DOS	U.S. Department of State
DPS	distinct population segment
DSDD	Draft Scoping Decision Document
DWSMA	drinking water supply management area
EA	Environmental Assessment
EAW	Environmental Assessment Worksheet
ECD	erosion and sediment control device
ECS	Ecological Classification System
eGRID	Emissions and Generation Resource Integrated Database
EI	Environmental Inspector
EIA	Energy Information Administration
EIS	Environmental Impact Statement
EJ	Environmental justice
Enbridge	Enbridge Energy (the Applicant)
EPA	U.S. Environmental Protection Agency
EQB	Environmental Quality Board
ERAP	Emergency Response Action Plan
ESA	federal Endangered Species Act
ESRI	Environmental Systems Research Institute
Exponent	Exponent, Inc.
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration

Acronym	Definition
FIRM	Flood Insurance Rate Map
FMA	Fisheries Management Area
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GAP	Gap Analysis Program
GHG	greenhouse gas
GIS	geographic information system
GLIFWC	Great Lakes Indian Fish and Wildlife Commission
GNTL	Great Northern Transmission Line Project
gpd	gallons per day
gpm	gallons per minute
GSOC	Gopher State One-Call
GWP	Global Warming Potential
H_2S	hydrogen sulfide
HAP	hazardous air pollutant
HARGIS	Historic Architectural/Archaeological Geographic Information System
HCA	high consequence area
HCAADT	heavy commercial vehicle portion of annual average daily traffic
HCVF	high conservation value forest
HDD	horizontal directional drilling
HHFT	high-hazard flammable train
hp	horsepower
HVTL	high-voltage transmission line
I&M	Illinois and Michigan

Acronym	Definition
IAC	Indian Affairs Commission
IAS	Inventory of Archaeological Sites
IBA	Important Bird Area
IBI	Index of Biotic Integrity
ICP	Integrated Contingency Plan
IHPA	Illinois Historic Preservation Agency
ILCS	Illinois Compiled Statutes
Ill. AC	Illinois Administrative Code
IMP	Integrity Management Plan
IMPLAN	Impact Model for Planning
Iowa AC	Iowa Administrative Code
Iowa DNR	Iowa Department of Natural Resources
IPaC	Information for Planning and Conservation
kg/m^3	kilogram per cubic meter
kV	kilovolt
L_{10}	the dBA that may be exceeded 10 percent of the time within 1 hour
L_{50}	the dBA that may be exceeded 50 percent of the time within 1 hour
LBS	Lakes of Biological Significance
LCM	lost circulation material
L_{dn}	day-night sound level
Leq_{24}	24-hour equivalent sound level
LGUs	local units of government
LLBO	Leech Lake Bank of Ojibwe
MAAQS	Minnesota Ambient Air Quality Standards
MBS	Minnesota Biological Survey
MBS Site	Minnesota Biological Survey Site of Biodiversity Significance

Acronym	Definition
MBTA	Migratory Bird Treaty Act
MDH	Minnesota Department of Health
MEPA	Minnesota Environmental Policy Act
MERLA	Minnesota Environmental Response and Liability Act
mg/L	milligrams per liter
mgd	million gallons per day
MGS	Minnesota Geological Survey
MHS	Minnesota Historical Society
MIAC	Minnesota Indian Affairs Council
Minn. R.	Minnesota Administrative Rules
Minnesota BWSR	Minnesota Board of Water and Soil Resources
Minnesota DA	Minnesota Department of Agriculture
Minnesota DNR	Minnesota Department of Natural Resources
Minnesota DPS	Minnesota Department of Public Safety
Minnesota PCA	Minnesota Pollution Control Agency
MLRA	major land resource area
MLV	mainline valve
mm	millimeter
MMcf/d	million cubic feet per day
mm^2/s	square millimeters per second
MNDOT	Minnesota Department of Transportation
MnOPS	Minnesota Office of Pipeline Safety
MP	milepost
MPL	Minnesota Pipe Line Company
MWh	Megawatt hours

Acronym	Definition
NAAQS	National Ambient Air Quality Standards
NACE	National Association of Corrosion Engineers
NATHPO	National Association of Tribal Historic Preservation Officers
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDAC	North Dakota Administrative Code
NDCC	North Dakota Century Code
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NETL	National Energy Technology Laboratory
NFIP	National Flood Insurance Program
NHIS	Natural Heritage Information System
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NLF	Northern Lakes and Forests
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
North Dakota DH	North Dakota Department of Health
North Dakota PR	North Dakota Parks and Recreation Department
NPC	Native plant community
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRDA	Natural Resource Damage Assessment
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory

Acronym	Definition
NRS	National Response System
NSPS	New Source Performance Standards
NTSB	National Transportation Safety Board
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
OAH	Office of Administrative Hearings
OFCVO	Office of Freight and Commercial Vehicle Operations
OPA 90	Oil Pollution Act of 1990
ORV	Outstanding Resource Value
ORVW	Outstanding Resource Value Waters
OSA	Office of the State Archaeologist
OSLTF	Oil Spill Liability Trust Fund
PAD-US	Protected Areas Database of the United States
PAH	polycyclic aromatic hydrocarbons
PHMSA	Pipeline and Hazardous Materials Safety Administration
PIG	pipeline inspection gauge
PM	particulate matter
PM-10	suspended particulate matter less than or equal to 10 microns in diameter
PM-2.5	suspended particulate matter less than or equal to 2.5 microns in diameter
PPE	personal protective equipment
PPV	peak particle velocity
PREP	National Preparedness for Response Exercise Program
PSD	Prevention of Significant Deterioration
psig	pounds per square inch gauge

Acronym	Definition
PW	Public Waters
PWS	Public Water Supply
RA-03AM	Route Alternative RA-03AM
RA-06	Route Alternative RA-06
RA-07	Route Alternative RA-07
RA-08	Route Alternative RA-08
RFAs	reasonably foreseeable actions
ROI	region of interest
RPM	Reasonable and Prudent Measure
RRT	Regional Response Team
RSA	route segment alternative
SA-04	System Alternative SA-04
SCADA	Supervisory Control and Data Acquisition
SCC	social cost of carbon
SDS	State Disposal System
SFHA	special flood hazard area
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Officer
SHSND	State Historical Society of North Dakota
SMPE	South Mist Pipeline Extension
SMS	Scenic Management System
SNA	Scientific and Natural Area
SO_2	sulfur dioxide
SPCC	Spill Prevention, Containment, and Control
SRHP	State Register of Historic Places
SSURGO	Soil Survey Geographic Database

Acronym	Definition
Superior Terminal	Enbridge Superior Station and Terminal Facility
STB	Surface Transportation Board
SWPPP	Stormwater Pollution Prevention Plan
TASC	Technical Assistance Services for Communities
TCP	Traditional Cultural Property
THPO	Tribal Historic Preservation Officer
TMDL	total maximum daily load
TSP	Total suspended particulates
TSS	total suspended solids
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VdB	vibration velocity decibels
VOC	volatile organic compound
WAN	Wildlife Action Network
WCA	Wetland Conservation Act
WCSB	Western Canadian Sedimentary Basin
WHAF	Watershed Health Assessment Framework
WHS	Wisconsin Historical Society
WIMN	What’s in My Neighborhood
WMA	Wildlife Management Area
WPA	Wellhead Protection Area

Acronym	Definition
WRAPS	Watershed Restoration and Protection Strategy
yard	material/pipe storage yard

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Executive Summary

THE PROJECT

What is the Line 3 Project?

Enbridge Energy, Limited Partnership (Enbridge, or Applicant) has submitted applications to the Minnesota Public Utilities Commission (Commission) to construct a new 340-mile, 36-inch-diameter pipeline in northern Minnesota to replace the aging 282-mile, 34-inch Line 3 oil pipeline (Line 3 Project, or Project). Line 3 is part of Enbridge's extensive Mainline system. Enbridge is proposing to abandon the existing Line 3 pipeline in place. (Figure ES-1 shows the existing Mainline system and Enbridge's proposed route for the new Line 3.)

Enbridge's Mainline system currently ships an estimated 2.4 million barrels of crude oil across northern Minnesota each day. The Minnesota portion runs from the Minnesota/North Dakota border to a terminal in Clearbrook, Minnesota, and then on to the Minnesota/Wisconsin border near Superior, Wisconsin. At the Clearbrook terminal, Enbridge transfers approximately 400,000 barrels per day (bpd) to the Minnesota Pipe Line Company, which supplies the oil to the two petroleum refineries in the Twin Cities. Nearly all of the heavy crude oil refineries in the Upper Midwest receive a portion of their oil, either directly or indirectly, from the Enbridge Mainline system.

The existing Line 3 pipeline has operated for approximately 50 years. It requires extensive maintenance and is currently restricted to a capacity of 390,000 barrels of crude oil per day. Enbridge's proposed new 36-inch-diameter pipeline would be capable of carrying up to 760,000 barrels of Canadian heavy crude oil per day, which was the original design capacity of the existing Line 3.

As proposed by Enbridge, the new Line 3 pipeline would generally parallel the existing Line 3 from the North Dakota-Minnesota border (in Kittson County) to the Clearbrook terminal in Clearwater County.

Between Clearbrook and the Minnesota/Wisconsin border, however, the proposed route moves outside the existing Mainline corridor. From Clearbrook, the proposed route first runs parallel to the Minnesota Pipe Line Company pipeline system to approximately Park Rapids, where it turns east. Enbridge estimates that between Park Rapids and the Minnesota/Wisconsin border, the proposed route is collocated with other utility or road rights-of-way for approximately 110 miles. The majority of the section between Clearbrook and the Minnesota/Wisconsin border runs parallel to existing rights-of-way, including high-voltage transmission lines and roads, before again joining the existing Mainline corridor to the Minnesota/Wisconsin border.

As shown in Figure ES-1, the existing six-pipeline Mainline crosses the Leech Lake Indian Reservation and the Fond du Lac Indian Reservation. Enbridge's proposed route for the new Line 3 avoids crossing the Leech Lake and Fond du Lac Reservations, but does cross a disputed section of the White Earth Indian Reservation, as well as ceded territory; tribal members use and value both the reservations and ceded lands for gathering (e.g., for wild rice), hunting, and fishing.

Chapter 2 provides a detailed description of the proposed Line 3 Project, construction methods, and the measures Enbridge proposes to avoid or reduce potential environmental effects.

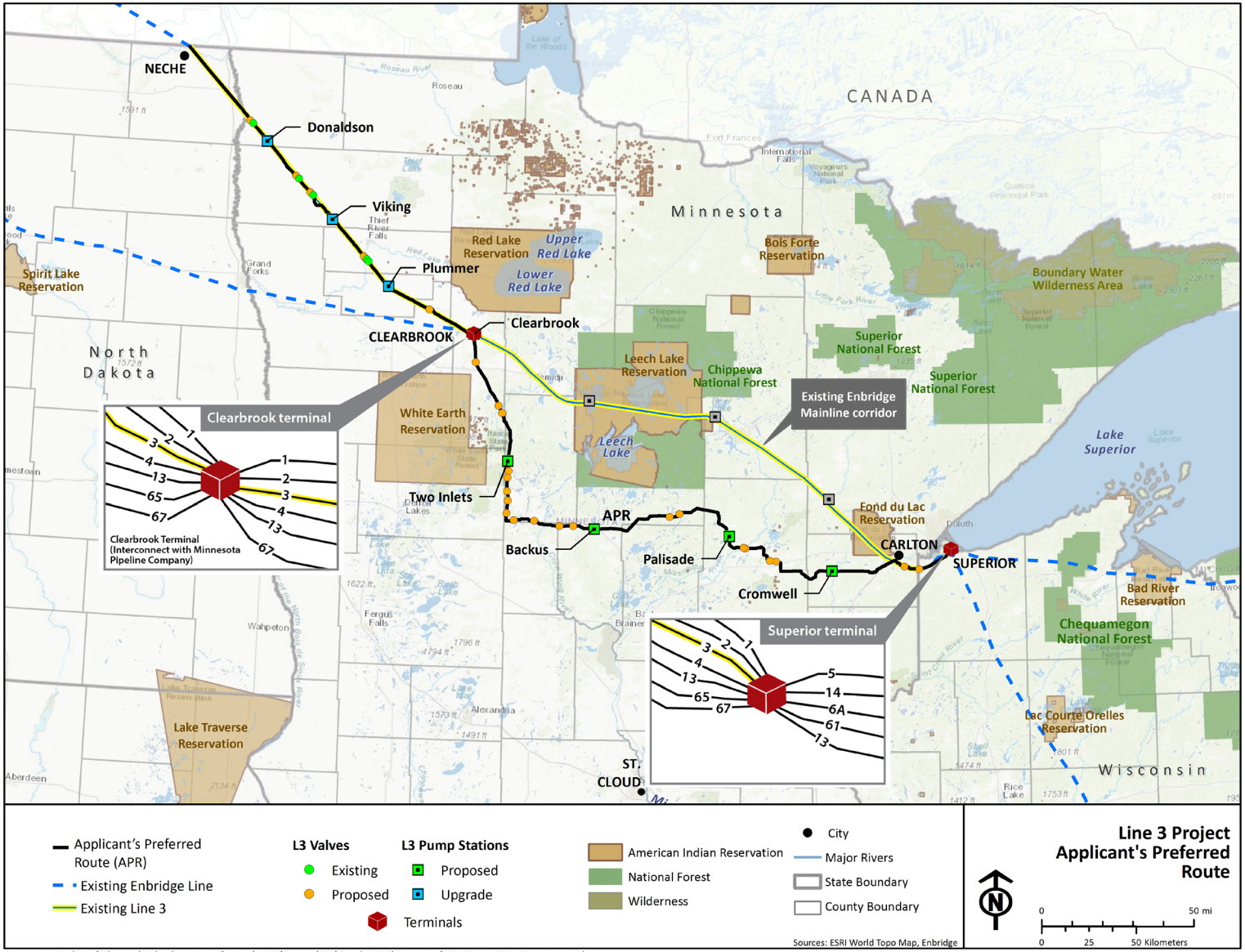

Figure ES-1. Overview of the Applicant's Preferred Route for the Line 3 Project

THE ENVIRONMENTAL IMPACT STATEMENT

What is the purpose of this Environmental Impact Statement?

The Minnesota Environmental Policy Act requires that "where there is potential for significant environmental effects resulting from a major governmental action, the action shall be preceded by a detailed environmental impact statement." In this case, the "governmental action" includes two separate but related decisions by the Commission:

Whether to issue a Certificate of Need (CN); and

Whether to issue a route permit for the Project, and if so, with what conditions.

In addition, Enbridge needs numerous other state and federal approvals before it can build the Project.

Therefore, the purpose of and need for this Environmental Impact Statement (EIS) is to help inform the Commission's decisions by evaluating the potential human and environmental effects of permitting the proposed Project, considering reasonable alternatives, and exploring methods for reducing adverse effects. In addition to the Commission, other permitting agencies, the public, and Enbridge can use the information in the EIS.

What decision-makers will use this EIS?

The Commission will use the EIS to help it decide whether to issue a CN and route permit. Other tribal, state and local agencies with permitting authority over the Project will also use the EIS.

In addition, the Line 3 Project will require permits from federal agencies, most notably the U.S. Army Corps of Engineers. Federal agencies must consider potential environmental impacts under the National Environmental Policy Act (NEPA). The federal agencies required to make decisions about the proposed Project may also use this EIS to inform their decisions or to help prepare their own environmental review documents. Chapter 3 describes the Commission's process and summarizes the other federal, tribal, state, and local permits and approvals.

Who prepared the EIS?

The Commission must complete environmental review of the Project before deciding whether to issue the CN or the route permit. The Commission has ordered an EIS for the CN and route permit applications, to be prepared by the Minnesota Department of Commerce, Energy Environmental Review and Analysis (DOC-EERA) in consultation with the Commission's Executive Secretary, and with assistance from the Minnesota Department of Natural Resources (Minnesota DNR) and Minnesota Pollution Control Agency.

What is a Certificate of Need, and how will "need" be determined?

The first approval Enbridge must obtain is a CN. As its name indicates, the CN is a decision by the Commission about whether a proposed project is in the State's interest.

The Commission must consider each of the criteria in Minnesota Statutes § 216B.243 and Minnesota Administrative Rules Part 7853.0130 in determining need. Under the regulatory criteria, the Commission first considers the underlying economic need for the proposed pipeline. This analysis, conducted by

parties in a contested case hearing, will aid the Commission in making this evaluation. Then, if the Applicant establishes the underlying need, the environmental and socioeconomic analysis in the EIS will help the Commission weigh the advantages and disadvantages of alternative ways of meeting the need and decide whether to issue a CN for the proposed Project.

For the CN decision, the Commission has three options: (1) issue the CN for the Project as proposed; (2) deny the CN; or (3) issue a CN contingent on modifications.[1]

What alternatives were considered in the EIS for the Certificate of Need decision?

Minnesota's regulations require that the EIS evaluate the environmental consequences of the No Action Alternative. In this case, a Commission decision to deny the CN is the No Action Alternative.

In analyzing the No Action Alternative, this EIS considers the human and environmental impacts associated with denying the CN, including a variety of CN Alternatives that correspond to each of the decision criteria. Table ES-1 provides an overview of the alternatives evaluated in the EIS for the CN decision and illustrates how the alternatives evaluated in the EIS align with the four major need-related criteria in the regulations.

As indicated in Table ES-1, the denial of the CN for failing to meet the criteria required under MN Rules 7853.0130 could result in continuing operation of the existing Line 3 at its current capacity (no change in the status quo). If underlying demand is present, denial of the CN could lead to other outcomes; for example, if the Commission denies the requested CN, the Applicant (or entities other than the Applicant) could reasonably be expected to meet shipper demand for the oil through other means, such as a different pipeline system, or by train or truck.

The CN section of the EIS, therefore, evaluates the impact of approving the CN and the following potential outcomes of denying the CN:

1. Continued use of existing Line 3 at its existing capacity.
2. Use of other pipelines.
3. System alternative SA-04 (a conceptual new pipeline that would deliver oil directly to Joliet, Illinois, bypassing Clearbrook and Superior, Wisconsin).
4. Use of rail as an alternative mode of transport.
5. Use of trucks as an alternative mode of transport.
6. Continued use of existing Line 3 supplemented by rail.
7. Continued use of existing Line 3 supplemented by truck.

[1] Minn. R. 7853.0800.

Table ES-1. Certificate of Need Alternatives and Criteria

Commission's Decision	Would denial adversely affect future adequacy, reliability, or efficiency of energy supply?	If yes, is there a more reasonable and prudent alternative, such as different endpoints or a different transport method?	If no, are the consequences to society of granting the CN more favorable than denial? Does the project comply with other laws?	Certificate of Need Alternatives Evaluated for Environmental Impacts	
	Minnesota Administrative Rules Part 7853.0130 A	Minnesota Administrative Rules Part 7853.0130 B	Minnesota Administrative Rules Part 7853.0130 C, D		
Certificate of Need Not Granted (CN Alternatives)	No Keep using existing Line 3	—	—	**CN Alternative 1** Continued use of existing Line 3	Line 3 operates at existing capacity, no supplemental oil transportation.
	Yes	Yes Use a different pipeline system	—	**CN Alternative 2** Other pipelines	Other pipelines transport up to 760,000 barrels per day (bpd)
				CN Alternative 3 System alternative SA-04	SA-04 transports up to 760,000 bpd
		Yes Use a different oil transportation mode		**CN Alternative 4** Transportation by rail	Trains transport up to 760,000 bpd
				CN Alternative 5 Transportation by truck	Trucks transport up to 760,000 bpd
	Yes	No	No The consequences to society of granting the CN are not more favorable than denying it	**CN Alternative 6** Existing Line 3 supplemented by rail	Line 3 operates at existing capacity; trains used to transport up to 370,000 additional bpd to market
				CN Alternative 7 Existing Line 3 supplemented by truck	Line 3 operates at existing capacity; trucks used to transport up to 370,000 additional bpd to market
Certificate of Need Granted	Yes	No	Yes	Applicant's proposed Project	CN granted for the proposed Project or for a modified project (e.g., a new lower-capacity pipeline)

The purpose of the CN process is to determine whether the particular project being proposed is needed. There is no legal authority in a CN proceeding of a separate proposed project (at the state or with the Public Utilities Commission) to evaluate the ongoing need of an existing project. Once constructed, the safety and operation of an existing pipeline is regulated by the United States Department of Transportation, Pipeline and Hazardous Materials Safety Administration. In this particular case, Enbridge has entered into a consent decree with the United States Environmental Protection Agency that allows for the continued operation of the existing Line 3 if a replacement for the line is not approved. In other words, if the proposed Line 3 project is not approved by the PUC, the continued operation of the existing Line 3 will be regulated by the Federal government, not the State of Minnesota. Accordingly, shutting down and removing existing pipelines in the mainline corridor is not included in the No Action Alternative.

Figure ES-2 shows the location of the existing Line 3, likely routes for the rail and truck alternatives, and an alternative pipeline system (system alternative SA-04).

What is a route permit and how will the route be determined?

If a CN is issued, the Commission then must decide whether to issue a pipeline route permit. The route permit is the Commission's approval to build the pipeline within a specific alignment and route width between two end points. Enbridge has identified its preferred 750-foot-wide route width and has identified a preferred alignment within this area (the Applicant's preferred route) (see the Applicant's preferred route in Figure ES-1).

The Commission cannot issue a route permit unless it first issues a CN. Enbridge has asked for approval of a route up to 750 feet, within which a maximum 120-foot-wide construction work area is requested, and a 50-foot-wide permanent right-of-way would remain after construction is complete. The permanent right-of-way allows Enbridge to monitor the pipeline and to conduct maintenance activities as required.

During the EIS scoping process, state agencies and citizens proposed alternative routes for the pipeline between Clearbrook and Carlton. The Commission approved four alternative routes to evaluate in this EIS. Chapter 4 describes these route alternatives (RAs). If the Commission issues a CN, it will compare the routes and determine which route to approve based on regulatory routing criteria. These criteria include the effects on human settlements, environmental resources, cultural resources, economics and cost, the amount of co-location with other infrastructure, and compliance with permitting requirements (Minn. R. 7853.1900, Subp. 3.)

Following a formal administrative contested case hearing on both the CN and route permit decisions, the Commission can approve Enbridge's proposed route or one of the alternatives if the Commission determines that an alternative route is in the best interest of the State. The Commission's route permit would confer the right of eminent domain on Enbridge should Enbridge need it to acquire the easements to build the Project. Chapter 3 describes the regulatory process. Chapter 4 describes the alternatives evaluated for the CN decision and the route permit decision.

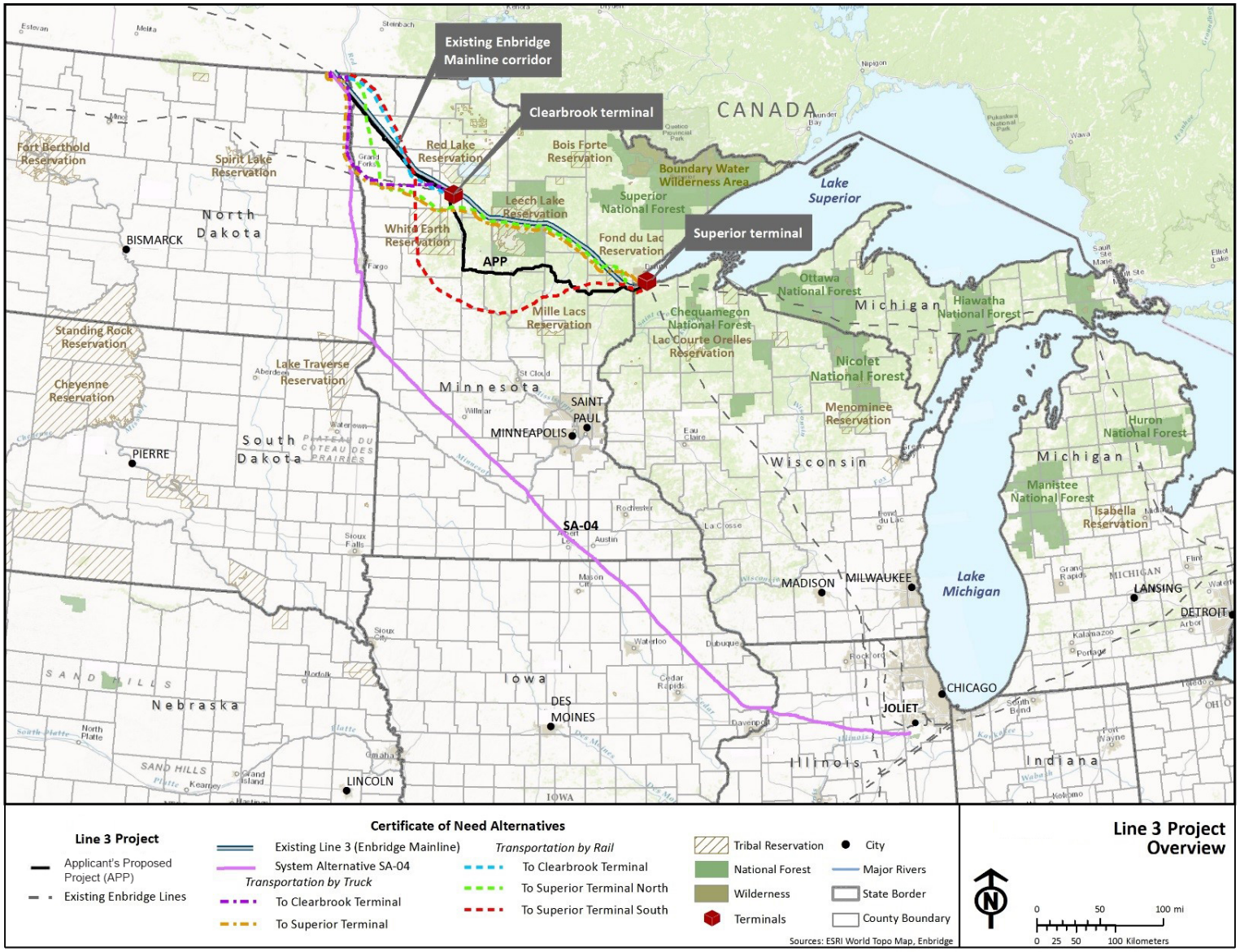

Figure ES-2. Certificate of Need Alternatives

How do the tribal and federal approvals affect the route decision?

Any routing option within the existing Mainline corridor (and some other routes) east of Clearbrook would require Enbridge to obtain permanent right-of-way across a large area of federal and state public lands and two American Indian reservations. Enbridge would need to acquire its easements in these locations through amicable agreements with tribal or federal landowners, because it cannot use eminent domain to acquire a pipeline right-of-way across these lands.

Enbridge has constructed pipelines through these areas in the past, going back to 1949 when it installed the first line from Canada to Superior, Wisconsin. Since then, Enbridge has completed several projects within the Enbridge Mainline right-of-way in Minnesota, which crosses the Chippewa National Forest, state public lands, and the Leech Lake and Fond du Lac Reservations. In its permit applications for Line 3, however, Enbridge maintains that the ability to obtain limited-term permits and easements is too uncertain.

During the EIS scoping process, however, some commenters requested that the option of installing the new pipeline within the existing Mainline corridor be evaluated in the EIS. These commenters seek to avoid opening a new oil pipeline corridor across northern Minnesota, which would be required for part of Enbridge's proposed route.

What route alternatives are the Commission considering?

The Commission approved the RAs included for evaluation in the EIS for the route permit. They include RA-03AM, the most southerly route; RA-06, the most northerly route; and RA-07 and RA-08, which generally follow the existing Enbridge pipeline corridor from Clearbrook to Carlton. RA-07 represents the option of installing the new Line 3 in the same trench as the existing Line 3. Figure ES-3 shows the RAs.

Are there other shorter route variations under consideration?

Yes. State agencies and the public proposed changes to Enbridge's preferred route during the EIS scoping process in order to avoid impacts or the threat of impacts on specific resources or other conflicts. Figure ES-3 shows the general locations of the route segment alternatives (RSAs). Most are relatively short; two, however, are more than 50 miles long.

Chapter 7 compares 24 individual RSAs to the segments of the Applicant's preferred route they would replace. Chapter 7 also analyzes a stand-alone segment: RSA-53. RSA-53 connects to RSA-21, making it possible for RA-06, RA-07, and RA-08 to avoid the Fond du Lac Reservation. Chapter 7 provides a discussion of the important variations between RSA-53 and the segment of the Applicant's preferred route it would replace.

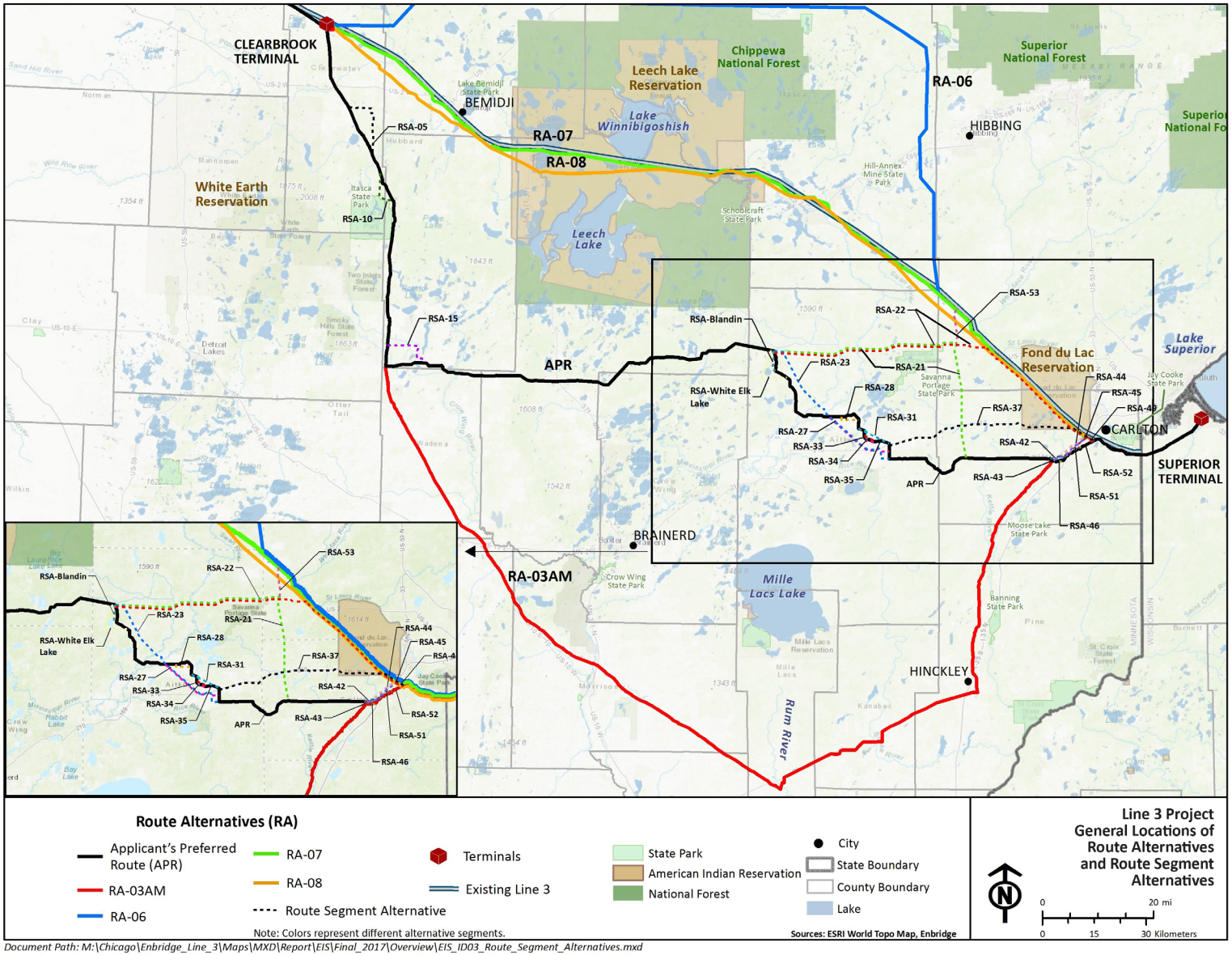

Figure ES-3. General Locations of Route Alternatives and Route Segment Alternatives

AGENCY DECISIONS, CONSULTATIONS, AND PUBLIC INVOLVEMENT

What was the role of federal agencies, tribal governments, and state and local governments in preparing the EIS; and how will they be involved in the final decision?

In addition to the Commission's CN and route permit, a number of other permits and approvals from different federal, tribal, state, and local jurisdictions will be required for the Project. A list of the possible "downstream" permits and approvals that might be required, depending on the specific route approved, is included in Chapter 3. At the federal level, for example, a U.S. Army Corps of Engineers permit must be obtained for certain water crossings. A special-use permit must be obtained from the U.S. Forest Service if the approved route crosses U.S. Forest Service land. State and federal agencies have participated in monthly conference calls for over a year, but these agencies have not been directly involved in preparing the EIS.

Enbridge would need tribal approval for the route to cross reservations. If the approved route were to cross tribal trust lands or lands under the jurisdiction of the Bureau of Indian Affairs, right-of-way easements would be required from these entities.

Department of Commerce staff and management have met with northern Minnesota tribal staff and have conducted formal government-to-government tribal consultations. Chapter 9 summarizes these efforts. Several tribes provided input on Chapter 9 (Tribal Resources) and on Chapter 11 (Environmental Justice).

How is the public involved in preparing the EIS, and how will they be involved in the final decision?

The EIS process and the Commission's decision-making process for the CN and route permit include four separate opportunities for public input and review. Chapter 3 includes a summary of the EIS scoping process. Other opportunities for public participation include:

- **Public Review and Comments on Draft EIS** – Release of the Draft EIS for public review and comment started an 8-week period during which the public, agencies, and American Indian tribes had an opportunity to comment on the Draft EIS. This period included 3 weeks of public information meetings. Based on the comments, appropriate changes or additions to the Draft EIS have been made as part of the process of preparing this Final EIS. A response to each substantive comment received during the public comment period is included in this Final EIS.
- **Public Review and Comments on Final EIS –** Upon release of this Final EIS, the public, agencies, and American Indian tribes will have another opportunity to comment on whether the Final EIS has adequately complied with the requirements of the Minnesota Environmental Policy Act. An Administrative Law Judge will consider these comments and make a recommendation to the Commission on the adequacy of the EIS.
- **Public Comments at Commission Public Hearing** – As part of its deliberation on the CN and route permit applications, the Commission will have a contested case hearing to receive input from the public.

What are the differences between the Draft EIS and the Final EIS?

The Draft EIS has been modified to respond to agency, American Indian tribe, and public (e.g., individuals and organizations) comments received during the comment period for the Draft EIS and to incorporate additional analysis to assist the Commission in evaluating the proposed Project. Key changes include the following:

- Additional discussion of socioeconomic impacts associated with the proposed Project (Chapters 5 and 6);
- Additional review of distances between existing Line 3 and adjacent pipelines (Chapter 8);
- Additional discussion of potential impacts on tribal resources (Chapter 9);
- Additional analysis of suitability of modeling of accidental oil release (Chapter 10);
- Additional discussion of potential impacts associated with accidental oil release and affected resources (Chapter 10);
- Additional discussion of the risk of explosion and fire associated with crude oil transport (Chapter 10);
- Addition of a discussion of existing conditions and potential impacts on environmental justice communities for the CN Alternatives (Chapter 11);
- Additional discussion of impacts on low-income environmental justice communities (Chapter 11);
- Additional reasonably foreseeable actions considered within the cumulative potential effects analysis (Chapter 12);
- Minor corrections to provide consistency between chapters and ensure references and web links are properly listed (throughout EIS); and
- Appendices have been added listing all agency, American Indian tribes, and public comments received during the comment period and providing responses to substantive comments.

The chapter notation provided herein denotes the primary location of the additions/revisions. Where appropriate, corresponding changes and/or references to the changes have been included throughout the EIS.

MAJOR ISSUES FOR THE CERTIFICATE OF NEED DECISION

The CN section of the EIS compares the environmental impacts of the Applicant's proposed Project to those of other alternatives, including:

- The Applicant's proposed pipeline to Superior, Wisconsin;
- Continued use of existing Line 3;
- Transport by train;
- Transport by truck; and

- System alternative SA-04, a conceptual pipeline to Illinois that bypasses Clearbrook and Superior.

The CN analysis in the EIS provides environmental information to aid the Commission in evaluating alternatives to the Applicant's proposed Project. Several key issues emerged:

- What are the advantages and disadvantages of continuing to use existing Line 3?
- How are the risks of accidental oil release different for pipelines, trucks, and rail?
- What are the impacts of the CN Alternatives on high-quality water resources?
- Will the proposed Project damage forests and wildlife habitat in northern Minnesota more than other alternatives?
- Will shipping the oil by rail or truck affect movement of other commodities?
- What are the greenhouse gas (GHG) and climate change implications?

What are the advantages and disadvantages of continuing to use existing Line 3?

The May 2017 revised Consent Decree entered between Enbridge and the U.S. Department of Justice on behalf of the U.S. Environmental Protection Agency and the U.S. Coast Guard (81 Federal Register 62536) requires Enbridge to seek all approvals necessary for the replacement of Line 3 and to replace Line 3 as expeditiously as practicable, pending approvals. The agreement provides a framework to allow ongoing operation of the existing Line 3,[2] which would require heightened integrity work and progressive decreases in operating pressure. The advantages and disadvantages of continuing to use existing Line 3 are evaluated in Chapter 5 of the EIS.

The primary benefits of continuing to use existing Line 3 instead of constructing the Applicant's proposed Project are that continuing to use existing Line 3 avoids:

- Impacts and risks of opening up a new oil pipeline corridor, and
- Impacts associated with construction of a new pipeline.

A significant portion of the Applicant's proposed Project would be located outside the existing Mainline corridor, and a portion of the route would require a new right-of-way, causing habitat fragmentation and expanding the total acreage of land and resources exposed to the risk of a potential accidental release from a pipeline. Continued use of existing Line 3 avoids these impacts. Continued use of existing Line 3 also avoids the construction impacts associated with clearing a 120-foot-wide right-of-way and trenching hundreds of miles across Minnesota.

Continuing to use the existing Line 3 has drawbacks, however, including:

- Ongoing direct impacts on tribal communities, as it passes through both the Leech Lake and Fond du Lac Reservations, and

[2] United States of America v. Enbridge Energy, Limited Partnership, Draft Revised Following Public Comment available at: https://www.epa.gov/enbridge-spill-michigan/revised-enbridge-consent-decree.

- Integrity issues that have arisen as the pipeline has aged and its coating has deteriorated, resulting in frequent maintenance work that causes disturbance to landowners.

Existing Line 3 goes through both the Leech Lake and Fond du Lac Reservations. The existing Mainline was constructed decades ago. As a result, it was not subject to state or federal environmental review or state procedures for CN and route permitting; it did not consider environmental justice issues. Tribal members who submitted comments during this EIS process and provided input for the Draft EIS reported that all of the proposed routes, including either keeping the current Line 3 in place or abandoning it, would add to the negative mental, spiritual, and physical health impacts already disproportionately suffered by American Indian populations.[3]

In addition, Line 3 is old and has integrity problems. Built in 1962 and 1963, Line 3 has corroded and cracked, necessitating more than 950 excavations in the last 16 years. Line 3 uses a coating popular at the time, which tends to dis-bond from the pipe. Line 3 has had 10 times as many anomalies per mile as any other pipeline in the Mainline corridor. The pipe was also flash-welded, which makes it more susceptible to defects. Line 3 thus requires an extensive amount of extra maintenance, and the intensity of the maintenance program to maintain pipeline safety would continue to increase. Since 1990, Line 3 has experienced 15 failures that released more than 50 barrels of oil during each incident, with seven of these failures occurring in Minnesota. Enbridge's use of pressure restrictions, intensive monitoring, and an extensive dig and repair program are so far preventing further releases. The program has required substantial investment, with no feasible technology or operational changes that can arrest or reverse the external corrosion on Line 3 or remove the defects that were inherent in the way the pipe was manufactured. Maintenance and repair activities and disturbance from successive integrity digs would continue to increase over time.

How are the risks of accidental oil release different for pipelines, trucks, and rail?

The risks posed by an accidental release are a function of a number of factors, including:

- The likelihood of an accidental release incident;
- The size and trajectory of the accidental release incident if one occurs; and
- The types and distribution of resources exposed along a pipeline, rail, or truck route.

3 See Pember. 2016. Intergenerational Trauma: Understanding Natives' Inherited Pain. https://www.tribaldatabase.org/wp-content/uploads/2017/01/ICMN-All-About-Generations-Trauma.pdf. Accessed July 14, 2017. Historical trauma describes multigenerational trauma experienced by American Indians, because of continuous subjection to trauma, poverty, dislocation, and war, as cumulative and collective.

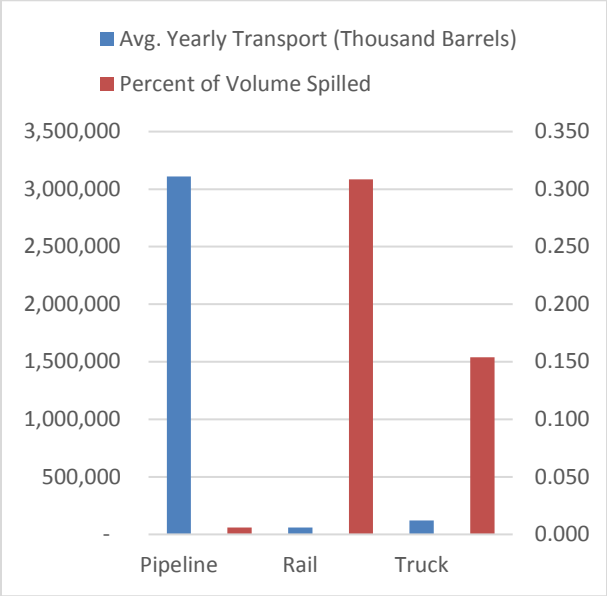

Figure ES-4. Annual Average Volume of Oil Transported and Percent Spilled

Trucks and trains are more likely than pipelines to have small to medium accidents and spills. This is because the number of transits required to transport crude oil is large, which increases the risk of human error. Tanker trucks also use major roadways and therefore present a greater risk of injuring or killing personnel or members of the public. Pipelines are less likely to have spills, but the amount of a pipeline's individual spill is likely to be greater. Figure ES-4 shows the average annual volume of crude oil transported and percent of transported crude oil spilled for different transportation modes.[4]

Even though the risk of an event occurring is higher for trains and trucks, the size of the release, if an incident occurs, is typically much smaller because the volume of a tanker truck or train car is smaller. The average size of crude oil from a truck incident is 16 barrels (687 gallons); from a train incident, 40 barrels (1,688 gallons); and from a pipeline incident, 462 barrels (19,412) gallons. However, when total volume of releases is compared to the volume of crude oil transported, rail and truck transport release a significantly higher percentage of the volume transported, 0.309 percent and 0.154 percent respectively. Comparatively, pipeline transport releases an average of 0.006 percent of the volume of crude oil transported.

Length is a key component in calculating the probability of pipeline failure because a longer pipeline has a greater area that could be exposed to the primary pipeline threats, such as third-party damages, construction defects, manufacturing defects, corrosion, and equipment (e.g., valve) failure. In general, longer pipelines pose a greater total risk of incident.

The CN Alternatives cross a wide range of habitats and conditions, including a variety of land uses, human uses, and ecosystems. Each alternative, therefore, differs in terms of the types and distribution of resources exposed. Table ES-2 illustrates the resources within specific distances of each CN Alternative.

[4] Average number of crude oil (49 CFR 171.15, 171.16 [Form F 5800.1]) transport incidents based on Pipeline and Hazardous Materials Safety Administration data. Average number of rail incidents per year based on data spanning the period 2007–2017. Average number of truck incidents per year based on data spanning the period 2007–2017. Average number of pipeline incidents per year based on data spanning the period 2010–2017. Average volume of yearly transport based on Energy Information Administration U.S. Refinery Receipts of Crude Oil by Method of Transportation data spanning the period 2010–2016.

Table ES-2. Summary of Potentially Exposed Resources of Concern from an Unanticipated Release of Crude Oil along the Applicant's Proposed Project and Certificate of Need Alternatives (acres)

Resources of Concern	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
HCA populated areas	10,959.8	25,697.9	25,128.7	41,579.2	44,431.8	67,277.1	70,129.6
HCA unusually sensitive ecological areas	12,318.0	27,527.8	20,378.4	27,578.6	37,272.0	55,106.4	64,799.8
HCA drinking water sources	2,443.9	4,521.9	24,468.7	14,787.2	27,941.9	19,309.1	32,463.8
Drinking water AOI	319.7	1,599.9	15,486.1	3,838.0	9,796.9	5,428.9	11,396.8
Cultural resources AOI	48.0	44,137.6	11,606.4	55,356.8	40,236.6	99,493.9	84,374.0
Biological AOI	102,426.2	99,970.3	369.4	96,325.3	87,205.8	195,007.8	187,166.2
Commodity production AOI	38,188.6	63,408.8	191.6	56,363.8	69,083.4	118,726.3	137,522.1
Recreation/tourism AOI	3,704.1	1,872.3	1,791.9	11,325.5	2,394.5	13,197.9	4,266.8
TOTAL	**170,408.3**	**268,736.2**	**99,421.2**	**307.154.4**	**318,362.9**	**573,547.4**	**592.119.1**

Notes: Acreages are the sum of acres within the 2,500-foot-wide and 10-mile-long downstream ROI for each metric, with the exception of Drinking Water AOI, which reflects drinking water supply management areas and Wellhead Protection Areas within a 1-mile ROI, and Hydrogeologic Sensitivity within a 0.5-mile ROI.

AOI = areas of interest (see Section 10.4.1 for descriptions of AOIs); HCA = high consequence area (see Section 10.4.1 for descriptions of HCAs); ROI = region of interest

Alternatives with a higher number of resources within the areas identified in Table ES-2 have a greater level of exposure and potential adverse effects following a release. This comparison of resources at risk assesses acres of sensitive resources within a 5,000-foot-wide (2,500 feet on each side of the centerline of the pipeline or train or truck route) corridor for releases on land. For waterbody exposure, acres of sensitive resources were calculated along a 10-mile-long, 1,000-foot-wide (500 feet on each side of the centerline of the waterbody crossed) corridor downstream of a release. Table ES-2 shows the magnitude of exposure to resources of concern along a color gradient (green to red), with red indicating the most exposure and green representing the least.

The risk of accidental release for the CN Alternatives is addressed in Chapter 10 of the EIS.

What are the impacts of the CN Alternatives on high-quality water resources?

Surface Water

The Applicant's proposed Project (and to some extent transport by trucks and rail) would have construction impacts and introduce new risk of spills in northern Minnesota where the watersheds are in general very healthy and water quality is very good. System alternative SA-04 avoids northern Minnesota, instead routing through North Dakota and southern Minnesota. Impacts of the CN Alternatives on water resources are evaluated in Section 5.2.1 of the EIS.

There is no one way to measure the general region-wide or state-wide differences in surface water resource quality across Minnesota. The northcentral and northeastern portions of Minnesota, however, contain many water resources that are generally the highest quality water resources in the state.

Figure ES-5 provides a comparison of the high-quality water resources at risk for each alternative, including:

- **Trout streams:** Because their watersheds are generally unpolluted, and because of their location, soils, and geologic setting within the state, these streams often represent high-quality cold, oxygenated water necessary for trout survival.
- **Wild rice:** Minnesota has more acres of natural wild rice (*Zizania palustris*) than any other state in the country. Wild rice has been historically documented in 45 of Minnesota's 87 counties and in all corners of the state. Anecdotal information suggests an even broader distribution prior to

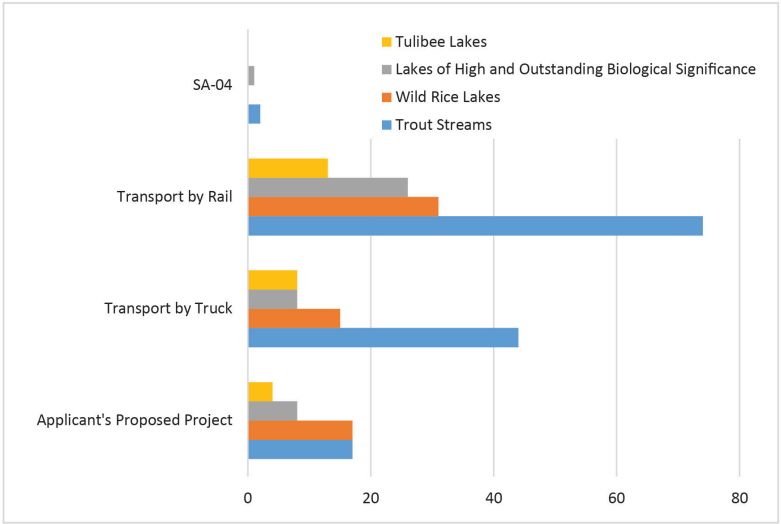

Figure ES-5. High-Quality Surface Waters in Minnesota within ROI of Certificate of Need Alternatives

European settlement. Wild rice is a sacred plant for American Indian tribes and is an important social and cultural component for rural Minnesota communities.

- **Lakes of Biological Significance:** Lakes of Biological Significance are identified and classified by Minnesota DNR subject matter experts on objective criteria for four community types (aquatic plants, fish, amphibians, and birds). Unique plant or animal presence is the primary measure of a lake's biological significance.
- **Tullibee (cisco) lakes:** Minnesota has about 650 tullibee lakes, more than any other state in the lower 48. Many of these waters are prized by anglers because tullibee provides a high-energy feast for walleye, northern pike, muskellunge, and lake trout. Changes in land use and climate are causing many lakes to lose tullibee. Keeping forested land intact can help maintain water quality in lakes with tullibee and other coldwater species.

Groundwater

Rail and truck alternatives pose the highest total potential impact on groundwater resources because they cross the largest acreage of:

- **High water table vulnerability areas:** These are areas where groundwater is especially susceptible to contamination because the physical and biochemical characteristics of the geology tend to allow the transport of pollutants into the groundwater more easily.
- **Wellhead protection areas:** These are areas surrounding public water supplies through which contaminants are likely to move, both toward and into the well or well field.

System alternative SA-04 is the only CN Alternative that crosses vulnerable karst topography. A karst aquifer is a type of bedrock aquifer that usually consists of basic rock types that are prone to chemical weathering and dissolution from the slight acidity of precipitation and groundwater. This can result in the formation of fractures, joints, sinkholes, cavities, caves, and void spaces that allow the movement of large volumes of surface water into and through the aquifer. These characteristics also allow contamination to spread rapidly within the aquifer. Karst aquifers are susceptible to collapse of the aquifer matrix, which can be triggered by construction activities on the land surface. This can lead to the formation of sinkholes in unconsolidated sediments that overlie the bedrock.

Will the proposed Project damage forests and wildlife habitat in northern Minnesota more than other alternatives?

The Applicant's proposed Project would require that an approximately 120-foot-wide construction work area be cleared in upland areas and an approximately 95-foot-wide construction work area be cleared in wetlands. Forested uplands and woody wetlands within the permanent right-of-way through northern Minnesota would be permanently converted, thereby permanently affecting more forested land cover and wildlife habitat than any other CN Alternative. A total of 38 miles of the Applicant's proposed Project, for example, would cross and permanently fragment 21 large-block forested and woody wetland habitats (i.e., habitats larger than 100 acres). This would permanently impact approximately 2,202 acres of forest and woody wetlands. System alternative SA-04 avoids habitat fragmentation and permanent forest conversion in wooded northern Minnesota, but it still would permanently impact approximately 161 acres of forest and woody wetlands.

System alternative SA-04 passes instead through North Dakota and western and southern Minnesota where primary impacts would be on agricultural land, which can be restored to agricultural use after construction is complete. In addition, because SA-04 would be co-located with existing pipelines for much of its length, construction of the route would fragment less habitat than the Applicant's proposed Project. The effects of CN Alternatives on vegetation are evaluated in Section 5.2.3 of the EIS, and effects on habitat and fish and wildlife are addressed in Section 5.2.4.

System alternative SA-04, however, would affect the most acres because it travels the greatest distance. It would mostly affect agricultural lands, with 100 percent of the route adjacent to existing corridors. The Applicant's proposed Project would affect about half as much land as SA-04, but would primarily run through both forest and agricultural lands. Rail and truck alternatives would affect less land than either SA-04 or the Applicant's proposed Project because those alternatives would require only limited new infrastructure in Gretna, Clearbrook, and Superior. Continuing to use the existing Line 3 would not result in any construction effects on vegetation, but it would have ongoing effects because continuing to operate it would require hundreds of integrity digs each year to keep it safe, as well as periodic mowing and brush clearing to ensure safe operation and to allow for visual inspection of the permanent right-of-way.

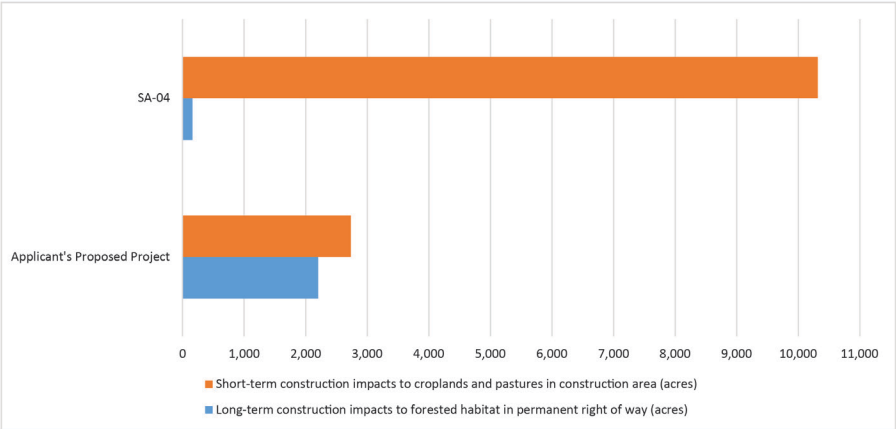

Figure ES-6. Relative Impacts on Agricultural Lands and Forest Habitat

Constructing and operating the Applicant's proposed Project would have the greatest long-term, major effects and would primarily affect forests. SA-04 would have the greatest short-term and minor impacts and would primarily affect croplands (Figure ES-6). Construction of the Applicant's proposed Project would affect the largest area of sensitive vegetation categories. In terms of operation, the rail alternative would affect the most sensitive vegetation categories, including crossing 59 miles of railroad prairies and just over a mile of rare plant communities.

System alternative SA-04 would pose an ongoing risk of accidental release in areas with high-quality agricultural soils, while the Applicant's proposed Project would place more high-quality forested and aquatic habitats at risk.

Potential impacts on individual threatened or endangered species or other unique natural resources vary widely across all CN Alternatives. The truck and rail alternatives would potentially affect the fewest individual species, while the Applicant's proposed Project could potentially affect the most acres of disturbance of Minnesota Biological Survey Sites of Biodiversity Significance and Minnesota Wildlife Action Network Species in Greatest Conservation Need habitat. The effects of CN Alternatives on these unique resources are addressed in Section 5.2.5.

Will shipping the oil by rail or truck affect the movement of other commodities and pose safety risks?

Train and truck alternatives could cause congestion that would affect the transport of other commodities. Transporting crude oil from near Gretna to Clearbrook and Superior would involve loading and dispatching 10 unit trains (each train consisting of 110 rail cars) per day onto the rail network in Minnesota. These unit trains would be dedicated to a single service and would return empty from Clearbrook and Superior. Since the overall round trip to Clearbrook or Superior would take more than a single day, some multiple of the 10 trains per day loaded and dispatched would be required to provide the required service.

It is likely that the increase in traffic on the rail system would cause congestion that would affect commodity producers during certain periods. For example, the record 2008/2009 grain harvest in western Canada caused increased demand for rail cars, and shippers experienced delays in their cargos being delivered to ports. The U.S. Surface Transportation Board has also indicated a concern about rail congestion and its potential to affect agricultural production, and it has initiated an oversight proceeding.

Rail and truck alternatives also pose safety risks, including increased risk of incidents involving fatalities. Compared to pipelines, both truck and rail transportation alternatives have a higher likelihood of accidents and spills due to the number of transits required to transport the crude oil and the associated increase in risk due to human error. Tanker trucks use major roadways and present a greater risk of injury and fatalities to personnel and members of the public. Trains can interfere with emergency vehicles and personnel where at-grade crossings bisect small towns along the route. The impact of alternative transport modes on commodity production and population centers are addressed in Section 5.3.

What are the implications of greenhouse gases and climate change?

All GHG emissions contribute to cumulative climate change, so all of the alternatives would play a role in global climate change. Recognizing this fact, but acknowledging that current limitations in the science and earth systems modeling make it impossible to directly link the emissions from a single action to an incremental change in climate, the evaluation in the EIS focuses on three specific issues:

- Direct, indirect, and lifecycle GHG emissions from the proposed Project and alternatives;
- The impacts of climate change on the Project; and
- The cumulative impacts on resources as a result of both the Project and climate change.

GHG emissions of the CN Alternatives are addressed in Section 5.2.7, and climate change impacts are addressed in the cumulative effects discussion in Section 12.5.

Direct and Indirect Emissions

GHG operations emissions from the CN Alternatives differ, with pipelines causing the fewest direct GHG emissions because the pump stations are powered by electricity, which results instead in indirect GHG emissions from power generation (Figure ES-7). Pipeline operations result in small amounts of direct fugitive emissions of GHGs from storage tanks, pumps, piping components, and the like. In addition, pipeline construction requires vegetation clearing, which would result in the release of stored carbon from trees and other vegetation. Maintaining the pipeline right-of-way would prevent woody vegetation from re-growing, and the conversion of forested land to a non-forested land use would result in a permanent loss of carbon sequestration.

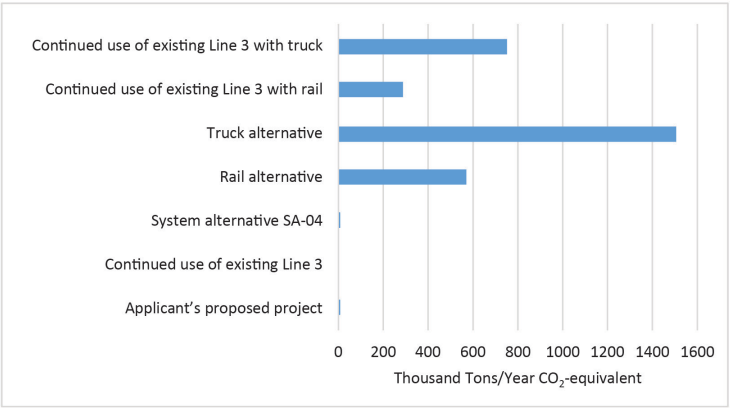

Figure ES-7. Direct GHG Operations Emissions from Certificate of Need Alternatives

Other transport modes result in direct emissions of GHGs as trains and trucks combust fossil fuels. Table ES-3 compares estimated direct and indirect GHG emissions and loss of carbon sequestration for the Applicant's proposed Project and all of the CN Alternatives. The table also presents the estimated cost to society arising from man-made emissions of CO_2 and other GHGs using the federal social cost of carbon to monetize impacts. The direct emissions in Table ES-3 show that the truck direct emissions contribute more to GHG than rail, and that both trucks and trains contribute more to GHG than the pipelines. They also show that the pipeline GHG emissions are dependent on the route distance. The current GHG emissions from continued use of Line 3 are ongoing and considered part of the existing environment. Air emissions associated with integrity digs for continued use of existing Line 3 have not been estimated. The Figure ES-7 and Table ES-3 show that there will be no increased GHG emissions due to continued use of Line 3.

Table ES-3. Summary of Greenhouse Gas Operations Emissions and Costs for Certificate of Need Alternatives

Certificate of Need Alternative	Direct GHG Emissions (tons per year)	Indirect GHG Emissions (tons per year)	30-Year SCC for Direct and Indirect GHG Emissions	Loss of Carbon Sequestration (tons per year)
Applicant's proposed Project	375.9	452,496.6	$673,365,150	1,262.3
Continued use of existing Line 3	--	--	--	--
System alternative SA-04	850.3	946,670.5	$1,408,845,737	74.3
Rail alternative	568,472.8	--	$845,248,443	--
Truck alternative	1,506,291.3	--	$2,239,688,011	--
Continued use of existing Line 3 with rail	284,236.4	--	$422,624,221	--
Continued use of existing Line 3 with truck	753,145.6	--	$1,119,833,958	--

GHG = greenhouse gas, SCC = social cost of carbon

Lifecycle Greenhouse Gas Emissions

The proposed pipeline is part of a larger crude oil extraction, production, refining, and consumption system that is affected by changes in the availability and price of transportation to get crude oil from the point of extraction to the refineries that process the oil. An increase in the availability of options for transport via pipeline, for example, could lower the overall cost of transporting crude oil to market, thereby improving its market prospects. Similarly, increased upstream activity induced by the Project could ultimately result in increased end-use of refined products—gasoline, for example, becomes more abundant and cheaper as additional oil is extracted, and pipeline transport becomes cheaper.

Changes in these upstream and downstream activities are accounted for by evaluating lifecycle GHG emissions—emissions of GHGs associated with all the steps in the extraction, upgrading, transport, refining, and end-use of the oil. The lifecycle GHG emission estimates presented in Figure ES-8 bookend the range of possible impacts of the Project on upstream and downstream activity and associated GHG emissions, including:

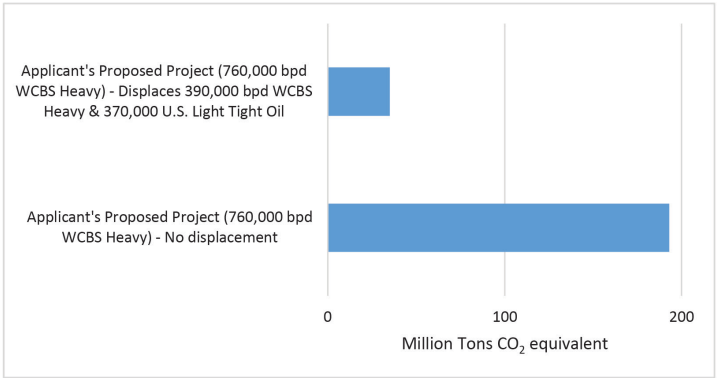

Figure ES-8. Lifecycle Greenhouse Gas Emissions from Certificate of Need Alternatives

- **Zero displacement:** Assuming that the Project creates worst-case throughput of 760,000 bpd of new production and consumption of Western Canadian Sedimentary Basin (WCSB) heavy crude, and no displacement of current 390,000 bpd of WCSB light crude occurs, causing GHG emissions from extraction, upgrading, transporting, refining, and consuming 760,000 barrels of WCSB crude oil each day.
- **Full displacement:** The Project does not create any new production or consumption of oil. However, a change in the emissions on the oil-production end could still occur if the heavy crude that the proposed Project would be capable of transporting replaces lighter crudes on the market. The process of extracting and upgrading heavy crudes requires much greater energy input (and GHG emissions) than extracting and upgrading light crudes, so the Project causes an incremental increase in extraction, upgrading, transport, and refining emissions over what would have occurred if demand was met instead with light crude oils.

Cumulative Impacts of the Project and Climate Change

Impacts of the Project and climate change could overlap for a number of resources, including aquatic species and other wildlife, threatened and endangered species, and tribal resources. For example:

- Increased water temperatures due to climate change could adversely affect aquatic species, and those effects could be exacerbated by the permanent loss of shading, nutrients, and habitat features for fish at some waterbody crossings, caused by removing vegetation along the permanent right-of-way. The use of pesticides and herbicides for maintenance during pipeline operation could also stress aquatic species.
- The changing composition of vegetation could affect resident wildlife unable to adapt to changing conditions. This could be worsened by the permanent loss of trees and shrubs, habitat fragmentation, and changes in vegetation cover in large blocks of forest habitats within the pipeline right-of-way.
- Some of the lands and resources affected by the Project are important to preserving the traditional ways of life, including fishing, hunting, wild rice farming, maple sugar gathering, and the collection of plants for medicines, spiritual and ceremonial purposes, shelter, and other needs. Project impacts on tribal resources would be further exacerbated by climate changes that affect tribal communities. These impacts, for example, include decreases in water quality and quantity in the Great Lakes region, threats to human health and safety, economic losses, loss of culturally important species, medicinal plants, cultural sites, and traditional foods, such as wild rice.

The Midwest's agricultural lands, forests, Great Lakes, industrial activities, and cities are all vulnerable to climate variability and climate change. Climate change will tend to amplify the existing risks that the climate poses to people, ecosystems, and infrastructure. Additional details on Minnesota and Midwest climate change trends are discussed in Section 12.5. The climate change impacts in Section 12.5 are assessed generically; the EIS does not attempt to directly link the emissions from a single action to an incremental change in climate.

The Effects of Climate Change on the Project

The primary impacts of climate change on the Project include severe weather, freeze-thaw cycles, and flooding, all of which could damage Project facilities. Climate change could also intensify the effects of a

spill. It could affect how spilled oil might move once there is a spill and could also affect how spilled oil might interact with the environment. Higher ambient temperatures, for example, could increase the volatilization of air contaminants from an accidental release, or flooding could cause spilled oil to be transported further downstream. In addition, heavy rain events have the potential to adversely affect spill response, including containment and clean-up actions.

The Applicant-proposed measures to minimize GHG emissions are discussed in Section 5.2.7.

MAJOR ENVIRONMENTAL ISSUES FOR THE ROUTE PERMIT DECISION

The route permit section of the EIS compares the environmental impacts of different routing options, including:

- The Applicant's preferred route,
- RA-03AM,
- RA-06,
- RA-07, and
- RA-08.

If the Commission issues a CN for the Project, it must determine the best route. Therefore, the routing analysis in the EIS provides environmental information to aid the Commission in making that decision. In addition, the routing analysis in the EIS addresses the environmental impacts of abandonment versus removal of the existing Line 3, so that the Commission can make an informed decision about the fate of the existing Line 3 if it determines that a new pipeline is needed.

The following key issues emerged in the routing analysis:

- What are the advantages and disadvantages of removing the old pipeline from the corridor, abandoning it in place, or removing the old pipeline and installing a new one in the same trench?
- How do the risks of an accidental release differ among the route options?
- Does the risk of damage to high-quality water resources vary between routes?
- Are there differences between the level of information available for the Applicant's preferred route and other alternatives?
- Which alternative would result in the least habitat loss, habitat fragmentation, and loss of timber resources?
- How were environmental justice and tribal resource impacts evaluated?

What are the benefits or drawbacks of corridor sharing versus opening a new corridor?

Using existing pipeline corridors, or even transmission corridors or roadways, can avoid new impacts and new risk exposures. Along existing corridors, resources have already been affected. New impacts occur at the margin of these previously disturbed and permanently altered areas, thereby minimizing further habitat fragmentation or degradation of aesthetics. Also, where pipeline corridors are shared, spill risk is

incrementally increased as the addition of a new pipeline in an existing corridor adds to the overall probability of an incident, but does not change the type or distribution of resources exposed if an accidental release does occur.

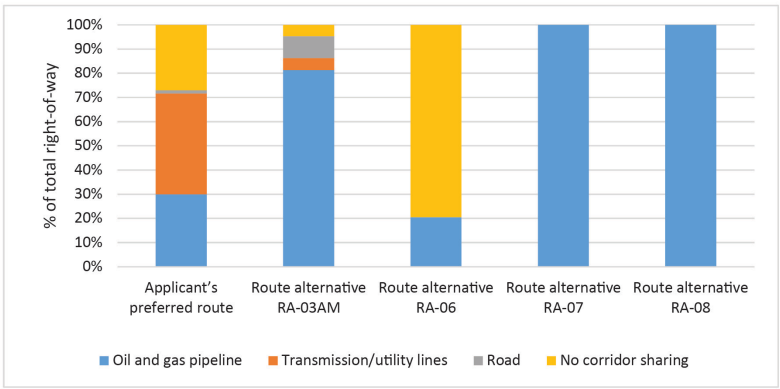

Figure ES-9. Route Alternatives Corridor Sharing

Between Clearbrook and Carlton, the Applicant's preferred route and most of the RAs would share or parallel existing rights-of-way for the majority of their lengths (Figure ES-9). RA-07 would parallel the Enbridge Mainline system right-of-way from the North Dakota border to the Wisconsin border and share the right-of way from Clearbrook to Carlton. RA-08 would share or parallel rights-of-way with existing pipelines for its entire length. The Applicant's preferred route would share or parallel existing rights-of-way along 73 percent of its length between Clearbrook and Carlton. RA-06 has the lowest proportion of its route co-located with existing rights-of-way between Clearbrook and Carlton (20 percent).

The Commission is required to consider corridor sharing in determining which route to select and permit (Minn. R. 7852.1900, Subp. 2 F). If a new pipeline corridor is permitted for this Project outside of the existing Enbridge Mainline, the new corridor creates an opportunity for future corridor sharing that could ultimately result in an accumulation of multiple pipelines within the corridor chosen for the Line 3 Project. This would be particularly the case with the Applicant's preferred route, RA03-AM, and RA-06.

The eventual addition of another pipeline within a new pipeline corridor like the existing Mainline would require widening of the right-of-way and would introduce additional spill risk in an already at-risk area. In general, the widening of the corridor would incrementally increase the effects on the resources described for each of the routes in Chapter 6 of this EIS. In the case of RA-06, for example, adding another pipeline in the corridor would result in additional clearing of forest in what is otherwise a densely forested, relatively undisturbed area with high-quality habitat and relatively pristine watersheds, but in relatively few populated areas.

In the case of RA-03AM or the Applicant's preferred route, adding another pipeline in the corridor would result in additional clearing in forested areas with slightly more disturbed habitat and affected watersheds, but in relatively more populated areas.

What are the advantages and disadvantages of removing the old pipeline from the corridor, abandoning it in place, or removing the old pipeline and installing a new one in the same trench?

As part of the Project, Enbridge proposes to abandon the existing Line 3 in place, permanently removing it from service. Enbridge would continue to maintain Line 3 once it is out of service. Federal safety regulations outline the process and requirements for abandoning oil pipelines. Chapter 8 of the EIS discusses Enbridge's plan for abandonment and ongoing responsibility, including monitoring and

maintenance, as well as its relationship (distance) to other pipelines within the Mainline corridor. Chapter 8 also discusses the potential for removal of the decommissioned Line 3 as an alternative to abandonment.

Some potentially significant effects are associated with abandoning the existing Line 3. These longer-term impacts would be caused by the continued presence of undiscovered legacy contamination that could exist around the existing pipeline, as well as the potential hazards associated with the aging of the abandoned pipe. These impacts include soil and water contamination, the ability of the pipeline to serve as a contaminant/water conduit, subsidence due to the failure over time of the pipeline, and loss of buoyancy control for the pipeline. Four of the five routes considered in this EIS (the Applicant's preferred route, RA-03AM, RA-06, and RA-08) could be coupled with abandonment or removal of the existing Line 3. As discussed in Chapter 4, RA-07 specifically contemplates removal of the existing Line 3 with the new pipeline placed in the existing trench.

Major issues considered in the assessment of abandoning the existing Line 3 include:

- Potential environmental benefits of not disturbing the active pipelines located on either side of existing Line 3;
- Potential environmental risks and impacts of existing contamination surrounding the pipe that may never be discovered and remediated if the line were abandoned in place; and
- Potential environmental risks and impacts associated with ongoing deterioration of the abandoned pipeline.

Major issues considered in the assessment of abandonment and removal of the existing Line 3 include:

- Potential risk that pipeline removal activities could damage an active pipeline located on either side of existing Line 3, causing an oil leak;
- Potential impacts associated with disturbances at waterbody and roadway crossings;
- Potential environmental benefits associated with discovering and remediating existing contamination surrounding the pipe, as it is being removed; and
- Avoidance of potential environmental risks and impacts associated with the ongoing deterioration of an abandoned pipeline.

Enbridge's assessment of the risks and benefits of removal contemplated the use of timber mats over operating pipelines to create a work and travel surface for equipment. These mats would help disperse the weight of the equipment and minimize potential impacts on these pipelines. Enbridge also indicates that sheet piling would likely be required to isolate specific segments of the existing Line 3, particularly in wet soils and wetlands. They further note that it might not be possible to use typical excavation equipment to excavate portions of Line 3, due to the weight of the equipment and the proximity to operating pipelines. Enbridge notes that it would likely use a hydraulic vacuum or hand dig to minimize potential impacts on existing pipelines.

Certain segments of the existing Line 3 could not be removed using existing technology, like timber mats or sheet piling, without significant risk of damaging operating pipelines. If the existing Line 3 were removed in these areas and operating pipelines were damaged, the damaged pipelines would need to be excavated and repaired, with considerable risk of further damage and leakage.

Perhaps the primary challenge in removing Line 3 is that it is located in the middle of the Mainline system, between other active oil pipelines. The distance between pipelines within this corridor varies, but they are generally from 10 to 15 feet apart. Enbridge has indicated that there is a significant risk that pipeline removal activities could damage an active pipeline and cause an accidental release. Damage could be caused by striking a pipeline with equipment or by the weight of the equipment as it works above operating pipelines. This damage would be immediately apparent if equipment struck a pipeline, or observable later if the pipeline was damaged and eventually leaked in the future.

As noted above, in addition to the question of abandonment versus removal, the EIS evaluates the alternative of removing the existing Line 3 and placing the new Line 3 pipeline in the same trench. This alternative, RA-07, is evaluated in Chapter 6. It would require a larger construction area than the Applicant's preferred route and the other RAs (approximately 205 feet wide instead of 120 feet wide). With most of the construction occurring within the existing Mainline corridor or immediately adjacent to it, however, new impacts associated with clearing woody vegetation and wooded habitat would be minimal. Additionally, releases that were not previously discovered would be located and remediated. RA-07 is compatible with existing land use in the area and avoids new long-term exposures to spill risk, noise, aesthetic disturbance, and maintenance-related disruption as it would be placed within an existing corridor.

While some benefit may be present to using an existing corridor, Enbridge has identified a number of challenges presented by RA-07, including (1) the difficulties of securing long-term land use approvals from the Leech Lake Band of Ojibwe and the Fond du Lac Band of Lake Superior Chippewa; and (2) logistic difficulties of construction.

The Minnesota Chippewa Tribe, the Minnesota Indian Affairs Council (MIAC), the National Congress of American Indians, the Leech Lake Band of Ojibwe, and the Red Lake Band of Chippewa Indians have passed formal resolutions in opposition to the proposed Project (see Appendix P). In addition, staff and tribal members of the Leech Lake Band of Ojibwe have indicated during the public comment period for the Draft EIS that they would not approve the placement of Line 3 on tribal lands or trust lands within the Leech Lake Indian Reservation. Staff and tribal members of the Leech Lake Band of Ojibwe have indicated that in this manner, RA-07, along with RA-08, would have the greatest impact on tribal resources, as it crosses two reservations and various ceded lands.

With the existing Line 3 located in the middle of the Mainline corridor with pipelines on either side of it, removal and replacement raises safety risks and construction challenges such as those from cave-ins and adjacent pipe movement due to the varying depths of cover.

How do the risks of an accidental release differ among the route options?

Modeling, statistics, and resource mapping can help predict the probability of an accidental oil release, how crude oil would behave in the environment, and what resources could be at risk should there be an oil spill. It is impossible, however, to predict the location or magnitude of the spill, how far the impacts would extend, or what resources would be affected because there are so many incident-specific factors involved. The weather, time of year, water levels, human error, and even the type of wildlife present at the time a spill occurs all affect its probability and outcome. While the EIS does not predict specific spill outcomes, it highlights:

- The general likelihood of a spill occurring, and

- The resources exposed.

Length is a key component in calculating the probability of pipeline failure because a longer pipeline has a greater area that could be exposed to the primary pipeline threats (third-party damages, construction defects, manufacturing defects, corrosion, and equipment [e.g., valve]) failure. In general, longer routes have a higher probability of an incident occurring than shorter routes.

Sensitive resources at risk were compared among the Applicant's preferred route and the RAs from Clearbrook to Carlton. As described in detail in Chapter 10, the federally defined high-consequence areas (HCAs) and state-specific areas of interest (AOIs) were used to quantify potential resources of concern.

Acres of sensitive resources were calculated within a 5,000-foot-wide (2,500 feet on each side of the centerline of the pipeline or train or truck route) corridor for releases on land. In addition, a 10-mile-long, 1,000-foot-wide (500 feet on each side of the centerline of the waterbody crossed) downstream corridor for releases to water were established as areas within which oil could be present after a release. Table ES-4 summarizes the potentially exposed resources of concern in the regions of interest (ROIs). A more detailed listing of each HCA and AOI category is provided in Table 10.7-11.

Overall, the potential acreage and number of HCA and AOI resources that could be exposed as a result of a crude oil release is greatest for RA-08 due to the combined acreages (for the 2,500-foot-wide and 10-mile-long ROIs) of resources within the ROIs. A spill in the ROIs of RA-07 would expose a slightly smaller number and acreage of HCAs and AOIs than for RA-08. The differences among the Applicant's preferred route, RA-03AM, and RA-06 are relatively small; but the total acreage and numbers of HCAs and AOIs potentially exposed is smaller than for RA-07 and RA-08.

Based on the results of these comparisons, it appears that RA-07 and RA-08 may be the least favorable routes in terms of potentially affected resources that might be impacted if a spill were to occur. The Applicant's proposed route, RA-03AM, and RA-06, in that order, would have fewer potentially affected resources.

The risk of an accidental release of crude oil for the RAs is addressed in Chapter 10.

How were environmental justice and tribal considerations evaluated?

Environmental justice refers to the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income. In general, environmental justice is intended to ensure that all people have the same opportunities to participate in decisions that may affect their environment or health.

Minority or low-income communities are often concentrated in small geographical areas within the larger geographically defined population. Minority communities and low-income communities may represent a very small percentage of the total population, but may be concentrated in specific census tracts within a county.

Table ES-4. Summary of Potentially Exposed Resources of Concern from an Unanticipated Release of Crude Oil from the Applicant's Preferred Route and Route Alternatives (acres)

Resources of Concern	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
HCA populated area	4,814.1	12,829.2	3,230.0	20,806.6	17,363.7
HCA unusually sensitive ecological area	10,978.1	7,752.3	12,674.4	26,854.4	27,566.9
HCA drinking water source	501.1	2,399.1	718.0	2,942.0	2,998.3
Drinking water AOI	83,833.7	153,971.9	16,196.0	64,785.5	63,726.0
Cultural resources AOI	0.0	13.5	11,425.6	44,046.8	45,766.0
Biological AOI	94,053.5	65,287.5	58,822.3	88,764.0	92,613.0
Commodity production AOI	50,199.6	5,648.2	88,363.0	72,008.1	80,853.5
Recreation/tourism AOI	3,704.1	4,100.9	1,838.6	1,443.0	1,924.3
TOTAL	**248,084.2**	**252,002.6**	**193.267.9**	**321.650.4**	**332,811.7**

Notes: Acreages are the sum of acres within the 2,500-foot-wide and 10-mile-long downstream ROI for each metric, with the exception of Drinking Water AOI, which reflects drinking water supply management areas and Wellhead Protection Areas within a 1-mile ROI, and Hydrogeologic Sensitivity within a 0.5-mile ROI.

AOI = areas of interest (see Section 10.4.1 for descriptions of AOIs); HCA = high consequence area (see Section 10.4.1 for descriptions of HCAs); ROI = region of interest

Chapter 9 summarizes American Indian community values, uses, and attitudes toward their natural and cultural resources. It also briefly summarizes the challenges faced by tribal communities in general. American Indian communities and individuals have unique health issues associated with historical and current trauma and structural racism. Data from the Minnesota Department of Health indicates that American Indians in Minnesota have greater health disparities and poorer health outcomes compared to other racial or ethnic groups in Minnesota. Tribal impacts are magnified because (1) impacts would be associated with abandonment or removal of the existing Line 3; and (2) additional impacts would be associated with replacement of Line 3 in a new location.

Chapter 11 contains an analysis of the potential for disproportionate and adverse impacts on American Indian and low-income populations in the Project area. Each of the five route options would cross one or more census tracts with a meaningfully higher minority population than that of the surrounding county. The Applicant's preferred route bisects, and RA-03AM crosses, the edge of such a census tract in Clearwater County, where the minority population of 25.3 percent exceeds the county level by more than 10 percentage points. This census tract includes a portion of the White Earth Reservation, and the minority population in the tract is overwhelmingly American Indian (23.2 percent). RA-06, RA-07, and RA-08 also cross reservation land.

It is not possible, however, to determine which route option would cause the least amount of impacts from an environmental justice perspective when each option affects tribal resources, tribal identity, and tribal health. Based on the information on tribal resources and uses given in Chapter 9, any of the routes selected between North Dakota and Superior, Wisconsin, therefore, would have a disproportionate and adverse effect on tribal resources and tribal members, even if the route itself does not cross near residences.

Chapter 11 includes a preliminary list of potential mitigation measures for addressing any disproportionate adverse impacts on environmental justice communities.

Does the risk of damage to high-quality water resources vary between routes?

Surface Water

While the CN Alternatives differ significantly in their potential effects on water quality, the differences among the RAs are not as pronounced because all of the route options pass through the northcentral and northeastern portions of Minnesota, which contain many of the highest quality water resources in the state. Effects of the route options on water resources are evaluated in Section 6.3.1 of the EIS. Figure ES-10 provides a comparison of the high-quality water resources at risk for each route option, including:

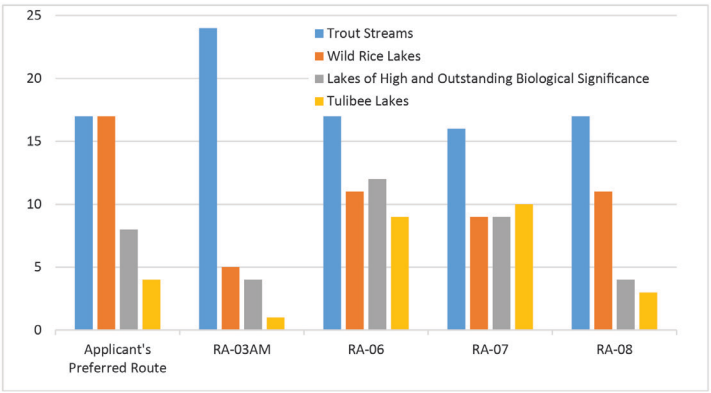

Figure ES-10. High-Quality Surface Waters within ROI of Route Options

- Trout streams
- Wild rice lakes
- Lakes of Biological Significance

- Tullibee (cisco) lakes

Groundwater

In general, RA-06 would least affect groundwater resources, including highly vulnerable aquifers and groundwater resources with high contamination sensitivity, high pollution sensitivity, and high to very high bedrock sensitivity. RA-03AM is the only route alternative that crosses vulnerable karst topography.

Are there differences between the level of information for the Applicant's preferred route and the route alternatives?

Yes. Enbridge has already optimized the Applicant's preferred route and completed preliminary engineering, as well as cultural and biological surveys. If the Commission issues a route permit for one of the RAs, a similar level of survey and design work would be required prior to downstream permitting.

On the one hand, more detailed information was available for the EIS on some impacts (such as the extent of threatened or endangered species to occur) for the Applicant's preferred route. This additional information can sometimes make the magnitude of the impacts from the Applicant's preferred route appear greater, simply because detailed information is not available for the other routes.

On the other hand, the predicted impacts of the RAs on some resources (e.g., displacement of homes or tree clearing) can appear to be greater than the impacts from the more optimized Applicant's preferred route, but these impacts could be reduced during optimization of the route if an alternative is chosen.

Which route option would result in the least habitat loss, habitat fragmentation, and loss of timber resources?

Habitat Loss

Vegetation management activities during pipeline operation would prevent trees and large shrubs from reestablishing within the permanent right-of-way. The greatest operational impact would be on 951 acres of previously forested and woody wetland areas (between Clearbrook and Carlton) within the permanent right-of-way for the Applicant's preferred route, and the least operational impact would be created by RA-07, where forest clearing would be minimal (478 acres) because the route uses the existing Mainline corridor, which is already devoid of trees (Figure ES-11).

The forested and scrub/shrub areas cleared from the construction work area and outside of the permanent right-of-way would be allowed to regenerate, but the process could take decades to

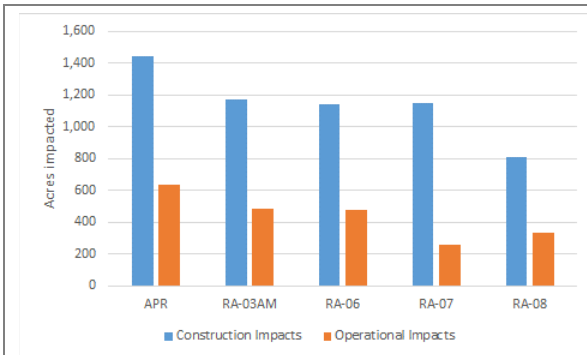

**The resolution of the NLCD landcover data does not provide accurate representation of land cover/land use to the scale of the Mainline corridor right-of-way. This limitation in the data creates some uncertainty about accuracy of the land cover types within the anticipated construction work area and permanent right-of-way for RA-07. The numbers shown should be considered a very conservative estimate of forest and forested wetlands impacts; the actual numbers are likely to be much lower.*

Figure ES-11. Disturbance and Loss of Forested Habitat from Construction and Operation of Route Options (Clearbrook to Carlton)

reach full recovery. The impacts on vegetation from each route option are addressed in Section 6.3.3.

Habitat Fragmentation

Habitat fragmentation is caused when contiguous habitats are divided into separate fragments. Large-block habitats (i.e., habitats larger than 100 acres) are susceptible to fragmentation—particularly large, mature-core or interior forested areas that serve as habitat for migratory birds, large mammals, and other wildlife. Construction of linear projects such as pipelines can cause habitat fragmentation, as well as changes in vegetation cover. Potential effects of fragmentation on wildlife habitat include a decrease in total habitat area and the amount of interior habitat, biodiversity (richness), and connectivity. Fragmentation could also increase the amount of edge habitat, increase the risk of the spread of invasive species, and isolate some habitat types.

The reduction in habitat connectivity can disrupt the behavior and movement of species, alter population dynamics, reduce the chance of recolonization in extirpated island habitats, and decrease genetic diversity. Forest-nesting birds are particularly vulnerable to the habitat fragmentation effects of linear construction projects. Habitat fragmentation can lead to increased predation, increased competition by generalist species, and changes in microclimate and vegetation that could result in extirpation and reduced reproductive success for area-sensitive species.

Habitat fragmentation would be greatest for the Applicant's preferred route. The Applicant's preferred route is co-located with other pipelines, utilities, or roads along most of its length (75 percent). Between Clearbrook and Carlton, however, nine segments are not co-located with other infrastructure. Within this span, 21 large-blocks would be crossed and fragmented by construction of the Applicant's preferred route. This would occur along approximately 38 miles of the Applicant's preferred route, or approximately 11 percent of the route in Minnesota and 17 percent of the route between Clearbrook and Carlton. These large habitat "patches" that would be crossed include primarily forested and woody wetland habitats. The largest patch crossed is approximately 8,900 acres over 7 miles, and the smallest patch crossed is approximately 130 acres over less than 1 mile.

Impacts on Fish and Wildlife Habitats

Impacts on fish and wildlife habitats would vary only slightly among the Applicant's preferred route and RAs. Fish and wildlife impacts of the route options are addressed in Section 6.2.4. The acreage of wildlife habitat affected by construction of the route options ranges from 2,286 acres (RA-08) to 3,832 acres (RA-07). All of the routes would cross aquatic and wildlife management areas. The Applicant's preferred route, RA-06, and RA-07 would permanently convert the greatest number of acres to maintained pipeline right-of-way. Route alternatives RA-06, RA-07, and RA-08 would result in greater permanent habitat removal than RA-03AM or the Applicant's preferred route. RA-03AM and RA-06 would have the greatest number of stream crossings.

Potential impacts on individual species and other unique natural resources are highly variable across all route options. RA-03AM has substantially less potential than the other route options to affect Sites of Biodiversity Significance and Minnesota Wildlife Action Network Species in Greatest Conservation Need. Using the effects on these sites as proxies for impacts on rare species would also indicate a smaller potential impact from RA-03AM.

Which route option would result in the least amount of impact to American Indian reservations?

The existing Line 3 crosses two American Indian reservations, including that of the Leech Lake Band of Ojibwe and the Fond du Lac Band of Lake Superior Chippewa. RA-07 and RA-08 also cross these reservations, while RA-06 only crosses the Fond du Lac Reservation. Comments received as part of the public comment period for the Draft EIS by the Leech Lake Band of Ojibwe show their concern for these two alternatives and for the potential abandonment of the existing Line 3. Their comments indicate that they feel these two alternatives would cause the greatest impact on the Leech Lake Reservation.

Some dispute is present over the boundaries of the White Earth Reservation. For this reason, the Applicant's preferred route and RA-03AM also may impact this reservation by crossing a portion in the northeast corner. Route segment alternative RSA-05 would allow for the route to bypass this portion of land.

NEXT STEPS

What happens next?

A number of future steps must be taken before the Commission can reach a final decision on Enbridge's CN and route permit applications. Table ES-5 identifies the milestones (previous and upcoming) and dates for the next steps.

Table ES-5. Key Milestones and Dates for the Line 3 Project

Milestone	Dates
Draft EIS public notice	May 15, 2017
Draft EIS information meetings	June 6, 2017 – June 22, 2017
End of Draft EIS 60-day comment period	July 10, 2017
DOC-EERA releases the Final EIS to the public, tribes, and agencies	August 2017
Adequacy Determination and Contested Case Process	Fall 2017 – Spring 2018
Minnesota Public Utilities Commission Decision on Certificate of Need and route permit applications	Anticipated Spring 2018

How can I stay up to date as the process continues?

Interested parties can obtain information and follow the Project in four ways:

- Website – DOC-EERA maintains an internet website accessible by the public at:

  http://mn.gov/commerce/energyfacilities/Docket.html?Id=34079

- Commission Docket – Persons interested in documents and information submitted to the Commission, including Enbridge's applications and related filings, can obtain them from the Commission's electronic docket library (eDockets) at:

  https://www.edockets.state.mn.us/EFiling/search.jsp.

After connecting to eDockets, search the Line 3 Project Need docket number 14(year) -916(number).

After connecting to eDockets, search the Line 3 Project Routing docket number 15(year) -137(number).

- Public Advisor – DOC-EERA has a public advisor that can help interested persons understand the process and advise them on how to effectively participate in the process. The public advisor's contact information is:

  Ray Kirsch, Public Advisor
  Department of Commerce, Energy Environmental Review and Analysis
  85 7th Place East
  St. Paul, Minnesota 55101-2198
  651-539-1841 or raymond.kirsch@state.mn.us

- Mailing List – DOC-EERA maintains a mailing list of all interested parties for the Line 3 Project. Notices of key steps in the process are sent to all parties on the mailing list. Contact the public advisor to have your name and email address added to the list.

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Chapter 1
Introduction

Enbridge Energy, Limited Partnership (Enbridge, or Applicant) has applied for a Certificate of Need (CN) and a route permit from the Minnesota Public Utilities Commission (Commission) to construct and operate a new 340-mile, 36-inch-diameter pipeline in northern Minnesota to abandon in place an aging 282-mile, 34-inch oil pipeline. The existing pipeline, called Line 3, is part of Enbridge's Mainline system. The existing Line 3 pipeline requires extensive maintenance and is currently restricted to a capacity of 390,000 barrels of crude oil per day. Enbridge's proposed new 36-inch-diameter pipeline would be capable of carrying up to 760,000 barrels of Canadian heavy crude oil per day, which was the original design capacity of the existing Line 3. Figure 1-1 shows the location of the proposed Line 3 Project, as well as the locations of other crude oil pipelines in northern Minnesota.

This Environmental Impact Statement (EIS) generally refers to the Enbridge proposal as the "Line 3 Project" or "the Project." Enbridge refers to their proposal as the "Line 3 Replacement Project" in their application.

Purpose Of and Need for This EIS Is To Inform both Regulators and Citizens

Minnesota's declared environmental policy is "to create and maintain conditions under which human beings and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of the state's people."[1]

The Minnesota Environmental Policy Act also requires that "Where there is potential for significant environmental effects resulting from a major governmental action, the action shall be preceded by a detailed environmental impact statement." In this case, the "governmental action" is two separate but related decisions by the Commission:

1. Whether to issue a CN.
2. Whether to issue a route permit for the project and, if so, with what conditions.

Enbridge needs numerous other state and federal approvals before they can build the project. (See Chapter 4.)

Therefore, the purpose of and need for this EIS is primarily to help inform the Commission's decisions by evaluating the potential human and environmental effects of permitting the proposed Line 3 Project, considering reasonable alternatives, and exploring methods for reducing adverse effects. Enbridge's proposed need for the Project is contained in their CN application and is summarized in Section 2.2 of the EIS.

[1] Minnesota Statutes § 116D.02.

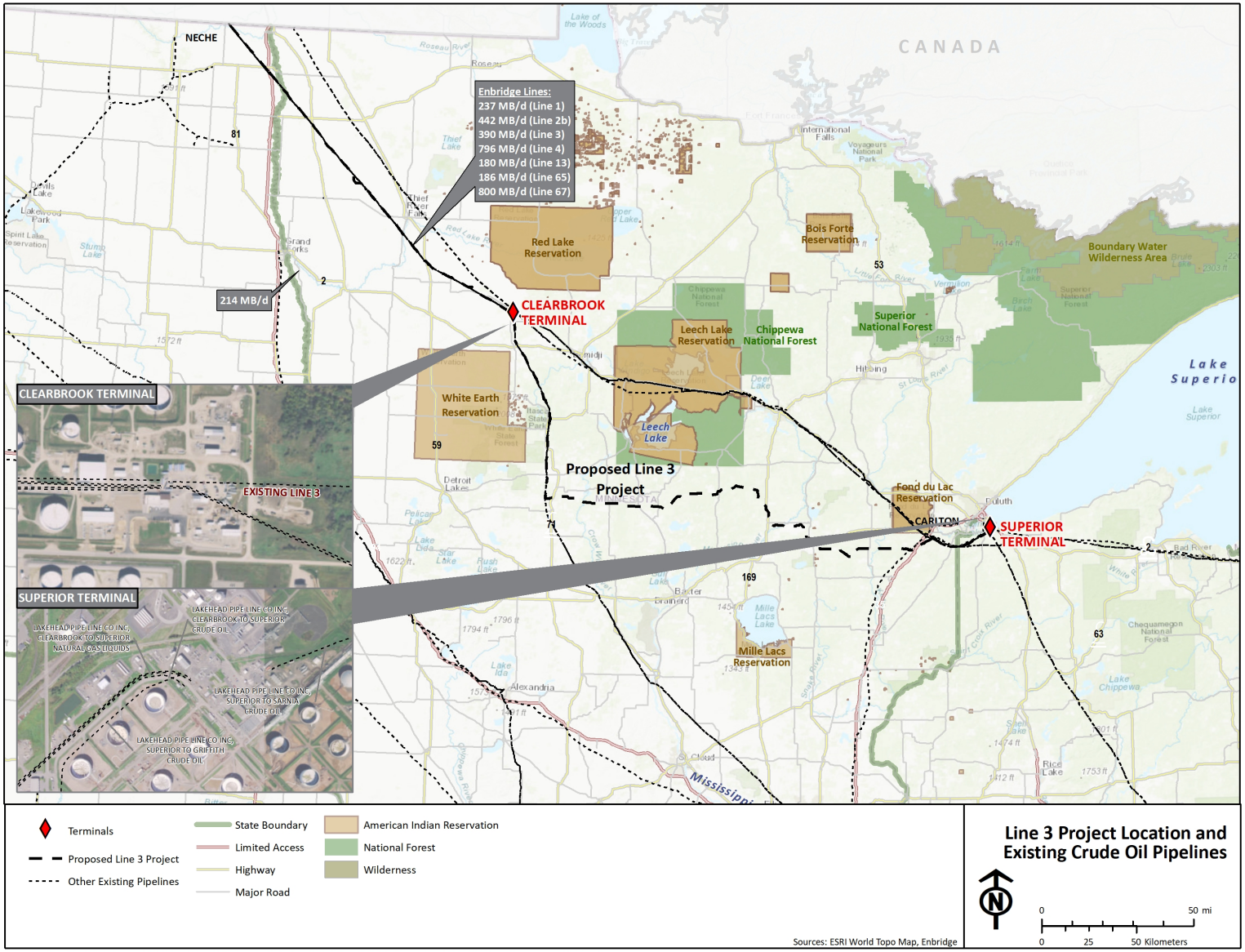

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Figure 1-1. Project Location and Existing Crude Oil Pipelines

The EIS is a factual document that is designed to inform public deliberations and government decision-making, but it does not make specific recommendations regarding either the CN or the route permit for the Project. The development and contents of this Final EIS reflect public comments received during the scoping phase of the Project and timely, substantive comments received following issuance of the Draft EIS.

The Minnesota Public Utilities Commission asked the Minnesota Department of Commerce, Energy Environmental Review and Analysis (DOC-EERA) staff to prepare this EIS in cooperation with the Minnesota Department of Natural Resources (Minnesota DNR) and the Minnesota Pollution Control Agency (Minnesota PCA) to facilitate the review of Enbridge's CN and route permit applications for the Project. Other agencies with permitting authority will also use information in this EIS.

EIS Focuses On Information That Is Directly Relevant To the CN and Route Decisions

Since the purpose of the EIS is to inform decision-making on Enbridge's CN and route permit applications for the Project, it focuses on providing information that is directly relevant to the two decisions in front of the Commission:

1. Whether the Commission should issue or deny the CN for Enbridge's Line 3 Project; and
2. If the Commission Issues a CN, what route should be approved, and with what conditions?

During the scoping process for this EIS and the public comment period following issuance of the Draft EIS, commenters raised a number of critical long-term energy-policy and tribal rights issues that do not easily fit within the framework of a project-specific EIS. Timely, substantive comments that directly relate to the environmental review required for this Project were considered during the preparation of this Final EIS. Some of these issues, however, are too broad to be resolved in this EIS, which is intended to facilitate decision-making on a single, specific pipeline proposal.

1.1 APPLICANT'S PROPOSAL AND REQUIRED APPROVALS

The Commission ordered this EIS to review Enbridge's April 24, 2015, applications for a CN and route permit for the Line 3 Project. As mentioned previously, in its CN application, Enbridge indicated that it proposes to replace the existing Line 3 pipeline for three main reasons. First, according to Enbridge, the Project would avoid the integrity risks associated with the existing Line 3 by replacing it with a new pipeline that uses new technology and materials (instead of continuing their ongoing dig and repair program). Second, Enbridge indicated that the new pipeline would improve their ability to fill all of the requests to ship Western Canadian crude oil on their system by allowing throughput of 760,000 barrels per day and improving the line's capacity to carry heavy crude oils. Third, Enbridge indicated that the new pipeline would reduce the amount of power used per barrel to ship crude oil through Line 3 and on the Enbridge Mainline system (Enbridge 2014).

A New 340-Mile Route Would Create a New Corridor Southeast of Clearbrook, Minnesota

The Applicant's preferred route for the Project involves constructing approximately 340 miles of a new 36-inch-diameter pipeline in Minnesota to replace the 282-mile existing 34-inch-diameter Line 3 pipeline. While most of the proposed route would be co-located along existing infrastructure, it would create a new Enbridge corridor southeast from Clearbrook to Carlton, Minnesota. Enbridge proposes to abandon the current Line 3 in place. The existing Line 3 pipeline originates in Canada and crosses the U.S.–Canada border near Neche, North Dakota. The line continues through North Dakota and

Minnesota, terminating at the Enbridge Superior Station and Terminal Facility (Superior terminal) near Superior, Wisconsin. As proposed by Enbridge, the new pipeline would generally parallel the existing Line 3 pipeline along the Enbridge Mainline system right-of-way from the North Dakota–Minnesota border in Kittson County to the Clearbrook terminal in Clearwater County. However, from Clearbrook to the terminal in Superior, Wisconsin, the proposed pipeline would diverge from the existing Line 3 corridor. Enbridge proposes to abandon (permanently deactivate) the existing Line 3 pipeline in place.

1.2 CONTEXT AND HISTORY

The Existing Pipeline Network in Minnesota Transports 2.4 Million Barrels of Oil per Day

Enbridge's existing Line 3 is part of an extensive network of 4,100 miles of pipeline that currently transports an estimated 2.4 million barrels of crude oil across northern Minnesota each day. Line 3 is one of six crude oil pipelines that form Enbridge's Mainline system through Minnesota, carrying crude oil from western Canada through a corridor across northwestern Minnesota, through Clearbrook, and east to Superior.

The Enbridge Mainline system, together with four Minnesota Pipe Line Company pipelines that carry crude oil south in a corridor from Clearbrook to the Twin Cities area, supplies approximately 400,000 barrels of oil per day to Minnesota's two petroleum refineries. These refineries use about 15 percent of the crude oil crossing into the state, with the bulk of the products refined from Canadian crude oil. Nearly all the heavy crude oil refineries in the Upper Midwest receive a portion of their crude oil, either directly or indirectly, from the Enbridge pipeline system that crosses Minnesota.

The Enbridge Mainline System Was Constructed between 1950 and 1969

The first component of the Enbridge Mainline system was established when the Interprovincial Pipe Line, Inc. (now Enbridge Pipelines, Inc.) crude oil pipeline was laid in 1950 from Edmonton, Canada, to Superior, Wisconsin. The Mainline continued to expand over the following decades, by adding pumping or compression capacity, laying additional pipe, or both (Bott 2004). Construction of Line 3 in this Mainline corridor began in 1962 as 34-inch parallel loops to Enbridge's Line 2 pipeline, to create additional Enbridge Mainline system capacity. Additional loops were constructed annually until a continuous 34-inch line, referred to as "Line 3," was completed and separated from Line 2 in 1969.

This EIS and the Commission's Permit Processes Represent an Opportunity to Consider Current Environmental and Socioeconomic Issues

The Interprovincial Pipe Line and various expansions and additions that established the Mainline corridor were authorized prior to the passage of the National Environmental Policy Act, the Minnesota Environmental Policy Act (MEPA), and Minnesota's CN and Pipeline Routing statutes.[2]

As a result, the Mainline corridor was not subject to state or federal environmental review, or the Commission's procedures for CN and route permitting. Certain permits and authorizations were required prior to the construction of these early pipelines. However, some environmental review considerations that today are understood to be essential to informed decision-making (e.g., environmental justice issues, threats to rare resources, and climate change impacts) were not factored into the original establishment of the Mainline.

[2] Minnesota Statutes § 116D.

Unlike the original construction of the existing Line 3, the Line 3 Project is subject to the Commission's CN and route permitting process and is subject to formal state environmental review processes. While efficiencies associated with following existing infrastructure rights-of-way tend to encourage continued use of an established corridor like the Mainline, the environmental review and permitting procedure for the Project presents an opportunity for a full evaluation of environmental and socioeconomic factors that did not necessarily enter into the original routing decisions for Enbridge's Mainline system.

1.3 ENVIRONMENTAL REVIEW

The Commission Must Understand and Consider Impacts of Their CN and Routing Decisions

MEPA requires decision-makers like the Commission to be informed about the potentially significant human and environmental consequences of an action and alternatives to that action before they make the relevant permitting decisions.[3] In this case, the Commission needs to understand and consider the impacts associated with both the CN decision and the routing decision.

The Commission has ordered DOC-EERA to prepare an EIS in accordance with Minnesota Administrative Rules (Minn. R.) Chapter 4410 to provide this information.[4] The EIS content and procedures therefore are being completed under Minnesota Administrative Rules Chapter 4410.

The Commission's two decisions, furthermore, are based on the criteria and parameters in Minn. R. Chapters 7853 and 7852 regarding need and routing determinations, respectively. Therefore, the EIS specifically considers impacts of the proposed action and alternatives that correspond with each decision point specified in these rules.

This EIS Evaluates Impacts and Alternatives for the CN Decision Using Applicable Criteria

The EIS evaluates impacts and alternatives for the CN determination, under Minn. R. Chapter 7853, which instructs the Commission to assess need via a multi-part decision, as follows:

A. The probable result of denial would adversely affect the future adequacy, reliability, or efficiency of energy supply to the Applicant, to the Applicant's customers, or to the people of Minnesota and neighboring states.[5]

B. A more reasonable and prudent alternative to the proposed facility has not been demonstrated by parties or persons other than the Applicant.[6]

C. The consequences to society of granting the CN are more favorable than the consequences of denying the certificate.[7]

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3 Minnesota Statutes § 116D.04, Subpart 2.

4 Commission Order Joining Need and Routing Dockets, February 1, 2016, eDockets Number 20162-117877-01.

5 Minnesota Administrative Rules Part 7853.0130 (A).

6 Minnesota Administrative Rules Part 7853.0130 (B).

7 Minnesota Administrative Rules Part 7853.0130 (C).

D. It has not been demonstrated that the design, construction, or operation of the proposed facility would fail to comply with the relevant policies, rules, or regulations of other federal, state, or local agencies.[8]

The EIS evaluates the impacts of granting a CN for the proposed action against denial of the CN by considering alternatives, including:

1. Continued use of the existing Line 3;
2. Use of alternative pipeline systems or modes of transport such as trucks and trains to support adequate, reliable, and efficient supply; and
3. Alternative methods of supplementing the existing Line 3 to support adequate, reliable, and efficient supply.

The EIS Also Evaluates Proposed and Alternative Routes, Contingent on CN Approval

A route permit for the Project cannot be approved without a CN. Even though the route decision is secondary, the Commission ordered this EIS to address both the CN and route permit decisions so that, if the CN is granted, the information needed to understand the impacts of the route decision is already developed and available in this EIS. For the routing decision, Minn. R. Chapter 7852 instructs the Commission to consider the characteristics, potential impacts, and methods to minimize or mitigate the potential impacts of all proposed routes to select a route that minimizes human and environmental impact. For the Commission to be fully informed about the human and environmental impacts of this decision, the EIS evaluates the impacts of the proposed action against alternative routes.

Through these analyses, the EIS compares alternatives to allow the Commission and citizens, other agencies, and governments to work from a common set of facts. The EIS does not advocate or state a preference for a specific outcome or alternative route.

As described in the *EIS Scoping Document*, public comments regarding the scope of the EIS identified numerous alternatives intended to eliminate or mitigate specific impacts, including system alternatives (CN alternative), route alternatives and route segment alternatives (Minnesota Department of Commerce 2016). Chapter 4 of the EIS describes the alternatives selected for detailed study in the EIS, and the impacts of these alternatives are analyzed and compared in Chapter 5 and Chapter 6. All of these alternatives were identified through comments received during public comment periods on the Sandpiper Project, the Line 3 Project, or both.

1.4 OVERARCHING POLICY ISSUES

Larger Energy Policy Issues Are Beyond the Scope of This EIS

As noted above, DOC-EERA staff, with the support of Minnesota DNR and the Minnesota PCA, has prepared this EIS for the Commission, which has before it Enbridge's CN and route permit applications for the Line 3 Project, and for other agencies and entities with permitting authority related to the Project. The Commission has ordered this EIS so they can make an informed response to applications before them for the Project.

[8] Minn. R. Part 7853.0130 (D).

While pipeline projects are increasingly contributing to public debate over important broader energy policy issues, many of these overarching policy issues are beyond the scope of this EIS because they stretch well beyond the specific decision before the Commission. However, where the policy issues specifically relate to the CN or routes, the EIS provides a project-level assessment.

1.4.1 Long-Term Reliance on Oil

1.4.1.1 Need for This Project

The EIS Does Not Determine Need for This Project

While the need for the proposed pipeline with the proposed throughput capacity is an issue for the Commission, this EIS will not assess the Project need. Instead, the environmental impacts of reasonable alternatives for the need decision are evaluated in this EIS to aid the Commission's evaluation of the criteria set forth in Minn. R. Chapter 7853. Based on the criteria and the information about environmental impacts in the EIS, the Commission ultimately will determine in its CN decision whether there is a need for the proposed Project. If the Applicant is granted a CN for the proposed Project, the Applicant's proposed start and endpoints will be used in the route permit decision. If the Commission determines that alternate start and endpoints would be more reasonable and prudent, a route with these start and endpoints could be applied for.

1.4.1.2 Need for Fossil Fuels

Comprehensive Policy-Level Assessment of Fossil Fuels in Our Society and Associated Tribal Rights Issues Is Beyond the Scope of an EIS for a Single Pipeline

Beyond market demand for the oil supplied by a single pipeline, or the practicality of replacing a pipeline versus repairing aging infrastructure, much of the debate surrounding recent oil pipeline projects has focused on the environmental and social cost of continuing to use fossil fuels. These issues include the human and environmental implications of climate change, and the risks associated with extracting and transporting fossil fuels, including potential threats to human rights. Human rights include:

- The right to water;
- The right to health;
- The right to information about the potential effects of these industries;
- The right to protest; and
- Indigenous rights to free, prior, and informed consent (Barlow 2014).

In the context of the Commission's CN process, which proceeds on a project-by-project basis, the EIS addresses these issues as they relate to the proposal before the Commission but does not provide a policy-level assessment of the societal implications of continued reliance on fossil fuel. For example, the EIS addresses greenhouse gas and climate change implications of the Project, but does not address the long-term climate consequences of state or federal energy policy. Similarly, the EIS addresses the impact of the Project on tribal rights and ways of life but does not address the bigger-picture consequences of state or federal energy policy for tribal communities.

1.4.2 Routing Issues

1.4.2.1 Establishing a New Mainline Corridor

The Public Is Concerned About a New Pipeline Corridor Potentially Being Established

During the scoping of this EIS, many public comments raised concerns about the establishment of a new pipeline corridor—in the Mississippi River Headwaters area specifically, and in the "Lake District" generally. This concern stems from the fact that, as the pipelines in the existing Mainline corridor age and need to be replaced, a new corridor for the Line 3 Project may become a de facto new Mainline corridor. The need for a more deliberate energy infrastructure planning process, potentially through a "generic EIS," is at the core of the public's concern. An overwhelming amount of public comment and testimony in the Sandpiper docket[9] reflects this large and complicated question. This question is also raised in a number of the public comments received during the DEIS comment period.

1.4.2.2 Resource Prioritization

The EIS Establishes Facts and Does Not Prioritize Some Resources over Others

The EIS assesses potential impacts on a wide range of resources and provides quantitative and qualitative descriptions of the nature, magnitude, and duration of these impacts. In addition, the EIS compares the nature, magnitude, and duration of impacts on a given resource across various alternatives. While the presentation of impact data in the EIS highlights tradeoffs across the different alternatives so that decision-makers and other stakeholders can work from a common set of facts, the EIS does not prioritize one resource over another, nor does it prescribe how impacts on different types of resources should be weighted. The analysis in the EIS may show, for example, that some alternatives would result in greater impacts on human settlement and fewer impacts on natural resources, or more impacts on pristine waters and fewer impacts on waters that already are stressed by pollution. Decisions about whether and how to prioritize avoiding populated areas over undisturbed natural areas, and whether to concentrate infrastructure in already disturbed watersheds or spread the burden to other areas are part of the Commission's charge and are not prescribed by the EIS.

1.5 ORGANIZATION OF THE EIS

The remainder of this EIS is organized into the following 12 chapters, followed by appendices.

Chapter 2 Project Description – Describes the Project as proposed by the Applicant, including the proposed route, objectives, and estimated costs. Chapter 2 also describes the Applicant's engineering, design, construction plans, land acquisition processes, and Applicant-proposed measures to avoid and minimize environmental impacts.

Chapter 3 Regulatory Framework – Describes the regulatory framework associated with the proposed Project, including the CN and route permit processes, the EIS process, major federal and tribal permits and consultation requirements, and other state and local permits.

[9] Enbridge and North Dakota Pipeline Company LLC. 2014. Docket No. PL-6668/CN13-473. Before the Minnesota Public Utilities Commission. Revised January 31.

Chapter 4 Alternatives to the Proposed Project – Describes alternatives to the proposed Project, including the No Action Alternative (outcome associated with denial of the CN), and alternative routes for the route permitting decision.

Chapter 5 Existing Conditions, Impacts, and Mitigation – Certificate of Need – Describes the existing conditions of resources with the potential to be affected by the proposed Project or CN Alternatives; describes the nature, magnitude, and duration of impacts associated with the proposed Project and each CN Alternative; and recommends mitigation measures that could reduce impacts.

Chapter 6 Existing Conditions, Impacts, and Mitigation – Route Permit – Describes the existing conditions of resources with the potential to be affected by the proposed Project or route alternatives; describes the nature, magnitude, and duration of impacts associated with each routing option; compares route alternatives from Clearbrook, Minnesota to Carlton, Minnesota; and recommends mitigation measures that could reduce impacts.

Chapter 7Route Segment Alternatives – Describes the route segment alternatives representing minor deviations along the Applicant's preferred route and compares the nature, magnitude, and duration of impacts associated with the route segment alternatives to those associated with the corresponding portion of the Applicant's preferred route.

Chapter 8 Existing Line 3 Abandonment and Removal – Describes the process that would be followed for abandonment in place or for removal of the existing Line 3.

Chapter 9 Tribal Resources – Describes the tribal resources that could be affected by the Applicant's preferred route and the route alternatives. These resources, which tend to be interconnected natural and cultural resources, provide the means for subsistence and economic viability to many tribal members. Tribal resources also reinforce traditional practices, beliefs, and tribal values, which closely tie into the health and well-being of the tribal community.

Chapter 10 Accidental Crude Oil Releases – Describes the potential for an unanticipated crude oil release during operation of the proposed Line 3 pipeline that could adversely affect environmental and human resources. The chapter discusses the potential for failures and subsequent releases, crude oil behavior in the environment, and the types of sensitive resources that could be affected should a release occur. This chapter provides context regarding observations from historical incidents and relevant studies while focusing on the proposed Project and alternatives. Comparisons of alternatives based on the potential for exposures and impacts on sensitive resources are provided. Also described are spill prevention, preparedness, and response measures that could influence the extent and duration of a release, and the potential impacts on resources that might be particularly vulnerable to crude oil exposures.

Chapter 11 Environmental Justice – Assesses the potential for the proposed Project and route alternatives to disproportionately affect low-income and minority populations, and describes the nature, magnitude, and duration of any disproportionate impacts.

Chapter 12 Cumulative Potential Effects – Describes reasonably foreseeable projects in the proposed Project area and assesses the cumulative impacts of the proposed Project in the context of these reasonably foreseeable projects, along with other past and present projects in the same area.

Chapter 13 List of Preparers – Identifies the individuals and agencies involved in preparing the EIS.

1.6 REFERENCES

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Chapter 2
Project Description

Enbridge Energy, Limited Partnership (Enbridge, or Applicant) proposes to construct, operate, and maintain a pipeline and related facilities to transport crude oil from its existing facilities in Edmonton, Alberta, Canada, to its existing terminals in Clearbrook, Minnesota, and Superior, Wisconsin. Enbridge has termed this proposed Project the "Line 3 Replacement Project." This chapter describes Enbridge's proposed Project, including Enbridge's proposed action within Minnesota and those portions of the Project that lie within North Dakota and Wisconsin. Detailed maps along the Applicant's preferred route are provided in Appendix A.

The Project information in this chapter is primarily based on public filings by the Applicant.

2.1 PROJECT SUMMARY

The Project Would Replace an Aging Pipeline and Increase Throughput

Enbridge's proposed Project would be constructed with a 36-inch-diameter pipeline and associated facilities to replace the existing 34-inch-diameter Line 3 pipeline, which currently crosses Minnesota as part of the Enbridge Mainline system corridor. Enbridge has indicated that the new pipeline would address safety and reliability, restore the line's capacity to carry heavy crude oils, and allow transport of 760,000 barrels per day (bpd), equivalent to 256,120 million barrels per day-miles, an increase over the current Line 3 operating level of 390,000 bpd.[1]

The Project Would Primarily, but Not Always, Follow Existing Rights-of-Way

Enbridge's proposed Line 3 pipeline route would begin at the Joliette Valve near Neche, North Dakota, and extend 365 miles across Minnesota to the Superior terminal at Superior, Wisconsin (Figure 2.1-1). Approximately 340 miles of the route would be located in Minnesota. The proposed Line 3 pipeline permanent right-of-way would follow the existing Enbridge Line 67 pipeline in the Enbridge Mainline corridor for approximately 110 miles from North Dakota to the existing Clearbrook terminal in Clearwater County. The right-of-way would diverge from the Mainline corridor at the Clearbrook terminal, routing south and then east for approximately 220 miles, where it would then rejoin the Mainline corridor near Carlton, Minnesota, and extend for approximately 10 miles to the Minnesota-Wisconsin border.

From the Clearbrook terminal to Carlton, the right-of-way would primarily follow third-party pipeline, utility, and transportation corridors, although some construction would occur through areas where no third-party utilities are present.

[1] One barrel of crude oil is equivalent to 42 gallons.

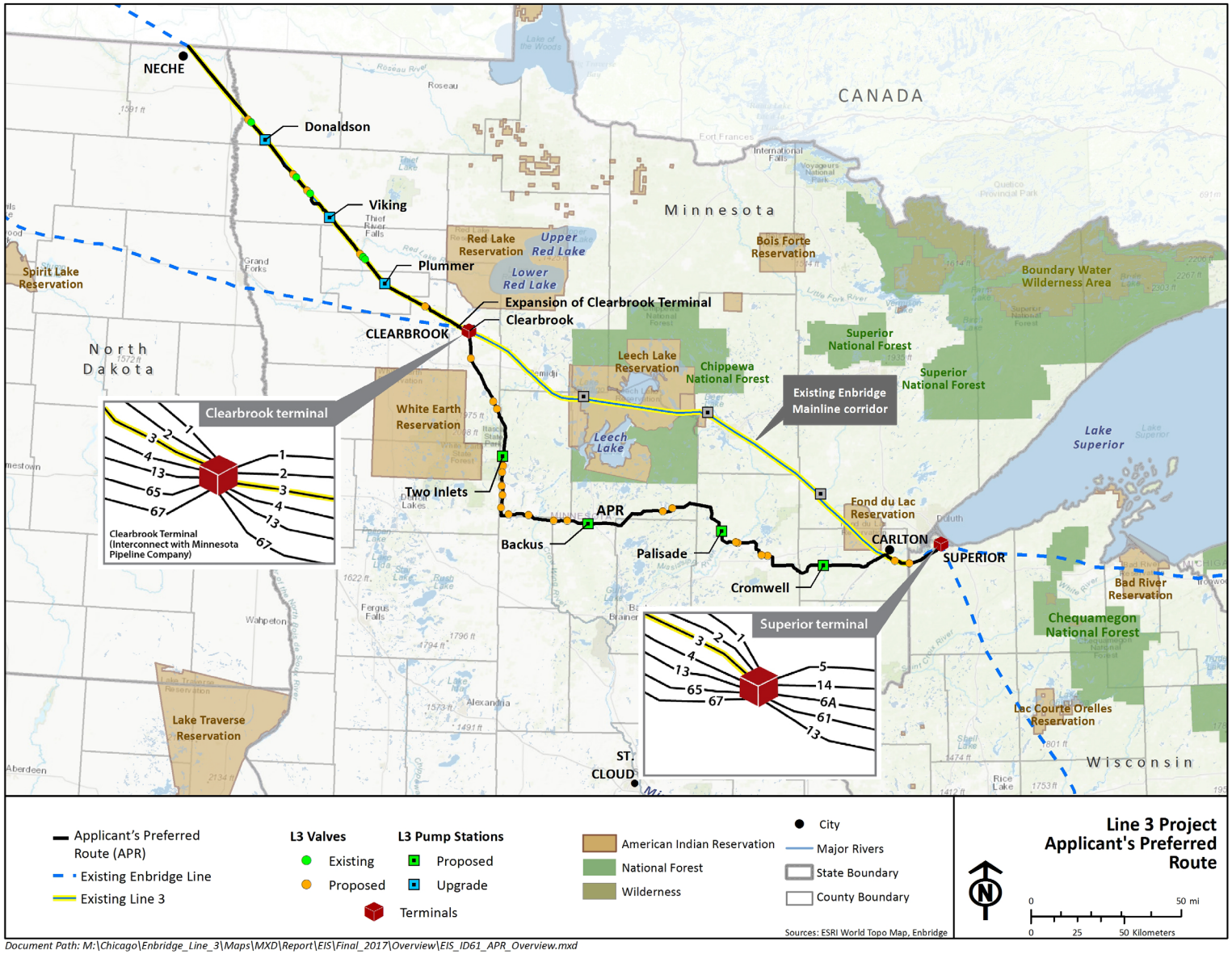

Figure 2.1-1. Overview of the Applicant's Preferred Route for the Line 3 Project

The proposed Line 3 route as depicted on figures throughout the EIS indicates that it does not cross reservation boundaries. The Applicant has noted in their comments that consideration was made for the avoidance of the two reservations, which the existing Line 3 crosses. However, some depictions of the White Earth Reservation boundaries indicate that the Applicant's preferred route would cross the northeastern corner of the reservation. The Applicant has proposed route segment alternative (RSA) 05 to avoid this area due to existing watersheds and hydrologic connections. Figure 9-3 depicts the differences in the boundaries, dependent on the source of information used. For the purposes of this EIS, the US Census boundary is used, thereby showing that the Applicant's preferred route does not cross reservations.

Enbridge Has Requested a 750-Foot Route Width for the Construction Phase

Enbridge has requested that the Commission permit a 750-foot route width (375 feet on each side of the proposed Line 3 pipeline centerline). The 50-foot permanent right-of-way would be located within this 750-foot corridor. The 750-foot route width would encompass construction workspace for the pipeline and associated facilities, and would allow Enbridge to make small-scale refinements of the pipeline centerline within the corridor, as needed, prior to and during construction.

Enbridge's application materials use the term "construction right-of-way" when referring to the temporary construction areas located alongside the permanent right-of-way that would be used temporarily for construction of the pipeline (see Section 2.7.1.2). The Applicant uses the term "construction workspace" to encompass additional temporary workspaces, or ATWS (see Section 2.3.5). This Environmental Impact Statement (EIS) uses the term "construction work area" when referring to the temporary construction areas located alongside the permanent right-of-way, and uses the term "ATWS" when referring to the areas required for staging equipment, storing some excavation spoil materials, and providing additional workspace where required for special construction methods.

Pump Stations, Valves, Roads, and Cathodic Protection Systems Also Would Be Constructed

The proposed Project includes constructing and operating (new or modified) pump stations, mainline valves (MLVs), block valves, cathodic protection systems, pipe yards, and permanent access roads. During construction, additional temporary material storage yards, contractor yards, and access roads would be required.

Pump stations include expansion of three existing pump stations in Kittson, Marshall, and Red Lake counties; expansion of one pump station and existing equipment at the Clearbrook terminal in Clearwater County; and construction of four new pump stations in Hubbard, Cass, Aitkin, and Carlton counties. Remotely controlled MLVs would be installed along the new pipeline to control and stop the flow of oil and to isolate segments of the pipeline should a pipeline leak or to perform pipeline repairs. These valves generally would be installed near populated areas, major waterbody crossings, drinking water resources, and environmentally sensitive areas. Cathodic protection systems would be installed with the buried pipelines to reduce external corrosion on the pipeline.

During Construction, the Project Would Require Additional Staging and Material Storage Areas

During construction, Enbridge would temporarily use off-pipeline-route areas (yards) for pipe and material storage, to receive deliveries of materials by rail (at rail sidings), and to park equipment and stage construction activities. Pipe yards and rail sidings would be located in Polk, Hubbard, Cass, Carlton, Red Lake, Kittson, and Beltrami counties. Contractor yard locations would be identified as planning and engineering for the Project progresses. Enbridge would attempt to use existing public or privately

owned roads to gain access to construction work areas along the right-of-way. Where public or privately owned roads are not available, Enbridge would construct new access roads. Enbridge would also construct permanent access roads to each MLV and pump station.

The installed pipeline and other permanent facilities would require 2,057 acres of land; 3,480 additional acres would be required for construction.

The Existing Pipeline Would Be Removed in Accord with Existing Regulations

Enbridge proposes to permanently remove the existing Line 3 pipeline from service (i.e., abandon the pipeline) once the proposed Line 3 pipeline is placed into service (for more details on abandonment see Section 2.9, Chapter 8, and Appendix B). Following 49 Code of Federal Regulations (CFR) 195.402 (c)(10), which details the process and requirements for pipeline abandonment, Enbridge would disconnect the existing Line 3 pipeline at each of the pump stations, purge the pipeline of all combustible materials, and permanently seal the ends of the pipeline. Enbridge would file a report with the Pipeline and Hazardous Materials Safety Administration (PHMSA) to identify where the pipeline is abandoned wherever it crosses over, under, or through a commercially navigable waterway.

2.2 PROJECT PURPOSE

Corrosion and Cracking of the Existing Pipeline Have Reduced Performance

The Line 3 Project would replace the existing Line 3 pipeline within the Enbridge Mainline pipeline system. The Enbridge Integrity Management Program, comprising inspections, repair, and maintenance, has detected a high amount of corrosion and long-seam cracking along the existing Line 3 pipeline.

A consent decree between Enbridge and the U.S. Department of Justice entered by the Justice Department in September 2016 on behalf of the U.S. Environmental Protection Agency and the U.S. Coast Guard (81 Federal Register 62536), revised in May 2017, requires replacement of Line 3. Until it is replaced, heightened integrity work and reduced operating pressures will be required. The consent decree has not been finalized at this time, but the draft consent decree is incorporated here by reference.[2]

Enbridge reduced discharge pressures of the Line 3 pump stations in 2008, extended the pressure reduction to the entirety of the Line 3 pipeline in 2010, and proportionately reduced the maximum allowable operating pressure of the Line 3 pipeline in 2012.

Enbridge Believes Replacing the Existing Pipeline Is Less Expensive and Avoids Extensive Inspections

Despite reducing pressure at the pump stations, along the entire line, and reducing the maximum allowable pressure, 4,000 integrity digs over the next 15 years along the U.S. portion of the line would be necessary if the Line 3 pipeline remained in service. According to Enbridge, constructing their proposed Project would be less expensive for the company than conducting the integrity dig program. Enbridge believes that installation of the proposed Line 3 pipeline would be less invasive than continuously conducting digs along the existing right-of-way to maintain and repair the existing Line 3 pipeline. Enbridge has estimated that it would cost $30 to $40 million per year to maintain the U.S.

[2] United States of America v. Enbridge Energy, Limited Partnership, Draft Revised Following Public Comment available at: https://www.epa.gov/enbridge-spill-michigan/revised-enbridge-consent-decree.

portion of the existing Line 3 pipeline. For comparison, Enbridge estimates maintaining the proposed Line 3 pipeline would cost approximately $2 million (Enbridge 2014).

Enbridge States that Demand for Canadian Crude Oil Exceeds Current Capacity

The proposed Line 3 pipeline would be designed to transport light and heavy crude oil. The crude oil refineries of Minnesota and the other states in the northern portion of the Petroleum Administrative Defense District II, which includes Minnesota and the surrounding states of the Midwest, rely solely on crude oil transported from western Canada and the United States. The Enbridge Mainline system transported upward of 74 percent of Canadian crude oil consumed in Petroleum Administrative Defense District II in 2014. Nonetheless, Enbridge maintains the demand for crude oil feedstock from western Canada is currently greater than the capacity of the Enbridge pipeline system.

Enbridge has Indicated that Expanded Capacity Would Reduce Curtailment and Improve Operational Flexibility

As a common carrier, Enbridge is required to treat all similarly situated crude oil customers on the Enbridge Mainline system without discrimination. Thus, when demand from refineries is greater than the capacity of the pipeline system, Enbridge must apportion the pipeline capacity as regulated by the Federal Energy Regulatory Commission, typically resulting in all refineries receiving less capacity to transport crude oil nominations than requested.

Enbridge's objective for the proposed Line 3 Project would be to restore the capability of this line to carry heavy crude and increase capacity, which would allow operational flexibility to the Enbridge system. This would reduce ongoing and forecasted apportionment to the refining industry in eastern Canada, the Gulf Coast, and the Midwest, including the Flint Hills and Northern Tier Energy refineries in Minnesota. Although the increased capacity of the proposed Line 3 pipeline would not be sufficient to meet all of the demand noted, Enbridge's goal would be to increase its ability to respond to fluctuating demand of different refineries in the United States in general and in Minnesota in particular.

Expanded Capacity Would Improve Energy Efficiency on Enbridge's System

According to Enbridge, the increased capacity of the proposed Line 3 pipeline also would increase the energy efficiency of transporting crude oil. The gain in energy efficiency would result from the principle that pumping the same volume of crude oil through a 36-inch-diameter pipeline as through a 34-inch-diameter pipeline requires lower pressure due to decreased friction in the larger pipeline. The lower pressure required translates to less horsepower, and consequently less energy, needed to operate the pumps. Increased operational flexibility resulting from increased capacity would allow Enbridge to operate its pipeline system as efficiently as possible.

2.3 PROPOSED FACILITIES

The permanent and temporary facilities proposed to be constructed or used as part of the proposed Line 3 Project are (as discussed below) the pipeline, associated facilities, permanent access roads, temporary contractor and material/pipe storage yards, additional temporary workspaces, and temporary access roads.

An overview of the Applicant's preferred route and proposed facilities is shown in Figure 2.1-1. Land requirements for the installed pipeline and other permanent facilities would be 2,134 acres;

3,309 additional acres would be required for construction. Detailed route maps are provided in Appendix A.

2.3.1 Pipeline

Proposed Pipeline Would Primarily Follow Existing Rights-of-Way

In Minnesota, Enbridge's proposed Line 3 pipeline would consist of approximately 340 miles of new 36-inch-diameter underground pipeline that would enter Minnesota approximately 10 miles southwest of the city of Hallock in Kittson County and traverse southeast through Marshall, Pennington, Red Lake, and Polk counties to the existing Enbridge Clearbrook terminal in Clearwater County. The proposed Line 3 pipeline right-of-way would be primarily co-located with the Enbridge Line 67 pipeline for 110 miles from where the right-of-way would enter Minnesota to the Clearbrook terminal.

From the Clearbrook terminal, the route would continue south through Clearwater and Hubbard counties and then turn east through Wadena, Cass, Crow Wing, Aitkin, and Carlton counties (Table 2.3-1). Throughout this area, the proposed Line 3 pipeline right-of-way would be primarily co-located with the Minnesota Pipe Line Company pipeline right-of-way until it reached the southern extent of Hubbard County. At the southern end of Hubbard County, the right-of-way would turn and be routed eastward, where it would then be generally co-located with third-party electric transmission, pipeline, and transportation corridors, although some portions would not be co-located with existing utility corridors.

Table 2.3-1. Pipeline Length by County for the Line 3 Project

County	Milepost Range[a]	Approximate Pipeline Length	
		Miles	Percent
Kittson	801.8 – 816.9	15.4	4.5
Marshall	816.9 – 851.7	36.3	10.7
Pennington	851.7 – 871.3	19.7	5.8
Red Lake	871.3 – 886.9	15.7	4.6
Polk	886.9 – 900.5	14.0	4.1
Clearwater	900.5 – 942.8	42.2	12.4
Hubbard	942.8 – 987.4	44.6	13.1
Wadena	987.4 – 994.4	7.1	2.1
Cass[b]	994.4 – 1015.8	21.4	6.3
	1020.6 – 1046.7	26.1	7.7
Crow Wing	1015.8 – 1020.6	4.8	1.4
Aitkin	1046.7 – 1098.3	51.6	15.2
Carlton	1098.3 – 1139.3	41.0	12.1
TOTAL		**339.7**	**100**

[a] Milepost numbering begins at the Hardisty terminal in Alberta, Canada. Mileposts are used as reference markers only; they are not accurate indicators of pipeline lengths.

[b] Two milepost ranges are presented for Cass County because the route would exit Cass County into Crow Wing County and then re-enter Cass County.

The proposed Line 3 pipeline would cross the Minnesota-Wisconsin border in Carlton County approximately 12 miles southeast of the city of Cloquet, Minnesota (Figure 2.1-1). Approximately 3 miles southwest of the city of Carlton, the right-of-way would rejoin and be co-located with the Enbridge Mainline system for approximately 10 miles until it crossed the Minnesota-Wisconsin border in eastern Carlton County.

The Life of the Proposed Pipeline Could Be Indefinite, with an Economic Life of More Than 30 Years

The Applicant anticipates that the physical life of the proposed Line 3 pipeline (i.e., the number of years that the pipeline would be capable of transporting crude oil) would be indefinite given appropriate construction, maintenance, and integrity systems. The economic life of the Project (i.e., the number of years that continued operation of the Project would be feasible) is anticipated to be no less than 30 years.

Design Capacity Would Be 844,000 bpd, with Annual Capacity of 760,000 bpd

The capacity of a liquids pipeline is expressed as design capacity or annual capacity. “Design capacity” is the theoretical flow rate of a pipeline for a specific type of liquid and is calculated assuming theoretically ideal operating conditions. In liquid petroleum pipelines, the design capacity is the maximum instantaneous throughput that a pipeline is capable of achieving under design conditions for a specific liquid. The design capacity of the proposed Line 3 pipeline would be 844,000 bpd, assuming that the total volume of crude oil transported by the pipeline would consist of 65 percent heavy crude oil and 35 percent light crude oil. This flow rate is also based on the number, spacing, and horsepower of the pump stations that are proposed.

“Annual capacity” is the average sustainable throughput over a year and is calculated assuming average annual historical operating conditions, including scheduled and unscheduled maintenance and the availability of crude oil. The annual capacity of a pipeline is typically 90 percent of its design capacity. Based on the proposed pipeline design and pumping capacity, the annual capacity of the proposed Line 3 pipeline would be approximately 760,000 bpd.

The maximum allowable operating pressure would be 1,440 pounds per square inch gauge (psig). The pipeline would be designed to withstand pressures over and above normal operating pressures, and would operate according to applicable codes and regulations.[3]

2.3.2 Associated Facilities

Associated Facilities Were Located after Hydraulic Studies and in Accord with Federal Regulations

Additional facilities associated with the proposed Line 3 pipeline include modified and new pump stations, MLVs, and cathodic protection systems.

Appropriate locations for pump stations along the pipeline route were determined by hydraulic studies of the pipeline operations that optimized pumping requirements at the design capacity. Optimizing the pumping requirements in turn minimizes the amount of energy needed for pumping.

[3] 49 CFR 195 Subpart F.

MLVs were located based on federal regulations[4] for protection of human and natural resources during hydraulic operation of the pipeline.

Cathodic protection sites were located adjacent to the permanent pipeline right-of-way as required to meet the operational requirements of the cathodic protection system.

The location of pump stations and currently planned MLVs are shown in Figure 2.1-1.

2.3.2.1 Pump Stations

2.3.2.1.1 Modification of the Clearbrook Terminal

Area of Clearbrook Terminal Would Permanently Expand by About 13 Acres

As part of the proposed Project, Enbridge would modify and expand the existing Clearbrook terminal at milepost (MP) 909.4 in Clearwater County, Minnesota. The expansion would include installation of four additional pumps and associated equipment, including:

- Four 7,000-horsepower (hp) electric motor and pump units;
- Two 7,000-hp variable frequency drives;
- A crude oil reinjection pump and sump tank;
- A 36-inch pipeline inspection gauge (PIG) launcher;
- Valves, metering equipment, pump station-to-terminal interconnections, and associated terminal piping;
- Instrumentation and monitoring equipment; and
- Associated electrical facilities, including a substation with redundant utility transformers and breakers.

Additional modification of the Clearbrook terminal would include:

- An additional 36-inch PIG receiver;
- A pressure relief system;
- Additional valves, metering equipment, terminal piping, and manifold interconnections;
- Instrumentation and monitoring equipment and associated electrical facilities; and
- A 16-inch meter manifold run with associated valves, interconnections, piping, instrumentation, electrical facilities, and sample system, which would be added to the existing meter manifold 152.

[4] 49 CFR 195.260. (See details in Section 2.3.2.2.).

The existing Clearbrook terminal would be permanently expanded by approximately 13 acres. An additional approximately 2 acres would be temporarily disturbed during construction of the Clearbrook terminal expansion (Table 2.3-2). This acreage would be restored to preconstruction conditions once construction is complete. Plot plans showing the boundary of the Project area for expansion of the Clearbrook terminal, including electrical and spill containment facilities associated with the existing Clearbrook terminal and details of pipeline routes in the vicinity of the expanded terminal, are provided in Appendix C.

Table 2.3-2. Locations and Land Requirements for the Clearbrook Terminal Expansion and Pump Stations for the Line 3 Project

Facility	County	Milepost	Construction Area (acres)	Permanent Area (acres)
Terminal Expansion				
Clearbrook terminal	Clearwater	909.4	15.3	13.3
Modification of Existing Pump Stations				
Donaldson pump station	Kittson	814.5	8.0	7.1
Viking pump station	Marshall	848.2	10.1	7.7
Plummer pump station	Red Lake	877.0	8.2	8.2
Subtotal			***26.3***	***23.0***
New Pump Stations				
Two Inlets pump station	Hubbard	956.1	10.1	8.1
Backus pump station	Cass	1006.7	9.4	7.4
Palisade pump station	Aitkin	1061.2	9.3	7.3
Cromwell pump station	Carlton	1108.1	7.3	5.7
Subtotal			***36.1***	***28.5***
TOTAL			**77.7**	**64.8**

2.3.2.1.2 Modification of Existing Pump Stations

Twenty-three Acres Would Be Permanently Disturbed by Pump Station Modifications

Enbridge would modify three existing pump stations located along the Enbridge Mainline system corridor right-of-way west of the Clearbrook terminal. At each facility, Enbridge would install additional pumps, MLVs, metering and monitoring equipment, and associated electrical facilities.

Each pump station, including the Clearbrook terminal, would have a maximum allowable operating pressure of 1,440 psig and an average annual capacity of 760,000 bpd. The maximum power capacity of each individual motor at the facilities would be 7,000 hp.

Approximately 26 acres would be temporarily disturbed during construction of the modified pump stations, and 23 acres would be permanently converted as a result of the modifications. Plot plans showing the boundary of the Project area for expansion of the existing pump stations, including the

electrical and spill containment facilities associated with the existing pump stations and details of pipeline routes through the pump stations, are provided in Appendix C.

2.3.2.1.3 New Pump Stations

Twenty-nine Acres Would Be Permanently Disturbed by Construction of New Pump Stations

Enbridge would construct new pump stations at four locations along the right-of-way east of the Clearbrook terminal. Each facility would contain two to three 7,000-hp motor and pump units with a maximum operating pressure of 1,440 psig and an average annual capacity of 760,000 bpd. The stations would also include MLVs, metering, monitoring equipment, and associated electrical facilities. In addition, the Backus pump station would contain a PIG receiver and launcher traps (see Section 2.8.2.1 for additional information on PIGs).

A total of 36 acres would be temporarily disturbed during construction of the new pump stations, and 29 acres would be permanently converted (Table 2.3-2).

2.3.2.2 Mainline Valves and Pressure Transmitters

MLVs and Pressure Transmitters Would Be Placed to Best Protect the Environment

MLVs are remotely controlled valves that are operated to shut down movement of oil in the pipeline and to isolate segments of the pipeline in the event of a leak or to perform pipeline repairs. MLVs are used as safeguards near populated areas, major waterbody crossings, drinking water sources, and environmentally sensitive areas identified during environmental review and permitting.

Each MLV location would contain a slide gate valve that could be remotely controlled from the Enbridge Control Center or manually operated; digital pressure and temperature monitoring equipment; and associated electrical and communications equipment necessary to control the MLVs and transmit pressure and temperature information to the Control Center.

Enbridge conducted an analysis to determine the most appropriate locations for MLVs in compliance with the requirements of 49 CFR Part 195.260. Once the optimal locations for MLVs are chosen, Enbridge must then conduct field surveys to confirm that there are no constraints to locate the MLVs at the given sites, obtain landowner agreement to locate the MLVs at the given sites, and submit the final locations listing to PHMSA for review to confirm compliance with 49 CFR Part 195.260. Based on these criteria, Enbridge is proposing to install 27 MLVs. As a result of the action of permitting agencies with jurisdiction, including PHMSA, however, the final number and location of MLVs may be modified.

MLVs and Pressure Transmitters Would Require Negligible Space

Enbridge also would install two pressure transmitters in conjunction with the MLVs. Pressure transmitters monitor pipeline pressure at specific points and transmit the values electronically to a control system. Pressure transmitters and MLVs are located within the permanent right-of-way; therefore, their number and location do not affect the total land area required for construction and operation of the proposed Project. A typical valve installation in the permanent pipeline right-of-way is shown in Figure 2.3-1. Each valve would be enclosed within a security fence and encompass an area of approximately 0.1 acre.

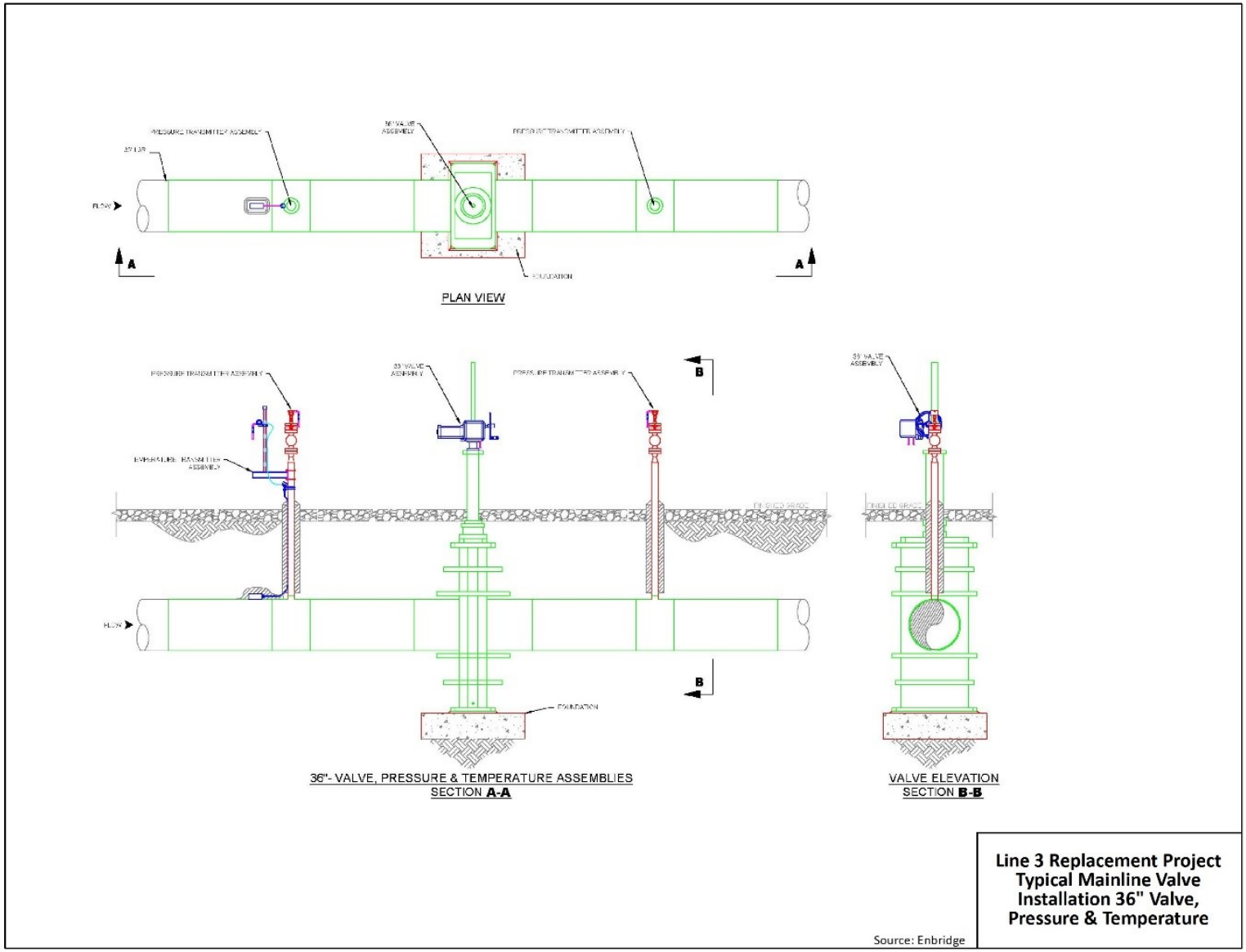

Figure 2.3-1. Typical Mainline Valve Installation

2.3.2.3 Cathodic Protection Systems

Cathodic Protection Would Be Operational Within a Year after Construction

The buried pipeline would be protected from external corrosion by application of a coating to the pipeline and by installation and operation of a cathodic protection system. A cathodic protection system must be constructed and operated in accordance with the requirements of 49 CFR Subpart H – Corrosion Control (Section 195.563 and Sections 195.567 through 195.577), which require the cathodic protection system be operational within one year of construction. The cathodic protection system electrically connects the pipeline to anodes buried in ground beds adjacent to the pipeline and located along the pipeline route. The cathodic protection system would be located within the right-of-way disturbed for construction.

The area necessary for the cathodic protection system anode beds would range between 0.2 and 0.6 acre per system, and the only aboveground features at each site would be a junction box and small-diameter vent pipe installed above the deep well beds.

Enbridge also would install alternating current/direct current mitigation to protect the pipeline and cathodic protection system from electromagnetic-induced voltage and stray current from co-located electric transmission lines. Enbridge would assess the electric transmission lines (that the proposed Line 3 pipeline would be co-located with) to determine the extent of cathodic protection necessary for the Project. Section 195.563 of 49 CFR Subpart H – Corrosion Control states that cathodic protection must be in operation no later than 1 year after the pipeline is constructed.

Preliminary locations for components of the cathodic protection system have been identified by Enbridge within their Environmental Assessment Worksheet (EAW).[5]

2.3.3 Permanent Access Roads

Permanent Roads Would Provide Access to Pump Stations and MLVs

Enbridge proposes to construct or improve permanent roads along the permanent right-of-way to access the pump stations. Enbridge also proposes to construct permanent roads along the permanent right-of-way to access the MLVs in accordance with the request of the Minnesota Public Utilities Commission. The amount of land required would range from 0.1 to 0.5 acre, with the average being closer to 0.1.

2.3.4 Temporary Contractor and Material/Pipe Storage Yards

Temporary Construction Sites Would Be Restored After Use

Construction of the proposed Line 3 pipeline would require that land be temporarily used for pipe and materials storage, construction staging, and offloading rail deliveries of construction materials. These pipe and material storage yards, contractor yards, and rail sidings would be located apart from the pipeline right-of-way.

Enbridge proposes to lease the sites on which the yards would be located and restore the land to its general condition prior to use once it is no longer required for construction. Several locations for pipe yards have received National Pollutant Discharge Elimination System (NPDES) Construction Stormwater

[5] Enbridge 2016, page 36.

(CSW) permits through the Minnesota Pollution Control Agency (Minnesota PCA). These NPDES permits authorize ground disturbance with approved protection measures to manage soil erosion and stormwater discharge on the construction sites.

Temporary Sites Chosen by Proximity, Accessibility, Ability to Be Restored, and Landowner Approvals

These NPDES permits authorize ground disturbance with approved protection measures to manage soil erosion and stormwater discharge on the construction sites. Rail sidings would be placed on land currently used for railroads, and pipe yards would be located on cultivated or uncultivated agricultural land. The locations of contractor yards would be determined as Project planning progresses. Locations for contractor yards would be chosen based on their proximity to the construction work area, access by sufficient load-rated haul roads, water drainage capabilities from soil and topography at the sites, ability for restoration of the sites to preconstruction conditions, avoidance of any sensitive cultural or environmental resources including public and private drinking water wells, and landowner approvals.

2.3.5 Additional Temporary Workspaces

Each ATWS Would Require Less Than Half an Acre

Outside of the construction work area along the pipeline alignment, ATWS would be required for staging equipment, storing some excavation spoil materials, and providing additional workspace where required for special construction methods. ATWS might, for example, be needed where the pipeline crosses waterbodies, wetlands, steep slopes, roads, railroads, and other pipelines or utilities. ATWS will also use appropriate stormwater erosion prevention and sediment control best management practices (BMPs) per Minnesota PCA's NPDES CSW Permit.

Additionally, ATWS would be required for accommodating equipment and resources necessary at horizontal directional drilling (HDD) sites and for withdrawing and discharging water during cleaning and hydrostatic testing of the pipeline. Generally, ATWS would be located adjacent to the construction work area and measure half an acre or less. Dimensions of ATWS would vary according to site-specific conditions.

2.3.6 Temporary Access Roads

Two Hundred Eighty-eight Proposed Access Roads Would Disturb Approximately 271 Acres

During construction, Enbridge proposes to use public roads wherever possible. Where public roads do not cross the right-of-way, Enbridge would request the use of privately owned roads. If neither public nor private roads are available, Enbridge would construct new access roads. Enbridge would need to obtain environmental permits and landowner permission for use or modification of existing public and private roads and construction of new access roads.

Enbridge has proposed a preliminary list of 288 access roads distributed throughout the counties in the Project (Appendix D). At some points along the pipeline route, final construction planning and Project permitting could require additional or different access roads. Enbridge estimates that roads used to access the construction work area along the pipeline route would temporarily disturb approximately 271 acres, based on a standard 30-foot-wide road. Of the proposed 288 access roads, 75 would be existing roads, 172 would be new roads, and 41 would be a combination of new and existing roads.

A final list of roads proposed to access the construction work area and the degree to which the roads would need improvement will not be available until the final planning and engineering phase of the Project.

Temporary access roads will also use appropriate stormwater erosion prevention and sediment control BMPs per Minnesota PCA's NPDES General CSW Permit.

2.4 RIGHT-OF-WAY REQUIREMENTS

Rights-of-Way Would Differ for Different Segments of the Proposed Pipeline

Construction of the proposed Line 3 pipeline would generally require a 50-foot-wide permanent right-of-way in uplands and an additional 70-foot-wide construction work area (Table 2.4-1). The combined 120-foot-wide construction work area would be required to accommodate construction vehicles, string and install the pipeline, and temporarily store topsoil and trench spoil. In wetlands, the width of the construction work area would be reduced to 95 feet.

From the North Dakota-Minnesota border to the Clearbrook terminal and from Carlton to the Minnesota-Wisconsin border, approximately 40 feet of the Line 67 pipeline permanent right-of-way would be included as part of the construction work area for the proposed Line 3 pipeline. After construction, 25 of the 40 feet of the Line 67 pipeline permanent right-of-way would serve as shared permanent right-of-way for the Line 3 and Line 67 pipelines, resulting in 25 feet of new permanent right-of-way attributable to the proposed Line 3 pipeline in both uplands and wetlands.

Between the Clearbrook terminal and Carlton, the permanent right-of-way for the pipeline would be 50 feet wide in both uplands and wetlands. Plan views of the permanent right-of-way and the construction work area with respect to the pipeline alignment are shown in Figures 2.4-1 through 2.4-6.

Table 2.4-1. Temporary Construction Work Area, Permanent Right-of-Way, and Total Land Requirements for the Line 3 Project

Route Segment	Temporary Construction Work Area (feet)[a]	Permanent Right-of-Way (feet)	Total Land Requirements (feet)	Corresponding Plan View Figure for Reference
North Dakota-Minnesota border to Clearbrook terminal – co-located with existing Enbridge pipeline (Line 67)	70 (upland)	50 (~25 new)	120 (upland)	2.4-1
	45 (wetland)		95 (wetland)	2.4-2
Clearbrook terminal to Minnesota-Wisconsin border – co-located with existing third-party utilities or greenfield construction	70 (upland)	50	120 (upland)	2.4-3, 2.4-5
	45 (wetland/ saturated wetland)		95 (wetland/ saturated wetland)	2.4-4, 2.4-6

[a] Construction work area includes the temporary construction work area plus the permanent right-of-way.

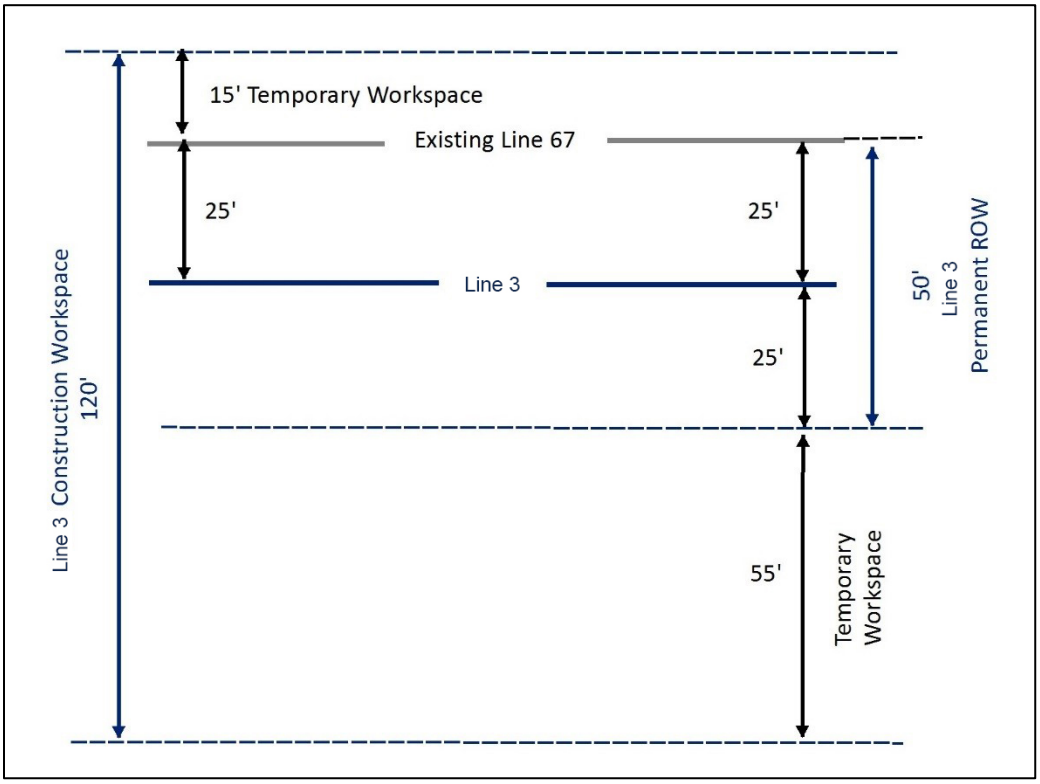

Figure 2.4-1. Plan View – Proposed Co-Location of the Proposed Line 3 Pipeline Right-of-Way with the Existing Line 67 Pipeline Right-of-Way in Uplands

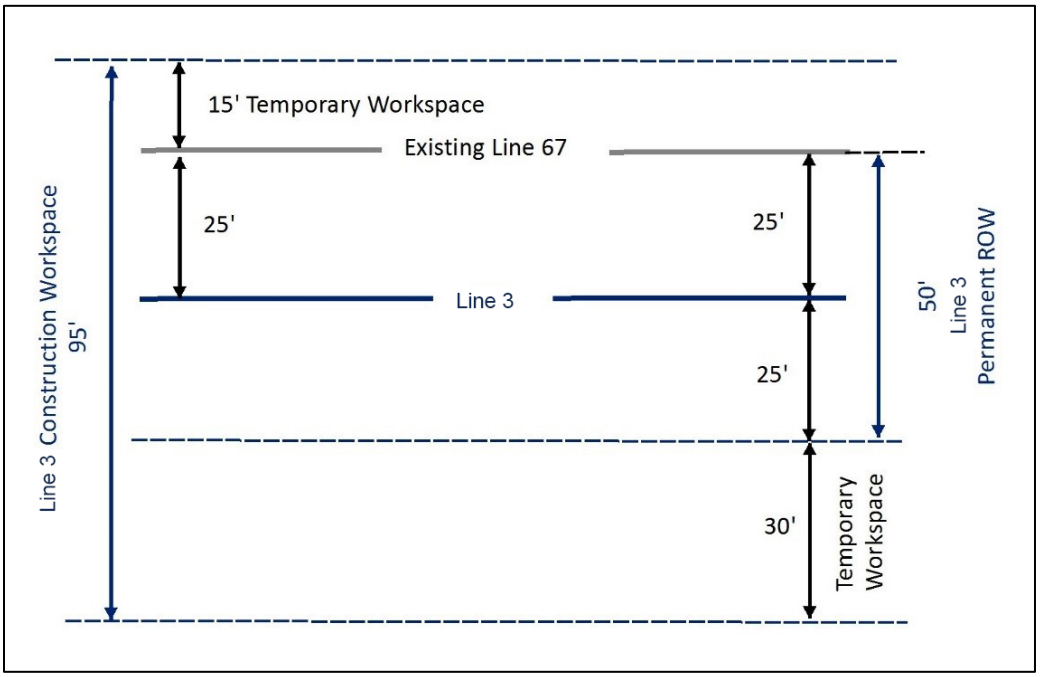

Figure 2.4-2. Plan View – Proposed Co-Location of the Proposed Line 3 Pipeline Right-of-Way with the Existing Line 67 Pipeline Right-of-Way in Wetlands

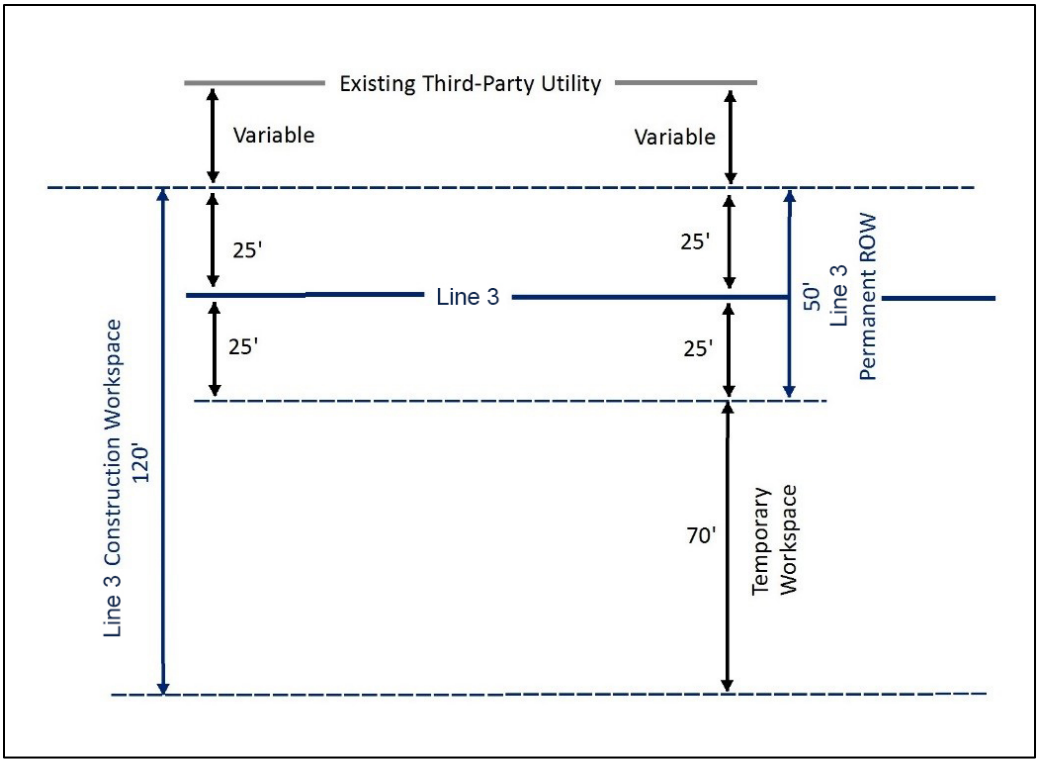

Figure 2.4-3. Plan View – Proposed Co-Location of the Proposed Line 3 Pipeline Right-of-Way with Existing Pipelines, Transmission Lines, and Highways in Uplands

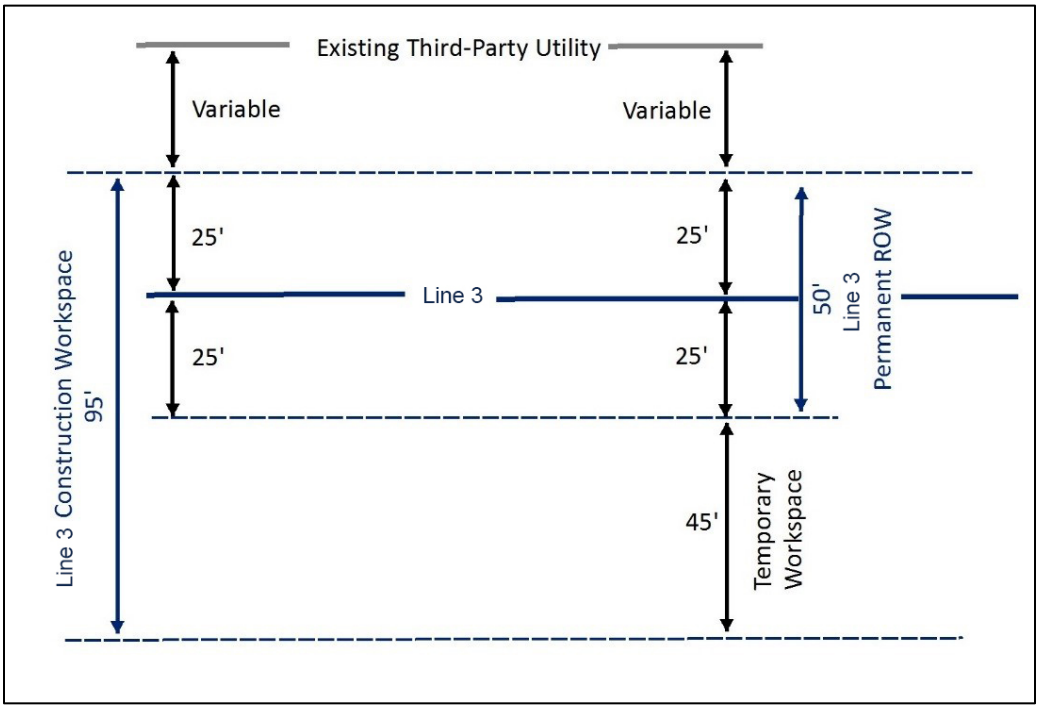

Figure 2.4-4. Plan View – Proposed Co-Location of the Proposed Line 3 Pipeline Right-of-Way with Existing Pipelines, Transmission Lines, and Highways in Wetlands

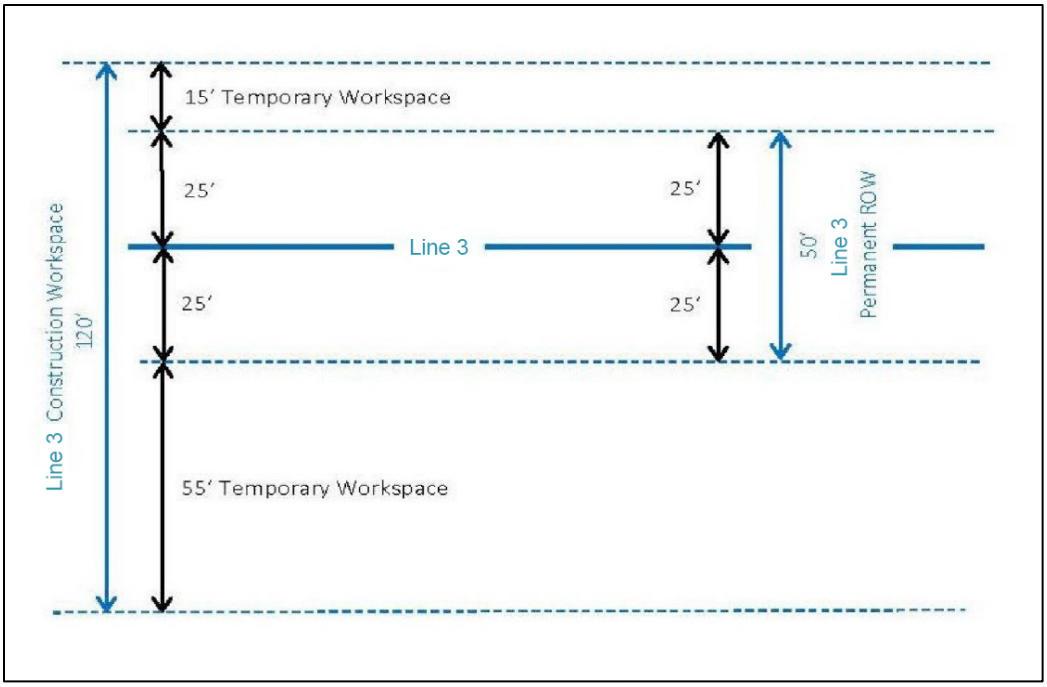

Figure 2.4-5. Plan View – Permanent Right-of-Way and Construction Work Area for the Proposed Line 3 Pipeline Route not Co-Located with Other Facilities in Uplands

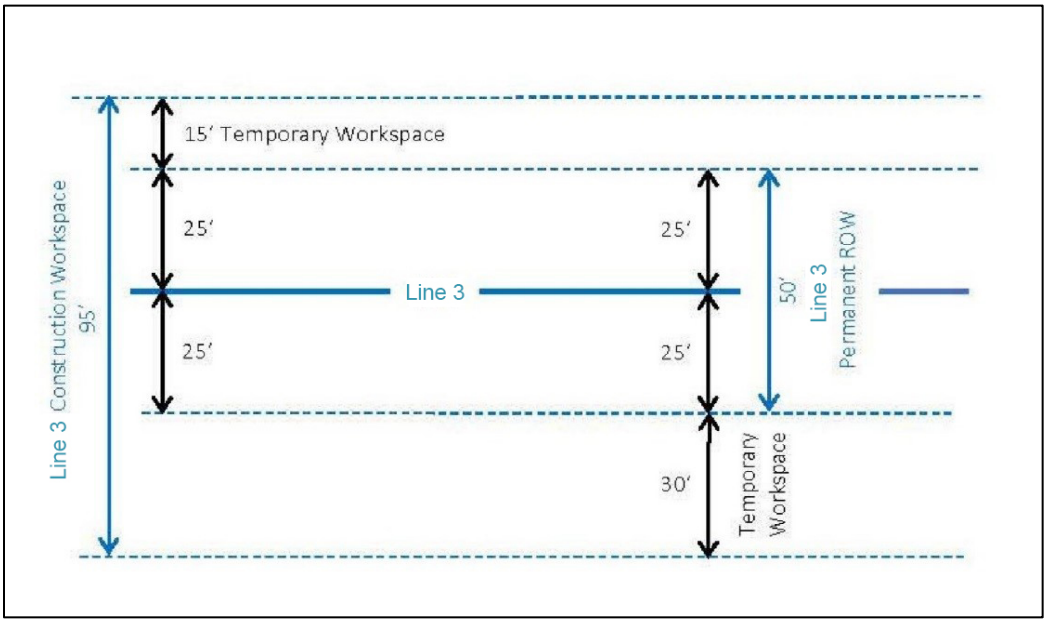

Figure 2.4-6. Plan View – Permanent Right-of-Way and Construction Work Area for the Proposed Line 3 Pipeline Route not Co-Located with Other Facilities in Wetlands

2.5 PROJECT COSTS

Total Costs in Minnesota Would Be $2.1 Billion, Excluding Land Purchases and Some Other Items

Enbridge expects the total costs of designing, permitting, and constructing the Line 3 Project from Hardisty, Alberta, Canada, to Superior, Wisconsin, to be $7.5 billion. Enbridge expects the U.S. portion of the Project to total approximately $2.6 billion and the Minnesota portion of the Project to account for approximately 80 percent, or $2.1 billion, of the U.S. total.

2.6 PROJECT SCHEDULE

Once Approved, Construction Would Start, with Commissioning Expected within 12 Months

Enbridge proposes to begin building the proposed Line 3 pipeline and associated facilities as soon as all construction-related regulatory approvals have been obtained. Enbridge plans to complete construction, testing, and commissioning of the new pipeline and associated facilities within approximately 12 months of initiating construction. Final restoration activities would likely extend beyond 12 months.

Prepositioning of pipe, construction materials, and construction equipment would begin approximately 60 days before the commencement of construction and would be expected to be completed within 45 days. Construction activities would be conducted simultaneously across seven construction segments. The planned construction spreads would be delineated as follows:

- Spread 1: MP 789.4 – MP 848.2
- Spread 2: MP 848.2 – MP 909.4
- Spread 3: MP 909.4 – MP D962.6
- Spread 4: MP D962.6 – MP D1014.4
- Spread 5: MP D1014.4 – MP D1066.6
- Spread 6: MP D1066.6 – MP D1118.3
- Spread 7: MP D1118.3 – MP 1097.8

Construction spreads 1 and 2 and portions of spreads 3 and 7 would be along Enbridge's Mainline corridor. The remaining construction would be conducted along other rights-of-way or a new corridor (mileposts identified with a "D").

Enbridge proposes to begin building pump stations as soon as they are permitted and expects that pump stations would be completed within approximately 10 months, depending on contractor availability, final design, and weather-induced delays. The order of events for typical construction efforts is described in Section 2.7.

Testing and certification would include hydrostatic testing and caliper tool runs. Testing and certification would be completed before line fill begins.

Commissioning would take place once all hydrostatic testing, caliper tool runs, and pump station construction is completed and would likely take about 45 days per pump station, with overlapping schedules across 3 months.

2.7 CONSTRUCTION METHODS

Measures are Proposed to Minimize Construction Impacts

This section describes the procedures that Enbridge would follow while constructing the proposed Line 3 pipeline and associated facilities, yards, and roads. It also summarizes the measures Enbridge would be required and/or has proposed to take to avoid or minimize potential impacts from the Project.

Based on regulatory requirements and industry BMPs, Enbridge has developed and proposed various measures for minimizing the potential impacts of construction and operation. Enbridge has committed to implementing and adhering to these Applicant-proposed measures, and they are considered are part of the proposed Project. Additional details about some of these measures are contained in Appendices E, F, and G. Specific regulatory requirements that will govern construction are addressed in Chapters 5 and 6, as well as additional mitigation measures to further minimize construction impacts.

2.7.1 Conventional Pipeline Construction Procedures

2.7.1.1 Construction Monitoring and Inspection

Construction Would Be Monitored and Inspected by Both Enbridge and State Agencies

Construction of the proposed Project would be subject to the requirements of a number of permit programs that are in place to manage impacts to the environment. Monitoring and inspection are requirements under the relevant permit programs for this Project. For example, under Minnesota PCA's NPDES CSW Permit, Enbridge will be required to conduct monitoring and inspections related to stormwater.

Consistent with the relevant permit programs, which are discussed in greater detail in Chapters 5 and 6, Enbridge proposes a two-tiered program for monitoring and inspecting construction: (1) a direct program of Environmental Inspectors (EIs); and (2) an independent third-party system of monitors to be implemented by state agencies.

EIs supplied by Enbridge would monitor and document compliance with company requirements, and the requirements of permit conditions,[6] the environmental protection measures contained in the Environmental Protection Plan included as Appendix E, and contract specifications. The specific concerns of landowners along the pipeline route would also be monitored during construction.

EIs Would Identify Environmental Issues and Train Project Personnel

EIs would serve as liaisons between Enbridge's Project management personnel, construction contractors, and federal and state agency officials. Their designated responsibilities would include identifying and marking environmentally sensitive areas to avoid during construction, clarifying environmental requirements within permit conditions, identifying potential environmental issues or challenges that might arise on a construction spread, and providing day-to-day oversight to ensure that construction practices abide by Enbridge's Environmental Protection Plan.

The EIs also would conduct appropriate environmental training for Project construction personnel, including how to identify and provide notification of the presence of sensitive environmental resources

[6] Minnesota PCA's NPDES CSW Permit would require stormwater-specific inspections of all active construction areas and areas of exposed soils every 7 days and after every rainfall event of 0.5 inch or greater.

(such as cultural and archaeological resources and threatened or endangered species). EIs would have the authority to stop construction activities and order corrective mitigation for actions that fail to comply with the environmental requirements imposed on the Project, including permit conditions and landowner agreements. Information on compliance provided by the EIs would be entered into an Enbridge database of Project commitments, permit conditions, and regulatory requirements.

State Agencies Would Independently Monitor Construction

Enbridge has committed to participating with state agencies with jurisdiction to establish a third-party monitoring program. Third-party monitors are independent monitors who document compliance with the environmental requirements of permits and Enbridge's construction plans. They do not have stop-work authority but do submit daily reports about construction activities to Enbridge and the agencies. Enbridge would coordinate with the participating agencies to identify the appropriate qualifications of the third-party monitors and determine their specific role during construction.

2.7.1.2 Construction Work Area

In the Construction Area, Storage and Work Areas Would Be Separated

The full width or limits of the pipeline construction work area would be 120 feet in uplands and 95 feet in wetlands. Within the construction limits would be two areas: one area for temporary storage of topsoil and trench excavation spoil (the non-working area), and a second area for active construction (i.e., the actual working area and travel lane for construction equipment) (Figure 2.7-1). The construction limits would include both the permanent right-of-way and the temporary construction work area.

Width of Temporary Work Area Would Be Determined by Co-Location Opportunities and Terrain

Three different conditions exist along the pipeline route that determine the width of the temporary construction work area within the overall 120-foot-wide construction limits: the pipeline would be located: (1) near an existing Enbridge easement; (2) near utilities owned by others; and (3) not near any existing Enbridge easements or other utilities.

From the Minnesota border to the Clearbrook terminal and from the Carlton Junction to the Wisconsin border, the pipeline would be installed adjacent to Enbridge's Line 67 where the company maintains an existing easement. In these segments of the route, a portion of the Line 67 easement would be used for the non-working area, as shown in Figures 2.4-1 and 2.4-2.

The portion of the route east of the Clearbrook terminal generally runs adjacent to pipelines, transmission lines, or roads owned by others where Enbridge does not have access to the adjacent easement. In these segments of the route, space is not available to extend the construction limit beyond the limit of permanent easement; therefore, the entire work area would be on one side of the pipeline alignment, as shown in Figures 2.4-3 and 2.4-4.

In some portions of the route between the Clearbrook terminal and the Carlton Junction, the route is not co-located with other facilities, and temporary construction work area can be used on both sides of the pipeline alignment, as shown in Figures 2.4-5 and 2.4-6.

In wetland areas, the overall width of the construction limits would be reduced to 95 feet. This would reduce the active working area from 80 feet to 55 feet in wetland areas.

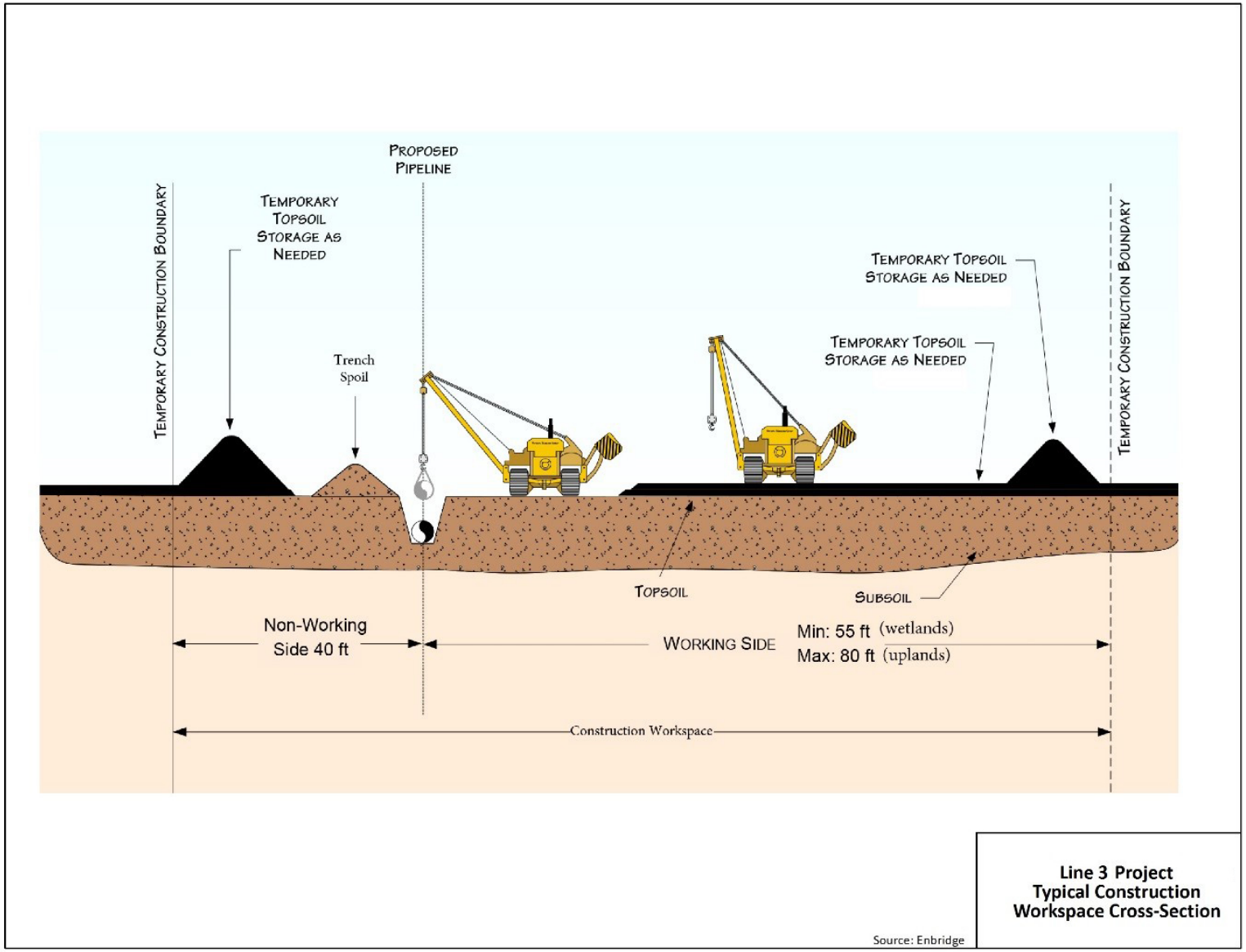

Figure 2.7-1. Typical Construction Cross-Section Adjacent to Line 67 or Where No Adjacent Facilities Occur

During construction, the topsoil and trench spoil would be segregated where required by permit conditions.[7] Trench spoil would be stored on the opposite side of the pipe trench from the construction work area, within the non-working portion of the construction work area. Segregated topsoil typically would be stored along the outer edge of the construction work area opposite of the pipe trench or within an ATWS. In some instances, topsoil may be stored on the trench spoil side of the construction works area (Figure 2.7-1). The sections below discuss clearing and grading of the construction work area and associated erosion control measures that would be implemented during this process.

2.7.1.3 Typical Pipeline Construction Procedures

Before Excavating, Work Area Would Be Surveyed and Safety Precautions Would Be Taken

First, the construction work area and ATWS would be surveyed and staked. The construction work area would then be cleared and graded as necessary. Silt fencing or other erosion and sediment control devices (ECDs) would be installed, and environmentally or culturally sensitive areas would be flagged by the EI as places construction personnel should avoid.

Second, before excavating, appropriate safety precautions would be taken, such as notifying the One-Call system to ensure that third-party utilities and pipelines are appropriately marked. Pipes, valves, and fittings would be placed along the construction work area in preparation for pipe stringing, bending, and welding and subsequent trenching, lowering of the pipeline, and backfilling of the trench. The pipeline then would be hydrostatically tested, and the right-of-way restoration process would begin. The following sections provide more detail for each of step of the typical construction process. The general construction sequence for the pipeline is depicted in Figure 2.7-2.

2.7.1.4 Surveying and Staking

2.7.1.4.1 Construction Survey

Before construction begins, Enbridge crews would survey and stake the centerline and construction limits and the exterior boundaries of the ATWS (Figure 2.7-2, panel 1). The exterior boundary stakes would mark the limit of approved disturbance areas that would be maintained throughout the construction period. Prior to any construction activity, Enbridge would contact the Minnesota Gopher State One-Call system to identify and mark the locations of underground utilities.

[7] Topsoil is segregated from trench spoil to maintain the integrity of the existing seed bed and facilitate natural restoration.

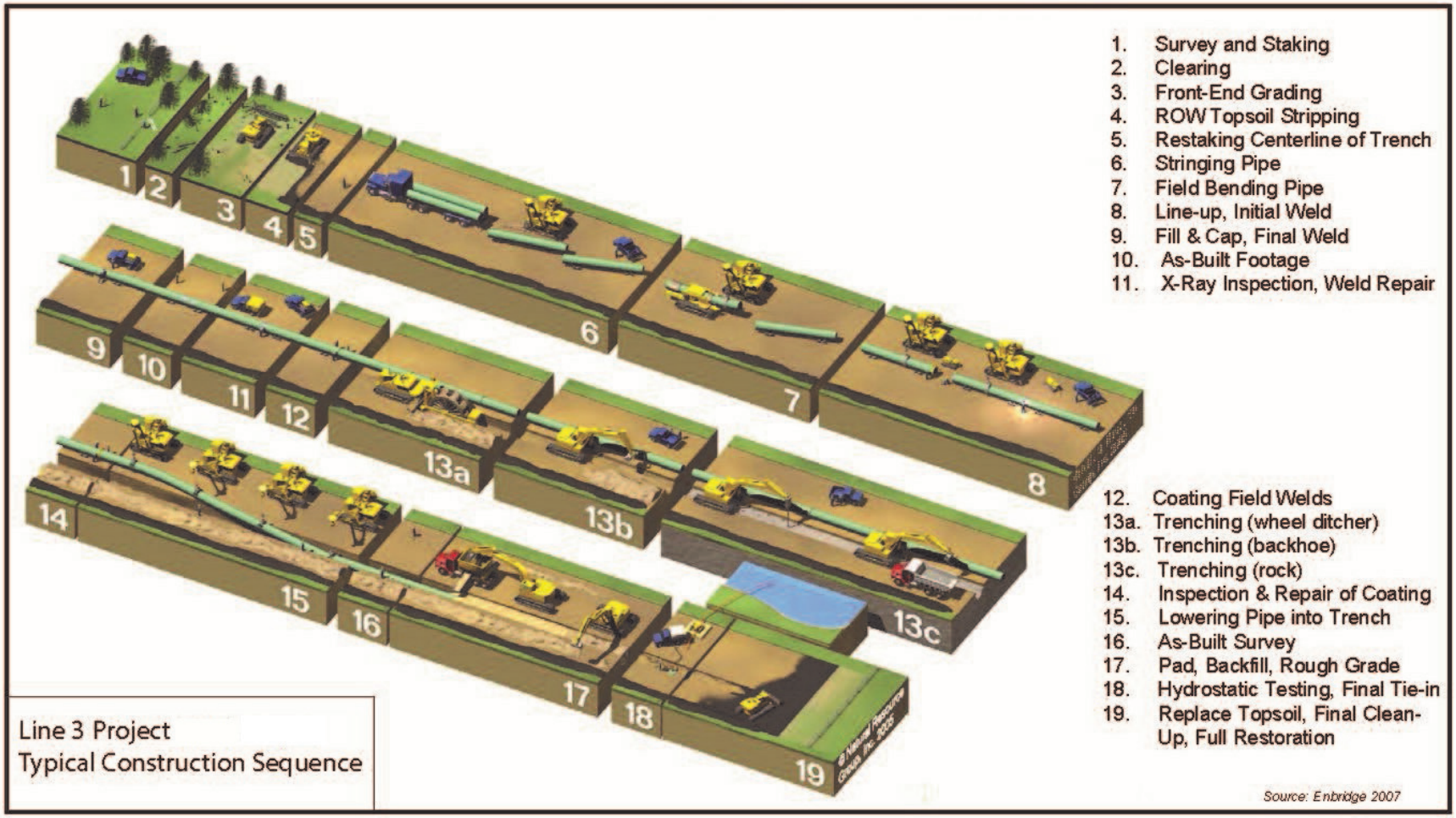

Figure 2.7-2. Planned Construction Sequence for the Proposed Line 3 Pipeline

2.7.1.4.2 Noxious Plant Survey and Treatment

Enbridge Would Take Measures to Prevent the Spread of Noxious Weeds or Invasive Species

During preconstruction surveys, Enbridge would also identify and mark the locations of noxious and invasive species as a part of its program to minimize or prevent the introduction and spread of those species along the right-of-way. Major infestation areas would be identified and treated with the recommended herbicides or their equivalents as agreed to by local agencies and landowners.

Construction equipment would be cleaned prior to arriving at the right-of-way. Equipment designated for construction within waterbodies would be washed and dried before use. In addition, construction equipment used in infested areas would be cleaned before departing from the infested areas. Methods could include mechanical means (scrape down; blow down) or washing with high-pressure water if mechanical means are not sufficient. Construction contractors would be required to document the cleaning history of all equipment planned for use. Equipment deemed not to be sufficiently cleaned would be denied access to the construction spreads until it could be cleaned in accordance with the measures identified in the Environmental Protection Plan to prevent the spread of noxious weeds and invasive species.

Methods for preventing and controlling noxious weeds and invasive species are detailed further in the Environmental Protection Plan (Appendix E).

2.7.1.5 Clearing and Grading

Shrubs, Trees, and Rocks Would Be Removed and Disposed of in Accordance with the Environmental Protection Plan

Enbridge proposes to clear the construction work area and ATWS of shrubs and trees (Figure 2.7-2, panels 2 and 3). The clearing crew would typically mow, chip, or mulch shrubs and ground cover vegetation. All non-merchantable timber would be chipped on site or removed from the construction work area. To facilitate cleanup and restoration in upland areas, tree stumps outside the trench line would be ground to below the normal ground surface or removed and hauled to an approved disposal facility. Stumps along the trench line would be completely removed and ground or hauled to an approved disposal facility.[8]

With landowner approval in non-agricultural upland areas, chipped or mulched woody debris may be uniformly broadcast across the construction work area or incorporated into the topsoil. Non-merchantable wood could be burned if Enbridge obtains the appropriate permits and approvals from the Minnesota Department of Natural Resources (Minnesota DNR). Enbridge would address handling of merchantable timber on private lands based on negotiations with the respective landowners. Enbridge would follow Minnesota DNR guidelines to address merchantable timber removed on State-managed forest lands.

Excess stones and rocks larger than 4 inches in diameter generally would be removed from the upper 8 inches of soil, or managed as otherwise specified in permit conditions or landowner agreements.

[8] "Approved disposal facilities" are locations licensed or permitted to receive waste materials. These include municipal or construction debris landfills or other upland locations with documented landowner approval that are in compliance with federal, state, and county laws and local ordinances for such use.

Excess rock would be piled in upland areas where landowner permission has been obtained or would be hauled offsite to an approved disposal site.

Erosion and Sediment Control Devices Would Be Installed after Clearing but Before Grading

Temporary ECDs are proposed to be installed in accordance with the procedures given in the Environmental Protection Plan (Appendix E) and Minnesota PCA's NPDES CSW Permit. This would include but not be limited to installing devices that would slow surface runoff flows (such as slope breakers, trench breakers, and stormwater diversions) and sediment barriers to prevent sediment from leaving the construction area (such as silt fencing and straw bales).

Enbridge proposes that temporary ECDs would be installed after clearing but prior to grading activities. Damaged or non-functioning ECDs would be repaired, replaced, or supplemented with functional devices within 24 hours of discovery, or as specified in applicable permits. Temporary ECDs present within the travel lane of the construction work area could be removed during active construction periods but would be replaced upon passage of the construction equipment or once construction activities have concluded for the day. Erosion control mats, mulch, or temporary seeding also may be installed in the right-of-way, depending on site conditions or if delays at a construction spread last more than 14 days.

2.7.1.6 Topsoil Stripping

Topsoil Typically Would Be Stripped to a Depth of 12 Inches and Would Be Segregated According to the Environmental Protection Plan

Enbridge proposes that topsoil would be stripped and segregated to maintain the integrity of the existing seed bed in cropland, hayfields, pastures, government set-aside program areas, and other areas as requested by landowners along the construction work area and in accordance with the Environmental Protection Plan (Appendix E) and the Agricultural Protection Plan (Appendix F) (Figure 2.7-2, panel 4).

On active agricultural lands, Enbridge proposes use one of three topsoil segregation methods: the full right-of-way method, the modified ditch-plus-spoil side method, or the trench-line-only method. A full description of these methods is included in the Agricultural Protection Plan. The type of topsoil segregation method used would depend on specific landowner agreements, site conditions, applicable permit requirements, and other factors.

Topsoil would be stripped to a maximum depth of 12 inches, except in the Red River Valley region, where up to 18 inches of topsoil would be stripped. Topsoil would be replaced within 14 days of backfilling the pipeline trench. If seasonal or other conditions prevent replacement within 14 days, temporary ECDs would be installed and maintained until conditions allow the replacement.

2.7.1.7 Delivery of Pipe Sections to Construction Spreads

Pipe and Construction Materials and Equipment Would Be Positioned before the Start of Construction

As noted in Section 2.6, prepositioning of pipe, construction materials, and construction equipment would begin approximately 60 days before the commencement of construction and would be expected to be completed within 45 days. Construction activities would be conducted simultaneously across seven construction spreads.

Enbridge has reportedly begun storing pipe at locations along the proposed route. Coatings on the exterior of pipes are used in conjunction with cathodic protection in order to protect the pipe from its environment. The coatings have a high dielectric strength, which prevents the flow of electrons to the pipe's surroundings, thus interrupting the electro-chemical reaction of the metal with its environment. Additionally, prior to installation, pipe sections should be inspected to ensure that scratches and dents, if present, to the pipe and/or coating are properly repaired. If they cannot be repaired, or there is question as to the pipe's structural or coating integrity, the section of pipe should not be used.

2.7.1.8 Pipe Stringing and Bending

Pipe Would Be Placed and Bent in the Construction Work Area

Prior to trench excavation, pipe would be placed (strung) along the construction work area and arranged to be accessible to construction personnel (Figure 2.7-2, panels 6 and 7). Specially designed stringing trucks would be used to deliver pipe from the pipe yards to the construction work area. Small portable cranes or side-boom tractors would be used to offload pipe from the stringing trucks and place it along the right-of-way. A mechanical pipe bending machine would bend individual joints of pipe to the angle required to traverse natural ground contours or to follow the pipeline alignment. In some areas, prefabricated fittings would be used where field bending is not practical.

2.7.1.9 Welding, Inspection, and Coating

Pipe Would Be Pre-Coated with Anti-Corrosives and Would Be Welded and Inspected

After stringing and bending are completed, pipe sections would be aligned, welded together, and placed on temporary supports along the edge of the area to be trenched (Figure 2.7-2, panels 8–12). All welds joining pipe segments or pipe fittings would be inspected visually and X-rayed by Enbridge personnel to ensure the integrity of all weld joints. The pipe would be coated at the factory with bonded epoxy or a similar material to prevent corrosion. Enbridge would apply a similar coating to welded joints and electronically inspect the pipeline coating before the pipe is lowered into the trench.

2.7.1.10 Trenching

Trench Typically Would Be 7 Feet Deep, 5 Feet Wide at the Bottom and 7 Feet Wide at the Top

Trenching typically would begin after the pipe has been welded and placed near the trench line. Backhoes or ditching machines would be used to excavate the trenches and place the excavated materials in stockpiles adjacent to the trench (Figure 2.7-2, panels 13a–13c). Areas where agricultural drain tiles[9] would be cut during trenching would be flagged. If drain tiles are damaged during construction, they would be repaired to restore operating condition in compliance with the Agricultural Protection Plan (Appendix F). Enbridge is developing a Contaminated Sites Management Plan in consultation with Minnesota PCA. This plan will be completed prior to construction to be implemented in the event that potentially contaminated properties are discovered within the construction work area.

Trenching would be conducted to a depth of approximately 48 inches burial depth plus the 36-inch pipeline diameter, or approximately 7 feet, except where described below. Table 2.7-1 lists the current

9. Drain tiles are subsurface drainage systems—typically consisting of networks of pipes that can be an assortment of diameters, depending on the drainage capacity required and made from an assortment of materials (e.g., concrete, clay, polyethylene)—that facilitate removal of excess water from agricultural lands.

U.S. Department of Transportation (USDOT) regulations (49 CFR 195.248, July 1998)[10] for the required minimum burial depth (depth from soil surface to the top of the pipe) for the pipeline. Although Enbridge would be required to bury the pipeline to at least these depths, the pipeline would be buried to a depth of 48 inches where possible, except as described below.

Table 2.7-1. U.S. Department of Transportation Required Minimum Burial Depths (Cover) of Crude Oil Pipelines

Location Type	Cover (inches)	
	Normal Excavation	Rock Excavation[a]
Industrial, commercial, and residential areas	36	30
Crossing of inland waterbodies ≥ 100 feet wide	48	18
Drainage ditches at public roads and railroads	36	36
Any other area	30	18

[a] "Rock excavation" is defined by the U.S. Department of Transportation as any excavation that requires blasting or removal by equivalent (49 CFR 195.248, July 1998).

In agricultural areas, State law (Minnesota Statutes 2014, 216G.07, Subd. 1) requires 54 inches of cover over the installed pipeline, unless the landowner waives the minimum depth requirement. Enbridge would request landowners to waive this requirement so that Enbridge could maintain the target depth of 48 inches. If landowners do not waive this requirement, Enbridge would abide by the 54-inch requirement.

Trench at Any Given Location Would Be Left Open for a Maximum of 3 Days

To achieve the desired burial cover for the pipe, the trench would typically be about 5 feet wide at the base and up to about 7 feet wide at the top, with walls sloped to maintain stability according to soil types and other site-specific conditions. In unstable and saturated soils, the trench might be wider.

Enbridge plans to minimize the amount of time that a trench is left open to 3 days at any given construction spread. This duration could be shortened based on site conditions or as specified by site-specific permits.

If trench dewatering is necessary, the onsite EI would review and approve in advance the water discharge plan to ensure that BMPs are being used, including the use of a dewatering filter device to minimize scour and the potential for sediment-laden water from reaching nearby wetlands or waterbodies. BMPs that would be used are described in the Environmental Protection Plan (Appendix E).

2.7.1.11 Lowering-In and Backfilling

After welding, inspection, coating, and trench excavation have been completed, the pipe would be lowered into the trench by side-boom tractors (Figure 2.7-2, panels 15–17). In sloped areas, trench breakers would be installed to avoid subsurface water flow and erosion along the trench line.

10. The USDOT PHMSA has established regulations governing the safety of hazardous liquid pipeline facilities and the transportation of hazardous liquids associated with those facilities in or affecting interstate commerce.

Lowering-In and Backfilling Would Be Conducted so as to Minimize Effects on Sensitive Resources

To best protect sensitive resource areas such as wetlands or waterbodies, trench breakers would be installed based on site-specific conditions, including the degree and length of the slope; the presence of sensitive resource areas downslope, such as wetlands or waterbodies; and proximity to other features, such as roads or railroads.

Backfilling follows pipe installation and consists of replacing the material excavated from the trench. In areas where topsoil has been segregated, the subsoil will be replaced first, and the topsoil will be spread uniformly over the area from which it was removed. Prior to backfilling, the trench will be dewatered if water obscures the trench bottom. The trench would be backfilled to the approximate ground surface elevation no more than 6 inches above the level of the surrounding ground.

The backfilled trench may be compacted to minimize settlement, depending on ambient site conditions. A greater level of compaction would be required when backfilling trenches at railroad crossings, pipeline crossings, and stream and river crossings; in irrigated lands; and at valve sites. Trench compaction would not be required in rocky or swampy areas. Excess trench spoil would be feathered to the existing grade within the existing stripped area in a manner that does not impede drainage patterns or agricultural operations. Spoil that cannot be distributed in this way would be disposed of in accordance with the Environmental Protection Plan.

Cultivated fields and compacted or rutted areas will be tilled prior to topsoil replacement with a deep tillage device or chisel plowed to loosen compacted subsoils. If subsequent construction and cleanup activities result in further compaction, additional measures will be undertaken to alleviate the soil compaction.

For more detailed information on lowering-in and backfilling, see Applicant's Environmental Protection Plan (Appendix E).

2.7.1.12 Mainline Valve Installation

Installing MLVs Would Follow a Process Similar to That Used for Construction Generally

Installation of MLVs would require similar steps to the overall construction of the pipeline. The land on which the MLV would be located would be surveyed, staked, cleared, graded, and excavated following the same procedures as for the pipeline. Next, the Mainline pipe, MLV foundation, and valve would be installed (Figure 2.3-1) and the site would be backfilled. After backfilling, the MLV would undergo testing as described in Section 2.7.1.13, and electrical and controls equipment would be installed and tested. Once the tests are complete, the MLV would be operational. Cleanup, restoration, and revegetation of the site would occur as described in Section 2.7.1.14.

2.7.1.13 Pipeline Testing

Pipeline Would Be Cleaned and Tested to Ensure It Could Be Operated at Design Pressure

After backfilling, Enbridge would hydrostatically test the pipeline in accordance with PHMSA regulations to ensure that the system would be capable of operating at the design pressure (Figure 2.7-2, panel 18). Hydrostatic testing involves filling a segment of the pipeline with water, hydraulically pressurizing it to a prescribed pressure, and maintaining that pressure for a given amount of time. The pressure and testing duration are specified by federal (USDOT) testing specifications.

Prior to conducting hydrostatic tests, Enbridge would run a cleaning PIG through the pipe to remove any construction debris, mill scale, dirt, and dust. Rinse (or wash) water would be used in conjunction with the cleaning PIG. The pipe debris and rinse water would be disposed of offsite at an approved waste facility.

Generally, the hydrostatic test water volumes required for each construction spread would range from approximately 11 million gallons to 17 million gallons. These volumes do not account for transferring water between testing segments. Transferring or recycling test water between pipeline segments would reduce the total volume needed for hydrostatic testing. Disposal of test water would need to be performed under the NPDES and associated permit. Depending on the source of rinse and test water, a water withdrawal notification may be necessary from the originating facility.

2.7.1.14 Cleanup, Restoration, and Revegetation

Enbridge Would Restore the Site as Much as Possible to Its Original Condition

Following backfilling of the pipeline trench, the construction work area would be cleaned and re-graded. Temporary erosion control devices would be installed according to timelines specified by applicable permits (Figure 2.7-2, panel 19). The trench and construction work area would be re-graded and restored as nearly as practicable to the original contour of the land. Topsoil would be redistributed over areas from which it was originally removed. Fences that had been removed to install the pipeline would be reconstructed across the right-of-way.

During final grading, slopes in areas other than active agricultural lands would be stabilized using permanent erosion control devices, including permanent berms.

Prior to replacing topsoil, compacted or rutted soils in cultivated fields would be loosened with a deep-tillage device or a chisel plow. If subsequent cleanup and restoration activities result in further compaction, additional measures would be undertaken to alleviate the condition.

Disturbed areas would be revegetated in accordance with the Environmental Protection Plan, permit requirements, and site-specific easement agreements with landowners. Enbridge would coordinate with landowners on any perceived restoration problems.

2.7.2 Special Pipeline Construction Procedures

Where the pipeline route crosses wetlands, waterbodies, steep terrain, and other infrastructure, or is near residences, construction techniques other than those previously described would be used.

2.7.2.1 Conventional Construction in Wetlands

Wetland Construction Would Require Special Methods and Close Monitoring

All wetland construction would be in accordance with Clean Water Act (CWA) permits issued by the U.S. Army Corps of Engineers (USACE) and Minnesota PCA's NPDES CSW Permit. Wetland construction would require monitoring to ensure compliance during construction (see Section 2.7.1.1). Along most of the pipeline route, construction in wetlands would consist of the same sequence as construction in uplands, albeit within narrower construction limits (see Figures 2.4-2, 2.4-4, and 2.4-6).

Wetland construction would consist of clearing, grading, trenching, installation, backfilling, cleanup, and revegetation, as described below. Access to wetlands would be limited to the construction work area or

by approved access roads. Construction equipment would be limited to low-ground-pressure equipment or conventional equipment working from timber construction mats. Final wetland crossing methods for each wetland would be determined in coordination with USACE and local government units.

2.7.2.1.1 Clearing and Grading

ATWS Typically Would Be Located 50 Feet from Wetlands, and Grading Would Be Minimized

Vegetation within wetlands would be cut at ground level, leaving root systems intact. Trees and shrubs would be removed, and stumps that are cleared from wetlands would be removed to proper disposal locations. Hydro-axe debris could be left in the cleared area but would be evenly spread throughout.

Enbridge would locate ATWS in upland areas at least 50 feet from wetlands, to the extent possible, and would limit the size of the ATWS to the minimum needed to conduct the wetland crossing. Where site conditions do not enable a 50-foot buffer, the ATWS would be located as far as practicable from the wetland. Vegetation would not be cleared nor construction activities undertaken between the ATWS and wetlands. In some cases, Enbridge might seek regulatory agency approval to locate ATWS in select wetlands. These instances would include when wetlands are adjacent to waterbodies, roads, railroads, non-Enbridge utility crossings, and pipeline crossovers.

At and adjacent to wetland crossings, grading would be minimized to the extent practicable. Enbridge would typically confine grading activities to the area of the trench, with grading allowed elsewhere only where required for safety reasons or to restore the construction work area after backfilling the trench.

Enbridge would install and maintain erosion control devices in construction work areas upslope from wetland boundaries to prevent sediment from entering wetlands from along the work area, and along the edge of the construction work area to contain spoil and sediment within the construction work area as it passes through or upslope of wetlands.

2.7.2.1.2 Trenching and Installation

Large Wetlands Require Different Modes of Trenching and Installation than Small Wetlands

While trenching in unsaturated wetlands, up to 1 foot of the topsoil (i.e., the organic layer) would be segregated from the remaining trench spoil. If the soils in the wetland area are stable and capable of supporting equipment, Enbridge would string, weld, and lower the pipe into the trench as described for upland areas.

The construction methods described above apply to smaller wetlands that provide some bearing capacity for the moving of equipment and materials. When crossing large wetlands with standing water and saturated soils that are incapable of supporting large equipment, the trench would be excavated using a backhoe supported on timber mats. With this method, it is often not feasible to separate topsoil from the underlying soil. However, as much of the organic layer as possible would be segregated, based on the level of saturation or site conditions.

For crossing large wetlands with standing water and saturated soils, the pipe string would be assembled in an ATWS and floated across the wetland into the excavated trench. Once the pipeline is in position, it would be sunk into position and welded to the adjacent, upland segments of the pipeline. After the pipe is installed, the trench would be backfilled and restored.

2.7.2.1.3 Cleanup and Revegetation

Enbridge Would Remove Debris, Seed Disturbed Wetlands and Enable Natural Regeneration

Enbridge proposes to begin rough grading and cleanup as soon as practical after the trench is backfilled. Rough grading includes restoring the construction work area and ATWS to their original conditions, installing or repairing temporary erosion control devices, and installing temporary slope breakers on sloped uplands adjacent to the wetlands.

Construction debris and timber mats would be removed, and any fences removed during construction would be replaced. Disturbed wetlands would be seeded with oats or a temporary seed mix (unless standing water is prevalent), or as otherwise directed by landowners or regulatory agencies. Enbridge would otherwise allow the wetlands to revegetate naturally from the seeds and rhizomes present in the topsoil and natural recruitment.

Fertilizer, lime, or mulch would not be used to restore wetlands. Enbridge would also implement any further restoration and long-term monitoring guidance required by USACE in the required CWA Section 404 permit or by the local government unit in relation to the Wetland Conservation Act permit.

2.7.2.1.4 Horizontal Directional Drilling or Guided Bore in Wetlands

HDD Would Be Used to Cross Especially Sensitive Areas and Would Be Closely Monitored

At certain locations along the pipeline route where trenching methods are not feasible, HDD or guided bore methods would be used to install the pipeline. HDD involves drilling under a wetland or waterbody and installing the pipeline without physical disturbance of the wetland or waterbody feature. These methods would be used to cross environmentally sensitive areas such as riparian forested wetlands, sensitive fishery resources, and impaired waters. The method is described in detail in Appendix G.

The Guided Bore Method Would Be Used for Waterbody Crossings near Roads or Railroads

The guided bore method would be used at crossings of narrow wetlands and ditches adjacent to roads or railroads. It is not suitable adjacent to steep slopes, where water tables are near the surface, or where substrates consist of loose sand and gravel. The guided bore method consists of boring an auger from an entrance hole on one side of the wetland to a corresponding hole on the other side of the wetland. The bore may or may not include a casing. An advantage of the guided bore is that there is no concern for a sediment release. The method is described in detail in Appendix G.

2.7.2.2 Winter Construction of Wetland Crossings

Winter Construction Can Be Useful in Large Saturated Wetlands, but Weather Is a Constraint

In large saturated wetlands with unconsolidated soils, construction of large-diameter pipelines is often difficult and has the potential for greater impacts than in other wetland areas because of the wider trench widths required and the greater amount of surface disturbances.

Overall, winter construction disturbs soil and vegetation less than does summer construction—when unstable soils would result in increased sloughing of trench walls and wider trenches, and would cause significantly more soil disturbance than excavation under frozen conditions. In addition, frost or ice roads during winter construction could allow heavy construction equipment to access the construction work area without damaging the underlying wetland vegetation and upper layers of the wetland surfaces.

Enbridge would attempt to construct the entire pipeline without using winter construction methods, which require long stretches of sustained cold weather, for instance, to construct and use ice roads to access the construction area. However, Enbridge could be required to use winter construction procedures at locations where the approach to saturated areas is lengthy or the length of the saturated areas themselves is long.

2.7.2.2.1 Clearing and Grading

After Construction of Ice Roads, Winter Construction Methods Are the Same as Regular Construction

At winter construction locations, construction vehicles compress frost within the ground until it reaches a depth that would safely support heavy construction equipment and ice roads can be built. At that point, the sequence for winter construction mostly includes the same components and methods as conventional, non-winter construction, including clearing and grading.

2.7.2.2.2 Trenching and Installation

After Segregating Topsoil, Installing the Pipe Follows the Conventional Pattern

Trenching during winter construction is conducted using a saw or ripper to cut the frost along the trench line to allow excavation of the trench spoil. If the soil is frozen to a depth that extends deeper than the depth of the topsoil, topsoil segregation might not be effective because the frozen soil could come out of the trench in chunks that contain both subsoil and topsoil. In such cases, the saw or ripper would cut just to the depth of the topsoil to remove and segregate the topsoil prior to resuming the trenching process.

Once the sawing or ripping is complete and the trench is excavated, installation of the pipe follows conventional, non-winter lowering-in and backfilling methods.

2.7.2.2.3 Cleanup and Revegetation

If Winter Weather Impedes Cleanup, Enbridge Could Install Erosion Control Devices

The size of the excavated trench would be reduced during winter construction to minimize the amount of frozen backfill removed from the trench and to facilitate restoration of the trench to its preconstruction contours. If winter conditions impede or prevent final grading and cleanup of the construction area, Enbridge would stabilize the area and maintain temporary ECDs in place until permanent ECDs could be installed. Based on the construction location and weather conditions, Enbridge could install dormant seeding and mulch to allow revegetation to occur once spring arrives.

2.7.2.3 Waterbody Crossings

Proposed Crossing of 242 Waterbodies Would Require Regulatory Approvals

Waterbody construction would require a Minnesota DNR License to Cross Public Waters for waterways classified as Minnesota Public Waters and would be subject to CWA permits issued by USACE for work that would fall under USACE jurisdiction. After consulting with appropriate regulatory agencies and doing an engineering review, Enbridge would cross waterbodies using the most environmentally appropriate and constructible method. The types of methods that could be used include wet trench, dam and pump, flume, and HDD or guided bore. The locations and initial method proposed for undertaking each crossing are shown in Appendix G.

Waterbodies Would Be Crossed Perpendicularly and in Short Timeframes

To minimize the length of the crossing, waterbody crossings would be designed to align as close to perpendicular to the axis of the waterbody as engineering and routing constraints allow. Unless specified otherwise in applicable permits or through consultation with regulatory agencies, Enbridge plans to cross minor waterbodies (less than 10 feet wide) within 24 hours, intermediate waterbodies (10 to 100 feet) within 48 hours, and large waterbodies as specified in applicable permits.

The construction techniques used would include appropriate clearing and grading; installing erosion control measures; possibly removing beavers and removing or altering beaver dams; constructing temporary equipment bridges; and installing the pipeline by either the wet trench, dam and pump, flume, HDD, or guided bore methods. Trenching and Installation methods are summarized below and detailed in Appendix G. All construction techniques would need to comply with regulations and the terms of various permits, which are discussed further in Sections 5.2.1 and 6.3.1.

2.7.2.3.1 Clearing and Grading

Enbridge would clear existing vegetation from the construction work area on the banks of the waterbodies as necessary to prepare for grading operations. A 20-foot-wide buffer of non-woody vegetation would be maintained on the banks of waterbodies until beginning trenching at the crossing. Woody vegetation (trees and shrubs) may be cut and removed within this buffer during initial clearing of the right-of-way and construction work area. The stumps of woody vegetation outside the trench line would be ground to below the normal ground surface or removed and hauled to an approved disposal facility. Stumps along the trench line would be completely removed and ground or hauled to an approved disposal facility. In addition, grading could be necessary on the banks of some waterbodies to install temporary bridges across the waterbodies. Grading also could be necessary for approaches to waterbodies in order to create safe working surfaces and allow for limitations on pipe bending.

Grading would be directed away from the waterbody to reduce the potential for material to enter the waterbody. Temporary erosion control measures and spoil containment devices (such as silt fences and straw bales) would be installed as necessary to minimize the potential for disturbed soils or trench spoil to enter the waterbody from the permanent right-of-way and construction work area. ATWS at waterbody crossings typically would be set back 50 feet from the water's edge where topographic and other site conditions allow.

Enbridge may be required to trap beavers or alter or remove beaver dams to lower water elevations within the Project corridor prior to construction. To alter a beaver dam, a perforated steel culvert, or equivalent device, would be inserted through the dam to facilitate water drainage. The culvert would be a minimum of 12 inches in diameter and 20 feet in length. The perforations would be a minimum of 1.5 inches in diameter and would encompass the entire circumference of the culvert and extend along its entire length. Enbridge would obtain landowner approval and all necessary environmental permits for all trapping of beavers and alteration or removal of beaver dams.

2.7.2.3.2 Temporary Equipment Bridges

Enbridge would install temporary equipment bridges across most waterbodies, including agricultural and intermittent drainage ditches that may connect to sensitive habitats downstream. The equipment bridges would allow vehicles and equipment to travel along the construction work area without transporting sediment or hazardous fluids into the waterbodies. Equipment required to install the equipment bridges would be permitted to ford a waterbody a single time prior to installing the bridge;

otherwise, construction equipment would not be permitted to ford waterbodies (except for trench excavators, which may be required to enter a waterbody during excavation; in such cases, the excavator would enter the waterbody on clean construction mats).

Typically, Enbridge would not install equipment bridges across waterbodies that would be directionally drilled unless an efficient and economical method to transport construction equipment beyond the waterbody (i.e., a nearby road or bridge) is not available.

Equipment bridges would include: (1) prefabricated timber mats that span the waterbody, with or without an instream support culvert; (2) clean rock placed over flume pipes; (3) railroad flat cars; (4) flexi-float or other temporary bridging; or (5) other methods as approved by appropriate regulatory agencies. Enbridge would design the equipment bridges to accommodate the maximum foreseeable stream flow and prevent flow restrictions while in place. Support structures would be placed above the ordinary high water mark of the waterbody. The bridges would be constructed with clean materials and would be maintained to prevent soil accumulation on the bridge from entering the waterbody. Enbridge would remove the temporary equipment bridges as soon as possible during final restoration.

2.7.2.3.3 Trenching and Installation

After initial clearing and grading is completed, Enbridge would install the pipeline across the waterbody using one of the four crossing methods: wet trench, dam and pump, flume, or HDD or guided bore. These methods are summarized below and are further described in the Environmental Protection Plan (Appendix E) and in Appendix G. Enbridge currently does not anticipate the need to conduct blasting activities to excavate trenches through any of the waterbodies. As such, Enbridge does not anticipate any complications with reaching the proper depth for installing the pipeline across the waterbodies.

- Wet trench method – The open-cut method (also known as the “wet open-cut” method) is typically used to cross waterbodies for which dam and pump, flume, and HDD are not permitted. This method involves digging an open trench across the waterbody, installing pipe, and backfilling the trench.
- Dam-and-pump method – The dam-and-pump method is a dry crossing method that is typically used for waterbodies with low gradients and flow or waterbodies with meandering channels. This method involves constructing temporary dams across the waterbody, both upstream and downstream of the crossing, prior to excavation. Dams generally would be installed using sandbags, plastic sheeting, sheet piling, or steel plates. Pumps and piping would be used to transport the stream flow around the construction area for the duration of the process.
- Wet flume method – The flume method is a dry crossing method used for relatively narrow waterbodies free of large rocks and bedrock at the trench line and with a relatively straight channel across the construction work area. The flume method generally is not appropriate for wide, deep, or heavily flowing waterbodies. Use of this method involves installing dams upstream and downstream of the construction area and installing one or more pipes (flumes) that would extend along the course of the waterbody and through both dams. Streamflow would be carried through the construction area by the flume pipe(s).

- HDD – HDD involves drilling under a waterbody and installing the pipeline without physical disturbance within the wetland or waterbody feature (impacts of HDD crossings, including risk of "frac-out," are discussed in Sections 5.2.1 and 6.3.1.). This method could be used to cross environmentally sensitive areas identified by permitting agencies, including Minnesota DNR and USACE, such as riparian forested wetlands, sensitive fishery resources, and impaired waters.

- Guided bore – The guided bore method typically is used for crossings of narrow wetlands and ditches adjacent to roads or railroads. It is not suitable adjacent to steep slopes, where water tables are near the surface, or where substrates consist of loose sand and gravel. The guided bore method consists of boring an auger from an entrance hole on one side of the wetland to a corresponding hole on the other side of the wetland. The bore may or may not include a casing. An advantage of the guided bore is that there is no concern for a sediment release.

2.7.2.3.4 Restoration and Revegetation

Enbridge Would Restore and Revegetate Water Crossings and Would Stabilize Streambanks

Once a waterbody has been crossed using the wet trench, dam-and-pump, or flume method, the crossing site would be revegetated and restored. Such restoration and revegetation are generally not necessary when using the HDD method, which does not generally disturb surface features for those portions outside the entry and exit points.

Enbridge would stabilize streambanks and install temporary ECDs within 24 hours of completing the crossing (weather and soil conditions permitting) to minimize the potential for sedimentation. On unstable slopes, Enbridge would install temporary slope breakers on all sloped approaches to waterbodies. The greater the slope, the closer together the slope breakers would be placed.

Other stabilization methods Enbridge might use are berms, creating 50-foot buffers, seeding, mulch, or erosion control blankets. For banks potentially subject to significant erosion, Enbridge could also install riprap after getting the necessary permits. Enbridge would stabilize a 50-foot buffer on either side of the waterbody crossings using a temporary seed mix (consisting of vegetation such as annual oats or slender wheatgrass; per Appendix C, Seed Mixes of the Environmental Protection Plan [Appendix E of the EIS]), mulch, and/or erosion control blankets. As a BMP, annual rye would be avoided as a temporary cover crop due to its potential allelopathic effects on permanent revegetation species. Silt fences, or a functional equivalent, would be installed upslope of the temporarily seeded buffer area. Enbridge would not plant seed in cultivated land, standing water wetland, or other standing water areas.

If the soils of the streambank are considered unstable or there is a potential for significant bank erosion, Enbridge would use supplemental bank stabilization methods such as rock riprap. However, rock riprap would be used only where site-specific conditions require such use and after applicable agency permits or approvals have been acquired.

During final cleanup, Enbridge would install permanent slope breakers across the full width of the permanent right-of-way and construction work area to slow surface runoff flows that could cause erosion and carry sediments into the waterbodies. Once the streambanks have been reestablished, Enbridge would conduct final seeding of the streambanks using native seed varieties intended to supplement revegetation through recruitment from the existing seed stock within the replaced topsoil.

Where necessary for access, the travel lane portion of the construction work area and temporary bridges at water crossings would remain in place until Enbridge completes final cleanup activities. Temporary equipment bridges would be removed after final cleanup, seeding, mulching, and other right-of-way restoration activities have been completed. The temporary ECDs would be removed after vegetation is reestablished. Additional detail on restoration and revegetation methods is provided in the Environmental Protection Plan.

2.7.2.4 Infrastructure Crossings

Enbridge Would Cross Railroads, Roads, and Other Pipelines

To cross existing infrastructure, Enbridge proposes to bore under railroads and bore under or use an open-cut trench method at road crossings. At these locations, an ATWS might be required and would be determined on a site-specific basis. The ATWS would be adjacent to the crossings and would be limited to the size necessary to contain spoil from the crossing. Roadway crossings would be maintained to prevent tracking mud onto the roadways. A listing of railroad and road crossings and Enbridge's proposed crossing method for each is provided in Appendix H.

The Line 3 Project would cross existing Enbridge pipelines at two locations immediately west of the Clearbrook terminal. The proposed Line 3 pipeline would run below the existing Enbridge lines at a general separation distance of 2 feet.

2.7.2.5 Construction in Urban Areas

In Urban Areas, Enbridge Would Control Noise and Dust Emissions

Enbridge's proposed Line 3 Project is routed through predominately rural areas. Approximately 8 acres of the total area of the proposed Line 3 Project construction work area would include "developed land," defined as land consisting of more than 30 percent asphalt, concrete, and buildings. Approximately 124 residences would be within 300 feet of the Project's construction work area, and 19 residences would be within 50 feet, including seven within the construction workspace and one within the permanent right-of-way. Enbridge would conduct most construction activities during daylight hours, in part to reduce the duration of increased noise emissions associated with construction. Enbridge would also spray water on the construction work area and access roads near residences to reduce dust emissions during construction. Enbridge would obtain permits and approval from Minnesota DNR, as needed, for water appropriations used for dust suppression.

2.7.2.6 Blasting

To date, Enbridge has identified only one location where blasting would be necessary for installing the pipeline. The location is at Milepost D1128.4 within Carlton County. The area contains rock outcroppings near the ground surface that extend for an estimated 0.25 mile. Enbridge would develop a Blasting Plan prior to commencement of construction.

2.7.3 Construction of New and Modified Pump Stations and Terminal Modifications

Constructing aboveground facilities (MLVs and pump stations) would involve clearing and grading, as necessary, including some cut-and-fill activities, construction of foundations, and installation of equipment such as new pumps and pipe reconfigurations. Small amounts of fill that may be needed for the foundations would be obtained from existing commercial pits. Switchgear buildings and buildings

used to house the variable frequency drive equipment would be prefabricated and installed onsite. Pumps would be installed on foundations in pump house buildings.

2.7.4 Preparation of Contractor/Materials and Pipe Storage Areas

In Building Storage Yards, Enbridge Would Avoid Environmentally Sensitive Areas

Enbridge proposes to select contractor/materials and pipe storage yards based on their proximity to the construction work area. Additionally, sites would be selected based on whether they can be accessed by sufficient load-rated haul roads, whether the soil and topography promote water drainage from the sites, whether Enbridge would be able to restore the sites to preconstruction conditions, and whether Enbridge could obtain landowner approval to use the sites.

If a site meets the above parameters, Enbridge would conduct environmental surveys to identify environmentally sensitive areas and other potential environmental impacts of the proposed yard. Enbridge would then design the layout of the contractor/material or pipe storage yard to minimize environmental impacts during use of the site.

The current pipe and rail yards permitted for use by Enbridge do not affect any identified sensitive environmental features. The yards are leased or fee-owned sites that would be restored upon completion of the Project.

2.7.5 Constructing New or Upgrading Existing Access Roads

Enbridge Would Use Existing Roads and Would Upgrade or Build New Roads as Needed

Enbridge would attempt to use existing roads to access the construction work area as much as possible. Roads that can currently accommodate construction vehicles and traffic would not require improvement or modification. However, roads that could not accommodate construction vehicles, such as certain dirt and gravel roads, would require widening or grading. Enbridge would widen roads by increasing the width of the road bed. Enbridge would grade only the existing road beds or newly widened road beds and would leave the land adjacent to the road beds in its existing state.

Enbridge would restore widened and graded roads to preconstruction conditions upon completion of construction, with the exception of roads providing access to the Two Inlets and Palisade pump stations, which would be retained after construction is complete to provide access for maintenance during operation. Enbridge would re-contour graded roads and areas beyond the original road bed of widened roads. Enbridge would also seed disturbed areas with a suitable seed mix for the area. Enbridge would leave any improved roads intact if requested by the respective landowner.

2.7.6 Environmental Compliance and Inspection

EIs would monitor compliance with the environmental restoration and mitigation measures included as permit conditions and in contract specifications with landowners along the construction work area.

2.8 OPERATION AND MAINTENANCE METHODS

The Enbridge operations and maintenance program complies with USDOT regulations included in 49 CFR Parts 194 and 195 and in other applicable federal and state regulations. The program is summarized in the sections that follow.

2.8.1 Project Operations

Enbridge Is Proposing to Transport Light and Heavy Crude Oils

The design, construction, maintenance, and operation of the proposed Line 3 pipeline are regulated by PHMSA under 49 CFR Part 195, which governs transportation of hazardous liquids by pipeline. Enbridge is responsible for abiding by all PHMSA regulations and working directly with regional, state, and local agencies, landowners, and other stakeholders to ensure that its programs meet the needs of the community in which it operates.

Crude oil from the Hardisty terminal in Alberta, Canada, would be transported in the proposed Line 3 pipeline to the Clearbrook and Superior terminals. From these locations, oil would be distributed into existing pipelines, for delivery from the Clearbrook terminal to Minnesota refineries and from the Superior terminal to refineries in the Midwest, on the Gulf of Mexico, and in eastern Canada.

The composition of the crude oil to be transported is set forth in Enbridge's tariff that is filed with the Federal Energy Regulatory Commission. Under this tariff, the proposed pipeline would be authorized to transport both light and heavy crude oils.

Information on Project operations is provided in the sections that follow.

2.8.1.1 Enbridge Control Center

Enbridge has an existing Control Center and a fully operational back-up Control Center that would monitor operation, maintenance, monitoring, and emergency response for the proposed Line 3 pipeline. The Control Center, which is staffed by pipeline operators 24 hours a day, includes computerized pipeline control and computational monitoring systems that allow operators to monitor and remotely control the pipelines and related facilities.

2.8.1.1.1 Pipeline Control System

Enbridge's Supervisory Control and Data Acquisition (SCADA) system is the central component of its existing pipeline control system. The proposed Line 3 pipeline would be incorporated into the existing SCADA system.

SCADA System Detects Anomalies and Allows Corrective Action

The Enbridge SCADA system, which is staffed by pipeline operators 24 hours a day, consists of pipeline sensing devices (including pressure, temperature, density, and flow sensors), a remote computer at each Enbridge pump station, a real-time communications network, a centralized data processing system, and a complete data display that is available to the pipeline control operator. The system includes automated alarms to warn operators when measurements depart from predetermined maximum and minimum limits.

The SCADA system reduces control errors and can automatically initiate pump station shut downs to maintain safe operating pressures. Pipeline control operators can also manually shut down the pipeline when they observe or suspect abnormal conditions. Enbridge enforces a "10-minute rule" that requires operators to shut down a pipeline within 10 minutes of observation of an abnormal condition that cannot be attributed to normal fluctuations in pressures and operating conditions.

2.8.1.1.2 Small Release Detection System

Small Release Detection System Compares Actual Behavior with Expected Behavior

To detect small releases, Enbridge operates a computational pipeline monitoring system and line balance calculations. The computational pipeline monitoring system uses computer models to determine oil flow rate and pressure values that would be expected under normal circumstances, and compares them to actual oil flow rate and pressure values recorded at the inlets and outlets of the pipeline.

Line balance calculations similarly compare the volume of oil injected into the pipeline at an inlet with the volume that is delivered at an outlet to confirm that the values match. Differences in the actual values compared to the expected values, or imbalances in the line calculations beyond a certain threshold, could indicate a release. In these circumstances, a leak alarm would be triggered, which could lead to shut down of the pipeline (see Chapter 10).

2.8.1.2 Unauthorized Use of the Right-of-Way

Enbridge Would Take Measures to Prevent Unauthorized Use of Rights-of-Way

Unauthorized use of the Line 3 Project right-of-way is considered trespassing and is not allowed by law. Although it is not feasible for Enbridge to patrol its entire right-of-way at all times to prevent unauthorized use, Enbridge has previously stated that it would consider site-specific measures, in cooperation with Minnesota DNR and landowners, to curtail unauthorized activities near sensitive resources on Enbridge's pipeline rights-of-way. Enbridge would also install access control measures at points of entry to the right-of-way as requested by landowners. Control measures could include fences and gates, or placement of other barriers such as boulders or timber barriers.

2.8.1.3 Training

Enbridge Provides Classroom and On-the-Job Training in Pipeline Operations and Maintenance

Enbridge has a comprehensive orientation, technical, safety, emergency, and on-the-job training program that complies with the Operator Qualification rules issued by PHMSA under 49 CFR Part 195. Enbridge personnel receive both formal and on-the-job training on pipeline operation and maintenance. Competence is demonstrated through job performance, periodic pipeline control system simulations, emergency exercises, welding certification tests, and other functions required to safely operate and maintain the pipeline.

Enbridge conducts semi-annual sessions for control operations staff that focus on lessons learned and communicate the importance of adhering to specific rules for control operations. Mandatory simulator sessions are included as part of training programs to provide operations staff with the opportunity to practice procedures while responding to abnormal and emergency operating conditions.

2.8.1.4 Public Awareness Program

Enbridge's existing public awareness program would be expanded to include the Line 3 pipeline corridor where it deviates from the existing Mainline corridor east of the Clearbrook terminal (see Figure 2.1-1).

Public Awareness Program Educates the Public, Local Government Officials, and First Responders

The public awareness program includes a comprehensive public education program for the affected public (those who work and live along the pipeline corridor), excavators, local public officials, and emergency response units of government. The program also entails providing emergency response personnel with information in key areas, such as pipeline operation and pipeline safety, how to recognize and respond to pipeline releases, and the locations of pipelines as a way to prevent damage from excavating equipment.

As part of keeping the public informed, all Enbridge lines are marked with signage and warnings, in accordance with federal regulations, at road and highway crossings, railroad crossings, navigable rivers, and other locations. This alerts the public to the presence of the pipelines and provides information, contact numbers, and emergency data. Further, Enbridge participates in the One-Call systems in the states along its pipeline alignments.

2.8.2 Maintenance

Enbridge would control vegetation along the pipeline rights-of-way to maintain the integrity of the pipeline and provide access for pipeline integrity surveys. The permanent right-of-way of the Line 3 Project would be added to the existing Enbridge right-of-way maintenance program. Enbridge would maintain vegetation along the permanent right-of-way by regularly removing trees and shrubs to inhibit woody vegetation growth over the pipelines, which can create safety and pipeline integrity issues.

2.8.2.1 Pipeline and Right-of-Way Inspections and Monitoring

Various routine operational and maintenance activities are required to maintain pipeline integrity, along with safe and reliable operations. In accordance with PHMSA requirements,[11] Enbridge maintains an Environmental Mitigation Plan (Pipeline Maintenance Projects) that outlines maintenance-related environmental policies, procedures, and mitigations for their pipeline maintenance projects (Enbridge 2013). The maintenance activities addressed in the plan are described further below.

Enbridge Regularly Inspects and Monitors Pipelines by Computer, in Person, and from the Air

Enbridge would integrate the Line 3 Project into the existing Enbridge pipeline inspection program, which would include regularly deploying computerized inspection tools that travel through the inside of the pipeline to test its integrity, inspecting the pump stations and terminals, testing the MLVs and pressure transmitters, inspecting the cathodic protection system, and conducting regular visual surveys of the pipeline right-of-way.

[11] 49 CFR Part 195 (Transportation of Hazardous Liquids by Pipeline) prescribes the design, construction, operational and maintenance safety standards, and reporting requirements for hazardous liquid pipelines and facilities—including requirements related to safety, integrity management, public awareness programs and environmental protection. Subpart F describes the operation and maintenance of steel pipeline systems. It also requires development and implementation of an integrity management program specifying supplemental integrity management requirements for pipelines that could affect high consequence areas, including populated areas, drinking water resources, and unusually sensitive ecological resources.

In accordance with USDOT requirements, Enbridge would periodically inspect the pipeline internally with electronic in-line inspection instruments or PIGs. As the PIG travels through the inside of the pipeline, its onboard computers mechanically, ultrasonically, or magnetically examine the condition of the pipe.

This technique identifies potential problems such as dents, gouges, corrosion, or cracks. If potential problems are identified, the pipe would be inspected to verify preliminary findings and repaired as needed. USDOT requires the inspections to occur at 5-year (and no more than 68-month) intervals. Since Enbridge, however, uses multiple types of in-line inspection technologies to detect various types of possible pipeline features, inspections are typically carried out more frequently than every 5 years.

Enbridge would physically inspect tanks, equipment, and piping at all pump stations and terminals, as well as Mainline valves, safety devices, cathodic protection systems and other components at regular intervals.

Enbridge also patrols the entire Mainline system by air every two weeks to observe the condition of the right-of-way, nearby construction, erosion and other circumstances that could affect the safety and operation of the pipelines or could indicate a potential crude oil release.

If irregular conditions are observed during the air surveys, Enbridge personnel would be deployed to investigate the irregularity on the ground. If a release is suspected, the survey pilot/ground personnel would immediately notify the Enbridge Control Center by radio so the affected pipeline could be shut down pending an onsite investigation.

For more detailed information on monitoring and inspection measures, see Applicant's Certificate of Need Application.

Maintenance of the Right-of-Way Includes Routine Mowing and Brush Removal

Maintenance of the right-of-way requires periodic clearing of vegetation to improve conditions for visual and aerial right-of-way inspection, maintain a safe and apparent corridor, and allow maintenance access. Clearing typically includes brushing equipment travelling down the right-of-way, which may consist of tracked or rubber-tired equipment and hand-held saws or other manual methods. Vegetation management may include application of herbicides.

Subsurface Investigations, Integrity Digs, and Inspection and Repair Require Ground Disturbance

Subsurface investigations occur on rare occasions and involve conducting soil borings on or near the right-of-way to investigate subsurface geotechnical and/or environmental conditions. The activity uses standard drilling rigs where access and soil conditions are adequate, and uses low-ground-pressure, all-terrain-vehicle-type rigs in or near a wetland area, soft soils, or other sensitive locations.

When integrity digs or visual inspection and repair are needed, ground clearing and excavation around the pipe is necessary. The typical workspace at a dig site is 80 by 250 feet, equating to a total disturbance area of approximately 20,000 square feet, and includes:

- 40- by 80-foot area for excavation,
- 50- by 50-foot workspace for dewatering, and

- 100- by 100-foot workspace for staging and vehicle parking.

The typical access area for a dig site may be smaller or larger, depending on site-specific factors and the nature of the dig.

If Enbridge identifies coating problems, maintenance crews remove the old coating via scraping and sandblasting and apply a new coating; if the pipe itself needs repair, sleeves may be welded onto the pipeline or defective sections removed and replaced. Coating consists of non-hazardous fusion-bonded epoxy. During removal, crews place a barrier (e.g., tarp) beneath the removal area and then collect the material for proper disposal at a licensed landfill. Enbridge's Environmental Protection Plan (Appendix E) describes waste and hazardous material handling and disposal.

2.8.3 Emergency Response

2.8.3.1 Emergency Response Plan

Enbridge's Emergency Response Plan Has Specific Details for Specific Regions

Enbridge's emergency response plan is referred to as its Integrated Contingency Plan (ICP). The ICP, which was formally implemented in 2013, would be updated to include the proposed Line 3 pipeline.

The ICP consists of two parts: the Core Plan, which is the overall response tool, and a series of zone-specific annexes based on geographic regions (North Dakota, Superior, Chicago, and Cushing). The proposed Line 3 pipeline would fall within the Superior Response Zone.

The ICP is structured in accord with the Incident Command System, which public and private sector emergency teams use to allow responders to work together without being hindered by jurisdictional boundaries. The ICP provides the following:

- Guidelines for responding to an emergency, including alert, notification, and response procedures and techniques to follow in response to and during an incident;
- Documentation of available equipment, personnel, and resources for responding to an incident; and
- Descriptions of the response teams and the roles and responsibilities of the team members within the structure of the Incident Command System.

Enbridge has also developed Emergency Response Action Plans (ERAPs) for the four response zones noted above. The ERAPs are condensed versions of the ICP specifically tailored for each response zone. The ERAPs include maps, line information, and equipment lists. Information specific to the proposed Line 3 pipeline would be included in the Superior Response Zone ERAP, once Enbridge finalizes the Project route and construction design.

The ERAP is publically available (www.emergencyresponderinfo.com) and is distributed to emergency response agencies in addition to Enbridge personnel. For further information about Enbridge's emergency response plan, see Applicant's Certificate of Need Application and Chapter 10 in this EIS.

2.8.3.2 Pre-Positioned Response Equipment and Staff

Enbridge Pre-Positions Emergency Equipment and Staff for Most Effective Response

The Enbridge facilities in Thief River Falls and Bemidji, Minnesota, and in Superior, Wisconsin, house emergency response equipment to respond to pipeline spill incidents. The fourth maintenance facility to be located east of the Clearbrook terminal would maintain similar emergency response equipment. Equipment housed at these facilities includes vacuum trucks, boats, containment booms, skimmers, pumps, and other related equipment and vehicles.

Pre-positioned containment and recovery equipment would also be maintained and available at each of the pipeline pump stations and at district Enbridge offices along the rights-of-way of the proposed Line 3 pipeline. Enbridge also maintains an Enterprise Emergency Response Team, which responds to large-scale incidents throughout the United States that require more resources than are available within a single response zone.

2.8.3.3 Spill Response Training

Enbridge's Spill Response Training Exceeds National Standards

Enbridge's ongoing spill response training programs meet the requirements of the National Preparedness for Response Exercise Program (PREP) standards. The PREP standards were developed by PHMSA, the U.S. Coast Guard, the U.S. Environmental Protection Agency, and the U.S. Department of Interior's Bureau of Safety and Environmental Enforcement to establish a training program that meets the intent of Section 4202(a) of the Oil Pollution Act of 1990. Completion of the PREP training allows federally regulated companies to maintain compliance with federal oil pollution response exercise requirements mandated by the Oil Pollution Act of 1990.

Enbridge personnel participate in both classroom and practical training in safety and emergency response procedures, including Incident Command System training, and are required to demonstrate knowledge and proficiency in these areas as appropriate to their responsibilities in accordance with the approved ERAP. PREP standards require at least one written/classroom spill response exercise and one equipment deployment exercise annually. Enbridge has indicated that their training programs exceed this standard.

2.9 ABANDONMENT OF THE EXISTING LINE 3 PIPELINE

In Abandoning the Existing Pipeline, Enbridge Would Comply with All Regulations

Once the proposed Line 3 pipeline is placed in service, Enbridge would abandon the existing Line 3 pipeline in accordance with federal, state, and tribal statutes, rules, and regulations. Abandoning the existing Line 3 pipeline would consist of disconnecting the pipeline from all sources of transported liquid, including other pipelines, pump stations, terminals, meter stations, control lines and other operating facilities; purging all crude oil or other combustibles (including vapor) from the line with an inert material;[12] and sealing the ends of the pipes and facilities left in place. Enbridge would subsequently file a report with PHMSA, documenting where the line crosses over, under, or through a

[12] Waste produced during purging is collected for proper disposal at a licensed landfill. Enbridge's Environmental Protection Plan describes waste and hazardous material handling and disposal.

commercially navigable waterway and would maintain permanent records so that the pipeline could be accurately located in the field according to Minnesota Department of Transportation regulations.

Enbridge would continue to maintain and monitor the Line 3 pipeline right-of-way after the pipeline is removed from service. Enbridge would maintain signage and continue to include the pipeline in the Minnesota Gopher State One-Call system. Enbridge would continue to regularly patrol the right-of-way to monitor surface conditions, mow brush within the right-of-way, and inspect and maintain the cathodic protection system. Finally, Enbridge would retain the abandoned Line 3 pipeline within the Enbridge emergency response protocols.

For further information on abandonment, see Appendix B and Chapter 8.

2.10 POTENTIAL CONNECTED ACTION – TRANSMISSION LINES

Connected actions to the proposed Project include transmission lines and associated infrastructure as described below. These actions are undergoing separate environmental reviews and permitting, and would be constructed by entities other than the Applicant.[13] The environmental review documents that have already been prepared for these proposed connected actions are incorporated by reference into this EIS.

Any future actions associated with additional increases in throughput on the proposed Line 3 pipeline would require a new application for a Certificate of Need from the Commission and a review of the need for the requested increase. Enbridge has not indicated any plans for future increases in throughput at this time and hypothetical future increases in throughput have not been evaluated as part of this EIS.

As discussed in Section 8.3.1, high-voltage power lines can accelerate corrosion of nearby pipelines. In these cases, corrosion protection should therefore be augmented with a polarization cell to help dissipate stray voltage away from the pipeline. It is unknown whether the existing or proposed Line 3 pipelines have been designed for such conditions.

Transmission Lines, for Which Enbridge Is Not Responsible, Also Must Be Considered

Electrical power to the new pump stations would be supplied by electrical transmission lines constructed by third-party utilities for the Line 3 Project. Each line would terminate at the electrical switching equipment within the pump station. Construction and operation of the transmission line and associated facilities would be the responsibility of the electrical utility.

2.10.1 Two Inlets Pump Station – Clover-Potato Lake Transmission Line

The Clover-Potato Lake transmission line would be a 7-mile-long, 115-kilovolt (kV) line connecting the Two Inlets pump station to the existing Great River IM-MPT Line within Arago and Clover townships in Hubbard County. The transmission line would be supported by 70- to 80-foot-tall single-pole structures with horizontal post insulators and 350- to 400-foot spans between them. It would follow the Line 3

[13] Connected actions are defined in Minnesota Rules 4410.4300 Subpart 9. Two projects are "connected actions" if a responsible governmental unit determines they are related in any of the following ways: (A) one project would directly induce the other; (B) one project is a prerequisite for the other and the prerequisite project is not justified by itself; or (C) neither project is justified by itself.

pipeline route for approximately 5 miles but would not be co-located with any other pipeline or utility corridor for the remaining 2 miles. The transmission line would be constructed within a 100-foot-wide right-of-way. This Project would be subject to environmental review under Minnesota Administrative Rules Chapter 7850 to address environmental impacts ranging from construction-related ground disturbance, stormwater, noise, and air emissions, to maintenance of a cleared right-of-way throughout the operational life of the transmission line.[14] The eDocket number for this project is ET2/TL-15-689.

2.10.2 Backus Pump Station – Bull Moose Transmission Line

The Bull Moose transmission line would be a 2.5-mile-long, 115 kV line connecting the Backus pump station to the existing Minnesota Power Badoura-to-Pine River 115 kV transmission line in Cass County. The transmission line would primarily be supported by 70- to 80-foot-tall single-pole structures with horizontal post insulators. In certain locations, H-frame, three-pole structures might be used in place of the single-pole structures. The spans between the structures would measure 350 to 400 feet. The transmission line would run parallel to Minnesota Power's DC line for about 2 miles before crossing about 0.3 mile of rural land to meet the Minnesota Power Badoura-to-Pine River line. It would be constructed within a 100-foot-wide right-of-way. Department of Commerce, Energy Environmental Review and Analysis prepared an environmental assessment for this Project in 2016.[15]

The eDocket number for this project is ET2/TL-15-628.

2.10.3 Palisade Pump Station – Palisade Transmission Line

The Palisade transmission line would be a 13-mile-long, 115 kV line connecting the Palisade pump station to a new Rice River breaker station constructed for the Project in Aitkin County. The transmission line would be supported by 70- to 80-foot-tall single-pole structures with horizontal post insulators. In certain locations, H-frame, three-pole structures might be used in place of the single-pole structures. The spans between the structures would measure 275 to 450 feet. The transmission line would parallel Highway 169 across primarily agricultural lands for the 13 miles between the Palisade pump station and the Rice River breaker station, and would be constructed within a 100-foot-wide right-of-way. Department of Commerce, Energy Environmental Review and Analysis prepared an environmental assessment for this transmission project in 2016.[16] The eDocket number for this project is ET2/TL-15-423.

2.10.4 Cromwell Pump Station – Cromwell Transmission Line

The Cromwell transmission line would be a 115 kV line spanning the less-than-1,500 feet between the Cromwell pump station and Great River Energy's 115 kV LC-CSX transmission line near the Great River Energy Cromwell substation in Carlton County. The line would be supported by 70- to 80-foot-tall single-pole structures with horizontal post insulators. The transmission line would cross rural land between the

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[14] Department of Commerce, Energy Environmental Review and Analysis, March 2016. Environmental Assessment for the Clover-Potato Lake Transmission Line Project. https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={D141BAB0-248C-40A6-9127-8FFC98EDB2B2}&documentTitle=20159-114207-01

[15] Department of Commerce, Energy Environmental Review and Analysis, March 2016. Environmental Assessment for the Bull Moose Transmission Line Project. http://mn.gov/commerce/energyfacilities//resource.html?Id=34428.

[16] Department of Commerce, Energy Environmental Review and Analysis, March 2016. Environmental Assessment for Palisade 115 kV Transmission Project http://mn.gov/commerce/energyfacilities//resource.html?Id=34467.

Cromwell pump station and Great River Energy's transmission line, and would likely be constructed within a 100-foot-wide right-of-way. The transmission line, however, is currently subject to final design. This Project would be subject to environmental review under Minnesota Administrative Rules Chapter 7850 to address environmental impacts ranging from construction-related ground disturbance, stormwater, noise, and air emissions, to maintenance of a cleared right-of-way throughout the operational life of the transmission line.

2.11 REFERENCES

Enbridge Energy, Limited Partnership (Enbridge). 2013. Environmental Mitigation Plan: Pipeline Maintenance Projects.

_____. 2016a. Environmental Assessment Worksheet (EAW). November. Response to Data Request 01 to provide additional details for the EAW filed by Enbridge in April 2015.

Enbridge and North Dakota Pipeline Company, LLC. 2014. Certificate of Need Application, Section 1.0. (Docket No. PL-6668/CN13-473.)

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Chapter 3
Regulatory Framework

Aside from Federal Regulations, States Regulate the Routing and Construction of Pipelines

This chapter addresses the regulations for constructing and operating oil pipelines in Minnesota. Pipelines in the United States are regulated by a variety of federal and state agencies. The Federal Energy Regulatory Commission, for example, regulates interstate oil pipeline rates and terms of service; and the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) regulates pipeline safety.

The federal government, however, does not determine whether an oil pipeline is needed or where it should be located. Those determinations generally are left to the states.[1] As a result, states regulate the routing and construction of oil pipelines through a variety of approvals, permits, and licenses.

The First Two Required State Approvals Are for Certificate of Need and Route Permit

Enbridge Energy, Limited Partnership's (Enbridge's, or the Applicant's) proposed Line 3 Project (Project) requires two initial approvals from the Minnesota Public Utilities Commission (Commission): a Certificate of Need (CN) and a route permit. The CN determines whether a project is needed and, if it is determined to be needed, the route permit determines where it should be located. Figure 3-1 provides an overview of the CN and route permit process.

Subsequent Approvals Are Needed from Federal, State, Local, and Tribal Agencies

If the CN and route permit are granted, additional approvals and consultations with other federal, state, and local agencies would be required before the pipeline could be constructed and operated along the permitted route. A license to cross public waters from the Minnesota Department of Natural Resources (Minnesota DNR), for example, would be required for each public water crossing along the permitted route, and potential wetland impacts resulting from the discharge of dredged or fill material into wetlands would require a Department of the Army permit from the U.S. Army Corps of Engineers (USACE). This wetland permit would require federal environmental review under the National Environmental Policy Act (NEPA), as well as consultation with other federal, tribal, and state agencies that are responsible for resources, such as threatened or endangered species and cultural resources.

Depending on the route approved by the Commission, a project also could require approvals from tribal nations, along with associated approvals from and consultations with federal agencies. Any routes that would pass through reservations and tribal trust lands, for example, would require review under NEPA, as well as consultations and approvals from USACE, the Bureau of Indian Affairs (BIA), and possibly the U.S. Environmental Protection Agency.

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[1] The U.S. Department of State is responsible for determining whether issuing a Presidential Permit for a proposed new oil pipeline crossing the Canadian or Mexican border would "serve the national interest." See Executive Order 11423 on pipelines: http://www.state.gov/e/eb/rls/othr/exec/114274.htm. No Presidential Permit amendment is required for the Line 3 Project.

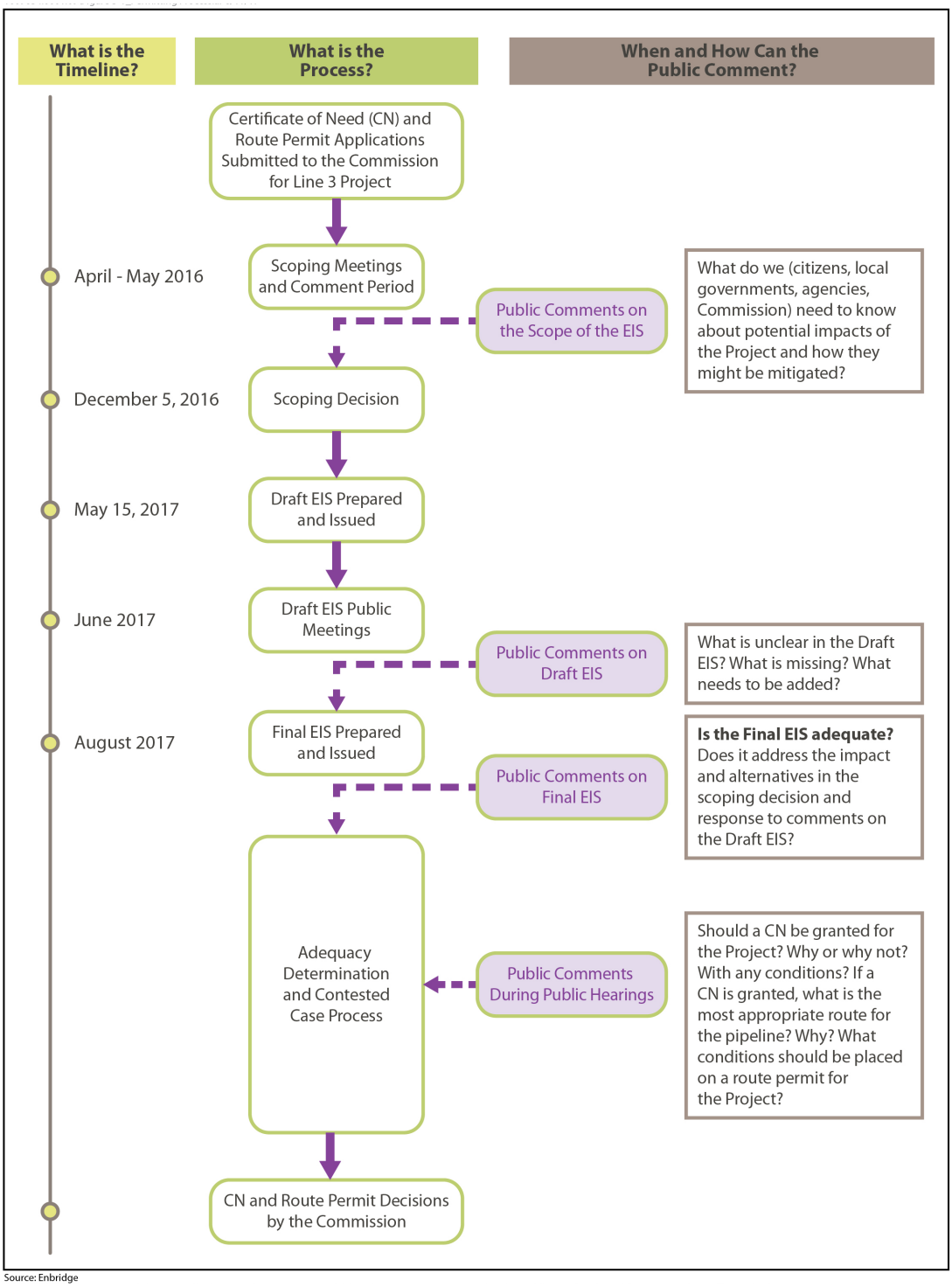

Source: Enbridge

Figure 3-1. Environmental Review and Commission Permitting Process for Line 3 Project

A preliminary list of these required permits is provided in Table 3.6-1. Each of these permits and approvals is addressed in greater detail as part of the regulatory context for each resource impact evaluation in Chapters 5 and 6 of this Environmental Impact Statement (EIS).

3.1 CERTIFICATE OF NEED

A CN Is the First Permit Required for the Proposed Project, and This EIS Addresses Both CN and Routing Permit Issues

In Minnesota, no person may construct a large energy facility without a CN from the Commission.[2] The definition of "large energy facility" includes an oil pipeline with a diameter greater than 6 inches and more than 50 miles of its length in Minnesota.[3] Enbridge's proposed Project, therefore, requires a CN because it is an oil pipeline with a 36-inch diameter and is approximately 340 miles long.

Enbridge submitted a CN application to the Commission on April 24, 2015. After accepting the application as complete, the Commission ordered the Department of Commerce, Energy Environmental Review and Analysis (DOC-EERA) to prepare a combined EIS that addressed both the CN and routing permit dockets in accordance with Minnesota Administrative Rule Chapter 4410. The Commission also referred the application to the Office of Administrative Hearings (OAH) for a contested case hearing for the CN decision, to be conducted jointly with the hearing for Enbridge's route permit application (discussed in Section 3.2).[4]

3.1.1 Certificate of Need Criteria

CN Criteria Address Energy Efficiency and Reliability, and Potential Social and Environmental Effects

In deciding on Enbridge's CN application, the Commission must determine whether the Project is needed, or whether some other project would be more appropriate for the State of Minnesota. Minnesota Administrative Rules Part 7853.0130 provides four criteria that the Commission must use in determining whether to approve Enbridge's CN application. The Commission must grant a CN if it determines that:

A. The probable result of denial would adversely affect the future adequacy, reliability, or efficiency of energy supply to the Applicant, to the Applicant's customers, or to the people of Minnesota and neighboring states.[5]

B. A more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of evidence on the record by parties or persons other than the Applicant.[6]

C. The consequences to society of granting the CN are more favorable than the consequences of denying the certificate.[7]

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2 Minnesota Statutes § 216B.243.

3 Minnesota Statutes § 216B.2421.

4 Commission Order Joining Need and Routing Dockets, February 1, 2016, PL-9/CN-14-916 and PL-9/PPL-15-137, eDockets Number 20162-117877-01 [hereinafter Commission Order Joining Need and Routing Dockets].

5 Minnesota Administrative Rules Part 7853.0130 (A).

6 Minnesota Rules Administrative Rules Part 7853.0130 (B).

7 Minnesota Administrative Rules Part 7853.0130 (C).

D. It has not been demonstrated on the record that the design, construction, or operation of the proposed facility would fail to comply with the relevant policies, rules, and regulations of other federal, state, and local agencies.[8]

Under these criteria, the Commission would first consider the underlying economic drivers for the proposed pipeline. If denying the CN would adversely affect the future adequacy, reliability, or efficiency of energy supply, the Commission would consider the EIS's analysis of the advantages and disadvantages of alternative ways of addressing these issues.

If the Commission denies a CN for the Project, it is adopting a no build or No Action Alternative (see Chapter 4). If the Commission issues a CN for the Project, it could approve the Project as proposed by Enbridge, or it could issue a CN contingent upon modifications to the Project.[9]

The Commission's CN decision would determine the pipeline's characteristics, including its diameter, throughput, and endpoints in Minnesota. The Commission could grant a CN with pipeline characteristics as proposed by Enbridge or could modify them. It also could place conditions on a CN by requiring Enbridge to take certain actions related to the receipt of a CN for the Project. These conditions, if any, would flow from the record developed during the environmental review and hearing process.

The Commission's CN decision does not determine the route that the pipeline would take between its endpoints in Minnesota. The route is determined by the Commission's route permit process (as discussed in Section 3.2 and in Table 3.1-1; further discussion is provided in Chapter 4).

If the Commission decides not to issue a CN for the proposed Project, it has no regulatory standing to determine the fate of the existing Line 3. There is no legal authority in a CN proceeding of a separate proposed project (at the state or with the Public Utilities Commission) to evaluate the ongoing need of an existing project. Once constructed, the safety and operation of an existing pipeline is regulated by the United States Department of Transportation, Pipeline and Hazardous Materials Safety Administration. In this particular case, Enbridge has entered into a consent decree with the United States Environmental Protection Agency that allows for the continued operation of the existing Line 3 if a replacement for the line is not approved. In other words, if the proposed Line 3 project is not approved by the PUC, the continued operation of the existing Line 3 will be regulated by the Federal government, not the State of Minnesota. Accordingly, shutting down and removing existing pipelines in the mainline corridor is not included in the No Action Alternative. If the Commission decides to issue a CN for the proposed Project, the Commission may determine that their regulatory jurisdiction allows them to consider permit conditions prescribing abandonment, removal, or a combination of abandonment and removal for the existing Line 3.

8 Minnesota Administrative Rules Part 7853.0130 (D).

9 Minnesota Administrative Rules Part 7853.0800.

Table 3.1-1. Commission Decisions and Decision Criteria

Commission Decision	Certificate of Need				Route Permit
	Would denial adversely affect future adequacy, reliability, or efficiency of energy supply?	**If yes, is there a more reasonable and prudent alternative, such as different endpoints or transport method?**	**If yes, are the consequences to society of granting the CN more favorable than denial?**	**Does the Project comply with other laws?**	**If yes, what is the most appropriate route for the pipeline?**
Commission Decision Criteria	Minnesota Administrative Rules Part 7853.0130 (A)	Minnesota Administrative Rules Part 7853.0130 (B)	Minnesota Administrative Rules Part 7853.0130 (C)	Minnesota Administrative Rules Part 7853.0130 (D)	Minnesota Administrative Rules Part 7852.1900
Analysis in EIS	--	EIS Chapter 5: Existing Conditions, Impacts, and Mitigation – CN			EIS Chapter 6: Existing Conditions, Impacts, and Mitigation – Route Permit
Other Analysis	Economic analysis conducted by Minnesota Department of Commerce, Division of Energy Resources and other parties to the contested case hearing	--			--

CN = Certificate of Need; EIS = Environmental Impact Statement

3.2 ROUTE PERMIT

A Route Permit Is Required for the Proposed Project, and This EIS Addresses Both CN and Routing Permit Issues

In Minnesota, no person may construct a pipeline with a diameter of 6 inches or more that is designed to carry a hazardous liquid without a route permit from the Commission.[10] Accordingly, Enbridge's proposed Project, an oil pipeline with a diameter of 36 inches, requires a route permit. The Commission may not grant a route permit for the Project until a CN has been issued (although these approvals could occur consecutively at the same Commission meeting).

Enbridge submitted a route permit application to the Commission on April 24, 2015. After accepting the application as complete, the Commission ordered DOC-EERA to prepare an EIS for the Project and

[10] Minnesota Statute § 216G.02.

referred the application to OAH for a contested case hearing to be conducted jointly with the hearing for Enbridge's CN application.

3.2.1 Route Permit Criteria

Route Permit Criteria Address Human and Environmental Effects, Including Cumulative Effects

The Commission is charged with routing pipelines in an orderly manner that minimizes or mitigates human and environmental impacts.[11] Minnesota Administrative Rules Part 7852.1900 provides the criteria that the Commission must consider in evaluating Enbridge's route permit application:

A. Human settlement, existence and density of populated areas, existing and planned future land use, and management plans;

B. The natural environment, public and designated lands, including but not limited to natural areas, wildlife habitat, water, and recreational lands;

C. Lands of historical, archaeological, and cultural significance;

D. Economies within the route, including agricultural, commercial or industrial, forestry, recreational, and mining operations;

E. Pipeline cost and accessibility;

F. Use of existing rights-of-way and right-of-way sharing or paralleling;

G. Natural resources and features;

H. The extent to which human or environmental effects can be mitigated by regulatory control and by applying the permit conditions contained in Minnesota Administrative Rule 7852.3400 for preparing the right-of-way, constructing the pipeline and associated facilities, and cleaning up, and restoring the right-of-way.

I. Cumulative potential effects of related or anticipated future pipeline construction; and

J. The relevant applicable policies, rules, and regulations of other state and federal agencies, and local government land use laws, including ordinances adopted under Minnesota Statutes Section 299J.05, on the location, design, construction, or operation of the proposed pipeline and associated facilities.

A pipeline route permit must designate a route for the pipeline and the conditions for preparing the right-of-way, constructing the pipeline and associated facilities, and cleaning up and restoring the right-of-way—in addition to any other appropriate conditions relevant to minimizing human and environmental impacts.[12] If issued a CN and route permit by the Commission, Enbridge could exercise the power of eminent domain to acquire land for the Project.[13] DOC-EERA has provided a sample Route Permit in Appendix I.

[11] Minnesota Administrative Rules Part 7852.0200.

[12] Minnesota Administrative Rules Part 7852.3200.

[13] Ibid.

3.3 ENVIRONMENTAL REVIEW

This EIS Addresses CN and Routing Permit Issues to Facilitate Informed Decision-Making

The Minnesota Environmental Policy Act (MEPA) requires that an EIS be prepared for major governmental actions with the potential to create significant environmental impacts.[14]

An EIS is intended to facilitate informed decision-making by entities with regulatory authority over a project. It also assists citizens in providing guidance to decision-makers regarding the project. An EIS describes and analyzes the potential environmental and socioeconomic impacts of a project and possible mitigation measures, including alternatives to the project.[15] It does not advocate or state a preference for a specific alternative. Instead, it analyzes and compares alternatives so that citizens, agencies, and governments can work from a common set of facts.

3.3.1 Scoping

After Obtaining Agency and Public Input, the Commission Determined the Scope of the EIS

The first step in preparing an EIS is scoping. The purpose of scoping is "to reduce the scope and bulk of the EIS, identify only those potentially significant issues relevant to the proposed project, define the form, level of detail, content, alternatives, time table for preparation, and preparers of the EIS, and to determine the permits for which information will be developed concurrently with the EIS."[16]

A scoping Environmental Assessment Worksheet and a Draft Scoping Decision Document were issued for Enbridge's Project on April 11, 2016. DOC-EERA staff provided notice of the scoping Environmental Assessment Worksheet and the Draft Scoping Decision Document, as well as the schedule for EIS scoping meetings. The scoping notice initiated a 45-day comment period, and comments on the scope of the EIS were accepted through May 26, 2016.

Between April 25, 2016, and May 11, 2016, DOC-EERA, Minnesota DNR, and Minnesota Pollution Control Agency (Minnesota PCA) staff conducted 12 scoping meetings throughout the Project area. In addition to making oral comments at these meetings, citizens and agencies submitted 322 scoping comment letters and 1,118 form letters.[17]

For the CN decision, based on the scoping comments, DOC-EERA suggested to the Commission several Project alternatives for inclusion in the scope of the EIS, including alternative technologies and a system alternative.[18] The Commission therefore included these in the scope of the EIS.[19] These alternatives are

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14 Minnesota Statutes § 116D.04.

15 Minnesota Administrative Rules Part 4410.2300.

16 Minnesota Administrative Rules Part 4410.2100.

17 DOC-EERA Comments and Recommendations to the Commission, September 21, 2016, PL-9/CN-14-916 and PL-9/PPL-15-137, eDockets Numbers 20169-125060-02, 20169-125058-02, 20169-125058-04, 20169-125058-06, 20169-125058-08, 20169-125058-10, 20169-125058-12, 20169-125058-14, 20169-125058-16, 20169-125058-18, 20169-125058-20, 20169-125064-01, 20169-125064-03, 20169-125064-05, 20169-125064-07, 20169-125064-09, 20169-125064-11, 20169-125064-13, 20169-125064-15, 20169-125064-17, 20169-125064-19 [hereinafter DOC-EERA Scoping Comments].

18 Id.

19 Order Denying Motion, Approving Scoping Decision as Modified, and Requiring Expanded Notice, November 30, 2016, eDockets Number 201611-126917-01 [hereinafter Order Approving Scoping Decision].

described in detail in Chapter 4 and are analyzed and compared in Chapters 5 and 10 through 12 of this EIS.

DOC-EERA also recommended four route alternatives and 23 route segment alternatives for inclusion in the scope of the EIS,[20] which the Commission included in the scope of the EIS.[21] The Commission also included an additional route segment alternative (RSA-53).[22] These alternatives are described in detail in Chapters 4 and 7 and are analyzed and compared in Chapters 6 and 10 through 12 of this EIS.

3.3.2 Environmental Impact Statement

A Key Purpose of This EIS Is to Help the Commission Decide on CN and Route Permit Applications

This combined CN and route permit EIS has been prepared by DOC-EERA staff in cooperation with the Minnesota DNR and Minnesota PCA. It was first issued as a Draft EIS so that it could be improved through public comment,[23] and a Final EIS could be developed based on those comments.[24] Once the Final EIS is issued, the public may comment on the adequacy of the Final EIS.[25] The Commission must then determine whether the Final EIS is adequate for decision-making purposes or whether it needs to be revised.[26]

On the issue of need, this EIS for the combined CN and route permit proceedings will aid the Commission's consideration under Minnesota Administrative Rules Part 7853.0130 (B) about whether a more reasonable and prudent alternative to the proposed facility exists, as well as the Commission's consideration of societal consequences under Minnesota Administrative Rules Part 7853.0130 (C). Specifically, the EIS will help to inform the Commission regarding reasonable and prudent alternatives as the Commission considers "the effect of the proposed facility on the natural and socioeconomic environments compared to the effects of reasonable alternatives"[27] and "the effect of the proposed facility, or a suitable modification of it, upon the natural and socioeconomic environments compared to the effect of not building the facility."[28]

On the issue of routing, this EIS for the combined CN and route permit proceedings will aid the Commission's consideration of each of the Commission's decision criteria in Minnesota Administrative Rules Part 7852.1900, Subpart 3.

20 DOC-EERA Scoping Comments.

21 Order Approving Scoping Decision.

22 Ibid.

23 Minnesota Administrative Rules Part 4410.2600.

24 Minnesota Administrative Rules Part 4410.2700.

25 Minnesota Administrative Rules Part 4410.2800.

26 Ibid.

27 Minnesota Administrative Rules Part 7853.0130 (B)(2).

28 Minnesota Administrative Rules Part 7853.0130 (C)(3).

3.4 PUBLIC HEARINGS

Public Hearings Will Determine Whether CN and Route Permit Criteria Have Been Met

After the public has reviewed the Final EIS, and it has been deemed adequate by the Commission, public hearings, presided over by an administrative law judge (ALJ) from OAH, will be held in the Project area. The hearings on the CN will be held jointly with those for the route permit.[29] At these hearings, citizens, agencies, and governmental bodies will have an opportunity to submit comments, present evidence, and ask questions. Commenters specifically will be able to address whether CN and route permit criteria have been met. After the public hearings, an evidentiary hearing will be held, and the ALJ will submit a report to the Commission with findings of facts, conclusions of law, and recommendations about issuing a CN and a route permit for the Project.

3.5 COMMISSION DECISION

The Commission Will Use All Information to Decide on the CN and Route Permit

After considering the entire record, including the Final EIS, input received during the public hearings, and the ALJ's findings and recommendations, the Commission will determine whether to deny the CN, grant a CN for the Project as proposed, or grant a CN contingent upon modifications to the Project.[30] As noted previously, the Commission may place conditions on a CN, requiring Enbridge to take certain actions before it can receive a CN for the Project.

The Commission will similarly determine what route should be permitted. Route permits include a permitted route and an anticipated alignment, as well as conditions specifying construction and operating standards. Route permits also typically include mitigation plans and project-specific mitigation measures (Interagency Pipeline Coordination Team 2015).

Decisions by the Commission on Enbridge's CN and route permit applications are anticipated in spring 2018.

3.6 ADDITIONAL PERMITS AND APPROVALS

Additional Federal, Tribal, State, and Local Approvals Also Could Be Required

A route permit from the Commission is the only state permit required for the routing of Enbridge's Project—that is, the Commission's route permit determines where the pipeline would be located. The Commission's route permit supersedes and preempts all local zoning, building, and land use regulations.[31]

Various federal, tribal, state, and local approvals could be required, however, for activities related to constructing and operating the Project. Once the route permit has been issued, Enbridge must obtain all other required permits (commonly referred to as "downstream permits"). The information in this EIS may be used by downstream permitting agencies in their evaluation of effects on resources. Table 3.6-1 lists the downstream permits and additional approvals required for Enbridge's Project.

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29 Commission Order Joining Need and Routing Dockets.

30 Minnesota Administrative Rules Part 7853.0800.

31 Minnesota Statutes § 216G.02; Minnesota Administrative Rules Part 7852.0200.

Table 3.6-1. Additional Permits and Approvals Required for the Line 3 Project

Unit of Government	Type of Application	Reason Required
U.S. Environmental Protection Agency – Region 5	Clean Water Act Section 402 NPDES	EPA has permitting authority for NPDES discharge and construction within the Leech Lake and Fond du Lac Reservations
U.S. Army Corps of Engineers – St. Paul District and Minnesota Pollution Control Agency	Section 10/404 Individual Permit and associated state 401 Individual Water Quality Certification	Authorizes discharge of dredged and fill material into waters of the United States, including wetlands, and crossing of navigable waters of the United States
	Section 14 Rivers and Harbor Act, Section 408 Flowage Easement Permit	Authorizes construction activities within flowage easements
U.S. Fish and Wildlife Service	Section 7 Endangered Species Act consultation (federally protected species)	Establishes conservation measures and authorizes, as needed, take of federally protected species
	Eagle Incidental Take or Eagle Nest Take Permit (Bald and Golden Eagle Protection Act [BGEPA] protected birds)	Allows known bald eagle nests near construction activities to be removed, relocated, or destroyed. Also, allows for nonpurposeful (incidental) take (disturbance, injury, or killing) of eagles during construction and/or operation activities.
U.S. Forest Service/U.S. Department of Agriculture	Special Use Permit	Authorizes crossing of U.S. Forest Service land
Bureau of Indian Affairs	Right-of-Way Grant	Authorizes crossing of tribal trust land
Minnesota Department of Natural Resources	License to Cross Public Waters	50-year license that allows a proposed utility to cross public waters
	License to Cross Public Lands[a]	50-year license that allows a proposed utility to cross public lands
	Water Appropriation Permit – Pipeline and Facilities	Authorizes withdrawal and use of water from surface water or groundwater sources
	State Endangered Species Permit and Avoidance Plan	Outlines plans for avoidance, minimization, and mitigation for take of state-listed species
	Osprey Nest Removal Permit	Authorizes removal of inactive osprey nest
	Fen Management Plan	Outlines plans for avoidance, minimization, and mitigation of fens within Project corridor

Table 3.6-1. Additional Permits and Approvals Required for the Line 3 Project

Unit of Government	Type of Application	Reason Required
	Infested Waters Transport permit	Permits transport of waters with identified invasive species infestation
	Federal Consistency Review	Ensures that activities requiring a federal license or permit are consistent with the state's coastal management program
	Public Waters Work Permit	In instances when a license to cross permit is not required, work in the beds of public waters would require a work permit
Minnesota Pollution Control Agency	Clearbrook Terminal Air Quality Permit – Synthetic-Minor Individual State Operating Permit	Authorizes construction and operation at the modified Clearbrook terminal
	Clean Water Act Section 401 Water Quality Certification	Certification under the Clean Water Act Section 401 certifies that the Project will comply with state water quality standards if the Project complies with all permit conditions.
	National Pollutant Discharge Elimination System (NPDES) Individual Construction Stormwater, Hydrostatic Test, and Trench Dewatering Permit – Pipeline Construction	Authorizes ground disturbance with approved protection measures to manage soil erosion and stormwater discharge on construction site; discharge of water from hydrotesting activities; and removal of water that may accumulate in pipeline trench
	NPDES General Construction Stormwater Coverage – Facilities	Authorizes ground disturbance with approved protection measures to manage soil erosion and stormwater discharge on construction site
	NPDES General Construction Stormwater Coverage – Pipeyards and Contractor Yards	Authorizes ground disturbance with approved protection measures to manage soil erosion and stormwater discharge on construction site
Minnesota Department of Health	Drinking Water Supply Management Area/Wellhead Protection Area Consultation	Ensures that pipeline construction and operation are compatible with goals of relevant plans
Minnesota State Historic Preservation Office	Cultural resources consultation; Section 106 of the National Historic Preservation Act, as amended – review and consultation Review and consultation with state agencies pursuant to M.S. 138.665-666 and M.S. 138.40	Ensures adequate consideration of impacts on significant cultural resources

Table 3.6-1. Additional Permits and Approvals Required for the Line 3 Project

Unit of Government	Type of Application	Reason Required
Minnesota Department of Agriculture	Agricultural Protection Plan	Establishes measures for agricultural protection
Minnesota Department of Transportation	Road crossing permits	Authorizes crossings of state-jurisdictional roadways
Minnesota Board of Water and Soil Resources/Wetland Conservation Act Local Governmental Units	Notice of Intent to Utilize Federal Approvals for Utilities Project Exemption	Notice of use of exemption required
Mississippi Headwaters Board	Local Land Use Review	Ensures compatibility with land use plan
Red Lake, Wild Rice, Two Rivers, and Middle-Snake Watershed Districts	Watershed District Permit	Authorizes crossing of legal drains and ditches within watershed
Local/County	Permits pertaining to off-right-of-way yard use	Ensures compatibility with relevant land use plans

Source: Scoping Environmental Assessment Worksheet, Section 8.0, April 11, 2016, eDockets Numbers 20164-119956-01 and 20164-119956-03.

[a] Minnesota Department of Natural Resources has indicated that the agency would not grant license for line RA-03AM to cross Alexander Woods Scientific and Natural Area.

3.6.1 Federal Approvals

The proposed Project requires a number of federal permits, approvals, and decisions before construction and operation can begin. Before federal permits can be issued, the relevant agency must complete environmental review in accordance with NEPA and conduct consultations, such as with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act (ESA) and with the State Historic Preservation Office (SHPO) and tribal authorities under Section 106 of the National Historic Preservation Act (NHPA), as amended. The permits and approvals required for the proposed Project are listed in Table 3.6-1 and discussed further herein.

3.6.1.1 U.S. Army Corps of Engineers

USACE regulates impacts on navigable waters of the United States pursuant to Section 10 of the Rivers and Harbors Act of 1899 and potential impacts on waters of the United States, including wetlands, under Section 404 of the Clean Water Act. Dredged or fill material, including material that moves from adjacent construction sites into these waters, could affect the quality of the waters, and USACE requires permits for projects that could have such effects. The Project is expected to be required to obtain a permit to cross navigable waters under Section 10 of the Rivers and Harbors Act and an individual permit under Section 404 of the Clean Water Act.

3.6.1.2 U.S. Fish and Wildlife Service

USFWS oversees compliance with the Bald and Golden Eagle Protection Act, which prohibits anyone from “taking” (which includes disturbance) birds, nests, or eggs without a permit from the Secretary of the Interior. The USFWS also is responsible for overseeing compliance with the Migratory Bird Treaty Act (MBTA). The MBTA protects migratory birds and prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except as authorized under a valid permit.

USFWS also oversees compliance with the federal ESA of 1973, as amended, which requires that federal agencies "insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat of such species." USFWS therefore requires permits for taking of threatened or endangered species (USFWS 2016). USFWS encourages project applicants to consult with the agency to ascertain a project's potential to affect these species, and to identify general conservation measures for the project.

Prior to issuing permits for a project, federal agencies (e.g., USACE) are required to consult with USFWS under Section 7 of the ESA. The permitting agency must prepare a Biological Assessment in accordance with the ESA to analyze potential project-related effects on federally listed threatened or endangered species, candidate species, species proposed for listing, and their designated critical habitats. After consulting with the permitting agency, USFWS issues a Biological Opinion and Incidental Take Permit, if necessary.

3.6.1.3 U.S. Forest Service

The U.S. Forest Service (USFS) is charged with the protection of the nation's national forests (USFS 2016). Three route alternatives analyzed in this EIS (RA-06, RA-07, and RA-08) cross the Chippewa National Forest. USFS requires a Special Use Permit or a Right-of-Way Permit/Easement if a proposed project crosses land under its jurisdiction. The U.S. Department of Agriculture oversees special use permits for USFS under 36 Code of Federal Regulations 214 Subpart B.

As part of the proposed Project, Enbridge proposes to abandon the existing Line 3. This line currently proceeds through the Chippewa National Forest. Abandonment of the pipeline could affect forest resources and could require consultation with USFS.

3.6.1.4 U.S. Department of Transportation

The U.S. Department of Transportation PHMSA administers a national regulatory program to ensure the safe and reliable transportation of hazardous materials by pipeline, including oil, and is charged with preventing and minimizing associated human and environmental impacts. Through federal regulations at 49 CFR Part 195, PHMSA develops minimum standards to ensure the safe design, construction, testing, operation, and maintenance of pipeline facilities, as well as emergency response. Many of these regulations are written as performance standards allowing for pipeline companies to use different technologies to achieve the standard. New pipelines must meet all current standards. The general requirements, reporting requirements, operation, and maintenance and corrosion control requirements are all considered retroactive and apply to all pipelines regardless of age.

Although there is no specific permit or approval needed from PHMSA for the Project, it must be constructed and operated in accordance with PHMSA regulations. Additionally, the agency reviews oil spill response plans provided by pipeline operators and coordinates federal, state, and local planning and prevention activities.

3.6.2 Tribal Approvals

Seven Anishinaabe (Chippewa/Ojibwe) and four Dakota (Sioux) reservations are located in Minnesota. Each reservation and community is an American Indian tribal nation and is a distinct, sovereign government.

The Applicant's preferred route and route alternatives evaluated in this EIS run near several tribal reservations. In addition, as part of the Project, Enbridge proposes to abandon the existing Line 3, which currently traverses the Leech Lake and Fond du Lac Indian reservations. Abandonment of the line could affect tribal resources within these reservations.

Two route alternatives analyzed in this EIS (RA-07 and RA-08) cross the Leech Lake Indian Reservation and three route alternatives (RA-06, RA-07, and RA-08) cross the Fond du Lac Indian Reservation. If the Commission were to select one of these alternatives as the route for the Project, Enbridge would be required to obtain authorizations from the Leech Lake and Fond du Lac Bands of Ojibwe and BIA. These routes also would require BIA to conduct an environmental review under NEPA, as well as associated consultations under Section 7 of the ESA and Section 106 of the NHPA.

DOC-EERA has consulted with the Red Lake Band of Chippewa Indians, White Earth Reservation, Leech Lake Band of Ojibwe, Fond du Lac Reservation, and Mille Lacs Bands of Ojibwe regarding the Project. DOC-EERA considered its responsibilities for providing for consultation, coordination, and cooperation in accordance with State of Minnesota Executive Order 13-10. Tribal consultations are discussed further in Chapter 9.

3.6.3 State Approvals

3.6.3.1 Minnesota Department of Natural Resources

Minnesota DNR regulates potential effects on Minnesota's public lands and waters; crossing these areas requires a license, which could in turn require mitigation measures. Minnesota DNR has jurisdiction over wildlife in Minnesota and administers the Minnesota outdoor recreation system, including Wildlife Management Areas, Scientific and Natural Areas, state parks, and state forests. As with USFWS, Minnesota DNR encourages project applicants to consult with them to ascertain a project's potential to affect state-listed threatened and endangered species and to identify possible mitigation measures. Minnesota DNR also regulates water withdrawals from both groundwater and surface water sources, and requires a permit for withdrawals in excess of 10,000 gallons per day or 1 million gallons per year. Minnesota's Lake Superior Coastal Program, within the Minnesota DNR, coordinates the review of federal actions to determine whether they will be consistent with the state's coastal management program. Minnesota DNR's federal consistency review includes activities requiring certain federal licenses or permits.

3.6.3.2 Minnesota Pollution Control Agency

Minnesota PCA monitors air and water quality in Minnesota and uses technical and financial assistance as well as a variety of regulations to protect and enhance environmental quality in Minnesota. An air quality permit is required for the proposed Project due to additional air emissions that will occur at the Clearbrook terminal due to the increased oil throughput at the facility.

A general National Pollutant Discharge Elimination System (NPDES)/State Disposal System construction stormwater permit (CSW) from Minnesota PCA is required for stormwater discharges from construction projects that disturb one or more acres of land. The general CSW permit requires: (1) a Stormwater Pollution Prevention Plan; (2) use of best management practices for erosion prevention and sediment control; and (3) permanent stormwater treatment from projects that create one or more acres of new impervious surface. A general CSW permit is required for land-disturbing activities including the

construction of access roads, laydown yards, and equipment storage pads such as pipe yards and contractor yards.

A NPDES Individual Permit is required from Minnesota PCA. The individual permit authorizes discharges from hydrostatic testing of tanks/pipelines and trench dewatering during pipeline maintenance activities. The permit requires protection measures to manage soil erosion and stormwater discharge on construction sites; discharge of water from hydrotesting activities; and removal of water that may accumulate in the pipeline trench. The individual permit does not cover stormwater discharges associated with the construction or installation of new pipeline facilities.

In addition, a Clean Water Act Section 401 Water Quality Certification is required from Minnesota PCA certifying that the Project will comply with state water quality standards. Minnesota PCA administers its Section 401 Certification program in association with USACE's Section 404 process. When a public notice is issued for an individual permit by the USACE under its 404 authority, the 401 Certification is completed by Minnesota PCA and then included within the USACE 404 permit.

Minnesota PCA must certify that proposed activities will not violate air and water quality standards. The water quality permitting process, in association with USACE's Section 404 process, would provide a Section 401 Certification through the Minnesota PCA.

3.6.3.3 Minnesota Department of Health

Minnesota Department of Health assists local water suppliers in preparing wellhead protection plans within their drinking water supply management areas. Department of Health and local water suppliers encourage project applicants to consult with them to evaluate and mitigate potential effects on drinking water supplies.

3.6.3.4 Minnesota State Historic Preservation Office

The Minnesota SHPO oversees the protection of cultural resources in Minnesota by identifying, evaluating, and protecting historic and archaeological resources. The SHPO encourages project applicants to consult with them, and they can guide applicants on appropriate measures for mitigating effects on cultural resources.

In addition, the SHPO consults with federal and state government agencies to identify historic properties in government project areas and advises on ways to avoid or reduce potential adverse effects on those properties. Under Section 106 of the NHPA, federal agencies must consult with the SHPO regarding potential effects on historic properties (i.e., those listed on or determined eligible for the National Register of Historic Places). The SHPO also consults with state agencies for projects, which may affect state archaeological sites; for projects that may affect sites listed on the State or National Register of Historic Places; and for projects that need to complete an Environmental Assessment Worksheet. State agencies and departments also must consult with the SHPO prior to state approval of state sponsored projects or those undertaken on non-federal public lands for which a state agency or department has jurisdiction.

3.6.3.5 Minnesota Department of Agriculture

Minnesota Department of Agriculture (Minnesota DA) requires an agricultural impact mitigation plan that identifies measures that could be taken to avoid, mitigate, repair, or provide compensation for the adverse effects of constructing a pipeline on agricultural lands (Minn. Stat. § 216B.243, Subd. 7).

Minnesota DA is responsible for eradicating, controlling, and abating nuisance plant species (Minn. Stat. § 18G.04); and local county agricultural inspectors administer the program.

Pipeline project applicants must consult with Minnesota DA on the potential effects of issuing a pipeline route permit on agricultural lands.[32] This consultation could require development of an agricultural mitigation plan.[33]

3.6.3.6 Minnesota Department of Transportation

A permit from Minnesota Department of Transportation (MNDOT) is required for pipelines that are adjacent to or cross under Minnesota trunk highway rights-of-way. MNDOT's utility accommodation policy generally allows utilities to occupy portions of highway rights-of-way where such occupation does not put the safety of the traveling public or highway workers at risk or unduly impair the public's investment in the transportation system (MNDOT 2017).

3.6.3.7 Minnesota Board of Water and Soil Resources

Minnesota Board of Water and Soil Resources oversees local governmental units (LGUs) implementation of Minnesota's Wetland Conservation Act. For linear projects that cross multiple LGUs, Minnesota Board of Water and Soil Resources typically coordinates the review of potential wetland impacts among the affected LGUs. The Wetland Conservation Act requires anyone proposing to go through a wetland to (1) try to avoid the impact; (2) try to minimize any unavoidable impacts; and (3) replace any lost wetland functions. Utilities, including pipelines, however, can request exemption from wetland replacement requirements, and Enbridge has indicated that they will seek this exemption.

In accordance with the Minnesota Wetland Conservation Act (WCA) Federal Approvals Exemption for Utilities (Approvals Exemption), local government unit approval of a WCA replacement plan for the Project is not required for wetland impacts resulting from the construction, maintenance, or repair of the pipeline and associated facilities, so long as (1) all affected wetlands are either jurisdictional under the Federal Clean Water Act or the applicant agrees to proceed with the federal review using a preliminary jurisdictional determination, which assumes that all affected aquatic resources, including wetlands, are jurisdictional under the Clean Water Act; (2) the applicant receives a signed individual permit or other applicable permit instrument from the USACE under Section 404 of the Clean Water Act; and (3) Approvals Exemption notification and review procedures between the USACE, the Board of Water and Soil Resources, and the Minnesota Department of Natural Resources (Minnesota DNR) are followed. While WCA local government units do not approve wetland crossing methods under the Approvals Exemption, they do have the opportunity to provide comments to the USACE in response to the public notice on the USACE permit.

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32 Minnesota Statutes § 216E.10, Subd. 3.

33 Ibid.

The Approvals Exemption does not change the requirement to provide compensatory wetland mitigation under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act for Project impacts to waters and wetlands. Because Enbridge has asked the USACE to conduct its Section 404 permit review under a preliminary jurisdictional determination, Enbridge has agreed to provide wetland mitigation for all affected aquatic resources, without formal jurisdictional determinations for each affected water or wetland.

3.6.3.8 Minnesota Office of Pipeline Safety

Under an agreement with the federal Office of Pipeline Safety, within PHMSA, Minnesota Office of Pipeline Safety (MnOPS) inspects liquid and natural gas pipelines and investigates pipeline accidents and spills as an authorized agent of the federal government. PHMSA officials decide the appropriate course of action with regard to non-compliance on interstate pipelines. MnOPS is responsible for reviewing pipeline spill prevention and response plans.[34] Although MnOPS would not issue a permit or approval for the proposed Project, if the Project is approved, they would conduct inspections and review prevention and response plans.

3.6.4 Local Approvals

The Mississippi Headwaters Board has adopted a comprehensive management plan to protect the natural, cultural, historic, and recreational values of the Mississippi Headwaters region, and the board encourages project applicants to consult with them to help protect these values.

Watershed districts in Minnesota monitor water quality and coordinate water management decisions in their particular watersheds. Project applicants are encouraged to consult with districts to evaluate and mitigate potential impacts on watersheds. Districts require permits for work within their watersheds.

Counties, townships, and cities in Minnesota regulate land use within their jurisdictions by requiring a variety of approvals. Although the Commission's route permit supersedes all local land use regulations, permittees are not excused from local approvals required for proper local government functioning, such as the safe use of local roads, or for temporary land uses associated with a project.

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[34] Minnesota Statutes §115E; see also Interagency Report on Oil Pipelines (Interagency Pipeline Coordination Team 2015).

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Chapter 4
Alternatives to the Proposed Project

4.1 INTRODUCTION

Environmental Impact Statement Must Compare Proposed Project with Reasonable Alternatives

As outlined in Chapter 3, the Minnesota Environmental Policy Act requires that an Environmental Impact Statement (EIS) compare the potentially significant impacts of a proposed project to those of other reasonable alternatives.[1] In addition, both the Certificate of Need (CN)[2] and route permit[3] regulations require an evaluation of reasonable alternatives to a proposed project. More specifically, Minnesota environmental review regulations require that:

> *The EIS must address one or more alternatives of each of the following types of alternatives or provide a concise explanation of why no alternative of a particular type is included in the EIS: alternative sites, alternative technologies, modified designs or layouts, modified scale or magnitude, and alternatives incorporating reasonable mitigation measures identified through comments received during the comment periods for EIS scoping or for the draft EIS.*[4]

In Scoping the EIS, the Commission Included Recommended Alternatives, Plus One Route Segment

During the scoping process, Minnesota Department of Commerce, Energy Environmental Review and Analysis (DOC-EERA) staff collected input from the public, agencies, tribes, and nongovernmental organizations—including suggestions for alternatives for the EIS. After reviewing the proposed alternatives, DOC-EERA prepared a proposed *Final Scoping Decision Document* and recommended the CN and route permit alternatives to be included in the scope of the EIS. The *Alternatives Screening Report*[5] and the *Final Scoping Decision Document*[6] describe the process used to solicit, evaluate, and select the alternatives included in this EIS.

On November 30, 2016, the Minnesota Public Utilities Commission (Commission) issued its EIS scoping order that included these alternatives as well as one additional route segment.[7]

CN and Route Permit Alternatives Are Addressed Separately

The Commission will use the EIS to help inform its CN decision and the route permit decision. Therefore, the alternatives analysis is divided into two sections to match the alternatives under consideration in

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1 Minnesota Statutes § 216D.04, Subp. 2a.

2 Minnesota Administrative Rules Part 7853.0120.

3 Minnesota Administrative Rules Part 7852.1400.

4 Minnesota Administrative Rules Part 4410.2300(G).

5 *Alternatives Screening Report for Line 3 Replacement Project,* dated September 21, 2016, available at eDockets Number 20169-125058-08.

6 *Final Scoping Decisions Document for Line 3 Replacement Project*, dated September 21, 2016, available at eDockets Number 201612-127062-03.

7 Order Denying Motions, Approving Scoping Decision as Modified, and Requiring Expanded Notice, November 30, 2016, eDockets Numbers 201611-126917-02 and 201611-126917-02.

each of these two separate, sequential decisions. This chapter describes each of the CN, route, and route segment alternatives to the proposed Line 3 Project. Chapter 5 evaluates the potential environmental impacts of CN Alternatives, and Chapter 6 evaluates the potential environmental impacts of route alternatives.

This EIS focuses on providing the applicable environmental information for the CN, the route permit, and other agency decisions. Section 4.2, describes the alternatives evaluated in the EIS for the CN decision. The majority of the economic analysis and other technical information for the CN decision will be provided by the Enbridge Energy, Limited Partnership (Enbridge, or Applicant), other parties, and the public that are participating in the contested case hearing.

4.2 DESCRIPTION OF ALTERNATIVES – CERTIFICATE OF NEED

CN Criteria Address Energy Efficiency and Reliability, and Potential Social and Environmental Effects

In analyzing the need for the proposed Project and alternatives, the Commission must consider whether:

A. The probable result of denial would adversely affect the future adequacy, reliability, or efficiency of energy supply to the Applicant, to the Applicant's customers, or to the people of Minnesota and neighboring states.[8]

B. A more reasonable and prudent alternative to the proposed facility has not been demonstrated by parties or persons other than the Applicant.[9]

C. The consequences to society of granting the CN are more favorable than the consequences of denying the certificate.[10]

D. It has not been demonstrated that the design, construction, or operation of the proposed facility would fail to comply with the relevant policies, rules, or regulations of other federal, state, or local agencies.[11]

For a more detailed discussion of CN criteria, see Chapter 3 in this EIS.

Commission Could Issue a CN for the Project as Proposed or Modified, or They Could Deny It

The Commission could issue a CN for the Project as proposed, modify it, or deny it. As discussed in Chapter 3, the Commission must consider each of the criteria in Minnesota Administrative Rules Part 7853.0130 in determining need. Under these criteria, the Commission first considers the underlying economic need for the proposed pipeline. This economic analysis, conducted by Minnesota Department of Commerce Division of Energy Resources Energy Planning and Advocacy and other parties to the contested case hearing, will aid the Commission in making this evaluation. Then, if the Applicant establishes the underlying need, the environmental and socioeconomic analyses in the EIS will help the Commission weigh the advantages and disadvantages of alternative ways to meet the need and whether to issue a CN for the proposed Project. Therefore, for the CN decision, the Commission has three

8 Minnesota Administrative Rules Part 7853.0130 (A).

9 Minnesota Administrative Rules Part 7853.0130 (B).

10 Minnesota Administrative Rules Part 7853.0130 (C).

11 Minnesota Administrative Rules Part 7853.0130 (D).

options: (1) issue the certificate for the Project as proposed; (2) issue a certificate contingent on modifications; or (3) deny the certificate.[12]

Table 4.2-1 provides an overview of the alternatives included in this section and illustrates how the range of alternatives evaluated in the EIS aligns with each of the four major need-related criteria in Minnesota Administrative Rules Part 7853.0130, A through D. The rows in Table 4.2-1 represent the CN Alternatives evaluated in the EIS, and the columns are the applicable CN criteria. Figure 4.2-1 shows the locations of the CN Alternatives.

The sections that follow provide a detailed description of each of the CN Alternatives. In addition to the CN Alternatives included in Table 4.2-1 and discussed in Sections 4.2.1 through 4.2.9, Section 4.2.10 discusses the alternative of using a smaller diameter pipeline.

4.2.1 Action Alternative – Certificate of Need Approved

Chapter 2 describes the Applicant's proposed Project in detail.

4.2.2 No Action Alternative – Certificate of Need Denied

No Action Alternative is The Denial of Certificate of Need, and Potential Consequences

The EIS must evaluate the environmental consequences of the No Action Alternative. In this case, a Commission decision to deny the CN is the "No Action" Alternative. If the Commission determines that the demand for increased shipping capacity exists but denies the CN, the Applicant (or entities other than the Applicant) could reasonably be expected to meet shipper demand through other means, such as a different pipeline system, or by train or truck.

In analyzing the No Action Alternative, this EIS must therefore consider the human and environmental impacts associated with a variety of CN Alternatives that correspond to potential other reasonable alternatives and the applicable CN decision criteria. As indicated in Table 4.2-1, the No Action Alternative, denying the CN, could lead to any of the following:

1. Continued use of existing Line 3
2. Use of other pipelines
3. System Alternative SA-04
4. Use of Rail as an alternate mode of transport
5. Use of Trucks as an alternate mode of transport
6. Continued use of existing Line 3 supplemented by rail
7. Continued use of existing Line 3 supplemented by truck

[12] Minnesota Administrative Rules Part 7853.0800.

Figure 4.2-1. Locations of Certificate of Need Alternatives

Table 4.2-1. Certificate of Need Alternatives and Criteria

Commission's Decision	Would denial adversely affect future adequacy, reliability, or efficiency of energy supply?	If yes, is there a more reasonable and prudent alternative, such as different endpoints or a different transport method?	If no, are the consequences to society of granting the CN more favorable than denial? Does the Project comply with other laws?	Certificate of Need Alternatives Evaluated for Environmental Impacts	
	Minnesota Administrative Rules Part 7853.0130 A	Minnesota Administrative Rules Part 7853.0130 B	Minnesota Administrative Rules Part 7853.0130 C, D		
Certificate of Need Not Granted (CN Alternatives)	No Keep using existing Line 3	—	—	**CN Alternative 1** Continued use of existing Line 3	Line 3 operates at existing capacity, no supplemental oil transportation
	Yes	Yes Use a different pipeline system	—	**CN Alternative 2** Other pipelines	Other pipelines transport up to 760,000 barrels per day (bpd)
				CN Alternative 3 System alternative SA-04	SA-04 transports up to 760,000 bpd
		Yes Use a different oil transportation mode		**CN Alternative 4** Transportation by rail	Trains transport up to 760,000 bpd
				CN Alternative 5 Transportation by truck	Trucks transport up to 760,000 bpd
	Yes	No	No The consequences to society of granting the CN are not more favorable than denying it	**CN Alternative 6** Existing Line 3 supplemented by rail	Line 3 operates at existing capacity; trains used to transport up to 370,000 additional bpd to market
				CN Alternative 7 Existing Line 3 supplemented by truck	Line 3 operates at existing capacity; trucks used to transport up to 370,000 additional bpd to market
Certificate of Need Granted	Yes	No	Yes	Applicant's proposed Project	CN granted for the proposed Project or for a modified Project (e.g., a new lower-capacity pipeline)

The sections that follow provide a detailed description of each of the CN Alternatives. In addition, Section 4.2.10 discusses the alternative of a smaller diameter pipeline.

To provide a basis for evaluating the No Action Alternative, the following throughput volumes by destination were assumed for each of the CN Alternatives (Table 4.2-2).

Table 4.2-2. Average Delivery Volume by Destination for Existing Line 3 and Certificate of Need Alternatives (barrels per day)

Alternative	Destination			Total Deliveries
	Clearbrook	Superior[a]	Other	
Continued use of existing Line 3	360,000	30,000	0	390,000
Use of other pipelines	0	0	760,000/various	760,000
System alternative SA-04	0	0	760,000 – Joliet, Illinois	760,000
Transportation by rail	360,000	400,000	0	760,000
Transportation by truck	360,000	400,000	0	760,000
Existing Line 3 supplemented by rail	360,000	400,000	0	760,000
Existing Line 3 supplemented by truck	360,000	400,000	0	760,000

[a] Deliveries by rail or truck would range from 154,000 barrels per day (bpd) (supplement to continued use of existing Line 3 at 390,000 bpd) to up to 494,000 bpd (exclusive use of rail or truck) to achieve a total volume of 760,000 bpd.

Note:

Unit of measure for crude oil: 1 barrel = 42 U.S. gallons

4.2.3 Certificate of Need Alternative 1 – Continued Use of Existing Line 3

As Table 4.2-2 shows, if the existing Line 3 continued to operate under the No Action Alternative, only 390,000 barrels per day (bpd) of transfer capacity would be available, considerably less than the 760,000 bpd planned capacity of the Line 3 Project.

Line 3 has operated at the current lower capacity for integrity reasons. Under the current version of the proposed consent decree (see Section 2.2), increasing the capacity of the existing Line 3 to a higher operating capacity would require significant investment by Enbridge to repair and maintain the existing facilities. Enbridge previously determined that such an investment in new facilities is cost prohibitive and not feasible. Because Enbridge has already determined that upgrading the existing line is not feasible, upgrading the existing line to a higher capacity was not considered in the CN evaluation and, as noted in Table 4.2-2, the analysis of this CN Alternative assumes 390,000 bpd throughput.

Maintaining the Existing Line 3 Would Require 4,000 Excavations over the Next 15 Years

Continued operation of Line 3 at its present capacity would require that Enbridge continue the high level of maintenance that the pipeline currently requires. Enbridge has estimated that up to 4,000 integrity digs (excavating and exposing the pipeline for maintenance and correction of anomalies) would be required over the next 15 years of operation (approximately 267 procedures per year) (Enbridge 2015). The effects of this high level of maintenance activity would continue under the No Action Alterative.

Integrity digs occur when a potential anomaly in the pipeline structure is detected and must be investigated and repaired. The potential repair site is identified and, if required for protecting adjacent operating pipelines, protective matting, or an additional soil layer is temporarily installed around the site. Topsoil at the repair site may be removed and stockpiled.

The pipeline trench is opened using excavating equipment, and the exposed pipeline is inspected and repaired, as warranted. In some cases, a portion of the pipe is removed and a replacement section welded into place, inspected, and tested. When the repair is completed and protective external coating is reapplied, the trench is backfilled, topsoil is replaced, and, if appropriate, vegetation is restored. The disturbed area within the pipeline right-of-way may be a small area for repair of the pipeline at a specific point or a larger area if a section of the pipe is replaced.

Under the consent decree, increasing the capacity of the existing Line 3 to a higher operating capacity would require significant investment by Enbridge in repair and maintenance of the existing facilities.

Annual Cost for Continued Maintenance of Existing Line 3 Is Estimated at $30 to $40 Million

Enbridge estimates that it would cost $30 to $40 million per year to maintain the U.S. portion of the existing Line 3. For comparison, Enbridge estimates that maintaining the new Line 3 would cost approximately $2 million (Enbridge 2014).

4.2.4 Certificate of Need Alternative 2 – Use of Other Pipelines

Other existing and potential future pipelines with available capacity were considered as alternatives to the Project if they (1) interconnected in the crude oil supply region near Edmonton, Alberta; and (2) served the same Clearbrook and Superior destinations.

Environmental Impacts of Alternative Pipeline Capacity Owned by Enbridge or Others Are Not Evaluated

Existing regional pipelines that originate in the Edmonton area include TransCanada's Keystone pipeline system and the Enbridge Mainline system, which consists of Line 3 and other pipelines, including Line 1 (237,000 bpd), Line 2A (442,000 bpd), Line 2B (442,000 bpd), Line 4 (796,000 bpd), and Line 67 (890,000 bpd). Other pipelines that have recently been constructed, are planned for construction, or are in the planning and permitting stage were also considered. Each potential alternative pipeline is listed and described in Table 4.2-3.

Table 4.2-3. Certificate of Need Alternative Pipelines

Pipeline	Route	Status
Keystone XL pipeline	Canada, North Dakota, South Dakota, Nebraska	Presidential Permit granted. Does not enter Minnesota and does not interconnect with Clearbrook or Superior.
TransCanada Energy East pipeline	From Hardisty, Alberta, to Montreal parallel to the U.S.-Canada border	Not currently approved for construction. Does not enter Minnesota and does not interconnect with Clearbrook or Superior.
Woodriver pipeline	Woodriver, Illinois, to Cushing, Oklahoma	Existing pipeline (inactive)
Minnesota pipeline	Clearbrook to Twin Cities	Existing pipeline
Enbridge Mainline system	Edmonton to Superior via Clearbrook	Existing pipelines

Source: Information Technology Associates 2008.

It is not clear whether these alternative pipelines could meet the need for this proposed project. However, the CN hearing process will evaluate additional information on the economic need or viability of other regional pipelines to transport the volume of additional oil proposed by the Project. The environmental impacts associated with these other pipelines have been (or would be) evaluated in other jurisdictions. Therefore, the "other pipeline" CN Alternatives are not evaluated in the EIS. The environmental implications of a Commission determination that existing and/or other proposed pipelines meet the need for the proposed project is addressed in the review of continued operation of existing line 3 at 390,000 barrels per day. This analysis is provided in Chapter 5 of the EIS.

4.2.5 Certificate of Need Alternative 3 – System Alternative SA-04

System Alternative SA-04 Would Mostly Run Through North Dakota, Iowa, and Illinois

SA-04 was proposed by commenters during the scoping process as an alternative that would completely avoid northern and central Minnesota, and would interconnect with the regional pipeline system closer to the major refineries in central Illinois. In the *Final Scoping Decision Document*, SA-04 was shown to terminate near Joliet, Illinois. Approximately 68 percent of SA-04 is located outside Minnesota in North Dakota, Iowa, and Illinois. System alternative SA-04 is not the same as a "route alternative," such as those evaluated in Chapter 6. It is a conceptual pipeline alternative to a different endpoint that is analyzed for comparative purposes. SA-04 and other CN Alternatives could not actually be permitted under this process.

4.2.5.1 Location

The location of SA-04 follows the Applicant's preferred route from Neche, North Dakota, to the vicinity of U.S. Highway 29 in the northeast corner of North Dakota, where it intersects with the Alliance pipeline corridor. It follows the pipeline corridor until it crosses into Minnesota near Wheaton, in Traverse County. In Minnesota, SA-04 parallels the Alliance pipeline right-of-way and the Minnesota River through Big Stone, Swift, Chippewa, Renville, and Nicolet counties to near Mankato, in Blue Earth County.

The route continues southeast, diagonally across Faribault and Freeborn counties to the vicinity of Albert Lea. South of Albert Lea, the route crosses the Minnesota-Iowa border and continues southeast to the vicinity of Clinton, in Clinton County, Iowa, generally following the Cedar River. The route crosses the Iowa-Illinois border southeast of Clinton, Iowa, and continues along existing pipelines (Alliance Pipeline, LP; Enterprise Products Operations, LLC; NGL Pipeline, LP) to Joliet, Illinois.

Figure 4.2-1 illustrates the location of SA-04. Figures showing the route at a larger scale are included in Appendix A. Distances for SA-04 are summarized in Table 4.2-4.

4.2.5.2 Pump Stations and Mainline Valves

System Alternative SA-04 Length Would Require 16 New Pump Stations

Enbridge indicated that 16 pump stations would be required along SA-04, or one every 50 miles on average, which is comparable to Enbridge's proposed Project. It was assumed that each pump station would require approximately 8 acres of land and would be located adjacent to the system alternative alignment. Similar to the proposed Project, mainline valves (MLVs) would be required near water crossings, significant environmental resources, and populated areas in order to shut off oil in case of a

leak. Hydraulic analysis of operating the pipeline for SA-04 is not available, so the specific locations of pump stations and MLVs cannot presently be determined.

Table 4.2-4. Measurements for System Alternative SA-04

Feature	Measurement
Total length (origin to destination)	795.4 miles
Length in Minnesota	251.0 miles
Length outside Minnesota	544.4 miles
States crossed (distance)	North Dakota – 233.5 miles Iowa – 187.9 miles Illinois – 123.0 miles
Counties crossed	North Dakota: Pembina, Walsh, Grand Forks, Trail, Cass, Richland Minnesota: Traverse, Stevens, Swift, Chippewa, Kandiyohi, Renville, Sibley, Nicollet, Le Sueur, Blue Earth, Waseca, Freeborn, Mower Iowa: Mitchell, Howard, Chickasaw, Bremer, Fayette, Buchanan, Delaware, Jones, Clinton Illinois: Rock Island, Whiteside, Lee, Bureau, LaSalle, Grundy, Will

4.2.5.3 Construction and Operation of System Alternative SA-04

Constructing and Operating System Alternative SA-04 Could Require Additional State and Local Permits

The analysis of impacts associated with SA-04 in the EIS assumes that it would be constructed and operated in the same manner as the Applicant's preferred route. SA-04 is located within other local and state jurisdictions (approximately 544 miles, or 68 percent of the total route), so other state and local regulations would apply.

4.2.6 Certificate of Need Alternative 4 – Transportation by Rail

This alternative considers rail as an alternative mode of transport to transfer 760,000 bpd to Enbridge's terminals in Clearbrook, Minnesota, and Superior, Wisconsin. The analysis assumes that 48 percent of the 760,000 bpd total (360,000 bpd) would be delivered to Clearbrook, Minnesota, based on the approximate capacity of the Twin Cities refineries that the Clearbrook terminal serves via the Minnesota Pipe Line Company (MPL) pipeline system. The analysis assumes that the remaining 52 percent (400,000 bpd) would be delivered to Superior, Wisconsin. It also assumes that existing rail lines would primarily be used. These destinations and existing routes are shown in Figure 4.2-2.

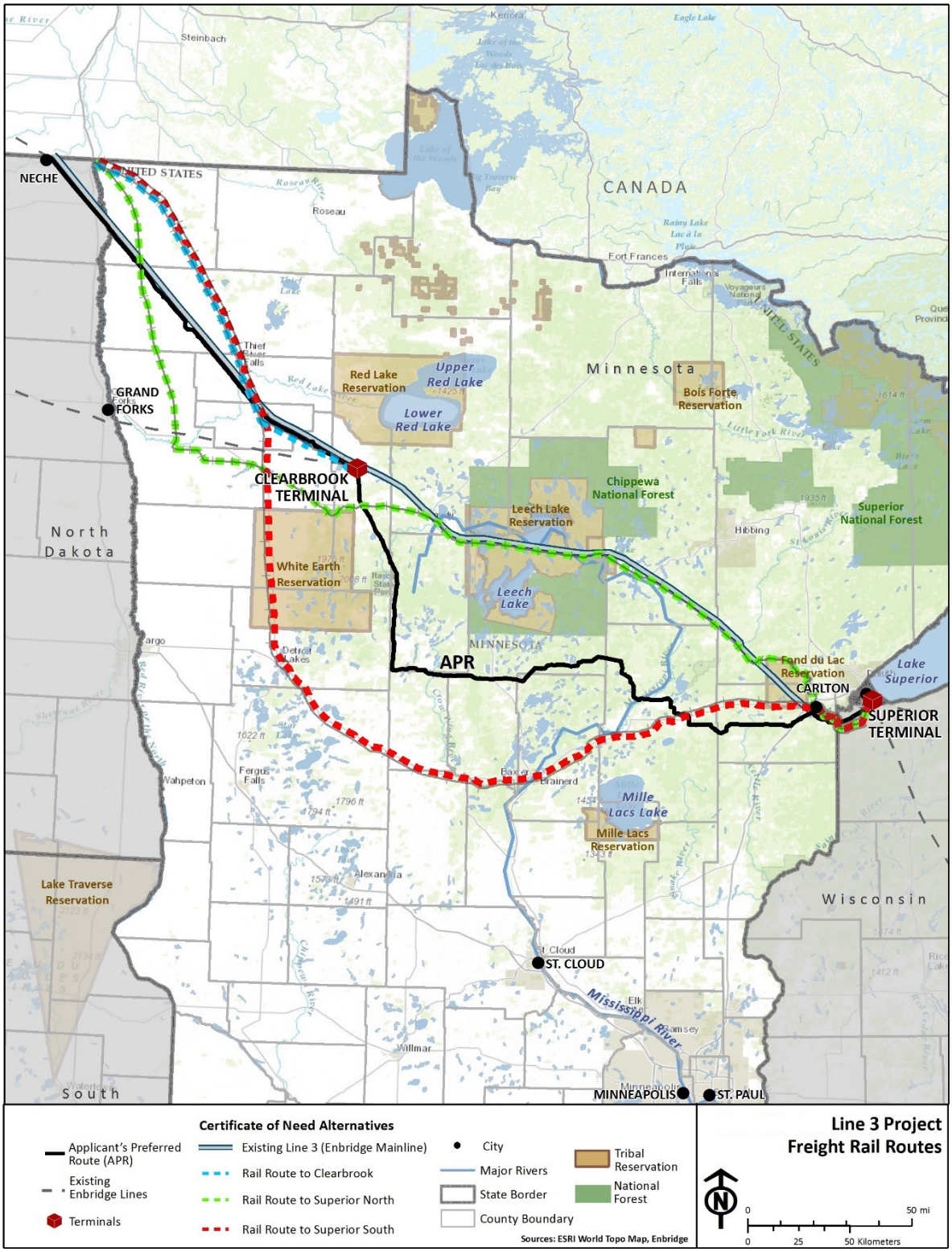

Figure 4.2-2. Potential Railway Routes from Gretna to the Clearbrook and Superior Terminals

Rail Transport Would Require New Oil Storage and Loading Facilities and Upgraded Rail Access

Transporting oil by rail would require an oil storage and rail loading facility near Neche, North Dakota, and could be transported by either the Burlington Northern Santa Fe (BNSF) or the Canadian Pacific rail lines to the Clearbrook and Superior terminals, respectively. There are currently no oil storage facilities, rail loading facilities, or rail access immediately adjacent to the Mainline near the international border. In addition, no rail offloading facilities or rail access are adjacent to the Clearbrook terminal. Some rail access and existing rail offloading capacity is currently available at Superior. Transporting crude oil by rail would require that loading/offloading facilities and new rail access be developed and that existing rail access be upgraded. To implement the rail alternative, the following facilities would be required.

- Gretna (near Neche) – The Mainline pump station and storage facilities closest to Neche are located at Enbridge's pump station in Gretna, Canada, approximately 2 miles north of Neche, North Dakota. Both BNSF and Canadian Pacific rail lines have mainline rail facilities at West Lynn/Emerson, Canada; a distance of approximately 14 miles. The Gretna pump station is in a rural location surrounded primarily by disturbed agricultural land. A 14-mile-long rail line across agricultural land, including some wetlands, would require disturbance of approximately 84 acres in addition to an area of 100 to 200 acres for the rail loading facility.

  The loading facility, which would be constructed in Canada, would include approach tracks, storage tracks, and active loading facilities, which would need to be enclosed to allow operations during winter and would need to accommodate railroad siding, metering equipment, underground piping, secondary containment and vapor control systems, catch basins, retention ponds, electric power, sewer and water systems, and other associated facility requirements. There are existing storage facilities at the Gretna pump station. Rail access would be directly east and could require an estimated six new rural road crossings. Any loading facility at Gretna would require permitting by provincial and national entities in Canada.

- Clearbrook – The existing Enbridge terminal and pump station at Clearbrook is surrounded by semi-disturbed agricultural lands and wetlands. An abandoned rail right-of way is directly adjacent to the existing pump station site. The line is abandoned, and the track from Clearbrook approximately 10 miles northwest to Gully, Minnesota, has been removed. At Gully, rail facilities are still present but would likely need to be upgraded or replaced along the Canadian Pacific route from Gully to Thief River Falls.

  The offloading facility would require converting 100 to 200 acres of agricultural lands and wetlands to accommodate arrival and departure tracks, enclosed transfer structures, concrete containment areas, repair facilities, support buildings, pumps, above- and below-ground pipelines providing connections to the Clearbrook terminal, electric power, stormwater infrastructure, sewer and water systems, and an oil-water separation area. Recommissioning the abandoned rail facilities could require re-converting approximately 60 acres of partially reclaimed right-of-way. Because an existing rail line would be used, no new road crossings would be created, but existing road crossings would be reactivated.

- Superior – An existing rail logistics facility is located adjacent to the Enbridge terminal at Superior. This facility could have limited capacity and would require expansion to accommodate crude oil transfers of 760,000 bpd. The land adjacent to the existing rail logistics facility consists primarily of wetlands that would need to be converted if used for expansion. Rail access to the BNSF and Canadian Pacific systems appears to be available subject to appropriate tariffs. No new road crossings are likely to be required.

Transporting 760,000 bpd of Oil by Rail Would Require Ten 110-Car Trainloads a Day

Oil is typically transported on unit trains, which consist of approximately 110 specialized tank cars designed to haul liquid freight, and specifically crude. Each of these specialized tank cars, which are regulated by the U.S. Department of Transportation (USDOT), could hold up to 800 barrels (33,600 gallons) of oil. Therefore, a full unit train of 110 tank cars could transport 88,000 barrels (3.7 million gallons) of oil.

Transporting 760,000 bpd of oil by rail would require 10 loaded unit trains per day to travel from Gretna to the Clearbrook and Superior terminals. Assuming that the volume of oil transported to the Clearbrook terminal and subsequently pumped to Minnesota refineries would equal 48 percent of this total and the remaining 52 percent of the total would be transported to Superior, five loaded unit trains would be required to travel from Gretna to the Clearbrook terminal per day, and five loaded unit trains would be required to travel from Gretna to the Superior terminal per day (Table 4.2-5).

Table 4.2-5. Summary of Transportation Requirements for the Rail Alternative

Unit Trains		
Volume	**Number Required[a]**	**Departures per Day**
760,000 barrels per day	66 trains/7,244 cars	10
Facilities		
Facility	**Facility Requirements**	**Land Requirements**
Rail loading and offloading facilities	Gretna – New 100- to 200-acre[b] facility with Class 1 rail connection adjacent to the existing Mainline right-of-way	Gretna – Adjacent agricultural land
	Clearbrook – New 100-to 200-acre[b] facility with Class 1 rail connection adjacent to the existing Clearbrook terminal	Clearbrook – Adjacent semi-disturbed land, agricultural land and wetlands
	Superior – Approximately 100-acre[b] expansion of existing rail logistics facility adjacent to existing Enbridge terminal	Superior – Adjacent wetlands and recreation land (golf course)
Rail upgrades	Gretna – New approximately 14-mile-long spur line connection from Gretna pump station to BNSF or Canadian Pacific rail line at West Lynn/Emerson in Canada	Gretna – Approximately 84 acres[c] of permanent agricultural land converted to rail use; additional road crossings
	Clearbrook – Reestablish approximately 10 miles of track from Gully to Clearbrook and upgrade portions of the existing Canadian Pacific rail line from Thief River Falls to Gully, Minnesota	Clearbrook – Approximately 60 acres[c] of existing abandon right-of-way converted back to rail use
	Superior – Direct interconnection with existing BNSF and Canadian Pacific Class 1 rail line. Less than 0.5 mile of new spur may be required.	Superior – Less than 3 acres[c] of semi-disturbed land converted to rail use

[a] Number of unit trains does not include requirements for locomotives.

[b] Area required for loop track, storage tracks, and transfer facilities for loading or offloading operations are exclusive of rail spur to interconnect with Class 1 rail line.

[c] Assumes a 50-foot-wide permanent right-of-way. An additional right-of-way of up to 50 feet could be disturbed during construction.

Cost of the Required Number of New Tank Cars Estimated at $1 Billion

Based on the calculations for the number of tank cars needed to deliver the specified volumes per day, the estimated transit times of the unit trains, and the time necessary for loading and offloading the tank cars and for empty trains to make return trips to Gretna, approximately 7,200 new tank cars would be required.[13] Assuming a cost of $140,000 per car, the capitalization to amass the needed number of unit trains would be approximately $1 billion.

Availability of Existing and New Tank Cars is Assumed in the Analysis

This estimate assumes that the proposed stock of tank cars would be available. While tank car manufacturers were said to have over 50,000 tank cars back ordered in 2013, more recent analysis indicates that this backlog has cleared (Kloster 2015). This estimate also does not include the cost of constructing the new rail spurs or any associated rail infrastructure needed, railway maintenance, labor costs, fuel, or other associated expenses. Nor does it include the cost of constructing unit train terminal facilities for loading and offloading, which have been estimated to range from approximately $85 to $125 million.

This scenario also assumes that the BNSF and Canadian Pacific rail carriers have availability for this increase in rail traffic and would provide joint rail tariffs for the service proposed. It would require one available route on Canadian Pacific to the Clearbrook terminal and two available routes to the Superior terminal through various combinations and routings of the BNSF and Canadian Pacific rail lines. See Figure 4.2-2.

4.2.7 Certificate of Need Alternative 5 – Transportation by Truck

This alternative considers truck as an alternative mode of transport to transfer 760,000 bpd to Enbridge's terminals in Clearbrook, Minnesota, and Superior, Wisconsin. As with the rail alternative, transporting crude oil by truck as an alternative to replacing Line 3 would require that oil be pumped through the existing Mainline from the Applicant's facilities in Edmonton, Alberta, to an oil storage and truck loading facility at Gretna, adjacent to the existing Mainline. Oil would subsequently be loaded into tanker trucks and transported by highway to the Clearbrook and Superior terminals. The analysis assumes that 48 percent of the 760,000 bpd total (360,000 bpd) would be delivered to Clearbrook, Minnesota, based on the approximate capacity of the Twin Cities refineries that the Clearbrook terminal serves via the MPL system. The analysis assumes that the remaining 52 percent (400,000 bpd) would be delivered to Superior, Wisconsin. It also assumes that existing highways would primarily be used. These destinations and existing routes are shown in Figure 4.2-3.

[13] Calculations are based on figures provided in the MPL, LLC Certificate of Need Application for the Minnesota Pipe Line Reliability Project. MPUC Docket No. PL-5/CN-14-320.

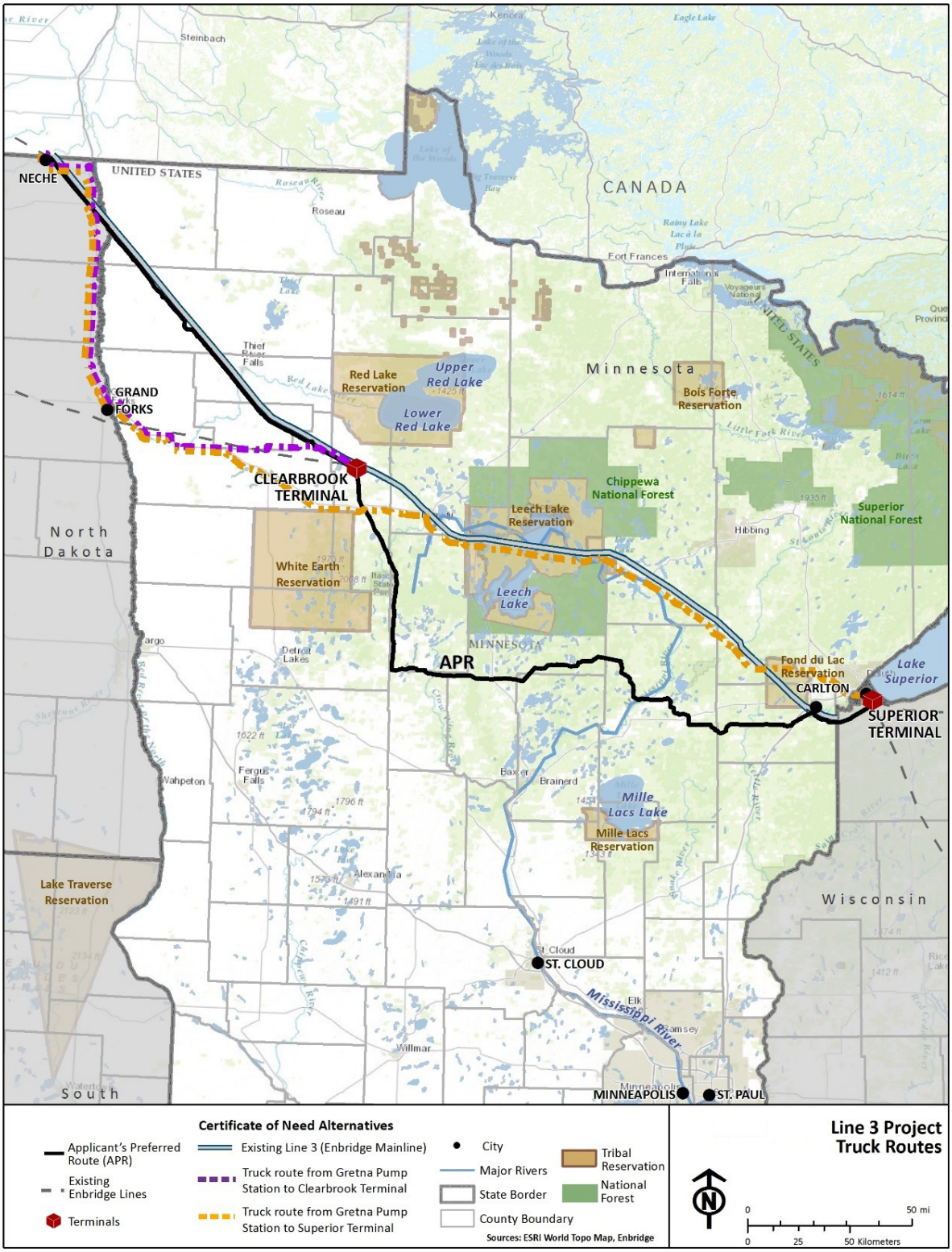

Figure 4.2-3. Potential Truck Routes from Gretna to the Clearbrook and Superior Terminals

Truck Transport Would Require New Loading Facilities and New or Upgraded Access to Highways

This alternative would require development of truck loading and offloading facilities and new or upgraded road access to the interstate highway system. Assuming that the Applicant could maximize use of that portion of Line 3 approved for upgrade in Canada, a truck loading facility would likely be located at the Gretna pump station near the U.S. border. From this point, trucks could be routed to Enbridge's Clearbrook and Superior terminals. To implement the truck alternative, the following facilities would be required.

- Gretna – A truck loading facility would most likely be located at the Gretna pump station. Manitoba Provincial Highway 30, North Dakota State Highway 18, and North Dakota County Road 55 would link the facility to Interstate 29 at Pembina, North Dakota. These roads, spanning 18 miles, may require the addition of passing lanes and other configuration changes to support the increased truck traffic. Due to the uncertainty of what upgrades would be required, amounts for permanently disturbed areas were not estimated, but road upgrades likely would involve only minimal acreage. The facility would require that rural agricultural land and some wetlands be permanently converted to industrial use—approximately 50 acres for the loading facility and 102 acres for road access.

  The loading facility would consist of covered loading bays, piping to connect to existing storage tanks, primary and secondary spill and runoff containment facilities, wastewater systems, and other associated components, including contained overnight parking facilities for the trucks. The location of facilities in Canada could be influenced by permitting and international border crossing requirements.

- Clearbrook – Tanker trucks using the interstate highway system would arrive at the Applicant's Clearbrook terminal and offload crude oil to be delivered to those customers taking deliveries at Clearbrook. It was assumed that existing storage tanks would be sufficient to support the truck delivery operation, but truck offloading facilities would need to be constructed with the same components as the loading facilities described above.

  The existing Enbridge terminal and pump station at Clearbrook are surrounded by semi-disturbed agricultural lands and wetlands that would need to be converted to industrial use to accommodate an approximately 50-acre truck offloading facility. A new 0.6-mile-long access road from the terminal to State Highway 92 would need to be constructed. In addition, State Highway 92 from Clearbrook to its intersection with County Highway 7 south of Oklee, County Highway 7 south of Oklee to its intersection with U.S. Highway 59 south of Brooks, a 1-mile expanse of U.S. Highway 59 connecting State Highway 92 and County Highway 49, and County Highway 49 south of Brooks to its intersection with U.S. Highway 2 15 miles east of Crookston could require upgrades.

  The existing 42-mile-long route consists of two-lane highways that could require adding passing lanes and other configuration changes to support the increased truck traffic. Because of the uncertainty of what upgrades would be required, amounts for permanently disturbed areas were not estimated, but road upgrades would likely involve only minimal acreage.
  U.S. Highway 2 runs west to Grand Forks, where it intersects Interstate 29 and the route to Gretna.

- Superior – The route from Gretna to Enbridge's existing terminal at Superior would be on U.S. Highway 2 from the west. This highway crosses into Superior on the Richard I. Bong Bridge and is then routed to the Superior Bay waterfront and on to Enbridge's Superior terminal. Significant additional tanker truck traffic on this route could, however, create unacceptable congestion.

  A new, approximately 5-mile-long more direct truck route could be developed by using an existing rail corridor and airport property. This new access would permanently disturb approximately 34 acres of semi-disturbed and industrial land. Installing a truck offloading facility would permanently disturb an additional approximately 50 acres of wetlands and possibly recreation land (golf course) directly adjacent to the Superior terminal.

Transporting 760,000 bpd by Truck Would Require 4,000 Truck Trips a Day

Tanker trucks can carry approximately 190 barrels and are often used to move oil from wellhead locations not served by pipeline gathering systems to aggregation points and storage facilities. They are not typically used to transport the volumes proposed by the Project. Transporting 760,000 bpd of oil by tanker truck would require 4,000 tanker trucks per day to travel from Gretna to the Clearbrook and Superior terminals.

As noted above, the analysis assumes that the volume of oil transported to the Clearbrook terminal and subsequently pumped to Minnesota refineries would equal approximately 48 percent of this total and that the remaining 52 percent of the total would be transported to Superior. To travel from Gretna to the Clearbrook terminal, 1,920 loaded trucks per day would be required; and 2,080 loaded trucks per day would be required to travel from Gretna to the Superior terminal (Table 4.2-6).

The Cost of the New Trucks for Transportation by Truck Is Estimated at $2.4 Billion per 5 Years

Although the amount of oil transported per day could vary by demand, the Applicant would need to operate a fleet of trucks capable of transporting the full estimated volumes per day. The shortest distances by highway from Gretna to the Clearbrook and Superior terminals are approximately 193 miles and 360 miles, respectively (Figure 4.2-3). Based on the estimated number of tanker trucks needed to deliver the specified volumes per day, a conservative estimate of the time necessary for loading and offloading the tanker trucks, and the time necessary for empty trucks to return to Gretna, 12,000 new tanker trucks would be required.

Assuming an estimated cost of $200,000 per truck, an initial capital investment of $2.4 billion would be required. With the mileage the trucks would cover in steady service, the economic life of a truck would be approximately 5 years, so that cost would be repeated every 5 years throughout the lifespan of the Project.

Table 4.2-6. Summary of Transportation Requirements for the Truck Alternative

Truck Units		
Volume	**Number Required**	**Departures per Day**
760,000 barrels per day	12,200 trucks	4,000 trucks
Facilities		
Facility	**Facility Requirements**	**Land Requirements**
Loading and offloading facilities	Gretna – New approximately 50-acre[a] site with access to freeway	Gretna – Adjacent to agricultural land
	Clearbrook – New approximately 50-acre[a] site with access to freeway	Clearbrook – Adjacent to semi-disturbed land, agricultural land, and wetlands
	Superior – New approximately 50-acre[a] site with access to freeway	Superior – Adjacent to wetlands and recreation land (golf course)
Road access requirements	Gretna – Improvement of approximately 18-miles of Provincial and State Highway and County Road from Gretna pump station to U.S. Interstate 29 at Pembina, North Dakota	Gretna – Upgrades to existing roads.
	Clearbrook – Approximately 0.6-mile-long truck access to State Highway 92 at Clearbrook; potential improvement of approximately 42 miles of State Highway and County Highways from Clearbrook to U.S. Highway 2 near Crookston, North Dakota	Clearbrook – Approximately 4.4 acres[b] of semi-disturbed agricultural land and wetlands converted to road use
	Superior – Could require new, approximately 4.7-mile-long truck route from U.S. Highway 2 entrance to Superior to the vicinity of the terminal	Superior – Less than 34 acres[b] of semi-disturbed land converted to road use

[a] Area required for loading and unloading bays, storage tanks, piping, containment facilities, catch basins, roads, water, wastewater systems and other associated components.

[b] Assumes 60-foot-wide permanent right-of-way. An additional right-of-way of up to 60 feet may be disturbed during construction.

4.2.8 Certificate of Need Alternative 6 – Existing Line 3 Supplemented by Rail

This alternative considers continued operation of existing Line 3 with trains transporting additional oil to achieve a total transfer capacity of 760,000 bpd. This alternative assumes existing Line 3 would supply 390,000 bpd to Superior. Assuming that Line 3 would transport the full amount of its daily operating volume (390,000 bpd) to the Superior terminal, the assumed 48 percent/52 percent division of total oil volume transported to the Clearbrook and Superior terminals, respectively, would result in 360,000 bpd of oil transported by rail to the Clearbrook terminal and 10,000 bpd of oil transported by rail to the Superior terminal.

This alternative would require the ongoing maintenance and repair activities associated with continued use of existing Line 3 (Section 4.2.3) as well as development of the infrastructure for rail transport described in Section 4.2.6.

Existing Line 3 Supplemented by Rail Would Require Six 110-Car Trainloads a Day

Transporting 370,000 bpd of oil by rail would require six loaded unit trains to travel from Gretna to the Clearbrook and Superior terminals per day. Five loaded unit trains would travel from Gretna to the Clearbrook terminal per day, and one unit train would travel from Gretna to the Superior terminal per day.

Existing Line 3 Supplemented by Rail Would Require $500 Million Investment in New Tank Cars and $30 to $40 Million per Year Continued Maintenance of Existing Line 3

Based on the calculations for the number of tank cars needed to deliver the specified volumes per day, the estimated transit times of the unit trains, and the time necessary for loading and offloading the tank cars and for empty trains to make return trips to Gretna, approximately 3,500 new tank cars would be required.[14] Assuming a cost of $140,000 per car, the capitalization to amass the needed number of unit trains would be approximately $495 million.

As noted above, Enbridge estimates that it would cost $30 to $40 million per year to maintain the U.S. portion of the existing Line 3.

4.2.9 Certificate of Need Alternative 7 – Existing Line 3 Supplemented by Truck

This alternative considers continued operation of existing Line 3 with trucks transporting additional oil to achieve a total transfer capacity of 760,000 bpd. This alternative assumes that existing Line 3 would supply 390,000 bpd to Superior. Assuming that Line 3 would transport the full amount of its daily operating volume (390,000 bpd) to the Superior terminal, the assumed 48 percent/52 percent division of total oil volume transported to the Clearbrook and Superior terminals, respectively, would result in 360,000 bpd of oil transported by truck to the Clearbrook terminal and 10,000 bpd of oil transported by truck to the Superior terminal.

This alternative would require the ongoing maintenance and repair activities associated with continued use of existing Line 3 (Section 4.2.3) as well as development of the infrastructure for truck transport described in Section 4.2.7.

Existing Line 3 Supplemented by Trucks Would Require 1,947 Truck Trips per Day

Transporting 360,000 bpd of oil by truck to the Clearbrook terminal and 10,000 bpd to the Superior terminal would require 1,889 trucks per day to travel from Gretna to the Clearbrook terminal and 58 trucks per day to travel from Gretna to the Superior terminal.

The Cost of the New Trucks for Transportation by Truck Is Estimated at $1.2 Billion per 5 Years and $30 to 40 Million per Year Continued Maintenance of Existing Line 3

As noted in Section 4.2.7, although the amount of oil transported per day could vary by demand, the Applicant would need to operate a fleet of trucks capable of transporting the full estimated volumes per day. The shortest distances by highway from Gretna to the Clearbrook and Superior terminals are approximately 193 miles and 360 miles, respectively (Figure 4.2-3). Based on the estimated number of tanker trucks needed to deliver the specified volumes per day, a conservative estimate of the time

[14] Calculations are based on figures provided in the MPL, LLC Certificate of Need Application for the Minnesota Pipe Line Reliability Project. MPUC Docket No. PL-5/CN-14-320.

necessary for loading and offloading the tanker trucks, and the time necessary for empty trucks to return to Gretna, 6,000 new tanker trucks would be required.

As noted above, Enbridge estimates that it would cost $30 to $40 million per year to maintain the U.S. portion of the existing Line 3.

4.2.10 Alternative Pipeline Configuration – Smaller Diameter Pipeline

Smaller Diameter Pipeline Would Have Smaller Throughput but Many of the Same Adverse Effects

The suggestion that a smaller diameter pipeline be used was reviewed. The Applicant's proposed Project includes a pipeline 36 inches in diameter. A smaller diameter pipeline (24 to 34 inches in diameter) operating in the same pressure range as the proposed Project would provide less annual throughput capacity and would likely reduce pumping energy requirements and associated indirect air emissions from electrical energy generation.

It would not, however, change any construction or operating impacts. Installing a smaller diameter pipeline would likely require the same construction work area, materials marshaling areas, earth-moving and pipe-laying equipment, access roads, and permanent right-of-way. The actual construction trench would be narrower and would result in a smaller volume of excavation spoils to be managed, but stripping, storing, and replacing topsoils would be the same.

After the pipeline was installed, restoring the construction work area and monitoring and maintaining the permanent right-of-way long-term would be the same.

A smaller diameter pipeline with lower throughput capacity could possibly be operated with one less pumping station. Determining pumping requirements and optimum pump station locations would, however, depend on pipeline design and operational simulations that are not available. The disturbed area for pump stations is a small area when compared to the disturbed area for the Project overall, so having one fewer pump station would not materially affect overall land disturbance.

MLVs and cathodic protection facilities are located within the permanent right-of-way, so they would not affect the overall area of land disturbance or permanent right-of-way.

The probability of an incident leading to a crude oil release would also be similar for a smaller diameter pipeline. Because the impacts are generally the same, a smaller diameter pipeline configuration was not evaluated as a Project configuration alternative.

4.3 DESCRIPTION OF ALTERNATIVES – ROUTE PERMIT

If the Commission grants a CN for replacement of Line 3 at the Applicant's proposed start and endpoints (North Dakota border to Superior, Wisconsin), the Commission must then determine the best route for the pipeline between those two points. The route permit decision requires a more detailed review of specific routing alternatives between the origin and destination points as approved in the CN process. Since this joint EIS covers both the CN and route permit decisions, the EIS also includes an evaluation of selected routes within Minnesota between the North Dakota and Wisconsin borders.

This section describes the reviewed route alternatives and route segment alternatives that will inform the Commission's decision.

4.3.1 Overview – Route Alternatives

4.3.1.1 Route Locations

The locations of route alternatives RA-03AM, RA-06, RA-07, and RA-08 are shown in Figure 4.3-1. Figures showing the location of each route at a larger scale are included in Appendix A. Detailed descriptions of each route follow. Technically, each of the route alternatives extends from Neche, North Dakota, to Superior, Wisconsin. However, the alignment of all route alternatives is identical to the Applicant's preferred route from Neche to approximately the Clearbrook terminal and from Carlton, Minnesota, to Superior (see description in Section 2.3). As the alignments for all route alternatives only diverge from the alignment for the Applicant's preferred route between approximately Clearbrook and Carlton, the description of each route alternative below, and the environmental impact assessment of the route alternatives in Chapter 6 is limited to the segment between Clearbrook and Carlton.

4.3.1.2 Construction and Operation – Route Alternatives

All route alternatives except RA-07 would be constructed and operated in the same manner as the Applicant's preferred route (see Section 2.7). RA-07 would call for removing the old pipeline and placing the new pipeline in the same location. The construction methods for this alternative are described below and are illustrated in Figure 4.3-2.

4.3.2 Route Alternative RA-03AM

Route Alternative RA-03AM Would Avoid Lakes and Wildlife Management Areas

Route alternative RA-03AM is an alternative between Clearbrook and Carlton. The Minnesota Pollution Control Agency (Minnesota PCA) originally proposed this as a CN "system alternative" that included a new terminal in Crookston, Minnesota, in part to avoid the Mississippi River Headwaters area as well as the Minnesota's Lakes region. During scoping for the Sandpiper Project, this route option was added as a modified version of the original proposal that would provide access to the Clearbrook terminal, allowing deliveries to the Northern Tier Energy and Flint Hills Resources refineries through MPL's pipeline. (Thus, it is called RA-03AM, or "as modified.") Minnesota Department of Natural Resources (Minnesota DNR) subsequently proposed additional modifications during the 2015 Line 3 process. This route alternative parallels an existing pipeline right-of-way from Clearbrook to Park Rapids, thereby focusing pipeline construction and operations impacts in an area already affected by a crude oil pipeline. Compared to some other alternatives, this option reroutes around fens, fish hatcheries, and to some extent communities, and avoids specific Wildlife Management Areas (WMAs).

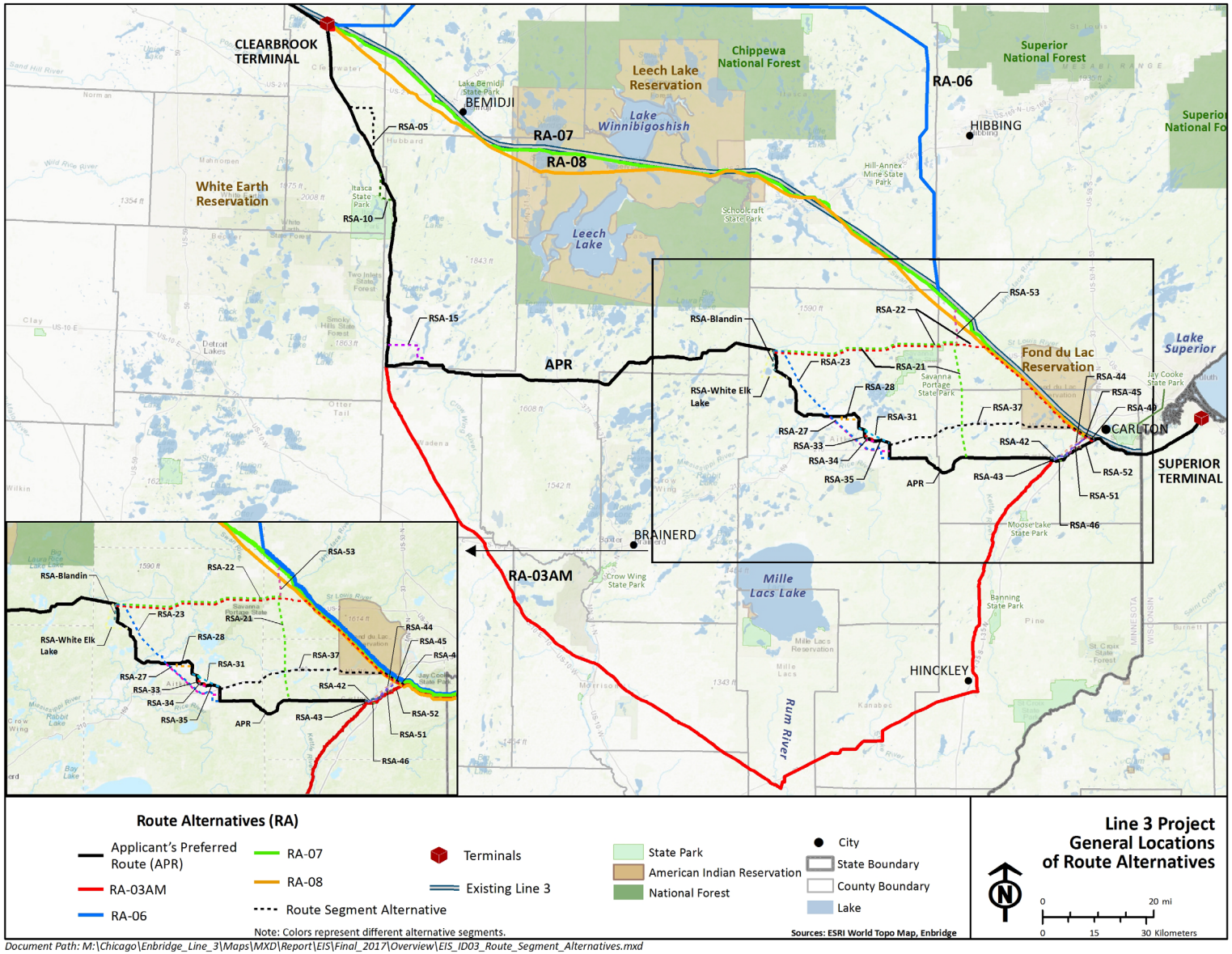

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Figure 4.3-1. General Locations of Route Alternatives

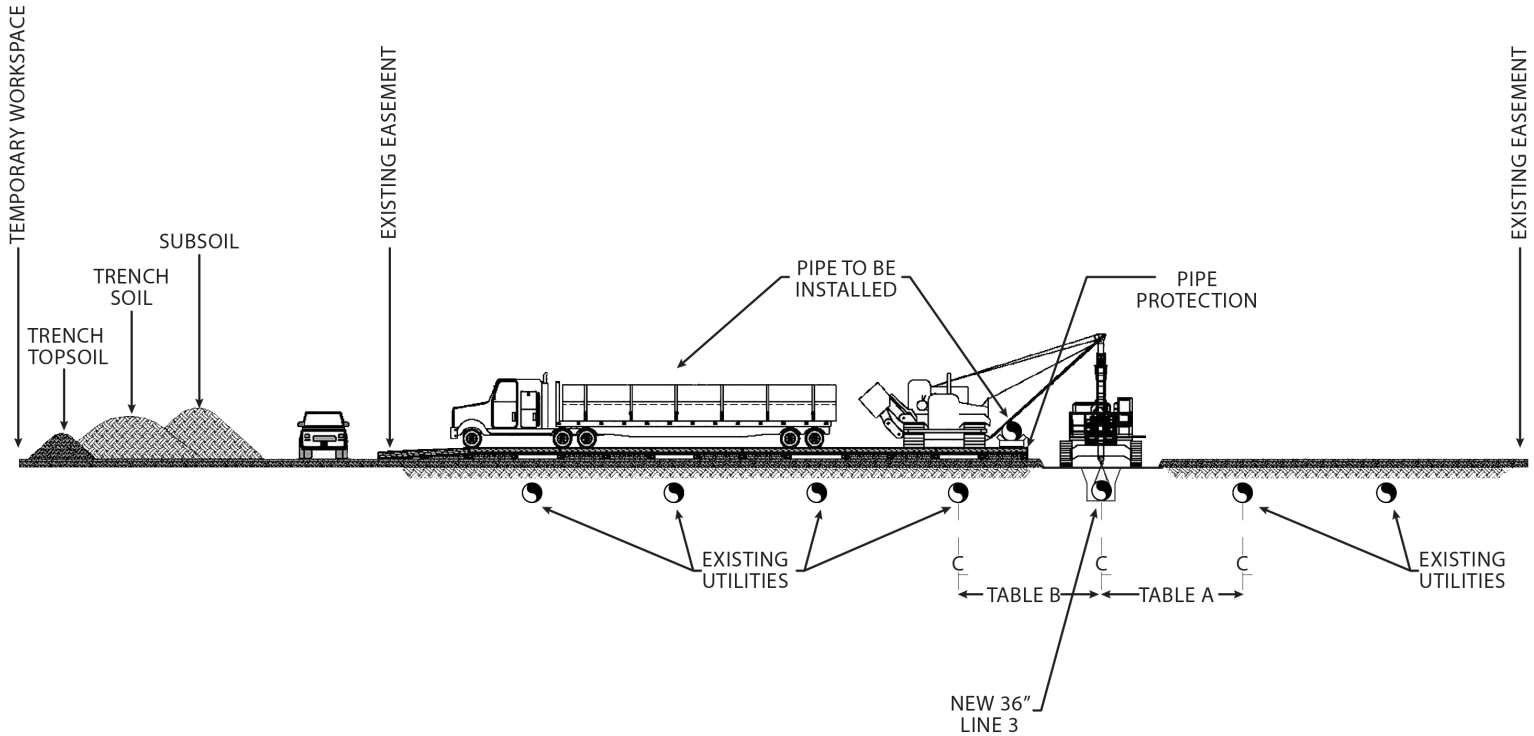

TABLE A

SCENARIO	TYPICAL SEPARATION	TOTAL SCENARIO %
1	0'-10'	3%
2	10'-20'	71%
3	20'+	13%

TABLE B

SCENARIO	TYPICAL SEPARATION	TOTAL SCENARIO %
1	0'-10'	1%
2	10'-20'	25%
3	20'+	40%

Source: Enbridge

Figure 4.3-2. Typical Construction Profile – Same Trench Replacement

4.3.2.1 Route Location

From Clearbrook, the route generally follows the existing MPL right-of-way south into Hubbard County. The route runs along the western border of Hubbard County to the vicinity of Park Rapids. The route then turns southeasterly, following the Minnkota Power Cooperative transmission line across Wadena County, the northeast corner of Todd County, and diagonally across Morrison County.

It continues across the northeast corner of Benton County and the southern portion of Mille Lacs County to the vicinity of Milaca. The route then turns northeasterly, generally following State Route 23 to the vicinity of Hinckley in Pine County. It then turns northeasterly, paralleling the existing 8-inch Magellan Refined Products pipeline or a Northern Natural Gas pipeline to a point where it meets the Applicant's preferred route near Carlton in Carlton County and then continues to Superior, Wisconsin. Measurements for RA-03AM are summarized in Table 4.3-1.

Table 4.3-1. Measurements for Route Alternative RA-03AM

Feature	Measurement
Total length (origin to destination)	435.6 miles
Length in Minnesota	394.9 miles
Length outside Minnesota	40.8 miles
States crossed – distance	North Dakota – 27.6 miles Minnesota – 394.9 miles Wisconsin – 13.1 miles
Counties crossed in Minnesota	Benton, Carlton, Clearwater, Hubbard, Kanabec, Kittson, Marshall, Mille Lacs, Morrison, Pennington, Pine, Polk, Red Lake, Todd, and Wadena

4.3.2.2 Pump Stations and Mainline Valves

Route Alternative RA-03AM Would Require 9 Pump Stations and Approximately 29 MLVs

Enbridge has indicated that nine pump stations would be required along the route of RA-03AM in Minnesota, with six of them between Clearbrook and Carlton. It was assumed that each pump station would require approximately 8 acres of land. The specific location of each pump station would be determined based on pipeline operation hydraulic studies.

As with the proposed Project, MLVs would be placed near water crossings, significant environmental resources, and populated areas. Enbridge has stated that at least 29 MLVs would be located along RA-03AM in Minnesota, including 23 MLVs between Clearbrook and Carlton. Each valve would occupy approximately 0.1 acre and would be located within the permanent pipeline right-of-way. Final valve spacing and location would be determined during final Project permitting.

4.3.3 Route Alternative RA-06

Route Alternative RA-06 Would Avoid Minnesota's Main Lakes Region

Route alternative RA-06 is another alternative to the Applicant's preferred route between Clearbrook and Carlton. RA-06 was proposed by scoping commenters to develop a route north of the Enbridge Mainline corridor to avoid the Mississippi Headwaters and crossing Minnesota's Lakes region.

4.3.3.1 Route Location

At Clearbrook, the route alternative runs easterly across Beltrami County to the south of Lower Red Lake and enters the northwest corner of Itasca County. The route intersects the Fond du Lac Reservation and the Chippewa National Forest and continues eastward to the eastern border of Itasca County, primarily across state and national forest lands.

Within George Washington State Forest, the route turns south, adjacent to the eastern border of Itasca County. In the southeast corner of Itasca County, the route rejoins the major pipeline corridor traversing Minnesota from the Canadian border to Superior, which includes the existing Line 3 pipeline. The route then trends southeast across the southwest corner of St. Louis County and the northeast portion of Carlton County, crossing the Fond du Lac Indian Reservation. It crosses the Minnesota-Wisconsin border and terminates in Superior, Wisconsin. Measurements for RA-06 are summarized in Table 4.3-2.

Table 4.3-2. Measurements for Route Alternative RA-06

Feature	Measurement
Total length (origin to destination)	357.3 miles
Length in Minnesota	316. 6 miles
Length outside Minnesota	40.7 miles
States crossed – distance	North Dakota – 27.6 miles Minnesota – 316.6 miles Wisconsin – 13.1 miles
Counties crossed in Minnesota	Aitkin, Beltrami, Carlton, Clearwater, Itasca, Kittson, Marshall, Pennington, Polk, Red Lake, and St. Louis

4.3.3.2 Pump Stations and Mainline Valves

Route Alternative RA-06 Would Require 7 Pump Stations and Approximately 24 MLVs

Enbridge has indicated that seven pump stations would be needed along RA-06 in Minnesota, including four pump stations between Clearbrook and Carlton. It was assumed that each pump station would require approximately 8 acres of land. The specific location of each pump station would be determined based on pipeline operation hydraulic studies.

As with the proposed Project, MLVs would be placed near water crossings, significant environmental resources, and populated areas. Enbridge has indicated that at least 24 MLVs would be required along the route of RA-06, including 16 MLVs between Clearbrook and Carlton. Each valve would occupy approximately 0.1 acre and would be located within the permanent pipeline right-of-way. Final valve spacing and location would be determined during final Project permitting.

4.3.4 Route Alternative RA-07

Route Alternative RA-07 Would Remove the Old Pipeline and Place the New Pipeline Mostly in the Same Trench

Similar to the previous routes, RA-07 is an alternative to the Applicant's preferred route between Clearbrook and Carlton. It was proposed by scoping commenters that the existing Line 3 pipeline be removed and that a new pipeline be installed in the same trench, allowing the use of the existing pipeline corridor without further expansion. This alternative would minimize the exposure of new areas of the state to pipeline construction and operations, while increasing overall pipeline capacity for deliveries to Superior. This alternative addressed concerns of Minnesota DNR, Minnesota PCA, and others about further development of a new corridor for other new or replaced oil pipelines and other infrastructure that could also use the Applicant's preferred route in the future.

RA-07 assumes removing and replacing the existing Line 3 in the same trench from Clearbrook to Carlton. However, the analysis assumed, for the purpose of directly comparing RA-07 to the other route alternatives, that RA-07 would follow the Applicant's preferred route from Neche to Clearbrook, with the existing Line 3 abandoned along this stretch and the RA-07 pipeline placed within a new (25-foot) right-of-way parallel to Enbridge's existing Mainline corridor. Similarly, east of Carlton, the analysis assumed that the RA-07 route would follow the Applicant's preferred route, with the existing Line 3 pipeline abandoned and the RA-07 pipeline placed within a new (25-foot) right-of-way parallel to Enbridge's existing Mainline corridor.

4.3.4.1 Route Location

At Clearbrook, the route continues on the Enbridge Mainline system corridor, where it would be located adjacent to existing pipelines. From Clearbrook, this route trends southeastward across the southern part of Beltrami County, the Lakes region, the northern part of Cass County, and the southern portion of Itasca County, intersecting the Leech Lake Band of Ojibwe and Fond du Lac reservations and the Chippewa National Forest. It continues across the southwest corner of Itasca County into Carlton County and then eastward to Superior. Measurements for RA-07 are summarized in Table 4.3-3.

Table 4.3-3. Measurements for Route Alternative RA-07

Feature	Measurement
Total length (origin to destination)	328.3 miles
Length in Minnesota	287.5 miles
Length outside Minnesota	40.7 miles
States crossed – distance	North Dakota – 27.6 miles Minnesota – 287.5 miles Wisconsin – 13.1 miles
Counties crossed in Minnesota	Aitkin, Beltrami, Carlton, Cass, Clearwater, Hubbard, Itasca, Kittson, Marshall, Pennington, Polk, Red Lake, and St. Louis

4.3.4.2 Pump Stations and Mainline Valves

Route Alternative RA-07 Would Require 7 New or Upgraded Pump Stations and Approximately 22 MLVs

Enbridge has indicated that RA-07 would require three new pump stations west of Clearbrook and upgrades to four pump stations between Clearbrook and Carlton. It was assumed that upgrades to the existing pump stations along the Enbridge Mainline corridor would consist of adding new pumps and would require minimal additional land disturbance.

As with the proposed Project, MLVs would be placed near water crossings, significant environmental resources, and populated areas. Enbridge has indicated that at least 22 MLVs would be located along RA-07 in Minnesota, including 14 MLVs between Clearbrook and Carlton. Each valve would occupy approximately 0.1 acre and would be located within the permanent pipeline right-of-way. Final valve spacing and location would be determined during final Project permitting.

4.3.4.3 Construction – Pipeline Removal and Replacement

From Neche to Clearbrook, Line 3 is one of seven pipelines co-located in a single corridor. From Clearbrook to Superior, the corridor includes six pipelines. Line 3 is in the interior of the multi-pipeline configuration (see Figure 4.3-3), where the pipelines are spaced as close as 10 to 15 feet apart. Chapter 8 provides additional analysis of the distance between Line 3 and the immediately adjacent pipelines. Unlike constructing a new pipeline along the edge of an existing pipeline corridor, removing and replacing the pipeline in the existing trench would require working over the top of existing operating high-pressure pipelines (see Figure 4.3-2). In addition to the construction procedures described in Section 2.7 for normal pipeline construction, removing and replacing the pipeline would require the following:

- Protection for existing buried pipes – A layer of protective soil, mats, or bridging would be placed over the existing pipelines to protect them during the movement of heavy equipment and materials to the work area along the existing pipeline alignment. This protective layer would be continuously moved with the construction activity as pipe removal and replacement progressed.
- Additional work space required – During normal pipeline construction, the additional work space required for operating equipment, storing topsoil and trenching spoils, staging of pipe, and lowering in and backfilling operations would be available directly adjacent to the Mainline corridor permanent right-of-way.

  The presence of the existing pipelines precludes these activities occurring adjacent to the Line 3 trench. They would need to be located adjacent to the outermost buried pipeline. This would increase the construction work area from a width of approximately 120 feet for normal construction to approximately 205 feet for removal and replacement.
- Increased time of open trench – The addition of pipeline removal activity would lengthen the time required for maintaining an open trench. Normal construction would include maintaining an open trench for approximately 3 days. Time for pipeline removal would require extending this time.
- Removal and disposal of existing Line 3 pipe – Following removal and stoppage of topsoil, the existing Line 3 pipeline trench would be open, and the existing pipe would be freed from its bed.

The pipe would then be cut into lengths suitable for transport by truck. Removal of the pipe lengths from the work area would require additional truck movements, although trucks staging new pipe to the work area could be used to haul existing pipe from the work area.

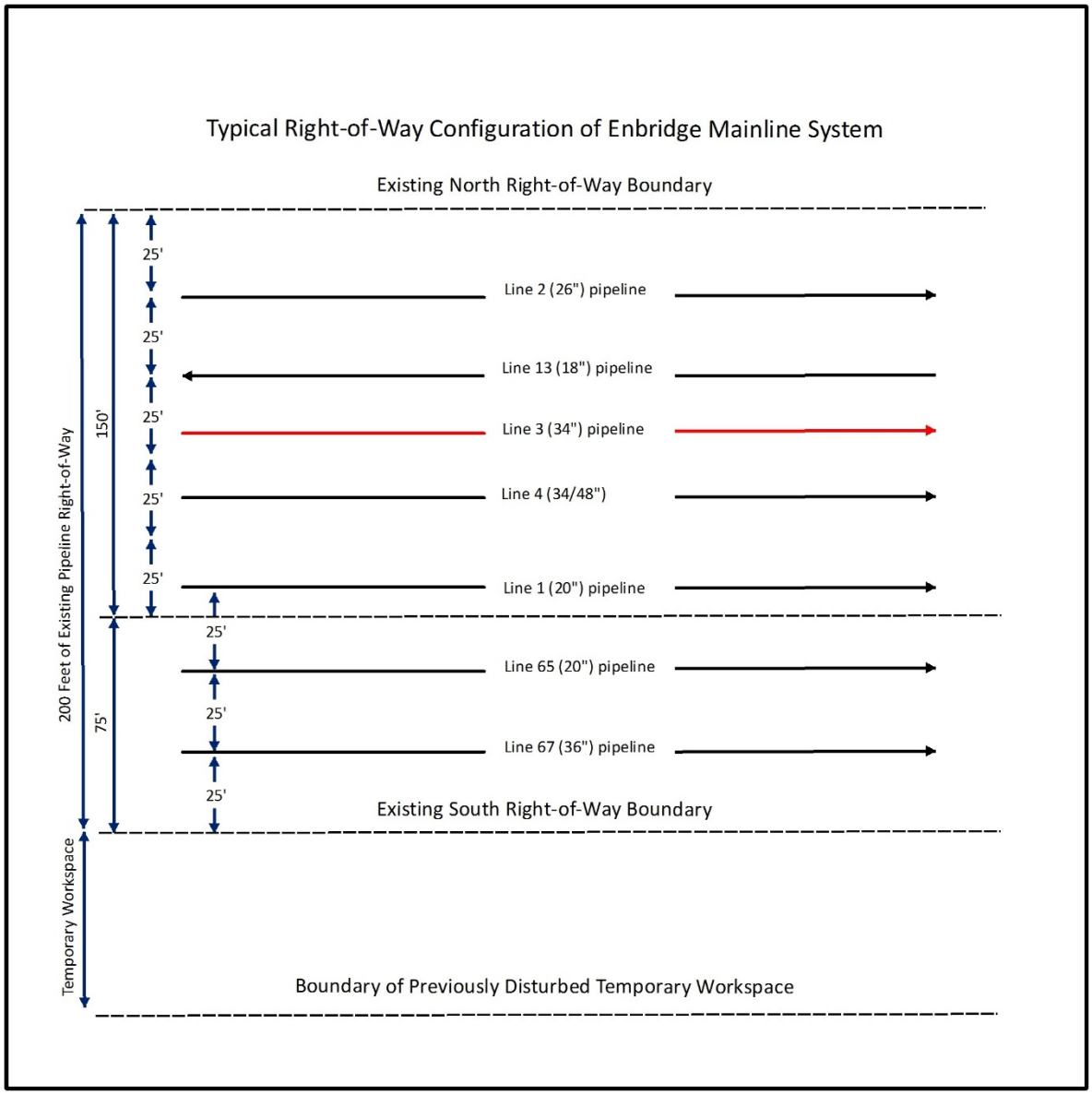

Figure 4.3-3. Enbridge Mainline System Right-of-Way Configuration†

†The shown configuration is a typical configuration. The configuration of adjacent lines changes throughout the pipeline length. Additional discussion of pipeline spacing is provided in Chapter 8.

4.3.5 Route Alternative RA-08

Route Alternative RA-08 Is in the Enbridge Mainline Corridor near RA-07, but along a New Route

Route alternative RA-08 is also an alternative to the Applicant's preferred route between Clearbrook and Carlton. Similar to RA-07, RA-08 was proposed to reduce development in the Lakes region in that it does not require an entirely new oil pipeline corridor between Clearbrook and Superior. The route alignment is generally located south of U.S. Highway 2 along an existing natural gas pipeline and reduces the length of the crossings of the Chippewa National Forest and the Leech Lake Band of Ojibwe Reservation.

4.3.5.1 Route Location

From Clearbrook, the route follows the same general configuration as RA-07 to Superior, except that in the portion of the route located in Beltrami, Cass, Itasca, and St Louis counties, the route has been repositioned south of and parallel to U.S. Highway 2. The route intersects the Leech Lake Band of Ojibwe and Fond du Lac reservations and the Chippewa National Forest. Measurements for RA-08 are summarized in Table 4.3-4.

Table 4.3-4. Measurements for Route Alternative RA-08

Feature	Measurement
Total length (origin to destination)	325.4 miles
Length in Minnesota	284.6 miles
Length outside Minnesota	40.7 miles
States crossed – distance	North Dakota – 27.6 miles Minnesota – 284.6 miles Wisconsin – 13.1 miles
Counties crossed in Minnesota	Aitkin, Beltrami, Carlton, Cass, Clearwater, Hubbard, Itasca, Kittson, Marshall, Pennington, Polk, Red Lake and St. Louis

4.3.5.2 Pump Stations and Mainline Valves

Route Alternative RA-08 Would Require 6 New or Upgraded Pump Stations and Approximately 22 MLVs

Enbridge has indicated that RA-08 could require two new pump stations west of Clearbrook and upgrades to four existing pump stations between Clearbrook and Carlton. It was assumed that the existing pump stations along the Enbridge Mainline corridor would be upgraded to accommodate new pumps for the Project, requiring minimal additional land disturbance.

As with the proposed Project, MLVs would be placed near water crossings, significant environmental resources, and populated areas. Enbridge indicated that at least 22 MLVs would be located along RA-08, including 14 MLVs between Clearbrook and Carlton. Each valve would occupy approximately 0.1 acre and would be located within the permanent pipeline right-of-way. Final valve spacing and location would be determined during final Project permitting.

4.3.6 Overview – Route Segment Alternatives

Enbridge Adopted Some Suggested Route Segment Alternatives, and Others are Discussed Below

During the scoping process, a number of route segment alternatives (RSAs) were recommended for consideration. DOC-EERA and the Applicant reviewed these alternatives, and a number of the shorter RSAs were adopted by Enbridge and integrated into the proposed alignment of the Applicant's preferred route. The adopted modifications are included in the proposed Project evaluated in the EIS. The remaining RSAs, which range in length from 1 mile or 2 to more than 60 miles, are evaluated in this EIS (Table 4.3-5). The general location of the RSAs and their relationship to the Applicant's preferred route are shown in Figure 4.3-4.

Table 4.3-5 describes the purpose of each RSA, the route of the RSA, the length compared to the substituted length of the Applicant's preferred route, and a brief summary of the general features of the area surrounding the RSA.

The milepost designations in Table 4.3-5 and in Figure 4.3-4 are based on mile zero at Neche, North Dakota. Milepost designations given by Enbridge in some Project documentation are based on mile zero at Edmonton, Alberta where Line 3 originates.

4.3.6.1 Pump Stations and Mainline Valves

Need for and Location of Pump Stations and Distance between MLVs Cannot Currently Be Determined

Based on the spacing of pump stations along the Applicant's preferred route, new pump stations would likely be required along the route for RSA-21, RSA-22, RSA-23, or RSA-37. Deciding, however, on whether a pump station might be needed and where specifically it should be placed can only be done based on hydraulic studies of pipeline operations, which are not available. It was assumed that approximately 8 acres of land would be required for a pump station on the RSAs.

Similar to the proposed Project, MLVs would be placed near water crossings, significant environmental resources, and populated areas. Average spacing of MLVs along the Applicant's preferred route is approximately 12 miles between valves. It was assumed that similar spacing would occur along the RSA. The specific spacing of valves would be determined during final permitting. It was further assumed that RSAs shorter than approximately 12 miles likely would not include any additional valves. RSAs that would require MLVs (and the number of valves required) include RSA-05 (one), RSA-21 (five), RSA-22 (five), RSA-23 (three), RSA-27 (one), and RSA-37 (three). The average area required for each valve would be 0.1 acre, and each valve would be located within the permanent pipeline right-of-way.

Table 4.3-5. Purpose and Location of Route Segment Alternatives

Route Segment Alternative	County	Purpose of Route Segment Alternative	Location[a]	Mileposts		Route Segment Alternative Length (miles)	Applicant's Preferred Route Length (miles)	Route Segment Alternative Change (miles)
				From	To			
Clearbrook to Aitkin County								
RSA-05	Clearwater	Enbridge proposed this route alternative to avoid the Eastern Wild Rice Watershed, and a possible hydrological connection to Lower Rice Lake in response to comments raised by the White Earth Band of Ojibwe.	RSA-05 starts at MP 154.1 on the Applicant's preferred route and runs east for approximately 4.0 miles adjacent to the Otter Tail Power Company Minnkota-Winger 230 kV transmission line right-of-way. It then turns south for approximately 9.0 miles, rejoining the Applicant's preferred route at MP 164.0. The route traverses an area of mixed active farm and forested land.	154.1	164.0	13.0	9.8	3.2
RSA-10	Clearwater, Hubbard	Minnesota PCA requested a route alternative that would move the route to a crossing at LaSalle Creek that is more accessible for emergency response in case of a spill.	RSA-10 starts at MP 167.4 and runs south 4.2 miles adjacent to State Highway 108 where it intersects State Highway 200. It then turns east and runs parallel to State Highway 200 for approximately 1.3 miles where it intersects Itasca Township Road 4. RSA-10 then enters Hubbard County where Itasca Township Road 4 becomes 400th Street. The route continues eastward parallel to 400th Street for approximately 1.4 miles, where it rejoins the Applicant's preferred route at MP 173.2. RSA-10 would increase the separation between the Applicant's preferred route and Big LaSalle Lake from 0.1 to approximately 0.7 mile. While it would mainly be located adjacent to highway rights-of-way, the area surrounding the RSA is forested or heavily vegetated areas with some mixed farmland.	167.4	173.1	6.8	5.6	1.2

Table 4.3-5. Purpose and Location of Route Segment Alternatives

Route Segment Alternative	County	Purpose of Route Segment Alternative	Location[a]	Mileposts		Route Segment Alternative Length (miles)	Applicant's Preferred Route Length (miles)	Route Segment Alternative Change (miles)
				From	To			
RSA-15	Hubbard	Minnesota PCA requested a route alternative that would provide better pipeline access near Twin Lakes (wild rice lakes) and Shell River for emergency response in case of a spill.	RSA-15 starts at approximately MP 199.7 on the Applicant's preferred route and runs eastward 5.5 miles adjacent to County Road 14 and the Great River Energy 34.5 kV electric distribution line right-of-way. It then turns south and then east, paralleling Minnesota Power's 34.5 kV distribution line and access road for 3.2 miles to the intersection of County Road 6. At County Road 6, it again turns south and runs adjacent to another Minnesota Power 34.5 distribution line and Road 6 for 0.8 mile, where it rejoins the Applicant's preferred route at MP 210.1.	199.7	210.1	9.5	10.4	-0.9
RSA-Blandin	Aitkin	Minnesota DNR requested a route alternative to avoid a conservation easement held by Minnesota DNR on lands owned by Blandin Paper Company.	RSA-Blandin starts at MP 278.3 on the Applicant's preferred route and runs south approximately 3.2 miles through forested/scrub and wetlands. It turns southeast for another 0.6 mile and rejoins the Applicant's preferred route at MP 282.2. For most of its length, RSA-Blandin runs parallel and approximately 0.3 mile west of County Road 29 – Osprey Avenue.	278.3	282.2	3.9	3.9	0.0
RSA-White Elk Lake	Aitkin	Minnesota DNR requested a route alternative to avoid a Forest Legacy Program easement and fragmenting a Minnesota Biological Survey Site of Biodiversity Significance.	RSA-White Elk Lake departs from the Applicant's preferred route at MP 277.9 and runs south-southwest approximately 5.2 miles parallel to Minnesota Power's Blackberry to Riverton 230 kV transmission line. It then turns east for 4.5 miles along County Road 68 – 540th Lane and rejoins the Applicant's preferred route at approximately MP 284.7. The proposed route for RSA-White Elk Lake runs between Mud Lake and White Elk Lake with a separation of 0.3 mile from either lake. The separation between White Elk Lake and the Applicant's preferred route is 0.7 mile. The RSA runs adjacent to existing infrastructure through forested and wetland areas.	277.9	284.7	9.7	6.8	2.9

Table 4.3-5. Purpose and Location of Route Segment Alternatives

Route Segment Alternative	County	Purpose of Route Segment Alternative	Location[a]	Mileposts		Route Segment Alternative Length (miles)	Applicant's Preferred Route Length (miles)	Route Segment Alternative Change (miles)
				From	To			
RSA-21	Aitkin, St. Louis, Carlton	Minnesota DNR recommended the Aitkin County power line as a route alternative to eliminate concerns regarding Sandy River fisheries, wild rice habitat, and trout stream habitat.	RSA-21 starts at MP 278.5 on the Applicant's preferred route and runs east approximately 33.2 miles adjacent to the right-of-way for the Minnkota Power Cooperative's Arrowhead-Center-1 1,000 kV high voltage DC transmission line. It intersects Northern States Power Company's Forbes-Chisago 500 kV high voltage transmission line and then turns south to run adjacent to the Forbes-Chisago transmission line right-of-way for 20.7 miles, where it rejoins the Applicant's preferred route at MP 331.9. A large portion of the route for RSA-21 is located in wetlands and forested areas.	278.5	331.9	53.9	53.5	0.4
RSA-22	Aitkin, St. Louis, Carlton	Minnesota DNR recommended a route alternative that would avoid important habitat in the Big Sandy Lake watershed as well as Grayling Marsh WMA and the Lawler WMA.	RSA-22 begins at the same point on the Applicant's preferred route as RSA-21 (MP 278.5). RSA-22 uses the same route as RSA-21 to the point where RSA-21 intersects the Northern States Power Company's Forbes-Chisago 500 kV high voltage transmission line right-of-way (approximately 33.2 miles). Instead of turning south along the Forbes-Chisago transmission line right-of-way, RSA-22 continues east adjacent to the Detroit Edison Forbes to Center-1 transmission line right-of-way for an additional approximately 5.7 miles, where it intersects the Enbridge Mainline corridor. It then runs approximately 25.8 miles southeast adjacent or parallel to the existing Enbridge Mainline corridor fir 26 miles and rejoins the Applicant's preferred route at MP 356.8. Similar to RSA-21, most of the route is located in forested and wetland areas until it joins the Enbridge Mainline corridor, which is located in areas that include some farming in addition to forest/wetlands land cover types. RSA-22 crosses the Fond du Lac Reservation.	278.5	356.8	64.7	73.8	-9.1

Table 4.3-5. Purpose and Location of Route Segment Alternatives

Route Segment Alternative	County	Purpose of Route Segment Alternative	Location[a]	Mileposts		Route Segment Alternative Length (miles)	Applicant's Preferred Route Length (miles)	Route Segment Alternative Change (miles)
				From	To			
RSA-23	Aitkin	The Applicant removed this route segment alternative from further analysis; however, it is being carried forward into the route alternatives analysis because it was recommended by several landowners throughout the comment period.	Similar to RSA-21 and RSA-22, RSA 23 starts at MP 278.5 on the Applicant's preferred route but runs generally southeast instead of directly eastward. It is located adjacent to Minnkota Power Cooperative's Arrowhead-Center-1 1000 kV high voltage DC transmission line right-of-way eastward for 1.6 miles where it intersects the Soo Line North ATV Trail. RSA-21 turns and runs south-southeast approximately 12.9 miles adjacent to the trail, approximately to the town of Palisade. The route jogs 1.2 miles to the east around Palisade and rejoins the Soo Line North ATV Trail as it continues southeast. On the south side of Palisade, the route is located adjacent to the Great Power Energy Round Lake to Palisade 69 kV distribution line right-of-way for a short distance. From Palisade, the route then continues southeast for 9.7 miles to the vicinity of the town of McGregor. At McGregor, SA-23 turns east and crosses north of the town for 1.0 mile, where it intersects the BNSF railroad right-of-way. It runs northeast adjacent to the railroad right-of way for 1.0 mile, turns southeast, crosses under the rail line, and then continues south approximately 2.2 miles, were it intersects Minnesota Power's McGregor to Cromwell 115 kV transmission line. RSA-23 then turns east and runs adjacent to the transmission line right-of-way for approximately 1.5 miles, where it rejoins the Applicant's preferred route at MP 315.5. RSA-23 is primarily dominated by wetlands, with some forested areas.	278.5	315.5	31.2	37.0	-5.8

Table 4.3-5. Purpose and Location of Route Segment Alternatives

Route Segment Alternative	County	Purpose of Route Segment Alternative	Location[a]	Mileposts		Route Segment Alternative Length (miles)	Applicant's Preferred Route Length (miles)	Route Segment Alternative Change (miles)
				From	To			
RSA-27	Aitkin	Minnesota DNR recommended that the analysis include the Soo Line to avoid the McGregor Scientific and Natural Area and the Sandy River watershed.	RSA-27 starts at MP 298.1 on the Applicant's preferred route just south of the town of Palisade. It follows the same route as RSA-23 along the Soo Line Trail (an abandoned railroad right-of-way designated as a recreation trail) southeast for approximately 9.0 miles to the vicinity of the town of McGregor. It continues to follow the same route as RSA-23 around the northern side of McGregor adjacent to a railroad right-of-way for approximately 2.0 miles. It then turns southeast, crosses under the rail line, and runs south approximately 0.8 mile, where it turns east for 1.5 miles and rejoins the Applicant's preferred route at approximately MP 314.0. A major portion of the route for RSA-27 occurs in an area of agricultural use with some forest/wetlands. A portion of the route is also located near McGregor.	298.1	314.0	13.2	16.0	-2.8
RSA-28	Aitkin	RSA-28 would cross an active wetland mitigation site. Through landowner communication, Enbridge confirmed the presence of a wetland mitigation site, where normally the purpose is to restore wetland habitat. Typically, wetland mitigation sites have either deed restrictions or conservation easements associated with them that prevent pipeline construction.	RSA-28 starts at MP 300.2 on the Applicant's preferred route and runs south for approximately 0.5 mile adjacent to an existing road. It then turns east for 3.1 miles, also adjacent to an existing road, and intersects the Applicant's preferred route at approximately MP 303.9. This RSA generally shifts the pipeline route approximately 0.8 mile to the south and runs adjacent to existing roads. It is located in an area of agricultural use and wetlands, and reportedly would cross a wetland mitigation site.	300.2	303.9	3.6	3.8	-0.2

Table 4.3-5. Purpose and Location of Route Segment Alternatives

Route Segment Alternative	County	Purpose of Route Segment Alternative	Location[a]	Mileposts		Route Segment Alternative Length (miles)	Applicant's Preferred Route Length (miles)	Route Segment Alternative Change (miles)
				From	To			
RSA-31	Aitkin	Commenter requested a route alternative to cut straight and diagonally across several miles in Aitkin County.	RSA-31 starts at MP 305.5 on the Applicant's preferred route and runs southeast for approximately 6.1 miles to rejoin the Applicant's preferred route at MP 312.7. The route cuts diagonally across developed farmland and undeveloped forest/wetland areas. It does not follow any existing linear infrastructure.	305.5	312.7	6.1	7.2	-1.1
RSA-33	Aitkin	This RSA would move the route to a different portion of the commenter's property, where it is adjacent to a peat plant.	RSA-33 starts at MP 306.7 on the Applicant's preferred route and runs southeast for 0.5 mile. It then turns south for 1.4 miles and rejoins the Applicant's preferred route at MP 308.4. RSA-33 is located approximately 0.4 mile east of the Applicant's preferred route and is not located adjacent to any existing infrastructure rights-of-way. It is located in undeveloped forested land and farmlands.	306.7	308.4	1.8	1.7	0.1
RSA-34	Aitkin	A commenter suggested shifting the pipeline north into the tree line to increase the distance from a residence.	RSA-34 starts at MP 307.6 on the Applicant's referred route and runs southeast for approximately 2.2 miles, where it rejoins the Applicant's preferred route at MP 310.1. The proposed RSA route runs diagonally, primarily across undeveloped land but intersects some developed farmland.	307.6	310.1	2.2	2.5	-0.3
RSA-35	Aitkin	A commenter suggested a route alternative that would cut south on Township Road 270 and travel east until it rejoins the Applicant's preferred route to increase the distance from a residence.	RSA-35 starts at MP 308.4 on the Applicant's preferred route and runs south adjacent to an unnamed road approximately 0.4 mile. It then turns eastward and runs 1.3 miles, where it rejoins the Applicant's preferred route at MP 309.8. The portion of the route adjacent to the road is generally forested. The remaining portion of the route is primarily developed farmland.	308.4	309.8	1.6	1.4	0.2

Table 4.3-5. Purpose and Location of Route Segment Alternatives

Route Segment Alternative	County	Purpose of Route Segment Alternative	Location[a]	Mileposts		Route Segment Alternative Length (miles)	Applicant's Preferred Route Length (miles)	Route Segment Alternative Change (miles)
				From	To			
RSA-37	Aitkin, Carlton	A commenter suggested a route alternative that would parallel State Highway 210 after mile marker 550 and then turn south to reconnect with the Applicant's preferred route south of Cloquet avoiding Salo Marsh and Lawler WMAs.	RSA-37 starts at MP 313.1 on the Applicant's preferred route and runs generally eastward parallel to State Highway 210, on the south side of the highway right-of-way. It runs 34.4 miles to the Enbridge Mainline corridor between Clearbrook and Superior. Along this portion of the route, the RSA passes near the communities of Tamarack, Wright, Cromwell, and Sawyer. It also crosses the Fond du Lac Reservation. At its intersection with the Mainline corridor, RSA-37 turns southeast for 4.3 miles, where it rejoins the Applicant's preferred route. Along the last section of the route, RSA-37 is located adjacent to the Mainline corridor. A major portion of the area adjacent to RSA-37 is forested/ scrub and wetlands. The remaining portion of the route is generally located in areas of active agriculture. The route also is located adjacent to four communities.	313.1	356.8	38.7	43.7	-5.0
Carlton County								
RSA-42	Carlton	A commenter requested co-location of the pipeline with an existing transmission line corridor.	RSA-42 starts at MP 347.1 on the Applicant's preferred route and runs east-northeast approximately 1.8 miles adjacent to Minnesota Power's Wrenshall to Mahtowa 115 kV transmission line right-of-way. It turns east-southeast and continues to parallel the right-of-way of the Wrenshall to Mahtowa transmission line for approximately 0.6 mile, crossing under State Highway 61. It then turns northeast continuing to parallel the transmission line for approximately 1.1 miles, where it crosses under Interstate Highway 35 and rejoins the Applicant's preferred route at MP 351.4. Most of the area adjacent to RSA-42 is forested land and wetlands.	347.1	351.4	3.5	4.3	-0.8

Table 4.3-5. Purpose and Location of Route Segment Alternatives

Route Segment Alternative	County	Purpose of Route Segment Alternative	Location[a]	Mileposts		Route Segment Alternative Length (miles)	Applicant's Preferred Route Length (miles)	Route Segment Alternative Change (miles)
				From	To			
RSA-43	Carlton	A commenter suggested moving the pipeline to the north side of U.S. Highway 61 and co-locating it with a utility corridor.	RSA-43 starts at MP 347.9 on the Applicant's preferred route and runs northeast 1.4 miles parallel to State Highway 61 and the Willard Munger State Trail on the highway's north side. The route then intersects Minnesota Power's Wrenshall to Mahtowa 115 kV transmission line right-of-way, where it turns eastward for 0.6 mile running adjacent to the transmission line right-of-way and crosses under State Highway 61. It then turns northeast, continuing to parallel the transmission line for approximately 1.3 miles, where it crosses under Interstate Highway 35 and rejoins the Applicant's preferred route at MP 351.4. Most of the area adjacent to RSA-42 is forest/wetlands.	347.9	351.4	3.1	3.5	-0.4
RSA-44	Carlton	A commenter suggested following an existing utility corridor on the north side of U.S. Highway 61 to avoid the Blackhoof River watershed and potential impacts from groundwater flow around the watershed.	RSA-44 starts at MP 347.9 and runs northeast 7.2 miles parallel to State Highway 61 and the Willard Munger State Trail. The pipeline is offset from the highway right-of-way approximately 0.1 mile. RSA-45 intersects the Enbridge Mainline corridor, where it turns southeast and runs approximately 1.8 miles and rejoins the Applicant's preferred route at MP 356.8. Approximately half of the area adjacent to the proposed route is forest/wetland. The remaining area is active agriculture and includes residential uses and gravel mining activity.	347.9	356.8	9.1	8.9	0.2

Table 4.3-5. Purpose and Location of Route Segment Alternatives

Route Segment Alternative	County	Purpose of Route Segment Alternative	Location[a]	Mileposts		Route Segment Alternative Length (miles)	Applicant's Preferred Route Length (miles)	Route Segment Alternative Change (miles)
				From	To			
RSA-45	Carlton	A commenter suggested following an existing utility corridor on the north side of U.S. Highway 61 to avoid the Blackhoof River watershed and potential impacts from groundwater flow around the watershed.	RSA-45 also starts at MP 347.9 on the Applicant's preferred route and runs 1.4 miles northeast, parallel to the State Highway 61 and the Willard Munger State Trail. It then turns eastward and crosses under State Highway 61, following the same alignment as RSA-44 for approximately 0.6 mile. It then turns northeast and runs for approximately 3.3 miles generally parallel to Interstate Highway 35 to the vicinity of the community of Otter Creek, where it intersects the Interstate Highway 35 right-of-way. The route crosses under Interstate Highway 35 and runs 2.3 miles generally parallel to the highway to intersect the Enbridge Mainline corridor. It then turns southeast and continues for 1.5 miles, where it rejoins the Applicant's preferred route at MP 356.8. Approximately one-third of the area adjacent to the proposed route is forest/wetland. The remainder is active agriculture, open undeveloped land, and limited agriculture.	347.9	356.8	9.0	8.8	0.2
RSA-46	Carlton	RSA-46 shifts the pipeline to the south to avoid active farmland.	RSA-45 starts at MP 348.9 on the Applicant's preferred route and runs east for approximately 0.8 mile, where it turns north for 0.2 mile and rejoins the Applicant's preferred route and RA-03AM at MP 349.8. RSA-45 re-locates a short portion of the Applicant's preferred route approximately 0.2 mile to the south; the RSA is located in a forested area adjacent to active agriculture.	348.9	349.8	1.0	0.9	0.1
RSA-49	Carlton	A commenter requested following the south sides of Interstate 35 and State Highway 61 to distance the pipeline from multiple properties.	RSA-49 starts at MP 351.4 on the Applicant's preferred route and runs parallel, on the south side of the right-of-way of Interstate Highway 35 and State Highway 61 for approximately 4.5 miles, where it intersects the existing Enbridge Mainline corridor. It then turns southeast for 1.5 miles and rejoin the Applicant's preferred route at MP 356.8. The area adjacent to the RSA is primarily forest and wetland.	351.4	356.8	6.0	5.3	0.7

Table 4.3-5. Purpose and Location of Route Segment Alternatives

Route Segment Alternative	County	Purpose of Route Segment Alternative	Location[a]	Mileposts		Route Segment Alternative Length (miles)	Applicant's Preferred Route Length (miles)	Route Segment Alternative Change (miles)
				From	To			
RSA-51	Carlton	A commenter proposed shifting the pipeline north to follow the tree line and distance it from homesteads.	RSA-51 starts at MP 352.8 on the Applicant's preferred route and runs north and then northeast for approximately 0.6 mile, where it turns eastward. It then runs 0.8 mile and rejoins the Applicant's preferred route at MP 354.1. The route does not parallel any existing infrastructure right-of-way. It is located in an area of undeveloped forest and agricultural land.	352.8	354.1	1.4	1.3	0.1
RSA-52	Carlton	A commenter proposed shifting the pipeline north to follow the tree line and distance it from homesteads.	RSA-52 starts at approximately MP 353.2 on the Applicant's preferred route and runs north along the west side of State Highway 5 for approximately 0.3 mile. It then turns east and runs 0.7 mile, where it rejoins the Applicant preferred route at MP 3.54.1. The route parallels an existing road and traverses agricultural land.	353.2	354.1	1.0	0.9	0.1
RSA-53 (RA-07)	St. Louis	The alternative route was proposed to connect RA-07 with RSA-22, allowing a connection between the northern routes (RA-06, RA-07, and RA-08) and the Applicant's preferred route to avoid crossing the Fond du Lac Reservation.	RSA-53 starts at the point where RA-07, which parallels the Enbridge Mainline corridor, intersects the Northern States Power Company's Forbes – Chisago 500 kV high voltage transmission line, approximately 4.8 miles northwest of the town of Fleetwood. RSA-53 runs south adjacent to the transmission line for approximately 6.2 miles in an area of primarily undeveloped and forested land and active farmland, where it intersects the Minnkota Power Cooperative's Arrowhead-Center-1 high voltage 1,000 kV DC transmission line.	270.4	279.4	11.9	9.0	2.9

[a] See Figure 4.3-2 for locations of RSAs.

ATV = all-terrain vehicle, kV = kilovolt, MP = milepost, Minnesota DNR = Minnesota Department of Natural Resources, Minnesota PCA = Minnesota Pollution Control Agency, RSA = route segment alternative, WMA = Wildlife Management Area

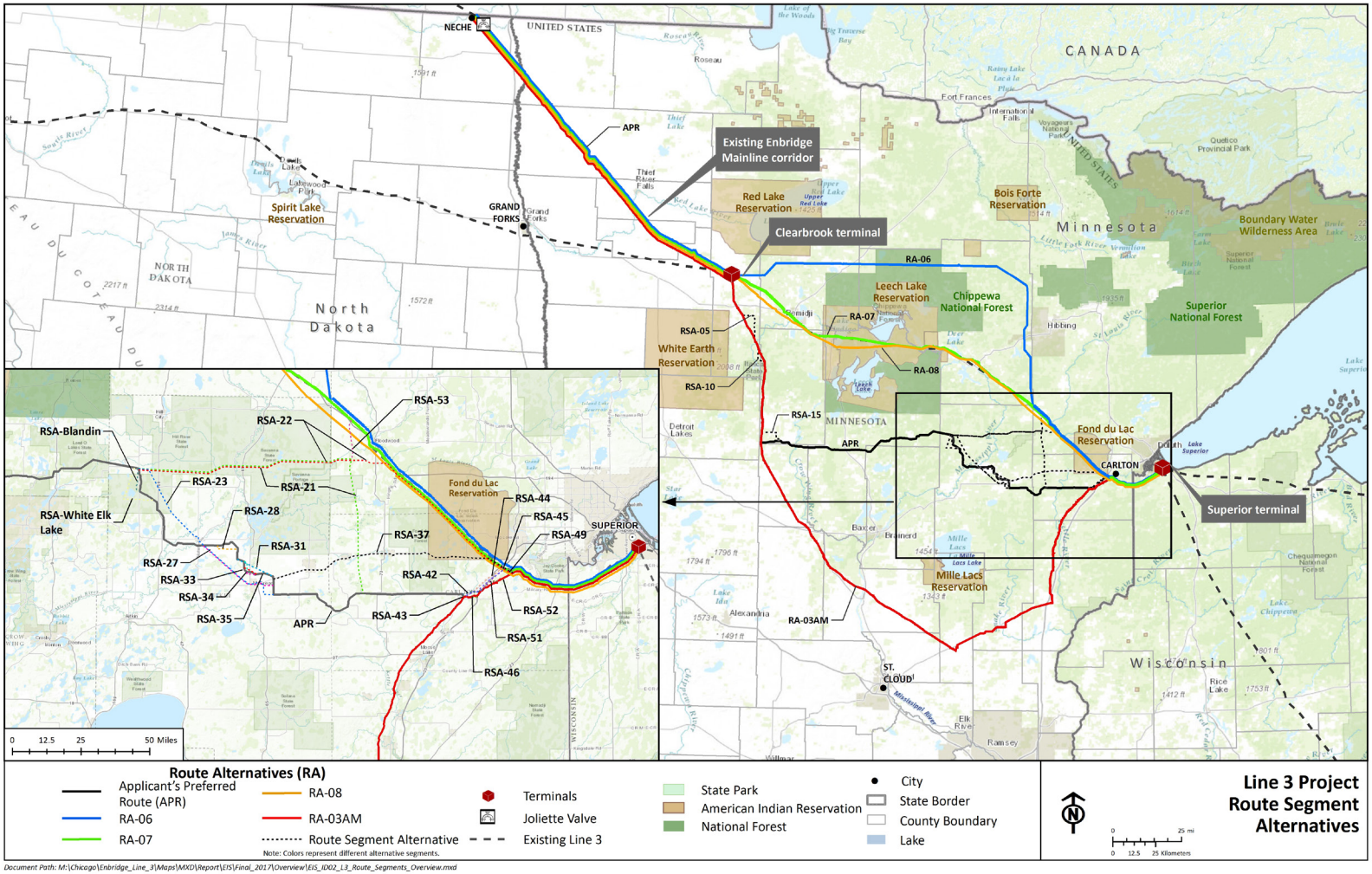

Figure 4.3-4. Locations of Route Segment Alternatives

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Chapter 5
Existing Conditions, Impacts, and Mitigation – Certificate of Need

5.1 INTRODUCTION

This chapter assesses potential construction and operations impacts of Enbridge Energy, Limited Partnership's (Enbridge's, or the Applicant's) proposed Project and each of the Certificate of Need (CN) Alternatives discussed in Chapter 4. As discussed in Section 4.2, the Minnesota Public Utilities Commission (Commission) must determine whether the benefits to society of granting a CN for Enbridge's proposed Project outweigh the consequences, or whether a more reasonable and prudent alternative is available. This review of Enbridge's proposed Project and the range of CN Alternatives identified in Chapter 4 will help to inform the Commission's decision on need.

The impact assessment in this chapter is organized by three sub-sections:

- Natural environment,
  - Socioeconomic environment, and
  - Cultural resources.

The Commission is required to consider environmental and socioeconomic impacts in determining whether to issue a CN.[1] While the Commission does not typically evaluate impacts on cultural resources as part of a CN determination, the evaluation of historical and archaeological resources provides context relevant to the socioeconomic and natural environments. The impact assessment focuses on issues of concern for each resource that were identified based on:

- Relevant regulatory requirements;
- Input during scoping from the public, agencies, non-governmental organizations, and tribal representatives;
- Consultation with knowledgeable resource management agencies and tribal resource representatives; and
- Professional judgment, in part based on other impact assessments in recent energy infrastructure environmental impact statements (EISs) and agency guidance including U.S. Department of State (DOS) 2009; Federal Energy Regulatory Commission (FERC) 2013a, 2013b; U.S. Department of Energy (DOE) 2015; Wisconsin DNR 2016.

[1] According to Minnesota Administrative Rules § 7853.0130 B(3), the Commission must consider "the effect of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives." According to Minnesota Administrative Rules § 7853.0130 C(2), the Commission must consider the effect of the proposed facility, or a suitable modification of it, upon the natural and socioeconomic environments compared to the effect of not building the facility.

The following sub-sections are presented in this chapter for each resource:

- Regulatory context and methodology,
- Existing conditions,
- Impact assessment, and
- Summary and mitigation.

The general contents of each of the sub-sections in this chapter are described below. The route permit analysis of route alternatives is described in Chapter 6, and the analysis of route segment alternatives is described in Chapter 7. The analysis of potential impacts associated with crude oil releases is presented in Chapter 10. Cumulative potential effects are discussed in Chapter 12.

5.1.1 Regulatory Context and Methodology

The regulatory context describes the framework of laws, regulations, ordinances, and policies intended to protect and manage an affected resource with regard to impacts associated with the proposed Project and CN Alternatives. As described in Chapter 3, these regulations are implemented under a variety of federal, state, and local jurisdictions.

For each affected resource, the impact assessment methodology is described. This includes identifying the region of interest (ROI) for the resource (the geographic scope), the specific data sets acquired and analyzed, the analytical methods and assumptions used, and the quantitative or qualitative metrics for assessing impacts relative to each issue of concern. The ROI incorporates the geographic extent of each CN Alternative, as described in Chapter 4. The extent of the ROI beyond the physical footprint of each CN Alternative varies among resources according to the characteristics of the resource and the Project-related effects that could occur (e.g., potential effects on vegetation would be localized while effects on air quality may be localized and regional).

5.1.2 Existing Conditions

The existing conditions within the ROI for each affected resource are described for the Applicant's proposed project and each CN Alternative. Sources of data used to characterize existing conditions were identified based on a review of publically available geospatial datasets; federal, state, and local government reports, assessments, and planning documents; and input during the scoping process, including input from the public, tribes, agencies, and non-governmental organizations. In addition, data available as part of Enbridge's application, Enbridge's November 2016 Environmental Assessment Worksheet (EAW), and responses to data requests from the Minnesota Department of Commerce Energy, Environmental Review and Analysis (DOC-EERA) were considered. Literature addressing the potential impacts of Project construction and operations was reviewed. Information was evaluated for its relevancy in assessing Project-related impacts based on the data collection methods used and the geographic extent, study duration and age, detail, and usefulness of the data in characterizing existing conditions. Project-specific mileposts included in Chapter 5 resource sections and figures are based on the Applicant's proposed project and system alternative SA-04 starting at milepost (MP) 0.0 from Neche, North Dakota, and extending to Superior, Wisconsin, or Joliet, Illinois, respectively. Maps depicting a range of existing resource conditions and data associated with land ownership and physical features are provided in Appendix A.

5.1.3 Impact Assessment

Resource-specific impact assessment methods are described in each resource section of this chapter. The impact assessments focus on direct impacts from construction and operation of the Project, describe the nature of the impacts, and provide quantifiable estimates of those direct impacts where feasible and meaningful. Examples of direct impacts include habitat fragmentation due to permanent loss of woody vegetation within the permanent right-of-way and contributions to climate change from greenhouse gas (GHG) emitted as a result of fossil fuel combustion in construction equipment. Indirect impacts, which may result from or be influenced by the Project later in time or further removed from direct Project activities, are described where appropriate. Examples of indirect impacts include economic growth, reduced productivity in wildlife due to stress, and direct impacts on aesthetics from vegetation removal indirectly affecting recreational use.

Within each resource section, the nature of impacts are discussed and the impacts are characterized in terms of their duration and magnitude or severity. Impacts are discussed for resources located within the ROI, specified for each resource. Impact duration was characterized as *temporary, short term, long term,* or *permanent*. Impact duration was considered temporary if the impact would occur only during and immediately following construction activity (e.g., turbidity due to instream construction). Impacts were considered short term if the resource recovery would last up to 3 years following construction (e.g., vegetation clearing in pastures). Impacts were considered long term if resource recovery would require more than 3 years but would occur during the life of the Project (e.g., clearing of trees in temporary construction work areas). Impacts were considered permanent if they would last for the life of the Project (e.g., clearing of trees within the permanent right-of-way). See Table 5.1-1.

Table 5.1-1. Definitions of Impact Duration

Term	Definition
Temporary	Impacts that would occur during and immediately following construction
Short term	Impacts that would continue for up to 3 years after construction
Long term	Impacts that would last more than 3 years but would recover during the life of the proposed Project or alternative[a]
Permanent	Impacts that would last for at least the duration of the proposed Project or alternative

Notes:

a. The life of the project is assumed to be 30 years for the purposes of this EIS.

Categories of impact magnitude or severity for the purposes of this EIS include *negligible*, *minor*, and *major*. Impacts were considered negligible if they have the potential to occur but generally would not be measurable or noticeable. Impacts were considered minor if they were expected to be evident but below resource-specific standards or metrics, such as those used in other recent linear infrastructure EISs in the region (e.g., Great Northern Transmission Line, Alberta Clipper, Wisconsin Sandpiper/Line 3 Replacement) and requirements by FERC for interstate natural gas pipelines crossing wetlands, waterbodies, or uplands (DOS 2009; FERC 2013a, 2013b; DOE 2015; Wisconsin DNR 2016). Impacts were considered major if they were expected to potentially exceed the resource-specific standards or metrics. See Table 5.1-2.

Table 5.1-2. Definitions of Impact Magnitude

Term	Definition
Negligible	Impacts could potentially occur, but not expected to be measureable or noticeable
Minor	Impacts are evident, but expected to be below resource-specific standards or metrics
Major	Impacts are evident and expected to exceed resource-specific standards or metrics

In each resource area, available datasets and metrics were reviewed to identify "factors" that provide an indication of how a given resource could be affected. For example, the presence of different vegetation types, noxious weeds, native plants, and old-growth forest were identified as factors that could be examined to understand how vegetation resources as a whole could be affected. In most cases, impacts were assessed by mapping available data for each of the relevant factors and overlaying information on the construction and operations footprint for the Applicant's proposed project and CN Alternative. These overlays were reviewed in order to identify the location, type, and condition of resources within and adjacent to the construction and operations features. In addition, methods of construction and operations, including Applicant-proposed measures to minimize impacts, and other potential mitigation approaches were reviewed. Together, the spatial analysis and review of construction and operation methods were used to determine the nature, duration, and magnitude of impacts on a given resource. In addition to the impact assessment for the Applicant's proposed project, the CN Alternatives analyzed in this chapter include:

- Continued use of existing Line 3
- System alternative SA-04
- Transportation by rail
- Transportation by truck
- Existing Line 3 supplemented by rail
- Existing Line 3 supplemented by truck

The footprint of the Applicant's proposed project was defined based on the Project applications and additional information provided by Enbridge. This information is summarized in Chapter 2, which includes the Applicant-proposed measures to limit or avoid impacts during construction and operations. It was assumed that the Applicant-proposed measures would be applied to other pipeline alternatives, as appropriate. In addition, it was assumed that the rail and truck alternatives would be constructed and operated in accordance with standard best management practices (BMPs), and that all alternatives would incorporate regulatory and permit requirements.

As described in Chapter 2, Enbridge provided the location and land requirements of the proposed Project during construction and operation, including the construction work area along the pipeline route, additional temporary workspaces (ATWS), temporary and permanent access roads, temporary contractor and material/pipe storage yards (yards), and aboveground facilities. Enbridge provided DOC-EERA with geo-referenced geographic information system (GIS) shapefiles of these features. Over 80 percent of the 5,604 acres that would be disturbed during construction of the Project would be associated with the construction work area along the pipeline (typically 120 feet wide). The remaining land disturbance primarily would be associated with temporary construction, including ATWS (9

percent), access roads (5 percent), and yards (4 percent). During operation, 62 percent (3,480 acres) of the land disturbed during construction would return to preconstruction uses, and the majority of the permanent operations-related land disturbance would be associated with maintenance of the permanent right-of-way (97 percent, or 2,057 acres). The remaining 3 percent of permanently disturbed land would be associated with aboveground facilities, including access roads (67 acres). Each resource section in this chapter discusses the impacts of construction and operations for the Applicant's proposed project based on this detailed geo-referenced information.

In contrast, the available data for the CN Alternatives are not as extensive or complete as those for the Applicant's proposed project—in part, because no one has designed or engineered those alternatives as stand-alone projects. For continued use of the existing Line 3, data are available on pipeline location, some existing resources along the Enbridge Mainline system corridor, and Enbridge's ongoing integrity digs (as discussed in Section 4.2.3). In addition, approximately 42 percent of the Applicant's proposed project would be located in the same Enbridge corridor as the existing Line 3; consequently, much of the data for the Applicant's proposed project can be used to describe existing conditions for Line 3. However, no information is available on the precise location of future integrity digs if existing Line 3 operations continued, and the extent of disturbance at a dig site would be based in part on initial findings in the field. As a result, the environmental analysis for continued use of the existing Line 3 identifies the types of resources that may be affected and qualitatively assesses the nature, magnitude, and duration of those impacts.

For system alternative SA-04, quantitative analysis was conducted using the digital centerline identified during scoping; no corresponding geo-referenced information is available on aboveground facilities, ATWS, access roads, or yards. Along SA-04, a standard 120-foot-wide construction work area, 60 feet either side of the centerline, was applied to assess the impacts associated with pipeline construction. This allowed quantification of construction and operations impacts on land cover, habitat, and resources along SA-04 based on publically available information on existing conditions. Applying the relative proportion of land requirements for the Applicant's proposed project to the AS-04 alternative, the 120-foot-wide construction footprint equates to approximately 80 percent of the overall construction acreage that would be required to construct the system alternative (the other 20 percent being associated with unidentified ATWS, access roads, yards, and aboveground facilities). The 50-foot-wide permanent right-of-way along the SA-04 centerline would account for 97 percent of the operations footprint of the system alternative (based on the relative proportion of the land requirements for the Applicant's proposed project). Without knowing precise locations of aboveground facilities and secondary construction features (e.g., ATWS, yards, and temporary access roads), potential impacts were qualitatively assessed by applying assumptions used in the evaluation of the Applicant's proposed project. For example, although the exact locations for pump stations are not known, they average about 8 acres each for the proposed Project and would be expected to be located in open upland areas—especially with all the available agricultural land along SA-04. If the proposed Project is not constructed, field surveys, landowner and agency coordination, and site-specific engineering would be conducted to develop routing; develop specialized construction methods; and locate aboveground facilities, access roads, and yards along any other pipeline route.

It was assumed that transportation by rail and transportation by truck would require a new oil loading facility at the closest Enbridge pump station to Neche, North Dakota (Gretna, Canada); a new offloading facility at Clearbrook, Minnesota; an expansion of the offloading facility in Superior, Wisconsin; and associated upgrades to access those facilities. In addition, the rail and truck alternatives would entail rail/truck traffic to deliver oil from Gretna to Clearbrook and Superior. Although the exact facility

locations and designs and the transit routes are not known, the environmental analysis was predicated on the general size of the facilities; an assumption that the facilities would be located within 1 mile of the Gretna pump station, Clearbrook terminal, and Superior terminal; and the likely train and truck transit routes described in Sections 4.2.6 and 4.2.7.

The environmental analysis of supplementing existing Line 3 with rail or truck transport assumed that (1) operation and maintenance of the existing Line 3 would continue as described for the existing Line 3; and (2) the same rail and truck facilities and access upgrades would be needed as described for transportation by rail and transportation by truck. Thus, the only difference in combining the impacts for the continued use of existing Line 3 with those for the rail or truck alternative would be associated with a decrease in the number of required train and truck transits during operations because of the reduced volume of oil that would be transported via train or truck with continued use of existing Line 3 (see Section 4.2.6-4.2.7).

5.1.4 Summary and Mitigation

Each resource discussion in this chapter concludes with a general summary of the anticipated impacts on the resource for the Applicant's proposed project and each CN Alternative based on the nature, extent, duration, and magnitude of potential impacts.

As discussed in Section 5.1.3, because of the lack of locational data for secondary facilities (aboveground facilities, access roads, ATWS, and yards) for the CN Alternatives, the impacts are more quantifiable for the Applicant's proposed project than for the CN Alternatives.

To allow for a more direct comparison between the Applicant's proposed project and the CN Alternatives, the impacts for both the Applicant's proposed project and SA-04 in the summary sub-section are calculated based on Enbridge's refined construction work area (typically 120 feet wide) and 50-foot-wide permanent right-of way. This approach results in underestimating impacts for both alternatives by approximately 3 percent (operations) to 20 percent (construction). As discussed in Section 5.1.3, it is expected that the majority of the acreage of aboveground facilities, access roads, ATWS, and yards for the SA-04 alternative would be located in upland open lands. From an overall acreage perspective, the 3- to 20-percent underestimate does not substantially alter the general relationship between the Applicant's proposed project and CN Alternatives, as the land requirements for construction and operation along the SA-04 alternative are over twice the amount for the Applicant's proposed project; both the Applicant's proposed project and SA-04 would require acreage for construction an order of magnitude greater than for construction of the rail or truck facilities (see Sections 2.4 and 4.2).

In addition to incomplete information on the extent of upland impacts for SA-04, the primary shortcoming of the above approach for the environmental analysis is associated with Enbridge's proposal to reduce the width of the construction work area for the Applicant's proposed project in some wetlands and waterbodies (from 120 feet to 95 feet) based on site-specific field investigations and engineering. These refinements have not been incorporated into the general approach for the SA-04 footprint. For wetlands, this discrepancy is addressed in the wetlands resource section. For the analysis of surface water, the issue is recognized but is less integral, as the impact assessment for surface waters is not driven by the acreage of waterbody crossings as much as the resulting impact on water quality, aquatic habitat, and fisheries, and the measures to minimize those impacts. As noted above, if SA-04 is approved, it is expected that field surveys and engineering would result in refinements to the route, the

width of the construction footprint, and construction methods to further avoid and minimize impacts to wetlands and waterbodies.

Comprehensive quantitative data were not available for all resource-specific factors associated with existing Line 3 operations, or with construction and operation of the rail or truck alternative. As a result, some of the summary sub-sections present quantitative information for these factors where available and qualitative results for those alternatives where quantitative information is not available.

The summary sub-section for each resource includes a summary table to highlight impacts on the resources among need alternatives. The summary sub-section also identifies mitigation, as appropriate, to further avoid and minimize impacts. Mitigation may include expanding BMPs, initiating agency/landowner coordination, and identifying potential permit conditions (Section 3.6 summarizes the permits and approval processes for the Project).

5.1.5 References

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_____. 2013b. Wetland and Waterbody Construction and Mitigation Procedures. May. Washington, DC.

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U.S. Department of State (DOS). 2009. Final Environmental Impact Statement for the Alberta Clipper Pipeline Project. U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs. June. Washington, DC.

Wisconsin Department of Natural Resources (Wisconsin DNR). 2016. Final Environmental Impact Statement Enbridge Sandpiper and Line 3 Replacement Projects. August.

5.2 NATURAL ENVIRONMENT

Project actions have the potential to affect the natural environment. This section describes the existing conditions and assesses potential impacts on water resources, geology and soils, flora and fauna, public lands, and air quality associated with the Applicant's proposed project and CN Alternatives.

5.2.1 Water Resources

This section describes water resources, including groundwater, surface water, wetlands, and floodplains, located along the Applicant's proposed project and the existing Line 3 pipeline in North Dakota, Minnesota, and Wisconsin and along system alternative system alternative SA-04 in North Dakota, Minnesota, Iowa, and Illinois. The analysis focuses on major groundwater aquifers and wells; surface waterbodies, including streams, rivers, and lakes, and their designations; Public Waters Wetlands, calcareous fens, and wetland reserve programs; and floodplains designated by the Federal Emergency Management Agency (FEMA). The potential impacts of pipeline construction and operation on water resources are described for and compared between the Applicant's proposed project and the CN Alternatives (continued use of the existing Line 3, system alternative SA-04, transportation by rail or truck, and supplementing continued use of the existing Line 3 with rail or truck transportation).

5.2.1.1 Groundwater

Groundwater is water that collects or flows beneath the Earth's surface, filling the porous spaces in soil, sediment, and rocks. Groundwater originates from rain and from melting snow and ice that infiltrate into the ground; it is the source of water for springs and wells. Groundwater is relied on as a source for drinking water, irrigation, and industrial use (USGS 1992). Groundwater can be sourced from shallow surficial aquifers or from deeper confined aquifers. Activities that reduce the quantity of available water or introduce contaminants into these aquifers can affect groundwater resources and the people and industries that rely on them.

This section assesses the potential for construction and operation of the Project to affect the quantity of available water or to introduce pollutants that would degrade the quality of groundwater resources. Groundwater impacts that could occur during construction and operation are evaluated and compared for the Applicant's proposed project and the CN Alternatives.

The potential construction-related groundwater impacts to be addressed include the following:

- Changes in groundwater availability (from withdrawals for hydrostatic testing and other construction activities including the "French drain" effects of a pipeline);
- Increases in total suspended solid (TSS) concentrations during trenching/excavation activities in shallow aquifers;
- Degradation of shallow groundwater quality from blasting, spills, or existing contamination;
- Degradation of groundwater quality in potable supply wells, sole source aquifers,[2] or other designated groundwater protection areas; and

[2] EPA defines a "sole source aquifer" as one that supplies at least 50 percent of the drinking water for its service area and there are no reasonably available alternative drinking water sources should the aquifer become contaminated.

- Degradation of water quality from drilling mud releases during horizontal directional drilling (HDD) crossings.

Potential operations-related groundwater issues addressed in this section include:

- The potential for ongoing groundwater availability changes due to repair and maintenance activities and the risk of French drain effects, and
- Contamination resulting from small fuel and lubricant leaks and spills from maintenance and inspection vehicles.

This section first describes the existing groundwater resource conditions within an area along the Applicant's proposed project and each of the CN Alternatives where groundwater could be affected by construction or operation activities. The potential impacts on groundwater resources from construction and operation of the Applicant's proposed project and CN Alternatives are considered next. A summary and comparison of the impacts of the Applicant's proposed project and CN Alternatives are included at the end of the section. Potential impacts on groundwater resources due to a release of crude oil from the pipeline are discussed in Chapter 10.

5.2.1.1.1 Regulatory Context and Methodology

Regulatory Context

A number of water management and groundwater regulations control activities that have the potential to affect the quantity or quality of groundwater resources. These programs and their relevance to the construction and operation of pipelines are summarized by state in Table 5.2.1.1-1.

Continued use of existing Line 3 and transport by rail or truck require no, or minimal, construction of above ground facilities; they do not require appropriation of large quantities of water that would trigger regulatory approval. The minimal construction activities related to these alternatives (see Chapter 4) would be subject to general stormwater management practices and associated BMPs.

Methodology

The ROI for the analysis of potential impacts on groundwater during construction generally consists of the pipeline, rail, or truck corridor and a 1,000-foot buffer on either side of the centerline of the Applicant's proposed project and the CN Alternatives. Although the precise location of rail and truck offloading facilities are not known, they would be located in proximity to the Clearbrook and Superior terminals, where existing conditions would be the same as those described for the Applicant's proposed project. Routes for rail and truck transportation have been assumed for this impact analysis but could vary in actual operation.

Table 5.2.1.1-1. Regulatory Requirements for Protection of Groundwater during Pipeline Construction

Unit of Government	Type of Application	Reason Required
North Dakota		
North Dakota State Water Commission[a]	Water Appropriation Permit	Chapter 61-04 North Dakota Century Code and Article 89-03 of the State Administrative Code authorizes withdrawal and use of groundwater for hydrostatic testing, dust control, HDD installation, and trench dewatering.
North Dakota Department of Health[b]	North Dakota Source Water Protection Program – Wellhead Protection Area consultation	1999 Safe Drinking Water Act requires applicant to determine whether pipeline construction would affect existing wellhead protection areas.
Minnesota		
Minnesota Department of Natural Resources[c]	Water Appropriation Permit for withdrawals exceeding 10,000 gallons per day or 1 million gallons per year	Minnesota Statute 103G.265 authorizes withdrawal and use of water from groundwater from private or municipal wells for hydrostatic testing, dust control, HDD installation, and trench dewatering.
	Calcareous Fen Management Plans	The Minnesota Wetlands Conservation Act requires approved management plans for impacts on calcareous fens.[d]
Minnesota Department of Health[e]	Drinking Water Supply Management Area – Wellhead Protection Area consultation	Minnesota Administrative Rules Chapter 4720 ensures that pipeline construction and operation are compatible with goals of relevant Drinking Water Supply Management Area and Wellhead Protection Area plans.
Minnesota Pollution Control Agency[f]	Permitting of actions that may result in discharges to surface water or groundwater	Clean Water Act Section 401 requires certification that the Project would not result in violation of state water quality standards.
		Minnesota Groundwater Protection Act requires prevention/remediation of groundwater contamination.
Iowa		
Iowa State Department of Natural Resources[h]	Water Use Permit	Iowa Administrative Code 567, Chapter 52 directs that registration of a minor, non-recurring use of water is required for a project where at least 25,000 gallons of water would be used in a 24-hour period and the project does not exceed a 1-year duration (e.g., well drilling and highway construction activities).
Illinois		
Illinois Environmental Protection Agency[i]	Consultation	Illinois Groundwater Protection Act – Wellhead Protection Area ensures that pipeline construction and operation are compatible with goals of relevant plans.
Wisconsin		
Wisconsin Department of Natural Resources[g]	Water Use Permit	Great Lakes Compact Law (2007 Wisconsin Act 227) and Groundwater Quantity Law (2003 Wisconsin Act 310) require users in Great Lakes Basin withdrawing quantities averaging 100,000 gallons per day or more in a 30-day period to secure a Water Use Permit to ensure that withdrawals do not harm rivers, streams, lakes, wetlands, springs, groundwater, or plants and animals that depend on them.

[a] Source: North Dakota State Water Commission 2015.

[b] Source: North Dakota DH 2016.

Table 5.2.1.1-1. Regulatory Requirements for Protection of Groundwater during Pipeline Construction

Unit of Government	Type of Application	Reason Required

[c] Source: *Minnesota DNR 2017a.*

[d] Calcareous fens are discussed in Wetlands, Section 5.2.1.3.

[e] Source: *Minnesota DH 2014.*

[f] Source: *Minnesota PCA* n.d.[a].

[g] Source: Wisconsin DNR n.d.

[h] Source: *Iowa State DNR n.d.*

[i] Source: Illinois EPA 2015.

HDD = horizontal directional drilling

The ROI for assessment of operations impacts varied according to the configuration of the alternative. Operations impacts for the Applicant's proposed project were estimated based on the footprints for the permanent right-of-way provided by the Applicant. Operations impacts for the existing Line 3 were evaluated based on the existing permanent right-of-way for that pipeline. Operations impacts for system alternative SA-04 were estimated by overlaying a standardized 50-foot-wide permanent right-of-way centered on the route. As noted above, specific routes for rail and truck transportation were assumed for the impact analysis, although other routes also may be used. Potential impacts on groundwater associated with transportation by rail and truck operations were assessed qualitatively.

Impacts on groundwater resources were identified based on common construction methods; peer-reviewed literature; agency documents, including permit requirements and guidance manuals; Applicant-submitted documents, including the November 2016 EAW and associated construction BMP plans (Enbridge 2016a); and the experience and professional judgment of the hydrogeologists involved in developing this analysis.

Identification of groundwater resources potentially affected by the Project was completed by reviewing reports and data from the U.S. Geological Survey (USGS); the State Geological Surveys of Minnesota, Iowa, and Illinois; the North Dakota State Water Commission and North Dakota Source Water Protection Program; the Minnesota Department of Natural Resources (Minnesota DNR), Minnesota Pollution Control Agency (Minnesota PCA), Minnesota Department of Agriculture (Minnesota DA), and Minnesota Department of Health (Minnesota DH); Iowa Department of Natural Resources (Iowa DNR); and the U.S. Environmental Protection Agency (EPA).

Impacts related to groundwater resources were evaluated by overlaying the Applicant's proposed project and CN Alternative footprints with the following data sources:

- Aquifer locations and type, including EPA-designated sole source aquifers;
- Wellhead protection areas[3] in North Dakota; Minnesota, Iowa, and Illinois;
- Domestic and public water supply wells in North Dakota, Minnesota, Iowa, and Illinois. A Public Water Supply (PWS) in Minnesota by definition must serve 25 or more people for at

[3] A wellhead protection area is the surface and subsurface area surrounding a public water supply well or well-field that is regulated to prevent contamination; any potential contaminants would be likely to move toward this area and reach the well or well-field capture zone.

least 60 days of the year as defined by the Federal Safe Drinking Water Act. PWSs are broken down into community and non-community:

  - Community PWS (Municipal and Non-municipal) – provides water to the public in their primary living space—where people live and sleep—(i.e., homes, apartments, nursing homes, prisons, mobile home parks, etc.)
  - Non-community PWS – provides water to the public in places other than their homes—where people work, gather and play. Two types are:
    - Transient Noncomm PWS – facilities that serve at least 25 people at least 60 days of the year, but do not serve the same 25 people over 6 months of the year (i.e., restaurants, campgrounds, hotels, churches)
    - Nontransient Noncomm PWS – facilities that serve at least 25 of the same people over 6 months of the year (i.e., schools, offices, factories, daycare centers);
- Minnesota water table aquifer vulnerability; Iowa groundwater vulnerability; and Illinois aquifer sensitivity maps;
- Minnesota DNR's Watershed Health Assessment Framework (WHAF) groundwater contamination susceptibility index;
- Minnesota PCA's "What's in My Neighborhood?" (WIMN) database and EPA's Facility Registry Service (EPA-listed contaminated sites);
- Minnesota drinking water supply management areas (DWSMAs);[4] and
- Minnesota pollution sensitivity of near-surface materials.

The impact analysis for the Applicant's proposed project and CN Alternatives was made using available comparable data. Individual states monitor and categorize groundwater quantity and quality in different manners; thus, the same or even similar data are not available across all states. Minnesota DH, Minnesota DNR, and Minnesota PCA provided data and guidance for these analyses.

5.2.1.1.2 Existing Conditions

Groundwater can accumulate in underground layers of permeable rock, sediment, or soil and when these layers yield usable amounts of water, they are known as "aquifers." Aquifers can be classified as unconfined or confined. When the top of the aquifer is not overlain by impermeable layers that restrict the vertical movement of water, the aquifer is unconfined. The upper surface of groundwater in this type of aquifer is referred to as the "water table." When there is a layer of low-permeability material between the top of the aquifer and overlying sediments that restricts the vertical movement of water, the aquifer is confined. The low-permeability layers are called "confining units," or aquitards, which are mainly composed of silt and clay. Both of these aquifer types occur beneath the Applicant's proposed project and the CN Alternatives.

Confined and unconfined aquifers occur in both glacial and bedrock materials. Glacial aquifers consist of unconsolidated sediments deposited and reworked by glaciers that range in depth from just below to

[4] A drinking water supply management area is the surface and subsurface area surrounding a public water supply well that is approved by Minnesota DH and completely contains the scientifically calculated wellhead protection area; these are managed by the entity identified in a Wellhead Protection Plan.

several hundred feet below the land surface. Bedrock aquifers underlie the glacial materials and consist of deeper consolidated bedrock layers, such as limestone or sandstone.

The following discussion details the existing groundwater conditions in the vicinity of the Applicant's proposed project and CN Alternatives, including aquifer types, characteristics of the materials that make up the aquifers, water yield, and water quality.

Applicant's Proposed Project

Glacial Aquifers

Groundwater in permeable glacial sediments and recent stream-derived (alluvial) sediments is an important source of water in the vicinity of the Applicant's proposed project in North Dakota and Minnesota. These sediments comprise glacial till, outwash, glacial lake sediments, or sand and gravel that have been deposited along streams.

The thickness of glacial aquifers is highly variable, ranging from a few feet to greater than 150 feet. The highly variable composition of these aquifers, both vertically and horizontally, results in widely varying yields at different depths and locations. Well yields in glacial aquifers range from approximately 10 to 1,000 gallons per minute (gpm) (Adolphson et al. 1981), which makes them important sources of drinking water for domestic and municipal use (Minnesota PCA 1999).

The quality of water in glacial aquifers is generally good, but minerals such as iron and manganese may be present in a dissolved state in concentrations that exceed secondary drinking water standards (levels at which human health is not affected, but at which the taste, odor, and color of water may be negatively affected).

Water Table Glacial Aquifers

Most glacial aquifers that contain sands and gravels near the land surface contain surficial or water table aquifers because they receive direct recharge from infiltrating precipitation, melting snow, and overlying wetlands. Groundwater in surficial aquifers generally moves downhill or down-gradient from upland areas, recharges deeper aquifers, and discharges at lakes and streams. Water table aquifers are inherently more vulnerable to construction and spill impacts because they are in direct contact with the land surface. The depth to the water table along with the soil types indicates the degree of vulnerability to impacts.

Confined Glacial Aquifers

Glacial aquifers also exist as confined aquifers near the Applicant's proposed project. Confined glacial aquifers consist of permeable sand and gravel sediments at variable depths from the land surface, overlain by confining units. The confining units restrict the movement of water between the aquifers and the land surface; therefore, these aquifers are generally better protected from human activity on the land surface and thus not generally affected by pipeline activities. Confined glacial aquifers are recharged primarily by downward leakage from overlying surficial aquifers or upward leakage from deeper confined aquifers. No available datasets show the exact location of confined glacial aquifers in the ROI, but their locations can be inferred from nearby well and boring records.

Bedrock Aquifers

In areas with greater thicknesses of glacial material overlying bedrock aquifers, there is a higher likelihood that low-permeability confining layers are present in the overlying glacial sediments, and the

potential for groundwater within the aquifers to be affected by construction or operation of a pipeline is low. Where the depth to bedrock is shallow, there is a lower likelihood that low-permeability confining layers are present in the overlying glacial sediments, and there is a higher potential for groundwater within these bedrock aquifers to be affected by construction or operation of the pipeline.

Generally, two types of bedrock aquifers occur beneath the glacial aquifers along the Applicant's proposed project. The first type consists of hard and very old igneous and metamorphic rocks where groundwater occurs mostly in fractures. In most instances, this type of material does not yield usable quantities of water. The exception is where this bedrock is shallow and more highly fractured.

The second type of bedrock aquifer consists of thick, laterally extensive sequences of sandstone, limestone, and dolostone of sedimentary origin. This type of bedrock aquifer tends to be more productive than the first type. Similar to confined glacial aquifers discussed above, the majority of this type of bedrock aquifer often is isolated from overlying surficial aquifers by confining units, which decreases their vulnerability to contamination from land surface activities. The exception to this is karst aquifers, which are vulnerable to contamination.

A karst aquifer is a type of bedrock aquifer that usually consists of limestone but also can consist of dolostone or sandstone. Aquifers composed of these pH basic rock types are prone to chemical weathering and dissolution from the slight acidity of precipitation and groundwater, which can result in the formation of fractures, joints, sinkholes, cavities, caves, and void spaces that allow the movement of large volumes of surface water into and through the aquifer. These aquifers are often the source of abundant springs and seeps. These characteristics also allow contamination to spread rapidly within the aquifer. Karst aquifers are susceptible to collapse of the aquifer matrix, which can be triggered by construction activities on the land surface. This can lead to the formation of sinkholes in unconsolidated sediments that overlie the bedrock. Paleozoic limestones and some Precambrian sandstones found in southeastern and eastern Minnesota and in northeast Iowa are susceptible to dissolution and result in karst topography. Bedrock in these areas often is less than 50 feet below land surface and is considered vulnerable to contamination (Minnesota DNR 2016; Iowa DNR 2010). Karst conditions are not believed to be present along the Applicant's proposed project.

With the exception of shallow bedrock (either igneous/metamorphic or sedimentary, which is not common along the Applicant's proposed project), bedrock aquifers are not expected to be affected by pipeline construction and operation because they exist at depths averaging from 300 to 400 feet, which is well below pipeline construction depths. These deeper bedrock aquifers often are overlain by thick confining layers, which protect them from disturbance by human activities on the land surface. These aquifers are listed below in Table 5.2.1.1-2 but generally are not discussed further.

Beneath the Applicant's proposed project in Minnesota, bedrock aquifers consist of hard and very old igneous and metamorphic rocks. Groundwater in these rocks occurs mostly in fractures that may not yield usable quantities of water.

Table 5.2.1.1-2. Bedrock Aquifers Crossed by the Applicant's Proposed Project

State	Bedrock Aquifer	Description
North Dakota	Unit D	• Primarily consists of limestone. • Includes some sandstone and shale. • The top of this unit is a few hundred feet below land surface in the area. • Very little is known about the water-bearing properties of the rocks in this unit.
North Dakota and Minnesota	Red River-Winnipeg	• Occupies a depression in the crystalline bedrock of northwestern Minnesota and is overlain by several hundred feet of glacial till and lake sediments. • A porous zone at the top of the upper limestone yields most of the water to wells in the aquifer. Groundwater generally flows eastward through the aquifer from North Dakota and discharges upward to wells and to overlying deposits. • Yields of wells open to the full thickness of the aquifer range from 100 to 250 gpm. • Water is unsuitable for most uses because of the high mineral content; concentrations of dissolved solids range from about 3,000 mg/L in the eastern part of the aquifer to about 60,000 mg/L in the northwestern corner of Minnesota.
Minnesota	Proterozoic	• Underlies glacial drift and rocks in much of the north-central part of Minnesota. • Yields to wells are generally less than 20 gpm, but yields of 30 gpm can be obtained locally from wells completed in the fractured zone near the upper surface of the aquifer. • Water is used for numerous domestic and some municipal supplies, and is of the calcium-magnesium-bicarbonate type. It contains much less iron, manganese, dissolved solids, and hardness than most water from glacial drift aquifers in the area.
Minnesota	Cretaceous	• Present in Kittson and Itasca counties in the Applicant's proposed project. • Aquifer is not widely used except where glacial drift aquifers are absent or where well yields are poor. • Most water is used to supply farms, and wells typically yield from 10 to 25 gpm. • Major source of water locally, southwest of the Minnesota River. • Water quality is typically poor compared to glacial aquifers, and it has naturally elevated levels of arsenic in many parts of the state.
Minnesota and Wisconsin	Precambrian Undifferentiated	• Underlies the entire state. • Source of minor water supplies in the central portion of the region of interest and along the Applicant's proposed project in Carlton County. • Yields generally range from 1 to 25 gpm. • Quality of water often is similar to that contained in overlying glacial drift aquifers. Concentrations of dissolved solids are generally less than 300 mg/l. Calcium-magnesium-bicarbonate type water is the most common water type, and concentrations of total dissolved solids are typically less than 300 mg/l.

Sources: Paulsen 1983; Adolphson et al. 1981; Wisconsin GNHS 2013.

gpm = gallons per minute, mg/L = milligrams per liter

Sole Source Aquifers

A sole source aquifer is an underground water supply designated by the EPA as the "sole or principal source" of drinking water for an area. The Applicant's proposed project would not cross any aquifers designated by EPA as sole source aquifers.

Domestic Wells, Public Wells, and Wellhead Protection Areas

There are 304 domestic wells within the ROI for the Applicant's proposed project (98 unverified and 205 verified location domestic wells in Minnesota and 1 in North Dakota). Well data were requested for the Wisconsin portions of the Applicant's proposed project and alternatives but were not made available. There are two unverified and four verified locations of public wells within Minnesota in the ROI. Private well databases often only include a portion of existing wells, as many older wells were installed prior to current record-keeping efforts; therefore it is likely that more wells are present in the vicinity of the proposed project, as well as in the vicinity of alternatives.

The Applicant's proposed project would not cross any wellhead protection areas in North Dakota, and it would cross 87 acres in Minnesota. Wellhead protection area data were requested for the Wisconsin portions of the Applicant's proposed projects and CN Alternatives but were not made available.

Aquifer Vulnerability Areas

Minnesota provides rankings of water table aquifer vulnerability based on the water time of travel to the aquifer. The vulnerability ranking is inversely proportional to the time of travel: in areas of higher sensitivity, contaminants may reach the groundwater within hours to months; and in areas of lower sensitivity, surface contamination may take months to years to travel into groundwater. The Applicant's proposed project would cross 25,765 acres of high vulnerability water table aquifers in Minnesota. Comparable data are not available for North Dakota or Wisconsin.

Contaminated Sites

There are 19 EPA-designated contaminated sites within the ROI for the Applicant's proposed project (13 in Minnesota and 6 in Wisconsin). There are 104 WIMN sites (three Minnesota DA and 101 Minnesota PCA) within the ROI for the Applicant's proposed project in Minnesota (these data are not available in other states).

Minnesota Groundwater Contamination Susceptibility and Pollution Sensitivity of Near-Surface Materials

Minnesota also evaluates the vulnerability of groundwater to contamination based on the shape, type, and relative position of surface and subsurface geology (e.g., the geomorphic setting), which controls the flow paths of water and dissolved elements above and below the surface. Sandiness, permeability, depth to rock outcrops, fracturing and permeability of bedrock, flow-restricting layers, and surface and subsurface connections all affect how vulnerable groundwater is to contamination. Areas of highest groundwater contamination susceptibility are in central, north-central, and east-central Minnesota and in the southeastern corner of the state in areas dominated by sand and gravel aquifers or in areas with karst bedrock. The Applicant's proposed project would cross 26,382 acres of high groundwater contamination susceptibility in Minnesota. Comparable data are not available for North Dakota or Wisconsin.

Additionally, Minnesota DNR classifies the sensitivity to pollution of near-surface materials, which is an estimate of the time it takes for water to travel through the unsaturated zone to reach the water table, which is assumed to be 10 feet below land surface. Generally, areas of coarse-grained material are modeled as higher sensitivity to pollution compared to areas of fine-grained material. Based on these data, the Applicant's proposed project would cross 16,299 acres of high pollution sensitivity in

Minnesota. The DNR also classifies bedrock (aquifer) surface sensitivity to pollution and there are 1700 acres of very high to high sensitivity Precambrian shallow fractured bedrock aquifers within the Applicant's proposed project ROI. There is no karst at or near the land surface within the ROI.

DWSMAs

The Applicant's proposed project ROI would cross 538 acres of DWSMAs in Minnesota. DWSMA data do not exist for other states.

Continued Use of Existing Line 3

Glacial Aquifers

The confined and unconfined glacial aquifers below the existing Line 3 pipeline are similar to those described above for the Applicant's proposed project.

Bedrock Aquifers

The existing Line 3 crosses the same bedrock aquifers as those crossed by the Applicant's proposed project (see Table 5.2.1.1-2). In addition, the primary fractured bedrock aquifer beneath existing Line 3 is the Biwabik Iron-formation aquifer. This Precambrian age aquifer is composed of chert and iron materials. It generally underlies glacial materials; however, it outcrops[5] above the land surface in north-central Minnesota. The yields of this aquifer range from 250 to 1,000 gpm. It is one of the most productive aquifers for the Mesabi Iron Range and is a primary source of drinking water for many municipalities. Dissolved solids range from 100 to 300 milligrams per liter (mg/L); and the water can contain high concentrations of iron, manganese and silica. This aquifer is susceptible to contamination where surficial materials are thin, at outcrops, and in mine pits. Groundwater flow in this aquifer occurs as regional flow along bedding planes and large fracture networks, as localized flow in discrete fractures near wells, or as a combination of both.

Sole Source Aquifers

The existing Line 3 route does not cross any aquifers designated by EPA as sole source aquifers.

Domestic Wells, Public Wells, and Wellhead Protection Areas

There are 589 domestic wells within the ROI for the existing Line 3 (366 unverified location and 222 verified location domestic wells in Minnesota and 1 in North Dakota). There are four unverified and 44 verified location public wells within the ROI for the existing Line 3, and all are located in Minnesota. The existing Line 3 crosses 624 wellhead protection area acres in Minnesota. It does not cross any wellhead protection areas in North Dakota. Well and wellhead protection data were requested for the Wisconsin portions of the route but were not made available.

Aquifer Vulnerability Areas

The existing Line 3 crosses 69,614 acres of high vulnerability water table aquifers in Minnesota. Comparable data are not available for North Dakota and Wisconsin.

[5] An outcrop is a visible exposure of bedrock on the land surface.

Contaminated Sites

There are 107 EPA-designated contaminated sites within the ROI for the existing Line 3 (101 in Minnesota and 6 in Wisconsin). There are 159 WIMN sites (one Minnesota DA and 158 Minnesota PCA) within the ROI for the existing Line 3 in Minnesota (these data are not available in other states).

Minnesota Groundwater Contamination Susceptibility and Pollution Sensitivity of Near-Surface Materials

The existing Line 3 would cross 19,833 acres of high groundwater contamination susceptibility, 16,179 acres of high pollution sensitivity of near-surface materials, and 1700 acres of very high to high sensitivity Precambrian shallow fractured bedrock aquifers in Minnesota. Comparable data are not available for North Dakota or Wisconsin. No other karst aquifers or bedrock at or near the land surface are within the ROI.

DWSMAs

The ROI for the existing Line 3 crosses 1,120 acres of DWSMAs in Minnesota. DWSMA data do not exist for the other states.

System Alternative SA-04

Glacial Aquifers

Groundwater in permeable glacial sediments and recent stream-derived (alluvial) sediments is an important source of water in the vicinity of system alternative SA-04 in North Dakota, Minnesota, Iowa, and Illinois (Kay and Bailey 2016; Prior et al. 2003; Sadorf and Linhart 2000; Visocky et al. 1985; Voelker 1986).

Bedrock Aquifers

North Dakota

System alternative SA-04 also would cross the Unit D bedrock aquifer described for the Applicant's proposed project (see Table 5.2.1.1-2).

Minnesota

Beneath system alternative SA-04 in southwest Minnesota and above the hard, fractured bedrock, bedrock aquifers consist of Cretaceous sandstones that are interbedded with thick shale. These sandstone aquifers are relatively thin and only locally useful. Cretaceous bedrock aquifers are present in Traverse, Stevens, Swift, Chippewa, Renville, Sibley, Nicollet counties although not everywhere that SA-04 crosses in these counties. Similar to the Applicant's proposed project, shallow bedrock is not common along system alternative SA-04, with depths to bedrock along both alignments averaging from 300 to 400 feet. System alternative SA-04 in Minnesota crosses the same bedrock aquifers as the Applicant's proposed project listed above, with the exception of the Proterozoic Aquifer.

In the southeastern third of Minnesota, beneath system alternative SA-04, the bedrock aquifers consist of thick, laterally extensive sequences of sandstone, limestone, and dolostone of sedimentary origin. In these bedrock aquifers, groundwater occurs in granular pore spaces, partings, joints, fractures, and dissolution features. Karst features are common in bedrock in the extreme southeast of Minnesota. Conditions vary locally, but generally these aquifers are capable of yielding quantities of groundwater that are sufficient for most purposes. However, these aquifers are highly vulnerable to contamination and structural changes with ground disturbance; including induced sinkhole formation and alteration of groundwater flow.

Karst topography is found in southeastern and eastern Minnesota, where Paleozoic limestones and some Precambrian sandstones are susceptible to dissolution. Along system alternative SA-04, relatively shallow carbonate bedrock with potential for karst intersects the route across Minnesota, Iowa, and Illinois (none is present in North Dakota). Karst features are present in Minnesota along 8 miles of system alternative SA-04 in Mower County and 3 miles in Le Seur and Blue Earth counties (Minnesota DNR 2016; USGS 2016). Known and potential karst conditions also are present along approximately 63 miles of the route in Iowa and 5 miles in Illinois.

Iowa

The Silurian-Devonian and Upper Carbonate aquifers are present near the land surface and supply approximately 37 percent of groundwater used in northeastern and southeastern Iowa. The Silurian-Devonian aquifer would be crossed by the central and southern portion of system alternative SA-04 in Iowa, and the Upper Carbonate aquifer would be crossed in the north (Savoca et al. 1998).

The Silurian-Devonian aquifer consists of shallow marine limestones, shales, evaporites, dolostone, and sandstone. Shale underlies quaternary alluvial deposits and acts as a confining unit to the dolomite, limestone, gypsum, and sandstone units below (Savoca et al. 1998). The Silurian-Devonian aquifer only reaches the surface in outcrops along the major river valleys (Prior et al. 2003).

The Upper Carbonate aquifer underlies unconsolidated Quaternary and Cretaceous sand, gravel, and clay deposits. The aquifer consists of shallow marine limestone, dolostone, and shale from the Ordovician and Devonian. The Upper Carbonate aquifer is unconfined in the ROI and is underlain by confining units of shale (Savoca et al. 1998).

Illinois

Below the surficial aquifer, Pennsylvanian and Devonian limestones, shales, and some sandstones act as confining/semi-confining layers to the bedrock aquifers. Water supply wells typically are cased through these confining units, but no water supplies are obtained from bedrock aquifers that outcrop at the land surface (Kay and Bailey 2016).

Sole Source Aquifers

System alternative SA-04 would not cross any aquifers designated by EPA as sole source aquifers (EPA 2016).

Domestic Wells, Public Wells, and Wellhead Protection Areas

The ROI for system alternative SA-04 would encompass domestic and public wells in the states through which it would be built. Data provided by the states differ in terms of clarity and classification of wells; therefore, direct comparison between states is difficult. The SA-04 ROI would encompass 17 domestic wells in North Dakota, 36 unverified location and 134 verified location domestic wells in Minnesota, 46 permitted private wells and 190 wells included in the private well tracking system in Iowa, and 205 domestic wells in Illinois. Public wells encompassed by the SA-04 ROI are as follows: one in North Dakota; nine verified location public wells in Minnesota; four in Iowa; and one in Illinois.

System alternative SA-04 would cross 1,203 acres of wellhead protection areas: 538 acres in North Dakota, 138 acres in Minnesota, 36 acres in Iowa, and 491 acres in Illinois.

Aquifer Vulnerability Areas

Minnesota, Iowa, and Illinois rank groundwater and aquifer vulnerability in different ways (Table 5.2.1.1-3). Iowa data represent areas with similar hydrogeologic characteristics thought to represent similar potentials for contamination of groundwater and/or water wells. Illinois data presented below are based on the vulnerability of aquifers to pesticide leaching. No aquifer or groundwater vulnerability data exist for North Dakota. In total, SA-04 would cross 30,201 acres of high vulnerability aquifers (5,687 acres in Minnesota; 12,280 acres of sinkholes and alluvial aquifers in Iowa; and 12,233 acres of high or excessive risk aquifers in Illinois).

Table 5.2.1.1-3. Acres of Aquifer or Groundwater Vulnerability Crossed by System Alternative SA-04

State Vulnerability Ranking	Acres Crossed
Minnesota Total	**60,781.7**
Low	3,821.7
Medium	50,225.2
High	5,686.8
Unrated	1,047.9
Iowa Total	**45,493.7**
Good bedrock aquifers; thin drift confinement	16,994.0
Sinkholes (400-meter radius around each is shown)	1,475.5
Good bedrock aquifers; moderate drift confinement	16,219.3
Alluvial aquifers (southeast Iowa)	2,984.2
Alluvial aquifers (northeast Iowa)	7,820.7
Illinois Total	**29,456.4**
Very limited	15,629.3
Somewhat limited	804.3
Limited	255.0
Moderate	569.6
High	11,705.1
Excessive	528.3

Sources: Illinois State Geological Survey 1995; Iowa DNR 2013; Minnesota DA 2015.

Contaminated Sites

There are 212 EPA-listed contaminated sites within the ROI for system alternative SA-04 (44 in North Dakota, 34 in Minnesota, 55 in Iowa, and 79 in Illinois). There are 80 Minnesota PCA and 3 Minnesota DA WIMN sites within the ROI for system alternative SA-04 in Minnesota (these data are not available in other states).

Minnesota Groundwater Contamination Susceptibility and Pollution Sensitivity of Near-Surface materials

Within the ROI in Minnesota, system alternative SA-04 would cross 4,674 acres of high groundwater contamination susceptibility, 1,493 acres of high pollution sensitivity, 2,053 acres of karst topography and very limited amounts of bedrock at or near the land surface.

Minnesota DWSMAs

System alternative SA-04 would cross 224 acres of DWSMAs within the ROI in Minnesota. DWSMA data do not exist for the other states crossed by system alternative SA-04.

Transportation by Rail

Glacial Aquifers

The glacial aquifers below the assumed rail routes are similar to those described above for the Applicant's proposed project.

Bedrock Aquifers

Beneath the assumed rail routes in Minnesota, bedrock aquifers consist of hard and very old igneous and metamorphic rocks. Groundwater in these rocks occurs mostly in fractures that may not yield usable quantities of water. The rail routes would cross the same general bedrock aquifers as those described for the Applicant's proposed project.

Sole Source Aquifers

The assumed rail routes do not cross any aquifers designated by EPA as sole source aquifers.

Domestic Wells, Public Wells, and Wellhead Protection Areas

The ROI for the assumed rail routes would encompass 584 domestic wells and no public wells in Minnesota. The assumed rail routes would cross 3,059 acres of wellhead protection areas in Minnesota. The ROI for the rail routes does not encompass any public or private wells or wellhead protection areas in North Dakota. Well and wellhead protection area data were requested for the Wisconsin portions of the route but were not made available.

Aquifer Sensitivity Areas

The assumed rail routes would cross 78,190 acres of high vulnerability aquifers in Minnesota. Comparable data are not available for North Dakota and Wisconsin.

Contaminated Sites

Within the ROI for the assumed rail routes, there are 2,251 EPA-listed contaminated sites (2,215 in Minnesota, 36 in Wisconsin, and none in North Dakota) and 2,108 Minnesota PCA WIMN sites.

Minnesota Groundwater Contamination Susceptibility and Pollution Sensitivity of Near-Surface Materials

Within the ROI in Minnesota, the assumed rail routes also would cross 41,707 acres of high groundwater contamination susceptibility, 43,189 acres of high pollution sensitivity of near-surface materials, no areas of karst topography, and very limited bedrock at or near the land surface.

Minnesota DWSMAs

The assumed rail routes would cross 3,678 acres of DWSMAs in Minnesota.

Transportation by Truck

Glacial Aquifers

The glacial aquifers below the assumed truck routes are similar to those described for the Applicant's proposed project.

Bedrock Aquifers

Beneath the assumed truck routes in Minnesota, bedrock aquifers consist of hard and very old igneous and metamorphic rocks. Groundwater in these rocks occurs mostly in fractures that may not yield usable quantities of water. The assumed truck routes would cross the same general bedrock aquifers as those described for the Applicant's proposed project.

Sole Source Aquifers

The assumed truck routes would not cross any aquifers designated by EPA as sole source aquifers.

Domestic Wells, Public Wells, and Wellhead Protection Areas

The ROI for the assumed truck routes would encompass 301 domestic wells in Minnesota and none in North Dakota. No Minnesota or North Dakota public wells are located within the ROI for the assumed truck routes. The potential truck routes would cross 2,197 acres of wellhead protection area acres (1,303 acres in Minnesota and 894 in North Dakota). Well and wellhead protection area data were requested for the Wisconsin portions of the route but were not made available.

Aquifer Sensitivity Areas

The assumed truck routes would cross 40,573 acres of high vulnerability aquifers in Minnesota. Comparable data are not available for North Dakota and Wisconsin.

Contaminated Sites

A total of 1,318 EPA-listed contaminated sites (1,023 in Minnesota, 270 in North Dakota, and 25 in Wisconsin) and 2,108 Minnesota PCA WIMN sites are within the ROI for the assumed truck routes.

Minnesota Groundwater Contamination Susceptibility and Pollution Sensitivity of Near-Surface Materials

The assumed truck routes also would cross 21,412 acres of high groundwater contamination susceptibility, 16,699 acres of high pollution sensitivity of near-surface materials, and no karst topography within the ROI in Minnesota.

Minnesota DWSMAs

The assumed truck routes would cross 1,567 acres of DWSMAs in Minnesota.

Existing Line 3 Supplemented by Rail

Existing conditions for the existing Line 3 supplemented by rail transport are similar to those described above for continued use of the existing Line 3 pipeline and the assumed rail routes.

Existing Line 3 Supplemented by Truck

Existing conditions for the existing Line 3 supplemented by truck transport are similar to those described above for continued use of the existing Line 3 pipeline and the assumed truck routes.

5.2.1.1.3 Impact Assessment

The Applicant's proposed project and each of the CN Alternatives were assessed separately for the construction and operations phases.

For construction, the following potential impacts were assessed:

- Changes in groundwater availability from withdrawals;
- Increases in TSS concentrations during excavation, trenching, and backfilling;
- Degradation of shallow groundwater quality from blasting, spills, or contamination;
- Degradation of groundwater quality in potable supply wells, sole source aquifers, or designated protection areas; and
- Degradation of water quality from drilling mud releases during HDD crossings.

Continuing potential impacts that could occur during operation include:

- Changes in groundwater availability; and
- Changes in groundwater quality.

Applicant's Proposed Project (from Neche to Superior)

Construction Impacts

Construction activities that could affect groundwater include groundwater withdrawals and discharges, dewatering and trenching, blasting, access road construction, waterbody crossings, and fueling and use of hazardous materials. These activities may affect groundwater quantity and quality; the extent and magnitude of the impacts would be influenced by the proximity and sensitivity of groundwater resources to construction work areas.

Changes in Groundwater Availability from Withdrawals

Impacts on groundwater availability could occur in two ways: (1) water withdrawals for hydrostatic testing; and (2) groundwater inflows to the pipe trench during construction and subsequent drawdown of the aquifer, if dewatering is required. The Applicant would withdraw water for construction activities such as dust control, HDD installation, and hydrostatic testing of the pipeline. Approximately 120 million gallons of water would be requested through water appropriation permits for hydrostatic testing for the 340 miles of the Applicant's proposed project in Minnesota. The total amounts of water needed for these activities for the Applicant's proposed project have not been determined for North Dakota and Wisconsin. The Applicant would source water from surface water and private and public wells; the proportion of water that would be obtained from groundwater versus surface water has not been determined. Prior to construction, the Applicant would obtain water appropriation permits from the appropriate state agencies (listed in Table 5.2.1.1-1). The rate and total volumes of water withdrawn would be measured with a flow meter and would not exceed the rate and amount specified in the permits (Appendix E).

Dewatering of the pipeline trench may be required before the pipe is lowered into it. It also may be necessary at road boring sites adjacent to wetlands, areas where excessive volumes of groundwater flow into the trench either as a result of seepage or artesian flow, or locations where increased visibility or physical access is necessary. Depending on the state, trench dewatering is considered a water

appropriation or water use permit activity that is regulated based on withdrawal volumes. In areas where an aquifer that is under artesian conditions is exposed by the trench, the volume of inflowing water could cause rapid flooding of the trench and the bottom or sides to become unstable. In these areas, the pipeline trench may have a French drain effect, allowing water to migrate down the trench. Soil borings would be advanced to the design depth of the pipeline in areas where artesian conditions are possible to determine whether a confining layer may be breached (Enbridge 2016a). To protect against subsurface water flow along the pipe after the trench is backfilled, the Applicant would install trench breakers from the bottom of the trench to near the top of the trench, completely surrounding the pipe. The trench breakers would be constructed of bags filled with rock-free subsoil or sand, and their locations would be based on field conditions—including the degree and length of slope, presence of down-slope sensitive resource areas, such as wetland and waterbodies, and proximity to other features such as roads and railroads (Appendix E). Once construction in the area is completed and the trench was backfilled, groundwater levels likely would return to preconstruction levels because shallow aquifers readily recharge due to precipitation and surface water inflow.

With adherence to Water Appropriation Permit conditions and implementation of Applicant-proposed measures, impacts on groundwater availability from water withdrawals would be temporary and minor.

Increases in Total Suspended Solid Concentrations in Groundwater

During trenching, excavation, and backfilling, the water table in surficial aquifers could be exposed, which could increase TSS concentrations in water in the trench or excavated area. The Applicant would use temporary erosion and sediment controls, including slope breakers, sediment barriers, stormwater diversions, trench breakers, and mulch, to minimize sedimentation in water resources during construction. The Applicant also would limit the amount of excavated open trench to a maximum of 3 days of anticipated welding production per spread, per pipe to minimize the potential for erosion and sedimentation (Appendix E). In addition, the relatively slow groundwater flow rate and fine-grained nature of the glacial sediments likely would filter out TSS from infiltrating groundwater. Thus, increases in TSS concentrations in groundwater, in aquifers near trenched and excavated areas would be temporary and minor.

Degradation of Shallow Groundwater Quality from Blasting, Spills, or Contamination

The quality of shallow groundwater may be degraded from blasting; small spills and leaks of lubricants, oil, or other hazardous chemicals used during construction; or disturbance of existing contamination. Blasting is likely to be necessary only in Carlton County, Minnesota, near the Wisconsin border where surface bedrock composed of slate and graywacke material of the Thomson Formation is present. The Applicant has identified one location at MP D1128.4 is required. The blasting area is expected to be approximately 0.25 mile in length (Enbridge 2016a).

Where blasting would occur, rock would be removed to a depth of 7 feet, which could be above the elevation of the water table in the area. If the water table is exposed by blasting, the turbidity, sedimentation, or chemical contamination that could result would be localized and likely confined to the immediate area of the activity. Prior to construction, the Applicant would develop a site-specific Blasting Plan, which would include measures for transporting, storing, handling, detonating, and disposing of blasting materials to protect groundwater resources.

Groundwater may become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities such as fuel storage, equipment refueling, and equipment maintenance. Water table aquifers are most vulnerable to

contamination because they lack confining layers and directly interact with the land surface (certain states identify areas of high aquifer and groundwater vulnerability or susceptibility to contamination; see Section 5.2.1.1.2 above). The Applicant would follow Spill Prevention, Containment, and Control (SPCC) measures outlined in Appendix E to minimize the likelihood of spills and of contamination entering groundwater. The Applicant would store petroleum products, hazardous chemicals, and lubricating oils; conduct refueling, maintenance, and lubricating operations; and perform concrete coating activities in upland areas at least 100 feet away from wells and use secondary containment (Appendix E). Concrete wash water, grindings, and slurry disposal would be limited to a designated area, away from wetlands and other sensitive areas. Rinse water, used in conjunction with a cleaning pig to remove any accumulated construction debris, dirt, and dust prior to hydrostatic testing, would be treated and disposed of or discharged in accordance with applicable National Pollutant Discharge Elimination System (NPDES) permit conditions. Excess HDD drilling mud would be disposed of offsite at an approved disposal facility. In addition to these prevention measures, the Applicant would be responsible for cleaning up spills through procedures outlined in the Environmental Protection Plan (Appendix E), including notifying proper personnel (e.g., the onsite spill coordinator) and agencies, stopping work activity that caused the spill, using absorbent booms and pads to contain and recover released materials in water, and disposing of contaminated response materials at approved facilities. Prevention and response procedures for an unanticipated release of crude oil are discussed in Chapter 10.

If contaminated soils or groundwater are encountered during construction, they would be handled and disposed of in accordance with applicable regulations; the Environmental Protection Plan; and a Contaminated Soils Management Plan, which the Applicant would develop prior to construction. The plan would describe site assessment and response actions that would be implemented to manage contaminated soils and groundwater (Enbridge 2016a). With implementation of Applicant-proposed measures and adherence to the Blasting and Contaminated Soils Management plans, impacts on groundwater quality from blasting, small leaks and spills, and existing contamination would be temporary and minor.

Degradation of Groundwater Quality in Potable Supply Wells, Sole Source Aquifers, or Designated Protection Areas

Potable water supply wells and wellhead protection areas could be affected by construction activities that include groundwater withdrawals, minor spills of industrial chemicals and hazardous materials, and drilling mud releases during HDD installation, depending on how close the wells are to construction areas. The Applicant's proposed project crosses the City of Oklee, Sundruds Court, and the City of Wrenshall's Wellhead Protection areas. The City of Plummer's Wellhead Protection Area lies within the ROI for the Applicant's proposed project. With adherence to the Applicant-proposed measures discussed above and below (e.g., water appropriation BMPs, erosion/sedimentation controls, SPCC measures, and HDD monitoring and clean-up procedures) construction impacts on groundwater in these sensitive areas and wells would be temporary and minor.

The Applicant's proposed project would not cross any aquifers designated by EPA as sole source aquifers. Therefore, there would be no construction impacts on any sole source aquifer.

Degradation of Water Quality from Drilling Mud Releases during HDD Crossings

HDD installation involves drilling under a waterbody and installing the pipeline without physical disturbance of the waterbody feature. This method would be used to cross environmentally sensitive areas such as certain wetlands, sensitive fishery resources, and impaired waters (Appendix G). Geotechnical surveys are conducted to determine which waterbodies exist in areas that are geologically suitable for HDD based on properties such as depth to aquifer, aquifer flow properties, aquifer material

type, strength, and deformational properties. Areas not conducive to HDD include soils containing cobbles, boulders, layers of gravel, or non-cohesive sands. During drilling, fluid (water, bentonite clay, and possible Minnesota PCA-approved additives) is circulated through the drilling pipe to lubricate the drill bit, remove drill cuttings, and stabilize the open hole.

The potential exists for an inadvertent rupture of the bore hole or "frac-out" and release of the drilling fluid. Such events can occur when pressurization of the drill hole increases beyond the containment capability of the overburden soil material, which allows the drilling fluid to flow to the ground surface. The general risks to groundwater associated with HDD construction methods include loss of drilling mud into surficial aquifers, which could lead to turbidity in nearby aquifers and wells. Partial or full loss of drilling mud may occur as a result of encountering loose, unstable zones of soil, particularly in areas of karst. A large subsurface drilling fluid escape that does not reach the surface may fill subsurface voids and potentially cause the upward displacement of water and materials, creating a "doming" effect until the water in the dome reaches equilibrium with the surrounding hydrology. No known areas of karst topography occur along the Applicant's proposed project.

Additives may be mixed with the drilling fluids/mud for viscosity or lubricating reasons. Only non-hazardous additives approved by the MPCA's 401 Water Quality Certification letter would be used, and a Material Safety Data Sheet for the drilling fluid would be maintained onsite. Construction personnel would monitor the crossing to detect releases of drilling mud and would implement containment, response, and clean-up procedures outlined in the Applicant's Environmental Protection Plan (Appendix E) to minimize the potential for drilling mud to reach groundwater resources. If a frac-out occurred and went undetected or was not quickly contained, impacts on groundwater quality could be long term and major. With implementation of the Applicant-proposed measures for drilling mud releases during HDD construction, impacts on groundwater quality would be temporary and minor.

Operations Impacts

Changes in Groundwater Availability

Ongoing French drain effects could occur during pipeline operations in areas of groundwater upwelling. With proper installation of trench breakers and soil compaction during backfilling during construction as described above, impacts on groundwater availability during pipeline operations would be temporary and negligible.

Normal operation of the Applicant's proposed project would not require withdrawal or discharge of water. During maintenance and repair of the pipe, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control are not defined. As described for pipeline construction, the Applicant would be required to obtain water appropriation permits for testing procedures, and the volume of water would be substantially less than for construction. With adherence to permit conditions and implementation of Applicant-proposed measures as described above for construction, impacts on groundwater from withdrawals would be temporary and negligible.

Degradation of Groundwater Quality

Small fuel and lubricant leaks and spills could occur from maintenance and inspection vehicles. Any refueling, fuel storage, or vehicle maintenance would follow the Applicant-proposed measures set forth in the Environmental Protection Plan (Appendix E). Further, the volume of such spills and leaks would be small and would largely remain on the land surface, and only very low concentrations likely would infiltrate into groundwater supplies. Therefore, impacts related to groundwater contamination from small leaks and spills during operation would be temporary and negligible to minor. Potential impacts on groundwater resources from a crude oil release are discussed in Chapter 10.

Continued Use of Existing Line 3

Construction Impacts

There would be no construction impacts on groundwater from continued use of the existing Line 3 pipeline because it is already built.

Operations Impacts

Operations impacts for continued use of the existing Line 3 pipeline would be similar to those discussed above for the Applicant's proposed project. In addition, continued use of Line 3 at its present capacity would require high levels of maintenance, with an estimated 267 repair procedures per year in the form of integrity digs (see Section 4.2.3 for more detail). Integrity digs require opening the pipeline trench with excavation equipment and making any necessary repairs. The impacts associated with integrity digs and subsequent pipeline repairs would be comparable to those associated with construction of new pipeline as described above, but on a much smaller scale. It was assumed that the Applicant would adhere to the same measures as proposed for new pipeline construction to protect groundwater resources during repair and maintenance procedures. As such, impacts associated with potential French drain effects, increased TSS concentrations, and degradation of water quality resulting from integrity digs would be expected to be temporary and negligible to minor when they occur; but they would occur as long as Line 3 was operational. Impacts on public or private wells from integrity digs are not anticipated.

Changes in Groundwater Availability

Continued use of the existing Line 3 also may require withdrawal and discharge of hydrostatic testing water. The frequency with which hydrostatic testing would occur, locations of testing, and amounts of water needed for testing are not defined. As described for new pipeline construction, the Applicant would be required to obtain water appropriation permits for testing procedures. With adherence to permit conditions and implementation of Applicant-proposed measures, impacts on groundwater from water appropriation would be temporary and negligible.

Degradation of Groundwater Quality

Small fuel and lubricant leaks and spills could occur from maintenance and inspection vehicles. Refueling, fuel storage, and vehicle maintenance were assumed to follow measures similar to the Applicant-proposed measures described above for maintenance activities and therefore would be minor. Further, the volume of such spills and leaks would be small and would largely remain on the land surface, and only very low concentrations likely would infiltrate into groundwater supplies. Therefore, impacts associated with groundwater contamination from small leaks and spills during operation likely would be temporary and negligible to minor. The potential impacts on groundwater resources from a crude oil release are discussed in Chapter 10.

System Alternative SA-04

Construction Impacts

Construction for system alternative SA-04 would result in impacts of the same type, magnitude, and duration as discussed above for the Applicant's proposed project. If SA-04 is constructed, it was assumed that the Applicant would implement the same Applicant-proposed measures identified for the Applicant's proposed project (Appendix E) and would implement all necessary requirements mandated by North Dakota, Minnesota, Iowa, and Illinois permits to reduce impacts on groundwater resources for the route.

Changes in Groundwater Availability from Withdrawals

With adherence to Water Appropriation Permit conditions and implementation of Applicant-proposed BMPs (Appendix E), temporary and minor alterations in groundwater quantity would occur from water withdrawn from groundwater wells during construction. The correct use of trench breakers during construction would result in temporary and minor impacts on groundwater migration (i.e., the French drain effect).

Increases in Total Suspended Solid Concentrations in Groundwater

Increases in TSS concentrations and sedimentation could occur in areas of construction with shallow aquifers. However, the relatively slow groundwater flow rate and fine-grained nature of glacial sediments likely would filter out TSS from infiltrating groundwater. With implementation of the Applicant-proposed measures discussed above for the Applicant's proposed project, increases in TSS concentrations during construction of system alternative SA-04 would be temporary and minor.

Degradation of Shallow Groundwater Quality from Blasting, Spills, or Contamination

The quality of shallow groundwater may be degraded from blasting; small spills and leaks of lubricants, oil, or other hazardous chemicals used during construction; or disturbance of existing contamination. The need for blasting along SA-04 is not known but may be required in areas where bedrock is at or near the land surface. Except for within karst topography that occurs along 70 miles of the SA-04 alternative, if the water table is exposed by blasting this could result turbidity, sedimentation, or chemical contamination, but impacts would be localized and likely diluted or attenuated before it could travel very far into the aquifer. For all blasting, the Applicant would develop a site-specific Blasting Plan, which would include measures to protect groundwater resources.

Temporary and minor impacts on groundwater quality could occur from small leaks and spills, as discussed above for the Applicant's proposed project. If any contaminated soils or groundwater are encountered during construction they would be handled and disposed of in accordance with applicable regulations; the Environmental Protection Plan; and a Contaminated Soils Management Plan, which the Applicant would develop prior to construction. The plan would describe site assessment and response actions that would be implemented to manage contaminated soils and groundwater (Enbridge 2016a).

With implementation of the Applicant-proposed measures and adherence to the Contaminated Soils Management Plan discussed for the Applicant's proposed project, impacts on groundwater quality from small leaks and spills, blasting activities, and existing contamination would be temporary and minor.

Degradation of Groundwater Quality in Potable Supply Wells, Sole Source Aquifers, or Other Designated Groundwater Protection Areas

Construction activities, including groundwater withdrawals, minor spills of industrial chemicals and hazardous materials, and drilling mud releases during HDD installation, could affect domestic and PWS

wells and wellhead protection area groundwater quality. With implementation of the Applicant-proposed measures described for the Applicant's proposed project, construction impacts on groundwater in these sensitive areas would be temporary and minor.

System alternative SA-04 would not cross any aquifers designated by EPA as sole source aquifers. Therefore, there would be no construction impacts on any sole source aquifer.

Degradation of Water Quality from Drilling Mud Releases during HDD Crossings

The number of HDDs to be constructed along SA-04 is not known at this time. Loss of drilling fluid into loose unstable zones of soil could temporarily restrict water movement in shallow aquifers. A loss of drilling fluid in areas prone to karst formation, of which SA-04 crosses over 2,000 acres in Minnesota, could affect local karst aquifers. Construction through karst areas would require a site-specific plan, which would include preconstruction assessment and surveys, construction monitoring, and karst mitigation and conservation procedures. A large subsurface drilling fluid escape that does not reach the surface may fill subsurface voids and potentially cause the upward displacement of water and materials, creating a doming effect until the water in the dome reaches equilibrium with the surrounding hydrology. Long-term major impacts on surface water quality could result if a frac-out occurred and went undetected or was not quickly contained. These impacts would be temporary and minor with implementation of Applicant-proposed measures for drilling mud releases during HDD construction (Appendix E).

Operations Impacts

Changes in Groundwater Availability

Ongoing French drain effects could occur during pipeline operations in areas of groundwater upwelling. With proper installation of trench breakers and soil compaction during backfilling during construction, as described for the Applicant's proposed project, impacts on groundwater availability during pipeline operations would be temporary and negligible.

Normal operation of SA-04 would not require withdrawal or discharge of water. During maintenance and repair activities over the duration of the pipeline's operation, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control are not defined. As described for pipeline construction, the Applicant would be required to obtain water appropriation permits for testing procedures, and the volume of water would be substantially less than for construction. With adherence to permit conditions and implementation of Applicant-proposed measures, impacts on groundwater from withdrawals would be temporary and negligible.

Degradation of Groundwater Quality

Small fuel and lubricant leaks and spills could occur from maintenance and inspection vehicles. Any refueling, fuel storage, or vehicle maintenance would follow the Applicant-proposed measures set forth in the Environmental Protection Plan (Appendix E). Further, the volume of such spills and leaks would be small and would largely remain on the land surface, and only very low concentrations likely would infiltrate into groundwater supplies. Therefore, any groundwater contamination from small leaks and spills during operation would be temporary and negligible to minor. Potential impacts on groundwater resources from a crude oil release are discussed in Chapter 10.

Transportation by Rail

Construction Impacts

Transportation of crude oil by rail would require construction of temporary storage and offloading facilities, and upgrade or replacement of existing rail lines. The exact locations and footprints for these facilities have not been identified. In general, clearing and grading would be required for these activities, which would not affect groundwater.

Changes in Groundwater Availability from Withdrawals

Water likely would be used for common construction purposes, such as dust control, but it would not be needed for hydrostatic testing. Therefore, impacts on groundwater availability from well withdrawals likely would not occur.

Increases in Total Suspended Solid Concentrations in Groundwater

The rail alternative does not appear to require trenching and excavation activities; therefore, no impacts on TSS concentrations in groundwater are expected to occur.

Degradation of Shallow Groundwater Quality from Blasting, Spills, or Contamination

Degradation of groundwater quality could occur from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals that could infiltrate into surficial aquifers during construction activities. These spills would be managed according to SPCC plans that would be developed for each facility.

Because potential rail lines already exist, construction would occur only at localized facility sites, not along the entire rail routes. With implementation of measures similar to those described above for the Applicant's proposed project and adherence to SPCC and Contaminated Soils Management plans, impacts on groundwater quality from small leaks and spills, blasting activities, and existing contamination likely would be temporary and minor.

Degradation of Groundwater Quality in Potable Supply Wells, Sole Source Aquifers, or Other Designated Groundwater Protection Areas

Minor spills of industrial chemicals and hazardous materials during construction could affect groundwater quality in domestic and PWS wells and wellhead protection areas. Because potential rail lines already exist, construction would occur only at localized facility sites, not along the entire rail routes. Small spills would be managed according to SPCC plans that would be developed for each facility. Therefore, construction impacts on groundwater quality in wells and wellhead protection areas would be temporary and negligible.

The rail alternative would not cross any aquifers designated by EPA as sole source aquifers. Therefore, there would be no construction impacts on any sole source aquifer.

Degradation of Water Quality from Drilling Mud Releases during HDD Crossings

The rail alternative does not appear to require construction through waterbodies; therefore, no impacts on water quality from HDD crossings are expected to occur.

Operations Impacts

Changes in Groundwater Availability

Transportation by rail operations would not require groundwater appropriation: therefore, no impacts on groundwater availability are expected to occur.

Degradation of Groundwater Quality

Impacts of rail transportation on groundwater quality could result from brakepad consumption, locomotive lubrication, and small cargo (i.e., crude oil) and fuel (i.e., diesel) drips and leaks that could infiltrate into surficial aquifers. The volume of such drips and leaks would be small and would largely remain on the rail bed, and only very low concentrations likely would infiltrate into groundwater supplies. These are existing impacts from trains currently transporting crude oil along existing rail lines. Impacts on groundwater quality would be temporary and negligible. Potential impacts of a crude oil release on groundwater resources are discussed in Chapter 10.

Transportation by Truck

Construction Impacts

Transportation of crude oil by truck would require construction of offloading facilities and new road access. The exact locations and footprints for storage and offloading facilities and new roads have not been identified. In general, clearing and grading would be required for these activities, which would not affect groundwater.

Changes in Groundwater Availability from Withdrawals

Water likely would be used for common construction purposes, such as dust control, but would not be needed for hydrostatic testing. Therefore, no impacts on groundwater availability from well withdrawals are expected to occur.

Increases in Total Suspended Solid Concentrations in Groundwater

The truck alternative does not appear to require trenching and excavation activities; therefore, no impacts on TSS concentrations in groundwater are expected to occur.

Degradation of Shallow Groundwater Quality from Blasting, Spills, or Contamination

Degradation of groundwater quality could occur from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals that could infiltrate into surficial aquifers during construction activities. These spills would be managed according to SPCC plans that would be developed for each facility.

Because potential roadways already exist, construction would occur only at localized facility sites, not along the entire truck routes. With implementation of Applicant-proposed measures and adherence to the SPCC and Contaminated Soils Management plans described for the Applicant's proposed project, impacts on groundwater quality from small leaks and spills, blasting activities, and existing contamination would be temporary and minor.

Degradation of Groundwater Quality in Potable Supply Wells, Sole Source Aquifers, or Other Designated Groundwater Protection Areas

Minor spills of industrial chemicals and hazardous materials during construction activities could affect groundwater quality in domestic and PWS wells and wellhead protection areas. Because potential

roadways already exist, construction would occur only at localized facility sites, not along the entire truck routes. Small spills would be managed according to SPCC plans that would be developed for each facility. Therefore, construction impacts on groundwater quality would be temporary and negligible.

The truck alternative would not cross any aquifers designated by EPA as sole source aquifers. Therefore, there would be no construction impacts on any sole source aquifer.

Degradation of Water Quality from Drilling Mud Releases during HDD Crossings

The truck alternative does not appear to require construction through waterbodies; therefore, no impacts on water quality from HDD crossings are expected to occur.

Operations Impacts

Changes in Groundwater Availability

The truck alternative would not require groundwater appropriation: therefore, no impacts on groundwater availability are expected to occur.

Changes in Groundwater Quality

Impacts of additional truck traffic on groundwater quality could result from small cargo (i.e., crude oil) and fuel (i.e., diesel) drips and leaks that could infiltrate into surficial aquifers. These are existing impacts from trucks currently transporting crude oil along highways. The volume of such drips and leaks would be small and would largely remain on the road surface, and only very low concentrations likely would infiltrate into groundwater supplies. Impacts on groundwater quality would be temporary and negligible. Potential impacts of a crude oil release on groundwater resources are discussed in Chapter 10.

Existing Line 3 Supplemented By Rail

Construction Impacts

There would be no construction impacts from the continued use of the existing Line 3 because it is already built.

Impacts on groundwater during construction of the temporary storage and offloading facilities and upgrade or replacement of rail lines would be the same as those described above for the rail alternative, including potential degradation of groundwater quality from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals that could infiltrate into surficial aquifers during construction activities. Impacts on groundwater during construction would be temporary and negligible to minor with implementation of appropriate BMPs and adherence to permit requirements.

Operations Impacts

Operations impacts on groundwater during integrity digs and subsequent excavation and repair work for continued use of the existing Line 3 would be the same as those described above for the existing Line 3 alternative, including temporary and negligible impacts from hydrostatic test water withdrawal and discharge, and temporary and negligible or minor impacts on groundwater contamination from minor leaks and spills during operation. Impacts of excavation activities from integrity digs associated with continued use of the existing Line 3 would be comparable to impacts described for construction of new pipeline. These impacts are expected to be temporary and minor.

Impacts of rail transportation on groundwater resources could result from brakepad consumption, locomotive lubrication, and small cargo (i.e., crude oil) and fuel (i.e., diesel) drips and leaks, although these are existing conditions for crude oil trains traveling on existing rail lines. The associated impacts on groundwater quality likely would be temporary and negligible to minor. Groundwater impacts for the existing Line 3 supplemented by train alternative would be less than for the rail alternative as fewer trains would be used to transport crude oil under this alternative.

Existing Line 3 Supplemented By Truck

Construction Impacts

There would be no construction impacts from continued use of the existing Line 3 because it is already built.

Impacts on groundwater during construction of the truck storage and offloading facilities and new road access would be the same as those described above for the truck alternative, including degradation of groundwater quality from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals that could infiltrate into surficial aquifers during construction activities. The impacts on groundwater during construction would be temporary and negligible to minor with implementation of appropriate BMPs and adherence to permit requirements.

Operations Impacts

Operations impacts on groundwater during integrity digs and subsequent excavation and repair work for continued use of the existing Line 3 would be the same as those described above for the existing Line 3 alternative, including temporary and negligible impacts from hydrostatic test water withdrawal and discharge, and temporary and negligible or minor impacts on groundwater contamination from minor leaks and spills during operation. Impacts of excavation activities for integrity digs associated with continued use of the existing Line 3 would be comparable to the impacts of new pipeline construction. These impacts are expected to be temporary and negligible to minor.

Impacts of truck transportation on groundwater resources could result from small cargo (i.e., crude oil) and fuel (i.e., diesel) drips and leaks, although these are existing conditions for trucks traveling on existing roads, and associated impacts on groundwater quality likely would be temporary and negligible to minor. Impacts on groundwater from trucks for the existing Line 3 supplemented by truck alternative would be less than under the truck alternative as fewer trucks would be used to transport crude oil.

5.2.1.1.4 Summary and Mitigation

Summary

Overall, based on industry-standard construction techniques and compliance with regulatory guidelines, impacts on groundwater for the Applicant's proposed project and the CN Alternatives would be temporary and negligible to minor, or no impact would occur. Potential construction impacts due to karst aquifers' sensitivity would be the highest for SA-04. Potential construction and operation impacts due to vulnerable groundwater would be the somewhat higher for the Applicant's proposed project due to the susceptibility of contamination to groundwater. Table 5.2.1.1-4 provides a summary and comparison of potential construction and operations impacts for the Applicant's proposed project and CN Alternatives. These impacts are listed below.

Construction Impacts

- Potential impacts on groundwater availability from groundwater withdrawals, hydrostatic testing, trench dewatering, and other construction activities, as a result of the Applicant's proposed project and SA-04, would be temporary and minor.
- Impacts on groundwater quality from construction-related increases in TSS for the Applicant's proposed project and SA-04 would be temporary and minor, wherever trenching, excavation, and backfilling occurred.
- The potential for degradation of water quality in shallow groundwater aquifers from blasting is known for only one location along the Applicant's proposed project, and impacts are expected to temporary and minor. It is not known whether blasting would be necessary for SA-04; and it is unlikely that it would be necessary for the rail, truck, and combination alternatives.
- Impacts from small spills of chemicals and fuels and lubricants are expected to be temporary and negligible to minor for the Applicant's proposed project and all of the CN Alternatives.
- Degradation of groundwater quality from drilling mud releases during HDD crossings for the Applicant's proposed project and SA-04 is expected to be temporary and minor with adherence to Applicant-proposed detection, response, and clean-up measures. Impacts could be long term and major if an inadvertent release of drilling mud went undetected.

Operations Impacts

- Operational impacts of the Applicant's proposed project and CN Alternatives on groundwater quality from small fuel, lubricant, and hazardous material leaks and drips would be temporary and negligible to minor because the volume of such drips and leaks would be relatively small, likely would remain on the land surface, and only very low concentrations would likely infiltrate into groundwater supplies.
- Operational impacts on groundwater from continued use of the existing Line 3 would primarily be associated with ongoing integrity digs. As no specific locations for integrity digs have been identified, there is no specific information on the exact extent to which the integrity digs may occur proximal to sensitive groundwater resources. However, it is expected that continued use would entail the same types of activities and impacts associated with new pipeline construction (e.g., trenching, hydrostatic testing, and potential for minor leaks). As a result, impacts on groundwater would be expected to be temporary and minor when they would occur at an integrity dig, but would occur over the life of the pipeline.
- The potential impacts on groundwater resources from a crude oil release are discussed in Chapter 10.

Table 5.2.1.1-4. Summary of Potential Impacts on Groundwater for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Rail Alternative	Truck Alternative	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Construction Impacts							
Changes in groundwater availability from withdrawals	Temporary/minor impacts	No impact	Temporary/minor impacts	No impact	No impact	No impact	No impact
Increases in TSS concentrations	Temporary/minor impacts	No impact	Temporary/minor impacts	No impact	No impact	No impact	No impact
Degradation of shallow groundwater quality from blasting, spills, or contamination	Temporary/minor impacts • 25,765 acres of high vulnerability water table aquifers (in MN) • 26,382 acres of high groundwater contamination susceptibility (in MN) • 16,299 acres of high pollution sensitivity (in MN) • 19 EPA-listed contaminated sites (13 in MN; 6 in WI) • 104 WIMN sites (in MN)	No impact • 69,614 acres of high vulnerability water table aquifers (in MN) • 19,833 acres of high groundwater contamination susceptibility (in MN) • 16,179 acres of high pollution sensitivity (in MN) • 107 EPA-listed contaminated sites (101 in MN; 6 in WI) • 159 WIMN sites (in MN) • No karst topography	Temporary/minor impacts • 30,201 acres of high water table vulnerability aquifers (5,687 in MN; 12,280 in IA; 12,233 in IL) • 4,674 acres of high groundwater contamination susceptibility (in MN) • 1,493 acres of high pollution sensitivity (in MN) • 212 EPA-listed contaminated sites (55 in IA; 79 in IL; 34 in MN; 44 in ND)	Temporary/minor impacts • 78,190 acres of high water table vulnerability aquifers (in MN) • 41,707 acres of high groundwater contamination susceptibility (in MN) • 43,189 acres of high pollution sensitivity (in MN) • 2,251 EPA-listed contaminated sites (2,215 in MN; 36 in WI; 0 in ND)	Temporary/minor impacts • 40,573 acres of high water table vulnerability aquifers (in MN) • 21,412 acres of high groundwater contamination susceptibility (in MN) • 16,699 acres of high pollution sensitivity (in MN) • 1,318 EPA-listed contaminated sites (1,023 in MN; 270 in ND; 25 in WI)	Temporary/minor impacts	Temporary/ minor impacts

Table 5.2.1.1-4. Summary of Potential Impacts on Groundwater for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Rail Alternative	Truck Alternative	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
	• No karst topography • 1700 acres of high and very high bedrock sensitivity	• 1700 acres of very high to high sensitivity Precambrian shallow fractured bedrock aquifers	• 83 WIMN sites (in MN) • 2,053 acres of karst topography in MN • Known or potential karst topography along 11 miles in MN; 63 miles in IA; 5 miles in IL	• 2,108 WIMN site (in MN) • No karst topography	• 2,108 WIMN sites (in MN) • No karst topography		
Degradation of groundwater quality in potable supply wells, sole source aquifers, or other designated groundwater protection areas	Temporary/minor impacts • 87 acres of wellhead protection areas (all in MN, 0 in ND) • 304 domestic wells (303 in MN; 1 in ND) • 6 public wells (in MN) • 0 sole source aquifers • 538 acres of DWSMAs (in MN)	No impact • 624 acres of wellhead protection areas (all in MN; 0 in ND) • 589 domestic wells (588 in MN; 1 in ND) • 48 public wells (all in MN) • 0 sole source aquifers • 1,120 acres of DWSMAs (in MN)	Temporary/minor impacts • 1,203 acres of wellhead protection areas (538 in ND; 138 in MN; 36 in IA; 491 in IL) • 628 domestic wells (17 in ND; 170 in MN; 46 permitted and 190 private in IA; and 205 in IL) • 15 public wells (1 in ND; 9 in MN; 4 in IA; and 1 in IL)	Temporary/ negligible impacts • 3,059 acres of wellhead protection areas (all in MN; 0 in ND) • 584 domestic wells (all in MN; 0 in ND) • 0 public wells • 0 sole source aquifers • 3,678 acres of DWSMAs (in MN)	Temporary/ negligible impacts • 2,197 acres of wellhead protection areas (1,303 in MN; 894 in ND) • 301 domestic wells (all in MN; 0 in ND) • 0 public wells • 0 sole source aquifers • 1,567 acres of DWSMAs (in MN)	Temporary/ negligible impacts	Temporary/ negligible impacts

Table 5.2.1.1-4. Summary of Potential Impacts on Groundwater for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Rail Alternative	Truck Alternative	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
			• 0 sole source aquifers • 224 acres of DWSMAs (in MN)				
Degradation of water quality from release of drilling mud during HDD crossings	Temporary/minor impacts (*if quickly contained*) to long-term/major impacts (*if undetected or uncontained*)	No impact	Temporary/minor impacts (*if quickly contained*) to long-term/major impacts (*if undetected or uncontained*)	No impact	No impact	No impact	No impact
Operations Impacts							
Changes in groundwater availability	Temporary/ negligible impacts	Temporary/ negligible impacts	Temporary/ negligible impacts	No impact	No impact	Temporary/ negligible impacts	Temporary/ negligible impacts
Changes in groundwater quality	Temporary/ negligible to minor impacts	Temporary/ negligible to minor impacts	Temporary/ negligible to minor impacts	Temporary/ negligible impacts	Temporary/ negligible impacts	Temporary/ negligible to minor impacts	Temporary/ negligible to minor impacts

WIMN = "What's in My Neighborhood?" [database]

Mitigation

Beyond the Applicant-proposed measures described for the Applicant's proposed project listed in Chapter 2, Section 2.7, potential mitigation measures to minimize impacts on groundwater could include:

- If the owner of a potable supply well believed that the quality or yield of their water was negatively affected as a result of a pipeline construction-related activity, the Applicant could engage a third party to determine the nature and severity of the impact. If it was determined that impacts were related to construction, the Applicant could provide an alternate source of water to the well owner until the well water returned to preconstruction conditions. If the well water did not return to preconstruction conditions within a reasonable time period, the Applicant could compensate the landowner for the installation of a new well or otherwise arrange for provision of a suitable water supply.
- To prevent the loss of drilling fluid from the borehole during HDD installation, the properties of drilling fluid may be augmented to aid in stabilizing the soils and in maintaining drilling fluid returns to the entry and exit pits. If circulation is lost, lost circulation materials can be used to seal around the borehole and prevent drilling fluid from escaping into the formation, and allow for reestablishment of drilling fluid returns to the entry and exit pits. Many types of lost circulation materials that are inert and environmentally benign are available for use during HDD installation. These can include wood fibers, cotton seed husks, ground walnut shells, and other natural materials. Special polymers that swell to several times their original size when introduced to water also can be used. These polymers are industrial-grade equivalents of food-grade polymers that are used to swell and absorb fluids in the food industry.

The potential impacts on groundwater resources from a crude oil release are discussed in Chapter 10.

5.2.1.1.5 References

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5.2.1.2 Surface Water

Surface water in the vicinity of the Applicant's proposed project and CN Alternatives consists of streams, rivers, lakes, wild rice waterbodies, and wetlands. Streams, rivers, lakes, and wild rice waterbodies are discussed in this section; wetlands are discussed in Section 5.2.1.3. This section assesses the potential for construction and operation of the proposed Project to affect surface water resources. Surface water impacts that could occur during construction and operation are evaluated and compared for the Applicant's proposed project and the CN Alternatives. The impact analysis focuses on potential impacts on surface waters associated with the following concerns:

- Runoff and flows – increases in stormwater runoff and erosion, increases in TSS concentrations and increased sedimentation, changes in stream flows from water withdrawals and discharges, and disruption of flow paths or local hydrologic connectivity;
- Surface water and aquatic habitat quality – degradation of surface water quality, degradation of aquatic habitat from instream and other construction activities, degradation of water quality and habitat from releases of drilling mud during HDD crossings;
- Channel morphology and stability – changes in channel morphology and stability caused by channel and streambank modifications; and
- Disturbance of wild rice waterbodies.

This section first describes the regulations relevant to assessing surface water impacts, the methods used to conduct the impact assessment, and the existing surface water conditions within the defined ROIs for the Applicant's proposed project and CN Alternatives. The potential impacts of construction and operation of the Applicant's proposed project and CN Alternatives on surface waters are considered next. A summary and comparison of the impacts for the Applicant's proposed project and CN Alternatives are presented at the end of the section along with potential mitigation measures that could be used to minimize impacts.

Surface water quality impacts that affect fish and wildlife and their habitats, including fisheries, Aquatic Management Areas (AMAs), waterbodies assigned an Index of Biotic Integrity, Lakes of Biological Significance (LBS), designated wildlife lakes, trout streams, and invasive species, are discussed in Section 5.2.4. This section and Section 5.2.4 should be considered together to provide an overall picture of the potential impacts of the Project on surface water.

Potential impacts on surface water due to unanticipated crude oil releases are discussed in Chapter 10.

5.2.1.2.1 Regulatory Context and Methodology

Regulatory Context

Federal, state, and local agencies have oversight and permitting authority for activities that may affect surface water use, flow, current, or quality. These permits include required actions and BMPs that would reduce potential impacts on surface water resources. EPA delegates authority to the states to regulate water quality and implement permitting (including the NPDES program) required by the Clean Water Act (CWA). The Applicant would be required to obtain NPDES permits from the North Dakota Department of Health's (North Dakota DH's) Division of Water Quality, Minnesota PCA, Iowa DNR, Wisconsin DNR, and Illinois EPA prior to construction in each respective state. Permits for withdrawal and use of water from surface water or groundwater sources also would be required from the North Dakota State Water

Commission, Minnesota DNR, Iowa DNR, Wisconsin DNR, and Illinois DNR. Any pipeline crossings of public water within Minnesota would require a license to cross from the Minnesota DNR.

Federal water permitting compliance associated with the sections 404 and 10 of the CWA would be required from the U.S. Army Corps of Engineers (USACE). State and federal rules as they pertain to surface water resources that could be affected by the Project are described below.

State-Designated/Sensitive Surface Waters

Each state designates certain surface waters as sensitive based on the beneficial use and water quality of the waterbody in order to maintain and protect the present and future beneficial uses of the designated waters. Each state designates the beneficial uses of its waters independently and with slight variations, including state-specific criteria such as whether the waterbody supports warmwater or coldwater aquatic life; is suitable for human contact and recreation; is suitable for drinking or for agricultural or industrial purposes; and is a lake, reservoir, or wetland. Each state also sets water quality standards (allowable concentrations of nutrients and pollutants) for each waterbody to protect the beneficial use(s). In Minnesota, some surface waters bodies are designated as outstanding resource value waters (ORVWs) when that waterbody has either wilderness, scientific, educational, ecological, recreational, cultural, or aesthetic resource characteristics, or other special qualities, that warrant stringent protection from degradation. Stringent water quality standards and fishing restrictions are implemented in Minnesota streams and lakes that have been designated as trout streams in order to maintain and propagate healthy communities of trout.[6] In Minnesota, surface waters used as a drinking water source are regulated by the Minnesota Department of Health.

Nationwide Rivers Inventory

Rivers or segments of rivers listed on the National Park Service's (NPS's) Nationwide Rivers Inventory (NRI) are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance (NPS 2011). All federal agencies must seek to avoid or mitigate actions that would adversely affect (e.g., decrease water quality or alter the free-flowing nature of the river) any NRI-listed river segments. Some NRI-listed rivers also are designated as Wild and Scenic Rivers, which are rivers or river segments with outstanding natural, cultural, and recreational values that are to be voluntarily protected in a free-flowing condition for the characteristics for which they were first designated.

Impaired Surface Waters

Section 303(d) of the CWA requires that states review, establish, and revise water quality standards for all surface waters within the state. Every 2 years, each state, territory, and authorized tribe must submit to the EPA a list of surface waters that do not meet EPA-approved water quality standards. These waters are considered impaired and do not meet their designated beneficial use from such causes as elevated contaminant levels, low dissolved oxygen, turbidity, high temperature, or bacterial contamination. The law also requires that the states establish priority rankings for waters on the Section 303(d) lists and develop total maximum daily loads (TMDLs) for these waters. North Dakota DH, Minnesota PCA, Iowa DNR, and Illinois EPA implement federal water quality regulations and identify and manage the list of impaired surface waters in their respective states. These agencies seek to avoid further impairment to these waterbodies by setting water quality standards and TMDLs (which are included in permit

[6] Minn. R. 7050.0222 and 6264.0050

conditions and not to be exceeded by construction and operations activities), conducting water quality assessments, and developing plans to restore waterbodies to meet their designated use(s).

Navigable Waterways

USACE has jurisdiction over navigable waterways in accordance with Section 10 of the Rivers and Harbors Act of 1899. Navigable waters of the United States include those that are subject to the ebb and flow of the tide or are presently used, have been used in the past, may be susceptible for use to transport interstate or foreign commerce, or have a defined streambed and streambanks and an ordinary high water mark. Surface water crossings of navigable waters would require authorization from USACE under the CWA Section 404 and Rivers and Harbors Act Section 10. Issuance of a CWA Section 401 Individual Water Quality Certification for the Project in Minnesota falls under the jurisdiction of Minnesota PCA. CWA Section 401 certification in Wisconsin is issued by Wisconsin DNR, and in North Dakota by North Dakota DH's Division of Water Quality. Permitting for system alternative SA-04 would require obtaining a CWA Section 401 certifications from both Iowa DNR and Illinois DNR.

Wild Rice Waterbodies

Wild rice waterbodies are shallow bodies of water where rice, a persistent annual grass, reproduces each year from seed stock deposited in previous fall seasons. Wild rice beds are very attractive to migrating waterfowl, and many rice areas are traditional waterfowl staging and hunting areas. Because they are an important component of Minnesota's agricultural economy, wild rice waterbodies are specifically protected from destruction and disturbance. Wild rice is grown in Minnesota and Wisconsin but does not occur in North Dakota, Iowa, or Illinois. Various tribal, federal, state, and local laws and regulations are designed to manage and protect wild rice. These are associated with formal recognition of the significance of natural wild rice and its protection, management, and harvest. The Wisconsin DNR and Chippewa Tribes work together to determine the season, number of permits, and prescribed method in which Wisconsin residents are allowed to harvest wild rice. No other formal wild rice protection regulations, beyond federal and state wetland and waterbody permitting, exist in Wisconsin.

In Minnesota, wild rice and other aquatic vegetation growing in public waters is owned by the state, and a person may not acquire a property interest in or destroy wild rice except as allowed by law. Outside of tribal jurisdictions, Minnesota statutes and agency rules regulate the harvest of natural wild rice, including methods and timing of harvest. The Minnesota DNR Aquatic Plant Management Program prohibits removal of wild rice without an approved permit. Wild rice also is protected through shoreland protection laws and regulations, which are based on a system of classification for lakes and rivers that applies different zoning regulations depending on their classification. Minnesota PCA is proposing amendments to Minnesota Administrative Rules, Chapters 7001, 7050, 7052, and 7053. These amendments would refine how a wild rice waterbody is defined as well as acceptable sulfate levels for wild rice waterbodies (Minnesota PCA 2016a).

Tribal regulations related to the harvest and protection of wild rice within reservation boundaries vary from tribe to tribe and are managed by tribe-specific wild rice committees. In addition to tribal regulations, treaties (e.g., 1854 Treaty Authority) and other agreements with the U.S. government have reserved off-reservation harvesting rights for some tribes.

Methodology

Potential impacts on surface water were assessed from construction and operation of the Applicant's proposed project and CN Alternatives. Impacts on surface waters from pipeline construction would be

largely due to waterbody crossing procedures and ground disturbing activities near waterbodies. Potential impacts from normal pipeline operation typically are localized and would likely be associated with maintenance activities. Therefore, the ROI for the assessment of construction impacts on surface waters includes the construction work area for each surface water crossed by the Applicant's proposed project in Minnesota (typically 120 feet wide) as well as the area immediately downstream from the crossing for flowing surface waters, and in the immediate vicinity for crossings of non-flowing surface waters such as lakes and wild rice waterbodies. Similarly, the ROI for construction impacts for SA-04 is based on a 120-foot-wide construction work area and the areas immediately downstream of flowing surface waters and in the immediate vicinity of non-flowing surface waters. The assessment of operations impacts is based on the location of the 50-foot-wide permanent pipeline right-of-way centered on the pipeline for the Applicant's proposed project and SA-04, as well as areas immediately downstream of flowing surface waters and in the immediate vicinity of non-flowing surface waters. Operations impacts for continued use of the existing Line 3 were evaluated based on the location of the existing permanent right-of-way for that pipeline and assuming that the integrity digs typically would be limited to the permanent right-of-way. The integrity repairs would consist of pipe repair or replacement, and the impacts address the potential for these actions to occur in or near-surface waters.

Potential impacts on surface waters from construction and operation of the rail and truck alternatives were evaluated based on the locations of surface waters at or near the routes described in Chapter 4 and on general information provided by the Applicant about the potential locations of offloading facilities. The waterbodies crossed by the potential rail and truck routes already exist and would only require construction for those crossings that need repair or upgrades to accommodate additional truck or rail traffic. Therefore, a more qualitative assessment of existing conditions and impacts was performed for these routes than for the Applicant's proposed project and system alternative SA-04.

- Watersheds and surface waters within the ROIs for the Applicant's proposed project and CN Alternatives were identified using GIS datasets and layers in the following data sources:
- USGS National Hydrography Dataset,
- USACE Section 10 navigable waterways,
- NPS's NRI national datasets,
- Minnesota DNR's Public Waters Inventory,
- Minnesota-designated trout streams,
- Minnesota DNR-identified wild rice waterbodies, and
- Section 303(d)-listed impaired surface waters in each state.

Acreages of wild rice waterbodies that could be affected were estimated using maps of the Minnesota DNR-identified wild rice waterbodies and rivers database (Minnesota DNR 2009), classified according to U.S. Fish and Wildlife Service (USFWS) Circular No. 39 (EPA 2002). These maps were overlaid with the construction work area and permanent right-of-way for the Applicant's proposed project, and the 120-foot-wide construction work area for SA-04. Wild rice waterbodies may occur that were not identified within the DNR database.

Potential impacts on surface waters were evaluated by:

- Identifying the existing conditions of surface waters that would be crossed, such as water quality and impairment, fishery resources (i.e., trout streams), beneficial use designations, state and federal classifications, and watershed water quality.
- Comparing the Applicant's proposed construction methods described in Chapter 2 and the special wetland construction methods described in the Applicant's November 2016 EAW and associated construction BMP plans (Enbridge 2016a) to peer-reviewed literature and agency documents, including permit requirements and guidance manuals, related to the proposed pipeline construction methods.
- Considering the potential for construction and operation of the Applicant's proposed project and CN Alternatives to affect the identified surface waters. The specific environmental concerns addressed in the impact analysis are listed in the introduction to Section 5.2.1.2.4.
- A separate analysis was prepared to evaluate potential impacts on high-quality surface waters. This was also a GIS analysis, but it was conducted using datasets that can help distinguish between the quality of surface waters that may be affected by the proposed Project and CN Alternatives.

Broader regional indicators of surface water quality were also reviewed to identify regional differences in existing conditions and extent of impacts. Due to unavailability of data from other states, this analysis was limited to Minnesota. These broad regional issues in Minnesota were evaluated by buffering GIS shapefiles the Applicant's proposed project and CN Alternatives by 0.5 mile and identifying intersections of features indicative of surface water quality, including trout streams, wild rice lakes, LBS (high and outstanding) and Tullibee (cisco) Lakes. Intersections of same stream over 1 mile apart were counted as separate intersections.

5.2.1.2.2 Existing Conditions

This section identifies surface waters that could be affected by construction and operation of the Applicant's proposed project and CN Alternatives. These include surface waters with beneficial use designations, state-designated/sensitive surface waters, NRI-listed rivers, impaired surface waters, wild rice waterbodies, and public waters in Minnesota. Information is presented on water quality, designated uses, and state and federal classifications.

Public waters have been defined in Minnesota Law since 1897. The waters included in the definition have evolved and been refined over the years. Significant clarification was given to which waters were included as public waters in the Public Waters Inventory process conducted in the late 1970s through the early 1980s. Public waters are protected from destruction and degradation because of their value to the people of Minnesota for water supplies; groundwater recharge potential; retention of water to prevent and minimize downstream flooding and property damage; entrapment of nutrients and sediment; recreational activities such as boating, swimming, fishing and hunting, and navigation; and wildlife habitat areas for spawning, rearing, feeding, and nesting of wildlife.

Applicant's Proposed Project

<u>Drainage Basins and Watersheds</u>

A "drainage basin" is an area of land where all surface water from rain and snowmelt converges to a single point at a lower elevation, such as a river, lake, reservoir, or wetland. Drainage basins are made up of smaller watershed units. Table 5.2.1.2-1 provides the number of acres of each watershed that

would be crossed by the construction work area and permanent right-of-way for the Applicant's proposed project.

The Red River of the North Basin encompasses a 39,270-square-mile surface drainage area to the mainstem of the Red River of the North within the United States. The basin stretches from northeastern South Dakota and west-central Minnesota northward through eastern North Dakota and northwestern Minnesota into southern Manitoba. It ends where the Red River empties into the southern end of Lake Winnipeg. The Minnesota portion of the Red River Basin covers approximately 37,100 square miles in northwestern Minnesota in all or part of 21 counties. It contains approximately 17,840 miles of streams and 668,100 acres of lakes. Land use in the Red River Basin consists of 74 percent agricultural land, 12 percent forest, 4 percent water/wetlands, 3 percent urban, and 7 percent other (Minnesota PCA and Red River Watershed Management Board 2006).

Table 5.2.1.2-1. Major Drainage Basins and Watersheds Crossed by the Applicant's Proposed Project

Drainage Basin	State(s)	Watershed	HUC-8	Watershed Water Quality Score[a]	Applicant's Proposed Project	
					Construction[b] (acres)	Operation[c] (acres)
Red River of the North	ND, MN	Tamarac River	09020311	63	463.9	198.0
	ND, MN	Grand Marais Creek	09020306	58	39.0	17.1
	MN	Red Lake River	09020303	63	301.2	132.8
	MN	Clearwater River	09020305	70	719.4	323.9
	MN, ND	Wild Rice River	09020108	77	72.0	33.4
	MN	Snake River	09020309	66	242.2	105.7
Lake Superior	MN, WI	Nemadji River	04010301	80	161.3	72.0
	MN	St. Louis River	04010201	56	64.8	28.0
St. Croix River	MN	Kettle River	07030003	76	317.9	149.8
Upper Mississippi River (Mississippi Headwaters)	MN	Mississippi River – Headwaters	07010101	89	251.2	112.7
	MN	Crow Wing River	07010106	79	664.1	299.8
	MN	Pine River	07010105	95	551.9	244.2
	MN	Leech Lake River	07010102	89	7.6	3.2
	MN	Mississippi River – Grand Rapids	07010103	83	621.0	298.5
	MN	Mississippi River – Brainerd	07010104	76	77.9	38.1

Table 5.2.1.2-1. Major Drainage Basins and Watersheds Crossed by the Applicant's Proposed Project

Drainage Basin	State(s)	Watershed	HUC-8	Watershed Water Quality Score[a]	Applicant's Proposed Project	
					Construction[b] (acres)	Operation[c] (acres)

Source: USGS 2016, Minnesota DNR 2015.

[a] Minnesota Department of Natural Resources implements the Watershed Health Assessment Framework to calculate a watershed health index score that represents the overall health of the watershed based on parameters that are grouped into five main components: biology, connectivity, geomorphology, hydrology, and water quality. Water quality scores, shown in this table, are based on various indices such as temperature, dissolved oxygen, pH, nutrient load, turbidity/sedimentation, and contaminant concentrations. Index scores of 0 to 20 represent components that are heavily affected/low quality, scores of 40 to 60 represent moderately affected/moderate quality, and scores of 80 to 100 represent the least affected/high quality (scores of 20–40 and 60–80 are intermediate values).

[b] Watershed acres that would be crossed by the construction work area.

[c] Watershed acres that would be crossed by the permanent right-of-way during operations.

HUC-8 = 8-digit hydrologic unit code that delineates watershed boundaries, defined by the U.S. Geological Survey (2016)

The Lake Superior Basin encompasses 9,126 square miles in Minnesota and Wisconsin. The Minnesota part of the basin encompasses portions of Aitkin, Carlton, Cook, Itasca, Lake, Pine, and St. Louis counties, covering approximately 6,200 square miles. Streams within the basin flow to Lake Superior, which discharges into Lake Huron, and ultimately flows into the St. Lawrence Seaway via Lakes Erie and Ontario. Nearly one-fifth of the state's 15,000 lakes and over 150 trout streams are located in four of the seven counties that make up the basin in Minnesota. Forests cover approximately 84 percent of the basin (Minnesota PCA 2004).

The St. Croix River Basin covers approximately 7,760 square miles and extends from near Mille Lacs Lake in Minnesota on the west to near Cable, Wisconsin, on the east. Approximately 46 percent of the basin is located in Minnesota. The St. Croix River's headwaters are at St. Croix Lake near Solon Springs, Wisconsin, from where it flows west and south over 160 miles until it joins the Mississippi River at Prescott, Wisconsin. The upper 20 percent of the St. Croix River is entirely within Wisconsin, and the lower 80 percent (129 miles) of the river forms part of the boundary between Wisconsin and Minnesota.

The Upper Mississippi River Basin covers approximately 20,100 square miles in Minnesota. It stretches from the headwaters of the Mississippi River at Lake Itasca to Lock and Dam Number 2 near Hastings. From its start at Itasca State Park, the Mississippi River flows south 2,350 miles, to the Gulf of Mexico. The basin drains 15 of the 80 major watersheds in Minnesota and all or parts of 21 counties. It is the only basin in the State of Minnesota with its watersheds wholly in the state (Minnesota PCA 2000).

Surface Waters Crossed

Various surface waters would be crossed by the Applicant's proposed project, as shown in Table 5.2.1.2-2. The Applicant's proposed project also would cross numerous non-jurisdictional ditches/drains, for which flows are unknown. Crossing of non-jurisdictional ditches/drains would be permitted by local authorities within each county. Appendix G contains a complete list of surface waters that would be crossed by the Applicant's proposed project.

The Applicant's proposed project crosses a total of 56 public waters in Minnesota. These include 4 public water ditches, 14 artificial paths, 25 perennial streams/rivers and 13 intermittent streams/rivers.

Sensitive/Specially Designated Surface Waters

As described in Section 5.2.1.2.1, states designate certain surface waters based on beneficial uses and water quality. The Applicant's proposed project would require 46 crossings of designated surface waters (5 in North Dakota, 39 in Minnesota, and 2 in Wisconsin). It also would cross six trout streams, all of which are located in Minnesota. Appendix G provides the designated uses of the surface waters crossed by the Applicant's proposed project in each state.

Nationwide Rivers Inventory

The Applicant's proposed project would cross seven NRI-listed rivers in Minnesota, with two crossings of two rivers, for a total of nine NRI-listed river crossings (Table 5.2.1.2-3). These waterbody crossings also are shown in Appendix A.

Table 5.2.1.2-2. Surface Waters Crossed by the Applicant's Proposed Project

Waterbody Type/Flow	North Dakota	Minnesota (PWI)	Wisconsin	Total
Artificial path	2	15 (14)	0	17
Canal/ditch	4	49 (4)	0	53
Connector	0	4 (0)	0	4
Lake/pond – perennial	3	18 (0)	0	21
Stream/river – intermittent	9	72 (13)	5	86
Stream/river – perennial	6	34 (25)	5	45
Swamp/marsh	1	0 (0)	0	1
TOTAL	**25**	**192 (56)**	**10**	**227**

Source: USGS 2017.

Notes:

An artificial path is a feature that represents flow through a two-dimensional feature, such as a lake or a double-banked stream. An artificial path represents the flow of water into, through, and out of features (channel, estuary, lake/pond, playa, reservoir, swamp, marsh). A canal ditch specifies that it is artificial and that it is used to transport water, to drain or irrigate land, to connect two or more water bodies, or to serve as a waterway for watercraft. A connector establishes a known, but non-specific connection between two non-adjacent network segments that have flow.

Perennial waterbodies are those that hold water at all times, except in cases of extreme drought. Intermittent waterbodies are those that are wet only during part of the year, usually in spring, when rain and snowmelt saturate the ground surface.

PWI = Public Waters Inventory

Table 5.2.1.2-3. Rivers Listed in the Nationwide Rivers Inventory Crossed by the Applicant's Proposed Project

Waterbody	Outstanding Resource Value	Crossing Milepost
Pembina River	Scenery; Geology; Wildlife	ND 1.4 and 1.7
Middle River	Scenery	MN 62.3
Red Lake River	Scenery; Recreation	MN 91.9
Clearwater River	Scenery	MN 149.5
Shell River	Scenery	MN 209.5 and 215.3
Crow Wing River	Scenery; Recreation	MN 217.4
Willow River	Scenery	MN 292.8

Source: NPS 2011.

Notes:

Geology: The river or the area within the river corridor contains one or more examples of a geologic feature, process, or phenomenon that is unique or rare within the region of comparison.

Recreation: Recreational opportunities are, or have the potential to be, popular enough to attract visitors or are unique or rare within the region. Visitors are willing to travel long distances to use the river resources for recreational purposes.

Scenery: The landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features and/or attractions.

Wildlife: The river or area within the river corridor contains nationally or regionally important populations of indigenous wildlife species, and/or provides exceptionally high-quality habitat for wildlife of national or regional significance, and/or may provide unique habitat or a critical link in habitat conditions for federal or state-listed (or candidate) threatened, endangered, or sensitive species.

Also see maps in Appendix A.

Impaired Surface Waters

Impaired surface waters have been identified by states as not meeting certain water quality criteria. Table 5.2.1.2-4 lists the impaired surface waters that would be crossed by the Applicant's proposed project, their impairment, and the milepost in each state where the crossing would occur. No impaired surface waters would be crossed in Wisconsin. The Applicant's proposed project would require 16 crossings of impaired surface waters. These impaired waterbody crossings are shown in Appendix A.

Table 5.2.1.2-4. Impaired Surface Waters Crossed by the Applicant's Proposed Project

State	Waterbody Name	Impaired Beneficial Use	Impairment	Crossing by Milepost
North Dakota	Tongue River Cutoff	Fish and other aquatic biota	Sedimentation/siltation; combination benthic/fishes bioassessments	ND 9.2
North Dakota	Pembina River	Fish and other aquatic biota	Metals (Se, Cd, Cu, Pb); sedimentation/siltation	ND 1.4 / 1.7
		Municipal/ domestic	Metals (Pb, As)	
		Recreation	*E. coli*	
Minnesota	Mississippi River	Aquatic consumption	Mercury in fish tissue	MN 296.7

Table 5.2.1.2-4. Impaired Surface Waters Crossed by the Applicant's Proposed Project

State	Waterbody Name	Impaired Beneficial Use	Impairment	Crossing by Milepost
Minnesota	Kettle River	Aquatic consumption	Mercury in fish tissue	MN 338.2
Minnesota	Walker Brook	Aquatic life	Dissolved oxygen	MN 151.4
Minnesota	Clearwater River	Aquatic consumption; aquatic life	Mercury in fish tissue; dissolved oxygen	MN 149.5
Minnesota	Mississippi River	Aquatic life	Dissolved oxygen	MN 165.1
Minnesota	Silver Creek	Aquatic recreation	Fecal coliform	MN 135.9
Minnesota	Tamarac River	Aquatic life	Aquatic macroinvertebrate bioassessments; fishes bioassessments	MN 54.4
Minnesota	Middle River	Aquatic life	Dissolved oxygen; turbidity; aquatic macroinvertebrate bioassessments	MN 62.3
Minnesota	Clearwater River	Aquatic consumption; aquatic life	Mercury in fish tissue; dissolved oxygen; turbidity	MN 103.0
Minnesota	Black River	Aquatic life	Dissolved oxygen	MN 82.6
Minnesota	Red River of the North	Aquatic consumption	Mercury in fish tissue	MN 27.6
Minnesota	Silver Creek	Aquatic recreation	Fecal coliform	MN 135.3 / 135.6

Sources: Iowa DNR 2017; North Dakota DH 2012; Minnesota PCA 2014, 2016b; Illinois EPA 2016.

Al = aluminum, As = arsenic, Cd = cadmium, Cu = copper, Pb = lead, PCBs = polychlorinated biphenyls, Se = selenium

Navigable Waterways

The Applicant's proposed project would require the following seven crossings of navigable waterways (five in Minnesota), as shown in Appendix A:

- Mississippi River – MN MP 296.7,
- Kettle River – MN MP 338.2,
- Sandy River – MN MP 305.9,
- Red Lake River – MN MP 91.9,
- Red River of the North – MN MP 27.6, and
- Pembina River – ND MPs 1.4 and 1.7.

Wild Rice Waterbodies

All wild rice waterbodies that would be crossed by the Applicant's proposed project occur between Clearbrook and Carlton. Seventeen wild rice waterbodies occur within 0.5 mile of the Applicant's proposed project. Four wild rice waterbodies could be affected by construction and operation of the

Applicant's proposed project: Mud Lake, Portage Lake, Peterson Lake, and an unnamed lake. The areas of wild rice waterbodies that would be affected by construction and operation of the Applicant's proposed project are listed in Table 5.2.1.2-5.

Table 5.2.1.2-5. Wild Rice Waterbodies Crossed by the Applicant's Proposed Project in Minnesota (acres)

Wild Rice Waterbody Type	Construction and Operation	Within 0.5 Mile of Centerline
Mud Lake	0.99	118.1
Peterson Lake	1.43	141.6
Portage Lake	2.11	74.9
Unnamed lake	0.3	54.1
TOTAL	**4.92**	**388.7**

Source: Minnesota DNR 2009b.

Continued Use of Existing Line 3

The existing Line 3 pipeline crosses the same drainage basins as the Applicant's proposed project. Various surface waters are crossed by existing Line 3, as shown in Table 5.2.1.2-6.

The existing Line 3 pipeline crosses a total of 53 public waters in Minnesota. These include four public water ditches, one connector, nine artificial paths, 24 perennial streams/rivers, 13 intermittent streams/rivers, one perennial lake/pond, and one intermittent swamp/marsh.

Eleven wild rice waterbodies occur within 0.5 mile of the existing Line 3. One wild rice waterbody (White Oak Lake) is crossed by the existing Line 3 corridor at the stream inlet to the lake basin portion of the wild rice lake boundary.

Table 5.2.1.2-6. Surface Waters Crossed by Existing Line 3

Waterbody Type/Flow	Number of Crossings (PWI)
Artificial path	11 (9)
Canal/ditch	57 (4)
Connector	3 (1)
Lake/pond – perennial	12 (1)
Stream/river – intermittent	66 (13)
Stream/river – perennial	48 (24)
Swamp/marsh	1
Swamp/marsh – intermittent	1 (1)
TOTAL	**199 (53)**

Source: USGS 2017.

Notes:

Table 5.2.1.2-6. Surface Waters Crossed by Existing Line 3

Waterbody Type/Flow	Number of Crossings (PWI)

An artificial path is a feature that represents flow through a two-dimensional feature, such as a lake or a double-banked stream. An artificial path represents the flow of water into, through, and out of features (channel, estuary, lake/pond, playa, reservoir, swamp, marsh). A canal ditch specifies that it is artificial and that it is used to transport water, to drain or irrigate land, to connect two or more water bodies, or to serve as a waterway for watercraft. A connector establishes a known, but non-specific connection between two non-adjacent network segments that have flow.

Perennial waterbodies are those that hold water at all times, except in cases of extreme drought. Intermittent waterbodies are those that are wet only during part of the year, usually in spring, when rain and snowmelt saturate the ground surface.

Also see maps in Appendix A.

PWI = Public Waters Inventory

System Alternative SA-04

Drainage Basins and Watersheds

Table 5.2.1.2-7 provides the number of acres of each watershed that would be crossed by the construction work area and permanent right-of-way for system alternative SA-04.

System alternative SA-04 follows the Applicant's proposed project in the Red River of the North Basin, as described above, before diverging from the Applicant's proposed project and entering the Minnesota River Basin. The Minnesota River Basin covers approximately 16,770 square miles. The Minnesota River flows southeast from its source at Big Stone Lake on the South Dakota border to Mankato, Minnesota, then northeast to join the Mississippi River at Fort Snelling (about 335 total miles). Thirteen major watersheds in Minnesota drain into the basin, which touches 37 counties.

Table 5.2.1.2-7. Major Drainage Basins and Watersheds Crossed by System Alternative SA-04

Drainage Basin (area)	State(s)	Watershed	HUC-8	Watershed Water Quality[a]	Construction[b] (acres)	Operation[c] (acres)
Red River of the North	ND	Goose	09020109	10.6%/37%	122.5	51.0
	ND	Park	09020310	9.6%/60.4%	75.7	31.6
	ND	Forest	09020308	NA	81.7	34.0
	ND	Lower Sheyenne	09020204	16.3%/25.2%	259.4	109.1
	ND	Turtle	09020307	NA	339.1	141.3
	ND	Maple	09020205	2.3%/0%	47.9	18.9
	ND	Western Wild Rice	09020105	52%/8%	776.0	323.3
	ND	Lower Pembina River	09020316	NA	240.8	100.3
	ND, MN	Bois De Sioux	09020101	53	209.3	87.2
	ND, MN	Upper Red	09020104	46	45.4	18.9
	ND, MN	Sandhill-Wilson	09020301	66	482.7	201.1
	ND, MN	Tamarac River	09020311	63	347.2	22.6

Table 5.2.1.2-7. Major Drainage Basins and Watersheds Crossed by System Alternative SA-04

Drainage Basin (area)	State(s)	Watershed	HUC-8	Watershed Water Quality[a]	Construction[b] (acres)	Operation[c] (acres)
	ND, MN	Elm-Marsh	09020107	27.5%/0%	362.1	150.9
	ND, MN	Grand Marais Creek	09020306	58	88.1	36.7
	MN	Mustinka	09020102	47	372.6	155.2
Minnesota River	MN	Hawk-Yellow Medicine	07020004	52	278.4	116.0
	MN	Le Sueur	07020011	52	555.3	231.4
	MN	Chippewa	07020005	64	572.7	238.6
	MN	Lower Minnesota	07020012	51	496.7	207.0
	MN	Middle Minnesota	07020007	47	298.6	124.4
	MN	Pomme de Terre	07020002	56	238.1	99.2
	MN	South Fork Crow	07010205	49	297.7	124.0
Upper Mississippi-Skunk-Wapsipinicon	MN, IA	Shell Rock	07080202	39	178.9	74.5
	MN, IA	Upper Wapsipinicon	07080102	39	994.6	414.4
	MN, IA	Upper Cedar	07080201	39	613.9	255.8
	IA, IL	Copperas-Duck	07080101	NA	185.7	77.4
	IA	Lower Wapsipinicon	07080103	NA	563.4	234.7
Upper Mississippi-Maquoketa-Plum	IA	Maquoketa	07060006	NA	752.1	313.4
Rock	IL	Green	07090007	NA	216.7	90.3
	IL	Lower Rock	07090005	NA	416.3	173.5
Upper Illinois	IL	Lower Fox	07120007	NA	261.2	108.86
	IL	Upper Illinois	07120005	NA	317.9	132.46
	IL	Des Plaines	07120004	NA	78.8	32.82
Lower Illinois	IL	Lower Illinois-Senachwine Lake	07130001	NA	400.6	166.92

Sources: USGS 2017; Minnesota DNR 2015; NRCS n.d.

[a]. Watershed water quality values for North Dakota are presented as two numbers: the percentage of total miles of rivers/streams in the watershed that are impaired and the percentage of total acres of lakes/reservoirs in the watershed that are impaired. Watershed health values for MN watersheds represent water quality scores, which are based on various indices such as temperature, dissolved oxygen, pH, nutrient load, turbidity/sedimentation, and contaminant concentrations. Index scores of 0 to 20 represent components that are heavily affected/low quality, scores of 40 to 60 represent moderately affected/moderate quality, and scores of 80 to 100 represent the least affected/high quality (scores of 20–40 and 60–80 are intermediate values). Iowa and Illinois do not categorize watershed health.

[b] Watershed acres that would be crossed by the construction work area.

[c] Watershed acres that would be crossed by the permanent right-of-way during operations.

HUC-8 = 8-digit Hydrologic Unit Code that delineates watershed boundaries, defined by the U.S. Geological Survey (2016); NA = not available

The Rock River Basin occupies the northwest portion of Illinois. It includes watersheds of the Rock, Green, Kishwaukee, and Pecatonica rivers, in addition to areas drained by the Galena, Apple, and Plum rivers and other small tributaries entering directly into the Mississippi River. The Rock River originates in the Horicon Marsh in Dodge County, Wisconsin, and flows in a generally southerly direction until it enters Illinois just south of Beloit. There, it flows in a southwesterly direction until it joins the Mississippi River at Rock Island. The river is about 163 miles long in Illinois, and its total length is about 318 miles. The basin covers 6,481 square miles (Sinclair 1996).

The Upper Illinois River Basin encompasses 10,949 square miles upstream from Ottawa, Illinois, on the Illinois River. It includes parts of 16 counties in northeastern Illinois (62 percent of the basin), 13 counties in northwestern Indiana (28 percent of the basin), 7 counties in southeastern Wisconsin (10 percent of the basin), and 1 county in southwestern Michigan (< 0.1 percent of the basin) (USGS 2004).

The Lower Illinois River Basin covers 18,000 square miles of central and west-central Illinois between the upper end at Ottawa and the confluence of the Illinois River with the Mississippi River near Grafton. The basin includes all of 22 and parts of 19 counties in Illinois. Agriculture accounts for 88 percent of the overall land area, whereas forests account for 7 percent and urban areas account for about 2 percent (USGS 2000).

Surface Waters Crossed

The types of surface waters crossed by system alternative SA-04 are listed in Table 5.2.1.2-8. System alternative SA-04 would cross numerous non-jurisdictional ditches/drains, for which flows are unknown. Crossing of non-jurisdictional ditches/drains would be permitted by local authorities within each county. Appendix G contains a complete list of surface waters that would be crossed by system alternative SA-04.

SA-04 would cross a total of 49 public waters in Minnesota. These include 11 public water ditches, 6 artificial paths, 8 perennial streams/rivers and 24 intermittent streams/rivers.

Table 5.2.1.2-8. Surface Waters Crossed by System Alternative SA-04

Waterbody Type/Flow	North Dakota	Minnesota (PWI)	Iowa	Illinois	Total
Artificial path	10	6 (6)	5	16	37
Canal/ditch	17	71 (11)	0	3	91
Connector	0	1 (0)	0	0	1
Lake/pond – intermittent	0	0 (0)	4	0	4
Lake/pond – perennial	5	3 (0)	4	1	13
Stream/river – intermittent	74	81 (24)	152	77	384
Stream/river – perennial	13	10 (8)	54	19	96
Swamp/marsh	2	0 (0)	4	4	10
TOTAL	**121**	**172 (49)**	**223**	**120**	**636**

Source: USGS 2017.

Notes:

An artificial path is a feature that represents flow through a two-dimensional feature, such as a lake or a double-banked stream. An artificial path represents the flow of water into, through, and out of features (channel, estuary, lake/pond, playa, reservoir, swamp, marsh). A canal

Table 5.2.1.2-8. Surface Waters Crossed by System Alternative SA-04

Waterbody Type/Flow	North Dakota	Minnesota (PWI)	Iowa	Illinois	Total

ditch specifies that it is artificial and that it is used to transport water, to drain or irrigate land, to connect two or more water bodies, or to serve as a waterway for watercraft. A connector establishes a known, but non-specific connection between two non-adjacent network segments that have flow.

Perennial waterbodies are those that hold water at all times, except in cases of extreme drought. Intermittent waterbodies are those that are wet only during part of the year, usually in spring, when rain and snowmelt saturate the ground surface.

Also see maps in Appendix A.

PWI = Public Waters Inventory

Sensitive/Specially Designated Surface Waters

System alternative SA-04 would require 56 crossings of designated surface waters, of which 18 are in North Dakota, 18 are in Minnesota, and 20 are in Iowa. Illinois designates only a small number of its surface waters, principally in the Chicago area, and none of these waterways would be crossed by system alternative SA-04. System alternative SA-04 would not cross any trout streams. Of the 636 (172 in Minnesota) surface waters crossed by system alternative SA-04, a total of 526 are unnamed and do not have designations. Appendix G provides the designated uses of the surface waters crossed by system alternative SA-04 in each state.

Nationwide Rivers Inventory

System alternative SA-04 would cross five NRI-listed rivers (one in Minnesota), with two crossings of one river, for a total of six crossings of NRI-listed rivers (Table 5.2.1.2-9). These waterbody crossings also are shown in Appendix A.

Table 5.2.1.2-9. Rivers Listed in the Nationwide Rivers Inventory Crossed by System Alternative SA-04

Waterbody	Outstanding Resource Value	Crossing by Milepost
Pembina River	Scenery; Geology; Wildlife	ND 1.4 and 1.7
Minnesota River	Scenery; Recreation; Wildlife; History	MN 406.6
Rock River	Recreation	IL 694.5
Indian Creek	Scenery	IL 759.9
Fox River	Scenery, Recreation; Geology	IL 762.9

Source: NPS 2011.

Notes:

Geology: The river or the area within the river corridor contains one or more examples of a geologic feature, process, or phenomenon that is unique or rare within the region of comparison.

History: The river or area within the river corridor contains a site(s) or feature(s) associated with a significant event, an important person, or a cultural activity of the past that was rare or one-of-a-kind in the region.

Recreation: Recreational opportunities are, or have the potential to be, popular enough to attract visitors or are unique or rare within the region. Visitors are willing to travel long distances to use the river resources for recreational purposes.

Scenery: The landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features and/or attractions.

Wildlife: The river or area within the river corridor contains nationally or regionally important populations of indigenous wildlife species, and/or provides exceptionally high-quality habitat for wildlife of national or regional significance, and/or may provide unique habitat or a critical link in habitat conditions for federal or state-listed (or candidate) threatened, endangered, or sensitive species.

Also see maps in Appendix A.

Impaired Surface Waters

Table 5.2.1.2-10 lists the impaired surface waters that would be crossed by system alternative SA-04, their impairment, and the milepost in each state where the crossing would occur. System alternative SA-04 would require 32 crossings of impaired waterways. These impaired waterbody crossings are shown in Appendix A.

Table 5.2.1.2-10. Impaired Surface Waters Crossed by System Alternative SA-04

State	Waterbody Name	Impaired Beneficial Use	Impairment	Crossing by Milepost
North Dakota	Wild Rice River	Fish and other aquatic biota	Sedimentation/siltation; dissolved oxygen	ND 213.0
North Dakota	Antelope Creek	Fish and other aquatic biota	Sedimentation/siltation; benthic-macroinvertebrate bioassessments; temperature	ND 203.9
North Dakota	Wild Rice River	Fish and other aquatic biota	Sedimentation/siltation; combination benthic/fishes bioassessments; dissolved oxygen	ND 185.6/173.3
North Dakota	Sheyenne River	Recreation	Fecal coliform	ND 167.5

Table 5.2.1.2-10. Impaired Surface Waters Crossed by System Alternative SA-04

State	Waterbody Name	Impaired Beneficial Use	Impairment	Crossing by Milepost
North Dakota	Maple River	Fish and other aquatic biota	Sedimentation/siltation	ND 154.7
		Recreation	*E. coli*	
North Dakota	Rush River	Fish and other aquatic biota	Sedimentation/siltation; combination benthic/fishes bioassessments	ND 149.8
North Dakota	North Branch Elm River	Fish and other aquatic biota	Sedimentation/siltation; combination benthic/fishes bioassessments	ND 126.2
North Dakota	Goose River	Fish and other aquatic biota	Fishes bioassessments	ND 120.0
North Dakota	Cole Creek	Fish and other aquatic biota	Combination benthic/fishes bioassessments	ND 96.9
North Dakota	Turtle River	Fish and other aquatic biota	Sedimentation/siltation; combination benthic/fishes bioassessments; metals (Cd, Se)	ND 69.1
		Municipal/ domestic	Chloride and metals (As, Se, Cd)	
North Dakota	Park River	Fish and other aquatic biota	Metals (Cd, Se, Pb, Cu)	ND 43.3
North Dakota	Forest River	Fish and other aquatic biota	Sedimentation/siltation; benthic-macroinvertebrate bioassessments	ND 53.9
North Dakota	Tongue River Cutoff	Fish and other aquatic biota	Sedimentation/siltation; combination benthic/fishes bioassessments	ND 9.2
North Dakota	Pembina River	Fish and other aquatic biota	Metals (Se, Cd, Cu, Pb); sedimentation/siltation	ND 1.4 / 1.7
		Municipal/ domestic	Metals (Pb, As)	
		Recreation	*E. coli*	
Minnesota	Minnesota River	Aquatic consumption	Mercury and PCBs in fish tissue	MN 406.6
		Aquatic life	Turbidity	
Minnesota	Cedar River	Aquatic life	Aquatic macroinvertebrate bioassessments; fishes bioassessments; turbidity	MN 478.6
		Recreation	Fecal coliform	

Table 5.2.1.2-10. Impaired Surface Waters Crossed by System Alternative SA-04

State	Waterbody Name	Impaired Beneficial Use	Impairment	Crossing by Milepost
Minnesota	Pomme de Terre River	Aquatic consumption	Mercury in fish tissue	MN 277.5
		Aquatic life	Aquatic macroinvertebrate bioassessments; fishes bioassessments; turbidity	
		Aquatic recreation	Fecal coliform	
Minnesota	South Branch Rush River	Aquatic recreation	Fecal coliform	MN 383.4
Minnesota	Woodbury Creek	Aquatic recreation	Fecal coliform	MN 472.7
Minnesota	Otter Creek	Aquatic recreation	Fecal coliform	MN 484.2
Minnesota	Twelvemile Creek	Aquatic life	Aquatic macroinvertebrate bioassessments; fishes bioassessments; turbidity	MN 247.5
		Aquatic recreation	*E. coli*	
Minnesota	Bois de Sioux River	Fish and other aquatic biota	Sedimentation/siltation; combination benthic/fishes bioassessments	MN 233.6
Iowa	Brophy Creek	Aquatic life	Biological – low biotic index	IA 664.1
Iowa	East Branch Buffalo Creek[a]	Aquatic life	Dissolved oxygen	IA 571.1
Iowa	Mississippi River	Aquatic life	Metals (Al)	IA 672.3
Illinois	Rock River	Fish consumption	Mercury and PCBs	IL 694.5
Illinois	Illinois River	Fish consumption	Mercury	IL 772.5
Illinois	Fox River	Fish consumption	PCBs	IL 762.9
Illinois	Aux Sable Creek	Aquatic recreation	Fecal coliform	IL 784.7
Illinois	Des Plaines River	Aquatic life	Aquatic macroinvertebrate bioassessments; fishes bioassessments; turbidity; metals (Cu),	IL 792.2
		Fish consumption	Mercury	

Sources: Iowa DNR 2017; North Dakota DH 2017; Minnesota PCA 2014, 2016b; Illinois EPA 2016.

[a] East Branch Buffalo Creek has been a pending listing since 2012.

Al = aluminum, As = arsenic, Cd = cadmium, Cu = copper, Pb = lead, PCBs = polychlorinated biphenyls, Se = selenium

Navigable Waterways

System alternative SA-04 would require the following nine crossings of navigable waterways (two in Minnesota), as shown in Appendix A:

- Minnesota River – MN MP 406.6,
- Bois de Sioux River – MN MP 233.6,
- Rock River – IL MP 694.5,
- Mississippi River – IA MP 672.3,
- Illinois River – IL MP 772.5,
- Fox River – IL MP 763.3,
- Des Plaines River – IL 792.2, and
- Pembina River – ND MPs 1.4 and 1.7.

Wild Rice Waterbodies

No wild rice waterbodies would be crossed by system alternative SA-04 (Great Lakes Indian Fish and Wildlife Commission 2017; Wisconsin DNR 2017).

Transportation by Rail

The potential rail routes cross the same drainage basins as does the Applicant's proposed project. Various surface waters are crossed by the rail beds that would be used by the rail alternative, as shown in Table 5.2.1.2-11. The potential rail routes also cross numerous non-jurisdictional ditches/drains, for which flows are unknown.

Table 5.2.1.2-11. Surface Waters Crossed by the Rail Alternative

Waterbody Type/Flow	Rail Route to Clearbrook	Rail Route to Superior North	Rail Route to Superior South	Total
Artificial path	6	9	15	30
Canal/ditch	30	50	62	142
Connector	1	4	4	9
Stream/river – intermittent	26	65	68	159
Stream/river – perennial	6	50	52	108
TOTAL	**69**	**178**	**201**	**448**

Source: USGS 2017.

Notes:

An artificial path is a feature that represents flow through a two-dimensional feature, such as a lake or a double-banked stream. An artificial path represents the flow of water into, through, and out of features (channel, estuary, lake/pond, playa, reservoir, swamp, marsh). A canal ditch specifies that it is artificial and that it is used to transport water, to drain or irrigate land, to connect two or more water bodies, or to serve as a waterway for watercraft. A connector establishes a known, but non-specific connection between two non-adjacent network segments that have flow.

Perennial waterbodies are those that hold water at all times, except in cases of extreme drought. Intermittent waterbodies are those that are wet only during part of the year, usually in spring, when rain and snowmelt saturate the ground surface.

Also see maps in Appendix A.

No wild rice waterbodies are crossed by rail lines that could be used to transport crude oil (Great Lakes Indian Fish and Wildlife Commission 2017; Wisconsin DNR 2017).

Transportation by Truck

The potential truck routes cross the same drainage basins as the Applicant's proposed project, except for the St. Croix River Basin. Various surface waters are crossed by the routes that could be used for the truck transport alternative, as shown in Table 5.2.1.2-12. The potential truck routes also cross numerous non-jurisdictional ditches/drains, for which flows are unknown.

No wild rice waterbodies are crossed by existing road networks that could be used to transport crude oil (Great Lakes Indian Fish and Wildlife Commission 2017; Wisconsin DNR 2017).

Table 5.2.1.2-12. Surface Waters Crossed by the Truck Alternative

Waterbody Type/Flow	Truck Route Gretna to Clearbrook Terminal	Truck Route Gretna to Superior Terminal	Total
Artificial path	7	15	22
Canal/ditch	28	48	76
Connector	0	5	5
Stream/river – intermittent	23	50	73
Stream/river – perennial	9	40	49
TOTAL	**67**	**158**	**225**

Source: USGS 2017.

Notes:

An artificial path is a feature that represents flow through a two-dimensional feature, such as a lake or a double-banked stream. An artificial path represents the flow of water into, through, and out of features (channel, estuary, lake/pond, playa, reservoir, swamp, marsh). A canal ditch specifies that it is artificial and that it is used to transport water, to drain or irrigate land, to connect two or more water bodies, or to serve as a waterway for watercraft. A connector establishes a known, but non-specific connection between two non-adjacent network segments that have flow.

Perennial waterbodies are those that hold water at all times, except in cases of extreme drought. Intermittent waterbodies are those that are wet only during part of the year, usually in spring, when rain and snowmelt saturate the ground surface.

Also see maps in Appendix A.

Existing Line 3 Supplemented by Rail

Existing conditions for the existing Line 3 supplemented by rail alternative are similar to those described above for continued use of the existing Line 3 pipeline and the rail alternative.

Existing Line 3 Supplemented by Truck

Existing conditions for the existing Line 3 supplemented by truck alternative are similar to those described above for continued use of the existing Line 3 pipeline and the truck alternatives.

5.2.1.2.3 Regional Analysis of the Quality of Existing Surface Water Conditions

This analysis provides a summary of general quality comparisons of surface water conditions across Minnesota as well as more detailed potential effects on specific surface water resources along the Applicant's proposed project and the CN Alternatives.

The north-central and northeast portion of Minnesota consist of water resources that are generally the highest quality recreational water resources in the state. To describe the general region wide or state wide difference in surface water resource quality across Minnesota, different general methods can be used including the Minnesota PCA ecoregion concept to guide typical water quality conditions and Minnesota DNR WHAF. Quality of existing surface water conditions are discussed using each of these frameworks below.

- **Minnesota PCA Ecoregion Concept to Guide Typical Water Quality Conditions**: The State is divided into seven different ecoregions based on soils. Ecoregions have similar soil, geomorphology, land use and natural vegetation. The Northern Lakes and Forests (NLF) Ecoregion typically has the highest water quality as compared to other ecoregions, especially those that are representative with areas more dominated by altered landscapes. The Minnesota PCA offers a guide to typical water quality conditions in these seven "ecoregions," large expanses of land containing a geographically distinct collection of plants, animals, natural communities and environmental conditions."[7]
- **Minnesota DNR WHAF:** Another approach used to describe surface water quality conditions across landscapes in Minnesota is the WHAF Tool, developed by the Minnesota DNR which uses the science of watershed health. The science of watershed health is based on a whole-system approach. Ecological processes interact to provide services such as clean air and water, available groundwater, and diverse plant and animal communities. The science of health explores how all the parts system work together to provide a "healthy watershed". In order to explore the watershed system in a consistent, systematic way, the ecological processes have been divided into five different components: Biology, Connectivity, Geomorphology, Hydrology and Water Quality. A suite of **watershed health index scores** have been calculated that represent many of the important ecological relationships within and between the components. These scores are built on statewide GIS data that is compared consistently across Minnesota to provide a baseline health condition report for each of the 81 major watersheds in the state. The Watershed Health Assessments consist of health scores that rank the condition of Minnesota's watersheds from 0 (poor health condition, red) to 100 (good health condition, green). Watershed report cards indicate poorer water quality related to altered land use indicators as depicted in this analysis[8] (Appendix J-1).

The ecoregion approach used to assess water quality by the Minnesota PCA and the WHAF Tool developed by the Minnesota DNR are useful in describing existing surface water conditions across Minnesota. In general, the north-central and northeast forested portions of Minnesota are the least affected and have the highest quality surface water resources, and areas in the west and south agricultural portions of the state have the most affected surface water resources and are of poorer quality.

Specifically, the data indicate that there are higher quality resources in the NLF Ecoregion of the State. Lower nutrients (mainly phosphorus) and chlorophyll-a (algae) and greater transparency are indicative of lakes in this ecoregion. Streams in this ecoregion exhibit lower nutrients, turbidity, and fecal coliform, as well as lower temperature and biological oxygen demand conditions. A spatial distribution of lakes and streams depicted in Appendix J-2 and J-3, which show lakes and streams relative to pipeline routes

[7] https://www.pca.state.mn.us/quick-links/eda-guide-typical-minnesota-water-quality-conditions

[8] http://www.dnr.state.mn.us/whaf/index.html

across the state. There are a large number of lakes and streams in north-central and northeast Minnesota and they are of the highest quality when comparing Ecoregion data.

Three selected watersheds, each representing potential pipeline routing areas through the state were reviewed. These included the Pine River watershed (north-central), Chippewa River (west) and Le Sueur River (south). The watershed health index scores indicate the best health scores are represented in the Pine River and the worst scores in the Chippewa and Le Sueur River watersheds accordingly. Further, in general, statewide maps indicate better health scores across the north and east and poorer scores across the south and west as depicted by analysis of the five different components: Biology, Connectivity, Geomorphology, Hydrology and Water Quality (Appendix J-1). Water quality scores for the Applicant's proposed project and SA-04 are provided in Tables 5.2.1.2-1 and 5.2.1.2-7.

Trout Streams

Several trout streams are intersected by the Applicant's proposed project. Often because of their non- or minimally-affected watersheds and their location, soils and geologic setting within the state, these streams represent high-quality cold oxygenated water necessary for trout survival.

The Applicant's proposed project passes within 0.5 mile of 17 designated trout streams or protected tributaries to designated trout streams. Truck and rail routes pass within 0.5 mile of 35 to 44 of these streams. In contrast, Route SA-04 crosses within two designated trout streams or protected tributaries to designated trout streams (Table 5.2.1.2-13)**.** Though more streams/ditches are crossed in southern areas, the analysis indicates the quality of the streams crossed in northern routes is greater since many are trout waters.

Table 5.2.1.2-13. High-Quality Surface Water Resources within 0.5 Mile of Route Centerline

High-Quality Resources	Applicant's Proposed Project	System Alternative SA-04	Transport by Truck	Transport by Rail (North)	Transport by Rail (South)
Trout Streams	17	2	44	35	39
Wild Rice Lakes	17	0	15	13	18
Lakes of High and Outstanding Biological Significance	8	1	8	10	16
Tulibee Lakes	4	0	8	9	4

Wild Rice Lakes

Minnesota has more acres of natural wild rice (*Zizania palustris*) than any other state in the country. Wild rice has been historically documented in 45 of Minnesota's 87 counties and in all corners of the state. Anecdotal information suggests an even broader distribution prior to European settlement. Wild rice is an important social and cultural component for American Indian tribes and rural Minnesota communities.

A DNR assessment found over 1,200 lakes and rivers in 54 counties that currently contain or historically had wild rice. Over 64,000 acres of wild rice (out of roughly 2 million basin acres) were found on these waters. More than half of the acreage was found in Aitkin, Cass, Crow Wing, Itasca, and St. Louis counties.

Lakes of Biological Significance (high and outstanding)

LBS were identified and classified by DNR subject matter experts on objective criteria for four community types (aquatic plants, fish, amphibians, and birds). Unique plant or animal presence was the primary measure of a lake's biological significance. Lakes were rated and grouped for each of the following communities: aquatic plants, fish, birds, and amphibians. Lakes were assigned one of three biological significance classes (outstanding, high, or moderate). This assessment viewed outstanding and high sites as they are representative of the highest quality conditions. Many Minnesota lakes have not been sampled for plants and/or animals, so this list of lakes would be periodically revised as additional biological data become available.

There are a large number of lakes with high and outstanding biological significance in the NLF. The Applicant's proposed project is near (< 0.5 mile) eight of these lakes in this ecoregion (see Table 5.2.1.2-13).

Tullibee Lakes

Minnesota has about 650 tullibee lakes, more than any other state in the lower 48. Many of these waters are prized by anglers because tullibee (also known as cisco, or lake herring in Lake Superior) provide a high-energy feast for walleye, northern pike, muskellunge, and lake trout. Changes in land use and climate are causing many lakes to lose tullibee. Keeping forested land intact can help maintain water quality in lakes with tullibee and other coldwater species. The Tullibee Lake Watershed Forest Stewardship Project[9] is engaging owners of private woodlands and other conservation partners to protect vulnerable waters in north-central Minnesota.

Other Spatial Indicators of the Quality of Surface Water

Ditches

An evaluation was also done on the number of public water ditches crossed by the routes. High numbers of ditches is an indication of landscape alteration that adversely affects water resources, thus diminishing the quality of water resources in the area. An image of the total number of ditches, including private, in the vicinity Applicant's proposed project and alternatives is depicted on a statewide map in Appendix J-4.

Perennial Cover

Areas that tend to rate low in perennial cover, terrestrial habitat quality and connectivity have poorer overall health index scores as depicted in watershed health index scores for the Pine, Chippewa and Le Sueur River Watersheds (Appendix J-5).

Wetlands

Minnesota's six million acres of peatlands represent a major component of the state's natural heritage. In a world-wide context, the patterned peatlands in Minnesota are extremely valuable for the study of ecological and developmental processes in peatlands as noted in "Recommendations for the Protection of Ecologically Significant Peatlands in Minnesota" (Minnesota DNR 1984). The number of wetlands

[9] http://www.dnr.state.mn.us/tullibeelake.html

statewide is also depicted in viewing watershed health index scores under Loss of Hydrologic Storage, Wetland Loss in (Appendices J-6 through J-7).

Walleye Lakes

Walleyes and walleye fishing is an important heritage to all Minnesotans, and can be an indicator of ecological condition of lakes. Walleye lakes are fairly dispersed across the state, however habitat suitable for reproduction and self-sustaining populations has a much higher presence in the high-quality waters representative of the NLF Ecoregion.

Existing Surface Water Conditions in the Region of Interest

Applicant's Proposed Project

The Applicant's proposed project follows a route south of Clearbrook following an existing pipeline right-of-way, and then follows an existing transmission line corridor easterly toward Carlton. The Applicant's proposed project, along with northern pipeline route alternatives discussed in Section 6.3.1.2 (RA-06, RA-07, and RA-08), all pass through a large number of streams, lakes, wetlands, and accompanying resources, all of which are generally of high quality. The Applicant's proposed project is located within 0.5 mile of 17 wild rice lakes, 17 trout streams and 8 lakes of high and outstanding biodiversity significance, and 4 tullibee lakes. See Table 5.2.1.2-13 for comparison of resources intersected.

System Alternative SA-04

System alternative SA-04 lies in an agriculture dominated area and has surface water resources of poorer quality. This is especially shown in Minnesota PCA's Ecoregion Concept for assessing surface waters, in the Minnesota DNR WHAF Tool, in evaluating specific high-quality surface water indicators (see Table 5.2.1.2-13), as well as altered landscape indicators such as ditching as an indicator of poorer water quality or altered landscape. These indicators are seen in areas to the south and west that tend to rate low in perennial cover, terrestrial habitat quality and connectivity that reduce overall health index scores.

Truck Route Gretna to Clearbrook Terminal

This route follows U.S. Highway 2 from Clearbrook to Duluth then crosses the St. Louis River Estuary over the Richard I. Bong Bridge to Superior Wisconsin. There are numerous waters intersected by this route including 44 trout stream and designated trout stream tributaries and 14 wild rice lakes as well as the St. Louis River Estuary. There are 8 tullibee lakes and 8 lakes of high and outstanding biodiversity significance. Like all northern pipeline routes (RA-06, RA-07, RA-08, and the Applicant's proposed project) and the Superior North Rail Route, the Truck Route passes through a large number of streams, lakes, wetlands and accompanying resources, all of which are generally of high quality.

Alternative Rail Route to Superior North

The Superior North Rail Route like the northern pipeline routes (RA-06, RA-07, RA-08, and the Applicant's proposed project) and the Truck Route passes through a large number of streams, lakes, wetlands, and accompanying resources, all of which are generally of high quality. This route passes 35 trout streams, 13 wild rice lakes, 10 lakes of high and outstanding biodiversity significance, and 9 tullibee lakes. The truck and rail routes pass more sensitive resources overall than all other routes. See Table 5.2.1.2-13 for comparison of proximal resources.

Alternative Rail Route to Superior South

The Superior South Rail Route like the northern pipeline routes (RA-06, RA-07, RA-08, and the Applicant's proposed project), Truck Route, and Superior North Rail Route passes through a large number of streams, lakes, wetlands and accompanying resources, all of which are generally of high quality. This route passes 39 trout streams, 18 wild rice lakes, 16 lakes of high and outstanding biodiversity significance and 4 tullibee lakes. The truck and rail routes pass more sensitive resources overall than all other routes. See Table 5.2.1.2-13 for comparison of proximal resources.

5.2.1.2.4 Impact Assessment

This section addresses the impact analysis conducted for the Applicant's proposed project and the CN Alternatives. The analysis assessed potential impacts on surface waters in the ROIs, as described in Section 5.2.1.2.1, related to the following concerns:

- Runoff and flows – increases in stormwater runoff and erosion, increases in TSS concentrations and increased sedimentation, changes in stream flows from water withdrawals and discharges, and disruption of flow paths or local hydrologic connectivity;
- Surface water and aquatic habitat quality – degradation of surface water quality, degradation of aquatic habitat from instream and other construction activities including vegetation removal near waterbodies, degradation of water quality and habitat from releases of drilling mud during HDD crossings;
- Channel morphology and stability – changes in channel morphology and stability caused by channel and streambank modifications; and
- Disturbance of wild rice waterbodies.

Many pipeline construction activities have the potential to affect surface water flow and quality. These activities include clearing and grading, dewatering and trenching, blasting, access road construction, waterbody crossings, surface water withdrawals and discharges (e.g., for hydrostatic test water), fueling and use of hazardous materials, and restoration or reclamation of construction areas. Construction of the offloading facilities for the rail and truck alternatives also would include many of the activities listed above, including clearing and grading, dewatering, access road construction, surface water withdrawals (e.g., for dust control), fueling and use of hazardous materials, and restoration or reclamation of some of the areas affected by construction. The potential impacts on surface water from these activities are addressed below for the Applicant's proposed project and CN Alternatives. After the discussion of construction impacts, the potential impacts of operations on surface waters are addressed for the Applicant's proposed project and each CN Alternative.

Applicant's Proposed Project (from Neche to Superior)

The Applicant's proposed project would require 227 surface water crossings (192 in Minnesota) (listed in Table 5.2.1.2-2), including 46 state-designated use/sensitive surface waters, 9 (7 in Minnesota) NRI-listed rivers (listed in Table 5.2.1.2-3), 16 (12 in Minnesota) impaired surface waters (listed in Table 5.2.1.2-4), 6 trout streams, and 7 (6 in Minnesota) navigable river crossings. The potential impacts of construction on these surface waterbodies are addressed below.

Construction Impacts

Runoff and Flows

Increases in Stormwater Runoff and Erosion. Clearing and grading would be required within the construction work area for the pipeline, mainline valves (MLVs), new and expanded pump stations, and cathodic protection sites—as well as for access roads and ATWS, including pipe yards. Newly cleared areas and new impervious surfaces could cause increased stormwater runoff and erosion into nearby surface waters. Consequently, this increased runoff and erosion would increase TSS concentrations and sedimentation. The Applicant would obtain construction stormwater NPDES permits in each state for the pipeline, MLVs, pump stations, cathodic protection sites, access roads and ATWS, and pipe yards prior to construction. NPDES permits require outline BMPs for erosion and sediment control and pollution prevention, regulate, discharges into surface waters impaired waters, pollution prevention, and require inspection of these items at construction sites. As part of the construction stormwater NPDES permits, the Applicant would be required to develop a Stormwater Pollution Prevention Plan (SWPPP) that would include a site description identifying construction activities and the locations of stormwater discharges and receiving waters. The SWPPP would describe erosion and sediment controls to be implemented during construction, stormwater pollution management, waste disposal, maintenance and inspection practices, and any additional requirements to prevent stormwater pollution.

The Applicant's Environmental Protection Plan (Appendix E) describes the Applicant-proposed measures to be used during construction that likely would be stipulated in the SWPPP and NPDES permits, including temporary sediment and erosion control such as slope breakers, sediment barriers (e.g., silt fence, straw bales, and bio-logs), stormwater diversions, trench breakers, mulch, and erosion control blankets. These temporary controls would be placed across the entire construction work area at the base of slopes greater than 5 percent where the base is less than 50 feet from surface waters, until the area is revegetated and there is no potential for scouring or sediment transport to surface waters. Trench breakers would be used at all waterbody crossings, as necessary, to prevent diversion of water into upland portions of the pipeline trench and to keep accumulated trench water out of the waterbody. Permanent berms, as approved by permit conditions, would be installed on all slopes greater than 3 percent to prevent erosion and sedimentation into surface waters once construction is complete, unless otherwise specified by permit conditions.

To further reduce the potential for long-term erosion and sedimentation, disturbed areas at waterbody crossings would be restored and stabilized to the extent practicable after pipeline installation. The Applicant proposes to reestablish streambank vegetation in North Dakota using North Dakota Seed Mix 2, in Minnesota using Minnesota Seed Mix 2, and in Wisconsin using Wisconsin Seed Mix 1 (described in Appendix C of the Applicant's Environmental Protection Plan [Appendix E]) unless an alternate seed mix is requested by a landowner or agencies such as the Minnesota Board of Water and Soil Resources (Minnesota BWSR). These seed mixes have been developed by the Applicant to reestablish herbaceous vegetation quickly following pipeline construction.

By complying with these NPDES permit conditions and implementing the Applicant-proposed measures to minimize impacts, the impact of increases in stormwater runoff and erosion from clearing and grading due to construction would be short term to long term and minor.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. In addition to clearing and grading, construction activities such as blasting, trenching, waterbody crossings, establishment of ATWS and access road construction, and water discharges may cause increased suspended solids and

sedimentation in surface waters crossed. The Applicant's proposed temporary erosion controls, SWPPP requirements, and NPDES permit requirements described above would be implemented during these activities to prevent sediment transport into surface waters during construction.

The Applicant anticipates the need for blasting from MP 354.6 to 356.6 in Carlton County, Minnesota, due to shallow bedrock. Blasting can increase TSS and sedimentation in surface waters near the blast site. Prior to construction, the Applicant would develop a Blasting Plan, which would adhere to all stipulations set forth by federal (Title 29 Code of Federal Regulations [CFR], Part 1926 Safety and Health Regulations for Construction/Subpart U – Blasting and the Use of Explosives) and state regulations and include measures to protect nearby surface waters from these impacts. Therefore, impacts on TSS from this localized blasting event likely would be temporary and negligible to minor.

During pipeline construction across a waterbody, the extent and duration of sedimentation and increased erosion potential depend on the soils and topography of the site and the proposed crossing method. The types of methods that may be used include the wet crossing method (wet trench), dry crossing methods (dam-and-pump and flume), and HDD or guided bore as described in Appendix E. Construction of the pipeline across the waterbody using dry open-cut methods would occur in a dry area created by temporary dams upstream and downstream of the work area. TSS and sedimentation would increase when flow is returned to the dry channel but would readily dissipate in the downstream vicinity of the crossing. As a result, impacts from increases in TSS concentrations and increased sedimentation in surface waters crossed using dry open-cut crossing methods would be temporary to short term and minor. However, some streams are not spring fed, instead they originate from surface water flow. Consequently they are relatively more susceptible to erosion, low light conditions, and surface water temperature changes. Many of these may already be subjected to sediment influx from other sources and therefore are susceptible to moderate to major impacts from additional sediment. The sediment would impact the substrate, turbidity, flow, from the point of construction at the crossing include any area affected just upstream, and continue to impact the stream as the water flows downstream.

Wet open-cut methods involve excavation of the channel and banks in the wetted channel, and excavated soils would be in direct contact with surface water. The Applicant would install sediment containment devices (e.g., in-water BMPs such as floating silt curtains) to contain the excavated material and minimize the potential for increased sedimentation (Appendix E). The in-water BMPs would remain in place until construction is completed. If the Applicant maintains compliance with NPDES permit conditions and implements Applicant-proposed measures, impacts on surface water quality due to increases in TSS concentrations and increased sedimentation in surface waters crossed using the wet open-cut crossing method would be temporary to short term and minor.

Changes in Stream Flows from Water Withdrawals and Discharges. The Applicant would withdraw water for hydrostatic testing, dust control, trench dewatering, and HDD installation. Hydrostatic testing would require approximately 120 million gallons of water (between 11 and 17 million gallons for each of seven construction spreads) (Enbridge 2016b), which the Applicant would obtain from lakes, streams, or groundwater wells. The proportion of water that would be obtained from groundwater versus surface water has not been determined. Water appropriation needs for dust control, trench dewatering, and HDD installation have not been determined. Prior to construction, the Applicant would obtain water appropriation permits from the state agencies with jurisdiction (listed in Section 5.2.1.2.1). These permits would require identification of and rationale for choosing specific surface water sources; requested maximum pumping rates and maximum annual volumes of water to be used; monitoring of

pumping rates during appropriation with an approved device or method; and reporting of daily, monthly, and/or yearly appropriation amounts.

In accordance with water use permit conditions, the Applicant has proposed the measures described below in the Environmental Protection Plan (Appendix E). If surface water is used, hose intakes would be equipped with a screen to prevent entrainment of aquatic species, and adequate waterbody flow rates and volumes would be maintained to protect aquatic life and allow for downstream uses. The Applicant is currently evaluating transferring water from one test section to another in order to minimize the total quantity of water needed to complete the hydrostatic test.

Hydrostatic test water would be discharged from a test section in accordance with an Industrial NPDES permit in one of two ways: (1) into well-vegetated upland areas using controlled-flow velocity with a dewatering structure such as a silt fence and straw bales or into geotextile filter bags that are used to avoid soil erosion, sediment transport, and bottom scouring; or (2) into the waterbody from which it was withdrawn to prevent the spread of invasive species or degradation in water quality; the discharge rate would not exceed the permitted applicable discharge rate (Appendix E). Water would be treated as specified in NPDES permits prior to discharge; and the Applicant would monitor pH, dissolved oxygen levels, and any other parameters required by the permit, as described in Appendix D of the Environmental Protection Plan (Appendix E). Hydrostatic test water withdrawal and discharges would avoid the use of surface waters with commercially or recreationally important species, including trout streams and ORVWs, as intake sources and discharge locations. Discharges would adhere to all conditions set forth in an MPCA Industrial Wastewater NPDES permit. With adherence to water appropriation and NPDES permit conditions and implementation of Applicant-proposed measures, alterations in stream flows from water appropriation and discharge during construction would be temporary and minor.

Disruption of Flow Paths or Local Hydrologic Connectivity. "Hydrologic connectivity" is the water-mediated transport of matter, energy, and organisms within or between elements of the hydrologic cycle (i.e., the continuous movement of water on, above, and below the Earth's surface) (Pringle 2003). Pipeline construction may disrupt flow paths and groundwater-surface water interaction due to clearing and grading of riparian vegetation, water appropriation and discharge, and channel and streambank modifications caused by waterbody crossings. Hydrologic connectivity can be decreased if barriers are constructed to prevent the natural flow of water and can be increased if natural barriers are removed. Disruption of hydrologic connectivity and the natural interaction between groundwater and surface water can affect water quality by altering the acidity, dissolved oxygen levels, and nutrient and contaminant loads in surface waters, thereby affecting the aquatic environment. It also can allow the spread of invasive species and prevent migration and reproduction of species.

With implementation of the Applicant-proposed measures described above to prevent or minimize erosion and sedimentation, monitor stream flows during water appropriation and discharge, and restore streambanks to their original attributes after construction, impacts on flow and hydrologic connectivity during construction along the construction work area would be temporary to permanent and minor to major. Potential impacts that are permanent and major would be associated with specific site features that are sensitive to disruption of hydrologic connectivity. Springs and other surface water features that are dependent on shallow groundwater have the potential for permanent and major impacts.

Construction would create temporary and permanent access roads that also could affect hydrologic connectivity. The Applicant would restore temporary access roads, including roads that were widened and graded, to preconstruction conditions upon completion of construction. The restoration would include

seeding disturbed areas with a suitable seed mix for the area. The Applicant would leave any improved roads intact if requested by the respective landowner. Impacts on hydrologic connectivity associated with temporary access roads is expected to be short term and negligible to minor, depending on the location of the roads. Impacts from permanent access roads are discussed in the operations section below.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. Because only minor increases in stormwater runoff would occur during construction, the potential for stormwater to carry contaminants into surface waters is low. The impact of contaminants in stormwater runoff on surface water quality therefore would be short term and negligible to minor, continuing until vegetative cover is restored to approximate preconstruction conditions.

Trout rely on coldwater habitats for survival, and exposure to sunlight from vegetation removal can cause adverse warming of the water. Therefore, construction NPDES permits typically prohibit removal of woody vegetation and replacement with grassy vegetation near trout streams unless the reasons are absolutely necessary and completely documented in the SWPPP. Further, to minimize stormwater discharge into and temperature increases in trout streams, NPDES permits typically require that impervious surfaces be minimized; discharges be made into vegetated areas or grass swales, avoiding impervious surfaces when possible; and Infiltration or other volume reduction practices be used to reduce runoff in excess of pre-Project conditions. By complying with these NPDES permit conditions and implementing the Applicant-proposed measures to minimize impacts, it is not likely that construction would impact water temperature in surface waters crossed.

During construction, surface water may become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals as a result of activities such as fuel storage, equipment refueling, and equipment maintenance. To protect surface water resources, the Applicant would store petroleum products, hazardous chemicals, and lubricating oils; conduct refueling, maintenance, and lubricating operations; and perform concrete coating activities in upland areas more than 100 feet from surface waters (Appendix E). Concrete wash water, grindings, and slurry disposal would be limited to a designated area and would not be discharged to surface waters. Rinse water, used in conjunction with a cleaning pig to remove any accumulated construction debris, dirt, and dust prior to hydrostatic testing, would be treated and disposed of or discharged in accordance with applicable NPDES permit conditions. During HDD installation, drilling mud and slurry would be stored away from the waterbody in an earthen berm sediment control structure, in tanks, or by other methods so that it does not flow into the waterbody. Excess drilling mud would be disposed of offsite at an approved disposal facility. In addition to these prevention measures, the Applicant would be responsible for cleaning up small spills through procedures described in the Environmental Protection Plan (Appendix E), including notifying proper personnel (e.g., the onsite spill coordinator) and agencies, stopping the work activity that caused the spill, using absorbent booms and pads to contain and recover released materials in water, and disposing of contaminated response materials at approved facilities. With adherence to NPDES permit conditions and implementation of Applicant-proposed measures, impacts on surface water quality from small leaks and spills during construction would be temporary and minor.

Potential impacts on surface water due to an unanticipated crude oil release are discussed in Chapter 10.

For Section 303(d)-listed surface waters, which already have an impairment that prevents a beneficial use, degradation of water quality is of particular concern. Aquatic life, human health, and recreational activities are already at risk in these surface waters, and further degradation of water quality may exacerbate an existing impairment, cause additional impairments, interfere with restoration activities, or delay attainment of water quality standards. NPDES permits would require identification of impaired waters. If the impaired waters have an approved TMDL implementation plan, the plan must be incorporated into the SWPPP, and discharges must comply with specified TMDLs. With adherence to the above NPDES permit conditions and implementation of Applicant-proposed measures, impacts of construction activities on Section 303(d)-listed surface waters would be temporary to short term and negligible to minor.

Degradation of Aquatic Habitat from Instream Construction Activities. Pipeline construction across surface waters has the potential to alter and degrade aquatic habitat through increased sedimentation and erosion, disruption or alteration of stream flow, and streambank disturbance. High mortality rate for freshwater mussels living in gravel-bedded or sand-bedded channels, negative and greatly reduced survival rates for fish eggs resulting from silt deposits have been documented.

Stream crossings would be designed as close to perpendicular to the axis of the stream channel as engineering and routing constraints allow to create the shortest possible crossing length to minimize disturbance to the stream. The Applicant has proposed primary and alternative crossing methods for the Applicant's proposed project based on various factors, including waterbody size, sensitivity (e.g., trout stream), water levels, soil/sediment stability installation, and anticipated season of installation (Appendix G). If a pipeline route is approved, the Applicant would be required to coordinate with the appropriate state agencies to determine waterbody crossing methods for each waterbody and to obtain crossing permits.

In general, surface waters with stable banks in mineral soil with noticeable flow at the time of construction would be crossed using dry crossing methods, HDD, or guided bore. Surface waters that are dry during construction and selected surface waters that consist of ditches in peatland with no banks or impoundments (e.g., beaver dams and plugged culverts), with stagnant or no noticeable flow conditions, and that would not support dams necessary to isolate and dry the construction area, likely would be crossed using the wet open-cut method.

One of two types of dry open-cut crossing methods would be used for certain sensitive surface waters. The dam-and-pump method would be used for surface waters of low flow, those with meandering channels, and those for which fish passage is not a concern; the flume method would be used in narrow surface waters with defined banks and a straight channel across the construction work area with a solid substrate. Appendix E provides additional details on water crossing methods. Dry crossing methods are advantageous because they limit sediment release and downstream transport, maintain stream flow, reduce the potential for trench sloughing, and provide a dry working environment for pipe installation. However, dry crossing methods are slower than wet trenching, may require fish salvage, and create a short-term barrier to fish passage.

Crossings constructed using either dry open-cut crossing method would release sediments after the dams are removed and natural waterbody flow returns. However, the sediments would readily dissipate to negligible levels in the downstream area in the vicinity of the crossing. As a result, the potential impact on aquatic habitat of using the dry crossing method is expected to be temporary to short term and minor for each crossing.

Wet open-cut crossings would be used to limit the duration of instream disturbance, as construction and pipeline installation via this method is rapid, and where dry crossing methods and HDD are not permitted. Instream construction activities for wet open-cut crossing methods would be completed within 24 hours for minor surface waters (i.e., those less than or equal to 10 feet wide at the water's edge at the time of crossing), within 48 hours for intermediate surface waters (i.e., those greater than 10 feet wide but less than 100 feet wide at the water's edge at the time of crossing), and as specified in applicable permits or by the Applicant for major surface waters (i.e., those greater than 100 feet wide at the time of crossing). The erosion and sedimentation control measures discussed above would be implemented during and after wet open-cut crossings, and disturbed areas at crossings would be restored and stabilized as soon as practical after pipeline installation. As a result, instream construction activities for wet open-cut crossings would cause short-term and minor impacts on aquatic habitat.

Guided bore crossings would be used at narrow wetlands and at shallow ditches adjacent to roads or railroads. Disturbance to the water in the ditch is avoided because the guided bore method involves boring an auger from one side of the ditch to a hole on the other side. This method is not suitable in areas with a high water table, loose sand and gravel substrates, or steep slopes. It also requires excavations and ATWS on either side of the crossing and increases the potential for streambank subsidence; if dewatering is required, sediment release is possible. However, successful bore crossings would cause no impact on aquatic habitat.

HDD crossings would be used to avoid impacts on certain sensitive surface waters, such as impaired waters and coldwater fishery resources; particularly deep, wide, or high-flow surface waters; and where appropriate based on subsurface substrate conditions and length of the drill path. HDD crossings are advantageous because they do not disturb streambeds or streambanks and they maintain stream flow and fish passage. However, they require ATWS on both sides of the crossing, which involves vegetative clearing, soil disturbance, and subsequent restoration activities. Woody vegetation in riparian areas typically would not be cleared for the purpose of ATWS unless approved by appropriate regulatory agencies, as stipulated in permits issued for the Project (Appendix E). Installation of HDD crossings has the potential for inadvertent releases (discussed below). However, successful HDD crossings would cause no impact on aquatic habitat.

Degradation of Water Quality and Habitat from Releases of Drilling Mud during HDD Crossings. Geotechnical surveys would be conducted to determine which surface waters to be crossed are geologically suitable for HDD. During drilling, fluid (water, bentonite clay, and possible Minnesota PCA-approved additives) is circulated through the drilling pipe to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. The potential exists for an inadvertent release or "frac-out" of this drilling fluid to occur when pressurization of the drill hole is beyond the containment capability of the overburden soil material, which would allow the drilling fluid to flow to the ground or riverbed surface. Although bentonite clay is non-toxic, drilling mud can smother aquatic wildlife and increase turbidity in affected surface waters. Additives may be mixed with the drilling fluids/mud for viscosity or lubricating reasons. Only Minnesota PCA-approved non-hazardous additives approved under permit conditions would be used, and a Material Safety Data Sheet for the drilling fluid would be maintained onsite. If a frac-out occurred near the streambank, bank stability may be compromised. Construction personnel would monitor the crossing to detect releases of drilling mud.

When used in appropriate conditions and completed successfully, HDD Crossings have the potential to reduce the amount of sedimentation produced by conventional techniques (Golder 1998). Consequently, HDD can provide a cost effective and environmentally viable solution to water crossings.

This appealing potential has encouraged its use in sensitive crossings such as wetlands and trout streams. Despite increased use over time a serious risk of inadvertent releases or 'frac-outs' exists (Golder 1998).

Multiple conditions can lead to frac-outs, such as circulation losses when drilling into highly permeable gravels and inaccurate drilling of pilot holes. The amount of fluid released is related to variables such as the pressure exerted on the fluid by the hydraulic system. Finally, "the subsequent dispersion from the release point will then be a function of the energy, or sediment transport characteristics of the receiving waterbody" (Golder 1998).

Negative impacts from frac-outs include: toxicity of drilling mud to aquatic organisms; the effects of spills or inadvertent releases of drilling fluid; and the disposal of drilling wastes. Slade (2000), reports "short-term effects of releasing drilling fluid into wetlands include temporary displacement of resident fauna, smothering of benthic organisms and plant root systems, increased turbidity of water quality, and effects on water chemistry and wetland hydrology." A release can reduce densities and emergence of adult benthic invertebrates, change hydrological and soil conditions, change fish physiology, behavior, and habitat suitability; and cause long-term impacts on the aquatic ecosystem (Golder 1998). Slade 2000, also identifies additional environmental considerations for the drill rig set-up with respect to water resources and sensitive areas: containment and storage placement of raw fluids, water appropriation and water storage areas, delineation of the "no fueling" areas, and disposal of drilling fluid and cuttings upon completion.

It can be difficult to predict the probability of an occurrence. Yet loss of circulation is common in HDD operations. Longer crossings and HDDs passing through glacial tills, boulders and gravels, have a higher risk of failure. Slade 2000, studied a pipeline construction project from Stockbridge to Freedom Junction Michigan (Enbridge). This was a 35-mile, 16-inch crude petroleum pipeline using 11 HDDs to cross through wetlands, streams and state recreational areas. Results determined multiple relatively minor releases requiring less clean up and two major frac-outs resulting in significant (volume, location, ecology) issues.

It is important to consider the implications (on organisms, sediment, physical disturbance) of potential frac-outs and clean-up operations, identify the pros and cons of each type of crossing method, then match the appropriate technique to each crossing based on the site characteristics and conditions. Therefore, this Project would take all of these into consideration for deciding what technique is applied to each site when using HDD[1] (see HDD contingency plan). This Project would follow BMPs to minimize potential impacts for all crossings during this Project.

The HDD operator would constantly monitor drilling fluid pressures during pilot hole operations and, if a loss in fluid pressure or circulation were identified, the operator would notify onsite construction observers who would visually monitor the portion of the drill path where the drill tool is located to determine whether a drilling mud release occurred. If a release occurred, the Applicant would implement containment, response, and clean-up procedures as outlined in the Applicant's Environmental Protection Plan (Appendix E) to limit the potential for drilling mud to reach surface water. These procedures include containment using straw bales, sandbags, pumps and hoses, vacuum trucks; response activities including adjusting drill rates and pump volumes or stopping drilling, removal of mud with pumps and appropriate storage away from the waterbody prior to disposal; and coordination with appropriate agencies to discuss additional containment or clean-up requirements. If the frac-out caused impacts on the streambank, the bank would be restored to the extent possible using

the channel and streambank modification BMPs described above. If a frac-out occurred and went undetected or was not quickly contained, impacts on surface water quality could be long-term and major. However, with implementation of the Applicant-proposed measures to respond to a drilling mud release during HDD construction, the impact of a release could be short term and minor to major.

Changes in Channel Morphology and Stability Caused by Channel and Streambank Modifications

Dry and wet open-cut waterbody crossing methods involve excavation of the streambed and potential changes to streambank stability and channel morphology. As described in the Environmental Protection Plan (Appendix E), temporary erosion control measures would be implemented as appropriate to minimize the impacts of surface water crossing activities; rock riprap, geotextile fabric, and other bioengineering techniques would be used to stabilize streambanks as needed. However, rock riprap can cause additional bank erosion.

After pipeline installation at river beds and streambeds crossed using dry crossing methods, the trench would be backfilled to restore the streambed or river bed to approximately preconstruction conditions. Although the pipeline trench created with the wet open-cut crossing technique also would be backfilled, it would be more difficult to restore the streambed or river bed to approximately preconstruction conditions. Sediments in those surface waters would continue to be deposited and it is likely that the streambed or river bed eventually would return to preconstruction conditions. For either type of crossing method, there would be little or no impediment to water flow. In addition to backfilling, streambanks would be restored to preconstruction grades when practicable. If the slope is determined to be unstable, the banks would be reshaped to prevent slumping. After reestablishing the grade, streambanks would be restored with appropriate vegetation.

The use of open-cut crossing methods for pipeline construction, along with the measures described above, would result in short-term to long-term and minor impacts on channel morphology and streambank stability. Construction of crossings using the HDD method would result in no impact on channel morphology or streambank stability.

Disturbance of Wild Rice Waterbodies

Wild rice waterbodies can be susceptible to disturbance in all habitats (lake or river) and are sensitive to temperature changes, contaminants, and hydrology changes—all of which on their own or in combination could affect germination and production. Four wild rice waterbodies would be crossed by the Applicant's proposed project, with about 5 acres of the delineated waterbody basins within the construction work area. Construction would occur across the edge of the basins within the existing pipeline corridor but not through the wild rice stands on Mud Lake, Peterson Lake, and Portage Lake (Appendix A). In addition, some or all of the wild rice areas occur along the margins of larger waterbodies where the Applicant would use site-specific waterbody crossing techniques, including HDD. HDD would be used to cross the unnamed wild rice waterbody at Hay Creek and the crossing of Shell River, a wild rice waterbody. At this location and at other sites where HDD is used as the crossing method, the wild rice waterbodies would not be affected unless a frac-out occurs (see above for information on frac-outs).

Where HDD is not used, the wild rice waterbodies would be crossed using applicable wetland crossing methods for the water saturation conditions at the crossing (see Appendix E for a description of the wet waterbody and wetland construction methods). Trenched crossing could remove the rice plants and disturb sediments and increase sedimentation within the remainder of the waterbody. Although the Applicant would restore the hydrology and soils of the affected wild rice waterbodies after construction,

rice yield would be reduced in the portion of the waterbody directly affected by the repair or replacement activities for the first growing season after construction. To minimize impacts of construction through wild rice waterbodies, the Applicant would implement applicable measures identified in the Environmental Protection Plan (Appendix E). This plan contains measures to reduce or avoid impacts on wild rice during construction. Avoidance measures include use of a narrower construction work area, reseeding, monitoring, and use of timber mats, and would incorporate any additional measures proposed by local and state agencies to reflect existing regional policies and procedures to protect wild rice. Wild rice stands also would be monitored for overall condition, function, and vegetative regrowth after construction until the permit conditions are met.

Although not anticipated, construction-related impacts on wild rice waterbodies could include longer than expected recovery time for native wild rice stands (i.e., could affect rice waterbodies beyond the first growing season after construction), introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice, and altered lakebed conditions—all of which could be detrimental to wild rice germination and production. These potential impacts would be reduced through Project-specific SPCC plans, invasive species management plans, and post-construction monitoring of vegetation for a period of time until permit conditions are met, as described in the Applicant's Environmental Protection Plan (Appendix E). With implementation of these measures, impacts on wild rice waterbodies are expected to be short term and minor. However, if HDD frac-out, introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice, and altered lakebed conditions occur as a result of construction, impacts could be major.

Operations Impacts

Runoff and Flows

Increases in Stormwater Runoff and Erosion. After the pipeline is installed, revegetation of the permanent right-of-way may require up to several years to reestablish to approximately preconstruction conditions, except for areas where new impervious surfaces are created, as addressed below. Runoff patterns along the non-impervious portions of the permanent right-of-way therefore would be altered during the first few years of operation, resulting in impacts of increased runoff and erosion that would be short term and negligible to minor. These changes could be more significant at streams within forested habitat. After vegetation is reestablished along the permanent right-of-way, surface water runoff and erosion would return to approximately preconstruction conditions. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would make the appropriate repairs and improvements.

Within Minnesota, expansion of the Clearbrook terminal, modification of three pump stations, construction of four new pump stations, and installation of 27 MLVs would add approximately 67 acres of impervious surfaces, with approximately 30 acres of that area between Clearbrook and Carlton. Stormwater retention ponds would be located at each pump station, consisting of an additional approximately 10 acres. No new permanent facilities are proposed outside of Minnesota for the Applicant's proposed project. The new and expanded facilities would be required to manage stormwater runoff through NPDES permits and SWPPPs as described above and through installation of stormwater retention ponds. Impacts on surface water from increased stormwater runoff from these facilities would be permanent and negligible to minor.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. During the first few years of operation, there may be a small increase in surface water runoff and erosion as revegetation continues, potentially resulting in increases in TSS and sedimentation in nearby surface waters. The impact of this increase on surface waters would be short term and negligible to minor.

The pipeline right-of-way in upland areas would be maintained in an herbaceous vegetative state during operation to allow access along the right-of-way for inspection, monitoring, and maintenance. The permanent removal of riparian vegetation within the permanent right-of-way in areas adjacent to waterbody crossings would result in localized alterations in habitat, streambank stability loss and erosion, and sedimentation. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify streambank areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would make the appropriate repairs and improvements. With implementation of these measures, the impacts associated with the localized changes to topography or vegetation would result in short-term to permanent and minor impacts in the vicinity of the alteration.

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. This could result in topographical changes and loss of vegetation in localized areas for relatively short periods of time, which would alter runoff patterns and could increase erosion. The Applicant would implement measures to minimize impacts during and after these activities, similar to the measures incorporated into the Project during construction. As a result, the impacts of these integrity management activities would be similar to those experienced during construction, but over a much smaller area. The impacts from increased TSS and sedimentation in nearby surface waters would be short term and negligible to minor for each local occurrence, but would occur periodically over the life of the Project.

Changes in Stream Flows from Water Withdrawals and Discharges. Normal operation of the Applicant's proposed project would not require withdrawal or discharge of water. However, during the repair or replacement of pipe as part of the Applicant's Integrity Management Program described above, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during the integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control are not defined. As described for pipeline construction, the Applicant would be required to obtain water appropriation and NPDES permits for testing procedures, and the volume of water would be substantially less than for construction. With adherence to permits and implementation of BMPs, impacts associated with alterations in stream flows from water appropriation and discharge would be temporary and negligible.

Disruption of Flow Paths or Local Hydrologic Connectivity. Integrity management digs would result in minor alterations of topography and stormwater flows at the excavation sites. With implementation of the Applicant-proposed measures described above to avoid changes to stormwater runoff and restore streambanks to their original attributes after work is completed, impacts on flow and hydrologic connectivity in the areas excavated for pipe repair or replacement would be temporary to short term and negligible to minor.

Permanent access roads during operation also could affect hydrologic connectivity. It is anticipated that permanent access roads would require local or state permits, which likely would require culverts to minimize the changes to hydrologic connectivity. Although the extent of the changes in those cases would depend on the topography of the area and the design of the roadway, the impact on hydrologic

connectivity likely would be permanent and minor. For access roads without culverts, the extent of changes to hydrologic connectivity could be greater, again dependent on the topography of the area and the design of the roadway. Where those roadways are present, the impact on hydrologic connectivity likely would be permanent and minor.

Other permanent aboveground facilities, such as pump stations and MLVs, also would affect hydrologic connectivity. Due to the relatively small footprints of these facilities, it is anticipated that the impact of their presence would be permanent but negligible to minor.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. The pipeline right-of-way in upland areas would be maintained in an herbaceous vegetative state during operation to allow access along the right-of-way for inspection, monitoring, and maintenance. The permanent removal of riparian vegetation in areas adjacent to waterbody crossings would allow more light to enter the waterbody and could cause long-term to permanent but negligible to minor increases in temperature at these locations. These effects would be more pronounced in areas where forest habitat is removed and herbaceous vegetation used for revegetation.

During normal operation, there would be no other measurable changes to water quality in surface waters. The minor changes within the major drainage basins and watersheds crossed by the Applicant's proposed project would not result in degradation of the watershed water quality score. As a result, water quality would not change in the surface waters of the basins and watershed along the route, including impaired surface waters. Therefore, watershed surface water quality would not be affected during normal operation of the Project.

Minor accidental fuel and lubricant leaks and spills could be released from maintenance and inspection vehicles. Any refueling, fuel storage, or vehicle maintenance would follow the Applicant-proposed measures set forth in the Environmental Protection Plan (Appendix E). Thus, minor leaks and spills during operations would result in temporary and negligible to minor impacts on surface water quality. The potential impacts of a crude oil release on surface water quality are addressed in Chapter 10.

Degradation of Aquatic Habitat from Instream Activities. Instream excavations may be required to repair or replace pipe segments buried beneath surface waters. This would result in impacts similar to those described for surface water crossings. The excavations to reach the pipe segments may be accomplished using the wet open-cut method or more likely would involve use of one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would release sediments after the dams are removed and natural waterbody flow returns. However, the sediments would readily dissipate to negligible levels in the downstream area in the vicinity of the crossing. As a result, the potential impact of using the dry open-cut method for instream integrity digs on aquatic habitat is expected to be temporary to short term and minor for each crossing.

If the wet open-cut method is used for integrity digs, the Applicant would implement the erosion and sediment control measures discussed above for construction of surface water crossings. These measures would be implemented during and after wet open-cut integrity digs, and if streambanks are disturbed, they would be restored and stabilized as soon as practical after completion of the pipe repair or replacement. As a result, instream integrity dig activities for using the wet open-cut method would result in short-term and minor impacts on aquatic habitat.

Changes in Channel Morphology and Stability Caused by Channel and Streambank Modifications

Excavation and repair or replacement of pipe may be required within surface waters or at the banks of surface waters. The excavations to reach the pipe segments may be accomplished using the wet open-cut method, or more likely would involve use of one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would involve backfilling of the trench, after the repair or replacement is made, to the approximate contours of the river bed or streambed. This could result in a minor, temporary change in channel morphology until the natural sedimentation processes of the waterbody return the affected area to essentially match the nearby morphology. If streambanks are affected by the digs, they would be restored to preconstruction grades when practicable. If the slope is determined to be unstable, the banks would be reshaped to prevent slumping. After reestablishing the grade, streambanks would be restored with appropriate vegetation. As a result, the potential impact on channel morphology and stability of using the dry open-cut method for instream integrity digs is expected to be temporary to short term and negligible to minor for each crossing.

The impacts associated with using the wet open-cut method for instream integrity digs may require a longer period of time for natural sedimentation processes to accomplish the same result. If streambanks are affected by the digs, they would be restored as described above. As a result, the potential impact on channel morphology and stability of using the wet open-cut method for instream integrity digs is expected to be short term and minor for each crossing.

Disturbance of Wild Rice Waterbodies

The wild rice waterbodies crossed by HDD at Hay Creek and Shell River would not be affected during operations. Wild rice waterbodies would not be affected by normal pipeline operation unless it is necessary to repair or replace a section of pipe within the waterbody as a part of the Applicant's Integrity Management Program. In that event, the impacts would be similar to those of the original crossing construction. Although the Applicant would restore the hydrology and soils of the affected portion of the wild rice waterbody after construction, rice yield in the portion of the waterbody affected by the repair or replacement activities could be reduced for the first growing season after completion of the activity. It is likely that only a portion of the approximately 3 acres of wild rice waterbodies within the permanent right-of-way would require repair or replacement at any one time; these activities could result in short-term and negligible to minor impacts. However, if replacement of a section of pipe within the waterbody resulted in, introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice, and altered lakebed conditions impacts could be major.

Continued Use of Existing Line 3

Construction Impacts

Continued use of Line 3 would not require construction because the full length of the pipeline was previously installed. As a result, there would be no construction impacts on surface water from continued use of the existing Line 3 pipeline.

Operations Impacts

Operations impacts for continued use of the existing Line 3 would be similar to those discussed for the Applicant's proposed project. However, continued use of Line 3 at its present capacity would require more frequent activities associated with Applicant's Integrity Management Program than for the Applicant's proposed project or for SA-04. The Applicant estimated that an average of 267 integrity digs

(i.e., excavations to repair or replace sections of pipe) would be required per year (see Section 4.2.3 for more detail). These activities may result in extensive disturbance at surface water crossings and near-surface waters. The impacts of the integrity excavations, backfilling, and revegetation are described below; impacts would be comparable to new pipeline construction but on a smaller scale as they would be localized in the area of each integrity dig.

Runoff and Flows

Increases in Stormwater Runoff and Erosion. The existing Line 3 pipeline has been in place for decades, and the vegetative cover is well established. As a result, stormwater runoff and erosion would continue at the same level as in the past.

During operation, the Applicant would implement its Integrity Management Program, which can require excavation and repair or replacement of sections of the pipeline. This could result in topographical changes and loss of vegetation in localized areas for relatively short periods of time, which would alter runoff patterns and could increase erosion. The Applicant would implement measures to minimize impacts during and after these activities, similar to the measures incorporated into the Project during construction. As a result, the impacts of these integrity management activities on stormwater runoff and erosion would be short term and negligible to minor for each local occurrence, but would occur periodically over the life (i.e., permanently) of the Project. As noted above, the number of integrity digs required for the decades-old existing pipeline would be substantially greater than for new pipe, and the impacts would occur more frequently than for a new pipeline.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. As noted above, the existing Line 3 pipeline has been in place for decades, and the vegetative cover is well established. Therefore, stormwater runoff and erosion would continue at the same level as in the past. No increase in eroded soils reaching surface waters with stormwater runoff would occur, and TSS and sedimentation in those waters would not change.

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. In upland areas, this could result in topographical changes and loss of vegetation in localized areas for relatively short periods of time, which would alter runoff patterns and could increase erosion and the potential for eroded soil to reach nearby surface waters. This could result in increases in TSS and sedimentation within the affected surface waters. The Applicant would implement measures to minimize impacts during and after these activities, similar to the measures incorporated into the Project during construction. As a result, the impacts of these integrity management activities on TSS and sedimentation would be short term and negligible to minor for each local occurrence, but would occur periodically over the life of the Project.

Repair or replacement of sections of pipe buried under surface waters would be accomplished using the wet open-cut method or more likely would involve use of one of the dry open-cut methods. Integrity management excavations accomplished using either of the dry open-cut crossing methods would release sediments after the dams are removed and natural waterbody flow returns, which would increase both TSS and downstream sedimentation. However, the sediments would readily dissipate to negligible levels in the downstream area in the vicinity of the crossing. As a result, the potential impact of increased TSS and sedimentation from using either of the dry open-cut methods for instream integrity digs is expected to be short term and minor for each crossing.

If the wet open-cut method is used for integrity digs, the Applicant would implement comparable erosion and sediment control measures as discussed above for construction of surface water crossings. It was assumed that these measures would be implemented during and after wet open-cut integrity digs. If streambanks are disturbed, they would be restored and stabilized as soon as practical after completion of pipe repair or replacement. As a result, instream integrity dig activities using the wet open-cut method would be expected to result in short-term and minor impacts on aquatic habitat.

For all integrity digs addressed above, the number of digs required for the decades-old existing pipeline would be substantially greater than for new pipe, and the impacts would occur more frequently than for a new pipeline.

Changes in Stream Flows from Water Withdrawals and Discharges. Continued normal operation of existing Line 3 would not require withdrawal or discharge of water beyond current requirements, if any. However, during the repair or replacement of pipe as part of the Applicant's Integrity Management Program described above, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during the integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control are not defined. As described for pipeline construction, the Applicant would be required to obtain water appropriation and NPDES permits for testing procedures, and the volume of water would be substantially less than for construction. With adherence to permits and implementation of BMPs, minor alterations in stream flows from water appropriation and discharge would be temporary and negligible.

Disruption of Flow Paths or Local Hydrologic Connectivity. Integrity management digs would result in minor alterations of topography and stormwater flows at the excavation sites. With implementation of the Applicant-proposed measures described above to avoid changes to stormwater runoff and restore streambanks to their original attributes after work is completed, impacts on flow and hydrologic connectivity in the areas excavated for pipe repair or replacement would be temporary to short term and negligible to minor.

Permanent access roads during operation also could affect hydrologic connectivity. It is anticipated that permanent access roads would require local or state permits, which likely would require culverts to minimize the changes to hydrologic connectivity. Although the extent of the changes in those cases would depend on the topography of the area and the design of the roadway, the impact on hydrologic connectivity likely would be permanent and minor. For access roads without culverts, the extent of changes to hydrologic connectivity could be greater, again dependent on the topography of the area and the design of the roadway. Where those roadways are present, the impact on hydrologic connectivity likely would be permanent and minor to major.

Other permanent aboveground facilities, such as pump stations and MLVs, also would affect hydrologic connectivity. Due to the relatively small footprints of these facilities, it is anticipated that their presence would result in permanent but negligible to minor impacts.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. As noted above, the existing Line 3 pipeline has been in place for decades, and the vegetative cover is well established. During operation, there would be no potential for increased runoff to carry contaminants to nearby surface waters; and continued operation would not

influence temperature changes to the water beyond those currently occurring, if any. As a result, normal operations would not affect water quality, including temperature.

Similarly, maintenance of the permanent right-of-way during operation would be expected to continue at the current level of activity. Consequently, the current level of contamination of surface waters, if any, would not change because of minor leaks and spills of petrochemicals and other chemicals from maintenance vehicles using the permanent right-of-way and nearby areas. Because of the increased need for integrity digs for the decades-old pipeline, the number of vehicles transiting the permanent right-of-way and nearby areas would increase, with the potential for an increase in the number of small leaks from the vehicles. Although this would increase the potential for petrochemicals to reach surface waters, the Applicant would implement the BMPs described for construction of the Applicant's proposed project, which would minimize the impacts. The impact on surface water quality related to small leaks from vehicles used during integrity digs would be +temporary to short term and negligible to minor.

During operation, the Applicant would implement its Integrity Management Program, which can require excavation and repair or replacement of sections of the pipeline. This could result in topographical changes and loss of vegetation in localized areas for relatively short periods of time, which would alter runoff patterns and could increase erosion and the potential for contaminants to reach nearby surface waters. In addition, repair or replacement of sections of pipe buried under surface waters would result in changes to water quality in the area of and immediately downstream of the excavated pipe section. The Applicant would implement measures to minimize impacts during and after these activities, similar to the measures incorporated into the Project during construction. As a result, the impacts of these integrity management activities on surface water quality would be short term and negligible to minor for each local occurrence, but they would occur periodically over the life of the Project. As noted above, the number of integrity digs required for the decades-old existing pipeline would be substantially greater than for new pipe, and the impacts would occur more frequently than for a new pipeline.

During normal operation, there would be no other measurable changes to water quality in surface waters. The minor changes within the major drainage basins and watersheds crossed by the existing Line 3 would not result in degradation of the watershed water quality score. As a result, water quality would not change in the surface waters of the basins and watershed along the route, including impaired surface waters. Therefore, watershed surface water quality would not be affected during normal operation of the Project.

Potential impacts on surface water due to an unanticipated crude oil release are discussed in Chapter 10.

Degradation of Aquatic Habitat from Instream Activities. Instream excavations may be required to repair or replace pipe segments buried beneath surface waters. This would result in impacts similar to those described for surface water crossings. The excavations to reach the pipe segments may be accomplished using the wet open-cut method or more likely would involve using one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would release sediments after the dams are removed and natural waterbody flow returns. However, the sediments would readily dissipate to negligible levels in the downstream area in the vicinity of the crossing. As a result, the potential impact of using the dry open-cut method for instream integrity digs on aquatic habitat is expected to be temporary to short term and minor for each crossing.

If the wet open-cut method is used for integrity digs, the Applicant would implement the erosion and sediment control measures discussed above for construction of surface water crossings. These measures would be implemented during and after wet open-cut integrity digs, and if streambanks are disturbed, they would be restored and stabilized as soon as practical after completion of the pipe repair or replacement. As a result, instream integrity dig activities for using the wet open-cut method would result in short-term and minor impacts on aquatic habitat.

Changes in Channel Morphology and Stability Caused by Channel and Streambank Modifications

Excavation and repair or replacement of pipe may be required within surface waters or at the banks of surface waters. The excavations to reach the pipe segments may be accomplished using the wet open-cut method or more likely would involve use of one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would involve backfilling of the trench, after the repair or replacement is made, to the approximate contours of the river bed or streambed. This could result in a minor, temporary change in channel morphology until the natural sedimentation processes of the waterbody return the affected area to essentially match the nearby morphology. If streambanks are affected by the digs, they would be restored to preconstruction grades when practicable. If the slope is determined to be unstable, the banks would be reshaped to prevent slumping. After reestablishing the grade, streambanks would be restored with appropriate vegetation. As a result, the potential impact on channel morphology and stability of using the dry open-cut method for instream integrity digs is expected to be temporary to short term and negligible to minor for each crossing.

The impacts associated with using the wet open-cut method for instream integrity digs may require a longer period of time for natural sedimentation processes to accomplish the same result. If streambanks are affected by the digs, they would be restored as described above. As a result, the potential impact on channel morphology and stability of using the wet open-cut method for instream integrity digs is expected to be short term and minor for each crossing.

Disturbance of Wild Rice Waterbodies

One wild rice waterbody is located within the permanent right-of-way for the existing Line 3 route. However, the pipeline is not installed within the waterbody but only crosses the dry basin portion of the wild rice lake boundary. If excavation and repair or replacement of a segment of pipeline in this area are required, no direct impacts on the wild rice waterbody would occur. This activity could result in topographical changes and loss of vegetation in the area near the wild rice waterbody for a relatively short period of time. Although there is a potential that these changes could alter runoff patterns and increase erosion, the Applicant would implement measures to minimize changes in stormwater runoff and erosion, as described above, during and after the integrity dig. Consequently, the impacts on a wild rice waterbody of an integrity dig near the waterbody would be short term and negligible. However, if introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice, and altered lakebed conditions occur as a result of an integrity dig, impacts could be major.

System Alternative SA-04

System alternative SA-04 would require 636 waterbody crossings (172 in Minnesota) (see Table 5.2.1.2-8 for the types of surface waters crossed), including 56 state-designated use/sensitive surface waters, 6 (1 in Minnesota) NRI-listed river crossings (listed in Table 5.2.1.2-9), 32 (8 in Minnesota) impaired surface water crossings (listed in Table 5.2.1.2-10), and 9 (2 in Minnesota) navigable waterway crossings.

The types of activities that could result in impacts during construction and operation of SA-04 would be essentially the same as those described for the Applicant's proposed project. As a result, some of those activities are briefly mentioned below, with more details provided in the sections above for construction and operation of the Applicant's proposed project. Construction and operation of SA-04 would affect more surface waters because the route crosses substantially more surface waters than the Applicant's proposed project.

Construction Impacts

Construction impacts for system alternative SA-04 would include impacts of the same type, magnitude, and duration as discussed above for the Applicant's proposed project; specific crossing methods for each waterbody and the construction timeline for system alternative SA-04 have not been developed. If SA-04 is constructed, it was assumed that the Applicant would implement the same Applicant-proposed measures identified for the Applicant's proposed project (Appendix E) and would implement all necessary requirements mandated by North Dakota, Minnesota, Iowa, and Illinois permits to reduce impacts on surface water for the route.

Based on the spacing of pump stations along the Applicant's proposed project, and estimated 16 new pump stations would be required and located approximately every 50 miles along system alternative SA-04. Each pump station would require approximately 8 acres of land and would be within the construction work area. The assumption for facility location assumed that MLVs would be sited in a manner similar to that of the Applicant's proposed project: near water crossings, significant environmental resources, and populated areas. Hydraulic analysis of operation of the pipeline on system alternative SA-04 is not available; therefore, the specific locations of pump stations and MLVs were not available at the time of preparation of this EIS analysis.

Runoff and Flows

Increases in Stormwater Runoff and Erosion. Clearing and grading would be required for construction of the SA-04 pipeline, MLVs, new and expanded pump stations, cathodic protection sites, and for access roads and ATWS, including pipe yards. Newly cleared areas and impervious surfaces could cause increased stormwater runoff and erosion into nearby surface waters; however, the Applicant would comply with the requirements of applicable permit programs that are in place to manage potential impacts. This would include NPDES permits that would specify various stormwater and erosion control measures to be implemented, such as requiring stormwater to be routed around exposed soil areas through conveyance channels and stormwater discharges to be directed from the site to vegetated areas in order to increase sediment removal and infiltrate stormwater on the site when feasible. With adherence to NPDES permit stipulations and use of appropriate BMPs, similar to those described above for the Applicant's proposed project, impacts from increases in stormwater runoff and erosion from clearing and grading during construction would be short term to long term and minor.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. In addition to clearing and grading, other construction activities such as blasting, trenching, waterbody crossings, ATWS and access road construction, and water discharges may cause increased suspended solids and sedimentation in the surface waters crossed by SA-04. The Applicant-proposed measures for temporary erosion controls, SWPPP requirements, and NPDES permit requirements described above for the Applicant's proposed project would be implemented during these activities to prevent sediment transport into surface waters during construction. During pipeline construction across a waterbody, the extent and duration of sedimentation and increased erosion potential depend on the soils, sediments, and topography of the crossing site and the proposed crossing method used.

The need for blasting along system alternative SA-04 is not known. If blasting was required, the Applicant would develop a Blasting Plan prior to construction that would include measures to protect nearby surface waters from impacts. Therefore, impacts on TSS from this localized blasting event likely would be temporary and negligible to minor.

Specific crossing methods for surface waters have not been determined for system alternative SA-04. When using the dry crossing method, increases in TSS and sedimentation would be localized and temporary in surface waters crossed because construction of the pipeline across the waterbody would occur in a dry area created by the temporary dams upstream and downstream of the work area. TSS and sedimentation would increase when flow is returned to the dry channel but would readily dissipate to negligible levels downstream in the vicinity of the crossing. As a result, impacts would be temporary to short term and minor.

Wet open-cut methods involve excavation of the channel and banks in the wetted channel, and excavated soils would be in direct contact with surface water. With adherence to NPDES permit stipulations and use of appropriate BMPs, similar to those described above for the Applicant's proposed project, impacts from increases in TSS concentrations and increased sedimentation in surface waters from using open-cut wet crossings would be temporary to short term and minor.

Changes in Stream Flows from Water Withdrawals and Discharges. Construction of SA-04 would require water withdrawal for hydrostatic testing, dust control, trench dewatering, and HDD installation, which would be sourced from lakes, streams, or groundwater wells. Approximately 11 to 17 million gallons would be required for hydrostatic testing for each construction spread; the number of construction spreads for SA-04 has not been determined, but substantially more spreads would be required than for the Applicant's proposed project because of the greater length of the route (about 795 miles for SA-04 versus about 340 miles for the Applicant's proposed project). The volume of water appropriation needed for dust control, trench dewatering, and HDD installation for system alternative SA-04 has not been determined. If a route permit is issued for this route, the Applicant would need to obtain a Water Appropriation Permit from each state crossed by the route prior to construction.

Hydrostatic test water would be discharged from a test section in one of two ways, as described for the Applicant's proposed project. Discharges would adhere to all conditions set forth in NPDES and water appropriation permits, including discharge over approved energy dissipation measures (e.g., sand bags, plastic sheeting, or natural rock riprap) and the sedimentation control measures as described above. With adherence to water appropriation and NPDES permit conditions and implementation of Applicant-proposed measures, impacts on stream flows from water appropriation and discharge during construction of SA-04 would be temporary and minor.

Disruption of Flow Paths or Local Hydrologic Connectivity. As described above for the Applicant's proposed project, pipeline construction may disrupt flow paths and groundwater-surface water interaction due to clearing and grading of riparian vegetation, water appropriation and discharge, construction of temporary and permanent access roads, and channel and streambank modifications caused by waterbody crossings. With implementation of measures similar to those described for the Applicant's proposed project to prevent erosion and sedimentation, to monitor stream flows during water appropriation and discharge, and to restore streambanks to their original attributes following construction, impacts on flow and hydrologic connectivity during construction of SA-04 would be temporary to permanent and minor to major.

Construction would involve creation of both temporary and permanent access roads that also could affect hydrologic connectivity. The Applicant would restore temporary access roads, including roads that were widened and graded, to preconstruction conditions upon completion of construction. The restoration would include seeding disturbed areas with a suitable seed mix for the area. The Applicant would leave any improved roads intact if requested by the respective landowner. Impacts on hydrologic connectivity associated with temporary access roads for SA-04 is expected to be short term and negligible to minor, depending on the location of the roads. Impacts from permanent access roads are discussed in the operations section below.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. Because only minor increases in stormwater runoff would occur during construction, as noted above, the potential for stormwater to carry contaminants into surface waters is low. The impact of contaminants in stormwater runoff on surface water quality therefore would be short term and negligible to minor, continuing until vegetative cover is restored to approximate preconstruction conditions.

Surface water along SA-04 could become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities such as fuel storage, equipment refueling, and equipment maintenance. However, to protect surface water resources, NPDES permits for construction of the route would require secondary containment of hazardous materials, prohibition of engine degreasing at work sites, containment and collection of liquid and solid wastes, and a spill prevention and response plan for fueling and maintenance of vehicles. Similar treatment/disposal or discharge measures to those described for the Applicant's proposed project would be necessary for handling concrete wash water, grindings, drilling mud and slurry, and rinse water generated by construction and hydrostatic testing.

In addition, the Applicant would be responsible for cleaning up small spills during construction of the route through procedures similar to those described in the Environmental Protection Plan (Appendix E) for the Applicant's proposed project, including notifying proper personnel (e.g., the onsite spill coordinator) and agencies, stopping the work activity that caused the spill, using absorbent booms and pads to contain and recover released materials in water, and disposing of contaminated response materials at approved facilities.

For Section 303(d)-listed surface waters, which already have an impairment that prevents a beneficial use, degradation of water quality is of particular concern. NPDES permits for construction of SA-04 likely would require identification of Section 303(d) waters with phosphorus, turbidity, dissolved oxygen, or biotic impairment within 1 mile of construction. If the impaired waters have an approved TMDL implementation plan, the plan likely would be required to be incorporated into the SWPPP, and discharges must comply with specified TMDLs. With adherence to these permit conditions and implementation of Applicant-proposed measures, impacts on surface water quality from small leaks and spills during construction would be temporary to short term and minor.

Degradation of Aquatic Habitat from Instream Construction Activities. Pipeline construction across surface waters has the potential to alter and degrade aquatic habitat through increased sedimentation and erosion, disruption or alteration of stream flow, and streambank disturbance. High mortality rate for freshwater mussels living in gravel-bedded or sand-bedded channels, negative and greatly reduced survival rates for fish eggs resulting from silt deposits have been well documented. The specific crossing method for each crossing has not been determined for construction of SA-04 but would be selected

based on various factors, including waterbody size, sensitivity (e.g., trout stream), water levels, soil/sediment stability, and anticipated season of installation. If a route permit is issued for this route, the Applicant would be required to obtain crossing permits for the surface waters crossed by the route.

Similar to construction of the Applicant's proposed project, dry and wet open-crossing crossing methods would be used. Each method has advantages and disadvantages for minimizing potential impacts on aquatic habitats. Assuming that erosion and sedimentation control measures would be the same as those discussed above for the Applicant's proposed project and that disturbed areas at crossings would be restored and stabilized as soon as practical after pipeline installation, using the dry open-cut crossing method would result in temporary to short-term and minor impacts on aquatic habitat for each crossing; with use of the wet open-cut method, the impact on aquatic habitat would be short term and minor.

If selected for certain crossings along the route (e.g., roads and ditches), successful guided bore crossings would result in no impacts on aquatic habitat. In addition, HDD crossings likely would be used to avoid impacts on certain sensitive surface waters, such as impaired waters and coldwater fishery resources; and particularly deep, wide, or high-flow surface waters. The use of HDD crossings would be determined based on evaluations of subsurface substrate conditions and length of the drill path. HDD crossings are advantageous because they do not disturb streambeds or streambanks, and they maintain stream flow and fish passage. Construction of an HDD crossing is slower than a dry crossing, and there is the potential for inadvertent releases (discussed below). As described above for the Applicant's proposed project, successful HDD crossings would result in no impacts on aquatic habitat during construction of SA-04.

Degradation of Water Quality and Habitat from Drilling Mud Releases during HDD Crossings*.* Specific locations to implement HDD crossings have not been determined for system alternative SA-04. Geotechnical surveys would need to be conducted along the route of SA-04 to determine which surface waters would benefit from use of the HDD method and which of those surface waters are in areas that are geologically suitable for HDD. During drilling, fluid (water, bentonite clay, and possible additives) is circulated through the drilling pipe to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. The potential exists for an inadvertent release or frac-out of this drilling fluid when pressurization of the drill hole is beyond the containment capability of the overburden soil material, which would allow the drilling fluid to flow to the ground or riverbed surface. Risk of HDD frac-out is discussed above in the assessment of impacts on surface water and aquatic habitat quality from the Applicant's proposed project. If a frac-out occurred during construction of the route and went undetected or was not quickly contained, impacts on surface water quality could be long term and major. However, with implementation of measures similar to those described for the Applicant's proposed project to respond to a drilling mud release during HDD construction along SA-04, the impact of a release of drilling fluid on surface water quality and streambank structure would be short term and minor.

Changes in Channel Morphology and Stability Caused by Channel and Streambank Modifications

Dry and wet open-cut waterbody crossing methods involve excavation of the streambed and potential changes to streambank stability and channel morphology. To minimize impacts on surface waters, the Applicant would consider crossing surface waters at the narrowest section of a waterbody where feasible, avoiding crossing when possible, and avoiding crossing on or under the beds of trout streams unless there is no feasible alternative. The Applicant would adhere to these stipulations when feasible, and each waterbody crossing would be approved prior to construction. Similar to construction of the Applicant's proposed project, temporary erosion control measures during construction of SA-04 would be implemented as necessary during waterbody crossing activities; and rock riprap, geotextile fabric,

and other bioengineering techniques would be used to stabilize sites as needed. Following crossing construction, river beds and streambeds would be restored to approximately preconstruction conditions, with no impediments to water flow; and streambanks would be restored to preconstruction grades when practicable. If the slope is determined to be unstable, the banks would be reshaped to prevent slumping. Finally, streambanks would be restored with appropriate vegetation.

The use of dry or wet open-cut crossings for pipeline construction, along with the Applicant-proposed measures described above, would result in short-term to long-term minor impacts on channel morphology and streambank stability. Successful construction of HDD crossings, where implemented for construction of SA-04, would result in no impacts on channel morphology or streambank stability.

Disturbance of Wild Rice Waterbodies

No wild rice waterbodies are within or adjacent to the construction work area of SA-04. Therefore, construction of this alternative would not affect those surface waters.

Operations Impacts

Operations impacts for system alternative SA-04 would include the same types, magnitudes, and durations of impacts discussed for the Applicant's proposed project, but impacts would occur in more surface waters because more surface waters would be crossed by system alternative SA-04 compared to the Applicant's proposed project. The locations, numbers, and types of permanent aboveground facilities that would be constructed for system alternative SA-04 have not been determined. The potential impacts on surface water resources from a crude oil release are discussed in Chapter 10.

Runoff and Flows

Increases in Stormwater Runoff and Erosion*.* After the pipeline is installed, revegetation of the permanent right-of-way may require up to several years to reestablish to approximately preconstruction conditions, except for areas where new impervious surfaces are created, as addressed below. Runoff patterns along the non-impervious portions of the permanent right-of-way would be altered during the first few years of operation, resulting in impacts on runoff and erosion that would be short term to long term and negligible to minor. After vegetation is reestablished along the permanent right-of-way, surface water runoff and erosion would return to approximately preconstruction conditions. These effects would be more pronounced in areas where forest habitat is removed and herbaceous vegetation used for revegetation. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would make the appropriate repairs and improvements.

The number, types, and locations of associated facilities that would be required for pipeline operation along SA-04 have not been determined. However, the Applicant would be required to manage stormwater runoff at these new facilities as stipulated in NPDES permits and SWPPPs, which include the use of permanent stormwater control systems. As a result, the potential impacts on surface water due to increased stormwater runoff from impervious surfaces would be negligible to minor and permanent.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation*.* During the first few years of operation, surface water runoff and erosion may slightly increase as revegetation continues, resulting in short-term and negligible to minor impacts related to increases in TSS and sedimentation. Similar to the Applicant's proposed project, the permanent right-of-way for SA-04 in upland areas would be maintained in an herbaceous vegetative state during operation to allow access for inspection, monitoring, and maintenance. The permanent removal of large woody vegetation also would result in

permanent but minor and localized alterations in habitat, streambank stability loss and erosion, and sedimentation. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify streambank areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would make the appropriate repairs and improvements. In other portions of the permanent right-of-way, there would be a permanent but negligible impact from increased TSS and sediments in surface water.

Changes in Stream Flows from Water Withdrawals and Discharges. Normal operation of the route would not require withdrawal or discharge of water. However, during the repair or replacement of pipe as part of the Applicant's Integrity Management Program described above, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during the integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control are not defined. However, as described for pipeline construction, the Applicant would be required to obtain water appropriation and NPDES permits for testing procedures and the volume of water would be substantially less than for construction. With adherence to permits and implementation of existing BMPs, minor alterations in stream flows from water appropriation and discharge would be temporary and negligible.

Disruption of Flow Paths or Local Hydrologic Connectivity. Integrity management digs would result in minor alterations of topography and stormwater flows at the excavation sites. With implementation of the Applicant-proposed measures described above to avoid changes to stormwater runoff and restore streambanks to their original attributes after work is completed, impacts on flow and hydrologic connectivity during in the areas excavated for pipe repair or replacement would be temporary to short term and negligible to minor.

Permanent access roads during operation also could affect hydrologic connectivity. It is anticipated that permanent access roads would require local or state permits, which likely would require culverts to minimize the changes to hydrologic connectivity. Although the extent of the changes in those cases would depend on the topography of the area and the design of the roadway, the impact on hydrologic connectivity likely would be permanent and minor. For access roads without culverts, the extent of changes to hydrologic connectivity could be greater, again dependent on the topography of the area and the design of the roadway. Where those roadways are present, the impact on hydrologic connectivity likely would be permanent and minor.

Other permanent aboveground facilities, such as pump stations and MLVs, also would affect hydrologic connectivity. Due to the relatively small footprints of these facilities, it is anticipated that their presence would result in permanent but negligible to minor impacts.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. The permanent right-of-way of SA-04 in upland areas would be maintained in an herbaceous vegetative state during operation to allow access along the right-of-way for inspection, monitoring, and maintenance. The permanent removal of riparian vegetation in areas adjacent to waterbody crossings would allow more light to enter the waterbody and could cause long-term to permanent but negligible to minor increases in temperature at these locations. These effects would be more pronounced in areas where forest habitat is removed and herbaceous vegetation used for revegetation.

During normal operation, there would be no other measurable changes to water quality in surface waters. The minor changes within the major drainage basins and watersheds crossed by system alternative SA-04 would not result in degradation of the watershed water quality score. As a result, water quality would not change in the surface waters of the basins and watershed along the route, including impaired surface waters. Therefore, watershed surface water quality would not be affected during normal operation of the Project.

Minor fuel and lubricant leaks and spills could occur from maintenance and inspection vehicles operating along SA-04. However, any refueling, fuel storage, or vehicle maintenance would follow measures similar to those in the Applicant's proposed Environmental Protection Plan (Appendix E). Thus, minor leaks and spills would result in temporary and negligible to minor impacts on surface water quality. The potential impacts of an unanticipated crude oil release are discussed in Chapter 10.

Degradation of Aquatic Habitat from Instream Activities. Instream excavations may be required to repair or replace pipe segments buried beneath surface waters. This would result in impacts similar to those described for surface water crossings. The excavations to reach the pipe segments may be accomplished using the wet open-cut method or more likely would involve use of one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would release sediments after the dams are removed and natural waterbody flow returns. However, the sediments would readily dissipate to negligible levels in the downstream area in the vicinity of the crossing. As a result, the potential impact on aquatic habitat of using the dry open-cut method for instream integrity digs is expected to be temporary to short term and minor for each crossing.

If the wet open-cut method is used for integrity digs, the Applicant would implement the erosion and sediment control measures discussed above for construction of surface water crossings. These measures would be implemented during and after wet open-cut integrity digs; if streambanks are disturbed, they would be restored and stabilized as soon as practical after completion of the pipe repair or replacement. As a result, instream integrity dig activities using the wet open-cut method would result in short-term and minor impacts on aquatic habitat.

Changes in Channel Morphology and Stability Caused by Channel and Streambank Modifications

Excavation and repair or replacement of pipe may be required within or at the banks of surface waters. The excavations to reach the pipe segments may be accomplished using the wet open-cut method or more likely would involve use of one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would involve backfilling of the trench, after the repair or replacement is made, to the approximate contours of the river bed or streambed. This could result in a minor, temporary change in channel morphology until the natural sedimentation processes of the waterbody return the affected area to essentially match the nearby morphology. If streambanks are affected by the digs, they would be restored to preconstruction grades when practicable. If the slope is determined to be unstable, the banks would be reshaped to prevent slumping. After reestablishing the grade, streambanks would be restored with appropriate vegetation. As a result, the potential impact on channel morphology and

stability of using the dry open-cut method for instream integrity digs is expected to be temporary to short term and negligible to minor for each crossing.

Using the wet open-cut method for instream integrity digs may require a longer period of time for natural sedimentation processes to accomplish the same result. If streambanks are affected by the digs, they would be restored as described above. As a result, the potential impact on channel morphology and stability of using the wet open-cut method for instream integrity digs is expected to be short term and minor for each crossing.

Disturbance of Wild Rice Waterbodies

Impacts on wild rice waterbodies would not occur during operations, as no wild rice waterbodies occur within or near the permanent right-of-way for SA-04.

Transportation by Rail

Construction Impacts

Transportation of crude oil by rail would require development of rail loading and offloading facilities, and replacement and upgrade of existing rail access (described in Section 4.2.6). As currently envisioned, the rail loading facility would be constructed and operated in Gretna, Canada. Those facilities would require permitting by provincial and national entities in Canada, and therefore are not addressed in this EIS. The offloading facilities would be sited near the existing Enbridge terminal in Clearbrook, Minnesota, and near the existing Enbridge terminal in Superior, Wisconsin. The specific locations of the offloading facilities have not been identified. The existing rail line near Clearbrook would need to be upgraded to a Class 1 standard, and a portion of abandoned line near Clearbrook would need to be re-installed. New construction would be required in undeveloped areas at both offloading facility locations.

Transportation of crude by rail will not require construction within waterbodies and thus no impacts on instream habitat, water quality, channel morphology or stream flow will occur.

Runoff and Flows

Increases in Stormwater Runoff and Erosion*.* Clearing and grading would be required for construction of new facilities and access roads, resulting in changes to stormwater runoff and erosion and the potential for runoff to reach nearby surface waters. It is likely that stormwater NPDES permits would be required, along with measures to address erosion and sediment controls to be implemented during construction, stormwater pollution management, waste disposal, maintenance and inspection practices, and any additional requirements to prevent stormwater pollution. Newly cleared areas and impervious surfaces could cause increased stormwater runoff and erosion into nearby surface waters; however, the requirements of applicable permit programs are in place to manage potential impacts. This includes NPDES permits that would specify various stormwater and erosion control measures to be implemented, such as requiring stormwater to be routed around exposed soil areas through conveyance channels and stormwater discharges to be directed from the site to vegetated areas in order to increase sediment removal and infiltrate stormwater on the site when feasible. With adherence to stipulations in NPDES permits and use of appropriate BMPs, similar to those described above for the Applicant's proposed project, impacts on surface waters from increases in stormwater runoff and erosion from clearing and grading during construction of facilities would be short term and minor.

The improvements required for the rail lines would be accomplished on the existing rail embankments and would not be expected to alter stormwater runoff and erosion patterns; consequently, no impacts on surface waters would be associated with rail line improvements.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. The temporary erosion controls, SWPPP requirements, and NPDES permit requirements described above would be implemented during construction of the offloading and related facilities to prevent sediment transport into nearby surface waters during construction. As a result, there would be no or small increases in TSS concentrations and sedimentation in nearby water crossings. Therefore, construction of these facilities likely would result in temporary negligible impacts related to increased TSS concentrations and sedimentation in surface waters.

The improvements required for the rail lines would be accomplished on the existing rail embankments and, as noted above, would not be expected to result in a substantial change in stormwater runoff or erosion patterns. Although construction activities could cause a small increase in erosion in some locations, the impact of increased TSS and sedimentation in nearby surface waters would be temporary and negligible.

Changes in Stream Flows from Water Withdrawals and Discharges. Construction of the offloading facilities would require water for dust control and other construction activities such as preparation of concrete. Water also may be required for hydrostatic testing of new storage tanks if they are included in the design. The source of the water, whether it would be withdrawn from surface waters or a PWS, is not known. If obtained from surface waters, it was assumed that appropriate BMPs would be implemented such as those described in the Environmental Protection Plan (Appendix E), and that all necessary permits (e.g., NPDES permits for discharges) would be obtained. Consequently, impacts on surface waters would be expected to be temporary and negligible to minor. If water is obtained from public water supplies provided by a local utility, there would be no withdrawals of surface water and therefore no impact.

Disruption of Flow Paths or Local Hydrologic Connectivity. Construction of the offloading facilities may disrupt flow paths and groundwater-surface water interaction due to clearing and grading and water appropriation (for dust control and other construction-related activities) and discharge. With implementation of measures similar to those described for the Applicant's proposed project to prevent erosion and sedimentation and, if applicable, to monitor stream flows during water appropriation and discharge, impacts on flow and hydrologic connectivity during construction of the offloading and related facilities would be temporary to short term and minor.

Construction of the offloading facilities also would involve creation of temporary and permanent access roads that could affect hydrologic connectivity. Applicable permits likely would stipulate that temporary access roads, including roads that were widened and graded, be restored to preconstruction conditions upon completion of construction. The restoration likely would include seeding disturbed areas with a suitable seed mix for the area. Impacts on hydrologic connectivity associated with temporary access roads likely would be short term and negligible to minor, depending on the location of the roads. Impacts from permanent access roads are discussed in the operations section below.

Because the improvements required for the rail lines would be accomplished on the existing rail embankments, they would not be expected to affect hydrologic connectivity.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. Because only minor increases in stormwater runoff would occur during construction of offloading facilities, the potential for stormwater to carry contaminants into surface waters is low. Surface water near construction areas could become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities such as fuel storage, equipment refueling, and equipment maintenance. However, to protect surface water resources, NPDES permits for construction of the route would require secondary containment of hazardous materials, prohibition of engine degreasing at work sites, containment and collection of liquid and solid wastes, and a spill prevention and response plan for fueling and maintenance of vehicles. Similar treatment/disposal or discharge measures to those described above for the Applicant's proposed project would be necessary for handling concrete wash water and rinse water generated by construction and hydrostatic testing, if such testing is done.

In addition, permits would stipulate the Applicant's responsibility for cleaning up small spills during construction, using procedures similar to those described in the Environmental Protection Plan (Appendix E) for the Applicant's proposed project, including notifying proper personnel (e.g., the onsite spill coordinator) and agencies, stopping the work activity that caused the spill, using absorbent booms and pads to contain and recover released materials in water, and disposing of contaminated response materials at approved facilities.

With implementation of the above practices and adherence to the requirements of NPDES permits, impacts related to degradation of water quality on nearby surface waters from small spills and leaks during construction would be temporary and negligible to minor.

Disturbance of Wild Rice Waterbodies

No wild rice waterbodies are located within the general area for the new rail access route from Gully to Clearbrook, and the offloading facility near Clearbrook in Minnesota. Therefore, no impacts on wild rice waterbodies are expected from construction associated with the rail alternative. No wild rice waterbodies are located in the general area for the new rail offloading facility near Superior in Wisconsin.

Operations Impacts

During operations, transportation of crude by rail will not impact instream habitat, channel morphology or stream flow.

Runoff and Flows

Increases in Stormwater Runoff and Erosion. The offloading facilities would be designed to comply with NPDES permits and other permitting requirements that control runoff from industrial sites. The increase in impermeable surfaces would alter runoff patterns; however, with adherence to permitting requirements, a substantial increase in stormwater runoff and erosion would not be anticipated. Consequently, potential impacts on surface waters from increases in stormwater runoff and erosion would be permanent and negligible to minor.

Rail transport would be conducted on existing embankments, with no changes to stormwater runoff or erosion patterns and no impact on surface waters.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. Operation of the rail facilities and train transportation would likely not result in increased runoff or introduction of eroded materials into nearby surface waters, causing increases in TSS concentrations or sedimentation, therefore, no impact would occur.

Disruption of Flow Paths or Local Hydrologic Connectivity. The presence of the permanent offloading facilities would affect hydrologic connectivity. The specific locations and acreages covered by permanent facilities were not known at the time this EIS was prepared. However, the footprints of these facilities would be relatively small in comparison to the hydrogeologic flows in the areas near the facilities. Consequently, it is anticipated that the impact of their presence would be permanent but negligible to minor.

Permanent access roads during operation also could affect hydrologic connectivity. It is anticipated that permanent access roads would require local or state permits, which likely would require culverts to minimize the changes to hydrologic connectivity. Although the extent of the changes in those cases would depend on the topography of the area and the design of the roadway, the impact on hydrologic connectivity likely would be permanent and minor. For access roads without culverts, the extent of changes to hydrologic connectivity could be greater, again dependent on the topography of the area and the design of the roadway. Where those roadways are present, the impact on hydrologic connectivity likely would be permanent and minor.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. Operation of unit trains would increase the amount of materials dropping from the trains to the railroad bed from the current level. Material reaching the railroad bed could include materials from brakepad consumption, lubrication, and fuel drips and leaks. The increase above current conditions is expected to be minor and typical of cargo transport by rail. If petrochemicals reach areas of the railroad bed adjacent to surface waters, it is possible that the petrochemicals could migrate to the surface water and create a sheen. However, the quantity of materials leaking during normal operation would be small, and the associated impact on surface water quality likely would be temporary and minor. The potential impacts on surface water resources due to an unanticipated crude oil release are discussed in Chapter 10.

Disturbance of Wild Rice Waterbodies

Because no wild rice waterbodies are located within the general area for the offloading facility near the Clearbrook terminal in Minnesota or the offloading facility near the Superior terminal in Wisconsin, no impacts on wild rice waterbodies would occur from operation of these facilities. Rail transport routes through Minnesota and Wisconsin would cross near multiple wild rice waterbodies. Degradation of surface water quality from drips, leaks, and mechanical wear from train transportation could result in temporary and negligible to minor impacts on wild rice waterbodies.

Transportation by Truck

Transportation of crude oil by truck would require development of truck loading and offloading facilities, transport on existing roadways, construction of new roadways to access the offloading terminals, and also may require roadway improvements near the facilities (described in Section 4.2.7). As currently envisioned, the truck loading facility would be constructed and operated in Gretna, Canada. Those facilities would require permitting by provincial and national entities in Canada and therefore are not addressed in this EIS. The offloading facilities would be sited within and adjacent to the existing Enbridge terminals in Clearbrook, Minnesota, and in Superior, Wisconsin. The specific locations of the offloading facilities have not been identified. New construction would be required in undeveloped areas at both offloading facility locations.

Construction Impacts

Transportation of crude by truck will not require construction within waterbodies and thus no impacts on instream habitat, water quality, channel morphology or stream flow will occur.

Runoff and Flows

Increases in Stormwater Runoff and Erosion*.* Clearing and grading would be required for construction of new facilities, new roadways, access roads, and roadway improvements, resulting in changes to stormwater runoff and erosion and the potential for runoff to reach nearby surface waters. It is likely that stormwater NPDES permits would be required, along with measures to address erosion and sediment controls to be implemented during construction, stormwater pollution management, waste disposal, maintenance and inspection practices, and any additional requirements to prevent stormwater pollution. Newly cleared areas and impervious surfaces could cause increased stormwater runoff and erosion into nearby surface waters; however, requirements of applicable permit programs are in place to manage potential impacts. This includes NPDES permits that would specify various stormwater and erosion control measures to be implemented, such as requiring stormwater to be routed around exposed soil areas through conveyance channels and stormwater discharges to be directed from the site to vegetated areas in order to increase sediment removal and infiltrate stormwater on the site when feasible. With adherence to NPDES permit stipulations and use of appropriate BMPs, similar to those described for the Applicant's proposed project, impacts on surface waters from increases in stormwater runoff and erosion from clearing and grading during construction would be short term and minor.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. The temporary erosion controls, SWPPP requirements, and NPDES permit requirements described above likely would be required during construction of the offloading and related facilities, including new roads, to prevent sediment transport into nearby surface waters during construction. As a result, no increases or small increases in TSS concentrations and sedimentation would occur in nearby water crossings. Therefore, construction of facilities for the truck alternative would result in temporary negligible impacts related to increased TSS concentrations and sedimentation in surface waters.

Changes in Stream Flows from Water Withdrawals and Discharges. Construction of offloading and related facilities would require water for dust control and other construction activities such as preparation of concrete. Water may also be required for hydrostatic testing of new storage tanks if they are included in the design. The source of the water, whether it would be withdrawn from surface waters or a PWS, is not known. If obtained from surface waters, it was assumed that appropriate BMPs would be implemented such as those described in the Environmental Protection Plan (Appendix E), and that all necessary permits (e.g., NPDES permits for discharges) would be obtained. Consequently, impacts on surface waters would be expected to be temporary and negligible to minor. If water is obtained from public water supplies provided by a local utility, there would be no withdrawals of surface water and therefore no impact.

Disruption of Flow Paths or Local Hydrologic Connectivity. Construction of the offloading facilities may disrupt flow paths and groundwater-surface water interaction due to clearing and grading and water appropriation (for dust control and other construction-related activities) and discharge. With implementation of measures similar to those described for the Applicant's proposed project to prevent erosion and sedimentation and, if applicable, to monitor stream flows during water appropriation and discharge, impacts on flow and hydrologic connectivity during construction of the offloading and related facilities would be temporary to short term and minor.

Construction would involve creation of both temporary and new permanent roadways roads that also could affect hydrologic connectivity. Applicable permits likely would stipulate that temporary access roads, including roads that were widened and graded, be restored to preconstruction conditions upon completion of construction. The restoration likely would include seeding disturbed areas with a suitable seed mix for the area. Impacts on hydrologic connectivity associated with temporary access roads likely would be short term and negligible to minor, depending on the location of the roads. Impacts from permanent access roads are discussed in the operations section below.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. Because only minor increases in stormwater runoff would occur during construction, the potential for stormwater to carry contaminants into surface waters is low. Surface water near construction areas could become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities such as fuel storage, equipment refueling, and equipment maintenance. However, to protect surface water resources, NPDES permits for construction of the route would require secondary containment of hazardous materials, prohibition of engine degreasing at work sites, containment and collection of liquid and solid wastes, and a spill prevention and response plan for fueling and maintenance of vehicles. Similar treatment/disposal or discharge measures to those described for the Applicant's proposed project would be necessary for handling concrete wash water and rinse water generated by construction and hydrostatic testing, if such testing is done.

In addition, permits would stipulate responsibilities for cleaning up small spills during construction using procedures similar to those described in the Environmental Protection Plan (Appendix E) for the Applicant's proposed project. These efforts include notifying proper personnel (e.g., the onsite spill coordinator) and agencies, stopping the work activity that caused the spill, using absorbent booms and pads to contain and recover released materials in water, and disposing of contaminated response materials at approved facilities.

With implementation of the above practices and compliance with requirements of NPDES permits, the impact on nearby surface waters of small leaks and spills during construction would be temporary and negligible to minor.

Disturbance of Wild Rice Waterbodies

No wild rice waterbodies are located within the general area for the truck access and offloading facility near the Clearbrook terminal in Minnesota. Therefore, no impacts on wild rice waterbodies are expected from construction associated with the truck alternative.

Operations Impacts

During operations, transportation of crude by truck will not impact instream habitat, channel morphology or stream flow.

Runoff and Flows

Increases in Stormwater Runoff and Erosion. The offloading facilities would be designed to comply with NPDES permits and other permitting requirements that control runoff from industrial sites. New roadways and improvements to existing roadways would be expected to comply with state and local permitting requirements, although there would be an increase in runoff, and the increase in impermeable surfaces would alter runoff patterns. With adherence to permitting requirements, there likely would not be a substantial increase in stormwater runoff or erosion. Therefore, the impact on

surface waters due to changes in stormwater runoff and erosion would be permanent and negligible to minor.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. As noted above, *o*peration of the truck offloading facilities would not likely result in substantial increased runoff or introduction of eroded materials into nearby surface waters. Therefore, TSS and sedimentation in the surface waters are not likely to increase, with no associated impact from operation of the facilities.

Construction of new roadways and improvement of new roadways would increase runoff and the potential for eroded materials and materials on the roadway to reach nearby surface waters. If surface waters are adjacent to or near the roadways, an increased amount of these materials could reach nearby surface waters. However, the quantity of materials reaching surface waters likely would be small, and the associated impact on surface water from increases in TSS and sedimentation would be temporary and minor.

Disruption of Flow Paths or Local Hydrologic Connectivity*.* The presence of the permanent offloading facilities would affect hydrologic connectivity. The specific locations and acreages covered by permanent facilities are not known. However, the footprints of these facilities would be relatively small in comparison to the hydrogeologic flows in the areas near the facilities. Consequently, it is anticipated that their presence would result in permanent but negligible to minor impacts.

It is anticipated that permanent access roads constructed for the truck alternative would require local or state permits, which likely would require culverts to minimize the changes to hydrologic connectivity. Although the extent of the changes in those cases would depend on the topography of the area and the design of the roadway, the impact on hydrologic connectivity likely would be permanent and minor.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. Operation of trucks on the highways and other roadways would increase the amount of materials dropping from the trucks to the roadway. Material reaching the roadway primarily would consist of materials from brakepad consumption, lubrication, and petrochemical drips and leaks from engines. The increase above current conditions is expected to be minor and typical of transport of cargo by truck. If petrochemicals reach areas of the roadway adjacent to surface waters, it is possible that the petrochemicals could migrate to the surface water and create a sheen. However, the quantity of materials leaking during normal operation would be small, and the associated impact on surface water quality likely would be temporary and minor. The potential impacts on surface water resources due to an unanticipated crude oil release are discussed in Chapter 10.

Disturbance of Wild Rice Waterbodies

Because no wild rice waterbodies are located within the general area for the truck offloading facilities, no impacts on wild rice waterbodies would occur from operation of these facilities. Truck transport routes through Minnesota and Wisconsin would occur near multiple wild rice waterbodies. Degradation of surface water quality from drips, leaks, and mechanical wear from truck transportation could result in temporary and negligible to minor impacts on wild rice waterbodies.

Existing Line 3 Supplemented by Rail

Surface water impacts associated with the combined use of the existing Line 3 pipeline and the rail alternative would be the same as those identified for the continued operation of the existing Line 3 pipeline in addition to those of the rail alternative identified above.

Existing Line 3 Supplemented by Truck

Surface water impacts associated with the combined use of the existing Line 3 pipeline and the truck alternative would be the same as those identified for the continued operation of the existing Line 3 pipeline in addition to those of the truck alternative identified above.

5.2.1.2.5 Regional Analysis of Impacts on Quality of Existing Surface Water Conditions

For northern Minnesota streams, the conversion of forested perennial cover to grassland dominated cover can have an overall effect on local hydrology by affecting the smaller peak flows. This is the yearly bankfull flow that shapes the channel and builds the floodplain (Verry 2001). Removing permanent perennial cover along streams also reduces instream quality and habitat by increasing water temperatures, negatively affecting trout and other sensitive aquatic organisms. Nutrient export from converted landscapes can also increase to lakes or streams when changing from forested to open grassland cover. The amount may be dependent on soil, slope and other factors (Radomski 2005). The overall effects of changes in forest cover on hydrology, nutrient export and temperature are dependent on the condition of the nearby watershed. The greater the landscape alteration the more potential for these changes. Quantifiable estimates of impacts from land use change activities is available and has been used to predict hydrology and water quality changes to surface waters with the use of computer modeling programs.

Northern forested wetlands that are converted to open linear landscapes can allow for invasive species or other aggressive plants to develop monocultures and displace native vegetation. Corridors are often prone to infestations of narrowleaf (*Typha angustifolia*) or hybrid cattail (*Typha X glauca*) which are not listed as an invasive plant but have been an aggressive nuisance with previous pipeline development.

5.2.1.2.6 Summary and Mitigation

Summary

At any specific surface water location along all the alternatives impacts may be short-term and minor with appropriate use of construction and operation practices; however, due to the great lengths of all alternatives the total impact would be additive and distributed along the routes. The importance of these impacts is determined by the distance of the alternative, number of surface water interactions, and the quality of surface water resources affected.

Potential impacts of the Applicant's proposed project and the CN Alternatives to surface waters from construction and normal operations range from no impact to permanent impacts (Table 5.2.1.2-14) and from negligible to major, with the exception of instances where a "frac-out" might occur during HDD activities. Temporary impacts are mostly related to construction, and permanent impacts are identified for various operational practices. There are potential minor to major construction impacts on wild rice waterbodies for the Applicant's proposed project. SA-04, does not have wild rice waterbodies located within the ROI and thus no impacts would occur to these resources.

Greater potential for construction-related impacts would likely occur for the Applicant's proposed project and SA-04, which would both require pipeline construction over long distances. Since rail and truck would rely mainly on existing infrastructure, construction-related impacts would be limited to new offloading facilities adjacent to the Clearbrook and Superior terminals and re-installation/upgrade of a limited length of track in the vicinity of Clearbrook. Continued use of existing Line 3 would not require new construction and thus no impacts would be expected.

Table 5.2.1.2-14. Summary of Potential Impacts on Surface Waters for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Construction Impacts							
Increases in stormwater runoff and erosion from newly cleared areas and impervious surfaces	Short-term to long-term/minor impacts • 227 waterbody crossings (192 in MN) • 46 designated waterbody crossings • 6 trout stream crossings • 9 NRI-listed river crossings (7 in MN) • 16 impaired waterbody crossings (12 in MN) • 7 navigable waterway crossings (6 in MN)	No impact	Short-term to long-term /minor impacts • 636 waterbody crossings (172 in MN) • 56 designated waterbody crossings • 6 NRI-listed river crossings (1 in MN) • 32 impaired waterbody crossings (8 in MN) • 9 navigable waterway crossings (2 in MN)	Short-term /minor impacts • 448 waterbody crossings	Short-term to long-term /minor impacts • 225 waterbody crossings	Short-term /minor impacts • 448 waterbody crossings	Short-term to long-term /minor impacts • 225 waterbody crossings
Increases in total suspended solids concentrations and increased sedimentation	Temporary to short-term/negligible to minor impacts	No impact	Temporary to short-term/negligible to minor impacts	Temporary/ negligible impacts	Temporary/ negligible impacts	Temporary/ negligible impacts	Temporary/ negligible impacts
Changes in stream flows from water withdrawals and discharges	Temporary/minor impacts	No impact	Temporary/minor impacts	Temporary/ negligible to minor impacts	Temporary/ negligible to minor impacts	Temporary/ negligible to minor impacts	Temporary/ negligible to minor impacts

Table 5.2.1.2-14. Summary of Potential Impacts on Surface Waters for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Disruption of flow paths or local hydrologic connectivity	Temporary to permanent negligible to major impacts	No impact	Temporary to permanent negligible to major impacts	Temporary to short-term / negligible to minor impacts	Temporary to short-term / negligible to minor impacts	Temporary to permanent negligible to major impacts	Temporary to permanent negligible to major impacts
Degradation of surface water quality	Temporary to short-term/negligible to minor impacts	No impact	Temporary to short-term/negligible to minor impacts	Temporary/ negligible to minor impacts	Temporary/ negligible to minor impacts	Temporary/ negligible to minor impacts	Temporary/ negligible to minor impacts
Degradation of aquatic habitat from instream activities	Temporary to short-term/minor impacts (*from dry and wet open-cut crossings*); no impact (*from guided bore and HDD crossings*)	No impact	Temporary to short-term/minor impacts (*from dry and wet open-cut crossings*); no impact (*from guided bore and HDD crossings*)	No impact	No impact	No impact	No impact
Degradation of water quality and habitat from releases of drilling mud during HDD crossings	Short-term/minor impacts *(if quickly contained*) to long-term/major impacts (*if undetected or uncontained)*	No impact	Short-term/minor impacts *(if quickly contained*) to long-term/major impacts (*if undetected or uncontained)*	No impact	No impact	No impact	No impact
Changes in channel morphology and stability caused by channel and streambank modifications	Short-term to long-term/ minor impacts (*from dry and wet open-cut crossings*); no impact (*from guided bore and HDD crossings*)	No impact	Short-term to long-term/ minor impacts (*from dry and wet open-cut crossings*); no impact (*from guided bore and HDD crossings*)	No impact	No impact	No impact	No impact

Table 5.2.1.2-14. Summary of Potential Impacts on Surface Waters for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Disturbance of wild rice waterbodies	Short-term/minor to major impacts • 5 acres • 5 waterbodies	No impact	No impact • No wild rice waterbodies along the route	No impact • No wild rice waterbodies in the general area of rail offloading facilities	No impact • No wild rice waterbodies in the general area of truck offloading facilities	No impact	No impact
Operations Impacts							
Increases in stormwater runoff and erosion	Short-term to permanent/ negligible to minor impacts	Short-term to permanent/ negligible to minor impacts	Short-term to permanent/ negligible to minor impacts	Permanent/ negligible to minor impacts	Permanent/ negligible to minor impacts	Short-term to permanent/ negligible to minor impacts	Short-term to permanent/ negligible to minor impacts
Increases in total suspended solids concentrations and increased sedimentation	Short-term to permanent/ negligible to minor impacts	Short-term to permanent/ negligible to minor impacts	Short-term to permanent/ negligible to minor impacts	No impact	Temporary/ minor impacts	Short-term to permanent/ negligible to minor impacts	Temporary to permanent/ negligible to minor impacts
Changes in stream flows from water withdrawals and discharges	Temporary/ negligible impacts	Temporary/ negligible impacts	Temporary/ negligible impacts	No impact	No impact	Temporary/ negligible impacts	Temporary/ negligible impacts
Disruption of flow paths or local hydrologic connectivity	Temporary to permanent/ negligible to minor impacts from access roads	Temporary to permanent/ negligible to minor impacts from access roads	Temporary to permanent/ negligible to minor impacts from access roads	Permanent/ negligible to minor impacts	Permanent/ negligible to minor impacts	Temporary to permanent/ negligible to minor impacts	Temporary to permanent/ negligible to minor impacts
Degradation of surface water quality	Temporary to permanent/ negligible to minor impacts	Temporary to short-term/ negligible to minor impacts	Temporary to permanent/ negligible to minor impacts	Temporary/ minor impacts	Temporary/ minor impacts	Temporary to permanent/ negligible to minor impacts	Temporary to permanent/ negligible to minor impacts

Table 5.2.1.2-14. Summary of Potential Impacts on Surface Waters for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Degradation of aquatic habitat from instream activities	Temporary to short-term/minor impacts from integrity digs	Temporary to short-term/ minor impacts from integrity digs	Temporary to short-term/minor impacts from integrity digs	No impact	No impact	Temporary to short-term/minor impacts from integrity digs	Temporary to short-term/ minor impacts from integrity digs
Changes in channel morphology and stability caused by channel and streambank modifications	Temporary to short-term/negligible to minor impacts from integrity digs	Temporary to short-term/ negligible to minor impacts from integrity digs	Temporary to short-term/negligible to minor impacts from integrity digs	No impact	No impact	Temporary to short-term/ negligible to minor impacts from integrity digs	Temporary to short-term/ negligible to minor impacts from integrity digs
Disturbance of wild rice waterbodies	Short-term/ negligible to major impacts • 3 acres • 5 waterbodies	Short-term/ negligible to major impacts • 1 wild rice waterbody in proximity	No impact • No wild rice waterbodies occur along this route	Temporary/ negligible to minor impacts • Multiple wild rice water bodies along rail routes	Temporary/ negligible to minor impacts • Multiple wild rice water bodies along truck routes	Short-term/ negligible impacts • 1 wild rice waterbody in proximity	Short-term/ negligible impacts • 1 wild rice waterbody in proximity

HDD = horizontal directional drilling, NRI = Nationwide Rivers Inventory

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During operations, continued use of existing Line 3, the Applicant's proposed project, and SA-04 could all require integrity digs that have the potential for localized limited impacts. The potential for integrity digs however, would likely be lower for the Applicant's proposed project or SA-04 as they would be new pipelines, whereas the other alternatives would include continued use of existing Line 3, which is projected to require a number of integrity digs (see Chapter 4).

Construction Impacts

Runoff and Flows

Construction of the Applicant's proposed project and the CN Alternatives, except for continued use of the existing Line 3, would cause changes to runoff and flows. The disruption of flow paths and local hydrologic connectivity for Applicant's preferred rout and SA-04 could result in permanent impacts. Permanent impacts would also result from construction of aboveground pipeline facilities and permanent access roads for pipeline alternatives and offloading facilities for the rail and truck transport alternatives. These impacts would occur along approximately 795 miles (250 in Minnesota) for SA-04 compared to approximately 340 miles in Minnesota for the Applicant's proposed project. For the rail and truck alternatives, construction impacts would occur over a smaller total area and would include areas near the offloading terminals and the new and improved roadways. Individual impacts on runoff and flows at any specific surface water location along all the alternatives is anticipated to be minor with appropriate use of construction and operation practices, however due to the great lengths of all alternatives the total impact would be additive and distributed along the routes. The importance of these impacts is determined by the distance of the alternative, number of surface water interactions, and the quality of surface water resources affected.

Surface Water and Aquatic Habitat Quality

Construction would mainly result in temporary impacts on surface water quality for the pipeline alternatives unless drilling fluids are released during HDD crossings and remain uncontained or undetected. In that event, the water quality impact would be long term and major. Construction of the pipeline alternatives would result in temporary impacts on aquatic habitat quality; construction of the rail and truck alternatives would only affect aquatic habitats for those areas where needed upgrades and surface waters coincide, such as improved river crossings. There would be a substantial difference in the number of surface waters affected by pipeline crossings: the Applicant's proposed project would cross 227 (192 in Minnesota) surface waters, and SA-04 would cross 636 (172 in Minnesota) surface waters. However, the existing condition of water resources as represented through comparisons of state geographic areas indicate the Applicant's proposed project crosses higher quality surface water resources. The number of surface water ditches and the lack of perennial cover as well as ecoregion water quality are good indicators of the specific type of poorer surface water quality areas crossed by or near SA-04. High-quality surface water resources are managed most appropriately with long-term watershed "protection" strategies to maintain existing conditions.

SA-04 also would cross more NRI-listed river crossings (fewer in Minnesota—one vs. seven for the Applicant's proposed project) and impaired waterbody crossings (12 in Minnesota for the Applicant's proposed project and 8 in Minnesota for SA-04). If construction activities are not properly mitigated or managed, impacts on impaired or low-quality waterbodies may cause further degradation of the waterbody, exacerbate an existing impairment, cause additional impairments, interfere with restoration activities, and/or delay attainment of water quality standards. Impaired waters are more related to watershed-scale factors such as lack of perennial cover and ditching and/or more direct hydrology impacts of tiling related to agriculture as well as the lack of natural stream conditions. Restoration in

some areas after construction could be managed through improved runoff and instream management with newly added perennial vegetation and properly sloped banks at crossings.

Impacts on high-quality waterbodies (i.e., trout streams, NRI-listed rivers, and wild rice waterbodies) may decrease the suitability of surface water as a habitat for sensitive species or degrade the existing beneficial use of the waterbody. There are a large number of lakes and streams in north-central and northeast Minnesota and they are of the highest quality when comparing ecoregion data and watershed health index scores as well as other specific indicators such as tullibee lakes, wild rice lakes, LBS and trout streams. Further, in general, statewide maps indicate better health scores across the north and east and poorer scores across the south and west as depicted by analysis of the five different indicator components (Biology, Connectivity, Geomorphology, Hydrology and Water Quality). Keeping high-quality surface waters off impaired waters listings is highly important to state agencies, however, keeping these resources in their current condition is just as important for maintaining surface water health components. Removing riparian zone vegetation such as trees and shrubs and herbaceous layers within the surface water areas of the NLF Ecoregion may be a permanent or take decades to recover whereas southern areas generally have fewer trees and other perennial cover and are often plowed to the stream edge. Recovery in southern Minnesota areas within SA-04 would generally happen more quickly, often within the first year. Effects of individual stream crossings on aquatic habitat and temperature of streams in the NLF would potentially be greater.

Channel Morphology and Stability

Pipeline construction impacts on channel morphology and stability would be short term to long term and minor, except where an HDD or guided bore crossing method is used; impacts on channel morphology and stability are not anticipated to occur at those locations. As noted above, SA-04 would cross a substantially greater number of surface waters (fewer in Minnesota) compared to the Applicant's proposed project. The rail and truck alternatives could affect channel morphology or stability in the areas where improved river crossings are needed.

Wild Rice Waterbodies

Construction of SA-04, the rail alternative, and the truck alternative would not affect any wild rice waterbodies. Construction of the Applicant's proposed project would result in impacts on approximately 5 acres of wild rice waterbodies.

<u>Operations Impacts</u>

Runoff and Flows

For all routes, the impacts of operation on runoff and flows range from temporary to permanent at each affected location. For the pipeline alternatives, short-term impacts would result from periodic integrity digs to repair or replace segments of pipe, including the need for hydrostatic test water for new pipe segments. The decades-old existing Line 3 would require substantially more digs than either of the two new pipeline alternatives.

Permanent impacts on stormwater runoff would result from the presence of new aboveground pipeline facilities and permanent access roads, and new offloading facilities and associated new and improved roads. The operator of the new and expanded facilities would be required to manage stormwater runoff through NPDES permits and SWPPPs and through installation of stormwater retention ponds. These impacts would occur along a greater distance for the SA-04 alternative compared to both pipeline

alternatives. Impacts on runoff and flows from the rail and truck alternatives would be limited to the offloading facilities and new and improved roads/rails, and nearby areas.

Temporary to permanent disruption of flow paths and local hydrologic connectivity would result from construction of aboveground pipeline facilities and permanent access roads for pipeline alternatives and offloading facilities for the rail and truck transport alternatives. These impacts would occur along approximately 795 miles (250 miles in Minnesota) for SA-04 compared to approximately 340 miles for the Applicant's proposed project. Removing riparian zone vegetation such as trees and shrubs and herbaceous layers within the surface water areas of the NLF Ecoregion may be permanent or take decades to recover whereas southern areas generally have fewer trees and other perennial cover and are often plowed to the stream edge. Recovery in southern Minnesota areas within SA-04 would generally happen more quickly, often within the first year. Final recovery during operation may not represent historic natural riparian zone quality in the NLF. Effects on runoff and quality during operation in the NLF would potentially be greater than historic natural conditions.

Surface Water and Aquatic Habitat Quality

Impacts on water quality during operation primarily would be temporary for all CN Alternatives but would occur periodically over the life of the Project. In areas where woody riparian vegetation would be permanently removed from the permanent rights-of-way for the Applicant's proposed project and SA-04, the effect on water temperature would be permanent. This impact would occur along a substantially longer (shorter in Minnesota) pipeline route for SA-04. Removing riparian zone vegetation such as trees and shrubs and herbaceous layers within the surface water areas of the NLF Ecoregion may be permanent or take decades to recover whereas southern areas generally have fewer trees and other perennial cover and are often plowed to the stream edge. Recovery in southern Minnesota areas within SA-04 would generally happen more quickly, often within the first year. Effects on habitat, temperature of streams and runoff rate and quality in the NLF would potentially be greater. Surface water temperature would not be affected by continued use of the existing Line 3.

The primary impact on water quality and habitat quality during operations likely would result from periodic integrity digs to repair or replace segments of pipe installed across surface waters. This would occur more often for continued use of the existing Line 3 because of its age compared to a new pipeline. The rail and truck alternatives would not affect instream habitats.

Channel Morphology and Stability

Operation of all pipeline alternative routes could result in impacts on channel morphology and stability, primarily from periodic integrity digs that are expected to be temporary. Integrity digs would occur substantially more often for the existing Line 3 because of its age compared to a new pipeline. The rail and truck alternatives would not affect channel morphology or stability.

Wild Rice Waterbodies

Integrity digs for the Applicant's proposed project during operation could affect as much as 3 acres of wild rice waterbodies, and integrity digs for continued use of the existing Line 3 could affect up to 1 acre of wild rice waterbodies. Operation of SA-04 would not affect wild rice waterbodies. Drips, leaks, and mechanical wear from normal train and truck transportation for the rail and truck alternatives could lead to impacts on nearby wild rice waterbodies. Large numbers of wild rice lakes exist in the NLF, and this is represented by several lakes within 0.5 mile of the alternatives in this ecoregion including train and truck routes.

Mitigation

In addition to the Applicant-proposed measures to avoid or minimize impacts that would be incorporated into the Project and the stipulations in permits required for the Project, Minnesota DNR identified the following mitigation measures for consideration by the Commission to further avoid and minimize impacts:

- Where riparian vegetation is removed at surface water crossings, revegetate the construction work area with a minimum 50-foot-wide buffer of woody vegetation to reduce runoff, erosion, water quality degradation, sunlight penetration, and water temperature warming, and increase bank stability.
- Longer term impacts of clearing in temporary work areas could be offset by reestablishing or enhancing the existing cover type within up to 500 feet of waterbodies, depending on topography.
- After construction on state forest lands or state Wildlife Management Areas, tree planting on all temporary workspaces could be accomplished to reduce erosion and runoff, as well as to ensure that forested areas within the riparian zone are restored to forest cover.

Rock riprap should be considered or permitted only when infrastructure (public or private) is at risk. Natural channel design and bioengineering methods should be considered the primary means of streambed and streambank restoration and stabilization.

5.2.1.2.7 References

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5.2.1.3 Wetlands

A wetland is a land area that is saturated with water, either permanently or seasonally, such that it takes on the characteristics of a distinct ecosystem. Wetlands are defined in a variety of ways for federal, state, and local regulatory protection; however, the common factors that distinguish wetlands from other landforms or waterbodies are the presence of a hydrophytic (waterlogged) vegetation community, hydric soils,[10] and hydrology. All wetlands provide a variety of functions of social significance, including: surface water storage (flood control), shoreline stabilization (wave damage protection/shoreline erosion control), stream flow maintenance (maintaining aquatic habitat and aesthetic appreciation opportunities), groundwater recharge (some types replenish water supplies), sediment removal and nutrient cycling (water quality protection), aquatic productivity (fishing, shellfishing, and waterfowl hunting), production of trees (timber harvest), production of herbaceous growth (livestock grazing and haying), production of peaty soils (peat harvest), and wildlife habitat (hunting, trapping, plant/wildlife/nature photography, nature observation, and aesthetics) (EPA 2002a, 2006).

The analysis of impacts to wetlands during construction of the Applicant's proposed project and CN Alternatives considered changes to wetland characteristics and functions by alteration or loss of the plant communities through removal or cover with fill, and by alteration or loss of the hydrologic conditions that maintain wetland plant communities and wetland soils. Construction and operations impacts considered included:

- Changes to forested and scrub/shrub wetland characteristics and functions
- Changes to emergent wetland characteristics and functions
- Changes to Minnesota Public Waters Wetlands characteristics and functions
- Changes to Minnesota calcareous fen characteristics and functions
- Changes to Wetland Reserve Program wetland characteristics and functions
- Changes to wetland mitigation bank easements characteristics, functions and availability

This section first describes the existing wetlands, including Public Waters Wetlands, calcareous fen wetlands, and wetland conservation easements, within the area along the Applicant's proposed project and each of the CN Alternatives where wetlands could be affected by construction and operation of the Project. The potential Project-related impacts of the Applicant's proposed project on wetlands during construction and operation then are discussed, along with measures the Applicant would implement to minimize impacts. Next, the potential impacts to wetlands during construction and operation are addressed for each CN Alternative (continued use of existing Line 3, SA-04, transportation by rail, transportation by truck, and existing Line 3 supplemented by rail or truck). A summary and comparison of potential Project-related impacts are included at the end of the section, with potential mitigation measures to be considered.

Potential impacts to wetlands due to an unanticipated crude oil release are discussed in Chapter 10.

[10] A soil that forms under conditions of water saturation long enough during the growing season to develop anaerobic conditions in the upper part of the soil.

5.2.1.3.1 Regulatory Context and Methodology

Regulatory Context

General Wetlands

Federal and State Jurisdictional Wetlands

CWA Sections 404/10 Individual Permits and associated state CWA Section 401 Individual Water Quality Certification for the Project in Minnesota are under the jurisdiction of USACE – St. Paul District and Minnesota PCA. USACE requires that projects first avoid impacts to wetlands to the extent practicable, then minimize potential impacts to the extent practicable, and lastly may require compensation be provided for unavoidable impacts (addressed below).

For CWA Section 401 certification, Minnesota PCA is responsible for non-reservation wetlands in Minnesota, Wisconsin DNR is responsible for wetlands in Wisconsin, and North Dakota DH's Division of Water Quality is responsible for wetlands in North Dakota. USEPA is responsible for 401 certifications on reservation lands, with the exception of Grand Portage and Fond du Lac Bands in Minnesota, and Mole Lake and Lac du Flambeau Bands in Wisconsin, which have their own 401 programs. Permitting for system alternative SA-04 would require obtaining a CWA Section 401 certification from Iowa DNR and Illinois DNR. Adherence to state-specific general construction and stormwater permit conditions, buffer laws, and other state and local resource protection measures also would be required, which would serve as a duplicative mechanism for oversight and protection of jurisdictional wetland resources.

In Minnesota, the Wetland Conservation Act (WCA) protects wetlands and applies to all wetlands except Public Waters Wetlands (described below). The WCA requires projects that affect wetlands to try to avoid the impact, minimize any unavoidable impacts, and replace any lost wetland functions. Responsibility for administration of the WCA is shared by local government units and Minnesota BWSR (Minn. R. Ch. 8420), and is enforced by Minnesota DNR.

In North Dakota, the Office of the State Engineer is responsible for first review of a project permit that affects a wetland. If the project does not have a large-scale impact on the state, it is directed to a jurisdictional Water Resource District Board for review and approval (North Dakota AC 89-02-01-09). In Illinois, the Interagency Wetland Act of 1989, administered by Illinois DNR, establishes a zero net loss for wetlands in the state, which would require mitigation by the Applicant for any wetlands affected (Illinois DNR 2000). Iowa relies solely on CWA Section 401 for wetland permitting and does not have supplemental required regulations (Iowa AC 567-61.2). In Wisconsin, Wisconsin DNR regulates wetlands in addition to USACE and reviews projects for water resources permits, including wetland crossings, and may require compensatory mitigation under Wisconsin Statute § 281.36 and Wisconsin Administrative Code NR 299 and NR 103.

Compensatory Mitigation

Compensatory wetland mitigation may be required in federal and state-specific permitting for permanent impacts on forested, scrub/shrub, and emergent wetlands. The overall objective of compensatory wetland mitigation would be to compensate for lost wetland aquatic resource functions, taking into consideration what is available and feasible. Compensatory wetland mitigation would be consistent with applicable policies, regulations, and rules governing compensatory wetland mitigation for the purposes of Section 404 CWA, including, but not limited to:

- USACE, St. Paul District Draft Compensatory Mitigation Policy for Minnesota, dated January 23, 2009;
- Joint guidance between St. Paul District and Minnesota BWSR for Developing Mitigation Plan Performance Standards and Credit Release Schedules in Minnesota, dated December 16, 2015;
- USACE and EPA Final Rule Regarding Compensatory Mitigation for Losses of Aquatic Resources, dated April 10, 2008; and
- Minnesota Office of the Revisor of Statutes 7050.0186 Wetlands Standards and Mitigation, dated April 1, 2008 and wetland replacement regulations as described under the WCA.

Specially Designated Wetlands

Minnesota Public Waters Wetlands

Public Waters Wetlands are a subset of the State's jurisdictional wetlands regulated under Minnesota Statutes § 103G. Public Waters Wetlands are regulated as public waters under Minnesota DNR's License to Cross Public Waters program. Where Public Waters Wetlands occur, a License to Cross Public Waters would be required from Minnesota DNR.

Minnesota DNR is responsible for granting utility crossing licenses for any utility projects proposing to cross Public Waters Wetlands, if the crossing plans are reasonable, practical, and will adequately protect public safety and promote the public welfare (Minn. Stat. § 84.415, and §103G.315). The Applicant may request exemption from wetland replacement requirements under existing utility exemptions for those portions of the Project within Public Waters Wetlands that would be regulated under WCA standards. Utility crossing licenses generally are required for installation of electrical, pipeline, and communication projects and are granted for a term of 25 or 50 years.

Calcareous Fen Wetlands

Calcareous fens are wetlands characterized by a substrate of non-acidic peat and dependent on a constant supply of cold, oxygen-poor groundwater rich in calcium and magnesium bicarbonates. They are rare and typically occur on slight slopes where upwelling water eventually drains away and where surface water inputs are minimal.

Impacts on calcareous fens are regulated by Minnesota DNR under the WCA and the USACE under the CWA. Under this act, a calcareous fen may not be filled, drained, or otherwise degraded, wholly or partially, by any activity. If impacts are identified and deemed necessary by the Minnesota Commissioner of Natural Resources, a Fen Management Plan must be provided by the applicant (Minn. Stat. § 103G.223). Eight state-listed, rare plant species are known to be commonly found within calcareous fens; these plant species would be additionally protected under Minnesota's Endangered Species Act (Minn. Stat. § 84.0895).

Calcareous fens in Iowa and Illinois, where local state rules and regulations apply, would need to be surveyed and protected, if present along system alternative SA-04. In Iowa, 20 threatened plant species were identified in the calcareous fen wetlands located in the northern portion of the state. They would require compliance with the Threatened and Endangered Species Program managed by Iowa DNR. Projects with potential impacts on calcareous fen wetlands in Illinois would need to follow the State's Interagency Wetland Act of 1989 (20 ILCS 830).

Wetland Reserve Program

The Wetland Reserve Program, a voluntary federal program managed by the Natural Resources Conservation Service (NRCS), supported wetland conservation, restoration, and enhancement projects on private agricultural and pastoral land through easements and restoration cost-share agreements. The Wetland Reserve Program ran from 2009 to 2014 and was replaced by the Agricultural Conservation Easement Program of the Agricultural Act of 2014, which has the same objectives and implementation tools.

Minnesota Wetland Mitigation Bank Easements

The Minnesota BWSR Mitigation Banking Program administered under the WCA (Minn. R. 8420.0700 to 8420.0820) facilitates applying for or purchasing wetland credits toward future wetland impacts. The Minnesota BWSR oversees the program with local government units involved in landowner application and monitoring. Minnesota created 10 wetland bank service areas. The compensatory mitigation ratio can be increased if a compensation site or wetland mitigation bank is located in a different Bank Service Area than where the impact occurs.

Methodology

As a part of the evaluation of potential impacts to wetlands and effects on specially designated wetland resources, the following information sources were used to identify wetlands potentially affected by construction and operation of the Project:

- USFWS National Wetlands Inventory (NWI) database (USFWS 2016), classified using the Cowardin classification system (Cowardin et al. 1979);
- Minnesota DNR Public Waters Wetlands database (Minnesota DNR 2014), classified based on USFWS Circular No. 39 (EPA 2002b);
- Minnesota DNR calcareous fens database (Minnesota DNR 2008), ranked based on the conservation status ranking (or “S-rank”) methodology developed by NatureServe and its member natural heritage programs in North America (NatureServe 2016), and classified using Minnesota’s native plant community classifications (Minnesota DNR 2005);
- USGS Protected Area Database – Wetland Reserve Programs (USGS 2016); and
- Minnesota wetland mitigation bank easements database (Minnesota BWSR 2015).

The ROI for the wetland evaluation encompasses areas that could be directly or indirectly affected by pipeline construction and areas within the footprints of new or expanded facilities required for the rail and truck alternatives.

Typical wetland disturbance effects for the Applicant’s proposed project and system alternative SA-04 were based on the Applicant’s proposed construction methods described in Chapter 2 and the special wetland construction methods described in the Applicant’s November 2016 EAW (Enbridge 2016). Wetland disturbance effects for the rail and truck alternatives were based on implementing general construction practices and BMPs.

Potential wetland impacts for the Applicant’s proposed project were evaluated by overlaying the footprints of the construction work area, ATWS, access roads, pipe yards, pipeline permanent right-of-way, MLV pads and driveways, and pump stations on the identified wetland maps. Comparisons of construction impacts between the Applicant’s proposed project and SA-04 were based on the

evaluations of the Applicant's proposed project and a 120-foot-wide construction work area centered on system alternative SA-04. Comparisons of operations impacts were based on the Enbridge-provided footprint for the Applicant's proposed project permanent right-of-way and a 50-foot-wide permanent right-of-way for system alternative SA-04. It should be noted that the Applicant's proposed project incorporates measures to avoid or minimize wetland impacts and these types of measures are accounted for in the impacts estimates. These same types of wetland impact reductions are not incorporated into SA-04 for this evaluation.

The potential wetland impacts of continued use of the existing, transportation by rail, transportation by truck, existing Line 3 supplemented by rail, and existing Line 3 supplemented by truck were qualitatively assessed based on publically available wetland information, potential locations for new facilities, and potential transportation routes.

5.2.1.3.2 Existing Conditions

Wetland Types

Wetlands potentially affected by the CN Alternatives were grouped into three wetland categories: forested wetland, scrub/shrub wetland, and emergent wetland.

General Wetlands

Forested wetlands are dominated by woody vegetation 20 feet or taller, including evergreen forest, deciduous forest, and mixed forest wetlands. Scrub/shrub wetlands are dominated by woody vegetation less than 20 feet tall including tall and low-growing woody shrubs. Woody wetlands include both forested and scrub/shrub wetlands: the term "woody wetlands" is sometimes used in this EIS when discussing forested and scrub/shrub wetlands. Emergent wetlands that would be crossed by the Applicant's proposed project are dominated by erect, rooted, herbaceous wetland plants such as sedges, rushes, and grasses. Most of the emergent prairie wetlands that were previously in the region have been converted to croplands. Federal and state jurisdictional wetlands occur along the routes for the CN Alternatives, including specially designated wetlands.

Detailed maps that show the locations of wetlands and calcareous fens are in Appendix A.

Specially Designated Wetlands

Specially designated wetlands are identified as high-value wetlands resources based on environmental and socioeconomic factors such as size, environmental function, presence of high-value resources, habitat qualities, species diversity, and participation in federally and state-funded conservation programs. Specially designated wetlands and their values are of specific concern to state and local agencies. The specially designated wetlands addressed in this analysis are:

- Minnesota DNR's Public Waters Inventory – Public Waters Wetlands,
- Minnesota calcareous fen wetlands,
- NRCS managed wetlands, and
- Minnesota BWSR Mitigation Banking Program wetlands.

Minnesota Public Waters Wetlands

Public Waters Wetlands include wetlands 10 acres or larger in unincorporated areas or 2.5 acres or larger in incorporated areas. Because of the size of these wetlands and their associated environmental and socioeconomic functions, they are afforded legal protection in Minnesota. Public Waters Wetlands are categorized by wetland type as defined in USFWS Circular No. 39 (EPA 2002). Public Waters Wetlands that potentially would be crossed include Type 3 wetlands (inland, shallow fresh marshes), Type 4 wetlands (inland, deep fresh marshes), and Type 5 wetlands (open fresh water).

Minnesota Calcareous Fen Wetlands

As noted above, calcareous fens are rare peat-accumulating wetlands formed as a result of groundwater upwelling through calcareous substrates; they are designated in Minnesota as ORVWs. Because of their regional rarity, biodiversity, and sensitivity to disturbance, calcareous fens are afforded legal protection in Minnesota.

Wetland Reserve Program and Minnesota Board of Water and Soil Resources Banking Program

Wetlands identified under the NRCS or state Wetland Reserve Programs and Minnesota BWSR Mitigation Banking Program include those wetlands that are a part of an existing federally funded or state-managed Wetland Reserve Program. These wetlands are of significance as they offer landowners the voluntary opportunity to protect, restore, enhance, and develop mitigation wetlands under a protective easement managed by NRCS or Minnesota BWSR. Pipeline construction through or placement of facilities on wetland reserves or mitigation banks may prevent these wetlands from being eligible for these programs. During pipeline operation, the permanent right-of-way and potentially some adjacent areas would be subject to disturbance (1) during activities associated with the Applicant's Integrity Management Program (e.g., excavation to repair or replace sections of pipe); and (2) during maintenance of the right-of-way (e.g., brush cutting, mowing).

5.2.1.3.3 Impact Assessment

This section addresses the potential impacts to wetlands during construction and operation of the Applicant's proposed project and the CN Alternatives. Impacts from construction and operation of the Applicant's proposed project and SA-04 were evaluated quantitatively, using state and federal wetland maps. Wetland disturbance effects for existing Line 3 were estimated based on the existing conditions along Enbridge's Mainline corridor (e.g., the Alberta Clipper Final EIS [DOS 2009]). Wetland disturbance effects for the rail and truck alternatives were based on existing conditions in the potential locations for new infrastructure, general construction practices, and BMPs. Potential impacts to wetlands associated with continued use of the existing Line 3, transportation by rail, transportation by truck, existing Line 3 supplemented by rail, and existing Line 3 supplemented by truck were qualitatively assessed based on publically available wetland information, potential locations for new facilities, and potential transportation routes.

Generally, pipeline and facility construction through wetlands can result in changes to vegetation, soils, hydrology, and wildlife habitats, including:

- Changes in wetland vegetation community composition, structure, and productivity due to modification of surface and subsurface flow patterns as a result of ground clearing and pipeline construction;
- Loss of sensitive plant species as a result of construction clearing and grading;

- Wetland soil disturbance as a result of mixing of topsoil and subsoil during trenching and backfilling;
- Changes to water-retaining substrates, thereby causing permanent alterations to their water-holding capacity;
- Alteration of surface and subsurface hydrology that is important for maintaining wetland communities and microhabitats as a result of trenching and backfilling during pipeline construction;
- Sedimentation of wetlands and fluctuations in wetland hydrology as a result of trenching, dewatering, and stockpiling activities;
- Reduction in wildlife habitat and forage productivity, and increased risk of soil erosion and weed invasion due to removal of vegetation;
- Potential spread of invasive species and noxious weed populations along the pipeline construction impact area; and
- Contamination from equipment drips or spills during refueling operations.

Generally, pipeline and facility operations can affect wetlands by:

- Disturbance to reclaimed wetlands within the permanent right-of-way as a result of excavation to repair or replace sections of pipe as a part of the Applicant's Integrity Management Program, and as a result of right-of-way vegetation maintenance activities;
- Permanent modification of forested or scrub/shrub wetland plant community composition and structure in the permanent right-of-way as a result of vegetation management activities; and
- Establishment and spread of noxious weeds and invasive plants within the permanent right-of-way and at aboveground facilities due to ground disturbance as part of the Applicant's Integrity Management Program, and as a result of right-of-way vegetation maintenance activities.

All construction through wetlands would need to be approved by the authorizing agencies and identified by milepost. In areas where permanent aboveground facilities are not proposed, construction of a pipeline through emergent wetlands would result primarily in short-term and minor impacts if the wetland can be restored to preconstruction conditions. If wetland impacts result in changes in hydrology and vegetation including introduction of invasive plant species to emergent wetlands they would result in long-term impacts. Construction of a pipeline through forested wetlands would result primarily in long-term or permanent and major impacts. Post-construction wetland reclamation and monitoring would be required for a period of time until reclamation standards and permit conditions are met, or otherwise could be offset through compensatory mitigation in an onsite or offsite location.

The Applicant would use BMPs to avoid and minimize impacts to wetlands from pipeline and facility construction and operation. Many of these BMPs also may be applicable to construction and operation of rail and truck offloading facilities. Unavoidable impacts to wetlands may require compensatory mitigation.

The Applicant has committed to implementing the following BMPs during construction to minimize wetland impacts:

- Developing and adhering to the Project-specific Construction Methods and Procedures for Wetland and Waterbody Crossings and site-specific crossing plans (Enbridge 2016);
- Using wetland crossings designed and approved by engineers, reviewed onsite by the Project engineer, and approved by agencies for each crossing;
- Committing to consideration of a variety of wetland and waterbody crossing techniques to identify the most appropriate site-specific methods, including open-cut (wet trench, push-pull with excavator, push-pull with swamphoe); dry crossing methods (dry trench, dam-and-pump, or flume); trench breakers; trenchless (guided bore, HDD); and those described in the Enbridge November 2016 EAW (Enbridge 2016);
- Implementing mitigation measures that protect adjacent waterbodies during construction including, but not limited to, use of a vegetated buffer, slope breakers, sediment barriers (i.e., silt fencing and sediment curtains), filtration devices during dewatering, or trench breakers;
- Conducting wetland shoreline stabilization measures, including the erosion controls identified above and erosion control blankets, mulching, seeding (with Minnesota BWSR seed mixes or other agency-approved seed mix), cat tracking, placing temporary slope breakers, and placing riprap where necessary;
- Developing and adhering to the wetland-specific avoidance measures in the Applicant's Environmental Protection Plan (Appendix E);
- Reducing temporary construction work area beyond the 50-foot-wide permanent right-of-way in wetlands areas from 70 feet to 45 feet, except in areas where trench wall failure or other construction constraints have been identified as a concern;
- Restoring wetland vegetation cover types following construction, as described in the Environmental Protection Plan;
- Co-locating the Project with existing rights-of-way unless co-location would result in a greater impact on wetlands or other sensitive resources;
- Minimizing impacts on sensitive wetland soils during wet conditions by use of timber mats, low-ground-weight equipment, and other methods identified in the Environmental Protection Plan;
- Designing and planning Project pipeline routes and infrastructure sites to reduce impacts on sensitive wetland resources;
- Adhering to the measures in the Environmental Protection Plan for monitoring for inadvertent release of drilling fluid during HDD construction and procedures for the containment, response, and cleanup to limit the potential for drilling mud to reach wetlands;
- Placing petroleum products storage, refueling, maintenance, and lubricating operations a minimum of 100 feet from wetlands;
- Placing concrete wash water, grindings, and slurry away from wetlands with no allowable discharge of these waste products into wetlands or waterbodies;

- During trench dewatering, pumping discharge water at controlled discharge rates into a filtration device located in a well-vegetated area and in a manner to prevent the migration of silt-laden water into wetlands;
- Posting signage during construction noting sensitive environmental features and wetlands;
- Cutting off wetland vegetation at ground level and removing it from wetland areas;
- Stripping the top 1 foot of topsoil or the amount of topsoil present, whichever is less, over the trench line, segregating it, and replacing it after pipe installation and backfilling in unsaturated wetlands;
- Avoiding the use of fertilizer, lime, and mulch in wetlands;
- Complying with USACE and state wetland permits, including compliance with permit conditions and long-term monitoring plans;
- Restoring wetlands to preconstruction contours;
- Maintaining wetland hydrology by using trench breakers in any area where the potential to drain, or partially drain, a wetland exists; sufficiently compacting the pipeline trench; and placing the pipeline on native material as opposed to gravel; and
- Using construction mats, as needed, to facilitate equipment access and pipeline installation and to minimize soil compaction and/or mixing.

Compensatory Mitigation

Compensatory wetland mitigation would be provided by the Applicant for permanent impacts on various types of wetlands, such as forested, scrub/shrub, and emergent wetlands, as required in the federal and state-specific permits issued. The overall objective of compensatory wetland mitigation would be to compensate for aquatic resource functions lost due to construction of the Applicant's proposed project, taking into consideration what is available and feasible. Although site-specific compensatory wetland mitigation has yet to be identified, it would continue to be considered in consultation with the permitting agencies to minimize and offset wetland impacts. Compensatory wetland mitigation would be consistent with applicable policies, regulations, and rules governing compensatory wetland mitigation for purposes of Section 404 CWA (see Section 5.2.1.3.1).

The assessments for the Applicant's proposed project and CN Alternatives are discussed within the following categories:

- General wetland impacts,
- Impacts on Minnesota Public Waters Wetlands,
- Impacts on Minnesota calcareous fen wetlands, and
- Impacts on federal and state Wetland Reserves and Minnesota BWSR Mitigation Bank easements.

Applicant's Proposed Project (from Neche to Superior)

Construction Impacts

General Wetlands

The estimated acreages of wetlands potentially affected by construction of the Applicant's proposed project are presented in Table 5.2.1.3-1 (Appendix A). The Applicant's proposed project would potentially impact 618.2 acres of wetlands during construction. Of these 618.2 acres of wetland construction wetland impact, 195.7 acres of these will consist of forested wetlands. The majority of wetland impacts (85 percent) would occur within Minnesota.

Table 5.2.1.3-1. Estimated Acreage of Wetlands Crossed by the Applicant's Proposed Project

Wetland Classification	Con ROW[a]	Op ROW[a]	ATWS	Access Roads	Pump Stations	MLVs	Total[c]	
							Con	Op
North Dakota[a]								
Forested wetland	0.6	0.2	NA	NA	NA	NA	0.6	0.2
Scrub/shrub wetland	0.0	0.0	NA	NA	NA	NA	0.0	0.0
Emergent wetland	12.0	5.0	NA	NA	NA	NA	12.0	5.0
Wetland subtotal	***12.6***	***5.2***	***NA***	***NA***	***NA***	***NA***	***12.6***	***5.2***
Minnesota[b]								
Forested wetland	141.1	66.3	6.3	3.5	0.8	0.1	147.5	70.6
Scrub/shrub wetland	214.5	115.7	7.5	8.3	0.2	0.3	224.6	122.0
Emergent wetland	143.8	79.2	5.5	4.8	0.8	0.0	151.6	82.5
Wetland subtotal	***499.3***	***261.2***	***19.4***	***16.7***	***1.8***	***0.4***	***523.7***	***275.1***
Wisconsin[a]								
Forested wetland	47.6	19.4	NA	NA	NA	NA	47.6	19.4
Scrub/shrub wetland	19.7	8.0	NA	NA	NA	NA	19.7	8.0
Emergent wetland	14.6	5.6	NA	NA	NA	NA	14.6	5.6
Wetland subtotal	***81.9***	***33.0***	***NA***	***NA***	***NA***	***NA***	***81.9***	***33.0***
All States								
Forested wetland	189.3	85.9	6.3	3.5	0.8	0.1	195.7	90.2
Scrub/shrub wetland	234.2	123.7	7.5	8.3	0.2	0.3	244.3	130.0
Emergent wetland	170.4	89.8	5.5	4.8	0.8	0.0	178.2	93.1
WETLAND TOTAL	***593.8***	***299.4***	***19.4***	***16.7***	***1.8***	***0.4***	***618.2***	***313.3***

Source: USFWS 2016.

[a] Con ROW = estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the pipeline route, including the 50-foot-wide permanent right-of-way; Op ROW = estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the pipeline route

[b] Con = Enbridge-provided footprint for construction work area; Op = Enbridge-provided footprint for permanent right-of-way; additional temporary workspaces (ATWS), including pipe yards; and mainline valves (MLVs), including valve pads and driveways

Table 5.2.1.3-1. Estimated Acreage of Wetlands Crossed by the Applicant's Proposed Project

Wetland Classification	Con ROW[a]	Op ROW[a]	ATWS	Access Roads	Pump Stations	MLVs	Total[c]	
							Con	Op

[c] Con = sum of pipeline construction work area, ATWS, and temporary access roads; Op = sum of pipeline permanent right-of-way, primary access roads, pump stations, and MLVs

Notes:

Values in table may not sum to subtotals and totals due to rounding.

NA = not applicable

Construction through or on wetlands would result in impacts on wetland vegetation, soils, hydrology, and wildlife habitats. Construction activities may result in reduction of a wetland's ability to trap and slowly release surface water, rain, snowmelt, groundwater, and flood waters. Wetland soils would be disturbed by trenching and backfilling during pipeline construction. Impacts to wetlands outside the construction work area are not expected because sediment containment barriers would be used until construction is complete and vegetation cover has reestablished. Over time, provided that original contours are restored and hydrology is maintained, most affected wetland vegetation would regenerate and wetland function would return. In general, wetland pipeline construction impacts do not result in the placement of fill and wetlands would be returned to preconstruction contours and wetland conditions.

Up to 440 acres of woody wetlands (scrub/shrub and forested) would be cleared within the entire construction work area during construction, after which woody wetlands would be allowed to reestablish within construction work areas outside of the permanent right-of-way. Woody vegetation and all other wetland vegetation would be permanently removed from the areas where aboveground facilities (pump stations and MLVs) and access roads would be constructed.

Until woody vegetation is reestablished, scrub/shrub and forested wetlands would be converted to emergent vegetation, resulting in major changes both to vegetation structure and wetland functions. Wetland habitats containing large mature woody growth would reestablish in temporary construction work areas within 3 to 50 years, depending on the vegetation community and vegetation structure (Jacobson 2006, Wenzel et al. 2012). Forested wetlands may require from 35 to 50 years to achieve vegetation and wildlife habitat similar to mature forested wetlands (Wenzel et al. 2012). Clearing of forested wetlands in construction work areas may require compensatory mitigation, as these wetland types would be converted to other wetland types on a long-term or permanent basis. Compensatory wetland mitigation for impacts on forested wetlands could offset these changes.

Construction of the route would affect up to 178.2 acres of emergent wetlands (Table 5.2.1.3-1). Emergent wetland vegetation would reestablish within 3 years as a community functionally similar to that of the wetland prior to construction (Jacobson 2006, Wenzel et al. 2012), provided that disturbance to vegetation is minimized, root structures are retained to the extent practicable, and preconstruction wetland contours and wetland hydrology are maintained. In areas where the disturbance to vegetation is minimal and the root structures, preconstruction wetland contours, and wetland hydrology are maintained, the impacts would be short-term and minor. In areas where trenching occurs directly through a wetland, the impacts would be short- to long-term and minor to major. Where emergent wetlands are cleared for construction of aboveground facilities and access roads (approximately 18.9 acres), the impacts on these wetlands would be permanent and minor to major; however, the impacts could be offset by compensatory wetland mitigation.

Approximately 19.4 acres of wetlands could be affected by use as ATWS and pipe storage yards for pipeline construction, resulting in short-term to long-term minor impacts, as these areas would be restored to wetlands after construction.

Crossings by HDD for selected waterbodies and associated wetlands generally would avoid direct impacts on wetland resources. Each crossing selected for HDD would be identified, and permitting would be carried out (including identification of BMPs) at each location. Fluid (water, bentonite clay, and possible additives) is used during drilling to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. The potential exists for an inadvertent release or "frac-out" of this drilling fluid when pressurization of the drill hole is beyond the containment capability of the overburden soil material, which would allow the drilling fluid to flow to the ground. If a frac-out occurred within a wetland, the vegetation and soil would be compromised. During drilling, construction personnel would monitor the crossing to detect releases of drilling mud and would implement containment, response, and clean-up procedures as outlined in the Applicant's Environmental Protection Plan (Appendix E) to limit the potential for drilling mud to reach surface water. If a frac-out occurred and went undetected or was not quickly contained, impacts to wetlands could be long-term and major. However, with implementation of the Applicant-proposed measures to respond to a drilling mud release during HDD construction, the impact of a release could be short-term and minor. Successful construction of wetland crossings using HDD (i.e., the crossing is completed without a frac-out) would not affect wetlands.

Specially Designated Wetlands

Impacts on Minnesota Public Waters Wetlands. Public Waters Wetlands crossed by the Applicant's proposed project include 2.8 acres of wetland Types 3 and 4 (Table 5.2.1.3-2) for construction. Because of their overall size and associated environmental and socioeconomic functions, Public Waters Wetlands are afforded legal protection in Minnesota.

Table 5.2.1.3-2. Estimated Acreages of Public Waters Wetlands Crossed by the Applicant's Proposed Project in Minnesota

Wetland Type	Con ROW[a]	Op ROW[a]	ATWS	Access Roads	Pump Stations	MLVs	Total[b]	
							Con	Op
Type 3 – Inland shallow fresh marshes	2.1	1.7	0.0	0.0	0.0	0.0	2.1	1.7
Type 4 – Inland deep fresh marshes	0.6	0.2	0.1	0.0	0.0	0.0	0.7	0.2
TOTAL	**2.7**	**1.9**	**0.1**	**0.0**	**0.0**	**0.0**	**2.8**	**1.9**

Source: Minnesota DNR 2014.

[a] Con = Enbridge-provided footprint for construction work area; Op = Enbridge-provided footprint for permanent right-of-way

[b] Con = sum of pipeline construction work area, additional temporary workspaces (ATWS), and temporary access roads; Op = sum of pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves.

The Applicant's proposed project would affect 2.8 acres of Public Waters Wetlands during construction, primarily between the North Dakota border and Carlton in Minnesota (Table 5.2.1.3-2). Impacts on Minnesota Public Waters Wetlands during construction would result from alteration of wetland vegetation, soils, and hydrology; however, these areas would be restored as wetlands after construction.

Minnesota DNR would be consulted regarding Public Waters Wetland crossings as part of the License to Cross Public Waters permitting process that would occur prior to construction. All impacts, BMPs, and proposed avoidance related to Public Waters Wetlands would be subject to conditions contained in a License to Cross Public Waters. Any dewatering of the trench that would be required for construction across Public Waters Wetlands would require a Water Appropriation Permit. Implementation of the measures identified in the license would limit potential impacts on Public Waters Wetlands.

As part of permit requirements, the Applicant would identify and prepare site-specific crossing plans, avoid and minimize impacts on Public Waters Wetlands to the extent possible, and restore affected Public Waters Wetlands onsite. Restoration to the existing level of wetland function would likely take several years. As a result, the impacts on Public Waters Wetlands from construction of the Applicant's proposed project would be short-term and minor.

Impacts on Minnesota Calcareous Fen Wetlands. One northwestern calcareous fen would be crossed by the Applicant's proposed project, and four others are near the route (Table 5.2.1.3-3). All northwestern calcareous fens near the Applicant's proposed project are located on the portion of the route between the North Dakota border and Clearbrook, Minnesota. The fen near MP 122.0 named Gully 30 is approximately 63 feet from the route centerline. Calcareous fen surveys completed in 2010 identified the presence of Gully 30 during development of the Alberta Clipper pipeline. As part of the environmental review for the Alberta Clipper pipeline, a Gully 30 Fen Management Plan was developed in coordination with Minnesota DNR (Natural Resource Group 2009). As proposed, portions of the Applicant's proposed project would be co-located with the Alberta Clipper pipeline where Gully 30 and other nearby fens occur (Table 5.2.1.3-3). If it is determined that impacts on this fen could not be practicably avoided by Project construction, construction would be subject to a Fen Management Plan approved by the Commissioner of Natural Resources of Minnesota DNR.

Table 5.2.1.3-3. Calcareous Fen Wetlands near the Applicant's Proposed Project in Minnesota

Approximate Milepost	Distance from Route	Name – Elemental Occurrence Identifier	MBS Native Plant Community Code	State Rank[a]	County
72.0	796 feet	Viking 18 – 14377	OPp93a	S2	Marshall
73.5	2,042 feet	Viking 20 – 15297	OPp93a	S2	Marshall
81.0	525 feet	Norden 18 – 34586	OPp93a	S2	Pennington
120.5	2,011 feet	Chester 24 – 35384	OPp93a	S2	Polk
122.0	63 feet	Gully 30 – 35382	OPp93a	S2	Polk

Sources: Minnesota DNR 2008, 2016, Enbridge 2016.

[a] State Rank: S1 = critically imperiled; S2 = imperiled; S3 = vulnerable to extirpation; S4 = apparently secure; S5 = secure, common, widespread, and abundant

MBS = Minnesota Biological Survey

Impacts on other nearby fens would be avoided. The Applicant's proposed project diverges from the Mainline corridor to avoid crossing Chester 24, Viking 18, and Norden 18 calcareous fens. Potential impacts on Gully 30 include alteration of hydrology, introduction of contaminants, loss of rare or unique plants, introduction of invasive species, and altered peat formation—all of which could be detrimental to calcareous fen wetland functions. Prior to construction, the Minnesota DNR would be consulted to aid in the identification of potential impacts on and major mitigation measures for calcareous fens.

Where calcareous fens are identified, the Minnesota DNR would request preparation of a Fen Management Plan, which would identify impacts and BMPs specific to the affected fen. These BMPs would include the general BMPs identified to avoid major impacts to wetlands discussed above. Overall, it is expected that the Applicant's proposed project would result in a short-term to long-term minor impact on one calcareous fen wetland.

Impacts on Wetland Reserves. No NRCS Wetland Reserves or state wetland reserves would be crossed by the Applicant's proposed project or associated facilities. A state wetland reserve is located between the North Dakota border and Clearbrook, Minnesota. Impacts on this reserve are not expected as the reserve is not near the pipeline route. No mitigation bank wetlands would be crossed by the Applicant's proposed project, and no impacts are expected to occur.

Operations Impacts

General Wetlands

The estimated acreages of wetlands potentially affected by the operation of the Applicant's proposed project are presented in Table 5.2.1.3-1 (Appendix A). Operation of the Project would potentially affect up to 313.3 acres of wetlands within the permanent right-of-way and associated facilities. Approximately 18.9 acres of wetlands would be permanently converted to developed land for aboveground facilities (pump stations and MLVs) and access roads (Appendix A). The impacts on these wetlands would be permanent and minor to major; however, the impacts could be offset by compensatory wetland mitigation.

Impacts on wetlands could result from maintenance activities, including vegetation management and pipeline inspections that would occur for the life of the Project. Woody vegetation within the permanent right-of-way would be managed (cut every 3 to 5 years) to prevent large shrubs and trees from reestablishing over the pipeline to allow for visual inspection of the right-of-way. Because trees and shrubs would not be allowed to reestablish within the permanent right-of-way, vegetation management would represent a permanent major impact through converting forested and scrub/shrub wetlands to emergent or early-stage scrub/shrub wetlands. A total of 209.6 acres of previously forested and scrub/shrub wetlands converted during construction would be maintained as emergent wetlands within the pipeline permanent right-of-way for the life of the Project (Table 5.2.1.3-1).

Emergent wetland vegetation in the permanent right-of-way generally would not be mowed or otherwise maintained and would not be affected by mowing or vegetation management activities. Routine vegetation management would use a rubber-tracked skid-steer vehicle, or similar, with specialized cutting equipment to minimize disturbance to low-growing herbaceous cover and compaction and rutting of wetland soils. However, this loss of woody vegetation communities would result in permanent and major impacts on wetland structure and functions that could require compensatory mitigation.

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. If excavation is required within a wetland, impacts would likely be short-term and minor but could occur periodically over the life of the Project.

Operation of the Applicant's proposed project may increase the potential for the introduction and spread of noxious weeds and invasive plants for the life of the Project and beyond. The Environmental

Protection Plan (Appendix E) and wetland permitting documents would describe measures to prevent the spread of noxious and invasive weeds in wetlands during wetland vegetation management and during pipeline maintenance activities. The presence of noxious weeds and potential for spread of infestations within the Project area are addressed in Section 5.2.3.

Specially Designated Wetlands

Impacts on Minnesota Public Waters Wetlands. Public Waters Wetlands impacted by the Applicant's proposed project include 1.9 acres of wetland Types 3 and 4 (Table 5.2.1.3-2) for operation. Because of their overall size and associated environmental and socioeconomic functions, Public Waters Wetlands are afforded legal protection in Minnesota.

Short-term minor impacts could occur on these 1.9 acres of Public Waters Wetlands within the permanent right-of-way for the Applicant's proposed project from maintenance activities. Impacts would result from vegetation management, however, it is unlikely that the shallow fresh marsh crossed would require vegetation management as shrubs are unlikely to grow as long as the marsh hydrology is maintained (Table 5.2.1.3-2). In addition, pipeline maintenance activities could spread noxious weeds and invasive plants. The potential impact is expected to be short- to long-term and minor to major after each maintenance activity, but would occur periodically over the life of the Project.

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. Impacts on Public Wetland Waters would be limited to the pipeline segment through the 2 acres of these wetlands, and repeated repairs or replacement at those locations are unlikely. Impacts on the Public Waters Wetlands from integrity digs likely would be short-term and minor to major.

Impacts on Minnesota Calcareous Fen Wetlands. One northwestern calcareous fen would be crossed by the Applicant's proposed project, and four others are near the route (Table 5.2.1.3-3). All northwestern calcareous fens near the Applicant's proposed project are located on the portion of the route between the North Dakota border and Clearbrook, Minnesota. The fen near MP 122 named Gully 30 is approximately 63 feet from the route centerline. Calcareous fen surveys completed in 2010 identified the presence of Gully 30 during development of the Alberta Clipper pipeline. As part of the environmental review for the Alberta Clipper pipeline, a Gully 30 Fen Management Plan was developed in coordination with Minnesota DNR (Natural Resource Group 2009). As proposed, portions of the Applicant's proposed project would be co-located with the Alberta Clipper pipeline where Gully 30 and other nearby fens occur (Table 5.2.1.3-3).

Although the Applicant's proposed project would cross the Gully 30 calcareous fen, it has been routed to avoid the Chester 24 and Viking 18 calcareous fens that are crossed by the existing Line 3. All activities occurring near calcareous fens would be subject to BMPs identified in a Fen Management Plan, if one needed to be developed for the Project.

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. Impacts on calcareous fens would be limited to the pipeline segment through the Gully 30 fen, and repeated repairs or replacement at this location are unlikely. Impacts on calcareous fens as a result of pipeline maintenance activities during normal operation of the Project would be short- to long-term and minor but could occur periodically over the life of the Project.

Impacts on Wetland Reserves. Impacts on wetland reserves would not occur during operation of the pipeline because no wetland reserves or mitigation bank easements are located within the permanent right-of-way.

Potential impacts to wetlands due to an unanticipated crude oil release are discussed in Chapter 10.

Continued Use of Existing Line 3

Construction Impacts

No construction impacts to wetlands are associated with continued use of the existing Line 3 pipeline because it is already in place and operating.

Operations Impacts

General Wetlands

Existing Line 3 crosses 86 miles of wetlands that originally were 60 percent forested wetlands, 25 percent scrub/shrub wetlands, and 15 percent emergent wetlands (DOS 2009). These wetland areas have been maintained primarily as emergent wetlands through removal of woody vegetation over the permanent pipeline right-of-way. Previous HDD crossings of forested and scrub/shrub wetlands would not have been altered.

Operations activities for the existing Line 3 pipeline include continued vegetation management to remove trees and large shrubs from the permanent right-of-way, and continuing potential for the spread of noxious weeds and invasive plants along the right-of-way and at aboveground facilities. These activities would occur within the pipeline corridor whether or not Line 3 remains in use.

The Applicant's ongoing Integrity Management Program for Line 3 would require excavation and repair or replacement of sections of the pipeline that could occur within wetlands. Because of the age of the existing Line 3, excavation and repair or replacement of the pipeline would occur at a higher rate than for new pipelines, with an estimated 466 excavations per year over the next 15 years. Potential impacts to wetlands associated with these maintenance activities could be short- to long-term and minor to major, depending on the frequency of occurrence within wetlands and the lengths of the pipeline segments requiring replacement.

Specially Designated Wetlands

The existing Line 3 pipeline corridor crosses through one Minnesota Public Waters Wetland. This Type 3 – inland shallow marsh is located between the North Dakota border and Clearbrook. Three Minnesota northwestern calcareous fens are crossed by the existing Line 3: Viking 18, Chester 24, and Gully 30. No wetlands enrolled in the NRCS Wetland Reserve Program are present near the existing Line 3 pipeline in Minnesota. No Minnesota BWSR Mitigation Banking Program wetlands are crossed by the existing Line 3 pipeline.

The Public Waters Wetland crossed by Line 3 could be affected by integrity management actions if excavation is required at this location. No vegetation maintenance would be required at this location because it is an emergent marsh. Line 3 crosses three calcareous fen wetlands (Chester 24, Viking 18, and Gully 30). Potential impacts on calcareous fens during operations could occur if excavation is required at these locations; however, repeated pipeline repairs or replacement are unlikely at these

locations. The resultant impacts would be similar to those for initial construction of the pipeline through the fens (i.e., the impact is expected to be short- to long-term and minor).

Impacts on wetland reserves would not be associated with operation of the pipeline because no wetland reserves or mitigation bank easements occur within the permanent right-of-way for the existing Line 3.

System Alternative SA-04

Construction and operation activities that would result in potential wetlands impacts for SA-04 are the same as those described for the Applicant's proposed project. Most impacts would be similar and are summarized in this section, along with information on impacts that would be different.

Construction Impacts

General Wetlands

The estimated acreages of wetlands potentially affected by construction and operation of SA-04 are presented in Table 5.2.1.3-4. SA-04 would potentially affect 286.5 acres of wetlands during construction. Construction-related wetland impacts would potentially affect 17.8 acres of forested wetlands that are difficult to restore and mitigate. In addition, 16.4 acres of scrub/shrub wetlands would potentially be impacted during construction.

After construction, woody vegetation would be allowed to reestablish within construction work areas outside of the permanent right-of-way. Until woody vegetation is reestablished, scrub/shrub and forested wetlands would be converted to emergent vegetation resulting in long-term to permanent major impacts on both vegetation structure and wetland functions.

Approximately 252.4 acres of emergent wetlands would be affected by construction. The wetlands along the route would be reclaimed after construction (Table 5.2.1.3-4), but would require several years for vegetation to become fully reestablished. As a result, the impact of construction on emergent wetlands within the construction impact area would be short-term and minor.

While footprints are not available for aboveground facilities for system alternative SA-04 at this time, impacts during construction would be permanent and major if placement of facilities within wetlands was unavoidable. However, the impact could be offset with compensatory mitigation.

Table 5.2.1.3-4. Estimated Acreage of Wetlands Crossed by System Alternative SA-04

Wetland Classification	Construction[a]	Operations[b]
North Dakota		
Forested wetland	1.1	0.5
Scrub/shrub wetland	8.6	3.6
Emergent wetland	145.0	53.6
Wetland subtotal	***154.8***	***57.7***
Minnesota		
Forested wetland	10.3	4.2
Scrub/shrub wetland	7.5	3.4

Table 5.2.1.3-4. Estimated Acreage of Wetlands Crossed by System Alternative SA-04

Wetland Classification	Construction[a]	Operations[b]
Emergent wetland	77.9	32.7
Wetland subtotal	***95.7***	***40.3***
Iowa		
Forested wetland	3.7	1.5
Scrub/shrub wetland	0.3	0.2
Emergent wetland	22.7	9.7
Wetland subtotal	***26.8***	***11.3***
Illinois		
Forested wetland	2.6	0.9
Scrub/shrub wetland	0.0	0.0
Emergent wetland	6.7	2.9
Wetland subtotal	***9.3***	***3.8***
All States		
Forested wetland	17.8	7.1
Scrub/shrub wetland	16.4	7.2
Emergent wetland	252.4	98.8
WETLAND TOTAL	**286.5**	**113.1**

Source: USFWS 2016.

[a] Construction = estimated construction impact area in acres based on 120-foot-wide construction work area centered on the pipeline route, including the 50-foot-wide permanent right-of-way

Specially Designated Wetlands

Impacts on Minnesota Public Waters Wetlands. SA-04 would cross near one Public Waters Wetland. This Type 3 – inland shallow fresh marsh would be encroached on through an agricultural field that surrounds the marsh. Construction of system alternative SA-04 would result in short-term minor impacts on up to 0.1 acre of inland shallow fresh marsh Public Waters Wetlands during construction. Impacts on Public Waters Wetlands would be subject to state-specific permitting requirements, and implementation of BMPs would be required for Project approval.

Impacts on Minnesota Calcareous Fen Wetlands. One southwestern calcareous fen (Kasota 7) is located 2,359 feet from SA-04 in Le Sueur County, Minnesota. Impacts would not occur on calcareous fens under this alternative because the nearest calcareous fen (Kasota 7) is located 2,359 feet from system alternative SA-04 in Le Sueur County, Minnesota, within the Kasota Prairie Scientific and Natural Area (SNA) (Minnesota DNR 2008).

Impacts on Wetland Reserves. Four state-managed wetland reserves (wetlands under a Wetland Reserve Program) would be crossed by SA-04 (Table 5.2.1.3-5). No Minnesota BWSR Mitigation Banking Program wetlands are crossed by the existing Line 3 pipeline. Short-term, minor impacts on up to 8.3 acres of these wetland reserves would potentially occur during construction. The entirety of these

wetland reserves occur within the construction work area and not permanent right-of-way and therefore would be reclaimed and restored.

Table 5.2.1.3-5. Estimated Acreages and Number of Wetland Reserves Crossed by System Alternative SA-04

State Wetland Reserves	Construction[a]	Operations[b]
North Dakota		
Wetlands Reserve Program	5.8 acres (two reserves)	2.4 acres (two reserves)
Minnesota		
Wetlands Reserve Program	2.5 acres (two reserves)	1.0 acre (one reserve)
Iowa		
Wetlands Reserve Program	0.0	0.0
TOTAL	**8.3 acres (four reserves)**	**3.5 acres (three reserves)**

Source: USGS 2016.

[a] Construction = estimated construction impact area in acres based on 120-foot-wide construction work area centered on the pipeline route, including the 50-foot-wide permanent right-of-way

[b] Operations = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the pipeline route

Operations Impacts

General Wetlands

SA-04 would potentially affect 113.1 acres of wetlands during operations (Table 5.2.1.3-4). Operation of system alternative SA-04 pipeline would be as described for the Applicant's proposed project above. The impacts would result from maintenance activities, including vegetation management that would occur for the life of the Project. Approximately 14.3 acres of forested and scrub/shrub wetlands would be managed to prevent trees and shrubs from reestablishing within the permanent right-of-way. Vegetation management would represent a permanent minor to major impact through conversion of forested and scrub/shrub wetlands to emergent or early-stage scrub/shrub wetlands. This loss of woody vegetation would result in permanent and major impacts on wetland structure and functions that could be offset with compensatory mitigation.

Emergent wetland vegetation in the permanent right-of-way generally would not be mowed or otherwise managed and would not be affected by vegetation management activities. If emergent vegetation is affected by vegetation management, the impact is expected to be short-term and minor.

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. Impacts on emergent wetlands as a result of these activities would likely be short-term and minor, but would occur periodically over the life of the Project.

While footprints are not available for aboveground facilities for system alternative SA-04 at this time, impacts during construction would be permanent and major if placement of facilities within wetlands was unavoidable. However, the impact could be offset with compensatory mitigation.

Operation of SA-04 may increase the potential for the introduction and spread of noxious weeds and invasive plants for the life of the Project. The Applicant would implement the procedures in the Environmental Protection Plan (Appendix E) prepared for the Project, and wetland permitting documents would describe measures to prevent the spread of noxious and invasive weeds in wetlands. With implementation of those procedures, the impact of the introduction and spread of noxious weeds and invasive plants would be short-term and minor.

Potential impacts to wetlands due to an unanticipated crude oil release are discussed in Chapter 10.

Specially Designated Wetlands

Impacts on Minnesota Public Waters Wetlands. No Public Waters Wetlands would be affected during operation as they do not occur within the permanent right-of-way of SA-04.

Impacts on Minnesota Calcareous Fen Wetlands. No calcareous fens would be affected during operation as they do not occur within the permanent right-of-way of SA-04.

Impacts on Wetland Reserves. Four state-managed wetland reserves (wetlands under a Wetland Reserve Program) would be crossed by SA-04 (Table 5.2.1.3-5). No Minnesota BWSR Mitigation Banking Program wetlands are crossed by the existing Line 3 pipeline.

Three NRCS Wetland Reserves are located within the permanent right-of-way of SA-04, which would result in permanent minor impacts on up to 3.5 acres of wetland reserves (Table 5.2.1.3-5). All wetlands within the permanent right-of-way would become ineligible as conservation easements, as the wetlands would no longer be protected from future disturbance due to routine maintenance, pipeline monitoring, and integrity management activities. However, in-kind compensatory mitigation could be used to offset wetland impacts.

Transportation by Rail

The rail alternative would require an area of approximately 100 to 200 acres for construction and operation of a rail loading facility, and an additional 84 acres to construct and operate a new 14-mile-long rail connection near Gretna, Canada. The rail access and loading facilities would be located in Canada and as such are not addressed as part of this MEPA EIS.

<u>Construction Impacts</u>

General Wetlands

The rail offloading facility near Clearbrook would require between 100 and 200 acres of land that is identified as agricultural lands and wetlands, including emergent, scrub/shrub, and forested wetlands. Wetlands located in this area would likely be affected, since potential construction locations near the Clearbrook terminal include emergent, scrub/shrub, and forested wetlands. However, the acreage of wetlands that would be affected by construction of the facilities has not been determined since the facility footprint has not been identified. Construction of rail facilities near Superior, Wisconsin, would likely affect wetlands. Construction of the Superior offloading facility could affect up to 100 acres. The undeveloped area near the Superior terminal is entirely wetlands, primarily forested and scrub/shrub wetlands, which would be permanently converted to developed use. Redevelopment of 10 miles of rail access would require approximately 60 acres between Clearbrook and Gully, Minnesota, that would cross through several small emergent wetlands. Compensatory mitigation could be used to offset these permanent impacts.

New facilities constructed under the rail alternative would undergo permitting, would be sited to avoid wetland resources to the extent practicable, and would require avoidance, minimization, and may require compensatory mitigation for unavoidable impacts to wetlands per state and federal regulations. During construction, direct impacts to wetlands would occur from clearing and grading for site preparation, and placement of fill for construction of offloading facilities and new rail connections for operation of the rail alternative. Some wetlands would likely be lost by construction of offloading facilities at Clearbrook and Superior, which would result in permanent major wetland impacts. Compensatory mitigation similar to that applied for the Applicant's proposed project could be used to offset wetland impacts.

Specially Designated Wetlands

Impacts on Minnesota Public Waters Wetlands. Three Public Waters Wetlands occur near the Clearbrook terminal, although it is unlikely that these wetlands would be directly affected by construction of the facility, as it is likely that siting the new facility on these wetlands would be avoidable. Temporary to short-term minor impacts could occur as these wetlands may be indirectly affected through an increase in impervious surface and potential changes in runoff water quality within the watersheds that support these wetlands.

Impacts on Minnesota Calcareous Fen Wetlands. Calcareous fens would not be affected since these do not occur in the area.

Impacts on Wetland Reserves. Wetland Reserve Program wetlands would not be affected since these do not occur in the area.

Operations Impacts

General Wetlands

Up to about 100 acres of forested and scrub/shrub wetlands could be permanently converted to industrial/developed use for the rail facilities, which would result in permanent major wetland impacts. In addition, redevelopment of 10 miles of rail access would require approximately 60 acres between Clearbrook and Gully, Minnesota, that would cross through several small emergent wetlands. However, compensatory mitigation similar to that applied for the Applicant's proposed project could be used to offset impacts would reduce the impact.

During operation there may be small leaks of petrochemicals from rail cars; the materials leaked would reach the rail bed and be susceptible to movement with runoff. However, due to the small amounts anticipated and the area over which the leaks would occur, the impacts would likely be short-term and negligible to minor. Unanticipated releases of crude oil from rail transport are addressed in Chapter 10. The transfer facilities would be constructed to include primary and secondary containment structures in accordance with applicable regulatory requirements. Small spills and leaks at the transfer facilities would be retained within the facility and there would not be an impact outside of the facility.

Specially Designated Wetlands

Impacts on Minnesota Public Waters Wetlands. Three Public Waters Wetlands occur near the Clearbrook terminal. These wetlands could be indirectly affected due to increased runoff resulting from the increase in impervious surfaces and the potential of the runoff containing contaminants. However, the changes in total runoff reaching the wetlands would likely be small, and the resultant impacts on the wetlands would be short-term and negligible to minor, but would occur for the life of the Project.

Impacts on Minnesota Calcareous Fen Wetlands. Calcareous fens would not be affected since these do not occur in the area.

Impacts on Wetland Reserves. Wetland Reserve Program wetlands would not be affected since these do not occur in the area.

Transportation by Truck

The truck alternative would require an area of approximately 140 acres for construction and operation of a truck loading facility, and an additional acreage to construct and operate a new access road connection near Gretna, Canada. The truck access road and loading facilities would be located in Canada and as such are not addressed as part of this MEPA EIS.

Construction Impacts

General Wetlands

Construction of a new truck offloading facility near Clearbrook would require approximately 50 acres; and an additional 5 acres for a new access road. Potential construction locations near the Clearbrook terminal include agricultural lands and emergent, scrub/shrub, and forested wetlands. Although the site for the facilities has not been selected, due to the number of wetlands in the general area, it is likely that some wetland impacts may be unavoidable. However, the acreage of wetlands that would be affected by construction of the facilities has not been determined since the facility footprint has not been identified. Construction of new truck offloading facilities near the terminal in Superior, Wisconsin would require approximately 50 acres and an additional 34 acres to establish a truck route to the facilities. The undeveloped area near the Superior terminal is entirely wetlands, primarily forested and scrub/shrub wetlands, which would be permanently converted to developed use. Up to 50 acres of primarily scrub/shrub and forested wetlands could be permanently converted to industrial/developed use for the truck facilities, which would result in permanent major wetland impacts. Compensatory mitigation could be used to offset these permanent impacts.

New facilities would undergo permitting, would be sited to avoid wetland resources to the extent practicable, and where avoidance is not possible would likely require minimization and may require compensatory mitigation for unavoidable impacts to wetlands as required by per state and federal regulations. During construction, direct impacts to wetlands would occur from clearing and grading for site preparation, and placement of fill for construction of offloading facilities and new highway connections for operation of the truck alternative.

Specially Designated Wetlands

Impacts on Minnesota Public Waters Wetlands. Three Public Waters Wetlands occur near the Clearbrook terminal, but are not likely to be directly affected by construction of an offloading facility, as direct clearing and fill impacts would likely be avoidable. These wetlands could be indirectly affected due to increased runoff resulting from the increase in impervious surfaces and the potential of the runoff containing contaminants. However, the changes in total runoff reaching the wetlands would likely be small, and the resultant impacts on the wetlands would be short-term and negligible to minor, but would occur for the life of the Project.

Impacts on Minnesota Calcareous Fen Wetlands. No calcareous fens would be affected by construction of these facilities and access roads since none are located in the vicinity.

Impacts on Wetland Reserves. No federal or state Wetland Reserve Program wetlands would be affected by construction of these facilities and access roads since none are located in the vicinity.

Operations Impacts

General Wetlands

Up to 50 acres of forested and scrub/shrub wetlands could be permanently converted to industrial/developed use for the truck facilities, which could result in permanent major wetland impacts (Appendix A). However, compensatory mitigation could be used to offset and reduce these impacts.

During truck transit, there may be minor leaks of petrochemicals from some vehicles. However, due to the small amounts anticipated and the area over which the leaks would occur, any impacts to wetlands would likely be short-term and negligible to minor. Unanticipated releases of crude oil from truck transport are addressed in Chapter 10.

The offloading facilities would be constructed to include primary and secondary containment structures in accordance with applicable regulatory requirements. Small spills and leaks at the transfer facilities would be retained within the facility and there would not be an impact outside of the facility.

Specially Designated Wetlands

Impacts on Minnesota Public Waters Wetlands. Three Public Waters Wetlands occur near the Clearbrook terminal, but are not likely to be directly affected by construction or operation of an offloading facility.

Impacts on Minnesota Calcareous Fen Wetlands. Calcareous fens would not be affected since these do not occur in the area of the truck offloading facilities.

Impacts on Wetland Reserves. Wetland Reserve Program wetlands would not be affected since these do not occur in the area of the truck offloading facilities.

Existing Line 3 Supplemented by Rail

Wetland impacts associated with the combined use of the existing Line 3 pipeline and the rail alternative would be the same as those identified for the continued operation of the existing Line 3 pipeline in addition to those of the rail alternative identified above.

Existing Line 3 Supplemented by Truck

Wetland impacts associated with the combined use of the existing Line 3 pipeline and the truck alternative would be the same as those identified for the continued operation of the existing Line 3 pipeline in addition to those of the truck alternative identified above.

5.2.1.3.4 Summary and Mitigation

Summary

Construction and operation of the Applicant's proposed project or reliance on any of the CN Alternatives could result in impacts to wetlands, ranging from no impact to permanent major impacts (see Table 5.2.1.3-6). Measurable impacts would likely occur on forested, scrub/shrub, and emergent wetlands from the Applicant's proposed project and each of the CN Alternatives although to a different degree.

No impacts or negligible or minor impacts would likely occur on specially designated wetlands, including Minnesota Public Waters Wetlands, Minnesota calcareous fen wetlands, federal and state wetland reserves, and Minnesota BWSR wetland mitigation bank easements. This occurs because either the Applicant's proposed route or the CN Alternatives do not intersect any of the specially designated wetlands or the area affected would be very small.

Avoidance and minimization measures include Applicant-proposed measures and measures stipulated in pending state and federal permits. All wetland changes would be reviewed and approved by the appropriate authorizing agency prior to any construction being allowed. The Applicant has committed to provide compensatory wetland mitigation for permanent impacts on forested, scrub/shrub, and emergent wetlands as required in the federal and state-specific permits. Many of the avoidance and minimization measures and the standard BMPs described for the Applicant's proposed project also would be applicable to the CN Alternatives.

Beyond the general findings given above a more detailed comparison of the Applicant's proposed project and the CN Alternatives shows that the effects on wetlands would vary primarily between the Applicant's proposed project and SA-04.

Construction Impacts

General Wetlands

For the CN Alternatives, the largest area of potential permanent fill impacts on forested and scrub/shrub wetlands is associated with the rail alternative, followed by the truck alternative. The largest area of long-term to permanent changes to wetlands is associated with tree and shrub clearing of forested wetland and scrub/shrubs within the Applicant's proposed project (Table 5.2.1.3-6). The Applicant's proposed project has the largest total wetland impact from construction and operation of all CN Alternatives.

Table 5.2.1.3-6. Summary of Potential Impacts to Wetlands for the Applicant's Proposed Project and the Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Rail Alternative	Truck Alternative	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Construction Impacts							
Changes to forested and scrub/shrub wetland characteristics and functions	Long-term to permanent/major impacts • 440.0 acres	No impact	Long-term to permanent/major impacts • 34.2 acres	Permanent/ major impacts • ~260–360 acres total, with potential fill of up to ~100 acres of wetlands	Permanent/ major impacts • ~140 acres total, with potential fill of up to ~50 acres of wetlands	Permanent/ major impacts • ~260–360 acres total, with potential fill of up to 100 acres of wetlands	Permanent/major impacts • ~140 acres total, with potential fill of up to ~50 acres of wetlands
Changes to emergent wetland characteristics and functions	Short-term/minor impacts • 178.2 acres	No impact	Short-term/minor impacts • 252.4 acres	Permanent/ major impacts • ~260–360 acres total – with potential fill of some wetlands	Permanent/ major impacts • ~140 acres total – with potential fill of some wetlands	Permanent/ major impacts • ~260–360 acres total – with potential fill of some wetlands	Permanent/major impacts • ~140 acres total – with potential fill of some wetlands
Changes to Minnesota Public Waters Wetlands characteristics and functions	Short-term/minor impacts • 2.8 acres	No impact	Short-term/minor impacts • 0.1 acre	Short-term/ negligible to minor indirect impacts	Short-term/ negligible to minor indirect impacts	Short-term/ negligible to minor indirect impacts	Short-term/ negligible to minor indirect impacts
Changes to Minnesota calcareous fen characteristics and functions	Short-term to long-term/minor impacts • Gully 30	No impact	No impact	No impact	No impact	No impact	No impact

Table 5.2.1.3-6. Summary of Potential Impacts to Wetlands for the Applicant's Proposed Project and the Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Rail Alternative	Truck Alternative	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Changes to Wetland Reserve Program wetland characteristics and functions	No impact	No impact	Short-term/minor impacts • 8.3 acres	No impact	No impact	No impact	No impact
Changes to wetland mitigation bank easements characteristics and functions	No impact	No impact	No impact	No impact	No impact	No impact	No impact
Operations Impacts							
Forested and scrub/shrub wetlands permanently converted to emergent wetlands or filled	Permanent/major impacts • 210.2 acres	Short-term to long-term/minor to major impacts	Permanent/major impacts • 14.3 acres	Permanent/ major impacts • Potential fill of up to ~100 acres of wetlands	Permanent/ major impacts • Potential fill of up to ~50 acres of wetlands	Permanent/ major impacts • Potential fill of up to ~100 acres of wetlands	Permanent/major impacts • Potential fill of up to ~50 acres of wetlands
Potential changes to emergent wetland characteristics and functions	Short-term/minor impacts • 93.1 acres	Short-term to long-term/minor to major impacts	Short-term/minor impacts • 98.8 acres	Permanent/ major impacts • Potential fill of some acres of wetlands	Permanent/ major impacts • Potential fill of some acres of wetlands	Permanent/ major impacts Potential fill of some wetlands	Permanent/ major impacts Potential fill of some wetlands
Potential changes to Minnesota Public Waters Wetlands characteristics and functions	Short-term/minor impacts • 1.9 acres	Short-term/minor impacts	No impact	Short-term/ negligible to minor indirect impacts	Short-term/ negligible to minor indirect impacts	Short-term/ negligible to minor indirect impacts	Short-term/ negligible to minor indirect impacts

Table 5.2.1.3-6. Summary of Potential Impacts to Wetlands for the Applicant's Proposed Project and the Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Rail Alternative	Truck Alternative	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Changes to Minnesota calcareous fen characteristics and functions	Short-term to long-term/minor impacts • Gully 30	Short-term to long-term/minor impacts • Chester 24 • Viking 18 • Gully 30	No impact	No impact	No impact	No impact	No impact
Changes to Wetland Reserve Program wetland characteristics and functions	No impact	No impact	Permanent/minor impacts • 3.5 acres	No impact	No impact	No impact	No impact
Wetland mitigation banks within the permanent right-of-way that would become ineligible as conservation easement	No impact	No impact	No impact	No impact	No impact	No impact	No impact

Emergent wetlands generally reestablish more quickly. While fill impacts would result in a permanent loss of emergent wetlands, vegetation cover and functions would be restored within several years after pipeline construction through emergent wetlands. For the CN Alternatives, the largest area of potential permanent fill impacts on emergent wetlands is associated with the rail and truck alternatives.

Specially Designated Wetlands

Construction of the Applicant's proposed project and SA-04 would directly affect Minnesota Public Waters Wetlands, while the rail and truck alternatives would result in indirect impacts (Table 5.2.1.3-6). Because few, if any, Minnesota Public Waters Wetlands would be affected by construction of the Applicant's proposed project or the CN Alternatives, impacts would be short-term and negligible to minor for all options.

Minnesota's calcareous fens represent a rare habitat that supports several plants protected as threatened or endangered. Only the Applicant's proposed project has the potential to affect a calcareous fen during construction. Wetland Reserve Program wetlands and mitigation bank easement wetlands represent conservation programs to protect and enhance wetlands. Only SA-04 has the potential to affect Wetland Reserve Program wetlands during construction. Neither the Applicant's proposed project nor the CN Alternatives have the potential to alter Minnesota BWSR wetland mitigation bank wetlands during construction (Table 5.2.1.3-6).

Operations Impacts

General Wetlands

Fill placed for aboveground facilities for pipelines and rail and truck infrastructure would result in permanent loss of wetlands. Pipeline operation would continue to disturb wetlands through vegetation maintenance that prevents trees and large shrubs from reestablishing within the pipeline permanent right-of-way. In addition, activities required by the Applicant's Integrity Management Program may require excavation to repair or replace sections of pipe that may be located within wetlands. Permanent fill impacts would be greatest for the rail alternative, followed by the truck alternative. The largest area of previously forested and scrub/shrub wetlands that would be permanently maintained as emergent wetland is associated with the Applicant's proposed project. The largest area of emergent vegetation potentially affected by excavation for pipeline maintenance is associated with SA-04.

Specially Designated Wetlands

Fill of Minnesota Public Waters Wetlands would not be required for the Applicant's proposed project or any of the CN Alternatives. Potential impacts associated with the rail and truck alternatives would be indirect through an increase in impermeable surface at offloading facilities and potential increased runoff from these facilities. Pipeline operation could continue to disturb specially designated wetlands because the Integrity Management Program may require excavation to repair or replace sections of pipe that may be located within wetlands. Both the Applicant's proposed project and continued use of the existing Line 3 could contribute to short-term minor impacts on Public Waters Wetlands from pipeline maintenance that could require excavation. The rail and truck alternatives could result in short-term and negligible to minor indirect effects on Public Waters Wetlands if these wetlands are near offloading facilities. Similarly, calcareous fens could be disturbed by pipeline maintenance that required excavation in the vicinity of the fen. Continued use of the existing Line 3 has the greatest potential to affect calcareous fens because the existing Line 3 crosses three fens, followed by the Applicant's proposed project which crosses one fen. For Wetland Reserve Program wetlands, only SA-04 has the potential to

result in operations impacts. Neither the Applicant's proposed project nor any of the CN Alternatives could affect wetland mitigation bank wetlands during operation.

Mitigation

All alternatives could result in permanent major impacts to wetlands associated with conversion of forested and scrub/shrub wetlands, with the potential exception of continued use of the existing Line 3. For the Applicant's proposed project and SA-04, this conversion primarily would consist of converting forested scrub/shrub wetlands to emergent wetlands (about 210 acres for the Applicant's proposed project and 14 acres for SA-04). New infrastructure for the rail alternative would require filling up to 100 acres, and new infrastructure for the truck alternative would require filling up to 50 acres of forested and scrub/shrub wetlands (Table 5.2.1.3-6). The Applicant has committed to provide compensatory wetland mitigation for permanent impacts on forested, scrub/shrub, and emergent wetlands associated with the Applicant's proposed project, as required in federal and state-specific permits. It is anticipated that any permanent wetland conversion for rail and truck alternatives also would require compensatory mitigation by the authorizing agencies. No additional mitigation measures have been identified.

5.2.1.3.5 References

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5.2.1.4 Floodplains

Periodically, rivers, streams, and lakes will overflow their banks and inundate adjacent low-lying floodplains. Functioning of a floodplain can affect stormwater runoff, water quality, vegetative diversity, wildlife habitat, and aesthetic qualities of waterbodies (Minnesota DNR 2017). Because of their proximity to waterbodies, intermittent flooding, rich soils, and wetland complexes, floodplains form diverse and high-quality habitats under natural conditions. In addition, their naturally flat topography has resulted in historical development within these areas. Construction of facilities such as a pipeline in a floodplain may affect the ability of the floodplain to store excess water or may raise flood elevations upstream. Flood damage can occur when natural flooding processes are disturbed by altering a watercourse or building inappropriately in the floodplain itself (FEMA 2009). The analysis of impacts on floodplains during construction and operation of the Applicant's proposed project and CN Alternatives considered the following:

- Altering floodplain topography;
- Changing flow patterns of flood waters, thereby increasing flooding;
- Blocking or restricting flows;
- Reducing the area within a floodplain that carries floodwaters; and
- Increasing flood elevations upstream.

The analysis of impacts on facilities located within a floodplain and subjected to flooding for the Applicant's proposed project and CN Alternatives considered:

- Disruption of construction activities and loss of materials;
- Damage to equipment and facilities from inundation by floodwaters or flood scour; and
- Interruption of operations.

This section describes the existing conditions for floodplains along the Applicant's proposed project and CN Alternatives that could be affected by construction and operation of the Project. The potential impacts on floodplains or on the pipeline and associated facilities from flood events are compared for the Applicant's proposed project and CN Alternatives. Flood-related spill hazards and potential impacts on floodplains from crude oil releases are discussed in Chapter 10.

5.2.1.4.1 Regulatory Context and Methodology

Regulatory Context

Under Minnesota state law, a "floodplain" is the land adjoining lakes and rivers that would be inundated by a 100-year flood (flood event expected to occur only once every 100 years). Flood Insurance Rate Maps (FIRMs) produced by the FEMA define the boundaries of floodplains and floodways. These maps indicate areas of the floodplain that are critical for conveying floodwaters (the floodway), the extent of the 100-year flood or special flood hazard areas (SFHAs) (areas subject to a 1-percent annual chance of a flood event), and areas subject to the 500-year flood (areas subject to a 0.2-percent annual chance of a flood). FEMA has not developed flood maps for some counties. The cross-section diagram in Figure 5.2.1.4-1 depicts the general relationship of the normal waterway channel to flood elevations and the area that may be inundated in the flood fringe. Development in floodplains typically is regulated by

local building, floodplain development, and shoreline permit regulations and ordinances and FEMA's National Flood Insurance Program (NFIP).[11] In Minnesota, development within a floodplain can be permitted with implementation of proper floodplain management measures to minimize risk from potential flood hazards (Minn. R. Ch. 6120).

For the portion of the Applicant's proposed project or the CN Alternative constructed within a floodplain, a local building, floodplain development, or shoreline permit for construction or staging within a FEMA-designated SFHA or designated shoreline would be required from each local jurisdiction participating in the NFIP. Aboveground facilities located within the SFHA also would require a floodplain permit and may require an engineering certification demonstrating that the proposed facility complies with the local regulations. All required permits would need to be obtained through the North Dakota Floodplain Administrator, Minnesota DNR, Iowa DNR, Illinois DNR, or Wisconsin DNR prior to construction in the respective state.

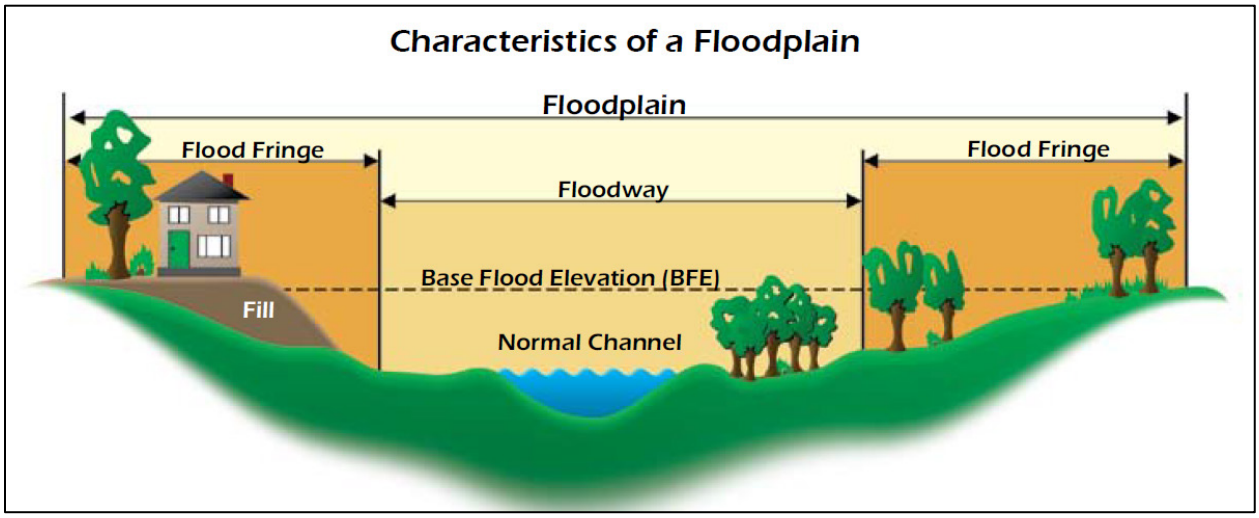

Source: FEMA 2009.

Figure 5.2.1.4-1. Characteristics of a Floodplain

Methodology

Impacts on floodplains were assessed by:

- Using GIS to overlay onto FEMA 100-year flood maps the construction and operations footprints for the Applicant's proposed project from Neche, North Dakota, to Superior, Wisconsin, and the footprints for each CN Alternative.
- Calculating the number of waterbody crossings where full coverage of FEMA flood maps are not available (i.e., not developed by FEMA) to approximate potential floodplains. Because not all waterbodies have designated floodplains (even where floodplains have been

[11] The general purposes of the NFIP are to offer primary flood insurance to properties with significant flood risk and to reduce flood risk through adoption of floodplain management standards. Generally, communities volunteer to participate in the NFIP in order to have access to flood insurance; in return, they are required to adopt minimum standards for construction within floodplains. To participate in the NFIP, local jurisdictions (typically cities or counties) must develop local floodplain regulations that meet the NFIP standards.

mapped), the number of waterbody crossings was considered only as an approximation of potential floodplain impacts for comparison purposes.

- Identifying any Project features that would be located within a FEMA-designated floodplain.

For the Applicant's proposed project and system alternative SA-04, the footprints included the right-of-way, construction work area, facilities, and access roads (where available) to determine whether any of the Project features would be located within a FEMA-designated floodplain. FEMA flood maps also were overlain in GIS with footprints for the assumed rail and truck routes. FEMA flood maps were available for portions of the Applicant's proposed project, existing Line 3, SA-04, and the general area for rail or truck offloading facilities. These mapped areas were designated as the ROI for the floodplains analysis.

5.2.1.4.2 Existing Conditions

Along large rivers, like the Mississippi River or Red River of the North, floodplains typically are flooded during spring after a heavy winter snow season. On these and other floodplains, flooding also can result from intense rains. In areas with small streams or ponds, flooding can occur within hours of intense rain. Floods of 100-year magnitude most recently occurred in 2001 (Minnesota DNR 2006, 2017).

Applicant's Proposed Project

Approximately 31 miles (432 acres) of the construction work area along the Applicant's proposed project would be located within FEMA-mapped 100-year floodplains in the counties for which FEMA mapping has been conducted (46 percent of the route has been mapped). The Applicant's proposed project would require 227 waterbody crossings. (See Section 5.2.1.2.2 and Appendix G for details on waterbody crossings.) Approximately 30 acres of ATWS also would be located within mapped SFHAs. One construction access road (totaling approximately 4 acres) would be located in the 100-year floodplain. No pump stations would be located in a 100-year floodplain, but portions of three MLVs, including an associated access road, would be located in a designated 100-year floodplain (Table 5.2.1.4-1).

Table 5.2.1.4-1. Permanent Aboveground Facilities and Access Roads within FEMA-Designated Special Flood Hazard Areas for the Applicant's Proposed Project in Minnesota

Feature	Acres[a]
Mainline valve access road	0.5
Mainline valve sites	0.5
TOTAL	**1.0**

[a] Acreage reflects counties for which Federal Emergency Management Agency (FEMA) maps are published.

Notes:

Special flood hazard areas represent the 100-year floodplain.

Continued Use of Existing Line 3

Approximately 30 miles of the existing Line 3 pipeline are located within SFHAs (57 percent of the route has been mapped). None of the existing pump stations that are part of existing Line 3 are located within designated floodplains.

System Alternative SA-04

For system alternative SA-04, 95 percent of the route has been mapped by FEMA to designate SFHAs. Approximately 2,187 acres of SA-04 construction work area within these counties would be located within SFHAs, and the route would require 636 waterbody crossings. Once constructed, approximately 151 miles of SA-04 would be located within mapped SFHAs.

Information regarding the location of permanent aboveground facilities and associated access roads has not been determined for SA-04, but some of these facilities may be sited in FEMA-designated floodplains.

Transportation by Rail

As described in Section 4.2, transportation of crude oil by rail would require development of rail loading and offloading facilities (two 100- to 200-acre facilities), upgrade of approximately 35 miles of existing rail line, and reestablishing approximately 10 miles of rail on an existing rail embankment (see Chapter 4 and Table 4.2-5). Construction of offloading facilities in Clearbrook, Minnesota and in Superior, Wisconsin would occur outside of FEMA-designated floodplains.

The assumed rail transportation routes occur within FEMA-designated floodplains. All rail line upgrades and replacement would occur on existing rail embankments that, if located in or near floodplains, are typically established above the flood elevation.

Transportation by Truck

The assumed truck transportation routes occur within FEMA-designated floodplains. As described in Section 4.2, transportation of crude oil by truck would require development of loading and offloading facilities (potentially three 50-acre facilities) and approximately 38 acres for new or reconfigured local road access to these facilities (see Chapter 4 and Table 4.2-6). The exact locations and configurations of the proposed facilities and local access are not known, but they may occur near flood channels and could be constructed within floodplain areas. No new highway construction would be required for truck transportation, although some highway upgrades may be necessary that likely would be constructed on existing highway embankments.

Existing Line 3 Supplemented by Rail

The existing conditions for the existing Line 3 supplemented by rail alternative are those described above for continued use of the existing Line 3 pipeline and the rail alternative. With the combined use of the existing Line 3 pipeline and rail transportation, some FEMA-mapped floodplains would be crossed during operations.

Existing Line 3 Supplemented by Truck

The existing conditions for the existing Line 3 supplemented by truck alternative are those described above for continued use of the existing Line 3 pipeline and the truck alternative. With the combined use of the existing Line 3 pipeline and truck transportation, some FEMA-mapped floodplains would be crossed during operations.

5.2.1.4.3 Impact Assessment

The floodplain analysis considers the potential impacts of the Applicant's proposed project and CN Alternatives on FEMA-mapped 100-year floodplains and the potential impacts of flooding on Project facilities located in the floodplain. Potential operations impacts on floodplains due to a crude oil release are discussed in Chapter 10.

Applicant's Proposed Project (from Neche to Superior)

Construction Impacts

Construction activities, including land clearing, grading, trenching, and excavating, within the 31 miles (432 acres) of the construction work area along the Applicant's proposed project, would occur within a FEMA-mapped 100-year floodplain. One construction access road (totaling approximately 4 acres) also would be located in the 100-year floodplain. These activities would temporarily alter floodplain topography, resulting in minor alterations to water flows in the event of a flood in the area. Construction activities are unlikely to block or restrict flows, reduce the area within a floodplain that carries floodwaters, or increase flood elevations upstream. The Applicant would restore temporary roadways built within the floodplain to original ground conditions to avoid permanent impacts on floodplain flow pathways, connectivity, and function. Construction impacts on floodplains generally would be temporary to short term and minor, persisting only until construction is completed and the natural land elevations and groundcover are restored. Construction and restoration would follow the plans contained in the Environmental Protection Plan (Appendix E), which would reduce potential impacts.

Impacts on Project elements from flooding could occur during pipeline construction in floodplains and at river crossings. Although the chance of a severe flood event occurring during the relatively short construction period would be low (because severe flood events occur infrequently), storm events could cause minor to major flooding and erosion at the construction site. Applicant-proposed measures to reduce flooding impacts include limiting the amount of time the trench is open at a location to 3 days, which would limit the amount of open trench and soil storage subject to flooding and storm events. Following construction through smaller waterbodies (less than 100 feet wide), the trench would be filled and recontoured within 24 to 48 hours of construction. Larger rivers would be crossed using site-specific methods, including HDD, which may involve placing more equipment in the floodplain (or immediately adjacent) during construction but would not result in temporary or permanent disturbance of the floodplain for the length of the drill. (See Appendix G for details on HDD crossings.) Impacts on construction activities and equipment in a flood event would generally be temporary and negligible to minor from disruption of construction activities and damage to equipment and structures from inundation by floodwaters.

Operations Impacts

Permanent facilities such as pump stations and MLVs would be constructed aboveground and operate for the duration of the Project. No pump stations would be located in a designated floodplain; where feasible, permanent facilities would be constructed outside of the 100-year floodplain. The siting of three MLVs within designated floodplains (1 acre total for the Applicant's proposed project) would not create a measurable impact because of their relatively small footprints. Aboveground facilities in floodplains would require floodplain development permitting, which likely would require measures to reduce impacts on floodwater conveyance (e.g., berm construction, raising the ground elevation above the floodplain) associated with permanent structures.

The pipeline would be constructed below the ground surface, typically with a minimum of 48 inches of ground cover. For waterbody crossings greater than 100 feet wide, the minimum burial depth is 48 inches below the channel bottom. Major river crossings (see Section 6.3.1.2 for details) would use HDD methods, generally resulting in pipeline placement 30 feet or more below the stream channel. The below-ground pipeline would not affect floodplain function once construction and restoration activities have been completed. Impacts on operations activities and equipment from inundation by floodwaters in a flood event generally would be temporary and negligible to minor.

Continued Use of Existing Line 3

Construction Impacts

No new construction would occur with continued use of the existing Line 3 pipeline. Periodic excavation of segments of the pipeline would occur as a maintenance activity (maintenance digs); these are addressed under operations impacts.

Operations Impacts

Continued use of Line 3 at its present capacity is expected to require high levels of maintenance, with an estimated 267 procedures per year in the form of integrity digs (Enbridge 2015). Some of these digs could occur within FEMA-designated floodplains; associated impacts would be temporary to short term and minor (similar to those discussed above for new pipeline construction). Continued use of existing Line 3 would not change the number of permanent aboveground facilities within designated floodplains, and maintenance digs are already occurring. Therefore, continued use of the existing Line 3 would result in no change in the degree of impacts on floodplains or the likelihood of flood-related damage to Line 3 facilities beyond those associated with existing conditions. Impacts on operations activities and equipment from inundation by floodwaters in a flood event generally would be temporary and negligible to minor.

Potential impacts on floodplains due to an unanticipated crude oil release are discussed in Chapter 10.

System Alternative SA-04

Construction Impacts

Approximately 2,187 acres of construction activities, including land clearing, grading, trenching, and excavating activities, would occur within designated SFHAs. Impacts from these activities would be similar to those described above for the Applicant's proposed project: they would be temporary to short-term and minor, persisting only until construction is completed and the natural land elevations and groundcover are restored. Construction of SA-04 would require 409 more water crossings than the Applicant's proposed project. Information regarding the specific crossing method for each waterbody has not been determined for SA-04; however, the design and construction methods for waterbody crossings are expected to be comparable to those for the Applicant's proposed project. Construction activities also could be affected by flood events, including disruption of construction activities and damage to equipment and structures from inundation by floodwaters. These impacts would be temporary and negligible to minor.

Operations Impacts

The types of impacts during operation of SA-04 would be the same as those discussed for the Applicant's proposed project. Impacts on floodplain function and impacts from flood events would be temporary and minor to negligible if they did occur during the life of the Project.

SA-04 would cross a significantly larger number of designated floodplains and rivers than the Applicant's proposed project. The greater length of this alternative increases the number of locations with the potential for impacts on floodplain function and impacts on facilities from flood events. SA-04 would require approximately twice as many pump stations, MLVs, and access roads as the Applicant's proposed project; and some of these facilities would be located in designated floodplains. Siting aboveground facilities in floodplain areas would require floodplain development permitting, which likely would require measures to reduce impacts on floodwater conveyance (e.g., berm construction, raising the ground elevation above the floodplain) associated with permanent structures. The impacts would be expected to be negligible to minor and last for the life of the Project.

The type of permanent aboveground facilities and associated access roads has not been determined for SA-04. As with the Applicant's proposed project, it is expected that these features would be located outside of FEMA-designated floodplains to the extent practicable, and the design and construction methods are expected to be comparable to those for the Applicant's proposed project. As a result, the overall impact of operation of SA-04 related to floodplains would be negligible to minor and permanent. Impacts on operations activities and equipment from inundation by floodwaters in a flood event generally would be temporary and negligible to minor.

Potential impacts on floodplains due to an unanticipated crude oil release are discussed in Chapter 10.

Transportation by Rail

Construction Impacts

Rail offloading facilities required at Clearbrook and Superior would not be located in FEMA-designated floodplains; therefore, no impact on floodplain function would occur. Rail line upgrades/replacement that would be required to provide rail service to Clearbrook and are located in or near floodplains would occur on existing rail embankments; therefore, they would not likely change flood flows or floodplain function.

Operations Impacts

Depending on the route to Superior, approximately 10 to 20 miles of the rail line would occurs within designated SFHAs. Operations impacts on floodplains from unit train transport of the oil would be negligible because the rail lines are located on existing embankments. Flood impacts on rail operations resulting from maintenance repairs and operational delays would be temporary and minor to negligible when they did occur, but they may occur over the life of the Project. To the extent that flood flows in flood-prone areas overtop rail lines used for transport of crude oil, rail operations may be temporarily suspended. The likelihood of such events is low because flood height and probability are considered when establishing rail line embankment height.

Transportation by Truck

Construction Impacts

Truck offloading facilities required at Clearbrook and Superior would not be located in FEMA-designated floodplains; therefore, no impacts on floodplain function would occur.

Because truck transport would occur over existing highways, no new road construction would occur except in the immediate vicinity of the Clearbrook and Superior terminals. Some portions of two-lane county roads may require upgrading near the Clearbrook and Superior terminals. The configuration of the offloading facilities and access is not known. Although impacts associated with these facilities cannot be assessed, they were assumed to be minimal because any construction would be in compliance with floodplain permitting requirements.

Operations Impacts

Approximately 83 miles of the truck route from Gretna to the Superior Terminal occurs within designated SFHAs, and the majority of the route has been mapped by FEMA. Operations impacts on floodplains from truck transportation would be negligible. During operations, trucks transporting crude oil would operate over existing highways; therefore, no change to floodplain function would be expected to occur. Flood impacts on truck operations would be negligible to minor and temporary if they did occur, but could occur over the life of the Project. To the extent that flood flows in flood-prone areas overtop highways used for transport of crude oil, highway operations may be temporarily suspended. However, the likelihood of such events is low because flood height and probability are considered when establishing major state and interstate highway embankment height.

Existing Line 3 Supplemented by Rail

Construction Impacts

No new construction would occur with continued use of the existing Line 3 pipeline. Impacts on floodplains from construction of rail facilities would be the same as those described above for the rail alternative.

Operations Impacts

No change in the degree of impacts on floodplains or the likelihood of flood-related damage to existing Line 3 facilities would occur beyond those associated with existing conditions (including maintenance digs). The impacts associated with supplemental transport by rail would be similar to those described above for operation of the rail alternative, although fewer crude oil trains per day would be exposed to flood-related hazards.

Existing Line 3 Supplemented By Truck

Construction Impacts

No new construction would occur with continued use of the existing Line 3 pipeline. Impacts on floodplains from construction of truck facilities would be the same as those described above for the truck alternative.

Operations Impacts

No change in impacts on floodplains or the likelihood of flood-related damage to existing Line 3 facilities would occur beyond those associated with existing conditions (including maintenance digs). The impacts associated with supplemental transport by truck would be similar to those described above for operation of the truck alternative, although fewer crude oil trucks per day would be exposed to flood-related hazards.

5.2.1.4.4 Summary and Mitigation

Summary

Overall, potential impacts on FEMA-designated floodplains for the Applicant's proposed project and CN Alternatives range from no impact to minor and temporary to permanent impacts. Differences in effects among alternatives were apparent, especially between the Applicant's proposed project and SA-04, which both require significant construction, and the existing Line 3, transportation by rail, and transportation by truck, which require no or very little construction. These impacts are summarized in Table 5.2.1.4-2.

Construction Impacts

Construction-related impacts on floodplains for the Applicant's proposed project and SA-04, including temporary alterations of topography that could change flow patterns of flood waters and increase flooding, would be temporary to short term and minor, lasting until the disturbed areas are recontoured and vegetation is reestablished. A greater amount of construction in designated SFHAs and more water crossings would be required for construction of SA-04 compared to construction of the Applicant's proposed project. However, the types of potential impacts on floodplains would be similar to those for the Applicant's proposed project: temporary to short term and minor. No impacts on floodplains from construction activities are expected to occur from continued use of existing Line 3, transportation by rail or truck, or continued use of existing Line 3 supplemented by rail or truck transport.

Operations Impacts

The Applicant's proposed project in Minnesota includes about 1 acre of permanent facilities that would be located within a FEMA-designated 100-year floodplain in areas for which FEMA mapping is available; these facilities would be allowed under state and local floodplain regulations if the appropriate permits are obtained. The location, number, and type of permanent aboveground facilities and the number and location of access roads have not been determined for SA-04; therefore, a comparison of specific impacts on floodplains from permanent facilities between these alternatives is not possible. With continued use of the existing Line 3, some ongoing maintenance digs could occur within FEMA-designated floodplains; associated impacts would be temporary to short term and minor. No impacts on floodplains from operations would be expected from transportation by rail or truck or continued use of existing Line 3 supplemented by rail or truck beyond the maintenance digging along existing Line 3 that already occurs.

Mitigation

Identified mitigation measures for the Applicant's proposed project and SA-04 include:

- In areas without available FEMA-designated floodplains, require Enbridge to site all pump stations and MLVs outside of potential floodplains.

Table 5.2.1.4-2. Summary of Potential Impacts on Floodplains for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Construction Impacts							
Construction activities and equipment altering floodplain function and water flow patterns	Temporary to short-term/minor impacts • 432 acres within SFHAs • 30 acres of ATWS within SFHAs • 4 acres of access roads within SFHAs • 227 waterbody crossings	No impact	Temporary to short-term/minor impacts • 2,187 acres within SFHAs • 636 waterbody crossings	*Locations of facilities and access not known but could be constructed within floodplain areas*		No impact for existing Line 3 *Exact locations of facilities not known but would be expected to be constructed within floodplain areas*	
Disruption of construction activities and loss of materials during a flood event	Temporary/ negligible to minor impacts	No impact	Temporary/ negligible to minor impacts	No impact	No impact	No impact	No impact
Damage to construction equipment and facilities from inundation by floodwaters or flood scour	Temporary/ negligible to minor impacts	No impact	Temporary/ negligible to minor impacts	No impact	No impact	No impact	No impact

Table 5.2.1.4-2. Summary of Potential Impacts on Floodplains for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Operations Impacts							
Operation and permanent facilities altering floodplain function	No impact	Temporary to short-term/minor impacts over the life of the Project • 267 annual maintenance procedures	Permanent/ negligible to minor impacts	No impact	No impact	Temporary to short-term/minor impacts over the life of the Project • 267 annual maintenance procedures	Temporary to short-term/minor impacts over the life of the Project • 267 annual maintenance procedures
Interruption of operations caused by flooding	Temporary/ negligible to minor impacts • 31 miles within SFHAs	Temporary/minor impacts • 30 miles within SFHAs	Temporary/ negligible to minor impacts • 151 miles within SFHAs	Temporary/ negligible to minor impacts • 10 to 20 miles within SFHAs	Temporary/ negligible to minor impacts • 83 miles within SFHAs	Temporary/ negligible to minor impacts • 40 to 50 miles within SFHAs	Temporary/ negligible to minor impacts • 113 miles within SFHAs
Damage to operations equipment and facilities from inundation by floodwaters or flood scour	Temporary/ negligible to minor impacts	Temporary/ negligible to minor impacts	Temporary/ negligible to minor impacts	No impact	No impact	Temporary/ negligible to minor impacts	Temporary/ negligible to minor impacts

ATWS = additional temporary workspaces, SFHA = special flood hazard area

5.2.1.4.5 References

Enbridge Energy, Limited Partnership (Enbridge). 2015. Certificate of Need Application to the Minnesota Public Utilities Commission for the Line 3 Replacement Project. April 24. (Docket No. PL 9/CN-14-916.)

Federal Emergency Management Agency (FEMA). 2009. NFIP Floodplain Management Guidebook. Region 10. 5th Edition. March. https://www.fema.gov/media-library-data/20130726-1647-20490-1041/nfipguidebook_5edition_web.pdf. Accessed on February 21, 2017.

Minnesota Department of Natural Resources (Minnesota DNR). 2006. Floodplains and Floodplain Management. http://files.dnr.state.mn.us/publications/waters/floodplain_basics.pdf. Accessed on February 21, 2017.

_____. 2017. Floodplain Regulations. http://www.dnr.state.mn.us/waters/watermgmt_section/floodplain/regulations.html. Accessed on February 21, 2017.

5.2.2 Geology and Soils

Activities that disturb sensitive soils, alter topography, or introduce geologic hazards can negatively affect geology and soil resources, and the people and industries that rely on them. In addition, geologic hazards such as landslides and subsidence and sinkholes can affect the integrity of infrastructure like pipelines, roads, and railways.

The construction-related geology and soils issues to be addressed include the following:

- Soil erosion;
- Soil compaction;
- Soil mixing;
- Soil contamination;
- Presence of shallow bedrock that may require blasting;
- Impacts on paleontological resources;
- Changes to topography; and
- Subsidence and sinkhole hazards.

The operations-related geology and soils impacts addressed in this section include:

- Permanent loss of soil cover;
- Soil erosion and compaction;
- Landslide hazards; and
- Subsidence and sinkhole hazards.

This section describes the existing conditions for the geology and soils within an area along the Applicant's proposed project and CN Alternatives where these resources could be affected by construction and operation of the Project. Potential impacts on geology and soils are discussed and compared for the Applicant's proposed project and the CN Alternatives (continued use of the existing Line 3, system alternative SA-04, transportation by rail, transportation by truck, and continued use of the existing Line 3 supplemented by rail or truck). Potential impacts on geology and soils from an accidental release of crude oil are discussed in Chapter 10.

5.2.2.1 Regulatory Context and Methodology

5.2.2.1.1 Regulatory Context

The NPDES General Construction Stormwater Coverage Permit requires that permittees use approved protection measures to manage soil erosion and minimize soil compaction. The Applicant would be required to obtain NPDES permits from North Dakota DH's Division of Water Quality, Minnesota PCA, Iowa DNR, Wisconsin DNR, and Illinois EPA prior to construction in each respective state. In addition, Minnesota Statutes Chapter 103F Soil Erosion Law prohibits activities that allow for excessive soil loss, as defined by NRCS guidelines. 29 CFR Part 1926, Subpart U regulates the storage and use of explosives for blasting of bedrock. Minnesota Administrative Rules Chapter 7500 also regulates the storage and use of explosives,

and designates municipal supervision of compliance with federal blasting regulations. Other geologic resource guidance and regulations include design and engineering protocols for dealing with site-specific geologic hazards (such as burial or reinforcement of pipelines to protect from landslides). Federal design and engineering specifications in 49 CFR Parts 192 and 193 ensure that pipeline facilities are protected from potential landslides and unstable slopes. Because no significant seismic hazard is present in the Project area, pipeline engineering requirements to address the seismic stability of the pipeline are not applicable to the Project (USGS 2016).

5.2.2.1.2 Methodology

To assess potential construction and operations impacts on geology and soils, and to assess potential impacts of geologic hazards on Project elements, relevant geologic resources present along the Applicant's proposed project and the CN Alternatives were reviewed and inventoried. These resources included soils, shallow bedrock, paleontological resources, and topography. Soil characteristics that may be sensitive to disturbance, including prime farmland, soils highly erodible by water or wind, hydric soils, compaction-prone soils, stony/rocky soils and coarse-textured soils, were identified from NRCS soil data, including both U.S. Department of Agriculture. Soil Survey Geographic (SSURGO) and STATSGO2 data (NRCS 2016). Other data sources included maps and publications from USGS, the Minnesota Geological Survey (MGS), and the Paleontology Portal. Potential geologic hazards, including landslide hazards and subsidence/sinkhole-prone areas, were also identified and inventoried using maps and publications from USGS and MGS.

Data for the relevant geologic resources and geologic hazards were overlain in GIS with maps of the estimated construction and operations footprints for the Applicant's proposed project and CN Alternatives to determine the locations and extent of potential impacts. Potential impacts on geologic resources for the Applicant's proposed project and the CN Alternatives were considered where construction or operation of the Applicant's proposed project or a CN Alternative could cause disturbance, loss, or modification of the resource—and where estimated footprints for these actions intersected potential geologic hazards that could cause damage or injury.

The ROI for the geology and soils impact analysis consists of areas where soils, topography, or potentially bedrock would be disturbed during construction or operation of the Applicant's proposed project or a CN Alternative. For the Applicant's proposed project, this includes temporary construction work areas; permanent rights-of-way; temporary and permanent access roads; and the locations of associated facilities outside the permanent rights-of-way, such as pump stations. For the existing Line 3, this was considered to be within the permanent right-of-way for the Mainline corridor. For SA-04, this includes a 120-foot-wide construction work area and a 50-foot-wide permanent right-of-way centered on the SA-04 alignment. For the rail and truck alternatives, the potential locations of offloading facilities and new or expanded rail lines or roads were included. No additional impacts on soils or geologic resources would be expected along existing rail lines or roads as no new footprint from construction or operation is anticipated along existing rail lines or roads for these alternatives.

5.2.2.2 Existing Conditions

The general geology and soil characteristics that may be affected by the various alternatives are described below, followed by additional detail on those resources associated with the Applicant's proposed project and specific CN Alternatives.

Soils

Soil types and characteristics are diverse, dependent on parent material, climate, topography, age of the soils, and potential modification by human activity. Throughout the ROI for the Applicant's proposed project and CN Alternatives, most soils tend to be deep, high-quality agricultural soils, with high organic matter content. Wetland (hydric) soils also are common throughout the ROI. Any soil type has the potential to be affected by pipeline development, but some soils found in the ROI are more susceptible than others to impacts such as erosion, compaction, and contamination. Soils that may be sensitive to disturbance include prime farmland, highly erodible soils (by water or wind), hydric soils, compaction-prone soils, stony/rocky soils, and coarse-textured soils. These sensitive soils are described as follows:

- Prime farmland soils – These include soils with the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if they are treated and managed according to acceptable farming methods—whether or not they are used for agriculture. "Prime farmlands" as defined herein include those soils that are prime farmlands with no limiting factor, as well as those soils that are considered prime farmlands when drained of excessive moisture. Such high-quality soils are critical to domestic crop production and the agricultural economy; and disturbance, contamination, or loss of these soils can reduce crop yields.
- Highly erodible soils – These soils are prone to high rates of erosion when exposed to wind or water after removal of vegetation. A soil's susceptibility to erosion is dependent on texture, moisture, slope, and soil management practices. Loss of soil from erosion, especially topsoil, can reduce the soil's ability to support plant growth. Highly erodible soils may require protective measures during soil disturbance to minimize soil loss.
- Hydric soils – These soils are sufficiently wet near the surface to develop anaerobic conditions during the growing season and are often found in association with wetlands. Hydric soils are particularly susceptible to compaction and rutting from operation of heavy equipment on the soil surface. Compaction of soils can create difficult conditions for plant growth, delaying or reducing plant reestablishment following disturbance. In agricultural areas, artificial drainage systems (i.e., drainage tiles) have been installed in many soils that are classified as hydric soils; these systems allow excess moisture to drain out of the soil. Where hydric soils are drained, they are less likely to be susceptible to compaction. (Drainage of otherwise water-logged agricultural land is common practice throughout the Upper Midwest; this is discussed further in Section 6.5.1.3.1.) Hydric soils may require modified construction methods to minimize potential compaction by heavy machinery.
- Compaction-prone soils – These include soils with clay loam or finer textures in somewhat poor, poor, and very poor drainage classes. When wet, these fine soils are susceptible to compaction and rutting from operation of heavy equipment on the soil surface. Compaction of soils can create difficult conditions for plant growth, delaying or reducing plant reestablishment following disturbance. Compaction-prone soils may require modified construction methods to minimize potential compaction by heavy machinery.
- Coarse-textured soils — Sandy loams and coarser soils, including gravels, allow for rapid infiltration of potential contaminants downward toward the water table. Additionally, HDD techniques may not be feasible through coarse-textured soils because of borehole instability during drilling. Coarse-textured soils are somewhat abundant in the Upper Midwest.

- Stony/rocky soils – These include soils with a cobbly, stony, bouldery, gravelly, or shaly modifier to the textural class. During soil disturbance activities, removal and replacement of stony/rocky soils may introduce more stones into the topsoil, which can reduce crop yields and lead to problems with operation of farm equipment. Rocks present in the soil also can damage a pipeline during backfilling, if the pipeline is not properly padded, and can prohibit the use of HDD water crossings. Stony/rocky soils occur only in minor, isolated areas throughout the region. Because of their very limited occurrence across the routes, stony/rocky soils are not anticipated to exacerbate the impact of soil disturbance, or impede pipeline installation or construction of other facilities, and therefore are not addressed further herein.

Subsurface Substrate

Subsurface substrate consists of the soils and sediments deeper than the surficial soils discussed above. The substrate may consist of soil, rock, glacial deposits, sand, and gravel. Some of these subsurface substrates outcrop at the surface, while others are present at shallow depths.

Shallow Bedrock

Shallow bedrock is considered bedrock within approximately 6 feet or less of the ground surface. Bedrock is the hard, solid rock beneath the soil or subsurface substrate.

Paleontology

Paleontological resources include the fossilized remains, traces, or imprints of organisms preserved in rock or sediments that are of scientific interest and that provide information about the history of life on earth. Young glacial sediments that make up most of the region's surficial geology rarely contain remains of Pleistocene megafauna, such as wooly mammoths or mastodon, but such remains are considered scientifically important when discovered (Paleontology Portal 2016). Sedimentary rock formations present at or near the surface in some areas throughout the ROI may contain common marine invertebrate fossils. These fossil remains are globally abundant and are not considered scientifically significant.

Topography

The distribution of abundant glacial sediments across the Upper Midwest has created relatively flat terrain.

Landslide Hazards

Landslide hazard potential is generally low across the ROI, including the Applicant's proposed project, SA-04, the existing Line 3, and potential locations for the rail and truck facilities. The rail and truck routes were not analyzed for landslide hazards.

Karst Conditions

Chemical weathering and dissolution of subsurface bedrock from the slight acidity of groundwater can result in the formation of caves, cavities, and void spaces in the rock, known as "karst topography." Overlying rock and sediment may sink downward into large void spaces, causing subsidence of the overlying land surface. In extreme cases, where large bedrock cavities are shallow, rocks and soils at the surface may collapse downward into a cavity, creating a sinkhole. Karst topography features are the source of abundant springs and seeps found throughout southeastern Minnesota and parts of northern Iowa. Rock types most susceptible to subsidence and sinkhole formation include limestone, dolostone,

and some sandstones. Some limestones and sandstones found in southeastern Minnesota and northeast Iowa are susceptible to subsidence and sinkhole formation. Because of the very permeable nature of karst topography, potential contaminants can travel rapidly downward through the formations to the water table. Karst regions therefore have increased susceptibility to potential groundwater pollution (addressed in Section 5.2.1.1).

5.2.2.2.1 Applicant's Proposed Project

Soils

Table 5.2.2-1 provides information on the sensitive soils along the Applicant's proposed project by miles and percentages of the total route.

Table 5.2.2-1. Sensitive Soils along the Applicant's Proposed Project

Soil Type	Miles	Percentage of Total Route
Length	380.4	
Prime farmland	158.7	42
Highly erodible soils (by wind) [a]	12.6	4
Highly erodible soils (by water)[a]	63.8	20
Hydric soils	154.2	41
Compaction-prone soils	38.4	10
Coarse-textured soils	42.5	11
Stony/rocky soils	1.5	<1

Sources: NRCS 2016; Minnesota DNR 2016a.

[a] The SSURGO dataset had unpopulated values for 37% of wind erosion and 42% of the water erosion for the map units crossed

As indicated by Table 5.2.2-1, prime farmland, hydric soils, and highly erodible soils (by wind) are within the ROI for the Applicant's proposed project. Highly erodible soils (by water) and stony/rocky soils are rare. Sites with existing soil contamination are addressed in Section 5.2.1.1.

Subsurface Substrate

The characteristics of the subsurface substrate (soils and sediments deeper than the surficial soils discussed above) are important in determining the method of pipeline installation, particularly regarding the use of HDD methods for pipeline installation. Some subsurface sand and gravel layers are not conducive to HDD techniques, as the unconsolidated sediments are prone to collapse during drilling. Some of these deposits have been well mapped and serve as aquifers, as discussed in Section 5.2.1.1. Geotechnical drilling is required to determine the site-specific characteristics of these deposits in order to determine the feasibility of using HDD to install the pipeline.

Shallow Bedrock

The depth to bedrock along the Applicant's proposed project ranges from 0 to over 450 feet, with depths averaging approximately 200 feet (MGS 2016). Where bedrock is present at or near the surface within the pipeline corridor, blasting of the rock with explosives would be required for installation of

buried pipeline. Surface bedrock along a 0.25 mile section of the Applicant's proposed project near milepost D1128.4 may require blasting.

Paleontology

The ROI for the Applicant's proposed project has isolated sections of sedimentary rock formations that are likely to contain common marine invertebrate fossils. These layers generally are found at depths greater than 30 feet, with very few outcrops occurring at or near the surface (MGS 2016). Along the eastern end of the route in Carlton County, bedrock may be at the surface or near the surface, and common marine invertebrate fossils could be present in shallow bedrock. Rare Pleistocene megafauna remains may also be present in the sediments overlying the bedrock.

Topography

Topographical variation is modest across the ROI, punctuated in some areas by isolated ridges and hills, with some steep slopes occurring along streambanks (Appendix A). Elevations range from approximately 903 to 1,681 feet above sea level across the Applicant's proposed project (NED DEM 2016).

Landslide Hazards

Landslide hazard potential is generally low for the ROI. However, near the eastern end of the Applicant's proposed project between Carlton and the Wisconsin border, 8 miles of the route intersect areas with a high susceptibility to landslides, mostly in isolated sections at stream crossings. Between Clearbrook and Carlton is an additional 0.4 mile of high landslide hazard (NPMS LSHR 2016; Enbridge 2016a).

Karst Conditions

Karst conditions, which could lead to subsidence and sinkhole formation, are not believed to be present along the Applicant's proposed project (Minnesota DNR 2016b; USGS 2016).

5.2.2.2.2 Continued Use of Existing Line 3

Soils

Table 5.2.2-2 provides information on the sensitive soils along the existing Line 3 by miles and percentages of the total route.

Table 5.2.2-2. Sensitive Soils along Existing Line 3

Soil Type	Miles	Percentage of Total Route
Length	326.3	
Prime farmland	129.9	40%
Highly erodible soils (by wind) [a]	46.2	14%
Highly erodible soils (by water)[a]	5.9	2%
Hydric soils	147.9	45%
Compaction-prone soils	40.8	13%
Coarse-textured soils	40.3	12%
Stony/rocky soils	2.9	<1%

Table 5.2.2-2. Sensitive Soils along Existing Line 3

Soil Type	Miles	Percentage of Total Route

Sources: NRCS 2016; Minnesota DNR 2016a.

[a] The SSURGO dataset had unpopulated values for 37% of wind erosion and 43% of the water erosion for the map units crossed

As indicated in Table 5.2.2-2, prime farmland and hydric soils are prevalent along the ROI for existing Line 3. Soils highly erodible by water are rare, while those highly erodible by wind are somewhat common. Compaction-prone and coarse-textured soils are not common, and stony/rocky soils are relatively rare along the existing Line 3.

Bedrock may be present at or near the surface in isolated segments along the eastern portion of Line 3, including isolated segments near Carlton. Some of the bedrock is likely to contain common marine invertebrate fossils. Rare Pleistocene megafauna remains also may be present in the glacial sediments overlying the bedrock.

The existing Line 3 passes through 8.4 miles of high landslide susceptibility, and does not intersect any known karst topography.

5.2.2.2.3 System Alternative SA-04

Soils

Soil characteristics along SA-04 were analyzed from NRCS soil data, including both SSURGO and STATSGO2 data (NRCS 2016). Table 5.2.2-3 provides the miles and percentages of the occurrence of sensitive soils across SA-04.

Table 5.2.2-3. Sensitive Soils along System Alternative SA-04

Soil Type	Miles	Percentage of Total Route
Length	795.4	
Prime farmland	675.5	85%
Highly erodible soils (by wind) [a]	13.5	2%
Highly erodible soils (by water)[a]	103.0	13%
Hydric soils	361.8	45%
Compaction-prone soils	216.0	27%
Coarse-textured soils	12.3	2%
Stony/rocky soils	0.1	<1%

Sources: NRCS 2016; Minnesota DNR 2016a.

a) The SSURGO dataset had unpopulated values for 6% of wind erosion and 9% of the water erosion for the map units crossed

As indicated in Table 5.2.2-3, prime farmland and hydric soils are prevalent along the ROI for SA-04. Highly erodible soils, coarse-textured soils, and stony-rocky soils are relatively rare.

Subsurface Substrate

Similar to the Applicant's proposed project, SA-04 crosses a variety of shallow sand and gravel layers; some of these outcrop at the surface, while others are present at shallow depths. Geotechnical drilling would be required to determine the site-specific characteristics of these deposits in order to determine appropriate methods of pipeline installation.

Shallow Bedrock

Shallow bedrock also is not common along SA-04, with depths in North Dakota and Minnesota averaging approximately 300 to 400 feet (Bluemle 1986; MGS 2016). Where SA-04 crosses southernmost Minnesota and northeastern Iowa, the average depth to bedrock is approximately 100 feet, with shallow bedrock present in isolated sections. Shallow and exposed bedrock is present where SA-04 crosses the Minnesota River at MP 406.6, between Nicollet and Blue Earth Counties, Minnesota. Shallow bedrock also may be encountered within an 8-mile segment in Mower County, Minnesota, near the Iowa border (MGS 2016). Where SA-04 crosses northeastern Iowa, bedrock outcrops are at or near the surface in several isolated sections (Iowa DNR 2017). Within northern Illinois, bedrock depths are generally several hundred feet deep, but SA-04 likely crosses isolated sections of bedrock at or near the surface (Hansel and McKay 2010). Geotechnical field investigations would be necessary to determine locations of shallow bedrock and the specific requirements for any blasting along SA-04.

Paleontology

Similar to the Applicant's proposed project, SA-04 would cross isolated sections of sedimentary rock formations that are known to contain common marine invertebrate fossils. These layers generally are found at depths greater than 30 feet, with very few outcrops occurring at or near the surface. Where rocks potentially containing fossils outcrop at or near the surface, the blasting necessary for buried pipeline installation likely would destroy or damage fossils. Rare Pleistocene megafauna remains also may be present in the glacial sediments overlying bedrock.

Topography

Topographical variation is modest across the ROI, punctuated in some areas by isolated ridges and hills, with some steep slopes occurring along streambanks (Appendix A). Elevations along SA-04 range from 493 to 1,367 feet above sea level (NED DEM 2016).

Landslide Hazards

SA-04 would pass through 3 miles of land considered at high risk for landslides (NPMS LSHR 2016).

Karst Conditions

Along SA-04, relatively shallow carbonate bedrock with potential for subsidence and sinkholes would intersect approximately 76 miles of the route across Minnesota, Iowa, and Illinois (none is present in North Dakota). A total of 8 miles of SA-04 in Mower County, Minnesota, has known karst conditions and thus a higher potential for subsidence and sinkholes where shallow carbonate bedrock is present (Minnesota DNR 2016c). Known and potential karst conditions also are present along approximately 63 miles of the route in Iowa, and 5 miles in Illinois (Weary and Doctor 2014).

5.2.2.2.4 Transportation by Rail

Soil and geology conditions for the rail alternative are similar to those of the other alternatives. While specific locations for these facilities have not been identified, the general areas likely to be designated for temporary storage and rail offloading facilities in Clearbrook and Superior contain substantial soils designated as prime farmland, and substantial hydric (wetland) soils. No soils in these areas are designated as highly erodible by water, but some soils are highly erodible by wind. Coarse-textured soils and stony/rocky soils are not common in these areas.

The presence of shallow bedrock and paleontological resources are not relevant for development of these facilities and access as they would not involve construction at depths that would require blasting or significant excavation. The relief is low across the ROI for the rail offloading facilities and associated access.

Areas likely to be designated for temporary storage and rail offloading facilities in Clearbrook and Superior do not intersect areas of elevated landslide hazard or known karst conditions.

5.2.2.2.5 Transportation by Truck

Soil and geology conditions for the truck alternative would be similar to those of the other alternatives. Areas likely to be designated for temporary storage and truck offloading facilities in Clearbrook and Superior contain substantial soils designated as prime farmland and substantial hydric (wetland) soils. No soils in these areas are designated as highly erodible by water, but some soils are highly erodible by wind. Coarse-textured soils and stony/rocky soils are not common in these areas.

The presence of shallow bedrock and paleontological resources are not relevant because development of offloading facilities and associated access for this alternative would not involve construction at depths that would require blasting or significant excavation. The relief is low across the ROI for truck offloading facilities and access.

Areas likely to be designated for temporary storage and truck offloading facilities in Clearbrook and Superior do not intersect areas of elevated landslide hazard or known karst conditions.

5.2.2.2.6 Existing Line 3 Supplemented by Rail

The existing conditions presented for the existing Line 3 and the rail alternatives are representative of existing soil and geology conditions for this combined alternative.

5.2.2.2.7 Existing Line 3 Supplemented by Truck

The existing conditions presented for the existing Line 3 and the truck alternative are representative of existing soil and geology conditions for this combined alternative.

5.2.2.3 Impact Assessment

5.2.2.3.1 Applicant's Proposed Project (from Neche to Superior)

Construction Impacts

In general, construction activities that can affect geology and soils include trenching and backfilling, blasting, grading, installation of permanent roads and facilities, and the use of fuels and other hazardous materials. Construction would cause disturbance to soils and topography. Where present, shallow

bedrock and potential fossil remains could be destroyed through excavation or blasting. Impacts from pipeline construction would mostly occur within the construction work areas along the length of the route and at aboveground facilities, staging areas, and access roads.

Soil disturbance along the Applicant's proposed project during construction would total approximately 5,147 acres. Of the amount disturbed during construction, 2,304 acres would be maintained as permanent right-of-way and dedicated to aboveground facilities during operations. Approximately 84 percent of the route would be co-located with existing infrastructure where prior disturbance to soils likely has occurred. Much of the remaining greenfield portion of the route has been disturbed by human activities, especially activities related to agriculture and timber harvesting. Additional detail on potential construction-related impacts for the Applicant's proposed project is provided below.

Soil Erosion

Removal of crops, sod, and other vegetation during construction would leave soil exposed to erosion by wind and water. Heavy equipment operation on the exposed soil loosens soil and breaks up soil peds (i.e., aggregations of soil particles that make the soil surface more stable), making the soil more susceptible to erosion, especially during periods of heavy rainfall or windy conditions. Erosion could continue to be a minor impact for several years after construction is complete while plant communities stabilize in the disturbed ground. Any exposed soil would be subject to erosion by water or wind.

As discussed in Section 5.2.2.2, the potential for soil erosion from exposure to water would be highest in areas with water erosion-prone soils, which occur along only approximately 4 miles of the Applicant's proposed project. Soils prone to erosion from exposure to wind are more common along the Applicant's proposed project (approximately 107 miles). Applicant-proposed measures to reduce the potential for soil erosion include using slope breakers (e.g., earthen berms) and erosion control blankets (straw mats, jute mats, coconut or biodegradable synthetic blankets) on sloped terrain and at stream crossings during construction. Erosion control blankets would be placed across the entire construction work area where the base of slopes greater than 5 percent are less than 50 feet from wetlands, waterbodies, drainage tile inlets, or drainageways until the area is revegetated and there is no longer an increased potential for erosion. Trench breakers would reduce or control erosion within the trench during pipe installation.

Erosion control BMPs would be implemented to reduce the potential for long-term erosion effects, including the use of mulch and revegetation in disturbed areas, and permanent earthen berms or installation of biodegradable erosion control blankets on slopes during final grading. Other erosion control BMPs are outlined in Enbridge's Environmental Protection Plan (Appendix E). Potential sedimentation resulting from soil erosion also would be reduced or controlled through stormwater diversions and sediment barriers (sedimentation is addressed in Section 5.2.1.2). Erosion and sedimentation control measures would be inspected and maintained according to Enbridge's Environmental Protection Plan (Appendix E). These Applicant-proposed measures would minimize the potential for soil erosion of all soils, including erosion-prone soils, such that soil erosion due to construction likely would be a temporary to short term, localized, and minor impact.

Soil Compaction

Heavy equipment passage and transport of pipe sections may compact soils, particularly during grading of the right-of-way. Compacted soils impede penetration of plant roots, which affects reestablishment of plant communities after construction activities are completed. Soil compaction also reduces pore space and infiltration within the soil, leading to increased runoff that can further promote erosion. Hydric soils and compaction-prone soils, particularly when wet, would be most susceptible to these impacts.

As indicated in Section 5.2.2.2.1, hydric soils occur across 41 percent of the Applicant's proposed project, and compaction-prone soils occur along approximately 10 percent of the route. Applicant-proposed measures to alleviate soil compaction include deep tillage operations prior to topsoil replacement and during clean-up activities, as necessary. In wetland areas with hydric soils, timber mats and/or low-ground-pressure equipment (which distributes a machine's weight over a larger area) would be used to reduce compaction from heavy machinery (Appendix E). In addition, when soil conditions are wet, such as after periods of heavy rainfall, certain heavy equipment operation activities would be avoided until soils dry out. If these measures are followed, soil compaction from proposed Project construction likely would be temporary, localized, and negligible to minor.

Soil Mixing

Topsoil and subsoil removal during excavation may cause some mixing of these soil layers. If soil is mixed during backfilling, some biological and chemical properties of the soil may be altered, which may affect reestablishment of plant communities in the short term (several years) after reclamation. In addition, rocks from the subsoil or from potential blasting operations may become mixed into the topsoil, further reducing its productivity.

The Applicant has proposed measures to reduce the potential for soil mixing (Appendix E). Soil mixing would be reduced by removal (stripping), segregation, stockpiling, and replacement of topsoil and subsoil—particularly in areas where soil productivity is an important consideration (e.g., in croplands, hay fields, pastures, residential areas, and other areas as requested by the landowner or as specified in Project plans and/or permits). In wetland environments where there is no standing water, up to 1 foot of topsoil may be stripped and stockpiled. If standing water is present, attempts would be made to segregate the topsoil/organic layer, but it may not be practical. An Environmental Inspector (EI) would perform audits of the topsoil and subsoil removal and segregation. Efforts would be made to remove excess rock (stone equal to or larger than 4 inches in diameter) from the upper 8 inches of subsoil or as specified by permits, contracts, or landowner agreements. If these measures are followed, soil mixing from Project construction likely would be short term and negligible to minor.

Soil Contamination

Soils may become contaminated from minor spills of industrial chemicals or hazardous materials (e.g., lubricants, gasoline, oil, other fuels, coolants, and transmission fluid) during construction activities such as fuel storage, equipment refueling, and equipment maintenance. This is a particular concern in areas of agricultural production, especially prime farmland soils, where contaminated soils can affect the quality and yield of crops. Contamination within soils also can migrate into surface waters or groundwater aquifers; therefore, soil contamination above or adjacent to sensitive water resources, and in areas where the water table is high, would be of particular concern.

Applicant-proposed measures to reduce the potential for minor spills include proper fuel storage practices, fuel dispensing operations, and other hazardous materials handling processes. In the event of a spill of hazardous material, clean-up measures would be in place to reduce the extent of soil contamination. Such measures include immediate assessment and notifications; mobilization of response personnel, equipment, and materials for containment and/or cleanup, such as spill kits with adsorbents; and proper storage and disposal of contaminated material. These spills would be managed according to SPCC Plans. All employees who handle fuels and other regulated substances would be trained by the contractor in these and other BMPs, as outlined in Enbridge's Environmental Protection Plan (Appendix E). The Applicant also would employ a Spill Coordinator, designated by the contractor, to report spills and mobilize spill response

in the event of a spill. If Applicant-proposed measures are followed, potential impacts from minor spills likely would be localized, temporary, and negligible to minor.

Presence of Shallow Bedrock

The Applicant has identified one 0.3-mile segment of the Applicant's proposed project in Carlton County, Minnesota, where bedrock outcrops at the surface for approximately 1,500 feet. Blasting with explosives would be required to break up and remove the bedrock in order to install the pipeline in this segment. The Applicant anticipates that four blasting events would be required, each event breaking up approximately 400 feet of the rock outcrop (Enbridge 2016b).

The Applicant would develop a Blasting Plan prior to construction, which would comply with all federal, state, and local regulations, including those related to the safety, use, storage, and transportation of explosives (Enbridge 2016a). After blasting and pipe installation, the pipe would be surrounded with padding material, such as sand, and the fragments of blasted rock would be used to infill the trench. Large fragments of rock (larger than those in surrounding undisturbed areas) would be removed from the construction work area. Removal of bedrock by blasting would be a permanent impact; however, unless the rock is a source of rare or unique fossils or mineral resources, the impact on geology and soils would be considered minor.

Impacts on Paleontological Resources

Potential impacts on paleontological resources during construction include damage to or destruction of fossils from excavation and blasting operations, if conducted; erosion of fossil beds from grading; and unauthorized collection of fossils by construction personnel or the public. Where blasting is required, it likely would disturb and fracture any fossils potentially found in shallow bedrock. Fossils most likely to be present in shallow bedrock are common marine invertebrate fossils that are globally abundant and not considered scientifically significant. Damage to or destruction of common marine invertebrate fossils from blasting or ripping of bedrock would be a permanent minor impact.

Pleistocene-age mammal fossils are rare but may be unearthed from glacial sediments overlying bedrock during excavation activities for the Project; these fossils are considered scientifically important. The Applicant has developed a state-specific Unanticipated Discovery Plan (Appendix O) that requires work to stop in the event that important paleontological resources are discovered during construction activities. With adherence to the Plan, impacts on rare or unique paleontological resources could be negligible to minor. However, if a rare or unique paleontological resource was damaged or destroyed prior to being discovered, the impact could be permanent and major to the individual resource. The likelihood of such an occurrence, however, is low.

Changes to Topography

Temporary, localized, and minor modifications to topography would take place during grading, trench excavation, and backfilling of the right-of-way. During construction in areas with slopes greater than 30 percent, slope stabilization blankets would be used (e.g., straw mats, jute mats, or coconut or biodegradable synthetic erosion blankets) (Appendix E). At the close of construction, the Applicant would restore the natural contour of any slopes and drainage patterns, which would stabilize the slopes. After pipe installation is complete, backfilling and regrading of the right-of-way would return the disturbed surface to pre-Project conditions.

Minor, localized, and temporary modifications to topography may take place during construction of temporary material storage yards, contractor yards, and temporary access roads. Disturbed areas would

be re-graded at the close of construction, and surfaces would be returned to their pre-Project elevations, in accordance with BMPs. Differential settling of the land surface may occur in the months following regrading, but impacts would be negligible.

Minor permanent modifications to topography (e.g., excavations for foundations, permanent road grading) may be required for some new or expanded pipeline-associated facilities (e.g., pump stations, MLVs, cathodic protection systems, and permanent access roads).

Subsidence and Sinkhole Hazards

Subsidence or sinkhole formation is not anticipated within the Applicant's proposed project, as no known shallow carbonate rocks intersect the route.

Operations Impacts

During standard operations, impacts on soil and geologic resources would be limited to permanent loss of soil cover where soils/surface sediments would be converted to impervious surfaces on new roads and aboveground facilities; and potential erosion and compaction during permanent right-of-way maintenance and use of permanent unpaved access roads.

Permanent Loss of Soil Cover

Construction of permanent access roads and associated facilities would require permanent removal of soil, to be replaced with materials such as cement and gravel. Loss of soil cover would total 3.4 acres for permanent access roads and 61.4 acres for other permanent facilities along the Applicant's proposed project in Minnesota. Additional acreage for permanent facilities in Wisconsin and North Dakota are unknown at this time. This loss of soil resources would be a permanent and minor impact. In addition, replacement of natural soil cover with less permeable cement and other materials could increase runoff and potential erosion and sedimentation. Runoff and sedimentation are addressed in Section 5.2.1.2.

Soil Erosion and Compaction

Approximately 2,304 acres that encompasses the permanent right-of-way would be subject to permanent, minor soil compaction from maintenance operations (i.e., vehicles traversing the area). New permanent access roads that are unpaved would be subject to minor, localized, and permanent erosion and sedimentation (sedimentation is addressed in Section 5.2.1.2). The locations of new permanent access roads that are unpaved also would experience negligible to minor, localized, permanent soil compaction.

Landslide Hazards

Landslide potential is low across most of the Applicant's proposed project. There is increased potential for landslide activity in isolated sections of the Applicant's proposed project, mostly at stream crossings between Carlton and the Minnesota-Wisconsin border. Areas along the Applicant's proposed project known to have high susceptibility to landslides are limited to 0.4 mile between Clearbrook and Carlton and 8 miles between Carlton and the Minnesota-Wisconsin border. The Project would follow existing design and engineering specifications (in accordance with 49 CFR Parts 192 and 193) to ensure that pipeline facilities are protected from potential landslides. Due to the low landslide potential across most of the route, the likelihood of a landslide affecting the pipeline or associated facilities would be low. The severity of impact on pipeline facilities for an individual landslide event would depend on the nature of the slope, the geologic materials present, and the design of the facilities; such a determination is beyond the scope of this analysis. It should be noted that, although the potential is low, a landslide could occur at any time throughout the life of the Project.

Subsidence and Sinkhole Hazards

Subsidence or sinkhole formation is not anticipated within the Applicant's proposed project because no known shallow carbonate rocks intersect the route.

5.2.2.3.2 Continued Use of Existing Line 3

Construction Impacts

There would be no construction impacts on geology and soils from continued use of the existing Line 3 pipeline because it is already built.

Operations Impacts

Operations impacts on geology and soils from continued use of the existing Line 3 would occur during maintenance, with an estimated 267 repair procedures per year in the form of integrity digs (see Section 4.2.3 for more detail). Soil disturbance from integrity digs and subsequent pipeline repairs (if required) could cause soil erosion. If BMPs to reduce soil erosion are implemented, this impact would be localized, temporary to short term, and negligible to minor. Other impacts from operation of the existing Line 3 would be part of the existing conditions and are not included in the analysis.

5.2.2.3.3 System Alternative SA-04

Construction Impacts

Impacts from pipeline construction for SA-04 primarily would occur within construction work areas along the length of the route, as well as at aboveground facilities, staging areas, and access roads. Soil disturbance along the route during construction would total approximately 11,568 acres. Of the amount disturbed during construction, 4,820 acres would be maintained as permanent right-of-way and dedicated to aboveground facilities during operations. Over 99 percent of SA-04 would be co-located with existing infrastructure, where prior disturbance to soils likely has occurred. Co-location of the route is discussed in Section 6.7.

Geologic resource impacts for SA-04 are expected to be similar to those described for the Applicant's proposed project, except for the greater extent of the impacts because SA-04 is significantly longer. Geology impacts that vary from the Applicant's proposed project include an increased occurrence of shallow bedrock and karst terrain on SA-04. If constructed, it was assumed that measures similar to the Applicant-proposed measures would be implemented along SA-04 to reduce the impacts on geologic resources and soils that were identified for the Applicant's proposed project, but additional measures would have to be developed to address the potential for localized subsidence from the karst terrain.

Soil Erosion

Highly erodible soils of concern are not common along SA-04. As detailed in Table 5.2.2-3, the route intersects less than 1 mile of soils that are highly susceptible to water erosion, and approximately 20 miles of soils highly susceptible to wind erosion. It is assumed that measures similar to the Applicant-proposed measures described above would be implemented to minimize the potential for soil erosion. As a result, minor, localized, and temporary to short-term soil erosion would be likely due to construction and restoration activities.

Soil Compaction

Operation of heavy equipment during construction and restoration can compact soils, especially hydric soils and fine-grained soils prone to compaction. As detailed in Table 5.2.2-3, hydric soils are found along approximately 362 miles (45 percent) of SA-04, and compaction-prone soils are encountered along 216 miles (27 percent) of the route. It was assumed that the Applicant-proposed measures described for the Applicant's proposed project would be implemented to minimize the potential impacts of compaction. With implementation of these, or similar measures, impacts from soil compaction likely would be localized, temporary, and negligible to minor.

Soil Mixing

The potential for soil mixing along SA-04 would be the same as for the Applicant's proposed project. With adherence to measures similar to the Applicant-proposed measures for soil removal and segregation described above, impacts from soil mixing should be short term and negligible to minor.

Soil Contamination

The types of soil contamination that could occur along SA-04 from minor spills during construction are the same as discussed for the Applicant's proposed project, although the potential for a minor spill to occur is greater because SA-04 is over twice as long as the Applicant's proposed project. With implementation of measures similar to the Applicant-proposed measures described above, impacts from soil contamination likely would be localized, temporary, and negligible to minor.

Presence of Shallow Bedrock

Shallow bedrock is not common for most of the length of SA-04; however, in a variety of isolated segments in southern Minnesota, Iowa, and Illinois, shallow bedrock is likely to be present. Blasting likely would be required at multiple locations along this route. Geotechnical field investigation ultimately would be required to determine the specific need for blasting of shallow bedrock since bedrock blasting sites have not yet been identified for SA-04. Removal of bedrock by blasting would be a permanent impact; however, unless the rock is a source of rare or unique fossils or mineral resources, the impact on geology and soils would be considered minor.

Impacts on Paleontological Resources

Potential impacts on fossil resources for SA-04 would be essentially the same as those described above for the Applicant's proposed project, except for a greater potential because of the greater length of SA-04. In addition, SA-04 is likely to have more outcrops of shallow bedrock that may contain common marine invertebrate fossils and thus more potential for construction to affect fossils. Damage to or destruction of common marine invertebrate fossils from blasting or ripping of bedrock would be a permanent minor impact.

The likelihood of impacts on rare or unique paleontological resources (such as Pleistocene mammals found in glacial sediments overlying bedrock) is low because of the rarity of these significant remains. With implementation of the Unanticipated Discovery Plan (Appendix O), work would stop if a discovery was made; and impacts on the fossil resource could be negligible to minor. If a rare or unique paleontological resource was damaged or destroyed prior to being discovered, the impact could be permanent and major for the individual resource.

Changes to Topography

Impacts on topography along SA-04 would be essentially the same as those described for the Applicant's proposed project—including both temporary, negligible to minor modifications to the ground surface

elevation within the construction work area and permanent minor impacts from installation of some aboveground facilities. Applicant-proposed measures to minimize impacts on topography include backfilling and regrading surfaces at the close of construction to restore the natural contour of the land, when possible.

Subsidence and Sinkhole Hazards

Relatively shallow carbonate bedrock with potential for subsidence and sinkholes intersects approximately 76 miles of SA-04 across Minnesota, Iowa, and Illinois (none is present in North Dakota). Known karst conditions are present along approximately 8 miles of SA-04 in Mower County, Minnesota, with the possibility of cavities at depth. Known and potential karst conditions also are present along approximately 63 miles of the route in Iowa and 5 miles of the route in Illinois. Thus, the potential exists for subsidence and sinkhole formation across SA-04 (Minnesota DNR 2016c; Weary and Doctor 2014).

Karst topography can pose increased risks to the successful installation of pipelines by HDD, including difficulties arising from very loose unstable soils and open voids along the drill path. Potential impacts include loss of drilling fluid into open conduits and inadvertent drilling fluid returns, leading to potential contamination and turbidity in nearby wells, springs, and rivers (addressed in Section 5.2.1.1 and 5.2.1.2); and ground subsidence and possible sinkhole formation due to excavating zones of loose unstable soils. The probability and severity of subsidence or sinkhole formation impacts on pipeline installation or construction of associated facilities depend on the nature of the bedrock, the groundwater conditions, the timing of the occurrence, and the design of the facilities. Such a determination is beyond the scope of this analysis.

Operations Impacts

Permanent Loss of Soil Cover

The types of operations impacts along SA-04 would be similar to those described for the Applicant's proposed project, except for the extent of those impacts given that SA-04 would be significantly longer. Consequently, the permanent, minor loss of soil cover at aboveground facilities along the 795-mile SA-04 route would generally be more than twice that for the 380-mile Applicant's proposed project.

Soil Erosion and Compaction

The extent of soil erosion and compaction impacts associated with right-of-way maintenance along the 795-mile SA-04 route generally would be more than twice that for the 380-mile Applicant's proposed project. Soil erosion and compaction impacts from SA-04 operations would be permanent, localized, and negligible to minor.

Landslide Hazards

Landslide hazards are generally low for SA-04. SA-04 passes through 2.8 miles of land considered to be at high risk for landslides (NPMS LSHR 2016). Due to the low landslide potential across most of the route, the likelihood of a landslide affecting the pipeline or associated facilities is low. The severity of the impact of a landslide on pipeline facilities depends on the nature of the slope, the geologic materials, and the design of the facilities; such a determination is beyond the scope of this analysis. It should be noted that, although the potential is low, a landslide could occur at any time throughout the life of the Project.

Subsidence and Sinkhole Hazards

The potential exists for subsidence and sinkhole formation due to karst conditions across SA-04 (Minnesota DNR 2016c; Weary and Doctor 2014). The probability and severity of an impact on the

pipeline or associated facilities related to subsidence or sinkhole formation during Project operations depend on the nature of the bedrock, the groundwater conditions, the timing of the occurrence, and the design of the facilities. Such a determination is beyond the scope of this analysis.

5.2.2.3.4 Transportation by Rail

Construction Impacts

Transportation of crude oil by rail would require development of temporary storage and offloading facilities, new rail access, and upgrade of existing rail access. Development of new rail facilities, as well as installation of a new interconnection between existing rail lines, would require clearing and grading adjacent to the Clearbrook and Superior terminals. During construction, clearing and grading would include a temporary to short-term increase in soil erosion and compaction. With implementation of measures and BMPs similar to those described in the Environmental Protection Plan (Appendix E), these impacts on soils would be temporary to short term, localized, and negligible to minor. Modifications to topography from grading would be minor and permanent. It was assumed that all of the surface soils at the offloading facilities at the Clearbrook and Superior terminals would be permanently converted to impervious substrate (e.g., concrete, pavement) as discussed below.

Contamination of soil could occur from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities. These spills would be managed according to SPCC Plans. With implementation of BMPs and measures similar to the Applicant-proposed measures described above, impacts on soil contamination likely would be temporary and negligible to minor.

Because no known karst conditions are present within the ROI for the rail alternative, no subsidence and sinkhole impacts are anticipated to occur.

Operations Impacts

Development and operation of temporary storage and offloading facilities in Clearbrook and Superior and new or expanded rail lines would permanently convert soil cover to impervious surfaces, resulting in a loss of up to about 360 acres of soil cover including 260 acres associated with the Clearbrook terminal and about 100 acres associated with the Superior terminal. This is considered a minor permanent impact on soils.

In addition, minor spills and leaks of crude oil, fuel, and lubricants from train transit could cause minor and localized soil contamination along the rail corridor and adjacent right-of-way. Regular inspection of rail cars for leaks would minimize the potential for such contamination; impacts likely would be minor and localized, and generally would remain on the rail line bed.

5.2.2.3.5 Transportation by Truck

Construction Impacts

Transportation of crude oil by truck would require development of temporary storage and offloading facilities at Clearbrook and Superior, and new or upgraded road access near Neche, Clearbrook, and Superior. During construction, clearing and grading for offloading facilities or rail access would cause a temporary to short-term increase in soil erosion and compaction. With implementation of measures and

BMPs similar to those described in the Environmental Protection Plan (Appendix E), these impacts on soils would be temporary to short term, localized, and negligible to minor.

Construction of the offloading facilities would result in conversion of approximately 100 acres of soil cover to an impervious surface (up to 50 acres adjacent to both the Clearbrook and Superior terminals). It was assumed that new and ungraded roads also would convert existing soil cover to impervious surfaces, including approximately 4 acres at Clearbrook and 34 acres at Superior (it is not expected that upgrades near Neche would increase the impervious surface of the existing roadway). Modifications to topography from grading would be minor and permanent.

Soil contamination could occur from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities. These spills would be managed according to SPCC Plans that would be developed for each facility. With implementation of BMPs and measures similar to the Applicant-proposed measures described for the Applicant's proposed project, impacts on soil contamination would be temporary and negligible to minor.

Operations Impacts

Operation of temporary storage and offloading facilities in Clearbrook and Superior would permanently convert pervious soils to impervious surfaces, resulting in a loss of approximately 138 acres of soil cover. This is considered a permanent and minor impact on soils. Operations of the truck alternative would result in no other impacts on geology and soils.

5.2.2.3.6 Existing Line 3 Supplemented by Rail

Construction Impacts

Construction impacts would be the same as those described above for the transportation by rail alternative.

Operations Impacts

Operations impacts would be the same as those described above for continued use of the existing Line 3 and transportation by rail. The only anticipated difference would be a reduction in rail traffic for this alternative compared to the rail alternative, which could reduce the potential for localized soil contamination from minor leaks in the vicinity of the offloading facilities and along the existing rail routes.

5.2.2.3.7 Existing Line 3 Supplemented by Truck

Construction Impacts

Construction impacts would be the same as those described above for the transportation by truck alternative.

Operations Impacts

Operations impacts would be the same as those described for continued use of the existing Line 3 and transportation by truck. The only anticipated difference would be a reduction in truck traffic for this alternative compared to the truck alternative, which could reduce the potential for localized soil contamination from minor leaks in the vicinity of the offloading facilities and along the existing truck routes.

5.2.2.4 Summary and Mitigation

5.2.2.4.1 Summary

Construction and operation of the Applicant's proposed project and all CN Alternatives would affect geologic and soil resources. Table 5.2.2-4 provides a summary of the occurrence and extent of potential impacts on geology and soils associated with the Applicant's proposed project and CN Alternatives. If the protective measures outlined in the Applicant's Environmental Protection Plan (Appendix E) or similar measures are implemented, most construction impacts on geology and soils would be negligible to minor and temporary to short term.

During construction, soil erosion by wind and water likely would be a minor, temporary to short-term impact. Hydric and compaction-prone soils occur to some extent along the Applicant's proposed project and the CN Alternatives (except that continued use of the existing Line 3 does not involve construction). If Applicant-proposed measures or similar measures and BMPs to reduce compaction are followed, compaction of soils likely would be temporary and minor for the Applicant's proposed project and the CN Alternatives.

Shallow bedrock is not prevalent along the Applicant's proposed project or in affected areas for any of the CN Alternatives. One instance of shallow bedrock along the Applicant's proposed project would require blasting. Shallow bedrock is not common along SA-04, but in limited sections within Minnesota, Iowa, and Illinois blasting could be required. Geotechnical field investigations would be necessary to determine the specific requirements for blasting along SA-04. No blasting of bedrock would be expected for rail or truck transport, as construction of those alternatives would require no significant excavation. The potential for encountering fossil-bearing rock or sediments is similarly low for all potential routes, although SA-04 is likely to require more excavation and blasting, with the resulting higher potential for damage or destruction of fossils. As noted, continued use of the existing Line 3 does not involve construction. Except for integrity digs required for maintenance, other impacts from operation of the existing Line 3 would be part of the existing conditions and are not included in the analysis.

Impacts on Project elements from geologic hazards are not likely for the Applicant's proposed project or any CN Alternative because the overall landslide potential is low. The potential exists for subsidence or sinkhole formation on SA-04 but not for the Applicant's proposed project, existing Line 3, or the rail or truck facilities.

The greatest impact during operations would the loss of soil cover associated with aboveground facilities; these permanent losses would be minor for the Applicant's proposed project and all CN Alternatives. The extent of permanent soil conversion to an impervious surface would be up to 140 acres for the truck alternative, up to 360 acres for the rail alternative, 63.8 acres for the Applicant's proposed project, and about 130 acres for SA-04.

5.2.2.4.2 Mitigation

Beyond the potential for an unanticipated discovery of and damage to a rare paleontological resource, no major impacts are expected on geologic or soil resources for the Applicant's proposed project or any CN Alternative. Beyond the Applicant-proposed measures described above, no mitigation measures have been identified to further avoid and minimize impacts on geology and soils.

Table 5.2.2-4. Summary of Potential Impacts on Geology and Soils for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Preferred Route	System Alternative SA-04	Continued Use of Existing Line 3	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Construction Impacts							
Prone to soil erosion by water or wind (miles)	Temporary to short-term/minor localized impacts • 110.6 miles	Temporary to short-term/minor localized impacts • 21.2 miles	No impact	Temporary to short-term/minor impacts • *Sensitive soils are present but are not quantifiable because the specific locations of activities and facilities are not known.*			
Prone to soil compaction, hydric, or other sensitive soils (miles)	Temporary/ negligible to minor localized impacts • 192.6 miles	Temporary/ negligible to minor localized impacts • 578.6 miles	No impact	Temporary to short-term/negligible to minor impacts • *Sensitive soils are present but are not quantifiable because the specific locations of activities and facilities are not known.*			
Increase in soil mixing	Short-term/ negligible to minor impacts	Short-term/ negligible to minor impacts	No impact	No impact	No impact	No impact	No impact
Potential for soil contamination from minor spills	Temporary/ negligible to minor localized impacts	Temporary/ negligible to minor localized impacts	No impact	Temporary/ negligible to minor impacts	Temporary/ negligible to minor impacts	Temporary/ negligible to minor impacts	Temporary/ negligible to minor impacts
Potential for shallow bedrock blasting (miles)	Permanent/minor impacts • 0.3 mile	Permanent/minor impacts[a]	No impact	No impact	No impact	No impact	No impact
Potential paleontological disturbance from excavation or blasting (miles)	Permanent/ negligible to major impacts • 0.3 mile	Permanent/ negligible to major impacts[a]	No impact	No impact	No impact	No impact	No impact

Table 5.2.2-4. Summary of Potential Impacts on Geology and Soils for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Preferred Route	System Alternative SA-04	Continued Use of Existing Line 3	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Potential for modifications to topography	Temporary/ negligible to minor impacts[b] Permanent/ minor impacts from installation of aboveground facilities[c]	Temporary/ negligible to minor impacts[b] Permanent/ minor impacts from installation of aboveground facilities[c]	No impact	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts
Subsidence or sinkhole hazard?	No	Yes	No	No	No	No	No
Operations Impacts							
Permanent loss of soil cover	Permanent/ minor impacts • 64.8 acres in MN • Additional acreage in ND and WI unknown	Permanent/ minor impacts • Acreage unknown, but likely twice that of the Applicant's proposed project	No impact	Permanent/minor impacts • Up to 360 acres	Permanent/minor impacts • Up to 140 acres	Permanent/minor impacts • Up to 360 acres	Permanent/minor impacts • Up to 140 acres
Potential for soil erosion and compaction	Permanent/ negligible to minor localized impacts	Permanent/ negligible to minor localized impacts	Temporary to short-term/ negligible to minor localized impacts from erosion No impact from compaction	No impact	No impact	Temporary to short-term/negligible to minor localized impacts from erosion No impact from compaction	Temporary to short-term/negligible to minor localized impacts from erosion No impact from compaction

Table 5.2.2-4. Summary of Potential Impacts on Geology and Soils for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Preferred Route	System Alternative SA-04	Continued Use of Existing Line 3	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Landslide hazard?	Yes	Yes	Yes	No impact for storage areas and facilities; entire route not analyzed	No impact for storage areas and facilities; entire route not analyzed	Yes	Yes
Subsidence or sinkhole hazard?	No	Yes	No	No	No	No	No

[a] Shallow bedrock is not common along SA-04, but in sections within Minnesota, Iowa, and Illinois, blasting likely would be required. Geotechnical field investigations would be necessary to determine the specific requirements for blasting along SA-04. Because the longer SA-04 route is likely to require more blasting, the potential for encountering fossil-bearing rock is higher, with the resulting higher potential for damage or destruction of fossils.

[b] Minor, localized, and temporary modifications to topography may take place during (1) grading, trench excavation, and backfilling of the right-of-way; and (2) construction of temporary material storage yards, contractor yards, and temporary access roads.

[c] Minor permanent modifications to topography (e.g., excavations for foundations, permanent road grading) may be required for some new or expanded pipeline-associated facilities (e.g., pump stations, mainline valves, cathodic protection systems, and permanent access roads).

5.2.2.5 References

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5.2.3 Vegetation

Vegetation is a critical component of ecosystem sustainability, as it supports and regulates biological and biochemical cycles, influences water quality, replenishes and stabilizes soils, provides habitat for wildlife, and contributes directly and indirectly to socioeconomic benefits. Plant species and associations themselves comprise a large portion of regional ecological richness, uniqueness, and diversity values as well as provide numerous specific habitat requirements that support the same values for wildlife.

Vegetation can be described by land cover types—predictable assemblages of plant species that grow together in similar habitat. In addition to existing land cover types, other vegetation parameters used to estimate potential Project impacts include the location and classification of native plant communities, old-growth forests, high conservation value forests (HCVFs), and distribution of noxious weed and invasive plant populations.

Potential impacts on types of vegetation that fall under specific regulatory jurisdiction are found in other sections, as detailed below:

- Wild Rice Waterbodies, *in* Surface Water, Section 5.2.1.2;
- Wetlands, including calcarious fens, *in* Wetlands, Section 5.2.1.3; and
- Special Status Plant Species and Communities, *in* Unique Natural Resources, Section 5.2.5. (Note: this included federal- and state-listed threatened and endangered species; Species of Greatest Conservation Need (SGCN); Minnesota Biological Survey Sites of Biodiversity Significance; and Scientific and Natural Areas); and
- Potential impacts on vegetation due to an unanticipated release of crude oil are addressed in Chapter 10.

After providing information on applicable regulations and the regulatory context for management of vegetation resources, this section describes the impact analysis methodology. Existing vegetation conditions within an area along the Applicant's proposed project and each of the CN Alternatives is discussed. Potential Project-related impacts of construction and operation on vegetation parameters are discussed for the Applicant's proposed project and each of the CN Alternatives. Detailed supporting analyses are cited and provided in Appendix K. A summary and comparison of the impacts are included at the end of the section.

5.2.3.1 Regulatory Context and Methodology

5.2.3.1.1 Regulatory Context

Regulations pertaining to the conservation, protection, and management of vegetation are established at various levels of federal, state, and local government. Conservation and protection activities regarding special status plant resources are managed by federal and state agencies. As noted above, regulatory protection for wetlands, including calcareous fens are addressed *in* Wetlands, Section 5.2.1.3. Regulatory measures protect federally and state-listed endangered or threatened plants, and other vegetation communities are discussed *in* Unique Natural Resources, Section 5.2.5.

Native plant communities (defined under methodology) are naturally occurring vegetation with considerable resource value. These are identified by the North Dakota Parks and Recreation Department, Minnesota DNR, Iowa DNR, Illinois DNR, and Wisconsin DNR. Data collected by these

departments typically are used to identify native plant community types, evaluate quality and quantity, assign rarity, and provide recommendations for land management practices to avoid and minimize disturbance of rare resources. Few regulations provide protection for native plant communities, although resource agencies devote considerable expense to their conservation for ecological and public values.

A "noxious weed" is "any plant or plant product that can directly or indirectly injure or cause damage to crops, livestock, poultry, or other interests of agriculture, irrigation, navigation, natural resources of the United States, public health, or the environment" as defined in the U.S. Plant Protection Act of 2000 (7 U.S. Code 7701–7772). Invasive plants are non-native plants also identified as a potential threat to the natural environment because of their tendency to dominate and exclude other vegetation. Weed and invasive plant classifications and rules vary between regulating agencies.

Each state is responsible for managing noxious weeds in accordance with the rules and regulations identified under the U.S. Plant Protection Act of 2000 (7 U.S. Code 7701–7772). Noxious weed management is regulated by the departments in each state listed in Table 5.2.3-1. In Minnesota, the Minnesota DNR is responsible for state-prohibited and state-regulated invasive aquatic plants, and the Department of Agriculture is responsible for state-prohibited and state-regulated terrestrial plants classified as noxious weeds.

Table 5.2.3-1. State Regulations Concerning Noxious Weed Management

State	Administering Agency	Regulation
North Dakota	North Dakota Department of Agriculture	Noxious Weed Control (ND Law Ch. 4.1-47-02)
Minnesota	Minnesota Department of Agriculture	Minnesota Noxious Weed Law (Minn Stat. § 18.75 to 18.91;)
Iowa	Iowa Weed Commissioners' Association	Iowa Noxious Weeds and the Iowa Weed Law (IA Code Ch. 317)
Illinois	Illinois Department of Agriculture	Illinois Noxious Weed Law (Illinois Administrative Code, Title 8, Ch. I, Subchapter f, Part 220)
Wisconsin	Wisconsin Department of Natural Resources	Invasive Species Rule (WI Code Ch. NR 40)

5.2.3.1.2 Methodology

The ROI for this evaluation encompassed the area within 0.5 mile of the Applicant's proposed project and CN Alternatives in North Dakota, Minnesota, Iowa, Illinois, and Wisconsin. Existing conditions, in terms of vegetation cover, noxious weeds and invasive plant locations, were identified within 0.5 mile from pipeline route centerlines or other facilities.

Existing vegetation resources were identified and analyzed using multiple information sources, starting at a broad scale and narrowing to a more localized scale. These data provided classification and nomenclature of vegetation that allowed comparison of the impacts of the Applicant's proposed project and CN Alternatives on specific vegetation resources at different levels.

The following data are used to describe existing conditions and perform analysis:

- EPA Ecoregions, Levels III and IV (describe existing conditions only, not integrated into the impact analysis) (EPA 2016);
- National Land Cover Database (NLCD) (Homer et al. 2015);
- Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites) (Minnesota DNR 2016d);
- Minnesota Native Plant Community Hierarchy (Minnesota DNR 2016a);
- Minnesota DNR Old Growth and HCVF (Minnesota DNR 2016f); and
- State-listed noxious weeds

Ecoregions are areas where ecosystems (and the type, quality, and quantity of associated environmental resources) are generally similar. They denote areas of similarity in the mosaic of biotic and abiotic components, including geology, landforms, soils, vegetation, climate, land use, wildlife, and hydrology (EPA 2016). Level III and IV Ecoregions data (EPA 2016) were used to identify broad-scale patterns of existing vegetation within the general vicinity of the proposed project.

The NLCD (Homer et al. 2015) describes and delineates broad-scale land classes of vegetation cover. NLCD uses a combination of satellite imagery, national vegetation survey data, and local vegetation survey data to provide a spatial reference and descriptive data for characteristics of the land surface by grouping similar types of land cover into a variety of classifications (e.g., developed, forested, and cultivated).

Not all of the NLCD cover classifications are appropriate for use in this analysis. For example, because the category of developed lands (residential, commercial, and industrial lands) primarily include artificially created landscapes with minimal naturally-occurring vegetation, these lands were not included in the vegetation impact summaries.

The NLCD vegetation cover classes that are within the ROI for the Applicant's proposed project and CN Alternatives are defined in Table 5.2.3-2 below and illustrated in Figure 5.2.3-1 under Existing Conditions.

MBS Sites are extensive landscape areas mapped and assessed by Minnesota DNR staff for context and ecological influence of the landscape; size, condition, and quality of native plant communities, and quality and rarity of individual plant species. These values are combined to assign a biodiversity significance rank for each site ranging from Outstanding, High, Moderate, or Below. Outstanding and High-ranked sites are of most concern for conservation, as they contain rare species, native plant communities, and intact landscapes. Delineation of MBS Sites is an on-going effort. These data are therefore incomplete and are considered to be preliminary. What are available for intersection with the Applicant's proposed project and CN Alternatives are illustrated in Figure 5.2.3-2.

Native vegetation in Minnesota is classified by a six-level hierarchy. This analysis references two of these levels – the ecological system and the native plant community. Ecological systems, the second highest level, are groups of native plant communities unified by strong influence from a major ecological process such as fire and hydrology. Minnesota native plant communities are groups of native plants that associate with each other, and with their environment, in ways not greatly altered by modern human activity or by introduced organisms. These groups of native plant species form recognizable plant communities that re-occur in similar ecological conditions. Native plant community mapping continues across the state; all completed MBS Sites have native plant community mapping done within

outstanding and high-ranked units only. Native plant communities are also mapped outside of MBS Sites. Native plant communities are ranked by state conservation status, which reflects the level of rarity across the state. The conservation status ranks range from S1 – critically imperiled to S5 – secure, common, widespread, and abundant; native plant communities ranked as S1 – critically imperiled, S2 – imperiled, and S3 – vulnerable to extirpation or extinction are considered to be "rare."

Table 5.2.3-2. National Land Cover Database Classifications

Classification	Definition
Barren Land (Rock/Sand/Clay)	Barren areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.
Deciduous Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.
Evergreen Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.
Mixed Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.
Shrub/Scrub	Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
Grassland/Herbaceous	Areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
Pasture/Hay	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.
Cultivated Crops	Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled.
Woody Wetlands	Areas where forest or shrub land vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
Emergent Herbaceous Wetlands	Areas where perennial herbaceous vegetation accounts for greater than 80 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

Old-growth forests, identified in Minnesota DNR's Forest Stand Inventory, are designated forests in Minnesota that have not experienced severe, stand-replacing disturbance over the last 120 years. Old-growth forests are recognized as valuable resources in Minnesota and are protected from harvesting operations. They provide unique wildlife habitat, rare plant refugia, genetic reservoirs, and research opportunities.

Minnesota DNR requires designation of HCVFs as part of the Forest Stewardship Council's® forest certification (Minnesota DNR 2016f). HCVFs are forest areas that contain concentrations of rare, threatened, or endangered species; natural communities; and other biodiversity values that occur in numbers, frequency, quality, and/or density that are sufficiently outstanding to be considered unique or

highly important in comparison with other forest areas within the ecoregion. HCVF lands are managed for a broad set of objectives and forest resources in a manner that will maintain or enhance these values across the landscape.

Mapped locations of state-listed noxious weeds and invasive plant species populations within 0.5 mile of the Applicants's proposed Project, and System Alternative SA-04 route, were obtained as state- and county-level data from three sources (University of Georgia 2016; Minnesota DA 2016; Minnesota DNR 2016b) for Minnesota, Wisconsin, and North Dakota. These populations are listed by route, species, state-specific control status, and state of observation, in Table 5.2.3-3.

Potential impacts on vegetation resources are estimated for activities associated both with construction and operation of the Applicant's proposed project, as well as the CN Alternatives. Direct impacts on vegetation include disruption or removal of rooted vegetation resulting in a reduction in areas of existing vegetation communities, reduction of total numbers of plant species (species richness) within an area, and/or reduction or loss of total area, diversity, structure, or function of wildlife habitat. Therefore, the potential for negative impacts on vegetation is assumed to be proportional to the estimated area of surface disturbance under each alternative. The larger the area, the greater the potential for direct and indirect impacts.

A number of indirect impacts on vegetation resources are possible as a result of construction and operation activities. Potential indirect impacts include loss of habitat suitable for colonization due to surface disturbance; introduction or spread of noxious weeds and invasive plant species by various vectors or conditions; and inability to achieve full expression of natural tree and shrub growth due to vegetation management. Failed reclamation or mitigation may also cause indirect impacts on these resources. Most indirect impacts are assumed to result from direct impacts in proportion to the relative amount of surface disturbance.

The following impact analysis integrates the assumption that for alternatives requiring new pipeline construction, the entire subject right-of-way would be subject to revegetation and reclamation commitments in the Applicant's Environmental Protection Plan (Appendix E). The plan includes BMPs to preserve and protect local soils from compaction or erosion, application of soil amendments, revegetation with site-specific seed mixes, and monitoring to document vegetation re-establishment and site stability as a part of the post-construction monitoring. Further discussion regarding impacts on soils and measures to reduce the extent and duration of impacts on soils is found in Section 5.2.2.

Construction impacts for the Applicant's proposed project were estimated using a surface disturbance that comprises estimated construction work areas, ATWS, access roads, pipe yards, pipeline permanent right-of-way, valve pads and driveways, and pump stations. This footprint was overlaid on vegetation resources parameter data, as described above.

Construction impacts for system alternative SA-04 were estimated by overlaying a standardized 120-foot-wide construction work area centered on SA-04. This footprint was overlaid on vegetation resources parameter data, as described above. Although the precise routes and facility locations for the rail and truck alternatives are not known, potential construction-related impacts for these alternatives were qualitatively estimated based on the descriptions of potential locations for new facilities, the descriptions of potential transportation routes, and available vegetation information for these areas.

Construction impacts for continued use of the existing Line 3 pipeline are qualitatively addressed for integrity digs and subsequent pipeline repair and address the potential for these actions to occur in areas of vegetation resources, as described above.

Operations impacts for the Applicant's proposed project were estimated based on the permanent right-of-way footprints provided by the Applicant. Operations impacts for SA-04 were estimated by overlaying a standardized 50-foot-wide permanent right-of-way centered on the route. Operations impacts for continued use of the existing Line 3 pipeline were evaluated based on the existing permanent right-of-way for that pipeline. Although the precise routes and facility locations of the rail and truck alternatives are not known, operations impacts for these alternatives were qualitatively evaluated using broad-scale spatial analysis and assumptions about the potential routes for train and truck transport.

5.2.3.2 Existing Conditions

A number of Level III and IV ecoregions occur within the general vicinity of the Applicant's proposed project and CN Alternatives. These ecoregions are listed, and described in Tables 5.2.3-4 and 5.2.3-5.

NLCD vegetation cover classes that occur within the ROI for the Applicant's proposed project and CN Alternatives are shown in Figure 5.2.3-1, and discussed under the impact analysis for the Applicant's proposed project and each of the CN Alternatives.

MBS Sites are shown in Figure 5.2.3-2 and discussed under the impact analysis for the Applicant's proposed project and each of the CN Alternatives.

Noxious weed and invasive plant populations mapped within 0.5 mile of the Applicant's proposed project, and system alternative SA-04, in Minnesota, Wisconsin, Illinois, and North Dakota are listed in Table 5.2.3-3

Applicant's Proposed Project

Most of the Applicant's proposed project (53 percent) would fall within the Northern Lakes and Forest Level III ecoregion, followed by the Lake Agassiz Plain ecoregion (35 percent) (Table 5.2.3-4). These ecoregions largely represent prairies, forests, wetlands, and agricultural vegetation communities. The Applicant's proposed project occurs within an area of the Midwest dominated by rolling hills, plains, and rich soils suitable for agricultural development. The route is located within ecoregions that support forested uplands, forested wetlands, and agricultural areas. The topography ranges from flat river terrace croplands to forested ridges and plains.

The Applicant's proposed project crosses 10 broad-scale vegetation cover classes, listed and described in Table 5.2.3-2, include evergreen forest, deciduous forest, mixed forest, scrub/shrub, grassland/herbaceous, hay/pasture, cultivated crops, woody wetlands, emergent herbaceous wetlands, and barren land (Figure 5.2.3-1). Developed lands (residential, commercial, and industrial lands) primarily include artificially created landscapes with minimal naturally occurring vegetation and therefore were not included in the analysis. Broad-scale vegetation cover patterns demonstrate that the Applicant's proposed project occurs within areas dominated by the presence of forested vegetation cover classes (e.g., deciduous forest, woody wetland), followed by shorter-canopied vegetation communities such as cultivated crops and hay pasture cover classes.

Minnesota DNR native plant community systems that occur within 0.5 mile of the Applicant's proposed project include 11 sensitive prairie, wetland, and forest communities. These occur within Sites of Biodiversity Significance that are ranked as moderate to outstanding under the MBS Sites significance ranking (Figure 5.2.3-2). Specific locations for moderate to outstanding-ranked MBS Site and the imbedded native plant communities relative to the location of the Applicant's proposed project are shown in greater detail in Appendix A. Nineteen rare native plant communities (with S1, S2, or S3 conservation rank) were documented within 0.5 mile of the Applicant's proposed project.

Source: Homer et al. 2015.

Figure 5.2.3-1. National Land Cover Database Vegetation Cover in the Region of Interest for the Applicant's Proposed Project and Certificate of Need Alternatives

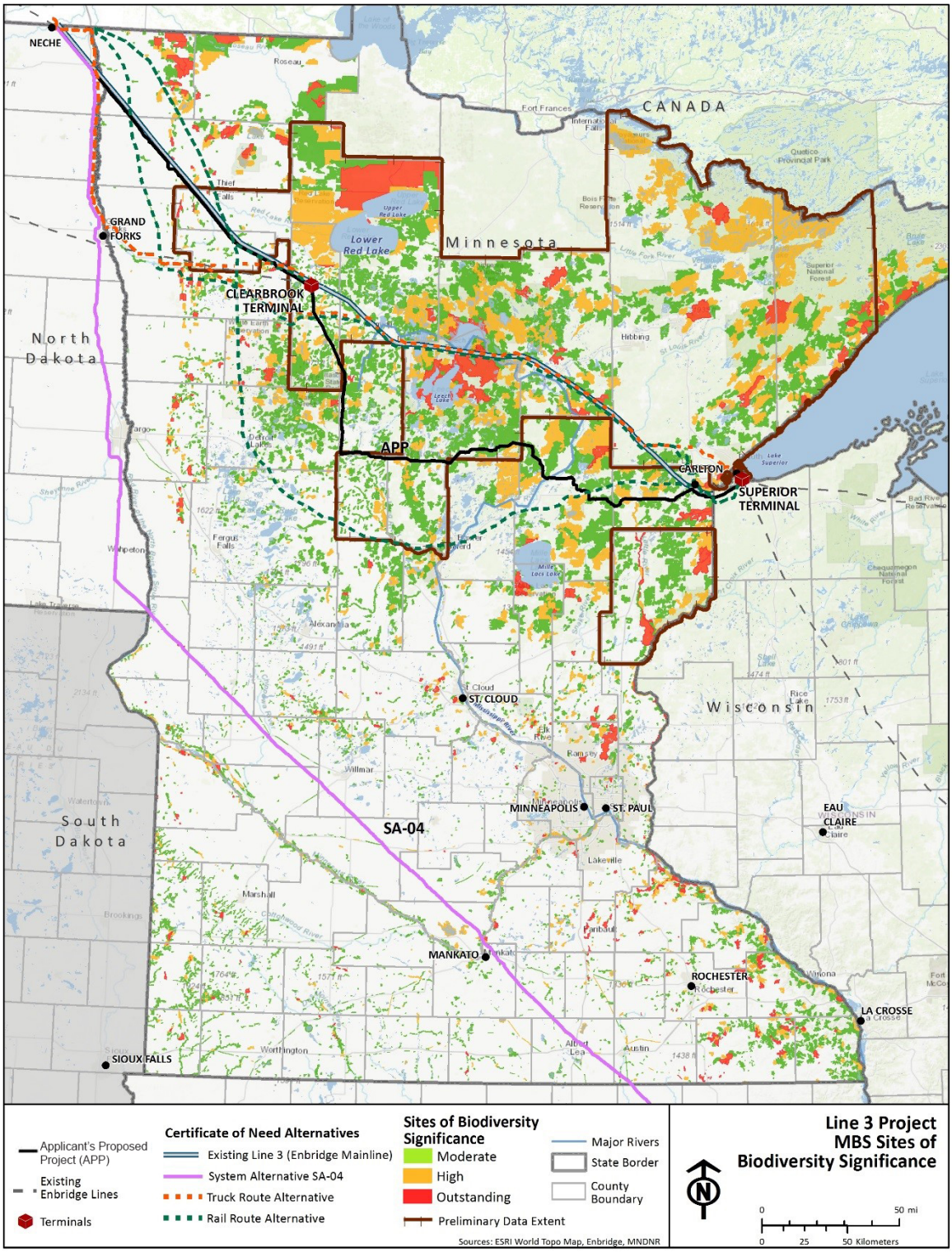

Source: Minnesota DNR 2016d, note that some data are preliminary.

Figure 5.2.3-2. Sites of Biodiversity Significance in the Region of Interest for the Applicant's Proposed Project and Certificate of Need Alternatives

Table 5.2.3-3. Noxious Weeds and Invasive Plants within 0.5 Mile of the Applicant's Proposed Project and System Alternative SA-04

Common Name	Scientific Name	State Observed[a]	Status[b]
Applicant Propose Route			
Hoary alyssum	*Berteroa incana*	MN	NA
Common buckthorn	*Rhamnus cathartica*	WI	R
Glossy buckthorn	*Frangula alnus*	WI	R
Oxeye daisy	*Leucanthemum vulgare*	MN	NA
Reed canary grass	*Phalaris arundinacea*	MN	NA
Smooth brome	*Bromus inermis*	MN	NA
Orange hawkweed	*Hieracium aurantiacum*	MN	NA
Honeysuckle	*Lonicera* spp.	MN	RNW
Spotted knapweed	*Centaurea stoebe*	MN	C
Lilac	*Syringa* spp.	WI	NA
Purple loosestrife	*Lythrum salicaria*	MN, WI	C (MN); R (WI)
Amur maple	*Acer ginnala*	WI	R
Siberian peashrub	*Caragana arborescens*	MN, WI	NA (MN); R (WI)
Queen of the prairie	*Filipendula ulmaria*	WI	R
Leafy spurge	*Euphorbia esula*	MN	C
White sweetclover	*Melilotus alba*	MN	NA
Yellow sweetclover	*Melilotus officinalis*	MN	NA
Tansy	*Tanacetum vulgare*	MN	C
Thistle spp.[c]	*Cirsium* spp.	MN	NA
Bull thistle	*Cirsium vulgare*	MN	NA
Canada thistle	*Cirsium arvense*	MN	C
Plumeless thistle	*Carduus acanthoides*	MN	C
Sow thistle	*Sonchus arvensis*	MN	NA
Birdsfoot trefoil	*Lotus corniculatus*	MN	NA
Common valerian	*Valeriana officinalis*	WI	R
White willow	*Salix alba*	MN	NA
Wild parsnip	*Pastinaca sativa*	MN	C
Clustered bur-reed	*Sparganium glomeratum*	MN	NA
Curly-leaved pondweed	*Potamogeton crispus*	MN	NA
Ladysthumb	*Persicaria maculosa*	MN	NA
Longleaf dock	*Rumex longifolius*	MN	NA
Redtop	*Agrostis gigantea*	MN	NA

Table 5.2.3-3. Noxious Weeds and Invasive Plants within 0.5 Mile of the Applicant's Proposed Project and System Alternative SA-04

Common Name	Scientific Name	State Observed[a]	Status[b]
System Alternative SA-04			
Birdsfoot trefoil	*Lotus corniculatus*	MN	NA
Bull thistle	*Cirsium vulgare*	ND	NA
Honeysuckle	*Lonicera* spp.	MN	RNW
Canada thistle	*Cirsium arvense*	MN, ND	C (MN); NW (ND)
Common reed	*Phragmites australis*	IL, MN	NA (IL); RNW (MN)
Cow vetch	*Vicia cracca* ssp. *tenuifolis*	MN	NA
Curly-leaved pondweed	*Potamogeton crispus*	MN	NA
Common buckthorn	*Rhamnus cathartica*	MN	RNW
Glossy buckthorn	*Frangula alnus*	MN	RNW
Greater celandine	*Chelidonium majus*	MN	NA
Purple loosestrife	*Lythrum salicaria*	MN	C
Purple crown-vetch	*Securigera varia*	MN	RNW
Reed canary grass	*Phalaris arundinacea*	IL,MN	NA (IL and MN)
Russian-olive	*Elaeagnus angustifolia*	MN	NA
Smooth brome	*Bromus inermis*	MN	NA
White sweetclover	*Melilotus alba*	MN	NA
Wild parsnip	*Pastinaca sativa*	MN	C
Yellow sweetclover	*Melilotus officinalis*	MN	NA

Sources: Minnesota DNR 2016b; Minnesota DA 2016; University of Georgia 2016.

[a] State Observed = Occurrences of infestations within 0.5 mile from the Applicant's proposed project and System Alternative SA-04.

[b] Status (MN): E = Eradicate List; C = Control List; RNW = Restricted Noxious Weed; SRP = Specially Regulated Plants (Minnesota DA 2016)
Status (WI): R = Restricted; P = Prohibited (Wisconsin DNR 2016b)
Status (ND): NW = Noxious Weed (North Dakota DA 2017)
Status (IL): NW – Noxious Weed (Illinois DA 2002)

[c] May include native, non-weed thistle species

NA = plant species with no legal status per Minnesota Noxious Weed List (Minnesota DA 2016); Wisconsin Invasive Species Rule (Wisconsin DNR 2016b), North Dakota Noxious Weed List (North Dakota DA 2017), or Illinois Noxious Weed Law (Illinois DA 2002.]

Table 5.2.3-4. Miles of Applicant's Proposed Project within Levels III and IV Ecoregions

Level III[a]	Level IV[a]	Description[a]	Miles within Ecoregion
48. Lake Agassiz Plain	Beach Ridges and Sand Deltas	Low ridges of gravel and sand with mix of row crops, small grains, woodland, and wetlands	35.5
	Glacial Lake Agassiz Basin	Flat former lake bed dominated by row crops and grains	56.1

Table 5.2.3-4. Miles of Applicant's Proposed Project within Levels III and IV Ecoregions

Level III[a]	Level IV[a]	Description[a]	Miles within Ecoregion
	Lake Agassiz Plains	Flat land higher than 48a with row crops, small grains, and pasture	42.7
50. Northern Lakes and Forests	Chippewa Plains	Mostly level landscape with forest, crops, and pasture and many lakes	30.1
	Glacial Lakes Upham and Aitken	Flat former lake beds with peat and sandy soils covered with wetlands, forest, and some pasture	31.4
	Itasca and St. Louis Moraines	Mostly forested rolling landscape with some lakes, crops, and pasture	74.7
	Lake Superior Clay Plain	Clay-covered former lake bed strongly dissected with mixed land use	19.1
	Minnesota/Wisconsin Upland Till Plain	Rolling landscape of woods, wetlands, pasture, and crops	45.6
51. North Central Hardwood Forests	Alexandria Moraines and Detroit Lakes Outwash Plain	Elevated knob and kettle landscape with many lakes and mix of forest, row crops, and pasture	11.1
	Wadena/Todd Drumlins and Osakis Till Plain	Drumlins and rolling plains with row crops, pasture, and woodland	34.3
TOTAL			**380.5**

[a] Source: EPA 2016.

Notes:

Values in table may not sum to total due to rounding.

The Applicant's proposed project does not cross any old-growth forest stands or HCVF. Three old-growth forest stands were identified within 0.5 mile of the Applicant's proposed project; these include two ash and one Norway pine cover types. One HCVF was identified within 0.5 mile of the Applicant's proposed project (Kettle Lake Peatlands HCVF).

Continued Use of Existing Line 3

The existing Line 3 pipeline route extends through four Level III ecoregions, initiating in the Lake Agassiz Plain and terminating in the Northern Lakes and Forests ecoregion. The existing Line 3 pipeline crosses the same 10 NLCD vegetation classes as the Applicant's proposed project, as shown in Figure 5.2.3-1 and described in Table 5.2.3.-2. Vegetation within the existing Line 3 pipeline permanent right-of-way is managed to prevent the growth of trees and large shrubs to allow for visual inspection of the right-of-way. Trees and shrubs are cleared at regular intervals to promote shorter-growth vegetation cover classes, including emergent marsh, grassland/herbaceous, and hay/pasture. Forest and shrub covers is retained above HDD crossings.

Nine Minnesota native plant communities within seven native plant community systems ranked from moderate to outstanding for MBS Site rank (Figure 5.2.3-2) and one rare native prairie plant community (S2) occur within the existing Line 3 pipeline permanent right-of-way. These rare and native plant

community sites may have each been avoided or previously disturbed during the original Line 3 construction.

One old-growth forest stand is adjacent to the existing Line 3 pipeline permanent right-of-way; no HCVFs are within 0.5 mile of the existing Line 3 pipeline permanent right-of-way.

System Alternative SA-04

SA-04 would initiate within the Lake Agassiz Plain EPA ecoregion and terminate in the Central Corn Belt Plains ecoregion of western Illinois. Table 5.2.3-5 describes the ecoregions crossed by SA-04. The route of SA-04 is within an area of the Midwest dominated by rolling hills, plains, and rich soils suitable for agricultural development. It is largely dominated (82 percent) by ecoregions that support croplands and other agricultural activities. The topography ranges from flat river terrace croplands to forested ridges and plains.

SA-04 crosses the same 10 NLCD cover classes as the Applicant's proposed project and the existing Line 3 pipeline right-of-way, including evergreen forest, deciduous forest, mixed forest, scrub/shrub, grassland/herbaceous, hay/pasture, cultivated crops, woody wetlands, emergent herbaceous wetlands, and barren land (Figure 5.2.3-1 and Table 5.2.3-2). Broad-scale vegetation cover patterns demonstrate that SA-04 occurs within areas dominated by the presence of cultivated crop cover classes.

Minnesota native plant community systems that occur within 0.5 mile of SA-04 include seven prairie, wetland, and forest communities; ranked as moderate to outstanding under the MBS Sites significance ranking (Figure 5.2.3-2). Specific locations for moderate to outstanding-ranked MBS Sites native plant communities relative to the location of SA-04 are shown in greater detail in Appendix A. Thirteen rare native plant communities (S1, S2, or S3 conservation rank) were documented within 0.5 mile of SA-04.

No old-growth forests and no HCVFs were identified within 0.5 mile of SA-04.

Table 5.2.3-5. Miles of System Alternative SA-04 within Levels III and IV Ecoregions

Level III[a]	Level IV[a]	Description[a]	Miles within Ecoregion
46. Northern Glaciated Plains	Tewaukon/Big Stone Stagnation Moraine	Gently undulating moraine field with mix of row crops, many small lakes, marshes, and potholes	39.0
47. Western Corn Belt Plains	Des Moines Lobe	Vast, fertile plain of deep soils dominated by row crops	140.5
	Eastern Iowa and Minnesota Drift Plains	Older till plain with mostly row crops and some pasture	177.2
	Rolling Loess Prairies	Loess-covered undulating plain with dissecting rivers and predominantly row crops	54.3
48. Lake Agassiz Plain	Beach Ridges and Sand Deltas	Low ridges of gravel and sand with mix of row crops, small grains, woodland, and wetlands	15.2
	Glacial Lake Agassiz Basin	Flat former lake bed dominated by row crops and grains	223.3
	Saline Area	Salt-affected soils from artesian groundwater flows. Areas of reduced crop productivity are used for range or wildlife habitat.	18.7

Table 5.2.3-5. Miles of System Alternative SA-04 within Levels III and IV Ecoregions

Level III[a]	Level IV[a]	Description[a]	Miles within Ecoregion
51. North Central Hardwood Forests	Big Woods	Rolling plain with some lakes, mostly row crops with pasture and suburban development; formerly extensive hardwood forest	3.9
54. Central Corn Belt Plains	Illinois/Indiana Prairies	Vast flat to rolling plains with fertile soils that developed under tallgrass prairies. Marshes and wet prairies naturally occurred in poorly drained areas, and forests grew on concentric moraines and floodplains.	71.3
	Rock River Hills	Agriculturally dominated, rolling hills, and undulating plains. Rugged areas are partly forested. Physiography is strongly influenced by the underlying limestone, dolomite, and sandstone.	1.4
	Sand Area	Disjunct, sandy outwash plains, sand plains, relict dunes; mix of natural vegetation, natural soil drainage properties, irrigation needs, and stream characteristics	31.7
72. Interior River Valleys and Hills	Upper Mississippi Alluvial Plain	Broad floodplains and low river terraces of the Mississippi River and its major tributaries above the Mississippi's confluence with the Missouri River, including much of the Illinois River	18.8
TOTAL			**795.4**

[a] Source: EPA 2016.

Notes:

Values in table may not sum to total due to rounding.

Transportation by Rail

New transport and loading facilities for the rail alternative would be located near Gretna, Canada, within the Lake Agassiz Plain ecoregion—in an area dominated by agricultural lands. Near Clearbrook, Minnesota, offloading facilities and a reactivated rail line would be located within the North Central Hardwoods ecoregion, in an area with a mix of developed land, forests, row crops, and pastures. Near Superior, Wisconsin, the offloading facilities would be located within the Northern Lakes and Forests ecoregion in an area with a mix of developed land, forests, and wetlands.

NLDC vegetation cover near the Clearbrook and Superior terminals where facilities likely would be developed includes a combination of primarily deciduous forest, evergreen forest, cultivated crops, and woody wetlands. Vegetation cover classes within the ROI for the rail alternative are as shown in Figure 5.2.3-1.

No Minnesota native plant communities occur near the potential locations for the offloading facility at the Clearbrook terminal. The new rail line between Clearbrook and Gully would cross just south of a forested area and a prairie ranked as moderate MBS Site native plant communities. No native plant communities were identified at the Superior terminal, although several Wisconsin threatened and

endangered plants occur near this location (Wisconsin DNR 2016a) (see Section 5.2.5). No old-growth forest stands or HCVFs occur near the Clearbrook terminal or along the new rail line.

Railroad rights-of-way, established prior to the widespread conversion of native prairies to croplands in the Prairie Parkland and Eastern Broadleaf Forest provinces, contain some of the last native prairie remnants in the region (Merchant and Biederman 1999). Of the approximately 332 miles of railroad rights-of-way that would most likely be used under this alternative that were evaluated in the Merchant and Biederman (1999) study, approximately 59 miles (18 percent) contain prairie remnants (Table 5.2.3-6). Mesic prairie was the most abundant type, and for all prairie remnants along the proposed routes, 14.5 miles (25 percent) were rated very good. Approximately 1.1 miles of native plant communities (S2 and S3) are crossed by the rail transportation route, most of which are prairies (Table 5.2.3-7). One aspen old-growth forest stand occurs along the southern rail route; one HCVF, Kertsonville Wildlife Management Area (WMA), is crossed by the northern rail route.

Table 5.2.3-6. Miles of Likely Rail Transportation Routes Through Prairie Remnants of Differing Quality

Prairie Type	Quality Rating[a]			
	Fair	Good	Very Good	TOTAL
Wet prairie	2.6	4.9	1.0	8.6
Wet-brush prairie	--	--	2.5	2.5
Mesic prairie	13.1	23.5	10.8	47.4
Dry prairie	--	--	0.2	0.2
TOTAL	**15.8**	**28.5**	**14.5**	**58.7**

Sources: Minnesota DNR 2017; Merchant and Biederman 1999.

[a] Fair: greater than 25% native grass cover, greater than 5% native forb cover, and less than 50% woody cover
Good: greater than 55% native grass cover, greater than 9% native forb cover, and less than 25% woody cover
Very Good: greater than 70% native grass cover, greater than 15% native forb cover, and less than 10% woody cover

Notes:

Values in table may not sum to subtotals and totals due to rounding.

"--" = no occurrence

Table 5.2.3-7. Miles of Likely Rail Transportation Routes Through Native Plant Communities

Native Plant Community	MBS Site Significance Rank[a]	Conservation Rank[b]	Miles
Dry sand – gravel prairie (northern)	Moderate	S2	<0.1
Mesic prairie (northern)	Below	S2	0.1
	Moderate	S2	0.1
	High	S2	0.6
Rich black spruce swamp (basin)	High	S3	0.2
Wet prairie (northern)	Outstanding	S3	<0.1
White pine – white spruce – paper birch forest	High	S2	<0.1
TOTAL			**1.1**

Sources: Minnesota DNR 2016a, 2016d.

[a] Systems occurring within Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites) are given these ranks (Minnesota only):
Outstanding = Sites containing the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes.
High = Sites containing very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes.
Moderate = Sites containing occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery.
Below = Sites below minimum biodiversity threshold for statewide significance. These sites lack occurrences of rare species or natural features or do not meet Minnesota Biological Survey standards for outstanding, high, or moderate rank.
(blank) = no corresponding Biodiversity Significance Rank;

[b] S1 = critically imperiled, S2 = imperiled, S3 = vulnerable to extirpation

Notes:

Values in table may not sum to total due to rounding.

Transportation by Truck

Transport and loading facilities for the truck alternative would be located near Gretna, Canada, within the Lake Agassiz Plain ecoregion, in an area dominated by agricultural lands. Near Clearbrook, Minnesota, the offloading facilities would be located within the North Central Hardwoods ecoregion in an area with a mix of developed, forest, row crops, and pasture. Near Superior, Wisconsin, the offloading facilities would be located within the Northern Lakes and Forests ecoregion in an area with mixed developed land, forests, and wetlands.

Vegetation cover near the Clearbrook and Superior terminals where facilities likely would be developed includes a combination of primarily deciduous forest, evergreen forest, cultivated crops, and woody wetlands. Vegetation cover classes within the ROI for the rail alternative are shown in Figure 5.2.3-1.

No Minnesota native plant communities occur near the potential locations for the offloading facility at the Clearbrook terminal. No native plant communities were identified near the potential locations for the offloading facility at the Superior terminal, although several Wisconsin threatened and endangered plants occur near this location (Wisconsin DNR 2016a) (see Section 5.2.5). No old-growth forest stands or HCVFs occur near the Clearbrook terminal.

No native plant communities are crossed by the truck routes. Four rare native plant communities occur next to the routes, including Northern Dry Sand-Gravel Prairie (S2, Chester 25); seepage meadow/Carr

(S3, McIntosh Channel Delta); tamarack seepage swamp (S3, McIntosh Channel Delta); and northern wet prairie (S3, Marcoux Corners). No old-growth forest stands or HCVFs are crossed by the truck routes, although the route passes just north of the Floodwood Bog HCVF.

Existing Line 3 Supplemented by Rail

Existing conditions for the existing Line 3 supplemented by rail are similar to those described above for continued use of the existing Line 3 pipeline and the rail alternative.

Existing Line 3 Supplemented by Truck

Existing conditions for the existing Line 3 supplemented by truck are similar to those described above for continued use of the existing Line 3 pipeline and the truck alternative.

5.2.3.3 Impact Assessment

This section describes the potential for impacts on vegetation resources from Project-related construction and operation actions. The potential effects on vegetation of the Applicant's proposed project and CN Alternatives are described below in terms of the following three vegetation parameters:

- Loss or alteration of vegetation cover,
- Loss or alteration of native plant communities, and
- Spread of noxious weeds and invasive plants.

The impact assessment integrates, for all alternatives, revegetation and reclamation commitments in the Applicant's Environmental Protection Plan (Appendix E), during, and upon completion of, construction of the entire respective pipeline rights-of-way. The plan includes a full compliment of BMPs and mitigation measures to protect soil resources, and conduct revegetation and monitoring activities.

5.2.3.3.1 Applicant's Proposed Project

Vegetation resources would be temporarily or permanently altered by construction and operations within the affected ecoregions, native and rare plant communities, and in terms of spread of noxious weed and invasive plant species, as discussed in the sections below.

Construction Impacts

<u>Loss or Alteration of Vegetation Cover</u>

Construction of the Applicant's proposed project would result in loss or alteration of up to 5,617 acres of existing vegetation during construction in North Dakota, Minnesota, and Wisconsin (Table 5.2.3-8). Sixty-three (63) percent of these impacts would occur within the Deciduous Forest and Cultivated Crops cover types. Affected vegetation cover classes are presented, by state, in Table 5.2.3-9. Estimated Impacts on Minnesota Native Plant Community Systems and MBS Sites from Applicant's Proposed Project are summarized in Table 5.2.3-10.

Table 5.2.3-8. Estimated Impacts on National Land Cover Database Vegetation Cover for the Applicant's Proposed Project (acres)

Vegetation Cover Class	Con[a]	Op[b]	ATWS	Access Roads	Pump Stations	MLVs	Total Construction[c]		Total Operation[c]	
							Acres	% of Total	Acres	% of Total
Evergreen forest	177	71	18	19	1	1	199	4	87	4
Deciduous forest	1,416	622	97	103	2	2	1,544	28	698	29
Mixed forest	20	8	1	2	<0.1	<0.1	21	4	11	0
Scrub/shrub	239	117	15	13	2	<0.1	256	5	131	5
Grassland/herbaceous	131	63	32	9	4	0	165	3	73	3
Hay/pasture	585	262	121	45	16	1	706	13	323	13
Cultivated crops	1,699	726	327	22	20	2	2,028	36	768	31
Woody wetlands	419	204	18	13	3	1	438	8	219	9
Emergent herbaceous wetlands	229	122	19	7	3	0	249	4	132	5
Barren land	4	2	8	1	<0.1	<0.1	12	0	2	0
TOTAL	**4,917**	**2,197**	**656**	**234**	**50**	**6**	**5,617**	**100**	**2,444**	**100**

Source: Homer et al. 2015.

[a] Minnesota: Con = Enbridge-provided construction work area, which includes 50-foot-wide permanent right-of-way; North Dakota and Wisconsin: Con = estimated construction impact area in acres based on 120-foot-wide construction footprint centered on route, which includes the 50-foot-wide permanent right-of-way

[b] Minnesota: Op = Enbridge-provided footprint of permanent right-of-way; North Dakota and Wisconsin: Op = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on route

[c] Total Construction = sum of pipeline construction work area, ATWS (additional temporary workspaces), including pipe yards, and temporary access roads; Total Operations = sum of pipeline permanent right-of-way, primary access roads, pump stations, and MLVs (mainline valves), including valve pads and driveways

Notes:

Values in table may not sum to subtotals and totals due to rounding.

Table 5.2.3-9. Estimated Impacts on National Land Cover Database Vegetation Cover by State for the Applicant's Proposed Project (acres)

Vegetation Cover Class	Con[a]	Op[b]	ATWS	Access Roads	Pump Stations	MLVs	Total Construction[c]		Total Operation[c]	
							Acres	% of Total	Acres	% of Total
North Dakota[a]										
Evergreen forest	1	0	--	--	--	--	1	0	0	0
Deciduous forest	2	1	--	--	--	--	2	0	1	0
Mixed forest	<0.1	<0.1	--	--	--	--	<0.1	0	<0.1	0
Scrub/shrub	<0.1	<0.1	--	--	--	--	<0.1	0	<0.1	0
Grassland/herbaceous	0	0	--	--	--	--	0	0	0	0
Hay/pasture	5	2	--	--	--	--	5	1	2	1
Cultivated crops	363	151	--	--	--	--	363	97	151	97
Woody wetlands	3	1	--	--	--	--	3	1	1	1
Emergent herbaceous wetlands	<0.1	<0.1	--	--	--	--	<0.1	0	<0.1	0
Barren land	<0.1	<0.1	--	--	--	--	<0.1	0	<0.1	0
Subtotal	***374***	***156***	***0***	***0***	***0***	***0***	***374***	***100***	***156***	***100***
Minnesota[b]										
Evergreen forest	176	71	18	19	1	1	198	4	86	4
Deciduous forest	1,349	594	97	103	2	2	1,477	29	670	30
Mixed forest	18	8	1	2	<0.1	<0.1	20	0	10	0
Scrub/shrub	226	112	15	13	2	<0.1	243	5	125	6
Grassland/herbaceous	130	62	32	9	4	0	164	3	73	3
Hay/pasture	577	259	121	45	16	1	699	14	320	14
Cultivated crops	1,336	575	327	22	20	2	1,665	33	617	28
Woody wetlands	336	170	18	13	3	1	355	7	185	8

Table 5.2.3-9. Estimated Impacts on National Land Cover Database Vegetation Cover by State for the Applicant's Proposed Project (acres)

Vegetation Cover Class	Con[a]	Op[b]	ATWS	Access Roads	Pump Stations	MLVs	Total Construction[c]		Total Operation[c]	
							Acres	% of Total	Acres	% of Total
Emergent herbaceous wetlands	229	122	19	7	3	0	249	5	132	6
Barren land	4	2	8	1	<0.1	<0.1	12	0	2	0
Subtotal	***4,380***	***1,973***	***656***	***234***	***50***	***6***	***5,081***	***100***	***2,220***	***100***
Wisconsin[a]										
Evergreen forest	1	0	--	--	--	--	1	0	0	1
Deciduous forest	65	28	--	--	--	--	65	1	28	40
Mixed forest	1	1	--	--	--	--	1	0	1	1
Scrub/shrub	13	6	--	--	--	--	13	0	6	8
Grassland/herbaceous	1	0	--	--	--	--	1	0	0	0
Hay/pasture	3	1	--	--	--	--	3	0	1	2
Cultivated crops	0	0	--	--	--	--	0	0	0	0
Woody wetlands	79	33	--	--	--	--	79	1	33	48
Emergent herbaceous wetlands	<0.1	<0.1	--	--	--	--	<0.1	0	<0.1	0
Barren land	<0.1	<0.1	--	--	--	--	<0.1	0	<0.1	0
Subtotal	***163***	***69***	***--***	***--***	***--***	***--***	***163***	***3***	***69***	***100***
TOTAL	**4,917**	**2,197**	**656**	**234**	**50**	**7**	**5,617**	**100**	**2,444**	**100**

Source: Homer et al. 2015.

[a] Minnesota: Con = Enbridge-provided construction work area, which includes 50-foot-wide permanent right-of-way; North Dakota and Wisconsin: Con = estimated construction impact area in acres based on 120-foot-wide construction footprint centered on route, which includes the 50-foot-wide permanent right-of-way

[b] Minnesota: Op = Enbridge-provided footprint of permanent right-of-way; North Dakota and Wisconsin: Op = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on route

[c] Total Construction = sum of pipeline construction work area, ATWS (additional temporary workspaces), including pipe yards, and temporary access roads; Total Operations = sum of pipeline permanent right-of-way, primary access roads, pump stations, and MLVs (mainline valves), including valve pads and driveways

"--" = no occurrence

Table 5.2.3-10. Estimated Impacts on Minnesota Native Plant Community Systems and MBS Sites from Applicant's Proposed Project, in Acres of Disturbance and Number of Respective Communities of Each Type Affected

Native Plant Community System	MBS Site Significance Rank[a]	Construction[b]		Operations[c]		Facilities				Totals[d]				Within 0.5 Mile	
						Construction		Operations		Construction		Operations			
		Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.
Acid peatland system	High	2.4	3	1.2	3	--	--	--	--	2.4	3	1.2	3	340	23
Complex community	High	--	--	--	--	--	--	--	--	--	--	--	--	135	7
	Moderate	5.8	2	3.1	2	--	--	--	--	5.8	2	3.1	2	288	5
Fire-dependent forest/woodland system	Outstanding	--	--	--	--	--	--	1.5	2	<0.1	<0.1	1.5	2	267	32
	High	--	--	--	--	0.3	1	--	--	0.3	1	--	--	277	24
	Moderate	28.7	9	13.7	9	3.5	19	3.5	6	32.2	28	17.2	15	1,817	59
Forested rich peatland system	Outstanding	3.5	2	1.8	2	--	--	--	--	3.5	2	1.8	2	27	1
	High	17.6	6	9	6	--	--	1	2	18	6	10	8	650	32
	Moderate	4.9	5	4.6	5	0.1	1	--	--	5.0	6	4.6	5	442	19
Marsh system	Outstanding	--	--	--	--	--	--	--	--	--	--	--	--	197	29
	Moderate	--	--	--	--	--	--	--	--	--	--	--	--	<0.1	1
Mesic hardwood forest system	Outstanding	--	--	--	--	--	--	--	--	--	--	--	--	129	30
	High	9.0	7	4.0	7	0.2	2	--	--	9.2	9	4.0	7	566	30
	Moderate	42.7	7	19.0	7	12.0	37	2.1	5	54.7	44	21.1	12	1,394	28
Open rich peatland system	Outstanding	--	--	--	--	--	--	--	--	--	--	--	--	49.5	3
	High	--	--	--	--	--	--	--	--	--	--	--	--	7.1	1
	Moderate	5.5	7	4.3	7	<0.1	3	--	--	5.5	10	4.3	7	515	16
Upland prairie system	Outstanding	--	--	--	--	--	--	--	--	--	--	--	--	37	6
	High	--	--	--	--	--	--	--	--	--	--	--	--	93	3
	Moderate	1.7	1	0.7	1	0.3	1	--	--	2.0	2	0.7	1	44	1

Table 5.2.3-10. Estimated Impacts on Minnesota Native Plant Community Systems and MBS Sites from Applicant's Proposed Project, in Acres of Disturbance and Number of Respective Communities of Each Type Affected

Native Plant Community System	MBS Site Significance Rank[a]	Construction[b]		Operations[c]		Facilities				Totals[d]				Within 0.5 Mile	
						Construction		Operations		Construction		Operations			
		Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.
Wet forest system	Outstanding	--	--	--	--	--	--	--	--	--	--	--	--	52	11
	High	6.2	4	2.8	4	0.6	3	--	--	6.8	7	2.8	4	206	18
	Moderate	2.8	3	1.9	3	0.1	1	--	--	2.9	4	1.9	3	207	8
Wet meadow/Carr system	Outstanding	--	--	--	--	--	--	0	1	--	--	0	1	35	35
	High	0.5	1	0.3	1	10.5	11	--	--	11.0	12	0.3	1	177	19
	Moderate	4.7	16	4.1	11	--	--	--	--	4.7	16	4.1	11	765	106
Wetland prairie system	High	--	--	--	--	--	--	--	--	--	--	--	--	164	8
Total		**135.9**	**73**	**70.5**	**68**	**27.7**	**79**	**7.9**	**16**	**163.6**	**152**	**78.4**	**84**	**8,881**	**555**

Sources: Minnesota DNR 2016a, 2016d.

[a] Refer to Note [a] in Table 5.2.3-6

[b] Minnesota: Con = Enbridge-provided construction work area, which includes 50-foot-wide permanent right-of-way; North Dakota and Wisconsin: Con = estimated construction impact area in acres based on 120-foot-wide construction footprint centered on route, which includes the 50-foot-wide permanent right-of-way

[c] Minnesota: Op = Enbridge-provided footprint of permanent right-of-way; North Dakota and Wisconsin: Op = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on route

[d] Total: Construction = sum of pipeline construction work area, ATWS (additional temporary workspaces), including pipe yards, and temporary access roads; Operations = sum of pipeline permanent right-of-way, primary access roads, pump stations, and MLVs (mainline valves), including valve pads and driveways)

Notes:

Values in table may not sum to subtotals and totals due to rounding.

"--" = no occurrence

Direct impacts on vegetation resources in these cover classes would result from vegetation removal during grading, trenching, and backfilling during pipeline construction. Further discussion regarding impacts on soils and measures to reduce the extent and duration of impacts on soils is found in Section 5.2.2. Construction within existing vegetation communities also would result in a short-term reduction in wildlife habitat and forage productivity in and near the active construction areas, as discussed in Section 5.2.4.

Construction impacts on shrubs and grassland cover classes (scrub/shrub, grassland/herbaceous, and emergent herbaceous wetlands), approximately 8 percent of the total vegetation disturbance, would be short- to long-term and minor, as these vegetation cover types would regenerate over time with integration of measures specificed in Appendix E. Herbaceous cover would be seeded on disturbed areas following completion of pipeline construction, and it is expected that preexisting herbaceous and shrub habitats would quickly become reestablished within several years following construction. Scrub/shrub cover, dominated by low woody cover and emergent wetlands, may require a longer time to establish cover similar to adjacent undisturbed lands when drought or the presence of livestock interfere with vegetation regrowth. Rapid colonization by annual and perennial herbaceous plants within the disturbed areas generally would restore most herbaceous groundcover within the first growing season; however, perennial herbaceous cover may require a longer time to establish cover similar to adjacent undisturbed lands when drought or the presence of livestock interfere with vegetation regrowth.

Pipeline construction impacts on the 49 percent of the total anticipated vegetation disturbance that supports hay/ pasture and cultivated crops would also be short-term and minor, with impacts typically limited to a single growing season. Impacts on hay pastures, rotated croplands, and open grassland range would be short- to long-term and minor, with vegetation reestablishing within several years following construction. Until reestablished, these vegetation cover classes would not be able to stabilize soils, provide mechanical filtration and energy dissipation during precipitation events, and provide wildlife habitat for cover and foraging. Short-term loss of these functions is of concern during the first one or two growing seasons, particularly along slopes where the potential for erosion from stormwater runoff and other areas prone to erosion exist.

Long-term or permanent major construction impacts would occur on approximately 2,451 acres (44 percent of the total) of forested upland and wetland vegetation (Table 5.2.3-8). Clearing trees within forested cover classes, including evergreen forest, deciduous forest, mixed forest, and woody wetland, would result in long-term and major impacts because these vegetation cover classes generally would require over a decade to regenerate outside the permanent right-of-way. After construction, all temporary construction work areas would be seeded with herbaceous species; previously forested areas would be allowed to revegetate naturally with trees and shrubs common to the area. Following construction, forested areas within the temporary construction work areas would return to forested vegetation type over time (up to 50 years for full recovery for some forest types). Revegetation in areas of jurisdictional wetlands may also be subject to additional mitigation measures (Section 5.2.1.3) that may hasten reestablishment and increase diversity of native plants in these areas.

Clearing trees within the construction work area would cause short-term and minor indirect impacts in adjacent forested areas by affecting interior forest vegetation along the edges of the construction work areas. By exposing adjacent trees to elevated levels of sunlight, wind, and evaporation rates, the probability of tree knockdown could increase, resulting in potential alteration of adjacent forest stands. Because of increased light levels penetrating the previously shaded interior, shade-intolerant species would be able to grow, and the native plant community composition within these forest edge habitats

likely would change. Clearing also could temporarily reduce local competition for available soil moisture and light, and may allow some early successional species to become established and persist on the edge of the undisturbed areas adjacent to the right-of-way.

Loss or Alteration of Native Plant Communities

Eleven Minnesota native plant community systems and 19 rare native plant communities were identified within 0.5 mile of the Applicant's proposed project (Table 5.2.3-10 and Table 5.2.3-11, respectively). Long-term to permanent major impacts on 164 acres (152 occurrences), representing the eleven plant community systems, would occur during construction due to a loss by surface disturbance of native plant community habitat. This would include approximately 3.6 acres within outstanding-ranked MBS Sites, 47.7 acres within high-ranked MBS Sites, and 113 acres within moderate-ranked MBS Sites that would be subject to direct disturbance during construction (Table 5.2.3-10). Construction activities occurring within native plant communities would decrease the size of the communities and could fragment the communities where they are crossed. Some local native plant communities may reestablish over time following revegetation activities; however, it is expected that the quality and diversity of these communities would be lower than current conditions. Specific locations for moderate to outstanding-ranked MBS Site native plant communities relative to the location of the Applicant's proposed project are shown in greater detail in Appendix A.

Nineteen rare native plant communities occur within 0.5 mile of the Applicant's proposed project, six of which occur within the construction footprint on 46 acres (43 occurrences). This includes 45.5 acres of S1, S2, and S3 ranked rare native plant communities in 39 occurrences (Table 5.2.3-11). These six communities would be subject to direct disturbance, resulting in long-term to permanent major impacts, and are not expected to fully recover following reclamation. Following ground disturbing construction activities, all disturbed areas would be recontoured and revegetated according to existing vegetation management plans, including Appendix E, Applicant Environmental Protection Plan and agency approvals (such as a fen management plan) for work in and near rare native plant communities. In some circumstances, partial recovery may occur; however it is expected that the quality and diversity of these communities would be permanently reduced or completely removed following project construction within the right-of-way. Construction also would decrease the habitat available to the rare plant species that depend on the native plant communities.

Permanent and major impacts on rare native wetland plant communities and complexes could include potential permanent loss of sensitive plant species, alteration of hydrology, introduction of contaminants, introduction of aquatic invasive plants, and altered peat formation. For jurisdiction wetlands, as waters of the U.S., these impacts would require mitigation through appropriate required federal and state permits. Impacts on forested rare native plant communities include loss of trees, potential loss of old-growth stands, and fragmentation of forest patches leading to invasion by grasses and non-native plants that may prevent succession to the original native forest community. Construction impacts would be considered long-term to permanent and major because mature forests would require decades to reestablish.

Long-term and major impacts on native prairie communities include the potential for alteration of prairie soils, loss of sensitive plant communities, and introduction of invasive plants. Direct impacts on untilled prairie soils and vegetation during construction are expected to be long-term and could require a significant amount of time to achieve full recovery, if at all.

Table 5.2.3-11. Estimated Impacts on Rare Native Plant Communities and MBS Sites for the Applicant's Proposed Project

Native Plant Community	MBS Site Significance Rank[a]	Conservation Rank[b]	Construction[c]		Operations[d]		Facilities				Total Impacts[e]				Within 0.5 Mile of Route	
							Construction		Operations		Construction		Operations			
			Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.
Minnesota																
Alder – (red currant – meadow-rue) swamp	Outstanding	S3	--	--	--	--	--	--	--	--	--	--	--	--	2	2
	Not Ranked	S3	--	--	--	--	--	--	--	--	--	--	--	--	<0.1	1
Black ash – (red maple) seepage swamp	High	S1S2	5.1	2	2.4	2	0.6	3	--	--	5.7	5	2.4	2	66	5
Calcareous fen (northwestern)	High	S2	--	--	--	--	--	--	--	--	--	--	--	--	7	1
Graminoid poor fen (basin)	High	S3	--	--	--	--	--	--	--	--	--	--	--	--	12	3
Jack pine – (bush honeysuckle) woodland	Moderate	S1 or S3	10.3	5	5.4	5	1.4	5	2.3	4	11.7	10	7.7	9	715	22
Jack pine – (bush honeysuckle) woodland, bracken subtype	High	S1	--	--	--	--	0.3	1	--	--	0.3	1	--	--	68	2
Jack pine – (yarrow) woodland	High	S1S2	--	--	--	--	--	--	--	--	--	--	--	--	30	1
Mesic brush-prairie (northern)	Outstanding	S2	--	--	--	--	--	--	--	--	--	--	--	--	33	4
	High	S2	--	--	--	--	--	--	--	--	--	--	--	--	93	3
Mesic prairie (northern)	Outstanding	S2	--	--	--	--	--	--	--	--	--	--	--	--	4	2
	Moderate	S2	1.7	1	0.7	1	0.3	1	--	--	2.0	2	0.7	1	44	1

Table 5.2.3-11. Estimated Impacts on Rare Native Plant Communities and MBS Sites for the Applicant's Proposed Project

Native Plant Community	MBS Site Significance Rank[a]	Conservation Rank[b]	Construction[c]		Operations[d]		Facilities				Total Impacts[e]				Within 0.5 Mile of Route	
							Construction		Operations		Construction		Operations			
			Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.
Oak – aspen forest	Outstanding	S3	--	--	--	--	--	--	0.8	1	--	--	0.8	1	128	15
	High	S3	--	--	--	--	--	--	--	--	--	--	--	--	88	2
	Moderate	S3	16.4	3	7.2	3	1.6	9	1.2	2	18.0	12	8.4	5	1,024	34
	Below	S3	6.3	1	2.6	1	0.9	4	<0.1	1	7.2	5	2.6	2	60	1
	Not Ranked	S3	--	--	--	--	--	--	--	--	--	--	--	--	0	2
Red pine – white pine forest	Outstanding	S2	--	--	--	--	--	--	0.7	1	--	--	0.7	1	5	1
	High	S2	--	--	--	--	--	--	--	--	--	--	--	--	50	13
	Moderate	S2	--	--	--	--	--	--	--	--	--	--	--	--	44	1
Red pine – white pine woodland, balsam fir subtype	High	S3	--	--	--	--	--	--	--	--	--	--	--	--	23	3
Red pine – white pine woodland, mountain maple subtype	High	S3	--	--	--	--	--	--	--	--	--	--	--	--	10	2
Spikerush – bur reed marsh (northern)	Outstanding	S2	--	--	--	--	--	--	--	--	--	--	--	--	13	23
	Moderate	S2	--	--	--	--	--	--	--	--	--	--	--	--	0	1
	Not Ranked	S2	--	--	--	--	--	--	--	--	--	--	--	--	0	7
Sugar maple – basswood – (bluebead lily) forest	High	S3	--	--	--	--	--	--	--	--	--	--	--	--	98	2
Tamarack seepage swamp (aspen parkland)	Outstanding	S3	--	--	--	--	--	--	--	--	--	--	--	--	27.0	1
	Moderate	S3	--	--	--	--	--	--	--	--	--	--	--	--	10.1	1

Table 5.2.3-11. Estimated Impacts on Rare Native Plant Communities and MBS Sites for the Applicant's Proposed Project

Native Plant Community	MBS Site Significance Rank[a]	Conservation Rank[b]	Construction[c]		Operations[d]		Facilities				Total Impacts[e]				Within 0.5 Mile of Route	
							Construction		Operations		Construction		Operations			
			Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.
Wet-brush prairie (northern)	High	S3	--	--	--	--	--	--	--	--	--	--	--	--	65	5
Wet prairie (northern)	High	S3	--	--	--	--	--	--	--	--	--	--	--	--	100	3
White pine – white spruce – paper birch forest	High	S2	0.6	3	0.3	3	<0.1	1	--	--	0.6	4	0.3	3	60	9
Minnesota subtotal			***40***	***15***	***19***	***15***	***5***	***24***	***5***	***9***	***46***	***39***	***24***	***24***	***2,878***	***173***

Sources: Minnesota DNR 2016a, 2016d; North Dakota PR 2016; Wisconsin DNR 2016a.

[a] Refer to Note [a] in Table 5.2.3-6

[b] Conservation status rank denotes rarity of S1 = critically imperiled, S2 = imperiled, S3 = vulnerable to extirpation; some ranks encompass ranges (ex: S1S2, S1 or S3), CMX = community complex

[c, d, e] Refer to Notes of Table 5.2.3-9

Notes:

Values in table may not sum to subtotals and totals due to rounding.

No occurrences of rare native plant communities are listed for North Dakota or Wisconsin.

"--" = no occurrence

In addition to direct effects in the construction footprint, construction activities could result in negligible to short-term minor impacts on native plant communities adjacent to the construction work area. Potential impacts caused by surface runoff from the construction work area include increased sedimentation and the introduction or spread of invasive species. Sedimentation can affect surrounding uplands or wetlands, as well as waterways in the vicinity of the construction. While these impacts could occur, the Applicant would implement construction procedures to control runoff through use of a variety of sediment control barriers and procedures aimed at minimization or reduction of impacts on adjacent habitats. Noxious weed and invasive plant management and control would be implemented during construction and operations in an effort to minimize the effect of noxious weeds on adjacent habitats.

Although three old-growth forest stands and one HCVF, Kettle Lake Peatlands, were identified within 0.5 mile of the Applicant's proposed project, no construction would occur within these forests. All temporary construction areas (ATWS, access roads, and yards) avoid these forests, and no direct construction impacts would occur. Potential Indirect impacts include the spread of noxious weeds and invasive plants and potential removal of contiguous forest areas that serve as protective buffers.

Spread of Noxious Weeds and Invasive Plants

Fourteen weed species listed by respective State Noxious Weed Acts (Table 5.2.3-1), and 18 other invasive plant species, occur near or within the Applicant's proposed project (Table 5.2.3-3).

Disturbed soil in cleared work areas would be susceptible to invasion by noxious weeds and invasive plants that already occur in the vicinity. Establishment of these species often inhibit regeneration of native vegetation. Impacts associated with invasion of noxious weeds are difficult to quantify; however, impacts likely would be short-term and minor, as noxious weeds and invasive plant management measures would be in place during and after construction, as identified in the Applicant's Environmental Protection Plan (Appendix E). This plan details noxious weed and invasive plant control measures for construction, and management of noxious weeds and invasive species for the operational life of the pipeline. The Project would be required to manage all noxious weeds (including those not identified in Table 5.2.3-3) for which federal, state, or local (county or city) agency management policies or regulations exist. Measures to ensure that the spread of weeds is minimized include equipment cleaning, use of weed-free mulch, and use of weed-free seed mix.

Operations Impacts

Loss or Alteration of Vegetation Cover

Permanent major impacts would occur from operation of the project from the loss of 291 acres of existing vegetation that would be converted to aboveground facilities (pump stations and MLV sites) and access roads for the life of the Project (Table 5.2.3-9).

In addition, the Applicant's proposed project would be require vegetation management, including periodic mowing, brush clearing, tree cutting, and pipeline inspections that would occur for the life of the Project. Short-term and negligible to minor impacts would occur within the affected vegetation cover classes as a result of routine vegetation management. Maintenance requiring pipeline inspection would result in short-term minor impacts on existing vegetation because measures would be implemented to avoid impacts on vegetation and the disturbed areas would revegetated following construction.

Approximately 1,091 acres of forested and woody wetland vegetation communities within the operational footprint would be subject to routine vegetation management. This represents a permanent major impact to these vegetation cover classes, as these forested communities would be effectively converted to other vegetation cover types for the life of the Project, as described above.

Loss or Alteration of Native Plant Communities

Approximately 78 acres of native plant communities occurs within the operations right-of-way (Table 5.2.3-10). Upon inception of operations activities, these areas will have been previously been disturbed by construction and revegetation actions. These represent nine native plant community systems, including 3.3 acres of communities ranked as Outstanding, 18.3 acres of communities ranked as High, and 57 acres of acres of communities ranked as Moderate, prior to construction activities. Short-term minor impacts on remaining components of these native plant communities could occur during routine management and pipeline maintenance requiring visual inspections. These maintenance activities would be generally limited in duration.

Six rare native plant communities occur within the permanent right-of-way of the Applicant's Proposed Project. Maintenance work would incur short-term to minor impacts on 24 acres of rare plant communities previously disturbed by construction activities. This includes 10 acres of S1 rank and 2 acres of S2 rank rare native plant communities (Table 5.2.3-11).

Following operations maintenance activities that required ground disturbance, all disturbed areas would be recontoured and reclaimed, and then revegetated according to existing vegetation management plans and agency approvals (such as a fen management plan) for work in and near rare native plant communities.

Spread of Noxious Weeds and Invasive Plants

For the life of the Project, surface disturbance and vehicle access during maintenance activities would continue to provide an opportunity for noxious weeds and invasive species to spread. Permanent minor impacts are expected to occur as a result of noxious weed and invasive plant infestations in some areas during operation. The noxious weed and invasive plant occurrence information provided in this analysis did not identify all noxious weed or invasive species known or documented within the region; however, routine vegetation maintenance along the permanent right-of-way may include treatment/mitigation or similar measures of mechanical or chemical management of undesirable species once they are identified. The Environmental Protection Plan (Appendix E) details control measures for noxious weeds and invasive plants for the Project. The Project would be required to manage all noxious weeds for which federal, state, or local (county or city) agency management policies or regulations exist, including but not limited to, those identified in Table 5.2.3-3. Measures implemented to ensure that the spread of weeds is minimized may include equipment cleaning, use of weed-free mulch, use of weed-free seed mix during site restoration, and ensuring that noxious weed and invasive plant species management is a continued commitment during operations involving vegetation management activities.

5.2.3.3.2 Continued Use of Existing Line 3

Construction Impacts

Because the pipeline is already constructed, there would be no impacts on vegetation cover, native plant communities, or contributing to the spread of noxious weeds and invasive plants from the continued use of the existing Line 3 pipeline.

Operations Impacts

Operations impact to vegetation resources from use of the existing Line 3 pipeline would remain the same as under current conditions. The current areas of each NLCD vegetation cover class affected by the existing Line 3 pipeline are summarized in Table 5.2.3-12. Operations activities are similar to those discussed above for the Applicant's proposed project. Existing Line 3 pipeline impacts are summarized for each vegetation parameter in the following sections.

Table 5.2.3-12. Estimated Operations Impacts on Vegetation Cover for the Existing Line 3 Pipeline

Vegetation Cover Class	Operations Impacts[a] (acres)
Evergreen forest	39
Deciduous forest	245
Mixed forest	29
Scrub/shrub	96
Grassland/herbaceous	125
Hay/pasture	175
Cultivated crops	673
Woody wetlands	281
Emergent herbaceous wetlands	181
Barren land	3
TOTAL	**1,847**

Source: Homer et al. 2015.

[a] The estimate is based on total acres for the Applicant's proposed project and route alternative RA-07 along the Enbridge Mainline.

Notes:

Values in table may not sum to subtotals and totals due to rounding.

Loss or Alteration of Vegetation Cover

Current Line 3 operations include vegetation management; therefore, there would be no new operations impacts from vegetation management that would result from continued use of the existing Line 3. Vegetation management within the permanent right-of-way includes periodic mowing and brush clearing about every 3 to 5 years to ensure safe operation and allow for visual inspection of the permanent right-of-way. Continued use of Line 3 at its present capacity would require high levels of pipeline maintenance, with an estimated average of 267 repair or replacement procedures needed per year over the next 15 years (see Section 4.2.1 for more detail). Pipeline integrity digs require opening a trench over the pipeline with excavation equipment. Excavation and repair or replacement activities would remove vegetation cover and disturb soils similar to new pipeline construction, but excavations would be over a smaller area and would occur within the permanent right-of-way. The area of excavations are unknown, but likely would result in short- to long-term and minor to major impacts on the vegetation cover classes listed in Table 5.2.3-12.

Loss or Alteration of Native Plant Communities

No new operation impacts on Minnesota native plant communities from vegetation management would result from continued use of the existing Line 3. Long-term and major impacts on rare native plant communities that persist within the permanent right-of-way could occur during pipeline repair or replacement. Excavation and repair or replacement activities could affect nine native plant communities covering approximately 11 acres within the permanent right-of-way (Table 5.2.3-13). The areas of future excavations are unknown but could result in long-term and major impacts if excavation is required within the small area of native plant communities remaining in the permanent right-of-way.

Table 5.2.3-13. Estimated Operations Impacts on Minnesota Native Plant Community Systems for the Existing Line 3 Pipeline

Native Plant Community System	MBS Site Significance Rank	Acres[a]	No.[a]
Acid peatland system	High	3.4	1
Complex community	Moderate	3.1	2
Fire-dependent forest/woodland system	Moderate	1.1	1
Forested rich peatland system	High	0.3	1
Marsh system	Outstanding	1.8	2
Mesic hardwood forest system	High	<0.1	1
Upland prairie system	Moderate	0.7	1
TOTAL		**10.5**	**9**

Sources: Minnesota DNR 2016a, 2016d.

[a] Estimate based on totals for the Applicant's proposed project for the segment from the North Dakota border to Clearbrook, plus RA-07 from Clearbrook to Carlton along the Enbridge Mainline. No native plant communities would be crossed within the segment from Carlton to the Wisconsin border.

Notes:

Values in table may not sum to subtotals and totals due to rounding.

According to the Minnesota native plant community database, no rare native plant communities persist along the existing Line 3 pipeline between Clearbrook and Carlton (Minnesota DNR 2016d). Less than 1 acre of rare (S2 rank) northern mesic prairie occurs along the Line 3 route between the North Dakota border and Clearbrook, which could be affected by pipeline repair or replacement activities. The area of future excavations are unknown but could result in short-term and minor impacts if excavation is required within the one previously disturbed rare plant community remaining within the permanent right-of-way. One old-growth forest stand is located adjacent to the existing Line 3 right-of-way; no HCVFs are located within 0.5 mile of the existing Line 3 permanent right-of-way. These special-status forests would not be affected by continued use of Line 3.

Spread of Noxious Weeds and Invasive Plants

The opportunity for noxious weeds and invasive species to spread would be increased with continued use of the existing Line 3, facilitated by the frequent excavations for pipeline repair and replacement. Permanent minor impacts are expected to occur as a result of noxious weed and invasive plant infestations during operation.

5.2.3.3.3 System Alternative SA-04

Construction Impacts

The types of impacts vegetation resources associated with construction of SA-04 would be similar to impacts discussed above for the Applicant's proposed project.

Loss or Alteration of Vegetation Cover

Approximately 95 percent of SA-04 is located in areas dominated by agricultural land (Table 5.2.3-5). The total acreages of vegetation cover types that would be affected by construction of SA-04 are summarized in Table 5.2.3-14 and presented by state in Table 5.2.3-15. The exact descriptions for, and detailed layouts of, permanent surface facilities have not been developed for this alternative; however, it is expected that a small percentage of vegetation cover classes (assumed to be largely cropland due to its dominance within this route) would be permanently converted to surface facilities to support pipeline operations.

Table 5.2.3-14. Estimated Impacts on Vegetation Cover for System Alternative SA-04

Vegetation Cover Class	Construction Work Area[a]		Permanent Right-of-Way[b]		Within 0.5 Mile[c]	
	Acres	%	Acres	%	Acres	%
Evergreen forest	9	0%	0	0	150	0
Deciduous forest	98	1%	41	1	7,207	2
Mixed forest	<0.1	0%	<0.1	0	29	0
Scrub/shrub	<0.1	0%	<0.1	0	33	0
Grassland/herbaceous	181	2%	76	2	8,010	2
Hay/pasture	100	1%	41	1	6,642	1
Cultivated crops	10,217	95%	4,266	95	Evergreen forest	93
Woody wetlands	54	0%	23	1	4,431	1
Emergent herbaceous wetlands	85	1%	35	1	5,735	1
Barren land	20	0%	9	0	672	0
TOTAL	**10,765**	**100%**	**4,490**	**100**	**462,357**	**100**

Source: Homer et al. 2015.

[a] Based on 120-foot-wide construction work area centered on the pipeline route.

[b] Based on a 50-foot-wide operations right-of-way centered on the pipeline alignment.

[c] Within 0.5 mile of the pipeline route.

Table 5.2.3-15. Estimated Impacts on Vegetation Cover by State for System Alternative SA-04

Vegetation Cover Class	Construction Work Area[a]		Permanent Right-of-Way[b]		Within 0.5 Mile[c]	
	Acres	%	Acres	%	Acres	%
North Dakota						
Evergreen forest	1	0%	0	0	52	0
Deciduous forest	23	1%	10	1	995	1
Mixed forest	<0.1	0%	<0.1	0	<0.1	0
Scrub/shrub	<0.1	0%	<0.1	0	<0.1	0
Grassland/herbaceous	5	0%	2	0	144	0
Hay/pasture	10	0%	4	0	624	0
Cultivated crops	2,957	98%	1,239	98	125,930	98
Woody wetlands	17	1%	8	1	1,056	%
Emergent herbaceous wetlands	9	0%	4	0	339	0
Barren land	<0.1	0%	<0.1	0	18	0
North Dakota subtotal	***3,022***	***100%***	***1,267***	***100***	***129,158***	***100***
Minnesota						
Evergreen forest	<0.1	0%	<0.1	0	0	0
Deciduous forest	8	0%	3	0	1,974	1
Mixed forest	<0.1	0%	<0.1	0	<0.1	0
Scrub/shrub	<0.1	0%	<0.1	0	5	0
Grassland/herbaceous	36	1%	15	1	2,442	2
Hay/pasture	19	1%	8	1	1,466	1
Cultivated crops	3,328	96%	1,388	96	138,013	92
Woody wetlands	10	0%	4	0	972	1
Emergent herbaceous wetlands	64	2%	26	2	4,875	3
Barren land	17	0%	7	0	558	0
Minnesota subtotal	***3,482***	***100%***	***1,451***	***100***	***150,306***	***100***
Iowa						
Evergreen forest	8	0%	3	0	44	0
Deciduous forest	10	0%	4	0	1,253	1
Mixed forest	<0.1	0%	<0.1	0	<0.1	0
Scrub/shrub	<0.1	0%	<0.1	0	<0.1	0
Grassland/herbaceous	103	4%	43	4	4,570	4
Hay/pasture	39	1%	16	1	2,879	3
Cultivated crops	2,429	93%	1,012	93	101,765	91

Table 5.2.3-15. Estimated Impacts on Vegetation Cover by State for System Alternative SA-04

Vegetation Cover Class	Construction Work Area[a]		Permanent Right-of-Way[b]		Within 0.5 Mile[c]	
	Acres	%	Acres	%	Acres	%
Woody wetlands	14	1%	6	1	1,284	1
Emergent herbaceous wetlands	11	0%	5	0	468	0
Barren land	3	0%	1	0	64	0
Iowa subtotal	***2,616***	***100%***	***1,090***	***100***	***112,326***	***100***
Illinois						
Evergreen forest	<0.1	0%	<0.1	0	54	0
Deciduous forest	60	4%	25	4	2,985	4
Mixed forest	<0.1	0%	<0.1	0	29	0
Scrub/shrub	<0.1	0%	<0.1	0	27	0
Grassland/herbaceous	37	2%	16	2	855	1
Hay/pasture	33	2%	13	2	1,664	2
Cultivated crops	1,503	91%	626	91	63,528	90
Woody wetlands	13	1%	5	1	1,119	2
Emergent herbaceous wetlands	<0.1	0%	<0.1	0	54	0
Barren land	<0.1	0%	<0.1	0	32	0
Illinois subtotal	***1,645***	***100%***	***686***	***100***	***70,345***	***100***
TOTAL	**10,765**	**100%**	**4,494**	**100**	**462,136**	**100**

Source: Homer et al. 2015.

[a] Based on 120-foot-wide construction work area centered on the pipeline route

[b] Based on a 50-foot-wide operations right-of-way centered on the pipeline alignment

[c] Within 0.5 mile of the pipeline route

Agricultural lands, including cultivated crops and hay/pasture vegetation cover types, occupy 10,318 acres of the vegetation cover within the construction footprint for SA-04. Pipeline construction impacts on cultivated croplands would be short-term and minor, with impacts typically limited to a single growing season. Impacts on hay pastures, rotated croplands, and open grassland range would be short- to long-term and minor, with vegetation reestablishing within several years following construction.

Approximately 265 acres (2 percent) of the construction footprint for SA-04 consists of grassland/herbaceous and emergent herbaceous wetlands vegetation cover. Construction impacts on shrub and grassland cover classes (scrub/shrub, grassland/herbaceous, and emergent herbaceous wetlands) would be short- to long-term and minor, as these vegetation cover types would regenerate over time. Herbaceous cover would be seeded on disturbed areas following completion of pipeline construction, and it is expected that preexisting herbaceous and shrub habitats would quickly become reestablished within several years following construction. Scrub/shrub, dominated by low woody cover

and emergent wetlands, may require a longer time to establish cover similar to adjacent undisturbed lands when drought or the presence of livestock interfere with vegetation regrowth.

Approximately 161 acres (less than 1 percent) of the construction footprint for SA-04 consists of forested vegetation cover. Clearing trees within forested cover classes, including evergreen forest, deciduous forest, mixed forest, and woody wetland, would result in long-term and major impacts because these vegetation cover classes generally require over a decade to regenerate outside the permanent right-of-way and may take up to 50 years for full recovery following construction. Clearing trees within the construction work area would cause short-term, minor indirect impacts in adjacent forested areas from effects on interior forest vegetation along the edges of the construction areas (see Section 5.2.3.3.1).

Loss or Alteration of Native Plant Communities

Seven Minnesota native plant community systems occur within 0.5 mile of SA-04. Construction would result in long-term to permanent major impacts on approximately 3.6 acres of three Minnesota native plant community systems. This would result in a loss of native plant community habitat in these locations. All native plant community systems identified within the SA-04 construction footprint fall within MBS Sites with a moderate rank, excepting less than an acre of high-quality ranked Upland Prairie System (Table 5.2.3-16).

Table 5.2.3-16. Estimated Impacts on Minnesota Native Plant Community Systems for System Alternative SA-04

Native Plant Community System	MBS Site Biodiversity Significance Rank	Construction Work Area[a]		Permanent Right-of-Way[b]		Within 0.5 Mile[c]	
		Acres	No.	Acres	No.	Acres	No.
Complex community	Outstanding	--	--	--	--	109	1
Floodplain Forest System	Outstanding	--	--	--	--	16	2
	Moderate	1.0	2	0.4	2	260	5
Mesic Hardwood Forest System	Outstanding	--	--	--	--	57	3
	High	--	--	--	--	102	4
	Moderate	1.1	3	0.4	3	211	6
Open Rich Peatland System	Outstanding	--	--	--	--	1	1
Upland Prairie System	Outstanding	--	--	--	--	3	4
	High	<0.1	1	--	--	173	22
	Moderate	1.5	2	0.6	2	64	11
Wet Meadow/Carr System	Outstanding	--	--	--	--	7	1
Wetland Prairie System	High	--	--	--	--	11	1
	Moderate	--	--	--	--	4	2
TOTAL		**3.6**	**8**	**1.4**	**7**	**1,019**	**63**

Sources: Minnesota DNR 2016a, 2016d.

[a] Based on 120-foot-wide construction work area centered on the pipeline route

[b] Based on a 50-foot-wide operations right-of-way centered on the pipeline alignment

[c] Within 0.5 mile of the pipeline route

"—" = no occurrence

Thirteen rare native plant communities occur within 0.5 mile of SA-04; of these, three occur within the construction work area and two within the permanent right-of-way. Pipeline construction would cause permanent major impacts on a total of 2 acres (five occurrences) of rare native plant communities, resulting in a loss of rare native plant community habitat in these locations. This includes approximately 2 acres of S2 rank and 0.3 acre of S3 rank rare native plant communities (Table 5.2.3-17).

Table 5.2.3-17. Estimated Impacts on Rare Native Plant Communities for System Alternative SA-04

Native Plant Community	MBS Site Significance Rank	Conservation Rank	Construction Work Area[a]		Permanent Right-of-Way[b]		Within 0.5 Mile[c]	
			Acres	No.	Acres	No.	Acres	No.
North Dakota								
Northern reedgrass wet meadow	NA[d]	S2S3	--	--	--	--	17	1
Wet prairie	NA[d]	S2S3	--	--	--	--	35	1
Wet-mesic tallgrass prairie	NA[d]	S1	--	--	--	--	NA	1
North Dakota subtotal							***52***	***3***
Minnesota								
Calcareous fen (southeastern)	Outstanding	S1	--	--	--	--	1	1
Dry hill prairie (southern)	Moderate	S2	--	--	--	--	15	1
Mesic prairie (southern)	Outstanding	S2	--	--	--	--	2	3
	High	S2	--	--	--	--	113	3
	Moderate	S2	1.5	2	0.6	2	48	8
	Below	S2	--	--	--	--	33	1
	Not Ranked	S2	--	--	--	--	0	1
Red oak – sugar maple – basswood – (bitternut hickory) forest	High	S3	--	--	--	--	34	3
	Moderate	S3	0.3	1	0.1	1	106	2
Seepage meadow/carr	Outstanding	S3	--	--	--	--	7	1
Silver maple – (virginia creeper) floodplain forest	Outstanding	S3	--	--	--	--	0	1
	Moderate	S3	<0.1	1	<0.1	1	154	3
Sugar maple – basswood – (bitternut hickory) forest	Outstanding	S2	--	--	--	--	35	1
	High	S2	--	--	--	--	68	1
	Moderate	S2	0.2	1	<0.1	1	43	2
Wet prairie (southern)	High	S2	--	--	--	--	11	1
	Moderate	S2	--	--	--	--	4	2
Minnesota subtotal			***2.0***	***5***	***0.7***	***5***	***672***	***35***

Table 5.2.3-17. Estimated Impacts on Rare Native Plant Communities for System Alternative SA-04

Native Plant Community	MBS Site Significance Rank	Conservation Rank	Construction Work Area[a]		Permanent Right-of-Way[b]		Within 0.5 Mile[c]	
			Acres	No.	Acres	No.	Acres	No.
Illinois								
Unusual concentration of vascular plants	NA[d]	NA[e]	--	--	--	--	15	1
Dry Sand Prairie, Midwest Type	NA[d]	NA[e]	--	--	--	--	13	1
Illinois subtotal							***18***	***2***
TOTAL Rare native plant communities			**2.0**	**5**	**0.8**	**5**	**851**	**41**

Sources: Minnesota DNR 2016a, 2016d; North Dakota PR 2016; Iowa DNR 2016; Illinois DNR 2016.

[a] Based on 120-foot-wide construction work area centered on the pipeline route

[b] Based on a 50-foot-wide operations right-of-way centered on the pipeline alignment

[c] Within 0.5 mile of the pipeline route

Notes:

Values in table may not sum to subtotals and totals due to rounding.

No occurrences of rare native plant communities are listed for Iowa.

"—" = no occurrence

Spread of Noxious Weeds and Invasive Plants

Eight weed species listed by the Minnesota Noxious Weed Law (Minnesota DA 2016), and 18 other invasive plant species, occur near or within the SA-04 project (Table 5.2.3-3). Construction-related impacts include the potential introduction and spread of these noxious weed and invasive plant species. The types of impacts and the Applicant-proposed measures to address them would be identical to those described for the Applicant's proposed project in Section 5.2.3.3.1. Impacts associated with invasion of noxious weeds are difficult to quantify; however, impacts likely would be short-term and minor because management actions for noxious weeds and invasive plants would be in place during and after construction.

Operations Impacts

Loss or Alteration of Vegetation Cover

Operations impacts would occur within the permanent right-of-way, as periodic mowing and brush clearing would be required every 3 to 5 years following construction to ensure safe operation of the pipeline and allow for routine maintenance and inspections throughout the life of the Project.

Acreages of vegetation cover types that would be affected by operation of SA-04 are summarized in Table 5.2.3-14 and listed by state in Table 5.2.3-15. Impacts on large portions of the route would be short-term and minor because 95 percent of SA-04 is used for agriculture. These areas would be maintained as agricultural land, which would not require mowing but could be subject to vegetation removal, excavation, and reclamation for future pipeline inspection activities.

Mowing of the permanent right-of-way would result in short-term minor impacts on 99 acres of woody wetland, shrub, and grassland vegetation. These impacts would occur periodically for the life of the Project.

Approximately 64 acres (one percent) of previously forested land would be maintained as herbaceous vegetation by removing trees and shrub to allow for visual inspection of the right-of-way (Table 5.2.3-14). Forested cover classes in the permanent right-of-way would be maintained as other vegetation cover classes (scrub/shrub, grassland, or emergent wetland) for the life of the Project, resulting in a permanent major impact on forested cover classes within the operational footprint of SA-04.

Loss or Alteration of Native Plant Communities

During operations-related vegetation maintenance activities and pipeline inspections within the permanent right-of-way, short-term minor impacts could occur on 1 acre (seven occurrences) of previously disturbed moderate-ranked Minnesota native plant communities and approximately 1 acre of previously disturbed S2 rank and S3 rank rare native plant communities (Table 5.2.3-17). Impacts specific to these activities on Minnesota native plant communities and rare native plant communities are addressed in Section 5.2.3.3.1.

Spread of Noxious Weeds

The opportunity for noxious weeds and invasive species to spread would continue for the life of the Project. The types of permanent impacts and the Applicant-proposed measures to address them would be identical to those described for the Applicant's proposed project in Section 5.2.3.3.1.

5.2.3.3.4 Transportation by Rail

Construction Impacts

Loss or Alteration of Vegetation Cover

The rail alternative would require as much as 200 acres to construct and operate an offloading facility and 60 acres to reactivate an abandoned rail line near Clearbrook, Minnesota. It would require as much as 100 acres to construct and operate offloading facilities and an additional 3 acres to establish a new rail spur near Superior, Wisconsin.

Vegetation cover near the Clearbrook terminal includes deciduous forest, evergreen forest, cultivated crops, and woody wetlands in undeveloped areas. Vegetation cover near the Superior terminal includes deciduous forest, woody wetlands, and scrub/shrub cover in undeveloped areas. Because a specific site has not been identified or designed, impacts on habitat by acreage cannot be quantified, but it was assumed that any impacts would be permanent and major as vegetation would be cleared during construction and permanently converted to facilities. Clearing trees within the construction work area could result in short-term, minor indirect impacts in adjacent forested areas from affecting interior forest vegetation along the edges of the construction areas, as discussed in Section 5.2.3.3.1.

Loss or Alteration of Native Plant Communities

No native plant communities in the vicinity of the Clearbrook terminal would be affected by construction of the rail alternative. Native plant communities occur to the north along the potential rail access route between Clearbrook and Gully, near Gully. Two Minnesota native plant communities could be crossed, including northwest dry-mesic oak woodland and the imperiled northern dry sand – gravel prairie (S2). These native plant communities could be affected by construction of a new reactivated rail

connection between Clearbrook and Gully. This would be a reactivation of an existing rail line, and the facilities are on the edge of the mapped communities; therefore, construction impacts likely would be permanent and minor.

No native plant communities were identified in the undeveloped area around the Superior terminal where the offloading facility could be located; however, multiple occurrences of protected plants are near the terminal (Wisconsin DNR 2016a). New facilities constructed for the rail alternative would undergo permitting, likely would be sited to avoid rare native plant communities or other sensitive resources to the extent practicable, and would require minimization measures to reduce potential impacts.

Spread of Noxious Weeds and Invasive Plants

Barren soil in cleared work areas would be susceptible to invasion by noxious weeds and invasive plants that may occur in the area, which may inhibit regeneration of native vegetation. However, most cleared areas would eventually be converted to impervious surfaces or permanent facilities; consequently, little barren soil would be subject to these impacts. Impacts associated with invasion of noxious weeds likely would be short-term and negligible to minor.

Operations Impacts

Loss or Alteration of Vegetation Cover

Once the facilities are constructed, no other direct impacts on vegetation would occur during operations of the Clearbrook or Superior terminals, as the areas would be permanently converted to rail lines and rail offloading facilities for the life of the Project. Small spills and leaks at transfer facilities would be controlled, and capture of spills is an enforced regulatory component of licensed facilities' operations, resulting in negligible to minor impacts on vegetation in these areas.

Loss or Alteration of native plant communities

Operation of the rail facilities and train transportation would not likely result in loss or alteration of native plant communities because the rail alternative does not involve vegetation management or other actions that could cause such impacts. However, the existing rail transportation corridors include remnant prairies and other sensitive plant communities that could be affected by small spills and leaks if they leach into the surrounding soils from the rail bed, resulting in long-term minor to major impacts in these areas.

Spread of Noxious Weeds and Invasive Plants

The risk of introduction and spread of noxious weeds and invasive plant species would be permanent and minor to major as the use of new and existing transportation corridors would continually provide avenues to transport noxious weeds and invasive plants into areas where they do not presently occur.

5.2.3.3.5 Transportation by Truck

Construction Impacts

Loss or Alteration of Vegetation Cover

The truck alternative also would require approximately 50 acres to construct and operate an offloading facility and approximately 5 acres for road access near Clearbrook, Minnesota, resulting in a permanent loss of vegetation cover from facilities construction. Vegetation cover near the Clearbrook terminal includes deciduous forest, evergreen forest, cultivated crops, and woody wetlands in undeveloped areas. In addition, the truck alternative would require approximately 50 acres to construct and operate

an offloading facility and an additional 34 acres to establish a truck route near the terminal in Superior, Wisconsin. Vegetation cover near the Superior terminal includes deciduous forest, woody wetlands, and scrub/shrub cover in undeveloped areas. During construction, permanent major impacts on vegetation would occur from clearing and grading for site preparation and from placement of fill for construction of loading/offloading facilities and new roads for access. Clearing trees within the construction work area would cause short-term, minor indirect impacts in adjacent forested areas from affecting interior forest vegetation along the edges of the construction areas, as discussed in Section 5.2.3.3.1.

Loss or Alteration of Native Plant Communities

No Minnesota native plant community sites in the vicinity of the Clearbrook terminal would be affected by construction activities. No native plant communities were identified near the potential locations for the offloading facility at the Superior terminal, although several Wisconsin threatened and endangered plants occur near this location (Wisconsin DNR 2016a) (see Section 5.2.5). Because no native plant communities were identified near the areas that likely would be used to construct the offloading facilities, none are likely to be affected by construction. New facilities constructed for the truck alternative would undergo permitting, likely would be sited to avoid any rare native plant communities or other sensitive resources that may subsequently be found, and would require minimization measures to reduce potential impacts.

Spread of Noxious Weeds and Invasive Plants

Barren soil in cleared work areas would be susceptible to invasion by noxious weeds and invasive plants that may occur in the area, which may inhibit regeneration of native vegetation. However, most cleared areas would eventually be converted to impervious surfaces or permanent facilities; consequently, little barren soil would be subject to these impacts. Impacts associated with invasion of noxious weeds likely would be short-term and negligible to minor.

Operations Impacts

Loss or Alteration of Vegetation Cover

Once the facilities are constructed, no other direct impacts on vegetation would occur during operations of the Clearbrook or Superior terminals, as the areas would be permanently converted to access roads and offloading facilities for the life of the Project. Small spills and leaks at transfer facilities would be controlled, and capture of spills is an enforced regulatory component of licensed facilities' operations, resulting in negligible to minor impacts on vegetation in these areas.

Loss or Alteration of Native Plant Communities

Once the facilities are constructed, no other direct impacts on native plant communities would occur. Four rare native plant communities and the Floodwood Bog HCVF border the truck transportation routes. Mechanical wear, equipment spills, and leaks could contribute to short-term and minor impacts on these rare native plant communities if contamination disperses from the roadways. Small spills and leaks from tanker trucks during transit likely would remain on the roadway; however, the existing transportation corridors are adjacent to several sensitive plant communities that could be affected by small spills, result in potential long-term minor to major impacts in affected areas.

Spread of Noxious Weeds and Invasive Plants

The risk of introduction and spread of noxious weeds and invasive plants would be permanent and minor to major, as the use of new and existing transportation corridors would continually provide avenues to transport noxious weeds and invasive plants into areas where they do not presently occur.

5.2.3.3.6 Existing Line 3 Supplemented By Rail

Impacts on vegetation associated with the combined use of the existing Line 3 pipeline and the rail alternative would be the same as the impacts identified for continued operation of the existing Line 3 pipeline in addition to the identified for the rail alternative.

5.2.3.3.7 Existing Line 3 Supplemented By Truck

Impacts on vegetation associated with the combined use of the existing Line 3 pipeline and the rail alternative would be the same as the impacts identified for continued operation of the existing Line 3 pipeline in addition to the identified for the truck alternative.

5.2.3.4 Summary and Mitigation

5.2.3.4.1 Summary

Potential impacts on all vegetation types for the Applicant's proposed project and CN Alternatives are summarized in Table 5.2.3-18. This includes a summary of potential construction- and operations-related impacts on existing land cover, MBS Sites, and native plant communities, as well as potential impacts from the spread of noxious weeds and invasive plants. Avoidance and minimization measures considered in the assessment of pipeline alternatives include rerouting, use of HDD, and preparation of, and adherence to, an agency-approved site- and resource-specific crossing plan. Many of these procedures would also be applicable to the rail and truck transport alternatives.

The impact assessment also considered the effects of implementation of BMPs during construction and operation and the Applicant's revegetation and reclamation commitments for the pipeline rights-of-way. Similar construction practices and revegetation and reclamation were assumed to be implemented for relevant construction areas of the other CN Alternatives.

<u>Construction Impacts</u>

Many impacts on vegetation would be short-term and minor, while other impacts would be permanent and major within the footprint of the aboveground facilities and the permanent right-of-way. Individual impacts at specific locations along all the alternatives where the existing vegetation can recover is anticipated to be minor, with appropriate use of BMP construction and operation practices. However, others would need to be maintained in a way that prohibits return to its existing state, and would be permanently altered or removed. Due to the great lengths of all alternatives, the total impact would be additive and distributed along the routes. The importance of these impacts is determined by the distance of the alternative, number of vegetation communities affected, and the quality of vegetation resources affected.

Loss or Alteration of Vegetation Cover

Clearing and grading the pipeline construction work area and other construction-related areas would result in a loss and alteration of vegetation. Forested and scrub/shrub vegetation communities within the construction work area would be cleared and would require many years to reestablish in areas outside of the permanent right-of-way, resulting in long-term to permanent major impacts. The Applicant's proposed project would have a substantially greater impact on forested and scrub/shrub vegetation communities than the other CN Alternatives, all of which would have a similar level of impact.

Areas cleared of other vegetation types during pipeline construction, including grassland/herbaceous, hay/pasture, cultivated crops, and emergent wetlands vegetation cover class types, would be reclaimed

after construction to the specifications or conditions of the authorizing/permitting agency. The recovery period for these areas would range from a single growing season to several years. As a result, the impacts would be short-term and minor. SA-04 would affect a substantially greater area of these vegetation types than the other CN Alternatives, with the Applicant's proposed project affecting substantially more than the rail or truck alternatives. However, the impact from implementation of the rail or truck alternatives would be permanent and major since construction of permanent aboveground facilities would not provide the opportunity for reclamation of vegetation.

Loss or Alteration of Rare Native Plant Communities

Clearing and grading would also result in the loss of rare native plant communities. The impacts typically would be permanent and major as these communities would be lost. The Applicant's proposed project would affect approximately 46 acres of rare native plant communities, whereas SA-04 would affect approximately 2 acres of the communities, the rail transport alternative would affect 1 rare plant community, and the truck transport alternative would not affect any rare native plant communities. For the pipeline alternatives, the impacts would be long-term to permanent and major.

Spread of Noxious Weeds and Invasive Plants

Noxious weed and invasive plant management and control would be implemented during construction to minimize the effect of noxious weeds. The potential for impacts due to the spread of noxious weeds and invasive plants during construction would be the same for all CN Alternatives, although the potentially affected area would be greatest for SA-04 followed by the area of the Applicant's proposed project. The impact due to construction for all alternatives would be short-term and negligible to minor.

Operations Impacts

Loss or Alteration of Vegetation Cover

Vegetation management activities during pipeline operation would prevent trees and large shrubs from reestablishing within the pipeline permanent right-of-way. This would affect approximately 1,105 acres of previously forested areas within the permanent right-of-way for the Applicant's proposed project and about 64 acres for SA-04. The impact for both pipelines would be permanent and major. The forested and scrub/shrub areas cleared from the construction work area and outside of the permanent right-of-way would be allowed to regenerate, but the process would take decades to reach full recovery. For the pipeline alternatives, the Applicant's Integrity Management Program would require periodic excavation to repair or replace sections of pipe segments, which would affect the vegetative cover of the permanent right-of-way. The existing Line 3 pipeline would require substantially more of these integrity digs than a newly installed pipeline and would therefore have a greater impact on vegetation.

Loss or Alteration of Rare Native Plant Communities

Potential impacts on rare native plant communities from pipeline operations would likely be minor because these communities are unlikely to persist within the permanent right-of-way after the construction disturbance. The Applicant's proposed project supports the largest area of rare native plant communities within the permanent right-of-way and represents the greatest potential impact on these communities. The rail and truck alternatives could affect rare native plant communities along the rail and truck routes if petrochemicals from engine leaks leach into the surrounding soils.

Spread of Noxious Weeds and Invasive Plants

As a result of implementation of a noxious weed and invasive plant management and control plan for the pipeline alternatives, the risk of spreading infestations of noxious weeds and invasive plants during operations would be similar for the pipeline routes. The impact would be long-term and minor, although SA-04 would have a greater area potentially affected than either of the other pipeline alternatives—the Applicant's proposed project or use of existing Line 3. The rail and truck alternatives may present a greater transmission risk because the large increase in traffic along new and existing transportation corridors would provide avenues to transport noxious weeds and invasive plants into areas where they do not presently occur. For all CN Alternatives, the potential impact of the spread of noxious weeds and invasive species would be permanent and minor.

5.2.3.4.2 Mitigation

BMPs for vegetation are presented in the revegetation and monitoring guidance in the Applicant's Environmental Protection Plan (Appendix E). Following construction, the entire pipeline right-of-way would be reclaimed following the detailed measures in this plan, including implementation of compaction prevention measures, seeding, plantings, application of soil amendments, and a period of monitoring to document stabilization of the right-of-way. In areas where soil quality is a concern for revegetation, applicable agencies would be consulted to develop seed mixes and seeding dates adapted to the immediate areas of concern.

The Applicant has committed to preparation and implementation of the following plans, procedures, and general vegetation protection measures during construction:

- Co-locate construction within and near existing utility corridors to minimize environmental impacts;
- Develop and adhere to Project-specific construction methods and procedures for vegetation clearing methods, including treatment of existing vegetation, topsoil segregation, storage, and reapplication;
- Restore preconstruction contours and use slope breakers, sediment barriers, mulch, geotextile fabric, and other erosion control devices to stabilize the disturbed areas during the vegetation regrowth phase and reduce runoff into the adjacent environment;
- Co-locate the Project with existing rights-of-way where feasible;
- Design and plan Project pipeline construction (including parking, access, and temporary work areas) to reduce environmental impacts on sensitive plant communities, such as rare native plant communities, calcareous fens, wetland vegetation, old-growth forests, and prairie vegetation;
- Inspect and clean all equipment prior to bringing it to the site to prevent the introduction and spread of invasive species; and
- Use certified weed-free mulch, topsoil, and seed mix.

Prior to construction, the lead and assisting agencies would be consulted on identification of avoidance and mitigation measures for rare plant communities, old-growth forests, and HCVFs that are located within the pipeline route and could be affected by construction or operation. Avoidance measures could include minor pipeline route adjustments, use of directional drilling, or preparation and adherence to an

agency-approved, site-specific crossing plan. Impacts on rare plant communities that cannot be avoided would be addressed through implementation of the Project's approved revegetation and monitoring measures, and invasive and noxious weed control measures outlined in the Environmental Protection Plan (Appendix E).

Measures that would be implemented to prevent the spread of noxious and invasive weeds during construction and operations include minimizing the time between ground-disturbing work and site reclamation and reseeding, staking avoidance areas at known weed locations, and implementing other BMPs.

In addition to the avoidance and minimization measures and BMPs that the Applicant has identified, Minnesota DNR identified the following mitigation measures that could reduce impacts on vegetation:

- Defining equipment cleaning methods and inspection standards to ensure that equipment is free of invasive species. On Minnesota DNR lands, following Operational Order 113 would further reduce the spread of noxious weeds and invasive plants and animals.
- Replanting appropriate tree species for restoration within cleared forested areas to reduce the recovery time, prevent changes in watershed hydrology, and runoff impacts that could alter stream geomorphology.
- Woody vegetation typically would not be cleared at ATWS. If clearing of woody vegetation is necessary, potential mitigation to offset the clearing could include reestablishing or enhancing the existing cover type within up to 50 feet of surface waters, depending on topography. On state forest lands or WMAs, tree planting may be desired for all temporary workspaces within the property boundary to reduce erosion and runoff, and to reestablish trees for potential future large woody habitat recruitment to streams and rivers.
- In counties where oaks are affected by oak wilt disease caused by a non-native fungus, seasonal restrictions on tree clearing would reduce the chance of sap-sucking beetles transporting fungal spores through fresh wounds during the infection period that extends from April through July.
- Removal, debarking, or chipping of cut pines and pine slash larger than 3 inches in diameter within 3 weeks of cutting during May through mid-August would prevent pine bark beetle outbreaks in pine stands.

Table 5.2.3-18. Summary of Potential Impacts on Vegetation for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Rail Alternative	Truck Alternative	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Construction Impacts							
Loss or alteration of vegetation cover	Long-term to permanent/ major impacts • 2,202 acres of forests/woody wetlands Short-term/minor impacts • 256 acres of scrub/shrub • 165 acres of grasslands • 2,734 acres of croplands and pastures • 249 acres of herbaceous wetlands No impacts • 12 acres of barren land • 5,617 acres total impacts • 84% adjacent to existing corridors	No impact	Long-term to permanent/ major impacts • 161 acres of forests/woody wetlands Short-term/minor impacts • <1 acre of scrub/shrub • 181 acres of grasslands • 10,317 acres of croplands and pastures • 85 acres of herbaceous wetlands No impacts • 20 acres of barren land • 10,765 acres total impacts • 100% adjacent to existing corridors	Permanent/major impacts • 263 to 363 acres total	Permanent/major impacts • 139 acres total	Permanent/major impacts • 263 to 363 acres total	Permanent/major impacts • 139 acres total
Loss or alteration of rare native plant communities	Long-term to permanent/major impacts	No impact	Long-term to permanent/major impacts	Permanent/major impacts	No impact	Permanent/major impacts	No impact

Table 5.2.3-18. Summary of Potential Impacts on Vegetation for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Rail Alternative	Truck Alternative	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
	• 46 acres of rare native plant communities		• 3.6 acres of rare native plant communities	• 1 rare native plant community		• 1 rare native plant community	
Spread of noxious weeds and invasive plants	Short-term/minor impacts	No impact	Short-term/minor impacts	Short-term/ negligible to minor impacts	Short-term/ negligible to minor impacts	Short-term/ negligible to minor impacts	Short-term/ negligible to minor impacts
Operations Impacts							
Loss or alteration of vegetation cover (permanent right-of-way)	Permanent impacts • 290 acres, across all vegetation classes Permanent/major impacts • 1,015 acres of forests/woody wetlands Short-term/minor impacts • 131 acres of scrub/shrub • 73 acres of grasslands • 1,091 acres of croplands and pastures • 132 acres of herbaceous wetlands No impacts	Permanent/major impacts • 594 acres of forests/woody wetlands Short-term/minor impacts • 96 acres of scrub/shrub • 125 acres of grasslands • 848 acres of croplands and pastures • 181 acres of herbaceous wetlands No impacts • 3 acres of barren land • 1,847 acres total	Permanent/major impacts • 64 acres of forests/woody wetlands Short-term/minor impacts • <1 acre of scrub/shrub • 76 acres of grasslands • 4,307 acres of croplands and pastures • 35 acres of herbaceous wetlands No impacts • 9 acres barren land • 4,490 acres total	Negligible to minor impacts	Negligible to minor impacts	Short-term to permanent/minor to major impacts	Short-term to long-term/minor to major impacts

Table 5.2.3-18. Summary of Potential Impacts on Vegetation for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Rail Alternative	Truck Alternative	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
	• 2 acres of barren land • 2,444 acres total						
Loss or alteration of rare native plant communities	Short-term/minor • 24 acres in 6 different rare native plant communities (that will be previously disturbed by construction)	Short-term/minor • <1 acre in 1 rare native plant community	Short-term/minor impacts • <1 acre in 4 rare native plant communities	Long-term/minor to major impacts • 1.1 miles in 5 rare native plant communities • 59 miles railroad prairies	Short-term to long-term/minor to major impacts • 4 rare native plant communities • Floodwood Bog HCVF	Short-term/minor impacts • See existing Line 3 and Rail	Short-term/minor impacts • See existing Line 3 and Truck
Spread of noxious weeds and invasive plants	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor to major impacts	Permanent/minor to major impacts	Permanent/minor to major impacts	Permanent/minor to major impacts

HCVF = high conservation value forest

5.2.3.5 References

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5.2.4 Fish and Wildlife

Fish and wildlife provide important social and cultural resources; they are managed by federal and state agencies for consumption and conservation. The general Project area supports a diversity of fish and wildlife, including coldwater, coolwater, and warmwater fisheries; reptiles, amphibians, and mammals; including big and small game mammals; fur-bearing mammals; and nongame mammal species; and various bird species, including both game and non-game species. Lakes, rivers, streams, and wetlands provide habitat for fish as well as for aquatic and terrestrial wildlife. Wildlife habitats include a variety of vegetation communities that provide foraging opportunities, shelter, overwintering, migration stopover, and breeding habitats for a wide variety of wildlife.

This section identifies the common and abundant fish and wildlife resources that may be affected by construction or operation of the Applicant's proposed project or the CN Alternatives (continued use of existing Line 3, system alternative SA-04, transportation by rail, transportation by truck, or existing Line 3 supplemented by rail or truck). It also presents the assessment of the potential for construction and operation of the Project to affect those resources.

This section first describes the regulations relevant to assessing impacts on fish and wildlife resources, the methods used to conduct the impact assessment, and the existing conditions within the defined ROIs (identified below). The potential construction- and operation-related impacts on fish and wildlife for the Applicant's proposed project and the CN Alternatives are presented next. A summary and comparison of the impacts for the alternatives are included at the end of the section, along with potential mitigation measures that could minimize impacts.

Wildlife protected under state and federal endangered species regulations are addressed in Section 5.2.5. ORVWs are addressed in Section 5.2.1.2. Potential impacts on fish and wildlife resources from an unanticipated crude oil release are addressed in Chapter 10.

5.2.4.1 Regulatory Context and Methodology

5.2.4.1.1 Regulatory Context

Regulations pertaining to fish and wildlife are managed by federal (e.g., USFWS) and state natural resources agencies. The goal of these agencies is to conserve, protect, and enhance fish, wildlife, and other natural resources for the benefit of the public. Fish, wildlife, and their habitats that are protected under federal or state endangered species or other protective regulations for special or unique resources are discussed in Section 5.2.5. Other federally enacted regulations provide protection for fish and wildlife not otherwise protected under the Endangered Species Act of 1973 (ESA), as amended. These include the Migratory Bird Treaty Act of 1918 (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). USFWS has statutory authority and responsibility for enforcing the MBTA (16 U.S.C. 703–712; 40 Stat. 755 as amended), and the BGEPA (16 U.S.C. 66-8-668d).

The MBTA makes it illegal for anyone to capture, kill, or possess migratory birds, or any parts, nests, or eggs of any migratory bird except under terms of a valid permit issued pursuant to federal regulations. In addition to the MBTA, Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," further directs executive departments and agencies to promote migratory bird conservation conventions to protect migratory birds and their habitats, including migratory waterfowl and game birds. The MBTA prohibits the take of any migratory bird without prior authorization from USFWS. "Migratory birds" are all species native to the United States or its territories. Nonnative birds

(e.g., house sparrow [*Passer domesticus*], European starling [*Sturnus vulgaris*]) are not protected under the MBTA (USFWS 2016a).

Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are additionally protected under the BGEPA. This act prohibits anyone from taking (i.e., pursuing, shooting or shooting at, poisoning, wounding, killing, capturing, trapping, molesting, or disturbing) eagles, including their parts (e.g., feathers), nests, or eggs (USFWS 2016b). This definition also covers impacts from human-induced alterations at nest sites when eagles are not present; therefore, if removal, relocation, or destruction of an eagle nest is necessary and unavoidable, a permit and consultation with USFWS would be required. Minnesota also issues permits for removal or disturbance of active and inactive bald eagle and osprey (*Pandion haliaetus*) nests per its statutory authority as provided by Chapter 97A (Game and Fish), Part 97A.045 (Commissioner, General Powers and Duties), Subdivision 2 (Power to Protect Wild Animals).

The National Invasive Species Act (16 U.S.C. 4701) is a federal law that requires state management plans along with regional panels to actively fight the spread of aquatic invasive species in U.S. waterways. Table 5.2.4-1 identifies the appropriate state agency and regulations pertaining to transport, introduction, or spread of invasive species that would apply to the Applicant's proposed project and CN Alternatives.

Table 5.2.4-1. State Regulations Concerning Invasive Species

State	Administering Agency	Regulation
North Dakota	North Dakota Game and Fish Department	Aquatic Nuisance Species (ND Century Code Ch. 30.03.06)
Minnesota	Minnesota Department of Natural Resources	Invasive species laws (Minn. Stat. Ch. 84D and Minn. R. Ch. 6216)
Iowa	Iowa Department of Natural Resources	Aquatic Invasive Species (Iowa AC 571.90)
Illinois	Illinois Department of Natural Resources	Injurious Species (Illinois AC 17 Ch. 1[b][805])
Wisconsin	Wisconsin Department of Natural Resources	Invasive Species Rule (WI Code Ch. NR 40)

States also have fisheries and wildlife protection and management laws in addition to endangered species laws. Individual states have developed a variety of management unit structures to address specific goals and agency strategies (e.g., state parks, wildlife refuges, and waterfowl protection areas).

5.2.4.1.2 Methodology

The methods used to assess potential impacts on fish and wildlife resources and their habitats from construction and operation of the Applicant's proposed project and CN Alternatives are described in this section. The ROIs for this evaluation encompassed the area that could be affected, including indirectly, by construction and operation within 0.5 mile from the centerlines of the alternative pipeline routes. As described below, the assessment of potential direct impacts focused on the areas directly affected by construction and operation activities. In addition, invasive species locations were identified within 1 mile of the pipeline route centerlines. For facilities required for the rail and truck transport alternatives, impacts were evaluated in the areas where the new structures and roadways likely would be constructed and in areas adjacent to those sites.

The impact analysis identified changes to fish and wildlife resources and their habitats, including consideration of the following:

- Fish and aquatic habitats
  - Fish distribution and habitat use, muskellunge (*Esox masquinongy*) waters, designated trout streams and lakes, and mussel concentration areas; and
  - Lakes, rivers, and streams, AMAs, Fish Index of Biotic Integrity (IBI) Lakes, waters infested with aquatic invasive species, LBS, and Sentinel Lakes.
- Wildlife and wildlife habitats
  - Wildlife distribution and habitat use, raptor nests and colonial waterbird colonies; and
  - Vegetated land cover, designated wildlife conservation areas (e.g., WMAs, waterfowl production areas, wetland management districts, Bureau of Land Management (BLM) land, federal and state forests, state parks, recreation areas, natural areas, nature preserves, scenic trails, and private conservation areas), and Audubon Important Bird Areas (IBAs).

The methods used to evaluate potential impacts on fisheries and aquatic habitats, and on wildlife and wildlife habitats are described below.

Fisheries and Aquatic Habitat

Descriptions of fish, fisheries, aquatic habitats, and aquatic invasive species were obtained from publicly available sources published by federal and state agencies, including data from USFWS, USGS, Minnesota DNR, Wisconsin DNR, North Dakota Game and Fish, Iowa DNR, and Illinois DNR.

The analysis of Project impacts considered the proximity of the Applicant's proposed project and CN Alternatives to classified waterbodies or areas, including AMAs, Sentinel Lakes, LBS, designated wildlife lakes, and waterbodies assigned an IBI. These management units are described below. Additional waterbody classifications specific to individual species (e.g., trout streams and muskellunge lakes) were also included in the analysis.

Management Units Considered

Aquatic Management Areas were established by the State of Minnesota to "protect, develop and manage lakes, rivers, streams, and adjacent wetlands and lands that are critical for fish and other aquatic life for water quality, and for their intrinsic biological value, public fishing, or other compatible outdoor recreational uses" (Minn. Stat. Ch. 86A, Subd. 14) (Figure 5.2.4-1). In Minnesota, the demand for shoreline property is high, and such areas are rapidly being developed. Minnesota DNR acquires riparian shoreline parcels to designate as AMAs in order to (1) establish protections for critical fish and wildlife habitat; (2) ensure that non-boat public access to water resources will always be available; and (3) ensure that habitat can be developed in previously disturbed areas (Minnesota DNR 2016a). North Dakota and Wisconsin do not specifically designate AMAs but manage more general wildlife areas for hunting, fishing, trapping, and other recreational activities (see Section 5.2.4.2.3).

Sentinel Lakes have been designated to model and monitor Minnesota ecosystems for detection and better understanding of environmental stressors in order to guide management that sustains fisheries and water resources for future generations (Minnesota DNR 2016b).

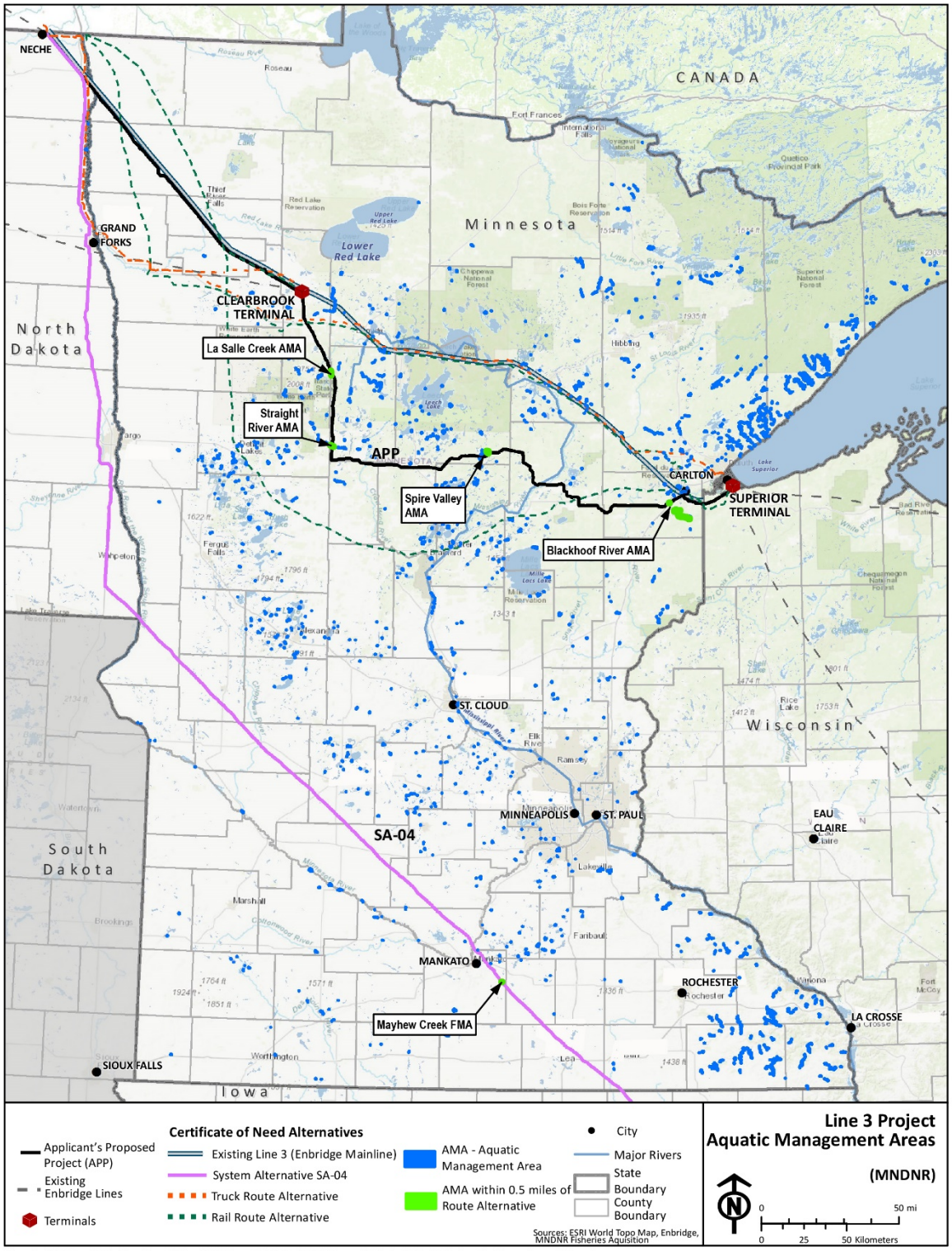

Source: Minnesota DNR 2016a

Figure 5.2.4-1. Aquatic Management Areas Crossed by the Applicant's Proposed Project and CN Alternatives

Lakes of Biological Significance have been identified and classified by Minnesota DNR subject matter experts based on objective criteria for four community types (aquatic plants, fish, amphibians, and birds). Unique plant or animal presence is the primary measure of a lake's biological significance. Lakes are assigned one of three biological significance classes:

- Outstanding – Plants: high aquatic plant richness, high floristic quality, and a population of an endangered or threatened plant; important wild rice lakes. Fish: exceptional fishery for selected game fish or an outstanding nongame fish community. Birds: endangered or threatened colonial waterbird nesting area; presence of several endangered, threatened, or special concern lake bird species; or six or more lake bird Species of Greatest Conservation Need.[12]
- High – Plants: high aquatic plant richness, high floristic quality, or a population of an endangered or threatened plant. Fish: populations of more than one fish of special concern or Species of Greatest Conservation Need. Birds: colonial waterbird nesting area; history of endangered or threatened colonial waterbird nesting; presence of endangered, threatened, or special concern lake bird species or five lake bird Species of Greatest Conservation Need. Amphibians – mudpuppy presence.
- Moderate – Plants: high aquatic plant richness, high floristic quality, or a population of an endangered or threatened plant. Fish: populations of one fish species of special concern or fish Species of Greatest Conservation Need. Birds: history of colonial waterbird nesting; presence of an endangered, threatened, or special concern lake bird species; or several lake bird Species of Greatest Conservation Need (Minnesota DNR 2015a).

Designated Wildlife Lakes in Minnesota include 56 public lakes covering over 56,000 acres that are designated, reserved, and managed for wildlife. Most of the 56 lakes are located in the southern portion of the state where watersheds have been highly modified to improve drainage. Management of designated wildlife lakes includes temporary lowering of lake levels to improve wildlife habitat, and includes regulation of motorized watercraft and recreational vehicles.

Index of Biotic Integrity is a biologically based method for measuring the integrity of aquatic systems that incorporates fish data on species richness, community assemblage, and trophic composition. Each metric represents an aspect of the biological assemblage structure, function, or other measurable characteristic that changes in some predictable way with increased human-induced stress. Fish IBI scores respond to differences in land use patterns, trophic state, and aquatic vegetation.

Other waterbodies evaluated include DNR fish hatcheries, muskellunge waters, and designated trout streams and lakes. In Minnesota, Iowa, and Wisconsin, trout streams and lakes are designated to protect and foster the propagation of trout and provide fishing opportunities and angler access. Further detail for these waterbody classification systems is included in the discussions of existing conditions below.

Data Sources and Potential Impact Areas

Specific geospatial data sources evaluated for impacts on fish and aquatic habitats included:

[12] Animals whose populations are rare, declining, or vulnerable to decline and are below levels desirable to ensure their long-term health and stability (Minnesota DNR 2006)

- USGS National Hydrography Dataset;
- Minnesota DNR and Minnesota PCA geospatial data for:
  - AMAs (Minnesota DNR 2016a),
  - Sentinel Lakes (Minnesota PCA 2016),
  - Lakes with Fish IBI scores (Minnesota DNR 2014a),
  - LBS (Minnesota DNR 2015b),
  - Designated Wildlife Lakes (Minnesota DNR 2016c),
  - Trout lakes and streams (Minnesota DNR 2015c),
  - Muskie lakes (Minnesota DNR 2008),
  - Infested waters list (Minnesota DNR 2016d), and
  - Minnesota Natural Heritage Information System (NHIS) mussel concentration areas (Minnesota DNR 2016e); and
- USGS nonindigenous aquatic species (USGS NAS 2016).

Impacts on fish and aquatic habitats from construction of the Applicant's proposed project were evaluated within the footprints provided by the Applicant for the construction work area, ATWS, access roads, pipe yards, pipeline permanent right-of-way, valve pads and driveways, and pump stations. Using GIS, these footprints were overlain on the resource maps to identify the potentially affected resources. The potentially affected areas during operation of the Applicant's proposed project were identified in a similar manner, using a 50-foot-wide permanent right-of-way.

Areas potentially affected during construction of SA-04 were estimated using the same method, except using a 120-foot-wide construction work area centered on SA-04. Potential impact areas for operations were identified using a 50-foot-wide permanent right-of-way overlain on available resource maps.

For the Applicant's proposed project and System SA-04, the ROI for the fisheries and aquatic habitat evaluation encompasses the area that could be directly affected by construction within 0.5 mile from the route centerlines, in addition to indirect effects that may occur within areas beyond the construction work areas.

Other CN Alternatives evaluated consist of continued use of the existing Line 3 pipeline, rail transport, truck transport, and the combined use of the Line 3 pipeline supplemented by rail or truck transport. These alternatives were qualitatively reviewed for potential impacts based on available fish and aquatic habitat information, descriptions of potential locations for new facilities, and descriptions of potential transportation routes.

Typical impacts on fisheries habitat from pipeline construction and operational maintenance were qualitatively evaluated by considering the sensitivity of the waterbody and considering the impact mechanism that could affect resident biota. Waterbody crossing methods could result in temporary increased turbidities and sedimentation that would negatively impact sensitive biota. Permanent impacts, such as the reduction or modification of riparian vegetation, could affect physicochemical attributes within a stream resulting in stress on resident populations. Similarly, erosional impacts resulting from changes to riparian habitat could result in long-term quality effects to aquatic habitats.

Wildlife and Wildlife Habitat

Descriptions of common wildlife (e.g., abundance, distribution, and seasonal sensitivity) and wildlife habitats were obtained from publicly available information published by state agencies, including Minnesota DNR, Wisconsin DNR, North Dakota Game and Fish, Iowa DNR, Illinois DNR, and the Audubon Society. Information on raptor nest locations was obtained from reports on raptor nest surveys completed for the Applicant's proposed project (Merjent 2015a, 2015b); data were not collected for the route alternatives. Colonial waterbird nesting locations were evaluated based on NHIS data (Minnesota DNR 2016e).

Designated Management Units

Wildlife conservation areas have been designated within each state that would be crossed by the Applicant's proposed project and CN Alternatives. The impacts analysis considered the proximity of the Applicant's proposed project and CN Alternatives to areas considered significant for conservation of wildlife or for preservation of wildlife habitat. The areas are presented under various naming conventions, including but not limited to, WMAs, waterfowl production areas, wetland management districts, BLM land, federal and state forests, state parks, recreation areas, natural areas, nature preserves, scenic trails, and private conservation areas. USGS Gap Analysis Program (GAP) data provide a compilation of these conservation areas. Each area is assigned a status code (1, 2, or 3) to indicate the level of protection and management objectives. All three of these GAP Status Codes include permanent protection from conversion of natural land cover over all or most of their area (USGS GAP 2013). GAP Status 1 and 2 lands are managed for biodiversity, while GAP Status 3 lands include areas managed for multiple uses.

Each of the states crossed maintains designated WMAs. These areas generally are established to protect lands and waters with productive habitat for fish and wildlife, as well as fish- and wildlife-oriented recreation (e.g., hunting, fishing, and bird watching) (Minnesota DNR 2016f; Wisconsin DNR 2016a). WMA managers actively plant food plots, restore native plants and wetlands, conduct prescribed burns, and manipulate water levels.

Audubon IBAs established by the National Audubon Society (rather than by state or federal agencies) are a useful management tool to identify areas that contain vital resources for birds and may concentrate birds. Audubon IBAs include both public and private lands and lack formal protections. IBAs are identified through a rigorous process by bird experts. Each IBA represents a place that supports: species of conservation concern (e.g., threatened and endangered species), range-restricted species (e.g., those species limited spatially), species that occur in only one habitat type or biome, or species or groups of species (e.g., waterfowl or shorebirds) that are vulnerable because they congregate in large numbers. While all IBAs are recognized for their importance to birds, some are of greater significance than others. IBAs are prioritized hierarchically, from greatest to least significant, as global, continental, or state.

In addition to these wildlife areas, general vegetation land cover types, including large blocks (greater than 100 acres) of forested and forested wetland habitats, provides important information about available habitats and the wildlife that likely use them. Further details for each of these land classification systems are provided in the discussion of existing conditions below.

Data Sources and Potential Impact Areas

Specific geospatial data sources evaluated for impacts on wildlife and wildlife habitats included:

- NLCD (Homer et al. 2015) for land cover information, including aquatic and terrestrial (vegetation) habitats;
- Federal, state, and local wildlife conservation areas and easements (USGS GAP 2016);
- Minnesota wildlife refuge inventory (Minnesota DNR 2016g);
- Audubon IBAs (Audubon 2016);
- Minnesota NHIS colonial waterbird nesting aggregations (Minnesota DNR 2016e); and
- Raptor nest surveys for the Applicant's proposed project (Merjent 2015a, 2015b).

Areas of potential impacts on wildlife and wildlife habitat from construction of the Applicant's proposed project were evaluated within the Project footprints provided by the Applicant for the construction work area, ATWS, access roads, pipe yards, permanent right-of-way, MLVs and driveways, and pump stations. Using GIS, these footprints were overlain on the resource maps to identify the resources potentially affected. The potentially affected areas during operation of the Applicant's proposed project were identified in a similar manner, using a 50-foot-wide permanent right-of-way.

Construction impacts for SA-04 were similarly evaluated using a 120-foot-wide construction work area centered on SA-04, and operations impacts were estimated using a 50-foot-wide permanent right-of-way overlain on the wildlife distribution and wildlife habitat resource maps.

The ROI for the wildlife and wildlife habitat evaluation encompasses the area that could be directly or indirectly affected by pipeline construction within 0.5 mile from the route centerlines because some construction activities and indirect effects may occur in areas beyond the construction work areas.

Other CN Alternatives—including continued use of the existing Line 3 pipeline, rail transport, truck transport, and combined use of the Line 3 pipeline supplemented by rail or truck—were qualitatively reviewed for potential impacts based on available wildlife species distribution and wildlife habitat information, the descriptions of potential locations for new facilities, and the descriptions of potential transportation routes.

Typical impacts on terrestrial wildlife habitat from pipeline construction and operational maintenance were qualitatively evaluated, including the alteration of vegetation cover. Permanent loss of wildlife habitat was quantified as the area required for maintenance of permanent facilities. Temporary loss and permanent alteration of wildlife habitats were quantified as the size and quality of the area disturbed by the construction work areas and permanent right-of-way by providing the total acres disturbed within wildlife conservation areas and by vegetation cover class. Habitats susceptible to fragmentation were identified by locating large blocks (greater than 100 acres) (Homer et al. 2015) of continuous upland forest and woody wetland cover that would be crossed by the pipeline alternative routes where those routes would not be co-located with other linear infrastructure. Particular attention was given to large, mature core or interior forested areas that serve as habitat for protected migratory birds and other wildlife.

The potential for wildlife mortality impacts was qualitatively evaluated based on occurrence, the animal's ability to move away from construction activities, and the animal's susceptibility to being run over or hit by equipment or crew vehicles. The potential for wildlife disturbance, displacement, or blockage of movements also was qualitatively evaluated based on occurrence, locations of migration corridors, locations of sensitive breeding or migration staging areas, and differential sensitivity to human activities.

5.2.4.2 Existing Conditions

5.2.4.2.1 Applicant's Proposed Project

Fisheries and Aquatic Habitat

The Applicant's proposed project would cross surface waters, including large rivers; perennial (permanent) streams, intermittent (wet part of the year) streams, and ephemeral (wet only after precipitation) streams; large lakes; shallow lakes; and wetlands. Potential impacts related to surface water crossings are addressed in Section 5.2.1.2.

Typically, large rivers are quite wide; flow more slowly than smaller rivers; and have numerous meanders and oxbows, islands, and backwaters. The backwater areas of these rivers are biologically productive and provide important spawning areas for several species of fish, as well as refuge habitat for many other animal species. Connectivity of these rivers is an important feature and influences the distribution of fish populations and other species. Smaller rivers, streams, and wetlands provide foraging areas, nesting areas, and refuge for a myriad of species of fish and wildlife, including SGCN birds such as yellow rails (*Coturnicops noveboracensis*) and sedge wrens (*Cistothorus platensis*) (see Section 5.2.5 for more information about SGCN). The Mississippi River, also within the Clearbrook-to-Carlton segment of the Applicant's proposed project, has a naturally reproducing population of muskellunge that has been supplementally stocked with fingerlings or adults since 2006.

The Applicant's proposed project would traverse areas with abundant freshwater lakes. Lakes are important to Minnesota's environment and economy (e.g., hunting and fishing, many forms of lake recreation, and the tourism industry). Good-quality lake habitat is largely the result of healthy, intact watersheds and shorelines. Watersheds influence water quality, where more intact watersheds tend to result in lakes with better water quality. Shoreline habitat provides bottom substrates, structure, and vegetation that fish and other aquatic animals need for foraging, spawning substrate, and cover from predation.

Shallow lakes provide habitat for many species. They are permanent or semi-permanent waterbodies that are less than 15 feet deep and typified by abundant aquatic plant growth that results from generally high levels of nutrients (e.g., phosphorus, nitrogen, and minerals) and abundant sunlight availability in shallow water. Wetlands and vegetated fringes form along the edges of lakes and include stands of emergent and floating-leaved aquatic plants such as cattails (*Typha* spp.), bulrush (several genera), water lily (*Nymphaea* spp.) and reeds (several genera), as well as submerged plants (e.g., coontail [*Ceratophyllum demersum*]), creating an extended littoral zone. These plants provide excellent food and habitat for zooplankton, insects, fish, waterfowl, and other wildlife. Abundant aquatic vegetation also helps to maintain water clarity by anchoring sediments. Shallow lakes are important breeding, nesting, and foraging areas for waterfowl and waterbirds such as ducks, geese, herons, rails, and many more (Minnesota DNR 2016h).

Four AMAs occur within 0.5 mile of the Applicant's proposed project: Blackhoof River AMA, La Salle Creek AMA, Spire Valley AMA, and Straight River AMA (see Figure 5.2.4-1).The Applicant's proposed project runs directly adjacent to Portage Lake. Portage Lake meets the criteria for a Lake of Biological Significance and is also a Sentinel Lake.

The ROI includes Minnesota DNR-designated trout streams, which occur throughout the state (Figure 5.2.4-2). There are 22 trout streams (21 in Minnesota and one in Wisconsin) identified within 0.5

mile of the Applicant's proposed project, as described in more detail in Section 5.2.4.3.1. Five lakes rated for the Fish IBI are located in the ROI in the following watersheds: Roosevelt, Island, Waukenabo, Big LaSalle, and Portage. The Applicant's proposed project would cross or be located within 1 mile of waters containing invasive species in Minnesota and Wisconsin. Invasive species established in waters that would be crossed by the Applicant's proposed project include reed canary grass (*Phalaris arundinacea*), flowering rush (*Butomus umbellatus*), rusty crayfish (*Orconectes rusticus*), faucet snail (*Bithynia tentaculata*), zebra mussel (*Dreissena polymorpha),* curly leaf pondweed (*Potamogeton crispus*), common carp (*Cyprinus carpio*), ruffe (*Gymnocephalus cernua*), and Eurasian milfoil (*Myriophyllum spicatum*).

Federal, state, and tribal agencies have identified significant fisheries with recreational or commercial value that occur in waterbodies (e.g., streams, rivers, lakes, and ponds) at or immediately downstream of proposed crossings. Maintaining abundant populations of fish requires high-quality aquatic habitat and healthy ecosystems. Fisheries can be defined as coldwater, coolwater, or warmwater and are associated with particular fish assemblages. These fisheries can include both game and nongame species.

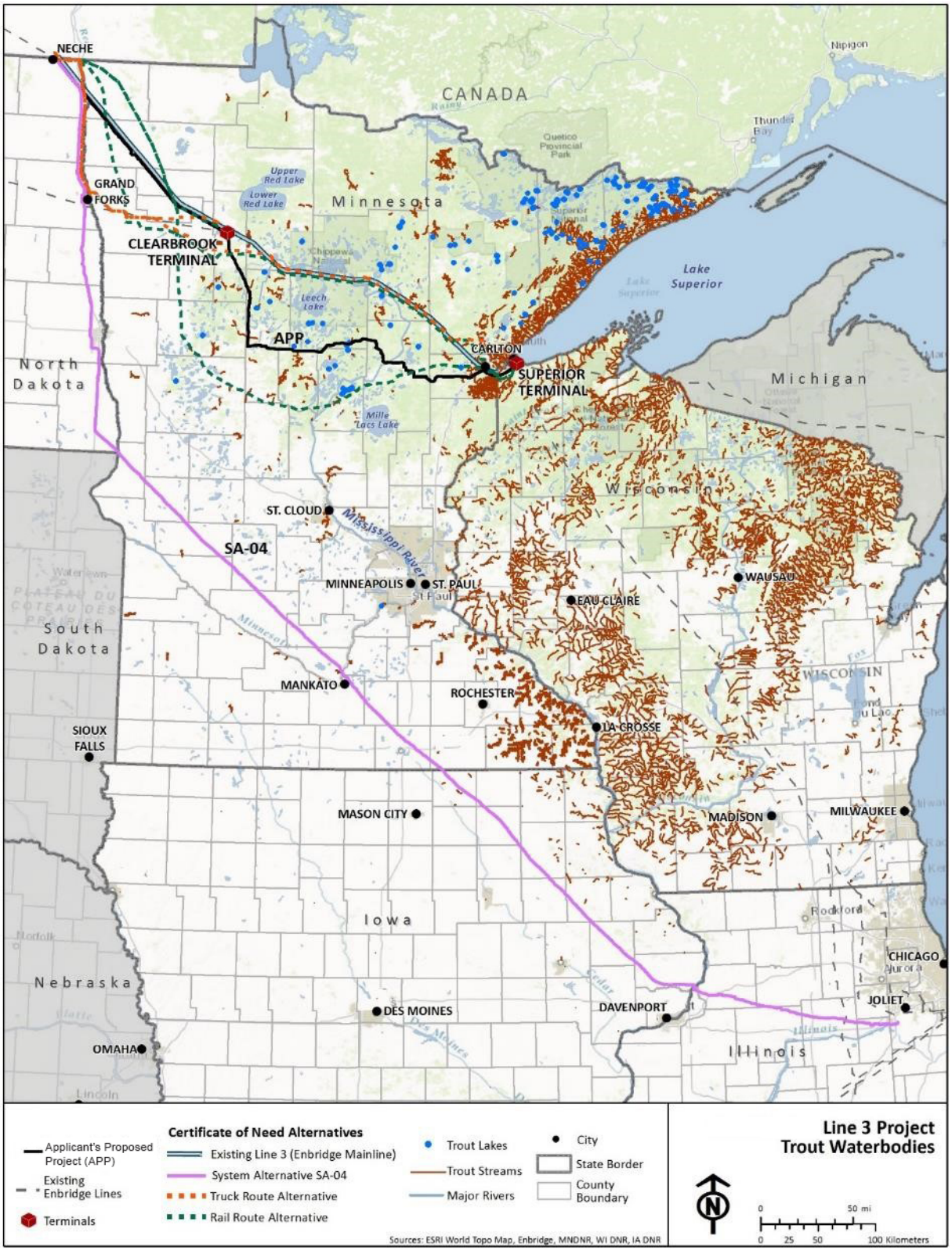

Source: Minnesota DNR 2015c

Figure 5.2.4-2. Trout Streams and Lakes in Relation to the Applicant's Proposed Project and Certificate of Need Alternatives

Generally, coldwater fisheries support trout and salmon (Salmonidae); these are important commercial and sport fishes that require cold, clean water for survival and reproduction. Chinook (*Oncorhynchus tshawytscha*), coho (*Oncorhynchus kisutch*), and pink salmon (*Oncorhynchus gorbuscha*) have been introduced to Lake Superior and now spawn in its tributaries (Minnesota DNR 2016i). Lake trout (*Salvelinus namaycush*) are naturally reproducing in cold lakes throughout the region. The native brook trout (*Salvelinus fontinalis*) and the introduced brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) are also present in rivers and streams in the region. No salmon species occur within streams crossed by the Applicant's proposed project.

Coolwater fisheries support gamefish such as northern pike (*Esox lucius*) and muskellunge or muskie, walleye (*Sander vitreus*), and yellow perch (*Perca flavescens*). Northern pike generally inhabit clear, shallow, warm waters near shore but move to deeper water midsummer to use coolwater areas (Michigan DNR 2016a). Muskellunge survive in a wide range of temperatures and prefer clear water (ADW 2016). They move from shallow, weedy water to deeper water as they grow larger (ADW 2016). Walleye occur in submerged bars and rocky areas of shallow bay lake waters in spring and fall but also move to cooler, deeper water (i.e., less than 50 feet) in summer (Michigan DNR 2016b). Yellow perch generally prefer relatively shallow water (i.e., less than 30 feet deep) near shore (Michigan DNR 2016c).

Warmwater fisheries support catfish and bullheads (Ictaluridae), sunfish and bass (Centrarchidae), carp and minnows (Cyprinidae), and temperate bass (Moronidae). Catfish and bullheads occur throughout the region, but are most common in warm, fertile rivers and lakes (Minnesota DNR 2016j). Sunfish, including the bluegill (*Lepomis macrochirus*), which is the most popular sunfish, prefer lakes and slow streams (Minnesota DNR 2016k). Bass, both largemouth (*Micropterus salmoides*) and smallmouth (*Micropterus dolomieu*), are becoming increasingly popular with anglers. Largemouth bass tend to favor clear lakes with abundant aquatic vegetation, and they can tolerate quite warm water temperatures. Smallmouth bass are often in rivers with suitable gravel or rubble for spawning that are warmer than those that support trout (Minnesota DNR 2016l). Carps and minnows occupy a variety of habitats, including coldwater and warmwater environments (Cornell 2016), and several are listed as SGCN; however, the common carp, and a number of Asian carp species are invasive fish. The white bass (*Morone chrysops*), important for sport fishing due to its size and abundance, occurs in rivers, tributaries, and reservoirs, as well as in several lakes (Minnesota DNR 2016m). The yellow bass (*Morone mississippiensis*) is present in the Mississippi River backwaters below Lake Pepin (Minnesota DNR 2016m).

All three main types of fishery (coldwater, coolwater, and warmwater) are present in the region. Protected and rare species are discussed in Section 5.2.5, including species listed by state or federal endangered species regulations.

Wildlife and Wildlife Habitat

The Project region supports a diversity of terrestrial wildlife, including mammals, birds, amphibians, reptiles, and invertebrates. Mammals include both game (those species that are hunted or trapped such as big and small game animals, and fur-bearing animals) and nongame species (small mammals and non-hunted species). Birds can be resident or migratory and include game species (waterfowl and upland game birds such as wild turkey [*Meleagris gallopavo*]) and nongame species (e.g., songbirds). Amphibians and reptiles include frogs, toads, salamanders, snakes, lizards, and turtles. Invertebrates include a wide variety of insects and other arthropods (e.g., spiders), as well as mussels. This section describes the existing wildlife resources in the vicinity of the Applicant's proposed project.

Applicant's Proposed Project

Wildlife Habitats

Northern Minnesota is relatively undeveloped with large expanses of protected lands that are home to many species of wildlife. The Applicant's proposed project would cross 10 broad-scale vegetation cover classes: evergreen forest, deciduous forest, mixed forest, shrub/scrub, grassland/herbaceous, hay/pasture, cultivated crops, woody wetlands, emergent herbaceous wetlands, and barren land (Homer et al. 2015). Each of these cover classes is defined in Table 5.2.3-2 in Section 5.2.3.1.2, Methodology. In general, the Applicant's proposed project occurs within ecoregions with forested uplands, forested wetlands, non-forested wetlands, prairie/grasslands, and agricultural areas. Table 5.2.4-2 lists the acreages of vegetation types crossed by the Applicant's proposed project.

Table 5.2.4-2. Vegetation Cover Potentially Affected by the Applicant's Proposed Project (acres)

Vegetation Cover Class	Con[a]	Op[b]	ATWS[c]	Access Roads	Pump Stations	MLVs	Total[d]	
							Con	Op
Evergreen forest	177	71	18	19	1	1	199	87
Deciduous forest	1,416	622	97	103	2	2	1,544	698
Mixed forest	20	8	1	2	<0.1	<0.1	21	11
Shrub/scrub	239	117	15	13	2	<0.1	256	131
Grassland/herbaceous	131	63	32	9	4	0	165	73
Hay/pasture	585	262	121	45	16	1	706	323
Cultivated crops	1,699	726	327	22	20	2	2,028	768
Woody wetlands	419	204	18	13	3	1	438	219
Emergent herbaceous wetlands	229	122	19	7	3	0	249	132
Barren land	4	2	8	1	<0.1	<0.1	12	2
TOTAL	**4,917**	**2,197**	**656**	**234**	**50**	**6**	**5,617**	**2,444**

Source: Homer et al. 2015.

[a] Con = Enbridge-provided footprint for construction work area in Minnesota. In North Dakota and Wisconsin, estimated construction impact area in acres based on 120-foot-wide construction work area centered on route, including the 50-foot-wide permanent right-of-way.

[b] Op = Enbridge-provided footprint in Minnesota. Estimated permanent impact acres based on 50-foot-wide right-of-way centered on route in North Dakota and Wisconsin.

[c] ATWS = additional temporary workspaces (includes pipe yards)

[d] Total: Con = sum of pipeline construction work area, ATWS, and temporary access roads; Op = sum of pipeline permanent right-of-way, primary access roads, pump stations, and MLVs (mainline valves).

Note:

Values in table may not sum to subtotals and totals due to rounding.

Forested uplands, including evergreen, deciduous, or mixed forests, typically exhibit closed canopies, dense understories, large trees, and downed trees. These areas are important habitat components for a variety of birds, salamanders, white-tailed deer (*Odocoileus virginianus*), and large carnivores such as gray wolves (*Canis lupus*) and black bears (*Ursus americanus*).

The shrub/scrub cover class includes shrub and young trees less than 5 meters tall, and includes vegetated areas in an early successional stage or trees stunted from environmental conditions (Homer et al. 2015). These habitats support white-tailed deer, small mammals, reptiles, and several bird species (e.g., ruffed grouse [*Bonasa umbellus*], American woodcock [*Scolopax minor*])

Grasslands and prairies are typified by large open areas with grasses and flowering plants dominating, which provide habitat for many species of pollinators, songbirds, small mammals, snakes, deer, coyotes (*Canis latrans*), and red fox (*Vulpes vulpes*).

Agricultural lands, including hay/pasture and cultivated crops, attract white-tailed deer, sandhill cranes (*Grus canadensis*), trumpeter swans (*Cygnus buccinator*), and wild turkeys that come to feed on crops.

Emergent herbaceous wetlands, such as marshes, and woody wetlands are permanently or periodically inundated with water and provide habitat for amphibians and reptiles, aquatic insects, aquatic mammals such as muskrats (*Ondatra zibethicus*), and many species of birds. Calcareous fens are a type of wetland that support unique plant and animal species (see Sections 5.2.1.3 and 5.2.5).

Barren land includes areas where vegetation accounts for less than 15 percent of the total cover. It may include areas of exposed bedrock, rockslides, glacial debris, strip mines, gravel pits, and other accumulations of earthen material (Homer et al. 2015). These areas provide minimal habitat for wildlife. However, reptiles (e.g., snakes) and small mammals may find shelter in between rocks.

Management Units

Wildlife conservation lands that occur along or near the Applicant's proposed project are listed in Table 5.2.4-3. The Applicant's proposed project occurs within the vicinity of a variety of Minnesota DNR wildlife management and conservation areas, including WMAs, wildlife refuges, state forests, and recreation areas.

Portions of six WMAs occur within the ROI for the Applicant's proposed project (Grayling Marsh, Lawler, Lowe, McGregor, Mud Lake, and Salo Marsh). Two (Grayling Marsh and Lawler) are located within the construction and operation area. Grayling Marsh WMA consists mostly of lowland habitats managed for sharp-tailed grouse (*Tympanuchus phasianellus*) and sandhill cranes. Other game species at this site include white-tailed deer, American black bear, small game, forest upland birds, and waterfowl. Lawler WMA consists mostly of marsh and low brush areas that are managed for deer and waterfowl (Minnesota DNR 2016l).

Figure 5.2.4-3 provides an overview of WMAs, wildlife refuges, and other conservation lands near the Applicant's proposed project and system alternative SA-04. The lands shown in Figure 5.2.4-3 include those assigned GAP Status Codes 1, 2, and 3 to indicate the level of protection and management objectives as well as wildlife refuges and state WMAs.

Table 5.2.4-3. Wildlife Conservation Lands within 0.5 Mile of the Applicant's Proposed Project and System Alternative SA-04

Location, Designation Type, and Name	Applicant's Proposed Project		System Alternative SA-04	
	Acres	Number of Parcels	Acres	Number of Parcels
North Dakota				
Habitat or Species Management Area				
Dakota Tallgrass Prairie Wildlife Management Area	--	--	34,806.8	1
Resource Management Area				
Pembina County Waterfowl Production Area (designated)	243.9	5	280.4	7
Pembina County Waterfowl Production Area (not designated)	--	--	36.5	2
North Dakota subtotal	***243.9***	***5***	***35,123.8***	***10***
Minnesota				
Protective Management Area				
Wetlands Reserve Program	--	--	11.4	2
Habitat or Species Management Area				
Clair Rollings Wildlife Management Area	--	--	29.7	1
Grayling Marsh Wildlife Management Area	820.1	1	--	--
Horning Pit Wildlife Management Area	--	--	34.2	2
Lawler Wildlife Management Area	197.8	2	--	--
Lowe Wildlife Management Area	57.9	1	--	--
Lyle-Austin Wildlife Management Area	--	--	12.4	1
McGregor Wildlife Management Area	152.1	1	--	--
Mud Lake Wildlife Management Area	3.6	1	--	--
Mueller Wildlife Management Area	--	--	38.4	1
Red Cedar River Wildlife Management Area	--	--	35.5	1
Salo Marsh Wildlife Management Area	201.6	1	--	--
Sena Wildlife Management Area	--	--	114.6	1
Swan Lake Wildlife Management Area	--	--	40.4	1
Windot Wildlife Management Area	--	--	5.7	2
Resource Management Area				
Bureau of Land Management land	60.8	1	--	--
Litchfield Wetland Management District	--	--	457.9	4
Morris Wetland Management District	--	--	319.4	6

Table 5.2.4-3. Wildlife Conservation Lands within 0.5 Mile of the Applicant's Proposed Project and System Alternative SA-04

Location, Designation Type, and Name	Applicant's Proposed Project		System Alternative SA-04	
	Acres	Number of Parcels	Acres	Number of Parcels
State Forest Lands				
Fond du Lac	987.8	2	--	--
Foothills	1,811.4	1	--	--
Hill River	5,056.0	1	--	--
Huntersville	4,504.0	2	--	--
Land O'Lakes	5,913.6	5	--	--
Mississippi Headwaters	1,335.2	2	--	--
Paul Bunyan	264.9	1	--	--
Savanna	579.6	6	--	--
Waukenabo	545.5	4	--	--
White Earth	207.6	1	--	--
Private Conservation Land				
Conservation Reserve Enhancement Program	--	--	751.0	32
Marginal cropland – limited	22.3	4	29.5	4
Marginal cropland – perpetual	--	--	33.2	5
Miller Prairie Fee	--	--	144.2	1
Reinvest in Minnesota Wetlands Reserve Program	--	--	431.1	10
Riparian buffer strip	--	--	5.3	2
Riparian lands	--	--	70.3	2
Minnesota subtotal	***22,721.8***	***37***	***2,564.0***	***78***
Iowa				
Habitat or Species Management Area				
Elma Wildlife Management Area	--	--	81.6	1
Recreation Management Area				
Pioneer State Recreation Area	--	--	8.3	2
Iowa subtotal	--	--	***89.9***	***3***
Illinois				
National Forest - National Grassland				
Midewin National Tallgrass Prairie	--	--	154.6	4
National Wildlife Refuge				
Upper Mississippi River Wildlife and Fish Refuge	--	--	0.9	1

Table 5.2.4-3. Wildlife Conservation Lands within 0.5 Mile of the Applicant's Proposed Project and System Alternative SA-04

Location, Designation Type, and Name	Applicant's Proposed Project		System Alternative SA-04	
	Acres	Number of Parcels	Acres	Number of Parcels
Protective Management Areas				
Coon Creek	--	--	10.7	1
East Grove	--	--	6.8	1
Lower Fox River-Blake's Landing Nature Preserve	--	--	0.0	4
Marsh Relicts	--	--	6.4	1
Mississippi River	--	--	213.4	1
Joliet Army Ammunition Plant	--	--	78.9	4
Des Plaines	--	--	10.2	1
State Park				
Hennepin Canal	--	--	44.1	1
Local Forest				
McKinley Woods Preserve 1	--	--	49.7	1
McKinley Woods Preserve 2	--	--	0.2	1
Illinois subtotal	--	--	***575.9***	***20***
Wisconsin				
Protective Management Area				
Statewide Natural Area	231.0	1	--	--
Recreation Management Area				
North Country National Scenic Trail	2.0	2	--	--
Wisconsin subtotal	***232.9***	***3***	--	--
TOTAL	**23,198.6**	**45**	**38,353.6**	**111**

Source: USGS GAP 2016.

Notes:

Values in table may not sum to subtotals and totals due to rounding.

Represents GAP Status 1, 2, and 3 areas only; these lands have permanent protection from conversion of natural land cover that provides wildlife habitat for all or most of the area.

Acreage of conservation lands and number of parcels within 0.5 mile of the Applicant's proposed project and system alternative SA-04 route.

"--" = no occurrence

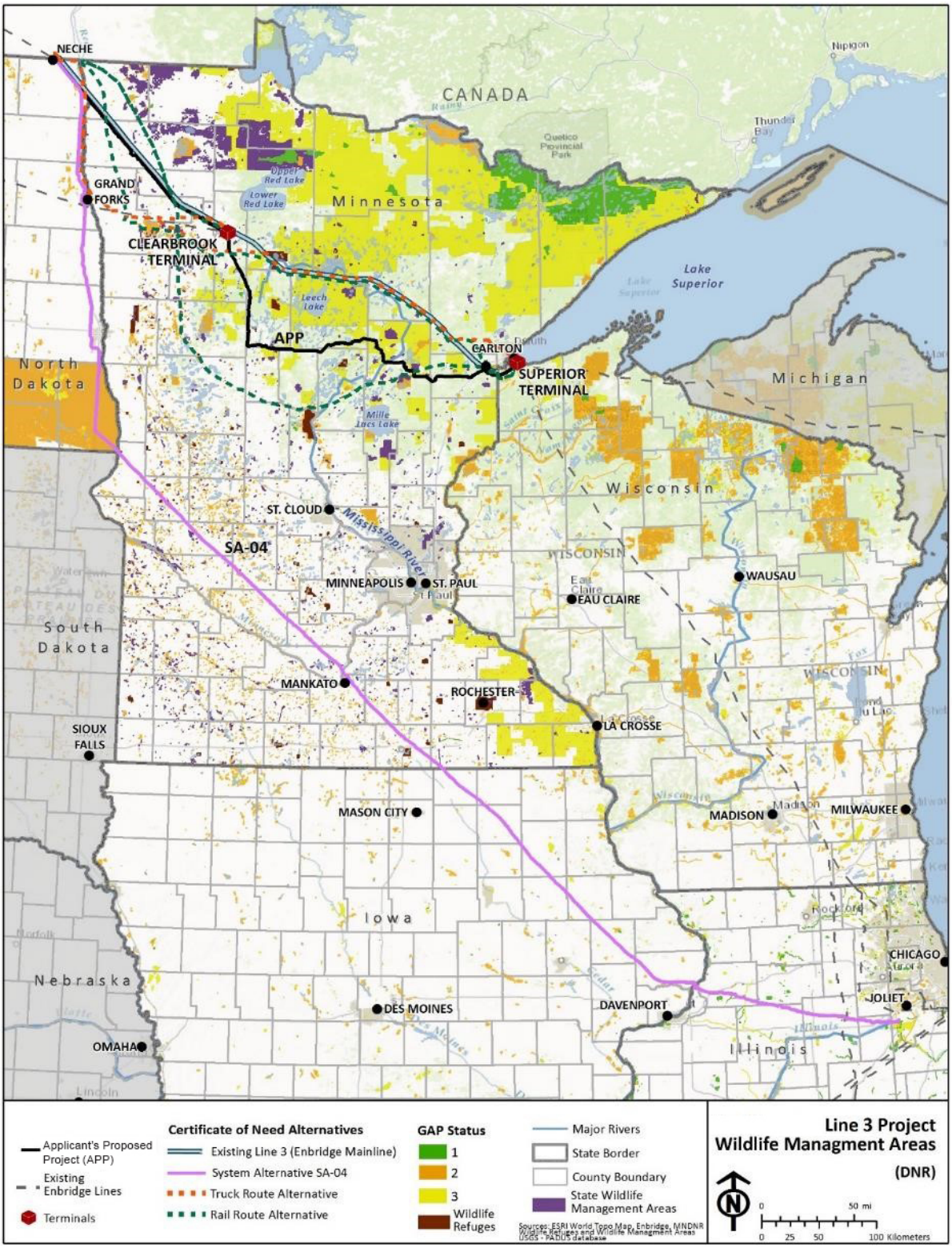

Source: USGS GAP 2016

Note: GAP Status 1 and 2 lands are managed for biodiversity, while GAP Status 3 lands include areas managed for multiple uses.

Figure 5.2.4-3. Wildlife Management Areas and Refuges near the Applicant's Proposed Project and Certificate of Need Alternatives

IBAs in the vicinity of the Applicant's proposed project are as follows (Figure 5.2.4-4):

- Itasca State Park IBA – This state priority IBA supports 222 species of birds. Itasca's extensive stands of boreal forests with mixed hardwoods provide excellent habitat for many northern birds such as crossbills (*Loxia* spp.), gray jays (*Perisoreus canadensis*), finches (Fringillidae), thrushes (Turdidae), black-backed woodpeckers (*Picoides arcticus*), and warblers (Parulidae). Over 20 species of nesting warblers and multiple breeding pairs of bald eagles are supported by the park.

- McGregor IBA – This state priority IBA contains various habitats to support many bird species, including wetlands, lowland forests, upland deciduous forests, open brushlands, and open grasslands. Species that use the IBA for nesting include, but are not limited to, the American bittern (*Botaurus lentiginosus*), yellow rail, sora (*Porzana carolina*), black tern (*Chlidonias niger*), and sandhill crane; 12 species of warblers; the trumpeter swan; bald eagle; American woodcock; wood thrush (*Hylocichla mustelina*); black-billed cuckoo (*Coccyzus erythropthalmus*); LeConte's sparrow (*Ammodramus leconteii*); and bobolink (*Dolichonyx oryzivorus*). The site is also known for the large number of ring-necked ducks (*Aythya collaris*) it supports during migration.

Wildlife in the Project Region

Mammals

Large Mammals and Big Game

The white-tailed deer is the most common big game animal occurring along the pipeline routes. Deer occur throughout the Project region and are an ecologically, socially, and economically important species. White-tailed deer inhabit a wide variety of habitats and are highly adaptable. Croplands, grasslands, shrublands, orchards, woodlands, and residential areas provide foraging and resting areas for deer. White-tailed deer eat a varied diet that may include acorns, corn, soybeans, mushrooms, grasses, tree leaves, buds, twigs and bark, wild grapes, apples, and assorted shrubs. During winter, deer often aggregate or "yard" in forested stream bottoms and other areas protected from heavy snows. Wolves, coyotes, bears, and bobcats (*Lynx rufus*) are natural predators of deer. White-tailed deer are hunted for sport and meat, and permits are available for hunting using firearms (e.g., shotgun, rifle), muzzleloaders, or archery (e.g., bow and arrow).

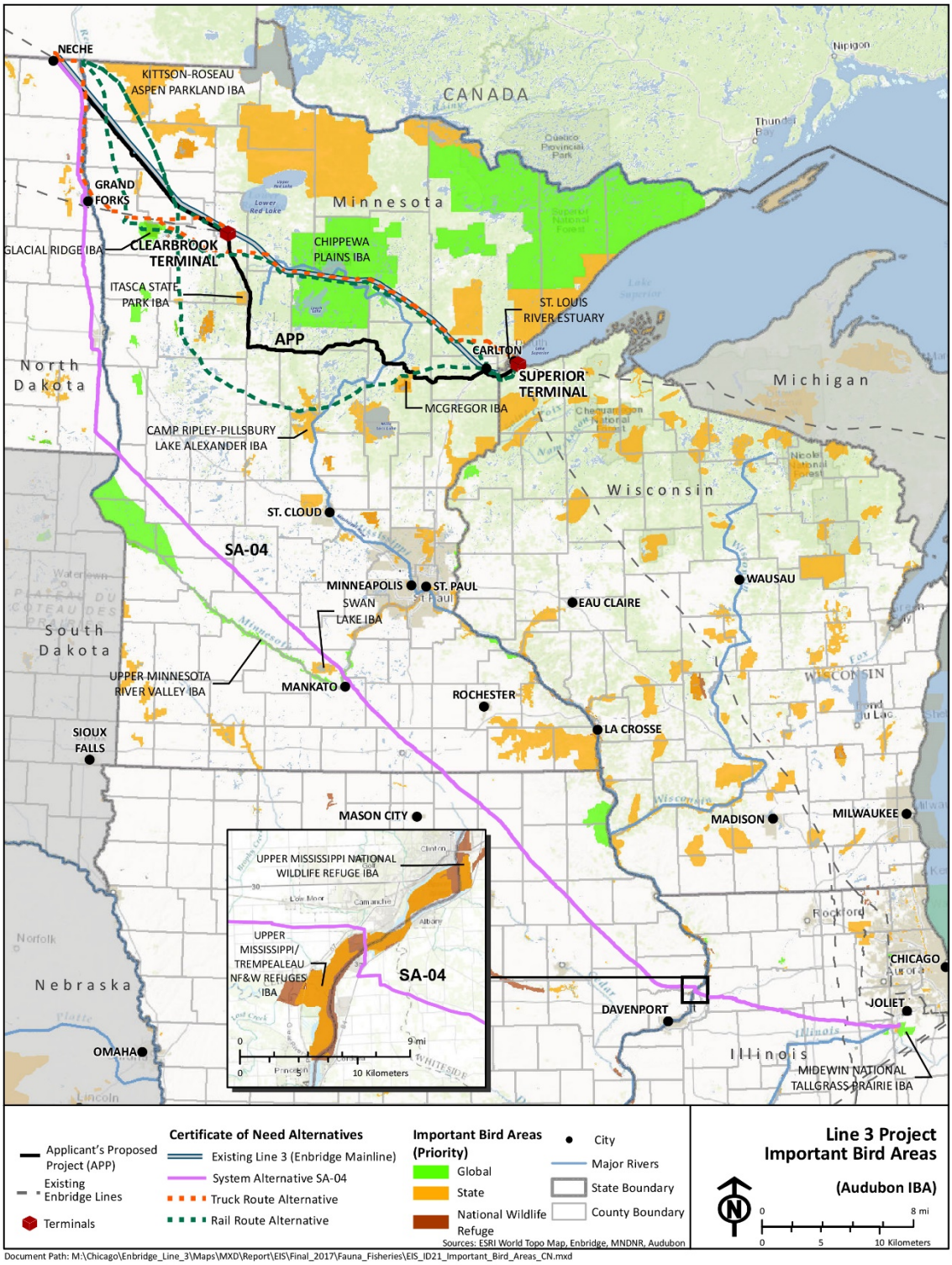

Source: Audubon 2016.

Figure 5.2.4-4. Audubon Important Bird Areas near the Applicant's Proposed Project and Certificate of Need Alternatives

Black bears are another big game mammal that occur in the Project region. Black bears occur mainly in the northern third of Minnesota but range as far south as the interface between the forested and agricultural areas (Minnesota DNR 2016i). There are roughly 20,000 black bears in Minnesota (Minnesota DNR 2016n). Wisconsin is home to a robust black bear population estimated at more than 28,000 bears. The black bear's primary range in Wisconsin includes the northern third of the state (Wisconsin DNR 2016b). Black bears are generally found in forests, swamps, and other areas with dense cover, but they also venture into clearings to feed. Black bears feed primarily on new plant growth in spring, switching to ants and ant pupae and a variety of berries in summer, and nuts (acorns and hazelnuts) in autumn. Black bears supplement their diets with corn and other crops, bird eggs, honey, and deer fawns opportunistically. Black bears are hunted for their meat and fur, primarily from the coniferous areas of northeast Minnesota. Sport hunting is their main source of mortality. Minnesota hunters harvest an average of about 3,000 black bears annually (Minnesota DNR 2016n).Wisconsin hunters harvested approximately 4,643 bears in 2016 (Wisconsin DNR 2016c).

While elk (*Cervus canadensis*) are managed as a game species in many states, only two small remnant populations are present in Minnesota and elk are listed as a Species of Concern in the state. Elk once were distributed throughout Minnesota, but the native woodland elk (*C. elaphus canadensis*) and prairie elk (*C. e. manitobensis*) subspecies were nearly extirpated from the state by the early 1900s because of excessive hunting during the 1800s. In the early 1930s, captive-bred elk were used to reestablish a population in northwest Beltrami County. Since then, a second elk herd has become established in Kittson and Roseau counties near the border with Manitoba, Canada. This northern herd is believed to include individuals that have naturally emigrated from Canada, North Dakota, or the original Beltrami County reintroduced herd (Minnesota DNR 2016o). Elk prefer a diet of grasses and forbs, but their diet varies by season. Elk will browse on willow (*Salix* spp.), aspen (*Populus* spp.), and other woody vegetation, and will consume many agricultural crops. Wolves, coyotes, black bears, and cougars (*Puma concolor*) are natural predators of elk. Elk hunting is conservatively managed in Minnesota. Each year, a limited number of licenses are offered to Minnesota residents to hunt elk. Hunters are selected using a lottery system. In 2014, 1,167 hunters applied for a license, but only nine permits were issued and six elk ultimately were harvested (Minnesota DNR 2014b).

Moose (*Alces alces*) occur in the Project region in the northeastern portion of North Dakota, and in the northwestern and northeastern portions of Minnesota. Moose hunting was permitted in Minnesota in both of these regions until 1997 when it was prohibited in the northwest corner. Hunting continued in the northeast portion of the state until a 2013 aerial survey revealed that the moose population had declined in this area by 52 percent since 2010, after which Minnesota DNR suspended moose hunting indefinitely (Minnesota DNR 2013, 2016p). Moose hunting is prohibited in Wisconsin, where a combination of parasites common to white-tailed deer and unregulated hunting caused their earlier disappearance by the early 1900s (Wisconsin DNR 2016d). Moose eat aspen, maple (*Acer* spp.), and cherry (*Prunus* spp.) trees and many kinds of water plants (Minnesota DNR 2016q). Wolves and bears are natural predators of moose.

Cougars, also known as mountain lions or pumas, are rare but could occur within the region. Cougars occurred throughout most of Minnesota prior to European settlement (Minnesota DNR 2016i). Today, they are occasionally observed in Minnesota. Because there is no evidence of a viable breeding population in Minnesota, cougars are not currently tracked in the Minnesota DNR's Rare Features Database. Cougars are hunted in southwestern North Dakota but not within the Project area. Cougars are not considered a game animal in Minnesota, Iowa, Illinois, or Wisconsin, and are considered rare migrant occurrences within these states.

Mid-Sized Mammals, Small Game, and Furbearers

The Project region is home to a number of mid-sized mammals, many of which are classified as "small game" in hunting regulations or as furbearers in trapping regulations. Common small game and furbearers that are hunted or trapped in the Project area include the badger (*Taxidea taxus*), beaver (*Castor canadensis*), bobcat, coyote, fisher (*Martes pennanti*), pine marten (*Martes martes*), red fox, gray fox (*Urocyon cinereoargenteus*), mink (*Neovison vison*), muskrat, Virginia opossum (*Didelphis virginiana*), river otter (*Lontra canadensis*), rabbits and hares (Leporidae), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), squirrels (Sciuridae), and weasels (Mustelidae). Many furbearers are associated with water and wetlands (e.g., muskrats, mink, otters, and beavers). Rabbits, raccoons, opossums, and coyotes are present in a wide variety of habitats, including croplands, residential areas, hedgerows, and forests. Squirrels require forested habitats with abundant mix of mast producing trees such as elms, maples, oaks, walnut, and/or hickory. Mid-sized mammals not traditionally hunted or trapped include the porcupine (*Erethizon dorsatum*) and groundhog (*Marmota monax*).

Small Mammals

Small mammals, including mice, moles, voles and shrews, are important members of ecosystems. Herbivorous small mammals shape vegetative communities by spreading seeds and grazing. Their burrowing activities and the addition of feces and urine to the soil influence soil chemistry through changes in nutrient and mineral cycling rates and pathways (Hull Sieg 1987). Small mammals such as shrews and bats also function as secondary consumers by preying on invertebrates and other mammals. Small mammals serve as food supply for a large number of predators and can influence predator population cycles. Predators such as foxes, various owl species, and various hawk species rely heavily on rodents and other small mammals for food.

Species of small mammals that are likely to occur in the Project region include, but are not limited to, the southern bog lemming (*Synaptomys cooperi*), meadow vole (*Microtus pennsylvanicus*), red-backed vole (*Myodes gapperi*), meadow jumping mouse (*Zapus hudsonius*), woodland jumping mouse (*Napaeozapus insignis*), western harvest mouse (*Reithrodontomys megalotis*), white-footed mouse (*Peromyscus leucopus*), deer mouse (*Peromyscus maniculatus*), house mouse (*Mus musculus*), star-nosed mole (*Condylura cristata*), and Norway rat (*Rattus norvegicus*) (Minnesota DNR 2016r). Shrews are the smallest mammals in the Project area. Shrews that could occur in the Project region include the pygmy shrew (*Sorex minutus*), short-tail shrew (*Blarina brevicauda*), masked shrew (*Sorex cinereus*), northern water shrew (*Sorex palustris*), and arctic shrew (*Sorex arcticus*) (Minnesota DNR 2016s).

Bats are important to ecosystems in part because they consume vast numbers of insects, including agricultural pests. Bats occurring in the Project area are primarily forest dwelling and/or associated with riparian areas, and are insectivorous. In summer the bats roost in trees or in buildings, and in fall migrate to caves to hibernate through the winter. They return to their summer roosting locations in spring. The little brown bat (*Myotis lucifugus*) and big brown bat (*Eptesicus fuscus*) are the most common species in Minnesota. Other species that occur in the Project region include the northern long-eared bat (*Myotis septentrionalis*), hoary bat (*Lasiurus cinereus*), eastern red bat (*Lasiurus borealis*), silver-haired bat (*Lasionycteris noctivagans*), and tri-colored bat (*Perimyotis subflavus*). The northern long-eared bat was recently listed as threatened by USFWS (see Section 5.2.5).

Birds

Waterfowl and Gamebirds

All waterfowl and most gamebirds occurring in the Project region are considered migratory birds and are protected under the MBTA (which prohibits the take of any migratory birds without authorization from USFWS). Hunting regulations are developed and authorized by USFWS and state game and fish departments. Waterfowl are harvested primarily in autumn, with some goose seasons occurring in spring. Many waterfowl species breed in or migrate through areas that would be crossed by the Applicant's proposed project, SA-04, or facilities developed for the CN Alternatives (Table 5.2.4-4). Important recreational waterfowl include the Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), wood duck (*Aix sponsa*), ring-necked duck, and blue-winged teal (*Anas discors*). Waterfowl habitats include wooded river bottoms, flooded forests, lakes (particularly those with wild rice), rivers, marshes, and flooded grain fields.

Other gamebird species include the American woodcock, Wilson's snipe (*Gallinago delicata*), mourning dove (*Zenaida macroura*), wild turkey, sandhill crane, greater prairie chicken (*Tympanuchus cupido*), sharp-tailed grouse, and introduced gamebirds such as the ring-necked pheasant (*Phasianus colchicus*) and gray (Hungarian) partridge (*Perdix perdix*). These species occur in areas crossed by the Applicant's proposed project, SA-04, or facilities developed for the CN Alternatives (Table 5.2.4-4).

Nongame Birds

The upper Midwest is home to many nongame bird species. Birds are an important part of healthy functioning ecosystems, including forests and prairies, and also developed areas such as agricultural, urban, and suburban areas. While a number of bird species are resident or migrate only short distances, many species perform long annual migrations in spring and fall. Minnesota, Iowa, Illinois, and Wisconsin are located on the Mississippi Flyway, a key migration flyway for millions of birds and hundreds of species that roughly follows the Mississippi River. North Dakota is part of the Central Flyway that encompasses the Great Plains area and links central Canada with the region surrounding the Gulf of Mexico. Nongame birds occur in all habitat types in the ROI, including coniferous, deciduous, and mixed forests; riparian areas and forested and non-forested wetlands; lakes, rivers, and streams; grasslands, prairies, and pastures; and shelterbelts and agricultural lands. Table 5.2.4-4 provides a list of some of the more common species expected to occur in the Project region.

Bald eagles once were protected by the ESA. Through the federal government's banning of Dichlorodiphenyltrichloroethane (DDT) and various conservation actions taken across the United States, populations recovered sufficiently and bald eagles were removed from the endangered species list (delisted) in 2007. However, bald eagles are still protected under the MBTA and the BGEPA. This legislation also protects their nesting structures, which tend to be used for a number of years. Bald eagles prefer to nest near lakes and rivers in forested areas where tall, large-diameter trees are available for nesting. Due to a growing population, more eagles have been found nesting in non-typical locations, such as tree lines in agricultural landscapes.

Table 5.2.4-4. Game and Nongame Birds Typical of Habitats Crossed by theCertificate of Need Alternatives

Habitat	Game	Nongame
Evergreen and mixed forests	--	Broad-winged hawk (*Buteo platypterus*), northern goshawk (*Accipiter gentilis*), sharp-shinned hawk (*Accipiter striatus*), boreal owl (*Aegolius funereus*), eastern whip-poor-will (*Antrostomus vociferus*), black-backed woodpecker (*Picoides arcticus*), hairy woodpecker (*Picoides villosus*), northern flicker (*Colaptes auratus*), pileated woodpecker (*Dryocopus pileatus*), yellow-bellied sapsucker (*Sphyrapicus varius*), merlin (*Falco columbarius*), blue-headed vireo (*Vireo solitarius*), red-eyed vireo (*Vireo olivaceus*), blue jay (*Cyanocitta cristata*), common raven (*Corvus corax*), gray jay (*Perisoreus canadensis*), brown creeper (*Certhia americana*), veery (*Catharus fuscescens*), black-and-white warbler (*Mniotilta varia*), black-throated green warbler (*Setophaga virens*), nashville warbler (*Oreothlypis ruficapilla*), yellow-rumped warbler (*Setophaga coronata*), chipping sparrow (*Spizella passerina*), dark-eyed junco (*Junco hyemalis*), white-throated sparrow (*Zonotrichia albicollis*), pine siskin (*Spinus pinus*)
Deciduous and mixed forests	Ruffed grouse (*Bonasa umbellus)*, wild turkey (*Meleagris gallopavo*)	Cooper's hawk (*Accipiter cooperii*), red-shouldered hawk (*Buteo lineatus*), barred owl (*Strix varia*), great horned owl (*Bubo virginianus*), ruby-throated hummingbird (*Archilochus colubris*), downy woodpecker (*Picoides pubescens*), red-bellied woodpecker (*Melanerpes carolinus*), eastern wood-pewee (*Contopus virens*), least flycatcher (*Empidonax minimus*), great crested flycatcher (*Myiarchus crinitus*), blue-headed vireo (*Vireo solitarius*), red-eyed vireo (*Vireo olivaceus*), tufted titmouse (*Baeolophus bicolor*), white-breasted nuthatch (*Sitta carolinensis*), house wren (*Troglodytes aedon*), wood thrush (*Hylocichla mustelina*), hermit thrush (*Catharus guttatus*), veery, cedar waxwing (*Bombycilla cedrorum*), American redstart (*Setophaga ruticilla*), chestnut-sided warbler (*Setophaga pensylvanica*), ovenbird (*Seiurus aurocapilla*), indigo bunting (*Passerina cyanea*), rose-breasted grosbeak (*Pheucticus ludovicianus*), scarlet tanager (*Piranga olivacea*), Baltimore oriole (*Icterus galbula*)
Riparian areas, wetlands (forested or non-forested)	Canada goose (*Branta canadensis*), wood duck (*Aix sponsa*), gadwall (*anas strepera*), mallard (*Anas platyrhynchos*), blue-winged teal (*Anas discors*), northern shoveler (*Anas clypeata*), green-winged teal (*Anas crecca*), canvasback (*Aythya valisineria*), redhead (*Aythya americana*), ring-necked duck (*Aythya collaris*), lesser scaup (*Aythya affinis*), common goldeneye (*Bucephala clangula*), American coot (*Fulica americana*), sandhill crane (*Grus canadensis*), American woodcock (*Scolopax minor*), Wilson's snipe (*Gallinago delicate*)	Trumpeter swan (*Cygnus buccinator*), pied-billed grebe (*Podilymbus podiceps*), red-necked grebe (*Podiceps grisegena*), western grebe (*Aechmophorus occidentalis*), American bittern (*Botaurus lentiginosus*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), green heron (*Butorides virescens*), northern harrier (*Circus cyaneus*), osprey (*Pandion haliaetus*), bald eagle (*Haliaeetus leucocephalus*), sora (*Porzana carolina*), Virginia rail (*Rallus limicola*), yellow rail (*Coturnicops noveboracensis*), black tern (*Chlidonias niger*), Forster's tern *(Sterna forsteri*), short-eared owl (*Asio flammeus*), belted kingfisher (*Megaceryle alcyon*), bank swallow (*Riparia riparia*), marsh wren (*Cistothorus palustris*), sedge wren (*Cistothorus platensis*), swamp sparrow (*Melospiza georgiana*), red-winged blackbird (*Agelaius phoeniceus*), yellow-headed blackbird (*Xanthocephalus xanthocephalus*)

Table 5.2.4-4. Game and Nongame Birds Typical of Habitats Crossed by theCertificate of Need Alternatives

Habitat	Game	Nongame
Lakes, rivers, streams	Canada Goose, wood duck, canvasback, redhead, ring-necked duck, lesser scaup, common goldeneye	Common loon (*Gavia immer*), red-necked grebe, western grebe, double-crested cormorant (*Phalacrocorax auritus*), American white pelican (*Pelecanus erythrorhynchos*), osprey, bald eagle, ring-billed gull (*Larus delawarensis*), belted kingfisher
Prairies, grasslands, pastures, open habitats	Greater prairie chicken (*Tympanuchus cupido*), sharp-tailed grouse (*Tympanuchus phasianellus*)	Turkey vulture (*Cathartes aura*), northern harrier, killdeer (*Charadrius vociferus*), upland sandpiper (*Bartramia longicauda*), American kestrel (*Falco sparverius*), eastern kingbird (*Tyrannus tyrannus*), loggerhead shrike (*Lanius ludovicianus*), horned lark (*Eremophila alpestris*), barn swallow (*Hirundo rustica*), eastern bluebird (*Sialia sialis*), clay-colored sparrow (*Spizella pallida*), field sparrow (*Spizella pusilla*), grasshopper sparrow (*Ammodramus savannarum*), Henslow's sparrow (*Ammodramus henslowii*), Savannah sparrow (*Passerculus sandwichensis*), vesper sparrow (*Pooecetes gramineus*), bobolink (*Dolichonyx oryzivorus*), eastern meadowlark (*Sturnella magna*), western meadowlark (*Sturnella neglecta*), dickcissel (*Spiza americana*)
Agricultural areas, shelterbelts	Canada goose, mallard, gray (Hungarian) partridge (*Perdix perdix*), ring-necked pheasant (*Phasianus colchicus*), wild turkey, sandhill crane, mourning dove (*Zenaida macroura*)	Turkey vulture, northern harrier, red-tailed hawk (*Buteo jamaicensis*), killdeer, rock pigeon (*Columba livia*), great horned owl, common nighthawk (*Chordeiles minor*), American kestrel, American crow (*Corvus brachyrhynchos*), black-billed magpie (*Pica hudsonia*), black-capped chickadee (*Poecile atricapillus*), gray catbird (*Dumetella carolinensis*), northern mockingbird (*Mimus polyglottos*), American robin (*Turdus migratorius*), eastern bluebird, song sparrow (*Melospiza melodia*), brown-headed cowbird (*Molothrus ater*), common grackle (*Quiscalus quiscula*), red-winged blackbird, American goldfinch (*Spinus tristis*), house finch (*Haemorhous mexicanus*), house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*)

Sources: Minnesota DNR 2016t, 2016u.

Osprey were also affected by DDT and suffered population declines in the 1960 and 1970s. Their populations have since recovered and they occur throughout much of the upper Midwest. While osprey used to rely entirely on dead trees for nests, they now also use man-made structures such as powerline poles and communication towers for nesting. Raptor stick nest surveys were conducted within 0.5 mile along the Applicant's proposed project to locate and identify bald eagle and osprey nests between 2014 and 2016. Six active bald eagle nests and one active osprey nest were observed during the most recent survey in 2016 (Table 5.2.4-5). An additional stick nest was documented in Carlton County, Minnesota; however, the status of the nest and the species using the nest, if any, is not currently known.

Table 5.2.4-5 Raptor Stick Nests within 0.5 Mile of the Applicant's Proposed Project in North Dakota and Minnesota (2014, 2015, and 2016)

County, State	Distance from Workspace (miles)	Nest Status			Common Name
		2014	2015	2016	
Pembina, North Dakota	0.2	No data	Active	Active	Bald eagle
Clearwater, Minnesota	0.1	Not present	Not present	Active	Bald eagle
Clearwater, Minnesota	1.0	Not present	Inactive	Active	Bald eagle
Hubbard, Minnesota	0.0	Inactive	Active	Active	Osprey[a]
Carlton, Minnesota	0.2	Inactive	Inactive	No data	Unknown
Cass, Minnesota	0.1	Not present	Not present	Active	Bald eagle
Cass, Minnesota	0.5	Not present	Inactive	Active	Bald eagle
Aitkin, Minnesota	0.4	Not present	Active	Active	Bald eagle

Sources: Merjent 2015a, 2015b.

[a] Considered a bald eagle nest in 2014, but an osprey was observed in 2015 and 2016.

Reptiles and Amphibians

Amphibians are four-legged, cold-blooded (meaning they get their warmth from the environment) animals that typically start out as larvae living in water (e.g., tadpoles). The young generally undergo metamorphosis from larva with gills to an adult air-breathing form with lungs. Amphibians use their skin as a secondary respiratory surface; some small terrestrial salamanders and frogs lack lungs and rely entirely on their skin for respiration. Reptiles are cold-blooded animals that can be four-legged, like turtles and lizards, or may have descended from four-legged ancestors, like snakes. Unlike amphibians, reptiles do not have an aquatic larval stage. Many amphibians and reptiles move between aquatic and terrestrial habitats and as such are major links in the flow of energy between these habitats.

Amphibians and reptiles commonly occurring in and around wetlands, lakes, ponds, and rivers in the Project region include turtles such as the snapping turtle (*Chelydra serpentine*), painted turtle (*Chrysemys picta*), map turtles (*Graptemys* spp.), and the spiny softshell turtle (*Apalone spinifer*a); frogs that are highly aquatic as adults such as the green frog (*Lithobates clamitans*) and mink frog (*Lithobates septentrionalis*); aquatic salamander species such as the eastern newt (*Notophthalmus viridescens*) and common mudpuppy (*Necturus maculosus*); and snakes, including the brown snake (*Storeria dekayi*) and northern watersnake (*Nerodia sipedon*). Amphibians and reptiles that are more likely to be associated with grasslands, prairies, and agricultural areas in the Project region include hognose snakes (*Heterodon* spp.), garter snakes (*Thamnophis* spp.), and the smooth green snake (*Opheodrys vernalis*), prairie skink (Plestiodon septentrionalis), and Great Plains toad (*Anaxyrus cognatus*). Amphibians and reptiles associated with forested habitats in the Project region include treefrogs (*Hyla* spp.), the spring peeper (*Pseudacris crucifer*), American toad (*Anaxyrus americanus*), and salamanders (*Ambystoma* spp.).

Invertebrates

Invertebrates are an essential component of the food chain in many ecosystems. Many hundreds of species of invertebrates occur within the aquatic, wetland, and upland areas that would be crossed by the Applicant's proposed project and the CN Alternatives. Notable groups of aquatic insects include

mayflies (*Ephemeroptera*), caddisflies (*Trichoptera*), dragonflies and damselflies (*Odonata*), and midges and mosquitoes (*Diptera*). Other aquatic invertebrates include mollusks such as native mussels (*Palaeoheterodonta*), snails (*Gastropoda*), and crayfish (*Astacidea*). Commonly seen upland invertebrates include bees, ants, and wasps (*Hymenoptera*); ladybugs and other beetles (*Coleoptera*); butterflies and moths (*Lepidoptera*); grasshoppers, katydids, and crickets (*Orthoptera*); cicadas, leafhoppers and other true bugs (*Hemiptera*); and ticks, spiders, and mites (*Arachnida*).

5.2.4.2.2 Continued Use of Existing Line 3 Pipeline

The existing Line 3 pipeline is co-located with existing pipelines, transmission lines, and roads along all of its length. The route, which extends through predominately forested and wetland areas, crosses 81 waterbodies, 6 trout streams, and 2 AMAs (Clearwater and Little Otter Creek), and is within 0.5 mile of 6 other AMAs. The route also crosses two Minnesota LBS with a rating of outstanding as well as passing within 0.5 mile of four lakes managed for muskellunge.

The route of the existing Line 3 pipeline crosses several wildlife conservation areas, including one wildlife refuge and three state forests; it also crosses the Chippewa Plains IBA.

The general types of aquatic resources, wildlife habitat, and species described for the Applicant's proposed project (see Section 5.2.4.2.1) also occur along the existing Line 3 pipeline right-of-way. The fish and wildlife species described above for the Applicant's proposed project are common to northern Minnesota and could be present in the areas crossed by existing Line 3.

5.2.4.2.3 System Alternative SA-04

Fisheries and Aquatic Habitat

System alternative SA-04 would cross over 600 waterbodies, including large rivers, perennial streams, intermittent streams, ephemeral streams, large lakes, shallow lakes, and wetlands. Water crossings are discussed in Section 5.2.1.2. Two trout streams occur within 0.5 mile of SA-04, although neither would be crossed.

SA-04 would pass through the Mayhew Creek Fisheries Management Area (FMA), as shown in Figure 5.2.4-1. North Dakota, Iowa, and Illinois do not specifically designate AMAs but manage more general wildlife areas for hunting, fishing, trapping, and other recreational activities.

> No lakes rated for Fish IBI occur within 0.5 mile of SA-04 (Minnesota DNR 2014a), no LBS would be crossed by SA-04 (Minnesota DNR 2015b), and no Sentinel Lakes would be crossed by SA-04 (Minnesota DNR 2016b). The Minnesota River crossing for SA-04 contains a freshwater mussel site (Minnesota DNR 2016e); the occurrence of mussels in a waterbody suggests good water quality.

SA-04 would cross infested waters in North Dakota, Minnesota, Iowa, Illinois, and Wisconsin. Invasive species established in these waters include common carp, zebra mussel, rusty crayfish, Eurasian milfoil, bighead carp, and silver carp.

All three types of fisheries (coldwater, coolwater, warmwater) are present in the regions crossed by SA-04. Protected and rare species are discussed in Section 5.2.5, including species listed by state or federal threatened and endangered species regulations.

Wildlife and Wildlife Habitat

SA-04 would cross the same 10 NLCD cover classes as the Applicant's proposed project and the existing Line 3 pipeline right-of-way (see Section 5.2.3 for a general discussion of vegetation along SA-04). Broadly, SA-04 occurs within ecoregions that are dominated by the presence of cultivated crops (95 percent of the total land cover), but also include areas of forest, scrub/shrub, grassland/herbaceous, hay/pasture, woody wetlands, barren land, and emergent herbaceous wetlands.

Each of the states crossed by SA-04 maintain designated WMAs. SA-04 would pass near 10 WMAs (1 in North Dakota, 8 in Minnesota, and 1 in Iowa). Figure 5.2.4-3 provides an overview of WMAs, wildlife refuges, and other conservation lands near SA-04. The lands shown in Figure 5.2.4-3 include those assigned GAP Status Codes 1, 2, and 3, which indicate the level of protection and management objectives as discussed previously.

IBAs in the vicinity of SA-04 include the following (Figure 5.2.4-4):

- Swan Lake IBA – This state priority IBA supports large breeding colonies of red-necked grebes, eared grebe (*Podiceps nigricollis*), and western grebes (*Aechmophorus occidentalis*) in summer. The lake also supports a large black-crowned night heron (*Nycticorax nycticorax*) rookery, breeding populations of least bitterns, Forster's terns (*Sterna forsteri*), and black terns. Swamp sparrows (*Melospiza georgiana)* and marsh wrens (*Cistothorus palustris*) are also common breeders at the site. In spring, nearly all waterfowl occurring in southwestern Minnesota occur within this IBA.
- Upper Minnesota River Valley IBA – This global priority IBA supports over 200 bird species during spring, summer, and fall. Surrounded by intensely farmed areas, the river valley corridor provides prime bird habitat and is a migration corridor for waterfowl, shorebirds, raptors, warblers, vireos, thrushes, flycatchers, and sparrows.
- Upper Mississippi National Wildlife Refuge (NWR) IBA – This state priority IBA is an important site for migrating waterfowl, particularly canvasbacks and tundra swans, as well as nesting waterbirds and breeding and wintering bald eagles. The Mississippi River is a significant bird migration route, especially for seasonal migrations of waterfowl. An estimated 40 percent of the nation's waterfowl and shorebirds use the Mississippi River valley during spring and fall migration.
- Upper Mississippi/Trempealeau National Fish and Wildlife Refuges IBA – This state priority IBA encompasses the Trempealeau Refuge and the Upper Mississippi Refuge from the confluence of the Mississippi and Chippewa rivers south through eight counties in southwest Wisconsin. Habitats include large tracts of floodplain forest, forested wetlands, bluffs, braided river channels, open water, forested islands, riverine wetlands, and prairie. Hundreds of thousands of waterfowl and landbirds use this IBA as migratory corridors and stopover sites, including over half the eastern population of canvasbacks (*Aythya valisineria*) and 20 percent of the tundra swan (*Cygnus columbianus*) population. The forests and wetlands also support significant breeding populations of great blue herons, bald eagles, red-shouldered hawks (*Buteo lineatus*), yellow-billed cuckoos (*Coccyzus americanus*), cerulean warblers (*Setophaga cerulea*), and prothonotary warblers (*Protonotaria citrea*).
- Midewin National Tallgrass Prairie IBA – This global priority IBA is a 19,000-acre complex of 21 natural biological communities that provide habitat for 348 species of native plants,

approximately 230 vertebrate species of animals, and numerous invertebrate species, including mussels. This IBA provides critical fall and spring migration habitat as well as breeding habitat for a large number of grassland birds, many of which are becoming rare (Audubon 2016).

The ROI for SA-04 supports a diversity of wildlife, mammals, birds, amphibians, reptiles, and invertebrates. Existing wildlife species in the vicinity of SA-04 are similar to those described above for the Applicant's proposed project; however, a few species, including elk, moose, and black bear are not likely to occur along this route.

5.2.4.2.4 Transportation by Rail

The rail alternative would require an area of between 100 and 200 acres for construction and operation of a rail loading facility and an additional 84 acres to construct and operate a new rail line connection near Gretna, Canada. These facilities would be located in Canada and as such are not addressed as part of this environmental review.

In the United States, the rail offloading facility would require between 100 and 200 acres of land that is identified as agricultural lands and wetlands near Clearbrook, Minnesota, along with reestablishment of 10 miles of existing track in Clearbrook.

The rail offloading facility near Superior, Wisconsin, would require approximately 100 acres adjacent to the existing Enbridge terminal and construction of a less than 1-mile interconnection between existing rail lines in Superior.

Fisheries and Aquatic Habitat

Small drainages occur in the area near Clearbrook, Minnesota. Several intermittent streams originate within the immediate area of the potential location for a new facility. No conservation lands or AMAs occur in the vicinity. Reestablishing rail line access would require several stream crossings.

The potential location for a new facility near the Superior terminal is entirely wetlands, primarily forested and scrub/shrub wetlands.

Wildlife and Wildlife Habitat

Along the rail route from northwest Minnesota to Clearbrook, the vegetated land cover is mostly cultivated farmland with remnant prairie patches. Reestablishing rail line access between Gully and Clearbrook would require passing through forested areas, including a patch of northwest dry-mesic oak woodland and northern dry prairie. A site of moderate biodiversity occurs near Gully, north of the rail line. The land cover around Clearbrook, Minnesota, includes deciduous and evergreen forests, woody and emergent wetlands, and hay/pasture and cultivated croplands, which provide habitat for white-tailed deer, small mammals, and birds. The rail line is surrounded by hay/pasture, cultivated croplands, and scattered forest and wetlands. The rail line east of Gully is bordered by dry sand-gravel prairie (northern) and northwestern dry-mesic oak woodland (Minnesota DNR 2016v).

From Clearbrook to Superior, vegetated land cover is dominated by woody and emergent wetlands along with some hay and cultivated croplands. The vegetation near Superior, Wisconsin, is primarily deciduous forest with patches of woody wetlands and scrub/shrub wetlands that provide habitat and

food for many breeding birds, small mammals, and reptiles, as well as hunting areas for birds of prey. No conservation lands or wildlife refuges occur in the vicinity of the Superior terminal.

The rail route crosses several wildlife areas, with Chippewa National Forest being the largest, and also crosses several IBAs.

- Kittson-Roseau Aspen Parkland IBA – This state priority IBA consists of almost 400,000 acres of aspen parkland landscape in extreme northwestern Minnesota. The IBA lies within the Aspen Parkland Physiographic Area, which harbors the highest number of breeding birds of any physiographic area on the continent. Eleven sandhill crane roost sites with 12,000 birds and 262 bird species including significant numbers of horned grebes, Wilson's phalaropes, yellow rails, marbled godwits (*Limosa fedoa*), short-eared owls, American bitterns, upland sandpipers, and Nelson's sharp-tailed sparrows have been documented.
- Glacial Ridge IBA – This global priority IBA includes a large complex of prairie grasslands and wetlands at the southern extent of Minnesota's Aspen Parkland region which is characterized by a mosaic of prairie, sedge wetlands, and aspen groves. Glacial Ridge is one of the top sites in Minnesota for prairie birds, particularly species dependent on wet prairie and sedge wetlands. Of the 164 species recorded here, 16 are state listed species including burrowing owls (*Athene cunicularia*), greater prairie chickens, marbled godwits, and yellow rails. A total of 43 SGCN are found in the IBA with relatively high numbers of American bitterns, upland sandpipers, Le Conte's sparrows (*Ammodramus leconteii*), and bobolinks. This area also supports fall migratory sandhill crane roosts with 2,000 to 6,000 birds documented, and is within the northwest Minnesota sandhill crane breeding range.
- Camp Ripley-Pillsbury-Lake Alexander IBA – This state priority IBA supports the greatest known concentration of nesting red-shouldered hawks (a state listed Special Concern Species) in the state. Habitat consists of relatively large blocks of upland deciduous and riparian forests. In addition, 228 species of birds have been documented here since monitoring started in 1991, including 28 species of warblers (and one of the most northerly reports of the hooded warbler [*Setophaga citrina*]). Other listed species that occur in this IBA include the bald eagle, trumpeter swan, yellow rail, and Louisiana waterthrush (*Parkesia motacilla*). Other important features within this IBA are the 21 miles of the Mississippi River and 27 miles of major tributaries (Crow Wing and Gull rivers), that provide important riparian corridors and migration pathways.
- Chippewa Plains IBA – This global priority IBA is a vast area of large lakes (Winnibigoshish, Leech, Cass, and Pokegama), rivers, and streams, as well as large tracts of upland and lowland forests. The Mississippi River, which flows through the IBA, provides a large river ecosystem complemented by smaller river systems throughout the IBA. Chippewa Plains is important for migrating waterfowl, with 160,000 ring-necked ducks and 30,000 lesser scaup (*Aythya affinis*) recorded in 2011. Nesting waterbirds include the ring-billed gull (*Larus delawarensis*), herring gull (*Larus argentatus*), American white pelican (*Pelecanus erythrorhynchos*), common tern (*Sterna hirundo*), and Caspian terns (*Hydroprogne caspia*).
- McGregor IBA – This state priority IBA contains habitat for many birds including wetlands, lowland forests, upland deciduous forests, open brushlands, and open grasslands. McGregor IBA is known for its fall ring-necked duck migration but also supports a variety of nesting bird species such as the American bittern, yellow rail, sora, black tern, sandhill crane,

trumpeter swan, bald eagle, American woodcock, wood thrush, black-billed cuckoo, LeConte's sparrow, and bobolink, and 12 species of warblers.

- St Louis River Estuary IBA - This state priority IBA contains an extensive riverine system with numerous bays, wetlands, and forested areas along its adjacent shoreline. The St. Louis River Estuary is a freshwater ecosystem that is one of the largest tributaries draining into the largest, by surface area, lake in the world. This IBA is an important migratory stopover for 31 species of waterfowl and 27 species of shorebirds along with large numbers of waterbirds, raptors, and songbirds that move along the western shore of Lake Superior during migration.

5.2.4.2.5 Transportation by Truck

The truck alternative would require an area of approximately 50 acres for construction and operation of a truck loading facility, and upgrades to existing access roads near Gretna. These facilities would be located in Canada and as such are not addressed as part of this environmental review.

In the United States, truck facilities near Clearbrook would require approximately 50 acres to construct and operate offloading facilities, and approximately 5 acres for road access. Truck facilities near the terminal in Superior would require approximately 50 acres to construct and operate a truck offloading facility, and 34 acres at the Superior terminal.

Fisheries and Aquatic Habitat

Small drainages occur in the area near Clearbrook, Minnesota. Several intermittent streams originate within the potential location for a new facility. No conservation lands or AMAs occur in the vicinity.

The potential location for a new facility near the Superior terminal is entirely wetlands, primarily forested and scrub/shrub wetlands.

Wildlife and Wildlife Habitat

The vegetated land cover around Clearbrook, Minnesota, includes deciduous and evergreen forests, woody and emergent wetlands, and hay/pasture and cultivated croplands, which provide habitat for white-tailed deer, small mammals, and birds.

The vegetation near Superior, Wisconsin is deciduous forest with patches of woody wetlands and scrub/shrub wetlands that provide habitat and food for many breeding birds as well as hunting areas for birds of prey. No conservation lands or wildlife refuges occur in the vicinity of the Superior terminal.

Along the truck route from northwest Minnesota to Clearbrook, the land cover is mostly cultivated farmland with remnant prairie patches. From Clearbrook to Superior, land cover is dominated by woody and emergent wetlands along with some hay and cultivated croplands.

The truck route crosses through several wildlife areas, with Chippewa National Forest being the largest, and also crosses through the Glacial Ridge, Chippewa Plains, and St. Louis River Estuary IBAs. Each of these IBAs is describe above in Section 5.2.4.2.4.

5.2.4.2.6 Existing Line 3 Supplemented by Rail

The existing conditions for continued use of existing Line 3 supplemented by rail transport are similar to those described above for continued use of the existing Line 3 pipeline and the rail alternative.

5.2.4.2.7 Existing Line 3 Supplemented by Truck

The existing conditions for continued use of existing Line 3 supplemented by truck transport are similar to those described above for continued use of the existing Line 3 pipeline and the truck alternative.

5.2.4.3 Impact Assessment

5.2.4.3.1 Applicant's Proposed Project (from Neche to Superior)

The potential impacts of construction and operation of the Applicant's proposed project are described below.

Construction Impacts

Clearing and grading would be required for construction of the pipeline, MLVs, new and expanded pump stations, and cathodic protection sites—as well as for access roads and ATWS, including six pipe yards in Minnesota. Construction activities that may affect fish, wildlife, and their habitats could include clearing, grading, dewatering, trenching, blasting, access road construction, waterbody crossings, surface water withdrawals and discharges (e.g., for hydrostatic testing), fueling and use of hazardous materials, facilities construction, and restoration or reclamation of construction areas.

Fisheries and Aquatic Habitat

Construction of the Applicant's proposed project would require 192 stream crossings in Minnesota, 25 in North Dakota, and 10 in Wisconsin. The surface waters crossed support warmwater, coolwater, and coldwater trout fisheries.

Surface Water Crossing Methods and Measures Proposed as Part of the Project

Surface water crossings would be designed as close to perpendicular to the axis of the stream channel as engineering and routing constraints allow to create the shortest possible crossing length. The Applicant would determine and obtain approval for specific crossing methods based on factors such as waterbody size, sensitivity, water levels, soil/sediment stability installation, and anticipated season of installation (Appendix G). The Applicant would cross waterbodies using the most environmentally appropriate and feasible method based on consultation among the Applicant, appropriate regulatory agencies, and engineering personnel. Methods that may be used include the wet open-cut method, dry open-cut methods (dam-and-pump and flume), the guided bore method, or the HDD method. These methods are summarized below:

- The wet open-cut method involves trenching through the waterbody while the water continues to flow through the construction work area. The wet trench method has the greatest potential for impacts on fisheries and aquatic habitat.
- The dam-and-pump method is used to cross sensitive waterbodies with low gradients and low-flow or meandering channels. It involves installing temporary dams across the waterbody both upstream and downstream of the crossing location, with pumps and piping used to carry streamflow around the construction area. The construction area located

between the two dams is then dewatered utilizing pumps. This method results in less sedimentation and turbidity than the wet open-cut method.

- The flume method can be used on relatively shallow and narrow waterbodies that do not have large rocks or bedrock at the trench line and have a relatively straight channel. Similar to the dam-and-pump method, two dams and pumps are used to dewater the work area. One or more pipes (flumes) extend the course of the waterbody through both dams, carrying streamflow through the construction area. This method results in less sedimentation and turbidity than the wet open-cut method.
- A guided bore could be used to cross ditches adjacent to roads or railroads. The guided bore method involves digging a pit on each side of the waterbody, boring a tunnel from one pit to the other, and installing the pipe in the tunnel. Dewatering and sheet-piling are needed to maintain the integrity of the excavated pits. This method typically results in no sediment release to surface water.
- HDD involves drilling under the surface water and installing the pipeline without physical disturbance of the surface water. HDD crossings are advantageous because they do not disturb streambeds or streambanks and they maintain stream flow and fish passage. However, they require ATWS on both sides of the crossing, which involves vegetative clearing, soil disturbance, and subsequent restoration activities. This method would be used to cross the most environmentally sensitive areas such as sensitive fishery resources and impaired waters. Unless there is a streambed collapse above the boring hole or a release of drilling fluid occurs (see Section 5.2.1.2), use of this crossing method would not alter or remove aquatic habitat and would not affect fisheries.

The currently planned crossing methods for the Applicant's proposed project are listed in Appendix G. Crossing method has not been identified for crossings in North Dakota or Wisconsin. Four AMAs crossed, or within 0.5 mile of the Applicant's proposed project, are listed in Table 5.2.4-6.

Table 5.2.4-6. Aquatic Management Areas Crossed by the Applicant's Proposed Project in Minnesota (acres)

Aquatic Management Area	Construction Work Area[a]	Permanent Right-of-Way[b]	Within 0.5 Mile of Centerline[c]
Blackhoof River AMA	0	0	44.4
La Salle Creek AMA	0.4	0.2	27.4
Spire Valley AMA	0	0	56.2
Straight River AMA	<0	0	16.6
TOTAL	**0.4**	**0.2**	**144.6**

Source: Minnesota DNR 2016h.

[a] Enbridge-provided footprint for construction work area, including additional temporary workspaces and access roads

[b] Enbridge-provided footprint for permanent right-of-way, including primary access roads, pump stations, and mainline valves

[c] Acres of Aquatic Management Area (AMA) within 0.5 mile of the centerline of the Applicant's proposed project

To avoid or reduce impacts on fisheries and aquatic habitat during construction, the Applicant would implement the measures described in its Environmental Protection Plan (Appendix E), including the following:

- Prepare a list of waterbodies to be crossed and the type of crossing method to be used for each crossing, as a part of obtaining Section 401/404 permits from USACE and Minnesota PCA for all surface water crossings.
- Comply with the seasonal restrictions and other requirements in the Section 401/404 permits to limit impacts on aquatic resources.
- Complete the crossings as quickly as possible to allow suspended sediment levels to return to pre-construction levels after in-stream work is completed.
- Cross waterbodies using the most environmentally appropriate and feasible method based on consultation among the Applicant, appropriate regulatory agencies, and engineering personnel. Methods that may be used include the wet open-cut method, dry open-cut methods (dam-and-pump and flume), the guided bore method, or the HDD method.
- Develop and implement BMPs in collaboration with state and federal agencies to avoid and minimize potential impacts associated with water crossing methods (e.g., use of silt or straw as sediment runoff barriers and use of construction mats to minimize ground pressure and soil compaction).
- Implement erosion and sediment control measures and limit the duration of construction in waterbodies, including the measures listed in Section 1.9 of the Applicant's Environmental Protection Plan (Appendix E) (e.g., temporary stabilization, erosion control blankets, mulch, cat tracking, and temporary slope breakers).
- Comply with Minnesota DNR guidance on water crossing by avoiding in-water work during the exclusion periods: from September 1 through April 15 or September 15 through April 30 for coldwater fisheries (trout) stream crossings, and from March 15 to June 15 or April 1 to June 30 for coolwater and warmwater fisheries stream crossings, depending on the Minnesota DNR region in which the work occurs.
- Suspend temporary water intake hoses or structures above the stream or lake bottom and equip the intakes with screens or equivalent devices to prevent fish uptake.
- Install trench breakers at all waterbody crossings, as appropriate, to prevent diversion of water into upland portions of the pipeline trench and to keep accumulated trench water out of the waterbody.
- Wash and dry equipment designated for use within waterbodies prior to use; purge and clean all pumps before proceeding from one crossing location to the next if designated noxious weeds or invasive aquatic species (e.g., zebra mussels and Eurasian milfoil) are known to be present in the area. Follow all permit requirements to prevent the spread of invasive species.
- Maintain a 20-foot-wide buffer of undisturbed herbaceous vegetation at all streambanks during the initial clearing and complete any in-stream trenching within 24 hours of initiation at minor waterbodies and within 48 hours at intermediate or major waterbodies (not including HDD crossings).

- Comply with the measures in the Environmental Protection Plan (Appendix E) to avoid or minimize impacts due to the unanticipated release of drilling fluids used in HDD crossings. These measures include (1) planned response actions if releases of drilling mud were to occur in waterbodies or upland areas; (2) containment, clean-up, and notification procedures; and (3) steps to be taken to restore affected areas.
- Discharge hydrostatic waters in a manner that avoids discharge into surface waters with commercially or recreationally important species, and in compliance with the stipulations of permits required for both intake and discharge. This would include seasonal restrictions and limitations associated with infested waters.

General Potential Impacts on Fisheries and Aquatic Habitat from Surface Water Crossings

Streambank alteration. Construction of the Applicant's proposed project would require clearing of vegetation from the construction work area. Removal of large trees and other woody vegetation near waterbodies would result in loss of shading, nutrients, and habitat features for fish at waterbody crossings. In addition, this change in streambank features would alter aquatic habitats used by fish for cover, spawning, and foraging. Loss of riparian cover can result in increased water temperatures, which can be detrimental to coldwater species such as trout or salmon.

The amount of vegetation that would be permanently removed adjacent to surface waters would be restricted to the permanent right-of-way at waterbody crossings, and streambanks would be restored with prescribed riparian vegetation. Revegetation would take longer for forested areas in the construction work areas adjacent to the permanent right-of-way as compared to prairie or agricultural areas. Therefore, vegetation clearing for construction of the Applicant's proposed project in grassy or agricultural streambank areas would result in indirect, short-term, and negligible to minor impacts on fisheries and aquatic habitats; for forested or other woody streambank areas would be long-term and minor to major, depending on existing surface water conditions. Removal of vegetation along waterbodies also can create conditions for bank destabilization and further erosion, which would result in direct temporary to short-term minor impacts on species residing in the immediate vicinity while the Applicant undertakes measures to stabilize the banks. For example, erosion can suffocate eggs and other aquatic species.

As a part of the crossing construction process, riverbeds and streambeds would be restored to pre-construction condition, with no impediments to water flow anticipated, and streambanks would be restored to pre-construction grades when practicable. If the slope of the bank is determined to be unstable, it would be reshaped to prevent slumping. The use of open-cut crossings during pipeline construction would result in short- to long-term minor impacts on channel morphology and stability, which in turn would result in short-to long-term minor impacts on fisheries and aquatic habitats.

The wet open-cut crossing method would result in greater amounts of sedimentation than the other methods. As currently planned, only 16 of the surface water crossings would be accomplished using the wet open-cut method. Crossings using the dam-and-pump and flume methods would increase sedimentation, but less than the wet open-cut method. The guided bore and HDD methods would not result in increased sedimentation if conducted successfully. However, if a frac-out were to occur, the consequences can be major because of the release of materials into already sensitive or impaired waters (more information about frac-outs below).

Increased sedimentation and turbidity can degrade aquatic habitat by filling in inter-gravel spaces and pool habitats, which reduces spawning habitat, rearing habitat, and benthic invertebrate production.

Reduced productivity of aquatic invertebrates can result in reduced food available for insectivorous fish. Mussels are particularly vulnerable to suffocation from in-stream construction activities. Fine sediments introduced by these processes can suffocate fish eggs and newly hatched larvae living in gravel, resulting in reduced survival. In addition, sediments can abrade the sensitive gill membranes of young and adult fish, resulting in injury or death; and can reduce ability of fish to locate prey or escape predation, leading to increased energy expenditure for foraging and increased mortality. Large concentrated sediment plumes can cause sediment accumulation within the gills of young and adult fish, which can lead to suffocation and increased mortality of fish that are not able to move away from sediment plumes fast enough to find refuge.

Disturbed areas at crossings would be restored and stabilized as soon as practical after pipeline installation. The increase in sedimentation is not expected to be substantial, and the impact on fisheries and aquatic habitat from increases in sedimentation associated with surface water crossings would be temporary to short term and minor. With successful use of the guided bore or HDD crossing methods, sedimentation would not increase and fisheries and aquatic habitats would not be affected. If a frac-out were to occur, the impacts would be short to long-term and major.

Removal of Large In-stream Structures. At some surface water crossings, large in-water structures (e.g., large woody debris and boulders) may have to be removed during construction of the crossing. These structures would be replaced after completion of the crossing, and stream hydrodynamics would transport sediments from upstream to the disturbed area until equilibrium is reestablished. This construction activity would result in a temporary to short-term, negligible to minor impact on aquatic habitat.

Direct Impacts on Fisheries. Trenching and backfilling, damming, and other in-stream construction activities could result in direct or indirect injury or mortality of fish. Mussels are particularly vulnerable to crushing from in-stream construction activities. However, fish would likely respond to the increased in-stream activities by leaving the construction area and avoiding direct impacts. Small fish species and juvenile individuals of larger fish species may be injured or killed by entrainment, which results when a fish gets trapped within hoses or pipes being used to dewater construction areas or divert surface waters around construction areas. Fish entrainment can be reduced by screening the ends of pipes and pump hoses, smaller fish may still be injured or killed by being impinged, trapped against, the screening due to suction and water pressure. The potential direct impacts of in-stream construction on aquatic communities would be temporary and minor.

Leaks or Small Spills. Spills and leaks of fuel or other hazardous liquids could occur during vehicle and equipment operation, during refueling and lubricating of construction equipment, and from leaks from storage containers or equipment working in or near streams. To protect surface water resources, NPDES permits would require secondary containment of hazardous materials, prohibition of engine degreasing at work sites, containment and collection of liquid and solid wastes, and a spill prevention and response plan for fueling and maintenance of vehicles. The Applicant would store petroleum products, hazardous chemicals, and lubricating oils; conduct refueling, maintenance, and lubricating operations; and perform concrete coating activities in upland areas more than 100 feet from surface waters (Appendix E). Although these and other similar measures would be implemented, small leaks or spills could reach surface waters and would alter water quality in the area of the release and for short distances downstream. Because such releases would likely be small and rapidly dispersed, the impacts on fisheries and aquatic habitats are expected to be temporary to short term and minor.

Potential impacts on fisheries and aquatic habitats from an unanticipated release of crude oil are discussed in Chapter 10.

Unanticipated Release of Drilling Fluids. For HDD crossings, there is a risk of escape of drilling fluids (frac-out) into rivers at crossings. During drilling, fluid (water, bentonite clay, and possible additives) is circulated through the drilling pipe to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. The potential exists for an inadvertent release or "frac-out" of this drilling fluid to occur when pressurization of the drill hole is beyond the containment capability of the overburden soil material, which would allow the drilling fluid to flow to the ground or riverbed surface. Although bentonite clay is non-toxic, drilling mud can smother aquatic wildlife and increase turbidity in affected surface waters. The consequences of a frac-out are amplified in waters where this technique is used, because these waters are already identified as sensitive or impaired. Additives may be mixed with the drilling fluids/mud for viscosity or lubricating reasons. Only non-hazardous additives approved by Minnesota PCA under permit conditions would be used, and a Material Safety Data Sheet for the drilling fluid would be maintained onsite. If a frac-out occurred near the streambank, bank stability may be compromised. Construction personnel would monitor the crossing to detect releases of drilling mud.

The HDD operator would constantly monitor drilling fluid pressures during pilot hole operations and, if a loss in fluid pressure or circulation were identified, the operator would notify onsite construction observers who would visually monitor the portion of the drill path where the drill tool is located to determine whether a drilling mud release occurred. If a release occurred, the Applicant would implement containment, response, and clean-up procedures as outlined in the Environmental Protection Plan (Appendix E) to limit the potential for drilling mud to reach surface water. These procedures include containment using straw bales, sandbags, pumps and hoses, vacuum trucks; response activities, including adjusting drill rates and pump volumes or stopping drilling, removal of mud with pumps and appropriate storage away from the waterbody prior to disposal; and coordination with appropriate agencies to discuss additional containment or clean-up requirements. If a frac-out occurred and went undetected or was not quickly contained, impacts on surface water quality as well as on fisheries and aquatic habitat could be long-term and major. However, with implementation of the Applicant-proposed measures to respond to a drilling mud release during HDD construction, the impact of a release could be short term to long-term and major, depending on the nature of the release and resources near the location of the crossing.

Hydrostatic Test Water Withdrawal and Discharge. The Applicant would withdraw water for hydrostatic testing, dust control, trench dewatering, and HDD installation. Hydrostatic testing would require approximately 11 to 17 million gallons of water for each construction spread that would be obtained from lakes, streams, or groundwater wells. The Applicant is currently evaluating transferring water from one test section to another in order to minimize the total quantity of water needed to complete the hydrostatic test. The volume of water appropriation needed for dust control, trench dewatering, and HDD installation has not been determined. Prior to construction, the Applicant would obtain a water appropriation permit from Minnesota DNR.

Withdrawals from surface waters for construction could result in entrainment of small fish, eggs, and macroinvertebrates during extraction; however, intakes would be equipped with a screen or equivalent device to prevent uptake of aquatic species. Smaller fish and invertebrates may still be injured or killed by being impinged, trapped against, the screening due to suction and water pressure. Spawning fish could be displaced through decreased water levels, fish eggs could desiccate if water levels drop too low, or eggs may experience delayed development due to impaired water quality. Larval and juvenile

fish could be affected through entrainment during water withdrawal, decreased survival under conditions of poor water quality, and reduced prey availability.

As stipulated in permit requirements, the Applicant would select appropriation sites that would meet Minnesota DNR's criteria of "doing no harm," and all appropriation sites would be reviewed by Minnesota DNR prior to issuance of a water appropriation permit. The permit requires that water withdrawals have a minimal potential for impacts on groundwater resources and must not adversely affect trout streams, calcareous fens, or other significant environmental resources. If water is withdrawn from surface water, hose intakes would be equipped with screens to prevent entrainment of aquatic species, and adequate waterbody flow rates and volumes would be maintained to protect aquatic life and allow for downstream uses as required by the water use permit (Appendix E).

Hydrostatic test water would be discharged from a test section in one of two ways: (1) into well-vegetated upland areas using controlled-flow velocity with a dewatering structure such as a silt fence and straw bales or into geotextile filter bags that are used to avoid soil erosion, sediment transport, and bottom scouring; or (2) into the waterbody from which it was withdrawn to prevent the spread of invasive species or degradation in water quality; the discharge rate would not exceed the permitted applicable discharge rate (Appendix E). Water would be treated as specified in the NPDES permit prior to discharge; and the Applicant would monitor pH, dissolved oxygen levels, and any other parameters required by the permit, as described in Appendix D of the Environmental Protection Plan (Appendix E). Discharges would adhere to all conditions set forth in NPDES and water appropriation permits, including discharge over approved energy dissipation measures (e.g., sand bags, plastic sheeting, or natural rock riprap) and the sedimentation control measures as described above. If inter-basin transfers of water occur, there is also the potential to introduce and spread aquatic nuisance species; however, hydrostatic waters would be discharged through a filtering device to the source waterbody and following all requirements of acquired permits.

With adherence to water appropriation and NPDES permit conditions and implementation of Applicant-proposed measures described above, impacts on fisheries and aquatic habitats from water appropriation and discharge during construction would be temporary and minor. No impacts on mussel beds will occur during construction of the Applicants's proposed project.

Impacts on Management Units and Managed Species

Aquatic Management Areas. LaSalle Creek would be crossed using the dry-crossing method; this would affect 0.4 acre of the La Salle Creek AMA. The LaSalle Creek AMA is 28 acres and provides angling opportunities (as described below, LaSalle Creek is also a designated trout stream). This would be the second pipeline to cross this AMA; an existing pipeline crossing is at the southern extent of this AMA. Woody vegetation would be removed from the construction work area during construction and, depending on the crossing method used, the habitat quality of LaSalle Creek adjacent to the crossing location may be reduced. The crossing of La Salle Creek has the potential to introduce invasive species and result in the loss of habitat and reduction of habitat quality. However, these impacts are expected to be short term, and negligible to minor as little habitat would be lost in the construction work area and BMPs would be in place to prevent the spread of invasive species.

The Applicant's proposed project would come within 0.5 mile of three other AMAs but would not directly disturb these areas. AMAs represent good-quality aquatic habitats with functional adjacent uplands.

Other Management Units. Thirty-nine sensitive aquatic resources are present within 0.5 mile of the Applicant's proposed project, including five lakes rated for Fish IBI, 10 LBS, one Sentinel Lake, 21 trout streams, one trout lake, and one lake managed for muskellunge. No Significant Wildlife Lakes would be impacted by the Applicant's preferred project.

The Applicant's proposed project would not cross any of the five lakes rated for Fish IBI that occur within 0.5 mile; therefore, no impacts are anticipated. One of the lakes, Portage Lake, is also a designated Sentinel Lake; the construction work area of the Applicant's proposed project would be directly adjacent to Portage Lake. BMPs would be in place to prevent erosion or other impacts on this lake during construction. The disturbance area would be restored to pre-construction conditions once the construction is complete. Little habitat would be lost due to construction, and BMPs would be in place to reduce impacts on aquatic habitats as described above, so the resultant impact is expected to be short term and negligible to minor.

Of the 10 LBS within 0.5 mile of the Applicant's proposed project (Appendix L, Table L-2), one unnamed, moderate-ranked wetland would be within the construction work area. None of these LBS would be crossed by the route centerline. This could result in the introduction of invasive species, loss of habitat, and reduction of habitat quality. However, the impacts would be direct, short-term and negligible to minor, as little habitat would be removed and BMPs would be in place to prevent spread of invasive species.

No hatcheries are within 0.5 mile of the Applicant's proposed project, and none are immediately downstream of a water crossing along the Applicant's proposed project. The nearest hatchery is the Spire Valley trout hatchery, which is located about 0.65 mile upstream of a crossing; the hatchery's water supply is dependent on artesian groundwater quantity and quality. As a result, construction of the Applicant's proposed project would not affect the hatchery.

Twenty-one trout streams are within 0.5 mile of the Applicant's proposed project; the Applicant's proposed project crosses 6 of those trout streams (Table 5.2.4-7). One trout lake (Marion Lake in Cass County) is within 0.5 mile of the Applicant's proposed project but is not within the construction work area.

Trout streams are sensitive to erosion, sedimentation, and changes to riparian vegetation in areas adjacent to the streams because those habitats provide shade and cooling. Pipeline construction could alter groundwater connectivity or flow resulting in warming of the stream and reduced habitat suitability for trout and their invertebrate prey. Trout streams may have groundwater discharge zones or wetland seepage areas on hillsides or slopes with deep organic soils that could be disrupted during construction. Destabilization of these soils could result in long-term increases to nutrients and sediments in the streams. Removal of vegetation along small trout streams could result in less large woody vegetation in the stream. However, riparian vegetation would be removed only from the construction work area adjacent to the trout stream and only if either wet or dry open-cut crossing methods are used. If HDD methods are used for crossing clearing of vegetation could be limited to the 50-foot permanent right-of-way. Trees and shrubs would not be allowed to reestablish within the permanent right-of-way, which could lead to permanent major thermal effects on trout streams. If tributaries to trout streams are crossed, some downstream impacts from sedimentation could occur, depending on the distance to the trout stream. The Applicant's proposed project would cross the Moose Horn River downstream of a protected trout stream and upstream of a tributary (King Creek) to a protected trout stream. As noted in Section 5.2.1.1, the impacts of sedimentation on surface water crossings and the impact of pipeline crossings for the Applicant's proposed project on water quality

would be temporary to short term and minor. As a result of these considerations, and with selection of the most appropriate crossing method and application of appropriate BMPs, the resultant impacts on trout streams from construction of the Applicant's proposed project would be permanent to short-term and minor to major, depending on the crossing.

Table 5.2.4-7. Trout Streams within 0.5 Mile of the Applicant's Proposed Project in Minnesota and Wisconsin

Trout Streams – (Kittle Number or WBIC)[a]	Approximate Milepost	Con[b]	Op[c]	ATWS[d]	Access Roads
Blackhoof River (S-001-003)	MN 408.1	1	1	--	--
King Creek (M-050-046-029-023)	MN 344.2	1	1	--	--
LaSalle Creek (M-163)	MN 171.4	--	--	--	--
LaSalle Creek (M-163)	MN 171.7	1	1	--	--
Pine River, South Fork (M-106-013)	MN 232.7	--	--	--	--
Red River (WBIC 2845800)	WI 366.7	--	--	--	--
Spring Brook (M-106-004-002-001)	MN 265.3	1	1	--	--
Straight River (M-096-035-002-002)	MN 198.3	1	1	--	--
Unnamed stream (M-050-046-029-023-002)	MN 344.8	--	--	--	--
Unnamed stream (M-050-046-029-029)	MN 406.3	--	--	--	--
Unnamed stream (M-106-013-008)	MN 232.4	--	--	--	--
Unnamed stream (S-001.9-009)	MN 313.4	--	--	--	--
Unnamed stream (S-001.9-011)	MN 364.2	--	--	--	--
Unnamed stream (S-001-003-027.8)	MN 408.1	--	--	--	--
Unnamed stream (S-001-003-028)	MN 352.1	--	--	--	--
Unnamed stream (S-001-003-029)	MN 352.3	1	1	--	--
Unnamed stream (S-001-003-030)	MN 352.7	--	--	--	--
Unnamed stream (S-001-003-030-001)	MN 408.7	--	--	--	--
Unnamed stream (S-001-003-030-001-B001)	MN 408.8	--	--	--	--
Unnamed stream (S-002-008-001)	MN 339.9	--	--	--	--
Unnamed stream (S-002-008-001-005)	MN 361.8	--	--	--	--
TOTAL		**6**	**6**	**--**	**--**

Sources: Minnesota DNR 2015c; Wisconsin DNR 2016e.

[a] Water Body Identification Code (WBIC) is used to identify waterbodies in Wisconsin. Kittle number is used to identify waterbodies in Minnesota.

[b] Con = Enbridge-provided footprint for construction work area

[c] Op = Enbridge-provided footprint for permanent right-of-way

[d] ATWS = additional temporary workspace (includes pipe yards)

"--" = no occurrence

Wildlife and Wildlife Habitat

General Potential Impacts

Construction would include clearing and grading of the construction work area, ATWS, temporary and permanent access roads, and the sites of MLVs, new and expanded pump stations, and cathodic protection sites. Other construction activities that could affect wildlife and wildlife habitats include trenching, dewatering, blasting, waterbody crossings, surface water withdrawals and discharges (e.g., for hydrostatic testing), fueling and use of hazardous materials, facility construction, and restoration or reclamation of temporary construction areas. Wildlife may be affected directly by construction activities or indirectly from disturbances caused by human activity and noise associated with construction activities. Although only a narrow band of habitat would be directly altered by construction, indirect effects would occur over a wider area.

As noted above, the Applicant would incorporate measures into the Project to avoid or minimize construction impacts on fisheries and fisheries habitat, and many of those measures would help to avoid or minimize impacts on wildlife and wildlife habitats. In addition to those measures identified previously, the Applicant would implement the following measures to avoid or reduce impacts on wildlife and wildlife habitats:

- Confine clearing activities to the approved construction work areas and adhere to erosion control specifications to minimize impacts on vegetation, aquatic resources, and wildlife.
- Fell trees toward previously cleared construction areas to prevent damage to adjacent trees.
- Upon completion of pipeline installation and backfilling and construction of facilities, revegetate disturbed areas in accordance with the Environmental Protection Plan (Appendix E) unless otherwise directed by landowners or land managing agencies.
- Restore cleared areas and reseed with an appropriate seed mix (e.g., Minnesota BWSR-approved mixes) to minimize the duration of vegetative disturbance.
- Slope the ends of open trenches to provide ramps for wildlife that fall into the trench (e.g., small animals such as rodents, amphibians, and snakes) to escape.
- Handle, store, and dispose of food and general waste generated during construction to reduce attraction for opportunistic scavengers such as raccoons, crows, and gulls that could prey on other wildlife in the area.
- Handle, store, and dispose of all solid waste and hazardous materials in accordance with stipulations of permits and as presented in the Environmental Protection Plan.

Construction of the Applicant's proposed project would result in the disturbance of 2,202 acres of forested habitats as well as 2,028 acres of cultivated crop land. Forest and cultivated crops account for approximately 75 percent of the vegetation affected by construction.

The areas cleared would remain clear of brush, trees, and vegetation until restoration is completed. This would result in the loss of habitat for some species, including those species that use tree and shrub habitats for cover, forage, and nesting. The effects on wildlife habitat generally would be short term and minor, except in areas where woody vegetation is removed or wetlands affected. In those areas, the impact would be long-term to permanent and minor to major, because of the long recovery period for forested areas and the sensitivity of wetlands to disturbance. Woody vegetation would be permanently

excluded from the permanent right-of-way of the pipeline but would be allowed to recover in the construction work area outside of the permanent right-of-way. This loss of habitat would affect small mammals, amphibians, reptiles, and other small animals to a greater extent than large animals (e.g., deer and large birds), which have larger territories and can avoid the active construction areas. As a result, the impact on wildlife from the loss of habitat would range from temporary to permanent and minor for small wildlife species, and short term and minor for larger species.

Clearing, grading, trenching, and the use of construction vehicles and equipment would result in direct impacts on some common animals, particularly small and mid-sized mammals, reptiles, amphibians, and invertebrates. Members of these species would be affected more than large wildlife because of their relative lack of mobility compared to that of larger animals (e.g., deer and coyotes). Burrows and dens could be destroyed or abandoned during clearing and excavation, resulting in displacement or loss of young, and loss of foraging or cover habitat during rearing seasons. Burrowing animals would be expected to return and recolonize the right-of-way after construction; however, compacted areas, such as temporary work areas, may become less suitable habitat because they would no longer be conducive to burrowing (Lauzon et al. 2002). In addition, if clearing is conducted during the bird nesting season, nests could be destroyed or abandoned, resulting in loss of eggs and young, and loss of foraging or cover habitat during nesting seasons. Although open trenches would be sloped at the ends, some small animals may become trapped in open trenches and may not survive. As a result of these considerations, it anticipated that the direct impact of these activities on wildlife would be temporary to short term and minor.

Many animals would be temporarily displaced from the active construction areas and adjacent areas because of clearing activities, noise, and human disturbance. Human disturbance could influence wildlife behavior or cause displacement of species that are less tolerant of human intrusion or more sensitive to noise, and intraspecific competition could increase stress among some individuals. Noise disturbance from construction activities also could lead to nest abandonment and subsequent depredation of eggs or young. The indirect effects of construction disturbance may include reduced foraging time and increased alerting behaviors, which could result in increased energy expenditure and potentially lower survival or reproduction. These indirect impacts would be reduced with implementation of the BMPs incorporated into the Project as described above. In addition, nearby habitat could provide cover and suitable escape habitat for many of the common wildlife species that would be displaced, and mobile animals could return to the area after completion of construction and restoration activities, if appropriate habitats are available. Consequently, the impact of these displacements during construction would be temporary to short term and minor.

The Applicant may be required to trap beavers or alter or remove beaver dams to lower water elevations within the construction corridor prior to construction. Because beavers would likely move back to the area once construction is complete (Wisconsin DNR 2005), these activities would result in a temporary to short-term and negligible to minor impact on beavers and on the altered waterbodies. Removal of a beaver dam may require a separate Public Waters Work Permit and, depending on the location, may not be permitted where beaver dams maintain control of basin water levels.

Disturbed areas would be susceptible to invasion by noxious and invasive species, which could result in degradation of wildlife habitat. However, implementation of BMPs to address invasive species would reduce the potential establishment and spread of noxious weeds, resulting in short-term and negligible to minor impacts.

During construction and clearing of the right-of-way, vehicle emission by-products (e.g., polycyclic aromatic hydrocarbons, aldehydes, carbon monoxide, nitrogen oxides, ozone, and sulfur oxides) could contaminate soil and vegetation in the areas immediately adjacent to the construction vehicles and equipment. The construction period at any location would be relatively short and would occur only during daytime hours—except for HDD crossings of surface waters, which would occur for 24 hours per day, and the level of contamination in vegetation is not expected to be substantial. Although it is possible that species such as pollinators and herbivores that inhabit the areas where vegetation is exposed to these contaminants could be affected, the impact would be short-term and negligible.

Potential Impacts on Management Units and Managed Species

Table 5.2.4-8 lists the wildlife conservation lands potentially affected by the Applicant's proposed project. Construction of the Applicant's proposed project would result in habitat loss or alteration of approximately 507 acres within WMAs and state forests, including approximately 15 acres of the Grayling Marsh WMA and approximately 3 acres of the Lawler WMA. Loss or alteration of habitats could adversely affect both game and nongame wildlife that use these WMAs until vegetation has recovered. The impact on the WMAs would be short to long-term depending on the existing habitat types and minor to major depending on the landscape context of these public areas to the areas around them.

Construction would also occur on land within eight state forests, resulting in the loss and alteration of forest habitat as well as forest fragmentation. Because the recovery of forested areas in the temporary construction work area (i.e., the disturbed areas outside of the permanent right-of-way) would take decades, the impact would be long-term to permanent but minor to major, based on the relatively small area affected compared to the nearby forested areas and habitat fragmentation.

Table 5.2.4-8. Wildlife Conservation Lands Potentially Affected by the Applicant's Proposed Project

Designation Type and Name	Con[a] Acres	Op[b] Acres	Facilities		Total[c]	
			Con Acres	Op Acres	Con Acres	Op Acres
North Dakota						
Resource Management Area						
Pembina County Waterfowl Production Area	0	0	0	1.5	0	1.5
North Dakota subtotal	***0***	***0***	***0***	***1.5***	***0***	***1.5***
Minnesota						
Habitat or Species Management Area						
Grayling Marsh Wildlife Management Area	14.1	6.4	0.6	--	14.7	6.4
Lawler Wildlife Management Area	2.9	1.5	--	--	2.9	1.5
Lowe Wildlife Management Area	--	--	--	--	--	--
McGregor Wildlife Management Area	--	--	--	--	--	--
Mud Lake Wildlife Management Area	--	--	--	--	--	--
Salo Marsh Wildlife Management Area	--	--	--	--	--	--
State Forest Lands						
Badoura	--	--	--	0.4	--	0.4

Table 5.2.4-8. Wildlife Conservation Lands Potentially Affected by the Applicant's Proposed Project

Designation Type and Name	Con[a] Acres	Op[b] Acres	Facilities		Total[c]	
			Con Acres	Op Acres	Con Acres	Op Acres
Fond du Lac	--	--	--	--	--	--
Foothills	42.3	18.6	11.8	1.1	54.1	19.7
Hill River	102.9	48.3	5.0	6.0	107.9	54.3
Huntersville	96.9	42.9	11.9	7.4	108.8	50.3
Land O'Lakes	130.2	58.1	25.9	5.2	156.1	63.3
Mississippi Headwaters	25.1	10.7	3.8	6.7	28.9	17.4
Paul Bunyan	--	--	--	--	--	--
Savanna	8.7	4.6	0.2	0.1	8.9	4.7
Waukenabo	15.8	8.3	0.5	0.7	16.3	9.0
White Earth	--	--	--	1.5	--	1.5
Minnesota subtotal	***438.9***	***199.4***	***59.7***	***29.1***	***498.6***	***228.5***
Wisconsin						
Protective Management Area – Land, Lake, or River						
Statewide Natural Area	8.6	3.5	NA	NA	8.6	3.5
Recreation Management Area						
North Country National Scenic Trail	--	--	NA	NA	--	--
Wisconsin subtotal	***8.6***	***3.5***	***NA***	***NA***	***8.6***	***3.5***
TOTAL	**447.5**	**202.9**	**59.7**	**30.6**	**507.2**	**233.5**

Source: USGS GAP 2016.

[a] Con = Enbridge-provided footprint for construction work area in Minnesota. In North Dakota and Wisconsin, estimated construction work area in acres based on 120-foot-wide construction work area centered on route, including the 50-foot-wide permanent right-of-way.

[b] Op= Enbridge-provided footprint in Minnesota. Estimated permanent impact area in acres based on 50-foot-wide permanent right-of-way centered on route in North Dakota and Wisconsin.

[c] Total: Con = sum of pipeline construction work area, additional temporary workspaces (including pipe yards), and temporary access roads; Op = sum of pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

Notes:

Values in table may not sum to subtotals and totals due to rounding.

"--" = no occurrence

NA = not available

The Applicant's proposed project would cross the McGregor IBA. Construction during the nesting season (beginning May 1 for most birds of conservation concern) could result in the loss of bird eggs and young. The Applicant would work with Minnesota DNR and USFWS to develop measures that would avoid and minimize disturbance of migratory birds. The impact on the IBA and breeding birds within the IBA from removal of vegetation would be short- to long-term and minor based on to the relatively small area affected compared to the acreage of the unaffected portion of the IBA.

The route would not cross the Itasca State Park IBA, and the pipeline corridor would be co-located with an existing pipeline for most of the length near this IBA. As a result, no impacts are expected on this IBA; if noise and disturbance affected some species within the IBA, the impact would be temporary and negligible.

Raptor habitat could be compromised by removal of trees from the construction work area and extra workspaces in adjacent areas. Many of these species require large, unfragmented habitats. In addition, because most raptors reuse nest structures for many years, loss of nest structures would require a pair to find a new nest tree and build a new nest. If suitable new nest trees are not available within established territories, new territories would need to be established. These processes would lead to increased energy demands during nesting and could lead to reduced or lost reproduction in subsequent years. Most migratory birds begin nesting from mid-April through late July; however, bald eagles may nest as early as February (Minnesota DNR 2016x). Construction during the nesting season (beginning May 1 for most birds of conservation concern) could result in loss of bird eggs and young. The Applicant would work with USFWS to develop measures to avoid and minimize impacts on migratory birds. Raptor nests identified during 2014 to 2016 surveys would be avoided when possible. If removal of one of these nests is unavoidable, a permit and consultation with USFWS and Minnesota DNR may be required.

Two colonial waterbird nesting sites (rookeries) occur within 0.5 mile of the Applicant's proposed project; both sites provide habitat for great blue herons. Waterbirds can be vulnerable to development, particularly when appropriate replacement habitat is not available. Direct impacts may occur from the loss of nesting habitat; indirect impacts could occur from disturbance to adults, nests, and young due to construction. Wildlife agencies often recommend a buffer of no impact around the colony and/or season restrictions on construction; although the Applicant has not received conservation measures or guidance from the USFWS or Minnesota DNR regarding rookeries. The Shell River rookery is about 1,220 feet, from the closest construction work area. The impact on this rookery is expected to be indirect, temporary, and negligible to minor, depending on the time of year construction takes place. The Mahtowa rookery is about 340 feet from the closest construction work area. Because construction activities are expected to occur within a distance that would affect the Mahtowa colony, the Applicant should consult with Minnesota DNR and USFWS, to establish construction BMPs and timeframes to minimize impacts on the rookeries; a permit may be required. The impact of construction within this buffer zone would be temporary to long-term and could be minor to major, depending on the construction activities conducted.

Impacts from Habitat Fragmentation

Habitat fragmentation is caused when contiguous habitats are divided into separate fragments. Large-block habitats (habitats larger than 100 acres) are susceptible to impacts from fragmentation, particularly large, mature core or interior forested areas that serve as habitat for migratory birds and other wildlife. Construction of linear projects such as pipelines can cause habitat fragmentation as well as changes in vegetation cover. Potential fragmentation effects on wildlife habitat include a decrease in total habitat area, amount of interior habitat, biodiversity (richness), and connectivity. Fragmentation may also cause an increase in amount of edge habitat, increase the risk of invasive species spread, and isolate some habitat types. The reduction in habitat connectivity can disrupt behavior and movement of species, alter population dynamics, reduce the chance of recolonization in extirpated island habitats, and decrease genetic diversity. Forest-nesting birds are particularly vulnerable to habitat fragmentation effects resulting from linear construction projects. Habitat fragmentation leads to increased predation, increased competition by generalist species, and changes in microclimate and vegetation which may result in extirpation and reduced reproductive success for area-sensitive species.

The Applicant's proposed project is co-located with other pipelines, utilities, or roads along most of its length. However, between Clearbrook and Carlton nine segments (between approximately MPs 215.0 and 352.0) are not co-located with other infrastructure. Within this span, 21 large-block forested and wetland habitats would be crossed and fragmented by construction of the Applicant's proposed project. This would occur along approximately 38 miles of the Applicant's proposed project, or approximately 11 percent of the route in Minnesota and 17 percent of the route between Clearbrook and Carlton. The habitat "patches" that would be crossed include primarily forested and woody wetland habitats, with the largest patch crossed approximately 4,500 acres over approximately 7 miles, and the smallest patch crossed is about 130 acres over less than 1 mile. Impacts on wildlife from habitat fragmentation would be indirect, permanent, and minor to major, depending on the habitat type and species present. If construction activities bisect interior habitats or remove additional existing edge habitat, thus reducing the habitat patch size, individuals of wildlife species with patch size requirements or sensitivities to habitat fragmentation could experience permanent and major habitat loss and displacement impacts. These impacts would be greatest in more remote, undisturbed areas.

Operations Impacts

The following sections describe the potential impacts of normal operation of the Applicant's proposed project. Impacts from an accidental release of crude oil during operation are addressed in Chapter 10.

Fisheries and Aquatic Habitat

Overall operations impacts on aquatic habitat (174 crossings), trout streams (6 crossings), LBS (1 lake), and AMAs (0.2 acres) would be short-term and negligible to minor. In areas where streambanks are cleared of forested or woody vegetation, thermal effects to trout habitat could occur resulting in long-term major impacts.

General Impacts

The pipeline right-of-way in upland areas would be maintained in an herbaceous vegetative state during operation to allow access for inspection, monitoring, and maintenance.

Alteration of riparian vegetation within the permanent right-of-way in areas adjacent to waterbody crossings would result in localized change in habitat, streambank stability loss and erosion, and the potential for increased sedimentation. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify streambank areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would consult Minnesota DNR and Minnesota PCA and make repairs and improvements based on recommendations from these agencies. With implementation of these measures, localized changes to topography or vegetation would result in short-term minor impacts in the vicinity of the alteration.

Removal of riparian vegetation in areas adjacent to some waterbody crossings would allow more light to enter the waterbody and could cause long-term to permanent, negligible to minor increases in temperature at these locations. Trees and shrubs would not be allowed to reestablish within the permanent right-of-way. This could lead to long-term, major thermal effects on trout streams. During normal operation, no other measurable changes to water quality in surface waters would be expected, with no impacts on most fisheries or aquatic habitats.

Minor accidental fuel and lubricant leaks and spills could be released from maintenance and inspection vehicles using the permanent right-of-way and nearby areas. Any refueling, fuel storage, or vehicle maintenance would follow the Applicant-proposed measures set forth in the Environmental Protection

Plan (Appendix E). If minor leaks or spills during operations reach surface waters, negligible to minor changes to surface water quality would result, and the subsequent temporary impacts on fisheries and aquatic habitats would be negligible to minor.

Chemical control methods (i.e., herbicides) to control invasive vegetation species during operations could be used near waterbodies. The Applicant would implement its noxious weed plans that include methods to prevent and reduce the introduction and spread of noxious weeds and invasive species, and would implement BMPs for herbicide applications. Only herbicides and surfactants labeled for aquatic use would be used within 50 feet of any waterbody (Appendix E). In addition, herbicide use would be based on the invasive species present from monitoring and the minimum herbicide would be used the treat the species present. These actions would reduce potential impacts on aquatic species from herbicides reaching surface waters with runoff. As a result, the use of herbicides would result in temporary negligible impacts on fisheries and aquatic habitats.

Impacts from Integrity Management Digs

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. In upland areas, these integrity digs could result in topographical changes and loss of vegetation in localized areas for relatively short periods of time. The Applicant would implement measures to minimize runoff to surface water during and after these activities, similar to the measures incorporated into the Project during construction. If pipe segments need to be repaired or replaced along surface water crossings, the wet open-cut or dry open-cut method would be used to access the pipe. These methods would be the same as those used for construction of the crossing as described above. The impacts on fisheries and aquatic habitat would be similar to those experienced during construction; for each integrity dig, the impacts would be temporary to short to long-term and minor, depending on the location, habitats affected, and whether repair or replacement are needed. These impacts would occur periodically over the life of the Project.

During repair or replacement of pipe as part of the Integrity Management Program, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during the integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control are not defined. As described for pipeline construction, the Applicant would be required to obtain water appropriation and NPDES permits for testing procedures, and the volume of water would be substantially less than for construction. With adherence to permits and implementation of BMPs to avoid the intake or entrainment of fish, the impacts associated with minor alterations in stream flows from water appropriation and discharge for each integrity dig would be temporary and negligible.

Wildlife and Wildlife Habitat

General Potential Impacts

During operation of the pipeline, the permanent right-of-way would be maintained to prevent woody vegetation from regrowing. Loss of tree and shrub habitats used by birds for cover, forage, and nesting would be permanent in the construction work area outside of the permanent right-of-way because of the long period of time required for forest habitat to regenerate. Within the permanent right-of-way, the impact would be permanent and minor to major, because the right-of-way would be maintained in an herbaceous state.

Differences in vegetation cover between the permanent right-of-way and the surrounding landscape can act as a barrier for some species, such as squirrels and small mammals, while acting as a travel corridor for others, such as raccoons and coyotes. Small mammals that do attempt to cross the cleared right-of-way in previously forested areas could be exposed to increased predation by coyotes, foxes, or birds. Trees and shrubs along rivers and creeks provide high-value wildlife habitat. Furbearers such as muskrats, mink, otter, weasels, and beaver use river edge habitats, and permanent removal of trees and large shrubs along the 50-foot-wide permanent right-of-way would create a break in cover that could increase exposure to terrestrial predators like foxes and coyotes as well as predatory birds. Losses of tree and shrub habitats used by small mammals and birds for cover, forage, and nesting would be a permanent and minor impact because the permanent right-of-way would be maintained free of trees and large shrubs.

Mowing and vegetation removal can result in injury or direct mortality of smaller species such as turtles, small mammals, and bird eggs and young, if conducted during the bird nesting season. This recurring impact would be localized to the permanent right-of-way and the areas around aboveground facilities, resulting in short-term minor impacts on common wildlife for each occurrence; but the mowing would be repeated periodically over the life of the Project.

The maintained permanent right-of-way may be used as travel corridors by some big game animals and humans. Increased human use could lead to disturbance and hunting pressure on game animals, resulting in minor permanent effects on wildlife (Hinkle et al. 2002).

The permanent right-of-way may become attractive to some small species as well. For example, during operations, there may be some warming of the soil above the pipeline, and that may attract rabbits, badgers, and burrowing rodents, especially during winter months. Small mammals attracted to the permanent right-of-way could be exposed to increased predation by coyotes, foxes, or birds. The pipeline right-of-way could also attract migratory waterfowl during early spring if it becomes snow free before surrounding habitats, which has been demonstrated during the early spring melt, when early vegetation emergence near roadways and the limited buried portions of the Trans Alaska Pipeline in Northern Alaska attracts waterfowl, shorebirds, and ptarmigan (*Lagopus* spp.; Trans Alaska Pipeline System Owners 2001). Migratory birds attracted to the permanent right-of-way could be exposed to increased predation by coyotes, foxes, or other predators. These effects would be permanent but minor.

Habitat in the permanent right-of-way could be degraded if native vegetation is replaced by noxious and invasive species. The use of chemical controls can adversely affect wildlife, particularly amphibians because of their sensitivity to chemical exposure. However, implementation of BMPs for use of herbicides that include measures such as only using herbicides when necessary and using aquatic formulations within 50 feet of water, and prevention of the spread of noxious species would minimize the potential for impacts, and the impact on wildlife and wildlife habitats is expected to be temporary to short term and minor.

Impacts on Management Units and Managed Species

The Applicant's proposed project would cross the McGregor IBA, permanently affecting about 25 acres. IBAs represent relatively intact areas that are important to birds. Maintenance of the permanent right-of-way could reduce populations of species sensitive to habitat disturbance and could indirectly result in a permanent and minor effect on breeding birds within the McGregor IBA.

Impacts from Habitat Fragmentation

During operation, the habitat fragmentation along the permanent right-of-way would continue, as described under construction impact, and could reduce populations of some forest interior species (e.g., birds, mammals, and amphibians). Forest-nesting birds are particularly vulnerable to habitat fragmentation effects of linear construction projects. Forest-nesting songbird abundance, diversity, and reproduction rates have been shown to become depressed from the fragmentation associated with linear developments (Jalkotzy et al. 1997). Linear corridors also increase songbird nest predation and parasitism (e.g., by brown-headed cowbirds), by fragmenting forest habitats and increasing access to nests. As a result, habitat fragmentation during operation of the Applicant's proposed project would cause permanent minor to major impacts on wildlife, depending on the location and species.

Impacts from Integrity Management Digs

The integrity management digs described above (see operations impacts for fisheries and aquatic habitat) would result in changes to the permanent right-of-way that would be similar to those during construction.

During operation, the Applicant would implement its Integrity Management Program, which could require excavation and repair or replacement of sections of the pipeline. In upland areas, these integrity digs would result in a loss of vegetation in localized areas for relatively short periods of time. The Applicant would restore the affected areas to conditions present prior to initiating the integrity dig. The impacts would be similar to those during construction of the pipeline, but over a substantially smaller area and without impacts on forested areas because the areas affected by integrity digs essentially would be limited to the permanent right-of-way. As a result, the impacts on wildlife and wildlife habitat would be short-term and negligible to minor but would occur periodically over the life of the Project.

5.2.4.3.2 Continued Use of Existing Line 3 Pipeline

Continued use of the existing Line 3 pipeline would involve continuing use of the existing Line 3 pipeline in Minnesota at its current operating capacity of approximately 390,000 barrels per day (bpd) (see Chapter 4 for further information).

Construction Impacts

Continued use of the existing Line 3 pipeline would not result in construction-related impacts on fisheries, aquatic habitat, wildlife, or wildlife habitat, because the pipeline is in place and operational.

Operations Impacts

Operations activities for the existing Line 3 pipeline would include continued vegetation maintenance along the permanent right-of-way to remove woody vegetation and maintain the right-of-way in an herbaceous vegetative state. All portions of the permanent right-of-way have been in place for decades, and the impacts of operation along the permanent right-of-way that are currently occurring would continue without substantial change.

The Applicant would continue to conduct regular monitoring of the right-of-way and would be able to identify streambank areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would consult Minnesota DNR and Minnesota PCA and make repairs and improvements following recommendations of these agencies. With implementation of these measures, localized changes to topography or vegetation would result in short-term minor impacts in the vicinity of the alteration.

Excavation and replacement of sections of the pipeline as part of the Applicant's ongoing Integrity Management Program and to allow visual inspection of the pipeline route would also continue. The impacts of these integrity digs on fisheries, aquatic habitats, wildlife, and wildlife habitats would be the same as currently experienced for each dig location. However, the need for integrity digs would increase as the pipe continues to age and require repair or replacement of pipe segments. Consequently, the impacts would occur over a wider area annually than currently takes place. The impacts associated with integrity digs range from short to long-term and are minor to major, depending on the location, habitats affected and whether repair or replacement are needed.

5.2.4.3.3 System Alternative SA-04

The methods implemented by the Applicant to avoid or minimize impacts during construction and operation of SA-04 would be the same as those described above for the Applicant's proposed project. The types of potential impacts on fisheries and aquatic resources and wildlife and wildlife habitat from construction and operation of SA-04 would also be similar as those described above for the Applicant's proposed project. Consequently, some discussions in this section refer to the impact analysis presented above for the Applicant's proposed project.

Construction Impacts

Fisheries and Aquatic Habitat

Construction of SA-04 would require 636 stream crossings in North Dakota, Minnesota, Iowa, and Illinois. The majority of crossings would occur in Iowa (Table 5.2.4-9). SA-04 would not cross any trout streams.

Surface water crossings would be designed as close to perpendicular to the axis of the stream channel as engineering and routing constraints allow to create the shortest possible crossing length. The Applicant would determine and obtain approval for specific crossing methods based on factors such as waterbody size, sensitivity, water levels, soil/sediment stability installation, and anticipated season of installation. See Appendix G for a complete discussion of crossing methods. Crossing methods have not yet been determined for the crossings associated with SA-04.

Table 5.2.4-9. Number of Stream Crossings by Crossing Type for System Alternative SA-04

Waterbody Type/Flow	North Dakota	Minnesota	Iowa	Illinois	Total
Artificial path	10	6	5	16	37
Canal/ditch	17	71	--	3	91
Connector	--	1	--	--	1
Lake/pond – intermittent	--	--	4	--	4
Lake/pond – perennial	5	3	4	1	13
Stream/river – intermittent	74	81	152	77	384
Stream/river – perennial	13	10	54	19	96
Swamp/marsh	2	--	4	4	10
TOTAL	**121**	**172**	**223**	**120**	**636**

Source: USGS 2017. Also see maps in Appendix A.

Notes:

An artificial path is a feature that represents flow through a two-dimensional feature, such as a lake or a double-banked stream. An artificial path represents the flow of water into, through, and out of features (channel, estuary, lake/pond, playa, reservoir, swamp, marsh). A canal ditch specifies that it is artificial and that it is used to transport water, to drain or irrigate land, to connect two or more water bodies, or to serve as a waterway for watercraft. A connector establishes a known, but non-specific connection between two non-adjacent network segments that have flow.

Perennial waterbodies are those that hold water at all times, except in cases of extreme drought. Intermittent waterbodies are those that are wet only during part of the year, usually in spring, when rain and snowmelt saturate the ground surface.

"--" = no occurrence

General Potential Impacts on Fisheries and Aquatic Habitat from Surface Water Crossings

SA-04 would cross 636 waterbodies. Construction of SA-04 would result in impacts similar to those identified for the Applicant's proposed project, including streambank alteration, removal of large in-stream structures, direct impacts on fish and fisheries, leaks or small spills of fuel or other hazardous liquids, unanticipated releases of drilling fluids, and risks associated with hydrostatic water withdrawal and discharge. Each of these impacts is discussed in detail above in Section 5.2.4.3.1. Impacts on aquatic habitat would generally be temporary to short-term and negligible to minor, unless a frac-out occurred and went undetected or was not quickly contained. In areas where streambanks are cleared of forested or woody vegetation, thermal effects could occur resulting in long-term minor to major impacts.

Impacts on Management Units and Managed Species

Construction of SA-04 would affect 0.2 acre of the Mayhew Creek FMA in Blue Earth County, Minnesota (Minnesota DNR 2016w). As for the Applicant's proposed project, the Applicant would incorporate BMPs into construction to avoid or minimize impacts; as a result, the impacts of construction of SA-04 from loss of habitat and reduction of habitat quality would be short-term and negligible to minor. The Applicant would implement BMPs to prevent the spread of invasive species, with the resultant impact expected to be at most short-term and negligible to minor.

Construction of SA-04 would affect a freshwater mussel bed site in the Minnesota River (Minnesota DNR 2016e). Impacts on AMAs and mussel beds from construction of SA-04 would depend on the type of waterbody crossing method used and could include introduction of invasive species, loss of habitat, and reduction of habitat quality. Wet open-cut construction through the Minnesota River could permanently

destroy part of the mussel bed, expose mussels to increased turbidity and sedimentation, and result in mortality. These impacts are expected to be permanent and minor to major, depending on how much habitat would be lost in construction areas and the species present. BMPs would be in place to reduce impacts on fisheries and aquatic habitats, as described above for the Applicant's proposed project. Successful use of the HDD crossing method would avoid impacts on mussels and mussel beds, but see information about unintended drilling fluid releases in Section 5.2.4.3.1 above. If an HDD crossing is not an option, mussel surveys, collection, temporary storage, and replacement of mussels could be required, depending on the particular mussel bed.

No trout streams would be crossed by SA-04 in Minnesota, although two trout streams in Nicollet County, Minnesota, occur within 0.5 mile of this alternative (Seven Mile Creek [M-055-071.5] and an unnamed stream [M-055-071.5-002]) (Minnesota DNR 2015c). These trout streams would not be affected by construction of SA-04, as the streams would not be crossed by the pipeline route.

No Significant Wildlife Lakes would be impacted by SA-04.

Wildlife and Wildlife Habitat

General Potential Impacts

The majority of vegetative cover that would be affected by construction of SA-04 is hay/pasture and cultivated cropland. Construction activities on cultivated cropland would temporarily displace and disturb white-tailed deer, small mammals, and birds that typically forage in these areas. These areas would be reclaimed as hay/pasture and cultivated cropland following construction, resulting in temporary to permanent minor to major impacts on these habitats and individuals of the wildlife species that inhabit these areas. Mowing, ground disturbance, and vegetation removal for construction can result in injury or direct mortality of smaller species such as turtles, small mammals, and bird eggs and young, if conducted during the bird nesting season, resulting in short-term minor impacts on common wildlife.

Construction of SA-04 would result in the disturbance of 10,217 acres of cultivated crops, accounting for 95 percent of the land cover affected by construction. Additionally, 161 acres of forest would be disturbed during construction of SA-04 (Table 5.2.4-10). Most of this area is in the Dakota Tallgrass Prairie WMA in North Dakota (94 percent) (Table 5.2.4-11). Impacts on forest and prairie habitats would be similar to those described for the Applicant's proposed project, including the potential for introduction of invasive species, loss of habitat, and reduction of habitat quality. For the prairie habitats, BMPs would be in place to reduce impacts on wildlife and wildlife habitats, and construction areas would be revegetated using native seed mixes (e.g., Minnesota BWSR mixes) or as required by the land administrator. Consequently, impacts are expected to be temporary to short term and minor. Forested areas would be permanently removed from the permanent right-of-way but would be allowed to regenerate in portions of the temporary construction work area that are outside of the permanent-right-of-way. As a result, impacts on wildlife habitat and the wildlife using the forested habitat would be temporary to permanent and minor to major, depending on the specific area affected.

Table 5.2.4-10. Vegetation Cover Potentially Affected by System Alternative SA-04 (acres)

Vegetation Cover Class	Construction Work Area[a]	Permanent Right-of-Way[b]
Evergreen forest	9	0
Deciduous forest	98	41
Mixed forest	<0.1	<0.1
Shrub/scrub	<0.1	<0.1
Grassland/herbaceous	181	76
Hay/pasture	100	41
Cultivated crops	10,217	4,266
Woody wetlands	54	23
Emergent herbaceous wetlands	85	35
Barren land	20	9
TOTAL	**10,765**	**4,490**

Source: Homer et al. 2015.

[a] Estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the pipeline route, including the 50-foot-wide permanent right-of-way.

[b] Estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the pipeline route.

Notes:

Values in table may not sum to subtotals and totals due to rounding.

"--" = no occurrence

Table 5.2.4-11. Wildlife Conservation Lands Potentially Affected by System Alternative SA-04

Designation Type and Name	Construction Work Area[a]		Permanent Right-of-Way[b]	
	Acres	Number	Acres	Number
North Dakota				
Habitat or Species Management Areas				
Dakota Tallgrass Prairie Wildlife Management Area	794.8	1	331.1	1
Resource Management Areas				
Pembina County Waterfowl Production Area	10.4	3	4.7	3
Not Designated				
Pembina County Waterfowl Production Area	5.0	2	2.5	2
North Dakota subtotal	***810.2***	***6***	***338.3***	***6***
Minnesota				
Habitat or Species Management Areas				
Lyle-Austin Wildlife Management Area	0.3	1	0.1	1
Resource Management Areas				

Table 5.2.4-11. Wildlife Conservation Lands Potentially Affected by System Alternative SA-04

Designation Type and Name	Construction Work Area[a]		Permanent Right-of-Way[b]	
	Acres	Number	Acres	Number
Morris Wetland Management District Waterfowl Production Area	0.3	2	0.1	1
Private Conservation Lands				
Conservation Reserve Enhancement Program	26.0	8	10.8	8
Reinvest in Minnesota Wetlands Reserve Program	5.0	2	2.1	2
Minnesota subtotal	***31.6***	***13***	***13.1***	***12***
Illinois				
National Wildlife Refuges				
Upper Mississippi River Wildlife and Fish Refuge	0.2	1	0.1	1
Protective Management Areas				
Coon Creek	0.2	1	0.1	1
Mississippi River	4.1	1	1.7	1
State Parks				
Hennepin Canal	0.9	1	0.4	1
Illinois subtotal	***5.4***	***5***	***2.2***	***5***
TOTAL	**847.1**	**24**	**353.7**	**23**

Source: USGS GAP 2016.

[a] Estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way.

[b] Estimated operations impact area in acres based on a 50-foot-wide right-of-way centered on the route.

Notes:

Values in table may not sum to subtotals and totals due to rounding.

Represents GAP Status 1, 2, and 3 only; these lands have permanent protection from conversion of natural land cover that provides wildlife habitat.

Potential Impacts on Management Units and Managed Species

Alternative SA-04 would affect 847 acres within 24 lands managed for conservation of wildlife, including WMAs in North Dakota, Minnesota, and Illinois (Table 5.2.4-11). SA-04 would primarily impact the Dakota Tallgrass Prairie Wildlife Management Area during construction, comprising 795 acres or 94 percent of all wildlife conservation lands potentially impacted during construction by SA-04. In addition, one state park (Hennepin Canal) would be crossed by SA-04. Impacts on these conservation areas would be short to long-term depending on the existing habitat types and minor to major depending on the landscape context of these public areas to areas around them.

Construction of SA-04 would affect lands within five IBAs. Each of these IBAs is described in Section 5.2.4.2.3. Construction would result in removal of habitats across or near these areas and could reduce populations of those species sensitive to habitat loss or alteration and species that rely on large, intact habitats. This could result in permanent and minor to major effects on breeding birds within the IBAs.

Potential Impacts from Habitat Fragmentation

System alternative SA-04 would be constructed along existing pipeline or utility corridors throughout its entire length and would not substantially contribute to fragmentation of large-block habitats.

Operations Impacts

Fisheries and Aquatic Habitat

Overall operations impacts on aquatic habitat (636 crossings) and AMAs (0.2 acres) would be short-term and negligible to minor. In areas where streambanks are cleared of forested or woody vegetation, thermal effects could occur resulting in long-term major impacts on aquatic areas.

General Impacts

The pipeline right-of-way in upland areas would be maintained in an herbaceous vegetative state during operation to allow access along the right-of-way for inspection, monitoring, and maintenance. Permanent removal of riparian vegetation within the permanent right-of-way in areas adjacent to waterbody crossings would result in localized alterations in habitat, streambank stability loss and erosion, and the potential for increased sedimentation. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify streambank areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would consult Minnesota DNR and Minnesota PCA and make repairs and improvements following recommendations of these agencies. With implementation of these measures, localized changes to topography or vegetation would result in short-term minor impacts in the vicinity of the alteration.

Permanent removal of riparian vegetation in areas adjacent to some waterbody crossings would allow more light to enter the waterbody and could cause long-term, negligible to minor increases in temperature at these locations. Trees and shrubs would not be allowed to reestablish within the permanent right-of-way. During normal operation, no other measurable changes to water quality in surface waters would be expected, with no impacts on most fisheries or aquatic habitats from these other effects.

Minor accidental fuel and lubricant leaks and spills could be released from maintenance and inspection vehicles using the permanent right-of-way and nearby areas. Any refueling, fuel storage, or vehicle maintenance would follow the Applicant-proposed measures set forth in the Environmental Protection Plan (Appendix E). If minor leaks or spills during operations reach surface waters, negligible to minor changes to surface water quality would result, and the subsequent temporary impacts on fisheries and aquatic habitats would be negligible to minor.

Chemical methods (i.e., herbicides) to control invasive vegetation species during operations could be used near waterbodies. The Applicant would implement its noxious weed plans that include methods to prevent and reduce the introduction and spread of noxious weeds and invasive species, and would implement BMPs for herbicide applications. Only herbicides and surfactants labeled for aquatic use would be used within 50 feet of any waterbody (Appendix E). In addition, herbicide use would be based on the invasive species present from monitoring and the minimum herbicide would be used the treat the species present. These actions would reduce potential impacts on aquatic species from herbicides reaching surface waters with runoff. As a result, the use of herbicides would result in temporary and negligible impacts on fisheries and aquatic habitats.

Impacts on Management Units and Managed Species

Operation of SA-04 would permanently affect 0.2 acre of the Mayhew Creek FMA in Blue Earth County, Minnesota (Minnesota DNR 2016w). These impacts are expected to be short-term and negligible to minor as the pipeline would be subsurface and vegetation would recover outside of the permanent right-of-way.

Impacts from Integrity Management Digs

During operation, the Applicant would implement its Integrity Management Program, which could require excavation and repair or replacement of sections of the pipeline. In upland areas, these integrity digs could result in topographical changes and loss of vegetation in localized areas for relatively short periods of time. The Applicant would implement measures to minimize runoff to surface water during and after these activities, similar to the measures incorporated into the Project during construction. If pipe segments need to be repaired or replaced along surface water crossings, the wet open-cut or dry open-cut method would be used to access the pipe. These methods would be the same as those used for construction of the crossing, as described above. Impacts on fisheries and aquatic habitat would be similar to those experienced during construction; for each integrity dig, the impacts would be short to long-term and minor, depending on the location, habitats affected, and whether repair or replacement are needed. These impacts would occur periodically over the life of the Project.

During repair or replacement of pipe as part of the Integrity Management Program, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during the integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control would vary depending on the situation. As described for pipeline construction, the Applicant would be required to obtain water appropriation and NPDES permits for testing procedures, and the volume of water would be substantially less than for construction. With adherence to permits and implementation of BMPs to avoid the intake or entrainment of fish, the impacts associated with minor alterations in stream flows from water appropriation and discharge for each integrity dig would be temporary and negligible.

Wildlife and Wildlife Habitat

General Potential Impacts

During operation of the pipeline, the permanent right-of-way would be maintained to prevent woody vegetation from regrowing. Loss of tree and shrub habitats used by birds for cover, forage, and nesting would be permanent in the construction work area outside of the permanent right-of-way because of the long period of time required for forest habitat to regenerate. Within the permanent right-of-way, the impact would be temporary to permanent and minor to major, because the right-of-way would be maintained in an herbaceous state.

Differences in vegetation cover between the permanent right-of-way and the surrounding landscape can act as a barrier for some species, such as squirrels and small mammals, while acting as a travel corridor for others, such as raccoons and coyotes. Small mammals that do attempt to cross the cleared right-of-way in previously forested areas could be exposed to increased predation by coyotes, foxes, or birds. Trees and shrubs along rivers and creeks provide high-value wildlife habitat. Furbearers such as muskrats, mink, otter, weasels, and beaver use river edge habitats; and permanent removal of trees and large shrubs along the 50-foot-wide permanent right-of-way would create a break in cover that could increase exposure to terrestrial predators like foxes and coyotes as well as predatory birds. Losses of tree and shrub habitats used by small mammals and birds for cover, forage, and nesting would be a

permanent and minor impact because the permanent right-of-way would be maintained free of trees and large shrubs.

Mowing and vegetation removal can result in injury or direct mortality of smaller species such as turtles, small mammals, and bird eggs and young, if conducted during the bird nesting season. This recurring impact would be localized to the permanent right-of-way and the areas around aboveground facilities, resulting in short-term minor impacts on common wildlife for each occurrence; but the mowing would be repeated periodically over the life of the Project.

The maintained permanent right-of-way may be used as travel corridors by some big game animals and humans. Increased human use could lead to disturbance and hunting pressure on game animals, resulting in minor permanent effects on wildlife (Hinkle et al. 2002).

The permanent right-of-way may become attractive to some small species as well. For example, during operations, there may be some warming of the soil above the pipeline, and that may attract rabbits, badgers, and other burrowing rodents, especially during winter months. Small mammals attracted to the permanent right-of-way could be exposed to increased predation by coyotes, foxes, or birds. The pipeline right-of-way could also attract migratory waterfowl during early spring if it becomes snow free before surrounding habitats, which has been demonstrated during the early spring melt, when early vegetation emergence near roadways and the buried portions of the Trans Alaska Pipeline in Northern Alaska attracts waterfowl, shorebirds, and ptarmigan (Trans Alaska Pipeline System Owners 2001). Migratory birds attracted to the permanent right-of-way could be exposed to increased predation by coyotes, foxes, or other predators. These effects would be permanent but minor.

Habitat in the permanent right-of-way could be degraded if native vegetation is replaced by noxious and invasive species. The use of chemical controls can adversely affect wildlife, particularly amphibians because of their sensitivity to chemical exposure. However, implementation of BMPs for use of herbicides, which include measures such as only using herbicides when necessary and using aquatic formulations within 50 feet of water, and prevention of the spread of noxious species would minimize the potential for impacts, and the impact on wildlife and wildlife habitats is expected to be temporary to short-term and minor.

Impacts on Management Units and Managed Species

Impacts of right-of-way maintenance within the several wildlife conservation areas crossed by SA-04, would be short-term to permanent and minor to major, depending on the type of habitat present. Maintenance of the permanent right-of-way could reduce populations of species sensitive to habitat disturbance, and could result in short-term to permanent, minor effects onto breeding birds within the IBAs.

Impacts from Habitat Fragmentation

Because SA-04 would be within or adjacent to existing utility corridors for all of its length, no impacts related to fragmentation of large tracts of wildlife habitat would occur.

Impacts from Integrity Management Digs

The integrity management digs described above (see operations impacts for fisheries and aquatic habitat) would result in changes to the permanent right-of-way that would be similar to those during construction.

During operation, the Applicant would implement its Integrity Management Program, which could require excavation and repair or replacement of sections of the pipeline. In upland areas, these integrity digs would result in loss of vegetation in localized areas for relatively short periods of time. The Applicant would restore the affected areas to conditions present prior to initiating the integrity dig. The impacts would be similar to those occurring during construction of the pipeline, but over a substantially smaller area, and without impacts on forested areas because the areas affected by the integrity digs would be limited to the permanent right-of-way. Consequently, impacts on wildlife and wildlife habitat would be short-term and negligible to minor but would occur periodically over the life of the Project.

5.2.4.3.4 Transportation by Rail

Near the existing Enbridge terminal at Clearbrook, the rail alternative would require as much as 200 acres to construct and operate an offloading facility and 60 acres to reactivate an abandoned rail line. Near the existing Enbridge terminal at Superior, Wisconsin, construction would require as much as 100 acres for offloading facilities and an additional 3 acres to establish a new rail spur.

Construction Impacts

Fisheries and Aquatic Habitat

Aquatic species and aquatic habitat would be affected by clearing and grading activities for development of the offloading facilities in both Clearbrook and Superior. The direct and indirect potential impacts would be similar to those described above for construction of the Applicant's proposed project, including the potential for habitat degradation from increases in stormwater runoff, erosion, and sedimentation, and the potential for injury or mortality of individual fish and other aquatic species. Degradation of water quality also could occur from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities. A SWPPP and a stormwater NPDES permit would be required for construction of facilities. Adhering to stipulations of the permit and the SWPPP, along with implementation of other BMPs, would minimize the potential for stormwater to carry eroded materials or contaminants into nearby surface waters and therefore minimize impacts on fisheries and aquatic habitats. The prevention and management of spills during construction would be managed according to SPCC plans that would be required for each facility. As a result, potential impacts on fisheries and aquatic habitats from construction of rail offloading facilities would be temporary to short-term and negligible.

Development of rail facilities likely would require water for common construction purposes, such as dust control, but large volumes would not be needed (e.g., for hydrostatic testing) because the existing tanks at the terminals likely would be used to store the delivered crude oil. Although the source of construction water is not known, it is anticipated that construction water could be obtained from sources other than surface waters (e.g., from a public water supply). Consequently, impacts on aquatic habitat and species from appropriation and discharge of large amounts of water are not expected to occur.

Wildlife and Wildlife Habitat

The habitat around the Clearbrook, Minnesota terminal includes deciduous and evergreen forests, woody and emergent wetlands and hay/pasture and cultivated croplands that provides habitat for white-tailed deer, small mammals, and birds. Vegetation cover near the Superior terminal is primarily deciduous forest and scrub/shrub wetlands. Wildlife and wildlife habitat would be affected by clearing and grading activities for development of offloading facilities at both locations. The loss of habitat would be permanent where the offloading facilities and new rail spur are sited. Larger species would be able to

re-locate to nearby areas but may not survive if those areas are at habitat-carrying capacity. The loss of wildlife habitat would result in permanent but minor impacts based on the relatively large area of similar habitat in the areas surrounding the facilities.

Clearing of vegetation and downed woody debris in deciduous habitats could have temporary minor impacts on species with small home ranges or are slow to recover after disturbance, such as salamanders, because it could result in mortality of these small species or reduce prey availability to bird and mammal species that rely on these small species for food.

Operations Impacts

Fisheries and Aquatic Habitat

New facilities would create permanent impervious surfaces that would affect stormwater runoff at these locations. However, the offloading facilities would be designed to comply with NPDES permits and other permitting requirements that control runoff from industrial sites. Although the increase in impermeable surfaces would alter runoff patterns, with adherence to permitting requirements, a substantial increase in stormwater runoff and erosion would not be anticipated and would not be expected to carry eroded materials or contaminants to nearby surface waters. Consequently, the potential impacts on the associated fisheries and aquatic habitats would be permanent but negligible to minor.

Although the route that would be traveled by the unit trains exists, operation of unit trains would increase the amount of materials dropping from the trains to the railroad bed above the current level. Material reaching the railroad bed could include materials from brake pad consumption, lubrication, and fuel drips and leaks. The increase above current conditions is expected to be minor and typical of transport of cargo by rail. If petrochemicals reach areas of the railroad bed adjacent to surface waters, it is possible that the petrochemicals could migrate to the surface water. However, the quantity of materials leaking during normal operation would be small, and the associated impact on surface water quality likely would be temporary and minor. As a result, the impacts on fisheries and aquatic habitats would be temporary to permanent and negligible to minor.

Potential impacts on fisheries and aquatic habitat from an unanticipated release of crude oil are discussed in Chapter 10.

Wildlife and Wildlife Habitat

The principle impact of the rail transport alternative on wildlife during operation would be collisions with trains. This would be a permanent minor to major impact on common highly mobile wildlife such as white-tailed deer, mid-sized mammals, and birds. Major impacts could occur if collision deaths affect population management of species such as white-tailed deer. The train route currently passes through and near WMAs, including IBAs. No changes in impacts on wildlife habitats or wildlife management units are anticipated from operation of trains on the existing rail lines but the operation of the terminal would result in permanent minor impacts on wildlife habitat because the area would be maintained free of vegetation.

Potential impacts on wildlife and wildlife habitat from an unanticipated release of crude oil from a unit train are discussed in Chapter 10.

5.2.4.3.5 Transportation by Truck

Transportation of crude oil by truck would require development of offloading facilities and new road access. In the United States, truck offloading facilities would require approximately 50-acre sites at the

existing terminals in Clearbrook, Minnesota, and in Superior, Wisconsin. New road access would require permanent conversion of approximately 5 acres of agricultural land, semi-disturbed land, and wetlands at the Clearbrook terminal; and 34 acres of semi-disturbed land at the Superior terminal.

The truck alternative would also require construction of a new loading facility and a new access road near Gretna, Canada. This EIS does not address construction or operation of those facilities.

Construction Impacts

Fisheries and Aquatic Habitat

Aquatic species and aquatic habitat would be affected by clearing and grading activities for development of the offloading facilities in both Clearbrook and Superior. Direct and indirect potential impacts would be similar to those described above for construction of the Applicant's proposed project, including the potential for habitat degradation from increases in stormwater runoff, erosion, and sedimentation, and the potential for injury or mortality of individual fish and other aquatic species. Degradation of water quality also could occur from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities. A SWPPP and a stormwater NPDES permit would be required for construction of facilities. Adhering to stipulations of the permit and the SWPPP, along with implementation of other BMPs would minimize the potential for stormwater to carry eroded materials or contaminants into nearby surface waters and therefore minimize impacts on fisheries and aquatic habitats. The prevention and management of spills during construction would be managed according to SPCC plans that would be required for each facility. As a result, potential impacts on fisheries and aquatic habitats from construction of truck offloading facilities would be temporary to short-term and negligible.

Development of the truck offloading facilities would likely require water for common construction purposes, such as dust control, but large volumes would not be needed (e.g., for hydrostatic testing) because the existing tanks at the terminals likely would be used to store the delivered crude oil. Although the source of construction water is not known, it is anticipated that construction water could be obtained from sources other than surface waters (e.g., from a public water supply). Consequently, impacts on aquatic habitat and species from appropriation and discharge of large amounts of water are not expected to occur.

Wildlife and Wildlife Habitat

The habitat around the Clearbrook, Minnesota terminal includes deciduous and evergreen forests, woody and emergent wetlands and hay/pasture and cultivated croplands that provides habitat for white-tailed deer, small mammals, and birds. Vegetation cover near the Superior terminal is primarily deciduous forest and scrub/shrub wetlands. Wildlife and wildlife habitat would be affected by clearing and grading activities for development of truck offloading facilities at both locations. Clearing of vegetation and downed woody debris in deciduous habitats could negatively affect species with small home ranges such as salamanders resulting in minor impacts including mortality of common species. The loss of habitat would be permanent where the offloading facilities and new roadway are sited. Larger species would be able to re-locate to nearby areas but may not survive if those areas are at

habitat-carrying capacity. The loss of wildlife habitat would result in impacts that would be permanent but minor based on the relatively large area of similar habitat in the areas surrounding the facilities.

Operations Impacts

Fisheries and Aquatic Habitat

New facilities would create permanent impervious surfaces that would affect stormwater runoff at these locations. However, the offloading facilities would be designed to comply with NPDES permits and other permitting requirements that control runoff from industrial sites. Although the increase in impermeable surfaces would alter runoff patterns, with adherence to permitting requirements, a substantial increase in stormwater runoff and erosion would not be anticipated and would not be expected to carry eroded materials or contaminants to nearby surface waters. Consequently, the potential impacts on the associated fisheries and aquatic habitats would be permanent but negligible to minor.

Although the trucks would transport crude oil along existing highways that are currently used by trucks and other vehicles, operation of the truck alternative would increase the amount of materials dropping from the trucks to the roadway above the current level. Materials dropping from the trucks to the roadway could include materials from brakepad consumption, lubrication, and fuel drips and leaks. The increase above current conditions is expected to be minor and typical of transport of cargo by truck. If petrochemicals reach areas of the roadway adjacent to surface waters, it is possible that the petrochemicals could migrate to the surface water. However, the quantity of materials leaking during normal operation would be small, and the associated impact on surface water quality likely would be temporary and minor. As a result, impacts on fisheries and aquatic habitats would be temporary to permanent and negligible to minor.

Potential impacts on fisheries and aquatic habitat from an unanticipated release of crude oil are discussed in Chapter 10.

Wildlife and Wildlife Habitat

The principle impact of operation of the truck transport alternative on wildlife would be collisions with trucks. This would be a permanent minor to major impact on common highly mobile wildlife such as white-tailed deer, mid-sized mammals, and birds. Major impacts could occur if collision deaths affect population management of species such as white-tailed deer. The highways used by the trucks route currently pass through and near WMAs, including IBAs. No changes in impacts on wildlife habitats or wildlife management units are anticipated from operation of trucks on the existing roadways, but the operation of the terminal would result in permanent minor impacts on wildlife habitat because the area would be maintained free of vegetation.

Potential impacts on wildlife and wildlife habitat from an unanticipated release of crude oil from trucks are discussed in Chapter 10.

5.2.4.3.6 Existing Line 3 Supplemented by Rail

Impacts on fisheries, aquatic habitat, wildlife, and wildlife habitat from the combined used of the existing Line 3 infrastructure and the rail alternative would be the same as described above for continued use of existing Line 3 plus those of the rail alternative. Because fewer trains would be required for transport, potential impacts on wildlife from collisions with trains could be reduced. No

changes in impacts, beyond those already addressed in this section, would be expected by using a combination of these alternatives.

5.2.4.3.7 Existing Line 3 Supplemented by Truck

Impacts on fisheries, aquatic habitat, wildlife, and wildlife habitat from the combined used of the existing Line 3 infrastructure and the truck alternative would be the same as described above for continued use of existing Line 3 in addition to those of the truck alternative. Because fewer trucks would be required for transport, potential impacts on wildlife from collisions with trucks would be reduced. No changes in impacts, beyond those already addressed in this section, would be expected by using a combination of these alternatives.

5.2.4.4 Summary and Mitigation

5.2.4.4.1 Summary

Construction and operation of the Applicant's proposed project or any of the CN Alternatives could result in impacts on aquatic habitat, fish, wildlife habitat, and wildlife, ranging from no impact to permanent major impacts. Impacts would likely occur in forested areas and wetlands where habitat fragmentation would be most noticeable as well as in areas where large trees are permanently removed along stream banks resulting in thermal changes and habitat loss. Impacts would also occur where colonial waterbird nesting trees are removed or where freshwater mussel beds are destroyed. Table 5.2.4-12 presents a summary of construction- and operations-related impacts on aquatic habitat, fish, wildlife habitat, and wildlife for the Applicant's proposed project and CN Alternatives.

Avoidance and impact minimization measures that would influence the duration and magnitude of impacts include Applicant-proposed measures, measures proposed by Minnesota DNR, and measures that would be included in state and federal permits. All stream crossings and measureable disturbance to wildlife (e.g., beaver dams, colonial nesting waterbirds, raptor nests) or aquatic species (e.g., fish, mussels) would be reviewed and approved by the authorizing agency prior to construction and may include requirements for further surveys or additional mitigation. Many of the avoidance and mitigation measures and the standard BMPs described for the Applicant's proposed project would be applicable to the CN Alternatives. Because the existing Line 3 pipeline was constructed previously and is operating, it was not considered under construction impacts.

Fisheries and Aquatic Habitat

<u>Construction Impacts</u>

A large potential impact on aquatic habitat due to construction would result from clearing vegetation along stream banks, in-water disturbance from construction of the Applicant's proposed project or SA-04 pipelines across surface water where the wet or dry open-cut crossing methods are used, and if a frac-out occurred during the HDD method in sensitive or impaired waters. In comparison, the rail alternative, truck alternative, and combination alternatives would have temporary to short-term and negligible to minor effects on aquatic habitats due to creation of new impervious surfaces and altered runoff.

Table 5.2.4-12. Summary of Potential Impacts on Fish and Wildlife for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Construction Impacts							
Aquatic habitat loss or reduction of aquatic habitat quality from construction activities, including hydrostatic testing	Temporary to short-term/ negligible to minor impacts Long-term/minor to major impacts *(where streambanks are cleared of forested or woody vegetation)* • 174 stream crossings	No impact	Temporary to short-term/negligible to minor impacts Long-term/minor to major impacts *(where streambanks are cleared of forested or woody vegetation)* • 636 stream crossings	Temporary to short-term/negligible impacts	Temporary to short-term/negligible impacts	Temporary to short-term/negligible impacts	Temporary to short-term/negligible impacts
Trout stream habitat loss or reduction of aquatic habitat quality from surface water crossings	Short-term/minor impacts Long-term/major thermal impacts *(where streambanks are cleared of forested or woody vegetation)* • 6 trout stream crossings	No impact	No impact	No impact	No impact	No impact	No impact
Loss of habitat and reduction of habitat quality in Minnesota Lakes of Biological Significance	Short-term/ negligible to minor impacts • 1 MN Lake of Biological Significance	No impact	No impact	No impact	No impact	No impact	No impact

Table 5.2.4-12. Summary of Potential Impacts on Fish and Wildlife for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Loss of habitat and reduction of habitat quality in Aquatic Management Areas (AMAs) or Fisheries Management Areas (FMAs)	Short-term/ negligible to minor impacts • 0.4 acre of AMA disturbance	No impact	Short-term/ negligible to minor impacts • 0.2 acre of FMA disturbance	No impact	No impact	No impact	No impact
Loss of habitat and reduction of habitat quality of freshwater mussel bed; mortality of mussels	No impact	No impact	Permanent minor to major impacts, depending on crossing method • 1 freshwater mussel bed disturbed	No impact	No impact	No impact	No impact
Potential for injury, mortality, or disturbance of aquatic species affecting fisheries	Temporary/minor to major impacts	No impact	Temporary/minor to major impacts	Temporary to short-term/negligible impacts	Temporary to short-term/negligible impacts	Temporary to short-term/negligible impacts	Temporary to short-term/negligible impacts
Loss of habitat or reduction of wildlife habitat quality from construction activities and vegetation clearing	Temporary to permanent/minor to major impacts from clearing of the right-of-way • 5,617 acres of habitat, primarily cultivated crops and forest (75%)	No impact	Temporary to permanent/minor to major impacts from clearing of the right-of-way • 10,765 acres of habitat, primarily cultivated crops (95%)	Permanent/minor impacts • Approximately 363 acres of habitat cleared for offloading facility, reactivation of abandoned line, and building new rail spur	Permanent/minor impacts from clearing • Approximately 100 acres of habitat • Approximately 40 acres of new roads	Permanent/ minor impacts • Approximately 363 acres of habitat cleared for offloading facility, reactivation of abandoned line, and building new rail spur	Permanent/minor impacts from clearing • Approximately 100 acres of habitat • Approximately 40 acres of new roads

Table 5.2.4-12. Summary of Potential Impacts on Fish and Wildlife for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Loss of habitat or reduction of wildlife habitat quality in wildlife conservation areas from vegetation clearing	Short-term to long-term/minor to major impacts from clearing of the right-of-way • 512.9 acres of wildlife conservation areas	No impact	Long-term/minor impacts from clearing of the right-of-way • 847 acres of wildlife conservation areas	No impact	No impact	No impact	No impact
Disturbance or loss of colonial waterbird nesting sites	Temporary to long-term/minor to major impacts on the Mahtowa rookery depending on season	No Impact	Impact unknown	No impact	No impact	No impact	No impact
Loss of habitat or reduction of wildlife habitat quality from habitat fragmentation	Permanent/major impacts on primarily forests and wetlands • 38 miles of habitat fragmented • 21 large-block habitats (>100 acres) crossed	No impact	No impact Pipeline would be co-located with existing corridors	No impact	No impact	No impact	No impact
Potential for injury, mortality, or disturbance of wildlife species	Temporary to short-term/minor impacts	No impact	Temporary minor impacts	Temporary minor impacts	Temporary minor impacts	Temporary minor impacts	Temporary minor impacts

Table 5.2.4-12. Summary of Potential Impacts on Fish and Wildlife for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Operations Impacts							
Aquatic habitat loss or reduction of aquatic habitat quality from maintenance activities, integrity digs, or small leaks and spills	Short-term to long-term/ negligible to minor to major impacts Long-term/major thermal effects (*where streambanks are cleared of forested or woody vegetation*) • 174 stream crossings	Short-term to long-term, /minor to major impacts	Short-term to long-term/ major to minor impacts Long-term/major thermal effects (where streambanks are cleared of forested or woody vegetation) • 636 stream crossings	Temporary to permanent/ negligible to minor impacts	Temporary to permanent/ negligible to minor impacts	Temporary to permanent/ negligible to minor impacts	Temporary to permanent/ negligible to minor impacts
Trout stream habitat loss or reduction of aquatic habitat quality from right-of-way maintenance at surface water crossings	Short-term/negligible to minor impacts Long-term/major thermal effects (*where streambanks are cleared of forested or woody vegetation*) • 6 trout stream crossings	No impact	No impact	No impact	No impact	No impact	No impact
Loss of habitat and reduction of habitat quality in Minnesota Lakes of Biological Significance	Short-term/ negligible to minor impacts • 1 MN Lake of Biological Significance	No impact	No impact	No impact	No impact	No impact	No impact

Table 5.2.4-12. Summary of Potential Impacts on Fish and Wildlife for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Loss of habitat and reduction of habitat quality in Aquatic Management Areas (AMAs) or Fisheries Management Areas (FMAs)	Short-term/ negligible to minor impacts • 0.2 acre of AMA disturbance	No impact	Short-term/ negligible to minor impacts • 0.2 acre of FMA disturbance	No impact	No impact	No impact	No impact
Potential for injury, mortality, or disturbance of aquatic species affecting fisheries	Temporary to long-term/minor impacts	Short-term/minor impacts	Temporary to permanent and long-term/minor impacts	Temporary/ negligible impacts	Temporary/ negligible impacts	Temporary/ negligible impacts	Temporary/ negligible impacts
Loss of habitat or reduction of wildlife habitat quality from maintenance of cleared vegetation	Permanent/minor to major impacts from maintenance of the right-of-way • 2,197 acres of habitat	Short-term/minor impacts	Permanent/minor to major impacts from maintenance of the right-of-way • 4,431 acres of habitat	Permanent/minor impacts • Approximately 363 acres of habitat cleared for offloading facility, reactivation of abandoned line, and building new rail spur	Permanent/minor impacts from clearing • Approximately 100 acres of habitat • Approximately 40 acres of new roads	Permanent/minor impacts • Approximately 363 acres of habitat cleared for offloading facility, reactivation of abandoned line, and building new rail spur	Permanent/minor impacts from clearing • Approximately 100 acres of habitat • Approximately 40 acres of new roads

Table 5.2.4-12. Summary of Potential Impacts on Fish and Wildlife for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Loss of habitat or reduction of wildlife habitat quality in wildlife conservation areas from vegetation clearing	Short-term to long-term/minor impacts from maintenance of the right-of-way • 234.3 acres of wildlife conservation areas	No impact	Permanent to short-term/minor to major impacts from maintenance of the right-of-way • 354 acres of wildlife conservation areas	No impact	No impact	No impact	No impact
Loss of habitat or reduction of wildlife habitat quality from habitat fragmentation	Permanent/minor to major impacts on primarily forests and wetlands • 21 large-block habitats (>100 acres) crossed	No impact	No impact • Pipeline would be co-located with existing corridors	No impact	No impact	No impact	No impact
Potential for injury, mortality, or disturbance of wildlife species	Short-term/minor impacts from habitat loss or fragmentation and mortality of common species during mowing and other maintenance activities	Temporary/minor impacts	Short-term/minor impacts from habitat loss and mortality of common species during mowing and other maintenance activities	Permanent/minor to major impacts from noise and collisions with wildlife	Permanent/minor to major impacts from collisions with wildlife	Permanent/minor to major impacts from noise and collisions with wildlife	Permanent/minor to major impacts from collisions with wildlife

The Applicant's proposed project would cross fewer surface waters (174) than SA-04 (558), but would cross sensitive trout streams whereas SA-04 would not. In addition, the Applicant's proposed project would pass through substantially more forested habitat (2,022 acres) than SA-04 (161 acres), which would require removal of woody vegetation that provides shade and stability along some streams. This could result in long-term, major impacts on trout streams due to the potential for thermal changes. However, impacts on aquatic habitat, including trout streams, could be temporary to short-term and minor if the crossing method with least disturbance is used and BMPs are in place to reduce impacts. Proper restoration of stream banks after construction of stream crossings, which includes restoring the channel longitudinal profile, channel cross sections, and bankfull elevations as well as revegetating the banks are recommended by permitting agencies, would prevent additional sedimentation as well as changes to the width, depth, and temperature of all streams, including trout streams. Improper restoration of stream crossings could result in sedimentation that leads to wider, shallower, warmer streams. Stream restoration should include the restoration of pre-construction dimension, pattern and profile to the stream channel as well as restoration of the vegetative boundary condition of the streambanks to ensure channel stability and stability of the pipeline crossing. Floodplain connectivity should not be altered by the stream crossing. Ecological processes of a healthy riparian corridor, such as the recruitment of large woody debris for in-stream habitat should be restored to pre-construction conditions or enhanced when possible.

SA-04 would traverse predominantly agricultural land and grasslands. Bank stability and temperature at stream crossings would be affected less by vegetation removal in areas such as these where streams and species have adapted to a more open canopy than the canopies along the Applicant's proposed project. One known freshwater mussel bed occurs within the Minnesota River along SA-04 and could be permanently destroyed or damaged by construction if one of the open-cut crossing methods is used. The magnitude of the effects would depend on how much habitat would be lost and the species present.

The waters within the ROIs of the two new pipeline routes provide habitat for species of fish specific to those waters, including important managed recreational species such as muskellunge and trout. Trout streams are particularly sensitive to erosion, sedimentation, and changes to the riparian corridor. Any changes in groundwater connectivity or flow as a result of a pipeline crossing can result in warming of the stream, which may negatively affect habitat suitability for trout and the ecology of invertebrate insects, which form the base of the food web. Fish in the vicinity of surface water crossings along both routes likely would respond to the increased in-stream activities by leaving the construction area and avoiding direct impacts; however, injuries or mortality could occur resulting in temporary and minor impacts for common species in the area. The construction of the rail, truck, and combined alternatives would not require in-stream construction and therefore would have temporary to short-term and negligible impacts on common fish species, primarily due to increased runoff, and no impact on trout streams.

With adherence to water appropriation and NPDES permit conditions and implementation of Applicant-proposed measures, impacts on fisheries and aquatic habitats from water appropriation and discharge during pipeline construction would be temporary and minor for the Applicant's proposed project and SA-04. Water used for construction of the offloading and access facilities for the rail and truck alternatives may not be obtained from surface waters; if it is, the withdrawals and discharges are expected to be temporary and minor.

Operations Impacts

The continued use of the existing Line 3 pipeline would not result in changes to the basic existing vegetation management activities for the permanent right-of-way of Line 3 or changes to most other right-of-way maintenance activities. Except for the increase in impacts resulting from the substantial increase in integrity management excavations that would be required for the Line 3 pipeline as addressed below, the impacts of right-of-way maintenance during operation would not be expected to change from the current level.

Vegetation maintenance during operations would require removal of riparian vegetation from the permanent right-of-way of each of the three pipeline alternatives, including areas adjacent to waterbody crossings. The resultant impacts on aquatic habitat would be greatest for the Applicant's proposed project and SA-04 because they would require new stream crossings; there would be no change in the conditions within the streams crossed by the Line 3 pipeline due to vegetation maintenance. The impacts for the new pipelines would be long-term to permanent and minor to major at heavily wooded crossing locations, and short- to long-term and minor to major at crossings within grasslands or croplands. The Applicant's proposed project has substantially fewer stream crossings than SA-04, a fact that can be attributed to the length of the route included in the analysis. Total impact would be additive, resulting in more extensive impacts to surface waterbodies throughout multiple watersheds, and distributed along the route. Where alternatives cross trout streams the impact during operation would be permanent and major due to the increase in temperature; vegetation maintenance of the CN Alternatives would not affect trout streams.

The primary impacts on fisheries and aquatic habitat during operation of the truck or rail offloading facilities in Clearbrook and Superior would be associated with minor changes to stormwater runoff that could reach nearby surface waters. However, the implementation of BMPs and the measures stipulated in the required permits would minimize the potential for stormwater to carry eroded materials or contaminants into nearby surface waters and would therefore minimize impacts on fisheries and aquatic habitats. As a result, the potential impacts would be permanent but negligible to minor, and would affect fewer streams than the new pipeline alternatives.

If minor leaks or spills occur during normal operations for the Applicant's proposed project or SA-04 reach surface waters, there would be negligible to minor changes to surface water quality, and the resultant impacts on fisheries and aquatic habitats would be temporary and negligible to minor. Similarly, normal operation of the rail and truck alternatives would result in a minor increase of the amount of materials dropping from the train or truck engines to the railbed or roadway above the current level. The increase is expected to be typical of the increased number of trains and trucks transporting cargo, with the resultant impacts likely to be temporary and negligible to minor.

For all route options, the Applicant would implement noxious weed plans that include methods to prevent and reduce the introduction and spread of noxious weeds and invasive species, and would implement BMPs for herbicide applications to minimize impact on aquatic and terrestrial resources. As a result, the use of herbicides would result in temporary negligible impacts on fisheries and aquatic habitats. No additional impact would be associated with the continued use of the existing Line 3 pipeline because all portions of the permanent right-of-way have been in place for decades, and the impacts of operation along the permanent right-of-way that are currently occurring would continue without substantial change.

During operation of the pipeline route options, the Applicant would implement its Integrity Management Program, which could require excavation and repair or replacement of sections of the pipeline at surface water crossings using the wet open-cut or dry open-cut method to access the pipe. For each integrity dig, impacts would be short-term and minor, and would occur periodically over the life of the Project. Continued use of the existing Line 3 would require substantially more integrity digs than the two new pipeline routes due to its advanced age. If pipe segments within surface water crossings need repair or replacement, the pipe may be removed using one of the open-cut methods, which would result in impacts similar to those of construction within surface waters. Because the pipelines for both the Applicant's proposed project and SA-04 would be new, these pipelines would likely require substantially fewer excavations than the Line 3 pipeline.

Wildlife and Wildlife Habitat

Construction Impacts

Construction of SA-04 would affect substantially more than the Applicant's proposed project, with about 10,585 acres of land affected by the former and 4,917 acres of land affected by the latter, but note that the footprint was analyzed for the Applicant's proposed project and that only the Neche to Superior portion of the Applicant's proposed project were analyzed for the CN. Both of these routes would affect land within wildlife management units and Audubon IBAs. Clearing and grading during construction of the offloading facilities for the rail and truck alternatives would affect substantially less wildlife habitat than either of the new pipeline alternatives.

The Applicant's proposed project would pass through habitats that are mainly forested uplands and woody wetlands. In comparison, the majority of habitats affected by construction of SA-04 would have vegetative cover of hay/pasture and cultivated cropland. The impacts of altering or removing these habitats would range from temporary to permanent and minor to major, depending on the specific areas crossed.

Because SA-04 would be co-located with existing pipelines for much of its length, construction of the route would result in less habitat fragmentation compared to the Applicant's proposed project. A total of 38 miles of the Applicant's proposed project permanently fragments 21 large-block habitats.

Construction of the Applicant's proposed project or SA-04 could affect colonial nesting waterbirds if nesting trees need to be removed. No colonial waterbird nesting sites are known to be present in the vicinity of the rail or truck alternative facilities.

For all CN Alternatives, clearing, grading, trenching (for pipelines), and use of construction vehicles and equipment would directly affect some animals, particularly small and mid-sized mammals, reptiles, amphibians, and invertebrates. Members of these species would be affected more than large wildlife because of their relative lack of mobility compared to that of larger animals (e.g., deer and coyotes). The impact of these activities on common wildlife species would be temporary to short-term and minor.

Many animals would be temporarily displaced from the construction work areas and adjacent areas for all CN Alternatives except for the alternative of continued use of the existing Line 3 pipeline. Nearby habitat may provide cover and suitable escape habitat for many of the displaced species, and the more mobile animals could return to the construction work areas after completion of construction and restoration activities, if appropriate habitats are available. These displacements would result in impacts that would generally be temporary to short-term, although permanent at aboveground facilities.

Operations Impacts

The types of impacts associated with operations of the pipeline alternatives differ substantially from those associated with the rail and truck alternatives and the combination alternatives. While the rail and truck alternatives would require substantially fewer acres of permanent vegetation removal compared to the Applicant's proposed project and SA-04, the large number of trains or trucks required would result in increased wildlife mortality from collisions with trains and trucks. This would be a permanent minor to major impact on common highly mobile wildlife such as white-tailed deer, mid-sized mammals, and birds.

For the Applicant's proposed project and SA-04, impacts of right-of-way maintenance within general wildlife habitat, conservation lands, and IBAs would be short-term to permanent and minor to major, depending on the type of habitat present. Maintenance activities could reduce populations of species sensitive to habitat disturbance and could result in permanent, minor effects on breeding birds. These impacts would occur along greater distances for SA-04 based on its greater length compared to the Applicant's proposed project. The routes that would be used by the trains and trucks currently pass through and near WMAs, including IBAs, and no changes in impacts on wildlife habitats or wildlife management units are anticipated from operation of trains or trucks along the existing rail lines and highways.

The maintained permanent rights-of-way may be used as travel corridors by some big game animals and humans and may become attractive to some small species. This could result in permanent and minor effects on common wildlife. Implementation of BMPs to prevent the spread of noxious weeds and invasive species would minimize colonization of these species within or near the rights-of-way with invasive plants.

Continued use of the existing Line 3 would require substantially more integrity digs each year than the two new pipelines due to the advanced age of the Line 3 pipeline. Because of the greater length of SA-04 compared to that of the Applicant's proposed project, the probability of the need for integrity digs would be greater for that route. The impacts of excavations would be similar to those occurring during construction of the pipeline but would affect a substantially smaller area.

5.2.4.4.2 Mitigation

In addition to the measures the Applicant would incorporate into the Project to avoid or minimize impacts, including stipulations in the permits required for the Project, Minnesota DNR identified the following measures to reduce impacts on fisheries and wildlife:

- Use the HDD method or a method appropriate for the individual crossing at all crossings of tributaries that are upstream of trout streams.
- Cover open-vent pipe ends with screens at cathodic protection systems to prevent birds and small mammals from becoming trapped in the pipe.
- During maintenance mowing of the permanent right-of-way, the mower blade height should be set at 6 to 8 inches above the ground to reduce injury and mortality impacts on small animals and to prevent erosion.
- If construction activities occur within the recommended buffer distance of 984 feet from the Mahtowa or other heron rookeries during the nesting season from April through August, the Applicant must consult with Minnesota DNR and USFWS to develop BMPs to reduce potential disturbance and impacts.

- Wider vegetated buffers during construction near trout streams (100 feet vs. the standard 50 feet).
- Reducing construction work area width.

5.2.4.5 References

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5.2.5 Unique Natural Resources

This section describes potential effects on animals and plants that are protected under federal and state regulations (termed "unique natural resources") from construction and operation of the Applicant's proposed project and the CN Alternatives. General impacts to *individual* state and federally protected animals and plants would be comparable to those described for common animals and plants presented in Sections 5.2.3 and 5.2.4. However, the magnitude of impacts on state- and federally protected *populations* may be more severe than on more common species because of their limited population size, distribution, and life history, which may warrant consideration of additional conservation measures to avoid or minimize impacts.

The analysis of impacts on unique natural resources from construction and operation of the Applicant's proposed project and CN Alternatives considered the potential for injury, mortality, or disturbance to the following:

- Federally listed threatened and endangered species;
- State-listed threatened, endangered, and special concern species;
- SGCN;
- MBS Sites; and
- SNAs.

The potential Project-related impacts on these resources due to construction and operation of the Applicant's proposed project are then described, along with conservation measures the Applicant would implement to avoid or minimize impacts. Next, the potential impact of unique natural resources due to construction and operation are addressed for each CN Alternative (continued use of the existing Line 3, system alternative SA-04, transportation by rail, transportation by truck, and existing Line 3 supplemented by rail or truck). A summary and comparison of potential Project-related impacts are included, along with potential mitigation measures to be considered. Potential impacts on unique natural resources from an unanticipated crude oil release are addressed in Chapter 10.

5.2.5.1 Regulatory Context and Methodology

5.2.5.1.1 Regulatory Context

The regulatory context for evaluating unique natural resources includes the federal ESA and state-level rules and regulations, including state endangered species acts and protections afforded SGCNs, MBS Sites, and SNAs. Birds protected under the MBTA and BGEPA are discussed in Section 5.2.4. This section provides information for regulatory agencies to assess potential impacts on unique natural resources.

Federally Listed Species

The federal ESA (16 U.S. Code 1531 et seq.; 50 CFR Parts 17 and 222) includes provisions for protection and management of species that are federally listed as threatened or endangered and their designated

critical habitat[13]. "Endangered species" are species that are in danger of extinction throughout all or a significant portion of their range. "Threatened species" are species that are likely to become endangered throughout all or a significant portion of their range. A "proposed species" is any species that is proposed for listing as a threatened or endangered species under the ESA. A "candidate species" is any species for which the USFWS has sufficient information on biological status and threats to propose the species for listing as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species receive no statutory protection under the ESA. Section 7 of the ESA directs federal departments and agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any threatened, endangered, or proposed species—or result in the destruction or adverse modification of their designated critical habitat.

According to the federal ESA, it is illegal to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct" with regard to an endangered or threatened species. In addition, the body parts and products of endangered or threatened species cannot be imported, exported, or sold.

Under Section 7 of the ESA, the federal lead agency must consult with the USFWS when any action may affect a federally listed species. If the agencies determine that the action may affect a federally listed species, a Biological Assessment would be prepared to assist the agencies in making a formal determination on whether the action is likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of their critical habitat. USACE is currently preparing a Biological Assessment for the Line 3 Project in response to Enbridge's application for a CWA 404 Individual Permit (i.e., the federal action). Thus, the USFWS' formal determination on whether the Project would jeopardize the continued existence of any federally listed species or would result in destruction or adverse modification of their critical habitat has yet to be made.

If any federally listed species is likely to be adversely affected, but the project does not jeopardize the existence of a species or adversely modify critical habitat, USFWS will develop a Biological Opinion (BO) identifying the proposed project activities, action area, anticipated impacts, and Reasonable and Prudent Measures (RPMs). RPMs are the actions USFWS believes are necessary to minimize the proposed project's effect on federally listed species. The Applicant would comply with RPMs identified by USFWS to protect federally listed species.

State-Listed Species

The states that would be crossed by the Applicant's proposed project or any of the CN Alternatives are North Dakota, Minnesota, Illinois, Iowa, and Wisconsin. Minnesota, Iowa, Illinois, and Wisconsin each administer a state-level ESA (Table 5.2.5-1). North Dakota defers to species listed under the federal ESA. The state-level ESAs allow for state-level identification and classification of native species with a need for protection or management to ensure their survival as free-ranging populations and to define the process by which listing, management, recovery, and de-listing of a species can be achieved.

[13] "Critical habitat" is a term defined and used in the federal ESA. It is a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat may include an area that is not currently occupied by the species but that will be needed for its recovery (https://www.fws.gov/sacramento/es/critical-habitat/Home/es_critical-habitat.htm).

Table 5.2.5-1. State Regulations Concerning Endangered Species

State	Administering Agency	Regulation
North Dakota (no state mandate)	U.S. Fish and Wildlife Service	Federal Endangered Species Act
Minnesota	Minnesota Department of Natural Resources	Minnesota's Endangered Species Statute
Iowa	Iowa Department of Natural Resources	Threatened and Endangered Species Program
Illinois	Illinois Department of Natural Resources/ Endangered Species Protection Board	Illinois Endangered Species Protection Act
Wisconsin	Wisconsin Department of Natural Resources	Wisconsin's Endangered Species Laws

Under the state ESAs, "endangered species" are those species that are native to the state and are seriously threatened with extinction throughout all or a significant portion of their range within the state. "Threatened species" are species native to the state that are likely to become endangered species in the foreseeable future throughout a significant portion of their range within the state without cooperative management or removal of threats. "Species of special concern" are any species native to the state that are not endangered or threatened but are extremely uncommon, or have unique or highly specific habitat requirements and deserve careful monitoring of their status.

State-listed endangered and threatened species are protected under state law. Similar to federal species, formal determinations on the level of impact and appropriate conservation measures to adequately protect state-listed species will be finalized by the applicable state agencies (Table 5.2.5-1).

Species of Greatest Conservation Need

Individual State Wildlife Action Plans identify SGCN. While each State's definition varies, SGCN generally includes species whose populations are rare, declining, or vulnerable to decline, and are in need of conservation action to ensure their long-term health and stability. SCGN may include those species that are also listed as threatened or endangered, or species whose populations in a particular state are stable, but may be at risk range-wide. Threats to these species also are described in the plans and include such factors as habitat loss or fragmentation, competition from non-native species, and stressors related to climate change. The action plans identify the habitats and actions needed to restore or maintain viable populations of these species. The designation of SGCN applies only to animals; plants are not included in this designation.

Minnesota's Wildlife Action Plan includes a habitat-based approach that focuses on sustaining and enhancing terrestrial and aquatic habitats for SGCN in the context of larger landscapes. To facilitate implementation of this approach, the plan identifies a Wildlife Action Network (WAN). The WAN represents the diversity of quality habitats, including terrestrial and aquatic habitats that support SGCN. Areas within the Wildlife Action Network are given an overall score from Low to High based on SGCN richness, SGCN population viability scores, prioritized Sites of Biodiversity Significance, LBS, and Stream Indices of Biological Integrity. Areas ranked high are those where multiple high-scoring metrics overlap.

Minnesota Biological Survey Sites of Biodiversity Significance

The MBS (part of Minnesota DNR), surveys for rare species and native plant communities throughout the state. After fieldwork, MBS ecologists assign a biodiversity significance rank to each survey site to assist with guiding conservation and management. MBS Sites have no legal protection within Minnesota. However, they may contain state-listed species and rare wetlands that are protected under the state ESA and the Minnesota WCA, respectively. The MBS Sites data were used to describe occurrences of high-diversity habitats, which are likely to support rare animals and plants (Minnesota DNR 2016h). The rankings used by the MBS (outstanding, high, moderate, and below) are based on the size and condition of the native plant communities, the presence of rare species, and the landscape context for the site (Minnesota DNR 2016b).

Scientific and Natural Areas

Minnesota's SNAs are state lands that preserve ecological and geological diversity, including rare species, native plants, and significant geological features (Minnesota DNR 2016d). These natural areas are given the highest level of protection and the utmost consideration in assessing potential impacts from nearby projects. Given the ecological significance of these SNAs in Minnesota, most of these areas likely are also identified as MBS Sites. Multiple SNAs in each landscape region are protected in order to capture genetic diversity and prevent the loss of important species, communities, and features (Minnesota DNR 2016d).

5.2.5.1.2 Methodology

Impacts were evaluated by considering the areas directly and indirectly affected by construction and operation of the Applicant's proposed project and the CN Alternatives. The potential for effects on rare animals and plants was evaluated (1) directly through a review of available NHIS elemental occurrence locations and species-specific survey data; and (2) indirectly through a review of species' geographic ranges from publicly available sources such as the USFWS' Information for Planning and Consultation (IPaC) system, USFWS County Distribution Species Lists and critical habitat designations, and habitat assessments such as the USGS GAP, the WAN, the MBS Sites, and state SNAs. These data sources and analysis methods are described below.

Federally Listed Species

For federally listed species, the initial review was conducted at the county level, to identify federally listed species and their critical habitat that could be present within the counties crossed by the Applicant's proposed project, existing Line 3, SA-04, and truck and rail routes. The ROI for federally listed species was established as:

- The area within the 50-foot-wide permanent right-of-way, a 120-foot-wide construction work area, and to a distance of 1 mile on both sides of the permanent right-of-way for the Applicant's proposed project, existing Line 3, and SA-04; and

- Within a 1 mile distance from the centerline of the rail and truck routes, offloading facilities, and new access rails and roads at the Clearbrook and Superior terminals.

Alternatives that cross counties in North Dakota, South Dakota, Iowa, Illinois, or Wisconsin maintain a county wide ROI. The ROI is reduced in Minnesota to provide more detailed and specific review, which is possible because of the availability of NHIS data within the State.

- Federally listed species with the potential to be affected by construction and operations activities were identified within the ROI based on data from IPaC, USFWS County Distribution Species Lists, and NHIS data for the pipeline alternatives, new facilities and new access roads for the rail and truck alternatives, and the rail and truck routes. IPaC identifies USFWS-listed endangered, threatened, candidate, and proposed species that may occur within a specified project area or county, and therefore could potentially be impacted by the proposed project.

In addition, species-specific surveys collected by Merjent, Inc. on behalf of the Applicant were reviewed to determine the presence or absence of federally listed species along the Applicant's proposed project. Those data, as well as some information on state-listed species, are presented in the following reports:

- 2013–2016 Dakota Skipper and Poweshiek Skipperling Habitat Assessment (Merjent 2016a),
- 2013–2016 Minnesota Protected Flora Field Survey (Merjent 2016b),
- 2013-2015 Western Prairie Fringed Orchid Field Survey (Merjent 2015e),
- 2014 Dakota Skipper Survey (Merjent 2014a),
- 2014 Northern Long-Eared Bat Acoustic Survey (Merjent 2014b),
- 2014 Northern Long-Eared Bat Mist-Net and Telemetry Survey (Merjent 2014c),
- 2015 Northern Long-Eared Bat Acoustic Survey (Merjent 2015c),
- 2015 Northern Long-Eared Bat Mist-Net and Telemetry Survey (Merjent 2015d),
- 2015 Butterfly[14] Survey Report (Merjent 2015a),
- 2016 Northern Long-Eared Bat Acoustic Survey (Merjent 2016c),
- Minnesota Protected Mussel Desktop Habitat Assessment (Merjent 2014d), and
- 2014 Minnesota Protected Mussel Field Survey Report (Rev 0) (Merjent 2015b).

Information on critical habitat for federally listed species within 1 mile of each alternative was developed based on GIS analysis of USFWS Critical Habitat database.

State-Listed Species

Known occurrences of state-listed animals and plants within the ROIs were identified from natural heritage inventory data provided by each state. The ROI encompassed the area within a distance of 0.5 mile from the centerline of the Applicant's proposed project, SA-04, and existing Line 3. In addition to the desktop search, for the Applicant's proposed project, habitat assessments and field surveys for state-listed butterflies, bats, mussels, and plants were conducted (Merjent 2014a, 2014b, 2014c, 2014d, 2015 a, 2015b, 2015c, 2015d, 2015e, 2016a, 2016b, 2016c). Field surveys were not conducted for the other alternatives.

For assessment of construction impacts, state-listed animal species documented within 0.5 mile of either side of the Applicant's proposed project and the CN Alternatives were considered potentially affected by project activities. Because site specific surveys were conducted for state-listed mussels and plants along the Applicant's proposed project, potential construction impacts on individuals of these

[14] Dakota skipper and Poweshiek skipperling.

species were assessed only if they had been documented within the proposed construction footprint including construction work area, ATWS, access roads, pipe yards, pipeline permanent right-of-way, valve pads and driveways, and pump stations. For the SA-04 alternative and the portions of the Applicant's proposed project in North Dakota and Wisconsin, construction impacts on plants were assessed using a 120-foot-wide construction work area centered on the routes.

For comparison between the Applicant's proposed project and the CN Alternatives, operation impacts were assessed using a 50-foot-wide permanent right-of-way centered on the routes. Because portions of the existing Line 3 overlaps with other route alternatives the same species lists were used for operation impacts of existing Line 3 for the following routes/segments: the Applicant's proposed project from the North Dakota border to Clearbrook, Minnesota; route Alternative RA-07 from Clearbrook to Carlton, Minnesota; and the Applicant's proposed project from Carlton, Minnesota, to the terminal at Superior, Wisconsin.

A discrete ROI was not established for the rail and truck alternatives because specific locations of new facilities were not available. Instead, the expected locations for new construction of rail or truck infrastructure (e.g., offloading facilities, new spur roads, and new rail access) were evaluated qualitatively for occurrences of state-listed species by reviewing (1) the areas within the existing boundaries of the Clearbrook and Superior terminals; (2) undeveloped sites near the existing terminals that could be impacted by construction and operation of new infrastructure; and (3) a desktop review of NHIS data for Minnesota and Wisconsin for an area out to approximately 1 mile around the Clearbrook and Superior terminals. Site-specific NHIS data were not used to analyze potential operations impacts from increased rail and truck traffic to the Clearbrook and Superior terminals. Train and truck transportation routes were evaluated for potential increases in collision mortality effects on those species identified as occurring within the vicinity of the new rail and truck infrastructure.

Species of Greatest Conservation Need

Gap Analysis Program Species Models

GAP species distribution models identify suitable habitat for individual species within the species' known distribution range. GAP species models use a national wildlife habitat relational database based on habitat associations described in published literature (USGS GAP 2016b). The models are created at 30-meter resolution using core habitat datasets, including detailed land cover, elevation, and hydrological characteristics (e.g., salinity, water type, and water velocity). Birds of conservation concern (BCCs)[15] identified from IPaC searches were used to select the GAP bird species models that were included in this analysis. Protected or rare species lists were compiled for each state that would be crossed by the Applicant's proposed project, existing Line 3, SA-04, and the rail and truck alternatives based on the state lists for threatened, endangered, and special concern species to identify amphibian, reptile, and mammal species models to be included in this analysis. These lists then were compared to

[15] Executive Order 13186 requires prioritization of BCC when considering impacts on migratory birds. BCCs are a subset of MBTA-protected species identified by the USFWS as those in the greatest need of additional conservation action to avoid future listing under the ESA. The USFWS designated BCCs at three distinct geographic scales: national, USFWS regions, and Bird Conservation Regions (BCRs). BCRs are the smallest geographic scale at which the USFWS identified BCCs, and the USFWS expects BCR-level BCC species to be the most useful for resource management agencies to comply with the MBTA and EO 13186. The Applicants proposed project occurs within BCRs II, 12, and 23.

species' GAP ranges (USGS GAP 2016a) to identify species that could occur within the regions crossed by the Applicant's proposed project and the CN Alternatives. Then the selected GAP species distribution models were combined to identify habitats used by one or more of the identified species within the ROI. The combined GAP species models identify used habitats and species richness hotspots within the ROIs for the Applicant's proposed project, existing Line 3, SA-04, and rail and truck alternatives in North Dakota, Minnesota, Iowa, Illinois, and Wisconsin.

Project-specific GAP species models were completed for birds, mammals, amphibians, and reptiles. Of the SGCN list generated for the ROI, models were available for 47 bird species,[16] 15 mammal species, and 21 combined amphibian and reptile species (herptiles). GAP species models used in the analyses are listed in Appendix M (Table M-4). Separate summaries were generated for mammals, birds, and herptiles. The areas rated medium and high by the GAP species models have an increased potential to be used by more SGCN, and impacts on these areas could affect habitats used by multiple protected or rare species. This indirectly indicates the potential for an alternative to affect multiple protected or rare species. Based on the modeling, areas affected by the Applicant's proposed project and the CN Alternatives were summarized according to the area of GAP habitat rated as low, medium, and high use by each vertebrate group, as provided in Table 5.2.5-2.

Table 5.2.5-2. GAP Protected or Rare Vertebrate Species Ranges for Determining Low, Medium, and High Species Occurrence

Vertebrate Groups	Range of Species at Risk		
	Low	Medium	High
Mammals	1 to 3	4 to 6	7 to 9
Birds	1 to 6	7 to 12	13 to 19
Amphibians and reptiles (herptiles)	1 to 2	3 to 6	7 to 11

Sources: Cardno modeling based on USGS GAP 2016a, 2016b.

Note:

Categories determined roughly by proportion of species: Low = 33% of total number, Medium = 33% of total number, and High = 33% of total number.

The combined GAP models indicate habitat areas potentially used by one or more protected or rare vertebrate species. The areas rated medium and high have an increased potential to affect habitats used by multiple protected or rare species. This indirectly indicates the potential for the Applicant's proposed project and CN Alternatives to affect multiple protected or rare species.

Minnesota's Wildlife Action Network

To document existing conditions, WAN habitats were identified within 0.5 mile of the pipeline route centerlines and around new rail and truck access and offloading facilities.

For comparison purposes between the Applicant's proposed project and the SA-04 alternative, construction impacts were assessed using a 120-foot-wide construction work area centered on the

[16] The state list of birds includes over 130 species that could occur in the state. However, inclusion on these lists did not ensure occurrence within the ROI. Therefore, IPaC data were used to identify the occurrence of federally listed BCCs (USFWS 2008) to select habitat-based models for the GAP bird model (Appendix M, Table M-5).

routes. As more detailed information is available for the Applicant's proposed project within Minnesota, construction impacts within Minnesota were also assessed based on footprints provided by the Applicant that delineate the construction work area, ATWS, access roads, pipe yards, pipeline permanent right-of-way, valve pads and driveways, and pump stations.

For comparison purposes between the Applicant's proposed project and the CN Alternatives, operations impacts were assessed using a 50-foot-wide permanent right-of-way centered on the routes.

The proportion of WAN habitats in the areas affected by the pipeline routes then were compared to the proportion of WAN habitats present within the ROIs.

New rail and truck access and offloading facilities were qualitatively evaluated based on review of likely locations for these facilities with GAP species models and WAN habitats where available within the United States or Minnesota, respectively.

Minnesota Biological Survey Sites of Biodiversity Significance

MBS Sites have not been finalized for northern Minnesota within regions that would be crossed by the Applicant's proposed project. To fill this gap, the Minnesota DNR provided a GIS layer of Preliminary MBS Sites in Minnesota. Native plant communities with conservation status ranks are also discussed in Section 5.2.3. MBS Sites were evaluated based on the areas of direct construction and operation impacts identified through overlay of Project data on this map. Direct impacts for the Applicant's proposed project were based on refined footprints provided by the Applicant that identify the construction work area, ATWS, access roads, pipe yards, pipeline permanent right-of-way, valve pads and driveways, and pump stations within Minnesota. Because portions of the existing Line 3 overlaps with other route alternatives the Line 3 impacts were estimated by combining the operations permanent right-of-way for the Applicant's proposed project from the North Dakota border to Clearbrook, RA-07 from Clearbrook to Carlton, and the Applicant's proposed project from Carlton to the Wisconsin border in Minnesota. Construction impacts for SA-04 (and the Applicant's proposed project in North Dakota and Wisconsin) were estimated by overlaying a standardized 120-foot-wide construction work area centered on the routes. Operations impacts were estimated by overlaying a standardized 50-foot-wide permanent right-of-way on the MBS Sites map. The affected areas were quantified and the proportion of affected areas with MBS Sites then were compared to the proportion of available MBS Sites within 0.5 mile from the route centerlines. New rail and truck access and offloading facilities were qualitatively evaluated based on an onscreen review of likely locations for these facilities at Clearbrook in relation to MBS Sites in Minnesota.

Scientific and Natural Areas

SNAs were identified using Minnesota SNA data and areas analogous to SNAs using The Protected Areas Database of the United States (PAD-US) (USGS GAP 2016c). The PAD-US is a national inventory of protected open space (USGS GAP 2016c). Lands designated as Research Educational Lands or Research Natural Areas within PAD-US were considered analogous to Minnesota SNAs for comparison purposes with the other states crossed by the CN Alternatives.

5.2.5.2 Existing Conditions

5.2.5.2.1 Applicant's Proposed Project

Federally Listed Species

Twelve federally listed threatened and endangered species may occur within the ROI for the Applicant's proposed project and are presented in Table 5.2.5-3. These species include three mammals - the Canada lynx (*Lynx canadensis*), gray wolf (*Canis lupus*), and northern long-eared bat; four birds – the whooping crane (*Grus americana*), piping plover (*Charadrius melodus*), rufa red knot (*Calidris canutus rufa*), and Kirtland's warbler (*Setophaga kirtlandii*); three invertebrates- the Dakota skipper (*Hesperia dacotae*), Poweshiek skipperling (*Oarisma poweshiek*), and rusty patched bumble bee (*Bombus affinis*); and two plants—the western praire fringed orchid (*Platanthera praeclara*) and Fassett's locoweed (*Oxytropis campestris* var. *chartacea*). The northern long-eared bat has been documented within the ROI of the Applicant's proposed project. No critical habitat occurs within the ROI for the Applicant's proposed project.

Table 5.2.5-3. Potential Occurrences of Federally Protected Species within the Region of Interest for the Applicant's Proposed Project

Listed Species (Common and Scientific Names)	Federal Status	Potential Locations of Occurrence		NHIS Records of Occurrence within One Mile ROI (Minnesota Counties Only)
		State	Counties	
Mammals				
Gray wolf (*Canis lupus*)	Endangered (North Dakota, Wisconsin)	North Dakota	Pembina	NA
		Wisconsin	Douglas	NA
	Threatened (Minnesota)	Minnesota	Kittson, Marshall, Pennington, Red Lake, Polk, Clearwater, Hubbard, Wadena, Cass, Crow Wing, Aitkin, Carlton	Not tracked in NHIS
Northern long-eared bat (*Myotis septentrionalis*)	Threatened	North Dakota	Pembina	NA
		Minnesota	Kittson, Marshall, Pennington, Red Lake, Polk, Clearwater, Hubbard, Wadena, Cass, Crow Wing, Aitkin, Carlton	22 records consisting of individuals and roost trees
		Wisconsin	Douglas	NA
Canada lynx (*Lynx canadensis*)	Threatened	Minnesota	Marshall, Clearwater, Cass, Aitkin, Carlton	Not tracked in NHIS
		Wisconsin	Douglas	NA

Table 5.2.5-3. Potential Occurrences of Federally Protected Species within the Region of Interest for the Applicant's Proposed Project

Listed Species (Common and Scientific Names)	Federal Status	Potential Locations of Occurrence		NHIS Records of Occurrence within One Mile ROI (Minnesota Counties Only)
		State	Counties	
Birds				
Whooping crane (*Grus americana*)	Endangered	North Dakota	Pembina	NA
Piping plover (*Charadrius melodus*)	Endangered	Wisconsin	Douglas	NA
Rufa red knot (*Calidris canutus rufa*)	Threatened	Wisconsin	Douglas	NA
Kirtland's warbler (*Setophaga kirtlandii*)	Endangered	Wisconsin	Douglas	NA
Invertebrates				
Dakota skipper (*Hesperia dacotae*)	Threatened	Minnesota	Kittson, Polk	No Records
Poweshiek skipperling (*Oarisma poweshiek*)	Endangered	Minnesota	Kittson, Marshall, Pennington, Red Lake, Polk,	No Records
Rusty patched bumble bee (*Bombus affinis*)	Endangered	Minnesota	Cass, Clearwater	No Records
Plants				
Western prairie fringed orchid (*Platanthera praeclara*)	Threatened	Minnesota	Kittson, Pennington, Red Lake, Polk	No Records
Fassett's locoweed (*Oxytropis campestris var. chartacea*)	Threatened	Wisconsin	Douglas	NA

NA = not applicable

State-Listed Species

Endangered and Threatened Species

State-listed animal species documented within the ROI of the Applicant's proposed project include the northern long-eared bat, wood turtle (*Glyptemys insculpta*), pugnose shiner (*Notropis anogenus*), and fluted shell mussel (*Lasmigona costata*) (Table 5.2.5-4). The documented occurrences of the northern long-eared bat were in Minnesota, where the species is listed as a state species of special concern. The Applicant completed mussel field surveys in 2014 at 16 sites along the Applicant's proposed project in Minnesota (including the known fluted shell mussel location), and no state-listed threatened or endangered mussels were found (Merjent 2015b).

Twenty-one state-listed endangered or threatened plants have been documented within the ROI, with 13 of these plants identified as potentially occurring within construction work areas (Table 5.2.5-5).

Table 5.2.5-4. Known Occurrences of State-Protected Animal Species within the Region of Interest for the Applicant's Proposed Project

Common and Scientific Name	Preferred Habitat	State/ Status[a]	Occurrences[b]		
			Con	Op	Within 0.5 Mile
Mammals					
Northern long-eared bat (*Myotis septentrionalis*)	Suitable summer habitat occurs in the ROI. In summer, bats roost underneath bark, in cavities, or in crevices of both live trees and snags. Mates in fall near their hibernacula (August and September) and gives birth in summer (May to July). Bats spend their winters in suitable caves and mines (October to April).	WI/T[c]	16	15	27
Amphibians and Reptiles					
Wood turtle (*Glyptemys insculpta*)	Found in moderate- to fast-flowing clear streams or rivers associated with forested riparian corridors, which provide primary overwintering, courtship, basking, and foraging habitat. Typically, inhabited waterways possess a sand, gravel, or cobble substrate with limited silt or muck. Nesting occurs in well-drained open or sparsely vegetated sandy soils, typically within 200 feet of suitable aquatic habitat. Nesting habitat includes native dry prairies, moderately sloughing sand banks, sandbars, agricultural fields, or areas of disturbed sandy soils that support no or sparse ground layer vegetation.	WI/T MN/T	--	--	1
Fish					
Pugnose shiner (*Notropis anogenus*)	Found in glacial lakes and streams with an abundance of submerged vegetation. Prefers low-velocity waters with a substrate of sand, mud, or gravel. Shallow waters in warm months and deeper waters in cold months.	MN/T	1	1	1
Mollusks					
Fluted-shell mussel (*Lasmigona costata*)	Streams or river beds. Likely spawns from June to July.	MN/T	1	1	1

Sources: Minnesota DNR 2016e; North Dakota GFP 2016; Wisconsin DNR 2016.

[a] State/Status: T = Threatened, MN = Minnesota, IA = Iowa, IL = Illinois, WI = Wisconsin

[b] Minnesota only: Con = sum of pipeline construction work area, ATWS, and temporary access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, pump stations, and valves.

North Dakota and Wisconsin: Con = occurrences based on 120-foot-wide construction work area centered on the pipeline. Op = occurrences based on 50-foot-wide permanent right-of-way centered on the pipeline.

[c] Occurrences are within Minnesota where northern long-eared bats are listed as a Species of Concern

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

"--" = no occurrence

Table 5.2.5-5. Known Occurrences of State-Protected Plant Species within the Region of Interest for the Applicant's Proposed Project

Common and Scientific Name	Preferred Habitat	State/ Status[a]	Occurrences[b]		
			Con	Op	Within 0.5 Mile
Nonvascular Plants					
A species of liverwort [Woollywort] (*Trichocolea tomentella*)	Damp, shaded rocks in forested rich peatland and wet forest. May through September, or anytime ground is not covered by snow.	MN/T	--	--	1
Vascular Plants					
Beaked spikerush (*Eleocharis rostellata*)	Coastal salt marshes and inland in saline, alkaline, or strongly calcareous habitats (e.g., around hot springs). Fruits during summer to fall in the north.	MN/T	1	1	2
Bog bluegrass (*Poa paludigena*)	Perched upon wet substrates (e.g., moss, fallen trees) in spring-fed swamps. Specifically, occurs within *Fraxinus nigra-Betula lutea* swamps along the base of steep bluffs and at the head of the spring that feeds into the swamp. Blooms in late May to early June.	MN/T	1	1	1
Bristle-berry (*Rubus fuller*)	Open sandy sites with a high water table. Blooms mid-June to mid-July; fruits in August.	MN/T	--	--	1
Butternut (*Juglans cinerea*)	Full sunlight on well-drained soils of bottomlands and floodplains.	MN/E	1	1	1
Clinton's bulrush (*Trichophorum clintonii*)	Rocky river ledges, argillaceous soils, clearings of fir forests, and prairie and open woods. Reproductive structures are present from early May through the end of June in southern Minnesota, and in late May through June in northern Minnesota.	MN/T	--	--	1
Clustered bur-reed (*Sparganium glomeratum*)	Cold ditches and pools within sedge meadows, willow-alder thickets and, occasionally, tamarack stands on the Lake Superior clay plain. Blooms late June through late July, and fruits late July through early September.	WI/T	1	1	4
Gray ragwort (*Packera cana*)	Northern plains, including the upper slopes of dry prairie remnant hills in sandy or gravelly soil. Flowers from May to June.	MN/E	--	--	1
Hair-like beak rush (*Rhynchospora capillacea*)	Calcareous fens, especially along the margins, and spring fens. Germinates in spring, and flowers mid-summer.	MN/T	1	1	1
Handsome sedge (*Carex formosa*)	Typically occurs in or at the edge of limey swamps, seeps, or bottomland forests but known to occur in moist, rich upland forests. Also can occur in disturbed habitats such as road edges and disturbed prairies. Blooms throughout June and fruits throughout July.	MN/E	1	--	2
Marsh-grass-of-Parnassus (*Parnassia palustris*)	Rich or spring fens; calcareous fens, wet meadows, clay seepage bluffs. Blooms August to September.	WI/T	--	--	1

Table 5.2.5-5. Known Occurrences of State-Protected Plant Species within the Region of Interest for the Applicant's Proposed Project

Common and Scientific Name	Preferred Habitat	State/ Status[a]	Occurrences[b]		
			Con	Op	Within 0.5 Mile
Narrow triangle moonwort (*Botrychium lanceolatum* ssp. *angustisegmentum*)	In woods and on hummocks in swamps, and in cool to warm, mostly rich, subacid soils. May be found in open fields at the northern end of its range. Site elevations range from near sea level to 3,600 feet.	MN/T	3	2	5
Neat spike-rush (*Eleocharis nitida*)	Occurs only near Superior on wet exposed clay in ditches and openings in alder thickets and marshes. Blooms in June, and fruits in late June through early September.	WI/E	2	2	5
Purple-flowered bladderwort (*Utricularia purpurea*)	Adjacent to boggy shorelines in small- to medium-size lakes with high water quality. Flowers from mid-July to September.	MN/E	--	--	1
Red saltwort (*Salicornia rubra*)	Salt flats, saline swales, alkaline depressions, and exposed shores of alkaline lakes. Flowers from late July into August.	MN/T	1	--	1
Seaside crowfoot [Alkali buttercup] (*Ranunculus cymbalaria*)	Salted roadsides near Superior; and sandy or muddy shores, marshes, ditches, and harbors along Lake Michigan. Blooms May to August.	WI/T	2	2	4
Small yellow water crowfoot (*Ranunculus gmelinii*)	Creeks, streams, ponds associated with cool forested swamps, marshes, or groundwater seeps. Blooms July to August.	WI/E	2	2	3
Sterile sedge (*Carex sterilis*)	Mineral-rich calcareous fens of the prairie region. Mature perigynia are present from early June to late July.	MN/T	2	2	6
Sweet colt's foot (*Petasites sagittatus*)	Cold marshes and swamp openings. Blooming occurs throughout May; fruiting occurs throughout June.	WI/T	5	5	8
Tea-leaved willow (*Salix planifolia* ssp. *planifolia*)	Near Lake Superior, including on bedrock shorelines in the Apostle Islands. Blooming occurs throughout May; fruiting occurs throughout June.	WI/T	--	--	1
Whorled nutrush (Scleria verticillata)	Restricted to the least disturbed calcareous fens in the prairie region. Blooms late June through late July.	MN/T	--	--	1

Sources: Minnesota DNR 2016e; Wisconsin DNR 2016; North Dakota GFP 2016; Merjent 2016b.

[a] State/Status: E = Endangered, T = Threatened, MN = Minnesota, IA = Iowa, IL = Illinois, WI = Wisconsin

[b] Minnesota only: Con = sum of pipeline construction work area, ATWS, and temporary access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, pump stations, and valves;

North Dakota and Wisconsin: Con = occurrences based on 120-foot-wide construction work area; Op = occurrences based on 50-foot-wide permanent right-of-way

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

"--" = no occurrence

Occurrences of state-listed threatened and endangered species based on NHIS database locations and rare plant surveys for the Applicant's proposed project are summarized in Appendix M (Table M-1, invertebrates; Table M-2, vertebrates; and Table M-3, plants). State-listed species that also are federally listed are included in these tables when they have been documented as elemental occurrences within NHIS data.

Special Concern Species

The number of state-listed special concern species with occurrences within the ROI include five invertebrates, 9 vertebrates, and 14 plants. Occurrences of state-listed special concern species based on NHIS database locations are summarized in Appendix M (Table M-1, invertebrates; Table M-2, vertebrates; and Table M-3, plants).

Species of Greatest Conservation Need

Gap Analysis Program Species Models

The combined GAP models indicate habitat areas potentially used by one or more protected or rare vertebrate species; habitat areas that would experience the greatest impact are depicted in Figures 5.2.5-1 to 5.2.5-3. The areas rated medium and high have an increased potential to affect habitats used by multiple protected or rare species. Much of the area within the ROI is rated medium and high for mammals (41 percent, 4 to 7 species); while little is rated medium and high for birds (15 percent, 7 to 19 species), or amphibians and reptiles (less than 1 percent, 3 to 11 species). This indirectly indicates the potential for the Applicant's proposed project to affect multiple protected or rare species.

Minnesota's Wildlife Action Network

The WAN shows viable or persistent populations and richness hotspots for the regions in Minnesota crossed by the Applicant's proposed project (Minnesota DNR 2016f). As shown in Figure 5.2.5-4, the Applicant's proposed project would cross through habitats within the WAN that could be used by multiple SGCNs. Approximately 30 percent of the area within the ROI is within the WAN.

Minnesota Biological Survey Sites of Biodiversity Significance

The Applicant's proposed project would cross through areas with MBS Sites (Figure 5.2.5-5); areas scoring outstanding, high, and moderate could include habitats used by rare animals and plants. Approximately 21 percent of the area within the ROI is rated as an outstanding (less than 1 percent), high (3 percent), or moderate (17 percent) MBS Site.

Scientific and Natural Areas

A review of PAD-US and Minnesota's SNAs indicated that no SNAs are located within the ROI.

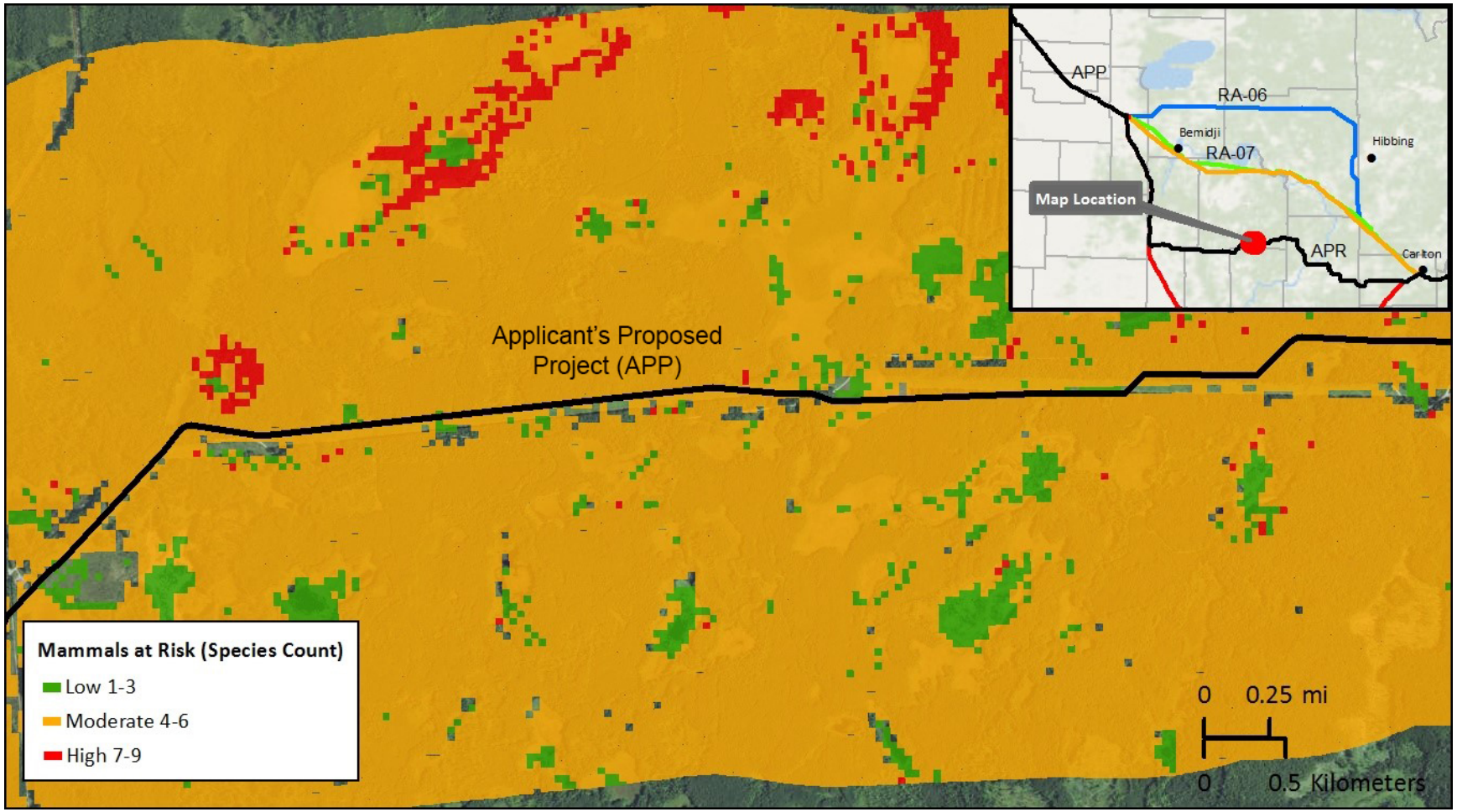

Source: Cardno analysis based on USGS GAP 2016a, 2016b.

Figure 5.2.5-1. GAP Analysis Program – Representative Protected or Rare Mammal Habitat along a Portion of the Applicant's Proposed Project

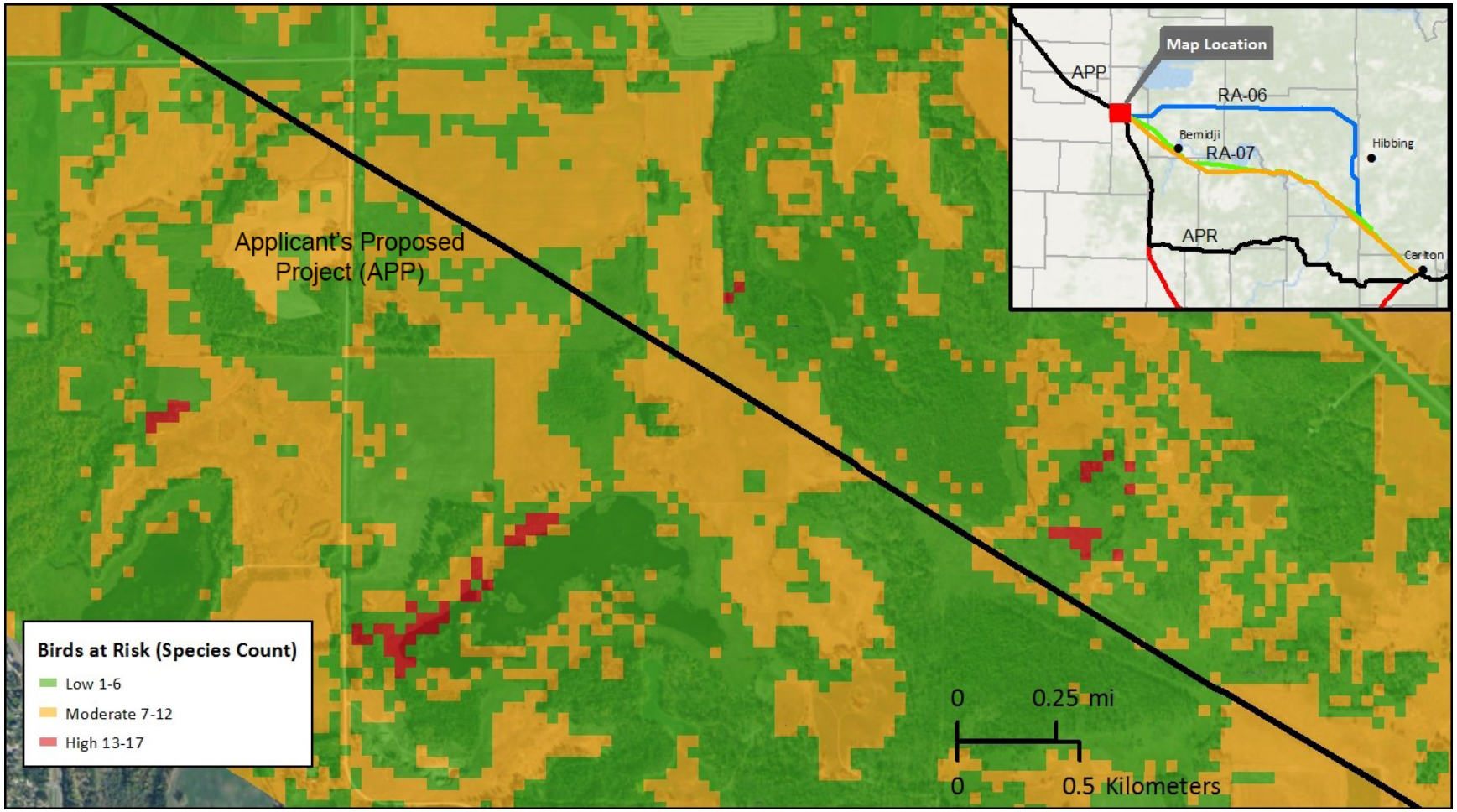

Source: Cardno analysis based on USGS GAP 2016a, 2016b.

Figure 5.2.5-2. GAP Analysis Program – Representative Protected or Rare Bird Habitat along a Portion of the Applicant's Proposed Project

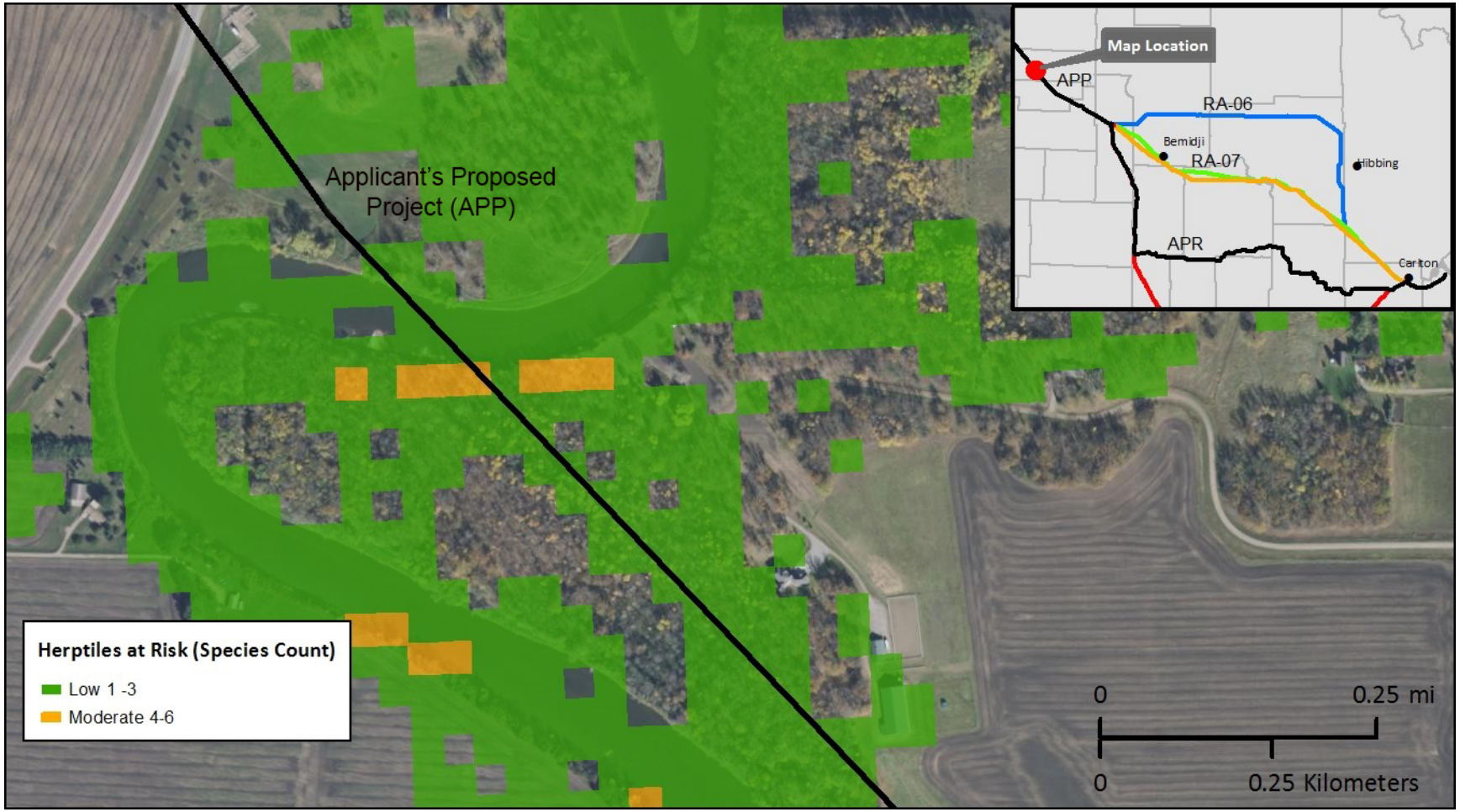

Source: Cardno analysis based on USGS GAP 2016a, 2016b.

Figure 5.2.5-3. GAP Analysis Program – Representative Protected or Rare Amphibian and Reptile (Herptile) Habitat along a Portion of the Applicant's Proposed Project

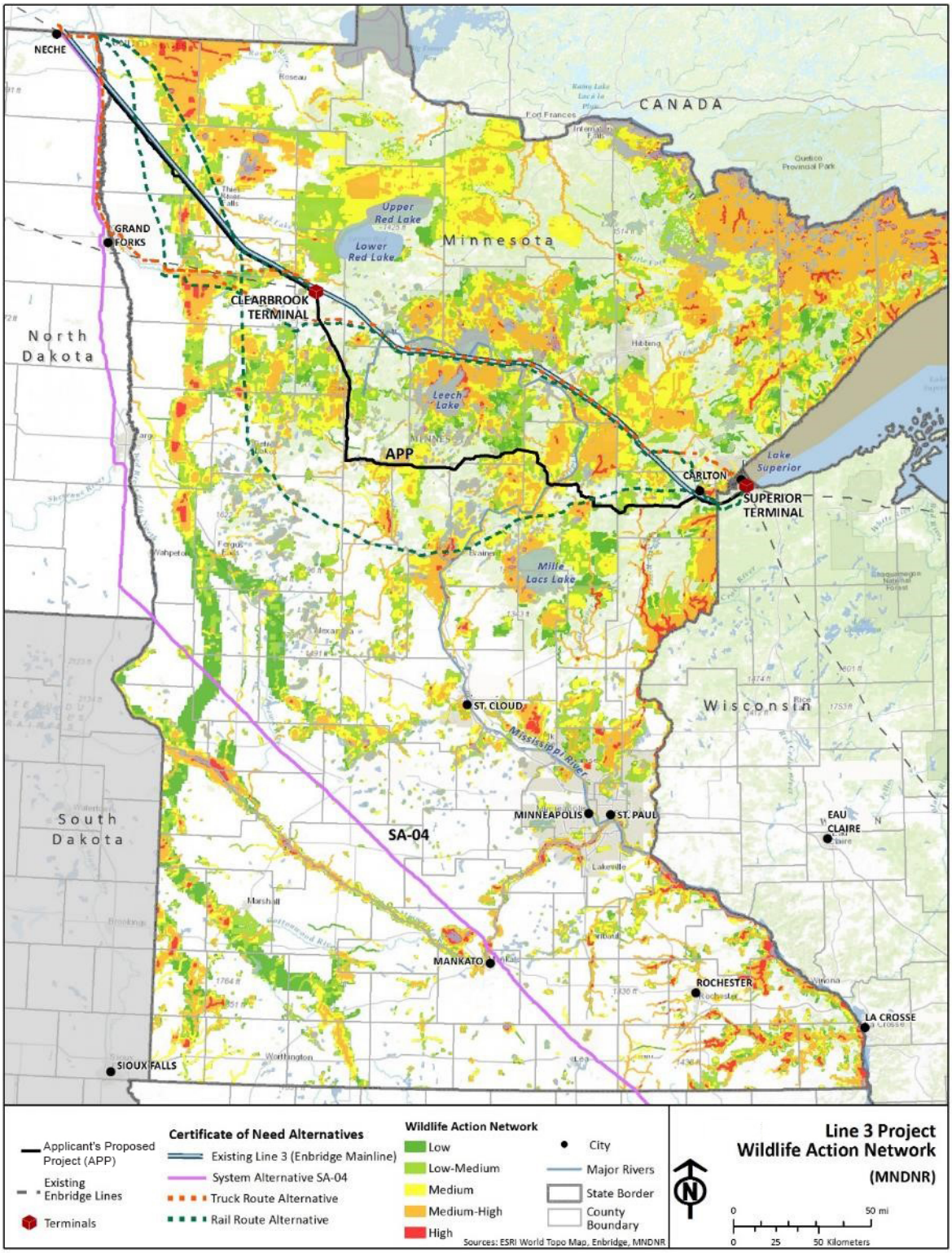

Source: Minnesota DNR 2016f.

Figure 5.2.5-4. Minnesota Wildlife Action Network Habitats

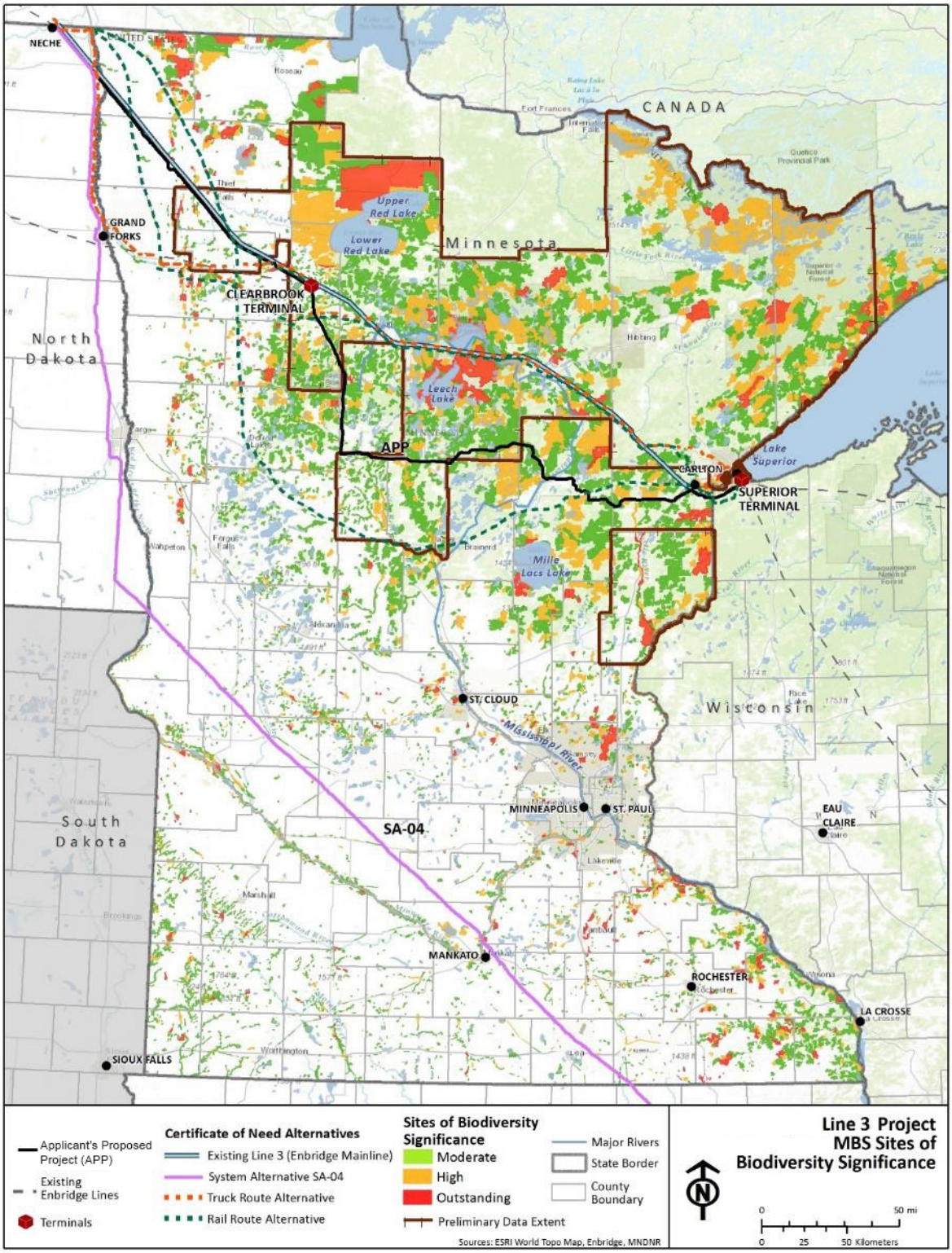

Source: Minnesota DNR 2016b.

Figure 5.2.5-5. Minnesota Biological Survey Sites of Biodiversity Significance

5.2.5.2.2 Continued Use of Existing Line 3

Federally Listed Species

Twelve federally listed threatened and endangered species are likely to occur within the ROI for the existing Line 3 pipeline route. No federal candidate species are likely to occur along the existing Line 3 pipeline. No critical habitat occurs within the ROI for the existing Line 3 pipeline.

State-Listed Species

Endangered and Threatened Species

State-listed endangered or threatened animals that have been documented within the ROI for the existing Line 3 pipeline include the northern long-eared bat, wood turtle, and fluted-shell mussel (Table 5.2.5-6). The northern long-eared bat occurrences are located within Minnesota, where this bat is considered a species of special concern.

A total of 15 state-listed threatened and 3 state-listed endangered plants have been documented within the ROI (Table 5.2.5-7). Eight of the 18 state-listed threatened and endangered plants occurring within the ROI also are known to occur within the permanent pipeline right-of-way (three in Minnesota – beaked spikerush [*Eleocharis rostellata*], hair-like beak rush [*Rhynchospora capillacea*], and sterile sedge [*Carex sterilis*]; and five in Wisconsin – clustered bur-reed [*Sparganium glomeratum*], neat spike-rush [*Eleocharis nitida*], seaside crowfoot [*Ranunculus cymbalaria*], small yellow-water crowfoot [*Ranunculus gmelinii*], and sweet colt's foot [*Petasites sagittatus*]) (Table 5.2.5-7). Occurrences of state-listed threatened and endangered animals and plants based on NHIS database locations are summarized in Appendix M (Table M-1, invertebrates; Table M-2, vertebrates; and Table M-3, plants). State-listed species that are also federally listed are included in these tables when they have been documented as elemental occurrences within NHIS data.

Special Concern Species

State-listed special concern species with occurrences within the ROI for the existing Line 3 pipeline include four invertebrates and nine vertebrates. The invertebrates include a caddisfly (*Anabolia ozburni*), and three mussels – black sandshell (*Ligumia recta*), creek heelsplitter (*Lasmigona compressa*), and pink heelsplitter (*Potamilus alatus*). The vertebrates include three bats – big brown bat, little brown bat, and northern long-eared bat; and six birds – Connecticut warbler (*Oporornis agilis*), Le Conte's sparrow, Nelson's sparrow (*Ammodramus nelsoni*), short-eared owl (*Asio flammeus*), trumpeter swan, and yellow rail. Twelve of the 17 state special concern plants occurring within the ROI also are known to occur within the permanent pipeline right-of-way (10 in Minnesota – barren strawberry *[Waldsteinia fragarioides* var. *fragarioides*], blunt sedge [*Carex obtusata*], false mountain willow [*Salix pseudomonticola*], few-flowered spiderush [*Eleocharis quinqueflora*], least moonwort [*Botrychium simplex*], Mingan moonwort [*Botrychium minganense*], northern single-spike sedge [*Carex scirpoidea*], pale moonwort [*Botrychium pallidum*], small white lady's-slipper [*Cypripedium candidum*], and St. Lawrence grapefern [*Botrychium rugulosum*]; and 2 in Wisconsin – mamillate spike-rush [*Eleocharis mamillata*], and Vasey's rush [*Juncus vaseyi*]). Occurrences of state special concern species based on NHIS database locations are summarized in Appendix M (Table M-1, invertebrates; Table M-2, vertebrates; and Table M-3, plants).

Table 5.2.5-6. Known Occurrences of State-Protected Animals within the Region of Interest and Permanent Right-of-Way for the Existing Line 3 Pipeline

Common and Scientific Name	Preferred Habitat	State/ Status[a]	Occurrences	
			Operations[b]	Within 0.5 Mile
Mammals				
Northern long-eared bat (*Myotis septentrionalis*)	Suitable habitat occurs in the ROI. In summer, bats roost underneath bark, in cavities, or in crevices of both live trees and snags. Mates in fall and gives birth in summer (May to July). Caves and mines are winter hibernacula (October to April).	WI/T[c]	1	3
Amphibians and Reptiles				
Wood turtle (*Glyptemys insculpta*)	Found in moderate- to fast-flowing clear streams or rivers associated with forested riparian corridors, which provide primary overwintering, courtship, basking, and foraging habitat. Typically, inhabited waterways possess a sand, gravel, or cobble substrate with limited silt or muck. Nesting occurs in well-drained open or sparsely vegetated sandy soils, typically within 200 feet of suitable aquatic habitat. Nesting habitat includes native dry prairies, moderately sloughing sand banks, sandbars, agricultural fields, or areas of disturbed sandy soils that support no or sparse ground layer vegetation.	WI/T	--	1
Mollusks				
Fluted-shell mussel (*Lasmigona costata*)	Streams or river beds. Likely spawns from June to July.	MN/T	1	1

Sources: Minnesota DNR 2016e; Wisconsin DNR 2016; Merjent 2016c.

[a] State/Status: T = Threatened, MN = Minnesota, WI = Wisconsin

[b] Operations: occurrence based on 50-foot-wide permanent right-of-way centered on the pipeline.

[c] Occurrences are within Minnesota where northern long-eared bats are listed as a Species of Concern

"--" = no occurrence

Table 5.2.5-7. Known Occurrences of State-Protected Plants along the Existing Line 3 Pipeline

Common and Scientific Name	Preferred Habitat	State/ Status[a]	Occurrences	
			Operations[b]	Within 0.5 Mile
Vascular Plants				
Beaked spikerush (*Eleocharis rostellata*)	Coastal salt marshes and inland in saline, alkaline, or strongly calcareous habitats (e.g., around hot springs). Fruits during summer to fall in the north.	MN/T	1	2
Clustered bur-reed (*Sparganium glomeratum*)	Cold ditches and pools within sedge meadows, willow-alder thickets and, occasionally, tamarack stands on the Lake Superior clay plain. Blooms late June through late July, and fruits late July through early September.	WI/T	1	4
Goblin fern (*Botrychium mormo*)	Rich leaf mold on shaded forest floors in mature maple-basswood and maple-basswood-beech forests. Plants emerge from the ground in June, and sporangia open in late September.	MN/T	--	1
Gray ragwort (*Packera cana*)	Northern plains, including the upper slopes of dry prairie remnant hills in sandy or gravelly soil. Flowers from May to June.	MN/E	--	1
Hair-like beak rush (*Rhynchospora capillacea*)	Calcareous fens, especially along the margins, and spring fens. Germinates in spring, and flowers mid-summer.	MN/T	1	2
Handsome sedge (*Carex formosa*)	Typically occurs in or at the edge of limey swamps, seeps, or bottomland forests but known to occur in moist, rich upland forests. Also can occur in disturbed habitats such as road edges and disturbed prairies. Blooms throughout June and fruits throughout July.	MN/E	--	2
Hidden-fruited bladderwort (*Utricularia geminiscapa*)	Wetlands, including bogs, fens, lakes, ponds, and river or lake shores. Blooms July through August.	MN/T	--	1
Marsh-grass-of-Parnassus (*Parnassia palustris*)	Rich or spring fens; calcareous fens, wet meadows, clay seepage bluffs. Blooms August to September.	WI/T	--	1
Narrow triangle moonwort (*Botrychium lanceolatum* ssp. *angustisegmentum*)	In woods and on hummocks in swamps, and in cool to warm, mostly rich, sub-acid soils. May be found in open fields at the northern end of its range. Site elevations range from near sea level to 3,600 feet.	MN/T	--	1
Neat spike-rush (*Eleocharis nitida*)	Occurs only near Superior on wet exposed clay in ditches and openings in alder thickets and marshes. Blooms in June, and fruits in late June through early September.	WI/E	2	5

Table 5.2.5-7. Known Occurrences of State-Protected Plants along the Existing Line 3 Pipeline

Common and Scientific Name	Preferred Habitat	State/ Status[a]	Occurrences	
			Operations[b]	Within 0.5 Mile
Ram's head orchid (*Cypripedium arietinum*)	Cool, dense white cedar, balsam, and spruce swamps; nearly pure sand over limestone beach cobble or bedrock, mulched with conifer needles; and in mesic soil of sandy loam or clay under the partial shade of conifer or mixed forest. Prefers cool, sub-acid or neutral soil, loam, or sand in upland sites and nutrient-poor peat in lowland sites. Flowers from late May through mid-June.	MN/T	--	1
Red saltwort (*Salicornia rubra*)	Salt flats, saline swales, alkaline depressions, and exposed shores of alkaline lakes. Flowers from late July into August.	MN/T	--	1
Seaside crowfoot (*Ranunculus cymbalaria*)	Salted roadsides near Superior; and sandy or muddy shores, marshes, ditches, and harbors along Lake Michigan. Blooms May to August.	WI/T	2	4
Small yellow-water crowfoot (*Ranunculus gmelinii*)	Cold brooks and springs; and shallow water and muddy shores of ditches, streams, and lakes.	WI/T	2	3
Sterile sedge (*Carex sterilis*)	Mineral-rich calcareous fens of the prairie region. Mature perigynia are present from early June to late July.	MN/T	2	6
Sweet-colt's foot (*Petasites sagittatus*)	Cold marshes and swamp openings. Blooming occurs throughout May; fruiting occurs throughout June.	WI/T	5	8
Tea-leaved willow (*Salix planifolia* ssp. *planifolia*)	Near Lake Superior, including on bedrock shorelines in the Apostle Islands. Blooming occurs throughout May; fruiting occurs throughout June.	WI/T	--	1
Whorled nutrush (*Scleria verticillata*)	Restricted to the least disturbed calcareous fens in the prairie region. Blooms late June through late July.	MN/T	--	1

Sources: Minnesota DNR 2016e; Wisconsin DNR 2016; North Dakota GFP 2016; Merjent 2016b.

[a] State/Status: E = Endangered, T = Threatened, MN = Minnesota, WI = Wisconsin.

[b] Minnesota Only: Operations = sum of pipeline permanent right-of-way, permanent access roads, pump stations, and valves.

Wisconsin: Operations = occurrences based on 50-foot-wide permanent right-of-way centered on the pipeline.

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

"--" = no occurrence

Species of Greatest Conservation Need

Gap Analysis Program Species Models

The combined GAP models indicate habitat areas potentially used by one or more protected or rare vertebrate species. The areas rated medium and high have an increased potential to affect habitats used by multiple protected or rare species. Much of the area within the ROI for the existing Line 3 is rated medium and high for mammals (49 percent, 4 to 9 species); while little is rated medium and high for birds (12 percent, 7 to 19 species) or amphibians and reptiles (less than 1 percent, 3 to 11 species). This indirectly indicates the potential for continued use of existing Line 3 to affect multiple protected or rare species.

Minnesota's Wildlife Action Network

The WAN shows viable or persistent populations and richness hotspots for the regions in Minnesota crossed by the existing Line 3 pipeline (Minnesota DNR 2016f). As shown in Figure 5.2.5-4, the existing Line 3 pipeline crosses habitats within the WAN that could be used by multiple SGCNs. Approximately 32 percent of the area within the ROI is within the WAN.

Minnesota Biological Survey Sites of Biodiversity Significance

The existing Line 3 pipeline crosses areas with MBS Sites (Figure 5.2.5-5); areas scoring outstanding, high, and moderate could include habitats used by rare animals and plants. Approximately 19 percent of the area within the ROI is identified as an outstanding (2 percent), high (4 percent), or moderate (13 percent) rated MBS Site.

Minnesota Scientific and Natural Areas

Review of PAD-US indicated that no SNAs are located within the ROI of the existing Line 3 pipeline (USGS GAP 2016c). Review of Minnesota's SNAs identified one SNA that occurs within ROI, the Wawina Peatland SNA (Minnesota DNR 2016d, 2016g). Natural areas are distinguished by undisturbed plant communities, rare or endangered species habitat, seasonal habitat, natural geologic formations and features, and plant communities undergoing natural succession (Minnesota DNR 2016d). The Wawina Peatland SNA is a large patterned peatland complex with ovoid island patterns, a featureless water track, raised bog, and crested raised bog (Minnesota DNR 2016g). This SNA is located approximately 0.4 mile northeast of the existing Line 3 pipeline. A Burlington Northern Santa Fe (BNSF) rail line lies between the SNA and the existing Line 3 pipeline.

5.2.5.2.3 System Alternative SA-04

Federally Listed Species

Six federally listed species, three threatened and three endangered, are known to occur in the North Dakota counties crossed by SA-04. Five federally listed species, four threatened and one endangered, are known to occur within the Minnesota Counties transected by SA-04. Thirteen federally listed species, six threatened and seven endangered, are known to occur within the Iowa Counties crossed by SA-04. Fifteen federally listed species, one candidate, seven threatened, and seven endangered, are known to occur within the Illinois counties crossed by SA-04. A number of the federally listed species are found in multiple states and counties along the ROI for SA-04. A total of twenty three federally listed plant and animal species, 11 threatened, 11 endangered, and one candidate, are known to occur within

counties transected by SA-04 (Table 5.2.5-8). No critical habitat occurs within the ROI for the SA-04 alternative.

Table 5.2.5-8. Potential Occurrences of Federally Protected Species within the Counties and One Mile Region of Interest for SA-04

Listed Species (Common and Scientific Names)	Federal Status	SA-04 (Listed Species State and County Occurrence)		NHIS Records of Occurrence within One Mile ROI (Minnesota Counties Only)
		State	Counties	
Whooping crane (*Grus americana*)	Endangered	North Dakota	Cass, Grand Forks, Pembina, Richland, Traill, Walsh	NA
Gray wolf (*Canis lupus*)	Endangered	North Dakota	Cass, Grand Forks, Pembina, Richland, Traill, Walsh	NA
Northern long-eared bat (*Myotis septentrionalis*)	Threatened	North Dakota	Cass, Grand Forks, Pembina, Richland, Traill, Walsh	NA
		Minnesota	Traverse, Stevens, Swift, Kandiyohi, Chippewa, Renville, Sibley, Le Sueur, Nicollet, Blue Earth, Waseca, Freeborn, Mower	No Records
		Iowa	Winneshiek, Howard, Mitchell, Worth, Cerro Gordo, Chickasaw, Floyd, Clayton, Fayette, Bremer, Dubuque, Delaware, Buchanan, Black Hawk, Jackson, Jones, Linn, Clinton, Cedar, Scott, Muscatine	NA
		Illinois	Carroll, Whiteside, Rock Island, Henry, Lee, Bureau, La Salle, Grundy, Will	NA
Indiana bat (*Myotis sodalis*)	Endangered	Iowa	Cedar, Muscatine, Scott	NA
		Illinois	Bureau, Carroll, Grundy, Henry, La Salle, Lee, Rock Island, Whiteside,	NA
Eastern massasauga (*Sistrurus catenatus*)	Threatened	Iowa	Muscatine	NA
		Illinois	Will	NA

Table 5.2.5-8. Potential Occurrences of Federally Protected Species within the Counties and One Mile Region of Interest for SA-04

Listed Species (Common and Scientific Names)	Federal Status	SA-04 (Listed Species State and County Occurrence)		NHIS Records of Occurrence within One Mile ROI (Minnesota Counties Only)
		State	Counties	
Higgins eye pearlymussel (*Lampsilis higginsii*)	Endangered	Iowa	Clayton, Clinton, Jackson, Jones, Linn, Muscatine, Scott, Dubuque	NA
		Illinois	Carroll, Rock Island, Whiteside	NA
Spectaclecase mussel (*Cumerlandia monodonta*)	Threatened	Iowa	Muscatine, Scott	NA
		Illinois	Rock Island	NA
Sheepnose mussel (*Plethobasus cyphyus*)	Endangered	Iowa	Muscatine, Scott	NA
		Illinois	Rock Island, Whiteside, Will	NA
Scaleshell (*Leptodea leptodon*)	Endangered	Illinois	Grundy	NA
Iowa Pleistocene snail (*Discus macclintocki*)	Endangered	Iowa	Jackson, Fayette, Dubuque, Clinton, Clayton	NA
Dakota skipper (*Hesperia dacotae*)	Threatened	North Dakota	Richland	NA
		Minnesota	Chippewa	No Records
Poweshiek skipperling (*Oarisma poweshiek*)	Endangered	North Dakota	Richland	NA
		Minnesota	Chippewa	No Records
		Iowa	Howard, Cerro Gordo	NA
Rusty patched bumble bee (*Bombus affinis*)	Endangered	Iowa	Clayton, Black Hawk, Winneshiek	NA
Hine's emerald dragonfly (*Somatochlora hineana*)	Endangered	Illinois	Will	NA
Rattlesnake-master borer moth (*Papaipema eryngii*)	Candidate	Illinois	Grundy, Will	NA

Table 5.2.5-8. Potential Occurrences of Federally Protected Species within the Counties and One Mile Region of Interest for SA-04

Listed Species (Common and Scientific Names)	Federal Status	SA-04 (Listed Species State and County Occurrence)		NHIS Records of Occurrence within One Mile ROI (Minnesota Counties Only)
		State	Counties	
Western prairie fringed orchid (*Platanthera praeclara*)	Threatened	North Dakota	Richland	NA
		Minnesota	Mower	No Record
		Iowa	Winneshiek, Howard, Mitchell, Worth, Cerro Gordo, Chickasaw, Floyd, Clayton, Fayette, Bremer, Dubuque, Delaware, Buchanan, Black Hawk, Jackson, Jones, Linn, Clinton, Cedar, Scott, Muscatine	NA
Prairie bush clover (*Lespedeza leptostachya*)	Threatened	Minnesota	Renville, Mower	No Records
		Iowa	Winneshiek, Howard, Mitchell, Worth, Cerro Gordo, Chickasaw, Floyd, Clayton, Fayette, Bremer, Dubuque, Delaware, Buchanan, Black Hawk, Jackson, Jones, Linn, Clinton, Cedar, Scott, Muscatine	NA
		Illinois	Lee	NA
Northern wild monkshood (*Aconitum noveboracensel*)	Threatened	Iowa	Jackson, Dubuque, Delaware, Clayton	NA
Eastern prairie fringed orchid (*Platanthera leucophaea*)	Threatened	Iowa	Jackson, Jones	NA
		Illinois	Carroll, Bureau, Grundy, Henry, Lee, Rock Island, Whiteside, Will	NA
Decurrent false aster (*Boltonia decurrens*)	Threatened	Illinois	Bureau, La Salle	NA
Lakeside daisy (*Hymenopsis herbacea*)	Threatened	Illinois	Will	NA
Mead's milkweed (*Asclepias meadii*)	Threatened	Illinois	Will	NA

Table 5.2.5-8. Potential Occurrences of Federally Protected Species within the Counties and One Mile Region of Interest for SA-04

Listed Species (Common and Scientific Names)	Federal Status	SA-04 (Listed Species State and County Occurrence)		NHIS Records of Occurrence within One Mile ROI (Minnesota Counties Only)
		State	Counties	
Leafy-prairie clover (*Dalea foliosa*)	Endangered	Illinois	Will, La Salle	NA

NA = not applicable

State-Listed Species

Endangered and Threatened Species

State-listed endangered or threatened animals and plants that have been documented within the ROI for SA-04 include 13 invertebrates – 2 arthropods and 11 mussels; 17 vertebrates – 1 bat, 5 birds, 3 reptiles, and 8 fish; and 22 plants (Tables 5.2.5-9 and 5.2.5-10). Of the 22 state-listed plants occurring within the ROI, three endangered plants – false mallow (*Malvastrum hispidum*), plains sedge (*Carex heliophila*), and quillwort (*Isoetes butleri*); and one threatened plant – broomrape (*Orobanche ludoviciana*) occur within the construction work area in Illinois (Table 5.2.5-10). Occurrences of state-listed threatened and endangered species based on NHIS database locations are summarized in Appendix M (Table M-1, invertebrates; Table M-2, vertebrates; and Table M-3, plants). State-listed species that are also federally listed are included in these tables when they have been documented as elemental occurrences within NHIS data.

Special Concern Species

State-listed special concern species that occur within the ROI for SA-04 include 9 invertebrates – 6 arthropods, and 3 mussels; 12 vertebrates – 6 birds, 2 reptiles, and 4 fish; and 20 plants. Of the 20 special concern plants within the ROI, 3 plants – buffalo grass (*Buchloe dactyloides*), plains wild indigo (*Baptisia bracteata* var. *glabrescens*), and small white lady's-slipper occur within construction work areas. State special concern species that are also federally listed are included in tables when they have been documented by state NHIS data. Occurrences of state special concern species based on NHIS database locations are summarized in Appendix M (Table M-1, invertebrates; Table M-2, vertebrates; and Table M-3, plants).

Species of Greatest Conservation Need

Gap Analysis Program Species Models

The combined GAP models indicate habitat areas potentially used by one or more protected or rare vertebrate species. The areas rated medium and high have an increased potential to affect habitats used by multiple protected or rare species. Little of the area within the ROI is rated medium and high for mammals (1 percent, 4 to 9 species), birds (6 percent, 7 to 19 species), or amphibians and reptiles (16 percent, 3 to 11 species). This indirectly indicates the potential for SA-04 to affect multiple protected or rare species.

Minnesota's Wildlife Action Network

The WAN shows viable or persistent populations and richness hotspots for the regions in Minnesota crossed by SA-04 (Minnesota DNR 2016f). As shown in Figure 5.2.5-4, the route would cross through habitats within the WAN that could be used by multiple SGCNs. Approximately 1 percent of the area within the ROI is within the WAN (much of SA-04 crosses through states other than Minnesota).

Table 5.2.5-9. Known Occurrences of State-Protected Animal Species within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for System Alternative SA-04

Common and Scientific Name	Preferred Habitat	State/ Status[a]	Occurrences		
			Con[b]	Op[c]	Within 0.5 Mile
Mammals					
Northern long-eared bat (*Myotis septentrionalis*)	Suitable habitat occurs in the ROI. In summer, bats roost underneath bark, in cavities, or in crevices of both live trees and snags. Mates in fall and gives birth in summer (May to July). Caves and mines are winter hibernacula (October to April).	IL/T	1	1	2
Birds					
Burrowing owl (*Athene cunicularia*)	Nests and lives underground in gently sloping open, treeless areas, with low, sparse vegetation. Breeds in spring.	MN/E	1	1	1
Chestnut –collared longspur (*Calcarius ornatus*)	Occurs almost exclusively in relatively dry, moderately grazed prairie. Nests are constructed in a depression on the ground, usually under a clump of grass, and lined with soft grasses and animal hair.	MN/E	--	--	1
King rail (*Rallus elegans*)	Generally associated with freshwater marshes but can adapt to a variety of habitats that support vegetation and are frequently wet. Nesting begins first week of May, and hatching occurs by the end of July (approx.).	IL/E	--	--	1
Loggerhead shrike (*Lanius ludovicianus*)	Associated with open areas containing shrub/brush and scattered thorny plant species. Eggs are laid from late March through mid-April; however, it may continue through early July.	MN/E IL/E	--	--	3
Upland sandpiper (*Batramia longicauda*)	Prefers hayfields and pastures, but are found in open grasslands in the absence of preferred habitat. Nesting begins in May, and hatching occurs mid-June to July.	IL/E	--	--	1
Amphibians and Reptiles					
Blanding's turtle (*Emydoidea blandingii*)	Found in productive, clean, shallow waters with abundant aquatic vegetation and soft, muddy bottoms over firm substrates. Extensive marshes bordering rivers provide excellent habitat. Nests in grasses and sedge close to water. Females nest in late May and June, and hatching occurs 2 to 4 months later.	MNT IA/T IL/E	1	1	5
Ornate box turtle (*Terrapene ornata*)	Underground burrows of grasslands. Breeds between April and October, and nesting occurs mainly in July.	IA/T IL/T	1	1	3

Table 5.2.5-9. Known Occurrences of State-Protected Animal Species within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for System Alternative SA-04

Common and Scientific Name	Preferred Habitat	State/ Status[a]	Occurrences		
			Con[b]	Op[c]	Within 0.5 Mile
Plains hog-nosed snake (*Heterodon nasicus*)	Habitat includes areas with sandy or gravelly soils, such as prairies, sandhills, and river floodplains. Females lay eggs from May to August (mainly in June and July), and hatching occurs approximately 2 months later.	IL/T	--	--	1
Fish					
American brook lamprey (*Lampetra appendix*)	Gravel-sand riffles, runs of creeks, and small to medium rivers with strong flow. Spawns in spring.	IA/T	--	--	1
Banded killifish (*Fundulus diaphanous*)	Quiet waters of lakes, ponds, and sluggish streams, usually over sand, gravel, or detritus-covered bottoms where there are patches of submerged aquatic plants. Spawns in late spring and summer.	IL/T	--	--	1
Black buffalo (*Ictiobus niger*)	Freshwater streams, rivers, and lakes that possess strong currents and deep waters. Spawns from April through mid-June.	MN/T	1	1	1
Blacknose shiner (*Notropis heterolepis*)	Runs and pools of creeks and small to medium, shallow flowing rivers with variable bottom, including sand, gravel, mud, rubble, and occasionally boulders. Spawns in June or July.	IL/E	1	1	1
Greater redhorse (*Moxostoma valenciennesi*)	Moderate to fast-flowing, medium-sized to large rivers. May also occur in river reservoirs and large lakes. Prefers clear water with substrates of clean sand, gravel, or boulders; cannot tolerate siltation. Spawns in May or June.	IL/E	--	--	2
Pallid shiner (*Hybopsis amnis*)	Quiet waters over sandy-silty bottoms in medium to large rivers. Often found at ends of sand and gravel bars. Spawns in late May through July.	IL/E	--	--	1
River redhorse (*Moxostoma carinatum*)	Found in deep pools with moderate current over bedrock or gravel substrate; cannot tolerate siltation. Spawns in April and May.	IL/T	--	--	1
Slender madtom (*Noturus exilis*)	Riffles of small- to medium-sized, permanent, spring-fed creeks, with moderate to swift currents and bottoms of rock or gravel interspersed with sand. Spawns in spring and summer.	MN/E	--	--	1

Table 5.2.5-9. Known Occurrences of State-Protected Animal Species within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for System Alternative SA-04

Common and Scientific Name	Preferred Habitat	State/ Status[a]	Occurrences		
			Con[b]	Op[c]	Within 0.5 Mile
Arthropods					
Redveined (Red-tailed) prairie leafhopper (*Aflexia rubranura*)	Dry to mesic prairies where the host plant, prairie dropseed, is found. Females insert their eggs into the stems of prairie dropseed in late summer, and eggs likely hatch in late May.	IL/T			1
Regal fritillary (*Speyeria idalia*)	Grassland habitats, including moist tallgrass prairies, wet fields and meadows, virgin grasslands, old fields, and floodplain forest openings and edges. Mate in mid-June through early July. Eggs are laid in late summer through early fall.	IL/T	1	1	1
Mollusks					
Black sandshell (*Ligumia recta*)	Rivers, lakes, and large streams with a good current and sandy mud, firm sand, or gravel substrates. Likely spawns mid-July through August.	IL/T	1	1	2
Butterfly (*Ellipsaria lineolata*)	Large rivers with swift currents in sand or gravel substrates. Females brood their young long-term from August through July before they are released as glochidia.	MNT IA/T	--	--	1
Creeper (*Strophitus undulatus*)	Small to medium-sized streams and occasionally large rivers in mud, sand, or gravel. Females brood their young long term, with eggs fertilized in summer and glochidia released the following spring.	IA/T	--	--	2
Ellipse (*Venustaconcha ellipsiformis*)	Headwater reaches of rivers in gravel riffles and silty areas along streambanks. Females brood their young long term before they are released as glochidia in mid-summer.	MNT IA/T	--	--	2
Fluted-shell mussel (*Lasmigona costata*)	Streams or river beds. Likely spawns from June to July.	MN/T	--	--	1
Higgins eye (*Lampsilis higginsii*)	Only occurs in the Mississippi River and the lower portion of some of its large tributaries, where it occupies stable substrates varying from sand to boulders. Females are gravid in May and September.	IL/E	1	1	1
Monkeyface (*Quadrula metanevra*)	Medium to large rivers and streams with mixed sand and gravel or gravel areas. Spawns in spring.	MN/T	1	1	1
Mucket (*Actinonaias ligamentina*)	Medium to large rivers with coarse sand and gravel substrates.	MN/T	2	2	4

Table 5.2.5-9. Known Occurrences of State-Protected Animal Species within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for System Alternative SA-04

Common and Scientific Name	Preferred Habitat	State/ Status[a]	Occurrences		
			Con[b]	Op[c]	Within 0.5 Mile
Pistolgrip (*Tritogonia verrucosa*)	Medium or large-sized rivers with sand and gravel substrates for burrowing. Spawns in spring and releases larvae in summer.	MN/E	1	1	1
Spike (*Elliptio dilatata*)	Small to large rivers, reservoirs, and lakes with sand and gravel substrates. Usually associated with outlet habitats dominated by swift currents when found in lakes. Spawns in early to mid-May.	MN/T	1	1	3
Yellow sandshell (*Lampsilis teres*)	Occupies a variety of aquatic habitats; however, the preferred habitat is along the banks of muddy or silty rivers. Spawns in summer and release larvae the following spring.	MN/E IA/E	1	1	4

Sources: Minnesota DNR 2016e; Illinois DNR 2016; Iowa DNR 2016a; North Dakota GFP 2016.

[a] State/Status: E = Endangered, T = Threatened, MN = Minnesota, IA = Iowa, IL = Illinois

[b] Con = occurrences based on 120-foot-wide construction work area centered on the pipeline

[c] Op = occurrences based on 50-foot-wide permanent right-of-way centered on the pipeline

"--" = no occurrence

Table 5.2.5-10. Known Occurrences of State-Protected Plant Species within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for System Alternative SA-04

Common and Scientific Name	Preferred Habitat	State/ Status[a]	Occurrences		
			Con[b]	Op[c]	Within 0.5 Mile
Vascular Plants					
Blue sage (*Salvia azurea*)	Dry soils in black soil and gravel prairie habitats, limestone glades, and roadsides. Spiked inflorescent flowers bloom in the late summer and fall. Avoided as a food source by mammals it is a pollen and nectar source for insects.	IL/T	--	--	1
Bog birch (*Betula pumila*)	Calcareous fens and moist prairies habitats that have a low elevation, high moisture regime and are mostly sunny. Plant flowers in the springtime with colorful foliage in the autumn.	IA/T	--	--	1
Broomrape (*Orobanche ludoviciana)*	Sandy soil in prairie habitats. Parasitic on members of the aster family.	IL/T	1	--	1
Dwarf grape fern (*Botrychium simplex*)	Grassy meadow habitat. Succulent stem and single leaf are similar to other grape fern varieties so species is typically identified from its large spores.	IL/E	--	--	1
Edible valerian (*Valeriana edulis var. ciliate*)	Calcareous fens, wet meadows, and moist prairies habitats that have a high moisture regime and are mostly sunny. Propagation through seed dispersal via wind or mammals; flowers from May to September.	MN/T	--	--	2
Flax-leaved aster (*Aster linariifolius*)	Sandy and rocky soils in prairies, savannas, stable sand dunes, sandstone glades, and woodland habitats with sparse groundcover. Blooms in mid-fall for approximately one month.	IA/T	--	--	2
False mallow (*Malvastrum hispidum*)	Dry soil in prairies and rocky and gravelly barrens, usually near limestone outcrops, occasionally in open alluvial ground in valleys and along gravel bars, and flowers in the summer.	IL/E	1	1	1
Hair-like beak rush (Beakrush) (*Rhynchospora capillacea*)	Calcareous fens, especially along the margins, and spring fens. Germinates in the spring, and flowers mid-summer.	IA/T	--	--	1
Hedge hyssop (*Gratiola quartermaniae*)	High moisture regime areas such as floodplain forests, soggy meadows, gravelly seeps, and mud depressions in woodland habitats. Annual plant that blooms in late spring and propagates through reseeding to form colonies.	IL/E	--	--	1
Leafy prairie-clover (*Dalea foliosa*)	Prefers prairie remnant sites with thin soils over limestone substrate, wet spring and fall seasons, and dry summers. Blooms in mid- to late summer.	IL/E	--	--	1
Meadow beauty (*Rhexia virginica*)	Prefers moist sandy soils in wet prairies and fen habitats. Typically blooms in mid-July through August.	IA/T	--	--	2

Table 5.2.5-10. Known Occurrences of State-Protected Plant Species within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for System Alternative SA-04

Common and Scientific Name	Preferred Habitat	State/ Status[a]	Occurrences		
			Con[b]	Op[c]	Within 0.5 Mile
Pale green orchid (*Platanthera flava*)	Prefers wet meadows or swales in savannas habitats along transitional edges with direct sunlight. Can also be found on margins of shallow marshy lakes. Orchid blooms in spring but germination requires specific conditions.	IA/E	--	--	3
Plains sedge (*Carex heliophila*)	On slopes and hilltops of dry to dry-mesic prairies with well-drained soils formed in glacial till.	IL/E	1	1	1
Quillwort (*Isoetes butleri*)	Seasonally wet calcareous soils of limestone glades, barrens, sandstone outcrops, and shallow depressions in dolomite prairie that are wet in spring and dry in summer. Species is visible/identifiable from May to June.	IL/E	2	1	3
Richardson's rush (*Juncus alpinoarticulatus*)	Prefers moist sandy soils in sandbar and swale habitats along the Missouri River. It is an obligatory wetland rush.	IL/T	--	--	1
Slender arrow grass (*Triglochin palustris*)	Primarily located in fens and some wet prairie habitats, this grass produces hydrocyanic acid and can be poisonous if ingested.	IA/T	--	--	1
Slender sandwort (*Minuartia patula*)	Found in wet dolomite prairie habitat. These prairies have high magnesium soils due to dolomite bedrock near the soil surface. Blooms in the spring.	IL/T	--	--	1
Sterile sedge (*Carex sterilis*)	Mineral-rich calcareous fens of the prairie region. Mature perigynia are present from early June to late July.	MN/T	--	--	1
Sullivant's milkweed (*Asclepias sullivantii*)	Solely found in mesic tallgrass prairie habitats. Blooms in mid-July and is an important food source for pollinators. Fruits in August.	MN/T	--	--	1
Tuberous Indian-plantain (*Arnoglossum plantagineum*)	Prefer moist prairies but can be found in few bluff prairies where the soil is drier. Blooms in the summer. Germination through seed only.	MN/T	--	--	1
Whorled nutrush [Low nut rush] (*Scleria verticillata*)	Restricted to the least disturbed calcareous fens in the prairie region. Blooms late June through late July.	IA/T	--	--	1

Table 5.2.5-10. Known Occurrences of State-Protected Plant Species within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for System Alternative SA-04

Common and Scientific Name	Preferred Habitat	State/ Status[a]	Occurrences		
			Con[b]	Op[c]	Within 0.5 Mile
Wild quinine (*Parthenium integrifolium*)	Located in remnant prairie and savanna habitats with a moderate moisture regime. This long-lived, herbaceous perennial blooms from June to September. Propagation through seed dispersal via wind or mammals.	MN/E	--	--	1

Sources: Minnesota DNR 2016e; Illinois DNR 2016; Iowa DNR 2016a; North Dakota GFP 2016.

[a] State/Status: E = Endangered, T = Threatened, MN = Minnesota, IA = Iowa, IL = Illinois

[b] Con = occurrences based on 120-foot-wide construction work area centered on the pipeline

[c] Op = occurrences based on 50-foot-wide permanent right-of-way centered on the pipeline

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

"--" = no occurrence

Minnesota Biological Survey Sites of Biodiversity Significance

SA-04 would cross through areas with MBS Sites (Figure 5.2.5-5); areas scoring outstanding, high, and moderate could include habitats used by rare animals and plants. Approximately 1 percent of the area within the ROI is identified as an outstanding (0.2 percent), high (0.3 percent), or moderate (0.5 percent) rated MBS Site (most of SA-04 crosses through habitats outside of Minnesota).

Minnesota Scientific and Natural Areas

A review of PAD-US and Minnesota's SNAs indicated that no SNAs are located within the ROI.

5.2.5.2.4 Transportation by Rail

This section addresses the existing conditions along the rail routes and in the general area near the Clearbrook and Superior terminals where rail offloading facilities and new rail access likely would be constructed.

Federally Listed Species

Ten federally listed plant and animal species are known to occur within the Minnesota and Wisconsin counties included in the Transportation by Rail alternative. The Transportation by Rail alternative consisted of three distinct segments, North Dakota Border to Clearbrook terminal, North Dakota Border to Superior South, and North Dakota Border to Superior North. NHIS data identified three occurrences of Poweshiek skipperling (endangered) within the 1-mile ROI for North Dakota Border to Clearbrook terminal. NHIS data (Minnesota counties only) identified three occurrences of Poweshiek skipperling and eight occurrences of northern long-eared bat within 1-mile ROI for North Dakota Border to Superior South. Within the 1-mile ROI for the rail route from the North Dakota Border to Superior North (Minnesota counties only) there are document occurrences of two Poweshiek skipperlings, two Dakota skippers, 36 western prairie fringed orchids, and one northern long-eared bat in the NHIS database. Gray wolf and Canada lynx occurrence data are not available in the NHIS database. However, because individuals of both species are wide-ranging, if they are known to occur within a county crossed by a Transportation by Rail segment they would likely occur within 1-mile of the route on occasion.

Critical habitat for the Dakota skipper and Poweshiek skippering occurs within 1 mile of the Transportation by Rail alternatives to Superior North (Polk County) and Superior South (Mahnomen County), respectively, but neither alternative directly crosses critical habitat for any federally listed species.

State-Listed Species

<u>Endangered and Threatened Species</u>

No state-listed endangered or threatened animals are likely to occur within the general locations of rail offloading facilities and new access facilities in Clearbrook and Superior (Minnesota DNR 2016e; North Dakota GFP 2016; Wisconsin DNR 2016). Four state-listed plants are likely to occur in the general area where new offloading and access facilities would be constructed (Table 5.2.5-11). Occurrences of state-listed threatened and endangered species based on NHIS database locations are summarized in Appendix M (Table M-1, invertebrates; Table M-2, vertebrates; and Table M-3, plants).

Table 5.2.5-11. Potential Occurrences of State-Protected Plants within the Region of Interest for the Transportation by Rail Alternative

Common and Scientific Name	Preferred Habitat	State/Status[a]
Vascular Plants		
Beaked spikerush (*Eleocharis rostellata*)	Coastal salt marshes and inland in saline, alkaline, or strongly calcareous habitats (e.g., around hot springs). Fruits during summer to fall in the north.	MN/T
Hair-like beak rush (*Rhynchospora capillacea*)	Calcareous fens, especially along the margins, and spring fens. Germinates in spring, and flowers mid-summer.	MN/T
Sterile sedge (*Carex sterilis*)	Mineral-rich calcareous fens of the prairie region.	MN/T
Sweet colt's-foot (*Petasites sagittatus*)	Cold marshes and swamp openings.	WI/T

Sources: Minnesota DNR 2016e; Wisconsin DNR 2016.

[a] State/Status: T = Threatened, MN = Minnesota, WI = Wisconsin.

Note:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Special Concern Species

Based on a review of available presence/probable absence information, no special concern animals are likely to occur within the general location of rail offloading and new access facilities for the rail alternative (Minnesota DNR 2016e; North Dakota GFP 2016; Wisconsin DNR 2016). Three Minnesota special concern plants – few-flowered spikerush (*Eleocharis quinqueflora*), McCalla's willow (*Salix maccalliana*), and twig rush (*Cladium mariscoides*) are potentially present within the likely construction area for the rail alternative facilities (Appendix M, Table M-3).

Species of Greatest Conservation Need

Gap Analysis Program Species Models

The combined GAP models indicate habitat areas potentially used by one or more protected or rare vertebrate species. The areas rated medium and high have an increased potential to affect habitats used by multiple protected or rare species. According to the models, much of the area in the vicinity of the Clearbrook terminal, where new rail facilities and access likely would be constructed, is rated low for all species. However, about 10 to 20 percent of the area is rated medium for mammals (1 to 6 species) and birds (1 to 12 species); and about 10 percent is rated low for amphibians and reptiles (1 to 2 species). A larger proportion of the area surrounding the new rail access between Clearbrook and Gully is rated medium for birds (7 to 12 species). The area in the vicinity of the Superior terminal where new rail facilities and access would be constructed is rated primarily high and medium for mammals (4 to 9 species), low for birds (1 to 6 species), and low for amphibians and reptiles (1 to 2 species).

Minnesota's Wildlife Action Network

The WAN shows viable or persistent populations and richness hotspots for the regions in Minnesota within or near access routes and offloading facilities for the rail alternative (Minnesota DNR 2016f). The WAN applies only to facilities at Clearbrook, Minnesota; and no WAN habitats occur in the vicinity of the Clearbrook terminal. Approximately 2.5 miles of the approximately 10 mile new rail access route

between Clearbrook and Gully crosses through WAN habitats, with 56 percent in low-medium and 44 percent in medium ranked WAN habitats.

Minnesota Biological Survey Sites of Biodiversity Significance

Three unnamed MBS Sites preliminarily ranked as moderate occur near the Clearbrook terminal in the general location where rail facilities are likely to be constructed. These sites include a 48-acre forested area with a pond north of the terminal, a 144-acre site that includes Steenerson and Deep Lake just east of the terminal, and a 319-acre forested and wetland area south of the terminal. The new rail access between Clearbrook and Gully would cross near three additional moderate ranked MBS Sites: the 501-acre Gully 36 site north of the route near Gully; a 65-acre unnamed site south of the route crossed by the Lost River near Gonvick; and a 164-acre wetland and wooded unnamed site north of the route, west of Clearbrook.

Minnesota Scientific and Natural Areas

A review of PAD-US and Minnesota's SNAs indicated that no SNAs occur in the area around the Clearbrook or Superior terminals where new rail facilities are likely to be constructed.

5.2.5.2.5 Transportation by Truck

Federally Listed Species

The Transportation by Truck alternative consisted of two distinct segments—Gretna, North Dakota, to the Clearbrook terminal and Gretna to the Superior terminal. Eight federally listed plant and animal species, four threatened (Canada lynx, gray wolf, northern long-eared bat, and Fassett's locoweed) and four endangered (Kirtland's warbler, piping plover, and whooping crane [*Grus americana*], rusty patched bumble bee), are known to occur within the North Dakota and Minnesota counties included in the Transportation by Truck segment from Gretna to the Clearbrook terminal. Twelve federally listed plant and animal species, seven threatened and five endangered, are known to occur within the North Dakota, Minnesota, and Wisconsin counties included in the Transportation by Truck segment from Gretna to the Superior terminal. Gray wolf and Canada lynx occurrence data are not available in the NHIS database, and due to the size and mobility of individuals of both species, if they are known to occur within a county crossed by a Transportation by Truck segment they would be considered to be within the 1-mile ROI. No critical habitat occurs within the ROI for the Truck alternative.

State-Listed Species

<u>Endangered and Threatened Species</u>

No state-listed endangered or threatened animals are likely to occur within the general locations for truck offloading facilities and new access roads at Clearbrook or Superior (Minnesota DNR 2016e; North Dakota GFP 2016; Wisconsin DNR 2016). Four state-listed plants are likely to occur in the area where new offloading and the access roads would be constructed (Table 5.2.5-12). Occurrences of state-listed threatened and endangered species based on NHIS database locations are summarized in Appendix M (Table M-1, invertebrates; Table M-2, vertebrates; and Table M-3, plants). State-listed species that are also federally listed are included in these tables when they have been documented as elemental occurrences within NHIS data.

Table 5.2.5-12. Potential Occurrences of State-Protected Plants within the Region of Interest for the Transportation by Truck Alternative

Common and Scientific Name	Preferred Habitat	State / Status[a]
Vascular Plants		
Beaked spikerush (*Eleocharis rostellata*)	Coastal salt marshes and inland in saline, alkaline, or strongly calcareous habitats (e.g., around hot springs). Fruits during summer to fall in the north.	MN/T
Hair-like beak rush (*Rhynchospora capillacea*)	Calcareous fens, especially along the margins, and spring fens. Germinates in the spring, and flowers mid-summer.	MN/T
Sterile sedge (*Carex sterilis*)	Mineral-rich calcareous fens of the prairie region.	MN/T
Sweet colt's-foot (*Petasites sagittatus*)	Cold marshes and swamp openings.	WI/T

Sources: Minnesota DNR 2016e; Wisconsin DNR 2016; North Dakota GFP 2016.

[a] State/Status: T = Threatened, MN = Minnesota, WI = Wisconsin.

Note:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Special Concern Species

Based on a review of available presence/absence information, no special concern animals are likely to occur within the general location of truck offloading and new access facilities for the truck alternative (Minnesota DNR 2016e; North Dakota GFP 2016; Wisconsin DNR 2016). Three Minnesota special concern plants—few-flowered spikerush, McCalla's willow, and twig rush—potentially are present within the construction area for the truck alternative facilities (Appendix M, Table M-3).

Species of Greatest Conservation Need

Gap Analysis Program Species Models

The combined GAP models indicate habitat areas potentially used by one or more protected or rare vertebrate species. The areas rated medium and high have an increased potential to affect habitats used by multiple protected or rare species. According to the models, much of the area in the vicinity of the Clearbrook terminal, where new truck facilities and access roads likely would be constructed, is rated low for all species. However, about 10 to 20 percent of the area is rated medium for mammals (1 to 6 species) and birds (1 to 12 species); and about 10 percent is rated low for amphibians and reptiles (1 to 2 species). The area in the vicinity the Superior terminal where new truck facilities and access roads likely would be constructed is rated primarily high and medium for mammals (4 to 9 species), low for birds (1 to 6 species), and low for amphibians and reptiles (1 to 2 species).

Minnesota's Wildlife Action Network

The WAN shows viable or persistent populations and richness hotspots for the regions in Minnesota within or near access routes and offloading facilities for the truck alternative (Minnesota DNR 2016f). The WAN applies only to facilities at Clearbrook, Minnesota; and no WAN habitats are present in the vicinity of the Clearbrook terminal.

Minnesota Biological Survey Sites of Biodiversity Significance

Three unnamed MBS Sites preliminarily ranked moderate occur near the Clearbrook terminal where truck facilities are likely to be constructed. These sites include a 48-acre forested area with a pond north of the terminal, a 144-acre site that includes Steenerson and Deep Lake just east of the terminal, and a 319-acre forested and wetland area south of the terminal.

Minnesota Scientific and Natural Areas

A review of PAD-US and Minnesota's SNAs indicated that no SNAs occur in the area around the Clearbrook and Superior terminals where new truck facilities are likely to be constructed.

5.2.5.2.6 Existing Line 3 Supplemented by Rail

Existing conditions for continued use of the existing Line 3 pipeline supplemented by rail transport are similar to those described above for continued use of the existing Line 3 pipeline and the transportation by rail alternative.

5.2.5.2.7 Existing Line 3 Supplemented by Truck

Existing conditions for continued use of the existing Line 3 pipeline supplemented by truck transport are similar to those described above for continued use of the existing Line 3 pipeline and the transportation by truck alternative.

5.2.5.3 Impact Assessment

Potential impacts on unique natural resources from construction of the Applicant's proposed project, SA-04, and transportation by rail and truck include the following:

- Injury or loss of aquatic invertebrates and fish from waterbody crossing construction;
- Injury or loss of terrestrial invertebrates, small mammals, bird and reptile eggs and young, and plants from vegetation clearing, trench excavation, and vehicle operations;
- Loss or alteration of forage and cover habitats during vegetation clearing, site grading, and trenching;
- Disturbance from construction noise and activity; and
- Exposure to small leaks and drips from construction equipment and vehicles.

Potential impacts on unique natural resources from operation of the Applicant's proposed project and the CN Alternatives include the following:

- Habitat loss or continued disturbance from pipeline right-of-way vegetation management,
- Continued habitat loss or alteration during excavation for pipeline inspection and repair,
- Continued disturbance from noise and activity at facilities, and
- Collision injury or mortality during rail and truck transits.
- Potential barrier effects created by increased rail and truck transit.

The potential for effects on unique natural resources depends on whether the protected unique natural resources occur near facilities, infrastructure, activities, and habitat changes associated with the Applicant's proposed project and CN Alternatives; and whether these conditions may result in injury, harm, or disturbance.

5.2.5.3.1 Applicant's Proposed Project (from Neche to Superior)

Federally Listed Species

Federally listed threatened and endangered species that could occur within the North Dakota, Minnesota, and Wisconsin counties crossed by the Applicant's proposed project and could be affected by construction and operation include three mammals – Canada lynx, gray wolf, and northern long-eared bat; three birds – Kirtland's warbler, piping plover, and whooping crane; three invertebrates – Dakota skipper, Poweshiek skipperling, and rusty patched bumble bee; and two plants – Fassett's locoweed and western prairie fringed orchid (Table 5.2.5-3).

Construction Impacts

If present, individual Canada lynx could be disturbed by construction noise and activity that likely would cause them to move to other areas, possibly returning after construction activities stop. Disturbance effects likely would be minor and temporary, unless den sites are disturbed. Most den sites, which are used from April to June, are unlikely to occur within the cleared work area because den sites usually are located around downed logs and windfall trees in the forest interior. Most tree clearing for pipeline construction, ATWS, access roads, and facility sites would occur next to previously cleared utility corridors that are not likely to support den sites. The habitat fragmentation analysis in Section 6.3.4 identifies 17 forested large-block habitats between MPs 215.0 and 352.0 that could support Canada lynx and den sites.

Foraging and reproductive activities for gray wolves could be affected by exposure to Project-related noise and increased human activity. Construction of a pipeline likely would displace a few gray wolves and alter used habitats, especially if packs currently use the existing pipeline rights-of-way in the area as travel corridors. If dens are present in the vicinity of the construction work area, construction-related disturbance could reduce pup survival. In addition, wolf-vehicle collisions continue to be a major contributor to wolf mortality. Typical conservation measures to reduce impacts on the gray wolf include:

- Observe vehicular speed limits during construction. Stop construction activities if the contractor or EI observes a gray wolf or possible den site within the construction corridor, or if USFWS notifies the Applicant of a gray wolf sighting within 1 mile of the construction work area; the stop work order for that area of construction should continue until the wolves leave the area.
- Report any wolf sightings immediately to USFWS, USACE, and state resource agencies (e.g., Minnesota DNR).

Minnesota NHIS reported 13 occurrences of the northern long-eared bat within the construction work area for the Applicant's proposed project (Minnesota DNR 2016e). Current use of the Applicant's proposed project by northern long-eared bats was confirmed by surveys performed by Merjent from 2014 to 2016 (2014b, 2014c, 2015c, 2015d, and 2016c). The Applicant conducted acoustic, mist-net, and telemetry surveys within forested areas that contain suitable habitat for northern long-eared bats during 2014 and 2015 to determine the summer presence or probable absence of northern long-eared bats, and

if found, identify locations of maternity and/or roost trees used by northern long-eared bats. Northern long-eared bats were confirmed acoustically at survey sites in Aitkin, Carlton, Cass, Crow Wing, Hubbard, and Wadena counties in Minnesota, and in Douglas County in Wisconsin (Merjent 2014b, 2015c). In 2014 and 2015, mist-net surveys were completed at 85 sites along the Applicant's proposed project. In 2014, northern long-eared bats were captured at 54 sites in Aitkin, Carlton, Cass, Crow Wing, and Hubbard counties in Minnesota, and Douglas County in Wisconsin. Similarly, in 2015 northern long-eared bats were captured at nine sites in Aitkin, Carlton, Cass, and Wadena counties in Minnesota. A total of 23 roosts, including 9 maternity roost trees and 14 triangulated roosts on inaccessible land, were identified (5 trees in Carlton County, 10 in Cass County, 7 in Aitkin County, and 1 in Wadena County) (Merjent 2014c, 2015d). In 2016, acoustic surveys were conducted at six sites along the Applicant's proposed project in Aitkin, Clearwater, Polk, and Red Lake counties, Minnesota. No confirmed acoustic northern long-eared bats calls were recorded at the six survey sites (Merjent 2016c).

Impacts on individuals or colonies of bats may occur if clearing or construction occurs when bats are using summer roosts. Northern long-eared bats could be disturbed by noise or human presence, causing them to abandon occupied tree roosts. Bats could be directly injured or killed if occupied trees are cut down or disturbed. Impacts could be substantial if trees with maternity colonies are destroyed or abandoned. Because the population of northern long-eared bats is declining from white-nose syndrome and destruction of habitat among other factors, the protection of these bats—and particularly of groups of female and juvenile bats in maternity colonies—is of critical importance.

Conservation measures were included in the ESA 4(d) rule[17] to reduce potential impacts on northern long-eared bats. Under the final 4(d) rule, incidental take involving tree removal in the mapped white nose syndrome zone, which includes the Applicant's proposed project, is not prohibited if the following two conservation measures are followed:

- Maintain a year-round 0.25-mile-radius buffer (which is equivalent to 125.7 acres) around known northern long-eared bat hibernacula.
- Protect known, occupied maternity roost trees. Incidental take is prohibited if the activity cuts or destroys a known, occupied maternity roost tree, or any other trees within a 150-foot radius around a known maternity roost tree, equivalent to 1.6 acres, during the pup season from June 1 to July 31.

Kirtland's warblers nest in jack pine forests in Wisconsin and Michigan, and they migrate along the southeast coast of the United States to overwinter in the Bahamas. No critical habitat has been designated for the species. Kirtland's warblers have been known to occur during the breeding season in Douglas County, Wisconsin. As part of the ongoing recovery effort, five jack pine stands were censused by the USFWS in Douglas County during the 2016 breeding season; however, no signing males were documented (USFWS 2016). Five occurrences of jack pine woodlands occur within the construction work area of the Applicant's proposed project (Table 5.2.5-3). However, it is unknown whether these woodlands are the same five stands surveyed by the USFWS in 2016, or if they provide suitable breeding habitat for Kirtland's warblers. If Kirtland's warblers were to nest in the construction work area and vegetation clearing occurred during the nesting season loss of eggs or young could occur. Construction

[17] Regulations identified by USFWS that are deemed "necessary and advisable" for protection and conservation of a federally threatened species.

activities and presence of construction personnel could also cause disturbance and displacement of adult birds, should they occur in the vicinity of the activity.

Piping plovers which breed in the Great Lakes region inhabit shorelines of the Great Lakes. They nest on open, sparsely vegetated sandy habitats such as sand spits or sand beaches found on Great Lakes islands and mainland shorelines. Critical habitat for this species has been designated in Douglas County, Wisconsin, and is defined as lands 500 meters (1,640 feet) from the normal high water line from the mouth of Dutchman Creek west-northwest along the Lake Superior shoreline to the breakwall forming the Superior Front Channel opening to Lake Superior (USFWS 2001). The Applicant's proposed project would end at the Superior terminal in Douglas County, approximately 4,000 meters (13,100 feet) west of the opening to Lake Superior. Because of the distance from the Lake Superior shoreline and highly developed nature of the Superior terminal, it is unlikely that any piping plovers would occur in the vicinity of the Applicant's proposed project.

Whooping cranes from the non-essential, experimental eastern population that winters in Florida migrate to breeding areas in Wisconsin and could occur in the ROI for the Applicant's proposed project during spring and fall migrations. Noise and activity during construction can displace whooping cranes from stopover habitats during foraging or in in wetlands or riverine habitats during roosting. Whooping cranes generally depart from wintering grounds during late March to mid-April and return from breeding grounds beginning in mid-September. The eastern population travels north through Georgia, Tennessee, Kentucky, Indiana, and Illinois to Wisconsin. During migration, whooping cranes use croplands and shallow wetlands for stop-over foraging and roosting habitats. The Aransas-Wood Buffalo Park whooping crane population migrates between wintering grounds in Aransas NWR to breeding grounds in Wood Buffalo National Park in northern Alberta. The migration corridor for this population crosses through central Oklahoma, Kansas, Nebraska, South Dakota, and North Dakota and is generally west of the Applicant's proposed project in North Dakota. If construction occurs during the migration period, individuals may avoid active construction areas, or if already present when construction begins for the day, foraging or roosting birds may be flushed (USFWS 2009).

If present, the Dakota skipper, Poweshiek skipperling, and rusty patched bumble bee could be affected by construction activities that disturb native vegetation. These activities would disrupt egg laying and foraging during spring and summer, and could crush dormant larvae or hibernating queens during fall and winter. These prairie-dependent insects depend on high-quality native grasslands and tallgrass prairies to provide food from flower pollen and nectar. Vegetation clearing and replacement with non-native ground covers could injure or kill these butterflies and bees, and remove forage plants.

The Applicant completed a desktop and field assessment of potentially suitable native prairie habitat for the Dakota skipper and Poweshiek skipperling along the Applicant's proposed project. Dakota skippers and Poweshiek skipperling are not currently known to occur in Pembina County, North Dakota, and the desktop review did not identify any suitable habitats along the Applicant's proposed project in North Dakota. Potentially suitable Dakota skipper and Poweshiek skipperling habitat identified as part of the desktop review was documented at one location along the proposed project in Polk County, and at two locations in Pennington County, Minnesota. Suitable habitats were found in small, isolated pockets that ranged in size from 0.4 to 1.8 acres. Presence/probable absence field surveys were conducted in 2015, and did not identify the presence of Dakota skipper or Poweshiek skipperling at the three potentially suitable habitat locations in Pennington and Polk counties (Merjent 2015a). Presence/ probable absence surveys have not been performed based on the revised 2016 habitat assessment (Merjent 2016a). While it is possible that the Dakota skipper and Poweshiek skipperling could occur within the ROI, based on the

results of the habitat survey and earlier presence/probable absence survey, it is unlikely that these prairie-dependent insects would be affected by construction activities.

The Applicant's proposed project would not cross any current high use areas for rusty patched bumble bee, and construction is not likely to directly or indirectly affect any individuals or current high use areas. The Applicant's proposed project crosses through current potential low use areas where rusty patched bumble bees may disperse from current high use areas or where their occurrence is uncertain. The rusty patched bumble bee may benefit from opportunities to conserve the species within the dispersal area, and USFWS may recommend surveys.

Applicable conservation measures that would benefit the rusty patched bumble bee within this dispersal area include restoration and maintenance of high-quality habitat through control of invasive species and restoration, including a high diversity and abundance of wildflowers appropriate for the region and local characteristics (USFWS 2017).

Fassett's locoweed and western prairie fringed orchids have the potential to occur within the Applicant's proposed project; however, there are no known occurrences of either species within the construction work area. If these plants were to occur, direct impacts could include trampling and destruction during construction from clearing and grubbing, grading, and trenching. Indirect effects from construction could include conversion of shoreline habitat (for locoweed) and already fragmented prairie habitat (orchid) into other habitat types and the spread of noxious weeds and invasive plants. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction.

Impacts on prairie soils from construction would be long term and could require a substantial amount of recovery time, which could affect any western prairie fringed orchids present. Surveys were not performed for Fassett's locoweed, but based on known habitat types, there is limited potential for them to occur within the construction work area. If they were to occur, effects could include trampling, destruction, or conversion of shoreline habitats. From 2013 to 2016, the Applicant completed habitat analyses and field surveys of potentially suitable western prairie fringed orchid habitat, and no orchids were located during these surveys (Merjent 2016e). Potentially suitable habitat was identified at one location, but no western prairie fringed orchids were found. Environmental inspectors and construction personnel will be trained to identify these plant species should they occur in the area in the future. However, it is unlikely that western prairie fringed orchids would be affected by construction of the Applicant's proposed project, because none are likely to occur in the construction area.

Summary

Measures to avoid or reduce construction impacts on the federally listed animals and plants that could occur along the Applicant's proposed project would be developed in consultation with USFWS to ensure that any unavoidable impacts would not jeopardize the continued existence of species protected by the ESA. The Canada lynx and gray wolf could experience temporary minor disturbance associated with construction activities. Northern long-eared bats and occupied bat maternity roots are known to occur in the ROI. With implementation of BMPs and general conservation measures associated with the ESA 4(d) rule, impacts from construction would be temporary and minor. Given the limited distribution within the ROI of Dakota skipper, Kirtland's warbler, piping plover, whooping crane, Poweshiek skipperling, and rusty patched bumble bee, construction impacts likely would be temporary to short

term and negligible. Effects on federally listed plants are not likely because of the scarcity of appropriate habitat and/or species presence.

Operations Impacts

Operations and maintenance activities of the Applicant's proposed project would result in periodic noise and human/equipment activity associated with inspection overflights, ground surveillance, and maintenance and repairs. Impacts on individual Canada lynx and gray wolves would be limited to temporary disturbance or displacement. Lynx and wolves would be expected to resume use of the area following the disturbance. Disturbance could also be caused by public and private use of all-terrain vehicles and snow machines along the permanent right-of-way. Operation of vehicles along the right-of-way could result in collisions with individual lynx or wolves. Minimization measures to reduce the potential for collisions could include operating equipment at speeds suitable for the driving conditions or posted speed limits. Use of the right-of-way for recreational purposes could potentially be reduced by limiting access through use of gates and posting of no trespassing signs, where appropriate. The probability of collisions with work vehicles during operations would be low. Therefore, no adverse impacts are expected as a result of collisions. Impacts to Canada lynx and gray wolf would be limited to periodic disturbance. Therefore, only temporary minor impacts on individuals of these species would be expected over the life of the project.

Operational impacts on the northern long-eared bat could include continued habitat loss or alteration (i.e., if trees are allowed to grow larger than 3 inch in diameter at breast height between tree maintenance events) and disturbance from noise and activity at aboveground facilities during pipeline inspection overflights or ground surveillance and during right-of-way maintenance activities. Human activities during operations typically would occur during daylight hours; therefore, operations activities would not interrupt nighttime foraging activities. However, each incident would result in a temporary minor impact that would occur periodically over the life of the Project. Operation of pipeline pump stations would increase nearby noise levels over existing ambient levels. As described in Section 6.2.2, however, sound level increases would comply with Minnesota Noise Standards and would decrease over distance. Pump station footprints would be devoid of trees; while bats could forage in the vicinity, they would not roost at the pump stations. Unless a roost site is near a pump station, the effect on northern long-eared bats from operation of pump stations is expected to be permanent and negligible.

If operation and maintenance activities occur in the vicinity of Superior during the Kirtland's warbler breeding season (May through September), foraging and reproductive activities could be affected by noise and increased human activity. In addition, vegetation clearing during the nesting season could result in loss of eggs or young, should individuals nest in the permanent right-of-way. Piping plovers also could occur near facilities in Superior. It is unlikely that Kirtland's warblers or piping plovers would use human-developed habitats; therefore, operations impacts on these species likely would be permanent and negligible. Migrant whooping cranes would not be affected by pipeline operation.

As described for construction, surveys did not document any individuals of the Dakota skipper or Poweshiek skipperling, and these species are unlikely to occur along the Applicant's proposed project. Therefore, there would be no adverse impacts on either of these species.

The Applicant's proposed project would not cross any current high use area for rusty patched bumble bee. Therefore, no adverse impacts on any individual bees or current high use areas are expected. The Applicant's proposed project crosses through current potential low use areas where rusty patched

bumble bees may disperse from a current high use area or where their occurrence is uncertain. If bees are determined to occur in these areas, measures to avoid or minimize impacts could include :

- Limiting vegetation management in high-quality habitat during the active season (March through September).
- Leaving one or more areas unmowed for the entire year in vegetation management areas.
- Using a minimum of 8 to 10 inches cutting height to prevent disturbance of overwintering queens or nesting sites.
- Carefully applying and targeting pesticide use to control pests and invasive species, including:
  - Using the least toxic options and following label directions to ensure proper use.

    Applying as locally and directly as possible; avoiding broadcast application that may be harmful to the rusty patched bumble bee or their nectar plants in areas where the species is likely to be found.
  - Ensuring that field crews recognize target weeds to avoid adverse effects on important native plants (USFWS 2017).

As described under construction impacts, Fassett's locoweed and western prairie fringed orchid are not likely to occur in the right-of-way. Surveys were not conducted for Fassett's locoweed and no individuals of western prairie frindged orchid were documented during field surveys. Therefore, impacts to individuals from operations are not anticipated. In the unlikely event that individuals of either species persist within the permanent right-of-way they could be permanently affected by vegetation maintenance activities; however, given the lack of appropriate habitat and known occurrences, impacts likely would be negligible.

Summary

Operations and maintenance impacts on Canada lynx and gray wolves would be limited to periodic disturbances over the life of the project. These impacts would be temporary and minor. No adverse impacts are expected as a result of vehicle collisions, due to the infrequent nature of the maintenance activities, rarity of the species occurring near the project, and minimization measures such as speed restrictions and measures to prevent trespassing. Impacts on northern long-eared bats would be permanent and negligible. Given the limited distribution and habitat types that could be used by Kirtland's warblers and piping plovers operations and maintenance impacts would be permanent and negligible. Migrant whooping cranes would not be affected by pipeline operation. No adverse impacts are anticipated on the Dakota skipper or Poweshiek skipperling, because no individuals were documented during surveys. Similarly, no adverse impacts are expected to occur to the rusty patched bumble bee, because no high use areas occur within the Applicant's proposed project. Operations would be unlikely to affect federally listed plants because of the scarcity of appropriate habitat and species presence.

State-Listed Species

Endangered and Threatened Species

State-listed endangered and threatened animal species that could occur within the ROI for the Applicant's proposed project and could be affected by construction and operation include one mammal – northern long-eared bat, one fish – pugnose shiner, one reptile – wood turtle, and one invertebrate –

fluted-shell mussel (Table 5.2.5-4). Potential impacts on the northern long-eared bat are discussed above for federally listed endangered and threatened species. Of the 21 state-listed endangered and threatened plants known to occur within the ROI, 13 potentially occur within the construction work area (Table 5.2.5-5).

Construction Impacts

Two aquatic animal species have been documented in the ROI for the Applicant's proposed project: the pugnose shiner and the fluted-shell mussel. Both species have been reported within the construction work area for the Applicant's proposed project. The pugnose shiner coincides with the construction work area in one location, and the fluted-shell mussel coincides with the construction work area in one location. The Applicant surveyed for mussels at sixteen sites along the Applicant's proposed project, and no state-protected mussels were found (Merjent 2015b).

If present at the time of construction, the pugnose shiner and fluted-shell mussel could be affected by in-stream construction or construction activities that take place in the adjacent uplands. Both species are vulnerable to any deterioration in water quality, especially increased siltation. Disturbance to the stream bottom could crush or suffocate the fluted-shell mussel and would temporarily increase turbidity that could reduce feeding efficiency and damage these sensitive aquatic animals. HDD is proposed for both of the stream crossings where these two species have been documented, so any impacts due to in-stream construction would be avoided. HDD requires the use of water-based drilling fluid to cool the cutting tools and remove soil/bedrock cuttings. Inadvertent releases of HDD water-based drilling fluid could affect surface water resources. However, HDD water-based drilling fluid would primarily consist of naturally occurring materials, such as bentonite, which in small quantities would not be detrimental to water quality. Increased turbidity and siltation could still occur due to surface runoff from construction work areas. Stringent erosion and sediment control practices would minimize these potential effects. Contaminated construction equipment and water used for hydrostatic testing could introduce invasive aquatic animals such as zebra mussels and quagga mussels (*Dreissena bugensis*) that could displace and reduce habitat quality for aquatic animals. To minimize the potential for introduction of invasive species, the Applicant would implement an invasive species minimization plan. In addition, EIs would monitor construction activities to ensure compliance with permit conditions and the invasive species plan, reducing the potential for introduction of invasive species during construction.

The wood turtle inhabits aquatic habitats and adjacent uplands. Although there are no known occurrences of this species within the construction footprint, the wood turtle has been documented within the ROI and could be encountered within the construction footprint. If wood turtles were present, construction could result in direct mortality of turtles or destruction of nests; turtles could be crushed by machinery, buried under excavated soil, or trapped in trenches. In areas with suitable habitat and known occurrences of wood turtles, EIs could monitor the trench and ensure that no turtles become entrapped prior to pipeline burial. Stream-disturbing activities and impacts as described above for the pugnose shiner and fluted-shell mussel also would affect aquatic habitats potentially used by wood turtles. Stringent erosion and sediment control practices would minimize these potential effects. Any destruction, degradation, or fragmentation of floodplains also has the potential to negatively affect this species in the long term. Given the limited overlap with wood turtle range and habitat, construction likely would result in temporary to long-term, minor impacts on wood turtles.

Fourteen Minnesota-listed plant species (10 threatened and 4 endangered) and seven Wisconsin-listed plant species (5 threatened and 2 endangered) are known to occur within (i.e., within the construction

work area or operation ROW) or near (i.e., within 0.5 mile) the Applicant's proposed project and could be affected during construction and operations (Table 5.2.5-5; Appendix M, Table M-3).

Minnesota-listed plants were documented at 16 survey sites along the Applicant's proposed project. The Applicant would avoid state-listed plants at 12 sites (Table 5.2.5-13) because they occur outside of the construction work area or by implementing avoidance strategies, including but not limited to, workspace area reductions or modifications, exclusion fencing, and minor route centerline adjustments. Some individuals would still be impacted at two of the 12 site (Table 5.2.5-13).

Table 5.2.5-13. Avoidance of Minnesota Endangered and Threatened Plant Populations for the Applicant's Proposed Project

Survey Site	County	Common and Scientific Name	Status	How Avoided
North Dakota Border to Clearbrook				
L3R_03	Kittson	Red saltwort (*Salicornia rubra*)	Threatened	Applicant modified workspace to avoid all 91 individuals of red saltwort.[a]
L3R_04	Kittson/Marshall	Red saltwort (*Salicornia rubra*)	Threatened	All 14,949 individuals of red saltwort are outside of workspace.[a]
L3R_08	Pennington	Sterile sedge (*Carex sterilis*)	Threatened	All individuals of sterile sedge are outside of workspace.
L3R_11	Red Lake	Clinton's bulrush (*Trichophorum clintonii*)	Threatened	All individuals of Clinton's bulrush are outside of workspace.
L3R_12	Polk	Whorled nutrush (*Scleria verticillata*)	Threatened	All 787 individuals of whorled nutrush are outside of workspace.[b]
L3R_14a	Clearwater	Handsome sedge (*Carex formosa*)	Endangered	Applicant modified workspace to avoid 11 individuals of handsome sedge. Applicant would use exclusion fencing to avoid one individual of handsome sedge within workspace.[b]
Clearbrook to Carlton				
L3X_22/23/58	Cass	Butternut (*Juglans cinerea*)	Endangered	Applicant developed and adopted a route deviation to avoid all 24 individual butternut trees.[c]
		Narrow triangle moonwort (*Botrychium lanceolatum* ssp. *angustisegmentum*)	Threatened	There are 19 individuals of narrow triangle moonwort outside of the workspace.[d, e] Other individuals of this species would be affected.
L3X_25	Cass	Purple-flowered bladderwort (*Utricularia purpurea*)	Endangered	All individuals of purple flowered bladderwort are outside of workspace.
L3X_105	Cass	A bristle-berry (*Rubus fuller*)	Threatened	All individuals of a bristle-berry[f] are outside of workspace.

Table 5.2.5-13. Avoidance of Minnesota Endangered and Threatened Plant Populations for the Applicant's Proposed Project

Survey Site	County	Common and Scientific Name	Status	How Avoided
L3X_81a	Aitkin	Narrow triangle moonwort *(Botrychium lanceolatum* ssp. *angustisegmentum)*	Threatened	All individuals of narrow triangle moonwort are outside of workspace.
		Bog bluegrass (*Poa paludigena*)	Threatened	Large numbers of bog bluegrass are outside of workspace. Other individuals of this species would be affected.
L3X_29	Carlton	A liverwort (*Trichocolea tomentella*)	Threatened	All individuals of *T. tomentella* are outside of workspace.
L3X_64	Carlton	Narrow triangle moonwort (*Botrychium lanceolatum* ssp. *angustisegmentum*)	Threatened	All individuals of narrow triangle moonwort are outside of workspace.[g]

Source: Minnesota DNR 2017b.

[a] Number of individuals avoided is based on 2015 population count data. At survey site L3R_03, no individuals were observed during 2016 population counts.

[b] Number of individuals avoided is based on 2016 population count data.

[c] The avoidance of all butternut trees at survey site L3X_22/23/58 is based on 2013 survey data. The Applicant would install exclusion fencing at a 25-foot radius around one individual to avoid impacts on the root zone. This tree, approximately 25 feet tall with a 7-inch diameter at breast height, is within 7 feet of the construction workspace and within 12 feet of additional temporary workspace. The tree size was measured on August 23, 2016. On the same site visit, there was no evidence of butternut canker (a lethal fungal disease) for this tree.

[d] Number of individuals avoided is based on a combination of 2015 and 2016 population count data.

[e] Applicant would fence individuals that are outside of the workspace but within 5 feet of the workspace edge to facilitate avoidance during construction.

[f] This species was tentatively identified on June 20, 2016. Upon revisit on August 23, 2016, to confirm the species identification based on characteristics of mature primocanes, the individuals were no longer present due to logging of the area.

[g] No individuals were observed within workspace or within 5 feet of the edge of workspace during 2016 population counts.

Note:

No Minnesota endangered or threatened plant populations were identified in the Carlton-to-Wisconsin border for the Applicant's proposed project.

Populations of six Minnesota-listed plants at seven sites are within the construction work area for the Applicant's proposed project and would not be avoided (Table 5.2.5-14). The Applicant would consult with Minnesota DNR to complete the Endangered Species permit process for takes at these sites ("takes" include picking, digging, or destroying). If there are no feasible alternatives to takes, the Applicant would propose compensatory mitigation to reduce the impact to an acceptable level. The amount of compensation required would depend on the degree of impact on each plant species (e.g., loss of the entire population at a site versus the loss of a few individuals) and the statewide significance of the population at the affected site. The types of acceptable compensatory mitigation for takes of endangered or threatened plants in Minnesota could include:

- Funding state acquisition and protection of another site where the species occurs that is currently unprotected and vulnerable to destruction,
- Funding additional survey work to locate other sites, and/or
- Funding research to improve Minnesota DNR's understanding of the habitat requirements or protection needs of the species.

Of the seven Wisconsin-listed endangered and threatened plants, multiple populations of five plant species may occur within the construction work area and could be destroyed. Similar state Endangered Species permits for takes and compensatory mitigation may be required by Wisconsin DNR if takes are not avoidable for the state threatened clustered bur-reed, seaside crowfoot, and sweet colt's foot, and for the state endangered neat spike-rush and small yellow water crowfoot.

If the populations of six Minnesota-listed plant species and five Wisconsin-listed plant species cannot be avoided, construction could result in permanent major impacts on those populations. These impacts could be offset by compensatory mitigation.

Summary. Measures to avoid or reduce construction impacts on state-listed animals and plants would be developed in consultation with the appropriate state agencies to ensure that any unavoidable impacts would not jeopardize the continued existence of state-listed species. Given their limited distribution and the proposed construction methods, the pugnose shiner and fluted-shell mussel would not be impacted. Impacts on the wood turtle could be temporary to long-term minor impacts. Eleven state-listed plants are known to occur within the construction work area, and effects on these plants are expected to be major and permanent. An additional 10 state-listed plant species could occur outside of the construction work area, but within the ROI. No impacts to individuals of these 10 species are anticipated. All state-listed animals and plants within the ROI also could be indirectly affected by habitat loss and alteration.

Table 5.2.5-14. Potential Construction Impacts on Minnesota Endangered and Threatened Plant Populations for the Applicant's Proposed Project

Survey Site	County	Common and Scientific Name	Status [a]	Number of Avoided Individuals	Number of Affected Individuals
North Dakota Border to Clearbrook					
L3R_07	Marshall	Sterile sedge (*Carex sterilis*)	Threatened	268[b]	47[c]
L3R_12	Polk	Sterile sedge (*Carex sterilis*)	Threatened	657[d]	292
		Beaked spikerush (*Eleocharis rostellata*)	Threatened	14,665[d]	5,036
		Hair-like beak rush (*Rhynchospora capillacea*)	Threatened	18	106
L3R_14	Clearwater	Handsome sedge (*Carex formosa*)	Endangered	62[c, d]	3[c]
Clearbrook to Carlton					
L3X_99	Cass	Bog bluegrass (*Poa paludigena*)	Threatened	10 (3,500)[c, e]	4[c]
L3X _22/23/58	Cass	Narrow triangle moonwort (*Botrychium lanceolatum* ssp. *angustisegmentum*)	Threatened	19[b]	1 + 40[f, g]
L3X _C1	Cass	Narrow triangle moonwort (*Botrychium lanceolatum* ssp. *angustisegmentum*)	Threatened	-	20[f]
L3X _81a	Aitkin	Bog bluegrass (*Poa paludigena*)	Threatened	45 (7,000)[e]	242[c]
		Bog bluegrass (*Poa paludigena*)	Threatened	257 (8,000)[e]	961[c]
		Bog bluegrass (*Poa paludigena*)	Threatened	1,173 (5,000)[e]	744[c]

Source: Minnesota DNR 2017b.

[a] Status refers to Minnesota listing.

[b] Number of individuals is based on a combination of 2015 and 2016 population counts.

[c] Number of individuals is based on 2016 population count data.

[d] The Applicant would fence individuals that are outside of the workspace but within 5 feet of the workspace edge to facilitate avoidance during construction.

[e] First number is based on number of individuals avoided within site boundary used for 2016 population count. Second number (in parentheses) is based on estimated size of population beyond site boundary during 2016 occurrence surveys;

[f] Number of individuals is based on 2015 population count data.

[g] The Applicant would avoid all individual butternut trees at this site with the understanding that some individuals of narrow triangle moonwort (which have a shorter time to maturity and are less imperiled) would be affected as a result.

Note:

No Minnesota endangered or threatened plant populations were identified in the Carlton-to-Wisconsin border for the Applicant's proposed project.

Operations Impacts

Pipeline operation activities include maintenance mowing of the permanent right-of-way, excavation for visual inspection and repair or replacement of pipeline sections, and invasive species control. Vegetation management that prevents riparian trees and large shrubs from reestablishing within the permanent right-of-way could increase stream temperatures by removing shade, which would reduce habitat suitability for aquatic animals in adjacent waterbodies. The application of herbicides in the vicinity of waterways also has the potential to negatively affect water quality and, consequently, aquatic species. Because the pugnose shiner and fluted-shell mussel are known to occur in the ROI for the Applicant's proposed project, these species could experience a permanent, although negligible, impact during operations. Upland vegetation management could crush nests and wood turtles, causing a permanent minor impact on the species. State-listed plants that persist within the permanent right-of-way after construction could be permanently affected by vegetation management activities, including herbicide application; however, given the potential for avoidance of these plants, the overall impact would be permanent and minor. All state-listed animals and plants in the ROI also could be indirectly affected by habitat loss and alteration.

Special Concern Species

State-listed animals of special concern that could be affected by operation of the Applicant's proposed project include 14 vertebrates: three bats – big brown bat, little brown bat, and northern long-eared bat; prairie vole (*Microtus ochrogaster*); eight birds – Connecticut warbler, greater prairie-chicken (*Tympanuchus cupido*), Le Conte's sparrow, Nelson's sparrow, northern goshawk (*Accipiter gentilis*), red-shouldered hawk, short-eared owl, and trumpeter swan; one amphibian – four-toed salamander (*Hemidactylium scutatum*); one fish – least darter (*Etheostoma microperca*); and five invertebrates – a caddisfly, a jumping spider (*Marpissa formosa*), and three mussels – black sandshell, creek heelsplitter, and pink heelsplitter (Appendix M, Tables M-1 and M-2).

Individuals of fourteen state-listed plant species of special concern could be affected by construction and operation, including blunt sedge, false mountain willow, few-flowered spikerush, least moonwort, mamillate spike-rush, McCalla's willow, northern single-spike sedge, northwestern sticky aster (*Canadanthus modestus*), slender naiad (*Najas gracillima*), small white lady's slipper, Torrey's mannagrass (*Torreyochloa pallida*), twig rush, Vasey's rush, and white adder's mouth (*Malaxis monophyllos* var. *brachypoda*) (Appendix M, Table M-3).

Construction Impacts

Construction could directly affect special concern bat individuals as a result of tree clearing during summer, if occupied maternity or roost trees are cut or disturbed (as described above for the northern long-eared bat). NHIS data and surveys identified that both big brown bats and little brown bats occur within the construction work area. Application of the conservation measures associated with the ESA 4(d) rule that protect the northern long-eared bat also would protect these bats.

Of the special concern birds, the Applicant's proposed project would have the greatest potential to affect greater prairie-chicken individuals during the lek (the period when males assemble in an area termed a "lek" and engage in competitive displays to attract a mate) and nesting period. As many as nine potential nesting areas could occur within the construction work area. Disturbance during the lek could interrupt breeding and make nesting birds and eggs more vulnerable to predation by foxes, skunks, and raptors. Other special concern birds that have been documented during the breeding season within the construction work area include Nelson's sparrow and short-eared owl. Construction

during the breeding season could result in the loss of eggs or young for these birds, resulting in short-term major impacts.

Construction of waterbody crossings for the Applicant's proposed project has the potential to affect individuals of the following aquatic special concern species documented within the ROI: caddisfly, black sandshell, creek heelsplitter, pink heelsplitter, and least darter. Dry or wet open-cut stream crossings can result in injury or death and short-term increased turbidity impacts if these animals are present at the stream crossing during construction. Of these special concern aquatic animals, black sandshell, creek heelsplitter, and least darters would occur at the crossing locations. Construction impacts on these aquatic animals would be short term and negligible to major, depending on the number of individuals present and the type of waterbody crossing method used.

Construction through mature upland forests and fish-free wetlands also could affect the four-toed salamander that is present within the ROI. Vegetation clearing for construction could also have direct impacts on individual jumping spiders.

Eleven of the 14 state-listed plants of special concern have been documented within the construction work area for the Applicant's proposed project, including blunt sedge, false mountain willow, few-flowered spikerush, least moonwort, mamillate spike-rush, McCalla's willow, northern single-spike sedge, slender naiad, small white lady's slipper, Torry's mannagrass, and Vasey's rush. Individual plants could be destroyed by construction if populations cannot practicably be avoided. Avoidance could include methods discussed above for state-listed plants. If the individual plants cannot be avoided, construction could result in permanent major impacts on 11 state-listed special concern plants.

Operations Impacts

Pipeline operation would include vegetation management and pipeline inspections that could require excavation and repair or replacement of sections of the pipeline. These activities could affect the four-toed salamander if the species is present within the permanent right-of-way. Pipeline operation would include noise from pump stations, which could but is not likely to, affect special concern birds during nesting. Maintenance mowing during the nesting season could cause nest abandonment and directly destroy nests, eggs, and young of ground-nesting birds, including those of the greater prairie-chicken, Nelson's sparrow, and short-eared owl. This could result in permanent major impacts on these special concern species. Habitat would be permanently altered by vegetation management, resulting in permanent minor impacts on special concern species that occur in the permanent right-of-way.

If special concern plants continue to persist within the permanent right-of-way, vegetation management and periodic excavation of pipeline sections for repair or replacement could affect them. Most of these plants would be unlikely to persist within the permanent right-of-way; consequently, if impacts do occur, they would be short term and minor.

Species of Greatest Conservation Need

Gap Analysis Program Species Models

The combined region-wide GAP species model data show the total area used by one or more protected or rare species. The distribution of low, medium, and high use areas for protected or rare mammal species indicates that 41 percent of the area within the ROI for the Applicant's proposed project could support medium to high use by these mammals (4 or more species). This relatively high proportion may reflect the widespread use of this area by Canada lynx. By comparison, 17 percent of the area within the ROI for

federally listed species could support medium to high use by protected or rare birds (7 or more species). A total of 27 BCCs were identified as occurring within the ROI from the North Dakota border to Superior, Wisconsin (Appendix M, Table M-5). The Applicant's proposed project is primarily low use for protected or rare amphibians and reptiles (Table 5.2.5-15).

Table 5.2.5-15. GAP Species Models – Habitat Use Areas for Protected and Rare Mammals, Birds, Amphibians, and Reptiles within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for the Applicant's Proposed Project (acres)

GAP Species Groups	Con[a]	Op[a]	Total		Within 0.5 Mile
			Con[b]	Op[b]	
Mammals[c]					
Low	2,487	1,099	3,101	1,247	130,256
Medium	1,474	664	1,705	757	81,340
High	128	62	148	69	8,458
Subtotal	***4,090***	***1,845***	***4,954***	***2,092***	***220,054***
Proportion of medium and high	**39%**	**39%**	**37%**	**39%**	**41%**
Birds[d]					
Low	3,778	1,694	4,601	1,916	205,570
Medium	776	362	1,012	439	35,711
High	0	0	0	0	239
Subtotal	***4,554***	***2,056***	***5,614***	***2,356***	***241,520***
Proportion of medium and high	**17%**	**18%**	**18%**	**19%**	**15%**
Amphibians and Reptiles[e]					
Low	1,117	506	1,328	581	64,727
Medium	<1	<1	<1	<1	18
High	0	0	0	0	-
Subtotal	***1,117***	***506***	***1,328***	***581***	***67,745***
Proportion of medium and high	**<1**	**<1%**	**<1%**	**<1%**	**<1%**

Sources: USGS GAP 2016a, 2016b.

[a] Con = Applicant-provided footprints for construction work area (note 120-foot-wide work area for North Dakota and Wisconsin); Op = 50-foot-wide permanent right-of-way centered on the pipeline

[b] Total: Con = sum of pipeline construction work area (includes the pipeline permanent right-of-way), additional temporary workspaces, and temporary access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, pump stations, and valves

[c] Mammals – Low = 1 to 3 species, Medium = 4 to 6 species, High = 7 to 9 species

[d] Birds – Low = 1 to 6 species, Medium = 7 to 12 species, High = 13 to 19 species

[e] Amphibians and Reptiles – Low = 1 to 2 species, Medium = 3 to 6 species, High = 7 to 11 species

Construction Impacts

General construction impacts and measures to avoid or reduce impacts on rare and protected species addressed in the GAP models would be the same as those described above for federally and state-listed

vertebrate fauna. Mammals could be disturbed by construction noise and activity that likely would cause larger mammals to move to other areas, possibly returning after construction activities stop; while smaller, less mobile mammals could be crushed and killed. Overall, effects likely would be short term and minor. Given the low proportion of medium use areas for birds and low overall use for herptiles within the construction areas, impacts on these groups from construction would be short term and minor to negligible.

Operations Impacts

Vegetation management within the permanent right-of-way would prevent the reestablishment of trees and large shrubs. Animals that depend on closed canopies for cover and habitat may avoid the permanent right-of-way. Therefore, the permanent right-of-way may act as a barrier to travel for some animals, such as amphibians, reptiles, and small mammals, and may result in fragmenting SGCN habitat. Habitat fragmentation can increase edge habitats favored by some animals and avoided by others; it can create a barrier to movements for some animals while facilitating movements of others, especially predators. Forest-nesting songbird abundance, diversity, and reproduction rates can be depressed by fragmentation associated with linear developments (Jalkotzy et al. 1997).

Minnesota's Wildlife Action Network

Approximately 28 percent of the Applicant's proposed project would affect WAN habitats (Table 5.2.5-16). Most WAN habitats (78 percent) that would be affected by construction and operation of the Applicant's proposed project are rated low-medium and medium, and no WAN habitats affected by the Applicant's proposed project are rated high. Most of the 97 miles (about 77 percent) of the Applicant's proposed project route that crosses WAN habitats in Minnesota would occur within existing utility or transportation corridors. About 23 miles (23 percent) would cross a new right-of-way, potentially contributing to fragmentation of these WAN habitats. Therefore, overall impacts on WAN habitats would be minor and permanent from habitat loss and alteration in addition to potential fragmentation (fragmentation is described in greater detail in Section 5.2.4).

Table 5.2.5-16. Impacts on the Wildlife Action Network in Minnesota within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for the Applicant's Proposed Project (acres)

Wildlife Action Network Rating	Con[a]	Op[a]	Total		Within 0.5 Mile
			Con[b]	Op[b]	
Low	228.6	100.5	272.9	107.6	10,166.3
Low-medium	598.2	268.9	727.2	299.4	28,181.8
Medium	407.5	187.0	487.8	225.4	21,413.2
Medium-high	57.6	30.1	72.9	36.3	4,270.1
High	0.0	0.0	0.0	0.0	0.0
WAN TOTAL	**1,291.8**	**586.6**	**1,560.9**	**665.1**	**64,031.5**
Minnesota total	***4,555.2***	***2,057.0***	***4,934.1***	***2,057.1***	***215,882.3***
Proportion in WAN	***28.4%***	***28.5%***	***31.6%***	***32.3%***	***29.7%***

Source: Minnesota DNR 2016f.

[a] Con = Applicant-provided footprint for construction work area; Op = Applicant-provided footprint for permanent right-of-way.

[b] Con = sum of pipeline construction work area (includes the pipeline permanent right-of-way), additional temporary workspaces, and temporary access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, pump stations, and valves.

Note:

Table 5.2.5-16. Impacts on the Wildlife Action Network in Minnesota within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for the Applicant's Proposed Project (acres)

Wildlife Action Network Rating	Con[a]	Op[a]	Total		Within 0.5 Mile
			Con[b]	Op[b]	

Values in the table may not sum to totals and subtotals because of rounding.

WAN = Wildlife Action Network

Minnesota Biological Survey Sites of Biodiversity Significance

Construction would affect an estimated 877 acres of MBS Sites, and operations would affect an estimated 403 acres of MBS Sites (Table 5.2.5-17). Outstanding and high rated MBS Sites that would be affected by construction are described in Table 5.2.5-18. The overall abundance of MBS Sites along the Applicant's proposed project is 16 percent for construction compared to the overall abundance of 21 percent within the ROI, suggesting that the route would not disproportionately affect MBS Sites.

Table 5.2.5-17. Estimated Impacts on Minnesota Biological Survey Sites of Biodiversity Significance for the Applicant's Proposed Project in Minnesota (acres)

Site of Biodiversity Significance Rating	Con[a]	Op[a]	Total[b]		Within 0.5 Mile
			Con	Op	
Outstanding	5.8	3.0	7.4	4.6	1,045.4
High	66.0	33.4	77.6	39.7	6,192.3
Moderate	672.1	312.0	791.9	358.8	37,061.6
MBS SITE TOTAL	**743.9**	**418.2**	**876.9**	**403.2**	**44,299.2**
Minnesota total	***4,555.2***	***2,057.1***	***4,934.1***	***2,057.1***	***215,882.3***
Proportion in MBS Sites	***16.3%***	***20.3%***	***17.8%***	***19.6%***	***20.5%***

Source: Minnesota DNR 2016h.

[a] Con = Applicant-provided footprint for construction work area; Op = Applicant-provided footprint for permanent right-of-way.

[b] Con = sum of pipeline construction work area (includes the pipeline permanent right-of-way), additional temporary workspaces pipe yards, and temporary access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, pump stations, and valves.

Note:

Values in the table may not sum to totals and subtotals because of rounding.

MBS Site = Minnesota Biological Survey Site of Biodiversity Significance

Table 5.2.5-18. Minnesota Biological Survey Sites of Outstanding and High Biodiversity Significance within the Construction Work Area for the Applicant's Proposed Project in Minnesota

County	MBS Site Rank Impact	Description	Native Plant Communities Crossed	Conservation Status Rank	North Dakota Border to Clearbrook[a] (acres)	Clearbrook to Carlton[a] (acres)
Pennington	Norden 18 Outstanding Impact – widening of existing corridor	A long, narrow depression with rich fen and disturbed emergent marsh bordered by oak woodland on steep, sandy slopes.	Northern mixed cattail marsh	S2 – Imperiled	3.5	--
Hubbard	La Salle Creek High Impact – greenfield crossing	High-quality rare native plant communities immediately adjacent to La Salle Creek. The steep, forested valley slopes are mostly dominated by red and jack pine. The valley is a unique geological feature and has some of the most interesting terrain in this part of the state.	White Pine – white spruce – paper birch forest	S2 – Imperiled	--	0.6
			Sedge meadow	S4 or S5 – Not rare	--	0.5
			Black ash – (red maple) seepage swamp	S1S2 – Between critically imperiled and imperiled	--	5.1
			Extremely rich tamarack swamp	S4 – Not rare	--	1.9
Carlton	Automba 1 High Impact – widening of existing corridor	Excellent quality wetlands and good quality uplands.	Aspen – birch – basswood forest	S4 – Not rare	--	0.6
			Poor black spruce swamp	S5 – Not rare	--	0.9
			Northern mesic hardwood forest	S4 – Not rare	--	8.0
			Alder – (maple – loosestrife) swamp	S5 – Not rare	--	3.2
			Poor tamarack – black spruce swamp	S4 – Not rare	--	1.5
			Northern rich tamarack swamp (western basin)	S4 or S5 – Not rare	--	1.2
			Northern very wet ash swamp	S4 – Not rare	--	1.0
			Rich tamarack – (alder) swamp	S5 – Not rare	--	11.3

Notes:

[a] Applicant provided footprints for construction work area plus additional temporary workspaces. No outstanding or high MBS Sites are crossed between Carlton and the Wisconsin border.

MBS Site = Minnesota Biological Survey Site of Biodiversity Significance

"--" = no occurrence

Approximately 61 miles of the Applicant's proposed project would be constructed within new rights-of-way, creating a new corridor. Of this new corridor, 17 miles (28 percent) would cross moderate, high, and outstanding ranked MBS Sites, potentially fragmenting habitats within 14 MBS Sites (Table 5.2.5-19). Habitat fragmentation can increase edge habitats favored by some animals and avoided by others, and can create a barrier to movements for some animals (e.g., small mammals, amphibians, reptiles) while facilitating movements of others, especially predators. Interior forest-nesting songbird abundance, diversity, and reproduction rates can be depressed by fragmentation associated with linear developments (Jalkotzy et al. 1997). Forest fragmentation can also lead to increased nest parasitism by the brown-headed cowbirs (*Molothrus ater*).

Table 5.2.5-19. Estimated Fragmentation Impacts on Minnesota Biological Survey Sites of Biodiversity Significance for the Applicant's Proposed Project in Minnesota

Site of Biodiversity Significance Rating	Minnesota Biological Survey Site of Biodiversity Significance	Length Crossed (miles)
High	Unnamed	0.5
	Automba 1	<0.1
	La Salle Creek	0.6
Moderate	Unnamed	1.5
	Atkinson 36	0.4
	Automba 7	3.3
	Beaver 24	3.3
	Daggett Brook	0.5
	Draper Tower Forest	1.3
	Macville 31	3.2
	McGregor 8	0.9
	Spalding 3	0.5
	Venoah Lake	0.2
	White Elk East	0.3
	White Elk Lake	0.4
TOTAL		**16.9**

Source: Minnesota DNR 2016h.

Construction Impacts

Construction of the Applicant's proposed project would affect an estimated 877 acres of MBS Sites. Of these 877 acres, 7 acres (1 percent) would be in areas ranked outstanding, 78 acres (9 percent) would be in areas ranked high, and 792 acres (90 percent) would be in areas ranked moderate. These 877 acres would be directly affected by construction activities that may result in adverse modification of habitats present.

Construction activities would result in destruction of native plant communities (and rare plants) within the construction footprint. In turn, this would decrease the habitat available for rare animals that

depend on the MBS Site. Depending on whether the corridor goes through the edge or the interior of the MBS Site and whether there is an existing utility corridor, construction activities could decrease the size of the MBS Site, fragment the MBS Site, or widen an existing corridor. Utility corridors can be effective barriers to animal movements, especially small mammals, amphibians, and reptiles. The wider the corridor, the more animals likely to be affected. Construction activities also may temporarily affect the hydrology of wetlands within the construction work area.

Construction activities also would affect the portions of MBS Sites that are adjacent to the construction work area. Potential impacts due to surface runoff from the construction work area include increased sedimentation and the introduction or spread of invasive species. Sedimentation can affect surrounding uplands or wetlands, as well as waterways in the vicinity of the construction.

The Applicant has committed to preparation of the following plans, procedures, and general vegetation protection measures during construction to minimize impacts:

- Co-locate the construction within and near existing utility corridors to minimize environmental impacts;
- Co-locate the Project with existing rights-of-way where feasible;
- Minimize and confine all construction equipment and vehicles to the approved designated construction work area and additional temporary workspaces;
- Develop and adhere to Project-specific construction methods and procedures for vegetation clearing methods, including treatment of existing vegetation, topsoil segregation, storage, and reapplication;
- Restore preconstruction contours and use slope breakers, sediment barriers, mulch, geotextile fabric, and other erosion control devices to stabilize the disturbed areas during the vegetative regrowth phase and reduce runoff into the adjacent environment;
- Design and plan Project pipeline construction (e.g., parking, access, temporary work areas) to reduce environmental impacts on sensitive plant communities;
- Inspect and clean all equipment prior to bringing it to the site to prevent the introduction and spread of invasive species; and
- Use weed free mulch, topsoil, and seed mix.

Impacts on MBS Sites from construction activities would be short term (i.e., until vegetation cover is reestablished) and major given their occurrence along the Applicant's proposed project.

Operations Impacts

Operations would continue to affect an estimated 403 acres of MBS Sites. Vegetation maintenance to remove trees and large shrubs within the pipeline permanent right-of-way would reduce the habitat availability for rare animals. This would result in a permanent minor habitat loss and a permanent barrier or impediment to travel for some animals.

In addition, the pipeline corridor can provide easier access to more remote MBS Sites and may result in increased human use of the corridor and MBS Sites. This can negatively affect the ecological integrity of these MBS Sites by causing habitat degradation (e.g., operation of off-road vehicles in native plant communities) or by increasing the spread of invasive species.

Long-term vegetation management during operation would result in a major permanent change to MBS Sites.

Minnesota Scientific and Natural Areas

The Applicant's proposed project does not overlap any SNAs, therefore construction and operation of the project would have no impact on SNAs.

5.2.5.3.2 Continued Use of the Existing Line 3 Pipeline

Continued use of the existing Line 3 pipeline would not involve construction impacts as the pipeline is already built and in operation. Impacts on unique natural resources would be limited to continued operation of the pipeline, as discussed below.

Although most impacts would not increase above the level currently experienced, the number of integrity digs required for continued operation would increase, with an estimated 267 integrity digs per year required over the next 15 years. The impacts associated with the increased number of integrity digs would be expected to increase beyond those currently experienced, as described below.

Federally Listed Species

Federally listed threatened and endangered species that could occur within the ROI for the existing Line 3 pipeline and could be affected by operation include three mammals – Canada lynx, gray wolf, and northern long-eared bat; four birds – Kirtland's warbler, piping plover, rufa red knot, and whooping crane; three invertebrates - Dakota skipper, Poweshiek skipperling, and rusty patched bumble bee; and two plants – Fassett's locoweed and western prairie fringed orchid (Table 5.2.5-3).

- If federally listed species persist within the permanent pipeline right-of-way, impacts could continue from ongoing operations and maintenance activities such as mowing for vegetation management, equipment maintenance, invasive species control, and pipeline integrity excavations. These activities could result in direct mortality of non-mobile species if they are present during the activity. Increased noise and human disturbance could cause more mobile animals to leave the area; however, they would be expected to return when the activity ceases.

Periodic project-related noise and human/equipment activity associated with operations and maintenance activities could impact foraging and reproductive activities of individual Canada lynx and gray wolves. However, these impacts would be temporary and lynx and wolves would be expected to resume use of the area following the disturbance. Disturbance could also be caused by public and private use of all-terrain vehicles and snow machines along the permanent right-of-way. Operation of vehicles along the right-of-way could result in collisions with individual lynx or wolves. Minimization measures to reduce the potential for collisions could include operating equipment at speeds suitable for the driving conditions or posted speed limits. Use of the right-of-way for recreational purposes could potentially be reduced by limiting access through use of gates and posting of no trespassing signs, where appropriate. The probability of collisions with work vehicles during operations would be low. Therefore, no adverse impacts are expected as a result of collisions. Impacts to Canada lynx and gray wolf would be limited to periodic disturbance. Therefore, only temporary minor impacts on individuals of these species would be expected over the life of the project.

Operations and maintenance could continue to affect the northern long-eared bat from habitat loss or alteration (i.e., if trees are allowed to grow larger than 3 inch in diameter at breast height between tree maintenance events), disturbance from noise and human activity at aboveground facilities, and pipeline inspection overflights or ground surveillance. Human activities during operations, including increased integrity digs, typically occur during daylight hours; therefore, operations activities would not interrupt foraging nighttime activities. The resultant periodic impacts on the northern long-eared bat would continue to be temporary and negligible but would occur over the life of the Project. Operation of pipeline pump stations would be the same as current conditions and would not result in any additional impacts on northern long-eared bats.

Operations and maintenance activities in the vicinity of Superior, Wisconsin, that occur during the Kirtland's warbler breeding season (May through September) could affect foraging and reproductive activities. Vegetation clearing for integrity digs during the nesting season could result in loss of eggs or young, should individuals nest in the permanent right-of-way. As described above, piping plovers could occur near facilities in Superior. It is unlikely that Kirtland's warblers or piping plovers would use the developed habitats around the terminal; therefore, operations impacts would not be expected to increase beyond the current level, and potential impacts would be negligible. Operations activities would continue to have no effect on migrant rufa red knots or whooping cranes.

Operations activities, especially periodic mowing to prevent growth of trees and shrubs, could directly affect adults, eggs, or larvae if Dakota skipper, Poweshiek skipperling, or rusty patched bumble bee come in direct contact with equipment, personnel, or chemicals. These effects could include death, reduced reproduction, or displacement. While it is possible that these species could occur, it is unlikely that the prairie-dependent Dakota skipper or Poweshiek skipperling would be affected by operations activities.

The existing Line 3 pipeline crosses current high use areas for rusty patched bumble bee. Operations, including vegetation management and excavation for pipeline repair or replacement, could directly affect individuals and current high use areas. The following measures would minimize impacts on the rusty patched bumble bee within this high use area. Implementation of these measures would result in a minor permanent impact on the species:

- Limiting vegetation management in high-quality habitat during the active season (March through September).
- Leaving one or more areas unmowed for the entire year in vegetation management areas.
- Using a minimum of 8 to 10 inches cutting height to prevent disturbance of overwintering queens or nesting sites.
- Carefully applying and targeting pesticide use to control pests and invasive species, including:
  - Using the least toxic options and following label directions to ensure proper use.
  - Applying as locally and directly as possible, and avoiding broadcast application that may be harmful to the rusty patched bumble bee or their nectar plants in areas where the species is likely to be found.
  - Ensuring that field crews recognize target weeds to avoid adverse effects on important native plants (USFWS 2017).

If the federally listed Fassett's locoweed and western prairie fringed orchids persist within the permanent right-of-way, they could continue to be permanently affected by vegetation maintenance activities and by the increased level of integrity digs. However, given the disturbed nature of the existing right-of-way, these species are unlikely to be present, and no increase in ongoing impacts is anticipated.

- If the regulatory agencies determine that impacts on federally listed animals and plants would be greater than those currently occurring during operation of the Line 3 pipeline, the Applicant would consult with USFWS to develop measures to avoid or reduce those impacts and to ensure that any additional unavoidable impacts would not jeopardize the continued existence of species protected by the ESA.

State-Listed Species

Endangered and Threatened Species

State-listed endangered and threatened species that could occur within the ROI and could be affected by operation include one mammal – northern long-eared bat, one invertebrate – fluted-shell mussel, and one reptile – wood turtle (Table 5.2.5-6). Potential impacts on the northern long-eared bat are discussed above for federally listed endangered and threatened species. Of the 18 state-listed endangered and threatened plants known to occur within the ROI, 8 potentially occur within the permanent right-of-way and could be affected by operations. These include three in Minnesota – beaked spikerush, hair-like beak rush, and sterile sedge; and five in Wisconsin –clustered bur-reed, neat spike-rush, seaside crowfoot, small yellow-water crowfoot, and sweet colt's foot.

Continued operations impacts for the existing Line 3 would include ongoing vegetation management and pipeline integrity digs. If excavation of the stream crossing where the fluted-shell mussel has been reported to occur was required, short-term turbidity increases and potential destruction of individual mussels could occur. Vegetation management and pipeline excavation could continue to result in injury or mortality of wood turtle eggs or adults if these activities coincided with occupied habitats. The increased number of integrity digs per year required to continue operation of the existing Line 3 would increase the potential for impacts to occur.

If the regulatory agencies determine that impacts on state-listed animals and plants would be greater than those currently occurring during operation of the Line 3 pipeline, measures to avoid or reduce impacts would be developed in consultation with the appropriate state agencies to ensure that any unavoidable impacts would not jeopardize the continued existence of state-protected species. Given the increased need for excavation to repair or replace the pipeline (with an estimated 267 integrity digs required per year over the next 15 years), the potential exists for the excavations to coincide with state-listed species occurrences, resulting in minor permanent impacts on the fluted-shell mussel, wood turtle, and some state-listed plants. If state-listed plants occur where work is proposed, a take permit would be required. If there are no feasible alternatives to takes, compensatory mitigation could be required to offset the impact.

Special Concern Species

State-listed special concern species that could continue to be affected by operation of the existing Line 3 pipeline include nine vertebrates: three bats– big brown bat, little brown bat and northern long-eared bat; six birds – Connecticut warbler, Le Conte's sparrow, Nelson's sparrow, short-eared owl, trumpeter swan, and yellow rail; and four invertebrates: a caddisfly and three mussels – black sandshell, creek heelsplitter, and pink heelsplitter (Appendix M, Tables M-1 and M-2).

- Seventeen state-listed plants of special concern that could be affected by continued operation of the existing Line 3 pipeline include barren strawberry, blunt sedge, English sundew (*Drosera anglica*), false mountain willow, few-flowered spikerush, Lapland buttercup (*Ranunculus lapponicus*), least moonwort, mamillate spike-rush, McCalla's willow, mingan moonwort, northern single-spike sedge, northwestern sticky aster, pale moonwort, small white lady's slipper, St. Lawrence grapefern, twig rush, and Vasey's rush (Appendix M, Table M-3).

Of the three bats of special concern, only the northern long-eared bat has been documented to occur within the Line 3 permanent right-of-way; potential operations impacts on this species is addressed above for federally listed species.

Vegetation management and pipeline excavation could result in injury or mortality of state-listed bird eggs and nests if these activities coincided with occupied habitats during the breeding season. Of the six birds occurring within the ROI, four – Nelson's sparrow, short-eared owl, trumpeter swan, and yellow rail are known to occur within the permanent right-of-way. These species could experience an increase in impacts above the current level because of the increased number of integrity digs required for continued operation of the pipeline. The impact of each integrity dig would be temporary to short term and minor but would occur periodically over the life of the Project. If excavation of the stream crossings where the caddisfly and mussels are present is required for repair or replacement of a pipeline segment, the excavation would result in the loss of some individuals, and the increase in turbidity could affect caddisflies and mussels in the area. The impacts are expected to be temporary to short term and minor for each occurrence.

Special concern plants that persist within the permanent right-of-way could continue be affected directly or indirectly by vegetation management and pipeline repair or replacement if these activities coincided with populations of these plants. Twelve of the 17 plants of special concern occurring within the ROI also are known to occur within the permanent pipeline right-of-way (10 in Minnesota – barren strawberry, blunt sedge, false mountain willow, few-flowered spikerush, least moonwort, mingan moonwort, northern single-spike sedge, pale moonwort, small white lady-s slipper, and St. Lawrence grapefern; and 2 in Wisconsin – mamillate spike-rush and Vasey's rush [Appendix M, Table M-3]). Given the increased need for excavation to repair or replace pipe segments, the excavations have the potential to affect state-listed special concern plants. If there are no feasible alternatives to the integrity digs, these plants could be disturbed. Because these rare plants have, in many instances, persisted or reestablished after construction of multiple pipelines through the Mainline corridor shared by the existing Line 3 pipeline, impacts are likely to be short term and negligible.

Species of Greatest Conservation Need

Gap Analysis Program Species Models

The combined region-wide GAP species model data show the areas used by one or more protected or rare species. The distribution of low, medium, and high use areas for protected or rare mammal species indicates that 49 percent of the permanent right-of-way for the existing Line 3 pipeline could support medium to high use by these mammals (4 or more species). This relatively high proportion may reflect the widespread use of this area by Canada lynx, wolves, and several species of bats. By comparison, 14 percent of the permanent right-of-way for the existing Line 3 pipeline may support medium to high use by protected or rare birds (7 or more species). A total of 26 BCCs were identified as occurring within the ROI for federally listed species from the North Dakota border to Superior, Wisconsin (Appendix M, Table M-5).

The Line 3 permanent right-of-way contains minimal habitats used by protected or rare amphibians and reptiles (Table 5.2.5-20).

- The permanent right-of-way contains an estimated 1,797 acres of habitats used by one or more protected and rare mammal species, 1,987 acres used by one or more protected and rare bird species, and 393 acres used by one or more protected and rare amphibian and reptile species (Table 5.2.5-20). All of the existing Line 3 permanent right-of-way that crosses through these GAP habitats is within the Applicant's existing mainline pipeline corridor. Impacts on these habitats and animals from ongoing operations, should they persist within the permanent pipeline right-of-way, could result from mowing for vegetation management, pipeline maintenance, and invasive species control. The increased number of required integrity digs could increase impacts on these habitats. Operations activities could continue to result in direct mortality of non-mobile animals, if animals are present while the activity is occurring, with the potential for an increase in impacts based on the increased number of integrity digs. The increased noise and human disturbance from the increase in integrity digs could cause more mobile species to leave the area than currently occurs; however, these individuals would be expected to return when the activity ceases.

Table 5.2.5-20. GAP Species Models – Habitat Use Areas for Protected and Rare Mammals, Birds, Amphibians, and Reptiles within the Permanent Right-of-Way and Region of Interest for the Existing Line 3 Pipeline (acres)

GAP Species Groups	Operations[a]	Within 0.5 Mile
Mammals[b]		
Low	923	96,274
Medium	700	72,508
High	174	20,225
Subtotal	***1,797***	***189,007***
Proportion of medium and high	**49%**	**49%**
Birds[c]		
Low	1,715	184,674
Medium	271	24,202
High	0	239
Subtotal	***1,987***	***209,115***
Proportion of medium and high	**14%**	**12%**
Amphibians and Reptiles[d]		
Low	393	**46,391**
Medium	0	**17**
High	0	**0**
Subtotal	***393***	***46,407***
Proportion of medium and high	**0%**	**0%**

Table 5.2.5-20. GAP Species Models – Habitat Use Areas for Protected and Rare Mammals, Birds, Amphibians, and Reptiles within the Permanent Right-of-Way and Region of Interest for the Existing Line 3 Pipeline (acres)

GAP Species Groups	Operations[a]	Within 0.5 Mile

Sources: USGS GAP 2016a, 2016b.

[a] Estimated operations impact area based on 50-foot-wide permanent right-of-way centered on the pipeline

[b] Mammals – Low = 1 to 3 species, Medium = 4 to 6 species, High = 7 to 9 species

[c] Birds – Low = 1 to 6 species, Medium = 7 to 12 species, High = 13 to 19 species

[d] Amphibians and Reptiles – Low = 1 to 2 species, Medium = 3 to 6 species, High = 7 to 11 species

Minnesota's Wildlife Action Network

Approximately 608 acres (35 percent) of the permanent right-of-way for the Line 3 pipeline contains WAN habitats (Table 5.2.5-21). Most WAN habitats (75 percent) that are currently affected are rated low-medium and medium, and no WAN habitats affected by the Line 3 pipeline are rated high. All of the Line 3 pipeline permanent right-of-way that crosses through WAN habitats in Minnesota is located within the Applicant's existing Mainline pipeline corridor. Operations activities such as vegetation management and integrity digs for pipeline repair and replacement could continue to result in direct mortality of non-mobile animals and plants, if these species are present during the activity. The increase in integrity digs could increase the impacts on these habitats. The increased noise and human disturbance from the increase in integrity digs could cause more mobile species to leave the area than currently occurs; however, these individuals would be expected to return when the activity ceases.

Table 5.2.5-21. Impacts on Wildlife Action Network Habitats within the Permanent Right-of-Way and Region of Interest for the Existing Line 3 Pipeline in Minnesota (acres)

Wildlife Action Network Rating	Operations[a]	Within 0.5 Mile
Low	81.0	8,872.3
Low-medium	346.3	34,009.4
Medium	106.8	14,474.3
Medium-high	73.8	8,810.8
High	0	30.2
WAN TOTAL	**607.8**	**66,197.0**
Minnesota total	***1,742.5***	***210,080.0***
Proportion in WAN	***34.9%***	***31.5%***

Source: Minnesota DNR 2016f.

[a] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

WAN = Wildlife Action Network

Minnesota Biological Survey Sites of Biodiversity Significance

Operations currently occur within an estimated 305 acres of moderate to outstanding MBS Sites (Table 5.2.5-22). Most MBS Sites (76 percent) that occur within the permanent right-of-way for the Line 3 pipeline are rated high for biodiversity. All of the Line 3 pipeline permanent right-of-way that crosses MBS Sites in Minnesota is within the Applicant's existing Mainline pipeline corridor. Continuing

operations activities such as vegetation management and integrity digs for pipeline repair and replacement could continue to result in direct mortality of plants. The increase in integrity digs could increase the impacts on MBS Sites. Long-term vegetation management and increase in integrity digs during operation would result in a minor permanent change to MBS Sites.

Table 5.2.5-22. Estimated Operations Impacts on Minnesota Biological Survey Sites of Biodiversity Significance for the Existing Line 3 Pipeline in Minnesota (acres)

Site of Biodiversity Significance Rating	Operations[a]	Within 0.5 Mile
Outstanding	24.9	4,196.7
High	233.1	9,203.0
Moderate	46.9	26,918.8
MBS SITE TOTAL	**304.9**	**40,318.5**
Minnesota total	***1,742.5***	***210,080.0***
Proportion in MBS Sites	***17.5%***	***19.2%***

Source: Minnesota DNR 2016h.

[a] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline.

MBS Site = Minnesota Biological Survey Site of Biodiversity Significance

Minnesota Scientific and Natural Areas

The Wawina Peatland SNA (Minnesota DNR 2016d, 2016g) occurs within the ROI. The boundary for this SNA is approximately 0.4 mile northeast of the Line 3 pipeline, and a BNSF rail line lies between the SNA and the Line 3 pipeline. The continued use of the Line 3 pipeline would not affect this SNA.

5.2.5.3.3 System Alternative SA-04

Federally Listed Species

Federally listed threatened and endangered species that could occur within the ROI and could be affected by construction and operation of SA-04 include three mammals – gray wolf, Indiana bat *(Myotis sodalis*), and northern long-eared bat; two birds –rufa red knot and whooping crane; one reptile – eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*); seven invertebrates – Dakota skipper, Hine's emerald dragonfly (*Somatochlora hineana*), Poweshiek skipperling, Higgins eye mussel (*Lampsilis higginsii*), Iowa Pleistocene snail (*Discus macclintocki*), sheepnose mussel (*Plethobasus cyphyus*), and spectaclecase mussel (*Cumberlandia monodonta*); and eight plants – decurrent false aster (*Boltonia decurrens*), eastern prairie fringed orchid (*Platanthera leucophaea*), lakeside daisy (*Hymenoxys herbacea*), leafy prairie-clover (*Dalea foliosa*), Mead's milkweed (*Asclepias meadii*), northern wild monkshood (*Aconitum noveboracensel*), prairie bush-clover (*Lespedeza leptostachya*), and western prairie fringed orchid (Table 5.2.5-9). One candidate for listing as threatened or endangered, the rattlesnake-master borer moth (*Papaipema eryngii*), also potentially occurs within the ROI and could be affected by construction and operation.

<u>Construction Impacts</u>

Foraging and reproductive activities of gray wolves could be affected by exposure to Project-related noise and increased human activity. Construction of a pipeline likely would displace a few gray wolves and alter used habitats, especially if packs currently use the existing rights-of-way as travel corridors. If dens are present in the vicinity, construction-related disturbance could reduce pup survival. In addition,

wolf-vehicle collisions continue to be a major contributor to wolf mortality. Typical conservation measures to reduce impacts on the gray wolf include:

- Observe vehicular speed limits during construction. Where speed limits are not posted, vehicles and equipment should be operated at speeds suitable for driving conditions. Stop construction activities if the contractor or EI observes a gray wolf or possible den site within the construction corridor, or if USFWS notifies the Applicant of a gray wolf sighting within 1 mile of the construction work area; the stop work order for that area of construction should continue until the wolves leave the area.
- Report any wolf sightings immediately to USFWS, USACE, and state resource agencies (e.g., Minnesota DNR).

Indiana bats have the potential to occur along approximately 103 miles of the Illinois portion of SA-04; the rest of the route is outside of their known range (USFWS 2015). If these bats are present in the construction work area, impacts could occur if clearing or construction occurs when bats are using summer roosts. Bats could be disturbed by noise or human presence, causing them to abandon occupied tree cavities; or they could be injured or killed if occupied trees are cut down. Impacts could be substantial if trees with maternity colonies are destroyed or abandoned. Although short-term minor to major impacts could result from construction, implementation of measures to avoid cutting occupied roost or maternity trees when bats may be present during the summer would result in temporary and minor impacts.

Impacts on individuals or colonies of northern long-eared bats may occur if clearing or construction occurs when bats are using summer roosts. Northern long-eared bats could be disturbed by noise or human presence, causing them to abandon occupied trees. Bats could be injured or killed if occupied trees are cut down. Impacts could be substantial if trees with maternity colonies are destroyed or abandoned. Because the population of northern long-eared bats is declining from white-nose syndrome and destruction of habitat, among other factors, the protection of these bats—and particularly of groups of female and juvenile bats in maternity colonies—is of critical importance.

Conservation measures associated with the ESA 4(d) rule that would reduce potential impacts on northern long-eared bats include:

- Maintain a year-round 0.25-mile radius buffer (which is equivalent to 125.7 acres) around known northern long-eared bat hibernacula.
- Protect known, occupied maternity roost trees. Incidental take is prohibited if the activity cuts or destroys a known, occupied maternity roost tree, or any other trees within a 150-foot radius around a known maternity roost tree, equivalent to 1.6 acres, during the pup season from June 1 to July 31.

The rufa red knot may use wetlands, cultivated fields, or waterbodies in the ROI as migratory stopover habitat. Construction activities have the potential to disturb rufa red knots, especially if disturbance coincides with important migration stopover locations. Noise or presence of humans and equipment during construction could cause rufa red knots to startle and flush from wetlands or fields, or cause them to avoid the area. Short-term impacts to wetlands and cultivated fields from clearing during construction could affect the availability of foraging and sheltering habitats. However, the abundance of wetlands in the vicinity of SA-04 suggests that short-term impacts on a small number of these habitats

would not limit the overall availability of stopover habitat for rufa red knots, and impacts on an individual bird's survival or reproductive capacity would be negligible. The following conservation measures would reduce impacts on the rufa red knot:

- Stop construction if the contractor or EI observes a rufa red knot within 1 mile of the construction work area, or if USFWS notifies the Applicant of a rufa red knot sighting within 1 mile; the stop order should continue until the birds have left the area.
- Report any sightings of rufa red knot within the construction work area immediately to USFWS. The Applicant must provide EIs with preconstruction training in identification of rufa red knots and have photos of the species onsite to aid in identification.
- Restore wetlands crossed by the pipeline to preconstruction contours to avoid long-term impacts on the rufa red knot's migratory stopover habitat.

Whooping cranes could occur in the ROI for SA-04 during spring and fall migrations. Noise and activity during construction could displace whooping cranes from stopover habitats during foraging or in wetlands or riverine habitats during roosting. Whooping cranes generally depart from wintering grounds during late March to mid-April and return from breeding grounds beginning in mid-September. The eastern population travels north through Georgia, Tennessee, Kentucky, Indiana, and Illinois to Wisconsin. During migration, whooping cranes use croplands and shallow wetlands for stopover foraging and roosting habitats. The Aransas-Wood Buffalo Park whooping crane population migrates between wintering grounds in Aransas NWR to breeding grounds in Wood Buffalo National Park in northern Alberta. The migration corridor for this population crosses through central Oklahoma, Kansas, Nebraska, South Dakota, and North Dakota. Potential construction impacts could include disturbance to foraging or roosting birds during migration periods (USFWS 2009). Potential foraging and roosting habitats for whooping cranes could occur along SA-04 in North Dakota and Illinois, although it is unlikely that Project activities would coincide with the occurrence of whooping cranes. If their occurrence did overlap construction, effects on whooping cranes would be negligible.

The eastern massasauga rattlesnake could occur in the ROI along the Minnesota and Illinois portions of SA-04, within wetlands and adjacent upland areas. For construction, this represents 3 percent of the overall construction work area in Minnesota and less than 1 percent in Illinois. Construction activities such as vegetation clearing, grading, and trenching could result in direct mortality of individuals of the species if they are present during the activity. During winter, massasaugas hibernate in the aquatic environment and could be affected by fluctuating water levels associated with dewatering, trenching, surface water withdrawals and discharges, and surface water crossings. If water fluctuations occur in winter in the vicinity of massasaugas hibernacula, it could result in direct mortality of individuals due to exposure to sub-freezing temperatures and dehydration (Johnson et al. 2000). If massasaugas are present and fluctuations occur, the overall impact would be temporary and minor.

If present, individuals of the Dakota skipper, Poweshiek skipperling, and rattlesnake-master borer moth could be affected by construction activities that disturb native vegetation. These activities would disrupt egg laying and foraging during spring and summer, and could crush dormant larvae during fall and winter. These prairie-dependent insects depend on high-quality native grasslands and tallgrass prairies to provide food from flower pollen and nectar. Vegetation clearing and replacement with non-native ground covers could injure or kill individuals of these butterflies and moths, and would remove forage plants. While it is possible that these invertebrates could be present along the construction work area, no habitat or presence/absence surveys have been conducted within SA-04. Direct construction impacts

on these populations would be temporary. SA-04 is sited to follow existing pipeline, transmission line, or road corridors; consequently, potential impacts, habitat loss, and habitat fragmentation would be minimized. If these species are present, impacts from construction activities would be temporary to short term and minor.

The Hine's emerald dragonfly could occur in the ROI in Illinois; however, SA-04 does not pass through, or come near, any of the counties in which the dragonfly is believed to occur (Cook, DuPage, and Will counties); therefore, it is unlikely these dragonflies or their habitats would be affected by pipeline construction.

If present, protected mussels could be affected by construction activities that increase turbidity and sedimentation, which could bury them. In addition, mussels may be crushed or suffocated by open-cut construction methods for surface water crossings. The spread of invasive zebra and quagga mussels also could smother native mussels if introduced during construction. The Higgins eye, sheepnose, and spectaclecase mussels occur primarily in large rivers in the upper Mississippi River drainage. Although the waterbody crossing methods are not known for SA-04, large rivers where these mussels are most probably present likely would be crossed by HDD, and no impacts on mussel-occupied substrates would occur. HDD requires the use of water-based drilling fluid to cool the cutting tools and remove soil/bedrock cuttings. Inadvertent releases of HDD water-based drilling fluid could affect surface water resources. However, HDD water-based drilling fluid would primarily consist of naturally occurring materials, such as bentonite, which in small quantities would not be detrimental to water quality. Trenched crossings through mussel-occupied rivers would result in increased turbidity and could result in direct disturbance of the mussel beds. These disturbances are expected to be minor, localized, and temporary. Therefore, impacts on federally listed mussel populations from construction would range from no effect to short-term and negligible impacts.

Federally listed plants potentially occurring within the ROI include six prairie-dependent species—decurrent false aster, eastern prairie fringed orchid, leafy prairie-clover, Mead's milkweed, prairie bush-clover, and western prairie fringed orchid. One federally listed native prairie plant—the leafy prairie-clover—has been identified within the ROI but is outside of the construction work area where it could be directly affected by construction. If federally listed plants occurred within the construction work area, direct impacts could include trampling and destruction during grubbing, grading, and trenching. Indirect effects could include conversion of already fragmented prairie habitat into other habitat types and the spread of noxious weeds and invasive plants. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction.

Impacts on prairie soils from construction would be long term and could require a substantial amount of recovery time, which could affect any prairie-dependent plants present. The lakeside daisy may occur on limestone or dolomite outcrops crossed by the construction work area in Illinois. If these habitats are crossed and the lakeside daisy occurs, local reintroduced populations could be damaged.

The Iowa pleistocene snail and northern wild monkshood occur on algific (cold air) talus (loose rock) slopes, which are usually north-facing; they occur where air circulates over underground ice, producing a constant stream of cold moist air through vents to the slope. These rare karst cold microclimate habitats support rare plants and animals. Potential algific talus slope habitats occur in Iowa and Illinois. Natural heritage data for the area within the ROI in Iowa and Illinois did not indicate that any of these

rare habitats would be crossed by the construction work area of SA-04. If any algific talus slope habitats are crossed, these federally listed species and the geologic conditions that support them could be damaged, and additional avoidance measures likely would be required.

Summary

Measures to avoid or reduce construction impacts on federally listed animals and plants would be developed in consultation with USFWS to ensure that any unavoidable impacts would not jeopardize the continued existence of species protected by the ESA. The gray wolf could experience temporary minor effects associated with construction activities in North Dakota. Indiana and northern long-eared bats could experience construction impacts on occupied maternity roost trees during the summer along SA-04. With implementation of general conservation measures associated with the ESA 4(d) rule, impacts on these bats during construction would be temporary and minor. Rufa red knot and whooping crane could occur within the construction work area during spring and fall migrations, but it is unlikely that construction would disturb these birds or affect significant foraging or roosting habitat along SA-04. Consequently, negligible impacts are expected. Although construction could affect the eastern massasauga rattlesnake, with implementation of standard conservation measures, impacts would be minor and temporary. Construction through occupied remnant prairie habitats, if they are present within the construction work area, could result in temporary and minor impacts on prairie-dependent insects and plants. If determined to be present, these federally listed insects and plants could be injured or destroyed; this likely would require development of additional avoidance or conservation measures. Most large rivers where federally listed mussels are likely to occur would be crossed using HDD, which would result in no effects on protected mussels. Construction through rocky outcrops occupied by the lakeside daisy could result in permanent major impacts on this federally protected plant if the daisy occurs at these habitats in Illinois. There would be no effects on the Iowa Pleistocene snail or the northern wild monkshood.

Operations Impacts

Project-related noise and increased human activity during operation and maintenance activities could interrupt gray wolf foraging and reproductive activities. Post-construction disturbances, such as public and private use of all-terrain vehicles and snow machines along the right-of-way, could reduce wolf habitat suitability. In addition, wolf-vehicle collisions continue to be a major contributor to wolf mortality. Based on the highly mobile nature of wolves, the transient nature of the disturbance, and wolves' use of a variety of habitats, impacts on wolves from operations would be temporary and minor over the life of the Project.

Operations impacts on the Indiana bat and northern long-eared bat could include continued habitat loss or alteration (i.e., if trees are allowed to grow larger than 3 inch in diameter at breast height between tree maintenance events) and disturbance from noise and activity at aboveground facilities, during pipeline inspection overflights or ground surveillance, and during right-of-way maintenance activities. Human activities during operation would typically occur during daylight hours; therefore, operations activities would not interrupt nighttime foraging activities and impacts would be permanent and negligible. Operation of pipeline pump stations could increase nearby noise levels over existing ambient levels; however, as described in Section 6.2.2, sound level increases would comply with Minnesota Noise Standards and would decrease over distance. Pump station footprints would be devoid of trees, so while bats could forage in the vicinity, they would not roost at the pump station sites. Unless roost sites are near a pump station, the effects on Indiana and northern long-eared bats from operation of pump stations would be permanent and negligible.

Operations activities such could result in direct mortality to the eastern massasauga rattlesnake if they are present within the areas where mowing and integrity digs occur. However, vegetation management activities, if managed correctly, also could benefit the eastern massasauga rattlesnake by opening up and maintaining basking areas along the right-of-way. The following conservation measures identified by Johnson et al. (2000) could reduce mortality of the eastern massasauga rattlesnake associated with operation of SA-04:

- Raise mowers so that vegetation is cut no lower than 4 to 6 inches above the ground.
- Mow during periods when snakes are less active, preferably before snakes become active in spring or after activity has ceased.
- Mow during periods of the day when snakes are inactive, mainly between 11 am and 3 pm during summer.

Migrant rufa red knot and whooping cranes could be in the area during operation activities. Given the occurrence of stopover habitat along the route, they would not be limited by habitat availability during intermittent pipeline operation and would not be affected.

Habitat and occurrence surveys have not been completed for native prairie-dependent insects – Dakota skipper, Poweshiek skipperling, and rattlesnake-master borer moth; and plants – decurrent false aster, eastern prairie fringed orchid, leafy prairie-clover, Mead's milkweed, prairie bush-clover, and western prairie fringed orchid. Maintenance activities, especially periodic mowing, have the potential to affect adults, eggs, or larvae directly if the species come in contact with equipment, personnel, or chemicals. These effects could include death, reduced reproduction, or displacement. While it is possible that these species could occur, it is not likely; therefore, potential impacts on prairie-dependent insects and plants would be permanent but at most negligible.

No operations impacts on the federally listed mussels are likely. However, if a segment of pipe needs repair or replacement at a surface water crossing that was constructed using the wet or dry open-cut method, an impact on mussels is possible similar to that described above for construction. No operation impacts on the Iowa Pleistocene snail or the northern wild monkshood are expected.

If they persisted in the permanent right-of-way, federally listed native prairie plants could be permanently affected by vegetation maintenance activities. The leafy prairie-clover was identified within the ROI for SA-04 but was outside of the construction work area and permanent right-of-way. The lakeside daisy would not be impacted by operations, because there is no suitable habitat for this plant along SA-04. Rare plant habitat and presence/absence surveys have not been completed for SA-04. If federally listed plants occur within the construction work area, additional avoidance and conservation measures could be required.

Summary

All federally listed animals and plants occurring in the ROI could be indirectly affected by habitat loss and alteration resulting from maintenance of the permanent right-of-way. However, the SA-04 pipeline would follow existing rights-of-way that previously have experienced disturbance from maintenance activities. The gray wolf, due to its transient nature, would experience temporary minor impacts that could occur throughout the life of the Project. Impacts on Indiana and northern long-eared bats would be permanent and negligible. With implementation of appropriate conservation measures, impacts on the eastern massasauga rattlesnake would be short term and minor. Prairie-dependent insects and

plants would be unlikely to be affected by operations activities and would experience permanent and at most negligible impacts. The lakeside daisy would not be impacted by operations, because there is no suitable habitat for this plant along SA-04. Listed mussels, the Iowa Pleistocene snail, and the northern wild monkshood would not be affected by operation of SA-04.

State-Listed Species

Endangered and Threatened Species

State-listed endangered and threatened species that could be affected by construction and operation of SA-04 include 17 vertebrates, 13 invertebrates, and 22 plants (Tables 5.2.5-10 and 5.2.5-11; Appendix M, Tables M-1 to M-3).

State-listed vertebrates include one mammal – the northern long-eared bat; five birds – burrowing owl, chestnut-collared longspur (*Calcarius ornatus*), king rail (*Rallus elegans*), loggerhead shrike (*Lanius ludovicianus*), and upland sandpiper (*Batramia longicauda*); three reptiles – Blanding's turtle (*Emydoidea blandingii*), ornate box turtle (*Terrapene ornata*), and plains hog-nosed snake (*Heterodon nasicus)*; and eight fish – American brook lamprey (*Lampetra appendix*), banded killifish (*Fundulus diaphanous*), black buffalo(*Ictiobus niger*), blacknose shiner (*Notropis heterolepis*), greater redhorse (*Moxostoma valenciennesi*), pallid shiner (*Hybopsis amnis*), river redhorse (*Moxostoma carinatum*), and slender madtom (*Noturus exilis*). Potential impacts on the northern long-eared bat are addressed for federally listed endangered and threatened species. The state-listed invertebrates are dominated by aquatic mollusks, but the redveined prairie leafhopper (*Aflexia rubranura*) and regal fritillary butterfly (*Speyeria idalia*) also could be affected during construction (Table 5.2.5-10; Appendix M, Table M-1).

Botanical surveys were not conducted along SA-04. Based on Minnesota DNR NHIS data (Minnesota DNR 2016e), there are no known occurrences of Minnesota-protected plants within the SA-04 construction work area.

Construction Impacts

State-listed birds that could be affected by construction of SA-04 include the burrowing owl, chestnut-collared longspur, king rail, loggerhead shrike, and upland sandpiper.

The eastern extent of the summer breeding range for the burrowing owl includes North Dakota, South Dakota, and the western edge of Minnesota. One NHIS-documented occurrence of burrowing owls in Minnesota is within the ROI and is likely in the construction work area. Burrowing owls occur in open grasslands, especially prairies and savanna, where they nest in abandoned burrows of prairie dogs and ground squirrels. If construction occurs through this area and burrowing owls are present, construction could destroy burrow structures; if construction occurs during the nesting season (from mid-March through September) and burrowing owls are present, it could disrupt breeding and destroy eggs or young within the burrows. Construction activities near active nest burrows could result in abandonment of active nests (Klute et al. 2003). If construction occurs outside of the nesting season, impacts on burrowing owls would be negligible based on their limited known occurrence and habitat availability.

Chestnut-collared longspurs also are ground-nesting, prairie-dependent birds that occur in a few western Minnesota counties. They arrive in Minnesota around April 15 from wintering areas in the southern United States and northern Mexico. Nests are constructed on the ground under a clump of grass. One occurrence of the species is documented in Traverse County, Minnesota, within the ROI; although the site may no longer be occupied. The construction work area for SA-04 occurs within an

existing pipeline corridor outside of the prairie habitat where this sighting occurred, and construction is not likely to result in habitat loss or disturbance to the chestnut-collared longspur.

The king rail's breeding range extends from southeast North Dakota through Illinois; they do not occur in northern North Dakota. There is one NHIS-documented occurrence of a king rail in Illinois within the ROI, but there are no known occurrences within the construction work area. King rails are ground nesters associated with freshwater marshes but can adapt to a variety of habitats that support vegetation and are frequently wet. If the species is present, construction occurring in these habitat types during the nesting season from May through July could disrupt breeding and destroy eggs, while construction post-hatch could kill or disrupt young within nests. If construction occurs outside of the nesting season, impacts on king rails would be negligible based on their limited known occurrence within the construction area.

The entire extent of SA-04 occurs in the loggerhead shrike's summer breeding range. However, there are only three NHIS-documented occurrences of loggerhead shrikes within the ROI, with no known occurrences within the construction work area. Loggerhead shrikes nest in trees or brush associated with open areas containing upland grasslands and agricultural areas; they use both native and non-native grasslands. Loggerhead shrikes could be disturbed by noise or human presence, causing them to abandon occupied nests. If nest trees or shrubs are cut down, eggs or young could be injured or killed. Based on their limited known occurrence in the ROI, impacts on loggerhead shrikes would be at most temporary and negligible during construction, if construction occurs during the breeding season. If construction occurs outside of the breeding season, loggerhead shrikes would not be affected.

The entire extent of SA-04 occurs in the upland sandpiper's summer breeding range. However, there is only one NHIS-documented occurrence of an upland sandpiper within the ROI, and no known occurrences within the construction work area. Upland sandpipers are ground-nesting birds that prefer hayfields and pastures, but they also occur in open grasslands in the absence of preferred habitat. Construction in these habitat types during the nesting season from May through July could disrupt breeding and destroy eggs, while construction post-hatch could kill or disrupt the young within nests. If construction occurs outside of the nesting season, impacts on upland sandpipers would be temporary and negligible based on their limited known occurrence within the construction area.

Reptiles that could be affected by construction of SA-04 include Blanding's turtle, ornate box turtle, and plains hog-nosed snake.

Blanding's turtles do not occur in North Dakota but could occur along the rest of SA-04. There are five NHIS-documented occurrences of Blanding's turtles within the ROI and one occurrence within the construction work area. Blanding's turtles use a variety of wetland types as well as upland areas. They overwinter in bottom mud of marshes, ponds, and streams; use wetlands upon emergence from overwintering sites. Due to their year-round residence, construction activities occurring near wet habitat types, regardless of season, could crush and kill turtles. Uplands are also used for nesting, basking, periods of dormancy, and traveling between wetlands. Blanding's turtles may be affected through direct fatalities or habitat disturbance/destruction due to dewatering, excavation, fill, or other construction activities associated with the Project. Any added mortality can be detrimental to populations of Blanding's turtles, as these turtles have a low reproduction rate that depends upon a high survival rate to maintain population levels. Minnesota DNR recommendations to minimize disturbance include, but are not limited to, the following measures: avoid filling or dewatering wetlands during the winter, implement stringent erosion control methods, use wildlife-friendly erosion control methods, and

monitor for turtles during construction. Provided the implementation of applicable measures, construction-related impacts on Blanding's turtles would be short term and minor.

The ornate box turtle could occur along the Illinois and Iowa portions of SA-04; this turtle does not occur in Minnesota or North Dakota. Within Illinois and Iowa, there are three NHIS-documented occurrences within the ROI; within Illinois, one of these occurrences is within the construction work area. Ground-disturbing construction activities in sandy dune habitat could affect nests, resulting in abandonment or mortality of both adults and young. Construction activities also could result in the loss of foraging habitat. Turtles may be injured or killed by collisions with construction vehicles. The following conservation measures identified by Iowa DNR (2016b) could reduce impacts on the ornate box turtle. Assuming that these measures are followed, construction impacts on the ornate box turtle would be negligible.

- Watch sand dunes between May 29 and June 12 from 9 pm to 2 am to identify the presence of nest-building turtles. If turtles are identified within the construction work area, work with Iowa DNR to protect nests.
- Construction and operation vehicles should be aware of road crossing locations for ornate box turtles between April and September.

The plains hog-nosed snake could occur along the entire extent of the SA-04 pipeline. There is one NHIS documented occurrence of a plains hog-nosed snake within the ROI; however, no occurrences have been documented within the construction work area. Habitats used by this species include open, sparsely vegetated areas with sandy or gravelly soils, such as prairies, sandhills, and river floodplains. Females lay eggs from May to August (mainly in June and July), and hatching occurs approximately 2 months later. This snake overwinters in underground burrows. Because of their year-round residence, construction activities occurring near their preferred habitat types, regardless of season, could crush and kill plains hog-nosed snakes. Construction-related impacts would be short term and minor.

State-protected fish that could be affected by construction of SA-04 include the American brook lamprey, banded killifish, black buffalo, blacknose shiner, greater redhorse, pallid shiner, river redhorse, and slender madtom. For each of these species, at least one known NHIS-documented occurrence is within the ROI, and some known occurrences are within the construction area. While these species occupy different habitat types, general impacts from construction activities in the vicinity of surface waters would be similar for all of them; therefore, this assessment does not separate potential effects by species.

Use of open-cut crossings of streams where these state-listed fish occur could result in mortality of these species. Fine sediments introduced during open-cut crossings can suffocate fish eggs and newly hatched larvae living in gravel. The sediments also can abrade the sensitive gill membranes of young and adult fish, resulting in injury or death. Sedimentation can cause reductions in prey availability or the ability of fish to locate prey or escape predation, leading to increased energy expenditure for foraging and increased mortality. Removal of water from waterbodies for hydrostatic testing can result in entrainment of small fish, eggs, and macroinvertebrates during extraction. Spawning fish could be affected through decreased water levels, displaced spawning habitat, and water quality degradation. Fish eggs could desiccate if water levels drop too low, or the eggs could become entrained within test water. They may experience delayed development due to impaired water quality. Larval and juvenile fish could be affected through entrainment during water withdrawal, decreased survival under conditions of poor water quality, and reduced prey availability. Contaminated construction equipment

and water used for hydrostatic testing could introduce invasive aquatic animals such as zebra and quagga mussels that could displace and reduce habitat quality for these species. Hydrostatic waters would be discharged in a manner that avoids the use of waterbodies with commercially or recreationally important species as intake sources. Impacts on fish due to water crossings would be temporary to short term and minor because of the localized nature of the activity.

Construction effects on invertebrates for SA-04 would be similar to those described for the Applicant's proposed project. Disturbance to the stream bottom during surface water crossings could crush or suffocate mussels, and would temporarily increase turbidity that could reduce feeding efficiency and damage these sensitive aquatic animals that are in the vicinity of the crossing. Contaminated construction equipment and water used for hydrostatic testing could introduce invasive aquatic animals such as zebra and quagga mussels that could displace and reduce habitat quality for aquatic animals. EIs would monitor construction activities, ensuring compliance with permit conditions and reducing the potential for introduction of invasive species from contaminated equipment.

If state-protected insects are present, they could be affected by construction activities that disturb native vegetation. These activities would disrupt egg laying and foraging during spring and summer, and could crush dormant larvae during fall and winter. These insects depend on high-quality native grasslands and tallgrass prairies to provide food from flower pollen and nectar. Vegetation clearing and replacement with non-native ground covers could injure or kill the redveined prairie leafhopper and regal fritillary butterfly, as well as removing forage plants for these species. Overall, given the limited presence of native prairie in the construction work area, impacts on invertebrates during construction of SA-04 would be temporary and minor.

Of the 22 state-listed endangered or threatened plants that occur within the ROI, four – broomrape, false mallow, plains sedge, and quillwort occur within the construction work area for SA-04. The listed plants in the construction footprint could be destroyed during grubbing, grading, and trenching; and their habitats could be degraded by the introduction or spread of noxious weeds and invasive plants. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction.

Permanent major impacts on individuals of the broomrape, false mallow, plains sedge, and quillwort could occur because of their occurrence within the construction work area. Rare plants surveys have not been completed for SA-04, and additional state-listed plants may occur within construction work areas if suitable habitat is present. However, given the habitat conversion that has occurred in the southern and western portion of Minnesota, there is limited suitable habitat for these species in this part of the state. All of the Minnesota protected plants found in the ROI are associated with native prairie or calcareous fens, and there are only two known occurrences of native prairie remnants in the construction work area (a delineated native prairie remnant within a moderate rated MBS Site in Traverse County and a native prairie remnant in a railroad right-of-way in Mower County). As such, it may be possible to avoid most impacts on Minnesota state-listed threatened or endangered plants. If state-protected plants are present, the plants would be affected by construction. Measures to avoid or reduce construction impacts on state-listed animals and plants would be developed in consultation with the appropriate state agencies, if required, to ensure that any unavoidable impacts would not jeopardize the continued existence of state-protected species.

Summary. Aquatic species and insects would experience temporary minor impacts from construction. Provided measures to minimize disturbance are implemented, impacts on the Blanding's turtles and plains hog-nosed snake would be short-term and minor. Implementation of conservation measures would reduce impacts on the box turtle to temporary and negligible. Due to the limited occurrence of state-listed birds or suitable habitats along SA-04, impacts on state-listed birds would be temporary and negligible. Permanent, major impacts would occur to individuals of the broomrape, false mallow, plains sedge, and quillwort. Individuals of the remaining plant species occurring within the ROI would not be impacted because they do not occur in the construction work area.

Operations Impacts

Vegetation management that prevents trees and large shrubs from reestablishing within the permanent right-of-way adjacent to streams could increase stream temperatures by removing shade, which would reduce habitat suitability for aquatic animals. Maintenance activities in and around surface waters also could crush Blanding's turtle adults, nests, and eggs. Upland maintenance activities and vehicle use could crush ground-nesting bird eggs and young (burrowing owl, chestnut-collared longspur, king rail, and upland sandpiper), and ornate box turtle and plains hog-nosed snake nests and eggs, as well as adult turtles and invertebrates. State-listed plants that persist within the permanent right-of-way could be permanently affected by vegetation management activities. Given their limited distribution within this area, overall impacts would be minor. All state-listed species could be indirectly affected by habitat loss and alteration resulting from maintenance of the permanent right-of-way. However, SA-04 would follow existing rights-of-way that have been periodically disturbed by maintenance activities. Given the limited potential for occurrence of state-listed species and the identified conservation measures, impacts from operation on state-listed endangered and threatened species would be expected to be negligible to minor and permanent.

Special Concern Species

State-listed special concern species that could be affected by construction and operation of SA-04 include 12 vertebrates, 9 invertebrates, and 20 plants (as listed in Appendix M, Tables M-1 to M-3). State-listed special concern vertebrates include six birds – Acadian flycatcher (*Empidonax virescens*), bald eagle (*Haliaeetus leucocephalus*), cerulean warbler, greater prairie-chicken, Louisiana waterthrush, and marbled godwit; two reptiles – North American racer (*Coluber constrictor*) and smooth softshell (*Apalone mutica*); and four fish – blue sucker (*Cycleptus elongatus*), least darter, Ozark minnow (*Notropis nubilus*), and redfin shiner (*Lythrurus umbratilis*) (Appendix M, Table M-2). State-listed special concern invertebrates include six arthropods – two jumping spiders (*Marpissa formosa* and *Phidippus pius*), Iowa skipper (*Atrytone arogos iowa*), leadplant flower moth (*Schinia lucens*), redveined prairie leafhopper, and regal fritillary; and three mussels – black sandshell, creek heelsplitter, and round pigtoe (*Pleurobema sintoxia*) (Appendix M, Table M-1).

Twenty state-listed special concern plants could be affected by construction and operation of SA-04, including a lichen (*Buellia nigra*), American ginseng (*Panax quinquefolius*), buffalo grass, cleft phlox (*Phlox bifida*), cutleaf ironplant (*Xanthisma spinulosum var. spinulosum*), flat top white aster (*Aster pubentior*), grassleaf rush (*Juncus marginatus*), green dragon (*Arisaema dracontium*), Kentucky coffee tree (*Gymnocladus dioica*), nodding wild onion (*Allium cernuum*), plains wild indigo, rattlesnake master (*Eryngium yuccifolium*), sage willow (*Salix candida*), small fringed gentian (*Gentianopsis procera*), small white lady's slipper, snow trillium (*Trillium nivale*), soft rush (*Juncus effusus*), swamp thistle (*Cirsium muticum*), valerian (*Valeriana edulis var. ciliata*), and white wild indigo (*Baptisia lactea* var. *lactea*). Of the 20 special concern plants, three occur within the construction work area: buffalo grass, plains wild indigo, and small white lady's slipper (Appendix M, Table M-3).

Construction Impacts. Of the special concern birds, construction of SA-04 would have the greatest potential to affect the bald eagle. This species potentially occurs within the construction work area during the nesting period. Other special concern birds that occur within the ROI during breeding could be affected by disturbance from activities within the construction work areas. Vegetation clearing and grading during breeding could cause loss of eggs or young of these birds, resulting in short-term major impacts if these special concern birds nest within the construction work area.

Reptiles that could be affected by construction of SA-04 include the North American racer and the smooth softshell turtle. There are two NHIS-documented occurrences in the ROI for the North American racer and one occurrence of the smooth softshell. North American racers occupy a variety of habitats in southeastern Minnesota, including forested hillsides, bluff prairies, grasslands, and open woods. These snakes emerge from hibernation during late April; breed in May and early June; and lay eggs under rotting logs, in stumps, or in mammal burrows in late June or early July. Snakes could be injured or killed during vegetation clearing and grading, run over by vehicles, or trapped and buried within the pipeline trench. Inspecting and removing wildlife from the trench prior to backfilling would reduce injuries to snakes.

Smooth softshell turtles inhabit large rivers and use sandy beaches for nesting habitat. Eggs are laid on sandbars and riverbanks from June to early July. Most large rivers would be crossed using the HDD method; consequently, suitable habitats and individual smooth softshell turtles would not likely be affected. Construction of HDD crossings during nesting could disrupt nesting if the entry or exit pits are installed within sandy areas used by the turtles; however, most pits likely would be excavated at a sufficient distance from the water to avoid those areas. Impacts on smooth softshell turtles during construction would be short term and negligible.

Construction of waterbody crossings has the potential to affect aquatic animals, including mussels—black sandshell, creek heelsplitter, round pigtoe and fish—blue sucker, least darter, Ozark minnow, and redfin shiner that have been documented within the ROI for the Applicant's proposed project and could occur within surface waters crossed by SA-04. Construction of surface water crossing using the wet or dry open-trench methods could result in injury or death, in addition to short-term increases of turbidity and sedimentation. Of these special concern aquatic animals, black sandshell, round pigtoe, blue sucker, least darter, and Ozark minnow likely would occur at the crossing locations. Construction impacts on these aquatic animals would be short term and negligible to major, depending on animal presence and the type of crossing method used.

Vegetation clearing and site grading through native grassland habitats could impact individuals of the prairie-dependent jumping spiders (*Marpissa formosa* and *Phidippus pius*), Iowa skipper, leadplant flower moth, redveined prairie leafhopper, and regal fritillary. These insects depend on high-quality native grasslands and tallgrass prairies to provide food from flower pollen and nectar. High-quality native prairie habitats are not expected to occur within the SA-04 construction work area because it is co-located with existing pipelines, transmission lines, or roads; however, surveys for native prairie habitats and butterflies have not been completed for SA-04. Overall, construction impacts on prairie-dependent invertebrates are expected to be short term, until vegetation cover is reestablished, and minor.

Individuals of three special concern plant species, buffalo grass, plains wild indigo, and small white lady's slipper, occur within the construction work are and would be directly impacted. Impacts on those individuals would be permanent and major. While individuals of the remaining 17 plant species could

occur within the ROI, they are not likely to occur within the construction work area. Therefore, there would be no impacts on those 17 special concern plant species.

Operations Impacts. Operation activities include mowing for vegetation management, periodic excavation for pipeline visual inspection and repair or replacement, and invasive species control. Vegetation management that prevents trees and large shrubs from reestablishing within the permanent right-of-way adjacent to streams could increase stream temperatures by removing shade, which would reduce habitat suitability for aquatic animals. Upland vegetation and maintenance activities and vehicle use could crush ground-nesting bird eggs and young (greater prairie-chicken, Louisiana waterthrush, and marbled godwit), and North American racer nests and eggs, as well as invertebrates. State-listed special concern plants that persist within the permanent right-of-way could be permanently affected by vegetation management activities; however, overall impacts likely would be minor. All state-listed special concern animals and plants could be indirectly affected by habitat loss and alteration resulting from maintenance of the permanent right-of-way; however, SA-04 would follow existing pipeline, transmission line, and road corridors. Given the potential for occurrence of state-listed special concern species and the identified conservation measures, impacts from operation are expected to be short term and negligible to minor.

Species of Greatest Conservation Need

Gap Analysis Program Species Models

The combined region-wide GAP species model data show the areas used by one or more protected or rare species. The distribution of low, medium, and high use areas for protected or rare mammal species indicates that 1 percent of the construction work area and permanent right-of-way for SA-04 could support medium to high use by these mammals (4 or more species). By comparison, 5 and 6 percent of the construction work area and permanent right-of-way for SA-04, respectively, may support medium to high use by protected or rare birds (7 or more species); and 17 percent of both the construction work area and permanent right-of-way contains habitats used by protected or rare amphibians and reptiles (Table 5.2.5-23). A total of 35 BCCs were identified as occurring within the ROI for SA-04 (Appendix M, Table M-5).

Table 5.2.5-23. GAP Species Models – Habitat Use Areas for Protected and Rare Species within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for System Alternative SA-04 (acres)

GAP Species Groups	Construction[a]	Operations[b]	Within 0.5 Mile
Mammals[c]			
Low	9,029	3,773	298,935
Medium	46	19	3,629
High	-	-	-
Subtotal	***9,076***	***3,792***	***402,564***
Proportion of medium and high	**1%**	**1%**	**1%**
Birds[d]			
Low	10,913	4,556	477,784
Medium	617	247	27,908

Table 5.2.5-23. GAP Species Models – Habitat Use Areas for Protected and Rare Species within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for System Alternative SA-04 (acres)

GAP Species Groups	Construction[a]	Operations[b]	Within 0.5 Mile
High	19	8	1,151
Subtotal	***11,549***	***4,812***	***506,843***
Proportion of medium and high	**6%**	**5%**	**6%**
Amphibians and Reptiles[e]			
Low	3,310	1,378	149,625
Medium	669	278	29,137
High	5	2	377
Subtotal	***3,984***	***1,658***	***179,139***
Proportion of medium and high	**17%**	**17%**	**16%**

Sources: USGS GAP 2016a, 2016b.

[a] Estimated construction impact area based on 120-foot-wide construction work area.

[b] Estimated operations impact area based on 50-foot-wide right-of-way centered on the pipeline.

[c] Mammals – Low = 1 to 3 species, Medium = 4 to 6 species, High = 7 to 9 species.

[d] Birds – Low = 1 to 6 species, Medium = 7 to 12 species, High = 13 to 19 species.

[e] Amphibians and Reptiles – Low = 1 to 2 species, Medium = 3 to 6 species, High = 7 to 11 species.

Construction Impacts. General construction impacts and measures to avoid or reduce impacts on rare and protected species addressed in the GAP models would be the same as those described above for federally and state-listed vertebrate fauna. Mammals, birds, amphibians, and reptiles could be disturbed by construction noise and activity that likely would cause larger animals to move to other areas, possibly returning after construction activities stop; while smaller, less mobile animals could be crushed and killed. Overall, the effects likely would be short term and minor. Given the low proportion of medium use areas for amphibians, reptiles, and birds and the low overall use for mammals within the construction areas, impacts on these groups from construction would be short term and negligible to minor.

Operations Impacts. The permanent right-of-way would be maintained clear of trees and tall shrubs. Due to periodic vegetation management, protected and rare animals that depend on closed canopies may avoid the permanent right-of-way. The herbaceous cover within the right-of-way may act as a barrier to travel for some small animals, fragmenting habitats. However, SA-04 would follow existing rights-of-way where similar maintenance activities have affected the rights-of-way, limiting the magnitude of the impacts from maintenance of the SA-04 permanent right-of-way. Given the limited areas of high protected and rare species use crossed by SA-04, impacts on habitats used by these animals from operations would be permanent and negligible.

Minnesota's Wildlife Action Network

Approximately 8 percent of the ROI within Minnesota is within the WAN. Most WAN habitats that would be affected by construction and operation of SA-04 are rated low, low-medium, and medium-high (Table 5.2.5-24). All 19 miles of SA-04 crossings of WAN habitats would occur within existing pipeline corridors. Given the limited amount of total WAN area affected, overall impacts on habitats within the WAN from habitat loss and alteration from construction and operations would be permanent and minor (see Section 5.2.4 for additional details).

Table 5.2.5-24. Wildlife Action Network Impacts within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for System Alternative SA-04 in Minnesota (acres)

Wildlife Action Network Rating	Construction[a]	Operations[b]	Within 0.5 Mile
Low	123.4	51.4	5,348.3
Low-medium	50.8	21.2	2,628.0
Medium	39.6	16.5	1,806.8
Medium-high	53.5	22.3	2,075.6
High	9.5	3.9	536.6
WAN TOTAL	**276.7**	**115.3**	**12,422.3**
Minnesota total	***3,650.9***	***1,521.2***	***160,230.0***
Proportion in WAN	***7.6%***	***7.6%***	***8%***

Source: Minnesota DNR 2016f.

[a] Estimated construction impact area in acres based on 120-foot-wide construction work area

[b] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline

WAN = Wildlife Action Network

Minnesota Biological Survey Sites of Biodiversity Significance

Construction would affect an estimated 25 acres of MBS Sites, and operations would affect an estimated 10 acres of these designated lands (Table 5.2.5-25). Potential impacts on these sites from construction and operation would be the same as those described for the Applicant's proposed project and could result in permanent habitat alteration. Given the small proportion of MBS Sites potentially affected and co-location of SA-04 with existing pipeline, transmission line, and road corridors, impacts from construction and operation likely would be permanent and minor.

Table 5.2.5-25. Estimated Impacts on Minnesota Biological Survey Sites of Biodiversity Significance within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for System Alternative SA-04 in Minnesota (acres)

Site of Biodiversity Significance Rating	Construction[a]	Operations[b]	Within 0.5 Mile
Outstanding	1.3	0.5	284.7
High	5.0	2.1	467.3
Moderate	18.4	7.6	869.3
MBS Site TOTAL	**24.7**	**10.3**	**1,621.3**

Table 5.2.5-25. Estimated Impacts on Minnesota Biological Survey Sites of Biodiversity Significance within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for System Alternative SA-04 in Minnesota (acres)

Site of Biodiversity Significance Rating	Construction[a]	Operations[b]	Within 0.5 Mile
Minnesota Total	***3,650.9***	***1,521.2***	***160,230.0***
Proportion in MBS Sites	***0.2%***	***0.2%***	***1.0%***

Source: Minnesota DNR 2016h.

[a] Estimated construction impact area in acres based on 120-foot-wide construction work area.

[b] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline.

Note:

Values in the table may not sum to totals and subtotals because of rounding.

MBS Site = Minnesota Biological Survey Sites of Biodiversity Significance

Minnesota Scientific and Natural Areas

SA-04 does not overlap any SNAs, therefore construction and operation of SA-04 would have no impact on SNAs.

5.2.5.3.4 Transportation by Rail

Transportation of crude oil by rail would require development of offloading facilities, including new rail access and upgrades of existing rail access to Clearbrook and Superior. Clearing of vegetation and ground disturbance associated with preparing sites for development and construction of these permanent facilities would affect unique natural resources. Rail offloading facilities would require the following:

- Clearing from 100 to 200 acres adjacent to the existing Clearbrook terminal in Minnesota;
- Clearing approximately 100 acres in Superior, Wisconsin, adjacent to the existing Enbridge terminal;
- Reestablishment of 10 miles of track on an existing railbed between Clearbrook and Gully, Minnesota; and
- Construction of a less than 0.5-mile interconnection between existing rail lines in Superior, Wisconsin.

In the United States, operations would include use of the offloading facilities and new and upgraded access routes, and use of existing rail routes from the U.S-Canada border to the Clearbrook and Superior terminals. Approximately 10 unit trains of 110 tanker cars would be required each day to transport the proposed volume.

Federally Listed Species

Federally listed threatened and endangered species that could occur within or near the new facilities and new rail access routes and that could be affected by construction and operation of the rail alternative include three mammals – Canada lynx, gray wolf, and northern long-eared bat; three birds – Kirtland's warbler, piping plover, and whooping crane; three invertebrates - Dakota skipper, Poweshiek skipperling, and rusty patched bumble bee; and one plant – western prairie fringed orchid.

Construction Impacts

If present, individual Canada lynx could be disturbed by construction noise and activity that likely would cause them to move to other areas, possibly returning after construction activities stop. Disturbance effects likely would be temporary and minor unless den sites are disturbed. Den sites, which are used from April to June, are unlikely to occur near the Clearbrook and Superior terminals where new offloading and rail access facilities would be constructed.

Foraging and reproductive activities of gray wolves could be affected by exposure to Project-related noise and increased human activity. Construction of the new rail offloading and access facilities could alter habitats used by wolves. If dens are present in the vicinity, construction-related disturbance could reduce pup survival. In addition, wolf-vehicle collisions continue to be a major contributor to wolf mortality. Typical conservation measures to reduce construction impacts on the gray wolf include:

- Observe vehicular speed limits during construction. Where speed limits are not posted, vehicles and equipment should be operated at speeds suitable for driving conditions. Stop construction activities if the contractor or EI observes a gray wolf or possible den site within the construction area, or if USFWS notifies the Applicant of a gray wolf sighting within 1 mile of the construction work area; the stop work order should continue until the wolves leave the area.
- Report any wolf sightings immediately to USFWS, USACE, and state resource agencies (e.g., Minnesota DNR).

With implementation of conservation measures, gray wolves would not be affected by construction of the new rail facilities and access at Clearbrook and Superior, or the effects would be temporary and minor.

Minnesota and Wisconsin NHISs report no occurrences of the northern long-eared bat for the area around the Clearbrook and Superior terminals or where new rail offloading facilities and rail access are likely to be constructed (Minnesota DNR 2016e; Wisconsin DNR 2016). The Applicant conducted acoustic surveys within forested areas containing suitable habitat for northern long-eared bats (i.e., trees with a diameter at breast height of 3 inches or larger) around the Clearbrook and Superior terminals during 2014 and 2015 to determine the summer presence or probable absence of northern long-eared bats. No northern long-eared bats were confirmed acoustically at the 14 survey sites around the Clearbrook terminal in Clearwater County, Minnesota, or at one survey site near the Superior terminal in Douglas County, Wisconsin (Merjent 2014b, 2015c).

Impacts on individuals or colonies of bats may occur if clearing or construction occurs when bats are using summer roosts. Northern long-eared bats could be disturbed by noise or human presence, causing them to abandon occupied tree cavities. Bats could be injured or killed if occupied trees are cut down. Impacts could be substantial if trees with maternity colonies are destroyed or abandoned. If northern long-eared bats were found to roost near these sites, applicable conservation measures associated with the ESA 4(d) rule could include:

- Maintain a year-round 0.25-mile radius buffer (which is equivalent to 125.7 acres) around known northern long-eared bat hibernacula.
- Protect known, occupied maternity roost trees. Incidental take is prohibited if the activity cuts or destroys a known, occupied maternity roost tree, or any other trees within a 150-

foot radius around a known maternity roost tree, equivalent to 1.6 acres, during the pup season from June 1 to July 31.

Northern long-eared bats are not expected to occur near the new rail offloading and access facilities. With implementation of applicable conservation measures associated with the ESA 4(d) rule, effects on northern long-eared bats would not occur or would be negligible to minor.

Kirtland's warblers nest in jack pine forests in Wisconsin and Michigan, and they migrate along the southeast coast of the United States to overwinter in the Bahamas. No critical habitat has been designated for the species. Kirtland's warblers have been known to occur during the breeding season in Douglas County, Wisconsin. As part of the ongoing recovery effort, five jack pine stands were censused by the USFWS in Douglas County during the 2016 breeding season; however, no signing males were documented (USFWS 2016). If Kirtland's warblers were to nest in the construction work area and vegetation clearing occurred during the nesting season loss of eggs or young could occur. Construction activities and presence of construction personnel could also cause disturbance and displacement of adult birds, should they occur in the vicinity of the activity. No jack pine woodlands appear to occur in the vicinity of the new rail offloading and access facilities near Clearbrook or Superior. Because Kirtland's warblers are not expected to occur near the facilities, they would not be affected during facility construction.

Piping plovers which breed in the Great Lakes region inhabit shorelines of the Great Lakes. They nest on open, sparsely vegetated sandy habitats such as sand spits or sand beaches found on Great Lakes islands and mainland shorelines. Critical habitat for this species has been designated in Douglas County, Wisconsin, and is defined as lands 500 meters (1,640 feet) from the normal high water line from the mouth of Dutchman Creek west-northwest along the Lake Superior shoreline to the breakwall forming the Superior Front Channel opening to Lake Superior (USFWS 2001). The new rail offloading and access facilities would be constructed near the Superior terminal in Douglas County. While it is possible that piping plovers could occur near facilities in Superior, it is unlikely that they would use these developed habitats; therefore, construction would be unlikely to affect piping plovers. There would also be no impact on designated critical habitat for the piping plover because the Superior terminal is not within the designated critical habitat.

Whooping cranes from the eastern population that winter in Florida migrate to breeding areas in Wisconsin and could occur near the Superior terminal during the spring and fall migrations. Noise and activity during construction can displace whooping cranes from stopover habitats during foraging or in wetlands or riverine habitats during roosting. Whooping cranes generally depart from wintering grounds during late March to mid-April and return from breeding grounds beginning in mid-September. During migration, whooping cranes use croplands and shallow wetlands for stopover foraging and roosting habitats. The Aransas-Wood Buffalo Park whooping crane population migrates between wintering grounds in the Aransas NWR to breeding grounds in the Wood Buffalo National Park in northern Alberta. The migration corridor for this population crosses through central Oklahoma, Kansas, Nebraska, South Dakota, and North Dakota and is generally west of the Clearbrook terminal. Potential impacts could include disturbance to foraging or roosting birds from construction during migration periods (USFWS 2009). Whooping cranes are unlikely to occur near the Clearbrook or Superior terminal areas and are not likely to be affected by construction.

If present, individuals of the Dakota skipper, Poweshiek skipperling, and rusty patched bumble bee could be affected by construction activities that disturb native vegetation. Vegetation clearing and grading

would disrupt egg laying and foraging during spring and summer, and could crush dormant larvae during fall and winter. These prairie-dependent insects depend on high-quality native grasslands and tallgrass prairies to provide food from flower pollen and nectar. Vegetation clearing and replacement with non-native ground covers could injure or kill individual butterflies and bees, and could remove forage plants. Habitat and presence/absence surveys have not been completed for the area surrounding the Clearbrook and Superior terminals. There may be some native prairie plant species persisting in the hay/pasture vegetation in the vicinity of the Clearbrook terminal that could provide habitat for these species. Two moderate rated northern dry sand-gravel prairie native plant communities are in the vicinity of the rail access route between Clearbrook and Gully. If suitable habitat for prairie-dependent insects are present, these habitats could be lost because of fill for construction of the offloading and rail access facilities. If these habitats are suitable for Dakota skipper, Poweshiek skipperling, or rusty patched bumble bee, loss of these habitats would result in a permanent and minor impact.

The new rail facilities near the Clearbrook terminal would not cross any current high use areas for rusty patched bumble bee, and construction is not likely to directly or indirectly affect any individuals or current high use areas. The new rail facilities would be located within a current potential low use area where rusty patched bumble bees may disperse from a current high use area or where their occurrence is uncertain. The rusty patched bumble bee may benefit from conservation measures implemented within the dispersal area, and USFWS may recommend surveys. Applicable conservation measures that would benefit the rusty patched bumble bee within this dispersal area include restoration and maintenance of high-quality habitat through control of invasive species and restoration, including providing a high diversity and abundance of wildflowers appropriate for the region and local characteristics (USFWS 2017).

Fassett's locoweed has the potential to occur near the Superior terminal, although there are no NHIS reports for the plant in this area. If Fassett's locoweed occurred within the construction area, direct impacts could include trampling and destruction during clearing and grading for site preparation. Indirect effects from construction could include conversion of shoreline habitat (locoweed) into other habitat types and the spread of noxious weeds and invasive plants. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction. Surveys were not performed for Fassett's locoweed; however, based on known habitat associations, there is limited potential for the plant to occur within the construction areas around the Superior terminal. If this plant was found to occur, additional avoidance measures may be required, and effects likely would be permanent and negligible.

Summary

Conservation measures to avoid or reduce construction impacts on federally listed animals and plants would be developed in consultation with USFWS to ensure that any unavoidable impacts would not jeopardize the continued existence of species protected by the ESA. Individual Canada lynx and gray wolves could experience temporary minor effects associated with construction activities for the rail alternative. Northern long-eared bats and occupied maternity roots are not known to occur near the Clearbrook and Superior terminals. With implementation of general conservation measures, impacts from construction would be temporary and negligible to minor. Kirtland's warbler, piping plover, and whooping crane are not likely to be affected by construction for the rail alternative. Native prairie plants that could provide habitat for the native prairie-dependent Dakota skipper, Poweshiek skipperling, and rusty patched bumble bee may persist within hay/pasture vegetation in the vicinity of the Clearbrook terminal. If suitable habitat for these butterflies and bumble bees occurs within these grassland, and the

habitat was lost during construction, the impact would be permanent and minor. Effects on the federally listed Fassett's locoweed would be negligible to minor and permanent based on the lack of appropriate habitat and species presence.

Operations Impacts

The increase in train traffic could increase barrier effects and wildlife collision mortality (Dorsey 2011) on Canada lynx and gray wolf, which could represent a permanent major impact. There would be no impact on the northern long-eared bat because they are not likely to occur in the vicinity of the new rail terminals. Similarly, there would be no impacts on Kirtland's warbler or piping plover, because there is no suitable habitat for these species in the vicinity of the new rail terminals. Whooping cranes are unlikely to occur near the Clearbrook or Superior terminal areas and therefore would not be impacted by operations. There would be no impact on federally listed insects or plants from operations of the transportation by rail alternative.

State-Listed Species

Endangered and Threatened Species

There are no state-listed endangered and threatened vertebrates or invertebrates that could be affected by construction or operation of the rail alternative; four state-listed plants could be affected (Appendix M, Tables M-1 to M-3).

Construction Impacts. The state-protected plants beaked spikerush, hair-like beak rush, sterile sedge, and sweet colt's-foot could occur near the Clearbrook and Superior terminals where new rail offloading and access facilities would be constructed (Appendix M, Table M-3). Listed plants present in the construction footprint could be destroyed during construction activities, and their habitats could be degraded by the introduction or spread of noxious weeds and invasive plants. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction. Impacts on state-listed plants in the construction work area would be permanent and major if these plants occur within the facility footprints. Taking of state-listed endangered or threatened plants would require consultation with the appropriate state DNR for a take permit, which may require compensatory mitigation to offset unavoidable losses.

Operations Impacts. The 10 loaded trains per day required for transport of crude oil for the Project (see Section 4.2.6) would not be expected to affect state-listed plant species.

Special Concern Species

There are no state-listed special concern vertebrates or invertebrates that could be affected by construction and operation of the transportation by rail alternative; 3 special concern plants could be affected (Appendix M, Tables M-1 to M-3).

Construction Impacts. State-listed special concern plants with the potential to occur in the areas of the offloading facilities and new rail access include few-flowered spikerush, McCalla's willow, and twig rush (Appendix M, Table M-3). Special concern plants in the construction footprint could be destroyed during construction activities, and their habitats could be degraded by the introduction or spread of noxious weeds and invasive plants. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction.

Impacts on special concern plants in the construction work area would be permanent and major if these plants are present within the facility footprints.

Operations Impacts. The 10 loaded trains per day required for transport of crude oil for the Project (see Section 4.2.6) would not be expected to affect state-listed special concern plant species.

Species of Greatest Conservation Need

Gap Analysis Program Species Models and Minnesota Wildlife Action Network

Construction Impacts. General construction impacts and measures to avoid or reduce impacts on protected and rare animals addressed in the GAP models would be the same as those described above for federally and state-listed vertebrate fauna. Overall, GAP models indicate no use by amphibians and reptiles and low and medium use by birds and mammals for offloading facilities and associated access at the Clearbrook terminal. GAP mammal models indicate that the area near the Superior terminal is high use by protected and rare mammals and low and medium use by birds, amphibians, and reptiles. If present, protected and rare animals could be injured or disturbed by construction activity and noise. Disturbance effects likely would be minor and temporary.

Given that most facilities would be in areas with no high use habitats for birds, amphibians, and reptiles, construction impacts on these habitats would be minor based on lack of use by special-status species, although permanent. Construction of facilities at Superior could affect habitats used by seven or more protected and rare mammals, which could cause permanent, major permanent impacts if those species are present, although NHIS data did not identify any state-listed mammals near this location.

The Minnesota WAN applies to facilities at Clearbrook, and no WAN habitats occur near the terminal. Therefore, no WAN habitats would be affected by construction of the Clearbrook terminal offloading facilities.

Operations Impacts. The principal impact on unique natural resources from the substantial increase in rail traffic would be increased wildlife collisions. Rail transportation routes extend through areas ranging from no to high use based on the GAP models for mammals, birds, amphibians, and reptiles. The increase in collision mortality for these animals could result in impacts ranging from negligible to major that would continue for the life of the Project.

Minnesota Biological Survey Sites of Biodiversity Significance

Three MBS Sites preliminarily rated as moderate occur near the Clearbrook terminal where rail facilities are likely to be constructed, and the route of the rail connection between Clearbrook and Gully is near three additional moderate rated MBS Sites. Construction of new rail offloading facilities likely would avoid the MBS Sites near the Clearbrook terminal, with no impacts resulting. Because construction of the new rail connection would be within a previous rail corridor on an existing rail bed, impacts on these MBS Sites also are unlikely.

Minnesota Scientific and Natural Areas

No SNAs occur in the area around the Clearbrook or Superior terminals where new rail facilities are likely to be constructed. Therefore, this alternative would have no impact on SNAs.

5.2.5.3.5 Transportation by Truck

Transportation of crude oil by truck would require development of offloading facilities and new road access. Truck offloading facilities would require an approximately 50-acre site at locations in Clearbrook, Minnesota, and Superior, Wisconsin. New road access would require approximately 5 acres in Clearbrook and 34 acres in Superior. In the United States, operations would include use of the offloading facilities and new and improved road access, and use of the existing highway system from the U.S-Canada border to the Clearbrook and Superior terminals. Transportation of the proposed volume of crude oil by truck would require up to approximately 4,000 loaded tanker trucks per day and 4,000 tanker trucks per day returning empty.

Federally Listed Species

Federally listed threatened and endangered species that could occur within or near the new facilities and new truck access routes and that could be affected by construction and operation of the truck alternative include three mammals – Canada lynx, gray wolf, and northern long-eared bat; three birds – Kirtland's warbler, piping plover, and whooping crane; one invertebrate – rusty patched bumble bee; and one plant – Fassett's locoweed.

Construction Impacts

If present, individual Canada lynx could be disturbed by construction noise and activity that likely would cause them to move to other areas, possibly returning after construction activities stop. Disturbance effects would be temporary and negligible to minor unless den sites are disturbed. Den sites, which are used from April to June, are unlikely to occur near the Clearbrook and Superior terminals where new offloading and truck access facilities would be constructed.

Foraging and reproductive activities for gray wolves could be affected by exposure to construction noise and increased human activity. Construction of the new facilities could alter used habitats used by gray wolves. If dens are present in the vicinity, construction-related disturbance could reduce pup survival. In addition, wolf-vehicle collisions continue to be a major contributor to wolf mortality. Typical conservation measures to reduce construction impacts on the gray wolf include:

- Observe vehicular speed limits during construction. Where speed limits are not posted, vehicles and equipment should be operated at speeds suitable for driving conditions. Stop construction activities if the contractor or EI observes a gray wolf or possible den site within the construction area, or if USFWS notifies the Applicant of a gray wolf sighting within 1 mile of the construction work area; the stop work order should continue until the wolves leave the area.
- Report any wolf sightings immediately to USFWS, USACE, and state resource agencies (e.g., Minnesota DNR).

With implementation of conservation measures, gray wolves would not be affected by construction of the new truck facilities and access roads, or the impact would be temporary and negligible to minor.

Minnesota and Wisconsin NHIS report no occurrences of the northern long-eared bat for the areas near the Clearbrook and Superior terminals where new truck offloading facilities and truck access are likely to be constructed (Minnesota DNR 2016e, Wisconsin DNR 2016). The Applicant conducted acoustic surveys within forested areas containing suitable habitat for northern long-eared bats (trees that have a diameter at breast height of 3 inches or larger) around the Clearbrook and Superior terminals for the Applicant's

proposed project during 2014 and 2015 to determine the summer presence or probable absence of northern long-eared bats. No northern long-eared bats were confirmed acoustically at 14 survey sites around the Clearbrook terminal or at one site near the Superior terminal (Merjent 2014b, 2015c).

Impacts on individuals or colonies of bats may occur if clearing or construction occurs when bats are using summer roosts. Northern long-eared bats could be disturbed by noise or human presence, causing them to abandon occupied tree cavities. Bats could be injured or killed if occupied trees are cut down. Impacts could be substantial if trees with maternity colonies are destroyed or abandoned. If northern long-eared bats were found to roost near these sites, applicable conservation measures associated with the ESA 4(d) rule would include:

- Maintain a year-round 0.25-mile radius buffer (which is equivalent to 125.7 acres) around known northern long-eared bat hibernacula.
- Protect known, occupied maternity roost trees. Incidental take is prohibited if the activity cuts or destroys a known, occupied maternity roost tree, or any other trees within a 150-foot radius around a known maternity roost tree, equivalent to 1.6 acres, during the pup season from June 1 to July 31.

Northern long-eared bats are not expected to occur near the new rail offloading and access facilities. With implementation of applicable conservation measures associated with the ESA 4(d) rule, there would be no impact on northern long-eared bats, or the impact would be temporary and negligible to minor.

Kirtland's warblers nest in jack pine forests in Wisconsin and Michigan and migrate along the southeast coast of the United States to overwinter in the Bahamas. Vegetation clearing for construction of new facilities during the nesting season could result in loss of eggs or young, if the birds are present. They are known to occur during the breeding season in the vicinity of Superior. No jack pine woodlands appear to occur in the vicinity of the new truck offloading and access facilities near Clearbrook or Superior, and Kirtland's warblers are not expected to occur near the facilities. Therefore, the warblers would not be affected by facility construction.

Great Lakes piping plovers inhabit shorelines of the Great Lakes. Critical habitat for this species has been designated in Douglas County, Wisconsin. New truck offloading and access facilities would be constructed near the Superior terminal in Douglas County. Piping plovers nest on open, sparsely vegetated sandy habitats such as sand spits or sand beaches found on Great Lakes islands and mainland shorelines. While it is possible that piping plovers could occur near facilities in Superior, it is unlikely that they would use these developed habitats; therefore, construction would be unlikely to affect piping plovers. There would also be no impact on designated critical habitat for the piping plover because the Superior terminal is not within the designated critical habitat.

Whooping cranes from the eastern population that winters in Florida migrate to breeding areas in Wisconsin and could be present near the Superior terminal during spring and fall migrations. Noise and activity during construction can displace whooping cranes from stopover habitats during foraging or in wetlands or riverine habitats during roosting. Whooping cranes generally depart from wintering grounds during late March to mid-April and return from breeding grounds beginning in mid-September. During migration, whooping cranes use croplands and shallow wetlands for stopover foraging and roosting habitats. The Aransas-Wood Buffalo Park whooping crane population migrates between wintering grounds in the Aransas NWR to breeding grounds in the Wood Buffalo National Park in northern Alberta.

The migration corridor for this population crosses through central Oklahoma, Kansas, Nebraska, South Dakota, and North Dakota and is located generally west of the Clearbrook terminal where new truck offloading and access would be constructed. Potential impacts could include disturbance to foraging or roosting birds from construction during migration periods (USFWS 2009). Whooping cranes are unlikely to occur near the Clearbrook or Superior terminal areas and are not likely to be affected by construction.

If present, individual rusty patched bumble bees could be affected by construction activities that disturb native vegetation. Vegetation clearing and grading would disrupt egg laying and foraging during spring and summer, and could crush dormant larvae during fall and winter. These prairie-dependent bumble bees depend on high-quality native grasslands and tallgrass prairies to provide food from flower pollen and nectar. Vegetation clearing and replacement with non-native ground covers could injure or kill these ground-nesting bees and remove forage plants. Habitat and presence/absence surveys have not been completed for the area surrounding the Clearbrook and Superior terminals. Native prairie plants that could provide habitat for the bees may persist in the hay/pasture vegetation in the vicinity of the Clearbrook terminal where facilities could be constructed. If suitable habitat for prairie-dependent rusty patched bumble bees is present, it could be lost due to fill or clearing required for construction. Loss of suitable habitat would result in a permanent minor impact.

The new truck facilities near the Clearbrook terminal would not cross any current high use areas for rusty patched bumble bee, and construction is not likely to directly or indirectly affect any individuals or current high use areas. The new facilities would, however, be within a current low potential area where rusty patched bumble bees may disperse from a current high use area or where their occurrence is uncertain. The rusty patched bumble bee may benefit from conserve measures implemented within the dispersal area, and USFWS may recommend surveys. Applicable conservation measures that would benefit the rusty patched bumble bee within this dispersal area include restoration and maintenance of high-quality habitat through control of invasive species and restoration, including a providing a high diversity and abundance of wildflowers appropriate for the region and local characteristics (USFWS 2017).

Fassett's locoweed has the potential to occur near the Superior terminal, although there are no NHIS reports for the plant in this area. If Fassett's locoweed occurred within the construction area, direct impacts could include trampling and destruction during construction during clearing and grading for site preparation. Indirect effects from construction could include conversion of shoreline habitat into other habitat types and the spread of noxious weeds and invasive plants. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction. Surveys were not performed for Fassett's locoweed, but based on known habitat associations, there is limited potential for the species to occur within the construction areas around the Superior terminal. If this plant was present, additional avoidance measures may be required. Consequently, there would be no impact, or the impact would be permanent and negligible.

Summary

Conservation measures to avoid or reduce construction impacts on federally listed animals and plants would be developed in consultation with USFWS to ensure that any unavoidable impacts would not jeopardize the continued existence of species protected by the ESA. Individual Canada lynx and gray wolves could experience temporary, negligible to minor effects associated with construction activities. Northern long-eared bats and occupied maternity roots are not known to occur near the Clearbrook and Superior terminals. If there is an occurrence, with implementation of BMPs and general conservation measures associated with the ESA 4(d) rule, construction would have no impacts or impacts would be

temporary and negligible to minor. Kirtland's warbler, piping plover, and whooping crane would not to affected by the truck alternative. Native prairie plants that could provide habitat for the native prairie-dependent rusty patched bumble bee may persist within hay/pasture vegetation in the vicinity of the Clearbrook terminal. If suitable habitat for bumble bees occurs within these grasslands, the habitats could be lost, potentially resulting in a permanent minor impact. There would be no impacts on the federally listed Fassett's locoweed or the impacts would be permanent and negligible based on the lack of appropriate habitat and species presence.

Operations Impacts

The principal impact on federally listed animals from such a large increase in truck traffic would be increased wildlife collisions, which could represent a major permanent impact for Canada lynx and gray wolf. There would be no impact on the northern long-eared bat because they are not likely to occur in the vicinity of the new rail terminals. Similarly, there would be no impacts on Kirtland's warbler or piping plover, because there is no suitable habitat for these species in the vicinity of the new rail terminals. Whooping cranes are unlikely to occur near the Clearbrook or Superior terminal areas and therefore would not be impacted by operations. There would be no impact on federally listed insects or plants from operations of the transportation by rail alternative.

State-Listed Species

Endangered and Threatened Species

State-listed endangered and threatened species that could be affected by construction and operation of the truck alternative includes four plants. See also Appendix M (Table M-1, invertebrates; Table M-2, vertebrates; and Table M-3, plants).

Construction Impacts. The state-protected plants beaked spikerush, hair-like beak rush, sterile sedge, and sweet colt's-foot have the potential to occur near the Clearbrook and Superior terminals where new truck offloading and access facilities would be constructed (Appendix M, Table M-3). Listed plants in the construction footprint could be destroyed during construction activities, and their habitats could be degraded by the introduction or spread of noxious weeds and invasive plants. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction. Impacts on plants in the construction work area would be permanent and major if they are present within the facility footprints. Take of state-listed endangered or threatened plants would require consultation with the appropriate state DNR for a take permit, which may require compensatory mitigation to offset unavoidable losses.

Operations Impacts. All of the state-listed species in the area are plants, and those plants would not be affected by operation of the truck alternative.

Special Concern Species

There are no state-listed special concern animals that could be affected by construction or operation of the truck alternative; three plants could be affected as listed in Appendix M, Tables M-1 to M-3.

Construction Impacts. State-listed special concern plants with the potential to occur in the likely areas for new offloading facilities and new truck access roads include few-flowered spikerush, McCalla's willow, and twig rush (Appendix M, Table M-3). Special concern plants in the construction footprint could be destroyed during construction activities, and their habitats could be degraded by the

introduction or spread of noxious weeds and invasive plants. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction. If these plants are present in the construction footprints, the potential impact would be permanent and major.

Operations Impacts. All of the state-listed special concern species in the area are plants, and those plants would not be affected by operation of the truck alternative.

Species of Greatest Conservation Need

Gap Analysis Program Species Models and Minnesota Wildlife Action Network

Construction Impacts. General construction impacts and measures to avoid or reduce impacts on protected and rare animals addressed in the GAP models would be the same as those described above for federally and state-listed vertebrate fauna. Overall, GAP models indicate no use by amphibians and reptiles and low and medium use by birds and mammals for the areas planned for offloading facilities and associated access at the Clearbrook terminal. GAP mammal models indicate that the area near the Superior terminal includes high use by protected and rare mammals, and low and medium use by birds, amphibians, and reptiles. If present, protected and rare animals could be injured or disturbed by construction activity and noise. Disturbance effects likely would be minor and temporary.

Given that most facilities would be in areas with no high use habitats for birds, amphibians, and reptiles, construction impacts on these habitats would minor although permanent. Construction of facilities at Superior could affect habitats used by seven or more protected and rare mammals, which could result in permanent and major impacts—although NHIS data did not identify any state-listed mammals near this location.

The Minnesota WAN applies to facilities at Clearbrook; however, no WAN habitats occur around the terminal. Therefore, no WAN habitats would be affected by construction of truck offloading facilities near the Clearbrook terminal.

Operations Impacts. The principal operations impact on unique natural resources from the large increase in truck traffic would be increased wildlife collisions. Truck transportation routes would cross areas ranging from no to high use based on the GAP models for mammals, birds, amphibians, and reptiles. The increase in collision mortality for wildlife would result in potential impacts that would be permanent and negligible to major.

Minnesota Biological Survey Sites of Biodiversity Significance

Three MBS Sites preliminarily rated as moderate occur near the Clearbrook terminal where truck facilities are likely to be constructed. Construction of new truck offloading facilities likely would be able to avoid the MBS Sites near the Clearbrook terminal, with the result of no impact.

Minnesota Scientific and Natural Areas

No SNAs occur in the area around the Clearbrook and Superior terminals where new truck facilities are likely to be constructed. Therefore, this alternative would have no impact on SNAs.

5.2.5.3.6 Existing Line 3 Supplemented by Rail

The potential construction- and operations-related impacts on unique biological resources associated with continued use of the existing Line 3 pipeline supplemented by transportation of crude oil by train would be similar to the impacts reported above for each of the components of this alternative. Information on the species and habitats potentially affected by this alternative and the potential impacts are summarized below.

Federally Listed Species

Federally listed threatened and endangered species that could occur within or near the existing Line 3 pipeline and that could be affected by construction and operation of the facilities and routes for the rail alternative include three mammals – Canada lynx, gray wolf, and northern long-eared bat; four birds – Kirtland's warbler, piping plover, rufa red knot, and whooping crane; three invertebrates - Dakota skipper, Poweshiek skipperling, and rusty patched bumble bee; and two plants – Fassett's locoweed and western prairie fringed orchid (Tables 5.2.5-6 and 5.2.5-11).

Construction Impacts

The Line 3 pipeline has been built and is in operation; therefore, no construction impacts are associated with that component of the alternative. Individual Canada lynx and gray wolves could experience temporary, minor effects associated with construction of new rail offloading and access facilities at the existing Clearbrook and Superior terminals. Northern long-eared bats and occupied maternity roosts are not known to occur near the terminals. With implementation of general conservation measures for northern long-eared bats associated with the ESA 4(d) rule, impacts from construction would be temporary and minor. Kirtland's warbler, piping plover, rufa red knot, and whooping crane are not likely to be affected by construction of rail facilities. Native prairie plants that could provide habitat for the native prairie-dependent Dakota skipper, Poweshiek skipperling, and rusty patched bumble bee may persist within hay/pasture vegetation in the vicinity of the Clearbrook terminal. If suitable habitat for these butterflies and bumble bees occurs within these grasslands, it could be lost, potentially resulting in a permanent and minor impact. There would be no effect on the federally listed Fassett's locoweed based on the lack of appropriate habitat and species presence.

Operations Impacts

- If federally listed species persist within the permanent Line 3 pipeline right-of-way, impacts on those species from ongoing operations and maintenance, such as mowing for vegetation management, equipment maintenance, invasive species control, right-of-way monitoring and inspections, and pipeline integrity excavations, would continue. Vegetation maintenance and the increase in required integrity digs to maintain the aging pipeline (an estimated 267 integrity digs per year over the next 15 years) could result in direct mortality of individuals of non-mobile species, including the Dakota skipper, Poweshiek skipperling, rusty patched bumble bee, Fassett's locoweed, and western prairie fringed orchid if individuals of these species are present during the activity. Increased noise and human disturbance at offloading facilities could cause individuals of more mobile animals, including Canada lynx, gray wolf, northern long-eared bat, Kirtland's warbler, pipeline plover, rufa red knot, and whooping crane to leave the area; however, they would be expected to return when the activity ceases.

Implementation of this combined alternative would reduce Project-related rail traffic from 10 unit trains per day to 6 unit trains per day. Nevertheless, this would be an increase in rail traffic over current

conditions and could result in permanent and major impacts on the federally listed gray wolf and Canada lynx because of the increased potential for collisions of trains with wildlife. Impacts on all other federally listed animals and plants would not occur or would be permanent and minor.

State-Listed Species

Endangered and Threatened Species

State-listed endangered and threatened species that could occur within the ROI for the existing Line 3 pipeline and that could be affected by construction and operation in the vicinity of the Clearbrook and Superior terminals where new rail offloading facilities and access would be constructed include one mammal – northern long-eared bat, one invertebrate – fluted-shell mussel, and one reptile – wood turtle. Potential impacts on the northern long-eared bat are discussed for federally listed endangered and threatened species. Of the 18 state-listed endangered and threatened plants known to occur within the ROI for the existing Line 3 pipeline, eight species potentially occur within the permanent right-of-way and could be affected by continued maintenance activities. These consist of three in Minnesota – beaked spikerush, hair-like beak rush, and sterile sedge; and five in Wisconsin –clustered bur-reed, neat spike-rush, seaside crowfoot, small yellow-water crowfoot, and sweet colt's foot. The state-protected plants beaked spikerush, hair-like beak rush, sterile sedge, and sweet colt's-foot have the potential to occur near the Clearbrook and Superior terminals, where new rail offloading and access facilities would be constructed for the rail alternative (Appendix M, Table M-3).

Construction Impacts

Listed plants in the construction footprint for rail offloading and access facilities could be destroyed during construction activities, and their habitats could be degraded by the introduction or spread of noxious weeds and invasive plants. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction. If listed plants are present in the construction work area, construction impacts would be permanent and major. Takings of state-listed endangered or threatened plants would require consultation with the appropriate state DNR for a take permit, which may require compensatory mitigation to offset unavoidable losses.

Operations Impacts

Pipeline operations that could affect state-listed species include ongoing vegetation management, right-of-way monitoring and inspection, and pipeline excavation for repair or replacement of pipe segments. If excavation of pipe segments is required at surface water crossings where the fluted-shell mussel is present, destruction of the mussels could occur, and increased turbidity and sedimentation also could affect the mussels. Vegetation management and pipeline excavation could result in injury or mortality of wood turtle eggs or adults if these activities coincided with turtle presence in the habitats.

Listed plants that persist within the permanent right-of-way could be affected directly or indirectly by maintenance activities. With the increased need for excavation to repair or replace the existing Line 3 pipeline, there is a potential for the excavations to affect state-listed plants. If state-listed plants occur where work is proposed, a take permit would be required. If there are no feasible alternatives to takings, compensatory mitigation could be used to offset the impact.

Where railways cross suitable habitat, increased train traffic has the potential to affect the wood turtle by increasing the risk of fatalities due to collision. The remaining state-listed species in the vicinity of the rail facilities are plants that would not be affected by increased rail traffic.

Special Concern Species

- State-listed special concern species that could be affected by construction and operation of existing Line 3 supplemented by rail include nine vertebrates: three bats – big brown bat, little brown bat and northern long-eared bat; six birds – Connecticut warbler, Le Conte's sparrow, Nelson's sparrow, short-eared owl, trumpeter swan, and yellow rail; and four invertebrates: a caddisfly, and three mussels – black sandshell, creek heelsplitter and pink heelsplitter (Appendix M, Tables M-1 and M-2).
- Seventeen state-listed plants of special concern that could be affected by operation of the combined rail alternative include barren strawberry, blunt sedge, English sundew, false mountain willow, few-flowered spikerush, Lapland buttercup, least moonwort, mamillate spike-rush, McCalla's willow, mingan moonwort, northern single-spike sedge, northwestern sticky aster, pale moonwort, small white lady's slipper, St. Lawrence grapefern, twig rush, and Vasey's rush (Appendix M, Table M-3). The state-protected plants beaked spikerush, hair-like beak rush, sterile sedge, and sweet colt's-foot have the potential to occur near the Clearbrook and Superior terminals (Appendix M, Table M-3).

Construction Impacts. The state-protected plants beaked spikerush, hair-like beak rush, sterile sedge, and sweet colt's-foot have the potential to occur near the Clearbrook and Superior terminals where new rail offloading and access facilities would be constructed for the rail alternative (Appendix M, Table M-3). Listed plants in the construction footprint could be destroyed during construction activities, and their habitats could be degraded by the introduction or spread of noxious weeds and invasive plants. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction. If listed plants are present in the construction work area, construction impacts would be permanent and major. Takings of state-listed endangered or threatened plants would require consultation with the appropriate state DNR for a take permit, which may require compensatory mitigation to offset unavoidable losses.

Operations Impacts. Of the three bats of special concern, only the northern long-eared bat has been reported to occur within the permanent right-of-way for the existing Line 3. Vegetation management and pipeline excavation within the permanent right-of-way is unlikely to affect bats, unless trees are allowed to grow larger than 3 inch in diameter at breast height between tree maintenance events. Vegetation management and pipeline excavation could continue to result in injury or mortality of bird eggs and nests, if they are present when maintenance activities occur during the breeding season. Of the six birds occurring within the ROI for the existing Line 3 pipeline, four – Nelson's sparrow, short-eared owl, trumpeter swan, and yellow rail are also known to occur within the permanent right-of-way. If excavation of pipe segments is required at surface water crossings where the fluted-shell mussel or caddisflies are present, destruction of the mussels or caddisflies could occur, and increased turbidity and sedimentation also could affect these species.

Special concern plants that persist within the permanent right-of-way for the existing Line 3 could be affected directly or indirectly by vegetation management and pipeline repair or replacement. Twelve of the 17 plants of special concern occurring within the ROI for the existing Line 3 pipeline also are known to occur within the permanent pipeline right-of-way (10 in Minnesota – barren strawberry, blunt sedge,

false mountain willow, few-flowered spikerush, least moonwort, mingan moonwort, northern single-spike sedge, pale moonwort, small white lady-s slipper, and St. Lawrence grapefern; and 2 in Wisconsin – mamillate spike-rush and Vasey's rush [Appendix M, Table M-3]). Given the increased need for excavation to repair or replace aging pipe segments, the excavations could coincide with occurrences of state-listed special concern plants. If special concern plants are present during maintenance activities and there are no feasible alternatives, they could be disturbed. Because these rare plants have, in many instances, persisted or reestablished after construction of other pipelines through this shared corridor, impacts are likely to be short term and negligible.

The increased train traffic could increase collisions with and mortality of special concern birds, including the Connecticut warbler, Le Conte's sparrow, Nelson's sparrow, short-eared owl, trumpeter swan, and yellow rail. These birds would be most susceptible if they nest in habitats near the train tracks. The remaining state-listed species in the vicinity of the rail facilities are plants that would not be affected by increased rail traffic.

Species of Greatest Conservation Need

Gap Analysis Program Species Models

The distribution of low, medium, and high use areas for protected or rare mammal species indicates that 49 percent of permanent right-of-way for the existing Line 3 pipeline could support medium to high use by these mammals (4 or more species). This relatively high proportion may reflect the widespread use of this area by Canada lynx, wolves, and several species of bats. By comparison, 14 percent of the permanent right-of-way for the existing Line 3 pipeline may support medium to high use by protected or rare birds (7 or more species). A total of 26 BCCs were identified as occurring within 1 mile of the existing Line 3 pipeline from the Canada-North Dakota border to Superior, Wisconsin (Appendix M, Table M-5). Little of the Line 3 permanent right-of-way contains habitats used by protected or rare amphibians and reptiles.

Overall, GAP models indicate no use by amphibians and reptiles, and low and medium use by birds and mammals for offloading facilities and associated access at the Clearbrook terminal. GAP mammal models indicate that the area near the Superior terminal is high use by protected and rare mammals, and low and medium use by birds, amphibians, and reptiles.

Construction Impacts. General construction impacts and measures to avoid or reduce impacts on protected and rare animals addressed in the GAP models would be the same as those described above for federally and state-listed vertebrate fauna. If present, protected and rare animals could be injured or disturbed by construction activity and noise. Disturbance effects likely would be minor and temporary. Given that most facilities would be in areas with no high use habitats for birds, amphibians, or reptiles, construction impacts on these habitats would be permanent and minor, based on lack of use. Construction of facilities at Superior could affect habitats used by seven or more protected and rare mammals. If any of these species are present, construction could cause permanent major impacts—although NHIS data did not identify any state-listed mammals near this location.

Operations Impacts. The permanent right-of-way for the existing Line 3 pipeline contains an estimated 1,797 acres of habitats used by one or more protected and rare mammal species; 1,987 acres used by one or more protected and rare bird species; and 393 acres used by one or more protected and rare amphibian and reptile species. All of the existing Line 3 pipeline permanent right-of-way that crosses these GAP habitats is located within the existing Enbridge Mainline pipeline corridor. If these habitats and animals persist within the permanent pipeline right-of-way, they could be affected by ongoing

maintenance activities, particularly by the increased number of integrity digs. Maintenance activities could result in direct mortality of non-mobile animals if animals are present during the activity. Increased noise and human disturbance could cause more mobile species to leave the area; however, they would be expected to return when the activity ceases.

The principal impact on unique natural resources from the increase in rail traffic would be an increased probability of wildlife collisions. Rail transportation routes would cross areas ranging from no to high use, based on the GAP models for mammals, birds, amphibians, and reptiles; the impact of the increase in collision mortality for these animals would be permanent and negligible to major.

Minnesota's Wildlife Action Network

Approximately 608 acres (35 percent) of the permanent right-of-way for the existing Line 3 pipeline contains WAN habitats. Most WAN habitats (75 percent) that are affected by operation of the Line 3 pipeline are rated low-medium and medium, and no WAN habitats that would be affected by continued operation of the existing Line 3 pipeline are rated high. All of the Line 3 permanent right-of-way that crosses through WAN habitats in Minnesota is located within the existing Enbridge Mainline pipeline corridor. Maintenance activities such as vegetation management and integrity digs for pipeline repair and replacement could result in direct mortality of non-mobile animals and plants, if these species are present while the activity is occurring—particularly the increase in the number of integrity digs above current levels. These activities also would affect the habitats of these species. Increased noise and human disturbance could cause more mobile species to leave the area; however, they would be expected to return when the activity ceases.

The Minnesota WAN applies to facilities at Clearbrook, Minnesota; however, no WAN habitats would be affected as none occur around the terminal.

Minnesota Biological Survey Sites of Biodiversity Significance

Continued operation of the Line 3 pipeline would occur within an estimated 305 acres of moderate to outstanding MBS Sites. Most MBS Sites (76 percent) that occur within the permanent right-of-way for the existing Line 3 are rated high for biodiversity. All of the Line 3 permanent right-of-way that crosses through MBS Sites in Minnesota is located within the existing Enbridge Mainline pipeline corridor. Maintenance activities such as vegetation management and integrity digs for pipeline repair and replacement could result in direct mortality of plants; in particular, the increase in the number of integrity digs above current levels in could affect these MBS Sites. Long-term vegetation management and increased integrity digs during operation would result in a minor permanent change to MBS Sites.

Three MBS Sites preliminarily rated as moderate occur near the Clearbrook terminal where rail facilities are likely to be constructed, and the rail connection between Clearbrook and Gully would cross near three additional moderate rated MBS Sites. Construction of new rail offloading facilities likely would be able to avoid the MBS Sites near the Clearbrook terminal, resulting in no impact. The new rail connection would be constructed on an existing rail bed along a previously used rail corridor and is unlikely to affect the three adjacent MBS Sites.

Minnesota Scientific and Natural Areas

The Wawina Peatland SNA (Minnesota DNR 2016d, 2016g) is within the ROI for the existing Line 3 pipeline. The boundary for this SNA is located approximately 0.4-mile northeast of the Line 3 pipeline; a BNSF rail line lies between the SNA and Line 3. Continued use of the Line 3 pipeline would not affect this SNA.

5.2.5.3.7 Existing Line 3 Supplemented by Truck

The potential construction- and operations-related impacts on unique biological resources associated with continued use of the existing Line 3 pipeline supplemented by transportation of crude oil by truck would be similar to the impacts reported above for each of the components of this combined alternative. Information on the species and habitats potentially affected by this alternative and the impacts that may occur are summarized below.

Federally Listed Species

Federally listed threatened and endangered species that could occur within or near the existing Line 3 pipeline and that could be affected by construction and operation of facilities and routes for the truck alternative include three mammals – Canada lynx, gray wolf, and northern long-eared bat; four birds – Kirtland's warbler, piping plover, rufa red knot, and whooping crane; three invertebrates – Dakota skipper, Poweshiek skipperling, and rusty patched bumble bee; and two plants – Fassett's locoweed and western prairie fringed orchid (Table 5.2.5-14 and 5.2.5-14).

Construction Impacts

The Line 3 pipeline has been built and is in operation; therefore no construction impacts are associated with that component of the combined alternative. Individual Canada lynx and gray wolves could experience temporary minor effects associated with construction of new truck offloading and access facilities at the existing Clearbrook and Superior terminals. Northern long-eared bats and occupied maternity roosts are not known to occur near the Clearbrook and Superior terminals. With implementation of general conservation measures for northern long-eared bats associated with the ESA 4(d) rule, impacts related to construction would be temporary and minor. Kirtland's warbler, piping plover, and whooping crane are not likely to be affected by construction of truck offloading facilities or access roads. Native prairie plants that could provide habitat for the native prairie-dependent rusty patched bumble bee may persist within hay/pasture vegetation in the vicinity of the Clearbrook terminal. If suitable habitat for these butterflies and bumble bees occurs within these grasslands, it could be lost, potentially resulting in a permanent minor impact. Effects on the federally listed Fassett's locoweed would be negligible based on the lack of appropriate habitat and species presence.

Operations Impacts

- If federally listed species persist within the permanent right-of-way for the existing Line 3, impacts on those species could continue from ongoing operations such as mowing for vegetation management, equipment maintenance, invasive species control, right-of-way monitoring and inspections, and pipeline integrity excavations. Vegetation maintenance and the increase in integrity digs (an estimated 267 integrity digs per year over the next 15 years) could result in direct mortality of individuals of non-mobile species, including the Dakota skipper, Poweshiek skipperling, rusty patched bumble bee, Fassett's locoweed, and western prairie fringed orchid, if these species are present while the activity is occurring. Increased noise and human disturbance at offloading facilities could cause more mobile animals, including Canada lynx, gray wolf, northern long-eared bat, Kirtland's warbler, piping plover, rufa red knot, and whooping crane, to leave the area; however, they would be expected to return when the activity ceases.

Implementation of this combined alternative would reduce Project-related truck traffic from 4,000 loaded tanker trucks per day to 1,947 trucks per day. Nevertheless, this represents a substantial increase in truck traffic over current conditions that could result in permanent and major impacts on the

federally listed gray wolf and Canada lynx because of the increased potential for collisions of trucks with wildlife. Impacts on all other federally listed animals and plants would not occur or would be permanent and minor.

State-Listed Species

Endangered and Threatened Species

State-listed endangered and threatened species that could occur within the ROI for the existing Line 3 pipeline and that could be affected by construction and operation in the vicinity of the Clearbrook and Superior terminals where new truck offloading facilities and access roads would be constructed include one mammal – northern long-eared bat, one invertebrate – fluted-shell mussel, and one reptile – wood turtle. Potential impacts on the northern long-eared bat are discussed for federally listed endangered and threatened species. Of the 18 state-listed endangered and threatened plants known to occur within the ROI for the Line 3 pipeline, 8 potentially occur within the permanent right-of-way and could be affected by operations. These include three in Minnesota – beaked spikerush, hair-like beak rush, and sterile sedge; and five in Wisconsin –clustered bur-reed, neat spike-rush, seaside crowfoot, small yellow-water crowfoot, and sweet colt's foot. The state-protected plants beaked spikerush, hair-like beak rush, sterile sedge, and sweet colt's-foot have the potential to occur near the Clearbrook and Superior terminals where new truck offloading and access facilities would be constructed (Appendix M, Table M-3).

Construction Impacts

Listed plants present in the construction footprint for truck offloading facilities and access roads could be destroyed during construction activities, and their habitats could be degraded by the introduction or spread of noxious weeds and invasive plants. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction. If listed plants are present in the construction work area, construction impacts would be permanent and major. Takings of state-listed endangered or threatened plants would require consultation with the appropriate state DNR for a take permit, which may require compensatory mitigation to offset unavoidable losses.

Operations Impacts

Pipeline operations for the existing Line 3 that could affect state-listed species include ongoing vegetation management, right-of-way monitoring and inspection, and pipeline excavation for repair or replacement of pipe segments. If excavation of pipe segments is required at surface water crossings where the fluted-shell mussel is present, destruction of the mussels could occur, and increased turbidity and sedimentation also could affect the mussels. Vegetation management and pipeline excavation could result in injury or mortality of wood turtle eggs or adults, if these activities coincided with occupied habitats.

Listed plants that persist within the permanent right-of-way could be affected directly or indirectly by maintenance activities. With the increased need for excavation to repair or replace the Line 3 pipeline, there is a potential for the excavations to affect state-listed plants. If this is the case, a take permit would be required. If there are no feasible alternatives to takings, compensatory mitigation could be required to offset the impact.

The principal impact on state-listed animals from the increase in truck traffic associated with this combined alternative would be increased wildlife collisions. This could represent a major permanent impact for state-listed species. Wood turtles are likely to be hit by trucks if they are on the roadway. If

routes cross occupied habitats with no provision for turtles to avoid crossing roads, the projected increase in traffic could increase road kills. The remaining state-listed species in the vicinity of new truck facilities are plants that would not be affected by truck traffic.

Special Concern Species

- State-listed special concern species that could be affected by construction and operation of the alternative include nine vertebrates: three bats – big brown bat, little brown bat and northern long-eared bat; six birds – Connecticut warbler, Le Conte's sparrow, Nelson's sparrow, short-eared owl, trumpeter swan, and yellow rail; and four invertebrates: a caddisfly, and three mussels – black sandshell, creek heelsplitter and pink heelsplitter (listed in Appendix M, Tables M-1 and M-2).
- Seventeen state-listed plants of special concern that could be affected by operation of the combined alternative include barren strawberry, blunt sedge, English sundew, false mountain willow, few-flowered spikerush, Lapland buttercup, least moonwort, mamillate spike-rush, McCalla's willow, mingan moonwort, northern single-spike sedge, northwestern sticky aster, pale moonwort, small white lady's slipper, St. Lawrence grapefern, twig rush, and Vasey's rush (Appendix M, Table M-3). The state-protected plants beaked spikerush, hair-like beak rush, sterile sedge, and sweet colt's-foot have the potential to occur near the Clearbrook and Superior terminals where new truck offloading and access facilities would be constructed (Appendix M, Table M-3).

Construction Impacts. The state-protected plants beaked spikerush, hair-like beak rush, sterile sedge, and sweet colt's-foot have the potential to occur near the Clearbrook and Superior terminals where new truck offloading and access road facilities would be constructed (Appendix M, Table M-3). Listed plants present in the construction footprint could be destroyed during construction activities, and their habitats could be degraded by the introduction or spread of noxious weeds and invasive plants. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction. If listed plants are present in the construction work area, construction impacts would be permanent and major. Takings of state-listed endangered or threatened plants would require consultation with the appropriate state DNR for a take permit, which may require compensatory mitigation to offset unavoidable losses.

Operations Impacts. Of the three bats of special concern, only the northern long-eared bat has been reported to occur within the permanent right-of-way for existing Line 3. Vegetation management and pipeline excavation within the Line 3 permanent right-of-way is unlikely to affect bats, unless trees are allowed to grow larger than 3 inch in diameter at breast height between tree maintenance events. Vegetation management and pipeline excavation could continue to result in injury or mortality of bird eggs and nests, if maintenance activities are conducted during the breeding season and they are present. Of the six birds occurring within the ROI for the existing Line 3 pipeline, four – Nelson's sparrow, short-eared owl, trumpeter swan, and yellow rail are known to occur within the permanent right-of-way. If excavation of pipe segments is required at surface water crossings where the fluted-shell mussel or caddisflies are present, destruction of the mussels or caddisflies could occur, and increased turbidity and sedimentation also could affect these species.

Special concern plants that persist within the permanent right-of-way could be affected directly or indirectly by vegetation management and pipeline repair or replacement. Twelve of the 17 plants of special concern occurring within the ROI for the existing Line 3 pipeline also are known to occur within

the permanent pipeline right-of-way (10 in Minnesota – barren strawberry, blunt sedge, false mountain willow, few-flowered spikerush, least moonwort, mingan moonwort, northern single-spike sedge, pale moonwort, small white lady-s slipper, and St. Lawrence grapefern; and 2 in Wisconsin – mamillate spike-rush, and Vasey's rush [Appendix M, Table M-3]). Given the increased need for excavation to repair or replace aging pipe segments, the excavations could coincide with occurrences of state-listed special concern plants. If this is the case and there are no feasible alternatives, these plants could be disturbed. Because these rare plants have, in many instances, persisted or reestablished after construction of other pipelines through this corridor, impacts are likely to be short term and negligible.

The increased truck traffic could increase collisions with and mortality of special concern birds, including the Connecticut warbler, Le Conte's sparrow, Nelson's sparrow, short-eared owl, trumpeter swan, and yellow rail. These birds would be most susceptible if they nest in habitats near the highways. The increase in collision mortality could represent a permanent major impact on these state-listed species. The remaining state-listed species in the vicinity of the truck facilities are plants that would not be affected by truck traffic.

Species of Greatest Conservation Need

Gap Analysis Program Species Models

The distribution of low, medium, and high use areas for protected or rare mammal species indicates that 49 percent of the permanent right-of-way for the existing Line 3 pipeline could support medium to high use by these mammals (4 or more species). This relatively high proportion may reflect the widespread use of the area by Canada lynx, wolves, and several species of bats. By comparison, 14 percent of the permanent right-of-way for the Line 3 pipeline may support medium to high use by protected or rare birds (7 or more species). A total of 26 BCCs were identified as occurring within 1 mile of the Line 3 pipeline from the Canada-North Dakota border to Superior, Wisconsin (Appendix M, Table M-5). Little of the Line 3 permanent right-of-way contains habitats used by protected or rare amphibians and reptiles.

Overall, GAP models indicate no use by amphibians and reptiles and low and medium use by birds and mammals for offloading facilities and associated access roads at the Clearbrook terminal. GAP mammal models indicate that the area near the Superior terminal is high use by protected and rare mammals, and low and medium use by birds, amphibians, and reptiles.

Construction Impacts. General construction impacts and measures to avoid or reduce impacts on protected and rare animals addressed in the GAP models would be the same as those described for federally and state-listed vertebrate fauna. If present, protected and rare animals could be injured or disturbed by construction activity and noise. Disturbance effects likely would be minor and temporary. Given that most facilities would be in areas with no high use habitats for birds, amphibians, and reptiles, construction impacts on these habitats would be permanent and minor, based on lack of use. Construction of truck facilities at Superior could affect habitats used by seven or more protected and rare mammals. If any of these species are present, construction could cause permanent, major permanent impacts—although NHIS data did not identify any state-listed mammals near this location.

Operations Impacts. The permanent right-of-way for the existing Line 3 pipeline contains an estimated 1,797 acres of habitats used by one or more protected and rare mammal species; 1,987 acres used by one or more protected and rare bird species; and 393 acres used by one or more protected and rare amphibian and reptile species. All of the Line 3 pipeline permanent right-of-way that crosses these GAP habitats is located within the existing Enbridge Mainline pipeline corridor. If these habitats and animals

persist within the permanent pipeline right-of-way, they could be affected by ongoing maintenance activities, particularly by the increased number of integrity digs. Maintenance activities could result in direct mortality of non-mobile animals, if animals are present while the activity is occurring. Increased noise and human disturbance could cause more mobile species to leave the area; however, they would be expected to return when the activity ceases.

The principal impact on unique natural resources from such a large increase in truck traffic would be increased wildlife collisions. Truck transportation routes would cross areas ranging from no to high use for mammals, birds, amphibians, and reptiles, based on the GAP models. The increase in collision mortality for these animals would be a permanent and negligible to major impact.

Minnesota's Wildlife Action Network

Approximately 608 acres (35 percent) of the permanent right-of-way for the existing Line 3 pipeline contains WAN habitats. Most WAN habitats (75 percent) that are affected by operation of the existing Line 3 are rated low-medium and medium, and no WAN habitats affected by Line 3 are rated high. All of the Line 3 permanent right-of-way that crosses WAN habitats in Minnesota is located within the existing Enbridge Mainline pipeline corridor. Maintenance activities, such as vegetation management and integrity digs for pipeline repair and replacement, could result in direct mortality of non-mobile animals and plants, if these species are present while the activity is occurring—particularly the increased number of integrity digs above current levels. These activities also would affect the habitats of these species. Increased noise and human disturbance could cause more mobile species to leave the area; however, they would be expected to return when the activity ceases.

The Minnesota WAN applies to facilities at Clearbrook, Minnesota; however, no WAN habitats would be affected as none occur around the terminal.

Minnesota Biological Survey Sites of Biodiversity Significance

Continued operation of the existing Line 3 pipeline would occur within an estimated 305 acres of moderate to outstanding MBS Sites. Most MBS Sites (76 percent) that occur within the permanent right-of-way for the Line 3 pipeline are rated high for biodiversity. All of the Line 3 permanent right-of-way that crosses MBS Sites in Minnesota is located within the existing Enbridge Mainline pipeline corridor. Maintenance activities such as vegetation management and integrity digs for pipeline repair and replacement could result in direct mortality of plants; in particular, the increased number of integrity digs above current levels could affect these MBS Sites. Long-term vegetation management and increased integrity digs during operation would result in a minor permanent change to MBS Sites.

Three MBS Sites preliminarily rated as moderate occur near the Clearbrook terminal where truck facilities are likely to be constructed. Construction of new truck offloading facilities likely would be able to avoid the MBS Sites near the Clearbrook terminal, with the result of no impact.

Minnesota Scientific and Natural Areas

The Wawina Peatland SNA (Minnesota DNR 2016d, 2016g) is within the ROI for the existing Line 3 pipeline. The boundary for this SNA is approximately 0.4-mile northeast of Line 3; a BNSF rail line lies between the SNA and Line 3. Continued use of the existing Line 3 pipeline would have no effect on this SNA.

5.2.5.4 Summary and Mitigation

5.2.5.4.1 Summary

Potential effects on protected and conservation concern species were evaluated directly based on occurrence identified from IPaC searches, NHIS data, and field survey data. Potential effects on species of conservation concern were also evaluated indirectly through abundance, distribution, and habitat-based models for rare species, including the Gap Analysis Program, and the WAN and MBS Sites in Minnesota. The potential for effects on federally and state-protected and conservation concern animals and plants depends on whether they occur near the alternatives; whether they would be present when activities that may injury, harm, or disturb them would occur; and whether typical conservation measures would effectively prevent impacts. Table 5.2.5-25 presents a summary of construction- and operations-related impacts on unique resources for the Applicant's proposed project and CN Alternatives.

The data and analyses regarding unique natural resources presented in this EIS can be used by the regulatory agencies to assess potential impacts on unique natural resources. In addition, the USACE is preparing a Biological Assessment for the Project that would be used by USFWS as part of its determination on whether the Project would jeopardize the continued existence of any federally listed species or would result in destruction or adverse modification of their critical habitat. Potential effects on protected species would require avoidance and conservation measures with a potential for requirements for formal ESA consultation and federal and state incidental take permits where unavoidable impacts are likely to occur.

Construction impacts could include injury or loss of aquatic and terrestrial invertebrates, amphibians and reptiles, small mammals, bird eggs and young, and plants; loss or alteration of forage and cover habitats; and disturbance from noise and activity. Operations effects could include permanent habitat loss or alteration and continued disturbance from noise and activity at aboveground facilities and from pipeline inspection overflights, ground surveillance, and pipeline integrity excavation. Creation of new pipeline rights-of-way may contribute to fragmentation of habitats creating barriers to movements for amphibians, reptiles, and small mammals; facilitated movements for some predators; new edge habitats; and potential reduction in the abundance and diversity of forest nesting birds. Potential direct injury or mortality of protected animals may be avoided or minimized through typically required conservation measures, although reduction in habitat quality resulting from facility and pipeline construction may indirectly impact protected animals due to a permanent reduction in the habitats suitability to support some protected species.

Construction Impacts

Construction activities have the potential to disturb special-status animals, plants, and habitats due to increased noise and human activity, the use of construction equipment, and vegetation removal. Injury, mortality, or disturbance of individuals of special-status species and alteration of habitat types could also occur as a result of these activities.

Construction noise and increased human activity likely would cause individuals of more mobile species (e.g., larger mammals, bats, birds) to move to other areas, possibly returning after construction activities stop. If these disturbances were to occur during sensitive reproductive periods it could cause them to abandon their young or nesting/denning/roosting area, resulting in a decrease in survival and possible reproductive failure of individual mating pairs. Individuals of less mobile species that occur within the

construction work area would not be able to avoid construction activities and could be crushed and killed.

Surface water crossings could affect individuals of aquatic species that are present. Disturbance to the stream bottom due to the use of dry or wet open-cut crossing methods could crush or suffocate individuals of aquatic species and/or their nests and would temporarily increase turbidity that could reduce feeding efficiency and damage these sensitive aquatic animals in the vicinity. Contaminated construction equipment and water used for hydrostatic testing could introduce invasive aquatic animals such as zebra and quagga mussels that could displace and reduce habitat quality for aquatic animals. Waterbodies crossed using the HDD crossing method would avoid direct mortality, injury, and habitat impact on special-status aquatic species.

Vegetation removal could injure or kill individuals of special-status species if they are present when clearing or construction activities occur. Mobile special-status animals would be likely to move to other areas, while individuals of less mobile species could be crushed and killed. Direct loss of protected plants may occur during construction and changes to soils and surrounding vegetation communities may leave habitats unsuitable after construction. Avoidance may be possible once precise locations are determined through surveys, such as those completed for the Applicant's proposed project. Some protected and special concern plants may be preserved and continue to persist within pipeline rights-of-way. In general, construction of aboveground facility sites and the establishment of pipeline rights-of-way would alter existing habitat types (including WAN and MBS Sites) and increase fragmentation.

Construction of the Applicant's proposed project, SA-04, or the rail and truck alternatives would have the potential to affect threatened and endangered species. Based on distribution and NHIS records, SA-04 has a greater potential to affect more federally and state-protected animals, while the Applicant's proposed project has a greater potential to affect more state-protected plants. The suite of federally and state-protected animals differs between the Applicant's proposed project and SA-04 because of their divergent routes and the different ecosystems they cross. There are more federally and state-protected animals in the ROI of SA-04 than the ROI of the Applicant's proposed project, partially due to the greater length of the SA-04 and the increased diversity of habitats along SA-04. Whether that translates into greater potential for impacts depends upon the suitability of the habitats crossed and the measures implemented to minimize disturbance, especially given the larger amount and higher quality of habitat along Minnesota portion of the Applicant's proposed project. For the populations of state-listed plants that cannot be avoided during construction, the impacts could be permanent and major. These impacts could be offset by compensatory mitigation.

Indirect habitat evaluations for vertebrate species based on GAP species models for the new pipeline alternatives indicate that SA-04 would affect more than twice the area of habitats identified as suitable for mammals, birds, amphibians, and reptiles of conservation concern compared to the Applicant's proposed project. This supports the overall conclusion from the IPaC and NHIS occurrence data that the potential for impacts on protected animals would increase for the new pipeline construction options. Among these vertebrate groups, however, the proportion of the suitable habitats used by the most species of conservation concern varies. A higher proportion of the area is used by mammals and birds for the Applicant's proposed project, and a higher proportion of the area is used by amphibians and reptiles for SA-04 (Table 5.2.5-18 and Table 5.2.5-26). Overall, SA-04 has the potential to affect more protected species. With implementation of BMPs and appropriate species-specific conservation measures for new pipeline construction, direct and indirect impacts on federally and state-listed vertebrates primarily would

be temporary disturbance, short-term habitat loss, and permanent habitat alteration—resulting in overall minor impacts.

Considering the potential impacts on unique natural resources within the portions of the new pipeline routes only within Minnesota, however, leads to the opposite conclusion. A review of construction impact areas indicates that the Applicant's proposed project would affect 5 times more WAN (habitat for SGCN) and 30 times more MBS Sites than SA-04. This is consistent with the overall increase in numbers of occurrences and species for state-protected plants for the Applicant's proposed project compared to SA-04. In addition, the Applicant's proposed project potentially would contribute to fragmentation within new pipeline rights-of-way across 23 miles of WAN habitats and across 17 miles of moderate to outstanding rated MBS Sites.

Direct impacts on federally and state-protected vertebrates from construction of rail and truck offloading and access facilities are expected to be negligible to minor for construction. Construction of these facilities for the rail and truck alternatives would potentially affect several state-protected and special concern plants.

Operations Impacts

Pipeline right-of-way maintenance activities during operation would include mowing, equipment maintenance, invasive species control, right-of-way monitoring, and integrity digs to repair or replace pipe segments. Vegetation maintenance that removes riparian trees and large shrubs could increase stream temperatures by removing shade, which would reduce habitat suitability for aquatic animals. Activities in and around water, as well as upland vegetation maintenance could result in direct mortality of individuals of less mobile species through crushing, if individuals are present while the activity is occurring. State-listed plants that persist within the permanent right-of-way after construction could be permanently affected by vegetation maintenance activities.

Individuals of all special-status species within the ROI could be indirectly affected by habitat loss and alteration due to maintenance activities. Maintained pipeline rights-of-way could act as a barrier to travel for some animals such as amphibians, reptiles, and small mammals, fragmenting habitat for SGCNs. Habitat fragmentation can increase edge habitats favored by some animals and avoided by others; and can create a barrier to movements for some animals while facilitating movements of others, especially predators.

With implementation of BMPs and appropriate species-specific conservation measures for operations of new pipeline, most impacts due to pipeline operations would be temporary disturbance and permanent habitat alteration, resulting in overall minor impacts for both the Applicant's proposed project and SA-04.

The effects of continued use of the existing Line 3 pipeline on protected and rare animals and plants would be the same as ongoing Line 3 operations, although the increased number of integrity excavations required for the aging pipeline would increase the potential for disturbance to protected or rare animals and plants, if they continue to persist within the permanent right-of-way. However, habitats along the route have been previously altered by construction of multiple pipelines and the long-term maintenance of the Line 3 permanent right-of-way and are unlikely to support a diversity or abundance of threatened or endangered species.

The primary potential impact for the rail and truck alternatives would be increased rail and truck wildlife collisions, which could affect protected and rare mammals, birds, reptiles, and insects. Incremental

increases in rail and truck traffic may result in increased collision mortality, especially for protected prairie-dependent insects that may persist in remnant prairie patches along rail lines, for protected reptiles where highways cross suitable habitat, and for protected wide-ranging mammals such as wolves and Canada lynx where rail and truck routes cross their ranges.

5.2.5.4.2 Mitigation

In addition to the Applicant-proposed measures described above, which would be incorporated into the Project, the Applicant would comply with conditions specified in permits required for the Project. Typical conservation measures to reduce impacts on unique resources are identified above in the discussions for the specific species. These measures likely would be required by the applicable agencies, and additional mitigation for potential impacts could be required.

Actions identified by Minnesota DNR to further minimize disturbance to MBS Sites include, but are not limited to, the following:

- Do not park equipment or stockpile supplies within MBS Sites,
- Do not place spoil within MBS Sites,
- Limit construction activities to frozen ground conditions, and
- Revegetate disturbed soil with native species suitable to the local habitat as soon after construction as possible.

Table 5.2.5-26. Summary of Potential Impacts on Unique Natural Resources for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact / Category	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Federally Protected Species							
Construction Impacts							
Potential for injury, mortality, or disturbance	Minor/temporary impacts • 3 mammals Minor/short-term impacts • 1 insect Negligible/ temporary to short-term impacts • 3 birds • 2 insects No impact • 2 plants 11 species total	Minor/temporary impacts • 3 mammals	Minor/temporary impacts • 3 mammals • 1 reptile • 3 insects Negligible/ temporary impacts • 2 birds Negligible/ permanent impacts • 6 plants No impact • 1 insect • 4 mollusks • 2 plants 21 species total, plus 1 candidate	Negligible to minor/temporary impacts • 3 mammal Minor/ permanent impacts • 3 insects Negligible to minor/permanent • 1 plant No impact • 3 birds 10 species total	Negligible to minor/temporary impacts • 3 mammal Minor/permanent impacts • 1 insects No impact • 3 birds • 1 plant 8 species total	Minor/temporary impacts • 3 mammals Minor/permanent impacts • 3 insects No impact • 4 birds • 1 plant 10 species total	Minor/temporary • 3 mammals Minor/permanent • 1 insects No impact • 3 birds • 1 plant 8 species total

Table 5.2.5-26. Summary of Potential Impacts on Unique Natural Resources for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact / Category	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Operations Impacts							
Potential for injury, mortality, or disturbance of federal ESA species	Minor/temporary impacts • 2 mammals Negligible/ permanent impacts • 1 mammal • 2 birds • 1 plant No impact • 1 bird • 3 insects • 1 plant 11 species total	Minor/permanent impacts • 1 mammal Minor/short-term • 1 mammal Negligible/ permanent impacts • 1 mammal, • 2 birds • 3 insects • 2 plants No impact • 2 birds 12 species total	Minor/Temporary impacts • 1 mammal, • 1 reptile Negligible/ permanent impacts • 2 mammals, • 4 insects • 6 plants No impact • 2 birds, • 4 mollusks • 2 plants 21 species total, plus 1 candidate	Major/permanent impacts • 2 mammals No impact • 1 mammal • 3 birds • 3 insects • 1 plant 10 species total	Major/permanent impacts • 2 mammals No impact • 1 mammal • 3 birds • 1 insect • 1 plant 8 species total	Major/permanent impacts • 2 mammals Minor/permanent impacts • 3 insects • 1 mammal • 4 birds • 2 plant 12 species total	Major/permanent impacts • 2 mammals Minor/permanent impacts • 1 insects Minor/temporary impacts • 1 mammal No impact • 3 birds • 1 plant 8 species total
State-listed Endangered or Threatened Species							
Construction Impacts							
Mammals	1 species (northern long-eared bat) See federal species	1 species (northern long-eared bat) See federal species	1 species See federal species	--	--	See Existing Line 3	See Existing Line 3
Birds	--	--	5 species Temporary/ negligible	--	--	--	--

Table 5.2.5-26. Summary of Potential Impacts on Unique Natural Resources for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact / Category	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Herptiles	1 species (wood turtle) Temporary to long-term/minor	1 species (wood turtle)	3 species Temporary to long-term/negligible to minor	--	--	See Existing Line 3	See Existing Line 3
Fish	1 species (pugnose shiner) No impact	--	8 species Temporary/minor	--	--	--	--
Mussels	1 species (fluted-shell mussel) no impact	1 species	11 species Temporary/minor	--	--	See Existing Line 3	See Existing Line 3
Insects	--	--	2 species Temporary/minor	--	--	--	--
Plants	11 species (6 Minnesota, 5 Wisconsin) Permanent/major 10 species No impact	8 species	4 species Permanent/major 18 species No impact	4 species Permanent/major	4 species Permanent/major	8 species (3 Minnesota, 5 Wisconsin) Permanent/major 10 species No impact	8 species (3 Minnesota, 5 Wisconsin) Permanent/major 10 species No impact
Operations Impacts							
Mammals	1 species (northern long-eared bat) See federal species	1 species (northern long-eared bat) See federal species	1 species See federal species	--	--	See Existing Line 3	See Existing Line 3

Table 5.2.5-26. Summary of Potential Impacts on Unique Natural Resources for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact / Category	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Birds	--	--	5 species Permanent/ negligible	--	--	--	--
Herptiles	1 species (wood turtle) Permanent/minor	1 species (wood turtle) Permanent/minor	3 species Permanent/ negligible	--	--	See Existing Line 3	See Existing Line 3
Fish	1 species (pugnose shiner) Permanent/ negligible	--	8 species Permanent/ negligible	--	--	--	--
Mussels	1 species (fluted-shell mussel) Permanent/ negligible	1 species Permanent/ negligible	11 species Permanent/ negligible	--	--	See Existing Line 3	See Existing Line 3
Insects	--	--	2 species Permanent/ negligible	--	--	--	--
Plants	11 species (6 Minnesota, 5 Wisconsin) Permanent/minor 10 species No impact	8 species Permanent/minor 10 species No Impact	22 species Permanent/minor	4 species No impact	4 species No impact	8 species (3 Minnesota, 5 Wisconsin) Permanent/minor 10 species No impact	8 species (3 Minnesota, 5 Wisconsin) Permanent/minor 10 species No impact

Table 5.2.5-26. Summary of Potential Impacts on Unique Natural Resources for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact / Category	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Species of Concern							
Construction Impacts							
Mammals	4 species Short-term/minor	1 species	--	--	--		
Birds	1 species Short-term/major	6 species	6 species Short-term/major	--	--	See Existing Line 3	See Existing Line 3
Herptiles	1 species Short-term/ negligible to major	--	2 species Short-term to permanent/ negligible to major	--	--	--	--
Fish	1 species Short-term/ negligible to major	--	4 species Short-term/ negligible to minor	--	--	--	--
Mussels	3 species Short-term/ negligible to major	3 species	3 species Short-term/ negligible to minor	--	--	--	--
Insects	2 species	1 species	6 species Short-term/minor	--	--	See Existing Line 3	See Existing Line 3
Plants	11 species Permanent/major 3 species No impact	17 species	3 species Permanent/major 17 species No impact	3 species Permanent/major	3 species Permanent/major	See Existing Line 3	See Existing Line 3

Table 5.2.5-26. Summary of Potential Impacts on Unique Natural Resources for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact / Category	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Operations Impact							
Mammals	4 species Short-term/minor	1 species See federal species 2 species No impact	--	--	--	See Existing Line 3	See Existing Line 3
Birds	1 species Short-term/major	6 species Temporary to short-term/minor	6 species Short-term/ negligible to minor	--	--	See Existing Line 3	See Existing Line 3
Herptiles	1 species Short-term/ negligible to major	--	2 species Short-term/ negligible to minor	--	--	--	--
Fish	1 species Short-term/ negligible to major	--	4 species Short-term/ negligible to minor	--	--	--	--
Mussels	3 mussels Short-term/ negligible to major	3 species Temporary to short-term/minor	3 species Short-term/ negligible to minor	--	--	See Existing Line 3	See Existing Line 3
Insects	--	1 species Temporary to short-term/minor	6 species Short-term/ negligible to minor	--	--	See Existing Line 3	See Existing Line 3
Plants	11 species Short-term/minor 3 species No impact	17 species Short-term/ negligible	20 species Short-term/ negligible to minor	3 species No impact	3 species No impact	See Existing Line 3	See Existing Line 3

Table 5.2.5-26. Summary of Potential Impacts on Unique Natural Resources for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact / Category	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Species in Greatest Conservation Need – GAP Models							
Mammal Habitat	Con: 4,954 acres *Op: 2,092 acres*	Con: -- *Op: 1,797 acres*	Con: 9,076 acres *Op: 3,792 acres*	Clearbrook Con: low/medium *Op: low/medium* Superior Con: high/medium *Op: high/medium*	Clearbrook Con: low/medium *Op: low/medium* Superior Con: high/medium *Op: high/medium*	Clearbrook Con: low/medium *Op: Line 3 + Rail* Superior Con: high/medium *Op: Line 3 + Rail*	Clearbrook Con: low/medium *Op: Line 3 + Truck* Superior Con: high/medium *Op: Line 3 + Truck*
Bird Habitat	Con: 5,614 acres *Op: 2,356 acres*	Con: -- *Op: 1,987 acres*	Con: 11,549 acres *Op: 4,812 acres*	Clearbrook Con: low/medium *Op: low/medium* Superior Con: low/medium *Op: low/medium*	Clearbrook Con: low/medium *Op: low/medium* Superior Con: low/medium *Op: low/medium*	Clearbrook Con: low/medium *Op: Line 3 + Rail* Superior Con: low/medium *Op: Line 3 + Rail*	Clearbrook Con: low/medium *Op: Line 3 + Truck* Superior Con: low/medium *Op: Line 3 + Truck*
Herptile Habitat	Con: 1,328 acres *Op: 581 acres*	Con: -- *Op: 393 acres*	Con: 3,984 acres *Op: 1,658 acres*	Clearbrook Con: none *Op: none* Superior Con: low/medium *Op: low/medium*	Clearbrook Con: none *Op: none* Superior Con: low/medium *Op: low/medium*	Clearbrook Con: none *Op: Line 3 + Rail* Superior Con: low/medium *Op: Line 3 + Rail*	Clearbrook Con: none *Op: Line 3 + Truck* Superior Con: low/medium *Op: Line 3 + Truck*
	Short-term/ negligible to minor *Short-term/ negligible to minor*	-- *Short-term/ negligible to minor*	Con: Short-term/ negligible to minor *Op: Permanent/ negligible*	Permanent/minor *Permanent/minor*	Permanent/minor *Permanent/minor*	Permanent/minor *Op: Line 3 + Rail*	Permanent/minor *Op: Line 3 + Truck*

Table 5.2.5-26. Summary of Potential Impacts on Unique Natural Resources for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact / Category	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Species in Greatest Conservation Need – MN Wildlife Action Network							
SGCN Habitat	23 miles new corridor Con: 1,561 acres *Op: 665 acres*	0 mi. new corridor Con: -- *Op: 608 acres*	0 mi. new corridor Con: 277 acres *Op: 115 acres*	--	--	See Existing Line 3	See Existing Line 3
	Permanent/major *Permanent/minor*	-- *Permanent/minor*	Permanent/minor *Permanent/minor*	--	--	See Existing Line 3	See Existing Line 3
Minnesota Biological Survey Sites of Biodiversity Significance							
	17 miles in new corridor	0 mi. new corridor	0 mile in new corridor	--	--	See Existing Line 3	See Existing Line 3
Outstanding	Con: 7 acres *Op: 5 acres*	-- *Op: 25 acres*	Con: 1 acre *Op: <1 acres*	-- --	-- --	See Existing Line 3	See Existing Line 3
High	Con: 78 acres *Op: 40 acres*	-- *Op: 233 acres*	Con: 5 acres *Op: 2 acres*	-- --	-- --	See Existing Line 3	See Existing Line 3
Total	Con: 877 acres *Op: 403 acres*	-- *Op: 305 acres*	Con: 25 acres *Op: 10 acres*	-- --	-- --	See Existing Line 3	See Existing Line 3
	Permanent/major *Permanent/major*	-- *Permanent/minor*	Permanent/minor *Permanent/minor*	-- --	-- --	See Existing Line 3	See Existing Line 3
Minnesota SNA and Analogous PAD-US							
	No impact	No impact	No impact	No impact	No impact	No impact	No impact

ESA = Endangered Species Act, GAP = GAP Analysis Program, MBS Sites = Minnesota Biological Survey Sites of Biodiversity Significance, SGCN = Species of Greatest Conservation Need, SNA = Scientific and Natural Area, WAN = Wildlife Action Network

5.2.5.5 References

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5.2.6 Public Lands

Public lands are lands managed or held by federal, state, and county governments for a variety of public benefits—including preservation of natural areas, wildlife habitat, timber, mineral resources, water resources and other natural resources, recreation areas, and other public interests. Because construction and operation of the Applicant's proposed project and the CN Alternatives may affect the future use of federal, state, and county land, the public lands analysis assessed:

- Potential impacts on public lands, including compatibility of the Project with designated uses of specific public lands.

In addition to the analysis of compatibility with the designated use of public lands in this section, impacts on the public resources contained within public lands are generally described (e.g., vegetation, wildlife, and recreation) although not correlated to specific public lands, and the measures that would be implemented to minimize potential impacts on those resources can be found in several other sections within Chapter 5, including Sections 5.2.1, 5.2.3, 5.2.4, and 5.3.2.

This section first describes the existing type and quantity of public lands for the Applicant's proposed project and each of the CN Alternatives (continued use of existing Line 3, SA-04, transportation by rail, transportation by truck, and existing Line 3 supplemented by rail or truck). Potential impacts on public lands from construction and operation of the Applicant's proposed project and the CN Alternatives are discussed next. A summary and comparison of the impacts for the Applicant's proposed project and CN Alternatives are included at the end of the section.

5.2.6.1 Regulatory Context and Methodology

5.2.6.1.1 Regulatory Context

Regulations governing public lands vary significantly depending on the specific purpose for which the lands were obtained and the government entity responsible for its management. The following section describes the general structure of public land ownership (federal, state, and county) and identifies the authorizing agency and major relevant regulatory provisions. Federal land would be crossed by the Applicant's proposed project and CN Alternatives in North Dakota, Minnesota, and Illinois; no federal or state lands would be crossed in Iowa. While the Applicant's proposed project and CN Alternatives would collectively cross five states, state-owned/managed lands would only be crossed in Minnesota.

5.2.6.1.2 Methodology

The ROI for the analysis of impacts on public lands was the construction and operations footprint for the Applicant's proposed project and each of the CN Alternatives. All federal, state, and county land directly crossed by construction and operations areas within the ROI was assessed for the Applicant's proposed project and CN Alternatives. The analysis was undertaken by first identifying and inventorying in GIS all public lands in the counties crossed by the Applicant's proposed project and the CN Alternatives.

The following construction and operation footprints were overlaid to quantify resources affected by construction and operation:

- The route and estimated footprints for the pipeline and associated facilities for the Applicant's proposed project,

- The 120-foot-wide construction footprint and 50-foot-wide permanent right-of-way for SA-04,
- The permanent right-of-way for the existing Line 3 pipeline, and
- The estimated footprints of required facilities and existing potential routes for the rail and truck alternatives.

Public land within the ROI for the Applicant's proposed project and CN Alternatives were identified using GIS datasets and layers in the following data source:

- PAD-US.
- Where data were available, ownership and identification of the authorizing agency for each land type is provided, along with a discussion of compatibility with the relevant regulatory provisions.

5.2.6.2 Existing Conditions

This section identifies public lands that could be affected by the Applicant's proposed project and CN Alternatives. Appendix A includes maps of the federal and state lands within the ROI.

Federal Land

Federal lands are lands in the United States for which ownership is claimed by the federal government. The primary purpose of federal land is to benefit the people of the United States with conservation of the natural resources as a priority; most federally owned lands are open to the public for recreational use. Primary federal landholders of the land that would be crossed by the Applicant's proposed project and CN Alternatives include the Department of the Interior (DOI), which includes agencies such as BLM, USFWS, NPS, and the Department of Agriculture—which includes the USFS. The types of land in federal ownership in this analysis include forests that are managed by USFS, refuge land managed by USFWS, National Heritage Parks managed by NPS, and other land managed by BLM. Compatibility of the Project with designated uses varies by authorizing agencies; therefore, a general discussion of the responsible agency based on land ownership and any associated regulatory provisions is provided. BLM is authorized to grant a right-of-way or permit for projects "where the surface of the Federal lands involved is administered by the Secretary of two or more Federal agencies" (30 USC § 185(c)). Under the Mineral Leasing Act, "Federal Lands means all lands owned by the United States except lands in the National Park System, lands held in trust for an Indian or Indian Tribe, and lands on the Outer Continental Shelf."

State Land

State lands are lands that are held under state management. State lands that would be crossed by the Applicant's proposed project and CN Alternatives include state WMAs, state AMAs, and state forests. These lands are administered by each state's respective DNR. Compatibility of the Project with designated uses varies by authorizing agencies; therefore, a general discussion of the responsible agency based on land ownership and any associated regulatory provisions is provided.

In certain instances, more than one government agency may have an interest in a specific piece of land; thus, additional regulatory authorizations would be needed. For example, if the State of Minnesota purchased and designated land as a WMA, but used federal grant money as part of that purchase, the

federal government has different and additional regulatory processes for considering proposed encroachments, such as pipelines.

County Land

County lands are lands that are held in trust for the public, for which ownership is claimed by county governments. As with federal and state land, their primary purpose is to benefit the public. These lands typically include county parks, forests, and other special management areas. Compatibility of the Project with designated uses varies by authorizing agencies; therefore, a general discussion of the responsible agency based on land ownership and any associated regulatory provisions is provided.

Counties in Minnesota may acquire land through tax forfeiture. Some of this land is then sold or exchanged; if the lands are classified as conservation lands, they may be retained and managed for designated conservation purposes or as forestry land. Some lands bordering lakes and streams cannot be sold by the counties.

5.2.6.2.1 Applicant's Proposed Project

Federal Land

In In Minnesota, the Applicant's proposed project would cross:

- North Country National Scenic Trail – The North Country National Scenic Trail stretches across seven states from New York to North Dakota (North Country Trail Association 2016). The National Scenic Trail program is administered through NPS. It includes trails that are 100 miles or longer and provides non-motorized recreational opportunities. At the location of the proposed crossing, the trail is administered by Hubbard County. However, compatibility of the Project with designated uses would be determined by the authorizing agency, which is NPS, and ultimately DOI.

State Land

All of the state land that would be crossed by the Applicant's proposed project is in Minnesota. The route would cross 17 acres in two WMAs (Grayling Marsh WMA (14 acres) and Lawler WMA (3 acres)), approximately 0.4 acre of the La Salle Creek AMA, and 422 acres in eight state forests:

- Foothills State Forest (42 acres),
- Hill River State Forest (103 acres),
- Huntersville State Forest (97 acres),
- Land O'Lakes State Forest (130 acres),
- Mississippi Headwaters State Forest (25 acres),
- Paul Bunyan State Forest (less than 0.1 acre),
- Savanna State Forest (9 acres), and
- Waukenabo State Forest (16 acres).

These forests, WMAs, and AMA are managed by Minnesota DNR as multiple use areas. They are primarily used for fish and wildlife resource protection, forestry, and recreation. Compatibility of the

Project with designated uses would be determined during easement negotiations with the authorizing agency. Table 5.2.6-1 provides the total acres of state land that would be crossed by the Applicant's proposed project. The total amount of state land in the ROI for the Applicant's proposed project is 526 acres (including ATWS, access roads, and valves) (Table 5.2.6-1).

Table 5.2.6-1. State Lands Crossed by the Applicant's Proposed Project (acres)

State	Construction Work Area	Permanent Right-of-Way	ATWS	Temp Access Road	Perm Access Road	Valves[a]	Con Total[b]	Op Total[b]
North Dakota	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minnesota	439.6	199.4	32.1	27.6	27.0	0.2	525.5	226.6
Wisconsin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**439.6**	**199.4**	**32.1**	**27.6**	**27.0**	**0.2**	**525.5**	**226.6**

Source: PAD-US – USGS 2016.

[a] Includes valve sites and valve driveways. Because valve sites are within the permanent right-of-way, total Project impacts may be slightly overestimated from double counting.

[b] Con = sum of pipeline construction work area, additional temporary workspaces (ATWS), pump stations, valves, and temporary and permanent access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, valves, and pump stations.

Note:

Acres for the construction work area and the permanent right-of-way are based on Enbridge-provided footprints for the Applicant's proposed project.

Perm = permanent; Temp = temporary

Although not directly affected by pipeline construction or standard operations, the centerline of the Applicant's proposed project would be located approximately 1,083 feet east of Itasca State Park boundary. Additionally, the temporary construction workspace for the Applicant's proposed project would be located approximately 960 feet from the Itasca State Park boundary. This state park is one of Minnesota's flagship state parks, with over 500,000 annual visits. The park was established in 1891 to preserve remnant stands of virgin pine and to protect the basin that is the source of the Mississippi River. The Itasca State Park is one of Minnesota's National Natural Landmarks.

County Land

Table 5.2.6-2 provides the county land that would be crossed by the Applicant's proposed project in Minnesota. It is likely that county land would be crossed in North Dakota and Wisconsin; however, data for these states were not available at the time of this assessment. In total, approximately 548 acres of county land would be within the ROI for the construction work area of the Applicant's proposed project, with an additional 102 acres disturbed for ATWS, access roads, and MLVs. While the exact designated use of this land is unknown, it is likely to be land in county parks or forests; therefore, compatibility with designated uses would be determined by the relevant county governments.

Table 5.2.6-2. County Lands Crossed by the Applicant's Proposed Project (acres)

State, County	Construction Work Area	Permanent Right-of-Way	ATWS	Temp Access Road	Perm Access Road	Valves[a]	Con Total[b]	Op Total[b]
North Dakota	NA	NA	NA	NA	NA	NA	NA	NA
Minnesota								
Carlton	128.1	53.4	4.7	1.3	1.6	0.0	135.7	55.0
Cass	273.7	114.0	21.5	17.7	27.1	0.0	340.0	141.1
Clearwater	26.8	11.1	3.1	0.0	0.0	0.1	30.0	11.2
Hubbard	119.1	49.6	7.0	10.1	7.8	0.0	144.0	57.4
Subtotal	***547.7***	***228.1***	***36.3***	***29.1***	***36.5***	***0.1***	***649.7***	***264.7***
Wisconsin	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL	**547.7**	**228.1**	**36.3**	**29.1**	**36.5**	**0.1**	**649.7**	**264.7**

Source: County-owned parcels were identified using the "owner" name within each county's GIS parcel data. Because parcel data and owner naming conventions vary from county to county, DOC-EERA identified county-owned parcels as best as possible. Note that Red Lake County had no GIS parcel data, and Aitkin County had no ownership information on their parcel data; therefore, these counties were not included in the analysis.

[a] Includes valve sites and valve driveways. Because valve sites are within the permanent right-of-way, total Project impacts may be slightly overestimated from double counting.

[b] Con = sum of pipeline construction work area, additional temporary workspaces (ATWS), pump stations, valves, and temporary and permanent access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, valves, and pump stations.

Note:

Acres for the construction work area and the permanent right-of-way are based on Enbridge-provided footprints for the Applicant's proposed project.

Perm = permanent; Temp = temporary

NA = data not available at the time of the analysis

5.2.6.2.2 Continued Use of Existing Line 3

Federal Land

A portion of the existing Line 3 lies within the boundaries of the Chippewa National Forest, and the easement covers about 37 acres. The Chippewa National Forest is managed by USFS and includes 666,952 acres of managed forest; 1,300 lakes and ponds; 925 miles of rivers; 440,000 acres of wetlands; and 25 watersheds (USFS 2017). The forest is managed to protect forest and water resources and provides a variety of recreational opportunities. Because the existing Line 3 is already in operation, it is already being regulated by USFS and has been permitted to comply with designated uses.

State Land

A portion of the existing Line 3 lies within three state forests (Bowstring [170 acres], Fond du Lac [15 acres], and Mississippi Headwaters [32 acres]) and two AMAs (Clearwater River AMA [0.1 acre] and Little Otter Creek AMA [2 acres]). Because the existing Line 3 is already in operation, it is already being regulated by Minnesota DNR and has been permitted to comply with designated uses.

County Land

A portion of the existing Line 3 lies within county land: Beltrami (0.7 acre), Carlton (4 acres), Cass (1 acre), Clearwater (2 acres), Hubbard (26 acres), Itasca (0.2 acre), and St. Louis (0.3 acre). Because the existing Line 3 is already in operation, it is already being regulated by the local county-level authorities and has been permitted to comply with designated uses.

5.2.6.2.3 System Alternative SA-04

Federal Land

Table 5.2.6-3 lists the total amount of federal land that would be crossed by SA-04. Public land that would be crossed in North Dakota incudes:

- Dakota Tallgrass Prairie WMA – This federal management area was established in 2000 to preserve tallgrass prairie habitat, primarily through the purchase of perpetual grassland easements (USFWS 2016); however, it is also open to the public for recreational use. USFWS administers the Dakota Tallgrass Prairie WMA; therefore, the Applicant would be required to comply with the designated uses and regulatory provisions established by USFWS as the authorizing agency. Non-federal oil and gas operations on NWRs and the associated regulatory provisions are contained within 50 CFR 29C and 29D.
- Pembina County Waterfowl Production Area – This waterfowl production area is managed by USFWS as part of the NWR system. The land is primarily used for bird and wildlife resource management; and is open for public access and general wildlife-dependent recreation such as hunting, wildlife watching and photography. Therefore, the Applicant would be required to comply with the designated uses and regulatory provisions established by USFWS as the authorizing agency.

Table 5.2.6-3. Federal Lands Crossed by System Alternative SA-04 (acres)

State	Construction Work Area	Permanent Right-of-Way
North Dakota	800.2[a]	331.2[b]
Minnesota	0.3	0.1
Iowa	0.0	0.0
Illinois	176.5	73.6[e]
TOTAL	**977.0[a,b]**	**404.9[a,b]**

Source: PAD-US – USGS 2016.

[a] Includes acreages of the Dakota Tallgrass Prairie Wildlife Management Area that are not owned by the U.S. Fish and Wildlife Service.

[b] Includes acreages of the Illinois and Michigan Canal National Heritage Area that are not owned by the National Park Service.

In Illinois, SA-04 would cross:

- The Upper Mississippi River National Wildlife and Fish Refuge – This refuge also is part of the NWR system and is managed by USFWS. As with other land managed by the USFWS, it is primarily used for fish and wildlife resource management and is open for public access and general recreation. Therefore, the Applicant would be required to comply with the designated uses and regulatory provisions established by USFWS as the authorizing agency.
- The Illinois and Michigan Canal in Illinois – This is a registered National Heritage Area administered by NPS. The actual origin site of the Illinois and Michigan Canal has been converted into a nature park that integrates history, ecology, and art to communicate the canal's importance in the development of Chicago. The former brownfield site has been converted to a landscape that provides passive recreational uses. Compatibility of the Project with designated uses would be determined by the authorizing agency (NPS), and ultimately DOI. As previously noted, the House Committee on Natural Resources passed a bill in 2015 granting the secretary of DOI the power to negotiate rights-of-way for gas pipelines through national park lands.

State Land

Table 5.2.6-4 lists the total amount of state land within the ROI for SA-04. Small areas of state land would be crossed by SA-04 in Minnesota and Illinois. In Minnesota, SA-04 would cross:

- Lyle-Austin WMA – This WMA is managed by Minnesota DNR to provide recreational opportunities for hunters, trappers, and wildlife watchers. Compatibility of the Project with designated uses would be determined during easement negotiations with the authorizing agency, which is Minnesota DNR.

Table 5.2.6-4. State Lands Crossed by System Alternative SA-04 (acres)

State	Construction Work Area[a]	Permanent Right-of-Way[a]
North Dakota	0.0	0.0
Minnesota	0.3	0.1
Iowa	0.0	0.0
Illinois	0.9	0.4
TOTAL	**1.2**	**0.5**

Source: PAD-US – USGS 2016.

[a] Acres for the construction work area and the permanent right-of-way are based on a 120-foot-wide construction footprint and a 50-foot-wide permanent right-of-way.

In Illinois, SA-04 would cross:

- Hennepin Canal State Trail – This regional trail runs 105 miles along the towpath of the old Hennepin Canal. The trail offers many opportunities for recreation, including hiking, biking, and fishing. It is administered by Illinois DNR; therefore, compatibility of the Project with designated uses would be determined during easement negotiations with Illinois DNR as the authorizing agency.

County Land

No county owned lands would be crossed by SA-04.

5.2.6.2.4 Transportation by Rail

The rail alternative includes construction of a new offloading facility in Clearbrook, Minnesota; an offloading facility in Superior, Wisconsin; and replacement and upgrades of existing rail infrastructure. The land that would be permanently converted for facility construction is not currently designated as public land. It is mostly mixed-use, industrial, and agricultural land.

5.2.6.2.5 Transportation by Truck

The truck alternative includes constructing a new offloading facility in Clearbrook, Minnesota; an offloading facility in Superior, Wisconsin; and new local access roads to these facilities. The land that would be permanently converted for facility construction and expansion is not currently designated as public land. It is mostly mixed-use, industrial, and agricultural land. The routes on existing highways most likely traveled by the trucks would not pass through public land areas, except for the second leg of the route that begins on U.S. Highway 2 in Bagley and continues all the way to Superior. The route crosses through the Mississippi Headwaters State Forest in Minnesota.

5.2.6.3 Impact Assessment

The impact assessment focuses on the compatibility of construction and operation of the Applicant's proposed project and CN Alternatives with designated uses of specific federal, state, and county public lands. In addition to the analysis of compatibility with the designated use of public lands in this section, impacts on the public resources contained within public lands (e.g., vegetation, wildlife, and recreation)

and the measures that would be implemented to minimize potential impacts on those resources can be found in several other sections in Chapter 5, including Sections 5.2.1, 5.2.3, 5.2.4, and 5.3.2.

5.2.6.3.1 Applicant's Proposed Project (from Neche to Superior)

Construction Impacts

The Applicant's proposed project would cross approximately 5 acres of federal land, 440 acres of state land, and 548 acres of county land during construction. These lands include state forests and state-managed WMAs and AMAs. The only federal lands that would be crossed by the Applicant's proposed project would be the North Country National Scenic Trail in Hubbard County, Minnesota.

Depending on the specific resource or feature being affected, impacts on public lands from construction would vary. The use of public lands would be temporarily restricted during the period of active construction. Construction in any location would last for several days to several weeks, depending on a variety of factors, such as land use type, topography, weather, and other environmental conditions. Limited use, access restrictions, and noise and visual disturbance could occur during this timeframe. However, the affected area would represent a relatively small area in proportion to the total amount of public land within the specific forest or resource area that remains undisturbed or unaffected. Given that construction impacts would be limited to small areas within the overall forest and resource area, and that the original use of these larger areas would be maintained during construction, it is likely that construction of the pipeline would result in a temporary, minor to negligible impact related to compatibility with the designated uses of these public lands. Removal of forested habitat would be a long term impact and depending on the route and the forest, the magnitude could be major.

Operations Impacts

Operation of the pipeline would involve periodic inspection, pipeline maintenance activities, and mowing to maintain appropriate vegetation along public lands. During operation, the permanent right-of-way for the Applicant's proposed project would include two acres of federal land, 199 acres of state land, and 228 acres of county land. The permanent right-of-way would be periodically cleared of vegetation, and no trees would be permitted to grow. With the exception of the 37 acres of county land and 27 acres of state lands that would be permanently converted to permanent access roads and MLV sites (Tables 5.2.6-1 and 5.2.6-2), the pipeline itself would be buried, so there would be no ongoing restriction to surface use, except at valve locations. Therefore, the public land could continue to be managed for its designated uses, and impacts associated with operation are likely to be long-term, but negligible to minor. The exception to this would be on forested land where the management objective is timber production, and no trees would be permitted to grow within the permanent right-of-way of the pipeline corridor. However, given the amount of affected land in state forests compared to the overall forested land that remains available for timber production, it is likely that operation of the pipeline would result in a permanent, but minor impact related to compatibility with the designated use of forested land for timber production.

5.2.6.3.2 Continued Use of Existing Line 3

Construction Impacts

There would be no impacts related to compatibility of the pipeline with the designated uses of public lands from continuing use of the existing Line 3 pipeline, because it is already built.

Operations Impacts

Impacts associated with operation of the existing Line 3 would be mainly limited to restricted use during times when inspections and repair digs or other maintenance activities are being conducted on the line. Impacts during continued operations related to compatibility of the pipeline with designated uses of public lands are expected to be negligible, temporary, localized, and limited to the permanent right-of-way. Because the permanent right-of-way already has been cleared of trees, no further loss of forested vegetation would be expected.

5.2.6.3.3 System Alternative SA-04

Construction Impacts

During construction, SA-04 would cross 977 acres of federal land and one acre of state land (0.3 acre in Minnesota, 0.9 acre in Illinois). Federal land crossed includes the Dakota Tallgrass Prairie WMA and the Illinois and Michigan Canal National Heritage Area. State land crossed consists of the Lyle-Austin WMA in Minnesota and the Hennepin Canal State Trail in Illinois. No county owned lands would be crossed by SA-04.

Operations Impacts

Operation of the pipeline would involve periodic inspection, pipeline maintenance activities, and mowing to maintain appropriate vegetation along public lands. During operation, the permanent right-of-way for SA-04 includes 405 acres of federal land and 0.5 acre of state land (0.1 acre in Minnesota, 0.4 acre in Illinois). With the exception of public lands that would be permanently converted to permanent access roads and MLV sites, the pipeline itself would be buried, so there would be no ongoing restriction to surface use, except at valve locations. Therefore, the public land could continue to be managed for its designated uses, and impacts associated with operation are likely to be long-term and negligible to minor.

5.2.6.3.4 Transportation by Rail

Construction Impacts

There would be no impacts related to the compatibility of construction of loading/offloading facilities with the designated use of public lands for new or improved rail access, because proposed locations for these facilities are not on public lands.

Operations Impacts

There would be no impacts related to the compatibility of transportation of crude oil via rail with the designated uses of public lands. The rail route would follow existing rail lines that are already in operation. Any additional rail traffic from increased volume would be passing through areas that are already accustomed to noise and visual disturbances from ongoing rail operations.

5.2.6.3.5 Transportation by Truck

Construction Impacts

There would be no impacts related to the compatibility of construction of loading/offloading facilities or new roads with the designated uses of public lands, because proposed locations for these facilities are not on public lands.

Operations Impacts

There would be no impacts related to the compatibility of transportation of crude oil via truck with the designated uses of public lands. The truck route would follow existing truck routes that are already in operation. Any additional traffic from increased volume would be passing through areas that are already accustomed to noise and visual disturbances from preexisting traffic.

5.2.6.3.6 Existing Line 3 Supplemented by Rail

Construction Impacts

No impacts would be associated with compatibility of the pipeline with designated uses of public lands from continuing use of the existing Line 3 pipeline, because it is already built.

No impacts related to compatibility with the designated use of public lands would be associated with construction of loading/offloading facilities for new or improved rail access, because proposed locations for these facilities are not on public lands.

Operations Impacts

No impacts related to the compatibility of continued operation of Line 3 with designated uses of public lands are expected unless integrity maintenance digs are required within the permanent right-of-way on public lands. Impacts of integrity digs are expected to be temporary, localized, and limited to the permanent right-of-way, thereby resulting in a negligible impact on public lands (depending on the location of the dig). Shipment of crude oil via rail is not expected to affect compatibility with designated uses of public lands.

5.2.6.3.7 Existing Line 3 Supplemented by Truck

Construction Impacts

There would be no impacts related to compatibility of the pipeline with designated uses of public lands from continued use of the existing Line 3 pipeline, because it is already built.

No impacts related to compatibility with the designated use of public lands would be associated with construction of loading/offloading facilities and new roads, because proposed locations for these facilities are not on public lands.

Operations Impacts

No impacts are expected concerning compatibility of continued operation of the existing Line 3 with designated uses of public lands unless integrity maintenance digs are required within the permanent right-of-way in public lands. Impacts of integrity digs are expected to be temporary, localized, and limited to the permanent right-of-way, thereby resulting in a negligible impact on public lands. Continued shipment of crude oil via truck would not be expected to affect compatibility with the designated uses of public lands.

5.2.6.4 Summary and Mitigation

5.2.6.4.1 Summary

Table 5.2.6-5 presents the results of the analysis of potential compatibility impacts on public lands from construction and operation of the Applicant's proposed project and the CN Alternatives. The results show that the duration and magnitude of construction impacts related to compatibility with designated uses of public land range from no impact to negligible or minor temporary to long-term impacts.

The low level of impacts occurs for two reasons. The limitation of designated use represents a small portion of the overall land designated for public use in most affected areas, and any impacts on these lands would be restored following construction. Therefore, any impacts related to compatibility of the pipeline with the designated uses of the land would be limited to the duration of construction (4 to 6 weeks) and full restoration of the site. Following restoration, the land would be able to be maintained for its original designated use, with the exception of changes in habitat associated with the permanent right-of-way. Construction of the Applicant's proposed project would have the largest impact in terms of total land area on state-owned land (i.e., forests) in Minnesota, whereas SA-04 would have the largest total impact on federally owned land (mostly associated with a WMA in North Dakota).

During operations, impacts related to compatibility of the pipeline with designated uses would be long-term to permanent and negligible to major. Except for public lands that would be permanently converted to permanent access roads and MLV sites, the pipeline itself would be buried, so there would be minimal ongoing restriction to surface use, except at valve locations. Therefore, the public land could continue to be managed for its designated uses, and impacts associated with operation are likely to be long-term and negligible to minor. The exception to this would be on forested land where the management objective is timber production, and no trees would be permitted to grow within the permanent right-of-way of the pipeline corridor. Given the area of land affected relative to the public land that remains available for timber production, it is likely that continued operation of the pipelines would result in a permanent, but minor impact related to compatibility with the designated use of forested land for timber production. Operation of the rail and truck alternatives would not be expected to affect public lands because they would use preexisting truck and rail routes with ongoing volumes of rail and truck traffic. Operation of the existing Line 3 would result in temporary negligible impacts related to the compatibility of the pipeline with public lands during integrity maintenance digs, if they occur on public lands.

5.2.6.4.2 Mitigation

As previously noted, crossing through public lands would prompt authorizing agencies to ensure that the Applicant's proposed project or a CN Alternative complies with the designated uses of the land; therefore, the various agencies would require mitigation, and the Applicant would need to coordinate with the authorizing agency.

With implementation of the Applicant-proposed measures and compliance with conditions specified in required permits, no mitigation has been identified to further minimize impacts on federal, state, and county lands—with the exception of forested land within the permanent right-of-way, which would not be allowed to re-establish. A potential mitigation would be to purchase and dedicate private forest land to timber production as an offset, or to compensate the federal, state, or county government for any merchantable timber lost.

Table 5.2.6-5. Summary of Potential Impacts Related to Compatibility of the Applicant's Proposed Project and Certificate of Need Alternatives with Designated Uses of Public Land

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Construction Impacts							
Federal land	Temporary/negligible to minor impacts • 5 acres	No impact	Temporary/negligible to minor impacts • 977 acres	No impact	No impact	No impact	No impact
State land	Temporary to Long term/negligible to minor impacts • 440 acres	No impact	Temporary/negligible to minor impacts • 1 acre	No impact	No impact	No impact	No impact
County land	Temporary/negligible to minor impacts • 548 acres	No impact	No Impact	Not available	Not available	Not available	Not available
Operations impacts							
Federal land	Long-term to permanent/negligible to minor impacts • 2 acres	Temporary/ negligible impacts	Long-term to permanent/negligible to minor impacts • 405 acres	No impact	No impact	Temporary/ negligible impacts	Temporary/ negligible impacts
State land	Long-term to permanent/negligible to minor impacts • 199 acres	Temporary/ negligible impacts	Long-term to permanent/negligible to minor impacts • 0.5 acre	No impact	No impact	Temporary/ negligible impacts	Temporary/ negligible impacts
County land	Long-term to permanent/negligible to minor impacts • 228 acres	Temporary/ negligible impacts	No Impact	Not available	Not available	Temporary/ negligible impacts	Temporary/ negligible impacts

5.2.6.5 References

North Country Trail Association. 2016. Trail association website. https://northcountrytrail.org/trail/. Accessed on December 11, 2016.

U.S. Fish and Wildlife Service (USFWS). 2016. Dakota Tallgrass Prairie. https://www.fws.gov/refuge/Dakota_Tallgrass_Prairie/about.html. Accessed on December 9, 2016.

U.S. Forest Service (USFS). 2017. Chippewa National Forest. Forest Facts. https://www.fs.usda.gov/detail/chippewa/about-forest/?cid=fsm9_016551. Accessed on January 28, 2017.

U.S. Geological Survey (USGS). 2016. Gap Analysis Program. May 2016. Protected Areas Database of the United States (PAD-US), Version 1.4 Combined Feature Class.

5.2.7 Air Quality

Construction and operation of the Applicant's proposed project and CN Alternatives may affect air quality through the emission of air pollutants that, directly or indirectly, enter the atmosphere and contribute to increased levels of air pollution. Air quality is defined by the ambient concentration of certain pollutants (i.e., criteria pollutants) in the atmosphere determined by EPA to be of concern to the health and welfare of the general public and the environment.

Construction causes air pollution primarily through emissions from construction equipment (i.e., non-road engines), mobile sources (i.e., vehicles), and construction-related activities (i.e., burning, blasting, and road travel). This analysis evaluates air quality impacts from construction of the Applicant's proposed project and CN Alternatives by assessing:

- Air pollutant emissions, including GHG emissions, generated by construction; and
- Stored carbon releases from tree clearing within the construction work areas.

Under normal operations, oil pipelines emit small amounts of fugitive emissions. More significant emissions may result from storage tanks at terminals and pump stations that utilize internal combustion engines. However, the pump stations for the Applicant's proposed project would use electric drive motors that do not directly emit air pollutants, but do create air emissions indirectly from the electricity generation required to operate them. This analysis evaluates air impacts from operations of the Applicant's proposed project and CN Alternatives by assessing:

- Air pollutant emissions, including GHG emissions, from pipeline, rail, and truck operations;
- The social cost of carbon (SCC), which provides an estimate of potential climate change damages based on GHG emissions; and
- Loss of carbon of carbon sequestration potential within the pipeline rights-of-way (i.e., carbon sequestration).
- Possible GHG emissions associated with upstream (production) or downstream (combustion) GHG emissions

This section first describes the existing condition for air quality within an area along the Applicant's proposed project and CN Alternatives where air quality could be affected by construction and operation. Next, this section evaluates the potential impacts of construction and operation on the existing air quality and compares these impacts for the Applicant's proposed project and CN Alternatives.

Chapter 10 addresses the impacts on air quality resulting from a crude oil release.

5.2.7.1 Regulatory Context and Methodology

5.2.7.1.1 Regulatory Context

Air Quality Standards

Air quality standards have been established at both the federal and state level to protect and enhance air quality for each of the primary pollutants of concern, called "criteria pollutants." They include carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone, suspended particulate matter less than or equal to 10 microns in diameter (PM-10), fine particulate matter less than or equal to 2.5 microns in diameter (PM-2.5), and lead. These pollutants are subject to both primary and secondary National Ambient Air Quality Standards (NAAQS). Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

State air quality standards cannot be less stringent than the NAAQS. The states potentially affected by the Applicant's proposed project and CN Alternatives include North Dakota, Minnesota, Wisconsin, Iowa, and Illinois. All of these states have adopted ambient air quality standards that are the same or more stringent than the NAAQS. Table 5.2.7-1 lists the NAAQS for the seven criteria pollutants. Minn. R. 7009.0080 set out the Minnesota Ambient Air Quality Standards (MAAQS). In addition to the criteria pollutants, Minnesota also sets standards for hydrogen sulfide and retains a standard for total suspended particulates (TSP). MAAQS are shown in Table 5.2.7-2.

Table 5.2.7-1. National Ambient Air Quality Standards for Criteria Pollutants

Pollutant	Averaging Time	National Ambient Air Quality Standards	
		Primary	Secondary
PM-10	24-hour	150 µg/m³	150 µg/m³
PM-2.5	Annual	12 µg/m³	15 µg/m³
	24-hour	35 µg/m³	35 µg/m³
SO_2[a]	3-hour	--	0.5 ppm
	1-hour	75 ppb	--
NO_2	Annual	53 ppb	53 ppb
	1-hour	100 ppb	--
Ozone	8-hour	0.070 ppm	0.070 ppm
CO	8-hour	9 ppm	--
	1-hour	35 ppm	--
Lead	Rolling 3-month average	0.15 µg/m³	0.15 µg/m³

Source: EPA 2016a.

Notes:

The primary annual (0.03 ppm) and 24-hour (0.14 ppm) SO_2 NAAQS have been revoked by the U.S. Environmental Protection Agency (EPA) since 2010. However, the State of Minnesota still adopts these standards. According to EPA, these previous annual and 24-hour SO_2 standards will additionally remain in effect in: (1) any area for which it has not yet been 1 year since the effective date of designation under the current (2010) standards; and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved, and which is designated as nonattainment under the previous SO_2 standards or is not meeting the requirements of a State Implementation Plan under the previous SO_2 standards (40 Code of Federal Regulations 50.4[3]).

Table 5.2.7-1. National Ambient Air Quality Standards for Criteria Pollutants

Pollutant	Averaging Time	National Ambient Air Quality Standards	
		Primary	Secondary

Minnesota has promulgated ambient air quality standards (Minnesota Ambient Air Quality Standards) for hydrogen sulfide (H_2S), Ozone, CO, SO_2, PM-10, PM-2.5, NO_2, Pb, TSP (Minnesota Rules 7009.0080)

CO = carbon monoxide, NO_2 = nitrogen dioxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, ppb = parts per billion, ppm = parts per million, SO_2 = sulfur dioxide, µg/m^3 = micrograms per cubic meter

"--" = no standard

Table 5.2.7-2. Minnesota Ambient Air Quality Standards

Pollutant	Averaging Time	Level of Standard		Form of the Standard
		Primary	Secondary	
H_2S	30-minutes	0.05 ppmv (70.0 µg/m^3)	--	30-minute average not to be exceeded more than two times in a year
H_2S	30-minutes	0.03 ppmv (42.0 µg/m^3)	--	30-minute average not to be exceeded more than two times in 5 consecutive days
Ozone	8-hour	70 ppbv (137 µg/m^3)	70 ppbv (137 µg/m^3)	3-year average of the annual fourth high daily maximum 8-hour concentration does not exceed standard
CO	8-hour	9 ppmv (10 mg/m^3)	--	Annual second-high 8-hour concentration does not exceed standard
CO	1-hour	35 ppmv (40 mg/m^3)	--	Annual second-high 1-hour concentration does not exceed standard
SO_2	Annual	30 ppbv (79 µg/m^3)	--	Annual average concentration does not exceed standard
SO_2	24-hour	140 ppb (367 µg/m^3)	--	Annual second-high 24-hour concentration does not exceed standard
SO_2	3-hour		500 ppbv (1,310 µg/m^3)	Annual second-high 3-hour concentration does not exceed the standard
SO_2	1-hour	75 ppb (197 µg/m^3)	--	3-year average of the annual 99th-

Table 5.2.7-2. Minnesota Ambient Air Quality Standards

Pollutant	Averaging Time	Level of Standard		Form of the Standard
		Primary	Secondary	
				percentile of daily maximum 1-hour concentrations does not exceed standard
TSP	Annual	75 µg/m^3	60 µg/m^3	Annual geometric mean concentration does not exceed standard
TSP	24-hour	260 µg/m^3	150 µg/m^3	Annual second-high 24-hour concentration does not exceed standard
NO_2	Annual	53 ppbv (100 µg/m^3)	53 ppbv (100 µg/m^3)	Annual average concentration does not exceed standard
NO_2	1-hour	100 ppbv (188 µg/m^3)	--	3-year average of the annual 98th-percentile of daily maximum 1-hour concentrations does not exceed standard
Lead	Rolling 3-month average	0.15 µg/m^3	0.15 µg/m^3	Maximum 3-month rolling average from 3 consecutive years does not exceed the standard
PM-10	24-hour	150 µg/m^3	150 µg/m^3	3-year average of the annual estimated exceedance days is less than or equal to 1
PM-2.5	24-hour	35 µg/m^3	35 µg/m^3	3-year average of the annual 98th-percentile of 24-hour concentrations does not exceed the standard
PM-2.5	Annual	12 µg/m^3	15 µg/m^3	3-year average of the annual seasonally-weighted average does not exceed the standard

Notes:

CO = carbon monoxide, H_2S = hydrogen sulfide, NO_2 = nitrogen dioxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, ppbv = parts per billion by volume, ppmv = parts per million by volume, SO_2 = sulfur dioxide, µg/m^3 = micrograms per cubic meter, TSP = total suspended particulates

Attainment of Air Quality Standards

EPA determines air quality attainment status based on whether the air quality in an area meets (attains) the NAAQS. Areas that do not meet the NAAQS for a specific criteria pollutant are designated as nonattainment areas for that pollutant. Areas with insufficient data are designated as attainment/unclassified areas and are treated as attainment areas. Areas that were previously designated as nonattainment but have achieved compliance with an NAAQS are designated as maintenance for 20 years after the effective date of attainment, assuming that they remain in compliance with the standard. A portion of the truck route from the Gretna pump station to the Superior terminal goes through Duluth, Minnesota. This area is designated as maintenance with respect to CO emissions (8-hour and 1-hour NAAQS) (EPA 2016b). Also, CN Alternative SA-04 would pass through Will County, IL which is designated as an ozone (8-hour NAAQS) non-attainment area. The Applicant's proposed project or the CN Alternatives would not pass through any other air quality nonattainment or maintenance areas.

Air Quality Control Regions

Air quality control regions are categorized as Class I, Class II, or Class III. Class I areas (commonly called "pristine areas") were established primarily as national parks and wilderness areas above a certain size and receive special protections under the Clean Air Act to help maintain pristine air quality.[18] The closest distances to Class I areas within states that would be intersected by the Applicant's proposed project and CN Alternatives are listed in Table 5.2.7-3. The table includes the Fond du Lac Reservation because the Fond du Lac Band of Lake Superior Chippewa is currently seeking re-designation from a Class II to a Class I area. Neither the Applicant's proposed project nor SA-04 would pass through a Class I area; however, the rail and truck alternative routes would pass through the Fond du Lac Reservation.

Table 5.2.7-3. Closest Distance to Class I Areas for the Applicant's Proposed Project and Certificate of Need Alternatives (miles)

Class I Area	Distance to Applicant's Proposed Project	Distance to System Alternative SA-04	Distance to Rail Alternative Route	Distance to Truck Alternative Route
Voyageurs National Park, Minnesota	110.8	184.8	82.7	82.5
Boundary Waters Canoe Area, Minnesota	87.6	216.3	68.4	68.5
Fond du Lac Reservation, Minnesota *(pending re-designation as Class I)*	2.0	162.8	0.0	0.0
Theodore Roosevelt National Park, North Dakota	305.4	296.6	295.3	279.4
Lostwood National Wilderness Area, North Dakota	225.4	225.4	240.1	223.8
Rainbow Lake Wilderness Area, Wisconsin	38.4	195.0	38.6	40.9
Forest County Potawatomi Community Reservation, Wisconsin	184.1	245.6	183.6	186.1

Sources: Jackson 2014; Minnesota PCA 2016; North Dakota DoH 2010; Wisconsin DNR 2015.

[18] Class II areas include all attainment and not classifiable areas not designated as Class I areas and are allowed higher levels of added pollution than Class I areas. Indian tribes that have received Treatment in the Same Manner as State designations can re-designate Class II tribal lands to Class I. Class III areas, allowing even higher levels of added pollutants, are intended for heavily industrialized zones and can be designated only on request. There are currently no Class III areas in the United States.

Air Quality Permitting Requirements

Air permits may be required for a project, depending on the quantity of specific project emissions. In general, federal permits are required for larger emitters and are implemented nationwide under a consistently applied permitting program. These federal permits may be issued by states when authority has been delegated to the state. State permits are those air permits required by state rules and statutes. These permits are the result of state-specific strategies approved by the federal government to regulate minor sources of air emissions and to attain compliance with broader air quality federal laws and regulations.

Oil pipelines under normal operations emit fugitive emissions in small amounts that do not require an air permit. Pipeline associated facilities, such as storage tanks at terminals and pump stations that utilize internal combustion engines to power pipeline pumps, do commonly require air permits. For the Applicant's proposed project, all pump stations use electric drive motors and no combustion air emissions are generated. However, they do create air emissions indirectly due to the additional electricity generation required to operate them. Also, the piping components (valves, connectors, pump seals, etc.), sump tanks, and pig traps at pump stations emit volatile organic compounds (VOCs). Note that although pipeline construction causes air pollution through emissions from non-road engines and mobile sources; these emissions do not count towards permitting triggers and therefore do not require air permits. Air permits also are not required for operation of rail equipment or trucks (i.e., mobile sources). Such equipment is subject to emissions performance standards that apply uniformly to specific types of equipment. The federal government has used such standards to reduce diesel particulate, nitrogen oxide (NOx), and volatile organic compound (VOC) emissions from trucks and railroad locomotives. The additional storage tank withdrawal losses due to increased throughput at two terminals will require air permits. At Clearbrook terminal, the Applicant would obtain a synthetic-minor individual state permit in order to limit VOC emissions and retain status as a minor source (Enbridge 2016a). The Superior terminal currently operates as a Title I Prevention of Significant Deterioration and Title V major source. The Applicant is currently working on an application for an air permit to accommodate the potential increased throughput of the terminal (Wisconsin DNR 2016).

5.2.7.1.2 Methodology

Construction and operation of the Applicant's proposed project and CN Alternatives would result in emissions that may affect local air quality. The ROI for the air quality analysis consisted of the airsheds (i.e., geographical regions that share the same air supply and are subject to the same air pollutants) through which pipeline and existing rail and truck routes pass. Because of the large regional nature of airsheds, the Applicant's proposed project and the CN Alternatives generally would occur within the same airsheds.

Potential impacts on air quality within the ROI from construction and operations of the Applicant's proposed project and the CN Alternatives were assessed as follows:

- Direct construction emissions data were obtained from the Applicant for one pipeline construction spread. The data were used to assess total construction emissions for the Applicant's proposed project (7 spreads) and SA-04 route (15 spreads).
- Direct operations emissions data were obtained from the Applicant for the Applicant's proposed project (based on 8 electric pump stations and 27 MLV sites) and SA-04 (based on 16 pump stations and 52 MLV sites).

- Direct operations emissions for the rail and truck alternatives were assessed using projected rail ton-miles per year truck miles per year, respectively.
- Indirect GHG emissions for the Applicant's proposed project and SA-04 from generation of electricity by the existing local utilities for electric pump station operations were calculated using pump station electricity consumption data supplied from the Applicant and GHG emission factors from EPA's Emissions and Generation Resource Integrated Database (eGRID).
- The amounts of carbon that potentially would be released back into the atmosphere during tree removal within the construction work areas were estimated using the average carbon density of trees within the Northern Lake States as developed by the USFS.
- The loss of carbon sequestration for areas along the permanent right-of-way that would remain cleared were estimated using the average annual carbon accumulation associated with trees within the Northern Lake States as developed by the Chicago Climate Exchange.
- The SCC values were assessed using a 3-percent discount rate developed by the Interagency Working Group to provide an estimate of potential climate change damages for the Applicant's proposed project and CN Alternatives based on total direct and indirect GHG emissions.

5.2.7.2 Existing Conditions

5.2.7.2.1 Applicant's Proposed Project and Certificate of Need Alternatives

Climate/Meteorology

Air quality is substantially influenced by climate and meteorological conditions; therefore, prevalent weather patterns are a major factor in both short-term and long-term air quality conditions. The Applicant's proposed project and the trucking and rail alternative routes would be located in portions of North Dakota, Minnesota, and Wisconsin; SA-04 would be in portions of North Dakota, Minnesota, Iowa, and Illinois. These areas are located within the humid continental climate, which is noted for its variable weather patterns and large temperature ranges. Representative climate data are presented in Table 5.2.7-4.

Table 5.2.7-4. Representative Climate Data

Measurement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cavalier, Pembina County, North Dakota												
Average low temperature (°F)	-7	0	13	29	41	51	56	53	43	31	15	0
Average high temperature (°F)	12	20	32	51	68	75	79	78	67	53	33	18
Average precipitation (inches)	0.4	0.4	0.7	1.1	2.2	3.2	3.3	2.6	1.8	1.5	0.7	0.4
Mean snowfall (inches)	6.7	5.5	5.9	2.0	0.4	0.0	0.0	0.0	0.1	1.6	5.9	6.6
Bagley, Clearwater County, Minnesota												
Average low temperature (°F)	-8	-1	13	28	42	51	55	53	42	31	16	0
Average high temperature (°F)	13	21	34	52	67	74	78	77	67	54	33	19
Average precipitation (inches)	0.6	0.5	0.9	1.4	2.7	4.4	4.1	3.5	2.9	2.4	1.0	0.6
Mean snowfall (inches)	9.6	5.3	7.7	3.5	0.2	0.0	0.0	0.0	0.0	1.0	5.0	9.4
Superior, Douglas County, Wisconsin												
Average low temperature (°F)	1	8	18	31	39	48	57	58	48	38	24	9
Average high temperature (°F)	20	26	35	47	57	68	75	73	65	53	37	25
Average precipitation (inches)	1.0	0.5	1.4	1.6	2.3	3.7	3.7	3.7	3.7	1.9	1.4	0.8
Mean snowfall (inches)	9.6	5.5	9.0	2.2	0.2	0.0	0.0	0.0	0.0	0.2	4.6	11.2
Alta Visa, Chickasaw County, Iowa												
Average low temperature (°F)	7	14	25	37	48	58	62	60	51	40	26	13
Average high temperature (°F)	24	31	43	58	71	80	83	81	73	61	42	28
Average precipitation (inches)	1.1	1.0	2.2	3.8	4.4	4.9	4.6	4.9	3.3	2.6	2.5	1.4
Mean snowfall (inches)	8.5	6.7	8.1	2.4	0.0	0.0	0.0	0.0	0.0	0.2	3.9	9.0
Joliet, Will County, Illinois												
Average low temperature (°F)	17	21	29	39	49	60	64	63	55	43	33	21
Average high temperature (°F)	31	36	47	61	71	81	84	82	76	64	49	35
Average precipitation (inches)	1.8	1.8	2.3	3.5	4.1	3.9	4.3	4.2	3.0	2.8	3.1	2.2
Mean snowfall (inches)	8.9	7.4	2.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7	10.0

Sources: Intellicast 2016; WeatherDB 2017.

°F = degrees Fahrenheit

Existing Air Quality

To characterize the background air quality for the ROI when no site-specific monitoring data were available, data were obtained from air quality monitoring stations located within the states and counties nearest to the Applicant's proposed project and CN Alternatives. A summary of the available background air quality data showing criteria pollutant concentrations for 2015 is presented in Table 5.2.7-5. The table shows that ambient air quality for all criteria pollutants is below the NAAQS for all areas that would be crossed by the Applicant's proposed project and CN Alternatives. Furthermore, ambient air quality for all criteria pollutants does not exceed MAAQS within Minnesota. The only pollutant concentration that approaches the standards is the 8-hour ozone concentration for all of the states.

Table 5.2.7-5. Representative Background Air Quality Data

Pollutant (Averaging Time)	Monitoring Station Location				
	Cass County, North Dakota	Anoka County, Minnesota	Milwaukee County, Wisconsin	Scott County, Iowa	Champaign County, Illinois
PM-10 (24-hour, 2nd max)	75 µg/m³ (50% of NAAQS)	54 µg/m³ (36% of NAAQS)	44 µg/m³ (29% of NAAQS)	135 µg/m³ (90% of NAAQS)	--
PM-2.5 (Annual, mean)	7.2 µg/m³ (60% of NAAQS)	6.6 µg/m³ (55% of NAAQS)	9.6 µg/m³ (80% of NAAQS)	9.9 µg/m³ (83% of NAAQS)	8.7 µg/m³ (73% of NAAQS)
PM-2.5 (24-hour, 98%)	20 µg/m³ (57% of NAAQS)	16 µg/m³ (46% of NAAQS)	28 µg/m³ (80% of NAAQS)	27 µg/m³ (77% of NAAQS)	19 µg/m³ (54% of NAAQS)
SO_2 (1-hour, 99%)	2 ppb (3% of NAAQS)	4 ppb (5% of NAAQS)	13 ppb (17% of NAAQS)	7 ppb (9% of NAAQS)	12 ppb (16% of NAAQS)
NO_2 (Annual, mean)	4 ppb (8% of NAAQS)	7 ppb (13% of NAAQS)	15 ppb (28% of NAAQS)	6 ppb (11% of NAAQS)	--
NO_2 (1-hour, 98%)	31 ppb (31% of NAAQS)	44 ppb (44% of NAAQS)	46 ppb (46% of NAAQS)	41 ppb (41% of NAAQS)	--
Ozone (8-hour, 4th max)	0.057 ppm (81% of NAAQS)	0.064 ppm (91% of NAAQS)	0.068 ppm (97% of NAAQS)	0.063 ppm (90% of NAAQS)	0.065 ppm (93% of NAAQS)
CO (8-hour, 2nd max)	0.7 ppm (8% of NAAQS)	0.9 ppm (10% of NAAQS)	0.7 ppm (8% of NAAQS)	0.8 ppm (9% of NAAQS)	0.3 ppm (3% of NAAQS)
CO (1-hour, 2nd max)	0.8 ppm (2% of NAAQS)	1.2 ppm (3% of NAAQS)	1.1 ppm (3% of NAAQS)	1.2 ppm (3% of NAAQS)	0.3 ppm (1% of NAAQS)
Lead (Max 3-month avg)	--	0.01 µg/m³ (7% of NAAQS)	--	--	--

Source: EPA 2016c.

Notes:

Table results depict the data from the monitoring site within the county with the highest pollutant level, including exceptional events data.

Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

Air quality standards for some pollutants (e.g., PM-2.5, lead) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standards. In those cases, the site-level statistics may differ from the monitor-level statistics.

CO = carbon monoxide, NAAQS = national ambient air quality standard, NO_2 = nitrogen dioxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, ppb = parts per billion, ppm = parts per million, SO_2 = sulfur dioxide, µg/m³ = micrograms per cubic meter

"--" = no available data.

EPA developed the Air Quality Index to provide a simple, uniform way to report daily air quality conditions taking into account all of the criteria air pollutants measured within a geographic area. The Applicant's proposed project would not be located near any of the areas noted for unhealthy air quality. SA-04 would come within 7 miles of Fargo, North Dakota, for which 3 days were cited as unhealthy for sensitive groups in 2015. The rail alternative route to the Superior terminal would intersect Bemidji and Brainerd, Minnesota, and comes within 3 miles of Duluth, Minnesota; and the truck route to the Superior terminal would intersect Bemidji and Duluth, Minnesota. Each of these cities were cited as having air quality conditions that were unhealthy for sensitive groups for 2 days in 2015 (EPA 2016d).

Greenhouse Gases

GHGs occur in the atmosphere both naturally and as a result of human activities, such as burning fossil fuels. GHGs are gases that trap heat in the atmosphere and include carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases. CO_2 is the reference gas for climate change, so measures of non-CO_2 GHGs are converted into a CO_2 equivalent (CO_2e).[19]

EPA's authority to regulate GHGs through the Clean Air Act was clarified in the U.S. Supreme Court decision in 2007. The Supreme Court ruled that GHGs meet the definition of air pollutants under the existing Clean Air Act and must be regulated if these gases could be reasonably anticipated to endanger public health or welfare. Responding to the Court's ruling, EPA finalized an endangerment finding in December 2009 and began regulating GHGs. Based on overwhelming scientific evidence, EPA found that GHGs were responsible for contributing to climate change which results in a threat to public health and welfare. Specifically, the impacts of climate change that will cause harm to human health and welfare of current and future generations include but are not limited to increased drought; more heavy downpours and flooding; more frequent and intense heat waves and wildfires; greater sea level rise; more intense storms; and harm to water resources, agriculture, wildlife, and ecosystems (Center for Climate and Energy Solutions 2016).

In 2007, the Minnesota Legislature passed the Next Generation Energy Act, which set goals for reducing GHG emissions in the state and goals for renewable energy use and energy conservation. The Next Generation Energy Act set a goal that would reduce GHG emissions in 2015 to a level 15% below the 2005 level, and also for 2025 and 2050 emissions levels to be 30% and 80%, respectively, below the 2005 emission levels (Minnesota Statutes 216H.02 Greenhouse Gas Emissions Control)

In 2009, President Obama pledged to reduce U.S. GHG emissions to approximately 17 percent below 2005 levels by 2020. In June 2013, the President outlined the Climate Action Plan—the steps his administration would take to cut carbon pollution, help prepare the United States for the impacts of climate change, and continue to lead international efforts to address global climate change (Executive Office of the President 2013). In a progress report released in June 2015, the President stated that the

[19] CO_2e gives you the equivalent number of tons of CO_2 emissions associated with an emission of another GHG. CO_2-equivalence is usually calculated using the Global Warming Potentials (GWPs) developed for each GHG by the Intergovernmental Panel on Climate Change. GWPs are a measure of the infrared energy that a gas traps in the troposphere, typically over 100 years, compared to CO_2 (U.S. Environmental Protection Agency 2013). As an example, methane, which is a common GHG, is widely represented as having a 100-year GWP of 25 (i.e., for the same weight, the comparative effect of methane on climate change is 25 times greater than CO_2 over a 100-year period).

United States is half-way to reaching its 2020 goal (Executive Office of the President 2015). U.S. GHG emissions in 2014 were 9 percent below the 2005 level of 7,350 million metric tons of CO_2e (EPA 2016e). Building on this progress, the President announced that the United States would commit to further reducing its carbon emissions to approximately 26 to 28 percent below 2005 levels by 2025 (Executive Office of the President 2015).

In 2014, approximately 76 percent of the U.S.'s GHG emissions were from fossil fuel combustion (EPA 2016e). Furthermore, fossil fuel-fired power plants are the largest source of emissions, making up 31 percent of U.S. total GHG emissions (EPA 2016f). To reduce carbon pollution from existing power plants, EPA issued the final Clean Power Plan on August 3, 2015 (EPA 2016g). The GHG reduction requirements in the Clean Power Plan could apply to power generation facilities that supply power to the Project's pump stations. This results in indirect GHG emissions for the Project. The ultimate goal of the Clean Power Plan is to reduce carbon pollution from the power sector by 32 percent below 2005 levels by 2030. Under the plan, states are required to develop and implement plans to ensure that the power plants in their state—individually, together, or in combination with other measures—achieve the performance rate goals for CO_2 for 2030 and for interim years 2022-2029 that are listed in the Final Rule. Under the Clean Power Plan Final Rule, states can opt to adopt state-level mass-based goals (in tons of statewide emissions for electric generating units) or rate-based goals (pounds per megawatt hour). Table 5.2.7-6 shows the final emission rate goal under the final Clean Power Plan for each of the states intersected by the Applicant's proposed project and CN Alternatives. Note that EPA uses 2012 as the baseline year for a fixed percentage of reductions. On March 28, 2017, President Trump signed an executive order that directs EPA to "as appropriate" initiate rulemaking to suspend, revise, or rescind the Clean Power Plan and related actions. Although the plan is currently subject to challenge in the D.C. Circuit and has been stayed by the Supreme Court, the executive order directs the Department of Justice to inform the D.C. Circuit of EPA's plans and ask the court to put those challenges on hold while EPA takes action to rescind or revise the rule.

On June 6, 2017, Minnesota Gov. Mark Dayton signed onto the U.S. Climate Alliance, a coalition launched after President Trump announced (June 1, 2017) plans to withdraw the United States from the Paris Agreement. The Paris Agreement reached in 2016 by 195 countries, aims to reduce the greenhouse gases emissions that are driving climate change. The U.S. Climate Alliance is a coalition of states that are committed to upholding the objectives of the Paris Agreement on climate change within their borders. The U.S. Climate Alliance also commits states to meeting or exceeding the targets of the federal Clean Power Plan discussed above.

Table 5.2.7-6. Final Clean Power Plan Emission Performance Goals

State	2012 Adjusted Baseline Emission Rate [a] (lb CO_2/MWh)	2030 State Goal (lb CO_2/MWh)	CO_2 Percent Reduction for Existing Fossil Fuel-Fired Electric Generating Units
North Dakota	2,368	1,305	45%
Minnesota	2,082	1,213	42%
Iowa	2,195	1,283	42%
Illinois	2,149	1,245	42%
Wisconsin	1,996	1,776	41%

Source: EPA 2015a.

[a] Emission rate is in units of adjusted output-weighted-average pounds of CO_2 per net MWh from all existing fossil fuel-fired electric generating units, excluding those located on tribal lands within the state.

CO_2 = carbon dioxide, lb = pounds, MWh = megawatt hours

5.2.7.3 Impact Assessment

This section of the analysis assesses the temporary air quality effects associated with construction of the pipeline and associated facilities and the permanent air quality effects resulting from facility operations for the Applicant's proposed project and each of the CN Alternatives.

5.2.7.3.1 Applicant's Proposed Project (from Neche to Superior)

Construction Impacts

Air quality impacts associated with construction would include emissions from fossil fuel-fired construction equipment engines, fugitive dust from ground disturbance and transportation, and emissions associated with burning wood debris in construction work areas. Table 5.2.7-7 shows the estimated construction emissions for the Applicant's proposed project, which would be constructed in 7 spreads (7 separate sections).

Fossil fuel-fired construction equipment is a source of combustion emissions, including NOx, CO, VOCs, SO_2, PM-10, PM-2.5, and small amounts of hazardous air pollutants. Construction equipment also emits GHGs. Gasoline and diesel engines must comply with the EPA mobile source regulations in 40 CFR Part 85 for on-road engines and 40 CFR Part 89 for non-road engines. These regulations are designed to minimize emissions and require a maximum sulfur content in diesel fuel of 15 parts per million. Open burning of cleared materials from construction activities has the potential to affect air quality, particularly the large volume of trees that would be removed from the right-of-way. Consequently, the burning of mature trees would not be allowed. Only small and dry brush piles will be allowed to burn.

Table 5.2.7-7. Estimated Construction Emissions for the Applicant's Proposed Project

Emission Source Description	Direct Emissions (tons)							
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs
On- and off-road diesel equipment combustion emissions	8.6	123.5	121.0	0.2	5.3	5.0	23,690.0	0.5
On- and off-road gasoline equipment combustion emissions	1.10	2.34	15.3	1.2	0.2	0.2	2,105.0	0.0
Fugitive emissions from paved roads	0.0	0.0	0.0	0.0	59.1	14.5	0.0	0.0
Fugitive emissions from unpaved roads	0.0	0.0	0.0	0.0	8.4	0.8	0.0	0.0
Emissions from open burning of wood debris	0.0	0.0	272.7	0.0	26.6	26.6	141.0	0.0
Blasting emissions[a]	0.0	0.2	0.3	0.003	0.0005	0.00003	0.0	0.0
Subtotal per spread	***9.7***	***126.0***	***409.3***	***1.4***	***99.6***	***47.1***	***25,936.0***	***0.5***
TOTAL EMISSIONS[b]	**67.7**	**880.8**	**2,863.3**	**9.8**	**697.3**	**329.6**	**181,552.0**	**3.7**

Source: Enbridge 2017.

[a] Blasting would be required for only one 1,500-foot section in Spread 7.

[b] Total emissions represent emissions from 7 construction spreads.

CO = carbon monoxide, GHGs = greenhouse gases, HAPs = hazardous air pollutants, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

Fugitive dust is a source of respirable airborne PM, including PM-10 and PM-2.5 that could result from blasting, open burning, and mobile source traffic on paved and unpaved roads. The amount of dust generated is a function of construction activity, silt and moisture content of the soil, wind speed, frequency of precipitation, vehicle traffic, vehicle types, and roadway characteristics. State regulations typically require measures to prevent fugitive dust from becoming airborne and leaving the property boundary. The Applicant would minimize dust generated from construction activities by wetting soils on the right-of-way and limiting working hours in residential areas as needed (Enbridge 2016a), and/or additional measures as appropriate based on site-specific conditions.

Because the pipeline would be constructed in 7 spreads, total emissions would not be concentrated in any one location but would occur incrementally along the pipeline route. Further, each spread of pipeline activity moves along the route daily during construction; therefore, emissions would be minimal and short term at any specific location, and typical meteorological conditions likely would cause rapid dispersal. As a result, air emissions from construction would result in localized minor, intermittent and temporary impacts. Because air permitting is not triggered by temporary construction phase emissions, dispersion modeling to ensure compliance with ambient air quality standards would not be required.

Stored Carbon Releases

A "carbon sink" is a natural or artificial reservoir that accumulates and stores some carbon-containing chemical compounds for an indefinite period. Trees, like other green plants, are carbon sinks that use

photosynthesis to convert CO_2 into sugar, cellulose, and other carbon-containing carbohydrates that they use for food and growth. They are able to lock up large amounts of carbon in their wood, on the forest floor and in forest soils and they continue to add carbon as they grow. When a tree is harvested and converted into forest products, a part of the CO_2 it has stored over a lifetime is retained within its cellular structure. When trees die and decompose or are burned, some of the stored carbon remains as forest litter and soils, but much of the rest is released back into the atmosphere as CO_2 (New York DEC 2016).

Construction along the Applicant's proposed project could require removal of trees from up to 1,612 acres of forested land in the construction work area. Of this, 702 acres would remain permanently without trees, while the forest would be allowed to regrow on the other 981 acres. Within the Northern Lake States, USFS estimated the carbon density of forested lands for six forest types: aspen-birch, elm-ash-cottonwood, maple-beech-birch, oak-hickory, spruce-fir, and white-red-jack pine (Smith et al. 2006). The average for the six forest types is 30.2 metric-tons of carbon per acre. Consequently, the amount of carbon that potentially would be released back into the atmosphere during construction tree removal of 1,612 acres is estimated at approximately 205,500 tons of CO_2e. Regrowth of the forest on the 981 acres outside of the pipeline right–of-way eventually would more than halve this loss in the long run after forest regrowth, bringing net CO_2 emissions from forest clearance down to a level of about 85,658 tons. Note that the annual loss of carbon sequestration is quantified below as an operations impact.

Operations Impacts

Table 5.2.7-8 shows the estimated operations emissions for the Applicant's proposed project based on 8 electric pump stations and 27 MLV sites. Air quality impacts associated with operations would predominantly involve emissions from piping components (e.g., pumps, valves, and flanges) at the pump stations and MLVs, and emissions associated with potential increased throughput of a terminal's external floating roof storage tanks. The external floating roof tank design is such that evaporative losses from the stored crude oil are limited to losses from the rim seal system and deck fittings (standing storage loss) and any exposed crude oil on the tank walls (working loss). Indirect GHG emissions resulting from power generation to supply electrical energy to the pump stations are considered in the following section.

Some of the external floating roof storage tanks at the existing Clearbrook terminal are subject to New Source Performance Standards (NSPS) in 40 CFR 60 Subpart Kb, "Standards of Performance for Volatile Organic Liquid Storage Vessels." Subpart Kb regulates VOC emissions and establishes controls based on the vapor pressure of the stored liquid. The Clearbrook terminal currently operates under a minor source Option A Registration Permit, which is a state of Minnesota permit, solely because an NSPS applies and no federal or state permitting thresholds are exceeded (i.e., applicability to NSPS Subpart Kb requires a State air permit under Minn. R. 7007.0250). The increased throughput associated with the Applicant's proposed project would cause potential emissions of VOCs at the Clearbrook terminal that exceed the 100-tons-per-year major source threshold, triggering a Title V operating permit. The Applicant would obtain a synthetic-minor individual state permit in order to limit VOC emissions and retain status as a minor source (Enbridge 2016a). Dispersion modeling to ensure compliance of the Clearbrook terminal with ambient air quality standards has not been completed and would likely not be triggered by this permit change. Furthermore, operational emissions would consist primarily of VOCs, which are a precursor to the criteria pollutant, ozone. VOC emissions cannot practically be modeled to show a source's ozone formation given the regional transport nature of the pollutant.

Table 5.2.7-8. Estimated Operations Emissions for the Applicant's Proposed Project

Emission Source Description	Direct Emissions (tons per year)							
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs
Pump station fugitive emissions from pumps, piping components, sump tanks, and pig traps	2.9	0.0	0.0	0.0	0.0	0.0	0.04	0.09
Mainline valve fugitive emissions from piping components	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.004
Clearbrook terminal fugitive emissions from pumps, piping components, sump tanks, and pig traps	0.5	0.0	0.0	0.0	0.0	0.0	0.006	0.02
Additional Clearbrook terminal storage tank withdrawal losses from pipeline throughput[a]	17.5	0.0	0.0	0.0	0.0	0.0	372.2	1.2
Fugitive emissions from unpaved roads	0.0	0.0	0.0	0.0	0.1	0.01	0.0	0.0
Vehicle combustion emissions	0.002	0.004	0.03	0.002	0.0004	0.0004	3.6	0.0
Additional Superior terminal storage tank withdrawal losses from pipeline throughput[b]	--	--	--	--	--	--	--	--
TOTAL EMISSIONS	**21.0**	**0.004**	**0.03**	**0.002**	**0.1**	**0.01**	**375.9**	**1.3**

Source: Enbridge 2017.

[a] Only those emissions associated with the proposed increase in throughput of the Clearbrook terminal are included as part of the Project's operations emissions (i.e., existing operations emissions are equivalent to the existing environment).

[b] The Applicant is currently working on an application for an air permit to accommodate the proposed increase in throughput of the Superior terminal.

Note:

Operations emissions are based on 8 pump stations and 27 mainline valve sites.

CO = carbon monoxide, GHGs = greenhouse gases, HAPs = hazardous air pollutants, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

"--" = Emissions not estimated.

The existing Superior terminal has both internal and external floating roof storage tanks that are subject to NSPS in 40 CFR 60 Subpart Kb, "Standards of Performance for Volatile Organic Liquid Storage Vessels." The Superior terminal also has diesel engines subject to NSPS in 40 CFR 60 Subpart IIII for stationary compression ignition internal combustion engines and the National Emission Standards for Hazardous Air Pollutants in 40 CFR 63 Subpart ZZZZ for reciprocating internal combustion engines. The Superior terminal currently operates as a Title I Prevention of Significant Deterioration and Title V major source. Currently, the Applicant is working on an application for an air permit to accommodate the potential increased throughput of the terminal (Wisconsin DNR 2016). The Wisconsin permitting agency may require dispersion modeling to determine compliance of the Superior terminal with ambient air quality standards, depending on the resulting emissions increase and permit triggered.

As a result of the permitting and federal NSPS and NESHAP requirements, it would be expected that permanent operations of the Applicant's proposed project would result in minor, localized air quality impacts; and GHG emissions would contribute to global climate change.

Loss of Carbon Sequestration

Trees, like other green plants, are carbon sinks that use photosynthesis to convert CO_2 into sugar, cellulose, and other carbon-containing carbohydrates that they use for food and growth. The process by which carbon sinks remove CO_2 from the atmosphere is known as "carbon sequestration." Although forests do release some CO_2 from natural processes such as decay and respiration, a healthy forest typically stores carbon at a greater rate than it releases carbon (New York DEC 2016). The actual rate of carbon sequestration is highly variable and depends on several factors, including the species of tree, age of the tree, climate, forest density, and soil conditions.

Following construction, 981 acres of previously cleared forested land could be reforested to provide a carbon sequestration (storage) reservoir. The remaining 702 acres along the permanent right-of-way would remain cleared. The nature of the proposed tree removal is to permanently convert forested land within the permanent right-of-way and aboveground facility sites to a non-forested land use, which would result in a permanent loss of carbon sequestration.

Within the Northern Lake States, the Chicago Climate Exchange estimated the annual carbon accumulation on forested lands for six forest types: aspen-birch, elm-ash-cottonwood, maple-beech-birch, oak-hickory, spruce-fir, and white-red-jack pine (Chicago Climate Exchange 2009). For these forest types, 1.6 metric tons of CO_2 is annually sequestered in the non-soil components of the forest. Thus the annual carbon sequestration foregone annually on the 702 acres that are permanently deforested would be 1,260 tons.

Indirect Greenhouse Gas Emissions

In addition to the direct operations emissions presented in Table 5.2.7-8 (376 tons of CO_2e per year) and an annual loss of an estimated 1,262 tons of CO_2e of sequestration, the Project would result in indirect GHG emissions at power generation facilities that supply energy to power the pump stations needed for the line.

The pump stations for the project would be powered by electricity from existing local electric utilities, which would produce indirect air emissions (i.e., emissions not from the Applicant's proposed project itself, but from power plant emissions that generate the electricity the Project uses). The projected power consumption from operations of all pump stations would be 533,249 megawatt-hours (MWh) per year (Enbridge 2016b). This estimate includes the power consumption for the existing Line 3 pump stations. GHG emissions for electricity use for the power control area for each of the proposed pump stations were calculated using EPA's eGRID GHG emission factors:

- 1,894 pounds of CO_2e per MWh for the Otter Tail Power Company for the Donaldson, Viking, Plummer, and Clearbrook terminal pump stations; and
- 1,836 pounds of CO_2e per MWh for the Great River Energy for the Two Inlets, Backus, Palisade, and Cromwell pump stations.

Based on this data, the maximum indirect GHG emissions from pump station operations would be 497,112 tons of CO_2e per year (EPA 2015b). The maximum indirect GHG emissions from pump station operations associated only with the increased throughput would be 452,497 tons of CO_2e per year, after removing 44,615 tons of CO_2e per year that is associated with the existing Line 3 and considered part of

the baseline in the existing environment (Enbridge 2017). The criteria pollutant emissions associated with the electric generating facilities would be authorized by applicable permits, ensuring compliance with ambient air quality standards. These facilities would also be subject to the GHG reduction requirements in the Clean Power Plan.

Social Cost of Carbon

The potential increased GHG emissions associated with the Project would contribute incrementally to global climate change, in conjunction with other regional, national and global sources of GHG emissions; when aggregated together on a global scale, emissions can have large cumulative effect on climate change.

EPA and other federal agencies use the SCC to estimate the climate benefits of rulemakings. The SCC is the total cost to society arising from man-made emissions of CO_2 and other GHGs. It is typically measured in U.S. dollars per metric ton of CO_2 or CO_2e. The SCC is meant to be a comprehensive estimate of climate change damages. It includes changes in net agricultural productivity; human health; property damages from increased flood risk; and changes in energy system costs, such as reduced costs for heating and increased costs for air conditioning. Given current modeling and data limitations, however, it does not include all important damages. Nonetheless, EPA (2016h) reports that the SCC is a useful measure to assess the benefits of CO_2 reductions.

Table 5.2.7-9 presents four SCC values developed by the Interagency Working Group, a group comprised of scientific and economic experts from the White House and federal agencies, including Council on Environmental Quality, National Economic Council, Office of Energy and Climate Change, and Office of Science and Technology Policy, EPA, and the Departments of Agriculture, Commerce, Energy, Transportation, and Treasury. Three values are based on the average SCC from three integrated assessment models, at discount rates of 2.5, 3, and 5 percent. The fourth value, which represents the 95th-percentile SCC estimate across all three models at a 3-percent discount rate, accounts for higher-than-expected impacts from temperature change farther out in the tails of the SCC distribution (White House 2015). The Interagency Working Group acknowledges that a 3-percent discount rate is the central (average) value (White House 2015). Thus, a 3-percent discount rate was used in this analysis.

Table 5.2.7-9. Social Cost of Carbon (in 2007 dollars per metric-ton CO_2)

Year	Discount Rate and Statistic			
	5% Average	3% Average	2.5% Average	3% 95th Percentile
2015	$11	$36	$56	$105
2020	$12	$42	$62	$123
2025	$14	$46	$68	$138
2030	$16	$50	$73	$152
2035	$18	$55	$78	$168
2040	$21	$60	$84	$183
2045	$23	$64	$89	$197
2050	$26	$69	$95	$212

Source: Whitehouse 2015.
CO_2 = carbon dioxide

Table 5.2.7-10 calculates the SCC using the 3-percent discount rate for the direct and indirect GHG emissions of the Applicant's proposed project over the 30-year life of the Project.

Table 5.2.7-10. Social Cost of Carbon (Fossil Greenhouse Gas Emissions) for the Applicant's Proposed Project (in 2007 dollars)

Year	30-Year SCC for Direct GHG Emissions[a]	30-Year SCC for Indirect GHG Emissions	30-Year SCC for Direct and Indirect GHG Emissions
30-Year Project Life (2020 to 2049)	$558,917	$672,806,234	$673,365,150

[a] Estimate does not include emissions associated with lost carbon sequestration

GHG = greenhouse gas, SCC = social cost of carbon

Life-Cycle Greenhouse Gas Emissions

The Project is part of a larger crude oil extraction, production, refining, and consumption system that is affected by changes in the availability and price of transportation to get crude oil from the point of extraction to the refineries that process the oil into refined products. An increase in the availability of options for transport via pipeline, for example, could lower the overall cost of transporting crude oil to market, improving its market prospects.

Similarly, increased upstream activity induced by the project could ultimately result in increased end-use of refined products, because, for example, gasoline becomes more abundant and cheaper as a result additional extraction and cheaper pipeline transport.

Addressing the GHG impact of these types of upstream and downstream changes requires a look at GHG emissions at each stage of the life-cycle of the crude oil—extraction to combustion and everything in between. The analysis below first addresses the question of whether and how much a single project like the Line 3 Project could affect upstream and downstream activity and then investigates the magnitude of life-cycle GHG emissions associated with potential upstream and downstream changes.

Potential for Upstream and Downstream Effects

Whether and how much a single project like the Line 3 Project would affect upstream and downstream depends on market dynamics that cannot be predicted with certainty. However, the potential for the additional heavy crude that the Project would accommodate to alter upstream and downstream activity was explored using information presented by the U.S. Energy Information Administration (EIA) in its most recent Annual Energy Outlook (AEO) and similar assessments in two other EISs for oil pipelines.

Each AEO includes long-term energy projections for the United States. AEO 2017 presents projections for U.S. energy markets through 2050 based on eight modeled cases (Reference, Low and High Economic Growth, Low and High Oil Price, Low and High Oil and Gas Resource and Technology, and No Clean Power Plan Implementation cases) (EIA 2017). These projections are not predictions of what will happen, but are modeled projections of what may happen given certain assumptions and methods. The Reference case projection includes consideration of continued improvement in known technologies as well as economic and demographic trends that are consistent with the current central views of leading economic forecasters and demographers.

AEO 2017 states that *overall* energy consumption, including petroleum products, is projected to remain relatively flat in the Reference case, rising 5 percent from the 2016 level by 2040. U.S. petroleum consumption was projected to remain below the 2005 level (about 21 million barrels per day [bpd], the highest recorded to date) through 2040 for all cases evaluated. The range of projections is bounded by the High Oil Price Economic Growth Case (about 15 million bpd) and the Low Oil Price Economic Growth Case (about 20 million bpd). EIA (2017) expects that petroleum consumption will remain relatively flat due to the increases in energy efficiency that would offset growth in the transportation and industrial sectors.

These findings are consistent with the projections reported in the Draft Supplemental EIS for the Line 67 Expansion, which states that "U.S. demand for liquids, including petroleum products and natural gas plant liquids among others, is generally believed to have plateaued at the consumption level in 2015, with some variance depending on price developments" (DOS 2017). In addition, the Final Supplemental EIS for the Keystone XL Project reported that "Approval or denial of any one crude oil transport project…remains unlikely to significantly impact the rate of extraction in the oil sands, or the continued demand for heavy crude oil at refineries in the United States" (DOS 2014).

Based on a review of these studies, it is difficult to determine with certainty that no upstream or downstream changes would occur as a result of the Project, therefore the following analysis describes life-cycle GHG emissions that could result if upstream or downstream changes did occur.

Life-Cycle Emission Estimates

A life-cycle analysis for GHGs tracks the total production of GHGs from their extraction from the earth to the end-use combustion of refined petroleum products or byproducts. Life-cycle stages for crude oil generally include the following (DOS 2017; NETL 2008):

- Life-Cycle Stage #1: Raw Material Acquisition
  - Begins with extraction of raw feedstocks (e.g., crude oil) from the earth and any partial processing of the raw materials that may occur.
  - Feedstocks include foreign and domestic crude oil, natural gas liquids, unfinished oils, and unconventional hydrocarbons (e.g., oil sands).
- Life-Cycle Stage #2: Raw Material Transport
  - Begins at the end of extraction/processing of the raw materials and ends at the entrance to the petroleum refineries.
  - Feedstocks are transported from both domestic and foreign sources to U.S. and foreign refineries.
- Life-Cycle Stage #3: Liquid Fuels Production/Refining
  - Begins at the entrance of the petroleum refinery with the receipt of crude oil (and other feedstock inputs) and ends at the entrance to the petroleum pipeline used to transport the liquid fuels to the bulk fuel storage depot.
  - Petroleum refinery operations are both foreign and domestic.

  - Emissions associated with acquisition and production of indirect fuel inputs such as purchased power and steam, purchased fuels such as natural gas and coal, and fuels produced in the refinery and subsequently consumed therein are included in this stage.
  - Emissions associated with onsite and offsite hydrogen production are included in this stage, including emissions associated with raw material acquisition for hydrogen plant feedstock and fuel.
  - Production of oxygenates is excluded from the analysis.

- Life-Cycle Stage #4: Product Transportation and Refueling
  - Begins at the exit of the domestic or foreign petroleum refinery and ends with dispensing the fuel into the vehicle/aircraft.
  - Includes the operation of the bulk fuel storage depot for gasoline and diesel and the airport fuel storage tanks.
  - Includes the operation of liquid fuel tanker trucks used to transfer the gasoline/diesel from the depot to the vehicle fueling stations and the transport of jet fuel from the airport fuel storage tanks to the aircraft by a refueling truck.

- Life-Cycle Stage #5: Combustion
  - Begins at the vehicle/aircraft fuel tank and ends with the combustion of the liquid fuel.
  - Includes emissions from combustion of coke sold as fuel for offsite use

Emissions at each stage of the life-cycle differ for different types of crude. For example, oil extracted from the Western Canadian Sedimentary Basin (WCSB) like the heavy crudes that would be carried by the proposed Line 3 pipeline, require greater energy input for extraction and upgrading than U.S. light crudes, and therefore create more GHG emissions at each stage during production. The Department of State's Line 67 Expansion Project EIS contains a detailed review of the life-cycle stages, sources of life-cycle GHG emissions, and sources of uncertainty in life-cycle GHG emissions for the types of oil that would be transported on both the 67 Expansion and the proposed Line 3 pipeline (DOS 2017). That document is incorporated by reference here, and a summary of the relevant per-barrel life-cycle GHG emissions is provided in Table 5.2.7-11. While Line 3 currently carries light WCSB crude, the Project would be capable of carrying both light and heavy WCSB crude.

While Table 5.2.7-11 provides a comparison of per-barrel life-cycle GHG emissions, the total magnitude of the life-cycle GHG impact of the Project depends on whether the expanded capacity of the Project induces entirely new upstream production and downstream consumption (no displacement) or simply replaces other sources of oil. If oil transported on the proposed Line 3 pipeline does displace other sources of crude oil to refineries, the total life-cycle GHG impact of the displacement depends on how much oil is displaced and of what type.

Table 5.2.7-11. Average Life-Cycle Greenhouse Gas Emissions for Various Crude Oils

Crude Oil Type	Life-Cycle GHG Emission Estimate[a] (kg CO_2-e/barrel of crude oil)
Heavy WCSB	584-632[b]
Light WCSB	513
Average U.S. Refinery Mix	521[c]
Venezuelan Heavy	558
Mexican Heavy	513
Iraqi Medium	484
Arab Medium	468
Canadian Conventional	464
U.S. Light Tight Oil	512
U.S. CO_2 EOR Medium	512
Nigerian Light	501
Iraqi Medium	484
Arab Medium	468

[a] Average from studies evaluated in DOS 2017

[b] Upper end of range represents results of GREET modeling conducted by DOS 2017

[c] Result of GREET modeling conducted by DOS 2017

EOR = enhanced oil recovery; WCSB = Western Canada Sedimentary Basin

The life-cycle GHG emission estimates provided below draw on the values in Table 5.2.7-11 to bookend the possible outcomes from full displacement to zero displacement. Baseline life-cycle GHG emissions for existing Line 3 are shown in Table 5.2.7-12, assuming current throughput of 390,000 bpd of WCSB light crude. Post-Project life-cycle GHG emissions were calculated assuming a worst case throughput of 760,000 bpd of WCSB heavy crude. Under these assumptions, if no displacement occurs, the Applicant's proposed Project would result in 760,000 bpd of new WCSB heavy crude entering the market, resulting in a 193 million ton CO_2e/year incremental increase in emissions. If, rather the heavy crude transported on this line displaces lighter crude, for example the 390,000 bpd of WCSB light crude that the existing Line 3 provides to market as well as 370,000 bpd of another light crude (U.S. light tight), the result would be a 35 million ton CO_2-*e*/year incremental increase in emissions. If the heavy crude transported on the Applicant's proposed Project displaces other heavy Canadian crude (market-wide supply and demand are unaffected by the Project), no change in upstream and downstream emissions would occur. Using the SCC estimates described above, the 30-year cost associated with the Project life-cycle emissions could range up to $120 billion.

Table 5.2.7-12. Average Life-Cycle Greenhouse Gas Emissions for Various Crude Oils

Scenario	Annual Life-Cycle GHG Emissions (million tons CO2*e*)	Incremental Annual Life-Cycle GHG Emissions (million tons CO2*e*)	30-Year SCC for Incremental Life-Cycle GHG Emissions (2007 dollars)
Existing Line 3 (390,000 bpd WCSB light)	80.5	0	0 billion
Applicant's Proposed Project (760,000 bpd WCSB Heavy[a]) - No displacement	273.5	193	287 billion
Applicant's Proposed Project (760,000 bpd WCSB Heavy) - Displaces 390,000 bpd WCSB Heavy & 370,000 U.S. Light Tight Oil	115.5	35	52 billion

[a] Western Canada Sedimentary Basin (WCSB) heavy value based on GREET Modeling (DOS 2017)

Note that there are assumptions and data limitations in the characterization of life-cycle GHG emissions that vary between studies. As a result, the GHG emissions can differ substantially from one study to the next. Since the studies reviewed do not consistently disclose the details of their analysis, and often rely on proprietary models and data, a thorough assessment of the reasons for this variability is not possible (Brandt et al. 2015; Cooney 2014; Ghandi et al. 2015; Keesom et al. 2009; NETL 2008, 2009; TIAX LLC and Math Pro Inc. 2009).

Applicant-Proposed Measures to Minimize Greenhouse Gas Emissions

Enbridge has indicated that the Project would use measures to reduce emissions of GHGs and save energy during construction and operation, such as the use of locally sourced pipe, establishment of field offices and worker camps in construction areas to reduce travel time of personnel, use of buses to transport workers to work sites to reduce the number of vehicles on the roads, and use of local accommodations and trade services wherever possible (Enbridge 2016f). During operations, the Applicant proposes to use high-efficiency pumps and motors to transport crude oil through the pipeline, which would minimize power requirements over the long term. The Applicant has also invested in renewable and alternative energy projects in Canada and the United States that will reduce GHG emissions (such as removing all cast-iron pipes from its natural gas delivery system) and increase energy conservation efforts (such as building new facilities to recognized green building certification standards).

5.2.7.3.2 Continued Use of Existing Line 3

Construction Impacts

Because existing Line 3 is already constructed and in operation, no initial construction activities are required. Therefore, there would be no construction impacts on air quality from continued use of the existing Line 3 pipeline. Construction activities related to future pipeline repairs, known as "integrity digs," are addressed under operations impacts below.

<u>Stored Carbon Releases</u>

Because no construction or tree removal would be associated with continued use of the existing Line 3, there would be no associated carbon releases.

Operations Impacts

Continued use of the existing Line 3 would continue transport of crude oil at the current average rate of 390,000 bpd, which is reduced from the operating capacity of the pipeline when it initially began operations. Air emissions associated with continued operations are ongoing and considered part of the existing environment; no incremental additional air emissions would occur.

Integrity digs to uncover and repair/replace pipeline sections would continue to occur along the pipeline. They involve construction activities similar to the initial pipeline construction but affect only a short segment of pipeline and last for a short period of time. Air quality impacts from integrity digs at any one location would be negligible, localized, and intermittent and temporary. Total air quality impacts from the integrity program would be negligible to minor and long-term.

Loss of Carbon Sequestration

Although the specific locations of integrity digs are not known, it was assumed that they would not involve permanent tree removal. Thus, no associated loss of carbon sequestration would be associated with continued use of the existing Line 3.

Life-Cycle Greenhouse Gas Emissions

Continued use of existing Line 3 would not induce upstream or downstream changes in emissions. Current, baseline level of life-cycle emissions per barrel of crude oil for existing Line 3 are provided in Table 5.2.7-12.

5.2.7.3.3 System Alternative SA-04

In general, the air quality impacts associated with construction and operation of SA-04 would be significantly higher to those described above for the Applicant's proposed project. The system alternative SA-04 requires eight additional pump stations needing more power and generating almost two times the amount of indirect GHG emissions per year than the Applicant's proposed project. The construction and operations emissions shown in Table 5.2.7-13 and 5.2.7.14, respectively, are considerably higher than the Applicant's proposed project including higher VOC and hazardous air pollutant emissions at the Joliet terminal in Illinois.

Construction Impacts

Construction emissions would be a direct function of pipeline length because the same construction equipment would be used for SA-04 and the Applicant's proposed project. Table 5.2.7-13 shows the estimated construction emissions for SA-04, assuming that it would be constructed in 15 spreads. The Applicant-proposed measures to minimize air impacts described for the Applicant's proposed project also would be implemented for the system alternative; consequently, the air quality impacts during construction would be minor and temporary.

Table 5.2.7-13. Estimated Construction Emissions for the System Alternative SA-04

Emission Source Description	Direct Emissions (tons)							
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs
On- and off-road diesel equipment combustion emissions	8.6	123.5	121.0	0.2	5.3	5.0	23,690.0	0.5
On- and off-road gasoline equipment combustion emissions	1.10	2.34	15.3	1.2	0.2	0.2	2,105.0	0.0
Fugitive emissions from paved roads	0.0	0.0	0.0	0.0	59.1	14.5	0.0	0.0
Fugitive emissions from unpaved roads	0.0	0.0	0.0	0.0	8.4	0.8	0.0	0.0
Emissions from open burning of wood debris	0.0	0.0	272.7	0.0	26.6	26.6	141.0	0.0
Blasting emissions[a]	--	--	--	--	--	--	--	--
Subtotal per spread	***9.7***	***125.8***	***409.0***	***1.4***	***99.6***	***47.1***	***25,936.0***	***0.5***
TOTAL EMISSIONS	**145.1**	**1,887.0**	**6,135.0**	**21.0**	**1,494.3**	**706.4**	**389,040.0**	**8.0**

Source: Enbridge 2017.

[a] Blasting emissions have not been quantified.

Note:

Total emissions represent emissions from 15 construction spreads (absent blasting).

CO = carbon monoxide, GHG = greenhouse gas, HAPs = hazardous air pollutants, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

"--" = Emissions not estimated.

Stored Carbon Releases

During construction, SA-04 could require removal of trees from 99 acres of forested land in the construction work area that, when removed, would release GHGs. Using the same emission factor of 30.2 metric-tons of carbon per acre as used for the Applicant's proposed project, the amount of carbon that potentially would be released back into the atmosphere during construction tree removal is estimated at 12,033 tons of CO_2e.

Operations Impacts

Table 5.2.7-14 estimates the operations emissions for SA-04 based on 16 pump stations and 52 MLV sites. The table includes indirect GHG emissions from the purchase of electricity for pump station operations determined as a function of the pipeline length. Unlike the Applicant's proposed project, SA-04 would not go through the Clearbrook or Superior terminals. Instead, the pipeline would end at the Joliet terminal in Illinois. The operations of SA-04 would result in minor permanent impacts on air quality but comparatively higher than the Applicant's proposed project, and GHG emissions could contribute to global climate change. Note that the emissions from vehicle combustion and unpaved roads have not been quantified.

Table 5.2.7-14. Estimated Operations Emissions for the System Alternative SA-04

Emission Source Description	Direct Emissions (tons per year)								Indirect Emissions (tons per year)[a]
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs	GHGs
Pump station fugitive emissions from pumps, piping components, sump tanks, and pig traps	6.5	0.0	0.0	0.0	0.0	0.0	0.1	0.2	N/A
Mainline valve fugitive emissions from piping components	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.007	N/A
Fugitive emissions from unpaved roads[b]	--	--	--	--	--	--	--	--	N/A
Vehicle combustion emissions[b]	--	--	--	--	--	--	--	--	N/A
Joliet terminal storage tank withdrawal losses from pipeline throughput and fugitive emissions from pumps, piping components, sump tanks, pig traps, and emergency generator	67.8	0.4	0.1	0.03	0.02	0.02	850.2	3.1	N/A
Pump stations indirect emissions from being powered by electricity from existing local electric utilities	--	--	--	--	--	--	--	--	946,670.5
TOTAL EMISSIONS	**74.5**	**0.4**	**0.1**	**0.03**	**0.02**	**0.02**	**850.3**	**3.3**	**946,670.5**

Source: Enbridge 2017.

[a] Because the projected power consumption from the pump stations and locations of pump stations are unknown, indirect GHG emissions for the 795 mile SA-04 were calculated based on 452,497 tons of CO_2e per year for the Applicant's preferred action over 380 total miles (i.e., 1,191 tons of CO_2e per year per mile).

[b] Air emissions from vehicles and unpaved roads have not been quantified for operations for SA-04.

Note:

Operations emissions are based on 16 pump stations and 52 mainline valve sites.

CO = carbon monoxide, GHGs = greenhouse gases, HAPs = hazardous air pollutants, N/A = not applicable, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds, "--" = Emissions not estimated.

Loss of Carbon Sequestration

Following construction of SA-04, 57 acres of previously cleared forested land could be reforested to provide a carbon sequestration (storage) reservoir. The remaining 41 acres along the permanent right-of-way would remain cleared and would not provide any future carbon sequestration. Using the same emission factor of 1.6 metric-tons of CO_2 per acre per year as used for the Applicant's proposed project, the amount of carbon that 41 acres would have sequestered is estimated at 74 tons of CO_2e per year.

Social Cost of Carbon

Table 5.2.7-15 calculates the SCC using the 3-percent discount rate for the direct and indirect GHG emissions for SA-04 over the 30-year life of the Project.

Table 5.2.7-15. Social Cost of Carbon (Fossil Greenhouse Gas Emissions) for the System Alternative SA-04 (in 2007 dollars)

Year	30-Year SCC for Direct GHG Emissions[a]	30-Year SCC for Indirect GHG Emissions	30-Year SCC for Direct and Indirect GHG Emissions
30-Year Project life (2020 to 2049)	$1,264,290	$1,407,581,446	$1,408,845,737

[a] Estimate does not include emissions associated with lost carbon sequestration.

GHG = greenhouse gas, SCC = social cost of carbon

Life-Cycle Greenhouse Gas Emissions

Like the Applicant's proposed project, SA-04 would be part of a larger crude oil extraction, production, refining, and consumption system that is affected by changes in the availability and price of transportation to get crude oil from the point of extraction to the refineries that process the oil into refined products. Similar to the Applicant's proposed project, SA-04 could stimulate additional upstream production and downstream consumption, or it could simply displace existing supplies of crude oil to the market. The possible outcomes and associated life-cycle GHG emissions for SA-04 are the same as those described in Section 5.2.7.3.1 for the Applicant's proposed project. Specifically, if no displacement occurs, system alternative SA-04 would result in 760,000 bpd of new WCSB crude entering the market, resulting in a 193 million ton CO_2e/year incremental increase in emissions. If, instead, the heavy crude transported on this line displaced lighter crude, for example the 390,000 bpd of WCSB light crude that the existing Line 3 provides to market as well as 370,000 bpd of another light crude (U.S. light tight), the result would be a 35 million ton CO_2e/year incremental increase in emissions. If the heavy crude transported on SA-04 displaced other heavy Canadian crude (market-wide supply and demand are unaffected by the Project), no change in upstream and downstream emissions would occur. Using the SCC estimates described above, the 30-year cost associated with the Project life-cycle emissions could range up to $120 billion.

5.2.7.3.4 Transportation by Rail

Construction Impacts

In order to transport crude oil via rail, temporary storage and offloading facilities likely would need to be constructed in Clearbrook and Superior. Air quality impacts associated with construction of the facilities would include emissions from fugitive dust and from fossil fuel-fired construction equipment. Although

these emissions have not been quantified, construction is a temporary activity and associated air emissions likely would be negligible, localized, and intermittent.

Stored Carbon Releases

Because the specific location and configuration of temporary storage and offloading facilities are not known, the acreage of tree removal and associated release of carbon cannot be estimated. However, both the Clearbrook and Superior terminal locations are located in developed areas with limited forestation, so it was assumed that no carbon releases would be associated with construction of the storage and offloading facilities.

Operations Impacts

Transporting up to 760,000 bpd of crude oil would require up to 10 loaded trains per day (88,000 barrels for a full train of 110 tank cars). Assuming that 48 percent of the oil would be delivered to the Clearbrook terminal (129 miles one-way) and 52 percent of the oil would be delivered to the Superior terminal (355 to 382 miles one-way), total traffic is estimated to be 20,280,822,131 rail ton-miles per year (round trip loaded and empty). The emissions associated with transport of crude oil via rail are shown in Table 5.2.7-16. Note that emissions from operation of the storage and offloading facilities have not been quantified. It also should be noted that the rail route to the Superior terminal would intersect Bemidji and Brainerd, Minnesota, which were cited as having air quality conditions that were unhealthy for sensitive groups for 2 days in 2015.

Table 5.2.7-16. Estimated Operations Emissions Associated with Transportation by Rail

Facility	Direct Emissions (tons per year)						
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs
Rail combustion emissions	556.8	15,111.5	1,487.0	179.9	373.5	359.9	568,472.8

Source: Minnesota Department of Commerce 2015.

Notes:

Rail transportation emissions are calculated for 20,280,822,131 rail ton-miles per year, derived from five fully loaded trains to the Clearbrook terminal and five fully loaded trains to the Superior terminal, with empty trains on the return. The weight for a loaded train (110 tank cars at 143 tons each and 4 locomotives at 200 tons each) was estimated at 16,530 tons, and the weight of an empty train (110 tank cars at 45.5 tons each and 4 locomotives at 200 tons each) was estimated at 5,805 tons.

Air emissions for operation of storage and offloading facilities that would be required for transportation via rail have not been determined.

CO = carbon monoxide, GHG = greenhouse gas, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

Loss of Carbon Sequestration

Because the specific location and configuration of temporary storage and offloading facilities are not known, the acreage of trees on forested land permanently cleared and unavailable for carbon sequestration cannot be estimated. However, both the Clearbrook and Superior terminal locations are in developed areas with limited forestation, so it was assumed that no loss of carbon sequestration would be associated with operation of the storage and offloading facilities.

Social Cost of Carbon

Using the 3-percent discount rate for the GHG emissions shown in Table 5.2.7-9 the SCC for the rail alternative over a 30-year period would be $845,248,443 (in 2007 dollars).

5.2.7.3.5 Transportation by Truck

Construction Impacts

In order to transport via truck, temporary storage and offloading facilities would likely need to be constructed in Clearbrook and Superior. Air quality impacts associated with construction of the facilities would include emissions from fugitive dust and from fossil fuel-fired construction equipment. Although these emissions have not been quantified, construction is a temporary activity and associated air emissions likely would be negligible, localized, and intermittent.

Stored Carbon Releases

Because the specific location and configuration of temporary storage and offloading facilities are not known, the acreage of tree removal and associated release of carbon cannot be estimated. However, both the Clearbrook and Superior terminal locations are in developed areas with limited forestation, so it was assumed that no carbon releases would be associated with construction of the storage and offloading facilities.

Operations Impacts

Absent a pipeline, transporting up to 760,000 bpd of crude oil would require up to 4,000 loaded tanker trucks per day and 4,000 returning empty tanker trucks per day (190 barrels per truck). Assuming that 48 percent of the oil would be delivered to the Clearbrook terminal (179 miles one-way) and 52 percent of the oil would be delivered to the Superior terminal (360 miles one-way), total traffic is estimated at 797,802,400 truck miles per year. Table 5.2.7-17 quantifies the operations emissions associated with transport of crude oil via truck. Note that emissions from operation of the facilities (loading and offloading) have not been quantified. It also should be noted that the truck route from the Gretna pump station to the Superior terminal goes through Duluth, Minnesota, which is designated as a maintenance area with respect to CO emissions (8-hour and 1-hour ambient air quality standards) and which has been cited for 2 days in 2015 for having air quality conditions that were unhealthy to sensitive groups. The truck route to the Superior terminal would also intersect Bemidji, Minnesota, which also was cited as having air quality conditions that were unhealthy for sensitive groups for 2 days in 2015.

Table 5.2.7-17. Estimated Operations Emissions Associated with Transportation by Truck

Facility	Direct Emissions (tons per year)						
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs
Truck combustion emissions	1,825.6	5,647.3	8,987.0	17.1	98.1	93.8	1,506,291.3
Fugitive emissions from paved roads	0.0	0.0	0.0	0.0	30,441.7	7,464.3	0.0
TOTAL EMISSIONS	**1,825.6**	**5,647.3**	**8,987.0**	**17.1**	**30,509.8**	**7,558.1**	**1,506,291.3**

Source: Minnesota Department of Commerce 2015.

Notes:

Truck transportation emissions are calculated for 797,802,400 truck miles per year, derived from 1,920 round trips to the Clearbrook terminal and 2,080 round trips to the Superior terminal each day.

Air emissions for operation of storage and offloading facilities that would be required for transportation via truck have not been determined.

CO = carbon monoxide, GHG = greenhouse gas, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compound

Loss of Carbon Sequestration

Because the specific location and configuration of temporary storage and offloading facilities are not known, the acreage of trees on forested land permanently cleared and unavailable for carbon sequestration cannot be estimated. However, both the Clearbrook and Superior terminal locations are in developed areas with limited forestation, so it was assumed that no loss of carbon sequestration would be associated with operation of the storage and offloading facilities.

Social Cost of Carbon

Using the 3-percent discount rate for the GHG emissions over a 30-year period, the SCC for the truck alternative would be $2,239,668,011 (in 2007 dollars).

Life-Cycle Greenhouse Gas Emissions

In this EIS the analysis of alternative transportation modes (train and by truck) assumes demand exists and is driving the use of these alternative modes of transport. Under this assumption, the alternative transport scenarios do not have the potential to stimulate upstream or downstream changes. Therefore, no change in production/consumption and associated life-cycle emissions is anticipated for these alternative transport modes.

5.2.7.3.6 Existing Line 3 Supplemented By Rail

Construction Impacts

No new construction would occur with continued use of the existing Line 3 pipeline. Impacts on air quality from construction of rail facilities would be the same as those described above for the rail alternative.

Operations Impacts

Under this alternative, the operations impacts would be identical to those described above for the continued use of existing Line 3 combined with approximately half of the emissions for the rail alternative because the number of train transits would be reduced as shown in Table 5.2.7-18.

Table 5.2.7-18. Estimated Operations Emissions Associated with Continued Use of Existing Line 3 Supplemented by Rail

Facility	Direct Emissions (tons per year)						
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs
Continued use of existing Line 3[a]	--	--	--	--	--	--	--
Transportation by rail[b]	278.4	7,555.8	743.5	90.0	186.7	179.9	284,236.4
TOTAL EMISSIONS	**278.4**	**7,555.8**	**743.5**	**90.0**	**186.7**	**179.9**	**284,236.4**

Notes:

[a] Air emissions associated with integrity digs for continued use of existing Line 3 have not been quantified.

[b] Air emissions associated with rail transportation are calculated at half of the emissions of the rail alternative; note that air emissions for operation of storage and offloading facilities that would be required for transportation via rail have not been determined.

CO = carbon monoxide, GHG = greenhouse gas, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compound

"--" = Emissions not estimated.

Social Cost of Carbon

Using the 3-percent discount rate for the GHG emissions over a 30-year period, the SCC for the truck alternative would be $422,624,221 (in 2007 dollars).

Life-Cycle Greenhouse Gas Emissions

In this EIS the analysis of alternative transportation modes (train and by truck) assumes demand exists and is driving the use of these alternative modes of transport. Under this assumption, the alternative transport scenarios do not have the potential to stimulate upstream or downstream changes. Therefore, no change in production/consumption and associated life-cycle emissions is anticipated for these alternative transport modes.

Continued use of existing Line 3 would not induce upstream or downstream changes in emissions. Current, baseline level of life-cycle emissions for existing Line 3 are provided in Table 5.2.7-12.

5.2.7.3.7 Existing Line 3 Supplemented By Truck

Construction Impacts

No new construction would occur with continued use of the existing Line 3 pipeline. Impacts on air quality from construction of truck facilities would be the same as those described above for the transportation by truck alternative.

Operations Impacts

Under this alternative, the impacts would be identical to those described above for the continued use of existing Line 3 combined with approximately half of the emissions for the truck alternative because the number of truck transits would be reduced as shown in Table 5.2.7-19.

Table 5.2.7-19. Estimated Operations Emissions Associated with Continued Use of Existing Line 3 Supplemented by Truck

Facility	Direct Emissions (tons per year)						
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs
Continued use of existing Line 3[a]	--	--	--	--	--	--	--
Transportation by truck[b]	912.8	2,823.6	4,493.5	8.5	15,254.9	3,799.1	753,145.6
TOTAL EMISSIONS	**912.8**	**2,823.6**	**4,493.5**	**8.5**	**15,254.9**	**3,799.1**	**753,145.6**

[a] Air emissions associated with integrity digs for continued use of existing Line 3 have not been quantified.

[b] Air emissions associated with truck transportation are calculated at half of the emissions of the truck alternative; note that air emissions for operation of storage and offloading facilities that would be required for transportation via truck have not been determined.

CO = carbon monoxide, GHG = greenhouse gas, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compound

"--" = Emissions not estimated.

Social Cost of Carbon

Using the 3-percent discount rate for the GHG emissions over a 30-year period, the SCC for the truck alternative would be $1,119,833,958 (in 2007 dollars).

Life-Cycle Greenhouse Gas Emissions

In this EIS the analysis of alternative transportation modes (train and by truck) assumes demand exists and is driving the use of these alternative modes of transport. Under this assumption, the alternative transport scenarios do not have the potential to stimulate upstream or downstream changes. Therefore, no change in production/consumption and associated life-cycle emissions is anticipated for these alternative transport modes.

Continued use of existing Line 3 would not induce upstream or downstream changes in emissions. Current, baseline level of life-cycle emissions for existing Line 3 are provided in Table 5.2.7-12.

5.2.7.4 Summary and Mitigation

5.2.7.4.1 Summary

Overall construction impacts on air quality would be minor, localized, and intermittent and temporary for the Applicant's proposed project and SA-04. This is primarily due to the nature of pipeline construction where the construction activity moves along the pipeline route, thus limiting the exposure of residents and resources in any one area. Construction impacts on air quality due to rail or truck storage and offloading facilities in Clearbrook and Superior would be temporary and negligible. Finally, there are no predicted construction air quality impacts associated with continued use of the existing Line 3 because no construction would be required.

Table 5.2.7-20 provides the construction emissions (for those that can be quantified) for the Applicant's proposed project and the CN Alternatives. When comparing the Applicant's proposed project and SA-04, SA-04 would generate approximately twice the total amount of construction emissions than the Applicant's proposed project because it is twice as long. However, emission rates at any specific location would be the same for either route.

Table 5.2.7-20. Construction Emissions for the Applicant's Proposed Project and Certificate of Need Alternatives

Route/Certificate of Need Alternative	Direct Emissions (tons)							Stored Carbon Releases (tons)
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	GHGs
Applicant's proposed project	67.7	880.8	2,863.3	9.8	697.3	329.6	181,552.0	85,658
Continued use of existing Line 3[a]	--	--	--	--	--	--	--	--
System alternative SA-04	145.1	1,887.0	6,135.0	21.0	1,494.3	706.4	389,040.0	12,033.1
Transportation by rail[b]	--	--	--	--	--	--	--	--

Table 5.2.7-20. Construction Emissions for the Applicant's Proposed Project and Certificate of Need Alternatives

Route/Certificate of Need Alternative	Direct Emissions (tons)							Stored Carbon Releases (tons)
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	GHGs
Transportation by truck[b]	--	--	--	--	--	--	--	--
Continued use of existing Line 3 supplemented by rail[b]	--	--	--	--	--	--	--	--
Continued use of existing Line 3 supplemented by truck[b]	--	--	--	--	--	--	--	--

[a] No construction emissions would be associated with continued operation of the existing Line 3.

[b] Construction emissions associated with building rail and truck storage and offloading facilities have not been quantified.

CO = carbon monoxide, GHGs = greenhouse gases, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

"--" = Emissions not estimated.

During construction, both the Applicant's proposed project and SA-04 would require removal of trees that, when removed, would release GHGs. The Applicant's proposed project would affect more forested lands than SA-04 and thus would release more GHGs. The rail and truck alternatives would be expected to require very little to no tree removal for construction of storage and offloading facilities, and thus would not be expected to release GHGs. Because continued use of the existing Line 3 would involve no construction, it would not affect trees or their potential to release GHGs.

Air quality impacts during operations of the Applicant's proposed project and CN Alternatives would all be minor and permanent, with the exception of continued use of the existing Line 3. Continued use of existing Line 3 would result in air emissions from the ongoing integrity program; the impacts on air quality would be negligible to minor and long term. Overall, air quality impacts from continued use of existing Line 3 would be less than other alternatives because it is already in operation and no new pumping capacity would be installed.

Table 5.2.7-21 presents the operations emissions (for those that can be quantified) for the Applicant's proposed project and CN Alternatives. For the pipeline alternatives, the table includes indirect GHG emissions from electricity purchased for operation of the pump stations and the associated SCC for direct and indirect GHG emissions. When comparing the Applicant's proposed project and the other CN Alternatives, the Applicant's proposed project would generate the least direct air emissions along the Project route (pipeline route right-of-way or transportation route) and would have the least effect on air quality. Direct air emissions for rail and truck transportation would be significantly higher along the rail and truck routes than those for the pipeline routes. Because the pipeline alternatives would use electric power pumps for pipeline operation, as does existing Line 3, no significant new point source emissions for power generation would be created for the Applicant's proposed project, SA-04, or continued use of

existing Line 3. Instead, generation of electricity to operate the pumps would be spread through the state's existing local electric utility grid. Other emissions during operations of the pipeline alternatives would consist of small, limited sources. Because SA-04 is significantly longer than the Applicant's proposed project, the total energy requirements and related emissions are more than double.

It should be noted that, under normal circumstances, air emissions from additional truck traffic on interstate freeways would be unlikely to decrease local air quality. However, during inclement weather conditions, where traffic delays and congestion may occur, trucks idling during delays may cause temporary increases in localized pollutant concentrations. This effect also may temporarily occur in the vicinity of the Clearbrook and Superior terminals, where up to 2,080 trucks per day (truck transport alternative) would be queuing to enter the terminal and discharge their cargo. Furthermore, it is unknown how the truck traffic would affect the CO maintenance in Duluth, Minnesota.

During operations, both the Applicant's proposed project and SA-04 would require previously forested land along the permanent rights-of-way to remain cleared of trees. These trees, if not removed, would sequester GHGs. The Applicant's proposed project would affect more forested lands than SA-04 and thus would remove more sequestration potential. Although specific locations have not been identified, the rail and truck alternatives and integrity digs associated with continued use of existing Line 3 would be expected to require very little to no permanent tree removal, and thus would not affect overall sequestration.

Table 5.2.7-22 summarizes the construction- and operations-related impacts on air quality that would be expected for the Applicant's proposed project and CN Alternatives. No effects on achievement of the NAAQS would be expected to occur from operation of the Applicant's proposed project or any of the CN Alternatives, with the potential exception of truck emissions in the vicinity of the Clearbrook or Superior terminals and passing through Duluth, Minnesota. Construction and operation of the Applicant's proposed project and CN Alternatives would directly contribute to global GHG emissions and associated climate change, which collectively could lead to a threat to public health and welfare. For further information about the impacts of climate change, refer to Chapter 12.

5.2.7.4.2 Mitigation

Beyond the Applicant-proposed measures described above for the Applicant's proposed project, additional measures to reduce impacts on air quality could include:

- Burning small and dry brush piles only;
- Operating construction equipment as far as possible from sensitive receptors (e.g., residences, schools, and hospitals);
- Limiting construction equipment idling to the extent practical when not in use; and
- Following equipment manufacturer-recommended operations and good combustion practices, including not tampering engines to increase horsepower and using ultra-low sulfur diesel.

Further mitigation for GHG emissions could include compensatory measures such as:

- Investment in new terrestrial carbon storage programs (forest establishment, other types of vegetation restoration)

- Purchase of GHG offset credits
- Investment in renewable energy development
- Contributing resources to regional and local climate adaptation programs.

Table 5.2.7-21. Operations Emissions and Social Cost of Carbon for the Applicant's Proposed Project and Certificate of Need Alternatives

Certificate of Need Alternative	Direct Emissions (tons per year)							Indirect Emissions (tons per year)	30-Year SCC for Direct and Indirect GHG Emissions[a]	Loss of Carbon Sequestration (tons per year)
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	GHGs		GHGs
Applicant's proposed project	21.0	0.004	0.03	0.002	0.1	0.01	375.9	452,496.6	$673,365,150	1,262.3
Continued use of existing Line 3[b]	--	--	--	--	--	--	--	--	--	--
System alternative SA-04[c]	74.5	0.4	0.1	0.03	0.02	0.02	850.3	946,670.5	$1,408,845,737	74.3
Rail alternative[d]	556.8	15,111.5	1,487.0	179.9	373.5	359.9	568,472.8	--	$845,248,443	--
Truck alternative[d]	1,825.6	5,647.3	8,987.0	17.1	30,509.8	7,558.1	1,506,291.3	--	$2,239,688,011	--
Continued use of existing Line 3 with rail[d]	278.4	7,555.8	743.5	90.0	186.7	179.9	284,236.4	--	$422,624,221	--
Continued use of existing Line 3 with truck[d]	912.8	2,823.6	4,493.5	8.5	15,254.9	3,799.1	753,145.6	--	$1,119,833,958	--

[a] Social cost of carbon is quantified in 2007 dollars.

[b] Air emissions associated with integrity digs for continued use of existing Line 3 have not been quantified.

[c] Air emissions from vehicles and unpaved roads for SA-04 have not been quantified.

[d] Air emissions for operation of storage and offloading facilities that would be required for transportation via rail or truck have not been determined.

CO = carbon monoxide, GHGs = greenhouse gases, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SCC = social cost of carbon, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

"--" = Emissions not estimated.

Table 5.2.7-22. Summary of Potential Impacts on Air Quality for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Rail Alternative	Truck Alternative	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Construction Impacts							
Direct and indirect emissions	Temporary/minor impacts	No new impact	Temporary/minor impacts	Temporary/ negligible impacts	Temporary/ negligible impacts	Temporary/ negligible impacts	Temporary/ negligible impacts
GHGs	GHG emissions contribute to overall global climate change	No new impact	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change
Operations Impacts							
Direct and indirect emissions	Permanent/minor impacts	Temporary/ negligible impacts (*from activities associated with pipeline integrity work at any one location)* Long-term/ negligible to minor impacts *(for the integrity program)*	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts
GHGs	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change

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5.2.7.5 References

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5.3 SOCIOECONOMIC ENVIRONMENT

The states and counties crossed by the Applicant's proposed project and CN Alternatives contribute to regional and statewide economies through the production of a variety of goods and services. Project actions have the potential to positively or negatively affect these economies, or may have no or negligible effects. This section discusses the existing conditions and assesses potential Project-related impacts with respect to commodity production; recreation and tourism; and employment, income, and tax revenues.

5.3.1 Commodity Production

The primary commodities produced along the Applicant's proposed project and the CN Alternatives that would be affected by construction or operations of the Project include agricultural commodities, forestry products, and mining products. Construction of Project facilities and permanent maintenance of a cleared right-of-way and Project facilities during operations may displace some capacity for production of these commodities.

The analysis of impacts on commodity production during construction and operation of the Applicant's proposed project and CN Alternatives considered the following issues:

- Disturbance and loss of agricultural land and lost yields,
- Restrictions in agricultural commodity distribution by rail,
- Disturbance and loss of forested land and timber resources, and
- Disturbance and loss of land used for mining and commodity reserves.

The above issues do not apply to the Applicant's proposed project and each CN Alternative uniformly. Reduction in land available for agricultural, forest, and mining production primarily relates to the Applicant's proposed project and to SA-04, where extensive new pipeline construction would occur. Continued use of the existing Line 3 and transportation by rail or truck would not require construction of new right-of-way, and alternative transportation modes would affect only minimal land area for loading and offloading facilities. A summary and comparison of the impacts for the Applicant's proposed project and CN Alternatives are included at the end of the section.

5.3.1.1 Regulatory Context and Methodology

5.3.1.1.1 Regulatory Context

Commodity production is commonly regulated by state-level laws and statutes that protect agricultural, timber, and mineral resources.

North Dakota

There are no state-specific laws or statutes for forest or farmland preservation in North Dakota; however, North Dakota Century Code § 38-08 lays out the mineral rights and protection for development of minerals.

Minnesota

Several Minnesota statutes provide for the protection and management of land used to produce commodities. Minnesota Statutes § 17.80 – 17.84 set the state policy on agricultural land preservation and conservation. One of the main goals is "[…] to minimize the disruption of agricultural production in accordance with local social, economic and environmental considerations of the agricultural community." Minnesota Statute § 89.002 establishes the policies for managing forest resources of state forest lands, providing for the responsible and sustainable use of forest products. The provision for leasing State-owned lands and mineral rights for nonferrous metallic minerals and other minerals, other than iron ore, is found in Minnesota Statutes § 93.25. Furthermore, state-owned lands and mineral rights administered by the Commissioner of Natural Resources may be leased to remove sand, gravel, clay, rock, marl, peat, and black dirt under Minnesota Statute § 92.50.

Iowa

Iowa Statute § 352.5 establishes methods for preserving agricultural lands for agricultural production, while Iowa Statute § 479B.20 establishes land restoration standards for agricultural lands both during and after pipeline construction. Iowa Statute § 427C.2 sets forth the procedures for establishing a forest reservation. Iowa Administrative Code 208 "provides for the reclamation and conservation of land affected by the mining of gypsum, clay, stone, sand, gravel, or other ores or mineral solids, except coal, and thereby to preserve natural resources, protect and perpetuate the taxable value of property, and protect and promote the health, safety, and general welfare of the people of this state."

Illinois

In Illinois, the Farmland Preservation Act establishes procedures whereby the Illinois Agriculture Department works with other state agencies, planning commissions, and county governments to help reduce the extent to which farmland is affected by conversion or development. Department policy is not designed to limit or stop development, but to minimize its impact on agricultural land—both in terms of acres lost and secondary impacts that may adversely affect farming operations. In addition, Illinois Compiled Statutes § 505.2 sets forth "the policy of the State to conserve, protect and to encourage the development and improvement of its agricultural lands for the production of food and other agricultural products." Illinois Compiled Statutes § 1537.2 establishes the procedures through which forests are managed, and Illinois DNR manages active mineral leases through Illinois Compiled Statutes § 67.1700.

Wisconsin

Wisconsin Statutes § 91.01 – 91.86 set the state policy on agricultural land preservation and conservation. Section 26.35 identifies privately owned forests that are likely to produce highly valued timber products, and Section 26.42 establishes a "forestry diversification program [that] shall promote and assist the development and use of industrial and commercial products from forestry products." Mining and mineral rights are administered under Wisconsin Statutes § 107.00 – 1107.25.

5.3.1.1.2 Methodology

The ROI for the analysis of impacts on commodities consists of all land currently used in the production of agricultural, timber, or mineral products—or land with the potential to be used for these purposes—that could be disturbed or removed from production by the Applicant's proposed project and CN Alternatives

in North Dakota, Minnesota, Iowa, Illinois, and Wisconsin. This includes the permanent pipeline right-of-way and the construction work area. Impacts on commodity production were evaluated by:

- Using GIS data resources to identify and inventory all land in the ROI currently being used, or with the potential to be used, in the production of agricultural, timber, or mineral production in the counties crossed by the Applicant's proposed project and CN Alternatives.
- Construction and operations impacts for the Applicant's proposed project were estimated by overlaying construction and operations footprints provided by the Applicant on GIS layers of commodity production lands. While integrity digs and subsequent pipeline repair activities would likely occur during the lifespan of the Applicant's proposed project as standard operation and maintenance activities, these activities have not been factored in as they are not imminent in the foreseeable future.
- Construction and operations impacts from continued use of the existing Line 3 pipeline were qualitatively addressed along the existing Line 3 right-of-way for integrity digs and subsequent pipeline repair, and the potential for these actions to occur on commodity production land, especially agricultural land.
- Temporary construction impacts for system alternative SA-04 were estimated by overlaying a standardized 120-foot-wide construction work area centered on SA-04. Operations impacts were estimated by overlaying a standardized 50-foot-wide permanent right-of-way centered on SA-04 on GIS layers of commodity production lands.
- Although the precise routes and facility locations for the rail and truck alternatives are not known, construction and operations impacts for the rail and truck alternatives were qualitatively evaluated based on commodity production lands in the vicinity of the Clearbrook and Superior terminals, where offloading facilities would likely be constructed, and assumptions on the routes that trains and trucks may use to transport oil to those terminals (Figure 4.2-2).
- For the acreages of land identified for each commodity type that would be disturbed or lost, a range of estimates of lost yield and market value of the affected commodities (where applicable) was provided, along with a qualitative statement on the duration and magnitude of impacts on the productivity of commodity lands associated with construction and operation of the Applicant's proposed project and the CN Alternatives.

Various state and federal database layers were obtained to identify agricultural land, forested land, and mineral resources. Acreages of agricultural and forested lands were obtained using the NLCD 2011 Classification System (Homer et al. 2015). Acreages of farmland soil were obtained using the NRCS database to identify prime farmland and farmlands of statewide importance (NRCS 2011). For mining, acreages of active lease land and acreages of land with potential sand and gravel deposits were obtained from Minnesota DNR and USGS. Based on the geographic extent of impacts on the land used in the production of each commodity, a qualitative assessment of the relative magnitude (i.e., negligible, minor, or major) and duration (temporary, short term, or long term) of the impacts in terms from disturbance/loss of agricultural, timber, and mining lands is provided.

5.3.1.2 Existing Conditions

Agricultural land is defined in this EIS as cultivated cropland and grassland, and includes activities such as crop harvesting, livestock grazing, dairy production, and organic farming. It also includes land with

areas of soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, i.e., "prime farmland" as defined by the U.S. Department of Agriculture Natural Resource Conservation Service.; or areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods (i.e., farmland of statewide importance). Collectively, these soils are referred to as "farmland soils." Farmland soils can include agricultural land as defined above or land that is not currently being used for agricultural production but has high potential for future productivity.

Commercially productive forested land is land that is actively managed for the sustainable harvest of timber and includes the following land cover types: deciduous, evergreen, and mixed forest. This land is currently being used in the production of timber or has timber resources that could be harvested in the future. The forest industry is an important part of the economies of Minnesota and Wisconsin. In Minnesota, the forest industry provided 86,775 jobs and had an output of $17.1 billion in 2011 (Minnesota DNR 2011). In Wisconsin, the forest industry provided more than 64,000 jobs and had an output of $24.7 billion in 2014 (Wisconsin DNR 2014).

Mineral resources in the states that would be crossed by the Applicant's proposed project and CN Alternatives include non-metallic (e.g., sand, gravel, and crushed stone) and metallic minerals (e.g., iron ore, nickel, and titanium). Access to reliable transportation for export of commodities produced in Minnesota and its neighboring states is also critical to achieving the highest economic yield for the commodities produced.

5.3.1.2.1 Applicant's Proposed Project

Agricultural Land

Table 5.3.1-1 presents the agricultural land and soil characterized as prime farmland or farmland of statewide significance located within the ROI for the Applicant's proposed project. The construction work area includes approximately 2,150 acres classified as prime farmland or farmland of statewide importance and approximately 2,284 acres classified as agricultural land. An additional approximately 487 acres of farmland soil and 554 acres of agricultural land are within the footprint of ATWS, access roads, valve sites, and pump stations. As the designation is based on soil characteristics and not land use, some of the farmland soil may be in active production, while some may not be actively farmed. In total, approximately 2,636 acres of farmland soil, and 2,838 acres of agricultural land are located within the ROI for the Applicant's proposed project (Table 5.3.1-1).

To illustrate this acreage in terms of market value, Table 5.3.1-2 presents the total dollar value ($2016 thousands) of the yield (i.e., the average yield per acre per year multiplied by the acres crossed) by crop type. In total, the market value of the crops that could be grown on affected lands for the Applicant's proposed project is approximately $938,000 (including footprints for the ATWS, pump stations, valve sites, and access roads).

Forested Land

Table 5.3.1-3 presents the total acres of forested land crossed by the Applicant's proposed project. In total, approximately 1,859 acres of forested land is present within the ROI for the Applicant's proposed project (including footprints for the ATWS, pump stations, valve sites, and access roads).

Table 5.3.1-4 presents the current market value of the timber within the ROI for the Applicant's proposed project, which is approximately $354,000 based on the assumption that an acre of forested land produces 7.8 cords of wood and the average value per cord across all species is $24.40 (USFS 2008; Minnesota DNR 2008).

Table 5.3.1-1. Agricultural Land and Farmland Soils Crossed by the Applicant's Proposed Project (acres)

Agricultural Land Type	North Dakota[a]		Minnesota[b]		Wisconsin[a]		Construction Work Area Subtotal		ATWS	Temp. Access Roads	Perm. Access Roads	Pump Stations	Valves[c]	Total[d]	
	Con	Op	Con	Op	Con	Op	Con	Op						Con	Op
Agricultural Land															
Cultivated crops	363	151	1336	575	<1	<1	1699	726	327	2	20	20	2	2,070	768
Grass/pasture-land	5	2	577	259	3	1	585	262	121	1	45	16	1	768	323
Agricultural land total	**368**	**153**	**1,913**	**833**	**3**	**1**	**2,284**	**988**	**448**	**3**	**65**	**36**	**3**	**2,838**	**1,092**
Farmland															
Prime farmland	122	51	862	378	0	0	984	429	181	8	60	4	1	1,238	495
Farmland of statewide importance	4	2	1046	455	116	48	1,165	505	134	12	67	17	3	1398	592
Farmland soils total	**126**	**53**	**1,907**	**833**	**116**	**48**	**2,150**	**934**	**315**	**19**	**127**	**21**	**4**	**2,636**	**1,087**

Sources: Homer et al. 2015 for agricultural land; NRCS 2011 for prime farmland and farmland of statewide importance.

[a] Con = 120-foot-wide construction footprint, Op = 50-foot-wide permanent right-of-way.

[b] Enbridge-provided footprints: Con = construction work area, Op = operations right-of-way.

[c] Includes valve sites and valve driveways. Since valve sites are within the permanent right-of-way, total Project impacts may be slightly overestimated due to double counting.

[d] Con = sum of pipeline construction work area, additional temporary workspaces (ATWS), pump stations, valves, and temporary and permanent access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, valves, and pump stations.

Note:

Values in the table may not sum to subtotals and totals due to rounding.

ATWS = additional temporary workspace; Con = construction work area; Op = operations permanent right-of-way

Table 5.3.1-2. Market Value of Crops Crossed by the Applicant's Proposed Project ($2016 thousands)

Crop Type	North Dakota		Minnesota		Wisconsin		Construction Work Area Subtotal		ATWS	Temp Access Roads	Perm Access Roads	Pump Stations	Valves	Total[c]	
	Con	Op	Con	Op	Con	Op	Con	Op						Con	Op
Alfalfa	$0.0	$0.0	$49.1	$21.9	$0.0	$0.0	$49.1	$21.9	$6.3	$0.1	$2.7	$2.6	$0.3	$61.1	$27.5
Barley	$4.6	$2.0	$6.7	$2.7	$0.0	$0.0	$11.3	$4.7	$1.5	$0.0	$0.0	$1.6	$0.2	$14.6	$6.5
Buckwheat	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Corn	$12.6	$5.1	$59.7	$25.3	$0.1	$0.1	$72.4	$30.5	$10.9	$0.1	$0.6	$0.2	$3.0	$87.3	$34.3
Dry beans	$5.4	$2.2	$33.6	$14.3	$0.0	$0.0	$39.0	$16.5	$2.9	$0.2	$2.0	$0.2	$1.2	$45.5	$19.9
Oats	$0.4	$0.1	$1.6	$0.7	$0.0	$0.0	$2.0	$0.8	$0.1	$0.0	$0.2	$0.2	$0.1	$2.5	$1.3
Other hay/ non alfalfa	$0.1	$0.0	$7.3	$3.2	$0.0	$0.0	$7.4	$3.2	$0.7	$0.0	$0.4	$0.1	$2.3	$10.9	$6.1
Potatoes	$0.0	$0.0	$31.0	$11.5	$0.0	$0.0	$31.0	$11.5	$7.7	$0.0	$1.2	$0.0	$0.0	$39.9	$12.7
Rye	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Soybeans	$47.7	$19.9	$253.8	$108.7	$0.0	$0.0	$301.5	$128.6	$37.3	$0.0	$3.2	$2.4	$32.8	$377.2	$166.8
Spring wheat	$23.8	$9.9	$96.6	$41.1	$0.0	$0.0	$120.4	$51.0	$20.9	$0.0	$1.1	$0.4	$1.2	$144.1	$53.8
Sugarbeets	$23.7	$9.9	$92.6	$37.3	$0.0	$0.0	$116.3	$47.2	$22.3	$0.0	$0.2	$0.3	$0.6	$139.6	$48.3
Sunflower	$2.4	$1.0	$4.7	$1.9	$0.0	$0.0	$7.1	$2.9	$1.1	$0.0	$0.0	$0.0	$0.1	$8.3	$3.1
Winter wheat	$0.0	$0.0	$6.3	$2.8	$0.0	$0.0	$6.3	$2.8	$0.8	$0.0	$0.1	$0.0	$0.0	$7.2	$2.9
TOTAL	**$120.7**	**$50.2**	**$642.9**	**$271.4**	**$0.2**	**$0.1**	**$763.8**	**$321.7**	**$112.6**	**$0.5**	**$11.6**	**$8.1**	**$41.7**	**$938.2**	**$383.0**

Source: U.S. Department of Agriculture, National Agricultural Statistical Service 2016.

Note:

Values in the table may not sum to subtotals and totals due to rounding.

ATWS = additional temporary workspace; Con = construction work area; Op = operations permanent right-of-way

Table 5.3.1-3. Forested Land Crossed by the Applicant's Proposed Project (acres)

Forested Land Type	North Dakota		Minnesota		Wisconsin		Construction Work Area Subtotal		ATWS	Temp Access Roads	Perm Access Roads	Pump Stations	Valves	Total[c]	
	Con	Op	Con	Op	Con	Op	Con	Op						Con	Op
Deciduous forest	2	1	1,349	594	65	28	1,416	622	97	31	73	2	2	1,621	699
Evergreen forest	1	0	176	71	1	0	177	71	18	4	15	1	1	215	88
Mixed forest	0	0	18	8	1	1	19	8	1	0	2	0	0	23	10
TOTAL	**3**	**1**	**1,543**	**673**	**67**	**29**	**1,612**	**701**	**116**	**35**	**89**	**3**	**3**	**1,859**	**797**

Source: Homer et al. 2015.

ATWS = additional temporary workspace; Con = construction work area; Op = operations permanent right-of-way

Table 5.3.1-4. Market Value of Forested Land Crossed by the Applicant's Proposed Project ($2016 thousands)

Forested Land	North Dakota		Minnesota		Wisconsin		Construction Work Area Subtotal		ATWS	Temp Access Roads	Perm Access Road	Pump Stations	Valves	Total	
	Con	Op	Con	Op	Con	Op	Con	Op						Con	Op
Deciduous forest	$0.3	$0.1	$257.2	$113.2	$12.4	$5.2	$269.8	$118.6	$18.4	$5.9	$13.8	$0.5	$0.4	$308.9	$133.2
Evergreen forest	$0.1	$0.1	$33.5	$13.5	$0.2	$0.1	$33.8	$13.6	$3.5	$0.7	$2.8	$0.1	$0.1	$41.0	$16.6
Mixed forest	$0.0	$0.0	$3.5	$1.5	$0.1	$0.1	$3.6	$1.6	$0.3	$0.0	$0.4	$0.0	$0.0	$4.3	$2.0
TOTAL	**$0.4**	**$0.2**	**$294.1**	**$128.2**	**$12.7**	**$5.4**	**$307.2**	**$133.8**	**$22.2**	**$6.7**	**$17.0**	**$0.6**	**$0.5**	**$354.2**	**$151.8**

Sources: Minnesota DNR 2008; USFS 2008.

ATWS = additional temporary workspace; Con = construction work area; Op = operations permanent right-of-way

Mineral Lands

Table 5.3.1-5 presents the total estimated acres of land with active mining areas within the ROI for the Applicant's proposed project. Table 5.3.1-6 presents the acres that contain undeveloped sand, gravel, and mineral resources. These resources include glacial lake sediments with potential commercially important deposits of sand and gravel. Less than 1 acre of land within active mineral areas is located within the ROI in Minnesota, and no land within active mineral areas are located within the ROI in North Dakota or Wisconsin.

In total, approximately 513 acres of land with potentially valuable sand and gravel resources is located within the ROI for the Applicant's proposed project (including footprints for the ATWS, pump stations, valve sites, and access roads) (Table 5.3.1-6).

Table 5.3.1-5. Active Mineral Leases within ROI of the Applicant's Proposed Project (acres)

Name	North Dakota		Minnesota		Wisconsin		Applicant's Proposed Project Total	
	Con	Op	Con	Op	Con	Op	Con	Op
Active metallic and non-metallic leases	0.0	0.0	0.5	<0.1	0.0	0.0	0.5	<0.1

Source: Minnesota DNR 2016.

Con = construction work area; Op = operations permanent right-of-way

Table 5.3.1-6. Land with Potential Sand and Gravel Resources within ROI of the Applicant's Proposed Project (acres)

Resource Type	North Dakota		Minnesota		Wisconsin		Construction Work Area Subtotal		ATWS	Temp Access	Perm Access Roads	Pump Stations	Valves	Total	
	Con	Op	Con	Op	Con	Op	Con	Op						Con	Op
Glacial lake sediment (sand and gravel) total	0	0	442	191	0	0	442	191	63	0.0	7	0	1	513	200

Source: USGS 2006.

ATWS = additional temporary workspace; Con = construction work area; Op = operations permanent right-of-way

5.3.1.2.2 Continued Use of Existing Line 3

The existing Line 3 permanent right-of-way includes approximately 752 acres of active agricultural land (cropland and grass/pastures) but does not contain any timber commodities, as trees are not permitted within pipeline permanent right-of-way. Similarly, mining is not permitted in the permanent right-of-way for the existing Line 3 pipeline.

5.3.1.2.3 System Alternative SA-04

Agricultural Land

Table 5.3.1-7 presents the agricultural land crossed by system alternative SA-04. In total, approximately 10,155 acres of agricultural land within the ROI and 4,281 acres of agricultural land within the anticipated permanent right-of-way is currently devoted to agricultural production. Approximately 5,167 acres of farmland soil is within the ROI and approximately 2,156 acres of farmland soil are located within the permanent right-of-way. Farmland soil may or may not be in active production of agricultural goods.

Table 5.3.1-7. Agricultural Land Crossed by System Alternative SA-04 (acres)

Land/Soil Type	Construction Work Area	Permanent Right-of-Way
Cultivated crops	10,051	4,210
Grass/pastureland	104	72
Agricultural land total	**10,155**	**4,281**
Prime farmland	4,479	1,868
Farmland of statewide importance	688	287
Farmland soil total	**5,167**	**2,155**

Sources: Homer et al. 2015 for agricultural lands; NRCS 2011 for prime farmland and farmland of statewide importance

Note:

Impacts on agricultural land resulting from access roads, additional temporary workspaces (ATWS), and valve information is not included because the exact location of these facilities has not been determined for SA-04

Table 5.3.1-8 presents the total dollar value of the recent annual yield (i.e., the average yield per acre per year multiplied by the acres crossed) by crop type. In total, crops in the construction work area for system alternative SA-04 provide a total market value of approximately $5.2 million, with the majority (83 percent) coming from corn and soybean production. The current total market value of the yield of crops within the permanent right-of-way for SA-04 is approximately $2.1 million (Table 5.3.1-8).

Table 5.3.1-8. Market Value of Crops Crossed by System Alternative SA-04 ($2016)

Crop Type	Construction Work Area	Permanent Right-of-Way
Alfalfa	$22,209	$9,229
Barley	$21,498	$9,361
Corn	$2,599,370	$1,084,209
Dry beans	$129,445	$55,644
Durum wheat	$19	$8
Oats	$1,240	$493
Potatoes	$48,373	$20,161
Soybeans	$1,576,581	$659,211
Spring wheat	$155,902	$65,680
Sugarbeets	$434,946	$181,921
Sunflower	$18,506	$7,769
Winter wheat	$2,265	$984

Table 5.3.1-8. Market Value of Crops Crossed by System Alternative SA-04 ($2016)

Crop Type	Construction Work Area	Permanent Right-of-Way
TOTAL	**$5,010,355**	**$2,094,674**

Source: U.S. Department of Agriculture, National Agricultural Statistical Service 2016.

Forested Land

Table 5.3.1-9 presents the total acres of forested land in the construction work area for SA-04. Nearly all of the approximately 99 acres of forested land in the construction work area is deciduous forest (i.e., maple, many oaks, and elm, aspen, and birch). Approximately 40 acres of forested land would be located within the permanent right-of-way for SA-04.

Table 5.3.1-9. Forested Land Crossed by System Alternative SA-04 (acres)

Forest Land Type	Construction Work Area	Permanent Right-of-Way
Deciduous forest	97	40
Evergreen forest	1	<1
Mixed forest	1	<1
TOTAL	**99**	**40**

Source: Homer et al. 2015.

Table 5.3.1-10 presents the current market value of the timber within the construction work area for SA-04, which is approximately $19,000. This is based on the assumption that an acre of forested land produces 7.8 cords of wood and the average value per cord across all species is $24.40 (USFS 2008; Minnesota DNR 2008).

Table 5.3.1-10. Market Value of Forested Land Crossed by System Alternative SA-04 ($2016)

Forest Land Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Deciduous forest	$18,450	$7,662
Evergreen forest	$133	$57
Mixed forest	$133	$57
TOTAL	**$18,717**	**$7,776**

Source: Homer et al. 2015.

[a] 120-foot-wide construction footprint

[b] 50-foot-wide permanent right-of-way

Note:

Assumes that an acre of forested land produces 7.8 cords of wood and the average value per cord across all species is $24.40

Mineral Lands

No land with active mineral areas is located within the construction work area for SA-04 in Minnesota or Illinois. Approximately 31 acres of land with known oil and gas resources present ("trust land"), occurs in the construction work area for SA-04 in North Dakota. In Iowa, 0.4 acre of land with active coal mining is located in the construction work area for SA-04, along with 2,393 acres of land with potential sand and gravel resources (USGS 2006), of which 840 acres is located within the permanent right-of-way.

5.3.1.2.4 Transportation by Rail

While no specific rail transport lines/locations have been identified, some agricultural and forested lands are present in the immediate vicinity of the Clearbrook and Superior terminals that could be affected by construction of rail offloading facilities. No active mines are in the immediate vicinity of the Clearbrook or Superior terminals.

The existing rail system currently carries approximately 25 percent by weight and value of all freight transiting through Minnesota (MNDOT 2015, Figure B.1 Mode Share by Weight and B.2 Mode Share by Value). This includes unit train crude oil shipments from the Bakken Oil fields to the Twin Cities area (on the order of 39 trains weekly on Burlington Northern Santa Fe) and shipments from Canadian sources. Crude oil shipments are only one type of commodity that relies on rail transportation; general freight, food and farm products, chemicals, equipment, metallic ores, coal, metallic products, and hazardous materials are routinely shipped by rail.

Farm product commodities are a significant component of state rail freight traffic. Approximately 4 million tons entered Minnesota in 2012, and these shipments are forecasted to approximately double to 8 million tons by 2040. Farm products outbound from Minnesota by rail likewise are expected to increase between 2012 and 2040, growing from 12 million to approximately 26 million tons (MNDOT 2015, Figure B.1). Overall, commodity transportation by rail is expected to grow from its current level of approximately 250 million tons per year in 2012 to approximately 470 million tons per year in 2040. By 2040, farm products are forecasted to be the largest outbound commodity class by weight (MNDOT 2015, Figure B.1).

Among all commodity types shipped by rail, grain commodities are particularly sensitive to the availability of rail transportation. Grain shipments must be scheduled to consider cyclical factors, including harvest periods, storage, and international market prices, to maximize economic yield. Competition with other commodities for rail capacity and congestion in the rail system can affect commodity shipments and economic yield.

5.3.1.2.5 Transportation by Truck

While no specific locations have been identified, some agricultural and forested lands are present in the immediate vicinity of new truck offloading facilities and associated road access at the Clearbrook and Superior terminals. No active mines are present in the immediate vicinity of the Clearbrook or Superior terminals.

5.3.1.2.6 Existing Line 3 Supplemented by Rail

The existing conditions for continued use of existing Line 3 supplemented by rail are identical to those described for continued use of the existing Line 3 pipeline and the rail alternative.

5.3.1.2.7 Existing Line 3 Supplemented by Truck

The existing conditions for continued use of existing Line 3 supplemented by truck are identical to those described for continued use of the existing Line 3 pipeline and the truck alternative.

5.3.1.3 Impact Assessment

Potential impacts on land used in the production of commodities from construction and operation of the Applicant's proposed project and CN Alternatives include impacts on agricultural productivity and commercial forestry through the loss of both current and future productivity from removal of crops, disruption of farmland soils, and clearing of trees. This also could affect the corresponding economies, depending on the total market value of the commodities lost and the overall size of the relevant commodity market in the counties crossed. Land that is currently being mined for mineral resources could temporarily be disrupted during construction, and land containing undeveloped potential mineral resources would not be accessible within the permanent right-of-way. The extent and magnitude of these impacts are influenced by the overall geographic scope of the impact and whether the land would recover or be available for future production. Use of the regional rail system to transport crude oil also may affect distribution of commodities to regional distribution points.

The duration of potential Project impacts on commodity production along new pipeline rights-of-way could range from temporary during active construction to permanent (e.g., aboveground facilities, a new corridor through forested areas). During construction, the greatest impacts on commodity production would be caused by clearing of vegetation. Operations impacts would be limited to the addition of aboveground facilities and reduced production from the permanent removal of trees on cleared forested land. In general, agricultural areas would return to their preconstruction condition relatively quickly, whereas forested lands would not be permitted to regrow within the permanent right-of-way.

5.3.1.3.1 Applicant's Proposed Project (from Neche to Superior)

Construction Impacts

<u>Disturbance and Loss of Agricultural Land and Lost Yields</u>

Impacts of construction activities on agricultural land (i.e., cropland and hay/pastures) include removal of crops and grasslands and deferral of production of commodities on lands under active cultivation. Construction activities such as clearing, trench excavation and backfilling, and vehicular traffic also could affect farmland soils (including prime farmland and farmland of statewide importance) through compaction, erosion, interference with drainage, and soil mixing. To prevent soil compaction, drainage alteration, and damage to crops, operation of equipment on agricultural lands would be limited to access routes agreed upon with landowners. Approximately 2,284 acres of agricultural land would be affected along the Applicant's proposed project. Construction of the Applicant's proposed project would cross approximately 2,150 acres of farmland soils (Table 5.3.1-1). The Applicant would implement measures to avoid and minimize potential impacts on soil productivity in accordance with the Agricultural Protection Plan (Appendix F). These measures include erosion control, topsoil segregation, rock removal, and measures to avoid compaction or loosen compacted soils. In temporary construction work areas and along the permanent right-of-way, adherence to the Agricultural Protection Plan would be expected to lead agricultural activity prevented for one growing season, resulting in short-term minor losses to agricultural productivity.

The Agricultural Protection Plan (Appendix F) provides additional measures that would be applied specifically to organic agricultural lands, such as organic-certified farms or farms that are in active transition to organic-certified status, in order to address the unique management and certification requirements of these operations. Two organic farms have been identified within the construction footprint of the Applicant's proposed project. Both organic farms are located east of Clearbrook in Minnesota, and both landowners have signed easement agreements (Enbridge 2016). The Applicant would continue to work with affected landowners to identify organic farms that have not yet been identified and would implement measures in the Agricultural Protection Plan accordingly.

The current market value of crops within the construction work area for the Applicant's proposed project is approximately $764,000; and the total value is approximately $938,000 including the value of crops within the footprint of ATWS, temporary access roads, valve sites, and pump stations (Table 5.3.1-2). This amount represents less than 1 percent of the total market value of agricultural products in the counties that would be crossed by the Applicant's proposed project. Applicant-proposed measures to reduce these impacts include compensating all landowners for lost crops and any documented damage that may be caused by construction activities. Considering the relatively small market value of agricultural commodity losses and the Applicant-proposed measures to compensate landowners and reduce damage to soils, construction of the Applicant's proposed project would result in a short-term negligible impact on the local agricultural economy.

Disturbance and Loss of Forested Lands and Timber Resources

During construction, trees from forested areas would be cleared within the construction work area, which would result in loss of timber production. The Applicant would compensate each state's respective DNR for any merchantable timber loss on state-managed forested lands, and compensation on private lands would be agreed upon by the Applicant and the landowner during easement acquisition.

Following construction activities, trees would not be allowed to re-establish within the permanent right-of-way or facility areas, but would be allowed to regenerate naturally within the remainder of the construction work areas, temporary access roads, and ATWS. However, the area within the temporary construction work area for the Applicant's proposed project could take up to 50 years to regenerate harvestable timber. Construction activities likely would result in long-term to permanent minor impacts on land used for timber production. Based on the value of the annual lost growth, the present value of the future growth foregone is approximately $2.5 million, with the majority of the impact occurring in Minnesota. When compared to the present value of the timber harvest market over the same time period (50 years, $662 million), the impact of construction on the associated local timber industry is likely to be long term to permanent and minor.

Disturbance and Loss of Land used for Mining

The only active mining lease along the Applicant's proposed project is in Minnesota, where less than 1 acre of land with active mineral leases is within the ROI of the Applicant's proposed project; therefore, impacts on productivity would be temporary and negligible. In addition, approximately 513 acres of land with potentially valuable sand and gravel resources is located within the construction footprint for the Applicant's proposed project (Table 5.3.1-6). These resources are in a relatively undeveloped state and are located at an average depth below the surface of between 5 and 450 feet (USGS 2006). Construction activities would temporarily prevent development of these resources for the duration of construction, but mineral resources outside of the permanent right-of-way and permanent facilities would be expected to be available for extraction after construction was complete. Impacts from construction on

future exploration or mining of resources in the construction work areas are likely to be temporary and negligible. If future discovery of metallic mineral resources occurs where the pipeline crosses state lands, realignment of the pipeline would be handled under standard licensing clauses.

Operations Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

During operation, the easement for the permanent right-of-way would include 988 acres of agricultural land (cropland and grass/pastureland), the majority of which would be located along the existing Mainline corridor and would return to agricultural use post construction. Following final restoration, agricultural activities would be able to resume on agricultural lands, with the exception of land within the permanent footprint of pump stations, MLVs, and permanent access roads that would be converted to industrial/developed land uses. Approximately 104 acres of agricultural land in Minnesota would be converted to industrial/developed land from permanent access roads, pump stations, and valves (Table 5.3.1-1). Enbridge has not proposed aboveground facilities in North Dakota or Wisconsin. As part of easement negotiations, landowners would be compensated for loss of the land. Conversion of 104 acres of agricultural land compared to the 2,838 acres of agricultural land within the ROI results in a permanent minor impact.

The current market value of crops on agricultural land that would be converted to other land uses (permanent access roads, valves, and pump stations) is approximately $61,400 (Table 5.3.1-2). The present value of this annual loss into perpetuity would be approximately $2.1 million. The annual loss of commodities from agricultural land removed from agricultural use relative to the overall value of agricultural products sold in the affected counties would be small; therefore, the impact on the local agricultural economy would be permanent and negligible.

The permanent right-of-way easement for the Applicant's proposed project includes approximately 429 acres of prime farmland and 505 acres of farmland of statewide importance (Table 5.3.1-1). Approximately 153 acres of prime farmland and farmland of statewide importance would be permanently converted to other land uses in Minnesota for permanent access roads, pump stations, and valves and would no longer be available for current or future production (Table 5.3.1-1). Following final restoration, the remaining lands disturbed during construction are expected to continue to be available for current and future agricultural uses. Conversion of 153 acres of prime farmland compared to the 2,636 acres of prime farmland within the ROI results in a permanent negligible impact.

Disturbance and Loss of Forested Lands and Timber Resources

To provide for ongoing pipeline inspection and maintenance, forested lands would not be allowed to reestablish within the permanent right-of-way. The permanent right-of-way easement for the Applicant's proposed project includes approximately 797 acres of forested land, of which approximately 87 percent is deciduous forest (Table 5.3.1-3). This land would be permanently restricted from use for commercial timber production. The Applicant would compensate Minnesota DNR for any merchantable timber loss on state-managed forested lands, and compensation on private lands would be agreed upon by the Applicant and the landowner during easement acquisition (Enbridge 2016). Conversion of 797 acres of forested land compared to the 1,858 acres of forested land within the ROI results in a permanent minor impact (Table 5.3.1-3).

The current market value of this timber is approximately $152,000 (Table 5.3.1-4). Assuming that this annual loss is continued into perpetuity, the present value of the foregone production is approximately

$5.1 million, compared to the present value of annual timber harvest in Minnesota into perpetuity, which is approximately $1.6 billion. Permanent conversion of 797 acres of forested land during operation of the Applicant's proposed project therefore would result in a permanent minor impact on the local timber economy.

Disturbance and Loss of Land Used for Mining

Operation of the pipeline is not expected to affect land with active mineral leases. Approximately 200 acres of land (including pump stations, access roads, and valves) with potential sand and gravel resources are located within the permanent right-of-way in Minnesota and would be removed from future mining activities. These resources are in a relatively undeveloped state, and the resource potential is unknown. Permanent conversion of 200 acres of land with potential sand and gravel resources compared to the 513 acres of land within the ROI, as well as the relatively undeveloped state of the resources, results in a permanent minor impact (Table 5.3.1-6).

5.3.1.3.2 Continued Use of Existing Line 3

Construction Impacts

Continued use of existing Line 3 would not require any future construction or conversion of agricultural lands or lands of prime farming soils. Therefore, there would be no construction impacts on current or future commodity production.

Operations Impacts

The existing Line 3 operations right-of-way includes over 752 acres of active crop and pasture land but does not contain any timber or mineral commodities, as timber production and mining activities are not permitted within this area. Agricultural lands within the existing Enbridge Mainline corridor could be affected by ongoing integrity maintenance digs and subsequent pipeline repair activities, which could prevent crop production in these areas by removing existing crops or reducing the productivity of agricultural soils. Such impacts would be short term, localized, and negligible.

5.3.1.3.3 System Alternative SA-04

Construction Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

The types of construction impacts in agricultural areas for SA-04 would be similar to those described for the Applicant's proposed project, including removal of crops and grasslands, reduction in the productivity of soils from soil erosion and interference with agricultural drainage (if present), mixing of topsoil and subsoil, and compaction and rutting of soil. Approximately 10,155 acres of agricultural land would be affected along SA-04. Construction of SA-04 also would cross 4,479 acres of prime farmland soils and 688 acres of farmland of statewide importance (Table 5.3.1-7). It is assumed that the Applicant's Agricultural Protection Plan (Appendix F) or a similar variation would be implemented to reduce impacts on agricultural land. Applicant-proposed measures include erosion control, topsoil segregation, rock removal, measures to avoid compaction or loosen compacted soils, and compensation to all landowners for lost crops. In temporary construction work areas and along the permanent right-of-way, agricultural activity typically would be prevented for one growing season, resulting in short-term minor losses of agricultural land currently being used for agricultural production.

The current market value of crops within the construction work area for SA-04 is approximately $5.0 million (Table 5.3.1-8). This amount represents less than 1 percent of the total market value of agricultural products in the counties that would be crossed by the system alternative (U.S. Department of Agriculture, National Agricultural Statistics Service, 2016); therefore, it is likely that construction of SA-04 would result in a temporary, minor impact on the local agricultural economy.

Disturbance and Loss of Forested Lands and Timber Resources

The types of construction impacts in forested areas would be similar to those described for the Applicant's proposed project, including loss of timber production from clearing of trees in the construction work areas. Approximately 99 acres of forested land would be affected along SA-04 (Table 5.3.1-9). Clearing trees within forested lands would result in long-term to permanent impacts within the construction work area. Over time (decades), natural growth and succession would restore the temporary construction work area to a forested community. Construction activities would result in long-term to permanent, minor impacts on land used for timber production.

The value of the annual lost growth of forested land within the construction work area is approximately $19,000 (Table 5.3.1-10). Assuming that this value is lost annually over 50 years, the present value of the future growth foregone is approximately $158,000, with the majority of the impact occurring in Minnesota. When compared to the present value of the timber harvest market over the same time period (50 years, $662 million), the impact of construction on the associated local timber industry is likely to be long term and negligible.

Disturbance and Loss of Land Used for Mining

No active mineral areas are located within the ROI for SA-04 in Minnesota or Illinois; therefore, no impacts on mining would occur in these states. Approximately 31 acres of land with known oil and gas resources occurs within the ROI for SA-04 in North Dakota and 0.4 acre of land with active coal mining is located in the ROI for SA-04 in Iowa, along with 2,393 acres of land with potential sand and gravel resources. Construction activities would temporarily prevent development of these resources for the duration of construction, but mineral resources outside of the permanent right-of-way and permanent facilities could be available for extraction after construction was complete. Construction-related impacts on potential exploration or mining of resources in the construction work area are likely to be temporary and negligible. If future discovery of metallic mineral resources occurs where the pipeline crosses state lands, realignment of the pipeline would be handled under standard licensing clauses.

Operations Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

During operation, the easement for the permanent right-of-way would include 4,281 acres of agricultural land, which would continue to be used for agricultural purposes post construction (Table 5.3.1-7). Following final restoration, agricultural activities would be able to resume across this land, with the exception of land used for aboveground facilities (pump stations, MLVs, and permanent access roads) that would be permanently converted to industrial/developed land uses. The exact amount of agricultural land that would be converted to industrial/developed land has not been determined for SA-04 but would be no more than approximately 128 acres for MLVs and pump stations. As part of easement negotiations, landowners likely would be compensated for the loss of this land. Conversion of 128 acres of agricultural land compared to the 10,155 acres of agricultural land within the ROI results in a permanent minor impact. Although the exact crop yield and dollar value is unknown, as

with the Applicant's proposed project, it is likely that conversion of this land would result in a permanent negligible impact on the local agricultural economy.

The permanent right-of-way for SA-04 includes 1,868 acres of prime farmland and 287 acres of farmland of statewide importance (Table 5.3.1-7). Following final restoration, agricultural activities on farmland soil would be able to resume across this land, resulting in no additional impacts during continued operation of the pipeline. As with agricultural land, the exact amount of farmland soil that would be converted to industrial/developed land has not been developed but would be no more than approximately 128 acres for MLVs and pump stations. Conversion of 128 acres of farmland soils compared to the 4,478 acres of farmland soils within the ROI results in a permanent minor impact.

Disturbance and Loss of Forested Lands and Timber Resources

To provide for ongoing inspection, monitoring, and maintenance, forested lands would not be allowed to reestablish within the permanent right-of-way. The permanent right-of-way easement for SA-04 would include approximately 40 acres of forested land, nearly all of which is deciduous forest. This land would be permanently removed from the ability to commercially produce timber for use in the wood product industries. Conversion of 40 acres of forested land compared to the 98 acres of forested land within the ROI results in a permanent minor impact on land that could be used in the production of timber products.

The current market value of this timber is approximately $8,000 (Table 5.3.1-10). Assuming that this annual loss is continued into perpetuity, the present value of the foregone production is approximately $256,000, compared to the present value of annual timber harvest in Minnesota into perpetuity ($1.6 billion). Although permanent, given the size of the dollar value loss relative to the overall size of the timber harvest, permanent conversion of this land would result in a permanent minor impact on the local timber economy.

Disturbance and Loss of Land Used for Mining

Operation of the pipeline is expected to have a minor effect on land in active mineral areas. Approximately 840 acres of land with potential sand and gravel resources would be located within the permanent right-of-way for SA-04 in Minnesota; this land would be removed from future mining activities. These resources are in a relatively undeveloped state and their resource potential is unknown. However, the width of the right-of-way is a small area relative to the expanse of areas with mineral resource potential. Conversion of 840 acres of land with potential sand and gravel resources compared to the 2,393 acres of land with potential sand and gravel resources within the ROI, as well as the relatively undeveloped state of the resources, results in a permanent minor impact.

5.3.1.3.4 Transportation by Rail

Construction Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

Less than 200 acres of agricultural land (hay/pasture and cultivated crops) is present in the areas adjacent to the Clearbrook and Superior terminals that would likely be considered for development of the rail offloading facilities and new or expanded rail lines. Impacts of construction activities on agricultural land would include permanent removal of crops and grasslands, resulting in permanent minor losses to agricultural land. The impact resulting from loss of market value of the crops that could be grown on this land is expected to be negligible.

Disturbance and Loss of Forested Lands and Timber Resources

Some forested land (evergreen forest and deciduous forest) is present in the general areas that are likely to be considered for development of rail offloading facilities and new or expanded rail lines; these areas would be permanently cleared for development of facilities. Such clearing likely would result in permanent negligible impacts on land used for timber production.

Disturbance/Loss of Land Used for Mining

No active mining areas have been identified within the areas that are likely to be developed for rail offloading facilities and new or expanded rail lines. As no information has been found on potential sand and gravel resources in these areas, impacts from construction for the rail alternative, while permanent, are anticipated to be negligible.

Operations Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

While no specific locations have been identified, the development of rail loading/offloading facilities and new rail lines near Neche, Clearbrook, and Superior would permanently convert up to 200 acres of land used for agriculture to industrial/developed use. This would result in a loss of commodity production in these areas of agricultural lands. Since the amount of land required for rail facilities is small compared to the amount of agricultural land in the region that is currently in agricultural use, or is suitable for agricultural use, potential impacts on agricultural land from operation of the rail alternative are anticipated to be permanent and minor. The market value of the crops that could be grown on this land is expected to be negligible.

In addition to direct impact from lost production resulting from expansion of the rail yards, an indirect impact from the loss of economic value could result from delays in transport of agricultural commodities by rail.

Transportation of crude oil from near Gretna to Clearbrook and Superior would involve loading and dispatch of 10 unit trains (each train consisting of 110 rail cars) per day onto the rail network in Minnesota. These unit trains would be dedicated to a single service and would return empty from Clearbrook and Superior. Since the overall round trip to Clearbrook or Superior would take more than a single day, some multiple of the 10 trains per day loaded and dispatched would be required to provide the required service. The unit trains would be required to operate on Class 1 rail lines because of their weight and cargo type. Likely routes for these transits have been identified in the description of alternatives (see Chapter 4).

It is likely that the increase in traffic (some multiple of 10 trains per day) operating on the rail system may cause congestion during certain periods. Congestion may develop as a result of seasonal demands for rail capacity. For example, the record 2008/2009 grain harvest in Western Canada saw shippers increase demand for rail cars and experience delays in delivery of their cargos to ports (Freight Monitor 2014). The U.S. Surface Transportation Board also has developed a concern over rail congestion and its potential to affect agricultural production, and has initiated an oversight proceeding (STB 2014).

In view of the underlying projections for increased use of the rail system for commodity transportation, the importance of the timely movement of commodities to market distribution points, and the incremental rail traffic required for the rail alternative, some degree of rail system congestion would likely occur. These impacts could affect commodity producers. Although they may be temporary (either

seasonal in response to commodity shipment schedules or resolved through capacity additions to the rail system), impacts from delays in transport of agricultural commodities by rail would be minor to major.

An analysis of rail system operations to determine the specific constraints to rail system infrastructure or operations is not possible within the context of this analysis.

Disturbance and Loss of Forested Lands and Timber Resources

The forested land present in the general areas likely to be considered for development of rail loading and offloading facilities and new or expanded rail lines would be permanently converted to industrial/developed use, resulting in permanent loss of potential timber production. Since the amount of land required for rail facilities is small compared to the amount of forested land in the region, impacts on forested land and timber resources from operation of this alternative are anticipated to be permanent and minor.

Disturbance and Loss of Land Used for Mining

While land used for mining has not been determined within the areas that could be developed for rail facilities and new or expanded rail lines, the amount of land required for such facilities compared to the amount of land in the region containing mineral resources is small. Potential impacts on land used for mining from operation of the rail alternative therefore are expected to be permanent and negligible.

5.3.1.3.5 Transportation by Truck

Construction Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

Up to 140 acres of agricultural land (hay/pasture and cultivated crops) is present in the general areas likely to be considered for development of new truck offloading facilities and associated road access. Impacts of construction activities on agricultural land include removal of crops and grasslands and prevention of the production of commodities on agricultural land, resulting in permanent minor losses to agricultural land. The market value of the crops that could be grown on this land is expected to be negligible.

Disturbance and Loss of Forested Lands and Timber Resources

Some forested land (evergreen forest and deciduous forest) is present in the general areas likely to be considered for development of new truck offloading facilities and associated road access. These areas would be cleared for development of facilities. Construction of the transportation by truck alternative likely would result in permanent, minor impacts on land used for timber production.

Disturbance and Loss of Land Used for Mining

While land used for mining has not been identified within the areas that could be developed for truck facilities and access roads, the amount of land required for such facilities compared to the amount of land in the region containing mineral resources is small. Potential impacts on land used for mining from construction of the truck alternative therefore are expected to be permanent and negligible.

Operations Impacts

The use of tanker trucks required to transport the oil would result in millions of highway miles driven by tank trucks per year, adding congestion to highways and increasing risks to public safety.[20] The increased volume of trucks on local highways that already carry a substantial volume of commercial traffic could lead to delays in the movement of commodities (agriculture, timber, and mining) by truck to market. Overall, operations under the truck alternative would be expected to result in a permanent minor impact on commodity production.

Disturbance and Loss of Agricultural Land and Lost Yields

While no specific locations have been identified, development of truck offloading facilities and access roads would permanently convert up to 140 acres of land used for agriculture to industrial/developed use. This would result in loss of commodity production on these areas of agricultural lands. Since the amount of land required for truck facilities is small compared to the amount of agricultural land in the region that is currently in agricultural use, or is suitable for agricultural use, potential impacts on agricultural land from operation of this alternative are anticipated to be permanent and minor. The market value of the crops that could be grown on this land is expected to be negligible.

Disturbance and Loss of Forested Lands and Timber Resources

The forested land present in the general areas likely to be considered for development of truck loading and offloading facilities and access roads would be permanently converted to industrial/developed use, resulting in an indefinite loss of potential timber production. Since the amount of land required for truck facilities is small compared to the amount of forested land in the region, impacts on forested land and timber resources from operation of the truck alternative are anticipated to be permanent and minor.

Disturbance and Loss of Land Used for Mining

While land used for mining has not been determined within the areas that could be developed for truck facilities and access roads, the amount of land required for such facilities compared to the amount of land in the region containing mineral resources is small. Potential impacts on land used for mining from operation of the truck alternative therefore are expected to be permanent and negligible.

5.3.1.3.6 Existing Line 3 Supplemented by Rail

Impacts associated with continued use of the existing Line 3 supplemented by rail would be the same as those described above for continued use of the existing Line 3 and the rail alternative. This combined alternative would require the same installation of additional rail offloading facilities as described above, thus the impacts would be the same as those described for the rail alternative—with the exception that fewer trains would be needed to transport the oil. This would reduce the potential for railway congestion. The overall impact of this alternative on commodity production would be minor and permanent.

[20] Transporting 760,000 bpd of oil by tanker truck would require 4,000 tanker trucks per day; 1,920 trucks would travel from near Gretna to the Clearbrook terminal, and 2,080 trucks would travel from near Gretna to the Superior terminal (see discussion in Section 4.2.6.2).

5.3.1.3.7 Existing Line 3 Supplemented by Truck

Impacts associated with continued use of the existing Line 3 supplemented by truck would be the same as those described above for continued use of the existing Line 3 and the truck alternative. This combined alternative would require the same installation of additional loading and offloading truck facilities as described for the truck alternative and would result in similar impacts, except that fewer trucks would be required to transport the oil. This would reduce the potential for highway congestion. The overall impact of this alternative on commodity production would be minor and permanent.

5.3.1.4 Summary and Mitigation

5.3.1.4.1 Summary

The analysis of potential impacts on commodities from construction and operation of the Applicant's proposed project and CN Alternatives is summarized in Table 5.3.1-11. Overall, there would be negligible to minor impacts on agricultural commodities along the Applicant's proposed project and all of the CN Alternatives — with one exception. The potentially significant addition of rail traffic carrying crude oil could cause congestion in the rail system at times when agricultural commodities seek to move to regional distribution points. Such congestion may delay commodity delivery. Because the analysis was not able to evaluate rail system operations, the potential for this impact to occur has been identified but cannot be quantified. Although impacts may be temporary (either seasonal in response to commodity shipment schedules or resolved through capacity additions to the rail system), delays in transport of agricultural commodities by rail could result in minor to major impacts.

The duration of impacts on agricultural lands and farmland soils ranged from short term or temporary for the Applicant's proposed project and SA-04, to long-term or permanent for impacts from land converted to rail/truck offloading facilities for the alternatives involving truck or rail—for both the construction and operations phase (with the exception that continued use of the existing Line 3 has no construction-related impacts). Agricultural lands within pipeline right-of-way would experience only short term impacts because once construction is completed, cultivation can be initiated or resume, even within the permanent right-of-way. In contrast, impacts on forested lands would be long term because reforestation would be restricted or forest replacement would require a long time. No active mines are anticipated to be affected by construction or operation of the Applicant's proposed project or the CN Alternatives.

While overall impacts are negligible to minor, comparison of the Applicant's proposed project and the CN Alternatives to each other reveal some differences in effects.

Acreage of agricultural or forested lands that would be impacted for the rail and truck alternatives or continued use of the existing Line 3 supplemented by rail or truck are minimal (on the order of 100–200 acres), and no agricultural or forested lands would be affected by continued use of the existing Line 3. Therefore, any of these alternatives would substantially avoid impacts on commodity production for both the construction and operations phases.

The Applicant's proposed project and SA-04 would involve construction over long distances and therefore would affect commodity production. There would be some short-term or limited impacts on agricultural production, primarily deferral of a crop for a growing season that would be offset with monetary compensation by the Applicant. Consequently, there little or no economic loss would be anticipated. Unlike impacts on agricultural production, impacts on forested land would be long term or

permanent; therefore, the difference in acreage of forest lands affected by the route options is more significant. For both the construction and operations phases, the Applicant's proposed project would affect substantially greater acreage of forested lands than SA-04. This includes lands cleared for construction but allowed to re-forest and lands cleared and restricted from future forest production. The Applicant's proposed project would result in long-term impacts on 1,612 acres of forested land within the construction work area and permanent impacts on 797 acres of forested land (701 acres of forested land within the permanent right-of-way and 96 acres lost to pump stations, valves, and permanent access roads). SA-04 would cause long-term impacts on 98 acres of forested land within the construction work area and permanent impacts on 41 acres of forested land within the permanent right-of-way. Forestry resources would be least affected by continued use of the existing Line 3, the rail or truck alternatives, and continued use of Line 3 supplemented by either rail or truck. Effects on forestry resources would be measurably increased by SA-04 and the Applicant's proposed project.

Neither the Applicant's proposed project nor any of the CN Alternatives would affect active mining except SA-04, where only 0.4 acre would be affected. Unmined sand and gravel resources could be affected by construction and operation along the Applicant's proposed project and SA-04. The Applicant's proposed project could restrict future development of 513 acres of potential sand and gravel reserves during construction and would restrict the potential future development of 200 acres of these resources. SA-04 would affect 2,393 acres of potential sand and gravel resources during construction and would permanently restrict future development of 840 acres. However, given the depth of these reserves and limited information on their potential to become viable sand and gravel resources, impacts on market value are considered to be negligible. Impacts on mining resources would be least affected by continued use of the existing Line 3, the rail or truck alternative, and continued use of the existing Line 3 supplemented by either rail or truck.

Overall effects on commodities would be minimized by continued use of the existing Line 3, the truck alternative, or use of the existing Line 3 supplemented by truck. The Applicant's proposed project and SA-04 would increase effects because they would require construction and a permanently cleared right-or-way. The CN Alternatives, including rail transportation, could affect commodity economics if congestion in the rail system occurred as described.

5.3.1.4.2 Mitigation

The Applicant proposes several measures to minimize or avoid impacts on commodity production that are discussed in the Agricultural Protection Plan (Appendix F). Beyond these Applicant-proposed measures, no mitigation has been identified.

Table 5.3.1-11. Summary of Potential Impacts on Commodity Production for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project [a]	Continued Use of Existing Line 3	System Alternative SA-04[b]	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Construction Impacts							
Disturbance and loss of agricultural land	Short-term/minor impacts • 2,284 acres of agricultural land Short- to long-term/minor impacts • 2,150 acres of farmland soils	No impact	Short-term/minor impacts • 10,155 acres of agricultural land Short- to long-term/minor impacts • 5,167 acres of farmland soils	Permanent/minor impacts • <200 acres of agricultural land	Permanent/minor impacts • <140 acres of agricultural land	Permanent/minor impacts • <200 acres of agricultural land	Permanent/minor impacts • <140 acres of agricultural land
Lost agricultural land yields	Temporary/ negligible impacts • $764,000 market value of crops	No impact	Temporary/ negligible impacts • $5.1 million	Permanent/ negligible impacts	Permanent/ negligible impacts	Permanent/ negligible impacts	Permanent/ negligible impacts
Disturbance and loss of forested lands and timber resources	Long-term to permanent/minor impacts • 1,612 acres of forested areas • $2.5 million market value of timber	No impact	Long-term to permanent/minor impacts • 98 acres of forested areas • $158,000 market value of timber	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts

Table 5.3.1-11. Summary of Potential Impacts on Commodity Production for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project [a]	Continued Use of Existing Line 3	System Alternative SA-04[b]	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Disturbance and loss of land used for mining	Temporary/ negligible impacts • 513 acres of land with potential sand and gravel resources No impact on active mines	No impact	Temporary/ negligible impacts • 2,393 acres of land with potential sand and gravel resources • 0.4 acre of active coal mine area in Iowa	Permanent/ negligible impacts	Permanent/ negligible impacts	Permanent/ negligible impacts	Temporary/ negligible impacts
Operations Impacts							
Disturbance and loss of agricultural land	Permanent/ negligible impacts • 104 acres of agricultural land • 153 acres of farmland soils	Short-term/minor impacts • 752 acres of agricultural land	Permanent/ negligible impacts • 128 acres of agricultural land • 128 acres of farmland soils	Permanent/minor impacts • <200 acres of agricultural land	Permanent/minor impacts • <140 acres of agricultural land	Permanent/minor impacts • <200 acres of agricultural land	Permanent/minor impacts • <140 acres of agricultural land
Lost agricultural land yields	Permanent/ negligible impacts • $61,400 market value of crops	Short-term/ negligible impacts	Permanent/negligible impacts within facilities footprint No additional lost yield on land within the permanent easement	Permanent/ negligible impacts • Increased rail congestion that could affect commodity producers	Permanent/ negligible impacts • Increased highway congestion that could affect commodity producers	Permanent/ negligible impacts • Increased rail congestion that could affect commodity producers	Permanent/ negligible impacts • Increased highway congestion that could affect commodity producers

Table 5.3.1-11. Summary of Potential Impacts on Commodity Production for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project [a]	Continued Use of Existing Line 3	System Alternative SA-04[b]	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Disturbance and loss of forested lands and timber resources	Permanent/minor impacts • 797 acres of forested areas • $5.1 million market value of timber	No impact	Permanent/ minor impacts • 41 acres of forested areas • $7,700 market value of timber	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts
Disturbance and loss of land used for mining	Permanent/ negligible impacts • 200 acres of land with sand and gravel resources No impact on active mines	No impact	Permanent/ negligible impacts • 840 acres of land with sand and gravel resources • 0.4 acre of active coal mine area in Iowa	Permanent/ negligible impacts	Permanent/ negligible impacts	Permanent/ negligible impacts	Permanent/ negligible impacts

[a] Enbridge-provided footprints: Construction = construction work area; Operation = operations permanent right-of-way

[b] Construction = 120-foot-wide construction footprint (except RA-07 is 205 feet wide), Operations = 50 foot-wide permanent right-of-way; SA-04 does not include access roads, ATWS, or aboveground facilities as the exact location of these facilities has not been determined for SA-04

5.3.1.5 References

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5.3.2 Recreation and Tourism

Recreational activities contribute to the local economy through the influx of tourists, purchases of gear and related equipment, and trip-related spending (e.g., gas, lodging, and food).

The issues of concern related to recreation and tourism are the loss of recreation-based spending and the associated effects on the recreational economies in the counties that would be crossed. This potential loss could come from a decrease in recreation-based visitation because of access limitations, such as trail closings or road detours, during construction and operation of the Project. This section assesses the potential for construction and operation of the Applicant's proposed project and CN Alternatives to affect the recreation economy. Impacts on recreation and tourism that could occur during construction and operation include:

- Limitations to recreation access, and
- Changes to the recreational economy.

This section first describes the existing conditions within an area along the Applicant's proposed project and each of the CN Alternatives where recreation and tourism could be affected by construction or operation of the Project. Impacts on access to recreation resources and effects on the recreation economy are assessed and compared to each other for the Applicant's proposed project and the CN Alternatives (continued use of the existing Line 3, system alternative SA-04, transportation by rail, transportation by truck, and existing Line 3 supplemented by rail or truck). Potential impacts on recreation and tourism associated with an unanticipated release of crude oil are discussed in Chapter 10.

5.3.2.1 Regulatory Context and Methodology

5.3.2.1.1 Regulatory Context

The Applicant's proposed project and CN Alternatives involve actions in North Dakota, Minnesota, Iowa, Illinois, and Wisconsin. The applicable regulations for each state are summarized below.

North Dakota

Several regulations in the North Dakota Century Code address pipelines; however, no specific regulations concern the impact of pipelines on access to recreational lands or impacts on recreation-based economies in the state.

Minnesota

Minnesota Administrative Rules Part 7853.0130, Subpart B provides the criteria the Commission must consider in assessing the need for the Project, including "the effect of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives." Impacts on recreation and tourism are part of the socioeconomic environment the Commission considers in their decision about whether there are more reasonable and prudent alternatives to the proposed Project (Minn. R. 7853.0130, Subp. B) and whether the benefits outweigh the consequences of granting a CN for the proposed Project (Minn. R. 7853.0130, Subp. C).

In addition, Minnesota Administrative Rules Part 7853.0600, Subpart 2(J) requires listing of "state critical areas, state WMAs; state scientific and natural areas; state wild, scenic, and recreational rivers; state

parks; state scenic wayside parks; state recreational areas; state forests; state trails; state canoe and boating rivers; state zoos, and designated trout lakes through which the route passes, as mapped on the inventory of significant resources by the State Planning Agency."

Iowa

Iowa Administrative Code Chapter 479(B) gives the Iowa utilities board primary authority over the routing of pipelines. No specific regulation in the chapter addresses recreational land or recreation-based economies. Iowa Statute 199—13 provides the standards related to hazardous liquid pipelines. There is only mention of recreational facilities under Iowa Statute 199—24.4(476A), which regulates electric power generation and transmission lines. Section 3, "Community Impact" in the "Application for a Certificate—Contents," states that the applicant shall include "an identification and analysis of the effects the construction, operation and maintenance of the proposed facility have on the site impact area including, but not limited to, the following: a. A forecast of the permanent impact of the construction, operation, and maintenance of the proposed facility on commercial and industrial sectors, housing, land values, labor market, health facilities, sewage and water, fire and public protection, recreational facilities, schools and transportation facilities."

Illinois

Under the Public Utilities Act in Illinois, § 15-401,"Licensing" states that "in its determination of public convenience and necessity for a proposed pipeline or facility designed or intended to transport crude oil and any alternate locations for such proposed pipeline or facility, the Commission shall consider, but not be limited to, the following: … (3) any evidence presented by the Department of Natural Resources regarding the impact of the proposed pipeline or facility on any conservation areas, forest preserves, wildlife preserves, wetlands, or any other natural resource."

Wisconsin

There is no specific provision for recreational land under Wisconsin Statute § 295.53(3)(a). However, the Statutes state the following under Subchapter 2 for Oil and Gas: "In the environmental impact report, the applicant shall provide a description of the proposed mining project, the present environmental conditions in the area and the anticipated environmental impacts of the proposed mining project, the present socioeconomic conditions in the area and the anticipated socioeconomic impacts of the proposed mining project, details of any wetlands mitigation program under s. 295.60 (8), any measures for navigable waters under s. 295.605 (4), any proposed changes to the forest designations specified in sub. (4)(c), and the alternatives to the proposed mining project."

5.3.2.1.2 Methodology

The ROI for the analysis of recreation and tourism impacts is twofold. It narrowly focuses on the public recreational lands and recreational waterbodies directly crossed by construction and operations areas for the Applicant's proposed project and the CN Alternatives in order to qualitatively assess effects of Project-related changes to recreation-based visitation. It also broadly includes the counties through which the Applicant's proposed project and the CN Alternatives pass to assess whether the Project-related changes would affect county-level recreational visitation and, subsequently, the local recreation-based economy. The counties where Project-related impacts would occur represent the relevant local recreational economies that are likely to be the most sensitive to Project-related actions.

The analysis was undertaken by first identifying and inventorying in GIS all public recreational lands, trails, and waterbodies in the counties crossed by the Applicant's proposed project and the CN Alternatives. The following construction and operations footprints were overlaid to quantify resources affected by construction and operation:

- The route and estimated footprints for the pipeline and associated facilities for the Applicant's proposed project,
- The 120-foot-wide construction footprint and 50-foot-wide permanent right-of-way for system alternative SA-04,
- The permanent right-of-way for the existing Line 3 pipeline, and
- The estimated footprints of required facilities and existing potential routes for the rail and truck alternatives.

The geographic extent (in acres) of expected restricted access to recreational land, including recreational waterbodies, land-based trails, and scenic byways, from the construction work areas, permanent rights-of-way, and associated aboveground facilities was determined by analyzing the number of crossings and crossing methods described by the Applicant. The analysis assumed that access would be restricted to the affected resource over the entire construction work area for the duration of construction. The analysis assumed that access along the permanent right-of-way for pipelines and at any aboveground facilities associated with pipelines, continued operations of existing Line 3, and rail and truck transportation would be restricted during operations.

Current statistics on visitation to the specific recreation areas identified in this analysis and any associated recreational spending were not available; consequently, quantitative estimates of economic impacts could not be developed. However, a qualitative assessment was developed to assess the magnitude of the associated loss of tourism that may result from the disruption of recreational activities and characterize the direction and magnitude of potential impacts on the regional recreation/tourism economy at the county level.

The methodology for assessing potential impacts on the local recreational economy in each affected county in the ROI involved (1) identifying physical impacts on land and water primarily used for recreational purposes; (2) assessing whether the magnitude and duration of access restrictions were likely to change recreational visitation at the county level; and (3) evaluating whether the change would be large enough to affect the local recreational economy (i.e., county-level recreation-based tourism spending). For a physical access restriction to measurably affect the recreational economy of a county, a significant amount of people would have to stop taking trips or take substantially fewer trips within the county as a whole instead of choosing to recreate at another site within the county or recreating at the affected site, but in a different area.

Recreational land and waterbodies within the ROI for the Applicant's proposed project and CN Alternatives were identified using GIS datasets and layers in the following federal- and state-level data sources:

- PAD-US,
- DNR water trails,
- DNR snowmobile trails,

- DNR state-designated trails,
- DNR hunter walking trails, and
- State-designated trout streams.

5.3.2.2 Existing Conditions

This section identifies recreational resources that could be affected by the Applicant's proposed project and CN Alternatives. Changes to these resources could reduce or restrict recreational use, which could affect recreational spending at the county level. This section does not discuss current recreational use or spending at the county level since publicly available, accurate, and consistent data were not available for each of the resources discussed. For context, an estimate of the approximate acreages or total size of the resources are provided where appropriate for the Applicant's proposed project and each CN Alternative.

Parks and Forests

Recreational use of parks, forests, and special management areas includes a variety of outdoor activities such as camping, hiking, skiing, horseback riding, off-road vehicle riding, snowmobiling, boating, bicycling, fishing, hunting, and wildlife watching. Parks include all parks or protected areas that are managed by state or federal agencies. Similarly, forests include forested land that is protected and maintained by state and federal agencies primarily for recreational enjoyment. Recreational activities in parks and forests can take place in developed areas that include a variety of recreational facilities (e.g., parking, trails, restroom, campsites, and boat launches) or in areas that are less developed, with few to no facilities.

Special Management Areas

Special management areas include other protected areas or areas set aside for conservation. For this analysis, special management areas include areas open to the public for recreation, such as wildlife refuges, WMAs, and other public management areas. These areas, considered as undeveloped open lands, are available for informal recreational use with limited modern facilities. Typically, these special management areas are used to hunt, fish, trap, or watch wildlife.

State-Designated Land-Based Trails

State-designated land-based trails include multi-use trails, hunter walking trails, and state-managed snowmobile trails. These trails are designated for a variety of recreational uses, such as walking, jogging, hiking, bicycling, horseback riding, hunting, and snowmobile use.

State-Designated Water Trails and Trout Streams

Water trails are marked routes on navigable waterways (e.g., rivers, lakes, canals, and coastlines) for recreational use of small, non-motorized boats (e.g., kayaks, canoes, rafts, and rowboats). There are 35 water trails in Minnesota (MN DNR 2017.). State-designated trout streams provide an important source of recreational activity for anglers. Minnesota has 687 designated trout streams, totaling 3,782 miles.

Scenic Byways

Under the National Scenic Byways Program, the Secretary of Transportation designates scenic byways, recognized as "roadways having outstanding qualities of scenic, historic, cultural, natural, recreational,

and archeological qualities" (23 U.S. Code 162, TEA-21). As of 2010, 151 byways in 46 states were recognized as America's Byways that represent the most scenic and rarest of landscapes, culture, and history preserved in the United States.

The following sections describe the existing conditions for recreational resources within the ROI for the Applicant's proposed project and CN Alternatives.

5.3.2.2.1 Applicant's Proposed Project

This section describes existing conditions in North Dakota, Minnesota, and Wisconsin for the resources noted in the previous section. Information enabling comparison of the CN Alternatives to the Applicant's proposed project is provided below.

Parks, Forests, and Special Management Areas

Table 5.3.2-1 lists by county the miles and acres of parks, forests, and special management areas (both state and federal) that would be crossed by the Applicant's proposed project. The Applicant's proposed project would not cross any federal or state parks but would cross the North Country National Scenic Trail. In addition, it would cross approximately 33 miles of state land, all in Minnesota. The total amount of land used for recreational purposes in the ROI for the Applicant's proposed project is 531 acres; the total area of park, forest, and special management area units crossed at some point by the Applicant's proposed project is 714,633 acres (Table 5.3.2-1).

State-Designated Land-Based Trails

The Applicant's proposed project would cross three state-designated multi-use trails in Minnesota, one trail in Wisconsin (58th Street Trail), and no trails in North Dakota (see Figure 5.3.2-1). Two of the trails in Minnesota would be crossed once (Paul Bunyan State Trail in Cass County and Willard Munger State Trail in Carlton), while a hunter walking trail would be crossed twice in Aitkin County. The Applicant's proposed project would also cross one snowmobile trail in North Dakota, 19 snowmobile trails in Minnesota, and no snowmobile trails in Wisconsin.

State-Designated Water Trails and Trout Streams

The Applicant's proposed project would cross five state-designated canoe and boating trails in Minnesota and no water trails in North Dakota or Wisconsin. Four of the rivers (Red River of the North in Kittson County, Red Lake River in Pennington County, Crow Wing River in Wadena County, and the Pine River in Cass County) would be crossed once, and the Mississippi River would be crossed twice(once in Clearwater County and again in Aitkin County) (see Figure 5.3.2-1). Each of the rivers that would be crossed range in length from 60 miles (Pine River) to over 500 miles (Red River of the North).

The Applicant's proposed project would cross six state-designated trout streams in Minnesota (King Creek and an unnamed stream in Carlton County, Straight River in Hubbard County, Spring Brook in Cass County, Blackhoof River in Carlton County, and LaSalle Creek in Hubbard County) and no trout streams in Wisconsin or North Dakota.

Table 5.3.2-1. Parks, Forests, and Special Management Areas Crossed by the Applicant's Proposed Project

State/County	Name	Total Size (acres)	Centerline (miles)	Construction Work Area (acres)	Permanent Right-of-Way (acres)	ATWS	Temp Access Road	Perm Access Road	Valves[a]	Con Total[b] (acres)	Op Total[b]
North Dakota											
None	None	0	0.0	0	0	0	0	0	0	0	0
Minnesota											
Aitkin County	Grayling Marsh WMA	9,627	1.1	14	6	1	0	0	0	15	6
Aitkin County	Lawler WMA	235	0.3	3	2	0	0	0	0	3	2
Cass County	Foot Hills State Forest	46,896	3.1	42	19	5	7	1	0	55	20
Aitkin County	Hill River State Forest	124,204	8.0	103	48	5	0	6	0	114	54
Wadena County	Huntersville State Forest	33,963	7.1	97	43	8	4	7	0	116	50
Cass County	Land O'Lakes State Forest	49,890	9.6	130	58	9	17	5	0	161	63
Hubbard County	Mississippi Headwaters State Forest	45,290	1.8	25	11	4	0	7	0	36	17
Hubbard County	Paul Bunyan State Forest	150,113	0.0	0	0	0	0	0	0	0	0
Aitkin County	Savanna State Forest	238,954	0.8	9	5	0	0	0	0	9	5
Aitkin County	Waukenabo State Forest	15,461	1.4	16	8	1	0	1	0	17	9
Subtotal		***714,633***	***33.2***	***439***	***200***	***33***	***28***	***27***	***0***	***526***	***226***
Wisconsin											
None	None	0	0.0	0	0	0	0	0	0	0	0
TOTAL	**-**	***714,633***	***33.2***	***439***	***200***	***33***	***28***	***27***	**0**	***526***	***226***

Table 5.3.2-1. Parks, Forests, and Special Management Areas Crossed by the Applicant's Proposed Project

State/County	Name	Total Size (acres)	Centerline (miles)	Construction Work Area (acres)	Permanent Right-of-Way (acres)	ATWS	Temp Access Road	Perm Access Road	Valves[a]	Con Total[b] (acres)	Op Total[b]

Source: USGS GAP 2016.

Notes:

Acres for the construction work area and the permanent right-of-way are based on Enbridge-provided footprints for the Applicant's proposed project and a 120-foot-wide construction footprint and 50-foot-wide permanent right-of-way for system alternative SA-04.

[a] Includes valve sites and valve driveways. Because valve sites are within the permanent right-of-way, total Project impacts may be slightly overestimated from double counting.

[b] Con = sum of pipeline construction work area, additional temporary workspaces (ATWS), pump stations, valves, and temporary and permanent access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, valves, and pump stations

Perm = permanent; Temp = temporary; WMA = wildlife management area

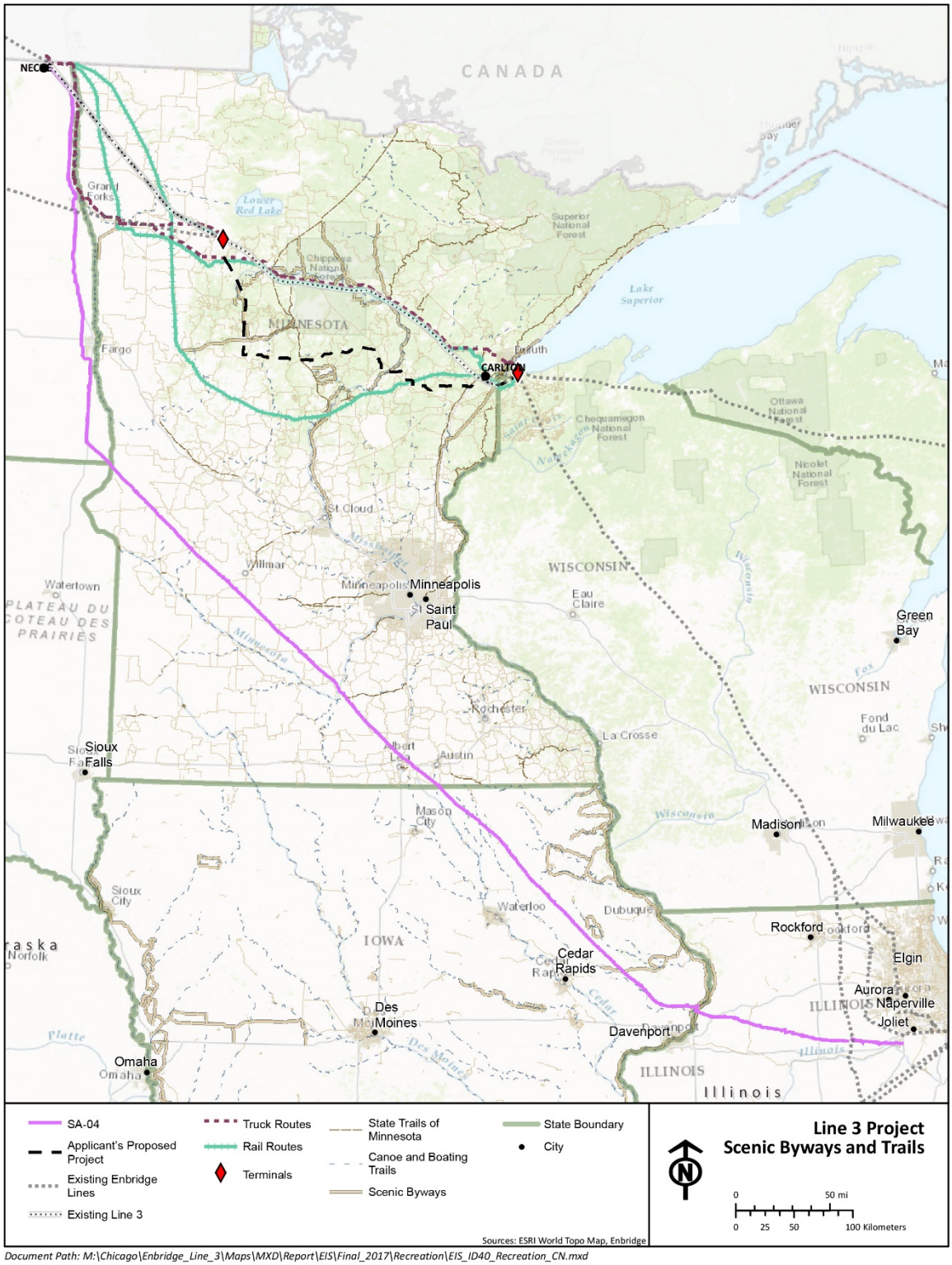

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Figure 5.3.2-1 State-Designated Multi-Use, Canoe and Boating Trails Crossed by the Applicant's Proposed Project and Certificate of Need Alternatives

Scenic Byways

In North Dakota, there are 10 scenic byways; Minnesota has 21 (8 of which are national byways), and Wisconsin has 4. Each highway crosses several of the finest cultural, historic, recreational, and scenic locations in each state. The Applicant's proposed project would cross one national byway in Minnesota (the Great River Road) twice, once in Clearwater County and again in Aitkin County, and three state-designated byways in Minnesota (Lake Country in Hubbard County, Veterans Memorial in Carlton County, and King of Trails). The route would not cross any designated byways in North Dakota or Wisconsin (see Figure 5.3.2-2).

5.3.2.2.2 Continued Use of Existing Line 3

Parks, Forests, and Special Management Areas

The existing Line 3 pipeline crosses federally owned land, including the Chippewa National Forest, and state forests and WMAs in Minnesota. The route crosses Bowstring State Forest, Fond du Lac State Forest, Mississippi Headwaters State Forest, Clearwater River WMA, and Little Otter Creek WMA.

State-Designated Land-Based Trails

The existing Line 3 pipeline does not cross any state-designated multi-use trails in North Dakota or Minnesota and crosses one multi-use trail in Wisconsin. The existing Line 3 pipeline crosses one snowmobile trail in North Dakota, 16 snowmobile trails in Minnesota, and no snowmobile trails in Wisconsin.

State-Designated Water Trails and Trout Streams

The existing Line 3 crosses four state-designated canoe and boating trails in Minnesota and no water trails in North Dakota or Wisconsin. Three of the rivers (Red River of the North in Kittson County, Red Lake River in Pennington County, and St. Louis River in St. Louis County) are crossed once, and the Mississippi River is crossed two times (once in Clearwater County and again in Aitkin County).

The existing Line 3 crosses three state-designated trout streams in Minnesota (Clearwater River in Beltrami County, Necktie River in Hubbard County, and Little Otter Creek in Carlton County) and no trout streams in Wisconsin or North Dakota.

Scenic Byways

The existing Line 3 crosses one national byway in Minnesota (the Great River Road) three times, once in Beltrami County and twice in Cass County, and two state-designated byways in Minnesota (Edge of the Wilderness in Itasca County and Veterans Memorial in Carlton County). It does not cross any designated byways in North Dakota or Wisconsin.

Figure 5.3.2-2. Scenic Byways Crossed by the Applicant's Proposed Project and Certificate of Need Alternatives

5.3.2.2.3 System Alternative SA-04

Parks, Forests, and Special Management Areas

SA-04 would cross 55 miles of federal land and about 1 mile of state land (a state park trail and a special management area). The geographic extent of the construction work area of SA-04 includes crossing 55 miles of a federal special management area and 1 mile of a state management area in North Dakota and 12.1 miles of a federal special management area in Illinois. The total amount of land within the construction work area includes approximately 972 acres of federal special management areas and 6.3 acres of state special management areas. The majority (795 acres) of this land is within the Dakota Tallgrass Prairie Wildlife Area in Richland County, North Dakota (refer to Table 5.3.2-2). The remaining land area (177 acres) is in Illinois along the Illinois and Michigan Canal. Of the parks and special management areas crossed by SA-04, approximately 42 percent (408 acres) would be located within the permanent right-of-way. The majority of this land (334 acres) is in North Dakota. The total amount of land used for recreational purposes in the ROI for SA-04 is 978 acres; the total land available for recreation in the forests and WMAs that would be crossed is 432,800 acres (Table 5.3.2-2).

State-Designated Land-Based Trails

SA-04 would cross one state-designated multi-use trail in Minnesota (Sakatah Singing Hills State Trail in Blue Earth County), three trails in Illinois (Great River Trail in Rock Island County, Hennepin Canal Feeder in Whiteside County, and Illinois and Michigan (I&M) Canal Path in LaSalle County), and one trail in Iowa (Clinton-Camanche Mississippi River Trail in Clinton County) (refer to Table 5.3.2-2). SA-04 would cross 15 snowmobile trails in North Dakota and 10 in Minnesota.

State-Designated Water Trails and Trout Streams

SA-04 would cross three state-designated canoe and boating trails in Minnesota (Cedar River in Mower County, Chippewa River in Swift County, and Minnesota River in Nicollet County) and four in Iowa (Little Cedar River in Mitchell County, Little Wapsipinicon River in Fayette County, Mississippi River in Clinton County, and Wapsipinicon River in Chickasaw County) (see Figure 5.3.2-1).

SA-04 would cross an unnamed trout stream three times and the Seven Mile Creek once, both located in Nicollet County in Minnesota. SA-04 does not cross any trout streams in Iowa, North Dakota, or Illinois.

Scenic Byways

SA-04 would cross three national byways in Iowa and on the border of Iowa and Illinois (Grant Wood, Great River Road, and Green River Road) (see Figure 5.3.2-2).

Table 5.3.2-2. Parks, Forests, and Special Management Areas Crossed by System Alternative SA-04 (acres)[a]

State/County	Name	Total Area (acres)	Centerline (miles)	Construction Work Area (acres)	Permanent Right-of-Way (acres)
North Dakota					
Richland County	Dakota Tallgrass Prairie Wildlife Management Areas	185,000	54.9	795	331
Pembina County	Pembina County Waterfowl Production Area	640	0.4	5	2
Subtotal		***185,640***	***55.3***	***800***	***333***
Illinois					
Whiteside County	Hennepin Canal State Park	6,030	<0.1	1	0
LaSalle, Grundy, Will	Illinois and Michigan Canal	1,130	12.1	177	74
Morrison	Upper Mississippi River National Wildlife Refuge	240,000	<0.1	0	0
Subtotal		***247,160***	***12.1***	***178***	***74***
TOTAL-		**432,800**	**67.4**	**978**	**407**

Source: USGS GAP 2016.

[a] Access road, additional temporary workspaces (ATWS), and valve information is not available because the exact location of permanent facilities has not been determined for SA-04.

Notes:

Values in the table may not sum to totals and subtotals because of rounding.

SA-04 would not cross parks, forests, or special management areas in Iowa.

Acres for the construction work area and the permanent right-of-way are based on Enbridge-provided footprints for the Applicant's proposed project and a 120-foot-wide construction footprint and 50-foot-wide permanent right-of-way used for system alternative SA-04.

5.3.2.2.4 Transportation by Rail

The rail alternative includes construction of a new offloading facility in Clearbrook, Minnesota; an offloading facility in Superior, Wisconsin; and upgrades and expansion of existing rail infrastructure. The land that would be permanently converted for facility construction and expansion is not currently designated for recreational purposes (i.e., state forest, park, or special management area). It is mostly mixed-use, industrial, and agricultural land. However, the likely rail transportation routes pass through areas used for recreation, as shown in Figure 5.3.2-1 and 5.3.2-2. These areas include several rivers such as the Red Lake River in Polk and Pennington counties, the Mississippi River in Beltrami and Cass counties, the St. Louis River in St. Louis and Carlton counties, and the Otter Tail River in Otter Tail County. Rail routes also include several smaller streams that are designated for trout fishing such as Union Creek in Wadena County, the Crow Wing River in Morrison County, the Red River and Moose Horn River in Carlton County, and Whitley's Creek in Crow Wing County. Rail routes pass through two

popular tourist destinations (the Detroit Lakes and Brainerd Lakes). The rail route would intersect the Paul Bunyan State Trail in Beltrami and Crow Wing counties, as well as the Willard Munger State Trail in Carlton County. The route also would intersect the Great River Road, a national scenic byway in several locations (Beltrami, Crow Wing, Cass, and Itasca counties), and the Veteran's Memorial highway in Carlton County. The route would come within 1,000 feet of the Lake Country Highway in Becker County.

5.3.2.2.5 Transportation by Truck

The truck alternative includes constructing a new offloading facility in Clearbrook, Minnesota; an offloading facility in Superior, Wisconsin; and new local access roads to these facilities. The land that would be permanently converted for facility construction and is mostly mixed-use, industrial, and agricultural land, and does not have land designated for recreational use. The roads likely to be traveled by trucks transporting crude oil for this alternative are located in areas used for recreation, as shown in Figure 5.3.2-1. These areas include the Red Lake River in Polk County and the International Historic Highway, a state-designated scenic byway also in Polk County, which would be crossed by the first leg of the truck route (Interstate 29). The second leg of the route begins on US Highway 2 in Bagley and continues all the way to Superior. The route crosses through the Mississippi Headwaters State Forest, the Paul Bunyan State Trail, the Great River Road Scenic Byway, and the Mississippi River in Beltrami County. It also runs parallel to the Necktie River, a trout fishing stream in Hubbard County, and crosses over Cass Lake in Cass County to intersect with the Great River Road and Mississippi River again in Cass County. The truck route runs parallel to the Mississippi River again in Itasca County and the St. Louis River in St. Louis County. In St. Louis County, it crosses 10 trout streams and the Saginaw Grade State Trail.

5.3.2.2.6 Existing Line 3 Supplemented by Rail

The existing conditions for the combined existing Line 3 and rail alternative are similar to those described above for continued use of the existing Line 3 pipeline and the rail alternative.

5.3.2.2.7 Existing Line 3 Supplemented by Truck

The existing conditions for the combined existing Line 3 and truck alternative are similar to those described above for continued use of the existing Line 3 pipeline and the truck alternative.

5.3.2.3 Impact Assessment

5.3.2.3.1 Applicant's Proposed Project (from Neche to Superior)

Construction Impacts

<u>Limitations to Recreation Access</u>

Parks, Forests, and Special Management Areas

Based on a review of relevant maps and satellite imagery, it was determined that most state forest land within the construction work areas does not include developed recreational areas (i.e., areas with facilities such as parking, campsites, boat launches, and hiking trails). This is also true for the WMAs because they are primarily designated for undeveloped recreational use. Generally, the land affected by construction of the pipeline consists of open public land available for informal recreation and does not include any developed areas, with the exception of off-road trails, all-terrain vehicles trails, and snowmobile trails.

During construction, impacts on parks, forests, and special management areas within the construction work areas include removal of existing vegetation, grading, excavation, pipeline installation, and reconstruction (for trails). Access to the affected land would be limited or restricted during this time. The Applicant may need to temporarily close or restrict access to non-motorized and off-road trails within state forests during construction of the pipeline across any trails. Enbridge would cross trails using either the bore or open-cut methods. With use of a bore crossing, no impacts on the trail are expected. If the open-cut method is used, Enbridge would complete pipeline installation activities across trails within 48 hours.

Construction in any location could last for several days to several weeks depending on a variety of factors such as land use type, topography, weather, and other environmental conditions; therefore, limited use, access restrictions, as well as noise and visual disturbance could occur during this timeframe. When construction activities are completed, recreational activities on the affected acres could resume as normal. Additional detail on noise and visual disturbance is provided in Sections 6.2.2 and 6.2.3, respectively.

At the county level, the majority of the land disturbed during construction (158 acres) would occur in state forests and WMAs in Aitkin County (Table 5.3.2-1). Based on a review of forest and WMA maps, the disturbed land represents a very small portion (less than 1 percent) of the total amount of land that remains available in each forest and WMA that would be crossed by the pipeline. In total, over 388,000 acres of land in the same forests and WMAs in Aitkin County would not be affected and would remain available for recreation during construction. This is also true in Cass County (216 acres affected of 96,876 total), Wadena County (116 acres out of 33,963 total), and Hubbard County (36 acres of 45,290 total). Therefore, impacts on access to forests and WMAs are anticipated to be temporary and minor, because restrictions would be confined to small portions of the total land available for recreation, and any closures would be limited to these areas during and immediately following construction.

State-Designated Land-Based Trails

For a short time during pipeline installation, construction-related activities would affect public access and use of land-based trails where the pipeline crosses the trail. The Applicant proposes to use the bore or open-cut method at trail crossings. If the latter is used, trail use at the intersection with the pipeline would be suspended for 48 hours during construction. After completion of pipeline installation, the Applicant would restore the trail surface to allow passage.

Based on a review of the trail route map for the 120-mile Paul Bunyan and the 90-mile Willard Munger state trails, the pipeline crossing would occur in areas with no designated public access or facilities. The crossing of the Paul Bunyan State Trail would occur near the middle of the trail just south of Backus, which does not include any public access points or recreational facilities. The pipeline would also cross the Willard Munger State Trail just north of Mahtowa, in an area with no public access points or recreational facilities. Construction-related impacts on these trails likely would result in a temporary restriction on recreational access during pipeline installation where the pipeline crosses over. Based on the overall length of the trails and alternative locations to access them, a temporary negligible impact on the recreational access of state trails is likely.

For the Hunter Walking Trail, the Applicant has stated that access would be maintained during the hunting season. Noise and visual disturbance may continue to affect the recreational experience in the affected areas during construction; however, restrictions in access at the pipeline crossing would no

longer be necessary. Therefore, impacts on the recreational access to the Hunter Walking Trail would be temporary and negligible. Overall, impacts on the recreational access of state-designated land-based trails are anticipated to be temporary and negligible, since impacts are confined to the area where the pipeline crosses the trail and any restrictions to access at these intersections would be limited to during and immediately following construction.

State-Designated Water Trails and Trout Streams

The Applicant's proposed project would cross five state-designated canoe and boating trails and six state-designated trout streams in Minnesota. No water trails or trout streams would be crossed by the Applicant's proposed project in North Dakota or Wisconsin. This assessment focuses on state-designated water trails as these are expected to have the highest number of visitors and would result in larger impacts on county tourism if use was disrupted.

For the Red River of the North in Kittson County, the Red Lake River in Pennington County, the Crow Wing River in Wadena County, and the Mississippi River in Clearwater and Aitkin counties, the Applicant has proposed using HDD crossing methods to prevent any disturbance of the river during construction. Therefore, public use of these rivers would not be interrupted, resulting in no impacts.

The Applicant does not propose using HDD methods to cross the Pine River. Depending on the crossing method, impacts may include temporary limits on access where the pipeline crosses over, construction noise, and downstream turbidity. Public use and access to the Pine River where the pipeline crosses over would be temporarily interrupted to allow installation of the pipeline. After the pipeline installation is completed, river users would be allowed to cross the construction area. Based on a review of the trail route map, the pipeline crossing would occur near the end of the trail (on or around River Mile 45 of 59 miles), which does not include any public access points or recreational facilities. Construction-related impacts on the Pine River likely would result in a temporary restriction on recreational access during pipeline installation where the pipeline crosses over. Based on the overall length of the Pine River and alternative sites to access the river, a temporary minor impact on recreational access to the Pine River is likely.

For trout streams, the Applicant has specified the use of HDD crossing methods for the Straight River and no impacts on recreational use of this waterbody are expected. Applicant-proposed methods for crossing King Creek (wet open cut), Spring Branch (dry crossing), Blackhoof River (dry crossing) and the unnamed stream (no method proposed) are also listed in Appendix G, as are the applicant-proposed alternative crossing methods for these streams. Depending on the crossing type, impacts could include temporary limits on access. Restrictions would likely be limited to where the pipeline crosses over, resulting in temporary minor impacts on recreational access to these streams.

The Applicant has proposed to develop a site-specific crossing plan for La Salle Creek. The Applicant also has consulted with Minnesota DNR regarding lessons learned related to construction methods and alignment at La Salle Creek by other third-party pipeline operators, including the potential for an unanticipated release of drilling fluid used during HDDs (i.e., a frac-out) (Enbridge 2016). The construction method and alignment at the La Salle Creek crossing have been modified as a result of Minnesota DNR's concerns.

Overall, restrictions on recreational use of trout streams are likely to be temporary and limited to the duration of pipeline installation. In addition, the Applicant has proposed no in-channel work during peak trout season in each waterbody. Because impacts on these streams would be temporary and would not

occur during designated trout fishing seasons, temporary minor impacts on recreational access to trout streams are anticipated.

Scenic Byways

The Applicant's proposed project would cross three scenic byways (the Great River Road, the Lake Country, and Veterans Memorial byways) using a bore or HDD, which would avoid road closures and any direct impacts on the roads. As a result, construction would not disrupt use of the byways, resulting in no impacts. Impacts associated with aesthetic changes along scenic byways are discussed in Section 6.2.3.

Changes to the Recreational Economy

Parks, Forests, and Special Management Areas

Construction could disrupt the activities or alter the recreational experience of people who regularly use the affected areas for specific recreational purposes. These impacts would be temporary and minor, and would be limited to small portions of the overall recreational area. (See discussion above for "Recreational Access Limitations.") A review of state forest and WMAs maps revealed that the majority of the land crossed by the Applicant's proposed project does not include developed recreational areas (e.g., facilities and trails), which are more likely to attract visitors from outside of the area. Therefore, it is likely that impacts would be limited to local people who live in and around the immediate area.

During construction, local recreational users could re-locate to undisturbed areas throughout each of the state forests and WMAs, given the overall size of these areas relative to the area affected by the construction footprint (531 acres of land disturbed for construction of 715,273 acres of total land available) (Table 5.3.2-1). Construction-related impacts would likely result in a temporary, negligible impact on the number of recreation-based trips people take to state forests and WMAs because construction impacts would be temporary (several days to several weeks depending on a variety of factors such as land use type, topography, weather, and other environmental conditions) and limited to areas with little opportunities for developed recreation. In addition, a variety of substitute or alternative sites both within the affected forest or WMA and in the county as a whole would be available to recreational users. Given the temporary nature of the activity and the opportunity to recreate in a variety of other places within each affected state forest and WMA, a loss of recreation-based visitation sufficient to measure in terms of recreational spending at the county-level is not expected. The impact on the recreational economies in each of the counties that would be crossed is expected to be temporary and negligible.

State-Designated Land-Based Trails

Construction-related impacts are likely to be confined to a specific segment of the affected trails for only a short period of time, and general access to the trails would not be restricted. Consequently, the change in overall recreation-based visitation to trails at the county level would not be large enough to measurably affect the amount of recreation-based tourism spending in any one county. Potential impacts on the recreational economy at the county level would be temporary and negligible.

State-Designated Water Trails and Trout Streams

Only the Pine River would be affected temporarily by construction of the Applicant's proposed project where the pipeline crosses the waterbody. Therefore, construction-related impacts on the recreational use of state-designated water trails likely would not be large enough to measure in terms of recreational

spending at the county-level. Potential impacts on the recreational economies in the counties that would be crossed would be temporary and negligible.

As previously stated, impacts on trout streams would not occur during designated trout fishing seasons; therefore, impacts on the recreational use of trout streams likely would be temporary and negligible. Subsequently, temporary negligible impacts on the recreational economy at the county level are expected.

Scenic Byways

The Applicant's proposed project would cross scenic byways using a bore or HDD, which would avoid road closures and any direct impacts on the roads. Therefore, there would be no impacts on the recreational economy.

Operations Impacts

Limitations to Recreation Access

Parks, Forests, and Special Management Areas

Operation of the pipeline would involve periodic inspection, pipeline maintenance activities, and mowing to maintain appropriate vegetation. Access to parks, forests, and special management areas would not be restricted or limited as a result of maintenance mowing and inspections during operations. Aboveground facilities, MLVs, and permanent access roads also would not limit recreational access to parks, forests, or special management areas. Therefore, no impacts on recreational use of parks, forests, or special management areas are expected from operation of the pipeline for the Applicant's proposed project.

State-Designated Land-Based Trails

Access and use of state-designated trails that would be crossed by the Applicant's proposed project would not be affected during maintenance mowing and inspection activities during operations. Aboveground facilities, MLVs, and permanent access roads would not limit recreational access to state-designated land-based trails. Therefore, no impacts on recreational use of land-based trails are expected during operation of the pipeline.

State-Designated Water Trails and Trout Streams

Access and use of state-designated canoe routes and other waterbodies that would be crossed by the Applicant's proposed project would not be affected during maintenance mowing and inspection activities during operations. Aboveground facilities, MLVs, and permanent access roads would not affect recreation use of water trails and trout streams. Therefore, no impacts on recreational use of state-designated water trails or trout streams are expected during operations.

Scenic Byways

Access and use of federally and state-designated scenic highways that would be crossed by the Applicant's proposed project would not be affected during maintenance mowing and inspection activities during operations. Aboveground facilities, MLVs, and permanent access roads would not affect recreational use. Therefore, no impacts on recreational use of scenic byways are expected during operations.

Changes to the Recreational Economy

Parks, Forests, and Special Management Areas

Because there would be no impacts on recreational use of forests or special management areas during operations for the Applicant's proposed project, there would be no impacts on the recreational economy in any of the affected counties.

State-Designated Land-Based Trails

Because there would be no impacts on recreational use of land-based trails during operations, there would be no impacts on the recreational economy in any of the affected counties.

State-Designated Water Trails and Trout Streams

Because there would be no impacts on recreational use of state designated water trails and trout streams during operations for the Applicant's proposed project, there would be no impacts on the recreational economy in any of the affected counties.

Scenic Byways

Because there would be no impacts on recreational use of scenic byways during operations for the Applicant's proposed project, there would be no impacts on the recreational economy in any of the affected counties.

5.3.2.3.2 Continued Use of Existing Line 3

Construction Impacts

No construction would be required for continued use of the existing Line 3, with no associated construction-related impacts on recreation and tourism resources.

Operations Impacts

Limitations to Recreation Access

Potential impacts on the use of recreational land or waterbodies could occur from integrity digs and subsequent pipeline repair if these activities occurred at crossings of recreational lands, including forests, land-based trails, and water trails. Impacts could include temporary access restrictions for the duration of inspections and repair work, which would occur only within the permanent right-of-way (except for access roads). The limited areal extent of such work and its short duration would result in no impacts on temporary, localized, and negligible impacts on recreational access depending on the location of the digs.

Changes to the Recreational Economy

Due to the localized nature of integrity digs and subsequent repairs and their limited duration, no impacts are expected on the local recreational economy during continued operation of the existing Line 3 pipeline.

5.3.2.3.3 System Alternative SA-04

Construction Impacts

As discussed in Section 4.3.1, SA-04 would be constructed and operated in the same manner as the Applicant's proposed project. However, the route would be within the jurisdiction of other states and other local governments for approximately 544 miles, or 68 percent of the total route. The system alternative is over twice the length of the Applicant's proposed project and would cross more recreational land and waterbodies than the Applicant's proposed project.

Limitations to Recreation Access

Parks, Forests, and Special Management Areas

After reviewing satellite imagery and maps, it was determined that recreational use in the areas crossed by SA-04 in North Dakota and Minnesota is likely limited to more informal recreation, such as hunting, wildlife watching, fishing, and trapping. The geographic extent of the construction work area primarily crosses open land with limited modern facilities (795 acres within the Dakota Tallgrass Prairie WMA). The remaining areas crossed (115 acres) occur in Illinois along the Illinois and Michigan Canal, which provides recreational uses in mostly developed areas, including boating, camping, fishing, and hiking.

At the county level, the majority of the land disturbed during construction (795 acres) would occur in a WMA within Richland County, North Dakota (Table 5.3.2-2). However, a review of national wildlife refuge maps revealed that the disturbed land represents a very small portion (less than one-half of a percent) of the total amount of land that remains available in the WMA. In total, over 185,000 acres of land would remain unaffected and available during construction within the Dakota Tallgrass WMA in Richland County. This is also true in Pembina County, North Dakota within the Pembina County Waterfowl Production Area (5 acres affected of 640 total); in Whiteside County (1 acre affected of 6,030 total); and in LaSalle, Grundy and Will Counties in Illinois (177 acres of 1,130 total). Impacts on access to parks, forests, and special management areas are anticipated to be temporary and minor because access limitations would be confined to small portions of the total land available for recreation, and any closures would be limited to these areas during and immediately following construction.

State-Designated Land-Based Trails

SA-04 would cross the Sakatah Singing Hills State Trail in Minnesota, three trails in Illinois (Great River Trail, Hennepin Canal Feeder, and I&M Canal Path), and the Clinton-Camanche Multi-Purpose Regional Trail l in Iowa. Based on a review of the trail route map for the Sakatah Singing Hills trail, the pipeline crossing would occur at the end of the 39-mile trail, just east of Mankato, in an area with no designated public access points or recreational facilities. The pipeline also crosses the 66-mile Great River trail in Illinois just south of Albany in a location that does not include any public access points or recreational facilities. This is also true for the Hennepin Canal Feeder, a 155-mile trail, also in Illinois. SA-04 crosses the west side of the 62-mile I&M Canal Path trail near the Marseilles Dam, affecting the trail head.

Construction impacts in recreation areas would be similar to those described for the Applicant's proposed project, including temporary restrictions on public access and use of land-based trails where the pipeline crosses over for a short time during pipeline installation. Based on the limited number of crossings and temporary nature of the impacts, it is likely that construction-related impacts on the recreational use of land-based trails along SA-04 would be temporary and negligible.

State-Designated Water Trails and Trout Streams

SA-04 would cross three state-designated canoe and boating trails in Minnesota (Cedar River, Chippewa River, and Minnesota River) and four in Iowa (Little Cedar River, Little Wapsipinicon River, Mississippi River, and Wapsipinicon River). Although the crossing methods have not been identified, they were assumed to be similar to those described for the Applicant's proposed project. For most rivers, the Applicant has proposed using HDD crossing methods to prevent any disturbance of the river during construction. Public use of these rivers would not be interrupted when HDD is used. Where the Applicant does not propose using HDD methods, impacts may include temporary limits on access where the pipeline crosses over. Based on the limited number of crossings and overall lengths of the rivers relative to where they intersect with the pipeline (i.e., offering ample opportunities for public access) it is expected that construction would result in temporary, minor impacts on recreational access.

In Minnesota, SA-04 would cross two trout streams (one stream would be crossed three times); no trout streams would be crossed in Iowa, Illinois, or North Dakota. Although the crossing methods are unknown, they were assumed to be similar to those described for the Applicant's proposed project. HDD crossings would result in no impacts, and other crossing methods could include temporary limits on access where the pipeline crosses over. Furthermore, the Applicant has proposed no in-channel construction during trout season. Based on the limited number of crossings of trout streams (only two and only in Minnesota), it is likely that construction-related impacts on the recreational use of trout streams would be temporary and minor.

Scenic Byways

SA-04 would cross three national byways in Iowa and on the border of Iowa and Illinois (Grant Wood, Great River Road, and Green River Road) (see Figure 5.3.2-2). The Applicant would cross each of the scenic byways using a bore or HDD, which would avoid road closures and any direct impacts on the roads. As a result, construction would not disrupt use of the byways along SA-04, resulting in no impacts on recreational access.

<u>Changes to the Recreational Economy</u>

Parks, Forests, and Special Management Areas

Construction of a pipeline along SA-04 could disrupt access to recreation sites and could affect the activities or alter the recreational experience of people who regularly use the affected areas for specific recreational purposes. These impacts would likely be temporary and localized, and limited to small portions of the overall recreational site (i.e., 978 acres of 432,800 acres available). A review of relevant maps and satellite imagery revealed that the majority of the land crossed by the route does not include developed recreational areas (e.g., facilities and trails) that are more likely to attract visitors from outside of the area. It is likely, therefore, that impacts would be limited to local people who live in and around the immediate area. During construction, it also is likely that local recreational users could temporarily re-locate to undisturbed areas throughout each of the state forests, parks and WMAs, given the overall size of these areas relative to the area affected by the construction footprint. Overall, construction-related impacts on the recreational economy would be temporary and negligible because (1) construction would move through an area relative quickly (several days to several weeks) and would be limited to areas with very little opportunities for developed recreation; and (2) a variety of substitute or alternative sites—within the affected park, forest, or WMA and in the county as a whole—would be available for recreational users.

Given the temporary nature of the construction activity and the opportunity to recreate in a variety of other places in the county, it is not expected that the loss of recreation-based visitation would be large

enough to measure in terms of recreational spending at the county-level, resulting in a temporary, negligible impact on the recreational economies in each of the counties crossed.

State-Designated Land-Based Trails

Since construction-related impacts would be confined to specific segments of trails and general access to trails would not be limited, the change in overall recreation-based visitation to trails at the county level would not be large enough to measurably affect the amount of recreation-based tourism dollars the county receives. Subsequently, this would result in a temporary and negligible impact on the recreational economy at the county level.

State-Designated Water Trails and Trout Streams

Because of the limited number of crossings with associated impacts and the temporary nature of the impacts, it is likely that construction-related impacts on the recreational use of state-designated water trails would not be large enough to measure in terms of recreational spending at the county-level, resulting in a temporary, negligible impact on the recreational economy.

Based on the limited number of trout stream crossings (only two and only in Minnesota), it is likely that construction-related impacts on the recreational use of trout streams would be temporary and negligible, with a corresponding temporary, negligible impact on the recreational economy of the affected counties.

Scenic Byways

The Applicant would anticipate crossing each of the scenic byways using a bore or HDD, which would avoid road closures and any direct impacts on the roads. As a result, construction impacts on scenic byways would not affect the recreational economy of the affected counties.

Operations Impacts

Limitations to Recreation Access

Parks, Forests, and Special Management Areas

Operation of the SA-04 pipeline would involve periodic inspection, pipeline maintenance activities, and mowing to maintain appropriate vegetation. Recreation access would not be restricted or limited as a result of these activities. Aboveground facilities, MLVs, and permanent access roads would not limit recreational access to state parks, forests, or special management areas. Therefore, temporary, negligible impacts on recreational use of parks, forests, and special management areas are expected during operation of the pipeline.

State-Designated Land-Based Trails

Operation of the pipeline would involve periodic inspection, pipeline maintenance activities, and mowing to maintain appropriate vegetation. Access and use of state-designated trails that would be crossed by SA-04 would not be affected during operational activities. Aboveground facilities, MLVs, and permanent access roads would not affect recreational access to state-designated land-based trails. Therefore, no impacts on recreational use of land-based trails are expected during operation.

State-Designated Water Trails and Trout Streams

Access and use of state-designated canoe routes and other waterbodies that would be crossed by SA-04 would not be affected during maintenance mowing and inspection operation activities. Aboveground

facilities, valves, and permanent access roads would not affect the recreational use of state-designated water trails and trout streams. Therefore, no impacts on recreational use of state designated water trails and trout streams are expected during continued operation of the pipeline.

Scenic Byways

Access and use of federally and state-designated scenic highways that would be crossed by SA-04 would not be affected during maintenance mowing and inspection operation activities. Aboveground facilities, MLVs, and permanent access roads would not affect recreational use of scenic byways. Therefore, no impacts on recreational use of scenic byways are expected during operation.

Changes to the Recreational Economy

Parks, Forests and Special Management Areas

Since recreational use of parks, forests, and special management areas would not be affected during operations, there would be no impacts on the recreational economy in any of the counties crossed.

State-Designated Land-Based Trails

Since recreational use of state-designated land-based trails would not be affected during operations, there would be no impacts on the recreational economy in any of the counties crossed.

State-Designated Water Trails and Trout Streams

Since recreational use of state designated water trails and trout streams would not be affected during operations, there would be no impacts on the recreational economy in any of the counties crossed.

Scenic Byways

Because recreational use of scenic byways would not be affected during operations, there would be no impacts on the recreational economy in any of the counties crossed.

5.3.2.3.4 Transportation by Rail

Construction Impacts

Limitations to Recreation Access

The rail alternative includes construction of a new offloading facility in Clearbrook, Minnesota; an offloading facility in Superior, Wisconsin; and upgrades and expansion of existing rail infrastructure. The land that would be permanently converted for facility construction and expansion is not currently designated for recreational purposes. It is mostly mixed-use, industrial, and agricultural land. Therefore, construction activities associated with transportation by rail would not affect recreational use.

Changes to the Recreational Economy

Because none of the new or expanded loading/offloading facilities or railway spurs would be constructed on land used for recreational purposes, construction activities for the transportation by rail alternative would not affect the local recreational economy.

Operations Impacts

Limitations to Recreation Access

Continued shipment of crude oil via rail would not be expected to affect recreational use of parks, forests, special management areas, land-based trails, water trails, trout streams, or scenic byways. Consequently, no impact on overall recreational visitation would result. However, one of the rail routes (Superior South) crosses through the Detroit Lakes and the Brainerd Lakes areas, which are popular vacation destinations for people inside and outside of Minnesota. An increase from 3 to 10 unit trains per day would increase the average daily gate down-time and obstruction of local traffic at rail crossings. Gate down-time is a function of train speeds, which vary by both regulation and rail system operational requirements (waiting on passing tracks, dispatch within various segments of each route, and train crew work schedules). As discussed in Section 5.3.3, gate down-time ranges from 2.3 minutes at 50 mph typical in rural areas to 3.0 minutes at 35 miles per hour, which may be typical in populated areas. In rural areas with little roadway traffic, the increase in blockage of at-grade crossings would have a minor but permanent impact on people who visit these areas on vacation. Therefore, with respect to access to these areas as a tourist destination, it is expected that operation of the rail line to transport crude oil would result in a permanent, minor impact.

Changes to the Recreational Economy

While the increased rail traffic is likely to have a permanent, minor impact on access to two popular tourist destinations because of an increase in blockage of at-grade crossings, it is not expected that this would deter people from choosing these areas as a vacation destination. Therefore, it is expected that continued operation of the rail line would have a permanent, negligible impact on the recreational economy in Becker or First Island counties.

5.3.2.3.5 Transportation by Truck

Construction Impacts

Limitations to Recreation Access

The truck alternative includes construction of a new offloading facility in Clearbrook, Minnesota; an offloading facility in Superior, Wisconsin; and new local access roads to these facilities. The land that would be permanently converted for facility construction and expansion is not currently designated for recreational purposes. It is mostly mixed-use, industrial, and agricultural land. Therefore, construction activities associated with transportation by truck would not affect recreational use.

Changes to the Recreational Economy

Because construction associated with the truck alternative would not affect recreational use, there would be no construction-related impact on the recreational economies in the counties crossed.

Operations Impacts

Limitations to Recreation Access

Shipment of crude oil via truck would not be expected to affect access to the recreational use of parks, forests, special management areas, land-based trails, or waterbodies, thereby causing no impact on overall recreational access. The increase in traffic along major truck routes and the increase in future traffic density (see Section 5.3.3.3.5) indicate that the potential for congestion along portions of the route may result in minor permanent impacts and major temporary impacts on traffic movement, thus affecting the mobility of people who drive on these truck routes. If the increased volume of tanker trucks leads to congestion along intersections with scenic byways or leads commuters to use scenic byways to avoid the truck routes, the potential exists for permanent, negligible to minor impacts on

motorists along the scenic byways. A variety of alternate scenic highways do not intersect with potential truck routes, and trucks transporting crude oil primarily would travel on major interstates and avoid scenic byways. Therefore, it is likely that transportation of oil by truck would result in a permanent negligible impact on access to scenic byways.

Changes to the Recreational Economy

Shipment of crude oil via truck would not be expected to affect recreational use of parks, forests, special management areas, land-based trails, or waterbodies, thereby causing no impact on recreational economies at the county level. The potential permanent negligible impact on the access to some scenic byways would not be large enough to measurably affect the amount of recreation-based tourism spending at the county-level. Subsequently, this would result in a permanent, negligible impact on the recreational economy at the county level.

5.3.2.3.6 Existing Line 3 Supplemented by Rail

Construction Impacts

Limitations to Recreation Access

No construction-related impacts on recreation and tourism would result from continued use of the existing Line 3 pipeline because it is already built. As previously noted, none of the new or expanded loading/offloading facilities for rail transport would be constructed on land used for recreational purposes. Therefore, construction impacts from continued use of the existing Line 3 pipeline supplemented by transportation by rail would not affect recreational access.

Changes to the Recreational Economy

No construction-related impacts on recreation and tourism would result from continued use of the existing Line 3 pipeline because it is already built. As previously noted, none of the new or expanded loading/offloading facilities or railway spurs would be constructed on land used for recreational purposes. Therefore, construction impacts from continued use of the existing Line 3 pipeline supplemented by transportation by rail would not affect the recreational economy at the county level.

Operations Impacts

Limitations to Recreation Access

No impacts on the use of recreational land or waterbodies would be associated with continued operations of the existing Line 3 pipeline unless integrity maintenance digs are required at crossings of recreational lands. Impacts on recreation and tourism during integrity digs and subsequent excavation and repair work for continued use of Line 3 would be the same as those described above for the existing Line 3 alternative. Impacts of integrity digs are expected to be temporary, localized, and limited to the permanent right-of-way, resulting in no impact to a negligible impact (depending on the location of the dig) on recreational access.

Shipment of crude oil via rail would not be expected to affect recreational use of parks, forests, special management areas, land-based trails, water trails, trout streams, or scenic byways. Consequently, no impact on overall recreational access would result, with the exception of the increase in blockage of at-grade crossings in the Detroit and Brainerd Lakes areas. The impact would be minor but a permanent impact on people who visit these areas on vacation.

Changes to the Recreational Economy

Due to the small areas that could be affected by integrity digs during continued operation of the Line 3 pipeline and their temporary duration, no impacts are expected on the local recreational economy. In addition, rail transport would not be expected to affect recreational use of parks, forests, special management areas, land-based trails, water trails, trout streams, or scenic byways. Consequently, no impact on overall recreational visitation or on recreational economies at the county level would result. While the increased rail traffic is likely to have a permanent minor impact on access to two popular tourist destinations caused by increased blockage of at-grade crossings, it is not expected that people would be deterred from choosing these areas as a vacation destination. Consequently, continued operation of the rail line is expected to result in a permanent, negligible impact on the recreational economy in either Becker or First Island counties.

5.3.2.3.7 Existing Line 3 Supplemented by Truck

Construction Impacts

Limitations to Recreation Access

Continued use of the existing Line 3 pipeline would not result in construction-related impacts on state parks, forests, special management areas, state-designated land-based trails, water trails, trout streams or scenic byways because it is already built. As previously noted, none of the new or expanded loading/offloading facilities for truck transport would be constructed on land used for recreational purposes. Therefore, construction-related impacts associated with transportation by truck would not affect recreational access.

Changes to the Recreational Economy

Continued use of the existing Line 3 pipeline would not result in construction-related impacts on the local recreational economy because it is already built. Subsequently, construction for the truck alternative would not affect the recreational economy.

Operations Impacts

Limitations to Recreation Access

No impacts on access to recreational land or waterbodies would be associated with continued operations of the existing Line 3 unless integrity maintenance digs are required at crossings of recreational lands. Continued operation of the existing Line 3 could affect recreational land from integrity digs along the existing pipeline. Impacts of integrity digs are expected to be temporary, localized, and limited to the permanent right-of-way, thereby resulting in no impacts on temporary negligible impacts on recreational use. If the increased volume of tanker trucks leads to congestion along intersections with scenic byways, the quality of the experience for motorists could be reduced. However, the volume of trucks under this alternative would be less than under transportation by truck alone and is not anticipated to result in such congestion. Consequently, impacts the recreational access to scenic byways would be permanent but negligible.

Changes to the Recreational Economy

Due to the small areas that could be affected by integrity digs during continued operation of the Line 3 pipeline and their temporary duration, no impacts are expected on the local recreational economy. In addition, truck transport would not be expected to affect recreational use of parks, forests, special management areas, land-based trails, water trails, trout streams, or scenic byways, thereby causing no

impact on recreational economies at the county level. Transportation by truck could result in a permanent negligible impact on recreational use of scenic byways from potential (but unlikely) increased congestion. Because it is unlikely that this impact would be large enough to measure in terms of recreational spending at the county-level, the impact on local recreational economies would be permanent but negligible.

5.3.2.4 Summary and Mitigation

5.3.2.4.1 Summary

Table 5.3.2-3 presents the results of the analysis of potential impacts on access to recreational resources and subsequent impacts on recreational economies at the county-level from construction and operation of the Applicant's proposed project and the CN Alternatives. The Applicant's proposed project and system alternative SA-04 would have temporary and negligible to minor impacts on recreational access to state forests and WMAs, but these anticipated impacts would not be large enough to measure in terms of recreational spending at the county level. Impacts on the recreational economies for the two pipeline routes would be temporary and negligible. The affected recreation areas represent a small (less than one-half of a percent) portion of the total land area that remains available for recreational use. This is also true for impacts on state-designated land, water-based trails, and scenic byways. Based on the limited number of crossings compared to the overall trail/route length, the Applicant's proposed crossing methods, and plans to limit construction during designated hunting and fishing seasons, both the Applicant's proposed project and SA-04 would result in temporary negligible impacts on access to these resources and therefore on recreational spending at the county level. Construction impacts from all of the other CN Alternatives would not affect recreational access to the described resources.

The analysis also found that recreational economies would not be affected unless construction for integrity digs on recreational land occurred during operations along the existing Line 3. Therefore, depending on the location of the digs, there would either be no impact or temporary negligible impacts.

Recreation access would not be affected during operation of pipelines; therefore, the recreational economy would not be affected in the counties that would be crossed during operations. A potential exception is if the increased volume of trucks on the road or rail traffic would affect access to scenic byways or vacation destinations such as the Brainerd Lakes or Detroit Lakes areas. It is unlikely that this impact would deter people from using scenic byways altogether or keep them from vacationing in the Brainerd Lakes or Detroit Lakes areas. Therefore, operations for the rail and truck alternatives would result in permanent but negligible impacts on the recreational economies. This finding is also true for operations associated with the combined rail/truck alternatives.

5.3.2.4.2 Mitigation

Given the findings that impacts on recreational access and recreational economies would be negligible to minor, no mitigation measures were identified to further reduce impacts.

Table 5.3.2-3. Summary of Potential Impacts on Recreation and Tourism for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Line 3 Supplemented by Rail	Line 3 Supplemented by Truck
Construction Impacts							
Recreation access limitations to parks, forests, and special management areas during construction	Temporary/minor impacts • 526 acres	No impact	Temporary/minor impacts • 978 acres	No impact	No impact	No impact	No impact
Recreation access limitations to state-designated trails and trout streams during construction	Temporary/ negligible to minor impacts • 20 snowmobile/ ATV trail crossings • 4 land trail crossings • 1 water trail crossing • 6 trout stream crossings No impact • HDD crossing methods • 4 water trails	No impact	Temporary/ negligible impacts • 25 snowmobile/ ATV trail crossings • 5 land trail crossings • 7 water trail crossings • 4 trout stream crossings (2 streams)	No impact	No impact	No impact	No impact
Recreation access limitations to scenic byways	No impact	No impact	No impact	No impact	No impact	No impact	No impact

Table 5.3.2-3. Summary of Potential Impacts on Recreation and Tourism for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Line 3 Supplemented by Rail	Line 3 Supplemented by Truck
Changes to the recreational economy during construction	Temporary/no impact to negligible impacts	No impact	Temporary/no impact to negligible impacts	No impact	No impact	No impact	No impact
Operations Impacts							
Recreation access limitations to parks, forests, and special management areas during operations	Temporary/no impact to negligible impacts	Temporary/no impact to negligible impacts during integrity digs	Temporary/no impact to negligible impacts	No impact	No impact	Temporary/no impact to negligible impacts during integrity digs	Temporary/no impact to negligible impacts during integrity digs
Recreation access limitations to state-designated trails and trout streams during operations	Negligible	No impact	Negligible	No impact	No impact	No impact	No impact
Recreation access limitations to scenic byways	No impact	No impact	No impact	No impact	Permanent/ negligible to minor impacts	No impact	Permanent/ negligible impacts
Recreation access limitations to tourist destinations	No impact	No impact	No impact	Permanent/minor impacts	No impact	Permanent/minor impacts	No impact
Changes to the recreational economy during operations	No impact	No impact	No impact	Permanent/ negligible impacts	Permanent/ negligible impacts	Permanent/ negligible impacts	Permanent/ negligible impacts

ATV = all-terrain vehicle

5.3.2.5 References

Minnesota Department of Natural Resources (MNDNR). 2017. Minnesota State Water Trails. http://www.dnr.state.mn.us/watertrails/index.html. Accessed July 2017.

U.S. Geological Survey, Gap Analysis Program (USGS GAP). 2016. Protected Areas Database of the United States (PAD-US). Version 1.4 Combined Feature Class. May.

5.3.3 Population

Population in the vicinity of the Applicant's proposed project and the CN Alternatives may be affected by construction of new facilities and operation of new or existing facilities. The population analysis focuses on how populations may be affected by the direct increase in Project-related workers. It does not consider indirect population changes from increased local economic activities. The analysis of effects on local populations includes changes in local workforces and disruption to local populations by the following potential impacts:

- Increases in local workforces from the influx of non-local workers temporarily or permanently moving to an area to support construction or operations. Changes in workforce population may affect demand on emergency services, increase traffic congestion from commuting, and the availability of housing;
- Disruptions to high-population areas and other populated areas in proximity to construction work areas from noise, dust, and vibrations from construction and operations equipment; disruptions to traffic and services such as water and gas during construction, and permanent displacement of residences and structures during operations.
- Increased disturbance of population areas along existing rail and highway routes from additional train and truck use of rail lines and highways, and their effects on local infrastructure.

Potential impacts on populations from pipeline crude oil releases are discussed in Chapter 10.

This section first describes the existing populations within an area along the Applicant's proposed project and each of the CN Alternatives where populations could be affected by construction and operation of the Applicant's proposed project or one of the CN Alternatives (the ROI). The potential impacts of construction and operation for the Applicant's proposed project and the CN Alternatives on those populations are assessed next. A summary and comparison of potential impacts are included at the end of the section, followed by potential mitigation measures to reduce impacts.

5.3.3.1 Regulatory Context and Methodology

5.3.3.1.1 Regulatory Context

In Minnesota, the Commission must consider the existence and density of populated areas when routing a crude oil pipeline in the state (Minn. R. 7852.1900, Subp. 3[a]). North Dakota, Illinois, and Iowa do not have a state-specific environmental review process or any regulations that specifically address population in the determination of energy infrastructure. No specific standards related to the proximity of populated areas to pipeline facilities were identified other than compliance with local planning and zoning ordinances. See Section 6.2.1 for a discussion of planning and zoning.

5.3.3.1.2 Methodology

The analysis for impacts on population is broken into two components: impacts associated with the non-local workforce re-locating to communities near the Project, and impacts associated with construction and operation of the pipeline near densely populated areas.

The additional pipeline workforce may affect communities during construction or operation if existing infrastructure and services are not adequate. Additionally, routing a pipeline through population centers

or areas of high population density is difficult because these areas have more infrastructure in place such as roads, structures, and utilities. A greater number of people potentially would be affected by noise, dust, population increase, and traffic during construction in these areas, which may exacerbate the magnitude and duration of impacts compared to less populated areas.

Non-Local Workforce

The net change to local populations from the influx of non-local workers was assessed by:

- Gathering current population statistics from the U.S. Census Bureau for the counties that would be crossed by the Applicant's proposed project and the CN Alternatives;
- Estimating the total population increase that could result from workers moving to the counties with their families;
- Identifying the areas where the total population increase in a county could be 10 percent or more, and the expected impacts of the increase; and
- Qualitatively assessing impacts related to population increases based on the percent and duration of change in population.

The ROI for the assessment of non-local workforce effects is the counties that are crossed by the Applicant's proposed project and the CN Alternatives (continued use of existing Line 3, system alternative SA-04, transportation by rail, transportation by truck, and Line 3 supplemented by rail or truck). County-level data provide a summary of populations potentially affected by the influx of the construction workforce. Workers re-locating to the area would commute to work from various communities near, but not necessarily along, the pipeline route. The counties crossed by the pipeline reflect a reasonable estimate for where the workers are likely to re-locate and the level of current population that would be affected.

Populated Areas

Impacts on high-population areas and other populated areas that may occur from construction and operation of the Project were assessed by:

- Overlaying the Applicant's proposed project and the CN Alternatives on a map of high consequence areas that includes highly populated areas and other populated areas;
- Recording the total miles of populated areas crossed by the Applicant's proposed project and the CN Alternatives, and the total area of populated areas that would fall within 1,250 feet of the construction work area;
- Identifying all populated areas within the ROI; and
- Assessing the nature, extent, duration, and magnitude of impacts on populated areas and any measures to minimize potential impacts.

The ROI for the review of populated areas consists of the area within 1,250 feet of the construction footprint for the Applicant's proposed project and the CN Alternatives. For this analysis, "populated areas," as defined by the U.S. Census Bureau, consist of incorporated areas or legal entities and census-designated places, which are statistical entities.

Data for populated areas within 1,250 feet of the routes were derived from the U.S. Census Bureau's Master Address File / Topologically Integrated Geographic Encoding and Referencing Database (U.S. Census Bureau 2015). Impacts on these areas were quantified in terms of the number of populated areas crossed, the extent of the pipeline crossing in these populated areas (i.e., miles crossed by the pipeline centerline), and the populated area (acreage) within 1,250 feet of construction. These metrics are intended to capture the number of communities most affected and the degree to which each community would be affected. The miles of an area crossed by the pipeline centerline quantifies the relative extent of impact, but does not reflect impacts on locations adjacent to the pipeline. Using a 1,250-foot buffer accounts for areas that may be affected by noise, dust, vibration, and increased traffic from construction (typical construction noise would most likely be within acceptable levels at a distance of 1,250 feet, as discussed in Section 6.2.2).

5.3.3.2 Existing Conditions

Populated areas and population density within those areas for the counties crossed by the Applicant's proposed project and CN Alternatives in Minnesota are shown in Figure 5.3.3-1.

5.3.3.2.1 Applicant's Preferred Route

The Applicant's proposed project would cross 14 counties in three states (Figure 5.3.3-1). The population density of all of the potentially affected counties is below the statewide average in all three states, which would indicate that the counties are primarily rural with few large population centers. Of these counties, the county with the highest population density is Crow Wing County in Minnesota, with 64 people per square mile (U.S. Census Bureau 2015). The population density of Minnesota as a whole is 69 people per square mile. The county with the lowest population density is Kittson County, also in Minnesota. Crow Wing County has the highest total population of all the counties, with 63,428 people; and Red Lake County in Minnesota has the lowest, with 4,055 people. The total population for the counties that would be crossed is 301,084 people. County population estimates for 2010 and 2015, the percentage population change between those years, and the population density for all counties crossed by the Applicant's proposed project are presented in Appendix N.

Table 5.3.3-1 lists the populated areas that occur along the Applicant's proposed project. For each populated area, the table also gives its population, the length of the route centerline that passes through the populated area, and the total acreage of populated areas that would be located within 1,250 feet of the construction work area. For the Applicant's proposed project, the total number of people in the populated areas that would be crossed is 92,017 people, the total miles of populated areas crossed would be approximately 10 miles, and the total acreage of populated areas within 1,250 feet would be approximately 3,314 acres.

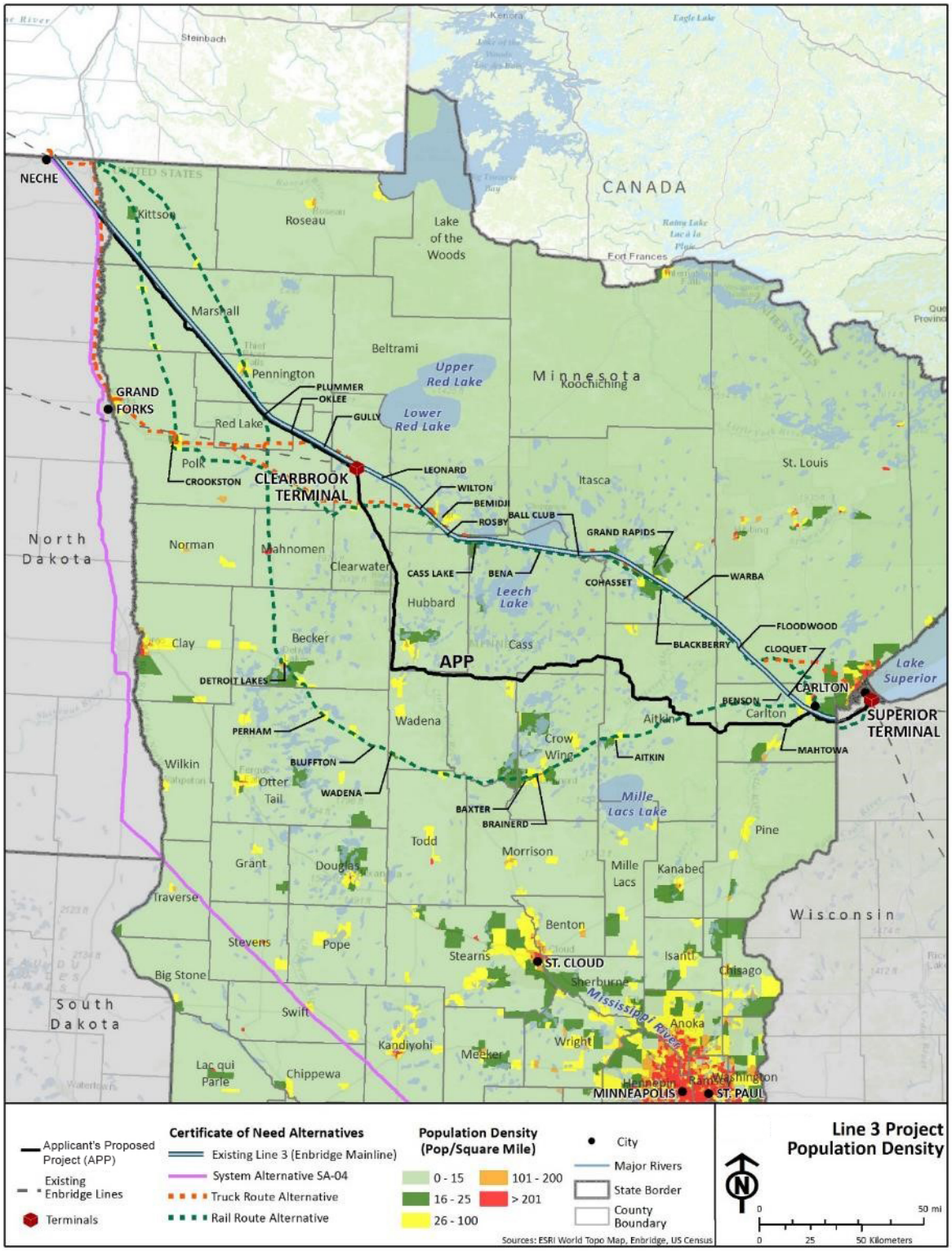

Figure 5.3.3-1. Population Density in the Counties Crossed by the Applicant's Proposed Project and the Certificate of Need Alternatives in Minnesota

Table 5.3.3-1. Populated Areas near the Applicant's Proposed Project

Populated Area	Population[a]	Miles of Populated Area Crossed by Pipeline Centerline	Populated Areas within 1,250 Feet of Construction Work Area (acres)
North Dakota			
None	None	None	None
Subtotal	***0.0***	***0.0***	***0***
Minnesota			
Gonvick	282	0.0	0
Gully	66	0.0	12
Oklee	435	0.8	215
Plummer	292	2.0	606
Trail	46	0.7	217
Clearbrook	518	0.0	70
Mahtowa	370	2.9	792
Mule Lake	--	0.0	3
Outing	--	0.0	41
Waukenabo	316	0.0	2
Carlton	862	0.0	84
Chub Lake	--	0.0	6
Wrenshall	399	0.1	79
Duluth	86,265	1.0	256
Subtotal	***89,851***	***6.5***	***2,383***
Wisconsin			
Superior	2,166	2.7	930
Subtotal	***2,166***	***2.7***	***930***
TOTAL	**92,017**	**9.9**	**3,313**

[a] Source: U.S. Census Bureau 2010.

"--" = these areas are not census-designated areas; therefore, population information is not available.

5.3.3.2.2 Continued Use of Existing Line 3

The existing Line 3 pipeline lies within the Enbridge Mainline corridor that follows a similar route to the Applicant's proposed project, except where the routes diverge between Clearbrook and Carlton in Minnesota (Figure 5.3.3-1).

Table 5.3.3-2 presents the number of people within the populated areas near the existing Line 3, the miles of populated areas crossed by the pipeline centerline, and the total acreage of populated areas located within 1,250 feet of the pipeline right-of-way.

Table 5.3.3-2. Populated Areas near the Existing Line 3 Pipeline

Populated Area	Population[a]	Miles of Populated Areas Crossed by Pipeline Centerline	Populated Areas within 1,250 Feet of Construction Work Area (acres)
North Dakota			
None	None	None	None
Subtotal	***0.0***	***0.0***	***0.0***
Minnesota			
Gonvick	282	0.0	0
Gully	66	0.0	12
Oklee	435	0.8	215
Plummer	292	2.0	606
Trail	46	0.7	217
Ball Club	342	1.8	492
Bemidji	13,431	4.7	1,749
Bena	116	0.8	250
Bagley	1,392	0.9	304
Blackberry	--	1.6	402
Cass Lake	770	1.6	566
Chub Lake	--	0.0	2
Cloquet	12,124	0.1	41
Cohasset	2,698	3.4	1,126
Coleraine	1,970	3.3	1,051
Deer River	930	0.0	9
Floodwood	528	0.4	173
Grand Rapids	10,869	4.6	1,509
Grant Creek	--	0.0	18
La Prairie	665	0.0	17
Leonard	41	0.2	54

Table 5.3.3-2. Populated Areas near the Existing Line 3 Pipeline

Populated Area	Population[a]	Miles of Populated Areas Crossed by Pipeline Centerline	Populated Areas within 1,250 Feet of Construction Work Area (acres)
Midge Lake	--	0.0	15
Pinewood	--	0.0	39
Portage Lake	--	0.0	18
Rosby	--	0.6	155
Warba	181	1.0	344
Wilton	204	1.6	561
Zemple	93	1.1	311
Chub Lake	--	0.0	6
Wrenshall	399	0.1	79
Duluth	86,265	1.0	256
Subtotal	***134,139***	***32.3***	***10,596***
Wisconsin			
Superior	2,166	2.7	930
Subtotal	***2,166***	***2.7***	***930***
TOTAL	**136,305**	**35.0**	**11,526**

[a] Source: U.S. Census Bureau 2010.

"--" = these areas are not census-designated areas; therefore, population information is not available.

The total number of people in the populated areas near the existing Line 3 pipeline is 136,305 people, the total miles of populated areas crossed is approximately 35 miles, and the total acreage of populated areas within 1,250 feet is approximately 11,526 acres.

5.3.3.2.3 System Alternative SA-04

The route for SA-04 would cross 35 counties in four states (Figure 5.3.3-2). The total population of the counties that would be crossed by SA-04 is 1,887,320 people. The population in the counties along SA-04 ranges from a low of 3,401 people in Traverse County, Minnesota, to a high of 677,560 people in Will County, Illinois. The population densities are typically higher in counties along SA-04 compared to the counties along the Applicant's proposed project. The overall population density for counties along SA-04 is 73 people per square mile. County population estimates for 2010 and 2015, the percentage population change between those years, and the population density for all counties crossed by SA-04 are presented in Appendix N.

Table 5.3.3-3 presents the population of populated areas near SA-04, the miles of populated areas that would be crossed by the pipeline centerline, and the total acreage of populated areas that would be located within 1,250 feet of the construction footprint.

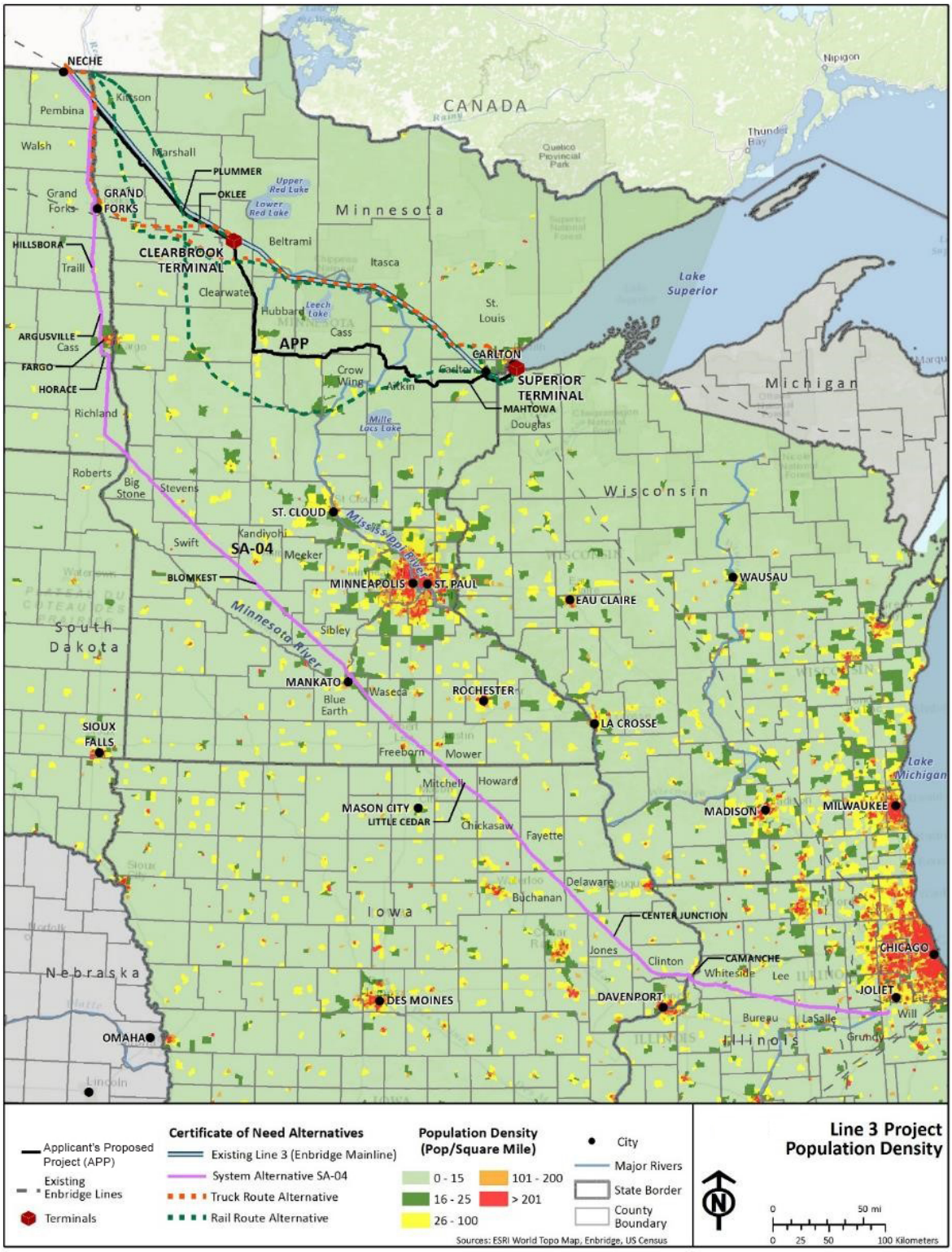

Figure 5.3.3-2. Population Density in the Counties Crossed by System Alternative SA-04

Table 5.3.3-3. Populated Areas near System Alternative SA-04

Populated Area	Population[a]	Miles of Populated Areas Crossed by Pipeline Centerline	Populated Areas within 1,250 Feet of Construction Work Area (acres)
North Dakota			
Argusville	475	2.0	643
Drayton	824	0.0	104
Fargo	105,549	1.1	323
Gardner	74	0.8	234
Grand Forks	52,838	1.0	338
Grandin	173	0.0	28
Hillsboro	1,603	0.7	184
Horace	2,430	3.6	940
Manvel	360	0.0	43
West Fargo	25,830	0.0	256
Subtotal	***190,156***	***9.2***	***3,093***
South Dakota			
White Rock	3	0.0	0
Subtotal	***3***	***0.0***	***0***
Minnesota			
Benson	3,240	0.0	7
Blomkest	157	0.1	61
Eagle Lake	2,422	1.0	73
Hector	1,151	0.0	14
Lyle	551	0.0	49
Mankato	39,309	0.0	341
Subtotal	***46,830***	***1.2***	***546***
Iowa			
Aurora	185	0.0	1
Camanche	4,448	3.5	898
Center Junction	111	0.1	58
Little Cedar	60	0.4	129
Subtotal	***4,804***	***4.0***	***1,086***
Illinois			
Morris	13,636	0.2	64
Mendota	7,372	0.0	0

Table 5.3.3-3. Populated Areas near System Alternative SA-04

Populated Area	Population[a]	Miles of Populated Areas Crossed by Pipeline Centerline	Populated Areas within 1,250 Feet of Construction Work Area (acres)
Channahon	12,560	3.6	1,151
Subtotal	***33,568***	***3.8***	***1,215***
TOTAL	**275,361**	**18.2**	**5,939**

[a] Source: U.S. Census Bureau 2010.

The total population of the populated areas within 1,250 feet of SA-04 is 275,361 people, the total miles of populated areas crossed would be approximately 18 miles, and the total acreage of populated areas within 1,250 feet of the construction footprint would be 5,939 acres.

5.3.3.2.4 Transportation by Rail

The rail alternative includes construction of a new offloading facility in Clearbrook, Minnesota, an offloading facility in Superior, Wisconsin, and upgrades and expansion of existing rail infrastructure. The likely routes for transportation by rail and counties crossed are shown in Figure 5.3.3-1. During operations, unit trains traveling between near Gretna and Clearbrook or Superior would transit through some populated areas and require closure of at-grade crossings during train passage. The increased number of train passages would increase the amount of time each day that rail crossings would be obstructed and movement of vehicular traffic blocked.

Table 5.3.3-4 lists populated areas and the size of the local population located near potential construction sites for rail loading, rail offloading, and rail improvement sites.

Table 5.3.3-4. Populated Areas near Potential Construction Sites for Transportation by Rail

Populated Area	Population[a]	Construction Type
Thief River Falls, Minnesota	8,573	Rail line improvement
Plummer, Minnesota	292	Rail line improvement
Oklee, Minnesota	435	Rail line improvement
Trail, Minnesota	46	Rail line improvement
Gully, Minnesota	66	Rail line improvement/new rail line
Gonvick, Minnesota	282	New rail line
Clearbrook, Minnesota	518	Loading facility/new rail line
Superior, Wisconsin	2,166	Offloading facility/new rail line
TOTAL	**12,378**	

[a] U.S. Census Bureau 2010.

Tables 5.3.3-5 through 5.3.3-7 list the population centers and the size of the local population through which likely rail routes to Clearbrook and Superior would pass. Depending on their proximity to the rail line, portions of these populations could experience increases in noise and dust from passing trains. Increased rail traffic also would extend the amount of time each day that local at-grade crossings would be blocked by passing trains and local traffic movements would be obstructed. Table 5.3.3-8 shows the number of rural and urban at-grade crossings along each potential route. For at-grade crossings, the Federal Railroad Administration's designation of a "population center" is different from the designation of a "populated area" by the U.S. Census Bureau (see table notes). Annual crossing incidents also are shown in Table 5.3.3-8.

Table 5.3.3-5. Populated Areas near the Northern Rail Route

Populated Area	Population[a]	Miles of Populated Areas Crossed by Route Centerline	Populated Areas within 1,250 Feet of Route (acres)
Minnesota			
Ball Club	342	1.2	418
Bemidji	13,431	4.7	1,911
Bena	116	0.3	239
Blackberry	--	0.0	542
Brookston	141	1.1	2238
Carlton	862	1.3	361
Cass Lake	770	1.2	487
Cloquet	12,124	7.3	2,179
Cohasset	2,698	5.0	1,523
Coleraine	1,970	1.6	508
Crookston	7,891	2.9	968
Deer River	930	0.9	324
Donaldson	42	1.5	374
Duluth	86,265	1.2	381
Ebro	64	0.4	237
Erksine	503	0.9	255
Floodwood	528	0.8	238
Fosston	1,527	0.7	365
Grand Rapids	10,869	3.9	1,149
Hallock	104	2.9	582
Humboldt	45	0.4	68
Kennedy	193	0.8	241
La Prairie	665	1.3	382
Lengby	86	0.5	132

Table 5.3.3-5. Populated Areas near the Northern Rail Route

Populated Area	Population[a]	Miles of Populated Areas Crossed by Route Centerline	Populated Areas within 1,250 Feet of Route (acres)
McIntosh	625	1.1	287
Mentor	153	1.5	453
Midge Lake	--	0.0	34
Portage Lake	--	0.0	2
Rosby	--	0.0	211
Scanlon	991	1.1	296
Shevlin	176	1.2	338
Solway	96	1.0	307
Stephen	658	0.8	224
Thomson	159	0.0	3
Warba	181	2.1	601
Warren	1,563	1.6	469
Wilton	204	2.2	641
Wrenshall	399	0.8	223
Zemple	93	0.0	51
Subtotal	***147,464***	***56.2***	***20,242***
Wisconsin			
Argyle	436	1.0	310
Bagley	210	1.8	518
Superior	2,166	2.2	619
Subtotal	***2,812***	***5.0***	***1,447***
TOTAL	**150,276**	**61.2**	**21,689**

[a] Source: U.S. Census Bureau 2010.

"--" = these areas are not census-designated areas; therefore, population information is not available.

Table 5.3.3-6. Populated Areas near the Southern Rail Route

Populated Area	Population[a]	Miles of Populated Areas Crossed by Route Centerline	Populated Areas within 1,250 Feet of Route (acres)
Minnesota			
Aitkin	2,165	0.8	475
Aldrich	48	0.8	202
Baxter	7,610	5.1	1,553
Bejou	89	0.7	150
Bluffton	207	1.5	455
Brainerd	13,590	2.8	928
Brooks	141	1.5	406
Callaway	234	0.8	205
Carlton	862	1.1	330
Cloquet	12,124	0.0	316
Cromwell	234	2.0	614
Deerwood	532	1.8	516
Detroit Lakes	52,334	2.7	994
Erskine	503	0.0	82
Fond Du Lac	--	0.0	172
Frazee	1,350	1.1	424
Halma	61	1.2	309
Karlstad	760	1.7	439
Lake Bronson	229	0.8	231
Lancaster	340	0.9	356
Mahnomen	1,214	1.3	330
McGregor	391	1.2	359
Motley	671	1.2	335
New York Mills	1,199	1.0	291
Newfolden	368	0.9	277
Ogema	184	1.3	355
Perham	2,985	1.7	562
Pillager	469	0.8	175
Plummer	292	1.7	505
Staples	2,981	1.3	441
Strandquist	69	0.5	116
Tamarack	94	1.6	490

Table 5.3.3-6. Populated Areas near the Southern Rail Route

Populated Area	Population[a]	Miles of Populated Areas Crossed by Route Centerline	Populated Areas within 1,250 Feet of Route (acres)
Thief River Falls	8,573	1.8	679
Thomson	159	0.0	3
Verndale	602	1.1	342
Wadena	4,088	2.2	679
Waubun	400	0.5	163
Winger	220	0.8	217
Wrenshall	399	0.8	223
Wright	127	0.0	461
Duluth	86,265	1.2	381
Subtotal	***205,036***	***50.20***	***16,080***
Wisconsin			
Superior	2,166	2.2	619
Subtotal	***2,166***	***2.2***	***619***
TOTAL	**207,202**	**52**	**16,699**

[a] Source: U.S. Census Bureau 2010.

"--" = these areas are not census-designated areas; therefore, population information is not available.

Table 5.3.3-7. Populated Areas near the Clearbrook Rail Route

Populated Area	Population[a]	Miles of Populated Areas Crossed by Route Centerline	Populated Areas within 1,250 Feet of Route (acres)
Minnesota			
Clearbrook	518	0.7	232
Gonvick	282	1.1	372
Gully	66	0.5	138
Halma	61	1.2	309
Karlstad	760	1.7	439
Lake Bronson	229	0.8	231
Lancaster	340	0.9	356
Newfolden	234	0.9	277
Oklee	435	0.8	251
Plummer	292	1.7	505
Strandquist	69	0.5	116
Thief River Falls	8,573	1.8	679
Trail	46	1.3	357
TOTAL	**11,905**	**13.9**	**4,260**

[a] Source: U.S. Census Bureau 2010.

Table 5.3.3-8. At-Grade Crossings along Potential Rail Routes

Route	Route Length (miles)	Population Centers along the Route[a]	Population Center At-Grade Crossings[b]	Rural At-Grade Crossings[b]	Average Annual Crossing Incidents[c]
Northern route	354.8	11	198	291	1.6
Southern route	381.7	10	261	303	3.2
Clearbrook route	129.3	1	11	238	0.6

[a] Concentrations of more than 1,500 people. Source: Minnesota State Demographic Center City 2016.

[b] Source: Federal Railroad Administration, Office of Safety 2017

[c] Average of January 2012 through December-2016. Source: Federal Railroad Administration, Office of Safety 2016

5.3.3.2.5 Transportation by Truck

The truck alternative would include constructing a new offloading facility in Clearbrook, Minnesota, expanding an offloading facility in Superior, Wisconsin, and constructing new local access roads to these facilities. The likely routes for transportation by truck to each destination and the counties that would be crossed are shown in Figure 5.3.3-1. During operations, increased use of freeways and state highways would occur between near Gretna and Clearbrook or Superior. Increased use of local roads also would occur in the vicinity of the Clearbrook and Superior terminals.

Table 5.3.3-9 lists the populated areas and their populations that are located near potential construction sites for the truck alternative. Two populated areas were identified, one in Minnesota and one in Wisconsin—each with populations below 2,200 people. Tables 5.3.3-10 and 5.3.3-11 list the populations and the populated areas through which likely truck routes to Clearbrook and Superior would pass.

Table 5.3.3-9. Populated Areas near Potential Construction Sites for Transportation by Truck

Populated Area	Population[a]	Construction Type
Clearbrook, Minnesota	518	Loading facility/new truck route
Superior, Wisconsin	2,166	Loading facility/new truck route
TOTAL	**4,076**	

[a] Source: U.S. Census Bureau 2010.

Table 5.3.3-10. Populated Areas near the Clearbrook Truck Route

Populated Area	Population[a]	Miles of Populated Areas Crossed by Route Centerline	Populated Areas within 1,250 Feet of Route (acres)
North Dakota			
Drayton	824	0.0	129
Grand Forks	52,838	4.0	1,127
Manvel	360	<0.1	15
Neche	371	0.7	104
Pembina	592	0.0	86
Subtotal	***54,985***	***4.7***	***1,462***
Minnesota			
Clearbrook	518	0.26	144
Crookston	7,891	2.1	551
East Grand Forks	8,601	0.0	106
Fisher	435	0.0	59
Gonvick	282	1.2	3586
Gully	66	0.0	39
Trail	46	1.1	315
Subtotal	***17,839***	***4.7***	***1,567***
TOTAL	**72,824**	**9.4**	**3,029**

[a] Source: U.S. Census Bureau 2010.

Table 5.3.3-11. Populated Areas near the Superior Truck Route

Populated Area	Population[a]	Miles of Populated Areas Crossed by Route Centerline	Populated Areas within 1,250 Feet of Route (acres)
North Dakota			
Drayton	824	0.0	129
Grand Forks	52,838	4.0	1,127
Manvel	360	0.0	15
Neche	371	0.7	104
Pembina	592	0.0	86
Subtotal	***54,985***	***4.7***	***1,461***
Minnesota			
Bagley	1,392	2.0	5912
Ball Club	342	1.1	414
Bemidji	13,431	6.7	2333
Bena	116	0.7	240
Blackberry	--	2.4	536
Cass Lake	770	3.0	784
Cohasset	2,698	4.9	1,493
Coleraine	1,970	1.7	534
Crookston	7,891	2.1	551
Deer River	930	0.8	290
East Grand Forks	8,601	0.0	106
Erskine	503	0.8	245
Fisher	435	0.0	59
Floodwood	528	0.8	210
Fosston	1,527	0.9	405
Grace Lake	--	0.0	109
Grand Rapids	10,869	3.9	1,157
Hermantown	9,414	3.2	980
La Prairie	665	1.3	419
McIntosh	625	1.1	294
Mentor	153	1.7	449
Midge Lake	--	1.5	317
Rosby	--	0.6	212
Shevlin	176	1.3	342

Table 5.3.3-11. Populated Areas near the Superior Truck Route

Populated Area	Population[a]	Miles of Populated Areas Crossed by Route Centerline	Populated Areas within 1,250 Feet of Route (acres)
Solway	96	1.0	307
Warba	181	2.3	585
Wilton	204	2.2	555
Duluth	86,265	8.7	2,634.0
Subtotal	***149,782***	***57***	***22,472***
Wisconsin			
Superior	2166	2.7	930
Subtotal	***2,166***	***2.7***	***930***
TOTAL	**206,933**	**64.4**	**24,863**

[a] Source: U.S. Census Bureau 2010.

"--" = these areas are not census-designated areas; therefore, population information is not available.

The Minnesota Department of Transportation reports road usage in two ways; annual average daily traffic (AADT) and heavy commercial annual average daily traffic (HCAADT). AADT is the total number of vehicles (in both directions) using a segment of the highway network on a daily basis while HCAADT is that portion of AADT that are trucks and other commercial vehicles. AADT and HCAADT along the routes from near Gretna to either Clearbrook or Superior are shown on Table 5.3.3-12. One-way traffic was assumed to be one-half of the values shown in Table 5.3.3-12.

Table 5.3.3-12. Existing Daily Traffic Levels – Truck Routes

Route	Annual Average Daily Traffic (AADT) (Vehicles per day-2010 to 2013)	Heavy Commercial Annual Average Daily Traffic (HCAADT) (Vehicles per day-2012)
Clearbrook – Highway 2	3,050	359
Superior – Highway 2	6,677	598

Source: Minnesota Department of Transportation 2017

5.3.3.3 Impact Assessment

An influx of workers to the area during the estimated 12-month construction period may create excess demand for housing; traffic congestion; or strain on government services such as police, fire, hospitals, and schools during this time period. Construction of pipelines or other facilities can cause disruptions to populated areas from noise, dust, and vibrations from construction and operations equipment; disruptions to traffic and services such as water and gas; and displacement of residences and structures. Areas with greater populations and amenities (e.g., hotels and restaurants) may be able to absorb an influx of temporary workers more readily than areas with lower populations and fewer amenities. Conversely, the more populated the area, the more people would be affected by construction (i.e.,

greater density of roads, residents, and businesses). Construction of facilities to support transportation by rail are truck could cause similar disruptions to local populations.

Additional rail and truck traffic also could cause congestion or temporary obstruction of local roadways during some portion of each day. The effects of increased rail traffic were assessed in relation to increased gate down-time and blockage of at-grade rail crossings in rural and urban settings. The effects of increased truck traffic were assessed in relation to increased traffic density at various traffic speeds, as traffic speeds would vary between rural and urban settings.

5.3.3.3.1 Applicant's Proposed Project (from Neche to Superior)

Construction Impacts

Non-Local Workforce

Enbridge estimates that each construction spread would require about 600 workers, resulting in a total maximum workforce of 4,200 workers across seven different construction spreads between Neche, North Dakota, and Superior, Wisconsin. While it is expected that Enbridge would use some local workers – as referenced in the direct testimony of Barry Simonson (lines 505-513) current labor agreements in Minnesota require that at least 50% of workers would be expected to be employed from local union halls - it was assumed as a conservative estimate in order to test a worst-case scenario for population that all workers would be non-local and would need to re-locate to the area during construction. Additionally, some workers could be accompanied by their families. However, given the transitory nature of pipeline construction and estimated project duration it is unlikely that all workers would re-locate with their families. According to the U.S. Census Bureau (2014), the average number of persons per household in the United States is about 3. If each of the non-local workers brought their families, the total increase in population across the entire route could be 12,600 people (worst-case scenario). This represents an increase to the current population of about 4 percent within all counties that would be crossed by the Applicant's proposed project.

In the event that two construction spreads occurred adjacent to each other during construction, a maximum of 1,200 workers could be present in a county at a given time. In the largest county crossed by the Applicant's proposed project (Crow Wing County, Minnesota), it would represent a 2-percent increase in population. In the smallest county crossed by the route (Red Lake County, Minnesota), it would represent 30 percent of the county's total population. Pembina County in North Dakota (17 percent) and Kittson County (27 percent), Marshall County (13 percent), and Clearwater County (14 percent) in Minnesota all would experience increases over 10 percent of their current population. Added population would create more traffic on roadways, as workers may need to commute from surrounding counties under the worst-case scenario. This could result in congestion on the roads and within the service industry area (e.g., restaurants and gas stations).The added population also could increase demand for emergency services, as discussed in Section 6.2.5. However, this increased need is expected to be temporary and minor.

As discussed in Section 6.2.4, the total housing available is expected to be adequate.

Overall, impacts related to the non-local workforce are expected to be minor and temporary, but could be major and temporary at times under some worst-case scenarios, such as when two spreads are located within the same county and/or if a high number of workers are accompanied by their families. Population increases of more than 10 percent would be considered a major impact; as previously noted,

increases of this magnitude are anticipated to occur in Red Lake County (MN), Pembina County (ND), Kittson County (MN), Marshall County (MN) and Clearwater County (MN).

Populated Areas

Overall, only 15 populated areas would be crossed by the Applicant's proposed project, and all but two areas that would be crossed have populations under 1,000. The populated areas identified within 1,250 feet of the construction work area are more likely to be affected by pipeline construction because of the higher density of people, structures, and infrastructure.

As described in Section 6.2.2, calculations show that typical construction noise attenuates to levels below the daytime noise standards at 1,250 feet from the noise source. Applicant-proposed measures to limit noise during construction include limiting construction to daylight hours, maintaining equipment in good working order, limiting transportation to areas of active construction, and using manufacturer-supplied silencers when available. Detailed noise and vibration analyses are provided in Section 6.2.2, and additional mitigation is identified there to further reduce noise or vibration impacts.

During construction, increased dust can be harmful or bothersome to people located near work areas. Construction-related dust is discussed in Section 5.2.7. Applicant-proposed measures to minimize dust include wetting construction areas and roadways.

The potential for displaced structures is increased when a pipeline is routed through populated areas. Structures in the permanent right-of-way would need to be removed or re-located during construction. Section 6.2.4 further discusses the displacement of residences. Enbridge has reached agreements with landowners for all structures identified within the permanent right-of-way for the Applicant's proposed project.

Populated areas have a higher density of roads and driveways than more rural areas, and generally more traffic and more people could be affected by traffic congestion associated with movement of construction workers and equipment or road closures. To minimize traffic impacts, Enbridge has proposed to cross all paved roads using the bore technique or HDD. These methods would prevent road closures by tunneling underneath the road surface. Impacts on roads are further discussed in Section 6.2.5.

Interruptions to utility services would be more likely in areas of dense population because of the amount of infrastructure, with potential effects on more people. Applicant-proposed measures to minimize the potential for service interruptions from construction include consulting with all utility companies prior to construction and using the One-Call system prior to excavation, to ensure that all adjacent pipelines and underground utilities are properly marked prior to construction. Utilities are further discussed in Section 6.2.5.

For areas with small populations that would be crossed, impacts on populated areas during construction are anticipated to be temporary and minor with implementation of the Applicant-proposed measures described above. For areas with larger populations that would be crossed —Duluth, Minnesota and Superior, Wisconsin—impacts on populated areas during construction are also anticipated to be temporary and minor, but could be major in localized areas, based on construction specifications.

Operations Impacts

Non-Local Workforce

Enbridge estimates that operation of the pipeline would require few workers along the pipeline route. Therefore, there would be minimal influx of non-local workers, and populations of local communities would experience no impact.

Populated Areas

During operations, populated areas may be affected through restrictions placed on land within the permanent right-of-way, such as prohibition of structures. This could prevent further development (both residential and commercial) within an easement; populated areas with more miles crossed by the pipeline centerline would have more land with this restriction. For the Applicant's proposed project, approximately 10 miles of populated areas would be crossed. While the restrictions would apply to the permanent right-of-way, existence of the permanent right-of-way would not restrict access across the easement or use of the easement. Typically, the pipeline would be buried at least 48 inches underground, and standard operations would not constitute a safety concern. Potential impacts associated with an accidental release of crude oil and associated emergency response procedures are discussed in Chapter 10.

Standard maintenance of the permanent right-of-way would include periodic mowing to prevent woody vegetation from interfering with inspection of the right-of-way or encroaching on the pipeline itself. In populated areas, mowing activity may be noticed by more people, but it would be infrequent and transitory.

Overall, operational impacts on populated areas would be negligible but permanent.

5.3.3.3.2 Continued Use of Existing Line 3

Construction Impacts

No construction impacts on populated areas would result from continued use of the existing Line 3 pipeline because it is already built.

Operations Impacts

Non-Local Workforce

No change in the local workforce is anticipated under continued operation of the existing Line 3 for normal operations. For pipeline maintenance, Enbridge estimates that about 267 pipeline integrity digs would be required per year. While the level of effort required for integrity digs and subsequent maintenance or repair would vary, the work is not expected to require additional personnel beyond the current workforce. Therefore, there would be no influx of non-local workers, and populations of local communities would not be affected.

Populated Areas

Integrity digs including pipeline excavation and repair have the potential to affect populations from noise, dust, and vibrations from maintenance and operations equipment. However, integrity digs are typically small, short timeframe construction projects. With implementation of Enbridge's existing BMPs to minimize noise, vibration, and dust, impacts would be temporary, minor, and localized.

5.3.3.3.3 System Alternative SA-04

Construction Impacts

Non-Local Workforce

Based on Enbridge's estimate that seven spreads would be needed to construct the 380-mile Applicant's proposed project, 14 to 15 spreads likely would be needed to construct the 795-mile long SA-04 route. This could result in a maximum of 9,000 workers relocating to the Project area. Given the transitory nature of pipeline construction, it is unlikely that all workers would re-locate with their families. However, if each of those workers was accompanied by their family members, a total influx of 27,000 people could re-locate to the Project area, which would represent a 1.4-percent increase to the total population of counties crossed by SA-04.

In counties where two construction spreads were located next to each other, non-local workers could total 1,200 people. In the smallest county crossed by the Applicant's proposed project (Traverse County, Minnesota), this would represent 35 percent of the county's total population. Pembina (17 percent), Walsh (11 percent), and Trail (15 percent) counties in North Dakota; Stevens (12 percent) and Swift (13 percent) counties in Minnesota; and Howard (13 percent) and Mitchell (11 percent) counties in Iowa would experience increases over 10 percent of their current population.

Added population would create more traffic on roadways and emergency services, as discussed in Section 6.2.5. Temporary housing in the counties with the highest population increases may become unavailable, requiring some workers to commute from surrounding counties under a worst-case scenario. However, the total housing available in the counties crossed by SA-04 is expected to be adequate. As with the Applicant's proposed project, overall impacts associated with non-local workers are expected to be minor and temporary in most areas crossed by SA-04. In some counties where an influx of workers would increase the local population by more than 10 percent, impacts could be major but temporary for the length of time it takes for one construction spread to be completed.

Populated Areas

The 24 populated areas identified within 1,250 feet of the construction work area are more likely to be affected by pipeline construction because of the higher density of people, structures, and infrastructure. The types of impacts felt in these areas would be similar to those described for the Applicant's proposed project, including noise, dust, increases in traffic, and potential disruption of local utilities. Impacts on populated areas would be greater for SA-04 than for the Applicant's proposed project because of the increased population and number of populated areas affected along SA-04. However, with implementation of measures similar to the Applicant-proposed measures summarized in Section 5.3.3.1, impacts during construction would likely be temporary and minor.

Operations Impacts

Non-Local Workforce

Operation of the pipeline would require few workers along the pipeline route; therefore, a minimal influx of non-local workers would not affect the populations of local communities.

Populated Areas

During operations, populated areas may be affected by restrictions placed on land within the permanent right-of-way. The exact location and amount of land that would be converted to industrial/developed

land for pump stations and valve sites is unknown but likely would be a larger amount than required for the Applicant's proposed project given the overall greater length of the SA-04 pipeline. Based on the length of SA-04 relative to the length of the Applicant's proposed project, disruptions to populated areas from restrictions placed on land within the permanent right-of-way likely would be greater. Standard maintenance of the permanent right-of-way would include periodic mowing to prevent woody vegetation from interfering with inspection of the right-of-way or encroaching on the pipeline itself. In populated areas, mowing activity may be noticed by more people, but it would be infrequent and transitory. Overall, operations impacts on populated areas would be negligible but permanent.

5.3.3.3.4 Transportation by Rail

Construction Impacts

Non-Local Workforce

The number of workers required to construct rail facilities is expected to be small (less than 100 construction jobs). Even in the event that each of the workers holding these jobs were non-local, the impacts resulting from an influx of 100 people to these areas would be negligible and temporary.

Populated Areas

Populated areas located near construction for new or improved rail lines and rail facilities would experience similar construction impacts on those described for the Applicant's proposed project, including increased noise and dust from construction work. However, unlike pipeline construction, construction of the rail facilities would be more localized; would occur adjacent to existing industrial facilities; and would last for a longer period of time in one location, rather than moving linearly. People and businesses near construction sites may experience relatively greater impacts because of the higher population, but overall construction impacts would be temporary and minor.

Operations Impacts

Non-Local Workforce

During operation, transporting crude oil by rail is not likely to result in a substantial increase in workers re-locating to the area, either temporarily or permanently. It is likely that the majority of rail facility operators would be hired from the local workforce. If additional rail facility operators were required, the number of non-local workers re-locating to the area would not likely measurably increase local populations in the ROI. Therefore, operations impacts related to changes in local workforces would be negligible and permanent.

Populated Areas

Impacts on populated areas during operation of the rail alternative include noise from trains and train horns in areas along rail tracks, and delays at road crossings when barriers are lowered to allow trains to pass. It is noted that these are existing impacts for populations located along active rail lines, but these impacts would be new to areas with inactive rail lines and with rail crossings that are currently inactive but would need to be re-instated as a result of the increased volume of oil. The rail alternative includes approximately 10 unit trains traveling along three possible rail routes. Therefore, a populated area along one of those routes could experience an increase of between 3 and 10 unit trains per day (each unit train comprises approximately 110 tank cars). In total, 10 populated areas along the Northern rail route, 11 populated areas along the Southern rail route, and 1 populated area along the Clearbrook rail route would be within 1,250 feet of the rail line (see Tables 5.3.3-5 to 5.3.3-7). For these areas, an increase in

noise and rail traffic could result in a permanent and minor to major impact, depending on the actual number of trains that would pass by each day.

An increase in 3 to 10 unit trains per day would increase the average daily gate down-time and obstruction of local traffic at rail crossings. The passing time for a unit train and the maximum gate closure time per day are shown in Table 5.3.3-13. Gate down-time is a function of train speeds, which vary by both regulation and rail system operational requirements (waiting on passing tracks, dispatch within various segments of each route and train crew work schedules). As Table 5.3.3-13 shows, that gate down-time ranges from 2.3 minutes at 50 mph typical in rural areas to 3.0 minutes at 35 mph, which may be typical in populated areas. These time intervals represent a potential increase of 23 to 30 minutes of additional blockage per day, but as a series of discrete events. In rural areas with little roadway traffic, the increase in blockage of at-grade crossings would be a minor permanent impact. In populated areas and in areas near the Clearbrook and Superior terminals, train speeds would be reduced, in some cases to speeds less than 35 mph, with a corresponding increase in blockage of at-grade crossings. In these areas, minor to major, permanent impacts on local traffic movement could occur. Table 5.3.3-8 shows that few population centers are located along potential rail routes; therefore, the number of high population areas potentially affected by major permanent impacts may be limited.

Table 5.3.3-13. At-Grade Crossing – Gated Down-Time by Train Speed

Train Speed[a]	Gate Down-Time[b]	Daily Access Limitation[c]	Speed Limit Description[a]
50 mph	2.3 minutes	23 minutes per day	Rural – all trains with 20 or more crude oil tank cars
40 mph	2.7 minutes	27 minutes per day	Crude oil trains with DOT-111 tank cars moving through High Threat Urban Areas
35 mph	3.0 minutes	30 minutes per day	Urban limited speed – shale crude oil trains through municipalities with populations of 100 thousand people or more

[a] Location speeds for trains based on their size and the populations traversed were established by the Federal Rail Administration/PHMSA Final Rule May 2015: Docket No. PHMSA-2012-0082 (HM-251).

[b] The gate down-time assumes a 110-unit train with 4 locomotives and 2 buffer cars equals 7,800-foot train length. Also assumed there would be a 30 second delay from when the gates descend until the train approaches the crossing

[c] The daily access limitation is the cumulative increase over a single day for all 10 trains.

5.3.3.3.5 Transportation by Truck

Construction Impacts

Non-Local Workforce

Similar to the rail alternative, the number of workers required for construction of truck facilities and roads is expected to be small and substantially lower than those needed for the Applicant's proposed project and SA-04. Because a measurable increase in population is unlikely in construction areas, impacts are expected to be negligible and temporary.

Populated Areas

Construction impacts at the truck offloading facilities would be similar to construction impacts for the rail alternative and would be associated with typical construction activities such as noise, dust, and

traffic. Unlike pipeline construction, construction of the truck facilities would be more localized; would occur adjacent to existing industrial facilities; and would last for a longer period of time in one location, rather than moving linearly. With implementation of standard measures for dust suppression and noise reduction during construction, impacts on populated areas in the immediate vicinity of the construction sites would be temporary and minor.

Operations Impacts

Non-Local Workforce

During operation, transporting crude oil by truck is not likely to result in a substantial number of workers re-locating to a specific area, temporarily or permanently; however, a workforce of approximately 4,000 truck drivers would be required in the general region. If additional truck drivers and fleet maintenance personnel were required, the number of non-local workers re-locating to the area still would not be likely to measurably increase local populations in the ROI. Therefore, impacts related to changes in local workforces would be negligible and permanent.

Populated Areas

Additional trucks on regional highways and local roads associated with the truck alternative could significantly increase traffic density and generate potential traffic congestion along routes between the loading facility at Gretna and the offloading facilities at Clearbrook and Superior. As described in Section 4.2.6, to transport the proposed 760,000 bpd of oil carried by the Line 3 pipeline would require that approximately 4,000 tanker trucks per day be loaded and dispatched from Gretna. On average, approximately 1,920 trucks would travel each day from Gretna to the Clearbrook terminal and unload, and 2,080 loaded trucks would travel each day from Gretna to the Superior terminal.

Table 5.3.3-12 shows that AADT along the major highway route is 3,050 AADT to Clearbrook and 4,671 to Superior for traffic in both directions. The addition of 4,000 tanker truck trips per day in both directions (approximately 8,000 truck trips) would more than double daily traffic. Table 5.3.3-12 shows that the HCAADT is 359 vehicles to Clearbrook and 598 to Superior. The addition of tanker truck traffic to these routes could represent a three- to five-fold increase in heavy commercial traffic.

Changes in potential traffic density along truck routes as an indicator of increased congestion were assessed by estimating the average spacing between trucks and the additional trucks per mile at various speeds (Table 5.3.3-14).

At typical freeway speeds (65 mph), traffic density would increase by approximately 5 vehicles per mile on routes used jointly by trucks going to Clearbrook or to Superior, and approximately 3 trucks per mile for routes used by trucks traveling solely to one destination or the other. During inclement winter weather, freeway speeds likely would be reduced, thus increasing the traffic density. It also should be noted that, although the evaluation is based on average spacing between trucks, spacing is more likely to be random due to variation in the dispatch rate, truck speed, traffic over specific route segments, and weather conditions.

Table 5.3.3-14. Average Truck Spacing on Clearbrook and Superior Routes

Average Speed	Clearbrook Route[a] (1,920 trucks per day)		Superior Route[b] (2,080 trucks per day)		Joint Route (4,000 trucks per day)	
	Average Trucks/Mile[c]	Average Spacing (Feet)[d]	Average Trucks/Mile[c]	Average Spacing (Feet)[d]	Average Trucks/Mile[c]	Average Spacing (Feet)[d]
65 mph	2.5	2,112	2.7	1,956	5.3	996
45 mph	3.3	1,600	3.9	1,354	7.4	714
20 mph	8.1	652	8.8	600	16.7	317

[a] Assumes one round trip per day to Clearbrook (179 miles each way)

[b] Assumes one round trip every 2 days to Superior (360 miles each way)

[c] Assuming trucks would be dispatched over a 12 hour period each day, calculated the number of trucks dispatched per hour and divided by the average speed to determine the average trucks per mile.

[d] Average spacing calculated by taking the average speed and dividing by the number of trucks dispatched per hour.

The increase in AADT and HCAADT along major truck routes and the increase in future traffic density indicate that the potential for congestion along portions of the route may result in minor permanent impacts and major temporary impacts on traffic movement, thus affecting the mobility of residents along truck routes.

Traffic density on state and county highways at lower speeds (45 mph) would increase between approximately 3 to 4 trucks per mile of traffic per day to accommodate the same number of trucks per day. Along State Highway 92 in particular, the addition of truck traffic to the Clearbrook terminal would cause a significant increase in AADT. It is likely that congestion on this truck route segment would result in major permanent impacts on the mobility of the local population without mitigation.

Traffic in urban areas on access roads off the freeway network near the Clearbrook or Superior terminals would typically operate at lower speeds (in the range of 20 mph). In these areas, the increase in traffic density could average from approximately 8 to 9 trucks per mile. A typical tractor-tailor combination may be approximately 65 feet long. This means that crude oil trucks would use approximately 585 lineal feet or 10 percent of the available roadway (a single lane). This assumes, however, that the trucks maintain average spacing. At lower speeds and maneuvering in stop-and-go traffic, density increases significantly, likely resulting in major local traffic impacts in the areas of the Clearbrook and Superior terminal accompanied by a reduction in local population access and safety. Such impacts would be major and permanent.

5.3.3.3.6 Existing Line 3 Supplemented by Rail

Impacts associated with continued use of the existing Line 3 pipeline supplemented by rail would be similar to the impacts described for each individual component of this alternative (see Sections 5.3.3.2 and 5.3.3.4). Impacts associated with construction of additional rail facilities would be similar to those described for the rail alternative, and the number of non-local workers from outside the local population is not expected to affect the overall population. Under this alternative, the volume of rail traffic would not increase as much as it would for transportation by rail alone. The lower rail traffic cause less noise-related impacts and fewer traffic delays at railroad crossings during operations, resulting in minor,

permanent impacts on populated areas along the rail routes. The number of integrity digs along the existing line would remain the same, resulting in localized minor temporary impacts on populated areas.

5.3.3.3.7 Existing Line 3 Supplemented by Truck

Impacts associated with continued use of the existing Line 3 pipeline supplemented by truck transportation would be similar to the impacts described for each individual component of the alternative (see Sections 5.3.3.2 and 5.3.3.5). Construction impacts associated with truck offloading facilities would be similar to those described for the truck alternative. No impact is expected from the number of non-local workers from outside the local population. Although the volume of truck traffic would be reduced, the additional number of trucks required for the truck alternative would increase traffic along the major routes between loading and offloading facilities. This would create a minor to major permanent impact on populations that travel along similar routes. This combined alternative therefore would result in minor to major, permanent impacts from traffic during operations.

5.3.3.4 Summary and Mitigation

5.3.3.4.1 Summary

Table 5.3.3-15 summarizes the impacts on populated areas for the Applicant's proposed project and each of the CN Alternatives. The potential change in the local workforce during construction of pipelines or offloading facilities and rail upgrades for rail and truck transportation would be temporary and would generally cause negligible impacts on housing availability or public services, with potentially temporary major impacts in counties with expected population increases of greater than 10 percent. Permanent impacts on the local workforce during operations would be negligible and have negligible impacts on local housing availability or demand for public services.

Disruption to local populations during construction would be temporary and minor for the Applicant's proposed project and all of the CN Alternatives. The Applicant's proposed project and SA-04 would require extended construction operations that would expose a larger population to construction activities than continued operation of existing Line 3 (no construction) or the rail and truck alternatives, which would require limited construction.

During operations, the Applicant's proposed project, SA-04, and continued use of the existing Line 3 would result in negligible to minor, permanent population disruption impacts. The rail and truck alternatives and the alternatives that combine rail and truck with continued operation of the existing Line 3 could result in permanent minor to major impacts on population mobility—especially in more populated areas, where rail obstruction of at-grade crossings would be increased, and where road traffic congestion could occur from the significant increase in tanker trucks transiting to the Clearbrook and Superior terminals.

When comparing the Applicant's proposed project and the CN Alternatives, continued use of the existing Line 3 would have the least impact on local populations because it would require no changes. However, it would not provide the same capacity for crude oil transfer as the Applicant's proposed project or the other CN Alternatives. Of the remaining options, the Applicant's proposed project would cause minor workforce and population disruption impacts as would system alternative SA-04. Because it is approximately one-half the length of SA-04, those impacts would be reduced for the Applicant's proposed project. The rail, truck, and combined rail/truck with continued use of the existing Line 3 may cause minor to potentially major disruption impacts on local populations from reduced mobility.

5.3.3.4.2 Mitigation

Beyond the Applicant-proposed measures described for the Applicant's proposed project, mitigation measures to address potential major impacts of traffic congestion for the rail and truck alternatives could include:

- Freeways – Construct additional freeway lanes, off ramps and other traffic flow features in congested areas to reduce traffic density.
- Highways – Upgrade (widening) or add lanes to existing state and county highways to increase traffic flow and reduce traffic density. Construction of additional lane capacity or dedicated truck-only lanes on State Highway 92 near Clearbrook may be required.
- Populated areas – Construct dedicated access roads to the terminal facilities.

However, it should be noted that these mitigation measures are infrastructure upgrades that could also result in similar or different impacts of unknown magnitude and duration to local populations.

Table 5.3.3-15. Summary of Potential Impacts on Population for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project [a]	Continued Use of Existing Line 3[a]	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Construction Impacts							
Changes in Population from Non-Local Workforce							
Percentage increase in local population across all counties	Temporary/minor impacts • 4.2 percent increase Temporary/major impacts *(in counties where population increase would be greater than 10 percent)*	No impact	Temporary/minor impacts • 1.4 percent increase Temporary/major impacts *(in counties where population increase would be greater than 10 percent)*	Temporary/ negligible impacts	Temporary/ negligible impacts	Temporary/ negligible impacts	Temporary/ negligible impacts
Populated Areas							
Number of populated areas crossed or within 1,250 feet of construction work area	Temporary/minor impacts • 15 populated areas	No impact • 32 populated areas	Temporary/minor impacts • 24 populated areas	Temporary/minor impacts • Northern route – 42 populated areas • Southern route – 42 populated areas • Clearbrook route – 13 populated area	Temporary/minor impacts • Clearbrook route – 12 populated areas • Superior route – 33 populated areas	Temporary/minor impacts • Northern route – 42 populated areas • Southern route – 42 populated areas • Clearbrook route – 13 populated areas	Temporary/minor impacts • Clearbrook route – 12 populated areas • Superior route – 33 populated areas

Table 5.3.3-15. Summary of Potential Impacts on Population for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project [a]	Continued Use of Existing Line 3[a]	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Total population of populated areas crossed	Temporary/minor impacts • 92,017	No impact • 136,305	Temporary/minor impacts • 275,361	Temporary/minor impacts • Southern route – 207,202 • Northern route – 150,276 • Clearbrook route – 11,905	Temporary/minor impacts • Clearbrook route – 72,824 • Superior route – 206,933	Temporary/minor impacts • Southern route – 207,329 • Northern route – 150,276 • Clearbrook route – 11,905	Temporary/minor impacts • Clearbrook route – 72,824 • Superior route – 206,933
Total area of populated areas crossed or within 1,250 feet of construction work area (acres)	Temporary/minor impacts • 3,313 acres	No impact • 11,526 acres	Temporary/minor impacts • 5,939 acres	Temporary/minor impacts • Southern route – 16,699 acres • Northern route – 21,689 acres • Clearbrook route – 4,260 acres	Temporary/minor impacts • Clearbrook route – 3,029 acres • Superior route – 24,863 acres	Temporary/minor impacts • Southern route – 17,159 acres • Northern route – 19,669 acres • Clearbrook route – 4,260 acres	Temporary/minor impacts • Clearbrook route – 3,029 acres • Superior route – 24,863 acres

Table 5.3.3-15. Summary of Potential Impacts on Population for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project [a]	Continued Use of Existing Line 3[a]	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Operations Impacts							
Changes in Population from Non-Local Workforce							
Increase in local population across all counties	No to negligible impact	No impact	No to negligible impact	No to negligible impact	No to negligible impact	No to negligible impact	No to negligible impact
Populated Areas							
Miles of populated areas crossed by pipeline centerline; effects on local populations	Temporary/minor impacts • 9.9 miles	Temporary/minor impacts • 35 miles	Temporary/minor impacts • 18.2 miles	Temporary/minor impacts • Southern route – 52 miles • Northern route – 61.2 miles • Clearbrook route - 13.9 miles	Temporary/minor impacts • Clearbrook route – 9.4 miles • Superior route – 64.4 miles	Temporary/minor impacts • Southern route – 52 miles • Northern route – 61 miles • Clearbrook route – 13.9 miles	Temporary/minor impacts • Clearbrook route– 9.4 miles • Superior route – 64.4 miles
Operations impacts on traffic in populated areas	No to negligible impacts	No to negligible impacts	No to negligible impacts	Permanent/minor impacts in rural areas Permanent/minor to major impacts in urban areas	Permanent/minor to major impacts in rural areas Permanent/minor to major impacts in urban areas	Permanent/minor impacts in rural areas Permanent/minor to major impacts in urban areas	Permanent/minor to major impacts in rural areas Permanent/minor major impacts in urban areas

5.3.3.5 References

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5.3.4 Employment, Income, and Tax Revenues

Employment and income statistics provide insight into local economic conditions. Changes in employment and income influence the level of tax revenues received by local and state governments, making tax revenues another important indicator of how well an economy is doing. Following are the issues addressed in this section related to employment, income, and tax revenue associated with construction and operation of the Applicant's proposed project and CN Alternatives:

- Construction-related employment, payroll spending, and expenditures on materials, supplies and equipment;
- Operations-related employment and payroll spending;
- Income tax revenue from workers during construction and operation; and
- Property taxes paid by the Applicant during operation.

This section first describes the regulatory context and methods used in the assessment of impacts, followed by a description of relevant economic conditions within the counties along the pipeline routes and where the rail and truck terminals would be sited; these counties could experience changes in employment, income, and tax revenue as a result of construction and operation of the Project. Section 5.3.4.3 addresses the potential impacts on employment, income, and tax revenue from construction and operation of the Applicant's proposed project and CN Alternatives (system alternative SA-04, continued use of the existing Line 3, transportation by rail, transportation by truck, continued use of the existing Line 3 pipeline supplemented by rail, and continued use of the existing Line 3 supplemented by truck). A summary and comparison of the impacts are presented in Section 5.3.4.4.

5.3.4.1 Regulatory Context and Methodology

5.3.4.1.1 Regulatory Context

Minnesota Administrative Rules Part 7853.0130 lists "the effect of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives" as one of several criteria to be considered for determining whether to grant a CN. Impacts on employment, income, and tax revenues are part of the socioeconomic environment the Commission considers in their decision about whether there are more reasonable and prudent alternatives to the proposed Project (Part 7853.0130 B) and whether the benefits outweigh the consequences of granting a CN for the proposed Project (Part 7853.0130 C).

North Dakota, Iowa, Illinois, and Wisconsin do not have state-specific environmental review processes. Impacts associated with any project would be assessed through the individual state's permit application process. More specifically, these states have not established regulations that require assessment of socioeconomic impacts associated with proposed pipeline or transportation projects.

5.3.4.1.2 Methodology

The assessment for this EIS addressed the impacts on employment, income, and tax revenues from construction and operation of the Applicant's proposed project and CN Alternatives. This assessment consisted of the following:

- Describing the existing economic conditions in the counties affected by the Applicant's proposed project and CN Alternatives using county-level employment, income, and tax revenues (where available); and
- Determining potential impacts on the economic baseline by using employment numbers and construction related expenditures provided by the Applicant to provide a qualitative discussion of the relative magnitude (i.e., negligible, minor, or major) of Project-related changes to county-level employment and income levels, and to quantitatively estimate the potential increase in income tax revenue by county.

The ROI for this analysis consists of the counties crossed by the Applicant's proposed project and CN Alternatives. County-level data provide a reasonable base for defining a local economy and determining economic impacts in each of the counties affected by the Applicant's proposed project and CN Alternatives.

The data obtained to describe the existing economic conditions in the ROI counties included county-level employment, income, and tax revenues (where available). Potential direct and indirect impacts on the economic baselines in the ROI were determined using employment numbers and construction-related expenditures provided by the Applicant and estimates from other sources for other CN applications. This information was used to develop a qualitative analysis of the relative magnitude and expected changes to county-level employment and income levels, and to estimate the potential increase in income tax revenue by county.

The employment and income statistics used to describe the economic baseline, or existing conditions, are based on median household income from the U.S. Census Bureau and per capita income, total labor force numbers, and employment rates from the U.S. Bureau of Labor Statistics. Median household income is commonly used to describe a household's economic status, or to track economic trends, whereas per capita household income is often used to measure the standard of living within a geographic area. Labor force numbers represent the total number of people (15 years and older) who are currently employed or unemployed but looking for work, while the unemployment rate represents the percentage of the labor force that is currently unemployed. All data are from the most recent survey years available when this EIS was prepared, unless otherwise noted.

Existing conditions for tax revenues were based on available data from the Office of the Auditor for each state in the ROI. These revenues included total government revenue and the portion of revenue from property taxes. Construction of a pipeline would generate tax revenues in the form of property taxes paid by the Applicant for the life of the Project. Rail and truck offloading terminals would also generate property taxes. Property tax revenue would be based on the appraised value of the pipeline easement or the rail or truck offloading terminals and state and local tax rates. Enbridge has appealed the amount of property taxes it paid between 2012 and 2016, alleging that the Minnesota Department of Revenue overvalued the value of the pipeline property, resulting in overpayment of taxes to counties and Minnesota. The appeal has not been settled at the time this document was prepared. For pipelines, this revenue would be additive to the amount that the existing landowner currently pays and is additional revenue to the local and state governments. For the purposes of this analysis, changes in property tax revenues from construction of the Applicant's proposed project and CN Alternatives (where applicable) are discussed in terms of relative magnitude and are assumed to be incurred only during operation.

While most states (including those crossed by the Applicant's proposed project and CN Alternative pipeline routes) do not have local or county-level income taxes, county governments receive income tax

appropriations from the state. Individual states determine the amount each county receives. For the pipelines in this analysis, existing income tax figures are reported at the state level. Output from a national Impact Model for Planning (IMPLAN) model (an economic input-output model) and the number of miles of pipeline per county were used to allocate the potential change in state income taxes from the alternatives and allocated to each county in the ROI (see Appendix R).

The total amount of estimated labor income to each state was generated using the IMPLAN output and each state's share of the total pipeline (in miles). Income tax revenue was derived using each state's respective income tax rate. This figure then was allocated to each county in the ROI based on the number of miles of pipeline in each county for the Applicant's proposed project and SA-04. For the rail and truck transport alternatives, assumptions related to construction expenditures provided in Chapter 4 were used as inputs into IMPLAN. Per-county estimates were not provided for the rail and truck alternatives because it is not known how each state would distribute the income generated by the terminal facilities. Per-county estimates were also not provided for the existing Line 3 since it is already in place, and information about the current level of income taxes generated by the pipeline were not readily available.

5.3.4.2 Existing Conditions

5.3.4.2.1 Applicant's Proposed Project

Employment and Income

The Applicant's proposed project would extend across 14 counties in three states. Summary statistics on employment and income for the counties that would be crossed by the route are listed in Table 5.3.4-1. The per capita income ranges from a low of $32,836 to a high of $52,326 (all in Minnesota), and the median household income ranges from a low of $38,706 to a high of $53,492 (also in Minnesota). Throughout the ROI, the median household income is below the median household income in each state, and only two counties (Kittson County in Minnesota and Douglas County in Wisconsin) are above their respective state averages for per capita personal income.

Crow Wing County in Minnesota has the highest share of the total labor force in the ROI at 21 percent, followed by Douglas County in Wisconsin at 15 percent, and Carlton County in Minnesota at 11 percent. Based on the labor force and the unemployment rates for each county, more than 6,800 individuals are estimated to be unemployed in the region. Unemployment rates are highest in Kittson and Clearwater counties in Minnesota, at approximately 7 percent each.

Table 5.3.4-1. Employment and Income Conditions in Counties Crossed by the Applicant's Proposed Project

State/County	Per Capita Personal Income 2014[a] ($2015)	Median Household Income 2010–2014[b] ($2015)	Labor Force (August 2015)[a]	Unemployment Rate (August 2015)[a]
North Dakota				
Pembina	$50,665	$51,673	3,649	3.1%
Minnesota				
Kittson	$52,326	$48,950	2,543	7.0%
Marshall	$47,271	$53,373	5,574	4.9%
Pennington	$48,980	$47,436	8,933	3.4%
Red Lake	$45,722	$47,253	2,259	3.9%
Polk	$42,157	$51,085	16,795	3.8%
Clearwater	$36,512	$45,158	4,493	6.7%
Hubbard	$36,338	$46,466	9,847	4.5%
Wadena	$32,836	$38,706	6,236	4.6%
Cass	$42,349	$45,620	14,690	5.1%
Crow Wing	$37,863	$49,244	32,402	3.9%
Aitkin	$36,363	$42,085	6,757	4.4%
Carlton	$36,801	$53,492	17,328	4.2%
Subtotal/Average	***Average = $41,293***	***Average = $47,406***	***Total = 127,857***	***Average = 4.7%***
Wisconsin				
Douglas	$38,603	$44,946	23,101	4.5%
TOTAL/AVERAGE	**Average = $41,770**	**Average = $47,535**	**Total = 154,607**	**Average 4.6%**

[a] Source: U.S. Bureau of Economic Analysis 2015.

[b] Source: U.S. Census Bureau 2014.

Tax Revenues

Table 5.3.4-2 list the existing conditions for total government revenue and the portion of revenue from property taxes for all of the counties that would be crossed by the Applicant's proposed project. For many of these counties, property taxes are an important source of income. In Minnesota, Pennington and Red Lake counties have the highest share of their total revenue from property taxes (86 and 74 percent, respectively). While the states crossed by the Applicant's proposed project do not have local and county-level income taxes, county governments receive income tax appropriations from the state. Individual states determine the amount each county receives. In the 2015 tax year, taxable income in Minnesota generated $11 billion in income tax revenue. North Dakota generated $722 million in income tax revenue, and Wisconsin generated $8 billion (U.S. Census Bureau 2015).

Table 5.3.4-2. Government Revenue in Counties Crossed by the Applicant's Proposed Project

State/County	Portion of Applicant's Proposed Project through the County	Government Revenue ($2015 thousands)	County Property Tax Revenue ($2015 thousands)[a]	Share of Government Revenue from Property Taxes
North Dakota				
Pembina	3%	$4,498	$2,310	51%
Minnesota				
Kittson	4%	$12,209	$3,346	27%
Marshall	10%	$17,237	$5,463	32%
Pennington	5%	$8,289	$7,153	86%
Red Lake	4%	$2,977	$2,198	74%
Polk	4%	$55,276	$20,562	37%
Clearwater	11%	$12,209	$3,346	27%
Hubbard	12%	$18,828	$6,142	33%
Wadena	2%	$31,732	$12,200	38%
Cass	12%	$21,289	$7,675	36%
Crow Wing	1%	$50,103	$20,332	41%
Aitkin	14%	$71,060	$35,583	50%
Carlton	11%	$35,408	$11,457	32%
Subtotal	***90%***	***$336,617***	***$135,457***	***40%***
Wisconsin				
Douglas	7%	$55,803	$16,397	30%
TOTAL	**100%**	**$396,918**	**$154,164**	**39%**

[a] Sources: Minnesota – Minnesota Office of the State Auditor 2015, North Dakota – North Dakota Office of the State Auditor, Pembina County 2013; Wisconsin – Douglas County Wisconsin 2016; adjusted to $2015 based on the consumer price index where necessary;

5.3.4.2.2 Continued Use of Existing Line 3 Pipeline

Employment and Income

Table 5.3.4-3 provides the employment and income statistics for the counties located along the pipeline corridor for the existing Line 3 pipeline The per capita income ranges from a low of $35,078 to a high of $52,326 (all in Minnesota), and the median household income ranges from a low of $43,990 to a high of $53,492 (also in Minnesota). The median household income is below the median household income in each state in the ROI, and only two counties (Kittson County in Minnesota and Douglas County in Wisconsin) are above their respective state averages for per capita personal income.

Table 5.3.4-3. Employment and Income Conditions in Counties Crossed by the Existing Line 3 Pipeline

State/County	Per Capital Personal Income 2014[a] ($2015)	Median Household Income 2010–2014[b] ($2015)	Labor Force (August 2015)[a]	Unemployment Rate (August 2015)[a]
North Dakota				
Pembina	$50,665	$51,673	3,649	3.1%
Minnesota				
Kittson	$52,326	$48,950	2,543	7.0%
Marshall	$47,271	$53,373	5,574	4.9%
Pennington	$48,980	$47,436	8,933	3.4%
Red Lake	$45,722	$47,253	2,259	3.9%
Polk	$42,157	$51,085	16,795	3.8%
Clearwater	$36,512	$45,158	4,493	6.7%
Beltrami	$35,078	$43,990	23,451	4.1%
Hubbard	$36,338	$46,466	9,847	4.5%
Cass	$42,349	$45,620	14,690	5.1%
Itasca	$36,367	$47,122	22,967	5.8%
Aitkin	$36,363	$42,085	6,757	4.4%
St. Louis	$39,861	$47,138	8,569	3.4%
Carlton	$36,801	$53,492	17,328	4.2%
Subtotal/Average	***Average = $41,240***	***Average = $47,628***	***Total = 144,206***	***Average = 4.7%***
Wisconsin				
Douglas	$38,603	$44,946	23,101	4.5%
TOTAL/AVERAGE	***Average = $41,693***	***Average = $47,719***	***Total = 170,956***	***Average = 4.6%***

[a] Source: U.S. Bureau of Economic Analysis 2015.

[b] Source: U.S. Census Bureau 2014.

Tax Revenues

Table 5.3.4-4 summarizes the existing conditions for total government revenue and the portion of revenue from property taxes for all of the counties along the existing Line 3 pipeline corridor. While the states crossed by the Line 3 pipeline do not have local and county-level income taxes, county governments receive income tax appropriations from the state. Individual states determine the amount distributed to each county. In the 2015 tax year, taxable income in Minnesota generated $11 billion in income tax revenue. North Dakota generated $722 million in income tax revenue, and Wisconsin generated $8 billion (U.S. Census Bureau 2015).

Table 5.3.4-4. Existing Government Revenue in Counties Crossed by the Existing Line 3 Pipeline

State/County	Portion of Pipeline through the County	Government Revenue ($2015 thousands)	County Property Tax Revenue ($2015 thousands)[a]	Share of Government Revenue from Property Taxes
North Dakota				
Pembina	8%	$4,498	$2,310	51%
Minnesota				
Kittson	5%	$12,209	$3,346	27%
Marshall	11%	$17,237	$5,463	32%
Pennington	6%	$8,289	$7,153	86%
Red Lake	4%	$2,977	$2,198	74%
Polk	4%	$55,276	$20,562	37%
Clearwater	6%	$18,828	$6,142	27%
Beltrami	7%	$72,476	$26,651	37%
Hubbard	2%	$18,828	$6,142	33%
Cass	10%	$21,289	$7,675	36%
Itasca	15%	$94,707	$28,855	30%
Aitkin	<1%	$71,060	$35,583	50%
St. Louis	8%	$278,021	$111,234	40%
Carlton	7%	$35,408	$11,457	32%
Subtotal	***86%***	***$706,605***	***$272,461***	***39%***
Wisconsin				
Douglas	7%	$55,803	$16,397	30%
TOTAL	**100%**	**$766,906**	**$291,168**	**38%**

[a] Sources: Minnesota – Minnesota Office of the State Auditor 2015, North Dakota – North Dakota Office of the State Auditor, Pembina County 2013; Wisconsin – Douglas County Wisconsin 2016; adjusted to $2015 based on the consumer price index where necessary

5.3.4.2.3 System Alternative SA-04

Employment and Income

System alternative SA-04 would cross 35 counties in 4 states. Table 5.3.4-5 provides the employment and income statistics for the counties that would be crossed by SA-04. The median household income ranges from a low of $46,074 in Chickasaw County in Iowa to a high of $76,101 in Will County, Illinois. In North Dakota, median household incomes in Cass, Richland, and Trail counties are above the state average, while only Le Sueur County in Minnesota is above the state average. In Iowa, all counties with the exception of Chickasaw are above the state average for median household income; in Illinois, Grundy and Will counties are above the state average.

Table 5.3.4-5. Employment and Income Conditions in Counties Crossed by System Alternative SA-04

State/County	Per Capita Personal Income 2014[a] ($2015)	Median Household Income 2010–2014[b] ($2015)	Labor Force (August 2015)[a]	Unemployment Rate (August 2015)[a]
North Dakota				
Cass	$53,552	$53,055	95,774	1.8%
Grand Forks	$46,129	$47,105	37,764	1.8%
Pembina	$50,665	$51,673	3,649	3.1%
Richland	$45,487	$56,462	8,767	2.0%
Traill	$51,420	$53,704	4,542	2.2%
Walsh	$46,728	$49,838	5,616	2.8%
Subtotal/Average	***Average = $48,997***	***Average = $51,973***	***Total = 156,112***	***Average 2.3%***
Minnesota				
Blue Earth	$43,168	$51,037	40,002	2.5%
Chippewa	$44,722	$51,583	7,065	3.3%
Freeborn	$41,371	$45,622	16,512	3.1%
Kandiyohi	$49,060	$52,104	24,435	2.7%
Le Sueur	$44,197	$60,367	15,739	3.2%
Mower	$42,364	$47,679	20,691	2.5%
Nicollet	$44,646	$60,033	20,662	2.2%
Renville	$51,844	$52,061	9,179	3.2%
Sibley	$43,865	$56,383	8,876	3.1%
Stevens	$52,226	$51,241	5,981	2.0%
Swift	$53,874	$49,810	5,474	6.6%
Traverse	$55,225	$48,807	1,929	2.4%
Waseca	$46,847	$53,893	10,073	3.2%
Subtotal/Average	***Average = $47,185***	***Average = $52,355***	***Total = 186,618***	***Average = 3.1%***
Iowa				
Bremer	$44,610	$61,691	14,080	2.9%
Buchanan	$42,757	$56,459	11,169	2.4%
Chickasaw	$50,531	$46,074	6,535	3.6%
Clinton	$40,161	$49,907	24,525	4.4%
Delaware	$44,894	$54,865	10,797	2.6%
Fayette	$40,294	$45,496	10,871	3.4%
Howard	$45,956	$47,355	5,356	3.1%
Jones	$40,524	$54,327	10,834	3.3%

Table 5.3.4-5. Employment and Income Conditions in Counties Crossed by System Alternative SA-04

State/County	Per Capita Personal Income 2014[a] ($2015)	Median Household Income 2010–2014[b] ($2015)	Labor Force (August 2015)[a]	Unemployment Rate (August 2015)[a]
Mitchell	$47,161	$47,381	5,447	2.1%
Subtotal/Average	***Average = $44,099***	***Average = $51,506***	***Total = 99,614***	***Average 3.1%***
Illinois				
Bureau	$38,446	$49,979	16,999	7.6%
LaSalle	$39,582	N/A	58,052	8.0%
Lee	$37,895	$52,065	18,012	5.9%
Rock Island	$40,332	$48,282	71,527	7.1%
Grundy	$47,930	$65,887	25,400	6.8%
Will	$46,823	$76,101	355,617	6.0%
Whiteside	$39,483	$53,482	28,574	6.3%
Subtotal/Average	***Average = $41,499***	***Average = $57,633***	***Total = 574,181***	***Average = 6.8%***
TOTAL/AVERAGE	**Average = $45,445**	**Average = $53,367**	**Total = 1,016,525**	**Average = 3.8%**

[a] Source: U.S. Bureau of Economic Analysis 2015.

[b] Source: U.S. Census Bureau 2014.

Tax Revenues

Table 5.3.4-6 summarizes the existing conditions for total government revenue and the portion of revenue from property taxes for all of the counties that would be crossed by SA-04. While the majority of states do not have local and county-level income taxes, county governments receive income tax appropriations from the state. Individual states determine the amount distributed to each county. In the 2015 tax year, taxable income in North Dakota generated $722 million in income taxes, while Minnesota generated $11 billion, Iowa generated $3.9 billion, and Illinois generated $19.9 billion (U.S. Census Bureau 2015).

Table 5.3.4-6. Government Revenue in Counties Crossed by System Alternative SA-04

State/County	Portion of Pipeline through County	Government Revenue ($2015 thousands)[a]	County Property Tax Revenue ($2015 thousands)[a]	Share of Government Revenue from Property Taxes
North Dakota				
Cass	6%	$92,833	$35,718	39%
Grand Forks	5%	$41,977	$22,024	53%
Pembina	5%	$4,498	$2,310	51%
Richland	7%	$17,123	$8,057	47%
Traill	4%	$10,668	$3,817	36%
Subtotal	***27%***	***$167,099***	***$71,926***	***43%***
Minnesota				
Walsh	3%	$13,704	$5,212	38%
Blue Earth	2%	$77,593	$29,775	38%
Chippewa	1%	$18,655	$8,781	47%
Freeborn	4%	$44,800	$19,900	44%
Kandiyohi	2%	$73,422	$30,087	41%
Le Sueur	0%	$31,769	$15,500	49%
Mower	1%	$45,039	$18,100	40%
Nicollet	2%	$34,250	$17,604	51%
Renville	3%	$10,307	$6,344	62%
Sibley	3%	$29,015	$11,944	41%
Stevens	4%	$14,234	$6,718	47%
Swift	3%	$20,594	$9,155	45%
Traverse	3%	$12,044	$4,528	38%
Waseca	2%	$23,542	$12,825	55%
Subtotal	***33%***	***$448,968***	***$196,473***	***44%***
Iowa				
Bremer	0.2%	$21,842	$7,435	34%
Buchanan	2%	$16,425	$6,948	42%
Chickasaw	4%	$13,380	$5,112	38%
Clinton	5%	$30,602	$17,421	57%
Delaware	3%	$16,017	$8,224	51%
Fayette	3%	$17,021	$7,242	43%
Howard	1%	$13,639	$4,715	35%
Jones	4%	$18,954	$7,294	38%

Table 5.3.4-6. Government Revenue in Counties Crossed by System Alternative SA-04

State/County	Portion of Pipeline through County	Government Revenue ($2015 thousands)[a]	County Property Tax Revenue ($2015 thousands)[a]	Share of Government Revenue from Property Taxes
Mitchell	3%	$16,402	$6,216	38%
Subtotal	***25.2%***	***$164,282***	***$70,607***	***43%***
Illinois				
Bureau	2%	$14,917	$5,306	36%
LaSalle	6%	$58,534	$23,701	40%
Lee	1%	$19,011	$7,173	38%
Grundy	1%	$28,144	$13,437	48%
Will	1%	$182,751	$65,615	36%
Rock Island	1%	$77,001	$25,836	34%
Whiteside	4%	$29,935	$9,210	31%
Subtotal	***16%***	***$410,293***	***$150,278***	***37%***
TOTAL	**100%**	**$1,190,642**	**$489,284**	**41%**

[a] Source: North Dakota – North Dakota Office of the State Auditor, Pembina County North Dakota 2013; Minnesota - Minnesota Office of the State Auditor 2015; Iowa –State of Iowa Auditor of State; Illinois – County Comptroller; adjusted to $2015 based on the consumer price index where necessary.

5.3.4.2.4 Transportation by Rail

Employment and Income

Table 5.3.4-7 provides the employment and income statistics for the counties in which the rail offloading facilities and development of new or expanded rail lines would be sited.

Table 5.3.4-7. Employment and Income Conditions in Counties for Development of Rail Facilities

County, State	Per Capita Personal Income 2014[a] ($2015)	Median Household Income 2010–2014[b] ($2015)	Labor Force (August 2015)[a]	Unemployment Rate (August 2015)[a]
Clearwater, Minnesota	$36,512	$45,158	4,493	6.7%
Douglas, Wisconsin	$38,603	$44,946	23,101	4.5%
TOTAL/AVERAGE	**AVERAGE = $37,558**	**AVERAGE = $45,052**	**TOTAL = 27,594**	**AVERAGE = 5.6%**

[a] Source: U.S. Bureau of Economic Analysis 2015.

[b] Source: U.S. Census Bureau 2014.

Tax Revenues

Table 5.3.4-8 summarizes the existing conditions for total government revenue and the portion of revenue from property taxes by county for all counties in the locations of rail facilities. Property taxes are an important source of income in these counties. Douglas County has the highest total government revenue while Clearwater has the highest share of its revenue from property taxes (33 percent). County governments receive income tax appropriations from states and individual states determine the amount distributed to each county. In the 2015 tax year, taxable income in Minnesota generated $11 billion, and Wisconsin generated $8billion (U.S. Census Bureau 2015).

Table 5.3.4-8. Government Revenue in Counties for Development of Rail Facilities

State/County	Government Revenue ($2015 thousands)	County Property Tax Revenue ($2015 thousands)[a]	Share of Government Revenue from Property Taxes
Clearwater, Minnesota	$18,828	$6,142	33%
Douglas, Wisconsin	$55,803	$16,397	30%
TOTAL	**$74,631**	**$22,539**	**30%**

[a] Sources: Minnesota – Minnesota Office of the State Auditor 2015, adjusted to $2015 based on the consumer price index where necessary; Wisconsin – Douglas County Wisconsin 2016.

5.3.4.2.5 Transportation by Truck

Employment and Income

Table 5.3.4-9 provides the employment and income statistics for the counties where construction or upgrades would occur for development of truck offloading facilities and access roads.

Table 5.3.4-9. Employment and Income Conditions in Counties for Development of Truck Facilities

County, State	Per Capita Personal Income 2014[a] ($2015)	Median Household Income 2010–2014[b] ($2015)	Labor Force (August 2015)[a]	Unemployment Rate (August 2015)[a]
Clearwater, Minnesota	$36,512	$45,158	4,493	6.7%
Douglas, Wisconsin	$38,603	$44,946	23,101	4.5%
TOTAL/AVERAGE	**Average = $37,558**	**Average = $45,052**	**Total = 27,594**	**Average = 5.6%**

[a] Source: U. S. Bureau of Economic Analysis 2015.

[b] Source: U.S. Census Bureau 2014.

Tax Revenues

Table 5.3.4-10 summarizes the existing conditions for total government revenue and the portion of revenue from property taxes by county for all of the counties in which truck offloading and related facilities would be sited. Property taxes are an important source of income in these counties. Douglas County has the highest total government revenue while Clearwater has the highest share of its revenue from property taxes (33 percent). While the majority of states (including those where the facilities would be constructed) do not have local and county-level income taxes, county governments receive income tax appropriations from the state. Individual states determine the amount distributed to each county. In the 2015 tax year, taxable income in Minnesota generated $11 billion, and Wisconsin generated $8 billion (U.S. Census Bureau 2015).

Table 5.3.4-10. Government Revenue in Counties for Development of Truck Facilities

State/County	Government Revenue ($2015 thousands)	County Property Tax Revenue ($2015 thousands)[a]	Share of Government Revenue from Property Taxes
Clearwater, Minnesota	$18,828	$6,142	33%
Douglas, Wisconsin	$55,803	$16,397	30%
TOTAL	**$74,631**	**$22,539**	**30%**

[a] Sources: Minnesota – Minnesota Office of the State Auditor 2015, adjusted to $2015 based on the consumer price index where necessary; Wisconsin – Douglas County Wisconsin 2016.

5.3.4.3 Impact Assessment

Construction and operation of the Applicant's proposed project and most of the CN Alternatives (except for aspects of the existing Line 3 pipeline alternative since that pipeline is in place and operating) are anticipated to have positive effects on employment, income, and tax revenue. Direct impacts on employment would be driven by the large number of construction personnel. Although it is not expected that all workers would live in the counties where construction would occur, some would be expected to temporarily re-locate to these counties during construction or spend money locally which could result in temporary county-level income changes in supporting industries. Furthermore, , it is expected that Enbridge would use some local workers – as referenced in the direct testimony of Barry Simonson (lines 505-513) current labor agreements in Minnesota require that at least 50% of workers would be expected to be employed from local union halls. As construction jobs are typically permanent in nature and spatially temporary in the sense that workers move from project to project, permanent jobs may result from said construction (this is also dependent on an unquantifiable backlog of other construction project demand). Tax revenues would increase due to the increase in labor income (i.e., taxable income), sales tax on the purchase of goods locally, and property taxes. Construction would also have a temporary indirect influence on economic conditions due to employment and income for service industries supporting construction activities (e.g., the hotel industry, fueling services, and the food service industry).

5.3.4.3.1 Applicant's Proposed Project (from Neche to Superior)

Construction Impacts

<u>Employment and Income</u>

Construction of the Applicant's proposed project is expected to require up to a maximum of 4,200 workers across 7 different construction spreads over a 12-month period. As noted above, it is expected that Enbridge would use some local workers – as referenced in the direct testimony of Barry Simonson (lines 505-513) current labor agreements in Minnesota require that at least 50% of workers would be expected to be employed from local union halls. As construction jobs are typically permanent in nature and spatially temporary in the sense that workers move from project to project, permanent jobs may result from said construction (this is also dependent on an unquantifiable backlog of other construction project demand). Based on this assumption, it is likely that direct construction-related employment would have a minor positive impact on county-level unemployment and per capita and/or median household income levels.

Furthermore, it is likely that some of the non-technical work could be accomplished by local labor (e.g., clearing and trenching); hiring of local labor for those positions would have a temporary (over the duration of construction and post-construction restoration activities) and negligible to minor impact on county-level unemployment or per capita and/or median household income levels, depending on the nature of work activities.

Construction workers who re-locate to the Project area would spend a portion of their income on local goods and services such as food, gas, and lodging. These expenditures would increase revenues to those secondary or supporting industries (i.e., industries that indirectly support the construction industry) for the duration of the construction period in the area of the construction spread. This would result in a temporary, negligible to minor positive impact on the secondary industries. If businesses in the secondary industries hire additional staff to accommodate increased business, there would be a temporary, positive negligible to minor indirect impact on employment and unemployment within each county along the route.

In addition to direct Project-related employment and payroll spending, a large portion of the construction-related expenses would be for construction materials, supplies, equipment, parts, and other goods and services such as fuel, hardware, and parts. The Applicant estimated the material costs for construction of its proposed project in Minnesota to be $438.9 million. According to the IMPLAN model results, the top 10 industries (as defined in the model) that would be positively affected by construction-related spending are construction services for new, non-residential structures; food services and drinking places; real estate businesses;, wholesale trade business (businesses engaged in wholesaling merchandise such as agriculture and mining); architectural and engineering services; offices of health practitioners; private hospitals; employment services; and financial services (see Appendix R). These expenditures during construction would result in temporary and negligible to minor indirect, positive impacts on those industries, particularly within the counties along the route. The magnitude of the impact on the industries would depend on the size of the industries and the portion of the expenditures that would be spent locally in each county crossed by the route.

If businesses in these industries hire local additional staff to accommodate increased business, there would be a temporary, positive negligible to minor indirect impact on employment, unemployment, and per capita income at the county level along the route.

If the Applicant employs some local residents during construction, there would be a direct effect on employment, unemployment, and per capita income at the county level along the route and the temporary, positive impact would likely be greater.

Tax Revenues

Construction of the Applicant's proposed project would generate state and local taxes from a variety of sources. State and county tax revenues would increase due to increased employment payrolls directly associated with construction (i.e., the wages paid to construction workers). In other words, regardless of where a construction worker lives, a portion of their wages would be subject to Minnesota state income taxes since the construction occurs in Minnesota over an extended period of time; nonresident employees in Wisconsin and North Dakota may also be subject to tax withholding. In addition, if the industries indirectly affected by construction hire additional staff to accommodate the increased business as described above, the wages paid to those workers would also increase state and county tax revenues. As noted, it was assumed that property taxes would not begin to accrue until the operations phase of the Project; therefore, construction of the pipeline would not affect property taxes at the county level.

As previously discussed, income taxes are generated at the state level and reapportioned to county governments as determined by the state. Table 5.3.4-11 presents the estimated increase in the state income tax that would be appropriated to each county in the ROI based on the portion of total length of the pipeline through each county. Based on these estimates, Aitkin County would receive the highest increase in income tax revenue at $15 million. Specifically, the State of Minnesota would receive approximately $98 million in income tax receipts, which is less than 1 percent of the amount that Minnesota currently receives in income tax revenue. This positive impact on income tax revenues would be temporary and minor to major (i.e., depending on the allocation to each individual county) and likely would be limited to the duration of the construction timeframe.

Table 5.3.4-11. Estimated Income Tax Generated from Construction-Related Income for the Applicant's Proposed Project

State/County	Miles of Pipeline through County	Estimated Income Tax Generated from Direct and Indirect Construction-Related Income[a] ($2016 millions)
North Dakota		
Pembina	27.6	$2.4
Minnesota		
Kittson	15.4	$4.5
Marshall	36.3	$10.7
Pennington	19.7	$5.8
Red Lake	15.7	$4.6
Polk	14.0	$4.1
Clearwater	42.2	$12.4
Hubbard	44.6	$13.1
Wadena	7.1	$2.1
Cass	47.4	$12.0
Crow Wing	4.8	$1.4
Aitkin	51.6	$15.2

Table 5.3.4-11. Estimated Income Tax Generated from Construction-Related Income for the Applicant's Proposed Project

State/County	Miles of Pipeline through County	Estimated Income Tax Generated from Direct and Indirect Construction-Related Income[a] ($2016 millions)
Carlton	41.0	$12.1
Subtotal	***339.8***	***$98.0***
Wisconsin		
Douglas	13.2	$3.5
TOTAL	**380.5**	**$103.9**

[a] The estimates represent a conservative upper bound on the actual values. The underlying data are based on results from an IMPLAN model that uses national data, rather than data at the state level. The national data inflate the results at a more localized level, compared to a state-level model (see Appendix R).

Operations Impacts

Employment and Income

The Applicant stated that the existing operations staff would be able to operate the Project and that few additional employees would be hired to assist the staff. As a result, operation of the pipeline would have no measureable impact on local employment, per capita household income, median household income, or unemployment in the ROI.

Tax Revenues

Since there would be few additional staff members hired for operation of the Project, there would be very little change in income tax or sales tax revenues due to increased spending by permanent operational staff. Therefore, the impact on income tax and sales tax revenues would be permanent, but at most negligible.

Property tax revenues would be the largest source of ongoing revenue to the counties along the route. Local and state governments would continue to collect annual property taxes from the Applicant based on the assessed value of the pipeline easements for the life of the Project. This would result in permanent, minor to major positive impacts on property tax revenues for the counties along the route.

5.3.4.3.2 Continued Use of Existing Line 3

Construction Impacts

There would be no construction impacts on employment, income, or tax revenue from the continued use of the existing Line 3 pipeline because it is already built.

Operation Impacts

Continued use of existing Line 3, including continuation of ongoing integrity maintenance, would not be expected to alter current employment, income, or tax revenue. Any integrity digs and subsequent maintenance or repairs would likely be completed by the existing workforce or local contractors and no new land or easements would need to be purchased. Therefore, no impacts on employment, income, or tax revenue would be expected associated with continued operations.

5.3.4.3.3 System Alternative SA-04

Construction Impacts

Employment and Income

For the purposes of the analysis, it was assumed that system alternative SA-04 would be constructed and operated in the same manner as the Applicant's proposed project. Based on the Applicant's estimate that 7 spreads would be needed to construct the Applicant's 380-mile-long proposed project, it was estimated that 14 to 15 spreads would be needed to construct the 795-mile-long system alternative SA-04. If all of the workers were hired from outside the Project area, a conservatively high estimate of 9,000 workers would temporarily re-locate to the Project area. Based on the assumptions that the additional workers would not be local, as described above, direct construction-related employment would not affect county-level unemployment or per capita and/or median household income levels. If some local labor was utilized for construction, minor positive impacts on county-level unemployment and per capita and/or median household income levels would be anticipated. As construction jobs are typically permanent in nature and spatially temporary in the sense that workers move from project to project, permanent jobs may result from said construction (this is also dependent on an unquantifiable backlog of other construction project demand). It is likely that some of the non-technical work could be accomplished by local labor (e.g., clearing and trenching); hiring of local residents for those positions would have a temporary and negligible to minor impact on county-level unemployment or per capita and/or median household income levels.

Construction workers who re-locate to the Project area would spend a portion of their income on local goods and services such as food, gas, and lodging. Construction of SA-04 would be expected to have the largest increase of local spending on goods and services of all alternatives due to the 9,000 workers (i.e., 4,200 more workers than for the Applicant's proposed project). These expenditures would increase revenues to those secondary or supporting industries (i.e., industries that indirectly support the construction industry) for the duration of the construction period in the area of the construction spread. This would result in a temporary, minor positive impact on the secondary industries. If businesses in the secondary industries hire additional staff to accommodate increased business, there would be a temporary, positive but negligible indirect impact on employment, and unemployment, and within each county along the route.

A large portion of the construction-related expenses would be for construction materials, supplies, equipment, parts, and other goods and services such as fuel, hardware, and parts. While the Applicant has not estimated the material costs for construction for SA-04, it is expected these would be higher than the Applicant's proposed project due to anticipated length and scope of the Project. According to the IMPLAN model results, the top 10 industries (as defined in the model) that would be positively affected by construction-related spending are construction services for new, non-residential structures; food services and drinking places; real estate businesses; wholesale trade business (i.e., businesses engaged in wholesaling merchandise such as agriculture and mining;, architectural and engineering services; offices of health practitioners; private hospitals; employment services; and financial services (see Appendix R). These expenditures during construction would result in temporary and negligible to minor indirect, positive impacts on those industries, particularly within the counties along the route. The magnitude of the impact on the industries would depend on the size of the industries and the portion of the expenditures that would be spent locally in each county crossed by the route.

If businesses in these industries hire local additional staff to accommodate increased business, there would be a temporary, positive negligible to minor indirect impact on employment, unemployment, and per capita income at the county level along the route.

Tax Revenues

Impacts on tax revenues from construction of SA-04 would be similar to those discussed for the Applicant's proposed project. At the state and local level, property taxes paid by the Applicant would be the primary source of tax revenue. State and county tax revenues would increase due to increased employment payrolls directly associated with construction (i.e., the wages paid to construction workers). This increase in income tax revenues would be higher for SA-04 compared to the Applicant's proposed project as a result of the greater number of workers projected to be required for construction. If the industries indirectly affected by construction hire additional staff to accommodate the increased business as described above, the wages paid to those workers would also increase state and county tax revenues. As stated earlier, it was assumed that property taxes would not begin to accrue until the operations phase of the Project; therefore, construction of the pipeline would not affect property taxes at the county level.

As previously discussed, income taxes are generated at the state level and reapportioned to county governments. Individual states determine the amount allocated to each county. Table 5.3.4-12 presents the estimated increase in state income tax for each state that would be crossed by SA-04. This amount was then allocated to each county that would be crossed by SA-04 based on the portion of pipeline through each county. Based on the IMPLAN output and total miles per county, it is estimated that Minnesota would receive the highest share of income tax revenue at approximately $75 million, followed by Iowa at approximately $63 million (see Appendix R). These figures represent less than a 1-percent change to the current overall level of income tax in each state (approximately $9 billion in Minnesota and $4 billion in Iowa). As a result, the impact would be positive, but temporary and minor to major (i.e., depending on the allocation in each individual county).

Table 5.3.4-12. Estimated Income Tax Generated from Construction-Related Income for System Alternative SA-04

State/County	Miles of Pipeline through County	Estimated Income Tax Generated from Direct and Indirect Construction-Related Income[a] ($2016 millions)
North Dakota		
Cass	46.3	$4.0
Grand Forks	39.5	$3.4
Pembina	37.4	$3.2
Richland	54.6	$4.7
Traill	31.0	$2.7
Walsh	24.6	$2.1
Subtotal	***233.5***	***$20.1***
Minnesota		
Blue Earth	18.2	$5.4
Chippewa	8.3	$2.5

Table 5.3.4-12. Estimated Income Tax Generated from Construction-Related Income for System Alternative SA-04

State/County	Miles of Pipeline through County	Estimated Income Tax Generated from Direct and Indirect Construction-Related Income[a] ($2016 millions)
Freeborn	29.7	$8.8
Kandiyohi	19.2	$5.7
Le Sueur	1.9	$0.6
Mower	8.5	$2.5
Nicollet	20.0	$6.0
Renville	23.1	$6.9
Sibley	22.2	$6.6
Stevens	31.6	$9.4
Swift	27.4	$8.2
Traverse	21.3	$6.3
Waseca	19.6	$5.8
Subtotal	***251.0***	***$74.7***
Iowa		
Bremer	1.6	$0.5
Buchanan	12.9	$4.3
Chickasaw	29.1	$9.7
Clinton	38.3	$12.8
Delaware	20.4	$6.8
Fayette	23.1	$7.7
Howard	5.4	$1.8
Jones	32.1	$10.7
Mitchell	24.9	$8.3
Subtotal	***187.9***	***$62.6***
Illinois		
Bureau	17.9	$3.2
LaSalle	31.8	$4.3
Lee	8.9	$1.6
Grundy	20.0	$3.6
Will	4.8	$0.9
Rock Island	4.9	$0.9
Whiteside	34.7	$6.2
Subtotal	***123***	***$20.7***

Table 5.3.4-12. Estimated Income Tax Generated from Construction-Related Income for System Alternative SA-04

State/County	Miles of Pipeline through County	Estimated Income Tax Generated from Direct and Indirect Construction-Related Income[a] ($2016 millions)
TOTAL	**795.4**	**$178.1**

[a] The estimates represent a conservative upper bound on the actual values. The underlying data are based on results from an IMPLAN model that uses national data, rather than data at the state level. The national data inflate the results at a more localized level, compared to a state-level model (see Appendix R).

Operations Impacts

Employment and Income

For the purposes of the analysis, it was assumed that SA-04 would be operated in the same manner as the Applicant's proposed project. Based on Enbridge's estimate that very few permanent workers would be needed for operation of the proposed project, it is expected that SA-04 would similarly require few operational staff. Based on the small number of permanent jobs, it is likely that operation of the pipeline would result in no to negligible impact on the per capita household income, median household income, or unemployment rates in the ROI.

Tax Revenues

Since there is likely to be a small number of permanent operational staff, it is also likely that operation of the pipeline would result in a permanent, negligible impact on tax revenues associated with payroll spending (i.e., income taxes) in the ROI.

Property tax revenues are likely to be the largest source of ongoing revenue to the counties in the ROI. Local and state governments would continue to collect annual property taxes from the Applicant for the life of the Project based on the assessed value of the pipeline easements for SA-04. Therefore, it is likely that positive impacts on property taxes from operation would be permanent and minor to major, depending on share of each county's property tax base.

5.3.4.3.4 Transportation by Rail

In the United States, this alternative would require construction and operation of a new rail offloading facility near the existing Enbridge terminals in Clearbrook, Minnesota. As described in Chapter 4, the rail alternative would also require upgrades to existing rail facilities near Clearbrook, in Clearwater County. The alternative would also require expansion of the existing facility at the Enbridge terminal in Superior, and up to 0.5 mile of new rail spur in Douglas County, Wisconsin.

Construction Impacts

Employment and Income

Construction of the offloading facility and associated facilities for the rail alternative is estimated to generate from 50 to 100 construction positions over the duration of construction activities, based on similar types of rail-related construction projects. As construction jobs are typically permanent in nature and temporary in the sense that workers move from project to project, an equal or lower number of

permanent jobs may result from said construction (this is also dependent on an unquantifiable backlog of other construction project demand). It also was assumed, based on the information in Chapter 4 that it would cost between $85 and $125 million to construct the terminal facilities.

For this analysis, it was assumed that the construction workforce would not be hired locally. Based on this assumption, it is likely that direct construction-related employment would not affect county-level unemployment or per capita and/or median household income levels. However, it is likely that some of the non-technical work could be accomplished by local residents (e.g., clearing and grading); hiring of local residents for those or other positions would have a temporary and negligible impact on county-level unemployment or per capita and/or median household income levels.

Construction workers who re-locate to the ROI (Clearwater and Douglas counties) would spend a portion of their income on local goods and services such as food, gas, and lodging. These expenditures would increase revenues to those secondary or supporting industries (i.e., industries that indirectly support the construction industry) for the duration of the construction period in the counties. This would result in a temporary, negligible to minor positive impact on the secondary industries. If businesses in the secondary industries hire additional staff to accommodate increased business, there would be a temporary, positive negligible to minor indirect impact on employment and unemployment within Clearwater and Douglas counties.

In addition to direct Project-related employment and payroll spending, a large portion of the construction-related expenses would be for construction materials, supplies, equipment, parts, and other goods and services such as fuel and hardware. These expenditures during construction would result in temporary and negligible to minor indirect, positive impacts on industries receiving the expenditures. The actual magnitude of the impact on the industries would depend on the size of the industries and the portion of the expenditures that would be spent in each county.

Tax Revenues

Income tax revenues generated from these activities would be determined at the state level, i.e, in Minnesota and Wisconsin, and allocated at the county level as determined by the state. Based on the IMPLAN output, it is likely that construction of the terminals and related facilities would generate approximately $2.5 million for Minnesota, and $2.2 million for Wisconsin, substantially lower than expected tax revenues generated by the Applicant's proposed project and SA-04 (see Appendix R). This positive impact on income tax revenues to the counties would be temporary and minor.

It was assumed that property taxes would not begin to accrue until the operations phase of the Project; therefore, construction of the pipeline would not affect property taxes at the county level.

Operations Impacts

Employment and Income

It is possible that the increased volume of rail traffic could lead to the addition of several hundred permanent jobs, such as railroad operators, technicians during operations, and general laborers to facilitate offloading of tank cars. However, it is unknown how many of the workers hired for operation would be housed within the ROI. At the county level, it is unlikely that the increase in permanent jobs would affect per capita income, mean household income levels, or unemployment rates; the increase would be small relative to the overall income and labor force in the county, resulting in permanent negligible impacts.

Tax Revenues

Depending on the number of local jobs, there could be a direct, permanent, minor impact on income taxes from the increase in direct permanent employment at the facilities. There would also be a permanent, minor indirect impact on income taxes from spending in industries in the ROI that support the rail industry.

Property tax revenues would be based on the increase in value of the new and expanded facilities. These new taxes are expected to result in a permanent, minor impact on tax revenues for the two counties.

5.3.4.3.5 Transportation by Truck

In the United States, this alternative would require construction of offloading and related facilities at and near the Enbridge terminals at Clearbrook and Superior. At both sites, small sections of additional roadways would be required for access. In Clearwater County, it may be also necessary to construct a new roadway and upgrade area highways (although these potential auxiliary needs are not specifically included in the analysis of this alternative). In Douglas County it would be necessary construct an alternate truck route to the Superior terminal.

Construction Impacts

Employment and Income

Construction of the offloading facility and associated facilities for the truck alternative is estimated to generate from 30 to 50 construction positions over the duration of Project construction activities, based on similar types of construction projects. As construction jobs are typically permanent in nature and temporary in the sense that workers move from project to project, an equal or lower number of permanent jobs may result from said construction (this is also dependent on an unquantifiable backlog of other construction project demand). For this analysis, it was assumed that the construction workforce would not be hired locally. Based on this assumption, it is likely that direct construction-related employment would not affect county-level unemployment or per capita and/or median household income levels. However, it is likely that some of the non-technical work could be accomplished by local residents (e.g., clearing and grading); hiring of local residents for those or other positions would have a temporary and negligible impact on county-level unemployment or per capita and/or median household income levels.

Construction workers who re-locate to the ROI (Clearwater and Douglas counties) would spend a portion of their income on local goods and services such as food, gas, and lodging. These expenditures would increase revenues to those secondary or supporting industries (i.e., industries that indirectly support the construction industry) for the duration of the construction period in the counties. This would result in a temporary, negligible to minor positive impact on the secondary industries. If businesses in the secondary industries hire additional staff to accommodate increased business, there would be a temporary, positive but negligible indirect impact on employment, and unemployment, and within each county along the route.

In addition to direct Project-related employment and payroll spending, a large portion of the construction-related expenses would be for construction materials, supplies, equipment, parts, and other goods and services such as fuel and hardware. These expenditures during construction would result in temporary and negligible to minor indirect, positive impacts on industries receiving the

expenditures. The magnitude of the impact on the industries would depend on the size of the industries and the portion of the expenditures that would be spent in each county.

Tax Revenues

Income tax revenues generated from these activities would be determined at the state level (i.e., in Minnesota and Wisconsin) and allocated at the county level as determined by the state. Based on the IMPLAN output, it is likely that construction of the terminal facilities would generate approximately $2.5 million for Minnesota, and $2.2 million for Wisconsin, substantially lower than expected tax revenues generated by the Applicant's proposed project and SA-04 (see Appendix R). This positive impact on income tax revenues to the counties would be temporary and minor.

It was assumed that property taxes would not begin to accrue until the operations phase of the Project; therefore, construction of the pipeline would have no impact on property taxes at the county level.

Operations Impacts

Employment and Income

Transport of oil via tanker trucks would require up to 4,000 trucks per day. If local workers were hired to operate and maintain the facilities or work directly for the truck line, a positive, permanent impact would result from an increase in labor income and employment in the surrounding county. However, it is likely that at least some truck drivers hired to transport the oil would come from outside of the ROI and therefore would have permanent negligible impact on per capita income, median household income, and unemployment rates at the county level.

Tax Revenues

Depending on the number of local jobs generated, there could be a direct permanent minor impact on income taxes from the increase in direct permanent employment at the facilities, as well as a permanent indirect minor impact on income taxes from spending in industries that support the truck industry. Each of the 4,000 trucks would need to refuel at gas stations along the truck routes. This could result in a permanent negligible to minor increase in tax revenue generated from the state gas tax, depending on where and how often the trucks need to refuel.

Property tax revenues would be based on the increase in value of the new and expanded facilities. These new taxes are expected to result in a permanent, minor impact on tax revenues for the two counties.

5.3.4.3.6 Existing Line 3 Supplemented by Rail

Construction Impacts

As previously indicated, no impacts on employment, income, or tax revenue would be expected associated with continued use of the existing Line 3. With respect to supplemental rail transport, it was assumed that the same upgrades of rail facilities described above for transportation by rail would be required at the Clearbrook and Superior terminals; therefore, the construction impacts would be the same as described for the rail alternative.

Operations Impacts

Continued use of existing Line 3, including continuation of ongoing integrity maintenance, would not be expected to alter current employment, income, or tax revenue. Therefore, no impacts on employment, income, or tax revenue would be expected associated with continued operations.

Overall, fewer trains would be used to transport crude oil than under the Transportation-by-Rail alternative which would reduce the number of new permanent jobs compared to the rail alternative. Therefore, it is unlikely that the additional permanent jobs would have more than a negligible effect on per capita income, mean household income levels, or unemployment rates at the county level, as the increase would be small relative to the overall income and labor force in the county.

Impacts on tax revenues would be the same as described for the rail alternative, with a potentially smaller permanent, minor impact on income taxes from the direct impact of employment related to operation of the facilities and the indirect impact of spending in industries that support the rail industry. Property taxes would likely be similar to those of the rail transport alternative, although it is possible that the offloading facilities would be smaller than for the rail transport alternative, which would result in a lower property value for the facilities.

5.3.4.3.7 Existing Line 3 Supplemented by Truck

Construction Impacts

As previously indicated, no impacts on employment, income, or tax revenue would be expected associated with continued use of existing Line 3. With respect to supplemental truck transport, it was assumed that the same upgrades of transport facilities described above for transportation by truck would be required at the Clearbrook and Superior terminals; therefore, the construction impacts would be the same as described for the truck alternative.

Operations Impacts

Continued use of existing Line 3, including continuation of ongoing integrity maintenance, would not be expected to alter current employment, income, or tax revenue. Therefore, no impacts on employment, income, or tax revenue would be expected associated with continued operations.

Overall, fewer trucks would be used to transport crude oil than under the Transportation-by-Truck alternative, which would reduce the number of trucks per day compared to the truck alternative and is likely to add fewer permanent jobs. Therefore, it is unlikely that the additional permanent jobs would have more than a negligible effect on per capita income, mean household income levels, or unemployment rates at the county level, as the increase would be small relative to the overall income and labor force in the county.

Impacts on tax revenues would be the same as described for the truck alternative, with a smaller permanent, minor impact on income taxes from the direct impact of employment related to operation of the facilities and the indirect impact of spending in industries that support the rail industry. Property taxes would likely be similar to those of the truck transport alternative, although it is possible that the offloading facilities would be smaller than for the truck transport alternative, which would result in a lower property value for the facilities.

5.3.4.4 Summary and Mitigation

5.3.4.4.1 Summary

The potential impacts on employment, income, and tax revenue from construction and operation of the Applicant's proposed project and CN Alternatives were assessed. This evaluation considered construction-related employment, payroll spending, and expenditures on materials, supplies and equipment; operation-related employment and payroll spending; income tax revenue from workers during construction and operation; and property taxes paid by the Applicant during operation. The ROI for this analysis consists of the counties where construction would occur for the Applicant's proposed project and CN Alternatives, as well as those counties crossed by Line 3. Table 5.3.4-13 provides a summary list of the potential impacts of construction and operation of the alternatives, including the anticipated duration and magnitude of the impacts.

Construction Impacts

The construction workforce needed for new pipeline construction (SA-04 and the Applicant's proposed project) would be much greater than for the rail or truck alternatives. Because the Line 3 pipeline is in place and operating, there would not be any construction-related changes in employment or income for that alternative. The construction workforce for any of the alternatives would not have a direct effect on employment and income at the county level, based on the assumption that the workforce would not be local. If the Applicant employs some local residents during construction, there would be a greater influence on employment, unemployment, and per capita income at the county level that could result in a temporary, positive negligible to minor impact.

During construction, there could be an increase in hiring in secondary industries (i.e., the industries that support the construction industry). The impact of that increase in employment for each alternative, except the alternative of continued use of Line 3, would have temporary, negligible to minor impacts on employment and income at the county level; positive impacts resulting from construction of the Applicant's proposed project or SA-04 would likely be of greater magnitude due to their substantially greater construction workforces as compared to those of the other CN alternatives.

Construction-related tax revenues would be largely due to income taxes paid at the state level and apportioned to the counties crossed by the pipeline, as well as sales and use taxes on construction-related goods and services. Tax revenues generated during construction are likely to be temporary and minor to major for all alternatives except continued use of Line 3. Construction-related tax revenues would likely be highest for the Applicant's proposed project and SA-04 alternatives.

The increase in tax revenues during construction is likely to be the greatest for construction of any of the new pipeline alternatives (Applicant's proposed project and SA-04) due to the size of the workforce and the amount of time required to complete construction activities. Of these two alternatives, SA-04 would be expected to have the largest positive effects on employment, income, and tax revenue since it would require the largest construction workforce.

Operations Impacts

Operation of the pipelines would require a small number of new hires at most since a new pipeline system would be operated primarily by the existing operations staff for the Enbridge Mainline. Therefore, operation would not result in a measureable effect on county-level income and employment levels. In addition, the small number of permanent staff required to operate a new pipeline would not

be large enough to have more than a negligible positive effect on tax revenues at the county-level. Continued operation of the Line 3 pipeline would not require additional staff. Property taxes for the pipelines would be substantial and would result in a permanent, minor to major impact on county-level tax revenues (depending on respective property tax base of each county). The impact on property taxes would likely be greater for SA-04 due to its greater length, and more evenly distributed among four states, whereas the majority of property taxes generated by the Applicant's proposed project would be in Minnesota.

Operation of the rail offloading facility and the truck offloading facility would not require a substantial number of workers. Although the increased volume of rail traffic could lead to the addition of several hundred permanent jobs, it is likely that many of the workers hired to operate the trains would not be housed within the ROI but spread across the general region. Similarly, transport of oil via tanker trucks would require a substantial number of truck drivers, but it is likely that many of the truck drivers hired to transport the oil would come from outside of the ROI. Therefore, operation of the rail and truck transport alternatives would have a permanent negligible impact on per capita income, median household income, and unemployment rates at the county level.

Depending on the number of local jobs for the rail and truck alternatives, there could be a direct permanent negligible impact on income taxes from the increase in direct permanent employment at the rail and truck offloading facilities, as well as a permanent indirect minor impact on income, sales, and use taxes from spending in industries that support the truck industry. This indirect impact would likely be greater for the truck transport alternative due to refueling needs along the truck routes.

Property tax revenues would be based on the increase in value of the new and expanded offloading facilities. These new taxes are expected to result in a permanent, minor impact on tax revenues for the two counties. The total property taxes generated by the rail and truck alternatives would likely be substantially less than those of the pipeline alternatives.

The impacts of operating the combined alternatives of continued use of the Line 3 and rail transport or continued use of the Line 3 and truck transport would be essentially the same as those for the rail and truck alternatives. However, with the use of the Line 3 pipeline, there would be fewer jobs for train and truck operations due to decreased volume

5.3.4.4.2 Mitigation

The only potentially major impacts of the Applicant's proposed project or CN Alternatives on employment, income, and tax revenue would be associated with increases in tax revenue during construction for the pipeline alternatives, and permanent increases in property tax revenue for the new pipeline alternatives. It is anticipated that SA-04 would result in generating more property tax than the Applicant's proposed project since the SA-04 pipeline would be over twice as long. According to Enbridge, engagement with and promotion of potential tribal businesses and individuals through work on Enbridge-related projects will occur. Based on information received from Enbridge, Enbridge supported the Heavy Equipment Operators (Local 49) in a tribal focused training in June 2017.No mitigation measures have been identified to address impacts on employment, income, or tax revenues.

Table 5.3.4-13. Summary of Potential Impacts on Employment, Income, and Tax Revenue for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Existing Line 3	System Alternative SA-04	Rail Alternative	Truck Alternative	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Construction Impacts							
Employment, unemployment, per capita income, median household income	Temporary and permanent/ negligible to minor impacts • 4,200 workers (*combination of local labor utilized per Enbridge commitments, non-local labor)* • Increase in income/jobs in secondary industries that support construction	No impact	Temporary and permanent/ negligible to minor impacts • 9,000 workers *(expected combination of local and non-local workers assumed non-local)* • Increase in income/jobs in secondary industries that support construction	Temporary/ negligible impacts • 50 to 100 workers *(all workers assumed non-local)* • Increase in income/jobs in secondary industries that support construction	Temporary/ negligible impacts • 30 to 50 workers *(all workers assumed non-local)* • Increase in income/jobs in secondary industries that support construction	Temporary/ negligible impacts • 50 to 100 workers *(all workers assumed non-local)* • Increase in income/jobs in secondary industries that support construction	Temporary/ negligible impacts • 30 to 50 workers *(all workers assumed non-local)* • Increase in income/jobs in secondary industries that support construction
Property tax revenue during construction	No impact	No impact	No impact	No impact	No impact	No impact	No impact
Income tax revenue during construction	Temporary/minor to major impacts • $104 million	No impact	Temporary/minor to major impacts • $178 million	Temporary/minor impacts • $5 million	Temporary/minor impacts • $5 million	Temporary/minor impacts • $5 million	Temporary/minor impacts • $5 million
Operations Impacts							
Employment, unemployment, per capita income, median household income	No impact	No impact	No impact	Permanent/ negligible impacts	Permanent/ negligible impacts	Permanent/ negligible impacts	Permanent/ negligible impacts

Table 5.3.4-13. Summary of Potential Impacts on Employment, Income, and Tax Revenue for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Existing Line 3	System Alternative SA-04	Rail Alternative	Truck Alternative	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Property tax revenue during operations	Permanent/minor to major impacts	No impact	Permanent/minor to major impacts	Permanent/ negligible to minor impacts	Permanent/ negligible to minor impacts	Permanent/ negligible to minor impacts	Permanent/ negligible to minor impacts
Income tax revenue during operations	Permanent/ negligible impacts	No impact	Permanent/ negligible impacts	Permanent/ negligible to minor impacts	Permanent/ negligible to minor impacts	Permanent/ negligible to minor impacts	Permanent/ negligible to minor impacts

5.3.4.5 References

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5.4 CULTURAL RESOURCES

Cultural resources include the locations of human activity, occupation, or usage that contain materials, structures, or landscapes that were used, built, or modified by people. They also include the institutions that form and maintain communities and link them to their surroundings. Cultural resources consist of archaeological resources (e.g., sites and isolated finds), historic resources (e.g., objects, buildings, structures, or districts), and sacred places (including traditional cultural properties and landscapes). Cultural resources also include tribal, usufructuary rights resources both within reservation boundaries and ceded lands by treaty (e.g., traditional hunting and fishing areas) and treaty areas, which are discussed in detail in Chapter 9. For the purposes of this discussion, these resources are referred to collectively as cultural resources.

The discussion of existing conditions and the evaluation of potential impacts on cultural resources, addressed in this section, are limited to archaeological and historic resources that are recorded as part of resource investigations (e.g., Phase I and Phase II archaeological surveys) and that are recorded in databases maintained by individual state historic preservation offices (SHPOs). Special attention also is made to historic properties (i.e., those listed or eligible for listing on the National Register of Historic Places [NRHP]). In this manner, cultural resources important to American Indian tribes may not be captured in their entirety. Additional discussion of resources important to American Indian tribes, as well as the confluence of cultural and natural resources are discussed in Chapter 9.

This section first describes the existing conditions for the cultural resources within an area along the Applicant's proposed project and each of the CN Alternatives where these resources could be affected by construction and operation of the Project. Potential impacts on cultural resources are discussed and compared for the Applicant's proposed project and the CN Alternatives (continued use of the existing Line 3, SA-04, transportation by rail, transportation by truck, and Line 3 supplemented by rail or truck). None of the impacts or mitigation measures described in this chapter reflect how American Indians describe impacts on the landscape and tribal resources within reservation boundaries and ceded lands (see Chapter 9). Potential impacts on cultural resources from an accidental release of crude oil are discussed in Chapter 10.

5.4.1 Regulatory Context and Methodology

The regulatory context and data availability varies across the states that would be collectively crossed by the Applicant's proposed project and the CN Alternatives (Minnesota, North Dakota, Iowa, Illinois, and Wisconsin).

5.4.1.1 Regulatory Context

5.4.1.1.1 North Dakota

North Dakota Century Code

The North Dakota Century Code (NDCC) outlines the policies of the state of North Dakota regarding cultural resources. The State Historical Society of North Dakota (SHSND) is the agency responsible for protecting historic properties and cultural resources within North Dakota. The Historic Preservation Division is within the SHSND. Through the director, this division is responsible for preservation and interpretation of antiquities on the state level.

NDCC 55-03 outlines the permitting process for cultural resources investigations. A permit to investigate, excavate, or otherwise record cultural resources on state land and to excavate cultural resources on private land is required under NDCC 55-03-01.1. NDCC 55-10 outlines the preservation of historic sites and antiquities, which are within the public's interest (see NDCC 55-10-01). It also established the North Dakota State Historic Sites Registry.

NDCC 23-06-27 protects unmarked human burial sites, human remains, and burial goods located on state lands and makes it a felony to knowingly disturb, or fail to report disturbance to, such locations without authority of law.

North Dakota Administrative Code

The North Dakota Administrative Code (NDAC) outlines the criteria for listing cultural resources in the State Historic Sites Registry (NDAC 40-02-01). However, the SHSND uses the NRHP to record and maintain lists of resources worthy of preservation (see Section 5.4.1.1.6 for a discussion of the NRHP). The NDAC outlines the process for obtaining a permit to conduct archaeological investigations (NDAC 40-02-02). Prehistoric and historic human burial sites, human remains, and burial goods are protected under NDAC 40-02-03.

5.4.1.1.2 Minnesota

Minnesota Field Archaeology Act of 1963

The Minnesota Field Archaeology Act of 1963 (Minn. Stat. 138.31-42) allows the State of Minnesota to reserve the exclusive right of field archaeology on state sites in order to protect and preserve archaeological sites on state lands. It prohibits unlicensed field archaeology on state sites and discourages unlicensed field archaeology on privately owned lands. Based on the Field Archaeology Act, it is a gross misdemeanor for a person to willfully conduct unlicensed archaeology on state sites; willfully deface, injure, destroy, displace, or remove any object or data belonging to the State; or willfully interfere with evidence or work on any state site or other site for which a license has been issued. Persons having knowledge of the location of archaeological sites are encouraged to communicate such information to the State Archaeologist.

The Field Archaeology Act also outlines the duties of the Minnesota's Office of the State Archaeologist (OSA), which include consultation with the Minnesota Indian Affairs Council (MIAC). The MIAC shares legal responsibility for monitoring and enforcing laws that protect Indian human remains and associated burial items. The MIAC reviews archaeological license applications to conduct fieldwork to determine if a burial or cemetery are within the project area. The authority for the MIAC is contained in Minnesota Statute 138.31.

Under the Field Archaeology Act, the Minnesota OSA shares some duties with the Minnesota Historical Society (MHS), but the Minnesota OSA is not affiliated with the MHS or the State Historic Preservation Officer (SHPO). The Minnesota OSA and the MHS/SHPO operate independently, but cooperatively with regard to their shared duties.

Minnesota DNR, MNDOT, and all other state agencies whose activities may affect cultural resources are required to cooperate with MHS and the State Archaeologist to carry out the provisions of the Field Archaeology Act. Under the Field Archaeology Act, state agencies (i.e., the agency controlling the public lands or waters) must supply MHS and the State Archaeologist with a development plan for review and comment when known or suspected sites (i.e., when significant archaeological sites exist, or are

predicted to exist) on public lands or waters under their jurisdiction may be affected by implementation of the plan. The Minnesota Environmental Quality Board submits copies of Environmental Assessment Worksheets to the MHS/SHPO for comment on potential effects of privately funded developments, such as the proposed Project, on cultural resources in Minnesota (Minnesota SHPO 2005). As part of the worksheet, consideration is made for historic designations (state or national registers), known artifact areas, and architectural features.

Minnesota Historic Sites Act

The Minnesota Historic Sites Act (Minn. Stat. 138.661-669) established the Minnesota Historic Sites Network. The sites are significant state resources that MHS is preserving, developing, interpreting, and maintaining for public use, benefit, and access.

The Minnesota Historic Sites Act also created the State Register of Historic Places (SRHP), which is an inventory of outstanding properties possessing historical, architectural, archaeological, and aesthetic values that are of paramount importance in the development of the state. These historic properties represent and reflect elements of the state's cultural, social, economic, religious, political, architectural, and aesthetic heritage. These properties are separate from the Minnesota Historic Sites Network and are not operated by MHS for historical interpretive or public use and access purposes.

Historic properties are selected for inclusion in the SRHP based on any of the following criteria:

1. The quality of significance in American history, architecture, archaeology, engineering, and culture that is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association;
2. Association with events that have made a significant contribution to the broad patterns of our history;
3. Association with the lives of persons significant in our past;
4. Embodiment of the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
5. The yielding or likelihood of yielding information pertinent in prehistory or history.

The Minnesota Historic Sites Act outlines the responsibility of the State in protecting the physical features and historic character of properties designated in the Minnesota Historic Sites Network, SRHP, or in the NRHP. Before carrying out any undertaking that would affect designated or listed properties, or funding or licensing an undertaking by other parties, the state department or agency must consult with the MHS to determine appropriate treatments and to seek ways to avoid and mitigate any adverse effects on designated or listed properties.

Minnesota Private Cemeteries Act

The Minnesota Private Cemeteries Act (Minn. Stat. 307.08) sets forth the equal treatment and respect for human dignity of all human burials, human remains, and human burial grounds without reference to their ethnic origins, cultural backgrounds, or religious affiliations. This applies to all human burials, human remains, or human burial grounds found on or in all public or private lands or waters in Minnesota. This also includes all remains found outside of recorded cemeteries or unplatted graves or burials found within recorded cemeteries and in contexts that indicate antiquity greater than 50 years. If

such burials are not Indian or their ethnic identity cannot be ascertained, as determined by the State Archaeologist, they shall be dealt with in accordance with provisions established by the State Archaeologist and other appropriate authority.

Minnesota State Historic Preservation Office

The Minnesota SHPO is a department of MHS. While the SHPO's principal responsibilities are defined in the National Historic Preservation Act (NHPA) Section 110, the SHPO also has historic preservation duties under Minnesota state law. The SHPO acts for MHS in the review of state agency projects that may affect state archaeological sites including projects.

The SHPO is responsible for maintaining an inventory of historic properties; identifying and nominating properties to the NRHP; implementing a statewide historic preservation plan; administering a federal grants program; assisting federal, state, and local governments with historic preservation duties; and working with state and federal agencies to ensure that historic properties (i.e., those eligible for listing or listed on the SRHP or the NRHP) are considered by planning and development.

As defined in 36 CFR 800, the SHPO plays a central role in the Section 106 process and "advises and assists federal agencies in carrying out their 106 responsibilities." The SHPO ensures that agencies make "a reasonable and good faith effort" to consider the effects of their undertakings on historic properties. "Historic properties" for the purposes of Section 106 are defined as sites, districts, buildings, structures, or objects that are included in or are eligible for listing in the NRHP.

Minnesota archaeological laws do not set standards for site significance and do not discuss integrity, but the SHPO evaluates affected sites using NRHP criteria and suggests treatments of significant state sites that are consistent with Section 106.

Minnesota Governor's Executive Order 13-10

The Minnesota Governor's Executive Order 13-10 directs state government agencies to implement new tribal consultation policies aimed at improving relationships and collaboration with Minnesota's 11 tribal governments. It provides for consultation, coordination, and cooperation between the State and the 11 Indian tribes.

5.4.1.1.3 Iowa

Iowa Administrative Code, Chapter 263B

Iowa Administrative Code (Iowa AC) Chapter 263B requires the University's Board of Regents to appoint a State Archaeologist, who is a faculty member of the Department of Anthropology at the University of Iowa. Established in 1959 and implemented under Chapter 685 (see below), the Office of the State Archaeologist (Iowa OSA) conducts archaeological research and public programs around the state, preserves ancient burial sites (150 years old or older), and examines and reinters ancient human remains (University of Iowa 2016a). The Iowa OSA also maintains the state archaeological repository, and manages data on all recorded archaeological sites in Iowa (University of Iowa 2016a).

Iowa Administrative Code, Chapter 303

Chapter 303 outlines the administrative responsibility of state agencies in agreement with the Department of Cultural Affairs under Chapter 28E for historical sites. Chapter 303.4 established a State Historical Society Board of Trustees. The State Historical Society preserves and provides access to Iowa's

historical resources through a variety of statewide programs, exhibitions, and projects while serving as an advocate for Iowa's past and connector to the future (Iowa Department of Cultural Affairs 2016).

Iowa Administrative Code, Chapter 685

The Iowa OSA's responsibilities are implemented under Iowa AC 685, Chapter 1. As part of their responsibility, the Iowa OSA has developed procedural guidelines for treatment of burial places (Iowa AC 685, Ch. 11), confidentiality of archaeological site records (Iowa AC 685, Ch. 14; see also Iowa AC Ch. 22.7 [21]), the curation of archaeological specimens and associated records (Iowa AC 685, Ch. 7), and submittal of site records (Iowa AC 685, Ch. 12).

Iowa Administrative Code, Chapter 716.5

The intentional disturbance of burials is a violation of Iowa state law. Under Chapter 716.5, such disturbance is prosecutable as an aggravated misdemeanor.

Iowa State Historic Preservation Office

The Iowa SHPO is within the State Historical Society of Iowa. The Iowa SHPO identifies, preserves, and protects Iowa's historic and prehistoric resources. It administers state and federal historic preservation programs, and maintains a survey and inventory collection of historic properties in Iowa. The SHPO also issues guidelines for archaeological investigations in Iowa.

5.4.1.1.4 Illinois

Historic Preservation Act (20 ILCS 3410)

The Historic Preservation Act (20 Illinois Compiled Statutes [ILCS] 3410) created the Illinois Historic Sites Advisory Council, which reviews nominations to the NRHP.

Historic Preservation Agency Act (20 ILCS 3405)

The Historic Preservation Agency Act created the Illinois Historic Preservation Agency (IHPA). The IHPA protects historic, architectural, and archaeological sites as part of the public planning process within Illinois. The IHPA carries out their duties in accordance with Section 106 of the NHPA and the Illinois State Agency Historic Resource Preservation Act.

Illinois State Agency Historic Resource Preservation Act (20 ILCS 3420)

The Illinois State Agency Historic Resources Preservation Act of 1990 (20 ILCS 3420) outlines procedures for the identification and protection of cultural resources that may be affected by projects that are funded by, licensed by, or permitted by state agencies. The Act was amended in 1991 to limit archaeological surveys for state agency permit and license reviews to projects in high-probability zones across the state and to locations of previously recorded sites. These zones are corridors extending up to 500 feet beyond both edges of the major river drainages in the state. Based on previous surveys and excavations, these areas are known as having the highest probabilities for containing archaeological sites, especially burial mounds. SA-04 would be located across major river drainages in Illinois.

Archaeological and Paleontological Resources Protection Act (20 ILCS 3435)

The Archaeological and Paleontological Resources Protection Act (20 ILCS 3435) was passed to ensure that cultural resources on state or local public lands are protected. Formal permits are required to conduct archaeology on public lands.

The IHPA is responsible for the protection of archaeological and paleontological resources. The act also provides strict penalties for vandalism and theft of archaeological and paleontological resources.

The Illinois State Museum and the IHPA maintain a statewide file of known archaeological and paleontological sites.

Human Skeletal Remains Protection Act

The Human Skeletal Remains Protection Act (20 ILCS 3440) protects marked or unmarked human burials without reference to ethnic origins, cultural backgrounds, or religious affiliations. This law states that all human graves in unregistered cemeteries that are older than 100 years are protected by the State of Illinois. It is illegal to intentionally disturb these burials or burial markers, including Indian mounds. In the case of accidental discovery of human remains, whoever makes the discovery is required by state law to notify the county coroner immediately so that the coroner can determine whether the remains are part of a crime scene.

Illinois State Archaeologist

The Illinois State Archaeologist was established under Public Act 098-0346, to provide current information on the results of archaeological-related research and scientific inquiries to the public at large, communities, scientists, industry, and government agencies (University of Illinois 2016). The duties of the State Archaeologist include preservation, data collection and management, education, and research (University of Illinois 2016).

5.4.1.1.5 Wisconsin

Wisconsin Historical Society and State Historic Preservation Officer (Wisc. Stat. 44.01-02, 44.31-32)

The Wisconsin Historical Society (WHS) is designated as an official agency and trustee of the state and is charged with the preservation and care of Wisconsin's heritage and cultural resources under Wisconsin State Legislature Statutes (Wisc. Stat.) Chapter 44.01-02. The WHS is authorized with carrying out a historic preservation program for the "preservation or rehabilitation of historic properties." Wisc. Stat. Chapter 44.32, Subchapter II states that the director of the WHS or his or her designee shall serve as the SHPO whose duty among others includes identifying and nominating properties of historic significance.

Wisconsin State Historic Preservation Program and Archaeology Program (Wisc. Stat. 44.48(2))

Wisc. Stat. Chapter 44.48(2) authorizes the WHS to establish and administer a state archaeology program, in order to carry out specified archaeological surveys, studies, excavations or other activities in designated regions of the state.

Wisconsin State Register of Historic Places (Wisc. Stat. 44.36-41)

The Wisconsin SRHP was established under Wisc. Stat. 44.36 to provide an inventory of districts, sites, buildings, structures and objects which are significant in national, state or local history, architecture, archaeology, engineering and culture.

Under Wisc. Stat. 44.41, each state agency that owns a listed property must develop a long-term plan for the management, preservation, and improvement of the property that to the greatest extent possible result in the preservation of the property.

Field Archaeology (Wisc. Stat. 44.47)

The Field Archaeology section of Wisc. Stat. 44.47 asserts that the State of Wisconsin reserves the exclusive right of field archaeology on state sites, and establishes regulations for field archaeology on sites owned by political subdivisions, in order to protect and preserve archaeological and scientific information, matter and objects. Further, it states that it is a declaration of legislative intent that persons practicing field archaeology on private owned land are encouraged to pursue their field archaeology in accordance with this Wisc. Stat. 44.47, and that the looting of all archaeological remains be strongly discouraged.

Burial Sites Preservation (Wisc. Stat. 157.70)

Chapter 157.70, Subchapter III of the Wisc. Stat. protects both catalogued and uncatalogued burial sites from disturbance, and outlines procedures necessary if any activity is thought to be disturb the burial site. The director of the WHS must be immediately notified if a person knows or has reasonable grounds to believe that a burial site or the cataloged land contiguous to a cataloged burial site is being disturbed or may be disturbed. Wisc. Stat. 157.70(10) details penalties to be imposed on any individual who fails to report the disturbance of a burial, intentionally disturbs a burial site, or allows for disturbance of a burial site to transpire without the authorization of the director of the WHS.

Wisconsin State Archaeologist (Wisc. Stat. 44.47)

The Wisconsin State Archaeologist was established under Wisc. Stat. 44.47 to sponsor, engage in, and direct fundamental research of Wisconsin archaeology, and encourage and coordinate archaeological research and investigation undertaken within the state. In addition to administering the state archaeology program, the State Archaeologist also approves permits for field archaeological research, cooperates with other state agencies which have authority in areas where archaeological site are located, encourages the preservation of archaeological sites located on privately owned property, and protects objects of archaeological significance discovered by field archaeology at state sites or discovered during the course of any public construction or demolition work on state sites.

5.4.1.1.6 Federal Regulations

National Historic Preservation Act, as amended

The NHPA of 1966 (54 U.S.C. 300101 et seq.) as amended, requires federal agencies to identify and manage historic properties that are under their jurisdiction, and encourages the preservation of historic properties through consultation and cooperation with state and local governments, Indian tribes, and private individuals. The NHPA outlines the role of the federal government has in preserving historic properties, considering the effects of its actions, advancing the purposes of the Act, and avoiding

activities that would be contrary to its purpose. The NHPA also outlines the roles of the Advisory Council on Historic Preservation, SHPOs, and Tribal Historic Preservation Officers (THPOs).

Section 106 of the NHPA (54 U.S.C. 306108, and its implementing regulations under 36 CFR Part 800) requires that any federal or federally assisted project, any project requiring federal licensing or permitting, or any project on federal lands consider the effect of the undertaking on historic properties listed in or eligible for listing in the NRHP. Under the NHPA, federal agencies must evaluate effects on historic properties that are eligible for or listed in the NRHP before a project is approved. Under Section 106, agencies are required to consult American Indian tribes at all stages of project development, particularly if an undertaking may affect a historic property with religious or cultural significance to a tribe, even if the undertaking is outside reservation boundaries.

National Register of Historic Places

The NRHP (54 U.S.C. Ch. 3021), created under the NHPA of 1966, is the federal list of historic, archaeological, and cultural resources. Resources listed in the NRHP include districts, sites, buildings, structures, and objects that are significant in American history, prehistory, architecture, archaeology, engineering, and culture. The NRHP is maintained and expanded by the NPS on behalf of the Secretary of the Interior.

In North Dakota, the SHPO at the SHSND administers the NRHP program. To guide the determination of eligibility of properties for inclusion in the NRHP, the NPS developed the NRHP Criteria for Evaluation (36 CFR 60.4). These criteria are standards by which properties are evaluated for listing in the NRHP. The criteria consider the level of significance in American history, architecture, archaeology, and culture and are applied to districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, material, workmanship, feeling, and association. To be listed in the NRHP or to be considered eligible for listing in the NRHP, a district, site, building, structure, or object must meet one of the following criteria:

- Criterion A: Are associated with events that have made a significant contribution to the broad patterns of our history; or
- Criterion B: Are associated with the lives of persons significant in our past; or
- Criterion C: Embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components make lack individual distinction; or
- Criterion D: Has yielded, or may be likely to yield, information important in prehistory or history.

Archaeological sites are primarily assessed under Criterion D. Buildings and other resources that are less than 50 years old do not meet the NRHP criteria unless they are of exceptional importance under Criterion Consideration G, as described in the NPS Bulletin No. 22, “How to Evaluate and Nominate Potential National Register Properties That Have Achieved Significance Within the Last 50 Years.”

Amendments to NHPA specify that properties of religious and cultural significance (including traditional cultural properties [TCPs]) may be determined to be eligible for inclusion on the NRHP.

In addition to these types of resources, TCPs also are present. A TCP is defined in the National Register Bulletin 38 as a property that is "eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community." Per the bulletin, "'Traditional' in this context refers to those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice" (Parker and King 1998).

5.4.1.1.7 Tribal Policies and Ordinances

American Indian tribes also have adopted policies and/or ordinances governing cultural resources, including archaeological and historic resources. These policies often define what cultural resources are and how they will be protected for future generations (see Chapter 9).

As an example of these policies, the Mille Lacs Band of Ojibwe define archaeological resources as remains of past human life or activities, which are of archaeological or historical interest. These resources must be at least fifty years in age. This definition is part of their Cultural Resources Code (1072-MLB-23), which was enacted prior to the establishment of the THPO (see Appendix P). In addition, the Fond du Lac Band of Lake Superior Chippewa have adopted Ordinance #03/14, which established a cultural resources preservation zone to help protect and preserve cultural sensitive areas. In addition to these policies and/or ordinances, the THPOs have assumed Section 106 responsibilities for archaeological sites and TCPs, as well as other duties; however, the SHPO has retained Section 106 responsibility for buildings, structures, and landscapes within these reservations. Agencies and contractors need to consult both the THPOs and the SHPO about federal undertakings within these reservations. Among the THPOs in MN are the Bois Forte Band of Chippewa Indians, the Fond du Lac Band of Lake Superior Chippewas, the Grand Portage Band of Lake Superior Chippewa, the Leech Lake Band of Ojibwe, Lower Sioux Indian Community, Mille Lacs Band of Ojibwe Indians, Prairie Island Indian Community, Upper Sioux Community, and the White Earth Band of Minnesota Chippewa.

5.4.1.2 Methodology

The ROI for this impact analysis encompasses the areas along the Applicant's proposed project and the CN Alternatives where cultural resources could be directly or indirectly disturbed during Project-related construction or operations. The ROI for the Applicant's proposed project, includes the construction work area, permanent right-of-way, ATWS, access roads, and aboveground facilities, including 0.5 mile on either side of the pipeline centerline for archaeological resources, and 1 mile on either side of the pipeline centerline for historic resources. The ROI for SA-04 and the existing Line 3 also included 0.5 mile on either side of the pipeline centerline for archaeological resources and 1 mile on either side of the pipeline centerline for historic resources. For the impacts analysis, an assumed construction work area and permanent right-of-way was used that is similar to that for the Applicant's proposed project. The ROI for the transportation by rail and the transportation by truck alternatives includes archaeological resources and historic resources that are within 0.5 mile of the offloading facility locations at the Clearbrook and Superior terminals. While the exact location of these rail or truck offloading facilities is not known, it was assumed they would be located adjacent to the terminals and associated with existing rail and truck infrastructure.

For Minnesota, existing data were obtained from MHS for archaeological and historic resources within the ROI. Cultural resource data from the MHS includes information on the following: properties that are listed in the NRHP or SRHP; resources that have been determined eligible for listing in the NRHP through

previous federal or state review; and resources that have been identified through reconnaissance surveys, but which have not been evaluated for NRHP eligibility or are not recommended for listing. . Archaeological and historic data were also obtained from the North Dakota and Wisconsin SHPOs for the Applicant's proposed project and the CN Alternatives that would extend into those states. For SA-04, archaeological and historic data were also obtained from the respective SHPOs for Iowa (Iowa Archaeological Site File and I-Sites) and Illinois (Illinois Inventory of Archaeological Sites [IAS] and the Historic Architectural and Archaeology Resources Geographic Information System [HARGIS]). Sensitive locational information, however, is not provided within the context of this EIS. This type of information, however, was considered in evaluating the potential impacts to cultural resources. For the CN alternatives, data reviewed includes only that provided as part of the SHPO databases, whereas for the Applicant's proposed project, information is available for surveys conducted within Minnesota and from the SHPO databases.

Cemetery data also was reviewed based on available GIS data. Available cemetery data included information for Illinois, Iowa, Minnesota, North Dakota, and Wisconsin. This data is not intended to represent a full list and may exclude small, family owned cemeteries or those without names. Cemetery information is included in the discussion of historic resources and is treated as a historic resource within the impacts discussion, unless noted as an archaeological resource within a SHPO database.

The data collected included site number, site/property type, site location, date of recordation, historic context, and associated reports. Site leads, which are resources that are located on historic maps (e.g., rural schools), but have not been recently surveyed and have not been officially recorded, are not included in these analyses. The types of cultural resources were input into a GIS and overlaid with the Applicant's proposed project and CN Alternatives where available. Potential impacts on cultural resources for the Applicant's proposed project and CN Alternatives were considered where construction or operation of the alternatives could cause disturbance, loss, or modification of the resource.

National Register data was reviewed using data from the National Park Service (2014). This data provides information on those properties listed within the NRHP as of April 28, 2014. The file reviewed consists of properties listed within the Midwest.

Additionally, surveys for archaeological resources were completed for the Applicant's proposed project in Minnesota, the information from these surveys is included in this analysis. Additionally, the Applicant did not conduct any surveys for cultural resources for any CN Alternative. DOC-EERA's consultation with SHPO is ongoing, and the results of the consultation concerning determinations of eligibility, potential Project effects, and any necessary treatment for impacts are not available.

Information concerning sacred places or resources with importance to American Indian tribes is not available through SHPO databases, but may be available through consultation with affected American Indian tribes with geographic and/or traditional interests in Minnesota, North Dakota, Iowa, Illinois, and Wisconsin. Where information is known on resources of this type or TCPs, information is provided within this chapter. Details on ongoing tribal consultation and coordination can be found in Chapter 9 and Appendix P.

5.4.2 Existing Conditions

This section describes the existing conditions for archaeological and historic resources in the ROI for the Applicant's proposed project and the CN Alternatives. Additional information on American Indian tribes and associated resources and histories is provided in Chapter 9.

5.4.2.1 Minnesota

Eleven federally recognized Indian tribes are located in Minnesota. The Ojibwe/Chippewa tribes in Minnesota are the Bois Forte (Nett Lake), Fond du Lac, Grand Portage, Leech Lake, Mille Lacs, Red Lake, and White Earth. The Dakota Communities (Sioux) in the state are the Lower Sioux, Prairie Island, Shakopee-Mdewakanton, and Upper Sioux.

Nine of the federally recognized American Indian tribes in Minnesota have a THPO. These include the following: Bois Forte Band of Chippewa Indians, Fond du Lack Band of Lake Superior Chippewa, Grand Portage Band of Lake Superior Chippewa, Leech Lake Band of Ojibwe, Lower Sioux Indian Community, Mille Lacs Band of Ojibwe Indians, Prairie Island Indian Community, Upper Sioux Community, and White Earth Band of Minnesota Chippewa.

North Dakota

The Applicant's proposed project and the CN Alternatives would cross through the Northern Red River Study Unit of North Dakota. Additionally, SA-04 crosses through the Southern Red River Study Unit and the Sheyenne River Study Unit.

Five federally recognized American Indian tribes are in North Dakota: the Three Affiliated Tribes of the Fort Berthold Reservation (the Mandan, Hidatsa and Arikara Nation), the Spirit Lake Nation, the Standing Rock Sioux Tribe, the Turtle Mountain Band of Chippewa Indians, and the Sisseton-Wahpeton Oyate of the Lake Traverse Reservation. Four of the tribes in North Dakota have THPOs: the Three Affiliated Tribes of the Fort Berthold Reservation, the Spirit Lake Nation, the Standing Rock Sioux Tribe, and the Turtle Mountain Tribe of Chippewa (NATHPO 2016).

The Trenton Indian Service Area is an American Indian community located partially within North Dakota and partially in Montana (North Dakota IAC 2010). Some tribes who have traditional and ceded lands within North Dakota now live on reservations in other states. These tribes may hold interests in the area of the ROI.

5.4.2.2 Iowa

SA-04 crosses through eastern Iowa.

One federally recognized tribe is in Iowa, the Sac and Fox Tribe of the Mississippi in Iowa (National Conference of State Legislatures 2016). The Sac and Fox Tribe (also called the Meskwaki Nation of Iowa), purchased land in Iowa to establish the Meskwaki Indian Settlement on July 13, 1857. Other tribes who have traditional and ceded lands within Iowa now live on reservations in other states. These tribes may hold interests in the ROI.

No THPOs are present in the state of Iowa (NATHPO 2016).

5.4.2.3 Illinois

SA-04 extends from Iowa into northern Illinois.

No federally recognized American Indian tribes have a reservation in Illinois, and no THPOs are present in the state of Illinois (NATHPO 2016). However, American Indian tribes are present who have traditional

and ceded lands within Illinois, but now live on reservations in other states. These tribes may hold interests in the ROI.

5.4.2.4 Wisconsin

The Applicant's proposed project and all of the CN Alternatives except SA-04 would cross into Wisconsin. Wisconsin is home to 11 federally recognized tribes (National Conference of State Legislatures 2016):

- Bad River Band of the Lake Superior Tribe of Chippewa Indians of the Bad River Reservation
- Forest County Potawatomi Community
- Ho-Chunk Nation of Wisconsin
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac du Flambeau Band of Lake Superior Chippewa Indians of the Lac du Flambeau Reservation of Wisconsin
- Menominee Indian Tribe of Wisconsin
- Oneida Tribe of Indians of Wisconsin
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- St. Croix Chippewa Indians of Wisconsin
- Sokaogon Chippewa Community
- Stockbridge Munsee Community

Additionally, the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) in Wisconsin represents 11 Ojibwe tribes in Minnesota, Wisconsin, and Michigan with off-reservation hunting, fishing, and gathering treaty rights (GLIFWC n.d.). Nine of the 11 Wisconsin tribes have formal THPO designations (the Sokaogon Chippewa Community and St Croix Band of Lake Superior Chippewa do not) (WHS 2017a).

Resources of value to these tribes may be located in the ceded territory, and hence these tribes may hold interests in the ROI.

5.4.2.5 Applicant's Proposed Project

5.4.2.5.1 Archaeological Resources

Based on data from the North Dakota SHPO provided in 2017, 16 previous studies were conducted for cultural resources within the ROI of the Applicant's proposed project in that state. Of these, 13 studies were previously conducted in areas that overlap with the construction work area and 12 that overlap with the permanent right-of-way. Based on the 2017 North Dakota SHPO data, the Applicant's proposed project in North Dakota has 15 archaeological resources (sites and/or isolates) within the ROI, four of which would be located within both the construction work area and permanent right-of-way). These resources primarily consist of chipped stone and ceramics.

For the Applicant's proposed project in Minnesota, the Applicant conducted 11 archaeological surveys (Phase I) and site evaluations (Phase II) between May 2013 and August 2016 (Table 5.4.2-1).

As part of the Applicant's surveys, over 80 archaeological resources were identified and/or re-visited (i.e., those that were previously documented). According to a 2017 summary report of the investigations, 59 of the resources are located within the Applicant's proposed project (Mueller 2017). The survey corridor for the Applicant's proposed project comprised an area of 23,874 ac (9,661 ha); a total of 23,513 ac (9,515 ha) of the corridor have been surveyed by the Applicant for archaeological resources through April 2017 (Mueller 2017).

Table 5.4.2-1. Archaeological Investigations in Minnesota Conducted by the Applicant

Survey Date	Survey Type	Reference	Archaeological Resources Identified/Re-visited[a]	Period	NRHP Status Recommendations	Counties	Miles Surveyed	Acres Surveyed
May – November 2013	Phase I	Mueller et al. April 2014	48	35 - Pre-Contact Sites 12 - Post-Contact Sites 1 Pre and Post Contact Site	35 – Not eligible 2 – Recommended as eligible 2 – Recommended for additional testing 9 - Not evaluated * 1 cemetery protected by other regulations (not included in total count)	Aitkin, Carlton, Cass, Clearwater, Crow Wing, Hubbard, Polk, and Red Lake	358	16,756
April – October 2014	Phase I and Phase II	Watson et al. 2014 Addendum	9	8 – Pre-Contact Sites 1 – Post-Contact Site	6 - Not eligible 2 - Not evaluated 1 - Recommended for additional testing	Polk, Crow Wing, Clearwater, Red Lake, Cass, Hubbard, Wadena, Aitkin, and Carlton	Unknown	3,800
May – November 2014	Phase I	Mueller and Terry March 2015	18	12 - Pre-Contact Sites 5 - Post-Contact Sites 1 Pre and Post Contact Site	17 – Not eligible 1 – Not evaluated	Kittson, Marshall, Pennington, Red Lake, Polk, and Clearwater	119	8,263
July 2014	Phase II	Mueller and Terry January 2017	1	1 – Pre and Post-Contact Site	1 – Not eligible	Hubbard	Unknown	Unknown
June – August 2015	Phase I	Mueller and Terry October 2015	2	1 - Pre-Contact Site 1 - Post-Contact Site	2 – Not eligible	Aitkin, Carlton, Cass, Clearwater, Crow Wing, Hubbard, Polk, and Red Lake	Unknown	1,617

Table 5.4.2-1. Archaeological Investigations in Minnesota Conducted by the Applicant

Survey Date	Survey Type	Reference	Archaeological Resources Identified/Re-visited[a]	Period	NRHP Status Recommendations	Counties	Miles Surveyed	Acres Surveyed
August – November 2015	Phase I	Mueller et al. 2016 Addendum	4	4 – Pre-Contact Sites	4 – Not eligible	Aitkin, Carlton, Cass, Clearwater, Crow Wing, Hubbard, Polk, and Red Lake	Unknown	1,347
June – July 2015	Phase II	Watson et al. September 2015	5	5 – Pre-Contact Sites	4 – Not eligible 1 – Recommended eligible	Polk, Clearwater, Hubbard, and Carlton	Unknown	N/A
June – August 2015	Phase I	Mueller and Terry October 2015	2	2 – Post-Contact Sites	2 –Not eligible	Kittson, Marshall, Pennington, Red Lake, Polk, and Clearwater	119	8,409
August – November 2015	Phase I	Mueller et al. February 2016 Addendum	1	1 – Post –Contact Site	1 – Not eligible	Polk	Unknown	69
June – August 2016	Phase 1	Mueller September 2016	3	3 - Post-Contact Sites	3 – Not eligible	Aitkin, Carlton, Cass, Clearwater, Crow Wing, Hubbard, Polk, and Red Lake	Unknown	781 mainline/139 access roads
June – August 2016	Phase 1	Mueller September 2016	0	Not applicable	Not applicable	Kittson, Marshall, Pennington, Red Lake, Polk, and Clearwater	Unknown	61 mainline/1 access roads

[a] Please note – the total number of sites may be overrepresented as some were subject to Phase II testing, and they, therefore, may be double-counted.

Based on a review of the site numbers noted in the reports shown in Table 5.4.2-1 and SHPO consultation letters submitted by the Applicant, 18 individual sites required additional testing to assist with recommendations for NRHP-eligibility. Among the 18, one was recommended as potentially eligible. An additional three sites were recommended as NRHP-eligible after initial investigations. Some of these sites, however, may be located in survey areas that are no longer considered part of the proposed Line 3 Project. As part of the surveys, one post-contact family cemetery plot was identified. In accordance with Minnesota Statute 307.08, this site is protected from unauthorized disturbance. The survey report indicates that the cemetery is named the Harrington Homestead Cemetery (Mueller et. al 2014). This site is proximate to the Applicant's proposed project.

Based on data obtained from MHS on November 17, 2016, 53 previously recorded archaeological resources are located within the ROI for the Applicant's proposed project in Minnesota (Table 5.4.2-2). Of these 53 archaeological resources in the ROI, nine would be located within the construction work area, four of which are in the permanent right-of-way (Table 5.4.2-1).Additionally, three archaeological sites would be located within the ATWS for the Applicant's proposed project. This data does not necessarily include all of the sites recorded by the Applicant as part of their surveys.

Based on data obtained from WHS on March 29, 2017, six previously recorded archaeological resources are located within the ROI for the Applicant's proposed project in Wisconsin (Table 5.4.2-1). Four of these Wisconsin archaeological resources are historic-era cemeteries that are located outside the construction work area. The remaining two archaeological resources, including a dam/historic earthwork site and a pre-contact lithic scatter, would be within the construction work areas. The lithic scatter would also be within the permanent right-of-way.

Based on a review of NPS data (2014) and MHS data (for MN portions only), no NRHP listed historic properties (that are archaeological in nature) are located within the construction workspaces, the permanent right-of-way, or ROI for the Applicant's proposed project.

5.4.2.5.2 Historic Resources

As stated above, 16 surveys were conducted for cultural resources within the ROI of the Applicant's proposed project. Based on data from the North Dakota SHPO provided in 2017, no historic resources are located within the ROI of the Applicant's proposed project in North Dakota.

Based on data obtained from MHS on November 17, 2016, 80 previously recorded historic resources are located within the ROI for the Applicant's proposed project. These historic resources include structures, buildings, and bridges. No historic resources would be located within the construction work area (Table 5.4.2-2).

Data obtained from WHS on March 29, 2017, found 48 previously recorded historic resources located within the historic resources ROI for the Applicant's proposed project in Wisconsin (Table 5.4.2-2). These include a farmstead, foundry, houses and outbuildings, a garage, a refinery, churches, an airport hangar, structures, and a car manufacturing plant. One historic resource was identified within the construction work area, but would be outside the permanent right-of-way.

Based on a review of NPS data (2014) and MHS data (for MN portions only), no NRHP listed historic properties (that are above-ground) are located within the construction workspaces or the permanent right-of-way for the Applicant's proposed project. However, the Itasca State Park, a NRHP listed

property, is within the ROI. This resource also is referred to as the Itasca State Park CCC/WPA/Rustic Style historic resources. It contains multiple contributing resources (NPS 2014).

Thirty-seven cemeteries are located within the ROI of the Applicant's proposed project. Among these, 17 are within 0.5 mile, and 20 are within 1 mile. None are located within an American Indian reservation.

Table 5.4.2-2. Previously Recorded Archaeological and Historic Resources within the Region of Interest of the Applicant's Proposed Project

State	Number of Resources in Region of Interest (ROI)	Number of Resources in Construction Work Area	Number of Resources in Permanent Right-of-Way	Number of NRHP Listed Historic Properties within the ROI[a]
North Dakota				
Archaeological Resources	15	4	4	0
Historic Resources	0	0	0	0
Minnesota				
Archaeological Resources	53	9	4	0
Historic Resources	80	0	0	1
Wisconsin				
Archaeological Resources	6	2	1	0
Historic Resources	48	1	0	0

[a] The ROI for the Applicant's Proposed Project consists of 0.5 mile to either side of the centerline for archaeological resources and 1.0 mile to either side of the centerline for historic resources.

5.4.2.5.3 Traditional Cultural Properties

As noted in Section 5.4.1.1.6, TCPs are places of traditional religious and cultural importance. They often are associated with American Indian tribes and nations, but they can be attributed to other cultural groups. A TCP can be eligible for or listed on the NRHP. For this reason, they are considered herein.

To date, no specific studies[21] of TCPs have been completed within the ROI, and as such, no specific locations and/or details are known at this time. However, information gathered from the consultation with American Indian tribes with an interest within the ROI have indicated that TCPs are present (see Appendix P). For instance, the Ojibwe consider wild rice waters to be TCPs (Hoppe 2017).

[21] Research conducted as part of this assessment did not identify any known studies that are specific to TCPs. Therefore, the assumption that none are present within the ROI (and for those of other alternatives) does not preclude the potential for studies of this nature to exist. This assumption is carried over into the discussion in Chapter 6 of this EIS, as well.

5.4.2.6 Continued Use of Existing Line 3

5.4.2.6.1 Archaeological Resources

Based on data from the North Dakota SHPO, 16 previous studies have been conducted for cultural resources within the ROI of the existing Line 3. Of these, 13 studies were within the construction work area and 12 were within the permanent right-of-way. Based on North Dakota SHPO data, the existing Line 3 in North Dakota has 15 archaeological resources within the ROI, of which 4 would be located within both the construction work area and permanent right-of-way (Table 5.4.2-3). These resources primarily consist of chipped stone and ceramics.

Based on data obtained from MHS on November 17, 2016, 107 previously recorded archaeological resources have been identified within the ROI for the existing Line 3 pipeline in Minnesota (Table 5.4.2-3). Of these, 7 sites would be in the construction work area and 5 would be in the permanent right-of-way. Based on data obtained from WHS on March 29, 2017, six previously recorded archaeological resources are located within the ROI for the existing Line 3 pipeline in Wisconsin (Table 5.4.2-3). These include four archaeological resources that are historic-era cemeteries, a dam/historic earthwork site, and a pre-contact lithic scatter.

Based on a review of NPS data (2014), no NRHP listed historic properties (that are archaeological in nature) are located within the ROI for the existing Line 3.Table 5.4.2-3. Previously Recorded Archaeological and Historic Resources in the Region of Interest of Existing Line 3 Pipeline

State	Number of Sites in Region of Interest	Number of Sites in Construction Work Area	Number of Sites in Permanent Right-of-Way	Number of NRHP Listed Historic Properties within the ROI
North Dakota				
Archaeological Resources	15	4	4	0
Historic Resources	0	0	0	0
Minnesota				
Archaeological Resources	107	7	5	0
Historic Resources	166	3	1	4
Wisconsin				
Archaeological Resources	6	2	1	0
Historic Resources	48	1	0	0

Source: I-Sites 2017; IAS 2017; IHPA 2017; MHS 2016; North Dakota SHPO 2017; University of Iowa 2017; WHS 2017.

a The ROI for the existing Line 3 consists of 0.5 mile to either side of the centerline for archaeological resources and 1.0 mile to either side of the centerline for historic resources.

5.4.2.6.1 Historic Resources

Sixteen surveys have been conducted for cultural resources within the ROI of the existing Line 3 pipeline in North Dakota. Based on data from the North Dakota SHPO, no historic resources are located within the ROI of the existing Line 3 pipeline in North Dakota.

Based on data obtained from MHS on November 17, 2016, 166 previously recorded historic resources are located in the ROI, of which 3 sites would be in the construction work area and 1 would be in the permanent right-of-way (Table 5.4.2-3). Based on a review of NPS data (2014), four NRHP listed properties are within the ROI. These include the Supervisor's Office Headquarters (Ash Avenue, Cass Lake, Cass County), the Winnibigoshish Resort (U.S. Route 2, Bena, Cass County), the Itasca Lumber Company Superintendent's House (506 5th Street, Southeast, Deer River, Itasca County), and Central School (North Pokegama and 4th Street, Grand Rapids, Itasca County).

Data obtained from WHS on March 29, 2017, shows 48 previously recorded historic resources are located within the ROI for the existing Line 3 pipeline in Wisconsin. These include a farmstead, foundry, houses and outbuildings, garage, refinery, churches, airport hangar, structures, and a car manufacturing plant. Thirty-seven cemeteries are located within the ROI of the existing Line 3. Among these, 18 are within 0.5 mile, and 19 are within 1 mile. Four of these are located within the boundaries of the Leech Lake Reservation. They include the Mary Donald Cemetery, the Pine Grove Cemetery, the Saint Joseph Cemetery, and the Thompson Cemetery.

5.4.2.6.2 Traditional Cultural Properties

To date, no specific studies of TCPs have been completed within the ROI. However, information gathered from the consultation with American Indian tribes with an interest within the ROI have indicated that TCPs are present (see Appendix P). The Ojibwe consider wild rice waters to be TCPs. Among these TCPs is Deadfish Lake. Comments provided to the DOC indicate that a ditch is present that feeds directly into the lake and that is crossed by the existing Line 3 (Hoppe 2017).

5.4.2.7 System Alternative SA-04

5.4.2.7.1 Archaeological Resources

Based on the North Dakota SHPO records, a total of 156 studies have been conducted within the 1-mile ROI for historic resources of SA-04. Of these studies, 126 were conducted within the 0.5-mile ROI for archaeological resources, 51 were conducted within the construction work area, and 46 were conducted within the permanent right-of-way.

A total of 32 archaeological resources are located within the 0.5-mile ROI in North Dakota (Table 5.4.2-4). Of these, five archaeological resources would be located in the construction work area, four of which would be located in the permanent right-of-way. These 32 resources include isolated finds of chipped stone, cultural material scatters (including projectile points and chipped stone), railroads, and trails.

Based on data obtained from MHS on November 17, 2016, one previously recorded archaeological resource is located within the archaeological resources study area for SA-04 (Table 5.4.2-4) in Minnesota, and there are no previously recorded archaeological resources within the construction work area for SA-04 in Minnesota.

A search in the ROI was conducted within the Iowa Archaeological Site File by the Site Records Manager. A total of 138 studies were conducted within the ROI, of which 67 studies were in the construction work area, and 59 in the permanent right-of-way. A total of 98 archaeological resources would be located in the 0.5-mile ROI for SA-04 in Iowa (Table 5.4.2-4). These include 35 sites in the construction work area, 27 of which would be in the permanent right-of-way. These resources include prehistoric scatters, lithic scatters, lithic workshops, isolated finds, open habitations, structure/building remains, abandoned town sites, and historic scatters.

Based on data obtained from IAS on March 29, 2017, 136 previously recorded archaeological resources were identified within the ROI in Illinois, including four cemeteries. Of the 136 archaeological sites in the ROI, 9 sites would be located within the construction work area. Of the 9 archaeological sites in the construction work area, 8 sites would be within the permanent right-of-way. Two archaeological sites located within the permanent right-of-way remain unevaluated by the Illinois SHPO for listing in the NRHP, including a pre-contact village site and pre-contact campsite. The other six sites have been determined not eligible for listing in the NRHP. No cemeteries were identified within either the construction work area or the permanent right-of-way.

Based on a review of NPS data (2014) and MN data (for MN portions only), no NRHP listed historic properties (that are archaeological in nature) are located within the ROI for SA-04.

5.4.2.7.2 Historic Resources

Based on North Dakota SHPO data, a total of 359 historic resources are located within the ROI in North Dakota (Table 5.4.2-4). No historic resources are within the construction work area or the permanent right-of-way. Historic resources in North Dakota include bridges, farmsteads, barns, churches, and outbuildings. NRHP listings for the ROI in North Dakota were reviewed using NPS data (2014). Eight NRHP-listed resources are located within the ROI of SA-04. These include the following:

- Adam Fairview Bonanza Farm – 7170 82nd Street, Southeast, Wahpeton, Richland County
- Drayton United Methodist Church – North Dakota 44, Drayton, Pembina County
- First State Bank of Buxton - 423 Broadway Street, Buxton, Traill County
- Nelson's Grocery - Main and 3rd Streets, Christine, Richland County
- Amos and Lillie Plummer House - 306 West Caledonia Avenue, Hillsboro, Traill County
- O.C. Sarles House - 2nd Avenue and 3rd Street, Northeast, Hillsboro, Traill County
- Post Office – Main and 3rd Streets, Christine, Richland County
- Traill County Courthouse – U.S. 81 Hillsboro, Traill County.

For SA-04, no NRHP-listed resources are within the construction work area in North Dakota.

Based on data obtained from MHS on November 17, 2016, three previously recorded historic resources are within the ROI for SA-04 (Table 5.4.2-4) in Minnesota. A review of NRHP listings also indicates that the Alberta Teacher's House (Main Street, Alberta, Stevens County) is located within the ROI (NPS 2014). None would be located within the construction work area or the permanent right-of-way for SA-04.

Based on I-Sites (University of Iowa 2017), a total of 208 historic studies have been previously conducted in the ROI in Iowa. 222 previously recorded historic resources are located within the ROI in Iowa (Table 5.4.2-4). The previously recorded resources include 29 cemeteries and 42 bridges. The remainder of the resources are primarily associated with farms. Of the 222 resources, 219 resources remain undetermined for NRHP eligibility (Office of the State Archaeologist 2017). Four NRHP-listed resources are within the ROI: Stoe Creek Bridge (V Avenue over Stoe Creek, Oelein, Fayette County), the

Richardson-Jakway House (Rural Route #1, Aurora, Buchanan County), the Lock and Dam No. 14 Historic District (near LeClaire, IA), and Dr. Martin H. Calkins House and Office (Washington and Main Streets, Wyoming, Jones County) (NPS 2014). No historic properties would be located within the construction work area or the permanent right-of-way in Iowa.

According to HARGIS (IHPA 2017), 77 previously recorded historic resources are located within the ROI in Illinois (Table 5.4.2-4). Four of these resources are listed in the NRHP: the Wood-Tellkamp House (201181 – 82 Main Street, LaMoille, Bureau County), the First Congregational Church of LaMoille (201032– 94 Franklin Street, LaMoille, Bureau County), the Allen School (201034– 301 Main Street, LaMoille, Bureau County), and the Dresden Island Lock and Dam Historic District (7521 North Lock Road, Morris, Grundy County) (04000164) (IHPA 2017, NPS 2014). Two additional historic resources, the Bridge over Baker Run (154875) and the Bridge over Masters Creek (153691), have been determined eligible for the NRHP (IHPA 2017).

Seventy cemeteries are located within the ROI of SA-04. Among these, 26 are within 0.5 mile, and 44 are within 1 mile. None are located within an American Indian reservation.

Table 5.4.2-4. Previously Recorded Archaeological and Historic Resources for System Alternative SA-04

Route Segment	Number of Sites in Region of Interest (ROI)	Number of Sites in Construction Work Area	Number of Sites in Permanent Right-of-Way	Number of NRHP Listed Historic Properties within the ROI
North Dakota				
Archaeological Resources	32	5	4	0
Historic Resources	359	0	0	8
Minnesota				
Archaeological Resources	1	0	0	0
Historic Resources	4	0	0	1
Iowa				
Archaeological Resources	98	35	27	0
Historic Resources	222	0	0	4
Illinois				
Archaeological Resources	136	9	8	0
Historic Resources	77	0	0	4

Source: I-Sites 2017; IAS 2017; IHPA 2017; MHS 2016; North Dakota SHPO 2017; University of Iowa 2017; WHS 2017.

[a] The ROI for SA-04 consists of 0.5 mile to either side of the centerline for archaeological resources and 1.0 mile to either side of the centerline for historic resources.

5.4.2.7.3 Traditional Cultural Properties

To date, no specific studies of TCPs have been completed within the ROI and, as such, no specific locations and/or details are known at this time. However, information gathered from the consultation

with American Indian tribes with an interest within the ROI have indicated that TCPs are present (see Appendix P). For instance, the Ojibwe consider wild rice waters to be TCPs (Hoppe 2017).

5.4.2.8 Transportation by Rail

In the United States, the rail offloading facility would require between 100 and 200 acres of land that is identified as agricultural lands and wetlands near Clearbrook, Minnesota, along with reestablishment of 10 miles of existing track in Clearbrook.

The rail offloading facility near Superior, Wisconsin, would require approximately 100 acres adjacent to the existing Enbridge terminal and construction of a less-than-one-mile interconnection between existing rail lines in Superior.

5.4.2.8.1 Archaeological Resources

Four archaeological resources are within the ROI for the Clearbrook offloading facility. These include post-contact surface features, artifact scatters, and pre-contact single artifacts. Six archaeological resources within the ROI for the Superior facility and connection. Four of these are cemeteries.

Based on a review of NPS data (2014), no NRHP listed historic properties (that are archaeological in nature) are located within the ROI for the Clearbrook or Superior offloading facilities.

5.4.2.8.2 Historic Resources

Twelve historic resources are within the ROI for the Clearbrook offloading facility. 47 historic resources are within the ROI for the Superior facility, including houses, farms, outbuildings, a church, an airport, and foundries, among other buildings, structures, and objects.

Based on a review of NPS data (2014), no NRHP listed historic properties (that are above-ground) are located within the ROI for the Clearbrook or Superior offloading facilities. No cemeteries are located within the ROI of the Clearbrook or Superior offloading facilities.

5.4.2.8.3 Traditional Cultural Properties

To date, no specific studies of TCPs have been completed within the ROI, and as such, no specific locations and/or details are known at this time. However, information gathered from the consultation with American Indian tribes with an interest within the ROI have indicated that TCPs are present (see Appendix P). For instance, the Ojibwe consider wild rice waters to be TCPs (Hoppe 2017).

5.4.2.9 Transportation by Truck

In the United States, truck facilities near Clearbrook would require approximately 50 acres to construct and operate offloading facilities, and approximately five acres for road access. Truck facilities near the terminal in Superior would require approximately 50 acres to construct and operate a truck offloading facility, and an additional 34 acres to establish a truck route. Specific locations for these facilities have not been identified, but each facility would be located in a general area adjacent to the terminals where the truck facilities (or the rail offloading facilities) would be expected to be constructed, and the ROI for both archaeological and historic resources is the same for both the truck and rail alternatives. Thus, the resources within the ROI are the same as well.

5.4.2.9.1 Archaeological Resources

Four known archaeological resources are within the ROI for the Clearbrook offloading facility. Two are post-contact surface features, and two are pre-contact single artifacts. Six archaeological resources are within the ROI for the Superior facility and connection. Four of these are cemeteries.

Based on a review of NPS data (2014), no NRHP listed historic properties (that are archaeological in nature) are located within the ROI for the Clearbrook or Superior offloading facilities.

5.4.2.9.2 Historic Resources

Twelve known historic resources are within the ROI near Clearbrook, Minnesota. All of these resources are buildings or structures and include houses, a bank, a warehouse, a grain elevator, and a train station. Forty-seven historic resources are within the ROI for the Superior facility, including houses, farms, outbuildings, a church, an airport, and foundries as well as other buildings, structures, and objects.

Based on a review of NPS data (2014), no NRHP listed historic properties (that are above-ground) are located within the ROI for the Clearbrook or Superior offloading facilities. No cemeteries are located within the ROI of the Clearbrook or Superior offloading facilities.

5.4.2.9.3 Traditional Cultural Properties

To date, no specific studies of TCPs have been completed within the ROI, and as such, no specific locations and/or details are known at this time. However, information gathered from the consultation with American Indian tribes with an interest within the ROI have indicated that TCPs are present (see Appendix P). For instance, the Ojibwe consider wild rice waters to be TCPs (Hoppe 2017).

5.4.2.10 Existing Line 3 Supplemented by Rail

The existing conditions for the existing Line 3 supplemented by rail alternative are identical to those described above for continued use of the existing Line 3 pipeline and transportation by rail alternatives.

5.4.2.11 Existing Line 3 Supplemented by Truck

The existing conditions for the existing Line 3 supplemented by truck alternative are identical to those described above for continued use of the existing Line 3 pipeline and transportation by truck alternatives.

5.4.3 Impact Assessment

Impacts occur when an undertaking alters, directly or indirectly, the characteristics of a cultural resource that qualify it for inclusion in the SRHP, the State Historic Site Network, or the NRHP in a manner that diminishes the historical integrity of the property.

The Project would cause impacts on cultural resources (e.g., archaeological resources, historic resources, and TCPs) during construction and operations. Direct and/or indirect impacts are those that may affect the ability of a cultural resource to convey its significance. These types of impacts may result in changes to a resource's integrity, visibility, accessibility, and research potential. The duration of impact could range from temporary to permanent, depending on the type of impact and type of cultural resource. The magnitude of impact could range from negligible to major, depending on the type of cultural

resource that would be affected and its location relative to the construction work area or permanent right-of-way.

Direct impacts are the physical disturbances of an action (e.g., construction, operation, or restoration) on a resource that occur at the same time and place as the action within the footprint of the physical disturbance. The types of direct impacts on cultural resources during construction and operation may include the following:

- Physical destruction of or damage to a cultural resource/historic property;
- Alteration of a cultural resource/historic property;
- Removal of a cultural resource/ historic property from its historic location;
- Change of the character of the cultural resource's/ historic property's use or of physical features as they relate to historical setting; and/or
- Neglect of a cultural resource/ historic property that causes its deterioration (except where such neglect and deterioration are recognized qualities of a sacred place).

The level of impact would depend on the type of archaeological resource and its eligibility for listing in the State Register of Historic Places, the State Historic Site Network, or the NRHP, as well as its significance to affected American Indian tribes (e.g., a sacred place). A resource that is eligible for listing in the NRHP generally would experience a higher magnitude of impacts than a site that is not eligible for the same register based on the site's importance to the affiliated culture or state. Single artifacts and surface sites may have a low potential to yield information important to prehistory or history as they may lack context. The level of impact also would vary depending on the location of the construction-related activity and the type of soil, bedrock, and vegetation. For example, vegetation removal may cause damage to surface sites more than deeply buried sites. Compaction may cause impacts on shallow sites and not affect deeply buried sites. If an archaeological site is directly affected, the impact would be permanent and would range in magnitude from minor to major.

Unknown archaeological resources may be located within the construction work area that could be inadvertently discovered during ground-disturbing activities. To reduce impacts on currently unknown archaeological resources, an Unanticipated Discovery Plan (Appendix O) would be implemented during construction. Impacts on inadvertently discovered archaeological resources would be similar to those described for previously recorded resources.

Contamination of archaeological resources could occur from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities for the Applicant's proposed project or CN Alternatives. These spills would be managed according to SPCC Plans. Direct impacts on archaeological resources due to contamination and disturbance from cleanup activities would be permanent, depending on the type and location of resource and would range in magnitude from minor to major. Direct impacts on historic resources would range from temporary to permanent and negligible to major, depending on the type and location of resource.

Indirect impacts may change the character of the property's use or physical features within the property's setting that contribute to its historic significance and integrity. Indirect impacts during construction and operations may include:

- Permanent change in viewshed of a historic resource;
- Limited or altered access to a historic resource, whereby the resource may be neglected and fall into ruin, or conversely, access to a historic resource may be facilitated, causing vandalism to increase;
- Introduction of visual, atmospheric, or audible elements that diminish integrity;
- Temporary construction-related impacts including dust, noise, vibration, and visual intrusions caused by heavy equipment.

Indirect impacts from construction activities, such as visual, auditory, and atmospheric changes, generally would be temporary. Evidence of construction would be visible during and for a short period after construction. Indirect impacts could be caused by changes to the surrounding landscape from clearing, excavation, construction equipment, and personnel. These impacts would typically be minor for cultural resources; however, some cultural resources may experience major impacts as a result of viewshed changes or inaccessibility. The changes in viewshed and accessibility would decrease over time. During revegetation, the visual impact from pipeline construction would typically be minor but may last several years or even decades (e.g., trees).

Since only the Applicant's proposed project was surveyed, the analyses for the remaining alternatives are based on the archival review of existing site data. As such, a greater number of cultural resources may be present within the ROI, construction work area, and permanent right-of-way for the alternatives. In addition, even where known resources exist, the significance of these resources may have not been evaluated.

5.4.3.1 Applicant's Proposed Project

For the Applicant's proposed project, no listed NRHP archaeological resources or historic resources are present within the construction workspaces or the permanent right-of-way (based on a review of NPS (2014) data and MHS data for the MN portions of the project). In this manner, no direct or indirect impacts would be anticipated to occur to these types of resources. However, other archaeological resources are present within the construction workspaces, permanent right-of-way, and within the ROI; direct and indirect impacts may occur to these resources. In addition, indirect impacts may occur to historic resources located within the ROI, including to one NRHP-listed property, the Itasca State Park.[22]

5.4.3.1.1 Construction Impacts

Impacts on Archaeological Resources

Fifteen known archaeological resources are within the construction work area of the Applicant's proposed project (Table 5.4.2-2). Construction-related activities such as excavation, grading, rutting, compaction, and removing vegetation would directly affect these archaeological resources. Damage to an archaeological resource could occur from clearing and grading of the pipeline alignment, construction work area, temporary workspaces, access roads, pump stations, and materials staging areas. An

[22] An ancestral burial ground was re-identified upon the construction of a nearby transportation project (to the Applicant's proposed project) at Highway 23 and 4th Street near Duluth, Minnesota. The full extent of the impact area to the burial ground has not yet been determined. While this burial ground is associated with the Fond du Lac Band, it will not be disturbed or impacted by the Applicant's proposed project or alternatives; the cemetery is over 3 miles from the closest alternative.

increased risk of erosion, vandalism, and looting of an archaeological resource may result from removal of protective vegetative cover, and compaction of archaeological resources could occur from movement of heavy machinery and transport of pipe sections, which may alter site stratigraphy and artifact morphology. In addition, impacts could be associated with Project-related spills including contamination, disturbance during cleanup activities, or encountering existing contamination (see Section 5.2.2).

Direct impacts on archaeological sites during construction would be permanent and minor to major depending on the type of resource and its eligibility for listing in the State or National Register. Some impacts would likely require mitigation that would be determined in consultation with the SHPO, affected American Indian tribes, and the public (see Section 5.4.4). Indirect impacts during construction would be temporary, localized, and negligible to minor. Temporary impacts, including vibration, changes in noise and air quality, and visual intrusions, may occur during construction.

Impacts on Historic Resources

A total of 128 known historic resources are within the ROI for the Applicant's proposed project one of which would be within the construction work area in Wisconsin (Table 5.4.2-2). Construction-related direct impacts on this known historic resource could occur and could include destruction and alteration to the resource, moving of associated historic features, as well as visual changes. These direct impacts would be permanent and minor to major.

Indirect temporary impacts may occur on the remaining 127 historic resources within the ROI, including dust, vibration, and intrusion related to construction equipment, as well as construction-related noise. These indirect impacts would be temporary and negligible to minor. Indirect visual intrusions due to vegetative clearing would be long-term and negligible to minor. Indirect impacts from the construction of aboveground facilities would be permanent and negligible to major. The viewshed contains existing pipeline rights-of-way and transmission lines, and the changes in viewshed would decrease over time from revegetation within temporary construction work areas and to a lesser degree the permanent right-of-way.

5.4.3.1.2 Operations Impacts

Impacts on Archaeological Resources

Disturbed areas would be restored and stabilized to the extent practicable after pipeline installation. Such restoration is unlikely to cause damage to cultural resources beyond what may occur during construction. Inspection, monitoring, and maintenance activities are unlikely to affect the four archaeological resources within the permanent right-of-way, because these activities would be undertaken using established access routes. The archaeological resources present within the permanent right-of-way would have been directly affected during construction, and as such, additional impacts from these activities would not be expected. Direct impacts associated with Project-related spills or encountering existing contamination could occur (see Section 5.2.2 and Chapter 10); however, no additional impacts would be expected as the archaeological resources would have already been disturbed during construction.

If operations-related activities result in direct impacts on archaeological resources that were not previously disturbed during construction (i.e., avoided) or to those resources that are adjacent to the construction work area, then the impacts would be permanent and minor to major. Some impacts

would likely require mitigation that would be determined in consultation with the SHPO, affected American Indian tribes, and the public (see Section 5.4.4).

If new ground disturbance occurs during the lifespan of the Project, it would occur within the already disturbed permanent right-of-way or construction work area. As such, direct impacts on archaeological resources would have already occurred during construction, and thus, any new ground disturbance is unlikely to cause additional impacts on these resources. However, if archaeological resources had been avoided during construction, or if they are adjacent to the construction work area, then new ground disturbance may cause new impacts on these resources, which would be permanent and minor to major.

Indirect impacts during operations would be temporary, localized, and negligible to minor. Temporary impacts would include vibration, changes in noise and air quality, and visual intrusions.

Impacts on Historic Resources

Operations impacts are unlikely to directly impact historic resources, as no known historic resources are located within the permanent right-of-way. Indirect temporary impacts may occur on the historic resources within the ROI during pipeline operations. These indirect impacts would primarily consist of the presence of MLVs, pump stations, and maintenance crews and would be temporary to permanent and negligible to minor.

Indirect visual intrusions from the new pipeline would be permanent as the viewshed contains existing pipeline rights-of-way and transmission lines, and the changes in viewshed would decrease over time from revegetation of temporary construction work areas and to a lesser degree the permanent right-of-way.

5.4.3.1.3 Traditional Cultural Properties

Without specific knowledge of the particulars of a TCP, the assessment of potential impacts is difficult to accomplish. A TCP may be important for a variety of reasons, may incorporate a small or large geographic area, and may have unique qualities that make it eligible for listing on the NRHP. In this manner, impacts would vary greatly depending on the location of the TCP in relation to a project component.

5.4.3.2 Continued Use of Existing Line 3

For the continued use of existing Line 3, no listed NRHP archaeological resources are present within the ROI (based on a review of NPS (2014) data). Therefore, no direct impacts would be anticipated to occur to these types of resources. Direct impacts to other archaeological resources generally are not anticipated since the line is already in place; however, as discussed herein, some potential exists during maintenance activities. Indirect impacts may occur to both archaeological and historic resources located within the ROI.

5.4.3.2.1 Construction Impacts

No construction impacts on archaeological and historic resources would be anticipated to occur from continued use of the existing Line 3 pipeline because it is already built.

5.4.3.2.2 Operations Impacts

Impacts on Archaeological Resources

No direct impacts on the five archaeological resources within the permanent right-of-way are expected with continued use of the existing Line 3, because the Enbridge Mainline corridor has been extensively disturbed from previous pipeline construction, operations, and maintenance, and ground disturbance would not likely occur in new areas during integrity digs.

Inspection, monitoring, and maintenance activities are unlikely to affect the archaeological resources within the permanent right-of-way because these activities would be undertaken using established access routes. The archaeological resources present within the permanent right-of-way would have been directly affected during construction, and as such, additional impacts from these activities would not be expected. Direct impacts associated with Project-related spills or encountering existing contamination could occur (see Section 5.2.2 and Chapter 10); however, no additional impacts would be expected, as the archaeological resources would have already been disturbed during construction.

If operations-related activities result in direct impacts on archaeological resources that were not previously disturbed during construction (i.e., avoided) or to those resources that are adjacent to the construction work area, then the impacts would be permanent and minor to major. Some impacts would likely require mitigation that would be determined in consultation with the SHPO, affected American Indian tribes, and the public (see Section 5.4.4).

If new ground disturbance occurs during the lifespan of the Project, it would occur within the already disturbed permanent right-of-way or construction work area. As such, direct impacts on archaeological resources would have already occurred during construction, and thus, any new ground disturbance is unlikely to cause additional impacts on these resources. However, if archaeological resources are avoided during construction, or if they are adjacent to the construction work area, then new ground disturbance may cause new impacts on these resources, which would be permanent and minor to major.

Indirect impacts during operations would be temporary, localized, and negligible to minor. Temporary impacts would include vibration, changes in noise and air quality, and visual intrusions.

Impacts on Historic Resources

No direct impacts on known historic resources are expected with continued use of the existing Line 3 because the Enbridge Mainline corridor has been extensively disturbed from previous pipeline construction, operations, and maintenance, and ground disturbance would not likely occur in new areas during integrity digs. Maintenance activities may indirectly impact the single historic resource within the permanent right-of-way or the remaining 165 historic resources in the ROI (three of which are in the construction work area), comparable to those described for new pipeline construction, including dust, vibration, and intrusion related to maintenance equipment and personnel. Indirect impacts would be temporary and negligible to minor.

5.4.3.2.3 Traditional Cultural Properties

The discussion of potential impacts on TCPs would be the same as provided in Section 5.4.3.1.3.

5.4.3.3 System Alternative SA-04

For SA-04, no listed NRHP archaeological resources are present within the ROI (based on a review of NPS [2014] data). Therefore, no direct impacts would be anticipated to occur to these types of resources. However, other archaeological resources are present within the ROI; direct and indirect impacts may occur to these resources. While NRHP listed properties that are above-ground are located within the ROI, it is assumed that if this alternative were to be constructed, these types of resources would not be directly impacted; indirect impacts, however, may occur. Direct and indirect impacts, however, may occur to other historic resources located within the ROI.

5.4.3.3.1 Construction Impacts

Impacts on Archaeological Resources

A total of 49 known archaeological resources would be within the construction work area for SA-04 (Table 5.4.2-4). Construction-related impacts would be the same as described above for archaeological resources within the Applicant's proposed project. Direct impacts would be permanent and minor to major; indirect impacts would be temporary and negligible to minor. However, a greater number of archaeological resources would be affected by SA-04 than by the Applicant's proposed project. Additionally, a greater chance of encountering unknown archaeological resources is present given that surveys have not been conducted along this alternative.

Impacts on Historic Resources

No known historic resources are within the construction work area for SA-04; however, a 662 known historic resources are in the ROI (Table 5.4.2-4). No construction-related direct impacts on historic resources are expected as no known historic resources are located within the construction work area. Construction-related activities may cause indirect impacts on historic resources located in the ROI. These indirect impacts would be similar to those described for the Applicant's proposed project, resulting from pipeline construction, aboveground facilities, staging areas, and access roads. These indirect impacts would be temporary to permanent and negligible to major.

5.4.3.3.2 Operations Impacts

Impacts on Archaeological Resources

Disturbed areas would be restored and stabilized to the extent practicable after pipeline installation. Such restoration is unlikely to cause damage to the 39 known archaeological resources within the permanent right-of-way beyond what may occur during construction. Inspection, monitoring, and maintenance activities are unlikely to affect the archaeological resources within the permanent right-of-way because these activities would be undertaken using established access routes. The archaeological resources present within the permanent right-of-way would have been directly affected during construction, and as such, additional impacts from these activities would not be expected. Direct impacts associated with Project-related spills or encountering existing contamination could occur (see Section 5.2.2 and Chapter 10); however, no additional impacts would be expected as the archaeological resources would have already been disturbed during construction.

If operations-related activities result in direct impacts on archaeological resources that were not previously disturbed during construction (i.e., avoided) or to those resources that are adjacent to the construction work area, then the impacts would be permanent and minor to major. Some impacts

would likely require mitigation that would be determined in consultation with the SHPO, affected Indian tribes, and the public (see Section 5.4.4).

If new ground disturbance occurs during the lifespan of the Project, it would occur within the already disturbed permanent right-of-way or construction work area. As such, direct impacts on archaeological resources would have already occurred during construction, and thus, any new ground disturbance is unlikely to cause additional impacts on these resources. However, if archaeological resources had been avoided during construction, or if they are adjacent to the construction work area, then new ground disturbance may cause new impacts on these resources, which would be permanent and minor to major.

Indirect impacts during operations would be temporary, localized, and negligible to minor. Temporary impacts would include vibration, changes in noise and air quality, and visual intrusions.

Impacts on Historic Resources

Operations are unlikely to cause direct impacts on historic resources as no known historic resources are located within the permanent right-of-way. Operations-related activities may cause indirect impacts on the 662 known historic resources located in the ROI. These indirect impacts would be similar to those described for the Applicant's proposed project including visual intrusions, viewshed changes, dust, noise and vibration caused from maintenance equipment and personnel. Indirect impacts would be temporary to permanent and negligible to minor.

5.4.3.3.3 Traditional Cultural Properties

The discussion of potential impacts on TCPs would be the same as provided in Section 5.4.3.1.3.

5.4.3.4 Transportation by Rail

For the transportation by rail alternative, no listed NRHP archaeological resources or historic resources are present within the ROI. In this manner, no direct or indirect impacts would be anticipated to occur to these types of resources. However, direct and indirect impacts may occur to other archaeological and historic resources located within the ROI, especially as the specific location of facilities has not been determined.

5.4.3.4.1 Construction Impacts

Impacts on Archaeological Resources

Four known archaeological sites are within the ROI for Clearbrook, and six known archaeological sites are within the ROI for Superior, which may be directly affected during construction of offloading facilities and associated access. Direct impacts could result from grading, vegetation removal, leak containment, and any inadvertent exposure of contaminated sediments. Construction activity may expose archaeological resources to looting and vandalism. These impacts would be permanent and may range in magnitude from minor to major, depending on the specific resource. Measures likely would be taken to avoid known important archaeological resources during construction of facilities associated with this alternative, and plans would likely be in place to address unanticipated discoveries of archaeological resources.

Indirect impacts would primarily be related to visual, auditory, and air quality changes during construction which may affect the setting or significant qualities of archaeological resources. These impacts would likely be temporary and negligible to minor.

Impacts on Historic Resources

Twelve known historic resources are within the ROI for Clearbrook, all of which are in the town. Forty-seven historic resources are within the ROI for Superior. Construction-related direct impacts could occur if resources are present within an area for ground disturbance, including destruction and alteration, and moving of associated historic features, as well as visual changes. These direct impacts, if they did occur, could be permanent and minor to major.

Indirect impacts would occur during construction of the new spur lines and loading/offloading facilities. These indirect impacts may include temporary construction-related impacts such as viewshed changes, noise, vibration, and dust, which would be negligible to minor. Long-term indirect impacts would result from vegetation removal, which could be negligible to minor. Permanent indirect impacts may include visual or auditory changes that affect the setting or significant qualities of historic resources, which would be minor to major. Construction activity also may temporarily prevent access to historic resources for a short time while construction and reclamation activities are ongoing, which would result in indirect temporary impacts that are negligible to minor.

5.4.3.4.2 Operations Impacts

Impacts on Archaeological Resources

Operation of the transportation by rail alternative includes operation of the offloading facilities and associated access adjacent to the Clearbrook and Superior terminals and use of existing rail lines. It would not involve any new ground disturbance. Therefore, direct impacts are not anticipated.

Direct impacts associated with Project-related spills or encountering existing contamination could occur (see Section 5.2.2 and Chapter 10); however, no additional impacts would be expected to archaeological resources that would have already been disturbed during construction. Regular inspection of rail cars for leaks would minimize the potential for such contamination; however, contamination could be permanent and minor to major, depending on the type of archaeological resource and soil permeability.

If operations-related activities result in direct impacts on archaeological resources that were not previously disturbed during construction (i.e., avoided) or to those resources that are adjacent to the construction work area, then the impacts would be permanent and minor to major. Some impacts would likely require mitigation that would be determined in consultation with the SHPO, affected American Indian tribes, and the public (see Section 5.4.4).

If new ground disturbance occurs during the lifespan of the Project, it would occur within the already disturbed permanent right-of-way or construction work area. As such, direct impacts on archaeological resources would have already occurred during construction, and thus, any new ground disturbance is unlikely to cause additional impacts on these resources. However, if archaeological resources had been avoided during construction, or if they are adjacent to the construction work area, then new ground disturbance may cause new impacts on these resources, which would be permanent and minor to major.

Known archaeological resources in proximity to these rail lines may be indirectly affected by dust and vibration, although these impacts are currently occurring from existing rail traffic. Operation of the

transportation by rail alternative would likely result in temporary negligible to minor indirect impacts on archaeological resources.

Impacts on Historic Resources

During operation of the transportation by rail alternative, trains hauling crude oil would use existing rail lines to access offloading facilities and associated access at the Clearbrook and Superior terminals. These operations would not involve ground disturbance. As such, direct impacts on historic resources are not anticipated. However, minor spills along existing and newly constructed rail lines have the potential to directly and indirectly affect historic resources through contamination, changes in access and setting, and response activities. Regular inspection of rail cars for leaks would minimize the potential for such contamination, and impacts would likely be temporary and minor; although some contamination could be permanent and negligible to major, depending on the type of cultural resource.

Indirect impacts related to access to a historic resource or changes to its visual, auditory, and air quality setting may result from an increase in rail traffic. However, historic resources along existing lines are already subject to rail traffic, and as such, these indirect impacts would be temporary and negligible to minor.

5.4.3.4.3 Traditional Cultural Properties

The discussion of potential impacts on TCPs would be the same as provided in Section 5.4.3.1.3.

5.4.3.5 Transportation by Truck

For the transportation by truck alternative, no listed NRHP archaeological resources or historic resources are present within the ROI. In this manner, no direct or indirect impacts would be anticipated to occur to these types of resources. However, direct and indirect impacts may occur to other archaeological and historic resources located within the ROI, especially as the specific location of facilities has not been determined.

5.4.3.5.1 Construction Impacts

Impacts on Archaeological Resources

Four known archaeological sites are within the ROI for Clearbrook, and six known archaeological sites are within the ROI for Superior, which may be directly affected during construction of offloading facilities and associated access. Direct and indirect impacts could occur from construction of new offloading sites and access routes. Construction would require clearing and grading adjacent to the Clearbrook and Superior terminals. Direct impacts could result from grading, vegetation removal, leak containment, and any inadvertent exposure of contaminated sediments. Construction activity may expose archaeological resources to looting and vandalism. These impacts would be permanent, and may range in magnitude from minor to major, depending on the specific resource. Measures likely would be taken to avoid known important archaeological resources during construction of facilities associated with this alternative, and plans would likely be in place to address unanticipated discoveries of archaeological resources. In areas with existing routes, direct impacts on archaeological resources would likely be minimal if no ground disturbance was involved.

Indirect impacts would primarily be related to visual, auditory, and air quality changes during construction which may affect the setting or significant qualities of archaeological resources. These

impacts would be temporary and negligible to minor. Cultural resources along existing routes are already subject to truck traffic. However, the increase in truck traffic could indirectly affect the visual, auditory, and air quality setting of, or access to, archaeological resources. These indirect impacts would be temporary and negligible to minor.

Impacts on Historic Resources

Twelve known historic resources are within the ROI for Clearbrook, all of which are in the town of Clearbrook. Forty-seven historic resources are within the ROI for Superior. Construction-related direct impacts could occur if resources are present within an area for ground disturbance, including destruction and alteration, and moving of associated historic features, as well as visual changes. These direct impacts would be permanent and minor to major.

Indirect impacts would occur during construction of the new offloading sites and access routes. These indirect impacts may include temporary construction-related impacts such as viewshed changes, noise, vibration, and dust, which would be negligible to minor. Long-term indirect impacts would result from vegetation removal, which could be negligible to minor. Permanent indirect impacts may include visual or auditory changes that affect the setting or significant qualities of historic resources, which would be minor to major. Construction activity also may temporarily prevent access to historic resources for a short time while construction and reclamation activities are ongoing, which would result in indirect temporary impacts that are negligible to minor.

5.4.3.5.2 Operations Impacts

Impacts on Archaeological Resources

Operation of the transportation by truck alternative includes use of existing roads and highways and offloading facilities and associated access adjacent to the Clearbrook and Superior terminals. Operations would not involve ground disturbance.

Direct impacts associated with Project-related spills or encountering existing contamination could occur (see Section 5.2.2 and Chapter 10); however, no additional impacts would be expected to archaeological resources that would have already been disturbed during construction. Regular inspection of trucks for leaks would minimize the potential for such contamination; however, contamination could be permanent and minor to major, depending on the type of archaeological resource and soil permeability.

If operations-related activities result in direct impacts on archaeological resources that were not previously disturbed during construction (i.e., avoided) or to those resources that are adjacent to the construction work area, then the impacts would be permanent and minor to major. Some impacts would likely require mitigation that would be determined in consultation with the SHPO, affected American Indian tribes, and the public (see Section 5.4.4).

If new ground disturbance occurs during the lifespan of the Project, it would occur within the already disturbed permanent right-of-way or construction work area. As such, direct impacts on archaeological resources would have already occurred during construction, and thus, any new ground disturbance is unlikely to cause additional impacts on these resources. However, if archaeological resources had been avoided during construction, or if they are adjacent to the construction work area, then new ground disturbance may cause new impacts on these resources, which would be permanent and minor to major.

Known archaeological resources in proximity to these roads may be indirectly affected by dust and vibration, although these impacts are currently occurring from existing traffic. Operation of the transportation by truck alternative would likely result in temporary negligible to minor indirect impacts on archaeological resources.

Impacts on Historic Resources

During operation of the transportation by truck alternative, trucks hauling crude oil would use existing roads and highways and offloading facilities and associated access at the Clearbrook and Superior terminals. Operations would not involve ground disturbance. As such, direct impacts on historic resources are not anticipated. However, minor spills have the potential to directly and indirectly affect historic resources through contamination, changes in access and setting, and response activities. These impacts would be temporary to permanent and negligible to major.

Historic resources in proximity to these roads (e.g., bridges) may be indirectly affected by dust and noise. However, these impacts are currently occurring from existing traffic, and as such, these indirect impacts would be temporary and negligible to minor.

5.4.3.5.3 Traditional Cultural Properties

The discussion of potential impacts on TCPs would be the same as provided in Section 5.4.3.1.3.

5.4.3.6 Existing Line 3 Supplemented by Rail

5.4.3.6.1 Construction Impacts

Impacts on Archaeological Resources

No construction impacts on archaeological resources would be anticipated from the continued use of the existing Line 3 pipeline, because it is already built. Impacts related to the construction of facilities and access required for the transportation by rail alternative would be the same as described above for that alternative, including damage to archaeological resources from construction activities, exposure of resources to vandalism/looting, contamination from spills of hazardous materials, and unanticipated discoveries of archaeological resources. Direct impacts would be permanent, and may range in magnitude from minor to major, depending on the specific resource. Indirect impacts would primarily be related to visual, auditory, and air quality changes during construction which may affect the setting or significant qualities of archaeological resources. Indirect impacts would be temporary and negligible to minor.

Impacts on Historic Resources

No construction impacts on historic resources would be anticipated from the continued use of the existing Line 3 pipeline, because it is already built. Impacts related to the development of facilities required for the transportation by rail alternative would be the same as described above for that alternative, including damage to historic resources from construction activities, contamination from spills of hazardous materials, and viewshed changes. Direct impacts if resources are present within an area for ground disturbance would be permanent, and may range in magnitude from minor to major, depending on the specific resource.

Indirect impacts would occur during construction of new spur lines and loading/offloading facilities and may include visual, auditory, air quality, access changes to historic resources. These indirect impacts would

be temporary and negligible to minor. Permanent indirect impacts may include visual or auditory changes that affect the setting or significant qualities of historic resources, which would be minor to major.

5.4.3.6.2 Operations Impacts

Impacts on Archaeological Resources

No impacts on archaeological resources are expected with continued use of the existing Line 3 because the Enbridge Mainline corridor has been extensively disturbed from previous pipeline construction, operations, and maintenance, and ground disturbance would not likely occur in new areas during integrity digs. Direct impacts associated with Project-related spills or encountering existing contamination could occur (see Section 5.2.2 and Chapter 10); however, no additional impacts would be expected to archaeological resources that would have already been disturbed during construction. Regular inspection of rail cars for leaks would minimize the potential for such contamination; however, contamination could be permanent and minor to major, depending on the type of archaeological resource and soil permeability.

If operations-related activities result in direct impacts on archaeological resources that were not previously disturbed during construction (i.e., avoided) or to those resources that are adjacent to the construction work area, then the impacts would be permanent and minor to major. Some impacts would likely require mitigation that would be determined in consultation with the SHPO, affected Indian tribes, and the public (see Section 5.4.4).

If new ground disturbance occurs during the lifespan of the Project, it would occur within the already disturbed permanent right-of-way or construction work area. As such, direct impacts on archaeological resources would have already occurred during construction, and thus, any new ground disturbance is unlikely to cause additional impacts on these resources. However, if archaeological resources had been avoided during construction, or if they are adjacent to the construction work area, then new ground disturbance may cause new impacts on these resources, which would be permanent and minor to major.

Known archaeological resources in proximity to these rail lines may be indirectly affected by dust and vibration, although these impacts are currently occurring from existing rail cars. This alternative likely would result in temporary negligible to minor indirect impacts on archaeological resources.

Impacts on Historic Resources

No direct impacts on historic resources are expected with continued use of the existing Line 3, because the Enbridge Mainline corridor has been extensively disturbed from previous pipeline construction, operations, and maintenance, and ground disturbance would not likely occur in new areas during integrity digs. However, minor spills along existing and newly constructed rail lines have the potential to directly and indirectly affect historic resources through contamination, changes in access and setting, and response activities. Regular inspection of rail cars for leaks would minimize the potential for such contamination, and impacts would likely be temporary and minor; although some contamination could be permanent and negligible to major, depending on the type of cultural resource and soil permeability.

If maintenance activities occurred near historic resources, impacts at those locations within the permanent right-of-way would be comparable to those described for new pipeline construction, including dust, vibration, and intrusion related to construction equipment, and construction-related noise. These indirect impacts would be considered temporary and negligible to minor.

During operation of the transportation by rail alternative, trains hauling crude oil would use existing rail lines to the offloading facilities at Clearbrook and Superior. Impacts related to increases in rail traffic could include limited access to a historic resource or its visual, auditory, and air quality setting. However, historic resources along existing lines are already subject to rail traffic, resulting in permanent negligible to minor impacts.

5.4.3.6.3 Traditional Cultural Properties

The discussion of potential impacts on TCPs would be the same as provided in Section 5.4.3.1.3.

5.4.3.7 Existing Line 3 Supplemented by Truck

5.4.3.7.1 Construction Impacts

Impacts on Archaeological Resources

No construction impacts on archaeological resources would be anticipated from the continued use of the existing Line 3 pipeline because it is already built.

Direct impacts related to the construction of offloading facilities and associated access required for the transportation by truck alternative would be the same as described above for that alternative, including damage to archaeological resources from construction activities, exposure of resources to vandalism/looting, contamination from spills of hazardous materials, and unanticipated discoveries of archaeological resources. Direct impacts would be permanent, and could range in magnitude from minor to major, depending on the specific resource. Indirect impacts would primarily be related to visual, auditory, and air quality changes during construction which may affect the setting or significant qualities of archaeological resources. Indirect impacts would be temporary and negligible to minor.

Impacts on Historic Resources

No construction impacts on historic resources would be anticipated from the continued use of the existing Line 3 pipeline because it is already built. Impacts related to the development of facilities required for the transportation by truck alternative would be the same as described above for that alternative, including damage to historic resources from construction activities, contamination from spills of hazardous materials, and viewshed changes. Direct impacts if resources are present within an area for ground disturbance would be permanent, and may range in magnitude from minor to major, depending on the specific resource.

Indirect impacts would occur during construction of offloading facilities and associated access and may include visual, auditory, air quality, access changes to historic resources. These indirect impacts would be temporary and negligible to minor. Permanent indirect impacts may include visual or auditory changes that affect the setting or significant qualities of historic resources, which would be minor to major.

5.4.3.7.2 Operations Impacts

Impacts on Archaeological Resources

No impacts on archaeological resources are expected with continued use of the existing Line 3 because the Enbridge Mainline corridor has been extensively disturbed from previous pipeline construction, operations, and maintenance, and ground disturbance would not likely occur in new areas during integrity digs. Direct impacts associated with Project-related spills or encountering existing

contamination could occur (see Section 5.2.2 and Chapter 10); however, no additional impacts would be expected to archaeological resources that would have already been disturbed during construction. Regular inspection of trucks for leaks would minimize the potential for such contamination; however, contamination could be permanent and minor to major, depending on the type of archaeological resource and soil permeability.

If operations-related activities result in direct impacts on archaeological resources that were not previously disturbed during construction (i.e., avoided) or to those resources that are adjacent to the construction work area, then the impacts would be permanent and minor to major. Some impacts would likely require mitigation that would be determined in consultation with the SHPO, affected American Indian tribes, and the public (see Section 5.4.4).

If new ground disturbance occurs during the lifespan of the Project, it would occur within the already disturbed permanent right-of-way or construction work area. As such, direct impacts on archaeological resources would have already occurred during construction, and thus, any new ground disturbance is unlikely to cause additional impacts on these resources. However, if archaeological resources are avoided during construction, or if they are adjacent to the construction work area, then new ground disturbance may cause new impacts on these resources, which would be permanent and minor to major.

Known archaeological resources in proximity to these roads may be indirectly affected by dust and vibration, although these impacts are currently occurring from existing traffic. This alternative likely would result in temporary negligible to minor indirect impacts on archaeological resources.

Impacts on Historic Resources

No direct impacts on historic resources are expected with continued use of the existing Line 3, because the Enbridge Mainline corridor has been extensively disturbed from previous pipeline construction, operations, and maintenance. However, minor spills have the potential to directly and indirectly affect historic resources through contamination, changes in access and setting, and response activities. Regular inspection of rail cars for leaks would minimize the potential for such contamination, and impacts would likely be temporary and minor; although some contamination could be permanent and negligible to major, depending on the type of cultural resource and soil permeability.

If maintenance activities occurred near historic resources, impacts at those locations within the existing right-of-way would be comparable to those described for new pipeline construction, including dust, vibration, and intrusion related to construction equipment, and construction-related noise. These indirect impacts would be considered temporary and negligible to minor.

Historic resources in proximity to the roads used to transport crude oil (e.g., bridges) may be indirectly affected by dust and noise. However, these impacts are currently occurring from existing traffic, and as such, these indirect impacts would be temporary and negligible to minor.

5.4.3.7.3 Traditional Cultural Properties

The discussion of potential impacts on TCPs would be the same as provided in Section 5.4.3.1.3.

5.4.4 Summary and Mitigation

5.4.4.1 Summary

Construction and operation of the Applicant's proposed project and CN Alternatives could impact archaeological and historic resources. Based on the current information, impacts on archaeological and historic resources could range from negligible to major during construction and operations (Table 5.4.4-1).

During construction, impacts on archaeological resources would be permanent and could range from minor to major for the Applicant's proposed project and each CN Alternative (except continued use of Line 3, which has already been constructed).

The types of archaeological resources across the ROI for the Applicant's proposed project and CN Alternatives are primarily comprised of individual lithic artifacts or lithic scatter. The number of archaeological resources that may be directly or indirectly affected during construction would be relatively comparable across the Applicant's proposed project and CN Alternatives (10 to 16 resources) with the exception of SA-04, which could directly impact up to 49 archaeological resources (Table 5.4.4-1). Substantially more historic resources could be directly affected within the construction footprints by the rail and truck alternatives, including those supplemented by existing Line 3, than either the Applicant's proposed project or SA-04. The historic resources in the ROI for the rail or truck alternatives around Clearbrook and Superior include houses, farms, outbuildings, and a church. Conversely, substantially greater numbers of historic resources that could be indirectly affected are within the ROI for SA-04 and the Applicant's proposed project than for the rail and truck alternatives, including those alternatives supplemented by existing Line 3 (Table 5.4.4-1).

During operations, no direct impacts on cultural resources would typically occur due to no ground disturbance beyond the previously disturbed construction footprint, so impacts on new cultural resources would not be expected unless there were extenuating circumstances (e.g., minor spills/leaks, erosion). SA-04 has substantially more archaeological resources in its operational footprint than the Applicant's proposed project or other CN Alternatives (Table 5.4.4-1). The rail and truck alternatives, including those supplemented by existing Line 3, could have more historic resources within their operational footprints than the Applicant's proposed project, existing Line 3, or SA-04. However, there could be substantially more historic resources indirectly affected during operations within the ROI for SA-04 than the Applicant's proposed project or the other CN Alternatives.

5.4.4.2 Mitigation

Avoiding known cultural resources may be possible in the construction work area by fencing around the site boundary, designating a buffer, and/or incorporating an archaeological monitor during ground-disturbing activities. Archaeological and/or tribal monitoring could be implemented in sensitive areas during construction to further minimize impacts.

Prior to construction, the need for minimization and mitigation for impacts on archaeological and historic resources would be discussed with MHS, SHPO, the OSA, affected American Indian tribes, and other parties through continuing consultation efforts. If a Certificate of Need is issued by the PUC, additional survey also may be needed to account for potential changes to the Applicant's project, as well as if a subsequent route permit is issued that accounts for areas not already investigated or surveyed. Minimization of impacts may include avoidance, site staking, and archaeological and tribal monitoring

during construction. Mitigation may include data recovery excavations of significant archaeological sites, intensive recordation of historic resources, ethnographic studies, and guaranteed access, among others.

Table 5.4.4-1. Summary of Potential Impacts on Cultural Resources for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Rail Alternative	Truck Alternative	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Construction Impacts							
Previously recorded archaeological resources	Direct: Permanent/minor to major impacts • 15 resources Indirect: Temporary/ negligible to minor • 15 resources	N/A (Already constructed)	Direct: Permanent/minor to major impacts • 49 resources Indirect: Temporary/ negligible to minor • 49 resources	Direct: Permanent/minor to major impacts • 10 resources Indirect: Temporary/ negligible to minor • 10 resources	Direct: Permanent/minor to major impacts • 10 resources Indirect: Temporary/ negligible to minor • 10 resources	Direct: Permanent/minor to major impacts • unknown resources Indirect: Temporary/ negligible to minor • unknown resources	Direct: Permanent/minor to major impacts • unknown resources Indirect: Temporary/ negligible to minor • unknown resources
Previously recorded historic resources	Direct: Permanent/ minor to major impacts • 1 resource Indirect: Temporary to permanent/ negligible to major impacts • 128 resources	N/A (Already constructed)	Direct: No impacts • 0 resources Indirect: Temporary to permanent/ negligible to major impacts • 662 resources	Direct: Permanent/ minor to major impacts • unknown resources Indirect: Temporary to permanent/ negligible to major impacts • 59 resources	Direct: Permanent/ minor to major impacts • unknown resources Indirect: Temporary to permanent/ negligible to major impacts • 59 resources	Direct: Temporary to permanent/ negligible to major impacts • unknown resources Indirect: Temporary to permanent/ negligible to minor impacts • unknown resources	Direct: Temporary to permanent/ negligible to major impacts • unknown resources Indirect: Temporary to permanent/ negligible to minor impacts • unknown resources

Table 5.4.4-1. Summary of Potential Impacts on Cultural Resources for the Applicant's Proposed Project and Certificate of Need Alternatives

Impact	Applicant's Proposed Project	Continued Use of Existing Line 3	System Alternative SA-04	Rail Alternative	Truck Alternative	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Operations Impacts							
Previously recorded archaeological resources	Direct: Permanent/ minor to major impacts • 9 resources Indirect: Temporary/ negligible to minor impacts • 9 resources	Direct: Permanent/ minor to major impacts • 10 resources Indirect: Temporary/ negligible to minor impacts • 10 resources	Direct: Permanent/ minor to major impacts • 39 resources Indirect: Temporary/ negligible to minor impacts • 39 resources	Direct: Permanent/ minor to major impacts • 10 resources Indirect: Permanent/ negligible to minor impacts • 10 resources	Direct: Permanent/ minor to major impacts • 10 resources Indirect: Temporary/ negligible to minor impacts • 10 resources	Direct: Permanent/ minor to major impacts • unknown resources Indirect: Temporary/ negligible to minor impacts • unknown resources	Direct: Permanent/ minor to major impacts • unknown resources Indirect: Temporary/ negligible to minor impacts • unknown resources
Previously recorded historic resources	Direct: No impacts • 0 resources Indirect: Temporary to permanent/ negligible to minor impacts • 128 resources	Direct: No impact • 1 resource Indirect: Temporary to permanent/ negligible to minor impacts • 214 resources	Direct: No impact • 0 resources Indirect: Temporary to permanent/ negligible to minor impacts • 662 resources	Direct: Temporary to permanent/ minor to major impacts • unknown resources Indirect: Temporary to permanent/ negligible to minor impacts • 59 resources	Direct: Temporary to permanent/ minor to major impacts • unknown resources Indirect: Temporary to permanent/ negligible to minor impacts • 59 resources	Direct: Temporary to permanent/ negligible to major impacts • unknown resources Indirect: Temporary to permanent/ negligible to minor impacts • unknown resources	Direct: Temporary to permanent/ negligible to major impacts • unknown resources Indirect: Temporary to permanent/ negligible to minor impacts • unknown resources

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Chapter 6
Existing Conditions, Impacts, and Mitigation – Route Permit

6.1 INTRODUCTION

This chapter assesses potential construction and operations impacts for the Applicant's preferred route and each of the route alternatives identified in Section 4.3. As discussed in Section 4.3, the Minnesota Public Utilities Commission (Commission) must determine the route of the Line 3 Project (Project) if they grant a Certificate of Need (CN) for the Project. The objectives of the analysis in this chapter are to (1) provide relevant information for a comparison of the Applicant's preferred route and each route alternative; and (2) determine whether any of the alternative routes may offer significant benefits through lower impacts to inform the Commission's decision.

The Applicant's preferred route begins near Neche, North Dakota, and terminates at Superior, Wisconsin. However, because the Commission has routing authority only over the portion of the route in Minnesota the route permit analysis is concerned only with the portion of the Project located in Minnesota. All route alternatives in Minnesota are variants on the segment of the Applicant's preferred route between Clearbrook and Carlton; the North Dakota border-to-Clearbrook segment and the Carlton-to-Wisconsin border segments are virtually identical for all route alternatives (Table 6.1-1). This chapter describes the existing conditions and assesses potential impacts for the Applicant's preferred route through Minnesota. In addition, the impact assessment highlights the potential impacts for the Applicant's preferred route and each route alternative where they diverge from a common alignment along the Clearbrook-to-Carlton segment.

In accordance with criteria for pipeline route selection in Minnesota Administrative Rules § 7852.1900, the environmental review in this chapter is structured to assess the impacts of the Applicant's preferred route and route alternatives associated with the following:

- Human settlement, existence and density of populated areas, existing and planned future land uses, and management plans;
- The natural environment, public and designated lands, including but not limited to natural area, wildlife habitats, water, and recreational lands;
- Lands of historical, archaeological, and cultural significance;
- Economies within the route, including agricultural, commercial or industrial, forestry, recreational, and mining operations;
- Pipeline cost and accessibility;
- Use of existing rights-of-way and right-of-way sharing or paralleling;
- Natural resources and features;

- The extent to which human or environmental effects are subject to mitigation by regulatory control;
- Cumulative potential effects of related or anticipated future pipeline construction; and
- Relevant applicable policies, rules, and regulations of other state and federal agencies and local governmental land use laws.

Table 6.1-1. Length of the Applicant's Preferred Route and Route Alternatives across Minnesota (miles)

Segment	Applicant's Preferred Route	Route Alternative RA-03-AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
North Dakota border to Clearbrook terminal[a]	109.1	110.2	110.2	110.2	110.2
Clearbrook terminal to Carlton	220.9	275.1	196.8	167.7	164.8
Carlton to Wisconsin border	9.6	9.6	9.6	9.6	9.6
TOTAL	**339.7**	**394.9**	**316.6**	**287.5**	**284.6**

[a] Differences in length are due to assumptions for where the route options enter the Clearbrook terminal.

The impact assessment in this chapter covers each of the criteria listed above that the Commission is required to consider in determining a route for the proposed Project. This chapter evaluates potential impacts on various resources, focusing on issues of concern for each resource identified based on:

- Relevant regulatory requirements;
- Input during scoping from the public, agencies, non-governmental organizations, and tribal representatives;
- Consultation with knowledgeable resource management agencies and tribal resource representatives; and
- Professional judgment, in part based on other impact assessments in recent energy infrastructure environmental impact statements (EISs) and agency guidance (DOS 2009; FERC 2013a, 2013b; DOE 2015; Wisconsin DNR 2016).

The following sub-sections are presented for each resource:

- Regulatory Context and Methodology
- Existing Conditions
- Impact Assessment
- Summary and Mitigation

The general contents of each of the sub-sections in this chapter are described below. The analysis of route segment alternatives is described in Chapter 7. The analysis of potential impacts associated with crude oil releases is presented in Chapter 10. Cumulative potential effects are discussed in Chapter 12.

6.1.1 Regulatory Context and Methodology

The regulatory context describes the framework of laws, regulations, ordinances, and policies intended to protect and manage an affected resource with regard to impacts associated with the Applicant's preferred route and route alternatives. As described in Chapter 3, these regulations are implemented by a variety of federal, state, and local jurisdictions.

For each affected resource, the impact assessment methodology is described. This includes identifying the region of interest (ROI) for the resource (the geographic scope), the specific datasets acquired and analyzed, the analytical methods and assumptions used, and the quantitative or qualitative metrics for assessing impacts relative to each issue of concern. The ROI incorporates the geographic extent of the Applicant's preferred route in Minnesota as presented in Chapter 2, and the Applicant's preferred route and the route alternatives in the Clearbrook-to-Carlton segment as described in Chapter 2 and Section 4.3. The extent of the ROI beyond the physical footprint of each route option varies among resources according to the characteristics of the resource and the Project-related effects that could occur (e.g., potential effects on vegetation would be localized while effects on air quality may be localized and regional).

6.1.2 Existing Conditions

The existing conditions within the ROI for each affected resource are described for the Applicant's preferred route and each route alternative. Sources of data used to characterize existing conditions were identified based on a review of publically available geospatial datasets; federal, state, and local government reports, assessments, and planning documents; and input during the scoping process, including input from the public, tribes, agencies, and non-governmental organizations. In addition, data available as part of Enbridge's application, Enbridge's 2016 Environmental Assessment Worksheet (EAW), and responses to data requests from the Minnesota Department of Commerce Energy, Environmental Review and Analysis (DOC-EERA) were considered. Literature addressing the potential impacts of Project construction and operations was reviewed. Information was evaluated for its relevancy in assessing Project-related impacts based on the data collection methods used and the geographic extent, study duration and age, detail, and usefulness of the data in characterizing existing conditions. Project-specific mileposts included in Chapter 6 resource sections and figures are based on the Applicant's preferred route and all route alternatives starting at milepost (MP) 0.0 near Neche, North Dakota, and extending to Superior, Wisconsin. Maps depicting a range of existing resource conditions and data associated with land ownership and physical features are provided in Appendix A.

6.1.3 Impact Assessment

Resource-specific impact assessment methods are described in each resource section of this chapter. The impact assessments focus on direct impacts from construction and operation of the Project, describe the nature of the impacts, and provide quantifiable estimates of those direct impacts where feasible and meaningful. Examples of direct impacts include habitat fragmentation due to permanent loss of woody vegetation within the permanent right-of-way and contributions to climate change from greenhouse gas (GHG) emitted as a result of fossil fuel combustion in construction equipment. Indirect impacts, which may result from or be influenced by the Project later in time or further removed from

direct Project activities, are described where appropriate. Examples of indirect impacts include economic growth, reduced productivity in wildlife due to stress, and direct impacts on aesthetics from vegetation removal indirectly affecting recreational use.

Within each resource section, the nature of impacts are discussed and the impacts are characterized in terms of their duration and magnitude or severity. Impacts are discussed for resources located within the ROI, specified for each resource. Impact duration was characterized as *temporary, short term, long term,* or *permanent*. Impact duration was considered temporary if the impact would occur only during and immediately following construction activity (e.g., turbidity due to instream construction). Impacts were considered short term if the resource recovery would last up to 3 years following construction (e.g., vegetation clearing in pastures). Impacts were considered long term if resource recovery would require more than 3 years but would occur during the life of the Project (e.g., clearing of trees in temporary construction work areas). Impacts were considered permanent if they would last for the life of the Project (e.g., clearing of trees within the permanent right-of-way). See Table 6.1-2.

Table 6.1-2. Definitions of Impact Duration

Term	Definition
Temporary	Impacts that would occur during and immediately following construction
Short term	Impacts that would continue for up to 3 years after construction
Long term	Impacts that would last more than 3 years but would recover during the life of the proposed Project or alternative
Permanent	Impacts that would last for at least the duration of the proposed Project or alternative

Categories of impact magnitude or severity for the purposes of this EIS include *negligible*, *minor*, and *major*. Impacts were considered negligible if they have the potential to occur but would not generally be measurable or noticeable. They were considered minor if they were expected to be evident but below resource-specific standards or metrics, such as those used in other recent linear infrastructure EISs in the region (e.g., Great Northern Transmission Line, Alberta Clipper, Wisconsin Sandpiper/Line 3 Replacement) and requirements by the Federal Energy Regulatory Commission for interstate natural gas pipelines crossing wetlands, waterbodies, or uplands (DOS 2009; FERC 2013a, 2013b; DOE 2015; Wisconsin DNR 2016). Impacts were considered major if they were expected to potentially exceed the resource-specific standards or metrics, with consideration of the geographic extent and duration. See Table 6.1-3.

Table 6.1-3. Definition of Impact Magnitude

Term	Definition
Negligible	Impacts could potentially occur, but not expected to be measureable or noticeable
Minor	Impacts are evident, but expected to be below resource-specific standards or metrics
Major	Impacts are evident and expected to exceed resource-specific standards or metrics

In each resource area, available datasets and metrics were reviewed to identify “factors” that provide an indication of how a given resource could be affected. For example, presence of different vegetation

types, noxious weeds, native plants, and old growth forest were all identified as factors that could be examined to understand how vegetation resources as a whole could be affected. In most cases impacts were assessed by mapping available data for each of the relevant factors and overlaying information on the construction and operations footprints for the Applicant's preferred route and route alternatives. These overlays were reviewed in order to identify the location, type, and condition of resources within and adjacent to the construction/operational features. In addition, methods of construction and operations, including Applicant-proposed measures to minimize impacts, were reviewed. Together, the spatial analysis and review of construction and operation methods were used to determine the nature, duration, and magnitude of impacts for the Applicant's preferred route and each route alternative.

The footprint of the Applicant's preferred route was defined based on the Project applications and additional information provided by Enbridge. This information is summarized in Chapter 2, which includes the Applicant-proposed measures to limit or avoid impacts during construction and operations. The impact analysis for each resource assumes that the Applicant-proposed measures would be implemented regardless of the route (e.g., construction activities along the RA-06 route would adhere to Enbridge's Environmental Protection Plan [Appendix E]).

As described in Chapter 2, Enbridge provided the location and land requirements of the Applicant's preferred route during construction and operation including the construction work area along the pipeline route, additional temporary workspaces (ATWS), temporary and permanent access roads, temporary contractor and material/pipe storage yards (yards), and aboveground facilities in Minnesota. Enbridge provided DOC-EERA with geo-referenced geographic information system (GIS) shapefiles of these features. Over 80 percent of the 5,604 acres that would be disturbed during construction of the entire Project would be associated with the construction work area along the pipeline (typically 120 feet wide). The remaining land disturbance primarily would be associated with temporary construction, including ATWS (9 percent), access roads (5 percent), and yards (4 percent). During operation, 62 percent of the land disturbed during construction of the entire Project (3,480 acres) would return to preconstruction uses, and the majority of the permanent operations-related land disturbance would be associated with maintenance of the permanent right-of-way (97 percent, or 2,057 acres). The remaining 3 percent would be associated with aboveground facilities, including access (67 acres). Each resource section in this chapter discusses the impacts of construction and operations for the Applicant's preferred route based on this detailed geo-referenced information.

As discussed in Section 4.3, each route alternative would follow the same centerline as the Applicant's preferred route from Neche, North Dakota, to Clearbrook, Minnesota; and from Carlton, Minnesota, to Superior, Wisconsin (Table 6.1-1). The only segment where the route alternatives would materially vary from the alignment of the Applicant's preferred route is between Clearbrook and Carlton in Minnesota. As the impacts for the route alternatives are already being described for the alignment that they share with the Applicant's preferred route (i.e., the impact analysis for the Applicant's preferred route in Chapter 5 and in this chapter), the environmental analysis of the route alternatives in this chapter is limited to the pipeline segment where the route alternatives would vary from the Applicant's preferred route (i.e., the Clearbrook-to-Carlton segment). For some socioeconomic resources, the impact analysis was based on county-level data (e.g., income, tax revenue); for those impact analyses, the ROIs for the route alternatives extend across Carlton County to the Wisconsin border (less than 10 miles from where the routes would re-converge with the Applicant's preferred route in Carlton County).

The available data for the route alternatives are not as extensive or complete as those for the Applicant's preferred route—in part, because no one has designed or engineered those alternatives. For route

alternatives, a quantitative analysis for each route alternative was conducted using the digital centerline identified during scoping; no corresponding geo-referenced information was provided on aboveground facilities, ATWS, access roads, or yards. Along the centerline for each route alternative, a standard construction work area was applied to assess the impacts associated with pipeline construction. For three of the four route alternatives (RA-03AM, RA-06, and RA-08), the standard construction work area was 120 feet wide. For RA-07, a 205-foot-wide construction work area was used to quantify the extent of the acreage affected along existing Line 3 between Clearbrook and Carlton in order to allow removal of the existing Line 3 and installation of the new pipeline in the same trench, as described in Section 4.3.4. Using these standard construction work areas allowed quantification of construction and operations impacts on land cover, habitat, and resources along the route alternatives based on publically available information on existing conditions. Using the relative proportion of land requirements for the Applicant's preferred route, the 120-foot-wide construction footprint equates to approximately 80 percent of the overall construction acreage that would be required to construct the route alternatives, and a 205-foot-wide construction work area would compose over 85 percent of the overall construction footprint (besides the construction work area along the centerline, acreage affected during construction would be associated with unidentified ATWS, access roads, yards, and aboveground facilities). The 50-foot-wide permanent right-of-way along each route alternative would account for 97 percent of the operations footprint of the route (based on the relative proportion of the land requirements for the Applicant's preferred route). Without knowing the precise locations of aboveground facilities and secondary construction features (e.g., ATWS, yards, and temporary access roads) potential impacts were qualitatively assessed by applying the assumptions used in the evaluation of the Applicant's preferred route. For example, although the exact locations for pump stations are not known for any of the route alternatives, they average about 8 acres each and would be expected to be located in open upland areas where feasible—although specific locations or land cover types are not known. If a route alternative is approved, field surveys, landowner and agency coordination, and site-specific engineering along the approved route would be conducted to refine routing; develop specialized construction methods; and locate aboveground facilities, access roads, and yards.

6.1.4 Summary and Mitigation

Each resource discussion in this chapter concludes with a general summary of the anticipated impacts on the resource for the Applicant's preferred route and the route alternatives between Clearbrook and Carlton based on the nature, extent, duration, and magnitude of potential impacts.

As discussed in Section 6.1.3, the quantitative results for the route alternative impact analysis include only standard construction work areas along the alternative centerlines (120 feet or 205 feet wide) and the 50-foot-wide permanent right-of-way, underestimating the overall construction footprint by up to 20 percent because no specific location or design information is available for secondary facilities (aboveground facilities, access roads, ATWS, and yards). To allow for a more direct comparison between the Applicant's preferred route and the route alternatives, impacts for all routes (Applicant's preferred and route alternatives) are presented in the summary sub-section are based on Enbridge's refined construction work area (typically 120 feet wide, or 205 feet in the case of RA-07) and 50-foot-wide permanent right-of-way. By not including aboveground facilities, access roads, ATWS, and yards, impacts for all routes are underestimated by approximately 3 percent (operations) to 20 percent (construction). It is expected that the majority of the acreage of aboveground facilities, access roads, ATWS, and yards would be located in upland open lands. From an overall acreage perspective, the 3- to 20-percent underestimate does not substantially alter the general relationship between the relative impacts among the route options.

The primary shortcoming of the above approach for the environmental analysis is associated with Enbridge's proposal to reduce the width of the construction work area for the Applicant's preferred route in some wetlands and waterbodies (from 120 feet to 95 feet, or 21 percent) based on site-specific field investigations and engineering. No design engineering has been conducted for the route alternatives. For context, theoretically reducing the construction width in wetlands from 120 to 95 feet for route alternatives would result in the Applicant's preferred route and RA-03AM affecting virtually the same total wetland acreage during construction, and the remaining route alternatives affecting substantially greater acreage than either of those two (over 40 percent more for RA-06, RA-07, and RA-08). For the analysis of surface water, the issue is recognized but is less integral, as the impact assessment for surface waters is not driven by the acreage of waterbody crossings as much as identifying and minimizing the impacts of in-water disturbance on water quality, aquatic habitat, and fisheries (see Section 6.3.1.2). As noted above, if a route alternative is approved, it is expected that field surveys and engineering would result in refinements to the route, the width of the construction footprint, and construction methods to further avoid and minimize impacts on wetlands and waterbodies.

The summary sub-section for each resource includes a summary table to highlight impacts on the resources among route options. The summary sub-section also identifies potential mitigation, as appropriate, to further avoid and minimize impacts. Mitigation may include expanding best management practices (BMPs), initiating agency/landowner coordination, and identifying possible permit conditions (Section 3.6 summarizes the permits and approval processes for the Project).

6.1.5 References

Federal Energy Regulatory Commission (FERC). 2013a. Upland erosion control, revegetation, and maintenance plan. May. Washington, DC.

_____. 2013b. Wetland and Waterbody Construction and Mitigation Procedures. May. Washington, DC.

U.S. Department of Energy (DOE). 2015. Great Northern Transmission Line Final Environmental Impact Statement. (DOE/EIS0499.) Prepared by the U.S Department of Energy, Office of Electricity Delivery and Energy Reliability and the Minnesota Department of Commerce, Energy Environmental Review and Analysis. October. Washington, DC.

U.S. Department of State (DOS). 2009. Final Environmental Impact Statement for the Alberta Clipper Pipeline Project. U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs. June. Washington, DC.

Wisconsin Department of Natural Resources (Wisconsin DNR). 2016. Final Environmental Impact Statement Enbridge Sandpiper and Line 3 Replacement Projects. August.

6.2 HUMAN SETTLEMENT

6.2.1 Planning and Zoning

Land use planning and zoning regulations are used by county and local jurisdictions to regulate the pattern of development to ensure that adjacent land uses are compatible with one another. They also ensure that the pattern of development allows for efficient incorporation of publicly provided infrastructure, including roads, utility systems, and public services. Land use planning and zoning regulations also minimize potential impacts on the public from floods, unstable slopes (landslides), and other natural events that may cause loss of life and property, in addition to protecting important natural resources. Where projects fail to conform with local land use plans and zoning ordinances, where established, they can disrupt orderly community development.

The following analysis evaluates compatibility with land use planning and zoning to identify where the pipeline construction and operation may disrupt orderly community development. The analysis considers land uses adjacent to each of the potential routes, based on a review of county and local comprehensive plans and zoning ordinances, floodplain and shoreland overlay districts, existing land use (for jurisdictions without planning and zoning ordinances),[1] and a general review of watershed district goals.

The analysis of impacts on planning and zoning from construction and operation of the Applicant's preferred route and the route alternatives considers the following issues:

- Compatibility with county and local comprehensive plans and zoning ordinances;
- Compatibility with floodplain and shoreland overlay district regulations;
- Compatibility with existing land use for jurisdictions without planning and zoning ordinances; and
- Compatibility with watershed district goals.

This section first describes the different types of existing or planned land use (per existing plans and zoning requirements) along the Applicant's preferred route and each of the route alternatives that could be affected by construction and operation of an oil pipeline. Potential Project-related impacts of construction and operation are then discussed and compared across each of the routing options.

6.2.1.1 Regulatory Context and Methodology

6.2.1.1.1 Regulatory Context

Planning and zoning regulations are authorized by Minnesota Statutes, Chapter 394. Under these statutes, counties and municipalities may develop comprehensive land use plans and establish zoning permit authorities. In county land use plans and zoning ordinances, specific areas within a jurisdiction are designated for one of a number of "allowable" uses. These designations include the type and

[1] For counties or local jurisdictions that have not established comprehensive land use plans or zoning ordinances, existing land use patterns have been reviewed. This review covers all land crossed by construction and operation of the Applicant's preferred route and the route alternatives, but is meant to supplement the review of comprehensive plans and zoning ordinances, especially for areas with no zoning information.

intensity of allowable use. Most, but not all, of the counties that are crossed by the pipeline routes have established land use plans or zoning ordinances. Local governments can further regulate the types of development or activity that can occur in special use areas called overlay districts, for example shoreland and floodplain[2] overlay districts that restrict development in floodways and near waterbodies. Minnesota also has 46 watershed districts,[3] which are local special-purpose units of government that manage water drainage and flow in the watershed in partnership with the state, counties, cities, and soil and water conservation districts.

A route permit from the Commission would supersede local government approvals including land use and zoning approvals (Minn. Stat. § 216G.02, Subd. 4); however, the Commission must consider the Project's compliance with local laws, plans, and ordinances when making a decision for the route permit (Minn. Stat. § 216G.02, Subd. 3[b][4]).

6.2.1.1.2 Methodology

The degree of compatibility with local land use plans and zoning ordinances, overlay districts, existing land use, and water resource management plans was evaluated by:

- Inventorying and reviewing existing comprehensive plans and zoning ordinances, including shoreland and floodplain ordinances and existing land uses for the counties crossed by the Applicant's preferred route and each of the route alternatives;
- Overlaying the Applicant's preferred route and route alternatives on zoning maps provided by counties and on existing land uses from the National Land Cover Database (NLCD) to measure:
  - Miles of each zone crossed by the route centerline, and
  - Acreage of each land use type within the construction work area and within the permanent right-of-way;
- Reviewing water resource management plans in watershed districts crossed by the Applicant's preferred route and route alternatives;
- Identifying the number of miles of each watershed district crossed by the each route's centerline; and
- Identifying those areas where the Applicant's preferred route or route alternatives were not consistent with or did not meet the requirements of existing local plans and zoning ordinances, overlay districts, or watershed districts.

The ROI is comprised of counties and watershed districts that are crossed by the Applicant's preferred route and route alternatives. The ROI included four watershed districts and 21 counties, 19 of which have a comprehensive land use plan or other relevant land use ordinance, and 12 have a comprehensive plan and a specific development code or ordinance outlining land use and zoning. The specific assessment of compatibility of the pipeline with land use plans and zoning ordinances, overlay districts, and watershed district goals is focused on the land crossed by the centerline of the Applicant's preferred

[2] Floodplain maps produced by the Federal Emergency Management Agency (FEMA), known as Flood Insurance Rate Maps, are used to identify floodplain areas. Any development or activity proposed to occur within a floodplain must meet FEMA guidelines (structures flood-proofed to some level), and some activities are prohibited.

[3] Watershed Districts were authorized by the Minnesota Legislature in 1955 when it passed the Watershed Act, Minnesota Statute 103D

route or the route alternatives. The assessment of compatibility of the pipeline with current land use plans is focused on the land disturbed for construction and the land within the permanent right-of-way for each alternative.

Data for the analysis was obtained from county land use zoning GIS layers, county websites, Federal Emergency Management Agency (FEMA) flood maps, watershed district websites, the NLCD, and GIS data for the construction and operational footprint of the Applicant's preferred route and the route centerlines for the route alternatives supplied by the Applicant.

Land use and zoning designations and the miles of each zone or land type crossed were determined by overlaying each route's centerline on zoning information. Because the potential routes cross counties that have a wide variety of zoning designations, zoning designations were reviewed and grouped into standardized "land use zone" categories to allow for comparison. The potential routes will also cross Indian Reservations with their own codified zoning regulations. For example, RA-08 passes through the Fond du Lac Reservation in Carlton and St. Louis counties in Minnesota. Fond du Lac Ordinance #02-07 establishes a land use committee and designated zoning districts for their lands (Fond du Lac Reservation Business Committee 2007).

"Shoreland" areas were identified based on overlay districts provided by counties.[4] Where no zoning data were available "the open water land use" category from the NLCD was used to estimate shoreland areas. Floodplain areas were determined based on 100-year floodplain, as outlined in the FEMA flood maps. Impacts on floodplains are discussed in detail in Section 6.3.1.4. Existing land use and the acreage of each land use crossed were determined by overlaying each route's construction and operation footprint on spatial land use data (NLCD).

The analysis of the Applicant's preferred route includes the entire route: (1) the segment from the North Dakota-Minnesota border to Clearbrook, Minnesota; (2) the segment from Clearbrook to Carlton, Minnesota; and (3) the segment from Carlton to the Wisconsin border. Because the first and last segments are the same for each of the routes, the analysis for the alternatives to the Applicant's preferred route is focused on the segment from Clearbrook to Carlton, Minnesota, where the route alternatives diverge from the Applicant's preferred route.

6.2.1.2 Existing Conditions

6.2.1.2.1 Applicant's Preferred Route

Table 6.2.1-1 lists the land use zones crossed by the Applicant's preferred route in each county where land use designations exist. The most common land use zone crossed by the Applicant's preferred route is agricultural land, followed by public/municipal land. A total of approximately 8 miles of shoreland would be crossed by Applicant's preferred route, all east of Clearbrook.

Table 6.2.1-2 lists the acreages of each land use type located within the construction (con) and operation (op) footprint of the Applicant's preferred route. The most common land use type present is agricultural.

[4] Shoreland designated as land located within 1,000 feet of the high water level of a lake, pond, or flowage, and land located within 300 feet of a river or stream or the landward extent of the floodplain, whichever is greater per Minn. Stat. § 103F.205, Subd. 4.

Table 6.2.1-1. Land Use Zoning Categories Crossed by the Applicant's Preferred Route (miles)

Segment/County	Agriculture/ Forestry	Residential	Commercial	Industrial	Public/ Municipal	Conservation/ Recreation	Shoreland	Other
North Dakota Border to Clearbrook								
Kittson County[a]	15.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Marshall County	NA	NA	NA	NA	NA	NA	NA	NA
Pennington County	NA	NA	NA	NA	NA	NA	NA	NA
Red Lake County	NA	NA	NA	NA	NA	NA	NA	NA
Polk County	NA	NA	NA	NA	NA	NA	NA	NA
Clearwater County	NA	NA	NA	NA	NA	NA	NA	NA
Subtotal	***15.4***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***
Clearbrook to Carlton								
Clearwater County	NA	NA	NA	NA	NA	NA	NA	NA
Hubbard County	NA	NA	NA	NA	NA	NA	NA	NA
Wadena County	7.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0
Cass County	11.8	7.2	0.0	0.0	28.5	0.0	0.0	0.0
Crow Wing County[b]	0.0	1.9	0.0	0.0	2.6	0.0	0.4	0.0
Aitkin County	16.0	0.0	0.5	0.0	10.3	18.0	6.7	0.0
Carlton County	31.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	***66.2***	***9.1***	***0.5***	***0.0***	***41.4***	***18.0***	***7.4***	***0.0***

Table 6.2.1-1. Land Use Zoning Categories Crossed by the Applicant's Preferred Route (miles)

Segment/County	Agriculture/ Forestry	Residential	Commercial	Industrial	Public/ Municipal	Conservation/ Recreation	Shoreland	Other
Carlton to Wisconsin Border								
Carlton County	8.8	0.0	0.0	0.5	0.0	0.0	0.3	0.0
Subtotal	***8.8***	***0.0***	***0.0***	***0.5***	***0.0***	***0.0***	***0.3***	***0.0***
TOTAL	**90.5**	**9.1**	**0.5**	**0.5**	**41.4**	**18.0**	**7.7**	**0.0**

Sources: GIS zoning layers from Aitkin, Carlton, Cass, and Wadena counties.

[a] Estimates for Kittson County are not based on a GIS layer but on a review of the Land Use Ordinance.

[b] Estimates for Crow Wing County are not based on a GIS layer but on a review using the online GIS tool for Crow Wing County.

Notes:

Each county has a different zoning ordinance, and zones differ between the counties. Zoning categories in this table are an approximation of similar zones. The specific zones for each county that makes up each category are listed below:

Agriculture/Forestry = Wadena, General Agriculture, Transitional Agriculture, and Mixed Ag and Forestry; Cass, Agricultural/Forestry; Carlton, Agricultural/Forest Management and Agriculture/Rural Residential; Aitkin, Farm Residential.

Residential = Cass, Rural Residential 2.5 and Rural Residential 5; Crow Wing, Rural Residential – 10 and Rural Residential – 20; Wadena, Residential.

Commercial = Wadena, Highway Service Business District; Cass, Commercial.

Industrial = Carlton, Limited Industrial.

Public/Municipal = Cass, Public Land or within City Limits; Crow Wing, Public Lands; Aitkin, Public.

Conservation/Recreation = Aitkin, Open; Carlton, Commercial Recreation.

Shoreland = Wadena, shoreland overlay district; Crow Wing, shoreland District; Aitkin, shoreland; Carlton, shoreland.

Other = Cass, Unknown.

NA = Zoning data not available for this county.

Table 6.2.1-2. Land Use Types Crossed by the Applicant's Preferred Route (acres)

Segment/ Facility	Agricultural[a]		Developed[b]		Forested[c]		Open Land[d]		Open Water[e]		Wetlands[f]		Total	
	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op
Pipeline Segment														
North Dakota border to Clearbrook	1,285.5	552.9	63.3	28.8	57.0	26.6	34.1	15.8	3.7	2.3	68.8	35.2	1,512.5	661.7
Clearbrook to Carlton	561.6	251.6	94.0	45.5	1,446.5	631.0	307.7	151.0	6.4	3.8	490.6	254.2	2,906.8	1,337.1
Carlton to Wisconsin border	65.7	28.8	7.5	3.4	39.7	14.9	17.3	8.5	0.0	0.0	5.8	2.7	136.0	58.2
Subtotal	***1,912.8***	***833.3***	***164.8***	***77.7***	***1,543.2***	***672.5***	***359.1***	***175.4***	***10.2***	***6.1***	***565.2***	***292.0***	***4,555.2***	***2,057.0***
Other Facilities														
Additional temporary workspaces and pipe yards	447.6	0.0	45.4	0.0	116.4	0.0	55.7	0.0	2.5	0.0	36.6	0.0	704.2	0.0
Access roads	67.7	67.7	44.8	44.8	123.5	123.5	22.5	22.5	0.6	0.6	20.1	20.1	279.2	279.2
Mainline valves and pump stations	38.9	38.9	10.2	10.2	5.5	5.5	5.8	5.8	0.0	0.0	6.6	6.6	67.0	67.0
Subtotal	***554.2***	***106.6***	***100.4***	***55.0***	***245.4***	***129.0***	***83.9***	***28.2***	***3.1***	***0.6***	***63.3***	***26.7***	***1,050.4***	***346.2***
TOTAL	**2,466.9**	**939.9**	**265.3**	**132.7**	**1,788.6**	**801.5**	**443.1**	**203.6**	**13.2**	**6.7**	**628.5**	**318.7**	**5,605.6**	**2,403.2**

[a] Agricultural Land = NLCD land use types: Cultivated and Hay/Pasture.

[b] Developed Land = NLCD land use types: Developed, High Intensity; Developed, Med Intensity; Developed, Low Intensity; and Developed, Open Space.

[c] Forested Land = NLCD land use types: Deciduous Forest, Evergreen Forest, and Mixed Forest.

[d] Open Land = NLCD land use types: Barren Land, Herbaceous, and Scrub/Shrub.

[e] Open Water = NLCD land use types: Open Water.

[f] Wetlands = NLCD land use types: Woody Wetlands and Emergent Herbaceous Wetlands.

Enbridge-provided footprints: Con = construction work area, Op = permanent right-of-way.

The Applicant's preferred route would cross four watershed districts for a total of approximately 134 miles: the Middle-Snake-Tamarac Rivers, Red Lake, Two Rivers, and Wild Rice watershed districts (Table 6.2.1-3). These watershed districts are all located in northwestern/western Minnesota. Red Lake Watershed District is the primary watershed district crossed, including approximately 76 miles of the route.

6.2.1.2.2 Route Alternatives

Route Alternative RA-03AM

Table 6.2.1-4 lists the land use zones crossed by RA-03-AM, between Clearbrook and Carlton, in each county where land use designations exist. The most common land use zone crossed by RA-03AM is agriculture/forestry. A total of approximately 4 miles of shoreland would be crossed by RA-03AM.

Table 6.2.1-5 lists the acreages of each land use type located within the construction (con) and operation (op) footprint of RA-03-AM. The most common land type present is agricultural.

Table 6.2.1-6 lists the miles of each watershed district crossed by RA-03AM. The route alternative would cross through approximately 19 miles of the Red Lake Watershed District and approximately 5 miles of the Wild Rice Watershed District.

Route Alternative RA-06

Table 6.2.1-7 lists the land use zones crossed by RA-06, between Clearbrook and Carlton, in each county where land use designations exist. The most common land use zone crossed by RA-06 is public/municipal land, followed closely by agriculture/forestry land. RA-06 would cross approximately 1 mile of shoreland.

Table 6.2.1-8 lists the acreages of the land use types located within the construction (con) and operation (op) footprint of RA-06. The most common land type present is forest. Additionally, RA-06 would cross 52 miles of the Red Lake Watershed District.

Route Alternative RA-07

RA-07 involves removal of the existing Line 3 and replacement in the existing trench, which is located entirely in the Enbridge Mainline corridor right-of-way. Enbridge has easements for the land in this corridor, and past, current, and foreseeable future land use in this corridor is pipeline right-of-way.

Route Alternative RA-08

The most common zone type crossed by RA-08 is public/municipal land (Table 6.2.1-9). The next most common zone type is agriculture/forestry land. RA-08 would cross 0.6 mile of shoreland.

Table 6.2.1-10 lists the acreages of the land use types located within the construction (con) and operation (op) footprint of RA-08. The most common land use type crossed is wetlands. Additionally, RA-08 would cross through 13 miles of the Red Lake Watershed District.

Table 6.2.1-3. Watershed Districts Crossed by the Applicant's Preferred Route (miles)

Segment	Middle-Snake-Tamarac Rivers Watershed District	Red Lake Watershed District	Two Rivers Watershed District	Wild Rice Watershed District	Total
North Dakota border to Clearbrook	36.6	56.4	16.1	0.0	109.1
Clearbrook to Carlton	0.0	19.6	0.0	5.4	25.0
Carlton to Wisconsin border	0.0	0.0	0.0	0.0	0.0
TOTAL	**36.6**	**76.0**	**16.1**	**5.4**	**134.1**

Table 6.2.1-4. Land Use Zoning Categories Crossed by Route Alternative RA-03AM (miles)

County	Agriculture/ Forestry	Residential	Commercial	Industrial	Public/ Municipal	Conservation/ Recreation	Shoreland	Other
Clearwater County	NA	NA	NA	NA	NA	NA	NA	NA
Hubbard County	NA	NA	NA	NA	NA	NA	NA	NA
Wadena County	33.9	0.1	0.5	0.0	0.0	0.0	1.3	0.0
Todd County	10.3	1.6	0.3	0.0	0.0	0.0	0.5	0.0
Morrison County	43.7	0.5	0.0	0.3	0.0	0.4	1.8	0.0
Benton County	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mille Lacs County	13.5	0.0	0.0	0.0	0.9	1.2	0.0	0.0
Kanabec County	NA	NA	NA	NA	NA	NA	NA	NA
Pine County	NA	NA	NA	NA	NA	NA	NA	NA
Carlton County	23.9	0.0	0.4	0.1	0.0	0.1	0.0	0.0
TOTAL	**130.8**	**2.2**	**1.2**	**0.4**	**0.9**	**1.7**	**3.7**	**0.0**

Sources: GIS Zoning layers from Benton, Carlton, Mille Lacs, Morrison, Todd, and Wadena counties.

Notes:

Each county has a different zoning ordinance, and zones differ between the counties. Zoning categories in this table are an approximation of similar zones. The specific zones for each county that make up each category are listed below:

Agriculture/Forestry = Wadena, General Agriculture, Transitional Agriculture, and Mixed Ag and Forestry; Carlton, Agricultural/Forest Management and Agriculture/Rural Residential; Todd, Agriculture/Forestry – 1 and Agriculture/Forestry – 2; Morrison, Agriculture; Mille Lacs, Agricultural Residential.

Residential = Wadena, Residential; Todd, Residential – 2 and Residential – 10; Morrison, Residential and Rural Residential; Benton, Rural Service District.

Commercial = Wadena, Highway Service Business District; Todd, Commercial.

Industrial = Carlton, Limited Industrial; Morrison, Manufacturing – Industrial.

Public/Municipal = Mille Lacs, Bock and Milaca.

Conservation/Recreation = Morrison, Mississippi Headwaters; Mille Lacs, Wild and Scenic River District – Recreational and West Branch of Rum River – Transition District; Carlton, Commercial Recreation.

Shoreland = Wadena, shoreland overlay district; Carlton, shoreland; Todd, shoreland; Morrison, shoreland.

NA = Zoning data are not available for this county.

Table 6.2.1-5. Land Use Types Crossed by Route Alternative RA-03AM (Clearbrook to Carlton) (acres)

Land Use Type	Construction	Operations
Agricultural[a]	1,611.1	676.8
Developed[b]	385.8	157.8
Forested[c]	1,137.7	470.5
Open Land[d]	339.6	143.5
Open Water[e]	17.0	7.1
Wetlands[f]	509.1	211.2
TOTAL	**4,000.4**	**1,666.9**

Notes:

[a] Agricultural Land = NLCD land use types: Cultivated and Hay/Pasture.

[b] Developed Land = NLCD land use types: Developed, High Intensity; Developed, Med Intensity; Developed, Low Intensity; and Developed, Open Space.

[c] Forested Land = NLCD land use types: Deciduous Forest, Evergreen Forest, and Mixed Forest.

[d] Open Land = NLCD land use types: Barren Land, Herbaceous, and Scrub/Shrub.

[e] Open Water = NLCD land use types: Open Water.

[f] Wetlands = NLCD land use types: Woody Wetlands and Emergent Herbaceous Wetlands.

Construction = 120-foot-wide construction footprint, Operations = 50-foot-wide permanent right-of-way.

Table 6.2.1-6. Watershed Districts Crossed by Route Alternative RA-03AM (miles)

Route Segment	Middle-Snake-Tamarac Rivers Watershed District	Red Lake Watershed District	Two Rivers Watershed District	Wild Rice Watershed District	TOTAL
Clearbrook to Carlton	0.0	19.4	0.0	5.4	24.8

Table 6.2.1-7. Land Use Zoning Categories Crossed by Route Alternative RA-06 (miles)

County	Agriculture/ Forestry	Residential	Commercial	Industrial	Public/ Municipal	Conservation/ Recreation	Shoreland	Other
Clearwater County	NA	NA	NA	NA	NA	NA	NA	NA
Beltrami County	NA	NA	NA	NA	NA	NA	NA	NA
Itasca County	31.1	0.2	0.0	10.0	63.3	0.0	0.0	3.4
Aitkin County	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0
St. Louis County	18.0	0.0	0.0	0.0	0.0	0.0	0.7	6.0
Carlton County	14.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
TOTAL	**63.1**	**0.2**	**0.0**	**10.0**	**63.3**	**0.8**	**1.3**	**9.4**

Sources: GIS Zoning layers from Aitkin, Carlton, St. Louis, and Itasca counties.

Notes:

Each county has a different zoning ordinance, and zones differ between the counties. Zoning categories in this table are an approximation of similar zones. The specific zones for each county that make up each category are listed below:

Agriculture/Forestry = Carlton, Agricultural/Forest Management and Agriculture/Rural Residential; Aitkin, Farm Residential; Itasca, Farm Residential; St. Louis, Forest Agriculture Management.

Residential = Beltrami, Rural, Moderate Density Residential, Multiple Family, Suburban Residential (Sewered), and Suburban Residential (Unsewered).

Commercial = Beltrami, Low Density Commercial.

Industrial = Carlton, Limited Industrial; Itasca, Light Industrial/Commercial and Industrial.

Public/Municipal = Aitkin, Public; Itasca, Municipal and Public.

Conservation/Recreation = Aitkin, Open; Carlton, Commercial Recreation; Beltrami, Conservation.

Shoreland = Aitkin, Shoreland; Carlton, Shoreland; St. Louis, Shoreland Mixed Use.

Other = Itasca (blank); St. Louis, Multiple Use Non-Shoreland and Non-Jurisdiction Area.

NA = Zoning data not available for this county.

Table 6.2.1-8. Land Use Types Crossed by Route Alternative RA-06 (Clearbrook to Carlton) (acres)

Land Use Type	Construction	Operations
Agricultural[a]	256.7	107.4
Developed[b]	65.4	26.4
Forested[c]	1,107.3	460.9
Open Land[d]	354.2	148.6
Open Water[e]	81.8	33.7
Wetlands[f]	996.3	415.3
TOTAL	2,861.8	1,192.4

[a] Agricultural Land = NLCD land use types: Cultivated and Hay/Pasture.

[b] Developed Land = NLCD land use types: Developed, High Intensity; Developed, Med Intensity; Developed, Low Intensity; and Developed, Open Space.

[c] Forested Land = NLCD land use types: Deciduous Forest, Evergreen Forest, and Mixed Forest.

[d] Open Land = NLCD land use types: Barren Land, Herbaceous, and Scrub/Shrub.

[e] Open Water = NLCD land use types: Open Water.

[f] Wetlands = NLCD land use types: Woody Wetlands and Emergent Herbaceous Wetlands.

Construction = 120-foot-wide construction footprint, Operations = 50-foot-wide permanent right-of-way.

Table 6.2.1-9. Land Use Zoning Categories Crossed by Route Alternative RA-08 (miles)

County	Agriculture/ Forestry	Residential	Commercial	Industrial	Public / Municipal	Conservation/ Recreation	Shoreland	Other
Clearwater County	NA	NA	NA	NA	NA	NA	NA	NA
Beltrami County	0.0	4.6	0.6	0.0	0.0	0.3	0.0	0.0
Hubbard County	NA	NA	NA	NA	NA	NA	NA	NA
Cass County	2.1	1.9	0.0	0.0	30.3	0.0	0.0	0.0
Itasca County	20.4	0.5	0.0	0.5	23.6	0.0	0.0	1.1
Aitkin County	0.0	0.0	0.0	0.0	4.7	0.0	0.0	0.0
St. Louis County	16.9	0.0	0.0	0.0	0.0	0.0	0.0	5.8
Carlton County	13.3	0.0	0.0	0.4	0.0	0.0	0.6	0.0
TOTAL	**52.7**	**7.0**	**0.6**	**1.0**	**58.5**	**0.3**	**0.6**	**6.8**

Sources: GIS Zoning layers from Aitkin, Beltrami, Carlton, Cass, Itasca, and St. Louis counties.

Notes:

Beltrami County zoning data cover only the Greater Bemidji Area.

Each county has a different zoning ordinance, and zones differ between the counties. Zoning categories in this table are an approximation of similar zones. The specific zones for each county that make up each category are listed below:

Agriculture/Forestry = Cass, Agricultural/Forestry; Carlton, Agricultural/Forest Management and Agriculture/Rural Residential; Aitkin, Farm Residential; Itasca, Farm Residential; St. Louis, Forest Agriculture Management.

Residential = Cass, Rural Residential 2.5 and Rural Residential 5; Itasca, Rural Residential; Beltrami, Rural, Moderate Density Residential, Multiple Family, Suburban Residential (Sewered), and Suburban Residential (Unsewered).

Commercial = Beltrami, Low Density Commercial; Cass, Commercial.

Industrial = Carlton, Limited Industrial; Itasca, Light Industrial/Commercial and Industrial.

Public/Municipal = Cass, Public Land or within City Limits; Aitkin, Public; Itasca, Municipal and Public.

Conservation/Recreation = Aitkin, Open; Carlton, Commercial Recreation; Beltrami, Conservation.

Shoreland = Aitkin, Shoreland; Carlton, Shoreland; St. Louis, Shoreland Mixed Use.

Other = Itasca (blank); St. Louis, Multiple Use Non-Shoreland and Non-Jurisdiction Area; Cass, Unknown.

NA = Zoning data not available for this county.

Table 6.2.1-10. Land Use Types Crossed by Route Alternative RA-08 (Clearbrook to Carlton) (acres)

Land Use Type	Construction	Operation
Agricultural[a]	335.6	141.4
Developed[b]	86.3	35.2
Forested[c]	772.8	319.8
Open land[d]	207.9	87.4
Open water[e]	25.3	10.3
Wetlands[f]	969.7	404.9
TOTAL	**2,397.6**	**999.0**

[a] Agricultural Land = NLCD land use types: Cultivated and Hay/Pasture.

[b] Developed Land = NLCD land use types: Developed, High Intensity; Developed, Med Intensity; Developed, Low Intensity; and Developed, Open Space.

[c] Forested Land = NLCD land use types: Deciduous Forest, Evergreen Forest, and Mixed Forest.

[d] Open Land = NLCD land use types: Barren Land, Herbaceous, and Scrub/Shrub.

[e] Open Water = NLCD land use types: Open Water.

[f] Wetlands = NLCD land use types: Woody Wetlands and Emergent Herbaceous Wetlands.

Construction = 120-foot-wide construction footprint, Operation = 50-foot-wide permanent right-of-way.

6.2.1.3 Impact Assessment

6.2.1.3.1 Applicant's Preferred Route (in Minnesota)

Construction Impacts

Compatibility with Comprehensive Plans and Zoning Ordinances

Review of the relevant comprehensive plans and zoning ordinances found that pipelines are not listed as an allowed use for any of the zones that would be crossed by the Applicant's preferred route or the route alternatives.

Agriculture/Forestry

The Applicant's preferred route crosses approximately 91 miles of land zoned as agriculture/forestry in Kittson, Wadena, Cass, Aitkin, and Carlton counties (Table 6.2.1-1). A typical goal associated with this zone is to preserve the resource, whether farmland or forested land. Preserving farmland in its designated use prevents encroachment of development that could remove the farmland from production. Preserving forestry land could fulfill many goals including timber production, recreation, habitat protection, and even water quality. Usually only limited residential development is permitted in these zones. Construction of an oil pipeline would be incompatible with some of these goals, either temporarily or long-term.

Impacts on agricultural land would be temporary; a growing season in the construction footprint would be lost, after which the land would revert to agricultural use, resulting in minor temporary impacts. For forested land, however, impacts would be greater; trees cleared from construction work areas would take a long time (up to many decades in some cases) to regenerate to preexisting conditions. Impacts on forested land uses would be minor to major and long-term for land zoned as forestry in the temporary

construction areas and major and permanent for land in the permanent right-of-way. Impacts on agricultural and forestry land are also discussed in Sections 6.3.3 and 6.5.1.

Residential

A total of approximately 9 miles of land zoned as residential would be crossed by the Applicant's preferred route in Cass and Crow Wing counties (Table 6.2.1-1). Two primary goals are associated with residential land: to provide an appropriate place to live and to prevent incompatible/nuisance development. Variations in land zoned as residential may dictate the minimum lot size and dwelling types allowed, which aid planners to regulate population density. Specific zones the Applicant's preferred route would cross are Rural Residential 2.5 and Rural Residential 5 in Cass County, and Rural Residential 10 and Rural Residential 20 in Crow Wing County. (The numbers in the zone name represent the minimum lot size in acres; so the lot sizes for a single residence would be 2.5 acres, 5 acres, 10 acres, or 20 acres, respectively.) Impacts on land zoned as residential would be temporary for areas outside the permanent right-of-way, because construction work areas would be restricted from development for a short period of time since construction moves through an area relatively quickly, after which these areas would be restored, and no further restrictions on development would be in place. Areas within the permanent right-of-way would be permanently restricted from development, and this would subtract from the land available for residential use. The large lot sizes would likely have adequate areas that could still be developed for residential use, resulting in minor and permanent impacts on land zoned as residential.

Commercial

The Applicant's preferred route crosses 0.5 mile of land zoned for commercial use in Aitkin County. The goal of commercial land is to provide areas for stores and businesses. Construction near stores and businesses could temporarily interrupt this use by restricting access to businesses or parking areas and creating extra traffic in the area. Noise and dust also could be a nuisance to businesses. The Applicant would cross all paved roads without disturbing the surface, which would help to maintain access and traffic flows (see Section 6.2.5). The Applicant also would use dust and noise suppression when possible (see Sections 6.3.7 and 6.2.2, respectively). With implementation of the Applicant-proposed measures, the impacts on commercial-zoned land from construction would be minor and temporary. Land in the permanent right-of-way would be permanently restricted from commercial development and would reduce the overall amount of commercial-zoned land available. Impacts would be minor because of the small amount of commercial land to be crossed and the reduction of impacts from the Applicant-proposed measures. Impacts would be permanent because after construction, the land within the permanent right-of-way would be restricted from development for the life of the Project.

Industrial

The Applicant's preferred route crosses 0.5 mile of industrial land in Carlton County. An industrial zone is intended for manufacturing or other production facilities and these areas typically require major transportation routes and/or appropriate access to handle the inflow of materials and the outflow of products. Construction of a pipeline in industrial areas could lead to traffic interruptions which could affect the facilities in this zone. However, the Applicant's proposal to bore underneath or use horizontal directional drilling (HDD) to drill underneath paved roads would prevent traffic and associated industrial disruptions (see Section 6.2.5). With implementation of the Applicant-proposed measures, impacts on industrial land outside the permanent right-of-way would be negligible to minor and temporary. Impacts would be negligible to minor because of the small amount of industrial land to be crossed and the reduction of impacts from the Applicant-proposed measures. Impacts would be temporary, because after construction areas outside the permanent right-of-way would not be restricted from development. Areas within the permanent right-of-way would be restricted from any development. This would be a

minor impact, because of the small amount of land affected, but it would be permanent because no development in the right-of-way would be permitted for the life of the Project.

Public/Municipal

Public and municipal land can have many different goals, depending on the specific land type, but typically this land is to be used for public benefit. Development on land zoned as public/municipal typically requires additional approvals outside of a zoning permit. These additional approvals and the specific goals of public lands are further discussed in Section 6.3.6.

The Applicant's preferred route crosses approximately 41 miles of public/municipal land in Cass, Crow Wing, and Aitkin counties. Most of this land is state forest land administered by Minnesota Department of Natural Resources (Minnesota DNR). Construction in public or municipal land would disrupt uses in this zone. The impact would be minor to major and temporary to permanent depending on the specific land type and ownership. Goals and impacts would vary across the different public land types and these are discussed further in Section 6.3.6.

Conservation/Recreation

The Applicant's preferred route would cross 18 miles of land zoned as conservation/recreation in Aitkin County. The specific zone name in Aitkin County is "open land;" this land use is applied to areas of floodplains, swamp lands, and other areas unsuitable or unsafe for development. The use of the area as open land would be temporarily affected by construction activities, such as clearing vegetation, grading the land, and trenching for placement of the pipe. These impacts would be minor and temporary. Following construction and restoration, impacts would remain minor because the pipeline would be buried and would not affect surface use.

Shoreland

The Applicant's preferred route would cross approximately 8 miles of land zoned as shoreland in Wadena, Crow Wing, Aitkin, and Carlton counties. The Shoreland zone is based on a special overlay district designed to limit and regulate development near waterbodies. The goals and impacts of overlay districts are further discussed in the overlay districts section below. Construction in the Shoreland zone would not meet the goal of limiting development near waterways, and removal of vegetation from the construction areas would be a minor temporary impact.

<u>Compatibility with Overlay Districts</u>

The goals of the shoreland overlay districts are to "provide guidance for the wise development of shorelands of public waters and, thus, preserve and enhance the quality of surface waters; preserve the economic and natural environmental values of shorelands; and provide for the wise use of water and related land resources" (Minn. Stat. § 103F.201). Conditions that are placed on construction in shoreland areas may include maintenance of a buffer of vegetation between construction and the edge of waterbodies, or other requirements to preserve vegetation and trees where possible. In areas where the Applicant's preferred route would cross waterways, pipeline construction may require clearing trees and vegetation from the edge of the water. A total of 192 surface waters would be crossed by the Applicant's preferred route (see Section 6.3.1.2).

As discussed further in Section 6.3.1.2, impacts on some waterbodies would be reduced through the use of bore crossings and HDD crossings where vegetation buffers and streambanks could be left intact. Generally, construction in the shoreland area and across streambanks is not compatible with the goals of shoreland overlay districts and would be a minor permanent impact. Overall, the impacts in shoreland

areas would be minor because of the small amount of land along waterbodies that would be affected and although trees would not be allowed, other vegetation would be planted. The impacts would be permanent because trees and woody vegetation would not be allowed to regrow in the permanent right-of-way. Impacts in shoreland areas are further discussed in Sections 6.3.1.2, 6.3.1.3, and 6.3.1.4.

Floodplain overlay districts are designated to reduce the quantity of development in floodplains and restrict the type of development to reduce losses from flooding and keep floodways clear for the movement of flood waters. Pipelines are generally a conditional use permitted in floodplain overlay districts, although not all floodplain ordinances specifically list them as a conditional use. The conditions for construction may include protecting spoil piles from erosion and storing materials and equipment outside the floodplain if it could not be moved in the time available after a flood warning. Construction activities would temporarily alter floodplain topography, resulting in minor alterations to water flows in the event of a flood in the area, but are unlikely to block or restrict flows, reduce the area within a floodplain that carries floodwaters, or increase flood elevations upstream (see Section 6.3.1.4 for further information). Thus, the uses of floodplains in the floodplain overlay districts would not likely change due to pipeline construction, resulting in minor and temporary impacts. Floodplains are further discussed in Section 6.3.1.4.

Compatibility with Existing Land Use

Construction of the Applicant's preferred route would affect a little over 5,600 acres of land in Minnesota. Approximately 2,467 acres of the total affected acreage would be agricultural land, and approximately 1,789 acres would be forested land. Developed land, open land, wetlands, and open water would account for approximately 1,350 acres of impacts.

Agricultural

Compatibility with agricultural land is discussed for the agriculture/forestry zone above. The temporary removal of land from agricultural production during construction would be a minor, temporary impact because agricultural land would lose a growing season in the construction footprint, after which the land would be returned to agricultural land use.

Developed Land

As mentioned in the discussions above for residential, commercial, and industrial zones, construction activities in developed lands may be incompatible with existing uses in developed land. With implementation of the Applicant-proposed measures described for those zones, impacts from construction in developed areas would be temporary and minor, because of the limited area that would be affected by construction and the short construction period. However, land in the permanent right-of-way would be restricted from future development, which would be a minor permanent impact.

Forested Land

Compatibility of the Applicant's preferred route with forested land is discussed above for the agriculture/forestry zone. Forested land also may fall under the public/municipal zone, especially for areas of state or national forests. Construction of the Applicant's preferred route is generally not compatible with forested land, because of the requirement to remove trees from construction work areas and the permanent right-of-way. The 1,789 acres of forested land affected would be a major long-term impact for areas in the temporary construction areas and would be major and permanent for areas within the permanent right-of-way.

Open Land

Open land may correspond most closely with the conservation/recreation zone type. Construction activities in open land would be incompatible temporarily with goals of preserving undeveloped natural areas or scenic resources and enhancing recreation opportunities. Construction of the pipeline would temporarily disturb approximately 359 acres of open land until restoration is complete. This would be a minor, temporary impact because of the small change to the land area that would be affected; after construction, open lands would be restored, and the buried pipeline would not affect surface use.

Open Water

Typically, the open water land use category is not a planned zone. From a planning and zoning perspective, pipeline construction in these areas would be compatible with the open water land use category. During construction in waterways, minor temporary impacts could occur to surface waters from sedimentation and potential spills of small quantities of hazardous materials used during construction, as discussed in Section 6.3.1.2. However, Applicant-proposed measures would be implemented to reduce such impacts, which would be temporary until construction is complete and the waterbody revegetated.

Wetlands

Wetlands most closely correspond with the Shoreland zone in local comprehensive plans. During construction of the Applicant's preferred route, construction activities in wetlands would not be compatible with preservation goals and would be a minor to major impact, which may be a temporary to long-term impact. After construction, the wetlands in some cases would revert to their original state; however, some wetlands, such as forested and scrub/shrub wetlands would be cleared of woody vegetation and would remain altered. Wetlands are discussed further in Section 6.3.1.3.

Compatibility with Watershed District Goals

The goals of watershed districts are broad and far reaching, involving all aspects of water within their districts, including but not limited to improving water quality, managing drainage systems, providing flood protection, enhancing recreational opportunities, and providing for wildlife habitat. The compatibility of construction of the Applicant's preferred route with these goals is largely related to the potential impacts of construction on water resources in the watershed. During construction of a pipeline, removal of vegetation in construction work areas and working in and around wetlands and waterbodies may result in impacts on water resources in watersheds, as discussed further in Section 6.3.1. Vegetation in watershed areas acts to slow water runoff, stabilize banks, prevent erosion, and enhance scenic views from the water. Removal of vegetation in and around waterbodies could eliminate or reduce some of these benefits (and associated watershed district goals), and it may reduce the scenic integrity of shoreland areas. The Applicant has proposed measures to limit impacts on water resources as described in the Environmental Protection Plan (Appendix E), including temporary erosion control measures and BMPs for waterbody crossings as described in Section 6.3.1.2. The Applicant-proposed measures would reduce construction impacts on water resources, which would help to meet the watershed districts' goals of conserving watershed functions and limiting impacts on water quality from development. With implementation of Applicant-proposed measures, pipeline construction would result in minor, temporary impacts on waterbodies and watershed district goals.

Operations Impacts

Compatibility with Comprehensive Plans and Zoning Ordinances

County and local comprehensive plans generally have long-term goals. While short-term impacts from construction may temporarily interrupt desired land uses, long-term effects of pipeline operation may represent greater impacts, as detailed below.

Agriculture/Forestry

Operation of the Applicant's preferred route would be compatible with the goal of preserving agricultural land because farming would be permitted in the right-of-way after construction, resulting in no compatibility impacts on land zoned as agricultural during operations. However, the goal of preserving forested land would not be compatible with operation of the Applicant's preferred route because no trees would be allowed within the permanent right-of-way, resulting in a loss of forested land and an impact that would be major and permanent.

Residential

The presence of a buried oil pipeline in residential areas would partially limit development of residential land during operation, as no structures would be permitted over the permanent right-of-way. However, these residential areas are zoned for development on large land parcels (2.5- to 10-acre plots), and land outside the permanent right-of-way would be available for such development. The loss of a 50-foot-wide permanent right-of-way corridor to residential development would represent a minor, permanent impact on residential land use.

Commercial

The presence of a buried oil pipeline would limit development of commercial land within the permanent right-of-way during operation, because no structures would be permitted for development in this area. However, only a small amount of land that is zoned as commercial (0.5 mile) is crossed by the permanent right-of-way, and land outside the permanent right-of-way would be available for commercial development. The loss of a 50-foot-wide permanent right-of-way corridor to commercial development would represent a minor, permanent impact on commercial use.

Industrial

The presence of a buried oil pipeline would partially limit development of industrial land within the permanent right-of-way during operation, because no structures would be permitted for development in this area. However, only a small amount of land that is zoned as industrial (0.5 mile) is crossed by the permanent right-of-way, and land outside the permanent right-of-way would be available for industrial development. The loss of a 50-foot-wide permanent right-of-way corridor to industrial development would represent a minor, permanent impact on commercial use.

Public/Municipal

The majority of land zoned for public/municipal use crossed by the Applicant's preferred route is state forest land, as described above. This land does not fall under local planning and zoning authority, as it is controlled by Minnesota State. The loss of forest from clearing trees would be a major permanent impact within the permanent right-of-way, which would be maintained free of trees and woody vegetation. For purposes of local government planning and zoning, the land would remain public; however, goals and impacts would vary across the different public land types, and these are discussed further in Section 6.3.6. Other public uses may be permitted to resume after construction is complete.

Conservation/Recreation

Operation of the Applicant's preferred route in areas zoned for conservation/recreation would be compatible with recreation in that the permanent right-of-way would be revegetated and would revert to its original use. The only conservation/recreation-zoned land that would be crossed by the Applicant's preferred route would be in Aitkin County. The specific zone in Aitkin County is the open land zone and pipeline construction in open land is generally compatible because the pipeline would be buried and out of sight. Land in this land use zone used for conservation purposes, however, would be periodically disturbed by maintenance mowing in the permanent right-of-way, which would result in minor, permanent impacts.

Shoreland

During operations, the Applicant's preferred route would largely be compatible with shoreland goals, since the pipeline would be buried beneath waterbodies and would generally not affect shoreland functions, with the exception of the permanent right-of-way at the water's edge, where trees would not be allowed to grow along the banks. The goal of preserving vegetation buffers and shade trees along waterbodies would be partially restricted in the permanent right-of-way in these areas. However, the right-of-way would be planted with other vegetation that would preserve other goals of water quality and bank stability. Operation of the Applicant's preferred route in shoreland areas would be a minor permanent impact on shoreland goals.

Compatibility with Overlay Districts

The Applicant's preferred route would largely be compatible with shoreland overlay district goals since the pipeline would be buried beneath waterbodies and would generally not affect shoreland functions. Where the pipeline crosses waterbodies, the permanent right-of-way abutting the water's edge would be maintained clear of trees and large woody vegetation, and the goal of preserving buffers and shade trees along waterbodies would be partially prevented. However, the permanent right-of-way would be planted with other vegetation that would preserve other goals of maintaining water quality and bank stability. Impacts and mitigation associated with water resources are further discussed in Section 6.3.1. Operation of the Applicant's preferred route in shoreland overlay districts would be a minor, permanent impact on overlay district goals.

Because the pipeline would be buried underground, and the ground cover conditions would be restored, the Applicant's preferred route would be compatible with floodplain overlay district requirements during operation. The buried pipeline would not be an obstruction in the floodplain and would not affect the water channel or flood levels.

Compatibility with Existing Land Use

During operation, the permanent footprint of the Applicant's preferred route would cover approximately 940 acres of agricultural land, 802 acres of forested land, 319 acres of wetlands, 204 acres of open land, 133 acres of developed land, and 7 acres of open water. This analysis reviews the compatibility of the Applicant's preferred route in Minnesota with these adjacent land uses during operation. The reason for this analysis is to supplement the review of compliance with zoning regulations. For areas without zoning information, however, the analysis covers all of the land crossed by the Applicant's preferred route, including land with zoning information.

Agricultural

Operation of the Applicant's preferred route would be compatible with the use of agricultural land because farming would occur in the right-of-way after construction, resulting in no compatibility impacts on land used for agriculture during operations.

Developed Land

The presence of a buried oil pipeline in developed areas would partially limit residential, commercial, and industrial development in these areas during operation, as no structures would be permitted over the permanent right-of-way. However, only a small amount of land is designated as developed (approximately 133 acres) within the permanent right-of-way, and land outside the permanent right-of-way would be available for development. The loss of a 50-foot-wide permanent right-of-way corridor to residential, commercial, and industrial development would represent a minor, permanent impact on developed land use.

Forested Land

Forested land also may fall under the public/municipal zone, especially for areas of state or national forests. Operation of the Applicant's preferred route would be least compatible with preservation of forested land, because trees would not be permitted in the permanent right-of-way. The loss of approximately 802 acres of forest land from clearing trees would be a major, permanent impact within the permanent right-of-way, which would be maintained free of trees and woody vegetation.

Open Land

Open land may correspond most closely with the conservation/recreation zone type. Maintenance vegetation mowing in the permanent right-of-way would be incompatible with goals of preserving undeveloped natural areas, but would be consistent with goals of providing public use of open areas. For this analysis, the approximately 204 acres of open land that would be maintained during operations is considered to be a minor permanent impact, as these areas could continue to be used as open space after restoration is complete.

Open Water

Typically, the open water land use category is not a planned zone. From a planning and zoning perspective, pipeline operation in open water areas would be compatible with the open water land use category, because open waters crossed by the Applicant's preferred route would remain in their current use, and there would be no impacts.

Wetlands

Wetlands would most closely correspond with the Shoreland zone in local comprehensive plans. Because the pipeline would be buried beneath waterbodies, operations of the Applicant's preferred route would generally not affect wetland functions, with the exception of the permanent right-of-way where trees and large woody vegetation would not be allowed to grow. Preservation of wetland vegetation buffers and shade trees along waterbodies would be partially restricted in the permanent right-of-way in these areas. However, the right-of-way would be planted with other vegetation that would preserve other wetland functions, such as water quality and bank stability. Operation of the Applicant's preferred route in wetland areas would be minor and long-term, as wetlands would generally return to functionality. Wetlands are further discussed in Section 6.3.1.3.

Compatibility with Watershed District Goals

During operation of the Applicant's preferred route, the pipeline would be compatible with watershed district goals, such as improving water quality, managing drainage systems, providing flood protection, enhancing recreational opportunities, and providing for wildlife habitat. During operation of a pipeline, maintenance of vegetation in the permanent right-of-way in and around wetlands and waterbodies may result in minor impacts on water resources in watersheds, as discussed further in Section 6.3.1. Vegetation in watershed areas acts to slow water runoff, stabilize banks, prevent erosion, and enhance scenic views from the water. Removal of large woody vegetation in and around waterbodies could reduce some of these benefits (and associated watershed district goals) and may reduce the scenic integrity of shoreland areas, although other vegetation would be retained which would provide many of these benefits. Generally, operation of an oil pipeline in wetland areas would be consistent with wetland land uses, resulting in minor, temporary impacts.

6.2.1.3.2 Route Alternatives (from Clearbrook to Carlton)

Table 6.2.1-11 presents the amount and categories of land zoned for specific uses for the Applicant's preferred route and route alternatives from Clearbrook to Carlton.

Route Alternative RA-03AM

Construction Impacts

Compatibility with Comprehensive Plans and Zoning Ordinances

The types of land use impacts and the compatibility of pipeline construction within land use zones for RA-03AM would be the same as those discussed above for the Applicant's preferred route. The difference would be in the amount of land that would be affected, as shown in Table 6.2.1-11.

Agriculture/Forestry. Impacts on agricultural land would consist of prevention of crops on agricultural land for one growing season in the construction work areas, after which the land would revert to agricultural use, resulting in minor temporary impacts. For forested land, impacts would be greater, as trees would be cleared from construction work areas and would take a long period of time (up to many decades in some cases) to regenerate to preexisting conditions, resulting in minor to major and long-term impacts on forestry land in construction workspace areas and major permanent impacts in the permanent right-of-way.

Residential. Impacts on approximately 2 miles of land zoned as residential would be temporary for areas outside the permanent right-of-way, because construction work areas would be restricted from development for a short period of time since construction moves through an area relatively quickly, after which these areas would be restored, and no further restrictions on development would be in place. Areas within the permanent right-of-way would be permanently restricted from development; this would subtract from the land available for residential use, resulting in minor and permanent impacts on land zoned as residential.

Table 6.2.1-11. Amount and Types of Land Zoning and Uses for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Comprehensive Plans and Zoning Ordinances (miles of zoned land in construction work areas)					
Agriculture/forestry	66.2	**130.8**	63.1	58.4	52.7
Residential	9.1	2.2	0.2	**9.3**	7.0
Commercial	0.5	**1.2**	0.0	0.7	0.6
Industrial	0.0	0.3	**10.0**	1.0	0.9
Public/municipal	41.4	0.9	**63.3**	52.7	58.5
Conservation/recreation	**18.0**	1.7	0.8	1.1	0.3
Shoreland	**7.4**	3.7	1.3	1.3	0.6
Other	0.0	0.0	**9.4**	6.8	6.8
Watershed Districts Crossed (miles of land in construction work areas)					
Watershed districts crossed	25.0	24.8	**52.4**	15.6	13.3
Existing Land Uses (acres of land in construction work spaces)					
Agricultural	561.6	**1,611.1**	256.7	401.8	335.6
Developed	94.0	**385.8**	65.4	272.9	86.3
Forested	**1,446.5**	1,137.7	1,107.3	1,146.4	772.8
Open land	307.7	339.6	354.2	**692.0**	207.9
Open water	6.4	17.0	**81.8**	34.5	25.3
Wetlands	490.6	509.1	996.3	**1,592.0**	969.7

Table 6.2.1-11. Amount and Types of Land Zoning and Uses for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Operations Impacts					
Existing Land Uses (acres of land in permanent right-of-way)					
Agricultural	251.6	**676.8**	107.4	111.5	141.4
Developed	45.5	**157.8**	26.4	69.5	35.2
Forested	**631.0**	470.5	460.9	242.0	319.8
Open land	151.0	143.5	148.6	**193.6**	87.4
Open water	3.8	7.1	**33.7**	9.6	10.3
Wetlands	254.2	211.2	**415.3**	390.3	404.9

Note:
Bold font indicates the route option with the greatest amount of acres or miles for the zone or land area crossed.

Commercial. Construction near stores and businesses could temporarily interrupt commercial land uses by restricting access to businesses or parking areas, creating extra traffic in the area and creating noise and dust nuisances. However, with implementation of the Applicant-proposed measures, as described for the Applicant's preferred route, the impacts on commercial-zoned land from construction would be minor and temporary. Land in the permanent right-of-way would be permanently restricted from commercial development and would reduce the overall amount of commercial-zoned land available. Impacts would be minor because of the small amount of commercial land to be crossed (approximately 1 mile) and reduction of impacts from the Applicant-proposed measures. Impacts would be permanent, because after construction, the land within the permanent right-of-way would be restricted from development for the life of the Project.

Industrial. Construction of a pipeline in industrial areas could lead to traffic interruptions that could disrupt access to the inflow of materials and the outflow of products for facilities in this zone. With implementation of the Applicant-proposed measures, as described for the Applicant's preferred route, impacts on industrial land outside the permanent right-of-way would be negligible to minor and temporary. Impacts would be negligible to minor because of the small amount of industrial land to be crossed (0.3 mile) and the reduction of impacts from the Applicant-proposed measures. Impacts would be temporary because after construction, areas outside the permanent right-of-way would not be restricted from development. Areas within the permanent right-of-way would be restricted from any development. This would be a minor impact because of the small amount of land affected, but it would be permanent, as no development in the right-of-way would be permitted for the life of the Project.

Public/Municipal. Typically, this land is to be used for public benefit, and construction in land zoned for public or municipal use would temporarily minor to major disruptions of such uses. In RA-03 AM, the public/municipal land is 0.9 mile of municipal land in Mille Lacs County. For purposes of local government planning and zoning, the land would remain public; however, goals and impacts would vary, and no development would be permitted in the permanent right-of-way. This would be a minor impact because of the small amount of land, but it would be permanent, as no development would be allowed in the right-of-way for the life of the Project.

Conservation/Recreation. Conservation/recreation-zoned land crossed by RA-03AM consists of 0.4 mile of Mississippi Headwaters land in Morrison County, approximately 1 mile of Wild and Scenic River District zone along the Rum River in Mille Lacs County, and 0.1 mile of commercial recreation-zoned land in Carlton County. The use of these land use types would be temporarily affected by construction activities, such as clearing vegetation, grading the land, and trenching for placement of the pipe. These impacts would vary depending on the specific land type. Impacts in Mississippi Headwaters and the Wild and Scenic Rivers District would see similar impacts as those described for Shoreland zones of the Applicant's preferred route and in Section 6.3.1. Specific waterbody crossing methods have not been identified for RA-03AM, but mitigation measures along the route would be similar to those being proposed for the Applicant's preferred route and may include steps to avoid or reduce impacts on sensitive areas such as using guided bore or HDD waterbody crossing methods. Without specific plans for crossings in these areas, we assume that impacts would be similar to those in the Applicant's preferred route for Shoreland zones and the shoreland overlay district and would be minor and permanent. The small amount of land affected and the likelihood of Applicant-proposed mitigation measures would make the impact minor. However, trees and other woody vegetation would not be allowed to regrow in the permanent right-of-way, which would be a permanent impact.

Shoreland. Construction in Shoreland zones would not meet the goal of limiting development near waterways. RA-03AM would cross approximately 4 miles of Shoreland zones. Removal of vegetation from the construction areas would be a minor temporary impact, as all disturbed areas would be revegetated, but trees and woody vegetation would not be allowed to regrow within the permanent right-of-way.

Compatibility with Overlay Districts

Conditions that are placed on construction in shoreland areas may include maintenance of a vegetation buffer between construction and the edge of waterbodies, or other requirements to preserve vegetation and trees where possible. In areas where the pipeline would cross waterways, construction may require clearing trees and vegetation from the edge of the water, which is generally not compatible with the goals of shoreland overlay districts. Impacts would be minor because of the small amount of land along waterbodies that would be affected, and although trees would not be allowed, other vegetation would be planted. The impacts would be permanent because trees and woody vegetation would not be allowed to regrow in the right-of-way.

Floodplain overlay districts are designated to reduce the quantity of development in floodplains and restrict the type of development to reduce losses from flooding and retain adequate area within a floodplain to carry floodwaters. Construction activities would temporarily alter floodplain topography, but the uses of floodplains in the floodplain overlay districts would not likely change as a result of pipeline construction, resulting in minor and temporary impacts. Floodplains are further discussed in Section 6.3.1.4.

Compatibility with Existing Land Use

The types of land use impacts and the compatibility of pipeline construction within land use zones for RA-03AM would be the same as those discussed above for the Applicant's preferred route. The difference would be in the amount of land that would be affected, as shown in Table 6.2.1-11.

Agricultural. Compatibility with agricultural land is discussed for the agriculture/forestry zone above. The temporary removal of approximately 1,611 acres of land from agricultural production during construction would be a minor temporary impact because agricultural land would lose a growing season in the construction footprint, after which the land would be returned to agricultural land use.

Developed Land. As mentioned in the discussions above for residential, commercial, and industrial zones, construction activities in developed lands may be incompatible with existing uses in developed land. With implementation of the Applicant-proposed measures described for those zones, impacts from construction in developed areas would be temporary and minor because of the limited area that would be affected by construction (approximately 386 acres) and the short construction period; however, land in the permanent right-of-way would be restricted from future development, which would be a minor permanent impact.

Forested Land. Compatibility of the Applicant's preferred route with forested land is discussed above for the agriculture/forestry zone. Forested land also may fall under the public/municipal zone, especially for areas of state or national forests. Construction of RA-03AM is generally not compatible with forested land because of the requirement to remove trees from construction work areas. The approximately 1,138 acres of forested land affected would be a major long-term impact for areas in the temporary construction areas and a major permanent impact for areas within the permanent right-of-way where trees would not be permitted to regrow.

Open Land. Open land may correspond most closely with the conservation/recreation zone type. Construction activities in open land would temporarily be incompatible with goals of preserving undeveloped natural areas or scenic resources and enhancing recreation opportunities. Construction of a pipeline in open land would temporarily disturb approximately 340 acres of open land until restoration is complete. This would be a minor temporary impact because of the small area that would be affected and after construction, open lands would be restored.

Open Water. Pipeline construction in open water areas would be compatible with this land use category. During construction in waterways, minor temporary impacts could occur to surface waters from sedimentation and potential spills of small quantities of hazardous materials used during construction as discussed in Section 6.3.1.2. However, Applicant-proposed measures would be implemented to reduce such impacts which, would be temporary until construction is complete and the waterbody revegetated.

Wetlands. During construction of RA-03AM, construction activities in wetlands would not be compatible with preservation goals and impact would be minor to major, which may be temporary to long-term. After construction, the wetlands in some cases would revert to their original state; however, some wetlands, such as forested and scrub/shrub wetlands would be cleared of woody vegetation and would remain altered. Wetlands are discussed further in Section 6.3.1.3.

Compatibility with Watershed District Goals

During construction of a pipeline, removal of vegetation in construction work areas and working in and around wetlands and waterbodies may result in impacts on water resources in watersheds, as discussed further in Section 6.3.1. Vegetation in watershed areas acts to slow water runoff, stabilize banks, prevent erosion, and enhance scenic views from the water.

Removal of vegetation in and around waterbodies during construction could result in impacts on water resources in watersheds. This could affect watershed district goals of retaining good water quality by keeping banks stabilized and preventing erosion and may reduce the scenic integrity of shoreland areas. Applicant-proposed measures, including temporary erosion control measures and BMPs for waterbody crossings, would reduce construction impacts on water resources. These measures would help to meet the watershed districts' goals of conserving watershed functions and limiting impacts on water quality from development. With implementation of Applicant-proposed measures, pipeline construction would result in minor temporary impacts on waterbodies and watershed district goals.

<u>Operations Impacts</u>

The types of land use impacts and the compatibility of pipeline operations within land use zones for RA-03AM would be the same as those discussed above for the Applicant's preferred route. The difference would be in the amount of land that would be affected, as shown in Table 6.2.1-11.

Compatibility with Comprehensive Plans and Zoning Ordinances

County and local comprehensive plans generally have long-term goals. While short-term impacts from construction may temporarily interrupt desired land uses, long-term effects of operation of the pipeline may represent greater impacts, as detailed below.

Agriculture/Forestry. Operation of an oil pipeline would be compatible with the goal of preserving agricultural land because farming would be permitted in the right-of-way after construction, resulting in no compatibility impacts on land zoned as agricultural during operations. The goal of preserving forested

land would not be compatible with operation of the proposed Project; however, because no trees would be allowed within the permanent right-of-way, this would result in a loss of forested land and an impact that would be major and permanent.

Residential. The presence of a buried oil pipeline in residential areas would partially limit development of residential land during operation, as no structures would be permitted over the permanent right-of-way. However, land outside the permanent right-of-way would be available for such development. The loss of a 50-foot-wide permanent right-of-way corridor to residential development would represent a minor permanent impact on residential land use.

Commercial. The presence of a buried oil pipeline would limit development of commercial land within the permanent right-of-way during operation, because no structures would be permitted for development in this area. However, only a small amount of land is zoned as commercial within the permanent right-of-way, and land outside the permanent right-of-way would be available for commercial development. The loss of a 50-foot-wide permanent right-of-way corridor to commercial development would represent a minor permanent impact on commercial use.

Industrial. The presence of a buried oil pipeline would partially limit development of industrial land within the permanent right-of-way during operation because no structures would be permitted for development in this area. However, only a small amount of land is zoned as industrial within the permanent right-of-way, and land outside the permanent right-of-way would be available for industrial development. The loss of a 50-foot-wide permanent right-of-way corridor to industrial development would represent a minor permanent impact on commercial use.

Public/Municipal. RA-03AM crosses approximately 1 mile of public/municipal land. The land zoned for public/municipal use crossed by RA-03AM is municipal land. For purposes of local government planning and zoning, the land would remain public; however, goals and impacts would vary across the different public land types, which is discussed further in Section 6.3.6. Other public uses may be permitted to resume after construction is complete; however, no development would be permitted in the permanent right-of-way. Because of the small amount of land affected, this would be a minor impact, but it would last throughout the lifetime of the Project, so it would be permanent.

Conservation/Recreation. Operation of RA-03AM in areas zoned conservation within Mississippi Headwaters and the Wild and Scenic River District would generally be compatible with the Project, because the pipeline would be buried and vegetation would be replanted in any disturbed areas. Trees and woody vegetation would not be allowed to revegetate in the permanent right-of-way, which could affect the viewshed of the scenic river area. Crossing methods have not been determined; but in special interest areas, less impactful crossing methods, such as boring and HDD would be considered. The elimination of trees from the permanent right-of-way may conflict with goals of conservation in these zones and would be a minor permanent impact. Impacts in land zoned as conservation/recreation would be similar to impacts in commercial land and would result in the loss of the ability to develop land within the permanent right-of-way. The small amount of land affected (1.7 miles) would make this a minor but permanent impact.

Shoreland. During operations, RA-03AM would largely be compatible with shoreland goals, since the pipeline would be buried beneath waterbodies and would generally not affect shoreland functions, with the exception of the permanent right-of-way at the water's edge, where trees would not be allowed to grow along the banks. The goal of preserving vegetation buffers and shade trees along waterbodies

would be partially restricted in the permanent right-of-way in these areas. However, the right-of-way would be planted with other vegetation, which would preserve other goals of water quality and bank stability. Operation of RA-03AM in shoreland areas would be a minor permanent impact on shoreland goals.

Compatibility with Overlay Districts

RA-03AM would largely be compatible with shoreland goals, since the pipeline would be buried beneath waterbodies and would generally not affect shoreland functions. Where the pipeline crosses waterbodies, the permanent right-of-way abutting the water's edge would be maintained clear of trees and large woody vegetation, and the goal of preserving buffers and shade trees along waterbodies would be partially prevented. However, the permanent right-of-way would be planted with other vegetation, which would preserve other goals of maintaining water quality and bank stability. Impacts and mitigation associated with water resources are further discussed in Section 6.3.1. Operation of RA-03AM in shoreland overlay districts would be a minor permanent impact on overlay district goals.

Because the pipeline would be buried underground and the groundcover conditions would be restored, the Project would be compatible with floodplain overlay requirements during operation. The buried pipeline would not be an obstruction in the floodplain and would not affect the water channel or flood levels.

Compatibility with Existing Land Use

During operation, the permanent footprint of RA-03AM would cover approximately 677 acres of agricultural land, 471 acres of forested land, 211 acres of wetlands, 144 acres of open land, 158 acres of developed land, and 7 acres of open water. This analysis reviewed the compatibility of RA-03AM with these adjacent land uses to supplement the zoning compatibility analyses of areas without zoning information, but the study included all areas crossed by RA-03AM.

Agricultural. Operation of RA-03AM would be compatible with the use of agricultural land because farming would occur in the right-of-way after construction, resulting in no compatibility impacts on land used for agriculture during operations.

Developed Land. The presence of buried oil pipeline in developed areas would partially limit residential, commercial, and industrial development in these areas during operation, because no structures would be permitted over the permanent right-of-way. However, only a small amount of land is zoned as developed (approximately 158 acres) within the permanent right-of-way, and land outside the permanent right-of-way would be available for development. The loss of a 50-foot-wide permanent right-of-way corridor to residential, commercial, and industrial development would represent a minor permanent impact on developed land use.

Forested Land. Forested land may also fall under the public/municipal zone, especially for areas of state or national forests. Operation of RA-03AM would be least compatible with preservation of forested land, because trees would not be permitted in the permanent right-of-way. The loss of approximately 471 acres of forest land from clearing trees would be a major permanent impact within the permanent right-of-way, which would be maintained free of trees and woody vegetation.

Open Land. Open land may correspond most closely with the conservation/recreation zone type. Maintenance mowing of vegetation in the permanent right-of-way would be incompatible with goals of preserving undeveloped natural areas, but would be consistent with goals of providing public use of

open areas. For this analysis, the approximately 144 acres of open land that would be maintained during operations is considered to be a minor, permanent impact, as these areas could continue to be used as open space after restoration is complete.

Open Water. Typically, the open water land use category is not a planned zone. From a planning and zoning perspective, pipeline operation in open water areas would be compatible with the open water land use category, because open waters crossed by RA-03AM would remain in their current use, and there would be no impacts.

Wetlands. Wetlands would most closely correspond with the Shoreland zone in local comprehensive plans. During operations, because the pipeline would be buried beneath waterbodies and would generally not affect wetland functions, with the exception of the permanent right-of-way where trees and large woody vegetation would not be allowed to grow. Preservation of wetland vegetation buffers and shade trees along waterbodies would be partially restricted in the permanent right-of-way in these areas. However, the right-of-way would be planted with other vegetation that would preserve other wetland functions, such as water quality and bank stability. Operation of RA-03AM in wetland areas would be minor and long-term, as wetlands would generally return to functionality. Wetlands are further discussed in Section 6.3.1.3.

Compatibility with Watershed District Goals

During operation of RA-03AM, the pipeline would be compatible with watershed district goals, including erosion control and water quality. During operation of a pipeline, maintenance of vegetation in the permanent right-of-way in and around wetlands and waterbodies may result in minor impacts on water resources in watersheds, as discussed further in Section 6.3.1. Vegetation in watershed areas acts to slow water runoff, stabilize banks, prevent erosion, and enhance scenic views from the water. Removal of large woody vegetation in and around waterbodies could reduce some of these benefits (and associated watershed district goals) and may reduce the scenic integrity of shoreland areas, although other vegetation would be retained that would provide many of these benefits. Generally, operation of an oil pipeline in wetland areas would be consistent with wetland land uses, resulting in minor temporary impacts.

Route Alternative RA-06

Construction Impacts

The types of land use impacts and the compatibility of pipeline construction within land use zones for RA-06 would be the same as those discussed above for the Applicant's preferred route. The difference would be in the amount of land that would be affected, as shown in Table 6.2.1-11.

Compatibility with Comprehensive Plans and Zoning Ordinances

Agriculture/Forestry. Impacts on agricultural land would consist of prevention of crops on agricultural land for one growing season in the construction work areas, after which the land would revert to agricultural use, resulting in minor, temporary impacts. For forested land, impacts would be greater as trees cleared from construction work areas would take a long period of time (up to many decades in some cases) to regenerate to preexisting conditions, resulting in minor to major and long-term impacts on forestry land in construction workspace areas and major permanent impacts in the permanent right-of-way.

Residential. Impacts on 0.2 mile of land zoned as residential would be temporary for areas outside the permanent right-of-way, because construction work areas would be restricted from development for a short period of time as construction moves through an area relatively quickly, after which these areas would be restored, and no further restrictions on development would be in place. Areas within the permanent right-of-way would be permanently restricted from development, and this would subtract from the land available for residential use. The small amount of residential land crossed would leave adequate areas that could still be developed for residential use, resulting in minor and permanent impacts on land zoned as residential.

Industrial. Construction of a pipeline in industrial areas could lead to traffic interruptions that could disrupt access to the inflow of materials and the outflow of products for facilities in this zone. With implementation of the Applicant-proposed measures, as described for the Applicant's preferred route, impacts on land zoned for industrial use would be minor, because of the amount of industrial land to be crossed (10 miles) and temporary, because after construction, areas outside the permanent right-of-way would not be restricted from development. Areas within the permanent right-of-way would be restricted from any development. This would be a minor impact because of the small amount of land affected, but it would be permanent, as no development in the right-of-way would be permitted for the life of the Project.

Public/Municipal. Typically, this land is to be used for public benefit, and construction in land zoned for public or municipal use would temporarily cause minor to major disruptions of such uses. Public/municipal land is the largest zoning category crossed by RA-06 with approximately 63 miles crossed. For purposes of local government planning and zoning, the land would remain public; however, goals and impacts would vary across the different public land types, and no development would be permitted in the permanent right-of-way. Impacts on specific public land types are discussed further in Section 6.3.6.

Conservation/Recreation. RA-06 would cross 0.8 mile of conservation/recreation-type zoning (see Table 6.2.1-11). The specific land is zoned open land in Aitkin County and is designated for areas of floodplains, swamp lands, and other areas unsuitable or unsafe for development. The use of the area as open land would be temporarily affected by construction activities, such as clearing vegetation, grading the land, and trenching for placement of the pipe. These impacts would be minor and temporary. However, following construction and restoration, impacts would be negligible because the pipeline would be buried and would not affect surface use.

Shoreland. Construction in Shoreland zones would not meet the goal of limiting development near waterways, and RA-06 would cross approximately 1 mile of Shoreland zones in St. Louis and Carlton counties. Construction in the Shoreland zone would not meet the goal of limiting development near waterways, and removal of vegetation from the construction areas would be a minor, temporary impact. Impacts on overlay districts are discussed further below.

Compatibility with Overlay Districts

Conditions that are placed on construction in shoreland areas may include maintenance of a buffer of vegetation between construction and the edge of waterbodies or other requirements to preserve vegetation and trees, where possible. In areas where the pipeline would cross waterways, construction may require clearing trees and vegetation from the edge of the water, which is generally not compatible with the goals of shoreland overlay districts. A total of 137 surface waters would be crossed by RA-06 (see Section 6.3.1.2). As discussed further in Section 6.3.1.2, impacts on some waterbodies would be

reduced through the use of bore crossings and HDD crossings where vegetation buffers and streambanks could be left intact, as well as other Applicant-proposed measures. Generally construction in the shoreland area and across streambanks is not compatible with the goals of shoreland overlay districts and would be a minor permanent impact. Overall, the impacts in shoreland areas would be minor because of the small amount of land along waterbodies that would be affected and although trees would not be allowed, other vegetation would be planted. The impacts would be permanent because trees and woody vegetation would not be allowed to regrow in the right-of-way. Impacts in shoreland areas are further discussed in Sections 6.3.1.2, 6.3.1.3, and 6.3.1.4.

Floodplain overlay districts are designated to reduce the quantity of development in floodplains and restrict the type of development in order to reduce losses from flooding and retain adequate area within a floodplain to carry floodwaters. Construction activities would temporarily alter floodplain topography but the uses of floodplains in floodplain overlay districts would not likely change as a result of pipeline construction, resulting in minor and temporary impacts. Floodplains are further discussed in Section 6.3.1.4.

Compatibility with Existing Land Use

Agricultural. Compatibility with agricultural land is discussed for the agriculture/forestry zone above. The temporary removal of approximately 257 acres of land from agricultural production during construction would be a minor temporary impact, because agricultural land would lose one growing season in the construction footprint, after which the land would be returned to agricultural land use.

Developed Land. As mentioned in the discussions for residential, commercial, and industrial zones, construction activities in developed lands may be incompatible with existing uses in developed land. With implementation of the Applicant-proposed measures described for those zones, impacts from construction in developed areas would be temporary and minor, because of the limited area that would be affected by construction (approximately 65 acres) and the short construction period; however, land in the permanent right-of-way would be restricted from future development, which would be a minor permanent impact.

Forested Land. Compatibility of RA-06 with forested land is discussed for the agriculture/forestry zone. Forested land also may fall under the public/municipal zone type, especially for areas of state or national forests. Construction of RA-06 is generally not compatible with forested land because of the requirement to remove trees from construction work areas. The approximately 1,107 acres of forested land affected would be a major long-term impact for areas in the temporary construction areas and a major permanent impact for areas within the permanent right-of-way where trees would not be permitted to regrow.

Open Land. Open land may correspond most closely with the conservation/recreation zone type. Construction activities in open land would temporarily be incompatible with goals of preserving undeveloped natural areas or scenic resources and enhancing recreation opportunities. Construction of RA-06 in open land would temporarily disturb approximately 354 acres of open land until restoration is complete. This would be a minor temporary impact because of the small area that would be affected and after construction, open lands would be restored.

Open Water. Pipeline construction in open water areas would be compatible with this land use category. RA-06 would cross approximately 82 acres of open water during construction. During construction in waterways, minor temporary impacts could occur to surface waters from sedimentation

and potential spills of small quantities of hazardous materials used during construction, as discussed in Section 6.3.1.2. However, Applicant-proposed measures would be implemented to reduce such impacts, which would be temporary until construction is complete and the waterbody revegetated.

Wetlands. During construction of RA-06, construction activities in wetlands would not be compatible with preservation goals and would be a minor to major impact, which may be temporary or long-term. A total of approximately 996 acres of wetlands would be crossed during construction. After construction, wetlands in some cases would revert to their original state; however, some wetlands, such as forested and scrub/shrub wetlands, would be cleared of woody vegetation and would remain altered. Wetlands are discussed further in Section 6.3.1.3.

Compatibility with Watershed District Goals

During construction of a pipeline, removal of vegetation in construction work areas and working in and around wetlands and waterbodies may result in impacts on water resources in watersheds, as discussed further in Section 6.3.1. Vegetation in watershed areas acts to slow water runoff, stabilize banks, prevent erosion, and enhance scenic views from the water.

Removal of vegetation in and around waterbodies during construction could result in impacts on water resources in watersheds that could affect watershed district goals of retaining good water quality by keeping banks stabilized and preventing erosion, and may reduce the scenic integrity of shoreland areas. The Applicant-proposed measures, including temporary erosion control measures and BMPs for waterbody crossings, would reduce construction impacts on water resources and help to meet the watershed districts' goals of conserving watershed functions and limiting impacts on water quality from development. With implementation of Applicant-proposed measures, pipeline construction would result in minor temporary impacts on waterbodies and watershed district goals.

Operations Impacts

The types of land use impacts and the compatibility of pipeline operations within land use zones for RA-06 would be the same as those discussed above for the Applicant's preferred route. The difference would be in the amount of land that would be affected, as shown in Table 6.2.1-11.

Compatibility with Comprehensive Plans and Zoning Ordinances

County and local comprehensive plans generally have long-term goals. While short-term impacts from construction may temporarily interrupt desired land uses, long-term effects of operation of the pipeline may represent greater impacts, as detailed below.

Agriculture/Forestry. Operation of an oil pipeline would be compatible with the goal of preserving agricultural land because farming would be permitted in the right-of-way after construction, resulting in no compatibility impacts on land zoned as agricultural during operations. The goal of preserving forested land would not be compatible with operation of the proposed Project; however, because no trees would be allowed within the permanent right-of-way, resulting in a loss of forested land and an impact that would be major and permanent.

Residential. The presence of a buried oil pipeline in residential areas would partially limit development of residential land during operation as no structures would be permitted over the permanent right-of-way. However, land outside the permanent right-of-way would be available for such development. The loss of a 50-foot-wide, 0.2-mile-long, permanent right-of-way corridor to residential development would represent a minor permanent impact on residential land use from RA-06.

Industrial. The presence of buried oil pipeline would partially limit development of industrial land within the permanent right-of-way during operation because no structures would be permitted for development in this area. However, only a small amount of land is zoned as industrial (10 miles) within the permanent right-of-way, and land outside the permanent right-of-way would be available for industrial development. The loss of a 50-foot-wide permanent right-of-way corridor to industrial development would represent a minor permanent impact on industrial use.

Public/Municipal. RA-06 crosses approximately 63 miles of public/municipal land, all in Itasca County. The majority of land zoned for public/municipal use crossed by RA-06 is state forest land as discussed further in Section 6.3.6. The loss of forest from clearing trees would be a major permanent impact along the permanent right-of-way, which would be maintained free of trees and woody vegetation. For purposes of local government planning and zoning, the land would remain public. However, goals and impacts would vary across the different public land types; these are discussed further in Section 6.3.6. Other public uses may be permitted to resume after construction is complete.

Conservation/Recreation. Operation of RA-06 in areas zoned for conservation/recreation would be compatible with recreation in that the permanent right-of-way would be revegetated and would revert to its original use. The only conservation/recreation-zoned land that would be crossed by RA-06 would be in Aitkin County. The specific zone crossed in Aitkin County is the open land zone, and pipeline construction in open land is generally compatible as the pipeline would be buried. Additionally, because of the small amount of land that would be affected (0.8 mile), RA-06 would lead to negligible impacts.

Shoreland. During operations, RA-06 would largely be compatible with shoreland goals, since the pipeline would be buried beneath waterbodies and would generally not affect shoreland functions, with the exception of the permanent right-of-way at the water's edge where trees would not be allowed to grow along the banks. The goal of preserving vegetation buffers and shade trees along waterbodies would be partially restricted in the permanent right-of-way in these areas. However, the right-of-way would be planted with other vegetation, which would preserve other goals of water quality and bank stability, for example. Operation of RA-06 in shoreland areas would be a minor permanent impact on shoreland goals.

Compatibility with Overlay Districts

RA-06 would largely be compatible with shoreland goals during operation, since the pipeline would be buried beneath waterbodies and would generally not affect shoreland functions. Where the pipeline crosses waterbodies, the permanent right-of-way abutting the water's edge would be maintained clear of trees and large woody vegetation, and the goal of preserving buffers and shade trees along waterbodies would be partially prevented. However, the permanent right-of-way would be planted with other vegetation, which would preserve other goals of maintaining water quality and bank stability. Impacts and mitigation associated with water resources are further discussed in Section 6.3.1. Operation of RA-06 in shoreland overlay districts would be a minor permanent impact on overlay district goals.

Because the pipeline would be buried underground and the ground cover conditions would be restored, the Project would be compatible with floodplain overlay requirements during operation. The buried pipeline would not be an obstruction in the floodplain and would not affect the water channel or flood levels.

Compatibility with Existing Land Use

During operation, the permanent footprint of RA-06 would cover approximately 107 acres of agricultural land, 461 acres of forested land, 415 acres of wetlands, 149 acres of open land, 26 acres of developed land, and 34 acres of open water. This analysis reviews the compatibility of the Project with these adjacent land uses during operation.

Agricultural. Operation of RA-06 would be compatible with the use of agricultural land because farming would occur in the right-of-way after construction, resulting in no compatibility impacts on land used for agriculture during operations.

Developed Land. The presence of buried oil pipeline in developed areas would partially limit residential, commercial, and industrial development in these areas during operation as no structures would be permitted over the permanent right-of-way. However, only a small amount of land is zoned as developed (approximately 26 acres) within the permanent right-of-way, and land outside the permanent right-of-way would be available for development. The loss of a 50-foot-wide permanent right-of-way corridor to residential, commercial, and industrial development would represent a minor permanent impact on developed land use.

Forested Land. Forested land also may fall under the Public/Municipal zone, especially for areas of state or national forests. Operation of RA-06 would be least compatible with preservation of forested land because trees would not be permitted in the permanent right-of-way. The loss of approximately 461 acres of forest land from clearing trees would be a major permanent impact along the permanent right-of-way, which would be maintained free of trees and woody vegetation.

Open Land. Open land may correspond most closely with the Conservation/Recreation zone type. Maintenance vegetation mowing in the permanent right-of-way would be incompatible with goals of preserving undeveloped natural areas, but would be consistent with goals of providing public use of open areas. For this analysis, the approximately 149 acres of open land that would be maintained during operations is considered to be a minor permanent impact, as these areas could continue to be used as open space after restoration is complete.

Open Water. Typically the Open Water land use category is not a planned zone. From a planning and zoning perspective, pipeline operation in open water areas would be compatible with the open water land use category because open waters crossed by RA-06 would remain in their current use, and there would be no impacts.

Wetlands. Wetlands would most closely correspond with the Shoreland zone in local comprehensive plans. During operations, because the pipeline would be buried beneath waterbodies and would generally not affect wetland functions, with the exception of the permanent right-of-way where trees and large woody vegetation would not be allowed to grow. Preservation of wetland vegetation buffers and shade trees along waterbodies would be partially restricted in the permanent right-of-way in these areas. However, the right-of-way would be planted with other vegetation that would preserve other wetland functions such as water quality and bank stability. Operation of RA-06 in wetland areas would be minor and long-term, as wetlands would generally return to functionality. Wetlands are further discussed in Section 6.3.1.3.

Compatibility with Watershed District Goals

During operation of RA-06, the pipeline would be compatible with watershed district goals, including erosion control and water quality. During operation of a pipeline, maintenance of vegetation in the permanent right-of-way in and around wetlands and waterbodies may result in minor impacts on water resources in watersheds, as discussed further in Section 6.3.1. Vegetation in watershed areas acts to slow water runoff, stabilize banks, prevent erosion, and enhance scenic views from the water. Removal of large woody vegetation in and around waterbodies could reduce some of these benefits (and associated watershed district goals) and may reduce the scenic integrity of shoreland areas, although other vegetation would be retained, which would provide many of these benefits. Generally, operation of an oil pipeline in wetland areas would be consistent with wetland land uses, resulting in minor, temporary impacts.

Route Alternative RA-07

Construction Impacts

As noted above, RA-07 involves removal of the existing Line 3 and replacement in the existing trench, which is located entirely within the Enbridge Mainline corridor right-of-way. Enbridge has easements for the land in this corridor, and past, current, and foreseeable future land use in this corridor is pipeline right-of-way. The 205-foot anticipated construction work area for this alternative would extend somewhat beyond the existing Mainline corridor, but impacts on land use/planning and zoning are expected to be temporary negligible, as this construction activity would occur on the margin of the existing Mainline corridor.

Operations Impacts

RA-07 involves removal of the existing Line 3 and replacement in the existing trench, which is located entirely in the Enbridge Mainline corridor right-of-way. Enbridge has easements for the land in this corridor, and past, current, and foreseeable future land use in this corridor is pipeline right-of-way. Continued use of this corridor would leave existing land-use in the corridor unchanged.

Route Alternative RA-08

Construction Impacts

The types of land use impacts and the compatibility of pipeline construction within land use zones for RA-08 would be the same as those discussed for the Applicant's preferred route. The difference would be in the amount of land that would be affected, as shown in Table 6.2.1-11.

Compatibility with Comprehensive Plans and Zoning Ordinances

Agriculture/Forestry. Impacts on agricultural land would consist of prevention of crops on agricultural land for one growing season in the construction work areas, after which the land would revert to agricultural use, resulting in minor temporary impacts. For forested land, impacts would be greater as trees would be cleared from construction work areas that would take a long period of time (up to many decades in some cases) to regenerate to preexisting conditions, resulting in minor to major and long-term impacts on forestry land in construction workspace areas and major permanent impacts in the permanent right-of-way.

Residential. Impacts on 7 miles of land zoned as residential would be temporary for areas outside the permanent right-of-way, because construction work areas would be restricted from development for a short period of time, as construction moves through an area relatively quickly, after which these areas

would be restored, and no further restrictions on development would be in place. Areas within the permanent right-of-way would be permanently restricted from development, and this would subtract from the land available for residential use. The small amount of residential land crossed would leave adequate areas that could still be developed for residential use, resulting in minor and permanent impacts on land zoned as residential.

Commercial. Construction near stores and businesses could temporarily interrupt commercial land uses by restricting access to businesses or parking areas, creating extra traffic in the area, and creating noise and dust nuisances. However, with implementation of the Applicant-proposed measures as described for the Applicant's preferred route, the impacts on commercial-zoned land from construction would be minor and temporary. Land in the permanent right-of-way would be permanently restricted from commercial development and would reduce the overall amount of commercial-zoned land available. Impacts would be minor because of the small amount of commercial land to be crossed (0.6 mile) and the reduction of impacts from the Applicant-proposed measures. Impacts would be permanent because after construction the land within the permanent right-of-way would be restricted from development for the life of the Project.

Industrial. Construction of a pipeline in industrial areas could lead to traffic interruptions, which could disrupt access to the inflow of materials and the outflow of products for facilities in this zone. With implementation of the Applicant-proposed measures as described for the Applicant's preferred route, impacts on land zoned for industrial use would be negligible to minor because of the small amount of industrial land to be crossed (1 mile) and temporary, because after construction areas outside the permanent right-of-way would not be restricted from development. Areas within the permanent right-of-way would be restricted from any development. This would be a minor impact because of the small amount of land affected, but it would be permanent as no development in the right-of-way would be permitted for the life of the Project.

Public/Municipal. This land is to be used for public benefit, and construction in land zoned for public or municipal use would temporarily minor to major disruptions of such uses. RA-08 would cross approximately 59 miles of Public/Municipal land in Cass and Itasca counties. For purposes of local government planning and zoning, the land would remain public; however, no development would be allowed in the permanent right-of-way and goals and impacts would vary across the different public land types. The various public land types crossed are discussed further in Section 6.3.6.

Conservation/Recreation. The use of this land use type would be temporarily affected by construction activities, such as clearing vegetation, grading the land, and trenching for placement of the pipe. RA-08 would cross 0.3 mile of conservation/recreation-type zoning (see Table 6.2.1-11). The specific land is zoned "Conservation" in Beltrami County. The goals of conservation would not generally be compatible with a pipeline; however, the small amount of land that would be affected would make this a minor impact. Following construction and restoration impacts would be negligible, because the pipeline would be buried and would not affect surface use.

Shoreland. Construction in Shoreland zones would not meet the goal of limiting development near waterways, and RA-08 would cross approximately 0.6 mile of Shoreland zones in Carlton County. Construction in the Shoreland zone would not meet the goal of limiting development near waterways, and removal of vegetation from the construction areas would be a minor temporary impact. Impacts on overlay districts are discussed further below.

Compatibility with Overlay Districts

Conditions that are placed on construction in shoreland areas may include maintenance of a buffer of vegetation between construction and the edge of waterbodies, or other requirements to preserve vegetation and trees where possible. In areas where the pipeline would cross waterways, construction may require clearing trees and vegetation from the edge of the water, which is generally not compatible with the goals of shoreland overlay districts. A total of 106 surface waters would be crossed by RA-08 (see Section 6.3.1.2). As discussed further in Section 6.3.1.2, impacts on some waterbodies would be reduced through the use of bore crossings and HDD crossings where vegetation buffers and streambanks could be left intact, as well as other Applicant-proposed measures. Generally, construction in the shoreland area and across streambanks is not compatible with the goals of shoreland overlay districts and would be a minor permanent impact. Overall, the impacts in shoreland areas would be minor because of the small amount of land along waterbodies that would be affected and although trees would not be allowed, other vegetation would be planted. The impacts would be permanent because trees and woody vegetation would not be allowed to regrow in the right-of-way. Impacts in shoreland areas are further discussed in Sections 6.3.1.2, 6.3.1.3, and 6.3.1.4.

Floodplain overlay districts are designated to reduce the quantity of development in floodplains and restrict the type of development in order to reduce losses from flooding and retain adequate area within a floodplain to carry floodwaters. Construction activities would temporarily alter floodplain topography but the uses of floodplains in the floodplain overlay districts would not likely change as a result of pipeline construction, resulting in minor and temporary impacts. Floodplains are further discussed in Section 6.3.1.4.

Compatibility with Existing Land Use

Agricultural. Compatibility with agricultural land is discussed for the Agriculture/Forestry zone above. The temporary removal of approximately 336 acres of land from agricultural production during construction would be a minor, temporary impact because agricultural land would lose a growing season in the construction footprint, after which the land would be returned to agricultural land use.

Developed Land. As mentioned in the discussions above for Residential, Commercial, and Industrial zones, construction activities in developed lands may be incompatible with existing uses in developed land. With implementation of the Applicant-proposed measures described for those zones, impacts from construction in developed areas would be temporary and minor, because of the limited area that would be affected by construction (approximately 86 acres) and the short construction period; however, land in the permanent right-of-way would be restricted from future development, which would be a minor permanent impact.

Forested Land. Compatibility of RA-08 with forested land is discussed above for the Agriculture/ Forestry zone. Forested land also may fall under the Public/Municipal zone, especially for areas of state or national forests. Construction of RA-08 is generally not compatible with forested land, because of the requirement to remove trees from construction work areas. The approximately 773 acres of forested land affected would be a major long-term impact for areas in the temporary construction areas and a major permanent impact for areas within the permanent right-of-way where trees would not be permitted to regrow.

Open Land. Open land may correspond most closely with the Conservation/Recreation zone type. Construction activities in open land would temporarily be incompatible with goals of preserving undeveloped natural areas or scenic resources and enhancing recreation opportunities. Construction of

a pipeline in open land would temporarily disturb approximately 208 acres of open land until restoration is complete. This would be a minor, temporary impact because of the small area that would be affected and after construction, open lands would be restored.

Open Water. Pipeline construction in open water areas would be compatible with this land use category. During construction in waterways, minor temporary impacts could occur to surface waters from sedimentation and potential spills of small quantities of hazardous materials used during construction, as discussed in Section 6.3.1.2. However, Applicant-proposed measures would be implemented to reduce such impacts, which would be temporary, until construction is complete and the waterbody revegetated.

Wetlands. During construction of RA-08, construction activities in wetlands would not be compatible with preservation goals and would be a minor to major impact, which may be a temporary to long-term impact. After construction, the wetlands in some cases would revert to their original state; however some wetlands, such as forested and scrub/shrub wetlands would be cleared of woody vegetation and would remain altered. Wetlands are discussed further in Section 6.3.1.3.

Compatibility with Watershed District Goals

During construction of a pipeline, removal of vegetation in construction work areas and working in and around wetlands and waterbodies may result in impacts on water resources in watersheds, as discussed further in Section 6.3.1. Vegetation in watershed areas acts to slow water runoff, stabilize banks, prevent erosion, and enhance scenic views from the water.

Removal of vegetation in and around waterbodies during construction could result in impacts on water resources in watersheds, which could affect watershed district goals of retaining good water quality by keeping banks stabilized and preventing erosion and may reduce the scenic integrity of shoreland areas. The Applicant-proposed measures outlined in Section 6.3.1.2, including temporary erosion control measures and BMPs for waterbody crossings would reduce construction impacts on water resources, which would help to meet the watershed districts' goals of conserving watershed functions and limiting impacts on water quality from development. With implementation of Applicant-proposed measures, pipeline construction would result in minor temporary impacts on waterbodies and watershed district goals.

Operations Impacts

The types of land use impacts and the compatibility of pipeline operations within land use zones for RA-08 would be the same as those discussed above for the Applicant's preferred route. The difference would be in the amount of land that would be affected, as shown in Table 6.2.1.11.

Compatibility with Comprehensive Plans and Zoning Ordinances

County and local comprehensive plans generally have long-term goals. While short-term impacts from construction may temporarily interrupt desired land uses, long-term effects of operation of the pipeline may represent greater impacts, as detailed below.

Agriculture/Forestry. Operation of an oil pipeline would be compatible with the goal of preserving agricultural land because farming would be permitted in the right-of-way after construction, resulting in no compatibility impacts on land zoned as agricultural during operations. The goal of preserving forested land would not be compatible with operation of the proposed Project; however, as no trees would be

allowed within the permanent right-of-way, resulting in a loss of forested land and an impact that would be minor to major and permanent.

Residential. The presence of buried oil pipeline in residential areas would partially limit development of residential land during operation, as no structures would be permitted over the permanent right-of-way. However, land outside the permanent right-of-way would be available for such development. The loss of a 50-foot-wide permanent right-of-way corridor to residential development would represent a minor permanent impact on residential land use.

Commercial. The presence of buried oil pipeline would limit development of commercial land within the permanent right-of-way during operation as no structures would be permitted for development in this area. However, only a small amount of land is zoned as commercial (0.6 acre) within the permanent right-of-way, and land outside the permanent right-of-way would be available for commercial development. The loss of a 50-foot-wide permanent right-of-way corridor to commercial development would represent a minor permanent impact on commercial use.

Industrial. The presence of buried oil pipeline would partially limit development of Industrial land within the permanent right-of-way during operation as no structures would be permitted for development in this area. However, only a small amount of land is zoned as industrial (0.9 acre) within the permanent right-of-way, and land outside the permanent right-of-way would be available for industrial development. The loss of a 50-foot-wide permanent right-of-way corridor to industrial development would represent a minor permanent impact on commercial use.

Public/Municipal. The majority of land zoned for public/municipal use crossed by RA-08 is state forest land, as described further in Section 6.3.6. The loss of forest from clearing trees would be a major permanent impact along the permanent right-of-way, which would be maintained free of trees and woody vegetation. For purposes of local government planning and zoning, the land would remain public; however, goals and impacts would vary across the different public land types and these, are discussed further in Section 6.3.6. Other public uses may be permitted to resume after construction is complete.

Conservation/Recreation. Operation of RA-08 in areas zoned for conservation/recreation would be compatible with recreation in that the permanent right-of-way would be revegetated and would revert to its original use. Land in this land use zone that is used for conservation purposes, however, would be periodically disturbed by maintenance mowing in the permanent right-of-way, but the small amount of land affected (0.3 mile) would result in negligible impacts.

Shoreland. During operations, RA-08 would largely be compatible with shoreland goals since the pipeline would be buried beneath waterbodies and would generally not affect shoreland functions, with the exception of the permanent right-of-way at the water's edge where trees would not be allowed to grow along the banks. The goal of preserving vegetation buffers and shade trees along waterbodies would be partially restricted in the permanent right-of-way in these areas. However, the right-of-way would be planted with other vegetation, which would preserve other goals of water quality and bank stability, for example. Operation of RA-08 in shoreland areas would be a minor permanent impact on shoreland goals.

Compatibility with Overlay Districts

RA-08 would largely be compatible with shoreland goals since the pipeline would be buried beneath waterbodies and would generally not affect shoreland functions. Where the pipeline crosses

waterbodies, the permanent right-of-way abutting the water's edge would be maintained clear of trees and large woody vegetation and the goal of preserving buffers and shade trees along waterbodies would be partially prevented. However, the permanent right-of-way would be planted with other vegetation, which would preserve other goals of maintaining water quality and bank stability. Impacts and mitigation associated with water resources are further discussed in Section 6.3.1. Operation of RA-08 in shoreland overlay districts would be a minor permanent impact on overlay district goals.

Because the pipeline would be buried underground and the ground cover conditions would be restored, the Project would be compatible with floodplain overlay requirements during operation. The buried pipeline would not be an obstruction in the floodplain and would not affect the water channel or flood levels.

Compatibility with Existing Land Use

During operation, the permanent footprint of RA-08 would cover approximately 141 acres of agricultural land, 320 acres of forested land, 405 acres of wetlands, 10 acres of open land, 35 acres of developed land, and 10 acres of open water. This analysis reviews the compatibility of the Project with these adjacent land uses during operation.

Agricultural. Operation of RA-08 would be compatible with the use of agricultural land because farming would occur in the right-of-way after construction, resulting in no compatibility impacts on land used for agriculture during operations.

Developed Land. The presence of a buried oil pipeline in developed areas would partially limit residential, commercial, and industrial development in these areas during operation as no structures would be permitted over the permanent right-of-way. However, only a small amount of land is designated as developed (approximately 35 acres) within the permanent right-of-way, and land outside the permanent right-of-way would be available for development. The loss of a 50-foot-wide permanent right-of-way corridor to residential, commercial, and industrial development would represent a minor permanent impact on developed land use.

Forested Land. Forested land also may fall under the Public/Municipal zone, especially for areas of state or national forests. Operation of RA-08 would be least compatible with preservation of forested land because trees would not be permitted in the permanent right-of-way. The loss of approximately 320 acres of forest land from clearing trees would be a major permanent impact along the permanent right-of-way, which would be maintained free of trees and woody vegetation.

Open Land. Open land may correspond most closely with the Conservation/Recreation zone type. Maintenance vegetation mowing in the permanent right-of-way would be incompatible with goals of preserving undeveloped natural areas, but would be consistent with goals of providing public use of open areas. For this analysis, the approximately 87 acres of open land that would be maintained during operations is considered to be a minor permanent impact, as these areas could continue to be used as open space after restoration is complete.

Open Water. Typically, the Open Water land use category is not a planned zone. From a planning and zoning perspective, pipeline operation in open water areas would be compatible with the open water land use category, because open waters crossed by RA-08 would remain in their current use, and there would be no impacts.

Wetlands. Wetlands would most closely correspond with the Shoreland zone in local comprehensive plans. During operations, because the pipeline would be buried beneath waterbodies and would generally not affect wetland functions, with the exception of the permanent right-of-way where trees and large woody vegetation would not be allowed to grow. Preservation of wetland vegetation buffers and shade trees along waterbodies would be partially restricted in the permanent right-of-way in these areas. However, the right-of-way would be planted with other vegetation that would preserve other wetland functions such as water quality and bank stability. Operation of RA-08 in wetland areas would be minor and long-term as wetlands would generally return to functionality. Wetlands are further discussed in Section 6.3.1.3.

Compatibility with Watershed District Goals

During operation of RA-08, the pipeline would be compatible with watershed district goals, including erosion control and water quality. During operation of a pipeline, maintenance of vegetation in the permanent right-of-way in and around wetlands and waterbodies may result in minor impacts on water resources in watersheds, as discussed further in Section 6.3.1. Vegetation in watershed areas acts to slow water runoff, stabilize banks, prevent erosion, and enhance scenic views from the water. Removal of large woody vegetation in and around waterbodies could reduce some of these benefits (and associated watershed district goals) and may reduce the scenic integrity of shoreland areas, although other vegetation would be retained which would provide many of these benefits. Generally, operation of an oil pipeline in wetland areas would be consistent with wetland land uses, resulting in minor, temporary impacts.

6.2.1.4 Summary and Mitigation

6.2.1.4.1 Summary

Table 6.2.1-12 presents a summary of potential impacts related to compatibility with planning and zoning regulations and land use for the Applicant's preferred route and route alternatives between Clearbrook and Carlton. Review of the relevant comprehensive plans and zoning ordinances found that pipelines are not listed as an allowed use for any of the zones that would be crossed by the Applicant's preferred route or the route alternatives.

The length of Shoreland zone and watershed district crossed and acres of open water crossed are shown in Table 6.2.1-11, which gives an estimated relative area of concern for protection of resources. The Applicant's preferred route crosses the most miles of Shoreland zone at approximately 7 miles, and RA-08 crosses the least at 0.6 mile. RA-06 crosses the most miles of watershed districts (approximately 52 miles), and RA-08 crosses the least (approximately 13 miles). Although not considered an allowed use for any of the overlay plans considered (shorelands, floodplains, and watershed districts), potential pipeline effects on the overlay plan goals were found to be no impact or minor in all cases. Overall, the impacts in shoreland areas would be minor because of the small amount of land along waterbodies that would be affected, and although trees would not be allowed, other vegetation would be planted. The impacts would be permanent because trees and woody vegetation would not be allowed to regrow in the right-of-way. Because the pipeline would be buried underground and the ground cover conditions would be restored, the Project would be compatible with floodplain overlay requirements during operation. The buried pipeline would not be an obstruction in the floodplain and would not affect the water channel or flood levels.

Effects of a pipeline on all other land use classifications were found to be no impact or minor and temporary to permanent impact.

Table 6.2.1-11 shows that forestry land use is the predominant designation for the Applicant's preferred route, RA-06, and RA-07; agricultural land is the predominant designation for RA-03AM; and wetlands is the predominant designation for RA-08. While agricultural use is typically compatible with the presence of a pipeline, forestry use is not. Forestry would be the most affected of any of the land use designations because some portion of the forested lands would be removed for construction and would remain cleared along the permanent right-of-way during operations. Major impacts are anticipated where land in forestry use/zoning would be cleared, based on the reduction in forestry use. The permanent right-of-way of the Applicant's preferred route crosses the largest amount of forested land during operation (631 acres). The least amount of forested land is crossed by the permanent right-of-way of RA-07 (242 acres). The remaining three route alternatives range from approximately 320 to 471 acres of forested land crossed.

6.2.1.4.2 Mitigation

Replanting appropriate tree species for restoration within forested areas cleared for construction to reduce the recovery time and prevent changes in watershed hydrology and runoff impacts that could alter stream geomorphology could mitigate the incompatibility with forest uses and zoning. Additionally, in temporary construction workspaces, topsoil segregation methods will be implemented in forested areas in order to assist with the revegetation after construction is complete.

With implementation of Applicant-proposed measures related to sediment and erosion control, streambank restoration, and waterbody crossings, no further mitigation has been identified to minimize impacts related to planning and zoning.

Table 6.2.1-12. Summary of Potential Impacts related to Compatibility with Planning and Zoning Regulations and Land Use for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Compatibility with comprehensive plans and zoning ordinances	Temporary to permanent/ (negligible to minor) to major	Temporary to permanent/ (negligible to minor) to major	Temporary to permanent/ negligible to major	Temporary to permanent/ negligible to major	Temporary to permanent/ negligible to major
Compatibility with overlay districts	Temporary to permanent/ minor impacts	Temporary to permanent/ minor impacts	Temporary to permanent/ minor impacts	Temporary to permanent/ minor impacts	Temporary to permanent/ minor impacts
Compatibility with existing land use	Temporary to permanent/ minor to major impacts	Temporary to permanent/ minor to major impacts	Temporary to permanent/ minor to major impacts	Temporary to permanent/ minor to major impacts	Temporary to permanent/ minor to major impacts
Compatibility with watershed district goals	Temporary/minor impacts	Temporary/minor impacts	Temporary/minor impacts	Temporary/minor impacts	Temporary/minor impacts
Operations Impacts					
Compatibility with comprehensive plans and zoning ordinances	No impact to permanent/ major impacts	No impact to permanent/ major impacts	No impact to permanent/ major impacts	No impact to permanent/ major impacts	No impact to permanent/ major impacts
Compatibility with overlay districts	No impact to minor/ permanent impact	No impact to minor/ permanent impact	No impact to minor/ permanent impacts	No impact to minor/ permanent impacts	No impact to minor/ permanent impacts
Compatibility with existing land use	No impact to permanent/ major impacts	No impact to permanent/ major impacts	No impact to permanent/ major impacts	No impact to permanent/ major impacts	No impact to permanent/ major impacts
Compatibility with watershed district goals	Temporary/minor impacts	Temporary/minor impacts	Temporary/minor impacts	Temporary/minor impacts	Temporary/minor impacts

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6.2.2 Noise and Vibration

Occupants of residences, schools, churches, and hospitals/medical centers can be sensitive to changes in noise levels (referred to as "sensitive receptors"). The associated buildings also could be susceptible to vibration damage. Pipeline construction can temporarily increase nearby noise levels and cause ground-borne vibration over existing ambient levels at nearby receptors, and the operation of pipeline pump stations can increase nearby noise levels over existing ambient levels.

The following analysis of impacts on sensitive resources from noise and vibration during construction and operation of the Applicant's preferred route and route alternatives considered the following:

- Exceedance of Minnesota Noise Standards for residential and other sensitive uses;
- Exceedance of Federal Transit Administration (FTA) noise impact criteria; and
- Exceedance of FTA construction vibration damage criteria for extremely susceptible buildings.

This section first describes the existing conditions for noise and vibration along the Applicant's preferred route and route alternatives, where sensitive receptors could be affected by construction and operation. Next, the section evaluates the potential impacts on receptors sensitive to noise and buildings susceptible to vibration damage and compares these impacts for each of the five routing options (the Applicant's preferred route, RA-03-AM, RA-06, RA-07, and RA-08). Chapter 10 addresses the noise impacts resulting from a crude oil release. An assessment of noise impacts on wildlife is included in Section 6.3.4.

For better understanding of this subject, noise and vibration terminologies and descriptors are provided herein.

Noise Terminology

Sound is mechanical energy transmitted by pressure waves in media, such as air or water (FTA 2006). When the sound level becomes excessive, annoying, or unwanted, it is referred to as "noise." Noise may be continuous (constant noise at a steady level), steady (constant noise with a fluctuating level), impulsive (having a high peak of short duration), stationary (occurring from a fixed source), intermittent (at intervals of high and low levels), or transient (occurring at different levels).

Noise levels are quantified using decibels (dB), which are units of sound pressure. The A-weighted sound level, expressed as dBA, is an expression of the relative loudness of sounds in air, as perceived by the human ear. Therefore, A-weighted sound levels are usually used to quantify audible sound and its effect on people (EPA 1978). On the dBA scale, normal conversation occurs at about 60 to 65 dBA, and sleep disturbance occurs at about 40 to 45 dBA.

Existing ambient noise levels, or background noise levels, are the sounds from natural and artificial sources at the receptors. The magnitude and frequency of background noise at any given location may vary considerably over the course of a day or night and throughout the year. The variations are caused in part by weather conditions, seasonal vegetative cover, and human activity. Two common measures used to relate the time-varying quality of environmental noise levels to known effects on people are the 24-hour equivalent sound level ($L_{eq(24)}$) and the day-night sound level (L_{dn}).

- The $L_{eq(24)}$ is the level of steady sound with the same total energy as the time-varying sound, averaged over a 24-hour period.
- The L_{dn} is the $L_{eq(24)}$ with 10 dBA added to the nighttime sound levels between the hours of 10:00 pm and 7:00 am to account for people's tendency to be more sensitive to sound during nighttime hours.

Where the nature of a new sound is similar to the ambient noise level, an increase of 3 dBA is barely detectable by the human ear, and an increase of 5 dBA is considered clearly noticeable. Increases of 10 dBA are perceived as a doubling of noise (i.e., twice as loud). Table 6.2.2-1 provides examples of common activities and their associated noise levels in dBA. Table 6.2.2-2 contains examples of outdoor day-night noise levels.

Table 6.2.2-1. Common Activities and Associated Noise Levels

Activity	Noise Level (dBA)
Loud live band music	110
Truck 50 feet away	80
Gas lawnmower 100 feet away	70
Normal conversation indoors	60
Moderate rainfall on vegetation	50
Refrigerator	40
Bedroom at night	25

Source: Caltrans 2009.

dBA = A-weighted decibel(s).

Table 6.2.2-2. Examples of Outdoor Noise Levels for Various Land Uses

Outdoor Location	Noise Levels (L_{dn} in dBA)
Apartment next to freeway	88
Core commercial, heavier industry	75
Urban row housing on major avenue	68
Lighter industry	60
Wooded residential	51
Agricultural cropland	44
Rural residential	39
Open space (wetland, forest, open land, abandoned land)	35

Sources: Caswell and Jakus 1977; EPA 1978.

dBA = A-weighted decibel(s), L_{dn} = day-night sound level expressed in dBA.

Vibration Terminology

Ground-borne vibration consists of oscillating motion within the ground and is typically caused by construction activities, such as blasting, pile driving, and operating heavy construction equipment. The effects of ground-borne vibration are typically no more than a nuisance; however, at extreme vibration levels, buildings can be damaged. Ground-borne vibration can be felt outdoors, but it is typically more of an annoyance to people when they are indoors (FTA 2006). This is because the associated effects of a shaking building are more noticeable indoors, where people tend to be moving less and thus are more likely to perceive vibration. Induced ground-borne noise is an effect of ground-borne vibration and occurs only indoors, because it is produced from noise radiated from the motion of the walls and floors of a room or the rattling of windows or dishes on shelves.

Two forms of vibration velocity are used to evaluate the effects of vibration. Peak particle velocity (PPV) is referred to as "vibration velocity amplitude," which is an instantaneous measure, and vibration velocity decibels (VdB) are referred to as "vibration velocity level," which is an average measure typically calculated over a 1-second period. Table 6.2.2-3 shows common vibration sources with their associated estimated VdB and PPV at a relative distance from the source.

Table 6.2.2-3. Typical Levels of Ground-Borne Vibration Associated with Construction Activities

Vibration Source	Distance from the Source (feet)	Vibration Velocity Level (VdB)	Peak Particle Velocity (in/sec)
Pile driver (impact type)	25	104–112	0.644–1.518
Pile driver (sonic or vibratory type)	25	93–105	0.170–0.734
Large bulldozer	25	87	0.089
Caisson drilling	25	87	0.089
Jackhammer	25	79	0.035
Loaded trucks	25	86	0.076
Small bulldozer	25	58	0.003
Blasting	50	100	0.300[a]

Sources: FTA 2006; Lucca 2003.

[a] Peak particle velocity measured at 50 feet distance from blast area and 4 pounds charge weight of explosive.

in/sec = inch(es) per second, VdB = vibration velocity decibels referenced to 1×10^{-6} in/sec.

6.2.2.1 Regulatory Context and Methodology

6.2.2.1.1 Regulatory Context

Minnesota regulates daytime (7:00 am to 10:00 pm) and nighttime (10:00 pm to 7:00 am) noise levels based on the land use activity at the location of the receiver (e.g., residential, commercial, or industrial land uses) (Minn. R. 7030.0040). These noise standards are expressed as a range of acceptable noise levels (dBA) within a 1-hour period: L_{50} is the noise level (dBA) that cannot be exceeded more than 50 percent of the time within 1 hour, while L_{10} is the dBA that cannot be exceeded more than 10 percent of the time within 1 hour. Table 6.2.2-4 describes Minnesota's applicable noise standards.

Table 6.2.2-4. Minnesota Noise Standards

Noise Area Classification	Daytime (dBA)		Nighttime (dBA)	
	L_{50}	L_{10}	L_{50}	L_{10}
Residential and other sensitive uses (e.g., educational, medical, cultural and designated recreational areas)	60	65	50	55
Non-residential uses (e.g., commercial areas, transportation facilities, and governmental services)	65	70	65	70
Non-residential uses (e.g., industrial/manufacturing areas, utilities, and highways/streets)	75	80	75	80

Source: Minnesota PCA 2000.

dBA = A-weighted decibel(s), L10 = the dBA that may be exceeded 10 percent of the time within 1 hour, L50 = the dBA that may be exceeded 50 percent of the time within 1 hour.

FTA regulations and criteria are not enforceable or otherwise directly applicable to a pipeline project. However, the FTA's noise impact criteria for combined noise increases (Figure 6.2.2-1) can be used to provide a qualitative description of long-term impacts from increases in ambient sound levels (i.e., the criteria are not suggested for use in defining short-term noise impacts that occur during construction). FTA impacts are categorized as no impact, moderate impact, or severe impact based on general community reactions to noise at varying levels. The criteria are based on the land use category of the receiving properties, including the following:

- Category 1 land uses are tracts of land where quiet is an essential element in their intended purpose and includes lands set aside for serenity and quiet, such as outdoor amphitheaters and concert pavilions, and National Historic Landmarks (NHLs), where outdoor interpretation usually occurs.
- Category 2 land uses are residences and buildings where people normally sleep. For Category 2 receiving properties, the FTA criteria include consideration of the potential for sleep disturbance.
- Category 3 land uses are institutional land uses with primary daytime and evening uses, including schools, libraries, theaters, and churches. Certain historical sites and parks are also included.

Based on the FTA impact criteria, locations with low existing ambient noise levels can be exposed to greater incremental increases in overall noise before impacts would occur, and locations with higher existing ambient noise levels can be exposed to lesser incremental increases in overall noise before impacts would occur (Figure 6.2.2-1).

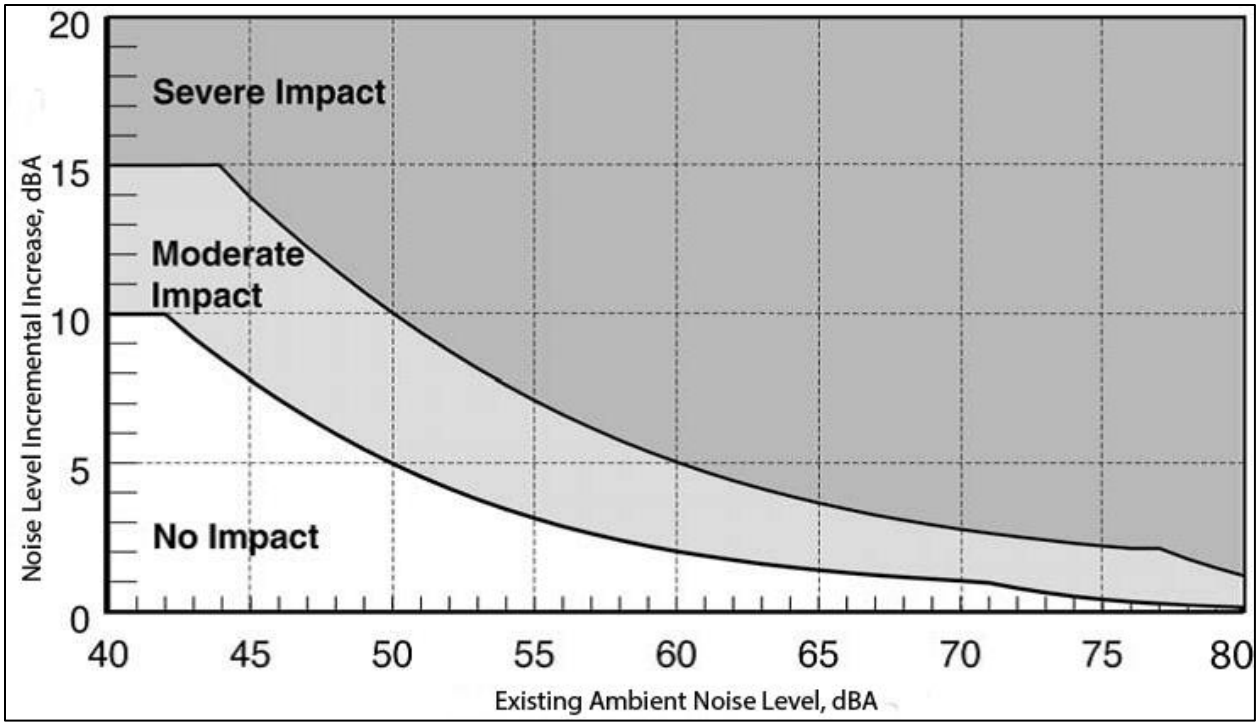

Source: FTA 2006.

Notes:

Noise level incremental increases should be calculated in terms of $L_{eq(h)}$ for Categories 1 and 3 land uses, and L_{dn} for Category 2 land uses, where $L_{eq(h)}$ is the hourly equivalent sound level.

dBA = A-weighted decibel(s).

Figure 6.2.2-1. Federal Transit Administration Impact Criteria for Combined Noise Level Increases

When assessing the effects of vibration, the FTA states that vibration should be assessed quantitatively in cases where there is a significant potential for impact from construction activities, such as blasting, pile driving, vibratory compaction, demolition, and drilling or excavation in proximity to sensitive structures. The FTA construction vibration damage criteria are listed in Table 6.2.2-5.

Table 6.2.2-5. Construction Vibration Damage Criteria

Building Category	Vibration Velocity Level (VdB)	Peak Particle Velocity (in/sec)
Reinforced-concrete, steel or timber (no plaster)	102	0.500
Engineered concrete and masonry (no plaster)	98	0.300
Non-engineered timber and masonry buildings	94	0.200
Buildings extremely susceptible to vibration damage	90	0.120

Source: FTA 2006.

in/sec = inch(es) per second, VdB = vibration velocity decibels referenced to 1 × 10-6 in/sec.

6.2.2.1.2 Methodology

The ROI for the noise and vibration impacts analysis includes the sensitive receptors located near the proposed construction work areas that may be affected by noise from construction-related activities and equipment, along with the sensitive receptors located near the proposed pump stations that may be affected by noise from pump station operations. Impacts on receptors sensitive to noise and buildings susceptible to vibration damage were assessed by the following:

- Using GIS data supplied by the Applicant and data available from the U.S. Geological Survey (USGS) National Structures Dataset to identify the locations of sensitive receptors and associated buildings near the Applicant's preferred route and route alternatives (Enbridge 2014; USGS ESRI 2014).
- Calculating noise levels generated by construction-related activities and equipment at various distances from the proposed construction work areas. Where the calculated noise levels could potentially exceed the Minnesota Noise Standards for residential and other sensitive uses, the number of potentially affected sensitive receptors was quantified.
- Calculating noise levels generated by operation of pump stations at the nearest sensitive receptors and comparing results with the Minnesota Noise Standards for residential and other sensitive uses.
- Calculating the increased noise levels associated with operation of pump stations over the existing ambient levels at the nearest sensitive receptor locations and comparing the results with the FTA impact criteria for Category 2 land uses.
- Calculating vibration levels generated by construction-related activities and equipment at the nearest sensitive receptor building locations. Where the calculated vibration levels would exceed the FTA construction vibration damage criteria for buildings that are extremely susceptible to vibration damage, the number of potentially affected sensitive receptors was quantified.

6.2.2.2 Existing Conditions

Sensitive receptors near the proposed construction work areas may be affected by both noise and vibration from construction-related activities and equipment, and sensitive receptors near the proposed pump stations may be affected by noise from operations. The existing ambient noise levels for these receptors along the alternative routes are described below.

6.2.2.2.1 Applicant's Preferred Route

The Applicant's preferred route within Minnesota would generally be co-located with existing pipelines or other linear infrastructure rights-of-way. Between Clearbrook and Carlton, the Applicant's preferred route would be 73 percent co-located. The land use along the Applicant's preferred route west of Clearbrook is primarily agricultural, while the land use east of Clearbrook is mainly forested land. Both of these land use types typically generate relatively low noise levels (Section 6.2.2.1). Existing ambient noise levels in areas that would be crossed by the Applicant's preferred route are estimated at 35 to 44 dBA L_{dn} (Table 6.2.2-2; EPA 1978). The estimated background vibration velocity level along the Applicant's preferred route is estimated at 52 VdB (representative of typical background vibration), which is below the threshold of perception for humans of approximately 65 VdB (FTA 2006).

Table 6.2.2-6 summarizes the existing ambient noise levels at the sensitive receptors nearest the pump stations for the Applicant's preferred route. These existing ambient (preconstruction) noise levels were determined by surveys completed by the Applicant (Enbridge 2016a). Because noise decreases with distance, the noise level at the nearest sensitive receptor to each of the proposed pump stations would experience the greatest impact.

Table 6.2.2-6. Sensitive Receptors and Existing Ambient Noise Levels near Proposed Pump Stations for the Applicant's Preferred Route in Minnesota

Pump Station	Distance from Pump Station to Nearest Sensitive Receptor (feet)	Existing Ambient Noise Level at Nearest Sensitive Receptor (dBA)
Donaldson	1,850	41.1
Plummer	1,350	38.2
Viking	2,550	34.9
Clearbrook	1,850	36.5
Two Inlets	1,000	38.6
Palisade	1,150	35.6
Backus	750	42.2
Cromwell	1,650	33.4

Source: Enbridge 2016a.
dBA = A-weighted decibel(s).

6.2.2.2.2 Route Alternatives

The only segment where the route alternatives would vary from the alignment of the Applicant's preferred route is between Clearbrook and Carlton in Minnesota. The existing conditions relevant to noise and vibration for the route alternatives between Clearbrook and Carlton are described below.

Route Alternative RA-03AM

Route alternative RA-03AM between Clearbrook and Carlton would be 95 percent co-located with existing pipelines or other linear infrastructure rights-of-way. Land uses along RA-03AM are primarily agricultural and forest, which typically generate relatively low noise levels. Since the land uses are similar to those along the Applicant's preferred route, the existing ambient noise and vibration levels were assumed to be within the same range (35 to 44 dBA L_{dn} and 52 VdB).

Based on the spacing of pump stations along the Applicant's preferred route, it was assumed that six pump stations would be required along the route of RA-03AM between Clearbrook and Carlton. However, the existing conditions near the six pump stations cannot be specified because the locations of pump stations for RA-03AM have not been determined.

Route Alternative RA-06

Route alternative RA-06 between Clearbrook and Carlton would primarily establish a new right-of-way corridor, with only 20 percent co-located with existing pipelines or other linear infrastructure rights-of-way. Land uses along RA-06 are primarily agricultural and forest, which typically generate relatively low

noise levels. Since the land uses are similar to those along the Applicant's preferred route, the existing ambient noise and vibration levels were assumed to be within the same range (35 to 44 dBA L_{dn} and 52 VdB).

Based on the spacing of pump stations along the Applicant's preferred route, it was assumed that four pump stations would be required along the route of RA-06 between Clearbrook and Carlton. However, the existing conditions near the four pump stations cannot be specified because the locations of pump stations for RA-06 have not been determined.

Route Alternative RA-07

Route alternative RA-07 between Clearbrook and Carlton would be 100 percent co-located with existing pipelines or other linear infrastructure rights-of-way. Land uses along RA-07 are primarily agricultural and forest, which typically generate relatively low noise levels. Since the land uses are similar to those along the Applicant's preferred route, the existing ambient noise and vibration levels were assumed to be within the same range (35 to 44 dBA L_{dn} and 52 VdB).

Based on the spacing of pump stations along the Applicant's preferred route, it was assumed that four pump stations would be required along the route of RA-07 between Clearbrook and Carlton. It was assumed that existing pump stations along the Enbridge Mainline corridor could be upgraded to accommodate new pumps for RA-07. However, which existing pump stations would be upgraded has not been determined. Thus, the existing conditions near the four existing pump stations cannot be specified.

Route Alternative RA-08

Route alternative RA-08 between Clearbrook and Carlton would be 100 percent co-located with existing pipelines or other linear infrastructure rights-of-way. Land uses along RA-08 are primarily agricultural and forest, which typically generate relatively low noise levels. Since the land uses are similar to those along the Applicant's preferred route, the existing ambient noise and vibration levels were assumed to be within the same range (35 to 44 dBA L_{dn} and 52 VdB).

Based on the spacing of pump stations along the Applicant's preferred route, four pump stations would be required along the route of RA-08 between Clearbrook and Carlton. It was assumed that existing pump stations along the Enbridge Mainline corridor could be upgraded to accommodate new pumps for RA-08. However, which existing pump stations would be upgraded has not been determined. Thus, the existing conditions near the four existing pump stations cannot be specified.

6.2.2.3 Impact Assessment

Project-related noise effects generally fall into two categories: temporary effects resulting from the use of construction equipment and activities and permanent effects resulting from pump station operations. Vibration, as it relates to potential for building damage, would result primarily from construction equipment and activities, causing temporary effects.

Noise impacts from construction were determined for typical construction equipment, HDD, and blasting. Construction noise levels are temporary and are rarely steady; they fluctuate depending on the number and type of equipment in use at any given time. In addition, construction-related sound levels experienced at a sensitive receptor near the construction activity are a function of distance; other noise

sources; and the presence and extent of vegetation, structures, and intervening topography between the noise source and the sensitive receptor.

Pipeline construction generally proceeds several hundred feet to 1 mile per day. Because of the assembly-line method of construction, active pipeline construction in any one area would generally last from 1 week to 30 days. As a result, noise impacts on nearby sensitive receptors would typically be localized, intermittent, and temporary. Construction of associated facilities generally takes longer to complete, but noise impacts would still be expected to be localized, intermittent, and temporary. The nighttime noise levels normally would be unaffected because typical construction would be limited to daylight hours. For this analysis, noise impacts for typical construction equipment were calculated using noise levels generated by two bulldozers, two dump trucks, one generator, one front-end loader, two excavators, one light plant, and a drill rig (Federal Highway Administration [FHWA] 2006). This is a typical scenario for construction equipment that could be operating at roughly the same time and location during a construction phase.

Noise impacts from HDD and blasting also were considered. HDD is used to install the pipeline crossing under waterbodies and railroad tracks, and is typically a 24-hour-per-day operation. For this analysis, noise impacts were calculated using noise levels generated by HDD at the entry point and at the exit point, with equipment not operating concurrently at both locations. HDD equipment at the entry point includes one drill rig, one mud pump, one generator, one air compressor, one crane, one pump generator, and two excavators; HDD equipment at the exit point includes one mud pump, one generator, one pump generator, and two excavators (FHWA 2006). This is a typical scenario for the construction equipment that could be operating at roughly the same time and location.

Noise impacts produced during blasting would be instantaneous and would vary based on a number of factors, such as the type and amount of explosives used, distance of the receptor to the blast site, below-ground depth of explosives, and noise minimization measures applied. However, typical construction blasting noise levels have been documented at about 94 dBA at a distance of 50 feet (FHWA 2006).

Noise impacts from operation of the pipeline primarily would originate from the pump stations. Crude oil traveling through the buried pipeline would not be expected to emit audible noise above the surface or a perceptible level of vibration. Furthermore, noise and vibration levels from operation of the Clearbrook terminal would not be expected to increase beyond the existing levels, and noise and vibration levels from routine inspection and maintenance activities would not be expected to result in perceptible noise or vibration level increases at the nearest sensitive receptors.

6.2.2.3.1 Applicant's Preferred Route (in Minnesota)

Construction Impacts

Noise levels for typical construction equipment at various distances from the construction work area were calculated and compared to the Minnesota Noise Standards. Typical construction noise attenuates to compliance levels with the daytime noise standards at 1,250 feet from the noise source. A total of 911 sensitive receptors are located less than 1,250 feet from the construction work area for the Applicant's preferred route and may experience noise at levels that exceed the daytime Minnesota Noise Standards, resulting in major temporary and intermittent impacts. Note that the calculations utilized an acoustical usage factor to estimate the fraction of time each piece of equipment is operating at full power (i.e., its loudest condition) during an hour to account for intermittent operation. Actual

noise levels and the resulting number of affected sensitive receptors may differ than those predicted if the number, type, and usage of equipment varies. The Applicant proposes to minimize typical construction-related noise impacts by limiting pipeline construction activities to daylight hours, maintaining equipment in good working order, limiting transportation to areas of active construction, and using manufacturer-supplied silencers when available (Enbridge 2016b). As explained in detail in Section 6.2.4, the Applicant also proposes to remove or re-locate any residence located within the permanent pipeline right-of-way.

For the Applicant's preferred route, HDD would be used at 21 locations, and blasting likely would be required between MP 354.6 and MP 356.6 (Enbridge 2016a, 2016b). The noise levels for HDD and blasting were calculated at 0.5 mile (2,640 feet) from the activity, and results were compared with the Minnesota Noise Standards. The noise from HDD attenuates to levels in compliance with the nighttime noise standards at 2,640 feet; therefore, a total of 81 sensitive receptors located less than 0.5 mile (2,640 feet) from an HDD site may experience noise at levels that exceed the standard, resulting in major intermittent and temporary impacts. Note that the calculations utilized an acoustical usage factor to estimate the fraction of time each piece of equipment is operating at full power (i.e., its loudest condition) during an hour to account for intermittent operation. Actual noise levels and the resulting number of affected sensitive receptors may differ than those predicted if the number, type, and usage of equipment varies. The Applicant proposes to limit noise impacts by maintaining equipment in good working order and using manufacturer-supplied silencers when available (Enbridge 2016b).

The Applicant anticipates the need for four blasting events, each covering 400 feet (Enbridge 2016a). In any 1 day, there would be only one blasting event (Enbridge 2016a). Three sensitive receptors are less than 0.5 mile (2,640 feet) from potential blasting locations. However, blasting would comply with the daytime noise standard at both 0.5 mile (2,640 feet) and 0.3 mile (1,758 feet), the distance of the nearest sensitive receptor, resulting in negligible, temporary impacts. Note that blasting also produces concussion waves within the lower inaudible frequency range of human hearing, which can cause annoyance to humans and damage to structures. The Applicant incorporated the lower frequencies into calculations, and results at the nearest sensitive receptor were below the value established by the U.S. Bureau of Mines for potential to cause damage to buildings (Enbridge 2016a). The Applicant would prepare a site-specific blasting plan to address safety, use, storage, and transportation of explosives. The plan would include public and agency notification protocols.

Table 6.2.2-7 compares vibration velocity impact levels from construction equipment and activities with the FTA vibration velocity damage criteria at the nearest sensitive receptor. Results indicate that vibration from HDD and blasting would not be above the damage criteria at any sensitive receptor. However, vibration from typical construction equipment could be above the damage criteria for sensitive receptors located within the construction work area, depending on their proximity to the source. As stated in Section 6.2.4, seven residences are within the construction work area for the Applicant's preferred route (excluding one residence located within the permanent right-of-way that would be removed or re-located). The exact placement of typical construction equipment within the construction work area is unknown. If construction equipment is operated less than 20 feet from sensitive receptors, calculations indicate that vibration from typical construction equipment could exceed FTA's damage criteria, resulting in major intermittent and temporary impacts.

Table 6.2.2-7. Construction Vibration Levels and Impacts for the Applicant's Preferred Route in Minnesota

Construction Activity	Distance to Nearest Sensitive Receptor[a] (feet)	Construction Vibration Velocity Level (VdB)	Vibration Velocity Level Damage Criteria[a] (VdB)	Construction Peak Particle Velocity (in/sec)	Peak Particle Velocity Damage Criteria[b] (in/sec)	Compliance with FTA Criteria
North Dakota Border to Clearbrook						
Typical construction equipment	95	69.6	90	0.012	0.120	Yes
Horizontal directional drilling	578	46.1		0.001		Yes
Blasting	--	--		--		--
Clearbrook to Carlton						
Typical construction equipment	20	89.9	90	0.120	0.120	Yes
Horizontal directional drilling	275	55.8		0.002		Yes
Blasting	1,758	53.6		0.001		Yes
Carlton to Wisconsin Border						
Typical construction equipment	89	70.5	90	0.013	0.120	Yes
Horizontal directional drilling	--	--		--		--
Blasting	--	--		--		--

Sources: FHWA 2006; FTA 2006.

[a] Nearest sensitive receptor is the closest residence, school, church, and hospital/medical center. For typical construction equipment, distance is measured from the right-of-way centerline to the nearest receptor.

[b] Damage criteria selected for buildings extremely susceptible to vibration damage as worst-case assessment per Table 6.2.2-5.

FTA = Federal Transit Administration, in/sec = inch(es) per second, VdB = vibration velocity decibels referenced to 1×10^{-6} in/sec.

Operations Impacts

Table 6.2.2-8 identifies the noise levels at the closest sensitive receptor from operation of pump stations. Results indicate that all pump stations would produce noise levels at the nearest sensitive receptors in compliance with the more restrictive nighttime Minnesota Noise Standards resulting in negligible permanent impacts. The Applicant's design measures restrict the noise levels around neighboring dwellings and industrial facilities to 40 dBA, measured at a distance of 50 feet from the affected structure, unless state regulations allow higher noise levels. If noise is determined to be above the Minnesota Noise Standards, the Applicant would be required to implement design measures to come into compliance with those standards, such as placement of pumps and motors inside a building. Additional noise measures proposed by the Applicant may include insulation, acoustic louvers, and acoustic silencers. The Applicant also has committed to conducting post-construction noise surveys at each of the nearest sensitive receptors to ensure compliance with the Minnesota Noise Standards (Enbridge 2016b).

Table 6.2.2-8. Noise Levels and Impacts from Pump Station Operations for the Applicant's Preferred Route in Minnesota

Pump Station	Nearest Sensitive Receptor Distance (feet)	Existing Ambient Noise Level[a] (dBA)	Estimated Operations Noise (dBA)		Combined Noise, Ambient + Operations (dBA)		Increased Noise over Ambient Noise Level (dBA)	Minnesota Noise Standards[b] (dBA)		Compliance with Minnesota Noise Standards	FTA Impact Criteria
			L_{50}	L_{10}	L_{50}	L_{10}		L_{50}	L_{10}		
North Dakota Border to Clearbrook											
Donaldson	1,850	41.1	28.2	28.2	41.3	41.3	0.2	50	55	Yes	No impact
Plummer	900	38.2	35.1	35.1	39.9	39.9	1.7			Yes	No impact
Viking	2,900	34.9	23.5	23.5	35.2	35.2	0.3			Yes	No impact
Clearbrook to Carlton											
Clearbrook	2,950	36.5	23.1	23.1	36.7	36.7	0.2	50	55	Yes	No impact
Two Inlets	1,000	38.6	33.9	33.9	39.9	39.9	1.3			Yes	No impact
Palisade	1,250	35.6	31.8	31.8	37.1	37.1	1.5			Yes	No impact
Backus	750	42.2	37.0	37.0	43.3	43.3	1.1			Yes	No impact
Cromwell	1,650	33.4	29.3	29.3	34.8	34.8	1.4			Yes	No impact

Source: Enbridge 2016a.

[a] Existing ambient noise levels identified from Table 6.2.2-6.

[b] Nighttime noise standard selected as applicable to residential and other sensitive uses (e.g., educational, medical, cultural, and designated recreational areas) per Table 6.2.2-4.

Notes:

No pump stations would be located in the Carlton-to-Wisconsin-border segment.

dBA = A-weighted decibel(s), FTA = Federal Transit Administration, in/sec = inch(es) per second, L_{10} = the dBA that may be exceeded 10 percent of the time within 1 hour, L_{50} = the dBA that may be exceeded 50 percent of the time within 1 hour, VdB = vibration velocity decibels referenced to 1×10^{-6} in/sec.

Table 6.2.2-8 also shows the increase in noise levels at the closest sensitive receptor from operation of pump stations. Results are compared to the FTA impact criteria for combined noise level increases for Category 2 land uses (Figure 6.2.2-1) in order to assess the magnitude of predicted impacts. According to this analysis, the increases in noise at the nearest sensitive receptor from operation of each of the pump stations would result in no impact on sensitive receptors. "No impact" by FTA definition is when introduction of a proposed project would result in insignificant increases in the number of people highly annoyed by the new noise (FTA 2006). It should be noted that the FTA criteria are based on general community reactions to noise at varying levels and are used to supplement the analyses based on regulatory levels.

6.2.2.3.2 Route Alternatives (from Clearbrook to Carlton)

As calculated for the Applicant's preferred route, typical construction noise levels for route alternatives RA-03AM, RA-06, RA-07, and RA-08 would attenuate to compliance with the daytime Minnesota Noise Standards at 1,250 feet from the noise source. This distance is considered valid for all route alternatives because the same construction equipment would be used for each route. Table 6.2.2-9 shows the number of sensitive receptors along the Clearbrook-to-Carlton segment that may be affected by noise from the route alternatives. Note that the noise calculations utilized an acoustical usage factor to estimate the fraction of time each piece of equipment is operating at full power (i.e., its loudest condition) during an hour to account for intermittent operation. Actual noise levels and the resulting number of affected sensitive receptors may differ than those predicted if the number, type, and usage of equipment varies.

Table 6.2.2-9 also identifies the number of sensitive receptor associated buildings located within the construction work areas along the Clearbrook-to-Carlton segment that may be affected by vibration from the route alternatives. Although the exact placement of typical construction equipment within the construction work areas is unknown, calculations indicate that vibration from typical construction equipment operating less than 20 feet from noise-sensitive receptors may not comply with the FTA's damage criteria (Table 6.2.2-5).

The noise and vibration impacts generated during HDD installation and blasting along the route alternatives also are expected to be comparable to the noise and vibration levels of these activities along the Applicant's preferred route. Because the locations of any HDD or blasting activities along the route alternatives have not been determined, it is not possible to quantify the number of sensitive receptors that could be affected by these activities.

Table 6.2.2-9. Number of Sensitive Receptors Affected by Typical Construction Noise and Vibration for the Route Alternatives between Clearbrook and Carlton

Route	Number of Sensitive Receptors within 1,250 Feet of Construction Work Area (Noise)	Number of Sensitive Receptors within the Construction Work Area (Vibration)
Route alternative RA-03AM	1,507	13
Route alternative RA-06	328	2
Route alternative RA-07	1,271	40
Route alternative RA-08	749	6

Sources: Enbridge 2014; USGS ESRI 2014.

Notes:

The number of sensitive receptors within the construction work area excludes receptors located within the permanent right-of-way that would be removed or re-located.

The noise generated during HDD installation and blasting along the route alternatives is expected to be comparable to the noise of these activities along the Applicant's preferred route. Because the locations of any HDD or blasting activities along the route alternatives have not been determined, it is not possible to quantify the number of noise-sensitive receptors that could be affected by these activities.

Route Alternative RA-03AM

Construction Impacts

As indicated in Table 6.2.2-9, a total of 1,507 sensitive receptors are located less than 1,250 feet from the construction work area for RA-03AM and may experience noise from typical construction equipment at levels that exceed the daytime Minnesota Noise Standards, resulting in major intermittent and temporary impacts. The Applicant-proposed measures to minimize noise impacts during construction identified for the Applicant's preferred route also would be implemented for the route alternatives.

Vibration from typical construction equipment could be above the damage criteria for 13 sensitive receptors located within the construction work area for RA-03AM. If construction equipment is operated less than 20 feet from these sensitive receptors, calculations indicate that vibration could exceed FTA's damage criteria, resulting in major intermittent and temporary impacts.

Because the locations of any HDD or blasting activities along the route alternatives have not been determined, it is not possible to quantify the number of sensitive receptors that could be affected by noise or vibration from these activities.

Operations Impacts

The locations of pump stations along RA-03AM have not been determined; thus, the impacts for the nearest sensitive receptors affected by operation of pump stations cannot be quantified.

Route Alternative RA-06

Construction Impacts

As indicated in Table 6.2.2-9, 328 sensitive receptors are located less than 1,250 feet from the construction work area for RA-06 and may experience noise from typical construction equipment at levels that exceed the daytime Minnesota Noise Standards, resulting in major intermittent and temporary impacts. The Applicant-proposed measures to minimize noise impacts during construction identified for the Applicant's preferred route also would be implemented for the route alternatives.

Vibration from typical construction equipment could be above the damage criteria for two sensitive receptors located within the construction work area for RA-06. If construction equipment is operated less than 20 feet from these sensitive receptors, calculations indicate that vibration could exceed FTA's damage criteria, resulting in major intermittent and temporary impacts.

Because the locations of any HDD or blasting activities along the route alternatives have not been determined, it is not possible to quantify the number of sensitive receptors that could be affected by noise or vibration from these activities.

Operations Impacts

The locations of pump stations along RA-06 have not been determined; thus, the impacts for the nearest sensitive receptors affected by operation of pump stations cannot be quantified.

Route Alternative RA-07

Construction Impacts

As indicated in Table 6.2.2-9, 1,271 sensitive receptors are located less than 1,250 feet from the 205-foot-wide construction work area for RA-07 and may experience noise from typical construction equipment at levels that exceed the daytime standard, resulting in major intermittent and temporary impacts. The Applicant-proposed measures to minimize noise impacts during construction identified for the Applicant's preferred route also would be implemented for the route alternatives.

Vibration from typical construction equipment could be above the damage criteria for 40 sensitive receptors located within the construction work area for RA-07. If construction equipment is operated less than 20 feet from these sensitive receptors, calculations indicate that vibration could exceed FTA's damage criteria, resulting in major intermittent and temporary impacts.

Because the locations of any HDD or blasting activities along the route alternatives have not been determined, it is not possible to quantify the number of sensitive receptors that could be affected by noise or vibration from these activities.

Operations Impacts

The four pump stations along RA-07 that would be upgraded have not been identified; thus, the impacts for the nearest sensitive receptors affected by operation of pump stations cannot be quantified.

Route Alternative RA-08

Construction Impacts

As indicated in Table 6.2.2-9, 749 sensitive receptors are located less than 1,250 feet from the construction work area for RA-08 and may experience noise from typical construction equipment at levels that exceed the daytime standard, resulting in major intermittent and temporary impacts. The Applicant-proposed measures to minimize noise impacts during construction identified for the Applicant's preferred route also would be implemented for the route alternatives.

Vibration from typical construction equipment could be above the damage criteria for six sensitive receptors located within the construction work area for RA-08. If construction equipment is operated less than 20 feet from these sensitive receptors, calculations indicate that vibration could exceed FTA's damage criteria, resulting in major intermittent and temporary impacts.

Because the locations of any HDD or blasting activities along the route alternatives have not been determined, it is not possible to quantify the number of sensitive receptors that could be affected by noise or vibration from these activities.

Operations Impacts

The pump stations along RA-08 that would be upgraded have not been identified; thus, the impacts for the nearest sensitive receptors affected by operation of pump stations cannot be quantified.

6.2.2.4 Summary and Mitigation

Summary

The impacts associated with noise and vibration from construction and operation of the Applicant's preferred route and the route alternatives between Clearbrook and Carlton are summarized in Table 6.2.2-10.

Construction noise would be temporary and intermittent along the Applicant's preferred route and the route alternatives. As shown in Table 6.2.2-10, the fewest sensitive receptors are located within 1,250 feet of the construction work area for RA-06 that may be affected by typical construction equipment noise, followed closely by the Applicant's preferred route and RA-08; considerably greater numbers of sensitive receptors potentially would be affected by typical construction equipment noise associated with RA-03AM and RA-07. HDD and blasting locations have not been identified for the route alternatives; thus, their associated noise impacts on noise-sensitive receptors cannot be compared with those for the Applicant's preferred route.

Even with implementation of the Applicant-proposed measures and additional potential mitigation measures described below, it is possible for typical construction noise and noise from specialized construction methods (e.g., HDD), although intermittent and of short duration, to exceed Minnesota Noise Standards for some sensitive receptors along the Applicant's preferred route and route alternatives. Specifically, noise from construction for any route would depend on the number, type, and usage of the equipment and its distance to noise-sensitive receptors. The resulting impact would be negligible for those sensitive receptors located far from the noise source and major (although intermittent and temporary) for nearby sensitive receptors.

Table 6.2.2-10 also identifies the sensitive receptor associated buildings located within the construction work areas along the Applicant's preferred route and route alternatives. If typical construction equipment is operated less than 20 feet from the sensitive receptors, calculations indicate that vibration could exceed FTA's damage criteria, resulting in major intermittent and temporary impacts. With implementation of mitigation described below, construction-related vibration from typical construction would be minor to negligible for sensitive receptors along any route. HDD and blasting locations have not been identified for the route alternatives; thus, their associated vibration impacts cannot be compared with those for the Applicant's preferred route.

Because the location of potential new and upgraded pump stations have not been determined for the route alternatives, the associated impacts on the nearest sensitive receptors cannot be assessed and compared with those of the Applicant's preferred route. The Applicant-proposed measures for the Applicant's preferred route also would be implemented for the route alternatives. Consequently, noise from pump station operations, although permanent, is expected to be negligible for all routes and is not expected to result in noise levels above the Minnesota Noise Standards or to affect any noise-sensitive receptor for any route.

Table 6.2.2-10. Summary of Potential Noise and Vibration Impacts for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Noise from typical construction equipment exceeding daytime Minnesota Noise Standards	Temporary and intermittent/major impacts • 524 sensitive receptors	Temporary and intermittent/major impacts • 1,507 sensitive receptors	Temporary and intermittent/major impacts • 328 sensitive receptors	Temporary and intermittent/major impacts • 1,271 sensitive receptors	Temporary and intermittent/major impacts • 749 sensitive receptors
Noise from HDD exceeding nighttime Minnesota Noise Standards	Temporary and intermittent/major impacts • 35 sensitive receptors	*HDD locations are not available for the route alternatives. Therefore, the number of affected sensitive receptors and resulting noise impacts cannot be quantified.*			
Noise from blasting exceeding daytime Minnesota Noise Standards	Temporary/negligible impacts • 0 sensitive receptors above standard	*Blasting locations are not available for the route alternatives. Therefore, the number of affected sensitive receptors and resulting noise impacts cannot be quantified.*			
Vibration from typical construction equipment exceeding FTA damage criteria	Temporary and intermittent/major impacts without mitigation • 5 sensitive receptors	Temporary and intermittent/major impacts without mitigation • 13 sensitive receptors	Temporary and intermittent/major impacts without mitigation • 2 sensitive receptors	Temporary and intermittent/major impacts without mitigation • 40 sensitive receptors	Temporary and intermittent/major impacts without mitigation • 6 sensitive receptors
Vibration from HDD and blasting exceeding FTA damage criteria	Temporary/negligible impacts • 0 sensitive receptors above criteria	*HDD and blasting locations are not available for the route alternatives. Therefore, the affected sensitive receptors and resulting vibration impacts cannot be quantified.*			

Table 6.2.2-10. Summary of Potential Noise and Vibration Impacts for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Operations Impacts		
Noise from pump stations exceeding nighttime Minnesota Noise Standards and FTA impact criteria	Permanent/negligible impacts • 0 sensitive receptors above standards and criteria	*New and upgraded pump station locations are not available for route alternatives. Therefore, the resulting noise impacts at the nearest sensitive receptors cannot be quantified.*

Mitigation

In addition to the Applicant-proposed measures described above, the Applicant can further mitigate noise impacts from typical construction equipment when less than 1,250 feet from a sensitive receptor, as presented by FTA (2006), as follows:

- Equipping construction equipment with residential-grade mufflers, and/or constructing noise barriers or walled enclosures between noisy activities or clusters of noisy equipment and sensitive receivers as much as practical.
- Siting equipment on the construction lot as far away from sensitive receivers as possible.
- Combining noisy operations to occur in the same time period. The total noise level produced will not be significantly greater than the level produced if the operations were performed separately.
- Posting signage with contact phone number to notify sensitive receptors of pending and active construction.

The Applicant could mitigate potential vibration impacts by:

Locating construction equipment at least 20 feet from a sensitive receptor.

6.2.2.5 References

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6.2.3 Aesthetics/Visual Resources

The aesthetic or visual quality of the landscape is of importance as a resource to residents, tourists, and other users of a given area. The value of the resource varies with the type of land cover, topography, and availability of locations where a viewshed can be observed. Changes in the land cover (e.g., removal of forested areas or development) and introduction of man-made facilities (e.g., a pipeline and its associated facilities) into a viewshed may change the quality of the visual experience. Certain areas have higher sensitivity to changes in a viewshed. These include parks, forests, and other special management areas; Indian reservations; scenic byways, scenic rivers, and trails; and residences.

The analysis of impacts on aesthetics and visual resources from construction and operation of the Applicant's preferred route and the route alternatives considers the following issues:

- Removal of existing vegetation, grading, and the presence of construction workers and equipment in a viewshed;
- Presence of permanent aboveground facilities in a viewshed; and
- Maintenance clearing along rights-of-way and access roads.

This section describes the existing aesthetic/visual resources within an area along the construction work area for the Applicant's preferred route and each of the route alternatives where receptors (viewshed users) could be affected by construction and operation of the Project. The potential impacts of Project-related construction and operation on aesthetics and visual resources are considered, and potential impacts are assessed. Potential impacts for each route option (the Applicant's preferred route, RA-03AM, RA-06, RA-07, and RA-08) also are assessed and compared to each other. A summary and comparison of potential impacts are included at the end of the section. Chapter 10 addresses impacts on aesthetics and visual resources resulting from crude oil releases.

6.2.3.1 Regulatory Context and Methodology

6.2.3.1.1 Regulatory Context

Aesthetic or visual resources were considered relative to the general guidance of Minnesota Statute 116D, which identifies the State's responsibility to "assure for all the people of the state safe, healthful, productive, and aesthetically and culturally pleasing surroundings." Specific regulations that define standards governing allowable effects on the quality of the visual environment have not been established in Minnesota. As discussed below, guidance on methodologies for undertaking such assessments are available.

6.2.3.1.2 Methodology

Guidance by the U.S. Forest Service (USFS) and the Service's Scenic Management System (SMS) was used as a basis for understanding the quality of, location of, and potential impacts on aesthetic resources. The SMS provides a framework for consistently evaluating and managing landscapes and thus maintaining aesthetically and culturally pleasing surroundings (USFS 1995). The SMS uses the following key elements when evaluating landscapes:

- **Scenic Attractiveness.** Scenic value can be divided into one of three classes based on whether landscapes are distinctive, typical, or indistinctive.

- **Scenic Integrity.** The scenic integrity of a landscape is ranked on a scale of very high to unacceptably low. The rank is determined based on the intactness of or degree of disruption to the landscape character.
- **Landscape Visibility.** The visibility of a landscape relates first to the importance of a landscape to the viewer and second to the distance between the viewer and the landscape.
- **Constituent Analysis.** The importance of landscapes to the constituents is expressed as a concern level of low to high.
- **Seen Areas and Distance Zones.** Distance zones of immediate foreground, foreground, middleground, and background are used to understand the relative sensitivity of a landscape based on its distance from the observer.

Through County Visual Quality committees, Minnesota has developed visual sensitivity classifications for highways, roads, designated recreation trails, lakes, and rivers in forested areas. These areas are collectively referred to as "travel routes and areas" for the purposes of this EIS. Visual sensitivity classes have been determined for 16 counties in northeast and central Minnesota (Minnesota DNR 2016a). The rating system consists of three classes: high scenic quality (*most sensitive*), moderate scenic quality (*moderately sensitive*), and low scenic quality (l*ess sensitive*). Similar to the USFS methods of analyzing visual resources, the ranking system used in Minnesota reflects the type and volume of users in determining sensitivity. For example, low-sensitivity areas may include public, low-volume local forest roads and non-recreational lakes and rivers. High sensitivity is given to travel routes and areas with significant public use and high user concern for visual resources (Minnesota DNR 2016a).

Impacts on aesthetics and visual resources and the alterations to viewsheds that may occur from construction and operation of the Applicant's preferred route and route alternatives were evaluated by:

- Following guidance by the USFS SMS framework described above for consistently evaluating landscapes.
- Identifying existing land use and the potential locations of sensitive viewers, using available GIS information. Data included the locations and distribution of forested areas, agricultural and open areas, scenic byways, special management areas, and Indian reservations. These datasets provide information about landscape visibility and the locations of sensitive areas, including areas of high use and areas of high viewer sensitivity. Special attention was given to Project areas that would cross through forested areas or be co-located with existing rights-of-way because those factors can greatly influence the magnitude of visual impacts.
- Using GIS to identify visual sensitivity classes (described above) for travel routes and areas crossed by the Applicant's preferred route and the route alternatives.
- Comparing the number of residences that occur within sensitive viewsheds near construction activities, permanent facilities, and landscape changes. Residences and residential areas represent areas where the importance of surrounding landscapes to the constituents, as well as the number of users, is likely to be moderate to high.

The ROI for this analysis includes all areas of high use and high user concern within the viewshed of a pipeline route or aboveground facilities. This can include parks, forests, and other special management areas; Indian reservations; scenic byways, scenic rivers, and trails; and the built environment. The "viewshed" was considered to be the immediate foreground (or 300 feet) from the edge of the

construction work area and within 0.25 mile of aboveground facilities. Given the land cover and topography of the area, viewers within the immediate foreground would represent the most sensitive viewers. For permanent aboveground facilities of any appreciable size, viewers within 0.25 mile would represent the most sensitive viewers.

6.2.3.2 Existing Conditions

6.2.3.2.1 Applicant's Preferred Route

The majority of existing land uses that would be crossed by the Applicant's preferred route are agricultural lands, followed by forested lands, wetlands, open lands, developed lands, and open water (Table 6.2.1-2). Approximately 82 percent of the Applicant's preferred route is co-located with existing rights-of-way, which are generally maintained in a cleared condition or may be in agricultural production. This includes 100 percent of the route from the North Dakota border to Clearbrook, 73 percent of the route from Clearbrook to Carlton, and 89 percent of the route from Carlton to the Wisconsin border.

The Applicant's preferred route would not cross any Indian reservation lands. The acreage of special management areas, including Wildlife Management Areas (WMAs) and state forests that would be crossed by the pipeline route, is provided in Table 6.2.3-1.

Table 6.2.3-1. Special Management Areas Crossed by the Applicant's Preferred Route in Minnesota

Route Segment	Special Management Area	Acres within Construction Work Area
North Dakota border to Clearbrook	None	0.0
Clearbrook to Carlton	Grayling Marsh Wildlife Management Area	14.1
	Lawler Wildlife Management Area	2.9
	Foot Hills State Forest	42.3
	Hill River State Forest	102.9
	Huntersville State Forest	96.9
	Land O'Lakes State Forest	130.2
	Mississippi Headwaters State Forest	25.1
	Paul Bunyan State Forest	<0.1
	Savanna State Forest	8.7
	Waukenabo State Forest	15.8
Carlton to Wisconsin border	None	0.0

Scenic byways are part of the National Scenic Byways Program under the U.S. Department of Transportation (USDOT) and the FHWA. Scenic byways are created to recognize archaeological, cultural, historic, natural, recreational, and scenic qualities. From the North Dakota border to Clearbrook, no scenic byways would be crossed. Between Clearbrook and Carlton, the Great River Road Scenic Byway

and Lake Country Scenic Byway each would be crossed twice. The Great River Road Scenic Byway is a multi-state scenic byway that follows the Mississippi River through Arkansas, Illinois, Iowa, Kentucky, Louisiana, Minnesota, Mississippi, Missouri, Tennessee, and Wisconsin. The Great River Road Scenic Byway recognizes several historical developments, including the Underground Railroad, and offers numerous historic sites and cultural artifacts to travelers (FHWA 2016). From Carlton to Superior, the Project would cross the Veterans Memorial Scenic Byway once.

The Mississippi River, which is classified as a State Water Trail, would be crossed twice by the Applicant's preferred route. The Applicant's preferred route also would cross snowmobile and all-terrain vehicle (ATV) trails, which often are found in scenic areas with potentially high use.

The visual sensitivity classification for travel routes and areas crossed by the Applicant's preferred route are provided in Table 6.2.3-2, and the number of residences that would be near construction and operation of the pipeline is provided in Table 6.2.3-3. Note that the USFS SMS defines the area within 300 feet of the observer as the immediate foreground (USFS 1995).

Table 6.2.3-2. Visual Sensitivity Classifications of Travel Routes and Areas Crossed by the Applicant's Preferred Route in Minnesota

Segment	Visual Sensitivity Classification			TOTAL
	Low	Moderate	High	
North Dakota border to Clearbrook[a]	0	1	8	**9**
Clearbrook to Carlton	23	21	95	**139**
Carlton to Wisconsin border	4	2	7	**13**

[a] A portion of the route would cross counties without complete visual sensitivity classifications.

Table 6.2.3-3. Residences near the Applicant's Preferred Route

Segment	Residences within Construction Work Area	Residences within 300 Feet of Construction Work Area[a]
North Dakota border to Clearbrook	0	30
Clearbrook to Carlton	6	78
Carlton to Wisconsin border	2	16

[a] Residences within 300 feet of the construction work area include those within the construction work area.

6.2.3.2.2 Route Alternatives

The only segment where the route alternatives would vary from the alignment of the Applicant's preferred route is between Clearbrook and Carlton in Minnesota. The existing conditions relevant to aesthetics and visual resources for the route alternatives between Clearbrook and Carlton are described below.

Route Alternative RA-03AM

Route alternative RA-03AM would be 95 percent co-located with existing pipelines or other linear infrastructure rights-of-way. Existing land uses along RA-03AM are primarily agricultural and forested land (Table 6.2.1-11). RA-03AM would not cross any Indian reservation lands. The acreage of special management areas, including WMAs and state forests that would be crossed by the RA-03AM route is provided in Table 6.2.3-4.

Table 6.2.3-4. Special Management Areas Crossed by Route Alternative RA-03AM

Special Management Area	Acres within Construction Work Area
Mississippi Headwaters State Forest	25.7
Neitermeier Wildlife Management Area	5.4
Lake Alexander Woods Scientific and Natural Area	1.0

The following scenic byways would be crossed by RA-03AM:

- Great River Road Scenic Byway (two crossings),
- Lake Country Scenic Byway (two crossings), and
- St. Croix Scenic Byway (two crossings).

Several scenic rivers and water trails, including the Kettle River, Rum River, and Mississippi River, would be crossed by RA-03AM. This route would cross the Mississippi River multiple times, including once near Lake Itasca, considered the headwaters of the Mississippi, and again approximately 5 miles north of Little Falls, Minnesota (Minnesota DNR 2016b). The permanent right-of-way for RA-03AM would cross 6 miles of snowmobile and ATV trails, including crossing the Munger State Trail several times between Hinckley and Carlton, Minnesota.

RA-03AM would cross 177 travel routes and areas classified by Minnesota for visual sensitivity, including:

- 20 low visual sensitivity travel routes and areas,
- 19 medium visual sensitivity travel routes and areas, and
- 138 high visual sensitivity travel routes and areas.

Some travel routes and areas crossed by RA-03AM have not been classified for visual sensitivity.

Sixteen residences would be within the construction work area, and 368 residences would be within 300 feet of the construction work area.

Route Alternative RA-06

Route alternative RA-06 between Clearbrook and Carlton would primarily establish a new right-of-way corridor, with only 20 percent of the route co-located with existing pipelines or other linear infrastructure rights-of-way. Land uses along RA-06 are primarily forested land and wetlands (Table

6.2.1-11). The acreage of special management areas, including national and state forests that would be crossed by the pipeline route is provided in Table 6.2.3-5.

Table 6.2.3-5. Special Management Areas Crossed by Route Alternative RA-06

Special Management Area	Acres within Construction Work Area
Chippewa National Forest	86.1
George Washington State Forest	458.1
Big Fork State Forest	294.4
Fond du Lac State Forest	36.5

RA-06 would cross 13 miles of the Fond du Lac Reservation, requiring approximately 79 acres for the permanent right-of-way and 189 acres for the construction work area.

RA-06 would require one crossing of the National Forest Avenue of Pines Scenic Byway and the Edge of the Wilderness Scenic Byway, which offer scenic natural views to travelers along with recreation and interpretive sites. RA-06 would not cross the Mississippi River but would cross the Big Fork River State Water Trail (Minnesota DNR 2016b). The permanent right-of-way for RA-06 would cross less than 1 mile of snowmobile and ATV trails, and would require approximately 2 miles of crossings to accommodate the construction work area.

RA-06 would cross 102 travel routes and areas classified by Minnesota for visual sensitivity, including:

- 22 low visual sensitivity travel routes and areas,
- 16 medium visual sensitivity travel routes and areas, and
- 46 high visual sensitivity travel routes and areas.

Nine residences would be within the construction work area, and 76 residences would be within 300 feet of the construction work area.

Route Alternative RA-07

Route alternative RA-07 would be 100 percent co-located with existing pipelines or other linear infrastructure rights-of-way. Land uses along RA-07 are primarily forested land and wetlands (Table 6.2.1-11). The acreage of special management areas, in this case only state forests that would be crossed by the pipeline route, is provided in Table 6.2.3-6.

RA-07 would cross approximately 56 miles of Indian reservation land, requiring that approximately 338 acres be established as a permanent right-of-way and affecting approximately 1,383 acres during construction (Table 6.2.3-7).

Table 6.2.3-6. Special Management Areas Crossed by Route Alternative RA-07

Special Management Area	Acres within Construction Work Area
Bowstring State Forest	408.5
Fond du Lac State Forest	36.5
Mississippi Headwaters State Forest	77.3
Chippewa National Forest	87.7

Table 6.2.3-7. Indian Reservations Crossed by Route Alternative RA-07

Indian Reservation	Centerline (miles)	Acres within Permanent Right-of-Way	Acres within Construction Work Area
Fond du Lac Reservation	13.0	78.7	321.5
Leech Lake Reservation	42.7	258.8	1,061.0
TOTAL	**55.7**	**337.5**	**1,382.5**

RA-07 would require two crossings of the Great River Road Scenic Byway and one crossing of the Edge of the Wilderness Scenic Byway, which offer scenic natural views to travelers along with recreation and interpretive sites. RA-07 would cross the Mississippi River twice, once near Bemidji and again at Ball Club, approximately 20 miles west of Grand Rapids (Minnesota DNR 2016b). RA-07 also would cross the Paul Bunyan State Trail near Bemidji, the Heartland State Trail near Cass Lake, and the Taconite State Trail at the north end of Grand Rapids, Minnesota. The permanent right-of-way for RA-07 would cross approximately 3 miles of snowmobile and ATV trails during operation, and would require approximately 7 miles of crossings to accommodate the construction work area.

RA-07 would cross 144 travel routes and areas classified by Minnesota for visual sensitivity, including:

- 31 low visual sensitivity travel routes and areas,
- 27 medium visual sensitivity travel routes and areas, and
- 66 high visual sensitivity travel routes and areas.

Forty residences would be within the construction work area, and 237 residences would be within 300 feet of the construction work area.

Route Alternative RA-08

Route alternative RA-08 would be 100 percent co-located with existing pipelines or other linear infrastructure rights-of-way. Land uses along RA-08 are primarily agricultural and forested land. The acreage of special management areas, including WMAs and state forests, that would be crossed by the pipeline route is provided in Table 6.2.3-8.

Table 6.2.3-8. Special Management Areas Crossed by Route Alternative RA-08

Special Management Area	Acres within Construction Work Area
Chippewa National Forest	84.4
Bemidji Slough Wildlife Management Area	4.1
Swan River Deer Yard Wildlife Management Area	7.4
Bowstring State Forest	410.0
Fond du Lac State Forest	35.5
Mississippi Headwaters State Forest	68.2
Welsh Lake State Forest	15.4
Savanna State Forest	38.2

RA-08 would cross approximately 61 miles of Indian reservation land, requiring that approximately 339 acres be established as a permanent right-of-way and affecting approximately 813 acres during construction (Table 6.2.3-9).

Table 6.2.3-9. Indian Reservations Crossed by Route Alternative RA-08

Indian Reservation	Centerline (miles)	Acres within Permanent Right-of-Way	Acres within Construction Work Area
Fond du Lac Reservation	13.0	78.1	187.5
Leech Lake Reservation	48.0	260.8	625.7
TOTAL	**61**	**338.9**	**813.2**

RA-08 would require two crossings of the Great River Road Scenic Byway and one crossing of the Edge of the Wilderness Scenic Byway, which offer scenic natural views to travelers along with recreation and interpretive sites. RA-08 would cross the Mississippi River twice, once near Bemidji and again at Ball Club, approximately 20 miles west of Grand Rapids. RA-08 also would cross the Paul Bunyan State Trail near Bemidji, the Heartland State Trail near Cass Lake, and the Taconite State Trail at the north end of Grand Rapids, Minnesota (Minnesota DNR 2016b). The permanent right-of-way for RA-08 would cross 3 miles of snowmobile and ATV trails during operation, and would require approximately 11 miles of crossings to accommodate the construction work area.

RA-08 would cross 150 travel routes and areas classified by Minnesota for visual sensitivity, including:

- 28 low visual sensitivity travel routes and areas,
- 25 medium visual sensitivity travel routes and areas, and
- 75 high visual sensitivity travel routes and areas.

Nine residences would be within the construction work area, and 168 residences would be within 300 feet of the construction work area.

6.2.3.3 Impact Assessment

Potential impacts on aesthetic resources from construction and operation of the Project include impacts on landscape visibility, scenic integrity, and scenic attractiveness through visual scarring, removal of trees and vegetation, and construction activity. The extent and magnitude of these impacts are influenced by the existing scenic integrity, the landscape visibility, and the importance of a landscape to its observers. The duration of potential Project impacts on visual resources along the pipeline rights-of-way could range from a couple of days during active construction to permanent (e.g., aboveground facilities or a new cleared corridor through forested areas). During construction, the greatest impacts would be caused by clearing of vegetation, as well as the presence of workers and construction equipment. Operations impacts would be limited to the addition of aboveground facilities and changes in viewsheds, primarily because of cleared forested land.

6.2.3.3.1 Applicant's Preferred Route (in Minnesota)

Construction Impacts

The majority of the Applicant's preferred route would be located within or adjacent to existing rights-of-way, with a small portion of the route creating a new right-of-way. Consequently, the visual integrity along the co-located portions of the route has been previously affected by installation of similar linear infrastructure projects. Most new right-of-way would be established between Clearbrook and Carlton (approximately 60 miles, 27 percent of the route). Construction of the route would affect approximately 562 acres of agricultural land and 308 acres of open land, where views of construction equipment and personnel would be visible from longer distances. Impacts on visual resources associated with the construction work area include removal of existing vegetation, grading, and the presence of construction workers and equipment.

For the Applicant's preferred route, approximately 1,447 acres of forested land would be cleared between Clearbrook and Carlton during construction. Cleared forested areas would alter the landscape integrity and viewed areas, particularly for viewers adjacent to or crossing the right-of-way. Trees outside the permanent right-of-way would be allowed to regrow; however, they would take decades to reestablish and may not return to preconstruction conditions during the life of the Project.

The Applicant's preferred route would not cross any Indian reservations and therefore would not result in visual impacts on reservations during construction. The route would require construction work areas located within special management areas; the greatest impact would be approximately 130 acres of construction work area within the Land O'Lakes State Forest. The Mississippi River, which is classified as a State Water Trail, would be crossed twice.

In addition, the Applicant's preferred route would cross 95 travel routes and areas designated as having a high visual sensitivity (Table 6.2.3-2). These crossings may include scenic roads, trails, and rivers. The Applicant's preferred route would cross eight state forests, affecting approximately 422 acres of state forested land during construction. The construction work area would be within 300 feet of 124 residences, of which 78 residences are between Clearbrook and Carlton.

Overall, visual impacts would be greatest where the pipeline route crosses or parallels roads, trails, or residences. The duration of visual impacts would be short-term along the construction work area in or near open lands; special management areas; scenic byways, scenic rivers, and trails; and residences. Impacts would be minor because they would be limited to the period of construction until vegetation

has reestablished. In areas where trees would be cleared, visual impacts would be permanent and minor. The Applicant has reduced the extent of potential impacts by co-locating most of the Applicant's preferred route and route alternatives with existing rights-of-way.

Operations Impacts

Operations impacts for the Applicant's preferred route would be associated mainly with aboveground facilities and permanent forest clearing along the right-of-way and access roads. Cleared forested land outside the permanent right-of-way would be allowed to reestablish. Within the right-of-way, forests would remain permanently cleared, altering the landscape integrity and viewed areas and resulting in permanent minor impacts on viewsheds near the 631 acres of forested land maintained as a right-of-way. These impacts would be strongest where they are in the immediate foreground for sensitive observers. Permanent impacts on scenic integrity along the right-of-way are not expected in areas of open and agricultural land, where the vegetation along the right-of-way would be restored. The presence of permanent aboveground facilities near residences would cause a greater visual impact, whereas the presence of permanent aboveground facilities in open land may affect viewers from a greater distance. In partially cleared forested areas, the impacts would be limited to observers at pipeline crossings or residents in proximity to the permanent right-of-way; however, these impacts would be permanent. Residents with immediate foreground views of permanent aboveground facilities and cleared forested areas are a highly sensitive viewer group.

The Applicant's preferred route would require 8 pump stations and 27 mainline valves (MLVs). In general, impacts on scenic integrity from MLVs are expected to be minimal because of the scale of the MLV and small size of each site (typically less than 0.1 acre) and because they would be located within the permanent right-of-way. Pump stations would result in greater visual impact as they are typically much larger and contain several buildings, piping, and other large structures. Of the eight pump stations proposed for the Applicant's preferred route, four would be located between Clearbrook and Carlton. The Cromwell pump station would be constructed in open land, with little other development nearby. Two residences are within 0.3 mile of the proposed pump station, and direct views of the site are possible from both residences. This represents a permanent major impact on the viewshed of the residents. The Palisade pump station would be constructed in mainly forested land. The area surrounding the site is dominated by mature woody vegetation, creating a natural buffer to nearby residences and viewers. Both the Backus and Two Inlets pump stations would be constructed in open land. The Backus pump station would be constructed adjacent to a ranch and would be visible to its residents. The Two Inlets pump station would be within 0.2 mile of two residences, each with a partial view of the permanent structure. Views of the new pump station would be somewhat blocked by existing vegetation surrounding the residences. Additionally, the pump station will likely be visible to travelers along U.S. Highway 71. For travelers on U.S. Highway 71 and the nearby residences, impacts as a result of the new pump station would likely be a permanent major impact on the viewshed. The Two Inlets pump station would be located in an open, undeveloped area that would somewhat alter the characteristic of the existing natural landscape.

Of the remaining four pump stations located between the North Dakota border and Clearbrook, three would be upgrades to existing pump stations and one is an upgrade at the existing Clearbrook terminal. The additional buildings and structures associated with the upgrades would cause visual impacts, especially where placed apart from existing pump stations. Visual impacts associated with pump station upgrades would be less than those for new pump stations because of the presence of similar structures in nearby viewsheds. The Donaldson pump station upgrade would be located on open land with

adjacent agricultural fields. Several agricultural outbuildings that are located nearby likely would have views of the Donaldson pump station upgrade. The closest residence is approximately 0.8 mile east and is somewhat shielded by vegetation, but the pump station addition may be visible from the property. This would result in a permanent negligible impact on the viewshed for residents. The Viking pump station upgrade would be on agricultural land; the nearest residence is approximately 0.5 mile south of the pump station. Due to intervening agricultural fields, the Viking pump station upgrade likely would be visible from this residence. This would result in a permanent negligible impact on the viewshed for residents. Other nearby residences are farther away, and intervening vegetation would block views of the proposed pump station upgrade. The Plummer pump station upgrade would be constructed in mainly forested land. Two residences are located within 0.5 mile of the pump station upgrade, but the pump station would be visible only from one because of intervening vegetation. This could result in a permanent minor impact on the viewshed for residents. The Clearbrook pump station upgrade would be located approximately 0.3 mile southeast of the town of Clearbrook on partially agricultural, partially forested land. Forested land would block potential views from the town. Seven residences are located within 0.5 mile of the proposed pump station upgrade. Forested areas and other buildings would block views of the pump station from a majority of these residences. The proposed upgrade may be visible from one to three of the nearby residences, which would result in a permanent negligible to minor impact on the viewshed for nearby residents.

6.2.3.3.2 Route Alternatives (from Clearbrook to Carlton)

Route Alternative RA-03AM

Construction Impacts

The majority of RA-03AM (95 percent) would be located within or adjacent to existing rights-of-way, with a small portion of the route creating a new right-of-way. Consequently, the visual integrity along the co-located portions of the route has been previously affected by installation of similar linear infrastructure projects. Construction of the route would affect approximately 1,611 acres of agricultural land and 340 acres of open land, where views of construction equipment and personnel would be visible from longer distances. Impacts on visual resources associated with the construction work area include removal of existing vegetation, grading, and the presence of construction workers and equipment.

Construction of RA-03AM would require clearing approximately 1,138 acres of forested land. Cleared forested areas would alter the landscape integrity and viewed areas, particularly for viewers adjacent to or crossing the right-of-way. Trees outside the permanent right-of-way would be allowed to regrow; however, they would take decades to reestablish and may not return to preconstruction conditions during the life of the Project.

RA-03AM would not cross any Indian reservations and therefore would not result in visual impacts on reservations during construction. Three scenic byways would be crossed by RA-03AM, as would scenic rivers and water trails, including the Kettle River, Rum River, and the Mississippi River, and snowmobile and ATV trails. The route would require construction work areas located within special management areas (although much less than for the Applicant's preferred route); the greatest impact would be 26 acres of construction work area within the Mississippi Headwaters State Forest.

RA-03AM would cross 138 travel routes and areas with a high visual sensitivity classification and would be located within 300 feet of 368 residences. The scenic attractiveness and scenic integrity in these

areas of moderate to high constituent concern would be affected by the presence of construction equipment and clearing of vegetation in the construction work area.

Overall, visual impacts would be greatest where the pipeline route crosses or parallels roads, trails, or residences. Visual impacts along the construction work area in open lands; special management areas; scenic byways, scenic rivers, and trails; and residences would be temporary to short-term and minor as impacts would be limited to the period of construction until vegetation has reestablished. In areas where trees would be cleared, visual impacts would be permanent and minor. Visual impacts would be minimized in areas where the pipeline construction occurs along existing rights-of-way, which are generally maintained in a cleared condition.

Operations Impacts

Similar to the operations impacts discussed for the Applicant's preferred route, permanent impacts on aesthetic resources for RA-03AM would include those from forest clearing and the presence of aboveground facilities. Cleared forested land outside the permanent right-of-way would be allowed to reestablish, which may require decades. Within the permanent right-of-way, forests would remain permanently cleared, altering the landscape integrity and viewed areas and resulting in permanent minor impacts on viewsheds near the 470 acres of forested land maintained as a right-of-way. Maintenance clearing in non-forested areas would occur throughout the life of the Project. Impacts from maintenance clearing would be temporary and negligible, as the work crews would be small and the cleared vegetation likely would be similar to the surrounding areas.

Given the spacing between the proposed pump stations for the Applicant's preferred route, it was assumed that RA-03AM would require six pump stations, which may result in more residences within the immediate foreground of pump stations. Pump stations typically are constructed in areas of agricultural or open land, away from residential and urban areas. As such, it is not likely that residences would be located within the immediate foreground of the pump stations, and impacts are expected to be permanent and negligible to minor.

Route Alternative RA-06

Construction Impacts

Only 20 percent of RA-06 route would be adjacent to existing rights-of-way; much of the route would require construction of new right-of-way. Construction of a new right-of-way would increase the magnitude of impacts on the viewshed, as it would necessitate additional grading, vegetation removal, and construction of facilities. Construction of the route would affect approximately 257 acres of agricultural land and 354 acres of open land, where views of construction equipment and personnel would be visible from longer distances. Impacts on visual resources associated within the construction work area include removal of existing vegetation, grading, and the presence of construction workers and equipment.

Construction of RA-06 would require clearing approximately 1,107 acres of forested land. Cleared forested areas would alter the landscape integrity and viewed areas, particularly for viewers adjacent to or crossing the right-of-way. Trees outside the permanent right-of-way would be allowed to regrow; however, they would take decades to reestablish and may not return to preconstruction conditions during the life of the Project.

RA-06 would cross the Fond du Lac Reservation. Where facilities cross Indian reservations, tribal members often express a high concern level for landscapes within those reservations and in the areas outside the reservation that are ceded lands with tribal use rights for hunting, fishing, subsistence, and spiritual use. Chapter 9 addresses impacts on Indian reservations and tribal resources.

Two scenic byways would be crossed by RA-06. Although RA-06 would not cross the Mississippi River, it would cross the Big Fork River State Water Trail (Minnesota DNR 2016b). The greatest impact would be a total of 458 acres of construction work areas within the George Washington State Forest.

RA-06 would cross 46 travel routes and areas with a high visual sensitivity classification, and would be located within 300 feet of 76 residences. The scenic attractiveness and scenic integrity in these areas of moderate to high constituent concern would be affected by the presence of construction equipment and clearing of vegetation in the construction work area.

Overall, visual impacts would be greatest where the pipeline route crosses or parallels roads, trails, or residences. Visual impacts along the construction work area to open lands; special management areas; scenic byways, scenic rivers, and trails; and residences would be short-term and minor as impacts would be limited to the period of construction until vegetation has reestablished. In areas where trees would be cleared, visual impacts would be permanent and minor. Visual impacts would be less in areas where the pipeline construction occurs along existing rights-of-way, which are generally maintained in a cleared condition; however, RA-06 is co-located for only 20 percent of the route.

Operations Impacts

Similar to the operations impacts discussed for the Applicant's preferred route, permanent impacts on aesthetic resources for RA-06 would be primarily those from forest clearing and the presence of aboveground facilities. Cleared forested land outside the permanent right-of-way would be allowed to reestablish, which may require decades. Within the right-of-way, forests would remain permanently cleared, altering the landscape integrity and viewed areas, and resulting in permanent minor impacts on viewsheds near the approximately 461 acres of forested land maintained as a right-of-way. Maintenance clearing in non-forested areas would occur throughout the life of the Project. Impacts from maintenance clearing would be temporary and negligible, as the work crews would be small and the cleared vegetation likely would be similar to the surrounding areas.

Given the spacing between the proposed pump stations for the Applicant's preferred route, it was assumed that RA-06 would require four pump stations. Pump stations typically are constructed in areas of agricultural or open land, away from residential and urban areas. As such, it is not likely that residences would be located within the immediate foreground of the pump stations, and impacts are expected to be permanent and negligible to minor.

Route Alternative RA-07

Construction Impacts

All of RA-07 would be located within and adjacent to existing rights-of-way. RA-07 would include removal and reinstallation of a pipeline in the same location as the existing Line 3 for a portion of the route and would require a slightly wider construction work area (205 feet). Since RA-07 involves replacement of the existing Line 3, most impacts would be within the existing permanent right-of-way. The remainder of the construction work area would be within the footprint of the former construction work area for Line 67, limiting the extent of impacts on aesthetic resources in the affected area. Impacts

on visual resources associated with the construction work area include removal of existing vegetation, grading, and the presence of construction workers and equipment. Construction of the route would affect approximately 402 acres of agricultural land and 692 acres of open land, where views of construction equipment and personnel would be visible from longer distances.

Construction of RA-07 would require clearing approximately 1,146 acres of forested land. Cleared forested areas would alter the landscape integrity and viewed areas, particularly for viewers adjacent to or crossing the right-of-way. Trees outside the permanent right-of-way would be allowed to regrow; however, they would take decades to reestablish and may not return to preconstruction conditions during the life of the Project.

RA-07 construction would cross the Fond du Lac Reservation and the Leech Lake Reservation. Where facilities cross Indian reservations, tribal members often express a high concern level for landscapes within those reservations and in the areas outside the reservation that are ceded lands with tribal use rights for hunting, fishing, subsistence, and spiritual use. Chapter 9 addresses impacts on Indian reservations and tribal resources.

Because two scenic byways would be crossed, a greater portion of the landscape crossed by RA-07 may have high scenic attractiveness and a high constituent concern level. Construction, including grading and vegetation removal, likely would be visible from crossings with scenic byways, as well as from crossings with trails, rivers, and other visual resource areas. Vegetation clearing, grading, and the presence of construction workers and equipment would detract from scenic attractiveness and integrity at the locations of the crossings. Visual impacts associated with the presence of construction equipment and construction activities primarily would be limited to the construction period. Impacts from vegetation clearing during construction would largely be short-term and minor, except the forested land along the RA-07 route, where impacts would be long-term to permanent, but minor because any tree clearing would be along existing cleared rights-of-way.

Construction of RA-07 would cross 66 travel routes and other areas in high visual sensitivity areas, and 237 residences would be within 300 feet of the construction work area. Because of their proximity to the construction work area and the extended durations of their views, observers associated with these residences are considered highly sensitive to the nearby landscape impacts—including the presence of construction workers and equipment, removal of vegetation, and construction of aboveground facilities.

Overall, visual impacts would be greatest where the pipeline route crosses or parallels roads, trails, or residences. The duration of visual impacts would be short-term along the construction work area to open lands; special management areas; scenic byways, scenic rivers, and trails; and residences. Impacts would be minor because they would be limited to the period of construction until vegetation has reestablished. In areas where trees would be cleared, visual impacts would be permanent and minor. Visual impacts would be minimized because all pipeline construction for RA-07 would occur along existing rights-of-way, and all new tree clearing would result in only a widening of the existing right-of-way.

Operations Impacts

Similar to the operations impacts discussed for the Applicant’s preferred route, permanent impacts on aesthetic resources for RA-07 would be primarily those from forest clearing and the presence of aboveground facilities. Cleared forested land outside the permanent right-of-way would be allowed to reestablish, which may require decades. Within the right-of-way, forests would remain permanently cleared, altering the landscape integrity and viewed areas, and resulting in permanent minor impacts on

viewsheds near the 242 acres of forested land maintained as a right-of-way. Maintenance clearing in non-forested areas would occur throughout the life of the Project. Impacts from maintenance clearing would be temporary and negligible, as the work crews would be small and the cleared vegetation likely would be similar to the surrounding areas.

Given the spacing between the proposed pump stations for the Applicant's preferred route, it was assumed that RA-07 would require four pump stations. Pump stations typically are constructed in areas of agricultural or open land, away from residential and urban areas. As such, it is not likely that residences would be located within the immediate foreground of the pump stations, and impacts are expected to be permanent and negligible to minor.

Route Alternative RA-08

Construction Impacts

All of RA-08 would be located within or adjacent to existing rights-of-way. Route alternative RA-08 would result in construction impacts mainly on wetlands and forested land. The primary visual impact would result from removal of existing vegetation, which would detract from scenic integrity and alter landscape visibility. Construction of the route would affect approximately 336 acres of agricultural land and 207 acres of open land, where views of construction equipment and personnel would be visible from longer distances. Construction of RA-08 would require clearing approximately 773 acres of forested land. Cleared forested areas would alter the landscape integrity and viewed areas, particularly for viewers adjacent to or crossing the right-of-way. Trees outside the permanent right-of-way would be allowed to regrow; however, they would take decades to reestablish and may not return to preconstruction conditions during the life of the Project.

Construction of the RA-08 right-of-way would affect both the Fond du Lac Reservation and the Leech Lake Reservation. Where facilities cross Indian reservations, tribal members often express a high concern level for landscapes within those reservations and in the areas outside the reservation that are ceded lands with tribal use rights for hunting, fishing, subsistence, and spiritual use. Chapter 9 addresses impacts on Indian reservations and tribal resources.

Because of the proximity of the Mississippi River, RA-08 would cross the Great River Road Scenic Byway twice and would cross the Veterans Memorial Scenic Byway and the Edge of the Wilderness Scenic Byway. In the region of the Mississippi River between Bemidji and Grand Rapids, RA-08 would cross two different state trails.

The RA-08 route would cross 75 travel routes and areas in high visual sensitivity areas, and the construction work area would be within 300 feet of 168 residences. Because of their proximity to the construction work area and the extended durations of their views, observers associated with these residences are considered to be highly sensitive to the nearby landscape impacts—including the presence of construction workers and equipment, removal of vegetation, and construction of aboveground facilities. As a result of the two scenic byway crossings, a greater portion of the landscape crossed by RA-08 may have high scenic attractiveness and a high constituent concern level. Construction likely would be visible from crossings with scenic byways as well as crossings with trails, rivers, and other visual resource areas. Construction equipment and vegetation clearing would detract from scenic attractiveness and integrity at the locations of the crossings.

Overall, visual impacts would be greatest where the pipeline route crosses or parallels roads, trails, or residences. The duration of visual impacts would be short-term along the construction work area to open lands; special management areas; scenic byways, scenic rivers, and trails; and residences. Impacts would be minor as they would be limited to the period of construction until vegetation has reestablished. RA-08 would requiring clearing the greatest amount of forested land, where visual impacts would be permanent and minor. Visual impacts would be minimized because all pipeline construction would occur along existing rights-of-way, which are generally maintained in a cleared condition.

Operations Impacts

Similar to the operations impacts discussed for the Applicant's preferred route, permanent impacts on aesthetic resources for RA-08 would be limited to those from forest clearing and the presence of aboveground facilities. Cleared forested land outside the permanent right-of-way would be allowed to reestablish. Within the right-of-way, forests would remain permanently cleared, altering the landscape integrity and viewed areas, resulting in permanent minor impacts on viewsheds near the approximately 320 acres of forested land maintained as a right-of-way. Maintenance clearing in non-forested areas would occur throughout the life of the Project. Impacts from maintenance clearing would be temporary and negligible, as the work crews would be small and the cleared vegetation likely would be similar to the surrounding areas.

Given the spacing between the proposed pump stations for the Applicant's preferred route, it was assumed that RA-08 would require four pump stations. Pump stations typically are constructed in areas of agricultural or open land, away from residential and urban areas. As such, it is not likely that residences would be located within the immediate foreground of the pump stations, and impacts are expected to be permanent and negligible to minor.

6.2.3.4 Summary and Mitigation

6.2.3.4.1 Summary

Impacts on aesthetic resources would vary among all routes, both in the magnitude and duration of impacts. Potential impacts on visual resources for the Applicant's preferred route and each of the route alternatives are summarized in Table 6.2.3-10. Impacts on visual resources along most of each route option would be minor and short-term, as vegetation regrowth would diminish the visibility of clearing and grading. However, certain areas have higher viewer concern and greater scenic attractiveness. These areas are associated with features such as residences, scenic byways, and special management areas. Construction of RA-03AM would affect the greatest amount of agricultural land and open land, where views of construction equipment and personnel would be visible from longer distances. The Applicant's preferred route and RA-03AM are the only routes that would not cross any Indian reservations.

All of the routes would cross scenic byways multiple times (Table 6.2.3-10). RA-03AM would cross three scenic byways and would cross all three of them twice. RA-03AM would cross the highest number of features in areas of high visual sensitivity. RA-06, although affecting the least amount of forested land compared to the other routes, would result in relatively larger impacts on aesthetic resources given the limited amount of the route that is co-located with existing rights-of-way and the number of visually sensitive resources that would be crossed (e.g., reservation lands and a national forest). RA-06 also would cross the least travel routes and areas with a high visual sensitivity classification and would cross the fewest special management areas. RA-03AM would cross more travel routes and areas with a high

visual sensitivity classification and scenic byways, and more residences are located within both the construction work area and permanent right-of-way for RA-03AM. The Applicant's preferred route would cross the highest number of special management areas.

The impact on residences within the immediate foreground of the construction work area would be similar across routes, although the number of residences affected varies (Table 6.2.3-10). The fewest residences are located within 300 feet of the construction work area for the Applicant's preferred route and RA-06, while RA-03AM would have the most. Generally, construction impacts on visual resources would be temporary to short-term and minor, as impacts would be limited to the period of construction until vegetation has reestablished. However, because of the proximity of some receptors—especially residences—to active construction in the immediate foreground, impacts during construction could be major for some observers.

During operation, aboveground facilities represent the biggest visual impact on residences. Several residences near the Cromwell and Two Inlets pump stations would have direct views of the pump station sites. Based on the assumptions described in Section 4.3, two additional pump stations would be needed along RA-03AM compared to the Applicant's preferred route and the other route alternatives. This could result in more residences within view of pump stations along RA-03AM, resulting in permanent impacts on their viewsheds.

6.2.3.4.2 Mitigation

To minimize impacts on residents and visitors with immediate foreground views of construction activities, identified mitigation measures could include:

- Require Enbridge to coordinate in advance with residents and building owners in the construction work area.
- Require Enbridge to complete construction in areas near residences as quickly as safely practical to minimize the duration of potentially major visual impacts on these receptors.

To minimize permanent aesthetic impacts on residents and visitors with views of pump stations, identified mitigation measures could include:

- Require Enbridge to develop a visual screening plan in order to minimize visual impacts on residents with views of the pump stations, regardless of the route option that is selected.

Table 6.2.3-10. Summary of Potential Impacts on Aesthetics and Visual Resources for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Viewsheds with existing linear infrastructure, with lower visual sensitivity to removal of existing vegetation, grading, and presence of construction activities	73 percent co-location	95 percent co-location	20 percent co-location	100 percent co-location	100 percent co-location
Land types with larger viewsheds and higher sensitivity to removal of existing vegetation, grading, and presence of construction activities	Short-term/minor impacts • 562 acres of agricultural land • 308 acres of open land Permanent/minor impacts • 1,447 acres of forested land	Short-term/minor impacts • 1,611 acres of agricultural land • 340 acres of open land Permanent/minor impacts • 1,138 acres of forested land	Short-term/minor impacts • 257 acres of agricultural land • 354 acres of open land Permanent/minor impacts • 1,107 acres of forested land	Short-term/minor impacts • 402 acres of agricultural land • 692 acres of open land Permanent/minor impacts • 1,146 acres of forested land	Short-term/minor impacts • 336 acres of agricultural land • 207 acres of open land Permanent/minor impacts • 773 acres of forested land
Indian reservations affected by removal of existing vegetation, grading, and presence of construction activities	None crossed	None crossed	79 acres	338 acres	339 acres

Table 6.2.3-10. Summary of Potential Impacts on Aesthetics and Visual Resources for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Special management areas and scenic areas with higher sensitivity to removal of existing vegetation, grading, and presence of construction activities	Short-term/minor impacts • 439 acres of special management areas • 4 scenic byway crossings • 2 scenic river/state river trail crossings • 1 mile of trail crossings	Short-term/minor impacts • 32 acres of special management areas • 6 scenic byway crossings • 4 scenic river/state river trail crossings • 6 miles of trail crossings	Short-term/minor impacts • 875 acres of special management areas • 2 scenic byway crossings • 1 scenic river/state river trail crossings • 1 mile of trail crossings	Short-term/minor impacts • 610 acres of special management areas • 3 scenic byway crossings • 2 scenic river/state river trail crossings • 3 miles of trail crossings	Short-term/minor impacts • 663 acres of special management areas • 3 scenic byway crossings • 2 scenic river/state river trail crossings • 3 miles of trail crossings
High visual sensitivity classification travel routes and areas affected by removal of existing vegetation, grading, and presence of construction activities	Short-term/minor impacts • 95 crossings	Short-term/minor impacts • 138 crossings	Short-term/minor impacts • 46 crossings	Short-term/minor impacts • 66 crossings	Short-term/minor impacts • 75 crossings
Residences affected by removal of existing vegetation, grading, and presence of construction activities	Short-term/minor impacts • 6 residences within the construction work area • 78 residences within 300 feet of construction work area	Short-term/minor impacts • 16 residences within the construction work area • 368 residences within 300 feet of construction work area	Short-term/minor impacts • 9 residences within the construction work area • 76 residences within 300 feet of construction work area	Short-term/minor impacts • 40 residences within the construction work area • 237 residences within 300 feet of construction work area	Short-term/minor impacts • 9 residences within the construction work area • 168 residences within 300 feet of construction work area
Operations Impacts					
Viewshed alteration from clearance of trees in forested areas to maintain the pipeline right-of-way	Permanent/minor impacts • 631 acres cleared	Permanent/minor impacts • 471 acres cleared	Permanent/minor impacts • 461 acres cleared	Permanent/minor impacts • 242 acres cleared	Permanent/minor impacts • 320 acres cleared

Table 6.2.3-10. Summary of Potential Impacts on Aesthetics and Visual Resources for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Landscape and viewshed alteration from presence of mainline valves (MLVs)	Permanent/negligible impacts	*Locations of MLVs have not been determined for the route alternatives. Therefore, the affected areas and receptors affected cannot be quantified.* In general, impacts on scenic integrity from MLVs are expected to be minimal because of the scale of the MLV and small size of each site (typically less than 0.1 acre) and because they would be located within the permanent right-of-way.			
Landscape and viewshed alteration from presence of pump stations	Permanent/negligible to minor impacts, except for one pump station Permanent/major impacts • 2 residences (Cromwell pump station)	*Locations of pump stations have not been determined for the route alternatives. Therefore, the affected areas and receptors affected cannot be quantified.* Pump stations typically are constructed in areas of agricultural or open land, away from residential and urban areas. As such, it is not likely that residences would be located within the immediate foreground of the pump stations, and impacts are expected to be permanent and negligible to minor. If a pump station was located in proximity to a large number of residences, the permanent impacts would be minor to major. Given the spacing between the proposed pump stations for the Applicant's preferred route, it was assumed that RA-06, RA-07, and RA-08 would require four pump stations. RA-03AM would require six pump stations.			

6.2.3.5 References

Federal Highway Administration (FHWA). 2016. America's Byways: Minnesota. http://www.fhwa.dot.gov/byways/states/MN. Accessed on November 20, 2016.

Minnesota Department of Natural Resources (Minnesota DNR). 2016a. Visual Sensitivity Classifications. http://dnr.state.mn.us/forestry/visual_sensitivity/index.html. Accessed on November 27, 2016.

_____. 2016b. Minnesota State Trails. http://www.dnr.state.mn.us/state_trails/index.html. Accessed on November 26, 2016.

U.S. Forest Service (USFS). 1995. Landscape Aesthetics: A Handbook for Scenery Management. http://www.fs.fed.us/cdt/carrying_capacity/landscape_aesthetics_handbook_701_no_append.pdf. Accessed on November 27, 2016.

6.2.4 Housing

Some portions of the Applicant's preferred route and route alternatives would affect housing near the proposed pipeline. The analysis of impacts on housing during construction and operation of the Applicant's preferred route and the route alternatives considers the following issues:

- The availability of housing to meet increased demand from the non-local construction and operations workforce,
- Access limitations or safety concerns caused by construction or operation of the pipeline near residences, and
- Changes in property values of homes during construction or operation from the presence of a pipeline easement.

This section first describes the existing conditions within an area along the Applicant's preferred route and route alternatives where housing could be affected by construction and operation of the Project. Potential Project-related impacts of construction and operation on existing housing are then discussed and compared for each of the five routing options (Applicant's preferred route, RA-03AM, RA-06, RA-07, and RA-08). Chapter 10 addresses the impacts on housing resulting from an unanticipated release of crude oil.

6.2.4.1 Regulatory Context and Methodology

6.2.4.1.1 Regulatory Context

The criteria considered by the Commission for route permit determination (Minn. R. 7852.1900, Subp. 3) includes consideration of human settlement and takes into account the State's goals to minimize human settlement and other land use conflicts (Minn. Stat. § 216E.03, Subp. 7). The availability of and impacts on housing stock are key components of human settlement.

6.2.4.1.2 Methodology

The analysis of impacts on housing during construction and operations of the Applicant's preferred route and the route alternatives considers housing availability, residence access and safety, and property values.

Housing Availability

Impacts on housing availability and the ability of communities to absorb the influx of workers that would be required for the Project were assessed. Impacts related to housing availability were evaluated by:

- Identifying existing housing availability in counties that would be crossed by the Applicant's preferred route and each of the route alternatives, including residential housing units and motel and hotel units;
- Comparing those results with an estimate of the potential demand for housing units created by the incoming workforce; and
- Assessing the magnitude of potential impacts based on the amount of available housing in each county relative to the expected demand, especially if availability was less than the expected demand.

The existing conditions for housing availability were determined from data on available housing rentals from the U.S. Census Bureau and commercial data on hotel and motel availability in Minnesota. Using these data, the total number of available housing units was estimated in each county along each of the pipeline routes. Using estimates for the number of workers required for construction, a worst-case estimate of demand was calculated, assuming that all the workers would be from outside the area and would require local housing; however, it is anticipated that some local labor would actually be utilized for the project, based on Enbridge's commitment to the use of labor unions for construction of the Line 3 Project. If the available housing units were greater than the worst-case estimate for housing demand, housing was considered adequate and no impact would result. For operation and maintenance of the pipeline, it was assumed that workers would be located at the Applicant's regional maintenance facilities and operations centers.

The ROI for the analysis consisted of all counties crossed by the Applicant's preferred route and route alternatives. County-level data provide an approximation of housing availability in the areas crossed by the pipeline for purposes of this EIS. However, it should be noted that workers could commute from nearby counties that would not be crossed by the pipeline; and, in large counties, the available housing may be beyond a reasonable commuting distance. Due to the nature of pipeline work, many workers are used to commutes of an hour or more because the work location moves along the route as construction progresses.

Access and Safety

Impacts related to access and safety on residents near the construction work area were assessed. Access to residences may be affected if construction closes roads temporarily. This also may affect safety by limiting the access of emergency service vehicles and personnel to respond to an emergency. In addition, as the pipeline is being constructed, the open trench and construction area may represent a hazard for residents living nearby. Impacts related to access and safety during construction and operations were evaluated by:

- Overlaying the Applicant's preferred route and the route alternatives onto a GIS layer of residence locations;
- Identifying any residences or residential structures within the permanent right-of-way, within the construction work area, or within an area 50 feet outside of the construction work area for the Applicant's preferred route and each of the route alternatives, and
- Identifying permanent easements along the permanent right-of-way for operations and maintenance activities that would affect landowners.

The analysis used an ROI that extends 50 feet beyond the construction work area. While residences at farther distances could be affected by construction of the Project, those within 50 feet of the work area are likely to experience impacts more directly because of their proximity to construction work. Data used for the access and safety analysis were a combination of GIS datasets, including pipeline route layers provided by Enbridge and the USGS National Structures dataset. Because impacts on individual homes would be similar, the number of residences in proximity, and not necessarily their type, was reported for the analysis. A higher number of affected residences would result in a higher level of impact.

Property Values

Impacts on property values from construction and operation of the Applicant's preferred route and the route alternatives were assessed by:

- Estimating the existing residential property values using U.S. Census Bureau data for the median value of owner-occupied housing units at the county level, and
- Conducting a literature review of relevant studies of historical home sale data that were prepared to assess impacts on residential home values near pipelines or similar projects.

The ROI used for existing home values consisted of the counties crossed by the Applicant's preferred route and the route alternatives. Studies considered in the literature review included a range of properties up to 1 mile away from a permanent pipeline right-of-way.

6.2.4.2 Existing Conditions

6.2.4.2.1 Applicant's Preferred Route

U.S. Census Bureau data (2010, 2015) indicate that a total of 35,072 housing units and 672 vacant housing units were available to rent in the counties that would be crossed by the Applicant's preferred route between the North Dakota border and Clearbrook (Table 6.2.4-1). Between Clearbrook and Carlton, 118,732 total available housing units and 1,604 vacant housing units were available to rent in the counties crossed by the Applicant's preferred route. From Carlton to the Wisconsin border, the Applicant's preferred route would be entirely within Carlton County, where 15,719 housing units and 2,177 vacant housing units were available to rent according to the U.S. Census Bureau (2010, 2015).

Several hotels and motels are located in the counties crossed by the Applicant's preferred route (and route alternatives). There are 285 hotels and motels in the counties crossed by the Applicant's preferred route, including 256 between Clearbrook and Carlton. The average number of units per hotel or motel in Minnesota was 79 in 2016 (Explore Minnesota 2016). This equates to an estimated total of 20,224 individual rooms in the counties crossed by the Applicant's preferred route between Clearbrook and Carlton. Per the State of Minnesota's lodging performance metrics, an occupancy rate of 55% year-to-date (YTD) (STR, Inc. 2016) equates to an estimated total of 11,123 occupant individual rooms in the counties crossed by the Applicant's preferred route between Clearbrook and Carlton.

Eight homes are located within the proposed construction work area of the Applicant's preferred route, and 19 residences are located within 50 feet of the construction work area.

For the portion of the Applicant's preferred route between Clearbrook and Carlton, six residences are within the construction work area and an additional seven residences are within 50 feet of the construction work area. One residence is located in the permanent right-of-way and would require removal or re-location. Home values in counties along the Applicant's preferred route have a wide degree of variability. Table 6.2.4-1 lists the median value of owner-occupied housing units for the affected counties. The lowest median home value is $68,100 in Kittson County, while the highest median home value is $177,400 in Crow Wing County.

Table 6.2.4-1. Housing in Counties Crossed by the Applicant's Preferred Route in Minnesota

County	Total Housing Units[a]	Median Value of Owner-Occupied Housing Units[a]	Vacant Housing Units[a]	Rental Vacancy Rate[a]	Vacant Housing Units Available for Rent[b]	Hotels and Motels[c]	Occupied Hotel and Motel Units[d]
Minnesota	**2,364,149**	**$185,200**	**248,812**	**4.6%**	**48,091**	**2,175**	**11,123**
North Dakota Border to Clearbrook							
Kittson County	2,609	$68,100	692	6.6%	69	0	0
Marshall County	4,810	$90,500	738	8.3%	80	1	43
Pennington County	6,304	$113,400	482	7.4%	115	11	478
Red Lake County	1,960	$89,200	239	14.7%	47	2	87
Polk County	14,629	$130,500	1,987	3.6%	233	12	521
Clearwater County	4,760	$115,000	1,221	4.1%	128	3	130
Subtotal	***35,072***	***$101,117***	***5,359***	***7.5%***	***672***	***29***	***1,260***
Clearbrook to Carlton							
Hubbard County	14,578	$171,300	5,838	3.3%	158	43	1,868
Wadena County	6,925	$115,500	1,188	5.5%	127	16	695
Cass County	24,934	$172,800	12,058	4.2%	202	62	2,694
Crow Wing County	40,516	$177,400	13,862	3.9%	750	80	3,476
Aitkin County	16,060	$165,400	8,423	6.1%	161	12	521
Carlton County	15,719	$158,400	2,177	3.9%	206	14	608
Subtotal	***118,732***	***$160,133***	***43,546***	***4.5%***	***1,604***	***227***	***9,863***
TOTAL/AVERAGE	**153,804**	**$130,625**	**48,905**	**6.0%**	**2,276**	**256**	**11,123**

[a] Source: U.S. Census Bureau, 2010–2014 American Community Survey.

[b] Source: U.S. Census Bureau, 2010 Census.

[c] Source: HotelMotels.info (2016).

[d] Source: STR, Inc. (2017)Notes: The occupied Hotel and Motel Units column used the rounded 2017 year-to-date Lodging Performance occupancy rate (55 percent) for the State of Minnesota provided by STR, Inc.

The Clearbrook to Carlton section includes data up to the Wisconsin border.

6.2.4.2.2 Route Alternatives

Route alternatives RA-03AM, RA-06, RA-07, and RA-08 vary from the alignment of the Applicant's preferred route between the Clearbrook terminal and Carlton in Minnesota. Therefore, the existing conditions relevant to housing for each of the route alternatives are described only for the segment between Clearbrook and Carlton.

Route Alternative RA-03AM

According to the U.S. Census Bureau (2010, 2015), there are 120,028 housing units in the counties that would be crossed by RA-03AM between Clearbrook and Carlton, and 1,717 vacant housing units are

available to rent (Table 6.2.4-2). There are 135 hotels and motels located in the counties crossed by RA-03AM, with an estimated total of 10,665 rooms and an estimated total of 5,866 occupant rooms.

Sixteen homes are located within the proposed construction work area of RA-03AM, and an additional 39 residences are located within 50 feet of the construction work area. Three residences are located in the permanent right-of-way and would require removal or re-location, or an adjustment of the route centerline within the 750-foot route width to avoid the homes.

The median value values of owner-occupied housing units in counties along RA-03AM are listed in Table 6.2.4-2. The lowest median home value is $115,500 in Wadena County, and the highest median home value is $171,300 in Hubbard County.

Table 6.2.4-2. Housing in Counties Crossed by Route Alternative RA-03AM (Clearbrook to Carlton)

County	Total Housing Units[a]	Median Value of Owner-Occupied Housing Units[a]	Vacant Housing Units[a]	Rental Vacancy Rate[a]	Vacant Housing Units Available for Rent[b]	Hotels and Motels[c]	Occupied Hotel and Motel Units[d]
Hubbard County	14,578	$171,300	5,838	3.3%	158	43	1,868
Wadena County	6,925	$115,500	1,188	5.5%	127	16	695
Todd County	12,933	$129,700	2,982	7.8%	200	4	174
Morrison County	15,808	$152,200	2,314	2.3%	202	17	739
Benton County	16,273	$155,500	807	5.3%	445	1	43
Mille Lacs County	12,736	$141,900	2,487	4.7%	173	20	869
Kanabec County	7,810	$139,000	1,554	4.5%	97	3	130
Pine County	17,246	$141,600	5,630	4.1%	109	17	739
Carlton County	15,719	$158,400	2,177	3.9%	206	14	608
TOTAL/AVERAGE	**120,028**	**$145,011**	**24,977**	**4.6%**	**1,717**	**135**	**5,866**

[a] Source: U.S. Census Bureau, 2010–2014 American Community Survey.

[b] Source: U.S. Census Bureau, 2010 Census.

[c] Source: HotelMotels.info (2016).

[d] Source: STR, Inc. (2017)

Note:

Notes: The occupied Hotel and Motel Units column used the rounded 2017 year-to-date Lodging Performance occupancy rate (55 percent) for the State of Minnesota provided by STR, Inc.

Route Alternative RA-06

According to the U.S. Census Bureau (2010, 2015), there are 182,768 housing units in the counties that would be crossed by RA-06 between Clearbrook and Carlton, and 2,894 vacant housing units are available to rent (Table 6.2.4-3). There are 193 hotels and motels located in the counties crossed by RA-06, with an estimated total of 15,247 rooms and an estimated total of 8,386 occupant rooms.

Nine homes are located within the proposed construction work area of RA-06, and an additional eight residences are located within 50 feet of the construction work area. Seven residences are located in the permanent right-of-way and would require removal or re-location or an adjustment of the route centerline within the 750-foot route width to avoid the homes.

The median value values of owner-occupied housing units in counties along RA-06 are listed in Table 6.2.4-3. The lowest median home value is $137,200 in St. Louis County, and the highest median home value is $165,400 in Aitkin County.

Table 6.2.4-3. Housing in Counties Crossed by Route Alternative RA-06 (Clearbrook to Carlton)

County	Total Housing Units[a]	Median Value of Owner-Occupied Housing Units[a]	Vacant Housing Units[a]	Rental Vacancy Rate[a]	Vacant Housing Units Available for Rent[b]	Hotels and Motels[c]	Occupied Hotel and Motel Units[d]
Beltrami County	20,635	$147,200	3,842	7.8%	302	26	1,130
Itasca County	27,145	$152,000	8,324	5.4%	303	71	3,085
Aitkin County	16,060	$165,400	8,423	6.1%	161	12	521
St. Louis County	103,209	$137,200	18,176	3.8%	1,922	70	3,041
Carlton County	15,719	$158,400	2,177	3.9%	206	14	608
TOTAL/AVERAGE	**182,768**	**$152,040**	**40,942**	**5.4%**	**2,894**	**193**	**8,386**

[a] Source: U.S. Census Bureau, 2010–2014 American Community Survey.

[b] Source: U.S. Census Bureau, 2010 Census.

[c] Source: HotelMotels.info (2016).

[d] Source: STR, Inc. (2017)

Note:

The occupied Hotel and Motel Units column used the rounded 2017 year-to-date Lodging Performance occupancy rate (55 percent) for the State of Minnesota provided by STR, Inc.

Route Alternative RA-07

According to the U.S. Census Bureau (2010, 2015), there are a total of 222,280 housing units in the counties that would be crossed by RA-07 between Clearbrook and Carlton, and 3,254 vacant housing units are available to rent (Table 6.2.4-4). There are 298 hotels and motels located in the counties crossed by RA-07, with an estimated total of 23,542 rooms and an estimated total of 12,948 occupant rooms.

Forty homes are located within the proposed construction work area of RA-07, and an additional 16 residences are located within 50 feet of the construction work area. No residences would need to be removed from the permanent right-of-way.

The median value values of owner-occupied housing units in counties along RA-07 are listed in Table 6.2.4-4. The lowest median home value is $137,200 in St. Louis County, and the highest median home value is $172,800 in Cass County.

Table 6.2.4-4. Housing in Counties Crossed by Route Alternative RA-07 and RA-08 (Clearbrook to Carlton)

County	Total Housing Units[a]	Median Value of Owner-Occupied Housing Units[a]	Vacant Housing Units[a]	Rental Vacancy Rate[a]	Vacant Housing Units Available for Rent[b]	Hotels and Motels[c]	Occupied Hotel and Motel Units[d]
Beltrami County	20,635	$147,200	3,842	7.8%	302	26	1,130
Hubbard County	14,578	$171,300	5,838	3.3%	158	43	1,868
Cass County	24,934	$172,800	12,058	4.2%	202	62	2,694
Itasca County	27,145	$152,000	8,324	5.4%	303	71	3,085
Aitkin County	16,060	$165,400	8,423	6.1%	161	12	521
St. Louis County	103,209	$137,200	18,176	3.8%	1,922	70	3,041
Carlton County	15,719	$158,400	2,177	3.9%	206	14	608
TOTAL/AVERAGE	**222,280**	**$157,757**	**58,838**	**4.9%**	**3,254**	**298**	**12,948**

[a] Source: U.S. Census Bureau, 2010–2014 American Community Survey.

[b] Source: U.S. Census Bureau, 2010 Census.

[c] Source: HotelMotels.info (2016).

[d] Source: STR, Inc. (2017)

Note:

The occupied Hotel and Motel Units column used the rounded 2017 year-to-date Lodging Performance occupancy rate (55 percent) for the State of Minnesota provided by STR, Inc.

Route Alternative RA-08

Route alternative RA-08 would pass through the same counties as described above for RA-07 (Table 6.2.4-4); therefore, conditions for housing availability would be the same (222,280 total housing units; 3,254 housing units available to rent; and 298 hotels and motels, with an estimated total of 23,542 rooms and an estimated total of 12,948 occupant rooms).

Nine homes are located within the proposed construction work area of RA-08, and an additional 20 residences are located within 50 feet of the construction work area. Three residences would need to be removed or re-located from the permanent right-of-way or an adjustment of the route centerline within the 750-foot route width would need to be made to avoid these homes.

The median values of owner-occupied housing units in counties along RA-08 are listed in Table 6.2.4-4.

6.2.4.3 Impact Assessment

6.2.4.3.1 Applicant's Preferred Route (in Minnesota)

Construction Impacts

Housing Availability

The Applicant estimates that the maximum total construction workforce would be approximately 4,200 workers across seven separate construction spreads in Minnesota, with each spread expected to total between 500 and 600 workers. It is likely that Enbridge would hire a portion of its workers from outside the counties through which the routes pass; however, to analyze the worst-case scenario impacts it was assumed that all 4,200 workers would be non-local and would re-locate to the vicinity of the pipeline route during construction. In the counties crossed by the Applicant's preferred route, a total of 2,276 housing units (Table 6.2.4-1) are estimated to be vacant and available to rent, in addition to 256 hotels and motels (Table 6.2.4-1) with an estimated 20,224 rooms and an estimated total of 11,123 occupant rooms. If the entire workforce of 4,200 workers were to re-locate to the area, and assuming that they would occupy hotels and motels or rental units, they would use approximately 19 percent of the available temporary housing in these counties. Although some counties have limited temporary housing available (e.g., Kittson, Marshall, and Red Lake counties), adequate housing is available in surrounding counties, so workers could reasonably find housing in an area from which they could commute to the pipeline worksite.

The Applicant's preferred route between Clearbrook and Carlton would require four separate construction spreads. In the counties between Clearbrook and Carlton, approximately 11 percent of the available temporary housing would be required to accommodate a worst-case scenario of all four spreads with a maximum of 2,400 workers requiring housing at the same time. It is likely that only a single spread would be located in one county at any given time, reducing the number of workers that would need to find housing in the same area.

Impacts on housing availability during construction of the Applicant's preferred route would be temporary, i.e. limited to the construction period. These temporary impacts are expected to be minor given the relatively small percentage of available housing that would be required to accommodate workers even under a worst-case scenario.

Residential Access and Safety

During construction, access to residences may be restricted or limited at times when the pipeline crosses driveways or other local roads. In some instances, construction would disturb the road surface to make room for construction equipment and the open trench. This could represent an inconvenience to local residents during the construction period. However, the construction period generally would be limited at any one location.

The pipeline would cross paved roads by boring underneath the road or using HDD. These crossing methods prevent road closures by passing under the road without requiring disturbance to the road itself. Unpaved roads would be crossed using the open-cut method. Where road closures would occur, Enbridge would ensure emergency access for residences and neighborhoods at all times during construction and would coordinate construction schedules with affected homeowners. Detours with appropriate signage would be used where possible. When no detour is available, one lane would be kept open except for the brief period when the pipe is lowered into the trench. Fencing would be used in areas where the trench or construction site poses a risk to the public. Enbridge has indicated that they

would complete all open-cut road crossings within three days, (see Chapter 2 for further details). Given Enbridge's use of bore crossings and HDDs across paved roads, as well as assurance that residences and emergency services would continue to have access on roads that are open cut, impacts related to residential access and safety would be temporary and minor to major for the 19 homeowners within 50 feet of construction (seven between Clearbrook and Carlton). For the eight residences within the construction work area (six between Clearbrook and Carlton), impacts may be more substantial because workers, construction equipment, and the pipeline trench would be in proximity to the residence, and use of the surrounding property would be limited. Therefore, residences within the construction work area would experience a temporary major impact related to safety and access.

Property Values

For homeowners who would be affected by construction, Enbridge would negotiate easements along the construction work area, which would address compensation for impacts resulting from construction of the pipeline and any hindrances created by the easement. Enbridge would be responsible for any construction-related damages and for returning affected property to its original condition to help maintain property value. Impacts on property values during construction would be temporary but likely to be major for homeowners attempting to sell their homes during construction.

Operations Impacts

Housing Availability

Operation and maintenance of the pipeline would require few additional workers, and those workers would be located at the Applicant's regional maintenance facilities and operations centers. Operations and maintenance would not require significant numbers of workers along the pipeline route and would have no or negligible impact on housing availability in the counties crossed by the Project.

Residential Access and Safety

During operation, the pipeline would be underground, and standard operations and maintenance would not pose any access or safety threats. Safety associated with accidental releases of crude oil is discussed in Chapter 10.

Residential structures were identified within the permanent right-of-way for the Applicant's preferred route. Because no barns, homes, or other structures would be allowed within the permanent right-of-way, Enbridge would need to remove or re-locate those structures, as negotiated with the landowner. Enbridge has identified 18 structures within the permanent right-of-way that would need to be removed and has reached an agreement with each of the affected landowners. Because Enbridge has negotiated agreements with each of the landowners, no unknown or unquantified impacts on structures in the permanent right-of-way would occur.

For aboveground facilities, the Applicant's preferred route would require 27 MLVs, 4 new pump stations, and upgrades to 4 existing pump stations. Operation of the aboveground facilities would not affect an individual's ability to access their home; however, a landowner would no longer have access to the 0.1-acre MLV site on their property, which would be enclosed by a fence. Depending on the overall size of the parcel, this would be a minor to major permanent impact related to access. The expanded area of existing pump stations and any new pump stations would be enclosed by a fence to exclude access to all but Enbridge personnel. Enbridge would purchase the pump station sites from the landowner to eliminate any landowner access issues.

Property Values

A review of relevant literature provided limited to no conclusive evidence that the presence of an oil or gas pipeline and associated r easement would have an effect—negative or otherwise—on surrounding property values. Various studies are available characterizing effects on property values related to proximity to oil and natural gas pipelines. This literature review focused on studies of the relation of property values to the mere presence of a pipeline facility; spills, ruptures and other incidents may have a greater impact on property values and are discussed in Chapter 10.

Table 6.2.4-5 summarizes the results of the literature review. Ultimately, the findings were inconclusive, disputed, or showed minimal to no relationship between pipeline easements and property values. It should be noted that some of the studies listed in the literature review were prepared by an industry group or project developer/applicant, or consultant on behalf of either; studies included in peer-reviewed journals are listed first within the table below. Furthermore, property values are often based on local or regional factors; the conclusions of a study focused on a different state or region of the U.S. may not apply in this case based on external local or regional factors.

Table 6.2.4-5. Summary of Property Values Literature Review

Citation	Summary	Conclusions
Wilde et al. (2012)	A literature review by Gnarus Advisors on the effects of pipelines on property values. Published in *Journal of Real Estate Literature*.	Gnarus Advisors found, "There is no credible evidence based on actual sales data that proximity to pipelines reduces property values."
Boxall, P.C., Chan, W.H. & McMillan, M.L. (2005)	The impact of oil and natural gas facilities on rural residential property values: a spatial hedonic analysis. *Resource and energy economics*. The study examines the impact of oil and gas facilities on rural residential property values using data from Central Alberta, Canada.	The results show that property values are negatively correlated with the number of sour gas wells and flaring oil batteries within 4 km of a property. This study also reviewed associated pipelines, but results suggest that it is the total numbers of wells but not the number of sour pipelines that have significant negative impacts on property prices.
Hansen, J.L., Benson, E.D. & Hagen, D.A. (2006)	Environmental hazards and residential property values: evidence from a major pipeline event. *Land Economics*. Study evaluates residential properties within one mile of a pipeline; one subject pipeline had an accident, and one did not.	Results suggest that in the absence of a highly publicized event, location near a pipeline is not viewed as a significant environmental risk. Negative effects diminish over time – with regard not necessarily to the pipeline, but to where an accident occurred.
Diskin et al. (2011)	The effect of natural gas pipelines on residential value. *Right of Way.* The study analyzed sales data from approximately 1,000 residential properties in Arizona to determine whether proximity to a natural gas pipeline affected real estate sales prices.	The study was unable to identify a systematic relationship between proximity to a pipeline and sales price or property value.
Allen, Williford, & Seale (2001)	Study sponsored by the Interstate Natural Gas Association of America (INGAA) reviewed home sales in neighborhoods that were crossed by pipelines of various diameter.	The study found no evidence that the presence of a pipeline on a property significantly altered its sales price, and surrounding development was not impeded.
Fruits (2008)	Study on the impacts of the South Mist Pipeline Expansion on property values in Oregon. Included price modeling using over 10,000 property transactions within 1 mile of the pipeline.	The study found that the pipeline had "no statistically significant or economically significant relationship with residential property values."

Table 6.2.4-5. Summary of Property Values Literature Review

Citation	Summary	Conclusions
PGP Valuation (2008)	Study conducted by PGP Valuation and released by Palomar Gas Transmission, LLC on the effects of the SMPE pipeline on property values in Oregon. Study used sales data for 18 properties that were affected by the pipeline right-of-way easements and compared them with sales of comparable unencumbered properties.	PGP Valuation concluded that natural gas pipelines had no measurable long-term impact on property values. The study also found that variations in short-term values were not substantial or were nonexistent, and that residential properties were not affected by the pipeline easement any more or less than other property types.
Diskin et al. (2011)	The study analyzed sales data from approximately 1,000 residential properties in Arizona to determine whether proximity to a natural gas pipeline affected real estate sales prices.	The study was unable to identify a systematic relationship between proximity to a pipeline and sales price or property value.
Integra Realty Resources (IRR) (2016)	INGAA released a study conducted by IRR on the impacts on property values of several natural gas transmission pipelines.	The study concluded that the presence of the pipeline had no measurable effect on sales prices and that the size of the pipeline had no effect on sales prices.

Given the lack of a conclusive, quantitative relationship between property values and proximity to pipelines, it is infeasible to quantify the potential for impacts of operation of the Project on property values, both in general and specific to any parcels or areas. Furthermore, reaching a conclusion that property values would be generally affected – positively or negatively – by the presence of a pipeline would be considered speculative at best.

6.2.4.3.2 Route Alternatives (from Clearbrook to Carlton)

Route Alternative RA-03AM

Construction Impacts

Route alternative RA-03AM is approximately 50 miles longer than the Applicant's preferred route between Clearbrook and Carlton; therefore, construction of the route may require an additional spread (a total of five spreads) in this segment. If the entire workforce were to re-locate to the area (a maximum of 3,000 workers), and assuming that they would occupy hotels and motels or rental units, they would use approximately 24 percent of the available temporary housing in the counties crossed by RA-03AM. Although some counties have limited temporary housing available (e.g., Benton County), adequate housing is available in surrounding counties, so workers could reasonably find housing in an area from which they could commute to the pipeline worksite. Additionally, it is likely that only a single spread would be located in one county at any given time, reducing the number of workers that would need to find housing in the same area. Impacts on housing availability during construction of RA-03AM would be temporary impacts limited to the construction period. These temporary impacts are expected to be minor given the relatively small percentage of available housing that would be required to accommodate workers even under a worst-case scenario.

During construction, access to residences may be restricted at times when the pipeline crosses driveways or other local roads. In some instances, construction would disturb the road surface to make room for construction equipment and the open trench. This could represent an inconvenience to local residents during construction of RA-03AM. Given Enbridge's use of bore crossings and HDDs across

paved roads, as well as assurance that residences and emergency services would continue to have access on roads that are open cut, impacts related to residential access and safety would be temporary and minor to major for the 39 homeowners within 50 feet of construction. For the 16 residences within the construction work area, impacts may be more substantial because workers, construction equipment, and the pipeline trench would be in proximity to the residence, and use of the surrounding property would be limited. Therefore, residences within the construction work area would experience a temporary major impact related to safety and access.

For homeowners who would be affected by construction of RA-03AM, construction-related damages may affect property value unless repairs return the property to its previous condition. Impacts on property values during construction would be temporary but likely to be major for homeowners attempting to sell their homes during construction.

Operations Impacts

Operation of the pipeline would not require significant numbers of workers along RA-03AM and would have no to negligible impact on housing availability in the counties through which the route alternative passes.

Impacts associated with access and safety for RA-03AM during operation would be similar to those described for the Applicant's preferred route. The permanent right-of-way for RA-03AM would intersect three residences and Enbridge would need to remove or re-locate those structures, as negotiated with the landowner, or the centerline of the route would need to be adjusted within the 750-foot route width to avoid the homes. Removal of the structures represents a major permanent impact for those affected. During operation, the pipeline would be underground, and standard operations and maintenance would not pose any residential access or safety threats.

Property Values

As described in Section 6.2.4.3.1 and accompanying Table 6.2.4-5, a review of relevant literature provided no conclusive evidence that an oil/gas pipeline and easement would affect surrounding property values. It should be noted that few studies relating to this topic exist; that some of the studies listed in the literature review were prepared by an industry group or project developer/applicant, or consultant on behalf of either; and that property values are often based on local or regional factors, so conclusions of a study focused on one region or state may not apply to another location.

Given the lack of a conclusive, quantitative relationship between property values and proximity to pipelines, it is infeasible to quantify the potential for impacts of operation of RA-03AM on property values or speculate on whether property values are likely to increase or decrease based on the presence of RA-03AM.

Route Alternative RA-06

Construction Impacts

Because RA-06 is similar in length to the Applicant's preferred route between Clearbrook and Carlton, it likely would require the same number of construction spreads (about four spreads, totaling a maximum of 2,400 workers). If the entire workforce were to re-locate to the area, and assuming that they would occupy hotels and motels or rental units, they would use approximately 13 percent of the available temporary housing in the affected counties. Additionally, it is likely that only a single spread (between 500 and 600 workers) would be located in one county at any given time, reducing the number of workers that would need to find housing in the same area. Impacts on housing availability during construction of RA-06 would be temporary, i.e. limited to the construction period. These temporary impacts are expected to be minor given the relatively small percentage of available housing that would be required to accommodate workers even under a worst-case scenario.

During construction, access to residences may be restricted at times when the pipeline crosses driveways or other local roads. In some instances, construction would disturb the road surface to make room for construction equipment and the open trench. This would represent an inconvenience to local residents during construction of RA-06. Given Enbridge's use of bore crossings and HDDs across paved roads, as well as assurance that residences and emergency services would continue to have access on roads that are open cut, impacts related to residential access and safety would be temporary and minor to major for the eight homeowners within 50 feet of construction. For the nine residences within the construction work area, impacts are likely to be more substantial because workers, construction equipment, and the pipeline trench would be in close proximity to the residence, and use of the surrounding property would be limited. Therefore, residences within the construction work area would experience a temporary major impact related to safety and access.

For homeowners who would be affected by construction of RA-06, construction-related damages would likely affect property value unless repairs return the property to its previous condition. Impacts on property values during construction would be major for homeowners attempting to sell their homes during construction.

Operations Impacts

Operation of the pipeline would not require significant numbers of workers along RA-06 and would not affect housing availability in the counties surrounding the Project.

Impacts associated with residential access and safety for RA-06 during operation would be similar to those described for the Applicant's preferred route. The permanent right-of-way for RA-06 would cross seven residences and Enbridge would need to remove or re-locate those structures, as negotiated with the landowner, or the centerline of the route would need to be adjusted within the 750-foot route width to avoid the homes. Removal of the structures represents a major, permanent impact for those affected. During operation, the pipeline would be underground, and standard operations and maintenance would not pose any residential access or safety threats.

Property Values

As described in Section 6.2.4.3.1 and accompanying Table 6.2.4-5, a review of relevant literature provided no conclusive evidence that an oil/gas pipeline and easement would affect surrounding property values. It should be noted that few studies relating to this topic exist; that some of the studies listed in the literature review were prepared by an industry group or project developer/applicant, or

consultant on behalf of either; and that property values are often based on local or regional factors, so conclusions of a study focused on one region or state may not apply to another location.

Given the lack of a conclusive, quantitative relationship between property values and proximity to pipelines, it is infeasible to quantify the potential for impacts of operation of RA-06 on property values or speculate on whether property values are likely to increase or decrease based on the presence of RA-06.

Route Alternative RA-07

Construction Impacts

Route alternative RA-07 is similar in length to the Applicant's preferred route between Clearbrook and Carlton. Therefore, it is likely to require the same number of construction spreads (about four totaling a maximum of 2,400 workers). Additional laborers may be needed to complete both the removal of the existing Line 3 and construction of the new Line 3. In addition, a longer construction period would be required to complete both removal and replacement, so laborers would be present, occupying housing in the affected counties for a longer period of time. If the entire workforce of 2,400 workers were to re-locate to the area, and assuming that they would occupy hotels and motels or rental units, they would use approximately 9 percent of the available temporary housing in the affected counties. Even if the required number of workers was doubled to address removal and replacement, less than 20 percent of the available housing would be occupied by these workers. Additionally, it is likely that only a single spread would be located in one county at any given time, reducing the number of workers that would need to find housing in the same area. Impacts on housing availability during construction of RA-07 would be temporary, i.e. limited to the construction period. These temporary impacts are expected to be minor given the relatively small percentage of available housing that would be required to accommodate workers, even under a worst-case scenario.

During construction, access to residences may be restricted at times when the pipeline crosses driveways or other local roads. In some instances, construction would disturb the road surface to make room for construction equipment and the open trench. This would represent an inconvenience to local residents during construction of RA-07, particularly given the extended construction time required to first remove the existing line and then put the new line in place. Given Enbridge's use of bore crossings and HDDs across paved roads, as well as assurance that residences and emergency services would continue to have access on roads that are open cut, impacts related to residential access and safety would be temporary and minor to major for the 16 homeowners within 50 feet of construction. For the 40 residences within the construction work area, impacts would likely be more substantial because workers, construction equipment, and the pipeline trench would be in proximity to the residence, and use of the surrounding property would be limited. Therefore, residences within the construction work area would experience a temporary major impact related to safety and access.

For homeowners who would be affected by construction of RA-07, construction-related damages may affect property value unless repairs return the property to its previous condition. Impacts on property values during construction would be temporary but major for homeowners attempting to sell their homes during construction.

Operations Impacts

Operation of the pipeline would not require significant numbers of workers along RA-07 and would not affect housing availability in the counties surrounding the Project.

Impacts associated with access and safety for RA-07 during operation would be similar to those described for the Applicant's preferred route. Because the permanent right-of-way for RA-07 would not intersect any residences, no impact from removal of homes and permanent structures or displacement of residents would occur. During operation, the pipeline would be underground, and standard operations and maintenance would not pose any residential access or safety threats.

Property Values

As described in Section 6.2.4.3.1 and accompanying Table 6.2.4-5, a review of relevant literature provided no conclusive evidence that an oil/gas pipeline and easement would affect surrounding property values. It should be noted that few studies relating to this topic exist; that some of the studies listed in the literature review were prepared by an industry group or project developer/applicant, or consultant on behalf of either; and that property values are often based on local or regional factors, so conclusions of a study focused on one region or state may not apply to another location.

Given the lack of a conclusive, quantitative relationship between property values and proximity to pipelines, it is infeasible to quantify the potential for impacts of operation of RA-07 on property values or speculate on whether property values are likely to increase or decrease based on the presence of RA-07. If a relationship does exist between property values and proximity to pipelines, however, the location of RA-07, within the existing Mainline corridor would make it very unlikely that RA-07 would affect existing property values.

Route Alternative RA-08

Construction Impacts

Because RA-08 is similar in length to the Applicant's preferred route between Clearbrook and Carlton, it is likely to require the same number of construction spreads (about four spreads totaling a maximum of 2,400 workers). If the entire workforce were to re-locate to the area, and assuming that they would occupy hotels and motels or rental units, they would use approximately 9 percent of the available temporary housing in the affected counties. It is likely that only a single spread (between 500 and 600 workers) would be located in one county at any given time, reducing the number of workers that would need to find housing in the same area. Impacts on housing availability during construction of RA-08 would be temporary, i.e. limited to the construction period. These temporary impacts are expected to be minor given the relatively small percentage of available housing that would be required to accommodate workers even under a worst-case scenario.

During construction, access to residences may be restricted at times when the pipeline crosses driveways or other local roads. In some instances, construction would disturb the road surface to make room for construction equipment and the open trench. This would represent an inconvenience to local residents during construction of RA-08. Given Enbridge's use of bore crossings and HDDs across paved roads, as well as assurance that residences and emergency services would continue to have access on roads that are open cut, impacts related to residential access and safety would be temporary and minor to major for the 20 homeowners within 50 feet of construction. For the nine residences within the construction work area, impacts would likely be more substantial because workers, construction equipment, and the pipeline trench would be in proximity to the residence, and use of the surrounding property would be limited. Therefore, residences within the construction work area would experience a temporary major impact related to safety and access.

For homeowners who would be affected by construction of RA-08, construction-related damages may affect property value unless repairs return the property to its previous condition. Impacts on property values during construction would be temporary but major for homeowners attempting to sell their homes during construction.

Operations Impacts

Operation of the pipeline would not require significant numbers of workers along RA-08 and would not affect housing availability in the counties surrounding the Project.

Impacts associated with access and safety for RA-08 during operation would be similar to those described for the Applicant's preferred route. The permanent right-of-way for RA-08 would intersect three residences and Enbridge would need to remove or re-locate those structures, as negotiated with the landowner, or the centerline of the route would need to be adjusted within the 750-foot route width to avoid the homes. Removal of the structures represents a major permanent impact for those affected. During operation, the pipeline would be underground, and standard operations and maintenance would not pose any residential access or safety threats.

Property Values

As described in Section 6.2.4.3.1 and accompanying Table 6.2.4-5, a review of relevant literature provided no conclusive evidence that an oil/gas pipeline and easement would affect surrounding property values. It should be noted that few studies relating to this topic exist; that some of the studies listed in the literature review were prepared by an industry group or project developer/applicant, or consultant on behalf of either; and that property values are often based on local or regional factors, so conclusions of a study focused on one region or state may not apply to another location.

Given the lack of a conclusive, quantitative relationship between property values and proximity to pipelines, it is infeasible to quantify the potential for impacts of operation of RA-08 on property values or speculate on whether property values are likely to increase or decrease based on the presence of RA-08. If a relationship does exist between property values and proximity to pipelines, however, the location of RA-08, within the existing Mainline corridor would make it very unlikely that RA-08 would affect existing property values.

6.2.4.4 Summary and Mitigation

6.2.4.4.1 Summary

Table 6.2.4-6 summarizes the potential impacts of construction and operations on housing availability, residential access and safety, and property values for the Applicant's preferred route and each of the route alternatives. Overall, the affected counties for all routes contain sufficient available housing to absorb the non-local workforce, and none of the routes represents a significant advantage over the others in terms of housing. For all routes, impacts on housing availability during construction would be minor and temporary. During operations, there would be no to negligible impact on housing availability for any route option.

Residents within or adjacent to the construction work area for each route option would experience temporary minor to major impacts from restricted access and construction safety hazards. The Applicant's preferred route would affect the fewest residences within 50 feet of the construction work area (7) and therefore would result in the least impacts on residential access and safety, while RA-03AM would affect the most residences within 50 feet of the construction work area (39). Residences within

the construction work area would be subject to a variety of impacts, including potential limits on access and impacts on safety. RA-07 would also affect the most residences within the construction work area (40), while the Applicant's preferred route would affect the fewest residences within the construction work area (6).

For homeowners who experience construction-related damages, property value could be affected unless repairs return the property to its previous condition. Impacts on property values during construction would be temporary but could be major for homeowners attempting to sell their homes during construction.

Operation of the pipeline could result in displacement of residents with homes located within the permanent right-of-way. Homes and associated structures located within the permanent right-of-way would be removed or re-located, or the route centerline would need to be adjusted within the 750-foot route width, because no structures are permitted within the permanent right-of-way. Enbridge has reached agreements with the landowners for all structures, including residences, identified within the permanent right-of-way for the Applicant's preferred route. Overall, RA-06 represents the largest potential permanent impact on residences, with seven residential structures located within the permanent right-of-way; while RA-07 would represent the least impact, as no residences are located within the existing Mainline corridor where RA-07 would run.

A review of relevant literature provided no conclusive evidence that an oil/gas pipeline and easement would negatively affect surrounding property values. A collection of studies is available that characterizes impacts related to proximity to a hazardous or potentially hazardous site, proximity to oil and natural gas pipelines, and proximity to oil pipeline ruptures. Ultimately, the findings were inconclusive, disputed, or showed no relationship between pipeline easements and home values. Given the lack of a conclusive, quantitative relationship between property values and proximity to pipelines, it is infeasible to estimate or quantify the potential for impacts from operation of the project on property values. If a relationship does exist between property values and proximity to pipelines, however, the location of RA-07 in the existing Mainline corridor and RA-08 along this corridor would make it very unlikely that either of these routing options would affect existing property values.

6.2.4.4.2 Mitigation

Identified mitigation includes reduction of impacts associated with restricted access and construction safety hazards on residences within 50 feet of the construction work area, specifically development of site-specific construction plans for all residences within 50 feet of the construction work area. These plans could include the use of safety fences, designated access routes, and limitations on construction activity.

If one of the route alternatives is selected as the preferred route, identified mitigation for residences located within the permanent right-of-way includes:

- Negotiating compensation for impacts resulting from construction of the pipeline and any hindrances created by the easement.
- Refining the route centerline to avoid residences where agreements with landowners cannot be reached.

Table 6.2.4-6. Summary of Potential Impacts on Housing for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Use of available temporary housing in affected counties to meet increased demand from the non-local workforce	Temporary/minor impacts • 11 percent of available temporary housing	Temporary/minor impacts • 24 percent of available temporary housing	Temporary/minor impacts • 13 percent of available temporary housing	Temporary/minor impacts • 9 percent of available temporary housing	Temporary/minor impacts • 9 percent of available temporary housing
Access limitations or safety concerns for residences within the construction work area	Temporary/minor to major impacts • 6 residences	Temporary/minor to major impacts • 16 residences	Temporary/minor to major impacts • 9 residences	Temporary/minor to major impacts • 40 residences	Temporary/minor to major impacts • 9 residences
Access limitations or safety concerns for additional residences within 50 feet of the construction work area	Temporary/minor to major impacts • 7 residences	Temporary/minor to major impacts • 39 residences	Temporary/minor to major impacts • 8 residences	Temporary/minor to major impacts • 16 residences	Temporary/minor to major impacts • 20 residences
Changes in property values of homes during construction of a pipeline	Temporary/major impacts (*if homeowner is attempting to sell home during construction*)	Temporary/major impacts (*if homeowner is attempting to sell home during construction*)	Temporary/major impacts (*if homeowner is attempting to sell home during construction*)	Temporary/major impacts (*if homeowner is attempting to sell home during construction*)	Temporary/major impacts (*if homeowner is attempting to sell home during construction*)
Operations Impacts					
Availability of housing to meet increased demand from the non-local workforce	Operations and maintenance would not require significant numbers of workers along the pipeline route and would not affect housing availability.				
Access limitations or safety concerns from removal of structures within permanent right-of-way	No impact (*Negotiated agreements with landowners of* 18 *structures requiring removal or re-location*)	Permanent/major impacts • 3 residences require removal or re-location	Permanent/major impacts • 7 residences require removal or re-location	No impact	Permanent/major impacts • 3 residences require removal or re-location

Table 6.2.4-6. Summary of Potential Impacts on Housing for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Access limitations or safety concerns from restricted property access	Permanent/minor to major impacts • Restricted access to 0.1-acre mainline valve site	*Locations of permanent structures and access roads have not been determined for the route alternatives. Therefore, the location and number of properties affected cannot be quantified. However, impacts would be expected to be minor to major.*			
Changes in property values of homes during operation of a pipeline	Available studies were inconclusive; therefore, it is infeasible to accurately estimate the potential for impacts of operation of the Applicant's preferred route or route alternatives on property values.				

6.2.4.5 References

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6.2.5 Transportation and Public Services

This section addresses potential impacts on transportation and public services in the areas crossed by the Applicant's preferred route and route alternatives. The analysis considered the potential for the following:

- Road closures, increased traffic, and road damage resulting from pipeline construction or operation;
- Disruption of rail travel and airport operation due to pipeline construction or operation;
- Disruption of utilities during construction and operation, including local, intrastate, and interstate utilities and transmission lines; and
- Increased need for emergency services during construction and operations.

This section first describes the existing conditions within an area along the Applicant's preferred route and each of the route alternatives where transportation and public services could be affected by construction and operation of the Project. The potential construction- and operations-related impacts on transportation, utilities, and public services for the routing options (the Applicant's preferred route, RA-03AM, RA-06, RA-07, and RA-08) are addressed next. The impact analysis focuses on the segment of the Applicant's preferred route and route alternatives between Clearbrook and Carlton, as described below. A summary and comparison of the impacts for the five routing options are included at the end of the section.

6.2.5.1 Regulatory Context and Methodology

6.2.5.1.1 Regulatory Context

Project construction would require permits from the Minnesota Department of Transportation (MNDOT) to cross state roads and to create access points onto state highways and county roads from private lands. At road and highway crossings, the Applicant would be subject to county, town, or city regulations that apply to roadways (Minn. Stat. § 222.37) during construction, operation, and maintenance of the pipeline route.

Federal Aviation Administration (FAA) regulations in 14 CFR 77 describe the standards used for determining obstructions to air navigation, navigational aids, or navigational facilities. Those regulations require that any construction project that includes structures with a height of 200 feet or more above ground level or above the established airport elevation (whichever is higher), within 3 nautical miles of an airport, comply with criteria presented in its regulations. The Applicant is not proposing to construct facilities that fall under those criteria; therefore, this issue is not further addressed in this EIS.

FAA regulations also state that the responsible party would have to notify FAA if construction would exceed a defined slope that, depending on various factors, could extend 20,000 feet from the nearest runway. For the purposes of this EIS, airports within 20,000 feet of an alternative route were identified.

The Minnesota Gopher State One-Call system (GSOC) requires notification 48 hours in advance of proposed excavations to allow time to inform utility operators with underground facilities near the excavation areas of the pending excavation (Minn. Stat. 216D.02). In addition, GSOC requires that white markings be placed to define the entire area where excavation would occur.

6.2.5.1.2 Methodology

Construction and operation of the Project have the potential to affect transportation and public services. The following methods were used to identify the relevant existing conditions:

- GIS datasets were used to identify major and minor roads, railways, and utility lines that would be crossed by the Applicant's preferred route and route alternatives, and airports within 20,000 feet of the routes and aboveground facilities;
- The annual average daily traffic (AADT) was estimated for major roads crossed by the route options, using available data for major roadways in the state; and
- Online datasets were used to identify the number of police, fire, and medical services available in counties crossed by the Applicant's preferred route and route alternatives.

Using these data, impacts were evaluated as follows:

- Crossing methods used for each road and railway were compared and qualitatively assessed, and the magnitude of the impacts on traffic due to access loss and traffic increases was determined;
- The estimated traffic from construction workers and vehicles was compared to the AADT estimates for major roads crossed by the route options to determine the magnitude of impacts on traffic;
- The potential impacts on the availability of emergency services were considered by using the number of available services to develop a qualitative assessment of the relative magnitude of potential Project-related needs for those services; and
- The potential effects and the magnitude of those effects on utilities were considered based on the number of service lines crossed by the route options.

The Applicant's preferred route and all of the route alternatives have the same route between the North Dakota border and Clearbrook, and from Carlton to the Wisconsin border. Therefore, comparison of impacts among the route options focused on the segments of the routes between Clearbrook and Carlton.

The ROI for the impact assessment on roads, railroads, and utilities consists of the actual crossing locations of the infrastructure crossed by the Applicant's preferred route and the route alternatives. The ROI for the analysis of potential impacts on regional airports consists of airports within 20,000 feet of the construction work areas and aboveground facilities. The ROI for impacts of construction traffic on local traffic is all major roads crossed by the Applicant's preferred route and the route alternatives.

Potential impacts on emergency services were reviewed at the county level, with the ROI consisting of the counties crossed by each of the route options. Data for Clearwater County were included in the assessment of the common route for the Applicant's preferred route and route alternatives between the North Dakota border and Clearbrook. The ROI for public services for the remainder of the Applicant's preferred route and route alternatives included all counties crossed by the routes, except for Clearwater County. Because the impact analysis for public services was based on county data, comparisons were made using data for existing conditions in all of Clearwater County, in which Clearbrook is located, and all of Carlton County, in which Carlton is located.

6.2.5.2 Existing Conditions

An overview of the transportation network within Minnesota that would be crossed by the Applicant's

preferred route and route alternatives is shown in Figure 6.2.5-1.

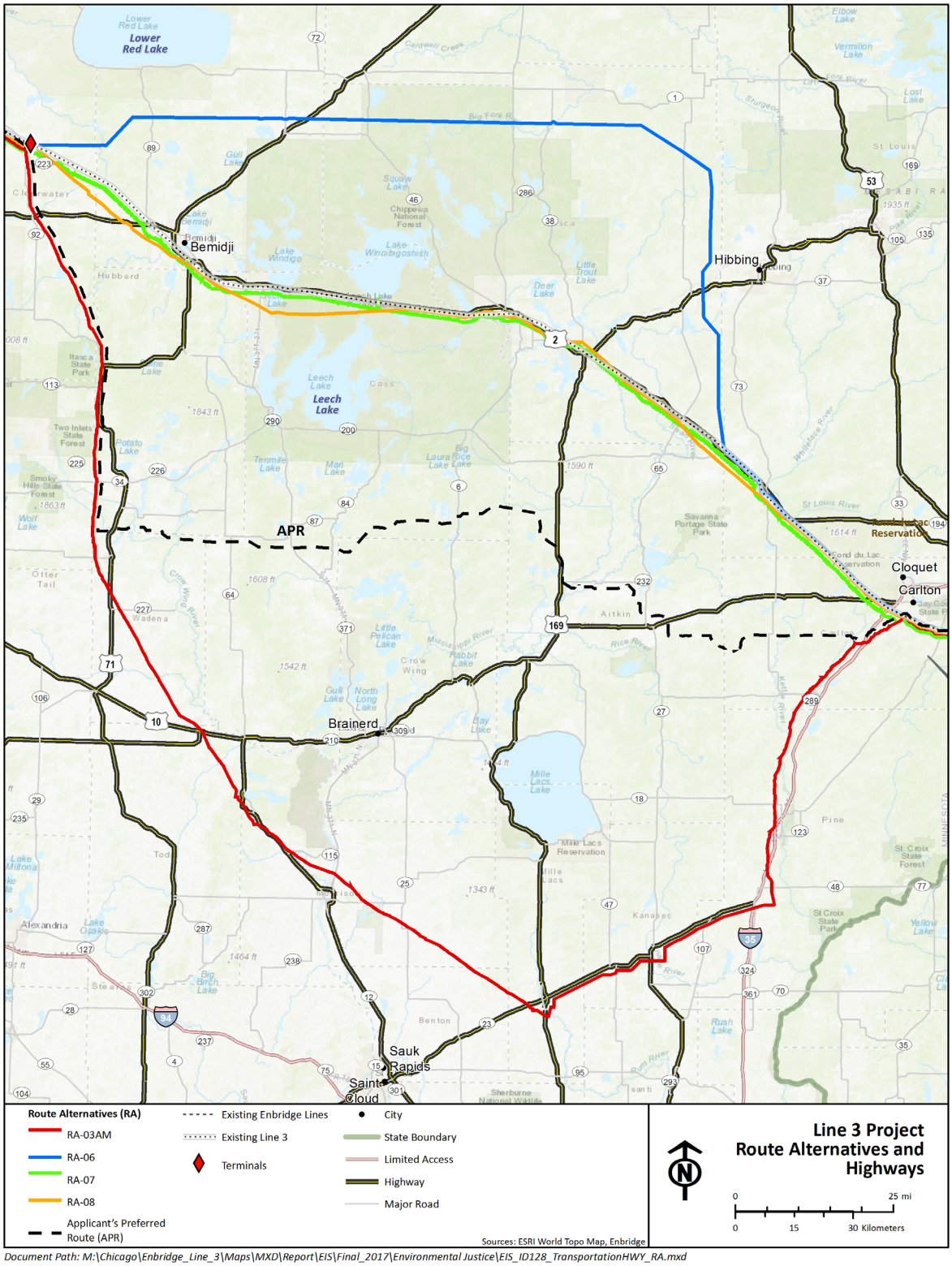

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Figure 6.2.5-1. Roads and Highway Infrastructure along Route Alternatives

6.2.5.2.1 Applicant's Preferred Route

Roads and Highways

The Applicant's preferred route lies roughly in the area north of Interstate 94, east of Interstate 29, and west of Interstate 35 (Figure 6.2.5-1). U.S. highways in the area include Highways 2, 10, 59, 71, 75, and 169. Several other state and local highways are also in the area. The Applicant's preferred route would require 12 road and highway crossings from the North Dakota border to Clearbrook, 164 road and highway crossings between Clearbrook and Carlton, and 144 road and highway crossings from Carlton to the Wisconsin border. Table 6.2.5-1 lists the numbers of road and highway crossings for the Applicant's preferred route along with crossings of railroads, pipelines, and electrical transmission lines.

Table 6.2.5-1. Number of Infrastructure Crossings by the Applicant's Preferred Route in Minnesota

Route	Roads and Highways	Railroads	Pipelines	Electrical Transmission Lines
North Dakota border to Clearbrook	12	5	15	12
Clearbrook to Carlton	164	2	25	42
Carlton to Wisconsin border	144	1	13	3

MNDOT calculates AADT for most township, county, state, and interstate roads within Minnesota. Table 6.2.5-2 presents the AADT for major federal and state roads crossed by the Applicant's preferred route (MNDOT 2015).

Railroads, Utilities, and Airports

The Applicant's preferred route would require eight passenger and freight railroad crossings; these include five railroad crossings from the North Dakota border to Clearbrook, two crossings between Clearbrook and Carlton, and one crossing between from Carlton and the Wisconsin Border (Figure 6.2.5-2).

The number of utility lines crossed by the Applicant's preferred route are listed in Table 6.2.5-1. These include 53 pipeline crossings and 57 electric transmission line crossings. The pipelines may be transporting natural gas, oil, or refined products. Other utility types that were not identified but would likely be crossed include sewer lines and water lines. Between Clearbrook and Carlton, the route would cross 25 pipelines and 42 electrical transmission lines (Figures 6.2.5-3 and 6.2.5-4).

Thief River Falls Regional Airport in Pennington County is within 20,000 feet of the Applicant's preferred route in the area between the North Dakota border and Clearbrook.

Table 6.2.5-2. Annual Average Daily Traffic Estimates for Major Roads Crossed by the Applicant's Preferred Route

Road/Highway	Annual Average Daily Traffic (vehicles per day)
North Dakota Border to Clearbrook	
State Highway 1	970
State Highway 11	1,900
State Highway 32	4,200
State Highway 59	2,750
State Highway 75	550
State Highway 92	600
Clearbrook to Carlton	
Interstate 35	16,400
U.S. Highway 71	2,000
U.S. Highway 2	5,900
State Highway 169	2,050
State Highway 210	3,750
State Highway 223	295
State Highway 34	3,400
State Highway 371	4,850
State Highway 6	1,300
State Highway 64	1,800
State Highway 65	5,200
State Highway 73	1,450
State Highway 84	1,300
Carlton to Wisconsin Border	
State Highway 23	265

Source: MNDOT 2015.

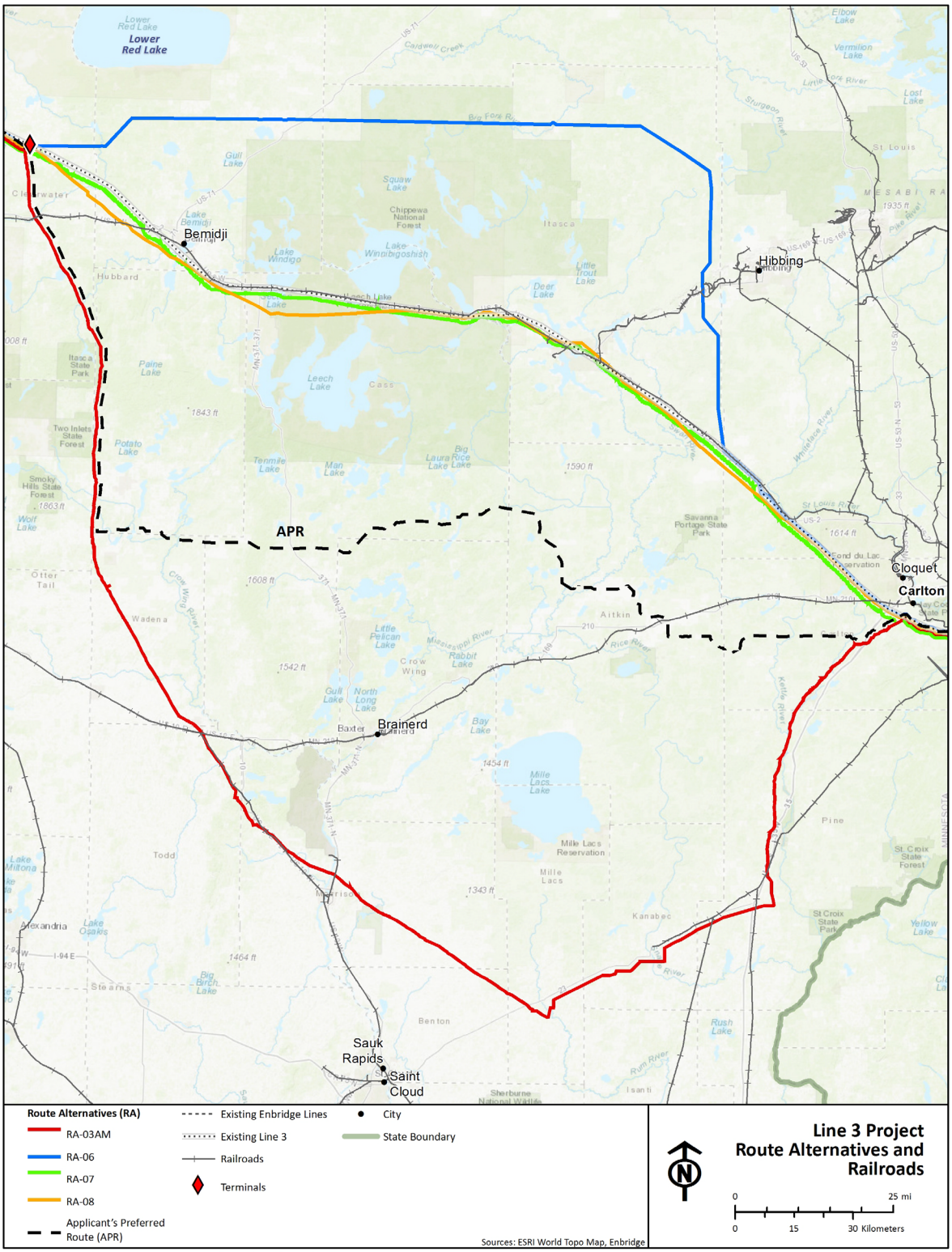

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Figure 6.2.5-2. Railroads along Route Alternatives

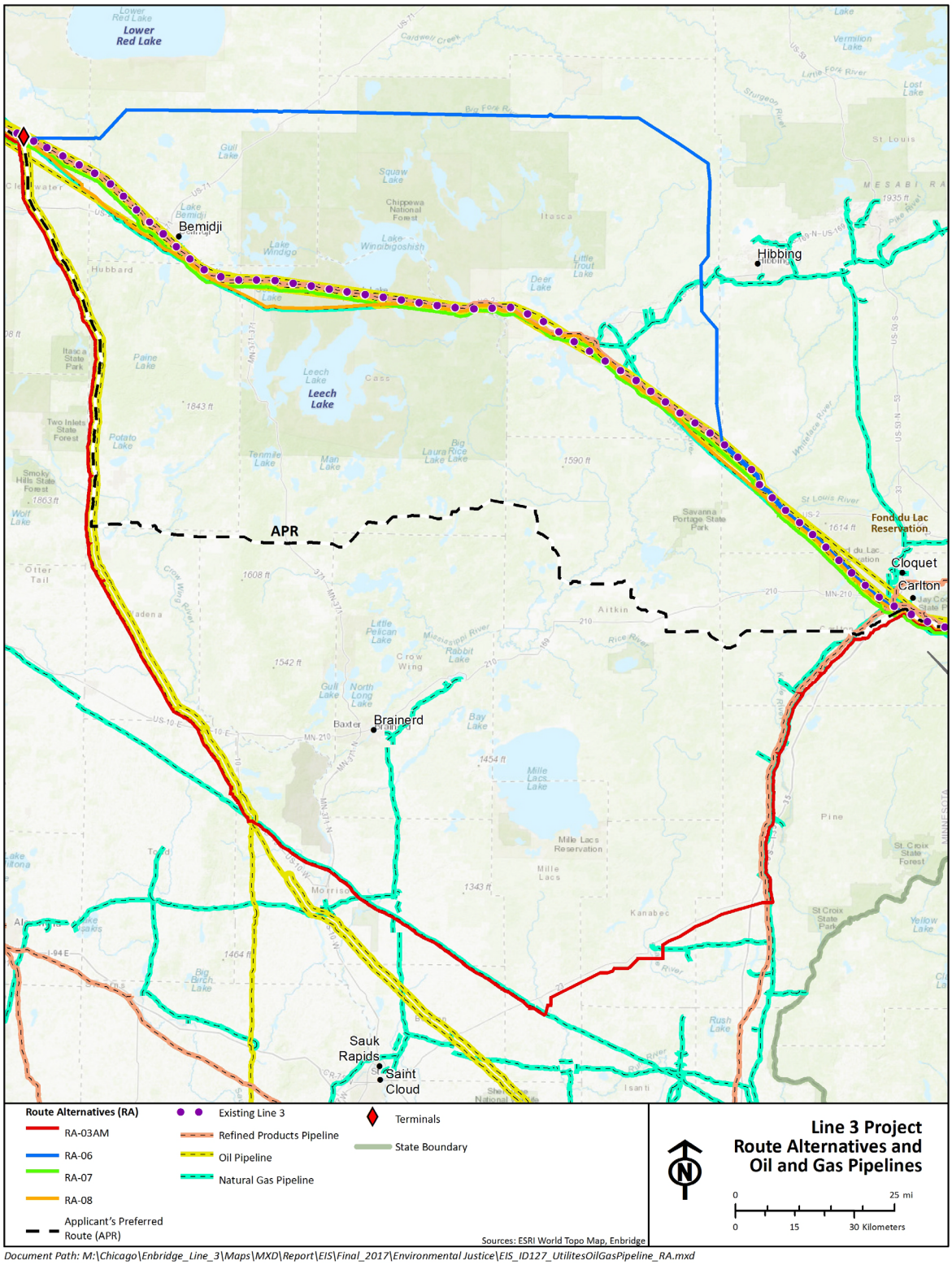

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Figure 6.2.5-3. Pipelines and Utilities along Route Alternatives

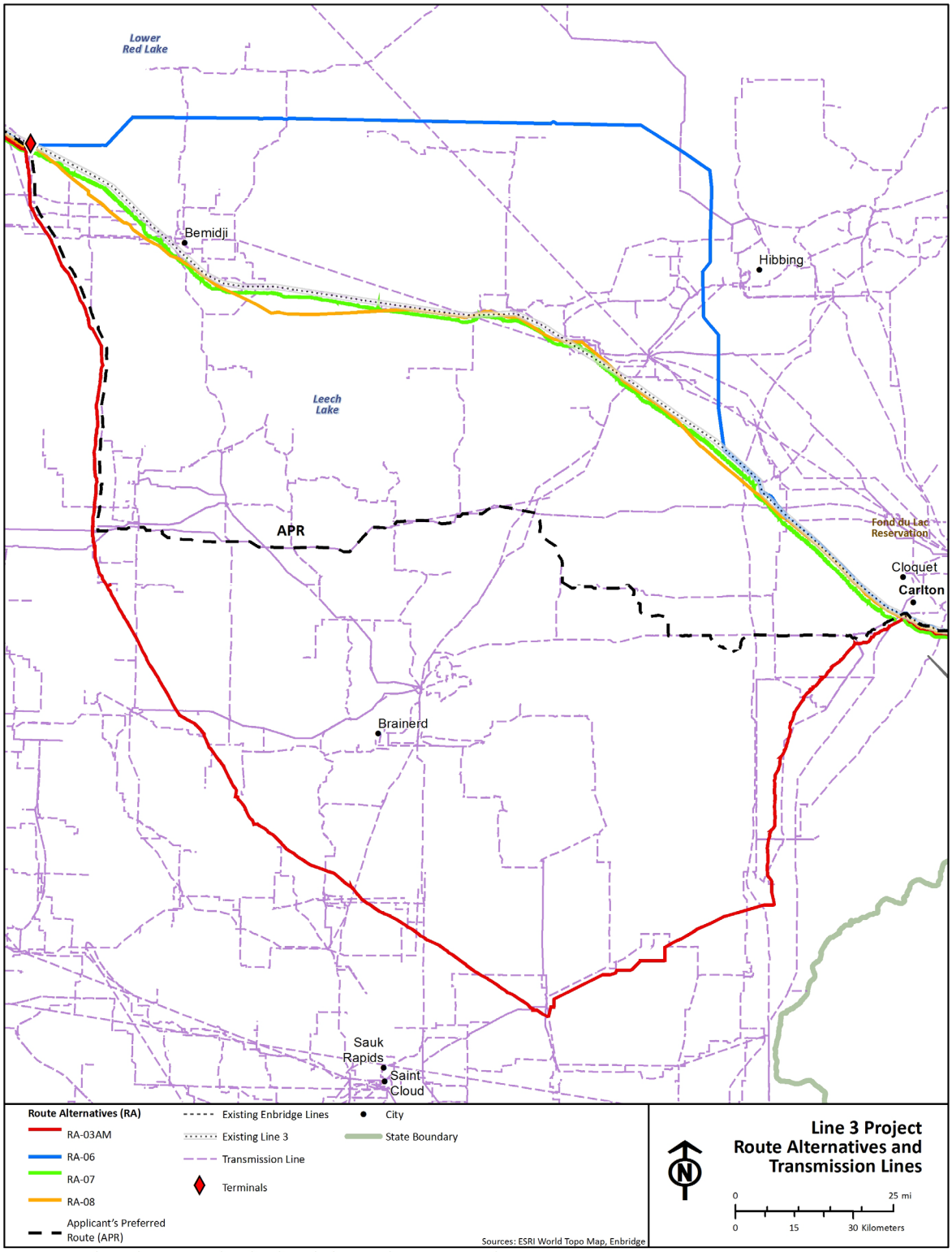

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Figure 6.2.5-4. Transmission Lines along Route Alternatives

Emergency Services

Law enforcement agencies, fire departments, and hospitals within the ROI for the Applicant's preferred route are listed in Table 6.2.5-3. Although Red Lake County does not have a hospital, the county is relatively small and surrounded by two counties (Pennington and Polk) that collectively have three hospitals.

Table 6.2.5-3. Emergency Services in Counties Crossed by the Applicant's Preferred Route

County	Law Enforcement Agencies[a,b]	Fire Departments[a]	Hospitals[c]
North Dakota Border to Clearbrook			
Kittson County	3	5	1
Marshall County	3	7	1
Pennington County	3	3	1
Red Lake County	2	1	0
Polk County	8	10	2
Clearwater County	5	2	1
Subtotal	***24***	***28***	***6***
Hubbard County to Wisconsin Border			
Hubbard County	5	5	1
Wadena County	5	3	2
Cass County	6	6	1
Crow Wing County	8	10	4
Aitkin County	3	3	1
Carlton County	6	15	2
Subtotal	***33***	***42***	***11***

[a] Source: Capitol Impact 2016.

[b] Law enforcement agencies include police departments, sheriff's offices, coroners, medical examiners, and state agencies.

[c] Source: American Hospital Directory 2016.

6.2.5.2.2 Route Alternatives

As noted above, the only area where the route alternatives would vary from the alignment of the Applicant's preferred route is between Clearbrook and Carlton in Minnesota. The existing conditions relevant to transportation and public services for the route alternatives between Clearbrook and Carlton are described below; for county-wide assessments, the comparison is for counties outside of Clearwater County since that county is addressed for the segment from the North Dakota border to Clearbrook, which is in Clearwater County.

Route Alternative RA-03AM

Roads and Highways

Portions of RA-03AM parallel State Route 23 (Figure 6.2.5-1). This route alternative would require a total of 329 road and highway crossings between Clearbrook and Carlton. The AADT for major roads and highways that would be crossed by the route are listed in Table 6.2.5-4.

Table 6.2.5-4. Annual Average Daily Traffic Estimates for Major Roads Crossed by Route Alternative RA-03AM

Road/Highway	Annual Average Daily Traffic (vehicles per day)
Interstate 35	16,400
U.S. Highway 71	2,000
U.S. Highway 2	5,900
State Highway 115	1,200
State Highway 169	15,400
State Highway 18	2,250
State Highway 223	295
State Highway 227	1,450
State Highway 23	5,500
State Highway 25	2,000
State Highway 27	2,450
State Highway 34	3,400
State Highway 371	11,600
State Highway 47	1,300
State Highway 48	9,500
State Highway 73	2,050
State Highway 87	1,000

Source: MNDOT 2015.

Railroads, Utilities, and Airports

RA-03AM would require 11 passenger and freight railroad crossings between Clearbrook and Carlton (Figure 6.2.5-2). Portions of RA-03AM are parallel and near the routes of the Minnesota Pipe Line Company pipeline, the Magellan Refined Products pipeline, and/or the Northern Natural Gas pipeline. The route would have 47 pipeline crossings and 59 electric transmission line crossings; the pipelines may be transporting natural gas, oil, or refined products (Figures 6.2.5-3 and 6.2.5-4). No airports occur within the ROI for RA-03AM.

Emergency Services

Law enforcement agencies, fire departments, and hospitals within the ROI for RA-03AM are listed in Table 6.2.5-5.

Table 6.2.5-5. Emergency Services in Counties Crossed by Route Alternative RA-03AM

County	Law Enforcement Agencies[a,b]	Fire Departments[a]	Hospitals[c]
Hubbard County	5	5	1
Wadena County	5	3	2
Todd County	7	7	2
Morrison County	6	8	1
Benton County	4	3	0
Mille Lacs County	6	4	1
Kanabec County	3	2	1
Pine County	2	8	2
Carlton County	6	15	2
TOTAL	**44**	**55**	**12**

[a] Source: Capitol Impact 2016.

[b] Law enforcement agencies include police departments, sheriff's offices, coroners, medical examiners, and state agencies.

[c] Source: American Hospital Directory 2016.

Route Alternative RA-06

Roads and Highways

Route alternative RA-06 would require a total of 112 road and highway crossings between Clearbrook and Carlton (Figure 6.2.5-1). The AADT of major roads and highways that would be crossed by the route are listed in Table 6.2.5-6.

Table 6.2.5-6. Annual Average Daily Traffic Estimates for Major Roads Crossed by Route Alternative RA-06

Road/Highway	Annual Average Daily Traffic (vehicles per day)
Interstate 35	16,400
U.S. Highway 71	1,200
U.S. Highway 2	3,800
State Highway 169	7,700
State Highway 210	4,450
State Highway 38	1,000
State Highway 46	580
State Highway 6	330
State Highway 65	270
State Highway 72	1,350
State Highway 73	1,650
State Highway 89	1,650

Source: MNDOT 2015.

Railroads, Utilities, and Airports

RA-06 would require four passenger and freight railroad crossings between Clearbrook and Carlton (Figure 6.2.5-2). The route would have 29 pipeline crossings and 22 electric transmission line crossings; the pipelines may be transporting natural gas, oil, or refined products (Figures 6.2.5-3 and 6.2.5-4). No airports occur within the ROI for RA-06.

Emergency Services

Law enforcement agencies, fire departments, and hospitals within the ROI for RA-06 are listed in Table 6.2.5-7.

Table 6.2.5-7. Emergency Services in Counties Crossed by Route Alternative RA-06

County	Law Enforcement Agencies[a,b]	Fire Departments[a]	Hospitals[c]
Beltrami County	4	4	3
Itasca County	9	11	3
Aitkin County	3	3	1
St. Louis County	21	50	8
Carlton County	6	15	2
TOTAL	**43**	**83**	**17**

Notes:

[a] Source: Capitol Impact 2016.

[b] Law enforcement agencies include police departments, sheriff's offices, coroners, medical examiners, and state agencies.

[c] Source: American Hospital Directory 2016.

Route Alternative RA-07

Roads and Highways

Route alternative RA-07 would require a total of 185 road and highway crossings between Clearbrook and Carlton (Figure 6.2.5-1). The AADT of major roads and highways that would be crossed by the route are listed in Table 6.2.5-8.

Table 6.2.5-8. Annual Average Daily Traffic Estimates for Major Roads Crossed by Route Alternative RA-07

Road/Highway	Annual Average Daily Traffic (vehicles per day)
Interstate 35	16,400
U.S. Highway 2	5,800
State Highway 169	12,200
State Highway 197	5,700
State Highway 210	4,450
State Highway 223	295
State Highway 371	5,700
State Highway 38	4,300
State Highway 65	870
State Highway 73	1,650

Source: MNDOT 2015.

Railroads, Utilities, and Airports

RA-07 would require seven passenger and freight railroad crossings between Clearbrook and Carlton (Figure 6.2.5-2). The route would have 42 pipeline crossings and 43 electric transmission line crossings; the pipelines may be transporting natural gas, oil, or refined products (Figures 6.2.5-3 and 6.2.5-4). The Bemidji Regional Airport is within the ROI for RA-07.

Emergency Services

Law enforcement agencies, fire departments, and hospitals within the ROI for RA-07 are listed in Table 6.2.5-9.

Table 6.2.5-9. Emergency Services in Counties Crossed by Route Alternative RA-07

County	Law Enforcement Agencies[a,b]	Fire Departments[a]	Hospitals[c]
Beltrami County	4	4	3
Hubbard County	5	5	1
Cass County	6	6	1
Itasca County	9	11	3
Aitkin County	3	3	1
St. Louis County	21	50	8
Carlton County	6	15	2
TOTAL	**54**	**94**	**19**

[a] Source: Capitol Impact 2016.

[b] Law enforcement agencies include police departments, sheriff's offices, coroners, medical examiners, and state agencies.

[c] Source: American Hospital Directory 2016.

Route Alternative RA-08

Roads and Highways

Route alternative RA-08 would require a total of 162 road and highway crossings between Clearbrook and Carlton (Figure 6.2.5-1). The roads and highways that would be crossed by the route have a minimum AADT of 5 vehicles and a maximum AADT of 16,400 vehicles (Table 6.2.5-10; MNDOT 2015).

Table 6.2.5-10. Annual Average Daily Traffic Estimates for Major Roads Crossed by Route Alternative RA-08

Road/Highway	Annual Average Daily Traffic (vehicles per day)
Interstate 35	16,400
U.S. Highway 2	5,800
State Highway 169	12,200
State Highway 200	640
State Highway 210	4,450
State Highway 223	295
State Highway 371	3,600
State Highway 38	4,300
State Highway 65	870
State Highway 71	8,600
State Highway 73	1,650

Source: MNDOT 2015.

Railroads, Utilities, and Airports

RA-08 would require five passenger and freight railroad crossings between Clearbrook and Carlton (Figure 6.2.5-2). The route would have 41 pipeline crossings and 36 electric transmission line crossings; the pipelines may be transporting natural gas, oil, or refined products (Figures 6.2.5-3 and 6.2.5-4). The Bemidji Regional Airport is within the ROI for RA-08.

Emergency Services

Law enforcement agencies, fire departments, and hospitals within the ROI for RA-08 are listed in Table 6.2.5-11.

Table 6.2.5-11. Emergency Services in Counties Crossed by the Route Alternative RA-08

County	Law Enforcement Agencies[a,b]	Fire Departments[a]	Hospitals[c]
Beltrami County	4	4	3
Hubbard County	5	5	1
Cass County	6	6	1
Itasca County	9	11	3
Aitkin County	3	3	1
St. Louis County	21	50	8
Carlton County	6	15	2
TOTAL	**54**	**94**	**19**

[a] Source: Capitol Impact 2016.

[b] Law enforcement agencies include police departments, sheriff's offices, coroners, medical examiners, and state agencies.

[c] Source: American Hospital Directory 2016.

6.2.5.3 Impact Assessment

The impact analysis conducted for transportation and public services for the Applicant's preferred route and the route alternatives considered the potential for the following:

- Road closures, increased traffic, and road damage caused by pipeline construction or operation;
- Disruption of rail travel and airport operation due to pipeline construction or operation;
- Disruption of utilities during construction and operation, including local, intrastate, and interstate utilities and transmission lines; and
- Increased need for emergency services during construction and operations.

6.2.5.3.1 Applicant's Preferred Route (in Minnesota)

Construction Impacts

Roads and Highways

The Applicant proposes to cross all paved roads using either the guided bore or HDD method. The guided bore method involves boring with an auger through the material under the road from an excavated pit on one side of the road to an excavated pit on the other side (see Section 2.7.2.8). The HDD method is similar, requiring an excavated pit on each side of the crossing, but it uses a computer-controlled drill to create the hole for pipe installation under the rail bed (see Section 2.7.2.8). Use of either method would avoid road closures. Although presence of the construction crews and vehicles in the areas adjacent to the crossings may cause some drivers to reduce their speed, the resultant impacts on transportation on paved roads due to pipeline crossings would be temporary and negligible.

Construction across unpaved roads would require temporary road closures since they would be crossed using the open-cut method, similar to construction of the main portion of the route across land. Where open-cut methods are used, detours would be established to route around road closures. If no detour is

available, at least one lane would be kept open, except for the limited time when the pipe is being installed. Disturbances at the open-cut road crossings would typically be limited to 1 day. The Applicant would implement measures such as creating detours, posting warnings, providing traffic control personnel, and installing safety signs to minimize the impacts on local traffic. Because most unpaved roads are in rural areas, detours and delays during temporary closures could result in longer driving times, causing a temporary minor impact on road users. Impacts on local access from road closures are addressed in Section 6.2.4.3.

Traffic along roads within the ROI may also be affected by the increased traffic volume from construction workers and construction equipment vehicles. Construction would be conducted along construction spreads, with the Applicant's preferred route requiring a total of seven spreads. Each spread would have a peak workforce of 500 to 600 workers. At that point of construction, work would be distributed along the work spread; as a result, not all workers would be in the same area at the same time. The Applicant stated that construction workers would either (1) drive directly to the work site and park near ATWS or along the road shoulder; or (2) drive to construction yards and be bussed or carpool to the work site. At the peak of construction, the Applicant expects a maximum of approximately 590 total trips per day per construction spread (there would be four construction spreads between Clearbrook and Carlton). Most workers would use major roadways to travel to and from the construction area, as well as some county and local roads to access the right-of-way. However, not all roads crossed by the route would be used as access points for workers. For major roads crossed by the route, AADT ranges from 265 to 16,400 vehicle per day (Table 6.2.5-2). Since workers would be distributed among the individual construction spreads, it is unlikely that any single road would be subject to an increase of 500 to 600 workers at a given time. For roads with low traffic counts, users may notice the increase in the number of vehicles; however, the impact on traffic is likely to be temporary and minor since impacts would be limited to the construction period and traffic increases are not expected to result in delays or safety concerns.

During construction at pump stations, all workers would be in a single location, which would result in localized increases in traffic volumes, particularly during the morning and evening commuting times for the construction workers. The Applicant estimated that construction of each pump station would require about 81 to 86 total vehicle trips per day. Each pump station would be near an existing road. County Road 74 near the Clearbrook pump station has the lowest estimated traffic count, with approximately 65 vehicles per day (MNDOT 2015). While construction at the Clearbrook pump station would more than double the number of vehicles during the morning and evening commutes, the road should be able to accommodate the increase of 86 total vehicle trips per day without causing substantial impacts on traffic. Although many variables influence the efficiency or level of service for a section of road, the typical base saturation flow rate (or maximum capacity) for a highway is 1,900 cars per hour per lane (TRB 2000). Even if the 81 to 86 vehicle trips were to occur in the same peak hour, which is not likely, this would only represent roughly 5 percent of the roadway's capacity. Therefore, with the short duration and small change in traffic relative to the roadway capacity, impacts on traffic during construction of pump stations are expected to be temporary and minor.

Construction may cause deterioration of road surfaces from the increased worker vehicle traffic and construction vehicles with heavy loads. Construction vehicles also could track dirt and debris onto the road surface. The Applicant would implement measures to minimize debris tracking, including requiring contractors to remove the debris within 24 hours. The Applicant also committed to restoring all road surfaces to preexisting conditions. With post-construction restoration and proposed measures to

minimize debris tracking during the construction period, the impact on road surfaces due to construction of the Applicant's preferred route would be temporary and minor.

Railroads, Utilities, and Airports

The Applicant's preferred route would cross eight railroads (Table 6.2.5-1). All active railroads would be crossed using the guided bore or HDD method. As noted above, both methods require an excavated pit on each side of the crossing; the crossings would be bored or drilled under the rail bed from one pit to the other. The use of either method would result in no impacts on the railroad or its uses.

The Applicant's preferred route would cross pipelines, utilities, and transmission lines. The Applicant would consult with all underground utility companies prior to construction and use the GSOC system prior to excavation to ensure that utility owners or operators are informed of the planned construction and that potentially affected pipelines and underground utilities are properly marked. With these safeguards in place, accidental damage to the utilities is not likely and disruption of service is not expected; therefore, impacts on utilities are not expected. However, it is possible that not all of the locations of local utility lines are known by the local communities or counties. If utility lines are accidentally damaged, disruption to service could result. The Applicant would be required to repair damaged utilities to allow the provider to restore service. In the event of a disruption, impacts on local residents would be temporary and major.

Before initiating crossings under overhead electrical transmission lines, the Applicant would consult with the owners or operators to ensure that all appropriate safety measures have been implemented. These measures would address aspects of construction such as the distance from the lines, the equipment used, and the methods of moving pipe segments. Implementation of these measures would avoid disruption of service, damage to the utilities, and worker injuries. With these measures in place, impacts on and from overhead electrical transmission lines are expected to be temporary and, at most, negligible.

Because the Thief River Falls Airport is within 20,000 feet of the Applicant's preferred route (in the area between the North Dakota/Minnesota Border and Clearbrook), the Applicant may be required to notify the FAA of the planned construction (Section 6.2.5.1.1). If notification is required, the Applicant would then be required to comply with FAA regulations for construction of facilities near airports. Through compliance with FAA regulations, no impacts on the Thief River Falls Airport would occur due to construction of the Applicant's preferred route.

Emergency Services

A variety of police and fire services are available in each county within the ROI. For larger counties that have high population centers, the number of these available services are higher, while the more rural counties generally have fewer services available. Potential Project-related impacts on these services include an increased need for police services to assist with traffic control at road crossings and to provide help or consultation regarding security, as well as an overall increased need for police services because of the increased population from the construction workforce. In some counties with fewer police departments and fewer officers available, the need for additional police to aid in traffic control during road closures may cause a minor and temporary impact on the departments. For emergency services, such as fire and medical, impacts would be associated with a general increased need due to the increase in overall population from the workforce in addition to potential injuries or accidents from construction. The number of emergency services departments in each county crossed by the Applicant's preferred route appears to be sufficient to absorb the potential increased need for their services

(Table 6.2.5-3). Although Red Lake County does not have a hospital, workers with injuries resulting from construction in this county could travel to surrounding hospitals in nearby counties. Overall, the temporary influx of workers to the Project area and the normal operations of day-to-day activities associated with construction would cause a temporary and negligible to minor impact on emergency services in the ROI.

Operations Impacts

Roads and Highways

The proposed pipeline would be underground, and normal pipeline operation would not affect the local transportation systems. Maintenance of the pipeline would require few additional workers, and those workers would be located at the Applicant's existing regional maintenance facilities and operations centers. Therefore, traffic along roads and highways in the counties crossed by the Applicant's preferred route would experience little increases in traffic due to operation and would not be measurably affected.

Maintenance activities would primarily consist of routine vegetation maintenance along the permanent right-of-way. Maintenance equipment and vehicles may briefly use local roads for access and egress to and from the right-of-way; this would have little effect on traffic.

During operation, the Applicant would implement its Integrity Management Program, which may require excavation to repair or replace segments of pipe at roadway crossings. In some cases, it could require removal of pipe that was installed under roadways crossed using the guided bore or HDD method. The impacts of those activities would be similar to those of constructing the crossings, and the Applicant would restore the roadways to their original condition if damaged. Therefore, impacts on roads and highways as a result of these maintenance activities would be temporary and negligible but would occur periodically over the life of the Project.

Railroads, Utilities, and Airports

No impacts on railroads would be expected during operation and maintenance of the pipeline. If a segment of pipe under the rail bed needs to be repaired or replaced it would be accomplished by excavating a pit to remove the pipe that was installed using the guided bore or HDD method and would not affect operation of the railroad.

If integrity digs are required along the route, the Applicant would consult with utility companies and use the Minnesota GSOC system to ensure that all adjacent pipelines and underground utilities are properly marked. As for construction of the pipeline, disruption of service is not expected, and no impact on utilities during maintenance is expected. However, if an unmarked utility line is damaged during maintenance excavations, the Applicant would repair the damage and to allow the provider to restore service. In the event of a disruption, the impact on local users of the utility would be temporary and major.

Operation of the Project would not affect the Thief River Falls Airport.

Emergency Services

Operation would require a small number of new hires since the pipeline system could be operated and maintained primarily by the existing staff that operates and maintains the Line 3 pipeline. Therefore, there would not be a measurable impact on emergency services.

Impacts on emergency services in the event of an accidental release of crude oil are addressed in Chapter 10.

6.2.5.3.2 Route Alternatives (Clearbrook to Carlton)

Route Alternative RA-03AM

Construction Impacts

Roads and Highways

Between Clearbrook and Carlton, RA-03AM would require the most road and highway crossings (329 crossings). Similar to construction of the Applicant's preferred route, paved roads would likely be crossed using the guided bore method, resulting in no road closures. Although presence of the construction crews and vehicles in the areas adjacent to the crossings may cause some drivers to reduce their speed, the resultant impacts on transportation on paved roads due to pipeline crossings would be temporary and negligible.

Construction across unpaved roads would require temporary road closures since they would be crossed using the open-cut method, similar to construction of the main portion of the route across land. Where open-cut methods are used, crossings would typically be completed in 1 day. With the Applicant-proposed measures of detours, warnings, traffic control, and safety signs, the impacts on local traffic would be minimized. Because most unpaved roads along RA-03AM are in rural areas, detours and delays during temporary closures could result in longer driving times, causing a temporary minor impact on road users. Impacts on local access from road closures along RA-03AM are addressed in Section 6.2.4.3.

Traffic along roads within the ROI may also be affected by the increased traffic volume from construction workers and construction equipment vehicles. Construction of RA-03AM would most likely be conducted along five construction spreads between Clearbrook and Carlton. Similar to construction of the Applicant's preferred route, there could be a maximum of approximately 590 total vehicle trips per day per construction spread during peak construction. Most workers would use major roadways to travel to and from the construction area, as well as some county and local roads to access the right-of-way. However, not all roads crossed by the route would be used as access points for workers. For major roads crossed by the route, AADT ranges from 295 to 16,400 vehicle per day (Table 6.2.5-4). Since workers would be distributed among individual construction spreads, it is unlikely that any single road would be subject to an increase of 590 vehicle trips at a given time. For roads with low traffic counts, users may notice the increase in the number of vehicles; however, the impact on traffic is likely to be temporary and minor.

During construction of the six pump stations that would be needed for RA-03AM, approximately 81 to 86 total vehicle trips per day would be added to roads and highways used for access. Since the locations of pump stations have not been determined for RA-03AM, the impacts on local traffic during construction of the six pump stations cannot be quantitatively assessed. However, it is anticipated that most roads could accommodate the increase of 86 total vehicle trips per day without causing substantial impacts on traffic. As noted above for the Applicant's preferred route, the typical base saturation flow rate (or maximum capacity) for a highway is 1,900 cars per hour per lane (TRB 2000). Even if the 81 to 86 vehicle trips were to occur in the same peak hour, which is not likely, this would only represent a small percentage of the capacity of most roadways along the route. Therefore, impacts on traffic during construction of pump stations for RA-03AM are expected to be temporary and minor.

Construction may cause deterioration of road surfaces from the increased worker vehicle traffic and construction vehicles with heavy loads. Construction vehicles also could track dirt and debris onto the road surface. The Applicant would implement measures to minimize debris tracking, including requiring contractors to remove the debris within 24 hours. The Applicant also committed to restoring all road surfaces to preexisting conditions. Therefore, the impact on road surfaces due to construction of RA-03AM would be temporary and minor.

Railroads, Utilities, and Airports

Between Clearbrook and Carlton, RA-03AM would require the most railroad crossings (11). All active railroads would be crossed using either the guided bore or HDD method. As noted above, both methods require an excavated pit on each side of the crossing; the crossings would be bored or drilled under the rail bed from one pit to the other. The use of either method would result in no impacts on the railroad or its uses.

The RA-03AM route would require constructing 47 pipeline crossings, 59 electrical transmission line crossings, and other local utility crossings. The Applicant would consult with all underground utility companies prior to construction and use the GSOC system prior to excavation to ensure that utility owners or operators are informed of the planned construction and that potentially affected pipelines and underground utilities are properly marked. With these safeguards in place, accidental damage to the utilities is not likely and disruption of service is not expected; therefore, impacts on utilities are not expected. However, it is possible that not all of the locations of local utility lines are known by the local communities or counties. If utility lines are accidentally damaged, disruption to service could result. The Applicant would be required to repair damaged utilities to allow the provider to restore service. In the event of a disruption, impacts on local residents would be temporary and major.

Before initiating crossings under overhead electrical transmission lines, the Applicant would consult with the owners or operators to ensure that all appropriate safety measures have been implemented. These measures would address aspects of construction such as the distance from the lines, equipment used, and methods of moving pipe segments. Implementation of these measures would avoid disruption of service, damage to the utilities, and worker injuries. With these measures in place, impacts on and from overhead electrical transmission lines are expected to be temporary and, at most, negligible.

Because no airports are within 20,000 feet of RA-03AM, construction of this route alternative would not affect airports.

Emergency Services

Multiple law enforcement agencies and fire departments are present in each county crossed by RA-03AM. Impacts on emergency services for the route alternatives would be similar to those described for the Applicant's preferred route, including an increased need for police services to assist with traffic control at road crossings and to provide help or consultation regarding security, as well as a general increased need for police services because of the increased population from the construction workforce. For emergency services, such as fire and medical, impacts would be associated with an increased need due to the increase in overall population from the workforce in addition to potential injuries or accidents from construction. The number of emergency services departments in each county crossed by RA-03AM appears to be sufficient to absorb the potential increased need for these services (Table 6.2.5-5). Although Benton County does not have a hospital, workers with injuries resulting from construction in this county could travel to nearby hospitals in surrounding counties. Overall, the

temporary influx of workers during construction of RA-03AM would result in a temporary and minor impact on emergency services in the ROI.

Operations Impacts

Roads and Highways

Maintenance activities would primarily consist of routine vegetation maintenance along the permanent right-of-way of RA-03AM. Maintenance equipment and vehicles may briefly use local roads for access and egress to and from the right-of-way; this would have little effect on traffic and would therefore not affect traffic.

During operation, the Applicant would implement its Integrity Management Program, which may require excavation to repair or replace segments of pipe at roadway crossings. In some cases, it could require removal of pipe that was installed under roadways crossed using the guided bore or HDD method. The impacts of those activities would be similar to those of constructing the crossings, and the Applicant would restore the roadways to their original condition. Therefore, impacts on roads and highways as a result of these maintenance activities for RA-03AM would be temporary and negligible but would occur periodically over the life of the Project.

Railroads, Utilities, and Airports

No impacts on railroads would be expected during operation and maintenance of the pipeline. If a segment of pipe under the rail bed needs to be repaired or replaced it would be accomplished by excavating a pit to remove the pipe that was installed using the guided bore or HDD method and would not affect operation of the railroad.

If integrity digs are required along the route, the Applicant would consult with utility companies and use the Minnesota GSOC system to ensure that all adjacent pipelines and underground utilities are properly marked. As for construction of the pipeline, disruption of service is not expected, and no impact on utilities during maintenance is expected. However, if an unmarked utility line is damaged during maintenance excavations, the Applicant would repair the damage and allow the provider to restore service. In the event of a disruption, the impact on local users of the utility would be temporary and major.

Because no airports are within 20,000 feet of RA-03AM, operation and maintenance of this route alternative would not affect any airports.

Emergency Services

Operation would require a small number of new hires since the pipeline system could be operated and maintained primarily by the existing staff that operates and maintains the Line 3 pipeline. Therefore, there would not be a measurable impact on emergency services.

Impacts on emergency services in the event of an accidental release of crude oil are addressed in Chapter 10.

Route Alternative RA-06

Construction Impacts

Roads and Highways

Between Clearbrook and Carlton, RA-06 would require the fewest road and highway crossings (112 crossings). Similar to construction of the Applicant's preferred route, paved roads would be crossed using either the guided bore or HDD method, resulting in no road closures. Although presence of the construction crews and vehicles in the areas adjacent to the crossings may cause some drivers to reduce their speed, the resultant impacts on transportation on paved roads due to pipeline crossings would be temporary and negligible.

Construction across unpaved roads would require temporary road closures since they would be crossed using the open-cut method, similar to construction of the main portion of RA-06 across land. Where open-cut methods are used, crossings would typically be completed in 1 day. With the Applicant-proposed measures of detours, warnings, traffic control, and safety signs, impacts on local traffic patterns would be minimized. Because most unpaved roads along RA-06 are in rural areas, detours and delays during temporary closures could result in longer driving times, causing a temporary minor impact on road users. Impacts on local access from road closures along RA-06 are addressed in Section 6.2.4.3.

Traffic along roads within the ROI may also be affected by the increased traffic volume from construction workers and construction equipment vehicles. Construction of RA-06 would most likely be conducted along four construction spreads between Clearbrook and Carlton. Similar to construction of the Applicant's preferred route, there could be a maximum of approximately 590 daily vehicle trips per construction spread during peak construction. Most workers would use major roadways to travel to and from the construction area, as well as some county and local roads to access the right-of-way. However, not all roads crossed by the route would be used as access points for workers. For major roads crossed by the route, AADT ranges from 330 to 16,400 vehicle per day (Table 6.2.5-6). Since workers would be distributed among individual construction spreads, it is unlikely that any single road would be subject to an increase of 590 trips at a given time. For roads with low traffic counts, users may notice the increase in the number of vehicles; however, the impact on traffic is likely to be temporary and minor.

During construction of the four pump stations that would be needed for RA-06, approximately 81 to 86 vehicle trips per day would be added to roads and highways used for access. Since the locations of pump stations have not been determined for RA-06, the impacts on local traffic during construction of the four pump stations cannot be qualitatively assessed. However, it is anticipated that most roads could accommodate the increase of 86 total vehicle trips per day without causing substantial impacts on traffic. As noted above for the Applicant's preferred route, the typical base saturation flow rate (or maximum capacity) for a highway is 1,900 cars per hour per lane (TRB 2000). Even if the 81 to 86 vehicle trips were to occur in the same peak hour, which is not likely, this would only represent a small percentage of the capacity of most roadways along the route. Therefore, impacts on traffic during construction of pump stations for RA-06 are expected to be temporary and minor.

Construction may cause deterioration of road surfaces from the increased worker vehicle traffic and construction vehicles with heavy loads. Construction vehicles could also track dirt and debris onto the road surface. The Applicant would implement measures to minimize debris tracking, including requiring contractors to remove the debris within 24 hours. The Applicant also committed to restoring all road

surfaces to preexisting conditions. Therefore, the impact on road surfaces due to construction of RA-06 would be temporary and minor.

Railroads, Utilities, and Airports

Between Clearbrook and Carlton, RA-06 would require the fewest railroad crossings (four). All active railroads would be crossed using either the guided bore or HDD method. As noted above, both methods require an excavated pit on each side of the crossing; the crossings would be bored or drilled under the rail bed from one pit to the other. The use of either method would result in no impacts on the railroad or its uses.

The RA-06 route would require constructing 29 pipeline crossings, 22 electrical transmission line crossings, and other local utility crossings. The Applicant would consult with all underground utility companies prior to construction and use the GSOC system prior to excavation to ensure that utility owners or operators are informed of the planned construction and that potentially affected pipelines and underground utilities are properly marked. With these safeguards in place, accidental damage to the utilities is not likely and disruption of service is not expected; therefore, impacts on utilities are not expected. However, it is possible that not all of the locations of local utility lines are known by the local communities or counties. If utility lines are accidentally damaged, disruption to service could result. The Applicant would be required to repair damaged utilities to allow the provider to restore service. In the event of a disruption, impacts on local residents would be temporary and major.

Before initiating crossings under overhead electrical transmission lines, the Applicant would consult with the owners or operators to ensure that all appropriate safety measures have been implemented. These measures would address aspects of construction such as the distance from the lines, the equipment used, and the methods of moving pipe segments. Implementation of these measures would avoid disruption of service, damage to the utilities, and worker injuries. With these measures in place, impacts on and from overhead electrical transmission lines are expected to be temporary and, at most, negligible.

Because no airports are within 20,000 feet of RA-06, construction of this route alternative would not affect airports.

Emergency Services

Multiple law enforcement agencies and fire departments are present in each county crossed by RA-06. Impacts on emergency services due to construction of this route alternative would be similar to those described for the Applicant's preferred route, including an increased need for police services to assist with traffic control at road crossings and to provide help or consultation regarding security, as well as a general increased need for police services because of the increased population from the construction workforce. For emergency services, such as fire and medical, impacts would be associated with an increased need due to the increase in population from the workforce in addition to potential injuries or accidents from construction. The number of emergency services departments in each county crossed by RA-06 appear to be sufficient to absorb the potential increased need for their services (Table 6.2.5-7). Overall, the temporary influx of workers during construction of RA-06 would result in a temporary and minor impact on emergency services in the ROI.

Operations Impacts

Roads and Highways

Maintenance activities would primarily consist of routine vegetation maintenance along the permanent right-of-way of RA-06. Maintenance equipment and vehicles may briefly use local roads for access and egress to and from the right-of-way; this would have little effect and thus no impact on traffic.

During operation, the Applicant would implement its Integrity Management Program, which may require excavation to repair or replace segments of pipe at roadway crossings. In some cases, it could require removal of pipe that was installed under roadways crossed using the guided bore or HDD method. The impacts of those activities would be similar to those of constructing the crossings, and the Applicant would restore the roadways to their original condition. Therefore, impacts on roads and highways as a result of these maintenance activities for RA-06 would be temporary and negligible but would occur periodically over the life of the Project.

Railroads, Utilities, and Airports

No impacts on railroads would be expected during operation and maintenance of the pipeline. If a segment of pipe under the rail bed needs to be repaired or replaced it would be accomplished by excavating a pit to remove the pipe that was installed using the guided bore or HDD method and would not affect operation of the railroad.

If integrity digs are required along the route, the Applicant would consult with utility companies and use the Minnesota GSOC system to ensure that all adjacent pipelines and underground utilities are properly marked. As for construction of the pipeline, disruption of service is not expected, and no impact on utilities during maintenance is expected. However, if an unmarked utility line is damaged during maintenance excavations, the Applicant would repair the damage and to allow the provider to restore service. In the event of a disruption, the impact on local users of the utility would be temporary and major.

Because no airports are within 20,000 feet of RA-06, operation and maintenance of this route alternative would not affect any airports.

Emergency Services

Operation would require a small number of new hires since the pipeline system could be operated and maintained primarily by the existing staff that operates and maintains the Line 3 pipeline. Therefore, there would not be a measurable impact on emergency services.

Impacts on emergency services in the event of an accidental release of crude oil are addressed in Chapter 10.

Route Alternative RA-07

Construction Impacts

Roads and Highways

Between Clearbrook and Carlton, RA-07 would require 185 road and highway crossings. Similar to construction of the Applicant's preferred route, paved roads would be crossed using the guided bore or HDD method, resulting in no road closures. Although presence of the construction crews and vehicles in

the areas adjacent to the crossings may cause some drivers to reduce their speed, the resultant impacts on transportation on paved roads due to pipeline crossings would be temporary and negligible.

Construction across unpaved roads would require temporary road closures since they would be crossed using the open-cut method, similar to construction of the main portion of the route across land. Where open-cut methods are used, crossings would typically be completed in 1 day. With the Applicant-proposed measures of detours, warnings, traffic control, and safety signs, impacts on local traffic patterns would be minimized. Because most unpaved roads along RA-07 are in rural areas, detours and delays during temporary closures could result in longer driving times, causing a temporary minor impact on road users. Impacts on local access from road closures along RA-07 are addressed in Section 6.2.4.3.

Traffic along roads within the ROI may also be affected by the increased traffic volume from construction workers and construction equipment vehicles. Construction of RA-07 would most likely be conducted along four construction spreads between Clearbrook and Carlton. Similar to construction of the Applicant's preferred route, there could be a maximum of approximately 590 daily vehicle trips per construction spread during peak construction. Most workers would use major roadways to travel to and from the construction area, as well as some county and local roads to access the right-of-way. However, not all roads crossed by the route would be used as access points for workers. For major roads crossed by the route, AADT ranges from 295 to 16,400 vehicle per day (Table 6.2.5-8). Since workers would be distributed among individual construction spreads, it is unlikely that any single road would be subject to an increase of 590 trips at a given time. For roads with low traffic counts, users may notice the increase in the number of vehicles; however, the impact on traffic is likely to be temporary and minor.

Because construction of RA-07 would require upgrading existing pump stations rather than constructing new pump stations, the estimated number of construction workers required and the associated number of vehicle trips per day that would be added to roads and highways has not been determined. In addition, the location of pump stations has not been determined for RA-07, so the impacts on local traffic during construction of the pump station upgrades cannot be quantitatively assessed. However, even if the upgrades require the same number of construction workers as the new pump stations noted above, it is anticipated that most roads could accommodate the increase of 86 total vehicle trips per day without causing substantial impacts on traffic. As noted above for the Applicant's preferred route, the typical base saturation flow rate (or maximum capacity) for a highway is 1,900 cars per hour per lane (TRB 2000). Even if the 81 to 86 vehicle trips were to occur in the same peak hour, which is not likely, this would only represent a small percentage of the capacity of most roadways along the route. Therefore, impacts on traffic during construction of pump stations for RA-07 are expected to be temporary and minor.

Construction may cause deterioration of road surfaces from the increased worker vehicle traffic and construction vehicles with heavy loads. Construction vehicles also could track dirt and debris onto the road surface. The Applicant would implement measures to minimize debris tracking, including requiring contractors to remove the debris within 24 hours. The Applicant also committed to restoring all road surfaces to preexisting conditions. Therefore, the impact on road surfaces due to construction of RA-07 would be temporary and minor.

Railroads, Utilities, and Airports

Between Clearbrook and Carlton, RA-07 would require the seven railroad crossings. All active railroads would be crossed using either the guided bore or HDD method. As noted above, both methods require an

excavated pit on each side of the crossing; the crossings would be bored or drilled under the rail bed from one pit to the other. The use of either method would result in no impacts on the railroad or its uses.

RA-07 would require constructing 42 pipeline crossings, 43 electrical transmission line crossings, and other local utility crossings. The Applicant would consult with all underground utility companies prior to construction and use the GSOC system prior to excavation to ensure that utility owners or operators are informed of the planned construction and that potentially affected pipelines and underground utilities are properly marked. With these safeguards in place, accidental damage to the utilities is not likely and disruption of service is not expected; therefore, impacts on utilities are not expected. However, it is possible that not all of the locations of local utility lines are known by the local communities or counties. If utility lines are accidentally damaged, disruption to service could result. The Applicant would be required to repair damaged utilities to allow the provider to restore service. In the event of a disruption, impacts on local residents would be temporary and major.

Before initiating crossings under overhead electrical transmission lines, the Applicant would consult with the owners or operators to ensure that all appropriate safety measures have been implemented. These measures would address aspects of construction such as the distance from the lines, the equipment used, and the methods of moving pipe segments. Implementation of these measures would avoid disruption of service, damage to the utilities, and worker injuries. With these measures in place, impacts on and from overhead electrical transmission lines are expected to be temporary and, at most, negligible.

Because the Bemidji Regional Airport is within 20,000 feet of the RA-07 route, the Applicant may be required to notify the FAA of the planned construction (Section 6.2.5.1.1). If notification is required, the Applicant would then be required to comply with FAA regulations for construction of facilities near airports; as a result, no impacts on the Bemidji Regional Airport are expected due to construction of RA-07.

Emergency Services

Multiple law enforcement agencies and fire departments are present in each county crossed by RA-07. Impacts on emergency services for the route alternatives would be similar to those described for the Applicant's preferred route, including an increased need for police services to assist with traffic control at road crossings and to provide help or consultation regarding security, as well as a general increased need for police services because of the increased population from the construction workforce. For emergency services, such as fire and medical, impacts would be associated with an increased need due to the increase in overall population from the workforce in addition to potential injuries or accidents from construction. The number of emergency services departments in each county crossed by RA-07 appear to be sufficient to absorb the potential increased need for their services (Table 6.2.5-9). Overall, the temporary influx of workers during construction of RA-07 would result in a temporary and minor impact on emergency services in the ROI.

Operations Impacts

Roads and Highways

Maintenance activities would primarily consist of routine vegetation maintenance along the permanent right-of-way of RA-07. Maintenance equipment and vehicles may briefly use local roads for access and egress to and from the right-of-way; this would have little effect on traffic and would therefore not affect traffic.

During operation, the Applicant would implement its Integrity Management Program, which may require excavation to repair or replace segments of pipe at roadway crossings. In some cases, it could require removal of pipe that was installed under roadways crossed using the guided bore or HDD method. The impacts of those activities would be similar to those of constructing the crossings, and the Applicant would restore the roadways to their original condition. Therefore, impacts on roads and highways as a result of these maintenance activities for RA-07 would be temporary and negligible but would occur periodically over the life of the Project.

Railroads, Utilities, and Airports

No impacts on railroads would be expected during operation and maintenance of the pipeline. If a segment of pipe under the rail bed needs to be repaired or replaced it would be accomplished by excavating a pit to remove the pipe that was installed using the guided bore or HDD method and would not affect operation of the railroad.

If integrity digs are required along the route, the Applicant would consult with utility companies and use the Minnesota GSOC system to ensure that all adjacent pipelines and underground utilities are properly marked. As for construction of the pipeline, disruption of service is not expected, and no impact on utilities during maintenance is expected. However, if an unmarked utility line is damaged during maintenance excavations, the Applicant would repair the damage and to allow the provider to restore service. In the event of a disruption, the impact on local users of the utility would be temporary and major.

Operation of the RA-07 pipeline would not affect the Bemidji Regional Airport.

Emergency Services

Operation would require a small number of new hires since the pipeline system could be operated and maintained primarily by the existing staff that operates and maintains the Line 3 pipeline. Therefore, there would not be a measurable impact on emergency services.

Impacts on emergency services in the event of an accidental release of crude oil are addressed in Chapter 10.

Route Alternative RA-08

Construction Impacts

Roads and Highways

Between Clearbrook and Carlton, RA-08 would require 162 road and highway crossings. Similar to construction of the Applicant's preferred route, paved roads would be crossed using the guided bore method, resulting in no road closures. Although presence of the construction crews and vehicles in the areas adjacent to the crossings may cause some drivers to reduce their speed, the resultant impacts on transportation on paved roads due to pipeline crossings would be temporary and negligible.

Construction across unpaved roads would require temporary road closures since they would be crossed using the open-cut method, similar to construction of the main portion of the route across land. Where open-cut methods are used, crossings would typically be completed in 1 day. With the Applicant-proposed measures of detours, warnings, traffic control, and safety signs, impacts on local traffic patterns would be minimized. Because most unpaved roads along RA-08 are in rural areas, detours and

delays during temporary closures could result in longer driving times, causing a temporary minor impact on road users. Impacts on local access from road closures along RA-08 are addressed in Section 6.2.4.3.

Traffic along roads within the ROI may also be affected by the increased traffic volume from construction workers and construction equipment vehicles. Construction of RA-08 would most likely be conducted along four construction spreads between Clearbrook and Carlton. Similar to construction of the Applicant's preferred route, there could be a maximum of approximately 590 daily vehicle trips per construction spread during peak construction. Most workers would use major roadways to travel to and from the construction area, as well as some county and local roads to access the right-of-way. However, not all roads crossed by the route would be used as access points for workers. For major roads crossed by the route, AADT ranges from 295 to 16,400 vehicle per day (Table 6.2.5-10). Since workers would be distributed among individual construction spreads, it is unlikely that any single road would be subject to an increase of 590 trips at a given time. For roads with low traffic counts, users may notice the increase in the number of vehicles; however, the impact on traffic is likely to be temporary and minor.

During construction of the four pump stations that would be needed for RA-08, approximately 81 to 86 vehicle trips per day would be added to roads and highways used for access. Since the locations of pump stations have not been determined for RA-08, the impacts on local traffic during construction of the four pump stations cannot be quantitatively assessed. However, it is anticipated that most roads could accommodate the increase of 86 total vehicle trips per day without causing substantial impacts on traffic. As noted above for the Applicant's preferred route, the typical base saturation flow rate (or maximum capacity) for a highway is 1,900 cars per hour per lane (TRB 2000). Even if the 81 to 86 vehicle trips were to occur in the same peak hour, which is not likely, this would only represent a small percentage of the capacity of most roadways along the route. Therefore, impacts on traffic during construction of pump stations for RA-08 are expected to be temporary and minor.

Construction may cause deterioration of road surfaces from the increased worker vehicle traffic and construction vehicles with heavy loads. Construction vehicles also could track dirt and debris onto the road surface. The Applicant would implement measures to minimize debris tracking, including requiring contractors to remove the debris within 24 hours. The Applicant also committed to restoring all road surfaces to preexisting conditions. Therefore, the impact on road surfaces due to construction of RA-08 would be temporary and minor.

Railroads, Utilities, and Airports

Between Clearbrook and Carlton, RA-08 would require five railroad crossings. All active railroads would be crossed using either the guided bore or HDD method. As noted above, both methods require an excavated pit on each side of the crossing; the crossings would be bored or drilled under the rail bed from one pit to the other. The use of either method would result in no impacts on the railroad or its uses.

RA-08 would require constructing 41 pipeline crossings, 36 electrical transmission line crossings, and other local utility crossings. The Applicant would consult with all underground utility companies prior to construction and use the GSOC system prior to excavation to ensure that utility owners or operators are informed of the planned construction and that potentially affected pipelines and underground utilities are properly marked. With these safeguards in place, accidental damage to the utilities is not likely and disruption of service is not expected; therefore, impacts on utilities are not expected. However, it is possible that not all of the locations of local utility lines are known by the local communities or counties. If utility lines are accidentally damaged, disruption to service could result. The Applicant would be

required to repair damaged utilities to allow the provider to restore service. In the event of a disruption, impacts on local residents would be temporary and major.

Before initiating crossings under overhead electrical transmission lines, the Applicant would consult with the owners or operators to ensure that all appropriate safety measures have been implemented. These measures would address aspects of construction such as the distance from the lines, the equipment used, and the methods of moving pipe segments. Implementation of these measures would avoid disruption of service, damage to the utilities, and worker injuries. With these measures in place, impacts on and from overhead electrical transmission lines are expected to be temporary and, at most, negligible.

Because the Bemidji Regional Airport is within 20,000 feet of the RA-08 route, the Applicant may be required to notify the FAA of the planned construction (Section 6.2.5.1.1). If notification is required, the Applicant would then be required to comply with FAA regulations for construction of facilities near airports; as a result, no impacts on the Bemidji Regional Airport are expected due to construction of RA-08.

Emergency Services

Multiple law enforcement agencies and fire departments are present in each county crossed by RA-08. Impacts on emergency services for the route alternatives would be similar to those described for the Applicant's preferred route, including an increased need for police services to assist with traffic control at road crossings and to provide help or consultation regarding security, as well as a general increased need for police services because of the increased population from the construction workforce. For emergency services, such as fire and medical, impacts would be associated with an increased need due to the increase in overall population from the workforce in addition to potential injuries or accidents from construction. The number of emergency services departments in each county crossed by RA-08 appear to be sufficient to absorb the potential increased need for their services (Table 6.2.5-11). Overall, the temporary influx of workers during construction of RA-08 would result in a temporary and minor impact on emergency services in the ROI.

Operations Impacts

Roads and Highways

Maintenance activities would primarily consist of routine vegetation maintenance along the permanent right-of-way of RA-08. Maintenance equipment and vehicles may briefly use local roads for access and egress to and from the right-of-way; this would have little effect on traffic and would therefore not affect traffic.

During operation, the Applicant would implement its Integrity Management Program, which may require excavation to repair or replace segments of pipe at roadway crossings. In some cases, it could require removal of pipe that was installed under roadways crossed using the guided bore or HDD method. The impacts of those activities would be similar to those of constructing the crossings, and the Applicant would restore the roadways to their original condition. Therefore, impacts on roads and highways as a result of these maintenance activities for RA-08 would be temporary and negligible but would occur periodically over the life of the Project.

Railroads, Utilities, and Airports

No impacts on railroads would be expected during operation and maintenance of the pipeline. If a segment of pipe under the rail bed needs to be repaired or replaced it would be accomplished by excavating a pit to remove the pipe that was installed using the guided bore or HDD method and would not affect operation of the railroad.

If integrity digs are required along the route, the Applicant would to consult with utility companies and use the Minnesota GSOC system to ensure that all adjacent pipelines and underground utilities are properly marked. As for construction of the pipeline, disruption of service is not expected, and no impact on utilities during maintenance is expected. However, if an unmarked utility line is damaged during maintenance excavations, the Applicant would repair the damage and to allow the provider to restore service. In the event of a disruption, the impact on local users of the utility would be temporary and major.

Operation of the Project would not affect the Bemidji Regional Airport.

Emergency Services

Operation would require a small number of new hires since the pipeline system could be operated and maintained primarily by the existing staff that operates and maintains the Line 3 pipeline. Therefore, there would not be a measurable impact on emergency services.

Impacts on emergency services in the event of an accidental release of crude oil are addressed in Chapter 10.

6.2.5.4 Summary and Mitigation

6.2.5.4.1 Summary

Table 6.5.2-12 summarizes the potential construction- and operations-related impacts on transportation and public services for the Applicant's preferred route and route alternatives. The types of impacts on transportation would be comparable across route options; the primary differences are the number of crossings (i.e., of roads, railroads, and utilities) for each route option.

Construction Impacts

Roads and Highways

Although impacts on individual unpaved roads are expected to be temporary and minor, the number of roads affected would be different among the route options. RA-03AM would affect the most roads (a total of 329, with some of those paved), followed by RA-07 (185 total road crossings), the Applicant's preferred route and RA-08 (164 and 162 total crossings, respectively), and RA-06 (112 total crossings). In addition, traffic impacts would occur along an additional area for RA-03AM because it would require five construction work spreads between Clearbrook and Carlton compared to four spreads for the other alternatives.

Railroads, Utilities, and Airports

All railroads would be crossed using either the guided bore or HDD method. The use of either method would result in no impacts on railroad bed or rail traffic.

Although impacts on utilities are not expected, the more utilities crossed, the greater the potential for accidental damage. RA-03AM would cross the most utilities (106), followed by RA-07 (85), RA-08 (77), the Applicant's preferred route (67), and RA-06 (51).

Emergency Services

Overall, the temporary influx of workers during construction would result in temporary and minor impacts on emergency services in the ROI for all route options, although the increase in service needs may be slightly higher for RA-03AM, with about 3,000 workers along the route compared to the 2,400 workers for the other route options.

Operations Impacts

Roads and Highways

The number of roads affected by construction would be different among the route options, with RA-03AM having the most road crossings and RA-06 the least.

Railroads, Utilities, and Airports

No impacts on railroads, utilities or airports would be expected during operation and maintenance, regardless of route.

Emergency Services

Emergency services would not be affected, regardless of route.

6.2.5.4.2 Mitigation

The following mitigation measures could be implemented by the Applicant to minimize impacts on transportation:

- Where temporary road closures are required to construct a road crossing, maintain at least one open lane during peak-traffic periods; and
- If roadway congestion occurs on roadways used to access the sites of pump stations or to access the work sites of the pipeline route, provide traffic control by police or sheriff departments.

Table 6.2.5-12. Summary of Potential Impacts on Transportation and Public Services for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Road closures, increased traffic, and road damage caused by construction	Temporary/minor impacts • 164 road crossings • 4 construction spreads	Temporary/minor impacts • 329 road crossings • 5 construction spreads	Temporary/minor impacts • 112 road crossings • 4 construction spreads	Temporary/minor impacts • 185 road crossings • 4 construction spreads	Temporary/minor impacts • 162 road crossings • 4 construction spreads
Disruption of rail or airport travel during construction Disruption of utility service during construction	Temporary/negligible to major impacts • 25 pipeline crossings Temporary/negligible impacts • 42 transmission line crossings Temporary/negligible impacts • 1 airport within 20,000 feet	Temporary/negligible to major impacts • 47 pipeline crossings Temporary/negligible impacts • 59 transmission line crossings	Temporary/negligible to major impacts • 29 pipeline crossings Temporary/negligible impacts • 22 transmission line crossings	Temporary/negligible to major impacts • 42 pipeline crossings, Temporary/negligible impacts • 43 transmission line crossings Temporary/negligible impacts • 1 airport within 20,000 feet	Temporary/negligible to major impacts • 41 pipeline crossings Temporary/negligible impacts • 36 transmission line crossings Temporary/negligible impacts • 1 airport within 20,000 feet
Increased need for emergency services (police, fire, and hospitals) during construction	Temporary/minor impacts	Temporary/minor impacts	Temporary/minor impacts	Temporary/minor impacts	Temporary/minor impacts
Operations Impacts					
Roads and highways	Temporary/negligible impacts	Temporary/negligible impacts	Temporary/negligible impacts	Temporary/negligible impacts	Temporary/negligible impacts
Utilities	No impact	No impact	No impact	No impact	No impact
Railroads and airports	No impact	No impact	No impact	No impact	No impacts
Impacts on emergency services (police, fire, and hospitals)	Permanent/negligible impacts	Permanent/negligible impacts	Permanent/negligible impacts	Permanent/negligible impacts	Permanent/negligible impacts

6.2.5.5 References

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6.3 NATURAL RESOURCES

Project actions have the potential to affect the natural environment. This section describes the existing conditions for the Applicant's preferred route and the route alternatives, and assesses their potential impacts on water resources, geology and soils, flora and fauna, and air quality.

6.3.1 Water Resources

This section describes water resources, including groundwater, surface water, wetlands, and floodplains, located along the Applicant's preferred route and route alternatives in Minnesota. The analysis focuses on major groundwater aquifers and wells; surface waterbodies, including streams, rivers, and lakes, and their designations; publically available wetland data, public waters wetlands; wild rice lakes; calcareous fens; wetland reserve programs; and floodplains designated by FEMA. The potential impacts of pipeline construction and operation are described, and comparisons are provided between the Applicant's preferred route and the four route alternatives (RA-03AM, RA-06, RA-07, and RA-08) between Clearbrook and Carlton.

6.3.1.1 Groundwater

Groundwater resources are relied on as sources for drinking water, irrigation, and industrial use (USGS 1992). Groundwater can be sourced from shallow surficial aquifers or from deeper confined aquifers. Activities that reduce the quantity of available water or introduce contaminants into these aquifers can affect groundwater resources and the people and industries that rely on them. The analysis of potential impacts on groundwater resources during construction of the Applicant's preferred route and route alternatives considered the following:

- Changes in groundwater availability (from withdrawals for hydrostatic testing and other construction activities including "French drain" effects of the pipeline);
- Increases in total suspended solid (TSS) concentrations during trenching and excavation activities in shallow aquifers;
- Degradation of shallow groundwater quality from blasting, spills, or contamination;
- Degradation of groundwater quality in potable supply wells, sole source aquifers, or other designated groundwater protection areas; and
- Degradation of water quality from drilling mud releases during HDD crossings.

Potential operations-related impacts on groundwater addressed in this section include:

- The potential for groundwater availability changes due to repair and maintenance activities and the risk of French drain effects; and
- Contamination resulting from small fuel and lubricant leaks and spills from maintenance and inspection vehicles.

This section first describes the existing conditions for groundwater resources within an area along the Applicant's preferred route and each of the route alternatives where groundwater could be affected by construction and operation activities. The potential impacts on groundwater resources from construction and operation of the Applicant's preferred route are considered next. Potential impacts on groundwater resources for each route alternative are assessed and then compared to each other and to

the Applicant's preferred route between Clearbrook and Carlton as the impacts from North Dakota to Clearbrook and from Carlton to Wisconsin will be the same for all route alternatives. A summary and comparison of the impacts for the five route options (the Applicant's preferred route, RA-03AM, RA-06, RA-07, and RA-08) are included at the end of the section. Chapter 10 addresses the impacts on groundwater resources resulting from an unanticipated release of crude oil.

6.3.1.1.1 Regulatory Context and Methodology

Regulatory Context

A number of regulatory programs in Minnesota control activities with the potential to affect the quantity or quality of groundwater resources. These programs and their relevance to the construction and operation of a pipeline are summarized in Table 6.3.1.1-1. They also are described in greater detail below.

Table 6.3.1.1-1. Minnesota Regulatory Requirements for Protection of Groundwater

Unit of Government	Type of Application	Reason Required
Minnesota Department of Natural Resources	Water Appropriation Permit for withdrawals exceeding 10,000 gpd or 1 million gallons/year	Authorizes withdrawal and use of groundwater from private or municipal wells for hydrostatic testing, dust control, horizontal directional drilling, and trench dewatering.
	Calcareous Fen Management Plans	Impacts on calcareous fens are managed by the Minnesota Department of Natural Resources under approved calcareous fen management plans.[a]
Minnesota Department of Health	Drinking water supply management area – wellhead protection area consultation	Ensures that pipeline construction and operation are compatible with goals of relevant drinking water supply management area and wellhead protection area plans.
Minnesota Pollution Control Agency	National Pollutant Discharge Elimination System/State Disposal System Permit 401 Certification for 404 USACE permit	Groundwater discharge/construction dewatering to groundwater interface

Sources: Minnesota DNR 2017a; MDH 2014; Minnesota PCA n.d.[a].

[a] Calcareous fens are discussed in Wetlands, Section 5.2.1.3.

gpd = gallons per day, USACE = U.S. Army Corps of Engineers

Minnesota Statutes Chapter 103G addresses management of groundwater quantity and groundwater withdrawals. Based on this authority, Minnesota DNR requires all water users withdrawing more than 10,000 gallons per day or 1 million gallons per year to apply for a Water Appropriations Permit. In its review of applications and issuance of permits, Minnesota DNR may consider the potential impact of the proposed withdrawal on the quantity of local groundwater resources and on unique ecosystems, like fens, which are sensitive to even minor changes in local hydrology.[5] In the case of pipeline projects like the Line 3 Project, Water Appropriations Permits are necessary because large volumes of water are

[5] Minnesota Administrative Rules Part 6115.0670.

needed for hydrostatic testing of the pipeline (see Section 2.7.1.13 for a description of hydrostatic testing).

Minnesota Statutes Chapter 103H addresses groundwater quality by establishing that the goal of the state is to maintain groundwater in its natural condition, free from any degradation caused by human activities. Minnesota Administrative Rules Part 7850.0221 establishes the water quality standards for domestic consumption, which are applicable to all groundwater resources in the state. The Minnesota Pollution Control Agency (Minnesota PCA) monitors groundwater quality; the agency has various programs in place to prevent pollution of groundwater and to remediate where groundwater has been contaminated. In addition, the Minnesota Department of Health (MDH) has authority under Minnesota Statutes § 103I, Subdivision 5, and Minnesota Administrative Rules Parts 4720.5100 to 4720.5590 to implement wellhead protection programs. These programs prevent contamination of public and non-public community water supply wells by effectively managing potential contaminant sources in the areas that contribute water to the public water supply well (wellhead protection areas). Drinking water supply management areas (DWSMAs) are delineated around these wellhead protection areas. Within a DWSMA, the water-supply provider conducts an inventory of potential contamination sources and develops management practices and monitoring strategies to mitigate well contamination. MDH consults with other agencies during environmental review and permitting of activities in these wellhead protection areas to ensure that risks are considered and minimized during environmental review and are managed through permit conditions.

Methodology

The ROI for groundwater analysis consists of the pipeline corridor and a 1,000-foot buffer on either side of the centerline of the Applicant's preferred route and route alternatives. Operations impacts for the Applicant's preferred route were estimated based on the footprint for the permanent right-of-way provided by the Applicant. Operations impacts for the route alternatives were estimated by overlaying a standardized 50-foot-wide permanent right-of-way centered on the route.

Impacts on groundwater resources were identified based on common pipeline construction methods; peer-reviewed literature; agency documents, including permit requirements and guidance manuals; Applicant-submitted documents, including the November 2016 EAW and associated construction BMP plans (Enbridge 2016a); and the experience and professional judgment of the hydrogeologists involved in developing this analysis.

Identification of groundwater resources potentially affected by the Project was completed by reviewing reports and data from USGS, Minnesota Geological Survey (MGS), Minnesota DNR, Minnesota PCA, MDH, Minnesota Department of Agriculture (Minnesota DA), and the U.S. Environmental Protection Agency (EPA). MDH, Minnesota DNR, and Minnesota PCA provided data and guidance for these analyses.

Impacts related to groundwater resources were evaluated by overlaying the ROI for the Applicant's preferred route and the route alternatives with the following Minnesota data sources:

- Aquifer locations and type, including sole source aquifers;
- Wellhead protection areas;[6] and
- Domestic and public water supply wells.

  A Public Water Supply (PWS) in Minnesota by definition must serve 25 or more people for at least 60 days of the year as defined by the Federal Safe Drinking Water Act. PWSs are broken down into community and noncommunity:

  - Community PWS (Municipal and Non-Municipal). Provides water to the public in their primary living space—where people live and sleep—(e.g., homes, apartments, nursing homes, prisons, mobile home parks).
  - Noncommunity PWS. Provides water to the public in places other than their homes—where people work, gather, and play.

    Two types are:

    - Transient Noncomm PWS. Facilities that serve at least 25 people at least 60 days of the year, but do not serve the same 25 people over 6 months of the year (e.g., restaurants, campgrounds, hotels, and churches).
    - Nontransient Noncomm PWS. Facilities that serve at least 25 of the same people over 6 months of the year (e.g., schools, offices, factories, and daycare centers).
- Minnesota DA's Water Table Aquifer Vulnerability.
- Minnesota DNR's Watershed Health Assessment Framework (WHAF) groundwater contamination susceptibility index.
- Minnesota PCA's and Minnesota DA's "What's in My Neighborhood?" (WIMN) databases and EPA's Facility Registry Service (EPA-listed contaminated sites).
- DWSMAs.[7]
- Minnesota DNR's Minnesota pollution sensitivity of near-surface materials.
- Minnesota DNR's Minnesota pollution sensitivity of bedrock surface.

6.3.1.1.2 Existing Conditions

The following discussion details the existing groundwater conditions in the vicinity of the Applicant's preferred route and the route alternatives, including aquifer types, characteristics of the materials that make up the aquifers, water yield, and water quality.

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[6] A wellhead protection area is the surface and subsurface area surrounding a public water supply well or well-field that is regulated to prevent contamination; any potential contaminants are likely to move toward this area and reach the well or well-field capture zone.

[7] A DWSMAs is the surface and subsurface area surrounding a public water supply well that is approved by MDH and completely contains the scientifically calculated wellhead protection area; these areas are managed by the entity identified in a Wellhead Protection Plan.

Aquifers are underground layers of permeable rock, sediment, or soil that yield usable amounts of water. Two types of aquifers provide water: unconfined and confined aquifers. When the top of the aquifer is not overlain by impermeable layers that restrict the vertical movement of water, the aquifer is unconfined. The upper surface of groundwater in this type of aquifer is referred to as the "water table." When there is a layer of low-permeability material between the top of the aquifer and overlying sediments, that restricts vertical movement of water, the aquifer is confined. The low-permeability layers are called confining units, or aquitards, and are mainly composed of silt and clay. Confined and unconfined aquifers occur beneath the Applicant's preferred route and the route alternatives.

Confined and unconfined aquifers occur in both glacial and bedrock materials. Glacial aquifers consist of unconsolidated sediments deposited and reworked by glaciers that range in depth from just below to several hundred feet below the land surface. Bedrock aquifers underlie the glacial materials and consist of deeper consolidated bedrock layers such as limestone or sandstone.

Applicant's Preferred Route

Glacial Aquifers

A general description of glacial aquifers as well as those crossed by the Applicant's preferred route is included in Section 5.2.1.1.2.

Bedrock Aquifers

There are generally two types of bedrock aquifers that occur beneath the surficial glacial-type aquifers along the Applicant's preferred route. The first type are aquifers that consist of hard and very old igneous and metamorphic rocks, where groundwater occurs mostly in fractures that may not yield usable quantities of water.

The second type of bedrock aquifer consists of thick, laterally extensive sequences of sandstone, limestone, and dolostone of sedimentary origin. This type of bedrock aquifer tends to be more productive than the first type. Similar to confined glacial aquifers, the majority of this type of bedrock aquifer often is isolated from overlying surficial aquifers by confining units, which decreases it vulnerability to contamination from land surface activities. The exception to this is karst aquifers, which are vulnerable to contamination. A karst aquifer is a type of bedrock aquifer that usually consists of limestone but can consist of dolostone or sandstone. Aquifers composed of these pH basic rock types are prone to chemical weathering and dissolution from the slight acidity of precipitation and groundwater, which can result in the formation of fractures, joints, sinkholes, cavities, caves, and void spaces that allow movement of large volumes of surface water into and through the aquifer. These aquifers often are the source of abundant springs and seeps. These characteristics also allow contamination to spread rapidly within the aquifer. Karst aquifers are susceptible to collapse of the aquifer matrix, which can be triggered by construction activities on the land surface and can lead to formation of sinkholes in unconsolidated sediments that overlie the bedrock. Paleozoic limestones and some Precambrian sandstones found in southeastern and eastern Minnesota are susceptible to dissolution and result in karst topography. Bedrock in these areas is often less than 50 feet deep and is considered vulnerable to contamination (Minnesota DNR 2016). No karst aquifers are believed to be present along the Applicant's preferred route.

With the exception of shallow bedrock (either igneous/metamorphic or sedimentary, which is not common along the Applicant's preferred route) and karst bedrock, bedrock aquifers are not expected to be affected by pipeline construction and operation because they exist at depths averaging from 300 to

400 feet, which is well below pipeline construction depths. These deeper bedrock aquifers often are overlain by thick confining layers, which protect them from disturbance by human activities on the land surface. There are a few areas in Carlton and Pine counties where Precambrian fractured bedrock depth is less than 50 feet and therefore these aquifers are more susceptible to pipeline construction and operation. The bedrock aquifers crossed by the Applicant's preferred route are listed in Table 5.2.1.1-2.

Sole Source Aquifers

A sole source aquifer is an underground water supply designated by the EPA as the "sole or principal source" of drinking water for an area. The Applicant's preferred route would not cross any aquifers designated by EPA as sole source aquifers.

Domestic Wells, Public Wells, Wellhead Protection Areas, and DWSMAs

Domestic (private) drinking water wells and their sensitivity were identified within an established 1,000-foot-wide buffer of the centerline for the Applicant's preferred route (Table 6.3.1.1-2.) The method of determining low, moderate, high, or very high geologic sensitivity for a well considers the thickness of fine-grained geologic material (clay or shale) overlying an aquifer that is penetrated by a well. Hydrogeologic sensitivity is a qualitative measure of the ability of near-surface materials to transmit contaminants vertically to the water table and is ranked as follows by MDH:

- Low – fine-grained materials such as clays and clay-silt mixtures;
- Moderate – clay-silt-sand mixtures, sandy or silty tills, and colluvium;
- High – sands and sandy mixtures; and
- Very high – gravels or coarse sands mixed with gravel.

From Clearbrook to Carlton, 164 domestic supply wells are within the within the ROI for the Applicant's preferred route, and 42 of these wells have a high or very high geological sensitivity rating. Two unverified and three verified locations for public supply/non community transient wells are located in the ROI for the Applicant's preferred route. Two public supply wellhead protection areas are located in the ROI, and have different geological sensitivity ratings (Table 6.3.1.1-2 and Figure 6.3.1.1-1). None of the wells are located within the construction work area or permanent right-of-way.

From Clearbrook to Carlton, the Applicant's preferred route would cross 0.6 acre of wellhead protection areas and 172 acres of DWSMAs (Table 6.3.1.1-2 and Figure 6.3.1.1-2).

Minnesota Water Table Aquifer Vulnerability, Groundwater Contamination Susceptibility, and Pollution Sensitivity of Near-Surface Materials

Water table aquifers are most vulnerable to contamination because they lack confining layers and directly interact with the land surface. Minnesota ranks water table aquifer vulnerability based on the overlapping time of water travel from the landsurface to groundwater. The vulnerability of the aquifer is inversely proportional to the time of travel. In areas of higher sensitivity, contaminants may reach the groundwater within hours to months; in areas of lower sensitivity, surface contamination may take months to years to travel into groundwater.

Table 6.3.1.1-2. Wells, Wellhead Protection Areas, and Drinking Water Supply Management Areas Crossed by the Applicant's Preferred Route

Segment	Domestic Wells and Sensitivity (number)					Wellhead Protection Areas and Sensitivity (number)					Wellhead Protection Area (acres)	DWSMA (acres)
	Low	Moderate	High	Very High	Total	Low	Moderate	High	Very High	Total	Low	Moderate
North Dakota-Minnesota border to Clearbrook (for APR and all route alternatives)	12	1	1	--	North Dakota-Minnesota border to Clearbrook	12	1	1	--	North Dakota-Minnesota border to Clearbrook	12	1
Clearbrook to Carlton (APR only)	87	35	25	17	Clearbrook to Carlton	87	35	25	17	Clearbrook to Carlton	87	35
Carlton to Minnesota-Wisconsin border (for APR and all route alternatives)	16	1	3	1	Carlton to Minnesota-Wisconsin border	16	1	3	1	Carlton to Minnesota-Wisconsin border	16	1
TOTAL	**115**	**37**	**29**	**18**	**TOTAL**	**115**	**37**	**29**	**18**	**TOTAL**	**115**	**37**

Sources: MDH n.d. 2014, 2016.

Notes:

Number of wells and acres of wellhead protection areas and drinking water supply management areas (DWSMAs) within a 1,000-foot buffer on either side of the route centerline.

APR = Applicant's preferred route.

"--" = no occurrence.

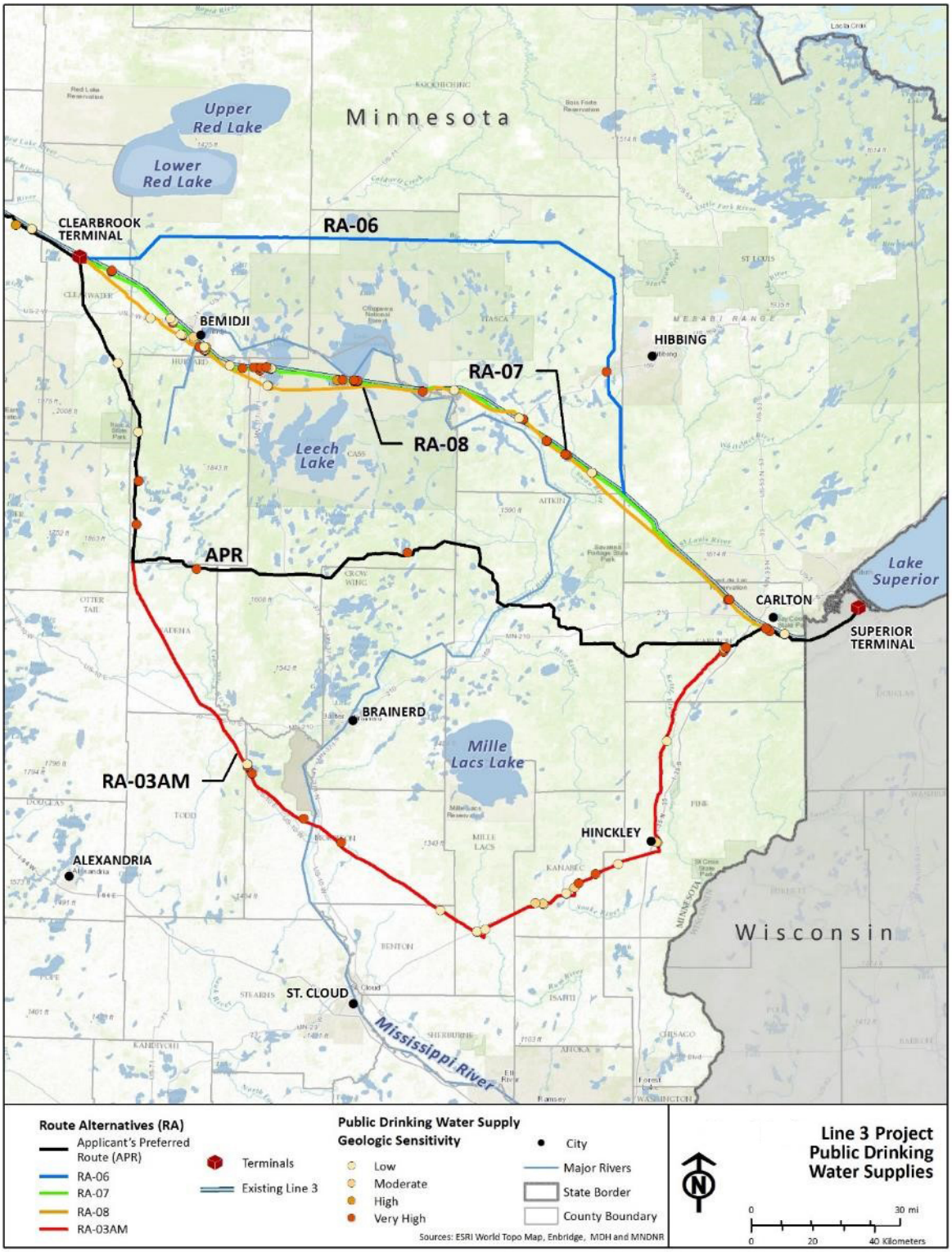

Figure 6.3.1.1-1. Public Wells in the Region of Interest for the Applicant's Preferred Route and Route Alternatives

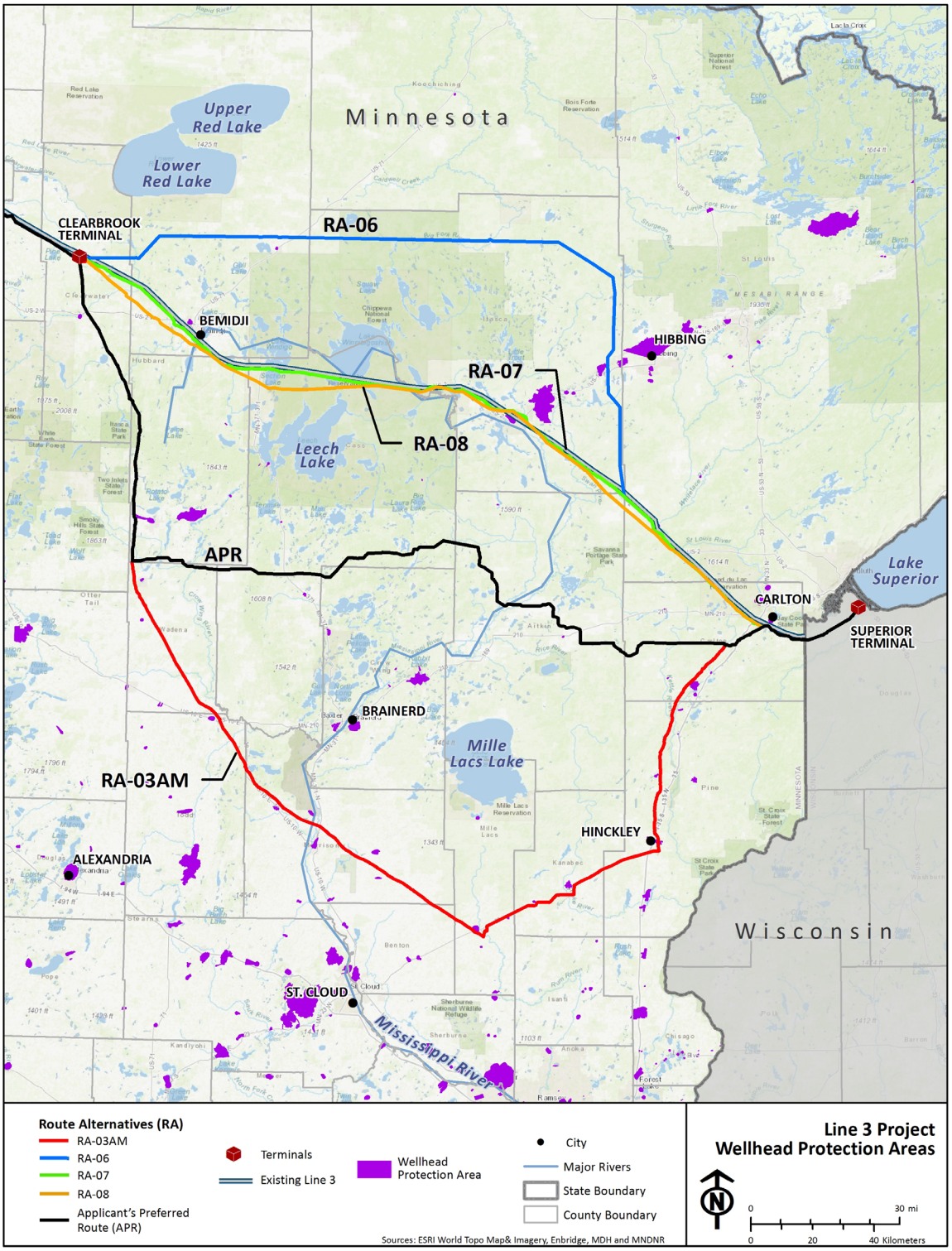

Figure 6.3.1.1-2. Wellhead Protection Areas near the Applicant's Preferred Route and Route Alternatives

Minnesota also evaluates the vulnerability of groundwater based on the shape, type, and relative position of surface and subsurface geology (i.e., the geomorphic setting), which controls the flow paths of water and dissolved elements above and below the surface. Sandiness, permeability, depth to rock outcrops, fracturing and permeability of bedrock, flow-restricting layers, and surface and subsurface connections all affect how vulnerable groundwater is to contamination. Areas of highest ground water contamination susceptibility are in central, north-central, and east-central Minnesota and the southeastern corner of the state, in areas dominated by sand and gravel aquifers or in areas with karstic bedrock. Additionally, Minnesota DNR classifies the sensitivity to pollution of near-surface materials, which is an estimate of the time it takes for water to travel through the unsaturated zone to reach the water table, which is assumed to be 10 feet below land surface. Transmission rates are based on soil type and the texture of surficial geologic units. Generally, areas of coarse-grained material are modeled as higher sensitivity to pollution compared to areas of fine-grained material. As with water table aquifer vulnerability rankings, transmission time in areas of high pollution sensitivity may be hours to months; in areas of low pollution sensitivity, transmission time may be months to years.

There is one area in Carlton County with shallow Precambrian bedrock that is fractured and used for domestic well supply. Minnesota DNR (2016, Minnesota Hydrogeology Atlas series HG-01) has classified the pollution sensitivity of the bedrock surface of parts of Minnesota and this includes these aquifers. The pollution sensitivity of the bedrock surface characterizes the relative rate of vertical travel time of a contaminant that moves conservatively with or within water from the land surface to the buried bedrock surface. The classification includes very high, high, moderate, low, and very low sensitivity. The Applicant's preferred route crosses 753 acres of high vulnerability bedrock surface and 947 acres of very high vulnerability bedrock surfaces in Carlton County.

From North Dakota to Carlton, the Applicant's preferred route would cross 25,751 acres of high vulnerability water table aquifers, 26,382 acres of high groundwater contamination susceptibility, 16,290 acres of high pollution sensitivity, and 1,700 acres of high to very high sensitivity Precambrian bedrock aquifers (Table 6.3.1.1-3). No karst topography would be crossed by the Applicant's preferred route within the ROI from Clearbrook to Carlton.

Table 6.3.1.1-3. Groundwater Sensitivity beneath the Applicant's Preferred Route (acres)

Segment	High Water Table Aquifer Vulnerability	High Groundwater Contamination Susceptibility	High Pollution Sensitivity	Precambrian Bedrock Aquifers with High to Very High Sensitivity
North Dakota-Minnesota border to Clearbrook	7,026.8	--	637.6	--
Clearbrook to Carlton	18,215.1	26,381.5	15,474.9	1,700
Carlton to Minnesota-Wisconsin border	508.7	--	177.9	
TOTAL	**25,750.6**	**26,381.5**	**16,290.4**	**1,700**

Sources: Minnesota DA 2015; Minnesota DNR 2016, 2017b.

Note:

Acres are within a 1,000-foot buffer on either side of the route centerline.

"--" = no occurrence.

Contaminated Sites

Between Clearbrook and Carlton, four EPA-listed contaminated sites and 62 WIMN sites are within the ROI for the Applicant's preferred route (Table 6.3.1.1-4).

Table 6.3.1.1-4. Contaminated Sites within the Region of Interest for the Applicant's Preferred Route

Segment	Minnesota PCA "What's in My Neighborhood" Sites	Minnesota DA "What's in My Neighborhood" Sites[a]
North Dakota-Minnesota border to Clearbrook	36	9
Clearbrook to Carlton	62	4
Carlton to Minnesota-Wisconsin border	3	--
TOTAL	**101**	**13**

Source: Minnesota PCA n.d.[b].

[a] Does not include Minnesota DA contingency clean-up sites.

Note:

Sites within a 1,000-foot buffer on either side of the route centerline.

"--" = no occurrence.

Route Alternatives

Glacial Aquifers

A general description of glacial aquifers, as well as those crossed by route alternatives, is included in Section 5.2.1.1.2.

Bedrock Aquifers

The bedrock aquifers crossed by the route alternatives are listed in Table 5.2.1.1-2. In addition to these aquifers, RA-06, RA-07, and RA-08 cross the Biwabik Iron-Formation aquifer. This Precambrian-age aquifer is composed of chert and iron materials, and it generally underlies glacial materials. However, it outcrops[8] above the land surface in north-central Minnesota. The yields of this aquifer ranges from 250 to 1,000 gallons per minute (gpm). This aquifer is one of the most productive aquifers for the Mesabi Iron Range and is a primary source of drinking water for many municipalities. Dissolved solids range from 100 to 300 milligrams per liter (mg/L), and the water can contain high concentrations of iron, manganese, and silica. This aquifer is susceptible to contamination where surficial materials are thin, at outcrops, and in mine pits. Groundwater flow in this aquifer occurs as regional flow along bedding planes and large fracture networks, as localized flow in discrete fractures near wells, or as a combination of both.

Similar to the Applicant's preferred route, shallow bedrock is not common along the route alternatives. Depths of bedrock along these alignments average from 300 to 400 feet with the exception of some areas of shallow fractured Precambrian bedrock aquifers in parts of Pine and Carlton Counties. Bedrock aquifers crossed by the route alternatives include the Red River-Winnipeg aquifer, Cretaceous aquifer,

[8] An outcrop is a visible exposure of bedrock on the land surface.

Precambrian Undifferentiated aquifer, and Proterozoic aquifer. These aquifers are generally described in Section 5.2.1.1.2.

Route Alternative RA-03AM

Sole Source Aquifers

The RA-03AM route would not cross any aquifers designated by EPA as a sole source aquifer.

Domestic Wells, Public Wells, Wellhead Protection Areas, and DWSMAs

From Clearbrook to Carlton, 396 domestic supply wells are within the ROI for the RA-03AM route; 55 of these have a high or very high geological sensitivity rating. Of the 10 public supply wells, 4 have a high or very high geological sensitivity rating (Table 6.3.1.1-5 and Figure 6.3.1.1-1). Five of these domestic wells are within the construction work area, and two are within the permanent right-of-way for the RA-03AM route.

The RA-03AM route would cross 329.5 acres of wellhead protection area acres and 849 acres of DWSMAs between Clearbrook and Carlton (Table 6.3.1.1-5 and Figure 6.3.1.1-2).

Table 6.3.1.1-5. Wells, Wellhead Protection Areas, and Drinking Water Supply Management Areas Crossed by Route Alternative RA-03AM

Domestic Wells and Sensitivity (number)					Public Wellhead Protection Areas and Sensitivity (number)					Wellhead Protection Area (acres)	DWSMA (acres)
Low	Moderate	High	Very High	Total	Low	Moderate	High	Very High	Total		
242	99	24	31	396	1	2	2	--	5	329.5	849

Sources: MDH n.d. 2014, 2016.

Notes:

Number of wells and acres of wellhead protection areas and drinking water supply management areas (DWSMAs) within a 1,000-foot buffer on either side of the route centerline.

Counts for the North Dakota-Minnesota border-to-Clearbrook and the Carlton-to-Minnesota-Wisconsin border segments are the same as those presented for the Applicant's preferred route in Table 6.3.1.1-2.

"--" = no occurrence.

Minnesota Water Table Aquifer Vulnerability, Groundwater Contamination Susceptibility, and Pollution Sensitivity of Near-Surface Materials

From Clearbrook to Carlton, the RA-03AM route would cross 25,928 acres of high vulnerability water table aquifers; 25,152 acres of high groundwater contamination susceptibility; and 25,588 acres of high pollution sensitivity. The RA-03AM route also would cross 2,917 acres of karst topography and 2,547 acres of very high to high sensitivity Precambrian shallow fractured bedrock aquifers within the ROI (Table 6.3.1.1-6).

Table 6.3.1.1-6. Groundwater Sensitivity beneath Route Alternative RA-03AM (acres)

High Aquifer Vulnerability	High Groundwater Contamination Susceptibility	High Pollution Sensitivity	Karst Topography	Bedrock Aquifers with High to Very High Sensitivity
25,927.6	25,152.3	25,587.7	2,916.6	5,463.7

Sources: Minnesota DA 2015; Minnesota DNR 2016, 2017b.

Notes:

Acres within a 1,000-foot buffer on either side of the route centerline.

Acres for the North Dakota-Minnesota border-to-Clearbrook and the Carlton-to-Minnesota-Wisconsin border segments of the route are the same as those presented for the Applicant's preferred route in Table 6.3.1.1-3.

Contaminated Sites

Between Clearbrook and Carlton, 70 EPA-listed contaminated sites and 182 WIMN sites (179 Minnesota PCA and 3 Minnesota DA) are within the ROI for RA-03AM.

Route Alternative RA-06

Sole Source Aquifers

The RA-06 route would not cross any aquifers designated by EPA as a sole source aquifer.

Domestic Wells, Public Wells, Wellhead Protection Areas, and DWSMAs

From Clearbrook to Carlton, 40 domestic supply wells are within the ROI for the RA-06 route; 4 of these have a high or very high geological sensitivity rating. No public supply wells are within the RA-06 ROI (Figure 6.3.1.1-1). Three domestic wells are within the construction work area, and two are within the permanent right-of-way for the RA-06 route. The RA-06 route would cross 56 acres of wellhead protection areas and 131 acres of DWSMAs (Table 6.3.1.1-7 and Figure 6.3.1.1-2).

Table 6.3.1.1-7. Wells, Wellhead Protection Areas, and Drinking Water Supply Management Areas Crossed by Route Alternative RA-06

Domestic Wells and Sensitivity (number)					Public Wellhead Protection Area and Sensitivity (number)					Wellhead Protection Area (acres)	DWSMA (acres)
Low	Moderate	High	Very High	Total	Low	Moderate	High	Very High	Total		
33	3	1	3	40	--	--	--	1	1	55.9	130.9

Sources: MDH n.d., 2014, 2016.

Notes:

Number of wells and acres of wellhead protection areas and drinking water supply water management areas (DWSMAs) within a 1,000-foot buffer on either side of the route centerline.

Counts for the North Dakota-Minnesota border-to-Clearbrook and the Carlton-to-Minnesota-Wisconsin border segments are the same as those presented for the Applicant's preferred route in Table 6.3.1.1-2.

"--" = no occurrence.

Minnesota Water Table Aquifer Vulnerability, Groundwater Contamination Susceptibility, and Pollution Sensitivity of Near-Surface Materials

From Clearbrook to Carlton, the RA-06 route would cross 5,806 acres of high vulnerability water table aquifers; 305 acres of high groundwater contamination susceptibility, and 3,134 acres of high pollution sensitivity. The RA-06 route also would cross 512 acres of very high to high sensitivity Precambrian shallow fractured bedrock aquifers within the ROI. The RA-06 route would not cross any areas of known karst topography (Table 6.3.1.1-8).

Table 6.3.1.1-8. Groundwater Sensitivity beneath Route Alternative RA-06 (acres)

High Aquifer Vulnerability	High Groundwater Contamination Susceptibility	High Pollution Sensitivity	Bedrock Aquifers with High to Very High Sensitivity
5,806.2	304.6	3,134.0	511.5

Sources: Minnesota DA 2015; Minnesota DNR 2016, 2017b.

Notes:

Acres within a 1,000-foot buffer on either side of the route centerline.

Acres for the North Dakota-Minnesota border-to-Clearbrook and the Carlton-to-Minnesota-Wisconsin border segments of the route are the same as those presented for the Applicant's preferred route in Table 6.3.1.1-3.

Contaminated Sites

Between Clearbrook and Carlton, 13 EPA-listed contaminated sites and 72 WIMN sites (71 Minnesota PCA and 1 Minnesota DA) are within the ROI for RA-06.

Route Alternative RA-07

Sole Source Aquifers

The RA-07 route would not cross any aquifers designated by EPA as a sole source aquifer.

Domestic Wells, Public Wells, Wellhead Protection Areas, and DWSMAs

From Clearbrook to Carlton, 183 domestic supply wells are within the ROI for the RA-07 route; 19 of these have a high or very high geological sensitivity rating. Of the 23 public supply wells, 8 have a high or very high geological sensitivity rating (Figure 6.3.1.1-1). Two of these domestic wells are within the construction work area, and one is within the permanent right-of-way for the RA-07 route. The RA-07 route would cross 536 acres of wellhead protection areas and 754 acres of DWSMAs (Table 6.3.1.1-9 and Figure 6.3.1.1-2).

Table 6.3.1.1-9. Wells, Wellhead Protection Areas, and Drinking Water Supply Management Areas Crossed by Route Alternative RA-07

Domestic Wells and Sensitivity (number)					Public Wellhead Protection Areas and Sensitivity (number)					Wellhead Protection Area (acres)	DWSMA (acres)
Low	Moderate	High	Very High	Total	Low	Moderate	High	Very High	Total		
118	46	10	9	183	1	2	1	--	4	4,426	5,155

Sources: MDH n.d., 2014, 2016.

Notes:

Number of wells and acres of wellhead protection areas and drinking water supply management area (DWSMAs) within a 1,000-foot buffer on either side of the route centerline.

Counts for North Dakota-Minnesota border to Clearbrook and Carlton to Minnesota-Wisconsin border are the same as those presented for the Applicant's preferred route in Table 6.3.1.1-2.

"--" = no occurrence.

Minnesota Water Table Aquifer Vulnerability, Groundwater Contamination Susceptibility, and Pollution Sensitivity of Near-Surface Materials

From Clearbrook to Carlton, the RA-07 route would cross 21,141 acres of high vulnerability water table aquifers, 19,833 acres of high groundwater contamination susceptibility, and 15,355 acres of high pollution sensitivity. The RA-07 route also would cross 512 acres of very high to high sensitivity Precambrian shallow fractured bedrock aquifers within the ROI. The RA-07 route would not cross any areas of known karst topography (Table 6.3.1.1-10).

Table 6.3.1.1-10. Groundwater Sensitivity beneath Route Alternative RA-07 (acres)

High Aquifer Vulnerability	High Groundwater Contamination Susceptibility	High Pollution Sensitivity	Bedrock Aquifers with High to Very High Sensitivity
21,141.1	19,832.6	15,354.6	512

Sources: Minnesota DA 2015; Minnesota DNR 2016, 2017b.

Notes:

Acres within a 1,000-foot buffer on either side of the route centerline.

Acres for the North Dakota-Minnesota border-to-Clearbrook and the Carlton-to-Minnesota-Wisconsin border segments of the route are the same as those presented for the Applicant's preferred route in Table 6.3.1.1-3.

"--" = no occurrence.

Contaminated Sites

Between Clearbrook and Carlton, 92 EPA-listed contaminated sites and 120 WIMN sites (119 Minnesota PCA and 1 Minnesota DA) are within the ROI for RA-07.

Route Alternative RA-08

Sole Source Aquifers

The RA-08 route would not cross any aquifers designated by EPA as a sole source aquifer.

Domestic Wells, Public Wells, Wellhead Protection Areas, and DWSMAs

From Clearbrook to Carlton, 162 domestic supply wells are within the ROI for the RA-08 route; 11 of these have a high or very high geological sensitivity rating. There are seven public supply wells, of which six have a high or very high geological sensitivity rating (Table 6.3.1.1-11 and Figure 6.3.1.1-1). One of these domestic wells is within the construction work area, and one is within the permanent right-of-way for the RA-08 route. The RA-08 route would cross 672 acres of wellhead protection areas and 810 acres of DWSMAs (Table 6.3.1.1-11 and Figure 6.3.1.1-2).

Table 6.3.1.1-11. Wells, Wellhead Protection Areas, and Drinking Water Supply Management Areas Crossed by Route Alternative RA-08

Domestic Wells and Sensitivity (number)					Public Wellhead Protection Areas and Sensitivity (number)					Wellhead Protection Area (acres)	DWSMA (acres)
Low	Moderate	High	Very High	Total	Low	Moderate	High	Very High	Total		
105	46	5	6	162	--	1	1	--	2	672	810

Sources: MDH n.d., 2014, 2016.

Notes:

Number of wells and acres of wellhead protection areas and drinking water supply management areas (DWSMAs) within a 1,000-foot buffer on either side of the route centerline.

Counts for North Dakota-Minnesota border-to-Clearbrook and the Carlton-to-Minnesota-Wisconsin border are the same as those presented for the Applicant's preferred route in Table 6.3.1.1-2.

"--" = no occurrence.

Minnesota Water Table Aquifer Vulnerability, Groundwater Contamination Susceptibility, and Pollution Sensitivity of Near-Surface Materials

From Clearbrook to Carlton, the RA-08 route would cross 16,889 acres of high vulnerability water table aquifers, 20,012 acres of high groundwater contamination susceptibility, and 11,699 acres of high pollution sensitivity. The RA-08 route also would cross 512 acres of very high to high sensitivity Precambrian shallow fractured bedrock aquifers within the ROI. The RA-08 route would not cross any areas of known karst topography (Table 6.3.1.1-12).

Table 6.3.1.1-12. Groundwater Sensitivity Beneath Route Alternative RA-08 (acres)

High Aquifer Vulnerability	High Groundwater Contamination Susceptibility	High Pollution Sensitivity	Bedrock Aquifers with High to Very High Sensitivity
16,888.9	20,012.4	11,699.1	512

Sources: Minnesota DA 2015; Minnesota DNR 2016, 2017b.

Notes:

Acres within a 1,000-foot buffer on either side of the route centerline.

Acres for the North Dakota-Minnesota border-to-Clearbrook and the Carlton-to-Minnesota-Wisconsin border segments of the route are the same as those presented for the Applicant's preferred route in Table 6.3.1.1-3.

"--" = no occurrence.

Contaminated Sites

Between Clearbrook and Carlton, 50 EPA-listed contaminated sites and 101 WIMN sites (99 Minnesota PCA and 2 Minnesota DA) are within the ROI for RA-08.

6.3.1.1.3 Impact Assessment

This section contains the impact analysis conducted for the Applicant's preferred route and the route alternatives. The analysis assessed potential impacts on groundwater resources in the ROI for the route options, as described in Section 6.3.1.2.1, related to the following concerns:

- Changes in groundwater availability (from withdrawals for hydrostatic testing and other construction activities, including French drain effects of the pipeline);
- Increases in TSS concentrations during trenching and excavation activities in shallow aquifers;
- Degradation of shallow groundwater quality from blasting, spills, or contamination;
- Degradation of groundwater quality in potable supply wells, sole source aquifers, or other designated groundwater protection areas; and
- Degradation of water quality from drilling mud releases during HDD crossings.

Potential operations-related impacts on groundwater addressed in this section include:

- The potential for groundwater availability changes due to maintenance and repair activities and the risk of French drain effects, and
- Contamination resulting from small fuel and lubricant leaks and spills from maintenance and inspection vehicles.

Many pipeline construction activities have the potential to affect groundwater quantity and quality. These activities include water withdrawals and discharges (e.g., for hydrostatic test water), dewatering and trenching, blasting, access road construction, waterbody crossings, and fueling and use of hazardous materials. The following sections address potential impacts on groundwater from these activities for the Applicant's preferred route and route alternatives. After the discussion of construction impacts, the potential impacts of operations on groundwater resources are addressed for the Applicant's preferred route and each route alternative.

The construction and operations activities that may affect groundwater resources are the same for the Applicant's preferred route and each of the route alternatives. The impacts vary with the length of the alternatives and the groundwater resources present along each specific route.

As noted in Section 6.1, impacts have been assessed for the entire length of the Applicant's preferred route in Minnesota and for the portion of the route from Clearbrook to Carlton. Impacts have been assessed for each of the route alternatives between Clearbrook and Carlton.

Applicant's Preferred Route (in Minnesota)

Construction Impacts

Changes in Groundwater Availability from Withdrawals

The Applicant would withdraw water for construction activities such as dust control, HDD installation, and hydrostatic testing of the pipeline. Approximately 120 million gallons of water would be requested through water appropriation permits submitted to Minnesota DNR for hydrostatic testing of the 340 miles of the Applicant's preferred route in Minnesota. Approximately 78 million gallons of this total would be requested for hydrostatic testing of the 221 miles of the route in Minnesota between Clearbrook and Carlton (Enbridge 2016b). The Applicant would source water from surface water and private and public wells; the proportion of water that would be obtained from groundwater versus surface water has not been determined. As stipulated in permit requirements, the Applicant would select appropriation sites that would meet Minnesota DNR's criteria of "doing no harm," and all appropriation sites would be reviewed by Minnesota DNR prior to issuance of a water appropriation permit. These permits would require identification of, and rationale for choosing, specific water sources, requested maximum pumping rates, and maximum annual volumes of water to be used; monitoring of pumping rates during appropriation with an approved device or method; and reporting of daily, monthly, and/or yearly appropriation amounts. The rate and total volumes of water withdrawn would be measured with a flow meter and would not exceed the rate and amount specified in the permits (Appendix E).

Dewatering of the pipeline trench may be required before the pipe is lowered into it. Dewatering also may be necessary at road boring sites adjacent to wetlands, in areas where excessive volumes of groundwater flow into the trench as a result of seepage or artesian flow, or at locations where increased visibility or physical access is necessary. Trench dewatering is considered a water appropriation permit activity by Minnesota DNR and must be included in permit applications. In areas where an aquifer that is under artesian conditions is exposed by the trench, the volume of inflowing water could cause rapid flooding of the trench and the bottom or sides to become unstable. In these areas, the pipeline trench may have a French drain effect, allowing water to migrate down the trench. Soil borings would be advanced to the design depth of the pipeline in these areas to determine whether a confining layer may be breached (Enbridge 2016). To protect against subsurface water flow along the pipe after the trench is backfilled, the Applicant would install trench breakers from the bottom of the trench to near the top of the trench, completely surrounding the pipe. The trench breakers would be constructed of bags filled with rock-free subsoil or sand; and their locations would be based on field conditions, including the degree and length of slope, presence of down-slope sensitive resource areas such as wetlands and waterbodies, and proximity to other features such as roads and railroads (Appendix E). Once construction in the area is completed and the trench was backfilled, groundwater levels likely would return to preconstruction levels because shallow aquifers readily receive recharge from precipitation and surface water inflow. With adherence to water appropriation permit conditions and implementation of Applicant-proposed measures, impacts on groundwater availability from water withdrawals would be temporary and minor.

Increases in Total Suspended Solid Concentrations in Groundwater

During trenching, excavation, and backfilling, the water table in surficial aquifers would be exposed in some areas. As a result, TSS concentrations in water in the trench or excavated area could increase. The Applicant would use temporary erosion and sediment controls, including, slope breakers, sediment barriers, stormwater diversions, trench breakers, and mulch, to minimize sedimentation in water

resources during construction. The Applicant also would limit the amount of excavated open trench to a maximum of 3 days of anticipated welding production per spread, per pipe to minimize the potential for erosion and sedimentation (Appendix E). In addition, the relatively slow groundwater flow rate and fine-grained nature of glacial sediments would likely filter out TSS from infiltrating groundwater. Thus, impacts associated with increases in TSS concentrations in groundwater in aquifers near trenched and excavated areas would be temporary and minor.

Degradation of Shallow Groundwater Quality from Blasting, Spills, or Contamination

The quality of shallow groundwater may be degraded from blasting; small spills and leaks of lubricants, oil, or other hazardous chemicals used during construction; or disturbance of existing contamination. Blasting is likely to be necessary only in Carlton County, Minnesota, near the Wisconsin border where surface bedrock is present. The Applicant has identified one location at MP 354.6 where bedrock outcrops at the surface for approximately 0.3 mile; and four blasting events would be required to install the pipeline (Enbridge 2016b). This location is within the Clearbrook-to-Carlton segment of the Applicant's preferred route. Blasting has been carried out in this segment previously for installation of the existing pipelines in the Enbridge Mainline system corridor.

Where blasting would occur, rock would be removed to a depth of 7 feet, which may be above the elevation of the water table in many areas. If the water table is exposed by blasting, potential turbidity, sedimentation, or chemical contamination would be localized and likely would be diluted or attenuated before it could travel very far into the aquifer. Prior to construction, the Applicant would develop a site-specific Blasting Plan, which would include measures for transporting, storing, handling, detonating, and disposing of blasting materials to protect groundwater resources (see Section 6.3.2.1.1 for blasting regulations).

Groundwater may become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities such as fuel storage, equipment refueling, and equipment maintenance. Areas of high aquifer vulnerability, high groundwater contamination susceptibility, or high pollution sensitivity are inherently more susceptible to groundwater contamination during construction activities. To protect groundwater resources, the Applicant would store petroleum products, hazardous chemicals, and lubricating oils; conduct refueling, maintenance, and lubricating operations; and perform concrete coating activities in areas greater than 100 feet from water supply wells and would use secondary containment (Appendix E). Concrete wash water, grindings, and slurry disposal would be limited to a designated area. Rinse water, used in conjunction with a cleaning pig to remove any accumulated construction debris, dirt, and dust prior to hydrostatic testing, would be treated and disposed of or discharged in accordance with applicable National Pollutant Discharge Elimination System (NPDES) permit conditions. Excess HDD drilling mud would be disposed of offsite at an approved disposal facility. In addition to these prevention measures, the Applicant would be responsible for cleaning up small spills through procedures outlined in the Environmental Protection Plan (Appendix E), including notifying proper personnel (e.g., the onsite spill coordinator) and agencies, stopping work activity that caused the spill, using absorbent booms and pads to contain and recover released materials in water, and disposing of contaminated response materials at approved facilities. Prevention and response procedures for a large oil spill are discussed in Chapter 10.

If any contaminated soils or groundwater were encountered during construction, they would be handled and disposed of in accordance with applicable regulations, the Environmental Protection Plan, and a Contaminated Soils Management Plan, which the Applicant would develop prior to construction. This plan would describe site assessment and response actions that would be implemented to manage

contaminated soils and groundwater (Enbridge 2016a). The Applicant would also follow Spill Prevention, Containment, and Control (SPCC) measures outlined in Appendix E to minimize the likelihood of spills and of contamination entering groundwater. With implementation of Applicant-proposed measures and adherence to the Blasting and Contaminated Soils Management plans, impacts on groundwater quality from small leaks and spills, blasting activities, and existing contamination would be temporary and minor.

Degradation of Groundwater Quality in Potable Supply Wells, Sole Source Aquifers, or Designated Protection Areas

Water supply wells, aquifers, and wellhead protection areas could be affected by construction activities, including groundwater withdrawals, minor spills of industrial chemicals and hazardous materials, and drilling mud releases during HDD installation—depending on how close the wells are to construction areas. No wells are located within the construction work area or permanent right-of-way for the Applicant's preferred route. However, if well interference occurred from pipeline construction, the Applicant would be required to participate in Minnesota DNR's well interference resolution process. Furthermore, the Applicant would work with landowners to develop site-specific plans for wells that could be affected by construction or request a variance from MDH. With adherence to the Applicant-proposed measures discussed above and below (e.g., water appropriation BMPs, erosion and sedimentation controls, SPCC measures, and HDD monitoring and clean-up procedures) construction impacts on groundwater in these sensitive areas and in wells would be temporary and minor.

The Applicant's preferred route would not cross any aquifers designated by EPA as a sole source aquifer. Therefore, there would be no construction impacts on any sole source aquifer.

Degradation of Water Quality from Drilling Mud Releases during HDD Crossings

HDD installation involves drilling under a waterbody and installing the pipeline without physical disturbance of the waterbody feature. This method would be used to cross environmentally sensitive areas such as certain wetlands, sensitive fishery resources, and impaired waters. Geotechnical surveys are conducted to determine which waterbodies exist in areas that are geologically suitable for HDD, based on properties such as depth to aquifer, aquifer flow properties, aquifer material type, strength, and deformational properties. Areas not conducive to HDD include soils containing cobbles, boulders, layers of gravel, or non-cohesive sands. The Applicant has proposed 19 HDD crossings along the entire length of the Applicant's preferred route in Minnesota and 12 crossings between Clearbrook and Carlton. During drilling, fluid (water, bentonite clay, and possible additives) is circulated through the drilling pipe to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. The potential exists for an inadvertent rupture of the bore hole or "frac-out" and release of the drilling fluid. Such events can occur when pressurization of the drill hole increases beyond the containment capability of the overburden soil material, which allows the drilling fluid to flow to the ground surface. The general risks to groundwater associated with HDD construction methods include loss of drilling mud into surficial aquifers, which could lead to turbidity in nearby aquifers and wells. Partial or full loss of drilling mud may occur as a result of encountering loose, unstable zones of soil, which could temporarily restrict water movement in shallow aquifers. Areas of karst are more prone to this occurrence. A large subsurface drilling fluid escape that does not reach the surface may fill subsurface voids and potentially cause the upward displacement of water and materials, creating a "doming" effect until the water in the dome reaches equilibrium with the surrounding hydrology.

Additives may be mixed with the drilling fluids/mud for viscosity or lubricating reasons. Only non-hazardous additives approved by the MPCA's 401 Water Quality Certification letter would be used, and a Material Safety Data Sheet for the drilling fluid would be maintained onsite. Construction personnel would monitor the crossing to detect releases of drilling mud and would implement containment,

response, and clean-up procedures as outlined in the Applicant's Environmental Protection Plan (Appendix E) to minimize the potential for drilling mud to reach groundwater resources. If a frac-out occurred and went undetected or was not quickly contained, impacts on groundwater quality could be long-term and major. With implementation of the Applicant-proposed measures for drilling mud releases during HDD construction, impacts on groundwater quality would be temporary and minor.

Operations Impacts

Changes in Groundwater Availability

Ongoing French drain effects could occur during pipeline operations in areas of groundwater upwelling. These impacts would be prevented by proper installation of trench breakers during construction as described above and would be temporary and negligible.

Normal operation of the Applicant's preferred route would not require withdrawal or discharge of water. During the maintenance and repair activities over the duration of pipeline's operation, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control have not been developed. However, as described for pipeline construction, the Applicant would be required to obtain water appropriation permits for testing procedures, and the volume of water would be substantially less than for construction. With adherence to permit conditions and implementation of Applicant-proposed measures as described for construction, impacts on groundwater from withdrawals would be temporary and negligible.

Degradation of Groundwater Quality

Small fuel and lubricant leaks and spills could occur from maintenance and inspection vehicles. However, any refueling, fuel storage, or vehicle maintenance would follow the Applicant-proposed measures in the Environmental Protection Plan (Appendix E). Further, the volume of such spills and leaks would be small, likely would remain on the land surface, and likely would not infiltrate into groundwater supplies. Therefore, any groundwater contamination from small leaks and spills during operation would be temporary and negligible to minor. The potential impacts on groundwater resources from a crude oil release are discussed in Chapter 10.

Route Alternatives (from Clearbrook to Carlton)

Route Alternative RA-03AM

Construction Impacts

Changes in Groundwater Availability from Withdrawals. Construction of RA-03AM would require approximately 11 to 17 million gallons of water for hydrostatic testing for each construction spread; construction of RA-03AM may require five construction spreads between Clearbrook and Carlton. Therefore, total water appropriation from groundwater or surface water sources would be approximately 55 to 85 million gallons. Water appropriation needs for dust control, trench dewatering, and HDD installation have not been determined. Prior to construction, the Applicant would need to obtain a water appropriation permit from Minnesota DNR. The permit requires that water withdrawals have a minimal potential for impacts on groundwater resources. Dewatering of the pipeline trench may be necessary during construction and also would require a water appropriation permit. The use of trench breakers avoid subsurface groundwater flow within the pipeline trench. If construction of

RA-03AM adheres to water appropriation permit conditions and uses appropriate BMPs as described for the Applicant's preferred route, impacts on groundwater availability from water withdrawals would be temporary and minor.

Increases in Total Suspended Solid Concentrations in Groundwater. Temporary erosion controls as described for the Applicant's preferred route would need to be implemented during excavation, trenching, and backfilling to prevent sediment transport into groundwater during construction. If appropriate BMPs as described for the Applicant's preferred route are used during construction of RA-03AM, impacts from increases in TSS concentrations and increased sedimentation in groundwater would be temporary and minor.

Degradation of Shallow Groundwater Quality from Blasting, Spills, or Contamination. Shallow groundwater along RA-03AM may become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities such as fuel storage, equipment refueling, and equipment maintenance. Handling, treatment/disposal, and discharge measures as described for the Applicant's preferred route would be necessary for fuels and hazardous chemicals, concrete wash water, grindings, drilling mud and slurry, and rinse water generated by construction and hydrostatic testing. In addition, the Applicant would be responsible for cleaning up small spills during construction of RA-03AM through procedures outlined in the Environmental Protection Plan (Appendix E) for the Applicant's preferred route.

The need for blasting along RA-03AM is not known but may be required for very limited areas of bedrock at or near the land surface along the route. If blasting is necessary, the Applicant would need to develop a site-specific Blasting Plan, which would include measures to protect groundwater resources.

Construction in contaminated sites can cause existing contaminants to be released and enter groundwater resources. If any contaminated soils or groundwater are encountered during construction, they would be handled and disposed of in accordance with applicable regulations, the Environmental Protection Plan, and a Contaminated Soils Management Plan, which the Applicant would develop prior to construction of RA-03AM. This plan would describe site assessment and response actions that would be implemented to manage contaminated soils and groundwater (Enbridge 2016a).

With use of appropriate BMPs as described for the Applicant's preferred route during construction of RA-03AM, impacts on shallow groundwater quality from blasting, small spills, or existing contamination during construction would be temporary and minor.

Degradation of Groundwater Quality in Potable Supply Wells, Sole Source Aquifers, or Designated Protection Areas. Water supply wells, aquifers, and wellhead protection areas could be affected by construction activities for RA-03AM. As noted above, five domestic wells are within the construction work area, and two are within the permanent right-of-way of the RA-03AM route. The Applicant would work with landowners to develop site-specific plans for wells that could be affected by construction, or request a variance from MDH. The Applicant also would be required to participate in Minnesota DNR's well interference resolution process if well interference occurred during pipeline construction. If appropriate BMPs as described for the Applicant's preferred route are used during construction of RA-03AM, construction impacts on drinking water wells and wellhead protection areas would be temporary and minor.

The RA-03AM route would not cross any aquifers designated by EPA as a sole source aquifer. Therefore, there would be no construction impacts on any sole source aquifer.

Degradation of Water Quality from Drilling Mud Releases during HDD Crossings. Specific locations to implement HDD crossings have not been determined for the route alternatives. Similar to the Applicant's preferred route, geotechnical surveys would need to be conducted to determine which waterbodies exist in areas along RA-03AM that are geologically suitable for HDD. If a route permit were to be issued for RA-03AM, the Applicant would be required to obtain crossing permits from Minnesota DNR for all public waters, and the exact crossing method for each waterbody would be stated in the permits. If a frac-out occurred during construction of RA-03AM and went undetected or was not quickly contained, impacts on groundwater quality could be long-term and major. With implementation of measures described for the Applicant's preferred route to respond to a drilling mud release during HDD construction along RA-03AM, impacts on groundwater quality would be temporary and minor.

Operations Impacts

Changes in Groundwater Availability. Ongoing French drain effects could occur during pipeline operations in areas of groundwater upwelling. With proper installation of trench breakers and soil compaction during backfilling as described for the Applicant's preferred route, impacts on groundwater availability during pipeline operations would be temporary and negligible.

Normal operation of the RA-03AM route would not require withdrawal or discharge of water. During maintenance and repair activities over the duration of pipeline's operation, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control have not been developed. As described for pipeline construction, the Applicant would be required to obtain water appropriation permits for testing procedures, and the volume of water would be substantially less than for construction. With adherence to permit conditions and implementation of Applicant-proposed measures as described for construction, impacts on groundwater from water withdrawals would be temporary and negligible.

Degradation of Groundwater Quality. Small fuel and lubricant leaks and spills could occur from maintenance and inspection vehicles. Any refueling, fuel storage, or vehicle maintenance would follow the Applicant-proposed measures set forth in the Environmental Protection Plan (Appendix E). Further, the volume of such spills and leaks would be small, likely would remain on the land surface, and likely would not infiltrate into groundwater supplies. Therefore, any groundwater contamination from small leaks and spills during operation would be temporary and negligible to minor. Potential impacts on groundwater resources from a crude oil release are discussed in Chapter 10.

Route Alternative RA-06

Construction Impacts

Changes in Groundwater Availability from Withdrawals. Approximately 44 to 68 million gallons of water (11 to 17 million gallons per construction spread) would be required for hydrostatic testing during construction of RA-06 between Clearbrook and Carlton. Water appropriation needs for dust control, trench dewatering, and HDD installation have not been determined. Prior to construction, the Applicant would need to obtain a water appropriation permit from Minnesota DNR requiring that water withdrawals have a minimal potential for impacts on groundwater resources. Dewatering of the pipeline line trench also may be necessary during construction, and trench breakers would need to be used to avoid subsurface groundwater flow within the pipeline trench. If construction of RA-06 adheres to water appropriation permit conditions and implements appropriate BMPs as described for the Applicant's

preferred route, impacts on groundwater availability from water withdrawals for RA-06 would be temporary and minor.

Increases in Total Suspended Solid Concentrations in Groundwater. Temporary erosion controls as described for the Applicant's preferred route would need to be implemented during excavation, trenching, and backfilling to prevent sediment transport into groundwater during construction. If appropriate BMPs as described for the Applicant's preferred route are used during construction of RA-06, impacts from increases in TSS concentrations and increased sedimentation in groundwater would be temporary and minor.

Degradation of Shallow Groundwater Quality from Blasting, Spills, or Contamination. Similar to the Applicant's preferred route, shallow groundwater that is present along RA-06 may become contaminated during construction from small spills or leaks. Handling, treatment/disposal, and discharge measures as described for the Applicant's preferred route would be necessary for activities associated with construction of RA-06. The Applicant would be responsible for cleaning up small spills during construction of RA-06 through procedures outlined in the Environmental Protection Plan (Appendix E) for the Applicant's preferred route.

The need for blasting along RA-06 is not known but may be required where bedrock is present at or near the land surface. If blasting was necessary, the Applicant would need to develop a site-specific Blasting Plan, which would include measures to protect groundwater resources.

Construction in contaminated sites can cause existing contaminants to be released and enter groundwater resources. If any contaminated soils or groundwater were encountered during construction, they would be handled and disposed of in accordance with applicable regulations; the Environmental Protection Plan; and a Contaminated Soils Management Plan, which the Applicant would develop prior to construction of RA-06. The plan would describe site assessment and response actions that would be implemented to manage contaminated soils and groundwater (Enbridge 2016a).

If appropriate BMPs as described for the Applicant's preferred route are used during construction of RA-06, impacts on shallow groundwater quality from blasting, small spills, or existing contamination during construction would be temporary and minor.

Degradation of Groundwater Quality in Potable Supply Wells, Sole Source Aquifers, or Designated Protection Areas. Water supply wells, aquifers, and wellhead protection areas could be affected by construction activities of RA-06.

As noted above, three domestic wells are within the construction work area and two are within the permanent right-of-way for the RA-06 route. The Applicant would work with landowners to develop site-specific plans for wells that could be affected by construction, or request a variance from MDH. The Applicant also would be required to participate in Minnesota DNR's well interference resolution process if well interference occurred during pipeline construction.

If appropriate BMPs as described for the Applicant's preferred route are used during construction of RA-06, construction impacts on drinking water wells and wellhead protection areas would be temporary and minor.

The RA-06 route would not cross any aquifers designated by EPA as a sole source aquifer. Therefore, there would be no construction impacts on any sole source aquifer.

Degradation of Water Quality from Drilling Mud Releases during HDD Crossings. Specific locations for HDD crossings have not been determined for the route alternatives. Similar to the Applicant's preferred route, geotechnical surveys would need to be conducted to determine which waterbodies exist in areas along RA-06 that are geologically suitable for HDD. If a route permit is issued for RA-06, the Applicant would be required to obtain crossing permits from Minnesota DNR for all public waters, and the exact crossing method for each waterbody would be stated in the permits. If a frac-out occurred during construction of RA-06 and went undetected or was not quickly contained, impacts on groundwater quality could be long-term and major. With implementation of measures described for the Applicant's preferred route to respond to a drilling mud release during HDD construction along RA-06, impacts on groundwater quality would be temporary and minor.

Operations Impacts

Changes in Groundwater Availability. Ongoing French drain effects could occur during pipeline operations in areas of groundwater upwelling. With proper installation of trench breakers and soil compaction during backfilling during construction as described for the Applicant's preferred route, impacts on groundwater availability during pipeline operations would be temporary and negligible.

Normal operation of the RA-06 route would not require withdrawal or discharge of water. However, during maintenance and repair activities over the duration of pipeline's operation, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control have not been developed. As described for pipeline construction, the Applicant would be required to obtain water appropriation permits for testing procedures, and the volume of water would be substantially less than for construction. With adherence to permit conditions and implementation of Applicant-proposed measures as described for construction, impacts on groundwater from withdrawals would be temporary and negligible.

Degradation of Groundwater Quality. Small fuel and lubricant leaks and spills could occur from maintenance and inspection vehicles. Any refueling, fuel storage, or vehicle maintenance would follow the Applicant-proposed measures set forth in the Environmental Protection Plan (Appendix E). Further, the volume of such spills and leaks would be small, likely would remain on the land surface, and likely would not infiltrate into groundwater supplies. Consequently, any groundwater contamination from small leaks and spills during operation would be temporary and negligible to minor. Potential impacts on groundwater resources from a crude oil release are discussed in Chapter 10.

Route Alternative RA-07

Construction Impacts

Changes in Groundwater Availability from Withdrawals. Construction of RA-07 would require approximately 44 to 68 million gallons of water (11 to 17 million gallons per construction spread) for hydrostatic testing during construction between Clearbrook and Carlton. Water appropriation needs for dust control, trench dewatering, and HDD installation have not been determined. Prior to construction, the Applicant would need to obtain a water appropriation permit from Minnesota DNR. The permit requires that water withdrawals have a minimal potential for impacts on groundwater resources. Dewatering of the pipeline trench also may be necessary during construction and would require a water appropriation permit. Trench breakers would need to be used to avoid subsurface groundwater flow within the pipeline trench. If construction of RA-07 adheres to water appropriation permit conditions

and uses appropriate BMPs as described for the Applicant's preferred route, impacts on groundwater availability from water withdrawals would be temporary and minor.

Increases in Total Suspended Solid Concentrations in Groundwater. Temporary erosion controls as described for the Applicant's preferred route would need to be implemented during excavation, trenching, and backfilling to prevent sediment transport into groundwater during construction. If appropriate BMPs as described for the Applicant's preferred route are used during construction of RA-07, impacts from increases in TSS concentrations and increased sedimentation in groundwater would be temporary and minor.

Degradation of Shallow Groundwater Quality from Blasting, Spills, or Contamination. Shallow groundwater along RA-07 may become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities such as fuel storage, equipment refueling, and equipment maintenance. Handling, treatment/disposal, and discharge measures as described for the Applicant's preferred route would be necessary for fuels and hazardous chemicals, concrete wash water, grindings, drilling mud and slurry, and rinse water generated by construction and hydrostatic testing. In addition, the Applicant would be responsible for cleaning up small spills during construction of RA-07 through procedures outlined in the Environmental Protection Plan (Appendix E) for the Applicant's preferred route.

The need for blasting along RA-07 is not expected as it would entail removal and replacement of the pipeline in the same trench. If blasting were necessary, the Applicant would need to develop a site-specific Blasting Plan, which would include measures to protect groundwater resources.

Construction in contaminated sites can cause existing contaminants to be released and enter groundwater resources. If any contaminated soils or groundwater were encountered during construction, they would be handled and disposed of in accordance with applicable regulations; the Environmental Protection Plan; and a Contaminated Soils Management Plan, which the Applicant would develop prior to construction of RA-07. The plan would describe site assessment and response actions that would be implemented to manage contaminated soils and groundwater (Enbridge 2016a).

With use of appropriate BMPs as described for the Applicant's preferred route during construction of RA-07, impacts on shallow groundwater quality from blasting, small spills, or existing contamination during construction would be temporary and minor.

Degradation of Groundwater Quality in Potable Supply Wells, Sole Source Aquifers, or Designated Protection Areas. Water supply wells, aquifers, and wellhead protection areas could be affected by construction activities for RA-07. Two domestic wells are within the construction work area, and one is within the permanent right-of-way for the RA-07 route. The Applicant would work with landowners to develop site-specific plans for wells that could be affected by construction, or request a variance from MDH. The Applicant also would be required to participate in Minnesota DNR's well interference resolution process if well interference occurred during pipeline construction. If appropriate BMPs as described for the Applicant's preferred route are used during construction of RA-07, construction impacts on drinking water wells and wellhead protection areas would be temporary and minor.

The RA-07 route would not cross any aquifers designated by EPA as a sole source aquifer. Therefore, there would be no construction impacts on any sole source aquifer.

Degradation of Water Quality from Drilling Mud Releases during HDD Crossings. Specific locations to implement HDD crossings have not been determined for the route alternatives. Similar to the Applicant's preferred route, geotechnical surveys would need to be conducted to determine which waterbodies exist in areas along RA-07 that are geologically suitable for HDD. If a route permit is issued for RA-07, the Applicant would be required to obtain crossing permits from Minnesota DNR for all public waters, and the exact crossing method for each waterbody would be stated in the permits. If a frac-out occurred during construction of RA-07 and went undetected or was not quickly contained, impacts on groundwater quality could be long-term and major. With implementation of measures described for the Applicant's preferred route to respond to a drilling mud release during HDD construction along RA-07, impacts on groundwater quality would be temporary and minor.

Operations Impacts

Changes in Groundwater Availability. Ongoing French drain effects could occur during pipeline operations in areas of groundwater upwelling. With proper installation of trench breakers and soil compaction during backfilling during construction as described for the Applicant's preferred route, impacts on groundwater availability during pipeline operations would be temporary and negligible.

Normal operation of the RA-07 route would not require withdrawal or discharge of water. During maintenance and repair activities over the duration of pipeline operation, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control have not been developed. As described for pipeline construction, the Applicant would be required to obtain water appropriation permits for testing procedures, and the volume of water would be substantially less than for construction. With adherence to permit conditions and implementation of Applicant-proposed measures as described for construction, impacts on groundwater from withdrawals would be temporary and negligible.

Degradation of Groundwater Quality. Small fuel and lubricant leaks and spills could occur from maintenance and inspection vehicles. Any refueling, fuel storage, or vehicle maintenance would follow the Applicant-proposed measures set forth in the Environmental Protection Plan (Appendix E). Further, the volume of such spills and leaks would be small, likely would remain on the land surface, and likely would not infiltrate into groundwater supplies. Consequently, any groundwater contamination from small leaks and spills during operation would be temporary and negligible to minor. Potential impacts on groundwater resources from a crude oil release are discussed in Chapter 10.

Route Alternative RA-08

Construction Impacts

Changes in Groundwater Availability from Withdrawals. Construction of RA-08 would require approximately 44 to 68 million gallons of water (11 to 17 million gallons per construction spread) for hydrostatic testing during construction between Clearbrook and Carlton. Water appropriation needs for dust control, trench dewatering, and HDD installation have not been determined. Prior to construction, the Applicant would need to obtain a water appropriation permit from Minnesota DNR. The permit requires that water withdrawals have a minimal potential for impacts on groundwater resources. Dewatering of the pipeline trench also may be necessary during construction and would require a water appropriation permit. Trench breakers would need to be used to avoid subsurface groundwater flow within the pipeline trench. If construction of RA-08 is adheres to water appropriation permit conditions

and uses appropriate BMPs as described for the Applicant's preferred route, impacts on groundwater availability from water withdrawals would be temporary and minor.

Increases in Total Suspended Solid Concentrations in Groundwater. Temporary erosion controls as described for the Applicant's preferred route would need to be implemented during excavation, trenching, and backfilling to prevent sediment transport into groundwater during construction. If appropriate BMPs as described for the Applicant's preferred route are used during construction of RA-08, impacts from increases in TSS concentrations and increased sedimentation in groundwater would be temporary and minor.

Degradation of Shallow Groundwater Quality from Blasting, Spills, or Contamination. Shallow groundwater along RA-08 may become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities such as fuel storage, equipment refueling, and equipment maintenance. Handling, treatment/disposal, and discharge measures as described for the Applicant's preferred route would be necessary for fuels and hazardous chemicals, concrete wash water, grindings, drilling mud and slurry, and rinse water generated by construction and hydrostatic testing. In addition, the Applicant would be responsible for cleaning up small spills during construction of RA-08 through procedures outlined in the Environmental Protection Plan (Appendix E) for the Applicant's preferred route.

The need for blasting along RA-08 is not known but may be required in some areas where bedrock is at or near the land surface. If blasting is necessary, the Applicant would need to develop a site-specific Blasting Plan, which would include measures to protect groundwater resources.

Construction in contaminated sites can cause existing contaminants to be released and enter groundwater resources. If any contaminated soils or groundwater were encountered during construction, they would be handled and disposed of in accordance with applicable regulations; the Environmental Protection Plan; and a Contaminated Soils Management Plan, which the Applicant would develop prior to construction of RA-08. The plan would describe site assessment and response actions that would be implemented to manage contaminated soils and groundwater (Enbridge 2016a).

If appropriate BMPs as described for the Applicant's preferred route are used during construction of RA-08, impacts on shallow groundwater quality from blasting, small spills, or existing contamination during construction would be temporary and minor.

Degradation of Groundwater Quality in Potable Supply Wells, Sole Source Aquifers, or Designated Protection Areas. Water supply wells, aquifers, and wellhead protection areas could be affected by construction activities for RA-08. One domestic well is within the construction work area, and one is within the permanent right-of-way for the RA-08 route. The Applicant would work with landowners to develop site-specific plans for wells that could be affected by construction, or request a variance from MDH. The Applicant also would be required to participate in Minnesota DNR's well interference resolution process if well interference occurred during pipeline construction.

If appropriate BMPs as described for the Applicant's preferred route are used during construction of RA-08, construction impacts on drinking water wells and wellhead protection areas would be temporary and minor.

The RA-08 route would not cross any aquifers designated by EPA as a sole source aquifer. Therefore, there would be no construction impacts on any sole source aquifer.

Degradation of Water Quality from Drilling Mud Releases during HDD Crossings. Specific locations to implement HDD crossings have not been determined for the route alternatives. Similar to the Applicant's preferred route, geotechnical surveys would need to be conducted to determine which waterbodies exist in areas along RA-08 that are geologically suitable for HDD. If a route permit is issued for RA-08, the Applicant would be required to obtain crossing permits from Minnesota DNR for all public waters, and the exact crossing method for each waterbody would be stated in the permits. If a frac-out occurred during construction of RA-08 and went undetected or was not quickly contained, impacts on groundwater quality could be long-term and major. With implementation of measures described for the Applicant's preferred route to respond to a drilling mud release during HDD construction along RA-08, impacts on groundwater quality would be temporary and minor.

Operations Impacts

Changes in Groundwater Availability. Ongoing French drain effects could occur during pipeline operations in areas of groundwater upwelling. With proper installation of trench breakers and soil compaction during backfilling during construction, as described for the Applicant's preferred route, impacts on groundwater availability during pipeline operations would be temporary and negligible.

Normal operation of the RA-08 route would not require withdrawal or discharge of water. During maintenance and repair activities over the duration of pipeline operation, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control have not been developed. As described for pipeline construction, the Applicant would be required to obtain water appropriation permits for testing procedures, and the volume of water would be substantially less than for construction. With adherence to permit conditions and implementation of Applicant-proposed measures as described for construction, impacts on groundwater from withdrawals would be temporary and negligible.

Degradation of Groundwater Quality. Small fuel and lubricant leaks and spills could occur from maintenance and inspection vehicles. Any refueling, fuel storage, or vehicle maintenance would follow the Applicant-proposed measures set forth in the Environmental Protection Plan (Appendix E). Further, the volume of such spills and leaks would be small, likely would remain on the land surface, and likely would not infiltrate into groundwater supplies. Consequently, any groundwater contamination from small leaks and spills during operation would be temporary and negligible to minor. Potential impacts on groundwater resources from a crude oil release are discussed in Chapter 10.

6.3.1.1.4 Summary and Mitigation

Summary

For all of the issues related to groundwater, the Applicant's preferred route would result in minor and temporary impacts during construction and negligible impacts during operations. The same finding was made for all of the route alternatives. Table 6.3.1.1-13 provides a summary and comparison of potential construction and operation impacts for the Applicant's preferred route and the route alternatives between Clearbrook and Carlton. Beyond the finding that impacts would be minor or negligible, the exposure of groundwater resources along each of the routes varied to some degree.

RA-03AM is the longest route and would cross the greatest acreage of high vulnerability water table aquifers, high pollution sensitivity areas, very high to high sensitivity Precambrian shallow fractured

bedrock aquifers and DWSMAs; the most WIMN sites; and the most domestic wells. RA-06 would cross the least acreage of high vulnerability water table aquifers, high contamination susceptibility, high pollution sensitivity, and DWSMAs, in addition to the least number of domestic and public wells. The Applicant's preferred route would cross the greatest acreage of high contamination susceptibility but the least number of EPA-listed contaminated sites and WIMN sites, and the fewest acres of wellhead protection areas. RA-07 and RA-08 are similar, but RA-08 would cross the greatest acreage of wellhead protection areas, and RA-07 would cross the greatest number of EPA-listed contaminated sites and public wells. **Construction of RA-06 would appear to have the least impact on groundwater sources, followed by the Applicant's preferred route, RA-07 and RA-08, and lastly, RA-03AM**.

With strict adherence to permit conditions and implementation of the Applicant-proposed measures, impacts on groundwater from construction of any of the route options would be temporary and minor during construction. Impacts between routes differ based on the acres of various groundwater sensitivity areas, DWSMAs, domestic and public wells, and contaminated sites crossed. During standard operations, negligible to minor and temporary impacts would be associated with ongoing French drain effects of the pipeline and small spills and leaks from pipeline inspection and maintenance.

Mitigation

Beyond the Applicant-proposed measures described above for the Applicant's preferred route, potential mitigation measures to minimize impacts on surface waters could include:

- If the owner of a potable supply well believed that the quality or yield of their water was negatively affected as a result of a pipeline construction-related activity, the Applicant could engage a third party to determine the nature and severity of the impact. If it was determined that impacts were related to construction, the Applicant could provide an alternate source of water to the well owner until the well water returned to preconstruction conditions. If the well water did not return to preconstruction conditions within a reasonable time period, the Applicant could compensate the landowner for installation of a new well or otherwise arrange for provision of a suitable water supply.
- To prevent the loss of drilling fluid from the borehole during HDD installation, the properties of drilling fluid may be augmented to aid in stabilizing the soils and in maintaining drilling fluid returns to the entry and exit pits. If circulation is lost, lost circulation materials can be used to seal around the borehole and prevent drilling fluid from escaping into the formation, and allow for reestablishment of drilling fluid returns to the entry and exit pits. Many types of lost circulation materials that are inert and environmentally benign are available for use during HDD installation. These can include wood fibers, cotton seed husks, ground walnut shells, and other natural materials. Special polymers that swell to several times their original size when introduced to water also can be used. These polymers are industrial-grade equivalents of food-grade polymers that are used to swell and absorb fluids in the food industry.

Table 6.3.1.1-13. Summary of Potential Impacts on Groundwater for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Changes in groundwater availability	Temporary/minor impacts • 4 spreads requiring water appropriation and discharge for hydrostatic testing (44–68 million gallons)	Temporary/minor impacts • 5 spreads requiring water appropriation and discharge for hydrostatic testing (55–85 million gallons)	Temporary/minor impacts • 4 spreads requiring water appropriation and discharge for hydrostatic testing (44–68 million gallons)	Temporary/minor impacts • 4 spreads requiring water appropriation and discharge for hydrostatic testing (44–68 million gallons)	Temporary/minor impacts • 4 spreads requiring water appropriation and discharge for hydrostatic testing (44–68 million gallons)
Increases in TSS concentrations during trenching and excavation activities in shallow aquifers	Temporary/minor impacts	Temporary/minor impacts	Temporary/minor impacts	Temporary/minor impacts	Temporary/minor impacts

Table 6.3.1.1-13. Summary of Potential Impacts on Groundwater for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Degradation of shallow groundwater quality	Temporary/minor impacts • Blasting 0.3 mile • 9 EPA-listed contaminated sites • 67 WIMN sites • 18,215 acres of high vulnerability aquifers • 26,382 acres of high contamination susceptibility • 15,475 acres of high pollution sensitivity • 1,700 acres of high and very high bedrock sensitivity • No known karst topography	Temporary/minor impacts • Need for blasting unknown • 70 EPA-listed contaminated sites • 182 WIMN sites • 25,928 acres of high vulnerability aquifers • 25,152 acres of high contamination susceptibility • 25,588 acres of high pollution sensitivity • 2,917 acres of karst topography • 2,547 acres of high and very high bedrock sensitivity	Temporary/minor impacts • Need for blasting unknown • 13 EPA-listed contaminated sites • 72 WIMN sites • 5,806 acres of high vulnerability aquifers • 305 acres of high contamination susceptibility • 3,134 acres of high pollution sensitivity • No known karst topography • 512 acres of high and very high bedrock sensitivity	Temporary/minor impacts • Need for blasting unknown, but not expected • 92 EPA-listed contaminated sites • 120 WIMN sites • 21,141 acres of high vulnerability aquifers • 19,833 acres of high contamination susceptibility • 15,355 acres of high pollution sensitivity • No known karst topography • 512 acres of high and very high bedrock sensitivity	Temporary/minor impacts • Need for blasting unknown • 50 EPA-listed contaminated sites • 101 WIMN sites • 16,889 acres of high vulnerability aquifers • 20,012 acres of high contamination susceptibility • 11,699 acres of high pollution sensitivity • No known karst topography • 446 acres of high and very high bedrock sensitivity
Degradation of groundwater quality in potable supply wells, sole source aquifers, or other designated groundwater protection areas	Temporary/minor impacts • No sole source aquifers • 164 domestic wells • 1 public well • 0.6 acre of wellhead protection areas • 172 acres of DWSMAs	Temporary/minor impacts • No sole source aquifers • 396 domestic wells • 10 public wells • 329 acres of wellhead protection areas • 849 acres of DWSMAs	Temporary/minor impacts • No sole source aquifers • 40 domestic wells • 0 public wells • 56 acres of wellhead protection areas • 131 acres of DWSMAs	Temporary/minor impacts • No sole source aquifers • 183 domestic wells • 23 public wells • 536 acres of wellhead protection areas • 754 acres of DWSMAs	Temporary/minor impacts • No sole source aquifers • 162 domestic wells • 7 public wells • 672 acres of wellhead protection areas • 810 acres of DWSMAs

Table 6.3.1.1-13. Summary of Potential Impacts on Groundwater for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Degradation of water quality from drilling mud releases during HDD crossings	Temporary/minor impacts (*if quickly contained*) to long-term/major (*if undetected or uncontained*) • 12 HDD crossings	Temporary/minor impacts (*if quickly contained*) to long-term/major (*if undetected or uncontained*) • Number of HDD crossings not determined for route alternatives			
Operations Impacts					
Changes in groundwater availability	Temporary/negligible impact	Temporary/negligible impact	Temporary/negligible impact	Temporary/negligible impact	Temporary/negligible impact
Changes in groundwater quality	Temporary/negligible to minor impacts • Minor leaks and spills	Temporary/negligible to minor impacts • Minor leaks and spills	Temporary/negligible to minor impacts • Minor leaks and spills	Temporary/negligible to minor impacts • Minor leaks and spills	Temporary/negligible to minor impacts • Minor leaks and spills

DWSMA = drinking water supply management area, EPA = U.S. Environmental Protection Agency, HDD = horizontal directional drill, WIMN = "What's in My Neighborhood"

6.3.1.1.5 References

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6.3.1.2 Surface Water

Surface water in the vicinity of the Applicant's preferred route and route alternatives consists of streams, rivers, lakes, wild rice waterbodies, and wetlands. Streams, rivers, lakes, and wild rice waterbodies are discussed in this section; wetlands are discussed in Section 6.3.1.3. This section identifies the surface waters that would be crossed, including their state and federal classifications or beneficial use designations. This section also assesses the potential for construction and operation of the Applicant's preferred route and route alternatives to affect those resources. The analysis of potential impacts on surface water resources during construction and operation of the Applicant's preferred route and route alternatives considered the following:

- Runoff and flows – increases in stormwater runoff and erosion, increases in TSSs concentrations and increased sedimentation, changes in stream flows from water withdrawals and discharges, and disruption of flow paths or local hydrologic connectivity;
- Surface water and aquatic habitat quality – degradation of surface water quality, degradation of aquatic habitat from instream and other construction activities, degradation of water quality and habitat from releases of drilling mud during HDD crossings;
- Channel morphology and stability – changes in channel morphology and stability caused by channel and streambank modifications; and
- Disturbance of wild rice waterbodies.

This section first describes the regulations relevant to assessing surface water impacts, the methods used to conduct the impact assessment, and the existing surface water conditions within the defined ROIs of the Applicant's preferred route and route alternatives. The potential impacts of construction and operation of the Applicant's preferred route and route alternatives on surface waters are considered next. A summary and comparison of the impacts for the route options between Clearbrook and Carlton are included at the end of the section, along with potential mitigation measures that could be used to minimize impacts.

Section 6.3.4 addresses surface water quality impacts that affect fish and wildlife and their habitats, including fisheries, Aquatic Management Areas (AMAs), surface waters assigned an Index of Biotic Integrity, Lakes of Biological Significance, designated wildlife lakes, trout streams, and invasive species. This section and Section 6.3.4 should be considered together to provide an overall picture of the potential impacts of the Project on surface water.

Potential impacts on surface water from unanticipated crude oil releases are discussed in Chapter 10.

6.3.1.2.1 Regulatory Context and Methodology

Regulatory Context

Federal, state, and local agencies have oversight and permitting requirements for activities that may affect surface water use, flow, current, or quality. These permits include required actions and BMPs that would reduce potential impacts on surface water resources. Within Minnesota, Minnesota PCA implements federal water quality regulations via authority from EPA and manages the list of impaired surface waters based on the Clean Water Act (CWA) Section 303(d) list. Minnesota PCA also implements a permitting program to manage stormwater discharges in compliance with the NPDES and State Disposal System (SDS), administering joint NPDES/SDS permits. Minnesota DNR regulates public waters

and oversees permitting for public waterbody crossings and water appropriation. Local agencies also implement water quality requirements. In addition, regional watershed districts, of which there are 46 in the state, manage water drainage and flow and issue permits for activities that may affect waters within the watershed. Watershed districts are discussed further in Section 6.2.1. State and federal rules as they pertain to the Project are described below.

Separate tribal water quality regulations and standards may be relevant for various routes that pass through tribal lands. These unique situations likely would be addressed during easement agreements, when and if a final route is determined. As shown in Chapter 9, American Indian tribes within Minnesota have jurisdiction for the management of natural resources within reservations and in some cases on ceded lands. For instance, the Leech Lake Band of Ojibwe (LLBO) have passed interim water quality standards. The intent of these standards is to protect the health and welfare of persons residing and doing business on the reservation (LLBO 2001). The DOC has consulted with American Indian tribes regarding natural resources, including surface waters. A listing of these tribes is provided in Chapter 9.

Minnesota Beneficial Use Designations

Surface waters in Minnesota are classified according to beneficial use designations, which identify how humans and terrestrial and aquatic wildlife use the waterbody. As required by the CWA, water quality standards must be set to protect the beneficial use(s) of a waterbody, and permits must be obtained for activities that may affect water quality. The seven beneficial use designations of Minnesota surface waters (defined in Minn. R. 7050.0140) are as follows:

- Class 1 – domestic consumption (i.e., drinking water);
- Class 2 – aquatic life and recreation;
- Class 3 – industrial or commercial use;
- Class 4 – agricultural use, irrigation (4A), and livestock and wildlife watering (4B);
- Class 5 – aesthetics and navigation;
- Class 6 – other uses and protection of border waters; and
- Class 7 – limited resource value waters.

Limited resource value waters are not fully protected for aquatic life because water quantities are intermittent or very low, existing aquatic life is severely limited, the waters have been irreversibly and significantly altered by human activity, and there are limited recreational opportunities. All surface waters are protected for Class 2 beneficial use unless the waterbody has been individually assessed and reclassified as a Class 7 limited resource value water. Minnesota Administrative Rules Part 7050.0470 lists the classifications of major surface waters in the state. If a waterbody is not listed there and is not a wetland, it is classified as a Class 2B, 3C, 4A, 4B, 5, and 6 water per Minnesota Administrative Rules Part 7050.0430. Thus, in practice, all surface waters of the state are protected for their associated beneficial use or all of the above uses other than drinking water (Minnesota PCA 2006). Minnesota Administrative Rules Part 7050.0222 further defines the water quality standards for the following subclasses of Class 2 waters:

- Class 2A – Coldwater fisheries, trout waters, suitable for all aquatic recreation and protected as a source of drinking water;

- Class 2Bd – Coldwater and warmwater fisheries, suitable for all aquatic recreation and protected as a source of drinking water;
- Class 2B – Coldwater and warmwater fisheries, suitable for all aquatic recreation but not protected for drinking water;
- Class 2C – Indigenous fish and associated aquatic community, suitable for boating but not protected for drinking water; and
- Class 2D – Wetlands – aquatic and terrestrial species, suitable for boating but not protected for drinking water.

State-Designated/Sensitive Surface Waters

Various Minnesota streams and lakes are designated as Class 2A trout streams, for which stringent water quality standards and fishing restrictions are implemented to maintain and propagate healthy communities of trout (Minn. R. 7050.0222 and 6264.0050). Minnesota PCA requires construction sites that discharge near trout streams to implement additional BMPs and enhanced runoff controls as part of the NPDES permit. In addition, all Minnesota surface waters in the Lake Superior Basin, other than Class 7 waters and designated Outstanding Resource Value Waters (ORVWs), are designated as Outstanding International Resource Waters (Minn. R. 7052.0300).

Nationwide Rivers Inventory

Rivers listed in the National Park Service's (NPS's) Nationwide Rivers Inventory (NRI) are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance (NPS 2011). Some NRI-listed rivers also are federally designated as Wild and Scenic Rivers, which are rivers or river segments with outstanding natural, cultural, and recreational values that are to be voluntarily protected in a free-flowing condition for the characteristics for which they were first designated. Minnesota also has state-designated Wild and Scenic River segments.

Impaired Surface Waters

Section 303(d) of the CWA requires that states review, establish, and revise water quality standards for all surface waters within the state. Each state, territory, and authorized tribe must biennially submit to EPA a list of surface waters that do not meet EPA-approved water quality standards. These waters are considered impaired and do not meet their designated beneficial use for reasons such as elevated contaminant levels, low dissolved oxygen, high temperature, or bacterial contamination. The law also requires that states establish priority rankings for waters on the list and develop total maximum daily loads (TMDLs) for these waters. Approximately 40 percent of Minnesota's surface waters are impaired for conventional pollutants. Projects that discharge near a waterbody that is impaired for phosphorous, turbidity, dissolved oxygen, and biotic impairment must meet special conditions required under the NPDES permit. In Minnesota, Minnesota PCA implements federal water quality regulations and identifies and manages the list of impaired surface waters.

When a waterbody is added to the Minnesota Impaired Waters List, a TMDL must be developed for it. A TMDL is the maximum amount of a pollutant a body of water can receive without violating water quality standards and an allocation of that amount to the pollutant sources. The TMDL development process identifies all sources of a pollutant and determines how much each source must reduce its contribution in order to meet the standard. Minnesota PCA organizes impaired surface waters into TMDL projects, which are then approved by EPA.

Minnesota uses a watershed approach, encompassing water quality assessment, watershed analysis, civic engagement, planning, implementation, and measurement of results, to address restoration and protection of the state's 80 major watersheds. On a 10-year cycle, a Watershed Restoration and Protection Strategy (WRAPS) report is completed for each watershed as a result of that work (Minnesota PCA 2016a). The water quality management cycles for the 80 major watersheds are staggered, with 8 to 10 watersheds beginning a new cycle each year. The WRAPS report includes a watershed TMDL study, TMDL implementation strategies for impaired waters, and protection study and implementation strategies for waters needing additional protection to prevent future water quality impairments (Minnesota PCA 2014b).

Navigable Waterways

The U.S. Army Corps of Engineers (USACE) has jurisdiction over navigable waterways in accordance with Section 10 of the Rivers and Harbors Act of 1899. Navigable waters of the United States are those that are subject to the ebb and flow of the tide or are presently used, have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Work in or affecting these waterways must be approved by USACE under the Section 10 of the Rivers and Harbors Act and under Section 404 of the CWA, if the activity involves discharging dredged or fill material into waters of the US. A CWA Section 401 Individual Water Quality Certification for the proposed Project in Minnesota is required. The Minnesota PCA is responsible for CWA Section 401 certification in Minnesota.

Public Waters

Public waters have been defined in Minnesota Law since 1897. The waters included in the definition have evolved and been refined over the years. Significant clarification was given to which waters were included as public waters in the Public Waters Inventory process conducted in the late 1970s through the early 1980s. Public waters are protected from destruction and degradation because of their value to the people of Minnesota for water supplies; groundwater recharge potential; retention of water to prevent and minimize downstream flooding and property damage; entrapment of nutrients and sediment; recreational activities such as boating, swimming, fishing and hunting, and navigation; and wildlife habitat areas for spawning, rearing, feeding, and nesting of wildlife.

Wild Rice Waterbodies

Various tribal, federal, state, and local laws and regulations are designed to manage and protect wild rice. These are associated with formal recognition of the significance of natural wild rice and its protection, management, and harvest. In Minnesota, wild rice and other aquatic vegetation growing in public waters is owned by the State, and a person may not acquire a property interest in or destroy wild rice except as allowed by law. Outside of tribal jurisdictions, Minnesota statutes and agency rules regulate the harvest of natural wild rice, including methods and timing of harvest. The Minnesota DNR Aquatic Plant Management Program prohibits removal of wild rice without an approved permit. Wild rice also is protected through shoreland protection laws and regulations, which are based on a system of classification for lakes and rivers that applies different zoning regulations depending on their classification.

Minnesota PCA is proposing amendments to Minnesota Administrative Rules Chapters 7001, 7050, 7052, and 7053. These amendments would refine how a wild rice waterbody is defined as well as acceptable sulfate levels. Since 1975, wild rice waterbodies have been defined as an area with a wild rice stem density of eight stems per square mile over 0.25 acre or four stems per square mile over 0.5 acre. Minnesota PCA proposes to change this to define a wild rice waterbody as an area that contains a self-

perpetuating wild rice population with at least 8,000 stems over a lake or wetland surface or 800 stems over a river-mile reach. Minnesota PCA also is proposing refinement of the acceptable sulfate levels for identified wild rice waterbodies. A 2015 technical document showed that factors such as organic matter and iron concentration affect how much sulfate is converted to sulfide, which is toxic to wild rice (Minnesota PCA 2014c). Based on this, Minnesota PCA is proposing to determine acceptable sulfate levels on a site-by-site basis by the organic carbon and iron concentrations found at each wild rice waterbody (Minnesota PCA 2016a). These amendments have not been enacted and therefore were not used in the analyses in this EIS.

Tribal regulations related to the harvest and protection of wild rice within reservation boundaries vary from tribe to tribe and are managed by tribe-specific wild rice committees. In addition to tribal regulations, treaties and other agreements with the U.S. government have reserved off-reservation harvesting rights for certain tribes.

Methodology

Potential impacts on surface water and effects on sensitive surface waters from construction and operation of the Applicant's preferred route and route alternatives were assessed. Impacts on surface waters from pipeline construction would be largely due to waterbody crossing procedures, and potential impacts from normal pipeline operation typically are localized. Therefore, the ROI for the assessment of construction impacts on surface waters includes the construction work area for each surface water crossed by the Applicant's preferred route in Minnesota (typically 120 feet wide) as well as the area immediately downstream from the crossing for flowing surface waters, and in the immediate vicinity for crossings of non-flowing surface waters such as lakes and wild rice waterbodies. Similarly, the ROI for the assessment of construction impacts on surface waters for the route alternatives is based on a 120-foot-wide construction work area for RA-03AM, RA-06, and RA-08; a 205-foot-wide construction work area for RA-07; and the areas immediately downstream of flowing surface waters and in the immediate vicinity of non-flowing surface waters. The assessment of operations impacts is based on the location of the 50-foot-wide permanent pipeline right-of-way for all the route options, as well as areas immediately downstream of flowing surface waters and in the immediate vicinity of non-flowing surface waters.

Watersheds and surface waters within the ROIs for the Applicant's preferred route and route alternatives were identified using GIS datasets and layers in the following data sources:

- USGS National Hydrography Dataset;
- USACE Section 10 navigable waterways;
- NPS's NRI national datasets;
- Minnesota DNR's Public Waters Inventory;
- Minnesota-designated trout streams;
- Minnesota DNR-identified wild rice waterbodies; and
- Section 303(d)-listed impaired surface waters, TMDL, and WRAPS project boundaries.

The acreages of areas that could be affected by construction of the Applicant's preferred route were estimated by using maps depicting surface waters with an overlay of the construction work area and footprints of aboveground facilities provided by the Applicant. Except for RA-07, the acreages of areas that could be affected by construction of the route alternatives were estimated using maps depicting

surface waters with an overlay of a 120-foot-wide construction work area centered on the pipeline route; for RA-07, a 205-foot-wide construction work area was used.

Acreages of wild rice waterbodies that could be affected were estimated using maps of the Minnesota DNR-identified wild rice waterbodies and rivers database (Minnesota DNR 2009), classified according to U.S. Fish and Wildlife Service (USFWS) Circular No. 39 (EPA 2002). These maps were overlaid with the construction work area and permanent right-of-way for the Applicant's preferred route; a 120-foot-wide construction work area for RA-03, RA-06, and RA-8; and a 205-foot-wide construction work area for RA-07. Because some construction activities and indirect effects may occur within areas beyond the construction work areas, wild rice resources also were identified within 0.5 mile of the pipeline routes. Wild rice lakes not identified within the DNR database may occur along alternative routes.

Potential impacts on surface waters were evaluated by:

- Identifying the existing conditions of surface waters that would be crossed, such as water quality and impairment, fishery resources (i.e., trout streams), beneficial use designations, state and federal classifications, and overall watershed health.
- Comparing the Applicant's proposed construction methods described in Chapter 2 and the special wetland construction methods described in the Applicant's November 2016 EAW and associated construction BMP plans (Enbridge 2016a) to peer-reviewed literature and agency documents, including permit requirements and guidance manuals, related to the proposed pipeline construction methods.
- Considering the potential for construction and operation of the Applicant's preferred route and route alternatives to affect the identified surface waters. The specific environmental concerns addressed in the impact analysis are listed in the introduction to Section 6.3.1.2.3.

6.3.1.2.2 Existing Conditions

Overview of Drainage Basins and Watersheds

A "drainage basin" is an area of land where all surface water from rain and snowmelt converges to a single point at a lower elevation, such as a river, lake, reservoir, or wetland. Drainage basins are made up of smaller watershed units. There are 10 major drainage basins and 80 major watersheds in Minnesota (Minnesota PCA n.d.). The Red River, Lake Superior, St. Croix River, and Upper Mississippi River basins are described in Section 5.2.1.2.2.

In addition to those basins crossed by the Applicant's preferred route, the Rainy River Basin would be crossed by one route alternative (RA-06). The Rainy River Basin encompasses a total area of 27,114 square miles, of which 11,244 square miles (41 percent) are in Minnesota, and 15,870 square miles (59 percent) are in Ontario, Canada. The basin is home to important forest and water resources: Voyageurs National Park and the Boundary Waters Canoe Area Wilderness, several of the state's most famous walleye fisheries, and many exceptional trout streams. The majority of the land within the basin is forested (Minnesota PCA 2001).

Overview of Wild Rice Waterbodies

Wild rice waterbodies are bodies of water where rice, a persistent annual grass, reproduces each year from seed stock deposited in previous fall seasons. Wild rice beds are very attractive to migrating waterfowl, and many rice areas are traditional waterfowl staging and hunting areas. Because they are an

important component of Minnesota's agricultural economy, they are protected in Minnesota. Wild rice can be susceptible to disturbance in all habitats (lake, river, or wetland) and is sensitive to temperature changes, contaminants, and hydrology changes—all of which on their own or in combination could affect germination and production.

Applicant's Preferred Route

Drainage Basins and Watersheds

The Applicant's preferred route would cross the Red River, Upper Mississippi River, Lake Superior, and St. Croix River basins, which are described in Section 5.2.1.2.2. Table 6.3.1.2-1 presents the average watershed health scores, water quality scores, and affected watershed acres for the major drainage basins and watersheds that would be crossed by the Applicant's preferred route. Watershed biological indices scores are discussed in Section 6.3.4.

Surface Waters Crossed

Table 6.3.1.2-2 lists the surface waters that would be crossed by the Applicant's preferred route in Minnesota. The Applicant's preferred route would require 192 crossings of surface waters (109 crossings between Clearbrook and Carlton), including perennial and intermittent streams, rivers, ponds, and lakes; unnamed surface waters and non-jurisdictional ditches; rivers listed in the NRI; navigable waters; sensitive and specially designated surface waters; and impaired surface waters. See Appendix G for a listing of all proposed waterbody crossings.

The Applicant's preferred route crosses a total of 56 public waters in Minnesota. These include 4 public water ditches, 14 artificial paths, 25 perennial streams/rivers and 13 intermittent streams/rivers. Between Clearbrook and Carlton, the Applicant's preferred route crosses a total of 36 public waters. These include 3 public water ditches, 10 artificial paths, 18 perennial streams/rivers, and 5 intermittent streams/rivers.

Table 6.3.1.2-1. Major Drainage Basins and Watersheds Crossed by the Applicant's Preferred Route in Minnesota

Drainage Basin	Watershed	HUC-8	Average Watershed Health Score[a]	Water Quality Score[b]	Construction[c] (acres)	Operations[d] (acres)
Red River of the North	Tamarac River	09020311	44	63	463.9	197.8
	Snake River	09020309	46	66	242.2	105.7
	Grand Marais Creek	09020306	42	58	39.0	17.1
	Red Lake River	09020303	54	63	301.2	132.8
	Clearwater River	09020305	60	70	719.4	323.9
	Wild Rice River	09020108	57	77	72.0	38.1
Upper Mississippi River (Mississippi Headwaters)	Mississippi River – Headwaters	07010101	68	89	251.2	112.7
	Crow Wing River	07010106	61	79	664.1	299.8
	Pine River	07010105	67	95	551.9	244.2
	Leech Lake River	07010102	69	89	7.6	3.2
	Mississippi River – Grand Rapids	07010103	65	83	621.0	298.5
	Mississippi River – Brainerd	07010104	63	76	77.9	38.1
Lake Superior	Nemadji River	04010301	64	80	161.3	72.0
	St. Louis River	04010201	59	56	64.8	28.0
St. Croix River	Kettle River	07030003	64	76	318.0	149.8

Source: Minnesota DNR 2015a.

[a] Average score is based on numerous indices comprising five main components: biology, connectivity, geomorphology, hydrology, and water quality. Index scores of 0 to 20 represent components that are heavily affected/low quality, scores of 40 to 60 represent moderately affected/moderate quality, and scores of 80 to 100 represent the least affected/high quality (scores of 20–40 and 60–80 are intermediate values). The overall watershed health scores and five component scores are calculated on a scale from 0 to 100, with 100 representing a highest score.

[b] Water quality score based on indices such as temperature, dissolved oxygen, pH, nutrient load, turbidity/sedimentation, and contaminant concentrations.

[c] Watershed acres that would be crossed by the construction work area.

[d] Watershed acres that would be crossed by the permanent right-of-way during operations.

HUC-8 = 8-digit hydrologic unit code that delineates watershed boundaries, defined by the U.S. Geological Survey (2016).

Table 6.3.1.2-2. Surface Waters Crossed by the Applicant's Preferred Route in Minnesota

Waterbody Type/Flow	Number of Crossings (PWI)
North Dakota Border to Clearbrook	
Artificial path	4
Canal/ditch	34
Connector	1
Lake/pond – perennial	2
Stream/river – intermittent	27
Stream/river – perennial	9
North Dakota border to Clearbrook subtotal	***77***
Clearbrook to Carlton	
Artificial path	11 (10)
Canal/ditch	15 (4)
Connector	3 (0)
Lake/pond – perennial	15 (0)
Stream/river – intermittent	40 (5)
Stream/river – perennial	25 (18)
Clearbrook to Carlton subtotal	***109 (36)***
Carlton to Wisconsin Border	
Lake/pond – perennial	1
Stream/river – intermittent	5
Carlton to Wisconsin border subtotal	***6***
TOTAL	**192**

Source: USGS 2017.

Notes:

An artificial path is a feature that represents flow through a two-dimensional feature, such as a lake or a double-banked stream. An artificial path represents the flow of water into, through, and out of features (channel, estuary, lake/pond, playa, reservoir, swamp, marsh). A canal ditch specifies that it is artificial and that it is used to transport water, to drain or irrigate land, to connect two or more water bodies, or to serve as a waterway for watercraft. A connector establishes a known, but non-specific connection between two non-adjacent network segments that have flow.

Perennial waterbodies are those that hold water at all times, except in cases of extreme drought. Intermittent waterbodies are those that are wet only during part of the year, usually in spring, when rain and snowmelt saturate the ground surface.

Also see maps in Appendix A.

PWI = Public Waters Inventory.

Sensitive/Specially Designated Surface Waters

The Applicant's preferred route would require nine crossings of Lake Superior Basin waters, which are designated as Outstanding International Resource Waters. Minnesota has designated the entire St. Croix River and its Kettle River tributary as ORVWs. The Applicant's preferred route would cross the Kettle River. Minnesota DNR has identified water resources crossed by the Applicant's preferred route that are sensitive due to their flow, steep slopes, beneficial use, or past construction activities on co-located projects or other factors. The Applicant and Minnesota DNR have communicated regarding these crossings, and the Applicant would prepare site-specific plans for the crossing of Mud Lake, LaSalle Creek, Hay Creek, and Straight River and two crossings of the Sandy River (and possibly others as determined by DNR) as part of its application for a License to Cross Public Waters.

The Applicant's preferred route would require six crossings of designated trout streams (Table 6.3.1.2-3). All trout stream crossings would occur in the Clearbrook-to-Carlton segment of the proposed route (maps with these trout streams are provided in Appendix A).

Table 6.3.1.2-3. Trout Streams Crossed by the Applicant's Preferred Route in Minnesota

Trout Stream	Crossing Milepost
Clearbrook to Carlton	
Blackhoof River (S-001-003)	352.1
King Creek (M-050-046-029-023)	344.2
LaSalle Creek (M-163)	170.1
Spring Brook (M-106-004-002-001)	265.3
Straight River (M-096-035-002-002)	198.3
Unnamed stream/river (perennial) (S-001-003-029)	352.3
TOTAL CROSSINGS	**6**

Source: Minnesota DNR 2015b.

Nationwide Rivers Inventory

The Applicant's preferred route would require seven crossings of NRI-listed rivers (Table 6.3.1.2-4). All of the rivers crossed have an Outstanding Resource Value (ORV) of scenery, recreation, or both. A recreational ORV signifies that recreational opportunities are, or have the potential to be, popular enough to attract visitors—or are unique or rare within the region; and visitors are willing to travel long distances to use the river resources for recreational purposes. A scenery ORV signifies that the landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features or attractions. The route would not cross a federally or state-designated Wild and Scenic River segment, though it may cross tributaries or upstream locations on other sensitive/specially designated waters.

Table 6.3.1.2-4. Rivers Listed in the Nationwide Rivers Inventory Crossed by the Applicant's Preferred Route in Minnesota

River	Outstanding Resource Value	Crossing Milepost
North Dakota Border to Clearbrook		
Middle River	Scenery	62.3
Red Lake River	Scenery; recreation	91.9
Clearbrook to Carlton		
Clearwater River	Scenery	149.5
Shell River (two crossings)	Scenery	209.5 and 215.3
Crow Wing River	Scenery; recreation	217.4
Willow River	Scenery	292.8

Source: NPS 2011.

Notes:

No rivers listed in the Nationwide Rivers Inventory would be crossed by the Applicant's preferred route in the Carlton-to-Wisconsin border segment.

Also see maps in Appendix A.

Recreation: Recreational opportunities are, or have the potential to be, popular enough to attract visitors or are unique or rare within the region. Visitors are willing to travel long distances to use the river resources for recreational purposes.

Scenery: The landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features and/or attractions.

Impaired Surface Waters

The Applicant's preferred route would require 13 crossings of impaired streams in Minnesota (Table 6.3.1.2-5) but would not cross any impaired lakes or wetlands. The Applicant's preferred route would cross three TMDL study areas, including:

- Big Sandy and Minnewawa Lakes TMDL study area (excess nutrients: phosphorus),
- Lake St. Croix Nutrient TMDL study area (excess nutrients: phosphorus), and
- Lower Wild Rice River TMDL study area (excess turbidity) (Minnesota PCA n.d.).

Table 6.3.1.2-5. Impaired Surface Waters Crossed by the Applicant's Preferred Route in Minnesota

Waterbody Name	Impaired Beneficial Use	Impairment	EPA Impairment Classification[a]	Crossing Milepost
North Dakota Border to Clearbrook				
Red River of the North	Fish consumption	Methylmercury	5	27.6
Tamarac River	Aquatic life	Aquatic macroinvertebrate bioassessments; fishes bioassessments	5	54.4
Middle River	Aquatic life	Dissolved oxygen; turbidity; aquatic macroinvertebrate bioassessments	5	62.3
Black River	Aquatic life	Dissolved oxygen	5	82.6
Clearwater River	Aquatic consumption; aquatic life	Mercury in fish tissue; dissolved oxygen; turbidity	4A	103.0
Silver Creek	Aquatic recreation	Fecal coliform	5	135.9 / 135.3 / 135.6
Clearbrook to Carlton				
Clearwater River	Aquatic consumption; aquatic life	Mercury in fish tissue; dissolved oxygen	4A	149.5
Walker Brook	Aquatic life	Dissolved oxygen	5	151.4
Mississippi River	Aquatic life	Dissolved oxygen	5	165.1
Mississippi River	Aquatic consumption	Mercury in fish tissue	4A	296.7
Kettle River	Aquatic consumption	Mercury in fish tissue	5	338.2

Sources: Minnesota PCA 2014a, 2016b, 2016c.

[a] U.S. Environmental Protection Agency (EPA) Impairment Classifications-
Category 4A: Waterbody is impaired or threatened, but a total maximum daily load (TMDL) study has been approved by EPA.
Category 5: Use assessment indicates an impaired status, and no TMDL plan has been completed.

Notes:

Also see maps in Appendix A.

No impaired rivers would be crossed by the Applicant's preferred route in the Carlton-to-Wisconsin border segment.

Navigable Waterways

The Applicant's preferred route would require five crossings of navigable waterways, as shown in Appendix A. From the North Dakota border to Clearbrook, the navigable surface waters that would be crossed include:

- Red Lake River (MP 91.9), and
- Red River of the North (MP 27.6).

From Clearbrook to Carlton, the navigable surface waters that would be crossed include:

- Kettle River (MP 338.2),
- Sandy River (MP 305.9), and
- Mississippi River (MP 296.7).

Wild Rice Waterbodies

All wild rice waterbodies within the ROI for the Applicant's preferred route occur between Clearbrook and Carlton. The areas of wild rice waterbodies that occur within 0.5 mile and that would be affected by construction and operation of the Applicant's preferred route are listed in Table 6.3.1.2-6. Seventeen wild rice waterbodies occur within 0.5 mile of the Applicant's preferred route. Four wild rice waterbodies could be affected by construction and operation of the Applicant's preferred route: Mud Lake, Peterson Lake, Portage Lake, and an unnamed lake. Wild rice waterbodies that would be crossed by the Applicant's preferred route are shown in Figure 6.3.1.2-1.

Table 6.3.1.2-6. Wild Rice Waterbodies Crossed by the Applicant's Preferred Route in Minnesota (acres)

Wild Rice Waterbody	Construction and Operations	Within 0.5 Mile of Centerline
Mud Lake	0.99	118.1
Peterson Lake	1.43	141.6
Portage Lake	2.11	74.9
Unnamed lake	0.3	54.1
TOTAL	**4.92**	**388.7**

Source: Minnesota DNR 2009b.

Route Alternatives

The only segment where the route alternatives would vary from the alignment of the Applicant's preferred route in Minnesota is between Clearbrook and Carlton. The existing conditions relevant to surface water for the route alternatives between Clearbrook and Carlton are described below.

Route Alternative RA-03AM

Drainage Basins and Watersheds

RA-03AM would cross the Red River, Upper Mississippi River, Lake Superior, and St. Croix River basins, which are described in Section 5.2.1.2.2. Table 6.3.1.2-7 presents the average watershed health scores, water quality scores, and affected watershed acres for the major drainage basins and watersheds that would be crossed by the RA-03AM route. Watershed biological indices scores are discussed in Section 6.3.4.

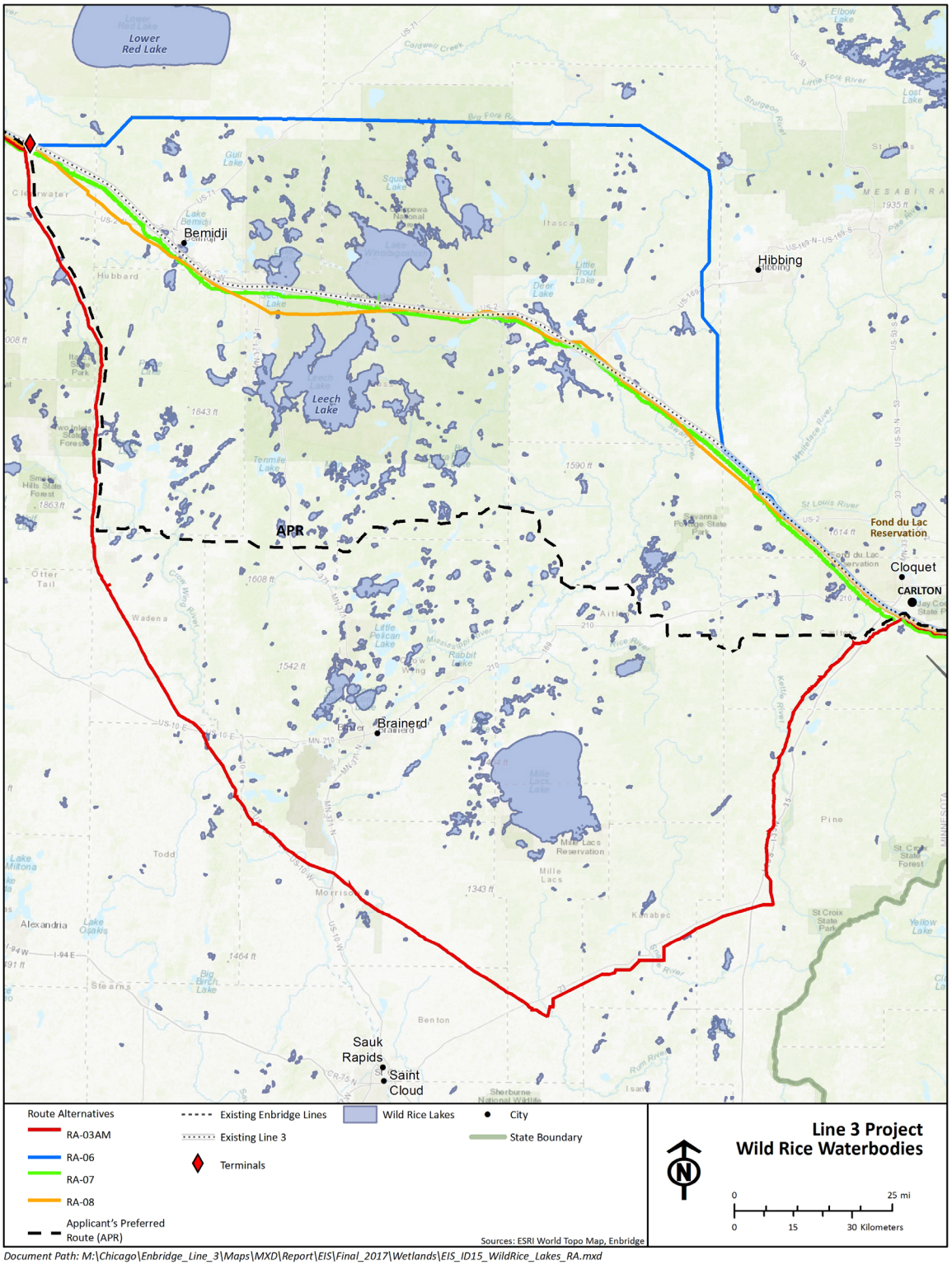

Sources: Minnesota DNR 2009a, 2009b.

Figure 6.3.1.2-1. Wild Rice Waterbodies near the Applicant's Preferred Route and Route Alternatives from Clearbrook to Carlton

Table 6.3.1.2-7. Major Drainage Basins and Watersheds Crossed by Route Alternative RA-03AM

Drainage Basin	Watershed	HUC-8	Average Watershed Health Score[a]	Water Quality Score[b]	Construction[c] (acres)	Operations[d] (acres)
Clearbrook to Carlton						
Red River of the North	Tamarac River	09020311	44	63	474.8	197.8
	Snake River	09020309	46	66	778.0	105.7
	Grand Marais Creek	09020306	42	58	40.9	17.0
	Red Lake River	09020303	54	63	318.5	132.7
	Clearwater River	09020305	60	70	792.9	330.4
	Wild Rice River	09020108	57	77	80.0	33.5
Upper Mississippi River (Mississippi Headwaters)	Mississippi River – Headwaters	07010101	68	89	270.2	112.6
	Crow Wing River	07010106	61	79	681.6	284.0
	Long Prairie River	07010108	59	64	153.7	64.0
	Mississippi River – Brainerd	07010104	63	76	267.6	111.6
	Mississippi River – Sartell	07010201	58	63	291.2	132.7
	Redeye	07010107	64	83	267.6	111.5
	Rum	07010207	61	71	383.6	159.8
Lake Superior	Nemadji River	04010301	64	80	172.8	72.0
	St. Louis River	04010201	59	56	67.2	28.0
St. Croix River	Kettle River	07030003	64	76	701.9	17.0

Source: Minnesota DNR 2015a.

[a] Average score is based on numerous indices comprising five main components: biology, connectivity, geomorphology, hydrology, and water quality. Index scores of 0 to 20 represent components that are heavily affected/low quality, scores of 40 to 60 represent moderately affected/moderate quality, and scores of 80 to 100 represent the least affected/high quality (scores of 20–40 and 60–80 are intermediate values). The overall watershed health scores and five component scores are calculated on a scale from 0 to 100, with 100 representing a highest score.

[b] Water quality score based on indices such as temperature, dissolved oxygen, pH, nutrient load, turbidity/sedimentation, and contaminant concentrations.

[c] Watershed acres that would be crossed by the construction work area.

[d] Watershed acres that would be crossed by the permanent right-of-way during operations.

HUC-8 = 8-digit hydrologic unit code that delineates watershed boundaries, defined by the U.S. Geological Survey (2016).

Surface Waters Crossed

Table 6.3.1.2-8 lists the surface waters crossed by RA-03AM. Route alternative RA-03AM would require 167 crossings of surface waters from Clearbrook to Carlton, including perennial, intermittent, and ephemeral streams; unnamed surface waters and non-jurisdictional ditches; rivers listed in the NRI; navigable waters; sensitive and specially designated surface waters; and impaired surface waters. See Appendix G for a listing of all proposed waterbody crossings.

From Clearbrook to Carlton, RA-03AM crosses a total of 60 public waters. These include 4 public water ditches, 13 artificial paths, 38 perennial streams/rivers and 4 intermittent streams/rivers, and 1 swamp/marsh.

Table 6.3.1.2-8. Surface Waters Crossed by Route Alternative RA-03AM

Waterbody Type/Flow	Number of Crossings (PWI)
Clearbrook to Carlton	
Artificial path	13 (13)
Canal ditch	31 (4)
Connector	6 (0)
Lake/pond – perennial	14 (0)
Stream/river – intermittent	62 (4)
Stream/river – perennial	41 (38)
Swamp/marsh – intermittent	? (1)
TOTAL	**167 (60)**

Source: USGS 2017.

Notes:

An artificial path is a feature that represents flow through a two-dimensional feature, such as a lake or a double-banked stream. An artificial path represents the flow of water into, through, and out of features (channel, estuary, lake/pond, playa, reservoir, swamp, marsh). A canal ditch specifies that it is artificial and that it is used to transport water, to drain or irrigate land, to connect two or more water bodies, or to serve as a waterway for watercraft. A connector establishes a known, but non-specific connection between two non-adjacent network segments that have flow.

Perennial waterbodies are those that hold water at all times, except in cases of extreme drought. Intermittent waterbodies are those that are wet only during part of the year, usually in spring, when rain and snowmelt saturate the ground surface.

PWI = Public Waters Inventory.

Sensitive/Specially Designated Surface Waters

Route alternative RA-03AM would require nine crossings of designated trout streams between Clearbrook and Carlton (Table 6.3.1.2-9). Maps with these trout streams are provided in Appendix A. RA-03AM would also cross the Kettle River, which is an ORVW.

Table 6.3.1.2-9. Trout Streams Crossed by Route Alternative RA-03AM

Trout Stream	Crossing Milepost
Clearbrook to Carlton	
Blackhoof River (S-001-003)	352.1
Cat River (M-096-028)	212.0 / 213.2
LaSalle Creek (M-163)	170.1
Mission Creek (M-050-044-006)	355.9
Straight River (M-096-035-002-002)	198.3
Unnamed Canal Ditch (M-096-018)	238.2
Unnamed stream/river (perennial) (M-096-020-001)	235.0
Unnamed stream/river (perennial) (S-001-003-029)	352.3
TOTAL CROSSINGS	**9**

Source: Minnesota DNR 2015b.

Nationwide Rivers Inventory

Between Clearbrook and Carlton, route alternative RA-03AM would cross one NRI-listed river: the Clearwater River with ORV-listed scenery at MP 149.5 (NPS 2011). RA-03AM also would cross state-designated Wild and Scenic Rivers sections of the Rum River and Kettle River.

Impaired Surface Waters

Between Clearbrook and Carlton, route alternative RA-03AM would require 14 crossings of impaired streams (Table 6.3.1.2-10) but would not cross any impaired lakes or wetlands. The route would cross six TMDL study areas, including:

- Lake St. Croix Nutrient TMDL study area (excess nutrients: phosphorus);
- Lower Wild Rice River TMDL study area (excess turbidity);
- Ann River watershed Bacteria, Nutrient, and Biota TMDL study area (excess nutrients (phosphorus), biota (fish and invertebrate), E. coli);
- Groundhouse River Fecal Coliform and Biota TMDL study area (excess fecal coliform and sediment levels);
- Long Prairie River Watershed TMDL study area (low dissolved oxygen); and
- Snake River Major Watershed (St. Croix Basin) WRAPS (excess nutrients: phosphorus), sediment, and bacteria) (Minnesota PCA n.d.).

Table 6.3.1.2-10. Impaired Surface Waters Crossed by Route Alternative RA-03AM

Waterbody Name	Impaired Beneficial Use	Impairment	EPA Impairment Classification[a]	Crossing Milepost
Clearbrook to Carlton				
Clearwater River	Aquatic consumption; aquatic life	Mercury in fish tissue; dissolved oxygen	4A	149.5
Walker Brook	Aquatic life	Dissolved oxygen	5	151.4
Mississippi River	Aquatic life	Dissolved oxygen	5	165.1
Skunk River	Aquatic recreation	Fecal coliform	5	286.8
South Fork Groundhouse River	Aquatic life	Aquatic macroinvertebrate bioassessments	4A	323.3
Groundhouse River	Aquatic life	Aquatic macroinvertebrate bioassessments	4A	328.5
Ann River	Aquatic life	Aquatic macroinvertebrate bioassessments	4A	332.7
Snake River	Aquatic consumption	Mercury in fish tissue	4A	334.9
Spring Brook	Aquatic life	Fishes bioassessments	5	337.0 / 338.0 / 335.2
Kettle River	Aquatic consumption	Mercury in fish tissue	5	384.6
Mud Creek	Aquatic life	Aquatic macroinvertebrate bioassessments; fishes bioassessments; *Escherichia coli*	4A	343.5
Grindstone River	Aquatic life	Fishes bioassessments	5	359.1

Sources: Minnesota PCA 2014a, 2016b, 2016c.

[a] U.S. Environmental Protection Agency (EPA) Impairment Classifications-
Category 4A: Waterbody is impaired or threatened, but a total maximum daily load (TMDL) study has been approved by EPA.
Category 5: Use assessment indicates an impaired status, and no TMDL plan has been completed.

Notes:
Also see maps in Appendix A.

Navigable Waterways

RA-03AM would require seven crossings of navigable waterways between Clearbrook and Carlton (USACE n.d.). The navigable surface waters that would be crossed include:

- Kettle River (MP 384.6),
- Grindstone River (MP 359.1),
- Snake River (MP 334.9),
- Ann River (MP 332.7),
- Groundhouse River (MP 328.5),
- Rum River (MP 314.3), and

- Mississippi River (MP 273.3).

Wild Rice Waterbodies

The areas of wild rice waterbodies that would be affected by construction and operation of RA-03AM are listed in Table 6.3.1.2-11 and shown in Figure 6.3.1.2-1. Eleven wild rice waterbodies occur within 0.5 mile of RA-03AM. Six wild rice waterbodies could be affected by RA-03AM: Mud Lake, Hay Creek (HDD crossing), Portage Lake, Hayden Lake, Fox Lake, and Moose Horn River. Mud Lake, Portage Lake, Hayden Lake, and Fox Lake would be crossed within an existing pipeline corridor. Moose Horn River in Pine County, a wild rice waterbody not included in Minnesota DNR's 2009 database, also would be crossed by RA-03AM at MP 400.2, within an existing pipeline corridor.

Table 6.3.1.2-11. Wild Rice Waterbodies Crossed by Route Alternative RA-03AM (acres)

Wild Rice Waterbody Type	Construction[a]	Operations[b]	Within 0.5 Mile of Centerline
Clearbrook to Carlton			
Type 3 – Inland shallow fresh marshes	2.6	1.1	226.1
Type 4 – Inland deep fresh marshes	0.0	0.0	105.1
Type 5 – Inland open fresh water	4.9	2.1	513.4
TOTAL	**7.5**	**3.1**	**844.6**

Source: Minnesota DNR 2009b.

[a] Acres of wild rice waterbodies that would be crossed by the construction work area.

[b] Acres of wild rice waterbodies that would be crossed by the permanent right-of-way during operations.

Route Alternative RA-06

Drainage Basins and Watersheds

RA-06 would cross the Red River, Upper Mississippi River Lake Superior, and St. Croix River basins, which are described in Section 5.2.1.2.2; the Rainy River Basin is described at the beginning of this section. Table 6.3.1.2-12 presents the average watershed health scores, water quality scores, and affected watershed acres for the major drainage basins and watersheds that would be crossed by the RA-06 route. Watershed biological indices scores are discussed in Section 6.3.4.

Table 6.3.1.2-12. Major Drainage Basins and Watersheds Crossed by Route Alternative RA-06

Drainage Basin	Watershed	HUC-8	Average Watershed Health Score[a]	Water Quality Score[b]	Construction[c] (acres)	Operations[d] (acres)
Clearbrook to Carlton						
Red River of the North	Tamarac River	09020311	44	63	474.8	197.8
	Snake River	09020309	46	66	253.6	105.7
	Grand Marais Creek	09020306	42	58	40.9	17.0
	Red Lake River	09020303	54	63	318.5	132.7
	Upper/Lower Red Lake	09020302	73	76	556.9	232.2
	Clearwater River	09020305	60	70	703.6	293.2
Upper Mississippi River (Mississippi Headwaters)	Mississippi River – Headwaters	07010101	68	89	17.8	7.3
	Mississippi River – Grand Rapids	07010103	65	83	339.7	141.6
Rainy River	Big Fork River	09030006	78	97	651.0	271.3
	Little Fork River	09030005	69	77	268.3	111.8
Lake Superior	Nemadji River	04010301	64	80	93.9	39.1
	St. Louis River	04010201	59	56	863.7	359.8
St. Croix River	Kettle River	07030003	64	76	21.6	9.0

Source: Minnesota DNR 2015a.

[a] Average score is based on numerous indices comprising five main components: biology, connectivity, geomorphology, hydrology, and water quality. Index scores of 0 to 20 represent components that are heavily affected/low quality, scores of 40 to 60 represent moderately affected/moderate quality, and scores of 80 to 100 represent the least affected/high quality (scores of 20–40 and 60–80 are intermediate values). The overall watershed health scores and five component scores are calculated on a scale from 0 to 100, with 100 representing a highest score.

[b] Water quality score based on indices such as temperature, dissolved oxygen, pH, nutrient load, turbidity/sedimentation, and contaminant concentrations.

[c] Watershed acres that would be crossed by the construction work area.

[d] Watershed acres that would be crossed by the permanent right-of-way during operations.

HUC-8 = 8-digit hydrologic unit code that delineates watershed boundaries, defined by the U.S. Geological Survey (2016).

Surface Waters Crossed

Table 6.3.1.2-13 lists the surface waters crossed by RA-06 from Clearbrook to Carlton. RA-06 would require 137 crossings of surface waters, including perennial, intermittent, and ephemeral streams; unnamed surface waters and non-jurisdictional ditches; rivers listed in the NRI; navigable waters; sensitive and specially designated surface waters; and impaired surface waters. See Appendix G for a listing of all proposed waterbody crossings.

From Clearbrook to Carlton, RA-06 crosses a total of 76 public waters. These include 2 public water ditches, 2 connectors, 17 artificial paths, 41 perennial streams/rivers and 8 intermittent streams/rivers, and 6 lakes/ponds.

Table 6.3.1.2-13. Surface Waters Crossed by Route Alternative RA-06

Waterbody Type/Flow	Number of Crossings (PWI)
Clearbrook to Carlton	
Artificial path	18 (17)
Canal/ditch	12 (2)
Connector	5 (2)
Lake/pond – perennial	16 (6)
Stream/river – intermittent	29 (8)
Stream/river – perennial	57 (41)
TOTAL	**137 (76)**

Source: USGS 2017.

Notes:

An artificial path is a feature that represents flow through a two-dimensional feature, such as a lake or a double-banked stream. An artificial path represents the flow of water into, through, and out of features (channel, estuary, lake/pond, playa, reservoir, swamp, marsh). A canal ditch specifies that it is artificial and that it is used to transport water, to drain or irrigate land, to connect two or more water bodies, or to serve as a waterway for watercraft. A connector establishes a known, but non-specific connection between two non-adjacent network segments that have flow.

Perennial waterbodies are those that hold water at all times, except in cases of extreme drought. Intermittent waterbodies are those that are wet only during part of the year, usually in spring, when rain and snowmelt saturate the ground surface.

PWI = Public Waters Inventory.

Sensitive/Specially Designated Surface Waters

Route alternative RA-06 would require eight crossings of designated trout streams between Clearbrook and Carlton (Table 6.3.1.2-14). Maps with these trout streams are provided in Appendix A. The RA-06 route crosses 37 Lake Superior Basin waters, which are considered to be Outstanding International Resource Waters.

Table 6.3.1.2-14. Trout Streams Crossed by Route Alternative RA-06

Trout Stream	Crossing Milepost
Clearbrook to Carlton	
Clearwater River (H-026-030-019)	149.2
Little Otter Creek (S-002-009-001)	304.2
O'Brien Creek (H-026-030-069-004) (3 crossings)	172.4 / 172.6 / 172.7
Unnamed stream/river (intermittent) (S-002-032-011)	283.6
Unnamed stream/river (perennial) (H-001-030-023-002-010-001-001)	243.6
Venning Creek (H-001-030-023-002-010)	242.7
TOTAL CROSSINGS	**8**

Source: Minnesota DNR 2015b.

Nationwide Rivers Inventory

Between Clearbrook and Carlton, RA-06 would cross two NRI-listed rivers: the Clearwater River with ORV-listed scenery at MP 149.2, and the Big Fork River with ORV-listed scenery and recreation at MP 223.4 (NPS 2011). The route would not cross a federally or state-designated Wild and Scenic River segment.

Impaired Surface Waters

Between Clearbrook and Carlton, RA-06 would require one crossing of Ruffy Brook, which has aquatic recreation beneficial uses and is impaired by fecal coliform (EPA Category 5) (Minnesota PCA 2014a, 2016b, 2016c). RA-06 would not cross any impaired lakes or wetlands. The route would cross the Lake St. Croix Nutrient TMDL study area once, which is impaired by excess nutrients (phosphorus) (Minnesota PCA n.d.).

Navigable Waterways

Route alternative RA-06 would cross the Big Fork River nine times (USACE n.d.) at the following mileposts:

- MP 214.5
- MP 215.2
- MP 223.4
- MP 210.0
- MP 215.9
- MP 203.9
- MP 212.6
- MP 204.2
- MP 205.6

Wild Rice Waterbodies

The areas of wild rice waterbodies that would be affected by construction and operation of RA-06 are listed in Table 6.3.1.2-15 and shown in Figure 6.3.1.2-1. Five wild rice waterbodies occur within 0.5 mile of RA-06. Four wild rice waterbodies would be crossed by RA-06, all within new pipeline rights-of-way: Rice Lake, Coddington Lake, Dora Lake, and Big Fork River. Rice Lake in Beltrami County, a wild rice waterbody not included in Minnesota DNR's 2009 database, would be crossed by RA-06 at MP 160.0.

Table 6.3.1.2-15. Wild Rice Waterbodies Crossed by Route Alternative RA-06 (acres)

Wild Rice Waterbody Type	Construction[a]	Operations[b]	Within 0.5 Mile of Centerline
Clearbrook to Carlton			
Type 4 – Inland deep fresh marshes	0.0	0.0	74.9
Type 5 – Inland open fresh water	10.6	4.4	352.6
TOTAL	**10.6**	**4.4**	**427.5**

Source: Minnesota DNR 2009b.

[a] Acres of wild rice waterbodies that would be crossed by the construction work area.

[b] Acres of wild rice waterbodies that would be crossed by the permanent right-of-way during operations.

Route Alternative RA-07

Drainage Basins and Watersheds

RA-07 would cross the Red River, Upper Mississippi River Lake Superior, and St. Croix River basins, which are described in Section 5.2.1.2.2. Table 6.3.1.2-16 presents the average watershed health scores, water quality scores, and affected watershed acres for the major drainage basins and watersheds that would be crossed by the RA-03AM route. Watershed biological indices scores are discussed in Section 6.3.4.

Table 6.3.1.2-16. Major Drainage Basins and Watersheds Crossed by Route Alternative RA-07

Drainage Basin	Watershed	HUC-8	Average Watershed Health Score[a]	Water Quality Score[b]	Construction[c] (acres)	Operations[d] (acres)
Clearbrook to Carlton						
Red River of the North	Tamarac River	09020311	44	63	635.4	197.8
	Snake River	09020309	46	66	253.6	105.7
	Grand Marais Creek	09020306	42	58	40.9	17.0
	Red Lake River	09020303	54	63	318.5	132.7
	Clearwater River	09020305	60	70	864.0	306.5
Upper Mississippi River (Mississippi Headwaters)	Mississippi River – Headwaters	07010101	68	89	1341.3	327.5
	Leech Lake River	07010102	69	89	474.8	169.4
	Mississippi River – Grand Rapids	07010103	65	83	581.2	132.7
Lake Superior	Nemadji River	04010301	64	80	97.0	39.1
	St. Louis River	04010201	59	56	1,171.2	295.9
St. Croix River	Kettle River	07030003	64	76	42.3	9.0

Source: Minnesota DNR 2015a.

[a] Average score is based on numerous indices comprising five main components: biology, connectivity, geomorphology, hydrology, and water quality. Index scores of 0 to 20 represent components that are heavily affected/low quality, scores of 40 to 60 represent moderately affected/moderate quality, and scores of 80 to 100 represent the least affected/high quality (scores of 20–40 and 60–80 are intermediate values). The overall watershed health scores and five component scores are calculated on a scale from 0 to 100, with 100 representing a highest score.

[b] Water quality score based on indices such as temperature, dissolved oxygen, pH, nutrient load, turbidity/sedimentation, and contaminant concentrations.

[c] Watershed acres that would be crossed by the construction work area.

[d] Watershed acres that would be crossed by the permanent right-of-way during operations.

HUC-8 = 8-digit hydrologic unit code that delineates watershed boundaries, defined by the U.S. Geological Survey (2016).

Surface Waters Crossed

Table 6.3.1.2-17 lists the surface waters crossed by RA-07 from Clearbrook to Carlton. RA-07 would require 81 crossings of surface waters, including perennial, intermittent, and ephemeral streams; unnamed surface waters and non-jurisdictional ditches; rivers listed in the NRI; navigable waters;

sensitive and specially designated surface waters; and impaired surface waters. See Appendix G for a listing of all proposed waterbody crossings.

From Clearbrook to Carlton, RA-07 crosses a total of 34 public waters. These include 3 public water ditches, 1 connector, 5 artificial paths, 17 perennial streams/rivers, 6 intermittent streams/rivers, 1 lake/pond and 1 swamp/marsh.

Table 6.3.1.2-17. Surface Waters Crossed by Route Alternative RA-07

Waterbody Type/Flow	Number of Crossings (PWI)
Clearbrook to Carlton	
Artificial path	5 (5)
Canal/ditch	19 (3)
Connector	2 (1)
Lake/pond – perennial	6 (1)
Stream/river – intermittent	20 (6)
Stream/river – perennial	28 (17)
Swamp/marsh – intermittent	1 (1)
TOTAL	**81 (34)**

Source: USGS 2017.

Notes:

An artificial path is a feature that represents flow through a two-dimensional feature, such as a lake or a double-banked stream. An artificial path represents the flow of water into, through, and out of features (channel, estuary, lake/pond, playa, reservoir, swamp, marsh). A canal ditch specifies that it is artificial and that it is used to transport water, to drain or irrigate land, to connect two or more water bodies, or to serve as a waterway for watercraft. A connector establishes a known, but non-specific connection between two non-adjacent network segments that have flow.

Perennial waterbodies are those that hold water at all times, except in cases of extreme drought. Intermittent waterbodies are those that are wet only during part of the year, usually in spring, when rain and snowmelt saturate the ground surface.

PWI = Public Waters Inventory.

Sensitive/Specially Designated Surface Waters

Route alternative RA-07 would require six crossings of designated trout streams between Clearbrook and Carlton (Table 6.3.1.2-18). Maps with these trout streams are provided in Appendix A.

Table 6.3.1.2-18. Trout Streams Crossed by Route Alternative RA-07

Trout Stream	Crossing Milepost
Clearbrook to Carlton	
Clearwater River (H-026-030-019)	151.2
Little Otter Creek (S-002-009-001)	304.2
Necktie River (M-146-017-001)	176.4
Unnamed stream/river (intermittent) (M-146-017-001-001)	174.5
Unnamed stream/river (intermittent) (M-146-017-001-002)	173.3
Unnamed stream/river (perennial) (H-026-030-019-025.1)	151.1
TOTAL CROSSINGS	**6**

Source: Minnesota DNR 2015b.

Nationwide Rivers Inventory

Route alternative RA-07 would cross one NRI-listed river between Clearbrook and Carlton: the Clearwater River, with ORV-listed scenery at MP 151.2 (NPS 2011). The route would not cross a federally or state-designated Wild and Scenic River segment.

Impaired Surface Waters

Route alternative RA-07 would require two crossings of impaired streams between Clearbrook and Carlton (Table 6.3.1.2-19) but would not cross any impaired lakes or wetlands. The route would cross the Lake St. Croix Nutrient TMDL study area once, which is impaired by excess nutrients (phosphorus) (Minnesota PCA n.d.).

Table 6.3.1.2-19. Impaired Surface Waters Crossed by Route Alternative RA-07

Waterbody Name	Impaired Beneficial Use	Impairment	EPA Impairment Classification[a]	Crossing Milepost
Clearbrook to Carlton				
Ruffy Brook	Aquatic recreation	Fecal coliform	5	143.1
Swan River	Aquatic consumption	Mercury in fish tissue	4A	253.9

Sources: Minnesota PCA 2014a, 2016b, 2016c.

[a] U.S. Environmental Protection Agency (EPA) Impairment Classifications-
Category 4A: Waterbody is impaired or threatened, but a total maximum daily load (TMDL) study has been approved by EPA.
Category 5: Use assessment indicates an impaired status, and no TMDL plan has been completed.

Note:
Also see maps in Appendix A.

Navigable Waterways

Route alternative RA-07 would cross the Mississippi River at MP 241.8.

Wild Rice Waterbodies

The areas of wild rice waterbodies that would be affected by construction and operation of RA-07 are listed in Table 6.3.1.2-20 and shown in Figure 6.3.1.2-1. Eleven wild rice waterbodies occur within 0.5 mile of RA-07 (Table 6.3.1.2-20). One wild rice waterbody (White Oak Lake) is crossed by RA-07 within the existing pipeline corridor at the stream inlet to the lake basin portion of the wild rice lake boundary.

Table 6.3.1.2-20. Wild Rice Waterbodies Crossed by Route Alternative RA-07 (acres)

Wild Rice Waterbody Type	Construction[a]	Operations[b]	Within 0.5 Mile of Centerline
Clearbrook to Carlton			
Type 3 – Inland shallow fresh marshes	0.0	0.0	0.0
Type 4 – Inland deep fresh marshes	6.1	2.5	581.3
Type 5 – Inland open fresh water	0.0	0.0	840.7
TOTAL	**6.1**	**2.5**	**1,422.0**

Source: Minnesota DNR 2009b.

[a] Acres of wild rice waterbodies that would be crossed by the construction work area.

[b] Acres of wild rice waterbodies that would be crossed by the permanent right-of-way during operations.

Route Alternative RA-08

Drainage Basins and Watersheds

RA-08 would cross the Red River, Upper Mississippi River Lake Superior, and St. Croix River basins, which are described in Section 5.2.1.2.2. Table 6.3.1.2-21 presents the average watershed health scores, water quality scores, and affected watershed acres for the major drainage basins and watersheds that would be crossed by the RA-08 route. Watershed biological indices scores are discussed in Section 6.3.4.

Table 6.3.1.2-21. Major Drainage Basins and Watersheds Crossed by Route Alternative RA-08

Drainage Basin	Watershed	HUC-8	Average Watershed Health Score[a]	Water Quality Score[b]	Construction[c] (acres)	Operations[d] (acres)
Clearbrook to Carlton						
Red River of the North	Tamarac River	09020311	44	63	474.8	197.8
	Snake River	09020309	46	66	253.6	105.7
	Grand Marais Creek	09020306	42	58	40.9	17.0
	Red Lake River	09020303	54	63	318.5	132.7
	Clearwater River	09020305	60	70	714.5	297.7
Upper Mississippi River (Mississippi Headwaters)	Mississippi River – Headwaters	07010101	68	89	664.4	276.8
	Leech Lake River	07010102	69	89	536.7	223.6
	Mississippi River – Grand Rapids	07010103	65	83	388.3	161.8
Lake Superior	Nemadji River	04010301	64	80	93.8	39.1
	St. Louis River	04010201	59	56	631.6	263.3
St. Croix River	Kettle River	07030003	64	76	22.9	9.3

Source: Minnesota DNR 2015a.

[a] Average score is based on numerous indices comprising five main components: biology, connectivity, geomorphology, hydrology, and water quality. Index scores of 0 to 20 represent components that are heavily affected/low quality, scores of 40 to 60 represent moderately affected/moderate quality, and scores of 80 to 100 represent the least affected/high quality (scores of 20–40 and 60–80 are intermediate values). The overall watershed health scores and five component scores are calculated on a scale from 0 to 100, with 100 representing a highest score.

[b] Water quality score based on indices such as temperature, dissolved oxygen, pH, nutrient load, turbidity/sedimentation, and contaminant concentrations.

[c] Watershed acres that would be crossed by the construction work area.

[d] Watershed acres that would be crossed by the permanent right-of-way during operations.

HUC-8 = 8-digit hydrologic unit code that delineates watershed boundaries, defined by the U.S. Geological Survey (2016).

Surface Waters Crossed

Table 6.3.1.2-22 lists the surface waters crossed by RA-08 from Clearbrook to Carlton. RA-08 would require 106 crossings of surface waters, including perennial, intermittent, and ephemeral streams; unnamed surface waters and non-jurisdictional ditches; rivers listed in the NRI; navigable waters; sensitive and specially designated surface waters; and impaired surface waters. See Appendix G for a listing of all proposed waterbody crossings.

From Clearbrook to Carlton, RA-08 crosses a total of 36 public waters. These include 1 public water ditch, 1 connector, 5 artificial paths, 21 perennial streams/rivers, 4 intermittent streams/rivers, and 1 lake/pond.

Table 6.3.1.2-22. Surface Waters Crossed by Route Alternative RA-08

Waterbody Type/Flow	Number of Crossings (PWI)
Clearbrook to Carlton	
Artificial path	6 (5)
Canal ditch	27 (1)
Connector	4 (1)
Lake/pond – perennial	11 (1)
Stream/river – intermittent	27 (4)
Stream/river – perennial	31 (21)
TOTAL	**106 (36)**

Source: USGS 2017.

Notes:

An artificial path is a feature that represents flow through a two-dimensional feature, such as a lake or a double-banked stream. An artificial path represents the flow of water into, through, and out of features (channel, estuary, lake/pond, playa, reservoir, swamp, marsh). A canal ditch specifies that it is artificial and that it is used to transport water, to drain or irrigate land, to connect two or more water bodies, or to serve as a waterway for watercraft. A connector establishes a known, but non-specific connection between two non-adjacent network segments that have flow.

Perennial waterbodies are those that hold water at all times, except in cases of extreme drought. Intermittent waterbodies are those that are wet only during part of the year, usually in spring, when rain and snowmelt saturate the ground surface.

Also see maps in Appendix A.

PWI = Public Waters Inventory.

Sensitive/Specially Designated Surface Waters

Route alternative RA-08 would require four crossings of designated trout streams between Clearbrook and Carlton (Table 6.3.1.2-23). Maps with these trout streams are provided in Appendix A.

Table 6.3.1.2-23. Trout Streams Crossed by Route Alternative RA-08

Trout Stream	Crossing Milepost
Clearbrook to Carlton	
Little Otter Creek (S-002-009-001)	301.4
Necktie River (M-146-017-001)	177.0
Unnamed stream/river (intermittent) (M-146-017-001-001)	173.9
Unnamed stream/river (intermittent) (M-146-017-001-002)	172.7
TOTAL CROSSINGS	**4**

Source: Minnesota DNR 2015b.

Nationwide Rivers Inventory

Route alternative RA-08 would cross one NRI-listed river between Clearbrook and Carlton: the Clearwater River, with ORV-listed scenery at MP 148.8 (NPS 2011). The route would not cross a federally or state-designated Wild and Scenic River.

Impaired Surface Waters

Route alternative RA-08 would require five crossings of impaired streams between Clearbrook and Carlton (Table 6.3.1.2-24) but would not cross any impaired lakes or wetlands. The route would cross the Lake St. Croix Nutrient TMDL study area once, which is impaired by excess nutrients (phosphorus) (Minnesota PCA n.d.).

Table 6.3.1.2-24. Impaired Surface Waters Crossed by Route Alternative RA-08

Waterbody Name	Impaired Beneficial Use	Impairment	EPA Impairment Classification[a]	Crossing Milepost
Clearbrook to Carlton				
Ruffy Brook (two crossings)	Aquatic recreation	Fecal coliform	5	144.1 / 144.3
Clearwater River	Aquatic consumption; aquatic life	Mercury in fish tissue; dissolved oxygen	4A	148.8
Swan River	Aquatic consumption	Mercury in fish tissue	4A	252.3
Mississippi River	Aquatic consumption	Mercury in fish tissue	4A	165.8

Sources: Minnesota PCA 2014a, 2016b, 2016c.

[a] U.S. Environmental Protection Agency (EPA) Impairment Classifications-

Category 4A: Waterbody is impaired or threatened, but a total maximum daily load (TMDL) study has been approved by EPA.

Category 5: Use assessment indicates an impaired status, and no TMDL plan has been completed.

Notes:

Also see maps in Appendix A.

Navigable Waterways

Route alternative RA-08 would cross the Mississippi River at MP 241.6 and Sucker Creek at MP 192.5 (USACE n.d.).

Wild Rice Waterbodies

The areas of wild rice waterbodies that would be affected by construction and operation of RA-08 are listed in Table 6.3.1.2-25 and shown in Figure 6.3.1.2-1. Two wild rice waterbodies, Nushka Lake and White Oak Lake, would be crossed by RA-08; both crossings would be located within an existing pipeline corridor. White Oak Lake would be crossed by RA-08 at the stream inlet to the lake basin, while Nushka Lake would be crossed at the lake shoreline.

Table 6.3.1.2-25. Wild Rice Waterbodies Crossed by Route Alternative RA-08 (acres)

Wild Rice Waterbody Type	Construction[a]	Operations[b]	Within 0.5 Mile of Centerline
Clearbrook to Carlton			
Type 4 – Inland deep fresh marshes	9.8	4.1	948.2
Type 5 – Inland open fresh water	0.0	0.0	246.8
Type 9 – Inland saline flats	0.0	0.0	9.4
TOTAL	**9.8**	**4.1**	**1,204.5**

Source: Minnesota DNR 2009b.

[a] Acres of wild rice waterbodies that would be crossed by the construction work area.

[b] Acres of wild rice waterbodies that would be crossed by the permanent right-of-way during operations.

6.3.1.2.3 Regional Analysis of the Quality of Existing Surface Water Conditions

This analysis provides a summary of general quality comparisons of surface water conditions across Minnesota as well as more detailed potential effects on specific surface water resources along the Applicant's preferred route and the route alternatives.

The north-central and northeast portion of Minnesota consist of water resources that are generally the highest quality recreational water resources in the state. To describe the general regionwide or statewide difference in surface water resource quality across Minnesota, different general methods can be used, including the Minnesota PCA ecoregion concept to guide typical water quality conditions and Minnesota DNR's WHAF. The quality of existing surface water conditions are discussed using each of these frameworks below.

- Minnesota PCA Ecoregion Concept to Guide Typical Water Quality Conditions. The state is divided into seven different ecoregions based on soils. Ecoregions have similar soil, geomorphology, land use and natural vegetation. The Northern Lakes and Forests (NLF) Ecoregion typically has the highest water quality compared to other ecoregions, especially those with areas more dominated by altered landscapes. Minnesota PCA offers a guide to typical water quality conditions in these seven ecoregions, "large expanses of land containing a geographically distinct collection of plants, animals, natural communities and environmental conditions."[9]
- Minnesota DNR WHAF. Another approach used to describe surface water quality conditions across landscapes in Minnesota is the WHAF Tool, developed by Minnesota DNR, which uses the science of watershed health. The **science** of watershed health is based on a whole-system approach. Ecological processes interact to provide services such as clean air and water, available groundwater, and diverse plant and animal communities. The science of health explores how all the parts system work together to provide a "healthy watershed." In order to explore the watershed system in a consistent, systematic way, the ecological processes have been divided into five different components: biology, connectivity, geomorphology, hydrology, and water quality. A suite of **watershed health index scores** have been calculated that represent many of

[9] https://www.pca.state.mn.us/quick-links/eda-guide-typical-minnesota-water-quality-conditions.

the important ecological relationships within and between the components. These scores are built on statewide GIS data that are compared consistently across Minnesota to provide a baseline health condition report for each of the 81 major watersheds in the state. The Watershed Health Assessments consist of health scores that rank the condition of Minnesota's watersheds from 0 (poor health condition, red) to 100 (good health condition, green). Watershed report cards indicate poorer water quality related to altered land use indicators as depicted in this analysis[10] (Appendix J-1).

The ecoregion approach used to assess water quality by Minnesota PCA and the WHAF Tool developed by Minnesota DNR are useful in describing existing surface water conditions across Minnesota. In general, the north-central and northeast forested portions of Minnesota are the least impaired and have the highest quality surface water resources; areas in the west and south agricultural portions of the state have the most impaired surface water resources and are of poorer quality.

Specifically, the data indicate that there are higher quality resources in the NLF ecoregion of the state. Lower nutrients (mainly phosphorus) and chlorophyll-a (algae) and greater transparency are indicative of lakes in this ecoregion. Streams in this ecoregion exhibit lower nutrients, turbidity, and fecal coliform, as well as lower temperature and biological oxygen demand conditions. A spatial distribution of lakes and streams depicted in Appendices J-2 and J-3, which show lakes and streams relative to pipeline routes across the state. There are a large number of lakes and streams in north-central and northeast Minnesota, and they are of the highest quality when comparing ecoregion data.

Three watersheds were assessed to represent potential pipeline routing areas throughout the state: the Pine River watershed (north-central), Chippewa River (west) and Le Sueur River (south). The watershed health index scores indicate that the best health scores are represented in the Pine River and the worst scores in the Chippewa and Le Sueur River watersheds accordingly. Further, in general, statewide maps indicate better health scores across the north and east and poorer scores across the south and west, as depicted by analysis of the five different components: biology, connectivity, geomorphology, hydrology, and water quality (Appendix J-1). Water quality scores for the Applicant's preferred route and route alternatives are provided in Tables 6.3.1.2-7, 6.3.1.2-12, 6.3.1.2-16, and 6.2.1.3-21).

Trout Streams

Several trout streams are intersected by the route alternatives. Often because of their non-impaired or minimally impaired watersheds and their locations, soils, and geologic setting within the state, these streams represent high-quality, cold, oxygenated water necessary for trout survival. RA-06, RA-07, RA-08, RA-03AM, and the Applicant's preferred route occur or intersect, within 0.5 mile, 17 to 24 designated trout streams or protected tributaries to designated trout streams (Table 6.3.2.1-26).

[10] http://www.dnr.state.mn.us/whaf/index.html.

Table 6.3.2.1-26. High-Quality Surface Water Resources Occurring within 0.5 Mile of Route Centerline for the Applicant's Preferred Route and Route Alternatives

High-Quality Surface Water Resource	Applicant's Preferred Route	Route Alternatives			
		RA-06	RA-07	RA-08	RA-03AM
Trout streams	17	24	17	16	17
Wild rice lakes	17	5	11	9	11
Lakes of high and outstanding biological significance	8	4	12	9	4
Tulibee lakes	4	1	9	10	3

Wild Rice Lakes

Minnesota has more acres of natural wild rice (*Zizania palustris*) than any other state in the country. Wild rice has been historically documented in 45 of Minnesota's 87 counties and in all corners of the state. Anecdotal information suggests an even broader distribution prior to European settlement. Wild rice is an important social and cultural component for American Indian tribes and rural Minnesota communities.

A Minnesota DNR assessment found over 1,200 lakes and rivers in 54 counties that currently contain or historically had wild rice. Over 64,000 acres of wild rice (out of roughly 2 million basin acres) were found on these waters. More than half of the acreage was found in Aitkin, Cass, Crow Wing, Itasca, and St. Louis counties.

Large numbers of wild rice lakes exist in the NLF ecoregion, and this is represented by several lakes located within 0.5 miles of each of the routes in this ecoregion (Table 6.3.2.1-26).

Lakes of Biological Significance (High and Outstanding)

Lakes of Biological Significance were identified and classified by Minnesota DNR subject matter experts on objective criteria for four community types (aquatic plants, fish, amphibians, and birds). Unique plant or animal presence was the primary measure of a lake's biological significance. Lakes were rated and grouped for each of the following communities: aquatic plants, fish, birds, and amphibians. Lakes were assigned one of three biological significance classes (outstanding, high, or moderate). This assessment viewed outstanding and high sites as they are representative of the highest quality conditions. Many Minnesota lakes have not been sampled for plants or animals, so this list of lakes will be periodically revised as additional biological data become available.

There are a large number of lakes with high and outstanding biological significance in the NLF ecoregion. RA-06, RA-07, RA-08, RA-03AM and the Applicant's preferred route all cross some of these lakes in this ecoregion (Table 6.3.2.1-26).

Tullibee Lakes

Minnesota has about 650 tullibee lakes, more than any other state in the lower 48. Many of these waters are prized by anglers because tullibee (also known as cisco, or lake herring in Lake Superior) provide a high-energy feast for walleye, northern pike, muskellunge, and lake trout. Changes in land use

and climate are causing many lakes to lose tullibee. Keeping forested land intact can help maintain water quality in lakes with tullibee and other coldwater species. The Tullibee Lake Watershed Forest Stewardship Project[11] is engaging owners of private woodlands and other conservation partners to protect vulnerable waters in north-central Minnesota (Table 6.3.2.1-26).

Other Spatial Indicators of the Quality of Surface Water

Ditches

An evaluation was also done on the number of public water ditches crossed by the routes. High numbers of ditches is an indication of landscape alteration that adversely affects water resources, thus diminishing the quality of water resources in the area. An image of the total number of ditches, including private, in the vicinity of the Applicant's preferred route and route alternatives is depicted on a statewide map in Appendix J-4.

Perennial Cover

Areas that tend to rate low in perennial cover, terrestrial habitat quality, and connectivity have poorer overall health index scores as depicted in watershed health scores for the Pine, Chippewa, and Le Sueur River watersheds (Appendix J-5).

Wetlands

The northern routes (RA-06, RA-07, and RA-08) extend through areas containing a large number of wetlands, many of which are peat wetlands. Minnesota's 6 million acres of peatlands represent a major component of the state's natural heritage. In a worldwide context, the patterned peatlands in Minnesota are extremely valuable for the study of ecological and developmental processes in peatlands as noted in *Recommendations for the Protection of Ecologically Significant Peatlands in Minnesota* (Minnesota DNR 1984). The number of wetlands statewide is also depicted in viewing watershed health scores under "Loss of Hydrologic Storage, Wetland Loss" in (Appendices J-6 and J-7).

Walleye Lakes

Walleyes and walleye fishing are an important heritage to all Minnesotans and can be an indicator of ecological condition of lakes. Walleye lakes are fairly dispersed across the state; however, habitat suitable for reproduction and self-sustaining populations has a much higher presence in the high-quality waters representative of the NLF ecoregion.

Applicant's Preferred Route – Clearbrook to Carlton

The Applicant's preferred route follows a route south of Clearbrook, following an existing pipeline right-of-way, and then follows an existing transmission line corridor easterly toward Carlton. The northern routes (RA-06, RA-07, RA-08, and the Applicant's preferred route) all pass through a large number of streams, lakes, wetlands, and accompanying resources—all of which are generally of high quality. The Applicant's preferred route intersects a similar amount of resources as the route alternatives; however, the Applicant's preferred route has the potential to affect the highest number of wild rice lakes (17). Among other notable resources, this route passes 17 trout streams and 8 lakes of high and outstanding biodiversity significance as well as 4 tullibee lakes. See Table 6.2.1.2-26 for a comparison of resources intersected.

[11] http://www.dnr.state.mn.us/tullibeelake.html.

RA-03AM – Clearbrook to Carlton

RA-03AM follows a route south of Clearbrook following an existing pipeline right-of-way and continues southeast toward Staples, Little Falls, and Milaca and then northeast toward Mora, Hinckley, Moose Lake, and Carlton. This route avoids areas of highest quality surface water resources in areas of north-central and northeast Minnesota. Notable in this route are similar amounts of trout stream and designated trout stream tributaries (17) as well as wild rice lakes (11). There are fewer tullibee lakes (3) and lakes of high and outstanding biodiversity significance (4) than most other northern routes. The longer length of this route increases the potential of intersecting more resources.

When reviewing Minnesota PCA's ecoregion concept for assessing lake water quality as well as Minnesota DNR WHAF data, there is a trend toward poorer water quality associated with more intensive land use in the southern portion of this route. This is noted in water quality conditions in the North Central Hardwood Forests as compared to the NLF ecoregion and WHAF health scores as well as layers depicting ditches, perennial cover, or loss of hydrologic storage from wetlands. See Table 6.2.1.2-26 for a comparison of resources intersected.

RA-06 – Clearbrook to Carlton

This route is the most northerly route around the Chippewa National Forest. The northern routes (RA-06, RA-07, RA-08, and the Applicant's preferred route) all pass through a large number of streams, lakes, wetlands and accompanying resources all of which are generally of high quality. Though there are fewer lakes of high and outstanding biodiversity intersected by RA-06, there are 5 wild rice lakes and a large number of trout streams and trout stream tributaries within this route (24). This route also passes four lakes of high and outstanding biodiversity significance and one tullibee lake. The large amount of undisturbed upland and wetland forest cover helps maintain healthy surface water conditions in this route area. See Table 6.2.1.2-26 for a comparison of resources intersected.

RA-07 – Clearbrook to Carlton

This route follows the existing pipeline corridor southeast to Carlton nearest U.S. Highway 2 until it leaves the highway and follows a southeasterly route toward Carlton. In evaluating the overall quality resources in the northern routes as well as trout streams, wild rice lakes, and lakes of high and outstanding biodiversity significance, this route has similar high-quality resources and potential effects when compared to other northern routes. Among notable resources, this route passes 17 trout streams, 11 wild rice lakes, 12 lakes of high and outstanding biodiversity significance, and 9 tullibee lakes. The difference in this route is that it is within an existing corridor that has already had similar land use alterations from previous pipeline installations and operations as well as U.S. Highway 2 and railway. See Table 6.2.1.2-26 for a comparison of resources intersected.

RA-08 – Clearbrook to Carlton

This route follows the existing pipeline corridor southeast to Carlton near but more south of U.S. Highway 2 than RA-07 until it follows a southeasterly route toward Carlton. In evaluating the overall quality resources in the northern routes as well as trout streams, wild rice lakes, lakes of high and outstanding biodiversity significance and tullibee lakes, this route has similar potential effects when compared to other northern routes. Notable resources, this route passes 16 trout streams, 9 wild rice lakes, 9 lakes of high and outstanding biodiversity significance and 10 tullibee lakes. Similar to RA-07, the difference is this route is that it is within an existing corridor that has already had similar land use

alterations from previous pipeline installations and operations as well as U.S. Highway 2 and railway. See Table 6.2.1.2-26 for comparison of resources intersected.

6.3.1.2.4 Impact Assessment

This section addresses the impact analysis conducted for the Applicant's preferred route and the route alternatives. The analysis assessed potential impacts on surface waters in the ROIs for the route options, as described in Section 6.3.1.2.1, related to the following concerns:

- Runoff and flows – increases in stormwater runoff and erosion, increases in TSSs concentrations and increased sedimentation, changes in stream flows from water withdrawals and discharges, and disruption of flow paths or local hydrologic connectivity;
- Surface water and aquatic habitat quality – degradation of surface water quality, degradation of aquatic habitat from instream and other construction activities, degradation of water quality and habitat from releases of drilling mud during HDD crossings;
- Channel morphology and stability – changes in channel morphology and stability caused by channel and streambank modifications; and
- Disturbance of wild rice waterbodies.

Many pipeline construction activities have the potential to affect surface water flow and quality. These activities include clearing and grading, dewatering and trenching, blasting, access road construction, waterbody crossings, surface water withdrawals and discharges (e.g., for hydrostatic test water), fueling and use of hazardous materials, and restoration or reclamation of construction areas. The following sections address potential impacts on surface water from these activities for the Applicant's preferred route and route alternatives. After the discussion of construction impacts, the potential impacts of operations on surface waters are addressed for the Applicant's preferred route and each route alternative.

Applicant's Preferred Route (in Minnesota)

Construction Impacts

Runoff and Flows

Increases in Stormwater Runoff and Erosion. Clearing and grading would be required within the construction work area for the pipeline, MLVs, new and expanded pump stations, and cathodic protection sites—as well as for access roads and ATWS, including six pipe yards in Minnesota. Newly cleared areas and impervious surfaces could cause increased stormwater runoff and erosion into nearby surface waters; however, the Applicant would comply with the requirements of applicable permit programs that are in place to manage potential impacts, as addressed below.

The Applicant would obtain NPDES permits for the pipeline, MLVs, pump stations, cathodic protection sites, access roads and ATWS, and pipe yards prior to construction. Minnesota PCA already has granted NPDES General Construction Stormwater Coverage permits for the pipe yard locations. NPDES permits would specify various stormwater and erosion control measures to be implemented, such as requiring stormwater to be routed around exposed soil areas through conveyance channels and requiring stormwater discharges to be directed from the site to vegetated areas in order to increase sediment removal and infiltrate stormwater on the site when feasible (Minnesota PCA 2013a). Prior to submitting

an application for an NPDES permit, the Applicant would be required to develop a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP would provide a site description identifying the construction activities, where stormwater discharge would occur, and the receiving waters. The plan also would describe erosion and sediment controls to be implemented during construction, stormwater pollution management, waste disposal, maintenance and inspection practices, and any additional requirements. The permit application and SWPPP must be submitted for Minnesota PCA review at least 30 days before the start of construction activity.

The Applicant's Environmental Protection Plan (Appendix E) describes the Applicant-proposed measures that likely would be included in the SWPPP and as conditions in the NPDES permit. These include temporary sediment and erosion control measures to be used during construction, such as slope breakers, sediment barriers (e.g., silt fence, straw bales, and bio-logs), stormwater diversions, trench breakers, mulch, and erosion control blankets. These temporary controls would be placed across the entire construction work area at the base of slopes greater than 5 percent, where the base of the slope is less than 50 feet from surface waters, until the area is revegetated and there is no potential for scouring or sediment transport to surface waters. Trench breakers would be used at all waterbody crossings, as necessary, to prevent diversion of water into upland portions of the pipeline trench and to keep accumulated trench water out of the waterbody. Permanent berms, as approved in permit conditions, would be installed 100 to 250 feet apart on all slopes greater than 3 percent to prevent erosion and sedimentation into surface waters once construction is complete.

To further protect surface water resources, NPDES permits would require maintenance of a 50-foot-wide natural buffer downgradient of the construction site, or redundant sediment controls if a buffer is not feasible, when construction is within 50 feet of a surface water (Minnesota PCA 2013b). For any construction site within 1 mile of a special water, NPDES permits also would require that an undisturbed buffer zone extending not less than 100 feet from the water be maintained at all times. If the buffer zone cannot be maintained, redundant BMPs must be used to protect the special water (e.g., trout streams) (Minnesota PCA 2013a). Trout rely on coldwater habitats for survival, and exposure to sunlight from vegetation removal can cause adverse warming of the water. Therefore, construction NPDES permits prohibit removal of woody vegetation and replacement with grassy vegetation near trout streams unless the reasons are absolutely necessary and completely documented in the SWPPP (Minnesota PCA 2013c). Further, to minimize stormwater discharge into and temperature increases in trout streams, NPDES permits would require that impervious surfaces be minimized; discharges be made into vegetated areas or grass swales, avoiding impervious surfaces when possible; and infiltration or other volume reduction practices be used to reduce runoff in excess of pre-Project conditions (Minnesota PCA 2013d).

The NPDES permits also would require that soil stabilization be initiated immediately (i.e., by the end of the day following the day that land-disturbing activities have temporarily or permanently ceased) when construction activities would not resume for 14 days for most sites, for 7 days for sites that drain to special or impaired waters, and within 24 hours for sites where Minnesota DNR "work in water restrictions" apply during fish spawning timeframes. Further, the NPDES permits would require inspection of the entire construction site once every 7 days or within 24 hours of a rainfall event greater than 0.5 inch in 24 hours as measured by a rain gauge installed onsite, a weather station that is within 1 mile of the Project location, or a weather reporting system that provides site specific rainfall data from radar summaries. All non-functioning stormwater and erosion control measures would be replaced or repaired within 24 hours of discovery.

By complying with these NPDES permit conditions and implementing the Applicant-proposed measures to minimize impacts, the impact of increased stormwater runoff and erosion from clearing and grading due to construction would be short-term to long-term and minor.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. In addition to clearing and grading, other construction activities such as blasting, trenching, waterbody crossings, establishment of ATWS, access road construction, and water discharges may result in increased suspended solids and sedimentation in surface waters crossed. The Applicant's temporary erosion controls, SWPPP requirements, and NPDES permit requirements described above would be implemented during these activities to prevent sediment transport into surface waters during construction. The Applicant anticipates the need for four blasting events from MP 354.6 to 356.6 in Carlton County, Minnesota, due to shallow bedrock. As noted above, blasting can cause increases in TSS and sedimentation in surface waters near the blast site. Prior to construction, the Applicant would develop a Blasting Plan, which would adhere to all stipulations set forth by federal (CFR Title 29, Part 1926 Safety and Health Regulations for Construction/Subpart U – Blasting and the Use of Explosives – Blasting) and state regulations (Minnesota Administrative Rules Chapter 7500) and would include measures to protect nearby surface waters from these impacts. Therefore, the impacts from four blasting events on TSS and sedimentation are expected to be temporary and negligible to minor.

During pipeline construction across a waterbody, the extent and duration of increased sedimentation and increased erosion potential depend on the soils, sediments, and topography of the crossing site and the crossing method used. As described in detail in Section 2.7.2, the types of methods that may be used include the wet open-cut crossing method, dry open-cut crossing methods (dam-and-pump and flume), and HDD or guided bore.

Construction of the pipeline across the waterbody using dry open-cut methods would occur in a dry area created by temporary dams upstream and downstream of the work area. TSS and sedimentation would increase when flow is returned to the dry channel but would readily dissipate to negligible levels in the downstream vicinity of the crossing. As a result, impacts on surface water quality due to increases in TSS concentrations and increased sedimentation in surface waters crossed using dry open-cut crossing methods would be temporary to short-term and minor.

Wet open-cut methods involve excavation of the channel and banks in the wetted channel. Because excavated soils would be in direct contact with surface water, the Applicant would install sediment containment devices (e.g., in-water BMPs such as floating silt curtains) to contain the excavated material and minimize the potential for increased sedimentation. The in-water BMPs would remain in place until construction is completed. The NPDES permits would require inspection of surface waters, drainage ditches, and conveyance systems at least every 7 days (or within 24 hours following a rainfall event greater than 0.5 inch) for sediment and would require removal of any deposits within 7 days (Minnesota PCA 2013b). To reduce the potential for long-term erosion and sedimentation, disturbed areas at waterbody crossings would be restored to preconstruction contours after pipeline installation is completed. The Applicant would reestablish streambank vegetation using Minnesota Seed Mix 2 (described in Appendix C of the Applicant's Environmental Protection Plan [Appendix E]) or a native seed mix recommended by the Minnesota BWSR. If the Applicant maintains compliance with NPDES permit conditions and implements the Applicant-proposed measures, impacts on water quality due to increases in TSS concentrations and increased sedimentation in surface waters crossed using the wet open-cut crossing method would be temporary to short-term to long-term and minor.

Changes in Stream Flows from Water Withdrawals and Discharges. The Applicant would withdraw water for hydrostatic testing, dust control, trench dewatering, and HDD installation. Hydrostatic testing would require approximately 120 million gallons of water (between 11 and 17 million gallons for each of seven construction spreads) (Enbridge 2016b) that the Applicant would obtain from lakes, streams, or groundwater wells. The proportion of water that would be obtained from groundwater versus surface water has not been determined. The Applicant is currently evaluating transferring water from one test section to another in order to minimize the total quantity of water needed to complete the hydrostatic test. Water appropriation needs for dust control, trench dewatering, and HDD installation have not been determined. Prior to construction, the Applicant would obtain a water appropriation permit from Minnesota DNR. These permits would require identification of and rationale for choosing specific surface water sources; requested maximum pumping rates and maximum annual volumes of water to be used; monitoring of pumping rates during appropriation with an approved device or method; and reporting of daily, monthly, and/or yearly appropriation amounts.

As stipulated in permit requirements, the Applicant would select appropriation sites that would meet Minnesota DNR's criteria of "doing no harm," and all appropriation sites would be reviewed by Minnesota DNR prior to issuance of a water appropriation permit. The permit requires that water withdrawals have a minimal potential for impacts on groundwater resources and must not adversely affect trout streams, calcareous fens, or other significant environmental resources. If water is withdrawn from surface water, hose intakes would be equipped with screens to prevent entrainment of aquatic species, and adequate waterbody flow rates and volumes would be maintained to protect aquatic life and allow for downstream uses as required by the water use permit (Appendix E).

Hydrostatic test water would be discharged from a test section in accordance with the NPDES permit in one of two ways: (1) into well-vegetated upland areas using controlled-flow velocity with a dewatering structure such as a silt fence and straw bales or into geotextile filter bags that are used to avoid soil erosion, sediment transport, and bottom scouring; or (2) into the waterbody from which it was withdrawn to prevent the spread of invasive species or degradation in water quality; the discharge rate would not exceed the permitted applicable discharge rate (Appendix E). Water would be treated as specified in the NPDES permit prior to discharge; and the Applicant would monitor pH, dissolved oxygen levels, and any other parameters required by the permit, as described in Appendix D of the Environmental Protection Plan (Appendix E). Discharges would adhere to all conditions set forth in NPDES and water appropriation permits, including discharge over approved energy dissipation measures (e.g., sand bags, plastic sheeting, or natural rock riprap) and the sedimentation control measures as described above. With adherence to water appropriation and NPDES permit conditions and implementation of Applicant-proposed measures, impacts on stream flows from water appropriation and discharge during construction would be temporary and minor.

Disruption of Flow Paths or Local Hydrologic Connectivity. "Hydrologic connectivity" is the water-mediated transport of matter, energy, and organisms within or between elements of the hydrologic cycle (the continuous movement of water on, above, and below the Earth's surface) (Pringle 2003). Pipeline construction may disrupt flow paths and groundwater-surface water interaction due to clearing and grading of riparian vegetation, water appropriation and discharge, and channel and streambank modifications caused by waterbody crossings (discussed above). Hydrologic connectivity can be decreased if barriers are constructed to prevent the natural flow of water and can be increased if natural barriers are removed. Disruption of hydrologic connectivity and the natural interaction between groundwater and surface water can affect water quality by altering the acidity, dissolved oxygen levels,

and nutrient and contaminant loads in surface waters, thereby affecting the aquatic environment. It also can allow the spread of invasive species and prevent migration and reproduction of species.

With implementation of the Applicant-proposed measures described above to prevent or minimize erosion and sedimentation, to monitor stream flows during water appropriation and discharge, and to restore streambanks to their original attributes after construction, impacts on flow and hydrologic connectivity during construction along the construction work area would be temporary to permanent and minor to major. Potential impacts that are permanent and major would be associated with specific site features that are sensitive to disruption of hydrologic connectivity. Springs and other surface water features that are dependent on shallow groundwater have the potential for permanent and major impacts.

Construction would involve creation of both temporary and permanent access roads, which also could affect hydrologic connectivity. The Applicant would restore temporary access roads, including roads that were widened and graded, to preconstruction conditions upon completion of construction. The restoration would include seeding disturbed areas with a suitable seed mix for the area. The Applicant would leave any improved roads intact if requested by the respective landowner. Impacts on hydrologic connectivity associated with temporary access roads is expected to be short-term and negligible to minor, depending on the location of the roads. Impacts from permanent access roads are discussed in the operations section below.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. Because only minor increases in stormwater runoff would occur during construction, the potential for stormwater to carry contaminants into surface waters is low. The impact of contaminants on surface water quality therefore would be short-term to long-term and negligible to minor, continuing until vegetative cover is restored to approximate preconstruction conditions. For areas that will not be returned to preconstruction conditions the potential impact would be permanent and minor. These impacts are discussed further as operational impacts.

Trout rely on coldwater habitats for survival, and exposure to sunlight from vegetation removal can cause adverse warming of the water. Therefore, construction NPDES permits typically prohibit removal of woody vegetation and replacement with grassy vegetation near trout streams unless the reasons are absolutely necessary and completely documented in the SWPPP (Minnesota PCA 2013c). Further, to minimize stormwater discharge into and temperature increases in trout streams, NPDES permits typically require that impervious surfaces be minimized; discharges be made into vegetated areas or grass swales, avoiding impervious surfaces when possible; and infiltration or other volume reduction practices be used to reduce runoff in excess of pre-Project conditions (Minnesota PCA 2013d). By complying with these NPDES permit conditions and implementing the Applicant-proposed measures to minimize impacts, it is not likely that construction would affect water temperature in surface waters crossed.

During construction, surface water may become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals as a result of activities such as fuel storage, equipment refueling, and equipment maintenance. To protect surface water resources, NPDES permits would require secondary containment of hazardous materials, prohibition of engine degreasing at work sites, containment and collection of liquid and solid wastes, and a spill prevention and response plan for fueling and maintenance of vehicles (Minnesota PCA 2013b). The Applicant would store petroleum products, hazardous chemicals, and lubricating oils;

conduct refueling, maintenance, and lubricating operations; and perform concrete coating activities in upland areas more than 100 feet from surface waters (Appendix E). Concrete wash water, grindings, and slurry disposal would be limited to a designated area and would not be discharged to surface waters. Rinse water, used in conjunction with a cleaning pig to remove any accumulated construction debris, dirt, and dust prior to hydrostatic testing, would be treated and disposed of or discharged in accordance with applicable permit conditions. During HDD installation, drilling mud and slurry would be stored away from the waterbody in a bermed sediment control structure, in tanks, or by other methods so that it would not flow into the waterbody. Excess drilling mud would be disposed of offsite at an approved disposal facility. In addition to these prevention measures, the Applicant would be responsible for cleaning up small spills through procedures outlined in their Environmental Protection Plan (Appendix E), including notifying proper personnel (e.g., the onsite spill coordinator) and agencies, stopping work activity that caused the spill, using absorbent booms and pads to contain and recover released materials in water, and disposing of contaminated response materials at approved facilities. With adherence to NPDES permit conditions and implementation of Applicant-proposed measures, impacts on surface water quality from small leaks and spills would be temporary and minor.

Potential impacts on surface water due to an unanticipated crude oil release are discussed in Chapter 10.

As discussed above, 100-foot buffers would be required adjacent to special waters (e.g., the Mississippi River, St. Croix River, and trout streams) during construction and as a permanent feature post-construction, except where a water crossing or other encroachment is necessary. As required by NPDES permit stipulations, the reasons that the buffer encroachment would be necessary and reasons for the use of redundant BMPs and restoration activities must be included in the SWPPP.

For Section 303(d)-listed surface waters, which already have an impairment that prevents a beneficial use, degradation of water quality is of particular concern. Aquatic life, human health, and/or recreational activities are already at risk in these surface waters, and further degradation of water quality may exacerbate an existing impairment, cause additional impairments, interfere with restoration activities, and delay attainment of water quality standards. NPDES permits would require identification of Section 303(d) waters with phosphorus, turbidity, dissolved oxygen, or biotic impairment within 1 mile of construction. If the impaired waters have an approved TMDL implementation plan, the plan must be incorporated into the SWPPP, and discharges must comply with specified TMDLs (Minnesota PCA 2013d). With adherence to the above NPDES permit conditions and implementation of Applicant-proposed measures, impacts of construction activities on Section 303(d)-listed surface waters would be temporary to short-term and negligible to minor.

Degradation of Aquatic Habitat from Instream Activities. Pipeline construction across surface waters has the potential to alter and degrade aquatic habitat through increased sedimentation and erosion, disruption or alteration of stream flow, and streambank disturbance. Stream crossings would be designed as close to perpendicular to the axis of the stream channel as engineering and routing constraints allow, to create the shortest possible crossing length in order to minimize disturbance to the stream. The Applicant has proposed primary and alternative crossing methods for the Applicant's preferred route based on various factors, including waterbody size, sensitivity (e.g., trout stream), water levels, soil/sediment stability installation, and anticipated season of installation (Appendix G). If a route permit is issued for a specific route, the Applicant would be required to obtain crossing permits from Minnesota DNR for all public waters, and the exact crossing method for each waterbody would be stated in the permits. Minnesota DNR would consider various factors, including geological, topographic,

hydrographic, geotechnical, and scour depth characteristics of each crossing, after final pipeline design in determining their approval for specific waterbody crossing methods.

In general, surface waters with stable banks in mineral soil and noticeable flow at the time of construction would be crossed using dry crossing methods, HDD, or guided bore. Surface waters that are dry during construction and selected surface waters that consist of ditches in peatland with no banks or impoundments (e.g., beaver dams and plugged culverts), with stagnant or no noticeable flow conditions, and that would not support dams necessary to isolate and dry the construction area, would be crossed using the wet open-cut method.

One of two types of dry crossing methods would be used for certain surface waters. The dam-and-pump method would be used for surface waters of low flow, those with meandering channels, and those for which fish passage is not a concern; the flume method would be used in narrow surface waters with defined banks and a straight channel across the construction work area that has a solid substrate (Appendix E provides additional details on water crossing methods). Dry crossing methods are advantageous because they limit sediment release and downstream transport, maintain stream flow, reduce the potential for trench sloughing, and provide a dry working environment for pipe installation. However, dry crossings take more time to complete than wet trenching, may require fish salvage, and create a short-term barrier to fish passage.

Crossings constructed using either dry open-cut crossing method would release sediments after the dams are removed and natural waterbody flow returns. However, the sediments would readily dissipate to negligible levels in the downstream area in the vicinity of the crossing. As a result, the potential impact on aquatic habitat of using the dry crossing method is expected to be temporary to short-term and minor for each crossing.

Wet open-cut crossings can be completed more rapidly than dry crossing methods and would result in a shorter duration of instream disturbance than dry crossings. This method also would be used where dry methods and HDD are not permitted. Wet crossings would require implementation of the erosion and sediment control measures discussed above. Instream construction activities for wet crossing methods would be completed within 24 hours for minor surface waters (i.e., those less than or equal to 10 feet wide at the water's edge at the time of crossing), within 48 hours for intermediate surface waters (i.e., those greater than 10 feet wide but less than 100 feet wide at the water's edge at the time of crossing), and as specified in applicable permits or by the Applicant for major surface waters (greater than 100 feet wide at the time of crossing). The erosion and sedimentation control measures discussed above would be implemented during and after wet open-cut crossings, and disturbed areas at crossings would be restored and stabilized as soon as practical after pipeline installation. As a result, instream construction activities for wet open-cut crossings would cause short-term and minor impacts on aquatic habitat.

Guided bore crossings would be used at narrow wetlands and at shallow ditches adjacent to roads or railroads. Disturbance to the water in the ditch would be avoided because the guided bore method involves boring an auger from an excavated pit on one side of the ditch to an excavated pit on the other side. This method is not suitable in areas with a high water table, loose sand and gravel substrates, or steep slopes. It also requires excavations and ATWS on either side of the crossing and increases the potential for streambank subsidence; if dewatering is required, sediment release is possible. However, successful bore crossings would result in no impact on aquatic habitat.

HDD crossings would be used to avoid impacts on certain sensitive surface waters, such as impaired waters and coldwater fishery resources; particularly deep, wide, or high-flow surface waters; and where appropriate based on subsurface substrate conditions and length of the drill path. HDD crossings are advantageous because they do not disturb streambeds or streambanks and they maintain stream flow and fish passage. However, they require ATWS on both sides of the crossing, which involves vegetative clearing, soil disturbance, and subsequent restoration activities. Woody vegetation in riparian areas typically would not be cleared for the purpose of ATWS unless approved by appropriate regulatory agencies, as stipulated in permits issued for the Applicant's preferred route (Appendix E). Installation of HDD crossings has the potential for inadvertent releases (discussed below). However, successful HDD crossings would cause no impact on aquatic habitat.

Degradation of Water Quality and Habitat from Drilling Mud Releases during HDD Crossings. When used in appropriate conditions and completed successfully, HDD Crossings have the potential to reduce the amount of sedimentation produced by conventional techniques (Golder 1998). Consequently, HDD can provide a cost effective and environmentally viable solution to water crossings. This appealing potential has encouraged its use in sensitive crossings such as wetlands and trout streams. Despite increased use over time a serious risk of inadvertent releases or "frac-outs" exists (Golder 1998).

Multiple conditions can lead to frac-outs, such as circulation losses when drilling into highly permeable gravels and inaccurate drilling of pilot holes. The amount of fluid released is related to variables such as the pressure exerted on the fluid by the hydraulic system. Finally, "the subsequent dispersion from the release point will then be a function of the energy, or sediment transport characteristics of the receiving waterbody" (Golder 1998).

Negative impacts from frac-outs include toxicity of drilling mud to aquatic organisms, the effects of spills or inadvertent releases of drilling fluid, and the disposal of drilling wastes. Slade (2000) reports "short-term effects of releasing drilling fluid into wetlands include temporary displacement of resident fauna, smothering of benthic organisms and plant root systems, increased turbidity of water quality, and effects on water chemistry and wetland hydrology." A release can reduce densities and emergence of adult benthic invertebrates; change hydrological and soil conditions; change fish physiology, behavior, and habitat suitability; and cause long-term impacts on the aquatic ecosystem (Golder 1998). Slade (2000) also identifies additional environmental considerations for the drill rig set-up with respect to water resources and sensitive areas: containment and storage placement of raw fluids, water appropriation and water storage areas, delineation of the "no fueling" areas, and disposal of drilling fluid and cuttings upon completion.

It can be difficult to predict the probability of an occurrence. Yet loss of circulation is common in HDD operations. Longer crossings and HDDs passing through glacial tills, boulders and gravels, have a higher risk of failure. Slade (2000) studied a pipeline construction project from Stockbridge to Freedom Junction Michigan (Enbridge). This was a 35-mile, 16-inch crude petroleum pipeline using 11 HDDs to cross through wetlands, streams, and state recreational areas. Results determined multiple relatively minor releases requiring less clean up and two major frac-outs resulting in significant (volume, location, and ecology) issues.

It is important to consider the implications (on organisms, sediment, physical disturbance) of potential frac-outs and clean-up operations, identify the pros and cons of each type of crossing method, then match the appropriate technique to each crossing based on the site characteristics and conditions. Therefore, the Applicant would consider all of these factors when deciding what technique is applied to

each site when using HDD[1] (see HDD contingency plan). The Applicant would follow BMPs to minimize potential impacts for all crossings during the Project.

Geotechnical surveys would be conducted to determine which surface waters to be crossed are geologically suitable for HDD. The Applicant has proposed HDD crossings at 19 locations (12 between Clearbrook and Carlton) to minimize construction impacts on certain surface waters (Table 6.3.1.2-27). The impact analysis includes the assumption that, if an HDD crossing has been proposed for a waterbody along the Applicant's preferred route, the same construction method would be used if the same waterbody is crossed by a route alternative. Other HDD crossings for surface waters crossed by route alternatives would be determined and permitted prior to construction.

During drilling, fluid (water, bentonite clay, and possible additives) is circulated through the drilling pipe to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. The potential exists for an inadvertent release or "frac-out" of this drilling fluid to occur when pressurization of the drill hole is beyond the containment capability of the overburden soil material, which would allow the drilling fluid to flow to the ground or river bed surface. Although bentonite clay is non-toxic, drilling mud can smother aquatic wildlife and increase turbidity in affected surface waters. Additives may be mixed with the drilling fluids/mud for viscosity or lubricating reasons. Only non-hazardous additives approved under permit conditions would be used, and a Material Safety Data Sheet for the drilling fluid would be maintained onsite. If a frac-out occurred near the streambank, bank stability may be compromised. Construction personnel would monitor the crossing to detect releases of drilling mud.

The HDD operator would constantly monitor drilling fluid pressures during pilot hole operations and, if a loss in fluid pressure or circulation were identified, the operator would notify onsite construction observers who would visually monitor the portion of the drill path where the drill tool is located to determine whether a drilling mud release occurred. If a release occurred, the Applicant would implement containment, response, and clean-up procedures as outlined in the Applicant's Environmental Protection Plan (Appendix E) to limit the potential for drilling mud to reach surface water. These procedures include containment using straw bales, sandbags, pumps and hoses, vacuum trucks; response activities, including adjusting drill rates and pump volumes or stopping drilling, removal of mud with pumps and appropriate storage away from the waterbody prior to disposal; and coordination with appropriate agencies to discuss additional containment or clean-up requirements. If the frac-out caused impacts on the streambank, the bank would be restored to the extent possible using the channel and streambank modification BMPs described above. Frac-outs would be reported to the Minnesota Duty Officer. If a frac-out occurred and went undetected or was not quickly contained, impacts on surface water quality could be long-term and major. However, with implementation of the Applicant-proposed measures to respond to a drilling mud release during HDD construction, the impact of a release could be short-term and minor.

Table 6.3.1.2-27. Proposed Horizontal Directional Drilling Crossings in Minnesota for the Applicant's Preferred Route and Route Alternatives

Waterbody	Milepost	Agency Designation	Minnesota PCA Classification	Route Option Crossing
North Dakota-Minnesota Border to Clearbrook				
Tamarac River	54.4	Section 303(d) impaired	1C, 2Bd, 3C	All routes
Middle River	62.3	NRI, Section 303(d) impaired	2B, 3C	All routes
Snake River	70.5	Public Water	2B, 3C	All routes
Red Lake River	91.9	NRI, Section 10	1C, 2Bd, 3C	All routes
Unnamed ditch	92.3	None	None	All routes
Clearwater River	103.0	Public Water, Section 303(d) impaired	2B, 3C	All routes
Red River of the North	ND 27.6	Public Water, Section 303(d) impaired, Section 10	1C, 2Bd,3C	All routes
Clearbrook to Carlton				
Clearwater River	149.5	Public Water, Section 303(d) impaired, NRI	2B, 3C	Applicant's preferred route; RA-03AM
Mississippi River	165.1	Public Water, Section 303(d) impaired	2B, 3C	Applicant's preferred route; RA-03AM
Hay Creek	187.8	Public Water, NRI, wild rice water	2B, 3C	Applicant's preferred route; RA-03AM
Straight River	198.3	Trout stream	1B, 2A, 3B	Applicant's preferred route; RA-03AM
Shell River	207.8	Wild rice water	2B, 3C	Applicant's preferred route
Unnamed stream/river perennial	209.5	Public Water	2B, 3C	Applicant's preferred route
Shell River	215.3	NRI	2B, 3C	Applicant's preferred route
Crow Wing River	317.4	Public Water, NRI	2B, 3C	Applicant's preferred route
Willow River	292.8	Public Water, NRI	2B, 3C	Applicant's preferred route
Mississippi River	296.7	Section 303(d) impaired, Section 10, Public Water	2B, 3C	Applicant's preferred route
Sandy River	305.9	Section 10, Public Water	2B, 3C	Applicant's preferred route
Sandy River	312.8	Public Water	2B, 3C	Applicant's preferred route

Source: Enbridge 2016a.

Notes:

No horizontal directional drilling is proposed to cross a surface water in the Carlton-to-Minnesota-Wisconsin border segment.

Minnesota PCA = Minnesota Pollution Control Agency, NRI = Nationwide Rivers Inventory

Changes in Channel Morphology and Stability Caused by Channel and Streambank Modifications

Dry and wet open-cut waterbody crossing methods involve excavation of the streambed and potential changes to streambank stability and channel morphology. To minimize impacts on waterbodies, Minnesota Administrative Rules Part 6135.1100, Subp. 4 specifies that crossings should be placed at the narrowest section of a waterbody feasible; crossing of lakes should be avoided when possible, and they should be crossed under water (i.e., using guided bore or HDD) when necessary; and crossing on or under the beds of trout streams should be avoided unless there is no feasible alternative. The Applicant would adhere to these stipulations when feasible, and each waterbody crossing would be approved prior to construction.

As outlined in the Environmental Protection Plan (Appendix E), temporary erosion control measures would be implemented as necessary during waterbody crossing activities; and rock riprap, geotextile fabric, and other bioengineering techniques would be used to stabilize sites as needed. Following crossing construction, river beds and streambeds would be restored to preconstruction conditions, with no impediments to water flow; and streambanks would be restored to preconstruction grades when practicable. If the slope is determined to be unstable, the banks would be reshaped to prevent slumping. Finally, streambanks would be restored with appropriate vegetation. The use of open-cut crossings during pipeline construction would result in short-term to long-term and minor changes in channel morphology and streambank stability. Construction for HDD crossings would result in no impacts on channel morphology or streambank stability.

Disturbance of Wild Rice Waterbodies

Four wild rice waterbodies would be crossed by the Applicant's preferred route, with about 5 acres of the delineated waterbody basins within the construction work area. Construction would occur across the edge of the basins within the existing pipeline corridor but not through the wild rice stands on Mud Lake, Peterson Lake, and Portage Lake (Appendix A). In addition, some or all of the wild rice areas occur along the margins of larger waterbodies where the Applicant would use site-specific waterbody crossing techniques, including HDD. HDD would be used to cross the unnamed wild rice waterbody at Hay Creek and the Shell River within the existing pipeline corridor. At this location and at other sites where HDD is used as the crossing method, the wild rice waterbodies would not be affected unless a frac-out occurs (see previous discussion of frac-outs).

Where HDD is not used, the wild rice waterbodies would be crossed using applicable wetland crossing methods for the water saturation conditions at the crossing (see Section 2.7.2 for a description of waterbody and wetland construction methods). Trenched crossing could remove the rice plants and disturb sediments, and could increase sedimentation within the remainder of the waterbody. Although the Applicant would restore the hydrology and soils of the affected wild rice waterbodies after construction, rice yield would be reduced in the portion of the waterbody directly affected by the repair or replacement activities for the first growing season after construction. To minimize impacts of construction through wild rice waterbodies, the Applicant would implement applicable measures identified in the Stream and River Crossing Requirements and Construction Methods in the Environmental Protection Plan (Appendix E). These plans contain measures to reduce or avoid impacts on wild rice during construction. Avoidance measures include use of a narrower construction work area, reseeding, monitoring, and use of timber mats, and incorporate any additional measures proposed by local and state agencies to reflect existing regional policies and procedures to protect wild rice. Two stands also would be monitored for overall condition, function, and vegetative regrowth after construction until the permit conditions are met.

Although not anticipated, construction-related impacts on wild rice waterbodies could include longer than expected recovery time for native wild rice stands (i.e., impacts could affect rice waterbodies beyond the first growing season after construction), introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice, and altered lakebed conditions—all of which could be detrimental to wild rice germination and production. These potential impacts would be reduced through Project-specific SPCC plans, invasive species management plans, and post-construction monitoring of vegetation for a period of time until permit conditions are met, as described in the Applicant's Environmental Protection Plan (Appendix E). With implementation of these measures, impacts on wild rice waterbodies are expected to be short-term and minor. However, if HDD frac-out, introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice, and altered lakebed conditions occur as a result of construction, impacts could be major.

Operations Impacts

Runoff and Flows

Increases in Stormwater Runoff and Erosion. After the pipeline is installed, revegetation of the permanent right-of-way may require up to several years to reestablish to approximately preconstruction conditions, except in areas where new impervious surfaces are created, as addressed below. Runoff patterns along the non-impervious portions of the permanent right-of-way therefore would be altered during the first few years of operation, resulting in impacts of increased runoff and erosion that would be short-term and negligible to minor. After vegetation is reestablished along the permanent right-of-way, surface water runoff and erosion would return to approximately preconstruction conditions. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would make the appropriate repairs and improvements. Runoff characteristics in areas where woody vegetation has been permanently removed would result in permanent and minor changes in runoff. These effects could be more pronounced in areas where forest habitat is removed and herbaceous vegetation used for revegetation.

Within Minnesota, expansion of the Clearbrook terminal, modification of three pump stations, construction of four new pump stations, and installation of 27 MLVs would add approximately 67 acres of impervious surfaces, with approximately 30.3 acres of that area between Clearbrook and Carlton. Stormwater retention ponds would be located at each pump station, consisting of an additional approximately 10 acres. The Applicant would be required to manage stormwater runoff at these new or expanded facilities in accordance with the stipulations of NPDES permits and SWPPPs as described above, which include the use of the stormwater retention ponds or other permanent stormwater controls. As a result, the potential impacts on surface water due to increased stormwater runoff from impervious surfaces would be permanent and negligible to minor.

During operation, the Applicant would implement their Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. This could result in topographical changes and loss of vegetation in localized areas for relatively short periods of time, which would alter runoff patterns and could increase erosion. The Applicant would implement measures to minimize impacts during and after these activities, similar to the measures incorporated into the Project during construction. As a result, the impacts of these integrity management activities on stormwater runoff and erosion would be short-term and negligible to minor for each local occurrence, but would occur periodically over the life of the Project.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. During the first few years of operation, there may be a small increase in surface water runoff and erosion as revegetation continues, potentially resulting in increases in TSS and sedimentation in nearby surface waters. The impact of this increase on surface waters would be short-term and negligible to minor. These effects could be more pronounced in areas where forest habitat is removed and herbaceous vegetation used for revegetation.

The pipeline right-of-way in upland areas would be maintained in an herbaceous vegetative state during operation to allow access along the right-of-way for inspection, monitoring, and maintenance. The permanent removal of riparian vegetation within the permanent right-of-way in areas adjacent to waterbody crossings would result in localized alterations in habitat, streambank stability loss and erosion, and sedimentation. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify streambank areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would make the appropriate repairs and improvements. With implementation of these measures, the impacts associated with the localized changes to topography or vegetation would result in short-term and minor impacts in the vicinity of the alteration.

During operation, the Applicant would implement their Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. This could result in topographical changes and loss of vegetation in localized areas for relatively short periods of time, which would alter runoff patterns and could increase erosion. The Applicant would implement measures to minimize impacts during and after these activities, similar to the measures incorporated into the Project during construction. As a result, the impacts of these integrity management activities would be similar to those experienced from construction, but over a much smaller area. The impacts on TSS and sedimentation in nearby surface waters would be short-term and negligible to minor for each local occurrence, but would occur periodically over the life of the Project.

Changes in Stream Flows from Water Withdrawals and Discharges. Normal operation of the Applicant's preferred route would not require withdrawal or discharge of water. However, during repair or replacement of pipe as part of the Applicant's Integrity Management Program described above, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during the integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control are not defined. However, as described for pipeline construction, the Applicant would be required to obtain water appropriation and NPDES permits for testing procedures; and the volume of water would be substantially less than for construction. With adherence to permits and implementation of existing BMPs, alterations in stream flows from water appropriation and discharge would be temporary and negligible.

Disruption of Flow Paths or Local Hydrologic Connectivity. Integrity management digs would result in minor alterations of topography and stormwater flows at the excavation sites. With implementation of the Applicant-proposed measures described above to avoid changes to stormwater runoff and restore streambanks to their original attributes after work is completed, impacts on flow and hydrologic connectivity during in the areas excavated for pipe repair or replacement would be temporary to short-term and negligible to minor.

Permanent access roads during operation also could affect hydrologic connectivity. It is anticipated that permanent access roads would require local or state permits, which likely would require culverts to

minimize the changes to hydrologic connectivity. Although the extent of the changes in those cases would depend on the topography of the area and the design of the roadway, the impact on hydrologic connectivity likely would be permanent and minor. For access roads without culverts, the extent of changes to hydrologic connectivity could be greater, again dependent on the topography of the area and the design of the roadway. Where those roadways are present, the impact on hydrologic connectivity likely would be permanent and minor.

Other permanent aboveground facilities, such as pump stations and MLVs, also would affect hydrologic connectivity. Due to the relatively small footprints of these facilities, it is anticipated that their presence would result in permanent but negligible to minor impacts.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. The pipeline right-of-way in upland areas would be maintained in an herbaceous vegetative state during operation to allow access along the right-of-way for inspection, monitoring, and maintenance. The permanent removal of riparian vegetation in areas adjacent to waterbody crossings would allow more light to enter the waterbody and could cause long-term to permanent but negligible to minor increases in temperature and runoff characteristics at these locations.

During normal operation, there would be no other measurable changes to water quality in surface waters. Water quality is not anticipated to materially change in the surface waters of the basins and watershed along the route, including impaired surface waters.

Minor accidental fuel and lubricant leaks and spills could be related to maintenance and inspection vehicles. Any refueling, fuel storage, or vehicle maintenance would follow the Applicant-proposed measures set forth in the Environmental Protection Plan (Appendix E). Thus, minor leaks and spills would result in temporary and negligible to minor impacts on surface water quality. The potential impacts of an unanticipated crude oil release on surface water quality are addressed in Chapter 10.

Degradation of Aquatic Habitat from Instream Activities. Instream excavations may be required to repair or replace pipe segments buried beneath surface waters. This would result in impacts similar to those described for surface water crossings. The excavations to reach the pipe segments may be accomplished using the wet open-cut method or more likely would involve use of one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would release sediments after the dams are removed and natural waterbody flow returns. However, the sediments would readily dissipate to negligible levels in the downstream area in the vicinity of the crossing. As a result, the potential impact on aquatic habitat of using the dry open-cut method for instream integrity digs is expected to be temporary to short-term and minor for each crossing.

If the wet open-cut method is used for integrity digs, the Applicant would implement the erosion and sediment control measures discussed above for construction of surface water crossings. These measures would be implemented during and after wet open-cut integrity digs; if streambanks are disturbed, they would be restored and stabilized as soon as practical after completion of the pipe repair or replacement. As a result, instream integrity dig activities for using the wet open-cut method would result in short-term and minor impacts on aquatic habitat.

Changes in Channel Morphology and Stability Caused by Channel and Streambank Modifications

Excavation and repair or replacement of pipe may be required within surface waters or at the banks of surface waters. The excavations to reach the pipe segments may be accomplished using the wet open-cut method or more likely would involve use of one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would involve backfilling of the trench, after the repair or replacement is made, to the approximate contours of the river or streambed. This could result in a minor temporary change in channel morphology until the natural sedimentation processes of the waterbody return the affected area to essentially match the nearby morphology. If streambanks are affected by the digs, they would be restored to preconstruction grades when practicable. If the slope is determined to be unstable, the banks would be reshaped to prevent slumping. After reestablishing the grade, streambanks would be restored with appropriate vegetation. As a result, the potential impact on channel morphology and stability of using the dry open-cut method for instream integrity digs is expected to be temporary to short-term and negligible to minor for each crossing.

Using the wet open-cut method for instream integrity digs may require a longer period of time for natural sedimentation processes to accomplish the same result. If streambanks are affected by the digs, they would be restored as described above. As a result, the potential impact on channel morphology and stability of using the wet open-cut method for instream integrity digs is expected to be short-term and minor for each crossing.

Disturbance of Wild Rice Waterbodies

The wild rice waterbodies crossed by HDD at Hay Creek and Shell River would not be affected during operations. Wild rice waterbodies crossed by other methods would not be affected by normal pipeline operation unless it is necessary to repair or replace a section of pipe within the waterbody as a part of the Applicant's Integrity Management Program. In that event, the impacts would be similar to those for the original crossing construction. Although the Applicant would restore the hydrology and soils of the affected portion of the wild rice waterbody after construction, rice yield could be reduced in the portion of the waterbody affected by the repair or replacement activities for the first growing season after completion of the activity. It is likely that only a portion of the approximately 3 acres of wild rice waterbodies within the permanent right-of-way for the Applicant's preferred route would require repair or replacement at any one time; therefore, these activities could result in short-term and negligible to minor impacts. However, if replacement of a section of pipe within the waterbody resulted in the introduction of contaminants, invasive aquatic plants and non-native strains of wild rice, or altered lakebed conditions, then impacts could be major.

Route Alternatives (from Clearbrook to Carlton)

The types of activities that could result in impacts during construction and operation of the route alternatives would be essentially the same as those described for the Applicant's preferred route. As a result, some of those activities are briefly mentioned below, with more details provided in the previous sections on construction and operation.

Route Alternative RA-03AM

Route alternative RA-03AM is the longest of the route alternatives. It would be 436 miles in total, with 395 miles in Minnesota, of which 275 miles would be from Clearbrook to Carlton. The RA-03AM route would require 167 waterbody crossings from Clearbrook to Carlton. Although the route requires the

largest number of waterbody crossings compared to the Applicant's preferred route and other route alternatives, it avoids the Minnesota Lakes region, thereby avoiding pipeline construction impacts on this region.

Construction Impacts

Runoff and Flows

Increases in Stormwater Runoff and Erosion. Clearing and grading would be required along the route alternative for construction of the pipeline, MLVs, new and expanded pump stations, and cathodic protection sites—as well as for access roads and ATWS, including pipe yards in Minnesota. Newly cleared areas and impervious surfaces could cause increased stormwater runoff and erosion into nearby surface waters; however, the Applicant would comply with the requirements of applicable permit programs that are in place to manage potential impacts, as addressed below.

If RA-03AM is selected, the Applicant would obtain NPDES permits for the pipeline, MLVs, pump stations, cathodic protection sites, access roads and ATWS, and pipe yards prior to construction. NPDES permits would specify various stormwater and erosion control measures to be implemented, such as requiring stormwater to be routed around exposed soil areas through conveyance channels and stormwater discharges to be directed from the site to vegetated areas in order to increase sediment removal and infiltrate stormwater on the site when feasible (Minnesota PCA 2013a). With compliance with NPDES permit stipulations and use of appropriate BMPs similar to those described for the Applicant's preferred route, impacts associated with increases in stormwater runoff and erosion from clearing and grading during construction would be short-term and minor. For areas that will not be returned to preconstruction conditions the potential impact would be permanent and minor. These impacts are discussed further as operational impacts.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. In addition to clearing and grading, other construction activities such as blasting, trenching, waterbody crossings, ATWS and access road construction, and water discharges may cause increased suspended solids and sedimentation in the surface waters crossed. The Applicant-proposed measures for temporary erosion controls, SWPPP requirements, and NPDES permit requirements described for the Applicant's preferred route would be implemented during these activities to prevent sediment transport into surface waters during construction. During pipeline construction across a waterbody, the extent and duration of sedimentation and increased erosion potential depend on the soils, sediments, and topography of the crossing site and the proposed crossing method used.

RA-03AM would cross 167 surface waters; however, the specific crossing methods for surface waters have not been determined for the route. When using the dry crossing method, increases in TSS and sedimentation would be localized and temporary in surface waters crossed because construction of the pipeline across the waterbody would occur in a dry area created by the temporary dams upstream and downstream of the work area. TSS and sedimentation would increase when flow is returned to the dry channel but would readily dissipate to negligible levels downstream in the vicinity of the crossing. As a result, impacts would be temporary to short-term and minor.

Wet open-cut methods involve excavation of the channel and banks in the wetted channel, and excavated soils would be in direct contact with surface water. With adherence to NPDES permit stipulations and use of appropriate BMPs similar to those described for the Applicant's preferred route,

impacts from increases in TSS concentrations and increased sedimentation in surface waters crossed using open-cut wet crossings would be temporary to short-term and minor.

Changes in Stream Flows from Water Withdrawals and Discharges. Construction of RA-03AM would require water withdrawal for hydrostatic testing, dust control, trench dewatering, and HDD installation, which would be sourced from lakes, streams, or groundwater wells. Approximately 55 to 85 million gallons (11 to 17 million gallons for each of five construction spreads between Clearbrook and Carlton) would be required for hydrostatic testing. The Applicant has not determined the volume of water appropriation needed for dust control, trench dewatering, and HDD installation. Prior to construction, the Applicant would need to obtain a water appropriation permit from Minnesota DNR.

As stipulated in permit requirements, the Applicant would select appropriation sites along RA-03AM that would meet Minnesota DNR's criteria of "doing no harm," and all appropriation sites would be reviewed by Minnesota DNR prior to issuance of a water appropriation permit. The permit requires that water withdrawals have a minimal potential for impacts on groundwater resources and must not adversely affect trout streams, calcareous fens, or other significant environmental resources.

Hydrostatic test water would be discharged from a test section in one of two ways, as described for the Applicant's preferred route. Discharges would adhere to all conditions set forth in NPDES and water appropriation permits, including discharge over approved energy dissipation measures (e.g., sand bags, plastic sheeting, or natural rock riprap) and the sedimentation control measures as described above. With adherence to water appropriation and NPDES permit conditions and implementation of Applicant-proposed measures, impacts on stream flows from water appropriation and discharge during construction would be temporary and minor.

Disruption of Flow Paths or Local Hydrologic Connectivity. As described for the Applicant's preferred route, pipeline construction may disrupt flow paths and groundwater-surface water interaction due to clearing and grading of riparian vegetation, water appropriation and discharge, and channel and streambank modifications caused by waterbody crossings. With implementation of measures similar to those described for the Applicant's preferred route to prevent erosion and sedimentation, to monitor stream flows during water appropriation and discharge, and to restore streambanks to their original attributes following construction, impacts on flow and hydrologic connectivity during construction of RA-03AM would be temporary to permanent and minor to major. Potential impacts that are permanent and major would be associated with specific site features that are sensitive to disruption of hydrologic connectivity. Springs and other surface water features that are dependent on shallow groundwater have the potential for permanent and major impacts.

In addition, construction would involve creation of temporary and permanent access roads, which could affect hydrologic connectivity. The Applicant would restore temporary access roads, including roads that were widened and graded, to preconstruction conditions upon completion of construction. The Applicant would leave any improved roads intact if requested by the respective landowner. Impacts on hydrologic connectivity associated with temporary access roads is expected to be short-term and negligible to minor, depending on the location of the roads. Impacts from permanent access roads are discussed in the operations section below.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. Because only minor increases in stormwater runoff would occur during construction, the potential for stormwater to carry contaminants into surface waters is low.

Surface water along RA-03AM could become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities such as fuel storage, equipment refueling, and equipment maintenance. To protect surface water resources, NPDES permits for construction of the route would require secondary containment of hazardous materials, prohibition of engine degreasing at work sites, containment and collection of liquid and solid wastes, and a spill prevention and response plan for fueling and maintenance of vehicles (Minnesota PCA 2013b). Similar treatment/disposal or discharge measures to those described for the Applicant's preferred route would be necessary for handling concrete wash water, grindings, drilling mud and slurry, and rinse water generated by construction and hydrostatic testing.

In addition, the Applicant would be responsible for cleaning up small spills during construction of RA-03AM through procedures similar to those described in the Environmental Protection Plan (Appendix E) for the Applicant's preferred route, including notifying proper personnel (e.g., the onsite spill coordinator) and agencies, stopping the work activity that caused the spill, using absorbent booms and pads to contain and recover released materials in water, and disposing of contaminated response materials at approved facilities.

In areas near sensitive or specially designated surface waters (e.g., the Clearwater River and trout streams), 100-foot buffers from the shoreline would be required during construction and as a permanent feature post-construction, except where a water crossing or other encroachment is necessary. For Section 303(d)-listed surface waters, which already have an impairment that prevents a beneficial use, degradation of water quality is of particular concern. NPDES permits for construction of RA-03AM would require identification of Section 303(d) waters with phosphorus, turbidity, dissolved oxygen, or biotic impairment within 1 mile of construction. If the impaired waters have an approved TMDL implementation plan, the plan must be incorporated into the SWPPP, and discharges must comply with specified TMDLs (Minnesota PCA 2013d). With adherence to these NPDES permit conditions and implementation of Applicant-proposed measures, impacts on surface water quality from small leaks and spills during construction would be temporary to short-term and negligible to minor.

Degradation of Aquatic Habitat from Instream Activities. Pipeline construction across surface waters has the potential to alter and degrade aquatic habitat through increased sedimentation and erosion, disruption or alteration of stream flow, and streambank disturbance. The specific crossing method for each crossing has not been determined for construction of RA-03AM but would be selected based on various factors, including waterbody size, sensitivity (e.g., trout stream), water levels, soil/sediment stability, and anticipated season of installation. If a route permit is issued for RA-03AM, the Applicant would be required to obtain crossing permits from Minnesota DNR for all public waters, and the exact crossing method for each waterbody would be stated in the permits. Minnesota DNR would consider various factors, including geological, topographic, hydrographic, geotechnical, and scour depth characteristics of each crossing, after final pipeline design in determining their approval for specific waterbody crossing methods.

Similar to construction of the Applicant's preferred route, dry and wet open-crossing crossing methods would be used. Each method has advantages and disadvantages for minimizing potential impacts on aquatic habitats. Assuming that erosion and sedimentation control measures would be the same as those discussed above for the Applicant's preferred route, and that disturbed areas at crossings would be restored and stabilized as soon as practical after pipeline installation, using the dry or wet open-cut crossing methods would result in impacts on aquatic habitat that would be temporary to short-term and minor for each crossing.

If selected for certain crossings along RA-03AM (e.g., roads and ditches), successful guided bore crossings would result in no impacts on aquatic habitat, as described for the Applicant's preferred route. In addition, HDD crossings likely would be used to avoid impacts on certain sensitive surface waters such as impaired waters and coldwater fishery resources, and particularly deep, wide, or high-flow surface waters. The use of HDD crossings would be determined based on evaluations of subsurface substrate conditions and length of the drill path. HDD crossings are advantageous because they do not disturb streambeds or streambanks, and they maintain stream flow and fish passage. Construction of an HDD crossing is slower than a dry crossing, and there is the potential for inadvertent releases (discussed below). As described for the Applicant's preferred route, successful HDD crossings would result in no impacts on aquatic habitat during construction of RA-03AM.

Degradation of Water Quality and Habitat from Drilling Mud Releases during HDD Crossings. Specific locations to implement HDD crossings have not been determined for the route alternatives. Similar to the Applicant's preferred route, geotechnical surveys would need to be conducted along the route of RA-03AM to determine which surface waters would benefit from use of the HDD method and which of those surface waters are in areas that are geologically suitable for HDD. During drilling, fluid (water, bentonite clay, and possible additives) is circulated through the drilling pipe to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. The potential exists for an inadvertent release or frac-out of this drilling fluid when pressurization of the drill hole is beyond the containment capability of the overburden soil material, which would allow the drilling fluid to flow to the ground or river bed surface. Risk of HDD frac-out is discussed above in the assessment of impacts on surface water and aquatic habitat quality from the Applicant's preferred route. If a frac-out occurred during construction of RA-03AM and went undetected or was not quickly contained, impacts on surface water quality could be long-term and major. However, with implementation of measures similar to those described for the Applicant's preferred route to respond to a drilling mud release during HDD construction along RA-03AM, the impact of a release on surface water quality and streambank structure would be short-term and minor.

Changes in Channel Morphology and Stability Caused by Channel and Streambank Modifications. Dry and wet open-cut waterbody crossing methods involve excavation of the streambed and potential changes to streambank stability and channel morphology. To minimize impacts on surface waters, Minnesota regulations regarding water crossings would be considered for selecting RA-03AM crossing methods (Minn. R. 6135.1100, Subp. 4). These regulations specify that crossings should be placed at the narrowest section of a waterbody feasible; crossing of lakes should be avoided when possible, and they should be crossed under water when necessary; and crossing on or under the beds of trout streams should be avoided unless there is no feasible alternative. The Applicant would adhere to these stipulations when feasible, and each waterbody crossing would be approved prior to construction. Similar to construction of the Applicant's preferred route, temporary erosion control measures during construction of RA-03AM would be implemented as necessary during waterbody crossing activities; and rock riprap, geotextile fabric, and other bioengineering techniques would be used to stabilize sites as needed. Following crossing construction, river beds and streambeds would be restored to approximately preconstruction conditions, with no impediments to water flow, and streambanks would be restored to preconstruction grades when practicable. If the slope is determined to be unstable, the banks would be reshaped to prevent slumping. Finally, streambanks would be restored with appropriate vegetation.

The use of open-cut crossings for pipeline construction, along with the Applicant-proposed measures described above, would result in short-term to long-term and minor impacts on channel morphology and streambank stability. Successful construction of HDD crossings, where implemented for construction of RA-03AM, would result in no impacts on channel morphology or streambank stability.

Disturbance of Wild Rice Waterbodies. RA-03AM would cross about 8 acres of the six wild rice waterbodies crossed within the construction work area (see Table 6.3.1.2-11). Three of these crossings would be the same as for the Applicant's preferred route: Mud Lake, Hay Creek, and Portage Lake. Hayden Lake would be crossed at the basin inlet and Fox Lake would be crossed near the lake shoreline; both of these crossings would be within an existing pipeline corridor. Specific construction methods for crossing of wild rice waterbodies along RA-03AM have not been determined. Hay Creek would be crossed by the Applicant's preferred route using HDD. Where HDD is used as the crossing method, the wild rice waterbodies would not be affected unless a frac-out occurs (see above for information on frac-outs).

Where HDD is not used, the wild rice waterbodies would be crossed using applicable wetland crossing methods for the water saturation conditions at the crossing (see Appendix E for a description of crossing methods). Trenching would remove the vegetation and sediments and increase sedimentation within the remainder of the waterbody. Although the Applicant would restore the hydrology and soils of the affected wild rice waterbodies after construction, rice yield could be reduced in the portion of the waterbody affected for the first growing season after construction. To minimize impacts of construction through wild rice waterbodies, the Applicant would implement applicable measures identified in the Applicant's Environmental Protection Plan (Appendix E). This plan would identify wild rice areas by milepost and contain specific measures to reduce or avoid impacts on wild rice during construction. Avoidance measures would include use of a narrower construction work area, reseeding, monitoring, and use of timber mats, and would incorporate any additional measures proposed by local and state agencies to reflect existing regional policies and procedures to protect wild rice. Wild rice stands also would be monitored for overall condition, function, and vegetative regrowth after construction until the permit conditions are met. As a result, construction through wild rice waterbodies would result in short-term minor impacts on wild rice waterbodies.

Although not anticipated, construction-related impacts on wild rice waterbodies could include longer than expected recovery time for native wild rice stands, introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice, and altered lakebed conditions—all of which could be detrimental to wild rice germination and production. These potential impacts would be reduced through Project-specific SPCC plans, invasive species management plans, and post-construction monitoring of vegetation for a period of time until permit conditions are met, as described in the Applicant's Environmental Protection Plan (Appendix E). With implementation of these measures, impacts on wild rice waterbodies are expected to be short-term and minor. However, if an HDD frac-out occurred, this could result in the introduction of contaminants, invasive aquatic plants, and non-native strains of wild rice, all considered long-term major impacts.

Operations Impacts

Runoff and Flows

Increases in Stormwater Runoff and Erosion. After the pipeline is installed, revegetation of the permanent right-of-way may require up to several years to reestablish to approximately preconstruction conditions, except for areas where new impervious surfaces are created as addressed below. Runoff patterns along the non-impervious portions of the permanent right-of-way therefore would be altered during the first few years of operation, resulting in impacts on runoff and erosion that would be short-term and negligible to minor. After vegetation is reestablished along the permanent right-of-way, surface water runoff and erosion would return to approximately preconstruction conditions. Areas of the permanent right-of-way that result in permanent vegetation changes, such as forested areas, would

result in permanent changes to runoff conditions. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would make the appropriate repairs and improvements.

The number, types, and locations of associated facilities that would be required for pipeline operation along each of the route alternatives have not been determined. However, based on the facility needs and spacing of the Applicant's preferred route, it was assumed that RA-03AM would require six pump stations and 23 MLVs. Assuming that approximately 8 acres are required for each pump station and 0.1 acre is required for each MLV, approximately 50 acres of newly impervious surfaces would be in place for RA-03AM for the life of the Project. The Applicant would be required to manage stormwater runoff at these new facilities in accordance with the stipulations of NPDES permits and SWPPPs as described above, which include the use of permanent stormwater control systems. As a result, the potential impacts on surface water due to increased stormwater runoff from impervious surfaces would be permanent and negligible to minor.

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. This could result in topographical changes and loss of vegetation in localized areas for relatively short periods of time, which would alter runoff patterns and could increase erosion. The Applicant would implement measures to minimize impacts during and after these activities, similar to the measures incorporated into the Project during construction. As a result, the impacts of these integrity management activities on stormwater runoff and erosion would be short-term and negligible to minor for each local occurrence, but would occur periodically over the life of the Project.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. As described above, during the first few years of operation, there may be a small increase in surface water runoff and erosion as revegetation continues, resulting in short-term and negligible to minor impacts related to increases in TSS and sedimentation. Similar to the Applicant's preferred route, the permanent right-of-way for RA-03AM in upland areas would be maintained in an herbaceous vegetative state during operation to allow access for inspection, monitoring, and maintenance. The permanent removal of large woody vegetation also would result in permanent but minor and localized alterations in habitat, streambank stability loss and erosion, and sedimentation. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify streambank areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would make the appropriate repairs and improvements. As a result, the impacts of these integrity management activities would be similar to those experienced from construction, but over a much smaller area. The impacts on TSS and sedimentation in nearby surface waters would be short-term and negligible to minor for each local occurrence, but would occur periodically over the life of the Project. In other portions of the permanent right-of-way, there would be a permanent but negligible impact related to increases in TSS and sediments in surface water.

Changes in Stream Flows from Water Withdrawals and Discharges. Normal operation of the route would not require withdrawal or discharge of water. However, during the repair or replacement of pipe as part of the Applicant's Integrity Management Program described above, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during the integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control are not defined. However, as described for pipeline

construction, the Applicant would be required to obtain water appropriation and NPDES permits for testing procedures, and the volume of water would be substantially less than for construction. With adherence to permits and implementation of existing BMPs, minor alterations in stream flows from water appropriation and discharge would be temporary and negligible.

Disruption of Flow Paths or Local Hydrologic Connectivity. Integrity management digs would result in minor alterations of topography and stormwater runoff flows at the excavation sites. With implementation of the Applicant-proposed measures described above to avoid changes to stormwater runoff and restore streambanks to their original attributes after work is completed, impacts on flow and hydrologic connectivity in the areas excavated for pipe repair or replacement would be temporary to short-term and negligible to minor.

Permanent access roads during operation also could affect hydrologic connectivity. It is anticipated that permanent access roads would require local or state permits, which likely would require culverts to minimize the changes to hydrologic connectivity. Although the extent of the changes in those cases would depend on the topography of the area and the design of the roadway, the impact on hydrologic connectivity likely would be permanent and minor. For access roads without culverts, the extent of changes to hydrologic connectivity could be greater, again dependent on the topography of the area and the design of the roadway. Where those roadways are present, the impact on hydrologic connectivity likely would be permanent and minor.

Other permanent aboveground facilities, such as pump stations and MLVs, also would affect hydrologic connectivity. Due to the relatively small footprints of these facilities, it is anticipated that their presence would result in permanent but negligible to minor impacts.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. The permanent right-of-way for RA-03AM in upland areas would be maintained in an herbaceous vegetative state during operation to allow access along the right-of-way for inspection, monitoring, and maintenance. The permanent removal of riparian vegetation in areas adjacent to waterbody crossings would allow more light to enter the waterbody and could cause long-term to permanent but negligible to minor increases in temperature at these locations.

During normal operation, there would be no other measurable changes to water quality in surface waters. The minor changes within the major drainage basins and watersheds crossed by the route alternative would not result in degradation of the average watershed health score or water quality score. As a result, water quality would not be changed in the surface waters of the basins and watershed along the route, including impaired surface waters. Therefore, watershed surface water quality would not be affected during normal operation of the Project.

Minor fuel and lubricant leaks and spills could occur from maintenance and inspection vehicles operating along RA-03AM. However, any refueling, fuel storage, or vehicle maintenance would follow measures similar to those in the Applicant's proposed Environmental Protection Plan (Appendix E). Thus, minor leaks and spills would result in negligible to minor and temporary impacts on surface water quality. The potential impacts of an unanticipated crude oil release are discussed in Chapter 10.

Degradation of Aquatic Habitat from Instream Activities. Instream excavations may be required to repair or replace pipe segments buried beneath surface waters. This would result in impacts similar to those

described for surface water crossings. The excavations to reach the pipe segments may be accomplished using the wet open-cut method or more likely would involve use of one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would release sediments after the dams are removed and natural waterbody flow returns. However, the sediments would readily dissipate to negligible levels in the downstream area in the vicinity of the crossing. As a result, the potential impact on aquatic habitat of using the dry open-cut method for instream integrity digs is expected to be temporary to short-term and minor for each crossing.

If the wet open-cut method is used for integrity digs, the Applicant would implement the erosion and sediment control measures discussed above for construction of surface water crossings. These measures would be implemented during and after wet open-cut integrity digs; if streambanks are disturbed, they would be restored and stabilized as soon as practical after completion of the pipe repair or replacement. As a result, instream integrity dig activities using the wet open-cut method would result in short-term and minor impacts on aquatic habitat.

Changes in Channel Morphology and Stability Caused by Channel and Streambank Modifications. Excavation and repair or replacement of pipe may be required within surface waters or at the banks of surface waters. The excavations to reach the pipe segments may be accomplished using the wet open-cut method or more likely would involve using one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would involve backfilling of the trench, after the repair or replacement is made, to the approximate contours of the river or streambed. This could result in a minor temporary change in channel morphology until the natural sedimentation processes of the waterbody return the affected area to essentially match the nearby morphology. If streambanks are affected by the digs, they would be restored to preconstruction grades when practicable. If the slope is determined to be unstable, the banks would be reshaped to prevent slumping. After reestablishing the grade, streambanks would be restored with appropriate vegetation. As a result, the potential impact on channel morphology and stability of using the dry open-cut method for instream integrity digs is expected to be temporary to short-term and negligible to minor for each crossing.

Use of the wet open-cut method for instream integrity digs may require a longer period of time for natural sedimentation processes to accomplish the same result. If streambanks are affected by the digs, they would be restored as described above. As a result, the potential impact on channel morphology and stability of using the wet open-cut method for instream integrity digs is expected to be short-term and minor for each crossing.

Disturbance of Wild Rice Waterbodies. During operation, wild rice waterbodies would not be affected unless it is necessary to repair or replace a section of pipe within the waterbody. In that event, the impacts would be similar to those for the initial construction of the pipeline through the waterbody, as described under construction impacts for the Applicant's preferred route. Although the Applicant would restore the hydrology and soils of the affected portion of the wild rice waterbody after construction, rice yield could be reduced in the portion of the waterbody affected by the repair or replacement activities for the first growing season after completion of the activity. It is likely that only a portion of the approximately 3 acres of wild rice waterbodies within the permanent right-of-way would require repair or replacement at any one time; therefore, these activities could result in short-term and negligible to minor impacts. However, if replacement of a section of pipe within the waterbody resulted in the introduction of contaminants, a subsequent introduction of invasive aquatic plants and non-native strains

of wild rice could occur, along with altered lakebed conditions, producing long-term and major impacts on wild rice waterbodies.

Route Alternative RA-06

Route alternative RA-06 would be 357 miles in total, with 317 miles in Minnesota, of which 197 miles would be from Clearbrook to Carlton. The RA-06 route would require 220 waterbody crossings in Minnesota and 137 from Clearbrook to Carlton. Because the RA-06 route is more northerly than the other route options, it avoids the Minnesota Lakes region and the Mississippi Headwaters. However, the route crosses 37 Lake Superior Basin waters, which are considered to be Outstanding International Resource Waters.

Construction Impacts

Runoff and Flows

Increases in Stormwater Runoff and Erosion. Clearing and grading would be required along the route alternative for construction of the pipeline, MLVs, new and expanded pump stations, and cathodic protection sites—as well as for access roads and ATWS, including pipe yards in Minnesota. Newly cleared areas and impervious surfaces could cause increased stormwater runoff and erosion into nearby surface waters; however, the Applicant would comply with the requirements of applicable permit programs that are in place to manage potential impacts as addressed below.

If RA-06 is selected, the Applicant would obtain NPDES permits for the pipeline, MLVs, pump stations, cathodic protection sites, access roads and ATWS, and pipe yards prior to construction. NPDES permits would specify various stormwater and erosion control measures to be implemented, such as requiring stormwater to be routed around exposed soil areas through conveyance channels and stormwater discharges to be directed from the site to vegetated areas in order to increase sediment removal and infiltrate stormwater on the site when feasible (Minnesota PCA 2013a). With compliance with NPDES permit stipulations and use of appropriate BMPs similar to those described for the Applicant's preferred route, construction of the alternative would result in impacts related to stormwater runoff and erosion that would be temporary to long-term and minor.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. In addition to clearing and grading, other construction activities such as blasting, trenching, waterbody crossings, ATWS and access road construction, and water discharges may cause increased suspended solids and sedimentation in the surface waters crossed. The Applicant's temporary erosion controls, SWPPP requirements, and NPDES permit requirements described for the Applicant's preferred route would be implemented during these activities to prevent sediment transport into surface waters during construction. During pipeline construction across a waterbody, the extent and duration of sedimentation and increased erosion potential depend on the soils, sediments, and topography of the crossing site and the proposed crossing method used.

RA-06 would cross 137 surface waters; however, specific crossing methods for surface waters have not been determined for the route. When using the dry crossing method, increases in TSS and sedimentation would be localized and temporary in surface waters crossed because construction of the pipeline across the waterbody would occur in a dry area created by the temporary dams upstream and downstream of the work area. TSS and sedimentation would increase when flow is returned to the dry channel but would readily dissipate to negligible levels downstream in the vicinity of the crossing. As a result, impacts would be temporary to short-term and minor.

Wet open-cut methods involve excavation of the channel and banks in the wetted channel, and excavated soils would be in direct contact with surface water. With adherence to NPDES permit stipulations and use of appropriate BMPs similar to those described for the Applicant's preferred route, impacts from increases in TSS concentrations and increased sedimentation in surface waters crossed using open-cut wet crossings would be temporary to short-term and minor.

Changes in Stream Flows from Water Withdrawals and Discharges. Construction of RA-06 would require water withdrawal for hydrostatic testing, dust control, trench dewatering, and HDD installation, which would be sourced from lakes, streams, or groundwater wells Approximately 44 to 68 million gallons of water (11 to 17 million gallons per construction spread) would be required for hydrostatic testing during construction of RA-06 between Clearbrook and Carlton. The Applicant has not determined the volume of water appropriation needed for dust control, trench dewatering, and HDD installation. Prior to construction, the Applicant would need to obtain a water appropriation permit from Minnesota DNR.

As stipulated in permit requirements, the Applicant would select appropriation sites along RA-06 that would meet Minnesota DNR's criteria of "doing no harm," and all appropriation sites would be reviewed by Minnesota DNR prior to issuance of a water appropriation permit. The permit requires that water withdrawals have a minimal potential for impacts on groundwater resources and must not adversely affect trout streams, calcareous fens, or other significant environmental resources.

Hydrostatic test water would be discharged from a test section in one of two ways, as described for the Applicant's preferred route. Discharges would adhere to all conditions set forth in NPDES and water appropriation permits, including discharge over approved energy dissipation measures (e.g., sand bags, plastic sheeting, or natural rock riprap) and the sedimentation control measures as described above. With adherence to water appropriation and NPDES permit conditions and implementation of Applicant-proposed measures, impacts on stream flows from water appropriation and discharge during construction would be temporary and minor.

Disruption of Flow Paths or Local Hydrologic Connectivity. As described for the Applicant's preferred route, pipeline construction may disrupt flow paths and groundwater-surface water interaction due to clearing and grading of riparian vegetation, water appropriation and discharge, and channel and streambank modifications caused by waterbody crossings. With implementation of measures similar to those described for the Applicant's preferred route to prevent erosion and sedimentation, to monitor stream flows during water appropriation and discharge, and to restore streambanks to their original attributes following construction, impacts on flow and hydrologic connectivity during construction of RA-06 would be temporary to permanent and minor to major. Potential impacts that are permanent and major would be associated with specific site features that are sensitive to disruption of hydrologic connectivity. Springs and other surface water features that are dependent on shallow groundwater have the potential for permanent and major impacts.

In addition, construction would involve creation of temporary and permanent access roads, which could affect hydrologic connectivity. The Applicant would restore temporary access roads, including roads that were widened and graded, to preconstruction conditions upon completion of construction. The Applicant would leave any improved roads intact if requested by the respective landowner. Impacts on hydrologic connectivity associated with temporary access roads is expected to be short-term and negligible to minor, depending on the location of the roads. Impacts from permanent access roads are discussed in the operations section below.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. Because only minor increases in stormwater runoff would occur during construction, the potential for stormwater to carry contaminants into surface waters is low. Surface water along RA-06 could become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities such as fuel storage, equipment refueling, and equipment maintenance. However, to protect surface water resources, NPDES permits for construction of the route would require secondary containment of hazardous materials, prohibition of engine degreasing at work sites, containment and collection of liquid and solid wastes, and a spill prevention and response plan for fueling and maintenance of vehicles (Minnesota PCA 2013b). Similar treatment/disposal or discharge measures to those described for the Applicant's preferred route would be necessary for handling concrete wash water, grindings, drilling mud and slurry, and rinse water generated by construction and hydrostatic testing.

In addition, the Applicant would be responsible for cleaning up small spills during construction of RA-06 through procedures similar to those described in the Environmental Protection Plan (Appendix E) for the Applicant's preferred route, including notifying proper personnel (e.g., the onsite spill coordinator) and agencies, stopping the work activity that caused the spill, using absorbent booms and pads to contain and recover released materials in water, and disposing of contaminated response materials at approved facilities.

In areas near sensitive or specially designated surface waters (e.g., the Clearwater River and trout streams), 100-foot buffers from the shoreline would be required during construction and as a permanent feature post-construction, except where a water crossing or other encroachment is necessary. For Section 303(d)-listed surface waters, which already have an impairment that prevents a beneficial use, degradation of water quality is of particular concern. NPDES permits for construction of RA-06 would require identification of Section 303(d) waters with phosphorus, turbidity, dissolved oxygen, or biotic impairment within 1 mile of construction. If the impaired waters have an approved TMDL implementation plan, the plan must be incorporated into the SWPPP, and discharges must comply with specified TMDLs (Minnesota PCA 2013d). With adherence to these NPDES permit conditions and implementation of Applicant-proposed measures, impacts on surface water quality from small leaks and spills during construction would be temporary to short-term and negligible to minor.

Degradation of Aquatic Habitat from Instream Construction Activities. Pipeline construction across surface waters has the potential to alter and degrade aquatic habitat through increased sedimentation and erosion, disruption or alteration of stream flow, and streambank disturbance. Crossing methods have not been determined for construction of RA-06 but would be selected based on various factors, including waterbody size, sensitivity (e.g., trout stream), water levels, soil/sediment stability, and anticipated season of installation. If a route permit is issued for RA-06, the Applicant would be required to obtain crossing permits from Minnesota DNR for all public waters, and the exact crossing method for each waterbody would be stated in the permits. Minnesota DNR would consider various factors, including geological, topographic, hydrographic, geotechnical, and scour depth characteristics of each crossing, after final pipeline design in determining their approval for specific waterbody crossing methods.

Similar to construction of the Applicant's preferred route, dry and wet open-crossing crossing methods would be used. Each method has advantages and disadvantages for minimizing potential impacts on aquatic habitats. Assuming that erosion and sedimentation control measures would be the same as those discussed above for the Applicant's preferred route, and that disturbed areas at crossings would

be restored and stabilized as soon as practical after pipeline installation, using the dry open-cut crossing method would result in impacts on aquatic habitat that would be temporary to short-term and minor for each crossing. For the wet open-cut method, the impact on aquatic habitat would be short-term to long-term and minor.

If selected for certain crossings along RA-06 (e.g., roads and ditches), successful guided bore crossings would result in no impacts on aquatic habitat, as described for the Applicant's preferred route. In addition, HDD crossings likely would be used to avoid impacts on certain sensitive surface waters, such as impaired waters and coldwater fishery resources; particularly deep, wide, or high-flow surface waters; and when appropriate based on subsurface substrate conditions and length of the drill path. HDD crossings are advantageous because they do not disturb streambeds or streambanks, and they maintain stream flow and fish passage. Construction of an HDD crossing is slower than a dry crossing, and there is the potential for inadvertent releases (discussed below). As described for the Applicant's preferred route, successful HDD crossings would result in no impacts on aquatic habitat during construction of RA-06.

Degradation of Water Quality and Habitat from Drilling Mud Releases during HDD Crossings. Specific locations to implement HDD crossings have not been determined for the route alternatives. Similar to the Applicant's preferred route, geotechnical surveys would need to be conducted along the route of RA-06 to determine which surface waters would benefit from use of the HDD method and which of those surface waters are in areas that are geologically suitable for HDD. During drilling, fluid (water, bentonite clay, and possible additives) is circulated through the drilling pipe to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. The potential exists for an inadvertent release or frac-out of this drilling fluid when pressurization of the drill hole is beyond the containment capability of the overburden soil material, which would allow the drilling fluid to flow to the ground or river bed surface. Risk of HDD frac-out is discussed above in the assessment of impacts on surface water and aquatic habitat quality from the Applicant's preferred route. If a frac-out occurred during construction of RA-06 and went undetected or was not quickly contained, impacts on surface water quality could be long-term and major. However, with implementation of measures similar to those described for the Applicant's preferred route to respond to a drilling mud release during HDD construction along RA-06, the impact of a release on surface water quality and streambank structure would be short-term and minor.

Changes in Channel Morphology and Stability Caused by Channel and Streambank Modifications. Dry and wet open-cut waterbody crossing methods involve excavation of the streambed and potential changes to streambank stability and channel morphology. To minimize impacts on surface waters, Minnesota regulations regarding water crossings would be considered for selecting RA-06 crossing methods (Minn. R. 6135.1100, Subp. 4). These regulations specify that crossings should be placed at the narrowest section of a waterbody feasible; crossing of lakes should be avoided when possible, and they should be crossed under water when necessary; and crossing on or under the beds of trout streams should be avoided unless there is no feasible alternative. The Applicant would adhere to these stipulations when feasible, and each waterbody crossing would be approved prior to construction. Similar to construction of the Applicant's preferred route, temporary erosion control measures during construction of RA-06 would be implemented as necessary during waterbody crossing activities; and rock riprap, geotextile fabric, and other bioengineering techniques would be used to stabilize sites as needed. Following crossing construction, river beds and streambeds would be restored to approximately preconstruction conditions, with no impediments to water flow, and streambanks would be restored to preconstruction grades when practicable. If the slope is determined to be unstable, the banks would be reshaped to prevent slumping. Finally, streambanks would be restored with appropriate vegetation.

The use of open-cut crossings for pipeline construction, along with the Applicant-proposed measures described above, would result in short-term to long-term and minor impacts on channel morphology and streambank stability. Successful construction of HDD crossings, where implemented for construction of RA-06, would result in no impacts on channel morphology or streambank stability.

Disturbance of Wild Rice Waterbodies. RA-06 would cross about 11 acres of the wild rice waterbodies within the construction work area (see Table 6.3.1.2-15). Specific construction methods for crossing of wild rice waterbodies along RA-06 have not been determined. Where HDD is used as the crossing method, the wild rice waterbodies would not be affected unless a frac-out occurs (see above for information on frac-outs).

Where HDD is not used, the wild rice waterbodies would be crossed using applicable wetland crossing methods for the water saturation conditions at the crossing (see Section 2.7.2 for a description of crossing methods). Trenching would remove the vegetation cover and sediments and increase sedimentation within the remainder of the waterbody. Although the Applicant would restore the hydrology and soils of the affected wild rice waterbodies after construction, rice yield could be reduced in the portion of the waterbody affected for the first growing season after construction. To minimize impacts of construction through wild rice waterbodies, the Applicant would implement applicable measures identified in the Applicant's Environmental Protection Plan (Appendix E). This plan would identify wild rice areas by milepost and contain specific measures to reduce or avoid impacts on wild rice during construction. Avoidance measures would include use of a narrower construction work area, reseeding, monitoring, and use of timber mats, and would incorporate any additional measures proposed by local and state agencies to reflect existing regional policies and procedures to protect wild rice. Wild rice stands also would be monitored for overall condition, function, and vegetative regrowth after construction until the permit conditions are met. As a result, construction through wild rice waterbodies using the wet open-cut crossing method would result in short-term and minor impacts on wild rice waterbodies.

Although not anticipated, construction-related impacts on wild rice waterbodies could include longer than expected recovery time for native wild rice stands, introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice, and altered lakebed conditions—all of which could be detrimental to wild rice germination and production. These potential impacts would be reduced through Project-specific SPCC plans, invasive species management plans, and post-construction monitoring of vegetation for a period of time until permit conditions are met, as described in the Applicant's Environmental Protection Plan (Appendix E). With implementation of these measures, impacts on wild rice waterbodies are expected to be short-term and minor. However, if an HDD frac-out occurred, this could result in the introduction of contaminants, invasive aquatic plants, and non-native strains of wild rice, all considered long-term and major impacts.

Operations Impacts

Runoff and Flows

Increases in Stormwater Runoff and Erosion. After the pipeline is installed, revegetation of the permanent right-of-way may require up to several years to reestablish to approximately preconstruction conditions, except for areas where new impervious surfaces are created, as addressed below. Runoff patterns along the non-impervious portions of the permanent right-of-way therefore would be altered during the first few years of operation, resulting in impacts on runoff and erosion that would be short-term and negligible to minor. After vegetation is reestablished along the permanent right-of-way,

surface water runoff and erosion would return to approximately preconstruction conditions. Areas of the permanent right-of-way that result in permanent vegetation changes, such as forested areas, would result in permanent changes to runoff conditions. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would make the appropriate repairs and improvements.

The number, types, and locations of associated facilities that would be required for pipeline operation along each of the route alternatives have not been determined. However, based on the facility needs and spacing of the Applicant's preferred route, it was assumed that RA-06 would require four pump stations and 16 MLVs. Assuming that approximately 8 acres are required for each pump station and 0.1 acre is required for each MLV, approximately 34 acres of newly impervious surfaces would be in place for RA-06 for the life of the Project. The Applicant would be required to manage stormwater runoff at these new facilities in accordance with the stipulations of NPDES permits and SWPPPs, as described above, which include the use of permanent stormwater control systems. As a result, the potential impacts on surface water due to increased stormwater runoff from impervious surfaces would be permanent and negligible to minor.

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. This could result in topographical changes and loss of vegetation in localized areas for relatively short periods of time, which would alter runoff patterns and could increase erosion. The Applicant would implement measures to minimize impacts during and after these activities, similar to the measures incorporated into the Project during construction. As a result, the impacts of these integrity management activities on stormwater runoff and erosion would be short-term and negligible to minor for each local occurrence, but would occur periodically over the life of the Project.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. As described above, during the first few years of operation, there may be a small increase in surface water runoff and erosion as revegetation continues, resulting in short-term and negligible to minor impacts related to increases in TSS and sedimentation. Similar to the Applicant's preferred route, the permanent right-of-way for RA-06 in upland areas would be maintained in an herbaceous vegetative state during operation to allow access for inspection, monitoring, and maintenance. The permanent removal of large woody vegetation also would result in permanent but minor and localized alterations in habitat, streambank stability loss and erosion, and sedimentation. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify streambank areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would make the appropriate repairs and improvements. As a result, the impacts of these integrity management activities would be similar to those experienced from construction, but over a much smaller area. The impacts on TSS and sedimentation in nearby surface waters would be short-term and negligible to minor for each local occurrence, but would occur periodically over the life of the Project. In other portions of the permanent right-of-way, there would be a permanent but negligible impact related to increases in TSS and sediments in surface water.

Changes in Stream Flows from Water Withdrawals and Discharges. Normal operation of the route would not require withdrawal or discharge of water. However, during the repair or replacement of pipe as part of the Applicant's Integrity Management Program described above, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during the integrity digs and

backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control are not defined. However, as described for pipeline construction, the Applicant would be required to obtain water appropriation and NPDES permits for testing procedures, and the volume of water would be substantially less than for construction. With adherence to permits and implementation of existing BMPs, minor alterations in stream flows from water appropriation and discharge would be temporary and negligible.

Disruption of Flow Paths or Local Hydrologic Connectivity. Integrity management digs would result in minor alterations of topography and stormwater flows at the excavation sites. With implementation of the Applicant-proposed measures described above to avoid changes to stormwater runoff and restore streambanks to their original attributes after work is completed, impacts on flow and hydrologic connectivity during in the areas excavated for pipe repair or replacement would be temporary to short-term and negligible to minor.

Permanent access roads during operation also could affect hydrologic connectivity. It is anticipated that permanent access roads would require local or state permits, which likely would require culverts to minimize the changes to hydrologic connectivity. Although the extent of the changes in those cases would depend on the topography of the area and the design of the roadway, the impact on hydrologic connectivity likely would be permanent and minor. For access roads without culverts, the extent of changes to hydrologic connectivity could be greater, again dependent on the topography of the area and the design of the roadway. Where those roadways are present, the impact on hydrologic connectivity likely would be permanent and minor.

Other permanent aboveground facilities, such as pump stations and MLVs, also would affect hydrologic connectivity. Due to the relatively small footprints of these facilities, it is anticipated that their presence would result in permanent but negligible to minor impacts.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. The permanent right-of-way of RA-06 in upland areas would be maintained in an herbaceous vegetative state during operation to allow access along the right-of-way for inspection, monitoring, and maintenance. The permanent removal of riparian vegetation in areas adjacent to waterbody crossings would allow more light to enter the waterbody and could cause long-term to permanent but negligible to minor increases in temperature at these locations.

During normal operation, there would be no other measurable changes to water quality in surface waters. The minor changes within the major drainage basins and watersheds crossed by the route alternative would not result in degradation of the average watershed health score or water quality score. As a result, water quality would not be changed in the surface waters of the basins and watershed along the route, including impaired surface waters. Therefore, watershed surface water quality would not be affected during normal operation of the Project.

Minor fuel and lubricant leaks and spills could occur from maintenance and inspection vehicles operating along RA-06. However, any refueling, fuel storage, or vehicle maintenance would follow measures similar to those in the Applicant's proposed Environmental Protection Plan (Appendix E). Thus, minor leaks and spills would result in negligible to minor and temporary impacts on surface water quality. The potential impacts of an unanticipated crude oil release are discussed in Chapter 10.

Degradation of Aquatic Habitat from Instream Activities. Instream excavations may be required to repair or replace pipe segments buried beneath surface waters. This would result in impacts similar to those described for surface water crossings. The excavations to reach the pipe segments may be accomplished using the wet open-cut method or more likely would involve use of one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would release sediments after the dams are removed and natural waterbody flow returns. However, the sediments would readily dissipate to negligible levels in the downstream area in the vicinity of the crossing. As a result, the potential impact on aquatic habitat of using the dry open-cut method for instream integrity digs is expected to be temporary to short-term and minor for each crossing.

If the wet open-cut method is used for integrity digs, the Applicant would implement the erosion and sediment control measures discussed above for construction of surface water crossings. These measures would be implemented during and after wet open-cut integrity digs; if streambanks are disturbed, they would be restored and stabilized as soon as practical after completion of the pipe repair or replacement. As a result, instream integrity dig activities for using the wet open-cut method would result in short-term and minor impacts on aquatic habitat.

Changes in Channel Morphology and Stability Caused by Channel and Streambank Modifications. Excavation and repair or replacement of pipe may be required within surface waters or at the banks of surface waters. The excavations to reach the pipe segments may be accomplished using the wet open-cut method or more likely would involve use of one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would involve backfilling of the trench, after the repair or replacement is made, to the approximate contours of the river or streambed. This could result in a minor temporary change in channel morphology until the natural sedimentation processes of the waterbody return the affected area to essentially match the nearby morphology. If streambanks are affected by the digs, they would be restored to preconstruction grades when practicable. If the slope is determined to be unstable, the banks would be reshaped to prevent slumping. After reestablishing the grade, streambanks would be restored with appropriate vegetation. As a result, the potential impact on channel morphology and stability of using the dry open-cut method for instream integrity digs is expected to be temporary to short-term and negligible to minor for each crossing.

Using the wet open-cut method for instream integrity digs may require a longer period of time for natural sedimentation processes to accomplish the same result. If streambanks are affected by the digs, they would be restored as described above. As a result, the potential impact on channel morphology and stability of using the wet open-cut method for instream integrity digs is expected to be short-term and minor for each crossing.

Disturbance of Wild Rice Waterbodies. During operation, wild rice waterbodies would not be affected unless it is necessary to repair or replace a section of pipe within the waterbody. In that event, the impacts would be similar to those for the initial construction of the pipeline through the waterbody, as described under construction impacts for the Applicant's preferred route. Although the Applicant would restore the hydrology and soils of the affected portion of the wild rice waterbody after construction, rice yield could be reduced in the portion of the waterbody affected by the repair or replacement activities for the first growing season after completion of the activity. It is likely that only a portion of the approximately 4 acres of wild rice waterbodies within the permanent right-of-way would require repair

or replacement at any one time; therefore, these activities could result in short-term and negligible to minor impacts. However, if replacement of a section of pipe within the waterbody resulted in, introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice, and altered lakebed conditions, then impacts could be long term and major.

Route Alternative RA-07

Route alternative RA-07 would be 328 miles in total, with 288 miles in Minnesota, of which 168 miles would be from Clearbrook to Carlton. The RA-07 route would require 164 waterbody crossings in Minnesota and 81 from Clearbrook to Carlton. RA-07 requires the fewest number of waterbody crossings. However, surface waters would be affected by the construction activities associated with removal of the existing Line 3 pipeline and installation of the new pipeline in the same trench. Removal and replacement would require a 205-foot-wide construction work area with all or almost all of the construction work area within the permanent right-of-way for the Enbridge Mainline and the previous construction work area for the Alberta Clipper pipeline.

Construction Impacts

Runoff and Flows

Increases in Stormwater Runoff and Erosion. Clearing and grading would be required along the route alternative for construction of the pipeline, MLVs, new and expanded pump stations, and cathodic protection sites—as well as for access roads and ATWS, including pipe yards in Minnesota. Newly cleared areas and impervious surfaces could cause increased stormwater runoff and erosion into nearby surface waters from the wider construction work area; however, the Applicant would comply with the requirements of applicable permit programs that are in place to manage potential impacts as addressed below.

If RA-07 is selected, the Applicant would obtain NPDES permits for the pipeline, MLVs, pump stations, cathodic protection sites, access roads and ATWS, and pipe yards prior to construction. NPDES permits would specify various stormwater and erosion control measures to be implemented, such as requiring stormwater to be routed around exposed soil areas through conveyance channels and stormwater discharges to be directed from the site to vegetated areas in order to increase sediment removal and infiltrate stormwater on the site when feasible (Minnesota PCA 2013a). With compliance with NPDES permit stipulations and use of appropriate BMPs similar to those described for the Applicant's preferred route, construction of the route alternative would result in impacts on stormwater runoff and erosion that would be temporary to long-term and minor.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. In addition to clearing and grading, other construction activities such as blasting, trenching, waterbody crossings, ATWS and access road construction, and water discharges may cause increased suspended solids and sedimentation in the surface waters crossed. The Applicant's temporary erosion controls, SWPPP requirements, and NPDES permit requirements described for the Applicant's preferred route would be implemented during these activities to prevent sediment transport into surface waters during construction. During pipeline construction across a waterbody, the extent and duration of sedimentation and increased erosion potential depend on the soils, sediments, and topography of the crossing site and the proposed crossing method used.

RA-07 would cross 81 surface waters; however, specific crossing methods for surface waters have not been determined for the route. When using the dry crossing method, increases in TSS and

sedimentation would be localized and temporary in surface waters crossed because construction of the pipeline across the waterbody would occur in a dry area created by the temporary dams upstream and downstream of the work area. TSS and sedimentation would increase when flow is returned to the dry channel but would readily dissipate to negligible levels downstream in the vicinity of the crossing. As a result, impacts would be temporary to short-term and minor.

Wet open-cut methods involve excavation of the channel and banks in the wetted channel, and excavated soils would be in direct contact with surface water. With adherence to NPDES permit stipulations and use of appropriate BMPs similar to those described for the Applicant's preferred route, impacts from increases in TSS concentrations and increased sedimentation in surface waters crossed using open-cut wet crossings would be temporary to short-term and minor.

Changes in Stream Flows from Water Withdrawals and Discharges. Construction of RA-07 would require water withdrawal for hydrostatic testing, dust control, trench dewatering, and HDD installation, which would be sourced from lakes, streams, or groundwater wells. Approximately 44 to 68 million gallons of water (11 to 17 million gallons per construction spread) would be required for hydrostatic testing during construction between Clearbrook and Carlton. The Applicant has not determined the volume of water appropriation needed for dust control, trench dewatering, and HDD installation. Prior to construction, the Applicant would need to obtain a water appropriation permit from Minnesota DNR.

As stipulated in permit requirements, the Applicant would select appropriation sites along RA-07 that would meet Minnesota DNR's criteria of "doing no harm," and all appropriation sites would be reviewed by Minnesota DNR prior to issuance of a water appropriation permit. The permit requires that water withdrawals have a minimal potential for impacts on groundwater resources and must not adversely affect trout streams, calcareous fens, or other significant environmental resources.

Hydrostatic test water would be discharged from a test section in one of two ways, as described for the Applicant's preferred route. Discharges would adhere to all conditions set forth in NPDES and water appropriation permits, including discharge over approved energy dissipation measures (e.g., sand bags, plastic sheeting, or natural rock riprap) and the sedimentation control measures as described above. With adherence to water appropriation and NPDES permit conditions and implementation of Applicant-proposed measures, impacts on stream flows from water appropriation and discharge during construction would be temporary and minor.

Disruption of Flow Paths or Local Hydrologic Connectivity. As described for the Applicant's preferred route, pipeline construction may disrupt flow paths and groundwater-surface water interaction due to clearing and grading of riparian vegetation, water appropriation and discharge, and channel and streambank modifications caused by waterbody crossings. With implementation of measures similar to those described for the Applicant's preferred route to prevent erosion and sedimentation, to monitor stream flows during water appropriation and discharge, and to restore streambanks to their original attributes following construction, impacts on flow and hydrologic connectivity during construction of RA-07 would be temporary to permanent and minor to major. Potential impacts that are permanent and major would be associated with specific site features that are sensitive to disruption of hydrologic connectivity. Springs and other surface water features that are dependent on shallow groundwater have the potential for permanent and major impacts.

In addition, construction would involve creation of temporary and permanent access roads, which could affect hydrologic connectivity. The Applicant would restore temporary access roads, including roads that

were widened and graded, to preconstruction conditions upon completion of construction. The Applicant would leave any improved roads intact if requested by the respective landowner. Impacts on hydrologic connectivity associated with temporary access roads is expected to be short-term and negligible to minor, depending on the location of the roads. Impacts from permanent access roads are discussed in the operations section below.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. Because only minor increases in stormwater runoff would occur during construction, the potential for stormwater to carry contaminants into surface waters is low. Surface water along RA-07 could become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities such as fuel storage, equipment refueling, and equipment maintenance. However, to protect surface water resources, NPDES permits for construction of the route would require secondary containment of hazardous materials, prohibition of engine degreasing at work sites, containment and collection of liquid and solid wastes, and a spill prevention and response plan for fueling and maintenance of vehicles (Minnesota PCA 2013b). Similar treatment/disposal or discharge measures to those described for the Applicant's preferred route would be necessary for handling concrete wash water, grindings, drilling mud and slurry, and rinse water generated by construction and hydrostatic testing.

In addition, the Applicant would be responsible for cleaning up small spills during construction of RA-07 through procedures similar to those described in the Environmental Protection Plan (Appendix E) for the Applicant's preferred route, including notifying proper personnel (e.g., the onsite spill coordinator) and agencies, stopping the work activity that caused the spill, using absorbent booms and pads to contain and recover released materials in water, and disposing of contaminated response materials at approved facilities.

In areas near sensitive or specially designated surface waters (e.g., the Clearwater River and trout streams), 100-foot buffers from the shoreline would be required during construction and as a permanent feature post-construction, except where a water crossing or other encroachment is necessary. For Section 303(d)-listed surface waters, which already have an impairment that prevents a beneficial use, degradation of water quality is of particular concern. NPDES permits for construction of RA-03AM would require identification of Section 303(d) waters with phosphorus, turbidity, dissolved oxygen, or biotic impairment within 1 mile of construction. If the impaired waters have an approved TMDL implementation plan, the plan must be incorporated into the SWPPP, and discharges must comply with specified TMDLs (Minnesota PCA 2013d). With adherence to these NPDES permit conditions and implementation of Applicant-proposed measures, impacts on surface water quality from small leaks and spills during construction would be temporary to short-term and negligible to minor.

Degradation of Aquatic Habitat from Instream Construction Activities. Pipeline construction across surface waters has the potential to alter and degrade aquatic habitat through increased sedimentation and erosion, disruption or alteration of stream flow, and streambank disturbance. Crossing methods have not been determined for construction of RA-07 but would be selected based on various factors, including waterbody size, sensitivity (e.g., trout stream), water levels, soil/sediment stability, and anticipated season of installation. If a route permit is issued for RA-07, the Applicant would be required to obtain crossing permits from Minnesota DNR for all public waters, and the exact crossing method for each waterbody would be stated in the permits. Minnesota DNR would consider various factors, including geological, topographic, hydrographic, geotechnical, and scour depth characteristics of each

crossing, after final pipeline design in determining their approval for specific waterbody crossing methods.

Similar to construction of the Applicant's preferred route, dry and wet open-crossing crossing methods would be used. Each method has advantages and disadvantages for minimizing potential impacts on aquatic habitats. Assuming that erosion and sedimentation control measures would be the same as those discussed above for the Applicant's preferred route, and that disturbed areas at crossings would be restored and stabilized as soon as practical after pipeline installation, using the dry and wet open-cut crossing methods would result in impacts on aquatic habitat that would be temporary to short-term and minor for each crossing.

If selected for certain crossings along RA-07 (e.g., roads and ditches), successful guided bore crossings would result in no impacts on aquatic habitat, as described for the Applicant's preferred route. In addition, HDD crossings likely would be used to avoid impacts on certain sensitive surface waters, such as impaired waters and coldwater fishery resources; particularly deep, wide, or high-flow surface waters; and when appropriate based on subsurface substrate conditions and length of the drill path. HDD crossings are advantageous because they do not disturb streambeds or streambanks, and they maintain stream flow and fish passage. Construction of an HDD crossing is slower than a dry crossing, and there is the potential for inadvertent releases (discussed below). As described for the Applicant's preferred route, successful HDD crossings would result in no impacts on aquatic habitat during construction of RA-07.

Degradation of Water Quality and Habitat from Drilling Mud Releases during HDD Crossings. Specific locations to implement HDD crossings have not been determined for the route alternatives. Similar to the Applicant's preferred route, geotechnical surveys would need to be conducted along the route of RA-07 to determine which surface waters would benefit from use of the HDD method and which of those surface waters are in areas that are geologically suitable for HDD. During drilling, fluid (water, bentonite clay, and possible additives) is circulated through the drilling pipe to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. The potential exists for an inadvertent release or frac-out of this drilling fluid when pressurization of the drill hole is beyond the containment capability of the overburden soil material, which would allow the drilling fluid to flow to the ground or river bed surface. Risk of HDD frac-out is discussed above in the assessment of impacts on surface water and aquatic habitat quality from the Applicant's preferred route. If a frac-out occurred during construction of RA-07 and went undetected or was not quickly contained, impacts on surface water quality could be long-term and major. However, with implementation of measures similar to those described for the Applicant's preferred route to respond to a drilling mud release during HDD construction along RA-07, the impact of a release on surface water quality and streambank structure would be short-term and minor.

Changes in Channel Morphology and Stability Caused by Channel and Streambank Modifications. Dry and wet open-cut waterbody crossing methods involve excavation of the streambed and potential changes to streambank stability and channel morphology. To minimize impacts on surface waters, Minnesota regulations regarding water crossings would be considered for selecting RA-07 crossing methods (Minn. R. 6135.1100, Subp. 4). These regulations specify that crossings should be placed at the narrowest section of a waterbody feasible; crossing of lakes should be avoided when possible, and they should be crossed under water when necessary; and crossing on or under the beds of trout streams should be avoided unless there is no feasible alternative. The Applicant would adhere to these stipulations when feasible, and each waterbody crossing would be approved prior to construction. Similar to construction of the Applicant's preferred route, temporary erosion control measures during

construction of RA-07 would be implemented as necessary during waterbody crossing activities; and rock riprap, geotextile fabric, and other bioengineering techniques would be used to stabilize sites as needed. Following crossing construction, river beds and streambeds would be restored to approximately preconstruction conditions, with no impediments to water flow, and streambanks would be restored to preconstruction grades when practicable. If the slope is determined to be unstable, the banks would be reshaped to prevent slumping. Finally, streambanks would be restored with appropriate vegetation.

The use of open-cut crossings for pipeline construction, along with the mitigation measures described above, would result in short-term to long-term minor impacts on channel morphology and streambank stability. Successful construction of HDD crossings, where implemented for construction of RA-07, would result in no impacts on channel morphology or streambank stability.

Disturbance of Wild Rice Waterbodies. RA-07 would cross about 6 acres of wild rice waterbodies within the construction work area at only a single waterbody (White Oak Lake) (see Table 6.3.1.2-20). Specific construction methods for crossing of wild rice waterbodies along RA-07 have not been determined. Where HDD is used as the crossing method, the wild rice waterbodies would not be affected unless a frac-out occurs (see above for information on frac-outs).

Where HDD is not used, the wild rice waterbodies would be crossed using applicable wetland crossing methods for the water saturation conditions at the crossing (see Section 2.7.2 for a description of the crossing methods). Trenching would remove the vegetation cover and sediments and increase sedimentation within the remainder of the waterbody. Although the Applicant would restore the hydrology and soils of the affected wild rice waterbodies after construction, rice yield could be reduced in the portion of the waterbody affected for the first growing season after construction. To minimize impacts of construction through wild rice waterbodies, the Applicant would implement applicable measures identified in the Applicant's Environmental Protection Plan (Appendix E). This plan would identify wild rice areas by milepost and contain specific measures to reduce or avoid impacts on wild rice during construction. Avoidance measures would include use of a narrower construction work area, reseeding, monitoring, and use of timber mats, and would incorporate any additional measures proposed by local and state agencies to reflect existing regional policies and procedures to protect wild rice. Wild rice stands also would be monitored for overall condition, function, and vegetative regrowth after construction until the permit conditions are met. As a result, construction through wild rice waterbodies using the wet open-cut crossing method would result in short-term and minor impacts on wild rice waterbodies.

Although not anticipated, construction-related impacts on wild rice waterbodies could include longer than expected recovery time for native wild rice stands, introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice, and altered lakebed conditions—all of which could be detrimental to wild rice germination and production. These potential impacts would be reduced through Project-specific SPCC plans, invasive species management plans, and post-construction monitoring of vegetation for a period of time until permit conditions are met, as described in the Applicant's Environmental Protection Plan (Appendix E). With implementation of these measures, impacts on wild rice waterbodies are expected to be short-term and minor. However, if an HDD frac-out occurred, this could result in the introduction of contaminants, invasive aquatic plants, and non-native strains of wild rice, all considered long-term and major impacts. This effect could be pronounced throughout White Oak Lake due to the corridor's crossing at the stream's inlet into the lake basin.

Operations Impacts

Runoff and Flows

Increases in Stormwater Runoff and Erosion. After the pipeline is installed, revegetation of the permanent right-of-way may require up to several years to reestablish to approximately preconstruction conditions, except for areas where new impervious surfaces are created as addressed below. Runoff patterns along the non-impervious portions of the permanent right-of-way would therefore be altered during the first few years of operation, resulting in impacts on runoff and erosion that would be short-term and negligible to minor. After vegetation is reestablished along the permanent right-of-way, surface water runoff and erosion would return to approximately preconstruction conditions. Areas of the permanent right-of-way that result in permanent vegetation changes, such as forested areas, would result in permanent changes to runoff conditions. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would make the appropriate repairs and improvements.

The number, types, and locations of associated facilities that would be required for pipeline operation along each of the route alternatives have not been determined. However, based on the facility needs and spacing of the Applicant's preferred route, it was assumed that RA-07 would require upgrading of existing pump stations along the Applicant's existing Line 3 corridor and 14 MLVs. Assuming that approximately 8 acres are required for each pump station and 0.1 acre is required for each MLV, approximately 1 acre of newly impervious surfaces would be in place for RA-07 for the life of the Project. The Applicant would be required to manage stormwater runoff at these new facilities in accordance with the stipulations of NPDES permits and SWPPPs as described above, which include the use of permanent stormwater control systems. As a result, potential impacts on surface water due to increased stormwater runoff from impervious surfaces would be permanent and negligible to minor.

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. This could result in topographical changes and loss of vegetation in localized areas for relatively short periods of time, which would alter runoff patterns and could increase erosion. The Applicant would implement measures to minimize impacts during and after these activities, similar to the measures incorporated into the Project during construction. As a result, the impacts of these integrity management activities on stormwater runoff and erosion would be short-term and negligible to minor for each local occurrence, but would occur periodically over the life of the Project.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. As described above, during the first few years of operation, there may be a small increase in surface water runoff and erosion as revegetation continues, resulting in short-term and negligible to minor impacts related to increases in TSS and sedimentation. Similar to the Applicant's preferred route, the permanent right-of-way for RA-07 in upland areas would be maintained in an herbaceous vegetative state during operation to allow access for inspection, monitoring, and maintenance. The permanent removal of large woody vegetation also would result in permanent but minor and localized alterations in habitat, streambank stability loss and erosion, and sedimentation. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify streambank areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would make the appropriate repairs and improvements. As a result, the impacts of these integrity management activities would be similar to those experienced from construction, but over a much smaller area. The impacts on TSS and

sedimentation in nearby surface waters would be short-term and negligible to minor for each local occurrence, but would occur periodically over the life of the Project. In other portions of the permanent right-of-way, there would be a permanent but negligible impact related to increases TSS and sediments in surface water.

Changes in Stream Flows from Water Withdrawals and Discharges. Normal operation of the route would not require withdrawal or discharge of water. However, during the repair or replacement of pipe as part of the Applicant's Integrity Management Program described above, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during the integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control are not defined. However, as described for pipeline construction, the Applicant would be required to obtain water appropriation and NPDES permits for testing procedures and the volume of water would be substantially less than for construction. With adherence to permits and implementation of existing BMPs, minor alterations in stream flows from water appropriation and discharge would be temporary and negligible.

Disruption of Flow Paths or Local Hydrologic Connectivity. Integrity management digs would result in minor alterations of topography and stormwater flows at the excavation sites. With implementation of the Applicant-proposed measures described above to avoid changes to stormwater runoff and restore streambanks to their original attributes after work is completed, impacts on flow and hydrologic connectivity during in the areas excavated for pipe repair or replacement would be temporary to short-term and negligible to minor.

Permanent access roads during operation also could affect hydrologic connectivity. It is anticipated that permanent access roads would require local or state permits, which likely would require culverts to minimize the changes to hydrologic connectivity. Although the extent of the changes in those cases would depend on the topography of the area and the design of the roadway, the impact on hydrologic connectivity likely would be permanent and minor. For access roads without culverts, the extent of changes to hydrologic connectivity could be greater, again dependent on the topography of the area and the design of the roadway. Where those roadways are present, the impact on hydrologic connectivity likely would be permanent and minor.

Other permanent aboveground facilities, such as pump stations and MLVs, also would affect hydrologic connectivity. Due to the relatively small footprints of these facilities, it is anticipated that their presence would result in permanent but negligible to minor impacts.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. The permanent right-of-way of RA-07 in upland areas would be maintained in an herbaceous vegetative state during operation to allow access along the right-of-way for inspection, monitoring, and maintenance. The permanent removal of riparian vegetation in areas adjacent to waterbody crossings would allow more light to enter the waterbody and could cause long-term to permanent but negligible to minor increases in temperature at these locations.

During normal operation, there would be no other measurable changes to water quality in surface waters. The minor changes within the major drainage basins and watersheds crossed by the route alternative would not result in degradation of the average watershed health score or water quality score. As a result, water quality would not be changed in the surface waters of the basins and watershed

along the route, including impaired surface waters. Therefore, watershed surface water quality would not be affected during normal operation of the Project.

Minor fuel and lubricant leaks and spills could occur from maintenance and inspection vehicles operating along RA-07. However, any refueling, fuel storage, or vehicle maintenance would follow measures similar to those in the Applicant's proposed Environmental Protection Plan (Appendix E). Thus, minor leaks and spills would result in negligible to minor and temporary impacts on surface water quality. The potential impacts of an unanticipated crude oil release are discussed in Chapter 10.

Degradation of Aquatic Habitat from Instream Activities. Instream excavations may be required to repair or replace pipe segments buried beneath surface waters. This would result in impacts similar to those described for surface water crossings. The excavations to reach the pipe segments may be accomplished using the wet open-cut method or more likely would involve use of one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would release sediments after the dams are removed and natural waterbody flow returns. However, the sediments would readily dissipate to negligible levels in the downstream area in the vicinity of the crossing. As a result, the potential impact on aquatic habitat of using the dry open-cut method for instream integrity digs is expected to be temporary to short-term and minor for each crossing.

If the wet open-cut method is used for integrity digs, the Applicant would implement the erosion and sediment control measures discussed above for construction of surface water crossings. These measures would be implemented during and after wet open-cut integrity digs; if streambanks are disturbed, they would be restored and stabilized as soon as practical after completion of the pipe repair or replacement. As a result, instream integrity dig activities for using the wet open-cut method would result in short-term and minor impacts on aquatic habitat.

Changes in Channel Morphology and Stability Caused by Channel and Streambank Modifications. Excavation and repair or replacement of pipe may be required within surface waters or at the banks of surface waters. The excavations to reach the pipe segments may be accomplished using the wet open-cut method or more likely would involve use of one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would involve backfilling of the trench, after the repair or replacement is made, to the approximate contours of the river or streambed. This could result in a minor temporary change in channel morphology until the natural sedimentation processes of the waterbody return the affected area to essentially match the nearby morphology. If streambanks are affected by the digs, they would be restored to preconstruction grades when practicable. If the slope is determined to be unstable, the banks would be reshaped to prevent slumping. After reestablishing the grade, streambanks would be restored with appropriate vegetation. As a result, the potential impact on channel morphology and stability of using the dry open-cut method for instream integrity digs is expected to be temporary to short-term and negligible to minor for each crossing.

Using the wet open-cut method for instream integrity digs may require a longer period of time for natural sedimentation processes to accomplish the same result. If streambanks are affected by the digs, they would be restored as described above. As a result, the potential impact on channel morphology and stability of using the wet open-cut method for instream integrity digs is expected to be short-term and minor for each crossing.

Disturbance of Wild Rice Waterbodies. During operation, wild rice waterbodies would not be affected unless it is necessary to repair or replace a section of pipe within the waterbody. In that event, the impacts would be similar to those for the initial construction of the pipeline through the waterbody, as described under construction impacts for the Applicant's preferred route. Although the Applicant would restore the hydrology and soils of the affected portion of the wild rice waterbody after construction, rice yield could be reduced in the portion of the waterbody affected by the repair or replacement activities for the first growing season after completion of the activity. It is likely that only a portion of the approximately 3 acres of wild rice waterbodies within the permanent right-of-way would require repair or replacement at any one time; therefore, these activities could result in short-term and negligible to minor impacts. However, if replacement of a section of pipe within the waterbody resulted in, introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice, and altered lakebed conditions, then impacts could be long term and major.

Route Alternative RA-08

Route alternative RA-08 would be 325 miles in total, with 285 miles in Minnesota, of which 165 miles would be from Clearbrook to Carlton. The RA-08 route would require 189 waterbody crossings in Minnesota and 106 from Clearbrook to Carlton. The RA-08 route is similar to that of RA-07 but does not involve removal of the existing Line 3.

Construction Impacts

Runoff and Flows

Increases in Stormwater Runoff and Erosion. Clearing and grading would be required along the route alternative for construction of the pipeline, MLVs, new and expanded pump stations, and cathodic protection sites—as well as for access roads and ATWS, including pipe yards in Minnesota. Newly cleared areas and impervious surfaces could cause increased stormwater runoff and erosion into nearby surface waters; however, the Applicant would comply with the requirements of applicable permit programs that are in place to manage potential impacts as addressed below.

If RA-08 is selected, the Applicant would obtain NPDES permits for the pipeline, MLVs, pump stations, cathodic protection sites, access roads and ATWS, and pipe yards prior to construction. NPDES permits would specify various stormwater and erosion control measures to be implemented, such as requiring stormwater to be routed around exposed soil areas through conveyance channels and stormwater discharges to be directed from the site to vegetated areas in order to increase sediment removal and infiltrate stormwater on the site when feasible (Minnesota PCA 2013a). With adherence to NPDES permit stipulations and implementation of appropriate BMPs similar to those described for the Applicant's preferred route, construction of the alternative would result in impacts on stormwater runoff and erosion that would be temporary to long-term and minor.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. In addition to clearing and grading, other construction activities such as blasting, trenching, waterbody crossings, ATWS and access road construction, and water discharges may cause increased suspended solids and sedimentation in the surface waters crossed. The Applicant's temporary erosion controls, SWPPP requirements, and NPDES permit requirements described for the Applicant's preferred route would be implemented during these activities to prevent sediment transport into surface waters during construction. During pipeline construction across a waterbody, the extent and duration of sedimentation and increased erosion potential depend on the soils, sediments, and topography of the crossing site and the proposed crossing method used.

RA-08 would cross 106 surface waters; however, specific crossing methods for surface waters have not been determined for the route. When using the dry crossing method, increases in TSS and sedimentation would be localized and temporary in surface waters crossed because construction of the pipeline across the waterbody would occur in a dry area created by the temporary dams upstream and downstream of the work area. TSS and sedimentation would increase when flow is returned to the dry channel but would readily dissipate to negligible levels downstream in the vicinity of the crossing. As a result, impacts would be temporary to short-term and minor.

Wet open-cut methods involve excavation of the channel and banks in the wetted channel, and excavated soils would be in direct contact with surface water. With adherence to NPDES permit stipulations and use of appropriate BMPs similar to those described for the Applicant's preferred route, impacts from increases in TSS concentrations and increased sedimentation in surface waters crossed using open-cut wet crossings would be temporary to short-term and minor.

Changes in Stream Flows from Water Withdrawals and Discharges. Construction of RA-08 would require water withdrawal for hydrostatic testing, dust control, trench dewatering, and HDD installation, which would be sourced from lakes, streams, or groundwater wells. Approximately 44 to 68 million gallons of water (11 to 17 million gallons per construction spread) would be required for hydrostatic testing during construction between Clearbrook and Carlton. The Applicant has not determined the volume of water appropriation needed for dust control, trench dewatering, and HDD installation. Prior to construction, the Applicant would need to obtain a water appropriation permit from Minnesota DNR.

As stipulated in permit requirements, the Applicant would select appropriation sites along RA-08 that would meet Minnesota DNR's criteria of "doing no harm," and all appropriation sites would be reviewed by Minnesota DNR prior to issuance of a water appropriation permit. The permit requires that water withdrawals have a minimal potential for impacts on groundwater resources and must not adversely affect trout streams, calcareous fens, or other significant environmental resources.

Hydrostatic test water would be discharged from a test section in one of two ways as described for the Applicant's preferred route. Discharges would adhere to all conditions set forth in NPDES and water appropriation permits, including discharge over approved energy dissipation measures (e.g., sand bags, plastic sheeting, or natural rock riprap) and the sedimentation control measures as described above. With adherence to water appropriation and NPDES permit conditions and implementation of Applicant-proposed measures, impacts on stream flows from water appropriation and discharge during construction would be temporary and minor.

Disruption of Flow Paths or Local Hydrologic Connectivity. As described for the Applicant's preferred route, pipeline construction may disrupt flow paths and groundwater-surface water interaction due to clearing and grading of riparian vegetation, water appropriation and discharge, and channel and streambank modifications caused by waterbody crossings. With implementation of measures similar to those described for the Applicant's preferred route to prevent erosion and sedimentation, to monitor stream flows during water appropriation and discharge, and to restore streambanks to their original attributes following construction, impacts on flow and hydrologic connectivity during construction of RA-08 would be temporary to permanent and minor to major. Potential impacts that are permanent and major would be associated with specific site features that are sensitive to disruption of hydrologic connectivity. Springs and other surface water features that are dependent on shallow groundwater have the potential for permanent and major impacts.

In addition, construction would involve creation of temporary and permanent access roads, which could affect hydrologic connectivity. The Applicant would restore temporary access roads, including roads that were widened and graded, to preconstruction conditions upon completion of construction. The Applicant would leave any improved roads intact if requested by the respective landowner. Impacts on hydrologic connectivity associated with temporary access roads is expected to be short-term and negligible to minor, depending on the location of the roads. Impacts from permanent access roads are discussed in the operations section below.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. Because only minor increases in stormwater runoff would occur during construction, the potential for stormwater to carry contaminants into surface waters is low. Surface water along RA-08 could become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities such as fuel storage, equipment refueling, and equipment maintenance. However, to protect surface water resources, NPDES permits for construction of the route would require secondary containment of hazardous materials, prohibition of engine degreasing at work sites, containment and collection of liquid and solid wastes, and a spill prevention and response plan for fueling and maintenance of vehicles (Minnesota PCA 2013b). Similar treatment/disposal or discharge measures to those described for the Applicant's preferred route would be necessary for handling concrete wash water, grindings, drilling mud and slurry, and rinse water generated by construction and hydrostatic testing.

In addition, the Applicant would be responsible for cleaning up small spills during construction of RA-08 through procedures similar to those described in the Environmental Protection Plan (Appendix E) for the Applicant's preferred route, including notifying proper personnel (e.g., the onsite spill coordinator) and agencies, stopping the work activity that caused the spill, using absorbent booms and pads to contain and recover released materials in water, and disposing of contaminated response materials at approved facilities.

In areas near sensitive or specially designated surface waters (e.g., the Clearwater River and trout streams), 100-foot buffers from the shoreline would be required during construction and as a permanent feature post-construction, except where a water crossing or other encroachment is necessary. For Section 303(d)-listed surface waters, which already have an impairment that prevents a beneficial use, degradation of water quality is of particular concern. NPDES permits for construction of RA-03AM would require identification of Section 303(d) waters with phosphorus, turbidity, dissolved oxygen, or biotic impairment within 1 mile of construction. If the impaired waters have an approved TMDL implementation plan, the plan must be incorporated into the SWPPP, and discharges must comply with specified TMDLs (Minnesota PCA 2013d). With adherence to these NPDES permit conditions and implementation of Applicant-proposed measures, impacts on surface water quality from small leaks and spills during construction would be temporary to short-term and negligible to minor.

Degradation of Aquatic Habitat from Instream Activities. Pipeline construction across surface waters has the potential to alter and degrade aquatic habitat through increased sedimentation and erosion, disruption or alteration of stream flow, and streambank disturbance. Crossing methods have not been determined for construction of RA-08 but would be selected based on various factors, including waterbody size, sensitivity (e.g., trout stream), water levels, soil/sediment stability, and anticipated season of installation. If a route permit is issued for RA-08, the Applicant would be required to obtain crossing permits from Minnesota DNR for all public waters, and the exact crossing method for each waterbody would be stated in the permits. Minnesota DNR would consider various factors, including

geological, topographic, hydrographic, geotechnical, and scour depth characteristics of each crossing, after final pipeline design in determining their approval for specific waterbody crossing methods.

Similar to construction of the Applicant's preferred route, dry and wet open-crossing crossing methods would be used. Each method has advantages and disadvantages for minimizing potential impacts on aquatic habitats. Assuming that erosion and sedimentation control measures would be the same as those discussed above for the Applicant's preferred route, and that disturbed areas at crossings would be restored and stabilized as soon as practical after pipeline installation, using the dry and wet open-cut crossing methods would result in impacts on aquatic habitat that would be temporary to short-term and minor for each crossing.

If selected for certain crossings along RA-08 (e.g., roads and ditches), successful guided bore crossings would result in no impacts on aquatic habitat as described for the Applicant's preferred route. In addition, HDD crossings likely would be used to avoid impacts on certain sensitive surface waters, such as impaired waters and coldwater fishery resources; particularly deep, wide, or high-flow surface waters; and when appropriate based on subsurface substrate conditions and length of the drill path. HDD crossings are advantageous because they do not disturb streambeds or streambanks, and they maintain stream flow and fish passage. Construction of an HDD crossing is slower than a dry crossing, and there is the potential for inadvertent releases (discussed below). As described for the Applicant's preferred route, successful HDD crossings would result in no impacts on aquatic habitat during construction of RA-08.

Degradation of Water Quality and Habitat from Drilling Mud Releases during HDD Crossings. Specific locations to implement HDD crossings have not been determined for the route alternatives. Similar to the Applicant's preferred route, geotechnical surveys would need to be conducted along the route of RA-08 to determine which surface waters would benefit from use of the HDD method and which of those surface waters are in areas that are geologically suitable for HDD. During drilling, fluid (water, bentonite clay, and possible additives) is circulated through the drilling pipe to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. The potential exists for an inadvertent release or frac-out of this drilling fluid when pressurization of the drill hole is beyond the containment capability of the overburden soil material, which would allow the drilling fluid to flow to the ground or river bed surface. Risk of HDD frac-out is discussed above in the assessment of impacts on surface water and aquatic habitat quality from the Applicant's preferred route. If a frac-out occurred during construction of RA-08 and went undetected or was not quickly contained, impacts on surface water quality could be long-term and major. However, with implementation of measures similar to those described for the Applicant's preferred route to respond to a drilling mud release during HDD construction along RA-08, the impact of a release on surface water quality and streambank structure would be short-term and minor.

Changes in Channel Morphology and Stability Caused by Channel and Streambank Modifications. Dry and wet open-cut waterbody crossing methods involve excavation of the streambed and potential changes to streambank stability and channel morphology. To minimize impacts on surface waters, Minnesota regulations regarding water crossings would be considered for selecting RA-08 crossing methods (Minn. R. 6135.1100, Subp. 4). These regulations specify that crossings should be placed at the narrowest section of a waterbody feasible; crossing of lakes should be avoided when possible, and they should be crossed under water when necessary; and crossing on or under the beds of trout streams should be avoided unless there is no feasible alternative. The Applicant would adhere to these stipulations when feasible, and each waterbody crossing would be approved prior to construction. Similar to construction of the Applicant's preferred route, temporary erosion control measures during

construction of RA-08 would be implemented as necessary during waterbody crossing activities; and rock riprap, geotextile fabric, and other bioengineering techniques would be used to stabilize sites as needed. Following crossing construction, river beds and streambeds would be restored to approximately preconstruction conditions, with no impediments to water flow, and streambanks would be restored to preconstruction grades when practicable. If the slope is determined to be unstable, the banks would be reshaped to prevent slumping. Finally, streambanks would be restored with appropriate vegetation.

The use of open-cut crossings for pipeline construction, along with the Applicant-proposed measures described above, would result in short-term to long-term and minor impacts on channel morphology and streambank stability. Successful construction of HDD crossings, where implemented for construction of RA-08, would result in no impacts on channel morphology or streambank stability.

Disturbance of Wild Rice Waterbodies. RA-08 would cross about 10 acres of the wild rice waterbodies within the construction work area at two wild rice lakes (see Table 6.3.1.2-25). Specific construction methods for crossing of wild rice waterbodies along RA-08 have not been determined. Where HDD is used as the crossing method, the wild rice waterbodies would not be affected unless a frac-out occurs (see above for information on frac-outs).

Where HDD is not used, the wild rice waterbodies would be crossed using applicable wetland crossing methods for the water saturation conditions at the crossing (see Section 2.7.2 for a description of crossing methods). Trenching would remove the vegetation cover and sediments and increase sedimentation within the remainder of the waterbody. Although the Applicant would restore the hydrology and soils of the affected wild rice waterbodies after construction, rice yield could be reduced in the portion of the waterbody affected for the first growing season after construction. To minimize impacts of construction through wild rice waterbodies, the Applicant would implement applicable measures identified in the Applicant's Environmental Protection Plan (Appendix E). This plan would identify wild rice areas by milepost and contain specific measures to reduce or avoid impacts on wild rice during construction. Avoidance measures would include use of a narrower construction work area, reseeding, monitoring, and use of timber mats, and would incorporate any additional measures proposed by local and state agencies to reflect existing regional policies and procedures to protect wild rice. Wild rice stands also would be monitored for overall condition, function, and vegetative regrowth after construction until the permit conditions are met. As a result, construction through wild rice waterbodies using the wet open-cut crossing method would result in short-term minor impacts on wild rice waterbodies.

Although not anticipated, construction-related impacts on wild rice waterbodies could include longer than expected recovery time for native wild rice stands, introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice, and altered lakebed conditions—all of which could be detrimental to wild rice germination and production. These potential impacts would be reduced through Project-specific SPCC plans, invasive species management plans, and post-construction monitoring of vegetation for a period of time until permit conditions are met, as described in the Applicant's Environmental Protection Plan (Appendix E). With implementation of these measures, impacts on wild rice waterbodies are expected to be short-term and minor. However, if an HDD frac-out occurred, this could result in the introduction of contaminants, invasive aquatic plants, and non-native strains of wild rice, all considered long-term and major impacts.

Operations Impacts

Runoff and Flows

Increases in Stormwater Runoff and Erosion. After the pipeline is installed, revegetation of the permanent right-of-way may require up to several years to reestablish to approximately preconstruction conditions, except for areas where new impervious surfaces are created as addressed below. Runoff patterns along the non-impervious portions of the permanent right-of-way would therefore be altered during the first few years of operation, resulting in impacts on runoff and erosion that would be short-term and negligible to minor. After vegetation is reestablished along the permanent right-of-way, surface water runoff and erosion would return to approximately preconstruction conditions. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would make the appropriate repairs and improvements.

The number, types, and locations of associated facilities that would be required for pipeline operation along each of the route alternatives have not been determined. However, based on the facility needs and spacing of the Applicant's preferred route, it was assumed that RA-08 would require four pump stations and 14 MLVs. Assuming that approximately 8 acres are required for each pump station and 0.1 acre is required for each MLV, approximately 33 acres of newly impervious surfaces would be in place for RA-08 for the life of the Project. The Applicant would be required to manage stormwater runoff at these new facilities in accordance with the stipulations of NPDES permits and SWPPPs as described above, which include the use of permanent stormwater control systems. As a result, the potential impacts on surface water due to increased stormwater runoff from impervious surfaces would be permanent and negligible to minor.

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. This could result in topographical changes and loss of vegetation in localized areas for relatively short periods of time, which would alter runoff patterns and could increase erosion. The Applicant would implement measures to minimize impacts during and after these activities, similar to the measures incorporated into the Project during construction. As a result, the impacts of these integrity management activities on stormwater runoff and erosion would be short-term and negligible to minor for each local occurrence, but would occur periodically over the life of the Project.

Increases in Total Suspended Solids Concentrations and Increased Sedimentation. As described above, during the first few years of operation, there may be a small increase in surface water runoff and erosion as revegetation continues, resulting in short-term and negligible to minor impacts related to increases in TSS and sedimentation. Similar to the Applicant's preferred route, the permanent right-of-way for RA-08 in upland areas would be maintained in an herbaceous vegetative state during operation to allow access for inspection, monitoring, and maintenance. The permanent removal of large woody vegetation also would result in permanent but minor and localized alterations in habitat, streambank stability loss and erosion, and sedimentation. Areas of the permanent right-of-way that result in permanent vegetation changes, such as forested areas, would result in permanent changes to runoff conditions. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify streambank areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would make the appropriate repairs and improvements. As a result, the impacts of these integrity management activities would be similar to those experienced from construction, but over a much smaller area. The impacts on TSS and sedimentation in nearby surface

waters would be short-term and negligible to minor for each local occurrence, but would occur periodically over the life of the Project. In other portions of the permanent right-of-way, there would be a permanent but negligible impact related to increases in TSS and sediments in surface water.

Changes in Stream Flows from Water Withdrawals and Discharges. Normal operation of the route would not require withdrawal or discharge of water. However, during the repair or replacement of pipe as part of the Applicant's Integrity Management Program described above, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during the integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control are not defined. However, as described for pipeline construction, the Applicant would be required to obtain water appropriation and NPDES permits for testing procedures, and the volume of water would be substantially less than for construction. With adherence to permits and implementation of existing BMPs, minor alterations in stream flows from water appropriation and discharge would be temporary and negligible.

Disruption of Flow Paths or Local Hydrologic Connectivity. Integrity management digs would result in minor alterations of topography and stormwater flows at the excavation sites. With implementation of the Applicant-proposed measures described above to avoid changes to stormwater runoff and restore streambanks to their original attributes after work is completed, impacts on flow and hydrologic connectivity during in the areas excavated for pipe repair or replacement would be temporary to short-term and negligible to minor.

Permanent access roads during operation also could affect hydrologic connectivity. It is anticipated that permanent access roads would require local or state permits, which likely would require culverts to minimize the changes to hydrologic connectivity. Although the extent of the changes in those cases would depend on the topography of the area and the design of the roadway, the impact on hydrologic connectivity likely would be permanent and minor. For access roads without culverts, the extent of changes to hydrologic connectivity could be greater, again dependent on the topography of the area and the design of the roadway. Where those roadways are present, the impact on hydrologic connectivity likely would be permanent and minor.

Other permanent aboveground facilities, such as pump stations and MLVs, also would affect hydrologic connectivity. Due to the relatively small footprints of these facilities, it is anticipated that their presence would result in permanent but negligible to minor impacts.

Surface Water and Aquatic Habitat Quality

Degradation of Surface Water Quality. The permanent right-of-way of RA-08 in upland areas would be maintained in an herbaceous vegetative state during operation to allow access along the right-of-way for inspection, monitoring, and maintenance. The permanent removal of riparian vegetation in areas adjacent to waterbody crossings would allow more light to enter the waterbody and could cause long-term to permanent but negligible to minor increases in temperature at these locations.

During normal operation, there would be no other measurable changes to water quality in surface waters. The minor changes within the major drainage basins and watersheds crossed by the route alternative would not result in degradation of the average watershed health score or water quality score. As a result, water quality would not be changed in the surface waters of the basins and watershed along the route, including impaired surface waters. Therefore, watershed surface water quality would not be affected during normal operation of the Project.

Minor fuel and lubricant leaks and spills could occur from maintenance and inspection vehicles operating along RA-08. However, any refueling, fuel storage, or vehicle maintenance would follow measures similar to those in the Applicant's proposed Environmental Protection Plan (Appendix E). Thus, minor leaks and spills would result in negligible to minor and temporary impacts on surface water quality. The potential impacts of an unanticipated crude oil release are discussed in Chapter 10.

Degradation of Aquatic Habitat from Instream Activities. Instream excavations may be required to repair or replace pipe segments buried beneath surface waters. This would result in impacts similar to those described for surface water crossings. The excavations to reach the pipe segments may be accomplished using the wet open-cut method or more likely would involve use of one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would release sediments after the dams are removed and natural waterbody flow returns. However, the sediments would readily dissipate to negligible levels in the downstream area in the vicinity of the crossing. As a result, the potential impact on aquatic habitat of using the dry open-cut method for instream integrity digs is expected to be temporary to short-term and minor for each crossing.

If the wet open-cut method is used for integrity digs, the Applicant would implement the erosion and sediment control measures discussed above for construction of surface water crossings. These measures would be implemented during and after wet open-cut integrity digs; if streambanks are disturbed, they would be restored and stabilized as soon as practical after completion of the pipe repair or replacement. As a result, instream integrity dig activities for using the wet open-cut method would result in short-term minor impacts on aquatic habitat.

Changes in Channel Morphology and Stability Caused by Channel and Streambank Modifications. Excavation and repair or replacement of pipe may be required within surface waters or at the banks of surface waters. The excavations to reach the pipe segments may be accomplished using the wet open-cut method, or more likely would involve use of one of the dry open-cut methods.

Integrity management excavations accomplished using either of the dry open-cut crossing methods would involve backfilling of the trench, after the repair or replacement is made, to the approximate contours of the river or streambed. This could result in a minor temporary change in channel morphology until the natural sedimentation processes of the waterbody return the affected area to essentially match the nearby morphology. If streambanks are affected by the digs, they would be restored to preconstruction grades when practicable. If the slope is determined to be unstable, the banks would be reshaped to prevent slumping. After reestablishing the grade, streambanks would be restored with appropriate vegetation. As a result, the potential impact on channel morphology and stability of using the dry open-cut method for instream integrity digs is expected to be temporary to short-term and negligible to minor for each crossing.

Using the wet open-cut method for instream integrity digs may require a longer period of time for natural sedimentation processes to accomplish the same result. If streambanks are affected by the digs, they would be restored as described above. As a result, the potential impact on channel morphology and stability of using the wet open-cut method for instream integrity digs is expected to be short-term and minor for each crossing.

Disturbance of Wild Rice Waterbodies. During operation, wild rice waterbodies would not be affected unless it is necessary to repair or replace a section of pipe within the waterbody. In that event, the impacts would be similar to those for the initial construction of the pipeline through the waterbody as

described under construction impacts for the Applicant's preferred route. Although the Applicant would restore the hydrology and soils of the affected portion of the wild rice waterbody after construction, rice yield could be reduced in the portion of the waterbody affected by the repair or replacement activities for the first growing season after completion of the activity. It is likely that only a portion of the approximately 4 acres of wild rice waterbodies within the permanent right-of-way would require repair or replacement at any one time; therefore, these activities could result in short-term negligible to minor impacts. However, if replacement of a section of pipe within the waterbody resulted in, introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice, and altered lakebed conditions, impacts could be long term and major.

6.3.1.2.5 Regional Analysis of Impacts on Quality of Existing Surface Water Conditions

For northern Minnesota streams, the conversion of forested perennial cover to grassland dominated cover can have an overall effect on local hydrology by effecting the smaller peak flows. This is the yearly bankfull flow that shapes the channel and builds the floodplain (Verry 2001). Removing permanent perennial cover along streams also reduces instream quality and habitat by increasing water temperatures, negatively affecting trout. Nutrient export from converted landscapes can also increase to lakes or streams when changing from forested to open grassland cover. The amount may be dependent on soil, slope, and other factors (Radomski 2005). The overall effects of changes in forest cover on hydrology, nutrient export, and temperature are dependent on the condition of the nearby watershed. The greater the landscape alteration, the more potential for these changes. Quantifiable estimates of impacts from land use change activities are available and have been used to predict hydrology and water quality changes to surface waters with the use of computer modeling programs.

Northern forested wetlands that are converted to open linear landscapes can allow for invasive species or other aggressive plants to develop monocultures and displace native vegetation. Corridors are often prone to infestations of narrowleaf (*Typha angustifolia*) or hybrid cattail (*Typha X glauca*), which are not listed as an invasive plant but have been an aggressive nuisance with previous pipeline development.

6.3.1.2.6 Summary and Mitigation

Summary

Impacts on surface waters, including streams, rivers, lakes, and wild rice waterbodies, watersheds, sensitive or specially designated surface waters, NRI rivers, impaired surface waters, and navigable waterways from construction of the Applicant's preferred route and the four route alternatives were assessed and found to be temporary and minor, with the exception of instances where a "frac-out" occurs while doing HDD boring. Impacts from operations were found to be potentially short-term to permanent and negligible to minor. The comparison of impacts among the alternatives focused on the pipeline routes between Clearbrook and Carlton, Minnesota, because all of the routes have the same alignments from Neche, North Dakota, to Clearbrook and from Carlton to Superior, Wisconsin.

Table 6.3.1.2-28 presents summary information on the impacts identified. For all route options, the types of impacts of construction and operations on surface water would be comparable at locations experiencing a change. However, the numbers and acreages of areas that would experience a change differ among the alternatives, as discussed below.

Construction Impacts

Construction of all route options would cause changes to runoff and flows that would result in temporary to short-term and minor impacts. Changes in water quality due to construction would result in impacts on surface water that would be temporary to short-term and negligible to minor for all route options, unless drilling fluids were released during HDD crossings and were uncontained or undetected. In this event, the impact could be long-term and major for all route options. The number of surface waters affected by crossings would differ among the alternatives: RA-07 would cross the fewest number of surface waters (81), followed by RA-08, the Applicant's preferred route, RA-06, and RA-03AM with 167 crossings (Table 6.3.1.2-28). RA-06 would affect the least number of impaired water crossings (1) and TMDL study areas (1), followed by RA-07, RA-08, the Applicant's preferred route, and RA-03AM with 14 crossings of impaired waters and crossings of 6 TMDL study areas (Table 6.3.1.2-28). These impacts on impaired or low-quality waterbodies may cause further degradation of the waterbody, exacerbate an existing impairment, cause additional impairments, interfere with restoration activities, and/or delay attainment of water quality standards. Impacts on high-quality waterbodies (e.g., trout streams, NRI-listed rivers, and wild rice waterbodies) may decrease the suitability of surface water as a habitat for sensitive species or degrade the existing beneficial use of the waterbody.

For channel morphology and stability, the construction impacts would be short-term to long-term and minor, except where the HDD or guided bore crossing method is used. At those locations, there would be no impact on channel morphology and stability. As noted above, the number of surface water crossings would range from 81 for RA-07 to 167 for RA-03AM (Table 6.3.1.2-28).

The construction impact on wild rice waterbodies for each location affected for each route option would be short-term and minor. The Applicant's preferred route would affect the least number of acres of wild rice waterbodies (4.9 acres), followed by RA-07, RA-03AM, RA-08, and RA-06 with 10.6 acres (Table 6.3.1.2-28).

Operations Impacts

As with construction, the types of impacts on surface water during operations would be the same at each location experiencing a change for all route options. Thus, the primary difference in impacts among the route options would be the extent of impacts and the types of resources affected. Operation would cause changes to runoff and flows from the presence of aboveground facilities, including permanent access roads; potential impacts would be temporary to permanent and minor. The increase in impervious surfaces that would cause these changes would range from 1.4 acres for RA-07 to between 30 and 50 acres for the other route options (Table 6.3.1.2-28). If integrity digs were required in or immediately adjacent to surface waters, changes in water quality from operation would result in temporary to short-term and negligible to minor impacts on surface water for all route options when they did occur and could occur periodically over the life of the Project. Permanent and minor increases in water temperature could occur from cleared vegetation around waterbodies.

Enbridge, in accordance with Minnesota PCA requirements, would designate at least one Environmental Inspector per 14,000-feet spread during pipeline construction.

Operation of all route options would result in impacts on channel morphology and stability and wild rice waterbodies that are expected to be temporary to short-term and negligible to minor due if they did occur, and would be associated with periodic integrity digs. The area of wild rice waterbodies potentially affected would be similar among the alternatives, ranging from 2.5 acres for RA-07 to 4.4 acres for RA-06; impacts would be short-term and negligible to minor (Table 6.3.1.2-27).

Mitigation

In addition to the Applicant-proposed measures to avoid or minimize impacts that would be incorporated into the Project, and the stipulations in permits required for the Project, Minnesota DNR identified the following mitigation measures for consideration by the Commission to further avoid and minimize impacts:

- Where riparian vegetation is removed at surface water crossings, revegetate the construction work area with a minimum 50-foot-wide buffer of woody vegetation to reduce runoff, erosion, water quality degradation, sunlight penetration, and water temperature warming, and increase bank stability.
- Longer term impacts of clearing in temporary work areas could be offset by reestablishing or enhancing the existing cover type within up to 500 feet of waterbodies, depending on topography.
- After construction on state forest lands or state WMAs, tree planting on all temporary workspaces could be accomplished to reduce erosion and runoff, as well as to ensure that forested areas within the riparian zone are restored to forest cover.
- Rock riprap should be considered or permitted only when infrastructure (public or private) is at risk. Natural channel design and bioengineering methods should be considered the primary means of streambed and streambank restoration and stabilization.

Table 6.3.1.2-28. Summary of Potential Impacts on Surface Waters for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Increases in stormwater runoff and erosion from newly cleared areas and impervious surfaces	Short-term/minor impacts • 109 waterbody crossings	Short-term/minor impacts • 167 waterbody crossings	Short-term/minor impacts • 137 waterbody crossings	Short-term/minor impacts • 81 waterbody crossings	Short-term/minor impacts • 106 waterbody crossings
Increases in total suspended solids concentrations and increased sedimentation	Temporary to short-term/minor impacts • 109 waterbody crossings Temporary/negligible to minor impacts • 1 blasting location	Temporary to short-term/minor impacts • 167 waterbody crossings *Need for blasting not known*	Temporary to short-term/minor impacts • 137 waterbody crossings *Need for blasting not known*	Temporary to short-term/minor impacts • 81 waterbody crossings *Need for blasting not known*	Temporary to short-term/minor impacts • 106 waterbody crossings *Need for blasting not known*
Changes in stream flows from water withdrawals and discharges	Temporary/minor impacts • 4 construction spreads (11–17 million gallons per spread)	Temporary/minor impacts • 5 construction spreads (11–17 million gallons per spread)	Temporary/minor impacts • 4 construction spreads (11–17 million gallons per spread)	Temporary/minor impacts • 4 construction spreads (11–17 million gallons per spread)	Temporary/minor impacts • 4 construction spreads (11–17 million gallons per spread)
Disruption of flow paths or local hydrologic connectivity	Temporary to permanent/ negligible to major impacts • 4 spreads requiring water appropriation and discharge for hydrostatic testing • Wet open-cut crossings • Clearing and grading of riparian vegetation • Access road construction	Temporary to permanent/ negligible to major impacts • 5 spreads requiring water appropriation and discharge for hydrostatic testing • Wet open-cut crossings • Clearing and grading of riparian vegetation • Access road construction	Temporary to permanent/ negligible to major impacts • 4 spreads requiring water appropriation and discharge for hydrostatic testing • Wet open-cut crossings • Clearing and grading of riparian vegetation • Access road construction	Temporary to permanent/ negligible to major impacts • 4 spreads requiring water appropriation and discharge for hydrostatic testing • Wet open-cut crossings • Clearing and grading of riparian vegetation • Access road construction	Temporary to permanent/ negligible to major impacts • 4 spreads requiring water appropriation and discharge for hydrostatic testing • Wet open-cut crossings • Clearing and grading of riparian vegetation • Access road construction

Table 6.3.1.2-28. Summary of Potential Impacts on Surface Waters for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Degradation of surface water quality	Temporary to short-term/ negligible to minor impacts • 13 impaired water crossings • 3 TMDL study area crossings	Temporary to short-term/ negligible to minor impacts • 14 impaired water crossings • 6 TMDL study area crossings	Temporary to short-term/ negligible to minor impacts • 1 impaired water crossing • 1 TMDL study area crossing	Temporary to short-term/ negligible to minor impacts • 2 impaired water crossings • 1 TMDL study area crossing	Temporary to short-term/ negligible to minor impacts • 5 impaired water crossings • 1 TMDL study area crossing
Degradation of aquatic habitat from instream activities	Temporary to short-term/minor impacts (*from dry and wet open-cut crossings*); no impact (*from guided bore and HDD crossings*) • 6 trout stream crossings • 7 NRI-listed river crossings	Temporary to short-term/minor impacts (*from dry and wet open-cut crossings*); no impact (*from guided bore and HDD crossings*) • 9 trout stream crossings • 1 NRI-listed river crossing	Temporary to short-term/minor impacts (*from dry and wet open-cut crossings*); no impact (*from guided bore and HDD crossings*) • 8 trout stream crossings • 2 NRI-listed river crossings	Temporary to short-term/minor impacts (*from dry and wet open-cut crossings*); no impact (*from guided bore and HDD crossings*) • 6 trout stream crossings • 1 NRI-listed river crossing	Temporary to short-term/minor impacts (*from dry and wet open-cut crossings*); no impact (*from guided bore and HDD crossings*) • 4 trout stream crossings • 1 NRI-listed river crossing
Degradation of water quality and habitat from releases of drilling mud during HDD crossings Each drilling mud additive must be identified; specific location where additive will be used; water analysis of before and after any frac-out	Short-term/minor impacts (*if quickly contained*) to long-term/major impacts (*if undetected or uncontained*) • 12 HDD crossings	Short-term/minor impacts (*if quickly contained*) to long-term/major impacts (*if undetected or uncontained*) • Number of HDD crossings not determined for route alternatives			

Table 6.3.1.2-28. Summary of Potential Impacts on Surface Waters for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Changes in channel morphology and stability caused by channel and streambank modifications	Short-term to long-term/ minor impacts (*from dry and wet open-cut crossings*); no impact (*from guided bore and HDD crossings*) • 12 HDD crossings; number of guided bore crossings not determined	Short-term to long-term/minor impacts from open-cut crossings; no impact from guided bore and HDD crossings • Crossing types not determined for route alternatives			
Disturbance of wild rice waterbodies	Short-term to long-term/minor to major impacts (*if HDD frac out occurs*). • 4.9 acres • 5 waterbodies	Short-term to long-term/minor to major impacts (*if HDD frac out occurs*). • 7.5 acres • 6 waterbodies	Short-term to long-term/minor to major impacts (*if HDD frac out occurs*). • 10.6 acres • 5 waterbodies	Short-term to long-term/minor to major impacts (*if HDD frac out occurs*). • 6.1 acres • 1 waterbody	Short-term to long-term/minor to major impacts (*if HDD frac out occurs*). • 9.8 acres • 2 waterbodies
Operations Impacts					
Increases in stormwater runoff and erosion	Short-term to permanent/ negligible to minor impacts • 30.3 acres of new impervious surfaces (4 pump stations, 18 MLVs)	Short-term to permanent/ negligible to minor impacts • 50.3 acres of new impervious surfaces (6 pump stations, 23 MLVs)	Short-term to permanent/ negligible to minor impacts • 33.6 acres of new impervious surfaces (4 pump stations, 16 MLVs)	Short-term to permanent/ negligible to minor impacts • 1.4 acres of new impervious surfaces (0 pump stations, 14 MLVs)	Short-term to permanent/ negligible to minor impacts • 33.4 acres of new impervious surfaces (4 pump stations, 14 MLVs)
Increases in total suspended solids concentrations and increased sedimentation	Short-term to permanent/ negligible to minor impacts • Removal of riparian vegetation • Increased erosion	Short-term to permanent/ negligible to minor impacts • Removal of riparian vegetation • Increased erosion	Short-term to permanent/ negligible to minor impacts • Removal of riparian vegetation • Increased erosion	Short-term to permanent/ negligible to minor impacts • Removal of riparian vegetation • Increased erosion	Short-term to permanent/ negligible to minor impacts • Removal of riparian vegetation • Increased erosion

Table 6.3.1.2-28. Summary of Potential Impacts on Surface Waters for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Changes in stream flows from water withdrawals and discharges	Temporary/negligible impacts	Temporary/negligible impacts	Temporary/negligible impacts	Temporary/negligible impacts	Temporary/negligible impacts
Disruption of flow paths or local hydrologic connectivity	Temporary to permanent/ negligible to minor impacts from access roads	Temporary to permanent/ negligible to minor impacts from access roads	Temporary to permanent/ negligible to minor impacts from access roads	Temporary to permanent/ negligible to minor impacts from access roads	Temporary to permanent/ negligible to minor impacts from access roads
Degradation of surface water quality	Temporary to permanent/ negligible to minor impacts • Minor leaks and spills during maintenance • Contaminants in runoff • Increased water temperature from cleared vegetation	Temporary to permanent/ negligible to minor impacts • Minor leaks and spills during maintenance • Contaminants in runoff • Increased water temperature from cleared vegetation	Temporary to permanent/ negligible to minor impacts • Minor leaks and spills during maintenance • Contaminants in runoff • Increased water temperature from cleared vegetation	Temporary to permanent/ negligible to minor impacts • Minor leaks and spills during maintenance • Contaminants in runoff • Increased water temperature from cleared vegetation	Temporary to permanent/ negligible to minor impacts • Minor leaks and spills during maintenance • Contaminants in runoff • Increased water temperature from cleared vegetation
Degradation of aquatic habitat from instream activities	Temporary to short-term/ minor impacts from integrity digs	Temporary to short-term/ minor impacts from integrity digs	Temporary to short-term/ minor impacts from integrity digs	Temporary to short-term/ minor impacts from integrity digs	Temporary to short-term/ minor impacts from integrity digs
Changes in channel morphology and stability caused by channel and streambank modifications	Temporary to short-term/ negligible to minor impacts from integrity digs	Temporary to short-term/ negligible to minor impacts from integrity digs	Temporary to short-term/ negligible to minor impacts from integrity digs	Temporary to short-term/ negligible to minor impacts from integrity digs	Temporary to short-term/ negligible to minor impacts from integrity digs
Disturbance of wild rice waterbodies	Short-term to long-term/minor to major impacts (*if replacement pipeline is required).* • 3.2 acres of wild rice waterbodies • 5 waterbodies	Short-term to long-term/minor to major impacts (*if replacement pipeline is required).* • 3.1 acres of wild rice waterbodies • 6 waterbodies	Short-term to long-term/minor to major impacts (*if replacement pipeline is required).* • 4.4 acres of wild rice waterbodies • 5 waterbodies	Short-term to long-term/minor to major impacts (*if replacement pipeline is required).* • 2.5 acres of wild rice waterbodies • 1 waterbody	Short-term to long-term/minor to major impacts (*if replacement pipeline is required).* • 4.1 acres of wild rice waterbodies • 2 waterbodies

6.3.1.2.7 References

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6.3.1.3 Wetlands

A wetland is a land area that is saturated with water, either permanently or seasonally, such that it takes on the characteristics of a distinct ecosystem. Wetlands are defined in a variety of ways for federal, state, and local regulatory protection; however, the common factors that distinguish wetlands from other landforms or waterbodies are the presence of a hydrophytic (waterlogged) vegetation community, hydric soils,[12] and hydrology. All wetlands provide a variety of functions of social significance, including: surface water storage (flood control), shoreline stabilization (wave damage protection/shoreline erosion control), stream flow maintenance (maintaining aquatic habitat and aesthetic appreciation opportunities), groundwater recharge (some types replenish water supplies), sediment removal and nutrient cycling (water quality protection), aquatic productivity (fishing, shellfishing, and waterfowl hunting), production of trees (timber harvest), production of herbaceous growth (livestock grazing and haying), production of peaty soils (peat harvest), and wildlife habitat (hunting, trapping, plant/wildlife/nature photography, nature observation, and aesthetics) (EPA 2002, 2006).

The analysis of impacts on wetlands during construction of the Applicant's preferred route and route alternatives considered changes to wetland characteristics and functions by alteration or loss of the plant communities through removal or cover with fill, and by alteration or loss of the hydrologic conditions that maintain wetland plant communities and wetland soils. Construction and operations impacts considered included:

- Changes to forested and scrub/shrub wetland characteristics and functions;
- Changes to emergent wetland characteristics and functions;
- Changes to Minnesota Public Waters Wetland characteristics and functions;
- Changes to Minnesota calcareous fen characteristics and functions;
- Changes to Wetland Reserve Program wetland characteristics and functions; and
- Changes to wetland mitigation bank easements characteristics, functions, and availability.

This section first describes the existing wetlands, including Public Waters Wetlands, calcareous fen wetlands, and wetland conservation easements, within the area along the Applicant's preferred route and each route alternative where wetlands could be affected by construction and operation of the Project. The potential Project-related impacts of the Applicant's preferred route on wetlands during construction and operation then are discussed, along with measures the Applicant would implement to minimize impacts. Next, the potential impacts on wetlands during construction and operation are addressed for each route alternative (RA-03AM, RA-06, RA-07, and RA-08). A summary and comparison of the impacts are included at the end of the section, with potential mitigation measures to be considered.

Potential impacts on wetlands due to an unanticipated crude oil release are discussed in Chapter 10.

[12] A soil that forms under conditions of water saturation long enough during the growing season to develop anaerobic conditions in the upper part of the soil.

6.3.1.3.1 Regulatory Context and Methodology

Regulatory Context

General Wetlands

Federal and State Jurisdictional Wetlands

CWA Section 404 and Rivers and Harbors Act Section 10 Individual Permits and associated state CWA Section 401 Individual Water Quality Certification for the Project in Minnesota are under the jurisdiction of USACE – St. Paul District and Minnesota PCA. USACE requires that projects avoid impacts on wetlands to the extent practicable and that potential impacts have been minimized, and that compensation be provided for all remaining unavoidable impacts.

For CWA Section 401 certification, Minnesota PCA is responsible for non-reservation wetlands in Minnesota, Wisconsin DNR is responsible for wetlands in Wisconsin, and North Dakota DH's Division of Water Quality is responsible for wetlands in North Dakota. USEPA is responsible for 401 certifications on reservation lands, with the exception of Grand Portage and Fond du Lac Bands in Minnesota, and Mole Lake and Lac du Flambeau Bands in WI, which have their own 401 programs. Permitting for route alternative RA-03AM would require obtaining a CWA Section 401 certification from Iowa DNR and Illinois DNR. Adherence to state-specific general construction and stormwater permit conditions, buffer laws, and other state and local resource protection measures also would be required, which would serve as a duplicative mechanism for oversight and protection of jurisdictional wetland resources.

In Minnesota, the Wetland Conservation Act (WCA) protects wetlands and applies to all wetlands except Public Waters Wetlands (described below). The WCA requires projects that affect wetlands to try to avoid the impact, minimize any unavoidable impacts, and replace any lost wetland functions. Responsibility for administration of the WCA is shared by local government units and Minnesota Board of Water and Soil Resources (Minnesota BWSR) (Minn. R. Ch. 8420) and is enforced by Minnesota DNR.

Compensatory Mitigation

Compensatory wetland mitigation may be required in federal and state-specific permitting for permanent impacts on forested, scrub/shrub, and emergent wetlands. The overall objective of compensatory wetland mitigation would be to compensate for wetland aquatic resource functions lost due to construction, taking into consideration what is available and feasible. Compensatory wetland mitigation would be consistent with applicable policies, regulations, and rules governing compensatory wetland mitigation for the purposes of Section 404 of the CWA, including, but not limited to:

- USACE, St. Paul District Draft Compensatory Mitigation Policy for Minnesota, dated January 23, 2009;
- Joint guidance between St. Paul District and Minnesota BWSR for Developing Mitigation Plan Performance Standards and Credit Release Schedules in Minnesota, dated December 16, 2015;
- USACE and EPA Final Rule Regarding Compensatory Mitigation for Losses of Aquatic Resources, dated April 10, 2008; and
- Minnesota Office of the Revisor of Statutes 7050.0186 Wetlands Standards and Mitigation, dated April 1, 2008 and wetland replacement regulations as described under the WCA.

Specially Designated Wetlands

Minnesota Public Waters Wetlands

Public Waters Wetlands are a subset of the State's jurisdictional wetlands regulated under Minnesota Statutes § 103G. Public Waters Wetlands are regulated as public waters under Minnesota DNR's License to Cross Public Waters program. Where Public Waters Wetlands occur, a License to Cross Public Waters would be required from Minnesota DNR.

Minnesota DNR is responsible for licensing utility crossings for any utility projects proposing to cross Public Waters Wetlands, ensuring that the crossing plans are reasonable, are practical, and will adequately protect public safety and promote the public welfare (Minn. Stat. § 84.415 and § 103G.315). The Applicant may request exemption from wetland replacement requirements (i.e., compensatory mitigation) under existing utility exemptions for those portions of the Project within Public Waters Wetlands that would be regulated under WCA standards (Minnesota WCA n.d.). Utility crossing licenses generally are required for installation of electrical, pipeline, and communication projects and are granted for a term of 25 or 50 years.

Minnesota Calcareous Fen Wetlands

Calcareous fens are wetlands characterized by a substrate of non-acidic peat and dependent on a constant supply of cold, oxygen-poor groundwater rich in calcium and magnesium bicarbonates. They are rare and typically occur on slight slopes where upwelling water eventually drains away and where surface water inputs are minimal.

Impacts on calcareous fens are regulated by Minnesota DNR under the WCA and the USACE under the CWA. Under this act, a calcareous fen may not be filled, drained, or otherwise degraded, wholly or partially, by any activity. If impacts are identified and deemed necessary by the Minnesota Commissioner of Natural Resources, a Fen Management Plan must be provided by the applicant (Minn. Stat. § 103G.223). Eight state-listed, rare plant species are known to be commonly found within calcareous fens; these plant species would be additionally protected under Minnesota's Endangered Species Act (Minn. Stat. § 84.0895).

Wetland Reserve Program

The Wetland Reserve Program, a voluntary federal program managed by the Natural Resources Conservation Service (NRCS), supported wetland conservation, restoration, and enhancement projects on private agricultural and pastoral land through easements and restoration cost-share agreements. The Wetland Reserve Program ran from 2009 and 2014 and has since been replaced by the Agricultural Act of 2014 Agricultural Conservation Easement Program, which has the same objectives and implementation tools.

Minnesota Wetland Mitigation Bank Easements

The Minnesota BWSR Mitigation Banking Program administered under the WCA (Minn. R. 8420.0700 to 8420.0820) facilitates applying for or purchasing wetland credits toward future wetland impacts. Minnesota BWSR oversees the program, with local government units involved in landowner application and monitoring. Minnesota created 10 wetland bank service areas. Bank credit ratio is reduced if the credit area used is in a different service area than the disturbance area (Minnesota BWSR 2016).

Methodology

As a part of the evaluation of potential impacts on wetlands and effects on specially designated wetland resources the following information sources were used:

- USFWS National Wetlands Inventory (NWI) database (USFWS 2016), classified using the Cowardin classification system (Cowardin et al. 1979);
- Minnesota DNR Public Waters Wetlands database (Minnesota DNR 2014), classified based on USFWS Circular No. 39 (EPA 2002);
- Minnesota DNR calcareous fens database (Minnesota DNR 2008), ranked based on the conservation status ranking (or "S-rank") methodology developed by NatureServe and its member natural heritage programs in North America (NatureServe 2016), and classified using Minnesota's native plant community classifications (Minnesota DNR 2005);
- USGS Protected Area Database – Wetland Reserve Programs (USGS 2016); and
- Minnesota wetland mitigation bank easements database (Minnesota BWSR 2015).

The ROI for the wetland evaluation encompasses the area that could be directly or indirectly affected by pipeline construction Federal and state jurisdictional wetlands occur in the ROI, including specially designated wetlands.

Potential wetland impacts from construction of the Applicant's preferred route were evaluated by overlaying the footprints of the construction work area, ATWS, access roads, pipe yards, pipeline permanent right-of-way, MLV pads and driveways, and pump stations on the identified wetland maps. Typical wetland disturbance effects were based on the Applicant-proposed construction methods described in Chapter 2 and the special wetland construction methods described in the Applicant's November 2016 EAW (Enbridge 2016). Comparisons of construction impacts between alternatives were based on evaluation of the Applicant's preferred route, and evaluations of the impacts of alternative routes. A standardized 120-foot-wide construction work area was used for RA-03AM, RA-06, and RA-08; and a 205-foot-wide construction work area was used for RA-07. Comparisons of operations impacts were based on the Enbridge-provided footprint for the Applicant's preferred route permanent right-of-way and a standardized 50-foot-wide permanent right-of-way for each route alternative.

6.3.1.3.2 Existing Conditions

Wetland Types

Wetland types crossed by the route alternatives are grouped into three categories: forested wetland, scrub/shrub wetland, and emergent wetland.

General Wetlands

Forested wetlands are dominated by trees 20 feet or taller, including evergreen forest, deciduous forest, and mixed forest wetlands. Scrub/shrub wetlands are dominated by short or dwarfed trees and shrubs less than 20 feet tall, including tall and low-growing shrubs. Woody wetlands include both forested and scrub/shrub wetlands; the term "woody wetlands" is sometimes used in this EIS when discussing forested and scrub/shrub wetlands. Emergent wetlands that would be crossed by the Applicant's preferred route are dominated by erect, rooted, herbaceous wetland plants such as sedges, rushes, and

grasses. Most of the emergent prairie wetlands that were previously in the region have been converted to croplands. Federal and state jurisdictional wetlands occur along the pipeline route alternatives.

Detailed maps that show the locations of wetlands are in Appendix A.

Specially Designated Wetlands

Specially designated wetlands are identified as high-value wetland resources based on environmental and socioeconomic factors such as size, environmental function, and presence of high-value resources, habitat qualities, species diversity, and participation in federally and state-funded conservation programs. Specially designated wetlands and their values are of specific concern to state and local agencies. The specially designated wetlands addressed in this analysis are:

- Minnesota DNR's Public Waters Inventory – Public Waters Wetlands,
- Calcareous fen wetlands, and
- Wetlands enrolled in the NRCS or state Wetland Reserve Programs or the Minnesota BWSR Wetland Mitigation Banking Program.

Minnesota Public Waters Wetlands

Public Waters Wetlands are categorized by type. Public Waters Wetlands crossed by the Applicant's preferred route and route alternatives include wetland Types 3, 4, and 5 that are 10 acres or larger in unincorporated areas or 2.5 acres or larger in incorporated areas. Type 3 wetlands are inland, shallow fresh marshes; Type 4 wetlands are inland, deep fresh marshes; and Type 5 wetlands are open fresh water. Because of the size of these wetlands and their associated environmental and socioeconomic functions, they are afforded legal protection in Minnesota. Public Waters Wetlands identified near the pipeline routes are dominated by Type 3 wetlands.

Minnesota Calcareous Fen Wetlands

As noted above, calcareous fens are rare peat-accumulating wetlands formed as a result of groundwater upwelling through calcareous substrates; they are designated in Minnesota as ORVWs. Because of their regional rarity, biodiversity, and sensitivity to disturbance, calcareous fens are afforded legal protection in Minnesota.

Wetland Reserve Program and Minnesota Board of Water and Soil Resources Banking Program

Wetlands identified under the NRCS or state Wetland Reserve Programs and Minnesota BWSR Mitigation Banking Program include those wetlands that are a part of an existing federally funded or state-managed Wetland Reserve Program. These wetlands are of significance as they offer landowners the voluntary opportunity to protect, restore, enhance, and develop mitigation wetlands under a protective easement managed by NRCS (USGS 2016) or Minnesota BWSR (2015). Pipeline construction through or placement of facilities on wetland reserves or mitigation banks may prevent the wetland areas from being eligible for these programs. During pipeline operation, the permanent right-of-way and potentially some adjacent areas would be subject to disturbance (1) during activities associated with the Applicant's Integrity Management Program (e.g., excavation to repair or replace sections of pipe); and (2) during maintenance of the right-of-way (e.g., brush cutting, mowing).

Applicant's Preferred Route

General Wetlands

Wetlands within the ROI for the Applicant's preferred route are predominantly scrub/shrub wetlands. In Minnesota, approximately 524 acres of forested, scrub/shrub, and emergent wetlands occur within the construction footprint, and approximately 275 acres of wetlands occur within the permanent right-of-way and facility footprints (Table 6.3.1.3-1). Between Clearbrook and Carlton, approximately 445 acres of wetlands occur within the construction work area, and approximately 234 acres of wetlands occur within the permanent right-of-way (Table 6.3.1.3-2).

Table 6.3.1.3-1. Estimated Acreages of Wetlands Crossed by the Applicant's Preferred Route in Minnesota (acres)

Wetland Classification	Construction[a]	Operations[a]	Total[b]	
			Construction	Operations
Forested wetland	141.1	66.3	147.5	70.6
Scrub/shrub wetland	214.5	115.7	224.6	122.0
Emergent wetland	143.8	79.2	151.6	82.5
TOTAL	**499.3**	**261.2**	**523.7**	**275.1**

Source: USFWS 2016.

[a] Construction = Enbridge-provided footprint for construction work area; Operations = Enbridge-provided footprint for permanent right-of-way; additional temporary workspaces (ATWS), including pipe yards; and mainline valves (MLVs), including valve pads and driveways.

[b] Total Construction = sum of pipeline construction work area, ATWS, and temporary access roads; Operations = sum of pipeline permanent right-of-way, primary access roads, pump stations, and MLVs.

Notes:

Values in table may not sum to subtotals and totals due to rounding.

Table 6.3.1.3-2. Estimated Acreages of Wetlands Crossed by the Applicant's Preferred Route (Clearbrook to Carlton) (acres)

Wetland Classification	Construction[a]	Operations[b]
Forested wetland	132.8	61.9
Scrub/shrub wetland	200.6	108.4
Emergent wetland	111.8	64.0
TOTAL	**445.2**	**234.3**

Source: USFWS 2016.

[a] Construction work area = Enbridge-provided footprint for construction work area.

[b] Permanent right-of-way = Enbridge-provided footprint for permanent right-of-way.

Specially Designated Wetlands

Public Waters Wetlands crossed by the Applicant's preferred route include wetland Types 3 and 4 in Minnesota (Table 6.3.1.3-3).

Table 6.3.1.3-3. Estimated Acreages of Public Waters Wetlands Crossed by the Applicant's Preferred Route in Minnesota (acres)

Wetland Type	Construction[a]	Operations[a]	Total[b]	
			Construction	Operations
Type 3 – Inland shallow fresh marshes	2.1	1.7	2.1	1.7
Type 4 – Inland deep fresh marshes	0.6	0.2	0.7	0.2
TOTAL	**2.7**	**1.9**	**2.8**	**1.9**

Source: Minnesota DNR 2014.

[a] Construction = Enbridge-provided footprint for construction work area; Operations = Enbridge-provided footprint for permanent right-of-way.

[b] Construction = sum of pipeline construction work area, ATWS, and temporary access roads; Operations = sum of pipeline permanent right-of-way, primary access roads, pump stations, and MLVs.

One calcareous fen would be crossed by the Applicant's preferred route, and four others are near the route (Table 6.3.1.3-4 and Figure 6.3.1.3-1). All calcareous fens near the Applicant's preferred route are located on the portion of the route between the North Dakota border and Clearbrook, Minnesota. The fen near MP 122, named Gully 30, is approximately 63 feet from the route centerline (Figure 6.3.1.3-1). Calcareous fen surveys completed in 2010 identified the presence of Gully 30 during development of the Alberta Clipper pipeline. As part of the environmental review for the Alberta Clipper pipeline, a Gully 30 Fen Management Plan was developed in coordination with Minnesota DNR (Natural Resource Group 2009). As proposed, portions of the Applicant's preferred route would be co-located with the Alberta Clipper pipeline where Gully 30 and other nearby fens occur.

No wetlands enrolled in the NRCS Wetland Reserve Program are present near the Applicant's preferred route. No wetlands that are part of the Minnesota BWSR Mitigation Banking Program would be crossed by the Applicant's preferred route.

Table 6.3.1.3-4. Estimated Acreages of Calcareous Fen Wetlands near the Applicant's Preferred Route in Minnesota

Approximate Milepost	Distance from Route	Elemental Occurrence Identifier	Primary Description	MBS Native Plant Community Code	State Rank[a]	County
APR 72.0	796 feet	14377 Viking 18	Calcareous fen (northwestern)	OPp93a	S2	Marshall
APR 73.5	2,042 feet	15297 Viking 20	Calcareous fen (northwestern)	OPp93a	S2	Marshall
APR 81.0	525 feet	34586 Norden 18	Calcareous fen (northwestern)	OPp93a	S2	Pennington
APR 120.5	2,011 feet	35384 Chester 24	Calcareous fen (northwestern)	OPp93a	S2	Polk
APR 122.0	63 feet	35382 Gully 30	Calcareous fen (northwestern)	OPp93a	S2	Polk

Source: Minnesota DNR 2008.

[a] State Rank: S1 = critically imperiled; S2 = imperiled; S3 = vulnerable to extirpation; S4 = apparently secure; S5 = secure, common, widespread, and abundant.

APR = Applicant's preferred route; MBS = Minnesota Biological Survey.

Route Alternatives

The only segment where the route alternatives would vary from the alignment of the Applicant's preferred route is between Clearbrook and Carlton in Minnesota. The existing conditions relevant to wetlands for the route alternatives between Clearbrook and Carlton are described below.

Route Alternative RA-03AM

Wetlands crossed by the construction work area for RA-03AM are listed in Table 6.3.1.3-5; about 80 percent of the wetlands crossed are emergent wetlands and scrub/shrub wetlands. For Public Waters Wetlands, only Type 3 – inland shallow fresh marshes would be crossed by the route, including approximately 8 acres within the construction work area and 3 acres within the permanent right-of-way (Table 6.3.1.3-6). No calcareous fens or wetlands enrolled in the NRCS Wetland Reserve Program have been identified along RA-03AM. Two Minnesota BWSR Mitigation Banking Program wetlands occur within 0.5 mile of RA-03AM. One of these (Number 3720) occurs within the construction work area and permanent right-of-way for the route (Figure 6.3.1.3-2 and Table 6.3.1.3-7).

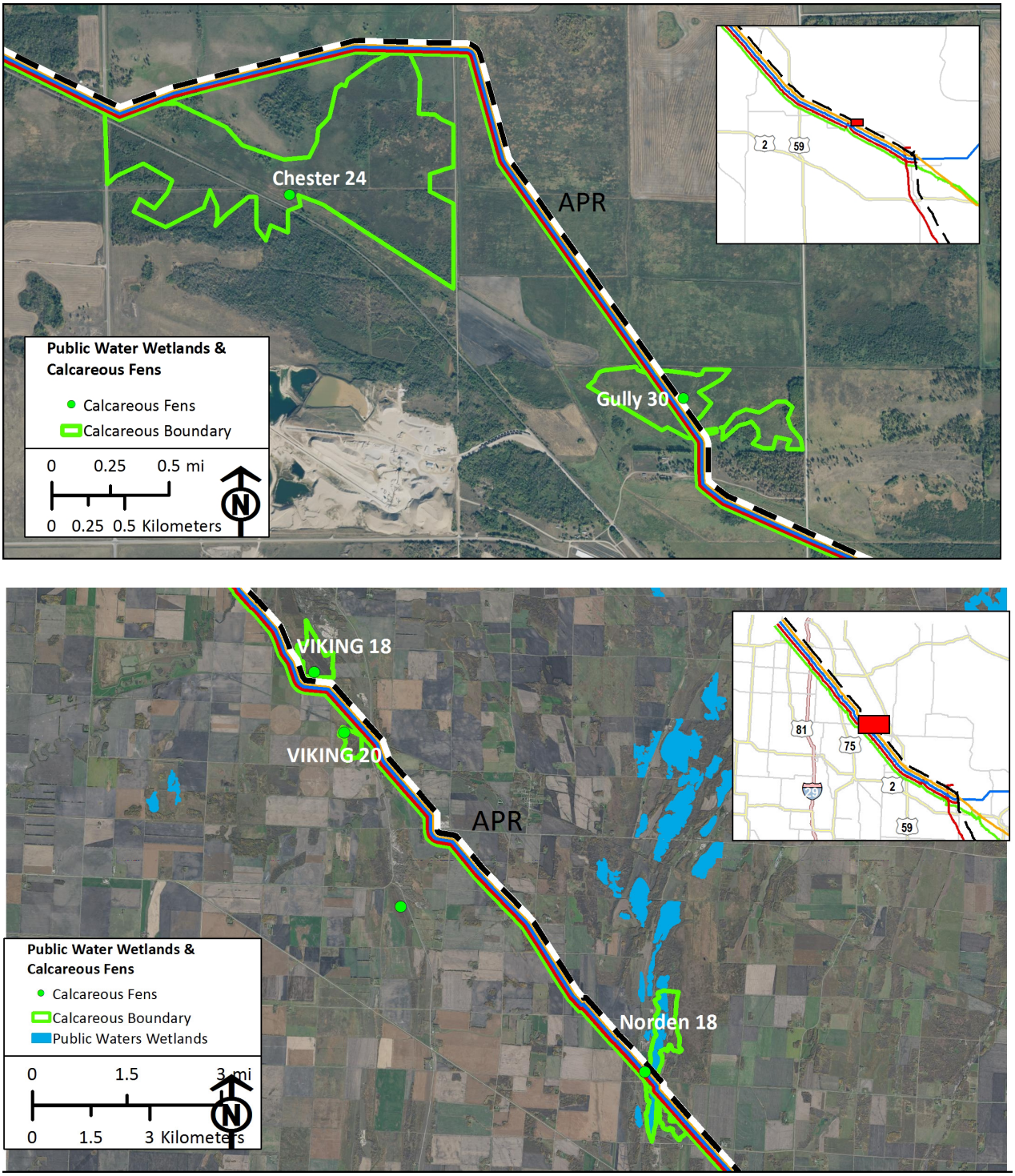

Sources: Minnesota DNR 2014, 2008.

Figure 6.3.1.3-1. Public Waters Wetlands and Calcareous Fens Crossed by the Applicant's Preferred Route

Table 6.3.1.3-5. Estimated Acreages of Wetlands Crossed by Route Alternative RA-03AM (Clearbrook to Carlton) (acres)

Wetland Classification	Construction[a]	Operations[b]
Forested wetland	116.2	48.2
Scrub/shrub wetland	205.6	83.9
Emergent wetland	233.9	96.6
TOTAL	**555.7**	**228.7**

Source: USFWS 2016.

[a] Construction = estimated construction impact area in acres based on 120-foot-wide construction work area centered on the pipeline route, including the 50-foot-wide permanent right-of-way.

[b] Operations = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the pipeline route.

Table 6.3.1.3-6. Estimated Acreages of Public Waters Wetlands Crossed by RA-03AM (Clearbrook to Carlton) (acres)

Wetland Type	Construction[a]	Operations[b]
Type 3 – Inland shallow fresh marshes	7.6	3.2
TOTAL	**7.6**	**3.2**

Source: Minnesota DNR 2014.

[a] Construction = estimated construction impact area in acres based on 120-foot-wide construction work area centered on the pipeline route, including the 50-foot-wide permanent right-of-way.

[b] Operations = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the pipeline route.

Table 6.3.1.3-7. Estimated Acreages of Wetland Mitigation Bank Easements Crossed by Route Alternative RA-03AM (Clearbrook to Carlton) (acres)

Wetland Mitigation Bank	Construction[a]	Operations[b]	Within 0.5 Mile
3720	4.7	1.9	145.1
4558	0.0	0.0	68.4
TOTAL	**4.7**	**1.9**	**213.6**

Source: Minnesota BWSR 2015.

[a] Construction = estimated construction impact area in acres based on 120-foot-wide construction work area centered on the pipeline route, including the 50-foot-wide permanent right-of-way.

[b] Operations = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the pipeline route.

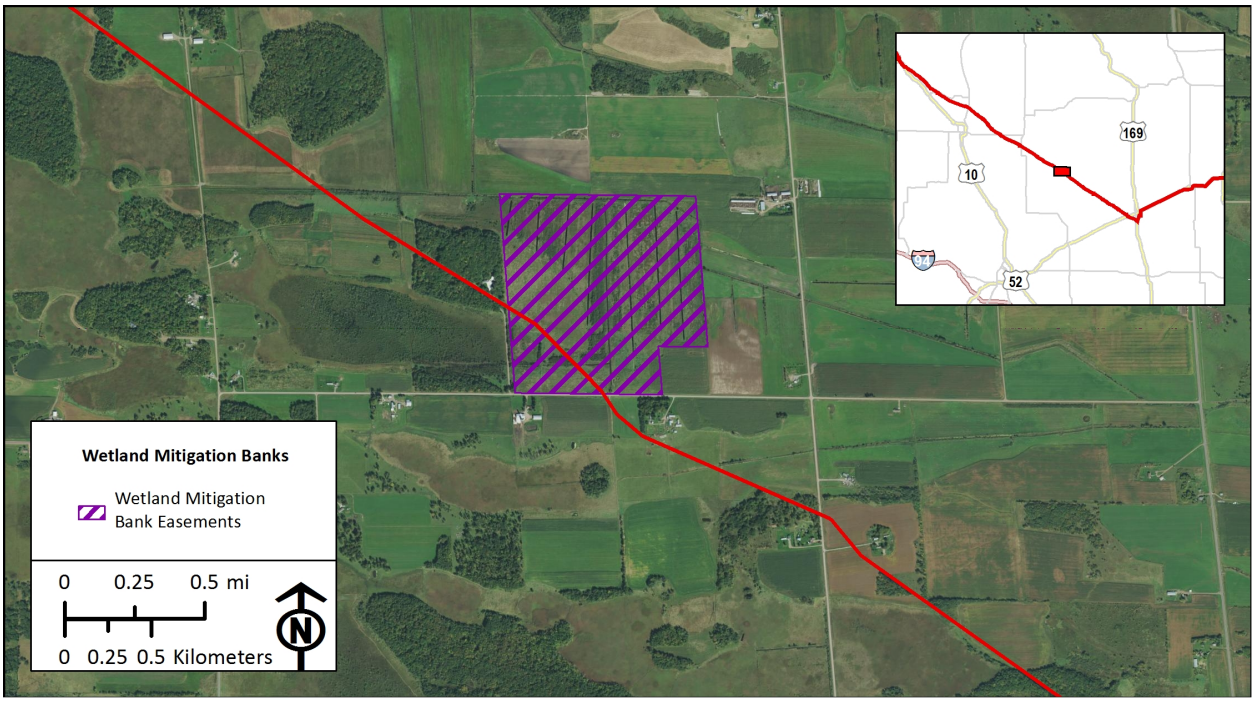

Source: Minnesota BWSR 2015.

Figure 6.3.1.3-2. Wetland Mitigation Bank Crossed by Route Alternative RA-03AM

Route Alternative RA-06

Wetlands within the construction impact area of RA-06 are predominantly forested wetlands (Table 6.3.1.3-8). Types 3 and 4 Public Waters Wetlands would be crossed by the route during construction and occur within the permanent right-of-way (Table 6.3.1.3-9). No calcareous fens, wetlands enrolled in the NRCS Wetland Reserve Program, or Minnesota BWSR Mitigation Banking Program wetlands would occur within the construction work area or within 0.5 mile of RA-06.

Table 6.3.1.3-8. Estimated Acreages of Wetlands Crossed by Route Alternative RA-06 (Clearbrook to Carlton) (acres)

Wetland Classification	Construction[a]	Operations[b]
Forested wetland	541.1	227.9
Scrub/shrub wetland	252.5	104.2
Emergent wetland	126.4	52.7
TOTAL	**920.1**	**384.8**

Source: USFWS 2016.

[a] Construction = estimated construction impact area in acres based on 120-foot-wide construction work area centered on the pipeline route, including the 50-foot-wide permanent right-of-way.

[b] Operations = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the pipeline route.

Table 6.3.1.3-9. Estimated Acreages of Public Waters Wetlands Crossed by Route Alternative RA-06 (Clearbrook to Carlton) (acres)

Wetland Type	Construction[a]	Operations[b]
Type 3 – Inland shallow fresh marshes	1.1	0.4
Type 4 – Inland deep fresh marshes	2.1	0.8
TOTAL	**3.2**	**1.3**

Source: Minnesota DNR 2014.

[a] Construction = estimated construction impact area in acres based on 120-foot-wide construction work area centered on the pipeline route, including the 50-foot-wide permanent right-of-way.

[b] Operations = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the pipeline route.

Route Alternative RA-07

Wetlands within the construction impact area of RA-07 are predominantly forested wetlands (Table 6.3.1.3-10). No Public Waters Wetlands, calcareous fens, or wetlands enrolled in the NRCS Wetland Reserve would be crossed by the construction work area. Two Minnesota BWSR Mitigation Banking Program wetlands occur near RA-07, and one easement (Number 3734) occurs within the construction work area (Figure 6.3.1.3-3 and Table 6.3.1.3-11).

Table 6.3.1.3-10. Estimated Acreages of Wetlands Crossed by Route Alternative RA-07 (Clearbrook to Carlton) (acres)

Wetland Classification	Construction[a]	Operations[b]
Forested wetland	594.9	124.1
Scrub/shrub wetland	445.7	119.5
Emergent wetland	154.0	37.4
TOTAL	**1,194.7**	**281.1**

Source: USFWS 2016.

[a] Construction = estimated construction impact area in acres based on 120-foot-wide construction work area centered on the pipeline route, including the 50-foot-wide permanent right-of-way.

[b] Operations = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the pipeline route.

Table 6.3.1.3-11. Estimated Acreages of Wetland Mitigation Bank Easements near Route Alternative RA-07 (Clearbrook to Carlton) (acres)

Wetland Mitigation Banks	Construction[a]	Operations[b]	Within 0.5 miles
3734	0.3	0.0	26.8
5617	0.0	0.0	62.1
TOTAL	**0.3**	**0.0**	**88.9**

Source: Minnesota BWSR 2015.

[a] Construction = estimated construction impact area in acres based on 120-foot-wide construction work area centered on the pipeline route, including the 50-foot-wide permanent right-of-way.

[b] Operations = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the pipeline route.

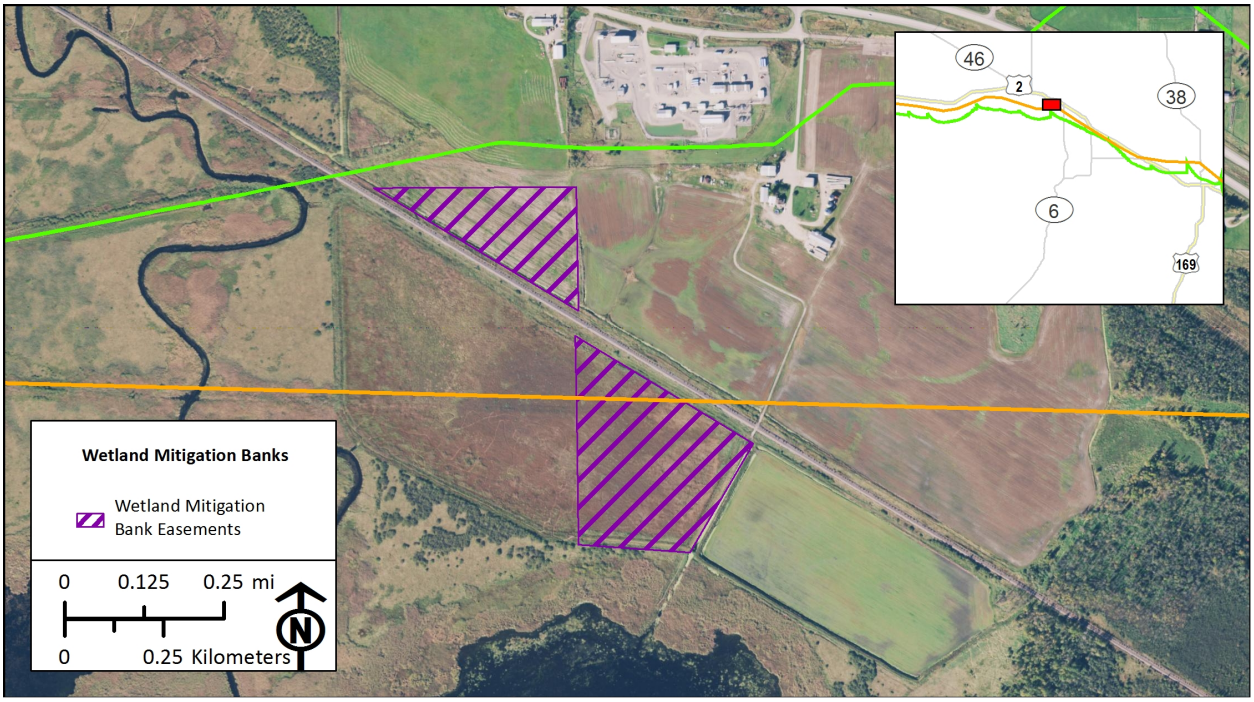

Source: Minnesota BWSR 2015.

Figure 6.3.1.3-3. Wetland Mitigation Bank Crossed by Route Alternatives RA-07 and RA-08

Route Alternative RA-08

Wetlands within the construction work area of RA-08 are predominantly forested and scrub/shrub wetlands (Table 6.3.1.3-12). Types 3 and 5 Public Waters Wetlands would be crossed by the construction work area and would be maintained as part of the permanent right-of-way (Table 6.3.1.3-13). No calcareous fens or wetlands enrolled in the NRCS Wetland Reserve Program have been identified along RA-08 (Minnesota DNR 2008; USGS 2016). Two Minnesota BWSR Mitigation Banking Program wetlands occur near RA-08, and one wetland mitigation bank easement (Number 3734) occurs within the construction work area and permanent right-of-way (Figure 6.3.1.3-3 and Table 6.3.1.3-14).

Table 6.3.1.3-12. Estimated Acreages of Wetlands Crossed by Route Alternative RA-08 (Clearbrook to Carlton) (acres)

Wetland Classification	Construction[a]	Operations[b]
Forested wetland	365.4	151.3
Scrub/shrub wetland	273.6	113.9
Emergent wetland	162.9	69.8
TOTAL	**802.0**	**335.0**

Source: USFWS 2016.

[a] Construction = estimated construction impact area in acres based on 120-foot-wide construction work area centered on the pipeline route, including the 50-foot-wide permanent right-of-way

[b] Operations = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the pipeline route

Table 6.3.1.3-13. Estimated Acreages of Public Waters Wetlands Crossed by Route Alternative RA-08 (Clearbrook to Carlton) (acres)

Wetland Type	Construction[a]	Operations[b]
Type 3 – Inland shallow fresh marshes	4.7	2.0
Type 5 – Inland open fresh water	0.7	0.3
TOTAL	**5.4**	**2.3**

Source: Minnesota DNR 2014.

[a] Construction = estimated construction impact area in acres based on 120-foot-wide construction work area centered on the pipeline route, including the 50-foot-wide permanent right-of-way.

[b] Operations = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the pipeline route.

Table 6.3.1.3-14. Estimated Acreages of Wetland Mitigation Bank Easements near Route Alternative RA-08 (Clearbrook to Carlton) (acres)

Wetland Mitigation Banks	Construction[a]	Operations[b]	Within 0.5 miles
3734	1.6	0.7	26.8
5617	0.0	0.0	91
TOTAL	**1.6**	**0.7**	**118.6**

Source: Minnesota BWSR 2015.

[a] Construction = estimated construction impact area in acres based on 120-foot-wide construction work area centered on the pipeline route, including the 50-foot-wide permanent right-of-way.

[b] Operations = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the pipeline route.

6.3.1.3.3 Impact Assessment

This section addresses the potential impacts on wetlands during construction and operation of the Applicant's preferred route and the route alternatives. Wetland impacts specific to the Applicant's preferred route in Minnesota and the route alternatives between Clearbrook and Carlton are described below.

Generally, pipeline construction through wetlands can result in changes to vegetation, soils, hydrology, and wildlife habitats, including:

- Changes in wetland vegetation community composition, structure, and productivity due to modification of surface and subsurface flow patterns as a result of ground clearing and pipeline construction;
- Loss of sensitive plant species as a result of construction clearing and grading;
- Wetland soil disturbance as a result of mixing of topsoil and subsoil during trenching and backfilling;
- Changes to water-retaining substrates, thereby causing permanent alterations to their water-holding capacity;

- Alteration of surface and subsurface hydrology that is important for maintaining wetland communities and microhabitats as a result of trenching and backfilling during pipeline construction;
- Sedimentation of wetlands and fluctuations in wetland hydrology as a result of trenching, dewatering, and stockpiling activities;
- Reduction in wildlife habitat and forage productivity, and increased risk of soil erosion and weed invasion due to removal of vegetation;
- Potential spread of invasive species and noxious weed populations along the pipeline construction impact area; and
- Contamination from equipment drips or spills during refueling operations.

Generally, pipeline operations can affect wetlands by:

- Disturbance to reclaimed wetlands within the permanent right-of-way as a result of excavation to repair or replace sections of pipe as a part of the Applicant's Integrity Management Program, and as a result of right-of-way vegetation maintenance activities;
- Permanent modification of forested or scrub/shrub wetland plant community composition and structure in the permanent right-of-way as a result of vegetation management activities; and
- Establishment and spread of noxious weeds and invasive plants within the permanent right-of-way and at aboveground facilities due to ground disturbance as part of the Applicant's Integrity Management Program, and as a result of right-of-way vegetation maintenance activities.

All wetland changes would need to be approved by the authorizing agencies and are identified by milepost. In areas where permanent aboveground facilities are not proposed, construction of the pipeline through wetlands would result primarily in temporary to short-term and minor impacts on wetlands and their functions during and immediately following construction activities, until the site is reclaimed and vegetation cover is reestablished. Post-construction wetland reclamation and monitoring would be required for a period of time until reclamation standards and permit conditions are met, or otherwise could be offset through compensatory mitigation in an onsite or offsite location.

Construction impacts on wetlands would be minimized by construction methods, including reducing the width of the construction work area, cutting wetland vegetation at the soil surface to retain roots, using low ground-pressure equipment and timber mats to minimize compaction and rutting, segregating topsoil, and not mounding topsoil, as described below. The Applicant has committed to implementing the following BMPs during construction to minimize direct and indirect wetland impacts:

- Developing and adhering to the Project-specific Construction Methods and Procedures for Wetland and Waterbody Crossings and site-specific crossing plans (Enbridge 2016);
- Using wetland crossings designed and approved by engineers, reviewed onsite by the Project engineer, and approved by agencies for each crossing;
- Committing to selection of the most appropriate wetland and waterbody crossing techniques in consultation with appropriate agencies to determine site-specific approaches, including open-cut (wet trench, push-pull with excavator, push-pull with swamphoe); dry crossing methods (dry

trench, dam-and-pump, or flume); trench breakers; trenchless (auger bore HDD); and those described in the Enbridge November 2016 EAW (Enbridge 2016);

- Implementing mitigation measures to protect adjacent waterbodies during construction including, but not limited to, use of a vegetated buffer, slope breakers, sediment barriers (i.e., silt fencing and sediment curtains), filtration devices during dewatering, or trench breakers;
- Conducting wetland shoreline stabilization measures, including the erosion controls identified above and erosion control blankets, mulching, seeding (with Minnesota BWSR seed mixes or other agency-approved seed mix), cat tracking, placing temporary slope breakers, and placing riprap where necessary;
- Developing and adhering to the wetland-specific avoidance measures in the Applicant's Environmental Protection Plan (Appendix E);
- Reducing temporary construction work area beyond the 50-foot-wide permanent right-of-way in wetlands areas from 70 feet to 45 feet, except in areas where trench wall failure or other construction constraints have been identified as a concern;
- Restoring wetland vegetation cover types following construction, as outlined in the Environmental Protection Plan;
- Co-locating the Project with existing rights-of-way unless co-location would result in a greater impact on wetlands or other sensitive resources;
- Minimizing impacts on sensitive wetland soils during wet conditions by use of timber mats, low-ground-weight equipment, and other methods identified in the Environmental Protection Plan;
- Designing and planning Project pipeline routes and infrastructure to reduce environmental impacts on sensitive wetland resources;
- Developing measures to describe inadvertent drilling fluid release response measures in wetlands and adjacent wetlands;
- Placing petroleum products storage, refueling, maintenance, and lubricating operations a minimum of 100 feet from wetlands;
- Placing concrete wash water, grindings, and slurry away from wetlands with no allowable discharge of these waste products into wetlands or waterbodies;
- During trench dewatering, pumping discharge water at controlled discharge rates into a filtration device located in a well-vegetated area and in a manner to prevent the migration of silt-laden water into wetlands;
- Posting signage during construction noting sensitive environmental features and wetlands;
- Cutting off wetland vegetation at ground level and removing it from wetland areas;
- Stripping the top 1 foot of topsoil or the amount of topsoil present, whichever is less, over the trench line, segregating it, and replacing it in unsaturated wetlands;
- Not applying fertilizer, lime, or mulch in wetlands;
- Complying with USACE and state wetland permits, including compliance with permit conditions and long-term monitoring plans;
- Restoring wetlands to preconstruction contours;

- Maintaining wetland hydrology by using trench breakers in any area where the potential to drain, or partially drain, a wetland exists; sufficiently compacting the pipeline trench; and placing the pipeline on native material as opposed to gravel; and
- Using construction mats, as needed, to facilitate equipment access and pipeline installation and to minimize soil compaction and/or mixing.

Wetland impacts and associated water quality certifications would be permitted or approved by the authorizing agencies and would be identified by milepost. In areas where permanent aboveground facilities are not proposed, wetland impacts resulting from construction would be temporary and minor for emergent wetlands and long-term or permanent for scrub/shrub and forested wetlands. Post-construction wetland reclamation and monitoring would be required for a period of time until reclamation standards and permit conditions are met, or otherwise mitigated entirely through compensatory mitigation in an onsite or offsite location.

The assessments presented below are discussed within the following categories:

- General wetland impacts,
- Impacts on Minnesota Public Waters Wetlands,
- Impacts on Minnesota calcareous fen wetlands, and
- Impacts on federal and state Wetland Reserves and Minnesota BWSR Mitigation Bank easements.

Applicant's Preferred Route (in Minnesota)

Construction Impacts

General Wetlands

Pipeline construction through wetlands would result in impacts on wetland vegetation, soils, hydrology, and wildlife habitats. Construction activities may result in reduction of a wetland's ability to trap and slowly release surface water, rain, snowmelt, groundwater, and flood waters. Wetland soils would be disturbed by trenching and backfilling during pipeline construction. Impacts to wetlands outside the construction work area are not expected because sediment containment barriers would be used until construction is complete and vegetation cover has reestablished. Over time, provided that original contours are restored and hydrology is maintained, most affected wetland vegetation would regenerate and wetland function would return. In general, wetland construction impacts that do not result from placement of fill in wetlands would be returned to preconstruction contours and wetland conditions.

The Applicant's preferred route within Minnesota would affect approximately 499.3 acres of wetlands during pipeline construction (Table 6.3.1.3-1). Up to 355.6 acres of scrub/shrub and forested wetlands would be cleared during construction, after which woody vegetation would be allowed to reestablish within construction work areas outside of the permanent right-of-way. Woody vegetation and all other wetland vegetation would be permanently removed from the areas where aboveground facilities (pump stations and MLVs) and access roads would be constructed.

Until woody vegetation is reestablished, scrub/shrub and forested wetlands would be converted to emergent vegetation, resulting in long-term major impacts on both vegetation structure and wetland

functions. Wetland habitats containing large mature woody growth would reestablish in temporary construction work areas within 3 to 50 years, depending on the vegetation community and vegetation structure (Jacobson 2006; Wenzel et al. 2012). Long-term to permanent major impacts on forested wetlands in the construction work area may require compensatory mitigation as these wetland types would be converted to other wetland types on a long-term or permanent basis. Forested wetlands may require from 35 to 50 years to achieve vegetation and wildlife habitat similar to mature forested wetlands (Wenzel et al. 2012).

Construction of the Applicant's preferred route would affect up to 143.8 acres of emergent wetlands. Emergent wetland vegetation would reestablish within 3 years as a community functionally similar to that of the wetland prior to construction (Jacobson 2006; Wenzel et al. 2012), provided that recommended wetland reclamation and revegetation efforts are implemented, disturbance to vegetation is minimized, and preconstruction wetland contours and wetland hydrology are maintained. In areas where the disturbance to vegetation is minimal and the root structures, preconstruction wetland contours, and wetland hydrology are maintained, the impacts would be short-term and minor. In areas where trenching occurs directly through a wetland, the impacts would be short-term to long-term and minor to major. Where emergent wetlands are cleared for construction of aboveground facilities and access roads (about 18.9 acres), impacts on these wetlands would be permanent and minor to major; however, these impacts could be offset by compensatory wetland mitigation.

Approximately 19 acres of wetlands could be affected by use as ATWS and pipe storage yards required for pipeline construction, resulting in short-term to long-term minor impacts, as these areas would be restored to wetlands after construction.

Crossings by HDD for selected waterbodies and associated wetlands generally would avoid direct impacts on wetland resources. Each crossing selected for HDD would be identified, and permitting would be carried out (including identification of BMPs) at each location. Fluid (water, bentonite clay, and possible additives) is used during drilling to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. The potential exists for an inadvertent release or "frac-out" of this drilling fluid when pressurization of the drill hole is beyond the containment capability of the overburden soil material, which would allow the drilling fluid to flow to the ground. If a frac-out occurred within a wetland, the vegetation and soil would be compromised. During drilling, construction personnel would monitor the crossing to detect releases of drilling mud and would implement containment, response, and clean-up procedures as outlined in the Applicant's Environmental Protection Plan (Appendix E) to limit the potential for drilling mud to reach surface water. If a frac-out occurred and went undetected or was not quickly contained, impacts on wetlands could be long-term and major. However, with implementation of the Applicant-proposed measures to respond to a drilling mud release during HDD construction, the impact of a release could be short-term and minor. Successful construction of wetland crossings using HDD (i.e., the crossing is completed without a frac-out) would not affect wetlands.

Specially Designated Wetlands

Impacts on Minnesota Public Waters Wetlands. The Applicant's preferred route would affect 2.8 acres of Public Waters Wetlands during construction (Table 6.3.1.3-3 and Figure 6.3.1.3-1). Impacts on Minnesota Public Waters Wetlands during construction would result from alteration of wetland vegetation, soils, and hydrology; however, these areas would be restored as wetlands after construction.

Minnesota DNR would be consulted regarding Public Waters Wetland crossings as part of the License to Cross Public Waters permitting process that would occur prior to construction. All impacts, BMPs, and proposed avoidance related to Public Waters Wetlands would be subject to conditions contained in a License to Cross Public Waters. Any dewatering of the trench that would be required for construction across Public Waters Wetlands would require a water appropriation permit. Implementation of the measures identified in the license would limit potential impacts on Public Waters Wetlands.

As part of permit requirements, the Applicant would identify and prepare site-specific crossing plans, avoid and minimize impacts on Public Waters Wetlands to the extent possible, and restore affected Public Waters Wetlands onsite. Restoration to the existing level of wetland function would likely take several years. As a result, the impacts on Public Waters Wetlands due to construction of the Applicant's preferred route would be short-term and minor.

Impacts on Minnesota Calcareous Fen Wetlands. Gully 30 could be affected by construction of the Applicant's preferred route (Table 6.3.1.3-4 and Figure 6.3.1.3-1). All other calcareous fens within 0.5 mile of the Applicant's preferred route (Chester 24 and Viking 18) would be unaffected by construction, as the route would avoid crossing these fens. Potential impacts on Gully 30 include alteration of hydrology, introduction of contaminants, loss of rare or unique plant species, introduction of invasive species, and altered peat formation—all of which could be detrimental to the formation and proper function of a calcareous fen.

The results of calcareous fen surveys completed in 2010 during development of the Alberta Clipper pipeline identified the presence of a single calcareous fen (Gully 30), located 63 feet away from the centerline. As part of the environmental review for the Alberta Clipper project, a Gully 30 Fen Management Plan was developed in coordination with Minnesota DNR. As proposed, portions of the Applicant's preferred route are co-located with the Alberta Clipper pipeline, including the area where this fen occurs. If it is determined that impacts on this fen could not be practicably avoided by Project construction, construction would be subject to a Fen Management Plan approved by the Commissioner of Natural Resources of Minnesota DNR.

Prior to construction, the Minnesota DNR would be consulted to aid in the identification of potential impacts on and major mitigation measures for calcareous fens. Where calcareous fens are identified, Minnesota DNR would request preparation of a Fen Management Plan, which would identify impacts and BMPs specific to the affected fen. These BMPs would include the general BMPs identified to avoid major impacts on wetlands discussed above. Overall, it is expected that the Applicant's preferred route would result in a short-term to long-term minor impact on one calcareous fen wetland.

Impacts on Wetland Reserves. No NRCS Wetland Reserves (i.e., wetlands under a Wetland Reserve Program) or Minnesota BWSR mitigation bank easements occur within the construction work area of the Applicant's preferred route; therefore, no impacts on these wetland resources would occur (USGS 2016; Minnesota BWSR 2015). A state wetland reserve is located between the North Dakota border and Clearbrook, Minnesota. Impacts on this reserve are not expected as the reserve are not crossed by the Applicant's preferred route.

Operations Impacts

General Wetlands

Operation of the Applicant's preferred route would affect 261.2 acres of wetlands within the permanent right-of-way and associated facilities. About 18.9 acres of wetlands would be permanently converted to developed land for aboveground facilities (pump stations and MLVs) and access roads. The impacts on these wetlands would be permanent and minor to major; however, the impacts could be offset by compensatory wetland mitigation.

Impacts to wetlands could result from maintenance activities, including vegetation management and pipeline inspections that would occur for the life of the Project. Because trees and shrubs would not be allowed to reestablish within the permanent right-of-way, vegetation management in forested and scrub/shrub wetlands would represent a permanent major impact on emergent or early-stage scrub/shrub wetlands.

A total of 182.0 acres of forested and scrub/shrub wetlands converted during construction would be maintained as emergent wetlands within the pipeline permanent right-of-way for the life of the Project. Woody vegetation within the permanent right-of-way would be managed (cut every 3 to 5 years) to prevent large shrubs and trees from reestablishing over the pipeline to allow for visual inspection of the right-of-way. This loss of woody vegetation would result in permanent and major impacts on wetland structure and functions that may require compensatory mitigation.

A total of 79.2 acres of emergent wetland vegetation in the permanent right-of-way generally would not be mowed or otherwise maintained and would not be affected by mowing or maintenance activities. Routine vegetation management would use a rubber-tracked skid-steer vehicle, or similar, with specialized cutting equipment to minimize impacts on wetlands resulting in short-term minor impacts on emergent wetlands.

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. If excavation is required within a wetland, impacts would likely be short-term and minor but could occur periodically over the life of the Project.

Operation of the Applicant's preferred route may increase the potential for the introduction and spread of noxious weeds and invasive plants for the life of the Project and beyond. The Environmental Protection Plan (Appendix E) and wetland permitting documents would describe measures to prevent the spread of noxious and invasive weeds in wetlands during wetland reclamation/revegetation and during pipeline monitoring and maintenance activities. The presence of noxious weeds and potential for spread of infestations within the Project area are addressed in Section 6.3.3.2.

Potential impacts on wetlands due to an unanticipated crude oil release are discussed in Chapter 10.

Specially Designated Wetlands

Impacts on Minnesota Public Waters Wetlands. Approximately 1.9 acres of Public Waters Wetlands occur within the permanent right-of-way for the Applicant's preferred route. Although operations impacts could result from vegetation management, it is unlikely that the shallow and deep fresh marshes crossed would require vegetation management because the shrubs are unlikely to grow as long as the marsh hydrology is maintained. The Public Waters Wetlands within the permanent right-of-way

are located between Clearbrook and Carlton in Minnesota. Any potential impacts would be expected to be short-term and minor, but would occur periodically over the life of the Project. In addition, pipeline maintenance activities could spread noxious weeds and invasive plants. The potential impact is expected to be short-term and minor after each maintenance activity, but would occur periodically over the life of the Project.

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. Impacts on Public Wetland Waters would be limited to the pipeline segment through the 1.9 acres of these wetlands and repeated repairs or replacement at those locations are unlikely. Impacts on the Public Waters Wetlands from integrity digs likely would be short-term and minor to major.

Impacts on Minnesota Calcareous Fen Wetlands. The Applicant's preferred route would cross the Gully 30 calcareous fen and has been routed to avoid the Chester 24 and Viking 18 calcareous fens that are crossed by the existing Line 3. All activities occurring near calcareous fens would be subject to BMPs identified in a Fen Management Plan, if one needed to be developed for the Project. Impacts on calcareous fens as a result of vegetation management activities during normal operation of the Project are not expected but would be short- to long-term and minor if they did occur, and could occur periodically over the life of the Project.

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. Impacts on calcareous fens would be limited to the pipeline segment through the Gully 30 fen, and repeated repairs or replacement at this location are unlikely. If excavation and repair at this locations were necessary, impacts would be similar to those for construction of the pipeline through the fen; the impact would be short- to long-term and minor but could occur periodically over the life of the Project.

Impacts on Wetland Reserves. Impacts on wetland reserves would not occur during operation of the pipeline because no wetland reserves or Minnesota BWSR mitigation bank easements are located within the permanent right-of-way.

Route Alternatives (from Clearbrook to Carlton)

Route Alternative RA-03AM

Construction Impacts

General Wetlands. Construction of RA-03AM would affect approximately 555.7 acres of wetlands in Minnesota (Table 6.3.1.3-5). Approximately 116.2 acres of forested wetlands and 205.6 acres of scrub/shrub wetlands would be cleared during construction along the entire route (Table 6.3.1.3-5). After construction, woody vegetation would be allowed to reestablish within construction work areas outside of the permanent right-of-way. Until woody vegetation is reestablished, scrub/shrub and forested wetlands would be converted to emergent vegetation, resulting in long-term to permanent major impacts on both vegetation structure and wetland functions. Impacts on forested wetlands in the construction work area may require compensatory mitigation to offset long-term to permanent impacts.

About 233.9 acres of emergent wetlands would be affected by construction (Table 6.3.1.3-5). Disturbance to these wetlands would be minimized through implementation of BMPs and would be reclaimed after construction, but emergent vegetation communities would require several years to

become fully reestablished. As a result, the impact of construction on emergent wetlands would be short-term and minor at each wetland.

Footprints are not available for aboveground facilities for RA-03AM at this time. If facilities are sited on wetlands, impacts during construction would be permanent and major because the wetlands would be converted to developed land. Impacts to wetlands from facilities would be avoided and minimized, and unavoidable impacts could be offset with compensatory mitigation similar to the Applicant's preferred route.

Specially Designated Wetlands. Construction of RA-03AM would result in short-term minor impacts on approximately 8 acres of Public Waters Wetlands in Minnesota. The affected Public Waters Wetlands would be reclaimed as wetlands following construction. Impacts on Public Waters Wetlands would be subject to state-specific permitting requirements, and implementation of BMPs would be required for Project approval.

No impacts on calcareous fens would be associated with the RA-03AM route, as none were identified during the calcareous fen data review within the construction work area or permanent right-of-way for the route.

No impacts on wetland reserves would be associated with the RA-03AM route, as no Wetland Reserve Program wetlands were identified near the route. Two Minnesota BWSR wetland mitigation bank easements are within 0.5 mile of RA-03AM, one of which (Number 3720) would be affected by construction and operation of RA-03AM. The affected wetland mitigation bank easement in construction work areas would be reclaimed, resulting in approximately 5 acres of short-term minor impacts.

Operations Impacts

General Wetlands. General wetland impacts associated with operation of a pipeline along RA-03AM would be similar to those described for the Applicant's preferred route. Operation of RA-03AM could affect approximately 228.7 acres of wetlands within the permanent right-of-way (Table 6.3.1.3-5). Impacts could result from maintenance activities, including vegetation management that would occur for the life of the Project. Trees and shrubs would not be allowed to reestablish within the permanent right-of-way to allow for visual inspection of the right-of-way. About 48.2 acres of previously forested wetlands and 83.9 acres of scrub/shrub wetland would be maintained as emergent wetlands for the life of the Project (Table 6.3.1.3-5). This loss of forested and scrub/shrub wetland communities would result in permanent and major impacts on wetland structure and functions that could require compensatory mitigation to offset permanent impacts.

Emergent wetland vegetation in the permanent right-of-way generally would not be mowed or otherwise managed and would not be affected by these activities. If emergent vegetation is affected by vegetation management activities, the impact is expected to be short-term and minor.

During operation, the Applicant would implement its Integrity Management Program, which could require excavation and repair or replacement of sections of the pipeline. If excavation is required within a wetland, impacts likely would be short-term and minor, but could occur periodically over the life of the Project.

Operation of RA-03AM may increase the potential for introduction and spread of noxious weeds and invasive plants for the life of the Project. The Applicant would implement the procedures in the

Environmental Protection Plan (Appendix E), and wetland permitting documents would describe measures to prevent the spread of noxious and invasive weeds in wetlands. With implementation of those procedures, the potential impact of introduction and spread of noxious weeds and invasive plants would be short-term and minor.

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. Impacts on emergent wetlands as a result of these activities would likely be short-term and minor, but would occur periodically over the life of the Project.

Facility locations are unknown for the route alternatives. If wetlands are covered by aboveground facilities, they would be permanently converted to developed land. Any potentially unavoidable impacts would be permanent and major; however, the impacts could be offset by compensatory wetland mitigation.

Specially Designated Wetlands. Short-term minor impacts on Public Waters Wetlands within the permanent right-of-way would affect approximately 3.2 acres along the RA-03AM route (Table 6.3.1.3-6). These Public Waters Wetlands would be reclaimed and would remain as wetlands for the life of the Project but would be subject to ground disturbance and restoration efforts during maintenance activities requiring pipeline inspection.

No calcareous fens would be affected during operation of RA-03AM, as they do not occur within the permanent right-of-way for the route.

No impacts on wetland reserves would occur for the RA-03AM route, as no Wetland Reserve Program wetlands were identified near the route. A total of 1.9 acres of Minnesota BWSR wetland mitigation bank easements occur within the permanent right-of-way for RA-03AM; the resultant impact would be permanent and minor, as the wetlands would be reclaimed. All wetlands within the permanent right-of-way would become ineligible as conservation easements, as the wetlands would no longer be protected from future disturbance because of required routine vegetation management and integrity management activities. However, in-kind compensatory mitigation could be used to offset wetland losses.

Route Alternative RA-06

Construction Impacts

General Wetlands. Construction of RA-06 would affect approximately 920.1 acres of wetlands between Clearbrook and Carlton (Table 6.3.1.3-8). About 541.1 acres of forested wetlands and 252.5 acres of scrub/shrub wetlands would be cleared during construction along the Clearbrook-to-Carlton segment (Table 6.3.1.3-9). After construction, trees and shrubs would be allowed to reestablish within construction work areas outside of the permanent right-of-way. Until woody vegetation is reestablished, scrub/shrub and forested wetlands would be converted to emergent vegetation, resulting in long-term to permanent major impacts on both vegetation structure and wetland functions. Impacts on forested wetlands in the construction work area may require compensatory mitigation to offset long-term to permanent impacts. Wetlands affected by construction of RA-06 would be within a new pipeline corridor, and many of these wetlands would have experienced limited to no prior ground disturbance.

Approximately 126.4 acres of emergent wetlands would be affected by construction of RA-06 (Table 6.3.1.3-8). Wetlands would be reclaimed after construction but would require several years for the

emergent vegetation community to become fully reestablished. The impact on emergent wetlands from construction would be short-term and minor at each affected wetland.

Footprints are not available for aboveground facilities for route alternative RA-06. If facilities are sited on wetlands, impacts from construction would be permanent and major because the wetlands would be converted to developed land. However, impacts on wetlands from facilities would be avoided and minimized, and unavoidable impacts could be offset with compensatory mitigation similar to the Applicant's preferred route.

Specially Designated Wetlands. Construction of RA-06 would result in short-term minor impacts on approximately 3.2 acres of Public Waters Wetlands in Minnesota (Table 6.3.1.3-9). The affected Public Waters Wetlands would be reclaimed as wetlands following construction, resulting in short-term minor impacts. Impacts on Public Waters Wetlands would be subject to state-specific permitting requirements, and implementation of BMPs would be required for Project approval.

No impacts on calcareous fens would be associated with RA-06 as none were identified during the calcareous fen data review within the construction work area or permanent right-of-way for the route.

No impacts on wetland reserves would be associated with RA-06, as no Wetland Reserve Program wetlands were identified near the route. No Minnesota BWSR wetland mitigation bank easements occur within 0.5 mile of RA-06; therefore, construction of RA-06 would not affect wetland mitigation bank easements.

Operations Impacts

General Wetlands. Operation of RA-06 could affect approximately 384.8 acres of wetlands within the permanent right-of-way (Table 6.3.1.3-8). The impacts could result from maintenance activities, including vegetation management that would occur within the permanent right-of-way for the life of the Project. Trees and shrubs would not be allowed to reestablish within the maintained right-of-way to allow for visual inspection of the right-of-way. Vegetation management would maintain previously forested and scrub/shrub wetlands as emergent or early-stage scrub/shrub wetlands. About 227.9 acres of forested wetlands and 104.2 acres of scrub/shrub wetlands would be maintained as emergent wetlands for the life of the Project (Table 6.3.1.3-8). This loss of forested wetland vegetation would result in permanent and major impacts on wetland structure and functions that could require compensatory mitigation to offset permanent major impacts.

A total of 52.7 acres of emergent wetland vegetation in the permanent right-of-way generally would not be mowed or otherwise maintained and would not be affected by mowing or maintenance activities. If emergent vegetation is affected by vegetation management activities, the impact is expected to be short-term and minor.

During operation, the Applicant would implement its Integrity Management Program, which could require excavation and repair or replacement of sections of the pipeline. If excavation is required within a wetland, impacts likely would be short-term and minor, but could occur periodically over the life of the Project.

Operation of RA-06 may increase the potential for the introduction and spread of noxious weeds and invasive plants for the life of the Project. The Applicant would implement the procedures in the Environmental Protection Plan (Appendix E), and wetland permitting documents would describe

measures to prevent the spread of noxious and invasive weeds in wetlands. With implementation of those procedures, the potential impact of introduction and spread of noxious weeds and invasive plants would be short-term and minor.

Facility locations for RA-06 are unknown. If wetlands are covered by aboveground facilities they would be permanently converted to developed land. Any potentially unavoidable impacts would be permanent and major; however, the impacts could be offset by compensatory wetland mitigation.

Specially Designated Wetlands. Short-term minor impacts on Public Waters Wetlands within the permanent right-of-way would affect approximately 1.3 acre along the RA-06 route (Table 6.3.1.3-9). Although these Public Waters Wetlands would be reclaimed and would remain as wetlands for the life of the Project, they could be subject to ground disturbance and restoration efforts as a result of maintenance activities requiring pipeline inspection.

No calcareous fens would be affected during operation, as they do not occur within the permanent right-of-way for RA-06.

No wetland reserves or wetland mitigation bank easements would be affected by operation of RA-06.

Route Alternative RA-07

Construction Impacts

General Wetlands. Construction of RA-07 would affect approximately 1,194.7 acres of wetlands between Clearbrook and Carlton (Table 6.3.1.3-10). About 584.9 acres of forested wetlands and 445.7 acres of scrub/shrub wetlands would be cleared during construction along the entire route (Table 6.3.1.3-10). After construction, trees and shrubs would be allowed to reestablish within construction work areas outside of the permanent right-of-way. Until woody vegetation is reestablished, scrub/shrub and forested wetlands would be converted to emergent vegetation, resulting in long-term to permanent major impacts on both vegetation structure and wetland functions. Impacts on forested wetlands in the construction work area may require compensatory mitigation for loss of forested wetlands. Most of the wetlands that would be affected by removal of the existing Line 3 and replacement with new pipeline were disturbed during the original construction of the Line 3 pipeline, and were disturbed again during construction of additional pipelines through the Mainline corridor.

A total of 154.0 acres of emergent wetlands would be affected by construction of RA-07 (Table 6.3.1.3-10). Wetlands would be reclaimed after construction but would require several years to become fully reestablished. As a result, the impact of construction on emergent wetlands would be short-term and minor at each wetland. Many of these emergent wetlands were disturbed during the original construction of the Line 3 pipeline and were disturbed again during construction of additional pipelines through the Mainline corridor.

Footprints are not available for aboveground facilities for route alternative RA-07. If facilities are sited on wetlands, impacts from construction would be permanent and major because the wetlands would be converted to developed land. However, impacts on wetlands from facilities would be avoided and minimized, and unavoidable impacts could be offset with compensatory mitigation similar to the Applicant's preferred route.

Specially Designated Wetlands. Construction of RA-07 would not affect Public Waters Wetlands in Minnesota, as none occur within the construction work area.

No impacts on calcareous fens would be associated with the RA-07 route, as none were identified during the calcareous fen data review within the construction work area or permanent right-of-way for the route.

No impacts on federal or state wetland reserves would occur, as no Wetland Reserve Program wetlands were identified near RA-07. Two Minnesota BWSR wetland mitigation bank easements occur within 0.5 mile of RA-07, one of which (Number 3734) would be crossed by the construction expanded construction work area for RA-07. If it is not possible to avoid this easement, construction would result in short-term and minor impacts; however, the wetlands may become ineligible for the mitigation banking program.

Operations Impacts

General Wetlands. Operation of RA-07 would affect 281.1 acres of wetlands within the permanent right-of-way. The impacts would result from ongoing maintenance activities, including vegetation management that would occur for the life of the Project. Because trees and shrubs would not be allowed to reestablish within the maintained pipeline right-of-way, vegetation management would represent a long-term to permanent major impact because 124.1 acres of forested and 119.5 acres scrub/shrub wetlands would be maintained as emergent or early-stage scrub/shrub wetlands. This right-of-way is currently maintained through vegetation management; consequently, there would be no additional impacts.

A total of 37.4 acres of emergent wetland vegetation in the permanent right-of-way generally would not be mowed or otherwise maintained and would not be affected by these activities. If emergent vegetation is affected by vegetation management, the impact could be short-term and minor. There would be no additional impacts, however, as this right-of-way is currently managed for the existing Line 3 and adjacent pipelines.

About 124.1 acres of forested wetlands in the permanent right-of-way for RA-07 would be maintained as emergent wetlands for the life of the Project (Table 6.3.1.3-10). This loss of forested wetland vegetation could result in permanent and major impacts on wetland structure and functions that could require compensatory mitigation to offset long-term to permanent major impacts. As these impacts would be within the current Line 3 permanent right-of-way, these impacts may have been avoided previously through HDD or may already have received compensation.

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. Impacts to wetlands as a result of these activities would likely be short-term and minor but would occur periodically over the life of the Project, as is currently the case for Line 3.

Operation of RA-07 may increase the potential for introduction and spread of noxious weeds and invasive plants for the life of the Project. The Applicant would implement the procedures in the Environmental Protection Plan (Appendix E), and wetland permitting documents would describe measures to prevent the spread of noxious and invasive weeds in wetlands. With implementation of those procedures, the potential impact of introduction and spread of noxious weeds and invasive plants would be short-term and minor.

Facility locations are unknown. If wetlands were covered by aboveground facilities they would be permanently converted to developed land. Any potentially unavoidable impacts would be permanent and major; however, the impacts could be offset by compensatory wetland mitigation.

Potential impacts on wetlands due to an unanticipated crude oil release are discussed in Chapter 10.

Specially Designated Wetlands. No Public Waters Wetlands would be affected by operation of RA-07.

No calcareous fens would be affected during operation of RA-07, as none occur within the permanent right-of-way for the route.

No impacts on federal or state wetland reserves would be associated with RA-07, as no Wetland Reserve Program wetlands were identified near the route. No wetland mitigation bank easements would be affected by operation of RA-07.

Route Alternative RA-08

Construction Impacts

General Wetlands. Construction of RA-08 would affect approximately 802.0 acres of wetlands in Minnesota (Table 6.3.1.3-12). About 365.4 acres of forested wetlands and 273.6 acres of scrub/shrub wetlands would be cleared during construction along the Clearbrook-to-Carlton segment (Table 6.3.1.3-12). After construction, trees and shrubs would be allowed to reestablish within construction work areas outside of the permanent right-of-way. Until woody vegetation is reestablished, scrub/shrub and forested wetlands would be converted to emergent vegetation, resulting in long-term to permanent major impacts on both vegetation structure and wetland functions. Impacts on forested wetlands in the construction work area may require compensatory mitigation to offset long-term to permanent impacts. Many of these wetlands would have been previously disturbed during construction of other pipelines because RA-08 would be constructed within an existing pipeline corridor.

About 162.9 acres of emergent wetlands would be affected by construction of RA-08 (Table 6.3.1.3-12). Wetlands would be reclaimed after construction, but the emergent wetland community would require several years to become fully reestablished. As a result, the impact of construction on emergent wetlands within most of the construction impact area would be short-term and minor at each affected wetland. Many of these emergent wetlands would have been disturbed previously during construction of other pipelines because RA-08 would be constructed within an existing pipeline corridor.

Footprints are not available for aboveground facilities for route alternative RA-08. If facilities are sited on wetlands, impacts from construction would be permanent and major because the wetlands would be converted to developed land. However, impacts on wetlands from facilities would be avoided and minimized, and unavoidable impacts could be offset with compensatory mitigation similar to the Applicant's preferred route.

Specially Designated Wetlands. Construction of RA-08 would result in short-term minor impacts on approximately 5.4 acres of Public Waters Wetlands in Minnesota (Table 6.3.1.3-13). The affected Public Waters Wetlands would be reclaimed as wetlands following construction, resulting in short-term minor impacts. Impacts on Public Waters Wetlands would be subject to state-specific permitting requirements, and implementation of BMPs would be required for Project approval.

No impacts on calcareous fens would be associated with the RA-08 route, as none were identified during the calcareous fen data review within the construction work area or permanent right-of-way for the route.

No impacts on wetland reserves would be associated with the RA-08 route, as no Wetland Reserve Program wetlands were identified near the route. Two Minnesota BWSR wetland mitigation bank easements occur within 0.5 mile of RA-08, one of which (Number 3734) would be crossed by the construction work area for the route resulting in approximately 2 acres of impacts. These wetlands would be reclaimed, resulting in short-term and minor impacts; however, the wetlands may become ineligible for the mitigation banking program.

Operations Impacts

General Wetlands. Operation of RA-08 would affect approximately 335.0 acres of wetlands within the permanent right-of-way (Table 6.3.1.3-12). Wetland impacts would result from pipeline maintenance activities, including vegetation management that would occur for the life of the Project. Trees and shrubs would not be allowed to reestablish within the maintained right-of-way, to allow for visual inspection of the right-of-way. Vegetation management would represent a permanent conversion of previously forested and scrub/shrub wetlands to emergent or early-stage scrub/shrub wetlands. About 151.3 acres of forested wetlands and 113.9 acres of scrub/shrub wetlands would be maintained as emergent wetlands for the life of the Project (Table 6.3.1.3-12). This loss of forested and scrub/shrub wetland communities would result in permanent and major impacts on wetland structure and functions that could require compensatory mitigation to offset permanent impacts.

Emergent wetland vegetation in the permanent right-of-way generally would not be mowed or otherwise managed and would not be affected by mowing or management activities. If emergent wetlands are affected by management activities, the impacts on approximately 69.8 acres of emergent wetlands is expected to be short-term and minor.

During operation, the Applicant would implement its Integrity Management Program, which could require excavation and repair or replacement of sections of the pipeline. If excavation is required within a wetland, impacts likely would be short-term and minor, but could occur periodically over the life of the Project.

Operation of RA-08 may increase the potential for the introduction and spread of noxious weeds and invasive plants for the life of the Project. The Applicant would implement the procedures in the Environmental Protection Plan (Appendix E), and wetland permitting documents would describe measures to prevent the spread of noxious and invasive weeds in wetlands. With implementation of those procedures, the potential impact of introduction and spread of noxious weeds and invasive plants would be short-term and minor.

Facility locations are unknown. If wetlands were covered by aboveground facilities, they would be permanently converted to developed land. Any potentially unavoidable impacts would be permanent and major; however, the impacts could be offset by compensatory wetland mitigation.

Potential impacts on wetlands due to an unanticipated crude oil release are discussed in Chapter 10.

Specially Designated Wetlands. Construction of RA-08 would result in short-term minor impacts on approximately 1.6 acres of Public Waters Wetlands in Minnesota (Table 6.3.1.3-13). The affected Public

Waters Wetlands would be reclaimed as wetlands following construction, resulting in short-term minor impacts. Impacts on Public Waters Wetlands would be subject to state-specific permitting requirements, and implementation of BMPs would be required for Project approval.

No calcareous fens would be affected during operation of RA-08, as none are located within the permanent right-of-way for the route.

No impacts on wetland reserves would be associated with RA-08, as no Wetland Reserve Program wetlands were identified near the route. Approximately 0.7 acre in one Minnesota BWSR wetland mitigation bank easement would be affected by operation of RA-08 (Table 6.3.1.3-14), resulting in a permanent minor impact. In addition, the mitigation bank easement crossed by the permanent pipeline right-of-way may become ineligible for the easement program. The easement would not be protected from future disturbance, including pipeline excavation for repairs, which could occur from implementing the Applicant's Integrity Management Program.

6.3.1.3.4 Summary and Mitigation

Summary

Construction and operation of the Applicant's preferred route and any route alternative would result in permanent, major impacts on forested and scrub/shrub wetlands. Potential impacts on emergent wetlands and specially designated wetlands were found to range from no impact to short-term minor impacts for the Applicant's preferred route and all of the route alternatives (see Table 6.3.1.3-15).

Avoidance and minimization measures include Applicant-proposed measures and mitigation measures stipulated in pending state and federal permits. All wetland changes would be reviewed and approved by the appropriate authorizing agency prior to any construction being allowed. The Applicant has committed to provide compensatory wetland mitigation for permanent impacts on forested, scrub/shrub, and emergent wetlands as required in the federal and state-specific permits. The avoidance and minimization measures and standard BMPs described for the Applicant's preferred route also would apply to the route alternatives.

Beyond the general findings given above, a more detailed comparison of the Applicant's preferred route and the route alternatives shows that the effects on wetlands would vary between the Applicant's preferred route and the different route alternatives based primarily on the amount of forested and scrub/shrub wetland disturbed/filled during construction, the recovery period to reestablish forested wetlands and the permanent loss of forested wetlands to the permanently cleared right-of-way.

<u>Construction Impacts</u>

General Wetlands

Clearing trees and shrubs from forested and scrub/shrub wetlands would require many years for reestablishment of wetlands similar in structure and function to the original wetlands. For the route alternatives, the largest area of clearing of forested and scrub/shrub wetlands would occur for RA-07, RA-06, and RA-08 (Table 6.3.1.3-15). The overall long-term implications for these construction impacts on wetlands for these alternatives differ, however. Construction of RA-07 and RA-08 would represent an expansion along the edges of existing pipeline corridors; while construction of RA-06 would represent construction through a new corridor where many wetlands may not have been previously exposed to

ground disturbance. The smallest area of clearing of forested and scrub/shrub wetlands would occur for the Applicant's preferred route and RA-03AM (Table 6.3.1.3-15).

Emergent wetlands generally reestablish more quickly after pipeline construction. Fill impacts would result in a permanent loss of emergent wetlands but, for pipeline construction through emergent wetlands, vegetation cover and wetland functions would be restored within several years. RA-03AM contains the largest area of emergent wetlands within the construction work area, while the Applicant's preferred route contains the smallest area within the construction work area (Table 6.3.1.3-15).

Specially Designated Wetlands

All of the routes, except RA-07, would affect Public Waters Wetlands between Clearbrook and Carlton during construction (Table 6.3.1.3-15). RA-03AM and RA-08 would affect the largest areas of Public Waters Wetlands, while RA-06 and the Applicant's preferred route would affect the smallest areas.

Minnesota's calcareous fens represent a rare habitat that supports several plants that are protected as threatened or endangered. No calcareous fen wetlands would be crossed by any route between Clearbrook and Carlton. Similarly, no wetlands enrolled in either federal or state Wetland Reserve Programs would be crossed by any route between Clearbrook and Carlton.

Minnesota BWSR wetland mitigation bank easements would be affected by construction of RA-03AM, RA-07, and RA-08 between Clearbrook and Carlton. The easements crossed by both RA-03AM and RA-08 would be co-located with existing pipeline corridors. The mitigation bank easement affected by construction of RA-07 may be avoidable by adjustment of the construction work area width next to the easement. Because these easements already contain existing pipelines, it is unlikely that they would become ineligible for the mitigation bank program because of an additional pipeline, although restoration would be delayed by the new construction.

Operations Impacts

General Wetlands

Fill placed in wetlands for construction of aboveground facilities represents a permanent loss of wetlands. Because the locations for aboveground facilities have not been developed for the route alternatives, a quantified comparison is not possible. New aboveground facilities generally would be sited to avoid wetlands to the extent practicable, although some impacts may be unavoidable. Pipeline operation would continue to disturb wetlands through vegetation management that prevents trees and large shrubs from reestablishing to allow visual inspection of the permanent right-of-way. In addition, the Applicant's Integrity Management Program may require excavation to repair or replace sections of pipe that could occur within wetlands. The largest areas of previously forested and scrub/shrub wetlands that would be permanently maintained as emergent wetland would be associated with RA-06, RA-07, and RA-08 (Table 6.3.1.3-15). The overall long-term implications for these operations impacts on wetlands for these route alternatives differ. Operation of RA-07 would occur within a currently maintained right-of-way, RA-08 would represent an expansion along the edges of existing pipeline corridors, and construction of RA-06 would involve construction through an entirely new corridor where many wetlands may not have been previously exposed to ground disturbance. The smallest area of previously forested and scrub/shrub wetlands would be associated with the Applicant's preferred route and RA-03AM (Table 6.3.1.3-15). Portions of both of these routes would create new rights-of-way; and other portions would be co-located with existing pipelines, transmission lines, and roads. The Applicant's preferred route would have a greater length of new pipeline corridor than RA-03AM.

All of the routes between Clearbrook and Carlton, except RA-07, would continue to affect Public Waters Wetlands during operations (Table 6.3.1.3-15). RA-03AM and RA-08 would affect the largest areas of Public Waters Wetlands, while RA-06 and the Applicant's preferred route would affect the smallest areas.

No calcareous fens or wetlands enrolled in either federal or state Wetland Reserve Programs would be affected by any of the route alternatives between Clearbrook and Carlton during operation.

Mitigation

No Minnesota BWSR wetland mitigation bank easements would be affected during operation of the RA-03AM or RA-08 route. Operations impacts could result in short-term minor impacts on these wetlands within the permanent right-of-way. The easements crossed by both RA-03AM and RA-08 would be co-located with existing pipeline corridors. Because these easements already contain existing pipelines, it is unlikely that they would become ineligible for the mitigation bank program because of an additional pipeline, although restoration would be delayed by the new construction.

All routes would result in permanent major impacts on wetlands associated with conversion of forested and scrub/shrub wetlands to emergent wetlands. The total acreage of forested/scrub/shrub conversion would be greatest for RA-06 followed RA-08, RA-07, the Applicant's preferred route, and RA-03AM. The Applicant has committed to provide compensatory wetland mitigation for permanent impacts on forested, scrub/shrub, and emergent wetlands as required in the federal and state-specific permits. No additional mitigation measures have been identified.

Table 6.3.1.3-15. Summary of Potential Impacts on Wetlands for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Changes to forested and scrub/shrub wetland characteristics and functions	Long-term to permanent/major impacts • 133 acres forested wetlands • 201 acres scrub/shrub wetlands	Long-term to permanent/ major impacts • 116 acres forested wetlands • 206 acres scrub/shrub wetlands	Long-term to permanent/major impacts • 541 acres forested wetlands • 253 acres scrub/shrub wetlands	Long-term to permanent/ major impacts • 595 acres forested wetlands • 446 acres scrub/shrub wetlands	Long-term to permanent/major impacts • 365 acres forested wetlands • 274 acres scrub/shrub wetlands
Changes to emergent wetland characteristics and functions	Short-term/minor impacts • 112 acres	Short-term/minor impacts • 234 acres	Short-term/minor impacts • 126 acres	Short-term/minor impacts • 154 acres	Short-term/minor impacts • 163 acres
Changes to Public Waters Wetlands characteristics and functions	Short-term/minor impacts • 3 acres	Short-term/minor impacts • 8 acres	Short-term/minor impacts • 3 acres	No impact	Short-term/minor impacts • 5 acres
Changes to calcareous fen characteristics and functions	No impact	No impact	No impact	No impact	No impact
Changes to Wetland Reserve Program wetland characteristics and functions	No impact	No impact	No impact	No impact	No impact
Changes to wetland mitigation bank easements characteristics and functions	No impact	Short-term/minor impacts • 5 acres	No impact	Short-term/minor impacts • 0.3 acre	Short-term/minor impacts • 2 acres

Table 6.3.1.3-15. Summary of Potential Impacts on Wetlands for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Operations Impacts					
Forested and scrub/shrub wetlands permanently converted to emergent wetlands	Permanent/major impacts • 62 acres forested wetlands • 108 acres scrub/shrub wetlands	Permanent/major impacts • 48 acres forested wetlands • 84 acres scrub/shrub wetlands	Permanent/major impacts • 228 acres forested wetlands • 104 acres scrub/shrub wetlands	Permanent/major impacts • 124 acres forested wetlands • 120 acres scrub/shrub wetlands	Permanent/major impacts • 151 acres forested wetlands • 114 acres scrub/shrub wetlands
Potential changes to emergent wetland characteristics and functions	Short-term/minor impacts • 64 acres	Short-term/minor impacts • 97 acres	Short-term/minor impacts • 53 acres	Short-term/minor impacts • 37 acres	Short-term/minor impacts • 70 acres
Potential changes to Public Waters Wetlands characteristics and functions	Short-term/minor impacts • 2 acres	Short-term/minor impacts • 3 acres	Short-term/minor impacts • 1 acre	No impact	Short-term/minor impacts • 2 acres
Changes to calcareous fen characteristics and functions	No impact	No impact	No impact	No impact	No impact
Changes to Wetland Reserve Program wetland characteristics and functions	No impact	No impact	No impact	No impact	No impact
Wetland mitigation banks within the permanent right-of-way that would become ineligible as conservation easement	No impact	Permanent/minor impacts • 2 acres	No impact	No impact	Permanent/minor impacts • 1 acre

6.3.1.3.5 References

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6.3.1.4 Floodplains

Floodplains form diverse and high-quality habitats under natural conditions because of their proximity to waterbodies, intermittent flooding, rich soils, and wetland complexes. In addition, their naturally flat topography has resulted in historical development within these areas. Construction of facilities such as a pipeline in a floodplain may affect the ability of the floodplain to store excess water or may raise flood elevations upstream. Flood damage can occur when natural flooding processes are disturbed by altering a watercourse or building inappropriately in the floodplain itself (FEMA 2009).

The floodplain analysis considered both the potential impacts of the Applicant's preferred route and route alternatives on floodplains, and the potential impacts of flooding on Project elements in the floodplain. The analysis of impacts on floodplains during construction and operation of the Applicant's preferred route and route alternatives considered the following:

- Altering floodplain topography;
- Changing flow patterns of flood waters, thereby increasing flooding;
- Blocking or restricting flows;
- Reducing the area within a floodplain that carries floodwaters; and
- Increasing flood elevations upstream.

The analysis of impacts on facilities located within a floodplain and subjected to flooding for the Applicant's preferred route and route alternatives considered the following:

- Disruption of construction activities and loss of materials,
- Damage to equipment and facilities from inundation by floodwaters or flood scour, and
- Interruption of operations.

This section describes the existing conditions for floodplains along the Applicant's preferred route and route alternatives that could be affected by construction and operation of the Project. The potential impacts on floodplains or on the pipeline and associated facilities from flood events are compared for each of the five routing options (the Applicant's preferred route, RA-03AM, RA-06, RA-07, and RA-08). Flood-related spill hazards and potential impacts on floodplains from crude oil releases are discussed in Chapter 10.

6.3.1.4.1 Regulatory Context and Methodology

Regulatory Context

Under Minnesota state law, a "floodplain" is the land adjoining lakes and rivers that would be inundated by a 100-year flood (i.e., a flood event expected to occur only once every 100 years). Flood Insurance Rate Maps (FIRMs) produced by the FEMA define the boundaries of floodplains and floodways. These maps indicate areas of the floodplain that are critical for conveying floodwaters (the floodway), the extent of the 100-year flood or special flood hazard areas (SFHAs) (areas subject to a 1-percent annual chance of a flood event), and areas subject to the 500-year flood (areas subject to a 0.2-percent annual chance of a flood).

Development in floodplains typically is regulated by local building, floodplain development, and shoreline permit regulations and ordinances, and FEMA's National Flood Insurance Program (NFIP).[13] Development within a floodplain can be permitted with implementation of proper floodplain management measures to minimize risk from potential flood hazards (Minn. R. Ch. 6120). See Section 5.2.1.4.1 for additional detail on the regulatory context for development within floodplains.

Methodology

Impacts on floodplains were assessed by:

- Using GIS to overlay onto FEMA 100-year flood maps the construction and operations footprints for the Applicant's preferred route and the route alternatives. FEMA has not developed flood maps for some counties.
- Calculating the number of waterbody crossings for areas where FEMA has not developed maps to approximate potential floodplains. Because not all waterbodies have designated floodplains (even where floodplains have been mapped), the number of waterbody crossings was considered only as an approximation of potential floodplain impacts for comparison purposes.
- Identifying any Project features that would be located within a FEMA-designated floodplain.

The ROI for the floodplains analysis consists of the pipeline rights-of-way, construction work areas, facilities, and access roads for the Applicant's preferred route and the route alternatives.

6.3.1.4.2 Existing Conditions

Applicant's Preferred Route

Approximately 12 miles (154 acres) of the construction work area along the Applicant's preferred route would occur within FEMA-mapped 100-year floodplains in counties for which FEMA flood maps are available (Table 6.3.1.4-1). The Applicant's preferred route would require 192 waterbody crossings in Minnesota. An additional 30 acres of ATWS and 4 acres of one access road also would be required within the SFHA for the Applicant's preferred route in Minnesota.

Table 6.3.1.4-1. Waterbodies and Floodplains Crossed by the Applicant's Preferred Route in Minnesota

Route Segment	Total Waterbody Crossings[a]	Special Flood Hazard Areas		
		Miles of Construction Work Area[b]	Acres of Construction Work Area[b]	Percent of FEMA Flood Map Coverage
North Dakota border to Clearbrook	75	6.3	91.7	89
Clearbrook to Carlton	111	5.6	62.7	26
Carlton to Wisconsin border	6	NA	NA	0

[13] The general purposes of the NFIP are to offer primary flood insurance to properties with significant flood risk and to reduce flood risk through the adoption of floodplain management standards. Generally, communities volunteer to participate in the NFIP to have access to flood insurance; in return, they are required to adopt minimum standards for construction within floodplains. To participate in the NFIP, local jurisdictions (typically cities or counties) must develop local floodplain regulations that meet the NFIP standards.

Table 6.3.1.4-1. Waterbodies and Floodplains Crossed by the Applicant's Preferred Route in Minnesota

Route Segment	Total Waterbody Crossings[a]	Special Flood Hazard Areas		
		Miles of Construction Work Area[b]	Acres of Construction Work Area[b]	Percent of FEMA Flood Map Coverage

[a] See Section 6.2.1.2 and Appendix G for details on waterbody crossings.

[b] For counties for which Federal Emergency Management Agency (FEMA) flood maps are available.

NA = FEMA flood maps are not available for Carlton County, which includes the right-of-way between Carlton and the Wisconsin border.

Between Clearbrook and Carlton, FEMA flood maps are available for only 26 percent of the Applicant's preferred route. Within this segment, approximately 5.6 miles (62.7 acres) of the construction work area would be located within SFHAs. An additional approximately 6.4 acres of ATWS and 1.8 acres of access roads also would be required within the SFHA. The route would require 111 waterbody crossings between Clearbrook and Carlton. The existing conditions relevant to floodplains along the Applicant's preferred route from Neche to Superior are described in Section 5.2.1.4.2.

For the Applicant's preferred route within Minnesota, 4 of the 8 pump stations and 16 of the 27 MLVs would be located in areas that have been mapped by FEMA. For areas with available FEMA flood mapping, no pump stations would be located in the 100-year floodplain; about 1 acre of a designated 100-year floodplain would be occupied by portions of three MLV sites, including an associated access road (Table 6.3.1.4-2). Of this total, approximately 0.4 acre associated with two MLVs would be located in the 100-year floodplain for the Clearbrook-to-Carlton segment.

Table 6.3.1.4-2. Permanent Aboveground Facilities and Access Roads within FEMA-Designated Special Flood Hazard Areas for the Applicant's Preferred Route in Minnesota

Feature	Acres[a]
Mainline valve access road	0.5
Mainline valve sites	0.5
TOTAL	**1.0**

[a] Acreage reflects counties for which Federal Emergency Management Agency (FEMA) flood maps are available.

Note:

Special flood hazard areas represent the 100-year floodplain.

Route Alternatives

The only segment where the route alternatives would vary from the alignment of the Applicant's preferred route is between Clearbrook and Carlton in Minnesota. The existing conditions relevant to floodplains for the route alternatives between Clearbrook and Carlton are described below.

Route Alternative RA-03AM

RA-03AM would be 275 miles long between Clearbrook and Carlton. Approximately 6.7 miles (97.2 acres) of the construction work area would be located within a FEMA-mapped 100-year floodplain in the counties for which FEMA flood mapping is available (64 percent of the route is mapped). The route would require 167 waterbody crossings.

Based on the spacing of pump stations along the Applicant's preferred route, it was assumed that six pump stations would be required along the route of RA-03AM between Clearbrook and Carlton. The specific locations of permanent aboveground facilities and access roads have not been determined for the route alternatives; therefore, it is unknown whether any permanent facilities associated with RA-03AM would be sited within a FEMA-designated SFHA.

Route Alternative RA-06

Route alternative RA-06 would be 197 miles long between Clearbrook and Carlton. Approximately 0.5 mile (7.2 acres) of the construction work area would be located within a FEMA-mapped 100-year floodplain in the counties for which FEMA flood mapping is available (56 percent of the route). The route would require 137 waterbody crossings between Clearbrook and Carlton.

Based on the spacing of pump stations along the Applicant's preferred route, it was assumed that four pump stations would be required along the route of RA-06 between Clearbrook and Carlton. The specific locations of permanent aboveground facilities and access roads have not been determined for the route alternatives; therefore, it is unknown whether any permanent facilities associated with RA-06 would be sited within a FEMA-designated SFHA.

Route Alternative RA-07

RA-07 would replace the existing Line 3 pipeline in the existing right-of-way, using a 205-foot-wide right-of-way. It would be approximately 168 miles long between Clearbrook and Carlton. Approximately 3.4 miles (85.2 acres) of the construction work area would be located within a FEMA-mapped 100-year floodplain in the counties for which FEMA flood mapping is available (42 percent of the route). The route would require 81 waterbody crossings between Clearbrook and Carlton.

It was assumed that four existing pump stations would be upgraded along the route of RA-07 between Clearbrook and Carlton. The specific pump stations to be upgraded and their associated locations have not been determined. Because the specific locations of MLVs and access roads also have not been determined for the route alternatives, it is unknown whether any permanent facilities associated with RA-07 would be sited within a FEMA-designated SFHA.

Route Alternative RA-08

RA-08 would be 165 miles long between Clearbrook and Carlton. Approximately 3.4 miles (49.4 acres) of the construction work area would be located within a FEMA-mapped 100-year floodplain in the counties for which FEMA flood mapping is available (40 percent of the route). The route would require 106 waterbody crossings between Clearbrook and Carlton.

It was assumed that four existing pump stations would be upgraded along the route of RA-08 between Clearbrook and Carlton. The specific pump stations to be upgraded and their associated locations have not been determined. Because the specific locations of MLVs and access roads also have not been determined for the route alternatives, it is unknown whether any permanent facilities associated with RA-08 would be sited within a FEMA-designated SFHA.

6.3.1.4.3 Impact Assessment

The floodplain analysis considered potential impacts of the Applicant's preferred route and route alternatives on floodplains and potential impacts of flooding on Project pipeline elements in the floodplain.

Applicant's Preferred Route (in Minnesota)

Construction Impacts

Construction activities, including land clearing, grading, trenching, and excavating, would occur within a FEMA-mapped 100-year floodplain for 12 miles (154 acres) of the construction work area along the Applicant's preferred route (from Clearbrook to Carlton, 6 miles (63 acres) of the construction work area would occur within a designated floodplain). One construction access road (totaling approximately 4 acres) also would be located in the 100-year floodplain. These activities would temporarily alter floodplain topography, resulting in minor alterations to water flows in the event of a flood in the area. Construction activities are unlikely to block or restrict flows, reduce the area within a floodplain that carries floodwaters, or increase flood elevations upstream. The Applicant would restore temporary roadways built within the floodplain to original ground conditions to avoid permanent impacts on floodplain flow pathways, connectivity, and function. Construction impacts on floodplains generally would be short-term and minor, persisting only until construction is completed and the natural land elevations and groundcover are restored. Construction and restoration would follow the plans contained in the Environmental Protection Plan (Appendix E), which would reduce potential impacts.

Impacts on Project elements from flooding could occur during pipeline construction in floodplains and at river crossings. Although the chance of a severe flood event occurring during the relatively short construction period would be low (because severe flood events occur infrequently), storm events could cause minor to major flooding and erosion at the construction site. Applicant-proposed measures to reduce flooding impacts include limiting the amount of open trench to 3 days, which would limit the amount of open trench and soil storage subject to flooding and storm events. Following construction through smaller waterbodies (less than 100 feet wide), the trench would be filled and recontoured within 24 to 48 hours of construction. Larger rivers would be crossed using site-specific methods, including HDD, which may involve placing more equipment in the floodplain (or immediately adjacent) during construction but would not result in temporary or permanent disturbance of the floodplain for the length of the drill. (See Section 2.7.2 for details on HDD crossings.) Impacts on construction activities and equipment in a flood event generally would be temporary and negligible to minor from disruption of construction activities and damage to equipment and structures from inundation by floodwaters.

Operations Impacts

Permanent facilities such as pump stations and MLVs would be constructed aboveground and operate for the duration of the Project. No pump stations or access roads would be located in a designated floodplain; where feasible, permanent facilities would be constructed outside of the 100-year floodplain. The siting of three MLVs within a designated floodplain (1 acre total for the Applicant's preferred route) would not create a measurable impact because of their relatively small footprints. Aboveground facilities in floodplains would require floodplain development permitting, which likely would require measures to reduce impacts on floodwater conveyance (e.g., berm construction, raising the ground elevation above the floodplain) associated with permanent structures.

The pipeline would be constructed below ground surface, typically with a minimum of 48 inches of ground cover. Minimum burial depths required by USDOT are listed in Table 2.7-1. For waterbody crossings greater than 100 feet wide, the minimum burial depth is 48 inches below the channel bottom. Major river crossings (see Section 6.3.1.2 for details) would use HDD methods, generally resulting in pipeline placement 30 feet or more below the stream channel. The below ground pipeline would not affect floodplain function once construction and restoration activities have been completed. Impacts on

operations activities and equipment from inundation by floodwaters in a flood event would generally be temporary and negligible to minor.

Route Alternatives (from Clearbrook to Carlton)

The types of potential impacts of the route alternatives on floodplains and the potential impacts of flooding on the route alternatives would be the same as described above for the Applicant's preferred route. The differences in impacts between route alternatives would depend on the amount of disturbance within floodplain areas. The number, type, and location of potential HDD crossings, wetlands, ATWS, access roads, and permanent aboveground facilities have not been determined for the route alternatives; therefore, potential impacts on floodplains associated with these developments for the route alternatives cannot be directly compared with those for the Applicant's preferred route.

Route Alternative RA-03AM

Construction Impacts

Construction activities, including land clearing, grading, trenching, and excavating, would occur within the approximately 6.7 miles (97.2 acres) of the construction work area for RA-03AM that is located within a FEMA-mapped 100-year floodplain in the counties for which FEMA flood mapping is available. Impacts from these activities would be similar to those described for the Applicant's preferred route. Impacts generally would short-term and minor, persisting only until construction is completed and the natural land elevations and groundcover are restored.

Route alternative RA-03AM would cross the greatest area of designated floodplains and would require more waterbody crossings than all other route options between Clearbrook and Carlton. The greater number of waterbody crossings (167) for this route alternative increases the potential for channel migration and scour during a flood event to expose pipe. Construction activities also could be affected by flood events, including temporary negligible to minor disruption of construction activities and damage to equipment and structures from inundation by floodwaters.

Operations Impacts

After right-of-way restoration, the pipeline would not affect floodplain function because it would be buried to at least regulatory-minimum depths. Because the locations of permanent aboveground facilities have not been determined for route alternatives, associated impacts cannot be quantified. If located within a floodplain, aboveground facilities would require floodplain development permitting that likely would require measures to reduce impacts on floodwater conveyance associated with permanent structures. The greater number of waterbody crossings for this route alternative increases the potential for channel migration and scour during a flood event to expose pipe. Routine inspection of the pipeline during operations should detect such conditions, which would be rectified during maintenance activities, resulting in temporary minor impacts. Impacts on operations activities and equipment from inundation by floodwaters in a flood event would generally be temporary and negligible to minor.

Route Alternative RA-06

Construction Impacts

Construction activities, including land clearing, grading, trenching, and excavating, would occur within the 0.5 mile (7.2 acres) of the construction work area for RA-06 that is located within a FEMA-mapped 100-year floodplain in the counties for which FEMA flood mapping is available. Impacts from these

activities would be similar to those described above for the Applicant's preferred route. Impacts generally would short-term and minor, persisting only until construction is completed and the natural land elevations and groundcover are restored. Construction activities also could be affected by flood events, including disruption of construction activities and damage to equipment and structures from inundation by floodwaters.

Operations Impacts

The impacts from operations and permanent facilities for RA-06 would be similar to those described above for RA-03AM, with fewer waterbody crossings (137) required.

Route Alternative RA-07

Construction Impacts

Construction activities, including land clearing, grading, trenching, and excavating, would occur within the 3.4 miles (85.2 acres) of the construction work area for RA-07 that is located within a FEMA-mapped 100-year floodplain in the counties for which FEMA flood mapping is available. Impacts from these activities would be similar to those described above for the Applicant's preferred route. Impacts generally would short-term and minor, persisting only until construction is completed and the natural land elevations and groundcover are restored.

Construction activities also could be affected by flood events, including disruption of construction activities and damage to equipment and structures from inundation by floodwaters. RA-07 would require the least amount of waterbody crossings, with a corresponding reduced potential for exposure of the pipe caused by channel migration and scour during a flood event.

Operations Impacts

The impacts from operations and permanent facilities for RA-07 would be the similar to those described above for RA-03AM; however, the least number of waterbody crossings (81) would be required under this route alternative, with a corresponding reduced potential for exposure of the pipe caused by channel migration and scour during a flood event.

Route Alternative RA-08

Construction Impacts

Construction activities, including land clearing, grading, trenching, and excavating, would occur within the 3.4 miles (85.2 acres) of the construction work area for RA-08 that is located within a FEMA-mapped 100-year floodplain in the counties for which FEMA flood mapping is available. Impacts from these activities would be similar to those described above for the Applicant's preferred route. Impacts generally would short-term and minor, persisting only until construction is completed and the natural land elevations and groundcover are restored.

Construction activities also could be affected by flood events, including disruption of construction activities and damage to equipment and structures from inundation by floodwaters. Compared to the Applicant's preferred route and RA-03AM, this route alternative has fewer waterbody crossings (106) where channel migration and scour during a flood event could expose pipe.

Operations Impacts

The impacts from operations and permanent facilities for RA-08 would be the similar to those described above for RA-03AM. Compared to the Applicant's preferred route and RA-03AM, this route alternative has fewer waterbody crossings where channel migration and scour during a flood event could expose pipe.

6.3.1.4.4 Summary and Mitigation

Summary

The assessment of potential floodplain impacts for the Applicant's preferred route and the route alternatives found that impacts would range from negligible to minor and temporary to short-term for construction, and from no impact to minor and temporary impacts for operations (Table 6.3.1.4-3).

The types of potential impacts on floodplains and the potential impacts of flooding would be the same for the Applicant's preferred route and route alternatives. The differences in impacts would depend on the amount of disturbance within floodplain areas. The length of pipeline route that crosses SFHAs is much lower for RA-06, reducing potential effects on floodplain function. During operations, the length of pipeline route exposed to interruption of operations caused by flooding would be significantly greater for route alternatives RA-03AM, RA-07, and RA-08.

Construction Impacts

Construction-related impacts on floodplains, including temporary alterations of topography that could change flow patterns of flood waters and increase flooding, would be temporary and minor; impacts would last until the disturbed areas are recontoured and vegetation is reestablished. Temporary impacts on floodplains would be greatest for routes with the greatest amount of disturbance from construction in floodplains and those with the most waterbody crossings. RA-03AM would require the most waterbody crossings (167), and RA-07 would require the fewest (81). The Applicant's preferred route is intermediate to the route alternatives, with 111 waterbody crossings required between Clearbrook and Carlton.

Construction activities also could be affected by flood events, including disruption of construction activities and damage to equipment and structures from inundation by floodwaters. Flood events could range from smaller, more frequent events with negligible to minor impacts on larger, less frequent events causing major disruption to equipment and activities within the floodplain.

Operations Impacts

The Applicant's preferred route in Minnesota includes less than 1 acre of permanent facilities that would be located within a FEMA-designated 100-year floodplain in areas for which FEMA mapping is available; these facilities would be allowed under state and local floodplain regulations if the appropriate permits are obtained. The location, number, and type of permanent aboveground facilities and the number and location of access roads have not been determined for the route alternatives; therefore, a comparison of impacts on floodplains from permanent facilities between alternatives is not possible.

Mitigation

Identified mitigation measures for the Applicant's preferred route and route alternatives could include:

- In areas without available FEMA-designated floodplains, require Enbridge to site all pump stations and MLVs outside of potential floodplains.

Table 6.3.1.4-3. Summary of Potential Floodplain Impacts for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Construction activities and equipment altering floodplain function	Short-term/minor impacts • 62.7 acres within SFHAs (26% of route mapped by FEMA) • 6.4 acres of ATWS within SFHAs • 1.8 acre of access roads within SFHAs • 111 waterbody crossings	Short-term/minor impacts • 97.2 acres within SFHAs (64% of route mapped by FEMA) • 167 waterbody crossings	Short-term/minor impacts • 7.2 acres within SFHAs (56% of route mapped by FEMA) • 137 waterbody crossings	Short-term/minor impacts • 85.2 acres within SFHAs (42% of route mapped by FEMA) • 81 waterbody crossings	Short-term/minor impacts • 49.4 acres within SFHAs (40% of route mapped by FEMA) • 106 waterbody crossings
Disruption of construction activities and loss of materials caused by flooding	Temporary/negligible to minor impacts	Temporary/negligible to minor impacts	Temporary/negligible to minor impacts	Temporary/negligible to minor impacts	Temporary/negligible to minor impacts
Damage to construction equipment and facilities from inundation by floodwaters or flood scour	Temporary/negligible to minor impacts	Temporary/negligible to minor impacts	Temporary/negligible to minor impacts	Temporary/negligible to minor impacts	Temporary/negligible to minor impacts
Operations Impacts					
Pipeline and permanent facilities altering floodplain function	No impact	*Locations of aboveground facilities are not known, but they could be constructed within floodplain areas.*			
Interruption of operations caused by flooding	Temporary/negligible to minor impacts • 5.6 miles within SFHAs (26% of route mapped by FEMA)	Temporary/negligible to minor impacts • 6.7 miles within SFHAs (64% of route mapped by FEMA)	Temporary/negligible to minor impacts • 0.5 mile within SFHAs (56% of route mapped by FEMA)	Temporary/negligible to minor impacts • 3.4 miles within SFHAs (42% of route mapped by FEMA)	Temporary/negligible to minor impacts • 3.4 miles within SFHAs (40% of route mapped by FEMA)

Table 6.3.1.4-3. Summary of Potential Floodplain Impacts for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Damage to operations equipment and facilities from inundation by floodwaters or flood scour	Temporary/negligible to minor impacts	Temporary/negligible to minor impacts	Temporary/negligible to minor impacts	Temporary/negligible to minor impacts	Temporary/negligible to minor impacts

FEMA = Federal Emergency Management Agency, SFHA = special flood hazard area.

6.3.1.4.5 References

Federal Emergency Management Agency (FEMA). 2009. NFIP Floodplain Management Guidebook. Region 10. 5th Edition. March. https://www.fema.gov/media-library-data/20130726-1647-20490-1041/nfipguidebook_5edition_web.pdf. Accessed on December 9, 2012.

6.3.2 Geology and Soils

Geologic resources, such as soil and bedrock, can be affected by construction and operation; and geologic hazards such as landslides and subsidence and sinkholes can affect pipeline integrity. Activities that disturb sensitive soils, alter topography, or introduce geologic hazards can negatively affect geology and soil resources, and the people and industries that rely on them.

The construction-related geology and soils issues to be addressed include the following:

- Soil erosion,
- Soil compaction,
- Soil mixing,
- Soil contamination,
- Presence of shallow bedrock that may require blasting,
- Impacts on paleontological resources,
- Changes to topography, and
- Subsidence and sinkhole hazards.

The operations-related geology and soils impacts addressed in this section include:

- Permanent loss of soil cover,
- Soil erosion and compaction,
- Landslide hazards, and
- Subsidence and sinkhole hazards.

This section describes the existing conditions for the geology and soils within an area along the Applicant's preferred route and route alternatives where these resources could be affected by construction and operation of the Project. Potential impacts on geology and soils are discussed and compared across each of the five route options (the Applicant's preferred route, RA-03AM, RA-06, RA-07, and RA-08). Potential impacts on geology and soils from an accidental release of crude oil are discussed in Chapter 10.

6.3.2.1 Regulatory Context and Methodology

6.3.2.1.1 Regulatory Context

The NPDES General Construction Stormwater Coverage Permit requires that permittees use approved protection measures to manage soil erosion and minimize soil compaction. The Applicant would be required to obtain an NPDES permit from Minnesota PCA prior to construction. In addition, Minnesota Statutes Chapter 103F, Soil Erosion Law prohibits activities that allow for excessive soil loss, as defined by NRCS guidelines. 29 Code of Federal Regulations (CFR) Part 1926, Subpart U regulates the storage and use of explosives for blasting of bedrock. Minnesota Administrative Rules Chapter 7500 also regulates the storage and use of explosives, and designates municipal supervision of compliance with federal blasting regulations. Other geologic resource guidance and regulations include design and engineering

protocols for dealing with site-specific geologic hazards (such as burial or reinforcement of pipelines to protect from landslides). Federal design and engineering specifications in 49 CFR Parts 192 and 193 ensure that pipeline facilities are protected from potential landslides and unstable slopes. Because no significant seismic hazard is present in the Project area, pipeline engineering requirements to address the seismic stability of the pipeline are not applicable to the Project (USGS 2016).

6.3.2.1.2 Methodology

To assess potential construction and operations impacts on geology and soils, and to assess the potential impacts of geologic hazards on Project elements, relevant geologic resources present along the Applicant's preferred route and the route alternatives were reviewed and inventoried. These resources included soils, shallow bedrock, paleontological resources, and topography. Soil types that may be sensitive to disturbance, including prime farmland, soils highly erodible by water or wind[14], hydric soils, compaction-prone soils, stony/rocky soils and coarse-textured soils, were identified from NRCS soil data, including both SSURGO and STATSGO2 data (NRCS 2016). Other data sources included maps and publications from USGS, MGS, and the Paleontology Portal. Potential geologic hazards, including landslide hazards and subsidence- and sinkhole-prone areas, also were identified and inventoried using maps and publications from USGS and MGS.

Data for the relevant geologic resources and geologic hazards were overlain in GIS with maps of the estimated construction and operations footprints for the Applicant's preferred route and the route alternatives to determine the locations and extent of potential impacts. Potential impacts on geologic resources for the Applicant's preferred route and route alternatives were considered where construction or operation of a route could cause disturbance, loss, or modification of the resource—and where estimated footprints for these actions intersected potential geologic hazards that could cause damage or injury.

The ROI for the geology and soils impact analysis consists of areas where soils, topography, and potentially bedrock would be disturbed during Project-related construction or operations in Minnesota. For the Applicant's preferred route, this includes pipeline construction work areas; permanent rights-of-way; temporary and permanent access roads; and locations of associated facilities outside the permanent right-of-way, such as pump stations. The footprint for route alternatives include a 120-foot-wide construction work area (except for RA-07, which would have a 205-foot-wide construction footprint; see Chapter 4) and a 50-foot-wide permanent right-of-way centered on the route alignments.

6.3.2.2 Existing Conditions

6.3.2.2.1 Applicant's Preferred Route

Soils

Section 5.2.2.2 provides a general discussion of soils across the ROI. Specific soil types and characteristics along the Applicant's preferred route were analyzed from soil maps prepared by NRCS, including both SSURGO and STATSGO2 data (NRCS 2016). Any soil type has the potential to be affected by pipeline development, but some soils are more susceptible than others to impacts such as erosion, compaction, and contamination. Soils that may be sensitive to disturbance are those designated as prime farmland, soils highly erodible by wind or water, hydric soils, compaction-prone soils, coarse-

[14] The SSURGO dataset had unpopulated values for 36% to 40% of wind erosion and 42% to 46% of the water erosion for the map units crossed by the Applicant's preferred route and the route alternatives.

textured soils, and stony/rocky soils, as described in Section 5.2.2.2. Table 6.3.2-1 provides the miles of occurrence of these sensitive soils along the Applicant's preferred route in Minnesota.

Table 6.3.2-1. Sensitive Soils along the Applicant's Preferred Route in Minnesota (miles)

Soil Type	North Dakota-Minnesota Border to Clearbrook	Clearbrook to Carlton	Carlton to Minnesota-Wisconsin Border	Minnesota Total
Length	109.1	220.9	9.6	339.7
Prime farmland	77.4	60.3	0.8	138.5
Highly erodible soils (by water) [a]	0.0	4.7	0.0	4.8
Highly erodible soils (by wind) [a]	16.6	47.2	0.1	63.8
Hydric soils	65.2	68.4	0.3	133.9
Compaction-prone soils	23.0	0.0	1.2	24.1
Coarse-textured soils	1.7	39.2	1.5	42.5
Stony/rocky soils	0.1	1.4	0.0	1.5

Sources: NRCS 2016; Minnesota DNR 2016a.

a) The SSURGO dataset had unpopulated values for 37% of wind erosion and 42% of the water erosion for the map units crossed

As indicated in Table 6.3.2-1, sensitive soils along the Applicant's preferred route in Minnesota are summarized as follows:

- Prime farmlands are prevalent; approximately 139 miles of prime farmland would be crossed by the Applicant's preferred route in Minnesota, of which approximately 60 miles are within the Clearbrook to Carlton segment.
- Soils that are highly erodible by water are minor, while soils prone to wind erosion are more common.
- Hydric soils are common, especially in wetland areas and near lakes. Compaction-prone soils are not very common. Both hydric soils and compaction-prone soils may require modified construction methods to avoid potential compaction by heavy machinery.
- Coarse-textured soils are present.
- Stony/rocky soils occur only in minor, isolated areas throughout the region. Because of their limited occurrence across the routes, stony/rocky soils are not anticipated to exacerbate the impact of soil disturbance, or impede pipeline installation or construction of other facilities, and therefore are not addressed further herein.

Subsurface Substrate

The characteristics of the subsurface substrate (soils and sediments deeper than the surficial soils discussed above) are important in determining the method of pipeline installation, particularly regarding the use of HDD methods for pipeline installation. Some subsurface sand and gravel layers are not conducive to HDD techniques, as the unconsolidated sediments are prone to collapse during drilling.

Some of these deposits have been well mapped and serve as aquifers, as discussed in Section 6.3.1.1. Geotechnical drilling is required to determine the site-specific characteristics of these deposits in order to determine the feasibility of using HDD to install the pipeline.

Shallow Bedrock

The depth to bedrock across the ROI ranges from 0 to over 450 feet, with depths averaging approximately 200 feet along the Applicant's preferred route (MGS 2016). Where bedrock is present at or near the surface within the corridor for the Applicant's preferred route, blasting of the rock with explosives could be required for installation of buried pipeline. However, shallow bedrock is not common along most of the route. Some shallow bedrock is present in the eastern end of the ROI, including a 0.3-mile segment (approximately 1,500 feet) of the Applicant's preferred route in Carlton County, Minnesota, near the Wisconsin border.

Paleontology

The Applicant's preferred route intersects isolated sections of sedimentary rock formations that are likely to contain common marine invertebrate fossils. Along most of the length of the route, these layers are generally found at depths greater than 30 feet. Along the eastern end of the route in Carlton County, bedrock may be at the surface or near the surface, and common marine invertebrate fossils could be present in shallow bedrock. Pleistocene-age megafauna remains, such as wooly mammoths or mastodon, also could be found in the glacial sediments overlying bedrock; however, these remains are rare in the ROI.

Topography

The Upper Midwest consists of relatively flat terrain, and topographical variation is modest across the route. Elevations range from approximately 903 to 1,681 feet above sea level across the Applicant's preferred route (NED DEM 2016). The generally low relief across the Applicant's preferred route is punctuated in some areas by isolated ridges and hills, and some steep streambanks (Appendix A).

Landslide Hazards

Landslide hazard potential is generally low across the majority of the Applicant's preferred route. Near the eastern end of the route between Carlton and the Wisconsin border, 8 miles of the route intersect areas with a high susceptibility to landslides, mostly in isolated sections at stream crossings. Between Clearbrook and Carlton is an additional 0.4 mile of high landslide hazard (NPMS LSHR 2016; Enbridge 2016a).

Subsidence and Sinkhole Hazards

Karst conditions, which could lead to subsidence and sinkhole formation, are not believed to be present along the Applicant's preferred route (Minnesota DNR 2016b; USGS 2016).

6.3.2.2.2 Route Alternatives

Soils

Specific soil types and characteristics along the route alternatives were analyzed from soil maps prepared by NRCS, including both SSURGO and STATSGO2 data (NRCS 2016). Table 6.3.2-2 provides the miles of occurrence of these sensitive soils along the route alternatives between Clearbrook and Carlton.

Table 6.3.2-2. Sensitive Soils along the Route Alternatives between Clearbrook and Carlton (miles)

Soil Type	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Length	275.1	196.8	167.7	164.8
Prime farmland	44.0	76.7	31.6	38.9
Highly erodible soils (by water)[a]	19.5	7.3	5.8	9.5
Highly erodible soils (by wind) [a]	50.9	18.2	31.4	17.8
Hydric soils	53.3	86.2	62.1	69.4
Compaction-prone soils	0.0	7.4	2.3	2.6
Coarse-textured soils	43.5	8.0	37.0	19.3
Stony/rocky soils	1.4	0.3	2.8	5.9

Sources: NRCS 2016; Minnesota DNR 2016a.

[a] The SSURGO dataset had unpopulated values for 36% to 40% of wind erosion and 42 percent to 46 percent of the water erosion for the map units crossed.

Subsurface Substrate

The characteristics of the subsurface substrate along the route alternatives are generally similar to those along the Applicant's preferred route. Geotechnical drilling would be required to determine the site-specific characteristics of these deposits in order to determine appropriate methods of pipeline installation.

Route Alternative RA-03AM

Shallow Bedrock

Bedrock is likely present at or near the surface along some eastern segments of RA-03AM, most likely in Todd, Pine, and Carlton counties. Potential bedrock blasting sites have not yet been identified for the route.

Paleontology

RA-03AM would intersect short segments of shallow sedimentary rock that is likely to contain common marine invertebrate fossils. Pleistocene-age megafauna remains also could be found in the glacial sediments along RA-03AM; however, these remains are rare throughout the ROI.

Topography

The elevation for RA-03AM ranges from 617 to 1,681 feet above sea level. The generally low relief across the route alternative is punctuated in some areas by isolated ridges and hills, and some steep streambanks (Appendix A).

Landslide Hazards

Landslide hazard potential is generally low across the majority of RA-03AM. The route would pass through minor isolated segments of high landslide hazard for a total of 0.4 mile between Clearbrook and Carlton (NPMS LSHR 2016).

Subsidence and Sinkhole Hazards

Along approximately 30 miles of the eastern portion of the RA-03AM route, relatively shallow carbonate bedrock has the potential for karst conditions. For approximately 12 miles of that segment (where the route passes through Pine County), there is a higher probability for subsidence or sinkhole formation where bedrock is at or near the surface (Minnesota DNR 2016b; USGS 2016).

Route Alternative RA-06

Shallow Bedrock

Bedrock is present at or near the surface in substantial portions of RA-06 where it passes through Itasca County and possibly in shorter segments in Carlton County. Potential bedrock blasting sites have not been identified for RA-06.

Paleontology

RA-06 would intersect short segments of shallow sedimentary rock that is likely to contain common marine invertebrate fossils. Pleistocene-age megafauna remains also could be found in the glacial sediments along RA-06; however, these remains are rare throughout the ROI.

Topography

The elevation for RA-06 ranges from 617 to 1,542 feet above sea level. The generally low relief across the route alternative is punctuated in some areas by isolated ridges and hills, and some steep streambanks (Appendix A).

Landslide Hazards

Landslide hazard potential is generally low across the majority of the RA-06 route. The route would pass through minor isolated segments of high landslide hazard for a total of 0.3 mile between Clearbrook and Carlton (NPMS LSHR 2016).

Subsidence and Sinkhole Hazards

Karst conditions, which could lead to subsidence and sinkhole formation, are not believed to be present along the RA-06 route.

Route Alternative RA-07

Shallow Bedrock

Bedrock may be present at or near the surface in isolated segments of RA-07 where it crosses Itasca and Carlton counties. Potential bedrock blasting sites have not been identified for RA-07.

Paleontology

Route alternative RA-07 would intersect short segments of shallow sedimentary rock that is likely to contain common marine invertebrate fossils. Pleistocene-age megafauna remains also could be found in the glacial sediments along RA-07; however, these remains are rare throughout the ROI.

Topography

The elevation for RA-07 ranges from 617 to 1,474 feet above sea level (NED DEM 2016). The generally low relief across the route alternative is punctuated in some areas by isolated ridges and hills, and some steep streambanks (Appendix A).

Landslide Hazards

Landslide hazard potential is generally low across the majority of the RA-07 route. The route would pass through minor isolated segments of high landslide hazard for a total of 0.3 mile between Clearbrook and Carlton (NPMS LSHR 2016).

Subsidence and Sinkhole Hazards

Karst conditions, which could lead to subsidence and sinkhole formation, are not believed to be present along the RA-07 route.

Route Alternative RA-08

Shallow Bedrock

Bedrock may be present at or near the surface in isolated segments of RA-08 where it crosses Itasca and Carlton counties. Potential bedrock blasting sites have not been identified for RA-08.

Paleontology

RA-08 would intersect short segments of shallow sedimentary rock that is likely to contain common marine invertebrate fossils. Pleistocene-age megafauna remains also could be found in the glacial sediments along RA-08; however, these remains are rare throughout the ROI.

Topography

The elevation for RA-08 ranges from 617 to 1,499 feet above sea level (NED DEM 2016). The generally low relief across the route alternative is punctuated in some areas by isolated ridges and hills, and some steep streambanks (Appendix A).

Landslide Hazards

Landslide hazard potential is generally low across the majority of RA-08. The route would pass through minor isolated segments of high landslide hazard for a total of 0.3 mile between Clearbrook and Carlton (NPMS LSHR 2016).

Subsidence and Sinkhole Hazards

Karst conditions, which could lead to subsidence and sinkhole formation, are not believed to be present along the RA-08 route.

6.3.2.3 Impact Assessment

Impacts associated with the Applicant's preferred route in Minnesota and the route alternatives between Clearbrook and Carlton are described below.

6.3.2.3.1 Applicant's Preferred Route (in Minnesota)

Construction Impacts

Pipeline construction activities that can affect geology and soils include trenching and backfilling, blasting, grading, installation of permanent roads and facilities, and the use of fuels and other hazardous materials. Construction likely would cause some disturbance to soils and topography. Where present, shallow bedrock and potential fossil remains could be destroyed through blasting or excavation. In addition, the presence of landslide hazards or subsidence and sinkholes would be a potential impact on Project area safety and infrastructure for the life of the Project. Impacts from pipeline construction primarily would occur within construction work areas along the length of the route and at aboveground facilities, staging areas, and access roads.

Soil disturbance along the Applicant's preferred route during construction would total approximately 4,555 acres. Of the amount disturbed during construction, 2,057 acres would be maintained as permanent right-of-way and dedicated to aboveground facilities during operations. Between Clearbrook and Carlton, approximately 2,907 acres would be disturbed during construction and 1,337 acres would be disturbed during operations. Approximately 82 percent of the route in Minnesota and 73 percent of the route between Clearbrook and Carlton, Minnesota, would be co-located with existing infrastructure where prior disturbance to soils likely has occurred. Much of the remaining greenfield portion of the route has been disturbed by human activities, especially activities related to agriculture and timber harvesting.

<u>Soil Erosion</u>

Removal of crops, sod, and other vegetation during construction would leave soil exposed to erosion by wind and water. Heavy equipment operation on the exposed soil loosens soil and breaks up soil peds (i.e., aggregations of soil particles that make the soil surface more stable), making the soil more susceptible to erosion, especially during periods of heavy rainfall or windy conditions. Erosion could continue to be a minor impact for several years after construction is complete while plant communities stabilize in the disturbed ground. Any exposed soil would be subject to erosion by water or wind.

Soils highly prone to erosion by water are not encountered by the Applicant's preferred route in Minnesota. However, soils prone to erosion by wind intersect approximately 107 miles in Minnesota, including about 86 miles between Clearbrook and Carlton. Such soils may require protective measures during soil disturbance to avoid soil loss, such as the use of slope breakers and biodegradable erosion control blankets during construction, and mulch and revegetation to minimize potential long-term erosion. With implementation of such Applicant-proposed measures (see Section 5.2.2.3.1 for additional details) soil erosion likely would be temporary to short-term, localized, and minor.

<u>Soil Compaction</u>

Heavy equipment passage, grading of the right-of-way, and transport of pipe sections may compact soils. Compacted soils impede penetration of plant roots, which affects reestablishment of plant communities after construction activities are completed. Soil compaction also reduces pore space and infiltration within the soil, leading to increased runoff that can further promote erosion. Hydric soils and compaction-prone soils, particularly when wet, would be most susceptible to these impacts.

Hydric soils occur across 134 total miles of the Applicant's preferred route through Minnesota, with 68 of those miles between Clearbrook and Carlton. Other compaction-prone soils occur along only 7 percent of the route, with none present between Clearbrook and Carlton. If the Applicant-proposed

measures are implemented, such as deep tillage and use of timber mats and/or low-ground-pressure equipment (Appendix E), soil compaction from proposed Project construction likely would be temporary, localized, and negligible to minor.

Soil Mixing

Topsoil and subsoil removal and segregation during excavation may allow some mixing of these soils. If soil is mixed during backfilling, some biological and chemical properties of the soil may be altered, which may affect reestablishment of plant communities in the short-term (several years) after reclamation. In addition, rocks from the subsoil or from potential blasting operations may become mixed into the topsoil, further reducing its productivity. The Applicant has proposed measures to reduce the potential for soil mixing, particularly removal, segregation, and replacement of soils (Appendix E). With implementation of Applicant-proposed measures, soil mixing during construction of the Applicant's preferred route likely would result in short-term and negligible to minor impacts.

Soil Contamination

Soils may become contaminated from minor spills of industrial chemicals or hazardous materials (e.g., lubricants, gasoline, oil, other fuels, coolants, and transmission fluid) during construction activities such as fuel storage, equipment refueling, and equipment maintenance. Applicant-proposed measures to reduce the potential for minor spills include training employees in proper storage and dispensing of fuels and other hazardous materials, and use of spill kits and designated Spill Coordinators to minimize impacts in the event of a spill. With implementation of such measures, potential impacts likely would be localized, temporary, and negligible to minor.

Presence of Shallow Bedrock

The Applicant has identified one 0.3-mile segment on the Applicant's preferred route in eastern Carlton County where bedrock outcrops at the surface for approximately 1,500 feet. Blasting of the bedrock with explosives would be required to break up and remove the bedrock in order to install the pipeline in this segment. The Applicant anticipates that four blasting events would be required, each event breaking up approximately 400 feet of the rock outcrop (Enbridge 2016b).

The Applicant would develop a Blasting Plan prior to construction, which would comply with all federal, state, and local regulations, including those related to the safety, use, storage, and transportation of explosives (Enbridge 2016b). Blasting debris would be used as trench backfill material, and large fragments of rock (larger than those in surrounding undisturbed areas) would be removed from the construction work area. Removal of bedrock by blasting is a permanent impact; however, unless the rock is a source of rare or unique fossils or mineral resources, the impact on geology and soils is considered minor.

Impacts on Paleontological Resources

Potential impacts on paleontological resources during construction include damage to or destruction of fossils from excavation and blasting operations, if conducted; erosion of fossil beds from grading; and unauthorized collection of fossils by construction personnel or the public. Where blasting is required, it likely would disturb and fracture any fossils potentially found in shallow bedrock. Fossils most likely to be present in shallow bedrock are common marine invertebrate fossils that are globally abundant and not considered scientifically significant. Damage to or destruction of common marine invertebrate fossils from blasting or ripping of bedrock would be a permanent minor impact.

Pleistocene-age mammal fossils are rare but may be unearthed in the glacial sediments overlying bedrock during excavation activities for the proposed Project; these fossils would be considered scientifically important. The Applicant developed a state-specific Unanticipated Discovery Plan (Appendix O) that requires work to stop in the event that important paleontological resources are discovered during construction activities. With adherence to the Unanticipated Discovery Plan, impacts on rare or unique paleontological resources would likely be negligible to minor. However, if a rare or unique paleontological resource was damaged or destroyed prior to being discovered, the impact would be permanent and major to the individual resource. The likelihood of such an occurrence, however, is low.

Changes to Topography

Modifications to topography from pipeline installation would be temporary, localized and minor. At the close of construction, the Applicant would restore the natural contour of any slopes and drainage patterns. After pipe installation is complete, backfilling and regrading of the right-of-way would return the disturbed surface to pre-Project conditions.

Minor, localized, and temporary modifications to topography may take place during construction of temporary material storage yards, contractor yards, and temporary access roads. Disturbed areas would be re-graded at the close of construction, and surfaces would be returned to their pre-Project elevations, in accordance with BMPs. Differential settling of the land surface may occur in the months following regrading, but impacts would be negligible.

Minor permanent modifications to topography (e.g., excavations for foundations, permanent road grading) may be required for some aboveground facilities (e.g., pump stations, MLVs, cathodic protection systems, and permanent access roads).

Subsidence and Sinkhole Hazards

Subsidence or sinkhole formation is not anticipated within the Applicant's preferred route, as no known shallow carbonate rocks intersect the route.

Operations Impacts

During standard operations, impacts on geologic and soil resources would be limited to permanent loss of soil cover where surface sediments would be converted to impervious surfaces on new roads and aboveground facilities; and potential erosion and compaction during permanent right-of-way maintenance and use of permanent unpaved access roads. Furthermore, along the Applicant's preferred route, there is a low potential for landslide hazards in isolated sections across the route, and no known potential for subsidence and sinkhole hazards, as detailed below.

Permanent Loss of Soil Cover

Construction of permanent access roads and associated facilities would require permanent removal or conversion of surface soil, to be replaced with materials such as cement and gravel. Loss of soil cover would total 3.4 acres for access roads and 61.4 acres for other permanent facilities along the Applicant's preferred route in Minnesota. Between Clearbrook and Carlton, loss of soil cover would total 2.2 acres for access roads and 39.4 acres for other permanent facilities. This would result in permanent minor impacts on soil. In addition, replacement of natural soil cover with less permeable cement and other materials could increase runoff and potential erosion and sedimentation outside of the construction area. See Section 5.2.1.2 for a discussion of runoff and sedimentation.

Soil Erosion and Compaction

Approximately 2,057 acres that encompass the permanent right-of-way would be subject to permanent, minor soil compaction from maintenance operations (i.e., heavy vehicles traversing the area). New permanent access roads that are unpaved would be subject to minor, localized, permanent erosion and sedimentation (sedimentation is addressed in Section 5.2.1.2). The locations of new permanent access roads also would experience negligible to minor, localized, and permanent soil compaction.

Landslide Hazards

Landslide potential is low across most of the Applicant's preferred route. There is increased potential for landslide activity in isolated sections of the Applicant's preferred route, mostly at stream crossings between Carlton and the Minnesota-Wisconsin border. Areas along the Applicant's preferred route known to have high susceptibility to landslides are limited to 0.4 mile between Clearbrook and Carlton, and 8 miles between Carlton and the Minnesota-Wisconsin border. The proposed Project also would follow existing design and engineering specifications (in accordance with 49 CFR Parts 192 and 193) to ensure that pipeline facilities are protected from potential landslides. The likelihood of a landslide affecting the pipeline or associated facilities would be low. The severity of impact on pipeline facilities for an individual landslide event depends on the nature of the slope, the geologic materials present, and the design of the facilities; such a determination is beyond the scope of this analysis. It should be noted that, although the potential is low, a landslide could occur at any time throughout the life of the Project.

Subsidence and Sinkhole Hazards

Subsidence or sinkhole formation is not anticipated within the Applicant's preferred route because no known shallow carbonate rocks intersect the route.

6.3.2.3.2 Route Alternatives (between Clearbrook and Carlton)

During construction and operations, the types of soil and geology impacts for the route alternatives between Clearbrook and Carlton would be similar to those described for the Applicant's preferred route. If any of the route alternatives are constructed, it was assumed that Enbridge would implement the same Applicant-proposed measures that were identified for the Applicant's preferred route to reduce impacts on geologic resources along the route alternatives.

The extent of soil disturbance from construction varies among the route alternatives based on the pipeline length and width of the construction work area. The length of the various routes between Clearbrook and Carlton ranges from 165 miles (RA-08) to 275 miles (RA-03AM); this represents a 40-percent difference in the extent of surface disturbance based on pipeline length (Table 6.3.2-1). The width of the construction work area varies among the routes from a standard of 120 feet (for all but RA-07) to an estimated 205 feet (for RA-07), representing almost a 60-percent difference in the extent of surface disturbance based on the width of the construction work area.

Similarly, the extent of impacts on soils during operations is influenced by the length of the route alternative. The large majority of the affected acreage would be associated with periodic mowing of the permanent right-of-way. Although the specific locations of aboveground facilities have not been identified for the route alternatives, the approximate acreage associated with permanent access roads and aboveground facilities across route alternatives is expected to be comparable to the acreage associated with the Applicant's preferred route between Clearbrook and Carlton (approximately 283 acres), except as discussed below.

Route Alternative RA-03AM

Construction Impacts

Approximately 4,000 acres of soil would be disturbed during construction of RA-03AM between Clearbrook and Carlton. Approximately 95 percent of the RA-03AM route would be co-located with existing infrastructure, where prior disturbance to soils likely has occurred.

As noted in Table 6.3.2-1, soils that are highly erodible by water and wind are encountered on the RA-03AM route. As a result, a minor, localized, and temporary to short-term increase in soil erosion likely would result from construction and restoration activities. Hydric soils are present along only 19 percent of RA-03AM, while routes farther to the north pass through slightly more hydric soils, as wetlands and lakes are more abundant. No soils considered highly susceptible to compaction are present along the RA-03AM route between Clearbrook and Carlton. With implementation of Applicant-proposed measures, soil compaction from construction disturbance along RA-03AM likely would be temporary and negligible.

Bedrock is likely present at or near the surface along some eastern segments of RA-03AM, most likely in Todd, Pine, and Carlton counties. Shallow bedrock likely would require blasting with explosives for installation of buried pipeline in some segments of the route, but the specific need for blasting cannot be determined without field-based geotechnical studies.

Known karst conditions, with potential for solution cavities at depth, are present along approximately 12 miles of the RA-03AM route where the pipeline would cross through Pine County. Subsidence or sinkhole formation from cavity collapse would be a potential impact on pipeline installation in this segment of the route. Karst topography can pose increased risks to the successful installation of pipelines by HDD techniques, in particular, due to loose unstable soils and open voids along the drill path. Potential impacts include loss of drilling fluid into open conduits and inadvertent drilling fluid returns, leading to potential contamination and turbidity in nearby wells, springs, and rivers (addressed in Section 5.2.1.1); and ground subsidence and possible sinkhole formation due to excavating zones of loose unstable soils. The probability and severity of the potential impact of subsidence or sinkhole formation on pipeline construction depend on the nature of the bedrock, the groundwater, the timing of the occurrence, and the design of the facilities. Such a determination is beyond the scope of this analysis.

Operations Impacts

Most impacts on geology and soil resources during operations for the RA-03AM route would be similar to those for the Applicant's preferred route. Route alternative RA-03AM would be significantly longer than the other routes, however, resulting in a longer permanent right-of-way, additional pump stations, and additional MLVs.

Of the acreage disturbed during construction, approximately 1,667 acres would be maintained as permanent right-of-way during operations for RA-03AM. Within the permanent right-of-way, installation of permanent access roads and facilities would cause a localized, minor, permanent loss of soil cover. In addition, replacement of natural soil cover with less permeable cement and other materials could increase runoff and associated erosion and sedimentation (addressed in Section 5.2.1.2).

Vehicle traffic associated with right-of-way maintenance would cause permanent, minor soil compaction. The locations of new permanent unpaved access roads also would experience negligible to minor, localized, and permanent soil compaction and erosion.

One key difference in potential impacts between RA-03AM and the other routes is the potential for subsidence or sinkhole formation from the presence of karst conditions along the RA-03AM route. As previously stated, the probability and severity of the potential impact of subsidence or sinkhole formation on the integrity of the pipeline or associated facilities depend on the nature of the bedrock, the groundwater, the timing of the occurrence, and the specific engineering design of the facilities. Such a determination is beyond the scope of this analysis.

Route Alternative RA-06

Construction Impacts

Soil disturbance along RA-06 would total approximately 2,862 acres during construction. Approximately 20 percent of the RA-06 route would be co-located with existing infrastructure, where prior disturbance to soils likely has occurred. Co-location of the route is discussed in Section 6.7.2.

As noted in Table 6.3.2-2, soils that are highly erodible by water are encountered on approximately 7.3 miles of the RA-06 route between Carlton and Clearbrook, while approximately 18.2 miles contain soils that are highly erodible by wind. A localized, minor, and temporary to short-term increase in soil erosion potential likely would result from construction and restoration activities across all route options. RA-06, being the farthest north of the routes analyzed, passes through the highest percentage of hydric soils (44 percent). Other soils prone to compaction are present along only about 7 miles of this route. With implementation of the Applicant-proposed measures, impacts from soil compaction likely would be temporary and negligible to minor.

Bedrock is present at or near the surface in substantial portions of RA-06 where it passes through Itasca County and possibly in shorter segments in Carlton County. Bedrock blasting likely would be necessary in some of these segments of RA-06, but the specific need for blasting cannot be determined without field-based geotechnical studies. Because no known karst conditions are present along the RA-06 route, no impacts from subsidence or sinkhole formation are anticipated.

Operations Impacts

Impacts on geology and soil resources for operations of the RA-06 route would be similar to those for the Applicant's preferred route. Of the amount disturbed during construction, 1,192 acres would be maintained as permanent right-of-way during operations. Within the permanent right-of-way, installation of permanent access roads and facilities would cause a localized, minor, permanent loss of soil cover. In addition, replacement of natural soil cover with less permeable cement and other materials could increase runoff and associated erosion and sedimentation.

Vehicle traffic associated with right-of-way maintenance would cause permanent minor soil compaction. The locations of new permanent unpaved access roads also would experience negligible to minor, localized, and permanent soil compaction and erosion.

Route Alternative RA-07

Construction Impacts

Because of a wider construction work area, soil disturbance along RA-07 would total approximately 4,156 acres during construction. The entire RA-07 route would be co-located along Enbridge's Mainline corridor, where prior disturbance to soils likely has occurred.

As noted in Table 6.3.2-2, soils that are highly erodible by water are encountered on approximately 5.8 miles of the RA-07 route, while approximately 31.4 miles of the route contain soils that are highly erodible by wind. If Applicant-proposed measures are implemented, soil erosion from construction activities likely would be localized, temporary to short-term, and minor. Hydric soils are present along 37 percent of this route between Clearbrook and Carlton, and other soils susceptible to compaction are present along only approximately 2 miles of the route. With implementation of the Applicant-proposed measures, impacts from soil compaction likely would be localized, temporary, and negligible to minor.

Bedrock may be present at or near the surface in isolated segments of RA-07 where it crosses Itasca and Carlton counties. It is possible that bedrock blasting with explosives would be required for installation of buried pipeline in these segments of the route, but the specific need for blasting cannot be determined without field-based geotechnical studies. Because no known karst conditions are present along the RA-07 route, no impacts from subsidence or sinkhole formation are anticipated.

Operations Impacts

Impacts on geology and soil resources for operation of the RA-07 route would be similar to those for the Applicant's preferred route. Of the acreage disturbed during construction, 1,017 acres would be maintained as permanent right-of-way during operations. Within the permanent right-of-way, installation of permanent access roads and facilities would cause a localized, minor, permanent loss of soil cover. In addition, replacement of natural soil cover with less permeable cement and other materials could increase runoff and associated erosion and sedimentation (addressed in Section 5.2.1.2).

Vehicle traffic associated with right-of-way maintenance would cause permanent, minor soil compaction. The locations of new permanent unpaved access roads also would experience negligible to minor, localized, and permanent soil compaction and erosion.

Route Alternative RA-08

Construction Impacts

Soil disturbance along RA-08 would total approximately 2,398 acres during construction. The entire RA-08 route would be co-located with existing infrastructure, where prior disturbance to soils likely has occurred.

As noted in Table 6.3.2-1, soils that are highly erodible by water are encountered on approximately 9.5 miles of the RA-08 route; and approximately 17.8 miles of the route contain soils that are highly erodible by wind. With implementation of Applicant-proposed measures to control soil erosion, soil erosion from construction likely would be temporary to short-term and minor. Hydric soils are present along 42 percent of the RA-08 route, while other soils susceptible to compaction are present along less than 3 miles of the route. With implementation of the Applicant-proposed measures, impacts from compaction of soils along RA-08 during construction likely would be localized, temporary and negligible to minor.

Bedrock may be present at or near the surface in isolated segments of RA-08 where it crosses Itasca and Carlton counties. It is possible that bedrock blasting would be necessary in these segments, but the specific need for blasting cannot be determined without field-based geotechnical studies.

Because no known karst conditions are present along route RA-08, no impacts from subsidence or sinkhole formation are anticipated.

Operations Impacts

Impacts on geology and soil resources for operation of the RA-08 route would be similar to those for the Applicant's preferred route. Of the acreage disturbed during construction, 999 acres would be maintained as permanent right-of-way during operations. Within the permanent right-of-way, installation of permanent access roads and facilities would cause a localized, minor, permanent loss of soil cover. In addition, replacement of natural soil cover with less permeable cement and other materials could increase runoff and associated erosion and sedimentation (addressed in Section 5.2.1.2).

Vehicle traffic associated with right-of-way maintenance would cause permanent minor soil compaction. The locations of new permanent unpaved access roads also would experience negligible to minor, localized, and permanent soil compaction and erosion.

6.3.2.4 Summary and Mitigation

6.3.2.4.1 Summary

Construction and operation of the Applicant's preferred route and all route alternatives would affect geologic and soil resources. Table 6.3.2-3 provides a summary of the occurrence and extent of potential impacts on geology and soils associated with the Applicant's preferred route and route alternatives. If the protective measures outlined in the Applicant's Environmental Protection Plan (Appendix E) are implemented, most construction impacts on geology and soils would be negligible to minor and temporary to short-term.

In general, the primary differences in the extent of impacts among the routes are associated with the pipeline length and the width of the construction work area—in terms of both general surface disturbance and sensitive geologic and soils characteristics. The length of the various routes between Clearbrook and Carlton ranges from 165 miles (RA-08) to 275 miles (RA-03AM); this represents a 40-percent difference in the extent of surface disturbance based on pipeline length (Table 6.3.2-3). Similarly, the width of the construction work area varies among the routes from a standard width of 120 feet (for all but RA-07) to an estimated width of 205 feet (for RA-07), representing almost a 60-percent difference in surface disturbance based on the width of the construction work area. Despite these differences, implementation of the Applicant-proposed measures to limit impacts on geology and soils would minimize the duration and magnitude of construction and operations impacts. Overall, both temporary and long-term effects on geology and soils are expected to be minor.

The Applicant's preferred route and all of the route alternatives cross through rich agricultural areas, with soils designated as prime farmland. The types of soil impacts along the Applicant's preferred route and the route alternatives would be similar, as all routes share similar overall soil conditions. Soils prone to erosion by water are rare across all route options, while soils prone to erosion by wind are present to similar extents across the routes. The susceptibility to soil compaction is similar for all route options, as the occurrence of hydric soils is somewhat similar among the four route alternatives and the Applicant's preferred route. The presence of other compaction-prone soils is not common (Table 6.3.2-3). The

potential for soil mixing from soil removal and soil contamination from minor spills during construction would be the same for all route options.

The need for bedrock removal from blasting is likely similar across the Applicant's preferred route and the route alternatives. One minor segment of shallow bedrock along the Applicant's preferred route has been documented to require blasting. Shallow bedrock likely would require blasting in some isolated eastern segments of all four route alternatives, but the specific need for blasting along the route alternatives cannot be determined without field-specific geotechnical studies. The potential for encountering scientifically significant fossil-bearing layers is low across all routes. For the most part, the terrain is flat through all route options, and any impacts on topography would be negligible to minor for all route options.

Landslide potential is similarly low for all the route options, with an elevated hazard in only isolated minor areas for all route options. Known karst conditions are present along approximately 12 miles of RA-03AM where the pipeline would cross through Pine County, with a potential for subsidence and sinkhole formation. No known karst features are present along the Applicant's preferred route or the other three route alternatives.

The greatest impact on soils during operations would be the loss of soil cover associated with aboveground facilities; these losses would be permanent and minor for the Applicant's preferred route and all route alternatives. The extent of permanent soil conversion to an impervious surface for all route alternatives would be expected to comparable to the Applicant's preferred route (64.8 acres), although the permanent conversion of soil to an impervious surface would be slightly higher for RA-03AM because it would require additional pump stations.

6.3.2.4.2 Mitigation

Beyond the potential for an unanticipated discovery of and damage to a rare paleontological resource, no major impacts are expected on geologic and soil resources associated with the Applicant's preferred route or any route alternative. Beyond the Applicant-proposed measures described for the Applicant's preferred route, no mitigation measures have been identified to further avoid and minimize impacts on geology and soils.

Table 6.3.2-3. Summary of Potential Impacts on Geology and Soils for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Prone to soil erosion by wind or water	Temporary to short-term/ minor localized impacts • 86.0 miles	Temporary to short-term/ minor localized impacts • 74.0 miles	Temporary to short-term/ minor localized impacts • 50.8 miles	Temporary to short-term/ minor localized impacts • 84.4 miles	Temporary to short-term/ minor localized impacts • 64.2 miles
Prone to soil compaction, hydric, or other sensitive soils	Temporary/negligible to minor localized impacts • 68.4 miles	Temporary/negligible localized impacts • 53.3 miles	Temporary/negligible to minor localized impacts • 93.6 miles	Temporary/negligible to minor localized impacts • 64.4 miles	Temporary/negligible to minor localized impacts • 72.0 miles
Increase in soil mixing	Short-term/negligible to minor impacts	Short-term/negligible to minor impacts	Short-term/negligible to minor impacts	Short-term/negligible to minor impacts	Short-term/negligible to minor impacts
Potential for soil contamination from minor spills	Temporary/negligible to minor localized impacts	Temporary/negligible to minor localized impacts	Temporary/negligible to minor localized impacts	Temporary/negligible to minor localized impacts	Temporary/negligible to minor localized impacts
Potential for shallow bedrock blasting[a]	Permanent/minor impacts • 0.3 mile	Permanent/minor impacts • The extent of blasting required is unknown.			
Potential paleontological disturbance from excavation or blasting[a]	Permanent/negligible to major impacts	Permanent/negligible to major impacts	Permanent/negligible to major impacts	Permanent/negligible to major impacts	Permanent/negligible to major impacts
Potential for modifications to topography	Temporary/negligible to minor localized impacts	Temporary/negligible to minor localized impacts	Temporary/negligible to minor localized impacts	Temporary/negligible to minor localized impacts	Temporary/negligible to minor localized impacts
	Permanent/minor modifications to topography (e.g., excavations for foundations, permanent road grading) for some aboveground facilities (e.g., pump stations, mainline valves, cathodic protection systems, and permanent access roads); locations of these facilities have not been determined for the route alternatives.				

Table 6.3.2-3. Summary of Potential Impacts on Geology and Soils for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Operations Impacts					
Permanent loss of soil cover	Permanent/minor impacts • 64.8 acres	Permanent/minor impacts[b]	Permanent/minor impacts[b]	Permanent/minor impacts[b]	Permanent/minor impacts[b]
Potential for soil erosion and compaction	Permanent/negligible to minor localized impacts	Permanent/negligible to minor localized impacts	Permanent/negligible to minor localized impacts	Permanent/negligible to minor localized impacts	Permanent/negligible to minor localized impacts
Landslide hazard?	Yes	Yes	Yes	Yes	Yes
Subsidence or sinkhole hazard?	No	Yes	No	No	No

[a] Shallow bedrock likely would require blasting in some isolated eastern segments of all four route alternatives, but the specific need for blasting along the route alternatives cannot be determined without field-specific geotechnical studies.

[b] Permanent loss of soil cover is not quantifiable for the route alternatives because the specific locations of activities and facilities are not known.

6.3.2.5 References

Enbridge Energy, Limited Partnership (Enbridge). 2016a. Environmental Assessment Worksheet (EAW). November. Response to Data Request 01 to provide additional details for the EAW filed by Enbridge in April 2015.

_____. 2016b. Response to Data Request 2 (submitted on November 18, 2016) for more information on blasting techniques. Received on December 1.

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National Pipeline Mapping System Landslide Hazard Rank (NPMS LSHR). 2016. https://www.npms.phmsa.dot.gov/DisasterData.aspx. Accessed on December 15, 2016.

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Paleontology Portal. 2016. http://paleoportal.org/. Accessed on November 14, 2016.

U.S. Geological Survey (USGS). 2016. Quaternary Fault and Fold Database. http://earthquake.usgs.gov/hazards/qfaults/. Accessed on December 15, 2016.

6.3.3 Vegetation

Vegetation is a critical component of ecosystem sustainability, as it supports and regulates biological and biochemical cycles, influences water quality, replenishes and stabilizes soils, provides habitat for wildlife, and contributes directly and indirectly to socioeconomic benefits. Plant species and associations themselves comprise a large portion of regional ecological richness, uniqueness, and diversity values as well as provide numerous specific habitat requirements that support the same values for wildlife.

Vegetation can be described by land cover types—predictable assemblages of plant species that grow together in similar habitat. In addition to existing land cover types, other vegetation parameters used to estimate potential Project impacts include the location and classification of native plant communities, old-growth forests, high conservation value forests (HCVFs), and distribution of noxious weed and invasive plant populations.

Potential impacts on types of vegetation that fall under specific regulatory jurisdiction are found in other sections, as detailed below:

- Wild Rice Waterbodies (see Section 6.3.1.2);
- Wetlands, including calcarious fens (see Section 6.3.1.3); and
- Special Status Plant Species and Communities (see Section 6.3.5). (Note: this included federal- and state-listed threatened and endangered species; Species of Greatest Conservation Need (SGCN); Minnesota Biological Survey Sites of Biodiversity Significance [MBS Sites]; and Scientific and Natural Areas [SNAs]); and
- Potential impacts on vegetation due to an unanticipated release of crude oil are addressed in Chapter 10.

After providing information on applicable regulations and the regulatory context for management of vegetation resources, this section describes the impact analysis methodology. This section describes the existing conditions within an area along the Applicant's preferred route and each of the route alternatives (RA-03AM, RA-06, RA-07, and RA-08). Potential Project-related impacts of construction and operation on vegetation parameters are discussed for the five route options (the Applicant's preferred route and the four route alternatives). The impact analysis focuses on the segments of the route alternatives between Clearbrook and Carlton, as described below. A summary and comparison of the impacts are included at the end of the section.

6.3.3.1 Regulatory Context and Methodology

6.3.3.1.1 Regulatory Context

Regulations pertaining to the conservation, protection, and management of vegetation are established at various levels of federal, state, and local government. Conservation and protection activities regarding special status plant resources are managed by federal and state agencies. As noted above, regulatory protection for wetlands, including calcareous fens are addressed Section 6.3.1.3. Regulatory measures protect federally and state-listed endangered or threatened plants, and other vegetation communities are discussed Section 6.3.5.

Native plant communities (defined under Methodology) are naturally-occurring vegetation with considerable resource value. In Minnesota, conservation and protection activities are managed by Minnesota DNR. Data collected are used to identify native plant community types, evaluate quality and quantity, assign rarity, and provide recommendations for land management practices to avoid and minimize disturbance of rare resources. Few regulations provide protection for native plant communities, although resource agencies devote considerable expense to their conservation for ecological and public values.

A "noxious weed" is "any plant or plant product that can directly or indirectly injure or cause damage to crops, livestock, poultry, or other interests of agriculture, irrigation, navigation, natural resources of the United States, public health, or the environment" as defined in the U.S. Plant Protection Act of 2000 (7 U.S. Code 7701–7772). "Invasive plants" are non-native plants also identified as potential threats to the natural environment because of their ability to dominate and exclude other vegetation. Weed and invasive plant classifications and rules vary between regulating agencies.

In Minnesota, the Minnesota DNR is responsible for state-prohibited and state-regulated invasive aquatic plants, and the Department of Agriculture is responsible for state-prohibited and state-regulated terrestrial plants classified as noxious weeds under the Minnesota Noxious Weed Law (Minn. Stat. § 18.75 to 18.91).

6.3.3.1.2 Methodology

Existing vegetation resources were identified and analyzed using multiple information sources, starting at a broad scale and narrowing to a more localized scale. These data provided consistent classification and nomenclature of vegetation that allowed comparison of the impacts of the Applicant's preferred route and the route alternatives on specific vegetation resources at different levels

The vegetation evaluation considered impacts on Minnesota Ecological Classification System (ECS) units, NLCD landcover types, MBS Sites and native plant communities, old-growth forests, HCVFs, and noxious weeds and invasive plants.

Minnesota's ECS is used to identify, describe, and map progressively smaller areas of land with increasingly uniform ecological features. Like ecoregions used in the Chapter 5 analysis, the ECS integrates biotic and environmental factors (e.g., climate, geology, topography, soils, hydrology, and vegetation) in a hierarchical framework to identify increasingly fine gradations of landscape characteristics (Minnesota DNR 2016a). The following levels of the ECS framework are referenced.

Provinces: units of land defined using major climate zones, native vegetation, and biomes such as prairies, deciduous forests, or boreal forests. There are four Provinces in Minnesota.

Sections: units within provinces that are defined by origin of glacial deposits, regional elevation, distribution of plants, and regional climate. Minnesota has 10 sections.

Subsections: units within sections that are defined using glacial deposition processes, surface bedrock formations, local climate, topographic relief, and the distribution of plants, especially trees. Minnesota has 26 subsections.

The NLCD (Homer et al. 2015) describes and delineates broad-scale land classes of vegetation cover. The NLCD uses a combination of satellite imagery, national vegetation survey data, and local vegetation

survey data to provide a spatial reference and descriptive data for characteristics of the land surface by grouping similar types of land cover into a variety of classifications (e.g., developed, forested, and cultivated).

Not all of the NLCD cover classifications are appropriate for this analysis. For example, because the category of developed lands (residential, commercial, and industrial lands) primarily include artificially created landscapes with minimal naturally occurring vegetation, these lands were not included in the vegetation impact summaries.

The NLCD vegetation cover classes that are within the ROI for the Applicant's preferred route and route alternatives are defined in Table 6.3.3-1 and illustrated in Figure 6.3.3-1.

Table 6.3.3-1. National Land Cover Database Land Cover Classifications

Classification	Definition
Barren land (rock/sand/clay)	Barren areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15 percent of total cover.
Deciduous forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20 percent of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change.
Evergreen forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20 percent of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.
Mixed forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20 percent of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover.
Shrub/scrub	Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20 percent of total vegetation. This class includes true shrubs, young trees in an early successional stage, and trees stunted from environmental conditions.
Grassland/herbaceous	Areas dominated by graminoid or herbaceous vegetation, generally greater than 80 percent of total vegetation. These areas are not subject to intensive management such as tilling but can be utilized for grazing.
Pasture/hay	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.
Cultivated crops	Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled.
Woody wetlands	Areas where forest or shrub land vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
Emergent herbaceous wetlands	Areas where perennial herbaceous vegetation accounts for greater than 80 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

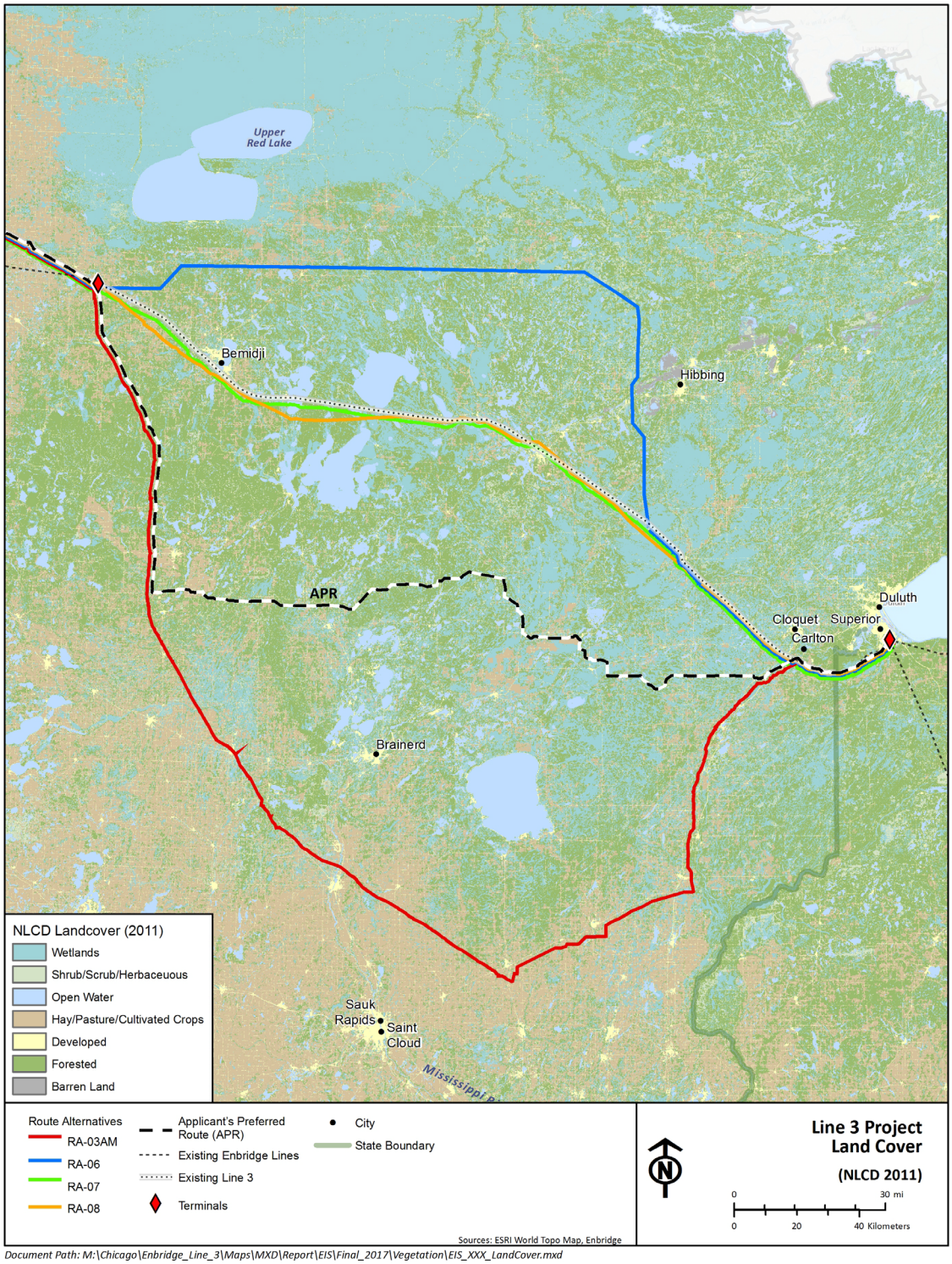

Source: Homer et al. 2015.

Figure 6.3.3-1. NLCD Vegetation Cover Crossed by the Applicant's Preferred Route and Route Alternatives in Minnesota

MBS Sites are extensive landscape areas mapped and assessed by Minnesota DNR staff for context and ecological influence of the landscape; size, condition, and quality of native plant communities, and quality and rarity of individual plant species. These values are combined to assign a biodiversity significance rank for each site ranging from Outstanding, High, Moderate, or Below. Outstanding and high-ranked sites are of most concern for conservation, as they contain rare species, native plant communities, and intact landscapes. This is an on-going effort, to be considered preliminary, if available at all, for intersection with the Applicant's proposed project and CN Alternatives, illustrated in Figure 5.2.3-2.

Native vegetation in Minnesota is classified by a six-level hierarchy. This analysis references two of these levels – the ecological system and the native plant community. Ecological systems, the second highest level, are groups of native plant communities unified by strong influence from a major ecological process such as fire and hydrology. Minnesota native plant communities are groups of native plants that associate with each other and with their environment in ways not greatly altered by modern human activity or by introduced organisms. These groups of native plant species form recognizable plant communities that re-occur in similar ecological conditions. Native plant community mapping continues across the state; all completed MBS Sites have native plant community mapping done only within outstanding and high ranked units. Native plant communities are also mapped outside of MBS Sites. Native plant communities are ranked by state conservation status, which reflects the level of rarity across the state. The conservation status ranks range from S1 – critically imperiled to S5 – secure, common, widespread, and abundant; native plant communities ranked as S1 – critically imperiled, S2 – imperiled, and S3 – vulnerable to extirpation or extinction are considered to be "rare."

Old-growth forests, identified in Minnesota DNR's Forest Stand Inventory, are designated forests in Minnesota that have not experienced severe, stand-replacing disturbance over the last 120 years. Old-growth forests are recognized as valuable resources in Minnesota and are protected from harvesting operations. They provide unique wildlife habitat, rare plant refugia, genetic reservoirs, and research opportunities.

Minnesota DNR requires designation of HCVFs as part of the Forest Stewardship Council's forest certification (Minnesota DNR 2016f). HCVFs are forest areas that contain concentrations of rare, threatened, or endangered species; natural communities; and other biodiversity values that occur in numbers, frequency, quality, and/or density that are sufficiently outstanding to be considered unique or highly important in comparison with other forest areas within the ecoregion. HCVF lands are managed for a broad set of objectives and forest resources in a manner that will maintain or enhance these values across the landscape.

Impacts related to vegetation were evaluated by overlaying construction work areas of the Applicant's preferred route and route alternatives with:

- Minnesota DNR ECS maps (Minnesota DNR 2016a) to identify and quantify broad-scale patterns of existing vegetation within the pipeline corridors;
- NLCD (Homer et al. 2015) to quantify site-specific construction and operations impacts;
- MBS Sites (Minnesota DNR 2016e) to identify areas of biological integrity and quantify construction and operations impacts;
- Locations of Minnesota native plant communities, including rare native plant communities (Minnesota DNR 2016c) to quantify site-specific construction and operations impacts;

- Minnesota DNR Forest Stand Inventory (Minnesota DNR 2016c) old-growth forest stand data to quantify site-specific construction and operations impacts;
- HCVF maps (Minnesota DNR 2016f) to identify forests of outstanding biological or cultural significance in order to quantify site-specific construction and operations impacts; and
- Minnesota noxious weed and invasive plant data layers (University of Georgia 2016; Minnesota DA 2016; Minnesota DNR 2016d) to identify infestations that could be spread by construction activities.

The ROI for this evaluation generally encompasses the area that could be directly or indirectly affected by pipeline construction within 0.5 mile of the centerline of the pipeline routes. To assess and quantify the magnitude of impacts, the analysis drew on the land cover and vegetation datasets referenced above to identify the number of acres of each vegetation type or native plant resource that could be affected.

Potential impacts on vegetation resources are estimated for activities associated both with construction and operation of the Applicant's preferred route, as well as the route alternatives. Direct impacts on vegetation include disruption or removal of rooted vegetation resulting in a reduction in areas of existing vegetation communities, reduction of total numbers of plant species (species richness) within an area, and/or reduction or loss of total area, diversity, structure, or function of wildlife habitat. Therefore, the potential for negative impacts on vegetation is assumed to be proportional to the estimated area of surface disturbance under each alternative. The larger the area, the greater the potential for direct and indirect impacts.

A number of indirect impacts on vegetation resources are possible as a result of construction and operation activities. Potential indirect impacts include loss of habitat suitable for colonization due to surface disturbance; introduction or spread of noxious weeds and invasive plant species by various vectors or conditions; and inability to achieve full expression of natural tree and shrub growth due to vegetation management. Failed reclamation or mitigation may also cause indirect impacts on these resources. Most indirect impacts are assumed to result from direct impacts in proportion to the relative amount of surface disturbance.

Vegetation impacts for the Applicant's preferred route were based on refined footprints provided by the Applicant that identify the construction work area, ATWS, access roads, pipe yards, pipeline permanent right-of-way, valve pads and driveways, and pump stations. Dimensions for these footprints are included in the Project description.

Construction impacts for route alternatives RA-03AM, RA-06, and RA-08 were estimated by overlaying a 120-foot-wide construction work area centered on the pipeline route alternative onto available vegetation maps. Construction impacts for route alternative RA-07 were estimated by overlaying a 205-foot-wide construction work area (this width extended 10 feet on the north side of the existing Line 3 pipeline permanent right-of-way and 195 feet on the south side of the existing Line 3 pipeline permanent right-of-way). Operations impacts for all route options were estimated by overlaying a 50-foot-wide operations right-of-way onto available vegetation maps. Results of this analysis are presented in the following sections. Appendix K, Vegetation Tables contains additional analyses details.

Impacts associated with construction activities would be common regardless of pipeline route and were identified based on construction methods described in the Project EAW (Enbridge 2016).

All of the route alternatives have the same route between the North Dakota border and Clearbrook, and from Carlton to the Wisconsin border. Therefore, the comparison of impacts among the route alternatives focuses on the segments of the routes between Clearbrook and Carlton.

6.3.3.2 Existing Conditions

Every ECS province (the largest land classification areas) is crossed by one or more of the Applicant's preferred route and pipeline route alternatives. The route alternatives largely occur within the Laurentian Mixed Forest province. Between Clearbrook and Carlton, the ECS provinces transition (west to east) from grasslands and parklands to uplands and peatlands dominated by forests. The next classification level is the ECS section. Eight ECS sections occur within the ROI for one or more of the route options (the Applicant's preferred route and the route alternatives) addressed in this chapter.

Figure 6.3.3-1 shows the distribution of NLCD vegetation in Minnesota (broad-scale vegetation cover classes, as described in the NLCD, Homer et al. 2015) along the route alternatives. Color gradations from yellow to green show landscape level changes from prairie and farmland to forest cover types.

Figure 6.3.3-2 illustrates the Minnesota native plant community systems crossed by the Applicant's preferred route and route alternatives.

6.3.3.2.1 Applicant's Preferred Route

Ecological Classifications and Vegetation Cover

The Applicant's preferred route crosses four ECS provinces within Minnesota and two ECS provinces between Clearbrook and Carlton. The Applicant's preferred route would cross through three ECS sections before Clearbrook. From Clearbrook to Carlton, the Applicant's preferred route is almost entirely within one section; close to Carlton, the Applicant's preferred route crosses through two sections before the Wisconsin border (Table 6.3.3-2.).

Review of the NLCD land cover patterns demonstrates that the Applicant's preferred route primarily occurs within areas dominated by forests (e.g., deciduous forest, woody wetland), shorter canopied scrub/shrub, and agricultural (e.g., hay/pasture, cultivated crops) cover classes (Figure 6.3.3-1).

MBS Sites and Native Plant Communities

Native plant community systems that occur within 0.5 mile of the Applicant's preferred route include 11 sensitive prairie, wetland, and forest systems. These primarily consist of forested and wetland forested systems, including acid peatland system, complex community, fire-dependent forest/woodland system, floodplain forest system, forested rich peatland system, marsh system, mesic hardwood forest system, open rich peatland system, upland prairie system, wet forest system, and wet meadow/Carr system (Aaseng et al. 2011). Several native plant community systems contain MBS Sites that are ranked as moderate to outstanding under the MBS Sites of Biodiversity significance ranking. Specific locations for moderate- to outstanding-ranked MBS Sites and associated native plant communities relative to the location of the Applicant's preferred route are shown in detail in Appendix A.

Nineteen rare native plant community types (with S1, S2, or S3 conservation rank) were documented within 0.5 mile of the Applicant's preferred route. Three old-growth forest stands were identified within 0.5 mile of the Applicant's preferred route: two ash and one Norway pine. In addition, one HCVF was identified within 0.5 mile of the Applicant's preferred route (Kettle Lake Peatlands HCVF).

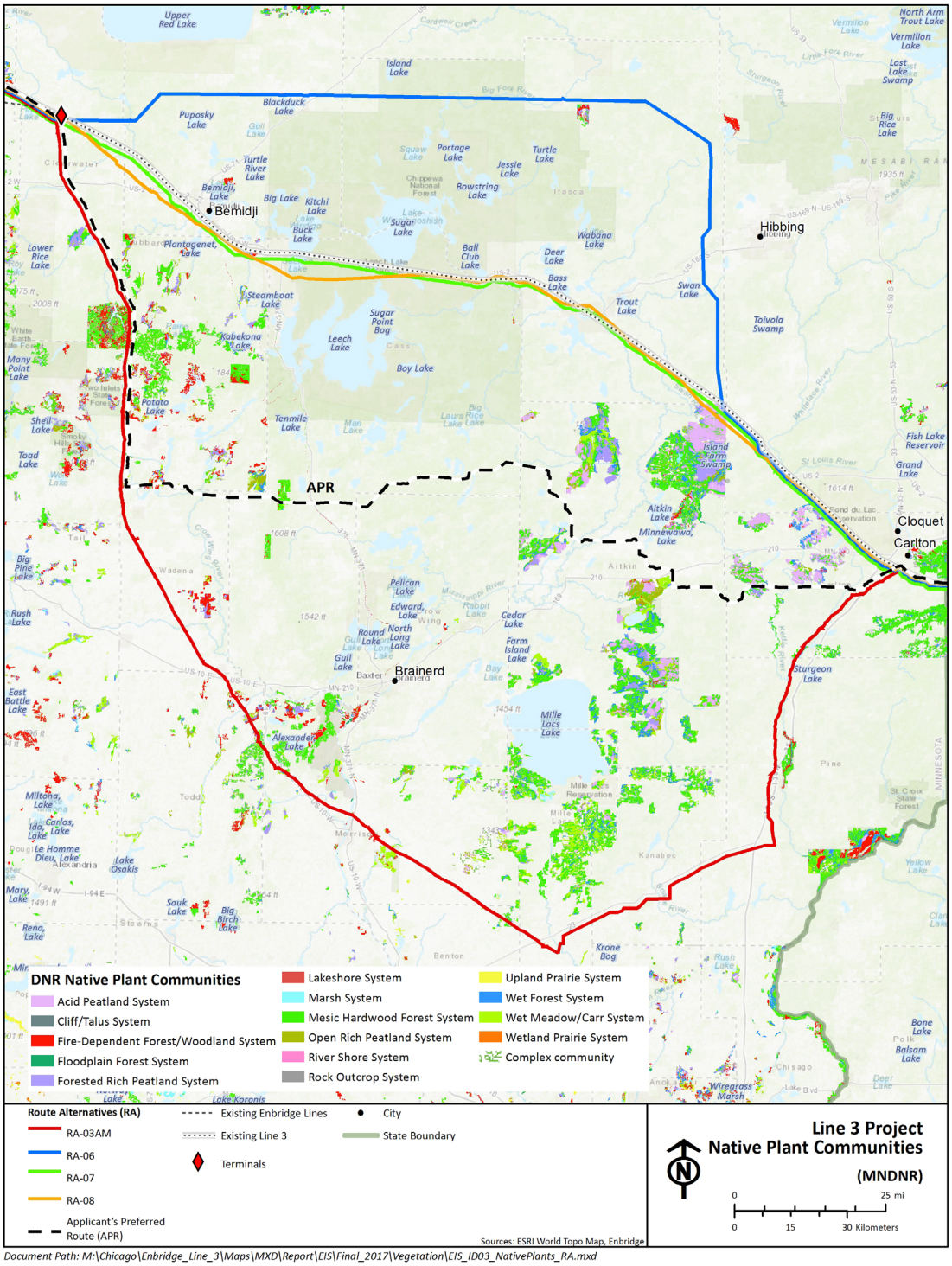

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Source: Minnesota DNR 2016c.

Figure 6.3.3-2. Native Plant Community Systems Crossed by the Applicant's Preferred Route and Route Alternatives in Minnesota

Table 6.3.3-2. Minnesota Ecological Sections Crossed by the Applicant's Preferred Route

Province	Section	Subsection	Total Distance Crossed within Minnesota (miles)	Distance Crossed between Clearbrook and Carlton (miles)
Prairie Parklands	Red River Valley	Red River Prairie	35.1	--
Prairie Parklands subtotal			***35.1***	***--***
Tallgrass Aspen Parklands	Lake Agassiz, Aspen Parklands	Aspen Parklands	61.6	--
Tallgrass Aspen Parklands subtotal			***61.6***	***--***
Eastern Broadleaf Forest	Minnesota & NE Iowa Morainal	Hardwood Hills	20.9	8.5
Eastern Broadleaf Forest subtotal			***20.9***	***8.5***
Laurentian Mixed Forest	N. Minnesota Drift & Lake Plains	Chippewa Plains	31.5	31.5
		Pine Moraines & Outwash Plains	94.7	94.7
		St. Louis Moraines	36.6	36.6
		Tamarack Lowlands	31.3	31.3
	Southern Superior Uplands	Glacial Lake Superior Plain	7.1	--
	Western Superior Uplands	Mille Lacs Uplands	20.8	18.2
Laurentian Mixed Forest subtotal			***222.1***	***212.4***
TOTAL			**339.6**	**220.9**

Source: Minnesota DNR 2016a.

Notes:

Values in table may not sum to subtotals and totals due to rounding.

See Appendix K, Table K-1 for additional detail.

"--" = no occurrence

Table 6.3.3-3. Noxious Weeds and Invasive Plants within 0.5 Mile of the Applicant's Preferred Route

Common Name	Scientific Name	Minnesota Status[a]	Occurrences within Minnesota[b]	Occurrences between Clearbrook and Carlton[c]
Hoary alyssum	*Berteroa incana*	NA	1	1
Oxeye daisy	*Leucanthemum vulgare*	NA	5	5
Reed canarygrass	*Phalaris arundinacea*	NA	66	65
Smooth brome	*Bromus inermis*	NA	14	14
Orange hawkweed	*Hieracium aurantiacum*	NA	3	3
Honeysuckle	*Lonicera* spp.	RNW	1	1
Spotted knapweed,	*Centaurea stoebe*	C	48	47
Siberian peashrub	*Caragana arborescens*	NA	1	1
Leafy spurge	*Euphorbia esula*	C	1	0
White sweetclover	*Melilotus alba*	NA	7	7
Yellow sweetclover	*Melilotus officinalis*	NA	5	5
Tansy	*Tanacetum vulgare*	C	115	107
Thistle spp.[d]	*Cirsium* spp.	NA	92	92
Bull thistle	*Cirsium vulgare*	NA	14	14
Canada thistle	*Cirsium arvense*	C	18	18
Plumeless thistle	*Carduus acanthoides*	C	1	1
Sow thistle	*Sonchus arvensis*	NA	9	9
Birdsfoot trefoil	*Lotus corniculatus*	NA	12	11
Total Number of Occurrences			**413**	**401**

Sources: Minnesota DNR 2016d; Minnesota DA 2016.

[a] Status (MN): E – Eradicate List; C – Control List; RNW – Restricted Noxious Weed; SRP – Specially Regulated Plants
Note: NA = plant species with no legal status per Minnesota Noxious Weed List (Minnesota DA 2016)

[b] Number of occurrences of infestations within 0.5 mile of the centerline of the Applicant's preferred route in Minnesota.

[c] Number of occurrences of infestations within 0.5 mile of the centerline of the Applicant's preferred route between Clearbrook and Carlton, Minnesota.

[d] May include native, non-weed thistle species

Note:

See Appendix K, Table K-2 for additional detail.

Noxious Weeds and Invasive Plants

Several noxious weed and invasive plant species have been reported near the Applicant's preferred route, totaling 413 occurrences in Minnesota and 401 occurrences between Clearbrook and Carlton (Table 6.3.3-3). Noxious and invasive weeds occurring near the Project include commonly occurring Midwest weeds such as reed canarygrass, tansy, spotted knapweed, and several thistles.

6.3.3.2.2 Route Alternatives

The only segment where the route alternatives would vary from the alignment of the Applicant's preferred route is between Clearbrook and Carlton in Minnesota. The existing conditions relevant to vegetation for the route alternatives between Clearbrook and Carlton are described below.

Route Alternative RA-03AM

Ecological Classifications and Vegetation Cover

Two ECS provinces would be crossed by route alternative RA-03AM: Eastern Broadleaf Forest and Laurentian Mixed Forest (Table 6.3.3-4). RA-03AM largely occurs within the Laurentian Mixed Forest province. Three ECS sections would be crossed by RA-03AM. RA-03AM crosses 10 broad-scale vegetation cover classes as described in the NLCD: evergreen forest, deciduous forest, mixed forest, scrub/shrub, grassland/herbaceous, hay/pasture, cultivated crops, woody wetlands, emergent herbaceous wetlands, and barren land (Homer et al. 2015). Figure 6.3.3-1 shows the distribution of vegetation cover along the route alternatives. Review of these broad-scale vegetation cover patterns demonstrates that RA-03AM is primarily located within areas dominated by agricultural (e.g., hay/pasture and cultivated crops) and deciduous forest cover classes.

Table 6.3.3-4. Minnesota Ecological Sections Crossed by Route Alternative RA-03AM

Province	Section	Subsection	Distance Crossed (miles)
Eastern Broadleaf Forest	Minnesota & NE Iowa Morainal	Anoka Sand Plain	10.7
		Hardwood Hills	24.0
Eastern Broadleaf Forest subtotal			***34.7***
Laurentian Mixed Forest	N. Minnesota Drift & Lake Plains	Chippewa Plains	31.5
		Pine Moraines & Outwash Plains	78.3
	Western Superior Uplands	Mille Lacs Uplands	130.2
Laurentian Mixed Forest subtotal			***240.0***
TOTAL			**274.7**

Source: Minnesota DNR 2016a.

Note:

See Appendix K, Table K-1 for additional detail.

Native Plant Communities

Between Clearbrook and Carlton, 87 acres of native plant communities have been documented within the construction work area for RA-03AM, 36 acres have been documented within the operations right-

of-way, and 7,732 acres have been documented within 0.5 mile of the pipeline centerline (Minnesota DNR 2016b, 2016e). Minnesota native plant community systems that occur within 0.5 mile from RA-03AM are primarily mesic hardwood forest and fire dependent forest/ woodland. Native plant community systems crossed by RA-03AM are shown in Figure 6.3.3-2 (Minnesota DNR 2016c). Specific locations for moderate- to outstanding-ranked MBS Sites and imbedded native plant communities relative to the location of RA-03AM are shown in greater detail in Appendix A. Rare native plant community types (with S1, S2, or S3 conservation rank) also occur within the construction work area and permanent right-of-way for RA-03AM, including oak-aspen forest and black ash – (red maple) seepage swamp. One old-growth forest stand type (Norway pine) was identified within 0.5 mile of RA-03AM. No HCVFs occur within or near the route.

Noxious Weeds and Invasive Plants

Several noxious weed and invasive plant species have been reported within 0.5 mile of RA-03AM, totaling 314 occurrences between Clearbrook and Carlton (Table 6.3.3-5). Noxious and invasive weeds occurring near the route include commonly occurring Midwest weeds, such as reed canarygrass, tansy, and several thistles.

Table 6.3.3-5. Noxious Weeds and Invasive Plants within 0.5 Mile of Route Alternative RA-03AM

Common Name	Scientific Name	Minnesota Status[a]	Occurrences[b]
Hoary alyssum	*Berteroa incana*	NA	1
Common buckthorn	*Rhamnus cathartica*	RNW	18
Creeping Charlie	*Glechoma hederacea*	NA	1
Oxeye daisy	*Leucanthemum vulgare*	NA	5
Siberian elm	*Ulmus pumila*	NA	1
Reed canarygrass	*Phalaris arundinacea*	NA	14
Smooth brome	*Bromus inermis*	NA	14
Orange hawkweed	*Hieracium aurantiacum*	NA	7
Honeysuckle	*Lonicera* spp.	RNW	2
Spotted knapweed	*Centaurea stoebe*	C	53
Amur maple	*Acer ginnala*	NA	1
Common mullein	*Verbascum thapsus*	NA	1
Siberian peashrub,	*Caragana arborescens*	NA	4
White sweetclover	*Melilotus alba*	NA	9
Yellow sweetclover	*Melilotus officinalis*	NA	5
Tansy	*Tanacetum vulgare*	C	76
Thistle spp.[c]	*Cirsium* spp.	NA	34
Bull thistle	*Cirsium vulgare*	NA	23
Canada thistle	*Cirsium arvense*	C	29
Sow thistle	*Sonchus arvensis*	NA	1
Birdsfoot trefoil	*Lotus corniculatus*	NA	11
Cow vetch	*Vicia cracca*	NA	1

Table 6.3.3-5. Noxious Weeds and Invasive Plants within 0.5 Mile of Route Alternative RA-03AM

Common Name	Scientific Name	Minnesota Status[a]	Occurrences[b]
Crown vetch	*Coronilla varia*	RNW	3
TOTAL NUMBER OF OCCURRENCES			**314**

Sources: Minnesota DNR 2016d; Minnesota DA 2016.

[a] Status (MN): E – Eradicate List; C – Control List; RNW – Restricted Noxious Weed; SRP – Specially Regulated Plants
Note: NA = plant species with no legal status per Minnesota Noxious Weed List (Minnesota DA 2016)

[b] Number of occurrences of infestations within 0.5 mile of the centerline of the RA-03AM route between Clearbrook and Carlton, Minnesota.

[c] May include native, non-weed thistle species

Note:

See Appendix K, Table K-2 for additional detail.

Route Alternative RA-06

Ecological Classifications and Vegetation Cover

Two ECS provinces would be crossed by route alternative RA-06: Eastern Broadleaf Forest and Laurentian Mixed Forest (Table 6.3.3-6). RA-06 is largely located within the Laurentian Mixed Forest province. Five ECS sections would be crossed by RA-06. RA-06 crosses 10 broad-scale vegetation cover classes, as described in the NLCD: evergreen forest, deciduous forest, mixed forest, scrub/shrub, grassland/herbaceous, hay/pasture, cultivated crops, woody wetlands, emergent herbaceous wetlands, and barren land (Homer et al. 2015). Figure 6.3.3-1 shows the distribution of vegetation cover along the route alternative. Review of these broad-scale vegetation cover patterns demonstrates that RA-06 is primarily located within areas dominated deciduous forest, and woody wetland cover classes.

Table 6.3.3-6. Minnesota Ecological Sections Crossed by Route Alternative RA-06

Province	Section	Subsection	Distance Crossed (Miles)
Eastern Broadleaf Forest	Minnesota & NE Iowa Morainal	Hardwood Hills	9.6
Eastern Broadleaf Forest subtotal			***9.6***
Laurentian Mixed Forest	N. Minnesota & Ontario Peatlands	Littlefork-Vermillion Uplands	21.2
	N. Minnesota Drift & Lake Plains	Chippewa Plains	54.9
		St. Louis Moraines	29.2
		Tamarack Lowlands	29.4
	Northern Superior Uplands	Nashwauk Uplands	30.9
		North Shore Highlands	17.0
	Western Superior Uplands	Mille Lacs Uplands	3.7
Laurentian Mixed Forest subtotal			***186.3***
TOTAL			**195.9**

Source: Minnesota DNR 2016a.

Note:

See Appendix K, Table K-1 for additional detail.

Native Plant Communities

Native plant community systems that occur within the construction work area and permanent right-of-way for RA-06 include acid peatland system, forested rich peatland system and small portions of mesic hardwood forest system and wet forest system. No rare native plant community types are documented within or near (within 0.5 mile) the construction work area or permanent right-of-way. Native plant community systems crossed by RA-06 are shown in Figure 6.3.3-2 (Minnesota DNR 2016c). Specific locations for moderate- to outstanding-ranked MBS Sites and imbedded native plant communities relative to the location of RA-06 are show in greater detail in Appendix A. Three old-growth forest stand types were identified within 0.5 mile of RA-06, including aspen, birch, and Norway pine. No HCVFs occur within 0.5 mile of the route.

Noxious Weeds and Invasive Plants

Several noxious weed and invasive plant species have been reported within 0.5 mile of RA-06, totaling 408 occurrences between Clearbrook and Carlton (Table 6.3.3-7). Noxious and invasive weeds occurring near the route include commonly occurring Midwest weeds, such as reed canarygrass, tansy, and thistles.

Table 6.3.3-7. Noxious Weeds and Invasive Plants within 0.5 Mile of Route Alternative RA-06

Common Name	Scientific Name	Minnesota Status[a]	Occurrences[b]
Oxeye daisy	*Leucanthemum vulgare*	NA	5
Reed canarygrass	*Phalaris arundinacea*	NA	106
Smooth brome	*Bromus inermis*	NA	1
Spotted knapweed	*Centaurea stoebe*	C	21
Wild parsnip	*Pastinaca sativa*	NA	6
Siberian peashrub	*Caragana arborescens*	NA	2
White sweetclover	*Melilotus alba*	NA	12
Yellow sweetclover	*Melilotus officinalis*	NA	2
Tansy	*Tanacetum vulgare*	C	108
Thistle spp.[c]	*Cirsium* spp.	NA	117
Bull thistle	*Cirsium vulgare*	NA	1
Canada thistle	*Cirsium arvense*	C	17
Birdsfoot trefoil	*Lotus corniculatus*	NA	10
TOTAL NUMBER OF OCCURRENCES			**408**

Sources: Minnesota DNR 2016d; Minnesota DA 2016.

[a] Status (MN): E – Eradicate List; C – Control List; RNW – Restricted Noxious Weed; SRP – Specially Regulated Plants
Note: NA = plant species with no legal status per Minnesota Noxious Weed List (Minnesota DA 2016)

[b] Number of occurrences of infestations within 0.5 mile of the RA-06 route between Clearbrook and Carlton, Minnesota.

[c] May include native, non-weed thistle species

Note:

See Appendix K, Table K-2 for additional detail.

Route Alternative RA-07

Ecological Classifications and Vegetation Cover

Two ECS provinces would be crossed by route alternative RA-07: Eastern Broadleaf Forest and Laurentian Mixed Forest provinces (Table 6.3.3-8). RA-07 is largely located within the Laurentian Mixed Forest province. Four ECS sections would be crossed by RA-07. RA-07 crosses 10 broad-scale vegetation cover classes as described in the NLCD: evergreen forest, deciduous forest, mixed forest, scrub/shrub, grassland/herbaceous, hay/pasture, cultivated crops, woody wetlands, emergent herbaceous wetlands, and barren land (Homer et al. 2015). Figure 6.3.3-1 shows the distribution of vegetation cover along the route alternative. Review of these broad-scale vegetation cover patterns demonstrates that RA-07 is primarily located within areas dominated by woody wetland, deciduous forest, and emergent herbaceous wetlands cover classes.

Table 6.3.3-8. Minnesota Ecological Sections Crossed by Route Alternative RA-07

Province	Section	Subsection	Distance Crossed (Miles)
Eastern Broadleaf Forest	Minnesota & NE Iowa Morainal	Hardwood Hills	6.2
Eastern Broadleaf Forest subtotal			***6.2***
Laurentian Mixed Forest	N. Minnesota Drift & Lake Plains	Chippewa Plains	87.3
		St. Louis Moraines	16.0
		Tamarack Lowlands	37.6
	Northern Superior Uplands	North Shore Highlands	17.0
	Western Superior Uplands	Mille Lacs Uplands	3.7
Laurentian Mixed Forest subtotal			***161.6***
TOTAL			**167.7**

Source: Minnesota DNR 2016a.

Notes:

Values in table may not sum to subtotals and totals due to rounding.

See Appendix K, Table K-1 for additional detail.

Native Plant Communities

Between Clearbrook and Carlton, 65 acres of native plant communities have been documented within the construction work area for RA-07, 4 acres have been documented within the operations permanent right-of-way, and 1,807 acres have been documented within 0.5 mile of the route. Minnesota native plant community systems that occur within the construction work area for RA-07 are primarily forested and wetland forested systems, including acid peatland system, fire-dependent forest/woodland system, forested rich peatland system, mesic hardwood forest system, open rich peatland system, wet forest system, and wet meadow/Carr system (Aaseng et al. 2011). Native plant community systems crossed by RA-07 are shown in Figure 6.3.3-2 (Minnesota DNR 2016c). Specific locations for moderate- to outstanding- ranked MBS Sites and imbedded native plant communities relative to the location of RA-07 are shown in greater detail in Appendix A. Rare native plant communities, including Jack pine – (yarrow) woodland and oak – aspen forest also occur within the construction work area and permanent right-of-way. Three old-growth forest stand types (aspen, Norway pine, and white cedar) were identified within 0.5 mile of RA-07. No HCVFs occur within 0.5 mile of the route.

Noxious Weeds and Invasive Plants

Several noxious weed and invasive plant species have been reported within 0.5 mile of RA-07, totaling 1,002 occurrences between Clearbrook and Carlton (Table 6.3.3-9). Noxious and invasive weeds occurring near the route include commonly occurring Midwest weeds, such as reed canarygrass, tansy, spotted knapweed, and thistles.

Table 6.3.3-9. Noxious Weeds and Invasive Plants within 0.5 Mile of Route Alternative RA-07

Common	Scientific Name	Minnesota Status[a]	Occurrences[b]
Oxeye daisy	*Leucanthemum vulgare*	NA	26
Amur silvergrass	*Miscanthus sacchariflorus*	NA	1
Reed canarygrass	*Phalaris arundinacea*	NA	316
Orange hawkweed	*Hieracium aurantiacum*	NA	1
Honeysuckle	*Lonicera* spp.	NA	1
Spotted knapweed	*Centaurea stoebe*	C	110
Black locust	*Robinia pseudoacacia*	RNW	4
Purple loosestrife	*Lythrum salicaria*	C	4
Amur maple	*Acer ginnala*	NA	4
Wild parsnip	*Pastinaca sativa*	NA	128
Siberian peashrub	*Caragana arborescens*	NA	5
Multi-flora rose	*Rosa multiflora*	RNW	2
Leafy spurge	*Euphorbia esula*	C	4
White sweetclover	*Melilotus alba*	NA	43
Tansy	*Tanacetum vulgare*	C	150
Thistle spp.[c]	*Cirsium* spp.	NA	117
Bull thistle	*Cirsium vulgare*	NA	1
Canada thistle	*Cirsium arvense*	C	34
Birdsfoot trefoil	*Lotus corniculatus*	NA	50
Crown vetch	*Coronilla varia*	RNW	1
Number of Taxa			**20**
TOTAL NUMBER OF OCCURRENCES			**1,002**

Sources: Minnesota DNR 2016d; Minnesota DA 2016.

[a] PNW – prohibited noxious weed, RNW – Restricted Noxious Weeds, SRP – Specially Regulated Plants, NR – not regulated

[b] Number of occurrences of infestations within 0.5 mile of the RA-07 route between Clearbrook and Carlton, Minnesota.

Note:

See Appendix K, Table K-2 for additional detail.

Route Alternative RA-08

Ecological Classifications and Vegetation Cover

Two ECS provinces would be crossed by route alternative RA-08: Eastern Broadleaf Forest and Laurentian Mixed Forest provinces (Table 6.3.3-10). RA-08 is largely located within the Laurentian Mixed Forest province. Five ECS sections would be crossed by RA-08. RA-08 crosses 10 broad-scale vegetation cover classes as described in the NLCD: evergreen forest, deciduous forest, mixed forest, scrub/shrub, grassland/herbaceous, hay/pasture, cultivated crops, woody wetlands, emergent herbaceous wetlands, and barren land (Homer et al. 2015). Figure 6.3.3-1 shows the distribution of vegetation cover along the route alternative. Review of these broad-scale vegetation cover patterns demonstrates that RA-08 is primarily located within areas dominated by woody wetland and deciduous forest cover classes.

Table 6.3.3-10. Minnesota Ecological Sections Crossed by Route Alternative RA-08

Province	Section	Subsection	Total Miles
Eastern Broadleaf Forest	Minnesota & NE Iowa Morainal	Hardwood Hills	6.4
Eastern Broadleaf Forest subtotal			***6.4***
Laurentian Mixed Forest	N. Minnesota & Ontario Peatlands	Chippewa Plains	87.9
	N. Minnesota Drift & Lake Plains		
		St. Louis Moraines	13.2
		Tamarack Lowlands	37.0
	Northern Superior Uplands	North Shore Highlands	16.9
	Western Superior Uplands	Mille Lacs Uplands	3.6
Laurentian Mixed Forest subtotal			***158.5***
TOTAL			**164.8**

Source: Minnesota DNR 2016a.

Notes:

Values in table may not sum to subtotals and totals due to rounding.

See Appendix K, Table K-1 for additional detail.

Native Plant Communities

Between Clearbrook and Carlton, 50 acres of native plant communities have been documented within the construction work area for RA-08, 21 acres have been documented within the operations permanent right-of-way, and 4,234 acres have been documented within 0.5 mile of the route. Minnesota native plant community systems that occur within the construction work area for RA-08 are primarily forested and wetland forested systems, including acid peatland system, fire-dependent forest/woodland system, forested rich peatland system, mesic hardwood forest system, open rich peatland system, wet forest system, and wet meadow/Carr system (Aaseng et al. 2011). Native plant community systems crossed by RA-08 are shown in Figure 6.3.3-2 (Minnesota DNR 2016c). Specific locations for moderate- to outstanding- ranked MBS Sites and imbedded native plant communities relative to the location of RA-08 are shown in greater detail in Appendix A. Rare native plant communities (aspen – birch – fir forest, Jack pine – (yarrow) woodland, and oak – aspen forest) also occur within 0.5 mile of the route, but none occur within the construction work area or permanent right-of-way. Five old-growth forest stand types

were identified within 0.5 mile of RA-08, including aspen, birch, northern hardwood, white pine, and white cedar. One HCVF (Floodwood Bog) is intersected by RA-08.

Noxious Weeds and Invasive Plants

Several noxious weed and invasive plant species have been reported within 0.5 mile of the RA-08 route, totaling 665 occurrences between Clearbrook and Carlton (Table 6.3.3-11). Noxious and invasive weeds occurring near the route include commonly occurring Midwest weeds, such as reed canarygrass, tansy, spotted knapweed, and thistles.

Table 6.3.3-11. Noxious Weeds and Invasive Plants within 0.5 Mile of Route Alternative RA-08

Common Name	Scientific Name	Minnesota Status[a]	Occurrences[b]
Hoary ayssum	*Berteroa incana*	NA	7
Oxeye daisy	*Leucanthemum vulgare*	NA	12
Siberian elm	*Ulmus pumila*	NA	4
Reed canarygrass	*Phalaris arundinacea*	NA	208
Smooth brome	*Bromus inermis*	NA	9
Spotted knapweed	*Centaurea stoebe*	C	56
Giant knotweed	*Polygonum sachalinense*	SRP	1
Purple loosestrife	*Lythrum salicaria*	C	2
Amur maple	*Acer ginnala*	NA	1
Wild parsnip	*Pastinaca sativa*	NA	50
Siberian peashrub	*Caragana arborescens*	NA	4
Multi-flora rose	*Rosa multiflora*	RNW	2
White sweetclover	*Melilotus alba*	NA	37
Yellow sweetclover	*Melilotus officinalis*	NA	2
Tansy	*Tanacetum vulgare*	C	152
Thistle spp.[c]	*Cirsium* spp.	NA	60
Bull thistle	*Cirsium vulgare*	NA	2
Canada thistle	*Cirsium arvense*	C	29
Birdsfoot trefoil	*Lotus corniculatus*	NA	27
Number of Taxa			**19**
TOTAL NUMBER OF OCCURRENCES			**665**

Sources: Minnesota DNR 2016d; Minnesota DA 2016.

[a] Status (MN): E – Eradicate List; C – Control List; RNW – Restricted Noxious Weed; SRP – Specially Regulated Plants
Note: NA = plant species with no legal status per Minnesota Noxious Weed List (Minnesota DA 2016)

[b] Number of occurrences of infestations within 0.5 mile of the RA-08 route between Clearbrook and Carlton, Minnesota.

[c] May include native, non-weed thistle species

Notes:

See Appendix K, Table K-2 for additional detail.

6.3.3.3 Impact Assessment

This section describes the potential impacts on existing vegetation cover, rare native plant communities, and old-growth forests, and the potential spread of noxious and invasive plants. Vegetation cover would be temporarily or permanently altered by construction and operations within the affected ecoregions and rare plant communities, as discussed.

The effects of construction and operation of the Applicant's preferred route and route alternatives are described below within the following three categories:

- Loss or alteration of vegetation cover,
- Loss or alteration of native plant communities, and
- Spread of noxious weeds and invasive plants.

The impact assessment integrates, for all alternatives, revegetation and reclamation commitments in the Applicant's Environmental Protection Plan (Appendix E), during, and upon completion of, construction of the entire respective pipeline rights-of-way. The plan includes a full complement of BMPs and mitigation measures to protect soil resources, and conduct revegetation and monitoring activities.

6.3.3.3.1 Applicant's Preferred Route (in Minnesota)

Vegetation resources would be temporarily or permanently altered by construction and operations within the affected ecoregions, native and rare plant communities, and in terms of spread of noxious weed and invasive plant species, as discussed in the sections below.

Construction Impacts

Loss or Alteration of Vegetation Cover

As shown in Table 6.3.3-12, land cover in the construction work area of the Applicant's preferred route is comprised primarily of deciduous forest (29 percent), cultivated crops (33 percent), and hay/pasture (14 percent). The Clearbrook-to-Carlton segment is predominately deciduous forest (45 percent) followed by hay/pasture (14 percent), and woody wetlands (11 percent). Most (75 percent) of the Clearbrook-to-Carlton segment would be adjacent to pipeline, transmission line, or road corridors that previously have been disturbed by construction. From the North Dakota border to Clearbrook, the Minnesota segment of the route is predominately cultivated cropland (approximately 1,154 acres, or 80 percent), all of which would be co-located with the existing pipeline corridor. Over 70 percent of the Carlton, Minnesota to Wisconsin border segment consists of a combination of hay/pasture (58 acres) and deciduous forest (38 acres) vegetation cover types, all of which would be co-located along the existing pipeline corridor.

The Applicant's preferred route would result in short-term to permanent and minor to major impacts on up to approximately 5,082 acres of existing vegetation in Minnesota (Table 6.3.3-12). Permanent major impacts on up to 291 acres of vegetation would occur as a result of permanent conversion to aboveground facilities and access roads (Table 5.2.3-8). Vegetation removed includes deciduous forest (107 acres), hay/pasture (62 acres), and cultivated crops (44 acres), which cumulatively account for over 70 percent of the vegetation for the additional construction areas and aboveground facilities. The loss of this cover would result in a permanent minor impact.

Table 6.3.3-12. Potential Impacts on Vegetation for the Applicant's Preferred Route in Minnesota

Vegetation Cover Class	Construction Work Area[a]		Permanent Right-of-Way[b]	
	Acres	Percent	Acres	Percent
Minnesota				
Evergreen forest	198	4	86	4
Deciduous forest	1,477	29	670	30
Mixed forest	20	0	10	0
Scrub/shrub	243	5	125	6
Grassland/herbaceous	164	3	73	3
Hay/pasture	699	14	320	14
Cultivated crops	1665	33	617	28
Woody wetlands	355	7	185	8
Emergent herbaceous wetlands	249	5	132	6
Barren land	12	0	2	0
MINNESOTA TOTAL	**5,082**	**100**	**2,220**	**100**
Clearbrook to Carlton				
Evergreen forest	173	6	70	5
Deciduous forest	1,256	45	554	43
Mixed forest	18	1	7	1
Scrub/shrub	211	8	104	8
Grassland/herbaceous	94	3	45	3
Hay/pasture	388	14	175	14
Cultivated crops	173	6	76	6
Woody wetlands	317	11	159	12
Emergent herbaceous wetlands	174	6	95	7
Barren land	4	0	2	0
CLEARBROOK TO CARLTON TOTAL	**2,806**	**100**	**1,288**	**100**

Source: Homer et al. 2015.

[a] Sum of Enbridge-provided construction work area, additional temporary workspaces (including pipe yards), and temporary access roads.

[b] Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

Note:

See Appendix K, Table K-3 for additional detail.

Short-term minor impacts are expected as a result of clearing and grading of up to 3,031 acres of non-forested vegetation communities, which would be reclaimed and would return to a similar vegetation type over time following construction. Long-term major impacts on 134 acres of forested upland and wetland vegetation would occur from ATWS and pipe yards, all of which would be reclaimed and allowed to return to forested vegetation type over time (up to 50 years for full recovery) following construction. Long-term or permanent major construction impacts would occur on 2,050 acres of forested upland and wetland vegetation, about 45 percent of which would be maintained as herbaceous vegetation within the permanent right-of-way for the life of the Project.

Additional vegetation cover impacts would occur from construction of ATWS and pipe storage yards, which would affect an additional 656 acres. Vegetation cover within these areas includes cultivated croplands (327 acres), hay/pasture (121 acres), and deciduous forest (97 acres) (Table 5.2.3-8). Cumulatively, this accounts for over 80 percent of the additional construction areas and aboveground facilities proposed for the Project.

Clearing of trees within forested communities, including evergreen forest, deciduous forest, mixed forest, and woody wetland cover types, would result in long-term minor impacts totaling approximately 2,050 acres (Applicant's preferred route plus construction work areas and aboveground facilities) within the construction work areas, as these vegetation cover classes generally are considered late-succession vegetation communities and generally regenerate over longer periods of time.

Loss or Alteration of Native Plant Communities

Construction of the Applicant's preferred route would disturb a total of approximately 164 acres within 152 individual native plant community systems associated with MBS Sites with biodiversity ranks of moderate or above (Table 6.3.3-13). Approximately 80 percent of these native plant community systems are forested uplands and wetlands; construction and operation would result in the loss of those native plant communities and habitat. Some local native plant communities may reestablish over time; however, it is expected that the quality and diversity of these communities would be lowered. Therefore, the resulting impact on the forested uplands and wetlands would be long term to permanent and major.

Most of the native plant community systems that would be affected by construction are ranked moderate for biodiversity. Construction would affect approximately 3.5 acres of outstanding forested rich peatlands (Table 6.3.3-13). Estimated impacts on native plant communities for the Clearbrook-to-Carlton segment are summarized in Table 6.3.3-14. Specific locations for moderate- to outstanding-ranked MBS Site native plant communities relative to the location of the alternatives are shown in greater detail in Appendix A.

A total of 45.5 acres that include six rare plant community systems would be affected by the Applicant's preferred route during construction (Table 6.3.3-15). These rare plant communities include calcareous fen and prairie wetlands located along the route from the North Dakota border to Clearbrook, Minnesota. Impacts on calcareous fens and other wetlands are further addressed in Section 6.3.1. Construction impacts on native prairies include the potential for alteration of prairie soils, loss of sensitive plant communities, and introduction of invasive plants. Direct impacts on previously untilled prairie soils and vegetation during construction are expected to be permanent and major. These impacts may be mitigated through several actions. Prior to construction, the lead and assisting agencies would be consulted on identification of avoidance and mitigation measures for rare plant communities that are located within the Applicant's preferred route and could be affected by construction or operation.

Avoidance measures could include rerouting the pipeline, use of directional drilling, or preparation of and adherence to, an agency-approved site-specific prairie crossing plan. These communities are not expected to fully recover following restoration; however, in some circumstances, these communities may make a full recovery over time. Totals for the Clearbrook-to-Carlton segment are provided in Table 6.3.3-16.

Construction-related impacts on old-growth forest include potential indirect effects on one Norway pine and two ash old-growth forest stands that occur within 0.5 mile of the Applicant's preferred route; no old-growth forest stands occur within the construction work area or permanent right-of-way. No direct construction or operations impacts are expected to occur on old-growth forests from construction of the Applicant's preferred route. However, potential indirect impacts on these stands include the potential spread of noxious weeds and invasive plants, and potential removal of contiguous forest areas that serve as protective buffers. One HCVF (Kettle Lake Peatlands) occurs within 0.5 mile of the Applicant's preferred route; no direct construction or operations impacts on the HCVF are expected to occur.

Table 6.3.3-13 Estimated Impacts on Minnesota Native Plant Community Systems and MBS Sites for the Applicant's Preferred Route in Minnesota

Native Plant Community System	MBS Site Biodiversity Significance Rank[a]	Construction Work Area[b]		Permanent Right-of-Way[c]		Within 0.5 Mile[d]	
		Acres	No.	Acres	No.	Acres	No.
Acid peatland system	High	2.4	3	1.2	3	339.5	23
Complex community	High	--	--	--	--	135.2	7
	Moderate	5.8	2	3.1	2	288.4	5
Fire-dependent forest/woodland system	Outstanding	--	--	1.5	2	267.3	32
	High	0.3	1	--	--	276.5	24
	Moderate	32.2	28	17.2	15	1,817.4	59
Forested rich peatland system	Outstanding	3.5	2	1.8	2	27.0	1
	High	17.6	6	9.7	8	650.1	32
	Moderate	5.0	6	4.6	5	442.1	19
Marsh system	Outstanding	--	--	--	--	197.2	29
	Moderate	--	--	--	--	<0.1	1
Mesic hardwood forest system	Outstanding	--	--	--	--	128.9	30
	High	9.2	9	4.0	7	565.7	30
	Moderate	54.7	44	21.1	12	1,393.5	28
Open rich peatland system	Outstanding	--	--	--	--	49.5	3
	High	--	--	--	--	7.1	1
	Moderate	5.5	10	4.3	7	514.5	16
Upland prairie system	Outstanding	--	--	--	--	37.1	6
	High	--	--	--	--	92.5	3
	Moderate	2.0	2	0.7	1	43.9	1

Table 6.3.3-13 Estimated Impacts on Minnesota Native Plant Community Systems and MBS Sites for the Applicant's Preferred Route in Minnesota

Native Plant Community System	MBS Site Biodiversity Significance Rank[a]	Construction Work Area[b]		Permanent Right-of-Way[c]		Within 0.5 Mile[d]	
		Acres	No.	Acres	No.	Acres	No.
Wet forest system	Outstanding	--	--	--	--	51.6	11
	High	6.8	7	2.8	4	206.2	18
	Moderate	2.9	4	1.9	3	207.2	8
Wet meadow/Carr system	Outstanding	--	--	<0.1	1	35.4	35
	High	11.0	12	0.3	1	177.3	19
	Moderate	4.7	16	4.1	11	765.2	106
Wetland prairie system	High	--	--	--	--	164.5	8
TOTAL		**163.6**	**152**	**78.4**	**84**	**8,880.9**	**555**

Sources: Minnesota DNR 2016b, 2016e.

[a] Systems occurring within Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites) are given these ranks (Minnesota only):
Outstanding = Sites containing the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes.
High = Sites containing very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes.
Moderate = Sites containing occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery.
Below = Sites below minimum biodiversity threshold for statewide significance. These sites lack occurrences of rare species or natural features or do not meet Minnesota Biological Survey standards for outstanding, high, or moderate rank.
(blank) = no corresponding Biodiversity Significance Rank

[b] Sum of Enbridge-provided construction work area, additional temporary workspaces (including pipe yards), and temporary access roads.

[c] Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

[d] Minnesota native plant community systems within 0.5 mile of the centerline of the pipeline route.

Notes:

See Appendix K, Table K-4 for additional detail.

"--" = no occurrence

Table 6.3.3-14. Estimated Impacts on Native Plant Community Systems and MBS Sites for the Applicant's Preferred Route between Clearbrook and Carlton

Native Plant Community System	MBS Site Biodiversity Significance Rating[a]	Construction Work Area[b]		Permanent Right-of-Way[c]		Within 0.5 Mile[d]	
		Acres	No.	Acres	No.	Acres	No.
Acid peatland system	High	2.4	3	1.2	3	339.5	23
Complex community	High	--	--	--	--	24.1	3
Fire-dependent forest/ woodland system	Outstanding	--	--	--	--	133.2	16
	High	--	--	--	--	269.3	23
	Moderate	26.7	8	12.6	8	1,785.6	58
Forested rich peatland system	High	17.6	6	9.1	6	650.1	32
	Moderate	4.9	5	4.6	5	432.0	18
Marsh system	Outstanding	--	--	--	--	12.5	23
	Moderate	--	--	--	--	<0.1	1
Mesic hardwood forest system	Outstanding	--	--	--	--	128.9	30
	High	9.0	7	4.0	7	565.7	30
	Moderate	42.7	7	19.0	7	1,393.5	28
Open rich peatland system	Outstanding	--	--	--	--	1.3	1
	Moderate	5.5	7	4.3	7	514.5	16
Wet forest system	Outstanding	--	--	--	--	4.6	10
	High	6.2	4	2.8	4	190.9	17
	Moderate	2.8	3	1.9	3	164.7	7
Wet meadow/Carr system	Outstanding	--	--	--	--	35.4	35
	High	0.5	1	0.3	1	177.3	19
	Moderate	4.7	16	4.1	11	765.2	106
TOTAL		**122.9**	**67**	**63.8**	**62**	**7,588.4**	**496**

Sources: Minnesota DNR 2016b, 2016e.

See Appendix K, Table K-4 for additional detail.

[a] Systems occurring within Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites) are given these ranks (Minnesota only):
Outstanding = Sites containing the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities), and/or the largest, most intact functional landscapes.
High = Sites containing very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes.
Moderate = Sites containing occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery.
Below = Sites below minimum biodiversity threshold for statewide significance. These sites lack occurrences of rare species or natural features or do not meet Minnesota Biological Survey standards for outstanding, high, or moderate rank.
(blank) = no corresponding Biodiversity Significance Rank

[b] Sum of Enbridge-provided construction work area, additional temporary workspaces (including pipe yards), and temporary access roads.

[c] Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

[d] Minnesota native plant community systems within 0.5 mile of the centerline of the pipeline route.

Notes:

Values in table may not sum to subtotals and totals due to rounding.

"--" = no occurrence

Table 6.3.3-15. Estimated Impacts on Rare Native Plant Community Systems and MBS Sites for the Applicant's Preferred Route in Minnesota

Native Plant Community	MBS Site Biodiversity Significance Rank[a]	Conservation Rank[b]	Construction Work Area[c]		Permanent Right-of-Way[d]		Within 0.5 Mile[e]	
			Acres	No.	Acres	No.	Acres	No.
Alder – (red currant – meadow-rue) swamp	Outstanding	S3	--	--	--	--	1.9	2
	Not ranked	S3	--	--	--	--	<0.1	1
Black ash – (red maple) seepage swamp	High	S1/S2	5.7	5	2.4	2	65.5	5
Calcareous fen (northwestern)	High	S2	--	--	--	--	7.1	1
Graminoid poor fen (basin)	High	S3	--	--	--	--	11.5	3
Jack pine – (bush honeysuckle) woodland	Moderate	S1/S2/S3	11.7	10	7.7	9	714.5	22
Jack pine – (bush honeysuckle) woodland, bracken subtype	High	S1	0.3	1	--	--	68.2	2
Jack pine – (yarrow) woodland	High	S1/S2	--	--	--	--	30.4	1
Mesic brush-prairie (northern)	High	S2	--	--	--	--	92.5	3
	Outstanding	S2	--	--	--	--	33.1	4
Mesic prairie (northern)	Outstanding	S2	--	--	--	--	4.1	2
	Moderate	S2	2.0	2	0.7	1	43.9	1
Oak – aspen forest	Outstanding	S3	--	--	0.8	1	128.1	15
	High	S3	--	--	--	--	87.8	2
	Moderate	S3	18.0	12	8.4	5	1,024.4	34
	Below	S3	7.2	5	2.6	2	60.2	1
	Not ranked	S3	--	--	--	--	0.1	2
Red pine – white pine forest	Outstanding	S2	--	--	0.7	1	5.1	1
	High	S2	--	--	--	--	49.8	13
	Moderate	S2	--	--	--	--	43.9	1
Red pine – white pine woodland, balsam fir subtype	High	S3	--	--	--	--	22.9	3
Red pine – white pine woodland, mountain maple subtype	High	S3	--	--	--	--	10.2	2
Spikerush – bur reed marsh (northern)	Outstanding	S2	--	--	--	--	12.5	23
	Moderate	S2	--	--	--	--	<0.1	1
	Not ranked	S2	--	--	--	--	0.4	7

Table 6.3.3-15. Estimated Impacts on Rare Native Plant Community Systems and MBS Sites for the Applicant's Preferred Route in Minnesota

Native Plant Community	MBS Site Biodiversity Significance Rank[a]	Conservation Rank[b]	Construction Work Area[c]		Permanent Right-of-Way[d]		Within 0.5 Mile[e]	
			Acres	No.	Acres	No.	Acres	No.
Sugar maple – basswood – (bluebead lily) forest	High	S3	--	--	--	--	97.9	2
Tamarack seepage swamp (aspen parkland)	Outstanding	S3	--	--	--	--	27.0	1
	Moderate	S3	--	--	--	--	10.1	1
Wet brush-prairie (northern)	High	S3	--	--	--	--	64.5	5
Wet prairie (northern)	High	S3	--	--	--	--	100.0	3
White pine – white spruce – paper birch forest	High	S2	0.6	4	0.3	3	59.9	9
TOTAL			**45.5**	**39**	**23.6**	**24**	**2,877.6**	**173**

Sources: Minnesota DNR 2016b, 2016e, 2016d.

[a] Systems occurring within Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites) are given these ranks (Minnesota only):
Outstanding = Sites containing the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes.
High = Sites containing very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes.
Moderate = Sites containing occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery.
Below = Sites below minimum biodiversity threshold for statewide significance. These sites lack occurrences of rare species or natural features or do not meet Minnesota Biological Survey standards for outstanding, high, or moderate rank.
(blank) = no corresponding Biodiversity Significance Rank

[b] S1 = critically imperiled, S2 = imperiled, S3 = vulnerable to extirpation.

[c] Sum of Enbridge-provided construction work area, additional temporary workspaces (including pipe yards), and temporary access roads.

[d] Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

[e] Minnesota native plant community systems within 0.5 mile of the centerline of the pipeline route.

Note:

See Appendix K, Table K-5 for additional detail.

"--" = no occurrence

Table 6.3.3-16. Estimated Impacts on Rare Native Plant Community Systems and MBS Sites for the Applicant's Preferred Route between Clearbrook and Carlton

Native Plant Communities	MBS Site Biodiversity Significance Rating[a]	Conservation Rank[b]	Construction[c]		Operations[d]		Within 0.5 Mile[e]	
			Acres	No.	Acres	No.	Acres	No.
Alder – (red currant – meadow-rue) swamp	Outstanding	S3	--	--	--	--	1.9	2
	Not ranked	S3	--	--	--	--	<0.1	1
Black ash – (red maple) seepage swamp	High	S1S2	5.1	2	2.4	2	65.5	5
Graminoid poor fen (basin)	High	S3	--	--	--	--	11.5	3
Jack pine – (bush honeysuckle) woodland	Moderate	S1 or S3	10.3	5	5.4	5	714.5	22
Jack pine – (bush honeysuckle) woodland, bracken subtype	High	S1	--	--	--	--	68.2	2
Jack pine – (yarrow) woodland	High	S1S2	--	--	--	--	30.4	1
Oak – aspen forest	Outstanding	S3	--	--	--	--	128.1	15
	High	S3	--	--	--	--	87.8	2
	Moderate	S3	16.4	3	7.2	3	1,024.4	34
	Below	S3	6.3	1	2.6	1	60.2	1
	Not ranked	S3	--	--	--	--	0.1	2
Red pine – white pine forest	Outstanding	S2	--	--	--	--	5.1	1
	High	S2	--	--	--	--	49.8	13
	Moderate	S2	--	--	--	--	43.9	1
Red pine – white pine woodland, balsam fir subtype	High	S3	--	--	--	--	22.9	3
Red pine – white pine woodland, mountain maple subtype	High	S3	--	--	--	--	10.2	2
Spikerush – bur reed marsh (northern)	Outstanding	S2	--	--	--	--	12.5	23
	Moderate	S2	--	--	--	--	<0.1	1
	Not ranked	S2	--	--	--	--	0.4	7
Sugar maple – basswood – (bluebead lily) forest	High	S3	--	--	--	--	97.9	2

Table 6.3.3-16. Estimated Impacts on Rare Native Plant Community Systems and MBS Sites for the Applicant's Preferred Route between Clearbrook and Carlton

Native Plant Communities	MBS Site Biodiversity Significance Rating[a]	Conservation Rank[b]	Construction[c]		Operations[d]		Within 0.5 Mile[e]	
			Acres	No.	Acres	No.	Acres	No.
White pine – white spruce – paper birch forest	High	S2	0.6	3	0.3	3	59.9	9
TOTAL			**38.7**	**14**	**17.9**	**14**	**2,495.3**	**152**

Sources: Minnesota DNR 2016b, 2016e.

[a] Systems occurring within Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites) are given these ranks (Minnesota only):
Outstanding = Sites containing the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes.
High = Sites containing very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes.
Moderate = Sites containing occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery.
Below = Sites below minimum biodiversity threshold for statewide significance. These sites lack occurrences of rare species or natural features or do not meet Minnesota Biological Survey standards for outstanding, high, or moderate rank.
(blank) = no corresponding Biodiversity Significance Rank

[b] S1 = critically imperiled, S2 = imperiled, S3 = vulnerable to extirpation.

[c] Sum of Enbridge-provided construction work area, additional temporary workspaces (including pipe yards), and temporary access roads.

[d] Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

[e] Minnesota native plant community systems within 0.5 mile of the centerline of the pipeline route.

Note:

See Appendix K, Table K-5 for additional detail.

"--" = no occurrence

Spread of Noxious Weeds and Invasive Plants

Six weed species listed as by the Minnesota Noxious Weed Act, and 12 other invasive plant species, occur near or within the Applicant's preferred route as well as within 0.5 mile of the Applicant's preferred route between Clearbrook and Carlton (Table 6.3.3-3).

Disturbed soil in cleared construction and work areas would be susceptible to invasion by noxious weeds and invasive plants that already occur within the vicinity. Establishment of these species often inhibit regeneration of native plants. Impacts associated with invasion of noxious weeds are difficult to quantify; however, impacts likely would be short-term and minor, as noxious weeds and invasive plant management measures would be in place during and after construction, as identified in the Applicant's Environmental Protection Plan (Appendix E). This plan details noxious weed and invasive plant control measures for construction, and management of noxious weeds and invasive species for the operational life of the pipeline. The Project would be required to manage all noxious weeds (including those not identified in Table 6.3.3-3) for which federal, state, or local (county or city) agency management policies or regulations exist. Measures to ensure that the spread of weeds is minimized include equipment cleaning, use of weed-free mulch, and use of weed-free seed mix. Consequently, impacts from the spread of noxious weeds and invasive plants during construction of the Project would be short term and minor.

Operations Impacts

Loss or Alteration of Vegetation Cover

Permanent major impacts would occur from operation of the project from the loss of 291 acres of existing vegetation that would be converted to aboveground facilities (pump stations and MLV sites) and access roads for the life of the Project (Table 5.2.3-9).

Right-of-way maintenance in both upland and wetland areas would include mechanical removal of woody vegetation, typically by a rubber-tracked skid-steer vehicle with specialized cutting equipment. The 766 acres of forested communities and 185 acres of woody wetlands that would be removed during construction would be subject to periodic mowing and brush clearing during operation (Table 6.3.3-12). This would result in a permanent major impact on forested vegetation. For areas of previously disturbed non-forested vegetation communities within the permanent right-of-way, routine vegetation management would result in short-term minor impacts.

Loss or Alteration of Native Plant Communities

Operations impacts on native plant community classes could include periodic maintenance of the permanent right-of-way to prevent re-growth of woody vegetation in approximately 78 acres of previous native plant communities. Upon inception of operations activities, these areas will have been previously been disturbed by construction and revegetation actions. In addition, pipeline maintenance occasionally would require excavation within the permanent right-of-way to repair or replace pipe segments, which also could affect native plant communities depending on the location of the integrity dig. Native plant communities likely would have been subjected to impacts during construction such that they are not likely to persist or reestablish within the permanent right-of-way. If they did persist, these operations activities could periodically result in short-term minor impacts on previously disturbed native plant communities for the life of the Project.

Operations impacts on 24 acres of 24 rare native plant community systems could include continued maintenance of the permanent right-of-way to prevent large woody growth and, on rare occasions, pipeline maintenance that could require excavation (Table 6.3.3-15). With the exception of red pine-white pine forest, which does not occur in the permanent right-of-way, all other vegetation communities are non-forested and would be maintained free of large woody vegetation. This has the potential to benefit the herbaceous native plant community. General impacts on rare native plant communities and mitigation are addressed in Section 5.2.3.3. These communities would have been subject to impacts during construction and are not expected to persist or reestablish within the permanent right-of-way during operations. If they did persist, short-term minor impacts could periodically occur during pipeline operation, as maintenance work may occur in previously disturbed rare native plant communities.

Spread of Noxious Weeds and Invasive Plants

For the life of the Project, surface disturbance and vehicle access during maintenance activities would continue to provide an opportunity for noxious weeds and invasive species to spread. Permanent minor impacts are expected to occur as a result of noxious weed and invasive plant infestations in some areas during operation. The noxious weed and invasive plant occurrence information provided in this analysis did not identify all noxious weed or invasive species known or documented within the region; however, routine vegetation maintenance along the permanent right-of-way may include treatment/mitigation or similar measures of mechanical or chemical management of undesirable species once they are identified. The Environmental Protection Plan (Appendix E) details control measures for noxious weeds

and invasive plants for the Project. The Project would be required to manage all noxious weeds for which federal, state, or local (county or city) agency management policies or regulations exist, including but not limited to, those identified in Table 6.3.3-3. Measures implemented to ensure that the spread of weeds is minimized may include equipment cleaning, use of weed-free mulch, use of weed-free seed mix during site restoration, and ensuring that noxious weed and invasive plant species management is a continued commitment during operations involving vegetation management activities.

6.3.3.3.2 Route Alternatives (from Clearbrook to Carlton)

Route Alternative RA-03AM

Construction Impacts

Loss or Alteration of Vegetation Cover

Construction of RA-03AM would affect 3,579 acres of vegetation. Most (95 percent) of the Clearbrook-to-Carlton segment would be adjacent to previously disturbed existing pipeline, transmission line, or road corridors. Consequently, areas of undisturbed vegetation potentially affected by construction would be reduced. Hay/pasture (29 percent), deciduous forest (27 percent), and cultivated crops (16 percent) vegetation cover classes dominate this route alternative. Clearing trees within evergreen forest, deciduous forest, mixed forest, and woody wetlands would result in long-term to permanent major impacts on approximately 1,329 acres of forest vegetation cover within the construction work areas (Table 6.3.3-17).

Loss or Alteration of Native Plant Communities

Construction of RA-03AM would result in long-term to permanent major impacts on 86.5 acres of forested and wet meadow/peatland/fen native plant community systems and 20.3 acres within four conservation-ranked rare native plant communities, including both wetland and upland forest communities (Table 6.3.3-19). No old-growth forest or HCVFs would be affected during construction of RA-03AM.

Spread of Noxious Weeds and Invasive Plants

Six weed species listed as by the Minnesota Noxious Weed Act, and 17 other invasive plant species, occur near or within 0.5 mile of route alternative RA-03AM (Table 6.3.3-5). Disturbed soil in cleared construction and work areas would be susceptible to invasion by noxious weeds and invasive plants that already occur within the vicinity. Establishment of these species often inhibit regeneration of native plants. Impacts associated with invasion of noxious weeds are difficult to quantify; however, impacts likely would be short-term and minor, as noxious weeds and invasive plant management measures would be in place during and after construction, as identified in the Applicant's Environmental Protection Plan (Appendix E). This plan details noxious weed and invasive plant control measures for construction, and management of noxious weeds and invasive species for the operational life of the pipeline. The Project would be required to manage all noxious weeds (including those not identified in Table 6.3.3-5) for which federal, state, or local (county or city) agency management policies or regulations exist. Measures to ensure that the spread of weeds is minimized include equipment cleaning, use of weed-free mulch, and use of weed-free seed mix. Consequently, impacts from the spread of noxious weeds and invasive plants during construction of RA-03AM would be short term and minor.

Operations Impacts

Loss or Alteration of Vegetation Cover

Maintenance activities in the permanent right-of-way for the RA-03AM alternative would be the same as those described for the Applicant's preferred route. These activities would affect 1,495 acres of vegetation, primarily the hay/pasture, deciduous forest, and cultivated crops vegetation cover. Approximately 547 acres of the affected area would be forest and woody wetlands, which would be permanently maintained as scrub/shrub, grassland, or emergent herbaceous wetlands vegetation during operation. This would result in permanent major impacts on forested and woody-wetland vegetation cover types (Table 6.3.3-17). For areas of previously disturbed non-forested vegetation communities within the permanent right-of-way, routine vegetation management would result in temporary to short-term minor impacts.

Loss or Alteration of Native Plant Communities

Operations impacts associated with RA-03AM would affect 36.4 acres in six native plant community systems (Table 6.3.3-18) and 9.9 acres in three rare native plant communities (Table 6.3.3-19). No old-growth forest would be affected by operation of RA-03AM. The affected native plant communities would have been subject to permanent major impacts associated with construction and are not expected to fully recover during operations. If these rare plant communities did persist following construction, short-term minor impacts would occur to them as a result of maintenance activities during operation but would occur periodically for the life of the Project.

Spread of Noxious Weeds and Invasive Plants

Six weed species listed as by the Minnesota Noxious Weed Act, and 17 other invasive plant species, occur near or within 0.5 mile of route alternative RA-03AM (Table 6.3.3-5). Operations-related impacts associated with noxious weeds would be identical to those identified for the Applicant's preferred route (i.e., permanent and minor).

Table 6.3.3-17. Estimated Impacts on Vegetation Cover for Route Alternative RA-03AM between Clearbrook and Carlton

Vegetation Cover	Construction Work Area[a]		Permanent Right-of-Way[b]	
	Acres	Percent	Acres	Percent
Evergreen forest	145	4	60	4
Deciduous forest	975	27	403	27
Mixed forest	14	0	6	0
Scrub/shrub	191	5	80	5
Grassland/herbaceous	143	4	61	4
Hay/pasture	1,031	29	433	29
Cultivated crops	565	16	238	16
Woody wetlands	195	5	78	5
Emergent herbaceous wetlands	315	9	134	9
Barren land	5	0	2	0
TOTAL	**3,579**	**100**	**1,494**	**100**

Source: Homer et al. 2015.

[a] Estimated 120-foot-wide construction work area centered on pipeline route, includes the 50-foot-wide permanent right-of-way.

[b] Estimated operations area based on 50-foot-wide permanent right-of-way centered on the pipeline route.

Note:

See Appendix K, Table K-6 for additional detail.

Table 6.3.3-18. Estimated Impacts on Native Plant Community Systems and MBS Sites for Route Alternative RA-03AM between Clearbrook and Carlton

Native Plant Community System	MBS Site Biodiversity Significance Rating[a]	Construction Work Area[b]		Permanent Right-of-Way[c]		Within 0.5 Mile[d]	
		Acres	No.	Acres	No.	Acres	No.
Acid peatland system	High	--	--	--	--	1.1	1
	Moderate	--	--	--	--	76.6	15
Complex community	Moderate	<0.1	1	--	--	68.5	12
Fire-dependent forest/ woodland system	Outstanding	--	--	--	--	133.3	17
	High	--	--	--	--	255.9	22
	Moderate	20.2	14	8.1	10	1,777.7	66
Floodplain forest system	High	--	--	--	--	0.1	1
Forested rich peatland system	High	2.5	2	1.0	1	33.1	5
	Moderate	2.2	8	0.6	4	531.9	36
Marsh system	Outstanding	--	--	--	--	12.5	23
	High	--	--	--	--	3.2	1
	Moderate	--	--	--	--	40.7	3
Mesic hardwood forest system	Outstanding	--	--	--	--	128.9	30
	High	0.9	4	0.3	3	403.2	20
	Moderate	32.7	7	15.7	5	2,331.9	34
Open rich peatland system	Outstanding	--	--	--	--	1.3	1
	Moderate	8.4	10	3.3	7	648.5	27
Upland prairie system	High	--	--	--	--	3.7	1
Wet forest system	Outstanding	--	--	--	--	4.6	10
	High	5.6	2	2.4	2	128.4	8
	Moderate	5.3	5	2.2	5	199.7	14

Table 6.3.3-18. Estimated Impacts on Native Plant Community Systems and MBS Sites for Route Alternative RA-03AM between Clearbrook and Carlton

Native Plant Community System	MBS Site Biodiversity Significance Rating[a]	Construction Work Area[b]		Permanent Right-of-Way[c]		Within 0.5 Mile[d]	
		Acres	No.	Acres	No.	Acres	No.
Wet meadow/Carr system	Outstanding	--	--	--	--	35.5	37
	High	2.6	2	1.1	2	247.1	21
	Moderate	6.1	11	1.8	9	664.4	109
TOTAL		**86.5**	**66**	**36.4**	**48**	**7,732.1**	**514**

Sources: Minnesota DNR 2016b, 2016e.

[a] Systems occurring within Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites) are given these ranks (Minnesota only):
Outstanding = Sites containing the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes.
High = Sites containing very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes.
Moderate = Sites containing occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery.
Below = Sites below minimum biodiversity threshold for statewide significance. These sites lack occurrences of rare species or natural features or do not meet Minnesota Biological Survey standards for outstanding, high, or moderate rank.
(blank) = no corresponding Biodiversity Significance Rank

[b] Sum of Enbridge-provided construction work area, additional temporary workspaces (including pipe yards), and temporary access roads.

[c] Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

[d] Minnesota native plant community systems within 0.5 mile of the centerline of the pipeline route.

Note:

See Appendix K, Table K-7 for additional detail.

"--" = no occurrence

Table 6.3.3-19. Estimated Impacts on Rare Native Plant Community Systems and MBS Sites for Route Alternative RA-03AM between Clearbrook and Carlton

Native Plant Communities	MBS Site Biodiversity Significance Rating[a]	Conservation Rank[b]	Construction Work Area[c]		Permanent Right-of-Way[d]		Within 0.5 Mile[e]	
			Acres	No.	Acres	No.	Acres	No.
Alder – (red currant – meadow-rue) swamp	Outstanding	S3	--	--	--	--	1.9	2
	Not ranked	S3	--	--	--	--	<0.1	1
Basswood – black ash forest	High	S3	--	--	--	--	41.8	1
	Moderate	S3	--	--	--	--	85.2	2
Black ash – (red maple) seepage swamp	High	S1S2	5.6	2	2.4	2	65.5	5
Black ash – silver maple terrace forest	High	S3	--	--	--	--	0.1	1
Black ash – yellow birch – red maple – basswood swamp (eastcentral)	Moderate	S3	0.2	1	<0.1	1	65.4	6
Dry sand – gravel oak savanna (southern)	High	S1S2	--	--	--	--	3.7	1
Jack pine – (bush honeysuckle) woodland	Moderate	S1 or S3	--	--	--	--	48.6	3
Jack pine – (bush honeysuckle) woodland, bracken subtype	High	S1	--	--	--	--	68.2	2
Jack pine – (yarrow) woodland	High	S1S2	--	--	--	--	30.4	1
Oak – aspen forest	Outstanding	S3	--	--	--	--	128.2	16
	High	S3	--	--	--	--	70.3	1
	Moderate	S3	13.7	3	7.2	3	1,019.6	33
	Not ranked	S3	--	--	--	--	0.1	2
Pin oak – bur oak woodland	High	S3	--	--	--	--	14.0	1
	Moderate	S3	--	--	--	--	40.3	1
Red pine – white pine forest	Outstanding	S2	--	--	--	--	5.1	1
	High	S2	--	--	--	--	49.8	13
	Moderate	S2	--	--	--	--	43.9	1
Red pine – white pine woodland, balsam fir subtype	High	S3	--	--	--	--	22.9	3

Table 6.3.3-19. Estimated Impacts on Rare Native Plant Community Systems and MBS Sites for Route Alternative RA-03AM between Clearbrook and Carlton

Native Plant Communities	MBS Site Biodiversity Significance Rating[a]	Conservation Rank[b]	Construction Work Area[c]		Permanent Right-of-Way[d]		Within 0.5 Mile[e]	
			Acres	No.	Acres	No.	Acres	No.
Red pine – white pine woodland, mountain maple subtype	High	S3	--	--	--	--	0.3	1
Spikerush – bur reed marsh (northern)	Outstanding	S2	--	--	--	--	12.5	23
	Moderate	S2	--	--	--	--	<0.1	1
	Not ranked	S2	--	--	--	--	0.4	7
White pine – white spruce – paper birch forest	High	S2	0.7	3	0.3	3	59.9	9
TOTAL			**20.3**	**9**	**9.9**	**9**	**1,878.3**	**138**

Sources: Minnesota DNR 2016b, 2016e, 2016d.

[a] Systems occurring within Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites) are given these ranks (Minnesota only):
Outstanding = Sites containing the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes.
High = Sites containing very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes.
Moderate = Sites containing occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery.
Below = Sites below minimum biodiversity threshold for statewide significance. These sites lack occurrences of rare species or natural features or do not meet Minnesota Biological Survey standards for outstanding, high, or moderate rank.
(blank) = no corresponding Biodiversity Significance Rank

[b] S1 = critically imperiled, S2 = imperiled, S3 = vulnerable to extirpation.

[c] Sum of Enbridge-provided construction work area, additional temporary workspaces (including pipe yards), and temporary access roads.

[d] Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

[e] Minnesota native plant community systems within 0.5 mile of the centerline of the pipeline route.

Note:

See Appendix K, Table K-8 for additional detail.

"--" = no occurrence

Route Alternative RA-06

Construction Impacts

Loss or Alteration of Vegetation Cover

Construction of RA-06 would affect 2,674 acres of vegetation. All of the Clearbrook-to-Carlton segment would be within a new pipeline corridor, much of it crossing through areas with no previous ground disturbance. This route is dominated by deciduous forest (30 percent), woody wetlands (27 percent), and scrub/shrub vegetation (9 percent). Clearing trees within forested communities during construction would

result in long-term to permanent major impacts on approximately 1,797 acres of forested areas within the construction work area (Table 6.3.3-20).

Loss or Alteration of Native Plant Communities

Construction of RA-06 would result in long-term to permanent major impacts on 19.5 acres in four forested and peatland/fen native plant community systems (Table 6.3.3-21). No rare native plant communities, old-growth forest (although 82 acres of old-growth forest occur within one half mile of the ROI), or HCVFs would be affected by construction of RA-06 (Table 6.3.3-22).

Table 6.3.3-20. Estimated Impacts on Vegetation Cover for Route Alternative RA-06 between Clearbrook and Carlton

Vegetation Cover	Construction Work Area[a]		Permanent Right-of-Way[b]	
	Acres	Percent	Acres	Percent
Evergreen forest	103	4	43	4
Deciduous forest	798	30	333	30
Mixed forest	164	6	68	6
Scrub/shrub	251	9	104	9
Grassland/herbaceous	116	4	49	4
Hay/pasture	213	8	89	8
Cultivated crops	43	2	18	2
Woody wetlands	732	27	304	27
Emergent herbaceous wetlands	223	8	94	8
Barren land	31	1	13	1
TOTAL	**2,674**	**100**	**1,115**	**100**

Source: Homer et al. 2015.

[a] Estimated 120-foot-wide construction work area centered on pipeline route, includes the 50-foot-wide permanent right-of-way.

[b] Estimated operations area based on 50-foot-wide permanent right-of-way centered on the pipeline route.

Note:

Values in table may not sum to totals due to rounding.

See Appendix K, Table K-6 for additional detail.

Table 6.3.3-21. Estimated Impacts on Native Plant Community Systems and MBS Sites for Route Alternative RA-06 between Clearbrook and Carlton

Native Plant Community System	MBS Site Biodiversity Significance Rating[a]	Construction Work Area[b]		Permanent Right-of-Way[c]		Within 0.5 Mile[d]	
		Acres	No.	Acres	No.	Acres	No.
Acid peatland system	High	8.6	2	3.7	2	290.1	8
Fire-dependent forest/ woodland system	High	--	--	--	--	9.5	1
Forested rich peatland system	High	9.9	4	3.5	3	429.0	19
Mesic hardwood forest system	High	0.4	2	<0.1	1	62.9	9
Wet forest system	High	0.6	2	--	--	233.0	10
Wet meadow/Carr system	High	--	--	--	--	3.3	1
TOTAL		**19.5**	**10**	**7.3**	**6**	**1,027.7**	**48**

Sources: Minnesota DNR 2016b, 2016e.

[a] Systems occurring within Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites) are given these ranks (Minnesota only):
Outstanding = Sites containing the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes.
High = Sites containing very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes.
Moderate = Sites containing occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery.
Below = Sites below minimum biodiversity threshold for statewide significance. These sites lack occurrences of rare species or natural features or do not meet Minnesota Biological Survey standards for outstanding, high, or moderate rank.
(blank) = no corresponding Biodiversity Significance Rank

[b] Sum of Enbridge-provided construction work area, additional temporary workspaces (including pipe yards), and temporary access roads.

[c] Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

[d] Minnesota native plant community systems within 0.5 mile of the centerline of the pipeline route.

Note:

Values in table may not sum to totals due to rounding.

See Appendix K, Table K-7 for additional detail.

"--" = no occurrence

Table 6.3.3-22. Estimated Impacts on Old-Growth Forest Communities for Route Alternative RA-06 between Clearbrook and Carlton

Main Cover Type	Construction Work Area[a]		Permanent Right-of-Way[b]		Within 0.5 Mile[c]	
	Acres	Number of Stands	Acres	Number of Stands	Acres	Number of Stands
Aspen	--	--	--	--	24.7	1
Birch	--	--	--	--	23.1	1
Norway pine	--	--	--	--	34.3	2
TOTAL	--	--	--	--	**82.1**	**4**

Sources: Minnesota DNR 2016c.

[a] Sum of Enbridge-provided construction work area, additional temporary workspaces (including pipe yards), and temporary access roads.

[b] Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

[c] Minnesota native plant community systems within 0.5 mile of the centerline of the pipeline route.

Notes:

Values in table may not sum to totals due to rounding.

Old-growth forest as identified by Timber Status = 5 (designated old-growth) and 7 (potential or future old-growth)

See Appendix K, Table K-9 for additional detail.

"--" = no occurrence

Spread of Noxious Weeds and Invasive Plants

Three weed species listed as by the Minnesota Noxious Weed Act, and 10 other invasive plant species, occur near or within 0.5 mile of route alternative RA-06 (Table 6.3.3-7). Disturbed soil in cleared construction and work areas would be susceptible to invasion by noxious weeds and invasive plants that already occur within the vicinity. Establishment of these species often inhibit regeneration of native plants. Impacts associated with invasion of noxious weeds are difficult to quantify; however, impacts likely would be short-term and minor, as noxious weeds and invasive plant management measures would be in place during and after construction, as identified in the Applicant's Environmental Protection Plan (Appendix E). This plan details noxious weed and invasive plant control measures for construction, and management of noxious weeds and invasive species for the operational life of the pipeline. The Project would be required to manage all noxious weeds (including those not identified in Table 6.3.3-5) for which federal, state, or local (county or city) agency management policies or regulations exist. Measures to ensure that the spread of weeds is minimized include equipment cleaning, use of weed-free mulch, and use of weed-free seed mix. Consequently, impacts from the spread of noxious weeds and invasive plants during construction of RA-06 would be short term and minor.

Operations Impacts

Loss or Alteration of Vegetation Cover

Operation of Alternative RA-06 would affect approximately 1,115 acres of vegetation within the permanent right of way. This route is dominated by deciduous forest, woody wetlands, and scrub/shrub vegetation cover. Approximately 748 acres of forests and woody wetlands would be permanently

maintained as scrub/shrub, grassland, or emergent herbaceous wetlands vegetation during operation of the pipeline, resulting in permanent major impacts on forested vegetation (Table 6.3.3-20).

Loss or Alteration of Native Plant Communities

RA-06 would affect 7.3 acres in three native plant community systems during operations (Table 6.3.3-21). No rare native plant communities, old-growth forest, or HCVFs would be affected during operation (Table 6.3.3-22).

Spread of Noxious Weeds and Invasive Plants

Three weed species listed as by the Minnesota Noxious Weed Act, and 10 other invasive plant species, occur near or within 0.5 mile of route alternative RA-06A (Table 6.3.3-7). Operations-related impacts associated with noxious weeds would be identical to those identified for the Applicant's preferred route (i.e., permanent and minor).

Route Alternative RA-07

Construction Impacts

Loss or Alteration of Vegetation Cover

Construction of RA-07 would affect approximately 3,833 acres of vegetation. This alternative is dominated by woody wetlands (28 percent), deciduous forest (20 percent), and emergent herbaceous wetlands vegetation (14 percent) landcover classes. Because RA-07 would be constructed within the existing Line 3 pipeline right-of-way, much of this vegetation would have been previously disturbed. Some new forest clearing for the expanded work area would be required; and some forested areas, especially near stream crossings, may be avoided by HDD. Clearing the construction work area would affect about 1,147 acres of forested communities and 1,056 acres of woody wetlands. Because most of the permanent right-of-way within the construction work area is already cleared of trees, this would result in long-term major impacts on forested communities within the construction work area but primarily outside of the permanent right-of-way (Table 6.3.3-23).

Table 6.3.3-23. Estimated Impacts on Vegetation Cover for Route Alternative RA-07 between Clearbrook and Carlton

Vegetation Cover	Construction Work Area[a]		Permanent Right-of-Way[b]	
	Acres	Percent	Acres	Percent
Evergreen forest	235	6	37	4
Deciduous forest	773	20	177	19
Mixed forest	139	4	28	3
Scrub/shrub	277	7	83	9
Grassland/herbaceous	405	11	107	11
Hay/pasture	326	8	88	9
Cultivated crops	76	2	23	2
Woody wetlands	1,056	28	236	25
Emergent herbaceous wetlands	536	14	154	16
Barren land	10	0	3	0
TOTAL	**3,832**	**100**	**936**	**100**

Source: Homer et al. 2015.

[a] Estimated 205-foot-wide construction work area, with 10-feet-wide on the north side of Line 3 and 195-feet-wide on the south side of Line 3, includes the 50-foot-wide permanent right-of-way.

[b] Estimated operations area based on 50-foot-wide permanent right-of-way centered on the pipeline route.

Notes:

RA-07 involves removing the existing Line 3 and placing the new Line 3 in the same trench. RA-07 would be centered in the existing Enbridge Mainline, which is largely cleared of trees. However, the resolution of the GIS landcover data does not provide accurate representation of land-cover/land use the scale of the Mainline corridor right-of-way. This limitation in the data creates some uncertainty about accuracy of the landcover within the anticipated construction work zone. The numbers shown should be considered a very conservative estimate of forest impacts; the actual numbers are likely to be much lower.

See Appendix K, Table K-6 for additional detail.

Loss or Alteration of Native Plant Communities

Construction of RA-07 would result in long-term to permanent major impacts on 64.9 acres of forested and wet meadow/peatland/fen native plant community systems (Table 6.3.3-24), 2.7 acres of disturbance to one conservation-ranked rare native plant community (Jack pine woodland) (Table 6.3.3-25), and one-tenth of an acre disturbance to one Norway pine old-growth forest (Table 6.3.3-26). No HCVFs would be affected.

Table 6.3.3-24. Estimated Impacts on Native Plant Community Systems and MBS Sites for Route Alternative RA-07 between Clearbrook and Carlton

Native Plant Community System	MBS Site Biodiversity Significance Rating[a]	Construction Work Area[b]		Permanent Right-of-Way[c]		Within 0.5 Mile[d]	
		Acres	No.	Acres	No.	Acres	No.
Acid peatland system	High	27.3	2	3.4	1	493.7	14
Fire-dependent forest/ woodland system	High	--	--	--	--	9.5	1
	Moderate	2.7	1	--	--	217.0	4
Forested rich peatland system	High	14.3	3	0.3	1	436.1	18
	Moderate	8.4	1	--	--	264.2	4
Mesic hardwood forest system	High	2.5	3	<0.1	1	62.9	9
Open rich peatland system	Moderate	--	--	--	--	48.4	2
Wet forest system	High	9.0	3	--	--	233.0	11
Wet meadow/Carr system	High	--	--	--	--	3.3	1
	Moderate	0.7	1	--	--	39.2	3
TOTAL		**64.9**	**14**	**3.8**	**3**	**1,807.2**	**67**

Sources: Minnesota DNR 2016b, 2016e.

[a] Systems occurring within Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites) are given these ranks (Minnesota only):
Outstanding = Sites containing the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes.
High = Sites containing very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes.
Moderate = Sites containing occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery.
Below = Sites below minimum biodiversity threshold for statewide significance. These sites lack occurrences of rare species or natural features or do not meet Minnesota Biological Survey standards for outstanding, high, or moderate rank.
(blank) = no corresponding Biodiversity Significance Rank

[b] Sum of Enbridge-provided construction work area, additional temporary workspaces (including pipe yards), and temporary access roads.

[c] Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

[d] Minnesota native plant community systems within 0.5 mile of the centerline of the pipeline route.

Note:

See Appendix K, Table K-7 for additional detail.

"--" = no occurrence

Table 6.3.3-25. Estimated Impacts on Rare Native Plant Community Systems and MBS Sites for Route Alternative RA-07 between Clearbrook and Carlton

Native Plant Communities	MBS Site Biodiversity Significance Rating[a]	Conservation Rank[b]	Construction Work Area[c]		Permanent Right-of-Way[d]		Within 0.5 Mile[e]	
			Acres	No.	Acres	No.	Acres	No.
Jack pine – (yarrow) woodland	Moderate	S1/S2	2.7	1	--	--	160.7	2
Oak – aspen forest	Moderate	S3	--	--	--	--	56.3	2
TOTAL			**2.7**	**1**	**--**	**--**	**--**	**--**

Sources: Minnesota DNR 2016b, 2016e, 2016d.

[a] Systems occurring within Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites) are given these ranks (Minnesota only):
Outstanding = Sites containing the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes.
High = Sites containing very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes.
Moderate = Sites containing occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery.
Below = Sites below minimum biodiversity threshold for statewide significance. These sites lack occurrences of rare species or natural features or do not meet Minnesota Biological Survey standards for outstanding, high, or moderate rank.
(blank) = no corresponding Biodiversity Significance Rank

[b] S1 = critically imperiled, S2 = imperiled, S3 = vulnerable to extirpation.

[c] Sum of Enbridge-provided construction work area, additional temporary workspaces (including pipe yards), and temporary access roads.

[d] Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

[e] Minnesota native plant community systems within 0.5 mile of the centerline of the pipeline route.

Note:

See Appendix K, Table K-8 for additional detail.

"--" = no occurrence

Table 6.3.3-26. Estimated Impacts on Old-Growth Forest Communities for Route Alternative RA-07 between Clearbrook and Carlton

Main Cover Type	Construction Work Area[a]		Permanent Right-of-Way[b]		Within 0.5 Mile[c]	
	Acres	Number of Stands	Acres	Number of Stands	Acres	Number of Stands
Aspen	--	--	--	--	16.8	1
Norway pine	0.1	1	--	--	43.5	3
White cedar	--	--	--	--	28.3	1
TOTAL	**0.1**	**1**	--	--	**88.5**	**5**

Source: Minnesota DNR 2016c.

[a] Sum of Enbridge-provided construction work area, additional temporary workspaces (including pipe yards), and temporary access roads.

[b] Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

[c] Minnesota native plant community systems within 0.5 mile of the centerline of the pipeline route.

Notes:

Old-growth forest as identified by Timber Status = 5 (designated old-growth) and 7 (potential or future old-growth)

See Appendix K, Table K-9 for additional detail.

"--" = no occurrence

Spread of Noxious Weeds and Invasive Plants

Eight weed species listed as by the Minnesota Noxious Weed Act, and 12 other invasive plant species, occur near or within 0.5 mile of route alternative RA-07 (Table 6.3.3-9). Disturbed soil in cleared construction and work areas would be susceptible to invasion by noxious weeds and invasive plants that already occur within the vicinity. Establishment of these species often inhibit regeneration of native plants. Of all route options between Clearbrook and Carlton, RA-07 has the greatest number of potential noxious weed occurrences and would disturb the largest area of vegetation during construction activities. Impacts associated with invasion of noxious weeds are difficult to quantify; however, impacts likely would be short-term and minor, as noxious weeds and invasive plant management measures would be in place during and after construction, as identified in the Applicant's Environmental Protection Plan (Appendix E). This plan details noxious weed and invasive plant control measures for construction, and management of noxious weeds and invasive species for the operational life of the pipeline. The Project would be required to manage all noxious weeds (including those not identified in Table 6.3.3-5) for which federal, state, or local (county or city) agency management policies or regulations exist. Measures to ensure that the spread of weeds is minimized include equipment cleaning, use of weed-free mulch, and use of weed-free seed mix. Consequently, impacts from the spread of noxious weeds and invasive plants during construction of RA-07 would be short term and minor.

Operations Impacts

Loss or Alteration of Vegetation Cover

Operation of RA-07 would affect 936 acres of vegetation (Table 6.3.3-23). This alternative is dominated by woody wetlands, deciduous forest, and emergent herbaceous wetlands vegetation cover. Approximately 478 acres of forested uplands and wetlands would be permanently maintained as

scrub/shrub, grassland, or emergent herbaceous wetland vegetation during operation, resulting in permanent major impacts on forested vegetation.

Loss or Alteration of Native Plant Communities

Operations associated with RA-07 would affect 3.8 acres in three native plant community systems (Table 6.3.3-24), no conservation-ranked rare native plant communities (Table 6.3.3-25), and no old-growth forest (Table 6.3.3-26). These communities would have been subjected to construction impacts and are not expected to persist or reestablish within the permanent right-of-way. If they did persist, short-term minor impacts could periodically occur during pipeline operation, as maintenance work may occur in previously disturbed rare native plant communities for the life of the Project.

Spread of Noxious Weeds and Invasive Plants

Eight weed species listed as by the Minnesota Noxious Weed Act, and 12 other invasive plant species, occur near or within 0.5 mile of route alternative RA-07 (Table 6.3.3-9). Operations-related impacts associated with noxious weeds for the route would be identical to those identified for the Applicant's preferred route (i.e., permanent and minor).

Route Alternative RA-08

Construction Impacts

Loss or Alteration of Vegetation Cover

All of the RA-08 Clearbrook-to-Carlton segment would be co-located next to the existing pipeline corridor that has been exposed to previous pipeline construction and operation disturbances. Construction of RA-08 would affect 2,287 acres of vegetation (Table 6.3.3-27). This alternative route is dominated by woody wetlands (28 percent), deciduous forest (26 percent), emergent herbaceous wetlands (14 percent), and hay/pasture (13) landcover classes. Clearing the construction work area would affect approximately 1,424 acres of forested communities, resulting in long-term to permanent major impacts on those communities (Table 6.3.3-27).

Table 6.3.3-27. Estimated Impacts on Vegetation Cover for Route Alternative RA-08 between Clearbrook and Carlton

Vegetation Cover	Construction Work Area[a]		Permanent Right-of-Way[b]	
	Acres	Percent	Acres	Percent
Evergreen forest	106	5	44	5
Deciduous forest	592	26	246	26
Mixed forest	75	3	31	3
Scrub/shrub	124	5	52	5
Grassland/herbaceous	81	4	35	4
Hay/pasture	304	13	128	13
Cultivated crops	32	1	13	1
Woody wetlands	651	28	270	28
Emergent herbaceous wetlands	319	14	135	14
Barren land	3	0	1	0
TOTAL	**2,286**	100	**955**	100

Source: Homer et al. 2015.

[a] Estimated 120-foot-wide construction work area centered on pipeline route, includes the 50-foot-wide permanent right-of-way.

[b] Estimated operations area based on 50-foot-wide permanent right-of-way centered on the pipeline route.

Note:

See Appendix K, Table K-6 for additional detail.

Loss or Alteration of Native Plant Communities

Construction of RA-08 would result in long-term to permanent major impacts on 50 acres of six forested and wet meadow/peatland/fen native plant community systems (Table 6.3.3-28), 2.1 acres of

disturbance to one white cedar old-growth forest (Table 6.3.3-30), and one HCVF (Floodwood Bog). No conservation-ranked rare native plant communities would be affected.

Table 6.3.3-28. Estimated Impacts on Native Plant Community Systems and MBS Sites for Route Alternative RA-08 between Clearbrook and Carlton

Native Plant Community System	MBS Site Biodiversity Significance Rating[a]	Construction Work Area[b]		Permanent Right-of-Way[c]		Within 0.5 Mile[d]	
		Acres	No.	Acres	No.	Acres	No.
Acid peatland system	High	37.2	9	15.9	8	2,580.0	42
Fire-dependent forest/woodland system	High	--	--	--	--	9.5	1
	Moderate	--	--	--	--	148.2	4
Forested rich peatland system	High	2.0	2	0.6	1	330.4	14
	Moderate	2.3	1	0.4	1	412.9	9
Mesic hardwood forest system	High	3.9	3	1.6	2	229.1	26
	Moderate	--	--	--	--	3.5	1
Open rich peatland system	Moderate	2.9	2	1.2	2	168.2	4
Wet forest system	High	1.3	1	0.6	1	301.2	10
Wet meadow/Carr system	High	0.4	1	0.2	1	11.7	2
	Moderate	--	--	--	--	39.2	3
TOTAL		**50.1**	**19**	**20.6**	**16**	**4,233.9**	**116**

Sources: Minnesota DNR 2016b, 2016e.

[a] Systems occurring within Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites) are given these ranks (Minnesota only):
Outstanding = Sites containing the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes.
High = Sites containing very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes.
Moderate = Sites containing occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery.
Below = Sites below minimum biodiversity threshold for statewide significance. These sites lack occurrences of rare species or natural features or do not meet Minnesota Biological Survey standards for outstanding, high, or moderate rank.
(blank) = no corresponding Biodiversity Significance Rank

[b] Sum of Enbridge-provided construction work area, additional temporary workspaces (including pipe yards), and temporary access roads.

[c] Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

[d] Minnesota native plant community systems within 0.5 mile of the centerline of the pipeline route.

Note:

See Appendix K, Table K-7 for additional detail.

"--" = no occurrence

Table 6.3.3-29. Estimated Impacts on Rare Native Plant Communities for Route Alternative RA-08 between Clearbrook and Carlton

Native Plant Communities	MBS Site Biodiversity Significance Rating[a]	Conservation Rank[b]	Construction Work Area[c]		Permanent Right-of-Way[d]		Within 0.5 Mile[e]	
			Acres	No.	Acres	No.	Acres	No.
Aspen – birch – fir forest	Moderate	S3	--	--	--	--	3.5	1
Jack pine – (yarrow) woodland	Moderate	S1 or S2	--	--	--	--	100.7	2
Oak – aspen forest	Moderate	S3	--	--	--	--	47.5	2
TOTAL			--	--	--	--	**151.8**	**5**

Sources: Minnesota DNR 2016b, 2016e, 2016d.

[a] Systems occurring within Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites) are given these ranks (Minnesota only):
Outstanding = Sites containing the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes.
High = Sites containing very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes.
Moderate = Sites containing occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery.
Below = Sites below minimum biodiversity threshold for statewide significance. These sites lack occurrences of rare species or natural features or do not meet Minnesota Biological Survey standards for outstanding, high, or moderate rank.
(blank) = no corresponding Biodiversity Significance Rank

[b] S1 = critically imperiled, S2 = imperiled, S3 = vulnerable to extirpation.

[c] Sum of Enbridge-provided construction work area, additional temporary workspaces (including pipe yards), and temporary access roads.

[d] Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

[e] Minnesota native plant community systems within 0.5 mile of the centerline of the pipeline route.

Note:

See Appendix K, Table K-8 for additional detail.

"--" = no occurrence

Table 6.3.3-30. Estimated Impacts on Old-Growth Forest Communities for Route Alternative RA-08 between Clearbrook and Carlton

Main Cover Type	Construction Work Area[a]		Permanent Right-of-Way[b]		Within 0.5 Mile[c]	
	Acres	Number of Stands	Acres	Number of Stands	Acres	Number of Stands
Aspen	--	--	--	--	23.3	2
Birch	--	--	--	--	3.1	1
Northern hardwoods	--	--	--	--	11.5	2
White pine	--	--	--	--	22.0	3
White cedar	2.1	1	0.9	1	28.6	2
TOTAL	**2.1**	**1**	**0.9**	**1**	**88.4**	**10**

Sources: Minnesota DNR 2016c.

[a] Sum of Enbridge-provided construction work area, additional temporary workspaces (including pipe yards), and temporary access roads.

[b] Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (including valve pads and driveways).

[c] Minnesota native plant community systems within 0.5 mile of the centerline of the pipeline route.

Notes:

Old-growth forest as identified by Timber Status = 5 (designated old-growth) and 7 (potential or future old-growth

See Appendix K, Table K-9 for additional detail.

"--" = no occurrence

Spread of Noxious Weeds and Invasive Plants

Six weed species listed as by the Minnesota Noxious Weed Act, and 13 other invasive plant species, occur near or within 0.5 mile of route alternative RA-08 (Table 6.3.3-11). Disturbed soil in cleared construction and work areas would be susceptible to invasion by noxious weeds and invasive plants that already occur within the vicinity. Establishment of these species often inhibit regeneration of native plants. Impacts associated with invasion of noxious weeds are difficult to quantify; however, impacts likely would be short-term and minor, as noxious weeds and invasive plant management measures would be in place during and after construction, as identified in the Applicant's Environmental Protection Plan (Appendix E). This plan details noxious weed and invasive plant control measures for construction, and management of noxious weeds and invasive species for the operational life of the pipeline. The Project would be required to manage all noxious weeds (including those not identified in Table 6.3.3-11) for which federal, state, or local (county or city) agency management policies or regulations exist. Measures to ensure that the spread of weeds is minimized include equipment cleaning, use of weed-free mulch, and use of weed-free seed mix. Consequently, impacts from the spread of noxious weeds and invasive plants during construction of RA-08 would be short term and minor.

Operations Impacts

Loss or Alteration of Vegetation Cover

Operation of RA-08 would affect 954 acres of vegetation (Table 6.3.3-27). This route is dominated by woody wetlands, deciduous forest, and emergent herbaceous wetlands vegetation cover. Approximately 591 acres of forested uplands and wetlands would be permanently maintained as scrub/shrub, grassland, or emergent wetland vegetation during operation of the pipeline, resulting in permanent major impacts on forested vegetation.

Loss of Alteration of Native Plant Communities

Operation of RA-08 would affect 20.6 acres in five native plant community systems (Table 6.3.3-28), no impacts on conservation-ranked rare native plant communities (Table 6.3.3-29), one acre of disturbance to a single stand of old-growth white cedar forest, and one HCVF (Table 6.3.3-30). These communities would have been subject to construction impacts and are not expected to persist or to reestablish within the permanent right-of-way. If they did persist, short-term minor impacts could periodically occur during pipeline operation, as maintenance work may occur in previously disturbed rare native plant communities for the life of the Project.

Spread of Noxious Weeds and Invasive Plants

Six weed species listed as by the Minnesota Noxious Weed Act, and 13 other invasive plant species, occur near or within 0.5 mile of route alternative RA-08 (Table 6.3.3-11). Operations-related impacts associated with noxious weeds would be identical to those identified for the Applicant's preferred route (i.e., permanent and minor).

6.3.3.4 Summary and Mitigation

6.3.3.4.1 Summary

The potential impacts on all vegetation types for the Applicant's preferred route and route alternatives between Clearbrook and Carlton are summarized in Table 6.3.3-31. This includes a summary of construction- and operations-related impacts on existing landcover, Minnesota MBS Sites and native plant communities, as well as potential impact from the spread of noxious weeds and invasive plants. The area from Clearbrook to Carlton was evaluated because all route options follow the same route from Neche, North Dakota, to Clearbrook and from Carlton to Superior, Wisconsin.

Avoidance and minimization measures considered in the assessment of impacts included rerouting the pipeline, use of HDD, and preparation of, and adherence to, an agency-approved site-specific crossing plan. The impact assessment also considered the effects of implementation of BMPs during construction and operation as well as revegetation and reclamation commitments for the pipeline rights-of-way, which would be similar for all route options.

The BMPs that the Applicant would incorporate into the Project to minimize impacts on vegetation are presented in the revegetation and monitoring guidance portion of the Applicant's Environmental Protection Plan (Appendix E). Following construction, the entire pipeline right-of-way would be reclaimed following the guidance presented in this document, including implementation of compaction prevention measures, seeding, plantings, application of soil amendments, and a period of monitoring to document stabilization of the right-of-way. In areas where soil quality is a concern for revegetation, applicable agencies would be consulted to develop seed mixes and seeding dates adapted to the immediate areas of concern.

In addition, the Applicant committed to preparation and implementation of the following plans, procedures, and general vegetation protection measures during construction:

- Co-locate construction within and near existing utility corridors to minimize environmental impacts;
- Develop and adhere to Project-specific construction methods and procedures for vegetation clearing methods, including treatment of existing vegetation, topsoil segregation, storage, and reapplication;
- Restore preconstruction contours and use slope breakers, sediment barriers, mulch, geotextile fabric, and other erosion control devices to stabilize the disturbed areas during the vegetation re-growth phase and reduce runoff into the adjacent environment;
- Co-locate the Project with existing rights-of-way where feasible;
- Design and plan pipeline construction (including parking, access, and temporary work areas) to reduce environmental impacts on sensitive plant communities, such as rare native plant communities, calcareous fens, wetland vegetation, old-growth forests, and prairie vegetation;
- Inspect and clean all equipment prior to bringing it to the site to prevent the introduction and spread of invasive species; and
- Use certified weed-free mulch, topsoil, and seed mix.

Impacts on rare plant communities that cannot be avoided would be addressed through implementation of the Project's approved revegetation and monitoring measures, and invasive and noxious weed control measures outlined in the Environmental Protection Plan (Appendix E). Measures that would be implemented to prevent the spread of noxious and invasive weeds during construction include minimizing the time between ground-disturbing work and site reclamation and reseeding, staking avoidance areas at known weed locations, and implementing other BMPs.

Prior to construction, the lead and assisting agencies would be consulted on identification of any additional avoidance and mitigation measures for rare plant communities, old-growth forests, and HCVFs that are within the selected route and could be affected by construction or operation. Avoidance measures could include minor pipeline route adjustments, use of directional drilling, or preparation of and adherence to an agency-approved site-specific crossing plan.

Construction Impacts

General types of construction impacts would be the same for all route options. Many impacts on vegetation would be short term and minor, while other impacts would be permanent and major within the footprint of the aboveground facilities and the permanent right-of-way. Impacts at specific locations along all the alternative routes where the existing vegetation can recover are anticipated to be minor, with appropriate use of BMP construction and operation practices. However, others will need to be maintained in a way that prohibits return to its existing state, and will be permanently altered or removed. Due to the great lengths of all alternatives, the total impact would be additive and distributed along the routes. The importance of these impacts is determined by the distance of the alternative, number of vegetation communities affected, and the quality of vegetation resources affected.

Loss or Alteration of Vegetation Cover

The total acreage of vegetation affected during construction would range from 5,082 acres for the Applicant's preferred route to 2,287 acres for RA-08, in the portions of the routes from Clearbrook to Carlton. The potential impacts on forested land, including woody wetlands, would be long term to permanent and major for all route options due to the long period of time required for forest regeneration. The Applicant's preferred route would affect the most forest land, RA-03AM would affect the least.

Areas cleared of other vegetation types during pipeline construction, including grassland/herbaceous, hay/pasture, cultivated crops, and emergent wetlands vegetation cover class types, would be reclaimed after construction to the specifications or conditions of the authorizing/permitting agency. The recovery period for these areas would range from a single growing season to several years. As a result, the impacts would be short term and minor. RA-07 would affect substantially more grasslands, and the Applicant's preferred route would affect more croplands and pasture, than the other route alternatives.

All of the route options except RA-06 would be co-located to varying extents with existing pipelines, electrical transmission lines, or roads, which would reduce the effects of clearing and grading since some of those areas were previously disturbed. RA-06 would be constructed within a new pipeline corridor, in many areas across previously undisturbed vegetation communities.

Loss or Alteration of Rare Native Plant Communities

Rare native plant communities would be affected due to construction of each route alternative. These impacts typically would be long term to permanent and major because these communities generally would be lost or degraded. The Applicant's preferred route would affect the largest area of rare native plant communities during construction and RA-06 would not affect such communities. This estimated effect may be underestimated, however, because the native plant communities crossed by RA-06 may not be as completely surveyed and mapped as elsewhere. Only RA-07 and RA-08 would affect old-growth forest, with RA-08 affecting the most, along with one HCVF. These impacts would be long term to permanent and major.

Spread of Noxious Weeds and Invasive Plants

Noxious weed and invasive plant management and control would be implemented during construction to minimize the effect of noxious weeds. The potential for impacts due to the spread of noxious weeds and invasive plants during construction would be about the same for all route options, although RA-07 and RA-08 support substantially more infestations than the other route alternatives. For all route options, the impact of noxious weeds and invasive species during construction would be short term and minor, with implementation of weed control BMPs and other actions included in the Applicant's Environmental Protection Plan (Appendix E).

Operations Impacts

Loss or Alteration of Vegetation Cover

Vegetation management activities during pipeline operations would prevent trees and large shrubs from reestablishing within the pipeline permanent right-of-way. The greatest effect would be on 951 acres of previously forested areas within the permanent right-of-way for the Applicant's preferred route, and the least effect would be about 478 acres of previously forested area for RA-07. The impact for all route options would be permanent and major. The forested and scrub/shrub areas cleared from the

construction work area and outside of the permanent right-of-way would be allowed to regenerate, but the process would take decades to reach full recovery.

The Applicant's Integrity Management Program would require periodic excavation to repair or replace sections of pipe segments, which would affect the vegetative cover of the permanent right-of-way. Because the Applicant's preferred route and all of the route alternatives would be new pipelines and there would not be a difference in age of the pipe, and the lengths of the routes area similar, there would not be a substantial difference anticipated in the number of integrity digs. Therefore, there would not be a substantial difference in the impacts on vegetation due to this activity.

Loss or Alteration of Rare Native Plant Communities

Potential operations impacts on rare native plant communities would be expected to be minor because these communities are unlikely to persist within the permanent right-of-way after construction activities. Vegetation management and integrity digs could result in recurring impacts on previously disturbed rare native plant communities if these communities continued to persist within the permanent right-of-way, but there likely would not be a difference in impacts among the route options due to these activities. If rare native plants persist in the permanent right-of-way after construction, the Applicant's preferred route could support the largest number of rare native plant communities within the permanent right-of-way, followed by RA-03AM. Maintenance activities for the other route alternatives would not affect rare native plant communities. RA-08 is the only route alternative for which maintenance activities during operation would affect areas of HCVF and previous old-growth forest, should they persist following construction activities.

Spread of Noxious Weeds and Invasive Plants

As a result of implementation of a Noxious Weed and Invasive Plant Management and Control Plan, in the Applicant's Environmental Protection Plan (Appendix E) for the route options, the risk of spreading infestations of noxious weeds and invasive plants during operations would be similar for all the pipeline routes. The impacts would be permanent and minor for all routes, although RA-03AM would have a slightly greater area potentially affected than the Applicant's preferred route and other route alternatives due to its greater length.

6.3.3.4.2 Mitigation

In addition to the avoidance and minimization measures and BMPs that the Applicant has identified, Minnesota DNR identified the following mitigation measures that could reduce impacts on vegetation:

- Defining equipment cleaning methods and inspection standards to ensure that equipment is free of invasive species, and on Minnesota DNR lands following Operational Order 113, would further reduce the spread of noxious weeds and invasive plants and animals.
- Replanting appropriate tree species for restoration within cleared forested areas to reduce the recovery time, prevent changes in watershed hydrology and runoff impacts that could alter stream geomorphology.
- Woody vegetation would not typically be cleared at ATWS. If clearing of woody vegetation is necessary, potential mitigation to offset the clearing could include reestablishing or enhancing the existing cover type within up to 50 feet of surface waters, depending on topography. On state forest lands or WMAs, tree planting may be desired for all temporary workspaces within

the property boundary to reduce erosion and runoff, and to reestablish trees for potential future large woody habitat recruitment to streams and rivers.

- In counties where oaks are affected by oak wilt disease caused by a non-native fungus, seasonal restrictions on tree clearing would reduce the chance of sap-sucking beetles transporting fungal spores through fresh wounds during the infection period that extends from April through July.
- Removal, debarking, or chipping of cut pines and pine slash larger than 3 inches in diameter within 3 weeks of cutting during May through mid-August would prevent pine bark beetle outbreaks in pine stands.

Table 6.3.3-31 Summary of Potential Impacts on Vegetation for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route[a]	Route Alternative RA-03AM[b]	Route Alternative RA-06[b]	Route Alternative RA-07[c]	Route Alternative RA-08[b]
Construction Impacts					
Loss or alteration of vegetation cover	Permanent minor impacts • 656 acres vegetation replaced with aboveground facilities Long-term to permanent/ major impacts • 2,050 acres of forests/woody wetlands • 243 acres of scrub/shrub Short-term/minor impacts • 164 acres of grasslands • 2,364 acres of croplands and pasture • 249 acres of herbaceous wetlands No impacts • 12 acres of barren land • 5,082 acres total • 72% adjacent to existing corridors	Long-term to permanent/ major impacts • 1,329 acres of forests/woody wetlands • 191 acres of scrub/shrub Short-term/minor impacts • 143 acres of grasslands • 1,596 acres of croplands and pasture • 315 acres of herbaceous wetlands No impacts • 5 acres of barren land • 3,579 acres total • 95% adjacent to existing corridors	Long-term to permanent/ major impacts • 1,797 acres of forests/woody wetlands • 251 acres of scrub/shrub Short-term/minor impacts • 116 acres of grasslands • 256 acres of croplands and pastures • 223 acres of herbaceous wetlands No impacts • 31 acres of barren land • 2,674 acres total • All new corridor	Long-term to permanent/ major impacts • 2,203 acres of forests/woody wetlands • 277 acres of scrub/shrub Short-term/minor impacts • 405 acres of grasslands • 402 acres of croplands and pasture • 536 acres of herbaceous wetlands No impacts • 10 acres of barren land • 3,833 acres total • All within existing corridor	Long-term to permanent/ major impacts • 1,424 acres of forests/woody wetlands • 124 acres of scrub/shrub Short-term/minor impacts • 81 acres of grasslands • 336 acres of croplands and pasture • 319 acres of herbaceous wetlands No impacts • 3 acres of barren land • 2,287 acres total • All adjacent to existing corridor

Table 6.3.3-31 Summary of Potential Impacts on Vegetation for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route[a]	Route Alternative RA-03AM[b]	Route Alternative RA-06[b]	Route Alternative RA-07[c]	Route Alternative RA-08[b]
Loss or alteration of rare native plant communities	Long-term to permanent/ major impacts • 45.5 acres of rare native plant communities No impact • Old-growth forests or HCVFs	Long-term to permanent/ major impacts • 20.3 acres of rare native plant communities No impact • Old-growth forests or HCVFs	No impacts to rare native plant communities, old-growth forests, or HCVFs	Long-term to permanent/ major impacts • 2.7 acres of rare native plant communities • 0.1 acre old-growth forest No impact • HCVFs	Long-term to permanent/ major impacts • 2.1 acres of old-growth forest • One HCVF
Spread of noxious weeds and invasive plants	Short-term/minor impacts • 6 MN-listed species, 12 invasive species • 413 occurrences	Short-term/minor impacts • 6 MN-listed species, 17 invasive species • 314 occurrences	Short-term/minor impacts • 3 MN-listed species, 10 invasive species • 408 occurrences	Short-term/minor impacts • 8 MN-listed species, 12 invasive species • 1,002 occurrences	Short-term/minor impacts • 6 MN-listed species, 13 invasive species • 665 occurrences

Table 6.3.3-31 Summary of Potential Impacts on Vegetation for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route[a]	Route Alternative RA-03AM[b]	Route Alternative RA-06[b]	Route Alternative RA-07[c]	Route Alternative RA-08[b]
Operations Impacts					
Loss or alteration of vegetation cover	Permanent minor impacts • 291 acres vegetation replaced with aboveground facilities Permanent/major impacts • 951 acres of forests/woody wetlands Short-term/minor impacts • 125 acres of scrub/shrub • 73 acres of grasslands • 937 acres of croplands/pasture • 132 acres of herbaceous wetlands No impacts • 2 acres of barren land • 2,220 acres total	Permanent/major impacts • 547 acres of forests/woody wetlands Short-term/minor impacts • 80 acres of scrub/shrub • 61acres of grasslands • 671 acres of croplands and pasture • 134 acres of herbaceous wetlands No impacts • 2 acres of barren land • 1,495 acres total	Permanent/major impacts • 748 acres of forests/woody wetlands Short-term/minor impacts • 104 acres of scrub/shrub • 49 acres of grasslands • 107 acres of croplands and pasture • 94 acres of herbaceous wetlands No impacts • 13 acres of barren land • 1,115 acres total	Permanent/major impacts • 478 acres of forests/woody wetlands Short-term/minor impacts • 83 acres of scrub/shrub • 107 acres of grasslands • 111 acres of croplands and pasture • 154 acres of herbaceous wetlands No impacts • 3 acres of barren land • 936 acres total	Permanent/major impacts • 591 acres of forests/woody wetlands Short-term/minor impacts • 52 acres of scrub/shrub • 35 acres of grasslands • 141 acres of croplands and pasture • 135 acres of herbaceous wetlands No impacts • 1 acre of barren land • 955 acres total
Loss or alteration of rare native plant communities	Short-term/minor impacts from maintenance • 17.9 acres of rare native plant communities No impact • old-growth forests or HCVFs	Short-term/minor impacts from maintenance • 9.9 acres of rare native plant communities No impact • old-growth forests or HCVFs	No impact • rare native plant communities, old-growth forests, or HCVFs	No impact • rare native plant communities, old-growth forests, or HCVFs	Short-term/minor impacts from maintenance • 0.9 acre of old-growth forest • 1 HCVF No impact • rare native plant communities

Table 6.3.3-31 Summary of Potential Impacts on Vegetation for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route[a]	Route Alternative RA-03AM[b]	Route Alternative RA-06[b]	Route Alternative RA-07[c]	Route Alternative RA-08[b]
Spread of noxious weeds and invasive plants	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts

[a] Enbridge-provided footprint for construction work area, Enbridge-provided footprint for permanent right-of-way.

[b] Estimated 120-foot-wide construction work area centered on pipeline route, includes the 50-foot-wide permanent right-of-way; estimated operations area based on 50-foot-wide permanent right-of-way centered on pipeline route.

[c] Estimated 205-foot-wide construction work area, with 10-feet-wide on the north side of Line 3 and 195-feet-wide on the south side of Line 3, includes the permanent right-of-way; estimated operations area based on 50-foot-wide permanent right-of-way centered on pipeline route.

HCVF = high conservation value forest

6.3.3.5 References

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6.3.4 Fish and Wildlife

Fish and wildlife provide important social and cultural resources; they are managed by federal and state agencies for consumption and conservation. The general Project area supports a diversity of fish and wildlife, including coldwater, coolwater, and warmwater fisheries; reptiles, amphibians, and mammals including big and small game mammals; fur-bearing mammals; and nongame mammal species; and various bird species, including both game and non-game species. Lakes, rivers, streams, and wetlands provide habitat for fish as well as for aquatic and terrestrial wildlife. Wildlife habitats include a variety of vegetation communities that provide forage opportunities, shelter, overwintering, migration stopover, and breeding habitats for a wide variety of wildlife.

This section identifies the common and abundant fish and wildlife resources that may be affected by construction or operation of the Applicant's preferred route or the other alternative routes in Minnesota. It also presents the assessment of the potential for construction and operation of the preferred route or other alternative routes to affect those resources.

This section first describes the regulations relevant to assessing impacts on fish and wildlife resources, the methods used to conduct the impact assessment, and the existing conditions within the defined ROIs (identified below). The potential construction- and operations-related impacts on fish and wildlife for the Applicant's preferred route and the route alternatives (RA-03AM, RA-06, RA-07, and RA-08) are presented next. A summary and comparison of the impacts for the route alternatives between Clearbrook and Carlton are included at the end of the section, along with potential mitigation measures that could minimize impacts.

Wildlife protected under state and federal endangered species regulations are addressed in Section 6.3.5. ORVWs are addressed in Section 6.3.1.2. Potential impacts on fish and wildlife resources from an unanticipated crude oil release are addressed in Chapter 10.

6.3.4.1 Regulatory Context and Methodology

6.3.4.1.1 Regulatory Context

Regulations pertaining to fish and wildlife are managed by federal (e.g., USFWS) and state (e.g., Minnesota DNR) natural resources agencies. The goal of these agencies is to conserve, protect, and enhance fish, wildlife, and other natural resources for the benefit of the public. Fish, wildlife, and their habitats that are protected under federal and state endangered species or other protective regulations for special or unique resources are discussed in Section 6.3.5. Other federally enacted regulations provide protection for fish and wildlife not otherwise protected under the Endangered Species Act of 1973 (ESA), as amended. These include the Migratory Bird Treaty Act of 1918 (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). USFWS has statutory authority and responsibility for enforcing the MBTA (16 U.S.C. 703–712; 40 Stat. 755 as amended), and the BGEPA (16 U.S.C. 66-8-668d).

The MBTA makes it illegal for anyone to capture, kill, or possess migratory birds, or any parts, nests, or eggs of any migratory bird except under terms of a valid permit issued pursuant to federal regulations. In addition to the MBTA, Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," further directs executive departments and agencies to promote migratory bird conservation conventions to protect migratory birds and their habitats, including migratory waterfowl and game birds. The MBTA prohibits the take of any migratory bird without prior authorization from USFWS. "Migratory birds" are all species native to the United States or its territories. Non-native birds

(e.g., house sparrow [*Passer domesticus*], European starling [*Sturnus vulgaris*]) are not protected under the MBTA (USFWS 2016a).

Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are additionally protected under the BGEPA. This act prohibits anyone from taking (i.e., pursuing, shooting or shooting at, poisoning, wounding, killing, capturing, trapping, molesting, or disturbing) eagles, including their parts (e.g., feathers), nests, or eggs (USFWS 2016b). This definition also covers impacts from human-induced alterations at nest sites when eagles are not present; therefore, if removal, relocation, or destruction of an eagle nest is necessary and unavoidable, a permit and consultation with USFWS would be required. Minnesota also issues permits for removal or disturbance of active and inactive bald eagle and osprey (*Pandion haliaetus*) nests per its statutory authority as provided by Chapter 97A (Game and Fish), Part 97A.045 (Commissioner, General Powers and Duties), Subdivision 2 (Power to Protect Wild Animals).

The National Invasive Species Act (16 U.S.C. 4701) is a federal law that requires state management plans along with regional panels to actively fight the spread of aquatic invasive species in U.S. waterways. Minnesota DNR regulates the state's invasive species laws (Minn. Stat. § 84D and Minn. R. 6216).

Minnesota DNR regulates potential effects on Minnesota's public lands and waters; crossing these areas requires a license, which could in turn require mitigation measures. Minnesota DNR has jurisdiction over wildlife in Minnesota and administers the Minnesota outdoor recreation system, including WMAs, Scientific Natural Areas, state parks, and state forests. As with USFWS, Minnesota DNR encourages project applicants to consult with them to ascertain a project's potential to affect state-listed threatened and endangered species and to identify possible mitigation measures. Minnesota DNR also regulates water withdrawals from both groundwater and surface water sources, and requires a permit for withdrawals in excess of 10,000 gpm or 1 million gallons per year. A detailed discussion of the regulatory framework for all aspects of the Project is provided in Chapter 3.

6.3.4.1.2 Methodology

The methods used to assess potential impacts on fish and wildlife resources and their habitats from construction and operation of the Applicant's preferred route and route alternatives are described in this section. The ROI for this evaluation encompassed the area that could be affected, including indirectly, by pipeline construction and operation within 0.5 mile of the route centerlines. As described below, the assessment of potential direct impacts focused on the areas directly affected by construction and operation activities. Where appropriate, a larger region was considered to describe existing resources and evaluate activities that would occur more than 0.5 mile from the route. Invasive species locations were identified within 1 mile from the route centerlines. Additional information specific to the Applicant's preferred route in Minnesota and the route alternatives between Clearbrook and Carlton are provided below.

The impact analysis identified changes to fish and wildlife resources and their habitats, including consideration of the following:

- Fish and aquatic habitats
  - Fish distribution and habitat use, muskellunge (*Esox masquinongy*) waters, designated trout streams and lakes, and mussel concentration areas; and
  - Lakes, rivers, and streams, AMAs, Fish Index of Biotic Integrity (Fish IBI) Lakes, waters infested with aquatic invasive species, Lakes of Biological Significance, and Sentinel Lakes.

- Wildlife and wildlife habitats
  - Wildlife distribution and habitat use, raptor nests and colonial waterbird colonies; and
  - Vegetated land cover, designated wildlife conservation areas (e.g., WMAs, waterfowl production areas, wetland management districts, U.S. Bureau of Land Management (BLM) land, federal and state forests, state parks, recreation areas, natural areas, nature preserves, scenic trails, and private conservation areas), and Audubon Important Bird Areas (IBAs).

The methods used to evaluate potential impacts on fisheries and aquatic habitats, and on wildlife and wildlife habitats are described below.

Fisheries and Aquatic Habitat

Descriptions of fish, fisheries, aquatic habitats, and aquatic invasive species were obtained from publicly available sources published by federal and state agencies, including data from USFWS, USGS, and Minnesota DNR.

Minnesota has several methods of classification used to identify, manage, or rate waterbodies in relation to water quality or habitat. The analysis of Project impacts considered the proximity of the Applicant's preferred route and the route alternatives to classified waterbodies or areas, including AMAs, Sentinel Lakes, Lakes of Biological Significance, designated wildlife lakes, and waterbodies assigned an IBI. These management units are described below. Additional waterbody classifications specific to individual species (e.g., trout streams and muskellunge lakes) also were included in the analysis.

<u>Management Units Considered</u>

Aquatic Management Areas were established by the State of Minnesota to "protect, develop and manage lakes, rivers, streams, and adjacent wetlands and lands that are critical for fish and other aquatic life for water quality, and for their intrinsic biological value, public fishing, or other compatible outdoor recreational uses" (Minn. Stat. 86A, Subd. 14). In Minnesota, the demand for shoreline property is high, and such areas are rapidly being developed. Minnesota DNR acquires riparian shoreline parcels to designate as AMAs in order to (1) establish protections for critical fish and wildlife habitat; (2) ensure that non-boat public access to water resources will always be available; and (3) ensure that habitat can be developed in previously disturbed areas (Minnesota DNR 2016a). North Dakota and Wisconsin do not specifically designate AMAs but manage more general wildlife areas for hunting, fishing, trapping, and other recreational activities (see Section 5.2.4.2.3).

Sentinel Lakes were designated to model and monitor Minnesota Lake ecosystems for detection and better understanding of environmental stressors in order to guide management that sustains fisheries and water resources for future generations (Minnesota DNR 2016b).

Lakes of Biological Significance were identified and classified by Minnesota DNR subject matter experts based on objective criteria for four community types (aquatic plants, fish, amphibians, and birds). Unique plant or animal presence is the primary measure of a lake's biological significance. Lakes are assigned one of three biological significance classes:

- Outstanding – Plants: high aquatic plant richness, high floristic quality, and a population of an endangered or threatened plant; important wild rice lakes. Fish: exceptional fishery for selected game fish or an outstanding nongame fish community. Birds: endangered or threatened colonial

waterbird nesting area; presence of several endangered, threatened or special concern lake bird species; or six or more lake bird SGCN.[15]

- High – Plants: high aquatic plant richness, high floristic quality, or a population of an endangered or threatened plant. Fish: populations of more than one fish of special concern or SGCN. Birds: colonial waterbird nesting area; history of endangered or threatened colonial waterbird nesting; presence of endangered, threatened, or special concern lake bird species or five lake bird SGCN. Amphibians – mudpuppy presence.
- Moderate – Plants: high aquatic plant richness, high floristic quality, or a population of an endangered or threatened plant. Fish: populations of one fish species of special concern or fish SGCN. Birds: history of colonial waterbird nesting; presence of an endangered, threatened or special concern lake bird species; or several lake bird SGCN (Minnesota DNR 2015a).

Designated Wildlife Lakes in Minnesota include 56 public lakes covering over 56,000 acres that are designated, reserved, and managed for wildlife. Most of the 56 lakes are located in the southern portion of the state where watersheds have been highly modified to improve drainage. Management of designated wildlife lakes includes temporary lowering of lake levels to improve wildlife habitat, and includes regulation of motorized watercraft and recreational vehicles.

Index of Biotic Integrity is a biologically based method for measuring the integrity of aquatic systems that incorporates fish data on species richness, community assemblage, and trophic composition. Each metric represents an aspect of the biological assemblage structure, function, or other measurable characteristic that changes in some predictable way with increased human-induced stress. Fish IBI scores respond to differences in land use patterns, trophic state, and aquatic vegetation.

Other waterbodies evaluated include DNR fish hatcheries, muskellunge waters, and designated trout streams and lakes. In Minnesota, trout streams and lakes are designated to protect and foster the propagation of trout and provide fishing opportunities and angler access. Further detail for these waterbody classification systems is included in the discussions of existing conditions below.

Data Sources and Potential Impact Areas

Specific geospatial data sources evaluated for impacts on fish and aquatic habitats included:

- USGS National Hydrography Dataset;
- Minnesota DNR and Minnesota PCA geospatial data for:
  - AMAs (Minnesota DNR 2016a),
  - Sentinel Lakes (Minnesota PCA 2016),
  - Lakes with Fish IBI scores (Minnesota DNR 2014a),
  - Lakes of Biological Significance (Minnesota DNR 2015b),
  - Trout lakes and streams (Minnesota DNR 2015c),
  - Muskie lakes (Minnesota DNR 2008),

[15] Animals whose populations are rare, declining, or vulnerable to decline and are below levels desirable to ensure their long-term health and stability (Minnesota DNR 2006).

  - Infested Waters List (Minnesota DNR 2016d), and
  - Minnesota Natural Heritage Information System (NHIS) mussel concentration areas (Minnesota DNR 2016e); and
- USGS nonindigenous aquatic species (USGS NAS 2016).

Impacts on fish and aquatic habitats from construction of the Applicant's preferred route were evaluated within the Project footprints provided by the Applicant for the construction work area, ATWS, access roads, pipe yards, pipeline permanent right-of-way, valve pads and driveways, and pump stations. Using GIS, these footprints were overlain on the resource maps to identify the resources potentially affected. The potentially affected areas during operation of the Applicant's preferred route were identified in a similar manner, using a 50-foot-wide permanent right-of-way.

The resources potentially affected by route alternatives RA-03AM, RA-06, and RA-08 were estimated using a 120-foot-wide construction work area centered on the route alternative. For RA-07, a 205-foot-wide construction work area was used, with 10 feet on the north side of the existing Line 3 pipeline permanent right-of-way and 195 feet on the south side of the existing Line 3 pipeline permanent right-of-way. Operations comparisons for all route alternatives used a 50-foot-wide permanent right-of-way overlain on the available resource maps.

Additional analyses were performed to compare the aquatic habitat value of waters along the route alternatives between Clearbrook and Carlton. These comparisons were developed using Minnesota PCA's Watershed Health Assessment parameters for species richness, stream species quality, and habitat quality and connectivity (Minnesota DNR 2016f). Values for each of these parameters were compared for the Applicant's preferred route and route alternatives by calculating the mean weighted average for the index of interest of the watersheds crossed by each alternative. Results are presented below in Section 6.3.4.3.

The ROI for the fisheries and aquatic habitat evaluation encompasses the area that could be directly or indirectly affected by pipeline construction within 0.5 mile from the route centerlines because some construction activities and indirect effects may occur within areas beyond the construction work areas.

Wildlife and Wildlife Habitat

Descriptions of common wildlife (e.g., abundance, distribution, and seasonal sensitivity) and wildlife habitats were obtained from publicly available information published by Minnesota DNR, USFWS, USGS, and the National Audubon Society. Information on raptor nest locations was obtained from reports on raptor nest surveys completed for the Project (Merjent 2015a, 2015b); data were not collected for the route alternatives. Colonial waterbird nesting locations were evaluated based on NHIS data (Minnesota DNR 2016e).

Designated Management Units

The impacts analysis considered the proximity of the Applicant's preferred route and route alternatives to areas considered significant for conservation of wildlife or for preservation of wildlife habitat.

Wildlife conservation lands are presented under various naming conventions, including but not limited to, WMAs, waterfowl production areas, wetland management districts, BLM land, federal and state forests, state parks, recreation areas, natural areas, nature preserves, scenic trails, and private conservation areas. USGS Gap Analysis Program (GAP) data provide a compilation of these conservation

areas. Each area is assigned a status codes (1, 2, or 3) to indicate the level of protection and management objectives. All three of these GAP status codes include permanent protection from conversion of natural land cover over all or most of their area (USGS GAP 2013). GAP status 1 and 2 lands are managed for biodiversity, while GAP status 3 lands include areas managed for multiple uses. Minnesota's WMAs were established to protect lands and waters with productive habitat for fish and wildlife, as well as fish- and wildlife-oriented recreation (e.g., hunting, fishing, and bird watching) (Minnesota DNR 2016f).

Audubon IBAs established by the National Audubon Society (rather than by state or federal agencies) are a useful management tool to identify areas that contain vital resources for birds and may concentrate birds. Audubon IBAs include both public and private lands and lack formal protections. IBAs are identified through a rigorous process by bird experts. Each IBA represents a place that supports species of conservation concern (e.g., threatened and endangered species), range-restricted species (e.g., those species limited spatially), species that occur in only one habitat type or biome, or species or groups of species (e.g., waterfowl or shorebirds) that are vulnerable because they congregate in large numbers. While all IBAs are recognized for their importance to birds, some are of greater significance than others. IBAs are prioritized hierarchically, from greatest to least significant, as global, continental, or state.

In addition to these wildlife areas, general vegetation land cover types, including large blocks (greater than 100 acres) of forested and wetland habitats, provides important information about available habitats and the wildlife that likely use them. Further details for each of these land classification systems are provided in the discussion of existing conditions section.

Data Sources and Potential Impact Areas

Specific geospatial data sources evaluated for impacts on wildlife and wildlife habitats included:

- NLCD (Homer et al. 2015) for land cover information, including aquatic and terrestrial (vegetation) habitats;
- Federal, state, and local wildlife conservation areas and easements (USGS-GAP 2016);
- Minnesota wildlife refuge inventory (Minnesota DNR 2016g);
- Audubon IBAs (Audubon 2016);
- Minnesota NHIS colonial waterbird nesting aggregations (Minnesota DNR 2016e); and
- Raptor nest surveys for the Applicant's preferred route (Merjent 2015a, 2015b).

Areas of potential impacts on wildlife and wildlife habitat from construction of the Applicant's preferred route were evaluated within the Project footprints provided by the Applicant for the construction work area, ATWS, access roads, pipe yards, permanent right-of-way, MLVs and driveways, and pump stations. Using GIS, these footprints were overlain on the resource maps to identify the resources potentially affected. The potentially affected areas during operation of the Applicant's preferred route were identified in a similar manner, using a 50-foot-wide permanent right-of-way.

The resources potentially affected by route alternatives RA-03AM, RA-06, and RA-08 were similarly estimated using a 120-foot-wide construction work area centered on the route alternative. For alternative RA-07, a 205-foot-wide construction work area was used, with 10 feet on the north side of the existing Line 3 pipeline permanent right-of-way and 195 feet on the south side of the existing Line 3 pipeline

permanent right-of-way. Operations comparisons used a 50-foot-wide permanent right-of-way overlain on the wildlife distribution and wildlife habitat resource maps.

The ROI for the wildlife and wildlife habitat evaluation encompasses the area that could be directly or indirectly affected by pipeline construction within 0.5 mile of the route centerlines because some construction activities and indirect effects may occur in areas beyond the construction work areas.

Typical impacts on terrestrial wildlife habitat from pipeline construction and operational maintenance were qualitatively evaluated, including the alteration of vegetation cover. Permanent loss of wildlife habitat was quantified as the area required for maintenance of permanent facilities. Temporary loss and permanent alteration of wildlife habitats were quantified as the size and quality of the area disturbed by the construction work areas and permanent right-of-way by providing the total acres disturbed within wildlife conservation areas and by vegetation cover class. Habitats susceptible to fragmentation were identified by locating large blocks (greater than 100 acres) (Homer et al. 2015) of continuous upland forest and woody wetland cover that would be crossed by the alternative routes where those routes would not be co-located with other linear infrastructure. Particular attention was given to large, mature core or interior forested areas that serve as habitat for protected migratory birds and other wildlife.

The potential for wildlife mortality impacts were qualitatively evaluated based on occurrence, the animal's ability to move away from construction activities, and the animal's susceptibility to being run over or hit by equipment or crew vehicles. The potential for wildlife disturbance, displacement, or blockage of movements also were qualitatively evaluated based on occurrence, locations of migration corridors, locations of sensitive breeding or migration staging areas, and differential sensitivity to human activities.

6.3.4.2 Existing Conditions

The following summary provides information on existing conditions specific to Minnesota. See Section 5.2.4.2 for additional detail on aquatic environments and their relationship to fisheries and aquatic species.

6.3.4.2.1 Fisheries and Aquatic Habitat

The Applicant's preferred route and all route alternatives would cross surface waters, including large rivers; perennial (permanent) streams, intermittent (wet during part of the year) streams, and ephemeral (wet only after precipitation) streams; and large lakes, shallow lakes, and wetlands. See Sections 6.3.1.1, 6.3.1.2, and 6.3.1.3 for a discussion of potential impacts on ground water, surface water, and wetland resources, respectively.

Aquatic Habitat in the Project Area

Waterbodies of all sizes provide habitat for fish and other wildlife. Typically, large rivers are quite wide; flow more slowly than smaller rivers; and have numerous meanders and oxbows, islands, and backwaters. The backwater areas of these rivers are biologically productive and provide important spawning areas for several species of fish, as well as refuge habitat for many other animal species. Connectivity of these rivers is an important feature and influences the distribution of fish populations and other species. Smaller rivers, streams, and wetlands provide foraging areas, nesting areas, and refuge for myriad species of fish and wildlife, including SGCN birds such as yellow rails (*Coturnicops noveboracensis*) and sedge wrens (*Cistothorus platensis*) (see Section 6.3.5 for more information about SGCN). The Mississippi River, which would be crossed by the Applicant's preferred route and all route

alternatives (except for RA-06), has a naturally reproducing population of muskellunge that since 2006 also has been stocked with fingerlings or adults.

Lakes are important to Minnesota's environment and economy (e.g., hunting and fishing, many forms of lake recreation, and the tourism industry). Good-quality lake habitat is largely the result of healthy, intact watersheds and shorelines. Watersheds influence water quality, where more intact watersheds tend to result in lakes with better water quality. Shoreline habitat provides bottom substrates, structure, and vegetation that fish and other aquatic animals need for foraging, spawning substrate, and cover from predation.

Shallow lakes provide habitat for many species. They are permanent or semi-permanent waterbodies that are less than 15 feet deep and typified by abundant aquatic plant growth that results from generally high levels of nutrients (e.g., phosphorus, nitrogen, and minerals) and abundant sunlight availability in shallow water. Wetlands and vegetated fringes form along the edges of lakes and include stands of emergent and floating-leaved aquatic plants such as cattails (*Typha* spp.), bulrush (several genera), water lily (*Nymphaea* spp.) and reeds (several genera), as well as submerged plants (e.g., coontail [*Ceratophyllum demersum*]), creating an extended littoral zone. These plants provide excellent food and habitat for zooplankton, insects, fish, waterfowl, and other wildlife. Abundant aquatic vegetation also helps to maintain water clarity by anchoring sediments. Shallow lakes are important breeding, nesting, and foraging areas for waterfowl and waterbirds such as ducks, geese, herons, rails, and many more (Minnesota DNR 2016h).

Aquatic Management Areas

All of the route options would traverse areas with abundant freshwater lakes that provide habitat for many species. There are 19 AMAs within 0.5 mile of the Applicant's preferred route and route alternatives (Figure 6.3.4-1).

Other Management Units

Minnesota has identified a number of lakes and streams as having excellent quality or high biological significance. These datasets include Fish IBI lakes, Lakes of Biological Significance, Sentinel Lakes, and designated wildlife lakes. A total of 35 Lakes of Biological Significance, including 25 lakes rated outstanding, 4 lakes rated high, and 6 lakes rated moderate, occur within 0.5 mile of the Applicant's preferred route and route alternatives (Appendix L, Table L-2). Six of these lakes would be crossed by the Applicant's preferred route and route alternatives (Table 6.3.4-1), including Portage Lake, which is a Sentinel Lake.

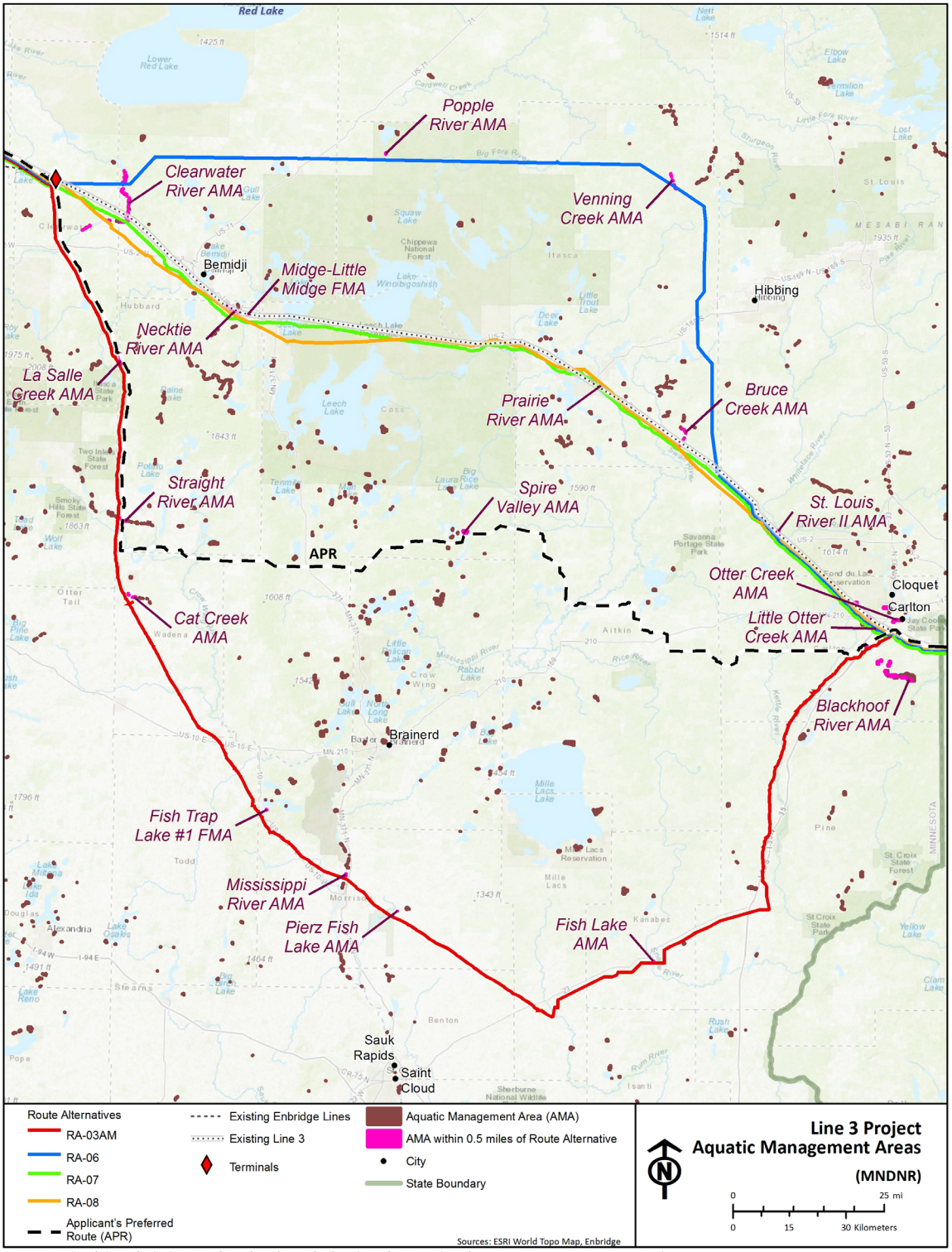

Source: Minnesota DNR 2016h.

Figure 6.3.4-1. Aquatic Management Areas near the Applicant's Preferred Route and Route Alternatives

Table 6.3.4-1. Lakes of Biological Significance Crossed by the Applicant's Preferred Route and Route Alternatives

Route	Watershed	Area (acres)	Shoreline (miles)	LBS Class[a]	Ranking Category[b]		
					Plant Rank	Fish Rank	Bird Rank
Applicant's preferred route	Unnamed (Wetland)	209	7.3	Moderate	--	--	3
Route alternative RA-06	Long	132	4.1	High	--	2	--
Route alternative RA-07	West Four-Legged	432	8.0	Outstanding	1	--	--
Route alternative RA-07	East Four-Legged	357	6.4	Outstanding	1	--	--
Route alternative RA-07	Pike Bay	4,751	10.7	Outstanding	--	1	--
Route alternative RA-08	Shallow	539	5.1	Outstanding	--	1	--

Sources: Minnesota DNR 2015b, 2016b.

[a] Lake of Biological Significance (LBS) class definitions:

Outstanding – *Plants*: high aquatic plant richness, high floristic quality, and a population of an endangered or threatened plant; important wild rice lakes. *Fish*: exceptional fishery for selected game fish or an outstanding nongame fish community. *Birds*: endangered or threatened colonial waterbird nesting area; presence of several endangered, threatened, or special concern lake bird species; or six or more lake bird Species of Greatest Conservation Need (SGCN).

High – *Plants*: high aquatic plant richness, high floristic quality, or a population of an endangered or threatened plant. *Fish*: populations of more than one fish of special concern and/or SGCN. *Birds*: colonial waterbird nesting area; history of endangered or threatened colonial waterbird nesting; presence of endangered, threatened, or special concern lake bird species; or five lake bird SGCN.

Moderate – *Plants*: high aquatic plant richness, high floristic quality, or a population of an endangered or threatened plant. *Fish*: populations of one fish species of special concern and/or fish SGCN. *Birds*: history of colonial waterbird nesting; presence of an endangered, threatened, or special concern lake bird species; or several lake bird SGCN.

[b] Number of lakes with ranks crossed

"--" = no crossing

Minnesota DNR-designated trout streams occur primarily in southeastern Minnesota and along the north shore of Lake Superior, although trout streams occur throughout the state.

Based on strong public interest in large muskellunge angling, Minnesota DNR maintains a set of specific management goals and strategies to maintain trophy muskellunge populations (including tiger muskellunge) in select waterbodies. Muskellunge waters must meet one of three criteria: (1) they are stocked; (2) a viable population exists; or (3) they represent an important component of the lake's fishery (either biologically or in terms of angler experience). Muskellunge are actively managed in 99 waters covering a total of 480,153 surface acres, including 8 rivers (Minnesota DNR 2016i).

Aquatic Invasive Species and Infested Waters

Minnesota DNR maintains an Infested Waters List of waters containing high-priority aquatic invasive species. A lake, river, pond, or wetland is included in the infested waters list if it contains an aquatic invasive species that could spread to other waters (Minnesota DNR 2017a). The Applicant's preferred route segment from Clearbrook to Carlton and all route alternatives except for RA-06 would cross or pass near rivers and lakes containing aquatic invasive species (Figure 6.3.4-2) (Table 6.3.4-2). A permit to appropriate, divert, or transport infested waters may be required from Minnesota DNR if a selected alternative would cross an infested waterway.

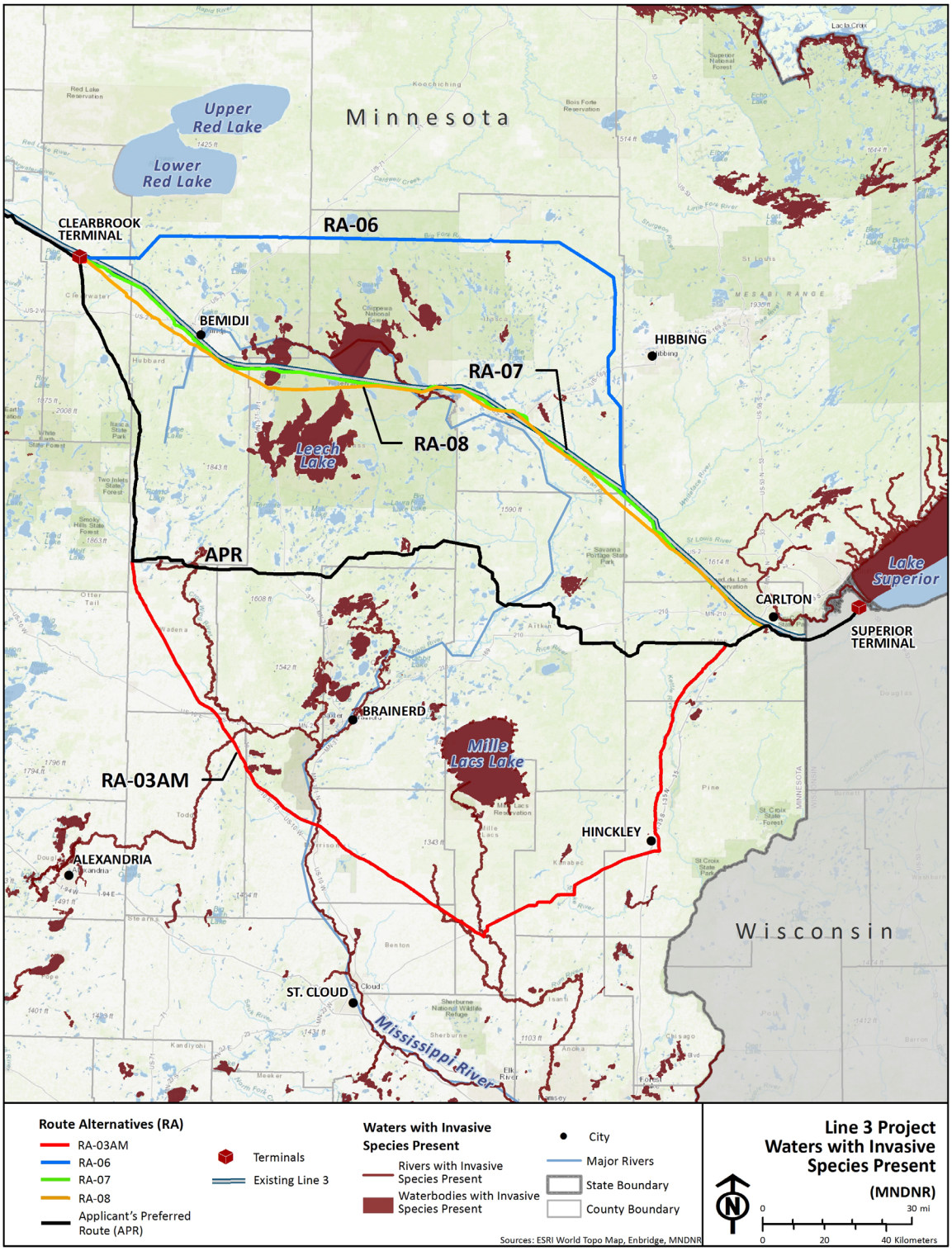

Source: Minnesota DNR 2016d.

Figure 6.3.4-2. Documented Aquatic Invasive Species Occurrences in Relation to the Applicant's Preferred Route and Route Alternatives

Table 6.3.4-2. Aquatic Invasive Species Infestations within 1 Mile of the Applicant's Preferred Route and Route Alternatives in Minnesota

Drainage (HUC-8) Location	Common Name	Scientific Name	Status	Applicant's Preferred Route		Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
				Minnesota Total	Clearbrook to Carlton				
Clearwater									
Clearwater County	Narrow-leaved cattail	*Typha angustifolia*	Collected	1	1	1	--	--	--
	Northern bur-reed	*Sparganium glomeratum*	Collected	1	1	1	--	--	--
Crow Wing									
Crow Wing River (south-central part of county)	Rusty crayfish	*Orconectes rusticus*	Collected	1	1	--	--	--	--
Upper Twin Lake	Mud bithynia, faucet snail	*Bithynia tentaculata*	Established	1	1	--	--	--	--
Kettle									
Moose Horn River, County Road 46 bridge	Chinese mysterysnail	*Cipangopaludina chinensis*	Established	--	--	1	--	--	--
Pine									
Margaret Lake west of Crooked Lake Township	Curly-leaf pondweed	*Potamogeton crispus*	Established	1	1	--	--	--	--
Platte-Spunk									
[No locality description provided by MARIS]	Common carp	*Cyprinus carpio*	Established	--	--	8	--	--	--
Prairie-Willow									
Ice (Crystal) Lake	Eurasian watermilfoil	*Myriophyllum spicatum*	Established	--	--	--	--	2	2
McKinney Lake	Eurasian watermilfoil	*Myriophyllum spicatum*	Established	--	--	--	--	2	2

Table 6.3.4-2. Aquatic Invasive Species Infestations within 1 Mile of the Applicant's Preferred Route and Route Alternatives in Minnesota

Drainage (HUC-8) Location	Common Name	Scientific Name	Status	Applicant's Preferred Route		Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
				Minnesota Total	Clearbrook to Carlton				
Snake									
Middle River	Common carp	*Cyprinus carpio*	Established	1	--	--	--	--	--
St. Louis									
Beauty Lake (~10 miles northeast of Warba, MN)	Rusty crayfish	*Orconectes rusticus*	Collected	--	--	--	1	--	--
Chub Lake	Eurasian watermilfoil	*Myriophyllum spicatum*	Established	1	--	--	--	--	--
TOTAL				**7**	**5**	**11**	**1**	**4**	**4**

Source: USGS NAS 2016.

Notes:

Numbers represent number of reported occurrences (infestations) within 1 mile of route centerlines as recorded in the USGS Aquatic Invasive Species database.

"--"= no occurrence

HUC-8 = 8-digit hydrologic unit code that delineates watershed boundaries, defined by USGS NHD 2016

Fisheries in the Project Area

Fish species present are similar along the Applicant's preferred route and the route alternatives. Federal, state, and tribal agencies have identified substantial fisheries with recreational or commercial value that occur in waterbodies (e.g., streams, rivers, lakes, and ponds) at or immediately downstream of proposed pipeline crossings. Maintaining abundant populations of fish requires high-quality aquatic habitat and healthy ecosystems. Minnesota DNR has 28 fisheries managers who work with local fishing clubs, lake associations, individuals, and conservation groups to manage the state's lakes and streams. Fisheries management includes protecting and restoring habitats and water quality, regulating the harvest, stocking, and public education.

Minnesota DNR has many fish hatcheries to meet stocking and other needs (Figure 6.3.4-3). Some hatcheries raise trout or northern pike and muskellunge, and white suckers may be raised as food for pike and muskellunge. Minnesota's coolwater hatcheries produce from 2 to 5 million walleye fingerlings and millions of fry each year. Minnesota has more walleye, walleye lakes, and walleye anglers than any other state; and most hatcheries are dedicated to producing walleye. While substantial numbers of walleye are produced at state hatcheries, the majority of walleye result from natural reproduction that occurs in the state, including within the areas crossed by the Applicant's preferred route and route alternatives. Stocking can provide walleye fishing in lakes that lack successful or consistent reproduction but can otherwise support walleye. Stocking also is effective for lakes that have been "rehabilitated" or those that occasionally winterkill. Because many hatcheries use natural water sources as part of their operation, the analysis of potential impacts identified hatcheries downstream of the route options; however, there are no hatcheries within 1 mile of the surface water crossings of the Applicant's preferred route or the route alternatives.

The Applicant's preferred route and route alternatives would cross surface waters with fisheries in the Red River, Rainy River, Upper Mississippi River, Lake Superior, and St. Croix River drainages (Table 6.3.4-3). Common Minnesota game fish and their habitats and distributions in those drainages are listed in Table 6.3.4-4.

Fisheries can be defined as coldwater, coolwater, or warmwater; they are associated with particular fish assemblages. These fisheries can include both game and nongame species. All three types are present in the region. Protected and rare species are discussed in Section 6.3.5, including species designated by Minnesota DNR or USFWS as threatened and endangered.

<u>Coldwater Fisheries</u>

Coldwater fisheries support trout and salmon (Salmonidae), which are important commercial and sport fishes that require cold, clean water for survival and reproduction. Three species of Pacific salmon have been introduced to Lake Superior and now spawn in its tributaries (Minnesota DNR 2016i). Lake trout (*Salvelinus namaycush*) are naturally reproducing in cold lakes throughout the region. The native brook trout (*Salvelinus fontinalis*) and the introduced brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) also are present in rivers and streams in the region.

Source: Minnesota DNR 2016m

Figure 6.3.4-3. Minnesota Fisheries Management Districts and Hatcheries near the Applicant's Preferred Route and Route Alternatives

Table 6.3.4-3. River Drainages Crossed by the Applicant's Preferred Route and Route Alternatives

Route	River Drainage				
	Red River	Rainy River	Upper Mississippi River	Lake Superior	St. Croix River
Applicant's preferred route	X	--	X	X	X
Route alternative RA-03AM	X	--	X	X	X
Route alternative RA-06	X	X	X	X	--
Route alternative RA-07	X	--	X	X	--
Route alternative RA-08	X	--	X	X	--

[a] See Table 6.3.4-4 for common Minnesota game fish in these drainages.

Notes:

Drainages with an "X" indicate drainages crossed.

"--" = no crossing

Table 6.3.4-4. Common Minnesota Game Fish in Major River Drainages Crossed by the Applicant's Preferred Route and Route Alternatives

Common Name	Scientific Name	Habitat	River Drainage[a]				
			Red River	Rainy River	Upper Mississippi River	Lake Superior	St. Croix River
Coldwater – Salmon and Trout							
Brook trout	*Salvelinus fontinalis*	Cool and clear water with sandy and gravelly bottoms and moderate vegetation	i	i	i	x	x
Brown trout	*Salmo trutta*	Coolwater lakes and streams; Lake Superior	i	i	i	i	i
Atlantic salmon	*Salmo salar*	Lake Superior and tributaries	--	--	--	i	--
Chinook salmon	*Oncorhynchus tshawytscha*	Lake Superior and tributaries	--	--	--	i	--
Coho salmon	*Oncorhynchus kisutch*	Lake Superior and tributaries	--	--	--	i	--
Pink salmon	*Oncorhynchus gorbuscha*	Lake Superior and tributaries	--	--	--	i	--
Cisco (tullibee or lake herring)	*Coregonus artedi*	Lakes, large rivers	x	x	x	x	u

Table 6.3.4-4. Common Minnesota Game Fish in Major River Drainages Crossed by the Applicant's Preferred Route and Route Alternatives

Common Name	Scientific Name	Habitat	River Drainage[a]				
			Red River	Rainy River	Upper Mississippi River	Lake Superior	St. Croix River
Lake whitefish	*Coregonus clupeaformis*	Lake Superior and deep, coolwater lakes in northern Minnesota	x	x	x	x	L#
Lake trout	*Salvelinus namaycush*	Coldwater lakes	--	x	i	x	i
Rainbow trout	*Oncorhynchus mykiss*	Cold streams and lakes	i	i	i	i	i
Coolwater – Pike and Perch							
Muskellunge (muskie)	*Esox masquinongy*	Clear, clean lakes	i	x	x	x	i
Northern pike	*Esox lucius*	Vegetated areas of quiet, slow-moving waters in lakes, ponds, and rivers	x	x	x	x	x
Sauger	*Sander canadense*	Large rivers with deep pools	--	x	--	--	L
Walleye	*Sander vitreus*	Large, shallow lakes with gravel shoals	x	x	x	x	x
Yellow perch	*Perca flavescens*	Lakes and backwaters of large rivers; pools and runs of small streams	x	x	x	x	x
Warmwater – Bass, Sunfish, and Catfish							
Largemouth bass	*Micropterus salmoides*	Shallow, fertile, lakes and river backwaters with ample aquatic vegetation as well as vegetated bays of larger lakes	x	x	x	x	x
Smallmouth bass	*Micropterus dolomieu*	Streams, rivers with clear water	i	i	x	x	x
White bass	*Morone chrysops*	Shallow rivers, creeks, and streams	i	--	--	--	L
Yellow bass	*Morone mississippiensis*	Slow-moving rivers, lakes, and ponds	--	--	--	--	--
Black crappie	*Pomoxis nigromaculatus*	Deep, cool, clear lakes	x	x	x	x	x
White crappie	*Pomoxis annularis*	Deep, cool, clear lakes	i	--	--	--	x
Bluegill	*Lepomis macrochirus*	Ponds, lakes, and slow-moving rivers	x	x	x	x	x

Table 6.3.4-4. Common Minnesota Game Fish in Major River Drainages Crossed by the Applicant's Preferred Route and Route Alternatives

Common Name	Scientific Name	Habitat	River Drainage[a]				
			Red River	Rainy River	Upper Mississippi River	Lake Superior	St. Croix River
Pumpkinseed	*Lepomis gibbosus*	Ponds, lakes, and slow-moving rivers	x	x	x	x	x
Green sunfish	*Lepomis cyanellus*	Ponds, lakes, and slow-moving rivers	x	x	x	x	x
Orangespotted sunfish	*Lepomis humilis*	Ponds, lakes, and slow-moving rivers	x	--	x	--	--
Longear sunfish	*Lepomis megalotis*	Shallow ponds, lakes, and slow-moving rivers	--	x	x	--	U W I IA
Warmouth	*Lepomis gulosus*	Shallow ponds, lakes, and slow-moving rivers	--	i	--	--	L W I IA
Rock bass	*Ambloplites rupestris*	Well-oxygenated lakes and streams with boulder and sand bottoms	x	x	x	x	x
Channel catfish	*Ictalurus punctatus*	Large and small rivers, lakes, and ponds	x	--	i	x	x
Flathead catfish	*Pylodictis olivaris*	Turbid, slow-moving streams	--	--	i	--	x
Black bullhead	Ameiurus melas	Slow-moving, quiet waters with soft bottoms made up of mud, sand, and gravel	x	x	x	x	x
Brown bullhead	Ameiurus nebulosus	Slow-moving, quiet waters with soft bottoms made up of mud, sand, and gravel	x	x	x	x	x
Yellow bullhead	Ameiurus natalis	Slow-moving, quiet waters with soft bottoms made up of mud, sand, and gravel	x	--	x	x	x
Miscellaneous							
Rainbow smelt	*Osmerus mordax*	Rivers, coastal areas, and ponds	--	i	i	i	i
Lake sturgeon	*Acipenser fulvescens*	Lakes and rivers with sandy, gravelly, and muddy bottoms	R	x	--	x	x
Shovelnose sturgeon	*Scaphirhynchus platorynchus*	Large rivers	--	--	--	--	L

Table 6.3.4-4. Common Minnesota Game Fish in Major River Drainages Crossed by the Applicant's Preferred Route and Route Alternatives

Common Name	Scientific Name	Habitat	River Drainage[a]				
			Red River	Rainy River	Upper Mississippi River	Lake Superior	St. Croix River
Paddlefish	*Polyodon spathula*	Large rivers and river lakes (e.g., Lake Pepin), oxbow lakes, and backwaters	--	--	--	--	L
Bowfin	*Amia calva*	Clear lakes and slow streams	x	--	x	--	x
Burbot	*Lota*	Cool waters of northern lakes and rivers; Lake Superior	x	x	x	x	x

Sources: Minnesota DNR 2016k; Hatch and Schmidt 2004.

[a] River drainage explanations:
"--" = not listed as present in the drainage
i = introduced to the drainage,
IA = Iowa portion of drainage,
L = below Taylor's Falls
U = above Taylor's Falls
R = native and reintroduced
x = native to and present today in drainage
WI = Wisconsin portion of drainage
# = present prior to 1975

Coolwater Fisheries

Coolwater fisheries support gamefish such as northern pike (*Esox lucius*) and muskellunge or muskie, walleye (*Sander vitreus*), and yellow perch (*Perca flavescens*). Northern pike generally inhabit clear, shallow, warm waters near shore but move to deeper water midsummer using coolwater areas (Michigan DNR 2016a). Muskellunge survive in a wide range of temperatures and prefer clear water (ADW 2016). They move from shallow, weedy water to deeper water as they grow larger (ADW 2016). Walleye are found in submerged bars and rocky areas of shallow bay lake waters in spring and fall but also move to cooler, deeper water (i.e., less than 50 feet) in summer (Michigan DNR 2016b). Yellow perch generally prefer relatively shallow water (i.e., less than 30 feet deep) near shore (Michigan DNR 2016c).

Warmwater Fisheries

Warmwater fisheries support catfish and bullheads (Ictaluridae), sunfish and bass (Centrarchidae), carp and minnows (Cyprinidae), and temperate bass (Moronidae). Catfish and bullheads are found throughout the region, but are most common in warm, fertile rivers and lakes (Minnesota DNR 2016j). Sunfish, including the bluegill (*Lepomis macrochirus*)—which is the most popular sunfish—prefer lakes and slow streams (Minnesota DNR 2016k). Bass, both largemouth (*Micropterus salmoides*) and smallmouth (*Micropterus dolomieu*), are becoming increasingly popular with anglers. Largemouth bass tend to favor clear lakes with abundant aquatic vegetation, and they can tolerate quite warm water temperatures. Smallmouth bass often are found in rivers with suitable gravel or rubble for spawning that are warmer than those that support trout (Minnesota DNR 2016l). Carp and minnows occupy a variety of habitats,

including coldwater and warmwater environments (Cornell 2016), and several are listed as SGCN. The common carp (*Cyprinus carpio*) and a number of Asian carp species are invasive fish. The white bass (*Morone chrysops*), important for sport fishing due to its size and abundance, occurs in rivers, tributaries, and reservoirs, as well as in several lakes (Minnesota DNR 2016m). The yellow bass (*Morone mississippiensis*) is found in the Mississippi River backwaters below Lake Pepin (Minnesota DNR 2016m).

6.3.4.2.2 Wildlife and Wildlife Habitat

Wildlife Habitat in the Project Area

Northern Minnesota is relatively undeveloped, with large expanses of protected lands that are home to many species of wildlife. The Applicant's preferred route and route alternatives would cross 10 broad-scale vegetation cover classes: evergreen forest, deciduous forest, mixed forest, scrub/shrub, grassland/herbaceous, hay/pasture, cultivated crops, woody wetlands, emergent herbaceous wetlands, and barren land (Homer et al. 2015). Each of these cover classes is defined in Table 6.3.3-1. In general, the Applicant's preferred route and the route alternatives occur within ecoregions with forested uplands, forested wetlands, non-forested wetlands, prairie/grasslands, and agricultural areas.

Forested uplands, including evergreen, deciduous, or mixed forests, typically exhibit closed canopies, dense understories, large trees, and downed trees. These areas are important habitat components for a variety of birds, salamanders, white-tailed deer (*Odocoileus virginianus*), and large carnivores such as gray wolves (*Canis lupus*) and black bears (*Ursus americanus*).

The scrub/shrub cover class includes shrub and young trees less than 5 meters tall, and includes vegetated areas in an early successional stage or trees stunted from environmental conditions (Homer et al. 2015). These habitats support white-tailed deer, small mammals, reptiles, and several bird species (e.g., ruffed grouse [*Bonasa umbellus*], American woodcock [*Scolopax minor*])

Grasslands and prairies are typified by large open areas with grasses and flowering plants dominating, which provide habitat for many species of pollinators, songbirds, small mammals, snakes, deer, coyotes (*Canis latrans*), and red fox (*Vulpes vulpes*).

Agricultural lands, including hay/pasture and cultivated crops, attract white-tailed deer, sandhill cranes (*Grus canadensis*), trumpeter swans (*Cygnus buccinator*), and wild turkeys that come to feed on crops.

Emergent herbaceous wetlands, such as marshes, and woody wetlands are permanently or periodically inundated with water and provide habitat for amphibians and reptiles, aquatic insects, aquatic mammals such as muskrats (*Ondatra zibethicus*), and many species of birds. Calcareous fens are a type of wetland that support unique plant and animal species (see Section 6.3.1.3).

Barren land includes areas where vegetation accounts for less than 15 percent of the total cover. It may include areas of exposed bedrock, rock slides, glacial debris, strip mines, gravel pits, and other accumulations of earthen material (Homer et al. 2015). These areas provide minimal habitat for wildlife. However, reptiles (e.g., snakes) and small mammals may find shelter in between rocks.

<u>Management Units</u>

Wildlife conservation lands (described in Section 6.3.4.1.2) that occur along or near the Applicant's preferred route are listed in Table 5.2.4-3. The Applicant's preferred route and route alternatives cross a variety of Minnesota DNR wildlife management and conservation areas, including WMAs, wildlife

refuges, state forests, and recreation areas. Minnesota's WMAs are established to protect lands and waters that have productive habitat for fish and wildlife, as well as fish- and wildlife-oriented recreation (e.g., hunting, fishing, and bird watching). WMA managers actively plant food plots, restore native plants and wetlands, conduct prescribed burns, and manipulate water levels to provide habitat for game species such as deer, bear, small game, forest upland birds, and waterfowl.

Audubon Important Bird Areas

IBAs in the vicinity of the Applicant's preferred route and route alternatives are shown in Figure 6.3.4-4 and include the following:

- Itasca State Park IBA – This state priority IBA supports 222 species of birds. Itasca's extensive stands of boreal forests with mixed hardwoods provide excellent habitat for many northern birds such as crossbills (*Loxia* spp.), gray jays (*Perisoreus canadensis)*, finches (*Fringillidae*), thrushes (*Turdidae*), black-backed woodpeckers (*Picoides arcticus*), and warblers (*Parulidae*). Over 20 species of nesting warblers and multiple breeding pairs of bald eagles are supported by the park.
- McGregor IBA – This state priority IBA contains various habitats to support many bird species including wetlands, lowland forests, upland deciduous forests, open brushlands, and open grasslands. Species that use the IBA for nesting include, but are not limited to, the American bittern (*Botaurus lentiginosus*), yellow rail (*Coturnicops noveboracensis*), sora (*Porzana carolina*), black tern (*Chlidonias niger*), sandhill crane; 12 species of warblers; the trumpeter swan; bald eagle; American woodcock (*Scolopax minor*); wood thrush (*Hylocichla mustelina*); black-billed cuckoo (*Coccyzus erythropthalmus*); LeConte's sparrow (*Ammodramus leconteii*); and bobolink (*Dolichonyx oryzivorus*). The site is also known for the large number of ring-necked ducks (*Aythya collaris*) it supports during migration.
- Camp Ripley-Pillsbury-Lake Alexander IBA – This state priority IBA supports the greatest known concentration of nesting red-shouldered hawks (*Buteo lineatus*, a state listed Special Concern Species) in the state. Habitat consists of relatively large blocks of upland deciduous and riparian forests. In addition, 228 species of birds have been documented here since monitoring started in 1991, including 28 species of warblers (and one of the most northerly reports of the hooded warbler [*Setophaga citrina*]). Other listed species that occur in this IBA include the bald eagle, trumpeter swan, yellow rail, and Louisiana waterthrush (*Parkesia motacilla*). Other important features within this IBA are the 21 miles of the Mississippi River and 27 miles of major tributaries (Crow Wing and Gull Rivers), that provide important riparian corridors and migration pathways.
- Chippewa Plains IBA – This global priority IBA is a vast area of large lakes (Winnibigoshish, Leech, Cass, and Pokegama), rivers, and streams, as well as large tracts of upland and lowland forests. The Mississippi River, which flows through the IBA, provides a large river ecosystem complemented by smaller river systems throughout the IBA. Chippewa Plains is important for migrating waterfowl, with 160,000 ring-necked ducks and 30,000 lesser scaup (*Aythya affinis*) recorded in 2011. Nesting waterbirds include the ring-billed gul (*Larus delawarensis*), herring gull (*Larus argentatus*), American white pelican (*Pelecanus erythrorhynchos*), common tern (*Sterna hirundo*), and Caspian tern (*Hydroprogne caspia*).

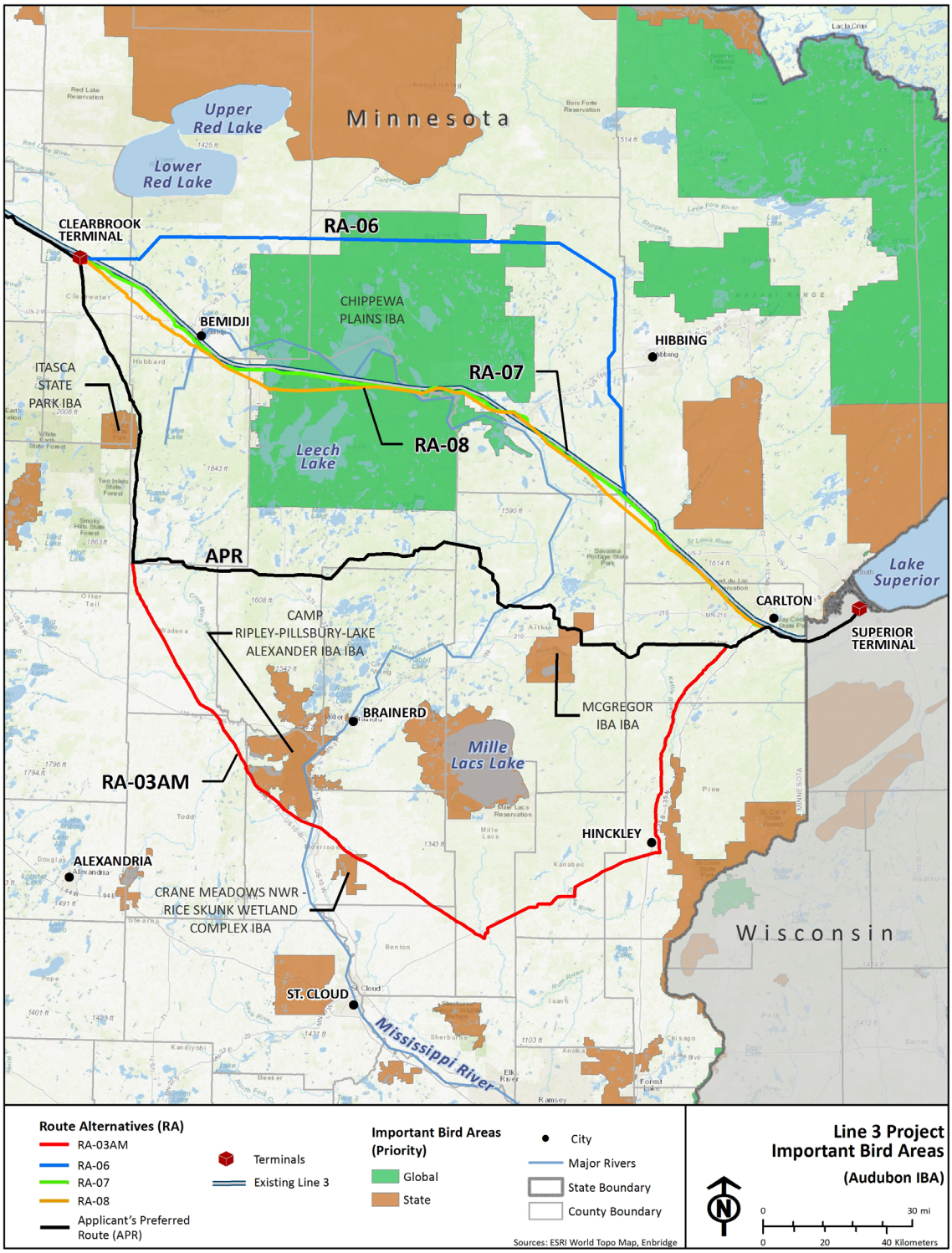

Source: Audubon 2016.

Figure 6.3.4-4. Audubon Important Bird Areas near the Applicant's Preferred Route and Route Alternatives

- Crane Meadows National Wildlife Refuge (NWR)-Rice Skunk Wetland Complex IBA – This state priority IBA consists mostly of lowland grass and brush, with limited upland wooded areas of aspen and oak. Rice-Skunk WMA is characterized by oak woods, lowland aspen, and brush emergent wetlands, and lowland grasses. This IBA is important for migrating waterfowl, nesting waterbirds (great blue herons [*Ardea herodias*], American bitterns, and least bitterns [*Ixobrychus exilis*]), and both breeding and migrating populations of sandhill cranes.

Wildlife in the Project Area

Wildlife species present would be similar along both the Applicant's preferred route and the route alternatives. The species that could be present are described below. The Project region supports a diversity of wildlife, including mammals, birds, amphibians, reptiles, and invertebrates. Mammals include both game species (species that are hunted or trapped such as big and small game animals and fur-bearing animals) and nongame species (small mammals and non-hunted species). Birds present are both resident and migratory, and include game species (waterfowl and upland birds) and nongame species (see Table 5.2.4-5). Amphibians and reptiles include frogs, toads, salamanders, snakes, lizards, and turtles. Invertebrates include a wide variety of insects as well as mollusks.

<u>Mammals</u>

Large Mammals and Big Game

The white-tailed deer is the most common big game animal occurring along the pipeline routes. Deer occur throughout the Project region and are an ecologically, socially, and economically important species. White-tailed deer inhabit a wide variety of habitats and are highly adaptable. Croplands, grasslands, shrublands, orchards, woodlands, and residential areas provide foraging and resting areas for deer. White-tailed deer eat a varied diet that may include acorns, corn, soybeans, mushrooms, grasses, tree leaves, buds, twigs and bark, wild grapes, apples, and assorted shrubs. During winter, deer often aggregate or "yard" in forested stream bottoms and other areas protected from heavy snows. Wolves, coyotes), bears, and bobcats (*Lynx rufus*) are natural predators of deer. White-tailed deer are hunted for sport and meat, and permits are available for hunting using firearms (e.g., shotgun, rifle), muzzleloaders, or archery (e.g., bow and arrow).

Black bears are another big game mammal that occur in the Project region. Black bears occur mainly in the northern third of Minnesota but range as far south as the interface between the forested and agricultural areas (Minnesota DNR 2016i). There are roughly 20,000 black bears in Minnesota (Minnesota DNR 2016n). Black bears are generally found in forests, swamps, and other areas with dense cover, but they also venture into clearings to feed. Black bears feed primarily on new plant growth in spring, switching to ants and ant pupae and a variety of berries in summer, and nuts (acorns and hazelnuts) in autumn. Black bears supplement their diets with corn and other crops, bird eggs, honey, and deer fawns opportunistically. Black bears are hunted for their meat and fur, and most bears are harvested in coniferous areas of northeast Minnesota. Sport hunting is their main source of mortality. Minnesota hunters harvest an average of about 3,000 black bears annually (Minnesota DNR 2016n).

While elk are managed as a game species in many states; only two small remnant populations are present in Minnesota, and elk are listed as a Species of Concern in the state. Elk once were distributed throughout Minnesota, but the native woodland (*Cervus elaphus anadensis*) and prairie (*C. e. manitobensis*) subspecies were nearly extirpated from the state by the early 1900s because of excessive hunting during the 1800s. In the early 1930s, captive-bred elk were used to reestablish a population in northwest Beltrami County. Since then, a second elk herd has become established in Kittson and Roseau

counties near the border with Manitoba, Canada. This northern herd is believed to include individuals that have naturally emigrated from Canada, North Dakota, and the original Beltrami County reintroduced herd (Minnesota DNR 2016o). Elk prefer a diet of grasses and forbs, but their diet varies by season. Elk will browse on willow (*Salix* spp.), aspen (*Populus* spp.), and other woody vegetation, and will consume many agricultural crops. Wolves, coyotes, black bears, and cougars (*Puma concolor*) are natural predators of elk. Elk hunting is conservatively managed in Minnesota. Each year, a limited number of licenses are offered to Minnesota residents to hunt elk. Hunters are selected using a lottery system. In 2014, 1,167 hunters applied for a license, but only nine permits were issued and six elk ultimately were harvested (Minnesota DNR 2014b).

Moose (*Alces alces*) occur in the Project region in the northwestern and northeastern portions of Minnesota. Moose hunting was permitted in Minnesota in both of these regions until 1997 when it was prohibited in the northwest corner. Hunting continued in the northeast portion of the state until a 2013 aerial survey revealed that the moose population had declined in this area by 52 percent since 2010, after which Minnesota DNR suspended moose hunting indefinitely (Minnesota DNR 2013, 2016p). Moose eat aspen, maple (*Acer* spp.), and cherry (*Prunus* spp.) trees and many kinds of water plants (Minnesota DNR 2016q). Wolves and bears are natural predators of moose.

Cougars, also known as mountain lions or pumas, are rare but could occur within the region. Cougars occurred throughout most of Minnesota prior to European settlement (Minnesota DNR 2016i). Today, they are occasionally observed in Minnesota. Because there is no evidence of a viable breeding population in Minnesota, cougars are not currently tracked in the Minnesota DNR's Rare Features Database. Cougars are not considered a game animal in Minnesota.

Mid-Sized Mammals, Small Game, and Furbearers

The Project region is home to a number of mid-sized mammals, many of which are classified as "small game" in hunting regulations or as furbearers in trapping regulations. Common small game and furbearers that are hunted or trapped in the Project area include the badger (*Taxidea taxus*), beaver (*Castor canadensis*), bobcat, coyote, fisher (*Martes pennant*), pine marten (*Martes martes*), red fox, gray fox (*Vulpes* and *Urocyon cinereoargenteus*), mink (*Neovison vison*), muskrat, Virginia opossum (*Didelphis virginiana*), river otter (*Lontra canadensis*), rabbits and hares (*Leporidae*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), squirrels (*Sciuridae*), and weasels (*Mustelidae*). Many furbearers are associated with water and wetlands (e.g., muskrats, mink, otters, and beavers). Rabbits, raccoons, opossums, and coyotes are present in a wide variety of habitats, including croplands, residential areas, hedgerows, and forests. Squirrels require forested habitats with abundant acorn or hickory trees. Mid-sized mammals not traditionally hunted or trapped include the porcupine (*Erethizon dorsatum*) and groundhog or woodchuck (*Marmota monax*).

Small Mammals

Small mammals, including mice, moles, voles, and shrews, are important members of ecosystems. Herbivorous small mammals shape vegetative communities by spreading seeds and grazing. Their burrowing activities and the addition of feces and urine to the soil influence soil chemistry through changes in nutrient and mineral cycling rates and pathways (Hull Sieg 1987). Small mammals such as shrews and bats also function as secondary consumers by preying on invertebrates and other mammals. Small mammals serve as food supply for a large number of predators and can influence predator population cycles. Predators such as foxes and barred owls (*Strix varia*) rely heavily on rodents and other small mammals for food.

Species of small mammals that are likely to occur in the Project area include, but are not limited to, the southern bog lemming (*Synaptomys cooperi*), meadow vole (*Microtus pennsylvanicus*), red-backed vole (*Myodes gapperi*), meadow jumping mouse (*Zapus hudsonius*), woodland jumping mouse (*Napaeozapus insignis*), western harvest mouse (*Reithrodontomys megalotis*), white-footed mouse (*Peromyscus leucopus*), deer mouse (*Peromyscus maniculatus*), house mouse (*Mus musculus*), star-nosed mole (*Condylura cristata*), and Norway rat (*Rattus norvegicus*) (Minnesota DNR 2016r). Shrews are the smallest mammals in the Project area. Shrews that could occur in the Project region include the pygmy shrew (*Sorex minutus*), short-tail shrew (*Blarina brevicauda*), and masked shrew (*Sorex cinereus*), northern water shrew (*Sorex palustris*), and arctic shrew (*Sorex arcticus*) (Minnesota DNR 2016s).

Bats are important to ecosystems in part because they consume vast numbers of insects, including agricultural pests. Bats occurring in the Project region are primarily forest dwelling or associated with riparian areas and are insectivorous. In summer, the bats roost in trees or in buildings; and in fall migrate to caves to hibernate through the winter. They return to their summer roosting locations in spring. The little brown bat (*Myotis lucifugus*) and big brown bat (*Eptesicus fuscus*) are the most common species in Minnesota. Other species that occur in the Project region include the northern long-eared bat (*Myotis septentrionalis*), hoary bat (*Lasiurus cinereus*), eastern red bat (*Lasiurus borealis*), and silver-haired bat (*Lasionycteris noctivagans*), and tri-colored bat (*Perimyotis subflavus*). The northern long-eared bat was recently listed as threatened by USFWS (see Section 5.2.5).

Birds

Waterfowl and Gamebirds

All waterfowl and some gamebirds occurring in the Project region are considered migratory birds and are protected under the MBTA (which prohibits the take of any migratory birds without authorization from USFWS). Hunting regulations are developed and authorized by USFWS and state game and fish departments. Waterfowl are harvested primarily in autumn, with some goose seasons occurring in spring. Many waterfowl species breed in or migrate through areas that would be crossed by the Applicant's preferred route and route alternatives. Important recreational waterfowl include the Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), wood duck (*Aix sponsa*), blue-winged teal (*Anas discors*), and ring-necked duck. Waterfowl habitats include wooded river bottoms, flooded forests, lakes (particularly those with wild rice), rivers, marshes, and flooded grain fields.

Other gamebird species include the American woodcock (*Scolopax minor*), Wilson's snipe (*Gallinago delicate*), mourning dove (*Zenaida macroura*), wild turkey, sandhill crane, greater prairie chicken (*Tympanuchus cupido*), sharp-tailed grouse, and introduced gamebirds such as the ring-necked pheasant (*Phasianus colchicus*) and gray (Hungarian) partridge (*Perdix perdix*).These species occur in areas crossed by the Applicant's preferred route and route alternatives. Refer to Table 5.2.4-4 for a more complete list of gamebird species likely to occur in the vicinity of the Project.

Nongame Birds

The upper Midwest is home to many nongame bird species. Birds are an important part of healthy functioning ecosystems, including forests and prairies, and developed areas such as agricultural, urban, and suburban areas. While a number of bird species are resident or migrate only short distances, many species perform long annual migrations in spring and fall. Minnesota and adjacent states are on the Mississippi Flyway, a key migration flyway for millions of birds and hundreds of species that roughly follows the Mississippi River. Nongame birds occur in all habitat types in the ROI, including coniferous, deciduous, and mixed forests; riparian areas and forested and non-forested wetlands; lakes, rivers, and

streams; grasslands, prairies, and pastures; and shelterbelts and agricultural lands. Refer to Table 5.2.4-4 for a more complete list of nongame bird species likely to occur in the vicinity of the Project.

Bald eagles (*Haliaeetus leucocephalus*) once were protected by the ESA. Through the federal government's banning of Dichlorodiphenyltrichloroethane (DDT) and various conservation actions taken across the United States, populations recovered sufficiently, and bald eagles were removed from the endangered species list (delisted) in 2007. However, bald eagles are still protected under the MBTA and the BGEPA. This legislation also protects their nesting structures, which tend to be used for a number of years. Bald eagles nest near lakes and rivers in forested areas where tall, large-diameter trees are available for nesting. Due to a growing population, more eagles have been found nesting in non-typical locations, such as tree lines in agricultural landscapes.

Osprey also were affected by DDT and suffered population declines in the 1960 and 1970s. Their populations have since recovered, and they occur throughout much of the upper Midwest. While osprey used to rely entirely on dead trees for nests, they now also use man-made structures such as powerline poles and communication towers for nesting. Raptor stick nest surveys were conducted within 0.5 mile along the Applicant's preferred route to locate and identify bald eagle and osprey nests between 2014 and 2016. Six active bald eagle nests and one active osprey nest were observed during the most recent survey in 2016 (see Table 5.2.4-5). An additional stick nest was documented in Carlton County, Minnesota; however, the status of the nest and the species using the nest, if any, is not currently known.

Reptiles and Amphibians

Amphibians are four-legged, cold-blooded (meaning they get their warmth from the environment) animals that typically start out as larvae living in water (e.g., tadpoles). The young generally undergo metamorphosis from larva with gills to an adult air-breathing form with lungs. Amphibians use their skin as a secondary respiratory surface; some small terrestrial salamanders and frogs lack lungs and rely entirely on their skin for respiration. Reptiles are cold-blooded animals that can be four-legged, like turtles and lizards, or may have descended from four-legged ancestors, like snakes. Unlike amphibians, reptiles do not have an aquatic larval stage. Many amphibians and reptiles move between aquatic and terrestrial habitats; consequently, they are major links in the flow of energy between these habitats.

Amphibians and reptiles commonly occurring in and around wetlands, lakes, ponds, and rivers in the project region include turtles such as the snapping turtle (*Chelydra serpentine*), painted turtle (*Chrysemys picta*), map turtles (*Graptemys* spp.), and the spiny softshell turtle (*Apalone spinifer*a); frogs that are highly aquatic as adults such as the green frog (*Lithobates clamitans*) and mink frog (*Lithobates septentrionalis*); aquatic salamander species such as the eastern newt (*Notophthalmus viridescens*) and common mudpuppy (*Necturus maculosus*); and snakes, including the brown snake (*Storeria dekayi*) and northern watersnake (*Nerodia sipedon*). Amphibians and reptiles that are more likely to be associated with grasslands, prairies, and agricultural areas in the Project region include hognose snakes (*Heterodon* spp.), garter snakes (*Thamnophis* spp.), and the smooth green snake (*Opheodrys vernalis*), prairie skink (*Plestiodon septentrionalis*), and Great Plains toad (*Anaxyrus cognatus*). Amphibians and reptiles associated with forested habitats in the Project region include treefrogs (*Hyla* spp.), the spring peeper (*Pseudacris crucifer*), American toad (*Anaxyrus americanus*), and salamanders (*Ambystoma* spp.).

Invertebrates

Invertebrates are an essential component of the food chain in many ecosystems. Many hundreds of species of invertebrates occur within the aquatic, wetland, and upland areas that would be crossed by the Applicant's preferred route and route alternatives. Notable groups of aquatic insects include

mayflies (Ephemeroptera), caddisflies (Trichoptera), dragonflies and damselflies (Odonata), and midges and mosquitoes (Diptera). Other aquatic invertebrates include mollusks such as native mussels (Palaeoheterodonta), snails (Gastropoda), and crayfish (Astacidea). Commonly seen upland invertebrates include bees, ants, and wasps (Hymenoptera); ladybugs and other beetles (Coleoptera); butterflies and moths (Lepidoptera); grasshoppers, katydids, and crickets (Orthoptera); cicadas, leafhoppers and other true bugs (Hemiptera); and ticks, spiders, and mites (Arachnida).

6.3.4.3 Impact Assessment

6.3.4.3.1 Applicant's Preferred Route (in Minnesota)

Construction Impacts

Clearing and grading would be required for construction of the pipeline, MLVs, new and expanded pump stations, and cathodic protection sites—as well as for access roads and ATWS, including six pipe yards in Minnesota. Construction activities that may affect fish, wildlife, and their habitats could include clearing, grading, dewatering, trenching, blasting, access road construction, waterbody crossings, surface water withdrawals and discharges (e.g., for hydrostatic testing), fueling and use of hazardous materials, facilities construction, and restoration or reclamation of construction areas.

Fisheries and Aquatic Habitat

Construction of the Applicant's preferred route in Minnesota would require 192 stream crossings, with 111 of those crossings occurring between Clearbrook and Carlton (see Table 6.3.1.2-2). The Applicant's preferred route also crosses streams in North Dakota and Wisconsin; streams outside of Minnesota are discussed in Section 5.2.4. The surface waters crossed support warmwater, coolwater, and coldwater trout fisheries.

Surface Water Crossing Methods and Measures Proposed as Part of the Project

Surface water crossings would be designed as close to perpendicular to the axis of the stream channel as engineering and routing constraints allow to create the shortest possible crossing length. The Applicant would determine and obtain approval for specific crossing methods based on factors such as waterbody size, sensitivity, water levels, soil/sediment stability installation, and anticipated season of installation (Appendix E). The Applicant would cross waterbodies using the most environmentally appropriate and feasible method based on consultation among the Applicant, appropriate regulatory agencies and engineering personnel. Methods that may be used include the wet open-cut method, dry open-cut methods (dam-and-pump and flume), guided bore method, or HDD method. These methods are summarized below:

- The wet open-cut method involves trenching through the waterbody while the water continues to flow through the construction work area. The wet trench method has the greatest potential for impacts on fisheries and aquatic habitat.
- The dam-and-pump method is used to cross sensitive waterbodies with low gradients and low flow or meandering channels. It involves installing temporary dams across the waterbody both upstream and downstream of the crossing location, with pumps and piping used to carry stream flow around the construction area. This method results in less sedimentation and turbidity than the wet open-cut method.
- The flume method can be used on relatively shallow and narrow waterbodies that do not have large rocks or bedrock at the trench line and have a relatively straight channel. Similar to the

dam-and-pump method, two dams are used to dry the work area. One or more pipes (flumes) extend the course of the waterbody through both dams, carrying stream flow through the construction area. This method results in less sedimentation and turbidity than the wet open-cut method.

- A guided bore could be used to cross ditches adjacent to roads or railroads. The guided bore method involves digging a pit on each side of the waterbody, boring a tunnel from one pit to the other, and installing the pipe in the tunnel. Dewatering and sheet-piling are needed to maintain the integrity of the excavated pits. This method typically results in no sediment release to surface water.
- HDD involves drilling under the surface water and installing the pipeline without physical disturbance of the surface water. HDD crossings are advantageous because they do not disturb streambeds or streambanks and they maintain stream flow and fish passage. However, they require ATWS on both sides of the crossing, which involves vegetative clearing, soil disturbance, and subsequent restoration activities. This method would be used to cross the most environmentally sensitive areas such as sensitive fishery resources and impaired waters. Unless a release of drilling fluid occurs (see Section 6.3.1.2.3), use of this crossing method would not alter or remove aquatic habitat and would not affect fisheries.

As currently planned, the methods used to cross surface waters for the Applicant's preferred route are listed in Table 6.3.4-5.

Table 6.3.4-5. Number of Stream Crossings by Crossing Type for the Applicant's Preferred Route in Minnesota

Water Type	HDD	Guided Bore	Dry Open Cut	Wet Open Cut	Undetermined	Total
Stream/river – perennial	6	--	23	1	4	34
Stream/river – intermittent	--	1	34	7	30	72
Artificial path	11	--	2	--	2	15
Connector	--	--	1	--	3	4
Canal ditch	2	7	24	8	8	49
Lake/pond – perennial	--	--	--	--	18	18
TOTAL CROSSINGS	**19**	**8**	**84**	**16**	**65**	**192**

Source: Water types from USGS NHD 2016. Also see maps in Appendix A.

Notes:

Stream/river, artificial path, and connector types are the crossing types that are most likely to provide fish habitat.

"--" = no crossing

HDD = horizontal directional drill

To avoid or reduce impacts on fisheries and aquatic habitat during construction, the Applicant would implement the measures described in the Environmental Protection Plan (Appendix E), including the following:

- Prepare a list of waterbodies to be crossed and the type of crossing method to be used for each crossing, as a part of obtaining Section 401/404 permits from USACE for all surface water crossings.
- Comply with the seasonal restrictions and other requirements in the Section 401/404 permits to limit impacts on aquatic resources.
- Complete the crossings as quickly as possible to allow suspended sediment levels to return to preconstruction levels after instream work is completed.
- Cross waterbodies using the most environmentally appropriate and feasible method based on consultation among the Applicant, appropriate regulatory agencies, and engineering personnel. Methods that may be used include the wet open-cut method, dry open-cut methods (dam-and-pump and flume), guided bore method, or HDD method.
- Develop and implement BMPs in collaboration with state and federal agencies to avoid and minimize potential impacts associated with water crossing methods (e.g., use of silt or straw as sediment runoff barriers and use of construction mats to minimize ground pressure and soil compaction).
- Implement erosion and sediment control measures and limit the duration of construction in waterbodies, including the measures listed in Section 1.9 of the Applicant's Environmental Protection Plan (Appendix E) (e.g., temporary stabilization, erosion control blankets, mulch, cat tracking, and temporary slope breakers).
- Comply with Minnesota DNR guidance on water crossing by avoiding in-water work during the exclusion periods: from September 1 through April 15 or September 15 through April 30 for coldwater fisheries (trout) stream crossings, and from March 15 to June 15 or April 1 to June 30 for coolwater and warmwater fisheries stream crossings, depending on the Minnesota DNR region in which the work occurs.
- Suspend temporary water intake hoses or structures above the stream or lake bottom and equip the intakes with screens or equivalent devices to prevent fish uptake.
- Install trench breakers at all waterbody crossings, as appropriate, to prevent diversion of water into upland portions of the pipeline trench and to keep accumulated trench water out of the waterbody.
- Wash and dry equipment designated for use within waterbodies prior to use; purge and clean all pumps before proceeding from one crossing location to the next if designated noxious weeds or invasive aquatic species (e.g., zebra mussels and Eurasian milfoil) are known to be present in the area. Follow all permit requirements to prevent the spread of invasive species.
- Maintain a 20-foot-wide buffer of undisturbed herbaceous vegetation at all streambanks during the initial clearing and complete any instream trenching within 24 hours of initiation at minor waterbodies and within 48 hours at intermediate or major waterbodies (not including HDD crossings).
- Comply with the measures in the Environmental Protection Plan (Appendix E) to avoid or minimize impacts due to the unanticipated release of drilling fluids used in HDD crossings. These measures include (1) planned response actions if releases of drilling mud were to occur in waterbodies or upland areas; (2) containment, clean-up, and notification procedures; and (3) steps to be taken to restore affected areas.

- Discharge hydrostatic waters in a manner that avoids discharge into surface waters with commercially or recreationally important species, and in compliance with the stipulations of permits required for both intake and discharge. This would include seasonal restrictions and limitations associated with infested waters.

General Potential Impacts on Fisheries and Aquatic Habitat due to Surface Water Crossings

Increased Sedimentation. Construction of the Applicant's preferred route would require clearing of vegetation from the construction work area (more information below about impacts of structure removal). Removal of large trees and other woody vegetation near waterbodies would result in loss of shading, nutrients, and habitat features for fish at waterbody crossings. In addition, this change in streambank features would alter aquatic habitats used by fish for cover, spawning, and foraging. Loss of riparian cover can result in increased water temperatures, which can be detrimental to coldwater species such as trout or salmon. The amount of vegetation that would be permanently removed adjacent to surface waters would be restricted to the permanent right-of-way at waterbody crossings, and streambanks would be restored with vegetation. Revegetation would take longer for forested areas in the construction work areas adjacent to the permanent right-of-way as compared to prairie or agricultural areas. Therefore, vegetation clearing for construction of the Applicant's preferred route in grassy or agricultural streambank areas would result in indirect, short-term, negligible to minor impacts on fisheries and aquatic habitats; impacts in forested or other woody streambank areas would be long term and minor to major, depending on existing surface water conditions. Removal of vegetation along waterbodies also can create conditions for bank destabilization and further erosion, which would result in direct temporary to short-term minor impacts on species residing in the immediate vicinity while the Applicant undertakes measures to stabilize the banks. For example, erosion can suffocate eggs and other aquatic species.

As a part of the crossing construction process, river beds and streambeds would be restored to preconstruction condition, with no impediments to water flow anticipated, and streambanks would be restored to preconstruction grades when practicable. If the slope of the bank is determined to be unstable, it would be reshaped to prevent slumping. The use of open-cut crossings during pipeline construction would result in short- to long-term minor impacts on channel morphology and stability (see Section 6.3.1.2), which in turn would result in short-to long-term minor impacts on fisheries and aquatic habitats.

The wet open-cut crossing method would result in greater amounts of sedimentation than the other methods. As currently planned, only 16 of the surface water crossings would be accomplished using the wet open-cut method. Crossings using the dam-and-pump and flume methods would increase sedimentation, but less than if using the wet open-cut method. The guided bore and HDD methods would not result in increased sedimentation if conducted successfully. However, if a frac-out were to occur, the consequences can be major because of the release of materials into already sensitive or impaired waters (more information about frac-outs below).

Increased sedimentation and turbidity can degrade aquatic habitat by filling in inter-gravel spaces and pool habitats, which reduces spawning habitat, rearing habitat, and benthic invertebrate production. Reduced productivity of aquatic invertebrates can result in reduced food available for insectivorous fish. Mussels are particularly vulnerable to suffocation from instream construction activities. Fine sediments introduced by these processes can suffocate fish eggs and newly hatched larvae living in gravel, resulting in reduced survival. In addition, sediments can abrade the sensitive gill membranes of young and adult fish, resulting in injury or death; and can reduce the ability of fish to locate prey or escape predation,

leading to increased energy expenditure for foraging and increased mortality. Large concentrated sediment plumes can cause sediment accumulation within the gills of young and adult fish, which can lead to suffocation and increased mortality of fish that are not able to move away from sediment plumes fast enough to find refuge.

Disturbed areas at crossings would be restored and stabilized as soon as practical after pipeline installation. (Section 6.3.1.2.3 identifies erosion and sedimentation control measures that would be implemented during and after open-cut crossings and describes the potential impacts on surface water quality and sedimentation that could result from each crossing method.) The increase in sedimentation is expected to be minor, and the impact on fisheries and aquatic habitat from increases in sedimentation associated with surface water crossings would be temporary to short term and minor. With successful use of the guided bore or HDD crossing methods, sedimentation would not increase and fisheries and aquatic habitats would not be affected. If a frac-out were to occur, the impacts would be short term to long term and major.

Removal of Large Instream Structures. At some surface water crossings, large in-water structures (e.g., large woody debris and boulders) may need to be removed during construction of the crossing. These structures would be replaced after completion of the crossing, and stream hydrodynamics would transport sediments from upstream to the disturbed area until equilibrium is reestablished. This construction activity would result in a temporary to short-term, negligible to minor impact on aquatic habitat.

Direct Impacts on Fisheries. Trenching and backfilling, damming, and other instream construction activities could result in direct or indirect injury or mortality of fish. Mussels are particularly vulnerable to crushing from instream construction activities. However, fish likely would respond to the increased instream activities by leaving the construction area and avoiding direct impacts. Small fish species and juvenile individuals of larger fish species may be injured or killed by entrainment, which results when a fish gets trapped within hoses or pipes being used to dewater construction areas or divert surface waters around construction areas. Fish entrainment can be reduced by screening the ends of pipes and pump hoses, smaller fish may still be injured or killed by being impinged, trapped against, the screening due to suction and water pressure. The potential direct impacts of instream construction on aquatic species would be temporary and minor.

Leaks or Small Spills. Spills and leaks of fuel or other hazardous liquids could occur during vehicle and equipment operation, during refueling and lubricating of construction equipment, and from leaks from storage containers or equipment working in or near streams. To protect surface water resources, NPDES permits would require secondary containment of hazardous materials, prohibition of engine degreasing at work sites, containment and collection of liquid and solid wastes, and a spill prevention and response plan for fueling and maintenance of vehicles. The Applicant would store petroleum products, hazardous chemicals, and lubricating oils; conduct refueling, maintenance, and lubricating operations; and perform concrete coating activities in upland areas more than 100 feet from surface waters (Appendix E). Although these and other similar measures would be implemented (see Section 6.3.1.2 for additional details), small leaks or spills could reach surface waters and would alter water quality in the area of the release and for short distances downstream. Because such releases would likely be small and rapidly dispersed, the impacts on fisheries and aquatic habitats are expected to be temporary to short term and minor.

Potential impacts on fisheries and aquatic habitats from an unanticipated release of crude oil are discussed in Chapter 10.

Unanticipated Release of Drilling Fluids. For HDD crossings, there is a risk of escape of drilling fluids (frac-out) into rivers at crossings. During drilling, fluid (water, bentonite clay, and possible additives) is circulated through the drilling pipe to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. The potential exists for an inadvertent release or "frac-out" of this drilling fluid to occur when pressurization of the drill hole is beyond the containment capability of the overburden soil material, which would allow the drilling fluid to flow to the ground or river bed surface. Although bentonite clay is non-toxic, drilling mud can smother aquatic wildlife and increase turbidity in affected surface waters. The consequences of a frac-out are amplified in waters where this technique is used, because these waters are already identified as sensitive or impaired. Additives may be mixed with the drilling fluids/mud for viscosity or lubricating reasons. Only non-hazardous additives approved by Minnesota PCA under permit conditions would be used, and a Material Safety Data Sheet for the drilling fluid would be maintained onsite. If a frac-out occurred near the streambank, bank stability may be compromised. Construction personnel would monitor the crossing to detect releases of drilling mud.

The HDD operator would constantly monitor drilling fluid pressures during pilot hole operations and, if a loss in fluid pressure or circulation was identified, the operator would notify onsite construction observers who would visually monitor the portion of the drill path where the drill tool is located to determine whether a drilling mud release occurred. If a release occurred, the Applicant would implement containment, response, and clean-up procedures as outlined in the Environmental Protection Plan (Appendix E) to limit the potential for drilling mud to reach surface water. These procedures include containment using straw bales, sandbags, pumps, and hoses, vacuum trucks; response activities, including adjusting drill rates and pump volumes or stopping drilling, removal of mud with pumps and appropriate storage away from the waterbody prior to disposal; and coordination with appropriate agencies to discuss additional containment or clean-up requirements. If a frac-out occurred and went undetected or was not quickly contained, impacts on surface water quality as well as on fisheries and aquatic habitat could be long term and major. However, with implementation of the Applicant-proposed measures to respond to a drilling mud release during HDD construction, the impact of a release could be short term to long term and major, depending on the nature of the release and resources near the location of the crossing.

Hydrostatic Test Water Withdrawal and Discharge. The Applicant would withdraw water for hydrostatic testing, dust control, trench dewatering, and HDD installation. Hydrostatic testing would require approximately 11 to 17 million gallons of water for each construction spread that would be obtained from lakes, streams, or groundwater wells. The Applicant is currently evaluating transferring water from one test section to another in order to minimize the total quantity of water needed to complete the hydrostatic test. The volume of water appropriation needed for dust control, trench dewatering, and HDD installation has not been determined. Prior to construction, the Applicant would obtain a water appropriation permit from Minnesota DNR.

Withdrawals from surface waters for construction could result in entrainment of small fish, eggs, and macroinvertebrates during extraction; however, intakes would be equipped with a screen or equivalent device to prevent uptake of aquatic species. Smaller fish and invertebrates may still be injured or killed by being impinged, trapped against, the screening due to suction and water pressure. Spawning fish could be displaced through decreased water levels, fish eggs could desiccate if water levels drop too low, or eggs may experience delayed development due to impaired water quality. Larval and juvenile fish could be affected through entrainment during water withdrawal, decreased survival under conditions of poor water quality, and reduced prey availability.

As stipulated in permit requirements, the Applicant would select appropriation sites that would meet Minnesota DNR's criteria of "doing no harm," and all appropriation sites would be reviewed by Minnesota DNR prior to issuance of a water appropriation permit. The permit requires that water withdrawals have a minimal potential for impacts on groundwater resources and must not adversely affect trout streams, calcareous fens, or other significant environmental resources. If water is withdrawn from surface water, hose intakes would be equipped with screens to prevent entrainment of aquatic species, and adequate waterbody flow rates and volumes would be maintained to protect aquatic life and allow for downstream uses as required by the water use permit (Appendix E).

Hydrostatic test water would be discharged from a test section in one of two ways: (1) into well-vegetated upland areas using controlled-flow velocity with a dewatering structure such as a silt fence and straw bales or into geotextile filter bags that are used to avoid soil erosion, sediment transport, and bottom scouring; or (2) into the waterbody from which it was withdrawn to prevent the spread of invasive species or degradation in water quality; the discharge rate would not exceed the permitted applicable discharge rate (Appendix E). Water would be treated as specified in the NPDES permit prior to discharge; and the Applicant would monitor pH, dissolved oxygen levels, and any other parameters required by the permit, as described in Appendix D of the Environmental Protection Plan (Appendix E). Discharges would adhere to all conditions set forth in NPDES and water appropriation permits, including discharge over approved energy dissipation measures (e.g., sand bags, plastic sheeting, or natural rock riprap) and the sedimentation control measures as described above. If inter-basin transfers of water occur, there is also the potential to introduce and spread aquatic nuisance species; however, hydrostatic waters would be discharged through a filtering device to the source waterbody and following all requirements of acquired permits. With adherence to water appropriation and NPDES permit conditions, and implementation of the Applicant-proposed measure described above, impacts on fisheries and aquatic habitats from water appropriation and discharge during construction would be temporary and minor

Impacts on Management Units and Managed Species

Aquatic Management Areas. LaSalle Creek would be crossed using the HDD method; this would affect 0.4 acre of the LaSalle Creek AMA. The LaSalle Creek AMA is 28 acres and provides angling opportunities (as described below, LaSalle Creek also is a designated trout stream). This would be the second pipeline to cross this AMA; an existing pipeline crossing is at the southern extent of the AMA. Woody vegetation would be removed from the construction work area during construction and, depending on the crossing method used, the habitat quality of LaSalle Creek adjacent to the crossing location may be reduced. The crossing of LaSalle Creek has the potential to introduce invasive species and result in the loss of habitat and reduction of habitat quality. These impacts are expected to be short term, and negligible to minor as little habitat would be lost in the construction work area and BMPs would be in place to prevent the spread of invasive species.

The Applicant's preferred route would come within 0.5 mile of three other AMAs (Figure 6.3.4-1) but would not directly disturb these areas (Table 6.3.4-6). AMAs represent good-quality aquatic habitats with functional adjacent uplands.

Table 6.3.4-6. Aquatic Management Areas Crossed by or near the Applicant's Preferred Route in Minnesota (acres)

Aquatic Management Area	Construction Work Area[a]	Permanent Right-of-Way[b]	Within 0.5 Mile of Centerline[c]
Blackhoof River AMA	<0.1	<0.1	44.4
LaSalle Creek AMA	0.4	0.2	27.4
Spire Valley AMA	<0.1	<0.1	56.2
Straight River AMA	<0.1	<0.1	16.6
TOTAL	**0.4**	**0.2**	**144.6**

Source: Minnesota DNR 2016h.

[a] Enbridge-provided footprint for construction work area, including additional temporary workspaces and access roads.

[b] Enbridge-provided footprint for permanent right-of-way, including primary access roads, pump stations, and mainline valves.

[c] Acres of Aquatic Management Area (AMA) within 0.5 mile of the centerline of the Applicant's preferred route.

Other Management Units. Thirty-nine sensitive aquatic resources are present within 0.5 mile of the Applicant's preferred route, including 5 lakes rated for Fish IBI, 10 Lakes of Biological Significance, 1 Sentinel Lake, 21 trout streams, 1 trout lake, and 1 lake managed for muskellunge.

The Applicant's preferred route would not cross any of the five lakes rated for Fish IBI that occur within 0.5 mile (Table 6.3.4-7); therefore, no impacts are anticipated. One of the lakes, Portage Lake, also is a designated Sentinel Lake; the construction work area for the Applicant's preferred route would be on the edge of the basin of Portage Lake. BMPs would be in place to prevent erosion or other impacts on this lake during construction. The disturbance area would be restored to preconstruction conditions once the crossing is complete (see Section 6.3.1.2). Little habitat would be lost due to construction, and BMPs would be in place to reduce impacts on aquatic habitats, as described above so the resultant impact is expected to be short term and negligible to minor.

Table 6.3.4-7. Lakes with Fish Index of Biotic Integrity Ranking within 0.5 Mile of the Applicant's Preferred Route in Minnesota

Watershed	DNR Identifier No.	Fish Index of Biological integrity Status
Roosevelt	14175	Exceptional
Island	14798	Exceptional
Waukenabo	13413	Below impairment threshold
Big LaSalle	14298	Exceptional
Portage	15124	Exceptional

Source: Minnesota DNR 2014a.

Note:

Occurrences are within 0.5 mile centered on the Applicant's preferred route (none would be crossed by the route).

Of the 10 Lakes of Biological Significance within 0.5 mile of the Applicant's preferred route (Appendix L, Table L-2), 8 are classified as outstanding. Construction of the Applicant's preferred route could result in the introduction of invasive species, loss of high-quality habitat, and reduction of habitat suitability for special-status species. However, the impacts would be indirect and short term and negligible to minor, because little habitat would be removed and BMPs would be in place to prevent the spread of invasive species.

No hatcheries are within 0.5 mile of the Applicant's preferred route, and none are immediately downstream of a water crossing for the Applicant's preferred route. The nearest hatchery is the Spire Valley trout hatchery which is located about 0.65 mile upstream of a crossing; the hatchery's water supply is dependent on artesian groundwater quantity and quality. Consequently, construction of the Applicant's preferred route would not affect the hatchery. A discussion of crossings where artesian conditions exist and associated BMPs is provided in Section 6.3.1.1.

Twenty-one trout streams are within 0.5 mile of the Applicant's preferred route; the Applicant's preferred route crosses six of those trout streams (Table 6.3.4-8). One trout lake (Marion Lake in Cass County) is within 0.5 mile of the Applicant's preferred route but is not within the construction work area.

Trout streams are sensitive to erosion, sedimentation, and changes to riparian vegetation in areas adjacent to the streams because those habitats provide shade and cooling. Pipeline construction could alter groundwater connectivity or flow, resulting in warming of the stream and reduced habitat suitability for trout and their invertebrate prey. Trout streams may have groundwater discharge zones or wetland seepage areas on hillsides or slopes with deep organic soils that could be disrupted during construction. Destabilization of these soils could result in long-term increases to nutrients and sediments in the streams. Removal of vegetation along small trout streams could result in less large woody vegetation in the stream. However, riparian vegetation would be removed only from the construction work area adjacent to the trout stream and only if either wet or dry open-cut crossing methods are used. If HDD methods are used for crossing clearing of vegetation could be limited to the 50-foot permanent right-of-way. Trees and shrubs would not be allowed to reestablish within the permanent right-of-way, which could lead to permanent major thermal effects on trout streams. If tributaries to trout streams are crossed, some downstream impacts from sedimentation could occur, depending on the distance to the trout stream. The Applicant's preferred route would cross the Moose Horn River downstream of a protected trout stream and upstream of a tributary (King Creek) to a protected trout stream. As noted in Section 6.3.1.1, the impacts of sedimentation on surface water crossings and the impact of pipeline crossings on water quality along the Applicant's preferred route would be temporary to short term and minor. As a result of these considerations, and with selection of the most appropriate crossing method and implementation of appropriate BMPs, the impacts on trout streams from construction of the Applicant's preferred route would be permanent to short term and minor to major, depending on the crossing.

Table 6.3.4-8. Number of Trout Streams Crossed by or near the Applicant's Preferred Route in Minnesota

Trout Streams – Kittle Name (Kittle Number)	Milepost	Construction Work Area[a]	Permanent Right-of-Way[b]	Within 0.5 Mile of Centerline[c]
Blackhoof River (S-001-003)	MN 408.1	1	1	1
King Creek (M-050-046-029-023)	MN 344.2	1	1	1
LaSalle Creek (M-163)	MN 171.4	--	--	1
LaSalle Creek (M-163)	MN 171.7	1	1	1
Pine River, South Fork (M-106-013)	MN 232.7	--	--	1
Spring Brook (M-106-004-002-001)	MN 265.3	1	1	2
Straight River (M-096-035-002-002)	MN 198.3	1	1	1
Unnamed stream (M-050-046-029-023-002)	MN 344.8	--	--	1
Unnamed stream (M-050-046-029-029)	MN 406.3	--	--	1
Unnamed stream (M-106-013-008)	MN 232.4	--	--	1
Unnamed stream (S-001.9-009)	MN 313.4	--	--	1
Unnamed stream (S-001.9-011)	MN 364.2	--	--	1
Unnamed stream (S-001-003-027.8)	MN 408.1	--	--	1
Unnamed stream (S-001-003-028)	MN 352.1	--	--	1
Unnamed stream (S-001-003-029)	MN 352.3	1	1	1
Unnamed stream (S-001-003-030)	MN 352.7	--	--	1
Unnamed stream (S-001-003-030-001)	MN 408.7	--	--	1
Unnamed stream (S-001-003-030-001-B001)	MN 408.8	--	--	1
Unnamed stream (S-002-008-001)	MN 339.9	--	--	1
Unnamed stream (S-002-008-001-005)	MN 361.8	--	--	1
TOTAL		**6**	**6**	**21**

Source: Minnesota DNR 2015a.

[a] Enbridge-provided footprint for construction work area.

[b] Enbridge-provided footprint for permanent right-of-way.

[c] Number of trout streams within 0.5 mile of the centerline of the Applicant's preferred route.

Minnesota PCA's Watershed Health Assessment parameters for species richness, stream species quality, and habitat quality and connectivity were compared for the Applicant's preferred route and RA-03AM, RA-06, RA-07, and RA-08 between Clearbrook and Carlton using the data in Figures 6.3.4-5, 6.3.4-6, and 6.3.4-7. No clear consistent trends distinguished among the potential routes, although in some instances, one alternative scored higher than the others for some individual indices.

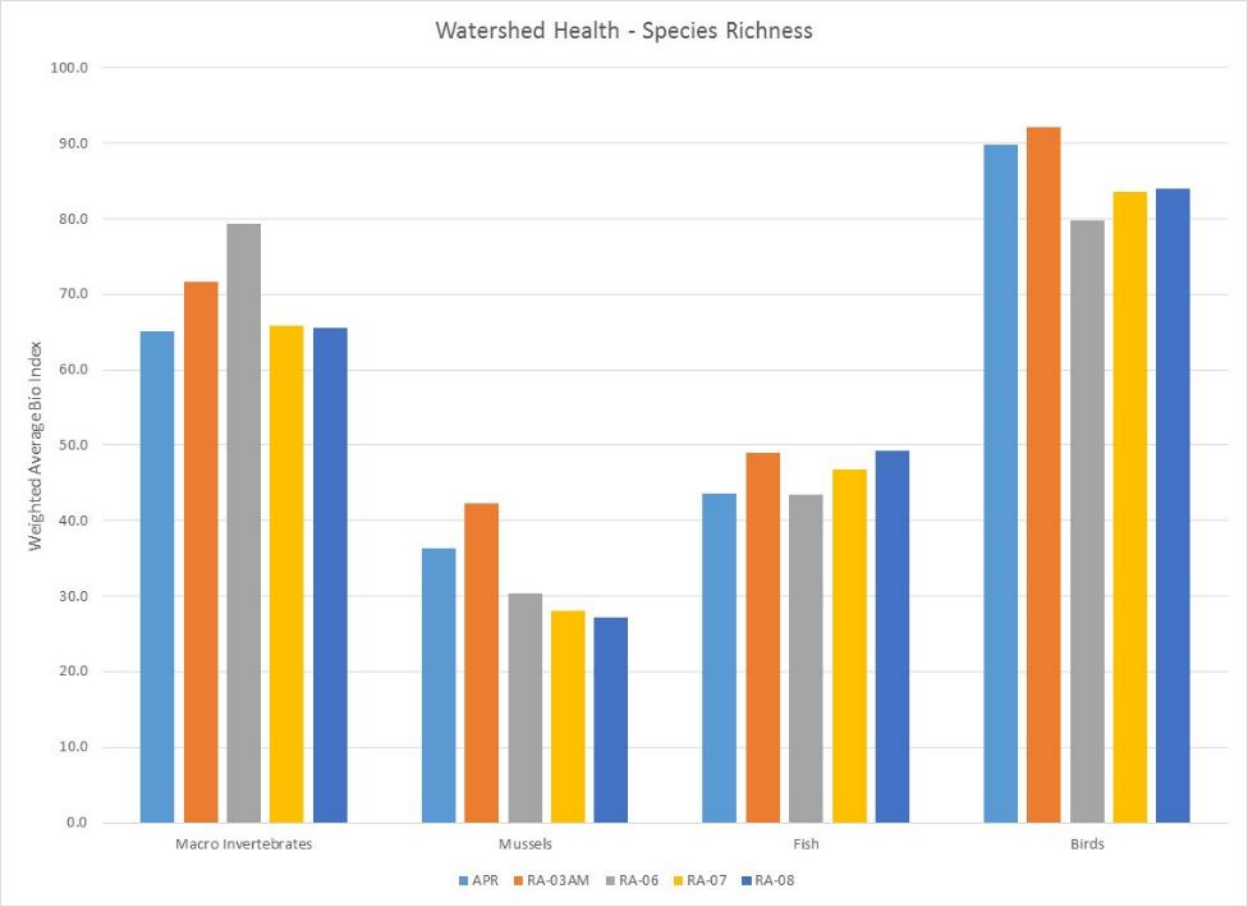

Source: Minnesota DNR 2016f.

APR = Applicant's preferred route, RA = route alternative

Figure 6.3.4-5. Weighted Average Species Richness Indices for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

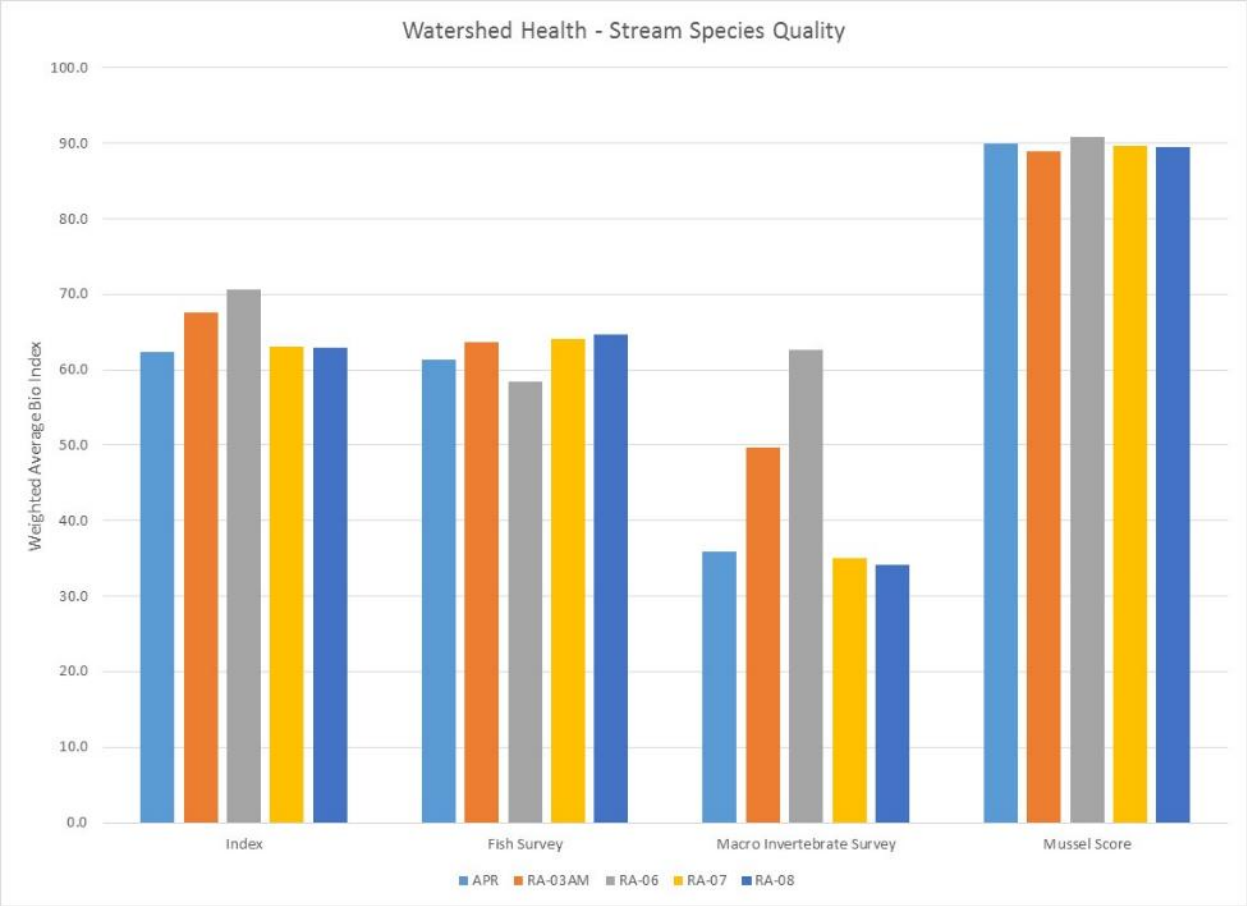

Source: Minnesota DNR 2016f.

APR = Applicant's preferred route, RA = route alternative

Figure 6.3.4-6. Weighted Average Stream Species Quality Indices for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

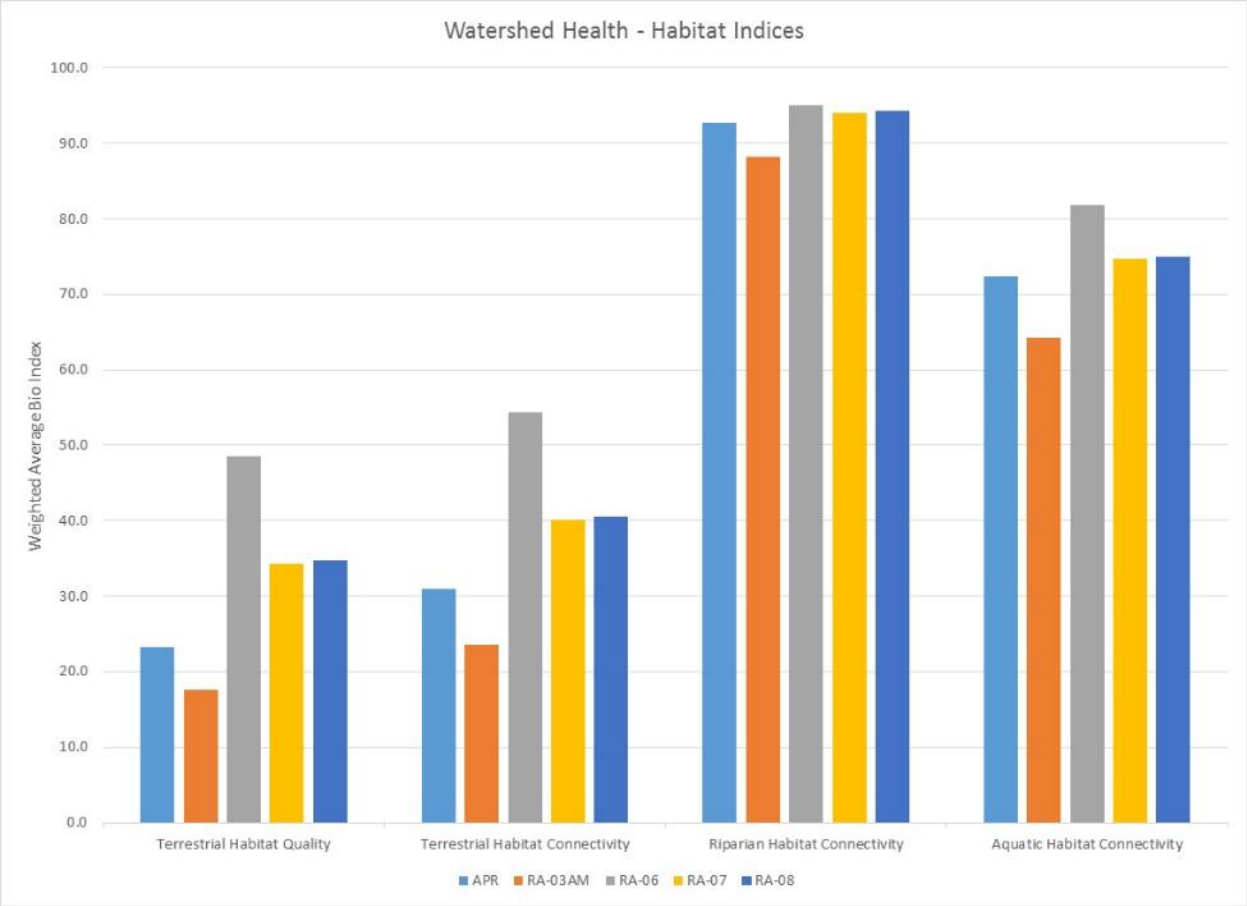

Source: Minnesota DNR 2016f.

APR = Applicant's preferred route, RA = route alternative

Figure 6.3.4-7. Weighted Average Habitat Quality and Connectivity Indices for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Wildlife and Wildlife Habitat

General Potential Impacts

Construction would include clearing and grading of the construction work area, ATWS, temporary and permanent access roads, and the sites of MLVs, new and expanded pump stations, and cathodic protection sites. Other construction activities that could affect wildlife and wildlife habitats include trenching, dewatering, blasting, waterbody crossings, surface water withdrawals and discharges (e.g., for hydrostatic testing), fueling and use of hazardous materials, facility construction, and restoration or reclamation of temporary construction areas. Wildlife may be affected directly by construction activities or indirectly from disturbances caused by human activity and noise associated with construction activities. Although only a narrow band of habitat would be directly altered by construction, indirect effects would occur over a wider area

As noted above, the Applicant would incorporate measures into the Project to avoid or minimize construction impacts on fisheries and fisheries habitat, and many of those measures would help to avoid or minimize impacts on wildlife and wildlife habitats. In addition to the fishery-related measures, the Applicant would implement the following measures to avoid or reduce impacts on wildlife and wildlife habitats:

- Confine clearing activities to the approved construction work areas and adhere to erosion control specifications to minimize impacts on vegetation, aquatic resources and wildlife.
- Fell trees toward previously cleared construction areas to prevent damage to adjacent trees.
- Upon completion of pipeline installation and backfilling and construction of facilities, revegetate disturbed areas in accordance with the Environmental Protection Plan (Appendix E) unless otherwise directed by landowners or land management agencies.
- Restore cleared areas and reseed with an appropriate seed mix (e.g., Minnesota BWSR-approved mixes) to minimize the duration of vegetative disturbance. Where appropriate, this seed mix could be used to provide a food source for wildlife.
- Slope the ends of open trenches to provide ramps for wildlife that fall into the trench (e.g., small animals such as rodents, amphibians, and snakes) to be able to escape.
- Handle, store, and dispose of food and general waste generated during construction to reduce attraction for opportunistic scavengers such as raccoons, crows, and gulls that could prey on other wildlife in the area.
- Handle, store, and dispose of all solid waste and hazardous materials in accordance with stipulations of permits and as presented in the Environmental Protection Plan.

Construction of the Applicant's preferred route would result in clearing of 1,696 acres of evergreen, deciduous and mixed forested habitats as well as 1,665 acres of cultivated crops (Table 6.3.4-9). Forest and cultivated crops represent approximately 66 percent of the total vegetation affected by construction of the Applicant's preferred route. Additionally, 604 acres of woody and emergent herbaceous wetlands would be disturbed by construction.

Table 6.3.4-9. Vegetation Cover Removed for the Applicant's Preferred Route in Minnesota (acres)

Vegetation Cover Class	Con[a]	Op[b]	ATWS[c]	Access Roads	Pump Stations	MLVs[d]	Total[e]	
							Con	Op
Evergreen forest	175.8	70.7	18.2	18.6	0.5	0.5	198	86
Deciduous forest	1,349.2	594.0	96.8	102.6	2.4	2.1	1,477	670
Mixed forest	18.2	7.8	1.4	2.3	--	--	20	10
Scrub/shrub	225.8	111.5	15.2	13.1	2.1	--	243	125
Grassland/herbaceous	129.8	62.1	32.4	8.7	3.5	0.2	164	73
Hay/pasture	577.2	258.7	120.7	45.4	15.7	1.2	699	320
Cultivated crops	1,335.5	574.6	326.9	22.3	20.1	1.8	1,665	617
Woody wetlands	336.0	169.6	17.7	13.0	3.0	0.5	355	185
Emergent herbaceous wetlands	229.2	122.4	18.9	7.1	3.0	0.1	249	132
Barren land	3.6	1.7	8.1	0.6	--	--	12	2
TOTAL	**4,380.3**	**1,973.2**	**656.2**	**233.8**	**50.2**	**6.6**	**5,082**	**2,220**

Source: Homer et al. 2015.

[a] Con = Enbridge-provided footprint for construction work area.

[b] Op = Enbridge-provided footprint for permanent right-of-way.

[c] ATWS = additional temporary workspaces (also pipe yards).

[d] MLVs = mainline valves, including valve pad and driveways.

[e] Con = Sum of Enbridge-provided construction work area, ATWS including pipe yards, and temporary access roads; Op = Sum of Enbridge-provided pipeline permanent right-of-way, primary access roads, pump stations, and MLVs (including valve pads and driveways).

Notes:

Values in table may not sum to subtotals and totals due to rounding.

"--" = no occurrence

The areas cleared would remain clear of brush, trees, and vegetation until restoration is completed. This would result in the loss of habitat for some species, including those species that use tree and shrub habitats for cover, forage, and nesting. The effects on wildlife habitat generally would be short term and minor, except in areas where woody vegetation is removed or wetlands affected. In those areas, the impact would be long term to permanent and minor to major, because of the long recovery period for forested areas and the sensitivity of wetlands to disturbance. Woody vegetation would be permanently excluded from the permanent right-of-way of the pipeline but would be allowed to recover in the construction work area outside of the permanent right-of-way. This loss of habitat would affect small mammals, amphibians, reptiles, and other small animals to a greater extent than large animals (e.g., deer and large birds), which have larger territories and can avoid the active construction areas. Therefore, the impact on wildlife from the loss of habitat would range from temporary to permanent and minor to major for small wildlife species, and short term and minor for larger species.

Clearing, grading, trenching, and the use of construction vehicles and equipment would result in direct impacts on some animals, particularly small and mid-sized mammals, reptiles, amphibians, and invertebrates. Members of these species would be affected more than large wildlife because of their

relative lack of mobility compared to that of larger animals (e.g., deer and coyotes). Burrows and dens could be destroyed or abandoned during clearing and excavation, resulting in displacement or loss of young, and loss of foraging or cover habitat during rearing seasons. Burrowing animals would be expected to return and recolonize the right-of-way after construction; however, compacted areas, such as temporary work areas, may become less suitable habitat because they would no longer be conducive to burrowing (Lauzon et al. 2002). In addition, nests could be destroyed or abandoned, resulting in loss of eggs and young, and loss of foraging or cover habitat during nesting seasons. Although open trenches would be sloped at the ends, some small animals may become trapped in open trenches and may not survive. As a result of these considerations, it anticipated that the direct impact of these activities on wildlife would be temporary to short term and minor.

Many animals would be temporarily displaced from the active construction areas and adjacent areas because of clearing activities, noise, and human disturbance. Human disturbance could influence wildlife behavior or cause displacement of species that are less tolerant of human intrusion or more sensitive to noise, and intraspecific competition could increase stress among some individuals. Noise disturbance from construction activities also could lead to nest abandonment and subsequent depredation of eggs or young. The indirect effects of construction disturbance may include reduced foraging time and increased alerting behaviors, which could result in increased energy expenditure and potentially lower survival or reproduction. These indirect impacts would be reduced with implementation of the BMPs incorporated into the Project as described above. In addition, nearby habitat could provide cover and suitable escape habitat for many of the common wildlife species that would be displaced, and mobile animals could return to the area after completion of construction and restoration activities, if appropriate habitats are available. Consequently, the impact of these displacements during construction would be temporary to short term and minor.

The Applicant may be required to trap beavers or alter or remove beaver dams to lower water elevations within the construction corridor prior to construction. Because beavers would likely move back to the area once construction is complete (Wisconsin DNR 2005), these activities would result in a temporary to short term and negligible to minor impact on beavers and on the altered waterbodies. Removal of a beaver dam may require a separate Public Waters Work Permit and, depending on the location, may not be permitted where beaver dams maintain control of basin water levels.

Disturbed areas would be susceptible to invasion by noxious and invasive species; if that occurred, the wildlife habitats would be degraded. However, implementation of BMPs to address invasive species would reduce the potential establishment and spread of noxious weeds, resulting in short-term and negligible to minor impacts.

During construction and clearing of the right-of-way, vehicle emission by-products (e.g., polycyclic aromatic hydrocarbons, aldehydes, carbon monoxide, nitrogen oxides, ozone, and sulfur oxides) could contaminate soil and vegetation in the areas immediately adjacent to the construction vehicles and equipment. The construction period at any location would be relatively short-and would occur only during daytime hours—except for HDD crossings of surface waters, which would occur for 24 hours per day, and the level of contamination in vegetation is not expected to be substantial. Although it is possible that species such as pollinators and herbivores that inhabit the areas where vegetation is exposed to these contaminants could be affected, the impact would be short term and negligible.

Impacts on Management Units and Managed Species

Construction of the Applicant's preferred route would result in habitat loss or alteration of 439 acres within WMAs and state forests (Table 6.3.4-10), including approximately 15 acres of the Grayling Marsh WMA and approximately 3 acres of the Lawler WMA. Loss or alteration of habitats could adversely affect both game and nongame wildlife that use these WMAs until vegetation has recovered. The resultant impact on the WMAs would be short term to long term, depending on the existing habitat types, and minor to major, depending on the landscape context of these public areas to the areas around them (see Table 6.3.4-10).

Construction would occur on land within eight state forests (Table 6.3.4-10), resulting in loss and alteration of forest habitat as well as fragmentation of forest. Because the recovery of forested areas in the temporary construction work area (i.e., the disturbed areas outside of the permanent right-of-way) would take decades, the impact would be long term to permanent but minor to major because of the relatively small area affected compared to the amount of nearby forested areas and habitat fragmentation (see Table 6.3.4-10).

The Applicant's preferred route would cross the McGregor IBA, affecting about 48 acres during construction (Table 6.3.4-11). Construction during the nesting season (beginning May 1 for most birds of conservation concern) could result in the loss of bird eggs and young. The Applicant would work with USFWS and Minnesota DNR to develop measures that would avoid and minimize disturbance or destruction of migratory birds. The impact on the IBA and breeding birds within the IBA from removal of vegetation would be short term to long term and minor based on to the relatively small area affected compared to the acreage of the unaffected portion of the IBA (see Table 6.3.4-11).

An access road would cross the Itasca State Park IBA; however, the pipeline corridor would not cross the IBA and would be co-located with an existing pipeline for most of the length near this IBA. As a result, no impacts are expected on this IBA; if noise and disturbance affected some species within the IBA, the impact would be temporary and negligible.

Raptor habitat could be compromised by removal of trees from the construction work area and extra workspaces in adjacent areas. Many of these species require large, unfragmented habitats. In addition, because most raptors reuse nest structures for many years, loss of nest structures would require a pair to find a new nest tree and build a new nest. If suitable new nest trees are not available within established territories, new territories would need to be established. These processes would lead to increased energy demands during nesting and could lead to reduced or lost reproduction in subsequent years. Most migratory birds begin nesting from mid-April through late July; however, bald eagles may nest as early as January (Minnesota DNR 2017b). Construction during the nesting season (beginning May 1 for most birds of conservation concern) could result in loss of bird eggs and young. The Applicant would work with USFWS to develop measures to avoid and minimize destruction of migratory birds. Raptor nests identified during 2014 to 2016 surveys would be avoided when possible. If removal of one of these nests is unavoidable, a permit and consultation with USFWS and Minnesota DNR would be required.

Table 6.3.4-10. Wildlife Conservation Lands Potentially Affected by Construction and Operation of the Applicant's Preferred Route in Minnesota

Designation Type	Con[a] (acres)	Op[b] (acres)	Facilities[c]		Total[d]		Within 0.5 Mile of Centerline	
			Con[a] (acres)	Op[b] (acres)	Con (acres)	Op (acres)	Acres	No.
Habitat or Species Management Area								
Grayling Marsh Wildlife Management Area	14.1	6.4	0.6	--	14.8	6.4	820.1	1
Lawler Wildlife Management Area	2.9	1.5	--	--	2.9	1.5	197.8	2
Lowe Wildlife Management Area	--	--	--	--	--	--	57.9	1
McGregor Wildlife Management Area	--	--	--	--	--	--	152.1	1
Mud Lake Wildlife Management Area	--	--	--	--	--	--	3.6	1
Salo Marsh Wildlife Management Area	--	--	--	--	--	--	201.6	1
Resource Management Area								
BLM land	--	--	--	--	--	--	60.8	1
State Forest								
Badoura	--	--	--	0.4	--	0.4	--	--
Fond du Lac	--	--	--	--	--	--	987.8	2
Foothills	42.3	18.6	11.8	1.1	54.1	19.7	1,811.4	1
Hill River	102.9	48.3	5.0	6.0	107.9	54.2	5,056.0	1
Huntersville	96.9	42.9	11.9	7.4	108.9	50.3	4,504.0	2
Land O'Lakes	130.2	58.1	25.9	5.2	156.2	63.4	5,913.6	5
Mississippi Headwaters	25.1	10.7	3.8	6.7	28.9	17.4	1,335.2	2
Paul Bunyan	--	--	--	--	--	--	264.9	1
Savanna	8.7	4.6	0.2	0.1	9.0	4.6	579.6	6
Waukenabo	15.8	8.3	0.5	0.7	16.2	8.9	545.5	4
White Earth	--	--	--	1.5	--	1.5	207.6	1
Private Conservation Land								
Marginal cropland – Limited	--	--	--	--	--	--	22.3	4
TOTAL[d]	**439.1**	**199.4**	**59.7**	**29.1**	**498.9**	**228.5**	**22,721.8**	**37**

Source: USGS-GAP 2016

[a] Con = estimated construction work area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way; Enbridge-provided footprint for permanent right-of-way.

[b] Op = estimated permanent right-of-way in acres based on a 50-foot-wide right-of-way centered on the route; Enbridge-provided footprint for permanent right-of-way in Minnesota.

[c] Facilities for construction include additional temporary workspaces (ATWS), including pipe yards, and temporary access roads; facilities for operation include primary access roads; pump stations; and mainline valves (MLVs), including valve pads and driveways.

[d] Con = sum of pipeline construction work area, ATWS (including pipe yards), and temporary access roads; Op = sum of pipeline permanent right-of-way, primary access roads, pump stations, and MLVs, including valve pads and driveways.

Notes:

Values in table may not sum to subtotals and totals due to rounding.

"--" = no crossing

Table 6.3.4-11. Audubon Important Bird Areas and Colonial Waterbird Nesting Sites Potentially Affected by the Applicant's Preferred Route in Minnesota

Resource	Con[a]	Op[b]	ATWS	Access Roads	Pump Stations and MLVs	Total[c]		Within 0.5 Mile of Centerline
						Con	Op	
Audubon Important Bird Areas (acres)								
McGregor IBA	47.5	24.5	3.1	2.2	0.1	50.6	26.8	3,023.3
Itasca State Park IBA	--	--	--	1.5	--	--	1.5	384.7
TOTAL	**47.5**	**24.5**	**3.1**	**3.7**	**0.1**	**50.6**	**28.3**	**3,408.1**
Colonial Waterbird Nesting Sites (number)								
Mahtowa – great blue heron	--	--	--	--	--	--	--	1
Shell River – great blue heron	--	--	--	--	--	--	--	1
TOTAL	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**2**

Sources: Audubon 2016; Minnesota DNR 2016e.

[a] Con = estimated construction work area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way; Enbridge-provided footprint for permanent right-of-way.

[b] Op = estimated permanent right-of-way in acres based on a 50-foot-wide right-of-way centered on the route; Enbridge-provided footprint for permanent right-of-way in Minnesota.

[c] Con = sum of pipeline construction work area, additional temporary workspaces (ATWS), including pipe yards, and temporary access roads; Op = sum of pipeline permanent right-of-way, primary access roads, pump stations, and mainline valves (MLVs), including valve pads and driveways

Notes:

Values in table may not sum to subtotals and totals due to rounding.

"--" = no crossing

IBA = Important Bird Area

Two colonial waterbird nesting sites (rookeries) occur within 0.5 mile of the Applicant's preferred route (Table 6.3.4-11). Waterbirds can be vulnerable to development, particularly when appropriate replacement habitat is not available and disturbance, even though a number of the species are not rare. Direct impacts may occur from the loss of nesting habitat; indirect impacts could occur from disturbance to adults, nests, young due to construction. Wildlife agencies often recommend a buffer of no impact around the colony and/or season restrictions on construction. The Shell River great blue heron rookery is about 1,220 feet from the closest construction work area; the impact on this rookery is expected to be indirect, temporary, and negligible to minor, depending on the time of year construction takes place. The Mahtowa great blue heron rookery is about 340 feet from the closest construction work area. Because construction activities would occur within a distance that would affect the Mahtowa colony, the Applicant would be required to consult with USFWS and Minnesota DNR, and a permit may be required. The impact of construction within this buffer zone would be temporary to long term and could be minor to major, depending on the construction activities conducted.

Impacts from Habitat Fragmentation

Habitat fragmentation is caused when contiguous habitats are divided into separate fragments. Large-block habitats (habitats larger than 100 acres) are susceptible to impacts from fragmentation—

particularly large, mature-core or interior forested areas that serve as habitat for migratory birds and other wildlife (Figure 6.3.4-8). Construction of linear projects such as pipelines can cause habitat fragmentation as well as changes in vegetation cover. Potential fragmentation effects on wildlife habitat include a decrease in total habitat area, amount of interior habitat, biodiversity (richness), and connectivity. Fragmentation also may cause an increase in amount of edge habitat, increase the risk of invasive species spread, and isolate some habitat types. The reduction in habitat connectivity can disrupt behavior and movement of species, alter population dynamics, reduce the chance of recolonization in extirpated island habitats, and decrease genetic diversity. Forest-nesting birds are particularly vulnerable to habitat fragmentation effects resulting from linear construction projects. Habitat fragmentation leads to increased predation, increased competition by generalist species, and changes in microclimate and vegetation that may result in extirpation and reduced reproductive success for area-sensitive species.

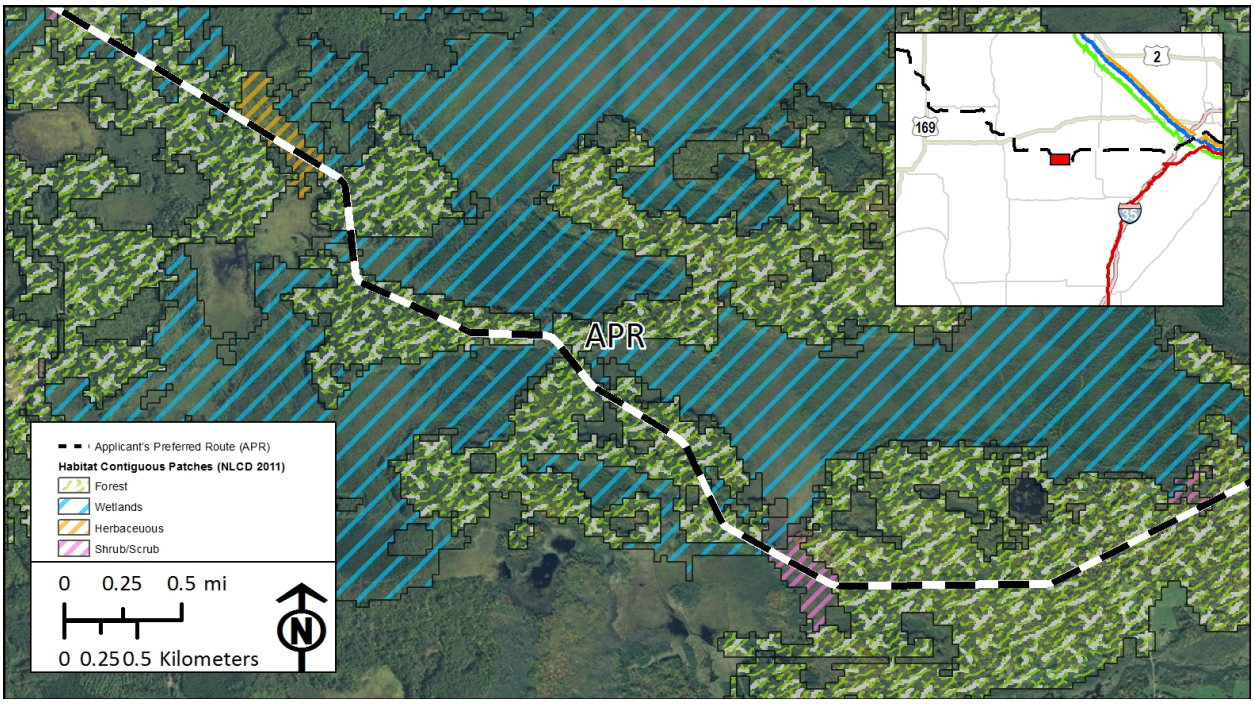

Source: Analysis based on Homer et al. 2015.

Figure 6.3.4-8. Example of Potential Fragmentation of Large-Block Habitats by the Applicant's Preferred Route

The Applicant's preferred route is co-located with other pipelines, utilities, or roads along most of its length. However, between Clearbrook and Carlton, nine segments (between approximately MPs 215.0 and 352.0 [Table 6.3.4-12]) are not co-located with other infrastructure. Within this span, 21 large-block forested and wetland habitats would be crossed and fragmented by construction of the Applicant's preferred route. This would occur along approximately 38 miles of the Applicant's preferred route, or approximately 11 percent of the route in Minnesota and 17 percent of the route between Clearbrook and Carlton. These habitat "patches" that would be crossed include primarily forested and woody wetland habitats. The largest patch crossed is approximately 8,900 acres over 7 miles, and the smallest patch crossed is approximately 130 acres over less than 1 mile (Table 6.3.4-12). Impacts on wildlife from habitat fragmentation would be permanent and major, depending on the habitat type and species present. These impacts would be greatest in the least disturbed areas.

Table 6.3.4-12. Large-Block Habitat Patches Crossed by the Applicant's Preferred Route in Minnesota

Beginning Milepost	Ending Milepost	Crossing Length (miles)	Patch Type	Patch Size (acres)
214.7	221.9	7.2	Forest/wetlands/herbaceous	4,513
223.1	224.3	1.2	Forest	1,208
265.2	266.1	0.9	Forest/scrub/shrub	561
279.8	283.4	3.6	Forest/wetlands	2,558
283.8	284.7	0.9	Wetlands	738
286.8	289.8	3.0	Forest/wetlands	549
291.5	292.9	1.4	Forest/wetlands	587
294.1	296.5	2.4	Wetlands	678
297.3	299.1	1.8	Wetlands	2,629
302.0	302.6	0.6	Forest/wetlands	156
302.9	303.6	0.7	Forest/wetlands	149
307.1	307.8	0.7	Forest/wetlands	133
308.1	308.7	0.6	Forest/wetlands	222
308.9	310.1	1.2	Forest/wetlands	1,200
311.1	312.1	1.0	Forest/wetlands	654
322.1	328.8	6.7	Forest/wetlands	8,951
329.7	330.8	1.1	Forest/wetlands	556
348.0	348.1	0.1	Forest	135
349.3	350.9	1.6	Forest/wetlands	332
351.5	352.0	0.5	Wetlands	408
352.1	352.5	0.4	Forest/wetlands	187
TOTAL		**37.6**		**27,101**

Source: Fragmentation analysis based on Homer et al. 2015.

Operations Impacts

The following sections describe the potential impacts of normal operation of the Applicant's preferred route. Potential impacts from an accidental release of crude oil during operation are addressed in Chapter 10.

Fisheries and Aquatic Habitat

General Potential Impacts

The pipeline right-of-way in upland areas would be maintained in an herbaceous vegetative state during operation to allow access along the right-of-way for inspection, monitoring, and maintenance. Permanent removal of riparian vegetation within the permanent right-of-way in areas adjacent to waterbody crossings would result in localized alterations in habitat, streambank stability loss and erosion, and the potential for increased sedimentation. The Applicant would conduct regular monitoring of the right-of-way and would be able to identify streambank areas where changes may occur to the topography or vegetation. If any such changes are identified, the Applicant would consult Minnesota DNR and Minnesota PCA and make repairs and improvements following recommendations of these agencies. With implementation of these measures, localized changes to topography or vegetation would result in short-term minor impacts in the vicinity of the alteration.

Permanent removal of riparian vegetation in areas adjacent to some waterbody crossings would allow more light to enter the waterbody and could cause long-term to permanent, negligible to minor increases in temperature at these locations. Trees and shrubs would not be allowed to reestablish within the permanent right-of-way. This could lead to permanent thermal effects on trout streams. During normal operation, no other measurable changes to water quality in surface waters would be expected, with no impacts on most fisheries or aquatic habitats.

Minor accidental fuel and lubricant leaks and spills could be released from maintenance and inspection vehicles using the permanent right-of-way and nearby areas. Any refueling, fuel storage, or vehicle maintenance would follow the Applicant-proposed measures set forth in the Environmental Protection Plan (Appendix E). If minor leaks or spills during operations reach surface waters, negligible to minor changes to surface water quality would result, and the subsequent temporary impacts on fisheries and aquatic habitats would be negligible to minor.

Chemical methods (i.e., herbicides) to control invasive vegetation species during operations could be used near waterbodies. The Applicant would implement its noxious weed plans that include methods to prevent and reduce the introduction and spread of noxious weeds and invasive species, and would implement BMPs for herbicide applications. Only herbicides and surfactants labeled for aquatic use would be used within 50 feet of any waterbody (Appendix E). In addition, herbicide use would be based on the invasive species present from monitoring, and the minimum herbicide would be used to treat the species present. These actions would reduce potential impacts on aquatic species from herbicides reaching surface waters with runoff. As a result, the use of herbicides would result in temporary and negligible impacts on fisheries and aquatic habitats.

Impacts from Integrity Management Digs

During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. In upland areas, these integrity digs would result in loss of vegetation in localized areas for relatively short periods of time. The Applicant would implement measures to minimize runoff to surface water during and after

these activities, similar to the measures incorporated into the Project during construction. If pipe segments need to be repaired or replaced along surface water crossings, the wet open-cut or dry open-cut method would be used to access the pipe. These methods would be the same as those used for construction of the crossing, as described above. Impacts on fisheries and aquatic habitat would be similar to those experienced during construction; for each integrity dig, the impacts would be short term to long term and minor, depending on the location, habitats affected, and whether repair or replacement are needed. These impacts would occur periodically over the life of the Project.

During repair or replacement of pipe as part of the Integrity Management Program, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during the integrity digs and backfilling activities. The frequency with which hydrostatic testing would occur, locations of testing, and amount of water needed for testing and dust control are not defined. As described for pipeline construction, the Applicant would be required to obtain water appropriation and NPDES permits for testing procedures, and the volume of water would be substantially less than for construction. With adherence to permits and implementation of BMPs to avoid the intake or entrainment of fish, potential impacts associated with minor alterations in stream flows from water appropriation and discharge for each integrity dig would be temporary and negligible.

Wildlife and Wildlife Habitat

General Potential Impacts

During operation of the pipeline, the permanent right-of-way would be maintained to prevent woody vegetation from re-growing. Losses of tree and shrub habitats used by birds for cover, forage, and nesting would be permanent in the area of the temporary construction work area that is outside of the permanent right-of-way because of the long period of time required for forest habitat to regenerate. Within the permanent right-of-way, the impact of this loss would be permanent and minor to major.

Differences in vegetation cover between the permanent right-of-way and the surrounding landscape can act as a barrier for some species, such as squirrels and small mammals, while acting as a travel corridor for others, such as raccoons and coyotes. Small mammals that do attempt to cross the cleared right-of-way in previously forested areas could be exposed to increased predation by coyotes, foxes, or birds. Trees and shrubs along rivers and creeks provide high-value wildlife habitat. Furbearers such as muskrats, mink, otter, weasels, and beaver use river edge habitats; and permanent removal of trees and large shrubs along the 50-foot-wide permanent right-of-way would create a break in cover that could increase exposure to terrestrial predators like foxes and coyotes, as well as predatory birds. Losses of tree and shrub habitats used by small mammals and birds for cover, forage, and nesting would be a permanent and minor impact because the permanent right-of-way would be maintained free of trees and large shrubs.

Mowing and vegetation removal can result in injury or direct mortality of smaller species such as turtles, small mammals, and bird eggs and young. This recurring impact would be localized to the permanent right-of-way and the areas around aboveground facilities, resulting in short-term minor impacts on common wildlife for each occurrence; but the mowing would be repeated periodically over the life of the Project.

The maintained permanent right-of-way may be used as travel corridors by some big game animals and humans. Increased human use could lead to disturbance and hunting pressure on game animals, resulting in minor permanent effects on wildlife (Hinkle et al. 2002).

The permanent right-of-way may become attractive to some small species as well. For example, during operations, there may be some warming of the soil above the pipeline, which may attract rabbits, badgers, and other burrowing rodents, especially during winter months. Small mammals attracted to the permanent right-of-way could be exposed to increased predation by coyotes, foxes, or birds. The pipeline right-of-way also could attract migratory waterfowl during early spring if it becomes snow free before surrounding habitats. This has been demonstrated during the early spring melt, when early vegetation emergence near roadways and the buried portion of the Trans Alaska Pipeline in Northern Alaska attracts waterfowl, shorebirds, and ptarmigan (Trans Alaska Pipeline System Owners 2001). Migratory birds attracted to the permanent right-of-way could be exposed to increased predation by coyotes, foxes, or other predators. These effects would be permanent but minor.

Habitat in the permanent right-of-way could be degraded if native vegetation is replaced by noxious and invasive species. The use of chemical controls can adversely affect wildlife species, particularly amphibians because of their sensitivity to chemical exposure. However, implementation of BMPs for use of herbicides that include measures such as only using herbicides when necessary and using aquatic formulations within 50 feet of water, and prevention of the spread of noxious species would minimize the potential for impacts; and the impact on wildlife and wildlife habitats is expected to be temporary to short term and minor.

Impacts on Management Units and Managed Species

The Applicant's preferred route would cross the McGregor IBA, permanently affecting about 25 acres. IBAs represent relatively intact areas that are important to birds. Maintenance of the permanent right-of-way could reduce populations of species sensitive to habitat disturbance and could indirectly result in a permanent and minor effect on breeding birds within the McGregor IBA.

Impacts from Habitat Fragmentation

During operation, the habitat fragmentation along the permanent right-of-way would continue, as described for construction impacts, and could reduce populations of some forest interior species (e.g., birds, mammals, and amphibians). Forest-nesting birds are particularly vulnerable to habitat fragmentation effects of linear construction projects. Forest-nesting songbird abundance, diversity, and reproduction rates have been shown to become depressed from the fragmentation associated with linear developments (Jalkotzy et al. 1997). Linear corridors also increase songbird nest predation and parasitism (e.g., by brown-headed cowbirds), by fragmenting forest habitats and increasing access to nests. As a result, habitat fragmentation during operation of the Applicant's preferred route would cause permanent minor to major impacts on wildlife, depending on the location and species.

Impacts from Integrity Management Digs

The integrity management digs described above (see operations impacts for fisheries and aquatic habitat) would result in changes to the permanent right-of-way that would be similar to those during construction.

During operation, the Applicant would implement its Integrity Management Program, which could require excavation and repair or replacement of sections of the pipeline. In upland areas, these integrity digs would result in loss of vegetation in localized areas for relatively short periods of time. The Applicant would restore the affected areas to conditions present prior to initiating the integrity dig. The impacts would be similar to those during construction of the pipeline, but over a substantially smaller area and without impacts on forested areas because the areas affected by integrity digs essentially would be limited to the permanent right-of-way. Consequently, impacts on wildlife and wildlife habitat would be short term and negligible to minor but would occur periodically over the life of the Project.

6.3.4.3.2 Route Alternatives (from Clearbrook to Carlton)

The types of potential impacts on fisheries and aquatic resources and wildlife and wildlife habitat that would result from construction and operation of route alternatives RA-03AM, RA-06, RA-07, and RA-08 would be the same as those described for the Applicant's preferred route. The species present would be similar for the Applicant's preferred route and all route alternatives. The duration and magnitude of impacts would be similar among all of the alternatives, with relatively minor differences resulting from different locations and increased or decreased occurrences of the impacts along the routes. As a result, this section refers to the impact analysis presented above for the Applicant's preferred route for most anticipated impacts.

Route Alternative RA-03AM

Construction Impacts

Fisheries and Aquatic Habitat

General Potential Impacts. Construction of RA-03AM would require crossing 167 streams, including 8 trout streams (Tables 6.3.4-13 and 6.4.3-14). These crossings would be constructed using the methods described in Section 6.3.4.3.1 for construction of surface water crossings of the Applicant's preferred route, including incorporation of the BMPs described in that section. The impacts of surface water crossings for RA-03AM would be the same as those for the Applicant's preferred route. Most crossing impacts would be temporary to short term and negligible to minor, although the use of wet open-cut crossings could result in a short- to long-term, minor impact at each crossing. Where streambanks are cleared of forested or other woody vegetation, the potential impacts on fisheries and aquatic habitats would be permanent and minor to major, depending on existing surface water conditions. Crossing methods have not been established for RA-03AM.

Table 6.3.4-13. Number of Stream Crossings for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Water Type	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Stream/river – perennial	25	41	57	28	31
Stream/river – intermittent	42	62	29	20	27
Artificial path	11	13	18	5	6
Connector	3	6	5	2	4
Canal ditch	15	31	12	19	27
Lake/pond – perennial	15	14	16	6	11
Swamp/marsh – intermittent	--	--	--	1	--
TOTAL CROSSINGS	**111**	**167**	**137**	**81**	**106**

Source: USGS NHD 2016.

Note:

The surface water types most likely to provide fish habitat are stream/river, artificial path, and connector.

Table 6.3.4-14. Number of Sensitive Aquatic Resources Crossed by and near the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Sensitive Aquatic Resource	Applicant's Preferred Route[a]			Route Alternative RA-03AM[b]			Route Alternative RA-06[b]			Route Alternative RA-07[c]			Route Alternative RA-08[b]		
	Con	Op	0.5 Mile[d]	Con	Op	0.5 Mile[d]	Con	Op	0.5 Mile[d]	Con	Op	0.5 Mile[d]	Con	Op	0.5 Mile[d]
Fish IBI Lake	--	--	5	--	--	6	--	--	--	--	--	3	--	--	1
Sentinel Lake	--	--	1	--	--	1	--	--	--	--	--	--	--	--	--
Lake of Biological Significance	--	--	10	--	--	6	1	1	4	3	2	16	1	1	16
Trout stream	6	6	17	8	8	19	7	6	28	8	6	7	7	4	18
Trout lake	--	--	1	--	--	--	1	1	--	--	--	--	--	--	--
Muskie lake	--	--	1	--	--	--	--	--	--	--	--	4	--	--	2
TOTAL	**6**	**6**	**35**	**8**	**8**	**32**	**9**	**8**	**32**	**11**	**8**	**30**	**8**	**5**	**37**

Sources: Minnesota DNR 2015b; 2015c; 2016b.

[a] Con = Enbridge-provided footprint for construction work area; Op = Enbridge-provided footprint for permanent right-of-way.

[b] Con = estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way; Op = estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the route.

[c] Con = estimated construction impact area in acres based on 205-foot-wide construction work area (10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3); Op = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on route.

[d] 0.5 mile = within 0.5 mile of the centerline of the route.

"—" = no crossing, Fish IBI Lake = Fish Index of Biotic Integrity Lake

Potential Impacts on Management Units and Managed Species. RA-03AM would result in 0.5 acre of disturbance to the LaSalle Creek AMA and would pass within 0.5 mile of seven other AMAs (Table 6.3.4-15). AMAs represent good-quality habitats with functional adjacent upland wildlife habitat areas. Impacts on AMAs from construction would depend on the type of waterbody crossing method used. As for the Applicant's preferred route, the Applicant would incorporate BMPs into construction to avoid or minimize impacts. Consequently; the impacts of construction of RA-03AM related to loss of habitat and reduction of habitat quality would be short term and negligible to minor. RA-03AM also would pass within 0.5 mile of six lakes with Fish IBI ratings (Table 6.3.4-16). The Applicant would implement BMPs to prevent the spread of invasive species, with the resultant impacts expected to be at most short term and negligible to minor. RA-03 would not cross any Lakes of Biological Significance (Table 6.3.4-17) or any waters managed for muskellunge (Table 6.3.4-18).

Table 6.3.4-15. Aquatic Management Areas Crossed by or near the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton (acres)

Aquatic Management Area	Applicant's Preferred Route[a]			Route Alternative RA-03AM[b]			Route Alternative RA-06[b]			Route Alternative RA-07[c]			Route Alternative RA-08[b]		
	Con	Op	0.5 Mile[d]	Con	Op	0.5 Mile[d]	Con	Op	0.5 Mile[d]	Con	Op	0.5 Mile[d]	Con	Op	0.5 Mile[d]
Blackhoof River AMA	--	--	44.4	--	--	44.4	--	--	--	--	--	--	--	--	--
Bruce Creek AMA	--	--	--	--	--	--	--	--	--	--	--	0.2	0.3	0.1	3.8
Cat Creek AMA	--	--	--	--	--	14.9	--	--	--	--	--	--	--	--	--
Clearwater River AMA	--	--	--	--	--	--	0.2	0.1	17.3	0.3	0.1	15.4	--	--	4.9
Fish Lake AMA	--	--	--	--	--	0.3	--	--	--	--	--	--	--	--	--
Fish Trap Lake #1 FMA	--	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--
LaSalle Creek AMA	0.4	0.2	27.4	0.5	0.2	27.4	--	--	--	--	--	--	--	--	--
Little Otter Creek AMA	--	--	--	--	--	--	4.6	1.9	92.9	7.8	1.9	92.9	4.4	1.8	82.2
Midge-Little Midge FMA	--	--	--	--	--	--	--	--	--	--	--	0.2	--	--	--
Mississippi River AMA	--	--	--	--	--	12.8	--	--	--	--	--	--	--	--	--
Necktie River AMA	--	--	--	--	--	--	--	--	--	--	--	41.9	--	--	41.9
Otter Creek AMA	--	--	--	--	--	--	--	--	67.2	--	--	67.2	--	--	66.6
Pierz Fish Lake AMA	--	--	--	--	--	0.1	--	--	--	--	--	--	--	--	--
Popple River AMA	--	--	--	--	--	--	--	--	3.1	--	--	--	--	--	--
Prairie River AMA	--	--	--	--	--	--	--	--	--	--	--	0.4	--	--	--
Spire Valley AMA	--	--	56.2	--	--	--	--	--	--	--	--	--	--	--	--
St. Louis River II AMA	--	--	--	--	--	--	--	--	25.1	--	--	25.1	--	--	--
Straight River AMA	--	--	16.6	--	--	16.6	--	--	--	--	--	--	--	--	--
Venning Creek AMA	--	--	--	--	--	--	0.3	0.1	12.5	--	--	--	--	--	--
TOTAL	**0.4**	**0.2**	**144.6**	**0.5**	**0.2**	**117.2**	**5.0**	**2.1**	**218.2**	**8.2**	**2.0**	**243.2**	**4.7**	**2.0**	**199.5**

Source: Minnesota DNR 2016h.

Table 6.3.4-15. Aquatic Management Areas Crossed by or near the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton (acres)

Aquatic Management Area	Applicant's Preferred Route[a]			Route Alternative RA-03AM[b]			Route Alternative RA-06[b]			Route Alternative RA-07[c]			Route Alternative RA-08[b]		
	Con	Op	0.5 Mile[d]	Con	Op	0.5 Mile[d]	Con	Op	0.5 Mile[d]	Con	Op	0.5 Mile[d]	Con	Op	0.5 Mile[d]

[a] Con = Enbridge-provided footprint for construction work area; Op = Enbridge-provided footprint for permanent right-of-way.

[b] Con = estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way; Op = estimated operations impact area in acres based on a 50-foot-wide right-of-way centered on the route.

[c] Con = estimated construction impact area in acres based on 205-foot-wide construction work area (10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3); Op = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the route.

[d] 0.5 mile = within 0.5 mile of the centerline of the route.

Notes:

Values in table may not sum to subtotals and totals due to rounding.

"—" = no crossing

AMA = Aquatic Management Area, FMA = Fisheries Management Area

Table 6.3.4-16. Number of Lakes with Fish IBI Ranking within 0.5 Mile of the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Lake Name	Fish IBI Status	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Big LaSalle	Exceptional	1	1	--	--	--
Fish	Meeting standard	--	1	--	--	--
Fish Trap	Exceptional	--	1	--	--	--
Green Prairie Fish	Mixed results – below/meeting	--	1	--	--	--
Irving	Exceptional	--	--	--	1	--
Island	Exceptional	1	1	--	-	--
Little Wolf	Exceptional	--	--	--	1	
Lower Sucker	Meeting standard	--	--	--	--	1
Midge	Meeting standard	--	--	--	1	--
Portage	Exceptional	1	1	--	--	--
Roosevelt	Exceptional	1	--	--	--	--
Waukenabo	Below impairment threshold	1	--	--	--	--
TOTAL		**5**	**6**	**0**	**3**	**1**

Source: Minnesota DNR 2014a.

Notes:

Number of occurrences within 0.5 mile centered on route (none would be crossed by route construction work area).

Fish IBI = Index of Biotic Integrity thresholds were developed to classify lakes based on their fish communities as exceptional, meeting standards, vulnerable to impairment, and impaired; "--" no occurrence

Table 6.3.4-17. Lakes of Biological Significance Crossed by the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton (acres)

Class	Watershed, Minnesota DNR Identifier	Applicant's Preferred Route[a]		Route Alternative RA-03AM[b]		Route Alternative RA-06[b]		Route Alternative RA-07[c]		Route Alternative RA-08[b]	
		Con	Op	Con	Op	Con	Op	Con	Op	Con	Op
Outstanding	13543	--	--	--	--	--	--	--	--	6.0	2.5
	Pike Bay, 14487	--	--	--	--	--	--	1.5	--	--	--
	West Four-Legged, 21300	--	--	--	--	--	--	7.0	1.5	--	--
	East Four-Legged, 23949	--	--	--	--	--	--	2.0	0.6	--	--
High	12005	--	--	--	--	3.4	1.4	--	--	--	--
TOTAL		**--**	**--**	**--**	**--**	**3.4**	**1.4**	**10.9**	**2.1**	**6.0**	**2.5**

Source: Minnesota DNR 2016b.

[a] Con = Enbridge-provided footprint for construction work area; Op = Enbridge-provided footprint for permanent right-of-way.

[b] Con = estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way; Op = estimated operations impact area in acres based on a 50-foot-wide right-of-way centered on the route.

[c] Con = estimated construction impact area in acres based on 205-foot-wide construction work area (10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3); Op = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the pipeline.

Notes:

Includes lakes and ponds.

Values in table may not sum to subtotals and totals due to rounding.

"--" no crossing

Table 6.3.4-18. Number of Lakes Managed for Muskellunge Fisheries within 0.5 Mile of the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Watershed	Minnesota DNR Identifier	Muskie Population[a]	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Cass	14870	N	--	--	--	1	--
Leech	21722	N	--	--	--	--	1
Little Wolf	14970	I	--	--	--	1	--
Pike Bay	14487	N	--	--	--	1	1
Roosevelt	14175	I	1	--	--	--	--
Winnibigoshish	12798	N	--	--	--	1	--
TOTAL			**1**	**--**	**--**	**4**	**2**

Source: Minnesota DNR 2008 – Muskellunge Waters.

[a] Muskie (Muskellunge) population: N = native, I = introduced

Notes:

Occurrences within 0.5 mile centered on route (none would be crossed by a construction work area).

"--" = no occurrence

Minnesota PCA's Watershed Health Assessment parameters for species richness, stream species quality, and habitat quality and connectivity were compared for the Applicant's preferred route and RA-03AM, RA-06, RA-07, and RA-08 between Clearbrook and Carlton using the data in Figures 6.3.4-5, 6.3.4-6, and 6.3.4-7. No clear consistent trends distinguished between the potential routes, although in some instances, one alternative scored higher than the others for some individual indices.

Wildlife and Wildlife Habitat

General Potential Impacts. The types of construction-related impacts on wildlife and wildlife habitats for RA-03AM and the measures to be implemented to avoid or reduce impacts associated with pipeline construction would be the same as those described in Section 6.3.4.3.1 for the Applicant's preferred route. Construction of RA-03AM would disturb 3,578 acres of wildlife habitat, primarily consisting of forest, hay, and pasture land (Table 6.3.4-19). Impacts on these areas would be similar to those described above, including the potential for introduction of invasive species, loss of habitat, and reduction of habitat quality. Forests provide complex and valuable habitat for many species of wildlife and would require decades to recover to maturity. Compared to the Applicant's preferred route, RA-06, RA-07, and RA-08, construction of RA-03AM would disturb the smallest acreage of wetlands (Table 6.3.4-19). The potential impact on wildlife and wildlife habitat from construction of RA-03AM would be long term to permanent and minor to major.

Table 6.3.4-19. Vegetation Cover Potentially Affected by the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Vegetation Cover Class	Applicant's Preferred Route[a]		Route Alternative RA-03AM[b]		Route Alternative RA-06[b]		Route Alternative RA-07[c]		Route Alternative RA-08[b]	
	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op
Evergreen forest	173.4	69.6	145.4	60.1	102.6	42.6	234.5	37.0	106.4	43.7
Deciduous forest	1,255.5	554.0	975.1	403.1	797.7	332.9	772.6	177.1	591.8	245.5
Mixed forest	17.5	7.4	13.5	5.7	164.2	68.3	139.4	27.9	74.6	30.5
Scrub/shrub	210.6	104.3	190.5	80.2	251.4	104.2	276.9	83.4	123.8	51.8
Grassland/herbaceous	93.5	45.0	142.8	60.6	115.5	49.2	404.8	107.0	81.3	34.5
Hay/pasture	388.1	175.2	1,030.6	432.9	213.2	89.2	325.5	88.4	303.9	128.2
Cultivated crops	173.4	76.4	565.2	237.7	43.0	18.0	76.3	23.1	31.7	13.2
Woody wetlands	316.6	158.8	194.7	78.1	732.2	304.2	1,055.9	236.1	651.1	270.2
Emergent herbaceous wetlands	174.0	95.3	315.1	133.5	223.3	94.0	536.1	154.2	318.6	134.7
Barren land	3.6	1.7	5.1	2.2	30.5	12.8	10.4	3.2	2.8	1.1
TOTAL	**2,806.4**	**1,287.8**	**3,579.0**	**1,494.1**	**2,673.6**	**1,115.4**	**3,832.3**	**937.4**	**2,286.0**	**953.5**

Source: Homer et al. 2015.

[a] Con = Enbridge-provided footprint for construction work area; Op = Enbridge-provided footprint for permanent right-of-way.

[b] Con = estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way; Op = estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the pipeline route.

[c] Con = estimated construction impact area in acres based on 205-foot-wide construction work area (10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3); Op = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the pipeline route.

Note:

Values in table may not sum to subtotals and totals due to rounding.

Potential Impacts on Management Units and Managed Species. Potential impacts on WMAs, state forests, and other conservation lands from construction of RA-03AM would be similar to those described for the Applicant's preferred route, including the potential for introduction of invasive species, loss of habitat, and reduction of habitat quality. Construction of RA-03AM would have short-term minor impacts on 44.1 acres of wildlife conservation areas, including one waterfowl refuge, one WMA, one state forest and one land classified as "other forest land" (Table 6.3.4-20). RA-03AM also would cross two IBAs, resulting in approximately 70 acres of short-term minor disturbance during construction as this pipeline would be co-located with existing corridors (Table 6.3.4-21). RA-03AM would not pass near any colonial nesting waterbird sites (Table 6.3.4-22).

Table 6.3.4-20. Wildlife Management Areas and Forests Potentially Affected by the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton (acres)

Unit Type and Name	Applicant's Preferred Routea		Route Alternative RA-03AMb		Route Alternative RA-06b		Route Alternative RA-07c		Route Alternative RA-08b	
	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op
Wildlife Refuge										
Bemidji Game Refuge	--	--	--	--	--	--	142.1	35.1	62.8	26.2
Staples Waterfowl Refuge	--	--	4.9	2.0	--	--	--	--	--	--
Wildlife refuge subtotal	***--***	***--***	***4.9***	***2.0***	***--***	***--***	***142.1***	***35.1***	***62.8***	***26.2***
Wildlife Management Area										
Bemidji Slough Wildlife Management Area	--	--	--	--	--	--	--	--	4.1	1.7
Grayling Marsh Wildlife Management Area	15.5	6.5	--	--	--	--	--	--	--	--
Lawler Wildlife Management Area	4.0	1.5	--	--	--	--	--	--	--	--
Neitermeier Wildlife Management Area	--	--	5.4	2.2	--	--	--	--	--	--
Swan River Deer Yard Wildlife Management Area	--	--	--	--	--	--	--	--	7.4	3.1
Wildlife Management Areas Subtotal	***19.5***	***8.0***	***5.4***	***2.2***	***--***	***--***	***142.1***	***35.1***	***11.6***	***4.8***
State Forest										
Big Fork	--	--	--	--	69.6	29.0	--	--	--	--
Bowstring	--	--	--	--	--	--	217.9	55.4	96.8	40.4
Fond du Lac	--	--	--	--	15.4	6.4	26.2	6.4	15.3	6.4
Foot Hills	30.2	12.6	--	--	--	--	--	--	--	--
George Washington	--	--	--	--	106.5	44.4	--	--	--	--
Hill River	67.5	27.9	--	--	--	--	--	--	--	--
Huntersville	45.5	19.0	--	--	--	--	--	--	--	--
Land O'Lakes	101.0	42.1	--	--	--	--	--	--	--	--
Mississippi Headwaters	8.5	3.5	8.5	3.5	--	--	2.9	0.7	7.7	3.2

Table 6.3.4-20. Wildlife Management Areas and Forests Potentially Affected by the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton (acres)

Unit Type and Name	Applicant's Preferred Routea		Route Alternative RA-03AMb		Route Alternative RA-06b		Route Alternative RA-07c		Route Alternative RA-08b	
	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op
Savanna	11.0	4.6	--	--	--	--	--	--	38.1	15.9
Waukenabo	19.8	8.3	--	--	--	--	--	--	--	--
State forest subtotal	***283.6***	***118.0***	***8.5***	***3.5***	***191.5***	***79.8***	***247.1***	***62.6***	***158.0***	***65.9***
Other Forest Land										
Miscellaneous	77.6	32.5	30.3	12.8	133.9	55.5	97.1	23.6	67.6	28.2
Other forest land subtotal	***77.6***	***32.5***	***30.3***	***12.8***	***133.9***	***55.5***	***97.1***	***23.6***	***67.6***	***28.2***
TOTAL	**380.7**	**158.5**	**44.1**	**18.5**	**325.3**	**135.2**	**486.3**	**86.1**	**237.1**	**98.9**

Sources: Minnesota DNR 2016n, Minnesota DNR 2016g = wildlife refuge inventory.

[a] Con = Enbridge-provided footprint for construction work area; Op = Enbridge-provided footprint for permanent right-of-way.

[b] Con = estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way; Op = estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the pipeline route.

[c] Con = estimated construction impact area in acres based on 205-foot-wide construction work area (10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3); Op = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on pipeline route.

Notes:

All impacts on Minnesota Wildlife Management Areas (WMAs) and state forests would occur between Clearbrook and Carlton, Minnesota.

Values in table may not sum to subtotals and totals due to rounding.

"--" = no occurrence

Table 6.3.4-21. Estimated Impacts on Important Bird Areas for the Applicant's Preferred Route and Route Alternatives Between Clearbrook and Carlton (acres)

Audubon Important Bird Area	Applicant's Preferred Routea			Route Alternative RA-03AMb			Route Alternative RA-06b			Route Alternative RA-07c			Route Alternative RA-08b		
	Con	Op	0.5 Mile	Con	Op	0.5 Mile	Con	Op	0.5 Mile	Con	Op	0.5 Mile	Con	Op	0.5 Mile
Camp Ripley-Pillsbury-Lake Alexander IBA	--	--	--	42.3	17.2	2,758.2	--	--	--	--	--	--	--	--	--
Chippewa Plains IBA	--	--	--	--	--	--	512.1	213.3	22,651.0	1,016.1	247.8	26,492.8	594.2	247.6	26,137.6
Crane Meadows NWR – Rice Skunk Wetland Complex IBA	--	--	--	27.6	11.5	1,233.9	--	--	--	--	--	--	--	--	--
Itasca State Park IBA	--	--	384.7	--	--	384.9	--	--	--	--	--	--	--	--	--
McGregor IBA	47.5	24.5	3,023.4	--	--		--	--	--	--	--	--	--	--	--
TOTAL	**47.5**	**24.5**	**3,408.1**	**69.8**	**28.7**	**4,377.1**	**512.1**	**213.3**	**22,651.0**	**1,016.1**	**247.8**	**26,492.8**	**594.2**	**247.6**	**26,137.6**

Source: Audubon 2016.

[a] Con = Enbridge-provided footprint for construction work area; Op = Enbridge-provided footprint for permanent right-of-way.

[b] Con = estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way; Op = estimated operations impact area in acres based on a 50-foot-wide right-of-way centered on the pipeline route.

[c] Con = estimated construction impact area in acres based on 205-foot-wide construction work area (10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3); Op = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the pipeline route.

Note:

Values in table may not sum to subtotals and totals due to rounding.

"--" = no occurrence

IBA = Important Bird Area, NWR = National Wildlife Refuge

Table 6.3.4-22. Number of Colonial Waterbird Nesting Sites Potentially Affected by the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Description	Applicant's Preferred Route[a]			Route Alternative RA-06[b]			Route Alternative RA-07[c]			Route Alternative RA-08[b]		
	Con	Op	0.5 Mile	Con	Op	0.5 Mile	Con	Op	0.5 Mile	Con	Op	0.5 Mile
Big Fork River – great blue heron	--	--	--	--	--	1	--	--	--	--	--	--
Boulder Hill – great blue heron	--	--	--	--	--	--	--	--	1	--	--	1
Grass Lake – red-necked grebe	--	--	--	--	--	--	--	--	1	--	--	--
Larson Lake – great blue heron	--	--	--	1	1	1	--	--	--	--	--	--
Mahtowa – great blue heron	--	--	1	--	--	--	--	--	--	--	--	--
Portage Creek – great blue heron	--	--	--	--	--	--	--	--	--	1	1	1
Red Lake Trail – great blue heron	--	--	--	--	--	1	--	--	--	--	--	--
Sherry Lake – great blue heron	--	--	-	1	1	1	--	--	--	--	--	--
Wagner Creek #2 – great blue heron	--	--	--	--	--	1	--	--	--	--	--	--
Shell River – great blue heron	--	--	1	--	--	--	--	--	--	--	--	--
TOTAL	**--**	**--**	**2**	**2**	**2**	**5**	**--**	**--**	**2**	**1**	**1**	**3**

Source: Minnesota DNR 2016e.

[a] Con = Enbridge-provided footprint for construction work area; Op = Enbridge-provided footprint for permanent right-of-way.

[b] Con = estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way; Op = estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the pipeline route.

[c] Con = estimated construction impact area in acres based on 205-foot-wide construction work area (10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3); Op = estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on the pipeline route.

Notes:

No colonial waterbird nests occur within 0.5 mile of RA-03AM.

0.5 mile = 0.5 mile from centerline of pipeline route

"--" = no occurrence

Impacts from Habitat Fragmentation. RA-03AM is co-located with existing pipelines, transmission lines, and roads across all of its length. No large-block habitats would be fragmented by RA-03AM; however, widening corridors in this area could contribute to habitat loss and conversion, decreased habitat quality, and increased risk of the introduction of invasive species. Impacts on wildlife habitat and wildlife from fragmentation are expected to be temporary to short term and negligible.

Operations Impacts

Fisheries and Aquatic Habitat

General Potential Impacts. General impacts from operation of a pipeline along the RA-03AM route would be similar to those described for the Applicant's preferred route above. Operation of RA-03AM

would affect 167 stream crossings, including 9 trout streams within the permanent right-of-way. Impacts could result from maintenance activities, including vegetation management at stream edges that would occur for the life of the Project. Trees and shrubs would not be allowed to reestablish within the permanent right-of-way, which could lead to permanent major thermal effects on trout streams. Additional impacts could occur from the use of herbicides and accidental fuel and lubricant leaks and spills from maintenance and inspection vehicles. With implementation of the proposed BMPs, these impacts would be short- to long-term and minor to major, depending on the nature of the vegetation permanently removed. RA-03AM would result in 0.2 acre of disturbance to the LaSalle Creek AMA.

Impacts from Integrity Management Digs. Impacts from integrity management digs for RA-03AM would be similar to those described for the Applicant's preferred route. During operation, the Applicant would implement its Integrity Management Program, which could require excavation and repair or replacement of sections of the pipeline. The Applicant would implement measures to minimize runoff to surface water during and after these activities, similar to the measures incorporated into the Project during construction. If pipe segments need to be repaired or replaced along surface water crossings, the wet open-cut or dry open-cut method would be used to access the pipe. These methods would be the same as those used for construction of the crossing, as described above. The impacts on fisheries and aquatic habitat would be similar to those experienced during construction; for each integrity dig, the impacts would be short term to long term and minor, depending on the location, habitats affected, and whether repair or replacement are needed. These impacts would occur periodically over the life of the Project.

During repair or replacement of pipe as part of the Applicant's Integrity Management Program, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during the integrity digs and backfilling activities. With adherence to permits and implementation of BMPs to avoid the intake or entrainment of fish, the impacts associated with minor alterations in stream flows from water appropriation and discharge for each integrity dig would be temporary and negligible.

Wildlife and Wildlife Habitat

General Potential Impacts. General impacts from operation of a pipeline along the RA-03AM route would be similar to those described for the Applicant's preferred route. Operation of RA-03AM would affect 1,495 acres of wildlife habitat, primarily consisting of deciduous forest, hay, and pasture land. During operation of the pipeline, the permanent right-of-way would be maintained to prevent woody vegetation from re-growing. Losses of tree and shrub habitats used by birds for cover, forage, and nesting would be long term to permanent in the area of the construction work area that is outside of the permanent right-of-way because of the long period of time that forest requires to regenerate. Within the permanent right-of-way, the impact would be permanent and minor to major.

Mowing and vegetation removal can result in injury or direct mortality of smaller species such as turtles, small mammals, and bird eggs and young. This recurring impact would be localized to the permanent right-of-way and the areas around aboveground facilities, resulting in short-term minor impacts on common wildlife for each occurrence; but the mowing would be repeated periodically over the life of the Project. The permanent right-of-way also could create a travel corridor for some species. Habitat in the permanent right-of-way could be degraded if native vegetation is replaced by noxious and invasive species. The use of chemical controls can adversely affect wildlife species, particularly amphibians because of their sensitivity to chemical exposure. However, implementation of BMPs for use of herbicides that include measures such as only using herbicides when necessary and using aquatic formulations within 50 feet of

water, and prevention of the spread of noxious species would minimize the potential for impacts; and the impact on wildlife and wildlife habitats is expected to be temporary to short term and minor.

Impacts on Management Units and Managed Species. Potential impacts on WMAs, state forests, and other conservation lands from operation of RA-03AM would be similar to those described for the Applicant's preferred route, including the potential for introduction of invasive species, loss of habitat, and reduction of habitat quality. Construction of RA-03AM would permanently disturb 19 acres of wildlife conservation areas, including one waterfowl refuge, one WMA, one state forest, and one land classified as "other forest land" (Table 6.3.4-20). RA-03AM also would cross two IBAs, resulting in approximately 29 acres of permanent minor to major disturbance during operation (Table 6.3.4-21).

Impacts from Habitat Fragmentation. RA-03AM is co-located with existing pipelines, transmission lines, and roads across all of its length. No large-block habitats would be fragmented by RA-03AM; however, widening corridors in this area could contribute to permanent habitat loss and conversion, decreased habitat quality, and increased risk of invasive species introduction. The impacts on wildlife habitat and wildlife from fragmentation are expected to be temporary to short term and negligible.

Impacts from Integrity Management Digs. Integrity management digs would result in disturbance to wildlife and wildlife habitat as described above for construction impacts; however, the area affected would be substantially smaller and would occur entirely within the established right-of-way. As a result, impacts on wildlife and wildlife habitat from integrity digs would be short term and negligible to minor but would occur periodically over the life of the Project.

Route Alternative RA-06

Construction Impacts

Fisheries and Aquatic Habitat

General Potential Impacts. Construction of RA-06 would require crossing 137 streams, including seven trout streams and one trout lake (Tables 6.3.4-13 and 6.4.3-15). These crossings would be constructed using the methods described in Section 6.3.4.3.1 for construction of surface water crossings for the Applicant's preferred route, including incorporation of the BMPs described in that section. The impacts of surface water crossings for RA-06 would be the same as those for the Applicant's preferred route. Most crossing impacts would be temporary to short term and negligible to minor; although the use of wet open-cut crossings could result in a short- to long-term, minor impact at each crossing. Where streambanks are cleared of forested or other woody vegetation, the potential impacts on fisheries and aquatic habitats would be permanent and minor to major, depending on existing surface water conditions. Crossing methods have not been established for RA-06.

Potential Impacts on Management Units and Managed Species. RA-06 would cumulatively result in 5 acres of disturbance to three AMAs (Clearwater, Little Otter Creek, and Venning Creek) and would pass within 0.5 mile of three other AMAs (Table 6.3.4-14). AMAs represent good-quality habitats with functional adjacent upland wildlife habitat areas. Impacts on AMAs from construction would depend on the type of waterbody crossing method used. Construction of RA-06 would disturb 3.4 acres of one Minnesota Lake of Biological Significance with a rating of high (Table 6.3.4-18).

As for the Applicant's preferred route, the Applicant would incorporate BMPs into construction to avoid or minimize impacts; consequently, impacts from loss of habitat and reduction of habitat quality would be

short term and negligible to minor. The Applicant would implement BMPs to prevent the spread of invasive species, with the resultant impact expected to be at most short term and negligible to minor.

Minnesota PCA's Watershed Health Assessment parameters for species richness, stream species quality, and habitat quality and connectivity were compared for the Applicant's preferred route and RA-03AM, RA-06, RA-07, and RA-08 between Clearbrook and Carlton using the data in Figures 6.3.4-5, 6.3.4-6, and 6.3.4-7. No clear consistent trends distinguished between the potential routes, although in some instances, one alternative scored higher than the others for some individual indices (e.g., RA-06 scored highest for macroinvertebrate species richness, terrestrial habitat quality, terrestrial habitat connectivity, and aquatic habitat connectivity).

Wildlife and Wildlife Habitat

General Potential Impacts. The types of impacts on wildlife and wildlife habitats from construction of RA-06 and the measures to be implemented to avoid or reduce construction-related impacts would be the same as those described in Section 6.3.4.3.1 for the Applicant's preferred route. Construction of RA-06 would disturb 2,674 acres of wildlife habitat, primarily consisting of forest and woody wetlands (Table 6.3.4-19). Impacts on these areas would be similar to those described above, including the potential for introduction of invasive species, loss of habitat, and reduction of habitat quality. Forests provide complex and valuable habitat for many species of wildlife and would take decades to recover to maturity. The potential impact on wildlife and wildlife habitat from construction of RA-06 would be long term to permanent and minor to major.

Potential Impacts on Management Units and Managed Species. Potential impacts on WMAs, state forests, and other conservation lands from construction of RA-06 would be similar to those described for the Applicant's preferred route, including the potential for introduction of invasive species, loss of habitat, and reduction of habitat quality. Construction of RA-06 would have short- to long-term minor impacts on 325 acres of wildlife conservation areas, including three state forests (Table 6.3.4-20). RA-06 also would cross the Chippewa Plains IBA, resulting in approximately 512 acres of permanent minor disturbance during construction from clearing of the right-of-way (Table 6.3.4-21). RA-06 would also disturb the Larson Lake and Sherry Lake great blue heron rookeries (Table 6.3.4-22). Research has shown that construction activities within 300 meters (984 feet) of nesting great blue herons can cause nest abandonment and reproductive failure (VFWD 2002; MNFI 2016). RA-06 could result in removal of great blue heron rookery trees within construction work areas, which would result in permanent major impacts on heron nesting habitat and short-term and minor impacts on individual birds as they would be forced to find new nest sites. Permits would be needed from USFWS and Minnesota DNR if tree removal would occur during the nesting season.

Impacts from Habitat Fragmentation. RA-06 is not co-located with other pipelines, utilities, or roads across much of its length and would affect a greater number of large-block habitats than any other potential route. Sixty large-block habitats (more than 100 acres) would be crossed and fragmented by construction of RA-06 between approximately MP 140.0 and 295.0 (Table 6.3.4-23). The large-block habitats that would be crossed by RA-06 primarily include forested and woody wetland habitats, with the largest patch size (about 9,100 acres) crossed by approximately 7 miles of pipeline and the smallest patch size (about 110 acres) crossed by approximately 0.4 mile of pipeline (Table 6.3.4-23). Habitats along RA-06 would be fragmented across a total of approximately 114 miles (about 58 percent of the route) between Clearbrook and Carlton. The construction of RA-06 would result in a total of 83,996 acres fragmented. Habitat fragmentation resulting from construction of RA-06 would create more edge habitats, may result in decreased populations of forest interior species, and could facilitate

spread of invasive species. Impacts from habitat fragmentation by construction of RA-06 would be long term and major.

Table 6.3.4-23. Large-Block Habitat Patches Crossed by Route Alternative RA-06 in Minnesota

Beginning Milepost	Ending Milepost	Crossing Length (miles)	Patch Type	Patch Size (acres)
140.1	140.8	0.7	Forest	349
142.7	143.8	1.1	Forest, wetlands	1,729
144.0	144.4	0.4	Forest, wetlands	109
146.4	151.5	5.1	Forest, wetlands, scrub/shrub	6,589
151.6	153.3	1.7	Forest	1,233
153.4	153.7	0.3	Forest, wetlands, scrub/shrub	533
155.2	155.5	0.3	Forest	1,960
155.5	155.5	0.0	Wetlands	465
155.5	157.8	2.3	Forest, wetlands	1,867
158.0	159.0	1.0	Forest, wetlands	466
160.3	160.9	0.6	Forest, wetlands	395
161.4	162.7	1.3	Forest, wetlands	333
163.5	165.0	1.5	Forest, scrub/shrub	689
166.6	167.6	1.0	Forest, wetlands	413
168.1	169.0	0.9	Forest, wetlands	166
170.7	171.0	0.3	Forest	173
180.7	182.3	1.6	Forest, wetlands	784
182.4	183.6	1.2	Forest, wetlands	315
183.8	193.3	9.5	Forest, wetlands, scrub/shrub	8,539
193.4	196.7	3.3	Forest, wetlands	2,607
196.8	202.1	5.3	Forest, wetlands	467
204.4	205.4	1.0	Forest, wetlands	324
205.5	207.0	1.5	Forest, wetlands	2,882
207.3	208.3	1.0	Forest, wetlands, scrub/shrub	121
208.4	210.0	1.6	Forest, wetlands, scrub/shrub, herbaceous	968
210.2	212.1	1.9	Forest, wetlands	508
214.4	215.2	0.8	Forest, wetlands	1,870
215.3	215.9	0.6	Forest, wetlands	235
215.6	216.2	0.6	Forest	237
218.5	221.1	2.6	Forest, wetlands, scrub/shrub, herbaceous	3,260
222.6	223.4	0.8	Forest	138

Table 6.3.4-23. Large-Block Habitat Patches Crossed by Route Alternative RA-06 in Minnesota

Beginning Milepost	Ending Milepost	Crossing Length (miles)	Patch Type	Patch Size (acres)
223.7	230.3	6.6	Forest, scrub/shrub	9,135
230.4	233.1	2.7	Forest, scrub/shrub	909
234.4	236.2	1.8	Forest, scrub/shrub, herbaceous	945
236.3	237.1	0.8	Scrub/shrub	1,266
237.3	239.5	2.2	Scrub/shrub	1,128
239.5	242.4	2.9	Forest, wetlands, scrub/shrub, herbaceous	1,280
242.5	243.6	1.1	Forest, wetlands, scrub/shrub, herbaceous	248
244.2	244.7	0.5	Forest	116
244.8	246.5	1.7	Forest, wetlands, scrub/shrub	706
246.6	249.3	2.7	Forest, wetlands, scrub/shrub, herbaceous	586
249.6	252.7	3.1	Wetlands	3,251
252.8	254.5	1.7	Forest, wetlands	367
254.9	255.8	0.9	Forest, wetlands, scrub/shrub	524
255.9	257.3	1.4	Forest, wetlands	295
257.4	257.9	0.5	Forest	133
257.9	261.4	3.5	Forest, wetlands	783
261.5	262.3	0.8	Forest	143
262.4	264.0	1.6	Scrub/shrub, wetlands	723
264.1	265.3	1.2	Forest	274
265.4	266.7	1.3	Forest, wetlands, scrub/shrub	184
266.9	268.3	1.4	Forest	790
269.3	272.2	2.9	Forest	886
272.8	273.5	0.7	Forest	145
274.2	276.4	2.2	Forest, wetlands	821
276.5	277.8	1.3	Forest, wetlands, scrub/shrub	1,570
279.2	280.3	1.1	Forest, wetlands	467
281.1	284.1	3.0	Forest	3,339
284.4	290.8	6.4	Forest, wetlands	5,451
290.7	295.2	4.5	Wetlands	6,804
TOTAL		**114.3**		**83,996**

Source: Fragmentation analysis based on Homer et al. 2015 – NLCD 2011.

Operations Impacts

Fisheries and Aquatic Habitat

General Potential Impacts. General impacts from operation of a pipeline along system RA-06 would be similar to those described for the Applicant's preferred route above. Operation of RA-06 would affect 137 stream crossings (Table 6.3.4-13), including seven trout streams and one trout lake within the permanent right-of-way (Table 6.3.4-15). Operations of RA-06 would impact 2.1 acres of AMA and 1.4 acres of Lakes of Biological Significance (Table 6.3.4-15). Impacts could result from maintenance activities, including vegetation management at stream edges that would occur for the life of the Project. Trees and shrubs would not be allowed to reestablish within the permanent right-of-way, which could lead to permanent major thermal effects on trout streams and permanent minor changes at other waterbody crossings. Additional impacts could occur from the use of herbicides and accidental fuel and lubricant leaks and spills from maintenance and inspection vehicles. With implementation of the proposed BMPs, these impacts would be short term and negligible to minor.

Impacts due to Integrity Management Digs. Impacts from integrity management digs of a pipeline along system alternative RA-06 would be similar to those described for the Applicant's preferred route above. During operation, the Applicant would implement its Integrity Management Program, which has the potential to require excavation and repair or replacement of sections of the pipeline. The Applicant would implement measures to minimize runoff to surface water during and after these activities, similar to the measures incorporated into the Project during construction. If pipe segments need to be repaired or replaced along surface water crossings, either the wet open-cut or dry open-cut method would be used to access the pipe. These methods would be the same as those used for construction of the crossing as described above. The impacts on fisheries and aquatic habitat would be similar to those experienced during construction; for each integrity dig, the impacts would be short term to long term and minor, depending on the location, habitats affected, and whether repair or replacement are needed. These impacts would occur periodically over the life of the Project.

During the repair or replacement of pipe as part of the Applicant's Integrity Management Program described above, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during the integrity digs and backfilling activities. With adherence to permits and implementation of BMPs to avoid the intake or entrainment of fish, the impacts associated with minor alterations in stream flows from water appropriation and discharge for each integrity dig would be temporary and negligible.

Wildlife and Wildlife Habitat

General Potential Impacts. General impacts from operation of a pipeline along system RA-06 would be similar to those described for the Applicant's preferred route above. Operation of RA-06 would affect 1,115 acres of wildlife habitat, primarily consisting of deciduous forest and woody wetlands. During operation of the pipeline, the permanent right-of-way would be maintained to prevent woody vegetation from regrowing. Losses of tree and shrub habitats used by birds for cover, forage, and nesting would be long term to permanent in the area of the construction work area that is outside of the permanent right-of-way due to the long period of time for forest to regenerate. Within the permanent right-of-way, this impact would be permanent and minor to major.

Mowing and vegetation removal can result in injury or direct mortality of smaller species such as turtles, small mammals, and bird eggs and young. This recurring impact would be localized to the permanent right-of-way and the areas around aboveground facilities, resulting in short-term minor impacts on

common wildlife for each occurrence, but the mowing would be repeated periodically over the life of the Project. The permanent right-of-way also could create a travel corridor for some species. Habitat in the permanent right-of-way could be degraded if native vegetation is replaced by noxious and invasive species. Use of chemical weed controls can adversely affect wildlife species, particularly amphibians because of their sensitivity to chemical exposure. However, implementation of BMPs for use of herbicides that include measures such as only using herbicides when necessary and using aquatic formulations within 50 feet of water, and prevention of the spread of noxious species would minimize the potential for impacts; and the impact on wildlife and wildlife habitats is expected to be temporary to short term and minor.

Impacts on Management Units and Managed Species. Potential impacts on WMAs, state forests, and other conservation lands from operation of RA-06 would be similar to those described for the Applicant's preferred route, including the potential for introduction of invasive species, loss of habitat, and reduction of habitat quality. Construction of RA-06 would permanently disturb 135 acres of wildlife conservation areas, including three state forests (Table 6.3.4-20). RA-06 also would cross the Chippewa Plains IBA, resulting in approximately 213 acres of permanent disturbance during operation (Table 6.3.4-21).

Impacts from Habitat Fragmentation. RA-06 is not co-located with other pipelines, utilities, or roads across much of its length and would affect a greater number of large-block habitats than any other potential route. Sixty large-block habitats (more than 100 acres) would be crossed and fragmented by construction of RA-06 between approximately MP 140.0 and 295.0 (Table 6.3.4-23). The large-block habitats that would be crossed by RA-06 primarily include forested and woody wetland habitats. The largest patch size (about 9,100 acres) would be crossed by approximately 7 miles of pipeline, and the smallest patch size (about 110 acres) would be crossed by approximately 0.4 mile of pipeline (Table 6.3.4-23). Habitats along RA-06 would be fragmented across a total of approximately 114 miles (about 58 percent of the route) between Clearbrook and Carlton. Habitat fragmentation resulting from construction of RA-06 would create more edge habitats, may result in decreased populations of forest interior species, and could facilitate the spread of invasive species. Impacts from habitat fragmentation by operations of RA-06 would be permanent and major.

Impacts from Integrity Management Digs. Integrity management digs would disturb wildlife and wildlife habitat as described above for construction impacts; however, the area affected would be substantially smaller and would occur entirely within the established right-of-way. Consequently, impacts on wildlife and wildlife habitat would be short term and negligible to minor but would occur periodically over the life of the Project.

Route Alternative RA-07

Construction Impacts

Fisheries and Aquatic Habitat

General Potential Impacts. Construction of RA-07 would require crossing 81 streams, including 6 trout streams (Tables 6.3.4-13 and 6.4.3-15). These crossings would be constructed using the methods described in Section 6.3.4.3.1 for construction of surface water crossings of the Applicant's preferred route, including incorporation of the BMPs described in that section. The impacts of surface water crossings for RA-07 would be the same as those for the Applicant's preferred route. Most crossing impacts would be temporary to short term and negligible to minor; although the use of wet open-cut

crossings could result in a short- to long-term, minor impact at each crossing. Where streambanks are cleared of forested or other woody vegetation, the potential impacts on fisheries and aquatic habitats would be permanent and minor to major, depending on existing surface water conditions. Crossing methods have not been established for RA-07.

Potential Impacts on Management Units and Managed Species. RA-07 would cumulatively result in 8.2 acres of disturbance to two AMAs (Clearwater and Little Otter Creek) and would pass within 0.5 mile of six other AMAs (Table 6.3.4-14). AMAs represent good-quality habitats with functional adjacent upland wildlife habitat areas. Impacts on AMAs from construction would depend on the type of waterbody crossing method used. RA-07 also would pass within 0.5 mile of three lakes with Fish IBI ratings (Table 6.3.4-16). Construction of RA-07 would disturb 10.9 acres within three Minnesota Lakes of Biological Significance rated as outstanding (Table 6.3.4-17) as well as pass within 0.5 mile of four lakes managed for muskellunge (Table 6.3.4-18).The Applicant would incorporate BMPs into construction to avoid or minimize impacts; as a result, construction-related impacts from loss of habitat and reduction of habitat quality would be short term and negligible to minor. The Applicant also would implement BMPs to prevent the spread of invasive species, with the resultant impact expected to be at most short term and negligible to minor. Minnesota PCA's Watershed Health Assessment parameters for species richness, stream species quality, and habitat quality and connectivity were compared for the Applicant's preferred route and RA-03AM, RA-06, RA-07, and RA-08 between Clearbrook and Carlton using the data in Figures 6.3.4-5, 6.3.4-6, and 6.3.4-7. No clear consistent trends distinguished between the route options.

Wildlife and Wildlife Habitat

General Potential Impacts. The types of impacts on wildlife and wildlife habitats from construction of RA-07 and the measures to be implemented to avoid or reduce construction-related impacts would be the same as those described in Section 6.3.4.3.1 for the Applicant's preferred route. Construction of RA-07 would disturb 3,833 acres of wildlife habitat primarily consisting of forest and wetlands (Table 6.3.4-19). Impacts on these areas would be similar to those described above including the potential of introduction of invasive species, loss of habitat, and reduction of habitat quality. Forests provide complex and valuable habitat for many species of wildlife and would take decades to recover to maturity. The potential impact on wildlife and wildlife habitat from construction of RA-07 would be long term to permanent and minor to major.

Potential Impacts on Management Units and Managed Species. Potential impacts on WMAs, state forests, and other conservation lands from construction of RA-07 would be similar to those described for the Applicant's preferred route, including the potential for introduction of invasive species, loss of habitat, and reduction of habitat quality. Construction of RA-07 would have short-term minor impacts on 486 acres of wildlife conservation areas, including one wildlife refuge and three state forests (Table 6.3.4-20). RA-07 also would cross the Chippewa Plains IBA, resulting in approximately 1,016 acres of disturbance during construction (Table 6.3.4-21); however, RA-07 is within or adjacent to existing pipelines and corridors with high levels of disturbance and therefore its impact on IBAs would be less than routes traversing undisturbed areas. These impacts would be short term and minor.

Red-necked grebes occupy the Grass Lake rookery, which is nearly 2,000 feet from the proposed route of RA-07. At this distance, construction activities would not be expected to disturb nesting red-necked grebes and any impacts would be temporary and negligible, regardless of the construction season.

Impacts from Habitat Fragmentation. RA-07 is co-located with existing pipelines, transmission lines, and roads across all of its length. No large-block habitats would be fragmented by RA-07; however, widening corridors in this area could contribute to habitat loss and conversion, decreased habitat quality, and increased risk of the introduction of invasive species. Potential impacts on wildlife habitat and wildlife from fragmentation are expected to be temporary to short term and negligible.

Operations Impacts

Fisheries and Aquatic Habitat

General Potential Impacts. General impacts from operation of a pipeline along the RA-07 route would be similar to those described for the Applicant's preferred route. Operation of RA-07 would affect 81 stream crossings, including 6 trout streams within the permanent right-of-way. Impacts could result from maintenance activities, including vegetation management at stream edges that would occur for the life of the Project. Trees and shrubs would not be allowed to reestablish within the permanent right-of-way, which could lead to permanent major thermal effects on trout streams and permanent minor effects at other water crossings. Additional impacts could occur from the use of herbicides and accidental fuel and lubricant leaks and spills from maintenance and inspection vehicles. With implementation of the proposed BMPs, these impacts would be temporary and negligible to minor. RA-07 would disturb 2 acres within AMAs. Operation of RA-07 also would disturb 2.1 acres of Minnesota Lakes of Biological Significance. Permanent and minor impacts would be expected for these resources.

Impacts from Integrity Management Digs. Impacts from integrity management digs along the RA-07 route would be similar to those described for the Applicant's preferred route. During operation, the Applicant would implement its Integrity Management Program, which could require excavation and repair or replacement of sections of the pipeline. The Applicant would implement measures to minimize runoff to surface water during and after these activities, similar to the measures incorporated into the Project during construction. If pipe segments need to be repaired or replaced along surface water crossings, the wet open-cut or dry open-cut method would be used to access the pipe. These methods would be the same as those used for construction of the crossing, as described above. Potential impacts on fisheries and aquatic habitat would be similar to those experienced during construction; for each integrity dig, the impacts would be short term to long term and minor, depending on the location, habitats affected, and whether repair or replacement are needed. These impacts would occur periodically over the life of the Project.

During repair or replacement of pipe as part of the Integrity Management Program, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during the integrity digs and backfilling activities. With adherence to permits and implementation of BMPs to avoid the intake or entrainment of fish, impacts associated with minor alterations in stream flows from water appropriation and discharge for each integrity dig would be temporary and negligible.

Wildlife and Wildlife Habitat

General Potential Impacts. General impacts from operation of a pipeline along the RA-07 route would be similar to those described for the Applicant's preferred route. Operation of RA-07 would affect 936 acres of wildlife habitat, primarily consisting of deciduous forest and woody wetlands. During operation of the pipeline, the permanent right-of-way would be maintained to prevent woody vegetation from re-growing. Losses of tree and shrub habitats used by birds for cover, forage, and nesting would be long term to permanent in the area of the construction work area that is outside of the

permanent right-of-way because of the long period of time required for forest to regenerate. Within the permanent right-of-way, the impact would be permanent and minor to major.

Mowing and vegetation removal can result in injury or direct mortality of smaller species such as turtles, small mammals, and bird eggs and young. This recurring impact would be localized to the permanent right-of-way and the areas around aboveground facilities, resulting in short-term minor impacts on common wildlife for each occurrence; but the mowing would be repeated periodically over the life of the Project. The permanent right-of-way also could create a travel corridor for some species. Habitat in the permanent right-of-way could be degraded if native vegetation is replaced by noxious and invasive species. The use of chemical controls can adversely affect wildlife species, particularly amphibians because of their sensitivity to chemical exposure. However, implementation of BMPs for use of herbicides that include measures such as only using herbicides when necessary and using aquatic formulations within 50 feet of water, and prevention of the spread of noxious species would minimize the potential for impacts; and the impact on wildlife and wildlife habitats is expected to be short term and minor.

Impacts on Management Units and Managed Species. Potential impacts on WMAs, state forests, and other conservation lands from operation of RA-07 would be similar to those described for the Applicant's preferred route, including the potential for introduction of invasive species, loss of habitat, and reduction of habitat quality. Operation of RA-07 would permanently disturb 86 acres of wildlife conservation areas (Table 6.3.4-20). RA-07 also would cross the Chippewa Plains IBA, resulting in approximately 248 acres of permanent disturbance during operation (Table 6.3.4-21). Impacts on these resources would be long term to permanent and minor.

Impacts from Habitat Fragmentation. RA-07 is co-located with existing pipelines, transmission lines, and roads across all of its length. No large-block habitats would be fragmented by RA-07; however, widening corridors in this area could contribute to habitat loss and conversion, decreased habitat quality, and increased risk of the introduction of invasive species. Impacts on wildlife habitat and wildlife from fragmentation are expected to be temporary to short term and negligible.

Impacts from Integrity Management Digs. Integrity management digs would disturb wildlife and wildlife habitat as described above for construction impacts; however, the area affected would be substantially smaller and would occur entirely within the established right-of-way. Consequently, impacts on wildlife and wildlife habitat from integrity digs would be short term and negligible to minor but would occur periodically over the life of the Project.

Route Alternative RA-08

Construction Impacts

Fisheries and Aquatic Habitat

General Potential Impacts. Construction of RA-08 would require crossing 106 streams, including 7 trout streams (Tables 6.3.4-13 and 6.4.3-15). These crossings would be constructed using the methods described in Section 6.3.4.3.1 for construction of surface water crossings of the Applicant's preferred route, including incorporation of the BMPs described in that section. The impacts of surface water crossings for RA-08 would be the same as those described for the Applicant's preferred route. Most crossing impacts would be temporary to short term and negligible to minor; although the use of wet open-cut crossings could result in a short- to long-term, minor impact at each crossing. Where streambanks are cleared of forested or other woody vegetation, the potential impacts on fisheries and

aquatic habitats would be permanent and minor to major, depending on existing surface water conditions. Crossing methods have not been established for RA-08.

Potential Impacts on Management Units and Managed Species. RA-08 would cumulatively result in 4.7 acres of disturbance to two AMAs (Bruce Creek and Little Otter Creek) and would pass within 0.5 mile of three other AMAs (Table 6.3.4-14). AMAs represent good-quality habitats with functional adjacent upland wildlife habitat areas. Impacts on AMAs from construction would depend on the type of waterbody crossing method used. RA-08 also would pass within 0.5 mile of one lake with a Fish IBI rating (Table 6.3.4-16). Construction of RA-08 would disturb 6 acres of one Minnesota Lake of Biological Significance with a rating of outstanding (Table 6.3.4-17) as well as pass within 0.5 mile of two lakes managed for muskellunge (Table 6.3.4-18). As for the Applicant's preferred route, the Applicant would incorporate BMPs into construction to avoid or minimize impacts; as a result, the impacts of construction of RA-08 from loss of habitat and reduction of habitat quality would be short term and negligible to minor. The Applicant would implement BMPs to prevent the spread of invasive species, with the resultant impact expected to be at most short term and negligible to minor. Minnesota PCA's Watershed Health Assessment parameters for species richness, stream species quality, and habitat quality and connectivity were compared for the Applicant's preferred route and RA-03AM, RA-06, RA-07, and RA-08 between Clearbrook and Carlton using the data in Figures 6.3.4-5, 6.3.4-6, and 6.3.4-7. No clear consistent trends distinguished between the potential routes.

Wildlife and Wildlife Habitat

General Potential Impacts. The types of impacts on wildlife and wildlife habitats that would occur for construction of RA-08 and the measures to be implemented to avoid or reduce impacts associated with pipeline construction would be the same as those described in Section 6.3.4.3.1 for the Applicant's preferred route. Construction of RA-08 would disturb 2,287 acres of wildlife habitat, primarily consisting of forest and wetlands (Table 6.3.4-19). Impacts on these areas would be similar to those described above, including the potential for introduction of invasive species, loss of habitat, and reduction of habitat quality. Forests provide complex and valuable habitat for many species of wildlife and would require decades to recover to maturity. Potential impacts on wildlife and wildlife habitat from construction of RA-08 would be long term to permanent and minor to major.

Potential Impacts on Management Units and Managed Species. Potential impacts on WMAs, state forests, and other conservation lands from construction of RA-08 would be similar to those described for the Applicant's preferred route, including the potential for introduction of invasive species, loss of habitat, and reduction of habitat quality. Construction of RA-08 would have short-term minor impacts on 237 acres of wildlife conservation areas, including one wildlife refuge, two WMAs, and four state forests (Table 6.3.4-20). RA-08 also would cross the Chippewa Plains IBA, resulting in approximately 594 acres of long-term to permanent and minor to major disturbance during construction (Table 6.3.4-21). Because RA-08 is within or adjacent to existing pipelines and corridors with high levels of disturbance, impacts on IBAs would be somewhat less than for routes traversing undisturbed areas.

A great blue heron colony falls within the construction and operation area of RA-08. Construction of RA-08 would result in disturbance to the Portage Creek great blue heron rookery (Table 6.3.4-22). Research has shown that construction activities within 300 meters (984 feet) of nesting great blue herons can cause nest abandonment and reproductive failure (VFWD 2002; MNFI 2016). RA-08 could result in removal of great blue heron rookery trees within construction work areas, which would cause permanent major impacts on Portage Creek heron nesting habitat and short-term and minor impacts on

individual birds, as they would be forced to find new nest sites. Permits would be needed from USFWS and Minnesota DNR if tree removal would occur during the nesting season.

Impacts from Habitat Fragmentation. RA-08 is co-located with existing pipelines, transmission lines, and roads across all of its length. No large-block habitats would be fragmented by RA-08; however, widening corridors in this area could contribute to habitat loss and conversion, decreased habitat quality, and increased risk of invasive species introduction. Potential impacts on wildlife habitat and wildlife from fragmentation are expected to be temporary to short term and negligible.

Operations Impacts

Fisheries and Aquatic Habitat

General Potential Impacts. General impacts from operation of a pipeline along the RA-08 route would be similar to those described for the Applicant's preferred route above. Operation of RA-08 would affect 106 stream crossings, including 4 trout streams within the permanent right-of-way. Operation of RA-08 would disturb 2 acres of AMAs and 2.5 acres of Minnesota Lakes of Biological Significance. Impacts could result from maintenance activities, including vegetation management at stream edges that would occur for the life of the Project. Trees and shrubs would not be allowed to reestablish within the permanent right-of-way, which could lead to permanent major thermal effects on trout streams and permanent but minor impacts at other water crossings. Additional impacts could occur from the use of herbicides and accidental fuel and lubricant leaks and spills from maintenance and inspection vehicles. With implementation of the proposed BMPs, these impacts would be short term and negligible to minor.

Impacts from Integrity Management Digs. Impacts from integrity management digs along the RA-08 route would be similar to those described for the Applicant's preferred route above. During operation, the Applicant would implement its Integrity Management Program, which could require excavation and repair or replacement of sections of the pipeline. The Applicant would implement measures to minimize runoff to surface water during and after these activities, similar to the measures incorporated into the Project during construction. If pipe segments need to be repaired or replaced along surface water crossings, the wet open-cut or dry open-cut method would be used to access the pipe. These methods would be the same as those used for construction of the crossing, as described above. Potential impacts on fisheries and aquatic habitat would be similar to those experienced during construction; for each integrity dig, the impacts would be short term to long term and minor, depending on the location, habitats affected, and whether repair or replacement are needed. These impacts would occur periodically over the life of the Project.

During repair or replacement of pipe as part of the Integrity Management Program, it may be necessary to withdraw and discharge water to hydrostatically test sections of pipe and for dust control during the integrity digs and backfilling activities. With adherence to permits and implementation of BMPs to avoid the intake or entrainment of fish, the impacts associated with minor alterations in stream flows from water appropriation and discharge for each integrity dig would be temporary and negligible.

Wildlife and Wildlife Habitat

General Potential Impacts. The types of impacts on wildlife and wildlife habitats from construction of RA-08 and the measures to be implemented to avoid or reduce construction-related impacts would be the same as those described in Section 6.3.4.3.1 for the Applicant's preferred route. Operation of RA-08 would affect 955 acres of wildlife habitat, primarily consisting of deciduous forest and wetlands. During operation of the pipeline, the permanent right-of-way would be maintained to prevent woody

vegetation from re-growing. Losses of tree and shrub habitats used by birds for cover, forage, and nesting would be long term to permanent in the area of the construction work area that is outside of the permanent right-of-way because of the long period of time required for forest to regenerate. Within the permanent right-of-way, the impact would be permanent and minor to major.

Mowing and vegetation removal can result in injury or direct mortality of smaller species such as turtles, small mammals, and bird eggs and young. This recurring impact would be localized to the permanent right-of-way and the areas around aboveground facilities, resulting in short-term minor impacts on common wildlife for each occurrence; but the mowing would be repeated periodically over the life of the Project. The permanent right-of-way also could create a travel corridor for some species. Habitat in the permanent right-of-way could be degraded if native vegetation is replaced by noxious and invasive species. The use of chemical controls can adversely affect wildlife species, particularly birds, from accidental ingestion. However, implementation of BMPs for use of herbicides and prevention of the spread of noxious species would minimize the potential for impacts. Therefore, the potential impact on wildlife and wildlife habitats is expected to be short term and minor.

Impacts on Management Units and Managed Species. Potential impacts on WMAs, state forests, and other conservation lands from operation of RA-08 would be similar to those described for the Applicant's preferred route, including the potential for introduction of invasive species, loss of habitat, and reduction of habitat quality. Operation of RA-08 would permanently disturb 237 acres of wildlife conservation areas (Table 6.3.4-20). RA-08 also would cross the Chippewa Plains IBA, resulting in approximately 248 acres of permanent disturbance during operation (Table 6.3.4-21). Operation of RA-08 would result in permanent removal of the Portage Creek great blue heron rookery (Table 6.3.4-22) resulting in permanent major impacts on the colony but short-term and minor impacts on the individuals.

Impacts from Habitat Fragmentation. RA-08 is co-located with existing pipelines, transmission lines, and roads across all of its length. No large-block habitats would be fragmented by RA-08; however, widening corridors in this area could contribute to habitat loss and conversion, decreased habitat quality, and increased risk of the introduction of invasive species. The impacts on wildlife habitat and wildlife due to fragmentation are expected to be temporary to short term and negligible.

Impacts from Integrity Management Digs. Integrity management digs would disturb wildlife and wildlife habitat as described above for construction impacts; however, the area affected would be substantially smaller and would occur entirely within the established right-of-way. As a result, impacts on wildlife and wildlife habitat would be short term and negligible to minor but would occur periodically over the life of the Project.

6.3.4.4 Summary and Mitigation

6.3.4.4.1 Summary

Construction and operation of the Applicant's preferred route or any of route alternatives could result in impacts on aquatic habitat, fish, wildlife habitat, and wildlife, ranging from no impact to permanent major impacts. Impacts would likely occur in forested areas and wetlands where habitat fragmentation would be most noticeable as well as in areas where large trees are permanently removed along streambanks. Impacts would also occur where colonial waterbird nesting trees are removed. Table 6.3.4-24 presents a summary of construction- and operations-related impacts on aquatic habitat, fish, wildlife habitat, and wildlife for the Applicant's preferred route and route alternatives.

Avoidance and impact minimization measures that would influence the duration and magnitude of impacts include Applicant-proposed measures, measures proposed by Minnesota DNR, and measures that would be included in state and federal permits. All stream crossings and measureable disturbance to wildlife (e.g., beaver dams, colonial nesting waterbirds, raptor nests) or aquatic species (e.g., fish, mussels) would be reviewed and approved by the authorizing agency prior to construction and may include requirements for further surveys or additional mitigation. The avoidance and mitigation measures and the standard BMPs described for the Applicant's preferred route would be applicable to the route alternatives.

Fisheries and Aquatic Habitat

Construction Impacts

The largest potential impacts on aquatic habitat due to construction would result from clearing vegetation along streambanks, in-water disturbance from construction of the Applicant's preferred route or route alternative pipelines across surface water where the wet or dry open-cut crossing methods are used, and if a frac-out occurred during the HDD method in sensitive or impaired waters.

The Applicant's preferred route would cross 192 surface waters along its total length and 111 waterbodies between Clearbrook and Carlton. For two route alternatives, the number of surface water crossings between Clearbrook and Carlton is greater (167 crossings for RA-03AM and 137 crossings for RA-06); and for two route alternatives, the number is less (81 crossings for RA-07 and 106 crossings for RA-08). All of the potential routes would cross AMAs and sensitive aquatic resources within the ROIs of the pipeline routes between Clearbrook and Carlton, including Fish IBI Lakes, Lakes of Biological Significance (including many ranked as outstanding), one Sentinel Lake (along RA-03M), seven trout streams, one trout lake, and lakes managed for muskellunge. No hatcheries are within the ROIs of the potential routes. Although there are hatcheries farther downstream, construction is not expected to affect those hatcheries.

The Applicant's preferred route and the route alternatives pass through forested areas and would involve the removal of woody vegetation that provides shade and stability along some streams. This could result in long-term major impacts on trout streams due to the potential for thermal changes. However, impacts on aquatic habitat, including trout streams and other sensitive aquatic resources, could be temporary to long-term and minor if the crossing method with least disturbance is used and BMPs are in place to reduce impacts. Proper restoration of streambanks after construction of stream crossings would prevent additional sedimentation as well as changes to the width, depth, and temperature of all streams, including trout streams.

The waters within the ROIs of the Applicant's preferred route and route alternatives provide habitat for similar species of fish, including important managed recreational species such as muskellunge and trout. Fish in the vicinity of surface water crossings along all routes likely would respond to the increased instream activities by leaving the construction area and avoiding direct impacts; however, injuries or mortality could occur resulting in temporary and minor impacts for common species in the area. Aquatic habitat connectivity and species richness of macroinvertebrates, mussels, and fish do not differ among pipeline routes.

With adherence to water appropriation and NPDES permit conditions and implementation of Applicant-proposed measures, impacts on fisheries and aquatic habitats from water appropriation and discharge

during pipeline construction would be temporary and minor for the Applicant's preferred route and route alternatives.

Operations Impacts

Vegetation maintenance during operations would require the removal of riparian vegetation from the permanent right-of-way of each of the pipeline alternatives, including areas adjacent to waterbody crossings. The resultant impacts on aquatic habitat would be similar for the Applicant's preferred route and route alternatives with RA-03AM and RA-06 requiring the greatest number of stream crossings. The impacts for the new pipeline would be long term and minor to major at heavily wooded crossing locations, and short term to long term and minor to major at crossings within grasslands or croplands. That Applicant's preferred route and all route alternatives would cross trout streams where the impact during operation would be permanent and major due to possible increases in temperature.

If minor leaks or spills occurred during normal operations for the Applicant's preferred route and route alternatives there would be negligible to minor changes to surface water quality and the resultant impacts on fisheries and aquatic habitats would be temporary and negligible to minor.

For all alternatives, the Applicant would implement its noxious weed plans that include methods to prevent and reduce the introduction and spread of noxious weeds and invasive species, and would implement BMPs for herbicide applications to minimize impacts on aquatic and terrestrial resources. As a result, the use of herbicides would result in temporary negligible impacts on fisheries and aquatic habitats.

During operation of the pipeline route options, the Applicant would implement its Integrity Management Program, which could require excavation and repair or replacement of sections of the pipeline at surface water crossings using the wet or dry open-cut method to access the pipe. For each integrity dig, impacts would be short term and minor, and would occur periodically over the life of the Project. Impacts from integrity digs would be similar for all routes.

Wildlife and Wildlife Habitat

Construction Impacts

Impacts on wildlife habitat would vary slightly among the Applicant's preferred route and route alternatives. The acreage of wildlife habitat affected by construction of the pipeline route options ranges from 2,286 acres (RA-08) to 3,578 acres (RA-03AM). All of the routes would cross WMAs. The Applicant's preferred route, RA-06 and RA-07 would permanently convert the greatest number of acres to maintained pipeline right-of-way. Audubon IBAs would be crossed by all routes. Route alternatives RA-06, RA-07, and RA-08 would result in greater permanent habitat removal than RA-03AM or the Applicant's preferred route.

Overall, wildlife habitat quality is similar for all routes based on vegetation cover class. Some routes would have greater impacts on high-value habitat such as wetlands (i.e., RA-07) or deciduous forest (i.e., Applicant's preferred route) than others. RA-03AM would mostly affect hay and pasture land. RA-07 and RA-08 would be co-located with existing pipelines for their entire lengths; RA-03AM would be co-located with existing pipelines, electrical transmission lines, and roads (Section 6.7). RA-06 would not be co-located with other pipelines, utilities, or roads across much of its length. Alternatives co-located would occupy areas that are already somewhat degraded, resulting in less impact on wildlife and habitat than routes or portions of routes that are not within or adjacent to utility corridors. Habitat

fragmentation would be greatest for the Applicant's preferred route (36.7 miles and 27,101 acres) and RA-06 (114.3 miles 83,996 acres). Route alternatives RA-03AM, RA-07, and RA-08 would be co-located with existing pipelines, transmission lines, and roads across most of their lengths such that these route alternatives would not contribute to wildlife habitat fragmentation.

For the Applicant's preferred route and all route alternatives, clearing, grading, trenching, and the use of construction vehicles and equipment would result in direct impacts on some animals, particularly small and mid-sized mammals, reptiles, amphibians and invertebrates. Members of these species would be affected more than large wildlife because of their relative lack of mobility compared to that of larger animals (e.g., deer and coyotes). The impact of these activities on wildlife would be temporary to short term and minor for all route options. Both RA-06 and RA-08 could result in permanent removal of heron nesting trees.

Many animals would be temporarily displaced from the active construction areas and adjacent areas. Nearby habitat could provide cover and suitable escape habitat for many of the displaced species, and the more mobile animals could return to the area after completion of construction and restoration activities, if appropriate habitats are available. As a result, the impact of these displacements during construction would be temporary to short term and minor.

Operations Impacts

The types of impacts associated with operations would be similar for the Applicant's preferred route and the route alternatives and would occur for the life of the Project. The general impacts of right-of-way maintenance would be temporary to short term and minor for each occurrence for all potential pipeline routes. Impacts of right-of-way maintenance within general wildlife habitat, conservation lands, and IBAs would be short term to permanent and minor to major, depending on the type of habitat present. Maintenance activities could reduce populations of species sensitive to habitat disturbance and could result in permanent minor effects on breeding birds. Maintenance of the right-of-way would also include mowing of vegetation, which could disturb wildlife or result in mortality of common small species. These impacts would be short term and minor.

The maintained permanent rights-of-way may be used as travel corridors by some big game animals and humans and may become attractive to some small species. This could result in permanent and minor effects on common wildlife. Implementation of BMPs to prevent the spread of noxious species would minimize impacts from herbicide applications and from colonization of the rights-of-way with invasive plants.

During operation, the Applicant's Integrity Management Program would periodically require excavation and repair or replacement of sections of the pipeline. The impacts would be similar to those occurring during construction of the pipeline; but they would occur over a substantially smaller area. For all routes, these impacts would be short term and negligible to minor for each occurrence but would occur periodically over the life of the Project.

6.3.4.4.2 Mitigation

In addition to the measures the Applicant would incorporate into the Project to avoid or minimize impacts, including stipulations in the permits required for the Project, Minnesota DNR has identified the following measures to reduce impacts on fisheries and wildlife:

- Use the HDD crossing method at all crossings of tributaries that are upstream of trout streams.

- Cover open-vent pipe ends with screens at cathodic protection systems to prevent birds and small mammals from becoming trapped in the pipe.
- During maintenance mowing of the permanent right-of-way, set the mower blade height at 6 to 8 inches above the ground to reduce injury and mortality impacts on small animals, and to prevent erosion.
- If construction activities occur within the recommended buffer distance of 984 feet from the Mahtowa or other heron rookeries during the nesting season (from April through August), the Applicant must consult with USFWS and Minnesota DNR and obtain any permits that may be required.
- Use wider vegetated buffers during construction near trout streams (100 feet vs the standard 50 feet).
- Reduce the construction work area width.

Table 6.3.4-24. Summary of Potential Impacts on Fish and Wildlife for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route[a]	Route Alternative RA-03AM[b]	Route Alternative RA-06[b]	Route Alternative RA-07[C]	Route Alternative RA-08[b]
Construction Impacts					
Aquatic habitat loss or reduction of aquatic habitat quality from construction activities, including hydrostatic testing	Generally temporary to long-term/negligible to minor impacts Long-term to permanent/minor to major impacts *(where streambanks are cleared of forested or woody vegetation)* • 111 stream crossings	Generally temporary to long-term/negligible to minor impacts Long-term to permanent /minor to major impacts *(where streambanks are cleared of forested or woody vegetation)* • 167 stream crossings	Generally temporary to long-term/negligible to minor impacts Long-term to permanent /minor to major impacts *(where streambanks are cleared of forested or woody vegetation)* • 137 stream crossings	Generally temporary to long-term/negligible to minor impacts Long-term to permanent /minor to major impacts *(where streambanks are cleared of forested or woody vegetation)* • 81 stream crossings	Generally temporary to long-term/negligible to minor impacts Long-term to permanent /minor to major impacts *(where streambanks are cleared of forested or woody vegetation)* • 106 stream crossings
Trout stream habitat loss or reduction of aquatic habitat quality from surface water crossings	Short-term/minor impacts Permanent/major thermal effects *(where streambanks are cleared of forested or woody vegetation)* • 6 trout stream crossings	Short-term/minor impacts Permanent/major thermal effects *(where streambanks are cleared of forested or woody vegetation)* • 8 trout stream crossings	Short-term/minor impacts Permanent/major thermal effects *(where streambanks are cleared of forested or woody vegetation)* • 7 trout stream and 1 trout lake crossings	Short-term/minor impacts Permanent/major thermal effects *(where streambanks are cleared of forested or woody vegetation)* • 8 trout stream crossings	Short-term/minor impacts Permanent/major potential thermal effects *(where streambanks are cleared of forested or woody vegetation)* • 7 trout stream crossings
Loss of habitat and reduction of habitat quality in Aquatic Management Areas (AMAs)	Short-term/negligible to minor impacts • 0.4 acre of AMA disturbance	Short-term/negligible to minor impacts • 0.5 acre of AMA disturbance	Short-term/negligible to minor impacts • 5.0 acres of AMA disturbance	Short-term/negligible to minor impacts • 8.2 acres of AMA disturbance	Short-term/negligible to minor impacts • 4.7 acres of AMA disturbance

Table 6.3.4-24. Summary of Potential Impacts on Fish and Wildlife for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route[a]	Route Alternative RA-03AM[b]	Route Alternative RA-06[b]	Route Alternative RA-07[C]	Route Alternative RA-08[b]
Loss of habitat and reduction of habitat quality in Minnesota Lakes of Biological Significance (LBS) and other sensitive aquatic resources such as fish IBI Lakes, mussel beds, and muskie lakes	No impact on LBS, but 1 sentinel lake may have short-tern/negligible to minor impacts	No impact	Short-term/negligible to minor impacts • 3.4 acres of LBS disturbance	Short-term/negligible to minor impacts • 10.9 acres of LBS disturbance	Short-term/negligible to minor impacts • 6 acres of LBS disturbance
Potential for injury, mortality, or disturbance of aquatic species affecting fisheries	Temporary/minor to major impacts	Temporary/minor to major impacts	Temporary/minor to major impacts	Temporary/minor to major impacts	Temporary/minor to major impacts
Loss of habitat or reduction of wildlife habitat quality from construction activities and vegetation clearing[d]	Temporary to permanent/minor to major impacts from clearing of the right-of-way; pipeline would be co-located with existing corridors • 2,806 acres of habitat, primarily deciduous forest and crop land	Temporary to permanent/minor impacts; pipeline would be co-located with existing corridors the entire length • 3,579 acres of habitat, primarily deciduous forest, hay, and pasture land	Long-term to permanent/minor to major impacts from clearing of the right-of-way • 2,674 acres of habitat, primarily forest and woody wetlands	Long-term/minor to major impacts; pipeline would be co-located with existing corridors the entire length • 3,832 acres of habitat, primarily wetlands and forest	Long-term to permanent to /minor to major impacts; pipeline would be co-located with existing corridors the entire length • 2,287 acres of habitat, primarily wetlands and forest
Loss of habitat or reduction of wildlife habitat quality in wildlife conservation areas from vegetation clearing	Short-term to permanent/minor to major impacts from clearing of the right-of-way • 381 acres of wildlife conservation areas	Short-term/minor impacts; pipeline would be co-located with existing corridors • 44 acres of wildlife conservation areas	Short-term/minor impacts from clearing of the right-of-way • 325 acres of wildlife conservation areas	Short-term/minor impacts; pipeline would be co-located with existing corridors • 486 acres of wildlife conservation areas	Short-term/minor; pipeline would be co-located with existing corridors • 237 acres of wildlife conservation areas

Table 6.3.4-24. Summary of Potential Impacts on Fish and Wildlife for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route[a]	Route Alternative RA-03AM[b]	Route Alternative RA-06[b]	Route Alternative RA-07[C]	Route Alternative RA-08[b]
Loss of habitat or reduction of wildlife habitat quality in Audubon Important Bird Areas (IBAs) from vegetation clearing	Short- to long-term/minor impacts from clearing of the right-of-way • 48 acres of IBAs	Short-term/minor impacts because pipeline would be co-located with existing corridors • 70 acres of IBAs	Permanent/minor to major impacts from clearing of the right-of-way • 512 acres of IBAs	Short-term/minor impacts because pipeline would be co-located with existing corridors • 1,016 acres of IBAs	Short-term/minor impacts because pipeline would be co-located with existing corridors • 594 acres of IBAs
Disturbance or loss of colonial waterbird nesting sites	Temporary/minor to major impacts on the Mahtowa rookery depending on season	No impact	Permanent/major impacts from removal of colonial waterbird nesting tree(s) at the Larson Lake and Sherry Lake great blue heron rookeries	Temporary/negligible impacts on Grass Lake red-necked grebe rookery	Permanent/major impacts from removal of colonial waterbird nesting tree(s) at the Portage Creek great blue heron rookery
Loss of habitat or reduction of wildlife habitat quality from habitat fragmentation	Permanent/minor to major impacts on primarily forested and woody wetlands • 37.6 miles of habitat fragmented • 21 large-block habitats (>100 acres) crossed • 27,101 acres total habitat fragmented	No impact because pipeline would be co-located with existing corridors	Permanent/major impacts on primarily forested and woody wetlands • 114.3 miles of habitat fragmented • 60 large-block habitats (>100 acres) crossed • 83,996 acres total habitat fragmented	No impact because pipeline would be co-located with existing corridors	No impact because pipeline would be co-located with existing corridors
Potential for injury, mortality, or disturbance of wildlife species	Temporary/minor to major impacts	Temporary/minor to major impacts	Temporary/minor to major impacts	Temporary/minor to major impacts	Temporary/minor to major impacts

Table 6.3.4-24. Summary of Potential Impacts on Fish and Wildlife for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route[a]	Route Alternative RA-03AM[b]	Route Alternative RA-06[b]	Route Alternative RA-07[C]	Route Alternative RA-08[b]
Operations Impacts					
Aquatic habitat loss or reduction of aquatic habitat quality from maintenance activities, integrity digs, or small leaks and spills	Short-term to long-term/ minor to major impacts Permanent/major thermal effects (*where streambanks are cleared of forested or woody vegetation*) • 111 stream crossings	Short-term to long-term/ minor to major impacts Permanent/major thermal effects (*where streambanks are cleared of forested or woody vegetation*) • 167 stream crossings	Short-term to long-term/ minor to major impacts Permanent/major thermal effects (*where streambanks are cleared of forested or woody vegetation*) • 137 stream crossings	Short-term to long-term/ minor to major impacts Permanent/major thermal effects (*where streambanks are cleared of forested or woody vegetation*) • 81 stream crossings	Short-term to long-term/ minor to major impacts Permanent/major thermal effects (*where streambanks are cleared of forested or woody vegetation*) • 106 stream crossings
Trout stream habitat loss or reduction of aquatic habitat quality from right-of-way maintenance at surface water crossings	Short-term/minor impacts Permanent/major thermal effects *(where streambanks are cleared of forested or woody vegetation)* • 6 trout stream crossings	Short-term/minor impacts Permanent/major thermal effects *(where streambanks are cleared of forested or woody vegetation)* • 8 trout stream crossings	Short-term/minor impacts Permanent/major thermal effects *(where streambanks are cleared of forested or woody vegetation)* • 6 trout stream and 1 lake crossings	Short-term/minor impacts Permanent/major thermal effects *(where streambanks are cleared of forested or woody vegetation)* • 6 trout stream crossings	Short-term/minor impacts Permanent/major thermal effects *(where streambanks are cleared of forested or woody vegetation)* • 4 trout stream crossings
Loss of habitat and reduction of habitat quality in Aquatic Management Areas (AMAs)	Short-term/negligible to minor impacts *This would be the second pipeline to cross LaSalle Creek AMA* • 0.2 acre of AMA disturbance	Short-term/negligible to minor impacts *This would be the second pipeline to cross LaSalle Creek AMA* • 0.2 acre of AMA disturbance	Short-term/negligible to minor impacts • 2.1 acres of AMA disturbance	Short-term/negligible to minor impacts • 2 acres of AMA disturbance	Short-term/negligible to minor impacts • 2 acres of AMA disturbance
Loss of habitat and reduction of habitat quality in Minnesota LBS; no other sensitive aquatic resources were affected	No impact	No impact	Short-term/negligible to minor impacts • 1.4 acres of LBS disturbance	Short-term/negligible to minor impacts • 2.1 acres of LBS disturbance	Short-term/negligible to minor impacts • 2.5 acres of LBS disturbance

Table 6.3.4-24. Summary of Potential Impacts on Fish and Wildlife for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route[a]	Route Alternative RA-03AM[b]	Route Alternative RA-06[b]	Route Alternative RA-07[C]	Route Alternative RA-08[b]
Potential for injury, mortality, or disturbance of aquatic species impacting fisheries from leaks, spills, or herbicide applications	Temporary to long-term/ minor impacts	Temporary to long-term/ minor impacts	Temporary to long-term/ minor impacts	Temporary to long-term/ minor impacts	Temporary to long-term/ minor impacts
Loss of habitat or reduction of wildlife habitat quality from maintenance activities and vegetation clearing	Permanent/minor to major impacts from maintenance of the right-of-way • 1,288 acres of habitat, primarily forest	Permanent/minor to major impacts from maintenance of the right-of-way • 1,495 acres of habitat, primarily deciduous forest, hay, and pasture land	Permanent/minor to major impacts from maintenance of the right-of-way • 1,115 acres of habitat, primarily forest and woody wetland	Permanent/minor to major impacts from maintenance of the right-of-way • 937 acres of habitat, primarily wetlands and deciduous forest	Permanent/minor to major impacts from maintenance of the right-of-way • 954 acres of habitat, primarily wetlands and deciduous forest
Loss of habitat or reduction of wildlife habitat quality in wildlife conservation areas from maintenance and vegetation clearing	Permanent/minor to major impacts from maintenance of the right-of-way • 159 acres of wildlife conservation areas	Permanent/minor to major impacts from maintenance of the right-of-way • 19 acres of wildlife conservation areas	Permanent/minor to major impacts from maintenance of the right-of-way • 135 acres of wildlife conservation areas	Permanent/minor to major impacts from maintenance of the right-of-way • 86 acres of wildlife conservation areas	Permanent/minor to major impacts from maintenance of the right-of-way • 99 acres of wildlife conservation areas
Loss of habitat or reduction of wildlife habitat quality in Audubon IBAs from maintenance and vegetation clearing	Permanent/minor to major impacts from maintenance of the right-of-way • 25 acres of IBA	Permanent/minor to major impacts from maintenance of the right-of-way • 29 acres of IBA	Permanent/minor to major impacts from maintenance of the right-of-way • 213 acres of IBA	Permanent/minor to major impacts from maintenance of the right-of-way • 248 acres of IBA	Permanent/minor to major impacts from maintenance of the right-of-way • 248 acres of IBA

Table 6.3.4-24. Summary of Potential Impacts on Fish and Wildlife for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route[a]	Route Alternative RA-03AM[b]	Route Alternative RA-06[b]	Route Alternative RA-07[C]	Route Alternative RA-08[b]
Loss of habitat or reduction of wildlife habitat quality from habitat fragmentation	Permanent/major impacts on primarily forested and woody wetlands • 21 large-block habitats (>100 acres) • 27,101 acres total habitat fragmented	Temporary to short-term/negligible impacts from widening existing corridor	Permanent/major impacts on primarily forested and woody wetlands • 60 large-block habitats (>100 acres) crossed • 83,996 acres total habitat fragmented	Temporary to short-term/negligible impacts from widening existing corridor	Temporary to short-term/negligible impacts from widening existing corridor
Potential for injury, mortality, or disturbance of wildlife species	Short-term minor to major impacts from habitat loss or fragmentation and mortality of common species during mowing and other maintenance activities; maintenance may also disturb the Mahtowa heron colony.	Short-term minor to major impacts from habitat loss or fragmentation and mortality of common species during mowing and other maintenance activities	Short-term minor to major impacts from habitat loss or fragmentation and mortality of common species during mowing and other maintenance activities	Short-term minor to major impacts from habitat loss or fragmentation and mortality of common species during mowing and other maintenance activities	Short-term minor to major impacts from habitat loss or fragmentation and mortality of common species during mowing and other maintenance activities

[a] Con = Enbridge-provided footprint for construction work area; Op = Enbridge-provided footprint for permanent right-of-way.

[b] Con = estimated 120-foot-wide construction work area centered on route, Op = estimated 50-foot-wide permanent right-of-way.

[c] Con = estimated 205-foot-wide construction work area (with 10 feet wide on the north side of the existing Line 3 and 95 feet wide on the south side of the existing Line 3); Op = estimated 50-foot-wide permanent right-of-way.

[d] Permanent loss in forested areas that are newly developed. The impacts would be less along co-located lines (e.g., RA-07).

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6.3.5 Unique Natural Resources

This section describes protected, rare, and sensitive plants and animals (termed "unique natural resources") that could be affected by construction and operation associated with the Minnesota portion of the Applicant's preferred route and route alternatives. The effects could result from loss or disturbance of a resource or from habitat loss and degradation. The analysis of impacts on unique natural resources from construction and operation of the Applicant's preferred route and route alternatives considered the potential for injury, mortality, or disturbance of the following:

- Federally listed endangered and threatened species;
- State-listed threatened, endangered, and special concern species;
- Minnesota SGCN;
- MBS Sites; and
- Minnesota SNAs.

This section first describes the existing conditions for unique natural resources that may be affected by construction and operation of the Applicant's preferred route and the route alternatives. The potential Project-related impacts on these resources from construction and operation of the Applicant's preferred route are then described, along with measures the Applicant would implement to minimize impacts. Next, the potential Project-related impacts on unique natural resources from construction and operation are addressed for each route alternative (RA-03AM, RA-06, RA-07, and RA-08) and compared to each other and to the Applicant's preferred route between Clearbrook and Carlton. The comparison focuses on the area between Clearbrook and Carlton because the Applicant's preferred route and the route alternatives all have identical routes from Neche, North Dakota, to Clearbrook and from Carlton to Superior, Wisconsin. A summary and comparison of the impacts are included at the end of the section, along with potential mitigation measures to be considered. Potential impacts on unique natural resources from an unanticipated crude oil release are addressed in Chapter 10.

6.3.5.1 Regulatory Context and Methodology

6.3.5.1.1 Regulatory Context

The regulatory context for evaluating impacts on unique natural resources is described in Section 5.2.5.1, including the federal ESA and Minnesota's Endangered Species Statute (Minn. R. Ch. 6134) and associated rules. Birds protected under the MBTA and BGEPA are discussed in Section 6.3.4. This section provides information for regulatory agencies to assess potential impacts on unique natural resources. The Applicant would be required to comply with appropriate species-specific conservation measures identified by state and federal natural resource agencies.

6.3.5.1.2 Methodology

The methodology for evaluating impacts on unique natural resources is described in Section 5.2.5.1. For federally listed species, the ROI for this evaluation encompassed the area within a distance of 1 mile from the centerlines of the pipeline routes. For the state-listed species and related concerns, the ROI for the evaluation encompassed the area within a distance of 0.5 mile from the centerlines of the pipeline routes. This is the area that could be directly or indirectly affected by pipeline construction. The area within 0.5 mile of the route centerlines was used as the ROI for state-listed species instead of 1 mile because the available state data have more specific locations associated with known occurrences than

federal data. Impacts were evaluated by considering the area directly and indirectly affected by the Applicant's preferred route and the route alternatives between Clearbrook and Carlton, Minnesota.

Direct impacts for the Applicant's preferred route were evaluated based on construction footprints provided by the Applicant. The areas identified consist of the construction work area, ATWS, access roads, pipe yards, pipeline permanent right-of-way, valve pads and driveways, and pump stations within Minnesota. Comparisons of construction impacts for route alternatives were based on the Applicant-provided construction work area for the Applicant's preferred route; a 120-foot-wide construction work area for RA-03AM, RA-06, and RA-08; and a 205-foot-wide construction work area for RA-07. Comparisons of operations impacts were based on the Applicant's footprint for the pipeline permanent right-of-way (a 50-foot-wide area centered on the pipeline route) and a 50-foot-wide permanent pipeline rights-of-way centered on the routes of RA-03AM, RA-06, RA-07, and RA-08. Animals were considered affected when they occurred within 0.5 mile of the route centerlines; plants were considered affected when they occurred within construction work areas and permanent rights-of-way.

The regulatory drivers for unique natural resources and the geospatial data sources evaluated were as follows:

- Federally listed animals and plants were evaluated using the USFWS' Information for Planning and Conservation (IPaC) online system for the area within a 2-mile-wide ROI (i.e., 1 mile from the centerline of each pipeline). While impacts were assessed for this entire area, direct impacts primarily would occur within construction work areas and the pipeline permanent rights-of-way. These data were used to determine the presence of federally listed animals and plants for the evaluation.
- Minnesota-listed animals and plants were evaluated using NHIS data for endangered, threatened, and special concern species within the ROI (0.5 mile from route centerlines). These data were used to determine the presence of Minnesota-listed animals and plants.
- Minnesota SGCN were evaluated using Minnesota's Wildlife Action Network (WAN) within the ROI for 0.5 mile from the route centerlines. Impacts on WAN habitats were evaluated for areas of direct construction and operations impacts by overlaying the WAN map on maps of the construction areas described above. The impact areas were quantified, and the proportion of WAN areas affected by the route alternatives were compared based on the proportion of WAN habitat available within the ROI. A description of the WAN scoring system is presented in Section 5.2.5.1.
- MBS Sites were evaluated within the ROI for 0.5 mile from the route centerlines. Impacts on MBS Site habitats were evaluated for areas of direct construction and operations impacts by overlaying the MBS Sites map on maps of the construction areas described above. The impact areas were quantified, and the proportion of MBS Site areas affected by the route alternatives were compared based on the proportion of MBS Sites available within the ROI.
- Minnesota SNAs were identified within the ROI for 0.5 mile from the route centerlines. Impacts on SNA habitats were evaluated for areas of direct construction and operations impacts by overlaying the SNA map on maps of the construction areas described above.

6.3.5.2 Existing Conditions

The discussion of existing conditions includes information presented in Section 5.2.5.2 but focuses on conditions in Minnesota.

6.3.5.2.1 Applicant's Preferred Route

Federally Listed Species

The Canada lynx (*Lynx canadensis*), gray wolf (*Canis lupus*), northern long-eared bat (*Myotis septentrionalis*), Dakota skipper (*Hesperia dacotae*), Poweshiek skipperling (*Oarisma poweshiek*), rusty patched bumble bee (*Bombus affinis*), and western prairie fringed orchid (*Platanthera praeclara*) have the potential to occur within the ROI for the Applicant's preferred route (Table 6.3.5-1). While there are no documented IPaC occurrences of mussels within the ROI, Merjent (2014a) determined that 33 waterbody crossings in Minnesota have potentially suitable habitat for protected mussels and recommended field surveys. The Applicant completed mussel field surveys at 16 sites along the Applicant's preferred route in Minnesota, and no federally listed mussels were found (Merjent 2015a).

Table 6.3.5-1. Potential Occurrences of Federally Protected Species within the Region of Interest for the Applicant's Preferred Route

Species	Preferred Habitat	Status[a]	Potential Occurrence[b]	
			In Minnesota	Clearbrook to Carlton
Animals				
Mammals				
Canada lynx *(Lynx canadensis)*	Boreal regions dominated by coniferous or mixed forests. Dens in mature or old-growth forests with high density of logs. Breeds late winter to early spring.	T	Yes	Yes
Gray wolf (*Canis lupus*) Great Lakes Distinct Population Segment	Suitable habitats in the ROI include hardwood forest, mixed forest, and grasslands. Digs dens in suitable soils or uses dens initiated by other animals. Breeds February to late June.	T	Yes	Yes
Northern long-eared bat (*Myotis septentrionalis*)	Suitable summer habitat occurs in the ROI. In summer, bats roost underneath bark, in cavities, or in crevices of both live trees and snags. Mates in fall near their hibernacula (August and September) and gives birth in summer (May to July). Bats spend their winters in suitable caves and mines (October to April).	T	Yes	Yes
Insects				
Dakota skipper (*Hesperia dacotae*)	Prefers native prairies (lowland and upland prairies) containing a high diversity of wildflowers and grasses. Eggs are laid in June and July and hatch after 10 days. Larvae are dormant in fall, and pupation usually occurs in June.	T	Yes	No
Poweshiek skipperling (*Oarisma poweshiek*)	Prefers native prairies (and in some cases, fens) containing a high diversity of wildflowers and grasses. Eggs are laid mid-June to mid-July, and hatch 9 days later.	E	Yes	No

Table 6.3.5-1. Potential Occurrences of Federally Protected Species within the Region of Interest for the Applicant's Preferred Route

Species	Preferred Habitat	Status[a]	Potential Occurrence[b]	
			In Minnesota	Clearbrook to Carlton
Rusty patched bumble bee (*Bombus affinis*)	Grasslands and tallgrass prairies with areas that provide flowers, nesting sites such as abandoned rodent cavities or grass clumps, and overwintering sites in undisturbed soil for hibernating queens. Eggs are laid in spring.	E	Yes	Yes
Plants				
Vascular Plants				
Western prairie fringed orchid (*Platanthera praeclara*)	Occurs in mesic-wet tallgrass native prairie, herbaceous wetlands, and dune complexes. Emerges in May and flowers in early to mid-July.	T	Yes	No

Source: USFWS 2016.

[a] E = Endangered, T = Threatened

[b] IPaC search = area within 1 mile of route centerline

ROI = region of interest

State-Listed Species

Endangered and Threatened Species

State-listed endangered and threatened animals and plants that are within the ROI, including those that are also federally listed, are presented in Table 6.3.5-2. Presence or probable absence of state-listed species was determined based on Minnesota NHIS element occurrence records or site-specific survey results where applicable. As described in Section 5.2.5, the Applicant performed surveys along the Applicant's preferred route. Results of these surveys are included in the impact discussion. Merjent (2014a) determined that 33 waterbody crossings have potentially suitable habitat for protected mussels and recommended field surveys. The Applicant completed mussel field surveys at 16 sites along the Applicant's preferred route in Minnesota, and no state-listed mussels were found (Merjent 2015a).

Special Concern Species

State-listed special concern species that occur within the ROI for the Applicant's preferred route include 12 vertebrates, 3 invertebrates, and 11 plants (Tables 6.3.5-3 and 6.3.5-4).

Minnesota Species of Greatest Conservation Need

The WAN shows viable or persistent populations and richness hotspots for the regions in Minnesota crossed by the Applicant's preferred route (Minnesota DNR 2016f). As shown in Figure 6.3.5-1, the Applicant's preferred route would cross habitats within the WAN that could be used by multiple SGCNs. Approximately 30 percent of the area within the ROI is within the WAN.

Minnesota Biological Survey Sites of Biodiversity Significance

As shown in Figure 6.3.5-2, the Applicant's preferred route would cross t areas with MBS Sites. Areas crossed that score outstanding, high, and moderate have an increased potential of containing habitats used by rare animals and plants that potentially would be affected, as discussed below in the impact assessment. Approximately 21 percent of the area within the ROI is rated as an outstanding (less than 1 percent), high (3 percent), or moderate (17 percent) MBS Site.

Table 6.3.5-2. Known Occurrences of State-Protected Animals and Plants within the Region of Interest for the Applicant's Preferred Route

Species	Preferred Habitat	Status[a]	Occurrences[b]	
			In Minnesota	Clearbrook to Carlton
Animals				
Fish				
Pugnose shiner (*Notropis anogenus*)	Found in glacial lakes and streams with an abundance of submerged vegetation. Prefers low-velocity waters with a substrate of sand, mud, or gravel. Shallow waters in warm months and deeper waters in cold months.	T	Yes	Yes
Mollusks				
Fluted-shell (*Lasmigona costata*)	Found in streams or river beds. Likely spawns from June to July.	T	Yes	No
Plants				
Nonvascular Plants				
A species of liverwort [Woolywort] (*Trichocolea tomentella*)	Damp, shaded rocks in forested rich peatland and wet forest.	T	Yes	Yes
Vascular Plants				
Beaked spikerush (*Eleocharis rostellata*)	Coastal salt marshes, and inland in saline, alkaline, or strongly calcareous habitats (e.g., around hot springs). Fruits during summer to fall in the north.	T	Yes	Yes
Bog bluegrass (*Poa paludigena*)	Perched upon wet substrates (e.g., moss, fallen trees) in spring-fed swamps. Specifically, occurs within *Fraxinus nigra-Betula lutea* swamps along the base of steep bluffs and at the head of the spring that feeds into the swamp. Blooms in late May to early June.	T	Yes	Yes
Bristle-berry (*Rubus fulleri*)	Swamp and marsh edges, wet and sedge meadows, and uplands mainly in central Minnesota. Flowers mid- to late June.	T	Yes	Yes
Butternut (*Juglans cinerea*)	Full sunlight on well-drained soils of bottomlands and floodplains. Flowers appear in mid-spring, and fruits develop throughout the summer.	E	Yes	Yes
Clinton's bulrush (*Trichophorum clintonii*)	Rocky river ledges, argillaceous soils, clearings of fir forests, and prairie and open woods. Reproductive structures are present from early May through the end of June in southern Minnesota, and late May through June in northern Minnesota.	T	Yes	No
Gray ragwort (*Packera cana*)	Northern plains, including the upper slopes of dry prairie remnant hills in sandy or gravelly soil. Flowers from May to June.	E	Yes	No

Table 6.3.5-2. Known Occurrences of State-Protected Animals and Plants within the Region of Interest for the Applicant's Preferred Route

Species	Preferred Habitat	Status[a]	Occurrences[b]	
			In Minnesota	Clearbrook to Carlton
Hair-like beak rush (*Rhynchospora capillacea*)	Calcareous fens, especially along the margins, and spring fens. Germinates in the spring and flowers mid-summer.	T	Yes	No
Handsome sedge (*Carex formosa*)	Typically occurs in or at the edge of limey swamps, seeps, or bottomland forests, but known to occur in moist, rich upland forests. Also can occur in disturbed habitats such as road edges and disturbed prairies. Blooms throughout June and fruits throughout July.	E	Yes	No
Narrow triangle moonwort (*Botrychium lanceolatum* ssp. *angustisegmentum*)	In woods and on hummocks in swamps, and in cool to warm, mostly rich, sub-acid soils. May be found in open fields at the northern end of its range. Site elevations range from near sea level to 3,600 feet. Leaves emerge in spring and spores mature through summer.	T	Yes	Yes
Purple-flowered bladderwort (*Utricularia purpurea*)	Adjacent to boggy shorelines in small to medium size lakes with high water quality. Flowers from mid-July to September.	E	Yes	Yes
Red saltwort (*Salicornia rubra*)	Salt flats, saline swales, alkaline depressions, and exposed shores of alkaline lakes. Flowers from late July into August.	T	Yes	No
Sterile sedge (*Carex sterilis*)	Mineral-rich calcareous fens of the prairie region. Mature perigynia are present from early June to late July.	T	Yes	Yes
Whorled nutrush (*Scleria verticillata*)	Restricted to the least disturbed calcareous fens in the prairie region. Blooms late June through late July.	T	Yes	No

Sources: Minnesota DNR 2016a, 2017a; Merjent 2016a.

[a] E = Endangered, T = Threatened

[b] Database search = within 0.5 mile of route centerline.

Note:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Table 6.3.5-3. Known Occurrences of Special Concern Animals within the Region of Interest for the Applicant's Preferred Route

Common Name	Scientific Name
Mammals	
Big brown bat	*Eptesicus fuscus*
Little brown bat	*Myotis lucifugus*
Northern long-eared bat	*Myotis septentrionalis*
Prairie vole	*Microtus ochrogaster*
Birds	
Greater prairie-chicken	*Tympanuchus cupido*
Nelson's sparrow	*Ammodramus nelsoni*
Northern goshawk	*Accipiter gentilis*
Red-shouldered hawk	*Buteo lineatus*
Short-eared owl	*Asio flammeus*
Trumpeter swan	*Cygnus buccinator*
Amphibians	
Four-toed salamander	*Hemidactylium scutatum*
Fish	
Least darter	*Etheostoma microperca*
Insects and Spiders	
A caddisfly	*Anabolia ozburni*
Mollusks	
Black sandshell	*Ligumia recta*
Creek heelsplitter	*Lasmigona compressa*

Source: Minnesota DNR 2016a.

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Database search = within 0.5 mile of route centerline.

Table 6.3.5-4. Known Occurrences of Special Concern Plants within the Region of Interest for the Applicant's Preferred Route

Common Name	Scientific Name
Forests	
Least moonwort	*Botrychium simplex*
Peatlands	
Few-flowered spikerush	*Eleocharis quinqueflora*
Twig rush	*Cladium mariscoides*
White adder's mouth	*Malaxis monophyllos* var. *brachypoda*
Prairies	
Blunt sedge	*Carex obtusata*
Northern single-spike sedge	*Carex scirpoidea*
Small white lady's-slipper	*Cypripedium candidum*
Wetlands/Water	
False mountain willow	*Salix pseudomonticola*
McCalla's willow	*Salix maccalliana*
Slender naiad	*Najas gracillima*
Torrey's mannagrass	*Torreyochloa pallida*

Sources: Minnesota DNR 2016a, 2017c.

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Database search = within 0.5 mile of route centerline.

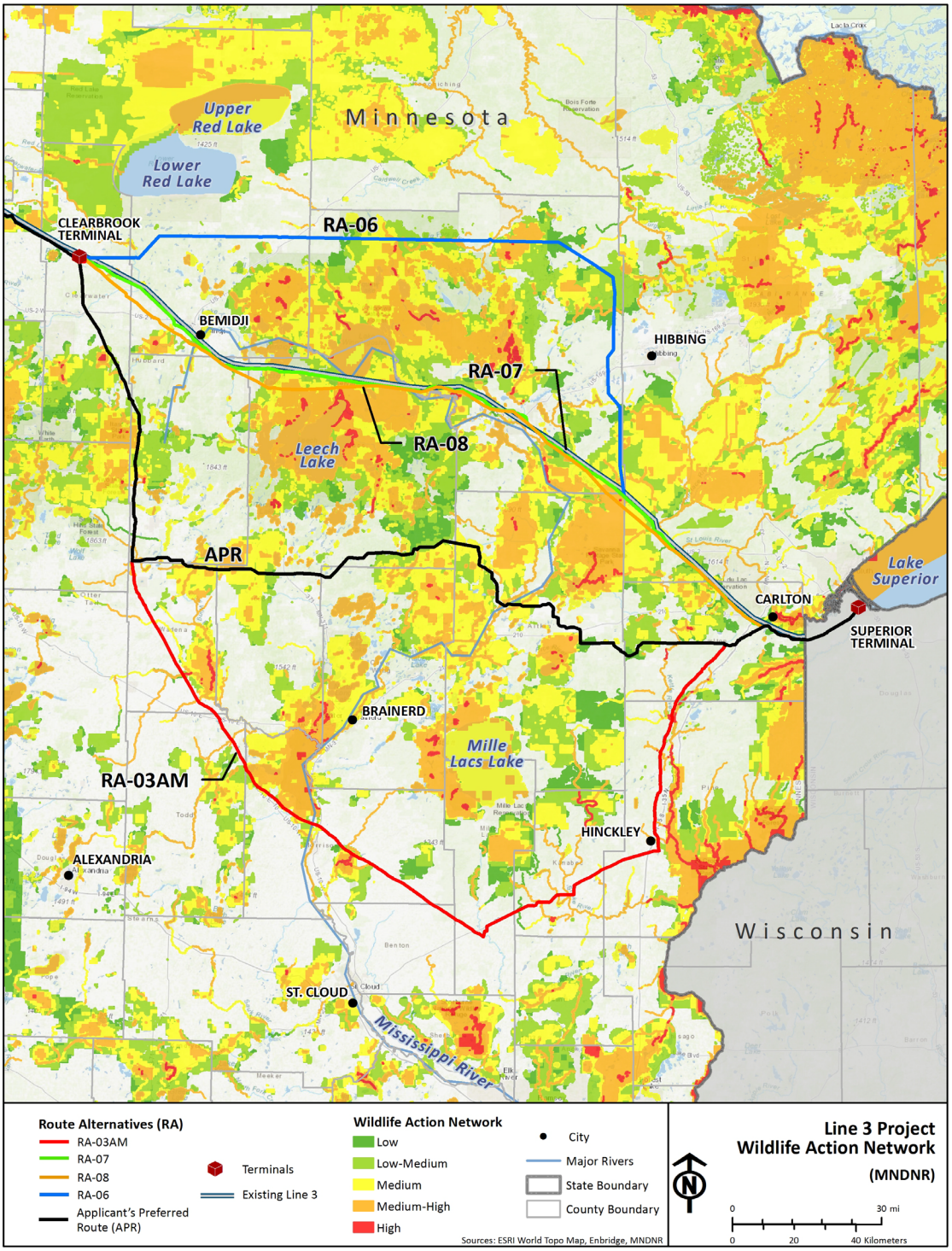

Source: Minnesota DNR 2016b.

Figure 6.3.5-1. Wildlife Action Network Crossed by the Applicant's Preferred Route and Route Alternatives

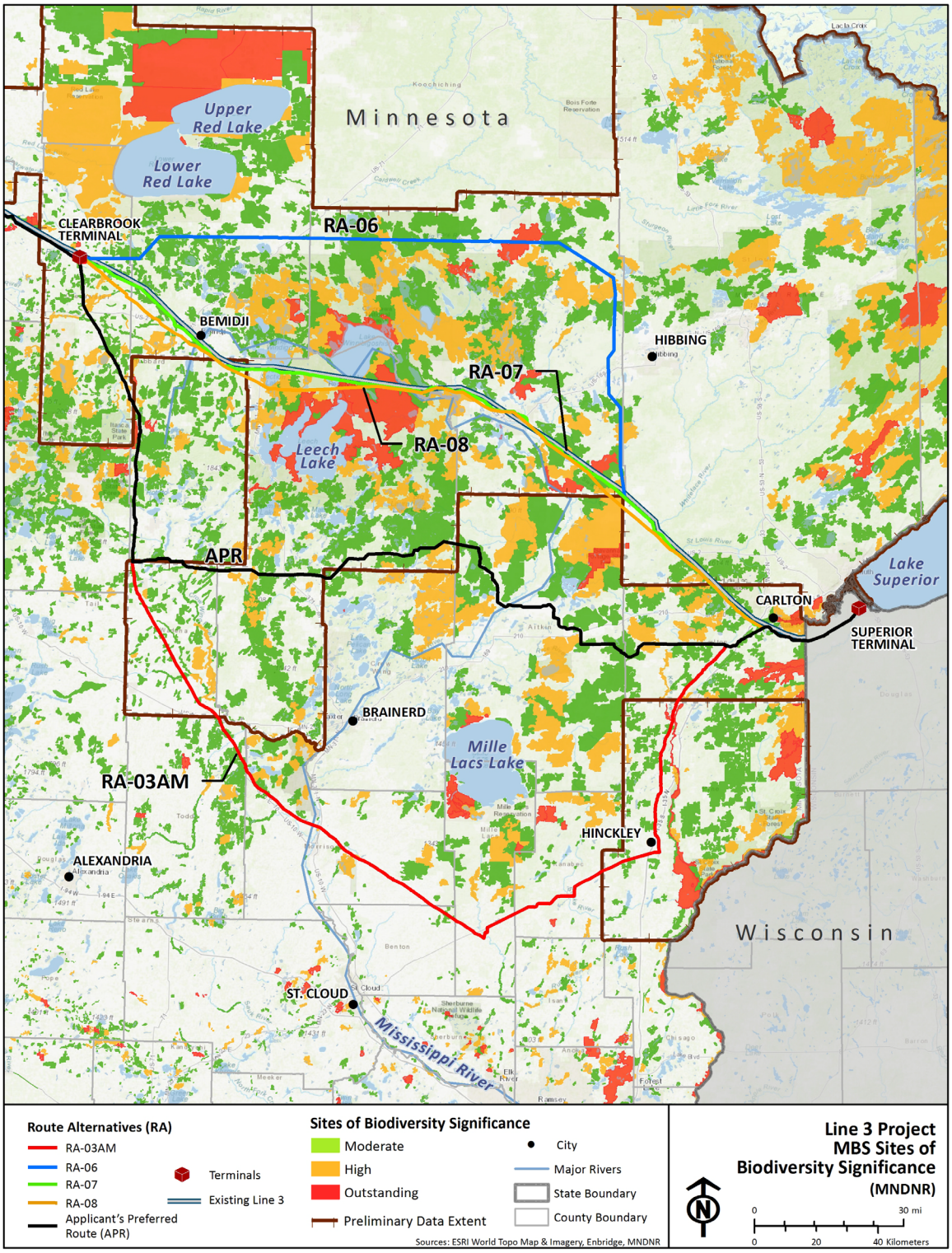

Source: Minnesota DNR 2016h.

Figure 6.3.5-2. Minnesota Biological Survey Sites of Biodiversity Significance Crossed by the Applicant's Preferred Route and Route Alternatives

Minnesota Scientific and Natural Areas

Minnesota's SNAs are state lands that preserve ecological and geological diversity, including rare species, native plants, and significant geological features (Minnesota DNR 2016c). Multiple sites in each landscape region are protected in order to capture genetic diversity and prevent the loss of important species, communities, and features (Minnesota DNR 2016c). Natural areas are distinguished by undisturbed plant communities, rare or endangered species habitat, seasonal habitat, natural geologic formations and features, and plant communities undergoing natural succession (Minnesota DNR 2016c). No SNAs would be crossed by or be within the ROI for the Applicant's preferred route.

6.3.5.2.2 Route Alternatives

The only segment in Minnesota where the route alternatives would vary from the alignment of the Applicant's preferred route is between Clearbrook and Carlton. The existing conditions relevant to unique natural resources for the route alternatives between Clearbrook and Carlton are described below.

Route Alternative RA-03AM

Federally Listed Species

The Canada lynx, gray wolf, northern long-eared bat, and rusty patched bumble bee have the potential to occur within or near RA-03AM (Table 6.3.5-5).

State-Listed Species

Endangered and Threatened Species

State-listed endangered and threatened animals and plants likely to occur within the ROI for RA-03AM, including those that are also federally listed, are presented in Table 6.3.5-6. Presence or probable absence of state-listed species was determined based on Minnesota NHIS element occurrence records.

Special Concern Species

Occurrences of Minnesota special concern animals and plants, including federally listed species, within the ROI for RA-03AM are listed in Tables 6.3.5-7 and 6.3.5-8.

Table 6.3.5-5. Potential Occurrences of Federally Protected Species within the Region of Interest for Route Alternative RA-03AM

Species	Preferred Habitat	Status[a]
Mammals		
Canada lynx *(Lynx canadensis)*	Boreal regions dominated by coniferous or mixed forests. Dens in mature or old-growth forests with high density of logs. Breeds late winter to early spring.	T
Gray wolf (*Canis lupus*) Great Lakes Distinct Population Segment	Suitable habitats in the ROI include hardwood forest, mixed forest, and grasslands. Digs dens in suitable soils or uses dens initiated by other animals. Breeds February to late June.	T
Northern long-eared bat (*Myotis septentrionalis*)	Suitable summer habitat occurs in the ROI. In summer, bats roost underneath bark, in cavities, or in crevices of both live trees and snags. Mates in fall near their hibernacula (August and September) and gives birth in summer (May to July). Bats spend their winters in suitable caves and mines (October to April).	T
Insects		
Rusty patched bumble bee (*Bombus affinis*)	Grasslands and tallgrass prairies with areas that provide flowers, nesting sites such as abandoned rodent cavities or grass clumps, and overwintering sites in undisturbed soil for hibernating queens. Eggs are laid in spring.	E

Source: USFWS 2016.

[a] E = Endangered, T = Threatened

Note:

IPaC search = within 1 mile of route centerline.

ROI = region of interest

Table 6.3.5-6. Known Occurrences of State-Protected Animals and Plants within the Region of Interest for Route Alternative RA-03AM

Species	Preferred Habitat	Status[a]
Animals		
Amphibians and Reptiles		
Blanding's turtle (*Emydoidea blandingii*)	Found in productive, clean, shallow waters with abundant aquatic vegetation and soft, muddy bottoms over firm substrates—in ponds, marshes, swamps, bogs, wet prairies, river backwaters, sloughs, slow-moving rivers, protected coves, and lake shallows and inlets. Extensive marshes bordering rivers provide excellent habitat. Nests in grasses and sedge close to water.	T
Wood turtle (*Glyptemys insculpta*)	Found in moderate- to fast-flowing clear streams or rivers associated with forested riparian corridors, which provide primary overwintering, courtship, basking, and foraging habitat. Typically inhabited waterways possess a sand, gravel, or cobble substrate with limited silt or muck. Nesting occurs in well-drained open or sparsely vegetated sandy soils, typically within 200 feet of suitable aquatic habitat. Nesting habitat includes native dry prairies, moderately sloughing sand banks, sandbars, agricultural fields, or areas of disturbed sandy soils that support no or sparse ground layer vegetation.	T
Mollusks		
Elktoe (*Alasmidonta marginata*)	Found in medium to large rivers with moderate to fast velocities and sand and gravel substrates.	T
Fluted-shell (*Lasmigona costata*)	Found in streams or river beds. Likely spawns from June to July.	T
Mucket (*Actinonaias ligamentina*)	Found in medium to large rivers with coarse sand and gravel substrates.	T
Spike (*Elliptio dilatata*)	Found in small to large rivers, reservoirs, and lakes with sand and gravel substrates. Usually associated with outlet habitats dominated by swift currents when found in lakes. Spawns in early to mid-May.	T
Plants		
Vascular Plants		
Beaked spikerush (*Eleocharis rostellata*)	Coastal salt marshes, and inland in saline, alkaline, or strongly calcareous habitats (e.g., around hot springs). Fruits during summer to fall in the north.	T
Bog bluegrass (*Poa paludigena*)	Perched upon wet substrates such as moss, fallen trees, etc. in spring-fed swamps. Specifically, occurs within *Fraxinus nigra-Betula lutea* swamps along the base of steep bluffs and at the head of the spring that feeds into the swamp. Blooms in late May to early June.	T
Bristle-berry (*Rubus fulleri*)	Swamp and marsh edges, wet and sedge meadows, and uplands mainly in central Minnesota. Flowers mid- to late June.	T
Hair-like beak rush (*Rhynchospora capillacea*)	Calcareous fens, especially along the margins, and spring fens. Germinates in the spring, and flowers mid-summer.	T
Kitten-tails (*Besseya bullii*)	Savannas of the Midwest. This plant is more common in the oak openings than in the prairies. Kitten tails have been observed in grazed pastures, in mesic forests, in open woods, and on flat, grassy slopes. Blooms April through June.	T

Table 6.3.5-6. Known Occurrences of State-Protected Animals and Plants within the Region of Interest for Route Alternative RA-03AM

Species	Preferred Habitat	Status[a]
Narrow triangle moonwort (*Botrychium lanceolatum* ssp. *angustisegmentum*)	In woods and on hummocks in swamps, and in cool to warm, mostly rich, subacid soils. May be found in open fields at the northern end of its range. Site elevations range from near sea level to 3,600 feet. Leaves emerge in spring and spores mature through summer.	T
Snailseed pondweed (*Potamogeton bicupulatus*)	Soft water lakes (i.e., low dissolved mineral levels) with clear water. Fruits during July and August.	E
Sterile sedge (*Carex sterilis*)	Mineral-rich calcareous fens of the prairie region. Mature perigynia are present from early June to late July.	T

Sources: Minnesota DNR 2016a, 2017a.

[a] E = Endangered, T = Threatened

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Database search = within 0.5 mile of route centerline.

Table 6.3.5-7. Known Occurrences of Special Concern Animals within the Region of Interest for Route Alternative RA-03AM

Common Name	Scientific Name
Mammals	
Big brown bat	*Eptesicus fuscus*
Little brown bat	*Myotis lucifugus*
Northern long-eared bat	*Myotis septentrionalis*
Birds	
Greater prairie-chicken	*Tympanuchus cupido*
Nelson's sparrow	*Ammodramus nelsoni*
Northern goshawk	*Accipiter gentilis*
Red-shouldered hawk	*Buteo lineatus*
Short-eared owl	*Asio flammeus*
Trumpeter swan	*Cygnus buccinator*
Fish	
Gilt darter	*Percina evides*
Lake sturgeon	*Acipenser fulvescens*
Least darter	*Etheostoma microperca*
Southern brook lamprey	*Ichthyomyzon gagei*
Insects	
A caddisfly	*Anabolia ozburni*
Mollusks	
Black sandshell	*Ligumia recta*
Creek heelsplitter	*Lasmigona compressa*
Round pigtoe	*Pleurobema sintoxia*

Source: Minnesota DNR 2016a.

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Database search = within 0.5 mile of route centerline.

Table 6.3.5-8. Known Occurrences of Special Concern Plants within the Region of Interest for Route Alternative RA-03AM

Common Name	Scientific Name
Forests	
Least moonwort	*Botrychium simplex*
Peatlands	
English sundew	*Drosera anglica*
Few-flowered spikerush	*Eleocharis quinqueflora*
Twig rush	*Cladium mariscoides*
White adder's mouth	*Malaxis monophyllos* var. *brachypoda*
Prairies	
Blunt sedge	*Carex obtusata*
Hill's thistle	*Cirsium pumilum* var. *hillii*
Northern single-spike sedge	*Carex scirpoidea*
Small white lady's-slipper	*Cypripedium candidum*
Wetlands/Water	
Autumn fimbry	*Fimbristylis autumnalis*
False mountain willow	*Salix pseudomonticola*
McCalla's willow	*Salix maccalliana*
Slender naiad	*Najas gracillima*

Sources: Minnesota DNR 2016a; 2017a.

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Database search = 0.5 mile from route centerline.

Species of Greatest Conservation Need

The WAN shows viable or persistent populations and richness hotspots for regions in Minnesota (Minnesota DNR 2016f). As shown in Figure 6.3.5-1, RA-03AM would cross habitats within the WAN that could be used by multiple SGCNs.

Minnesota Biological Survey Sites of Biodiversity Significance

As shown in Figure 6.3.5-2, RA-03AM would cross areas with MBS Sites. Areas scoring outstanding, high, and moderate that are crossed by a route have an increased potential of containing habitats used by rare animals and plants that potentially would be affected, as discussed below in the impact assessment.

Minnesota Scientific and Natural Areas

RA-03AM would cross the Lake Alexander Woods SNA (Figure 6.5.3-3). The topography of the Lake Alexander SNA consists of hummocky mounds alternating with depressions (also known as knob and kettle), and the vegetation includes undisturbed mesic oak and aspen-birch forests interspersed with wetlands. A variety of wildlife use this area, including bald eagles, red-shouldered hawks (*Buteo lineatus*), and the threatened bog bluegrass (*Poa paludigena*) (Minnesota DNR 2016e).

Route Alternative RA-06

Federally Listed Species

The Canada lynx, gray wolf, northern long-eared bat, rufa red knot (*Calidris canutus rufa*), and rusty patched bumble bee have the potential to occur within the ROI for RA-06 (Table 6.3.5-9).

Table 6.3.5-9. Potential Occurrences of Federally Protected Species within the Region of Interest for Route Alternative RA-06

Species	Preferred Habitat	Status[a]
Mammals		
Canada lynx *(Lynx canadensis)*	Boreal regions dominated by coniferous or mixed forests. Dens in mature or old-growth forests with high density of logs. Breeds late winter to early spring.	T
Gray wolf (*Canis lupus*) Great Lakes Distinct Population Segment	Suitable habitats in the ROI include hardwood forest, mixed forest, and grasslands. Digs dens in suitable soils or uses dens initiated by other animals. Breeds February to late June.	T
Northern long-eared bat (*Myotis septentrionalis*)	Suitable summer habitat occurs in the ROI. In summer, bats roost underneath bark, in cavities, or in crevices of both live trees and snags. Mates in fall near their hibernacula (August and September) and gives birth in summer (May to July). Bats spend their winters in suitable caves and mines (October to April).	T
Birds		
Rufa Red knot (*Calidris canutus rufa*)	Shorelines, tidal zones, sandy beaches. Nests in Arctic tundra, usually near water. Breeds late May to early June.	T
Insects		
Rusty patched bumble bee (*Bombus affinis*)	Grasslands and tallgrass prairies with areas that provide flowers, nesting sites such as abandoned rodent cavities or grass clumps, and overwintering sites in undisturbed soil for hibernating queens. Eggs are laid in spring.	E

Sources: USFWS 2016.

[a] E = Endangered, T = Threatened

Note:

IPaC search = within 1 mile of route centerline

ROI = region of interest

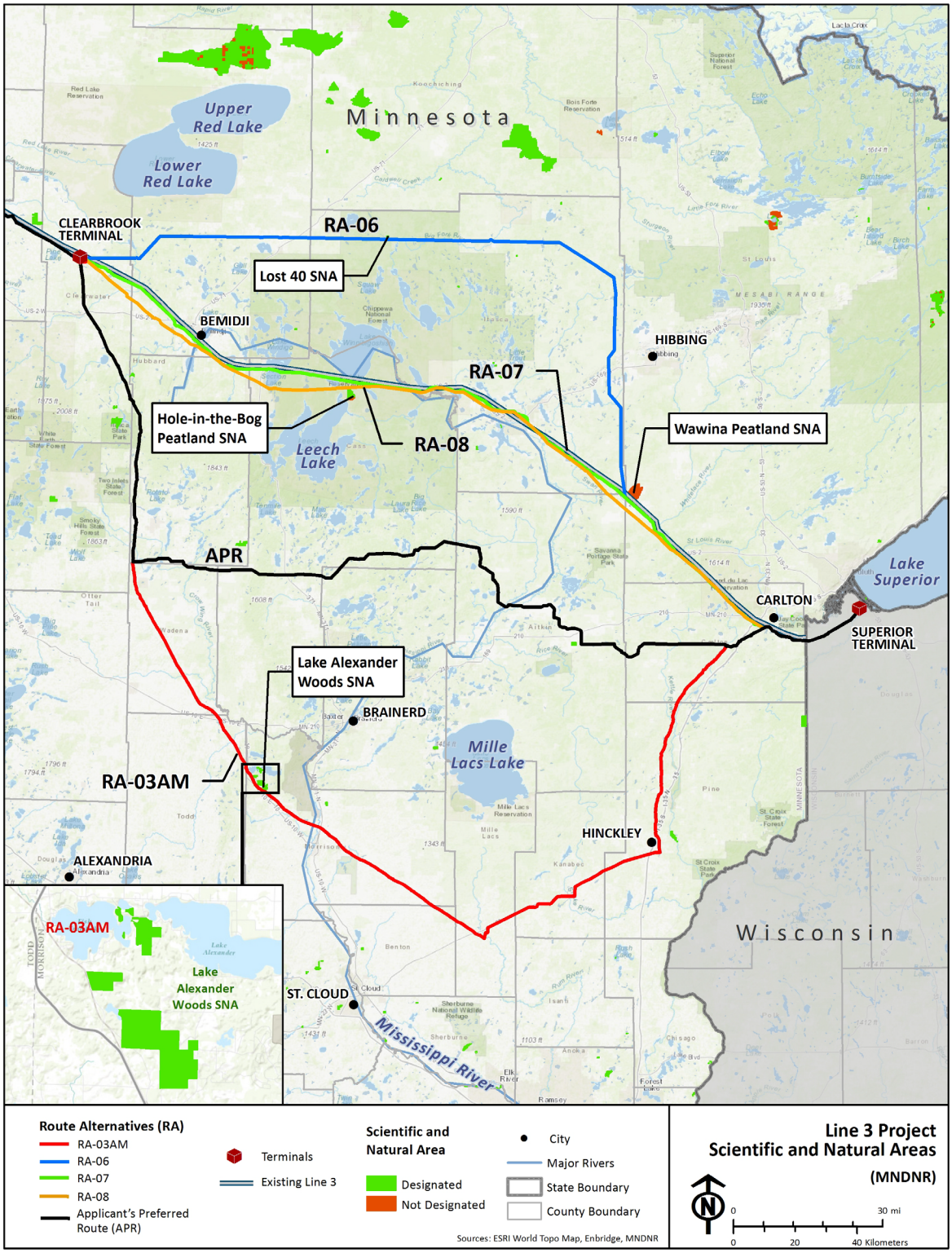

Source: Minnesota DNR 2016i.

Figure 6.3.5-3. Scientific and Natural Areas Crossed by the Route Alternatives

State-Listed Species

Endangered and Threatened Species

State-listed endangered and threatened animals and plants likely to occur within the ROI for RA-06 are presented in Table 6.3.5-10. Presence or probable absence of state-listed species was determined based on Minnesota NHIS element occurrence records.

Table 6.3.5-10. Known Occurrences of State-Protected Animals and Plants within the Region of Interest for Route Alternative RA-06

Species	Preferred Habitat	Status[a]
Fish		
Pugnose shiner (*Notropis anogenus*)	Found in glacial lakes and streams with an abundance of submerged vegetation. Prefers low-velocity waters with a substrate of sand, mud, or gravel. Shallow waters in warm months and deeper waters in cold months.	T
Vascular Plants		
Beaked spikerush (*Eleocharis rostellata*)	Coastal salt marshes, and inland in saline, alkaline, or strongly calcareous habitats (e.g., around hot springs). Fruits during summer to fall in the north.	T
Blunt-lobed grapefern (*Botrychium oneidense*)	Second-growth forests in shallow depressions and ephemeral pools. A new leaf emerges in the summer (i.e., late June).	T
Goblin fern (*Botrychium mormo*)	Rich leaf mold on shaded forest floors in mature maple-basswood and maple-basswood-beech forests. Plants emerge from the ground in June, and sporangia open in late September.	T
Hair-like beak rush (*Rhynchospora capillacea*)	Calcareous fens, especially along the margins, and spring fens. Germinates in the spring, and flowers mid-summer.	T
Sterile sedge (*Carex sterilis*)	Mineral-rich calcareous fens of the prairie region. Mature perigynia are present from early June to late July.	T

Sources: Minnesota DNR 2016a, 2017a.

[a] E = Endangered, T = Threatened

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Database search = within 0.5 mile of route centerline.

Special Concern Species

Occurrences of Minnesota special concern animals and plants, including federally listed species, within the ROI for RA-06 are listed in Tables 6.3.5-11 and 6.3.5-12.

Table 6.3.5-11. Known Occurrences of Special Concern Animals within the Region of Interest for Route Alternative RA-06

Common Name	Scientific Name
Mammals	
Big brown bat	*Eptesicus fuscus*
Little brown bat	*Myotis lucifugus*
Northern long-eared bat	*Myotis septentrionalis*
Birds	
Nelson's sparrow	*Ammodramus nelsoni*
Northern goshawk	*Accipiter gentilis*
Short-eared owl	*Asio flammeus*
Trumpeter swan	*Cygnus buccinator*
Amphibians	
Four-toed salamander	*Hemidactylium scutatum*
Fish	
Least darter	*Etheostoma microperca*
Mollusks	
Black sandshell	*Ligumia recta*
Creek heelsplitter	*Lasmigona compressa*

Source: Minnesota DNR 2016a.

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Database search = within 0.5 mile of route centerline.

Table 6.3.5-12. Known Occurrences of Special Concern Plants within the Region of Interest for Route Alternative RA-06

Common Name	Scientific Name
Forests	
Least moonwort	*Botrychium simplex*
Peatlands	
Bog rush	*Juncus stygius* var. *americanus*
English sundew	*Drosera anglica*
Few-flowered spikerush	*Eleocharis quinqueflora*
Small green wood orchid	*Platanthera clavellata*
Twig rush	*Cladium mariscoides*
White adder's mouth	*Malaxis monophyllos* var. *brachypoda*
Prairies	
Blunt sedge	*Carex obtusata*
Northern single-spike sedge	*Carex scirpoidea*
Small white lady's-slipper	*Cypripedium candidum*
Wetlands/Water	
Discoid beggarticks	*Bidens discoidea*
False mountain willow	*Salix pseudomonticola*
McCalla's willow	*Salix maccalliana*

Sources: Minnesota DNR 2016a; 2017a.

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Database search = within 0.5 mile of route centerline.

Minnesota Species of Greatest Conservation Need

The WAN shows viable or persistent populations and richness hotspots for the regions in Minnesota (Minnesota DNR 2016f). As shown in Figure 6.3.5-1, RA-06 would cross habitats within the WAN that could be used by multiple SGCNs.

Minnesota Biological Survey Sites of Biodiversity Significance

As shown in Figure 6.3.5-2, RA-06 would cross areas with MBS Sites. Areas scoring outstanding, high, and moderate that are crossed by this route alternative have an increased potential of containing habitats used by rare animals and plants that potentially would be affected, as discussed below in the impact assessment.

Minnesota Scientific and Natural Areas

As depicted in Figure 6.3.5-3, RA-06 would come within 0.5 mile of the Lost 40 and Wawina Peatland SNAs (Minnesota DNR 2016i). The Lost 40 SNA has virgin old-growth white pine-red pine forest that is considered to be the most significant stand outside of the Boundary Waters and Itasca State Park

(Minnesota DNR 2016f). The Wawina Peatland SNA is a large-patterned peatland complex with ovoid island patterns, a featureless water track, raised bog, and crested raised bog (Minnesota DNR 2016g).

Route Alternative RA-07

Federally Listed Species

The Canada lynx, gray wolf, northern long-eared bat, rufa red knot, and rusty patched bumble bee have the potential to occur within the ROI for RA-07 (Table 6.3.5-13).

Table 6.3.5-13. Potential Occurrences of Federally Protected Species within the Region of Interest for Route Alternative RA-07

Species	Preferred Habitat	Status[a]
Mammals		
Canada lynx *(Lynx canadensis)*	Boreal regions dominated by coniferous or mixed forests. Dens in mature or old-growth forests with high density of logs. Breeds late winter to early spring.	T
Gray wolf (*Canis lupus*) Great Lakes Distinct Population Segment	Suitable habitats in the ROI include hardwood forest, mixed forest, and grasslands. Digs dens in suitable soils or uses dens initiated by other animals. Breeds February to late June.	T
Northern long-eared bat (*Myotis septentrionalis*)	Suitable habitat occurs in the ROI. In summer, bats roost underneath bark, in cavities, or in crevices of both live trees and snags. Mates in fall and gives birth in summer (May to July). Caves and mines are winter hibernacula (October to April).	T
Birds		
Rufa red knot (*Calidris canutus rufa*)	Shorelines, tidal zones, sandy beaches. Nests in Arctic tundra, usually near water. Breeds late May to early June.	T
Insects		
Rusty patched bumble bee (*Bombus affinis*)	Grasslands and tallgrass prairies with areas that provide flowers, nesting sites such as abandoned rodent cavities or grass clumps, and overwintering sites in undisturbed soil for hibernating queens. Eggs are laid in spring.	E

Source: USFWS 2016.

[a] E = Endangered, T = Threatened

Note:

IPaC search = within 1 mile of route centerline.

ROI = region of interest

State-Listed Species

Endangered and Threatened Species

No state-protected animals are reported to occur along the RA-07 route. State-listed endangered and threatened plants likely to occur along RA-07 are presented in Table 6.3.5-14. Presence or absence of state-listed species was determined based on Minnesota NHIS element occurrence records.

Table 6.3.5-14. Known Occurrences of State-Protected Plants within the Region of Interest for Route Alternative RA-07

Species	Preferred Habitat	Status[a]
Beaked spikerush (*Eleocharis rostellata*)	Coastal salt marshes, and inland in saline, alkaline, or strongly calcareous habitats (e.g., around hot springs). Fruits during summer to fall in the north.	T
Goblin fern (*Botrychium mormo*)	Rich leaf mold on shaded forest floors in mature maple-basswood and maple-basswood-beech forests. Plants emerge from the ground in June, and sporangia open in late September.	T
Hair-like beak rush (*Rhynchospora capillacea*)	Calcareous fens, especially along the margins, and spring fens. Germinates in the spring, and flowers mid-summer.	T
Hidden-fruited bladderwort (*Utricularia geminiscapa*)	Wetlands, including bogs, fens, lakes, ponds, and river or lake shores. Blooms July through August.	T
Narrow triangle moonwort (*Botrychium lanceolatum* ssp. *angustisegmentum*)	In woods and on hummocks in swamps, and in cool to warm, mostly rich, subacid soils. May be found in open fields at the northern end of its range. Site elevations range from near sea level to 3,600 feet. Leaves emerge in spring and spores mature through summer.	T
Ram's head orchid (*Cypripedium arietinum*)	Cool, dense white cedar, balsam, and spruce swamps; nearly pure sand over limestone beach cobble or bedrock, mulched with conifer needles; and in mesic soil of sandy loam or clay under the partial shade of conifer or mixed forest. Prefers cool, sub-acid or neutral soil, loam, or sand in upland sites and nutrient-poor peat in lowland sites. Flowers from late May through mid-June.	T
Sterile sedge (*Carex sterilis*)	Mineral-rich calcareous fens of the prairie region. Mature perigynia are present from early June to late July.	T

Sources: Minnesota DNR 2016a, 2017a.

[a] E = Endangered, T = Threatened

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Database search = within 0.5 mile of route centerline; no occurrence of state-protected animals.

Special Concern Species

Occurrences of Minnesota special concern animals and plants, including federally listed species, within the ROI for RA-07 are listed in Tables 6.3.5-15 and 6.3.5-16.

Table 6.3.5-15. Known Occurrences of Special Concern Species within the Region of Interest for Route Alternative RA-07

Common Name	Scientific Name
Mammals	
Big brown bat	*Eptesicus fuscus*
Little brown bat	*Myotis lucifugus*
Northern long-eared bat	*Myotis septentrionalis*
Birds	
Nelson's sparrow	*Ammodramus nelsoni*
Trumpeter swan	*Cygnus buccinator*
Yellow rail	*Coturnicops noveboracensis*
Mollusks	
Black sandshell	*Ligumia recta*
Creek heelsplitter	*Lasmigona compressa*

Source: Minnesota DNR 2016a.

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Database search = within 0.5 mile of route centerline.

Table 6.3.5-16. Known Occurrences of Special Concern Plants within the Region of Interest for Route Alternative RA-07

Common Name	Scientific Name
Forests	
Barren strawberry	*Waldsteinia fragarioides* var. *fragarioides*
Least moonwort	*Botrychium simplex*
Mingan moonwort	*Botrychium minganense*
Pale moonwort	*Botrychium pallidum*
St. Lawrence grapefern	*Botrychium rugulosum*
Peatlands	
English sundew	*Drosera anglica*
Few-flowered spikerush	*Eleocharis quinqueflora*
Lapland buttercup	*Ranunculus lapponicus*
Twig rush	*Cladium mariscoides*
Prairies	
Blunt sedge	*Carex obtusata*
Northern single-spike sedge	*Carex scirpoidea*
Small white lady's-slipper	*Cypripedium candidum*
Wetlands/Water	
False mountain willow	*Salix pseudomonticola*
McCalla's willow	*Salix maccalliana*

Sources: Minnesota DNR 2016a, 2017a.

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Database search = within 0.5 mile of route centerline.

Species of Greatest Conservation Need

The WAN shows viable or persistent populations and richness hotspots for the regions in Minnesota (Minnesota DNR 2016f). As shown in Figure 6.3.5-1, RA-07 would cross habitats within the WAN that could be used by multiple SGCNs.

Minnesota Biological Survey Sites of Biodiversity Significance

As shown in Figure 6.3.5-2, RA-07 would cross areas with MBS Sites. Areas scoring outstanding, high, and moderate that are crossed have an increased potential of containing habitats used by rare animals and plants that potentially would be affected, as discussed below in the impact assessment.

Minnesota Scientific and Natural Areas

As depicted in Figure 6.3.5-3, RA-07 would come within 0.5 mile of the Wawina Peatland SNA, which is a large-patterned peatland complex with ovoid island patterns, a featureless water track, raised bog, and crested raised bog (Minnesota DNR 2016g).

Route Alternative RA-08

Federally Listed Species

The Canada lynx, gray wolf, northern long-eared bat, rufa red knot, and rusty patched bumble bee have the potential to occur within or near RA-08 (Table 6.3.5-17).

Table 6.3.5-17. Potential Occurrences of Federally Protected Species within the Region of Interest for Route Alternative RA-08

Species	Preferred Habitat	Status[a]
Mammals		
Canada lynx *(Lynx canadensis)*	Boreal regions dominated by coniferous or mixed forests. Dens in mature or old-growth forests with high density of logs. Breeds late winter to early spring.	T
Gray wolf (*Canis lupus*) Great Lakes Distinct Population Segment	Suitable habitats in the ROI include hardwood forest, mixed forest, and grasslands. Digs dens in suitable soils or uses dens initiated by other animals. Breeds February to late June.	T
Northern long-eared bat (*Myotis septentrionalis*)	Suitable habitat occurs in the ROI. In summer, bats roost underneath bark, in cavities, or in crevices of both live trees and snags. Mates in fall and gives birth in summer (May to July). Caves and mines are winter hibernacula (October to April).	T
Birds		
Rufa red knot (*Calidris canutus rufa*)	Shorelines, tidal zones, sandy beaches. Nests in Arctic tundra, usually near water. Breeds late May to early June.	T
Insects		
Rusty patched bumble bee (*Bombus affinis*)	Grasslands and tallgrass prairies with areas that provide flowers, nesting sites such as abandoned rodent cavities or grass clumps, and overwintering sites in undisturbed soil for hibernating queens. Eggs are laid in spring.	E

Source: USFWS 2016.

[a] E = Endangered, T = Threatened

Note:

IPaC search = within 1 mile of route centerline.

ROI = region of interest

State-Listed Species

Endangered and Threatened Species

No state-protected animals are likely to occur along the RA-08 route. State-listed endangered and threatened plants likely to occur within the ROI for RA-08, including those that are also federally listed, are presented in Table 6.3.5-18. Presence or probable absence of state-listed species was determined based on Minnesota NHIS element occurrence records.

Table 6.3.5-18. Known Occurrences of State-Protected Plants within the Region of Interest for Route Alternative RA-08

Species	Preferred Habitat	Status[a]
Beaked spikerush (*Eleocharis rostellata*)	Coastal salt marshes, and inland in saline, alkaline, or strongly calcareous habitats (e.g., around hot springs). Fruits during summer to fall in the north.	T
Bog adder's mouth (*Malaxis paludosa*)	Open, acidic, sphagnum bogs; very wet forests; and occasionally along stream edges on peaty mud and among grasses. In the southern part of its range, it often occurs in deep shade, possibly because it requires cool temperatures. Flowers and fruits from mid-July to late August.	E
Clinton's bulrush (*Trichophorum clintonii*)	Rocky river ledges, argillaceous soils, clearings of fir forests, and prairie and open woods. Reproductive structures are present from early May through the end of June in southern Minnesota, and late May through June in northern Minnesota.	T
Goblin fern (*Botrychium mormo*)	Rich leaf mold on shaded forest floors in mature maple-basswood and maple-basswood-beech forests. Plants emerge from the ground in June, and sporangia open in late September.	T
Hair-like beak rush (*Rhynchospora capillacea*)	Calcareous fens, especially along the margins, and spring fens. Germinates in the spring, and flowers mid-summer.	T
Hidden-fruited bladderwort (*Utricularia geminiscapa*)	Wetlands, including bogs, fens, lakes, ponds, and river or lake shores. Blooms July through August.	T
Narrow triangle moonwort (*Botrychium lanceolatum* ssp. *angustisegmentum*)	In woods and on hummocks in swamps, and in cool to warm, mostly rich, subacid soils. May be found in open fields at the northern end of its range. Site elevations range from near sea level to 3,600 feet. Leaves emerge in spring and spores mature through summer.	T
Oakes' pondweed (*Potamogeton oakesianus*)	Wetlands, including lakes, ponds, rivers, and streams. Blooms summer through fall (i.e., June to October).	E
One-flowered broomrape (*Orobanche uniflora*)	Woodland and bluff prairies with a variety of soil and light conditions. Blooms from late spring to early summer.	T
Sterile sedge (*Carex sterilis*)	Mineral-rich calcareous fens of the prairie region. Mature perigynia are present from early June to late July.	T

Source: Minnesota DNR 2016a.

[a] E = Endangered, T = Threatened

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Database search = within 0.5 mile of route centerline; no occurrences of state-protected animals.

Special Concern Species

Occurrences of Minnesota special concern animals and plants, including federally listed species, within the ROI for RA-08 are listed in Tables 6.3.5-19 and 6.3.5-20.

Table 6.3.5-19. Known Occurrences of Special Concern Animals within the Region of Interest for Route Alternative RA-08

Common Name	Scientific Name
Mammals	
Big brown bat	*Eptesicus fuscus*
Little brown bat	*Myotis lucifugus*
Northern long-eared bat	*Myotis septentrionalis*
Birds	
Nelson's sparrow	*Ammodramus nelsoni*
Northern goshawk	*Accipiter gentilis*
Red-shouldered hawk	*Buteo lineatus*
Short-eared owl	*Asio flammeus*
Trumpeter swan	*Cygnus buccinator*
Insects and Spiders	
A Caddisfly	*Anabolia ozburni*
Mollusks	
Black sandshell	*Ligumia recta*
Creek heelsplitter	*Lasmigona compressa*

Source: Minnesota DNR 2016a.

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Database search = within 0.5 mile of route centerline.

Table 6.3.5-20. Known Occurrences of Special Concern Plants within the Region of Interest for Route Alternative RA-08

Common Name	Scientific Name
Forests	
Least moonwort	*Botrychium simplex*
Mingan moonwort	*Botrychium minganense*
Pale moonwort	*Botrychium pallidum*
St. Lawrence grapefern	*Botrychium rugulosum*
Peatlands	
English sundew	*Drosera anglica*
Few-flowered spikerush	*Eleocharis quinqueflora*
Twig rush	*Cladium mariscoides*
White adder's mouth	*Malaxis monophyllos* var. *brachypoda*
Prairies	
Blunt sedge	*Carex obtusata*
Northern single-spike sedge	*Carex scirpoidea*
Small white lady's-slipper	*Cypripedium candidum*
Wetlands/Water	
False mountain willow	*Salix pseudomonticola*
McCalla's willow	*Salix maccalliana*
Slender naiad	*Najas gracillima*

Sources: Minnesota DNR 2016a; 2017a.

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Database search = within 0.5 mile of route centerline.

Species of Greatest Conservation Need

The WAN shows viable or persistent populations and richness hotspots for the regions in Minnesota (Minnesota DNR 2016f). As shown in Figure 6.3.5-1, RA-08 would cross habitats within the WAN that could be used by multiple SGCNs.

Minnesota Biological Survey Sites of Biodiversity Significance

As shown in Figure 6.3.5-2, RA-08 would cross areas with MBS Sites. Areas rated outstanding, high, and moderate that are crossed by the alternative have an increased potential of containing habitats used by rare animals and plants that potentially would be affected, as discussed below in the impact assessment.

Minnesota Scientific and Natural Areas

RA-08 would come within 0.5 mile of the Hole-in-the-Bog Peatland SNA (Figure 6.3.5-3), which is a minimally disturbed, well-defined, crested raised bog and peatland lake (Minnesota DNR 2016d). As the

only protected peatland of this type, it is Minnesota's best example of a basin-filled raised bog and is one of few outside a major glacial lake plain (Minnesota DNR 2016d).

6.3.5.3 Impact Assessment

Potential impacts on unique natural resources from construction of the Applicant's preferred route and route alternatives include the following:

- Injury or loss of aquatic invertebrates, fish, and reptiles from waterbody crossing construction;
- Injury or loss of terrestrial invertebrates, small mammals, reptiles, bird eggs and young, and plants from vegetation clearing, trench excavation, and vehicle operations;
- Loss or alteration of forage and cover habitats from vegetation clearing, site grading, and trenching;
- Disturbance from construction noise and activity; and
- Exposure to small leaks and drips from construction equipment and vehicles.

Operations impacts on unique natural resources could include:

- Continued habitat loss or alteration from pipeline right-of-way vegetation management,
- Continued habitat loss or alteration from excavation for pipeline inspection and repair, and
- Continued disturbance from noise and activity at facilities.

The potential for effects on unique natural resources depends on whether the protected unique natural resources occur near the facilities, infrastructure, activities, and habitat changes associated with construction and operation of the route alternatives, and whether these conditions may result in injury, harm, or disturbance. Impact assessments specific to route alternatives in Minnesota are presented below.

6.3.5.3.1 Applicant's Preferred Route (in Minnesota)

Federally Listed Species

The Canada lynx, gray wolf, northern long-eared bat, Dakota skipper, Poweshiek skipperling, rusty patched bumble bee, and western prairie fringed orchid have the potential to occur within the ROI for the Applicant's preferred route (Table 6.3.5-1). Of these species, the Canada lynx, gray wolf, northern long-eared bat, and rusty patched bumble bee potentially occur between Clearbrook and Carlton (Table 6.3.5-1).

<u>Construction Impacts</u>

If present, individual Canada lynx could be disturbed by construction noise and activity that likely would cause lynx to move to other areas, possibly returning after construction activities stop. Disturbance effects likely would be minor and temporary unless den sites are disturbed. Most den sites, which are used from April to June, would not be present within the cleared work area because den sites usually are located around downed logs and windfall trees in the forest interior. Most tree clearing for pipeline construction, ATWS, access roads, and facility sites would occur next to previously cleared utility corridors that are not likely to support den sites. Most (approximately 75 percent) of the Clearbrook-to-Carlton segment would

be adjacent to pipeline, transmission line, or road corridors that previously have been disturbed by construction. The habitat fragmentation analysis in Section 6.3.4 identifies 17 forested large-block habitats between MPs 215.0 and 352.0 that could support Canada lynx and den sites.

Foraging and reproductive activities for gray wolves could be affected by exposure to Project-related noise and increased human activity. Construction of a pipeline likely would displace a few gray wolves and alter used habitats, especially if packs currently use existing rights-of-way as a travel corridor. If dens are present in the vicinity, construction-related disturbance could reduce pup survival. In addition, wolf-vehicle collisions continue to be a major contributor to wolf mortality. Typical conservation measures to reduce impacts on the gray wolf include:

- Stop construction activities if the contractor or Environmental Inspector observes a gray wolf or possible den site within the construction corridor, or if USFWS notifies the Applicant of a gray wolf sighting within 1 mile of the construction work area; the stop work order for that area of construction should continue until the wolves leave the area.
- Report any wolf sightings immediately to USFWS, USACE, and state resource agencies (e.g., Minnesota DNR).

Current use of the Applicant's preferred route by northern long-eared bats was confirmed by surveys performed by Merjent from 2014 to 2016 (2014b, 2014c, 2015b, 2015c, and 2016b). The Applicant conducted acoustic, mist-net, and telemetry surveys within forested areas that contain suitable habitat for northern long-eared bats during 2014 and 2015 to determine the summer presence or probable absence of northern long-eared bats, and if found, identify locations of maternity and/or roost trees used by northern long-eared bats. Northern long-eared bats were confirmed acoustically at survey sites in Aitkin, Carlton, Cass, Crow Wing, Hubbard, and Wadena counties in Minnesota, and in Douglas County in Wisconsin (Merjent 2014b, 2015b). In 2014 and 2015, mist-net surveys were completed at 85 sites along the Applicant's preferred route. In 2014, northern long-eared bats were captured at 54 sites in Aitkin, Carlton, Cass, Crow Wing, and Hubbard counties in Minnesota, and Douglas County in Wisconsin. Similarly, in 2015 northern long-eared bats were captured at nine sites in Aitkin, Carlton, Cass, and Wadena counties in Minnesota. A total of 23 roosts, including 9 maternity roost trees and 14 triangulated roosts on inaccessible land, were identified (5 trees in Carlton County, 10 in Cass County, 7 in Aitkin County, and 1 in Wadena County) (Merjent 2014c, 2015c). In 2016, acoustic surveys were conducted at six sites along the Applicant's preferred route in Aitkin, Clearwater, Polk, and Red Lake counties, Minnesota. No confirmed acoustic northern long-eared bats calls were recorded at the six survey sites (Merjent 2016b).

If northern long-eared bats occur in the construction area, individuals or colonies of bats could be affected if clearing or construction occurs when bats are using summer roosts. Northern long-eared bats could be disturbed by noise or human presence, causing them to abandon occupied tree roosts. Bats could be injured or killed if occupied trees are cut down or disturbed. Because female northern long-eared bats return to the same trees yearly to birth and raise their young, impacts could be substantial if roost trees are destroyed or abandoned. Because the population of northern long-eared bats is declining from white-nose syndrome and destruction of habitat among other factors, the protection of these bats—and particularly of groups of female and juvenile bats in maternity colonies—is of critical importance.

Conservation measures were included in the ESA 4(d) rule[16] to reduce potential impacts on northern long-eared bats. Under the Final 4(d) rule, incidental take involving tree removal in the mapped white nose syndrome zone is not prohibited if the following two conservation measures are followed:

- Maintain a year-round 0.25-mile radius buffer (which is equivalent to 125.7 acres) around known northern long-eared bat hibernacula.
- Protect known, occupied maternity roost trees. Incidental take is prohibited if the activity cuts or destroys a known, occupied maternity roost tree, or any other trees within a 150-foot radius around a known maternity roost tree, equivalent to 1.6 acres, during the pup season from June 1 to July 31.

If present, the Dakota skipper, Poweshiek skipperling, and rusty patched bumble bee could be affected by construction activities that disturb native vegetation. These activities would disrupt egg laying and foraging during spring and summer, and could crush dormant larvae or hibernating queens during fall and winter. These prairie-dependent insects depend on high-quality native grasslands and tallgrass prairies to provide food from flower pollen and nectar. Vegetation clearing and replacement with non-native ground covers could injure or kill these butterflies and bees, and could remove forage plants.

The Applicant completed a desktop and field assessment of potentially suitable native prairie habitat for the Dakota skipper and Poweshiek skipperling along the Applicant's preferred route. Potentially suitable Dakota skipper and Poweshiek skipperling habitat was documented at one location along the survey corridor in Polk County, and potentially suitable habitat for Poweshiek skipperling was documented at two locations in Pennington County. Suitable habitats were found in small, isolated pockets that ranged in size from 0.4 to 1.8 acres. Presence/absence surveys were conducted in 2015 at a subset of USFWS selected locations identified in the 2013/2014 habitat assessment. Sites were selected based on habitat quality and size (Merjent 2015d). Surveys did not identify the presence of Dakota skippers or Poweshiek skipperling at the three suitable habitat locations in Pennington and Polk counties in Minnesota (Merjent 2015d). Presence/absence surveys have not been performed based on the revised 2016 habitat assessment (Merjent 2016c). While it is possible that these species could occur, based on the results of the habitat survey and earlier presence/absence survey, it is unlikely that the Dakota skipper or Poweshiek skipperling would be affected by construction activities.

The Applicant's preferred route would not cross any current high use areas for rusty patched bumble bees, and construction is not likely to directly or indirectly affect any individuals or current high use areas. The Applicant's preferred route crosses through current potential low use areas where rusty patched bumble bees may disperse from current high use areas or where their occurrence is uncertain. Construction could render some potentially used habitat as unusable, such that the rusty patched bumble bee could experience short-term, minor impacts. The rusty patched bumble bee may benefit from opportunities to conserve the species within the dispersal area, and USFWS may recommend surveys. Applicable conservation measures that would benefit the rusty patched bumble bee within this dispersal area include restoration and maintenance of high-quality habitat through control of invasive species and restoration that includes a high diversity and abundance of wildflowers appropriate for the region and local characteristics (USFWS 2017).

[16] Regulations identified by USFWS that are deemed "necessary and advisable" for protection and conservation of a federally threatened species.

Western prairie fringed orchids have the potential to occur within 1 mile of the Applicant's preferred route; however, there are no known occurrences of this plant within the construction work area for the Applicant's preferred route in Minnesota. If these plants were to occur, direct impacts could include trampling and destruction during construction from grubbing, grading, and trenching. Indirect effects from construction could include conversion of already fragmented prairie habitat into other habitat types and the spread of noxious weeds and invasive plants. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction.

Impacts on prairie soils from construction would be long term and could require a substantial amount of recovery time, which could affect any western prairie fringed orchids present. The Applicant completed habitat analyses and field surveys of potentially suitable western prairie fringed orchid habitat from 2013 to 2016, and no orchids were located during these surveys (Merjent 2015e, 2016a). Potentially suitable habitat was identified at one location, but no western prairie fringed orchids were found. Therefore, it is unlikely that western prairie fringed orchids would be affected by construction of the Applicant's preferred route.

Summary

Measures to avoid or reduce construction impacts on federally listed animals and plants would be developed in consultation with USFWS to ensure that any unavoidable impacts would not jeopardize the continued existence of species protected by the ESA. The Canada lynx and gray wolf would experience temporary minor effects associated with construction activities. While habitat fragmentation represents a permanent impact on all species, the impact would be minor due to the limited extent of the fragmentation. Northern long-eared bats and occupied maternity roots are known to occur along the Applicant's preferred route. With implementation of conservation measures associated with the ESA 4(d) rule, they would experience temporary minor effects from construction. Effects on the Dakota skipper and Poweshiek skipperling are not expected. Effects on potential rusty patched bumble bee habitat could be short term and minor. With implementation of BMPs and general conservation measures, impacts from construction would be temporary and minor. Impacts specific to Minnesota key habitats with the potential to affect federally listed species are described below for WAN and MBS Sites. Effects on the federally listed western prairie fringed orchid would be negligible based on the lack of presence and the scarcity of suitable habitat.

Operations Impacts

Operations and maintenance activities would result in periodic noise and human/equipment activity associated with inspection overflights, ground surveillance, and maintenance and repairs. Impacts on individual Canada lynx and gray wolves would be limited to temporary disturbance or displacement. Lynx and wolves would be expected to resume use of the area following the disturbance. Disturbance could also be caused by public and private use of ATVs and snow machines along the permanent right-of-way. Operation of vehicles along the right-of-way could result in collisions with individual lynx or wolves. Minimization measures to reduce the potential for collisions could include operating equipment at speeds suitable for the driving conditions or posted speed limits. Use of the right-of-way for recreational purposes could potentially be reduced by limiting access through use of gates and posting of no trespassing signs, where appropriate. The probability of collisions with work vehicles during operations would be low. Therefore, no adverse impacts are expected as a result of collisions. Impacts to Canada lynx and gray wolf would be limited to periodic disturbance. Therefore, only temporary minor impacts on individuals of these species would be expected over the life of the project.

Operations impacts on the northern long-eared bat could include continued habitat loss or alteration (i.e., if trees are allowed to grow larger than 3 inch in diameter at breast height between tree maintenance events) and disturbance from noise and activity at aboveground facilities and from right-of-way inspection overflights or ground surveillance. Human activities during operation typically would occur during daylight hours; therefore, operations activities would not interrupt foraging activities, and impacts would be permanent and negligible. Operation of pipeline pump stations could increase nearby noise levels over existing ambient levels; however, as described in Section 6.2.2, noise would be compliant with Minnesota Noise Standards and would decrease over distance. Pump station footprints would be devoid of trees. Although bats could forage in the vicinity, they would not roost at the pump station. Unless a roost site is near a pump station, the effects from operation of pump stations would be permanent and negligible.

As described for construction, surveys did not document any individuals of the Dakota skipper or Poweshiek skipperling, and these species are unlikely to occur along the Applicant's preferred route. Therefore, there would be no adverse impacts on either of these species.

The Applicant's preferred route would not cross any current high use areas for rusty patched bumble bees. Therefore, no adverse impacts on any individual bees or current high use areas are expected. The Applicant's preferred route crosses current potential low use areas where rusty patched bumble bees may disperse from current high use areas or where their occurrence is uncertain. If bees are determined to occur in these areas, measures to avoid or minimize impacts could include:

- Limiting vegetation management in high-quality habitat during the active season (March through September);
- Leaving one or more areas unmowed for the entire year in vegetation management areas;
- Using a minimum of 8 to 10 inches cutting height to prevent disturbance of overwintering queens or nesting sites; and
- Careful and targeted pesticide use to control pests and invasive species:
  - Use least toxic options, follow label directions to ensure proper use,
  - Apply as locally and directly as possible, avoid broadcast application that may be harmful to the rusty patched bumble bee or their nectar plants in areas where the species is likely to be found, and
  - Ensure that field crews recognize target weeds to avoid adverse effects on important native plants (USFWS 2017).

Fassett's locoweed and western prairie fringed orchid are not likely to occur in the right-of-way. Surveys were not conducted for Fassett's locoweed and no individuals of western prairie frindged orchid were not documented during field surveys. Therefore, impacts on individuals from operations are not anticipated. In the unlikely event that individuals of either species persist within the permanent right-of-way, they could be permanently affected by vegetation management activities. Given the lack of appropriate habitat and known presence, impacts would be expected to be negligible.

Summary

Operations and maintenance impacts on Canada lynx and gray wolves would be limited to periodic disturbances over the life of the project. These impacts would be temporary and minor. No adverse

impacts are expected as a result of vehicle collisions. Impacts on northern long-eared bats would be permanent and negligible. Given the limited distribution and habitat types that could be used by Kirtland's warblers and piping plovers operations and maintenance impacts would be permanent and negligible. Migrant whooping cranes would not be affected by pipeline operation. No adverse impacts are anticipated on the Dakota skipper or Poweshiek skipperling, because no individuals were documented during surveys. Similarly, no adverse impacts are expected to occur to the rusty patched bumble bee, because no high use areas occur within the Applicant's preferred route. Operations would be unlikely to affect federally listed plants because of the scarcity of appropriate habitat and species presence.

State-Listed Species

Endangered and Threatened Species

Two Minnesota-listed aquatic animals, the pugnose shiner (*Notropis anogenus*) and fluted-shell mussel (*Lasmigona costata*), and 14 Minnesota-listed plants could occur within the construction work area for the Applicant's preferred route and could be affected during construction and operation (Tables 6.3.5-23 and 6.3.5-24). The pugnose shiner and eight Minnesota-listed plants occur between Clearbrook and Carlton. Potential impacts and conservation measures applicable for Minnesota-protected species are summarized below for construction and operation.

Construction Impacts

The pugnose shiner and fluted shell mussel have been documented in the ROI for the Applicant's preferred route. The Applicant surveyed for mussels at sixteen sites along the Applicant's preferred route, and no state-protected mussels were found (Merjent 2015b).

If present at the time of construction, the pugnose shiner and fluted-shell mussel could be affected by instream construction or construction activities that take place in the adjacent uplands. Both species are vulnerable to any deterioration in water quality, especially increased siltation. Disturbance to the stream bottom could crush or suffocate the fluted-shell mussel and would temporarily increase turbidity that could reduce feeding efficiency and damage these sensitive aquatic animals. HDD is proposed for both of the stream crossings where these two species have been documented, so any impacts due to instream construction would be avoided. Increased turbidity and siltation could still occur due to surface runoff from construction work areas. Stringent erosion and sediment control practices will minimize these potential effects. Contaminated construction equipment and water used for hydrostatic testing could introduce invasive aquatic animals such as zebra and quagga mussels that could displace and reduce habitat quality for aquatic animals. To minimize the potential for introduction of invasive species, the Applicant would implement an invasive species minimization plan. In addition, environmental inspectors would monitor construction activities to ensure compliance with permit conditions and the invasive species plan, reducing the potential for introduction of invasive species during construction.

Based on the surface water crossing method that would be used and the BMPs that would be implemented for water withdrawals and discharge, construction impacts on the pugnose shiner and fluted-shell mussel would be temporary to short term and negligible.

Minnesota-listed plants were documented at 19 survey sites along the Applicant's preferred route. The Applicant would avoid all state-listed plants at 12 of these sites (Table 6.3.5-21). Avoidance strategies include, but are not limited to, workspace area reductions or modifications, exclusion fencing, and minor route centerline adjustments.

The Applicant would not avoid populations of six Minnesota-listed plants at seven survey sites and would consult with Minnesota DNR to complete the Endangered Species permit process for takings (Table 6.3.5-22). Takings include picking, digging, or destroying. If there are no feasible alternatives to takings, the Applicant would propose compensatory mitigation to reduce the impact to an acceptable level. The magnitude of the compensation required would be related to the degree of impact on each plant species (e.g., loss of the whole population at a site versus the loss of just a few individuals), and the statewide significance of the population at the site that would be affected. Types of acceptable compensatory mitigation for taking endangered or threatened plants in Minnesota could include:

- Funding state acquisition and protection of another site where the species occurs that is currently unprotected and vulnerable to destruction,
- Funding additional survey work to locate other sites, and
- Funding research to improve Minnesota DNR's understanding of the habitat requirements or protection needs of the species.

Summary

Measures to avoid or reduce construction impacts on Minnesota-protected animals and plants would be developed in consultation with Minnesota DNR to ensure that any unavoidable impacts would not jeopardize the continued existence of state protected species. No unavoidable impact on Minnesota-listed animals are expected. Minnesota-listed plants are known to occur within the construction work area. Therefore, effects on Minnesota-protected plants are expected to be permanent and major. All species could be indirectly affected by habitat loss and alteration.

Operations Impacts

Operation and maintenance activities include mowing, equipment maintenance, and invasive species control. Vegetation maintenance that removes riparian trees and large shrubs could increase stream temperatures by removing shade, which would reduce habitat suitability for aquatic animals. State-protected plants that persist within the permanent right-of-way after construction could be permanently affected by vegetation maintenance activities; however, given the few occurrences and potential for avoidance within this area, overall impacts would be permanent but minor.

Table 6.3.5-21. Minnesota Endangered and Threatened Plant Populations Avoided by the Applicant's Preferred Route

Survey Site	County	Common and Scientific Name	Status[a]	How Avoided
North Dakota Border to Clearbrook				
L3R_03	Kittson	Red saltwort (*Salicornia rubra*)	Threatened	Enbridge modified workspace to avoid all 91 individuals of red saltwort. [a]
L3R_04	Kittson/Marshall	Red saltwort (*Salicornia rubra*)	Threatened	All 14,949 individuals of red saltwort are outside of workspace. [a]
L3R_08	Pennington	Sterile sedge (*Carex sterilis*)	Threatened	All individuals of sterile sedge are outside of workspace.
L3R_11	Red Lake	Clinton's bulrush (*Trichophorum clintonii*)	Threatened	All individuals of Clinton's bulrush are outside of workspace.
L3R_12	Polk	Whorled nutrush (*Scleria verticillata*)	Threatened	All 787 individuals of whorled nutrush are outside of workspace. [b]
L3R_14a	Clearwater	Handsome sedge (*Carex formosa*)	Endangered	Enbridge modified workspace to avoid 11 individuals of handsome sedge. Enbridge would use exclusion fencing to avoid one individual of handsome sedge within workspace. [b]
Clearbrook to Carlton				
L3X_22/23/58	Cass	Butternut (*Juglans cinerea*)	Endangered	Enbridge developed and adopted a route deviation to avoid all 24 individual butternut trees. [c]
		Narrow triangle moonwort (*Botrychium lanceolatum* ssp. *angustisegmentum*)	Threatened	There are 19 individuals of narrow triangle moonwort outside of the workspace. [d, e] Other individuals of this species will be affected.
L3X_25	Cass	Purple-flowered bladderwort (*Utricularia purpurea*)	Endangered	All individuals of purple flowered bladderwort are outside of workspace.
L3X_105	Cass	A bristle-berry (*Rubus fuller*)	Threatened	All individuals of a bristle-berry[f] are outside of workspace.
L3X_81a	Aitkin	Narrow triangle moonwort *(Botrychium lanceolatum* ssp. *angustisegmentum)*	Threatened	All individuals of narrow triangle moonwort are outside of workspace.

Table 6.3.5-21. Minnesota Endangered and Threatened Plant Populations Avoided by the Applicant's Preferred Route

Survey Site	County	Common and Scientific Name	Status[a]	How Avoided
		Bog bluegrass (*Poa paludigena*)	Threatened	Large numbers of bog bluegrass are outside of workspace. Other individuals of this species would be affected.
L3X_29	Carlton	A liverwort (*Trichocolea tomentella*)	Threatened	All individuals of *T. tomentella* are outside of workspace.
L3X_64	Carlton	Narrow triangle moonwort (*Botrychium lanceolatum* ssp. *angustisegmentum*)	Threatened	All individuals of narrow triangle moonwort are outside of workspace. [g]

Source: Minnesota DNR 2017c.

[a] Number of individuals avoided is based on 2015 population count data. At survey site L3R_03, no individuals were observed during 2016 population counts.

[b] Number of individuals avoided is based on 2016 population count data.

[c] The avoidance of all butternut trees at survey site L3X_22/23/58 is based on 2013 survey data. Enbridge would install exclusion fencing at a 25-foot radius around one individual to avoid impacts on the root zone. This tree, approximately 25 feet tall with a 7-inch diameter at breast height, is within 7 feet of construction workspace and within 12 feet of additional temporary workspace. The tree size was measured on August 23, 2016. On the same site visit, there was no evidence of butternut canker (a lethal fungal disease) for this tree.

[d] Number of individuals avoided is based on a combination of 2015 and 2016 population count data.

[e] Enbridge would fence individuals that are outside of the workspace but within 5 feet of the workspace edge to facilitate avoidance during construction.

[f] This species was tentatively identified on June 20, 2016. Upon revisit on August 23, 2016, to confirm the species identification based on characteristics of mature primocanes, the individuals were no longer present due to logging of the area.

[g] No individuals were observed within workspace or within 5 feet of the edge of workspace during 2016 population counts.

Note:

No endangered or threatened plant populations were identified in the Carlton-to-Wisconsin border segment for the Applicant's preferred route.

Table 6.3.5-22. Minnesota Endangered and Threatened Plant Populations Potentially Affected by Construction and Operation of the Applicant's Preferred Route

Survey Site	County	Common and Scientific Name	Statusa	Number of Avoided Individuals	Number of Affected Individuals
North Dakota Border to Clearbrook					
L3R_07	Marshall	Sterile sedge (*Carex sterilis*)	Threatened	268 [b]	47 [c]
L3R_12	Polk	Sterile sedge (*Carex sterilis*)	Threatened	657 [d]	292
		Beaked spikerush (*Eleocharis rostellata*)	Threatened	14,665 [d]	5,036
		Hair-like beak rush (*Rhynchospora capillacea*)	Threatened	18	106
L3R_14	Clearwater	Handsome sedge (*Carex formosa*)	Endangered	62 [c, d]	3 [c]
Clearbrook to Carlton					
L3X_99	Cass	Bog bluegrass (*Poa paludigena*)	Threatened	10 (3,500) [c, e]	4 [c]
L3X _22/23/58	Cass	Narrow triangle moonwort (*Botrychium lanceolatum* ssp. *angustisegmentum*)	Threatened	19 [b]	1 + 40 [f, g]
L3X _C1	Cass	Narrow triangle moonwort (*Botrychium lanceolatum* ssp. *angustisegmentum*)	Threatened	--	20 [f]
L3X _81a	Aitkin	Bog bluegrass (*Poa paludigena*)	Threatened	45 (7,000) [e]	242 [c]
		Bog bluegrass (*Poa paludigena*)	Threatened	257 (8,000) [e]	961 [c]
		Bog bluegrass (*Poa paludigena*)	Threatened	1,173 (5,000) [e]	744 [c]

Sources: Minnesota DNR 2017c.

[a] Status refers to Minnesota listing (E = endangered, T = threatened).

[b] Number of individuals is based on a combination of 2015 and 2016 population counts.

[c] Number of individuals is based on 2016 population count data.

[d] Enbridge would fence individuals that are outside of the workspace but within 5 feet of the workspace edge to facilitate avoidance during construction.

[e] First number is based on number of individuals avoided within site boundary used for 2016 population count. Second number (in parentheses) is based on estimated size of population beyond site boundary during 2016 occurrence surveys.

[f] Number of individuals is based on 2015 population count data.

[g] Enbridge would avoid all individual butternut trees at this site with the understanding that some individuals of narrow triangle moonwort (which have a shorter time to maturity and are less imperiled) would be affected as a result.

Note:

No Minnesota endangered or threatened plant populations were identified in the Carlton-to-Wisconsin border segment for the Applicant's preferred route.

"--" = no occurrence

Table 6.3.5-23. Known Occurrences of Minnesota-Protected Animals within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for the Applicant's Preferred Route

Common Name	Scientific Name	State Status[a]	Federal Status[b]	North Dakota Border to Clearbrook			Clearbrook to Carlton			Carlton to Wisconsin Border			Total		
				Con[c]	Op[c]	Within 0.5 Mile	Con[c]	Op[c]	Within 0.5 Mile	Con[c]	Op[c]	Within 0.5 Mile	Con[c]	Op[c]	Within 0.5 Mile
Fish															
Pugnose shiner	*Notropis anogenus*	THR	NA	--	--	--	1	1	1	--	--	--	1	1	1
Mollusks															
Fluted-shell mussel	*Lasmigona costata*	THR	NA	1	1	1	--	--	--	--	--	--	1	1	1

Source: Minnesota DNR 2016a.

[a] THR = Threatened

[b] NA = not applicable

[c] Results for Applicant's preferred route within Minnesota based on Enbridge-provided footprints. Con = sum of pipeline construction work area, additional temporary workspaces, and temporary access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, pump stations, and valves.

"--" = no occurrence

Table 6.3.5-24. Known Occurrences of Minnesota-Protected Plants within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for the Applicant's Preferred Route

Common Name	Scientific Name	State Status[a]	Federal Status[b]	North Dakota Border to Clearbrook		Clearbrook to Carlton		Carlton to Wisconsin Border		Total	
				Con	Op	Con	Op	Con	Op	Con	Op
Vascular Plants											
Beaked spikerush	*Eleocharis rostellata*	THR	NA	1	1	--	--	--	--	1	1
Bog bluegrass	*Poa paludigena*	THR	NA	--	--	--	--	1	1	--	--
Butternut	*Juglans cinerea*	END	NA	--	--	1	1	--	--	1	1
Hair-like beak rush	*Rhynchospora capillacea*	THR	NA	1	1	--	--	--	--	1	1
Narrow triangle moonwort	*Botrychium lanceolatum* ssp. *angustisegmentum*	THR	NA	--	--	3	2	--	--	3	2
Red saltwort	*Salicornia rubra*	THR	NA	1	--	--	--	--	--	1	--
Sterile sedge	*Carex sterilis*	THR	NA	2	2	--	--	--	--	2	2

Sources: Minnesota DNR 2016a; Merjent 2016a.

[a] END = Endangered, THR = Threatened

[b] NA = not applicable

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Results for Applicant's preferred route within Minnesota based on Enbridge-provided footprints. Con = sum of pipeline construction work area, additional temporary workspaces, and temporary access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, pump stations, and valves

"--" = no occurrence

Special Concern Species

Minnesota-listed special concern species that could be affected by construction and operation of the Applicant's preferred route include mollusks, mammals, birds, fish, and plants (Tables 6.3.5-25 and 6.3.5-26).

Construction Impacts

The greatest impacts on special concern species based on known occurrence would be to mammals, birds, amphibians, and fish that occur within the Clearbrook-to-Carlton segment, while plants would experience the greatest impact in the segment from the North Dakota border to Clearbrook (Tables 6.3.5-25 and 6.3.5-26).

Given the Applicant's surveys for bats, there are several known occurrences of bats along the Applicant's preferred route. Impacts on individuals or colonies of bats may occur if clearing or construction occurs when bats are using summer roosts. Bats could be disturbed by noise or human presence, causing them to abandon occupied roosts. Bats could also be injured or killed if occupied trees are cut down. Impacts could be substantial if trees with maternity colonies are destroyed or abandoned. Implementation of the conservation measures associated with the ESA 4(d) rule that protect the northern long-eared bat would protect these bats as well.

Potential impacts on the prairie vole include disturbance due to construction noise and activity and fatalities due to heavy equipment use and earth movement within the construction work area. Prairie voles are mainly restricted to relatively undisturbed dry grasslands and would not be present throughout the entire route. Effects on mammal populations likely would be temporary and minor with implementation of BMPs.

Of the six species of birds with the potential to occur, construction impacts likely would be the greatest for the prairie-chicken (*Tympanuchus cupido*), which is a ground-nesting grassland bird that is an uncommon year-round resident of Minnesota. If construction activities occur in grassland habitat during spring and summer when the birds are breeding and fledging, activities could disrupt breeding and destroy eggs, while construction post-hatch could kill or disrupt young within nests. The remainder of the special concern birds could also be disturbed by construction activities during the breeding season. Potential impacts include nest abandonment due to disturbance, and nest/egg destruction or bird fatalities due to tree removal or earth movement. Outside of the breeding season, special concern birds could be disturbed by noise or human presence. While construction activities would be temporary, impacts associated with reduced fecundity could be longer lasting for populations. Avoiding tree removal and impacts on grasslands during the breeding season will help to minimize impacts. Four-toed salamanders occur in isolated colonies in mature upland forests interspersed with sphagnum seepages, vernal ponds, or other fish-free habitats. Upland forests provide cover, foraging, and overwintering habitat, while egg deposition and larval development occur in wetlands. Potential impacts would be limited to areas with suitable habitat, and include fatalities due to construction activities and habitat destruction, degradation, and fragmentation due to tree clearing and earth movement. Measures to minimize disturbance include minimizing wetland impacts, herbicide application, and surface runoff.

Table 6.3.5-25. Known Occurrences of Special Concern Animals within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for the Applicant's Preferred Route

Common Name	Scientific Name	Federal Statusa	North Dakota Border to Clearbrook			Clearbrook to Carlton			Carlton to Wisconsin Border			Total		
			Con	Op	Within 0.5 Mile	Con	Op	Within 0.5 Mile	Con	Op	Within 0.5 Mile	Con	Op	Within 0.5 Mile
Mammals														
Big brown bat	*Eptesicus fuscus*	NA	--	--	--	4	3	7	--	--	--	4	3	7
Little brown bat	*Myotis lucifugus*	NA	--	--	--	8	6	11	--	--	--	8	6	11
Northern long-eared bat	*Myotis septentrionalis*	THR	--	--	--	16	15	26	1	1	2	16	15	27
Prairie vole	*Microtus ochrogaster*	NA	--	--	--	--	--	1	--	--	--	--	--	1
Birds														
Greater prairie-chicken	*Tympanuchus cupido*	NA	--	--	--	9	8	11	--	--	--	9	8	11
Nelson's sparrow	*Ammodramus nelsoni*	BCC	2	2	2	--	--	-	--	--	--	2	2	2
Northern goshawk	*Accipiter gentilis*	NA	--	--	--	--	--	1	--	--	--	--	--	1
Red-shouldered hawk	*Buteo lineatus*	NA	--	--	--	--	--	1	--	--	--	--	--	1
Short-eared owl	*Asio flammeus*	BCC	1	1	1	--	--	--	--	--	--	1	1	1
Trumpeter swan	*Cygnus buccinators*	NA	--	--	--	--	--	2	--	--	--	-	-	2
Reptiles and Amphibians														
Four-toed salamander	*Hemidactylium scutatum*	NA	--	--	--	--	--	1	--	--	--	--	--	1

Table 6.3.5-25. Known Occurrences of Special Concern Animals within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for the Applicant's Preferred Route

Common Name	Scientific Name	Federal Statusa	North Dakota Border to Clearbrook			Clearbrook to Carlton			Carlton to Wisconsin Border			Total		
			Con	Op	Within 0.5 Mile	Con	Op	Within 0.5 Mile	Con	Op	Within 0.5 Mile	Con	Op	Within 0.5 Mile
Fish														
Least darter	*Etheostoma microperca*	NA	--	--	--	1	1	2	--	--	--	--	--	2
Insects														
A caddisfly	*Anabolia ozburni*	NA	--	--	--	1	--	1	--	--	--	--	--	1
Mollusks														
Black sandshell	*Ligumia recta*	NA	1	1	1	1	1	1	--	--	--	2	2	2
Creek heelsplitter	*Lasmigona compressa*	NA	2	2	2	1	1	2	--	--	--	3	3	4

Source: Minnesota DNR 2016a.

[a] NA = not applicable

Note:

Results for Applicant's preferred route within Minnesota based on Enbridge-provided footprints: Con = sum of pipeline construction work area, ATWS, and temporary access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, pump stations, and valves.

"--" = no occurrence

Table 6.3.5-26. Known Occurrences of Special Concern Plants within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for the Applicant's Preferred Route

Common Name	Scientific Name	North Dakota Border to Clearbrook		Clearbrook to Carlton		Carlton to Wisconsin Border		Total	
		Con	Op	Con	Op	Con	Op	Con	Op
Blunt sedge	*Carex obtusata*	1	1	--	--	--	--	1	1
False mountain willow	*Salix pseudomonticola*	2	1	--	--	--	--	2	1
Few-flowered spikerush	*Eleocharis quinqueflora*	2	2	--	--	--	--	2	2
McCalla's willow	*Salix maccalliana*	1	--	--	--	--	--	1	--
Least moonwort	*Botrychium simplex*	--	--	3	1	--	--	3	1
Northern single-spike sedge	*Carex scirpoidea*	2	2	--	--	--	--	2	2
Slender naiad	*Najas gracillima*	--	--	1	1	--	--	1	1
Small white lady's-slipper	*Cypripedium candidum*	1	1	--	--	--	--	1	1
Torrey's mannagrass	*Torreyochloa pallida*	--	--	2	2	--	--	2	2

Source: Minnesota DNR 2016a.

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Results for Applicant's preferred route within Minnesota based on Enbridge-provided footprints: Con = sum of pipeline construction work area, additional temporary workspaces, and temporary access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, pump stations, and valves.

"--" = no occurrence

General construction impacts and measures to avoid or reduce impacts on rare and protected species would be the same as those described for vegetation and fish and wildlife in Sections 5.2.3 and 5.3.3, respectively. Construction impacts on fish, aquatic insects, and mussels would be short term and negligible to minor during construction of the stream crossings.

Impacts on special concern plants would be the same as described above for federally and state-protected species; the impacts would be long term and minor.

Operations Impacts

Pipeline operation would include vegetation management and pipeline inspections that could include excavation and repair or replacement of sections of the pipeline. Vegetation management would be conducted to prevent trees and large shrubs from growing over the pipeline. Mammals, birds, and amphibians that depend on closed canopies may avoid the permanent right-of-way, which may act as a barrier to travel for some species, fragmenting SGCN habitat. General effects of fragmentation, including habitat loss and alteration, would be permanent and minor; these types of impacts are further described in Section 5.2.4. Impacts on greater prairie-chickens from habitat fragmentation would also be permanent, although clearing and maintenance of herbaceous cover may benefit this bird.

Species of Greatest Conservation Need

Approximately 30 percent of the segments from the North Dakota border to Clearbrook and from Clearbrook to Carlton contain areas within the WAN (Table 6.3.5-27). Most of the WAN habitats, 78 percent, that would be affected by construction and operation of the Applicant's preferred route are rated low-medium and medium, and no WAN habitats that would be affected by the route were rated high (Table 6.3.5-27). The lack of high-quality WAN habitats indicates that the habitat affected would not be likely to be a SCGN richness hotspot. Most of the 97 miles (about 77 percent) of the Applicant's preferred route that crosses through WAN habitats in Minnesota would occur within existing utility or transportation corridors; although 23 miles (23 percent) would cross a new right-of-way, potentially contributing to fragmentation of these WAN habitats. Most of the new corridor that crosses WAN habitats is between Clearbrook and Carlton. Overall impacts on WAN habitats, and the SGCN that they support, from construction and operation would be permanent and minor and caused by habitat loss and alteration, which is described in more detail in Section 5.2.4.

Table 6.3.5-27. Estimated Impacts on Wildlife Action Network Habitat from Construction and Operation of the Applicant's Preferred Route in Minnesota (acres)

Wildlife Action Network Rating	North Dakota Border to Clearbrook		Clearbrook to Carlton		Carlton to Wisconsin Border		Total	
	Con	Op	Con	Op	Con	Op	Con	Op
Low	121.4	42.8	141.7	61.3	9.8	3.5	272.9	107.6
Low-medium	302.6	116.9	424.6	182.4	--	--	727.2	299.4
Medium	47.3	20.4	440.5	205.0	--	--	487.8	225.4
Medium-high	38.8	17.6	34.1	18.7	--	--	72.9	36.3
High	--	--	--	--	--	--	--	--
WAN TOTAL	**510.2**	**197.8**	**1,040.9**	**467.4**	**9.8**	**3.5**	**1,560.9**	**665.1**
Segment total	***1,587.3***	***661.4***	***3,207.0***	***1,337.4***	***139.8***	***58.3***	***4,934.1***	***2,057.1***
Proportion in WAN	***32.1%***	***29.9%***	***32.5%***	***35.0%***	***7.0%***	***6.0%***	***31.6%***	***32.3%***

Source: Minnesota DNR 2016b.

Notes:

Enbridge-provided footprints: Con = sum of pipeline construction work area, ATWS, pipe yards, and temporary access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, pump stations, and valves.

WAN = Wildlife Action Network

"--"= no occurrence

Minnesota Biological Survey Sites of Biodiversity Significance

The proportion of the Applicant's preferred route that occurs in an MBS Site within the ROI, the construction work area, and the permanent right-of-way are similar; therefore, the overall route would not disproportionately affect MBS Sites. Most of this area is rated as moderate. Construction would affect an estimated 877 acres of MBS Sites, and operations would affect an estimated 403 acres of these designated lands (Table 6.3.5-28). Potential impacts and conservation measures applicable for MBS Sites are described in Section 5.2.5.3 and summarized below for construction and operations.

Construction Impacts

Construction of the Applicant's preferred route would affect an estimated 877 acres of MBS Sites (Table 6.3.5-28). Outstanding MBS Sites (7 acres) within the construction work areas are primarily within the segment from the North Dakota border to Clearbrook in Pennington County. Within the construction work areas that overlap this MBS Site, MBS has documented a northern mixed cattail marsh, a rare type of wetland that is considered imperiled in Minnesota. However, this is in an existing utility corridor that has already been affected by previous construction activities.

All impacts on MBS Sites ranked high (78 acres) within the construction work areas would occur within the Clearbrook-to-Carlton segment of the Applicant's preferred route. This section crosses two MBS Sites ranked high: the LaSalle Creek MBS Site in Hubbard County and the Automba 1 MBS Site in Carlton County. Although an existing utility corridor crosses the LaSalle Creek MBS Site, the centerline of the Applicant's preferred route does not follow the existing corridor. Instead, the centerline creates a new crossing of LaSalle Creek, which would result in new impacts on high-quality rare native plant

communities, including habitat destruction and fragmentation. The Automba 1 MBS Site also contains an existing utility corridor, and the centerline of the Applicant's preferred route mostly follows this corridor. However, the construction work area would widen the existing corridor and result in habitat destruction.

Construction activities would result in destruction of native plant communities (and rare plants) within the construction work area and in the footprints of aboveground facilities. In turn, this would decrease the habitat available for rare animals that depend on the MBS Site. Depending on whether the corridor goes through the edge or the interior of the MBS Site and whether there is an existing utility corridor, construction activities would decrease the size of the MBS Site, fragment the MBS Site, or widen an existing corridor. Utility corridors can be effective barriers to animal movements, especially small mammals, amphibians, and reptiles. The wider the corridor, the more animals likely to be affected. Construction activities also may temporarily affect the hydrology of wetlands within the construction work area. Approximately 61 miles of the Applicant's preferred route would be constructed within new rights-of-way, creating a new corridor. Of this new corridor, 17 miles (28 percent) would cross moderate, high, and outstanding ranked MBS Sites, potentially fragmenting habitats within 14 MBS Sites—most of which (16 miles) is between Clearbrook and Carlton.

Construction activities also would affect the portions of MBS Sites that are adjacent to the construction work area. Potential impacts caused by surface runoff from the construction work area include increased sedimentation and the introduction or spread of invasive species. Sedimentation can affect surrounding uplands or wetlands, as well as waterways in the vicinity of the construction.

The Applicant has committed to preparation of the following plans, procedures, and general vegetation protection measures during construction:

- Co-locate the construction within and near existing utility corridors to minimize environmental impacts;
- Co-locate the Project with existing rights-of-way where feasible;
- Minimize and confine all construction equipment and vehicles to the approved designated construction work area and ATWS;
- Develop and adhere to Project-specific construction methods and procedures for vegetation clearing methods, including treatment of existing vegetation, topsoil segregation, storage, and reapplication;
- Restore preconstruction contours and use slope breakers, sediment barriers, mulch, geotextile fabric, and other erosion control devices to stabilize the disturbed areas during the vegetative regrowth phase and reduce runoff into the adjacent environment;
- Design and plan Project pipeline construction areas (parking, access, and temporary work areas) to reduce environmental impacts on sensitive plant communities;
- Inspect and clean all equipment prior to bringing it to the site to prevent the introduction and spread of invasive species; and
- Use weed-free mulch, topsoil, and seed mix.

Impacts on MBS Sites from construction activities would be short term (i.e., until vegetation cover is reestablished) and major given their occurrence along the Applicant's preferred route.

Table 6.3.5-28. Estimated Impacts on Minnesota Biological Survey Sites of Biodiversity Significance within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for the Applicant's Preferred Route in Minnesota (acres)

MBS Sites Rating	North Dakota Border to Clearbrook			Clearbrook to Carlton			Carlton to Wisconsin Border			Applicant's Preferred Route Total		
	Con	Op	Within 0.5 Mile	Con	Op	Within 0.5 Mile	Con	Op	Within 0.5 Mile	Con	Op	Within 0.5 Mile
Outstanding	5.8	3.0	664.1	1.6	1.6	381.2	0	0	0	7.4	4.6	1,045.4
High	0	0	461.1	77.6	39.7	5,731.2	0	0	0	77.6	39.7	6,192.3
Moderate	19.7	9.6	722.3	749.1	340.7	35,549.2	23.2	8.6	788.7	791.9	358.8	37,060.1
MBS SITES TOTAL	**25.4**	**12.6**	**1,847.5**	**828.3**	**381.9**	**46,244.9**	**23.2**	**8.6**	**788.7**	**876.9**	**403.2**	**44,297.8**
Segment total	***1,587.3***	***661.4***	***69,683.4***	***3,207.0***	***1,337.4***	***140,068.0***	***139.8***	***58.3***	***6,130.9***	***4,934.1***	***2,057.1***	***215,882.3***
Proportion in MBS Sites	***1.6%***	***1.9%***	***2.7%***	***25.8%***	***28.6%***	***33.0%***	***16.6%***	***14.8%***	***12.9%***	***17.8%***	***19.6%***	***20.5%***

Source: Minnesota DNR 2016h.

Notes:

Enbridge-provided footprints: Con = sum of pipeline construction work area, additional temporary workspaces, pipe yards, and temporary access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, pump stations, and valves.

MBS Sites = Minnesota Biological Survey Sites of Biodiversity Significance

Operations Impacts

Operations would continue to affect an estimated 403 acres of MBS Sites (Table 6.3.5-11). Vegetation maintenance to remove trees and large shrubs within the pipeline permanent right-of-way would reduce the habitat availability for rare animals. The utility corridor would be a permanent habitat loss and would continue to be a barrier or impediment to travel for some animals.

Conversely, the pipeline corridor can provide easy access to more remote MBS Sites and may result in increased human use of the corridor and the MBS Sites. This can negatively affect the ecological integrity of these MBS Sites by causing habitat degradation (e.g., operation of off-road vehicles in native plant communities) or by increasing the spread of invasive species.

Long-term vegetation management during operation would result in a major permanent change to MBS Sites.

Minnesota Scientific and Natural Areas

No impact on SNAs would occur from construction or operations of the Applicant's preferred route.

6.3.5.3.2 Route Alternatives (from Clearbrook to Carlton)

The only segment in Minnesota where the route alternatives would vary from the alignment of the Applicant's preferred route is between Clearbrook and Carlton. The impacts relevant to unique natural resources for the route alternatives between Clearbrook and Carlton are described below.

Route Alternative RA-03AM

Federally Listed Species

The Canada lynx, gray wolf, northern long-eared bat, and rusty patched bumble bee have the potential to occur within or near RA-03AM (Table 6.3.5-5). The types of impacts on all of these species from construction and operation of RA-03AM would be the same as those described above for the Applicant's preferred route. An evaluation of potential effects for each species is provided below.

Construction Impacts

Individual Canada lynx and gray wolves would experience temporary minor effects from disturbance by construction noise and activity associated with construction of RA-03AM. Most of the route (95 percent) would be co-located with existing pipeline, electrical transmission line, or road corridors that previously have been disturbed by construction. No large-block forested habitats occur within the non-co-located sections, and none would be fragmented by construction of the RA-03AM route. Typical conservation measures to reduce construction disturbance to gray wolves include stopping construction if a gray wolf or possible den site is observed until the wolf leaves the area, and reporting any wolf sighting to USFWS, USACE, and Minnesota DNR.

Current use of portions of RA-03AM by northern long-eared bats was confirmed by surveys performed by Merjent from 2014 to 2016 (Merjent 2015b, 2015c, 2016b). Northern long-eared bats were confirmed at acoustic survey sites in Carlton and Hubbard counties, where the RA-03AM route would be the same as the Applicant's preferred route (Merjent 2014b, 2015b). In 2014 and 2015, mist-net surveys were completed at 85 sites along the Applicant's preferred route. Northern long-eared bats were captured during mist-net surveys conducted in 2014 and 2015 at survey sites in Carlton County (Merjent 2014c, 2015c). If northern long-eared bats occur in the construction area, temporary minor impacts

could occur if individuals or colonies of bats are disturbed by noise or human presence, causing them to abandon occupied tree cavities. If bats are injured or killed, or if occupied trees or maternity roosts are destroyed or abandoned, the impacts would be short term and major. Conservation measures associated with the ESA 4(d) rule to reduce potential impacts on northern long-eared bats include protecting known, occupied maternity roost trees and other trees within a 150-foot radius around maternity roost trees during the pup season from June 1 to July 31.

The rusty patched bumble bee could experience temporary minor effects associated with vegetation clearing and the use of construction equipment and vehicles. Vegetation clearing and replacement with non-native ground covers could injure or kill these butterflies and bees, and could remove forage plants. The RA-03AM route would not cross any current high use areas for rusty patched bumble bees, and construction is not likely to directly or indirectly affect any individuals or current high use areas. The RA-03AM route would cross current potential low use areas where rusty patched bumble bees may disperse from adjacent high use areas or where their occurrence is uncertain. Construction could render some potentially used habitat in the dispersal area as unusable, and the rusty patched bumble bee could experience short-term minor impacts. The rusty patched bumble bee may benefit from measures designed to conserve the species within the dispersal area and USFWS may recommend surveys. Although habitat surveys have not been completed for RA-03AM, no native prairie habitats appear to occur within the area that would be crossed by RA-03AM based on Minnesota DNR mapped native plant communities (Minnesota DNR 2017b). Conservation measures that would benefit the rusty patched bumble bee within these potential dispersal areas during construction include restoration and maintenance of high-quality habitat through control of invasive species, and restoration that includes a high diversity and abundance of wildflowers appropriate for the region and local characteristics (USFWS 2017).

Summary. Measures to avoid or reduce construction impacts on federally listed animals and plants would be developed in consultation with USFWS to ensure that any unavoidable impacts would not jeopardize the continued existence of species protected by the ESA. The Canada lynx and gray wolf would experience temporary minor effects associated with noise and human activities during construction. While habitat fragmentation represents a permanent impact on all species, the impact would be minor based on the limited extent of the fragmentation. Northern long-eared bats are known to occur along RA-03AM; with implementation of conservation measures associated with the ESA 4(d) rule, they would experience temporary minor effects from construction. Effects on potential habitat for rusty patched bumble bees could be short term and minor. Impacts specific to Minnesota key habitats with the potential to affect federally listed species are described below under WAN and MBS Sites.

Operations Impacts

Operations and maintenance activities would result in periodic noise and human/equipment activity associated with inspection overflights, ground surveillance, and maintenance and repairs. Noise and increased human activity could interrupt foraging and reproductive activities for individual gray wolves and Canada lynx. However, the impacts would be limited to temporary disturbance or displacement. Lynx and wolves would be expected to resume use of the area following the disturbance. Disturbance could also be caused by public and private use of ATVs and snow machines along the permanent right-of-way. Operation of vehicles along the right-of-way could result in collisions with individual lynx or wolves. Minimization measures to reduce the potential for collisions could include operating equipment at speeds suitable for the driving conditions or posted speed limits. Use of the right-of-way for recreational purposes could potentially be reduced by limiting access through use of gates and posting of no trespassing signs, where appropriate. The probability of collisions with work vehicles during operations would be low. Therefore, no adverse impacts are expected as a result of collisions. Impacts to Canada lynx and gray wolf would be

limited to periodic disturbance. Therefore, only temporary minor impacts on individuals of these species would be expected over the life of the project.

Operations impacts on the northern long-eared bat could include continued habitat loss or alteration (i.e., if trees are allowed to grow larger than 3 inch in diameter at breast height between tree maintenance events) and disturbance from noise and activity at aboveground facilities and from right-of-way inspection overflights or ground surveillance. Human activities during operations typically would occur during daylight hours; therefore, operations activities would not interrupt foraging activities, and impacts would be permanent and negligible.

The RA-03AM route would not cross any current high use areas for rusty patched bumble bees. Therefore, no adverse impacts on any individual bees or current high use areas are expected. The RA 03AM route would cross current potential low use areas where rusty patched bumble bees may disperse from adjacent high use areas or where their occurrence is uncertain. Although habitat surveys have not been completed for RA-03AM, no native prairie habitats appear to occur within the area that would be crossed by RA-03AM based on Minnesota DNR mapped native plant communities (Minnesota DNR 2017b). If bees are determined to occur in these areas, measures to avoid or minimize impacts could be implemented as described for the Applicant's preferred route.

Summary. Measures to avoid or reduce construction impacts on federally listed animals and plants would be developed in consultation with USFWS to ensure that any unavoidable impacts would not jeopardize the continued existence of species protected by the ESA. Operations and maintenance impacts on Canada lynx and gray wolves would be limited to periodic disturbances over the life of the project. These impacts would be temporary and minor. No adverse impacts are expected as a result of vehicle collisions. Impacts on northern long-eared bats would be permanent and negligible. No adverse impacts are expected to occur to the rusty patched bumble bee, because no high use areas occur within RA-03AM.

State-Listed Species

Endangered and Threatened Species

Minnesota-protected animals occurring within the ROI for RA-03AM include two reptiles, four mollusks, and eight plants (Tables 6.3.6-6 and 6.3.5-29).

Table 6.3.5-29. Known Occurrences of Minnesota-Protected Species within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for Route Alternative RA-03AM

Common Name	Scientific Name	State Status[a]	Federal Status[b]	Con[c]	Op[d]	Within 0.5 Mile
Animals						
Amphibians and Reptiles						
Blanding's turtle	*Emydoidea blandingii*	THR	NA	5	5	8
Wood turtle	*Glyptemys insculpta*	THR	NA	--	--	1
Mollusks						
Elktoe	*Alasmidonta marginata*	THR	NA	--	--	2
Fluted-shell	*Lasmigona costata*	THR	NA	1	1	5
Mucket	*Actinonaias ligamentina*	THR	NA	1	1	5
Spike	*Elliptio dilatata*	THR	NA	--	--	1
Plants						
Beaked spikerush	*Eleocharis rostellata*	THR	NA	--	--	1
Bog bluegrass	*Poa paludigena*	THR	NA	1	1	1
Bristle-berry	*Rubus fulleri*	THR	NA	--	--	1
Hair-like beak rush	*Rhynchospora capillacea*	THR	NA	--	--	1
Kitten-tails	*Besseya bullii*	THR	NA	--	--	1
Narrow triangle moonwort	*Botrychium lanceolatum* ssp. *angustisegmentum*	THR	NA	--	--	1
Snailseed pondweed	*Potamogeton bicupulatus*	END	NA	--	--	1
Sterile sedge	*Carex sterilis*	THR	NA	--	--	1

Sources: Minnesota DNR 2016a; Merjent 2016a.

[a] THR = Threatened

[b] NA = not applicable

[c] Con = estimated construction impact area in acres based on 120-foot-wide construction work area.

[d] Op = estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

"--" = no occurrence

Construction Impacts. The Blanding's turtle (*Emydoidea blandingii*) and wood turtle (*Glyptemys insculpta*) inhabit aquatic habitats and adjacent uplands. If they are present, construction activities could result in direct mortality to turtles or nests, which could be crushed by machinery, buried under excavated soil, or trapped in trenches. Surface water disturbances during construction also would affect aquatic habitats potentially used by turtles. Applicable conservation measures that would avoid and minimize potential impacts on Blanding's turtles and wood turtles include:

- Turtles in imminent danger should be moved, by hand, out of harm's way;
- Silt fencing should be set up to keep turtles out of construction areas;

- If erosion control mesh will be used, limit the mesh to wildlife-friendly materials; Minimize access and maintenance roads to a minimum to reduce road kill (tunnels should be considered in areas with concentrations of turtle crossings);
- Roads should be ditched, not curbed or below grade;
- Culverts between wetland areas, or between wetland areas and nesting areas, should be 36 inches or greater in diameter, and elliptical or flat-bottomed;
- Roads crossing streams should be bridged, or use oversized culverts (at least twice as wide as the normal width of open water) and flat-bottomed or elliptical;
- Check trenches prior to backfilling to avoid burying trapped turtles, and return the site to the original grade; and
- Revegetate with native grasses and forbs (Minnesota DNR 2008).

Impacts on turtles during construction likely would be short-term and minor. Measures to avoid or reduce construction impacts on Minnesota-listed animals and plants would be developed in consultation with Minnesota DNR to ensure that any unavoidable impacts would not jeopardize the continued existence of state-protected species.

Mussel surveys were not completed for the route alternatives. Effects on mollusks from construction would depend on whether live mussels are present at the crossing locations and the method used to construct the crossing. Four state-listed threatened mussels have been documented within 0.5 mile of RA-03AM and may occur at stream crossings if suitable habitat is present. If stream crossings are constructed using the HDD method and standard BMPs are implemented for surface runoff and water withdrawals and discharges, construction impacts would be temporary and negligible for state-listed mollusks. If the wet or dry open-cut crossing methods are used, mussel beds could be destroyed; and temporary increases in turbidity could cause damage to gills, cover mussels with sediment, and decrease habitat suitability.

Botanical surveys were not conducted along RA-03AM, except for where it overlaps with the Applicant's preferred route. Minnesota-listed plants were documented during surveys at one site for RA-03AM where it overlaps with the Applicant's preferred route. Direct impacts on the occurrence of narrow triangle moonwort (*Botrychium lanceolatum* ssp. *angustisegmentum*) at the site in Carlton County would be avoided because the plants are outside of the construction work area (Table 5.2.5-16). The Minnesota DNR NHIS data also contain a known occurrence from 1991 of bog bluegrass potentially within the construction work area in a northern wet ash swamp in a moderate rated MBS Site in Morrison County. The current size and extent of this population are unknown. If construction proceeds in this area, botanical surveys likely would be needed to inform the takings permit process. If the bog bluegrass occurs within the construction work area, it could be destroyed during grubbing, grading, and trenching; and habitats could be degraded by the introduction or spread of noxious weeds and invasive plants. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction. Nevertheless, impacts on bog bluegrass could be permanent and major.

Other state-protected plants have been documented within the ROI and these species may occur within the construction work area if suitable habitat is present. Given that there are 368 acres of MBS Sites (a measure of rare species habitat) within the construction area of RA-03AM, it is likely that additional state-

protected plants would be discovered if surveys were conducted along this route. If state-protected plants are present, the plants have the potential to be directly affected by construction. Some construction impacts may be avoidable through survey and flagging and through refinement of the construction work areas. BMPs to minimize overall impacts on vegetation and prevent the spread of noxious weeds and invasive plants would be implemented as noted above. For state-protected plants within the construction work area, impacts could range from short term to permanent and minor to major.

Measures to avoid or reduce construction impacts on state-protected animals and plants would be developed in consultation with the appropriate state agencies, if required, to ensure that any unavoidable impacts would not jeopardize the continued existence of state-protected species.

Summary. Measures to avoid or reduce construction impacts on Minnesota-protected animals and plants would be developed in consultation with Minnesota DNR to ensure that any unavoidable impacts would not jeopardize the continued existence of state protected species. Impacts on turtles would be minor and short-term. Construction impacts on mussels would depend on the location and crossing method employed and would range from no impact to temporary and negligible impacts when HDD is used, to short term and minor if mussels occur at a location crossed using the open-cut method. No impact would occur on the narrow triangle moonwort in Carlton County, as it is outside of the construction work area. Impacts on bog bluegrass could be permanent and major. Impacts on any other state-protected plants that may occur in the construction work area could range from short term to permanent and minor to major depending on the implementation of BMPs to minimize overall impacts and to prevent the spread of noxious weeds and invasive plants.

Operations Impacts. Operations and maintenance activities that could result in impacts include mowing, equipment maintenance, inspection of the permanent right-of-way, integrity digs to repair or replace segments of pipe, and invasive species control.

Operation of RA-03AM has the potential to impact state-listed threatened turtles. Vegetation management that prevents trees and large shrubs from reestablishing in riparian habitats could increase stream temperatures by removing shade, which would reduce habitat suitability for aquatic animals. Vegetation management and integrity digs could crush turtle adults, nests, and eggs. Mowing can kill turtles and make it easier for predators to locate turtles.

Conservation measures related to vegetation management in infrequently mowed areas along access roads and the permanent pipeline right-of-way include:

- Use of mechanical methods (chemicals should not be used), and
- Limit maintenance periods to the fall through spring (i.e., after October 1 and before June 1) (Minnesota DNR 2008).

Potential impacts on the Blanding's turtle and the wood turtle during operations could be minor and permanent. If bog bluegrass continues to persist within the permanent right-of-way, these plants would be permanently affected by vegetation management. All state-listed species could be indirectly affected by habitat loss and alteration resulting from maintenance of the permanent right-of-way. Measures to avoid or reduce construction impacts on Minnesota-listed animals and plants would be developed in consultation with Minnesota DNR to ensure that any unavoidable impacts would not jeopardize the continued existence of state protected species. Overall impacts would be permanent and minor.

Special Concern Species

Minnesota special concern animals and plants within the ROI for RA-03AM are listed in Tables 6.3.5-7 and 6.3.5-8. NHIS occurrences for Minnesota-listed special concern species that could be affected by construction and operation of RA-03AM are listed in (Tables 6.3.5-30 and 6.3.5-31).

Table 6.3.5-30. Known Occurrences of Special Concern Animals within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for Route Alternative RA-03AM

Common Name	Scientific Name	Federal Status[a]	Con[b]	Op[c]	Within 0.5 Mile
Mammals					
Big brown bat	*Eptesicus fuscus*	NA	2	1	3
Little brown bat	*Myotis lucifugus*	NA	2	1	3
Northern long-eared bat	*Myotis septentrionalis*	THR	2	2	3
Birds					
Greater prairie-chicken	*Tympanuchus cupido*	NA	1	1	3
Northern goshawk	*Accipiter gentilis*	NA	--	--	1
Red-shouldered hawk	*Buteo lineatus*	NA	--	--	3
Trumpeter swan	*Cygnus buccinator*	NA	--	--	1
Fish					
Gilt darter	*Percina evides*	NA	--	--	2
Lake sturgeon	*Acipenser fulvescens*	NA	--	--	1
Least darter	*Etheostoma microperca*	NA	--	--	1
Southern brook lamprey	*Ichthyomyzon gagei*	NA	--	--	2
Insects					
A caddisfly	*Anabolia ozburni*	NA	--	--	1
Mollusks					
Black sandshell	*Ligumia recta*	NA	3	3	7
Creek heelsplitter	*Lasmigona compressa*	NA	6	6	13
Round pigtoe	*Pleurobema sintoxia*	NA	1	1	4

Source: Minnesota DNR 2016a.

[a] NA = not applicable, THR = Threatened

[b] Con = estimated construction impact area in acres based on 120-foot-wide construction work area.

[c] Op = estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

"--" = no occurrence

Table 6.3.5-31. Known Occurrences of Special Concern Plants within the Construction Work Area and Permanent Right-of-Way for Route Alternative RA-03AM

Common Name	Scientific Name	Federal Status[a]	Construction[b]	Operations[c]
Autumn fimbry	*Fimbristylis autumnalis*	NA	1	1
Least moonwort	*Botrychium simplex*	NA	1	--
Twig rush	*Cladium mariscoides*	NA	1	1

Source: Minnesota DNR 2016a.

[a] NA = not applicable

[b] Estimated construction impact area in acres based on 120-foot-wide construction work area.

[c] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Protected plant surveys have not been conducted for the route.

Construction Impacts. Construction impacts on bats, birds, fish, insects, and mollusks would generally be the same as described above for the Applicant's preferred route. There are three additional fish species and one additional mussel species that are known to occur in the ROI of RA-03AM, but impacts would be the same as discussed for the Applicant's preferred route. There are no known occurrences of the prairie vole or four-toed salamander in the ROI of RA-03AM, so impacts on these species would not be anticipated.

There are known occurrences of 13 Minnesota special concern plants within the ROI for RA-03AM and these species may occur within the construction work area if suitable habitat is present. Three of the species have been documented within the construction work area and could be destroyed by construction activities. These three plants occur in forests – least moonwort (*Botrychium simplex*), peatlands – twig rush (*Cladium mariscoides*), and wetlands – autumn fimbry (*Fimbristylis autumnalis*). Given the 368 acres of MBS Sites (habitat for rare species) within the construction work area of RA-03AM and that botanical surveys were not conducted along the entire route, it is likely that additional special concern plants would be documented within the construction work area if surveys were conducted. The list of special concern species known to occur in the ROI for RA-03AM is very similar to the list for the ROI of the Applicant's preferred route. Potential Impacts on special concern plants would be the same as described above for the Applicant's preferred route.

Operations Impacts. Pipeline operation would require ongoing vegetation management to prevent trees and large shrubs from growing over the pipeline. Mammals and birds that depend on closed canopies may avoid the permanent right-of-way, which may act as a barrier to travel for some species, and fragment the habitats of the area. In addition, vegetation management that prevents trees and large shrubs from reestablishing in riparian habitats could increase stream temperatures by removing shade, which would reduce habitat suitability for aquatic animals. Plants that persist within the permanent right-of-way after construction could be permanently affected by vegetation management activities. Overall, impacts on special concern species from operations activities would be permanent and minor.

Species of Greatest Conservation Need

Compared to the other route alternatives, the lowest proportion (12 percent) of WAN occurs in the construction work area and permanent right-of-way for RA-03AM (Table 6.3.5-32). The majority of WAN habitats that would be affected by construction and operations are rated low-medium and medium. The scarcity of high-quality WAN lands indicates that the habitat affected probably would not be SCGN richness hotspots. Although RA-03AM is the only alternative that could affect high-rated WAN habitats that may provide SCGN richness hotspots, the area affected would be less than 1 acre. All of the WAN habitats crossed by RA-03AM occur within existing pipeline corridors and therefore have experienced previous disturbances. Overall impacts on WAN land, and the SGCN that they support, from construction and operations would be permanent and minor based on habitat loss and alteration.

Table 6.3.5-32. Estimated Impacts on Wildlife Action Network Habitat within the Construction Work Area and Permanent Right-of-Way for Route Alternative RA-03AM (acres)

Wildlife Action Network Ratings	Construction[a]	Operations[b]
Low	1.1	0.4
Low-medium	257.4	107.1
Medium	194.0	80.7
Medium-high	29.3	12.2
High	0.7	0.3
WAN TOTAL	**482.6**	**200.7**
RA-03AM total	***4,000.4***	***1,666.9***
Proportion in WAN	***12.1%***	***12.0%***

Source: Minnesota DNR 2016b.

[a] Estimated construction impact area in acres based on 120-foot-wide construction work area.

[b] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

WAN = Wildlife Action Network

Minnesota Biological Survey Sites of Biodiversity Significance

The proportion of the RA-03AM route between Clearbrook and Carlton that passes through the MBS Sites within the ROI, the construction work area, and the permanent right-of-way are roughly similar (Table 6.3.5-33); therefore, the overall route would not disproportionately affect MBS Sites. The majority of the affected area is rated as moderate. Potential impacts and conservation measures applicable for MBS Sites are described in Section 5.2.5 and summarized below for construction and operation.

Table 6.3.5-33. Estimated Impacts on Minnesota Biological Survey Sites of Biodiversity Significance within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for Route Alternative RA-03AM (acres)

MBS Site Rating	Construction[a]	Operations[b]	Within 0.5 Mile
Outstanding	0.6	0.3	595.3
High	38.0	15.9	3,132.4
Moderate	329.2	139.5	20,478.7
MBS SITES TOTAL	**367.8**	**155.6**	**24,206.3**
RA-03AM total	***4,000.4***	***1,666.9***	***175,189.0***
Proportion in MBS Sites	***9.2%***	***9.3%***	***13.8%***

Source: Minnesota DNR 2016h.

[a] Estimated construction impact area in acres based on 120-foot-wide construction work area.

[b] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

MBS Sites = Minnesota Biological Survey Sites of Biodiversity Significance

Construction Impacts

Construction would affect 368 acres of MBS Sites in the construction work area (Table 6.3.5-33). Construction activities in the construction work area likely would reduce the overall diversity of the MBS Site and create a barrier to animal movements, as described above for the Applicant's preferred route. MBS Sites provide habitat for rare species and may contain additional occurrences of state-protected species.

Of the 26 miles of the RA-03AM route that crosses through moderate to outstanding rated MBS Sites, all but 1 mile would be within an existing pipeline, electrical transmission line, or road corridor. Construction impacts on MBS Sites would be short term and minor given their persistent occurrence along the route.

Operations Impacts

Operations would continue to affect an estimated 207 acres of MBS Sites previously affected during construction. Operations vegetation maintenance to remove trees and large shrubs within the pipeline permanent right-of-way would reduce the capacity for these sites to provide diverse habitats for wildlife, including habitats for protected, conservation concern, and rare animals. The permanent right-of-way would represent a permanent habitat loss and would continue to be a barrier or impediment to travel for some animals. Increased human access, as described above for the Applicant preferred route, could negatively affect the ecological integrity of these MBS Sites by causing habitat degradation or increasing the spread of invasive species.

Long-term vegetation management would result in a minor permanent change to MBS Sites.

Minnesota Scientific and Natural Areas

RA-03AM is the only route alternative that would cross an SNA, potentially affecting 0.4 acre of the Lake Alexander Woods SNA during construction and 0.2 acre during operations. Minnesota DNR would not grant a license or easement to cross any SNA; therefore, the RA-03AM route would need to be modified to avoid this crossing.

Route Alternative RA-06

Federally Listed Species

The Canada lynx, gray wolf, northern long-eared bat, rufa red knot, and rusty patched bumble bee have the potential to occur within the ROI for RA-06 (Table 6.3.5-9). The types of impacts on Canada lynx, gray wolf, northern long-eared bat, and rusty patched bumble bee from construction and operation of RA-06 would be similar to those described for the Applicant's preferred route. All of the Clearbrook-to-Carlton segment would be within a new pipeline corridor, much of it crossing through areas with no previous ground disturbance. In addition, construction of RA-06 would fragment forested large-block habitats, which could reduce habitat suitability for Canada lynx. Impacts on these species are summarized below, along with a discussion of impacts specific to the rufa red knot.

Construction Impacts

Individual Canada lynx and gray wolves would experience temporary effects associated with increased noise and human activity. Typical conservation measures to reduce construction disturbance to gray wolves include stopping construction if a gray wolf or possible den site is observed until the wolf leaves the area, and reporting any wolf sighting to USFWS, USACE, and Minnesota DNR. RA-06 is not co-located with other pipelines, utilities, or roads along much of its length and would cross 60 large-block habitats that would be fragmented by construction. This would affect more than 100 acres along approximately 114 miles (or about 58 percent of the route) between approximately MPs 140.0 and 295.0. Habitat fragmentation would reduce habitat suitability for the Canada lynx and would result in a permanent, major impact on Canada lynx. Impacts to wolves would be temporary and minor, as they are a habitat generalist.

NHIS data document one occurrence of the northern long-eared bat within the construction work area for RA-06. If northern long-eared bats occur in the construction area during the construction period, temporary minor impacts could occur if individuals or colonies of bats are disturbed by noise or human presence and abandon occupied tree cavities. Short-term major impacts could result if bats are injured or killed, or if occupied trees or maternity roosts are destroyed or abandoned. Conservation measures associated with the ESA 4(d) rule to reduce potential impacts on northern long-eared bats include protecting known, occupied maternity roost trees and other trees within a 150-foot radius around maternity roost trees during the pup season from June 1 to July 31.

The rusty patched bumble bee could experience temporary minor effects associated with vegetation clearing and the presence of construction equipment and vehicles. This prairie-dependent species depends on high-quality native grasslands and tallgrass prairies to provide food from flower pollen and nectar. Vegetation clearing and replacement with non-native ground covers could injure or kill these bumble bees, and remove forage plants. Although habitat surveys have not be completed for RA-06, no native prairie habitats appear to be crossed (Minnesota DNR 2017b). The route would cross within about 180 feet of a current high use area in Clearwater County within the bee dispersal area. Construction could render some potentially used habitat in the dispersal area as unusable, resulting in short-term minor impacts on the rusty patched bumble bee. Conservation measures may benefit the species within the dispersal area, and USFWS may recommend surveys. Conservation measures that would benefit the rusty patched bumble bee within this dispersal area during construction include limiting vegetation management in high-quality habitat during the active season (March through September); using a minimum of 8 to 10 inches cutting height for mowers; and careful and targeted pesticide use, as described above (USFWS 2017).

The rufa red knot may use wetlands, cultivated fields, or shorelines of waterbodies in the vicinity of RA-06 as migratory stopover habitat. Construction activities have the potential to disturb rufa red knots, especially if disturbance coincides with important migration stopover locations. Noise or presence of humans and equipment during construction could cause rufa red knots to startle and flush from wetlands or fields or to avoid the area entirely. Short-term impacts on wetlands and cultivated fields from clearing during construction could affect the availability of foraging and sheltering habitats. However, wetlands in the vicinity of RA-06 are predominantly forested, which is not the preferred habitat of the rufa red knot; therefore, construction would be unlikely to affect overall availability of stopover habitat for rufa red knots, and the impacts on an individual bird's survival or reproductive capacity would be short term and negligible.

Summary. Measures to avoid or reduce construction impacts on federally listed animals would be developed in consultation with USFWS to ensure that any unavoidable impacts would not jeopardize the continued existence of species protected by the ESA. The gray wolf would experience temporary minor effects associated with construction activities. Impacts to Canada lynx would be permanent and major from habitat loss and fragmentation. Northern long-eared bats are known to occur in the ROI for RA-06; with implementation of conservation measures associated with the ESA 4(d) rule, the species would experience temporary minor effects from construction. Potential effects on rusty patched bumble bee habitat could be short term and minor. Potential impacts on the rufa red knot would be short term and negligible based on a lack of preferred habitat. Potential impacts specific to Minnesota key habitats that may affect federally listed species are described below under WAN and MBS Sites.

Operations Impacts

Operations and maintenance impacts on individual gray wolves, Canada lynx, and rufa red knots would be minor and temporary as a result of periodic inspection overflights, ground surveillance, and maintenance and repairs. Lynx, wolves, and red knots would be expected to resume use of the area following the disturbance. Disturbance could also be caused by public and private use of ATVs and snow machines along the permanent right-of-way. Operation of vehicles along the right-of-way could result in collisions with individual lynx or wolves. Minimization measures to reduce the potential for collisions could include operating equipment at speeds suitable for the driving conditions or posted speed limits. Use of the right-of-way for recreational purposes could potentially be reduced by limiting access through use of gates and posting of no trespassing signs, where appropriate. The probability of collisions with work vehicles during operations would be low.

Operations impacts on the northern long-eared bat could include continued habitat loss or alteration (i.e., if trees are allowed to grow larger than 3 inch in diameter at breast height between tree maintenance events) and disturbance from noise and activity at aboveground facilities and from right-of-way inspection overflights or ground surveillance. Human activities during operations typically would occur during daylight hours; therefore, operations activities would not interrupt foraging activities, and impacts would be permanent and negligible.

The RA-06 route would cross near current high use areas for rusty patched bumble bees. Although habitat surveys have not been completed for RA-06, no native prairie habitats appear to occur within the area that would be crossed by RA-06 based on Minnesota DNR mapped native plant communities (Minnesota DNR 2017b). Therefore, no adverse impacts on any individual bees or current high use areas are expected. If bees are determined to occur in these areas, measures to avoid or minimize impacts could be implemented as described for the Applicant's preferred route.

Summary. Measures to avoid or reduce construction impacts on federally listed animals and plants would be developed in consultation with USFWS to ensure that any unavoidable impacts would not jeopardize the continued existence of species protected by the ESA. Operations and maintenance impacts on Canada lynx, gray wolves, and rufa red knots would be limited to periodic disturbances over the life of the project. These impacts would be temporary and minor. No adverse impacts are expected as a result of vehicle collisions. Impacts on northern long-eared bats would be permanent and negligible. No adverse impacts are expected to occur to the rusty patched bumble bee, because no high use areas occur within RA-06.

State-Listed Species

Endangered and Threatened Species

Minnesota-protected animals that occur within the ROI for RA-06 include the pugnose shiner and five protected plant species[17] (Table 6.3.6-10). Impacts on these species from construction and operation of RA-06 would be the same as described for the Applicant's preferred route; a conclusion of effects is summarized below.

Construction Impacts. Effects on the pugnose shiner from construction would be the same as described for the Applicant's preferred route. If surface waters are crossed by the HDD method and BMPs are in place for water withdrawals and discharge, construction impacts on the pugnose shiner would be temporary and negligible.

Based on the Minnesota DNR NHIS data, there are no known occurrences of state-protected plants within the RA-06 construction work area between Clearbrook and Carlton. However, given that there are 1,160 acres of MBS Sites (habitat for rare species) within the construction work area for RA-06, it is likely that additional state-protected plants would be found within the construction work area if botanical surveys were conducted. If state-listed plants are present within the construction zone, they could be destroyed during grubbing, grading, and trenching activities. In addition, their habitats could be degraded by the introduction or spread of noxious weeds and invasive plants. Noxious weed and invasive plant management measures would be in place during and after construction. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include measures to control noxious weeds and invasive plants during construction. Some construction impacts may be avoidable through surveys, flagging areas of concern, and refinement of the construction work areas. Potential impacts on state-protected plants would be short term and minor.

Measures to avoid or reduce construction impacts on Minnesota-listed animals and plants would be developed in consultation with Minnesota DNR to ensure that any unavoidable impacts would not jeopardize the continued existence of state-protected species.

Operations Impacts. Vegetation maintenance that removes riparian trees and large shrubs could increase stream temperatures by removing shade, which would reduce habitat suitability for the pugnose shiner. If listed plants persist within the permanent right-of-way, they would be permanently affected by vegetation maintenance activities; however, given their expected limited distribution within this area, overall impacts would be minor. All state-listed species could be indirectly affected by habitat loss and alteration resulting from maintenance of the permanent right-of-way and periodic integrity

[17] Protected plant surveys have not been completed for the route alternatives.

digs. Measures to avoid or reduce construction impacts on Minnesota-listed animals and plants would be developed in consultation with Minnesota DNR to ensure that any unavoidable impacts would not jeopardize the continued existence of state protected species.

Special Concern Species

Minnesota special concern animals and plants within the ROI for RA-06 are listed in Tables 6.3.5-11 and 6.3.5-12. NHIS occurrences for Minnesota-listed special concern animals that could be affected by construction and operation of RA-06 are listed in Table 6.3.5-34. There are no known occurrences of special concern plants in the construction work area or permanent right-of-way for RA-06; however, protected plant surveys have not been completed for the route.

Table 6.3.5-34. Known Occurrences of Special Concern Animals within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for Route Alternative RA-06

Common Name	Scientific Name	Federal Status[a]	Construction[b]	Operations[c]	Within 0.5 Mile
Mammals					
Big brown bat	*Eptesicus fuscus*	NA	--	--	1
Little brown bat	*Myotis lucifugus*	NA	--	--	1
Northern long-eared bat	*Myotis septentrionalis*	THR	1	1	2
Birds					
Northern goshawk	*Accipiter gentilis*	NA	--	--	1
Trumpeter swan	*Cygnus buccinator*	NA	--	--	1
Amphibians and Reptiles					
Four-toed salamander	*Hemidactylium scutatum*	NA	--	--	1
Fish					
Least darter	*Etheostoma microperca*	NA	1	1	1
Mollusks					
Black sandshell	*Ligumia recta*	NA	1	1	1

Source: Minnesota DNR 2016a.

[a] NA = not applicable, THR = Threatened

[b] Estimated construction impact area in acres based on 120-foot-wide construction work area.

[c] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

Notes:

Protected plant surveys have not been conducted for the route.

"--" = no occurrence

Construction Impacts. Construction impacts on state-listed special concern animals would be the same as described above for the Applicant's preferred route. Impacts on state-listed special concern plants would be similar to those for the Applicant's preferred route, although there is some difference in the species that would be potentially affected.

Operations Impacts. Mammals and birds that depend on closed canopies may avoid the maintained permanent right-of-way, which may act as a barrier to travel for some species and may fragment habitats. In addition, vegetation management that prevents riparian trees and large shrubs from reestablishing could increase stream temperatures by removing shade, which would reduce habitat suitability for aquatic animals. Habitat would be permanently altered by vegetation management, resulting in long-term minor impacts on special concern animals and plants that occur in the permanent right-of-way. Overall, impacts on special concern species from operations activities would be permanent and minor.

Species of Greatest Conservation Need

Approximately 41 percent of the route for RA-06 occurs within WAN areas (Table 6.3.5-35). The majority of WAN habitats that would be affected by construction and operations are rated low-medium and medium; no high-rated WAN lands would be affected by the RA-06 route. The lack of high-quality WAN lands indicates that the habitat affected would not likely be SCGN richness hotspots. About 66 miles (or 81 percent) of the approximately 81 miles of WAN habitats that would be crossed by RA-06 would be within a new pipeline corridor. Therefore, overall construction- and operations-related impacts on WAN land, and the SGCN that they support, would be permanent and major, and caused by habitat loss and alteration.

Table 6.3.5-35. Estimated Impacts on Wildlife Action Network Habitat within the Construction Work Area and Permanent Right-of-Way for Route Alternative RA-06 (acres)

Wildlife Action Network Ratings	Construction[a]	Operations[b]
Low	201.3	83.4
Low-medium	442.5	183.9
Medium	395.2	164.5
Medium-high	135.8	56.7
High	--	--
WAN TOTAL	**1,174.8**	**488.5**
RA-06 total	***2,861.8***	***1,192.4***
Proportion in WAN	***41.1%***	***41.0%***

Source: Minnesota DNR 2016b.

[a] Estimated construction impact area in acres based on 120-foot-wide construction work area.

[b] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

WAN = Wildlife Action Network

"--" = no occurrence

Minnesota Biological Survey Sites of Biodiversity Significance

A high proportion (40 percent) of the RA-06 construction and operations impact area is within MBS Sites, similar to the proportion within the ROI (Table 6.3.5-36). The majority of the MBS Sites are rated moderate, but approximately 10 percent of the construction work area is within outstanding and high rated MBS Sites. All of the Clearbrook-to-Carlton segment would be within a new pipeline corridor, much of it crossing through areas with no previous ground disturbance.

Table 6.3.5-36. Estimated Impacts on Minnesota Biological Survey Sites of Biodiversity Significance within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for Route Alternative RA-06 (acres)

MBS Site Rating	Construction[a]	Operations[b]	Within 0.5 Mile
Outstanding	58.7	24.4	2,979.3
High	225.6	93.1	9,311.2
Moderate	875.4	363.2	39,878.0
MBS SITE TOTAL	**1,159.6**	**480.7**	**52,168.5**
RA-06 total	***2,861.8***	***1,192.4***	***125,825.0***
Proportion in MBS Sites	***40.5%***	***40.3%***	***41.5%***

Source: Minnesota DNR 2016h.

[a] Estimated construction impact area in acres based on 120-foot-wide construction work area.

[b] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

MBS Sites = Minnesota Biological Survey Sites of Biodiversity Significance

Construction Impacts

About 1,160 acres of MBS Sites would be affected by construction of RA-06 (Table 6.3.5-36). Construction and post-construction reclamation through these sites likely would alter vegetation structure and reduce their overall diversity. Of the 79 miles of the RA-06 route that crosses moderate to outstanding rated MBS Sites, 68 miles would be new pipeline corridor. Of those 68 miles, 4 miles would extend through outstanding rated MBS Sites, 15 miles through high rated MBS Sites, and 49 miles through moderate rated MBS Sites.

Construction impacts on MBS Sites would be short term and major given the abundance of outstanding and high rated sites that have not been previously fragmented by a pipeline corridor, and the time required for reestablishment of vegetation. However, changes to the native plant communities would be permanent.

Operations Impacts

Operations would affect 481 acres of MBS Sites. Vegetation maintenance during operations to remove trees and large shrubs within the pipeline permanent right-of-way would reduce the capacity for these sites to provide these diverse habitats for wildlife, including habitats for protected, conservation concern, and rare animals. Long-term vegetation management would result in a permanent major impact on MBS Sites.

Minnesota Scientific and Natural Areas

RA-06 would not cross any SNA, and no impact on SNAs would result from construction or operation of the route alternative.

Route Alternative RA-07

Federally Listed Species

The Canada lynx, gray wolf, northern long-eared bat, rufa red knot, and rusty patched bumble bee have the potential to occur within the ROI for RA-07. The types of impacts on Canada lynx, gray wolf, and

northern long-eared bat from construction and operation of RA-07 would be similar to those described for the Applicant's preferred route, and the types of impacts on the rufa red knot would be similar to those described for RA-06. The effects on each of these species are summarized below.

Construction Impacts

The Canada lynx and gray wolf would experience temporary minor effects from construction of RA-07. This route alternative would be constructed within the existing Line 3 pipeline corridor and would not contribute to additional habitat fragmentation. Typical conservation measures to reduce construction disturbance to gray wolves include stopping construction if a gray wolf or possible den site is observed within 1 mile of the construction area; enforcing the stop work order until the wolf leaves the area; and reporting any wolf sighting to USFWS, USACE, and Minnesota DNR.

NHIS data document one occurrence of the northern long-eared bat within the construction work area for RA-07. If northern long-eared bats occur in the construction area, temporary minor impacts could occur if individuals or colonies of bats are disturbed by noise or human presence and they abandon occupied tree cavities. Short term major impacts could result if bats are injured or killed, or if occupied trees or maternity roosts are destroyed or abandoned. Conservation measures associated with the ESA 4(d) rule to reduce potential impacts on northern long-eared bats include protecting known, occupied maternity roost trees and other trees within a 150-foot radius around maternity roost trees during the pup season from June 1 to July 31.

The rusty patched bumble bee could experience temporary major effects associated with vegetation clearing and the presence of construction vehicles. These prairie-dependent insects depend on high-quality native grasslands and tallgrass prairies to provide food from flower pollen and nectar. Vegetation clearing and replacement with non-native ground covers could injure or kill these bumble bees and could remove forage plants. The RA-07 route would cross a current high use area and dispersal area in Clearwater County, where bumble bees could experience short-term major impacts related to construction. Conservation measures may benefit the species within the dispersal area, and USFWS may recommend surveys. Conservation measures that would minimize construction impacts and benefit the rusty patched bumble bee within the high use and dispersal area during construction include restoration and maintenance of high-quality habitat through control of invasive species and restoration that includes a high diversity and abundance of wildflowers appropriate for the region and local characteristics (USFWS 2017).

Construction activities have the potential to disturb rufa red knots, especially if disturbance coincides with important migration stopover locations. Emergent wetlands in the vicinity of the RA-07 route could provide stopover habitat. Noise or the presence of humans and construction equipment could cause rufa red knots to startle and flush from wetlands or fields, or to avoid the area entirely. Short-term impacts on wetlands and cultivated fields from clearing during construction could affect the availability of foraging and sheltering habitats. Construction would be unlikely to affect the overall availability of stopover habitat for rufa red knots, and impacts on an individual bird's survival or reproductive capacity would be short term and negligible.

Construction impacts specific to Minnesota key habitats with the potential to affect federally listed species are described below under WAN and MBS Sites.

Summary. Measures to avoid or reduce construction impacts on federally listed animals and plants would be developed in consultation with USFWS to ensure that any unavoidable impacts would not jeopardize the continued existence of species protected by the ESA. The Canada lynx and gray wolf

would experience temporary minor effects associated with construction of RA-07. With implementation of conservation measures associated with the ESA 4(d) rule, northern long-eared bats in the construction area could experience temporary minor impacts. The rufa red knot could be affected by construction activities that occur in the vicinity of stopover habitats; however, disturbances to emergent wetlands in the vicinity of the RA-07 route are unlikely to affect the overall availability of stopover habitat for rufa red knots. Thus, impacts on an individual bird's survival or reproductive capacity would be short term and negligible. The RA-07 route would cross a current high use area and dispersal area in Clearwater County for rusty patched bumble bees. The bees could experience short-term major construction-related impacts.

Operations Impacts

Operations and maintenance impacts on individual gray wolves, Canada lynx, and rufa red knots would be minor and temporary as a result of periodic inspection overflights, ground surveillance, and maintenance and repairs. Lynx, wolves, and red knots would be expected to resume use of the area following the disturbance. Disturbance could also be caused by public and private use of ATVs and snow machines along the permanent right-of-way. Operation of vehicles along the right-of-way could result in collisions with individual lynx or wolves. Minimization measures to reduce the potential for collisions could include operating equipment at speeds suitable for the driving conditions or posted speed limits. Use of the right-of-way for recreational purposes could potentially be reduced by limiting access through use of gates and posting of no trespassing signs, where appropriate. The probability of collisions with work vehicles during operations would be low.

Operations impacts on the northern long-eared bat could include continued habitat loss or alteration (i.e., if trees are allowed to grow larger than 3 inch in diameter at breast height between tree maintenance events) and disturbance from noise and activity at aboveground facilities and from right-of-way inspection overflights or ground surveillance. Human activities during operations typically would occur during daylight hours; therefore, operations activities would not interrupt foraging activities, and impacts would be permanent and negligible.

The rusty patched bumblebee could experience permanent, major effects associated with ongoing vegetation management activities, particularly caused by mowing and integrity digs. Conservation measures may benefit the species within the high use and dispersal areas, and USFWS may recommend surveys. Conservation measures that would benefit the rusty patched bumble bee within this dispersal area during operations include limiting vegetation management in high-quality habitat during the active season (March through September); using a minimum of 8 to 10 inches cutting height for mowers; and careful and targeted pesticide use, as described above (USFWS 2017).

Summary. Measures to avoid or reduce construction impacts on federally listed animals would be developed in consultation with USFWS to ensure that any unavoidable impacts would not jeopardize the continued existence of species protected by the ESA. Operations and maintenance impacts on Canada lynx, gray wolves, and rufa red knot would be limited to periodic disturbances over the life of the project. These impacts would be temporary and minor. No adverse impacts are expected as a result of vehicle collisions. Impacts on northern long-eared bats would be permanent and negligible. The rusty patched bumblebee could experience permanent, major effects because RA-07 crosses through a current high use area and dispersal area.

State-Listed Species

Endangered and Threatened Species

No Minnesota protected animals occur within the ROI for RA-07, although seven protected plants could occur[18] (Table 6.3.6-14). RA-07 would be constructed within the existing Line 3 pipeline corridor. If state-protected plants persist along the existing pipeline corridor, impacts from construction and operation of RA-07 would be the same as described for the Applicant's preferred route. Effects on these species are discussed below.

Construction Impacts. Botanical surveys were not conducted from Clearbrook to Carlton on route alternative RA-07. Where RA-07 overlaps with the Applicant's preferred route, the potential impacts would be the same as described for the Applicant's preferred route. In addition, the Minnesota DNR NHIS contains a known occurrence of state-listed threatened species within the construction work area. This record was documented within a moderate rated MBS Site in Cass County in 2010 and consisted of two plants. The current size and extent of this population is unknown. If construction proceeds in this area, botanical surveys likely would be needed to inform the takings permit process.

The other state-protected plants documented within the ROI have the potential to occur within the construction work area if suitable habitat is present. Given that the portion of the RA-07 route from Clearbrook to Carlton contains 1,279 acres of MBS Sites that provide habitat for rare plants, it is likely that additional occurrences of state-protected species would be identified if botanical surveys were conducted along this segment.

Plants within the construction area could be destroyed during vegetation clearing and grading, and potential habitat could be degraded by the introduction or spread of noxious weeds and invasive plants. Some construction impacts may be avoidable through survey, flagging areas to avoid, and refinement of the construction work areas. BMPs to minimize overall vegetation impacts and prevent the spread of noxious weeds and invasive plants would be implemented. Noxious weed and invasive plant management measures would be in place during and after construction. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include measures to control noxious weeds and invasive plants during construction. If this population is unavoidable, the resultant impacts would be permanent and potentially major. Impacts on other state-protected plants, should they be present in construction zones, would be short term and minor.

Measures to avoid or reduce construction impacts on Minnesota-listed animals and plants would be developed in consultation with Minnesota DNR to ensure that any unavoidable impacts would not jeopardize the continued existence of state-protected species.

Operations Impacts. Operations and maintenance activities include mowing, equipment maintenance, invasive species control, integrity digs, and aerial surveillance of the permanent right-of-way. If listed plants occur within the permanent right-of-way, they would be permanently affected by maintenance activities. The goblin fern population is located outside of the RA-07 permanent right-of-way. If this population persists during operation, potential impacts could include indirect effects due to decreased shade cause by the reduced canopy cover along the margin of the maintained permanent right-of-way.

[18] Protected plant surveys have not been completed for the route alternatives.

These indirect habitat impacts may be sufficient to prevent the population from persisting, which would result in a permanent, major impact on the population.

All state-listed plant species that persist in areas within or adjacent to the permanent right-of-way could be indirectly affected by habitat loss and alteration resulting from maintenance of the permanent right-of-way. Measures to avoid or reduce impacts on Minnesota-listed plants would be developed in consultation with Minnesota DNR to ensure that any unavoidable impacts would not jeopardize the continued existence of state-protected species.

Special Concern Species

Minnesota special concern animals and plants within the ROI for RA-07 are listed in Tables 6.3.5-15 and 6.3.5-16. NHIS occurrences of Minnesota-listed special concern animals and plants that could be affected by construction and operation of RA-06 are listed in Tables 6.3.5-37 and 6.3.5-38.

Table 6.3.5-37. Known Occurrences of Special Concern Animals within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for Route Alternative RA-07

Common Name	Scientific Name	Federal Status[a]	Construction[b]	Operations[c]	Within 0.5 Mile
Mammals					
Big brown bat	*Eptesicus fuscus*	NA	--	--	1
Little brown bat	*Myotis lucifugus*	NA	--	--	1
Northern long-eared bat	*Myotis septentrionalis*	THR	1	1	2
Birds					
Nelson's sparrow	*Ammodramus nelsoni*	BCC	1	1	1
Trumpeter swan	*Cygnus buccinator*	NA	1	1	1
Yellow rail	*Coturnicops noveboracensis*	BCC	1	1	1
Mollusks					
Black sandshell	*Ligumia recta*	NA	2	1	3
Creek heelsplitter	*Lasmigona compressa*	NA	1	1	2

Source: Minnesota DNR 2016a.

[a] BCC = Birds of Conservation Concern, NA = not applicable, THR = Threatened

[b] Estimated construction impact area in acres based on 205-foot-wide construction work area (10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3).

[c] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

"--" = no occurrence

Table 6.3.5-38. Known Occurrences of Special Concern Plants within the Construction Work Area and Permanent Right-of-Way for Route Alternative RA-07

Common Name	Scientific Name	Federal Status[a]	Construction[b]	Operations[c]
Barren strawberry	*Waldsteinia fragarioides* var. *fragarioides*	NA	1	1
Few-flowered spikerush	*Eleocharis quinqueflora*	NA	1	1
Lapland buttercup	*Ranunculus lapponicus*	NA	1	--
Least moonwort	*Botrychium simplex*	NA	5	5
Mingan moonwort	*Botrychium minganense*	NA	4	4
Pale moonwort	*Botrychium pallidum*	NA	4	4
St. Lawrence grapefern	*Botrychium rugulosum*	NA	4	4

Source: Minnesota DNR 2016a.

[a] NA = not applicable

[b] Estimated construction impact area in acres based on 205-foot-wide construction work area (10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3).

[c] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Protected plant surveys have not been conducted for the route.

"--" = no occurrence

Construction Impacts. Construction impacts on bats, birds, mollusks, and plants would be the same as described for the Applicant's preferred route. Construction impacts on bats and birds primarily would result from these species moving away from the area because of increased human activity and noise. Impacts would be temporary and minor, as the species likely would return after construction is completed. Construction impacts on mollusks would be short term and negligible to minor during construction of surface water crossings. Impacts on special concern plants would be long term and minor.

Operations Impacts. Pipeline operation would require ongoing vegetation management to prevent trees and large shrubs from reestablishing within the permanent right-of-way. Mammals and birds that depend on closed canopies may avoid the permanent right-of-way, which may act as a barrier to travel for some species. In addition, vegetation management that prevents riparian trees and large shrubs from reestablishing could increase stream temperatures by removing shade, which could reduce habitat suitability for aquatic animals. Habitat within the permanent right-of-way would be permanently altered by periodic vegetation management activities, resulting in permanent minor impacts on special concern animals and plants—especially bats and forest plants, including barren strawberry, least moonwort, mingan moonwort, pale moonwort, and St. Lawrence grapefern that occur in the permanent right-of-way. Overall, impacts on special concern species from operations activities would be permanent and minor.

Species of Greatest Conservation Need

Approximately 41 percent of the route for RA-07 occurs within WAN areas (Table 6.3.5-39). The majority of WAN habitats that would be affected by construction and operation are rated low-medium and medium, there are no high-rated WAN lands that would be affected by the RA-06. The lack of high-quality WAN lands indicates that the habitat affected would not likely be SCGN richness hotspots. All of the 68.5 miles of WAN habitats crossed by RA-07 would be within an existing pipeline corridor. Therefore, overall construction- and operations-related impacts on WAN land, and the SGCN that they support, would be permanent and minor due to habitat loss and alteration, which is described in more detail in Section 5.2.4.

Table 6.3.5-39. Estimated Impacts on the Wildlife Action Network Habitat within the Construction Work Area and Permanent Right-of-Way for Route Alternative RA-07 (acres)

Wildlife Action Network Ratings	Construction[a]	Operations[b]
Low	151.5	35.2
Low-medium	954.9	235.0
Medium	370.9	87.3
Medium-high	249.9	57.9
High	--	--
WAN TOTAL	**1,727.2**	**415.5**
RA-07 total	***4,139.7***	***1,016.5***
Proportion in WAN	***41.7%***	***40.9%***

Source: Minnesota DNR 2016b.

[a] Estimated construction impact area in acres based on 205-foot-wide construction work area (10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3).

[b] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

WAN = Wildlife Action Network

"--" = no occurrence

Minnesota Biological Survey Sites of Biodiversity Significance

The proportion of MBS Sites that would be affected by the RA-07 route between Clearbrook and Carlton would be similar for the ROI, construction work area, and permanent right-of-way (Table 6.3.5-40). Therefore, the overall route would not disproportionately affect MBS Sites. RA-07 would be constructed within the existing pipeline corridor, and the majority of the affected area is rated as moderate.

Table 6.3.5-40. Estimated Impacts on Minnesota Biological Survey Sites of Biodiversity Significance within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for Route Alternative RA-07 (acres)

MBS Site Rating	Construction[a]	Operations[b]	Within 0.5 Mile
Outstanding	126.5	21.9	3,532.6
High	238.1	46.9	8,742.0
Moderate	914.2	214.9	25,340.0
MBS SITE TOTAL	**1,278.7**	**283.7**	**37,614.6**
RA-07 total	***4,139.7***	***1,016.5***	***107,004.0***
Proportion in MBS Sites	***30.9%***	***27.9%***	***35.1%***

Source: Minnesota DNR 2016h.

[a] Estimated construction impact area in acres based on 205-foot-wide construction work area (10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3).

[b] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

MBS Site = Minnesota Biological Survey Site of Biodiversity Significance

Construction Impacts

Construction would affect 1,279 acres (RA-07) of MBS Sites. Construction and post-construction reclamation through these MBS Sites likely would change the vegetation structure and reduce the overall diversity. Construction impacts on MBS Sites would be short term, lasting until vegetation cover is reestablished, and minor, given their persistent occurrence along the route.

Operations Impacts

Operations would affect 334 acres of MBS Sites. Vegetation management activities that prevent the reestablishment of trees and large shrubs within the pipeline permanent right-of-way would reduce the capacity for these sites to provide diverse habitats for wildlife, including habitats for protected, special concern, and rare animals. The Applicant's long-term vegetation management program would result in a permanent change to a minor portion of the overall available MBS Sites; however, this would not differ from current conditions within the permanent right-of-way for the existing Line 3 pipeline.

Minnesota Scientific and Natural Areas

No impact on SNAs would occur from construction or operations for RA-07.

Route Alternative RA-08

Federally Listed Species

The Canada lynx, gray wolf, northern long-eared bat, rufa red knot, and rusty patched bumble bee have the potential to occur within the ROI for RA-08. The types of impacts on Canada lynx, gray wolf, northern long-eared bat, and rusty patched bumble bee from construction and operation of RA-08 would be similar to those described for the Applicant's preferred route, and impacts on the rufa red knot would be similar to those described for RA-06. Effects on these species are discussed below.

Construction Impacts

The Canada lynx and gray wolf would experience temporary minor effects associated with construction of RA-08. The route would be constructed within an existing pipeline corridor, and the addition of this pipeline would increase the width of the existing corridor; however, it would not result in additional habitat fragmentation. Typical conservation measures to reduce construction disturbance to gray wolves include stopping construction if a gray wolf or possible den site is observed within 1 mile of the construction area; enforcing the stop work order until the wolf leaves the area; and reporting any wolf sighting to USFWS, USACE, and Minnesota DNR.

NHIS data document one occurrence of the northern long-eared bat within the construction work area for RA-08. If northern long-eared bats are present in the construction area, temporary and minor impacts could occur if individuals or colonies of bats are disturbed by noise or human presence, causing them to abandon occupied tree cavities. Short-term major impacts could result if bats are injured or killed, or if occupied trees or maternity roosts are destroyed or abandoned. Conservation measures associated with the ESA 4(d) rule to reduce potential impacts on northern long-eared bats include protecting known occupied maternity roost trees and other trees within a 150-foot radius from maternity roost trees during the pup season from June 1 to July 31.

The rusty patched bumble bee could experience temporary major effects associated with vegetation clearing and the presence of construction equipment and vehicles. These prairie-dependent insects depend on high-quality native grasslands and tallgrass prairies to provide food from flower pollen and nectar. Vegetation clearing and replacement with non-native ground covers could injure or kill these bumble bees, and could remove forage plants. The RA-08 route would cross a current high use area and dispersal area in Clearwater County, where bumble bees could experience short-term major construction impacts. Conservation measures may benefit the species within the dispersal area, and USFWS may recommend surveys. Conservation measures that would minimize the impacts of construction and benefit the rusty patched bumble bee within this dispersal area include restoration and maintenance of high-quality habitat through control of invasive species and restoration that includes a high diversity and abundance of wildflowers appropriate for the region and local characteristics (USFWS 2017).

Construction activities have the potential to disturb rufa red knots, especially if disturbance coincides with important migration stopover locations. Noise or presence of humans and construction equipment could cause rufa red knots to startle and flush from wetlands or fields, or to avoid the area entirely. Emergent wetlands in the vicinity of the RA-08 route could provide stopover habitat, and short-term impacts on wetlands and cultivated fields from clearing during construction could affect the availability of foraging and sheltering habitats. However, construction would be unlikely to affect the overall availability of stopover habitat for rufa red knots, and the potential impacts on an individual bird's survival or reproductive capacity would be short term and negligible.

Summary. Measures to avoid or reduce construction impacts on federally listed animals and plants would be developed in consultation with USFWS to ensure that any unavoidable impacts would not jeopardize the continued existence of species protected by the ESA. The Canada lynx and gray wolf would experience temporary minor effects associated with construction of RA-08. Northern long-eared bats are present in the construction area. With implementation of conservation measures associated with the ESA 4(d) rule, the species would experience temporary minor effects from construction, if individuals or colonies of bats are disturbed by noise or human presence and they abandon occupied tree cavities. The rufa red knot could be affected by construction activities occurring in the vicinity of

their stopover habitat. However, disturbances to emergent wetlands used for stopover habitat in the vicinity of the route are unlikely to affect the overall availability of stopover habitat for rufa red knots. Therefore, the potential impact on an individual bird's survival or reproductive capacity would be short term and negligible. The RA-08 route would cross a current high use area and dispersal area for rusty patched bumblebees in Clearwater County; construction through that area would result in short-term major impacts.

Impacts specific to Minnesota key habitats with the potential to affect federally listed species are described below under WAN and MBS Sites.

Operations Impacts

Operations and maintenance impacts on individual gray wolves, Canada lynx, and rufa red knots would be minor and temporary as a result of periodic inspection overflights, ground surveillance, and maintenance and repairs. Lynx, wolves, and red knots would be expected to resume use of the area following the disturbance. Disturbance could also be caused by public and private use of ATVs and snow machines along the permanent right-of-way. Operation of vehicles along the right-of-way could result in collisions with individual lynx or wolves. Minimization measures to reduce the potential for collisions could include operating equipment at speeds suitable for the driving conditions or posted speed limits. Use of the right-of-way for recreational purposes could potentially be reduced by limiting access through use of gates and posting of no trespassing signs, where appropriate. The probability of collisions with work vehicles during operations would be low.

Operations impacts on the northern long-eared bat could include continued habitat loss or alteration (i.e., if trees are allowed to grow larger than 3 inches in diameter at breast height between tree maintenance events) and disturbance from noise and activity at aboveground facilities and from right-of-way inspection overflights or ground surveillance. Human activities during operations typically would occur during daylight hours; therefore, operations activities would not interrupt foraging activities, and impacts would be permanent and negligible.

The rusty patched bumblebee could experience permanent major effects associated with vegetation management activities that include mowing. Conservation measures may benefit the species within the high use and dispersal areas, and USFWS may recommend surveys. Conservation measures that would benefit the rusty patched bumble bee within this dispersal area during operations include limiting vegetation management in high-quality habitat during the active season (March through September); using a minimum of 8 to 10 inches cutting height for mowers; and careful and targeted pesticide use, as described above (USFWS 2017).

Summary. Measures to avoid or reduce construction impacts on federally listed animals would be developed in consultation with USFWS to ensure that any unavoidable impacts would not jeopardize the continued existence of species protected by the ESA. Operations and maintenance impacts on Canada lynx, gray wolves, and rufa red knot would be limited to periodic disturbances over the life of the project. These impacts would be temporary and minor. No adverse impacts are expected as a result of vehicle collisions. Impacts on northern long-eared bats would be permanent and negligible. The rusty patched bumblebee could experience permanent, major effects because RA-08 crosses through a current high use area and dispersal area.

State-Listed Species

Endangered and Threatened Species

No state-listed animals are likely to occur within the ROI for RA-08; 10 protected plants could occur[19] (Table 6.3.5-18). Of the 10 Minnesota-listed plants within the ROI, four potentially occur within the construction work area—Clinton's bulrush (*Trichophorum clintonii*), goblin fern, hidden-fruited bladderwort (*Utricularia geminiscapa*), and one-flowered broomrape (*Orobanche uniflora*). Impacts on these species from construction and operation of RA-08 would be the same as described for the Applicant's preferred route.

Construction Impacts. Minnesota DNR NHIS data contain four known occurrences of state-protected plants within the construction work area. Goblin fern was documented within a high rated MBS Site in Cass County in 1992 and 1996. Approximately 665 flowering stems of one-flowered broomrape were documented in 2009 along the edge of a pipeline corridor in Cass County. Three plants of Clinton's bulrush were documented in 2011 in Beltrami County. A minimum of 20 individual plants of hidden-fruit bladderwort were observed in 2009 growing in a northern spruce bog in Cass County. The current size and extent of these populations are unknown. If construction proceeds in this area, botanical surveys likely would be needed to inform the takings permit process.

As there are 889 acres of MBS Sites within the construction work area of the Clearbrook-to-Carlton segment of RA-08, it is likely that additional occurrences of state-protected species would be identified if botanical surveys were conducted along this segment.

Minnesota-protected plants within the construction work area could be destroyed during clearing, grading, and trenching. Their habitats could be degraded by the introduction or spread of noxious weeds and invasive plants, which would result in permanent major impacts. To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan. This plan would include control measures for management of noxious weeds and invasive plants during construction.

Other state listed plants could experience short-term minor impacts. Some construction impacts may be avoidable through survey, flagging to identify and avoid plants, and refinement of the construction work areas. BMPs to minimize overall vegetation impacts and prevent the spread of noxious weeds and invasive plants would be implemented as noted above. If it is not possible to avoid these populations, impacts would be permanent and potentially major. Measures to avoid or reduce construction impacts on Minnesota-listed plants would be developed in consultation with Minnesota DNR to ensure that any unavoidable impacts would not jeopardize the continued existence of state protected species.

Operations Impacts. If state-protected plants persist within the permanent right-of-way, they would be permanently affected by vegetation management activities and integrity digs. Given their expected limited distribution within the permanent right-of-way, the overall impact on listed plants would be short term and minor.

[19] Protected plant surveys have not been completed for the route alternatives.

Special Concern Species

Minnesota-listed special concern animals and plants that could be affected by construction and operation of the route alternative are listed in Tables 6.3.5-41 and 6.3.5-42.

Construction Impacts. Construction impacts on Minnesota-listed special concern mammals, birds, mollusks, and plants would be the same as described for the Applicant's preferred route. Construction impacts on mammals and birds primarily would result from these species moving away from the area because of increased human activity and noise. Impacts would be temporary and minor, as the species likely would return after construction is complete. Construction impacts on mollusks would be short term and negligible to minor during construction of the surface water crossings. Construction impacts on special concern plants would be long term and minor.

Operations Impacts. Pipeline operation would require ongoing vegetation management to prevent trees and large shrubs from growing over the pipeline. Mammals and birds that depend on closed canopies may avoid the permanent right-of-way, which may act as a barrier to travel for some species, fragmenting habitat. The RA-08 route would be co-located with an existing pipeline corridor and would widen the corridor but would not contribute to new fragmentation. In addition, vegetation management that prevents the reestablishment of riparian trees and large shrubs could increase stream temperatures by removing shade, which could reduce habitat suitability for mollusks. If special concern plants were to persist within the permanent right-of-way, they would be permanently affected by vegetation management activities. Given the lack of occurrence, the impact would be minor. Overall, impacts on special concern species from operations activities would be permanent and minor.

Table 6.3.5-41. Known Occurrences of Special Concern Animals within the Construction Work Area, Permanent Right-of-Way, and Region of Interest for Route Alternative RA-08

Common Name	Scientific Name	Federal Status[a]	Construction[b]	Operations[c]	Within 0.5 Mile
Mammals					
Big brown bat	*Eptesicus fuscus*	NA	--	--	1
Little brown bat	*Myotis lucifugus*	NA	--	--	1
Northern long-eared bat	*Myotis septentrionalis*	THR	1	1	2
Birds					
Northern goshawk	*Accipiter gentilis*	NA	--	--	2
Red-shouldered hawk	*Buteo lineatus*	NA	1	1	6
Trumpeter swan	*Cygnus buccinator*	NA	1	1	1
Mollusks					
Black sandshell	*Ligumia recta*	NA	--	--	3
Creek heelsplitter	*Lasmigona compressa*	NA	--	--	3

Source: Minnesota DNR 2016a.

[a] NA = not applicable, THR = Threatened

[b] Estimated construction impact area in acres based on 120-foot-wide construction work area.

[c] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

"--" = no occurrence

Table 6.3.5-42. Known Occurrences of Special Concern Plants within the Construction Work Area and Permanent Right-of-Way for Route Alternative RA-08

Common Name	Scientific Name	Federal Status	Construction[a]	Operations[b]
Few-flowered spikerush	*Eleocharis quinqueflora*	None	1	--
Least moonwort	*Botrychium simplex*	None	3	2
Mingan moonwort	*Botrychium minganense*	None	4	4
Slender naiad	*Najas gracillima*	None	1	1
White adder's mouth	*Malaxis monophyllos* var. *brachypoda*	None	1	1

Source: Minnesota DNR 2016a.

[a] Estimated construction impact area in acres based on 120-foot-wide construction work area.

[b] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

Notes:

An occurrence can consist of one or more observations of one or more individuals temporally and spatially.

Protected plant surveys have not been conducted for the route.

"--" = no occurrence

Species of Greatest Conservation Need

Approximately 45 percent of the RA-08 route occurs within WAN areas (Table 6.3.5-43). The majority of WAN habitats that would be affected by construction and operation are rated low-medium and medium. No high rated WAN lands would be affected by the RA-08 route. The lack of high-quality WAN lands indicates that the habitat affected would not likely be SCGN richness hotspots. All of the 74.2 miles of WAN habitats crossed by RA-08 would be within an existing pipeline corridor. Therefore, overall construction- and operations-related impacts on WAN land, and the SGCN that they support, would be permanent and minor, and would be caused by habitat loss and alteration.

Table 6.3.5-43. Estimated Impacts on Wildlife Action Network Habitat within the Construction Work Area and Permanent Right-of-Way for Route Alternative RA-08 (acres)

Wildlife Action Network Ratings	Construction[a]	Operations[b]
Low	104.7	43.7
Low-medium	372.9	155.1
Medium	388.0	161.7
Medium-high	213.9	89.2
High	--	--
WAN TOTAL	**1,079.5**	**449.7**
RA-08 total	***2,397.7***	***999.0***
Proportion in WAN	***45.0%***	***45.0%***

Source: Minnesota DNR 2016b.

[a] Estimated construction impact area in acres based on 120-foot-wide construction work area.

[b] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

WAN = Wildlife Action Network

"--"= no occurrence

Minnesota Biological Survey Sites of Biodiversity Significance

The proportion of MBS Sites that would be affected by the RA-08 route between Clearbrook and Carlton would be similar for the ROI, construction work area, and permanent right-of-way (Table 6.3.5-44). Therefore, the overall route would not disproportionately affect MBS Sites. In addition, the route of RA-08 would be entirely within an existing pipeline corridor.

Construction Impacts

Construction would affect 889 acres of MBS Sites in the construction work area between Clearbrook and Carlton. Construction and post-construction reclamation through these sites likely would reduce their overall diversities. Construction impacts on MBS Sites would be short term (lasting until vegetation cover is reestablished) and minor given their persistent occurrence along the route, which is located within an existing pipeline corridor.

Table 6.3.5-44. Estimated Impacts on Minnesota Biological Survey Sites of Biodiversity in the Construction Work Area, Permanent Right-of-Way and Region of Interest for Route Alternative RA-08 (acres)

MBS Sites Rating	Construction[a]	Operations[b]	Within 0.5 Mile
Outstanding	124.0	51.7	5,958.8
High	271.6	112.7	12,931.6
Moderate	493.3	205.2	22,777.1
MBS SITE TOTAL	**888.8**	**369.6**	**41,667.6**
RA-08 total	***2,397.7***	***999.0***	***105,470.0***
Proportion in MBS Sites	***37.1%***	***37.0%***	***39.5%***

Source: Minnesota DNR 2016h.

[a] Estimated construction impact area in acres based on 120-foot-wide construction work area.

[b] Estimated operations impact area in acres based on 50-foot-wide right-of-way centered on the pipeline route.

MBS Site = Minnesota Biological Survey Site of Biodiversity Significance

Operations Impacts

Operations would affect 370 acres of MBS Sites. Vegetation management during operations to prevent the reestablishment of trees and large shrubs within the permanent right-of-way would reduce the capacity for these sites to provide diverse habitats for wildlife, including habitats for protected, conservation concern, and rare animals. Long-term vegetation management would result in a permanent change to a minor portion of the overall available MBS Sites.

Minnesota Scientific and Natural Areas

No impacts on SNAs would occur from construction and operation of RA-08.

6.3.5.4 Summary and Mitigation

6.3.5.4.1 Summary

Potential effects on protected and rare species were directly assessed by quantifying occurrences based on IPaC searches and NHIS data, and indirectly through evaluation of habitat-based measures in Minnesota, including the WAN, MBS Sites, and SNAs. Potential effects on federally and state-protected and rare animals and plants depend on whether they occur near the route options (the Applicant's preferred route, RA-03AM, RA-06, RA-07, and RA-08) and whether they are present when activities are occurring that may result in injury, harm, or disturbance. Table 6.3.5-45 presents a summary of construction- and operations-related impacts on unique resources for the Applicant's preferred route and the route alternatives.

The data and analyses regarding unique natural resources presented in this EIS can be used by the regulatory agencies to assess potential impacts on unique natural resources. In addition, USACE is preparing a Biological Assessment for the Project that would be used by USFWS as part of its determination on whether the Project would jeopardize the continued existence of any federally listed species or would result in destruction or adverse modification of their critical habitat. Potential effects on protected species would require avoidance and conservation measures, and formal ESA consultation and federal and state incidental take permits may be required where unavoidable impacts are likely to occur.

Construction impacts could include (1) injury or loss of aquatic and terrestrial invertebrates; amphibians reptiles, and small mammals; bird eggs and young; and plants; (2) loss or alteration of forage and cover habitats; and (3) disturbance from noise and activity. Operations effects could include permanent habitat loss or alteration and continued disturbance from noise and activity at aboveground facilities and from pipeline inspection overflights, ground surveillance, and pipeline integrity excavation. Creation of new pipeline rights-of-way may contribute to fragmentation of habitats, creating barriers to movements for amphibians, reptiles, and small mammals; facilitated movements for some predators; new edge habitats; and potential reduction in the abundance and diversity of forest-nesting birds. Potential direct injury or mortality of protected animals may be avoided or minimized through typically required conservation measures, although reduction in habitat quality resulting from facility and pipeline construction may indirectly affect protected animals because of a permanent reduction in the habitat's ability to support some protected species.

Construction Impacts

Construction activities have the potential to disturb special-status animals, plants, and habitats because of increased noise and human activity, use of construction equipment, and vegetation removal. Injury, mortality, or disturbance of special-status species and alteration of habitat types also could occur as a result of these activities.

Construction noise and increased human activity likely would cause more mobile species (e.g., larger mammals, bats, and birds) to move to other areas; they would possibly return after construction activities stop. If these disturbances occurred during sensitive reproductive periods, animals could abandon their young or nesting/denning area, resulting in a decrease in survival and possible reproductive failure of individual mating pairs. Less mobile species that occur within the construction work area would not be able to avoid construction activities and could be crushed and killed.

Surface water crossings could affect aquatic species that are present. Disturbance to the stream bottom during the use of dry or wet open-cut crossing methods could crush or suffocate aquatic species and their nests. The temporarily increased turbidity could reduce feeding efficiency and damage these sensitive aquatic animals in the vicinity. Contaminated construction equipment and water used for hydrostatic testing could introduce invasive aquatic animals such as zebra and quagga mussels that could displace and reduce habitat quality for aquatic animals. Use of HDD to cross waterbodies would avoid mortality and injury of special-status aquatic species, and impacts on their habitat.

Vegetation removal could injure or kill special-status species if they are present when clearing or construction activities occur. Mobile special-status animals would be likely to move to other areas, while less-mobile species could be crushed and killed. Protected plants may be lost during construction, and changes to soils and surrounding vegetation communities may leave habitats unsuitable after construction. Avoidance may be possible, once precise locations are determined through surveys such as those completed for the Applicant's preferred route. Some protected and special concern plants may be preserved and continue to persist within pipeline rights-of-way. In general, construction of aboveground facility sites and establishment of the pipeline rights-of-way would alter existing habitat types (including WAN and MBS Sites) and increase fragmentation.

Construction of the Applicant's preferred route or any of the route alternatives has the potential to affect special-status species and habitats. All route options could affect four or five federally protected species. Of the federally listed species, four occur within the construction work areas for the Applicant's preferred route and RA-03AM; and five occur within the construction work areas for RA-06, RA-07, and

RA-08. Based on the potential for species to occur and total known occurrences, effects on state-listed species would be the greatest for RA-03AM and the Applicant's preferred route. Construction of RA-06, RA-07, and RA-08 would affect fewer species, and construction of RA-07 and RA-08 would affect only plants because no state-protected animals are known to occur within the ROIs for these route alternatives. In general, direct impacts on federally and state-listed and special concern vertebrate and invertebrate animals would be temporary and minor with implementation of BMPs and conservation measures; potential impacts on listed plants would be permanent and minor.

All routes would pass though WAN areas and MBS Sites. The percent of the route distance that would affect WAN habitat would be the greatest for RA-08, RA-07, and RA-06 (41 to 45 percent); 30 percent of the Applicant's preferred route would affect WAN acreage, and 12 percent of RA-03AM would affect WAN habitat. The majority of WAN areas crossed by the Applicant's preferred route, RA-03AM, RA-07, and RA-08 would be in existing corridors, limiting the impacts. WAN acreage crossed by RA-06 would be in a new pipeline corridor, resulting in habitat loss and alteration, with potential reduced use by SGCNs. There is no high ranked WAN habitat along the RA-06 route, indicating that the WAN habitat is unlikely to provide SGCN richness hotspots. Overall, the lack of high-quality WAN lands across all alternatives indicates that the habitat affected would not likely be SCGN richness hotspots. Impacts on WAN habitats, and the associated SGCNs they support, crossed by the Applicant's preferred route, RA-03AM, RA-07, and RA-08 would be minor and permanent based on the extent of and ratings for WAN habitats affected and the proximity of routes to existing pipeline and utility corridors. Construction of RA-06 would result in permanent major impacts on WAN habitat because a new pipeline corridor would be created.

The percent of MBS Sites affected would be the greatest for RA-06 and RA-08 and the least for RA-03AM. Areas where routes cross MBS Sites would experience long-term impacts. Because these areas, for all route options, represent a small proportion of available MBS Sites in Minnesota, the overall impact would be minor. Minnesota SNAs would be unaffected by all routes except RA-03AM, where less than an acre would be affected by construction. Minnesota DNR would not grant a license or easement to cross any SNA; therefore, this route would need to be altered slightly if it is selected.

Operations Impacts

Pipeline right-of-way maintenance activities during operations would include mowing, equipment maintenance, invasive species control, right-of-way monitoring, and integrity digs to repair or replace pipe segments. Vegetation maintenance that removes riparian trees and large shrubs could increase stream temperatures by removing shade, which would reduce habitat suitability for aquatic animals. Activities in and around water, as well as upland vegetation maintenance could result in direct mortality of less mobile species through crushing, if species are present while the activity is occurring. State-listed plants that persist within the permanent right-of-way after construction could be permanently affected by vegetation maintenance activities.

All special-status species within the ROIs for the route options could be indirectly affected by habitat loss and alteration. The maintained permanent right-of-way of each route option could act as a barrier to travel for some animals such as amphibians, reptiles, and small mammals, and could fragment SGCN habitat. Habitat fragmentation can increase edge habitats favored by some animals and avoided by others; and can create a barrier to movements for some animals while facilitating movements of others, especially predators.

With implementation of BMPs and appropriate species-specific conservation measures for pipeline operations, most impacts during operations would be caused by temporary disturbance and permanent habitat alteration, resulting in overall minor impacts for all route options for the life of the Project.

6.3.5.4.2 Mitigation

In addition to the Applicant-proposed measures described above, which would be incorporated into the Project, the Applicant would comply with conditions specified in permits required by agencies with jurisdiction. Typical conservation measures to reduce impacts on unique resources are identified in the discussions above for specific species. These measures likely would be required by the applicable agencies, and additional mitigation for potential impacts could be required.

Actions identified by Minnesota DNR to further minimize disturbance to MBS Sites include, but are not limited to:

- Do not park equipment or stockpile supplies within MBS Sites,
- Do not place spoil within MBS Sites,
- Limit construction activities to frozen ground conditions, and
- Revegetate disturbed soil with native species suitable to the local habitat as soon after construction as possible.

Table 6.3.5-45. Summary of Potential Impacts on Unique Natural Resources for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Federally Protected Species					
Construction Impacts					
Potential for injury, mortality, or disturbance of federally listed ESA species	Minor/temporary impacts • 3 mammals Minor/short-term impacts • 1 insect	Minor/temporary impacts • 3 mammals Minor/short-term impacts • 1 insect	Major/permanent impacts • 1 mammal Minor/short-term impacts • 2 mammals • 1 insect Negligible/short-term impacts • 1 bird	Major/short-term impacts • 1 insect Minor/temporary impacts • 3 mammals Negligible/short-term impacts • 1 bird	Major/short-term impacts • 1 insect Minor/temporary impacts • 3 mammals Negligible/short-term impacts • 1 bird
Operations Impacts					
Potential for injury, mortality, or disturbance of federally listed ESA species	Minor/temporary impacts • 2 mammals Negligible/permanent impacts • 1 mammal • No impact • 1 insect	Minor/temporary impacts • 2 mammals Negligible/permanent impacts • 1 mammal • No impact • 1 insect	Minor/temporary impacts • 2 mammals • 1 bird Negligible/permanent impacts • 1 mammal • No impact • 1 insect	Major/permanent impacts • 1 insect Minor/temporary impacts • 2 mammals • 1 bird Negligible/permanent impacts • 1 mammal	Major/permanent impacts • 1 insect Minor/temporary impacts • 2 mammals • 1 bird Negligible/permanent impacts • 1 mammal
State-Listed Endangered or Threatened Species					
Construction Impacts					
Impacts on herptiles	No impact	Minor/short-term impacts • 2 species	No impact	No impact	No impact

Table 6.3.5-45. Summary of Potential Impacts on Unique Natural Resources for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Impacts on fish	Negligible/temporary impacts • 1 species	No impact	Negligible/temporary impacts • 1 species	No impact	No impact
Impacts on mussels	No impact	Negligible to minor/ temporary to short-term • 4 species	No impact	No impact	No impact
Impacts on plants	Major/permanent impacts • 2 species No Impact • 4 species	Minor to major/ short-term to permanent impacts • 8 species	Minor/permanent impacts • 5 species	Major/permanent impacts • 1 species Minor/short-term impacts • 6 species	Major/permanent impacts • 4 species Minor/short-term impacts • 6 species
Operations Impacts					
Impacts on herptiles	No impact	Minor/short-term impacts • 2 species	No impact	No impact	No impact
Impacts on fish	No impact • 1 species	No impact	Negligible/temporary impacts • 1 species	No impact	No impact
Impacts on mussels	No impact	Negligible to minor/ temporary to short-term impacts • 4 species	No impact	No impact	No impact
Impacts on plants	Minor/short-term to permanent impacts • 8 species	Minor/short-term to permanent impacts • 8 species	Minor/short-term to permanent impacts • 5 species	Minor/short-term to permanent impacts • 7 species	Minor/short-term to permanent impacts • 10 species

Table 6.3.5-45. Summary of Potential Impacts on Unique Natural Resources for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Species of Special Concern					
Construction Impacts					
Impacts on mammals	Minor to major/ temporary to permanent impacts • 4 species	Minor to major/ temporary to permanent impacts • 3 species	Minor to major/ temporary to permanent impacts • 3 species	Minor to major/ temporary to permanent impacts • 3 species	Minor to major/ temporary to permanent impacts • 3 species
Impacts on birds	Major/short-term impacts • 6 species	Major/short-term impacts • 4 species	Major/short-term impacts • 2 species	Major/short-term impacts • 3 species	Major/short-term impacts • 2 species
Impacts on herptiles	Negligible to major/short-term impacts • 1 species	No impact	Negligible to major/short-term impacts • 1 species	No impact	No impact
Impacts on fish	Negligible to major/short-term impacts • 1 species	Negligible to major/short-term impacts • 4 species	Negligible to major/short-term impacts • 1 species	No impact	No impact
Impacts on mussels	Negligible to major/short-term impacts • 3 species	Negligible to major/short-term impacts • 3 species	Negligible to major/short-term impacts • 1 species	Negligible to major/short-term impacts • 2 species	Negligible to major/short-term impacts • 2 species
Impacts on aquatic insects	Negligible/short-term impacts • 1 species	Negligible/short-term impacts • 1 species	No impact	No impact	No impact
Impacts on plants	Major/permanent impacts • 9 species	Major/permanent impacts • 3 species	No impact	No impact	Major/permanent impacts • 5 species
Operations Impacts					
Impacts on mammals	Minor/permanent impacts • 4 species	Minor/permanent impacts • 3 species	Minor to major/ temporary to permanent impacts • 3 species	Minor to major/ temporary to permanent impacts • 3 species	Minor to major/ temporary to permanent impacts • 3 species

Table 6.3.5-45. Summary of Potential Impacts on Unique Natural Resources for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Impacts on birds	Major/permanent impacts • 6 species	Major/permanent impacts • 4 species	Minor/short-term impacts • 2 species	Minor/short-term impacts • 3 species	Minor/short-term impacts • 2 species
Impacts on herptiles	Minor/permanent impacts • 1 species	No impact	Minor/permanent impacts • 1 species	No impact	No impact
Impacts on fish	Minor/permanent impacts • 1 species	Minor/permanent impacts • 4 species	Minor/permanent impacts • 1 species	No impact	No impact
Impacts on mussels	Negligible to major permanent/minor short-term impacts • 3 species	Negligible to major permanent/minor short-term impacts • 3 species	Negligible to major permanent/minor short-term impacts • 1 species	Negligible to major permanent/minor short-term impacts • 2 species	Negligible to major permanent/minor short-term impacts • 2 species
Impacts on insects	Negligible/short-term impacts • 1 species	Negligible/short-term impacts • 1 species	No impact	No impact	No impact
Impacts on plants	Minor/permanent impacts • 9 species	Minor/permanent impacts • 3 species	No impact	No impact	Minor/permanent impacts • 5 species
Species of Greatest Conservation Need					
Construction Impacts					
Impacts on habitat for Species of Greatest Conservation Need	Minor/permanent impacts • 22.4 miles of new corridor • 1,041 acres	Minor/permanent impacts • 0 mile of new corridor • 483 acres	Major/permanent impacts • 0 mile of new corridor • 1,175 acres	Minor/permanent impacts • 0 mile of new corridor • 1,727 acres	Minor/permanent impacts • 0 mile of new corridor • 1,080 acres

Table 6.3.5-45. Summary of Potential Impacts on Unique Natural Resources for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Operations Impacts					
Impacts on habitat for Species of Greatest Conservation Need	Minor/permanent impacts • 467 acres	Minor/permanent impacts • 201 acres	Minor/permanent impacts • 489 acres	Minor/permanent impacts • 416 acres	Minor/permanent impacts • 450 acres
Minnesota Biological Survey Sites of Biodiversity Significance					
Construction Impacts					
Impacts on outstanding-ranked MBS Sites (acres)	Major/short-term impacts • 16 miles in new corridor • 2 acres	Minor/short-term impacts • 1 mile in new corridor • 1 acres	Major/short-term impacts • 68 miles in new corridor • 59 acres	Minor/short-term impacts • 0 mile in new corridor • 127 acres	Minor/short-term impacts • 0 mile in new corridor • 124 acres
Impacts on high-ranked MBS Sites (acres)	Major/short-term impacts • 16 miles in new corridor • 78 acres	Minor/short-term impacts • 1 mile in new corridor • 38 acres	Major/short-term impacts • 68 miles in new corridor • 226 acres	Minor/short-term impacts • 0 mile in new corridor • 238 acres	Minor/short-term impacts • 0 mile in new corridor • 272 acres
Total affected acres	• 828 acres	• 368 acres	• 1,160 acres	• 1,279 acres	• 889 acres
Operations Impacts					
Impacts on outstanding-ranked MBS Sites (acres)	Major/permanent impacts • 2 acres	Minor/permanent impacts • <1 acre	Major/permanent impacts • 24 acres	Minor/permanent impacts • 22 acres	Minor/permanent impacts • 52 acres
Impacts on high-ranked MBS Sites (acres)	Major/permanent impacts • 40 acres	Minor/permanent impacts • 16 acres	Major/permanent impacts • 93 acres	Minor/short-term impacts • 47 acres	Minor/short-term impacts • 113 acres
Total affected acres	• 382 acres	• 156 acres	• 481 acres	• 284 acres	• 370 acres

Table 6.3.5-45. Summary of Potential Impacts on Unique Natural Resources for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Minnesota Scientific and Natural Areas					
Construction Impacts					
Impacts on Scientific and Natural Areas (SNAs)	No impact	No impact Avoidance required for Lake Alexander Woods SNA	No impact	No impact	No impact
Operations Impacts					
Impacts on Scientific and Natural Areas (SNAs)	No impact	No impact Avoidance required for Lake Alexander Woods SNA	No impact	No impact	No impact

MBS Sites = Minnesota Biological Survey Sites of Biodiversity Significance

6.3.5.5 References

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6.3.6 Public Lands

Public lands are lands managed or held by federal, state, and county governments for a variety of public benefits—including preservation of natural areas, wildlife habitat, timber, mineral resources, water resources and other natural resources, recreation areas, and other public interests. Because construction and operation of the Applicant's preferred route and the route alternatives may affect the future use of federal, state, and county land, the public lands analysis assessed:

- Potential impacts on public lands, including compatibility of the Project with designated uses of specific public lands.

In addition to the analysis of compatibility with the designated use of public lands in this section, impacts on the public resources contained within public lands are generally described (e.g., vegetation, wildlife, and recreation) although not correlated to specific public lands, and the measures that would be implemented to minimize potential impacts on those resources can be found in several other sections within Chapter 6, including Sections 6.3.1, 6.3.3, 6.3.4, and 6.5.2.

This section first describes the existing amounts of federal, state, and county land within an area along the Applicant's preferred route and each of the route alternatives where these lands could be affected by construction and operation of the Project. Potential Project-related impacts of construction and operation then are discussed and compared across each of the five routing options (the Applicant's preferred route, RA-03AM, RA-06, RA-07, and RA-08). A summary and comparison of the impacts for the Applicant's preferred route and the route alternatives are included at the end of the section.

Potential impacts on public lands from a release of crude oil are addressed in Chapter 10.

6.3.6.1 Regulatory Context and Methodology

6.3.6.1.1 Regulatory Context

Regulations that govern public lands vary significantly depending on the government entity that manages the land and the specific purpose for which the land was obtained. Therefore, identification of the authorizing agency and the relevant regulatory provisions are provided for each land type (federal, state, and county) within each routing option. The Applicant's preferred route and all of the route alternatives cross varying amounts of federal, state, and county land.

6.3.6.1.2 Methodology

The ROI for the analysis of impacts on public lands was focused on Minnesota only and included the construction and operations footprints for the Applicant's preferred route and the route alternatives. All federal, state, and county land in Minnesota directly crossed by construction and operations areas within the ROI was assessed for the Applicant's preferred route and route alternatives. See Section 6.3.1 for discussion of public waters that would be crossed by the Applicant's preferred route and the route alternatives. The analysis was undertaken by first identifying and inventorying in GIS all public lands in the counties crossed by the Applicant's preferred route and the route alternative. The following construction and operations footprints were overlaid to quantify resources affected by construction and operation:

- The route and estimated footprints for the pipeline and associated facilities for the Applicant's preferred route;

- The 120-foot-wide construction footprint and 50-foot-wide permanent right-of-way for route alternatives (except portions of RA-07 where a 205-foot-wide construction work area was overlaid; see Chapter 4);

Public lands within the ROI for the Applicant's preferred route and route alternatives were identified using GIS datasets and layers in the following data source:

- Protected Areas Database of the United States (PAD-US).

Where data were available, ownership and identification of the authorizing agency for each land type are provided, along with a discussion of compatibility with relevant regulatory provisions.

6.3.6.2 Existing Conditions

This section identifies public lands that could be affected by the Applicant's preferred route and the route alternatives. Appendix A includes maps of the federal and state lands within the ROI.

Federal Land

Federal lands are lands in the United States for which ownership is claimed by the U.S. federal government. The primary purpose of federal land is to benefit the people of the United States, with conservation of the natural resources as a priority; most federally owned lands are open to the public for recreational use. Primary federal landholders of the land that would be crossed by the Applicant's preferred route and route alternatives include the Department of the Interior (DOI), which includes agencies such as BLM, USFWS, NPS, and the Department of Agriculture—which includes USFS. The types of land in federal ownership in this analysis include forests that are managed by USFS, refuge land managed by USFWS, National Heritage Parks managed by NPS, and other land managed by BLM. Compatibility of the Project with designated uses varies by authorizing agencies; therefore, a general discussion of the responsible agency based on land ownership and any associated regulatory provisions is provided. When multiple federal properties that are operated by more than one federal agency or bureau would be crossed by a project, an application would be filed with BLM.

State Land

State lands are lands that are held under state management. State lands that would be crossed by the Applicant's preferred route and route alternatives include state WMAs, AMAs, and state forests. These lands are administered by each state's respective DNR. Compatibility of the Project with designated uses varies by authorizing agencies; therefore, a general discussion of the responsible agency based on land ownership and any associated regulatory provisions is provided.

In certain instances, more than one government agency may have an interest in a specific piece of land; thus, additional regulatory authorizations would be needed. For example, if the State of Minnesota purchased and designated land as a WMA but used federal grant money as part of that purchase, the federal government has different and additional regulatory processes for considering proposed encroachments such as pipelines.

County Land

County lands are lands that are held in trust for the public, for which ownership is claimed by county governments. As with federal and state land, their primary purpose is to benefit the public. These lands typically include county parks, forests, and other special management areas. Compatibility of the Project with designated uses varies by authorizing agencies; therefore, a general discussion of the responsible agency based on land ownership and any associated regulatory provisions is provided

Counties in Minnesota may acquire land through tax forfeiture. Some of this land is then sold or exchanged; if the lands are classified as conservation lands, they may be retained and managed for designated conservation purposes or as forestry land. Some lands bordering lakes and streams cannot be sold by the counties.

6.3.6.2.1 Applicant's Preferred Route

The following section describes existing conditions in Minnesota for public lands. Information enabling comparison of the route alternatives to the Applicant's preferred route is provided below

Federal Land

The only federal land that would be crossed by the Applicant's preferred route would be:

- North Country National Scenic Trail – The North Country National Scenic Trail stretches across seven states from New York to North Dakota (North Country Trail Association 2016). The National Scenic Trail program is administered through NPS. It includes trails that are 100 miles or longer and provides non-motorized recreational opportunities. At the location of the proposed crossing, the trail is administered by Hubbard County. However, compatibility of the Project with designated uses would be determined by the authorizing agency, which is NPS, and ultimately DOI. In 2015, the House Committee on Natural Resources passed a bill granting the Secretary of DOI the power to negotiate rights-of-way for gas pipelines through national park lands.

State Land

In total, the amount of state land in the ROI for the Applicant's preferred route, including access roads, ATWS, and MLVs, is 526 acres (Table 6.3.6-1). This includes about 17 acres between two WMAs: the Grayling Marsh WMA (14 acres) and Lawler WMA (3 acres), and approximately 0.4 acre of the LaSalle Creek AMA.

The Applicant's preferred route would cross approximately 422 acres in eight state forests:

- Foothills State Forest (42 acres),
- Hill River State Forest (103 acres),
- Huntersville State Forest (97 acres),
- Land O'Lakes State Forest (130 acres),
- Mississippi Headwaters State Forest (25 acres),
- Paul Bunyan State Forest (less than 0.1 acre),

- Savanna State Forest (9 acres), and
- Waukenabo State Forest (16 acres).

Table 6.3.6-1. State Lands Crossed by the Applicant's Preferred Route (acres)

Segment	State Land							
	Construc-tion Work Area	Permanent Right-of-Way	ATWS	Temp Access Road	Perm Access Road	Valves[a]	Con Total[b]	Op Total[b]
North Dakota border to Clearbrook	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Clearbrook to Carlton	439.6	199.4	32.1	27.6	27.0	0.2	525.5	226.6
Carlton to Wisconsin border	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**439.6**	**199.4**	**32.1**	**27.6**	**27.0**	**0.2**	**525.5**	**226.6**

Source: PAD-US – USGS 2016.

[a] Includes valve sites and valve driveways. Because valve sites are within the permanent right-of-way, total Project impacts may be slightly overestimated from double counting.

[b] Con = sum of pipeline construction work area, additional temporary workspaces (ATWS), pump stations, valves, and temporary and permanent access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, valves, and pump stations.

Notes:

Acres for the construction work area and the permanent right-of-way are based on Enbridge-provided footprints for the Applicant's preferred route.

Perm = permanent, Temp = temporary

These forests, WMAs, and AMA are managed by Minnesota DNR as multiple-use areas. They are primarily used for fish and wildlife resource protection, forestry, and recreation. Compatibility of the Project with designated uses would be determined during easement negotiations with the authorizing agency, which is Minnesota DNR.

Although not directly affected by pipeline construction or standard operations, the Applicant's preferred route would pass directly east of Itasca State Park, and an existing road that passes through the park would be used as an access road. This state park is one of Minnesota's flagship state parks, with over 500,000 annual visits. The park was established in 1891 to preserve remnant stands of virgin pine and to protect the basin that is the source of the Mississippi River. The Itasca State Park is one of Minnesota's National Natural Landmarks.

County Land

In total, approximately 548 acres of county land would be within the ROI for construction work area of the Applicant's preferred route with an additional 102 acres disturbed for ATWS, access roads and valves. Counties with lands crossed would be Cass (274 acres), Carlton (128 acres), Hubbard (119 acres), and Clearwater (27 acres). During operation about 228 acres would be affected by the permanent right-of-way, including 114 acres in Cass County, 53 acres in Carlton County, 50 acres in Hubbard County, and

11 acres in Clearwater County. While the exact designated use of this land is unknown, it is likely to be land in county parks and/or forests; therefore, compatibility with designated uses would be determined by the relevant county governments

Table 6.3.6-2. County Lands Crossed by the Applicant's Preferred Route (acres)

Segment	State Land							
	Construction Work Area	Permanent Right-of-Way	ATWS	Temp Access Road	Perm Access Road	Valves[a]	Con Total[b]	Op Total[b]
North Dakota border to Clearbrook	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Clearbrook to Carlton	547.7	228.1	36.3	29.1	36.5	0.1	649.7	264.7
Carlton to Wisconsin border	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**547.7**	**228.1**	**36.3**	**29.1**	**36.5**	**0.1**	**649.7**	**264.7**

Source: County-owned parcels were identified using the "owner" name within each county's GIS parcel data. Because parcel data and "owner" naming conventions vary from county to county, DOC-EERA identified county-owned parcels as best as possible. Note that Red Lake County had no GIS parcel data, and Aitkin County had no ownership information on their parcel data; therefore, these counties were not included in the analysis

[a] Includes valve sites and valve driveways. Because valve sites are within the permanent right-of-way, total Project impacts may be slightly overestimated from double counting.

[b] Con = sum of pipeline construction work area, additional temporary workspaces (ATWS), pump stations, valves, and temporary and permanent access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, valves, and pump stations

Notes:

Acres for the construction work area and the permanent right-of-way are based on Enbridge-provided footprints for the Applicant's preferred route.

Perm = permanent; Temp = temporary

6.3.6.2.2 Route Alternatives

The only segment where the route alternatives would vary from the alignment of the Applicant's preferred route is between Clearbrook and Carlton in Minnesota. The existing conditions relevant to public lands for the route alternatives between Clearbrook and Carlton are described below.

Route Alternative RA-03AM

Table 6.3.6-3 lists the acreage of federal, state, and county lands crossed by RA-03AM during construction and operation.

Table 6.3.6-3. Public Lands Crossed by Route Alternative RA-03AM (acres)

Segment	Federal Lands[a,b]		State Lands[a,b]		County Lands[b,c]	
	Con	Op	Con	Op	Con	Op
Clearbrook to Carlton	25.4	10.6	32.5	13.5	261.7	119.2

[a] Source: PAD-US – USGS 2016.

[b] Con = 120-foot-wide construction footprint, Op = 50-foot-wide permanent right-of-way.

[c] Source: County-owned parcels were identified using the "owner" name within each county's GIS parcel data. Because parcel data and owner naming conventions vary from county to county, DOC-EERA identified county-owned parcels as best as possible. Note that Red Lake County had no GIS parcel data, and Aitkin County had no ownership information on their parcel data; therefore, these counties were not included in the analysis.

Federal Land

Approximately 25 acres of the ROI for RA-03AM are within the Crane Meadows NWR, which is managed by USFWS. The land is primarily used for bird and wildlife resource management; and is open for public access and general wildlife-dependent recreation such as hunting, wildlife watching, and photography. Therefore, the Applicant would be required to comply with the designated uses and regulatory provisions established through USFWS as the authorizing agency. Non-federal oil and gas operations on NWRs and the associated regulatory provisions are contained within 50 CFR, Part 29, Subparts C and D. Specifically, Section 29.32(a)(2) of Subpart C states that, "Persons conducting mineral operations on Service-administered lands and waters must comply with all applicable Federal and State laws and regulations for the protection of wildlife and the administration of the area."

State Land

The state land consists of 26 acres within the Mississippi Headwaters State Forest, 5 acres within the Neitermeier WMA, and 0.2 acre within the LaSalle Creek AMA. This forest, WMA, and AMA are managed by Minnesota DNR as multiple-use areas. They are primarily used for fish and wildlife resource protection, forestry, and recreation. Compatibility of the Project with designated uses would be determined during easement negotiations with the authorizing agency, which is Minnesota DNR.

Although not directly affected by pipeline construction or standard operations, RA-03AM would pass directly east of Itasca State Park, and an existing road that passes through the park would be used as an access road.

County Land

Construction work areas for RA-03AM includes land in seven counties during construction: 108 acres in Hubbard County, 69 acres in Mille Lacs County, 31 acres in Carlton County, 27 acres in Clearwater County, 25 acres in Pine County, 2 acres in Kenabec County, and 0.3 acre in Morrison County. The operational right-of-way includes 45 acres in Hubbard County, 36 acres in Mille Lacs County, 14 acres in Pine County, 13 acres in Carlton County, 11 acres in Clearwater County, 0.5 acre in Kenabec County, and 0.1 acre in Morrison County. While the exact designated use of this land is unknown, it is likely to be land in county parks or forests; therefore, compatibility with designated uses would be determined by the relevant county governments.

Route Alternative RA-06

Table 6.3.6-4 lists the acreage of federal, state, and county lands crossed by RA-06 during construction and operation.

Table 6.3.6-4. Public Lands Crossed by Route Alternative RA-06 (acres)

Segment	Federal Lands[a,b]		State Lands[a,b]		County Lands[b,c]	
	Con	Op	Con	Op	Con	Op
Clearbrook to Carlton	90.5	37.7	794.0	330.8	10.8	4.5

[a] Source: PAD-US – USGS 2016.

[b] Con = 120-foot-wide construction footprint, Op = 50-foot-wide permanent right-of-way.

[c] Source: County-owned parcels were identified using the "owner" name within each county's GIS parcel data. Because parcel data and owner naming conventions vary from county to county, DOC-EERA identified county-owned parcels as best as possible. Note that Red Lake County had no GIS parcel data, and Aitkin County had no ownership information on their parcel data; therefore, these counties were not included in the analysis.

Federal Land

RA-06 would cross approximately 86 acres of Chippewa National Forest, which is managed by USFS, and 4 acres of BLM-owned land. The forest is managed to protect forest and water resources and provides a variety of recreational opportunities; therefore, the Applicant would be required to comply with the designated uses as established by USFS as the authorizing agency. Grants for pipeline rights-of-way through BLM land are administered under the Mineral Leasing Act of 1920. Specifically, 43 CFR 2880 states, "As authorized by MLA [Mineral Leasing Act], the BLM will issue right-of-way grants for oil and natural gas gathering, and distribution pipelines and related facilities (not authorized by appropriate leases), and oil and natural gas transmission pipelines and related facilities." Therefore, the Applicant would need to apply for a right-of-way grant.

State Land

Construction of RA-06 would cross 794 acres of state lands, including 294 acres of Big Fork State Forest, 37 acres of Fond du Lac State Forest, 458 acres of George Washington State Forest, 0.2 acre of Clearwater River AMA, 5 acres of Little Otter Creek AMA, and 0.3 acre of Venning Creek AMA. These forests and AMAs are managed by Minnesota DNR as multiple-use areas. They are primarily used for fish and wildlife resource protection, forestry, and recreation. Compatibility of the Project with designated uses would be determined during easement negotiations with the authorizing agency, which is Minnesota DNR.

County Land

RA-06 would cross county land in two counties: 10 acres in Carlton County and 0.7 acre in St. Louis County. During operation, RA-06 would affect 4 acres in Carlton County and 0.3 acre in St. Louis County. While the exact designated use of this land is unknown, it is likely to be land in county parks or forests; therefore, compatibility with designated uses would be determined by the relevant county governments.

Route Alternative RA-07

Table 6.3.6-5 lists the acreage of federal, state, and county lands crossed by RA-07 during construction and operation.

Table 6.3.6-5. Public Lands Crossed by Route Alternative RA-07 (acres)

Segment	Federal Lands[a,b]		State Lands[a,b]		County Lands[b,c]	
	Con	Op	Con	Op	Con	Op
Clearbrook to Carlton	157.1	36.5	900.1	219.6	82.7	34.6

[a] Source: PAD-US – USGS 2016.

[b] Con = 205-foot-wide construction footprint, Op = 50-foot-wide permanent right-of-way.

[c] Source: County-owned parcels were identified using the "owner" name within each county's GIS parcel data. Because parcel data and owner naming conventions vary from county to county, DOC-EERA identified county-owned parcels as best as possible. Note that Red Lake County had no GIS parcel data, and Aitkin County had no ownership information on their parcel data; therefore, these counties were not included in the analysis.

Federal Land

RA-07 would cross 157 acres of Chippewa National Forest, which is managed by USFS. The forest is managed to protect forest and water resources, and provides a variety of recreational opportunities. Therefore, the Applicant would be required to comply with the designated uses as established by USFS as the authorizing agency.

State Land

Construction of RA-07 would cross approximately 900 acres of state lands, including three state forests (Bowstring State Forest [698 acres], Fond du Lac State Forest [63 acres], Mississippi Headwaters State Forest [131 acres]) and two AMAs (Clearwater River AMA [0.3 acre] and Little Otter Creek AMA [8 acres]). These forests and AMAs are managed by Minnesota DNR as multiple-use areas. They are primarily used for fish and wildlife resource protection, forestry, and recreation. Compatibility of the Project with designated uses would be determined during easement negotiations with the authorizing agency, which is Minnesota DNR.

County Land

Construction of RA-07 would affect county land in seven counties: 61 acres in Hubbard County, 10 acres in Carlton County, 5.5 acres in Clearwater County, 3 acres in Cass County, 2 acres in Beltrami County, and 0.5 acre in Itasca County. The operational right-of-way would include 26 acres in Hubbard County, 4 acres in Carlton County, 2 acres in Clearwater County, 1 acre in Cass County, 0.7 acre in Beltrami County, 0.3 acre in St. Louis County, and 0.2 acre in Itasca County. While the exact designated use of this land is unknown, it is likely to be land in county parks or forests. Therefore, compatibility with designated uses would be determined by the relevant county governments.

Route Alternative RA-08

Table 6.3.6-6 lists the acreage of federal, state, and county lands crossed by RA-08 during construction and operation.

Table 6.3.6-6. Public Lands Crossed by Route Alternative RA-08 (acres)

Segment	Federal Lands[a,b]		State Lands[a,b]		County Lands[b,c]	
	Con	Op	Con	Op	Con	Op
Clearbrook to Carlton	84.4	35.2	583.7	243.2	47.9	19.9

[a] Source: PAD-US – USGS 2016.

[b] Con = 120-foot-wide construction footprint, Op = 50-foot-wide permanent right-of-way.

[c] Source: County-owned parcels were identified using the "owner" name within each county's GIS parcel data. Because parcel data and owner naming conventions vary from county to county, DOC-EERA identified county-owned parcels as best as possible. Note that Red Lake County had no GIS parcel data, and Aitkin County had no ownership information on their parcel data; therefore, these counties were not included in the analysis.

Federal Land

RA-08 would cross 84 acres of Chippewa National Forest, which is managed by USFS. The forest is managed to protect forest and water resources, and provides a variety of recreational opportunities. Therefore, the Applicant would be required to comply with the designated uses as established by USFS as the authorizing agency.

State Land

Construction of RA-08 would cross 584 acres of state lands, including two AMAs (Bruce Creek AMA [0.3 acre] and Little Otter Creek AMA [4 acres]), five state forests (Bowstring State Forest [410 acres], Fond du Lac State Forest [36 acres], Mississippi Headwaters State Forest [68 acres], Savanna State Forest [38 acres], and Welsh Lake State Forest]15 acres]), and two WMAs (Bemidji Slough WMA [4 acres] and Swan River Deer Yard WMA [7 acres]). These forests, WMAs, and AMAs are managed by Minnesota DNR as multiple-use areas. They are primarily used for fish and wildlife resource protection, forestry, and recreation. Compatibility of the Project with designated uses would be determined during easement negotiations with the authorizing agency, which is Minnesota DNR.

County Land

RA-08 would cross county-owned land in six counties: 24 acres of county land in Hubbard County, 10.6 acres in Carlton County, 6 acres in Clearwater County, 5 acres in Itasca County, 2 acres in St. Louis County, and 0.2 acre in Beltrami County. During operation, the RA-08 route would include 10 acres in Hubbard County, 4 acres in Carlton County, 2 acres in Clearwater County, 2 acres in Itasca County, 1 acre in St. Louis County, and 0.1 acre in Beltrami County. While the exact designated use of this land is unknown, it is likely to be land in county parks or forests. Therefore, compatibility with designated uses would be determined by the relevant county governments.

6.3.6.3 Impact Assessment

The impact assessment focuses on compatibility of construction and operation of the Applicant's preferred route and route alternatives with designated uses of specific federal, state, and county public lands. In addition to the analysis of compatibility with the designated use of public lands in this section, impacts on the public resources contained within public lands (e.g., vegetation, wildlife, and recreation) and the measures that would be implemented to minimize potential impacts on those resources can be found in several other sections within Chapter 6, including Sections 6.3.1, 6.3.3, 6.3.4, 6.2.3, and 6.5.2.

6.3.6.3.1 Applicant's Preferred Route (in Minnesota)

Construction Impacts

In Minnesota, the Applicant's preferred route would cross 0.4 mile of federal land associated with the North County Scenic Trail federal land. It would cross approximately 440 acres of state land, including AMAs, WMAs, and state forests, and 548 acres of county land.

Depending on the specific resource or feature being affected, impacts on public lands from construction would vary. The use of public lands would be temporarily restricted during the period of active construction. Construction in any location would last for several days to several weeks, depending on a variety of factors such as land use type, topography, weather, and other environmental conditions. Limited use, access restrictions, and noise and visual disturbance could occur during this timeframe. However, the affected area would represent a relatively small area in proportion to the total amount of public land within the specific forest or resource management area that remains undisturbed or unaffected. Given that construction impacts would be limited to small areas within the overall forest and resource management area, and that the original use of these larger areas would be maintained during construction, it is likely that construction of the pipeline would result in a temporary to long-term and minor to negligible impact related to compatibility with the designated uses of these public lands. Removal of forested habitat would be a long-term impact; depending on the route and the forest, the magnitude could be major.

There would be no direct impacts on Itasca State Park; during construction of the Applicant's preferred route, however, access to the park and visitor experience could be indirectly affected.

Operations Impacts

Operation of the pipeline would involve periodic inspection, pipeline maintenance activities, and mowing to maintain appropriate vegetation along public lands. During operation, the permanent right-of-way for the Applicant's preferred route includes 2 acres of federal land, 199 acres of state land, and 228 acres of county land. The permanent right-of-way would be periodically cleared of vegetation, and no trees would be permitted to grow. With the exception of the 37 acres of county land and 27 acres of state lands that would be permanently converted to permanent access roads and valve sites (see Tables 6.3.6-1 and 6.3.6-2), the pipeline itself would be buried so there would be no ongoing restriction to surface use, except at valve locations. Therefore, the public land could continue to be managed for its designated uses, and impacts associated with operation would likely be long-term but negligible to minor. The exception to this would be on forested land where the management objective is timber production, and no trees would be permitted to grow within the permanent right-of-way of the pipeline corridor. Given the amount of affected land in state forests compared to the overall forested land that remains available for timber production, it is likely that operation of the pipeline would result in a permanent but minor impact related to compatibility with the designated use of forested land for timber production.

6.3.6.3.2 Route Alternatives (from Clearbrook to Carlton)

Route Alternative RA-03AM

Construction Impacts

During construction, federal, state, and county lands affected by RA-03AM would total approximately 320 acres (Table 6.3.6-3). The largest portion of this land would be county land (262 acres); followed by 33 acres of state forests, WMAs, and AMAs; and 25 acres of federal land within the Crane Meadows NWR, which is managed by USFWS.

Depending on the specific resource or feature being affected, impacts on public lands from construction would vary. The use of public lands would be temporarily restricted during the period of active construction. Construction in any location would last for several days to several weeks, depending on a variety of factors such as land use type, topography, weather, and other environmental conditions; limited use, access restrictions, and noise and visual disturbance could occur during this timeframe. However, the affected area would represent a relatively small area in proportion to the total amount of public land within the specific forest or resource management area that remains undisturbed or unaffected. Given that construction impacts are limited to small areas within the overall forest and resource management area, and that the original use of these larger areas would be maintained during construction, it is likely that construction of the pipeline would result in a temporary to long-term and minor to negligible impact related to compatibility with the designated uses of these public lands. Removal of forested habitat would be a long-term impact; depending on the route and the forest, the magnitude could be major.

There would be no direct impacts on Itasca State Park; during construction of RA-03AM, however, access to the park and visitor experience would be indirectly affected.

Operations Impacts

Operation of the pipeline would involve periodic inspection, pipeline maintenance activities, and mowing to maintain appropriate vegetation along public lands. During operation, the permanent right-of-way for the RA-03AM route would include 143 acres of public lands, most of which would be county-owned lands (Table 6.3.6-3).

With the exception of public lands that would be permanently converted to permanent access roads and valve sites, the pipeline itself would be buried so there would be no ongoing restriction to surface use, except at valve locations. The public land could continue to be managed for its designated uses; therefore, impacts associated with operation are likely to be long term but negligible to minor. The exception to this would be on forested land where the management objective is timber production, and no trees would be permitted to grow within the permanent right-of-way of the pipeline corridor. However, given the amount of affected land in state forests compared to the overall forested land that remains available for timber production, it is likely that operation of the pipeline would result in a permanent but minor impact related to compatibility with the designated use of forested land for timber production.

Route Alternative RA-06

Construction Impacts

During construction, the federal, state, and county lands affected by RA-06 would total approximately 895 acres (Table 6.3.6-4). The largest portion of this land would be state land (794 acres), followed by approximately 90 acres of federal land (86 acres of the Chippewa National Forest, which is managed by USFS, and 4 acres of BLM-owned land).

Depending on the specific resource or feature being affected, impacts on public lands from construction would vary. The use of public lands would be temporarily restricted during the period of active construction. Construction in any location would last for several days to several weeks, depending on a variety of factors such as land use type, topography, weather, and other environmental conditions; limited use, access restrictions, and noise and visual disturbance could occur during this timeframe. However, the affected area would represent a relatively small area in proportion to the total amount of public land within the specific forest or resource management area that remains undisturbed or unaffected. Given that construction impacts are limited to small areas within the overall forest and resource management area and that the original use of these larger areas would be maintained during construction, it is likely that construction of the pipeline would result in a temporary to long-term and minor to negligible impact related to compatibility with the designated uses of these public lands. Removal of forested habitat would be a long-term impact; depending on the route and the forest, the magnitude could be major.

Operations Impacts

Operation of the pipeline would involve periodic inspection, pipeline maintenance activities, and mowing to maintain appropriate vegetation along public lands. During operation, the permanent right-of-way for RA-06 includes 38 acres of federal land, 331 acres of state land, and 5 acres of county land.

With the exception of public lands that would be permanently converted to permanent access roads and valve sites, the pipeline itself would be buried so there would be no ongoing restriction to surface use, except at valve locations. The public land could continue to be managed for its designated uses; therefore, impacts associated with operation are likely to be long term but negligible to minor. The exception to this would be on forested land where the management objective is timber production, and no trees would be permitted to grow within the permanent right-of-way of the pipeline corridor. However, given the amount of affected land in state forests compared to the overall forested land that remains available for timber production, it is likely that operation of the pipeline would result in a permanent but minor impact related to compatibility with the designated use of forested land for timber production.

Route Alternative RA-07

Construction Impacts

During construction, the federal, state, and county lands affected by RA-07 would total approximately 1,140 acres (Table 6.3.6-5). The largest portion of this land would be state land (900 acres), followed by 157 acres of federal land through the Chippewa National Forest, which is managed by USFS.

Depending on the specific resource or feature being affected, impacts on public lands from construction would vary. The use of public lands would be temporarily restricted during the period of active construction. Construction in any location would last for several days to several weeks, depending on a

variety of factors such as land use type, topography, weather, and other environmental conditions; limited use, access restrictions, and noise and visual disturbance could occur during this timeframe. However, the affected area would represent a relatively small area in proportion to the total amount of public land within the specific forest or resource management area that remains undisturbed or unaffected. Given that construction impacts are limited to small areas within the overall forest and resource management area and that the original use of these larger areas would be maintained during construction, it is likely that construction of the pipeline would result in a temporary to long-term and minor to negligible impact related to compatibility with the designated uses of these public lands. Removal of forested habitat would be a long-term impact; depending on the route and the forest, the magnitude could be major.

Operations Impacts

With the exception of public lands that would be permanently converted to permanent access roads and valve sites, the pipeline itself would be buried so there would be no ongoing restriction to surface use, except at valve locations. The public land could continue to be managed for its designated uses; therefore, impacts associated with operation are likely to be long term but negligible to minor. The exception to this would be on forested land where the management objective is timber production, and no trees would be permitted to grow within the permanent right-of-way of the pipeline corridor. However, given the amount of affected land in state forests compared to the overall forested land that remains available for timber production, it is likely that operation of the pipeline would result in a permanent but minor impact related to compatibility with the designated use of forested land for timber production.

Route Alternative RA-08

Construction Impacts

During construction, the federal, state, and county lands affected by RA-08 would total approximately 716 acres (Table 6.3.6-6). The largest portion of this land would be state land (584 acres), followed by 84 acres of federal land through the Chippewa National Forest, which is managed by USFS.

Depending on the specific resource or feature being affected, impacts on public lands from construction would vary. The use of public lands would be temporarily restricted during the period of active construction. Construction in any location would last for several days to several weeks, depending on a variety of factors such as land use type, topography, weather, and other environmental conditions; limited use, access restrictions, and noise and visual disturbance could occur during this timeframe. However, the affected area would represent a relatively small area in proportion to the total amount of public land within the specific forest or resource management area that remains undisturbed or unaffected. Given that construction impacts are limited to small areas within the overall forest and resource management area and that the original use of these larger areas would be maintained during construction, it is likely that construction of the pipeline would result in a temporary to long-term and minor to negligible impact related to compatibility with the designated uses of these public lands. Removal of forested habitat would be a long-term impact; depending on the route and the forest, the magnitude could be major.

Operations Impacts

Operation of the pipeline would involve periodic inspection, pipeline maintenance activities, and mowing to maintain appropriate vegetation along public lands. During operation, the permanent right-of-way for RA-08 includes 35 acres of federal land, 243 acres of state land, and 20 acres of county land.

With the exception of public lands that would be permanently converted to permanent access roads and valve sites, the pipeline itself would be buried so there would be no ongoing restriction to surface use, except at valve locations. The public land could continue to be managed for its designated uses; therefore, impacts associated with operation are likely to be long term but negligible to minor. The exception to this would be on forested land where the management objective is timber production, and no trees would be permitted to grow within the permanent right-of-way of the pipeline corridor. However, given the amount of affected land in state forests compared to the overall forested land that remains available for timber production, it is likely that operation of the pipeline would result in a permanent but minor impact related to compatibility with the designated use of forested land for timber production.

6.3.6.4 Summary and Mitigation

6.3.6.4.1 Summary

Table 6.3.6-7 presents the results of the analysis of potential compatibility impacts on public lands from construction and operation of the Applicant's preferred route and the route alternatives. Depending on the specific resource or feature being affected, impacts on public lands from construction would vary. The use of public lands would be temporarily restricted during the period of active construction. Construction in any location would last for several days to several weeks, depending on a variety of factors such as land use type, topography, weather, and other environmental conditions; limited use, access restrictions, and noise and visual disturbance could occur during this timeframe.

The duration and magnitude of the construction impacts related to the compatibility of the Applicant's preferred route and route alternatives with the designated uses of public land would range from negligible to minor and temporary to long-term impacts. The low level of impact occurs for two reasons. The limitation represents a small portion of the overall land designated for public use in most affected areas, and any impacts on this land would be restored following construction. Therefore, any impacts related to the compatibility of the pipeline with the designated uses of the land would be limited to the duration of construction and site restoration. Construction of the Applicant's preferred route would have the largest effect in terms of total land area on county-owned land (548 acres), whereas the RA-07 route would have the largest total impact on federally and state-owned land (157 acres and 900 acres, respectively).

During operations, impacts on public lands related to compatibility of a pipeline (for any route option) with their designated uses would be long term to permanent and negligible to major. With the exception of public lands that would be permanently converted to permanent access roads and valve sites, the pipeline itself would be buried so there would be limited restriction to surface use, except at valve locations. Therefore, the public land could continue to be managed for its designated uses, and impacts associated with operation are likely to be long term but negligible to minor. The exception to this would be on forested land within the permanent right-of-way of the pipeline corridor where there would be permanent minor impacts on forest production, recreation and habitat. Given the area of the affected land relative to the public land that remains available for timber production, it is likely that continued operation of the pipeline (for any route option) would result in a permanent but minor impact related to compatibility of a pipeline with the designated use of the affected land.

6.3.6.4.2 Mitigation

As previously noted, crossing through public lands would prompt authorizing agencies to ensure that the Applicant's preferred route or a route alternative complies with the designated uses of the land; therefore, the various agencies would require mitigation and the Applicant would need to coordinate with the authorizing agency.

In the area where the Applicant preferred route crosses the North Country National Scenic Trail, the Applicant will minimize the removal of trees and vegetation to the greatest extent possible within visual distances of the route of the North Country National Scenic Trail. Additionally, after construction activities in the area of the trail crossing have been completed, the Applicant will:

- Clear all evidence of construction materials from the site immediately along the trail as well as areas that may be observable from the trail;
- Restore the shape and structure of the treadway to its original condition and ensure that water does not pool or otherwise collect and flow along the trail;
- Re-vegetate the construction workspace adjacent to the trail to the greatest extent possible with site-appropriate trees, shrubs, and ground vegetation.

With implementation of Applicant-proposed measures and compliance with conditions specified in required permits by the authorizing agencies, no mitigation has been identified to further minimize impacts on federal, state, and county lands—with the exception of forested land within the permanent right-of-way, which would not be allowed to re-establish. A potential mitigation would be to purchase and dedicate private forest land to timber production as an offset; or to compensate the state, federal, or county government for any merchantable timber lost.

Table 6.3.6-7. Summary of Potential Impacts Related to Compatibility of the Applicant's Preferred Route and Route Alternatives with Designated Uses of Public Land

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Federal land	Temporary/negligible to minor impacts • 5 acres	Temporary/negligible to minor impacts • 25 acres	Temporary/negligible to minor impacts • 91 acres	Temporary/negligible to minor impacts • 157 acres	Temporary/negligible to minor impacts • 84 acres
State land	Temporary to long-term/negligible to minor impacts • 440 acres	Temporary to long-term/negligible to minor impacts • 33 acres	Temporary to long-term/negligible to minor impacts • 794 acres	Temporary to long-term/negligible to minor impacts • 900 acres	Temporary to long-term/negligible to minor impacts • 584 acres
County land	Temporary/negligible to minor impacts • 548 acres	Temporary/negligible to minor impacts • 262 acres	Temporary/negligible to minor impacts • 11 acres	Temporary/negligible to minor impacts • 83 acres	Temporary/negligible to minor impacts • 48 acres
Operations Impacts					
Federal land	Long-term to permanent/ negligible to minor impacts • 2 acres	Long-term to permanent/ negligible to minor impacts • 11 acres	Long-term to permanent/ negligible to minor impacts • 38 acres	Long-term to permanent/negligible to minor impacts • 37 acres	Long-term to permanent/negligible to minor impacts • 35 acres
Impacts on state land	Long-term to permanent/ negligible to minor impacts • 199 acres	Long-term to permanent/ negligible to minor impacts • 14 acres	Long-term to permanent/ negligible to minor impacts • 331 acres	Long-term to permanent/negligible to minor impacts • 220 acres	Long-term to permanent/negligible to minor impacts • 243 acres
Impacts on county land	Long-term to permanent/ negligible to minor impacts • 228 acres	Long-term to permanent/ negligible to minor impacts • 119 acres	Long-term to permanent/ negligible to minor impacts • 5 acres	Long-term to permanent/negligible to minor impacts • 35 acres	Long-term to permanent/negligible to minor impacts • 20 acres

6.3.6.5 References

Minnesota Department of Natural Resources (Minnesota DNR). 2016. Wildlife Management Areas. http://dnr.state.mn.us/wmas/description.html. Accessed on December 9, 2016.

North Country Trail Association. 2016. Trail association website. https://northcountrytrail.org/trail/. Accessed on December 11, 2016.

U.S. Geological Survey (USGS). 2016. Gap Analysis Program. May 2016. Protected Areas Database of the United States (PAD-US), Version 1.4 Combined Feature Class.

6.3.7 Air Quality

Construction and operation of the Applicant's preferred route and route alternatives may affect air quality in Minnesota through the emission of air pollutants that, directly or indirectly, enter the atmosphere and contribute to increased air pollution. Air quality is defined by the ambient concentration of certain pollutants (i.e., criteria pollutants) in the atmosphere determined by EPA to be of concern to the health and welfare of the general public and the environment.

Pipeline construction causes air pollution primarily through emissions from construction equipment (i.e., non-road engines), mobile sources (i.e., vehicles), and construction-related activities (i.e., burning, blasting, and road travel). This analysis evaluates air quality impacts from construction of the Applicant's preferred route and route alternatives by assessing:

- Air pollutants, including GHG emissions, generated by construction; and
- Stored carbon releases from tree removal within the construction work areas.

Under normal operations, oil pipelines emit small amounts of fugitive emissions. More significant emissions may result from storage tanks at terminals and pump stations that use internal combustion engines. The pump stations for the Applicant's preferred route would use electric-drive motors that do not emit air pollutants but do create air emissions indirectly from the electricity generation required to operate them. Furthermore, an underlying issue associated with oil pipelines has been their potential to affect climate change through increased concentrations of GHGs in the atmosphere. This analysis evaluates air impacts from operations for the Applicant's preferred route and route alternatives by assessing:

- Air pollutants, including GHG emissions, from pipeline operations; and
- Loss of carbon storage capability (i.e., carbon sequestration) from tree removal within the pipeline rights-of-way.

This section first describes the existing condition for air quality within an area along the Applicant's preferred route and route alternatives where air quality could be affected by construction and operation. Next, the section evaluates the potential impacts of construction and operation on the existing conditions and compares these impacts for the five route options (i.e., the Applicant's preferred route, RA-03AM, RA-06, RA-07, and RA-08).

Chapter 10 addresses the impacts on air quality resulting from a crude oil release.

6.3.7.1 Regulatory Context and Methodology

6.3.7.1.1 Regulatory Context

Air Quality Standards

Criteria pollutants and federal air quality standards are defined in Section 5.2.7.1 and Table 5.2.7-1. Minnesota has adopted ambient air quality standards that are the same as or more stringent than the National Ambient Air Quality Standards (NAAQS); these are referred to as "Minnesota Ambient Air Quality Standards" (MAAQS). Minnesota also has established state standards for hydrogen sulfide and particulate matter (PM) (EPA 2016a; Minnesota PCA 2000).

Attainment of Air Quality Standards

Neither the Applicant's preferred route nor any route alternative would pass through an air quality maintenance or nonattainment area within Minnesota (EPA 2016b). Refer to Section 5.2.7.2 for general information on air quality attainment status.

Air Quality Control Regions

Air quality control regions are categorized as Class I, Class II, or Class III. Class I areas (commonly called "pristine areas") were established primarily as national parks and wilderness areas above a certain size and receive special protections under the Clean Air Act to help maintain pristine air quality. Minnesota contains two Class I areas: Voyageurs National Park (in Koochiching and St. Louis counties) and the Boundary Waters Canoe Area (in St. Louis, Lake, and Cook counties). The closest distances to Class I and pending Class I areas are listed in Table 6.3.7-1. Neither the Applicant's preferred route nor any route alternative would pass through a Class I area within Minnesota; however, route alternatives RA-06, RA-07, and RA-08 would pass through the Fond du Lac Reservation.

Table 6.3.7-1. Closest Distance to Class I Areas in Minnesota for the Applicant's Preferred Route and Route Alternatives (miles)

Route	Distance to Boundary Waters Canoe Area Wilderness Area	Distance to Voyageurs National Park	Distance to Fond du Lac Reservation (pending re-designation)
Applicant's preferred route	87.6	110.8	2.0
Route alternative RA-03AM	87.6	112.9	2.0
Route alternative RA-06	38.6	47.4	0.0
Route alternative RA-07	69.1	82.4	0.0
Route alternative RA-08	69.5	82.6	0.0

Source: Minnesota PCA 2016a.

Air Quality Permitting Requirements

Air permits may be required for a project, depending on the quantity of specific project emissions. In general, federal permits are required for larger emitters and are implemented nationwide under a consistently applied permitting program. Minnesota has been delegated authority to implement the federal permits program. State permits are those air permits required by state rule and statutes. In Minnesota, these permits are the result of state-specific strategies approved by the federal government to regulate minor sources of air emissions and to attain compliance with broader air quality federal laws and regulations (e.g., registration permits, capped emission permits).

Generally, no significant air emissions are associated with operation of a pipeline itself. While there may be what are termed "fugitive emissions" from a pipeline, such emissions are generally very minor and typically are not subject to the requirement to obtain a permit. The pipeline-associated facilities that most commonly trigger the requirement to obtain a permit for operations are storage tanks at terminals and pump stations that use internal combustion engines to power pipeline pumps. All the pump stations proposed for the Applicant's preferred route and route alternatives use electric-drive motors and do not emit air pollutants. However, they do create air emissions indirectly from the additional electricity

generation required to operate them. Note that, although pipeline construction causes air pollution through emissions from non-road engines and mobile sources, these emissions do not count toward permitting triggers and therefore do not require air permits. The additional storage tank withdrawal losses due to increased throughput at the Clearbrook terminal will require an air permit. At Clearbrook terminal, the Applicant would obtain a synthetic-minor individual state permit in order to limit VOC emissions and retain status as a minor source (Enbridge 2016a).

6.3.7.1.2 Methodology

Construction and operation of the Applicant's preferred route and route alternatives would result in emissions that may affect local air quality. The ROI consisted of the designated airsheds (geographical regions that share the same air supply and are subject to the same air pollutants) through which the pipeline routes pass. Because of the large regional nature of airsheds, the Applicant's preferred route and the route alternatives generally would occur within the same airsheds.

Potential impacts on air quality within the ROI from construction and operation of the Applicant's preferred route and route alternatives were assessed as follows:

- Direct construction emissions data were obtained from the Applicant for one pipeline construction spread. Each construction emission source group from the Applicant's data was divided by an average of 54.8 miles per spread to obtain emissions per mile. Emissions per mile then were multiplied by the corresponding pipeline segment length to determine the emissions for each source group for each route segment. This allowed a comparable assessment of the construction emissions from the Clearbrook-to-Carlton segment for the Applicant's preferred route and route alternatives.
- Direct operations emissions data were obtained from the Applicant for the Applicant's preferred route and route alternatives based on the number of electric pump stations and MLV sites. Operational emissions for the Applicant's preferred route and route alternatives were presented for the entire routes within Minnesota, not just the Clearbrook-to-Carlton segment.
- Indirect GHG emissions for the Applicant's preferred route and route alternatives from generation of electricity by the existing local utilities for electric pump station operations were calculated using pump station electricity consumption data supplied by the Applicant and GHG emission factors from EPA's Emissions and Generation Resource Integrated Database (eGRID).
- The amounts of carbon that potentially would be released back into the atmosphere during tree removal within the construction work areas were estimated using the average carbon density of trees within the Northern Lake States developed by USFS.
- The loss of carbon sequestration for areas along the permanent right-of-way that would remain cleared was estimated using the average annual carbon accumulation associated with trees within the Northern Lake States developed by the Chicago Climate Exchange.

6.3.7.2 Existing Conditions

6.3.7.2.1 Applicant's Preferred Route and Route Alternatives

Climate/Meteorology

Air quality is substantially influenced by climate and meteorological conditions. Minnesota has a continental climate with cold, often frigid winters and hot summers. Refer to Table 5.2.7-3 for representative climate data.

Existing Air Quality

To characterize the background air quality for northern Minnesota when no site-specific monitoring data were available, data were obtained from air quality monitoring stations located within the counties that would be crossed by the Applicant's preferred route and route alternatives. To obtain representative background air quality for nitrogen dioxide (NO_2) and sulfur dioxide (SO_2), data from a monitoring station in Anoka County were used. This monitoring station is the closest station to counties in the ROI that monitors for NO_2 and SO_2 emissions. A summary of the available background air quality concentrations for 2015 is presented in Table 6.3.7-2. The table shows that ambient air quality for all criteria pollutants are below the NAAQS for all areas that would be crossed by the Applicant's preferred route and route alternatives. Furthermore, ambient air quality for all criteria pollutants are also below MAAQS.

EPA developed the Air Quality Index to provide a simple, uniform way to report daily air quality conditions taking into account all of the criteria air pollutants measured within a geographic area. Minnesota reports the Air Quality Index in 10 reporting areas across the state. According to the Air Quality Index report for 2015, all of the routes are in areas that are in-attainment for air quality standards, and none are located near any of the areas noted for unhealthy air quality (Minnesota PCA 2016b).

Greenhouse Gases

GHGs occur in the atmosphere both naturally and as a result of human activities, such as burning fossil fuels. Based on overwhelming scientific evidence, EPA found that GHGs constitute a threat to public health and welfare (Center for Climate and Energy Solutions 2016). Refer to Section 5.2.7.2.1 for a general discussion of federal actions designed to reduce overall GHG emissions in 2025 by 26 to 28 percent over 2005 emission levels.

Minnesota has implemented various programs and legislation to reduce GHG emissions. Since the 1990s, the state has provided tax exemptions for renewable and alternative energy sources (Minn. Stat. § 272.02 and 297A.68). The Next Generation Energy Act of 2007 established state GHG reduction goals of 15 percent by 2015, 30 percent by 2025, and 80 percent by 2050. Recent data indicate that Minnesota missed the 2015 target and is not on track to meet the other goals (MNDOT 2017; MPR News 2016).

Table 6.3.7-2. Representative Background Air Quality Data in the Vicinity of the Applicant's Preferred Route and Route Alternatives in Minnesota (2015)

Pollutant (Averaging Time)	Monitoring Station Location				
	Beltrami County	Carlton County	Crow Wing County	St. Louis County	Anoka County[a]
PM-10 (24-hour, 2nd max)	--	--	--	67 µg/m³ (45% of NAAQS)	--
PM-2.5 (Annual, mean)	5.0 µg/m³ (42% of NAAQS)	6.8[b] µg/m³ (57% of NAAQS)	6.2 µg/m³ (52% of NAAQS)	5.6 µg/m³ (47% of NAAQS)	6.6 µg/m³ (55% of NAAQS)
PM-2.5 (24-hour, 98%)	14 µg/m³ (40% of NAAQS)	23 µg/m³ (66% of NAAQS)	16 µg/m³ (46% of NAAQS)	16 µg/m³ (46% of NAAQS)	15 µg/m³ (43% of NAAQS)
SO_2 (1-hour, 99%)	--	--	--	--	4 ppb (5% of NAAQS)
NO_2 (Annual, mean)	--	--	--	--	6.55 ppb (12% of NAAQS)
NO_2 (1-hour, 98%)	--	--	--	--	44 ppb (44% of NAAQS)
Ozone (8-hour, 4th max)	--	0.06 ppm (86% of NAAQS)	0.06 ppm (86% of NAAQS)	0.056 ppm (80% of NAAQS)	0.064 ppm (91% of NAAQS)
CO (8-hour, 2nd max)	--	--	--	--	0.9 ppm (10% of NAAQS)
CO (1-hour, 2nd max)	--	--	--	--	1.2 ppm (4% of MAAQS)
Lead (Max 3-month average)	--	--	--	0 µg/m³ (0% of NAAQS)	0.01 µg/m³ (7% of NAAQS)

Source: EPA 2016c.

[a] Although the region of interest (ROI) is not within Anoka County, this monitoring station is the closest station to counties in the ROI that monitors for NO_2 and SO_2 emissions.

[b] The mean value does not satisfy minimum data completeness criteria.

Notes:

Table results depict the data from the monitoring site within the county with the highest pollutant level, including exceptional events data.

Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

Air quality standards for some pollutants (PM-2.5, lead) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standards. In those cases, the site-level statistics may differ from the monitor–level statistics.

CO = carbon monoxide, MAAQS = Minnesota Ambient Air Quality Standards, NAAQS = National Ambient Air Quality Standards, NO_2 = nitrogen dioxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, ppb = parts per billion, ppm = parts per million, SO_2 = sulfur dioxide, µg/m³ = micrograms per cubic meter

"--" = no available data

Total GHG emissions in Minnesota in 2012 were approximately 154 million tons of carbon dioxide equivalents (CO_2e). Between 2005 and 2012, GHG emissions from Minnesota declined by 11 million tons of CO_2e, or about 7 percent, with the most significant reductions coming from electric power utilities and transportation energy use. In 2012, about 31 percent of the GHG emissions were from consumption of electricity, and about 25 percent of emissions were from transportation, as identified in Table 6.3.7-3 (Minnesota PCA 2015).

Table 6.3.7-3. Minnesota Greenhouse Gases by Sector (2012)

Economic Sector	Percent of 2012 Total	Sector Description
Electric utility	31%	Combustion of fuel for generation of electricity; all emissions from electricity consumption in Minnesota, including electricity imported from other states
Transportation	25%	Fuel combustion, air conditioning leakage, and natural gas pipelines
Agriculture	19%	Ruminant digestion, animal feedlots and manure management, fertilizer use, crop cultivation, and fuel combustion
Industrial	14%	Fuel combustion; taconite processing; petroleum refining; magnesium casting; lead recycling; and manufacturing steel, glass, insulating foam, and semiconductors
Residential	6%	Fuel combustion (space and water heating, dryers), fertilizer and product use, housing material carbon sequestration, and air conditioner and refrigerator leakage
Commercial	4%	Fuel combustion, solvent use, medical N_2O; includes institutional sources
Waste	1%	Waste processing and incineration, methane from landfill gas and wastewater, and carbon sequestered in demolition landfills

Source: Minnesota PCA 2015.

6.3.7.3 Impact Assessment

This section of the analysis assesses the temporary air quality effects associated with construction of the pipeline and associated facilities, and the permanent air quality effects resulting from facility operations for the Applicant's preferred route and each of the route alternatives. See Section 5.2.7.3 for a general discussion of potential air quality effects related to pipeline construction and operation.

6.3.7.3.1 Applicant's Preferred Route (in Minnesota)

Construction Impacts

The total estimated construction emissions for the Applicant's preferred route in Minnesota are shown in Table 6.3.7-4. Because the pipeline would be constructed in seven spreads (seven separate sections), total emissions would not be concentrated in any one location but would occur incrementally along the pipeline route. Further, each spread of pipeline activity moves along the route daily during construction; therefore, emissions would be minimal at any specific location, and typical meteorological conditions likely would cause rapid dispersal. The Applicant would minimize dust generated from construction activities by wetting soils on the right-of-way and limiting working hours in residential areas as needed (Enbridge 2016a), and/or taking additional measures as appropriate based on site specific conditions. Gasoline and diesel engines must comply with the EPA mobile source regulations in 40 CFR Part 85 for on-road engines and 40 CFR Part 89 for non-road engines. These regulations are designed to minimize emissions and require a maximum sulfur content in diesel fuel of 15 parts per million.

Open burning of cleared materials from construction activities has the potential to affect air quality, particularly the large volume of trees that would be removed from the right-of-way. Consequently, the burning of mature trees would not be allowed. Only small and dry brush piles will be allowed to burn.

As a result, air emissions from construction would result in only localized minor, intermittent and temporary impacts. Because air permitting is not triggered by temporary construction phase emissions, dispersion modeling to ensure compliance with ambient air quality standards would not be required.

Table 6.3.7-4. Estimated Construction Emissions for the Applicant's Preferred Route in Minnesota

Emission Source Description	Direct Emissions (tons)							
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs
North Dakota Border to Clearbrook								
On- and off-road diesel equipment combustion emissions	17.1	245.8	241.0	0.4	10.6	9.9	47,162.5	1.1
On- and off-road gasoline equipment combustion emissions	2.2	4.7	30.4	2.4	0.5	0.4	4,190.7	0.0
Paved roads fugitive emissions	0.0	0.0	0.0	0.0	117.7	28.9	0.0	0.0
Unpaved roads fugitive emissions	0.0	0.0	0.0	0.0	16.7	1.7	0.0	0.0
Open burning of wood debris emissions	0.0	0.0	542.9	0.0	52.9	52.9	280.7	0.0
Subtotal	***19.3***	***250.4***	***814.2***	***2.8***	***198.3***	***93.7***	***51,633.9***	***1.1***
Clearbrook to Carlton								
On- and off-road diesel equipment combustion emissions	34.5	497.6	487.8	0.9	21.4	20.0	95,473.4	2.1
On- and off-road gasoline equipment combustion emissions	4.4	9.4	61.5	4.8	0.9	0.9	8,483.5	0.0
Paved roads fugitive emissions	0.0	0.0	0.0	0.0	238.3	58.5	0.0	0.0
Unpaved roads fugitive emissions	0.0	0.0	0.0	0.0	33.8	3.4	0.0	0.0
Open burning of wood debris emissions	0.0	0.0	1,099.0	0.0	107.0	107.0	568.3	0.0
Blasting emissions[a]	0.0	0.2	0.3	0.003	0.0005	0.00003	0.0	0.0
Subtotal	***39.0***	***507.1***	***1,648.6***	***5.6***	***401.5***	***189.8***	***104,525.1***	***2.1***
Carlton to Wisconsin Border								
On- and off-road diesel equipment combustion emissions	1.5	21.6	21.2	0.04	0.9	0.9	4.2	0.1
On- and off-road gasoline equipment combustion emissions	0.2	0.4	2.7	0.2	0.04	0.04	369.0	0.0
Paved roads fugitive emissions	0.0	0.0	0.0	0.0	10.4	2.6	0.0	0.0

Table 6.3.7-4. Estimated Construction Emissions for the Applicant's Preferred Route in Minnesota

Emission Source Description	Direct Emissions (tons)							
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs
Unpaved roads fugitive emissions	0.0	0.0	0.0	0.0	1.5	0.2	0.0	0.0
Open burning of wood debris emissions	0.0	0.0	47.8	0.0	4.7	4.7	24.7	0.0
Subtotal	***1.7***	***22.1***	***71.7***	***0.2***	***17.5***	***8.3***	***4,546.9***	***0.1***
TOTAL MINNESOTA EMISSIONS	**59.9**	**779.6**	**2,534.6**	**8.7**	**617.3**	**291.8**	**160,705.8**	**3.3**

Source: Enbridge 2017.

[a] Blasting would be required only for one 1,500-foot section in Spread 7.

Notes:

Calculations are based on the emissions per spread presented in Table 5.2.7-6 (absent blasting), and an average of 54.8 miles per spread was used to determine emissions per mile. Emissions per mile then were multiplied by the corresponding pipeline length to determine the emissions for each source group for each route segment.

CO = carbon monoxide, GHGs = greenhouse gases, HAPs = hazardous air pollutants, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

Stored Carbon Releases

Construction along the Applicant's preferred route could require removal of trees from up to 1,543 acres of forested land within the construction work area in Minnesota (i.e., 1,447 acres between Clearbrook and Carlton). Of this, 673 acres are to remain permanently without trees, while the forest would be allowed to regrow on the other 871 acres. When a tree is harvested and converted into forest products, the carbon dioxide (CO_2) it has stored or sequestered over a lifetime is retained within its cellular structure. When trees die and decompose or are burned, some of the sequestered carbon remains as forest litter and soils, but much of the rest is released back into the atmosphere as CO_2. Within the Northern Lake States, USFS estimated the carbon density of forested lands for six forest types: aspen-birch, elm-ash-cottonwood, maple-beech-birch, oak-hickory, spruce-fir, and white-red-jack pine (Smith et al. 2006). The average for the six forest types is 30.2 metric-tons of carbon per acre. Consequently, the amount of carbon that potentially would be released back into the atmosphere as a result of tree removal over 1,543 acres is estimated at 188,523 tons of CO_2e, with approximately 176,710 tons of CO_2e occurring between Clearbrook and Carlton. Regrowth of the forest on the 871 acres outside of the pipeline right-of-way eventually would more than halve this loss, in the long run, after forest regrowth, bringing net CO_2 emissions from forest clearance to a level of about 82,095 tons. Note that the annual loss of carbon sequestration is quantified below as an operations impact.

Operations Impacts

Total annual emissions during operations are shown in Table 6.3.7-5. These emissions would result from eight pipeline pump stations operated with electric motors and 27 MLV sites (Enbridge 2017). Indirect GHG emissions resulting from power generation to supply electrical energy to the pump stations is considered in the following section.

Table 6.3.7-5. Estimated Operations Emissions for the Applicant's Preferred Route in Minnesota

Emission Source Description	Direct Emissions (tons per year)							
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs
Pump station fugitive emissions from pumps, piping components, sump tanks, and pig traps	2.9	0.0	0.0	0.0	0.0	0.0	0.04	0.09
Mainline valve fugitive emissions from piping components	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.004
Clearbrook terminal fugitive emissions from pumps, piping components, sump tanks, and pig traps	0.5	0.0	0.0	0.0	0.0	0.0	0.006	0.02
Additional Clearbrook terminal storage tank withdrawal losses from pipeline throughput[a]	17.5	0.0	0.0	0.0	0.0	0.0	372.2	1.2
Unpaved roads fugitive emissions	0.0	0.0	0.0	0.0	0.1	0.01	0.0	0.0
Vehicle combustion emissions	0.002	0.004	0.03	0.002	0.0004	0.0004	4.1	0.0
TOTAL MINNESOTA EMISSIONS	**21.0**	**0.004**	**0.03**	**0.002**	**0.1**	**0.01**	**375.9**	**1.3**

Source: Enbridge 2017.

[a] Only those emissions associated with the proposed increase in throughput of the Clearbrook terminal are included as part of the Project's operations emissions (i.e., existing operations emissions are equivalent to the existing environment).

Note:

Operations emissions are based on 8 pump stations and 27 mainline valve sites.

CO = carbon monoxide, GHGs = greenhouse gases, HAPs = hazardous air pollutants, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

As discussed in Section 5.2.7.3, the external floating roof storage tanks at the existing Clearbrook terminal are subject to New Source Performance Standards (NSPS) in 40 CFR 60 Subpart Kb, "Standards of Performance for Volatile Organic Liquid Storage Vessels." Subpart Kb regulates VOC emissions and establishes controls based on the vapor pressure of the stored liquid. The Clearbrook terminal currently operates under a minor source Option A Registration Permit, which is a State of Minnesota permit, solely because an NSPS applies and no federal or state permitting thresholds are exceeded (i.e., applicability to NSPS Subpart Kb requires a state air permit under Minnesota Administrative Rules Part 7007.0250). The increased throughput associated with the Applicant's preferred route would cause potential emissions of VOCs at the Clearbrook terminal that exceed the 100 tons-per-year major source threshold, triggering a Title V operating permit. The Applicant would obtain a synthetic-minor individual state permit to limit VOC emissions in order to retain status as a minor source (Enbridge 2016a).

Overall, operations would be expected to result in permanent, minor, localized air quality impacts; and GHG emissions could contribute to global climate change. Dispersion modeling to ensure compliance with ambient air quality standards has not been completed and would likely not be triggered by the

synthetic-minor individual state permit. Furthermore, operations emissions would consist primarily of VOCs, which are a precursor to the criteria pollutant ozone.

Indirect Greenhouse Gases

In addition to the direct operations emissions presented in Table 6.3.7-5 (376 tons of CO_2e per year), the pump stations would be powered by electricity from existing local electric utilities, which would produce indirect air emissions (i.e., emissions not from the Project itself but from power plant emissions that generate the electricity used by the Project). The projected power consumption from operations of all pump stations is 533,249 megawatt-hours (MWh) per year (Enbridge 2016b). This estimate includes the power consumption for the existing Line 3 pump stations.

GHG emissions for electricity use for the power control area for each of the proposed pump stations were calculated using EPA's eGRID emission factors:

- 1,894 pounds of CO_2e per MWh for the Otter Tail Power Company for the Donaldson, Viking, Plummer, and Clearbrook terminal pump stations; and
- 1,836 pounds of CO_2e per MWh for the Great River Energy for the Two Inlets, Backus, Palisade, and Cromwell pump stations.

Based on these data, the maximum indirect GHG emissions from pump station operations would be 497,112 tons of CO_2e per year (EPA 2015). The maximum indirect GHG emissions from pump station operations associated only with the increased throughput would be 452,497 tons of CO_2e per year, after removing 44,615 tons of CO_2e per year that is associated with existing Line 3 and considered part of the existing environment (Enbridge 2017). The criteria pollutant emissions associated with the electric generating facilities would be authorized by applicable air quality operating permits that ensure compliance with ambient air quality standards.

Loss of Carbon Sequestration

Following construction, 871 acres of previously cleared forested land could be reforested to provide a carbon sequestration (storage) reservoir. The remaining 673 acres along the permanent right-of-way within Minnesota would remain cleared (i.e., 631 acres between Clearbrook and Carlton). The nature of the proposed tree removal is to permanently convert forested land within the permanent right-of-way and aboveground facility sites to a non-forested land use, which would result in a permanent loss of carbon sequestration. The mechanism for carbon sequestration is discussed in Section 5.2.7.3.

Within the Northern Lake States, the Chicago Climate Exchange (2009) estimated the annual carbon accumulation on forested lands for six forest types: aspen-birch, elm-ash-cottonwood, maple-beech-birch, oak-hickory, spruce-fir, and white-red-jack pine. For these forest types, 1.6 metric tons of CO_2 is annually sequestered in the non-soil components of the forest. Thus, the carbon sequestration foregone annually on the 631 acres that are permanently deforested would be 1,210 tons. Between Clearbrook and Carlton, 631 acres would sequester approximately 1,135 tons of CO_2e per year.

6.3.7.3.2 Route Alternatives (from Clearbrook to Carlton)

In general, the air quality impacts associated with construction and operation of the route alternatives would be similar to those described above for the Applicant's preferred route.

Route Alternative RA-03AM

Construction Impacts

Table 6.3.7-6 shows the estimated construction emissions for RA-03AM between Clearbrook and Carlton. The Applicant-proposed measures to minimize air impacts for the Applicant's preferred route also would be implemented for the route alternative; consequently, the air quality impacts during construction would be minor and temporary.

Table 6.3.7-6. Estimated Construction Emissions for Route Alternative RA-03AM between Clearbrook and Carlton

Emission Source Description	Direct Emissions (tons)							
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs
On- and off-road diesel equipment combustion emissions	43.0	619.5	607.4	1.1	26.6	24.9	118,873.2	2.7
On- and off-road gasoline equipment combustion emissions	5.5	11.7	76.6	5.9	1.2	1.1	10,562.6	0.0
Paved roads fugitive emissions	0.0	0.0	0.0	0.0	296.8	72.9	0.0	0.0
Unpaved roads fugitive emissions	0.0	0.0	0.0	0.0	42.1	4.2	0.0	0.0
Open burning of wood debris emissions	0.0	0.0	1,368.4	0.0	133.2	133.2	707.5	0.0
Blasting emissions[a]	--	--	--	--	--	--	--	--
TOTAL EMISSIONS	**48.5**	**631.2**	**2,052.3**	**7.0**	**499.9**	**236.3**	**130,143.3**	**2.7**

Source: Enbridge 2017.

[a] Blasting emissions have not been quantified.

Notes:

Calculations are based on the emissions per spread presented in Table 5.2.7-6 (absent blasting), and an average of 54.8 miles per spread was used to determine emissions per mile. Emissions per mile then were multiplied by the corresponding pipeline length to determine the emissions for each emission source group for the route alternative.

CO = carbon monoxide, GHGs = greenhouse gases, HAPs = hazardous air pollutants, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

"--" = Emissions not estimated.

Stored Carbon Releases

During construction, RA-03AM could require removal of trees from the construction work area between Clearbrook and Carlton that, when removed, would release GHGs. Using the same emissions factor of 30.2 metric-tons of carbon per acre as noted for the Applicant's preferred route, the amount of carbon that potentially would be released back into the atmosphere during construction tree removal of 1,138 acres is estimated at 138,986 tons of CO_2e. Regrowth of the forest on the 667 acres outside of the pipeline right-of-way eventually would more than halve this loss, in the long run, after forest regrowth, bringing net CO_2 emissions from forest clearance to a level of about 57,455 tons.

Operations Impacts

Table 6.3.7-7 shows the estimated operations emissions for RA-03AM in Minnesota based on 9 pump stations and 29 MLV sites (Enbridge 2017). The table includes indirect GHG emissions from the purchase of electricity for pump station operations determined as a function of the pipeline length. Although the route alternative varies only in the Clearbrook-to-Carlton segment, the operations emissions presented in the table are for the entire pipeline route within Minnesota. Similar to the Applicant's preferred route, operations of RA-03AM would result in minor permanent impacts on air quality, and GHG emissions could contribute to global climate change. Note that emissions from vehicle combustion and unpaved roads have not been quantified.

Loss of Carbon Sequestration

Following construction of RA-03AM, 667 acres of previously cleared forested land could be reforested to provide a carbon sequestration (storage) reservoir. The remaining 471 acres along the permanent right-of-way between Clearbrook and Carlton would remain cleared and would not provide any future carbon sequestration. Using the same emission factor of 1.6 metric-tons of CO_2 per acre per year as noted for the Applicant's preferred route, the amount of carbon that would have been sequestered by 471 acres is estimated at 846 tons of CO_2e per year.

Route Alternative RA-06

Construction Impacts

Table 6.3.7-8 shows the estimated construction emissions for RA-06 between Clearbrook and Carlton. The Applicant-proposed measures to minimize air impacts for the Applicant's preferred route also would be implemented for the route alternative; consequently, air quality impacts during construction would be minor and temporary.

Table 6.3.7-7. Estimated Operations Emissions for Route Alternative RA-03AM in Minnesota

Emission Source Description	Direct Emissions (tons per year)[a]								Indirect Emissions (tons per year)[b]
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs	GHGs
Pump station fugitive emissions from pumps, piping components, sump tanks, and pig traps	3.7	0.0	0.0	0.0	0.0	0.0	0.05	0.1	N/A
Mainline valve fugitive emissions from piping components	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.004	N/A
Clearbrook terminal fugitive emissions from pumps, piping components, sump tanks, and pig traps	0.5	0.0	0.0	0.0	0.0	0.0	0.006	0.02	N/A
Additional Clearbrook terminal storage tank withdrawal losses from pipeline throughput	17.5	0.0	0.0	0.0	0.0	0.0	372.2	1.2	N/A
Unpaved roads fugitive emissions[c]	--	--	--	--	--	--	--	--	N/A
Vehicle combustion emissions[c]	--	--	--	--	--	--	--	--	N/A
Pump stations indirect emissions from being powered by electricity from existing local electric utilities	--	--	--	--	--	--	--	--	518,668.3
TOTAL EMISSIONS	**21.8**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**372.2**	**1.3**	**518,668.3**

Source: Enbridge 2017.

[a] Only those emissions associated with the proposed increase in throughput of the Clearbrook terminal are included as part of the operations emissions (i.e., existing operations emissions are equivalent to the existing environment).

[b] Because the projected power consumption from the pump stations is unknown, indirect GHG emissions for the route alternatives were calculated based on 452,497 tons of CO_2e per year for the Applicant's preferred route over 380 total miles (i.e., 1,191 tons of CO_2e per year per mile).

[c] Air emissions from vehicles and unpaved roads have not been quantified for operations for RA-03AM.

Note:

Operations emissions are based on 9 pump stations and 29 mainline valve sites.

CO = carbon monoxide, GHGs = greenhouse gases, HAPs = hazardous air pollutants, N/A = not applicable, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

"--" = Emissions not estimated.

Table 6.3.7-8. Estimated Construction Emissions for Route Alternative RA-06 between Clearbrook and Carlton

Emission Source Description	Direct Emissions (tons)							
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs
On- and off-road diesel equipment combustion emissions	30.8	443.1	434.5	0.8	19.1	17.8	85,031.4	1.9
On- and off-road gasoline equipment combustion emissions	3.9	8.4	54.8	4.2	0.8	0.8	7,555.6	0.0
Paved roads fugitive emissions	0.0	0.0	0.0	0.0	212.3	52.1	0.0	0.0
Unpaved roads fugitive emissions	0.0	0.0	0.0	0.0	30.1	3.0	0.0	0.0
Open burning of wood debris emissions	0.0	0.0	978.8	0.0	95.3	95.3	506.1	0.0
Blasting emissions[a]	--	--	--	--	--	--	--	--
TOTAL EMISSIONS	**34.7**	**451.5**	**1,468.0**	**5.0**	**357.6**	**169.0**	**93,093.0**	**1.9**

Source: Enbridge 2017.

[a] Blasting emissions have not been quantified.

Notes:

Calculations are based on the emissions per spread presented in Table 5.2.7-6 (absent blasting), and an average of 54.8 miles per spread was used to determine emissions per mile. Emissions per mile then were multiplied by the corresponding pipeline length to determine the emissions for each emission source group for the route alternative.

CO = carbon monoxide, GHGs = greenhouse gases, HAPs = hazardous air pollutants, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

"--" = Emissions not estimated.

Stored Carbon Releases

During construction, RA-06 could require removal of trees from the construction work area between Clearbrook and Carlton that, when removed, would release GHGs. Using the same emission factor of 30.2 metric-tons of carbon per acre as noted for the Applicant's preferred route, the amount of carbon that potentially would be released back into the atmosphere during construction tree removal of 1,107 acres is estimated at 135,272 tons of CO_2e. Regrowth on the forest on the 646 acres outside of the pipeline right-of-way eventually would more than halve this loss, in the long run, after forest regrowth, bringing net CO_2 emissions from forest clearance to a level of about 56,245 tons.

Operations Impacts

Table 6.3.7-9 shows the estimated operations emissions for RA-06 in Minnesota based on 7 pump stations and 24 MLV sites (Enbridge 2017). The table includes indirect GHG emissions from the purchase of electricity for pump station operations determined as a function of the pipeline length. Although the route alternative varies only in the Clearbrook-to-Carlton segment, the operations emissions presented in the table are for the entire pipeline route within Minnesota. Similar to the Applicant's preferred route, operations of RA-06 would result in minor permanent impacts on air quality, and GHG emissions could contribute to global climate change. Note that emissions from vehicle combustion and unpaved roads have not been quantified.

Table 6.3.7-9. Estimated Operations Emissions for Route Alternative RA-06 in Minnesota

Emission Source Description	Direct Emissions (tons per year)[a]								Indirect Emissions (tons per year)[b]
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs	GHGs
Pump station fugitive emissions from pumps, piping components, sump tanks, and pig traps	2.9	0.0	0.0	0.0	0.0	0.0	0.04	0.09	N/A
Mainline valve fugitive emissions from piping components	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.003	N/A
Clearbrook terminal fugitive emissions from pumps, piping components, sump tanks, and pig traps	0.5	0.0	0.0	0.0	0.0	0.0	0.006	0.02	N/A
Additional Clearbrook terminal storage tank withdrawal losses from pipeline throughput	17.5	0.0	0.0	0.0	0.0	0.0	372.2	1.2	N/A
Unpaved roads fugitive emissions[c]	--	--	--	--	--	--	--	--	N/A
Vehicle combustion emissions[c]	--	--	--	--	--	--	--	--	N/A
Pump stations indirect emissions from being powered by electricity from existing local electric utilities	--	--	--	--	--	--	--	--	425,442.1
TOTAL EMISSIONS	**21.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**372.2**	**1.3**	**425,442.1**

Source: Enbridge 2017.

[a] Only those emissions associated with the proposed increase in throughput of the Clearbrook terminal are included as part of the operations emissions (i.e., existing operations emissions are equivalent to the existing environment).

[b] Because the projected power consumption from the pump stations are unknown, indirect GHG emissions for the route alternatives were calculated based on 452,497 tons of CO_2e per year for the Applicant's preferred route over 380 total miles (i.e., 1,308 tons of CO_2e per year per mile).

[c] Air emissions from vehicles and unpaved roads have not been quantified for operations for RA-06.

Notes:

Operations emissions are based on 7 pump stations and 24 mainline valve sites.

CO = carbon monoxide, GHGs = greenhouse gases, HAPs = hazardous air pollutants, N/A = not applicable, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

"--" = Emissions not estimated.

Loss of Carbon Sequestration

Following construction of RA-06, 646 acres of previously forested land could be reforested to provide a carbon sequestration (storage) reservoir. The remaining 461 acres along the permanent right-of-way between Clearbrook and Carlton would remain cleared and would not provide any future carbon sequestration. Using the same emission factor of 1.6 metric-tons of CO_2 per acre per year as noted for the Applicant's preferred route, the amount of carbon that would have been sequestered for 461 acres is estimated at 829 tons of CO_2e per year.

Route Alternative RA-07

Construction Impacts

Table 6.3.7-10 shows the estimated construction emissions for RA-07 between Clearbrook and Carlton. The Applicant-proposed measures to minimize air impacts for the Applicant's preferred route also would be implemented for the route alternative; consequently, air quality impacts during construction would be minor and temporary.

Table 6.3.7-10. Estimated Construction Emissions for Route Alternative RA-07 between Clearbrook and Carlton

Emission Source Description	Direct Emissions (tons)							
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs
On- and off-road diesel equipment combustion emissions	26.2	377.8	370.4	0.7	16.2	15.2	72,487.5	1.6
On- and off-road gasoline equipment combustion emissions	3.4	7.2	46.7	3.6	0.7	0.6	6,441.0	0.0
Paved roads fugitive emissions	0.0	0.0	0.0	0.0	181.0	44.4	0.0	0.0
Unpaved roads fugitive emissions	0.0	0.0	0.0	0.0	25.7	2.6	0.0	0.0
Open burning of wood debris emissions	0.0	0.0	834.4	0.0	81.2	81.2	431.4	0.0
Blasting emissions[a]	--	--	--	--	--	--	--	--
TOTAL EMISSIONS	**29.6**	**384.9**	**1,251.5**	**4.3**	**304.8**	**144.1**	**79,359.9**	**1.6**

Source: Enbridge 2017.

[a] Blasting emissions have not been quantified.

Notes:

Calculations are based on the emissions per spread presented in Table 5.2.7-6 (absent blasting), and an average of 54.8 miles per spread was used to determine emissions per mile. Emissions per mile then were multiplied by the corresponding pipeline length to determine the emissions for each emission source group for the route alternative.

CO = carbon monoxide, GHGs = greenhouse gases, HAPs = hazardous air pollutants, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

"--" = Emissions not estimated.

Stored Carbon Releases

During construction, RA-07 could require removal of trees from the construction work area between Clearbrook and Carlton that, when removed, would release GHGs. Using the same emission factor of 30.2 metric-tons of carbon per acre as noted for the Applicant's preferred route, the amount of carbon that would potentially be released back into the atmosphere during construction tree removal of 1,146 acres is estimated at 140,048 tons of CO_2e. Regrowth of the forest on the 904 acres outside of the pipeline right-of-way eventually would more than halve this loss, in the long run, after forest regrowth, bringing net CO_2 emissions from forest clearance to a level of about 29,520 tons.

Operations Impacts

Table 6.3.7-11 shows the estimated operations emissions for RA-07 in Minnesota based on 7 pump stations and 22 MLV sites for RA-07 (Enbridge 2017). The table includes indirect GHG emissions from the purchase of electricity for pump station operations determined as a function of the pipeline length. Although the route alternative varies only in the Clearbrook-to-Carlton segment, the operations emissions presented in the table are for the entire pipeline route within Minnesota. Similar to the Applicant's preferred route, operations of RA-07 would result in minor permanent impacts on air quality, and GHG emissions could contribute to global climate change. Note that emissions from vehicle combustion and unpaved roads have not been quantified.

Loss of Carbon Sequestration

Following construction of RA-07, 904 acres of previously forested land could be reforested to provide a carbon sequestration (storage) reservoir. The remaining 242 acres along the permanent right-of-way between Clearbrook and Carlton would remain cleared and would not provide any future carbon sequestration. Using the same emission factor of 1.6 metric-tons of CO_2 per acre per year as used for the Applicant's preferred route, the amount of carbon that would have been sequestered for 242 acres is estimated at 435 tons of CO_2e per year.

Table 6.3.7-11. Estimated Operations Emissions for Route Alternative RA-07 in Minnesota

Emission Source Description	Direct Emissions (tons per year)[a]								Indirect Emissions (tons per year)[b]
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs	GHGs
Pump station fugitive emissions from pumps, piping components, sump tanks, and pig traps	2.9	0.0	0.0	0.0	0.0	0.0	0.04	0.09	N/A
Mainline valve fugitive emissions from piping components	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.003	N/A
Clearbrook terminal fugitive emissions from pumps, piping components, sump tanks, and pig traps	0.5	0.0	0.0	0.0	0.0	0.0	0.006	0.02	N/A
Additional Clearbrook terminal storage tank withdrawal losses from pipeline throughput	17.5	0.0	0.0	0.0	0.0	0.0	372.2	1.2	N/A
Unpaved roads fugitive emissions[c]	--	--	--	--	--	--	--	--	N/A
Vehicle combustion emissions[c]	--	--	--	--	--	--	--	--	N/A
Pump stations indirect emissions from being powered by electricity from existing local electric utilities	--	--	--	--	--	--	--	--	390,873.7
TOTAL EMISSIONS	**21.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**372.2**	**1.3**	**390,873.7**

Source: Enbridge 2017.

[a] Only those emissions associated with the proposed increase in throughput of the Clearbrook terminal are included as part of the operations emissions (i.e., existing operations emissions are equivalent to the existing environment).

[b] Because the projected power consumption from the pump stations are unknown, indirect GHG emissions for the route alternatives were calculated based on 452,497 tons of CO_2e per year for the Applicant's preferred route over 380 total miles (i.e., 1,308 tons of CO_2e per year per mile).

[c] Air emissions from vehicles and unpaved roads have not been quantified for operations for RA-07.

Notes:

Operations emissions are based on 7 pump stations and 22 mainline valve sites.

CO = carbon monoxide, GHGs = greenhouse gases, HAPs = hazardous air pollutants, N/A = not applicable, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

"--" = Emissions not estimated.

Route Alternative RA-08

Construction Impacts

Table 6.3.7-12 shows the estimated construction emissions for RA-08 between Clearbrook and Carlton. The Applicant-proposed measures to minimize air impacts for the Applicant's preferred route also would be implemented for the route alternative; consequently, air quality impacts during construction would be minor and temporary.

Table 6.3.7-12. Estimated Construction Emissions for Route Alternative RA-08 between Clearbrook and Carlton

Emission Source Description	Direct Emissions (tons)							
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs
On- and off-road diesel equipment combustion emissions	25.8	371.3	364.0	0.7	16.0	14.9	71,238.6	1.9
On- and off-road gasoline equipment combustion emissions	3.3	7.0	45.9	3.5	0.7	0.6	6,330.0	0.0
Paved roads fugitive emissions	0.0	0.0	0.0	0.0	177.8	43.7	0.0	0.0
Unpaved roads fugitive emissions	0.0	0.0	0.0	0.0	25.2	2.5	0.0	0.0
Open burning of wood debris emissions	0.0	0.0	820.0	0.0	79.8	79.8	424.0	0.0
Blasting emissions[a]	--	--	--	--	--	--	--	--
TOTAL EMISSIONS	**29.1**	**378.3**	**1,229.9**	**4.2**	**299.6**	**141.6**	**77,992.0**	**1.6**

Source: Enbridge 2017.

[a] Blasting emissions have not been quantified.

Notes:

Calculations are based on the emissions per spread presented in Table 5.2.7-6 (absent blasting), and an average of 54.8 miles per spread was used to determine emissions per mile. Emissions per mile then were multiplied by the corresponding pipeline length to determine the emissions for each emission source group for the route alternative.

CO = carbon monoxide, GHGs = greenhouse gases, HAPs = hazardous air pollutants, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

"--" = Emissions not estimated.

Stored Carbon Releases

During construction, RA-08 could require removal of trees from the construction work area between Clearbrook and Carlton that, when removed, would release GHGs. Using the same emission factor of 30.2 metric-tons of carbon per acre as used for the Applicant's preferred route, the amount of carbon that would potentially be released back into the atmosphere during construction tree removal of 773 acres is estimated at 944,408 tons of CO_2e. Regrowth of the forest on the 453 acres outside of the pipeline right-of-way eventually would more than halve this loss, in the long run, after forest regrowth, bringing net CO_2 emissions from forest clearance to a level of about 39,035 tons.

Operations Impacts

Table 6.3.7-13 shows the estimated operations emissions for RA-08 in Minnesota based on 6 pump stations and 22 MLV sites (Enbridge 2017). The table includes indirect GHG emissions from the purchase of electricity for pump station operations determined as a function of the pipeline length. Although the route alternative varies only in the Clearbrook-to-Carlton segment, the operations emissions presented in the table are for the entire pipeline route within Minnesota. Similar to the Applicant's preferred route, operations of RA-08 would result in minor permanent impacts on air quality, and GHG emissions could contribute to global climate change. Note that emissions from vehicle combustion and unpaved roads have not been quantified.

Loss of Carbon Sequestration

Following construction of RA-08, 453 acres of previously forested land could be reforested to provide a carbon sequestration (storage) reservoir. The remaining 320 acres along the permanent right-of-way between Clearbrook and Carlton would remain cleared and would not provide any future carbon sequestration. Using the same emission factor of 1.6 metric-tons of CO_2 per acre per year as used for the Applicant's preferred route, the amount of carbon that would have been sequestered for 320 acres is estimated at 575 tons of CO_2e per year.

Table 6.3.7-13. Estimated Operations Emissions for Route Alternative RA-08 in Minnesota

Emission Source Description	Direct Emissions (tons per year)[a]								Indirect Emissions (tons per year)[b]
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs	GHGs
Pump station fugitive emissions from pumps, piping components, sump tanks, and pig traps	2.5	0.0	0.0	0.0	0.0	0.0	0.03	0.08	N/A
Mainline valve fugitive emissions from piping components	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.003	N/A
Clearbrook terminal fugitive emissions from pumps, piping components, sump tanks, and pig traps	0.5	0.0	0.0	0.0	0.0	0.0	0.006	0.02	N/A
Additional Clearbrook terminal storage tank withdrawal losses from pipeline throughput	17.5	0.0	0.0	0.0	0.0	0.0	372.2	1.2	N/A
Unpaved roads fugitive emissions[c]	--	--	--	--	--	--	--	--	N/A
Vehicle combustion emissions[c]	--	--	--	--	--	--	--	--	N/A
Pump stations indirect emissions from being powered by electricity from existing local electric utilities	--	--	--	--	--	--	--	--	387,450.4
TOTAL EMISSIONS	**20.6**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**372.2**	**1.3**	**387,450.4**

Source: Enbridge 2017.

[a] Only those emissions associated with the proposed increase in throughput of the Clearbrook terminal are included as part of the operations emissions (i.e., existing operations emissions are equivalent to the existing environment).

[b] Because the projected power consumption from the pump stations are unknown, indirect GHG emissions for the route alternatives were calculated based on 452,497 tons of CO_2e per year for the Applicant's preferred route over 380 total miles (i.e., 1,308 tons of CO_2e per year per mile).

[c] Air emissions from vehicles and unpaved roads have not been quantified for operations for RA-08.

Notes:

Operations emissions are based on 6 pump stations and 22 mainline valve sites.

CO = carbon monoxide, GHGs = greenhouse gases, HAPs = hazardous air pollutants, N/A = not applicable, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

"--" = Emissions not estimated.

6.3.7.4 Summary and Mitigation

6.3.7.4.1 Summary

Overall, construction impacts on air quality would be minor, localized, and intermittent and temporary along the construction work areas for the Applicant's preferred route and each of the route alternatives. This is primarily due to the nature of pipeline construction, where the construction activity moves along the pipeline route, thus limiting the exposure of residents and resources in any one area. Air quality impacts during operations for any of the route options would be minor but permanent. Because the Applicant plans to use electric power pumps for pipeline operation, no significant new point source emissions would be created. Instead, generation of electrical power to operate the pumps would be spread through the state's existing electrical generation system. Other emissions during operations would be limited to small, limited sources. No effects on achievement of either NAAQS or MAAQS would be expected to occur from construction or operation of any of the route options, although air dispersion modeling has not been completed. GHG emissions from construction, operations, and changes in the carbon sequestration of forested lands would occur for all the route options. These GHG emissions could contribute to climate change.

The estimated construction emissions for the Applicant's preferred route and route alternatives between Clearbrook and Carlton are shown in Table 6.3.7-14. Comparing the route options, RA-03AM would have the highest emissions, followed by the Applicant's preferred route, and then RA-06, RA-07, and RA-08, in that order. The length of each alternative between Clearbrook and Carlton determines this ranking, as the longer the route distance, the higher the total construction-related emissions.

Table 6.3.7-14. Estimated Total Construction Emissions for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Route	Direct Emissions (tons)						
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs
Applicant's preferred route	39.0	507.0	1,648.3	5.6	401.5	189.8	104,525.1
Route alternative RA-03AM	48.5	631.2	2,052.3	7.0	499.9	236.3	130,143.3
Route alternative RA-06	34.7	451.5	1,468.0	5.0	357.6	169.0	93,093.0
Route alternative RA-07	29.6	384.9	1,251.5	4.3	304.8	144.1	79,359.9
Route alternative RA-08	29.1	378.3	1,229.9	4.2	299.6	141.6	77,992.0

Notes:

The estimates for GHGs do not include emissions from forest clearance.

Blasting emissions have not been quantified for the route alternatives.

CO = carbon monoxide, GHGs = greenhouse gases, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

During construction, all of the route options would require tree removal from construction work areas between Clearbrook and Carlton; when removed, the trees would release GHGs. The Applicant's preferred route would affect more forested lands than the route alternatives, and thus would release more GHGs. The RA-08 route would affect less forested lands than the other route options and thus would release less GHGs.

Table 6.3.7-15 presents the operations emissions (for those that can be quantified) for the Applicant's preferred route and route alternatives in Minnesota. Although the route alternatives vary only in the Clearbrook-to-Carlton segment, the operations emissions presented in the table are for the entire pipeline route within Minnesota. The table includes indirect GHG emissions from electricity purchased for operation of the pump stations. Similar to construction impacts, because the Applicant's preferred route has a shorter pipeline length than the RA-03AM route, the resulting air emissions and associated impacts from operations would be lower. Conversely, because the Applicant's preferred route has a longer pipeline length than the RA-06, RA-07, and RA-08 routes, the resulting air emissions and associated impacts from operations would be greater.

During operations, all route options would require that previously forested land within the permanent rights-of-way between Clearbrook and Carlton remain cleared. If not removed, the trees would sequester GHGs. The Applicant's preferred route would affect more forested lands than the route alternatives and thus would remove more sequestration potential. The RA-07 route would affect less forested lands than the other route options and thus would remove less sequestration potential.

Table 6.3.7-15. Estimated Operations Emissions for the Applicant's Preferred Route and Route Alternatives in Minnesota

Route	Direct Emissions (tons per year)							Indirect Emissions (tons per year)
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	GHGs
Applicant's preferred route	21.0	0.004	0.03	0.002	0.1	0.01	375.9	452,497.6
Route alternative RA-03AM	21.8	0.0	0.0	0.0	0.0	0.0	372.2	518,668.3
Route alternative RA-06	21.0	0.0	0.0	0.0	0.0	0.0	372.2	425,442.1
Route alternative RA-07	21.0	0.0	0.0	0.0	0.0	0.0	372.2	390,873.7
Route alternative RA-08	20.6	0.0	0.0	0.0	0.0	0.0	372.2	387,420.4

Notes:

The estimates for GHGs do not include emissions for lost sequestration potential.

Air emissions from vehicles and unpaved roads have not been quantified for the route alternatives.

CO = carbon monoxide, GHGs = greenhouse gases, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

In summary, construction- and operations-related impacts on air quality would be expected to be minor for all routes, as detailed in Table 6.3.7-16. Construction and operation of the Applicant's preferred route and route alternatives would directly contribute to global GHG emissions and associated climate change, which collectively could lead to a threat to public health and welfare. For further information about the impacts of climate change, refer to Chapter 12.

6.3.7.4.2 Mitigation

Beyond the Applicant-proposed measures described above for the Applicant's preferred route, air impacts could be reduced further by:

- Burning small and dry brush piles only;
- Operating construction equipment as far as possible from sensitive receptors (e.g., residences, schools, and hospitals);
- Limiting construction equipment idling to the extent practical when not in use; and
- Following equipment manufacturer-recommended operations and good combustion practices, including not tampering with engines to increase horsepower and using ultra-low sulfur diesel.

Further mitigation for GHG emissions could include compensatory measures such as:

- Investment in new terrestrial carbon storage programs (forest establishment, other types of vegetation restoration);
- Purchase of GHG offset credits;
- Investment in renewable energy development; and
- Contributing resources to regional and local climate adaptation programs.

Table 6.3.7-16. Summary of Potential Impacts on Air Quality for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Direct and indirect emissions	Temporary/minor impacts	Temporary/minor impacts	Temporary/minor impacts	Temporary/minor impacts	Temporary/minor impacts
Greenhouse gases (GHG)	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change
Operations Impacts					
Direct and indirect emissions	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts	Permanent/minor impacts
Greenhouse gases (GHG)	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change	GHG emissions contribute to overall global climate change

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6.4 CULTURAL RESOURCES

Cultural resources include the locations of human activity, occupation, or usage that contain materials, structures, or landscapes that were used, built, or modified by people. They also include the institutions that form and maintain communities and link them to their surroundings. Cultural resources consist of archaeological resources (e.g., sites and isolated finds), historic resources (e.g., objects, buildings, structures, or districts), and sacred places (including traditional cultural properties (TCPs) and landscapes). Cultural resources also include tribal, usufructuary rights resources both within reservation boundaries and ceded lands by treaty (e.g., traditional hunting and fishing areas) and treaty areas, which are discussed in detail in Chapter 9. For the purposes of this discussion, these resources are referred to collectively as cultural resources.

The discussion of existing conditions and the evaluation of potential impacts on cultural resources, addressed in this section, are limited to archaeological and historic resources that are recorded as part of resource investigations (e.g., Phase I and Phase II archaeological surveys) and that are recorded in databases maintained by individual state historic preservation offices (SHPOs). Special attention also is made to historic properties (i.e., those listed or eligible for listing on the National Register of Historic Places [NRHP]). In this manner, cultural resources important to American Indian tribes may not be captured in their entirety. Additional discussion of resources important to American Indian tribes, as well as the confluence of cultural and natural resources are discussed in Chapter 9.

This section first describes the existing conditions for the cultural resources within an area along the Applicant's preferred route and each of the route alternatives where cultural resources could be affected by construction and operation of the Project. Potential impacts on cultural resources are discussed and compared for the Applicant's preferred route and route alternatives (RA-03AM, RA-06, RA-07, and RA-08). None of the impacts or mitigation measures described in this chapter reflect how American Indians describe impacts on the landscape and tribal resources within reservation boundaries and ceded lands (see Chapter 9). Potential impacts on cultural resources from an accidental release of crude oil are discussed in Chapter 10.

6.4.1 Regulatory Context and Methodology

6.4.1.1 Regulatory Context

Minnesota Field Archaeology Act of 1963

The Minnesota Field Archaeology Act of 1963 (Minn. Stat. 138.31-42) allows the State of Minnesota to reserve the exclusive right of field archaeology on state sites in order to protect and preserve archaeological sites on state lands. It prohibits unlicensed field archaeology on state sites and discourages unlicensed field archaeology on privately owned lands. Based on the Field Archaeology Act, it is a gross misdemeanor for a person to willfully conduct unlicensed archaeology on state sites; willfully deface, injure, destroy, displace, or remove any object or data belonging to the State; or willfully interfere with evidence or work on any state site or other site for which a license has been issued. Persons having knowledge of the location of archaeological sites are encouraged to communicate such information to the State Archaeologist.

The Field Archaeology Act also outlines the duties of the Office of the State Archaeologist (Minnesota OSA), which include consultation with the Minnesota Indian Affairs Council (MIAC). The MIAC shares legal responsibility for monitoring and enforcing laws that protect Indian human remains and associated

burial items. The MIAC reviews archaeological license applications to conduct fieldwork to determine if a burial or cemetery are within the project area. The authority for the MIAC is contained in Minnesota Statutes § 138.31.

Under the Field Archaeology Act, the Minnesota OSA shares some duties with the Minnesota Historical Society (MHS), but the Minnesota OSA is not affiliated with the MHS or the State Historic Preservation Officer (SHPO). The Minnesota OSA and the MHS/SHPO operate independently but cooperatively with regard to their shared duties.

Minnesota DNR, MNDOT, and all other state agencies whose activities affect cultural resources are required to cooperate with MHS and the State Archaeologist to carry out the provisions of the Field Archaeology Act. Under the Field Archaeology Act, state agencies (i.e., the agency controlling the public lands or waters) must supply MHS and the State Archaeologist with a development plan for review and comment when known or suspected sites (i.e., when significant archaeological sites exist, or are predicted to exist) on public lands or water under their jurisdiction may be affected by implementation of the plan. The Minnesota Environmental Quality Board submits copies of EAWs to the MHS/SHPO for comment on potential effects of privately funded developments, such as the Project, on cultural resources in Minnesota (Minnesota SHPO 2005). As part of the worksheet, consideration is made for historic designations (e.g., NHRP), known artifact areas, and architectural features.

Minnesota Historic Sites Act

The Minnesota Historic Sites Act (Minn. Stat. § 138.661–669) established the Minnesota Historic Sites Network. The sites are significant state resources that MHS is preserving, developing, interpreting, and maintaining for public use, benefit, and access.

The Minnesota Historic Sites Act also created the State Register of Historic Places (SRHP), which is an inventory of outstanding properties possessing historical, architectural, archaeological, and aesthetic values that are of paramount importance in the development of the state. These historic properties represent and reflect elements of the state's cultural, social, economic, religious, political, architectural, and aesthetic heritage. These properties are separate from the Minnesota Historic Sites Network and are not operated by MHS for historical interpretive or public use and access purposes.

Historic properties are selected for inclusion in the SRHP based on any of the following criteria:

1. The quality of significance in American history, architecture, archaeology, engineering, and culture that is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association;
2. Association with events that have made a significant contribution to the broad patterns of our history;
3. Association with the lives of persons significant in our past;
4. Embodiment of the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
5. The yielding or likelihood of yielding information pertinent in prehistory or history.

The Minnesota Historic Sites Act outlines the responsibility of the State in protecting the physical features and historic character of properties designated in the Minnesota Historic Sites Network, SRHP, or NRHP. Before carrying out any undertaking that would affect designated or listed properties, or funding or licensing an undertaking by other parties, the state department or agency must consult with the MHS to determine appropriate treatments and to seek ways to avoid and mitigate any adverse effects on designated or listed properties.

Minnesota Private Cemeteries Act

Minnesota's "Private Cemeteries Act" (Minn. Stat. § 307.08) protects all human remains and burials older than 50 years, and located outside of platted, recorded or identified cemeteries, protection from unauthorized disturbance; whether on either public or private lands or waters. In the event that a burial is either known or suspected to be associated with American Indian peoples, Minnesota OSA works together with the MIAC to ensure the integrity of these sites. The Minnesota OSA maintains a database of identified burial sites in the state.

Minnesota State Historic Preservation Office

The Minnesota SHPO is a department of MHS. While the SHPO's principal responsibilities are defined in the National Historic Preservation Act (NHPA) Section 110, the SHPO also has historic preservation duties under Minnesota state law. The SHPO acts for MHS in the review of state agency projects that may affect state archaeological sites.

The SHPO is responsible for maintaining an inventory of historic properties; identifying and nominating properties to the NRHP; implementing a statewide historic preservation plan; administering a federal grants program; assisting federal, state, and local governments with historic preservation duties; and working with state and federal agencies to ensure that historic properties (i.e., those eligible for listing or listed on the NRHP) are considered by planning and development.

As defined in 36 CFR 800, the SHPO plays a central role in the Section 106 process and "advises and assists federal agencies in carrying out their 106 responsibilities." The SHPO ensures that agencies make "a reasonable and good faith effort" to consider the effects of their undertakings on historic properties. "Historic properties" for the purposes of Section 106 are defined as sites, districts, buildings, structures, or objects that are included in or are eligible for listing in the NRHP.

Minnesota archaeological laws do not set standards for site significance and do not discuss integrity, but the SHPO evaluates affected sites using NRHP criteria and suggests treatments of significant state sites that are consistent with Section 106.

Minnesota Governor's Executive Order 13-10

The Minnesota Governor's Executive Order 13-10 directs state government agencies to implement new re consultation policies aimed at improving relationships and collaboration with Minnesota's 11 tribal governments. It provides for consultation, coordination, and cooperation between the State and the 11 Indian tribes.

Tribal Historic Preservation Offices and Tribal Policies/Ordinances

American Indian tribes also have adopted policies and/or ordinances governing cultural resources, including archaeological and historic resources. These policies often define what cultural resources are and how they will be protected for future generations.

As an example of these policies, the Mille Lacs Band of Ojibwe define archaeological resources as remains of past human life or activities, which are of archaeological or historical interest. These resources must be at least fifty years in age. This definition is part of their Cultural Resources Code (1072-MLB-23), which was enacted prior to the establishment of the Tribal Historic Preservation Officer (THPO) (see Appendix P). In addition, the Fond du Lac Band of Lake Superior Chippewa have adopted Ordinance #03/14, which established a cultural resources preservation zone to help protect and preserve cultural sensitive areas.

In addition to these policies and/or ordinances, the THPOs have assumed Section 106 responsibilities for archaeological sites and TCPs, as well as other duties. Among the THPOs in MN are the Bois Forte Band of Chippewa Indians, the Fond du Lac Band of Lake Superior Chippewas, the Grand Portage Band of Lake Superior Chippewa, the LLBO, Lower Sioux Indian Community, Mille Lacs Band of Ojibwe Indians, Prairie Island Indian Community, Upper Sioux Community, and the White Earth Band of Minnesota Chippewa.

6.4.1.2 Methodology

The ROI for this impact analysis encompasses the areas in the estimated footprints of the Applicant's preferred route and route alternatives where archaeological or historic resources could be directly or indirectly disturbed during Project-related construction or operations. The ROI for the Applicant's preferred route includes the construction work area, permanent right-of-way, ATWS, access roads, and aboveground facilities, including 0.5 mile on either side of the pipeline centerline for archaeological resources, and 1 mile on either side of the pipeline centerline for historic resources. The ROI also includes 0.5 mile on either side of the pipeline centerline for archaeological resources and 1 mile on either side of the pipeline centerline for historic resources for the route alternatives. For route alternatives, no locations for ATWS, access roads or aboveground facilities have been identified; however, the ROI would generally encompass the likely extent of the features.

Existing data were obtained from MHS on November 16, 2017, for archaeological and historic resources within the ROI for Minnesota. Cultural resource data from the MHS includes information on the following: properties that are listed in the NRHP or SRHP; resources that have been determined eligible for listing in the NRHP through previous federal or state review; and resources that have been identified through reconnaissance surveys, but which have not been evaluated for NRHP eligibility or are not recommended for listing. Sensitive locational information, however, is not provided within the context of this EIS. This type of information, however, was considered in evaluating the potential impacts on cultural resources. For the route alternatives, data reviewed includes only that provided as part of the SHPO database, whereas for the Applicant's preferred route, information also is available for archaeological surveys conducted within Minnesota.

Cemetery data also was reviewed based on available GIS data. Available cemetery data included information for Minnesota. This data is not intended to represent a full list and may exclude small, family owned cemeteries and those without names. Cemetery information is included in the discussion

of historic resources and is treated as a historic resource within the impacts discussion, unless noted as an archaeological resource within a SHPO database.

The data collected included site number, site/property type, site location, date of recordation, historic context, and associated reports. The types of cultural resources were input into GIS and overlaid with the Applicant's preferred route and route alternatives. Potential impacts on archaeological and historic resources for the Applicant's preferred route and route alternatives were considered where construction or operation of the routes could cause disturbance, loss, or modification of the resource.

National Register data was reviewed using data from the NPS (2014). This data provides information on those properties listed within the NRHP as of April 28, 2014. The file reviewed consists of properties listed within the Midwest.

Additionally, surveys were completed for archaeological resources by the Applicant for the Applicant's preferred route in Minnesota; the information from these surveys is included in this analysis. DOC-EERA's consultation with SHPO is ongoing, and the results of the consultation concerning determinations of eligibility, Project effects, and any necessary treatment for impacts are not currently available.

Information concerning sacred places or resources with importance to American Indian tribes is not available through SHPO databases, but may be available through consultation with affected American Indian tribes. Where information is known on resources of this type or TCPs, information is provided within this chapter. Details on ongoing tribal consultation and coordination can be found in Chapter 9 and Appendix P.

6.4.2 Existing Conditions

6.4.2.1 Applicant's Preferred Route

6.4.2.1.1 Archaeological Resources

For the Applicant's preferred route in Minnesota, the Applicant conducted 11 archaeological surveys (Phase I) and site evaluations (Phase II) between May 2013 and August 2016 (Table 6.4.2-1). As part of the Applicant's surveys, over 80 archaeological resources were identified and re-visited (i.e., those that were previously documented). According to a 2017 summary report of the investigations, 59 of the resources are located within the Applicant's preferred route (Mueller 2017). The survey corridor for the Applicant's preferred route comprised an area of 23,874 ac (9,661 ha); a total of 23,513 ac (9,515 ha) of the corridor have been surveyed by the Applicant for archaeological resources through April 2017 (Mueller 2017).

Based on data obtained from MHS on November 17, 2016, 53 previously recorded archaeological resources are located within the archaeological resources ROI for the Applicant's preferred route in Minnesota (Table 6.4.2-2). Of these 53 archaeological resources in the ROI, 9 would be located within the construction work area, 4 of which are in the permanent right-of-way (Table 6.4.2-2). Additionally, three archaeological resources would be located within the ATWS for the Applicant's preferred route.

Based on a review of NPS data (2014) and MHS data (for MN portions only), no NRHP listed historic properties (that are archaeological in nature) are located within the construction workspaces, the permanent right-of-way, or ROI for the Applicant's preferred route.

Table 6.4.2-1. Archaeological Investigations Conducted by the Applicant in the Region of Interest for the Applicant's Preferred Route in Minnesota

Survey Date	Survey Type	Reference	Archaeological Resources Identified/ Revisited[a]	Period	NRHP Status Recommendations	Counties	Miles Surveyed	Acres Surveyed
May – November 2013	Phase I	Mueller et al. April 2014	48	35 - Pre-Contact Sites 12 - Post-Contact Sites 1 Pre and Post Contact Site	35 – Not eligible 2 – Recommended as eligible 2 – Recommended for additional testing 9 - Not evaluated * 1 cemetery protected by other regulations (not included in total count)	Aitkin, Carlton, Cass, Clearwater, Crow Wing, Hubbard, Polk, and Red Lake	358	16,756
April – October 2014	Phase I and Phase II	Watson et al. 2014 Addendum	9	8 – Pre-Contact Sites 1 – Post-Contact Site	6 - Not eligible 2 - Not evaluated 1 - Recommended for additional testing	Polk, Crow Wing, Clearwater, Red Lake, Cass, Hubbard, Wadena, Aitkin, and Carlton	Unknown	3,800
May – November 2014	Phase I	Mueller and Terry March 2015	18	12 - Pre-Contact Sites 5 - Post-Contact Sites 1 Pre and Post Contact Site	17 – Not eligible 1 – Not evaluated	Kittson, Marshall, Pennington, Red Lake, Polk, and Clearwater	119	8,263
July 2014	Phase II	Mueller and Terry	1	1 – Pre and Post-Contact Site	1 – Not eligible	Hubbard	Unknown	Unknown
June – August 2015	Phase I	Mueller and Terry October 2015	2	1 - Pre-Contact Site 1 - Post-Contact Site	2 – Not eligible	Aitkin, Carlton, Cass, Clearwater, Crow Wing, Hubbard, Polk, and Red Lake	Unknown	1,617

Table 6.4.2-1. Archaeological Investigations Conducted by the Applicant in the Region of Interest for the Applicant's Preferred Route in Minnesota

Survey Date	Survey Type	Reference	Archaeological Resources Identified/ Revisited[a]	Period	NRHP Status Recommendations	Counties	Miles Surveyed	Acres Surveyed
August – November 2015	Phase I	Mueller et al. 2016 Addendum	4	4 – Pre-Contact Sites	4 – Not eligible	Aitkin, Carlton, Cass, Clearwater, Crow Wing, Hubbard, Polk, and Red Lake	Unknown	1,347
June – July 2015	Phase II	Watson et al. September 2015	5	5 – Pre-Contact Sites	4 – Not eligible 1 – Recommended eligible	Polk, Clearwater, Hubbard, and Carlton	N/A	N/A
June – August 2015	Phase I	Mueller and Terry October 2015	2	2 – Post-Contact Sites	2 –Not eligible	Kittson, Marshall, Pennington, Red Lake, Polk, and Clearwater	119	8,409
August – November 2015	Phase I	Mueller et al. February 2016 Addendum	1	1 – Post –Contact Site	1 – Not eligible	Polk	Unknown	69
June – August 2016	Phase 1	Mueller September 2016	3	3 - Post-Contact Sites	3 – Not eligible	Aitkin, Carlton, Cass, Clearwater, Crow Wing, Hubbard, Polk, and Red Lake	Unknown	781 mainline/ 139 access roads
June – August 2016	Phase 1	Mueller September 2016	0	Not applicable	Not applicable	Kittson, Marshall, Pennington, Red Lake, Polk, and Clearwater	Unknown	61 mainline/ 1 access roads

[a] Please note – the total number of sites may be overrepresented as some were subject to Phase II testing, and they, therefore, may be double-counted.

Table 6.4.2-2. Previously Recorded Archaeological Resources in the Region of Interest for the Applicant's Preferred Route

Route Segment	Number of Archaeological Resources in Region of Interest	Number of Archaeological Resources in Construction Work Area	Number of Archaeological Resources in Permanent Right-of-Way	Number of NRHP Historic Properties (Archaeological) within the ROI[a]
North Dakota border to Clearbrook	27	1	0	0
Clearbrook to Carlton	24	8	4	0
Carlton to Wisconsin border	2	0	0	0

Source: MHS 2016.

[a] The ROI for the Applicant's preferred route consists of 0.5 mile to either side of the centerline for archaeological resources.

6.4.2.1.2 Historic Resources

Based on data obtained from MHS on November 17, 2016, 80 previously recorded historic resources are located within the ROI for the Applicant's preferred route (Table 6.4.2-3). These historic resources include structures, buildings, and bridges. None of these would be located within the construction work area or the permanent right-of-way of the Applicant's preferred route.

Table 6.4.2-3. Previously Recorded Historic Resources in the Region of Interest for the Applicant's Preferred Route

Route Segment	Number of Historic Resources in Region of Interest (ROI)	Number of Historic Resources in Construction Work Area	Number of Historic Resources in Permanent Right-of-Way	Number of NRHP Historic Properties (Above-Ground) within the ROI[a]
North Dakota border to Clearbrook	34	0	0	0
Clearbrook to Carlton	40	0	0	1
Carlton to Wisconsin border	6	0	0	0

Source: MHS 2016.

[a] The ROI for the Applicant's preferred route consists of 1.0 miles to either side of the centerline for historic resources.

Based on a review of NPS data (2014) and MHS data (for MN portions only), no NRHP listed historic properties (that are above-ground) are located within the construction workspaces or the permanent right-of-way for the Applicant's preferred route. However, the Itasca State Park, a NRHP listed property, is within the ROI. This resource also is referred to as the Itasca State Park CCC/WPA/Rustic Style historic resources. It contains multiple contributing resources (NPS 2014).

Within Minnesota, 31 cemeteries are located within the ROI of the Applicant's preferred route. Among these, 17 are within 0.5 miles, and 14 are within 1 mile. Among these, 16 are located between Clearbrook and Carlton. None are located within an American Indian reservation.

6.4.2.1.3 Traditional Cultural Properties

As noted in Section 5.4.1.1.6, TCPs are places of traditional religious and cultural importance. They often are associated with American Indian tribes and nations, but they can be attributed to other cultural groups. A TCP can be eligible for or listed on the NRHP. For this reason, they are considered herein.

To date, no specific studies of TCPs have been completed within the ROI, and as such, no specific locations and/or details are known at this time. However, information gathered from the consultation with American Indian tribes with an interest within the ROI have indicated that TCPs are present (see Appendix P). For instance, the Ojibwe consider wild rice waters to be TCPs (Hoppe 2017).

6.4.2.2 Route Alternatives

The only segment where the route alternatives would vary from the alignment of the Applicant's preferred route is between Clearbrook and Carlton in Minnesota. The existing conditions relevant to archaeological and historic resources for the route alternatives between Clearbrook and Carlton are described below. No Project-specific surveys were conducted for archaeological or historic resources; the following summary is based on available data obtained from MHS on November 17, 2016 and where applicable, a review of NPS data for listed NRHP resources.

6.4.2.2.1 Route Alternative RA-03AM

Archaeological Resources

Based on data obtained from MHS, 47 previously recorded archaeological resources are located within the ROI between Clearbrook and Carlton for RA-03AM. Of these, six would be in the construction work area, one of which would also be in the permanent right-of-way.

Based on a review of NPS data (2014) and MHS data (for MN portions only), no NRHP listed historic properties (that are archaeological in nature) are located within the construction workspaces, the permanent right-of-way, or ROI for RA-03AM.

Historic Resources

Based on data obtained from MHS, 141 previously recorded historic resources are located in the ROI between Clearbrook and Carlton for RA-03AM; seven of these would be within the construction work area, and two would be in the permanent right-of-way.

Seven NRHP listed properties would be located within the ROI within Minnesota. These include the John A. Oldenburg House (Minnesota 18, Finlayson, Pine County), the Ogilvie Watertower (Anderson Street, Ogilvie, Kanabec County), the Milaca Municipal Hall (145 Central Avenue, South, Milaca, Mille Lacs County), the Mille Lacs County Courthouse (635 2nd Street, Southeast, Milaca, Mille Lacs County), the Northern Pacific Depot (Front Street, Finlayson, Pine County), the Itasca Park State (21 mi. N of Park Rapids off U.S. 71, Park Rapids, Clearwater County), and the Our Lady of the Angels Academy (18801 Riverwood Drive, Little Falls, Morrison County) (NPS 2014).

Within Minnesota, 43 cemeteries are located within the ROI. Among these, 20 are within 0.5 miles, and 23 are within 1 mile. Twenty-seven of the cemeteries are located between Clearbrook and Carlton. None are located within an American Indian reservation.

Traditional Cultural Properties

To date, no specific studies of TCPs have been completed within the ROI, and as such, no specific locations and/or details are known at this time. However, information gathered from the consultation with American Indian tribes with an interest within the ROI have indicated that TCPs are present (see Appendix P). For instance, the Ojibwe consider wild rice waters to be TCPs (Hoppe 2017).

6.4.2.2.2 Route Alternative RA-06

Archaeological Resources

Based on data obtained from MHS, eight previously recorded archaeological resources were identified within the ROI between Clearbrook and Carlton for RA-06, none of which would be in the construction work area or in the permanent right-of-way.

Based on a review of NPS data (2014) and MHS data (for MN portions only), no NRHP listed historic properties (that are archaeological in nature) are located within the construction workspaces, the permanent right-of-way, or ROI.

Historic Resources

Based on data obtained from MHS, 27 previously recorded historic resources are located in the ROI between Clearbrook and Carlton for RA-06, one of which would be in the construction work area (none would be in the permanent right-of-way).

One NRHP listed property is located within the ROI within Minnesota. It includes the District No. 132 School, which is located along County Road 500 in Pinewood, Beltrami County (NPS 2014).

Within Minnesota, 19 cemeteries are located within the ROI. Among these, 11 are within 0.5 miles, and eight are within 1 mile. Three of these cemeteries are located between Clearbrook and Carlton. None are located within an American Indian reservation.

Traditional Cultural Properties

To date, no specific studies of TCPs have been completed within the ROI for RA-06, and as such, no specific locations and/or details are known at this time. However, information gathered from the consultation with American Indian tribes with an interest within the ROI have indicated that TCPs are present (see Appendix P). For instance, the Ojibwe consider wild rice waters to be TCPs (Hoppe 2017).

6.4.2.2.3 Route Alternative RA-07

Archaeological Resources

Based on data obtained from MHS, 107 previously recorded archaeological sites were identified within the ROI between Clearbrook and Carlton for RA-07. Of these, seven would be in the construction work area, five of which would be in the permanent right-of-way.

Based on a review of NPS data (2014) and MHS data (for MN portions only), no NRHP listed historic properties (that are archaeological in nature) are located within the construction workspaces, the permanent right-of-way, or ROI.

Historic Resources

Based on data obtained from MHS, 166 previously recorded historic resources are located in the ROI between Clearbrook and Carlton for RA-07; three of these would be in the construction work area, and one would be in the permanent right-of-way.

Three NRHP listed properties are located within the ROI within Minnesota. These include the Itasca Lumber Company Superintendent's House (506 5th Street in Deer River, Itasca County), the Supervisor's Office Headquarters (Ash Avenue in Cass Lake, Cass County), and the Winnibigoshish Resort (on U.S. Route 2 in Bena, Cass County) (NPS 2014).

Within Minnesota, 31 cemeteries are located within the ROI. Among these, 18 are within 0.5 miles, and 13 are within 1 mile. Fifteen are located between Clearbrook and Carlton. Four are located within an American Indian reservation; they include the Mary Donald Cemetery, the Pine Grove Cemetery, the Saint Joseph Cemetery, and the Thompson Cemetery. These are all within the boundaries of the Leech Lake Reservation.

Traditional Cultural Properties

To date, no specific studies of TCPs have been completed within the ROI. Information gathered from the consultation with American Indian tribes with an interest within the ROI have indicated that TCPs are present (see Appendix P). The Ojibwe consider wild rice waters to be TCPs. Among these TCPs is Deadfish Lake; the lake itself is approximately 0.6 miles from the centerline of RA-07 (Hoppe 2017). Additional information concerning this TCP was not available at the time of this assessment.

6.4.2.2.4 Route Alternative RA-08

Archaeological Resources

Based on data obtained from MHS, 119 previously recorded archaeological resources were identified within the ROI between Clearbrook and Carlton for RA-08. Of these, 12 would be in the construction work area, and 10 would be in the permanent right-of-way.

Based on a review of NPS data (2014) and MHS data (for MN portions only), no NRHP listed historic properties (that are archaeological in nature) are located within the construction workspaces, the permanent right-of-way, or ROI.

Historic Resources

Based on data obtained from MHS, 74 previously recorded historic resources are located in the ROI between Clearbrook and Carlton for RA-08; three of these would be in the construction work area, one of which would also be in the permanent right-of-way.

One NRHP listed property, the Itasca Lumber Company Superintendent's House, is located within the ROI within Minnesota. This property is located at 506 5th Street in Deer River, Itasca County (NPS 2014).

Within Minnesota, 28 cemeteries are located within the ROI. Among these, 15 are within 0.5 miles, and 13 are within 1 mile. Twelve are located between Clearbrook and Carlton. Three are located within an American Indian reservation; they include the Mary Donald Cemetery, the Rabbits Cemetery, and the Saint Joseph Cemetery. These are all within the boundaries of the Leech Lake Reservation.

Traditional Cultural Properties

To date, no specific studies of TCPs have been completed within the ROI. Information gathered from the consultation with American Indian tribes with an interest within the ROI have indicated that TCPs are present (see Appendix P). The Ojibwe consider wild rice waters to be TCPs. Among these TCPs is Deadfish Lake; the lake itself is approximately 0.6 miles from the centerline of RA-08 (Hoppe 2017). Additional information concerning this TCP was not available at the time of this assessment.

6.4.3 Impact Assessment

The Project would cause potential direct and indirect impacts on archaeological and historic resources during construction and operations. Where information was available, consideration also was made for TCPs, which may consist of sites or landscapes important to American Indian tribes and are listed or eligible for listing on the NRHP (Parker and King 1998).

Direct and/or indirect impacts are those that may affect the ability of a cultural resource to convey its significance. These types of impacts may result in changes to a resource's integrity, visibility, accessibility, and/or research potential. The duration of impact could range from temporary to permanent, depending on the type of impact and type of cultural resource. The magnitude of impact could range from negligible to major, depending on the type of cultural resource that would be affected and its location relative to the construction work area or permanent right-of-way. Additional information on general direct and indirect impacts on cultural resources is described in Section 5.4.2.

The level of impact on archaeological resource would depend on the type of resource and its eligibility for listing in the SRHP, the State Historic Site Network, or the NRHP, as well as its significance to affected American Indian tribes (e.g., a sacred place).

A resource that is eligible for listing in the SRHP generally would have a higher magnitude of impacts than a site that is not eligible for the same register based on the site's importance to the affiliated culture or the State of Minnesota. A similar type of impact would be anticipated if the resources is listed or eligible for the NRHP. Single artifacts and surface sites may have a low potential to yield information important to prehistory or history as they may lack context. If an archaeological site is physically affected, the impact likely would be permanent and would range in magnitude from minor to major.

The level of impact would also vary depending on the location of the construction-related activity and the type of soil, bedrock, and vegetation. For example, vegetation removal may cause damage to surface sites more than deeply buried sites. Compaction may affect shallow sites and not affect deeply buried sites.

Unknown archaeological resources may be located within the construction work area could be discovered during ground-disturbing activities. To reduce impacts on currently unknown archaeological resources, an Unanticipated Discovery Plan would be implemented during construction (Appendix O). Impacts on inadvertently discovered archaeological resources would be similar to those described for previously recorded resources.

Contamination of archaeological resources could occur from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals during construction activities for the Applicant's preferred route or route alternatives. These spills would be managed according to pending SPCC plans. Direct impacts on archaeological resources due to contamination and disturbance

from cleanup activities would be permanent, depending on the type and location of resource and would range in magnitude from minor to major. Direct impacts on historic resources would range from temporary to permanent and negligible to major, depending on the type and location of resource.

Since only the Applicant's preferred route was surveyed for archaeological resources, the analyses for the remaining alternatives are based on the archival review of existing site data. Additionally, no surveys were conducted for historic resources; thus, only archival data were used in these analyses. As such, a greater number of cultural resources may be present within the ROI, construction work area, and permanent right-of-way for the route alternatives. In addition, even where known resources exist, the significance of these resources may have not been evaluated.

6.4.3.1 Applicant's Preferred Route (in Minnesota)

For the Applicant's preferred route, no listed NRHP archaeological resources are present within the construction workspaces or the permanent right-of-way (based on a review of NPS (2014) data and MHS data for the MN portions of the project). In this manner, no direct or indirect impacts would be anticipated to occur to these types of resources. However, other archaeological resources are present within the construction workspaces, permanent right-of-way, and within the ROI; direct and indirect impacts may occur to these resources.

6.4.3.1.1 Construction Impacts

Archaeological Resources

Construction-related activities would directly impact the nine previously recorded archaeological resources within the construction work area (see Table 6.4.2-2). Construction-related activities such as excavation, grading, rutting, compaction, and removing vegetation would directly impact these archaeological resources. Damage to an archaeological resource could occur from clearing and grading of the pipeline alignment, construction work area, ATWS, access roads, pump stations, and materials staging areas. An increased risk due to erosion, vandalism and looting (if significant), and compaction of archaeological resources could occur from movement of heavy machinery and transport of pipe sections, which may alter site stratigraphy. In addition, impacts could be associated with minor Project-related spills or leaks, such as contamination or disturbance during cleanup activities, or encountering existing contamination.

Direct impacts on archaeological resources during construction would be permanent and minor to major depending on the type of resource. Some impacts may require mitigation that would be determined in consultation with the SHPO, affected American Indian tribes, and the public (see Section 6.4.4).

Indirect impacts during construction would be temporary, localized, and negligible to minor. These impacts include vibration, changes in noise and air quality, dust, and visual intrusions.

Historic Resources

No previously recorded historic resources would be within the construction work area (Table 6.4.2-3). As such, construction-related direct impacts on historic resources are unlikely to occur. However, indirect impacts may occur on the 80 historic resources within the ROI during construction. These indirect impacts include dust, vibration, and intrusion related to construction equipment, as well as construction-related noise. These impacts would be temporary and negligible to minor. Spill response activities and personnel would also cause temporary negligible to minor indirect impacts. Indirect visual

intrusions due to vegetation clearing would be long-term and negligible to minor. Indirect impacts from the construction of aboveground facilities would be permanent and negligible to major. Most of the viewshed along the Applicant's preferred route contains existing pipelines and transmission lines and the changes in viewshed would decrease over time from revegetation of temporary construction work areas and to a lesser degree the permanent right-of-way.

6.4.3.1.2 Operations Impacts

Archaeological Resources

Disturbed areas would be restored and stabilized to the extent practicable after pipeline installation. Such restoration is unlikely to cause damage to archaeological resources beyond what may occur during construction. Inspection, monitoring, and maintenance activities are unlikely to affect the four archaeological resources within the permanent right-of-way. The archaeological resources present within the permanent right-of-way would have been directly affected during construction, and as such, additional impacts from these activities would not be expected. Direct impacts associated with Project-related spills or encountering existing contamination could occur; however, no additional impacts would be expected as the archaeological resources would have already been disturbed during construction.

If operations-related activities result in direct impacts on archaeological resources that were not previously disturbed during construction (i.e., avoided) or to those resources that are adjacent to the construction work area, then the impacts would be permanent and minor to major. Some impacts may require mitigation that would be determined in consultation with the SHPO, affected American Indian tribes, and the public (see Section 6.4.4).

If new ground disturbance occurs during the lifespan of the project, it would occur within the already disturbed permanent right-of-way or construction work area. As such, direct impacts on archaeological resources would have already occurred during construction; thus, any new ground disturbance is unlikely to cause additional impacts on these resources. However, if archaeological resources had been avoided during construction, or if they are adjacent to the construction work area, new ground disturbance may cause new impacts on these resources, which would be permanent and minor to major.

Indirect impacts of new ground disturbance during operations would be temporary, localized, and negligible to minor. Temporary impacts would include vibration, changes in noise and air quality, and visual intrusions.

Historic Resources

Operations impacts are unlikely to directly impact historic resources, as no known historic resources are located within the permanent right-of-way. Indirect temporary impacts may occur on historic resources within the ROI during pipeline operations. These indirect impacts would primarily consist of the presence of MLVs, pump stations, and maintenance crews and equipment, resulting in dust, vibration, and visual and auditory intrusions. These indirect impacts would be temporary to permanent and negligible to minor. Spill response activities and personnel would also cause temporary negligible to minor indirect impacts.

Indirect visual intrusions from the new pipeline would be permanent and negligible to minor, as almost all of the viewshed contains existing pipelines and transmission lines and the changes in viewshed would

decrease over time from revegetation of temporary construction work areas and to a lesser degree the permanent right-of-way.

6.4.3.1.3 Traditional Cultural Properties

Without specific knowledge of the particulars of a TCP, the assessment of potential impacts is difficult to accomplish. A TCP may be important for a variety of reasons, may incorporate a small or large geographic area, and may have unique qualities that make it eligible for listing on the NRHP. In this manner, impacts would vary greatly depending on the location of the TCP in relation to a Project component.

6.4.3.2 Route Alternatives (from Clearbrook to Carlton)

Archaeological and historic resources information along the route alternatives is limited to archival information along the pipeline corridor. No field surveys have been completed for the route alternatives. Archaeological and historic resource types are similar between the route alternatives and the Applicant's preferred route. Archaeological resources include historic scatters, pre-contact artifacts, pre-contact surface features, railroads, and agricultural developments. Historic resources include bridges, farmhouses and associated outbuildings, and other buildings and structures.

For the route alternatives, no listed-NRHP archaeological resources are present within the construction workspaces or the permanent right-of-way (based on a review of NPS (2014) data and MHS data). In this manner, no direct or indirect impacts would be anticipated to occur to these types of resources. However, other archaeological resources are present within the construction workspaces, permanent right-of-way, and within the ROI; direct and indirect impacts may occur to these resources.

In addition, while NRHP listed properties that are above-ground are located within the ROI, it is assumed that if one of these alternatives were to be constructed, these types of resources would not be directly affected. Direct and indirect impacts, however, may occur to other historic resources located within construction workspaces, the permanent right-of-way, and the ROI.

6.4.3.2.1 Route Alternative RA-03AM

Construction Impacts

<u>Archaeological Resources</u>

Based on MHS data, six previously recorded archaeological resources would be within the construction work area. Construction-related impacts would be similar to those described in Section 6.4.3.1 for the Applicant's preferred route. Direct impacts could result from ground excavation with machinery and hand tools, grading, vegetation removal, leak containment, and any inadvertent exposure of contaminated sediments. Construction activity may expose archaeological resources (if significant) to looting and vandalism. Archaeological resources within the RA-03AM construction work area primarily include artifact scatters, which would be permanently affected by ground disturbance related to construction if not avoided. Direct impacts would be permanent and minor to major, depending on the types of affected sites and their significance. In addition, impacts could be associated with minor Project-related spills and leaks such as contamination or disturbance during cleanup activities, or encountering existing contamination. These direct impacts may require mitigation that would be determined in consultation with the SHPO, affected American Indian tribes, and the public (see Section 6.4.4).

Indirect impacts during construction would be temporary, localized, and negligible to minor. These impacts include vibration, changes in noise and air quality, dust, and visual intrusions.

Historic Resources

Based on MHS data, seven previously recorded historic resources would be within the construction work area, including railroads, structural ruins, and farm buildings. Construction along RA-03AM would directly affect more known historic resources than the other route alternatives. Construction-related direct impacts on historic resources may include physical destruction, alteration, or damage caused by equipment and excavation, which would cause permanent minor to major impacts.

Indirect impacts may occur on the 141 historic resources within the ROI during construction. These indirect impacts include dust, vibration, and intrusion related to construction equipment, as well as construction-related noise. These impacts would be temporary and negligible to minor. Indirect visual intrusions due to vegetation clearing would be long-term and negligible to minor. Indirect impacts from the construction of aboveground facilities would be permanent and negligible to major. Almost all of the viewshed contains existing pipelines and transmission lines and the changes in viewshed would decrease over time from revegetation of temporary construction work areas and to a lesser degree the permanent right-of-way.

Minor spills have the potential to directly and indirectly affect historic resources through contamination, changes in access and setting, and response activities. These impacts would be temporary to permanent and negligible to major.

Operations Impacts

Archaeological Resources

Based on MHS data, one previously recorded archaeological resource would be within the permanent right-of-way. Disturbed areas would be restored and stabilized to the extent practicable after pipeline installation. Such restoration is unlikely to cause damage to archaeological resources beyond what may occur during construction. Inspection, monitoring, and maintenance activities are unlikely to affect the one archaeological resources within the permanent right-of-way because these activities would be undertaken using established access routes. The archaeological resources present within the permanent right-of-way would have been directly affected during construction, and as such, additional impacts from these activities would not be expected. Direct impacts associated with Project-related spills or encountering existing contamination could occur; however, no additional impacts would be expected as the archaeological resources would have already been disturbed during construction.

If operations-related activities result in direct impacts on archaeological resources that were not previously disturbed during construction (i.e., avoided) or to those resources that are adjacent to the construction work area, then the impacts would be permanent and minor to major. Some impacts may require mitigation that would be determined in consultation with the SHPO, affected American Indian tribes, and the public (see Section 6.4.4).

If new ground disturbance occurs during the lifespan of the project, it would occur within the already disturbed permanent right-of-way or construction work area. As such, direct impacts on archaeological resources would have already occurred during construction; thus, any new ground disturbance is unlikely to cause additional impacts on these resources. However, if archaeological resources had been avoided during construction, or if they are adjacent to the construction work area, new ground

disturbance may cause new impacts on these resources, which would be permanent and minor to major.

Indirect impacts of new ground disturbance during operations would be temporary, localized, and negligible to minor. Temporary impacts would include vibration, changes in noise and air quality, and visual intrusions.

Historic Resources

Based on MHS data, two previously recorded historic resources are within the permanent right-of-way for RA-03AM, including a historic farmstead. No ground disturbance would occur during operations; therefore, direct impacts are not anticipated beyond those that occurred during construction. Inspection, monitoring, and maintenance activities are unlikely to affect historic resources because they would be undertaken using established access routes. Impacts could be associated with Project-related spills or encountering existing contamination, which may cause temporary to permanent and negligible to major impacts.

Indirect impacts may occur on the 141 historic resources within the ROI during pipeline operations. These indirect impacts would primarily consist of the presence of MLVs, pump stations, and maintenance crews and equipment, resulting in dust, vibration, and visual and auditory intrusion. These indirect impacts would be temporary to permanent and negligible to minor. Spill response activities and personnel would also cause temporary negligible to minor indirect impacts. Indirect visual intrusions from the new pipeline would be permanent and negligible to minor as almost all of the viewshed contains existing pipelines and transmission lines. The changes in viewshed would decrease over time from revegetation of temporary construction work areas and to a lesser degree the permanent right-of-way.

Traditional Cultural Properties

The discussion of potential impacts on TCPs would be the same as provided in Section 6.4.3.1.3.

6.4.3.2.2 Route Alternative RA-06

Construction Impacts

Archaeological Resources

Based on MHS data, no previously recorded archaeological resources would be within the construction work area. As such, this route alternative would not directly or indirectly impact known archaeological sites. It is possible that currently unknown archaeological resources are located within the construction work area that could be discovered and affected during ground-disturbing activities. To reduce impacts on currently unknown cultural resources, an Unanticipated Discovery Plan would be implemented during construction (Appendix O).

Historic Resources

Based on MHS data, one previously recorded historic resource would be within the construction work area. RA-06 would affect fewer known historic resources than the other route alternatives. Construction-related direct impacts on historic resources may include physical destruction, alteration, or damage caused by equipment and excavation, which would cause permanent minor to major impacts.

Indirect impacts may occur on the 27 historic resources within the ROI during construction. These indirect impacts include dust, vibration, and intrusion related to construction equipment, as well as construction-related noise. These impacts would be temporary and negligible to minor. Indirect visual intrusions due to vegetation clearing would be long-term and negligible to minor. The changes in viewshed would decrease over time from revegetation of temporary construction work areas and to a lesser degree the permanent right-of-way. Indirect impacts from the construction of aboveground facilities would be permanent and negligible to major given that relatively little of the viewshed contains existing pipelines, transmission lines, and associated facilities.

Minor spills have the potential to directly and indirectly affect historic resources through contamination, changes in access and setting, and response activities. These impacts would be temporary to permanent and negligible to major.

Operations Impacts

Archaeological Resources

Based on MHS data, no previously recorded archaeological resources would be within the permanent right-of-way. Therefore, no direct or indirect impacts on known archaeological resources are expected during operation of RA-06.

Historic Resources

Based on MHS data, no previously recorded historic resources would be within the permanent right-of-way. Therefore, no direct impacts on historic resources are expected during operation of RA-06. Inspection, monitoring, and maintenance activities are unlikely to affect historic resources because there are no historic resources in the permanent right-of-way. Similarly, no impacts caused by Project-related spills or encountering existing contamination are expected as no historic resources are within the permanent right-of-way.

Indirect impacts may occur on the 27 historic resources within the ROI during pipeline operations. These indirect impacts would primarily consist of the presence of MLVs, pump stations, and maintenance crews and equipment, resulting in dust, vibration, and visual and auditory intrusion. These indirect impacts would be temporary to permanent and negligible to minor. Spill response activities and personnel would also cause temporary negligible to minor indirect impacts. Indirect visual intrusions from the new pipeline would be permanent and negligible to major as relatively little of the viewshed contains existing pipelines and transmission lines. The changes in viewshed would decrease over time from revegetation of temporary construction work areas and to a lesser degree the permanent right-of-way.

Traditional Cultural Properties

The discussion of potential impacts on TCPs would be the same as provided in Section 6.4.3.1.3.

6.4.3.2.3 Route Alternative RA-07

Construction Impacts

Archaeological Resources

Based on MHS data, seven previously recorded archaeological resources would be within the construction work area. The types of construction-related impacts would be similar to those described in Section

6.4.3.1 for the Applicant's preferred route; however, the extent would differ as the construction work area would be larger (205 feet wide), and the activities would be more intensive and last longer to allow removal and replacement of the pipeline. Direct impacts could result from ground excavation with machinery and hand tools, grading, vegetation management, leak containment, and any inadvertent exposure of contaminated sediments. Construction activity may expose archaeological resources to looting and vandalism. Archaeological resources within the RA-07 construction work area primarily include artifact scatters, which would be permanently affected by ground disturbance related to construction, if not avoided. Direct impacts would be permanent and minor to major, depending on the types of affected sites and their significance. In addition, impacts could be associated with Project-related spills including contamination or disturbance during cleanup activities, or encountering existing contamination. These direct impacts may require mitigation that would be determined in consultation with the SHPO, affected American Indian tribes, and the public (see Section 6.4.4).

Indirect impacts during construction would be temporary, localized, and negligible to minor. These impacts include vibration, changes in noise and air quality, dust, and visual intrusions.

Historic Resources

Based on MHS data, three previously recorded historic resources would be within the construction work area for RA-07. Construction-related direct impacts on historic resources may include physical destruction, alteration, or damage caused by equipment and excavation, which would cause permanent minor to major impacts.

Indirect impacts on the 166 historic resources in the ROI. These indirect impacts include dust, vibration, and intrusion related to construction equipment, as well as construction-related noise. These impacts would be temporary and negligible to minor. Indirect visual intrusions due to vegetation clearing would be long-term and negligible to minor. Indirect impacts from the construction of aboveground facilities would be permanent and negligible to major. The entire viewshed contains existing pipelines and transmission lines along the Mainline corridor and the changes in viewshed would decrease over time from revegetation of temporary construction work areas.

Minor spills have the potential to directly and indirectly affect historic resources through contamination, changes in access and setting, and response activities. These impacts would be temporary to permanent and negligible to major.

Operations Impacts

Archaeological Resources

Based on MHS data, five previously recorded archaeological resources would be within the permanent right-of-way. Disturbed areas would be restored and stabilized to the extent practicable after pipeline installation. Such restoration is unlikely to cause damage to archaeological resources beyond what may occur during construction. Inspection, monitoring, and maintenance activities are unlikely to affect the five archaeological resources within the permanent right-of-way because these activities would be undertaken using established access routes. The archaeological resources present within the permanent right-of-way would have been directly affected during construction, and as such, additional impacts from these activities would not be expected. Direct impacts associated with Project-related spills or encountering existing contamination could occur; however, no additional impacts would be expected as the archaeological resources would have already been disturbed during construction.

If operations-related activities result in direct impacts on archaeological resources that were not previously disturbed during construction (i.e., avoided) or to those resources that are adjacent to the construction work area, then the impacts would be permanent and minor to major. Some impacts may require mitigation that would be determined in consultation with the SHPO, affected American Indian tribes, and the public (see Section 6.4.4).

If new ground disturbance occurs during the lifespan of the project, it would occur within the already disturbed permanent right-of-way or construction work area. As such, direct impacts on archaeological resources would have already occurred during construction; thus, any new ground disturbance is unlikely to cause additional impacts on these resources. However, if archaeological resources had been avoided during construction, or if they are adjacent to the construction work area, new ground disturbance may cause new impacts on these resources, which would be permanent and minor to major.

Indirect impacts of new ground disturbance during operations would be temporary, localized, and negligible to minor. Temporary impacts would include vibration, changes in noise and air quality, and visual intrusions.

Historic Resources

Based on MHS data, one previously recorded historic resource would be within the permanent right-of-way. No ground disturbance would occur during operations; therefore, direct impacts are not anticipated during operations beyond those that occurred during construction. Inspection, monitoring, and maintenance activities are unlikely to affect historic resources because they would be undertaken using established access routes. Impacts could be associated with minor Project-related spills and leaks or encountering existing contamination, which may cause temporary to permanent and negligible to major impacts.

Indirect impacts may occur on the 166 historic resources within the ROI during pipeline operations. These indirect impacts would primarily consist of the presence of MLVs, pump stations, and maintenance crews and equipment, resulting in dust, vibration, and visual and auditory intrusion. These indirect impacts would be temporary to permanent and negligible to minor. Spill response activities and personnel would also cause temporary negligible to minor indirect impacts. Indirect visual intrusions from the new pipeline would be permanent and negligible to minor as the viewshed along the Mainline corridor contains existing pipelines and transmission lines. The changes in viewshed would decrease over time from revegetation of temporary construction work areas.

Traditional Cultural Properties

The discussion of potential impacts on TCPs would be the same as provided in Section 6.4.3.1.3.

6.4.3.2.4 Route Alternative RA-08

Construction Impacts

Archaeological Resources

Based on MHS data, 12 previously recorded archaeological resources would be within the construction work area. Construction related impacts would be similar to those described in Section 6.4.3.1 for the Applicant's preferred route. Direct impacts could result from ground excavation with machinery and hand tools, grading, vegetation management, leak containment, and any inadvertent exposure of

contaminated sediments. Construction activity may expose archaeological resources (if significant) to looting and vandalism. Archaeological resources within the RA-08 construction work area primarily include artifact scatters, which would be permanently affected by ground disturbance related to construction, if not avoided. Direct impacts would be permanent and minor to major, depending on the types of affected sites and their significance. In addition, impacts could be associated with Project-related spills including contamination or disturbance during cleanup activities, or encountering existing contamination. These direct impacts may require mitigation that would be determined in consultation with the SHPO, affected American Indian tribes, and the public (see Section 6.4.4).

Indirect impacts during construction would be temporary, localized, and negligible to minor. These impacts include vibration, changes in noise and air quality, dust, and visual intrusions.

Historic Resources

Based on MHS data, three previously recorded historic resources would be located within the construction work area (Table 6.4.2-3). Construction-related direct impacts on historic resources may include physical destruction or damage caused by equipment, which would cause long-term to permanent minor to major impacts.

Indirect impacts on the 74 historic resources within the ROI during construction. These indirect impacts include dust, vibration, and intrusion related to construction equipment, as well as construction-related noise. These impacts would be temporary and negligible to minor. Indirect visual intrusions due to vegetation clearing would be long-term and negligible to minor. Indirect impacts from the construction of aboveground facilities would be permanent and negligible to major. The entire viewshed contains existing pipelines and transmission lines, and the changes in viewshed would decrease over time from revegetation of temporary construction work areas and to a lesser degree the permanent right-of-way.

Minor spills have the potential to directly and indirectly affect historic resources through contamination, changes in access and setting, and response activities. These impacts would be temporary to permanent and negligible to major.

Operations Impacts

Archaeological Resources

Based on MHS data, 10 previously recorded archaeological resources would be within the permanent right-of-way. Disturbed areas would be restored and stabilized to the extent practicable after pipeline installation. Such restoration is unlikely to cause damage to archaeological resources beyond what may occur during construction. Inspection, monitoring, and maintenance activities are unlikely to affect the four archaeological resources within the permanent right-of-way, because these activities would be undertaken using established access routes. The archaeological resources present within the permanent right-of-way would have been directly affected during construction; as such, additional impacts from these activities would not be expected. Direct impacts associated with Project-related spills or encountering existing contamination could occur; however, no additional impacts would be expected as the archaeological resources would have already been disturbed during construction.

If operations-related activities result in direct impacts on archaeological resources that were not previously disturbed during construction (i.e., avoided) or to those resources that are adjacent to the construction work area, then the impacts would be permanent and minor to major. Some impacts may

require mitigation that would be determined in consultation with the SHPO, affected American Indian tribes, and the public (see Section 6.4.4).

If new ground disturbance occurs during the lifespan of the project, it would occur within the already disturbed permanent right-of-way or construction work area. As such, direct impacts on archaeological resources would have already occurred during construction; thus, any new ground disturbance is unlikely to cause additional impacts on these resources. However, if archaeological resources had been avoided during construction, or if they are adjacent to the construction work area, new ground disturbance may cause new impacts on these resources, which would be permanent and minor to major.

Indirect impacts of new ground disturbance during operations would be temporary, localized, and negligible to minor. Temporary impacts would include vibration, changes in noise and air quality, and visual intrusions.

Historic Resources

Based on MHS data, one previously recorded historic resource would be located within the permanent right-of-way. No new ground disturbance would be expected to occur during operations; therefore, direct impacts are not anticipated during operations beyond those that occurred during construction. Inspection, monitoring, and maintenance activities are unlikely to affect historic resources because they would be undertaken using established access routes. Impacts could be associated with minor Project-related spills and leaks or encountering existing contamination, which may cause temporary to permanent and negligible to major impacts.

Indirect impacts may occur on the 74 historic resources within the ROI during pipeline operations. These indirect impacts would primarily consist of the presence of MLVs, pump stations, and maintenance crews and equipment, resulting in dust, vibration, and visual and auditory intrusion. These indirect impacts would be temporary to permanent and negligible to minor. Spill response activities and personnel would also cause temporary negligible to minor indirect impacts. Indirect visual intrusions from the new pipeline would be permanent and negligible to minor, as the entire viewshed contains existing pipelines and transmission lines. The changes in viewshed would decrease over time from revegetation of temporary construction work areas and to a lesser degree the permanent right-of-way.

Traditional Cultural Properties

The discussion of potential impacts on TCPs would be the same as provided in Section 6.4.3.1.3.

6.4.4 Summary and Mitigation

6.4.4.1 Summary

Construction and operation of the Applicant's preferred route and route alternatives could impact archaeological and historic resources. Based on the current information, impacts on archaeological and historic resources could range from negligible to major during construction and operations (Table 6.4.4-1). DOC-EERA's consultation with the SHPO is ongoing, and the results of the consultation concerning recommendations of eligibility, Project effects, and any necessary treatment for impacts, are not yet available.

During construction, direct impacts on archaeological resources would be permanent and could range from minor to major for the Applicant's preferred route and each route alternative. The types of archaeological resources across the ROI for the Applicant's preferred route and route alternatives primarily consist of individual lithic artifacts or lithic scatter.

As a result, the primary difference in potential impacts on archaeological resources among route options is associated with the number of resources present in the ROI and construction footprint between Clearbrook and Carlton. The number of previously recorded archaeological resources that could be directly affected ranges from none for RA-06 up to 12 resources for RA-08 (Table 6.4.4-1). Direct impacts on historic resources would be permanent and minor to major if physical disturbance of these resources during construction or operation were to occur. Historic resources within the construction footprints of the route options ranges from none for the Applicant's preferred route to seven historic resources for RA-03AM. Indirect impacts on historic resources within the ROI for a route option could occur (e.g., dust, noise, visibility of new features) during construction and operation. Most construction impacts would be temporary and negligible to minor. However, construction of new features on the landscape could result in permanent and minor to major impacts. Historic resources along the ROI for the route options range from 27 historic resources for RA-06 to up to 166 resources for RA-07 (Table 6.4.4-1).

During operations, direct and indirect impacts on archaeological resources could continue with the operational footprint of the Project. The number of archaeological resources within the permanent right-of-way would range from no resources for RA-07 to up to 10 resources for RA-08 (Table 6.4.4-1). As potential impacts on historic structures across the ROI during construction could be permanent, the same number of historic structures within the ROI for each route option could continue to be affected during operations, if no minimization measures were implemented.

6.4.4.2 Mitigation

Known archaeological resources may be avoided in the construction work area through the use of fencing around the site boundaries or designated buffers and incorporation of an archaeological monitor during ground-disturbing activities. To reduce impacts on currently unknown archaeological resources, an Unanticipated Discovery Plan would be implemented during construction (Appendix O). Archaeological and/or tribal monitoring could be implemented in sensitive areas during construction to further minimize impacts.

The need for minimization and mitigation measures for impacts on cultural resources would be discussed with MHS, the SHPO, State Archaeologist, and affected American Indian tribes through continuing consultation efforts. Additional survey also may be needed to account for areas not already investigated or surveyed (i.e., if a route permit is issued for a route alternative other than the Applicant's preferred route, or if variations were to be incorporated into the route). Minimization measures may include avoidance, site staking, and archaeological and tribal monitoring during construction. Mitigation measures may include data recovery excavations of significance archaeological sites, intensive recordation of historic resources, ethnographic studies, and guaranteed access, among others.

Table 6.4.4-1. Summary of Potential Impacts on Archaeological and Historic Resources for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Previously recorded archaeological resources	Direct: Permanent/minor to major impacts • 8 resources Indirect: Temporary/ negligible to minor impacts • 8 resources	Direct: Permanent/minor to major impacts • 6 resources Indirect: Temporary/negligible to minor impacts • 6 resources	Direct: No impact • 0 resources Indirect: No impact • 0 resources	Direct: Permanent/minor to major impacts • 7 resources Indirect: Temporary/negligible to minor impacts • 7 resources	Direct: Permanent/minor to major impacts • 12 resources Indirect: Temporary/negligible to minor impacts • 12 resources
Previously recorded historic resources	Direct: No impacts • 0 resources Indirect: Temporary to permanent/ negligible to major impacts • 40 resources	Direct: Permanent/minor to major impacts • 7 resources Indirect: Temporary to permanent/ negligible to major impacts • 141 resources	Direct: Permanent/minor to major impacts • 1 resource Indirect: Temporary to permanent/ negligible to major impacts • 27 resources	Direct: Permanent/minor to major impacts • 3 resources Indirect: Temporary to permanent/ negligible to major impacts • 166 resources	Direct: Permanent/minor to major impacts • 3 resources Indirect: Temporary to permanent/ negligible to major impacts • 74 resources
Operations Impacts					
Previously recorded archaeological resources	Direct: Permanent/minor to major impacts • 4 resources Indirect: Temporary/ negligible to minor impacts • 4 resources	Direct: Permanent/minor to major impacts • 1 resources Indirect: Temporary/negligible to minor impacts • 1 resources	Direct: No impact • 0 resources Indirect: No impact • 0 resources	Direct: Permanent/minor to major impacts • 5 resources Indirect: Temporary/negligible to minor impacts • 5 resources	Direct: Permanent/minor to major impacts • 10 resources Indirect: Temporary/negligible to minor impacts • 10 resources

Table 6.4.4-1. Summary of Potential Impacts on Archaeological and Historic Resources for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Previously recorded historic resources	Direct: No impacts • 0 resources Indirect: Temporary to permanent/ negligible to minor impacts • 40 resources	Direct: Temporary to permanent/negligible to major impacts • 2 resources Indirect: Temporary to permanent/ negligible to minor impacts • 141 resources	Direct: No impact • 0 resources Indirect: Temporary to permanent/ negligible to minor impacts • 27 resources	Direct: Temporary to permanent/negligible to major impacts • 1 resource Indirect: Temporary to permanent/ negligible to minor impacts • 166 resources	Direct: Temporary to permanent/ negligible to major impacts • 1 resource Indirect: Temporary to permanent/ negligible to minor impacts • 74 resources

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6.5 SOCIOECONOMICS

The 20 counties in Minnesota that could be crossed by the Applicant's preferred route and route alternatives contribute to regional and statewide economies through the production of a variety of goods and services. Project actions have the potential to affect these economies (both positively and negatively). This section discusses the existing conditions and assesses potential Project-related impacts with respect to commodity production; recreation and tourism; and employment, income, and tax revenues.

6.5.1 Commodity Production

The primary commodities produced along the Applicant's preferred route and the route alternatives that would be affected by construction or operations of the Project include agricultural commodities, forestry products, and mining production. Construction of Project facilities and permanent maintenance of a cleared right-of-way during operations may displace some capacity for production of these commodities. The analysis of impacts on commodity production during construction and operations for the Applicant's preferred route and route alternatives considered the following issues:

- Disturbance and loss of agricultural land, including for the production of wild rice, and potential for and magnitude of lost yields,
- Disturbance and loss of forested land and timber resources, and
- Disturbance and loss of land used for mining.

This section first describes the existing conditions within an area along the Applicant's preferred route and each of the route alternatives where commodity production could be affected by construction and operation of the Project. The potential impacts on commodity production of Project-related construction and operation in these areas are considered next. Potential impacts for each route alternative (RA-03AM, RA-06, RA-07, and RA-08) also are assessed and then compared to each other and to the Applicant's preferred route between Clearbrook and Carlton. A summary and comparison of the impacts for all route options are included at the end of the section. Chapter 10 addresses the impacts on commodity production resulting from an unanticipated crude oil release.

6.5.1.1 Regulatory Context and Methodology

6.5.1.1.1 Regulatory Context

Several Minnesota statutes provide for the protection and management of land used to produce commodities. Minnesota Statutes § 17.80 – 17.84 set the state policy on agricultural land preservation and conservation. One of the main goals is "[…] to minimize the disruption of agricultural production in accordance with local social, economic and environmental considerations of the agricultural community." Minnesota Statutes § 89.002 establishes the policies for managing forest resources of state forest lands, providing for the responsible and sustainable use of forest products. The provision for leasing state-owned lands and mineral rights for nonferrous metallic minerals and other minerals, other than iron ore, is found in Minnesota Statutes § 93.25. Furthermore, state-owned lands and mineral rights administered by the Commissioner of Natural Resources may be leased for peat, sand, gravel, stone, clay, and rock under Minnesota Statutes § 92.50.

6.5.1.1.2 Methodology

The ROI for the analysis of impacts on commodities consists of all land currently used in the production of agricultural, timber, or mineral products—or land with the potential to be used for these purposes—that could be disturbed or removed from production along the Applicant's preferred route or the route alternatives. This includes the permanent right-of-way and the broader construction work area. Impacts on commodity production were evaluated by:

- Using GIS data resources to identify and inventory all land in the ROI currently being used, or with the potential to be used, in the production of agricultural, timber, or mineral production in the counties crossed by the Applicant's preferred route and route alternatives.
- Overlaying the construction and operations footprints for the Applicant's preferred route and the route alternatives on these areas. The footprint for the Applicant's preferred route is based on specific geo-referenced information provided by Enbridge; the construction footprint for the route alternatives is based on a standard 120-foot-wide construction footprint (except for RA-07, which would have a 205-foot-wide construction footprint; see Chapter 4) and a 50-foot-wide permanent right-of-way.
- Determining the geographic extent of impacts on all land currently being used for commodity production or land that could be used for commodity production from the construction work area, the permanent right-of-way, and the associated aboveground facilities.
- Providing a range of estimates of lost yield and market value of the affected commodities (where applicable).
- Providing a qualitative statement of the duration and magnitude of impacts on the productivity of commodity lands.

Various state and federal database layers were obtained for agricultural land, forested land, and mineral resources. Acreages of agricultural and forested lands were obtained using the NLCD 2011 Classification System (Homer et al. 2015). Acreages of farmland soils were obtained using the NRCS database to identify prime farmland and farmlands of statewide importance (NRCS 2011). For mining, acreages of active lease land and acreages of land with potential sand and gravel deposits were obtained from Minnesota DNR and USGS. Based on the geographic extent of impacts on the land used in the production of each commodity, a qualitative assessment is provided of the relative magnitude (i.e., negligible, minor, or major) and duration (i.e., temporary, short-term, long-term, or permanent) of the impacts in terms of lost production, access, and disruption.

6.5.1.2 Existing Conditions

Existing conditions are described for the entire length of the Applicant's preferred route in Minnesota. Route alternatives RA-03AM, RA-06, RA-07, and RA-08 represent alternative routes to the Applicant's preferred route between Clearbrook and Carlton. A subset of data for the segment from Clearbrook to Carlton is included in the description of existing conditions for the Applicant's preferred route to enable direct comparison of the route alternatives to the Applicant's preferred route.

The following discussion of existing conditions describes agricultural land, forested land, and mineral resource lands. These land types are defined as follows:

- Agricultural lands – Cultivated cropland and grassland that includes activities such as crop harvesting, livestock grazing, dairy production, and organic farming. It also includes land with areas of soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops (i.e., prime farmland); or areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods (i.e., farmland of statewide importance). Collectively, these soils are referred to as "farmland soils." Farmland soils can include agricultural land as defined above or land that is not currently being used for agricultural production but has high potential for future productivity.
- Forested lands – Commercially productive land that is actively managed for the sustainable harvest of timber and includes the following land cover types: deciduous, evergreen, and mixed forest. This land currently is being used in the production of timber or has timber resources that could be harvested in the future. The timber industry is an important part of Minnesota's economy.
- Mineral resource lands – lands where non-metallic (e.g., sand, gravel, and crushed stone) and metallic (e.g., iron ore, nickel, and titanium) minerals are produced.

6.5.1.2.1 Applicant's Preferred Route

Agricultural Lands

Table 6.5.1-1 presents the agricultural land located within the ROI for the Applicant's preferred route. Within the construction work area 1,913 acres are classified as agricultural land; 562 of these acres occur in the segment between Clearbrook and Carlton. The construction work area includes 1,907 acres of farmland soils (classified as prime farmland or farmland of statewide importance). Of this total, approximately 1,278 acres are located between Clearbrook and Carlton.

An additional approximately 487 acres of farmland soils and 554 acres of agricultural land are within the footprint of ATWS, access roads, valve sites, and pump stations. Some of the farmland soils may be in active production, while some may not be actively farmed as the designation is based on soil characteristics, not land use. In total, approximately 2,394 acres of farmland soils and 2,467 acres of agricultural land are located within the ROI for the Applicant's preferred route (Table 5.3.1-1).

The market value of crops (as reported by the U.S. Department of Agriculture in 2016) within the area disturbed by the Applicant's preferred route for construction and operation is shown in Table 6.5.1-2 (i.e., the average yield per acre multiplied by the acres crossed) by crop type. In total, the market value of the crops grown on lands crossed by the Applicant's preferred route is approximately $817,000 within the construction work area and approximately $333,000 within the permanent right-of-way.

Table 6.5.1-1. Agricultural Land and Farmland Soils Crossed by the Applicant's Preferred Route (acres)

Agricultural Land Type	North Dakota Border to Clearbrook		Clearbrook to Carlton		Carlton to Wisconsin Border		Construction Work Area Subtotal		ATWS	Temp Access Roads	Perm Access Roads	Pump Stations	Valves[a]	Total[b]	
	Con	Op	Con	Op	Con	Op	Con	Op						Con	Op
Agricultural Land															
Cultivated crops	1,154	495	173	76	8	4	1,336	575	327	2	20	21	2	1,707	617
Grass/pastureland	131	58	388	175	58	25	577	259	121	1	45	16	2	760	320
Agricultural land subtotal	***1,285***	***553***	***562***	***252***	***66***	***29***	***1,913***	***832***	***448***	***3***	***65***	***36***	***3***	***2,467***	***937***
Farmland															
Prime farmland	337	146	514	227	11	4	862	371	182	8	60	4	1	1,116	444
Farmland of statewide importance	206	90	763	332	76	33	1,046	459	134	12	67	17	3	1,278	542
Farmland soils subtotal	***541***	***236***	***1,278***	***559***	***84***	***38***	***1,907***	***833***	***315***	***19***	***127***	***21***	***5***	***2,394***	***986***

Sources: Homer et al. 2015 for agricultural lands; NRCS 2011 for prime farmland and farmland of statewide importance.

[a] Includes valve sites and valve driveways. Since valve sites are within the permanent right-of-way, total project impacts may be slightly overestimated due to double counting.

[b] Con = sum of pipeline construction work area, additional temporary workspaces (ATWS), pump stations, valves, and temporary and permanent access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, valves, and pump stations.

Notes:

Values in the table may not sum to subtotals and totals due to rounding.

Enbridge-provided footprints: Con = construction work area, Op = operations permanent right-of-way.

Table 6.5.1-2. Market Value of Crops Crossed by the Applicant's Preferred Route ($2016 thousands)

Crop Type	North Dakota Border to Clearbrook		Clearbrook to Carlton		Carlton to Wisconsin Border		Construction Work Area Subtotal		ATWS	Temp Access Roads	Perm Access Roads	Pump Station	Valves[a]	Total[b]	
	Con	Op	Con	Op	Con	Op	Con	Op						Con	Op
Alfalfa	$21.7	$9.7	$25.3	$11.3	$2.1	$0.9	$49.1	$21.9	$6.3	$0.1	$2.7	$2.6	$0.3	$61.1	$27.5
Barley	$6.6	$2.7	$0.0	$0.0	$0.0	$0.0	$6.7	$2.7	$1.5	$0.0	$0.0	$1.6	$0.2	$10.0	$4.5
Buckwheat	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Corn	$44.3	$18.7	$13.3	$5.6	$2.1	$1.0	$59.7	$25.3	$10.9	$0.1	$0.6	$0.2	$3.0	$74.5	$29.1
Dry beans	$8.9	$4.1	$24.7	$10.1	$0.0	$0.0	$33.6	$14.3	$2.9	$0.2	$2.0	$0.2	$1.2	$40.1	$17.7
Oats	$0.7	$0.3	$0.9	$0.4	$0.0	$0.0	$1.6	$0.7	$0.1	$0.0	$0.2	$0.2	$0.1	$2.2	$1.1
Other hay/ non alfalfa	$1.2	$0.6	$5.6	$2.5	$0.4	$0.2	$7.3	$3.2	$0.7	$0.0	$0.4	$0.1	$2.3	$10.8	$6.0
Potatoes	$0.0	$0.0	$31.0	$11.5	$0.0	$0.0	$31.0	$11.5	$7.7	$0.0	$1.2	$0.0	$0.0	$39.9	$12.7
Rye	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Soybeans	$246.0	$105.0	$7.8	$3.7	$0.0	$0.0	$253.8	$108.7	$37.3	$0.0	$3.2	$2.4	$32.8	$329.5	$147.0
Spring wheat	$93.9	$40.0	$2.8	$1.1	$0.0	$0.0	$96.6	$41.1	$20.9	$0.0	$1.1	$0.4	$1.2	$120.3	$43.9
Sugarbeets	$92.6	$37.3	$0.0	$0.0	$0.0	$0.0	$92.6	$37.3	$22.3	$0.0	$0.2	$0.3	$0.6	$116.0	$38.3
Sunflower	$4.7	$1.9	$0.0	$0.0	$0.0	$0.0	$4.7	$1.9	$1.1	$0.0	$0.0	$0.0	$0.1	$6.0	$2.1
Winter wheat	$6.2	$2.7	$0.0	$0.0	$0.0	$0.0	$6.3	$2.8	$0.8	$0.0	$0.1	$0.0	$0.0	$7.2	$2.9
TOTAL	**$526.9**	**$223.0**	**$111.4**	**$46.3**	**$4.6**	**$2.1**	**$642.9**	**$271.4**	**$112.6**	**$0.5**	**$11.6**	**$8.1**	**$41.7**	**$817.4**	**$332.7**

Source: U.S. Department of Agriculture, National Agricultural Statistical Service 2016.

[a] Includes valve sites and valve driveways. Since valve sites are within the permanent right-of-way, total Project impacts may be slightly overestimated due to double counting.

[b] Con = sum of pipeline construction work area, additional temporary workspaces (ATWS), pump stations, valves, and temporary and permanent access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, valves, and pump stations.

Notes:

Values in the table may not sum to subtotals and totals due to rounding.

Enbridge-provided footprints: Con = construction work area, Op = operations permanent right-of-way.

Wild Rice

As discussed within Section 6.3, the Applicant's preferred route would cross waterbodies known to be used for the harvesting of wild rice. The construction work area of the Applicant's preferred route would cross approximately 4.9 acres in a total of five waterbodies, while the permanent right-of-way for operations of the Applicant's preferred route would cross approximately 3.2 acres in a total of five waterbodies.

The market value of wild rice is variable and dependent on source and means of cultivation and harvesting (e.g., traditional hand-harvested versus use of a combine). Limited information pertaining to commodity values of Minnesota wild rice, both generally and traditionally hand-harvested, is available. According to a report on wild rice prepared by the Minnesota DNR, the price paid for unprocessed rice from the LLBO reservation between 1990 and 2007 was between $1.00 and $1.50 (Minnesota DNR 2008). Based on the 2015 Annual Report of the LLBO, the LLBO Department/Division of Resource Management purchased over 89,000 pounds of wild rice from LLBO Band members, resulting in $178,000 injected into the local economy (LLBO 2015). However, it should be noted that the Applicant's preferred route would not cross any American Indian reservations.

Using the resulting rudimentary assumption that the average price for traditionally harvested unprocessed wild rice is $2.00 per pound (LLBO 2015), a reasonable assumption given the previously noted 1990-2007 price range, and a yield assumption of approximately 300 pounds per acre (), the approximate market values of unprocessed wild rice within the construction work area and permanent right-of-way of the Applicant's preferred route are $3,000 and $2,000, respectively. These estimates assume that the entire waterbody acreage contains harvestable wild rice. The estimates do not consider the economic value of other activities, such as finishing/processing for consumption.

Forested Land

Forested land in the State of Minnesota represents 17.4 million acres of land (all ownerships). Of this total area, 15.7 million acres is considered to be commercially productive. This is forested land that is actively managed for sustainable harvest of timber and includes the following land cover types: deciduous, evergreen, and mixed forest. This land currently is being used for production of timber or has timber resources that could be harvested in the future.

Table 6.5.1-3 presents the total acres of forested land that would be crossed by the Applicant's preferred route. In total, approximately 1,790 acres of forested land is present within the ROI for the Applicant's preferred route (including footprints for the ATWS, pump stations, valve sites, and temporary access roads). The majority of forested land that would be crossed by the proposed pipeline is within the Clearbrook-to-Carlton segment (approximately 1,447 acres) and currently is owned by private landowners. These lands are used primarily as residential property, as recreational property, or for harvesting wood products.

Table 6.5.1-4 presents the current market value of the timber within the ROI for the Applicant's preferred route, which is approximately $337,000, based on the assumption that an acre of forested land produces 7.8 cords of wood and the average value per cord across all species is $24.40 (USFS 2008).

Mineral Lands

In Minnesota, mineral resource commodity areas host occurrences, deposits, or mine operations, or are sites of active or recurrent exploration.

Table 6.5.1-5 presents the total acres of active mineral exploration areas that would be crossed by the Applicant's preferred route and the route alternatives. The Applicant's preferred route crosses approximately 0.5 acre of land within active county metallic areas for a temporary access road in Carlton County.

Table 6.5.1-6 presents the acres of land within the ROI for the Applicant's preferred route that contain undeveloped sand, gravel, and mineral resources. These include glacial lake sediments with potential commercially important deposits of sand and gravel. Glacial deposits in the area of the proposed pipeline range from 5 to 450 feet in depth. In total, including the ATWS and access roads (Table 6.5.1-6), the construction work area of the Applicant's preferred route would cross approximately 513 acres of land with glacial deposits containing potentially valuable sand and gravel resources. MLVs and permanent access roads would permanently convert approximately 8 acres of land with potential sand and gravel resources, whereas 191 acres would remain within the permanent right-of-way.

Table 6.5.1-3. Forested Land Crossed by the Applicant's Preferred Route (acres)

Forested Land Type	North Dakota Border to Clearbrook		Clearbrook to Carlton		Carlton to Wisconsin Border		Construction Work Area Subtotal[a]		ATWS	Temp Access Roads	Perm Access Roads	Pump Stations	Valves[a]	Total[b]	
	Con	Op	Con	Op	Con	Op	Con	Op						Con	Op
Deciduous forest	56	26	1,256	554.0	38	14	1,349	594	97	31	73	2	2	1,554	671
Evergreen forest	1	1	173	70	1	1	176	71	18	4	15	1	1	214	86
Mixed forest	-	-	18	7	1	0	18	8	1	0	2	0	0	22	10
TOTAL	**57**	**27**	**1,446**	**631**	**40**	**15**	**1,543**	**673**	**116**	**35**	**90**	**3**	**3**	**1,790**	**767**

Source: Homer et al. 2015.

[a] Includes valve sites and valve driveways. Since valve sites are within the permanent right-of-way, total Project impacts may be slightly overestimated due to double counting.

[b] Con = sum of pipeline construction work area, additional temporary workspaces (ATWS), pump stations, valves, and temporary and permanent access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, valves, and pump stations.

Notes:

Enbridge-provided footprints: Con = construction work area; Op = operations permanent right-of-way.

Table 6.5.1-4. Estimated Market Value of Forested Land Crossed by the Applicant's Preferred Route ($2016 thousands)

Forested Land Type	North Dakota Border to Clearbrook		Clearbrook to Carlton		Carlton to Wisconsin Border		Construction Work Area Subtotal		ATWS	Temp Access Roads	Perm Access Roads	Pump Stations	Valves[a]	Total[b]	
	Con	Op	Con	Op	Con	Op	Con	Op						Con	Op
Deciduous forest	$10.6	$5.0	$239.3	$105.6	$7.2	$2.7	$257.2	$113.2	$18.4	$5.9	$13.8	$0.5	$0.4	$296.2	$127.9
Evergreen forest	$0.2	$0.1	$33.0	$13.3	$0.2	$0.1	$33.5	$13.5	$3.5	$0.7	$2.8	$0.1	$0.1	$40.7	$16.5
Mixed forest	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$3.5	$1.5	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
TOTAL	**$10.9**	**$5.1**	**$272.3**	**$118.9**	**$7.4**	**$2.8**	**$294.2**	**$128.2**	**$21.9**	**$6.7**	**$16.6**	**$0.6**	**$0.5**	**$336.9**	**$144.4**

Source: USFS 2008.

[a] Includes valve sites and valve driveways. Since valve sites are within the permanent right-of-way, total Project impacts may be slightly overestimated due to double counting.

[b] Con = sum of pipeline construction work area, additional temporary workspaces (ATWS), pump stations, valves, and temporary and permanent access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, valves, and pump stations.

Notes:

Values in the table may not sum to subtotals and totals due to rounding.

Enbridge-provided footprints: Con = construction work area, Op = operations permanent right-of-way.

Assumes that an acre of forested land produces 7.8 cords of wood and the average value per cord across all species is $24.40.

Table 6.5.1-5. Active Mineral Areas Crossed by the Applicant's Preferred Route and Route Alternatives (acres)

Project Phase	North Dakota Border to Clearbrook[a]	Clearbrook to Carlton					Carlton to Wisconsin Border[a]
		Applicant's Preferred Route[b]	Route Alternative RA-03AM[a]	Route Alternative RA-06[a]	Route Alternative RA-07[c]	Route Alternative RA-08[a]	
Construction	0.0	0.51	0.0	2.7	0.0	0.0	0.0
Operations	0.0	<0.1	0.0	1.1	0.0	0.0	0.0

Source: Minnesota DNR 2016.

[a] Con = estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way; Op = estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the route.

[b] Enbridge-provided footprints: Con = construction work area, Op = operations permanent right-of-way.

[c] Con = estimated construction impact area in acres based on 205-foot-wide construction area, 10 feet wide on the north side of the existing Line 3 and 195 feet wide on the south side of the existing Line 3; Op = estimated operations impact area in acres based on 50-foot-wide operations permanent right-of-way centered on the route.

Table 6.5.1-6. Land with Potential Sand and Gravel Resources Crossed by the Applicant's Preferred Route (acres)

Resource	North Dakota Border to Clearbrook		Clearbrook to Carlton		Carlton to Wisconsin Border		Applicant's Preferred Route Total		ATWS	Temp Access Roads	Perm Access Roads	Pump Stations	Valves[a]	Total[b]	
	Con	Op	Con	Op	Con	Op	Con	Op						Con	Op
Land with glacial deposits	395.2	170.9	14.1	6.8	32.1	13.5	441.4	191.2	62.7	0.0	7.1	0.0	1.2	513.2	199.5

Source: USGS 2006.

[a] Includes valve sites and valve driveways. Since valve sites are within the permanent right-of-way, total Project impacts may be slightly overestimated due to double counting.

[b] Con = sum of pipeline construction work area, additional temporary workspaces (ATWS), pump stations, valves, and temporary and permanent access roads; Op = sum of pipeline permanent right-of-way, permanent access roads, valves, and pump stations.

Notes:

Enbridge-provided footprints: Con = construction work area, Op = operations permanent right-of-way.

6.5.1.2.2 Route Alternatives

As previously noted, the only segment where the route alternatives would vary from the alignment of the Applicant's preferred route is between Clearbrook and Carlton in Minnesota. The existing conditions relevant to commodity production for the route alternatives between Clearbrook and Carlton are described below.

Route Alternative RA-03AM

Agricultural Land

Table 6.5.1-7 presents the agricultural commodity land located within the ROI for RA-03AM. In total, the construction work area of the route would include approximately 1,681 acres of agricultural land between Clearbrook and Carlton. It also would cross approximately 1,608 acres of farmland soils that may or may not currently be in active production. Temporary and permanent access roads, pump stations, and valve sites have not been determined for the route alternatives; therefore, the additional affected acreage from these footprints cannot be quantified.

Table 6.5.1-7. Agricultural Commodity Land Crossed by Route Alternative RA-03AM (acres)

Agricultural Land Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Agricultural Land		
Cultivated crops	585	246
Grass/pastureland	1,096	460
Agricultural land subtotal	***1,681***	***706***
Farmland		
Prime farmland	493	206
Farmland of statewide importance	1,115	465
Farmland soils subtotal	***1,608***	***671***

Sources: Homer et al. 2015 for agricultural lands; NRCS 2011 for prime farmland and farmland of statewide importance.

[a] Estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way.

[b] Estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the route.

To illustrate the impact in terms of market value, Table 6.5.1-8 presents the total dollar value of the yield (i.e., the average yield per acre multiplied by the acres crossed) by crop type. In total, the market value of the crops grown on lands crossed by RA-03AM is approximately $482,000 within the construction work area and approximately $201,000 within the permanent right-of-way.

Table 6.5.1-8. Market Value of Crops for Route Alternative RA-03AM[a] ($2016)

Crop Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Alfalfa	$78,401	$33,058
Barley	$224	$81
Corn	$155,598	$64,904
Dry beans	$38,175	$16,020
Oats	$3,173	$1,369
Other hay/non alfalfa	$9,289	$3,735
Potatoes	$147,638	$61,571
Soybeans	$46,114	$18,954
Spring wheat	$2,735	$1,095
Sugarbeets	$134	$27
Sunflower	$167	$78
Winter wheat	$39	$23
TOTAL	**$481,687**	**$200,914**

Source: U.S. Department of Agriculture, National Agricultural Statistical Service 2016.

[a] Estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way.

[b] Estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the route.

Wild Rice

As discussed within Section 6.3, the RA-03AM route would cross waterbodies known to be used for the harvesting of wild rice. The construction work area of RA-03AM would cross approximately 7.5 acres in a total of seven waterbodies, while the permanent right-of-way for operations of the Applicant's preferred route would cross approximately 3.1 acres in a total of seven waterbodies.

The market value of wild rice is variable and dependent on source and means of cultivation and harvesting (e.g., traditional hand-harvested versus use of a combine). Limited information pertaining to commodity values of Minnesota wild rice, both generally and traditionally hand-harvested, is available. According to a report on wild rice prepared by the Minnesota DNR, the price paid for unprocessed rice from the LLBO reservation between 1990 and 2007 was between $1.00 and $1.50 (Minnesota DNR 2008). Based on the 2015 Annual Report of the LLBO, the LLBO Department/Division of Resource Management purchased over 89,000 pounds of wild rice from LLBO Band members, resulting in $178,000 injected into the local economy (LLBO 2015). However, it should be noted that RA-03AM would not cross any American Indian reservations.

Using the resulting rudimentary assumption that the average price for traditionally harvested unprocessed wild rice is $2.00 per pound, and a yield assumption of approximately 300 pounds per acre (UMN 1982), the approximate market values of unprocessed wild rice within the construction work area and permanent right-of-way of the Applicant's preferred route are $4,500 and $2,000, respectively. These estimates assume that the entire waterbody acreage contains harvestable wild rice. The

estimates do not consider the economic value of other activities, such as finishing/processing for consumption.

Forested Land

Table 6.5.1-9 presents the total acres of forested land that would be crossed by RA-03AM during construction and operation of the pipeline. In total, the construction work area of the route would include approximately 1,175 acres of forested land between Clearbrook and Carlton; and the permanent right-of-way would include 486 acres of forested land. Temporary and permanent access roads, pump stations, and valve sites have not been determined for the route alternatives; therefore, the additional affected acreage from these footprints cannot be quantified. Table 6.5.1-10 presents the current market value of timber within the ROI for RA-03AM, which is $193,000 within the construction work area and approximately $80,000 within the permanent right-of-way for operation. This is based on the assumption that an acre of forested land produces 7.8 cords of wood and the average value per cord across all species is $24.40 (USFS 2008).

Table 6.5.1-9. Forested Land Crossed by Route Alternative RA-03AM (acres)

Forest Land Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Deciduous forest	1,013	419
Evergreen forest	147	61
Mixed forest	15	6
TOTAL	**1,175**	**486**

Source: Homer et al. 2015.

[a] Estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way.

[b] Estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the route.

Table 6.5.1-10. Market Value of Forested Land Crossed by Route Alternative RA-03 AM ($2016 thousands)

Forest Land Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Deciduous forest	$193.0	$79.8
Evergreen forest	$27.9	$11.6
Mixed forest	$2.8	$1.2
TOTAL	**$193.0**	**$79.8**

Sources: Minnesota DNR 2016; U.S. Forest Service 2008.

[a] Estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way.

[b] Estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the route.

Notes:

Assumes that an acre of forested land produces 7.8 cords of wood and the average value per cord across all species is $24.40.

Mineral Lands

No active mineral mining areas would be crossed by RA-03AM during construction or operations. Glacial lake sediments have potential commercially important deposits of sand and gravel. The construction work area would cross approximately 442 acres of land with potential sand and gravel resources, and the permanent right-of-way would cross approximately 184 acres.

Route Alternative RA-06

Agricultural Land

Table 6.5.1-11 presents the agricultural commodity land located within the ROI for RA-06. In total, the construction work area would include approximately 326 acres of agricultural land between Clearbrook and Carlton. The route also would cross approximately 1,241 acres of farmland soils that may or may not currently be in active production. Temporary and permanent access roads, pump stations, and valve sites have not been determined for the route alternatives; therefore, the additional affected acreage from these footprints cannot be quantified.

Table 6.5.1-11. Agricultural Commodity Land Crossed by Route Alternative RA-06 (acres)

Agricultural Land Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Agricultural Land		
Cultivated crops	51	22
Grass/pastureland	275	115
Agricultural land subtotal	***326***	***137***
Farmland		
Prime farmland	770	321
Farmland of statewide importance	471	197
Farmland soils subtotal	***1,241***	***518***

Sources: Homer et al. 2015 for agricultural lands; NRCS 2011 for prime farmland and farmland of statewide importance.

[a] Estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way.

[b] Estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the route.

Table 6.5.1-12 presents the total dollar value of the yield (i.e., the average yield per acre multiplied by the acres crossed) by crop type. In total, the recent market value of the crops grown on lands crossed by RA-06 is approximately $52,000 within the construction work area and approximately $22,000 within the permanent right-of-way.

Table 6.5.1-12. Market Value of Crops for Route Alternative RA-06 ($2016)

Crop Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Alfalfa	$27,538	$11,613
Corn	$12,071	$5,210
Oats	$1,737	$713
Other hay/non alfalfa	$1,763	$706
Soybeans	$8,214	$3,392
Spring wheat	$932	$393
TOTAL	**$52,255**	**$22,026**

Source: U.S. Department of Agriculture, National Agricultural Statistical Service 2016.

[a] Estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way.

[b] Estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the route.

Wild Rice

As discussed within Section 6.3, RA-06 would cross waterbodies known to be used for the harvesting of wild rice. The construction work area of RA-06 would cross approximately 10.6 acres in a total of five waterbodies, while the permanent right-of-way for operations of RA-06 would cross approximately 4.4 acres in a total of five waterbodies.

The market value of wild rice is variable and dependent on source and means of cultivation and harvesting (e.g., traditional hand-harvested versus use of a combine). Limited information pertaining to commodity values of Minnesota wild rice, both generally and traditionally hand-harvested, is available. According to a report on wild rice prepared by the Minnesota DNR, the per-pound price paid for unprocessed rice from the LLBO reservation between 1990 and 2007 was between $1.00 and $1.50 (Minnesota DNR 2008). Based on the 2015 Annual Report of the LLBO, the LLBO Department/Division of Resource Management purchased over 89,000 pounds of wild rice from LLBO Band members, resulting in $178,000 injected into the local economy (LLBO 2015). RA-06 would cross the Fond du Lac Reservation.

Using the resulting rudimentary assumption that the average price for traditionally harvested unprocessed wild rice is $2.00 per pound, and a yield assumption of approximately 300 pounds per acre, the approximate market values of unprocessed wild rice within the construction work area and permanent right-of-way of the Applicant's preferred route are $7,000 and $3,000, respectively. These estimates assume that the entire waterbody acreage contains harvestable wild rice. The estimates do not consider the economic value of other related activities, such as wages paid for harvesting, finishing/processing for consumption, etc.

Forested Land

Table 6.5.1-13 presents the total acres of forested land that would be crossed by RA-06 during construction and operation of the pipeline. Temporary and permanent access roads, pump stations, and valve sites have not been determined for the route alternatives; therefore, the additional affected acreage from these footprints cannot be quantified. Table 6.5.1-14 presents the current market value of timber within the ROI for RA-06, which is approximately $165,000 within the construction work area and

approximately $69,000 within the permanent right-of-way. This is based on the assumption that an acre of forested land produces 7.8 cords of wood and the average value per cord across all species is $24.40 (USFS 2008).

Table 6.5.1-13. Forested Land Crossed by Route Alternative RA-06 (acres)

Forest Land Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Deciduous forest	865	360
Evergreen forest	105	44
Mixed forest	174	72
TOTAL	**1,143**	**476**

Sources: Homer et al. 2015.

[a] Estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way.

[b] Estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the route.

Table 6.5.1-14. Market Value of Forested Land for Route Alternative RA-06 ($2016 thousands)

Forest Land Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Deciduous forest	$164.8	$68.6
Evergreen forest	$20.0	$8.3
Mixed forest	$33.1	$13.8
TOTAL	**$164.8**	**$68.6**

Sources: USFS 2008.

[a] Estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way.

[b] Estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the route.

Note:

Assumes that an acre of forested land produces 7.8 cords of wood and the average value per cord across all species is $24.40.

Mineral Lands

The 120-foot construction footprint for RA-06 would cross the highest amount of land with active county metallic areas (approximately 3 acres), and approximately 1 acre would be crossed during operations (Table 6.5.1-15). Glacial lake sediments have potential commercially important deposits of sand and gravel. The construction work area would cross approximately 571 acres of land with potential sand and gravel resources, and the permanent right-of-way would cross approximately 238 acres.

Table 6.5.1-15. Mining Areas Crossed by Route Alternative RA-06 (acres)

Project Phase	Active Mineral Areas	Land with Potential Sand and Gravel Resources
Construction[a]	2.7	570.7
Operations[b]	1.1	237.8

Source: Minnesota DNR 2016.

[a] Estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way.

[b] Estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the route.

Route Alternative RA-07

Agricultural Land

Table 6.5.1-16 presents the agricultural commodity land located within the ROI for RA-07. In total, the construction work area for the route would include approximately 402 acres of agricultural land between Clearbrook and Carlton. It also would cross approximately 1,082 acres of farmland soils that may or may not currently be in active production. Temporary and permanent access roads, pump stations, and valve sites have not been determined for the route alternatives; therefore, the additional affected acreage from these footprints cannot be quantified.

Table 6.5.1-16. Agricultural Commodity Land Crossed by Route Alternative RA-07 (acres)

Agricultural Land Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Agricultural Land		
Cultivated crops	76	57
Grass/pastureland	326	114
Agricultural land subtotal	***402***	***170***
Farmland		
Prime farmland	422	113
Farmland of statewide importance	660	189
Farmland soils subtotal	***1,082***	***302***

Sources: Homer et al. 2015 for agricultural lands; NRCS 2011 for prime farmland and farmland of statewide importance.

[a] Estimated construction impact area in acres based on 205-foot-wide construction work area, 10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3.

[b] Estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on route.

To illustrate the impact in terms of market value, Table 6.5.1-17 presents the total dollar value of the yield (i.e., the. average yield per acre multiplied by the acres crossed) by crop type. In total, the market value of the crops grown on lands crossed by RA-07 is approximately $39,000 within the construction work area and approximately $15,000 within the permanent right-of-way.

Table 6.5.1-17. Market Value of Crops for Route Alternative RA-07 ($2016)

Crop Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Alfalfa	$18,717	$7,918
Corn	$4,433	$1,936
Oats	$207	$90
Other hay/non alfalfa	$2,522	$1,035
Soybeans	$5,300	$2,293
Spring wheat	$3,040	$1,276
Sunflower	$36	$16
TOTAL	**$39,153**	**$14,564**

Sources: U.S. Department of Agriculture, National Agricultural Statistical Service 2016.

[a] Estimated construction impact area in acres based on 205-foot-wide construction work area, 10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3.

[b] Estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on route.

Wild Rice

As discussed within Section 6.3, RA-07 would cross waterbodies known to be used for the harvesting of wild rice. The construction work area of RA-07 would cross approximately 6.1 acres in a total of one waterbody, while the permanent right-of-way for operations of RA-07 would cross approximately 2.5 acres in a total of one waterbody.

The market value of wild rice is variable and dependent on source and means of cultivation and harvesting (e.g. traditional hand-harvested versus use of a combine). Limited information pertaining to commodity values of Minnesota wild rice, both generally and traditionally hand-harvested, is available. According to a report on wild rice prepared by the Minnesota DNR, the per-pound price paid for unprocessed rice from the LLBO reservation between 1990 and 2007 was between $1.00 and $1.50 (Minnesota DNR 2008). Based on the 2015 Annual Report of the LLBO, the LLBO Department/Division of Resource Management purchased over 89,000 pounds of wild rice from LLBO Band members, resulting in $178,000 injected into the local economy (LLBO 2015). RA-07 would cross the Fond du Lac and LLBO reservations.

Using the resulting rudimentary assumption that the average price for traditionally harvested unprocessed wild rice is $2.00 per pound, and a yield assumption of approximately 300 pounds per acre, the approximate market values of unprocessed wild rice within the construction work area and permanent right-of-way of the Applicant's preferred route are $4,000 and $2,000, respectively. These estimates assume that the entire waterbody acreage contains harvestable wild rice. The estimates do not consider the economic value of other related activities, such as wages paid for harvesting, finishing/processing for consumption, etc.

Forested Land

Table 6.5.1-18 presents a conservative estimate of the total acres of forested land that would be crossed by RA-07 during construction and operation of the pipeline. RA-07 involves removing the existing Line 3 and placing the new Line 3 in the same trench. RA-07 would be centered in the existing Enbridge Mainline, which is largely cleared of trees. However, the resolution of the GIS land cover data does not

provide accurate representation of land cover/land use at the scale of the Mainline corridor right-of-way. This limitation in the data creates some uncertainty about the accuracy of the land cover data within the anticipated construction work area. The numbers shown should be considered a very conservative estimate of impacts on forested land; the actual numbers are likely to be much lower.

Temporary and permanent access roads, pump stations, and valve sites have not been determined for the route alternatives; therefore, the additional affected acreage from these footprints cannot be quantified. Table 6.5.1-19 presents the current market value of timber within the ROI for RA-07, which is approximately $147,000 within the construction work area and approximately $36,000 within the permanent right-of-way. This is based on the assumption that an acre of forested land produces 7.8 cords of wood and the average value per cord across all species is $24.40 (USFS 2008).

Table 6.5.1-18. Forested Land Crossed by Route Alternative RA-07 (acres)

Forest Land Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Deciduous forest	773	192
Evergreen forest	235	38
Mixed forest	139	28
TOTAL	**1,147**	**258**

Sources: Homer et al. 2015.

[a] Estimated construction impact area in acres based on 205-foot-wide construction work area, 10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3.

[b] Estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on route.

Table 6.5.1-19. Market Value of Forested Land for Route Alternative RA-07 ($2016 thousands)

Forest Land Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Deciduous forest	$147.3	$36.4
Evergreen forest	$44.7	$7.1
Mixed forest	$26.6	$5.4
TOTAL	**$147.3**	**$36.4**

Sources: USFS 2008.

Notes:

Assumes that an acre of forested land produces 7.8 cords of wood and the average value per cord across all species is $24.40.

[a] Estimated construction impact area in acres based on 205-foot-wide construction work area, 10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3.

[b] Estimated operations impact area in acres based on 50-foot-wide permanent right-of-way centered on route.

Mineral Lands

No active mineral areas would be crossed by RA-07 during construction or operations. Glacial lake sediments have potential commercially important deposits of sand and gravel. The construction work area would cross approximately 562 acres of land with potential sand and gravel resources, and the permanent right-of-way would cross approximately 234 acres.

Route Alternative RA-08

Agricultural Land

Table 6.5.1-20 presents the agricultural commodity land located within the ROI for RA-08. In total, the construction work area for the route would include approximately 405 acres of agricultural land between Clearbrook and Carlton. It also would cross approximately 944 acres of farmland soils that may or may not currently be in active production. Temporary and permanent access roads, pump stations, and valve sites have not been determined for the route alternatives; therefore, the additional affected acreage from these footprints cannot be quantified.

To illustrate the impact in terms of market value, Table 6.5.1-21 presents the total dollar value of the yield (i.e., the average yield per acre multiplied by the acres crossed) by crop type. In total, the market value of the crops grown on lands crossed by RA-08 is approximately $41,000 within the construction work area and approximately $17,000 within the permanent right-of-way.

Table 6.5.1-20. Agricultural Commodity Land Crossed by Route Alternative RA-08 (acres)

Agricultural Land Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Agricultural Land		
Cultivated crops	41	17
Grass/pastureland	364	153
Agricultural land subtotal	***405***	***170***
Farmland		
Prime farmland	387	162
Farmland of statewide importance	556	232
Farmland soils subtotal	***944***	***394***

Sources: Homer et al. 2015 for agricultural lands; NRCS 2011 for prime farmland and farmland of statewide importance.

[a] Estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way.

[b] Estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the route.

Table 6.5.1-21. Market Value of Crops for Route Alternative RA-08 ($2016)

Crop Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Alfalfa	$22,604	$9,596
Corn	$8,678	$3,690
Oats	$690	$293
Other hay/non alfalfa	$1,381	$560
Soybeans	$6,918	$2,957
Spring wheat	$373	$146
TOTAL	**$40,645**	**$17,242**

Sources: U.S. Department of Agriculture, National Agricultural Statistical Service 2016.

[a] Estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way.

[b] Estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the route.

Wild Rice

As discussed within Section 6.3, RA-08 would cross waterbodies known to be used for the harvesting of wild rice. The construction work area of RA-08 would cross approximately 9.8 acres in a total of two waterbodies, while the permanent right-of-way for operations of RA-08 would cross approximately 4.1 acres in a total of two waterbodies.

The market value of wild rice is variable and dependent on source and means of cultivation and harvesting (e.g., traditional hand-harvested versus use of a combine). Limited information pertaining to commodity values of Minnesota wild rice, both generally and traditionally hand-harvested, is available. According to a report on wild rice prepared by the Minnesota DNR, the per-pound price paid for unprocessed rice from the LLBO reservation between 1990 and 2007 was between $1.00 and $1.50 (Minnesota DNR 2008). Based on the 2015 Annual Report of the LLBO, the LLBO Department/Division of Resource Management purchased over 89,000 pounds of wild rice from LLBO Band members, resulting in $178,000 injected into the local economy (LLBO 2015). RA-08 would cross the Fond du Lac and LLBO reservations.

Using the resulting rudimentary assumption that the average price for traditionally harvested unprocessed wild rice is $2.00 per pound, and a yield assumption of approximately 300 pounds per acre, the approximate market values of unprocessed wild rice within the construction work area and permanent right-of-way of the Applicant's preferred route are $6,000 and $3,000, respectively. These estimates assume that the entire waterbody acreage contains harvestable wild rice. The estimates do not consider the economic value of other related activities, such as wages paid for harvesting, finishing/processing for consumption, etc.

Forested Land

Table 6.5.1-22 presents the total acres of forested land that would be crossed by RA-08 during construction and operation of the pipeline. Temporary and permanent access roads, pump stations, and valve sites have not been determined for the route alternatives; therefore, the additional affected acreage from these footprints cannot be quantified. Table 6.5.1-23 presents the current market value of the timber within the ROI for RA-08, which is approximately $119,000 within the construction work area

and approximately $50,000 within the permanent right-of-way easement. This is based on the assumption that an acre of forested land produces 7.8 cords of wood and the average value per cord across all species is $24.40 (USFS 2008).

Table 6.5.1-22. Forested Land Crossed by Route Alternative RA-08 (acres)

Forest Land Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Deciduous forest	626	260
Evergreen forest	108	44
Mixed forest	76	31
TOTAL	**810**	**335**

Sources: Homer et al. 2015.

[a] Estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way.

[b] Estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the route.

Table 6.5.1-23. Market Value of Forested Land for Route Alternative RA-08 ($2016 thousands)

Forest Land Type	Construction Work Area[a]	Permanent Right-of-Way[b]
Deciduous forest	$119.3	$49.5
Evergreen forest	$20.5	$8.4
Mixed forest	$14.4	$5.9
TOTAL	**$119.3**	**$49.5**

Sources: USFS 2008.

[a] Estimated construction impact area in acres based on a 120-foot-wide construction work area centered on the route, including the 50-foot-wide permanent right-of-way.

[b] Estimated operations impact area in acres based on a 50-foot-wide permanent right-of-way centered on the route.

Note:

Assumes that an acre of forested land produces 7.8 cords of wood and the average value per cord across all species is $24.40.

Mineral Lands

No active mineral areas would be crossed by RA-08 during construction or operations. Glacial lake sediments have potential commercially important deposits of sand and gravel. The construction work area would cross approximately 555 acres of land with glacial deposits, and the permanent right-of-way would cross approximately 231 acres.

6.5.1.3 Impact Assessment

Potential impacts on land used in the production of commodities from construction and operation of the Applicant's preferred route and route alternatives include impacts on agricultural productivity and commercial forestry through the loss of both current and future productivity from removal of crops, disruption of farmland soils, and clearing of trees. This also could affect the corresponding economies, depending on the total market value of the commodities lost and the overall size of the relevant commodity market in the counties crossed. Land that is currently being mined for mineral resources

could temporarily be disrupted during construction, and land containing undeveloped potential mineral resources would not be accessible within the permanent right-of-way. The extent and magnitude of these impacts are influenced by the overall geographic scope of the impact and whether the land would recover or be available for future production.

The duration of potential Project impacts on commodity production along the pipeline right-of-way could range from temporary during active construction to permanent (e.g., aboveground facilities, a new corridor through forested areas). During construction, the greatest impacts on commodity production would be caused by clearing of vegetation. Operations impacts would be limited to the addition of aboveground facilities and reduced production from the permanent removal of trees on cleared forested land. In general, agricultural areas would return to their preconstruction condition relatively quickly, whereas forested lands would not be permitted to regrow within the permanent right-of-way.

6.5.1.3.1 Applicant's Preferred Route (in Minnesota)

Construction Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

Construction activities would affect agricultural land (i.e., cropland and hay/pastures). Impacts could include soil erosion, interference with and damage to agricultural surface and subsurface drainage and irrigation systems, mixing or loss of fertile topsoil and subsoil, and soil compaction. During construction, the production of crops on agricultural land typically would need to be deferred for one growing season, resulting in short-term minor impacts on land currently in production. The Applicant would compensate all landowners for lost crops and any documented damage that may be caused by construction activities.

To prevent soil compaction, drainage alteration, and damage to crops, operation of equipment on agricultural lands would be limited to the access routes to the construction footprint agreed upon with landowners. The Applicant would implement measures to avoid or minimize potential impacts on soil productivity in accordance with their Agricultural Protection Plan (Appendix F). These measures include erosion control, topsoil segregation, rock removal, and measures to avoid compaction or loosen compacted soils. In temporary construction work areas and along the permanent right-of-way, agricultural activity typically would be prevented for one growing season, resulting in short-term minor losses to agricultural productivity.

The Agricultural Protection Plan provides additional measures that would be applied specifically to organic agricultural lands, such as organic-certified farms or farms that are in active transition to organic-certified status, in order to address the unique management and certification requirements of these operations. The Applicant has identified two organic farms that would be crossed by the Applicant's preferred route. Both organic farms are located east of Clearbrook, and both landowners have signed easement agreements (Enbridge 2016). The Applicant would continue to work with affected landowners to identify organic farms that have not been identified to date and would implement measures in the Agricultural Protection Plan accordingly. As part of this plan, The Applicant has developed specific measures, outlined in an appendix to the plan, to minimize impacts on organic farms.

Construction activities also could affect farmland soils. Impacts on prime farmland and farmland of statewide importance from construction of the Applicant's preferred route could include interference with agricultural drainage (if present), mixing of topsoil and subsoil, and compaction and rutting of soil. These impacts could result from clearing, trench excavation and backfilling, and vehicular traffic within the construction work area. Potential impacts include temporary and short-term minor soil erosion, short-

term minor soil compaction, permanent increases in the proportion of large rocks in the topsoil, and short-term to long-term minor soil contamination. Overall, these impacts could result in short-term to long-term minor impacts on the current and future productivity of the soil in terms of agricultural production.

The current market value of crops within the construction work area is approximately $643,000 and the total value is approximately $817,000 including the value of crops within the footprint of ATWS, access roads, valve sites and pump stations (Table 6.5.1-2). Within the Clearbrook-to-Carlton segment, this amount is approximately $111,000. This amount represents less than one-half of a percent of the total market value of agricultural products in the counties that would be crossed by the Applicant's preferred route; therefore, it is likely that construction of the Project would result in a temporary negligible impact on the local agricultural economy.

Disturbance and Loss of Wild Rice

Five wild rice waterbodies would be crossed by the Applicant's preferred route, with about 5 acres of the delineated waterbody basins within the construction work area. Construction would occur across the edge of the basins within the existing pipeline corridor but not through the wild rice stands on Mud Lake, Peterson Lake, and Portage Lake (Appendix A). In addition, some or all of the wild rice areas occur along the margins of larger waterbodies where the Applicant would use site-specific waterbody crossing techniques, including HDD. HDD would be used to cross the unnamed wild rice waterbody at Hay Creek and the Shell River within the existing pipeline corridor. At this location and at other sites where HDD is used as the crossing method, the wild rice waterbodies would not be affected unless a frac-out occurs.

Where HDD is not used, the wild rice waterbodies would be crossed using applicable wetland crossing methods for the water saturation conditions at the crossing (see Section 2.7.2 for a description of waterbody and wetland construction methods). Trenched crossing could remove the rice plants and disturb sediments, and could increase sedimentation within the remainder of the waterbody. Although the Applicant would restore the hydrology and soils of the affected wild rice waterbodies after construction, rice yield would be reduced in the portion of the waterbody directly affected by the repair or replacement activities for the first growing season after construction. To minimize impacts of construction through wild rice waterbodies, the Applicant would implement applicable measures identified in the Stream and River Crossing Requirements and Construction Methods in the Environmental Protection Plan (Appendix E). These plans contain measures to reduce or avoid impacts on wild rice during construction. Avoidance measures include use of a narrower construction work area, reseeding, monitoring, and use of timber mats, and incorporate any additional measures proposed by local and state agencies to reflect existing regional policies and procedures to protect wild rice. Two stands also would be monitored for overall condition, function, and vegetative regrowth after construction until the permit conditions are met.

Although not anticipated, construction-related impacts on wild rice waterbodies could include longer than expected recovery time for native wild rice stands (i.e., impacts could affect rice waterbodies beyond the first growing season after construction), introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice, and altered lakebed conditions—all of which could be detrimental to wild rice germination and production. These potential impacts would be reduced through Project-specific SPCC plans, invasive species management plans, and post-construction monitoring of vegetation for a period of time until permit conditions are met, as described in the Applicant's Environmental Protection Plan (Appendix E). With implementation of these measures, impacts on wild rice waterbodies are expected to be short-term and minor. However, if HDD frac-out,

introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice, and altered lakebed conditions occur as a result of construction, impacts could be major.

Based on the conservative assumption that the entire 4.9 acres within the Clearbrook-Carlton segment construction work area includes viable stands of wild rice (not likely to be the case based on the discussion above), the approximate annual commodity value economic loss for at least one year during or following construction, at a price of $2.00 per pound, is $3,000 per year. This amount represents less than one percent of the total market value of unprocessed wild rice to the Minnesota economy, approximately $2 million (Minnesota DNR 2017). Most wild rice production occurs in northern Minnesota, including counties crossed by the Project. Therefore, it is likely that construction of the Project would result in a temporary negligible to minor impact on the local agricultural economy.

Disturbance and Loss of Forested Lands and Timber Resources

During construction, trees from forested areas would be cleared within the construction work area, which would result in loss of timber production. However, the Applicant would compensate Minnesota DNR for any merchantable timber loss on state-managed forested lands, and compensation on private lands would be agreed upon by the Applicant and the landowner during easement acquisition. For any merchantable timber on state lands, disposal/sale must be handled with the division of forestry. Any merchantable timber within the ROI belongs to the State and must follow its procedures. For forested land in WMAs, any revenue for merchantable timber that is harvested would be deposited into the WMA revenue account.

Following construction activities, trees would be allowed to regenerate naturally within the construction work areas, temporary access roads, and ATWS; however, the area within the construction work area could take up to 50 years to regenerate harvestable timber. Construction activities likely would result in long-term to permanent, minor impacts on land used for timber production. Based on the value of the annual lost growth, the present value of the future growth foregone is approximately $2.3 million, with the majority of the impact occurring in Minnesota. When compared to the present value of the timber harvest market over the same time period (50 years, $662 million), the impact of construction is likely to cause a long-term to permanent, minor impact on the associated local timber industry.

Disturbance and Loss of Land Used for Mining

Because the pipeline for Applicant's preferred route would be installed mainly within and adjacent to an existing right-of-way, no additional restrictions on the current use of land for mining mineral resources would be expected from construction. Approximately 0.5 acre of land in active mineral areas would be crossed by the route for a temporary access road; however, impacts on productivity are expected to be temporary and negligible. Given the temporary nature of construction coupled with the relatively undeveloped state of the resources and the average depth of their location below the surface (from 5 to 450 feet), impacts from construction on future exploration or mining of lands with potential sand and gravel resources are likely to be temporary and negligible. If future discovery of metallic mineral resources occurs where the pipeline crosses state lands, realignment of the pipeline would be handled under standard licensing clauses.

Operations Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

Impacts on agricultural lands during operation would be minimal, as most of these areas would recover following construction and typically would not require maintenance mowing. During operation, the

easement for the permanent right-of-way would include 833 acres of agricultural land (cropland and grass/pastureland), the majority of which would be located along the existing pipeline corridor. Following final restoration, agricultural activities would be able to resume across the construction work area and the permanent right-of-way, resulting in no additional impacts during continued operation of the pipeline. Operation of the pipeline would not affect land currently being used for agricultural production, except for land within the permanent footprint of pump stations, MLVs, and permanent access roads that would be converted to industrial/developed land uses. Approximately 104 acres of agricultural land in the Clearbrook-to-Carlton segment would be converted to industrial/developed land associated with aboveground facilities and associated access. As with construction of the pipeline, the Applicant would compensate all landowners for lost crops and any documented damage that may be caused by maintenance activities.

The current market value of crops on agricultural land that would be converted to other land uses is approximately $61,400 (value of the land converted to pump stations, valve sites, and permanent access roads from Table 6.5.1-2). The value of this annual loss into perpetuity would equal approximately $2.1 million. The annual loss of commodities from agricultural land removed from agricultural use relative to the overall value of agricultural products sold in the affected counties would be small; therefore, the impact on the local agricultural economy would be permanent and negligible.

The easement for the Applicant's preferred route also would include farmland soils (i.e., 378 acres of prime farmland and 455 acres of farmland of statewide importance). Following final restoration, agricultural activities would be able to resume across this land, resulting in no additional impacts during the continued operation of the pipeline. Impacts on farmland soils from operation of the pipeline therefore would be short term and minor. The exception would be about 153 acres that would be permanently converted to industrial use for the pump stations, permanent access roads, and MLVs, and would no longer be available for future production. Conversion of this land would result in a permanent negligible impact.

Disturbance and Loss of Wild Rice

The wild rice waterbodies crossed by HDD at Hay Creek and Shell River would not be affected during operations. Wild rice waterbodies crossed by other methods would not be affected by normal pipeline operation unless it is necessary to repair or replace a section of pipe within the waterbody as a part of the Applicant's Integrity Management Program. In that event, the impacts would be similar to those for the original crossing construction.

Although the Applicant would restore the hydrology and soils of the affected portion of the wild rice waterbody after construction, rice yield could be reduced in the portion of the waterbody affected by the repair or replacement activities for the first growing season after completion of the activity.

Based on the conservative assumption that the entire 3.2 acres of wild rice waterbodies within the Clearbrook-Carlton permanent right-of-way area includes viable stands of wild rice (not likely to be the case based on the discussion above), and will be affected simultaneously by repair or replacement activities, the approximate annual commodity economic loss for at least one year during or following construction, at a price of $2.00 per pound, is $2,000 per year. This amount represents less than one percent of the total market value of unprocessed wild rice to the Minnesota economy, approximately $2 million (Minnesota DNR 2017). Most wild rice production occurs in northern Minnesota, including counties crossed by the Project. Therefore, it is likely that operations of the Project would result in a long-term temporary impact on the local agricultural economy, occurring at irregular intervals;

permanent losses to wild rice crops would not be anticipated. The magnitude of said impacts is expected to be negligible to minor.

Disturbance and Loss of Forested Lands and Timber Resources

Forested lands would not be allowed to reestablish within the permanent right-of-way because it would be maintained clear of trees for operational purposes, such as facilitating aerial inspections, preserving pipeline integrity, and providing access for maintenance or emergency work. The permanent right-of-way for the Applicant's preferred route would include approximately 673 acres of forested land, of which the majority (88 percent) is deciduous forest. This land would permanently be removed from the ability to commercially produce timber for use in the wood product industries. Given the available timber resources in the area, as well as compensation that would be received by landowners, impacts on land that could be used in the production of timber products from operation of the pipeline are considered permanent and minor.

The current market value of the timber that would be removed is approximately $144,000 (Table 6.5.1-4). Assuming that this annual loss is continued into perpetuity, the present value of the foregone annual harvest is $4.8 million; the present value of annual timber harvest in Minnesota into perpetuity is $1.6 billion. Permanent conversion of 673 acres of forested land during operation of the Applicant's preferred route therefore would result in a permanent minor impact on the local timber economy.

The Applicant would continue to work with potentially affected landowners to determine whether any impacts would occur as a result of operations activities and would compensate them accordingly.

Disturbance and Loss of Land Used for Mining

Operation of the pipeline is not expected to affect land in active mineral areas. In terms of land with potential sand and gravel resources, 191 acres would be within the permanent right-of-way for the entire route, while approximately 7 acres would be within the permanent easement in the Clearbrook-to-Carlton segment. Impacts could involve permanently removing this land from current and future mining activities. Impacts on future mineral development would not constitute a significant loss of mineral resources or mineral availability because the resource potential is unknown. In addition, the width of the right-of-way is narrow relative to the expanse of areas with mineral resource potential. Operations-related impacts on land with potential mineral resources are likely to be permanent and negligible.

6.5.1.3.2 Route Alternatives (from Clearbrook to Carlton)

Route alternatives consist of temporary construction work areas and permanent pipeline rights-of-way along a specific alignment. The route alternatives would require pump stations and MLVs, but specific locations and designs of any aboveground facilities have not been identified. As such, the analysis of impacts focuses on the proximity of sensitive receptors to the identified pipeline corridor and recognizes that land used in the production of commodities could experience additional permanent impacts from the presence of aboveground facilities if a route alternative is selected and locations for these facilities have been identified.

Although impacts differ in location and quantity, the types of impacts would be similar between the Applicant's preferred route and the route alternatives. Impacts from construction on land used in the production of agricultural products would decrease productivity in the short term from removal of existing vegetation within the construction work area, whereas impacts from construction on forested land would be long term based on the time until trees within the temporary construction work area would regenerate. Impacts from operations primarily would be associated with the permanent clearing

of trees and vegetation along the right-of-way and access roads, as well as with permanent aboveground facilities.

Route Alternative RA-03AM

Construction Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

Construction of the RA-03AM route would affect 1,680 acres of agricultural land (cropland and grass/pasture) and 1,608 acres of farmland soils. During construction, production of crops on agricultural land typically would be prevented for one growing season, resulting in short-term minor losses to land currently being used for agricultural production. The estimated market value of crops lost during construction is approximately $482,000 annually. This amount represents less than one-half of a percent of the total market value of agricultural products in the counties that would be crossed by the route; therefore, it is likely that construction of RA-03AM would result in a temporary negligible impact on the local agricultural economy. In terms of agricultural production on farmland soils, short-term to long-term minor impacts on the current and future productivity of farmland soils could occur.

Disturbance and Loss of Wild Rice

RA-03AM would cross about 7.5 acres of the six wild rice waterbodies crossed within the construction work area (see Table 6.3.1.2-11). Three of these crossings would be the same as for the Applicant's preferred route: Mud Lake, Hay Creek, and Portage Lake. Hayden Lake would be crossed at the basin inlet and Fox Lake would be crossed near the lake shoreline; both of these crossings would be within an existing pipeline corridor. Specific construction methods for crossing of wild rice waterbodies along RA-03AM have not been determined. Hay Creek would be crossed by the Applicant's preferred route using HDD. Where HDD is used as the crossing method, the wild rice waterbodies would not be affected unless a frac-out occurs.

Construction-related impacts and avoidance measures would be similar to those described for the Applicant's preferred route.

Based on the conservative assumption that the entire 7.5 acres within the Clearbrook-Carlton segment permanent right-of-way includes viable stands of wild rice (not likely to be the case based on the discussion above), the approximate annual commodity economic loss for at least one year during or following construction, at a price of $2.00 per pound, is $5,000 per year. This amount represents less than one percent of the total market value of unprocessed wild rice to the Minnesota economy, approximately $2 million (Minnesota DNR 2017). Most wild rice production occurs in northern Minnesota, including counties crossed by the Project. Therefore, it is likely that construction of the Project would result in a temporary negligible impact on the local agricultural economy.

Disturbance and Loss of Forested Lands and Timber Resources

RA-03AM also would affect 1,174 acres of forested land. The duration and magnitude of impacts during construction would be the same as those described for the Applicant's preferred route (minor long-term to permanent impacts). The estimated dollar value of harvestable timber that would be lost within the construction work area until the trees would be harvestable would be approximately $1.9 million.

Disturbance and Loss of Land Used for Mining

Construction of the RA-03AM route would not affect any land in active mine areas and would traverse the smallest amount of land area (442 acres) between Clearbrook and Carlton that contains potential sand and gravel resources. Given the temporary nature of construction coupled with the relatively undeveloped state of the resources and the average depth of their location below the surface (from 5 to 450 feet), impacts from construction on the future exploration or mining of these resources are likely to be temporary and negligible. If future discovery of metallic mineral resources occurs where the pipeline crosses state lands, realignment of the pipeline would be handled under standard licensing clauses.

Operations Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

Following final restoration, agricultural activities would be able to resume across the construction work area and the permanent right-of-way, resulting in no additional impacts during continued operation of the pipeline. Operation of the pipeline would not affect land currently being used for agricultural production, except for land within the permanent footprint of pump stations, MLVs, and permanent access roads that would be converted to industrial/developed land uses. Because the location of permanent facilities and access roads have not been determined for the route alternatives, the amount of agricultural land permanently converted to industrial uses cannot be quantified; however, given that it is likely to be similar to the Applicant's preferred route, it is likely that operation along RA-03AM would result in a permanent but negligible impact on the local agricultural economy.

Disturbance and Loss of Wild Rice Waterbodies

During operation, wild rice waterbodies would not be affected unless it is necessary to repair or replace a section of pipe within the waterbody. In that event, the impacts would be similar to those for the initial construction of the pipeline through the waterbody, as described in discussion on construction impacts for the route.

Although the Applicant would restore the hydrology and soils of the affected portion of the wild rice waterbody after construction, rice yield could be reduced in the portion of the waterbody affected by the repair or replacement activities for the first growing season after completion of the activity.

Based on the conservative assumption that the entire 3.1 acres of wild rice waterbodies within the Clearbrook-Carlton segment permanent right-of-way area includes viable stands of wild rice (not likely to be the case based on the discussion above), and will be affected simultaneously by repair or replacement activities, the approximate annual commodity economic loss for at least one year during or following construction, at a price of $2.00 per pound, is $2,000 per year. This amount represents less than one percent of the total market value of unprocessed wild rice to the Minnesota economy, approximately $2 million (Minnesota DNR 2017). Most wild rice production occurs in northern Minnesota, including counties crossed by the Project. Therefore, it is likely that operations of the Project would result in a long-term temporary impact on the local agricultural economy, occurring at irregular intervals; permanent losses to wild rice crops would not be anticipated. The magnitude of said impacts is expected to be negligible to minor.

Disturbance and Loss of Forested Lands and Timber Resources

Forested lands would not be allowed to reestablish within the permanent right-of-way to allow ongoing inspection and maintenance. The permanent easement for the RA-03AM route would include approximately 485 acres of forested land within the Clearbrook-to-Carlton segment, of which the

majority (88 percent) is deciduous forest. This land would be permanently restricted from commercial timber production. Assuming that the current annual value of this timber would be lost into perpetuity, the present value of the timber removed from annual harvest is approximately $3.1 million, compared to the present value of the annual timber harvest in Minnesota over the same time period (perpetuity), which is $1.6 billion. Permanent conversion of 485 acres of forested land during operation of RA-03AM would result in a permanent minor impact on the local timber economy.

Disturbance and Loss of Land Used for Mining

Operation of the pipeline is not expected to affect land in active mineral areas. Operations could involve permanently removing land with potential sand and gravel resources from both current and future mining activities. Impacts on future mineral development would not constitute a significant loss of mineral resources or mineral availability because the resource potential is unknown. In addition, the width of the right-of-way is narrow relative to the expanse of areas with mineral resource potential. Impacts on land with potential mineral resources from operation are likely to be permanent and negligible.

Route Alternative RA-06

Construction Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

Construction of RA-06 would affect 326 acres of agricultural land (cropland and grass/pasture) and 1,241 acres of farmland soils. During construction, production of crops on agricultural land would typically be prevented for one growing season, resulting in short-term minor losses to land currently being used for agricultural production. The estimated market value of crops lost during construction is approximately $52,000. This amount represents less than one-half of a percent of the total market value of agricultural products in the counties that would be crossed by the route; therefore, it is likely that construction of RA-06 would result in a temporary negligible impact on the local agricultural economy. The impacts on farmland soils would be the same as those described for the Applicant's preferred route (short term to long term and minor).

Disturbance and Loss of Wild Rice

RA-06 would cross about 11 acres of the wild rice waterbodies within the construction work area (see Table 6.3.1.2-15). Specific construction methods for crossing of wild rice waterbodies along RA-06 have not been determined. Where HDD is used as the crossing method, the wild rice waterbodies would not be affected unless a frac-out occurs.

Construction-related impacts and avoidance measures would be similar to those described above for the Applicant's preferred route.

Based on the conservative assumption that the entire 10.6 acres within the Clearbrook-Carlton segment construction work area includes viable stands of wild rice (not likely to be the case based on the discussion above), the approximate annual commodity economic loss for at least one year during or following construction, at a price of $2.00 per pound, is $7,000 per year. This amount represents less than one percent of the total market value of unprocessed wild rice to the Minnesota economy, approximately $2 million (Minnesota DNR 2017). Most wild rice production occurs in northern Minnesota, including counties crossed by the Project. Therefore, it is likely that construction of the Project would result in a temporary negligible to minor impact on the local agricultural economy. Affects

to the Fond du Lac Reservation, while likely to be disproportionately more significant, are still anticipated to be minor relative to the overall Fond du Lac Band economy.

Disturbance and Loss of Forested Lands and Timber Resources

The RA-06 route would cross 1,143 acres of forested land, which would result in impacts similar to those described for the Applicant's preferred route (minor long-term to permanent impacts). The estimated dollar value of harvestable timber that would be lost within the construction work area until the trees would be harvestable would be approximately $1.8 million.

Disturbance and Loss of Land Used for Mining

Unlike the other route alternatives, RA-06 route would cross 0.2 mile of land in active mine areas and would traverse a larger amount of land areas that contain potential sand and gravel resources (570 acres). Therefore, it is likely that construction of RA-06 could cause a temporary minor impact on current mining activities.

Operations Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

Following final restoration, agricultural activities would be able to resume across the temporary construction work area and the permanent right-of-way, resulting in no additional impacts during continued operation of the pipeline. Operation of the pipeline would result in short-term minor losses to land currently being used for agricultural production. Because the location of permanent facilities and access roads have not been determined for the route alternatives, the amount of agricultural land permanently converted to industrial uses cannot be quantified; however, given that it is likely to be similar to the Applicant's preferred route, it is likely that operation along RA-06 would result in a permanent but negligible impact on the local agricultural economy.

Disturbance and Loss of Wild Rice Waterbodies

During operation, wild rice waterbodies would not be affected unless it is necessary to repair or replace a section of pipe within the waterbody. In that event, the impacts would be similar to those for the initial construction of the pipeline through the waterbody, as described in discussion on construction impacts for the route.

Although the Applicant would restore the hydrology and soils of the affected portion of the wild rice waterbody after construction, rice yield could be reduced in the portion of the waterbody affected by the repair or replacement activities for the first growing season after completion of the activity.

Based on the conservative assumption that the entire 4.4 acres of wild rice waterbodies within the Clearbrook-Carlton segment construction work area includes viable stands of wild rice (not likely to be the case based on the discussion above), and will be affected simultaneously by repair or replacement activities, the approximate annual commodity economic loss for at least one year during or following construction, at a price of $2.00 per pound, is $3,000 per year. This amount represents less than one percent of the total market value of unprocessed wild rice to the Minnesota economy, approximately $2 million (Minnesota DNR 2017). Most wild rice production occurs in northern Minnesota, including counties crossed by the Project. Therefore, it is likely that operations of the Project would result in a long-term temporary impact on the local agricultural economy and the overall economy of the Fond du Lac Band, occurring at irregular intervals; permanent losses to wild rice crops would not be anticipated. The magnitude of said impacts is expected to be negligible to minor.

Disturbance and Loss of Forested Lands and Timber Resources

To allow for visual inspection and maintenance of the pipeline, forested lands would not be allowed to reestablish within the permanent right-of-way. The easement for RA-06 route would include approximately 476 acres of forested land within the Clearbrook-to-Carlton segment, of which the majority is deciduous forest. This land would permanently be removed from the ability to commercially produce timber for use in the wood product industries. Assuming that the current annual value of this timber is lost into perpetuity, the present value of the timber removed from annual harvest is approximately $3.0 million, compared to the present value of the annual timber harvest in Minnesota over the same time period (perpetuity), which is $1.6 billion. Permanent conversion of 476 acres of forested land during operation of the RA-06 route would result in a permanent minor impact on the local timber economy.

Disturbance and Loss of Land Used for Mining

Operation of the pipeline is not expected to affect land in active mineral areas. Operations could involve permanently removing land with potential sand and gravel resources from both current and future mining activities. Impacts on future mineral development would not constitute a significant loss of mineral resources or mineral availability because the resource potential is unknown. In addition, the width of the right-of-way is narrow relative to the expanse of areas with mineral resource potential. Operations impacts on land with potential mineral resources are likely to be permanent and negligible.

Route Alternative RA-07

Construction Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

Construction of the RA-07 route would result in the second lowest total impacts on agricultural land (402 acres of agricultural land and 1,082 acres of farmland soils). During construction, production of crops on agricultural land typically would be prevented for one growing season, resulting in temporary minor losses to land currently being used for agricultural production. The estimated market value of crops lost during construction is approximately $39,000. This amount represents less than one-half of a percent of the total market value of agricultural products in the counties that would be crossed by the route; therefore, it is likely that construction of RA-07 would result in a temporary negligible impact on the local agricultural economy. The impacts on farmland soils would be the same as those described for the Applicant's preferred route (short term to long term and minor).

Disturbance and Loss of Wild Rice

RA-07 would cross about 6 acres of the wild rice waterbodies (one) within the construction work area (see Table 6.3.1.2-20). Specific construction methods for crossing of wild rice waterbodies along RA-07 have not been determined. Where HDD is used as the crossing method, the wild rice waterbodies would not be affected unless a frac-out occurs.

Construction-related impacts and avoidance measures would be similar to those described above for the Applicant's preferred route.

Based on the conservative assumption that the entire 6.1 acres within the Clearbrook-Carlton segment construction work area includes viable stands of wild rice (not likely to be the case based on the discussion above), the approximate annual commodity economic loss for at least one year during or following construction, at a price of $2.00 per pound, is $4,000 per year. This amount represents less

than one percent of the total market value of unprocessed wild rice to the Minnesota economy, approximately $2 million (Minnesota DNR 2017). Most wild rice production occurs in northern Minnesota, including counties crossed by the Project. Therefore, it is likely that construction of the Project would result in a temporary negligible to minor impact on the local agricultural economy. Impacts on the Fond du Lac and LLBO reservations, while likely to be disproportionately more significant, are still anticipated to be minor relative to the overall economies. For example, $4,000 per year is approximately 2% of the value of unprocessed wild rice to the overall LLBO economy in 2015.

Disturbance and Loss of Forested Lands and Timber Resources

The RA-07 route would cross 1,147 acres of forested land. Because RA-07 involves replacement of the existing Line 3, most impacts would be within the existing permanent right-of-way. The remainder of the construction footprint for RA-07 would be within the former construction footprint for Line 67, limiting the severity of impacts. Impacts on timber production would be long term but negligible because there should be little harvestable timber within the existing permanent right-of-way.

Disturbance and Loss of Land Used for Mining

The RA-07 route also would not cross any land in active mine areas but would traverse the largest amount of land areas with potential sand and gravel resources relative to the Applicant's preferred route (562 acres), resulting in a temporary minor impact during construction.

Operations Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

Following final restoration, agricultural activities would be able to resume across the construction work area and the permanent right-of-way, resulting in no additional impacts during continued operation of the pipeline. Operations for the RA-07 pipeline would not affect land currently being used for agricultural production, except for land within the permanent footprint of pump stations, MLVs, and permanent access roads that would be converted to industrial/developed land uses. Because the location of permanent facilities and access roads have not been determined for the route alternatives, the amount of agricultural land permanently converted to industrial uses cannot be quantified; however, given that it is likely to be similar to the Applicant's preferred route, it is likely that operation along RA-07 would result in a permanent but negligible impact on the local agricultural economy.

Disturbance and Loss of Wild Rice Waterbodies

During operation, wild rice waterbodies would not be affected unless it is necessary to repair or replace a section of pipe within the waterbody. In that event, the impacts would be similar to those for the initial construction of the pipeline through the waterbody, as described in discussion on construction impacts for the route.

Although the Applicant would restore the hydrology and soils of the affected portion of the wild rice waterbody after construction, rice yield could be reduced in the portion of the waterbody affected by the repair or replacement activities for the first growing season after completion of the activity.

Based on the conservative assumption that the entire x acres of wild rice waterbodies within the Clearbrook-Carlton segment permanent right-of-way area includes viable stands of wild rice (not likely to be the case based on the discussion above), and will be affected simultaneously by repair or replacement activities, the approximate annual commodity economic loss for at least one year during or following construction, at a price of $2.00 per pound, is $2,000 per year. This amount represents less

than one percent of the total market value of unprocessed wild rice to the Minnesota economy, approximately $2 million (Minnesota DNR 2017). Most wild rice production occurs in northern Minnesota, including counties crossed by the Project. Therefore, it is likely that operations of the Project would result in a long-term temporary impact on the local agricultural economy and the overall economies of the Fond du Lac Band and LLBO, occurring at irregular intervals; permanent losses to wild rice crops would not be anticipated. The magnitude of said impacts is expected to be negligible to minor.

Disturbance and Loss of Forested Land and Timber Resources

To allow for visual inspection and maintenance of the pipeline, forested lands would not be allowed to reestablish within the permanent right-of-way. The easement for the RA-07 route would include approximately 257 acres of forested land within the Clearbrook-to-Carlton segment, of which the majority is deciduous forest. Given that the majority of this forested land already has been cleared within the permanent right-of-way of the existing Line 3 and in the construction of Line 67, little to no harvestable timber likely is present on the existing land, thereby resulting in a long-term negligible impact on the local timber industry.

Disturbance and Loss of Land Used for Mining

Operations for the RA-07 pipeline are not expected to affect land in active mineral areas. Operations could involve permanently removing land with potential sand and gravel resources from both current and future mining activities. Impacts on future mineral development would not constitute a significant loss of mineral resources or mineral availability because the resource potential is unknown. In addition, the width of the right-of-way is narrow relative to the expanse of areas with mineral resource potential. Impacts on land with potential mineral resources from operation are likely to be permanent and negligible.

Route Alternative RA-08

Construction Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

Construction of the RA-08 route would affect 405 acres of agricultural land and 944 acres of farmland soils. During construction, production of crops on agricultural land typically would be prevented for one growing season, resulting in short-term minor losses to land currently being used for agricultural production. The estimated market value of crops lost during construction is approximately $41,000. This amount represents less than one-half of a percent of the total market value of agricultural products in the counties that would be crossed by the route; therefore, it is likely that construction of RA-08 would result in a temporary negligible impact on the local agricultural economy.

Disturbance and Loss of Wild Rice

RA-08 would cross approximately 10 acres of the wild rice waterbodies within the construction work area (see Table 6.3.1.2-20). Specific construction methods for crossing of wild rice waterbodies along RA-08 have not been determined. Where HDD is used as the crossing method, the wild rice waterbodies would not be affected unless a frac-out occurs.

Construction-related impacts and avoidance measures would be similar to those described above for the Applicant's preferred route.

Based on the conservative assumption that the entire 9.8 acres within the Clearbrook-Carlton segment construction work area includes viable stands of wild rice (not likely to be the case based on the discussion above), the approximate annual commodity economic loss for at least one year during or following construction, at a price of $2.00 per pound, is $6,000 per year. This amount represents less than one percent of the total market value of unprocessed wild rice to the Minnesota economy, approximately $2 million (Minnesota DNR 2017). Most wild rice production occurs in northern Minnesota, including counties crossed by the Project. Therefore, it is likely that construction of the Project would result in a temporary negligible to minor impact on the local agricultural economy. Impacts on the Fond du Lac and LLBO reservations, while likely to be disproportionately more significant, are still anticipated to be minor relative to the overall economies. For example, $6,000 per year is approximately 3% of the value of unprocessed wild rice to the overall LLBO economy in 2015.

Disturbance and Loss of Forested Land and Timber Resources

Construction of the RA-08 route would result in the lowest impact on total forested land (809 acres), resulting in a minor long-term impact on timber production. The estimated dollar value of harvestable timber that would be lost within the construction work area until the trees would be harvestable again would be approximately $1.3 million.

Disturbance and Loss of Land Used for Mining

The RA-08 route would not cross any land in active mine areas but would traverse a larger amount of land areas with potential sand and gravel resources relative to the Applicant's preferred route (555 acres). The impact on mining would be temporary and minor during construction.

Operations Impacts

Disturbance and Loss of Agricultural Land and Lost Yields

Following final restoration, agricultural activities would be able to resume across the construction work area and the permanent right-of-way, resulting in no additional impacts during continued operation of the pipeline. Operation of the pipeline would not affect land currently being used for agricultural production, except for land within the permanent footprint of pump stations, MLVs, and permanent access roads that would be converted to industrial/developed land uses. Because the location of permanent facilities and access road have not been determined for the route alternatives, the amount of agricultural land permanently converted to industrial uses cannot be quantified; however, given that it is likely to be similar to the Applicant's preferred route, it is likely that operation along RA-08 would result in a permanent but negligible impact on the local agricultural economy.

Disturbance and Loss of Wild Rice Waterbodies

During operation, wild rice waterbodies would not be affected unless it is necessary to repair or replace a section of pipe within the waterbody. In that event, the impacts would be similar to those for the initial construction of the pipeline through the waterbody, as described in discussion on construction impacts for the route.

Although the Applicant would restore the hydrology and soils of the affected portion of the wild rice waterbody after construction, rice yield could be reduced in the portion of the waterbody affected by the repair or replacement activities for the first growing season after completion of the activity.

Based on the conservative assumption that the entire 4.1 acres of wild rice waterbodies within the Clearbrook-Carlton segment construction work area includes viable stands of wild rice (not likely to be

the case based on the discussion above), and will be affected simultaneously by repair or replacement activities, the approximate annual commodity economic loss for at least one year during or following construction, at a price of $2.00 per pound, is $3,000 per year. This amount represents less than one percent of the total market value of unprocessed wild rice to the Minnesota economy, approximately $2 million (Minnesota DNR 2017). Most wild rice production occurs in northern Minnesota, including counties crossed by the Project. Therefore, it is likely that operations of the Project would result in a long-term temporary impact on the local agricultural economy and the overall economies of Fond du Lac Band and LLBO, occurring at irregular intervals; permanent losses to wild rice crops would not be anticipated. The magnitude of said impacts is expected to be negligible to minor.

Disturbance and Loss of Forested Land and Timber Resources

To allow for visual inspection and maintenance of the pipeline, forested lands would not be allowed to reestablish within the permanent right-of-way. The permanent easement for RA-08 route would include approximately 335 acres of forested land within the Clearbrook-to-Carlton segment, of which the majority is deciduous forest. This land would permanently be removed from the ability to commercially produce timber for use in the wood product industries. Assuming that the current annual value of this timber would be lost into perpetuity, the present value of the timber removed from annual harvest is approximately $2.1 million, compared to present value of annual timber harvest in Minnesota over the same time period (perpetuity), which is $1.6 billion. The permanent conversion of 335 acres of forested land during operations for the RA-08 route therefore would cause a permanent minor impact on the local timber economy.

Disturbance and Loss of Land Used for Mining

Operation of the pipeline is not expected to affect land in active mineral areas. Operations could involve permanently removing land with potential sand and gravel resources from both current and future mining activities. Impacts on future mineral development would not constitute a significant loss of mineral resources or mineral availability because the resource potential is unknown. In addition, the width of the right-of-way is narrow relative to the expanse of areas with mineral resource potential. Impacts on land with potential mineral resources from operation are likely to be permanent and negligible.

6.5.1.4 Summary and Mitigation

6.5.1.4.1 Summary

Table 6.5.1-24 summarizes the potential impacts on commodity production in counties along the Applicant's preferred route and each of the route alternatives. Overall, the impact analysis found the following potential effects on agricultural land for the Applicant's preferred route and all of the route alternatives:

- Minor and short-term impacts during construction; and
- No to negligible impacts during continued operations, except for the land within the footprints of the pump stations, MLVs, and permanent access roads.

These impacts on agricultural land would lead to the following potential effects on the agricultural economies of the counties that would be crossed:

- Negligible temporary impacts during construction, and
- Negligible permanent impacts during operations.

These results are based on several factors. The aggregate value of the crop production foregone during construction is relatively low when compared to the overall aggregate value of those crops produced in the counties through which the pipeline routes pass. In addition, the Applicant would compensate for deferred crop production in the construction work area.

The aggregate value of wild rice production foregone during construction is low when compared with the overall aggregate value of wild rice produced in northern Minnesota, including the counties through which the pipeline routes pass. Impacts resulting from routes passing through the Fond du Lac Band and LLBO reservations could have disproportionate effects on the economies of these Indian communities, relative to the Minnesota economy. However, the anticipated magnitude would still be negligible to minor. The Applicant would utilize BMPs to minimize impacts on wild rice stands, particularly beyond the first growing season following construction. Impacts resulting from operations would be temporary, occurring during repair and other integrity activities, and negligible to minor in magnitude.

Removal of timber resources from the construction work area represents a permanent impact but, as with crop production, the economic impact would be partially offset by the sale of merchantable timber. For forested land and timber resources, the potential impact on timber production during construction of the pipelines would be long term and minor. It would take up to 50 years for the land cleared for construction to produce harvestable timber; however, the value of the timber lost is low relative to the value of the timber that remains available for harvest in the counties that would be crossed. Continued operation of the pipelines is expected to result in permanent negligible impacts on the agricultural economy, permanent minor impacts on the timber economy, and permanent negligible impacts on land with potential mineral resources.

No land in active mining areas would be affected by construction or operations of any route option, except for a temporary facility access road for the Applicant's preferred route that would affect 0.5 acre in Carlton County (access roads would be required for all route alternatives, but none have been identified) and approximately 1 acre of the permanent right-of-way along RA-06. Although the potential for future mining based on mineral resources beneath the surface is unknown, it is expected that construction of the Applicant's preferred route and route alternatives would result in a temporary negligible impact on this land, while operations would result in a permanent negligible impact.

Beyond the finding that impacts on commodity production would be negligible to minor and temporary to permanent, the Applicant's preferred route and the route alternatives can be compared to each other based on projected impact values and differences identified among them.

When considering disturbance or loss of agricultural land from construction, the Applicant's preferred route and RA-06, RA-07, and RA-08 are in a similar lower range of acreage affected, while RA-03AM would result in a much higher value. Lost agricultural yields has a similar result; RA-03AM has a much higher yield loss, more than four times as much as any of the other routes. In this case, however, the Applicant's preferred route has a loss of yield that, while relatively small, is greater than RA-06, RA-07, and RA-08.

When considering disturbance or loss of wild rice stands from construction, the Applicant's preferred route would affect the least amount of acreage, while RA-06 would affect the greatest amount. However, impacts would be similar in magnitude (acreage and dollar value). RA-06, RA-07, and RA-08 would potentially impact the Fond du Lac and/or LLBO communities' economies, of which wild rice production is a greater proportion. However, the magnitude of economic impact to these communities would still be expected to be minor and temporary.

On the basis of disturbance and loss of forested land and associated economic yields during construction, the Applicant's preferred route affects the greatest amount of acreage and yield. All of the route alternatives were found to be in a similar range of impacts and loss of economic yield.

The comparative results for operations were similar to those for construction. For agricultural production and forestry, lower effects were predicted for RA-06, RA-07, and RA-08; and the Applicant's preferred route was at the high end of the range. The effects of RA-03AM were measurably higher.

For mining resources, the impacts for the Applicant's preferred route were significantly less than for all of the route alternatives.

6.5.1.4.2 Mitigation

The Applicant proposes several measures to minimize or avoid impacts that are discussed in the Agricultural Protection Plan (Appendix F). Beyond the Applicant-proposed measures to avoid and minimize impacts on commodity production, no mitigation has been identified.

Table 6.5.1-24. Summary of Potential Impacts on Commodity Production for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route[a]	Route Alternative RA-03AM[b]	Route Alternative RA-06[b]	Route Alternative RA-07[b]	Route Alternative RA-08[b]
Construction Impacts					
Disturbance and loss of agricultural land	Short-term/minor impacts • 562 acres of agricultural land Short- to long-term/minor impacts • 1,278 acres of farmland soils	Short-term/minor impacts • 1,680 acres of agricultural land Short- to long-term/minor impacts • 1,608 acres of farmland soils	Short-term/minor impacts • 326 acres of agricultural land Short- to long-term/minor impacts • 1,241 acres of farmland soils	Short-term/minor impacts • 402 acres of agricultural land Short- to long-term/minor impacts • 1,082 acres of farmland soils	Short-term/minor impacts • 405 acres of agricultural land Short- to long-term/minor impacts • 944 acres of farmland soils
Lost agricultural land yields	Temporary/negligible impacts • $111,000 market value of crops	Temporary/negligible impacts • $481,000 market value of crops	Temporary/negligible impacts • $52,000 market value of crops	Temporary/negligible impacts • $39,000 market value of crops	Temporary/negligible impacts • $41,000 market value of crops
Disturbance and loss of wild rice production	Short-term/negligible to minor impacts	Short-term/negligible to minor impacts	Short-term/negligible to minor impacts Short-term/negligible to minor impacts on Indian communities	Short-term/negligible to minor impacts Short-term/negligible to minor impacts on Indian communities	Short-term/negligible to minor impacts Short-term/negligible to minor impacts on Indian communities
Disturbance and loss of forested land and timber resources	Long-term to permanent/ minor impacts • 1,446 acres of forested areas • $2.3 million market value of timber	Long-term to permanent/ minor impacts • 1,174 acres of forested areas • $1.9 million market value of timber	Long-term to permanent/ minor impacts • 1,143 acres of forested areas • $1.8 million market value of timber	Long-term/negligible impacts • 1,145 acres of forested areas • Negligible – occurs within existing right-of-way, which is cleared of trees	Long-term to permanent/ minor impacts • 809 acres of forested areas • $1.3 million market value of timber

Table 6.5.1-24. Summary of Potential Impacts on Commodity Production for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route[a]	Route Alternative RA-03AM[b]	Route Alternative RA-06[b]	Route Alternative RA-07[b]	Route Alternative RA-08[b]
Disturbance and loss of land used for mining	Temporary/negligible impacts • 14 acres of land with potential sand and gravel resources No impact on active mines	Temporary/negligible impacts • 444 acres of land with potential sand and gravel resources No impact on active mines	Temporary/negligible impacts • 571 acres of land with potential sand and gravel resources Temporary/minor impact • 3 acres of active mines	Temporary/negligible impacts • 562 acres of land with potential sand and gravel resources No impact on active mines	Temporary/negligible impacts • 555 acres of land with potential sand and gravel resources No impact on active mines
Operations Impacts					
Disturbance and loss of agricultural land	Permanent/negligible impacts • 104 acres of agricultural land • 153 acres of farmland soils No additional impact on land within the permanent easement: • 252 acres of agricultural land • 559 acres of farmland soils	Permanent/negligible impacts on land within the footprint of the pump stations, MLVs, and permanent access roads. No additional impact land within the permanent easement: • 706 acres of agricultural land • 670 acres of farmland soils	Permanent/negligible impacts on land within the footprint of the pump stations, MLVs, and permanent access roads. No additional impact land within the permanent easement: • 136 acres of agricultural land • 518 acres of farmland soils	Permanent/negligible impacts on land within the footprint of the pump stations, MLVs, and permanent access roads. No additional impact land within the permanent easement: • 170 acres of agricultural land • 302 acres of farmland soils	Permanent/negligible impacts on land within the footprint of the pump stations, MLVs, and permanent access roads. No additional impact on land within the permanent easement: • 170 acres of agricultural land • 394 acres of farmland soils
Lost agricultural land yields	Permanent/negligible impacts • $64,000 market value of crops No additional lost yield on land within the permanent easement	Permanent/negligible impacts within facilities footprint No additional lost yield on land within the permanent easement	Permanent/negligible impacts within facilities footprint No additional lost yield on land within the permanent easement	Permanent/negligible impacts within facilities footprint No additional lost yield on land within the permanent easement	Permanent/negligible impacts within facilities footprint No additional lost yield on land within the permanent easement

Table 6.5.1-24. Summary of Potential Impacts on Commodity Production for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route[a]	Route Alternative RA-03AM[b]	Route Alternative RA-06[b]	Route Alternative RA-07[b]	Route Alternative RA-08[b]
Disturbance and loss of wild rice production	Short-term/negligible to minor impacts at regular intervals No additional permanent lost yield within permanent right-of-way	Short-term/negligible to minor impacts at regular intervals No additional permanent lost yield within permanent right-of-way	Short-term/negligible to minor impacts at regular intervals No additional permanent lost yield within permanent right-of-way	Short-term/negligible to minor impacts at regular intervals No additional permanent lost yield within permanent right-of-way	Short-term/negligible to minor impacts at regular intervals No additional permanent lost yield within permanent right-of-way
Disturbance and loss of forested land and timber resources	Permanent/minor impacts • 631 acres of forested areas • $4.8 million market value of timber	Permanent/minor impacts • 485 acres of forested areas • $3.1 million market value of timber	Permanent/minor impacts • 476 acres of forested areas • $3.0 million market value of timber	Long-term/negligible impacts • 257 acres of forested areas • Negligible – occurs within existing right-of-way which is cleared of trees	Permanent/minor impacts • 335 acres of forested areas • $2.1 million market value of timber
Disturbance and loss of land used for mining	Permanent/negligible impacts • 7 acres of land with sand and gravel resources No impact on active mines	Permanent/negligible impacts • 184 acres of land with sand and gravel resources No impact on active mines	Permanent/negligible impacts • 238 acres of land with sand and gravel resources • 1 acre of active mines	Permanent/negligible impacts • 234 acres of land with sand and gravel resources No impact on active mines	Permanent/negligible impacts • 231 acres of land with sand and gravel resources No impact on active mines

[a] Enbridge-provided footprints: Construction = construction work area, Operations = operations permanent right-of-way.

[b] Construction = 120-foot-wide construction footprint (except RA-07 would be 205 feet wide), Operations = 50-foot-wide permanent right-of-way.

6.5.1.5 References

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6.5.2 Recreation and Tourism

Recreational tourism dollars contribute to recreational economies. They are based on spending associated with participation in outdoor activities that take place on public lands and waters, such as parks, forests, and special management areas; state-designated land based trails; state-designated water trails and trout streams; and state- and federally designated scenic byways. Recreational activities contribute to the local economy through the influx of tourists, purchases of gear and related equipment, and trip-related spending (e.g., gas, lodging, and food).

The issues of concern related to recreation and tourism are the loss of recreation-based spending and the associated effects on the recreational economies in the counties that would be crossed. This potential loss would come from a measurable decrease in recreation-based visitation because of trail closings and access limitations during construction and operation of the Project. This section assesses the potential for construction and operation of the Applicant's preferred route and route alternatives to affect the recreation economy. Impacts on recreation and tourism that could occur during construction and operation include:

- Limitations to recreation access, and
- Changes to the recreational economy.

This section first describes the existing conditions within an area along the Applicant's preferred route and each of the route alternatives where recreation and tourism could be affected by construction or operation of the Project. The potential impacts of Project-related construction and operation on recreation and tourism are considered next. Potential impacts for each route alternative (RA-03AM, RA-06, RA-07, and RA-08) are assessed and compared to each other and to the Applicant's preferred route between Clearbrook and Carlton. A summary and comparison of the impacts are included at the end of the section. Chapter 10 addresses the potential impacts on recreation and tourism resulting an unanticipated release of crude oil.

6.5.2.1 Regulatory Context and Methodology

6.5.2.1.1 Regulatory Context

Minnesota Administrative Rules Part 7852.0700, Subpart (3) provides the criteria the Commission must consider in determining the route of a pipeline. This includes, among other things, the potential impacts of, and the methods to minimize or mitigate the potential impacts of, all proposed routes on, "the natural environment, public and designated lands, including but not limited to natural areas, wildlife habitat, water, and *recreational lands*," (emphasis added) and "economies within the route, including agricultural, commercial or industrial, forestry, *recreational*, and mining operations" (emphasis added).

6.5.2.1.2 Methodology

The ROI for the analysis of recreation and tourism impacts is twofold. It narrowly focuses on the public recreational lands and recreational waterbodies directly crossed by construction and operational areas the Applicant's preferred route and the route alternatives in order to qualitatively assess how Project-related changes would affect recreation-based visitation. It broadly includes the counties through which the Applicant's preferred route and the route alternatives pass to assess whether the Project-related changes would affect recreation-based visitation at the county-level and subsequently the local

recreation-based economy. The counties where Project related impacts would occur represent the relevant local recreational economies that are likely to be the most sensitive to Project-related actions.

The analysis was undertaken by first identifying and inventorying in GIS all public recreational lands, trails, and waterbodies in the counties crossed by the Applicant's preferred route and the route alternatives. The following construction and operations footprints were overlaid to quantify resources affected by construction and operation:

- The route and estimated footprints for the pipeline and associated facilities for the Applicant's preferred route;
- The 120-foot-wide construction footprint for RA-03AM, RA-06, and RA-08; 205-foot-wide construction footprint for RA-07; and 50-foot-wide permanent right-of-way for all route alternatives.

The geographic extent (acres) of restricted access to recreational land from the construction work areas, permanent rights-of-way, and associated aboveground facilities—in addition to the geographic extent of restricted access to recreational waterbodies, land-based trails, and scenic byways—was determined by analyzing the number of crossings and crossing methods described by the Applicant. The analysis assumed that access would be restricted to the affected resource over the entire construction work area for the duration of construction. During operations the analysis assumed that access would be restricted during operations along the permanent right-of-way for pipelines and at any associated aboveground facilities.

The geographical extent of restricted access was assessed to determine potential impacts on localized recreational use and recreational economies at the county level. Current statistics on visitation to the specific recreation areas identified in this analysis and any associated recreational spending were not available; consequently, quantitative estimates of economic impacts could not be developed. However, a qualitative assessment was developed to assess the overall potential for disruption of these activities and the magnitude of the associated loss of tourism. A qualitative discussion of impacts on recreation-based tourism characterizes the direction and magnitude of potential impacts on the regional recreation/tourism economy at the county level.

Recreational land and waterbodies within the ROI for the Applicant's preferred route and route alternatives were identified using GIS datasets and layers in the following federal- and state-level data sources:

- PAD-US,
- Minnesota DNR water trails,
- Minnesota DNR snowmobile trails,
- Minnesota DNR state-designated trails,
- Minnesota DNR hunter walking trails, and
- Minnesota state-designated trout streams.

A more detailed discussion of the methodology may be found in Section 5.3.2.1.2.

6.5.2.2 Existing Conditions

This section identifies recreational resources that could be affected by the Applicant's preferred route and route alternatives (see Section 5.3.2.2 for a full description of each resource). As previously described, changes to these resources could reduce or restrict recreational use, which could affect recreational spending at the county level. This section does not discuss current recreational use or spending at the county level because publicly available, accurate, and consistent data were not available for each of the resources discussed. For context, an estimate of the approximate acreages or total size of the resources are provided where appropriate for the Applicant's preferred route and each route alternative.

6.5.2.1.3 Applicant's Preferred Route

Section 5.3.2 describes existing conditions in Minnesota for recreational use of parks, forests, and special management areas; state-designated land-based trails; state-designated water trails and trout streams; and scenic byways. Information enabling comparison of the route alternatives to the Applicant's preferred route is provided below.

Parks, Forests, and Special Management Areas

Table 6.5.2-1 lists by county the miles and acres of parks, forests, and special management areas that would be crossed by the Applicant's preferred route. No federal or state parks in Minnesota would be crossed by the Applicant's preferred route. The Applicant's preferred route would not cross any federally owned forests but would cross approximately 32 miles of state forested land (all within the Clearbrook-to-Carlton segment) and approximately 1 mile of special management areas, which includes two WMAs (both in Aitkin County). The total amount of land used for recreational purposes in the ROI for the Applicant's preferred route (and all is within the Clearbrook-to-Carlton segment) is approximately 526 acres (including access roads, ATWS, and MLVs), compared to the total land available for recreation in the forests and WMAs that would be crossed (714,633 acres) (Table 6.5.2-1).

State-Designated Land-Based Trails

State-designated land-based trails include multi-use trails, hunter walking trails, and state-managed snowmobile trails. Minnesota has 25 state trails that were developed for multi-use purposes such as hiking, biking, horseback riding, and more. In addition, dozens of hunter walking trails are located within WMAs, and over 22,000 miles of groomed snowmobile trails are managed by Minnesota DNR.

The Applicant's preferred route would cross three state-designated multi-use trails, each located in the Clearbrook-to-Carlton segment. Two of the trails would be crossed once (Paul Bunyan State Trail in Cass County and Willard Munger State Trail in Carlton County), and a hunter walking trail in the Hill River State Forest would be crossed twice. The route would cross 0.8 mile of snowmobile/ATV trails.

No state-designated multi-use trails would be crossed in the Carlton-to-Wisconsin border segment or in the North Dakota border-to-Clearbrook segment.

Table 6.5.2-1. Parks, Forests, and Special Management Areas Crossed by the Applicant's Preferred Route (Clearbrook to Carlton)

County	Name	Total Size (acres)	Centerline (miles)	Construction Work Area (acres)	Permanent Right-of-Way (acres)	Access Roads	ATWS	Valves	Con Total[a]	Op Total[b]
Aitkin County	Grayling Marsh WMA	9,627	1.1	14	6	--	1	--	15	6
Aitkin County	Lawler WMA	235	0.3	3	2	--	--	--	3	2
Cass County	Foot Hills State Forest	46,896	3.1	42	19	8	5	--	55	19
Aitkin County	Hill River State Forest	124,204	8.0	103	48	6	5	--	114	48
Wadena County	Huntersville State Forest	33,963	7.1	97	43	11	8	--	116	43
Cass County	Land O'Lakes State Forest	49,890	9.6	130	58	22	9	--	161	58
Hubbard County	Mississippi Headwaters State Forest	45,290	1.8	25	11	7	4	0.2	35	11
Hubbard County	Paul Bunyan State Forest	150,113	--	<0.1	<0.1	--	--	--	0	0
Aitkin County	Savanna State Forest	238,954	0.8	9	5	0	0	--	9	5
Aitkin County	Waukenabo State Forest	15,461	1.4	16	8	1	1	--	17	8
TOTAL		**714,633**	**33.2**	**439**	**199.4**	**54.6**	**32.1**	**0.2**	**526**	**200**

Source: USGS GAP 2016.

[a] Con Total = For the Applicant's preferred route, the construction total is the sum of the Applicant-provided footprints, additional temporary workspaces (ATWS) that include pipe yards, and temporary access roads.

[b] Op Total = For the Applicant's preferred route, the operations total is the sum of the Applicant-provided pipeline permanent right-of-way, primary access roads, pump stations, and valves (where valves include valve pad and driveway).

Notes:

The Applicant's preferred route would not cross parks, forests, or special management areas from the North Dakota border to Clearbrook or from Carlton to the Wisconsin border.

Acres for the construction work area and the permanent right-of-way are based on Enbridge-provided footprints for the Applicant's preferred route and a 120-foot-wide construction footprint and 50-foot-wide permanent right-of-way used for the route alternatives.

"--" = no occurrence, WMA = Wildlife Management Area

In total, the Applicant's preferred route would cross 19 snowmobile trails within Minnesota, of which 12 trails are in the Clearbrook-to-Carlton segment. In Clearwater County, the Clearwater Blazer Trail would be crossed once; in Hubbard County, the North Country Trail and the Wadena Trail would be crossed once, and the Forest Rider Trail would be crossed six times; in Wadena County, the Wadena Trail would be crossed twice, and the Nevis Wilder Trail would be crossed once; in Cass County, the Cass County Trail would be crossed four times, and the Emily-Outing Snowbird Trail would be crossed twice; in Aitkin County, the Haypoint Trail would be crossed once, the Palisade Trail would be crossed three times, and the Tamarack Trail would be crossed four times; and in Carlton County, the Kettle Trail would be crossed once. No snowmobile trails would be crossed from Carlton to the Wisconsin border.

State-Designated Water Trails and Trout Streams

Water trails are marked routes on navigable waterways (e.g., rivers, lakes, canals, and coastlines) for people using small, non-motorized boats (e.g., kayaks, canoes, rafts, and rowboats). Minnesota has 35 state-designated canoe and boating routes totaling over 4,500 miles.

The Applicant's preferred route would cross five state-designated canoe and boating trails in Minnesota, three of which are between Clearbrook and Carlton. Two of the rivers (Crow Wing River in Wadena County and Pine River in Cass County) would be crossed once; while the Mississippi River would be crossed two times, once in Clearwater County and again in Aitkin County (Figure 6.5.2-1). Each of the rivers that would be crossed range in length from 60 miles (Pine River) to over 500 miles (Red River of the North).

State-designated trout streams provide an important source of recreational activity to local anglers. For context, Minnesota has 687 designated trout streams, totaling 3,782 miles. In total, the Applicant's preferred route would require crossing six state-designated trout streams, all located in the Clearbrook-to-Carlton segment (King Creek and an unnamed stream in Carlton County, Straight River in Hubbard County, Spring Brook in Cass County, Blackhoof River in Carlton County, and LaSalle Creek in Hubbard County). No trout streams would be crossed outside of the Clearbrook-to-Carlton segment.

Scenic Byways

In Minnesota, 21 scenic byways (8 of which are national byways) cross several of Minnesota's finest cultural, historic, recreational, and scenic locations. In total, the Applicant's preferred route would cross one national byway (the Great River Road) twice, once in Clearwater County and again in Aitkin County; and three state-designated byways, one of which is located in the Clearwater-to-Carlton segment (Lake Country in Hubbard County) (Figure 6.5.2-2).

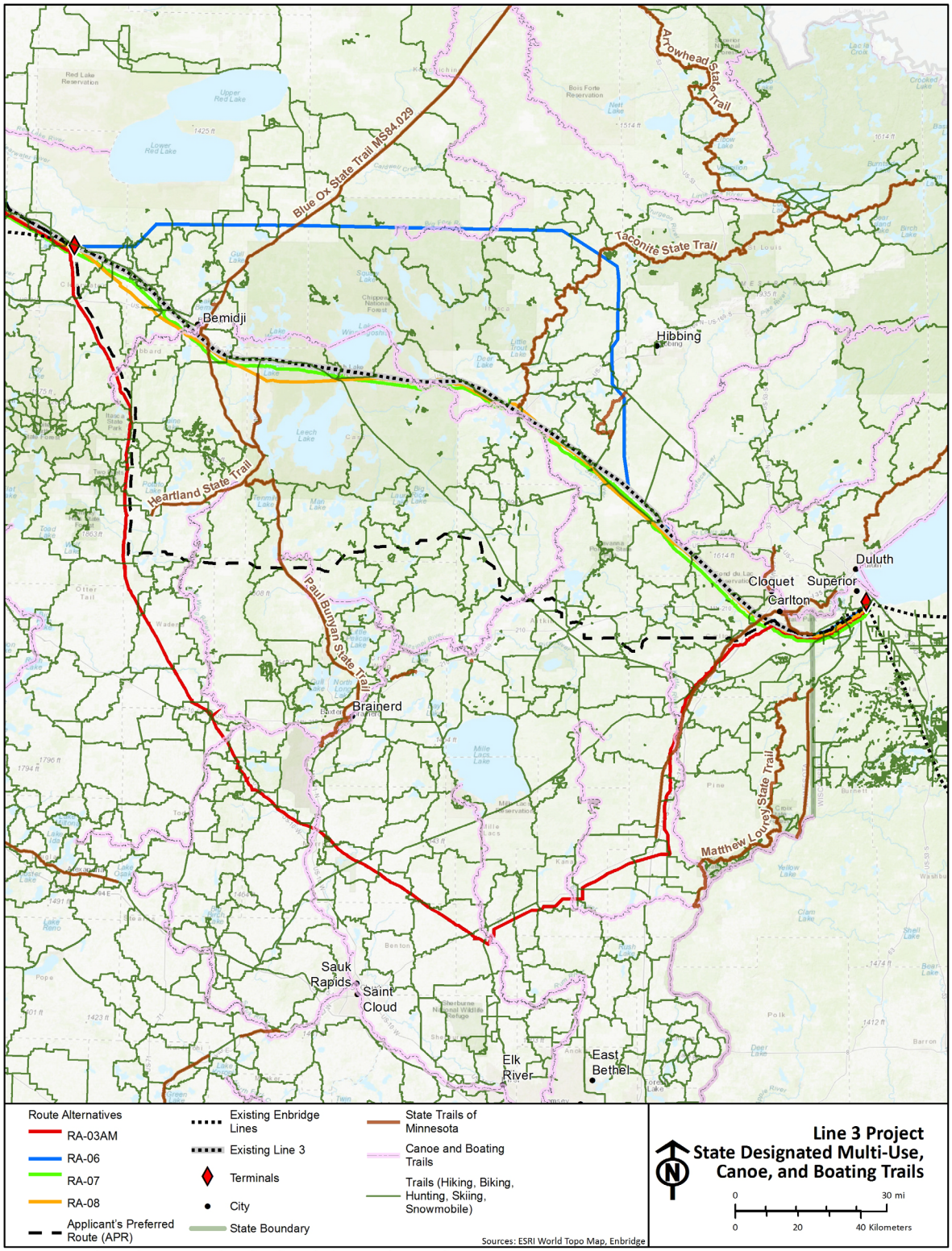

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Figure 6.5.2-1. State Designated Multi-Use, Canoe, and Boating Trails Crossed by the Applicant's Preferred Route and Route Alternatives

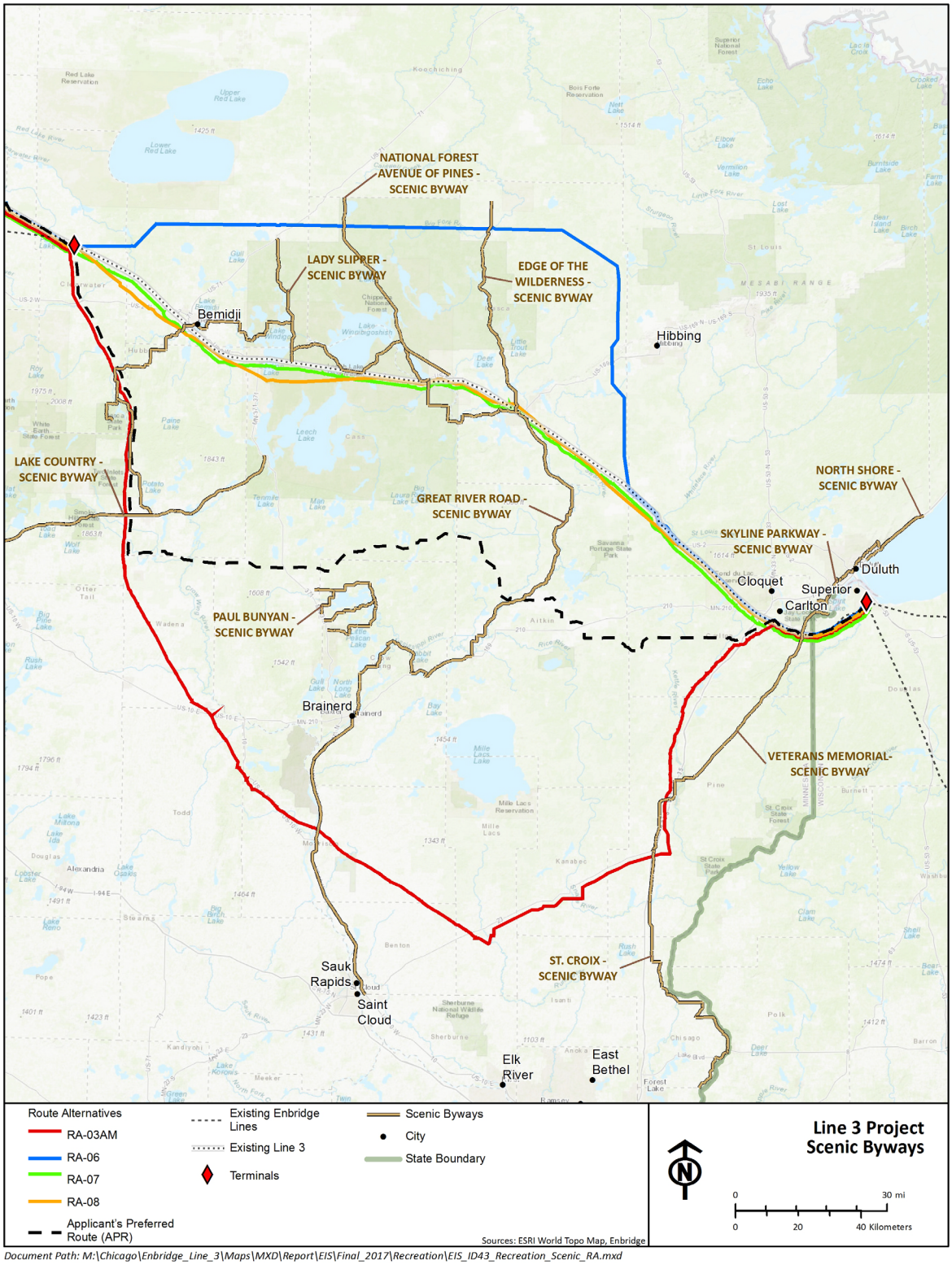

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Figure 6.5.2-2. Scenic Byways Crossed by the Applicant's Preferred Route and Route Alternatives

6.5.2.1.4 Route Alternatives

The only segment where the route alternatives would vary from the alignment of the Applicant's preferred route is between Clearbrook and Carlton in Minnesota. The existing conditions relevant to recreation and tourism for the route alternatives between Clearbrook and Carlton are described below.

Route Alternative RA-03AM

Parks, Forests, and Special Management Areas

No federal or state parks would be crossed by RA-03AM (Table 6.5.2-2). The route would cross approximately 5 acres of WMAs, and 26 acres of state forest—all within the Mississippi Headwaters State Forest. The total amount of land used for recreational purposes in the ROI for RA-03AM within the Clearbrook-to-Carlton segment is 57 acres, compared to the total land available for recreation in the forests and WMAs that would be crossed (59,071 acres) (Table 6.5.2-2).

Table 6.5.2-2. Parks, Forests, and Special Management Areas Crossed by Route Alternative RA-03AM

County	Name	Total Area (acres)	Centerline (miles)	Construction Work Area (acres)	Permanent Right-of-Way (acres)
Hubbard County	Mississippi Headwaters State Forest	45,290	1.8	26	11
Morrison County	Neitermeier WMA	277	0.4	5	2
TOTAL		**59,071**	**4.0**	**57**	**24**

Source: USGS GAP 2016.

Notes:

Acres for the construction work area and the permanent right-of-way are based on a 120-foot-wide construction footprint and 50-foot-wide permanent right-of-way for RA-03AM. The specific locations of activities and facilities are not known for the route alternatives.

WMA = Wildlife Management Area

State-Designated Land-Based Trails

No hunter walking trails would be crossed by RA-03AM; however, it would cross one state-designated trail (Willard Munger State Trail) two times in Pine County and once in Carlton County (Figure 6.5.2-1). RA-03AM would cross the most snowmobile trails (16 trails/5.6 miles within the Clearbrook-to-Carlton segment).

State-Designated Water Trails and Trout Streams

RA-03AM would cross the highest number of state-designated canoe and boating trails (Kettle River in Pine County, Long Prairie River in Todd County, Mississippi River [two crossings] once in Clearwater County and again in Morrison County, Rum River in Mille Lacs County, and Snake River in Kanabec County) (Figure 6.5.2-1). RA-03AM would require the most trout stream crossings (nine crossings).

Scenic Byways

RA-03AM would require three crossings of scenic byways (Great River Road once in Clearwater County and again in Morison County, Lake Country in Hubbard County, and St. Croix in Pine County) (Figure 6.5.2-2).

Route Alternative RA-06

Parks, Forests, and Special Management Areas

No federal or state parks would be crossed by RA-06; however, it would cross through the Chippewa National Forest (Table 6.5.2-3). Furthermore, RA-06 would cross the highest amount of forest (over 59 miles), of which 54 miles, or 91 percent, is within state forests. RA-06 has the second largest land area of state forests and special management areas crossed by the route (approximately 875 acres), and the highest acreage of parks, forests, and special management areas remaining in the permanent right-of-way (approximately 365 acres). The total amount of land used for recreational purposes in the ROI for the RA-06 route within the Clearbrook-to-Carlton segment is 875 acres, compared to the total land available for recreation in the forests and WMAs that would be crossed (2,113,000 acres) (Table 6.5.2-3).

Table 6.5.2-3. Parks, Forests, and Special Management Areas Crossed by Route Alternative RA-06

County	Name	Total Land Area (acres)	Centerline (miles)	Construction Work Area (acres)	Permanent Right-of-Way (acres)
Cass County	Chippewa National Forest	1,600,000	5.9	86	36
Itasca County	George Washington State Forest	320,534	31.5	458	191
Itasca County	Big Fork State Forest	127,929	20.2	294	123
Carlton County	Fond du Lac State Forest	64,505	2.5	37	15
TOTAL		**2,112,968**	**60.1**	**875**	**365**

Source: USGS GAP 2016.

Notes:

Acres for the construction work area and the permanent right-of-way are based on a 120-foot-wide construction footprint and 50-foot-wide permanent right-of-way for RA-06. The specific locations of activities and facilities are not known for the route alternatives.

WMA = Wildlife Management Area

State-Designated Land-Based Trails

No hunter walking trails would be crossed by RA-06; however, it would cross the Blue Ox State Trail in Beltrami County, the Willard Munger State Trail in Carlton County, and the Taconite State Trail and Pengilly to Goodland State Trail—both located in Itasca County (Figure 6.5.2-1). The route would cross 0.7 mile of snowmobile/ATV trails.

State-Designated Water Trails and Trout Streams

RA-06 would cross one state-designated canoe and boating trail three times; would cross the Big Fork River in Itasca County (see Figure 6.5.2-1); and would require eight trout stream crossings (an unnamed creek, Clearwater River, Spring Creek, and O'Brien Creek in Beltrami County; two unnamed streams in Itasca County; and Otter Creek and an unnamed stream in Carlton County).

Scenic Byways

RA-06 would cross two byways: the National Forest Avenue of Pines Byway and the Edge of the Wilderness Byway, both in Itasca County (Figure 6.5.2-2).

Route Alternative RA-07

Parks, Forests, and Special Management Areas

No federal or state parks would be crossed by RA-07; however, it would cross through the Chippewa National Forest (Table 6.5.2-4). RA-07 would cross the greatest amount of land available for recreation (approximately 1,049 acres), primarily in the Bowstring State Forest (698 acres) in both Cass and Itasca counties. The total amount of land used for recreational purposes in the ROI for the RA-07 route within the Clearbrook-to-Carlton segment is approximately 1,049 acres, compared to the total land available for recreation in the forests and WMAs that would be crossed (2,236,364 acres) (Table 6.5.2-4).

Table 6.5.2-4. Parks, Forests, and Special Management Areas Crossed by Route Alternative RA-07

County	Name	Total Land Area (acres)	Centerline (miles)	Construction Work Area (acres)	Permanent Right-of-Way (acres)
Cass County	Bowstring State Forest	526,569	28.1	698	170
Carlton County	Fond du Lac State Forest	64,505	2.5	63	15
Beltrami County	Mississippi Headwaters State Forest	45,290	5.3	131	32
Cass County	Chippewa National Forest	1.6 million	6.0	157	36
TOTAL		**2,236,364**	**41.9**	**1,049**	**254**

Source: USGS GAP 2016.

Notes:

Acres for the construction work area and the permanent right-of-way are based on a 205-foot-wide construction footprint, 10 feet wide on the north side of existing Line 3 and 195 feet wide on the south side of existing Line 3and 50-foot-wide permanent right-of-way for RA-07. The specific locations of activities and facilities are not known for the route alternatives.

WMA = Wildlife Management Area

State-Designated Land-Based Trails

No hunter walking trails would be crossed by RA-07; however, RA-07 would cross the Paul Bunyan State Trail in Beltrami County, the Heartland State Trail in Cass County, and the Taconite State Trail in Itasca County (Figure 6.5.2-1). The route would cross 2.6 miles of snowmobile/ATV trails.

State-Designated Water Trails and Trout Streams

RA-07 would cross two state-designated canoe and boating trails (the Mississippi River) two times (once in Beltrami County, and again in Itasca County) and the St. Louis River in St. Louis County (Figure 6.5.2-1). The route would require six trout stream crossings (an unnamed creek and the Clearwater River in Beltrami County; the Necktie River in Hubbard County; and Otter Creek, Little Otter Creek, and an unnamed stream in Carlton County).

Scenic Byways

RA-07 would cross two byways: the Great River Road four times (once in Beltrami County and three times in Cass County) and the Edge of the Wilderness Byway in Itasca County (Figure 6.5.2-2).

Route Alternative RA-08

Parks, Forests, and Special Management Areas

No federal or state parks would be crossed by RA-08; however, it would cross through the Chippewa National Forest (Table 6.5.2-5). The total amount of land used for recreational purposes in the ROI for the RA-08 route within the Clearbrook-to-Carlton segment is approximately 663 acres, compared to the total land available for recreation in the forests and WMAs that would be crossed (2,496,073 acres) (Table 6.5.2-5).

Table 6.5.2-5. Parks, Forests, and Special Management Areas Crossed by Route Alternative RA-08

Route/ County	Name	Total Land Area (acres)	Centerline (miles)	Construction Work Area (acres)	Permanent Right-of-Way (acres)
Cass County	Chippewa National Forest	1,600,000	5.8	84	35
Beltrami County	Bemidji Slough WMA	49	0.3	4	2
Itasca County	Swan River Deer Yard WMA	909	0.5	7	3
Cass County	Bowstring State Forest	526,569	28.2	410	171
Carlton County	Fond du Lac State Forest	64,505	2.4	36	15
Beltrami County	Mississippi Headwaters State Forest	45,290	4.7	68	28
Cass Count	Welsh Lake State Forest	19,797	1.1	15	6
Aitkin County	Savanna State Forest	238,954	2.6	38	16
TOTAL		**2,496,073**	**45.6**	**663**	**276**

Source: USGS GAP 2016.

Notes:

Acres for the construction work area and the permanent right-of-way are based on a 120-foot-wide construction footprint and 50-foot-wide permanent right-of-way for RA-08. The specific locations of activities and facilities are not known for the route alternatives.

WMA = Wildlife Management Area

State-Designated Land-Based Trails

No hunter walking trails would be crossed by RA-08; however, it would cross the Paul Bunyan State Trail in Beltrami County, the Heartland State Trail in Cass County, and the Taconite State Trail in Itasca County (Figure 6.5.2-1). The route would cross 2.9 miles of snowmobile/ATV trails.

State-Designated Water Trails and Trout Streams

RA-08 would cross only one state-designated canoe and boating trail (the Mississippi River) three times: once in Beltrami County, once in Cass County, and again in Itasca County (see Figure 6.5.2-1). RA-08 would require the fewest number of state-designated trout stream crossings (four crossings): the

Necktie River in Beltrami County and the Little Otter Creek, Otter Creek, and an unnamed stream in Carlton County.

Scenic Byways

RA-08 would cross two byways: the Great River Road Byway twice (once in Beltrami and again in Itasca County) and the Edge of the Wilderness Byway, also in Itasca County (Figure 6.5.2-2).

6.5.2.3 Impact Assessment

6.5.2.1.5 Applicant's Preferred Route (in Minnesota)

Construction Impacts

Limitations to Recreation Access

Parks, Forests, and Special Management Areas

Based on a review of relevant maps and satellite imagery, most land within the construction work areas does not include developed recreational areas (i.e., areas with facilities such as parking, campsites, boat launches, and hiking trails). This is also true for the two WMAs in Aitkin County because they are primarily designated for undeveloped recreational use. Generally, the land affected by construction of the pipeline consists of open public land available for informal recreation and does not include any developed areas, with the exception of off-road trails, ATV trails, and snowmobile trails.

During construction, impacts on eight state forests, and two special management areas within the construction work area include removal of existing vegetation, grading, excavation, pipeline installation, and reconstruction (for trails). Access to the affected land would be limited or restricted during this time. The Applicant may need to temporarily close or restrict access to trails within state forests (both non-motorized and off road) during construction of the pipeline across any trails. Enbridge would cross trails using the bore or open-cut method. If a bore is used, no impacts on the trail would be expected. If the open-cut method is used, Enbridge would complete pipeline installation activities across trails within 48 hours.

Construction in any location would last for several days to several weeks depending on a variety of factors such as land use type, topography, weather, and other environmental conditions; therefore, limited use, access restrictions, and noise and visual disturbance could occur during this timeframe. After this time period, recreational activities on the affected acres could resume as normal. Additional detail on noise and visual disturbance is provided in Sections 6.2.2 and 6.2.3, respectively.

At the county level, the majority of the land disturbed during construction (156 acres) would occur in state forests and WMAs within Aitkin County (Table 6.5.2-1). A review of forest and WMA maps revealed that the disturbed land represents a very small portion (less than 1 percent) of the total amount of land that remains available in each forest and WMA that would be crossed by the pipeline. In total, over 388,000 acres of land in the same forests and WMAs in Aitkin County would remain unaffected and available during construction. This is also true in Cass County (217 acres of 96,876 total), Wadena County (116 acres of 33,963 total) and Hubbard County (36 acres of 45,290 total). Impacts on forests and special management areas are anticipated to be temporary and minor because impacts would be confined to small portions of the total land available for recreation and any closures of these areas would be limited to during and immediately following construction.

State-Designated Land-Based Trails

Construction-related activities would temporarily affect public access and use of land-based trails where the pipeline crosses the trail for a short time during pipeline installation. The Applicant proposes to use the bore or open-cut method at trail crossings. If the latter is used, trail use would be suspended for 48 hours during construction. After completion of pipeline installation, the Applicant would restore the trail surface to allow passage.

Based on a review of the trail route map for the Paul Bunyan and the Willard Munger state trails, the pipeline crossing would occur in areas with no designated public access or facilities. The Paul Bunyan State Trail is over 120 miles long, and the intersection would occur near the middle of the trail just south of Backus, which does not include any public access points or recreational facilities. The pipeline also crosses the Willard Munger State Trail, which is over 90 miles long. The intersection occurs just north of Mahtowa and does not include any public access points or recreational facilities. Construction-related impacts on these trails likely would result in a temporary restriction on recreational access where the pipeline crosses over during pipeline installation. Based on the overall length of the trails and alternative locations to access it, a temporary negligible impact on the recreational access of state trails is expected.

For the hunter walking trail in the Hill River State Forest, the Applicant would maintain access during the hunting season. Noise and visual disturbance may continue to affect the recreational experience in the disturbed areas during construction; however, restrictions in use would no longer be necessary. Overall, impacts on the recreational access to state-designated land-based trails are anticipated to be temporary and negligible. Impacts would be confined to the area where the pipeline crosses the trail, and any restrictions to access at these intersections would be limited to during and immediately following construction.

State-Designated Water Trails and Trout Streams

The Applicant's preferred route would cross three state-designated canoe and boating trails and six state-designated trout streams between Clearbrook and Carlton. Except for the Pine River, the canoe and boating trails would be crossed using HDD, resulting in no impacts on recreation or tourism. Public use and access to the Pine River would be interrupted temporarily at the intersection of the river and the pipeline during installation of the pipeline. After the pipeline is installed, river users would be allowed to cross the construction area. Based on a review of the trail route map, the pipeline crossing would occur near the end of the trail (on or around River Mile 45 of 59 miles), which does not include any public access points or recreational facilities. Construction-related impacts on the Pine River likely would result in a temporary restriction on recreational access where the pipeline crosses the river during pipeline installation. Based on the overall length of the Pine River (59 miles) and alternative sites to access the river, a temporary negligible impact on the overall recreational access of the Pine River is expected. Potential impacts associated with trout stream waterbody crossings are discussed in Section 5.3.2. Because impacts on these streams would be temporary and would not occur during designated trout fishing seasons, temporary negligible impacts on the recreational use of trout streams are anticipated.

Scenic Byways

The Applicant's preferred route would cross scenic byways using a bore or HDD, which would avoid road closures and any direct impacts on the roads. As a result, construction of the proposed Project would not disrupt use of the byways and therefore would not limit recreational access. Impacts associated with aesthetic changes along scenic byways are discussed in Section 6.2.3.

Changes to the Recreational Economy

Parks, Forests, and Special Management Areas

Construction could disrupt the activities or alter the recreational experience of people who regularly use the affected areas for specific recreational purposes. However, these impacts would be temporary, minor, and localized and would be limited to small portions of the overall recreational site (i.e., the forest or WMA). Because the majority of the land crossed by the Applicant's preferred route does not include developed recreational areas (e.g., facilities and trails) that are more likely to attract visitors from outside of the area, it is likely that impacts would be limited to local people who live in and around the immediate area.

During construction, local recreational users could re-locate to undisturbed areas throughout each of the state forests and WMAs, given the overall size of these areas relative to the area affected by the construction footprint (439 acres of land disturbed for construction of 714,633 acres of total land available). Construction-related impacts likely would result in a temporary, negligible impact on the number of recreation-based trips people take to state forests and WMAs. Construction impacts would be temporary (several days to several weeks depending on a variety of factors such as land use type, topography, weather, and other environmental conditions) and limited to areas with very little opportunities for developed recreation. In addition, recreational users have a variety of substitute or alternative sites both within the affected forest or WMA and in the county as a whole. Construction activities may limit access to the affected areas or reduce the quality of the experience. However, given the temporary nature of the activity and the opportunity to recreate in a variety of other places in the county, the loss of recreation-based visitation is not expected to be large enough to measure in terms of recreational spending at the county level. Consequently, impacts on the recreational economies in each of the counties that would be crossed would be temporary and negligible.

State-Designated Land-Based Trails

Because construction-related impacts are likely to be confined to a very short segment of the trail (on the order of 170 feet) and general access to the trail would not be restricted, the change in overall recreation-based visitation to trails at the county level would not be large enough to measurably affect the amount of recreation-based spending in the county. Subsequently, this would result in a temporary and negligible impact on the recreational economy at the county level.

State-Designated Water Trails and Trout Streams

Since only the Pine River would be affected temporarily by construction of the Applicant's preferred route where the pipeline crosses the waterbody, it is likely that construction-related impacts on the recreational use of state-designated water trails would not be large enough to measurably affect the amount of recreation-based spending at the county level. This would likely cause a temporary, negligible impact on the recreational economy.

Impacts on trout streams would not occur during designated trout fishing seasons; therefore, impacts on the recreational use of trout streams are likely to be temporary and negligible. Subsequently, temporary negligible impacts on the recreational economy at the county level could be expected.

Scenic Byways

The Applicant's preferred route would cross scenic byways using a bore or HDD, which would avoid road closures and any direct impacts on the roads. Therefore, there would be no impacts on the recreational economy.

Operations Impacts

Limitations to Recreation Access

Parks, Forests, and Special Management Areas

Operation of the pipeline for the Applicant's preferred route would involve periodic inspection, pipeline maintenance activities, and mowing to maintain appropriate vegetation. Access to parks, forests, and special management areas; trails; and scenic byways would not be restricted or limited as a result of maintenance mowing or inspection operation. Aboveground facilities, MLVs, and permanent access roads would also not limit recreational access to parks, forests, or special management areas. Therefore, no impacts on recreational use of parks, forests, or special management areas are expected during operation of the pipeline.

State-Designated Land-Based Trails

Access and use of state-designated trails that would be crossed by the Applicant's preferred route would not be affected during maintenance mowing and inspection activities during operation. Aboveground facilities, MLVs, and permanent access roads would not limit recreational access to state-designated land-based trails. Therefore, no impacts on recreational use of land-based trails during operation of the pipeline are expected.

State-Designated Water Trails and Trout Streams

Access and use of state-designated canoe routes and other waterbodies that would be crossed by the Applicant's preferred route would not be affected during maintenance mowing and inspection activities during operation. Aboveground facilities, MLVs, and permanent access roads would not affect recreation use of water trails or trout streams. Therefore, no impacts on recreational use of state-designated water trails or trout streams are expected during operation of the pipeline.

Scenic Byways

Access and use of federally and state-designated scenic highways that would be crossed by the Applicant's preferred route would not be affected during maintenance mowing and inspection activities during operation. Aboveground facilities, MLVs, and permanent access roads would not affect recreational use. Therefore, no impacts on recreational use of scenic byways are expected during operation of the pipeline.

Changes to the Recreational Economy

Parks, Forests, and Special Management Areas

Because recreational use of forests and special management areas would not be affected by the Applicant's preferred route during operations, the recreational economy in each of the counties crossed would not be affected.

State-Designated Land-Based Trails

Because recreational use of state-designated land-based trails would not be affected by the Applicant's preferred route during operations, the recreational economy in each of the counties crossed would not be affected.

State-Designated Water Trails and Trout Streams

Because recreational use of state-designated water trails and trout streams would not be affected by the Applicant's preferred route during operations, the recreational economy in each of the counties crossed would not be affected.

Scenic Byways

Because recreational use scenic byways would not be affected by the Applicant's preferred route during operations, the recreational economy in each of the counties crossed would not be affected.

6.5.2.1.6 Route Alternatives (from Clearbrook to Carlton)

The only segment where the route alternatives would vary from the alignment of the Applicant's preferred route is between Clearbrook and Carlton in Minnesota. The potential construction and operations impacts on recreational access and recreational economies for the route alternatives between Clearbrook and Carlton are described below.

Route Alternative RA-03AM

Construction Impacts

Limitations to Recreation Access

Parks, Forests, and Special Management Areas. No federal or state parks would be crossed by RA-03AM between Clearbrook and Carlton. Unlike the other route alternatives, RA-03AM would not cross through the Chippewa National Forest. RA-03AM follows the same route as the Applicant's preferred route through the Mississippi Headwaters; therefore, the impacts on recreational access would be the same (i.e., temporary and minor). Similar to the Applicant's preferred route, the land affected by construction of the pipeline primarily consists of open public land that is available for informal recreation and does not include any developed recreational areas except for off-road trails, ATV trails, and snowmobile trails.

Construction in any location would last for several days to several weeks depending on a variety of factors such as land use type, topography, weather, and other environmental conditions; therefore, limited use, access restrictions, and noise and visual disturbance could occur during this timeframe. After this time period, recreational activities on the affected acres could resume as normal. Details on noise and visual disturbance are provided in Sections 6.2.2 and 6.2.3, respectively.

At the county level, the majority of the land disturbed during construction (approximately 31 acres) would occur in a NWR and WMA within Morrison County (Table 6.5.2-2). A review of maps revealed that the disturbed land represents a very small portion (less than one-half of a percent) of the total amount of land that remains available in the refuge and WMA that would be crossed by the pipeline. In total, over 13,781 acres of land within the same refuge and WMA in Morrison County would remain unaffected and available during construction. This is also true in Hubbard County (26 acres of 45,290 total). Therefore, impacts on access to forests, WMAs, and special management areas are anticipated to be temporary and minor. Impacts would be confined to small portions of the total land available for recreation, and any closures of these areas would be limited to during and immediately following construction.

State-Designated Land-Based Trails. RA-03AM would cross the most snowmobile trails (16 trails within the Clearbrook-to-Carlton segment). It also would cross the Willard Munger State Trail two times. In total, approximately 9 miles of the trail would be temporarily affected during construction, of 90 total

miles of the trail. If bore or HDD crossing methods are used for crossings, no impacts on trails are expected. If the open-cut method is used, Enbridge would complete pipeline installation activities across trails within 48 hours and then would restore the trail surface to allow passage. Noise and visual disturbance may continue to affect the recreational trail experience in disturbed areas during construction; however, restrictions to access would no longer be necessary. Overall, impacts on state-designated land-based trails are anticipated to be temporary and negligible. Impacts would be confined to the area where the pipeline crosses the trail, and any restrictions to access at these intersections would be limited to during and immediately following construction.

State-Designated Water Trails and Trout Streams. RA-03AM would cross the highest number of state-designated canoe and boating trails (Kettle River in Pine County; Long Prairie River in Todd County; Mississippi River [two crossings], once in Clearwater County and again in Morrison County; Rum River in Mille Lacs County; and Snake River in Kanabec County). Canoe and boating trails crossed using HDD would not affect recreational access. Public use and access to the state water trails would be interrupted temporarily where the pipeline intersects the river during installation of the pipeline, resulting in a temporary negligible impact on the overall recreational use of the water trails.

Depending on the crossing method, impacts on trout streams are likely to be the same as those described for the Applicant's preferred route. The Applicant has proposed no in-channel work during peak trout season in each waterbody. Because impacts on these streams would be temporary, and assuming that construction would not occur during designated trout fishing seasons, temporary negligible impacts on the recreational use of trout streams are anticipated during construction of RA-03AM.

Scenic Byways. Three scenic byways crossings would be required during construction of RA-03AM. Assuming that bore or HDD is used for these three crossings to avoid road closures and any direct impacts on the roads, construction activities would not affect the recreational access of the byways. Impacts associated with aesthetic changes along scenic byways are discussed in Section 6.2.3.

Changes to the Recreational Economy

Parks, Forests, and Special Management Areas. During construction for RA-03AM, local recreational users could re-locate to undisturbed areas throughout each of the affected resources, given the overall size of these areas relative to the area affected by the construction footprint (57 acres of land disturbed for construction of 59,071 acres of total land available) (Table 6.5.2-2). Given the temporary nature of the construction activity and the opportunity to recreate in a variety of other places in the county, a loss of recreation-based visitation is not expected to be large enough to measure in terms of recreation spending at the county level. Little to no net change in recreation-based trips would be expected at the county level, resulting in a temporary negligible impact on the recreational economies in each of the counties that would be crossed.

State-Designated Land-Based Trails. Since construction-related impacts for RA-03AM would be confined to specific segments of trails and general access to trails would not be limited, the change in overall recreation-based visitation to trails level would not be large enough to measurably affect the amount of recreation-based spending in the counties crossed. Subsequently, this would result in a temporary and negligible impact on the recreational economy at the county level.

State-Designated Water Trails and Trout Streams. Because of the limited number of crossings with associated impacts for RA-03AM and the temporary nature of the impacts, it is likely that construction-

related impacts on the recreational use of state-designated water trails would not be large enough to measurably affect the amount of recreation-based spending at the county level, resulting in a temporary negligible impact on the recreational economy.

Impacts on trout streams would not occur during designated trout fishing seasons; therefore, temporary negligible impacts on the recreational use of trout streams are expected. Subsequently, temporary negligible impacts on the recreational economy at the county level could be expected.

Scenic Byways. The Applicant would cross each of the scenic byways using a bore or HDD, which would avoid road closures and any direct impacts on the roads. As a result, construction for RA-03AM would not affect the recreational economy of the counties crossed.

Operations Impacts

Limitations to Recreation Access

Parks, Forests, and Special Management Areas. Operation of the RA-03AM pipeline would involve periodic inspection, pipeline maintenance activities, and mowing to maintain appropriate vegetation. Access to parks, forests, and special management areas would not be restricted or limited as a result of maintenance mowing and inspection operation. Although the exact location of aboveground facilities, MLVs, and permanent access roads is unknown, it is unlikely that they would limit recreational access. Therefore, no impacts on recreational use of parks, forests, or special management areas during operation of the pipeline are expected.

State-Designated Land-Based Trails. Access and use of state-designated trails that would be crossed by RA-03AM would not be affected during maintenance mowing and inspection operation activities. Aboveground facilities, MLVs, and permanent access roads would not affect recreation use. Therefore, no impacts on recreational use of land-based trails are expected.

State-Designated Water Trails and Trout Streams. Access and use of state-designated canoe routes and other waterbodies that would be crossed by RA-03AM would not be affected during maintenance mowing and inspection operation activities. Although the exact location of aboveground facilities, MLVs, and permanent access roads is unknown, it is unlikely that they would limit recreational access. Therefore, no impacts on recreational use of state designated water trails or trout streams are expected.

Scenic Byways. Access and use of federally and state-designated scenic highways that would be crossed by RA-03AM would not be affected during maintenance mowing and inspection operation activities. Although the exact location of aboveground facilities, MLVs, and permanent access roads is unknown, it is unlikely that they would limit recreational access. Therefore, no impacts on recreational use of scenic byways are expected.

Changes to the Recreational Economy

Parks, Forests, and Special Management Areas. Because recreational use of forests and special management areas would not be affected during operations for RA-03AM, the recreational economy in each of the counties crossed would not be affected by pipeline operations.

State-Designated Land-Based Trails. Because recreational use of land-based trails would not be affected during operations for RA-03AM, the recreational economy in each of the counties crossed would not be affected by pipeline operations.

State-Designated Water Trails and Trout Streams. Because recreational use of state-designated water trails and trout streams would not be affected during operations for RA-03AM, the recreational economy in each of the affected counties crossed would not be affected by pipeline operations.

Scenic Byways. Because recreational use of scenic byways would not be affected during operation of RA-03AM, the recreational economy in each of the counties crossed would not be affected by pipeline operations.

Route Alternative RA-06

Construction Impacts

Limitations to Recreation Access

Parks, Forests, and Special Management Areas. RA-06 would cross the Chippewa National Forest, George Washington State Forest, Big Fork State Forest, and Fond du Lac State Forest. RA-06 also crosses two lakes, one of which has a public campground. Therefore, it is likely that construction-related impacts could cause a temporary, minor impact on the recreational use of these areas near the route.

Construction in any location would last for several days to several weeks depending on a variety of factors such as land use type, topography, weather, and other environmental conditions; therefore, limited use, access restrictions, and noise and visual disturbance could occur during this timeframe. After this time period, recreational activities on the affected acres could resume as normal. Details on noise and visual disturbance are provided in Sections 6.2.2 and 6.2.3, respectively.

At the county level, the majority of the land disturbed during construction (753 acres) would occur in state forests within Itasca County (Table 6.5.2-3). Based on a review of forest and WMA maps, the disturbed land represents a very small portion (less than one-half of a percent) of the total amount of land that remains available in each forest that would be crossed by the pipeline. In total, approximately 447,000 acres of land within the same forests in Itasca County would remain unaffected and available during construction. This is also true in Cass County (86 acres of 1.6 million total), and Carlton County (37 acres of 64,505 total). Impacts on access to forests are anticipated to be temporary and minor because impacts would be confined to small portions of the total land available for recreation, and any closures of these areas would be limited to during and immediately following construction.

State-Designated Land-Based Trails. RA-06 would cross the Blue Ox State Trail in Beltrami County; the Willard Munger State Trail in Carlton County; and the Taconite State Trail and Pengilly to Goodland State Trail, both located in Itasca County. RA-06 would cross the Willard Munger State Trail two times in Pine County and once in Carlton County. Construction-related activities would temporarily affect public access and use of the trail where it intersects the pipeline for a short time during pipeline installation. The Applicant has proposed to use the bore or open-cut method at trail crossings. If the latter is used, trail use would be suspended for 48 hours during construction and then the trail surface would be restored to allow passage. Noise and visual disturbance may continue to affect the recreational experience in the affected areas during construction; however, restrictions in use would no longer be necessary. Overall, impacts on recreational access to state-designated land-based trails are anticipated to be temporary and negligible because impacts would be confined to the area where the pipeline crosses the trail, and any restricted access at these intersections would be limited to during and immediately following construction.

State-Designated Water Trails and Trout Streams. RA-06 would cross one state-designated canoe and boating trail, the Big Fork River in Itasca County, three times. Canoe and boating trails crossed using HDD would not affect recreation or tourism. Public use and access to the state water trail would be interrupted where the pipeline intersects the river temporarily during installation of the pipeline, resulting in a temporary negligible impact on the overall recreational use of the trail.

Depending on the crossing method, impacts on trout streams are likely to be the same as those described for the Applicant's preferred route. The Applicant has proposed no in-channel work during peak trout season in each waterbody. Because impacts on these streams would be temporary, and assuming that construction would not occur during designated trout fishing seasons, temporary negligible impacts on the recreational use of trout streams are anticipated during construction of RA-06.

Scenic Byways. Three scenic byways crossings would be required during construction of RA-06. Assuming that bore or HDD is used for these three crossings to avoid road closures and any direct impacts on the roads, construction activities would not affect recreational access to the byways. Impacts associated with aesthetic changes along scenic byways are discussed in Section 6.2.3.

Changes to the Recreational Economy

Parks, Forests, and Special Management Areas. During construction for RA-06, local recreational users could re-locate to undisturbed areas throughout each of the affected resources, given the overall size of these areas relative to the area affected by the construction footprint (60 acres of land disturbed for construction of approximately 2.1 million acres of total land available) (Table 6.5.2-3). Given the temporary nature of the construction activity and the opportunity to recreate in a variety of other places with the county, the loss of recreation-based visitation at the county level is not expected to be large enough to measure in terms of recreation-based spending at the county level. Therefore, a temporary negligible impact on the recreational economies in each of the counties crossed would result.

State-Designated Land-Based Trails. Because construction-related impacts for RA-06 would be confined to specific segments of trails and general access to trails would not be limited, the change in overall recreation-based visitation to trails at the county level would not be large enough to measurably affect the amount of recreation-based spending at the county level. Subsequently, this would result in a temporary and negligible impact on the recreational economy at the county level.

State-Designated Water Trails and Trout Streams. Because of the limited number of crossings with associated impacts and the temporary nature of the impacts for RA-06, it is likely that construction-related impacts on the recreational use of state-designated water trails would not be large enough to measurably affect the amount of recreation-based spending at the county level, resulting in a temporary negligible impact on the recreational economy.

Impacts on trout streams would not occur during designated trout fishing seasons; therefore, temporary negligible impacts on the recreational use of trout streams are likely. Subsequently, temporary negligible impacts on the recreational economy at the county level could be expected.

Scenic Byways. The Applicant would cross each of the scenic byways using a bore or HDD, which would avoid road closures and any direct impacts on the roads. As a result, construction would not affect the recreational economy of the affected counties.

Operations Impacts

Limitations to Recreation Access

Parks, Forests, and Special Management Areas. Operation of the RA-06 pipeline would involve periodic inspection, pipeline maintenance activities, and mowing to maintain appropriate vegetation. Access to parks, forests, and special management areas would not be restricted or limited as a result of maintenance mowing and inspection operation. Although the exact location of aboveground facilities, MLVs, and permanent access roads is unknown, it is unlikely that they would limit recreational access. Therefore, no impacts on recreational use of parks, forests, or special management areas during operation of the pipeline are expected.

State-Designated Land-Based Trails. Access and use of state-designated trails that would be crossed by RA-06 would not be affected during maintenance mowing and inspection operation activities. Aboveground facilities, MLVs, and permanent access roads would not affect recreation use. Therefore, no impacts on recreational use of land-based trails are expected.

State-Designated Water Trails and Trout Streams. Access and use of state-designated canoe routes and other waterbodies that would be crossed by RA-06 would not be affected during maintenance mowing and inspection operation activities. Although the exact location of aboveground facilities, MLVs, and permanent access roads is unknown, it is unlikely that they would limit recreational access. Therefore, no impacts on recreational use of state-designated water trails or trout streams are expected.

Scenic Byways. Access and use of federally and state-designated scenic highways that would be crossed by the Applicant's preferred route would not be affected during maintenance mowing and inspection operation activities. Although the exact location of aboveground facilities, MLVs, and permanent access roads is unknown, it is unlikely that they would limit recreational access. Therefore, no impacts on recreational use of scenic byways are expected.

Changes to the Recreational Economy

Parks, Forests, and Special Management Areas. Because recreational use of forests and special management areas would not be affected during operations for RA-06, the recreational economy in each of the counties crossed would not be affected by pipeline operations.

State-Designated Land-Based Trails. Because recreational use of land-based trails would not be affected during operations for RA-06, the recreational economy in each of the counties crossed would not be affected by pipeline operations.

State-Designated Water Trails and Trout Streams. Because recreational use of state-designated water trails and trout streams would not be affected during operations for RA-06, the recreational economy in each of the affected counties crossed would not be affected by pipeline operations.

Scenic Byways. Because recreational use of scenic byways would not be affected during operation of RA-06, the recreational economy in each of the counties crossed would not be affected by pipeline operations.

Route Alternative RA-07

Construction Impacts

Limitations to Recreation Access

Parks, Forests, and Special Management Areas. RA-07 would require the largest acreage for construction work area in state and national forests (1,049 acres), and could temporarily affect the recreational use of two lakes, as well as general recreation that occurs on less developed land in the Bowstring State Forest.

Construction in any location would last for several days to several weeks depending on a variety of factors such as land use type, topography, weather, and other environmental conditions; therefore, limited use, access restrictions, and noise and visual disturbance could occur during this timeframe. After this time period, recreational activities on the affected acres could resume as normal. Details on noise and visual disturbance are provided in Sections 6.2.2 and 6.2.3, respectively.

At the county level, the majority of the land disturbed during construction (855 acres) would occur in forests within Cass County (Table 6.5.2-4). However, a review of forest and WMA maps revealed that the disturbed land represents a very small portion (less than one half of a percent) of the total amount of land that remains available in each forest that would be crossed by the pipeline. In total, there are over 2.1 million acres of land within the same forests in Cass County that would remain unaffected and available during construction. This is also true in Beltrami County (131 acres out of 45,290 total), and Carlton County (63 acres out of 64,505 total). Impacts on access to forests are anticipated to be temporary and minor because impacts would be confined to small portions of the total land available for recreation, and any closures of these areas would be limited to during and immediately following construction.

State-Designated Land-Based Trails. RA-07 would cross the Paul Bunyan State Trail in Beltrami County, the Heartland State Trail in Cass County, and the Taconite State Trail in Itasca County. Construction-related activities would temporarily affect public access and use of the trail where the trail intersects the pipeline for a short time during pipeline installation. The Applicant has proposed to use the bore or open-cut method at trail crossings. If the latter is used, trail use would be suspended for 48 hours during construction and then the trail surface would be restored to allow passage. Noise and visual disturbance may continue to affect the recreational experience in the affected areas during construction; however, restrictions in use would no longer be necessary. Overall, impacts on recreational access to state-designated land-based trails are anticipated to be temporary and negligible because impacts would be confined to the area where the pipeline crosses the trail, and any restricted access at these intersections would be limited to during and immediately following construction.

State-Designated Water Trails and Trout Streams. RA-07 would cross one state-designated canoe and boating trail (the Mississippi River) two times. Canoe and boating trails crossed using HDD would not affect recreational access. Public use and access to the state water trail would be interrupted temporarily where the pipeline crosses the river during installation of the pipeline, resulting in a temporary negligible impact on the overall recreational use of the trail.

Depending on the crossing method, impacts on trout streams are likely to be the same as those described for the Applicant's preferred route. The Applicant has proposed no in-channel work during peak trout season in each waterbody. Because impacts on these streams would be temporary, and

assuming that construction would not occur during designated trout fishing seasons, temporary negligible impacts on the recreational use of trout streams are anticipated during construction of RA-07.

Scenic Byways. Three scenic byways crossings would be required during construction of RA-07. Assuming that bore or HDD is used for these three crossings to avoid road closures and any direct impacts on the roads, construction activities would not affect recreational access to the byways. Impacts associated with aesthetic changes along scenic byways are discussed in Section 6.2.3.

Changes to the Recreational Economy

Parks, Forests, and Special Management Areas. During construction, local recreational users could re-locate to undisturbed areas throughout each of the affected resources, given the overall size of these areas relative to the area affected by the construction footprint (1,049 acres of land disturbed for construction of approximately 2.2 million acres of total land available) (Table 6.5.2-4). Because of the temporary nature of the construction activity and the opportunity to recreate in a variety of other places in the county, the loss of recreation-based visitation would not be large enough to measure in terms of recreation-based spending at the county level. Therefore, construction of RA-07 would result in a temporary negligible impact on the recreational economy in each of the counties crossed.

State-Designated Land-Based Trails. Because construction-related impacts would be confined to specific segments of trails and general access to trails would not be limited, the change in overall recreation-based visitation to trails at the county level would not be large enough to measurably affect the amount of recreation-based spending at the county level. Subsequently, this would result in a temporary negligible impact on the recreational economy at the county level.

State-Designated Water Trails and Trout Streams. Because of the limited number of crossings with associated impacts for RA-07 and the temporary nature of the impacts, it is likely that construction-related impacts on the recreational use of state-designated water trails would not be large enough to measurably affect the amount of recreation-based spending at the county level, resulting in a temporary negligible impact on the recreational economy.

Impacts on trout streams would not occur during designated trout fishing seasons; therefore, temporary negligible impacts on the recreational use of trout streams are expected. Subsequently, temporary negligible impacts on the recreational economy at the county level could be expected.

Scenic Byways. The Applicant would cross each of the scenic byways using a bore or HDD, which would avoid road closures and any direct impacts on the roads. As a result, construction would not affect the recreational economy of the counties crossed.

Operations Impacts

Limitations to Recreation Access

Parks, Forests, and Special Management Areas. Operation of the RA-07 pipeline would involve periodic inspection, pipeline maintenance activities, and mowing to maintain appropriate vegetation. Access to parks, forests, and special management areas would not be restricted or limited as a result of maintenance mowing and inspection operation. Although the exact location of aboveground facilities, MLVs, and permanent access roads is unknown, it is unlikely that they would limit recreational access. Therefore, no impacts on recreational use of parks, forests, or special management areas during operation of the pipeline are expected.

State-Designated Land-Based Trails. Access and use of state-designated trails that would be crossed by RA-07 would not be affected during maintenance mowing and inspection operation activities. Aboveground facilities, MLVs, and permanent access roads would not affect recreation use. Therefore, no impacts on recreational use of land-based trails are expected.

State-Designated Water Trails and Trout Streams. Access and use of state-designated canoe routes and other waterbodies that would be crossed by RA-07 would not be affected during maintenance mowing and inspection operation activities. Although the exact location of aboveground facilities, MLVs, and permanent access roads is unknown, it is unlikely that they would limit recreational access. Therefore, no impacts on recreational use of state designated water trails and trout streams are expected.

Scenic Byways. Access and use of federally and state-designated scenic highways that would be crossed by the Applicant's preferred route would not be affected during maintenance mowing and inspection operation activities. Although the exact location of aboveground facilities, MLVs, and permanent access roads is unknown, it is unlikely that they would limit recreational access. Therefore, no impacts on recreational use of scenic byways are expected.

Changes to the Recreational Economy

Parks, Forests, and Special Management Areas. Because recreational use of forests and special management areas would not be affected during operations for RA-07, the recreational economy in each of the counties crossed would not be affected by pipeline operations.

State-Designated Land-Based Trails. Because recreational use of land-based trails would not be affected during operations for RA-07, the recreational economy in each of the counties crossed would not be affected by pipeline operations.

State-Designated Water Trails and Trout Streams. Because recreational use of state-designated water trails and trout streams would not be affected during operations for RA-07, the recreational economy in each of the affected counties crossed would not be affected by pipeline operations.

Scenic Byways. Because recreational use of scenic byways would not be affected during operation of RA-07, the recreational economy in each of the counties crossed would not be affected by pipeline operations.

Route Alternative RA-08

Construction Impacts

Limitations to Recreation Access

Parks, Forests, and Special Management Areas. RA-08 could temporarily affect the recreational use of two lakes, as well as general recreation that occurs on less developed land in the Bowstring State Forest. The route also crosses through the Chippewa National Forest, as well as six other state forests. It is likely that construction-related impacts could cause a temporary minor impact on the recreational use of these areas along RA-08.

Construction in any location would last for several days to several weeks depending on a variety of factors such as land use type, topography, weather, and other environmental conditions; therefore, limited use, access restrictions, and noise and visual disturbance could occur during this timeframe.

After this time period, recreational activities on the affected acres could resume as normal. Details on noise and visual disturbance are provided in Sections 6.2.2 and 6.2.3, respectively.

At the county level, the majority of the land disturbed during construction (510 acres) would occur in forests within Cass County (Table 6.5.2-5). A review of forest and WMA maps revealed that the disturbed land represents a very small portion (less than one-half of a percent) of the total amount of land that remains available in each forest that would be crossed by the pipeline. In total, over 2.1 million acres of land within the same forests in Cass County would remain unaffected and available during construction. This is also true in Beltrami County (72 acres of 45,339 total), Aitkin County (38 acres of 238,954 total), Itasca County (7 acres of 909 total) and Carlton County (36 acres of 64,505 total). Impacts on access to forests are anticipated to be temporary and minor because impacts would be confined to small portions of the total land available for recreation, and any closures of these areas would be limited to during and immediately following construction.

State-Designated Land-Based Trails. RA-08 would cross the Paul Bunyan State Trail in Beltrami County, the Heartland State Trail in Cass County, and the Taconite State Trail in Itasca County. Construction-related activities would temporarily affect public access and use of the trail for a short time during pipeline installation. The Applicant has proposed to use the bore or open-cut method at trail crossings. If the latter is used, trail use would be suspended for 48 hours during construction and then the trail surface would be restored to allow passage. Noise and visual disturbance may continue to affect the recreational experience in the affected areas during construction; however, restrictions in use would no longer be necessary. Overall, impacts on recreational access to state-designated land-based trails are anticipated to be temporary and negligible because impacts would be confined to the area where the pipeline crosses the trail, and any restricted access at these intersections would be limited to during and immediately following construction.

State-Designated Water Trails and Trout Streams. RA-08 would cross one state-designated canoe and boating trail (the Mississippi River) three times. Canoe and boating trails crossed using HDD would not affect recreational access. Public use and access to the state water trail would be interrupted temporarily where the pipeline intersects the trail during installation of the pipeline, resulting in a temporary negligible impact on the overall recreational use of the trail.

Depending on the crossing method, impacts on trout streams are likely to be the same as those described for the Applicant's preferred route. The Applicant has proposed no in-channel work during peak trout season in each waterbody. Because impacts on these streams would be temporary, and assuming that construction would not occur during designated trout fishing seasons, temporary negligible impacts on the recreational use of trout streams are anticipated during construction of RA-08.

Scenic Byways. Three scenic byways crossings would be required during construction of RA-08. Assuming that bore or HDD is used for these three crossings to avoid road closures and any direct impacts on the roads, construction activities would not disrupt use of the byways. Impacts associated with aesthetic changes along scenic byways are discussed in Section 6.2.3.

Changes to the Recreational Economy

Parks, Forests, and Special Management Areas. During construction of RA-08, local recreational users could re-locate to undisturbed areas throughout each of the affected resources, given the overall size of these areas relative to the area affected by the construction footprint (663 acres of land disturbed for construction of approximately 2.5 million acres of total land available) (Table 6.5.2-5). Given the

temporary nature of the construction activity and the opportunity to recreate in a variety of other places with the county, the loss of recreation-based visitation at the county level is not expected to be large enough to measure in terms of tourism dollars. There would likely be little to no net change in recreation-based trips at the county level, which would result in a temporary negligible impact on the recreational economy in each of the counties crossed.

State-Designated Land-Based Trails. Because construction-related impacts for RA-08 would be confined to specific segments of trails and general access to trails would not be limited, the change in overall recreation-based visitation to trails at the county level would not be large enough to measurably affect the amount of recreation-based spending at the county level. Subsequently, this would result in a temporary negligible impact on the recreational economy at the county level.

State-Designated Water Trails and Trout Streams. Because of the limited number of crossings with associated impacts for RA-08 and the temporary nature of the impacts, it is likely that construction-related impacts on the recreational use of state-designated water trails would not be large enough to measurably affect the amount of recreation-based spending at the county level, resulting in a temporary negligible impact on the recreational economy.

Impacts on trout streams would not occur during designated trout fishing seasons; therefore, temporary negligible impacts on the recreational use of trout streams are expected. Subsequently, temporary negligible impacts on the recreational economy at the county level could be expected.

Scenic Byways. The Applicant would cross each of the scenic byways using a bore or HDD, which would avoid road closures and any direct impacts on the roads. As a result, construction would not affect the recreational economy of the counties crossed.

Operations Impacts

Limitations to Recreation Access

Parks, Forests, and Special Management Areas. Operation of the RA-08 pipeline would involve periodic inspection, pipeline maintenance activities, and mowing to maintain appropriate vegetation. Access to parks, forests, and special management areas would not be restricted or limited as a result of maintenance mowing and inspection operation. Although the exact location of aboveground facilities, MLVs, and permanent access roads is unknown, it is unlikely that they would limit recreational access. Therefore, no impacts on recreational use of parks, forests, or special management areas during operation of the pipeline are expected.

State-Designated Land-Based Trails. Access and use of state-designated trails that would be crossed by RA-08 would not be affected during maintenance mowing and inspection operation activities. Aboveground facilities, MLVs, and permanent access roads would not affect recreation use. Therefore, no impacts on recreational use of land-based trails are expected.

State-Designated Water Trails and Trout Streams. Access and use of state-designated canoe routes and other waterbodies that would be crossed by RA-08 would not be affected during maintenance mowing and inspection operation activities. Although the exact location of aboveground facilities, MLVs, and permanent access roads is unknown, it is unlikely that they would limit recreational access. Therefore, no impacts on recreational use of state designated water trails and trout streams are expected.

Scenic Byways. Access and use of federally and state-designated scenic highways that would be crossed by RA-08 would not be affected during maintenance mowing and inspection operation activities. Although the exact location of aboveground facilities, MLVs, and permanent access roads is unknown, it is unlikely that they would limit recreational access. Therefore, no impacts on recreational use of scenic byways are expected.

Changes to the Recreational Economy

Parks, Forests, and Special Management Areas. Because recreational use of forests and special management areas would not be affected during operations for RA-08, the recreational economy in each of the counties crossed would not be affected by pipeline operations.

State-Designated Land-Based Trails. Because recreational use of land-based trails would not be affected during operations for RA-08, the recreational economy in each of the counties crossed would not be affected by pipeline operations.

State-Designated Water Trails and Trout Streams. Because recreational use of state-designated water trails and trout streams would not be affected during operations for RA-08, the recreational economy in each of the affected counties crossed would not be affected by pipeline operations.

Scenic Byways. Because recreational use of scenic byways would not be affected during operation of RA-08, the recreational economy in each of the counties crossed would not be affected by pipeline operations.

6.5.2.4 Summary and Mitigation

6.5.2.4.1 Summary

Table 6.5.2-6 presents the potential impacts from construction and operation of the Applicant's preferred route and the route alternatives on access to recreational resources and subsequent impacts on recreational economies at the county level. The results show that impacts on access to recreational resources for the Applicant's preferred route and all of the route alternatives would range from no impact to negligible or minor temporary impacts for construction and no impacts during operations. Similarly, potential effects on recreational spending and the regional economies of the counties through which the routes pass were found to be temporary and negligible or no impact during construction and nonexistent during operations.

The low level of impact occurs primarily for two reasons. The routes through forests and special management areas do not intersect any developed recreational sites; therefore, the only limited access to the forest or managed area would be at the actual construction work site. This limitation represents a small portion (less than one-half of a percent) of the overall land designated for recreational use in most affected areas. At linear recreation resources (e.g., waterways and trails), only a short portion of the waterway or trail would be restricted from temporary use where the pipeline crosses the trail, and the restriction would be limited to the short construction period.

Although the Applicant's preferred route and all of the route alternatives would experience negligible or no impacts, the geographic extent of the affected area within recreational lands differs among the route options. RA-07 would affect the greatest amount of land available for recreation in forests or special management areas (1,049 acres), while RA-03AM would affect the least (57 acres). The Applicant's preferred route would affect 439 acres.

Except for RA-03AM, all proposed routes each would cross three state-designated multi-use trails; RA-03AM would cross only one (three times). None of the route alternatives would cross hunter walking trails, but the Applicant's preferred route would cross one trail two times. RA-03AM would cross the most amount of snowmobile trails (16), whereas the Applicant's preferred route would cross the least (12). RA-03AM would cross the most amount of state-designated water trails (six). RA-06, RA-07, and RA-08 each would cross one water trail multiple times. RA-03AM would cross the most trout streams (nine), whereas RA-08 would cross the fewest (four); and the Applicant's preferred route would cross six. Based on the crossing methods proposed by the Applicant and the limited number of crossings, impacts on the recreational use of these trails and waterbodies are likely to be temporary and negligible. Although the crossing methods have not been identified for the route alternatives, construction impacts in recreation areas would be similar to those described for the Applicant's preferred route (negligible), with a corresponding negligible impact on the recreational economies of the counties crossed. Construction-related impacts are not expected to result in a measurable impact on overall visitation to trails and waterbodies at the county level, thereby resulting in a negligible impact on the amount of recreation-based spending at the county level.

Construction methods proposed by the Applicant for the Applicant's preferred route and route alternatives would not disrupt use of scenic byways and therefore would not affect their users or the recreational economies of the counties crossed. Operation of the pipeline would not cause additional impacts on land-based trails, water trails, trout streams, or byways and consequently would not affect the recreational economies in the counties crossed. For all alternatives, no impacts on recreational use or the recreational economy in the counties crossed would occur during operations.

6.5.2.4.2 Mitigation

Based on the limited impacts and implementation of Applicant-proposed measures to reduce impacts on recreation use, no mitigation measures have been identified to further reduce potential impacts on recreational access or economies.

Table 6.5.2-6. Summary of Potential Impacts on Recreation and Tourism for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Limited recreation access to parks, forests and special management areas during construction	Temporary/minor impacts • 439 acres	Temporary/minor impacts • 57 acres	Temporary/minor impacts • 875 acres	Temporary/minor impacts • 1,049 acres	Temporary/minor impacts • 663 acres
Limited recreation access to state-designated trails and trout streams during construction	Temporary/negligible impacts • 0.8 mile of snowmobile/ATV trail crossings • 4 land trail crossings • 1 water trail crossing • 6 trout stream crossings No impact due to crossing methods • 4 water trails	Temporary/negligible impacts • 5.6 miles of snowmobile/ATV trail crossings • 3 land trail crossings • 6 water trail crossings • 9 trout stream crossings	Temporary/negligible impacts • 0.7 mile of snowmobile/ATV trail crossings • 4 land trail crossings • 1 water trail crossing • 8 trout stream crossings	Temporary/negligible impacts • 2.6 miles of snowmobile/ATV trail crossings • 3 land trail crossings • 3 water trail crossings • 6 trout stream crossings	Temporary/negligible impacts • 2.9 miles of snowmobile/ATV trail crossings • 3 land trail crossings • 3 water trail crossings • 4 trout stream crossings
Limited recreation access to scenic byways	No impact	No impact *(assuming bore or HDD crossing method used)*	No impact *(assuming bore or HDD crossing method used)*	No impact *(assuming bore or HDD crossing method used)*	No impact *(assuming bore or HDD crossing method used)*
Changes to the recreational economy during construction	Temporary/no impact to negligible impacts	Temporary/ no impact to negligible impacts	Temporary/ no impact to negligible impacts	Temporary/ no impact to negligible impacts	Temporary/ no impact to negligible impacts
Operations Impacts					
Limitations to recreation access and changes to the recreational economy during operations	No impact	No impact	No impact	No impact	No impact

6.5.2.5 References

U.S. Geological Survey, Gap Analysis Program (USGS GAP). 2016. Protected Areas Database of the United States (PAD-US). Version 1.4 Combined Feature Class. May.

6.5.3 Population

Population in the vicinity of the Applicant's preferred route and route alternatives may be affected by construction and operation of new facilities. The population analysis focuses on how populations may be affected by the direct increase in Project-related workers. It does not consider indirect population changes from increased local economic activities. Such indirect changes in growth are expected to be limited because the Project-related workforce is transitory. The analysis of effects on local populations includes changes in local workforces and disruption to local populations by the following potential impacts:

- Increases in local workforces from the influx of non-local workers temporarily or permanently moving to an area to support construction or operations. Changes in workforce population may affect demand on emergency services, increase traffic congestion from commuting, and the availability of housing.
- Disruptions to high-population areas and other populated areas in proximity to construction work areas from noise, dust, and vibrations from construction and operations equipment; disruptions to traffic and services such as water and gas during construction, and permanent displacement of residences and structures during operations.

Potential impacts on populations from pipeline crude oil releases are discussed in Chapter 10.

This section first describes the existing populations along the Applicant's preferred route and the route alternatives within an area where populations would be most directly affected by construction and operation of the pipeline (the ROI). The potential Project-related impacts of construction and operation on those populations are considered next. Potential impacts for each route alternative (RA-03AM, RA-06, RA-07, and RA-08) also are assessed and then compared to each other and to the Applicant's preferred route between Clearbrook and Carlton. A summary and comparison of the impacts are included at the end of the section.

6.5.3.1 Regulatory Context and Methodology

6.5.3.1.1 Regulatory Context

In Minnesota, the Commission must consider the existence and density of populated areas when routing a crude oil pipeline in the state (Minn. R. 7852.1900, Subp. 3[a]). No specific standards related to the proximity of populated areas to pipeline facilities were identified other than compliance with local planning and zoning ordinances. See Section 6.2.1 for a discussion of planning and zoning.

6.5.3.1.2 Methodology

The analysis for impacts on population is broken into two components: impacts associated with the non-local workforce re-locating to communities near the Project, and impacts associated with construction and operation of the pipeline near densely populated areas.

The additional pipeline workforce may affect communities during construction or operation if existing infrastructure and services are not adequate. Additionally, routing a pipeline through population centers or areas of higher population density is difficult because these areas have more infrastructure in place such as roads, structures, and utilities. A greater number of people potentially would be affected by noise, dust, population increase, and traffic during construction in these areas, which may increase the

magnitude and duration of impacts compared to less populated areas. Associated impacts related to planning and zoning, noise, housing, transportation, and air quality are evaluated in Sections 6.2.1, 6.2.2, 6.2.4, 6.2.5, and 6.3.7, respectively.

Non-Local Workforce

Net change to local populations from worker influx were assessed by:

- Gathering current population statistics from the U.S. Census Bureau for the counties that would be crossed by the Applicant's preferred route and the route alternatives;
- Estimating the total population increase that could result from workers moving to the counties with their families;
- Identifying the areas where the total population increase in a county could be 10 percent or more, and the expected impacts of the increase; and
- Qualitatively assessing impacts related to population increases based on the percent and duration of the change.

The ROI for assessment of non-local workforce effects is the counties that are crossed by the Applicant's preferred route and the route alternatives. County-level data provide a summary of populations potentially affected by the influx of the construction workforce. Workers re-locating to the area would commute to work from various communities near, but not necessarily along, the pipeline route. The counties crossed by the pipeline reflect a reasonable estimate for where the workers are likely to re-locate and the level of current population that would be affected.

Populated Areas

Impacts on high-population areas and other populated areas that may occur from construction and operation of the Project were assessed by:

- Overlaying the Applicant's preferred route and the route alternatives onto a map of high consequence areas that includes highly populated areas and other populated areas;
- Recording the total miles of populated areas crossed by the centerlines of each route and the total area of populated areas that would fall within 1,250 feet of the construction work area;
- Identifying all populated areas within the ROI; and
- Assessing the nature, extent, duration, and magnitude of impacts on populated areas and any measures to minimize potential impacts.

The ROI for the review of populated areas consists of the area within 1,250 feet of the construction footprint for the Applicant's preferred route and the route alternatives. For this analysis, "populated areas, as defined by the U.S. Census Bureau, consist of incorporated areas or legal entities, and census-designated places, which are statistical entities."

Data for populated areas within 1,250 feet of the routes were derived from the U.S. Census Bureau's Master Address File / Topologically Integrated Geographic Encoding and Referencing Database (U.S. Census Bureau 2016). Impacts on these areas were quantified in terms of the number of populated areas crossed, the extent of the pipeline crossing in these populated areas (i.e., miles crossed by the

centerline), and the populated area (acreage) within 1,250 feet of construction. These metrics are intended to capture the number of communities most affected and the degree to which each community would be affected. The miles of an area crossed by the centerline quantifies the relative extent of impact but does not reflect impacts on locations adjacent to the pipeline. Using a 1,250-foot buffer accounts for areas that may be affected by noise, dust, vibration, and increased traffic from construction (typical construction noise would most likely be within acceptable levels at a distance of 1,250 feet, as discussed in Section 6.2.2).

6.5.3.2 Existing Conditions

Existing conditions are described for the entire length of the Applicant's preferred route in Minnesota. RA-03AM, RA-06, RA-07 and RA-08 represent alternative routes to the Applicant's preferred route between Clearbrook and Carlton. Included in the description of existing conditions for the Applicant's preferred route is a subset of data for the segment from Clearbrook to Carlton to allow for direct comparison of the route alternatives to the Applicant's preferred route.

Populated areas and population density within those areas for the counties crossed by the Applicant's preferred route and route alternatives are shown in Figure 6.5.3-1.

6.5.3.2.1 Applicant's Preferred Route

The Applicant's preferred route would cross 12 counties in Minnesota. County population estimates for 2010 and 2015, the percentage population change, and the population density are presented in Appendix N. As described in Section 5.3.3.2.1, the population density along the Applicant's preferred route is low and generally similar to the statewide average.

Non-Local Workforce

The Applicant's preferred route would cross 12 counties in Minnesota. Of these, 7 counties (Kittson, Marshall, Pennington, Red Lake, Polk, Clearwater, and Carlton) would be crossed by all 5 route options (Figure 6.5.3-1). Between Clearbrook and Carlton, the Applicant's preferred route would cross seven counties (Clearwater, Hubbard, Wadena, Cass, Crow Wing, Aitkin, and Carlton). County population estimates for 2010 and 2015, the percentage population change, and the population density for all counties crossed by the Applicant's preferred route or the route alternatives are presented in Appendix N.

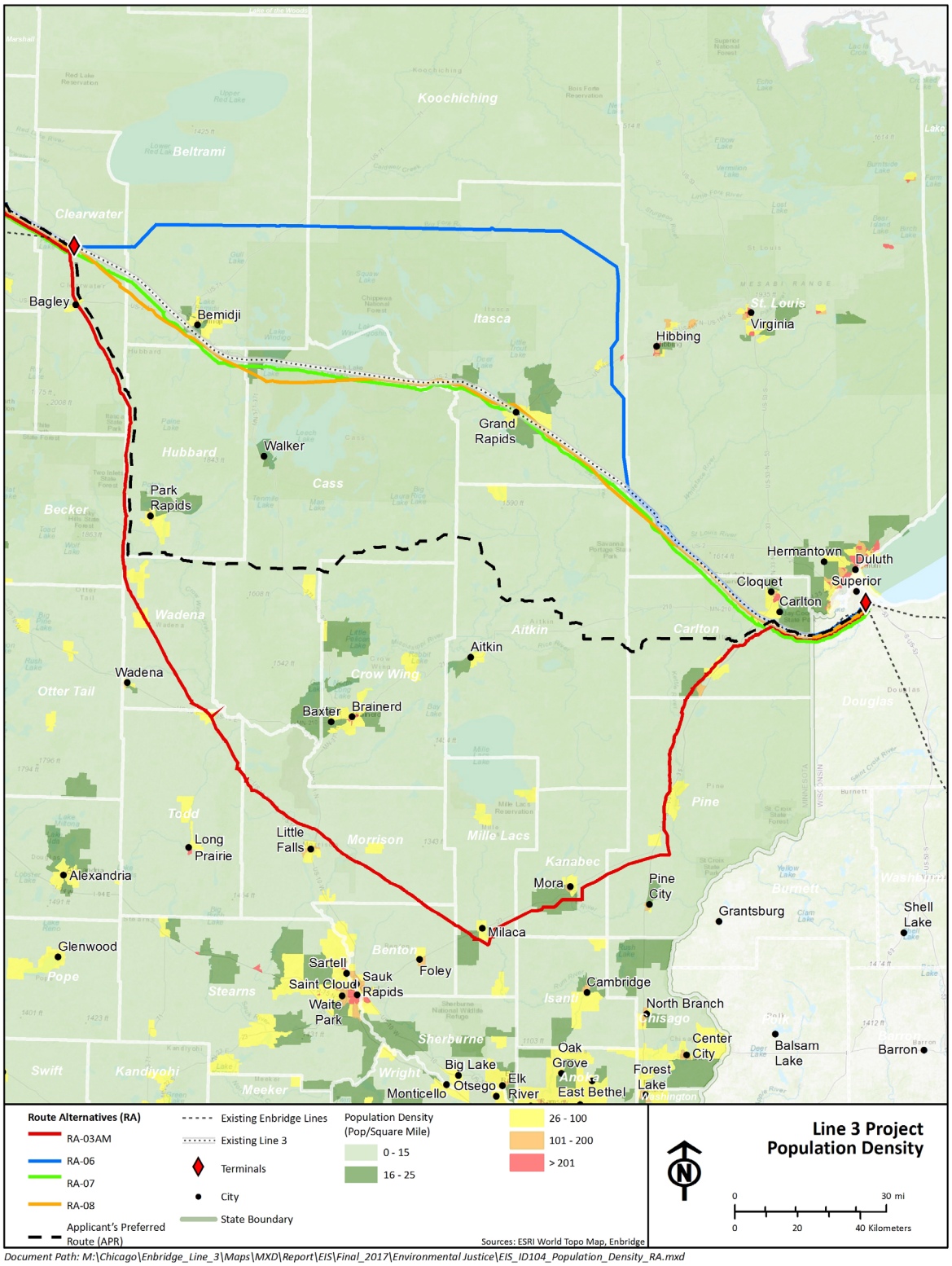

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Figure 6.5.3-1. Population Density for the Counties Crossed by the Applicant's Preferred Route and the Route Alternatives

Populated Areas

Table 6.5.3-1 lists the populated areas that occur along the Applicant's preferred route (divided into three segments to isolate the Clearbrook-to-Carlton segment). For each populated area, the table also gives the population of the local populated area, the length of the route centerline that passes through the populated area, and the total acreage of populated areas that would be located within 1,250 feet of the construction footprint. Across the entire route, 13 populated areas are located along the Applicant's preferred route; within these 13 populated areas 4,104 people are living within 1,250 feet of the construction work area. In the section of the Applicant's preferred route from Clearbrook to Carlton, five populated areas with 1,204 people are within 1,250 feet of the construction work area.

Table 6.5.3-1. Populated Areas near the Applicant's Preferred Route

Populated Area	Population[a]	Miles of Populated Areas Crossed by Pipeline Centerline	Populated Areas within 1,250 Feet of Construction Work Area (acres)
North Dakota Border to Clearbrook			
Clearbrook	518	0.0	33
Gonvick	282	0.0	0
Gully	66	0.0	12
Oklee	435	0.8	215
Plummer	292	2.0	605
Trail	46	0.7	217
Subtotal	***1,639***	***3.5***	***1,082***
Clearbrook to Carlton			
Clearbrook	518	0.0	38
Mahtowa	370	2.9	792
Mule Lake	--	0.0	3
Outing	--	0.0	41
Waukenabo	316	0.0	2
Subtotal	***1,204***	***2.9***	***876***
Carlton to Wisconsin Border			
Carlton	862	0.0	84
Chub Lake	--	0.0	6
Wrenshall	399	0.1	79
Subtotal	***1,261***	***0.1***	***170***
TOTAL	**4,104**	**6.5**	**2,127**

[a] Source: U.S. Census Bureau 2010.

"--" = These areas are not census-designated areas; therefore, population information is not available.

6.5.3.2.2 Route Alternatives

Route Alternative RA-03AM

Non-Local Workforce

Of the 10 counties (Clearwater, Hubbard, Wadena, Todd, Morrison, Benton, Mille Lacs, Kanabec, Pine, and Carlton) through which RA-03AM passes, Benton County has the highest population density, at 97 people per square mile. The lowest population density is 9 people per square mile in Clearwater County. For context, the overall population density of the State of Minnesota is 69 people per square mile.

Population growth between 2010 and 2015 in the affected Minnesota counties was highest in Benton County, which grew 3 percent. Todd County's population decreased 3 percent in the same timeframe, which was the largest decrease of the affected counties. All of the counties saw a lower percentage population change than the 4-percent increase in population for the State of Minnesota.

Populated Areas

Table 6.5.3-2 presents the population of populated areas near RA-03AM, the miles of populated areas that would be crossed by the pipeline centerline, and the total acreage of populated areas that would be located within 1,250 feet of the construction footprint. These populated areas also are labeled in Figure 6.5.3-1.

Table 6.5.3-2. Populated Areas near Route Alternative RA-03AM

Populated Area	Population[a]	Miles of Populated Areas Crossed by Pipeline Centerline	Populated Areas within 1,250 Feet of Construction Work Area (acres)
Bock	106	0.0	59
Brook Park	522	1.1	315
Finlayson	456	0.5	192
Hinckley	1,800	2.0	526
Mahtowa	370	6.5	1,716
Milaca	2,946	0.5	199
Mora	3,571	0.7	284
Ogilvie	369	1.3	341
Quamba	123	0.9	280
Randall	650	0.0	7
Staples	2,981	1.4	476
Sturgeon Lake	439	0.0	35
TOTAL	**14,333**	**14.9**	**4,429**

[a] Source: U.S. Census Bureau 2010.

Route Alternative RA-06

Non-Local Workforce

RA-06 would pass through six counties (Clearwater, Beltrami, Itasca, Aitkin, St. Louis, and Carlton). Of these, the county with the greatest existing population density is Carlton County, at 41 people per square mile. The lowest population density is 9 people per square mile in Aitkin County. This compares to a statewide population density of 69 people per square mile.

Population growth between 2010 and 2015 in the affected Minnesota counties was highest in Beltrami County, which grew 3 percent. Aitkin County experienced a decline in population of 3 percent in the same timeframe, which was the lowest. The population of the State of Minnesota as a whole increased by 4 percent for the same time period.

Populated Areas

Table 6.5.3-3 presents the population of populated areas near RA-06, the miles of populated areas that would be crossed by the pipeline centerline, and the total acreage of populated areas that would be located within 1,250 feet of the construction footprint.

Table 6.5.3-3. Populated Areas near Route Alternative RA-06

Populated Area	Population[a]	Miles of Populated Areas Crossed by Pipeline Centerline	Populated Areas within 1,250 Feet of Construction Work Area (acres)
Big Lake	10,060	0.9	284
Bigfork	446	0.0	16
Cloquet	12,124	0.1	42
Floodwood	528	0.4	167
Nashwauk	938	2.0	619
TOTAL	**24,096**	**3.4**	**1,127**

[a] Source: U.S. Census Bureau 2010.

Route Alternative RA-07

Non-Local Workforce

RA-07 would pass through eight counties (Clearwater, Beltrami, Hubbard, Cass, Itasca, Aitkin, St. Louis, and Carlton). The county with the greatest existing population density is Carlton County, at 41 people per square mile. The lowest population density is 9 people per square mile in Aitkin County. This compares to a statewide population density of 69 people per square mile.

Population growth between 2010 and 2015 in the affected Minnesota counties was highest in Beltrami County, which grew 3 percent. Aitkin County experienced a decline in population of 3 percent in the same timeframe, which was the lowest of the counties. The overall population of the State of Minnesota increased by 4 percent for the same time period.

Populated Areas

Table 6.5.3-4 presents the population of populated areas near RA-07, the miles of populated areas that would be crossed by the pipeline centerline, and the total acreage of populated areas that would be located within 1,250 feet of the construction footprint.

Table 6.5.3-4. Populated Areas near Route Alternative RA-07

Populated Area	Population[a]	Miles of Populated Areas Crossed by Pipeline Centerline	Populated Areas within 1,250 Feet of Construction Work Area (acres)
Ball Club	342	1.8	492
Bemidji	13,431	4.7	1,749
Bena	116	0.8	250
Big Lake	10,060	0.9	304
Blackberry	--	1.6	402
Cass Lake	770	1.6	566
Chub Lake	--	0.0	2
Cloquet	12,124	0.1	41
Cohasset	2,698	3.4	1,126
Coleraine	1,970	3.3	1,051
Deer River	930	0.0	9
Floodwood	528	0.4	173
Grand Rapids	10,869	4.6	1,509
Grant Creek	--	0.0	18
La Prairie	665	0.0	17
Leonard	41	0.2	54
Midge Lake	--	0.0	15
Pinewood	--	0.0	39
Portage Lake	--	0.0	18
Rosby	--	0.6	155
Warba	181	1.0	344
Wilton	204	1.6	561
Zemple	93	1.1	311
TOTAL	**55,022**	**27.7**	**9,205**

[a] Source: U.S. Census Bureau 2010.

"--" = These areas are not census-designated areas; therefore, population information is not available.

Route Alternative RA-08

Non-Local Workforce

RA-08 would pass through eight counties (Clearwater, Beltrami, Hubbard, Cass, Itasca, Aitkin, St. Louis, and Carlton). The county with the greatest existing population density is Carlton County, at 41 people per square mile. The lowest population density is 9 people per square mile in Aitkin County. This compares to a statewide population density of 69 people per square mile.

Population growth between 2010 and 2015 in the affected Minnesota counties was highest in Beltrami County, which grew 3 percent. Aitkin County experienced the lowest population growth and declined 3 percent in the same timeframe. These growth rates compare to an overall 4-percent increase in population for the State of Minnesota for the same time period.

Populated Areas

Table 6.5.3-5 presents the population of populated areas near RA-08, the miles of populated areas that would be crossed by the pipeline centerline, and the total acreage of populated areas that would be located within 1,250 feet of the construction footprint.

Table 6.5.3-5. Populated Areas near Route Alternative RA-08

Populated Area	Population[a]	Miles of Populated Areas Crossed by Pipeline Centerline	Populated Areas within 1,250 Feet of Construction Work Area (acres)
Ball Club	342	1.6	456
Bemidji	13,431	4.4	1,453
Bena	116	0.0	37
Big Lake	10,060	1.0	299
Blackberry	--	0.4	165
Cloquet	12,124	0.1	37
Cohasset	2,698	4.3	1,370
Coleraine	1,970	2.0	626
Floodwood	528	0.3	132
Grand Rapids	10,869	4.5	1,431
La Prairie	665	0.7	224
Rosby	--	0.5	159
Warba	181	0.8	249
Zemple	93	1.3	370
TOTAL	**53,077**	**21.9**	**7,008**

[a] Source: U.S. Census Bureau 2010.

"--" = These areas are not census-designated areas; therefore, population information is not available.

6.5.3.3 Impact Assessment

Impacts on populations may result from an influx of workers from outside the ROI during the anticipated 12-month construction period or operation. The additional population may increase the demand for local amenities, services, infrastructure, and temporary housing and hospitality (e.g., restaurants). Areas with greater populations and amenities are able to absorb the influx of temporary workers more readily than areas with lower populations and fewer amenities (e.g., hotels, restaurants).

Conversely, the more populated the area, the more people who may be disrupted by construction and the greater the potential impact (e.g., greater density of roads, residents, and businesses). Services may be disrupted when pipeline construction crosses underground utilities or roads. Noise, dust, and vibrations caused by construction equipment may disturb more people in nearby homes and businesses. Following construction land within the permanent right-of-way easement would be restricted from further development for certain uses.

6.5.3.3.1 Applicant's Preferred Route (in Minnesota)

Construction Impacts

Non-Local Workforce

The Applicant provided an estimate that construction would occur simultaneously over seven separate construction spreads for the portion of the overall Line 3 Project located in Minnesota. Each construction spread would require approximately 600 workers, resulting in a total maximum workforce of 4,200 workers to construct the entire Project. Based on the length of the Applicant's preferred route, each spread would cover approximately 49 miles. While it is likely that Enbridge would use some local workers, as a worst case, it was assumed that all workers would be non-local and would need to temporarily re-locate to the area during construction. Additionally, some workers could be accompanied by their families. According to the U.S. Census Bureau (2014), the average number of persons per household in the United States is approximately three. If each of the non-local workers brought their families, the increase in local population could be approximately 12,600 people. This represents a 5-percent increase to the current population of all counties that would be crossed by the Applicant's preferred route. Given the transitory nature of the Project and the limited time period of construction, however, it is unlikely that all workers would re-locate with their families so the total temporary change in population would be less than 5 percent.

In the event that two construction spreads are adjacent to each other during construction, a maximum of 1,200 workers could be present in a county at a given time. In the largest county crossed by the Applicant's preferred route (Crow Wing County), it would represent a 2-percent increase in population. In the smallest county crossed by the route (Red Lake County), this would represent 30 percent of the county's total population. Additionally, Kittson County (27 percent), Marshall County (13 percent), and Clearwater County (14 percent) all would experience population increases over 10 percent of their current population. For these counties, additional strain may be expected in a worst-case scenario. Added population would create more traffic on roadways and emergency services, as discussed in Section 6.2.5. As discussed in Section 6.2.4, the total housing available is expected to be adequate. While adequate housing may be available across the ROI and the potential population increase would be less than 10 percent for most counties, 4 of the 12 counties (Red Lake, Kittson, Marshall, and Clearwater) could experience more than a 10-percent increase in population if all workers from two construction spreads were present in the county at the same time. This could result in congestion on the roads and within the service industry area (e.g., restaurants, gas stations). However, the worst-case

scenario of two construction spreads operating close to each other would be temporary as pipeline construction moves along the route, and any local impacts would diminish. Overall, impacts related to the influx of non-local workforce are expected to be minor and temporary, but could be major and temporary for those counties with low population density if a large number of workers bring their families and if construction spreads operate in proximity to each other.

Populated Areas

A total of 13 populated areas would be proximal to the Applicant's preferred route. These areas have a total population of 3,586 people. A total of approximately 6 miles of populated areas would be crossed by the Applicant's preferred route, and a total of 2,127 acres of populated areas would be within the ROI in Minnesota.

For the segment of the Applicant's preferred route between Clearbrook and Carlton, five populated areas would be proximal to the construction area, with a total population of 1,204 people. A total of 3 miles of populated areas would be crossed by the centerline in this segment, and 876 acres of populated areas would be within the ROI.

Impacts on the populated areas within the ROI during construction would be caused by noise, dust, and vibrations from equipment; displaced residences and structures; the potential for traffic disruptions; and the potential for disrupted services such as water, electricity, or gas during construction. Populated areas are more likely to be affected by these impacts due to the higher density of people, structures, and infrastructure.

As described in Section 6.2.2, calculations show that typical construction noise attenuates to compliance levels with the daytime noise standards at 1,250 feet from the noise source. If a large portion of land that falls within a populated area is within this distance, there is a greater likelihood of impacts, including the number of people who would experience noise at levels that exceed the daytime standard. Applicant-proposed measures to limit noise during construction include limiting construction to daylight hours, maintaining equipment in good working order, limiting transportation to areas of active construction, and using manufacturer-supplied silencers when available. Detailed noise and vibration analyses are given in Section 6.2.2, as are additional recommendations that should be implemented to further reduce noise or vibration impacts.

During construction, increased dust can be harmful or bothersome to people located near work areas. Dust from construction is discussed in Section 6.3.7. Enbridge would wet construction areas and roadways as necessary to minimize dust.

The potential for displaced structures is increased when the pipeline is routed through populated areas. Structures in the permanent right-of-way would be removed or re-located during construction. No structures would be permitted in the permanent right-of-way during operation. Section 6.2.4 further discusses displacement of residences. Enbridge has reached agreements with landowners for all structures identified within the permanent right-of-way.

Populated areas have a higher density of roads and driveways than more rural areas. Additionally, the roadways generally have more traffic on them, and more people would be affected by traffic congestion created by the movement of construction workers and equipment or road closures. To minimize traffic impacts, Enbridge has proposed to cross all paved roads using the bore technique or HDD. These

methods would prevent road closures by tunneling underneath the road surface. Impacts on roads are further discussed in Section 6.2.5.

Enbridge would consult with all utility companies prior to construction and utilize the Minnesota GSOC system prior to excavation to ensure that all adjacent pipelines and underground utilities are properly marked prior to construction. This would minimize the potential for service interruptions from construction. Nevertheless, interruptions would be more likely in areas of dense population due to the amount of infrastructure, with potential effects on more people. Utilities are further discussed in Section 6.2.5.

Overall, relatively few populated areas are crossed by the Applicant's preferred route, and the areas that are crossed have relatively small populations. With implementation of Applicant-proposed measures, impacts on populated areas during construction would be temporary and minor.

Operations Impacts

Non-Local Workforce

Enbridge estimates that operation of the pipeline would require few workers along the pipeline route; therefore, populations of local communities would not be affected.

Populated Areas

During operations, populated areas may be affected through restrictions placed on land within the permanent right-of-way or pipeline leaks or spills. The presence of a pipeline easement would prevent further development within the easement. Populated areas with more miles crossed by the pipeline centerline would have more land with this restriction. For the Applicant's preferred route, approximately 6 miles of populated areas would be crossed, with 3 miles of that occurring between Clearbrook and Carlton. While the restrictions would be placed on structures along the right-of-way, the existence of the permanent right-of-way would not restrict access across the easement. Typically, the pipeline would be buried at least 48 inches underground. Potential impacts associated with an accidental release of crude oil and associated emergency response procedures are discussed in Chapter 10.

Standard maintenance of the permanent right-of-way would include periodic mowing to prevent woody vegetation from interfering with inspection of the right-of-way or encroaching on the pipeline itself. In populated areas, mowing activity may be noticed by more people, but it would be infrequent and transitory.

Overall, operational impacts on populated areas would be negligible but permanent.

6.5.3.3.2 Route Alternatives (from Clearbrook to Carlton)

Route Alternative RA-03AM

Construction Impacts

Non-Local Workforce

For RA-03AM, the route from Clearbrook to Carlton would be 275 miles long, about 54 miles longer than the Applicant's preferred route. Based on the length of the route, it could require five construction spreads, resulting in the need for 3,000 workers. Assuming that each worker would be accompanied by

their family, the population increase within the RA-03AM ROI would be 1 percent. Given the transitory nature of the Project and the limited time period for construction, it is unlikely that all workers would re-locate with their families.

In the event that two construction spreads are adjacent to each other during construction, a maximum of 1,200 workers could be present in a county at a given time. In the largest county crossed by RA-03AM (Benton County), this would represent a 3-percent increase in population. In the smallest county crossed by the route (Clearwater County), this would represent 14 percent of the county's total population. Added population would create more traffic on roadways and emergency services, as discussed in Section 6.2.5. As discussed in Section 6.2.4, the total housing available is expected to be adequate. Overall, impacts related to the non-local workforce are expected to be minor and temporary but could be major and temporary in areas with low population density.

Populated Areas

Impacts on populated areas would be similar to those described for the Applicant's preferred route. Differences between the Applicant's preferred route and the route alternatives would be due to the number and size of populated areas crossed and the extent to which they would be crossed. RA-03AM would affect 12 populated areas with a total population of 14,333. The largest populated area within the ROI would be Mora with 3,571 people. A total of 14.9 miles of populated areas would be crossed by the pipeline centerline, and 4,429.1 acres would be within the ROI. Impacts on populated areas would be minor because of the relatively low population affected and the temporary construction duration.

Operations Impacts

Non-Local Workforce

Enbridge estimates that operation of the route alternatives would not require significant numbers of workers along the pipeline route; therefore, populations would not be affected by a non-local workforce.

Populated Areas

Operations impacts on populated areas along the route alternatives would be similar to those presented for the Applicant's preferred route, constituting a negligible but permanent impact.

Route Alternative RA-06

Construction Impacts

Non-Local Workforce

The length of the RA-06 route is to the Applicant's preferred route and would require approximately four construction spreads. The four construction spreads would total roughly 2,400 workers, which would represent about 1 percent of the population in the counties crossed by RA-06. If two construction spreads were in the same county at the same time, impacts could be magnified and up to 1,200 workers could be located in one county. The largest county crossed by RA-06 (St. Louis County) has a population of 200,431 people; two spreads would represent 1 percent of that population. The smallest county crossed would be Clearwater County, with 8,803 people; two construction spreads would represent 14 percent of that population. Impacts related to the non-local workforce would be minor and temporary but could be major and temporary in the instance of multiple construction spreads working at the same time in the smaller counties with low populations.

Populated Areas

RA-06 would affect five populated areas, with a total population of 24,096. The largest populated area within the ROI would be Cloquet, with 12,124 people. A total of 3.4 miles of populated areas would be crossed by the pipeline centerline, and 1,127 acres would be within the ROI. Impacts on populated areas would be minor and temporary because of the relatively low population affected and the transitory nature of construction.

Operations Impacts

Non-Local Workforce

Enbridge estimates that operation of the route alternatives would not require significant numbers of workers along the pipeline route; therefore, populations would not be affected by a non-local workforce.

Populated Areas

Operations impacts on populated areas along the route alternatives would be similar to those presented for the Applicant's preferred route, constituting a negligible but permanent impact.

Route Alternative RA-07

Construction Impacts

Non-Local Workforce

The length of the RA-07 route is similar to the Applicant's preferred route and would require approximately four construction spreads. The four construction spreads would total roughly 2,400 workers, representing about 1 percent of the population in the counties crossed by RA-07. If two construction spreads were in the same county at the same time, impacts could be magnified and up to 1,200 workers could be located in one county. The largest county crossed by RA-07 (St. Louis County) has a population of 200,431 people; two spreads would represent 1 percent of the population. The smallest county crossed would be Clearwater County, with 8,803 people; two construction spreads would represent 14 percent of the population. Impacts related to the non-local workforce would be minor and temporary but could be major and temporary in the instance of multiple construction spreads working at the same time in the smaller counties with low populations.

Populated Areas

RA-07 would affect 23 populated areas, with a total population of 55,022. The largest populated area within the ROI would be Bemidji, with 13,431 people. A total of 27.7 miles of populated areas would be crossed by the pipeline centerline and 9,205 acres of populated areas would be within the ROI. Impacts on populated areas would be minor because of the relatively low population of the areas affected. As noted for the Applicant's preferred route, populated areas are more likely to be affected by construction impacts because of the higher density of people, structures, and infrastructure. Impacts would be temporary during construction.

Operations Impacts

Non-Local Workforce

Enbridge estimates that operation of the route alternatives would not require significant numbers of workers along the pipeline route; therefore, populations would not be affected by a non-local workforce.

Populated Areas

Operations impacts on populated areas along the route alternatives would be similar to those presented for the Applicant's preferred route, constituting a negligible but permanent impact.

Route Alternative RA-08

Construction Impacts

Non-Local Workforce

The length of the RA-08 route is similar to the Applicant's preferred route and would require approximately four construction spreads. The four construction spreads would total roughly 2,400 workers, representing about 1 percent of the population in the counties crossed by RA-08. If two construction spreads were in the same county at the same time, impacts could be magnified and up to 1,200 workers could be located in one county. The largest county crossed by RA-07 (St. Louis County) has a population of 200,431 people; two spreads would represent 1 percent of that population. The smallest county crossed would be Clearwater County, with 8,803 people; two construction spreads would represent 14 percent of the population. Impacts related to the non-local workforce would be minor and temporary, but could be major and temporary in the instance of multiple construction spreads working at the same time in the smaller counties with low populations.

Populated Areas

RA-08 would affect 14 populated areas, with a total population of 53,077. The largest populated area within the ROI would be Bemidji, with 13,431 people. A total of 21.9 miles of populated areas would be crossed by the pipeline centerline, and 7,008 acres of populated areas would be within the ROI. Impacts on populated areas would be minor because of the relatively low population levels in the areas affected and would be temporary during construction.

Operations Impacts

Non-Local Workforce

Enbridge estimates that operation of the route alternatives would not require significant numbers of workers along the pipeline route; therefore, populations would not be affected by a non-local workforce.

Populated Areas

Operations impacts on populated areas along the route alternatives would be similar to those presented for the Applicant's preferred route, constituting a negligible but permanent impact.

6.5.3.4 Summary and Mitigation

6.5.3.4.1 Summary

Impacts on population for the Applicant's preferred route and the route alternatives are summarized in Table 6.5.3-6. Overall, the influx of construction workers to build and operate the Applicant's preferred route or any of the route alternatives would result in negligible to minor impacts except in those few counties with the lowest populations. The influx of non-local workers is not expected to affect the local populations unless two construction spreads are working in proximity to each other within a single low-population county. The nature of the construction work requires the workers to move through each area after a short time, and the existing services and housing in the areas on a county-wide basis are adequate to support the worker influx. In the circumstance where two construction spreads are active in the same low-population county, temporary but major impacts could occur.

Potential impacts from operations would be permanent but negligible for the Applicant's preferred route and all of the route alternatives. Pipeline operations would require relatively few additional employees and thus would not affect the local workforce, need for housing, or local services.

When comparing the Applicant's preferred route and the route alternatives to each other, the Applicant's preferred route would be expected to have the lowest impact on populated areas. It has the lowest number of populated areas within the ROI and the lowest total population within those populated areas. It also has the least acreage along of permanent right-of-way that crosses populated areas and would restrict surface land use within populated areas.

The next highest population exposure would occur from RA-03AM, where approximately 10 times as many people are in populated areas proximal to the pipeline route. The permanent right-of-way acreage that would need to remain cleared in the populated areas would be five times greater for RA-03AM than for the Applicant's preferred route.

RA-06, RA-08, and RA-07, in that order, would increase the exposed population within populated areas; and the amount of exposed population increases significantly. However, at all levels of population exposure, impacts are expected to be negligible to minor as shown in Table 6.5.3-6.

The amount of acreage restricted for surface land use also is higher for RA-06, RA-07, and RA-08, as shown in Table 6.5.3-6.

6.5.3.4.2 Mitigation

Beyond the Applicant-proposed measures described for the Applicant's preferred route, mitigation measures to address potential major impacts of traffic congestion for the rail and truck alternatives could include:

- Freeways – Construct additional freeway lanes, off ramps and other traffic flow features in congested areas to reduce traffic density.
- Highways – Upgrade (widening) or add lanes to existing state and county highways to increase traffic flow and reduce traffic density. Construction of additional lane capacity or dedicated truck-only lanes on State Highway 92 near Clearbrook may be required.
- Populated areas – Construct dedicated access roads to the Clearbrook terminal.

Given the temporary nature of the construction activity (the construction spread moves along the construction route), potential impacts are expected to be minor to negligible and temporary. Likewise, pipeline operations would require relatively few additional employees and thus would not affect the local workforce, need for housing, or local services. No additional mitigation has been identified associated with employment.

Table 6.5.3-6. Summary of Potential Impacts on Population for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Changes in Population from Non-Local Workforce					
Percentage increase in local population across all counties	Temporary/minor impacts • 6.7 percent increase Temporary/major impacts *(in counties where population increase would be greater than 10 percent)*	Temporary/minor impacts • 5.1 percent increase Temporary/major impacts *(in counties where population increase would be greater than 10 percent)*	Temporary/minor impacts • 3.6 percent increase Temporary/major impacts *(in counties where population increase would be greater than 10 percent)*	Temporary/minor impacts • 3.1 percent increase Temporary/major impacts *(in counties where population increase would be greater than 10 percent)*	Temporary/minor impacts • 3.1 percent increase Temporary/major impacts *(in counties where population increase would be greater than 10 percent)*
Disruptions to Populated Areas					
Number of populated areas crossed or within 1,250 feet of construction work area	Temporary/minor impacts • 5 populated areas	Temporary/minor impacts • 12 populated areas	Temporary/minor impacts • 5 populated areas	Temporary/minor impacts • 23 populated areas	Temporary/minor impacts • 14 populated areas
Total population of populated areas crossed	Temporary/minor impacts • 1,204	Temporary/minor impacts • 14,333	Temporary/minor impacts • 24,096	Temporary/minor impacts • 55,022	Temporary/minor impacts • 53,077
Total area of populated areas crossed or within 1,250 feet of construction work area (acres)	Temporary/minor impacts • 875.7 acres	Temporary/minor impacts • 4,429.1 acres	Temporary/minor impacts • 1,127.0 acres	Temporary/minor impacts • 9,205.1 acres	Temporary/minor impacts • 7,008.4 acres

Table 6.5.3-6. Summary of Potential Impacts on Population for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Operations Impacts					
Changes in Population from Non-Local Workforce					
Increase in local population across all counties	Permanent/negligible impacts	Permanent/negligible impacts	Permanent/negligible impacts	Permanent/negligible impacts	Permanent/negligible impacts
Disruptions to Populated Areas					
Miles of populated areas crossed by pipeline centerline	Permanent/negligible impacts • 2.9 miles	Permanent/negligible impacts • 14.9 miles	Permanent/negligible impacts • 3.4 miles	Permanent/negligible impacts • 27.7 miles	Permanent/negligible impacts • 21.9 miles

6.5.3.5 References

U.S. Census Bureau. 2010. 2010 Census. QuickFacts. https://www.census.gov/quickfacts/table/PST045215/00. Accessed on January 23, 2017.

_____. 2014. 2010 – 2014 American Community Survey. American Fact Finder. https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml. Accessed on January 23, 2017.

_____. 2016. 2016 TIGER Geodatabases. https://www.census.gov/geo/maps-data/data/tiger-geodatabases.html.

6.5.4 Employment, Income, and Tax Revenues

Employment and income statistics provide insight into local economic conditions. Changes in employment and income influence the level of tax revenues received by local and state governments, making tax revenues another important indicator of how well an economy is doing. The issues addressed in this section related to employment, income, and tax revenue associated with construction and operation of the Applicant's preferred route and route alternatives are:

- Construction-related employment, payroll spending, and expenditures on materials, supplies and equipment;
- Operation-related employment and payroll spending;
- Income tax revenue from workers during construction and operation;
- Property taxes paid by the Applicant during operation; and
- Impacts on property taxes, if any, of appraised property value changes due to construction and operations.

This section first describes the regulatory context and methods used in the assessment of impacts (Section 6.5.4.1), followed by a description of relevant economic conditions within the counties along the Applicant's preferred route and each of the route alternatives (Section 6.5.4.2); these counties could experience changes in employment, income, and tax revenue as a result of construction and operation of the Project. Section 6.5.4.3 addresses the potential impacts on employment, income, and tax revenue from construction and operation of the Project. That section identifies the potential impacts for all the route options (the Applicant's preferred route and route alternatives RA-03AM, RA-06, RA-07, and RA-08). A summary and comparison of the impacts are presented in Section 6.5.4.4.

6.5.4.1 Regulatory Context and Methodology

6.5.4.1.1 Regulatory Context

Minnesota Administrative Rules Part 7852.1900, Subpart (3) describes what the Commission must consider in determining the route of a pipeline. Among other things, the Commission must consider the potential impacts, and methods to minimize or mitigate the potential impacts, of all proposed routes on "economies within the route." A "local economy" is defined as the activities that take place within a designated geographic area.

6.5.4.1.2 Methodology

The assessment addressed the impacts on employment, income, and tax revenue from construction and operation of the Applicant's preferred route and route alternatives. This assessment consisted of the following:

- Describing the existing economic conditions in the counties that would be crossed by the Applicant's preferred route and route alternatives using county-level employment, income, and tax revenues (where available); and
- Determining potential impacts on the economic baseline by using employment numbers and construction related expenditures provided by the Applicant to provide a qualitative discussion of the relative magnitude (i.e., negligible, minor, or major) of Project-related changes to county-

level employment and income levels, and to quantitatively estimate the potential increase in tax revenue by county.

For this analysis, the ROI encompasses the counties crossed by the Applicant's preferred route and route alternatives. County-level data provide a reasonable basis for defining a local economy and determining Project-related impacts in each county crossed by each route. The comparison of impacts on most of the other resources in this EIS consider the alternative routes between the Enbridge terminals at Clearbrook and Carlton since the routes of those alternatives are the same between the North Dakota border and Clearbrook and between Carlton and the Wisconsin border. However, because the impact analysis for this section is based on county data, the comparisons were made using (1) data for existing conditions in all of Clearwater County, in which Clearbrook is located, and all of Carlton County, in which Carlton is located; and (2) construction employment for the four construction spreads between the Enbridge terminals at Clearbrook and Carlton.

The employment and income statistics used to describe the economic baseline (or existing conditions) include median household income from the U.S. Census Bureau, and per capita income, total labor force numbers, and unemployment rates from the U.S. Bureau of Labor Statistics. Median household income is commonly used to describe a household's economic status or to track economic trends, whereas per capita household income often is used to measure the standard of living within a geographic area. Labor force numbers represent the total number of people (15 years and older) who are currently employed or unemployed but looking for work, while the unemployment rate represents the percentage of the labor force that is currently unemployed. All data are from the most recent survey years available when this EIS was prepared, unless otherwise noted.

Existing conditions for tax revenues were based on available data from the Minnesota Department of Revenue for the ROI except for Benton and Pine counties. These data include total government revenue and the portion of revenue from property taxes. Construction of a pipeline and associated facilities would generate tax revenues in the form of property taxes paid by the Applicant for the life of the Project. Property tax revenue used in the impact assessment was based on the appraised value of the pipeline easement and the state and local tax rates. Enbridge has appealed the amount of property taxes it paid between 2012 and 2016, alleging that the Minnesota Department of Revenue overvalued the value of the pipeline property, resulting in overpayment of taxes to counties and Minnesota. The appeal has not been settled at the time this document was prepared. This revenue would be in addition to the amount that the current landowner pays and represents additional revenue to the county and the state.

County governments receive income tax appropriations from the state of Minnesota. The state determines the amount each county receives. Output from a national IMPLAN model (an economic input-output model) and the number of miles of pipeline per county were used to allocate the potential change in income taxes appropriated from the State of Minnesota to each county in the ROI for the Applicant's preferred route and route alternatives (see Appendix R). The total estimated labor income to Minnesota was generated using the IMPLAN output along with each county's share of the total pipeline (in miles). The total estimated income tax to the state was generated using the IMPLAN output and Minnesota's current income tax rate of 7.08 percent. The resultant estimated state income tax was allocated to each county in the ROI based on the number of miles of pipeline in the county.

It is likely that the Applicant would hire local residents during construction of any of the alternative routes for a portion of its workforce, based on Enbridge's commitment to the use of labor unions for the

construction of the Line 3 Project (as referenced in the direct testimony of Barry Simonson, lines 505-513, the current labor agreements in Minnesota require that at least 50% of workers will be expected to be employed from local union halls). This is noted elsewhere in this EIS, as well as that impacts on population and housing are based primarily on the assumption that all of the workers would be from outside of the counties crossed by the routes and they would therefore re-locate to the area during construction in order to evaluate a worst-case scenario (see Section 6.2.4.3). These workers may reside in Minnesota or may be out-of-state workers, which is a common situation in pipeline construction projects.

6.5.4.2 Existing Conditions

6.5.4.2.1 Applicant's Preferred Route

Employment and Income

Summary statistics of employment, per capita income, and median household income for the counties that would be crossed by the Applicant's preferred route are listed in Table 6.5.4-1. In all of the counties, the median household income is below the state average of $60,828, and only one county (Kittson) is above the state average for per capita personal income of $50,541; however, Kittson County also had the highest unemployment rate (7 percent).

Tax Revenues

Table 6.5.4-2 lists the current total government revenue and the portion of revenue from property taxes for each county that would be crossed by the Applicant's preferred route. For many of these counties, property taxes are an important source of income. Pennington and Red Lake counties have the highest share of their total revenues from property taxes (86 and 74 percent, respectively). Crow Wing County has the highest total government revenue at $77 million. In 2015, income taxes received by the State of Minnesota were approximately $11 billion (U.S. Census 2015).

6.5.4.2.2 Route Alternatives

The only area where the route alternatives would vary from the alignment of the Applicant's preferred route is between Clearbrook and Carlton in Minnesota. The existing conditions relevant to employment, income, and tax revenue for the route alternatives between Clearbrook and Carlton are described below. However, because this assessment incorporates county data, the information associated with routes in Carlton County includes data for the entire county, although the differences in the alignments of the route alternatives extend only between the Enbridge terminals at Clearbrook and Carlton.

Route Alternative RA-03AM

<u>Employment and Income</u>

Summary statistics of employment, per capita income, and median household income for the counties that would be crossed by RA-03AM between Clearbrook and Carlton are listed in Table 6.5.4-3. Kanabec and Pine counties have the highest unemployment rates (5 percent), and the median household income averaged $47,475 for all the counties crossed.

Table 6.5.4-1. Employment and Income Conditions in Counties Crossed by the Applicant's Preferred Route in Minnesota

County	Per Capita Personal Income 2014[a] ($2015)	Median Household Income 2010–2014[b] ($2015)	Labor Force (August 2015 – September 2016)[a]	Unemployment Rate (August 2015 – September 2016)[a]
North Dakota Border to Clearbrook				
Kittson	$52,326	$48,950	2,543	7.0%
Marshall	$47,271	$53,373	5,574	4.9%
Pennington	$48,980	$47,436	8,933	3.4%
Red Lake	$45,722	$47,253	2,259	3.9%
Polk	$42,157	$51,085	16,795	3.8%
Clearwater	$36,512	$45,158	4,493	6.7%
Subtotal/Average	***Average = $45,495***	***Average = $48,876***	***Subtotal = 40,957***	***Average = 4.6%***
Clearbrook to Carlton[c]				
Hubbard	$36,338	$46,466	9,847	4.5%
Wadena	$32,836	$38,706	6,236	4.6%
Cass	$42,349	$45,620	14,690	5.1%
Crow Wing	$37,863	$49,244	32,402	3.9%
Aitkin	$36,363	$42,085	6,757	4.4%
Carlton	$36,801	$53,492	17,328	4.2%
Subtotal/average	***Average = $37,092***	***Average = $45,936***	***Subtotal = 87,260***	***Average = 4.5%***
TOTAL/AVERAGE	**AVERAGE = $41,616**	**AVERAGE = $47,519**	**TOTAL = 127,857**	**AVERAGE = 4.7%**

[a] Source: U.S. Bureau of Economic Analysis 2015.

[b] Source: U.S. Census Bureau 2014.

[c] Carlton County extends to the Wisconsin border; because this is a county-level analysis, it includes data for all of Carlton County.

Table 6.5.4-2. Government Revenue in Counties Crossed by the Applicant's Preferred Route in Minnesota

County	Portion of Pipeline through County	Government Revenue ($2015 thousands)[a]	County Property Tax Revenue ($2015 thousands)[a]	Share of Government Revenue from Property Taxes
North Dakota Border to Clearbrook				
Kittson	5%	$12,209	$3,346	27%
Marshall	11%	$17,237	$5,463	32%
Pennington	6%	$8,289	$7,153	86%
Red Lake	5%	$2,977	$2,198	74%
Polk	4%	$55,276	$20,562	37%
Clearwater[b]	12%	$12,209	$3,346	27%
Subtotal/average	***Subtotal = 43%***	***Subtotal = $108,197***	***Subtotal = $42,068***	***Average = 47%***
Clearbrook to Carlton[c]				
Hubbard	13%	$18,828	$6,142	33%
Wadena	2%	$31,732	$12,200	38%
Cass	14%	$21,289	$7,675	36%
Crow Wing	1%	$50,103	$20,332	41%
Aitkin	15%	$71,060	$35,583	50%
Carlton	11%	$35,408	$11,457	32%
Subtotal/average	***Subtotal = 57%***	***Subtotal = $228,420***	***Subtotal = $93,389***	***Average = 38%***
TOTAL/AVERAGE	**TOTAL = 100%**	**TOTAL = $336,617**	**TOTAL = $135,457**	**AVERAGE = 43%**

[a] Source: Minnesota Office of the State Auditor 2015, adjusted to $2015 based on the consumer price index where necessary.

[b] Includes data for all of Clearwater County.

[c] Carlton County extends to the Wisconsin border; because this is a county-level analysis, it includes data for all of Carlton County.

Table 6.5.4-3. Employment and Income Conditions in Counties Crossed by Route Alternative RA-03AM between Clearbrook and Carlton

County	Per Capita Personal Income 2014[a] ($2015)	Median Household Income 2010–2014[b] ($2015)	Labor Force (August 2015 – September 2016)[a]	Unemployment Rate (August 2015 – September 2016)[a]
Hubbard	$36,338	$46,466	9,847	4.5%
Wadena	$32,836	$38,706	6,236	4.6%
Todd	$38,082	$45,432	12,822	3.4%
Morrison	$37,448	$40,080	17,717	3.9%
Benton	$41,101	$60,589	21,694	3.6%
Mille Lacs	$34,168	$48,763	12,761	4.4%
Kanabec	$35,290	$46,872	8,860	5%
Pine	$35,290	$46,872	8,860	5%
Carlton[c]	$36,801	$53,492	17,328	4.2%
TOTAL/AVERAGE	**AVERAGE = $36,373**	**AVERAGE = $47,475**	**TOTAL = 116,125**	**AVERAGE = 4.29%**

[a] Source: U.S. Bureau of Economic Analysis 2015.

[b] Source: U.S. Census Bureau 2014.

[c] Carlton County extends to the Wisconsin border; because this is a county-level analysis, it includes data for all of Carlton County.

Tax Revenues

Table 6.5.4-4 lists the current total government revenue and the portion of revenue from property taxes for each county crossed by RA-03AM between Clearbrook and Carlton. For many of these counties, property taxes are an important source of income, averaging 40 percent. No data were available for Todd, Benton, or Pine counties.

Table 6.5.4-4. Government Revenue in Counties Crossed by Route Alternative RA-03AM between Clearbrook and Carlton

County	Portion of Pipeline through County	Government Revenue ($2015 thousands)[a]	County Property Tax Revenue ($2015 thousands)[a]	Share of Government Revenue from Property Taxes
Hubbard	9%	$18,828	$6,142	33%
Wadena	9%	$31,732	$12,200	38%
Todd	3%	NA	NA	--
Morrison	12%	41,762	16,964	41%
Benton	1%	NA	NA	--
Mille Lacs	4%	$34,234	15,052	44%
Kanabec	6%	$26,625	$11,094	42%
Pine	11%	NA	NA	--
Carlton[b]	6%	$35,408	$11,457	32%
TOTAL/AVERAGE	**61% (of total route)[c]**	**$138,029**	**$54,567**	**40%**

[a] Source: Minnesota Office of the State Auditor 2015, adjusted to $2015 based on the consumer price index where necessary.

[b] Includes data for all of Carlton County.

[c] Does not sum to 100% since this represents only the portion of the pipeline from Clearbrook to Carlton.

NA = Data were not readily available or available publicly via the Internet, "--" = Could not calculate because no data were available.

Route Alternative RA-06

Employment and Income

Summary statistics of employment, per capita income, and median household income for the counties that would be crossed by RA-06 between Clearbrook and Carlton are listed in Table 6.5.4-5. Itasca County has the highest unemployment rates (5.8 percent), and the median household income averaged $46,765 for all the counties crossed.

Table 6.5.4-5. Employment and Income Conditions in Counties Crossed by Route Alternative RA-06 between Clearbrook and Carlton

County	Per Capita Personal Income 2014[a] ($2015)	Median Household Income 2010–2014[b] ($2015)	Labor Force (August 2015 – September 2016)[a]	Unemployment Rate (August 2015 – September 2016)[a]
Beltrami	$35,078	$43,990	23,451	4.1%
Itasca	$36,367	$47,122	22,967	5.8%
Aikin	$36,363	$42,085	6,757	4.4%
St. Louis	$39,861	$47,138	8,569	3.4%
Carlton[c]	$36,801	$53,492	17,328	4.2%
TOTAL/AVERAGE	**AVERAGE = $36,894**	**AVERAGE = $46,765**	**TOTAL = 79,072**	**AVERAGE = 4.4%**

[a] Source: U.S. Bureau of Economic Analysis 2015.

[b] Source: U.S. Census Bureau 2014.

[c] Carlton County extends to the Wisconsin border; because this is a county-level analysis, it includes data for all of Carlton County.

Tax Revenues

Table 6.5.4-6 summarizes the current total government revenue and the portion of revenue from property taxes for each county between Clearbrook and Carlton that would be crossed by RA-06. For many of these counties, property taxes are an important source of income, averaging 38 percent.

Table 6.5.4-6. Government Revenue in Counties Crossed by Route Alternative RA-06 between Clearbrook and Carlton

County	Portion of Pipeline through County	Government Revenue ($2015 thousands)[a]	County Property Tax Revenue ($2015 thousands)[a]	Share of Government Revenue from Property Taxes
Beltrami	12%	$72,476	$26,651	37%
Itasca	34%	$94,707	$28,855	30%
Aitkin	0.2%	$71,060	$35,583	50%
St. Louis	8%	$278,021	$111,234	40%
Carlton[b]	5%	$35,408	$11,457	32%
TOTAL/AVERAGE	**62% (of total route)[c]**	**TOTAL = $551,672**	**TOTAL = $213,780**	**AVERAGE = 38%**

[a] Source: Minnesota Office of the State Auditor 2015, adjusted to $2015 based on the consumer price index where necessary.

[b] Carlton County extends to the Wisconsin border; because this is a county-level analysis, it includes data for all of Carlton County.

[c] Does not sum to 100% since this represents only the portion of the pipeline from Clearbrook to Carlton.

Route Alternative RA-07

Employment and Income

Summary statistics of employment, per capita income, and median household income for the counties that would be crossed by RA-07 between Clearbrook and Carlton are listed in Table 6.5.4-7. Itasca County has

the highest unemployment rates (5.8 percent), and the median household income averaged $46,559 for all the counties crossed.

Table 6.5.4-7. Employment and Income Conditions in Counties Crossed by Route Alternative RA-07 between Clearbrook and Carlton

County	Per Capita Personal Income 2014[a] ($2015)	Median Household Income 2010–2014[b] ($2015)	Labor Force (August 2015 – September 2016)[a]	Unemployment Rate (August 2015 – September 2016)[a]
Beltrami	$35,078	$43,990	23,451	4.1%
Hubbard	$36,338	$46,466	9,847	4.5%
Cass	$42,349	$45,620	14,690	5.1%
Itasca	$36,367	$47,122	22,967	5.8%
Aitkin	$36,363	$42,085	6,757	4.4%
St. Louis	$39,861	$47,138	8,569	3.4%
Carlton[c]	$36,801	$53,492	17,328	4.2%
TOTAL/AVERAGE	**AVERAGE = $37,594**	**AVERAGE = $46,559**	**TOTAL = 103,609**	**AVERAGE = 4.5%**

[a] Source: U.S. Bureau of Economic Analysis 2015.

[b] Source: U.S. Census Bureau 2014.

[c] Carlton County extends to the Wisconsin border; because this is a county-level analysis, it includes data for all of Carlton County.

Tax Revenues

Table 6.5.4-8 lists the current total government revenue and the portion of revenue from property taxes for each county crossed by RA-07 between Clearbrook and Carlton. For many of these counties, property taxes are an important source of income, averaging 37 percent.

Table 6.5.4-8. Government Revenue in Counties Crossed by Route Alternative RA-07 between Clearbrook and Carlton

County	Portion of Pipeline through County	Government Revenue ($2015 thousands)[a]	County Property Tax Revenue ($2015 thousands)[a]	Share of Government Revenue from Property Taxes
Beltrami	8%	$72,476	$26,651	37%
Hubbard	3%	$18,828	$6,142	33%
Cass	12%	$21,289	$7,675	36%
Itasca	17%	$94,707	$28,855	30%
Aitkin	0.4%	$71,060	$35,583	50%
St. Louis	9%	$278,021	$111,234	40%
Carlton[b]	5%	$35,408	$11,457	32%
TOTAL/AVERAGE	**54% (of total route)[c]**	**TOTAL = $519,313**	**TOTAL = $200,946**	**AVERAGE = 37%**

[a] Source: Minnesota Office of the State Auditor 2015, adjusted to $2015 based on the consumer price index where necessary.

[b] Carlton County extends to the Wisconsin border; because this is a county-level analysis, it includes data for all of Carlton County.

[c] Does not sum to 100% since this represents only the portion of the pipeline from Clearbrook to Carlton.

Route Alternative RA-08

Employment and Income

Summary statistics of employment, per capita income, and median household income for the counties that would be crossed by RA-08 between Clearbrook and Carlton are listed in Table 6.5.4-9. Itasca County has the highest unemployment rates (5.8 percent), and the median household income averaged $46,559 for all the counties crossed.

Table 6.5.4-9. Employment and Income Conditions in Counties Crossed by Route Alternative RA-08 between Clearbrook and Carlton

County	Per Capita Personal Income 2014[a] ($2015)	Median Household Income 2010–2014[b] ($2015)	Labor Force (August 2015 – September 2016)[a]	Unemployment Rate (August 2015 – September 2016)[a]
Beltrami	$35,078	$43,990	23,451	4.1%
Hubbard	$36,338	$46,466	9,847	4.5%
Cass	$42,349	$45,620	14,690	5.1%
Itasca	$36,367	$47,122	22,967	5.8%
Aitkin	$36,363	$42,085	6,757	4.4%
St. Louis	$39,861	$47,138	8,569	3.4%
Carlton[c]	$36,801	$53,492	17,328	4.2%
TOTAL/AVERAGE	**AVERAGE = $37,594**	**AVERAGE = $46,559**	**TOTAL = 103,609**	**AVERAGE = 4.5%**

[a] Source: U.S. Bureau of Economic Analysis 2015.

[b] Source: U.S. Census Bureau 2014.

[c] Carlton County extends to the Wisconsin border; because this is a county-level analysis, it includes data for all of Carlton County.

Tax Revenues

Table 6.5.4-10 lists the current total government revenue and the portion of revenue from property taxes for each county crossed by RA-08 between Clearbrook and Carlton. For many of these counties, property taxes are an important source of income, averaging 37 percent.

Table 6.5.4-10. Government Revenue in Counties Crossed by Route Alternative RA-08 between Clearbrook and Carlton

County	Portion of Pipeline through County	Government Revenue ($2015 thousands)[a]	County Property Tax Revenue ($2015 thousands)[a]	Share of Government Revenue from Property Taxes
Beltrami	7%	$72,476	$26,651	37%
Hubbard	3%	$18,828	$6,142	33%
Cass	12%	$21,289	$7,675	36%
Itasca	16%	$94,707	$28,855	30%
Aitkin	2%	$71,060	$35,583	50%
St. Louis	8%	$278,021	$111,234	40%
Carlton[b]	5%	$35,408	$11,457	32%
TOTAL/AVERAGE	**53% (of total route)[c]**	**TOTAL = $519,313**	**TOTAL = $200,946**	**AVERAGE = 37%**

[a] Source: Minnesota Office of the State Auditor 2015, adjusted to $2015 based on the consumer price index where necessary.

[b] Carlton County extends to the Wisconsin border; because this is a county-level analysis, it includes data for all of Carlton County.

[c] Does not sum to 100% since this represents only the portion of the pipeline from Clearbrook to Carlton.

6.5.4.3 Impact Assessment

Construction and operation of the Applicant's preferred route or an alternative route would increase employment, income, and tax revenue. Direct impacts on employment would be driven by the large number of construction personnel. Although it is expected that the workers would not live in the counties where construction would occur, they may temporarily re-locate to these counties during construction or spend money locally, which could result in temporary county-level income changes in supporting industries. Tax revenues would increase due to the increase in labor income (i.e., taxable income), sales tax on the purchase of goods locally, and property taxes. Construction would also have a temporary indirect influence on economic conditions due to employment and income for service industries supporting construction activities (e.g., the hotel industry, fueling services, and the food service industry).

6.5.4.3.1 Applicant's Preferred Route (in Minnesota)

Construction Impacts

Employment and Income

Construction of the Applicant's preferred route across Minnesota is expected to require up to a maximum of 4,200 workers across 7 different construction spreads over an 8 to 12-month period. The portion of the route between Clearbrook and Carlton would require up to 2,400 workers across 4 construction spreads.

It is expected that Enbridge would use some local workers – as referenced in the direct testimony of Barry Simonson (lines 505-513) current labor agreements in Minnesota require that at least 50% of workers would be expected to be employed from local union halls. As construction jobs are typically permanent in nature and spatially temporary in the sense that workers move from project to project, permanent jobs may result from said construction (this is also dependent on an unquantifiable backlog of other construction project demand). Based on this assumption, it is likely that direct construction-related employment would have a minor positive impact on county-level unemployment and per capita and/or median household income levels.

Furthermore, it is likely that some of the non-technical work could be accomplished by local labor (e.g., clearing and trenching); hiring of local labor for those positions would have a temporary (over the duration of construction and post-construction restoration activities) and negligible to minor impact on county-level unemployment or per capita and/or median household income levels, depending on the nature of work activities.

Construction workers who do re-locate to the Project area would spend a portion of their income on local goods and services such as food, gas, and lodging. These expenditures would increase revenues to those secondary or supporting industries (i.e., industries that indirectly support the construction industry) for the duration of the construction period in the area of the construction spread. This would result in a temporary, minor positive impact on the secondary industries. If businesses in the secondary industries hire additional staff to accommodate increased business, there would be a temporary, positive but negligible indirect impact on employment and unemployment within each county along the route.

In addition to direct Project-related employment and payroll spending, a large portion of the construction-related expenses would be for construction materials, supplies, equipment, parts, and other goods and services such as fuel and hardware. The Applicant estimated the material costs for construction of its preferred route in Minnesota to be $438.9 million. According to the IMPLAN model results, the top industries (as defined in the model) that would be positively affected by construction-related spending are construction services for new, non-residential structures; food services and drinking places; real estate businesses; wholesale trade business (businesses engaged in wholesaling merchandise such as agriculture and mining); architectural and engineering services; offices of health practitioners; private hospitals; employment services; and financial services (see Appendix R). These expenditures during construction would result in temporary and negligible to minor indirect, positive impacts on those industries, particularly within the counties along the route. The magnitude of the impact on the industries would depend on the size of the industries and the portion of the expenditures that would be spent locally in each county crossed by the route.

If businesses in these industries hire local additional staff to accommodate increased business, there would be a temporary, positive but negligible indirect impact on employment, unemployment, and per capita income at the county level along the route.

If the Applicant employs some local residents during construction, there would be a greater influence on employment, unemployment, and per capita income at the county level along the route; and the temporary, positive impact would be greater.

Tax Revenues

Construction of the Applicant's preferred route would generate state and local taxes from a variety of sources. State and county tax revenues would increase due to increased employment payrolls directly

associated with construction (i.e., wages paid to construction workers). In other words, regardless of where a construction worker lives, a portion of their wages would be subject to Minnesota state income taxes since the construction occurs in Minnesota over an extended period of time. In addition, if the industries indirectly affected by construction hire additional staff to accommodate the increased business as described above, wages paid to those workers would also increase state and county tax revenues. In terms of property taxes, as previously stated, it was assumed that property taxes would not begin to accrue until the operations phase of the Project; therefore, construction of the pipeline would not affect property taxes at the county level.

As previously discussed, income taxes are generated at the state level and reapportioned to county governments as determined by the state. Table 6.5.4-11 presents the estimated increase in the state income tax that would be appropriated to each county in the ROI based on the portion of total length of the pipeline through each county. Based on these estimates, Aitkin County would receive the highest increase in income tax revenue at $15.2 million. The counties along the Clearbrook-to-Carlton segment would receive approximately $55.9 million in income tax revenue from construction of the Project. This positive impact on income tax revenues to the counties would be temporary and minor to major (i.e., depending on the allocation to each individual county).

Operations Impacts

Employment and Income

The Applicant stated that the existing operations staff would be able to operate the Project and that few additional employees would be hired to assist the staff. As a result, operation of the pipeline would have no measureable impact on local employment, per capita household income, median household income, or unemployment in the ROI.

Tax Revenues

Since there would be few additional staff members hired for operation of the Project, there would be very little change in income tax or sales tax revenues due to increased spending by permanent operational staff. Therefore, the impact on income tax and sales tax revenues would be permanent, but at most negligible.

Property tax revenues would be the largest source of ongoing revenue to the counties along the route. Local and state governments would continue to collect annual property taxes from the Applicant based on the assessed value of the pipeline easements for the life of the Project. This would result in permanent, major positive impacts on property tax revenues for the counties along the route.

Table 6.5.4-11. Estimated Income Tax Generated from Construction-Related Income for the Applicant's Preferred Route

County	Miles of Pipeline through County	Estimated Income Tax Generated from Direct and Indirect Construction-Related Income ($2016 millions)[a]
North Dakota Border to Clearbrook		
Kittson	15.4	$4.5
Marshall	36.3	$10.7
Pennington	19.7	$5.8
Red Lake	15.7	$4.6
Polk	14.0	$4.1
Clearwater	42.2	$12.4
Subtotal	***143.3***	***$42.1***
Clearbrook to Carlton		
Hubbard	44.6	$13.1
Wadena	7.1	$2.1
Cass	47.4	$12.0
Crow Wing	4.8	$1.4
Aitkin	51.6	$15.2
Carlton[b]	41.0	$12.1
Subtotal	***196.5***	***$55.9***
TOTAL	**339.8**	**$98.0**

[a] The estimates represent a conservative upper bound on the actual values. The underlying data are based on results from an IMPLAN model that uses national data, rather than data at the state level. The national data inflate the results at a more localized level, compared to a state-level model (see Appendix R).

[b] Carlton County extends to the Wisconsin border; because this is a county-level analysis, it includes data for all of Carlton County.

6.5.4.3.2 Route Alternatives (from Clearbrook to Carlton)

Route Alternative RA-03AM

Construction Impacts

Employment and Income

RA-03AM is between 55 miles longer than the other routes between the Clearbrook and Carlton terminals, and construction between Clearbrook to Carlton and may require five spreads and an additional 600 workers (up to 3,000 total) during construction.

As stated in previous sections, it is expected that Enbridge would use some local labor (at least 50% from local union halls) regardless of the route alternative selected. As construction jobs are typically permanent in nature and spatially temporary in the sense that workers move from project to project, permanent jobs may result from said construction (this is also dependent on an unquantifiable backlog

of other construction project demand). Based on this assumption, it is likely that direct construction-related employment would have a minor positive impact on county-level unemployment and per capita and/or median household income levels.

Furthermore, it is likely that some of the non-technical work could be accomplished by local labor (e.g., clearing and trenching); hiring of local labor for those positions would have a temporary (over the duration of construction and post-construction restoration activities) and negligible to minor impact on county-level unemployment or per capita and/or median household income levels, depending on the nature of work activities.

Construction workers who re-locate to the Project area would spend a portion of their income on local goods and services such as food, gas, and lodging. Construction of RA-03AM would have the largest increase of local spending on goods and services of all alternatives due to the additional 600 workers. These expenditures would increase revenues to those secondary or supporting industries (i.e., industries that indirectly support the construction industry) for the duration of the construction period in the area of the construction spread. This would result in a temporary, minor positive impact on the secondary industries. If businesses in the secondary industries hire additional staff to accommodate increased business, there would be a temporary, positive but negligible indirect impact on employment and unemployment within each county along the route.

A large portion of the construction-related expenses would be for construction materials, supplies, equipment, parts, and other goods and services such as fuel and hardware. According to the IMPLAN model results, the top industries (as defined in the model) that would be positively affected by construction-related spending are construction services for new, non-residential structures; food services and drinking places; real estate businesses; wholesale trade business (i.e., businesses engaged in wholesaling merchandise like agriculture, and mining); architectural and engineering services; offices of health practitioners; private hospitals; employment services; and financial services (see Appendix R). These expenditures during construction would result in temporary and negligible to minor indirect, positive impacts on those industries, particularly within the counties along the route. The magnitude of the impact on the industries would depend on the size of the industries and the portion of the expenditures that would be spent locally in each county crossed by the route.

If businesses in these industries hire local additional staff to accommodate increased business, there would be a temporary, positive but negligible indirect impact on employment, unemployment, and per capita income at the county level along the route.

Tax Revenues

Construction of RA-03AM would generate state and local taxes from a variety of sources. State and county tax revenues would increase due to increased employment payrolls directly associated with construction (i.e., wages paid to construction workers). This increase in income tax revenues would be highest for RA-03AM compared to the other alternatives as a result of the increase in workers for the route. If the industries indirectly affected by construction hire additional staff to accommodate the increased business as described above, wages paid to those workers would also increase state and county tax revenues. As noted above, it was assumed that property taxes would not begin to accrue until the operations phase of the Project; therefore, construction of the pipeline would not affect property taxes at the county level.

As previously discussed, income taxes are generated at the state level and reapportioned to county governments as determined by the state. Table 6.5.4-12 presents the estimated increase in the state income tax that would be appropriated to each county in the ROI based on the portion of total length of the pipeline through each county. Based on the IMPLAN output in Table 6.5.4-12, counties crossed by RA-03AM would receive the highest total amount of income taxes ($73 million) as compared to that of the other alternatives. This positive impact on income tax revenues to the counties would be temporary and minor to major (i.e., depending on the allocation to each individual county) (see Appendix R).

Table 6.5.4-12. Estimated Income Tax Generated from Construction-Related Income for Route Alternative RA-03AM

County	Miles of Pipeline through County	Estimated Income Tax Generated from Direct and Indirect Construction-Related Income[a] ($2016 millions)
Hubbard	33.7	$9.7
Wadena	35.9	$10.4
Todd	12.6	$3.7
Morrison	47.8	$13.9
Benton	5.5	$1.6
Mille Lacs	15.6	$4.5
Kanabec	22.0	$6.4
Pine	43.6	$12.6
Carlton[b]	34.1	$9.9
TOTAL	**250.8**	**$72.7**

[a] The estimates represent a conservative upper bound on the actual values. The underlying data are based on results from an IMPLAN model that uses national data, rather than data at the state level. The national data inflate the results at a more localized level, compared to a state-level model (see Appendix R).

[b] Carlton County extends to the Wisconsin border; since this is a county-level analysis, this includes data for all of Carlton County.

Operations Impacts

Employment and Income

As for the Applicant's preferred route, the existing operations staff would be able to operate RA-03AM and few additional employees would be hired to assist the staff. As a result, operation of the pipeline would have no measureable impact on local employment, per capita household income, median household income, or unemployment in the ROI.

Tax Revenues

Since there would be few additional staff members hired for operation of the Project, there would be very little change in income tax or sales tax revenues due to increased spending by permanent operational staff. Therefore, the impact on income tax and sales tax revenues would be permanent, but at most negligible.

Property tax revenues would be the largest source of ongoing revenue to the counties along the route. Local and state governments would continue to collect annual property taxes from the Applicant based on the assessed value of the pipeline easements for the life of the Project. This would result in permanent, major positive impacts on property tax revenues for the counties along the route.

Route Alternative RA-06

Construction Impacts

Employment and Income

The portion of the RA-06 between Clearbrook and Carlton would require up to 2,400 workers across 4 construction spreads.

As stated in previous sections, it is expected that Enbridge would use some local labor (at least 50% from local union halls) regardless of the route alternative selected. As construction jobs are typically permanent in nature and spatially temporary in the sense that workers move from project to project, permanent jobs may result from said construction (this is also dependent on an unquantifiable backlog of other construction project demand). Based on this assumption, it is likely that direct construction-related employment would have a minor positive impact on county-level unemployment and per capita and/or median household income levels.

Furthermore, it is likely that some of the non-technical work could be accomplished by local labor (e.g., clearing and trenching); hiring of local labor for those positions would have a temporary (over the duration of construction and post-construction restoration activities) and negligible to minor impact on county-level unemployment or per capita and/or median household income levels, depending on the nature of work activities.

Construction workers who re-locate to the Project area would spend a portion of their income on local goods and services such as food, gas, and lodging. These expenditures would increase revenues to those secondary or supporting industries (i.e., industries that indirectly support the construction industry) for the duration of the construction period in the area of the construction spread. This would result in a temporary, minor positive impact on the secondary industries. If businesses in the secondary industries hire additional staff to accommodate increased business, there would be a temporary, positive but negligible indirect impact on employment and unemployment within each county along the route.

A large portion of the construction-related expenses would be for construction materials, supplies, equipment, parts, and other goods and services such as fuel and hardware. According to the IMPLAN model results, the top industries (as defined in the model) that would be positively affected by construction-related spending are construction services for new, non-residential structures; food services and drinking places; real estate businesses; wholesale trade business (i.e., businesses engaged in wholesaling merchandise like agriculture, and mining); architectural and engineering services; offices of health practitioners; private hospitals; employment services; and financial services (Appendix R). These expenditures during construction would result in temporary and negligible to minor indirect, positive impacts on those industries, particularly within the counties along the route. The magnitude of the impact on the industries would depend on the size of the industries and the portion of the expenditures that would be spent locally in each county crossed by the route.

If businesses in these industries hire local additional staff to accommodate increased business, there would be a temporary, positive but negligible indirect impact on employment, unemployment, and per capita income at the county level along the route.

Tax Revenues

Construction of RA-06 would generate state and local taxes from a variety of sources. State and county tax revenues would increase due to increased employment payrolls directly associated with construction (i.e., wages paid to construction workers). If the industries indirectly affect by construction hire additional staff to accommodate the increased business as described above, wages paid to those workers would also increase state and county tax revenues. In terms of property taxes, it was assumed that property taxes would not begin to accrue until the operations phase of the Project; therefore, construction of the pipeline would have no impact on property taxes at the county level.

As previously discussed, income taxes are generated at the state level and reapportioned to county governments as determined by the state. Table 6.5.4-13 presents the estimated increase in the state income tax that would be appropriated to each county in the ROI based on the portion of total length of the pipeline through each county. Based on the IMPLAN output in Table 6.5.4-13, counties crossed by RA-06 would receive $58.2 million in taxes, and Itasca County would experience the greatest revenue increase from income taxes ($32.1 million) (see Appendix R). This positive impact on income tax revenues to the counties would be temporary and minor to major (i.e., depending on the allocation to each individual county).

Table 6.5.4-13. Estimated Income Tax Generated from Construction-Related Income for Route Alternative RA-06

County	Miles of Pipeline through County	Estimated Income Tax Generated from Direct and Indirect Construction-Related Income[a] ($2016 millions)
Beltrami	38.4	$11.4
Itasca	108.2	$32.1
Aitkin	0.8	$0.2
St. Louis	24.7	$7.3
Carlton[b]	24.2	$7.2
TOTAL	**196.3**	**$58.2**

[a] The estimates represent a conservative upper bound on the actual values. The underlying data are based on results from an IMPLAN model that uses national data, rather than data at the state level. The national data inflate the results at a more localized level, compared to a state-level model (Appendix R).

[b] Carlton County extends to the Wisconsin border; since this is a county-level analysis, it includes data for all of Carlton County.

Operations Impacts

Employment and Income

The existing operations staff would be able to operate SA-06 and few additional employees would be hired to assist the staff. As a result, operation of the pipeline would have no measureable impact on local employment, per capita household income, median household income, or unemployment in the ROI.

Tax Revenue

Since there would be few additional staff members hired for operation of the Project, there would be very little change in income tax or sales tax revenues due to increased spending by permanent operational staff. Therefore, the impact on income tax and sales tax revenues would be permanent, but at most negligible.

Property tax revenues would be the largest source of ongoing revenue to the counties along the route. Local and state governments would continue to collect annual property taxes from the Applicant based on the assessed value of the pipeline easements for the life of the Project. This would result in permanent, major positive impacts on property tax revenues for the counties along the route.

Route Alternative RA-07

Construction Impacts

Employment and Income

The portion of the RA-07 between Clearbrook and Carlton would require up to 2,400 workers across 4 construction spreads.

As stated in previous sections, it is expected that Enbridge would use some local labor (at least 50% from local union halls) regardless of the route alternative selected. As construction jobs are typically permanent in nature and spatially temporary in the sense that workers move from project to project, permanent jobs may result from said construction (this is also dependent on an unquantifiable backlog of other construction project demand). Based on this assumption, it is likely that direct construction-related employment would have a minor positive impact on county-level unemployment and per capita and/or median household income levels.

Furthermore, it is likely that some of the non-technical work could be accomplished by local labor (e.g., clearing and trenching); hiring of local labor for those positions would have a temporary (over the duration of construction and post-construction restoration activities) and negligible to minor impact on county-level unemployment or per capita and/or median household income levels, depending on the nature of work activities.

Construction workers who re-locate to the Project area would spend a portion of their income on local goods and services such as food, gas, and lodging. These expenditures would increase revenues to those secondary or supporting industries (i.e., industries that indirectly support the construction industry) for the duration of the construction period in the area of the construction spread. This would result in a temporary, minor positive impact on the secondary industries. If businesses in the secondary industries

hire additional staff to accommodate increased business, there would be a temporary, positive but negligible indirect impact on employment and unemployment within each county along the route.

A large portion of the construction-related expenses would be for construction materials, supplies, equipment, parts, and other goods and services such as fuel and hardware. According to the IMPLAN model results, the top industries (as defined in the model) that would be positively affected by construction-related spending are construction services for new, non-residential structures; food services and drinking places; real estate businesses; wholesale trade business (i.e., businesses engaged in wholesaling merchandise like agriculture, and mining); architectural and engineering services; offices of health practitioners; private hospitals; employment services; and financial services (see Appendix R). These expenditures during construction would result in temporary and negligible to minor indirect, positive impacts on those industries, particularly within the counties along the route. The magnitude of the impact on the industries would depend on the size of the industries and the portion of the expenditures that would be spent locally in each county crossed by the route.

If businesses in these industries hire local additional staff to accommodate increased business, there would be a temporary, positive but negligible indirect impact on employment, unemployment, and per capita income at the county level along the route.

Tax Revenues

Construction of RA-07 would generate state and local taxes from a variety of sources. State and county tax revenues would increase due to increased employment payrolls directly associated with construction (i.e., wages paid to construction workers). If the industries indirectly affect by construction hire additional staff to accommodate the increased business as described above, wages paid to those workers would also increase state and county tax revenues. As previously noted, it was assumed that property taxes would not begin to accrue until the operations phase of the Project; therefore, construction of the pipeline would not affect property taxes at the county level.

As previously discussed, income taxes are generated at the state level and reapportioned to county governments as determined by the state. Table 6.5.4-14 presents the estimated increase in the state income tax that would be appropriated to each county in the ROI based on the portion of total length of the pipeline through each county. Based on the IMPLAN output in Table 6.5.4-14, counties crossed by RA-07 would receive $49.6 million in taxes, and Itasca County would receive the greatest portion of revenue increases from income taxes ($15.1 million) (see Appendix R). This positive impact on income tax revenues to the counties would be temporary and minor to major (i.e., depending on the allocation to each individual county).

Operations Impacts

Employment and Income

The existing operations staff would be able to operate SA-07 and few additional employees would be hired to assist the staff. As a result, operation of the pipeline would have no measureable impact on local employment, per capita household income, median household income, or unemployment in the ROI.

Tax Revenues

Since there would be few additional staff members hired for operation of the Project, there would be very little change in income tax or sales tax revenues due to increased spending by permanent

operational staff. Therefore, the impact on income tax and sales tax revenues would be permanent, but at most negligible.

Property tax revenues would be the largest source of ongoing revenue to the counties along the route. Local and state governments would continue to collect annual property taxes from the Applicant based on the assessed value of the pipeline easements for the life of the Project. This would result in permanent, major positive impacts on property tax revenues for the counties along the route.

Table 6.5.4-14. Estimated Income Tax Generated from Construction-Related Income for Route Alternative RA-07

County	Miles of Pipeline through County	Estimated Income Tax Generated from Direct and Indirect Construction-Related Income[a] ($2016 millions)
Beltrami	22.9	$6.9
Hubbard	7.9	$2.4
Cass	34.2	$10.2
Itasca	50.3	$15.1
Aitkin	1.1	$0.3
St. Louis	24.7	$7.4
Carlton[b]	24.2	$7.3
TOTAL	**165.3**	**$49.6**

[a] The estimates represent a conservative upper bound on the actual values. The underlying data are based on results from an IMPLAN model that uses national data, rather than data at the state level. The national data inflate the results at a more localized level, compared to a state-level model (see Appendix R).

[b] Carlton County extends to the Wisconsin border; since this is a county-level analysis, it includes data for all of Carlton County.

Route Alternative RA-08

Construction Impacts

Employment and Income

The portion of the RA-08 between Clearbrook and Carlton would require up to 2,400 workers across 4 construction spreads.

As stated in previous sections, it is expected that Enbridge would use some local labor (at least 50% from local union halls) regardless of the route alternative selected. As construction jobs are typically permanent in nature and spatially temporary in the sense that workers move from project to project, permanent jobs may result from said construction (this is also dependent on an unquantifiable backlog of other construction project demand). Based on this assumption, it is likely that direct construction-related employment would have a minor positive impact on county-level unemployment and per capita and/or median household income levels.

Furthermore, it is likely that some of the non-technical work could be accomplished by local labor (e.g., clearing and trenching); hiring of local labor for those positions would have a temporary (over the

duration of construction and post-construction restoration activities) and negligible to minor impact on county-level unemployment or per capita and/or median household income levels, depending on the nature of work activities.

Construction workers who re-locate to the Project area would spend a portion of their income on local goods and services such as food, gas, and lodging. These expenditures would increase revenues to those secondary or supporting industries (i.e., industries that indirectly support the construction industry) for the duration of the construction period in the area of the construction spread. This would result in a temporary, minor positive impact on the secondary industries. If businesses in the secondary industries hire additional staff to accommodate increased business, there would be a temporary, positive but negligible indirect impact on employment and unemployment within each county along the route.

A large portion of the construction-related expenses would be for construction materials, supplies, equipment, parts, and other goods and services such as fuel and hardware. According to the IMPLAN model results, the top industries (as defined in the model) that would be positively affected by construction-related spending are construction services for new, non-residential structures; food services and drinking places; real estate businesses; wholesale trade business (i.e., businesses engaged in wholesaling merchandise like agriculture, and mining); architectural and engineering services; offices of health practitioners; private hospitals; employment services; and financial services (see Appendix R). These expenditures during construction would result in temporary and negligible to minor indirect, positive impacts on those industries, particularly within the counties along the route. The magnitude of the impact on the industries would depend on the size of the industries and the portion of the expenditures that would be spent locally in each county crossed by the route.

If businesses in these industries hire local additional staff to accommodate increased business, there would be a temporary, positive but negligible indirect impact on employment, unemployment, and per capita income at the county level along the route.

Tax Revenues

Construction of RA-08 would generate state and local taxes from a variety of sources. State and county tax revenues would increase due to increased employment payrolls directly associated with construction (i.e., wages paid to construction workers). If the industries indirectly affected by construction hire additional staff to accommodate the increased business as described above, wages paid to those workers would also increase state and county tax revenues. As noted, it was assumed that property taxes would not begin to accrue until the operations phase of the Project; therefore, construction of the pipeline would not affect property taxes at the county level.

As previously discussed, income taxes are generated at the state level and reapportioned to county governments as determined by the state. Table 6.5.4-15 presents the estimated increase in the state income tax that would be appropriated to each county in the ROI based on the portion of total length of the pipeline through each county. Based on the IMPLAN output in Table 6.5.4-15, counties crossed by RA-08 would receive $48.2 million in taxes, and Itasca County would receive the greatest portion of revenue increases from income taxes ($13.9 million) (see Appendix R). This positive impact on income tax revenues to the counties would be temporary and minor to major (i.e., depending on the allocation to each individual county).

Operations Impacts

Employment and Income

The existing operations staff would be able to operate SA-08 and few additional employees would be hired to assist the staff. As a result, operation of the pipeline would have no measureable impact on local employment, per capita household income, median household income, or unemployment in the ROI.

Tax Revenues

Since there would be few additional staff members hired for operation of the Project, there would be very little change in income tax or sales tax revenues due to increased spending by permanent operational staff. Therefore, the impact on income tax and sales tax revenues would be permanent, but at most negligible.

Property tax revenues would be the largest source of ongoing revenue to the counties along the route. Local and state governments would continue to collect annual property taxes from the Applicant based on the assessed value of the pipeline easements for the life of the Project. This would result in permanent, major positive impacts on property tax revenues for the counties along the route.

Table 6.5.4-15. Estimated Income Tax Generated from Construction-Related Income for Route Alternative RA-08

County	Miles of Pipeline through County	Estimated Income Tax Generated from Direct and Indirect Construction-Related Income[a] ($2016 millions)
Beltrami	20.4	$6.1
Hubbard	8.3	$2.5
Cass	34.3	$10.3
Itasca	46.3	$13.9
Aitkin	4.7	$1.4
St. Louis	22.6	$6.8
Carlton[b]	23.9	$7.2
TOTAL	**160.5**	**$48.2**

[a] The estimates represent a conservative upper bound on the actual values. The underlying data are based on results from an IMPLAN model that uses national data, rather than data at the state level. The national data inflate the results at a more localized level, compared to a state-level model (see Appendix R).

[b] Carlton County extends to the Wisconsin border; since this is a county-level analysis, it includes data for all of Carlton County.

6.5.4.4 Summary and Mitigation

6.5.4.4.1 Summary

Potential impacts on employment, income, and tax revenue were assessed for construction and operation of the Applicant's preferred route and route alternatives. These evaluations considered construction-related employment, payroll spending, and expenditures on materials, supplies and equipment; operation-related employment and payroll spending, income tax revenue from workers during construction and operation, and property taxes paid by the Applicant during operation. The ROI for this analysis consists of the counties in Minnesota crossed by the Applicant's preferred route and route alternatives. Table 6.5.4-16 provides a summary list of the potential impacts of construction and operation of the Applicant's preferred route and route alternatives, including the anticipated duration and magnitude of the impacts.

Construction Impacts

Pipeline construction would require a substantial workforce. Based on the assumption that Enbridge would use some local labor (at least 50% from local union halls) regardless of the route alternative selected, it is likely that direct construction-related employment would have a minor positive impact on county-level unemployment and per capita and/or median household income levels.

Furthermore, it is likely that some of the non-technical work could be accomplished by local labor (e.g., clearing and trenching); hiring of local labor for those positions would have a temporary (over the duration of construction and post-construction restoration activities) and negligible to minor impact on county-level unemployment or per capita and/or median household income levels, depending on the nature of work activities.

If the Applicant employs additional local labor during construction, there would be a greater influence on employment, unemployment, and per capita income at the county level that would result in a temporary positive but still minor impact. As construction jobs are typically permanent in nature and temporary in these sense that workers move from project to project, permanent impact may also be realized (this is also dependent on an unquantifiable backlog of other construction project demand).

During construction, there could be an increase in hiring in secondary industries (i.e., the industries that support the construction industry). The impact of that increase in employment would have temporary, negligible impacts on employment and income at the county level. If the Applicant employs some local residents during construction, there would be a greater influence on employment, unemployment, and per capita income at the county level and the temporary, positive impact would be somewhat greater.

Construction-related tax revenues would be largely due to income taxes paid at the state level and apportioned to the counties crossed by the pipeline, as well as sales and use taxes on construction-related goods and services. Tax revenues generated during construction are likely to be temporary and minor to major for all alternatives.

Employment and income effects as well as the impacts on tax revenues during construction would be substantially the same for all of the routes. Differences in impacts would be due to the differences in length of the route options. RA-03AM would have the largest positive impact on the tax revenues during construction, with an estimated $73 million in income tax revenue, because it has the longest route. The Applicant's preferred route and RA-06 are the next longest, followed by RA-07 and RA-08.

Operations Impacts

Operation of the Applicant's preferred route and each of the route alternatives would require a small number of new hires since the new pipeline would be operated primarily by the existing operations staff for the Enbridge Mainline. Therefore, operation would not result in a measureable effect on county-level income and employment levels. In addition, the small number of permanent staff required to operate each pipeline would not be substantial enough to change tax revenues at the county-level. However, property taxes would be substantial and would result in a permanent, major impact on county-level tax revenues. As noted above, the impact on property taxes would differ slightly, with the longest route (RA-03AM) generating higher taxes than the shorter routes.

6.5.4.4.2 Mitigation

The major impacts of the Applicant's preferred route or route alternatives on employment, income, and tax revenue would be associated with beneficial increases in tax revenue for all route options, including temporary increases in local tax during construction and permanent increases in property tax revenue during operation. No other mitigation measures have been identified to address impacts on employment, income, or tax revenues.

Table 6.5.4-16. Summary of Potential County-Level Impacts on Employment, Income, and Tax Revenues for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Construction Impacts					
Employment, unemployment, per capita income, median household income	Temporary and permanent/ negligible to minor impacts • 2,400 workers (combination of local labor utilized per Enbridge commitments, non-local labor) • Increase in income/jobs in secondary industries that support construction	Temporary and permanent/ negligible to minor impacts • 3,000 workers (*combination of local labor utilized per Enbridge commitments, non-local labor* • Increase in income/jobs in secondary industries that support construction	Temporary and permanent/ negligible to minor impacts • 2,400 workers (*combination of local labor utilized per Enbridge commitments, non-local labor*) • Increase in income/jobs in secondary industries that support construction	Temporary and permanent/ negligible to minor impacts • 2,400 workers (*combination of local labor utilized per Enbridge commitments, non-local labor*) • Increase in income/jobs in secondary industries that support construction	Temporary and permanent/ negligible to minor impacts • 2,400 workers (*combination of local labor utilized per Enbridge commitments, non-local labor*) • Increase in income/jobs in secondary industries that support construction
Property tax revenue during construction	No impact	No impact	No impact	No impact	No impact
Income tax revenue during construction	Temporary/minor to major impacts (*depending on the allocation to each individual county*) • $56 million in income tax revenue	Temporary/minor to major impacts (*depending on the allocation to each individual county*) • $73 million in income tax revenue	Temporary/minor to major impacts (*depending on the allocation to each individual county*) • $58 million in income tax revenue	Temporary/minor to major impacts (*depending on the allocation to each individual county*) • $49 million in income tax revenue	Temporary/minor to major impacts (*depending on the allocation to each individual county*) • $48 million in income tax revenue
Operations Impacts					
Employment, unemployment, per capita income, median household income	No impact • Few new staff needed	No impact • Few new staff needed	No impact • Few new staff needed	No impact • Few new staff needed	No impact • Few new staff needed

Table 6.5.4-16. Summary of Potential County-Level Impacts on Employment, Income, and Tax Revenues for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Impact	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Property tax revenue during operations	Permanent/major impacts	Permanent/major impacts • Longest route, greatest property tax revenue	Permanent/major impacts	Permanent/major impacts	Permanent/major impacts • Shortest route, least property tax revenue
Income tax revenue during operations	Permanent/negligible impacts	Permanent/negligible impacts	Permanent/negligible impacts	Permanent/negligible impacts	Permanent/negligible impacts

6.5.4.5 References

Minnesota Office of the State Auditor. 2015. http://www.osa.state.mn.us/list.aspx?get=8 Accessed on November 16, 2016.

U.S. Census Bureau. 2014. 2010–2014 American Community Survey. American Fact Finder. https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml. Accessed on November 11, 2016.

U.S. Bureau of Economic Analysis. 2015. Local Personal Income 2015. http://www.bea.gov/newsreleases/regional/lapi/lapi_newsrelease.htm. Accessed on November 11, 2016.

6.6 COST COMPARISON

Project costs is one of the factors to be considered by the Commission for approval of a pipeline (Minn. R. 7850.4100, Subp. L). Two major categories of cost were considered: construction costs and operations costs; these costs were considered on a comparative basis.

6.6.1 Methodology

To estimate costs, information supplied by Enbridge for the cost of the Applicant's preferred route was used to determine a per-mile cost for the pipeline. The per-mile cost then was applied to the length of each route alternative to derive comparative costs. Cost estimates were prepared for the entire length of each route alternative in Minnesota. Costs also were broken out for the Clearbrook-to-Carlton segment of each route where the route alternative varies from the Applicant's preferred route.

6.6.2 Construction Costs

Construction costs include the costs for acquiring right-of-way easements or land purchase, construction equipment, pipe and associated equipment, pump station equipment, expendable supplies, and labor. Enbridge has reported that construction of the Applicant's preferred route across Minnesota would cost approximately $2.1 billion, or an average of $6.2 million per mile. After subtracting the cost of pump stations, the cost of a pipeline project of a given pipe diameter is highly correlated to the length of the project. Nevertheless, site-specific conditions, such as acquisition of easements, obtaining access, and special construction methods influence actual costs.

The average cost per mile for the Applicant's preferred route was applied to the length of each route alternative to obtain a cost for comparison (see Table 6.6-1). Total costs were calculated for each route alternative over the entire route in Minnesota and for the portion of the route between Clearbrook and Carlton that varied from the Applicant's preferred route. Overall construction costs across Minnesota ranged from $1.8 billion dollars (RA-07 and RA-08) to $2.4 billion dollars (RA-03AM). The significant portion of the cost would be for construction of the route segment between Clearbrook and Carlton, which would total between $1.0 billion (RA-08) and $1.7 billion (RA-03AM).

Table 6.6-1. Estimated Construction Costs for the Applicant's Preferred Route and Route Alternatives

Route	Minnesota Total		Clearbrook-to-Carlton Segment	
	Miles	Cost ($ billions)	Miles	Cost ($ billions)
Applicant's preferred route	339.7	$2.1	220.9	$1.4
Route alternative RA-03AM	394.9	$2.4	275.1	$1.7
Route alternative RA-06	316.6	$2.0	196.7	$1.2
Route alternative RA-07	287.5	$1.8	167.7	$1.0
Route alternative RA-08	284.6	$1.8	164.8	$1.0

Source: Average cost per mile for the Applicant's preferred route (Enbridge 2016).

6.6.3 Operations Costs

An estimate of operations costs was not available for the Minnesota portion of the proposed Project, as Enbridge would operate the Line 3 Project as part of its proprietary Mainline system. However, pumping costs (energy) is a major factor in the cost of operating the proposed Project in Minnesota. Like construction costs, pumping costs are related to pipeline length. Other length-related costs are surveillance and maintenance of the permanent right-of-way. Enbridge has indicated that energy use for the Applicant's preferred route would total over 533 million kilowatt-hours per year. Based on the average energy use per mile and the estimated cost of energy per kilowatt, the energy cost of operation was estimated for each route alternative (see Table 6.6-2). The annual energy costs for RA-03AM would be approximately 116 percent higher than for the Applicant's preferred route for the entire route in Minnesota. Energy costs for RA-06, RA-07, and RA-08 would be from 84 to 93 percent of the energy costs for the Applicant's preferred route in Minnesota. For the portion of the route between Clearbrook and Carlton that contains the route alternatives, energy costs for RA-03AM would be approximately 124 percent of the costs for the Applicant's preferred route; costs for RA-06, RA-07, and RA-08 would range from 75 to 88 percent of the costs for the Applicant's preferred route (Table 6.6-2).

Table 6.6-2. Estimated Annual Energy Costs during Operation for the Applicant's Preferred Route and Route Alternatives

Route	Minnesota Total		Clearbrook-to-Carlton Segment	
	Miles	Cost ($ millions)	Miles	Cost ($ millions)
Applicant's preferred route	339.7	$47.1	220.9	$30.7
Route alternative RA-03AM	394.9	$54.8	275.1	$38.2
Route alternative RA-06	316.6	$43.9	196.7	$27.3
Route alternative RA-07	287.5	$39.9	167.7	$23.3
Route alternative RA-08	284.6	$39.5	164.8	$22.9

Sources: Average cost per mile for Applicant's preferred route based on energy use provided by Enbridge (2016) and the average commercial energy cost in Minnesota in 2016 of 8.84 cents per kilowatt-hour (Electricity Local 2016).

6.6.4 References

Electricity Local. 2016. Minnesota Electricity Rates & Consumption. Electricitylocal.com/states/Minnesota. Accessed on December 19, 2016.

Enbridge Energy, Limited Partnership (Enbridge). 2016. Environmental Assessment Worksheet (EAW). November. Response to Data Request 01 to provide additional details for the EAW filed by Enbridge in April 2015.

6.7 RIGHT-OF-WAY SHARING OR PARALLELING

The Commission considers the extent of right-of-way sharing or right-of-way paralleling in its review of pipeline routes (Minn. R. 7850.4200, Subp. H and J). Right-of-way sharing or paralleling is a desirable land use policy because it concentrates the effects of linear infrastructure within corridors. Both right-of-way sharing and right-of-way paralleling avoid creating new corridors and habitat fragmentation, and can reduce the extent of new disturbance of vegetation and surface soils during construction compared to the creation of new corridors. Right-of-way sharing typically further reduces the extent of disturbance to vegetation and surface soils because of the overlap of the two standard rights-of-way widths.

The types of existing linear infrastructure in the shared or paralleled corridor also can influence the allowable proximity of adjacent infrastructure. For example, new oil pipelines may be co-located closer to an existing crude oil or refined products pipeline than to a highway or high-voltage transmission line, especially when the pipelines are owned by the same company, out of consideration for constructability, safety, and easement rights.

6.7.1 Regulatory Context and Methodology

6.7.1.1 Regulatory Context

Right-of-way sharing occurs when the permanent right-of-way of new linear infrastructure overlaps with the permanent right-of-way of existing infrastructure. For example, Enbridge's existing Mainline system in Minnesota contains six adjacent pipelines spaced approximately 10 to 15 feet from each other within a permanent right-of-way. Right-of-way paralleling occurs when the right-of-way of a new linear infrastructure is located adjacent to the permanent right-of-way of another linear infrastructure system but does not overlap. For example, two pipelines with 50-foot permanent rights-of-way (25 feet on either side of each pipe) would result in the two pipelines being 50 feet apart. Although no state-level regulations currently require right-of-way sharing or paralleling, the practice of resource management agencies is to encourage right-of-way sharing or paralleling.

6.7.1.2 Methodology

To assess right-of-way sharing or paralleling, the permanent rights-of-way for the Applicant's preferred route and each of the route alternatives were overlain on maps of existing infrastructure corridors using GIS to determine the portions of each route that would share, parallel, or be located independently of existing oil and gas pipelines, electric transmission lines, railroads, and highways.

6.7.2 Co-Location of Applicant's Preferred Route and Route Alternatives

Between Clearbrook and Carlton, the Applicant's preferred route and most of the route alternatives would share or parallel existing rights-of-way for the majority of their length (see Table 6.7-1). RA-07 would parallel the right-of-way with the Enbridge Mainline system from the North Dakota border to the Wisconsin border and share the right-of-way from Clearbrook to Carlton. RA-08 would share or parallel rights-of-way with existing pipelines for its entire length. The Applicant's preferred route would share or parallel existing rights-of-way along 73 percent of its length between Clearbrook and Carlton. RA-06 has the lowest proportion of its route co-located with existing rights-of-way between Clearbrook and Carlton (20 percent).

Table 6.7-1. Extent of Co-Location for the Applicant's Preferred Route and Route Alternatives

Segment	Total Length (miles)	New Right-of-Way (miles)	Type of Existing Infrastructure (miles)[a]			Percent of Co-Location
			Oil and gas pipeline	Transmission /utility lines	Road	
North Dakota Border to Clearbrook						
Applicant's preferred route	109.3	0	109.3	0	0	100
Clearbrook to Carlton						
Applicant's preferred route	220.9	59.8	66.2	92.0	2.9	73
Route alternative RA-03AM	275.1	12.9	223.6	13.8	24.8	95
Route alternative RA-06	196.7	156.5	40.3	0	0	20
Route alternative RA-07	167.7	0	167.7	0	0	100
Route alternative RA-08	164.8	0	164.8	0	0	100
Carlton to Wisconsin Border						
Applicant's preferred route	9.6	0	9.6	0	0	100

[a] Total miles co-located may be greater than total length due to areas where segment is shared with multiple types of existing infrastructure.

6.8 REGULATORY CONTROL

A wide variety of state and federal permits and approvals are required initially for approval of the Project and subsequently for various elements of Project construction and operation. The primary state regulations and associated major permits are described in Chapter 3. Resource-specific regulations and permits are discussed in the "Regulatory Context and Methodology" sub-sections found for each of the resources in Chapters 5 and 6.

Not all regulations require a permit or jurisdictional approval. Those that do are listed in Table 6.8-1, along with the government agency that issues approval, the type of application, the application status, and the general purpose for the permit.

Minnesota Statutes § 216G.02 Subdivision 3, Subpart (b)(4) states that the Commission must give "consideration of local government land use laws," including pipeline setback ordinances. Subdivision 4 also states that, while the statute requires consideration of the local laws, the pipeline permit supersedes those laws. Subdivision 4 stipulates that issuance of a pipeline routing permit "is the only site approval required" and that "the pipeline routing permit supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local, and special purpose governments." Because of this pre-emption, all local permits—and in particular, local land use/zoning permits—are not included in Table 6.8-1.

Table 6.8-1. Status of Required Permits and Approvals

Unit of Government	Type of Application	Status		Reason Required
		Applicant's Preferred Route	Route Alternatives	
U.S. Army Corps of Engineers – St. Paul District and Minnesota Pollution Control Agency (Minnesota PCA)	Section 10/404 Individual Permit and associated state 401 Individual Water Quality Certification	Application submitted and determined complete (January 28, 2016) - pending submittal of revised application	Not initiated	Authorizes discharge of dredged and fill material into waters of the United States, including wetlands, and crossing of navigable waters of the United States
U.S. Army Corps of Engineers – St. Paul District: Consent and Permission to Cross Flowage Easement and USACE Civil Works project, if needed.	33 USC 408	Not initiated	Not initiated	

Table 6.8-1. Status of Required Permits and Approvals

Unit of Government	Type of Application	Status		Reason Required
		Applicant's Preferred Route	Route Alternatives	
U.S. Fish & Wildlife Service	Section 7 Endangered Species Act (ESA) consultation (federally endangered species)	Consultation ongoing	Not initiated	Establishes conservation measures and authorizes, as needed, take of federally protected species
	Bald Eagle Nest Removal Permit	Pending submittal	Not initiated	Allows for removal of a known bald eagle nest in proximity to construction activities
U.S. Department of the Interior, Bureau of Indian Affairs	25 Code of Federal Regulations (CFR) Section 169	Not applicable	Applicable, but not initiated	Considers issuing a right-of-way grant (easement) across tribal land.
U.S. Department of Agriculture, U.S. Forest Service, Chippewa National Forest (CNF)	39 CFR Section 219; 16 U.S. Code 1601–1604	Not applicable	Applicable, but not initiated	Reviews the Project for consistency with CNF Land and Resource Management Plan; considers issuance of special use permit; Section 7 ESA and Section 106 National Historic Preservation Act (NHPA) consultations
Advisory Council on Historic Preservation	Section 106 of the NHPA	Not applicable	Applicable, but not initiated	Reviews and comments on the effects of the Project on historic properties
Leech Lake Band of Ojibwe	Section 7 of the ESA	Not applicable	Applicable, but not initiated	Coordinates in preparation of Biological Assessment /Biological Evaluation
	Section 106 of the NHPA	Not applicable	Applicable, but not initiated	Reviews and comments on the effects of the Project on historic properties and properties of religious and cultural importance
	Leech Lake Land Use Plan	Not applicable	Applicable, but not initiated	Considers issuance of land use permit
	Leech Lake Open Burning, Burn Barrel, and Fire Prevention Ordinance	Not applicable	Applicable, but not initiated	Considers need for burning permit

Table 6.8-1. Status of Required Permits and Approvals

Unit of Government	Type of Application	Status		Reason Required
		Applicant's Preferred Route	Route Alternatives	
Fond du Lac Band of Lake Superior Chippewa (FDL)	Section 106 of the NHPA	Not applicable	Applicable, but not initiated	Reviews and comments on the effects of the Project on historic properties and properties of religious and cultural importance
	FDL Wetlands Protection and Management Ordinance 03/06	Not applicable	Applicable, but not initiated	Reviews and considers applications for Wetland Activity Permits
	Section 401 of the Clean Water Act, FDL Water Quality Certification Standards, Ordinance 01/06	Not applicable	Applicable, but not initiated	Considers issuing 401 Water Quality Certificate and Tribal Water Quality Certification for areas within the FDL Reservation
	Special Use and Shoreland Use under FDL Land Use Ordinance 02/07	Not applicable	Applicable, but not initiated	Reviews and considers applications for Conditional Use Permits
	FDL Open Burning Restrictions and Permitting Requirements Ordinance 5/93	Not applicable	Applicable, but not initiated	Reviews and considers applications for burning permits, if appropriate
	FDL Ordinance 5/84 and Secretarial Order 3215.	Not applicable	Applicable, but not initiated	Considers issuance of a Timber Cutting Permit based on results of timber surveys
Minnesota Public Utilities Commission	Certificate of Need	Application submitted	Not initiated	Determines the need for the pipeline, including questions of size, type, and timing
	Route permit	Application submitted	Not initiated	Authorizes construction of the pipeline along a specific route, subject to certain conditions

Table 6.8-1. Status of Required Permits and Approvals

Unit of Government	Type of Application	Status		Reason Required
		Applicant's Preferred Route	Route Alternatives	
Minnesota DNR	License to Cross Public Waters	Application submitted	Not initiated	50-year license that allows a proposed utility to cross public waters
	License to Cross Public Lands	Application submitted	Not initiated	50-year license that allows a proposed utility to cross public lands
	Long-term Lease – Access Roads	Pending submittal	Not initiated	Authorizes use of access roads managed by Minnesota DNR during construction and operation
	Water Appropriation Permit – Pipeline and Facilities	Pending submittal	Not initiated	Authorizes withdrawal and use of water from surface water or groundwater sources
	State Endangered Species Permit and Avoidance Plan	Pending submittal	Not initiated	Outlines plans for avoidance, minimization, and mitigation of take of state-listed species
	Osprey Nest Disturbance Authorization	Pending submittal	Not initiated	Allows removal of a known osprey nest
	Eagle Nest Removal Permit	Pending submittal	Not initiated	Allows removal of a known eagle nest
	Gully 30 Fen Management Plan	Pending submittal	Not initiated	Authorizes construction across the Gully 30 fen
Minnesota PCA	Clearbrook Terminal Air Quality Permit – Synthetic –Minor Individual State Operating Permit	Pending submittal	Not initiated	Authorizes construction and operation at the modified Clearbrook terminal
	Any aboveground overpressure relief storage tanks (ASTs) (usually 100,000- to 200,00-gallon capacity) will need to meet applicable standards	Pending submittal	Not initiated	All ASTs must meet American Petroleum Institute Standards 620, 650, 651, and 653.
	Clean Water Act Section 401 Certification	Pending submittal	Not initiated	Section 401 of the Clean Water Act requires this certification for a federal license or permit (in this case, a Section 404 wetland permit) to conduct an activity that may result in a discharge of a pollutant into waters of the United States.

Table 6.8-1. Status of Required Permits and Approvals

Unit of Government	Type of Application	Status		Reason Required
		Applicant's Preferred Route	Route Alternatives	
	National Pollutant Discharge Elimination System (NPDES) Individual Construction Stormwater, Hydrostatic Test, and Trench Dewatering Permit – Pipeline Construction	Pending submittal	Not initiated	Authorizes ground disturbance with approved protection measures to manage soil erosion and stormwater discharge on a construction site, discharge of water from hydrotesting activities, and removal of water that may accumulate in the pipeline trench
	NPDES General Construction Stormwater Coverage – Facilities	Pending submittal	Not initiated	Authorizes ground disturbance with approved protection measures to manage soil erosion and stormwater discharge on a construction site
	NPDES General Construction Stormwater Coverage – Pipeyards and Contractor Yards	Pipe yard permits received and stormwater monitoring ongoing	Not initiated	Authorizes ground disturbance with approved protection measures to manage soil erosion and stormwater discharge on a construction site
Minnesota State Historic Preservation Office	Cultural Resources consultation, NHPA Section 106 clearance	Consultation ongoing	Not initiated	Ensures adequate consideration of impacts on significant cultural resources
Minnesota Department of Agriculture	Agricultural Protection Plan	Consultation initiated	Not initiated	Establishes measures for agricultural protection
Minnesota Department of Transportation	Road crossing permits	Pending submittal	Not initiated	Authorizes crossings of state jurisdictional roadways
	Temporary access/entrance permits	Pending submittal	Not initiated	Authorizes access to private lands during construction from state highway right-of-way
Minnesota Department of Health and Wrenshall and Sundsrud Court drinking water supply management areas	Drinking Water Supply Management Area/Wellhead Protection Area consultation	Consultation only (in progress)	Not initiated	Ensures that pipeline construction and operation are compatible with goals of relevant plans
Mississippi Headwaters Board	Local land use review	Consultation only (in progress)	Not initiated	Ensures compatibility with land use plan
Red Lake, Wild Rice, Two Rivers, and Middle-Snake watershed districts	Watershed District Permit	Pending submittal	Not initiated	Authorizes crossing of legal drains and ditches within watershed

Table 6.8-1. Status of Required Permits and Approvals

Unit of Government	Type of Application	Status		Reason Required
		Applicant's Preferred Route	Route Alternatives	
Minnesota Board of Water and Soil Resources/ Wetland Conservation Act Local Governmental Units	Notice of Intent to Utilize Federal Approvals for Utilities Project Exemption	Notice submitted	Not initiated	Notice of use of exemption required
Local/County	Permits pertaining to off-right-of-way yard use	Pending submittal	Not initiated	Ensures compatibility with relevant land use plans
	Road crossing permits	Pending submittal	Not initiated	Authorizes crossing of local and county jurisdictional roadways
	Construction haul road agreements	Pending submittal	Not initiated	Authorizes use of local and county roads to haul oversized loads
	Temporary access/entrance permits	Pending submittal	Not initiated	Authorizes access to private lands from local and county road rights-of-way
	Short- to long-term leases – access roads	Pending submittal	Not initiated	Authorizes use of temporary roads on locally and county-owned lands

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Chapter 7
Route Segment Alternatives

Chapter 7 compares individual route segment alternatives (RSAs) with the segment of the Applicant's preferred route they would replace. Commenters proposed RSAs during the scoping process to mitigate impacts on localized resources. Most are relatively short deviations; however, two are over 50 miles long. This chapter also describes RSA-53, a stand-alone RSA that connects to RSA-21, making it possible for RA-06, RA-07, or RA-08 to avoid the Fond du Lac Indian Reservation. Table 4.3-5 describes the location of each RSA, as well as its intended purpose. Figure 7-1 shows the location of the RSAs.

7.1 BACKGROUND

The discussion that follows identifies differences between individual RSAs and the segment of the Applicant's preferred route they replace by comparing common resources and factors. Each RSA is briefly described and discussed; meaningful variations between the RSA and the segment of the Applicant's preferred route it replaces are highlighted; affected resources are shown in a table; and the RSA is identified on a map. Note that the purpose of this chapter is to identify differences between the routing options—that is, the variation between the RSA and the segment of the Applicant's preferred route it replaces. As such, this chapter does not discuss impacts that are similar regardless of their intensity level.

The analysis used geographic information system (GIS) software to identify resources affected by the pipeline based upon the commenter's proposed alignment. In certain instances, re-aligning the pipeline within the route width might avoid specific resources. A centerline modification within a non-homogenous route segment might change the resources affected. This analysis does not account for these changes because without detailed engineering surveys and consideration of design constraints or restrictions associated with other resources within the route segment, it is difficult to accurately determine if re-alignment is possible and, if it is possible, where the pipeline would ultimately be located. Instead, in these instances the analysis relies on generic assessments, for example: "Re-aligning the pipeline within the route width would avoid this structure; re-alignment would likely increase the number of forested acres within the construction work area."

7.2 ASSUMPTIONS

Existing conditions along individual RSAs at the landscape scale are similar to those described in Chapter 6. Construction and operation practices are identical to those described in Chapter 2, including Applicant-proposed measures to avoid and minimize environmental impacts. Mitigation measures discussed throughout Chapters 2, 5, and 6 apply to any RSA selected. This analysis assumes coordination with local, state, federal, and tribal agencies would occur to determine appropriate design, construction, and operation techniques.

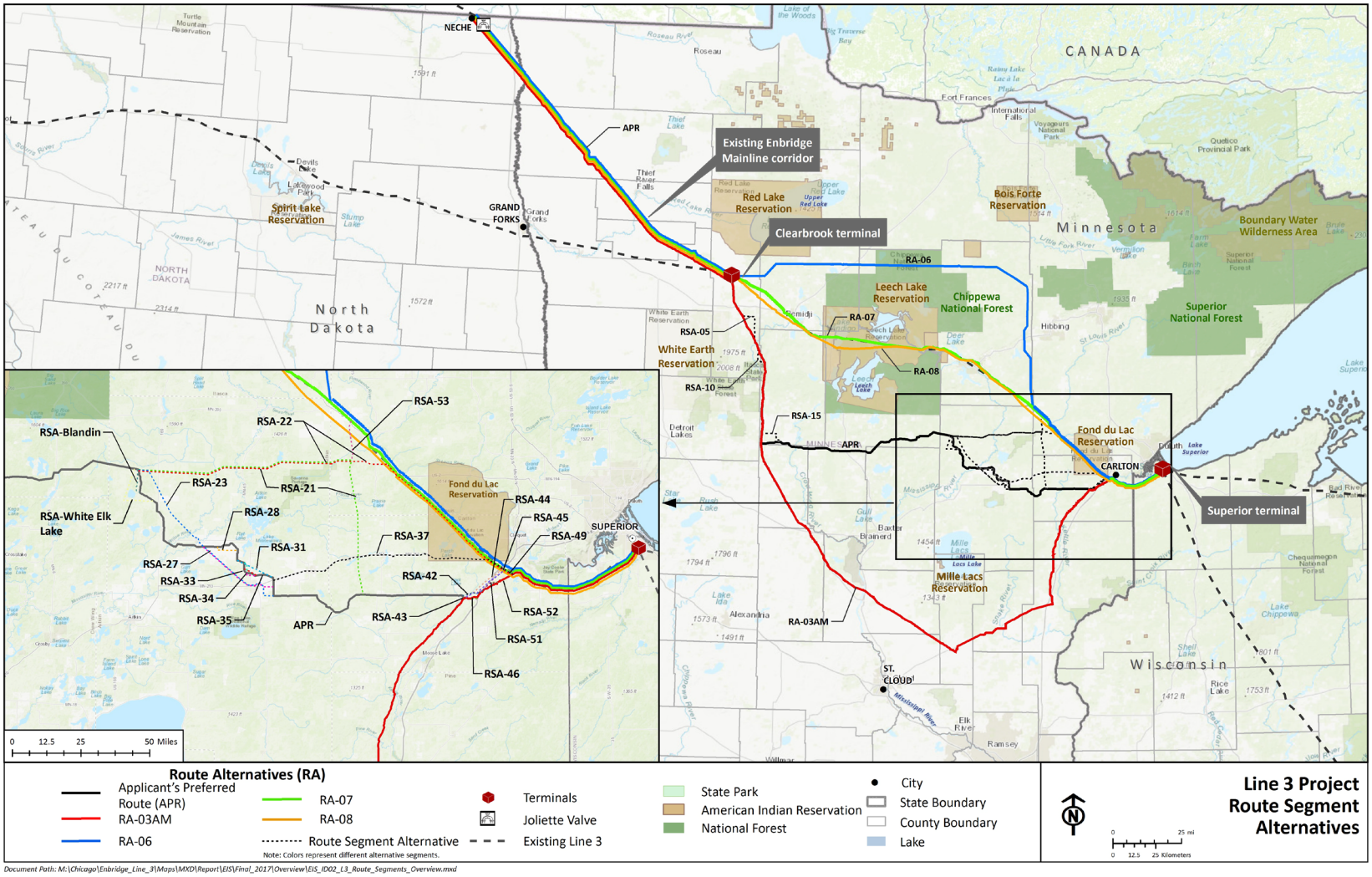

Figure 7-1. Location of Route Segment Alternatives

If the Minnesota Public Utilities Commission (Commission) selects RSA-21, RSA-22, RSA-23, or RSA-37, a new pump station might be required. A pump station would require approximately 8 acres of land. Additional mainline valves (MLV) could be required for RSA-05, RSA-21, RSA-22, RSA-23, RSA-27, and RSA-37 because of their length or proximity to sensitive resources. Specific footprints of these facilities are not evaluated in this analysis because pump station or MLV locations have not been identified. Facilities would be sited as part of final design, if a given RSA is selected by the Commission for the permitted route.

The analysis in Section 7.3 highlights meaningful variations between routing options. To reduce redundancy, potential impacts are described once below. Impacts are organized by routing factor. The analysis of meaningful variations between routing options in Section 7.3 pulls from these descriptions.

(A) Human Settlement

Aesthetics: Aesthetic impacts are subjective and relate to an individual's perceived sense of beauty. They are influenced by many factors. Commonly, people consider a harmonious viewshed to be aesthetically pleasing.

In general, the duration of visual impacts during construction in all but areas of woody vegetation, including forested wetlands, would persist until vegetation has reestablished in the construction work area. Operational impacts would be associated mainly with aboveground facilities and permanent clearing of woody vegetation within the 50-foot-wide permanent right-of-way. These impacts would be strongest where they are in the immediate foreground of sensitive observation points.

Noise: Project-related noise impacts generally fall into two categories: temporary impacts resulting from the use of construction equipment and activities and permanent impacts resulting from pump station facility operations. Because Chapter 7 does not discuss facilities, permanent noise impacts are not discussed.

Construction-related noise associated with heavy equipment can range from 80 to 90 decibels (specifically A-weighted decibels or dBA) at full power. Heavy equipment usually runs at full power 50 percent of the time. Point source sounds decrease 6 dBA per doubling of distance. This means an 80 dBA sound at 50 feet is perceived as a 56 dBA sound at 800 feet. A 90 dBA sound is perceived as 66 dBA. As such, construction-related noises are anticipated to be greatest within 1,250 feet of the centerline of the pipeline permanent right-of-way.

Transportation: Pipeline companies cross roads and other features by a variety of methods: open trench, bore, or directional drill. These methods affect traffic patterns differently. For example, the open trench method will result in road closures, whereas a bore or directional drill method might occur while traffic utilizes the road. The Applicant is proposing to cross paved roads and railroads by boring or horizontal directional drill (HDD), which would prevent road closures.

Displacement: Displacement is the forced removal of a residence or business to accommodate the routing of the pipeline. Often displacement can be avoided by re-aligning the pipeline within the route width.

Environmental Justice: Environmental justice refers to the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income. In general, environmental justice is

addressed to ensure equal protection from environmental and health hazards, as well as equal access to the environmental decision-making process.

Minority or low-income communities are often concentrated in small geographical areas within the larger area of study. Identifying these areas enables an analysis of whether these communities might experience disproportionate impacts from a project. This allows analysts and decision-makers to identify and understand what portion of the total impacts may be borne by minority or low-income communities, to assess whether they are disproportionately high and adverse and to develop alternatives and mitigation measures if necessary.

(B) Natural Environment

Vegetation: Vegetation is an assemblage of plants with similar structure that are categorized into types of ground cover. This analysis is based on existing cover types and site-specific impacts.

Vegetation would be removed or disturbed during construction. Short-term impacts are the result of grading and other physical disturbances. Woody species are not permitted to regenerate in the permanent right-of-way. This alters the composition and structure of the vegetation by converting it to herbaceous cover types. These impacts are permanent. Clearing vegetation increases potential for the introduction of invasive species; however, for the purposes of Chapter 7, potential impacts from invasive species are assumed to be similar for all routing options.

Native Plant Communities: Native plant communities are a group of native plants that interact with each other and with their environment in ways not greatly altered by modern human activity or by introduced organisms. Impacts on these communities are considered greater than impacts on other areas (e.g., non-native plant communities, heavily disturbed areas).

Wildlife Habitat: As a result of vegetation clearing, the underlying wildlife habitat would be altered—in some instances, permanently. Habitat loss has a consistent negative effect on biodiversity and can adversely affect species richness and population growth rates, among other measures. Habitat loss results from the creation of new corridors (called greenfield crossings) or the expansion of an existing corridor. Greenfield crossings create new habitat fragmentation, or the breaking apart of habitat, and new “edge” effects, or the creation of an artificial habitat boundary. While expansion of existing corridors further emphasizes existing habitat fragmentation and edge effects on one side of the right-of-way, potential impacts are less than those created by greenfield crossings.

Designated trout stream corridors are permanent easements that encompass 66 feet of land and water on either side of the centerline of the stream. Easements permit angler access, provide corridor protection, and allow the Minnesota DNR to conduct habitat improvement activities if needed. Impacts on these areas are considered greater due to the public investment of funds to secure the easement and the habitat they protect.

Wildlife: Wildlife that inhabit the route are anticipated to relocate during Project construction. The majority would return; however, some might be permanently displaced—especially species that rely upon woody vegetation or unfragmented habitats. Some individuals might be struck or killed, but population-level impacts are not anticipated.

Unique Natural Resources: Rare/protected wildlife species that inhabit the route are anticipated to temporarily relocate during Project construction. However, injury or loss of rare/protected individuals or communities could occur during construction. Population-level impacts are not anticipated.

Public Lands: Potential impacts on public lands—lands identified and protected because of their value to the state—would affect all Minnesotans. Given the importance of state lands to wildlife, recreation, and tourism, potential impacts would be regional. Impacts on private lands generally only affect those specific landowners and communities, and remain local. While both impacts may be significant, this analysis assumes, that on whole, potential impacts on public lands are greater.

(C) Cultural Resources

Potential direct impacts to cultural resources (including archaeological and historic resources) may occur during construction, when ground disturbing and right-of-way clearing activities are being conducted. Direct impacts may include the physical destruction of a resource (due to ground penetration or disruption of the stratigraphy of an archaeological site), limitations on access, or vandalism or looting, if the resource is significant. Indirect impacts include dust, vibration, and visual intrusions related to construction equipment and activities, as well as construction-related noise.

Operations related direct impacts largely would occur if a previously undiscovered resource is found during maintenance activities, or if a spill were to occur. Indirect impacts would primarily consist of the presence of MLVs, pump stations, and maintenance crews and equipment, resulting in dust, vibration, and visual and auditory intrusions.

For the purposes of this analysis, all information provided is based on data obtained from State Historic Preservation Office (SHPO) databases. Since all RSAs are located within Minnesota, this includes data obtained from the Minnesota Historical Society (MHS) in 2016. In this manner, archaeological and historic resources that are considered important to American Indian tribes may not be captured, unless the resource was recorded and included in one of these databases. In this manner, the potential number of resources to be impacted may be underestimated.

(D) Economics

Agriculture: Impacts on agriculture occur during pipeline construction. Impacts can include soil erosion, interference with and damage to agricultural surface and subsurface drainage and irrigation systems, mixing or loss of fertile topsoil and subsoil, and soil compaction. During construction, the production of crops on agricultural land would typically be prevented for one growing season, resulting in temporary minor losses to land currently being used for agricultural production. Additionally, timber production can be disrupted also resulting in crop losses. For the purposes of this analysis, impacts on peat lands are assumed to be permanent.

Recreation and Tourism: Impacts on recreation can be positive or negative. Potential impacts might be negative if they change the aesthetics of a recreational destination. Conversely, right-of-way clearing might increase opportunities for wildlife viewing or hunting. Impacts on recreation affect tourism if the impact increases or decreases visitor use in such areas as state owned lands. Since the majority of the land crossed by the route does not include developed recreational areas such as facilities and trails, potential impacts are likely to be temporary and localized, and limited to recreational users who live in and around the area.

(G) Natural Resources

Water Resources: Pipelines can affect surface waters, generally through indirect impacts from vegetation removal during right-of-way clearing. These impacts can include changes in water flow patterns or increased sedimentation. The potential for surface water impacts increases at stream/river crossings and in proximity to surface waters, such as rivers, lakes, and ponds. Direct impacts on groundwater can occur when a pipeline trench affects shallow water tables or underground pathways to aquifers. Potential for impacts is assumed to correlate with vulnerable water table distance crossed. Indirect impacts on groundwater can result from direct impacts on surface water.

Wetlands: Potential impacts to wetlands generally occur during construction. Impacts to wetlands are usually short-term and temporary because there is no permanent filling of wetland areas. Impacts on the hydrology of a wetland can significantly impair its function. Conversion of forested or woody wetlands will not reduce the overall wetland acreage, but will permanently convert the wetland to a different vegetation community and wetland type. Like surface waters, wetlands are affected in large part from changes in water flow patterns or increased sedimentation. The potential for impacts increases in proximity to the wetland.

7.3 ANALYSIS

Section 7.3 analyses 24 RSAs.

7.3.1 Route Segment Alternative RSA-05

RSA-05 is located in Clearwater County. It is 13.0 miles long and replaces a 9.8-mile segment of the Applicant's preferred route between Milepost (MP) 154.1 and MP 164.0 (Figure 7.3-1). RSA-05 traverses an area of mixed active farmland and forested land. It departs from the Minnesota Pipeline Company, LLC (MPL) pipeline corridor along which the Applicant's preferred route is co-located, creating a new greenfield corridor. RSA-05 was proposed by Enbridge in its May 26, 2016 Project scoping comments to avoid crossing lands within the boundaries of the Eastern Wild Rice Watershed. Enbridge proposed the alternative to address concerns raised by the White Earth Band of Ojibwe regarding impacts to Lower Rice Lake, an important wild rice lake for tribal members located within the watershed. Table 7.3-1 highlights the differences between RSA-05 and the Applicant's preferred route.

RSA-05 moves the pipeline out of the Eastern Wild Rice watershed. However, it shifts the resources at risk from an accidental release of oil to the Clearwater River watershed and Mississippi River – Headwaters watershed. These two watersheds are otherwise affected by the Applicant's preferred route in the immediate area; the Eastern Wild Rice watershed is not.

The Wild Rice River flows from Upper Rice Lake and meanders through Lower Rice Lake and the Eastern Wild Rice watershed until it reaches the Red River. The Applicant's preferred route is 0.7 mile from Upper Rice Lake at its closest point. Due to this distance, impacts on this waterbody from construction and normal operation are not anticipated. Mud Lake is approximately 1.3 miles north of Upper Rice Lake. Satellite imagery and topographic maps suggest that Mud Lake also drains to the Wild Rice River. The Applicant's preferred route passes approximately 500 feet northeast of this waterbody through a freshwater emergent wetland. It appears that, should this wetland be saturated, a hydrological connection between the Applicant's preferred route and the Wild Rice River might exist.

RSA-05 increases the minimum separation between these lakes and the pipeline to approximately 2.5 miles and moves the pipeline out of the Eastern Wild Rice watershed. However, RSA-05 crosses Walker Brook, which is a tributary to the Clearwater River. In addition, RSA-05 crosses an unnamed, intermittent stream at three locations as well as two other unnamed intermittent streams. These streams flow through Duncan, Berg, and Moose lakes prior to joining the Little Mississippi River.

Meaningful Variation Exists Between Routing Options

RSA-05 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; (F) Co-Location; and (G) Natural Resources.

(A) Human Settlement

Aesthetics: Both routing options expand or create new openings on the landscape; however, RSA-05 requires greenfield crossings, while the Applicant's preferred route does not. Therefore, RSA-05 is anticipated to increase aesthetic impacts.

Noise: The centerline of RSA-05 is within 1,250 feet of 14 additional sensitive noise receptors. This increases potential construction-related noise impacts at those noise sensitive receptors.

Transportation: RSA-05 and the Applicant's preferred route cross the same number of roads. This does not necessarily mean the impact will be the same between the two routes as traffic volumes and flow patterns differ among roads. Impacts may or may not affect traffic patterns during Project construction depending upon the construction method used to cross all affected roadways.

(B) Natural Environment

Vegetation: RSA-05 would require clearing of an additional 29 acres of forested cover types. This could lead to greater stormwater run-off and permanent loss of forest vegetation. Neither the RSA or APR cross any MBS survey areas where sensitive vegetation may be found.

Wildlife Habitat: RSA-05 would affect 29 additional acres of woodland habitat, but 5 fewer acres of wetland habitat for those wildlife species that depend on these habitat types. Conversely, wildlife species that tend to prefer edge habitat would be positively impacted post-restoration.

RSA-05 requires greenfield crossings; the Applicant's preferred route does not. Because of this, impacts from habitat fragmentation and edge effects would be greater along RSA-05.

Unique Natural Resources: RSA-05 and the Applicant's preferred route both cross in the vicinity of one occurrence of a Minnesota state species of special concern (mussel species) at the same location. Therefore, impacts are expected to be similar between the two routes.

(F) Co-Location

RSA-05 is co-located with existing corridors for approximately 71 percent less of its length than the Applicant's preferred route.

(G) Natural Resources

Water Resources: RSA-05 increases potential for surface water impacts because it requires four additional stream crossings. RSA-05 also crosses an additional 0.8 mile of vulnerable water table aquifers compared with the Applicant's preferred route which may affect groundwater.

Wetlands: RSA-05 would affect half as many wetland acres and reduce conversion of forested wetlands, reducing potential impacts to wetlands overall. Although the overall acreage loss would not change, conversion of forested wetlands to emergent wetlands is a quantifiable loss of habitat functionality.

Table 7.3-1. Localized Differences between Route Segment Alternative RSA-05 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	189.20	128.79	**+ 60.41**
Percentage co-located with existing corridors[a]	28.4%	100%	**– 71.6%**
Number of sensitive noise receptors[b]	32	18	**+ 14**
Number of road crossings[c]	11	11	**No change**
Number of NHD stream/river crossings [c]	6	2	**+ 4**
NHD Artificial Path	0	0	**No change**
NHD Canal/Ditch	0	0	**No change**
NHD Connector	0	0	**No change**
NHD Steam/River Intermittent	5	2	**+ 3**
NHD Stream/River Perennial	1	0	**+ 1**
Number of designated trout stream crossings	--	--	**No change**
Acres of native plant community crossings (construction work area)	--	--	**No change**
Acres of forested land crossings (construction work area)	89.15	59.80	**+ 29.35**
Acres of wetland crossings (construction work area)	16.91	22.81	**– 5.9**
Miles of vulnerable water table crossings[f]	2.3	1.5	**+ 0.8**
Number of Minnesota rare/protected species occurrences[g]	1	1	**No change**
Number of public water wells within 1250ft. of the centerline	4	5	**- 1**
Public water basins crossed by centerline	0	1	**- 1**
Miles of State Lands crossed by centerline	0.0	0.0	**No change**
Miles of timber parcels crossed by centerline	0.0	0.0	**No change**
Number of archaeological resources	1	0	**+1**
Number of historic resources	0	1	**-1**

Table 7.3-1. Localized Differences between Route Segment Alternative RSA-05 and the Applicant's Preferred Route

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	41%	2%	48%	4%	6%
Replaced segment	32%	3%	45%	8%	11%
Change	**+ 9%**	**– 1%**	**+ 3%**	**– 4%**	**– 5%**
Wetlands – Permanent Right-of Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	3.42	3.71	--	--	--
Replaced segment	4.76	6.82	0.23	--	--
Change	**– 1.34**	**– 3.11**	**– 0.23**	**No change**	**No change**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

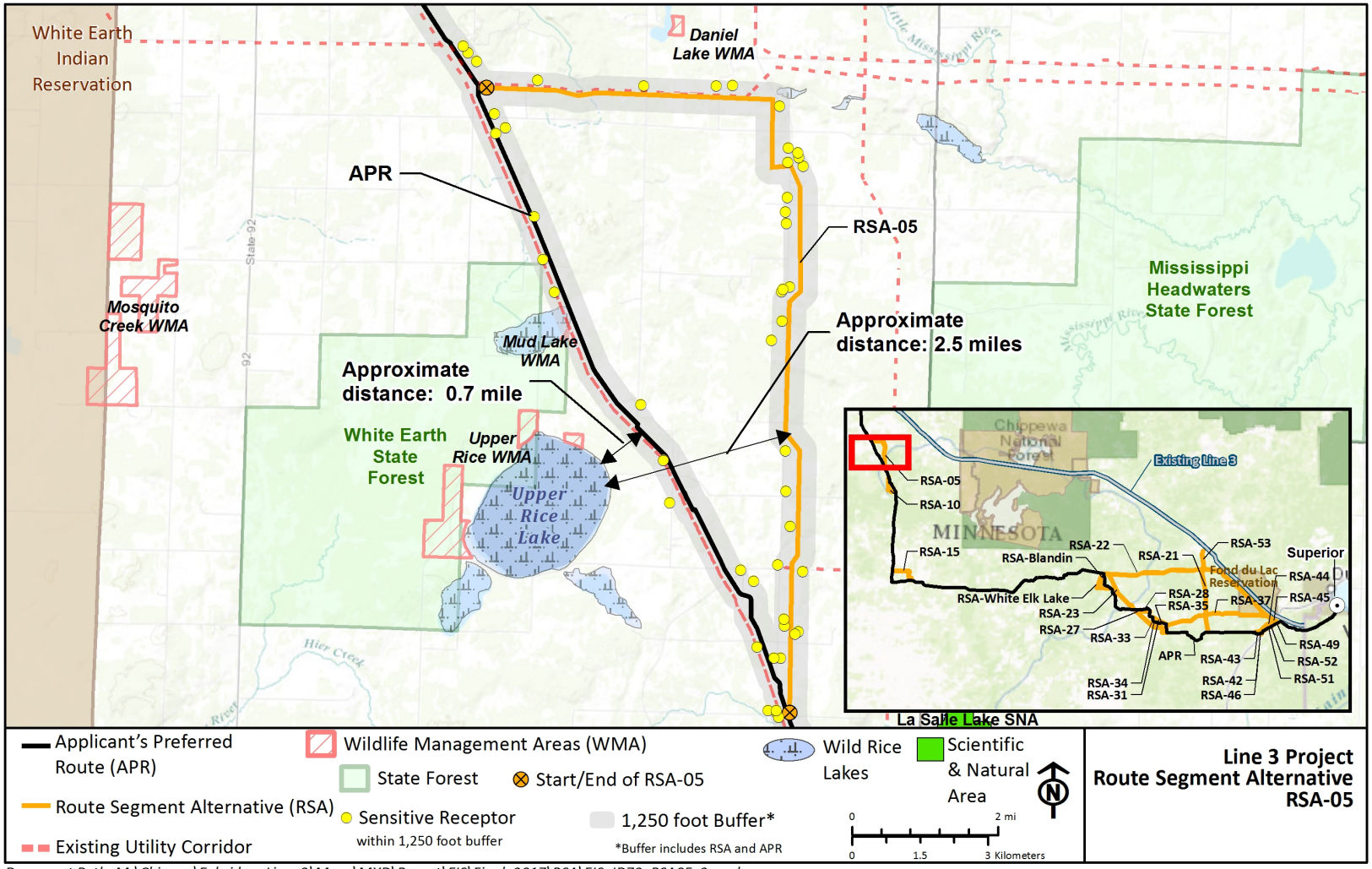

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Figure 7.3-1. Route Segment Alternative RSA-05

7.3.2 Route Segment Alternative RSA-10

RSA-10 is located in Clearwater and Hubbard counties. It is approximately 6.8 miles long and replaces a 5.6-mile segment of the Applicant's preferred route between MP 167.4 and MP 173.1 (Figure 7.3-2). RSA-10 is located adjacent to road rights-of-way and crosses forested areas intermixed with farmland. The purpose of RSA-10 is to move the crossing at LaSalle Creek to a more accessible location for emergency response. LaSalle Creek is a tributary to the Mississippi River. It flows south-to-north through various wetland types and Big LaSalle Lake, Middle LaSalle Lake, and LaSalle Lake before joining the Mississippi River. Table 7.3-2 highlights the differences between RSA-10 and the Applicant's preferred route.

RSA-10 locates the LaSalle Creek crossing in a more accessible location. The Applicant's preferred route positions the LaSalle Creek crossing approximately 0.5 mile upstream from Big LaSalle Lake, about 0.8 miles from Itasca Township Road 187, and 1.6 miles from 105th Avenue. The Applicant's preferred route crossing would be accessible via maintenance roads along new or existing oil pipelines. RSA-10 increases the distance of the crossing from Big LaSalle Lake to approximately 3.0 miles. It crosses LaSalle Creek along County Road 96, effectively eliminating separation from road access.

Cumulative Impacts Influence Route Segment Alternative RSA-10

Minnkota Power Cooperative proposes to construct a 115-kilovolt (kV) high-voltage transmission line to serve the industrial load for a new pumping station to be constructed and operated by MPL. The project is referred to as the Minnesota Pipeline – Laporte 115-kV Transmission Line Project (MPL-Laporte Project). RSA-10 follows the preferred transmission line route. Should the Commission ultimately select the preferred transmission line route, it would necessitate shifting the RSA-10 centerline for a portion of its length to provide adequate spacing between it and the transmission line.

The Environmental Assessment (EA) for the MPL-Laporte Project included an alternative that co-located the transmission line along the existing MPL pipeline corridor (Collocate Alternative Route). During development of the Collocate Alternative Route, MPL requested that a separation distance of 100 feet be maintained between the existing pipeline corridor and the new 115-kV transmission line, resulting in a 25-foot gap between the existing pipeline right-of-way and the transmission line right-of-way.

In the Relative Merits analysis contained in the EA, staff determined the Collocate Alternative Route had greater potential for negative impacts than the preferred route because of the separation between rights-of-way. This separation would create a new corridor, causing greater aesthetic impacts and increased habitat fragmentation and edge effects.

In the MPL-Laporte Project EA, staff indicated that the preferred transmission line route has the least potential for negative impacts. Should the Commission ultimately select this route, it would likely necessitate shifting the RSA-10 centerline 150 feet farther from 281st Avenue to provide adequate spacing between it and the transmission line—much like the Collocate Alternative Route discussed above—leaving a 75-foot gap between the pipeline and transmission line rights-of-way. This area may or may not be cleared of vegetation. This spacing is not necessary between pipelines. Therefore, should the Applicant's preferred route be selected instead of RSA-10, a separation distance would not be necessary, and the impacts discussed above (greater aesthetic impacts, increased habitat fragmentation, and new edge effects) would not occur.

Meaningful Variation Exists Between Routing Options

RSA-10 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; (C) Cultural Resources; (D) Economics, and (G) Natural Resources.

(A) Human Settlement

Aesthetics: RSA-10 follows existing roadway corridors for nearly its entire length. This would result in greater visual disturbance during construction than the Applicant's preferred route but create fewer long-term aesthetic impacts by not creating as many new openings in the landscape. Long-term aesthetic impacts may or may not be noticeable to the casual observer.

Noise: The centerline of RSA-10 is within 1,250 feet of six additional sensitive noise receptors, increasing potential noise impacts related to construction.

(B) Natural Environment

Vegetation: As currently routed, RSA-10 would affect approximately 25 forested acres; however, should the preferred route of the MPL-Laporte Project be selected, this would necessitate the pipeline being shifted from its current location. This would likely increase impacts on forested lands along the RSA and, as a result, would make impacts on forested cover types similar between routing options.

RSA-10 would affect approximately half as many acres within a native plant community compared with the Applicant's preferred route.

Wildlife Habitat: RSA-10 would affect 24 fewer acres of woodland habitat, but 5 more acres of wetland habitat for those wildlife species that depend on these habitat types.

RSA-10 requires virtually no greenfield crossings. Because of this, impacts from habitat fragmentation and edge effects would be less along RSA-10. Conversely, wildlife species that tend to prefer edge habitat would be more positively impacted by the Applicant's preferred route post-restoration.

RSA-10 would cross a designated trout stream (LaSalle Creek) in a less sensitive location (existing road crossing), reducing impacts on this resource.

(C) Cultural Resources

RSA-10 contains one more archaeological resource, as compared to the route segment it would replace. However, it would contain one less historic resource. None of the resources are listed on the State Register or the NRHP.

(D) Economics

State Lands: RSA-10 borders Itasca State Park for a portion of its length; the Applicant's preferred route does not. This would decrease accessibility to a portion of this State Park during construction as construction workspaces would be off-limits.

(G) Natural Resources

Water Resources: The LaSalle Creek crossing along RSA-10 is approximately 3.0 miles from Big LaSalle Lake—a 2.5-mile increase over the Applicant's preferred route—potentially reducing impacts on Big LaSalle Lake from an accidental release of oil. There is no change in the overall number of stream crossing between the two alternatives.

RSA-10 crosses 0.7 fewer miles of vulnerable water table aquifers and two more public water wells.

Wetlands: RSA-10 would convert approximately 2.5 acres of forested wetlands to emergent wetlands; the Applicant's preferred route would convert less than 0.1 acre. Overall, RSA-10 crosses more acres of forested wetlands, increasing potential impacts resulting from the functionality loss due to forested wetland conversion to emergent wetlands.

Table 7.3-2. Localized Differences between Route Segment Alternative RSA-10 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of permanent right-of-way	99.25	78.12	**+ 21.13**
Percentage co-located with existing corridors[a]	99%	70%	**+ 29%**
Number of sensitive noise receptors[b]	16	9	**+ 7**
Number of road crossings[c]	9	6	**+ 3**
Number of NHD stream/river crossings	2	2	**No change**
NHD Artificial Path	0	0	**No change**
NHD Canal/Ditch	0	0	**No change**
NHD Connector	0	0	**No change**
NHD Steam/River Intermittent	1	1	**No change**
NHD Stream/River Perennial	1	1	**No change**
Number of designated trout stream crossings	1	1	**No change**
Acres of native plant community crossings (construction work area)	4.73	8.19	**– 3.46**
Acres of forested land crossings (construction work area)	44.97	69.01	**– 24.04**
Acres of wetland crossings (construction work area)	5.70	1.82	**+ 3.88**
Miles of vulnerable water table crossings[f]	0.2	0.9	**– 0.7**
Number of Minnesota rare/protected species occurrences[g]	6	5	**+1**
Number of public water wells within 1250ft. of the centerline	2	0	**+ 2**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	1.0	0.0	**+ 1.0**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	1	0	**+1**
Number of historic resources	0	1	**-1**

Table 7.3-2. Localized Differences between Route Segment Alternative RSA-10 and the Applicant's Preferred Route

Land Cover[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	14%	33%	45%	2%	7%
Replaced segment	6%	2%	87%	1%	5%
Change	**+ 8%**	**+ 31%**	**– 42%**	**+ 1%**	**– 2%**
Wetlands[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	0.20	2.40	--	--	--
Replaced segment	0.76	0.08	--	--	--
Change	**– 0.56**	**+ 2.32**	**No change**	**No change**	**No change**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

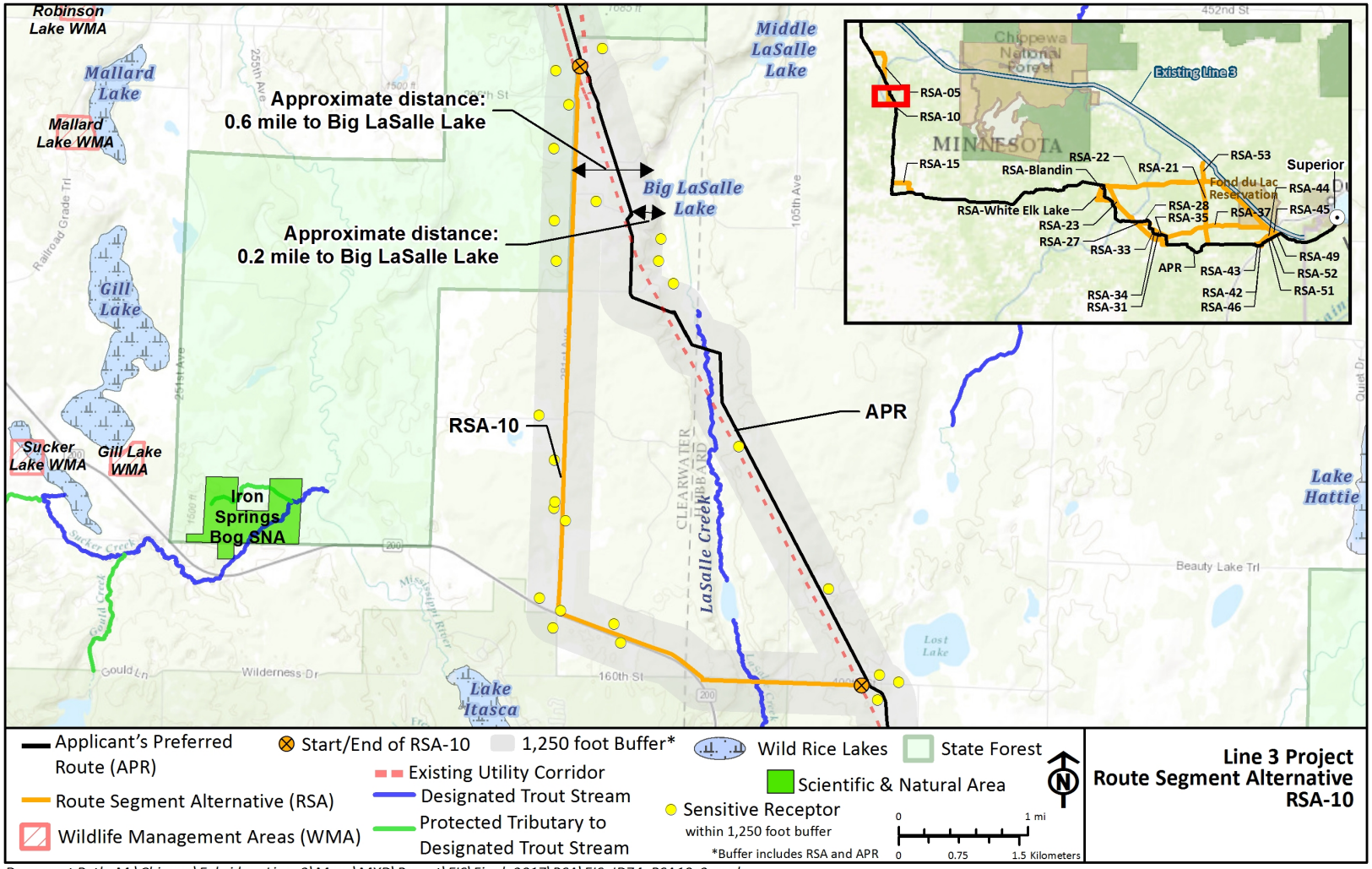

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Figure 7.3-2. Route Segment Alternative RSA-10

7.3.3 Route Segment Alternative RSA-15

RSA-15 is located in Hubbard County. It is approximately 9.5 miles long and replaces a 10.4-mile segment of the Applicant's preferred route between MP 199.7 and MP 210.1 (Figure 7.3-3). RSA-15 is co-located with existing corridors for its entire length, and passes through farmland, forest, and wetland areas. The purpose of RSA-15 is to provide better access near Twin Lakes and Shell River for emergency response. Table 7.3-3 highlights the differences between RSA-15 and the Applicant's preferred route.

RSA-15 does not cross the Shell River, but rather the Fishhook River about 1,300 feet upstream of the Shell River and 1.7 miles from Upper Twin Lake. The crossing is approximately 900 feet from Arbor Road. The Applicant's preferred route crosses the Shell River at three locations, one of which is approximately 0.5 mile from Upper Twin Lake. The crossing is 0.6 mile from County Road 6. There is no road access between the Applicant's preferred route and Upper Twin Lake, whereas along RSA-15 the Shell River passes beneath Arbor Road approximately 1.4 miles upstream of Upper Twin Lake.

Meaningful Variation Exists Between Routing Options

RSA-15 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; (C) Cultural Resources; (D) Economics; and (G) Natural Resources.

(A) Human Settlement

Noise: The centerline of RSA-15 is within 1,250 feet of nine more sensitive noise receptors, thereby increasing potential overall noise impacts related to construction.

Displacement: As currently proposed, RSA-15 displaces several residences. The homes could be avoided by re-aligning the pipeline within the route width. This would likely increase impacts on agricultural and forested cover types.

(B) Natural Environment

Vegetation: RSA-15 would affect approximately 13 more acres of native plant communities, but 28 fewer acres of forested cover types potentially resulting in lessened stormwater run-off potential.

Wildlife Habitat: RSA-15 would affect 28 fewer acres of woodland habitat, but 18 more acres of wetland habitat for those wildlife species that depend on these habitat types.

RSA-15 would cross five fewer designated trout streams. This is a significant decrease in potential impacts to trout production waters when compared to the Applicant's preferred route.

Unique Natural Resources: RSA-15 and the Applicant's preferred route both cross in the vicinity of two occurrences. Therefore, impacts are expected to be similar between the two routes. Occurrences within RSA-15 include mussel species.

(C) Cultural Resources

RSA-15 contains one more archaeological resource, as compared to the route segment it would replace. However, it would contain four less historic resources. None of the resources are listed on the State Register or the NRHP.

(D) Economics

RSA-15 does not cross any designated timber parcels while the Applicant's preferred route crossed approximately 1.8 miles of timber parcels. Thus, RSA-15 would have less of an impact to timber activities.

(G) Natural Resources

Water Resources: RSA-15 reduces the number of stream crossings by five when compared to the Applicant's preferred route. This reduction creates less potential for run-off, sedimentation, and turbidity to affect the area waterway network.

RSA-15 crosses 2.8 fewer miles of vulnerable water table aquifers but 29 more public water wells.

Wetlands: RSA-15 would increase potential impacts to wetlands by almost tripling the acreage of forested wetland conversion to emergent wetland.

Table 7.3-3. Localized Differences between Route Segment Alternative RSA-15 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	137.77	133.30	**+ 4.47**
Percentage co-located with existing corridors[a]	100%	100%	**No change**
Number of sensitive noise receptors[b]	32	23	**+ 9**
Number of road crossings[c]	14	11	**+ 3**
Number of NHD stream/river crossings	1	6	**– 5**
NHD Artificial Path	0	3	**– 3**
NHD Canal/Ditch	0	0	**No Change**
NHD Connector	0	0	**No Change**
NHD Steam/River Intermittent	0	0	**No Change**
NHD Stream/River Perennial	1	3	**– 2**
Number of designated trout stream crossings	1	6	**– 5**
Acres of native plant community crossings (construction work area)	30.01	16.70	**+ 13.31**
Acres of forested land crossings (construction work area)	52.38	80.02	**– 27.64**
Acres of wetland crossings (construction work area)	30.38	11.93	**+ 18.45**
Miles of vulnerable water table crossings[f]	6.9	9.7	**– 2.8**

Table 7.3-3. Localized Differences between Route Segment Alternative RSA-15 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Number of Minnesota rare/protected species occurrences[g]	2	2	**No change**
Number of public water wells within 1250ft. of the centerline	52	23	**+ 29**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	1.0	1.0	**No Change**
Miles of timber parcels crossed by centerline	0.0	1.8	**– 1.8**
Number of archaeological resources	1	0	**+1**
Number of historic resources	0	4	**-4**

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	26%	26%	36%	6%	5%
Replaced segment	20%	3%	57%	13%	7%
Change	**+ 6%**	**+ 23%**	**– 21%**	**– 7%**	**– 2%**

Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	4.24	8.25	--	--	--
Replaced segment	3.62	5.80	0.15	--	0.26
Change	**+ 0.62**	**+ 2.45**	**– 0.15**	**No change**	**– 0.26**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

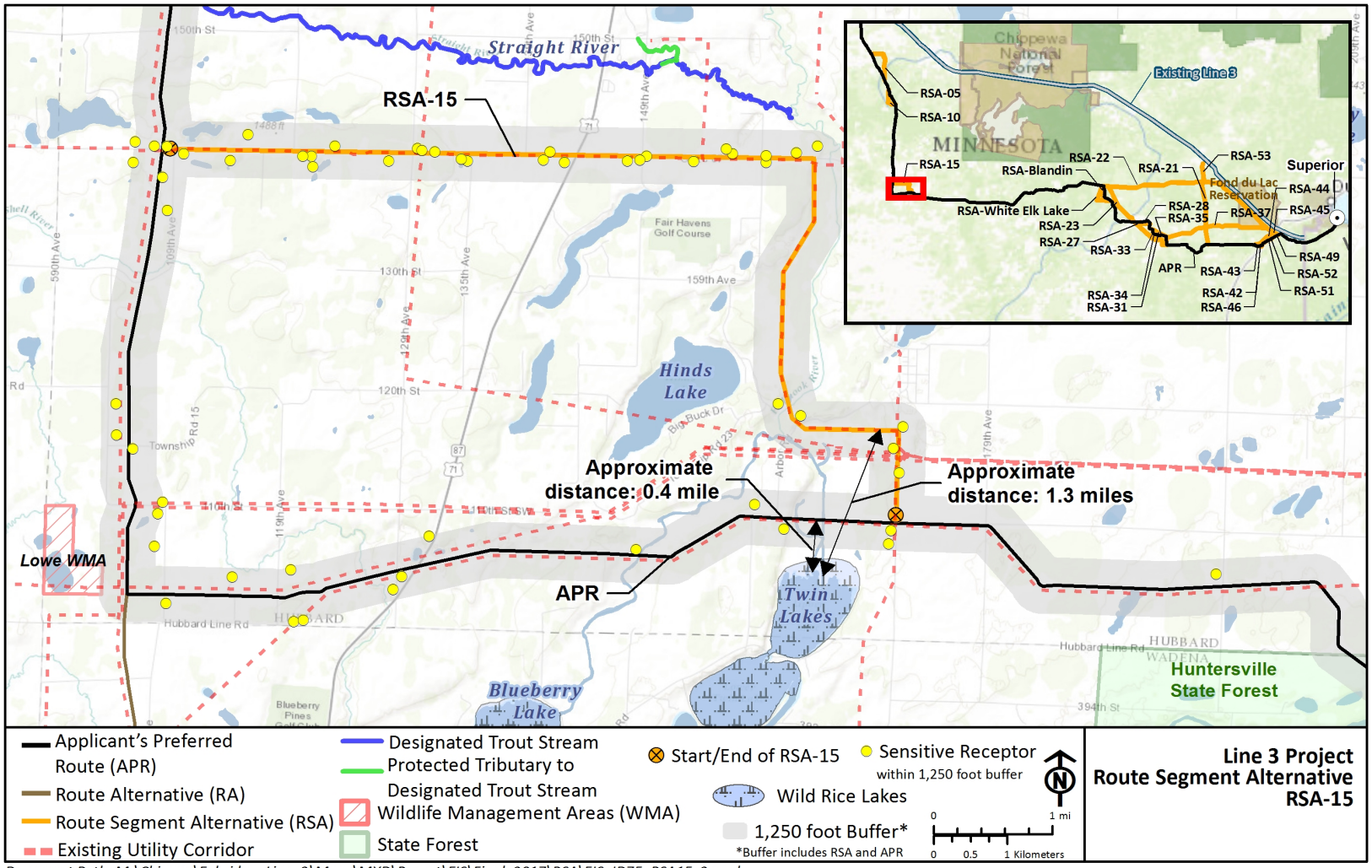

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Figure 7.3-3. Route Segment Alternative RSA-15

7.3.4 Route Segment Alternative RSA-Blandin

RSA-Blandin is located in Aitkin County. It is approximately 3.9 miles in length and replaces a 3.9-mile segment of the Applicant's preferred route between MP 278.3 and MP 282.2 (Figure 7.3-4). RSA-Blandin is a greenfield route that crosses mainly forested areas and some wetlands. Its purpose is to avoid a Minnesota DNR Forest Legacy Easement, which contains a provision restricting disturbance from a pipeline. RSA-Blandin avoids the Forest Legacy Easement. Minnesota DNR commented that uncertainty associated with these restrictions necessitates additional routing options in this area. Table 7.3-4 highlights the differences between RSA-Blandin and the Applicant's preferred route.

Meaningful Variation Exists Between Routing Options

RSA-Blandin and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; (D) Economics; (F) Co-Location; and (G) Natural Resources.

(A) Human Settlement

Aesthetics: Both routing options create new openings within Hill River State Forest that would create visual impacts; however, 15 percent of the Applicant's preferred route is co-located with existing road corridor, reducing this effect.

Noise: The centerline of RSA-Blandin is within 1,250 feet of one less sensitive noise receptor, thereby decreasing overall potential noise impacts related to construction

(B) Natural Environment

Vegetation: RSA-Blandin would affect 20 additional forested acres than the Applicant's preferred route potentially resulting in lessened stormwater run-off potential.

Wildlife Habitat: RSA-Blandin would affect 20 more acres of woodland habitat, but 6 less acres of wetland habitat for those wildlife species that depend on these habitat types. Overall, both routing options reduce wildlife habitat in an MBS site, specifically forest and wetland habitats; however, the Applicant's preferred route would have less habitat fragmentation and lower edge effects because a greater percentage is co-located with existing infrastructure.

RSA-Blandin requires 100% greenfield crossings. Because of this, negative impacts from habitat fragmentation and edge effects would be a factor to species affected by such habitat.

Unique Natural Resources: RSA-Blandin would cross in the vicinity of one more occurrence than the Applicant's preferred route, increasing potential impacts. Occurrences within RSA-Blandin include amphibian and bat species.

(D) Economics

Public Lands: The Applicant's preferred route would cross more mileage of state lands than this RSA and a state conservation easement.

(F) Co-Location

The Applicant's preferred route is co-located for 15 percent of its length. RSA-Blandin is a greenfield route.

(G) Natural Resources

Water Resources: RSA-Blandin requires neither river crossings nor vulnerable water table crossings which reduces the potential impact to these water resources when compared to the Applicant's preferred route.

Wetlands: RSA-Blandin would affect 6 fewer acres of wetlands and about half as many forested wetlands as the Applicant's preferred route.

Table 7.3-4. Localized Differences between Route Segment Alternative RSA-Blandin and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	56.84	50.67	**+ 6.17**
Percentage co-located with existing corridors[a]	0%	15.8%	**– 15.8%**
Number of sensitive noise receptors[b]	2	3	**– 1**
Number of road crossings[c]	1	1	**No change**
Number of NHD stream/river crossings	0	1	**– 1**
NHD Artificial Path	0	0	**No change**
NHD Canal/Ditch	0	0	**No change**
NHD Connector	0	0	**No change**
NHD Steam/River Intermittent	0	1	**– 1**
NHD Stream/River Perennial	0	0	**No change**
Number of designated trout stream crossings	0	0	**No change**
Acres of native plant community crossings (construction work area)	0	0	**No change**
Acres of forested land crossings (construction work area)	48.52	28.50	**+ 20.02**
Acres of wetland crossings (construction work area)	3.34	9.40	**– 6.06**
Miles of vulnerable water table crossings[f]	0	0.5	**– 0.5**
Number of Minnesota rare/protected species occurrences[g]	4	3	**+1**
Number of public water wells within 1250ft. of the centerline	1	2	**– 1**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	2.9	3.5	**– 0.6**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	0	0	No Change
Number of historic resources	0	0	No Change

Table 7.3-4. Localized Differences between Route Segment Alternative RSA-Blandin and the Applicant's Preferred Route

Land Cover – Permanent Right-of-Way[d]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	--	2%	86%	7%	5%
Replaced segment	--	16%	55%	20%	9%
Change	**No change**	**– 14%**	**+ 31%**	**– 13%**	**– 4%**
Wetlands – Permanent Right-of-Way[e]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	0.29	1.17	--	--	--
Replaced segment	0.96	3.85	--	--	--
Change	**– 0.67**	**– 2.68**	**No change**	**No change**	**No change**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

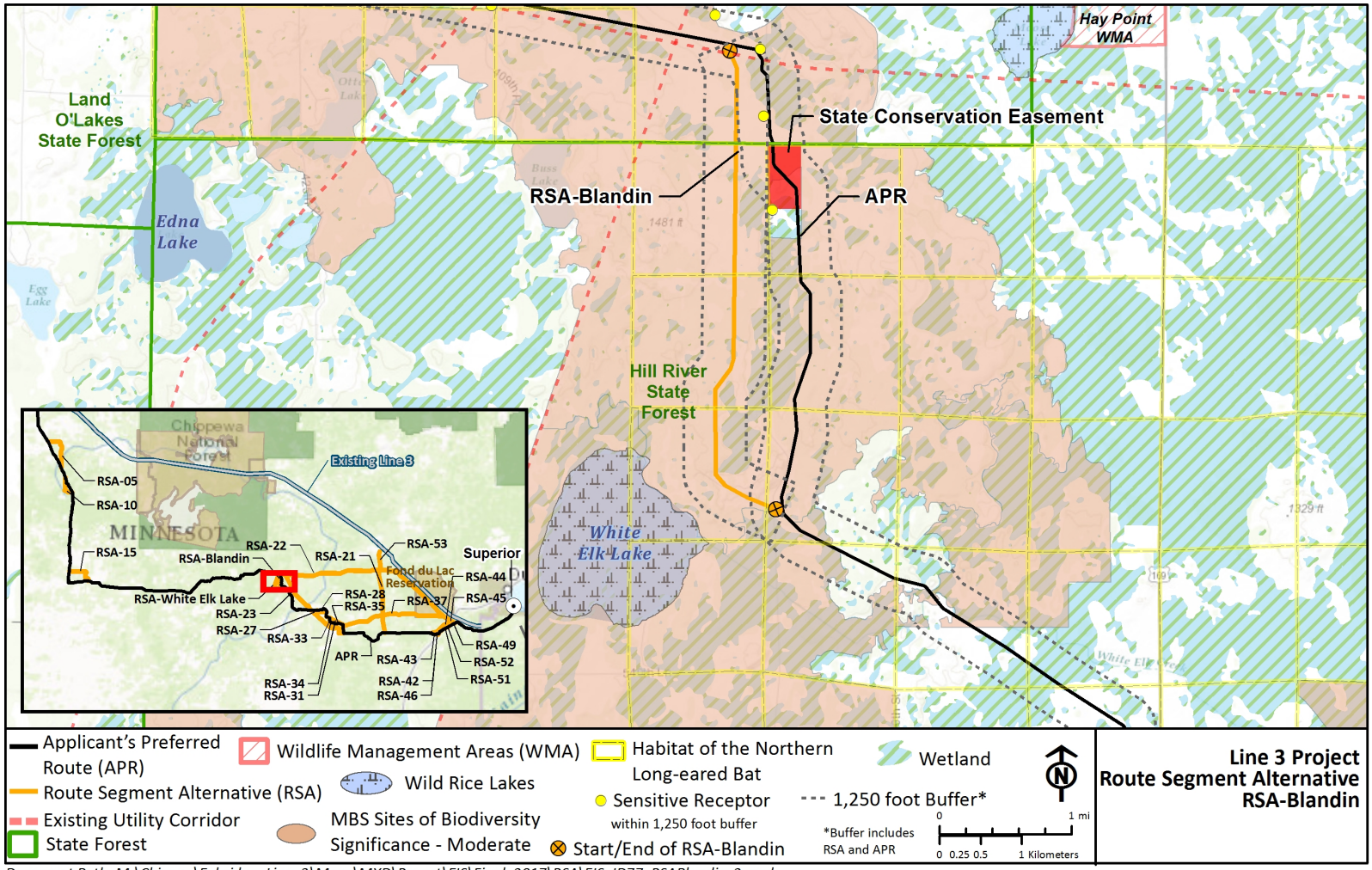

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Figure 7.3-4. Route Segment Alternative RSA-Blandin

7.3.5 Route Segment Alternative RSA-White Elk Lake

RSA-White Elk Lake is located in Aitkin County. It is approximately 9.7 miles long and would replace a 6.8-mile segment of the Applicant's preferred route between MP 277.9 and MP 284.7 (Figure 7.3-5). RSA-White Elk is co-located with existing infrastructure, and runs through primarily forest and wetlands areas. The purposes of RSA-White Elk Lake are to avoid a conservation easement held by the MDNR on land owned by the Blandin Paper Company as part of the Minnesota Forest Legacy Program and fragmentation of an MBS Site. Minnesota DNR commented that uncertainty associated with Forest Legacy Easement which contains a provision restricting disturbance from a pipeline, necessitates additional routing options in this area. Table 7.3-5 highlights the differences between RSA-White Elk Lake and the Applicant's preferred route.

RSA-White Elk Lake avoids the Forest Legacy Easement. This is the same easement avoided by RSA-Blandin. RSA-White Elk Lake is co-located with existing roadway and transmission line corridors for its entire length; therefore, while it crosses an MBS Site, it does not create new habitat fragmentation, specifically new edge effects.

Meaningful Variation Exists Between Routing Options

RSA-White Elk Lake and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; and (G) Natural Resources.

(A) Human Settlement

Aesthetics: RSA-White Elk Lake follows existing infrastructure rights-of-way for the greater portion of its length, reducing potential for visual impacts by not creating as many new landscape openings.

Noise: The centerline of RSA-White Elk Lake is within 1,250 feet of twice as many sensitive noise receptors as the Applicant's preferred route, thereby increasing potential noise impacts related to construction.

(B) Natural Environment

Wildlife: RSA-White Elk Lake avoids documented maternity roost trees for the northern long-eared bat along the Applicant's preferred route; however, considering the proximity of the two routing options, the species likely uses portions of RSA- White Elk Lake as well.

Wildlife Habitat: Both routing options would have reduced wildlife habitat in an MBS Site, specifically forest and wetland habitats; however, RSA-White Elk Lake would have reduced habitat fragmentation and edge effects because a greater percentage is co-located with existing infrastructure—that is, the MBS Site is already fragmented along RSA-White Elk Lake.

Unique Natural Resources: RSA-White Elk Lake would cross in the vicinity of four fewer rare species occurrences than the Applicant's preferred route, decreasing potential impacts. There are no occurrences within RSA-White Elk Lake.

(G) Natural Resources

Wetlands: RSA-White Elk Lake is significantly longer than the Applicant's preferred route. For this reason, it doubles potential impacts to wetlands. The RSA passes through a wetland that might hydrologically connect two wild rice lakes.

Table 7.3-5. Localized Differences between Route Segment Alternative RSA-White Elk Lake and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	140.79	86.95	**+ 53.84**
Percentage co-located with existing corridors[a]	68.0%	8.8%	**+ 60.0%**
Number of sensitive noise receptors[b]	8	4	**+ 4**
Number of road crossings[c]	8	1	**+ 7**
Number of NHD stream/river crossings	2	2	**No change**
NHD Artificial Path	0	0	**No change**
NHD Canal/Ditch	0	0	**No change**
NHD Connector	0	0	**No change**
NHD Steam/River Intermittent	1	1	**No change**
NHD Stream/River Perennial	1	1	**No change**
Number of designated trout stream crossings	0	0	**No change**
Acres of native plant community crossings (construction work area)	0	0	**No change**
Acres of forested land crossings (construction work area)	42.92	47.59	**– 4.67**
Acres of wetland crossings (construction work area)	36.54	18.23	**+ 18.31**
Miles of vulnerable water table crossings[f]	--	0.5	**– 0.5**
Number of Minnesota rare/protected species occurrences[g]	0	4	**-4**
Number of public water wells within 1250ft. of the centerline	6	3	**+ 3**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	5.4	6.0	**– 0.6**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	0	0	No Change
Number of historic resources	0	0	No Change

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	10%	5%	30%	30%	25%
Replaced segment	1%	9%	53%	28%	9%
Change	**+ 9%**	**– 4%**	**– 23%**	**+ 2%**	**+ 14%**

Table 7.3-5. Localized Differences between Route Segment Alternative RSA-White Elk Lake and the Applicant's Preferred Route

Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	7.84	7.34	--	--	--
Replaced segment	4.95	4.45	--	--	--
Change	**+ 2.89**	**+ 2.89**	**No change**	**No change**	**No change**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

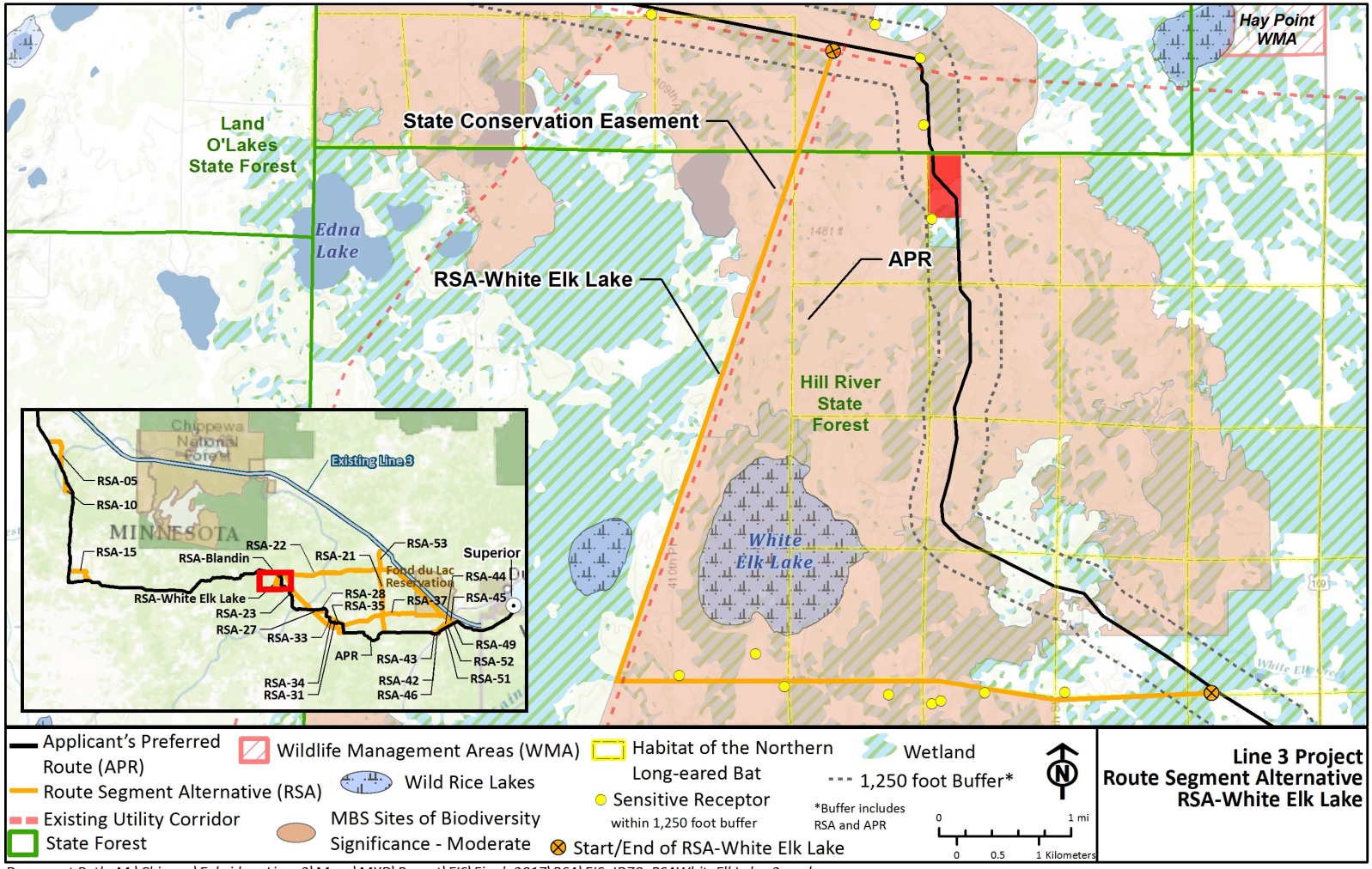

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Figure 7.3-5. Route Segment Alternative RSA-White Elk Lake

7.3.6 Route Segment Alternative RSA-21

RSA-21 is located in Aitkin County. It is approximately 53.9 miles long and would replace a 53.5-mile segment of the Applicant's preferred route between MP 278.5 and MP 331.9 (Figure 7.3-6). RSA-21 crosses primarily wetland cover types, but forested cover types are also crossed. The purpose of RSA-21 is to avoid impacts on the Sandy River, an ecologically and economically significant fisheries resource, especially downstream resources, such as wild rice and trout streams in the Big Sandy Lake watershed. Table 7.3-6 highlights differences between RSA-21 and the Applicant's preferred route.

RSA-21 eliminates crossings of, and increases separation between, the pipeline and the Sandy River. It does not eliminate impacts on wild rice waters, and it crosses an additional designated trout stream.

RSA-21 avoids crossing the Sandy River; however, it crosses the West Savanna River, Prairie River, and Tamarack River, all of which flow to Big Sandy Lake. The RSA also crosses a wetland that, based on desktop analysis, is hydrologically connected to the Little Tamarack River, which flows to the Tamarack River and into Big Sandy Lake. Therefore, while RSA-21 might eliminate potential impacts on the Sandy River from an accidental release of oil, it does not necessary avoid potential impacts on Big Sandy Lake.

RSA-21 passes adjacent to Moose Lake, an identified wild rice water. It crosses the Tamarack River approximately 0.5 mile upstream of Tamarack Lake, a wild rice water. Additionally, the RSA crosses West Savanna River, Prairie River, and Tamarack River, all of which flow to Big Sandy Lake.

Meaningful Variation Exists Between Routing Options

RSA-21 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; (C) Cultural Resources; (D) Economics; (F) Co-Location; and (G) Natural Resources.

(A) Human Settlement

Aesthetics: RSA-21 would have reduced visual impacts compared with the Applicant's preferred route due to its distance from population centers and co-location with existing corridors.

Noise: The centerline of RSA-21 is within 1,250 feet of 57 fewer sensitive noise receptors, thereby decreasing potential noise impacts to human settlement related to construction.

(B) Natural Environment

Vegetation: RSA-21 would reduce impacts on forested areas by approximately 60 acres. It would increase impacts on native plant communities by approximately the same acreage, including two high conservation value forests—Savanna Hardwoods and Floodwood Bog—within the Savanna State Forest. These forest types are managed in accordance with Forest Stewardship Council forest certification for high biodiversity value.

Unique Natural Resources: RSA-21 would cross in the vicinity of 36 fewer occurrences than the Applicant's preferred route, decreasing potential impacts. Occurrences within RSA-21 include bat, bird, and plant species.

(C) Cultural Resources

RSA-21 contains three less archaeological resources, as compared to the route segment it would replace. It also contains two less historic resources. However, none of the resources are listed on the State Register or the NRHP.

(D) Economics

Agriculture: RSA-21 does not cross any agricultural areas while the Applicant's preferred route would cross approximately 133 acres.

Public Lands: RSA-21 would increase separation or avoid several Wildlife Management Areas (WMAs)—Grayling Marsh and Lawler—near the Applicant's preferred route. It approaches Hay Point WMA to the north. Overall, RSA-21 increases separation between the pipeline and WMAs. A greater portion of RSA-21 crosses state forests. RSA-21 borders the Savanna Portage State Park for a portion of its length.

(F) Co-Location

RSA-21 is co-located with existing transmission line rights-of-way for its entire length; the Applicant's preferred route is co-located for approximately one-quarter of its length.

(G) Natural Resources

Water Resources: RSA-21 has two more waterbody crossings overall compared with the Applicant's preferred route and four more perennial stream crossings, one of which is a designated trout stream tributary. The Applicant's preferred route does not cross a trout stream.

Wetlands: RSA-21 crosses approximately two-thirds more wetland acres: 403 acres compared to 164 acres. It would convert twice as many forested wetlands (154 acres) to a less functional emergent wetland type.

Table 7.3-6. Localized Differences between Route Segment Alternative RSA-21 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	784.49	667.86	**+ 116.63**
Percentage co-located with existing corridors[a]	100%	26.3%	**+ 73.7%**
Number of sensitive noise receptors[b]	6	63	**– 57**
Number of road crossings[c]	20	25	**– 5**
Number of NHD stream/river crossings	25	23	**+ 2**
NHD Artificial Path	2	2	**No Change**
NHD Canal/Ditch	12	7	**+ 5**
NHD Connector	0	0	**No Change**
NHD Steam/River Intermittent	3	10	**– 7**

Table 7.3-6. Localized Differences between Route Segment Alternative RSA-21 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
NHD Stream/River Perennial	8	4	**+ 4**
Number of designated trout stream crossings	1	--	**+ 1**
Acres of native plant community crossings (construction work area)	76.12	9.70	**+ 66.42**
Acres of forested land crossings (construction work area)	169.37	232.65	**– 63.28**
Acres of wetland crossings (construction work area)	403.25	164.83	**+ 238.42**
Miles of vulnerable water table crossings[f]	6.0	1.9	**+ 4.1**
Number of Minnesota rare/protected species occurrences[g]	10	46	**-36**
Number of public water wells within 1250ft. of the centerline	5	53	**– 48**
Public water basins crossed by centerline	1	0	**+ 1**
Miles of State Lands crossed by centerline	12.1	13.4	**– 1.3**
Miles of timber parcels crossed by centerline	0.3	0.0	**+ 0.3**
Number of archaeological resources	0	3	-3
Number of historic resources	0	2	-2

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	--	1%	21%	61%	16%
Replaced segment	20%	5%	33%	36%	5%
Change	**– 20%**	**– 4%**	**– 12%**	**+ 25%**	**+ 11%**

Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	12.70	154.27	0.97	0.13	0.24
Replaced segment	20.37	65.19	0.48	--	0.50
Change	**– 7.67**	**+ 89.08**	**+ 0.49**	**+ 0.13**	**– 0.26**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

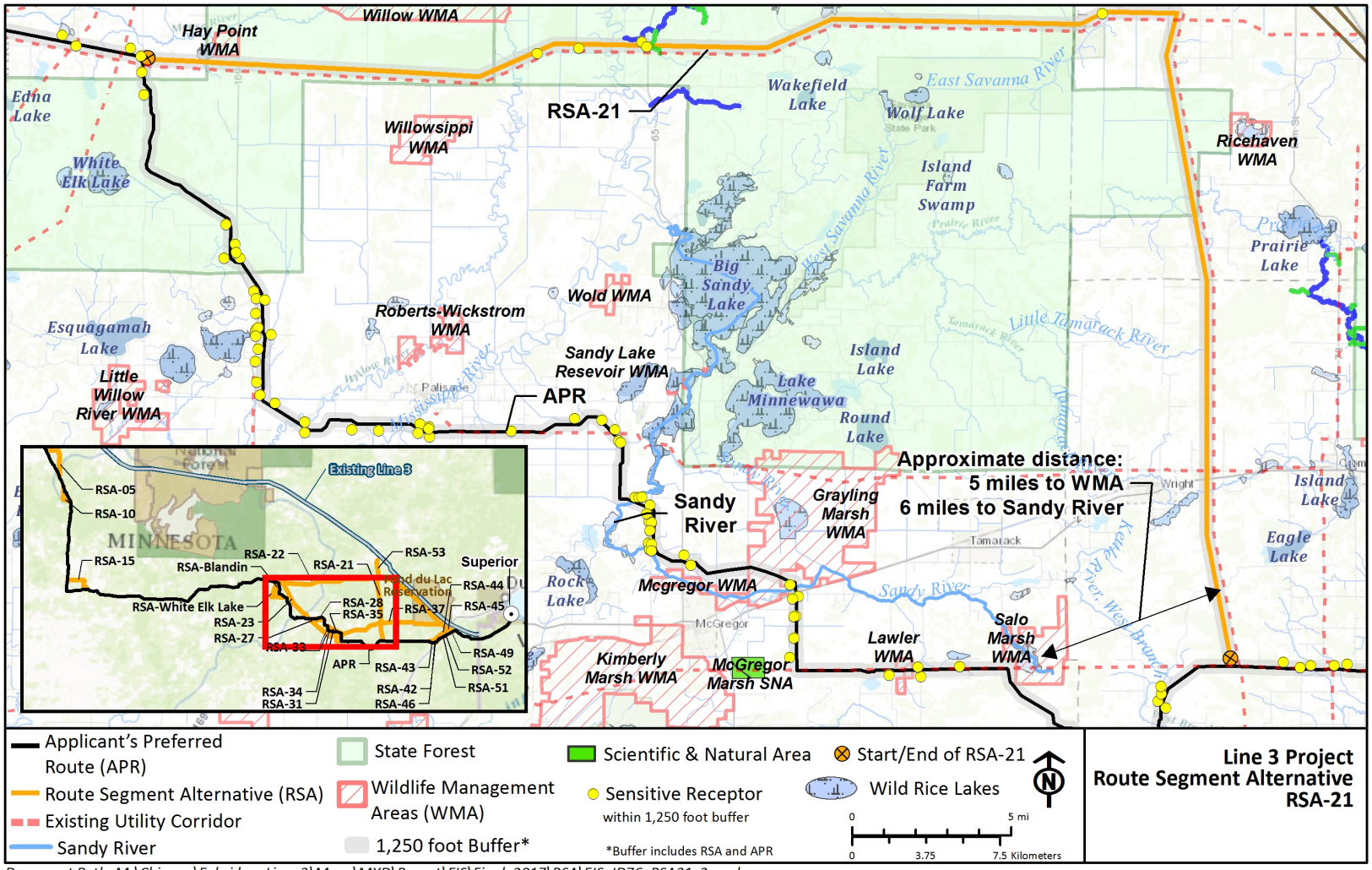

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Figure 7.3-6. Route Segment Alternative RSA-21

7.3.7 Route Segment Alternative RSA-22

RSA-22 is located in Aitkin, St. Louis, and Carlton counties. It is approximately 64.7 miles long and replaces a 73.8-mile segment of the Applicant's preferred route between MP 278.5 and MP 356.7 (Figure 7.3-7). RSA-22 is predominately wetland and forested cover types; however, some farming does occur in this area. The purpose of this RSA is to avoid important habitat in the Big Sandy Lake watershed as well as Grayling Marsh WMA, and Lawler WMA. Table 7.3-7 highlights the differences between RSA-22 and the Applicant's preferred route.

RSA-22 avoids crossing the Sandy River; however, it crosses the West Savanna River, which flows to Big Sandy Lake. Therefore, it would have reduced potential impacts on the Sandy River from an accidental release of oil, but does not necessarily avoid potential impacts on the Big Sandy Lake watershed or the 13 other perennial streams it would cross.

RSA-22 increases separation or avoids several WMAs—Grayling Marsh and Lawler—near the Applicant's preferred route. It approaches Hay Point WMA to the north. Overall, this RSA increases separation between the pipeline and WMAs.

Meaningful Variation Exists Between Routing Options

RSA-22 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; (C) Cultural Resources; (D) Economics; (F) Co-Location; and (G) Natural Resources.

(A) Human Settlement

Aesthetics: The RSA would reduce visual impacts due to its distance from population centers and co-location with existing corridors.

Noise: The centerline of RSA-22 is within 1,250 feet of 47 fewer sensitive noise receptors, thereby decreasing potential noise impacts related to construction.

Environmental Justice: RSA-22 passes through the Fond du Lac Indian Reservation, whereas the Applicant's preferred route does not.

(B) Natural Environment

Vegetation: RSA-22 crosses 130 fewer forested acres, but an additional 40 acres of native plant communities, including two high conservation value forests—Savanna Hardwoods and Floodwood Bog—within the Savanna State Forest. These forest types are managed in accordance with Forest Stewardship Council forest certification for high biodiversity value. RSA-22 increases separation or avoids several WMAs, including Grayling Marsh and Lawler WMAs, near the Applicant's preferred route.

Wildlife Habitat: RSA-22 would affect 130 fewer acres of woodland habitat, but 145 more acres of wetland habitat for those wildlife species that depend on these habitat types.

RSA-22 would cross eleven fewer streams, with one less designated trout stream when compared to the Applicant's preferred route. This would represent a decrease in potential impacts to trout production waters when compared to the Applicant's preferred route.

Unique Natural Resources: RSA-22 would cross in the vicinity of 57 fewer occurrences than the Applicant's preferred route, decreasing potential impacts. Occurrences within RSA-22 include bat, bird, and plant species.

(C) Cultural Resources

RSA-22 contains five less archaeological resources, as compared to the route segment it would replace. It also contains one less historic resource. However, none of the resources are listed on the State Register or the NRHP.

(D) Economics

Public Lands: RSA-22 approaches Hay Point WMA to the north. Overall, RSA-22 increases separation between WMAs; however, the RSA is routed through significantly more State Forest—Savanna and Fond du Lac State Forests—and borders Savanna Portage State Park for a portion of its length. However, overall impacts to state lands are greater under the Applicant's preferred route.

(F) Co-Location

RSA-22 is co-located with existing transmission line, refined product pipeline, oil pipeline, or natural gas pipeline rights-of-way for its entire length; the Applicant's preferred route is co-located for 44 percent of its length.

(G) Natural Resources

Water Resources: RSA-22 crosses eleven fewer streams and rivers, one less designated trout stream tributary, and a wild rice lake compared with Applicant's preferred route.

Wetlands: RSA-22 crosses twice as many acres of wetland habitat, including an additional 90 acres of forested wetlands, as the Applicant's preferred route. It crosses twice as many miles of vulnerable water tables.

Table 7.3-7. Localized Differences between Route Segment Alternative RSA-22 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	940.81	985.84	**– 45.03**
Percentage co-located with existing corridors[a]	100%	44.3%	**+ 55.7%**
Number of sensitive noise receptors[b]	75	122	**– 47**
Number of road crossings[c]	39	42	**– 3**
Number of NHD stream/river crossings	30	41	**– 11**
NHD Artificial Path	2	2	**No change**
NHD Canal/Ditch	11	9	**+ 2**
NHD Connector	0	1	**– 1**
NHD Steam/River Intermittent	3	18	**– 15**
NHD Stream/River Perennial	14	11	**+ 3**
Number of designated trout stream crossings	2	3	**– 1**
Acres of native plant community crossings (construction work area)	68.99	27.49	**+ 41.50**
Acres of forested land crossings (construction work area)	217.38	348.96	**– 131.58**
Acres of wetland crossings (construction work area)	418.44	273.07	**+ 145.37**
Miles of vulnerable water table crossings[f]	12.0	6.2	**+ 5.8**
Number of Minnesota rare/protected species occurrences[g]	17	74	**-57**
Number of public water wells within 1250ft. of the centerline	42	92	**– 50**
Public water basins crossed by centerline	1	0	**+ 1**
Miles of State Lands crossed by centerline	10.5	14.2	**– 3.7**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	0	5	-5
Number of historic resources	2	3	-1

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	4%	2%	23%	52%	20%
Replaced segment	16%	4%	33%	39%	7%
Change	**– 12%**	**– 2%**	**– 10%**	**+ 13%**	**+ 13%**

Table 7.3-7. Localized Differences between Route Segment Alternative RSA-22 and the Applicant's Preferred Route

Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	19.51	152.79	2.11	0.13	0.23
Replaced segment	32.79	106.84	0.83	--	0.50
Change	**– 13.28**	**+ 45.95**	**+ 1.28**	**+ 0.13**	**– 0.27**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

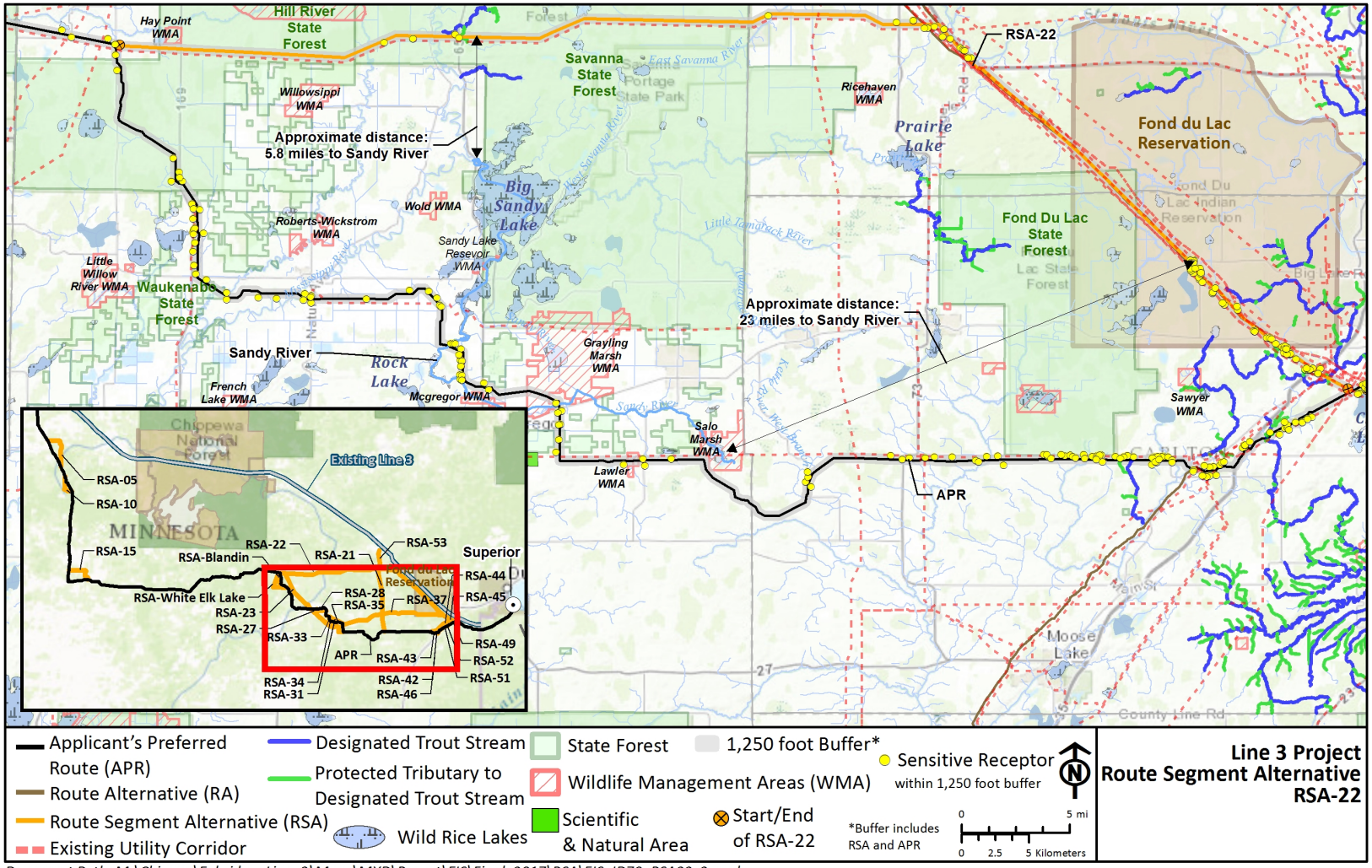

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Figure 7.3-7. Route Segment Alternative RSA-22

7.3.8 Route Segment Alternative RSA-23

RSA-23 is located in Aitkin County. It is approximately 31.2 miles long and replaces a 37.0-mile segment of the Applicant's preferred route between MP 278.5 and MP 315.5 (Figure 7.3-8). RSA-23 co-locates the pipeline route with the Soo Line North Trail, a recreational off-highway vehicle trail, for the majority of its length. Wetlands dominate RSA-23; forested areas also exist. The Applicant had originally considered this routing option, but ultimately did not include it in their preferred route. Though no specific environmental reasons were given, multiple commenters requested the RSA be assessed in the Environmental Impact Statement (EIS). Table 7.3-8 highlights the differences between RSA-23 and the Applicant's preferred route.

Route Segment Alternative Crosses a Prohibited Area

RSA-23 crosses the McGregor Marsh Scientific and Natural Area (SNA) following an existing corridor. McGregor SNA is a sensitive area. It is an extensive marsh in the bed of Glacial Lake Aitkin that contains very specific habitat requirements for two rare birds.

Minnesota Statutes 86A.05, Subdivision 5(c), states that "[*p*]*hysical development shall be limited to the facilities absolutely necessary for protection, research, and educational projects, and, where appropriate, for interpretive services*." Minnesota Rule 6135.1100 [Utility Crossings], Subpart 5, indicates that unless no feasible alternative exists, Minnesota DNR must avoid permitting utility crossings across SNAs. Minnesota DNR has indicated it will not permit this crossing. For this reason, no discussion comparing RSA-23 with the Applicant's preferred route was completed.

Table 7.3-8. Localized Differences between Route Segment Alternative RSA-23 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	453.24	449.61	**+ 3.63**
Percentage co-located with existing corridors[a]	15.8%	7.3%	**+ 8.5%**
Number of sensitive noise receptors[b]	96	54	**+ 42**
Number of road crossings[c]	18	21	**– 3**
Number of NHD stream/river crossings	17	20	**– 3**
NHD Artificial Path	1	2	**– 1**
NHD Canal/Ditch	8	7	**+ 1**
NHD Connector	0	0	**No Change**
NHD Steam/River Intermittent	3	9	**– 6**
NHD Stream/River Perennial	5	2	**+ 3**
Number of designated trout stream crossings	--	--	**No change**
Acres of native plant community crossings (construction work area)	28.22	--	**+ 28.22**
Acres of forested land crossings (construction work area)	83.86	118.83	**– 34.97**
Acres of wetland crossings (construction work area)	283.70	129.28	**+ 154.42**

Table 7.3-8. Localized Differences between Route Segment Alternative RSA-23 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Miles of vulnerable water table crossings[f]	6.2	1.9	**+ 4.3**
Number of Minnesota rare/protected species occurrences[g]	21	31	**-10**
Number of public water wells within 1250ft. of the centerline	41	49	**– 8**
Public water basins crossed by centerline	1	0	**+ 1**
Miles of State Lands crossed by centerline	12.7	12.0	**+ 0.7**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	10	3	+7
Number of historic resources	1	2	-1

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	4%	3%	18%	69%	5%
Replaced segment	22%	7%	26%	41%	4%
Change	**– 18%**	**– 4%**	**– 8%**	**+ 28%**	**+ 1%**

Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	34.28	85.02	--	--	0.22
Replaced segment	15.68	51.51	0.48	--	0.50
Change	**+ 18.60**	**+ 33.51**	**– 0.48**	**No change**	**– 0.23**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

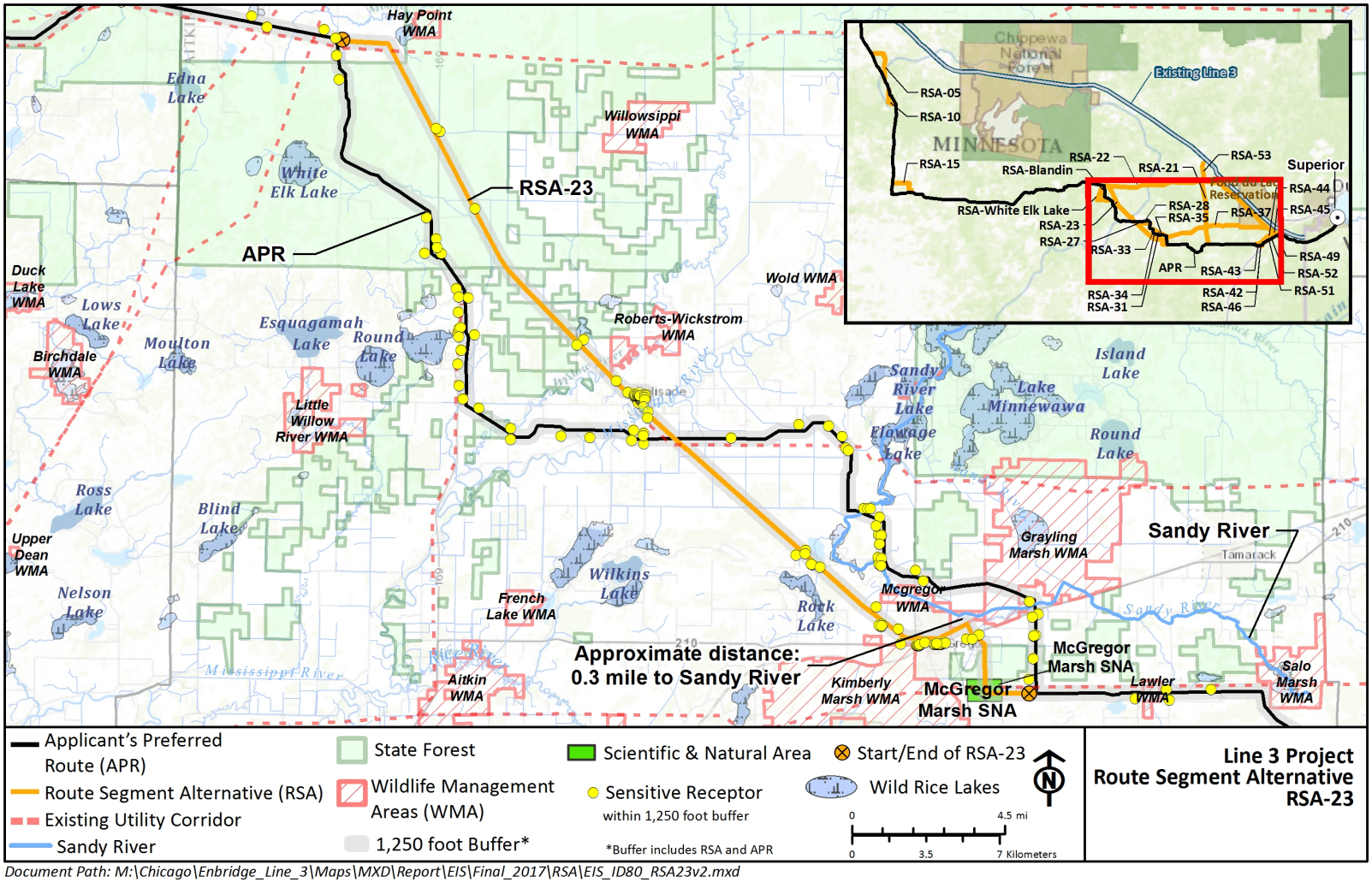

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Figure 7.3-8. Route Segment Alternative RSA-23

7.3.9 Route Segment Alternative RSA-27

RSA-27 is located Aitkin, St. Louis, and Carlton counties. It is approximately 13.2 miles long and replaces a 16.0-mile segment of the Applicant's preferred route between MP 298.1 and MP 314.0 (Figure 7.3-9). It follows the Soo Line North Trail, a recreational off-highway vehicle trail, for a significant portion of its length. RSA-27 is primarily dominated by wetlands, and crosses forested cover types to a lesser extent. Its purpose is to avoid the McGregor Marsh SNA and the Sandy River watershed. Table 7.3-9 highlights the differences between RSA-27 and the Applicant's preferred route.

RSA-27 avoids the McGregor Marsh SNA. The Applicant's preferred route also avoids the SNA. RSA-27 avoids crossing the Sandy River, but does not eliminate potential impacts on the Sandy River watershed. RSA-27 crosses an unnamed stream that connects Rock Lake to Round Lake to Davis Lake. As currently routed, the proposed pipeline would run adjacent to Round Lake. The Sandy River flows through Davis Lake. Overall, the RSA decreases the number of Sandy River crossings, reducing potential impacts on the Sandy River watershed.

Meaningful Variation Exists Between Routing Options

RSA-27 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; (C) Cultural Resources; (D) Economics; (F) Co-Location; and (G) Natural Resources.

(A) Human Settlement

Aesthetics: The RSA would increase visual impacts due to its proximity to the city of McGregor and the Soo Line North Trail although neither alternative would make substantial use of existing rights-of-way.

Noise: The centerline of RSA-27 is within 1,250 feet of 10 additional sensitive noise receptors, thereby increasing potential noise impacts related to construction.

(B) Natural Environment

Vegetation: RSA-27 crosses 16 acres of native plant communities; the replaced segment of the Applicant's preferred route does not.

Unique Natural Resources: RSA-27 would cross in the vicinity of 15 fewer occurrences than the Applicant's preferred route, decreasing potential impacts. Occurrences within RSA-27 include bird and plant species.

(C) Cultural Resources

RSA-27 contains the same number of archaeological resources, as compared to the route segment it would replace. However, it would contain one more historic resource. None of the resources are listed on the State Register or the NRHP.

(D) Economics

Recreation and Tourism: RSA-27 parallels the Soo Line North Trail for a portion of its length. Construction of the pipeline would affect recreational users. Permanent impacts would result from the

conversion of forest and forested wetland cover types near the trail. These impacts (cleared right-of-way) would be perceptible to trail users after restoration of the pipeline in select locations; however, the trail parallels or crosses existing utility corridors and roadways in different locations along its length. Once constructed, impacts on recreation or tourism are not expected.

Agriculture: RSA-27 crosses less agricultural land as a percentage of its length than the Applicant's preferred route, decreasing short-term agricultural impacts.

Public Lands: RSA-27 avoids crossing the Grayling Marsh WMA. It crosses the McGregor WMA, but the pipeline alignment could avoid this WMA through re-alignment of the centerline within the route width. RSA-27 approaches Kimberly Marsh WMA. Overall, the RSA reduces impacts on WMAs.

(F) Co-Location

RSA-27 utilizes existing rights-of-way for approximately 16 percent of its length while the Applicant's preferred route utilizes 7 percent.

(G) Natural Resources

Wetlands: RSA-27 crosses an additional 100 acres of wetlands than the Applicant's preferred route, including 30 acres of forested wetlands.

Water Resources: The RSA crosses 2.7 additional miles of vulnerable water tables and a single public watershed basin.

Table 7.3-9. Localized Differences between Route Segment Alternative RSA-27 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	192.50	190.34	**+ 2.16**
Percentage co-located with existing corridors[a]	15.8%	7.3%	**+ 8.5%**
Number of sensitive noise receptors[b]	35	25	**+ 10**
Number of road crossings[c]	10	10	**No change**
Number of NHD stream/river crossings	9	11	**- 2**
NHD Artificial Path	0	1	**- 1**
NHD Canal/Ditch	6	6	**No change**
NHD Connector	0	0	**No Change**
NHD Steam/River Intermittent	2	4	**- 2**
NHD Stream/River Perennial	1	0	**+ 1**
Number of designated trout stream crossings	0	0	**No change**
Acres of native plant community crossings (construction work area)	16.49	0	**+ 16.49**
Acres of forested land crossings (construction work area)	32.03	40.60	**– 8.57**

Table 7.3-9. Localized Differences between Route Segment Alternative RSA-27 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of wetland crossings (construction work area)	139.07	40.88	**+ 98.19**
Miles of vulnerable water table crossings[f]	3.8	1.1	**+ 2.7**
Number of Minnesota rare/protected species occurrences[g]	9	24	**-15**
Number of public water wells within 1250ft. of the centerline	25	21	**+ 4**
Public water basins crossed by centerline	1	0	**+ 1**
Miles of State Lands crossed by centerline	1.1	1.1	**No Change**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	1	1	No change
Number of historic resources	1	0	+1

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	1%	2%	17%	79%	1%
Replaced segment	33%	9%	21%	34%	3%
Change	**– 32%**	**– 7%**	**– 4%**	**+ 45%**	**– 2%**

Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	15.18	42.85	--	--	--
Replaced segment	8.58	13.11	0.48	--	0.24
Change	**+ 6.60**	**+ 29.74**	**– 0.48**	**No change**	**– 0.24**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

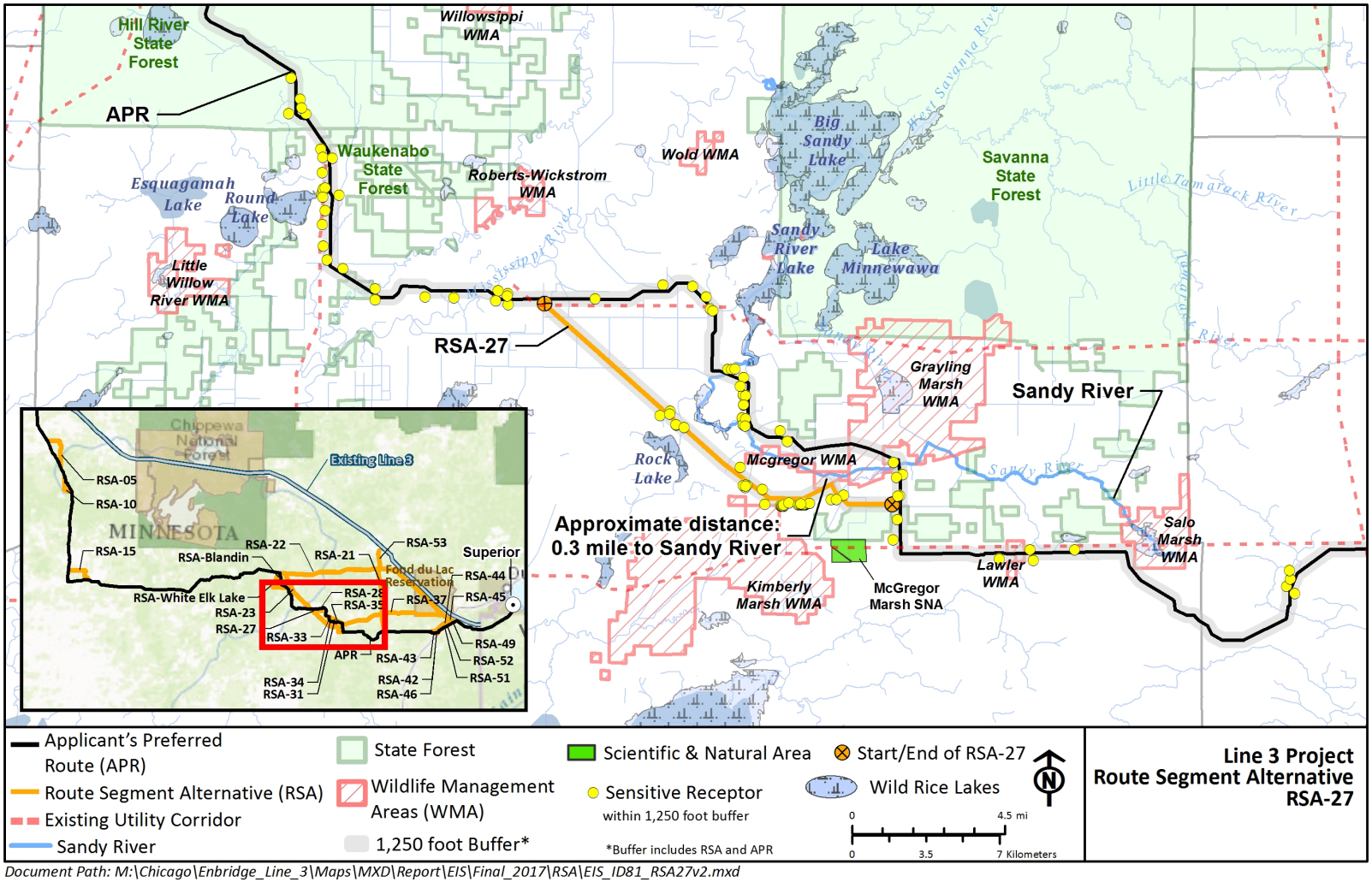

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Figure 7.3-9. Route Segment Alternative RSA-27

7.3.10 Route Segment Alternative RSA-28

RSA-28 is located in Aitkin County. It is approximately 3.6 miles long and replaces a 3.8-mile segment of the Applicant's preferred route from MP 300.2 to MP 303.9. RSA-28 is located primarily in an agricultural area. It was submitted as a map with no comment attached; therefore, its purpose is unknown. The RSA avoids multiple diagonal crossings of rural properties and a few noise sensitive receptors. However, it passes through land recorded by U.S. Steel (Keetac) as a compensatory wetland mitigation bank easement. Therefore, RSA-28 is not a viable routing option and no further analysis is provided. As proposed, this RSA is unworkable.

7.3.11 Route Segment Alternative RSA-31

RSA-31 is located in Aitkin County. It is approximately 6.1 miles long and replaces a 7.2-mile segment of the Applicant's preferred route from MP 305.5 to MP 312.7 (Figure 7.3-10). RSA-31 is a greenfield crossing across developed farmland, wetlands, and forests. Its purpose is to straighten and shorten the pipeline route. RSA-31 was proposed to reduce the distance between the pipeline and a specific residence. Table 7.3-10 highlights the differences between RSA-31 and the Applicant's preferred route.

RSA-31 shortens and straightens the pipeline route. It increases the distance between the pipeline and many of the receptors along the replaced segment of the Applicant's preferred route; however, it decreases the distance between the pipeline and two receptors.

Meaningful Variation Exists Between Routing Options

RSA-31 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; (C) Cultural Resources; (D) Economics; and (G) Natural Resources.

(A) Human Settlement

Noise: RSA-31 decreases the number of sensitive noise receptors within 1,250 feet of the pipeline centerline by 11, reducing construction-related noise impacts.

(B) Natural Environment

Vegetation: RSA-31 crosses approximately 12 fewer forested acres than the Applicant's preferred route.

Unique Natural Resources: RSA-31 would cross in the vicinity of 13 fewer protected species occurrences than the Applicant's preferred route, decreasing potential impacts. Occurrences within RSA-31 include bat, bird, butterfly, and plant species.

(C) Cultural Resources

RSA-31 contains one less archaeological resource, as compared to the route segment it would replace. However, neither RSA-31 nor the segment it would replace contain historic structures.

(D) Economics

Agriculture: The RSA bisects an active peat farm near Savanna State Forest which is a permanent impact. Both alternatives would impact similar overall acreages of agriculture land but with the RSA impacting a peat farm the negative economic impact would be greater.

Public Lands: The RSA crosses Savanna State Forest; the replaced segment of the Applicant's preferred route does not.

(G) Natural Resources

Water Resources: RSA-31 crosses 1 less mile of vulnerable water tables, and would require two fewer waterbody crossings reducing the potential for run-off into area waterways. .

Wetlands: RSA-31 would affect approximately 22 additional acres of wetlands, and would convert twice as many acres of forested wetlands to a different wetland type.

Table 7.3-10. Localized Differences between Route Segment Alternative RSA-31 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	88.68	87.03	**+ 1.65**
Percentage co-located with existing corridors[a]	0	0	**No change**
Number of sensitive noise receptors[b]	4	15	**– 11**
Number of road crossings[c]	3	3	**No change**
Number of NHD stream/river crossings	3	5	**– 2**
NHD Artificial Path	1	1	**No change**
NHD Canal/Ditch	0	0	**No change**
NHD Connector	0	0	**No change**
NHD Steam/River Intermittent	2	4	**– 2**
NHD Stream/River Perennial	0	0	**No change**
Number of designated trout stream crossings	--	--	**No change**
Acres of native plant community crossings (construction work area)	--	--	**No change**
Acres of forested land crossings (construction work area)	16.97	28.99	**– 12.02**
Acres of wetland crossings (construction work area)	36.89	14.31	**+ 22.58**
Miles of vulnerable water table crossings[f]	0.1	1.1	**– 1.0**
Number of Minnesota rare/protected species occurrences[g]	8	21	**-13**
Number of public water wells within 1250ft. of the centerline	3	16	**– 13**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	1.1	0.0	**+ 1.1**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	0	1	-1
Number of historic resources	0	0	No Change

Table 7.3-10. Localized Differences between Route Segment Alternative RSA-31 and the Applicant's Preferred Route

Resource or Factor				Route Segment Alternative	Replaced Segment of Route	Change
Land Cover – Permanent Right-of-Way[h]						
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**	
RSA	25%	1%	20%	47%	7%	
Replaced segment	28%	1%	33%	33%	4%	
Change	**– 3%**	**No change**	**– 13%**	**+ 14%**	**+ 3%**	
Wetlands – Permanent Right-of-Way[i]						
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**	
RSA	1.81	13.11	--	--	0.47	
Replaced segment	1.13	6.46	--	--	0.24	
Change	**+ 0.68**	**+ 6.65**	**No change**	**No change**	**+ 0.23**	

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

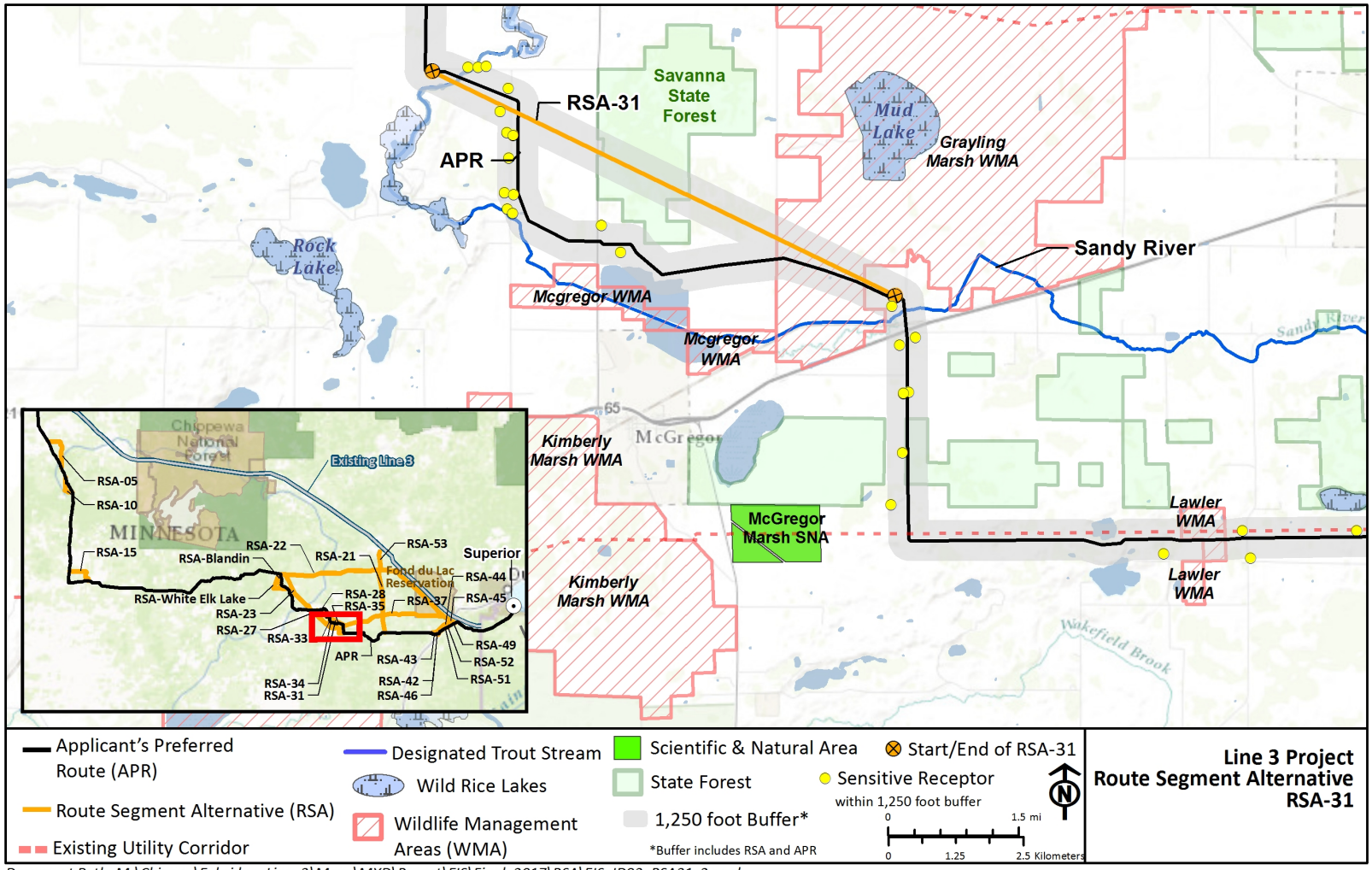

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Figure 7.3-10. Route Segment Alternative RSA-31

7.3.12 Route Segment Alternative RSA-33

RSA-33 is located in Aitkin County. It is approximately 1.8 miles long and replaces a 1.7-mile segment of the Applicant's preferred route between MP 306.7 and MP 308.4 (Figure 7.3-11). RSA-33 is located on primarily forest and wetland cover types. This RSA moves the pipeline to a different portion of the commenter's property, where it is adjacent to a peat plant. It relocates the pipeline further from residences, and does not shift these impacts to other residences. Table 7.3-11 highlights the differences between RSA-33 and the Applicant's preferred route.

Meaningful Variation Exists Between Routing Options

RSA-33 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; and (G) Natural Resources.

(A) Human Settlement

Noise: RSA-33 eliminates sensitive noise receptors within 1,250 feet of the pipeline centerline, avoiding construction-related noise impacts.

(B) Natural Environment

Unique Natural Resources: RSA-33 would cross in the vicinity of two more protected species occurrences than the Applicant's preferred route, increasing potential impacts. Occurrences within RSA-33 include bat and butterfly species.

(G) Natural Resources

Wetlands: RSA-33 would affect approximately 8 acres of wetlands, half of which are forested wetlands, increasing conversion of forested wetlands to another wetland type by 3 acres.

Table 7.3-11. Localized Differences between Route Segment Alternative RSA-33 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	26.47	20.99	**+ 5.48**
Percentage co-located with existing corridors[a]	0	0	**No change**
Number of sensitive noise receptors[b]	0	8	**– 8**
Number of road crossings[c]	0	0	**No Change**
Number of designated trout stream crossings	0	0	**No change**
Number of NHD stream/river crossings	3	2	**+ 1**
NHD Artificial Path	0	0	**No change**
NHD Canal/Ditch	0	0	**No change**
NHD Connector	0	0	**No change**
NHD Steam/River Intermittent	3	2	**+ 1**

Table 7.3-11. Localized Differences between Route Segment Alternative RSA-33 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
NHD Stream/River Perennial	0	0	**No change**
Acres of native plant community crossings (construction work area)	0	0	**No change**
Acres of forested land crossings (construction work area)	8.66	5.93	**+ 2.73**
Acres of wetland crossings (construction work area)	11.20	2.57	**+ 8.63**
Miles of vulnerable water table crossings[f]	0.5	0.4	**+ 0.1**
Number of Minnesota rare/protected species occurrences[g]	10	8	**+2**
Number of public water wells within 1250ft. of the centerline	0	9	**+ 9**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	0.0	0.0	**No Change**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	0	0	No Change
Number of historic resources	0	0	No Change

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	11%	--	33%	46%	9%
Replaced segment	22%	--	29%	47%	2%
Change	**– 11%**	**No change**	**+ 4%**	**– 1%**	**+ 7%**

Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	--	4.64	--	--	--
Replaced segment	--	1.35	--	--	--
Change	**No change**	**+ 3.29**	**No change**	**No change**	**No change**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

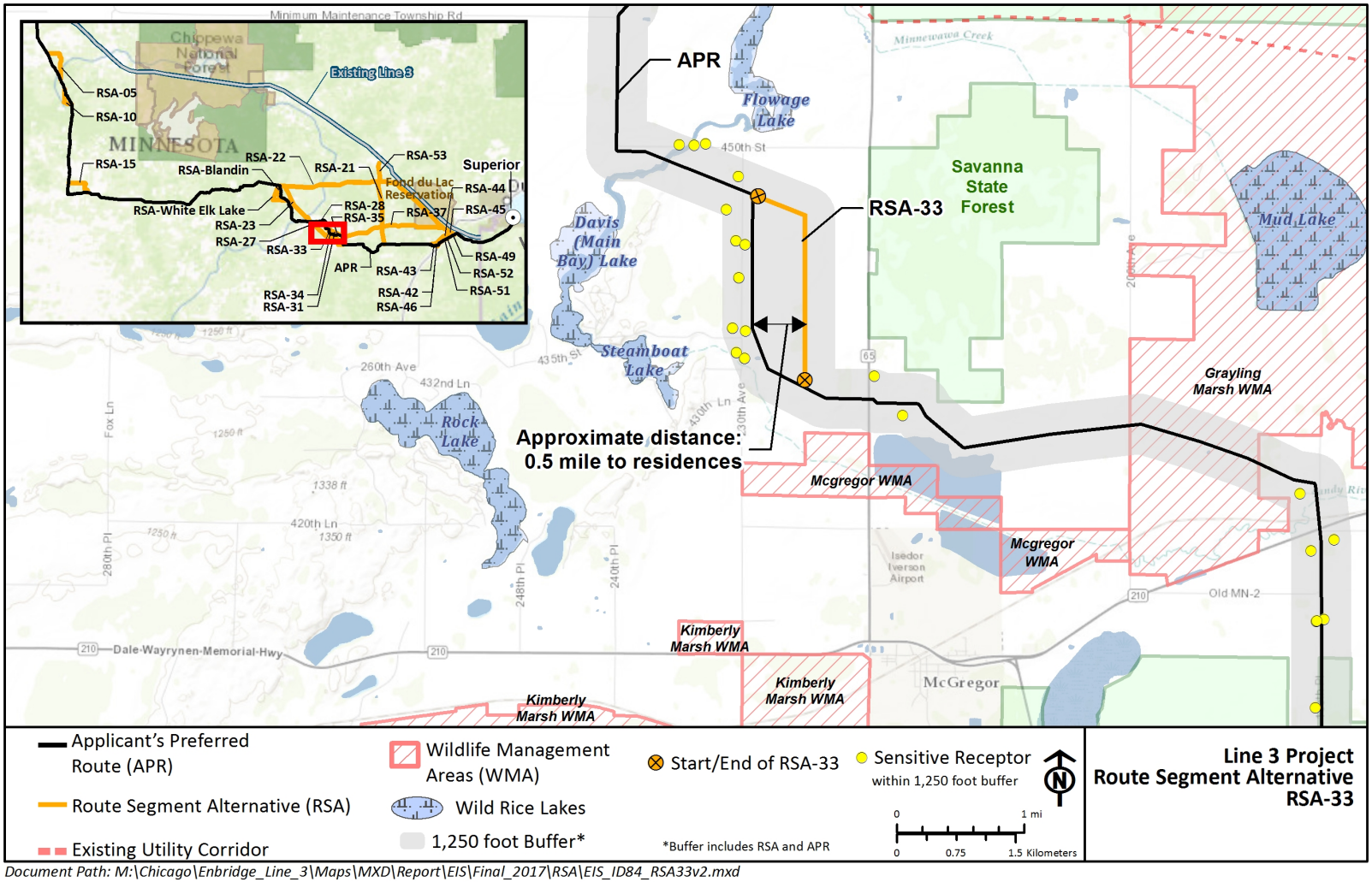

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Figure 7.3-11. Route Segment Alternative RSA-33

7.3.13 Route Segment Alternative RSA-34

RSA-34 is located in Aitkin County. It is approximately 2.2 miles long and replaces a 2.5-mile segment of the Applicant's preferred route between MP 307.6 and MP 310.1 (Figure 7.3-12). It is primarily wetland, forest, and agricultural cover types. RSA-34 was proposed to increase the distance from a specific residence. It reduces the number of sensitive noise receptors within 1,250 feet of the pipeline centerline; however, it shifts impacts to an active peat mining facility, crossing its storage and processing facility. Table 7.3-12 highlights the differences between RSA-34 and the replaced segment of the Applicant's preferred route.

Meaningful Variation Exists Between Routing Options

RSA-34 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; (D) Economics; and (G) Natural Resources.

(A) Human Settlement

Noise: RSA-34 reduces the number of sensitive noise receptors within 1,250 feet of the pipeline centerline by half, avoiding construction-related noise impacts.

(B) Natural Environment

Vegetation: The RSA passes through approximately half as many acres of forested cover types as the Applicant's preferred route.

RSA-34 and the corresponding Applicant's preferred route require all greenfield crossings. Because of this, negative impacts from habitat fragmentation and edge effects would be a factor with both alternatives. However, fragmentation would likely be a greater factor in the Applicant's preferred route because it crossed approximately 8 more acres of forested lands.

Unique Natural Resources: RSA-34 would cross in the vicinity of four fewer occurrences than the Applicant's preferred route, decreasing potential impacts. Occurrences within RSA-34 include bat and butterfly species.

(D) Economics

Agriculture: The RSA crosses through an active peat processing and storage facility. Based on satellite imagery, should RSA-34 be selected it would likely necessitate re-routing the pipeline route to avoid this business. This would increase impacts on forested cover types. Re-routing within the route width may or may not be possible within the route width.

(G) Natural Resources

Wetlands: RSA-34 would affect approximately 10 additional wetland acres, increasing conversion of forested wetlands to another wetland type by approximately 5 acres.

Table 7.3-12. Localized Differences between Route Segment Alternative RSA-34 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	32.23	31.37	**+ 0.86**
Percentage co-located with existing corridors[a]	0	0	**No change**
Number of sensitive noise receptors[b]	3	6	**– 3**
Number of road crossings[c]	1	1	**No change**
Number of NHD stream/river crossings	3	3	**No change**
NHD Artificial Path	0	0	**No change**
NHD Canal/Ditch	0	0	**No change**
NHD Connector	0	0	**No change**
NHD Steam/River Intermittent	3	3	**No change**
NHD Stream/River Perennial	0	0	**No change**
Number of designated trout stream crossings	0	0	**No change**
Acres of native plant community crossings (construction work area)	0	0	**No change**
Acres of forested land crossings (construction work area)	11.65	19.39	**– 7.74**
Acres of wetland crossings (construction work area)	14.93	4.77	**+ 10.16**
Miles of vulnerable water table crossings[f]	1.0	1.1	**– 0.1**
Number of Minnesota rare/protected species occurrences[g]	10	14	**-4**
Number of public water wells within 1250ft. of the centerline	4	8	**– 4**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	0.0	0.0	**No Change**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	1	1	**No Change**
Number of historic resources	0	0	**No Change**

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	16%	2%	37%	45%	1%
Replaced segment	5%	1%	62%	30%	1%
Change	**+ 11%**	**+ 1%**	**– 25%**	**+ 15%**	**No change**

Table 7.3-12. Localized Differences between Route Segment Alternative RSA-34 and the Applicant's Preferred Route

Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	0.35	5.87	--	--	--
Replaced segment	0.57	1.92	--	--	--
Change	**– 0.22**	**+ 3.95**	**No change**	**No change**	**No change**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

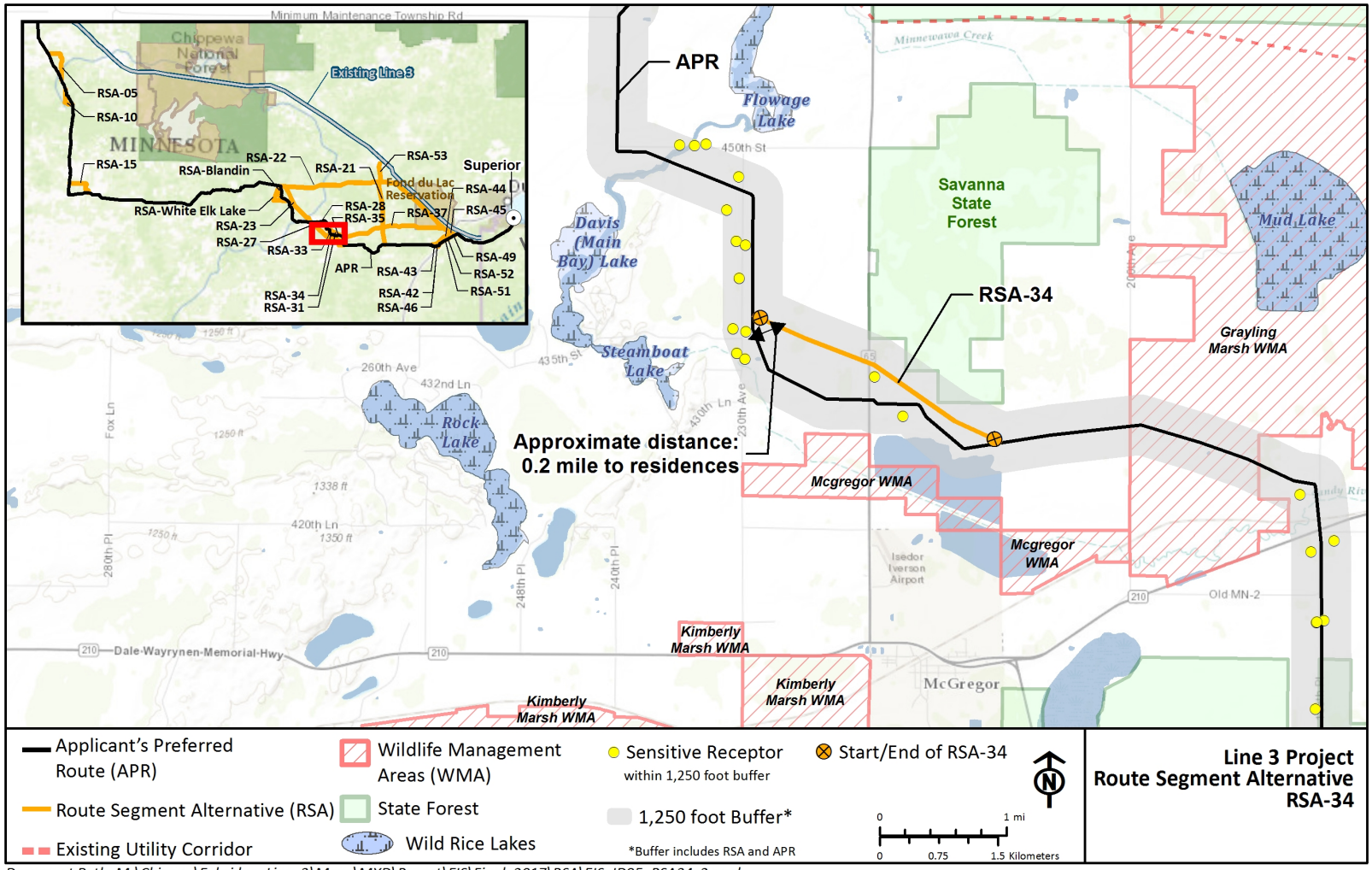

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Figure 7.3-12. Route Segment Alternative RSA-34

7.3.14 Route Segment Alternative RSA-35

RSA-35 is located in Aitkin County. It is approximately 1.6 miles long and replaces a 1.4-mile segment of the Applicant's preferred route from MP 308.4 to MP 309.8 (Figure 7.3-13). The RSA crosses primarily forested and wetland cover types. These National Land Cover Database (Homer et al. 2015) identified wetlands are likely peat fields that may or may not be active. The RSA was proposed to increase the distance between the pipeline and a specific residence. RSA-35 does not change the number of sensitive noise receptors within 1,250 feet of the pipeline centerline. It simply shifts impacts from one residence to another. Table 7.3-13 highlights the differences between RSA-35 and the Applicant's preferred route.

Meaningful Variation Exists Between Routing Options

RSA-35 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; (C) Cultural Resources; (D) Economics, and (G) Natural Resources.

(A) Human Settlement

Displacement: The current alignment of RSA-35 would displace a residence; as such, it would need to be re-routed within the route width. This would likely increase impacts on wetland cover types.

(B) Natural Environment

Vegetation: The RSA passes through approximately half as many acres of forested cover types as the Applicant's preferred route.

Unique Natural Resources: RSA-35 would cross in the vicinity of one more occurrence than the Applicant's preferred route, increasing potential impacts. Occurrences within RSA-35 include bat and butterfly species.

(C) Cultural Resources

RSA-35 contains one less archaeological resource, as compared to the route segment it would replace. Neither RSA-35 nor the segment it would replace contain historic resources. None of the resources are listed on the State Register or the NRHP.

(D) Economics

Agriculture: While both RSA-35 and the Applicant's preferred route cross peat lands, the RSA is located within peat lands for a greater portion of its length.

Public Lands: RSA-35 crosses the McGregor WMA for approximately 0.5 mile of its length. The Applicant's preferred route does not cross state lands.

(G) Natural Resources

Wetlands: RSA-35 would affect approximately 11 additional wetland acres, increasing conversion of forested wetlands to emergent wetland.

Table 7.3-13. Localized Differences between Route Segment Alternative RSA-35 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	23.68	17.93	**+ 5.75**
Percentage co-located with existing corridors[a]	0	0	**No change**
Number of sensitive noise receptors[b]	2	2	**No change**
Number of road crossings[c]	1	1	**No Change**
Number of NHD stream/river crossings	1	1	**No change**
NHD Artificial Path	0	0	**No change**
NHD Canal/Ditch	0	0	**No change**
NHD Connector	0	0	**No change**
NHD Steam/River Intermittent	1	0	**+ 1**
NHD Stream/River Perennial	0	1	**- 1**
Number of designated trout stream crossings	0	0	**No change**
Acres of native plant community crossings (construction work area)	0	0	**No change**
Acres of forested land crossings (construction work area)	7.73	12.21	**– 4.48**
Acres of wetland crossings (construction work area)	14.53	2.93	**+ 11.60**
Miles of vulnerable water table crossings[f]	0.5	0.7	**– 0.2**
Number of Minnesota rare/protected species occurrences[g]	10	9	**+1**
Number of public water wells within 1250ft. of the centerline	0	3	**– 3**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	0.5	0.0	**+ 0.5**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	0	1	-1
Number of historic resources	0	0	No Change

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	--	2%	34%	64%	--
Replaced segment	--	3%	66%	28%	3%
Change	**No change**	**– 1%**	**– 32%**	**+ 36%**	**– 3%**

Table 7.3-13. Localized Differences between Route Segment Alternative RSA-35 and the Applicant's Preferred Route

Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	5.42	0.66	--	--	--
Replaced segment	0.29	1.23	--	--	--
Change	**+ 5.13**	**– 0.57**	**No change**	**No change**	**No change**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

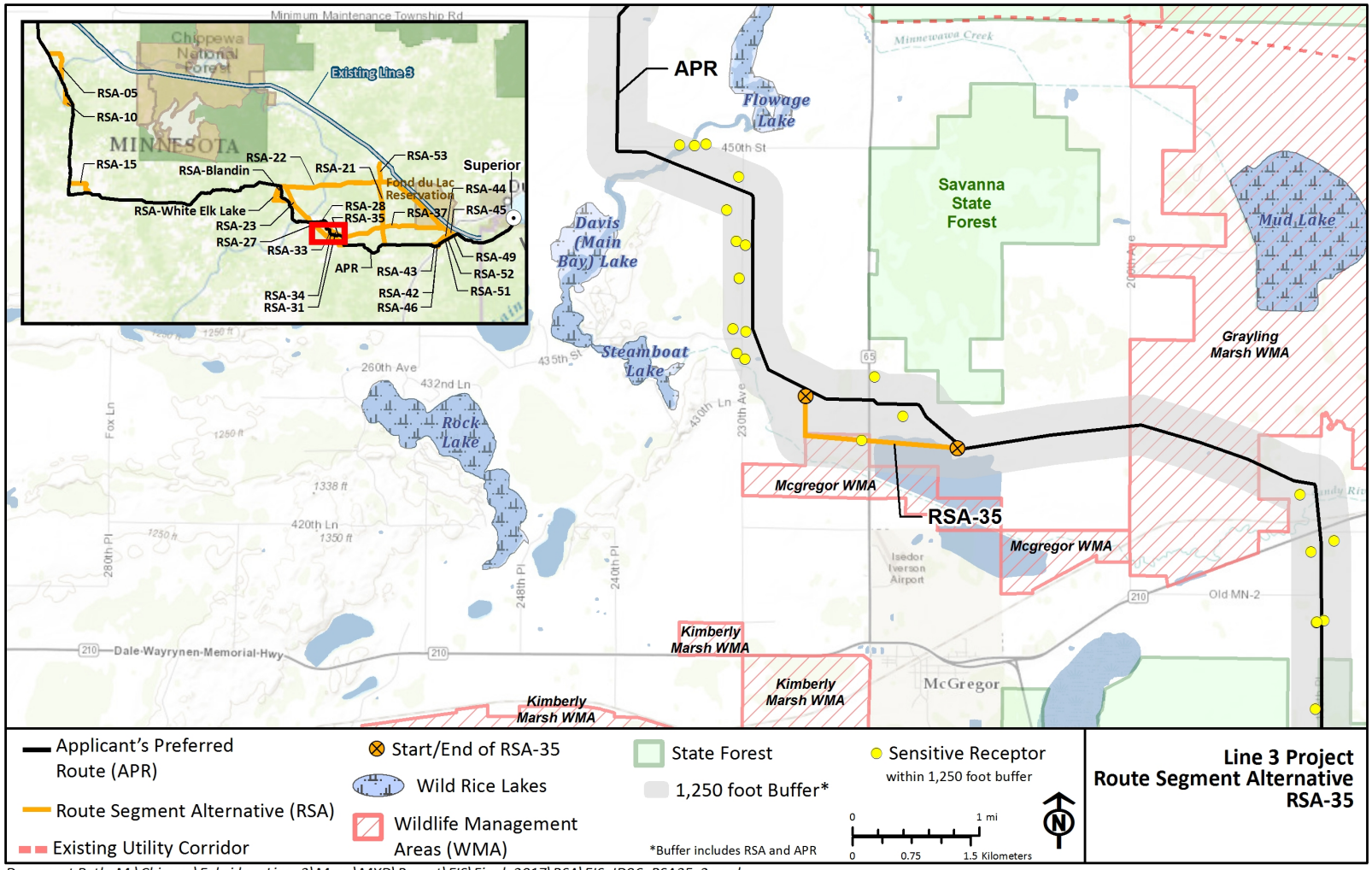

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Figure 7.3-13. Route Segment Alternative RSA-35

7.3.15 Route Segment Alternative RSA-37

RSA-37 is located in Aitkin and Carlton counties. It is approximately 38.7 miles long and replaces a 43.7-mile segment of the Applicant's preferred route between MP 313.1 and MP 356.8 (Figure 7.3-14). The RSA was proposed to avoid Salo Marsh WMA and Lawler WMA.

RSA-37 is not a viable routing option; therefore, no further analysis is provided. As proposed, this RSA is unworkable. It passes beneath multiple structures, most notably beneath Cromwell High School. The school and its grounds cannot be avoided within the route width. Table 7.3-14 nonetheless highlights the differences between RSA-37 and the Applicant's preferred route.

Table 7.3-14. Localized Differences between Route Segment Alternative RSA-37 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	562.17	564.91	**– 2.74**
Percentage co-located with existing corridors[a]	11.4%	68.9%	**– 57.5%**
Number of sensitive noise receptors[b]	190	97	**+ 93**
Number of road crossings[c]	38	21	**+ 17**
Number of NHD stream/river crossings	20	22	**– 2**
NHD Artificial Path	3	0	**_+ 3**
NHD Canal/Ditch	5	3	**+ 2**
NHD Connector	0	1	**– 1**
NHD Steam/River Intermittent	5	9	**– 4**
NHD Stream/River Perennial	7	9	**– 2**
Number of designated trout stream crossings	2	3	**– 1**
Acres of native plant community crossings (construction work area)	21.82	27.49	**– 5.67**
MBS, Plant Occurrences[d]	327	0	**+ 327**
MBS, Lake Points[e]	6	0	**+ 6**
Acres of forested land crossings (construction work area)	94.92	236.31	**– 141.39**
Acres of wetland crossings (construction work area)	235.96	154.98	**+ 80.98**
Miles of vulnerable water table crossings[f]	6.6	4.4	**+ 2.2**
Number of Minnesota rare/protected species occurrences[g]	7	44	**-37**
Number of public water wells within 1250ft. of the centerline	88	44	**+ 44**
Public water basins crossed by centerline	1	0	**+ 1**
Miles of State Lands crossed by centerline	0.8	3.0	**– 2.2**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	17	2	+15
Number of historic resources	1	1	No Change

Table 7.3-14. Localized Differences between Route Segment Alternative RSA-37 and the Applicant's Preferred Route

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	17%	4%	17%	52%	10%
Replaced segment	10%	4%	39%	39%	9%
Change	**+ 7%**	**No change**	**– 22%**	**+ 13%**	**+ 1%**
Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	28.63	67.02	1.49	1.76	--
Replaced segment	18.17	60.14	0.35	--	--
Change	**+ 10.46**	**+ 6.88**	**+ 1.14**	**+ 1.76**	**No change**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

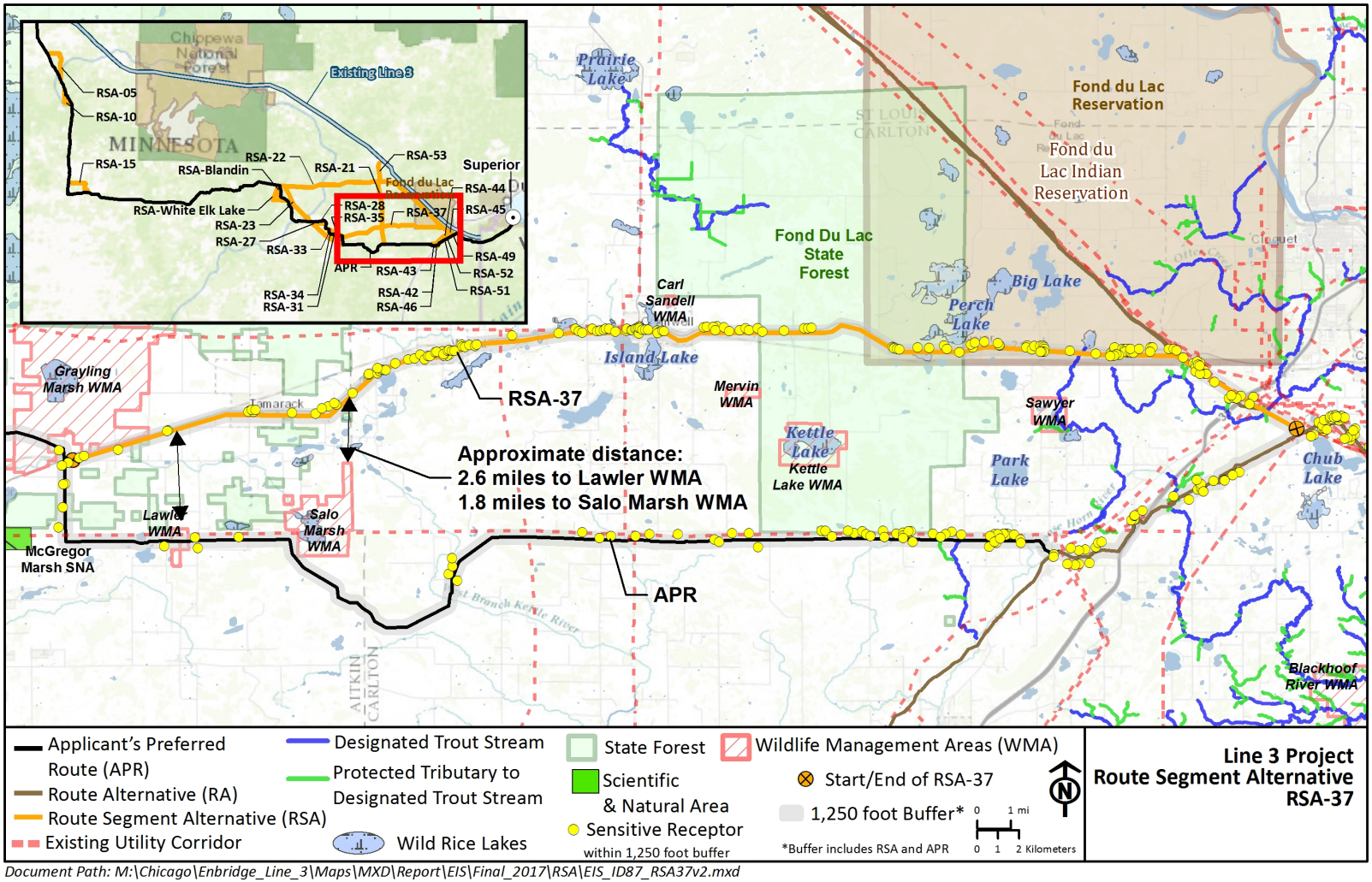

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Figure 7.3-14. Route Segment Alternative RSA-37

7.3.16 Route Segment Alternative RSA-42

RSA-42 is located in Carlton County. It is approximately 3.5 miles long and replaces a 4.3-mile segment of the Applicant's preferred route between MP 347.1 and MP 351.4 (Figure 7.3-15). The RSA crosses primarily wetland cover types and to a lesser extent forested and agricultural cover types as well. The purpose of the RSA is to co-locate the pipeline with an existing transmission line corridor. Table 7.3-15 highlights the differences between RSA-42 and the Applicant's preferred route.

Meaningful Variation Exists Between Routing Options

RSA-42 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; (F) Co-Location; and (G) Natural Resources.

(A) Human Settlement

Aesthetics: RSA-42 reduces aesthetic impacts because it is co-located with existing corridors for its entire length whereas the Applicant's preferred route is entirely greenfield. RSA-42 would avoid creating new openings in the landscape reducing aesthetic impacts.

(B) Natural Environment

Vegetation: The RSA passes through approximately 16 less acres of forested cover types as the Applicant's preferred route. This would reduce impact to species that rely on forested communities.

RSA-42 utilizes co-location of existing rights-of-way for 100 percent of its route. Because of this, negative impacts from habitat fragmentation and edge effects are reduced when compared with the Applicant's preferred route.

Wildlife Habitat: RSA-42 crosses two designated trout streams; the Applicant's preferred route does not. This would create potential stresses to trout production waters in the immediate area. RSA-42 would affect more acres of wetland habitat.

Unique Natural Resources: RSA-42 would cross in the vicinity of three more protected species occurrences than the Applicant's preferred route, increasing potential impacts. Occurrences within RSA-42 include bat species.

(F) Co-Location

RSA-42 is co-located for its entire length; the Applicant's preferred route is not co-located with existing corridors.

(G) Natural Resources

Water Resources: The RSA is routed within 500 feet of several designated trout waters for approximately 10,000 feet of its length, which increases potential impacts on floodplain hydrology and water quality for these streams as much of the pipeline crosses the floodplain wetlands immediately adjacent to these streams.

Wetlands: RSA-42 would affect approximately twice as many wetland acres as the Applicant's preferred route.

Table 7.3-15. Localized Differences between Route Segment Alternative RSA-42 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	50.91	56.59	**– 5.68**
Percentage co-located with existing corridors[a]	100%	0	**+ 100%**
Number of sensitive noise receptors[b]	19	18	**+ 1**
Number of road crossings[c]	4	4	**No Change**
Number of NHD stream/river crossings	3	2	**+ 1**
NHD Artificial Path	0	0	**No Change**
NHD Canal/Ditch	0	0	**No Change**
NHD Connector	2	0	**+ 2**
NHD Steam/River Intermittent	0	1	**– 1**
NHD Stream/River Perennial	1	1	**No Change**
Number of designated trout stream crossings	2	0	**+ 2**
Acres of native plant community crossings (construction work area)	-	-	**No change**
Acres of forested land crossings (construction work area)	8.49	25.14	**– 16.65**
Acres of wetland crossings (construction work area)	32.71	16.29	**+ 16.42**
Miles of vulnerable water table crossings[f]	-	-	**No change**
Number of Minnesota rare/protected species occurrences[g]	5	2	**+3**
Number of public water wells within 1250ft. of the centerline	11	12	**– 1**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	0.0	0.0	**No Change**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	0	0	No Change
Number of historic resources	0	0	No Change

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	10%	8%	17%	66%	1%
Replaced Segment	14%	4%	44%	31%	7%
Change	**– 4%**	**+ 4%**	**– 27%**	**+ 35%**	**– 6%**

Table 7.3-15. Localized Differences between Route Segment Alternative RSA-42 and the Applicant's Preferred Route

Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	4.23	9.36	-	-	-
Replaced Segment	-	7.66	-	-	-
Change	**+ 4.23**	**+ 1.70**	**No change**	**No change**	**No change**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

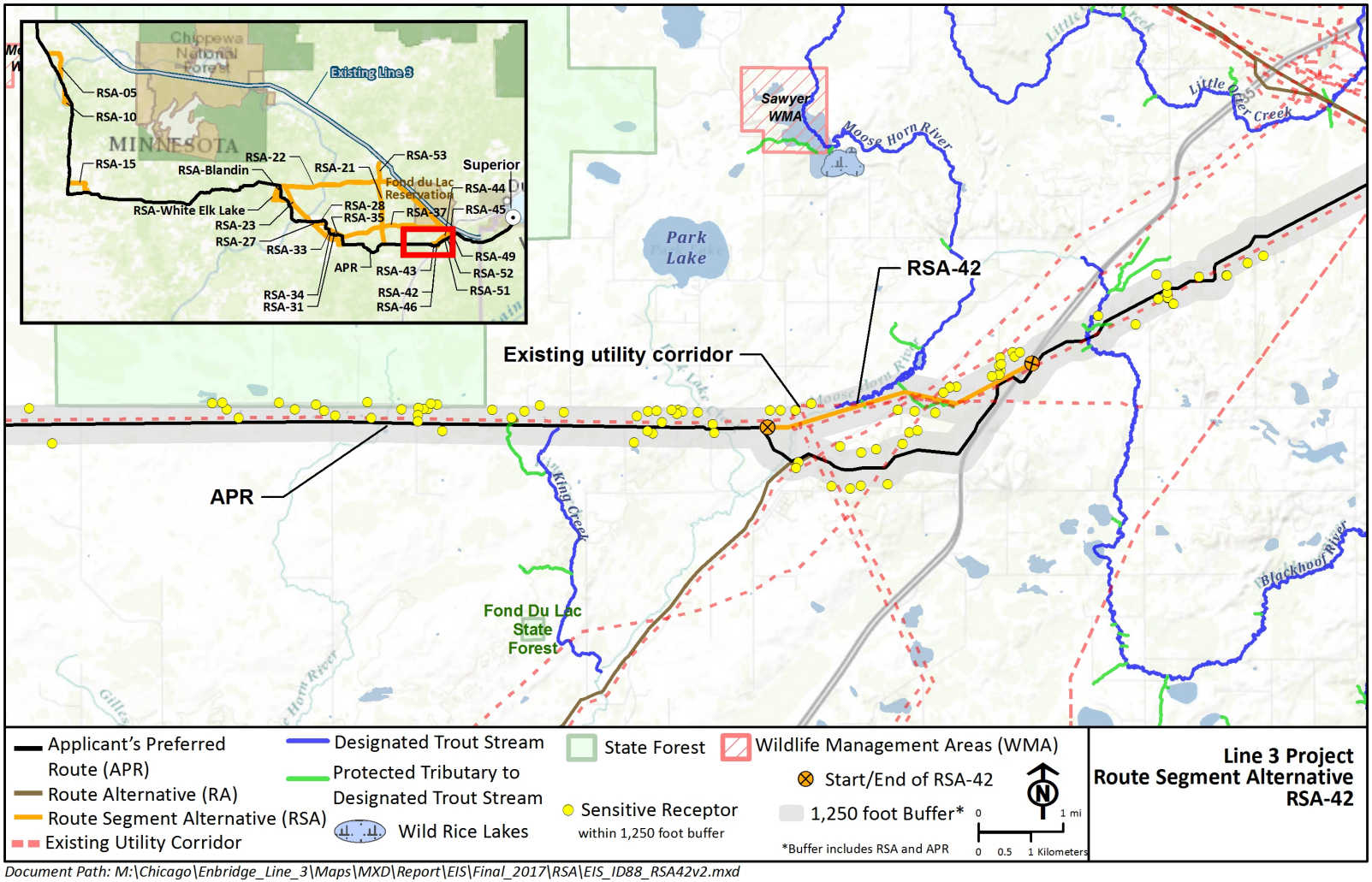

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Figure 7.3-15. Route Segment Alternative RSA-42

7.3.17 Route Segment Alternative RSA-43

RSA-43 is located in Carlton County. It is approximately 3.1 miles long and replaces a 3.5-mile segment of the Applicant's preferred route between MP 347.9 and 351.4 (Figure 7.3-16). RSA-43 crosses primarily forested and wetland cover types. Its purpose is to co-locate the pipeline with existing corridors. The RSA is co-located for its entire length. Table 7.3-16 highlights the differences between RSA-43 and the Applicant's preferred route.

Meaningful Variation Exists Between Routing Options

RSA-43 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; and (F) Co-Location.

(A) Human Settlement

Aesthetics: RSA-43 reduces aesthetic impacts because it is co-located with existing corridors for its entire length while the Applicant's preferred route is not co-located with existing corridors.

(B) Natural Environment

Wildlife Habitat: RSA-43 crosses a designated trout stream; the Applicant's preferred route does not.

Unique Natural Resources: RSA-43 would cross in the vicinity of four more occurrences than the Applicant's preferred route, increasing potential impacts. Occurrences within RSA-43 bat species.

(F) Co-Location

RSA-43 is co-located with existing corridors for its entire length; the Applicant's preferred route is not.

Table 7.3-16. Localized Differences between Route Segment Alternative RSA-43 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	44.85	46.84	**– 1.99**
Percentage co-located with existing corridors[a]	100%	0	**+ 100%**
Number of sensitive noise receptors[b]	22	16	**+ 6**
Number of road crossings[c]	3	3	**No Change**
Number of NHD stream/river crossings	2	1	**+ 1**
NHD Artificial Path	0	0	**No change**
NHD Canal/Ditch	0	0	**No change**
NHD Connector	1	0	**+ 1**
NHD Steam/River Intermittent	1	1	**No change**
NHD Stream/River Perennial	0	0	**No change**
Number of designated trout stream crossings	1	0	**+ 1**

Table 7.3-16. Localized Differences between Route Segment Alternative RSA-43 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of native plant community crossings (construction work area)	0	0	**No change**
Acres of forested land crossings (construction work area)	17.70	21.45	**– 3.75**
Acres of wetland crossings (construction work area)	13.59	11.71	**+ 1.88**
Miles of vulnerable water table crossings[f]	0	0	**No change**
Number of Minnesota rare/protected species occurrences[g]	6	2	**+4**
Number of public water wells within 1250ft. of the centerline	11	9	**+ 2**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	0.0	0.0	**No Change**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	0	0	No Change
Number of historic resources	0	0	No Change

Land Cover[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	11%	8%	41%	37%	3%
Replaced segment	17%	4%	45%	25%	8%
Change	**– 6%**	**+ 4%**	**– 4%**	**+ 12%**	**– 5%**

Wetlands[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	--	5.71	--	--	--
Replaced segment	--	5.43	--	--	--
Change	**No change**	**+ 0.28**	**No change**	**No change**	**No change**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

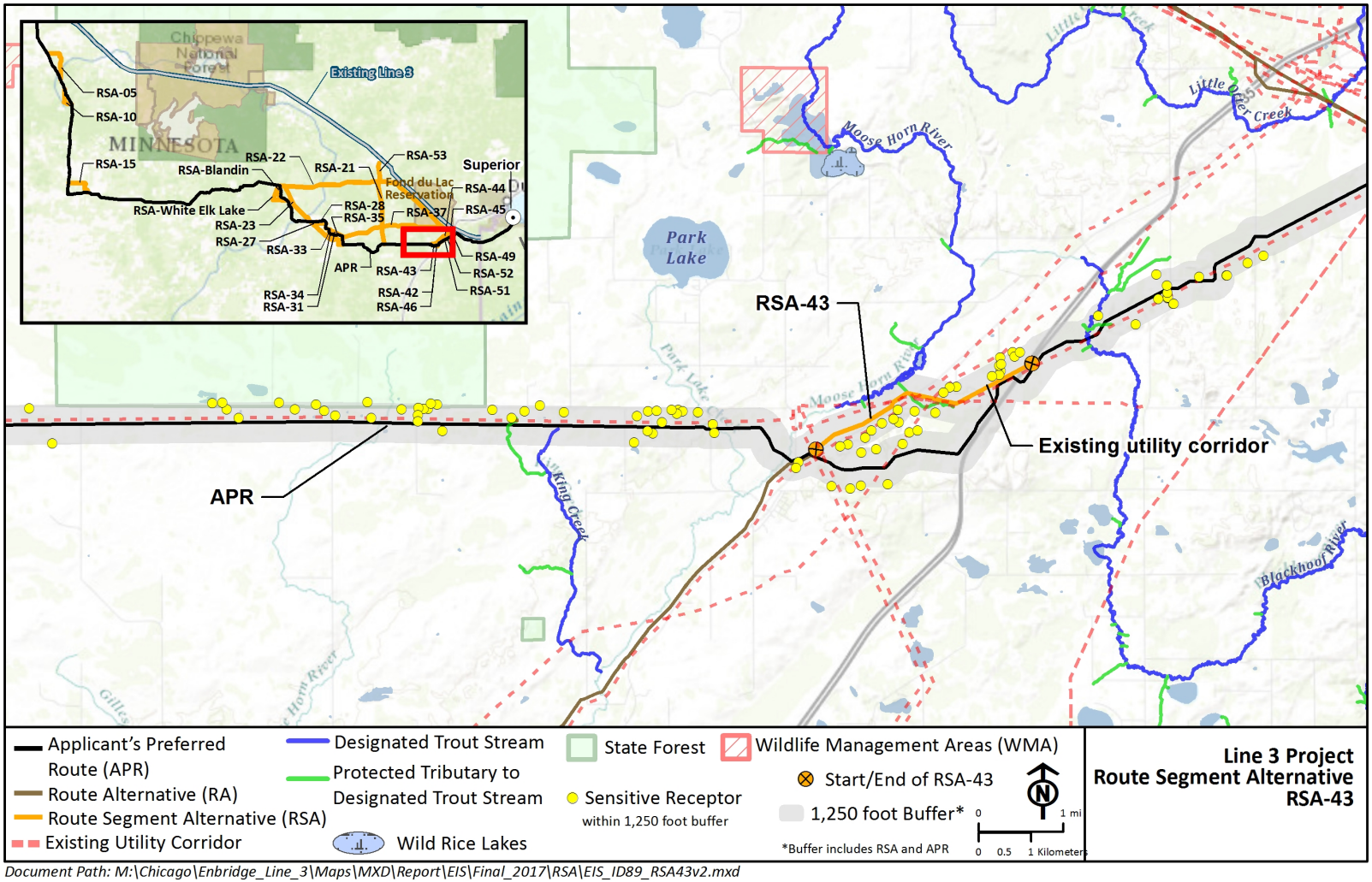

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Figure 7.3-16. Route Segment Alternative RSA-43

7.3.18 Route Segment Alternative RSA-44

RSA-44 is located in Carlton County. It is approximately 9.1 miles long and replaces an 8.9-mile segment of the Applicant's preferred route between MP 347.9 and MP 356.8 (Figure 7.3-17). The RSA was proposed to avoid the Blackhoof River watershed and potential impacts from groundwater flow around the watershed.

RSA-44 is not a viable routing option; therefore, no further analysis is provided. As proposed, this RSA is unworkable. The RSA passes beneath multiple structures, most notably the cluster of structures south of Omar's Sand & Gravel. These buildings cannot be avoided within the route width. Table 7.3-17 nonetheless highlights the differences between RSA-44 and the Applicant's preferred route.

Table 7.3-17. Localized Differences between Route Segment Alternative RSA-44 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	131.60	116.85	**+ 14.75**
Percentage co-located with existing corridors[a]	19.9%	60.2%	**– 57.5%**
Number of sensitive noise receptors[b]	42	28	**+ 14**
Number of road crossings[c]	7	6	**+ 1**
Number of NHD stream/river crossings	7	5	**+ 2**
NHD Artificial Path	0	0	**No change**
NHD Canal/Ditch	0	0	**No change**
NHD Connector	1	1	**No change**
NHD Steam/River Intermittent	2	2	**No change**
NHD Stream/River Perennial	4	2	**+ 2**
Number of designated trout stream crossings	3	2	**+ 1**
Acres of native plant community crossings (construction work area)	0	0	**No change**
Acres of forested land crossings (construction work area)	39.88	45.56	**– 5.68**
Acres of wetland crossings (construction work area)	51.42	35.33	**+ 16.09**
Miles of vulnerable water table crossings[f]	0	0	**No change**
Number of Minnesota rare/protected species occurrences[g]	11	12	**-1**
Number of public water wells within 1250ft. of the centerline	21	15	**+ 6**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	0.7	0.3	**+ 0.4**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	3	0	+3
Number of historic resources	0	0	No Change

Table 7.3-17. Localized Differences between Route Segment Alternative RSA-44 and the Applicant's Preferred Route

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	13%	3%	31%	41%	12%
Replaced segment	10%	5%	37%	39%	9%
Change	**+ 3%**	**– 2%**	**– 6%**	**+ 2%**	**+ 3%**
Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	0.34	21.12	--	--	--
Replaced segment	--	17.28	0.35	--	--
Change	**+ 0.34**	**+ 3.84**	**– 0.35**	**No change**	**No change**

Notes:

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

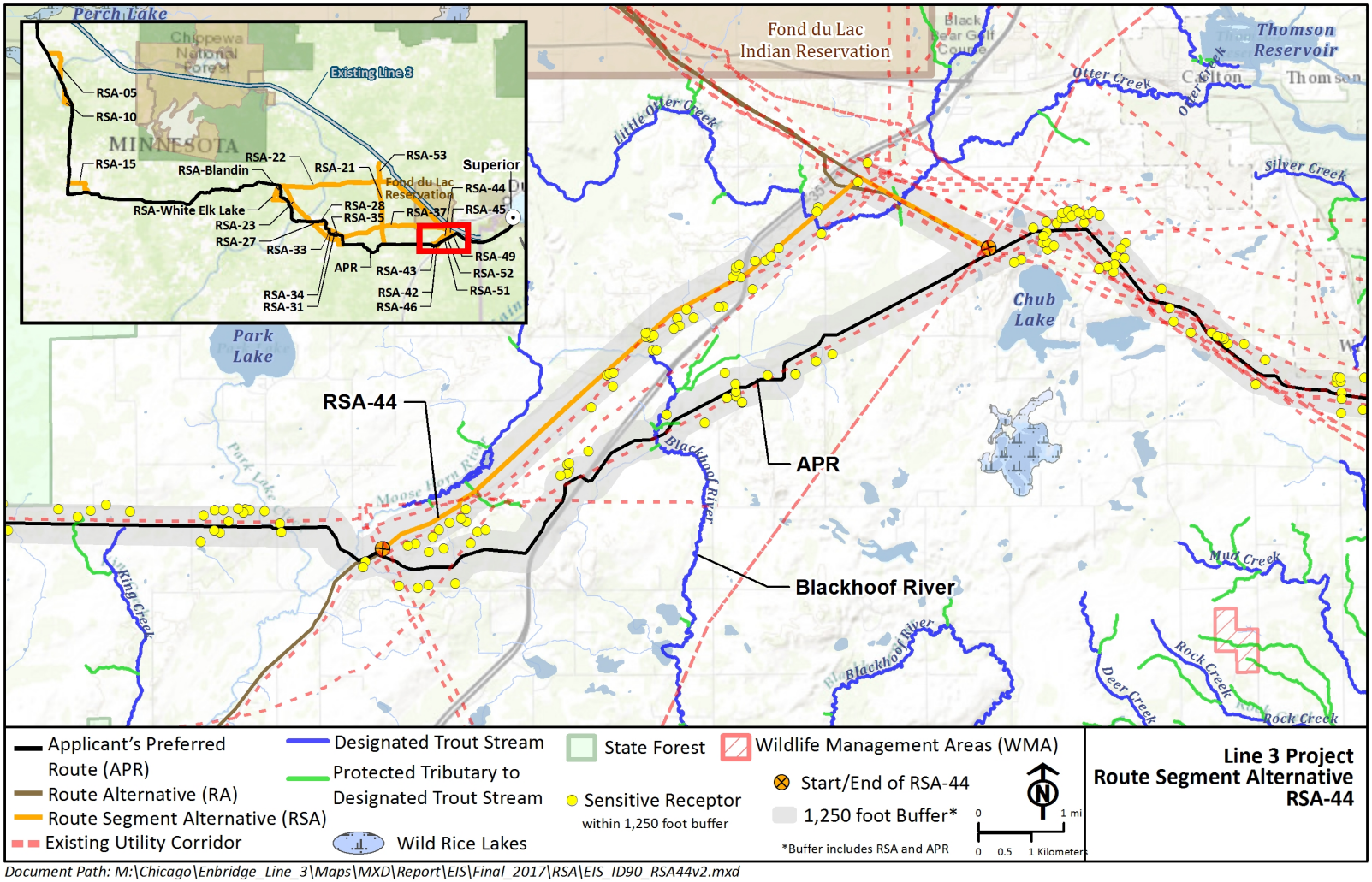

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Figure 7.3-17. Route Segment Alternative RSA-44

7.3.19 Route Segment Alternative RSA-45

RSA-45 is located in Carlton County. It is approximately 9.1 miles long and replaces an 8.8-mile segment of the Applicant's preferred route between MP 347.9 and 356.8 (Figure 7.3-18). The RSA crosses primarily forest and wetland cover types. It makes new greenfield crossings in an area heavily affected by habitat fragmentation. A commenter suggested following an existing utility corridor on the north side of State Highway 61 to avoid the Blackhoof River watershed and potential impacts from groundwater flow around the watershed. RSA-45 crosses the Blackhoof River and three other perennial streams. The Blackhoof River meets with the Nemadji River and eventually flows to Lake Superior. Table 7.3-18 highlights the differences between RSA-45 and the Applicant's preferred route.

Meaningful Variation Exists Between Routing Options

RSA-45 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; (D) Economics; (F) Co-Location; and (G) Natural Resources.

(A) Human Settlement

Noise: RSA-45 increases the number of sensitive noise receptors within 1,250 feet of the pipeline centerline by 13, increasing potential noise impacts.

(B) Natural Environment

Wildlife Habitat: RSA-45 would further fragment an area already heavily affected by habitat fragmentation. It would affect approximately 14 additional acres of wetland habitat. RSA-45 would require two additional designated trout stream crossings (Little Otter Creek).

(D) Economics

Agriculture: 6 percent of the land RSA-45 crosses is considered agricultural land while the Applicant's preferred route is 10 percent.

Public Lands: RSA-45 crosses 0.2 less miles of state owned public lands compared with the Applicant's preferred route. This would create a lessened impact for the public visiting state lands.

(F) Co-Location

RSA-45 is co-located with existing infrastructure for 16 percent of its length; the Applicant's preferred route is co-located for 60 percent of its length.

(G) Natural Resources

Water Resources: RSA-45 crosses 1.2 fewer miles of vulnerable water tables compared with the Applicant's preferred route. It makes two additional river crossings.

Wetlands: RSA-45 would affect approximately 14 additional acres of wetlands.

Table 7.3-18. Localized Differences between Route Segment Alternative RSA-45 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	131.53	116.85	**+ 14.68**
Percentage co-located with existing corridors[a]	16.60	60.20	**– 43.6%**
Number of sensitive noise receptors[b]	41	28	**+ 13**
Number of road crossings[c]	7	6	**+ 1**
Number of NHD stream/river crossings	7	5	**+ 2**
NHD Artificial Path	0	0	**No change**
NHD Canal/Ditch	0	0	**No change**
NHD Connector	1	1	**No change**
NHD Steam/River Intermittent	2	2	**No change**
NHD Stream/River Perennial	4	2	**+ 2**
Number of designated trout stream crossings	4	2	**+ 2**
Acres of native plant community crossings (construction work area)	--	--	**No change**
MBS, Plant Occurrences[d]	0	0	**No Change**
MBS, Lake Points[e]	0	0	**No Change**
Acres of forested land crossings (construction work area)	42.91	45.56	**– 2.65**
Acres of wetland crossings (construction work area)	49.03	35.33	**+ 13.70**
Miles of vulnerable water table crossings[f]	0.5	1.7	**– 1.2**
Number of Minnesota rare/protected species occurrences[g]	14	12	**+ 2**
Number of public water wells within 1250ft. of the centerline	25	15	**+ 10**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	0.1	0.3	**– 0.2**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	0	0	No Change
Number of historic resources	0	0	No Change

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	6%	5%	33%	46%	9%
Replaced Segment	10%	5%	37%	39%	9%
Change	**– 4%**	**No change**	**– 4%**	**+ 7%**	**No change**

Table 7.3-18. Localized Differences between Route Segment Alternative RSA-45 and the Applicant's Preferred Route

Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	1.96	18.50	--	--	--
Replaced Segment	--	17.28	0.35	--	--
Change	**+ 1.96**	**+ 1.22**	**– 0.35**	**No change**	**No change**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

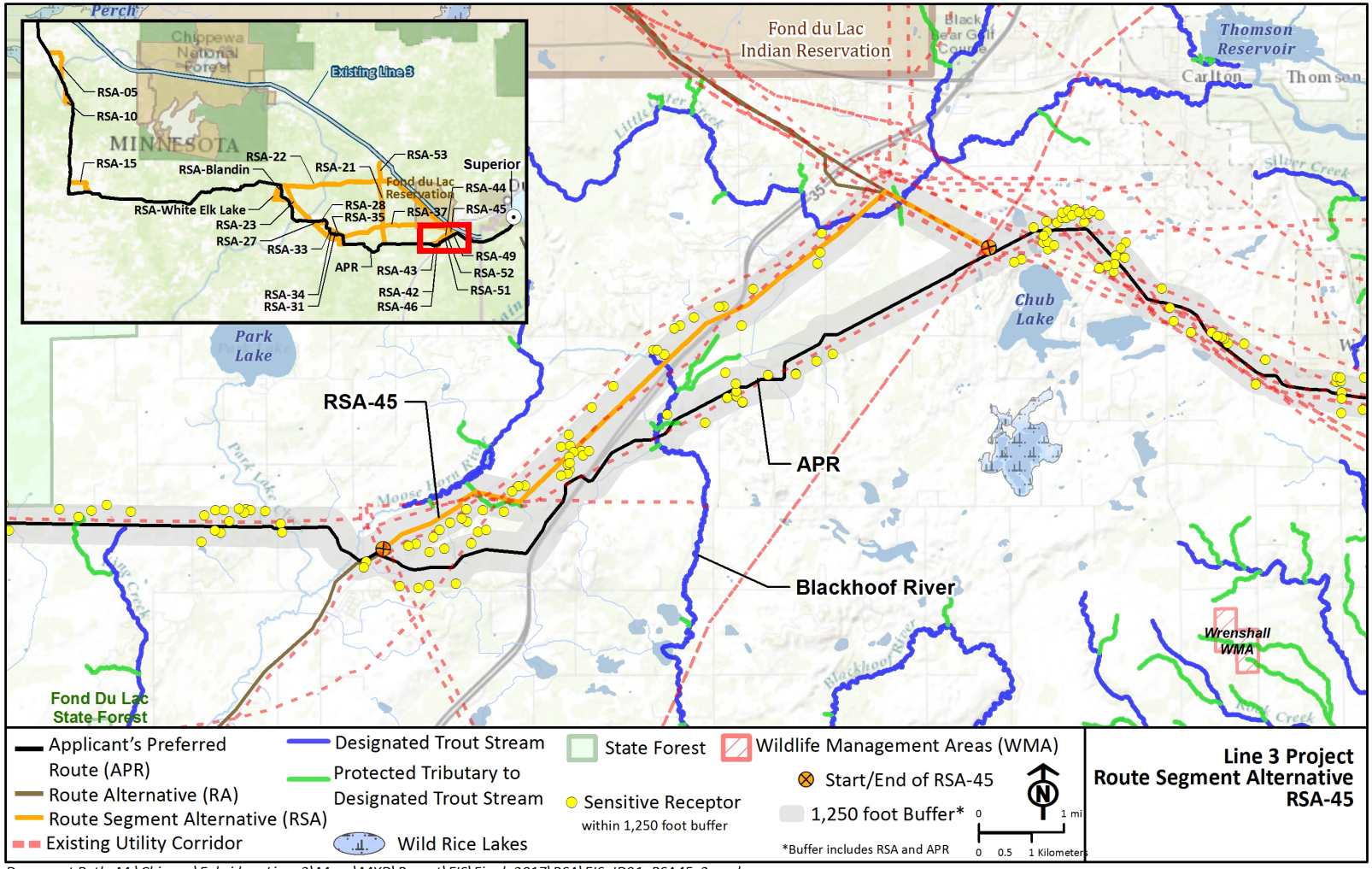

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Figure 7.3-18. Route Segment Alternative RSA-45

7.3.20 Route Segment Alternative RSA-46

RSA-46 is located in Carlton County. It is approximately 1.0 mile long and replaces a 0.9-mile segment of the Applicant's preferred route between MP 348.9 and MP 349.8 (Figure 7.3-19). RSA-46 is located primarily through wetland and forest cover types. It avoids an area of active farmland. Table 7.3-19 highlights the differences between RSA-46 and the Applicant's preferred route.

Meaningful Variation Exists Between Routing Options

RSA-46 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; (D) Economics; and (G) Natural Resources.

(A) Human Settlement

Noise: RSA-45 has two less number of sensitive noise receptors within 1,250 feet of the pipeline centerline. This would decrease the potential of negative impacts to nearby NSA's.

(B) Natural Environment

Vegetation: RSA-46 crosses an additional 2.75 acres of forested cover types compared with the Applicant's preferred route.

(D) Economics

Agriculture: RSA-46 would not impact any agricultural land nor timber production areas. The Applicant's preferred route would impact approximately 4 acres of land used in agriculture.

(G) Natural Resources

Wetlands: The RSA would affect approximately 2.5 additional wetland acres and approximately twice as many forested wetlands as the Applicant's preferred route.

Table 7.3-19. Localized Differences between Route Segment Alternative RSA-46 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	14.47	13.01	**+ 1.46**
Percentage co-located with existing corridors[a]	0	0	**No change**
Number of sensitive noise receptors[b]	3	5	**– 2**
Number of road crossings[c]	0	0	**No Change**
Number of NHD stream/river crossings	0	1	**– 1**
NHD Artificial Path	0	0	**No change**
NHD Canal/Ditch	0	0	**No change**
NHD Connector	0	0	**No change**
NHD Steam/River Intermittent	0	1	**– 1**

Table 7.3-19. Localized Differences between Route Segment Alternative RSA-46 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
NHD Stream/River Perennial	0	0	**No change**
Number of designated trout stream crossings	0	0	**No change**
Acres of native plant community crossings (construction work area)	0	0	**No change**
Acres of forested land crossings (construction work area)	6.91	4.16	**+ 2.75**
Acres of wetland crossings (construction work area)	5.47	3.02	**+ 2.45**
Miles of vulnerable water table crossings[f]	0	0	**No change**
Number of Minnesota rare/protected species occurrences[g]	1	1	**No change**
Number of public water wells within 1250ft. of the centerline	1	4	**– 3**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	0.0	0.0	**No Change**
Miles of timber parcels crossed by centerline	0.0	0.0	**No Change**
Number of archaeological resources	0	0	No Change
Number of historic resources	0	0	No Change

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	--	--	46%	46%	7%
Replaced segment	36%	--	31%	26%	6%
Change	**– 36%**	**No change**	**+ 15%**	**+ 20%**	**+ 1%**

Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	--	2.30	--	--	--
Replaced segment	--	1.44	--	--	--
Change	**No change**	**+ 0.86**	**No change**	**No change**	**No change**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

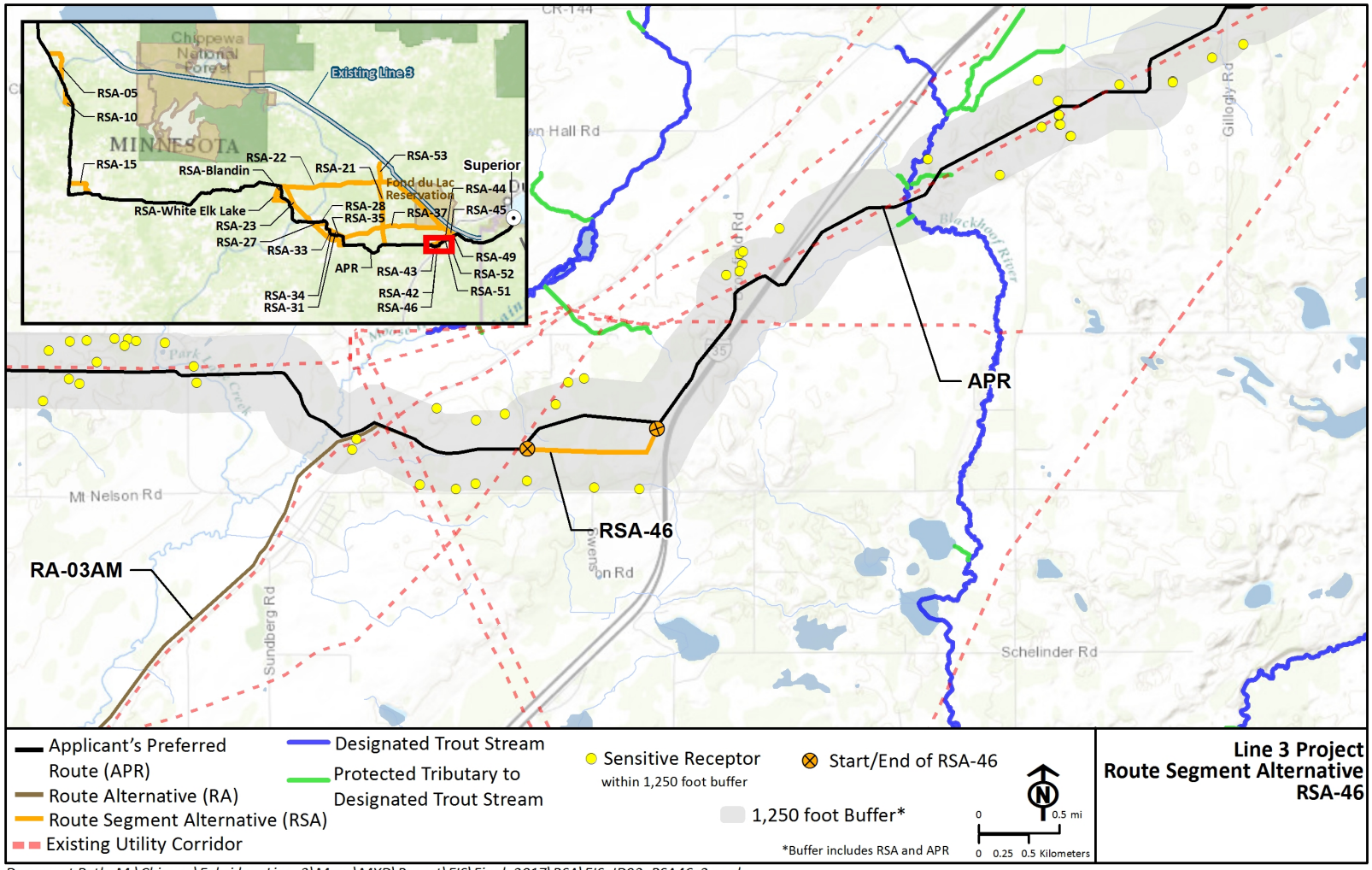

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Figure 7.3-19. Route Segment Alternative RSA-46

7.3.21 Route Segment Alternative RSA-49

RSA-49 is located in Carlton County. It is approximately 6.0 miles long and replaces a 5.4-mile segment between MP 351.4 and 356.8 (Figure 7.3-20). RSA-49 is dominated by wetland and forested cover types. A commenter requested following the south sides of Interstate 35 and State Highway 61 to distance the pipeline from multiple properties. The RSA accomplishes this purpose. Table 7.3-20 highlights the differences between RSA-49 and the Applicant's preferred route.

Meaningful Variation Exists Between Routing Options

RSA-49 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; (F) Co-Location; and (G) Natural Resources.

(A) Human Settlement

Aesthetics: RSA-49 would utilize less existing rights-of-way than the Applicant's preferred route. Each route would create new openings in the landscape but RSA-49 would be constructed near I-35 which may increase visual impacts.

Noise: RSA-49 reduces the number of sensitive noise receptors within 1,250 feet of the pipeline centerline by four, decreasing potential noise impacts.

(B) Natural Environment

Wildlife Habitat: RSA-49 would further fragment an area already heavily affected by habitat fragmentation. It would affect approximately 30 additional acres of wetland habitat. RSA-49 would cross two additional designated trout streams and be routed adjacent to tributary S-001-003-030-001 for approximately 3,000 feet, increasing potential for impacts on riparian vegetation and shading. These impacts might be avoidable by re-aligning the pipeline within the route width. Re-alignment would likely result in impacts on similar cover types.

Unique Natural Resources: RSA-49 would cross in the vicinity of two more occurrences than the Applicant's preferred route, increasing potential impacts. Occurrences within RSA-49 include bat species.

(F) Co-Location

RSA-49 is co-located with existing infrastructure for 25 percent of its length; the Applicant's preferred route is co-located for 80 percent of its length.

(G) Natural Resources

Water Resources: RSA-49 crosses 1.2 fewer miles of vulnerable water tables. It makes three additional river crossings, two of which are designated as trout streams.

Fewer public water wells would potentially be impacted by RSA-49 because this route moves away from an areas off Highway 5 where houses are located.

Wetlands: RSA-49 would affect approximately 30 additional acres of wetlands, converting those acres to less functional emergent wetlands.

Table 7.3-20. Localized Differences between Route Segment Alternative RSA-49 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	86.53	69.11	**+ 17.42**
Percentage co-located with existing corridors[a]	25.4%	80.7%	**– 55.3%**
Number of sensitive noise receptors[b]	8	12	**– 4**
Number of road crossings[c]	2	3	**– 1**
Number of NHD stream/river crossings	7	4	**+ 3**
NHD Artificial Path	0	0	**No change**
NHD Canal/Ditch	0	0	**No change**
NHD Connector	1	1	**No change**
NHD Steam/River Intermittent	0	1	**– 1**
NHD Stream/River Perennial	6	2	**+ 4**
Number of designated trout stream crossings	4	2	**+ 2**
Acres of native plant community crossings (construction work area)	--	--	**No change**
Acres of forested land crossings (construction work area)	15.38	24.11	**– 8.73**
Acres of wetland crossings (construction work area)	53.84	22.93	**+ 30.91**
Miles of vulnerable water table crossings[f]	0.5	1.7	**– 1.2**
Number of Minnesota rare/protected species occurrences[g]	11	9	**+ 2**
Number of public water wells within 1250ft. of the centerline	4	6	**– 2**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	0.3	0.3	**No Change**
Miles of timber parcels crossed by centerline	0	0	**No Change**
Number of archaeological resources	0	0	No Change
Number of historic resources	0	0	No Change

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	1%	1%	19%	68%	11%
Replaced segment	6%	6%	31%	46%	10%
Change	**– 5%**	**– 5%**	**– 12%**	**+ 22%**	**+ 1%**

Table 7.3-20. Localized Differences between Route Segment Alternative RSA-49 and the Applicant's Preferred Route

Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	0.88	21.48	--	--	--
Replaced segment	--	11.51	0.35	--	--
Change	**+ 0.88**	**+ 9.97**	**– 0.35**	**No change**	**No change**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

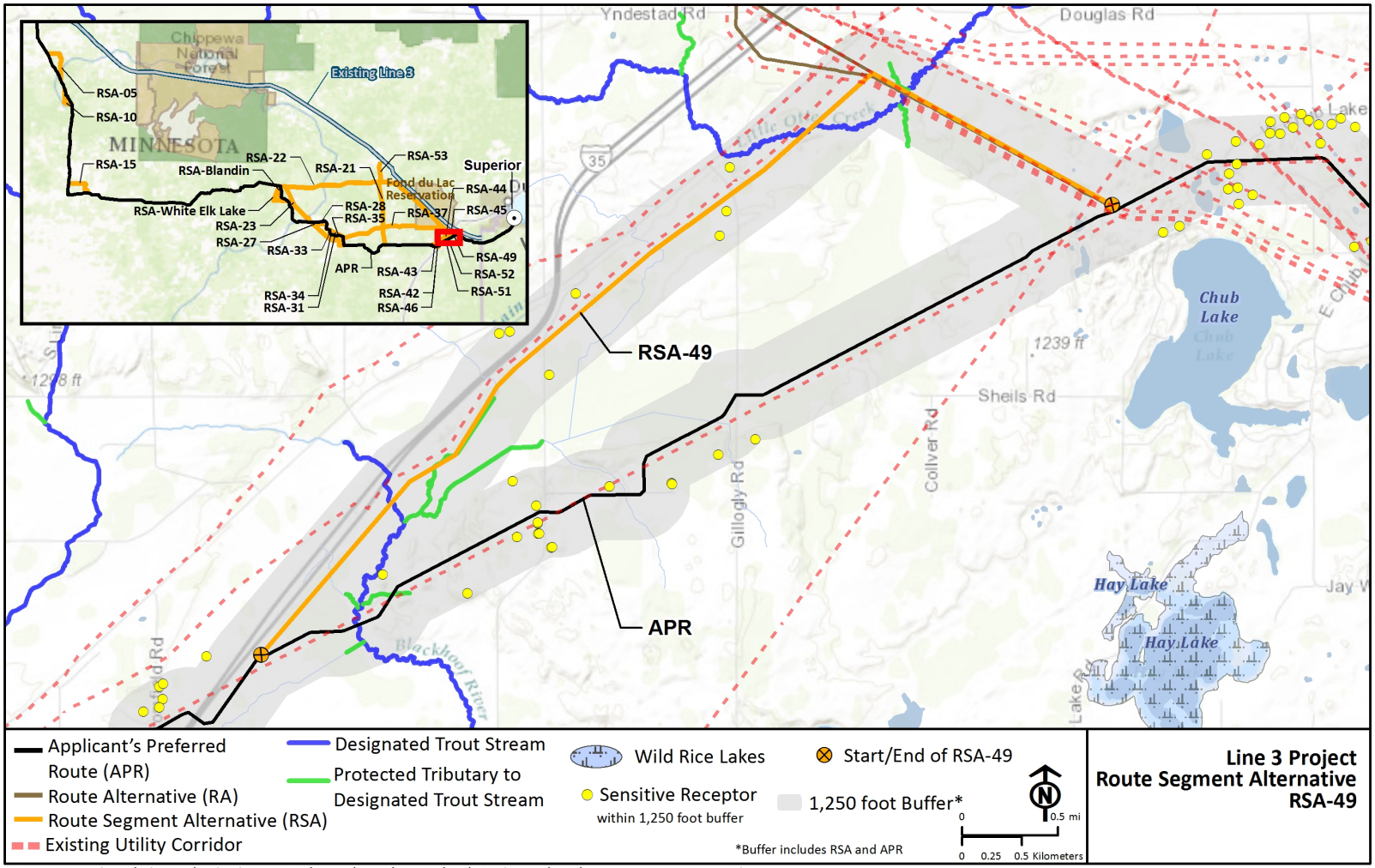

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Figure 7.3-20. Route Segment Alternative RSA-49

7.3.22 Route Segment Alternative RSA-51

RSA-51 is located in Carlton County. It is approximately 1.4 miles long and replaces a 1.3-mile segment of the Applicant's preferred route between MP 352.8 and MP 354.1 (Figure 7.3-21). Forest and wetland cover types dominate this RSA. A commenter proposed shifting the pipeline north to follow the tree line to create distance between the pipeline and nearby homesteads. Table 7.3-21 highlights the differences between RSA-51 and the Applicant's preferred route.

RSA-51 reduces the number of sensitive noise receptors within 1,250 feet of the pipeline centerline; it does not shift impacts to other residences.

Meaningful Variation Exists Between Routing Options

RSA-51 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; and (G) Natural Resources.

(A) Human Settlement

Noise: RSA-51 reduces the number of sensitive noise receptors within 1,250 feet of the pipeline centerline by half. The RSA avoids the nearby homes that are found along the Applicant's preferred route.

(B) Natural Environment

Vegetation: RSA-51 is a greenfield route which would create forest fragmentation and promote edge and open space species. The Applicant's preferred route would widen the existing rights-of-way it utilizes.

Unique Natural Resources: RSA-51 would cross in the vicinity of three more occurrences than the Applicant's preferred route, increasing potential impacts. Occurrences within RSA-51 include bat species.

(G) Natural Resources

Water Resources: The RSA makes two additional river crossings of a tributary to the Blackhoof River. This stream crossing is a trout designated stream and it is not crossed by the Applicant's preferred route.

Wetlands: RSA-51 crosses 9 acres of wetlands and 4 acres of forested wetlands. The Applicant's preferred route does not cross wetlands.

Table 7.3-21. Localized Differences between Route Segment Alternative RSA-51 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	20.56	18.62	**+ 1.94**
Percentage co-located with existing corridors[a]	0	43.3%	**– 43.3%**
Number of sensitive noise receptors[b]	4	8	**– 4**
Number of road crossings[c]	1	2	**– 1**
Number of NHD stream/river crossings	2	1	**+ 1**
NHD Artificial Path	0	0	**No change**
NHD Canal/Ditch	0	0	**No change**
NHD Connector	0	0	**No change**
NHD Steam/River Intermittent	0	1	**– 1**
NHD Stream/River Perennial	2	0	**+ 2**
Number of designated trout stream crossings	1	0	**+ 1**
Acres of native plant community crossings (construction work area)	0	0	**No change**
Acres of forested land crossings (construction work area)	9.39	8.14	**+ 1.25**
Acres of wetland crossings (construction work area)	9.26	0	**+ 9.26**
Miles of vulnerable water table crossings[f]	0.5	1.3	**– 0.8**
Number of Minnesota rare/protected species occurrences[g]	5	2	**+3**
Number of public water wells within 1250ft. of the centerline	1	3	**– 2**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	0.0	0.0	**No Change**
Miles of timber parcels crossed by centerline	0	0	**No Change**
Number of archaeological resources	0	0	No Change
Number of historic resources	0	0	No Change

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	--	1%	45%	50%	3%
Replaced segment	16%	24%	43%	8%	10%
Change	**– 16%**	**– 23%**	**+ 2%**	**+ 42%**	**– 7%**

Table 7.3-21. Localized Differences between Route Segment Alternative RSA-51 and the Applicant's Preferred Route

Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	--	3.97	--	--	--
Replaced segment	--	--	--	--	--
Change	**No change**	**+ 3.97**	**No change**	**No change**	**No change**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

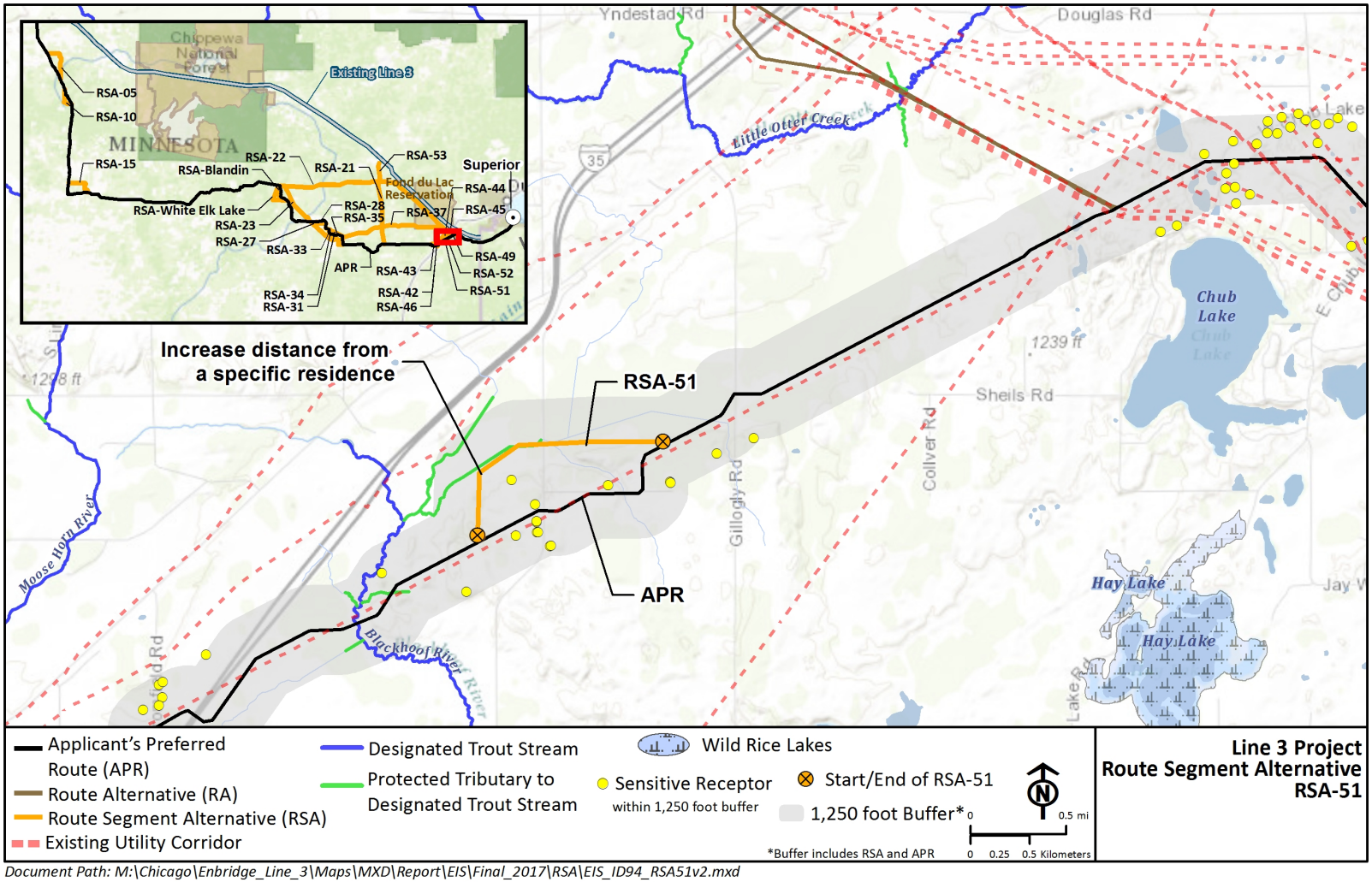

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Figure 7.3-21. Route Segment Alternative RSA-51

7.3.23 Route Segment Alternative RSA-52

RSA-52 is located in Carlton County. It is approximately 1.0 mile long and replaces a 0.9-mile segment of the Applicant's preferred route between MP 353.2 and MP 354.1 (Figure 7.3-22). Forest and wetland cover types dominate this RSA. A commenter proposed shifting the pipeline north to follow the tree line to increase separation between the pipeline and homesteads. Table 7.3-22 highlights the differences between RSA-52 and the Applicant's preferred route.

RSA-52 reduces the number of sensitive noise receptors within 1,250 feet of the pipeline centerline by one. It borders one homestead on two sides.

Meaningful Variation Exists Between Routing Options

RSA-52 and the Applicant's preferred route are different in the following criteria: (A) Human Settlement; (B) Natural Environment; (F) Co-location; and (G) Natural Resources.

(A) Human Settlement

Noise: RSA-52 reduces the number of sensitive noise receptors within 1,250 feet of the pipeline centerline by one. It borders one homestead on two sides.

(B) Natural Environment

Vegetation: RSA-52 doubles the number of forested acres crossed. This along with being a greenfield route would increase impacts to tree species and wildlife habitat that utilize the forest for cover.

Unique Natural Resources: RSA-52 would cross in the vicinity of two more occurrences than the Applicant's preferred route, increasing potential impacts. Occurrences within RSA-52 include bat species.

(F) Co-Location

RSA-52 is co-located with existing road right-of-way for approximately 25 percent of its length; the Applicant's preferred route is co-located for 43 percent of its length.

(G) Natural Resources

Wetlands: The RSA would affect approximately 2.5 additional wetland acres, of which 2 acres are forested wetlands. The Applicant's preferred route would not affect wetlands.

Table 7.3-22. Localized Differences between Route Segment Alternative RSA-52 and the Applicant's Preferred Route

Resource or Factor	Route Segment Alternative	Replaced Segment of Route	Change
Acres of construction work area	14.20	13.22	**+ 0.98**
Percentage co-located with existing corridors[a]	~25%	43.3%	**– ~18.3%**
Number of sensitive noise receptors[b]	4	5	**– 1**
Number of road crossings[c]	1	2	**– 1**
Number of NHD stream/river crossings	1	1	**No change**
NHD Artificial Path	0	0	**No change**
NHD Canal/Ditch	0	0	**No change**
NHD Connector	0	0	**No change**
NHD Steam/River Intermittent	0	1	**– 1**
NHD Stream/River Perennial	1	0	**+ 1**
Number of designated trout stream crossings	0	0	**No change**
Acres of native plant community crossings (construction work area)	0	0	**No change**
Acres of forested land crossings (construction work area)	8.51	3.53	**+ 4.98**
Acres of wetland crossings (construction work area)	4.07	0	**+ 4.07**
Miles of vulnerable water table crossings[f]	0.7	1.1	**– 0.4**
Number of Minnesota rare/protected species occurrences[g]	3	1	**+2**
Number of public water wells within 1250ft. of the centerline	1	2	**– 1**
Public water basins crossed by centerline	0	0	**No Change**
Miles of State Lands crossed by centerline	0.0	0.0	**No Change**
Miles of timber parcels crossed by centerline	0	0	**No Change**
Number of archaeological resources	0	0	**No Change**
Number of historic resources	0	0	**No Change**

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	--	2%	60%	35%	2%
Replaced segment	22%	34%	23%	11%	10%
Change	**– 22%**	**– 32%**	**+ 37%**	**+ 24%**	**– 8%**

Table 7.3-22. Localized Differences between Route Segment Alternative RSA-52 and the Applicant's Preferred Route

Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	--	1.76	--	--	--
Replaced segment	--	--	--	--	--
Change	**No change**	**+ 1.76**	**No change**	**No change**	**No change**

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

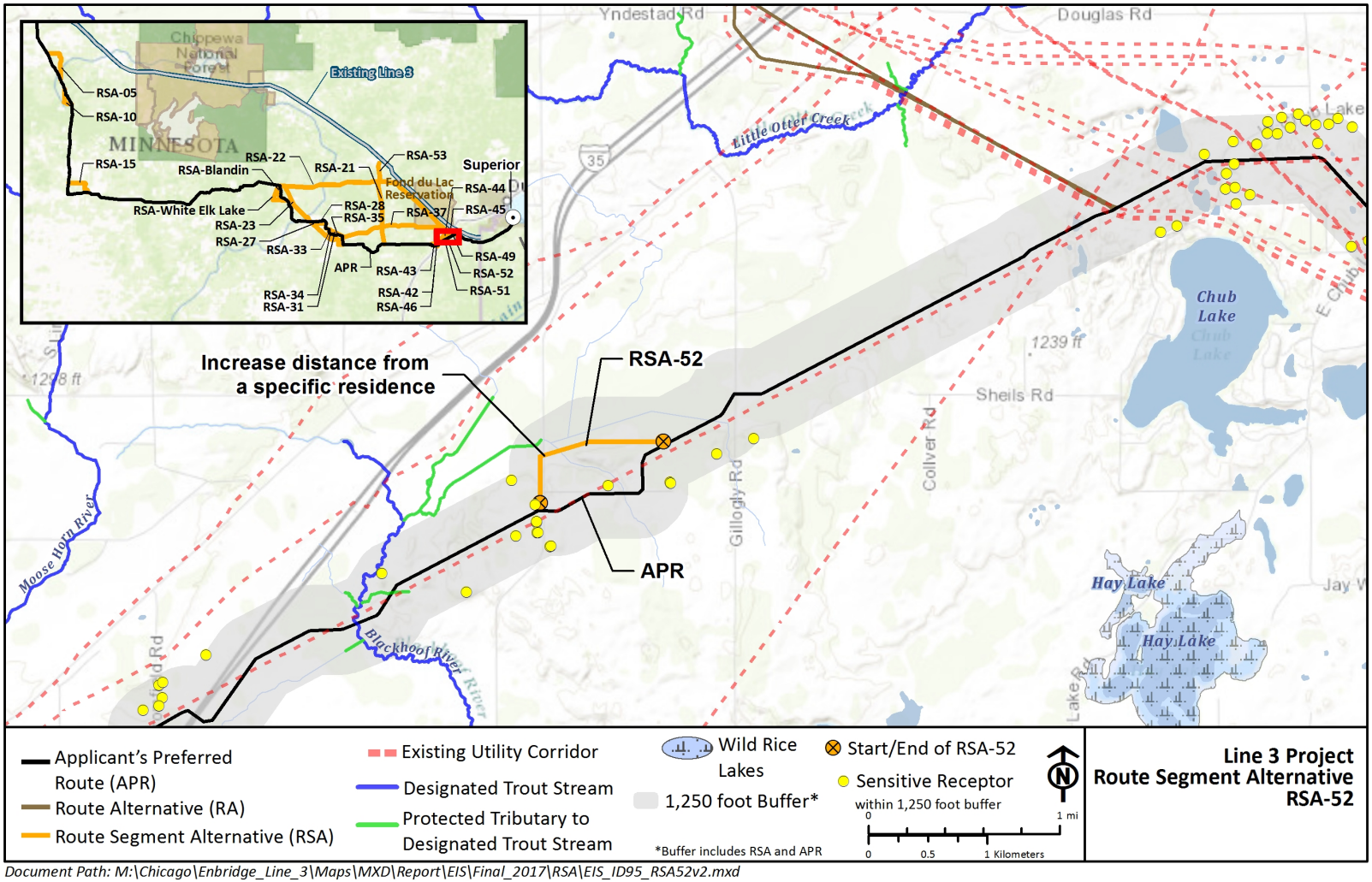

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Figure 7.3-22. Route Segment Alternative RSA-52

7.3.24 Route Segment Alternative RSA-53

RSA-53 is in St. Louis County. It is approximately 6.15 miles long and begins at MP 270.4 along RA-07 (Figure 7.3-23). It is dominated by wetland cover types and is co-located with existing transmission infrastructure for its entire length. RSA-53 would convert approximately 30 acres of forested wetlands to a different wetland type. The RSA was proposed to connect RA-07 with RSA-22, allowing a connection between the northern route alternatives (RA-06, RA-07, and RA-08) and the Applicant's preferred route to avoid crossing the Fond du Lac Indian Reservation. Table 7.3-23 highlights the impacts that would be associated with RSA-53.

Table 7.3-23. Route Segment Alternative RSA-53 Resources and Factors

Resource or Factor	Route Segment Alternative
Acres of construction work area	89.5
Percentage co-located with existing corridors[a]	100%
Number of sensitive noise receptors[b]	1
Number of road crossings[c]	3
Number of NHD stream/river crossings	3
NHD Artificial Path	0
NHD Canal/Ditch	3
NHD Connector	0
NHD Steam/River Intermittent	0
NHD Stream/River Perennial	0
Number of designated trout stream crossings	--
Acres of native plant community crossings (construction work area)	--
MBS, Plant Occurrences[d]	0
MBS, Lake Points[e]	0
Acres of forested land crossings (construction work area)	3.75
Acres of wetland crossings (construction work area)	76.68
Miles of vulnerable water table crossings[f]	0
Number of Minnesota rare/protected species occurrences[g]	0
Number of public water wells within 1250ft. of the centerline	0
Miles of public water basins crossed by centerline	0.0
Miles of State Lands crossed by centerline	0.0
Miles of timber parcels crossed by centerline	0
Number of archaeological resources	0
Number of historic resources	0

Table 7.3-23. Route Segment Alternative RSA-53 Resources and Factors

Land Cover – Permanent Right-of-Way[h]					
Route Segment	**Agricultural**	**Developed**	**Forest**	**Water/Wetlands**	**Other**
RSA	3%	2%	4%	88%	3%
Wetlands – Permanent Right-of-Way[i]					
Route Segment	**Emergent**	**Forested/Shrub**	**Freshwater Pond**	**Lake**	**Riverine**
RSA	0.60	30.75	0.18	-	-

[a] Existing corridors used by RSA-05 would consist of transmission line and road rights-of-way.

[b] Sensitive noise receptors within 1,250 feet of the centerline of the pipeline permanent right-of-way.

[c] Crossings by proposed centerline.

[d] Minnesota Biological Survey, sensitive plant communities

[e] Minnesota Biological Survey, lakes with aquatic vegetation 1250ft. of the centerline.

[f] Provided by Minnesota Department of Natural Resources.

[g] Occurrences of state rare/protected species within 1,250 feet of the centerline of the pipeline permanent right-of-way. In order to protect their exact location, an "occurrence" represents the location of the record plus a species-specific buffer distance. Data provided by State of Minnesota, Department of Natural Resources (MN-DNR 2016). State data does not include occurrence information for Canada lynx or gray wolf.

[h] National Land Cover Database (Homer et al. 2015). Percentage of permanent right-of-way in acres.

[i] National Wetlands Inventory (USFWS n. d.). Permanent right-of-way in acres.

RSA = route segment alternative, "--" = Not applicable

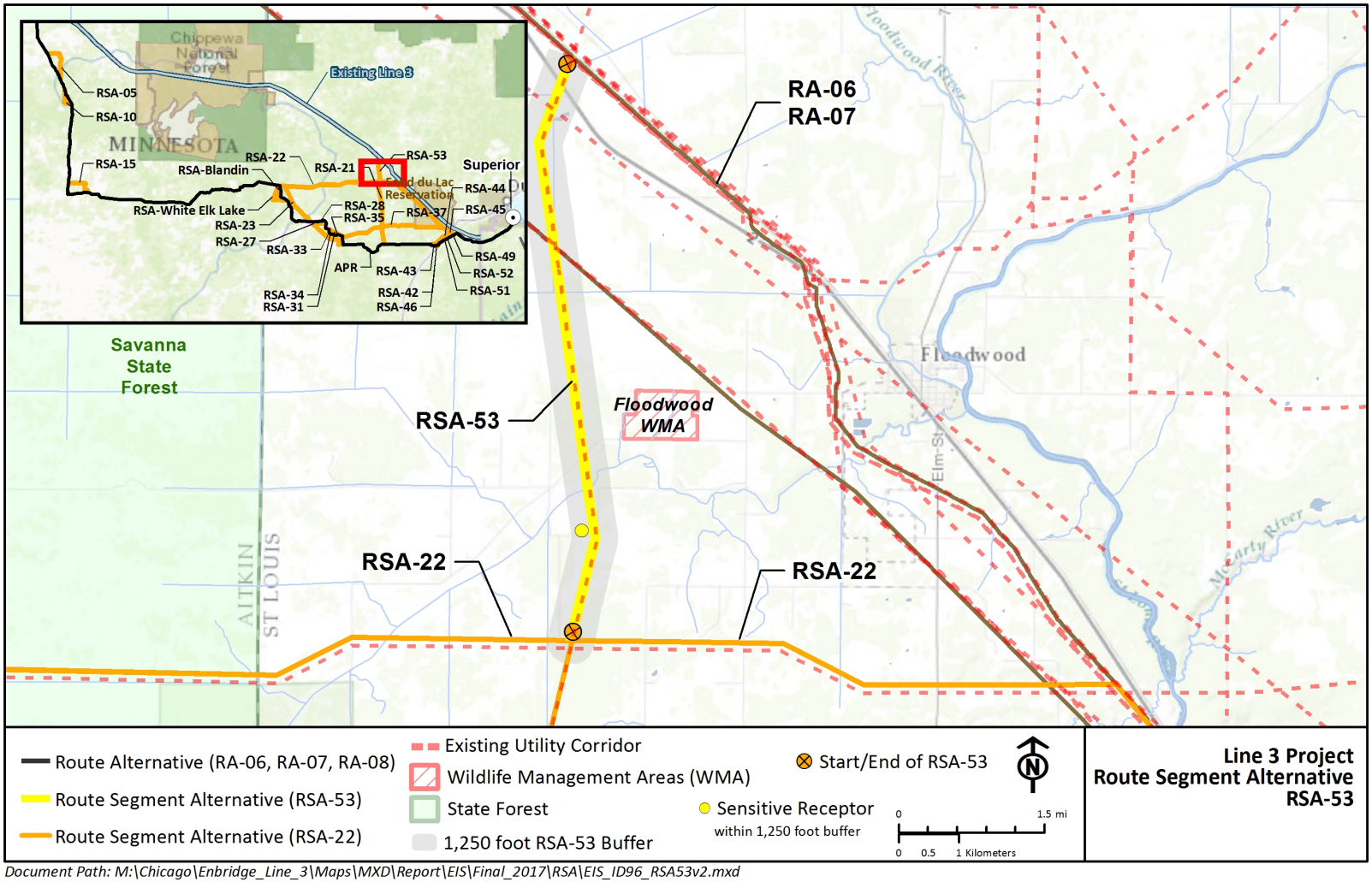

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Figure 7.3-23. Route Segment Alternative RSA-53

7.4 REFERENCES

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State of Minnesota, Department of Natural Resources (MN-DNR). 2016. Rare features data included here were provided by the Division of Ecological and Water Resources, Minnesota Department of Natural Resources (DNR), and were current as of July 26, 2017. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present.

U. S. Fish and Wildlife Service (USFWS). (n.d.). National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D. C. http://www.fws.gov/wetlands/. Accessed April 22, 2016.

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Chapter 8
Existing Line 3 Abandonment and Removal

8.1 INTRODUCTION

Options for Existing Line 3 Include Abandonment, Removal, and Removal with Replacement in the Same Trench

As part of the Project, Enbridge proposes to abandon in-place the existing Line 3, permanently removing it from service, following state[1] and federal[2] regulations, which outline the process and requirements for pipeline abandonment. As an alternative to abandonment, this FEIS evaluates excavating and removing the existing Line 3, as well.

Four of the five routes considered in this EIS (the Applicant's preferred route and route alternatives RA-03AM, RA-06, and RA-08) could be coupled with either abandonment of the existing Line 3 or removal of the existing Line 3. As discussed in Chapter 4, RA-07 specifically contemplates removal of the existing Line 3 with the new line placed in the existing trench, so therefore abandonment in place is not an option for that route alternative.

Whether the existing line is abandoned, removed, or removed with replacement in the same trench, the proposed pipeline will eventually require replacement, as well. The following discussion of alternatives is pertinent not only to the existing pipeline, but will also apply to the proposed pipeline at the end of its service life.

Options for Existing Line 3 Provide Benefits but Also Raise Challenges

This chapter discusses the benefits and drawbacks of each of the options for the existing Line 3. Additionally, this chapter discusses the potential impacts and identifies possible mitigation measures.

Major issues considered in the assessment of abandonment of the existing Line 3 include:

- Potential environmental benefits of avoiding disturbance to active pipelines located in the immediate vicinity of the existing Line 3;
- Potential environmental risks and adverse impacts of unknown existing contamination surrounding the pipe that would never be discovered and remediated if the line was abandoned;
- Providing a potential conduit for migration of water or contaminants that are present and/or associated with releases from nearby pipelines; and

[1] Minnesota Statutes § 216D.04, Subd. 3(f) and Minnesota Administrative Rules Part 7560.0125 (known collectively as "Gopher State One Call," or call before you dig) require specific document retention for all abandoned underground utilities in Minnesota (after December 31, 1998) and require providing specific information to excavators.

[2] 49 Code of Federal Regulations (CFR) 195.402(10) "Abandoning Pipeline Facilities"; 49 CFR 195.59 abandonment reporting requirements.

- Potential environmental risks and impacts associated with ongoing deterioration of abandoned pipeline, which include subsidence and becoming buoyant and exposed at the ground surface.

Major issues considered in the assessment of removal of the existing Line 3 include:

- Removal activities could damage an active pipeline located on in the near vicinity of the existing Line 3, causing a release;
- Potential impacts associated with disturbances at waterbody and roadway crossings, such as increased erosion potential;
- Potential environmental benefits associated with identification and remediation of existing contamination surrounding the pipe during removal;
- Removal of a potential conduit for contaminant migration associated with a release from an adjacent pipeline;
- Potential economic benefits from employing workforce to remove Line 3; and
- Avoidance of potential environmental risks and impacts associated with subsidence or buoyancy issues from ongoing deterioration of abandoned pipeline.

The option of removing the existing Line 3 and placing the new Line 3 in the existing trench (RA-07) has similar issues to those listed for removing the existing Line 3. Additionally, replacement of Line 3 using the same trench would require Line 3 to be out of service for the period during removal and construction activities. Issues, impacts, and mitigation associated with the option of removal and replacement within the same trench are addressed in detail in the evaluation of RA-07 in Chapter 6.

8.2 REGULATORY FRAMEWORK AND METHODOLOGY

Pipeline and Hazardous Materials Safety Administration (PHMSA) regulations govern the abandonment of pipelines. These regulations prescribe certain steps for formal abandonment of oil pipelines, including the disconnection, purging, and sealing of pipelines that are to be abandoned in place.[3] Enbridge has provided a plan describing how the basic requirements will be met, which is included as Appendix B. In addition, federal regulations require pipeline operators to file an abandonment report for each abandoned facility that crosses a navigable waterway. This abandonment report includes certification that the facility was abandoned in accordance with all applicable laws.[4] Minnesota's regulations require specific document retention for all abandoned underground utilities in the State to prevent unexpected discovery during excavation activities.[5] State and federal pipeline regulations do not specifically regulate the removal of pipelines. For crude oil pipelines located in Minnesota, Minnesota Office of Pipeline Safety (MNOPS) coordinates with PHMSA to review reports, records, and procedures in addition to performing field visits. MNOPS typically performs inspections during new construction, decommissioning/abandonment, and integrity digs.

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3 49 CFR 192.3; 195.2.

4 49 CFR 192.727(g); 195.59.

5 Minnesota Statutes § 216D.04, Subd. 3(f) and Minnesota Administrative Rules Part 7560.0125 (known collectively as "Gopher State One Call," or call before you dig).

Abandonment and removal activities that involve clearing and ground disturbance would require authorizations, permits, and approvals similar to any other construction activity including, for example, construction stormwater permits, permits for construction in public waters, and permitting for impacts on wetlands. The regulations that govern these programs are presented in detail in Chapters 5 and 6.

Impacts of abandonment have been characterized based on:

- A review of the nature and extent of the on-the-ground activities that are involved in each step of abandonment (e.g., disconnection, purging, sealing, and long-term monitoring); and
- A review of literature and studies that characterize potential short- and long-term interactions between the abandoned pipe and the surrounding resources as the pipeline degrades.

Impacts of removal have been characterized based on:

- A review of the nature and extent of the on-the-ground activities that are involved in each of the steps involved in removal (e.g., excavation, removal/transportation/disposal, and remediation of contaminated soil).

8.3 ABANDONMENT

Enbridge Has Filed a Proposed Abandonment Plan per PHMSA Regulations

In its Certificate of Need and route permit applications, Enbridge proposes to abandon the existing Line 3 following the PHMSA requirements for abandonment and generally described how the work would be performed. Subsequently, Enbridge filed with the Minnesota Public Utilities Commission (Commission) a draft of the required plan that details how the basic requirements of the PHMSA abandonment regulations will be met (Appendix B). Enbridge's abandonment plan for the portion of existing Line 3 in Canada is discussed in the Canadian National Energy Board's (CNEB's) Report regarding Line 3. The discussion here draws upon Enbridge's abandonment plan filed with the Commission and the CNEB report.

Enbridge proposes abandonment in place of the existing Line 3 that includes:

- **Removing the Oil** – Oil within existing Line 3 would be purged from the pipeline using cylindrical plug-like devices known as "pigs." The pigs would be propelled by nitrogen gas. Oil removed from the line would be moved to holding tanks at the Clearbrook terminal and the Superior terminal.
- **Cleaning the Pipeline** – Following oil removal, the pipeline would undergo a multi-step cleaning process. The process involves sending a variety of cleaning solutions and specialized pigs through the pipeline to remove remaining oil or associated hydrocarbons. Enbridge has indicated that solid and liquid waste materials generated as a result of cleaning activities, including spent cleaning solution, must be handled and disposed of in accordance with applicable federal and state requirements and permits. According to Enbridge documentation provided in Appendix B, purging and subsequent cleaning on a 12-mile section of Line 3 that was abandoned in 2014 resulted in 99.99 percent removal of hydrocarbons, as indicated by analysis of rinse water. However, the analysis of rinse water does not provide detailed information associated with whether residual product might be remaining within the pipeline.

- **Disconnecting the Pipeline** – Once the cleaning process has been completed and passed inspection, the existing pipeline would be physically disconnected from pump station terminals. The pipeline's mainline valves would be closed and electrically disconnected so that they could not be operated.
- **Segmenting the Pipeline** – In addition to disconnecting the pipeline and closing mainline valves, engineers for Enbridge would evaluate the existing line to determine whether additional segmentation of the pipeline would be needed to prevent the pipeline from acting as a conduit for water or residual oil, either within or outside the pipeline. At any such locations, the pipeline would be accessed and cut, and a cap welded onto "opened" ends of the pipeline. To reduce the potential for the pipe trench to act as a water/contaminant conduit, the installation of trench breaks can be considered to segment sloped locations.
- **Monitoring and Maintaining the Pipeline** – Enbridge would be required to continue to monitor and maintain the abandoned Line 3 right-of-way in accordance with PHMSA regulations indefinitely. Enbridge notes that this monitoring would enable them to identify and assess impacts to the public or the environment caused by the abandoned Line 3. Enbridge would take measures to mitigate identified potential risks, and cathodic protection would be maintained for the abandoned pipeline to prevent corrosion. In addition to Enbridge's own monitoring, Minnesota (MNOPS) is authorized by PHMSA to provide local regulatory oversight. This includes safety inspections of operating pipelines and during decommissioning, as well as, inspections during integrity digs.

8.3.1 Potential Impacts and Mitigation Measures

Disconnecting and Segmenting Existing Line 3 Would Require Some Ground Disturbance

Clearing and ground disturbance required for cleaning, disconnecting, segmenting, and on-the-ground activities associated with long-term monitoring of the abandoned pipeline would occur within the Mainline corridor. With clearing and excavation activities limited to the Mainline corridor, the potential impacts associated with abandonment activities are anticipated to be minimal. As noted above, impacts from clearing and ground disturbance would be managed through permitting similar to other construction activity including, for example, construction stormwater permits, permits for construction in public waters, and permitting for impacts on wetlands. Many of the same construction techniques and environmental protection measures described in Chapters 5 and 6 would be required for pipeline abandonment activities, including the use of work windows to avoid sensitive species' lifecycles (like breeding or nesting), vehicle and equipment crossing methods, sediment control measures, and bank restoration.

Abandonment May Limit Risks to Other Pipelines

The existing Line 3 is situated between other active oil pipelines within Enbridge's Mainline corridor (see Figure 4.3-2). The existing Line 3 is approximately 282 miles in length. Of that, approximately 104 miles of it has another pipeline on each side that is within a 20-foot buffer. The remaining 178 miles has either a single pipeline within the 20-buffer or no pipelines. Enbridge reports that in some cases the distance between pipelines is 10 to 15 feet apart. Enbridge believes that abandonment would reduce risk to other pipelines in the Mainline corridor by limiting the extent of disturbance and reducing the potential of striking the adjacent pipelines with equipment or stressing the adjacent pipelines with the weight of heavy equipment traveling across the ground. However, using timber mats and/or long reach boom cranes, removal activities can be performed such that adjacent pipelines are protected.

Effects of Pipeline Abandonment

There are, however, some potentially significant impacts associated with abandoning the existing Line 3. These longer term impacts are associated with the continued presence of undiscovered legacy contamination that may exist surrounding the existing pipeline, as well as the potential hazards associated with the aging of the abandoned pipe. These potential impacts include soil and water contamination from residual contamination around or beneath the pipeline, the ability of the pipeline to serve as a contaminant and/or water conduit, subsidence due to the failure over time of the pipeline, and loss of buoyancy control[6] for the pipeline. These impacts are discussed further below. A summary of potential impacts of abandonment of the existing Line 3 is provided in Table 8.3-1.

It should be noted that due to other pipelines existing within the corridor, the degree to which contaminated soils can be addressed, if found, may be limited.

8.3.1.1 Soil and Water Contamination

Remaining Oils and Cleaning Agents May Cause Future Environmental Problems

Oil or cleaning agents that remain in the pipeline after cleaning have the potential, at some time in the future, to leak and contaminate soils and waters near the pipeline. Corrosion of the pipeline would be slowed by cathodic protection. Over a long enough period of time, however, the pipeline will corrode and begin to fail (discussed further below). Thus, ensuring that the pipeline contains as few oils or cleaning agents as possible is key to minimizing potential future impacts on nearby soils and waters.

Enbridge Has Developed a Cleaning Protocol to Comply with PHMSA Regulations

As mentioned in Appendix B, the Department of Justice Consent Decree mandates that cleaning and purging of the existing line must begin within three months of the in-service date of the proposed pipeline. The decree further states that cleaning and decommissioning of the existing line shall be completed within one year of commencement[7]. The Consent Decree includes a provision in section VII.J that requires Enbridge to secure an independent third party to verify compliance with the Consent Decree. However, no specific guidelines have been provided that indicate adequacy of pipeline cleanliness after purging and cleaning. Section XI of the Consent Decree stipulates penalties associated for violating the requirements set forth within the document.

Enbridge's proposed abandonment plan includes removing the oil from the existing Line 3, cleaning the line of remaining oil and associated hydrocarbons, and using a variety of pigs and a cleaning agent to clean the pipeline. The pigs would have a variety of smooth and scraping surfaces to remove oils, hydrocarbons, and other materials on the pipeline walls. The pigs would be driven through the pipeline using an increase in back pressure created by nitrogen gas, and the cleaning solution would consist of water and biodegradable cleaning agents, as indicated by Enbridge in Appendix B.

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6 Buoyancy controls prevent the pipeline from becoming buoyant and, eventually, becoming exposed at the surface. The buoyancy of a pipeline depends on the weight of the pipe, the weight of the volume of water displaced by the pipe, the weight of the liquid load carried by the pipe, and the weight of the backfill. When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high.

7 Consent Decree for Civil Action No. 1:16-cv-914, United States v. Enbridge and subsidiaries.

Table 8.3-1. Potential Impacts of Line 3 Abandonment

Resource	Impact
Human Settlements	In the near term, impacts on human settlements are anticipated to be minimal. Work to clean, disconnect, segment, and monitor the pipeline would occur within the Mainline corridor. Some segmentation activities could require site-specific excavation. It is anticipated that this work, and all work within the Mainline corridor, would comply with applicable permits and approvals, thus minimizing and mitigating potential impacts. In the longer term, impacts on transportation and public services could be significant due to potential subsidence. These impacts could be reduced and potentially mitigated through long-term monitoring, adaptive management, and site-specific mitigation measures.
Natural Resources	In the near term, impacts on natural resources are anticipated to be minimal. Enbridge proposes to protect these resources by clearing the pipe of potential pollutants and segmenting the pipe to prevent it from acting as a contaminant/water conduit. The effectiveness of Enbridge's cleaning protocol and proposed segmentation of Line 3 could require further review and alteration as appropriate. In the longer term, impacts on natural resources could be significant due to subsidence and exposed segments of pipeline (buoyancy). These potential impacts could be mitigated by monitoring, adaptive management, and site-specific mitigation measures.
Cultural Resources	No impacts on cultural resources are anticipated. Abandonment activities would take place within the Mainline corridor and along the existing Line 3.
Socioeconomics	In the near term, impacts on socioeconomics are anticipated to be minimal. Abandonment could decrease tax revenues or shift them to other taxing authorities. In the longer term, impacts on socioeconomics, particularly agricultural production, could be significant due to subsidence and/or exposure of pipeline. These potential impacts could be lessened by monitoring, adaptive management, and site-specific mitigation measures. It is expected that job creation related to abandonment would be negligible.
Cost	Enbridge estimates the short-term cost of deactivating Line 3 in place to be approximately $85 million.[8] Enbridge estimates annual monitoring costs for Line 3 to be about $100,000.[9] Costs for future site-specific mitigation measures (e.g., to mitigate subsidence or loss of buoyancy control) are uncertain and would depend on the nature of the mitigation measures.
Environmental Justice	Communities with potential environmental justice impacts related to the Line 3 Project are discussed in Chapter 11. The abandonment of existing Line 3 could negatively affect these communities due to ongoing stress or anxiety related to the presence of the pipeline and ongoing risks related to water flow, soil and water contamination, and subsidence.

As discussed in Appendix B, Enbridge has developed and tested a cleaning protocol using a 12-mile abandoned section of Line 3 in Manitoba. Enbridge indicates that its proposed cleaning protocol removes over 99.99 percent of hydrocarbons, indicated by testing performed on rinse water after the cleaning process. Liquid and solid waste materials generated as a result of cleaning activities, including spent cleaning solution, must be handled and disposed of in accordance with applicable federal and state requirements and permit conditions.

Based on laboratory analytical results, Enbridge indicates that its proposed cleaning protocol is effective at removing potential contaminants from the interior of the pipeline, minimizing the potential adverse effects associated with a pipeline line failure and contaminant release to soils and waters (Appendix B).

8 Communication with Enbridge, March 10, 2017.

9 Id.

Therefore, the risk associated with potential impacts to soil and water resources near the existing Line 3 due to oils or other hydrocarbons from the abandoned Line 3 are reduced.

If Effective on Long Pipelines, Enbridge's Protocol Could Minimize Effects on Soils and Waters

The testing done by Enbridge associated with its cleaning protocol was conducted on a 12-mile length of pipe, and the existing Line 3 in Minnesota is approximately 282 miles long. It is currently unknown whether Enbridge's protocol works on a longer length of pipeline. Potential future impacts on soils and waters along the existing Line 3 could be minimized by ensuring that Enbridge's protocol works on the longer length of pipeline in Minnesota with similar effectiveness as that observed in testing of the protocol. Post-cleaning observations via pipeline inspection (e.g., in-line video) and other methods would provide resource agencies and authorities with substantial evidence that Enbridge has ensured the efficacy of the cleaning protocol and properly removed the waste materials.

8.3.1.1.1 Contamination Outside of the Pipeline

Past and Present Contaminants Outside Existing Line 3 Could Cause Impacts

Soils and waters near the abandoned Line 3 could also be adversely affected where either undiscovered or known contamination along the existing pipeline (from lubricants, process chemicals, and oil releases and spills) are left in-place. Potential impacts on soil and water resources cannot be readily ascertained, as they depend on the extent of the potential existing undiscovered contamination.

Enbridge has been, and would continue to be responsible for preventing discharges and contamination, as spelled out in Minnesota Statutes 115E[10]. Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage, and mitigate historically contaminated soils and waters. Such a plan would require them to identify potential contamination sources along abandoned Line 3 and coordinate with resource agencies and authorities to determine appropriate mitigation measures (see Sections 5.2.1.1, 5.2.2, 6.3.1.1, and 6.3.2). One such mitigation measure may be to sample nearby wells and wells within the right-of-way to determine human health impacts.

8.3.1.2 Existing Line 3 as a Water Conduit

If It Were to Act as a Water/Contaminant Conduit, Existing Line 3 Could Adversely Affect Water Resources

Over time, despite cathodic protection, the abandoned Line 3 would continue to corrode and lose structural integrity such that water and/or contaminants could enter the pipeline. This material could flow through the pipeline by gravity and exit the pipeline at another location. Thus, the abandoned pipeline could serve as a conduit for water and/or contaminants to move from one water resource to another, creating hydrological connections that might not otherwise occur. These connections could make water relatively more scarce or more abundant in specific locations and create/increase the extent of a contaminant plume, which can lead to potential impacts on wetlands, watercourses, and lakes and on human uses of water such as drinking water or for agricultural irrigation.

Cathodic Protection and Segmenting the Pipeline May Minimize Effects on Water Resources

Enbridge's proposed abandonment plan includes maintaining cathodic protection of the pipeline to minimize corrosion, segmenting the pipeline to prevent the pipeline from acting as a water conduit, and

[10] 2016 Minnesota Statutes 115E.02 Duty to Prevent Discharges.

monitoring the pipeline. Enbridge's abandonment plan proposes to segment (i.e., cap) Line 3 at 47 locations, with three other locations requiring further study (for a possible total of 50 locations; see Appendix B).

It should be noted that in 1996, Enbridge determined that the polyethylene tape used for cathodic protection has been "wrinkling." Water/contaminants tend to seep under the wrinkles and follow the pipe. Additionally, all identified external metal loss locations occurred at locations of wrinkled tape. While additional information associated with this phenomenon is presented in Appendix B, it is unclear what Enbridge is doing about this issue. This effect will increase the deterioration of the existing Line 3.

Additionally, pipelines that are located in the immediate vicinity of high-voltage power lines can be adversely affected by the alternating currents that are generated, which can accelerate the corrosion process. In addition to a standard cathodic protection system, the pipeline section(s) located near high voltage lines should be augmented with a polarization cell that dissipates the stray voltage into the ground and away from the pipeline. It is uncertain as to whether the existing Line 3 or the new pipeline's cathodic protection system has been designed to offset alternating currents.

The 47 locations selected for segmentation, consist of 40 mainline valves, six pump stations, and one pump station/terminal. Enbridge selected the segmentation locations based on topographical data, GIS analysis, and computer modeling. Enbridge notes that water resources are generally located at lower elevations within a landscape. Because the pipeline elevation on either side of a waterbody is higher than the elevation of the segment of pipe that passes beneath the waterbody, gravity may keep water that might enter the pipe from flowing uphill and passing beyond the limited segment of pipe that runs beneath the water body. These conditions imposed by elevation and gravity typically effectively limit water movement beyond the limited segment of pipe that passes below a particular water resource.

Work at Pump Stations and Mainline Valves Would Take Place within Their Fenced Boundaries

At pump stations and terminals, the abandoned Line 3 would be disconnected and segmented by excavating down to the pipeline, cutting the pipeline, and welding a cap onto the pipe. Enbridge anticipates that this work would occur within the fenced boundaries of the pump stations and terminals. Mainline valves that serve as segmentation locations would be closed and electrically disconnected so that they could not be operated. For all other segmentation locations, Enbridge proposes to excavate to the pipeline, cut the pipeline, and weld a cap onto the pipe or close the pipe with grout.

It is unclear whether valves can be operated manually after electrical disconnection. If valve stems remain in place, an assurance of ongoing functionality to maintain isolated segmentation should be provided by Enbridge.

Additional Segmentation Locations Still Need to Be Studied

If Enbridge's proposed abandonment plan is effectively implemented, including segmentation of the existing Line 3, the potential risks to water resources resulting from a potential flow of water through existing Line 3 can be reduced. As Enbridge acknowledges in its plan, however, additional segmentation locations require further study. Additionally, water resources may be identified by state, federal, and tribal resource agencies that these agencies believe are not adequately protected by Enbridge's proposed plan and that, as a result, require additional segmentation of an abandoned Line 3.

One example of potentially high priority segmentation locations is where pipelines cross under streams. These locations may see increased streamflow and become deeper over time, leading to exposed portions of the pipeline.

8.3.1.3 Subsidence

Failure of Existing Line 3 Depends on Structural Integrity and Applied Loads

As the abandoned Line 3 corrodes and loses its structural integrity, soil could enter the pipeline, causing a subsidence of the ground in that area. This would likely occur over time with soil slowly filling the pipe, but the pipeline could also collapse quickly, before it has much soil in it. Subsidence could affect public safety, particularly if it occurred at highways, railroads, or other utility crossings. It could also affect agricultural production and could lead to water channeling and erosion with adverse impacts on water resources.

Underground Loads Are Typically Less Than Surface Loads

Whether subsidence occurs, and the extent to which it occurs, depends on the structural integrity of the pipe and on the loads applied to the pipe associated with deformation and failure. In general, loads at the pipe level (underground) are less than live loads at the surface (like those from a heavy truck), because part of the load is shared with the surrounding soil. If there is a dearth of surrounding soil, or if the cover for the pipeline is relatively shallow, the pipeline bears more of the load and, all things being equal, is more likely to fail.

The Longer the Pipe Is in the Ground, the More Likely It Is to Fail

Enbridge has analyzed and modeled potential subsidence of the abandoned Line 3 in its proposed abandonment plan (see Appendix B). This analysis includes projecting loss of pipeline wall thickness due to corrosion over time, possible failure modes for the pipeline, and estimated subsidence levels should the pipeline fail. In general, subsidence is a time-dependent risk. The longer the pipe is in the ground, the greater the advancement of corrosions and increased risk that the pipe may fail.

Subsidence Is Inversely Proportional to the Amount of Soil That Has Entered the Pipeline

Enbridge's analysis indicates that it would take a minimum of 506 years for the abandoned Line 3 to fail under typical highway loads and 87 years to fail under typical railway loads. How much subsidence occurs as a result of these failures depends on whether or not soil has been slowly filling the pipe over these time periods. The greatest subsidence would occur when no soil has entered the pipe. Enbridge estimates that subsidence with no soil having entered the pipeline prior to loss of structural integrity would range from about 3 to 7 inches, depending on the pipeline's depth of cover (2.0 feet to 13.1 feet, respectively).

Near-Term Effects on Natural Resources, Land-Based Economies, and Public Safety

In light of Enbridge's analysis, impacts on natural resources and land-based economies such as agriculture are anticipated to be minimal in the near term (i.e., the next 40 years) but could be significant longer term. For many areas and land-uses along the route of the existing Line 3, mitigation of subsidence can be corrected, to some extent, by fill with soil. In some areas, however, a fill would not be possible (e.g., in each incident where the pipeline passes underneath a watercourse). Due to the length of the existing Line 3 and the variety of resources along it, Enbridge proposes that the primary mitigation strategy would be effective monitoring and adaptive management to address these issues at

first identification. Additional identification and/or analysis of existing and potential subsidence locations may allow Enbridge to preemptively address short- and long-term impacts related to subsidence.

Enbridge's analysis also indicates that impacts on public safety are anticipated to be minimal in the near term, but that the potential exists for significant impacts on highway, railways, and other utilities, absent monitoring, adaptive management, and effective mitigation measures. Subsidence of highways and railways could result in significant adverse impacts, and avoiding and mitigating these impacts is a site-specific and authority-specific endeavor. Initial analysis by Enbridge indicates that the existing Line 3 crosses under 297 roads and 17 railways.

Enbridge notes that tolerable subsidence levels for roads, railways, and utilities have not been established with respect to pipelines. Each pipeline crossing scenario is evaluated independently to determine potential risks and mitigation measures. In some instances, the preferable approach for road or railway crossings could be to fill the abandoned pipe with an engineered fill material that would provide structural integrity over the longer term.

Long-Term Effects Could Be Significant and Would Require Site-Specific Mitigation Measures

In sum, impacts on human and natural resources due to potential subsidence of the ground above the abandoned Line 3 are anticipated to be minimal in the near term but could be significant in the longer term, absent effective monitoring, adaptive management, and the timely introduction of mitigation measures. Because of the length of Line 3 and the variety of resources crossed, mitigation measures would be site specific and would need to be designed in collaboration with those agencies and authorities responsible for the resources in question.

8.3.1.4 Loss of Buoyancy Control

Loss of Buoyancy Control Could Cause Pipe to Become Exposed

Once oil is removed from the existing Line 3, portions of the pipeline could become buoyant. That is, once the pipeline is no longer burdened by the weight of the transported oil, the depth of cover and other buoyancy control measures might no longer be adequate to prevent the pipeline from becoming buoyant and, eventually, becoming exposed at the surface. Enbridge has indicated that loss of buoyancy control could occur at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high.

For Line 3, Enbridge has documented 223 occurrences totaling a length of 8,496 linear feet of exposure pipeline. Line 3 was originally installed prior to the minimum depth of cover standard that was established under 49 CRF 195.248. Therefore, given the lack of adequate soil cover and the lack of transported oil in the pipe, it is probable that the frequency associated with the pipeline becoming buoyant and being exposed at the ground surface will increase.

Exposed Pipe Could Affect Streambeds and Cause Erosion, but Locations Are Difficult to Predict

If the abandoned Line 3 became buoyant, the exposed pipeline could adversely affect natural resources, including soil erosion and impacts on streambeds. Because of the length of Line 3, the variety of resources crossed, depth of groundwater relevant to the depth of the pipeline, and the number of variables that determine whether a specific segment of pipe will become buoyant, it is difficult to

predict where buoyancy and exposed pipe will occur. Accordingly, the primary mitigation measures are monitoring and adaptive management.

In the CNEB report, Enbridge indicated that it would conduct a preliminary buoyancy analysis of Line 3 in Canada to determine areas where there might be pipeline buoyancy issues. Buoyancy analysis may also be required by PHMSA. Enbridge noted that it would use a variety of mitigation measures to address exposed pipeline, including weights or engineered fill, placing additional cover over the pipeline and, in some circumstances, removing segments of the pipeline.

Complexity and Variety of Affected Resources Would Require Site-Specific Mitigation Measures

Enbridge's proposed abandonment plan for Line 3 in Minnesota mentions the potential need for buoyancy control. The plan also discusses the possibility of exposed pipe and potential mitigation measures. Enbridge indicates in its proposed plan that it would monitor for exposed pipeline and, if found, would work with relevant agencies and authorities to develop site-specific mitigation measures, which could include removing a segment of pipeline, grouting, and/or continued monitoring.

Because of the length of Line 3 and the variety of resources crossed, mitigation measures for buoyancy and exposed segments of the abandoned Line 3 would be site specific and would need to be designed in collaboration with the responsible agencies. In Minnesota, the Department of Natural Resources is responsible for issues that involve crossing the state's waters. Buoyancy is a phenomenon that occurs near and within water resources, making it more likely that mitigation measures designed for specific exposed segments of pipeline would involve working with the Department of Natural Resources. A preliminary analysis and subsequent monitoring plan of potential buoyancy-related issues and locations, along with typical mitigation measures for such conditions would provide the regulatory agencies with additional indication that Enbridge has giving this concern appropriate consideration.

8.3.1.5 Cost

Short-Term Cost of Abandonment Estimated at $85 Million

Enbridge estimates the short-term cost of abandoning Line 3 in place to be approximately $85 million.[11] For context, Enbridge estimates annual monitoring costs for Line 3 to be about $100,000.[12] It is unclear whether ongoing cathodic protection costs are included in the annual monitoring cost estimate. Costs for future site-specific mitigation measures (e.g., to mitigate subsidence or loss of buoyancy control) are uncertain and would depend on the nature of the mitigation measures. It is expected that job creation related to abandonment would be negligible.

8.4 REMOVAL

Removing a Pipeline Requires Much the Same Process as Constructing a Pipeline

An alternative to abandoning Line 3 in place is to remove the pipeline. A description of the removal process is included in the discussion of RA-07 (see Section 4.3.4). Removing an existing pipeline is essentially the reverse of constructing a pipeline and involves topsoil removal, excavation, pipe removal, backfilling and compaction of the trench, replacement of the topsoil, and revegetation measures.

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11 Communication with Enbridge, March 10, 2017.

12 Id.

With clearing and excavation activities occurring within and immediately adjacent to the Mainline corridor, potential impacts related to construction disturbance are anticipated to be minimal. As noted above, impacts from clearing and ground disturbance would be managed through permitting similar to other construction activity including, for example, construction stormwater permits, permits for construction in public waters, and permitting for impacts on wetlands. Many of the same construction techniques and environmental protection measures would apply to pipeline removal in order to reduce impacts, including the use of work windows to avoid sensitive species' lifecycles (like breeding or nesting), vehicle and equipment crossing methods, sediment control measures, and bank restoration.

Soil materials required to fill the trench after pipe removal could be recovered from areas immediately adjacent to the pipeline right-of-way, although additional topsoil may need to be obtained from local borrow sources.

As with abandonment, pipe cleaning would be required if the pipe were to be removed to avoid contamination of soil and groundwater during the removal process. Cleaning would need to be conducted using a process similar to the process used for pipeline abandonment to minimize risks to humans and the environment from residual oil. However, the overall cleanliness of the pipe may not have to be as thorough given that the pipe would be removed from the ground and recycled.

8.4.1 Potential Impacts and Mitigation Measures

The potential impacts of removing the existing Line 3 are anticipated to be similar to those for removing and replacing Line 3 in the same trench (route alternative RA-07). Potential impacts of RA-07 are discussed in Chapter 6. Impacts are also summarized here in Table 8.4-1.

Table 8.4-1. Potential Impacts of Line 3 Removal

Resource	Impacts
Human Settlements	Impacts on human settlements are anticipated to be similar to those for route alternative RA-07, as discussed in Section 6.2, and include temporary noise and aesthetic impacts and impacts due to the heavy use of local roads. There is a risk of damage to existing nearby pipelines with the risk of an oil leak that could significantly affect human settlements. Impacts on roads, railways, and utilities could be significant if subsidence occurs with removal of Line 3. These impacts could be reduced and potentially mitigated through accurate marking of existing pipelines, long-term monitoring, adaptive management, and site-specific mitigation measures.
Natural Resources	Impacts on natural resources are anticipated to be similar to those for RA-07, as discussed in Section 6.3, and include minor vegetation clearing, air emissions, and construction stormwater impacts. There is a significant risk of damage to existing pipelines and the risk of an oil leak that could significantly affect natural resources. In wetland areas, it might not be possible to remove Line 3 without damaging existing pipelines. Impacts of removal could be minimized by targeting portions of the pipeline for removal that would not cause undue damage to such natural resources, and by preparing for potential spill response and cleanup.
Cultural Resources	Impacts on cultural resources are anticipated to be similar to those for RA-07, as discussed in Section 6.4, and are anticipated to be negligible, with ground-disturbing activities limited to the Mainline corridor and immediately adjacent areas.

Table 8.4-1. Potential Impacts of Line 3 Removal

Resource	Impacts
Socioeconomics	Impacts on socioeconomic resources are anticipated to be similar to those for RA-07, as discussed in Section 6.5, and include minor impacts associated with disturbance to recreation and tourism as well as minor impacts on local economies. There is a significant risk of damage to existing pipelines and the risk of an oil leak that could significantly affect socioeconomic resources. In wet soils, it might not be possible to remove Line 3 without damaging existing pipelines. Tax revenues could decrease or shift to other taxing authorities. As discussed below, based on Enbridge's cost estimates for construction and removal, it is assumed that removal of the existing Line 3 would create approximately half as many jobs as the construction of the new line.
Cost	Enbridge estimates the cost of removing Line 3 at approximately $1.28 billion. Enbridge estimates the cost for removal to be approximately $855 per linear foot of pipeline.[a]
Environmental Justice	Communities with potential environmental justice impacts related to the Line 3 Project are discussed in Chapter 11. Removal of the existing Line 3 could positively affect these communities by removing the presence of the abandoned pipeline and associated risks related to water flow, soil and water contamination, and subsidence.

[a] Communication with Enbridge, March 10, 2017.

Primary Challenge Is Proximity of Other Pipelines, but Mitigation Measures Would Be Used

The primary challenge in removing Line 3 is that it is situated between other active oil pipelines within Enbridge's Mainline corridor (see Figure 4.3-2). As previously stated, roughly 104 miles of the 282 mile long Line 3 has pipelines located on both sides within a 20-foot buffer. The remaining 178 miles has either no adjacent pipelines or has one side without a pipe. Enbridge believes that in isolated areas that an adjacent pipeline may be as close as 10-feet away. An analysis of the provided data for the 104 mile stretch shows that adjacent pipelines are within an average of 11 feet of Line 3. This data broken down by segment is shown in Table 8.4-2. Enbridge has indicated that there is a significant risk that pipeline removal activities could damage an active pipeline and cause an accidental release. Damage could be caused by striking a pipeline with equipment or by the weight of the equipment as it works above operating pipelines. This damage could be immediately apparent if equipment struck a pipeline, or observable later if the pipeline was damaged and only leaked in the future.

Table 8.4-2. Average Distance to Nearest Adjacent Pipeline[a]

Line 3 Segment	Average Distance to Nearest Adjacent Pipeline (feet)[b]
North Dakota border to Clearbrook	12.1
Clearbrook to Carlton	12.4
Carlton to Wisconsin	11.0

[a] Analysis only performed for pipeline segments that have adjacent pipelines within a 20-foot buffer on both sides of the existing Line 3.

[b] Averages were calculated by measurements at the following points: one point at the beginning and end of each segment as well as points every 10 miles along the pipeline.

Enbridge's assessment of the risks and benefits of removal included in their abandonment plan contemplated the use of timber mats over operating pipelines to create a work and travel surface for equipment. These mats would help disperse the weight of the equipment and minimize potential impacts on these pipelines. The use of timber mats for this purpose is typical in wetland and other sensitive environments where heavy equipment is necessary. Enbridge provided an estimate in Appendix B of 600,000 to 900,000 timber mats to complete this work. It is unclear how this estimate was determined.

As a highly conservative estimate that assumes 20-foot long mats that are 4 feet wide each and are placed the entire length of the pipeline at once to create a 16-foot-wide corridor (appropriate for typical excavators and dump trucks), approximately 300,000 mats would be needed. However, the work would not require that the entire corridor have timber mats at any given time. Instead, several access points can be constructed for multiple crews at once. For each crew, approximately 500 to 1,000 feet of matting can be used and moved as work progresses. Assuming five crews work concurrently and each requires 1,000 feet of matting 16 feet wide, a total of 1,000 mats would be required.

Further, the1,000-mat estimate assumes that the entire 282-mile-long Line 3 would require timber mats at some point during construction. As stated previously, only 104 miles of Line 3 has limited access (i.e., a pipeline line on both sides within a 20-foot buffer zone). This is equates to 37 percent. Therefore, it is possible that only 370 mats would be needed.

Enbridge also indicates that sheet piling would likely be required to isolate specific segments of existing Line 3 and control the trench width, particularly in wet soils and wetlands. The source of Enbridge's estimate of required sheet piling to perform removal (provided in Appendix B) is unclear. Similar to timber mats, sheet piling would be installed at necessary locations as the work progressed to those locations, rather than all at once.

Enbridge notes that it would likely use a hydraulic vacuum or hand dig to minimize potential impacts on existing pipelines.

If the existing Line 3 was removed in its entirety, and adjacent pipelines were adversely impacted,, these pipelines would need to be excavated and repaired.

Special Mitigation Measures Would Be Needed at Watercourses and Where Line 3 Removal Would Create Unacceptable Risks

Where Line 3 crosses underneath watercourses, roads, and railways, excavation and removal may temporarily affect waters and fisheries or access on roads and railways. These impacts would be similar to those arising during construction of the proposed new Line 3, and mitigation measures would also be similar.

There may also be areas where local geology would cause removal to create a higher risk of erosion or subsidence. In these areas, mitigation measures would be site specific and would need to be designed in collaboration with the responsible agencies and authorities.

Where existing Line 3 cannot be safely removed, the appropriate mitigation measure could be segmenting (similar to abandonment in place) or using an engineered fill until the pipeline could be reached without damaging existing pipelines. Similarly, where Line 3 crosses under watercourses,

roads, and railways, the appropriate mitigation measure might be to deactivate and segment the pipeline and use an engineered fill to prevent subsidence.

Contaminated Soil Could Be Remediated

Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage, and mitigate historically contaminated soils and waters. Any existing contamination discovered during excavation of the existing Line 3 could be remediated in accordance with this plan, avoiding the potential for long-term adverse impacts on soil and water quality caused by undiscovered contamination along the existing pipeline (from lubricants, process chemicals, and oil spills) as discussed in Sections 5.2.1.1, 5.2.2, 6.3.1.1, and 6.3.2. However, the location of other existing pipelines in the corridor may limit the ability to access and remediate soil and water contamination.

Proper Handling of Waste Materials Would Be Critical to Minimize Impacts

Enbridge indicates that, if the existing Line 3 was removed with a hydraulic vacuum process, the removal would generate approximately 1.7 million gallons of slurry waste that would need to be properly handled to minimize potential impacts. In addition, the pipe would need to be recycled or disposed of. Pipe that would be used for another purpose after removal would also be cleaned of hazardous materials while in place and can include supplementary cleaning techniques after the pipe has been removed from the ground. For pipe that is targeted for disposal, existing disposal or landfilling guidelines would determine the required cleanliness of the pipe.

Cost of Removal Estimated at Approximately $1.28 Billion

Minnesota Statutes 116D.04 Subdivision 6 prohibits state actions, on the basis of cost alone, which may affect the environment. Such actions include permit approval for development.[13] Enbridge estimates the cost of removing Line 3 at approximately $1.28 billion.[14] This estimate is based on a per-foot cost for removal at about $855.[15] Of this cost estimate, approximately 25 percent would be for labor, 40 percent for equipment, and 35 percent for materials costs. This overall estimate does not account for the value of scrap metal recovered from the pipeline, which would offset approximately $19 million of this cost. [16] As this estimate is slightly more than half of the cost of installing the portion of the proposed Line 3 that would be located in Minnesota ($2.1 billion), it appears that the potential jobs created during the removal effort would be approximately half of the jobs generated by construction of a new Line 3.

8.5 SUMMARY

The above discussion and Appendix B, identify key benefits and risks associated with abandonment and removal as options for decommissioning the existing Line 3. Generally, the negative impacts due to removal of the pipeline are concentrated in the near term (i.e., removal occurs in conjunction with the construction of the new line). Conversely, these impacts shift towards long-term concerns in the case of abandonment (i.e., subsidence, corrosion, and buoyancy). The primary exception to this is the

13 2016 Minnesota Statutes 116D.04

14 Communication with Enbridge, March 10, 2017.

15 Id.

16 Enbridge Response to Data Request 05, July 14, 2017

associated cost, which is expected to be higher for removal than for abandonment. Additionally, removal would likely create about half as many jobs as would the construction of the new line.

In addition to considering abandonment and removal as stand-alone alternates, a combination of the two may most adequately mitigate risks. For example, high priority locations that are adequately spaced from adjacent pipelines or are more likely to experience subsidence, exposure or cause hydraulic problems would be removed, while lengths of pipe that are not expected to have these issues would be purged, cleaned, and abandoned in-place with ongoing monitoring and associated maintenance. To best inform this approach, additional studies regarding potential locations of subsidence, corrosion, and buoyancy issues could be conducted prior to finalizing a more detailed decommissioning plan.

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Chapter 9
Tribal Resources

9.1 INTRODUCTION

Impacts analyzed within an Environmental Impact Statement (EIS) generally rely heavily on quantitative data and a western worldview of science and its applications (Dongoske et al. 2015). Using western scientific methods to evaluate environmental impacts "fails to consider and incorporate Native American perspectives of, values about, and relationships with the environment." The goal of this chapter is to provide an alternative, qualitative measure of the impacts of Enbridge's proposed Line 3 Project (Project) on American Indian tribes. This chapter reflects American Indian values and relationships to the environment, traditional ecological knowledge, and the impacts associated with constructing a pipeline through areas of traditional, cultural, spiritual, and natural resource significance.

Quantitative impacts are discussed in the preceding chapters of the EIS. Chapters 5 and 6 analyze impacts of the Certificate of Need and route alternatives, including impacts on reservation lands, treaty lands, resources that hold tribal significance, such as wild rice, water resources, wildlife, and climate change. To fully understand and appreciate the impacts of the proposed Project and its alternatives on tribal communities and cultures within the project area, qualitative *and* quantitative discussions are necessary. The differences between these approaches highlight the unique impacts on tribal communities and tribal members. In combining these two approaches, an opportunity is created to better incorporate feedback received through consultation and to understand impacts within the cultural context of American Indian tribes (Barnhardt and Kawagley 2005; USFWS 2011).

American Indian traditions are interwoven into the ecosystems in which they live, from hunting and gathering to sacred sites—places and activities that have spiritual and artistic meaning. For example, wild rice has important cultural ties to local traditions, spiritual fulfillment, sustenance, local economies, and more. "Culturally important ecosystem services often cannot be measured in pounds, gallons, acres, or kilowatts" (Fletcher and Christin 2015). Knowledge formed through this understanding is known as traditional ecological knowledge (TEK) or Indigenous Knowledge (Plumer 2017; USFWS 2011). "This knowledge is specific to a location and includes the relationships between plants, animals, natural phenomena, landscapes and timing of events that are used for lifeways, including but not limited to hunting, fishing, trapping, agriculture, and forestry" (USFWS 2011).

This chapter identifies tribal resources and details their importance to the survival of traditional ways. By incorporating tribal input received through consultation and sources provided by tribes, the intent is to provide a more complete analysis of long-term consequences of any alteration, modification, or rerouting of Line 3, all which would have impacts on the natural and cultural environment important to American Indian tribes.

9.2 SOVEREIGNTY

Federally recognized tribes are sovereign nations that retain the power of self-governance over their lands and members. The U.S. Supreme Court has characterized tribal governments as "domestic dependent nations" to whom the federal government has essentially a fiduciary relationship. One

element of this fiduciary relationship has been to preserve American Indian tribes' status as self-governing entities within their territories, including protection from state interference without their prior, informed consent absent an act of Congress. Tribal sovereignty and the right to self-govern is the central tenet of federal American Indian policy.

Treaties are the supreme law of the land which necessarily supersede state laws, and the significance of treaty rights and treaty-protected resources in Minnesota has been acknowledged in judicial decisions that have addressed those rights both on and off reservations.[1] Treaties continue to affirm the inherent sovereignty of American Indian nations, enabling tribal governments to maintain a nation-to-nation relationship with the United States government; manage their lands, resources, and economies; protect their people; and build a more secure future for generations to come.[2]

9.3 HISTORICAL AND LEGAL FRAMEWORK

Eleven federally recognized American Indian tribes and reservations are located in Minnesota; seven Anishinaabe (Chippewa, Ojibwe) reservations and four Dakota (Sioux) communities.[3] The current reservation locations were established by treaty. The seven Ojibwe reservations in Minnesota were originally established by treaty, and the United States government accordingly considers them as unique sovereign nations (Figure 9-1 and Figure 9-2).

The Dakota (Sioux) Communities in the state are: Lower Sioux, Prairie Island, Shakopee-Mdewakanton, and Upper Sioux. The Ojibwe (Chippewa) tribes in Minnesota are: Bois Forte Band of Chippewa (Nett Lake), Fond du Lac Band of Lake Superior Chippewa, Grand Portage Band of Chippewa Indians, Leech Lake Band of Ojibwe, Mille Lacs Band of Ojibwe, Red Lake Band of Chippewa Indians, and White Earth Band of Ojibwe. The members of the Minnesota Chippewa Tribe include: Bois Forte Band of Chippewa, Fond du Lac Band of Lake Superior Chippewa, Grand Portage Band of Chippewa Indians, Leech Lake Band of Ojibwe, Mille Lacs Band of Ojibwe, and White Earth Band of Ojibwe. The six Wisconsin Ojibwe Bands—St. Croix Chippewa Indians of Wisconsin, Lac Courte Oreilles Band of Lake Superior Chippewa, Sakoagan (Mole Lake) Chippewa Community, Bad River Band of Lake Superior Chippewa Tribe, Red Cliff Band of Lake Superior Ojibwe, and Lac du Flambeau Band of Lake Superior Chippewa Indians —also have treaty rights within the portion of the 1837 ceded territory that lies within the state of Minnesota. The Ho-Chunk Nation of Wisconsin also has trust lands within Minnesota. Many other tribal groups currently residing in the Midwest and the western United States have historical and ancestral ties to what is now Minnesota.

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1 For example, see Minnesota et al. v. Mille Lacs Band of Chippewa Indians et al.

2 Minnesota Indian Affairs Council, *Why Treaties Matter*, http://mn.gov/indianaffairs/

3 For this discussion, the names Chippewa, Ojibwe, and Anishinaabe are used interchangeably, as are Dakota and Sioux. The use of Dakota more frequently is used within this chapter unless referencing a particular community, consistent with how these four communities are presented by the State of Minnesota Indian Affairs Council. It is recognized that multiple names often are used when discussing the Sioux communities, such as Dakota, Lakota, or Nakota. Where a specific reference is not made, "American Indian tribe" or "tribe" is used. Please note, however, that individual tribal governments may refer to themselves as tribes, nations, communities, confederacies, or bands.

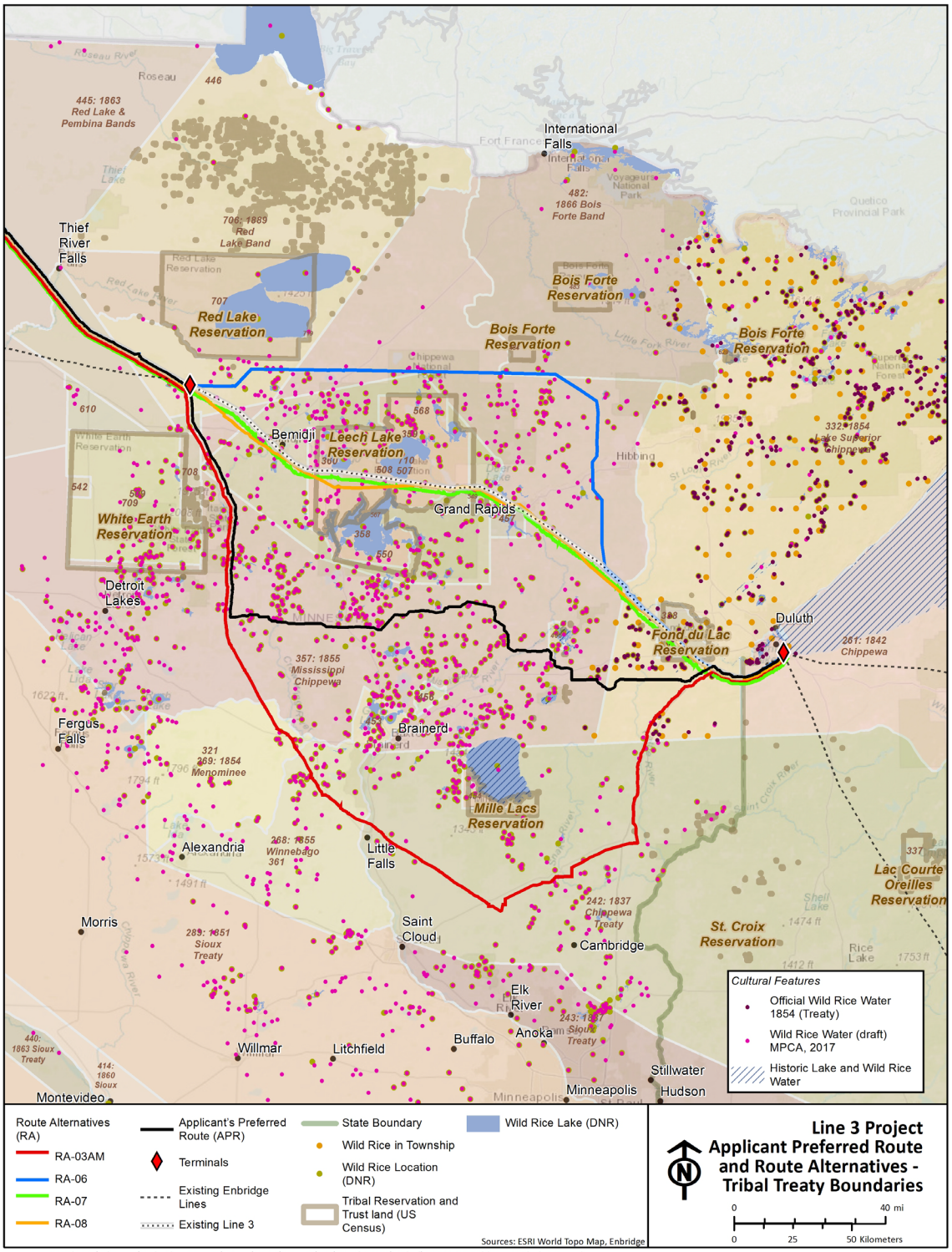

Figure 9-1. Applicant Preferred Route and Route Alternatives - Tribal Treaty Boundaries

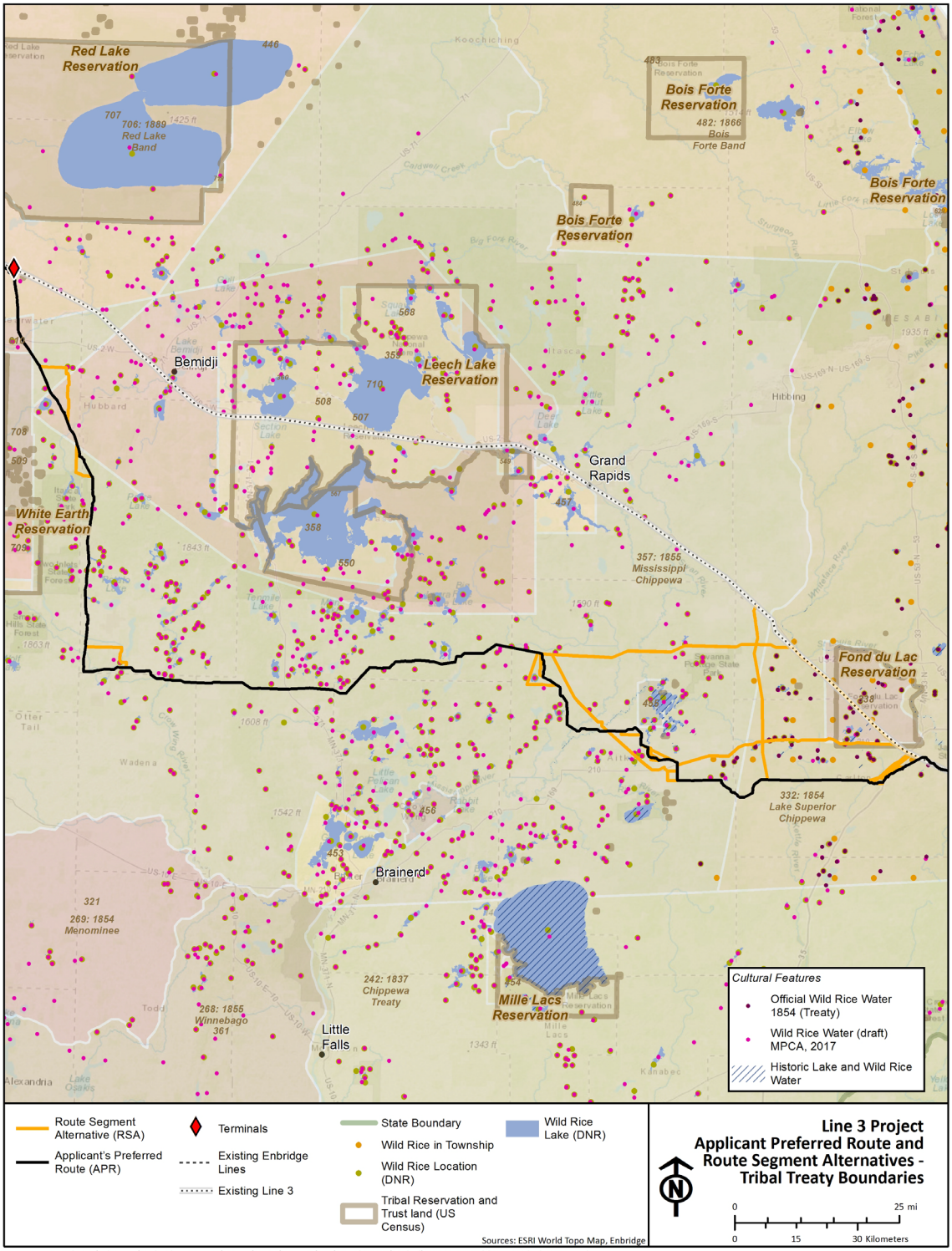

Figure 9-2. Applicant Preferred Route and Route Segment Alternatives - Tribal Treaty Boundaries

American Indians have fished, hunted, and gathered for thousands of years within the land now known as Minnesota and neighboring states; these lands are their ancestral homeland. As sovereign nations, some federally recognized tribes manage natural resources accordingly. In association with the multiple treaties signed between tribes and the United States government, numerous tribes in the region retain the right to fish, hunt, and gather on their ceded lands, which extend outside of reservation boundaries. Tribal members continue to exercise these rights by fishing, hunting, and gathering on traditional lands for a variety of plants, animals, fish, and materials traditionally and currently used in or as medicines, foods, tools, textiles, building materials, carvings, and sacred objects.

9.3.1 Federal Indian Law and Policy

American Indian law and public policy have evolved significantly since the founding of the United States. The Indian Commerce Clause of the U.S. Constitution recognizes tribes as distinct political entities by authorizing Congress "to regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes." In addition, the Treaty Clause, while not explicitly referencing American Indian tribes, played a major role in structuring a government-to-government relationship between tribes and the United States. The Indian Commerce Clause and the Treaty Clause are most often cited as the constitutional basis for legislation regarding American Indian tribes. In 2004, the Supreme Court reaffirmed that the federal power to regulate American Indian affairs is derived from the structure and text of the Constitution (Cohen 1982: §5.01).[4]

The courts have recognized that Congress has broad or "plenary" power to legislate in the area of American Indian affairs, and Congressional power to set policy in Indian affairs supersedes conflicting state laws or state constitutional provisions. Congress may constitutionally enact legislation, execute provisions of a treaty, or ratify agreements with a tribe, even if doing so affects state interests (Cohen 1982: §5.02). This power includes the power to recognize and to terminate tribal relations with the United States and to impose federal laws limiting tribal authority without tribal consent.

In 1871, Congress discontinued the practice of treaty making with Indian tribes, while expressly continuing existing treaties in force. Subsequently, the executive branch negotiated agreements with tribes, which were then enacted into law by Congress. These agreements are accorded the same legal standing as treaties; they are the supreme law of the land. In recent years, American Indian tribes have entered into a number of agreements with the executive branch, implemented by legislation, dealing with a variety of subjects including settlement of land and water rights claims.

Treaties, agreements, and federal laws implementing them preempt state laws and state constitutional provisions. Treaties and treaty substitutes, such as agreements and compacts, remain in force absent later Congressional action abrogating particular provisions and serve as the source of judicially enforceable property rights and personal rights (Cohen 1982: §5.01).

[4] See *United States v. Lara*, 541 U.S. 193, 200 (2004) (Commerce and Treaty clauses and structure of Constitution are basis for "plenary and exclusive" power of Congress); *McClanahan v. Ariz. State Tax Comm'n*, 411 U.S. 164, 172, n.7 (1973) ("[t]he source of federal authority over Indian matters has been the subject of some confusion, but it is now generally recognized that the power derives from federal responsibility for regulating commerce with Indian tribes and for treaty making"); see also *Morton v. Mancari*, 417 U.S. 535, 551–552 (1974) ("[t]he plenary power of Congress to deal with the special problems of Indians is drawn both explicitly and implicitly from the Constitution itself.").

9.3.2 Indian Country and Indian Lands

"Indian country" is land that falls under the primary jurisdiction of the tribe inhabiting it and the federal government. State jurisdiction over Indian country is limited. Once established, Indian country can only be diminished or terminated by Congress, and its intent to do so must be clearly expressed. Indian country includes all land within the limits of any Indian reservation, including fee lands and rights-of-way, dependent Indian communities, and lands allotted to Indian individuals.

A federal Indian reservation is an area of land reserved for a tribe or tribes under treaty or other agreement with the United States, executive order, or federal statute or administrative action as permanent tribal homelands, and where the federal government holds title to the land in trust on behalf of the tribe (BIA 2017). Lands held in simple fee title by both non-Indians and tribal members and non-Indian government land also exist within the exterior boundaries of reservations due to massive land losses suffered by the tribes in the "Allotment Era." This means that tribes may at times not control all of the land within its reservation. For instance, the Fond du Lac Band has expended large amounts of revenue to regain its land base within its own reservation, a common story for American Indian tribes. In 1934 through the Wheeler-Howard Act (or Indian Reorganization Act), Congress delegated to the Secretary of the Interior the authority to take land in trust for American Indians, establish new reservations, or add area to existing reservations.

Lands can be owned by individuals or by the tribe. Individual ownership may consist of two types: trust land and restricted fee land. Allotted trust lands are held in trust for the use of an individual Indian (or his or her heirs). The federal government holds the legal title and the individual (or his or her heirs) holds the beneficial interest. For restricted fee land, an individual Indian holds legal title, but legal restrictions are in place against alienation and encumbrance (TEEIC n.d.).

Tribally owned lands may consist of trust land, restricted fee land, and fee land purchased by the tribes. Indian trust land is land owned in fee by the United States, but administered for the benefit of the tribes and individuals who are the equitable owners of the land. As discussed, land may be held in trust for tribes or individual Indians. The federal government, as the trustee of the lands, has a fiduciary duty to administer the land for the benefit of the Indian owners. Trust land cannot be sold or conveyed by its tribal or individual Indian owners without federal consent.

Tribal trust lands are held in trust by the federal government for a tribe's use. Tribal trust land is held in common for the benefit of all members of the tribe. Trust land is exempt from state and local property taxes. Although most tribal property is trust land, not all tribal property is held in trust. Congress or the Secretary of the Interior can accept fee land into trust for individual Indians or tribes. For restricted fee lands, the tribe holds legal title, but restrictions are in place against alienation or encumbrance.[5] Fee land purchased by tribes is where a tribe acquires legal title under specific statutory authority. Fee land owned by a tribe outside the boundaries of a reservation is not subject to legal restrictions against alienation or encumbrance, absent any special circumstances (TEEIC n.d.).

It is important to distinguish an Indian reservation from tribal property. An Indian reservation is a place within which a tribe may exercise tribal powers, but not all land within a reservation may belong to the tribe. In addition, tribes may own land, including trust land, outside the limits of a reservation, or tribes

[5] Alienation refers to the capacity for a piece of property or a property right to be sold or otherwise transferred from one party to another, while encumbrance is a burden, obstruction, or impediment on property that lessens its value or that can restrict the owner's ability to transfer title to the property.

may claim rights in land now occupied by others by virtue of original possession and exercise of sovereignty or rights reserved by treaty (Cohen 1982: §15.02). State power over tribal property is limited to those powers that Congress has delegated to it or those that have not been preempted by federal or tribal law.

American Indians face numerous challenges to their identities through the cession and colonization of their lands (Cohen 1982: §5.01).[6] The land, watershed, and air are not only part of the landscapes they call home, but integral to who they are and to their sense of self and community (Cohen 1982: §5.02). For many tribes, self-governance centers on the management of tribally important natural resources. A fundamental difference between natural resource management by American Indian tribes and non-tribal governments is the "cultural significance of being indigenous to the United States with cultural roots to the land" (Cohen 1982: §5.02). Tribes have regulatory authority over lands and resources within the boundaries of their respective reservations, but have limited authority outside reservation boundaries. Tribally important resources off-reservation are sometimes ''co-managed'' with federal or state governments (Cohen 1982: §5.01).

In addition to lands within reservation boundaries, this chapter takes into account the ceded lands affected by Enbridge's proposed Project due to the tribal resources, benefits, and conditions retained by the tribes.

9.3.3 Treaties and Reserved Rights

Treaties are contracts signed between American Indian tribes and the U.S. government prior to 1871 that recognize and establish sets of rights, benefits, and conditions for the tribes who agreed to cede millions of acres of their homelands to the United States and accept the protection of the United States in return (BIA 2017).

Before Europeans arrived in North America, many American Indian tribes relied on hunting, fishing, trapping, and gathering to provide food, clothing, and shelter. As the Supreme Court stated in *United States v. Winans* (198 U.S. 371 (1905)), these activities "were not much less necessary to the existence of the Indians than the atmosphere they breathed." Aboriginal, or original Indian, title over land includes the right to engage in hunting, fishing, and gathering activities. Aboriginal title, along with its component hunting, fishing, and gathering rights, remains in the tribe that originally possessed it unless it has been granted to the United States by treaty or extinguished by statute. If aboriginal title to land is extinguished, the hunting, fishing, and gathering rights on the land are extinguished as well, unless those rights are expressly or implicitly reserved by treaty, statute, or executive order (Cohen 1982: §18.01).

Some American Indian tribes entered into treaties that expressly reserved hunting, fishing, and gathering rights on specified lands outside reservation borders. Treaties reserving hunting, fishing, and gathering rights over previously owned tribal lands do not constitute a "grant of rights to the Indians, but a grant of rights from them—a reservation of those not granted." Treaty-reserved hunting, fishing, and gathering rights on off-reservation lands are akin to easements running with the burdened lands

[6] See *United States v. Lara*, 541 U.S. 193, 200 (2004) (Commerce and Treaty clauses and structure of Constitution are basis for "plenary and exclusive" power of Congress); *McClanahan v. Ariz. State Tax Comm'n*, 411 U.S. 164, 172, n.7 (1973) ("[t]he source of federal authority over Indian matters has been the subject of some confusion, but it is now generally recognized that the power derives from federal responsibility for regulating commerce with Indian tribes and for treaty making"); see also *Morton v. Mancari*, 417 U.S. 535, 551–552 (1974) ("[t]he plenary power of Congress to deal with the special problems of Indians is drawn both explicitly and implicitly from the Constitution itself.").

and include easements to access hunting, fishing, and gathering sites. Thus, reserved rights on off-reservation lands do not require the tribe to have title to the underlying land (Cohen 1982: §18.02).

As noted by Natalie Weyaus, with regard to treaties, "All of the grandfathers, our ancestors that signed the treaties were not only thinking of themselves then, they were thinking of the future generations. So when we get to practice our rights, our treaty rights to gather, hunt, and fish, that was thought of way before our time. They didn't give that up. That we're always connected to the land to do what we have to do to survive."

Tribal resources include collective rights reserved by tribes for tribal members to hunt, fish, and gather natural resources. These resources may be used for commercial, subsistence, or ceremonial purposes. Tribes regulate hunting, fishing, and gathering on their reservations. Congress may abrogate treaty rights, but it must clearly express its intent to do so.

In addition to collective rights reserved by the tribes, usufructuary property rights are individual, and "operate as an affirmative defense to attempts by the state to regulate Treaty-protected hunting, fishing and gathering."[7] Pursuant to the *1842 Treaty with the Chippewa,* "all the unceded lands belonging to the Indians of Fond du Lac, Sandy Lake, and Mississippi bands, shall be the common property and home of all the Indians, party to this treaty."[8]

Despite attempts by the state to limit collective and individual rights, "the courts have held that the Chippewa's individual usufructuary rights to hunt, fish and gather are part of a right to earn a modest living, are protected by federal statutes and can only be modified or impinged upon by congress. These are important, constitutionally protected, long-term food, health, and economic rights meant to sustain the Chippewa in perpetuity. These rights are meant to be accomplished by using natural resources on and off reservation."[9]

The United States has a trust responsibility under which the United States has both moral and legally enforceable fiduciary obligations to protect tribal resources, lands, assets, and resources (BIA 2017). Therefore, when a project such as Enbridge's proposed Line 3 Project is under consideration for federal approvals, permitting, or licensing, tribes must be consulted per federal regulations, policies, and/or executive orders; they have legally protected standing because of the unique impacts on tribal rights and resources. However, tribes with co-management authority over natural resources would assert that along with the co-management of the land, the same consultation as the federal government is required as to the managed resources.

9.3.3.1 Ceded Lands in Minnesota

Ceded lands are those lands that American Indian tribes relinquished to the U.S. government as part of a treaty (Figure 9-1 and Figure 9-2). Treaties were written in the English language, the language of the

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7 See U.S. v. Brown, 777 F.3d 1025 (8th Cir. 2015). (As noted in the 1855 Treaty Authority comments on the draft EIS (Bibeau 2017), it is well settled, however, that an individual Indian may assert usufructuary rights in a criminal prosecution. For example, the Supreme Court stated in United States v. Dion that hunting and fishing "treaty rights can be asserted by Dion as an individual member of the Tribe." 476 U.S. at 738 n. 4, 106 S.Ct. 2216. Evaluating usufructuary rights in United States v. Winans, the Court explained that while "the negotiations were with the tribe," treaties "reserved rights, however, to every individual Indian, as though named therein." 198 U.S. at 381, 25 S.Ct. 662.

8 See 1842 Treaty with the Chippewa, Art. 3.

9 See 1855 Treaty Authority Comment Letter, July 10, 2017.

people seeking to appropriate the lands from the Dakota and Ojibwe people in Minnesota. The treaty negotiations were conducted under the implicit threat of an armed military invasion, as had been done against tribes farther to the east. Tribes may retain treaty rights over ceded lands, if such rights are reserved within the treaty. Tribal members still rely on natural and cultural resources located within ceded lands. Within the state of Minnesota's boundaries, all of the Applicant's preferred route and its alternatives traverse ceded lands.

The 1837 White Pine Treaty or Treaty of St. Peters and the 1854 Ojibwe Land Cession Treaty with the Ojibwe provide for the "usufructuary right to hunt, fish, and gather the wild rice, upon the lands, the rivers, and the lakes included in the territory ceded" outside the reservation boundaries (MIAC and Minnesota Humanities Council n.d., TASC 2016). For many decades, the State of Minnesota actively interfered with treaty rights held by the Ojibwe bands of Minnesota and Wisconsin. Many Anishinaabeg people were subject to fines, jail, harassment, and even imprisonment by the state and by non-Indian citizens simply for exercising the rights their ancestors had preserved in the treaties. As a result, the Ojibwe were forced to pursue litigation in federal courts to protect the free exercise of their treaty rights within the ceded territories. Treaty rights to the ceded territory were found to remain in force by the Federal District Court, the Eighth Circuit Court of Appeals, and finally the Supreme Court in *Minnesota v. Mille Lacs* in the 1990s, which upheld the Mille Lacs Band, the Fond du Lac Band, and several Wisconsin Ojibwe bands retain the right to hunt, fish, and gather on the Treaty of 1837 ceded lands, which extend from northeast Minnesota to Canada.

The bands developed a conservation code with the State of Minnesota for the 1837 Ceded Territory. As part of the conservation measures, a management plan was created that included a series of measures to regulate their members' hunting, fishing, and gathering activities. The Mille Lacs Band of Ojibwe also agreed with the State of Minnesota to a series of protocols coordinating harvest management and resource assessment in the ceded area (Squires 2014).

The 1854 treaty established permanent reservations for the Fond du Lac, Grand Portage, and Bois Forte Bands. Article 11 of the 1854 treaty retains the three bands' right to hunt and fish within the ceded territory (Kappler 1904). The Minnesota Legislature approved an agreement with the three bands in 1988 by which the bands agreed to restrict hunting, fishing, and wild rice gathering off-reservation in exchange for an annual payment from the state.

The 1854 Treaty Authority is governed by the Bois Forte and Grand Portage Bands; it protects and manages off-reservation treaty rights and resources for those Bands in the 1854 Ceded Territory in northeastern Minnesota (this includes all of Lake and Cook Counties, most of St. Louis and Carlton Counties, and portions of Aitkin and Pine Counties). The Fond du Lac Band manages their own off-reservation treaty rights and resources in the 1854 Ceded Territory.

The 1855 Land Cession Treaty with the Ojibwe established the Mille Lacs and Leech Lake reservations, among others. The 1863 treaty included the Red Lake and Pembina[10] bands. The treaty ceded 11,000,000 acres in present-day Minnesota and North Dakota to the United States. The 1863 treaty was changed before being ratified, and several Ojibwe bands did not sign it. The next year, a new version was negotiated, which increased the annual payments.

[10] The Pembina Band of Chippewa Indians is a historical band of the Ojibwe. The Red Lake Band aligned with the Pembina Band as part of the 1863 Treaty (Red Lake Nation 2016).

Memoranda of understanding (MOU) between the tribes and the U.S. Forest Service (Chippewa National Forest) for co-management of forest lands are included in Appendix P (Leech Lake Reservation Tribal Council and Chippewa National Forest 1993; U.S. Department of Agriculture – Forest Service and Tribes 2012). The MOUs outline the responsibilities/standards of the U.S. Forest Service and the tribes that they will enact when on national forest lands within areas ceded per the treaties of 1836, 1837, and 1842. The MOUs were signed by the agency and tribes to recognize treaty rights of tribes to hunt, fish, and gather wild plants on national forest lands.

9.3.3.2 Reservation Land

Within the context of this EIS and as aforementioned, a federal Indian reservation is an area of land that is reserved for an Indian tribe or tribes, under treaty or other agreement with the United States, executive order, or federal statute or administrative action, as permanent tribal homelands (BIA 2017).

9.3.3.3 Government Lands

Reservation lands may include other land holdings, including those of state and federal agencies. Government-owned lands within the context of this EIS refers to all lands owned by a government, either state or federal, and subject to sale or disposal under the homestead laws.

9.3.3.3.1 Ojibwe Tribes

The seven Minnesota Ojibwe reservations are located across central and northern Minnesota, in the following areas: Grand Portage Reservation is located in the northeast corner of the state; Bois Forte Reservation is located in northern Minnesota; Red Lake Reservation is located in northern Minnesota west of Bois Forte; White Earth Reservation is located in northwestern Minnesota; Leech Lake Reservation is located in the north-central portion of the state; Fond du Lac Reservation is located in northeast Minnesota west of the city of Duluth; and Mille Lacs Reservation is located in the central part of the state, south and east of Brainerd (Figure 9-1 and Figure 9-2).

Six of the seven reservations were allotted to individual Indians during the late 1800s or otherwise subjected to federal action that resulted in reservation lands passing out of tribal ownership. The Red Lake Indian Reservation is the only reservation in Minnesota that was never allotted; all of the reservation land continues to be held in common by all tribal members. The other six Minnesota Ojibwe reservations are a mix of tribal trust land, tribal fee land, and land not owned by the governing tribe.

Within this EIS, the boundaries of the White Earth Reservation are depicted according to geographic information system (GIS) shapefiles from the United States Census Bureau with a metadata update of October 2, 2015 and a file date of 2014. This depiction matches that of the Minnesota Legislative Coordinating Commission. The boundary of the White Earth Reservation, however, is depicted differently when considering the use of a ceded lands shapefile from the USDA Forest Service Geospatial Service and Technology Center, USDA Forest Service, dated July 2017. This file more closely matches a compilation of federal lands databases published by ESRI and dated 2004 (Figure 9-3). As shown in Figure 9-3, the Applicant's preferred route and RA-03AM would cross through the reservation. The Applicant has proposed a route segment alternative (RSA-05) to avoid this area.

Figure 9-3. White Earth Reservation Tribal Boundaries

In the Old Crossing Treaty of 1863, the Red Lake Nation ceded more than 11 million acres of the richest agricultural land in Minnesota in exchange for monetary compensation and a stipulation that the "President of the United States direct a certain sum of money to be applied to agricultural education and to such other beneficial purposes calculated to promote the prosperity and happiness of the Red Lake Indian." In 1889 and 1904, Red Lake Nation ceded another 2,256,152 acres, but received guarantees that all benefits under existing treaties would not change.

According to the 1837 and 1842 treaties, the Ojibwe were to receive annuities for 25 years as payment for relinquished land (GLIFWC n.d.). The annuities were made to the people in the fall months on Madeline Island in Lake Superior. In 1850, President Zachary Taylor ordered the Ojibwe people living east of the Mississippi River to move to unceded land. The order failed, so Ramsey (Territorial Governor and Superintendent of Indian Affairs in Minnesota) informed the Ojibwe that in order to receive their annuities, they would have to travel from Madeline Island to Sandy Lake, 285 miles by canoe to the west. The intent was to trap the Ojibwe at Sandy Lake over the winter. More than 5,500 Ojibwe set out for Sandy Lake. They arrived exhausted. There was no food. Living conditions deteriorated. A harsh winter and disease took hold; more than 150 Ojibwe people died. The government sent a 3-day food supply early in December. In response, many people headed home on foot. An additional 250 Ojibwe died on the reverse trail; those who reached their homelands vowed that they would never leave again. There is a present-day memorial located on a glacial mound overlooking Sandy Lake called the Mikwendaagoziwag Memorial (GLIFWC n.d.).

9.3.3.3.2 Dakota Communities

The four Dakota Communities in Minnesota are primarily in the southern and western areas of the state. Shakopee Mdewakanton is located south of the Twin Cities near Prior Lake; Prairie Island is located near Red Wing; Lower Sioux is located near Redwood Falls; and Upper Sioux is near the city of Granite Falls.

The Shakopee Mdewakanton Sioux Community (SMSC) are part of the Eastern Dakota. Their reservation was formed from land purchased by the U.S. government between 1886 and 1891. The federal government granted the SMSC official recognition in 1969 (SMSC n.d.).

The Prairie Island Community are descendants of the Mdewakanton Band of Eastern Dakota (also known as the Mississippi or Minnesota Sioux). The Mdewakanton Band was a party to treaties with the United States from 1805 to 1851. In the treaty of October 15, 1851, a 10-mile-wide strip of land on both sides of the Minnesota River from Little Rock to Yellow Medicine River was preserved as the permanent home of the Dakota. However, after the U.S.-Dakota Conflict of 1862, Congress severed all treaties with the Dakota and forced them from their homes in the state. The Prairie Island reservation was created in 1886 when the Secretary of Interior purchased land and placed it into trust for the tribe (Prairie Island Indian Community n.d.).

The Lower Sioux also are part of the Mdewakanton Band. The reservation was established under the Treaty of Traverse des Sioux in 1851 with the federal government. The reservation was greatly reduced following the Dakota War of 1862 and was re-established in the late 1880's (MHS n.d.).

The Upper Sioux Community was established in 1938, when 746 acres of original Dakota lands in Minnesota were returned to the community. The original territory of the community was along the Minnesota River Valley (Upper Sioux Community n.d.).

The four Dakota Community land bases today represent a small fraction of the original reservations as a result of the U.S. Dakota War of 1862 and subsequent policies and treatment of the Dakota communities; the reservations were restored to the Dakota by acts of Congress or Proclamations of the Secretary of Interior.

9.3.3.3.3 Formal Tribal Government Actions on Line 3 Project

The Minnesota Chippewa Tribe, the Minnesota Indian Affairs Council (MIAC), the National Congress of American Indians, Leech Lake Band of Ojibwe, and Red Lake Band of Chippewa Indians have passed formal resolutions (Resolutions) in opposition to the proposed Project. The White Earth Band of Minnesota Chippewa passed a similar resolution regarding the Sandpiper petroleum pipeline, a project no longer in consideration by the MN PUC. The Resolutions are included in Appendix P.

9.4 METHODOLOGY

The unique sovereign status of each tribe and their tribal resources are critical to understanding the impacts on natural, cultural, and spiritual resources. Tribal resources rights include access to fishing, hunting, wild rice, and medicinal and traditional plants and foods, which are the foundation of the physical and mental well-being of the tribal community. An evaluation of this Project's potential impacts on tribal resources can only be made within the cultural context from which those values are derived (Bureau of Land Management 2015).

The information presented in this chapter is informed by the following methods:

1. Tribal consultation with the sovereign nations affected by the proposed Project,
2. Coordination with tribal natural resource departments and technical experts and Tribal Historic Preservation Offices (THPOs),
3. Community meetings,
4. Interviews with tribal elders and historians,
5. Comments submitted during comment periods in 2015 and 2016, and
6. Literature reviews.

This chapter relies heavily on information gathered through consultation and coordination, including information obtained from members of the Ojibwe tribes. It focuses on those lands and resources that potentially would be impacted by the Applicant's preferred route and the route alternatives (Figure 9-1 and Figure 9-2).

9.4.1 Tribal Consultation

Tribal consultation with the sovereign nations affected by the proposed Project began in 2015 with a request from the Mille Lacs Band of Ojibwe for formal government-to-government consultation with the Minnesota Department of Commerce (Commerce Department) on Enbridge's Sandpiper pipeline application. The Commerce Department identified the need to develop a formal consultation policy and asked the MIAC to accept an interim policy for use in March 10, 2016 (see Appendix P).

The Commerce Department developed and began tribal consultation, even though it was not required under Governor Dayton's Executive Order 13-10, to establish a formal government-to-government tribal

consultation policy and a tribal liaison. Once accepted by MIAC, the Commissioner of Commerce held formal government-to-government consultations with the Fond du Lac Band of Lake Superior Chippewa, Leech Lake Band of Ojibwe, Mille Lacs Band of Ojibwe, Red Lake Band of Chippewa Indians, and White Earth Band of Minnesota Chippewa. In addition, the commissioner consulted with the Fond du Lac Band of Lake Superior Chippewa, the Leech Lake Band of Ojibwe, the Mille Lacs Band of Ojibwe, Red Lake Band of Chippewa Indians, and White Earth Band of Minnesota Chippewa specifically on the EIS in early 2017. Letters were sent to these tribes in February, March, and April 2017 (see Appendix P).

Through consultation with MIAC and the sovereign nations directly affected by the proposed Project, the Commerce Department was made aware of bands with land holdings and ceded territories that could also be affected by the proposed Project. This includes the six federally recognized Wisconsin Ojibwe bands that are also signatories to the 1837 treaty and thus exercise harvesting rights and governmental co-regulatory authority with the Minnesota American Indian tribes and the State of Minnesota in that portion of the 1837 ceded territory within Minnesota.

Commerce sent letters to Bois Forte Band of Chippewa, Grand Portage Reservation Tribal Council, Lower Sioux Agency, Upper Sioux Community, Prairie Island Indian Community, Shakopee Mdewakanton Sioux Community, Ho-Chunk Nation (Wisconsin), Bad River Band of the Lake Superior Tribe of Chippewa (Wisconsin), Lac Courte Oreilles Band of Lake Superior Chippewa (Wisconsin), Lac du Flambeau Band of Lake Superior Chippewa (Wisconsin), Red Cliff Band of Lake Superior Chippewa (Wisconsin), Sokaogon Chippewa Community (Wisconsin), and the St. Croix Chippewa Indians of Wisconsin for formal consultation (see Appendix P).

Among the responses from the Dakota communities, the Prairie Island Indian Community declined consultation. Chief Arvol Looking Horse of the Cheyenne River Reservation, Oceti Sakowin has noted that they would like to be more involved in identifying important cultural corridors.

Consultation and information obtained through consultation does not constitute tribal consent or approval with the Applicant's proposed Project nor any decision made by the Public Utilities Commission. Consultation is intended to provide meaningful communication and coordination between the DOC and tribal officials. It allows for American Indian tribes to voice at an equal level with state officials potential concerns and issues to be evaluated as part of the state decision-making process, as well as to share information that may be difficult to acquire from other types of sources. The consultation process allows tribal governments and tribal members an opportunity to provide information to prepare the EIS and which assists the Commission in their decision making process for approval or denial of the Certificate of Need and route permit.

Consultation recognizes tribal sovereignty, which is the right of American Indian tribes to determine their own future. American Indian tribes have a special legal status derived from their status as sovereign nations under the U.S. Constitution and federal law. Through elected tribal governments, federally recognized American Indian tribes have the right to operate as self-governing nations over their lands and people (MN House of Representatives 2017).

Tribal consultation and coordination for the Line 3 Project will continue through the construction of the project, if the Certificate of Need and subsequent route permit are issued. The DOC also will continue to coordinate and consult with American Indian tribes, regardless of the status of the Line 3 Project.

9.4.1.1 Federal Regulations, Policies, and Executive Orders

Federal executive orders (EOs), policies, and memoranda provide for consultation with American Indian tribes, along with some components of federal legislation. Some of the federal regulations also allow for the preservation and management of cultural resources, largely pertaining to those that are archaeological or historic in nature (see Sections 5.4 and 6.4 for a discussion of these types of resources). While federal regulations do not hold states to the same requirements of federal agencies, these were considered when consulting American Indian tribes for the Line 3 Project.

EO's and memoranda requiring consultation with American Indian tribes and nations include the following:

- EO 13175, Consultation and Coordination with Indian Tribal Governments (November 6, 2000). This EO requires that federal agencies consider tribal rights in the development of their regulatory policies and that they establish accountable processes for consultation. Policies that have tribal implications are defined as those regulations, legislative comments, or proposed legislation and other policy statements or actions that have substantial direct effects on one or more tribes (Clinton 2000a). President Clinton's statement on signing the EO (also dated November 6, 2000) indicates that the intent of the EO was to ensure not only that all federal agencies consult with tribes but that they also respect tribal sovereignty (Clinton 2000b).
- Presidential Memorandum dated November 5, 2009. This memorandum emphasizes federal agencies' need to comply with EO 13175 by requiring the submittal of plans for how consultation will be conducted (Obama 2009).
- Presidential Memorandum dated April 29, 1994, Government-to-Government Relations with Native American Governments. This memorandum establishes that federal agencies should undertake activities affecting tribal rights or trust resources in a manner that is knowledgeable, sensitive, and respectful of tribal sovereignty. In this manner, it requests that federal agencies ensure a government-to-government relationship with federally recognized tribal governments (Clinton 1994).

Consultation with American tribes also is governed by the following federal laws:

- National Historic Preservation Act of 1966 (NHPA), as amended – in carrying out its Section 106 requirements, federal agencies must consult with any tribe that attaches religious and/or cultural significance to historic properties;
- Archaeological and Historic Preservation Act of 1974 – this act requires federal agencies to consult with tribal authorities before permitting archaeological investigations on tribal lands. It also requires the confidentiality of information concerning the nature and location of archaeological resources (which includes tribal archaeological resources);
- American Indian Religious Freedom Act of 1978 – this act establishes the policy of the federal government to protect and preserve traditional religions and allows for access to sites, use and possession of sacred objects, and the freedom to worship; and
- Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) – this act requires consultation with tribes, traditional religious leaders, and lineal descendants regarding the treatment and disposition of specific kinds of human remains, funerary objects, sacred objects, and other items (WH-IAEWG, CACAG 2009).

The Antiquities Act of 1906, the Historic Sites Act of 1935, and the Archaeological Resources Protection Act of 1979 also provide for the consideration of cultural resources for federal actions. In addition to these regulations, Executive Order 13007 Indian Sacred Sites provides for the protection of sacred sites, and Executive Order 11593 provides necessary guidance on protection and enhancement of cultural resources.

9.4.1.2 State Regulations, Policies, and Executive Orders

In addition to Minnesota's state policy on tribal consultation through EO 13-10, the EIS also must consider impacts to archaeological sites, which includes tribal resources on public lands and the protection of human remains and burials.

The State Historic Preservation Office (SHPO) consults with applicants, as well as federal and state government agencies, to identify historic properties and ways to avoid or reduce adverse effects on those properties. If a permit is issued for this project, the SHPO will continue to work with the Applicant and other agencies to identify, evaluate, and protect archaeological and historic resources.

Minnesota Statutes sections 138.31-138.42 require licensure for field archaeology undertaken on all lands or waters owned, leased by, or subject to the paramount right of the state or its subdivisions, as well as on lands affected by publicly funded development projects. Proposed projects are reviewed to assess the appropriateness of research methodology and to assist in identifying strategies for mitigating potential adverse effects on known cultural resources. Only professional archaeologists meeting the Secretary of the Interior's Standards for Archaeology (36 Code of Federal Regulations Part 61) may be licensed to conduct such investigations in the State of Minnesota.

Minnesota's Private Cemeteries Act (Minnesota Statutes 307.08) protects all human remains and burials older than 50 years and located outside of platted, recorded, or identified cemeteries from unauthorized disturbance, whether on public or private lands or waters. In the event that a burial is either known or suspected to be associated with American Indian peoples, the Office of the State Archeologist work together with the MIAC to ensure the integrity of these sites. The Office of the State Archaeologist maintains a database of identified burial sites in the state.

The MIAC shares legal responsibility for monitoring and enforcing laws that protect Indian human remains and associated burial items. The MIAC reviews archaeological license applications to conduct fieldwork to determine if a burial or cemetery is within a project area. The authority for the MIAC is contained in Minnesota Statute section 138.31, Field Archaeology Act.[11]

9.4.1.3 Other Policies and Resolutions

In 2007, the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) was developed. The resolution received the support of the United States in 2010.

Among the important tenets of the resolution is the recognition that all indigenous peoples are equal to all other people and that each deserve to be treated with respect. The resolution further notes that all people contribute to the diversity and richness of the shared civilizations in which all people live. The

[11] Minn Stat. sections 138.32-138.42; 307.08

resolution outlines 46 individual articles, many describing the importance of "free, prior and informed consent" (UNDRIP 2007).

9.4.2 Technical Coordination Meetings

Technical coordination meetings were held between tribal technical staff and Department of Commerce, Energy Environmental Review and Analysis (DOC-EERA) technical staff beginning in 2015. These meetings included tribal natural resource departments (wildlife, fisheries, biology, air quality, and many other tribal technical staff). The meetings provided an opportunity for tribal technical staff to share information on natural resources and culturally important or sensitive areas. In addition to sovereignty and treaty rights, the tribal resource concerns and interests currently identified through coordination are spill analysis, groundwater impacts, surface water impacts, wild rice impacts, tribal resources, climate change, and the impact of abandoning the existing Line 3 (see Appendix P).

9.4.3 Community Meetings

The Commerce Department invited all of the Ojibwe tribes in the proposed Project vicinity to co-host a community meeting for tribal members. The meeting was held as the Ojibwe tribes would have the potential to be directly impacted if one of the route alternatives were to be constructed. The purpose of the meeting was to provide an informal question-and-answer session on the development of the Draft EIS and the environmental review process. Community meetings were held with the Mille Lacs and Fond du Lac Bands in March 2017. At the request of the Fond du Lac Band, a community meeting on the Draft EIS also was held in June 2017.

9.4.4 Interviews with Tribal Elders and Historians

To gain information for this chapter, Commerce Department staff interviewed tribal elders and historians. Staff from the Mille Lacs THPO and the MIAC provided oral information on the cultural, spiritual, and historical Ojibwe culture in Minnesota. The Commerce Department asked the following questions for gathering insight and input for this chapter:

- Describe the interconnectedness of land, identity, and spirituality. Can they be separated from one another, and if not, why?
- What obligations do the Anishinaabe have to Mother Earth and how can they be met today?
- There are many projects that affect tribal interests, such as energy transmission, rights-of-way, etc. Is there something specific about pipelines that threatens the Anishinaabe way of life and relationship to place?
- What are sacred places? How is this different from sacred sites? What are culturally significant sites or cultural sites?
- What do you see as the biggest difference between the Anishinaabe communal, traditional use of land and the Anglo-Saxon concept of private land ownership and land use?
- How could state agencies more effectively understand or respect the inherent right to self-govern and sovereignty when coordinating special projects that affect tribal interests?
- What cultural resources are most threatened by pipeline projects? Please describe.
- We have heard of the water protectors—please explain their role(s) within the community.

Elders and participants during the interview with the Mille Lacs Band of Ojibwe include Natalie Weyaus (Tribal Elder and Tribal Historic Preservation Officer), Terry Kemper (Tribal Elder), John Reynolds, Charlie Lippert, and Carl Klimah. As a member of the Great Sioux Nation, Chief Arvol Looking Horse of the Cheyenne River Reservation, Oceti Sakowin also submitted a statement.

The Leech Lake Band of Ojibwe provided oral statements obtained during hearings held by the tribe in February of 2017 on Line 3. The Mille Lacs Band of Ojibwe provided statements from a hearing held by the tribe in September of 2015 on the Applicant's preferred route.

During the coordination meetings and the meetings with tribal elders and historians, Commerce Department staff collected information about traditionally important cultural and spiritual sites across northern Minnesota. This information became the basis of two maps for this chapter (Figure 9-4 and Figure 9-5), and they illustrate the rich history and value the land holds for American Indians in Minnesota (see Appendix P for information on the consultation).

9.4.5 Scoping Comments

Scoping meetings for the Project were held in 2015 and 2016. Fifteen scoping meetings were held in the Project vicinity in 2015, with meetings held on the White Earth and Mille Lacs reservations. Twelve scoping meetings were held in 2016, including meetings held on the White Earth and Mille Lacs reservations. Written and oral comments from the scoping meetings were cataloged and used to develop the scope of the EIS and develop route alternatives (DOC-EERA 2016).

9.4.6 Guiding Principles

The preparation of this chapter is guided by the following principles:

- Recognition of the privilege and importance of the information shared and presented;
- Respect for, and protection of, the rights, interests, and sensitivities of sovereign tribal governments in Minnesota;
- Accountability through face-to-face interviews and opportunity for review and feedback; and
- Accuracy in reflecting the information gathered.

For this chapter, the concept of region of interest, as defined in other chapters, does not apply. To use an artificial distance from the center of a pipeline route alternative is antithetical to understanding tribal concepts of resource importance and use. While this chapter generally focuses on potential impacts to American Indian tribes, lands, and resources within Minnesota, the conception of land and interconnection to people transcends a state boundary and thereby impacts may be experienced by tribes and lands (and waters) beyond Minnesota.

Cultural differences and different worldviews between tribal and non-tribal governments may create a dilemma when discussing potential impacts on resources due to the different perspectives of non-tribal and tribal members. For example, common within the framework of the National Environmental Policy Act or the Minnesota Environmental Policy Act is to view tribal governments as another partner in the federal or state process with the same regulatory or review roles as other agencies. This construct may force tribal governments to "participate" in processes that are not reflective of their governments' or cultural belief systems. According to scholars, a different model of government-to-government relations

would be to accept tribal cultural differences and to recognize "tribal governments can form the basis for a different civic community with a different sense of the public good" (Ranco et al. 2011).

Members of all 11 federally recognized sovereign nations in Minnesota maintain longstanding ancestral and traditional-use practices, which connect them to the natural and spiritual worlds. Tribal connections are maintained by protecting these resources and retaining the ability to manage them. Management of, and access to, tribal resources provides opportunities to pass traditional ecological knowledge to younger generations and to cement social bonds and shared cultural values (Ranco et al. 2011).

The well-being of tribal members depends on the health of tribal cultural and traditional resources (Ranco et al. 2011). When tribes are deprived of access to, and management of, natural and cultural resources, their cultural identity suffers. This has led to historical and current trauma that some tribal members may experience. The traditional tribal worldview may consider the cultural and spiritual value of the resource and not the total number of affected resources. For example, some tribes consider an adverse impact on a single natural resource, as harmful as an impact on multiple resources.

9.5 TRIBAL RESOURCES

This section describes resources important to American Indians. Tribal resources refer to the collective rights and resources associated with a tribe's sovereignty or formal treaty rights, or their interest in and use of these resources. These resources have natural, spiritual, and cultural values associated with them. Four of the five route alternatives would cross reservation boundaries, and all would cross treaty lands (when considering the potential to cross the White Earth Reservation). Chapter 4 provides a description of the Certificate of Need and the route alternatives.

9.5.1 Cultural Resources

For American Indian tribes, cultural resources have evolved in concert with natural resources, such that one is dependent on the other. In this manner, no distinction is present between what is considered a cultural resource and a natural resource (Stults et. al 2016). Therefore, a natural resource is also one of cultural and spiritual value. Traditional American Indian cultural belief considers all elements of an ecosystem to be interconnected and that certain species of wildlife and plants are relatives and spiritual messengers.

This chapter, therefore, focuses on those cultural resources that include plants, animals, habitat, and locations associated with hunting, fishing, and gathering activities for subsistence or ceremonial use. Other types of cultural resources, including traditional cultural properties (TCPs), are discussed in Sections 5.4 and 6.4.

For example, the White Earth Nation defines cultural resources as prehistoric and historic archaeological or anthropological sites, objects, historic standing structures, sacred and burial locations, and areas where traditional practices, resources, or cultural properties are used, located or collected (see Appendix P). The Mille Lacs band defines its cultural resources as the ceremonial areas, cemeteries, archeological sites and artifacts, bodies of water, wild rice lakes and rivers, wildlife, and medicinal plants within the historical Ojibwe native region. Cultural resources also include the language, customs, beliefs, and significant items of the Ojibwe people. Many tribal members respect the natural world by paying reverence to wildlife phenomena as divine inspiration and prefer to eat wild, traditional foods from their ancestral homelands. Any diminishment of natural resources or access to those resources amounts to a diminishment of treaty-protected rights, which are also tribal property rights. Traditional cultural

resources associated with cultural practices and beliefs of a living community are rooted in history and are important in maintaining the continuing cultural identity of the community; such properties are not quantifiable nor alienable.

9.5.2 Cultural Corridors

Cultural corridors are geographic areas that served as conduits for trade or travel of American Indians. In Minnesota, many of these corridors are along rivers and streams, where American Indian cultures lived and traveled. Sensitive locational information, however, is not provided within the context of this EIS. This type of information when known, however, was considered in evaluating the potential impacts to cultural resources.

Jim Jones, the cultural historian for MIAC, describes cultural corridors in the Project vicinity as areas that were important in the development of tribal communities (including both the Ojibwe and the Dakota) today. Many of these corridors are historic routes that go back thousands of years and are based on historic trade routes that indigenous people have had with one another for centuries. Tribes retain the inherent rights to fish, travel, hunt, and gather along these routes and watersheds. The crossing of the proposed route north of Outing, Minnesota and north of Roosevelt Lake is another example of this type of corridor. While seven Ojibwe reservations are located within what is now known as Minnesota, these lands also were once part of the Dakota communities. As noted by Natalie Weyaus, “Those are sites that are maybe not Anishinaabe, but they are Dakotas, and we need to protect those, too.”

MIAC recommends a complete survey of the entire proposed route; this survey should occur prior to the start of any construction, as it will involve gaining input from a number of tribal communities and gathering their oral histories to assist with the identification of these places. Figure 9-4 and Figure 9-5 identify some of the cultural corridors and features described during tribal consultation, coordination, and community meetings. [12] As shown in these figures, water is a central component to the vitality of American Indian tribes and is considered an important resource to be managed for the future.

Applicable state and federal laws govern cultural resource management and the different cultural areas of the state. For example, any survey work conducted as part of federal approvals, permitting, and/or licensing will have to meet certain federal requirements, while concurrently coordinating with the different tribal nations, multiple agencies, and the different landowners potentially affected by this Project (see Appendix P).

[12] The cultural corridors shown in Figure 9-4 and Figure 9-5 were developed through information shared during tribal coordination meetings and tribal community meetings and provides an overview of the rich history of American Indian culture across the project area.

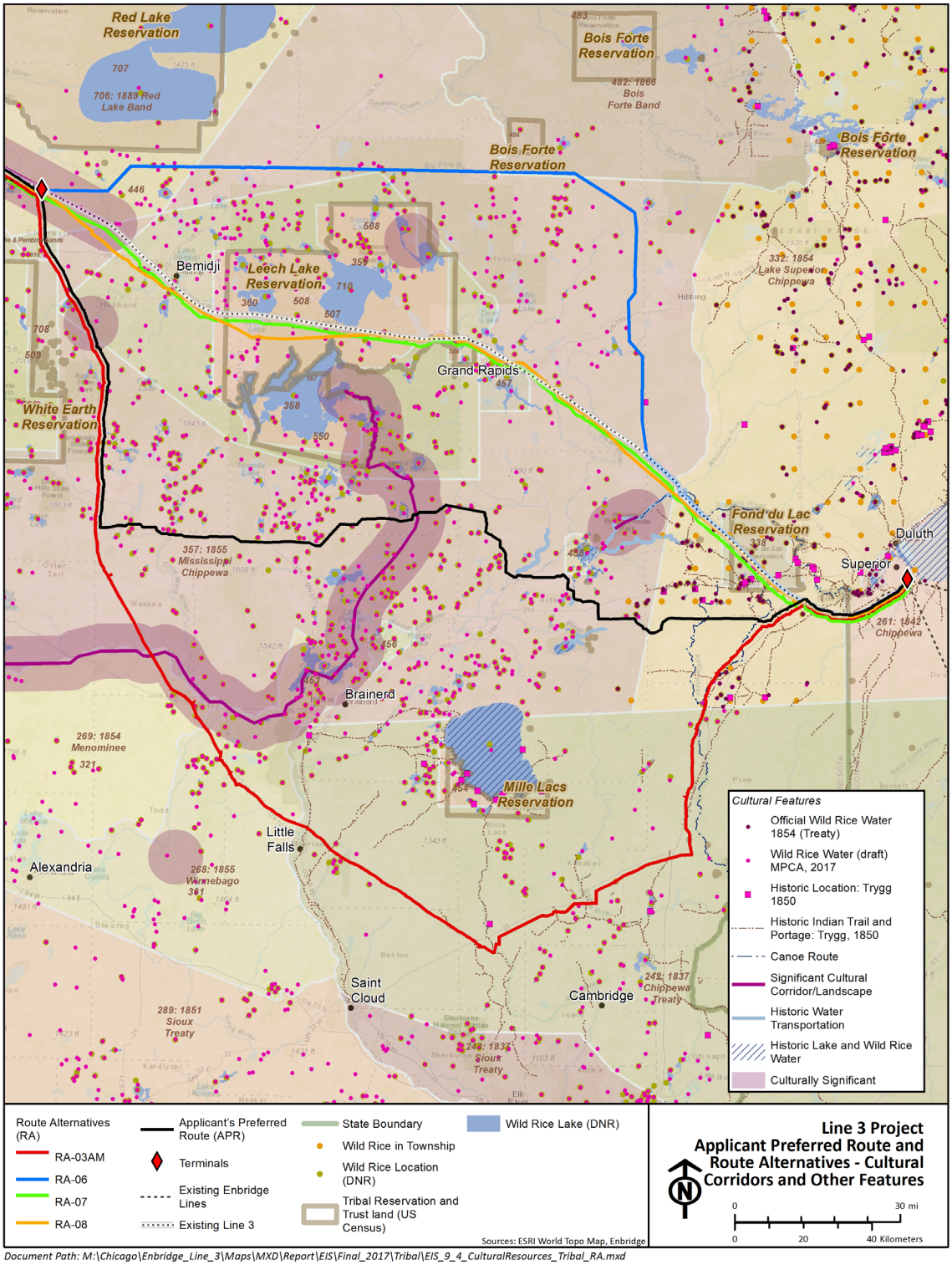

Figure 9-4. Applicant Preferred Route and Route Alternatives - Cultural Corridors and Other Features

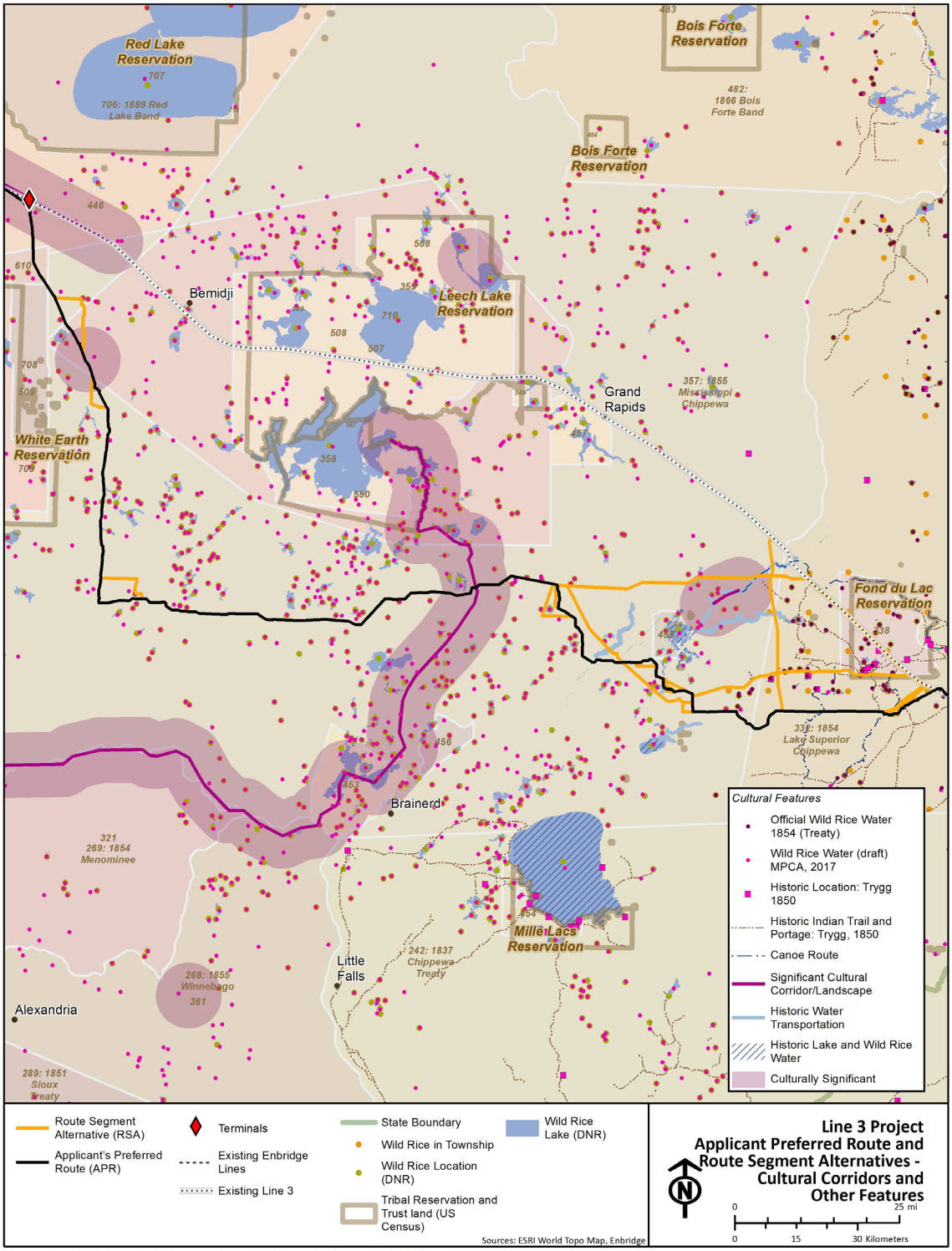

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Figure 9-5. Applicant Preferred Route and Route Segment Alternatives - Cultural Corridors and Other Features

The Applicant's preferred route, as well as any proposed alternative, would result in a diminishment of Indian interests. Potential impacts to tribal resources include the following:

- Water – disruption to water bodies or degradation of water quality; degradation of spiritual connectedness to water and to Mother Earth, as a result of contamination and loss of water quality and water resources;
- Hunting – restricted access to hunting areas due to construction and loss of resources from fragmented forests, contamination, and habitat destruction;
- Fishing – restricted access to fishing areas due to construction and loss of resources from contamination and habitat destruction;
- Wild rice – restricted access to wild rice lakes due to construction and loss of resources from contamination and habitat destruction;
- Spiritual practices- construction activities and operation may impact land areas and/or cultural or sacred sites of importance in which spiritual practices take place;
- Medicinal and traditional plants and foods – restricted access to resource gathering areas due to construction and loss of resources from contamination and habitat destruction; and
- Health and mental well-being – loss of tribal connections and educational opportunities due to restricted access to tribal resources and contaminated or destroyed tribal resources; and experiences of historical and current trauma dues to stresses associated with construction and operation of the pipeline.

American Indian tribes depend on traditional land use activities and related natural resources that exist along the Applicant's preferred route and route alternatives, such as wild rice gathering locations, hunting and fishing habitats, hunting trails, and areas for harvesting plant foods and medicinal plants. The Project also proposes leaving the existing Line 3 pipeline in its current location through abandonment. Line 3 directly crosses the boundaries of the Leech Lake and Fond du Lac Reservations, and potential impacts of abandonment could also affect the environment, thus affecting tribal resources.

9.5.3 Traditional Uses

Tribal resources reinforce traditional practices, beliefs, and tribal values. Such resources are interconnected with and inseparable from the health and well-being of the tribal communities. For example, Manoomin (wild rice) is the very identity of the Ojibwe nations—it is the reason for migration from the east "to find and settle where food grows on water" (Erlinder 2011). According to tradition, the original clans emerged from an ocean that could have been the Atlantic Ocean. Sometime prior to 1500, the Anishinaabe began a migration through the Great Lakes watershed to find a place where food grows on water (wild rice), guided by a vision of a miigis shell (Baca 2005; Benton-Banai 1979; Myer 1994). Anishinaabe oral tradition relates a 500-year journey, with some groups settling along the way (Minnesota Department of Commerce and U.S. Department of Agriculture Rural Development 2010: 30). Ojibwe tradition teaches that Manoomin is a gift that should not be altered by man and is not intended for profit making; rather, it is given by the Creator to them for spiritual and material sustenance (Dussias 2010).

Near the end of this journey, the fifth of the seven stopping places was at Sault Ste. Marie, where a group stayed because of the rich fisheries. From Sault Ste. Marie, the Ojibwe split into two groups. One traveled north around Lake Superior and the other south around the lake. They met at Spirit Island in the St. Louis River estuary, the sixth stopping place and where they found wild rice. From Spirit Island, some moved east along the south shore of Lake Superior to find the seventh stopping place, which was at Madeline Island, the last point on the migration.

During consultation, members of the Ojibwe tribes stated that "Manoomin, the food that grows on the water, not the oil that is underneath, is the source of all the life they were given and this is why we're here." Traditional resources are essential to the maintenance and realization of tribal lifeways, and the destruction or desecration has profound cultural consequences that affect quality of life for tribal members. Resources are not just shared within tribal communities, but also are given to surrounding non-Indian communities and shared with other tribes.

9.5.4 Spiritual Connection to the Land

Tribal communities are concerned that traditional tribal lifeways and sites of spiritual and cultural significance are at risk of harm. In the distant and recent past, Minnesota tribes have survived relocation, termination, assimilation, and other traumatic events and persevered against overwhelming odds. As presented during consultation, they now see Enbridge's Line 3 Project as yet another threat to their culture and future generations. For tribal communities, the Project threatens the rich watersheds in the region and is a threat to everything that depends on water.

The effects of land dispossession, culture destruction, and loss of sovereignty rights have cumulatively subjected American Indians in Minnesota to poverty, economic vulnerability, and limited political capacity. Some tribal advocates have referred to the Applicant's preferred route and its alternatives as environmental racism due to its disproportionate impact on Native resources and rights, which are discussed in Chapter 11, Environmental Justice. As stated by Terry Kemper, "Even through all atrocities that they did to Native American people, taking our land, putting us in boarding schools, even killing us, murder, death, by the army, we're still connected. And that's -- that is so profound to say that, to be sitting here and telling you that I still remember my relatives from long ago." One of the primary values expressed by tribal members is the quiet solitude of the reservation, which reduces stress, enhances peace of mind and mental health, and enriches the spirit. Many elders teach that the practice of Indian spirituality requires undisturbed access to culturally significant places and their resources. These specific places derive their power and sacredness from their natural state that was provided by the Creator. The Lakota/Dakota hold the earth sacred, and its places and associated ceremonies are a necessary expression of Indian spirituality and often are a key to wellness and public health.

At community meetings, members described detrimental mental health effects due to the presence of pipe yards and storage, which are identified as the trigger for the beginning of adverse land use changes and increased risks to the quality of water and land, which the bands depend upon for sustenance. Protection of riparian corridors is also a very high priority, both to protect the streams, but also because riparian corridors have a high biodiversity. Riparian corridors and viewsheds are culturally and aesthetically important, as well (AESE, Inc. 2008).

Based on the sovereign, inherent right to self-determination, tribes collectively oversee sacred responsibilities to the land, waters, and people. Tribal members maintain a cultural responsibility to safeguard a future for all people to protect their land, water, air, and climate from harm, which comes from a legal and cultural responsibility to protect their land, water, air, and climate. Tribes are entrusted

to protect the sacred resource of water. Water sustains all life, and because all water is interconnected, it is, therefore, a tribal resource. Traditional uses of plants and animals drive the need to protect vegetation and wildlife diversity. Appreciation of the water, the air, and the soils goes far beyond scientific or measurable descriptions typically discussed within an EIS.

This view is exemplified by feelings expressed by tribal members as part of the consultation. Natalie Weyaus of the Mille Lacs Band, for instance, noted her connection to the physical the world by saying, "We are not alone in this world. We are not above anything else. We're just part of the environment, and not better or not worse, just here with the environment. And as I grow older, we were, we are stewards of the environment and we don't waste anything that's out there. Even the little trees. We don't cut them down, because they need a chance to grow."

Tribal member identities are rooted in their relationship and responsibility to the land and all of its inhabitants. Traditionally, the Ojibwe clan system was created to provide leadership and to care for these needs. There are seven original clans, and each clan is known by its animal emblem, or totem. The animal totem symbolized the strength and duties of the clan. The seven original clans are given a function to serve for their people (Benton-Banai 1979).

- The Crane and the Loon clans are given the power of Chieftainship. By working together, these two clans give the people a balanced government with each serving as a check on the other. Between the two chief clans is the Fish Clan.
- The people of the Fish Clan are the teachers and scholars. They help children develop skills and healthy spirits. They also draw on their knowledge to solve disputes between the leaders of the Crane and Loon clans.
- The Bear Clan members are the strong and steady police and legal guardians. Bear Clan members spend a lot of time patrolling the land surrounding the village, and in so doing, they learn which roots, bark, and plants can be used for medicines to treat the ailments of their people.
- The people of the Hoof Clan are gentle, like the deer and moose or caribou for whom the clan is named. They care for others by making sure the community has proper housing and recreation. The Hoof Clan people are the poets and pacifists avoiding all harsh words.
- The people of the Martin Clan are hunters, food gatherers, and warriors of the Ojibwe. Long ago, warriors fought to defend their village or hunting territory. They became known as master strategists in planning the defense of their people.
- The Bird Clan are the spiritual leaders of the people and give the nation its vision of well-being and its highest development of the spirit. The people of the Bird Clan are said to possess the characteristics of the eagle, the head of their clan, in that they pursued the highest elevations of the mind just as the eagle pursues the highest elevations of the sky.

To meet all the needs of the nation, the clans work together and cooperate to achieve their goals. The clan system has built in equal justice, voice, and law and order, and it reinforces the teachings and principles of a sacred way of life.

The Ojibwe believe that any time something is taken from the land, a spirit is being removed from its natural state and environment. This could range from the smallest rock to the biggest animal. Because the spirit is being displaced, the Ojibwe people will offer tobacco to that spirit as a gift for the energy

that that spirit will now share with them. The spirit will accept the gift and use it to communicate with the spirits around to relay the purpose and need of that spirit to the Ojibwe people.

Intimate familial ties to specific places in the natural world create a spiritual relationship to the land for Ojibwe and Dakota people. One result is a value placed on sustainability; Indian tribal cultures are built for the long-haul and have endured for centuries. By contrast, at times, the American economic and political system may place value on material progress over sustainability and the understanding of land as real estate (MIAC n.d.; MIAC and National Museum of the American Indian n.d.).

9.5.4.1 Tribal Lands

Every mile of the Applicant's preferred route crosses ceded lands (1854, 1855, and 1863 treaties). The Applicant's preferred route also crosses through the Treaty of 1842 ceded lands near Duluth. From the Minnesota border to Superior, Wisconsin, the Applicant's preferred route would traverse through 1842 ceded territory, to which the Fond du Lac Band is a signatory.

The Applicant's preferred route and RA-03AM would not cross any American Indian reservation land; however, these routes would cross near the White Earth Reservation and Fond du Lac Reservation on ceded land. Route alternative RA-06 would cross the Fond du Lac Reservation and ceded land. Route alternatives RA-07 and RA-08 would cross both the Fond du Lac and Leech Lake Reservations and ceded land.

Within the Fond du Lac Reservation:

- RA-06 crosses seven rivers or streams and one waterbody
- RA-07 crosses seven rivers or streams and one waterbody
- RA-08 crosses five rivers or streams and one waterbody

Within the Leech Lake Reservation:

- RA-07 would cross seven rivers or streams and four waterbodies
- RA-08 would cross 22 rivers or streams and five waterbodies. (For RA-08, one of these waterbodies includes Nushka Lake, which is identified as a wild rice lake. RA-08 would directly affect less than 0.1 acre of the wild rice lake.)

The Fond du Lac Reservation is approximately 19 miles west of the main body of Lake Superior, while the Leech Lake Reservation is approximately 83 miles northwest.

Chapter 11 provides information on the census tracts that are crossed by the Applicant's preferred route and route alternatives.

9.5.4.1.1 Natural Resources and Traditional Uses

This section references some of the traditional foods, plants, and medicinal plants used for various purposes by the Anishinaabe. Traditionally (in the past and today), plants are used by the Anishinaabe for some purpose; this is known through the oral tradition and is referenced in *Ethnobotany of the Ojibwe Indians* (Smith 1932). The author, Huron H. Smith, reports:

> *The writer collected every plant he could find in each region because he had been informed that the Ojibwe differ from other Wisconsin Indians in that they believe that every plant that grows is some kind of medicine or useful for something. The only plants discovered for which they had no name or use were adventive plants, and one could fairly well establish the date of their appearance in the state, because the Indians pay much more attention to our native flora than do the whites*.

The Ojibwe tribes, and other American Indian tribes, use the majority of plants and foods for medicinal and traditional purposes as they have for generations. Often called "first foods," these plants and foods are important to tribal identities and cultural continuation, in addition to meeting nutritional and utilitarian needs (Vickery and Hunter 2014). Traditional foods include wild rice, cattail, mushrooms, game animals, fish (particularly walleye), mushrooms, and a variety of berries and roots (Zoll 2016).

Traditional plants include wetland reeds, birch trees, tamarack, white cedar, red maple, and balsam fir (Zoll 2016).

Medicinal plants include lily pad roots, sage, sweet grass, Labrador tea, cranberry, red-osier dogwood, bitterroot, iron wood, birch, cha ga (birch tree fungus), and red cedar (Zoll 2016). Each medicine is a gift from one of the four directions. Depending on the tribe, the medicines may differentiate from the direction and teaching that represent it. The reason for this is that each of the medicines traditionally traveled its own path to each tribe. Both spiritually and physically, medicine would have entered each community through different methods. For example, sweet grass (discussed herein) could have been carried from the great lakes to a northern tribe through trade, or sage could have begun to grow to the south of one tribe and west from another. When addressing the directional representation of each medicine, the geography, agriculture, and traditions of the local tribes must be considered.Additionally, clams are used for ceremonial purposes (Zoll 2016).

The traditional plant communities in the Mille Lacs band community include the following: Northern Rich Tamarack Swamp, Northern Spruce Bog, Northern Poor Conifer Swamp, Northern Open Bog (McGregor Marsh), and Northern Poor Fen. First foods, spiritual medicines, and traditional plants are all found within Minnesota (Zoll 2016).

9.5.4.1.2 Management of Natural Resources

The National Congress of American Indians and the Minnesota Chippewa Tribe, along with the individual tribes of the White Earth Nation, Red Lake Nation, Leech Lake, and Mille Lacs, passed resolutions to assert the importance of their natural and cultural resources and that indicated the need for fiduciary and legal protection and preservation of culturally important resources, as well as mandating full consultation with the tribes for federal agencies, such as the Army Corps of Engineers (see Sections 5.4.1 and 6.4.1 for a discussion of tribal policies and ordinances).

For example, the National Congress of American Indians' resolution indicates the need for an Environmental Protection Agency (EPA) official to engage with the Army Corps of Engineers. The White Earth Reservation Tribal Council's 2014 resolution (No. 001-14-012) notes their concern for potential leaks or ruptures near the reservation.[13] The Red Lake Band of Chippewa Indians' resolution notes the need to consult with the Army Corps of Engineers for all activities that occur on tribal land, regardless of

[13] The White Earth Reservation Tribal Council's resolution concerns the permitting of the Sandpiper pipeline between Tioga, North Dakota and Superior, Wisconsin. A copy of the resolution is included in Appendix P.

land status; similar language is found in the resolution of the Minnesota Chippewa Tribe (see Appendix P).

Natural resources (and thereby cultural resources) within tribal lands often are managed by the respective tribe. All of the tribes in the area of the Applicant's preferred route and route alternatives have natural resource departments that manage natural resources and in some cases co-manage natural resources with state or federal agencies. For instance, the 1854 Treaty Authority is governed by the Bois Forte and Grand Portage Bands; they protect and manage off-reservation treaty rights and resources for those bands in the 1854 Ceded Territory. The Fond du Lac Band managed their own off-reservation treaty rights and resources in the ceded territory, as well. Resource management includes, but is not limited to, forestry, fisheries, wildlife, wild rice, and air. In this manner, the management of these resources extends beyond reservation boundaries.

9.5.4.1.3 Use of Natural Resources

During information and community meetings, tribal members expressed that if the food resources are injured, so will the people. Water and Manoomin are not commodities, but rather a means of sustenance and way of life. The destruction of the ability to exercise usufructuary rights because of contamination or other human diminishment would profoundly affect tribal cultural, spiritual, and physical well-being. Traditional gathering also allows for the opportunity to experience, learn, and promote cultural activities, all treaty-protected rights. Tribal members believe all routes, including, but not limited to, the Applicant's preferred route pose irreparable harm to their landscapes, protected resources, and practices. A discussion on sweet grass and cedar is provided as an illustration of the types of plants used by American Indian tribes. As shown in this discussion, numerous other plants are used by American Indian tribes.

Sweet Grass - Wiingash

Sweet grass is a gift from Mother Earth. It is said to be part of her hair, and the use of sweet grass promotes strength and kindness. When braiding sweet grass, each strand of the braid represents mind, body, and spirit. American Indians are taught the importance of remembering this representation of the sweet grass braid and walking that way when wearing a braid in one's hair.

Sweet grass, as well as sage, also were harvested, and often burned for medicinal and spiritual purposes (McClurken and Cleland 2000).

Cedar – Giizhig (aandag)

Cedar is used for purification and bringing balance into oneself. It is also known for attracting positive feelings, energy, and emotions. Cedar is often hung around the home and laid out on the floor of ceremonial lodges to offer protection from bad or harmful energy.

9.5.5 Hunting

Traditional terrestrial game and waterfowl hunting grounds are habitat for a variety of subsistence resources. As shown in regulations for permits to hunt and through traditional practices, these animals include deer, bear, ducks, geese, and turkey (GLIFWC 2014; Treuer 2012). According to information provided in a 2016 report by the Technical Assistance Services for Communities (TASC), the Applicant's preferred route crosses highly productive wild turkey hunting grounds in Clearwater and Hubbard

counties (TASC 2016). Two hunter trails are located nearby, including the White Elk Trail and the Salo Marsh Trail (TASC 2016). The White Elk Trail may be crossed by the proposed Project (TASC 2016).

9.5.6 Water

Surface water and groundwater are important to all people, "but it would be hard to imagine a group of people more dependent upon freshwater resources…than the Ojibwe, the original residents of the land of a thousand lakes."[14] They are sources of drinking water and support all life; water has a spiritual significance, as well as a physical significance. In this manner, the protection of clean water is high on the list of sacred responsibilities of Anishinaabe people (Plumer 2017). Water is also tied to tribal ceremonies, such as spring celebrations of aquatic life, and its quality affects fisheries and wild rice production (Mille Lacs Band of Ojibwe DNR n.d.).

High-quality waterbodies and rivers support wild rice, which is extremely sensitive to chemical pollutants.[15] The St. Louis River watershed is a primary source of wild rice. The river remains the primary reservation fishery for the Fond du Lac Band of Lake Superior Chippewa. The main stem of the St. Louis River and several of its larger tributaries have been dammed for hydropower generation, disrupting connectivity and increasing mercury bioaccumulation in fish (Fletcher and Christin 2015).

Waterfowl habitat within Minnesota includes wild rice lakes, such as Upper Rice Lake in Clearwater County (TASC 2016). Additional migratory birds and waterfowl habitat include the Sherburne National Wildlife Refuge, Rice Lake National Wildlife Refuge, and important bird areas (IBA), including McGregor IBA at Grayling Marsh Wildlife Management Area (WMA), Savanna State Forest, Kimberly March WMA, McGregor Marsh Scientific and Natural Area (SNA), Lawler WMA, and Sandy Lake Reservoir (WMA).

"Nagachiwanong" in Ojibwemowin translates to "where the water ends" and Fond du Lac in French translates to "the foot of the lake." Water is central to the existence of the band. The Fond du Lac Band of Lake Superior Chippewa formerly resided on the shores of the St. Louis River and Lake Superior in villages located in what is now Duluth, Minnesota and Superior, Wisconsin. The current Fond du Lac Reservation includes a stretch of the St. Louis River upstream from those ancestral villages. The Applicant's preferred route is not many river miles from "Gitchee gummee," known as Lake Superior. Lake Superior is the world's largest freshwater lake by area and is of paramount importance to all of the Ojibwe bands, tribes, communities, and First Nations that reside upon its shores in what is now referred to as Minnesota, Wisconsin, Michigan, and Ontario (Canada).

Members of the Mille Lacs Band explained that the entire subsistence cycle of hunting, fishing, and gathering depends upon the region's water system, which itself is intricately connected to the region's vast wetland resources. Traditional knowledge recognizes that these wetlands are not only vessels of life for a vast array of plant and animals, but are an integral part of the traditional life. Members of the Mille Lacs Band feel that the following resources may be affected by the Project:

- Habitats and associated species
- Sherburne National Wildlife Refuge (important to migratory birds and waterfowl)
- Rice Lake National Wildlife Refuge (important to ring-necked ducks)

[14] Mille Lacs Band of Ojibwe, Hearing Examiner's Report on Enbridge Energy Sandpiper Pipeline, August 2015.

[15] Ibid.

- Wild rice lakes and populations
- Hydrology
- Wakefield Brook flows to Rice Lake
- Other National Wildlife Refuges (important to migratory birds and waterfowl)
- Fisheries

9.5.7 Fishing

Reserved tribal resources include access to traditional fishing areas. Tribal resources include walleye and trout fisheries, which are predominately used for subsistence. Numerous trout streams are crossed by or located near the Applicant's preferred route (Mille Lacs Band of Ojibwe DNR n.d.; TASC 2016). Additionally, tullibee sensitive lakes are near the Applicant's preferred route including Roosevelt and Washburn lakes (Mille Lacs Band of Ojibwe DNR n.d.). Walleye (also called Ogaa) is a very important species to the affected tribes. Walleye lakes include Lake Mille Lacs, Big LaSalle, Two Inlets, Island, Blueberry, Twin, Roosevelt, Bass, Park, Washburn, Upper Twin, Lower Twin, and First Crow Wing (Mille Lacs Band of Ojibwe DNR n.d.). Additional lakes of concern to the Mille Lacs Band near the Applicant's preferred route include Rice Lake, Rice River, and Wayfield Brook; Big Sandy Lake Reservoir; Lake Minnewawa; Sandy River; and Long Lake Creek.

Fishing also is an important economic generator. According to the White Earth Reservation, fish and wildlife provide an impact of approximately $1,050,000 annually (White Earth Economic Development Office 2013). As part of public comments provided in June 2017, fish were noted as an important economic generator for the Leech Lake Band of Ojibwe (Brown 2017).

9.5.8 Manoomin

Manoomin—wild rice—is sacred not only to the Anishinaabe, but also to other American Indian tribes. Minnesota and northern Wisconsin are the largest producers of it in the United States, making it an economic mainstay, as well as a federally protected tribal resource. Tribal members believe that Manoomin is priceless; it nourishes the soul, community, and bodies of the Anishinaabe (Aubid, Sandy Lake Elder and District Representative, pers. comm., 2017). According to the Ojibwe, Manoomin is animate and is grammatically referred to as "him/her" not "it" (Minnesota DNR 2008). Manoomin is both a commercial and a subsistence resource that has been used for hundreds of years. It is cultivated in numerous lakes and streams, some of which are named, while others remain unnamed.

Wild rice lakes are often considered to be sacred landscapes with cultural connections (TASC 2016). One such area, Lower Rice Lake on the White Earth Reservation, has been designated a Traditional Cultural Property (TCP) (TASC 2016). This TCP also was noted as an important cultural site in the scoping comments by the United States Environmental Protection Agency (USEPA 2016). Lower Rice Lake is also the only certified organic rice lake in Minnesota (TASC 2016). The Leech Lake Band of Ojibwe harvest and cultivate seeds used to reestablish wild rice beds, which can be in lakes or rivers. Leech Lake is one of the many wild rice lakes within Minnesota (Leech Lake Band of Ojibwe 2015). Another is Dead Fish Lake, from which the Fond du Lac Band of Lake Superior Chippewa gather wild rice; this lake is located over 0.6 miles west of RA-07 and RA-08.

The regulations regarding wild rice lakes are discussed in Section 6.3.1. Tribal regulations of the harvest and protection of wild rice within reservation boundaries vary from tribe to tribe. Among these policies,

for instance, is the Leech Lake Tribal Council Ordinance 99-01. This policy is for the protection and preservation of wild rice beds (Leech Lake Tribal Council 2001). In addition to tribal regulations, treaties and other agreements with the U.S. government have reserved off-reservation harvesting rights for some tribes.

As shown in Table 6.3.2.1-26, a total of 17 wild rice lakes are located within 0.5 miles of the centerline of the Applicant's preferred route; while five are within 0.5 miles of the centerline for RA-06, 11 for RA-07, 9 for RA-08, and 11 for RA-03AM. Wild rice is susceptible to disturbance in lake, river, or wetland habitats and is sensitive to temperature changes, contaminants, and hydrology changes. These changes could affect germination and production.

Similar to fishing, wild rice is an important economic generator. For example, the White Earth Nation estimates that wild rice has an economic impact of $600,000 annually (White Earth Economic Development Office 2013). Comments provided on the draft EIS from the Leech Lake Band of Ojibwe indicate that 280,000 pounds of green rice are produced each year (Brown 2017). An additional discussion of wild rice as a commodity is provided in Section 6.5.1.

9.6 IMPACTS

All of the proposed routes and route alternatives cross ceded lands. RA-07 and RA-08 cross the reservation boundaries of the Leech Lake Band of Ojibwe and the Fond du Lac Band of Lake Superior Chippewa; while RA-06 crosses the Fond du Lac Reservation. The Applicant's proposed route and the route alternatives have the potential to impact tribal resources. The discussion of potential impacts considers both a quantifiable approach, which summarizes the potential impacts as they are described in Chapters 6, 8, and 10 (construction and operations impacts and abandonment), and the tribal perspective (overall impacts), which provides aspects of a qualitative approach.

The discussion of impacts focuses on the Applicant's preferred route and the route alternatives. Potential impacts to tribal resources associated with the CN alternatives would be similar for those areas that cross reservation or ceded lands. For example, the continued use of existing Line 3 (one of the CN alternatives) would pose similar operational risks as that of RA-07 and RA-08. The CN alternatives would have varying levels of quantifiable impacts to tribal resources dependent on their geographic proximity and the construction activities necessary for operation (see Chapters 5 and 10 for a discussion of potential impacts to CN alternatives and those related to releases). The qualitative discussion of impacts to tribal resources, however, would be similar to that presented within Chapter 9 regardless of the CN alternative.

9.6.1 Construction Impacts

As described in Chapter 6, most construction impacts would be temporary to short term and restricted to the construction work area, temporary workspaces, access roads, pump stations, and materials staging areas. In this manner, construction-related activities pose substantial threats to waters, natural resources and important cultural resources through the unavoidable disturbances during construction, as well as from the permanent environmental destruction which results through ongoing project activities. Potential impacts may be long-term or permanent, minor or major impact. Indirect impacts to some types of resources also may occur downstream or within a larger geographic area.

Construction work areas may result in fragmentation of forests and changes in forest composition, resulting in impacts on wildlife populations (see Section 6.3.4). Impacts could be permanent and major

depending on the habitat and species type present. As shown in Section 6.3.4, these impacts may include a decrease in total habitat area, amount of interior habitat, biodiversity (richness), and connectivity. Fragmentation also may cause an increase in the amount of edge habitat, increase the risk of invasive species spread, and isolate some habitat types. Figure 6.3.4-8, Example of Potential Fragmentation of Large-Block Habitats by the Applicant's preferred route, for instance, illustrates the potential occurrence of this fragmentation. These types of impacts may affect tribal resources consisting of both plant and animal species (see Sections 6.3.3 to 6.3.5).

Another impact that may occur due to construction and operation is the spread of invasive species, which are often introduced by construction equipment and seed mixes used for restoration. Over time, invasive species can outcompete native vegetation and change plant composition, altering the types and quantity of medicinal and traditional plants. Some invasive species, such as wild parsnip, contain chemicals that are phototoxic and cause severe damage to the skin of anyone who comes into contact with it. When plants, such as wild parsnip, become established as they have along the Enbridge Mainline corridor, a further diminishment of medicinal plant resources and a diminishment of the right to gather them due to the phototoxicity of the surrounding vegetation occurs. Tables 6.3.3-3, 6.3.3-5, 6.3.3-7, and 6.3.3-9 provide listings of the noxious weeds and invasive plants located within 0.5 miles of the Applicant's preferred route and the route alternatives. The Applicant will prepare a Noxious Weeds and Invasive Species Control Plan to prevent the spread of invasive species and noxious weeds (see Section 6.3.3).

Tribes are very concerned about accidental spills (see Chapter 10). Releases during construction may directly affect tribal resources, including, but not limited to, wild rice, aquatic animal species, and plants used for medicines (see Section 10.4). These types of resources are considered as part of the areas of interest (AOI). The impacts associated with a release would vary based upon the proximity of the resource and the type of resource, as well as the size and type of spill. Even if contained quickly, tribes state the resulting impact would compromise their protected landscapes. An example of this would be a spill during equipment refueling that may enter a wild rice lake, if it was not contained. As some spills may impact reservation land, these impacts could have a major impact on tribes. Tribes do not have the ability to replace lost resources in a different location or to move away from the reservation.

Access to resources, such as hunting and fishing areas, may be restricted due to closed work areas. During construction, prohibitions on hunting and fishing would be placed within the construction work area, which would typically be a moving area 120 feet wide and several miles long. Hunting success would be severely depressed in the larger area surrounding active construction and would likely be avoided by tribal hunters. A temporary loss of these activities during construction would result in negative impacts on tribal members. A major impact caused by hunting and fishing prohibitions may occur if the prohibition coincided with a peak hunt, harvest period, or ceremonial event, which would cause economic, subsistence, and health effects.

Neither the Applicant's preferred route nor the route alternatives cross through documented cemeteries. An ancestral burial ground was re-identified upon construction of a nearby transportation project at Highway 23 and 4th Street near Duluth, Minnesota. While this burial ground is associated with the Fond du Lac Band, it is not expected to be further disturbed or impacted by the Applicant's preferred route or route alternatives; the burial ground is over 3 miles from the closest alternative. Sections 5.4 and 6.4 provide discussion on known cemeteries and potential impacts associated with them.

Indirect construction-related impacts would include, but are not limited to, dust, vibration, noise, and air quality changes. Enbridge has identified various measures to limit these impacts, such as dust suppression, limiting idling by construction vehicles, and covering spoil piles (see Environmental Protection Plan in Appendix E).

Impacts on air quality during construction would be short term, minor, and localized (see Section 6.3.7). This is primarily due to the nature of the construction activities, in which people and equipment move along the route, thus limiting the exposure of residents and resources in any one area. Air quality also would be indirectly impacted through the removal of trees, for which some species are important resources for American Indian tribes.

Increased noise levels could result from normal construction activities, such as clearing, grading, and trenching. The most significant noise impacts during construction would be the result of horizontal directional drilling operations or blasting, if needed (see Section 6.2.2). Wildlife may be affected directly by construction activities or indirectly from disturbances caused by human activity and noise associated with construction activities. Increased noise may cause hunter prey species, such as deer to leave the area, resulting in a profound impact on tribal hunting (see Section 6.3.5). Since construction-related noise is temporary, the deer may return later, resulting in this impact being temporary to short term and negligible to minor.

The Applicant's preferred route would result in impacts on approximately 4.92 acres of wild rice lakes during construction and operation (Table 6.3.1.2-6). Additional information on impacts on wild rice are discussed in Section 6.3.1. Construction across waterbodies could result in increased turbidity and sedimentation (for more information see Section 6.3.1.2). Any waterbodies or streams crossed by the routes may experience increases in stormwater runoff and erosion from cleared vegetation, increases in turbidity and sedimentation, changes to stream flow due to horizontal directional drilling testing water, or degradation of aquatic habitat from instream construction. Such changes may affect wild rice habitat and production and fisheries. Enbridge has developed Applicant-proposed measures intended to minimize these types of impacts (see Environmental Protection Plan in Appendix E).

The Applicant's preferred route and route alternatives would cross ceded lands used for hunting, fishing, or gathering resources. Ancestral cultural sites within a reservation and/or ceded lands also would be subject to irreparable damage, if directly crossed by construction activities that cause ground disturbance or potential indirect visual impacts or access restrictions; these impacts, in turn, would damage each tribe's heritage. Impacts on various tribal resources on these lands would be similar to those described herein.

Route alternatives RA-06, RA-07, and RA-08 would cross the Fond du Lac Reservation (Figure 9-1). Both RA-07 and RA-08 would cross the Leech Lake Reservation. Each route could result in the loss of forested land. Hunting would be prohibited in the construction work area, which could limit tribal members from hunting various wildlife (as discussed above). These impacts could be temporary to short term and minor to major depending upon the species and the location.

Additionally, the loss of medicinal and traditional plants could be a short-term to permanent impact with a magnitude ranging from minor to major. If the same species were replanted during revegetation, the impact would be reduced. As shown in Section 6.3.3.4.1, the potential impacts on forested land would be long term to permanent and major for all route options due to the long period of time

required for forest regeneration. Loss of trees would be a direct impact on tribal resources, particularly for important species, such as cedar.

Although several acres of open water also would be affected by each of these routes through the reservation, Section 6.3.1.2 Surface Water, concludes that impacts on waterbodies during construction would likely be minor and temporary. However, impacts also would vary dependent on the quality of the existing waterbody. For instance, impacts on high-quality waterbodies, which may include trout streams and wild rice waterbodies may decrease the suitability of surface water as a habitat for sensitive species or degrade the existing beneficial use of the waterbody.

9.6.2 Operations Impacts

As described throughout Chapter 6, operations impacts would largely be associated with impacts on vegetation associated with maintenance of a permanent pipeline right-of-way and aboveground facilities, as well as air emissions from pump stations (see Section 6.3.3.3 and Section 6.3.7.3).The largest potential impact on tribal resources would be a pipeline incident that resulted in the accidental release of oil. For a detailed discussion of accidental releases, refer to Chapter 10. In the event of an accidental release of oil, the severity of impacts would depend on the location and type of resources within the area of the spill. Any release affecting a wild rice lake or river and/or a walleye or trout lake or stream would cause irreparable impact on tribal resources. Impacts on tribal resources may also affect the mental and physical health of the tribal community.

9.6.3 Abandonment

As detailed in Chapter 8, if Line 3 is replaced, Enbridge proposes to clean out the existing Line 3, cap it, and leave it in place (abandonment). Pipeline abandonment raises many concerns with the tribes.

The first concern is associated with responsibility for the abandoned pipe. If all of the pipelines in the corridor are abandoned, tribes are concerned that they would ultimately become responsible for any costs associated with removal, contamination, and remediation. For example, without knowing contamination is present in the existing corridor and the extent of any contamination, the costs associated with remediation could be significant. Another concern is the ability to reclaim the land currently occupied by the pipelines. Without the removal of abandoned pipelines, the ability of the tribes to reclaim the corridor is limited. Current right-of-way maintenance precludes many uses, including construction and many types of revegetation. In its current state, the corridor and recent construction areas are dominated by invasive species and have fragmented the landscape. If the existing corridor is contaminated, options for land reclamation may be further limited even if the pipelines were removed as a result of any necessary remediation.

During consultation, Mille Lacs leadership explained that mere abandonment without removal of existing pipeline would cause irreparable harm and that the abandonment would violate their spiritual beliefs and practices (see Appendix P):

> *When we use something from nature, we thank the Creator and the plants and animals for what they provide for us. We take only what is necessary and recognize our dependence on Earth and all that is in it to sustain our life. A pipeline takes the Earth out of the condition the Creator intended. When the pipeline no longer is needed, we must remove the pipeline, restore the environment, and allow nature to heal. We cannot continue to use the Earth by taking it out of its natural state when it is no longer necessary to do so. Just as a surgeon would remove the*

> *gauze and other tools after a surgery and allow the body to heal, we must remove the pipeline from the Earth when it is no longer being used (Mille Lacs Band tribal member).*

As the Applicant plans to abandon the existing Line 3 in place (see Section 2.9), two pipeline corridors would be in use, the existing Mainline corridor (where other pipelines are present) and the one where the new Line 3 pipeline would be constructed. The new pipeline corridor potentially could be used at a future time for additional infrastructure. This ultimately could result in an accumulation of multiple pipelines within the corridor chosen for the proposed Line 3 Project. This particularly would be the case with the Applicant's preferred route, RA03-AM, and RA-06 (see Executive Summary).If the existing Line 3 were removed (see Section 8.4), impacts still would be anticipated. Removing an existing pipeline is essentially the reverse of constructing a pipeline. This would include topsoil removal, excavation, pipe removal, backfilling and compaction of the trench, replacement of the topsoil, and revegetation measures. Impacts would be anticipated to be less than construction of a new pipeline or one within a new corridor. However, if the Applicant's proposed project/preferred route were permitted (i.e., a new location), but with the removal of the existing Line 3 (instead of abandonment), the Mainline corridor would still remain as other pipelines are present, and a second corridor would be opened for the new Line 3.

9.6.4 Overall Impacts

For American Indians, cultural resources cannot be separated from natural resources; therefore, the conclusion is that any pipeline route would affect cultural and natural resources. The degree to which these resources are affected would vary; if quantitative values are assigned, the impacts are direct and localized. If a holistic tribal perspective is used to determine impacts, any pipeline would have direct and permanent impacts.

The potential for these types of effects to occur is illustrated by Mille Lacs Band member Terry Kemper:

> *So when you leave things behind like that [pipelines], it's like—or you create new avenues of putting those things in, it's like taking the love out of someplace and then how do you put that back? You know, how do you get that back into that area? So to us it's like the whole ecological system is just set upside down. It affects us mentally, spiritually, and physically. We're so interconnected to those things out there that even our Indian names are after them. Many people are named Zhingwaak for that [points] pine tree. People are named after rocks, Asin, Asiniikaa, Asiniinini. They're named after these things because that's how interconnected we are. We're interconnected so much that plants are things we're named after. The rocks, the earth, we're named after that. The universe and all the things that are there, people have names after that. So when they say that, you know, there wouldn't be damage, you know, digging eight feet in the ground and putting in a pipeline, that's not true to us. To us you're taking all of our relatives and you're turning them upside down. You're taking all of our medicines, all of our spirituality when you're turning it upside down and wasting it. And so it makes—it hurts. It hurts the whole tribe to see something. When you see something like that. And it affects a whole community because all of our community is connected to that. We're taught from a young age that these things have meaning to them, they have life. And so now you have 100 miles of trees that are cut down, or 50 or 25 miles of trees that are just—that's all death. They just took it. And then they come in and they plant the trees and they think that they're going to make up for it by creating a farm, you know, another ecological system. And that ecological system then is—is like us as a people trying to survive. That ecological system is*

> *us trying to remember a time when this world was just beautiful. When this world was producing everything that we needed as a people in order for us to survive. You can't see those sacred places. The moon, that's a site, you can see it, it's sacred to us. Something in the earth, something in the water that's a sacred place, you can't see it. Sacred places are places you take in a spiritual journey that you can't see. When we get into a ceremony, we go places in a sacred site. Sacred places, when you go to sleep at night, you wander, your spirit wanders and travels. It's a place that is a sacred place, but when you come back into this world you can't see that site. You can't remember. You remember it as a human being, but you don't remember it as the place. You bring it into this world. So there's two different things there, and the very rice beds are sacred sites to us, every river, every stream, every waterbed, every swamp that you see out there is a sacred site, you can see it people. It affects our past, it affects everything that we're about.*

At the end of the interview, Mr. Kemper struggled to find words to express his feelings regarding the potential impacts of the pipeline. When Commerce explained the impacts of each route were being assessed, he responded that it could not be done, and the impact could not be isolated or measured—any impact is harmful and equally concerning.

Elders, during consultation and interviews, revealed that the health of the tribes and their members directly relates to the health of the ecosystem (see Chapter 11). They manage their lands within their reservation boundaries; they also watch the land and water that surrounds the reservation boundaries, because their history and way of life is not limited to the lines on current-day maps. What they choose to protect helps define them as a people (see Appendix P):

> *And so to us we can't separate the two and that's why this Project will have such an impact to us as human beings, as Anishinaabe people, as Native American people, when things are disrespected, moved around, cut down, hurt, trees are cut down, plants and ground is dug up, because basically you're digging up us. Our relatives, our ceremonies, our everything is interconnected to that earth, to those trees, to those plants. So you can't separate the two of those (Terry Kemper).*

The tribes look at not just the immediate impacts, but what is going to potentially affect future generations; they are taught to project to seven generations in the future. This sentiment is expressed by John Reynolds when he stated, "For the Indigenous people of this area, the way of life that they have is something that was given. And it's not something that they just live for today, it's something that they try and maintain for future generations." In this manner, American Indians link the time of the ancestors to that of the descendants. Any major changes to the environment affects not only the ceremony, but people's mental, physical, and spiritual health. Hunting, fishing, traditional use of resources, and gathering is ceremonial—they are not just for sustenance, but to bring a whole community together to connect with the outside world.

Tribal values for natural and cultural resources (e.g., medicinal plants, culturally or spiritually important areas or resources) are not quantifiable. Actions such as the proposed Project that result in the loss of a resource, or access to a resource, are considered equally detrimental by the tribes and cannot be mitigated. Such impacts contribute to the continued erosion of tribal resources, which in turn, contributes to overall societal and health impacts.

9.6.5 Cumulative Impacts

When past, present, and reasonably foreseeable future actions are analyzed in concert with the Applicant's preferred route, the potential for cumulative impacts to tribal resources would be present. Potential impacts may include the following:

- Disturbance to water bodies and water quality, animal populations (including game species), and plant resources;
- Potential disruption to habitat due to multiple project corridors;
- Potential demolition or alteration of archaeological or historic resources, sacred locations, or objects important to American Indian tribes;
- Potential disruption to access to sacred locations or landscapes;
- Construction in previously undeveloped areas or spaces used for hunting, gathering, and fishing;
- Multiple pipelines within ceded lands or reservations; and
- Pipeline and other project operation and maintenance activities, which have the potential to add either above-ground or underground infrastructure or the presence of people and equipment in otherwise quiet areas.

Chapter 12 provides additional discussion of resource-specific cumulative impacts.

Incremental impacts (or cumulative impacts) on American Indian communities are part of a larger pattern of structural racism, or "the normalization of an array of dynamics—historical, cultural, institutional and interpersonal—that routinely advantage white people while producing cumulative and chronic adverse outcomes for people of color and American Indians" (Minnesota Department of Health [Minnesota DH] 2014). These patterns are perpetuated when "decisions are made without accounting for how they might benefit one population more than another, or when cultural knowledge, history and locally-generated approaches are excluded. When this happens, programs and policies can reinforce or compound existing race-based inequities" (Minnesota DH 2014). Tribal communities also explained that the proposed Project would have an additional cumulative impact on historical and current trauma as the affected tribes continue to face the loss of tribal resources and ongoing degradation to the natural environment, because of the impacts of the Applicant's preferred route on tribal resources. Chapter 11 provides an environmental justice analysis.

9.6.6 Mitigation

Mitigation of impacts due to construction and operation are detailed in Chapter 6 for each of the specific resource areas; the mitigation measures are in addition to those measures that Enbridge proposes as part of their project description and/or are noted in their Environmental Protection Plan (Appendix E). Additional mitigation measures more specific to American Indian tribes may include the following:

- Impacts to cultural resources (archaeological and historic resources) – In addition to the unanticipated discoveries plan (see Appendix O), American Indian tribal monitors may be used to assist with surveys and construction oversight. This would help to identify resources that may require tribal and local knowledge.

- Impacts resulting from the use of herbicides or vegetation removal – American Indian tribes may be consulted to help avoid the application of herbicides to areas that may contain plants used by tribes (see Appendix B). The use of this mitigation measure would help to avoid potential damage to plants used by tribes.
- Impacts resulting from spills – American Indian tribes may be given a more active role in the monitoring and inspection of pipelines, such that they would be better prepared to address leaks or spills that could occur within reservation boundaries. The use of this mitigation measure would allow tribes to assist in the determination of appropriate methods to assist in the protection and preservation of tribal resources.

The Applicant's preferred route and RA-03AM would not cross reservation lands; however, they would cross ceded lands on which tribes exercise their treaty rights to access tribal resources. The other route alternatives (RA-06, RA-07, and RA-08) cross reservations, as well as ceded lands. Overall, route alternatives RA-07 and RA-08 would have the greatest direct impact on tribal resources within reservations, as they cross two reservations and various ceded lands. RA-06 would also have some minor to major impacts on tribal resources within the Fond du Lac Reservation.

Direct impacts from construction could occur on tribal resources; however, most of these are considered temporary to short term and minor. Indirect impacts could occur on tribal members from temporary restrictions during construction of the Applicant's preferred route on non-reservation lands used by the tribe for hunting, fishing, or farming operations.

While non-quantifiable impacts are difficult, if not impossible, to mitigate, tribes feel they should be entrusted with the inspection, monitoring, and maintenance activities in and through their lands and territories as they are most familiar with their resources.

9.7 UNIQUE TRIBAL IMPACTS

The American Indian tribes are very clear that the proposed Project, CN alternatives, the Applicant's preferred route, and the route alternatives (and route segment alternatives) would have a long-term detrimental effect on tribal lands, resources, spiritual places, medicines, food, and members. The impacts cannot be categorized by duration (short term or permanent) or by extent (region of interest, construction work, or pipeline right-of-way). It is also not possible to determine which alternative is better when each alternative affects tribal resources, tribal identity, and tribal health. All tribal members who submitted comments and/or participated in drafting the EIS reported that all of the routes, including keeping the current Line 3 in place and/or abandonment, would add to the negative mental, spiritual, and physical health effects already disproportionately suffered by American Indian populations.[16]

[16] Historical trauma describes multigenerational trauma experienced by American Indians because of continuous subjection to traumatic events, poverty, dislocation, war, etc. It is cumulative and collective. The term "historical trauma" is used by scholars, such as Maria Yellow Horse Brave Heart, as a means to understand intergenerational psychological consequences of trauma. The original use of the term was for Holocaust survivors, but began to be used to describe the American Indian plight in the 1980's and 1990's and continues today (Whitbeck et al. 2004). Scholars have noted that methods of dealing with trauma are those that develop from within tribal communities and draw on the traditional ways of knowing and spirituality (Pember 2016).

In an interview, Mr. Kemper discussed the cumulative psychological impacts of having lands and resources diminished by ongoing infrastructure projects (see Appendix P):

> *You're taking all of our medicines, all of our spirituality when you're turning it upside down and wasting it. And so it makes—it hurts. It hurts the whole tribe to see something.*

Many resources or the environment that was in place prior to clear cutting and activities related to other infrastructure projects (e.g., roads, transmission lines, development) have cumulatively diminished many of the once-existing resources. John Reynolds of the Mille Lacs Band explains "that if a pipeline of this magnitude comes through, it would basically destroy, you know, what's remaining."

9.7.1 Climate Change

The Fond du Lac Band of Lake Superior Chippewa elaborated on the cumulative effect of climate change from the Project, including the cost of petroleum extraction, the cost to the climate from production of the steel used to transport the oil, the cost of pumping the oil, the cost of trucking to transport the pipe and other assorted materials used in construction of the pipeline, the cost of the refining process, and the cost of using the oil once it is transported and refined. All of the tribes that participated in consultation and collaboration explained that any new oil transportation infrastructure serves to encourage the country's reliance on an energy resource that is inherently damaging to the world's climate, locking us into an uncertain future for children, grandchildren, and all future generations. The pipeline would lead to increasing greenhouse gas emissions and reducing chances of meeting pollution-reduction targets. Continued reliance on energy from oil is altering many resources on earth, contributing to devastating climate change (see Appendix P).

Climate change impacts threaten tribal lands and resources, ways of life, culture, and economies. Some alternatives cross the Leech Lake and the Fond du Lac Reservations, which both contain numerous resources, such as wild rice processing sites, cemeteries, and ceremonial grounds. The proposed Project and its alternatives are located within territories ceded to the United States by the Chippewa Indians under treaties. These lands and resources are important to preserving the traditional ways of life, including fishing, hunting, wild rice farming, maple sugar gathering, the collection of plants for medicines, spiritual, and ceremonial purposes, shelter, and other needs. Studies indicate rising temperatures, and hotter, drier summers will decrease water quality and quantity in the Great Lakes region, endangering homes, human health and safety, economies, culturally important species, medicinal plants, cultural sites, and traditional foods, such as wild rice in tribal communities.

In addition, American Indian tribes are tied to specific geographic location due to the presence of reservations and cultural, spiritual, and natural resources that sustain them. For many tribes, the reservation is a primary location for practicing traditional lifeways and for providing for its members. If impacts are permanent, tribes do not have the ability to replace lost resources in a different location or to move away from the reservation.

Loss of or diminishment of resources from global climate change would constitute an adverse effect on American Indian tribes. For example, hotter and drier summers could adversely affect water levels and wild rice and fish harvests. These impacts could potentially be exacerbated by declining water quality as a result of increased surface runoff and sewage overflows. Climate change could also shift or reduce the habitat ranges of culturally significant plant and animal species, thereby affecting the ability of tribal communities to harvest these species (U.S. Department of State 2017).

9.7.2 Health Impacts

Ojibwe and Dakota cultures have a deep and longstanding connection with the natural environment. This connection is integral to their cultural identity, and the loss of tribal resources results in profound impacts on mental health including increased incidence of alcoholism, depression, and suicide. The evaluation of health impacts in the EIS must include these impacts in addition to impacts on physical health resulting from potential exposure to pollutants, contaminants, and increased noise and dust during construction (see Section 11.3).

According to Chief Arvol Looking Horse of the Great Sioux Nation, "Now we have earth changes, climate changes, and global disasters. That's happening today. Volcanos and earth quakes. All this is happening that the elders said. It's all man made. What's supposed to happen in the future is happening now. Things escalate so fast, now we are all getting sick from this environment, the foods we are eating, and our livelihood. So we have the statistics from the hospitals, it's said how bad, how sick our people are. And, they are telling us, we are lucky to live until 60 years old."

The potential impacts are amplified by the fact that the Applicant's preferred route runs through the middle of the Mille Lacs Band's District II Community. District II's government services are located in the East Lake community south of the proposed pipeline, while the Minnewawa and Sandy Lake communities are located north of the proposed pipeline. If there were any road closures in the region as a result of a major pipeline failure, it would isolate the Minnewawa and Sandy Lake communities from the basic services provided through the East Lake community and would isolate family members living in different regions from each other. The effects of bisecting the community with the proposed pipeline would be particularly significant for the extremely traditional community with strong ties to time-honored culture. The consequences of construction and the constant threat of a spill that could impact traditional cultural practices would have long term devastating consequences to this community. The emotional toll of a spill in the area would be devastating (see Appendix P).

9.8 SUMMARY

This chapter provides insight into the American Indian views on the construction and operation of a new pipeline. From this perspective, any route, route segment, or system alternative would have a long-term detrimental impact on tribal members and tribal resources. The impacts cannot be categorized by extent (e.g., region of interest, construction work area, permanent right-of way). Tribal members and governments express their desire and expectation for a healthy and functional environment that ensures the meaningful use of treaty rights. A comparison of impacts to tribal resources, identity, and health for the Applicant's preferred route and the route alternatives is difficult to accomplish, since this discussion is largely qualitative in nature. However, as part of this discussion of tribal resources, a summary of the impact analyses from Chapters 5 and 6 for the CN alternatives and the route alternatives pertinent to the use of natural and cultural resources was incorporated into this chapter. The intent is to provide an identification and quantification of animals, plants, and other resource types that may be impacted, as well as the amount of acres or crossings that occur.

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Chapter 10
Accidental Crude Oil Releases

10.1 INTRODUCTION

During the transport of crude oil by pipeline and by the alternative modes of rail and truck transportation, unplanned events may occur that can result in a release of crude oil. Although the probability of a large or major oil release at any specific location is extremely low, the probability of a release of some type along the entire pipeline during its lifetime is not low. In addition, the consequences of a large release can be significant. Therefore, in addition to the analysis of potential Project impacts during construction and normal operations, the potential for unanticipated releases and the potential consequences of such releases must be considered in this Environmental Impact Statement (EIS).

Modeling, statistics, and resource mapping can help predict the probability of an accidental oil release, how crude oil behaves in the environment, and what resources could be at risk should there be an oil spill. However, it is impossible to predict where a spill would happen, the quantity of oil involved, how far the impacts would extend, or exactly what resources would be affected. In part, this is because there are so many incident-specific factors involved. The weather, time of year, water levels, human error, and even what type of wildlife is present at the time a spill occurs all affect its probability and outcome.

This chapter first describes the relevant federal and state regulations for crude oil transportation by pipeline, rail, and truck and the causes of crude oil releases and then provides a baseline crude oil spill risk analysis (Section 10.1). Section 10.2 describes the behavior of crude oil in the environment, including case studies of prior releases. The crude oil trajectory and fates modeling is discussed in Section 10.3, followed by descriptions of the potential exposure of and impacts on specific resources if a spill were to occur (Section 10.4). Sections 10.5 and 10.6 describe spill prevention and response measures and clean-up and recovery measures, respectively. Lastly, Section 10.7 compares the potential exposure of resources of concern to crude oil releases for the alternatives.

10.1.1 Regulatory Context

Crude oil transport by pipeline, rail, and tanker truck is regulated by a number of state and federal guidelines and standards, which are described below.

10.1.1.1 Pipeline Safety Regulations and Standards

The federal (U.S. Department of Transportation [USDOT]) and state (Minnesota Office of Pipeline Safety [MnOPS]) regulatory requirements for oil pipelines, as well as industry standards for oil pipelines, are discussed below. These regulations and standards apply to each of the pipeline alternatives.

10.1.1.1.1 U.S. Department of Transportation Regulations

USDOT is mandated to regulate pipeline safety under Title 49 U.S. Code Chapter 601. The Pipeline and Hazardous Materials Safety Administration (PHMSA) is the agency within USDOT that has jurisdiction and is responsible for developing and enforcing regulations for the safe, reliable, and environmentally

sound operation of interstate pipelines. PHMSA's regulations encompass design, construction, testing, operation, maintenance, and emergency response for hazardous liquid pipelines and related facilities.[1]

49 Code of Federal Regulations (CFR) 195 (Transportation of Hazardous Liquids by Pipeline) include Subparts A through H, establish reporting requirements, design requirements, construction requirements, pressure testing, operation and maintenance, integrity management, required qualifications of pipeline personnel, and corrosion control. For a new hazardous liquid pipeline, high consequence areas (HCAs)[2] must be identified prior to operation, and hazardous liquid pipeline operators are required to develop and submit to PHMSA a written Integrity Management Plan (IMP) within 1 year of the start of operation (49 CFR 195.452).

The Applicant's IMP must include identification of all pipeline segments that could affect HCAs; a baseline assessment plan to ensure integrity of these segments; a process for continual integrity assessment and evaluation; repair criteria to address issues identified by the integrity assessment method; a process to identify, evaluate, and implement preventative and mitigation measures to protect HCAs; and a description of how each element of the IMP would be implemented. Because populations can expand and environmental situations can change, HCA boundaries can change over time; therefore, new HCAs must be incorporated into baseline assessment plans within a year of identification (PHMSA 2016). As a part of IMP implementation, the Applicant would also have to perform periodic integrity assessments on line segments that could affect HCAs at least once every 5 years.

If a pipeline is approved for the Project, it is anticipated that the Applicant's IMP for the new pipeline system would be in large part similar to its existing IMPs for the existing Enbridge pipeline system. The new IMP would include a new baseline assessment plan, identification of HCAs specific to the Project, and other Project-specific information.

10.1.1.1.2 State Pipeline Regulations

Although PHMSA is responsible for regulation, inspection, and enforcement of safety regulatory requirements for interstate pipelines as described above, it also permits individual states to adopt additional or more stringent safety regulations for intrastate pipelines. In states where such an agreement is in place, the state is the delegated inspection authority for compliance with federal rules while PHMSA retains enforcement authority. MnOPS, a division of the Minnesota Department of Public Safety, inspects pipelines within the state and has such an agreement with PHMSA to inspect pipelines.[3] PHMSA's Office of Pipeline Safety enforces its federal regulations based on the inspections conducted by MnOPS. PHMSA or MnOPS inspections or audits can occur at any time, but typically happen every 2

1 Parts 190, 194, 195, 198, and 199 are relevant to hazardous liquid (including crude oil) pipelines. Parts 194 and 195 address issues that are directly related to pipeline system integrity and oil spill risk assessment and environmental consequences. The regulations at 49 CFR 194 (Response Plans for Onshore Oil Pipelines) contain requirements for onshore oil spill response plans that are intended to reduce the environmental impact of oil unintentionally discharged from onshore oil pipelines. Parts 190, 198, and 199 address issues that are tangential to pipeline system integrity, including rulemaking procedures, regulations for grants and state aid for safety programs, and required drug and alcohol testing for operators of pipeline facilities.

2 HCAs are areas or features where a crude oil pipeline failure, such as a release of crude oil, may have long-term and/or permanent and major impacts on resources. They are defined and discussed in more detail in Section 10.4.1.

3 The agreement is codified under Minnesota Statutes, Chapter 299J, Pipeline Safety.

years. The scope of audits and inspections conducted by these regulators are broad and can include the following (Enbridge 2015c):

- Compliance with aerial patrol requirements;
- Review of integrity dig records to determine both adequacy and accuracy;
- Inspection of cathodic protection systems;
- Review of tank inspection records;
- Review of operation, maintenance, and contingency manuals;
- Review of pipeline integrity methodology;
- Review of leak detection methodology;
- Review of system maximum operating pressures;
- Review of facility integrity manuals;
- Inspections of facilities;
- Review of operation and maintenance procedures and records;
- Review of operator qualification records; and
- Examination of public awareness materials.

If MnOPS identifies a violation of Minnesota pipeline laws, it has the authority to issue civil penalties for violations of these laws.

Of the states affected by the pipeline alternatives, only Minnesota has an agreement with PHMSA. The Iowa Utilities Board has primary jurisdiction over the routing and siting of hazardous liquids (including crude oil) pipelines in Iowa but does not have safety jurisdiction over hazardous liquids pipelines—PHMSA retains that authority (Iowa Utilities Board 2017). Similarly, North Dakota, Illinois, and Wisconsin have not entered into agreement with PHMSA to monitor the safety of their pipelines; therefore, PHMSA regulates, inspects, and enforces interstate liquid pipeline safety requirements in those states.

10.1.1.1.3 Pipeline Industry Standards

In addition to adhering to PHMSA regulatory requirements, major oil transport pipelines must also comply with pertinent industry standards. If a pipeline system is selected for approval, the design of the system would be expected to comply with the industry standards and codes listed below. These standards and codes were established to improve pipeline system integrity and safety and to reduce the potential for accidental releases.

- American Society of Mechanical Engineers (ASME)/American National Standards Institute (ANSI) Code B31.4, “Liquid Transportation Systems for Hydrocarbons, Liquid Petroleum Gas, Anhydrous Ammonia, and Alcohols”: This standard addresses requirements for materials of construction welds, inspection, and testing for cross-country hazardous liquid pipelines, including crude oil pipelines, to ensure that pipelines are constructed using the appropriate methods and materials to prevent leaks. ASME B31.4 434.15.2 (a) requires mainline block valves on the upstream side of major river crossings and public water supply reservoirs, and either a block valve or a check

valve on the downstream side. 49 CFR Part 195, "Transportation of Hazardous Liquids by Pipelines," has incorporated ASME/ANSI B31.4 code by reference.

- American Petroleum Institute (API) 570, "Piping Inspection Code–Inspection, Repair, Alteration, and Re-Rating of In-Service Piping Systems": This code provides guidance on proper inspection and repair of pipelines the petroleum refining and chemical processing industries use, but it may be used for any piping system.
- API RP 1102, "Recommended Practices for Liquid Petroleum Pipelines Crossing Railroads and Highways": This recommended practice is a requirement of ASME/ANSI B31.4. This guide gives primary emphasis to provisions for public safety. It covers the design, installation, inspection, and testing required to ensure safe crossings of steel pipelines under railroads and highways. The provisions apply to the design and construction of welded steel pipelines under railroads and highways.
- API RP 1109, "Recommended Practice for Marking Liquid Petroleum Pipeline Facilities": ASME/ANSI B31.4 advises that this API RP 1109 be used as a guide. The recommended markers are signs that visually alert the public to the presence of a pipeline and the potential hazards associated with excavating near pipelines. Strategic placement of markers and signs also helps the pipeline operator to perform right-of-way surveillance, inspections, and other routine activities.
- NACE [National Association of Corrosion Engineers] RP 0169, "Control of External Corrosion on Underground or Submerged Metallic Piping Systems": ASME/ANSI B31.4 refers to sections of this recommended practice as a guide for an adequate level of cathodic protection. This standard presents acknowledged practices for control of external corrosion on buried or submerged piping systems. It takes into consideration the material of the pipe, the environment around the pipe, and the nature of the contents of the pipe in determining what types of corrosion prevention should be applied to prevent external corrosion from compromising the integrity of the pipe and resulting in a leak.

10.1.1.2 Rail Safety Regulations

Transport of hazardous materials by rail is primarily regulated by PHMSA and the Federal Railroad Administration (FRA). The role of these agencies as well as connected advisory boards and pertinent legislation is discussed below.

10.1.1.2.1 Federal Agency Regulations and Requirements for Rail Transport

The FRA has jurisdiction over railroad safety, including the transport of hazardous materials such as crude oil. Congress passed the Rail Safety Improvement Act of 2008, which directed the FRA to regulate railroad safety so as to reduce the likelihood of train derailments and collisions.

On May 1, 2015, PHMSA and the FRA issued a final rule defining high-hazard flammable trains (i.e., rail cars carrying flammable liquids such as crude oil and ethanol) and addressing safety concerns raised in response to significant rail incidents involving crude oil and other hazardous/flammable materials. High-hazard flammable trains are defined as having a continuous block of 20 or more tank cars loaded with a flammable liquid or 35 or more cars loaded with a flammable liquid dispersed through the train. Components of the requirements include enhanced braking; enhanced standards for new and existing tank cars; reduced operational speeds; implementation of risk assessments for rail routes; and provision

of rail routing information to state, local, and tribal officials. The implementation of these preventative actions is meant to reduce the incidence of accidents involving high-hazard flammable trains.

In August 2016, PHMSA issued its final rule to codify tank car safety standards required by the Fixing America's Surface Transportation Act, signed in December 2015. Under these regulations, all DOT-111 tank cars used to transport crude oil, ethanol, and other flammable liquids must be phased out or retrofitted by 2025, and new tank cars must meet enhanced DOT-117 design or performance criteria. These new cars have increased shell thickness, thermal protection, full-height head shields, high-flow pressure-relief valves, protected top fittings, and upgraded bottom outlet valves for increased safety while transporting flammable materials (81 Federal Register 53935).

In addition to the FRA, the Surface Transportation Board (STB) is an independent adjudicatory and economic regulatory agency. The STB established the Rail Energy Transportation Advisory Committee in July 2007 to provide advice and guidance to the STB and to serve as a forum for discussion of emerging issues regarding the transportation of energy resources, including oil, by rail.

10.1.1.2.2 Minnesota Regulations and Requirements for Rail Transport

Minnesota has implemented new rail incident and response efforts. Minnesota Statute 115E.042 requires by June 30, 2015, annual communication to ensure coordination of emergency response activities between the railroad and local responders and the development and annual submittal of spill prevention and response plans. The Minnesota Department of Public Safety has completed its report outlining Minnesota's response capabilities for an oil transportation incident (Minnesota Department of Public Safety 2015). In addition, in April 2016 Governor Dayton appointed a State Rail Director to enhance railway safety, pursue needed infrastructure improvements, continue training and support for first responders, closely monitor rail movements, and work with communities and railroad companies to ensure the safe and efficient operation of rail systems across Minnesota.

10.1.1.3 Tanker Truck Regulations and Requirements

10.1.1.3.1 Federal Agency Regulations and Requirements for Truck Transport

Federal regulations and requirements for truck transport are established in 49 CFR 177, 178, 385, 107, 392, and 397 as described below.

- Federal regulations regarding the transport of hazardous materials, including crude oil, along public highways are provided in 49 CFR 177. Regulations cover vehicular tunnel sizes, driver training, emergency situation protocols, and other topics pertinent to transport of crude oil by tanker truck.
- 49 CFR 178 includes specifications required for the construction of tanker trucks, including USDOT Specification 407 (Cargo Tank Motor Vehicle). These specifications, including those pertaining to materials, structural integrity requirements, and pressure-relief devices, are meant to ensure safe transport of hazardous materials, including crude oil.
- Safety requirements under 49 CFR 385 include the requirement to obtain and maintain a safety permit to transport certain hazardous materials, including crude oil. Federal regulations at 49 CFR 107, Subpart G, require registration with PHMSA for transportation of hazardous materials, including crude oil.

- The Federal Motor Carrier Safety Administration regulations in 49 CFR Parts 392 and 397 set additional requirements for parking, attendance of hazmat vehicles, routing of hazardous materials shipments, and railroad crossings. These safety requirements apply to tanker trucks transporting crude oil.

10.1.1.3.2 Minnesota Regulations and Requirements for Truck Transport

Minnesota has adopted the Federal Motor Carrier Safety Administration regulations governing hazardous materials transportation, including crude oil.[4] The Minnesota Department of Transportation regulates truck transportation of crude oil through its Office of Freight and Commercial Vehicle Operations (OFCVO). OFCVO focuses on at-risk carriers and shippers who pose the greatest threat to highway safety such as those transporting flammable products, including crude oil. OFCVO works closely with the Federal Motor Carrier Safety Administration in administering and enforcing motor carrier laws and regulations that were established to increase the safety of transporting materials such as crude oil and to minimize the potential for accidental release of those materials.

Under the auspices of the Federal Motor Carrier Safety Administration, OFCVO investigators conduct onsite investigations and reviews of interstate carrier and shipper records and determine whether the carrier or shipper has adequate safety controls in place. Safety controls include driver qualifications; weight limitations; vehicle inspection, repair, and maintenance; driver safety; insurance requirements; and placard and labeling requirements. If a carrier or shipper does not meet the safety standards set by OFCVO, the carrier or shipper can be considered unfit, which may lead to severe penalties up to and including a shutdown of its operations.

Minnesota Statute 115E.045 requires the development and maintenance spill prevention and response plans for trucks transporting 10,000 gallons of oil or hazardous substances as bulk cargo or more per month.

10.1.2 Potential Causes of Unanticipated Releases

10.1.2.1 Crude Oil Transport by Pipeline Systems

Modern crude oil pipeline systems are designed, constructed, and operated with technology to minimize the potential for integrity failures and to rapidly detect and manage unanticipated releases. However, releases do still occur, including releases from pipelines, pump stations, mainline valves (MLVs), and storage tanks. According to the ASME (2010), threats of pipeline failure fall within three categories: time-dependent, stable, and time-independent. Time-dependent threats are those that tend to increase over time. Stable threats are those that are always present but only manifest when activated by a change in operations or the surrounding environment. Time-independent threats are those that are not influenced by time (ASME 2010).

Time-dependent threats (e.g., aging infrastructure) include external corrosion, stress corrosion cracking, and internal corrosion. External corrosion occurs when the pipeline walls, seam welds, or joint welds weaken from corrosive action from outside the pipe. External corrosion can be caused by the natural conditions of the substrate surrounding the pipeline. Stress corrosion cracking occurs when the

[4] Minnesota Statutes §221.033

combined action of corrosion and applied stress causes cracks. Internal corrosion weakens the pipe through corrosive action on the interior surface of the pipe.

Stable threats include manufacturing, construction, and equipment failure threats. Manufacturing threats are caused by defects in the pipeline system that originated during the manufacturing process, such as pipe seam defects and out-of-roundness. Construction threats result from defects caused during the construction, installation, or fabrication of the pipe and its components. Equipment threats result from a failure of the equipment to perform its intended design or its operational or functional purpose.

Time-independent threats include operational error, damage from weather or natural forces, and third-party damage. Operational errors are caused by human mistakes leading to the incorrect operation of the pipeline system that could ultimately lead to a release. Additionally, weather-related and other natural threats have the potential to damage the pipeline system. Natural forces that could stress or damage pipelines, pump stations, MLVs, and storage tanks include inclement weather (e.g., lightning strikes, flooding) or geological shifts (e.g., earthquakes, landslides, mudslides, ground settlement). Pipeline stress or corrosion can also occur due to the natural conditions of the substrate surrounding the pipeline. For example, many types of peat (which is common in Minnesota) exhibit negative buoyancy and place upward pressure on pipelines, causing stress on the pipe (Ryder et al. 2004). Third-party damage threats consist of potential actions by parties other than the pipeline operator that could compromise the integrity of the pipeline. Unintentional damage by third parties most often occurs when other parties are constructing in the vicinity of an installed pipeline and encounter the pipeline while excavating or conducting other ground-disturbing activities. Third-party damage could also include intentional vandalism or sabotage.

10.1.2.2 Crude Oil Transport by Rail

Crude oil releases associated with rail transport can result in a number of ways. Rail tank car loading or offloading[5] errors, hose failures, or rail tank car valve failures could lead to relatively small releases of crude oil within the loading or offloading facilities.[6] Derailments or other accidents while in transit could lead to larger spills that would generally not be within areas designed to contain releases. Such releases could also enter waterways if the tracks are adjacent to or near a waterbody.

There are relatively few incidents of crude oil rail accidents for analysis. Crude oil has only been transported in larger quantities by rail since about 2005 when the first 20-tank car “key trains” began operating at the rate of one train daily in the US. Between the years 2005 and 2015, there was an 84-fold exponential increase in crude transport by rail (Etkin 2017a). Much of this oil was being transported by “unit trains” with 100 to 120 tank cars. Since 2015, there has been a significant drop in the amount of crude oil transported by rail, though this may change based on economic market factors.

Since no specific analyses were conducted for the spill risk associated with crude-by-rail transport for this EIS for Enbridge Line 3 and to provide a more detailed perspective on recent developments, a review of data from existing modeling and statistical studies was conducted. These analyses were conducted in part for the State of Washington for DEIS and FEIS studies for crude-by-rail facilities in that

[5] Loading refers to crude oil being transferred to a rail car or tanker truck from a storage tank; offloading refers to crude oil being transferred from a rail car or tanker truck to a storage tank.

[6] Section 10.1.3 defines the size categories of releases.

state, as well as for peer-reviewed technical papers (Etkin et al. 2015b; Etkin 2016a, 2016b, 2017b, 2017). Risk analyses for crude-by-rail spills are challenging in that there are few data that exist on spills and accidents specifically for this mode of crude oil transport as it have been occurring for only limited time period (since about 2011). The studies and data reviewed involved the analyses of freight rail traffic and accidents, in general, with the review of a large number of technical reports and papers in the literature that address specific aspects of freight rail accidents.

Analyses of accidents from all freight rail transport (regardless of cargo) for the years 1975 through 2015 indicate that derailments are the most common type of accident (79 percent of incidents). Collisions between trains, highway-rail crossing accidents (collisions with trucks or automobiles at crossings), and other miscellaneous incidents, including fires in locomotives, are the other types of accidents that occur (Etkin 2016).

Derailments can be caused by collisions with other objects (e.g., vehicular traffic), operational errors (e.g., harsh handling such as hard braking or traveling at high speeds), mechanical failure of the tracks (e.g., broken rails), or mechanical failure of the wheels. According to a recent study, broken rails or broken wheels were the leading cause of derailments at all speeds (Liu et al. 2012). Human factor-related causes such as improper use of switches and violation of switching rules were also prevalent, as were equipment failures (e.g., bearing failure, broken wheel, and axle defects) (Liu et al. 2012). There has been an 80 percent decrease in rail accidents since 1975, with the sharpest drop occurring prior to 1985. Even in the last decade, there has been a 50 percent decrease in accidents (Etkin 2016b; Etkin 2017b). This finding corresponds with a study that indicates a 5.8 percent annual decrease in freight train derailments between 2000 and 2012 (Liu 2015).

The accident rate for freight rail transport averages 1.5 derailment accidents, 0.092 collisions, 0.089 highway-rail crossing accidents, 0.029 fire incidents, and 0.075 miscellaneous accidents per million train miles for loaded trains (Etkin 2017a). However, calculating the likelihood of a crude train spill needs to take into account a number of other factors. Not all train accidents involving loaded tank cars result in the release of cargo. For derailments, 15 percent to 22 percent of accidents with tank cars have resulted in spillage. In addition, there are a number of factors that make crude-by-rail transport different than other types of freight rail transport, which would affect potential accident rates.

In these studies (Etkin et al. 2015; Etkin 2016a, 2016b, 2017a, 2017b) modeling of crude-by-rail accident rates was conducted, taking into account potential increases in the likelihood of accidents (train length) and reduction in accident rates (electronically-controlled pneumatic braking, positive train control, wayside detection systems, track upgrades, and changes in operating procedures), to determine potential accident rates. In addition, the reduced likelihood of a tank car breach that would result in spillage with the use of newer types of tank cars and requirements for lower operating speeds was factored in. The resulting estimate of spill frequency was 0.0062 spills annually per million train-miles, assuming all safety improvements were in place and were effective. Without the benefit of the safety improvements, the spill frequency was 0.15 spills annually per million train-miles. The volume of spillage would be dependent on the number of tank cars involved in each accident, as well as the probability of breach. For a 120-car train, the expected median spill volume was estimated to be 9,280 bbl. For a 100-car train, the median volume was 8,686 bbl. There was a 10 percent chance that a spill would involve 20,000 bbl or more (Etkin 2017a). While it has not yet occurred, rail lines may also become the target of intentional sabotage or terrorism (U.S. Government Accountability Office 2012).

The greatest concern about crude-by-rail train accidents is that they may involve fires and explosions. There have been 20 crude-by-rail accidents with spillage in the US and Canada since 2013.

Table 10.1-1. Notable CBR US and Canadian Accidents with Spillage 2013–2016

CBR Incident	Accident Date	Outcome Synopsis
Paynton, Saskatchewan	1/24/2013	Collision with road grader; 16 cars derailed; 4 cars spilled oil; 667 bbl spilled.
Parkers Prairie, Minnesota	3/27/2013	14 tank cars derailed; 1 car ruptured; 714 bbl spilled; no fire; minimal damage due to frozen ground
Calgary, Alberta	4/3/2013	7 tank cars derailed; 2 tank cars released oil; fire (put out by local firefighters); 640 bbl spilled
White River, Ontario	4/3/2013	22 cars derailed; 1 car spilled oil; 393 bbl spilled
Jansen, Saskatchewan	5/21/2013	Mixed train; 5 cars derailed; 575 bbl spilled.
Lac-Mégantic, Quebec	7/5/2013	63 tank cars derailed; 37,719 bbl spilled; 47 fatalities; 2,000 people evacuated; extensive damage to town
Aliceville, Alabama	11/7/2013	30 tank cars derailed; 12 tank cars burned; 10,846 bbl spilled; No injuries; fire; wetland impact
Casselton, North Dakota	12/30/2013	Collision; 20 crude cars derailed; explosion/fire; > 9,524 bbl spilled; 1,400 residents evacuated; no injuries
Plaster Rock, New Brunswick	2/7/2014	5 tank cars derailed; 5 tank cars burned; 45 homes evacuated; 3,000 bbl spilled; 45 homes evacuated; no injuries; no fire
Vandergrift, Pennsylvania	2/13/2014	19 tank cars derailed; 4 tank cars spilled oil; 108 bbl spilled; no fire; no injuries
Lynchburg, Virginia	4/30/2014	15 tank cars derailed; 3 tank cars burned; 1,190 bbl spilled; immediate area evacuated; some oil in river; no injuries
LaSalle, Colorado	5/9/2014	6 tank cars derailed; 1 tank car spilled oil; 155 bbl spilled; spill contained in ditch; no fire
Mount Carbon, West Virginia	2/16/2015	27 tank cars derailed; 14 tank cars burned; 9,800 bbl spilled; oil entered Kanawha River; drinking water impacts
Gogama, Ontario	2/14/2015	35 tank cars derailed; 7 tank cars caught fire; 4,900 bbl spilled
Galena, Illinois	3/5/2015	6 cars derailed; 2 cars burned; estimated 1,400 bbl spilled.
Gogama, Ontario	3/7/2015	69 tank cars derailed; 7 tank cars caught fire; 4,709 bbl spilled
Heimdal, North Dakota	5/6/2015	6 cars derailed and spilled oil; cars burst into flames; town evacuated; estimated spill 4,000 bbl.
Culbertson, Montana	7/17/2015	22 cars derailed; 4 cars leaked oil; 833 bbl spilled; no injuries, fire, or explosion.
Watertown, Wisconsin	11/8/2015	13 cars derailed; 1 car spilled oil; 12 bbl spilled.
Mosier, Oregon	6/3/2016	11 tank cars derailed; Several cars burned; 1,000 bbl spilled; some oil entered Columbia River

Source: Updated from Etkin et al. 2015.

The largest accident in the US involved 10,846 bbl of spillage and a fire in Aliceville, Alabama, in November 2013. The largest incident occurred in Lac-Mégantic, Quebec, in July 2013, in which nearly 38,000 bbl of Bakken crude oil spilled, and there were 47 fatalities in the resulting fire and explosions. There are a number of reasons that this type of incident would not likely occur in the US, notably that the practice of having a train be under the control of a sole operator, the poor condition of the train, and leaving the train unattended in an abnormal condition, would not be permitted in the US (reviewed in Etkin 2016).

The volatility of Bakken crude during transport has been identified as a major concern; however, there have been rail accidents with fire that have involved the spillage of diluted bitumen as well (e.g., the two incidents in Gogama, Ontario).

10.1.2.3 Crude Oil Transport by Truck

Crude oil releases associated with truck transport are typically related to the failure of equipment during loading or offloading or human error (Heavy Duty Innovations 2014). Loading crude oil to and offloading crude oil from a tanker truck involves transferring the oil through manifolds, hoses, and valves using a pump (typically mounted on the tractor or tank trailer) to move the oil in either direction. If any of the valves on the truck or the transfer pipes of the storage tank are not properly opened when the pump starts, crude oil under high pressure can blow out the hose or the fitting connecting to the truck's tank. These types of releases would be within the containment area of the loading or offloading facility. In addition, trucks traveling along highways and other roads are at risk of collisions and crashes due to the unpredictable nature of other drivers, driver fatigue, poor road conditions, and inclement weather conditions. When a truck crashes, the tank may be punctured or otherwise damaged, allowing the release of crude oil.

10.1.3 Baseline Crude Oil Pipeline Spill Risk Analysis

In order to quantify the incremental risk for the Line 3 Project, the potential spills that might occur need to be compared with the baseline risk of spills from existing, operating crude oil and refined product pipelines in the area. This section provides an overview of pipeline spill rates and trends in the inland[7] U.S. as a whole, as well as an analysis of historical data for existing crude oil pipelines in Minnesota. Additional analysis and supporting data is provided in Appendix S.

10.1.3.1 General Analysis Inland Pipeline Spills in the U.S.

10.1.3.1.1 Pipeline Spill Data

Data analyses on the crude and refined product pipeline spills were based on data available publicly from the PHMSA.[8] A total of 10,810 spill incidents were included. Criteria for inclusion of spill incidents in the database were:

- Spillage of 1 gallon or more;

[7] In this EIS, the term "inland" pipeline specifically excludes any pipelines offshore in marine waters, but does not exclude pipelines that cross inland waterways.

[8] https://www.phmsa.dot.gov/pipeline/library/data-stats/raw-data

- Onshore/inland spill location;[9] and
- Incident occurrence during 1968 through 2015.[10]

The spill incidents were individually characterized with respect to:

- Year and data of incident;
- Location (state, county, city, latitude/longitude);
- General oil type (crude or refined);
- Detailed oil type (crude, gasoline, light oil,[11] and heavy oil[12]); and
- Amount of spillage (in barrels).

10.1.3.1.2 Analytical Results and Findings: Annual Spill Numbers and Volumes

Over the 48-year time period, there were a total of 6,433 crude pipeline spills, and 4,377 refined product spills in inland[13] areas of the U.S., involving a total of over 6.7 million bbl of spillage. These figures are for spills of 1 gallon or more.[14]

The data for significant pipeline spills of at least 10,000 gallons (238 bbl) were also analyzed separately.

Five-year averages of spillage for significant spills are shown in Figure 10.1-1. The annual numbers and total volumes are shown in Figures 10.1-2 and 10.1-3.

The average volume of pipeline spills has decreased significantly since the late 1960s, and particularly in the last dozen years. The average spill volume (all oil types) is now less than 50 percent of the average volume 10 years ago, and 12 percent of the volume in the late 1960s.

The vast majority of spillage is attributable to significant spills (238 bbl and larger). Overall, 93 percent of the volume of spillage can be attributed to the 37 percent of incidents that are considered significant by involving 10,000 gallons (238 bbl) or more.

9 Spills from offshore pipelines were excluded.

10 These were the data that were available at the time of the preparation of this document.

11 Light oil included diesel, jet fuel, kerosene.

12 Heavy oil included heavy fuel oil, transmix.

13 The term "inland" is used to exclude offshore and exclusively marine pipeline spill incidents.

14 Parts of these analyses appeared in Etkin 2014 and Etkin 2017.

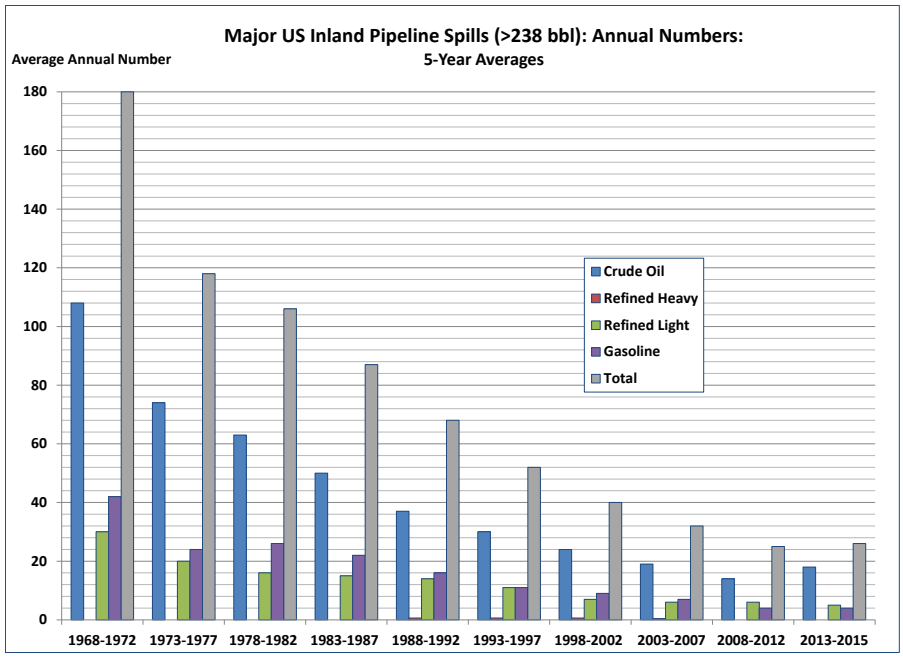

Figure 10.1-1. Significant U.S. Inland Pipeline Spills (>238 bbl): Five-Year Averages of Annual Spill Numbers

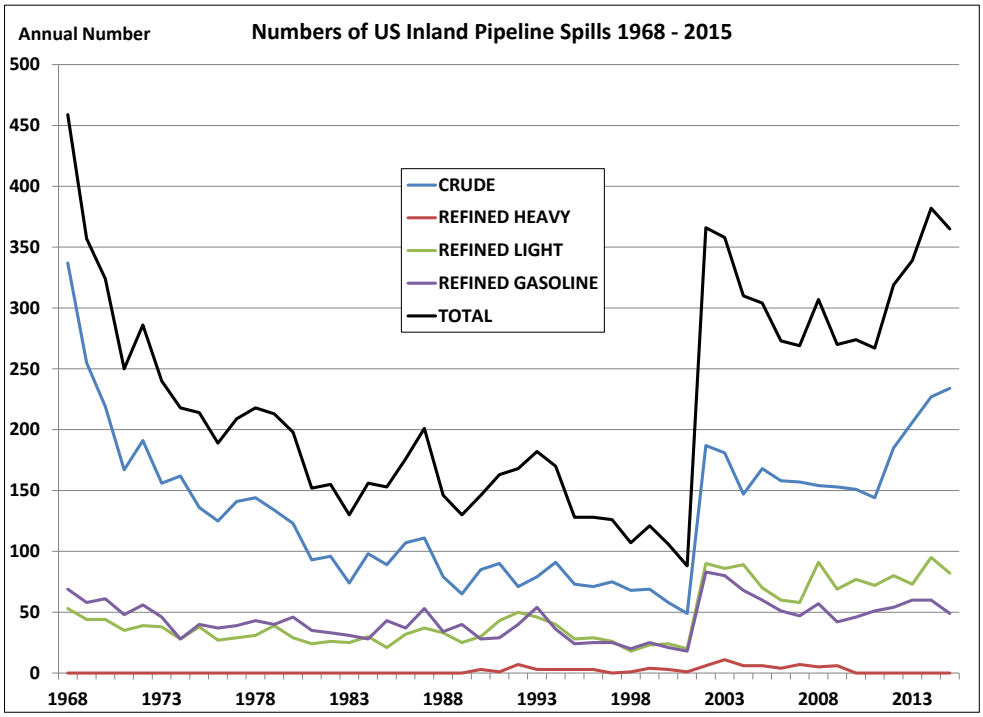

Figure 10.1-2. Annual Numbers of U.S. Inland Pipeline Spills (>1 gallon)

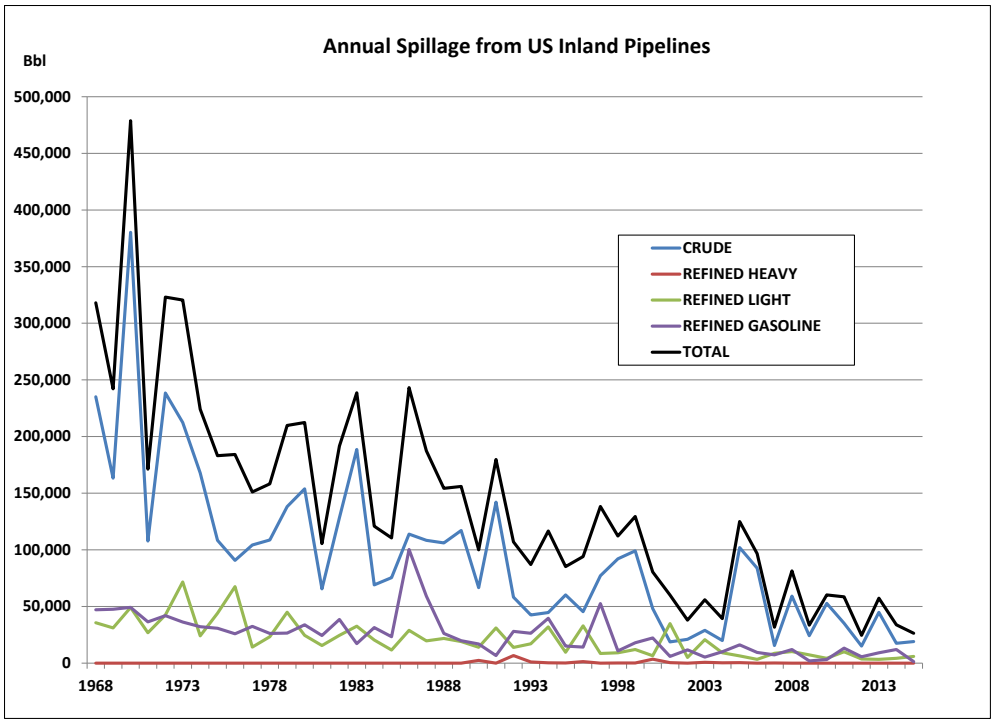

Figure 10.1-3. Annual Volume of Spillage from U.S. Inland Pipelines

10.1.3.1.3 Probability Distribution of Pipeline Spill Volume

The volumes of spills vary from a few drops or a small leak to a very large discharge. The distribution of volumes in the spills from inland oil pipelines over the years 1968 to 2015 indicates the majority of spills released less than 999 bbl, approximately 12 percent of spills ranged between 1,000 and 9,999 bbl releases, and less than 1 percent of spills involved releases of 10,000 bbl or more.

The cumulative probability distribution function of spill volume developed for spills in the last decade only (2006–2015), shown in Table 10.1-2, indicates a shift towards smaller spills in the last decade.

Table 10.1-2. Probability Distribution of Spill Volumes for U.S. Inland Pipelines (2006–2015)

Spill Volume	% Spill Incidents	Number Incidents
<1 bbl	33.51%	1,027
1-9 bbl	34.78%	1,066
10-99 bbl	18.76%	575
100-999 bbl	10.15%	311
1,000-9,999 bbl	2.58%	79
10,000-90,000 bbl	0.23%	7
100,000+ bbl	0.00%	0

10.1.3.1.4 Pipeline Spillage Rate per Volume Transmitted

To determine incident rates spillage should be viewed with respect to the amount of oil transported through pipelines, which also allows projections for future spillage rates. Two types of incident rates analyzed—spillage rate (volume of oil spilled per unit crude or refined product transported through pipelines) and incident frequency (numbers of spills per unit crude or refined product transported through pipelines).[15] Spill numbers, particularly crude spills, have increased since 1985. However, rates of significant spills (238 bbl and larger) have *decreased* (Figure 10.1-4). This may possibly be explained by increasingly higher reporting rates for smaller spills. Crude pipelines consistently have higher spillage rates than refined product pipelines.

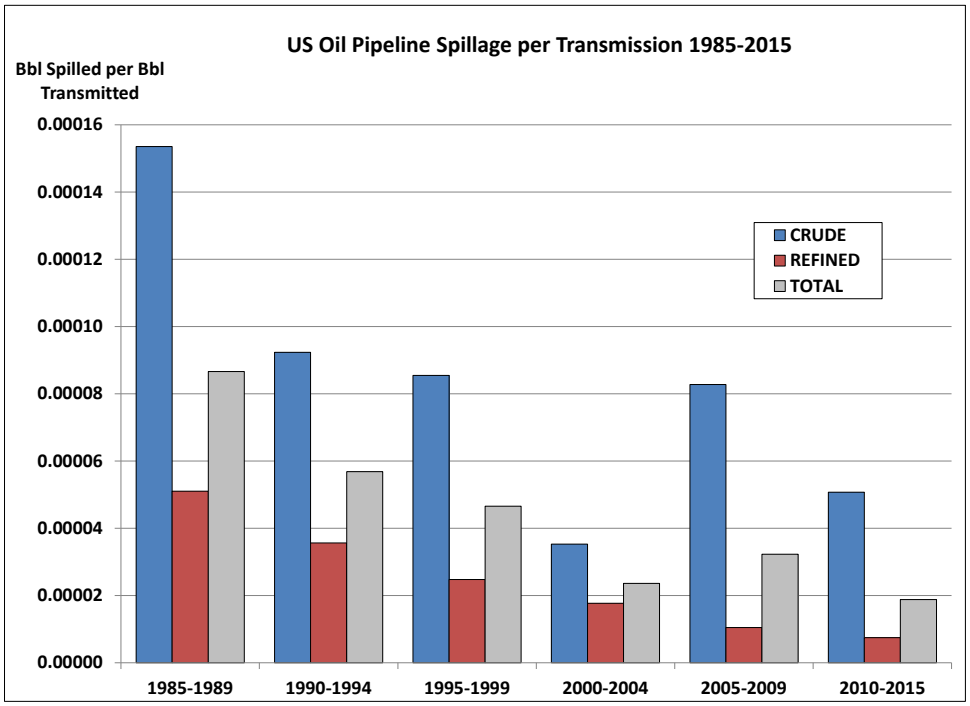

Figure 10.1-4. U.S. Inland Oil Pipeline Spill Number per Volume Transmission (1985–2015)

10.1.3.1.5 U.S. Inland Pipeline Spillage Summary

Based on the analytical results presented above, the following conclusions are reached concerning U.S. inland pipeline spills:[16]

- Each year, it can be expected that about 360 pipeline spills (of any volume) will occur, of which:

[15] Oil pipeline transmission rates are from U.S. Energy Information Administration. In the U.S. Energy Information Administration data, refined products are combined into one category. Spill incidents from the various refined product categories are combined.

[16] Data from analytical results have been rounded to the nearest two significant digits.

  - About 60 percent (216) would be crude spills;
  - About 25 percent (90) would be gasoline spills; and
  - About 15 percent (54) would be light refined product spills.
- Heavy refined product pipeline spills are relatively rare.
- Each year, throughout the U.S., it can be expected that there will be about 26 significant pipeline spills of at least 238 bbl (10,000 gallons), of which:
  - About 70 percent (18) would be crude spills;
  - About 15 percent (4) would be gasoline spills; and
  - About 15 percent (4) would be refined light product spills.
- Overall, half of the pipeline spills that do occur would be expected to involve 1 bbl or less. About 90 percent would involve 100 bbl or less. Only 5 percent would be expected to be 400 bbl or more, and only 1 percent would be expected to be 2,500 bbl or more.
- For future projections, assuming that pipeline operations and conditions are constant, any changes in spillage could be estimated from the number of spills per oil transmission and/or volumes of spillage per oil transmission:
  - Inland crude pipeline spills occur at the rate of about one pipeline spill (of any volume) for every 3.3 million bbl transmitted;
  - A significant inland crude pipeline spill of at least 238 bbl (10,000 gallons) might be expected once for every 42 million bbl of crude oil transmitted;
  - Inland refined product pipeline spills occur at the rate of about one spill (of any volume) for every 12.5 million bbl of refined product transmitted;
  - A significant inland refined product pipeline spill of at least 238 bbl (10,000 gallons) might be expected once for every 28 million bbl of refined product transmitted; and
  - About half of the significant refined product pipeline spills might be expected to be gasoline spills and the other half of light refined product spills.

10.1.3.2 Minnesota Pipeline Spill Analysis

The data presented thus far represent pipeline spills of both crude and refined products throughout the U.S. The following analyses specifically focus on crude pipelines that transit within and through Minnesota.

10.1.3.2.1 Minnesota Crude Pipeline Mileage in Comparison with Other States

According to PHMSA, the state of Minnesota currently has 2,416 miles of crude oil pipelines, making it the state with the seventh greatest crude transmission pipeline mileage. Its pipeline mileage is exceeded only by Texas, Oklahoma, California, Wyoming, Louisiana, and Kansas. In terms of “pipeline density,” i.e., the mileage of pipelines per square mile, Minnesota ranks eighth, exceeded by Oklahoma, Louisiana, Texas, Illinois, Wyoming, Kansas, and Mississippi. There is one crude pipeline mile for every 35 square miles of land in Minnesota. Oklahoma, Louisiana, and Texas—all oil-producing states—have 2.3, 2.2, and 1.8 times as many pipelines per square mile, respectively, in comparison with Minnesota.

10.1.3.2.2 Minnesota Crude Pipeline Spill History

During the years 1968 through 2016, there were a total of 118 crude pipeline spills (of one bbl or more) reported in Minnesota.[17] A total of 184,239 bbl of crude oil spilled in this time period. Over this whole time period, there has been an average of 2.45 spills per year, though the average annual number has increased in the last 10 to 20 years (3.5 spills per year since 1997, and 2.5 spills per year since 2007 compared to only 1.7 spills per year up to 1997). This may be an artifact of the data in that in the earlier years the reporting of pipeline spills was less rigorous. Smaller spills (of less than a few bbl) were not reported consistently.

The five-year average data are shown in Table 10.1-3. The average annual number of spills has increased; however, the average annual volume and the average volume per spill have both decreased.

The frequency distribution of spill volumes (volume for each individual incident) varies from 0.01 bbl (0.42 gallons or less than 2 quarts) to 40,500 bbl. Just over 69 percent of spill incidents involved less than 100 bbl, about 85 percent less than 1,000 bbl, and nearly 97 percent less than 10,000 bbl.

During the 49-year time frame, there were 32 significant crude pipeline spills (>238 bbl), of which three occurred in the last decade and eight in the last 20 years. These significant spills account for over 98 percent of the total volume of spillage. There have been no pipeline spills in excess of 238 bbl in Minnesota in the last six years. There have been no spills of over 10,000 bbl since 1991.

Table 10.1-3. Five-Year Average Crude Pipeline Spill Data for Minnesota

Years[a]	Annual Number Spills (1 bbl or more)	Annual Volume Spilled (bbl)	Average Volume/Spill (1 bbl or more)
1968–1972	2	3,270	1,318
1973–1977	2	10,565	3,470
1978–1982	1	6,831	4,472
1983–1987	2	1,880	1,120
1988–1992	1	8,214	8,158
1993–1997	2	1,178	455
1998–2002	4	2,551	818
2003–2007	5	976	192
2008–2012	3	1,363	257
2013–2016	2	31	14
Overall Average	**2.4**	**3,760**	**2,068**

[a] The period 2013-2015 is a four-year average.

[17] There were two spills of less than 1 bbl (0.21 bbl and 0.15 bbl) in 2016 and one spill of 0.76 bbl thus far in 2017 that are not included in this analysis.

10.1.3.2.3 Minnesota Significant Crude Pipeline Spills

Data on the 32 significant crude pipeline spills (>238 bbl) in Minnesota are shown in Table 10.1-4 in chronological order.

Table 10.1-4. Significant Crude Pipeline Spills in Minnesota (1968–2016)

Date	Operator[a]	County (City)	Bbl Spilled	Cause
12/8/1968	Enbridge	Red Lake	4,000	Defective weld
7/14/1972	Enbridge	Marshall	8,000	Equipment rupturing line
8/23/1972	Enbridge	Clearwater	3,000	Incorrect operation by carrier
9/9/1972	Enbridge	Carlton	700	Equipment rupturing line
8/13/1973	Enbridge	Marshall	17,000	Incorrect operation by carrier
9/5/1973	Enbridge	Kittson	400	Equipment rupturing line
9/11/1973	Enbridge	Polk	5,000	Incorrect operation by carrier
12/4/1973	Enbridge	Marshall	18,700	Other (no further information available)
7/12/1974	Enbridge	Clearwater	6,900	Defective pipe
4/3/1975	Enbridge	Clearwater	350	Other (no further information available)
11/4/1977	Koch	Todd (Staples)	4,398	Defective pipe
8/20/1979	Enbridge	Beltrami	10,500	Defective pipe
1/11/1980	Koch	Benton	11,847	Defective weld
6/26/1980	Enbridge	Kittson	2,400	Defective pipe
7/21/1982	Enbridge	Clearwater (Clearbrook)	9,200	Other (No further information available)
2/11/1984	Koch	Benton (Foley)	2,196	Defective pipe
11/7/1985	Koch	Anoka (Burns)	5,980	Other (No further information available)
2/10/1986	Koch	Dakota (Inner Grove Hts)	300	Failed weld
9/6/1986	Enbridge	Polk	265	Other (Contractor failed to tighten)
3/6/1987	Enbridge	Clearwater	500	Failed weld
3/26/1989	Enbridge	Pennington (Sanders Twp)	300	Failed weld
3/3/1991	Enbridge	Itasca	40,500	Other (Split in heat affect zone)
8/24/1996	Enbridge	Kittson (Donaldson Station)	5,000	Corrosion
1/3/1997	Marathon	Washington (Cottage Grove)	475	Other (Tank farm pipeline)
9/16/1998	Enbridge	Red Lake (Plummer)	5,700	Excavation damage
2/22/1999	Enbridge	Marshall (Radium)	400	Other (Loose bolts on flange)
7/4/2002	Enbridge	Itasca (Cohasset)	6,000	Material and/or weld failures
2/19/2004	Enbridge	Itasca (Grand Rapids)	1,003	Natural forces (earth movement)
6/27/2006	Koch	Morrison (Little Falls)	3,200	Other outside force damage
11/28/2007	Enbridge	Clearwater (Clearbrook)	325	Incorrect operation by carrier

Table 10.1-4. Significant Crude Pipeline Spills in Minnesota (1968–2016)

Date	Operator[a]	County (City)	Bbl Spilled	Cause
3/23/2008	Koch	Clearwater (Clearbrook)	1,600	Natural forces (earth movement)
12/4/2009	Koch	Todd (Staples)	5,000	Incorrect operation by carrier

[a] Minnesota Pipeline and Wood River Pipeline are grouped under Koch; Lakehead is grouped under Enbridge.

A summary of Minnesota crude oil pipeline releases of any size per incident type, barrels spilled, and barrel spilled per pipeline mile operated by Enbridge and all Minnesota operators is presented in Table 10.1-5.

Table 10.1-5. Minnesota Crude Oil Unintentional Spill Incidents 2002-2016[a]

Causes of Pipeline Failure	Number of Incidents	Bbl Spilled	Bbl Spilled/ Mile-Year[b]	Number of Incidents	Bbl Spilled	Bbl Spilled/ Mile-Year[b]
	All Minnesota Pipeline Operators			Enbridge		
Corrosion Failure	3	30	0.001	2	10	0.001
Equipment Failure	32	242	0.006	24	202	0.011
Excavation Damage	1	50	0.001	1	50	0.003
Incorrect Operation	17	5,410	0.136	10	397	0.021
Material Failure of Pipe or Weld	14	6,477	0.163	12	6,294	0.337
Natural Force Damage	14	2,675	0.067	10	1,052	0.056
Other Outside Force Damage	2	3,200	0.080	0	0	0.000
TOTAL	**83**	**18,085**	**0.455**	**59**	**8,005**	**0.429**

[a] Base on PHMSA incident data and operator reports.

[b] Barrel spilled per miles of pipeline in operation averaged over the years of the data set.

10.1.3.2.4 Comparison of Minnesota and U.S. for Significant Crude Pipeline Spills

The rate of significant crude pipeline spills (>238 bbl) in Minnesota was compared with the crude pipeline spillage in the U.S. as a whole for the last 16 years (2001 through 2016), and for the last seven years (2010 through 2016). The latter time period was selected because this was the only time frame for which state-specific pipeline transmission rates were available from PHMSA. Overall, the Minnesota crude pipeline rate was considerably less than that of the nation as a whole, with respect to spillage per pipeline miles and barrels transmitted (Table 10.1-6).

Table 10.1-6. Crude Pipeline Spillage: Minnesota vs. U.S. Nationwide[a]

Spill Rate[b]	Average 2001–2016			Average 2010–2016		
	MN	US	MN/US Ratio	MN	US	MN/US Ratio
Significant Spills/Pipeline Mile-Year	0.00023	0.0003	0.767	0	0.00026	0.000
Bbl Spilled/Pipeline Mile-Year	0.43	0.69	0.623	0.015	0.53	0.028
Significant Spills/Million Bbl Transmitted	0.0014	0.025	0.056	0	0.024	0.000
Bbl Spilled/Million Bbl Transmitted	4.3	56	0.077	0.16	51	0.003

[a] U.S. data is for all states inclusive of Minnesota.

[b] Pipeline mile-year is a mile of pipeline in operation for one year. Crude transmission bbl-miles for Koch and Enbridge based on PHMSA data for 2015 and mileage data.

10.1.3.2.5 All Crude Pipeline Spills (2000–2016)

Analysis of the data for crude pipeline spills of *all sizes* that occurred since 2000 indicates there were 91 spill incidents, with one incident occurring in 2017.[18] For the years 2000 through the present (end of June 2017), there were 91 incidents of which nearly 30 percent involved less than one bbl. The average spill volume was 201 bbl. The median (i.e., 50th percentile) was 2.0 bbl. For the years 2010 through the present, there were 37 incidents of which over 81 percent involved less than one bbl. The average spill volume was 7.8 bbl. The median was 0.54 bbl. The spill volumes have been significantly smaller since 2010.

10.1.3.3 Summary of Findings for Minnesota Crude Pipeline Spills

In order to quantify the incremental risk for the Line 3 Project, the potential spills that might occur need to be compared with the baseline of spills occurring from existing pipelines in the area. The analyses of historical data conducted in this chapter provide an overview of pipeline spill rates and trends in the inland U.S. as a whole for existing crude oil pipelines in Minnesota.

10.1.3.3.1 U.S. Crude Pipeline Spills

For crude oil pipeline spillage in the U.S. as a whole, the following conclusions were reached:

- There are about 53,045 miles of crude oil pipeline throughout the U.S.
- The frequency of crude pipeline spills in the U.S. has decreased significantly over the last 48 years.
- Crude pipeline spills have become increasingly lower in volume.
- Projecting into the future, half of the pipeline spills that do occur would be expected to involve 1 bbl or less, and about 90 percent would involve 100 bbl or less. Only 5 percent would be expected to be 400 bbl or more, and only 1 percent would be expected to be 2,500 bbl or more.

[18] There was one crude pipeline spill incident of 0.76 bbl reported for 2017 – on 5 June 2017 in Clearwater.

- Inland crude pipeline spills occur at the rate of about one pipeline spill (of any volume) for every 3.3 million bbl transmitted.
- A significant inland crude pipeline spill of at least 238 bbl (10,000 gallons) might be expected once for every 42 million bbl of crude oil transmitted.

10.1.3.3.2 Minnesota Crude Pipeline Spills

For crude oil pipeline spillage in Minnesota, the following conclusions were reached:

- Minnesota currently has about 2,416 miles of crude oil pipelines.
- Since 1968, there were a total of 118 crude oil pipeline spills of one bbl or more with a total of 184,332 bbl spilled.
- The annual number of reported pipelines has increased; however, this can be attributed to the increase in reporting of smaller spills that previously had not been reported.
- During 1968 through 2016, there were 32 significant pipeline spills (>238 bbl or 10,000 gallons).
- There have been no significant crude pipeline spills in Minnesota in the last six years, and no spills over 10,000 bbl since 1991.
- The rate of spillage in Minnesota has been lower than that in the U.S. as a whole, accounting for pipeline mileage and amount transmitted.
- The rate of significant spills per pipeline mile-year in Minnesota was 77 percent that of the U.S. as a whole during 2001 through 2016. There were no significant spills in 2010 through the present.
- The volume spilled per pipeline mile-year in Minnesota as 62 percent that of the U.S. as a whole during 2001 through 2016, and 3 percent that of the U.S. during 2010 through 2016.
- The number of significant spills per volume transmitted in Minnesota was 6 percent that of the U.S. as a whole during 2001 through 2016. There were no significant pipeline spills in Minnesota since 2010.
- The volume of spillage per amount transmitted in Minnesota was 8 percent that of the U.S. as a whole in 2001 through 2016, and 0.3 percent that of the U.S. as a whole since 2010.
- Since 2010, 62 percent of crude pipeline spills have involved less than 0.1 bbl (4.2 gallons); 81 percent have involved less than 1 bbl.
- A spill of less than 0.1 bbl might be expected once every four months; a spill of less than 10 bbl, once every 16 months; and a spill of less than 100 bbl once every 7.5 years.

Using a conservative (cautionary over-estimating) approach, it was estimated that the volumes of spillage in the seven hypothetical Line 3 spill scenarios—ranging from 8,625 bbl to 16,239 bbl—might be expected once in 26 to 99 years somewhere in the state of Minnesota. *This does not indicate that the incidents would occur at the specific sites selected for modeling.*

10.1.4 Release/Spill Volume Categories

For pipelines, the total volume of a release is influenced by several factors, including size of the breach, pipeline pressure, fluid properties (e.g., temperature and viscosity), time required to detect a release,

time to isolate a leak and shut down the pipeline, distance between isolation valves, and effectiveness of the isolation (Stantec and Barr Engineering 2017). For rail, the total volume of the spill depends on the number of rail tank cars affected and the severity of the incident. A spill could be limited to the partial contents of a single tank car or the complete contents of many tank cars. Each tank car has a capacity of up to 800 barrels (bbl; 33,600 gallons) of oil. Therefore, a full unit train of 110 tank cars could transport 88,000 bbl (3.7 million gallons) of oil. For tanker trucks, most spills would be limited to the contents of a single tank. Tanker trucks can carry approximately 190 bbl of oil (7,980 gallons).

The five categories of spill sizes established for the assessment of crude oil releases in the EIS for the Line 67 Expansion Project (U.S. Department of State [DOS] 2017) were determined to be useful in the assessment of potential spills in this EIS as well. Categories for this EIS consist of the following:

- Incidental spills: less than 0.1 bbl (5 gallons);
- Small spills: equal to or greater than 0.1 bbl (5 gallons) and less than or equal to 50 bbl (2,100 gallons);
- Medium spills: greater than 50 bbl (2,100 gallons) and less than or equal to 1,000 bbl (42,000 gallons);
- Large spills: greater than 1,000 bbl (42,000 gallons) and less than or equal to 10,000 bbl (420,000 gallons); and
- Major spills: greater than 10,000 bbl (420,000 gallons).

Incidental spills (less than 0.1 bbl [5 gallons]) are considered minor by PHMSA and reporting is not required at that threshold (the minimum-volume reporting requirement that has been in effect since 2002); therefore, no historical data exist for incidental spills for use in the analysis described below. The behavior of small, medium, large, and major spills in the environment is discussed in Section 10.2.1.3.

10.2 BEHAVIOR OF CRUDE OIL RELEASES

When released into the environment, each type of crude oil exhibits unique behavior that depends on many factors. The primary factors that determine the fate of crude oil released into the environment (regardless of the transport mechanism from which it is released) include the chemical and physical differences between light and heavy crude oils, weathering of the oil over time, the type of environment into which oil is released (e.g., water versus soil), and the size of the spill. These factors are addressed in Sections 10.2.1 and 10.2.2. Section 10.3. presents a summary of the findings of Stantec et al.'s spill trajectory and fate modeling of large-volume crude oil releases (Stantec et al. 2017), including context for the analysis of potential exposures presented in Section 10.4.

10.2.1 Factors Affecting the Behavior of Crude Oil Releases

The physical and chemical properties of the crude oil are the primary influences in determining how a spill spreads and how long it lasts in the environment. These properties are addressed in Section 10.2.1.1. When crude oil is released into the environment, it is physically and chemically altered over time through various processes collectively called "weathering." These processes and their effects on crude oil in the environment are discussed in Section 10.2.1.2. The influence of spill size on crude oil behavior in the environment is addressed in Section 10.2.1.3.

10.2.1.1 Physicochemical Characteristics of Crude Oil

Crude oil is a complex mixture of thousands of compounds. An "average" crude oil contains approximately 84 percent carbon, 14 percent hydrogen, 1 to 3 percent sulfur, 1 percent nitrogen, 1 percent oxygen, and 0.1 percent minerals and salts (API 2011). Carbon and hydrogen are present in oil as a large group of compounds called hydrocarbons, which include alkanes (also called *paraffins*); cycloalkanes (also called *naphthenes*); aromatics, including benzene, toluene, ethylbenzene, and xylenes (BTEX); polycyclic aromatic hydrocarbons (PAHs); and polar compounds, including resins and *asphaltenes* (API 1999). The proportions of these compounds in a particular type of crude oil determine its propensity to evaporate or persist in the environment. The greater the percentage of the lighter compounds aromatics and alkanes, the more evaporates in the hours and days after spilling. These components also tend to be the more toxic parts of the oil. The heavier components, such as the PAHs and polar compounds are more persistent in the environment. The heavier components are also those that adhere to substrates and create the greatest difficulties for cleanup.

The following properties of crude oil differ based on the proportions of the above compounds present and affect its behavior in the environment.

- API gravity,[19] a measure of how dense an oil is compared to water (the lower the API, the denser the oil);
- Viscosity, a measure of how readily a crude oil will flow when released;
- Flash point, the lowest temperature at which a crude oil will vaporize and ignite in air;
- Vapor pressure, a measure of how quickly a crude oil will evaporate; and
- Solubility, a measure of the propensity of a crude oil to dissolve in water.

The proposed Project would transport crude oil ranging from light to heavy crude oil, with an assumed annual proportion of 65 percent heavy crude oil, including diluted bitumen (dilbit; see Section 10.2.1.1.2), and 35 percent light crude oil (Enbridge 2016a). The physicochemical properties of light and heavy crude oils differ, and these properties influence the fate, transport, and potential impacts of crude oil in the environment and toxicity to humans and other biological receptors as described below. Crude oils are further differentiated based on their sulfur content. Crude oils that contain less than 1 percent by weight total sulfur are referred to as "sweet," and those that contain more than 1 percent by weight total sulfur are "sour" (API 2011). Both light and heavy crude oils can be sour or sweet.

10.2.1.1.1 Light Crude Oil

Light crude oils are less dense than medium and heavy crude oils due to having a higher percentage of low-molecular-weight or "light" hydrocarbon fractions (i.e., alkanes, cycloalkanes, and BTEX). They are liquids at room temperature and tend to have a lower viscosity, higher API gravity, higher vapor pressure, higher water solubility, and higher flammability than heavier oils. This means a light crude oil released into the environment would likely float on water surfaces (high API gravity), evaporate more

[19] If a crude oil has an API gravity greater than 10, the oil is lighter than water and will float; conversely, a crude oil with an API gravity less than 10 will sink in water.

readily (high vapor pressure), and dissolve more relatively easily in water (higher water solubility). Under certain conditions, volatile components of light crude oil can ignite explosively (high flammability).

The light crude oils that the Applicant is proposing to transport via the Project would have densities ranging from an API gravity of approximately 30 to 45 (Enbridge 2016b). The Applicant provided examples of light crude oil that could be transported by the proposed Project and these include Bakken crude oil, North Dakota Sweet, High Sweet Clearbrook, Mixed Sweet Blend, Pembina, Gibson Light, Pembina Sweet Blend, Rangeland Sweet, Rainbow Light, Federated, Light Smiley, and Manitoba Sweet Tundra.

10.2.1.1.2 Heavy Crude Oil

In contrast to light crude oil, heavy crude oils and dilbits exhibit higher density, lower vapor pressure, lower solubility, and higher concentrations of nitrogen, oxygen, sulfur, heavy metals, and PAHs. The specific characteristics of heavy oils are attributed to the biodegradation process in which microorganisms on a geological time scale degrade light and medium hydrocarbons, concentrating PAHs, resins, and asphaltenes in the reserves. Heavy oils can also be created via physical rather than biological means. Water washing and phase fractionation physically remove the lighter petroleum fragments (Santos et al. 2014). The result is that heavy crude oils do not flow as easily as light crude oils. In addition, refining heavy oils is more difficult and costly and produces lower proportions of high added value products such as liquefied petroleum gas, gasoline, kerosene, and diesel (Santos et al. 2014).

The most viscous heaviest and thickest of the heavy crude oils is bitumen from oil sands. In its original state, bitumen is dense and requires unique handling, which involves the addition of diluting agents (diluent) to facilitate transport. Bitumen is separated from its host rock or sand by heating, which reduces its viscosity and allows it to flow to a collection point. It is too dense and viscous for transportation by pipeline without heating or altering the material. To reduce viscosity and density, a diluent must be added to facilitate its flow.

Bitumen is mostly composed of larger heavy hydrocarbons with an API gravity of typically < 10 degrees. Alberta bitumen has an API gravity as low as 8 degrees (Environment Canada 2013). Diluents are composed of light hydrocarbons such as natural gas condensate and naphtha, which increase the API gravity of the dilbit to around 23 degrees. The resulting dilbit is a highly viscous oil similar in appearance to other heavy crude oils, but with unique properties specific to dilbit. Typically, dilbit consists of approximately 30 percent diluent and 70 percent bitumen (Crosby et al. 2013). Natural gas condensate (a byproduct of natural gas production) is currently the primary type of diluent used for Canadian heavy crude oil and is composed of hydrocarbons such as propane, butane, pentane, and hexane (Crosby et al. 2013).

However, different diluents may be used at different times of the year or under varying circumstances to change the nature of the resulting blend and to accommodate environmental conditions, particularly ambient temperatures. For example, there are Summer and Winter Blends of Cold Lake Diluted Bitumen that have somewhat different properties. Cold Lake Summer Blend has an API gravity of 20.73 (a density of 0.9295). Cold Lake Winter Blend is lighter with an API gravity of 22.69 (a density of 0.9177) (based on information in the Crude Monitor 2016.) Note that both blends are lighter than fresh water and will float. Oil with an API gravity of 10 degrees or higher are less dense than fresh water at 15°C and will typically float (Environment Canada 2013).

10.2.1.2 Weathering Processes

Immediately following the release of crude oil into the environment, the weathering process begins. This is a process in which the physical and chemical characteristics of the oil interact with the physical and biochemical features of the environment it has reached. This interaction determines how the oil will behave and its fate in the environment, with the rate and degree of weathering dependent on the crude oil type and environmental conditions at the spill location. The following weathering processes, which are illustrated in Figure 10.2-1, influence how crude oil behaves:

- **Spreading and thinning** of spilled oil reduces the amount of oil in one location but increases the surface area over which oil is present. This increased surface area enhances surface-dependent fate processes such as evaporation, biodegradation, photodegradation, and dissolution. Spreading from the spill source is constrained by natural conditions in the release site vicinity. For instance, oil reaching rivers and creeks would likely spread farther than in wetlands, ponds, and lakes. Lighter oils would also likely spread more quickly than heavier oils due to their lower viscosities.
- **Adhesion** of oil to surfaces, such as shorelines, vegetation, and other surfaces along the spill path also reduces the spill volume and increases surface area for surface-dependent fate processes but accounts for a large portion of the spill impacts. Adhesion also allows for accumulation of sediment particulates, vegetation and other matter which promotes the formation of petroleum masses, such as tar balls.
- **Dispersion** includes the entrainment of oil droplets in the water column (i.e., the spreading of oil vertically in water) as well as mixing of oil and dissolved fractions in the water column. It is enhanced by the turbulence or mixing energy of a waterbody, which is increased by rain events, wind, and water currents. Oil can also be dispersed through adhesion to particulate matter (e.g., organic matter, silt, and clay) suspended in the water column. Light oil tends to produce smaller oil droplets due to its lower viscosity compared to heavy oil and is more prone to dispersion.
- **Evaporation** occurs when the lighter components of crude oil volatilize. Evaporation begins as soon as oil reaches the environment, and approximately 80 percent of evaporation occurs in the first 48 hours following a release. It results in a heavier, denser, and more viscous oil remaining in the environment as compared to the released oil. Evaporation is greater and more rapid for light crude oils because they contain a greater percentage of light constituents than heavy oils, which do not evaporate as readily.
- **Dissolution** occurs as water-soluble components dissolve into the water column from a surface slick. It is estimated that only 2 to 5 percent of spilled oil in water undergoes natural dissolution following a release because the compounds that most readily dissolve (e.g., BTEX) also most readily evaporate (Neff 1990). However, these compounds are also the most toxic to aquatic life. Dissolution increases with decreasing hydrocarbon molecular weight, increasing water temperature, decreasing salinity, and increasing concentration of dissolved organic matter. Because light crude oils contain a higher proportion of BTEX compounds than heavy oils, they are more prone to dissolution.
- **Emulsification** creates mixtures of small droplets of oil and water known as emulsions. Two types of emulsions, water-in-oil (also referred to as a mousse) and oil-in-water, are formed by wave action. Emulsions are not prone to other types of weathering, leading to increased crude oil persistence in the environment. Emulsification occurs less frequently in fresh water than in

saltwater, and it occurs more frequently in large waterbodies with more wave action and currents than in smaller waterbodies. Heavy crude oils that contain higher concentrations of heavy asphaltenes and resins emulsify more readily than light crude oils (API 1999).

- **Photodegradation** occurs when ultraviolet light from the sun breaks down the chemical bonds of the oil constituents. This process, which is a pronounced component of weathering on sunny days and in summer months, can be a significant factor in the degradation of lighter hydrocarbons and, therefore, lighter crude oils. Photodegraded compounds tend to be more water soluble and more prone to further degradation processes. Photodegradation has also been shown to increase the toxicity of certain PAHs (NOAA 2017a).
- **Adsorption** is the binding of oil to particles in soil, sediment, and water. In water, PAHs and other higher-molecular-weight hydrocarbons may bind to suspended particulates, and this process can be substantial in highly turbid or eutrophic waters (i.e., waters rich in phosphates, nitrates, and organic nutrients). Organic particles in soils or suspended in water tend to be more effective at adsorbing oils than inorganic particles (e.g., clays). Adsorption and sedimentation decrease the concentration of hydrocarbons present in the water column but also make them less susceptible to further degradation, increasing persistence in the environment.
- **Biodegradation** is the breakdown of oil compounds by naturally occurring microorganisms. This is not a substantial process in controlling the fate of crude oil released into waterbodies previously unexposed to oil. Saturated alkanes, which are more prevalent in light crude oils than in heavy crude oils, are the most readily biodegraded components of crude oil. Thus, while this process is very slow for all crude oils, heavy oils are less susceptible to biodegradation than light oils.

10.2.1.2.1 Effect of Weathering on Dilbit

When a conventional heavy crude oil reaches the aquatic environment, the amount that is typically lost to evaporation will be dependent on the composition of the oil and its vapor pressure. Generally, heavier crude oil is less likely to evaporate than light crude oil. Dilbit, however, is different than heavier crudes in that it contains more of the lighter components that have been added in the diluent. These lighter components typically evaporate when exposed to air. However, once the lighter components of dilbit evaporate, the remaining heavier fraction may sink if the density of the remaining oil exceeds that of fresh water (1.0 grams per milliliter).

There are two main mechanisms by which any oil, including dilbit, may sink or become submerged (suspended below the water surface in the water column)—through increases in density due to evaporation and by combining with heavier sediment or particles. The possibility of sinking or submergence of oil is a major concern as it can significantly complicate cleanup operations.

The nature of dilbit as it weathers has been the subject of considerable debate and research. Some research has indicated that as dilbit weathers, it exhibits bimodal behavior as diluent volatilizes and bitumen dominates the chemistry of the weathered oil (Fingas 2015a). According to a review conducted by the Royal Canadian Society (2015), “current questions include whether blending bitumen with a diluent yields a homogeneous fluid equivalent to a conventional heavy oil and, conversely, whether loss of diluent restores dilbit to the original bitumen composition and properties.”

There is considerable debate whether 100 percent of the diluent component of bitumen blends can actually be lost by natural evaporation (Fingas 2015b; King et al. 2014) or whether the residual

bitumen/heavy oil will retain some of the diluent components as intimately blended constituents, conferring novel properties on the partially weathered oil (Winter and Haddad 2014). This is particularly important for predicting if weathered dilbit or other diluted bitumen variations will float or sink in water. It is possible that some higher molecular weight components of the diluent would be retained in the weathered oil, but at concentrations too low to significantly change the physical behavior of the residual oil compared with the original bitumen or heavy oil stock.

It is possible that there would be sufficient evaporation of lighter hydrocarbon components that the remaining portions of the oil would have densities greater than that of fresh water. If this occurs, it would generally occur after several days had passed and at least 30 percent of the oil had evaporated (Hollebone 2015).

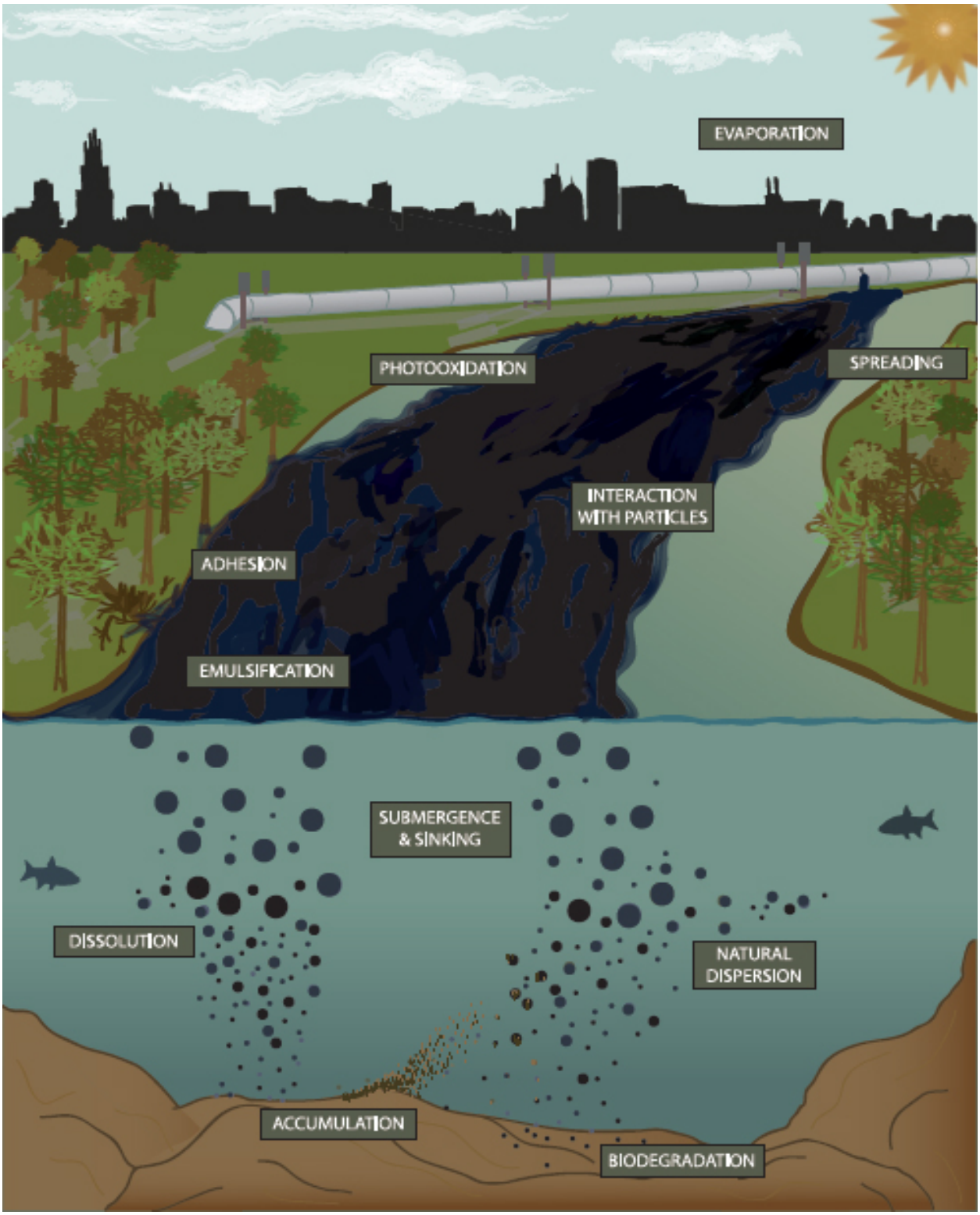

Source: National Academies of Sciences, Engineering, and Medicine 2016

Figure 10.2-1. Diagram of Crude Oil Weathering Processes

Sinking and submergence of oil may occur when it comes in contact with particles and sediment. The formation of oil-particle aggregates (OPAs) can occur with any type of oil, including dilbit, even when its density is less than that of the water, particularly under turbulent underwater conditions (National Academies of Sciences, Engineering, and Medicine 2016). The spill of dilbit in Marshall, Michigan, involved the release of the Cold Lake Blend and Western Canadian dilbit products into a river experiencing flooding, turbidity, high velocities, and high water volumes. In that case, some of the oil floated, some submerged, and some sank.

Water temperature may also affect the likelihood of sinking and submergence. Weathered dilbit has been shown to be more likely to sink in cooler water (Short 2013).

Besides potential submergence and sinking, another property of weathered dilbit that is of concern is its adhesion potential. When diluted bitumen weathers, its adhesion increases significantly so that it sticks to substrates and surfaces that it contacts (Hollebone 2015; Environment Canada 2013). The adherence of spilled dilbit to shorelines, subsurface features, aquatic vegetation, and other surface complicates the cleanup process, but it also means this portion of the spill doesn't travel as far downstream. Adherence and coating of organisms, such as turtles, amphibians, insects, birds, and mammals can have a significant effect on the degree of natural resource damages.

In general, the toxic properties of both bitumen and diluents are similar to those of other crude oil products, including conventional heavy crude; however, little research has been conducted specifically on the toxicity of dilbit to organisms. The components of the diluents are commonly found in other crude oils. Both crude oil and bitumen may contain several potentially toxic metals, stable and persistent resins, and asphaltenes.

In the event of a land surface release, the dispersion of dilbit through soils would be slower than for other crude oils, including heavy crude oils with similar viscosities; light and medium crude oils would penetrate soils the fastest (Tsaprailis 2014). Immediately upon release, dilbit behaves much like heavy crude oil; however, weathering, temperature, and dispersion alter its properties, causing it to behave more like the original bitumen. As the diluent components volatilize, the heavier components of dilbit remain and the increasing viscosity results in slower spreading and greater adherence to soil particles. Heavy crude oils may lose up to 10 percent of their initial volume following a spill due to evaporation in the first few days (National Research Council 2003). Dilbit has been shown to lose between 11.7 and 15.9 percent of its mass within the first 6 hours of a release (Environment Canada 2013).

The heavy crude oils that the Applicant is proposing to transport via the Project would have API densities of approximately 21 to 25 (Enbridge 2016b). The Applicant provided examples of heavy crude oil that could be transported by the proposed Project; these include Premium Conventional Heavy, Conventional Heavy, Cold Lake Blend (dilbit blend), and Cold Lake Winter Blend (dilbit blend).

10.2.1.3 Influence of Spill Size on Crude Oil Behavior

Different spill sizes influence the transport, fate, and potential environmental consequences of a release. This section describes behavior of releases from small to major spills using the categories of spills defined in Section 10.1.3.

10.2.1.3.1 Small Spills

Small spills are defined as spill volumes greater than or equal to 0.1 bbl (5 gallons) and less than or equal to 50 bbl (2,100 gallons). These are the most common and most likely release volumes for the Project and its alternatives. Small spills tend to affect limited areas and dilute quickly in the environment as they spread and disperse. Despite the limited range of effects, small releases can persist in the environment for long periods of time and can cause localized contamination requiring cleanup and remediation.

10.2.1.3.2 Medium Spills

Medium spills range from greater than 50 bbl (2,100 gallons) to less than or equal to 1,000 bbl (42,000 gallons) and are less common than small-volume releases (DOS 2017). Medium spills on land or water would likely spread and disperse over a greater area than small spills. A medium spill on land could result in oil adsorbing or otherwise adhering to soil particles and being transported over extended distances by processes such as wind or water erosion. A medium spill in water could cause oil to spread over a greater area of shoreline and water surface and a higher concentration of oil to be dispersed within the water column as compared to a small spill.

Tanker trucks can carry approximately 190 bbl of oil (7,980 gallons); therefore, the majority of spills from tanker trucks would likely fall within this spill category, as it is unlikely that multiple tanker trucks would crash at the same time in the same place. Medium spills could also result from rail car accidents involving the compromise of a single tank car, which has a capacity of up to 800 bbl (33,600 gallons). Pipeline damage resulting from outside forces such as excavators and major earth movement or corrosion of the pipe could result in spills within this size class.

10.2.1.3.3 Large Spills

Large releases could result from rail car accidents involving more than one tank car. The failure of 12 tank cars in a unit train could release up to 9,600 bbl (403,200 gallons) of crude oil. Pipe damage resulting from outside forces such as excavators and major earth movement, or corrosion of the pipe, could also result in a large spill.

Large spills can result in significant volumes of crude oil on the ground surface, which could migrate over the land surface and affect vegetation, soil invertebrates, and other receptors of concern (DOS 2014). Rapid response and cleanup of these incidents would reduce the exposure and impacts on resources. Large spills along a subsurface pipeline can result in movement of oil through soils, contact with the water table, and impacts on groundwater resources adjacent to and beyond the vicinity of the release location and pipeline trench (DOS 2014). Vertical upward migration can result in substantial accumulation of crude oil on surface soil, migration along the ground surface, and potential impacts on vegetation and other receptors. Oil may pool in low-lying areas and infiltrate into the soil and contact groundwater (DOS 2014). Large spills from a rail accident would begin at the soil surface but could spread downward into the soil, depending on the properties of the oil. Even with such soil infiltration, with this volume of oil, the spill could spread overland to contaminate water sources.

10.2.1.3.4 Major Spills

Major spills are defined as spills greater than 10,000 bbl (420,000 gallons). The release of this volume of crude oil could result from catastrophic pipeline ruptures or a rail incident that breaches more than 12 cars. For pipelines, very large releases are assumed to result with the release of the total volume of crude oil from the pipeline segment between the two nearest shutoff valves. Major spills from pipelines

could occur as the result of a complete break in the pipeline from major earthquakes, flooding, bank erosion or scouring at waterbody crossings, mechanical damage during third-party ground-disturbing activities, or vandalism, sabotage, or terrorist acts. Major pipeline ruptures can be defined as low-probability, high-consequence events in the context of risk assessment.

Major spills from rail transport could occur as the result of major environmental events (e.g., earthquake, flooding), rail breakage, bridge collapse, track operational malfunctions due to human error, collisions with other trains or vehicles at crossings, or mechanical damage from vandalism or sabotage of the tracks by the public or terrorists.

As with other spill sizes, the extent of oil exposure and resulting potential effects in the environment can vary based on a multitude of factors (e.g., type of crude oil, crude oil behavior, environmental conditions, and presence of resources and receptors; discussed in detail in the sections below), including spill prevention, preparedness, and response (Section 10.5). In the event of a crude oil spill, rapid and well-coordinated response actions can effectively contain and control the release, thereby reducing potential environmental impacts. The potential effects of a major spill would be similar in nature, but greater in scale (i.e., extent of exposure and adverse effects on environmental and human receptors) than large spills. A major spill would tend to migrate farther from the incident location, potentially affecting greater areas of land, water, and subsurface soil and groundwater. Oil could infiltrate deeper into soil with greater impacts on groundwater, including drinking water sources (DOS 2014).

Major spills of oil released directly into waterbodies, such as at surface water pipeline crossings or at railroad bridge crossings of rivers, would result in the majority of the oil being transported beyond the release location, especially under high-flow conditions, with substantial transport potential (DOS 2014).

10.2.1.4 Pinhole Releases

Enbridge funded a study on failure probabilities related to potential pinhole leaks (Stantec and Barr Engineering 2017). The study is available online on the DOC-EERA Project website (https://mn.gov/commerce/energyfacilities/line3/), on the Project eDockets site (Line 3 Route Permit PUC eDockets), and by CD included with hard copies.

One objective of the pinhole release work (Stantec and Barr Engineering 2017) was to provide information on the possibility of a release occurring that was below the pipeline supervisory control and data acquisition (SCADA) detection threshold[20] and would also not be detected with routine surveillance methods until sufficient release had occurred to present a readily visible oil plume. For a physical perspective, a pinhole is characterized a “1/32-inch hole” (Stantec and Barr Engineering 2017). The work characterized the anticipated frequency, potential causes, size, rate of release, and maximum release volume from potential pinhole releases. The work determined that release volumes from small-flow releases ranged between 633 to 4,900 bbl, at 1 to 0.1 percent of 760,000 bbl per day throughput respectively, with a range of corresponding release times from 120 min to 14 days. The 1/32-inch pinhole leak was estimated to 784 bbl before detection 28 days after the start of release.

[20] The SCADA system, in conjunction with computational pipeline monitoring or model-based leak detection systems are designed to detect leaks to a level of approximately 1% of the pipeline flow rate.

Small spills could result from pinhole releases of crude oil from subsurface pipeline segments. Subsurface pinhole releases would typically disperse to soil and more permeable trench materials immediately surrounding the pipeline (DOS 2014; Stantec et al. 2017). Where pipelines are in shallow water tables, released oil would migrate upward; eventually reaching the surface where visual detection and response would occur (Stantec et al. 2017). In areas of deeper water tables, the release typically migrates radially outward from the release and down-gradient until it reaches groundwater where it will travel laterally with ground water flow but potentially at a slower rate (Cozzarelli et al. 2001).

If pinhole releases remain undetected for long periods of time, ultimately releasing volumes that would be classified as medium or even approaching large spills if the released oil does not reach the surface for long periods of time. Unnoticed pinhole leaks can lead to the infiltration of crude oil through unsaturated, permeable soils and result in contact with the water table and surficial groundwater aquifers (DOS 2014; Stantec et al. 2017; Exponent 2013). Surficial aquifers where overlying geologic materials are more permeable are generally most susceptible to contamination from a pinhole release of crude oil (Stantec and Barr Engineering 2017). Pipelines monitored with SCADA systems, in conjunction with computational pipeline monitoring or model-based leak detection systems, greatly lower the potential for long undetected releases.

10.2.2 Crude Oil Behavior in the Environment

The general behavior of crude oil that is released into the terrestrial, aquatic, and human environment is described below. Section 10.4 discusses these aspects of oil behavior and the potential effects of a spill on specific resources.

10.2.2.1 Terrestrial Environment

When crude oil spills onto land or into soils beneath the ground surface, its movement will depend on the soil type, oil viscosity, and the depth to the water table (National Academies of Sciences, Engineering, and Medicine 2016). Dilbit and other heavier crude oils would disperse more slowly than lighter crude oils in terrestrial environments due to their higher viscosity. Because dilbit contains a higher concentration of asphaltenes and resins compared to light oils, it is not as prone to evaporation and is, therefore, more persistent in terrestrial environments.

Spilled oil will typically spread over land until it reaches a depression, a surface waterbody, or is absorbed into the ground. In addition to topography, migration of the oil can be affected by vegetation cover and seasonal conditions.

Oil released on land is typically more easily contained than oil released into water. The rapid installation of containment features (e.g., dikes, impoundments, and physical barriers) around the spill area deters spreading and enhances clean-up activities.

10.2.2.2 Aquatic Environment

Oil spilled into surface waterbodies generally floats initially and is transported by winds and currents, depending on the waterbody type and conditions during the spill. Spills tend to spread shorter distances in standing water such as lakes and ponds with minimal currents; however, wind can increase oil dispersal in those surface waters. Currents in streams and rivers transport oil downstream, and thus impacts are likely to occur over greater areas than in lakes or ponds. However, crude oil concentrations in the water decrease as the oil thins out during spreading or adheres to shorelines and other surfaces.

Both dilbit and light crude oil would be expected to initially float. Evidence from previous dilbit spills (in Marshall, Michigan, in 2010 and Burnaby, British Columbia, Canada, in 2007) has shown that dilbit floats on water until its density is altered by weathering or the entrainment of sediment, which can cause the oil to submerge and sink (Witt O'Brien's et al. 2013).

As the time after a release increases, multiple processes act to entrain oil and its constituents into the water column, which in turn affects water quality and aquatic biota. Although most of the compounds in oil are insoluble, BTEX and some of the lighter PAHs are volatile and soluble in water and can contaminate the water column. Turbulence, which is common in rivers and streams, is a key process that enhances dissolution of oil constituents, particularly BTEX. In lakes and larger rivers, wind-driven waves can also create turbulence that drives crude oil downward and facilitates dissolution of BTEX in the water column (Witt O'Brien's et al. 2013). Therefore, in larger, fast-moving rivers and creeks, oil would be quickly dispersed downstream and diluted with the flow of the river, while in smaller flowing streams and backwater eddies an oil spill could have a greater effect on the water column and surrounding habitat due to the lower relative volume and rate of water flow.

As crude oil mixes with water it forms emulsions that are thicker and stickier than the original oil. Over time, winds, waves, and currents continue to spread and disperse the emulsified oil patches into smaller pieces, or "tarballs," which are very persistent in aquatic environments (NOAA 2017b). As dilbit weathers and the condensate component evaporates, its density increases has a greater tendency to submerge in comparison to lighter crude oils. As with heavy crude, dilbit's asphaltenes, waxes and resins increases its potential for accumulation and the formation of petroleum bodies (National Academies of Sciences, Engineering, and Medicine 2016).

Wetlands, including marshes, swamps, peat bogs, and fens, are particularly sensitive to oil spills. In wetlands, small areas of shallow water, finer sediments with high organic content, greater vegetation cover, and high biochemical oxygen demand (leading to anaerobic conditions) would affect the dispersion and weathering of spilled crude oil. Oil spilled into wetlands could be widely dispersed by wind or water movement, and would typically become stranded on fine sediments or vegetation. In this case oil would not likely travel as far as it would in open water. Transport out of the wetland may occur via small stream discharge points. If the spilled oil becomes entrained within anaerobic sediments, the rate of biodegradation may be significantly reduced (Boufadel et al. 2015).

Oil released into aquatic environments is more difficult to recover in large quantities because water surface and weather conditions must be sufficiently calm to permit recovery equipment to function well and for response personnel to safely operate the equipment (International Tanker Owners Pollution Federation Limited 2016).

10.2.2.3 Human Environment

Crude oil can reach public and private lands used for commercial, agricultural, industrial, residential, and recreational purposes. Water intakes in shallow lakes and rivers can be susceptible to contamination from an oil spill, and paved surfaces and conduits such as ditches/sewers can act as preferential pathways for spills, extending the spread of oil. If a crude oil spill occurs in a developed area, oil can migrate into stormwater and sewer collection systems, particularly during rain events, and result in contamination of the infrastructure and associated treatment systems.

Spills in agricultural and other developed areas tend to pool in areas with flatter topography but can spread through ditches, small streams, and groundwater if the water table is reached. If a spill reaches

groundwater, constituents in the crude oil may dissolve and migrate farther underground, forming a contaminated plume that follows the general direction of groundwater flow. The contaminated groundwater can intersect with groundwater wells or reach surface water, making water supplies potentially unsafe, depending on the degree of contamination. In karst regions, groundwater may flow more rapidly than in other areas, increasing the risk of contamination.

Without remediation, groundwater contamination can persist for lengthy periods of time. For example, a crude oil spill from a pipeline rupture in 1979 contaminated a shallow aquifer near Bemidji, Minnesota. Despite initial cleanup, the spill continues to be a source of contaminants to a shallow outwash aquifer. This release has been used as a research project to study the fate and transport of crude oil in groundwater. These studies to track the oil have shown that the groundwater contaminant plume has migrated a total distance of approximately 600 feet from the release point in 38 years. This is primarily because the plume is moving as dissolved petroleum constituents in groundwater and as vapors in an unsaturated zone, and that native microbes are converting the oil derivatives into carbon dioxide, methane, and other biodegradation products (U.S. Geological Survey 2017). This has resulted in a steady state system where the plume is no longer expanding appreciably.

10.2.2.4 Review of Observed Impacts from Historical Spills

Immediate and long-term monitoring, experimental studies, and response efforts following various historical spills provide an overview of potential spill-related impacts. Over 20 historical spills and associated reports and literature were evaluated (Enbridge 2016d). The impacts discussed below were observed from spills including, but not limited to, the following:

- **Bemidji, Minnesota** – August 20, 1979: the Enbridge Line 6 crude oil pipeline burst and released approximately 10,700 bbl of light crude oil.
- **Cass Lake, Minnesota** – Roughly 25 miles from the Bemidji spill site; an estimated 1,150 bbl of crude oil were released to the water table at a crude oil pipeline pumping station. The long-term leak was discovered in 2002. The leak onset is not known precisely, but occurred sometime after pipeline construction in 1971.
- **Wabamun Lake, Alberta, Canada** – August 2005: a train derailment resulted in the release of 4,500 bbl of heavy, high-viscosity fuel oil.
- **Marshall, Michigan** – June 2010: rupture of Enbridge Line 6B released 20,000 bbl of heavy crude oil with 30 percent diluent (combined Western Canadian Select and Cold Lake Blend dilbit).
- **Red Deer River, Alberta** – June 2012: exceptionally high river flows eroded and ruptured a Plains Midstream Canada pipeline adjacent to Jackson Creek, a tributary of the Red Deer River, releasing 2,900 bbl of light crude oil.
- **Asher Creek**, **Missouri** – August 1979: a release of 9,500 bbl of crude oil occurred from a burst pipeline.
- **Pine River, British Columbia, Canada** – August 2000: a rupture of a Pembina Pipeline Corporation pipeline resulted in approximately 2,800 bbl of sour light crude discharging into the Pine River.
- **Fort McMurray, Alberta** – June 2013: a break in the Enbridge Line 37 pipeline released approximately 1,300 bbl of light crude oil.

- **Moose Jaw, Saskatchewan, Canada** – January 1974: a crude oil pipeline break released 15,725 bbl of heavy crude oil.
- **Cayuga Inlet, New York** – November 1997: a train derailment resulted in 167 bbl of spilled diesel fuel.
- **Grand Rapids, Minnesota –** March 1991: a Lakehead Pipeline Company pipeline ruptured and released 40,000 bbl of crude oil into the Prairie River during winter months.
- **Rainbow Pipeline, Alberta** – April 2011**:** release of 28,300 bbl of sweet crude oil occurred from a Plains Midstream Canada pipeline into a muskeg area.
- **Glenavon, Saskatchewan** – April 2007: a release from Enbridge Line 3 of 6,200 bbl of heavy crude oil occurred.
- **Ashland Oil Facility**, **West Elizabeth, Pennsylvania** – January 1988: a spill tank failure at the facility released nearly 24,000 bbl of diesel fuel into the Monongahela River.
- **Burnaby, British Columbia** – July 2007: rupture of the Trans Mountain Pipeline sprayed dilbit 40 to 50 feet in the air for 25 minutes.

The subsequent sections (10.2.2.4.1 through 10.2.2.4.17) describe observed impacts from these spills and others with respect to environmental receptors, including elements of the physical, biological, and human environment. Physical receptors include air quality, groundwater, lakes, rivers, sediment, shorelines and riparian banks, wetlands, and soils. Biological receptors include terrestrial plants, benthos, fish, aquatic plants, amphibians and reptiles, birds, and semi-aquatic mammals. Human receptors include human health and land resource uses.

10.2.2.4.1 Air Quality

Previous spills highlight the rate, timing, and magnitude of evaporation following crude oil releases. In general, the greatest evaporation rates, and thus greatest potential for air quality impacts, occurred immediately after the release and declined with time. Most or all of the evaporation commonly occurred within the first few days to weeks of the release. In the case of the Exxon Valdez spill in Alaska on March 24, 1989, volatile compounds (e.g., BTEX) evaporated within the first few hours of the spill, and less volatile compounds (i.e., those with longer hydrocarbon chains) evaporated over the first two weeks (Hanna and Drivas 1993). Similar evaporation rates were observed for other spills, including the Silvertip Pipeline Spill in Laurel, Montana, in 2011, where all volatile compounds had evaporated within 4 days of the release. Laboratory experiments following the 2010 Marshall, Michigan, spill showed that 75 to 85 percent of volatiles from dilbit evaporated within 6 hours, with additional loss occurring over the following few days (Zhou et al. 2015).

The spill volume and original concentration of volatile compounds within the crude oil were most likely to affect the local air concentrations of volatile compounds during the period immediately following the spills. Environment Canada found that evaporation rates of volatile compounds were largely a function of volume released, and had little relation to spill area, spill thickness, or wind speed. Light, medium, and heavy crude oils respectively lost 75, 40, and 5 percent by volume over the first few days following a release (Fingas 1999). In contrast, evaporation of less volatile compounds can be increased by wind and higher temperatures. In the case of the Wabamun Lake spill, the amount of evaporation was negligible over a few days.

Following the Marshall, Michigan, spill, Enbridge conducted extensive air quality monitoring for about a month after the spill in nearby residential areas. During the voluntary evacuation period (July 29 to August 17, 2010) and in the residential areas in the immediate release vicinity, 62 of 1,619 measurements exceeded the screening level for benzene and 70 of 1,747 samples exceeded the screening level for hydrogen sulfide. During the post-evacuation period (August 18 to December 31), 17 of 3,095 measurements exceeded the screening level for benzene and none of 3,270 samples exceeded the screening level for hydrogen sulfide. No samples exceeded screening levels for ozone for the entire monitoring period. The Burnaby, British Columbia, pipeline rupture also occurred in a residential area, and nearby residents were evacuated after reporting various acute symptoms. After air monitoring revealed rapidly declining volatile concentrations, more than half of the 225 evacuees were allowed to return to their homes within the day.

10.2.2.4.2 Groundwater

As discussed in Section 10.2.2.3, spills originating from pipelines have the potential to enter underlying groundwater aquifers and form plumes that migrate along with the natural flow of groundwater. The ultimate fate and transport of these plumes is dictated by many factors including the amount and type of oil released, groundwater flow rate, geological properties of the aquifer, chemical reactions occurring within the plume, and the presence of microbes that degrade contaminants (Enbridge 2016d).

Observations from the Bemidji and Cass Lake spills shed light on the possible groundwater impacts from a pipeline spill. These two spills occurred in northern Minnesota with similar geography and geology to the proposed Project routes.

Immediately following the Bemidji spill, clean-up efforts successfully removed approximately 75 percent of the released oil, with the remainder ultimately migrating downward to the underlying aquifer. The underlying groundwater aquifer is a glacial outwash deposit composed of highly permeable sands and gravels, and extends to a depth of approximately 60 feet below the ground surface (Essaid et al. 2011). The U.S. Geological Survey, Minnesota Pollution Control Agency (Minnesota PCA), Enbridge, and Beltrami County established the National Crude Oil Spill Research Site in Bemidji to evaluate the migration and evolution of the remaining contaminant plume.

Because the pipeline was located approximately 15 feet above the water table, released oil first migrated downward to the water table prior to migrating laterally with groundwater flow. This unsaturated zone above the groundwater table allowed the oil to migrate downward until encountering the groundwater table, where downward migration significantly slowed due to oil and its constituents largely being less dense than water (i.e., they float). However, downward passage of the contaminants through the unsaturated zone did leave crude oil contamination within the pore spaces—roughly 10 to 20 percent of pore spaces were filled with oil. The percentage of pore spaces filled with oil was higher, 30 to 70 percent, near the water table where the light crude oil tended to float.

Oil migrated with groundwater either by infiltrating or dissolving into flowing groundwater. Infiltrated oil, also known as non-aqueous phase liquid (NAPL), generally remains separate from groundwater, but is carried along with groundwater flow. NAPL has migrated roughly 330 feet in the direction of groundwater flow since the spill (USGS 2017). Conversely, dissolved oil constituents have been carried roughly 450 to 600 feet from the source and have stabilized at that distance (Cozzarelli et al. 2001). Both travel distances demonstrate that the contaminant plume has migrated more slowly than uncontaminated groundwater, which migrates 300 feet per year. This disparity in velocity is partially due to degradation of the contaminant plume by biological processes that convert the oil to vapors, mostly

carbon dioxide and other hydrocarbon fractions. In addition to loss of oil mass within the migrating plume, the non-dissolved oil near at the spill source also has degraded through time (total loss is roughly 11 percent at present). In general, lighter compounds associated with the crude have degraded faster than heavier compounds (Cozzarelli et al. 2001).

The gradual Cass Lake leak, which contrasts to the single release at the Bemidji site, has implications for the migration and evolution of the contaminant plume. Groundwater tables at the site are roughly 25 to 45 feet below the land surface, and the near-surface aquifer occupies a glacial outwash deposit composed of sands and silt. Groundwater migrates at a rate of approximately 85 feet per year.

Monitoring at the site has revealed the maximum downgradient extent of the plume (dissolved benzene) to be roughly 500 feet (Drennan et al. 2010).

Natural attenuation and biodegradation of the contaminant plume have been primary subjects of research at the Cass Lake site, which provides information on the lifetime of the plume and expected period that it poses a potential risk. In general, the plume is considered to be in a highly degraded state; however, natural degradation progresses at rates that depend on the petroleum constituent being considered. As constituents reach a fully degraded state, they are less able to dissolve in groundwater, and therefore can no longer migrate along with the groundwater. Researchers have attributed the highly degraded state of the Cass Lake plume to three factors: (1) the time since initial release, (2) natural groundwater recharge rates, and (3) the gradual nature of the release (e.g., leak).

10.2.2.4.3 Lakes

A number of previous spills in North America highlight the potential effects of oil on lakes. Crude oil is generally less dense than water, which makes impacts on near-surface water quality and adjacent shorelines most likely, discussed in Section 10.2.2.4.6 below.

Following the Wabamun Lake train derailment, approximately 20 percent of the spilled oil traveled overland into the lake. Windy conditions and waves dispersed the oil rapidly over the lake surface, ultimately causing impacts on downwind shorelines. High winds also caused mixing of oil into the water column, particularly within boomed areas. As a consequence of the heavy oil first traveling overland, organic and soil debris incorporated into the oil, causing the formation of consolidated oil masses (tar balls and logs) in the lake, which behaved in various manners, including floating, submerging, resurfacing, and sinking (Fingas et al. 2006). They also formed large tar mats in nearshore areas. BTEX and PAH concentrations were below laboratory detection limits in lake water within 4 months of the spill.

In the Marshall, Michigan, spill, roughly 8,200 bbl of dilbit initially entered a small creek and tributary of the larger Kalamazoo River, which in turn flowed into Morrow Lake approximately 37 miles downstream (Dollhopf et al. 2014). Because the released crude oil was initially less dense than water, it traveled downstream from the release point as a slick and deposited on the river shoreline and adjacent floodplain wetlands. Flood conditions in the streams caused greater dispersal of oil onto the floodplain, including the delta of Morrow Lake, and further downstream, as well as greater turbulence and mixing with sediment that caused the formation of OPAs. Therefore, oil that reached Morrow Lake was weathered and altered by river transport (Dollhopf et al. 2014). Sampling in these streams and Morrow Lake for nearly 2 years after the spill revealed few petroleum-related compounds in excess of health screening levels, most of which were longer-lived PAHs.

Following the Red Deer River spill, floodwaters carried the released crude oil roughly 25 miles downstream to Gleniffer Lake reservoir, and then an additional 5 miles downstream. Response efforts included containment booms in the lake. BTEX compounds were initially detected in the lake above Canadian water quality guidelines for aquatic life, but these lighter weight compounds evaporated quickly. PAHs were present for up to 4 days but also diminished through time. Drinking water system intakes within Gleniffer Lake were a primary concern, but monitoring revealed no exceedance of drinking water standards. The relatively minor impacts on the lake have been attributed to the relatively long distance traveled by the oil in streams before reaching the lake. In addition, the lighter weight crude contributed to a high degree of weathering.

10.2.2.4.4 Rivers

Pipeline releases have the potential to enter streams and rivers, which then can transport released crude oil downstream, affecting water quality, sediments, adjacent shorelines, and other features. In addition to the volume and type of release, the nature and extent of impacts can depend on factors like stream size (width and depth), type, and flow conditions at the time of the release (Enbridge 2016d).

The subsequent discussion focuses on a series of documented oil spills to shed light on the nature of impacts on streams under a range of conditions.

Following the Asher Creek spill, responders installed six surface skimming siphoning dams along the creek to collect and retain floating oil. Upstream of dams, oil infiltrated the streambed, and given the relatively low stream flow at the time of the release, dilution of the released oil was minor. However, scouring floods during the following winter helped dissipate the oil. Oil sheens were observed after disturbing the stream substrate for as many as 453 days following the release at select sites. However, most of the downstream area did not have observable oil impacts for much of the 532-day study.

In the Pine River spill, the generally fast-flowing nature of the river effectively dispersed the released oil, though some oil accumulated in slow-velocity areas (Lee et al. 2015). Accumulation in slow-velocity areas, river margins, and off-channel features was also a common observation following the Red Deer River, Alberta, and Marshall, Michigan, spills. Petroleum was ultimately dispersed at least 50 miles downstream along Pine River. High flows from heavy rainfall in the subsequent months scoured and remobilized oil and oil-contaminated debris. Response efforts involved removal of oil-contaminated sediments and log jams. Three weeks after the spill, petroleum contamination was still detectable at groundwater intakes, but concentrations were below applicable water quality guidelines. The rapid declines in hydrocarbon concentrations were attributed to the lightweight crude and its tendency to degrade and weather rapidly.

The Marshall, Michigan, spill resulted in oil impacts on multiple streams. The receiving streams, Talmadge Creek and Kalamazoo River, have extensive floodplain features including wetlands, forests, and ponds, which ultimately acted as depositional areas for oil (Dollhopf and Durno 2011). Response efforts involved removal of affected riparian vegetation and sediment. OPAs formed extensively as a result of the heavyweight crude and turbulence along the river present during the flood flows and passage over two dams. Water quality sampling revealed petroleum concentrations below water quality criteria within a month or two following the spill, depending on the location.

10.2.2.4.5 Sediment

Sediments along banks and shorelines can be affected by floating oil, whereas oil submergence is a key process required for impacts on sediments in non-nearshore environments. The type of waterbody can affect the nature and mobility of the sediment being considered. Sediment in lakes is generally more stationary and finer grained, and resides in a depositional environment, whereas sediments found in stream and riverbeds are often transported by floods and therefore are less stationary by nature.

The Marshall, Pine River, and Asher Creek spills affected stream sediments. In the Marshall and Pine River spills, affected sediments were most prevalent in slow-moving water depositional areas such as eddies and back channels. However, in the Asher Creek spill, depositional areas, and thus sediment impacts, were concentrated by the low flows and resulting deposition at the time of the spill (Crunkilton and Duchrow 1990). In the roughly 3-year monitoring period following the Marshall spill, petroleum concentrations within sediments in these depositional areas declined, though there were some detections and exceedances of screening criteria, primarily of more persistent PAHs (Fitzpatrick et al. 2015). These declining concentrations were likely due to flushing by floods and weathering of petroleum-related compounds. In Pine River, petroleum was detected in downstream water quality samples taken 2 years after the release, suggesting the petroleum was leaching from sediment (De Pennart et al. 2004). In Wabamun Lake, PAHs were detected in sediment sources 2 years following the spill events and were at even lower concentrations 5 years after the spill (Anderson 2006).

10.2.2.4.6 Shorelines and Riparian Banks

Shorelines and riparian banks represent the interface between surface water and terrestrial environments. These areas have diverse land cover and vegetation in response to disturbing scour and sediment transport from stream flow and wave action (Enbridge 2016d). They also have potential to be affected by spills, particularly from oil that enters and is mobilized in lakes and streams. The effect of oil on shorelines and riparian banks is influenced by various factors, including the oil type, waterbody type, substrate type, frequency and intensity of scour (by waves or current), vegetation characteristics, and seasonal timing of the spill.

The tendency for oil to attach to and affect banks depends to a large degree on the oil type, which is demonstrated by differences in oil dispersal between a light crude oil spill in Grapevine Creek (Kern County, California) and heavy fuel oil release in the Patuxent River (Chalk Point, Maryland). Within 2 days of the Grapevine spill, over 90 percent of its toxic compounds had been degraded (Mancini et al. 1995). In comparison, only 39 percent of the oil spilled at Chalk Point had degraded within 5 days (NOAA 2002).

Observations from previous spills also demonstrate the effect of vegetation type and extent on the oil trapping capacity of shorelines. Vegetation can absorb oil and effectively protect bank sediments from oil, as was the case in the 1988 Shell oil release in Martinez, California, and the M/T Westchester oil release into the Mississippi River (2000). Vegetation can also act to absorb and hold oil on the banks, thereby increasing the length of time that oil has an effect on shorelines and banks. For example, in the Buzzards Bay spill in Massachusetts (1969), areas with marshy vegetation retained oil residues, whereas un-vegetated areas did not (Peacock et al. 2005).

10.2.2.4.7 Wetlands

Oil releases into wetlands have the potential to affect vegetation communities or cause soil contamination such that typical hydrologic conditions are interrupted. The effects of released petroleum products on wetlands have been extensively studied at a number of release sites and via case studies.

Crude oil type, plant recovery, contaminated soil effects on plant growth, and sensitivity to oil releases influence the impacts of oil on wetlands.

A 30,000-bbl spill of crude oil into a Louisiana Cypress swamp had the greatest impact on floating vascular plants, whereas highly shaded plants and perennials in sunlit areas were minimally affected (Baca et al. 1985). A 160-bbl diesel fuel spill on Mount Baker, Washington, severely reduced vegetation cover from nearly complete coverage to no coverage, with the exception of one particularly resistant species. Snow cover at the time of the spill helped to reduce the effects by absorbing the diesel (Belsky 1982). Subsequent spring snowmelt carried the stored diesel fuel away from the wetland.

Topography on the site also helped to divert fuel away from sensitive plants. The spill site was covered by roughly 12 percent plants 9 years after the spill.

Hutchinson and Freedman (1978) studied effects of the type and timing of releases and found that intensive releases were generally more damaging than spray releases, and that releases during winter months tended to be less damaging than summer releases. A study of plant recovery following a release (Racine 1994) found that understory vegetation was nearly complete within 20 years, but areas with pooled oil had little recovery. Leck and Simpson (1992) found that contaminated soil reduced plant survival and growth from seeds, and diminished growth of plant seedlings in tidal freshwater marshes. Lin and Mendelssohn (1996) found that organic matter in soils made the wetland and plants particularly sensitive to crude oil.

10.2.2.4.8 Soils

Petroleum releases to the ground surface can have harmful effects on soil and important resident microorganisms (Enbridge 2016d). Response efforts often involve scraping or excavating the land surface to remove contamination.

A series of oil releases in north-central Alberta near Great Slave Lake happened in close proximity to one another and within a relatively short time span (1970 to 1972). The combined volume of 60,000 bbl of oil represents one of the largest spills in Canadian history, and the area has been studied extensively as a result (Wang et al. 1998). Clean-up efforts following the releases included burning, tilling, and fertilizer application. Researchers returned 25 years later to evaluate conditions and the effectiveness of the employed remediation techniques. This research revealed high oil concentrations to depths of over a foot and low contamination at approximately 3-foot depths. The state of oil contamination became less weathered with depth. Weathering rates were therefore greatest near the surface.

A wide range of soil remediation techniques have been employed in response to previous spills. The effectivity of burning and fertilizer application at reducing oil contamination was tested following the Moose Jaw, Saskatchewan, spill. Response efforts included fertilizer application with positive results: oil concentrations decreased during the fertilizer application period, with the greatest decrease in the year with the largest fertilizer application rate (De Jong 1980). Burning of dispersed oil contamination had mixed results. A direct effect was a reduction in habitat, and the burning may have been associated with

the soil becoming highly water repellent (also an effect of the oil; Nieber 2013). In the case of the Glenavon spill, which discharged heavy crude oil to a slough, remediation efforts included recovery of oil from surface water, containment berm construction, removal of oil-contaminated vegetation, and removal of sediment and soil.

Bioremediation was a subject of study at the Fort McMurray spill site, as well as at a series of experimental release sites. At Fort McMurray, contaminated soils had sufficient bacterial populations to promote biodegradation, though they were more effective at dissolving lighter oil constituents. This study showed that existing microbial communities adjust to the presence of oil, with some natural communities being diminished and others increasing in abundance (Hemmings et al. 2015). The microbe communities with increased abundance are able to metabolize petroleum hydrocarbons present in soil, and thus help to degrade contamination.

10.2.2.4.9 Terrestrial Vegetation

Numerous studies examining the impacts of crude oil on vegetation have been completed in northern latitudes that have general applicability to Minnesota climate and vegetation types. An experimental application of oil onto terrestrial vegetation by Wein and Bliss (1973;) in Northwest Territories revealed that oil-contaminated deciduous plants showed effects within hours of oil application, whereas evergreen vegetation took weeks to show stress. Regrowth in oil-exposed plants was less robust than would typically occur. Plants in oil-saturated soil showed no regrowth. After a growing season, recovery varied between 20 and 55 percent, depending on the oil treatment rate. A similar study in the Northwest Territories involving light-crude application revealed changes in species composition and diminished vegetation cover in the test area after 10 years (Robson et al. 2004). A test release of heavy crude in Caribou-Poker Creek Watershed (Alaska, 1976) showed that mosses and lichens died shortly after the release, but particular grass species persisted and thrived with lesser competition in the years following the spill (Collins et al. 1994). After 15 years, roughly half of black spruce trees had died in a plot with winter oil application, and roughly one-third had died in the plot experiencing summer application.

Previous spill incidents also shed light on the various impacts of oil contamination on vegetation. The Moose Jaw, Saskatchewan, spill directly affected wheat crops, causing reduced yields with greater oil contamination until 1 percent oil concentration in soil, at which point no plant growth occurred (De Jong 1980). Over the 4 years following the release, crop yields in oil-contaminated sites generally improved but had not improved to the production level of uncontaminated areas. Response to the Bemidji spill involved capture and recovery of spilled oil and burning of oil-soaked vegetation (Nieber 2013). The burning caused surface soils to become highly water-repellent, which has contributed to a slow vegetation recovery over at least 30 years. Following the Fort McMurray spill, emergency response efforts removed 93 percent of the oil; however, over the subsequent year, impacts on birch, black spruce, and reedgrass were observed (Hemmings et al. 2015).

10.2.2.4.10 Benthos

Effects of oil spills on benthos tend to be minimized due to the tendency of oil to float on water; however, oil that enters the water column through processes like mixing and dissolution can have negative effects. Benthos are commonly used as an indicator of waterbody health, which makes them a common focus in post-spill monitoring programs.

Various spills reveal approximate response and recovery times of benthic communities to oil releases. The Asher Creek spill illustrates the response of benthos to a spill with heavy impacts on a stream.

Immediately following the spill event, benthic populations within the affected area were 0.1 percent of typical populations, with a complete loss of mayflies and stoneflies. By 9 months following the release, the mayfly and stonefly populations had recovered to levels observed in unaffected areas upstream of the spill (Crunkilton and Duchrow 1990). By 18 months, the mayfly and stonefly populations had recovered to levels observed in healthy Missouri streams. In a similar 18-month timeframe at a separate Missouri pipeline spill (Gasconade River, 1988, intermediate weight sweet crude), macroinvertebrate communities had not fully recovered in their diversity and abundance due to residual hydrocarbon contamination, which was particularly concentrated in sloughs (Poulton et al. 1997). Greater recovery had occurred in riffle habitats where more frequent bed scour helped to flush oil contamination from sediments. Following another spill in the Chariton River (Missouri, 1990, 2,600 bbl of light crude from rupture of an Amoco Pipeline), benthic communities were nearing recovery by approximately a year post-release with reductions in abundance and the number of species present continuing (Poulton et al. 1998). Immediate responses of benthic communities to the Pine River spill extended 75 miles downstream from the release site. Within approximately a year, monitoring found that these communities had recovered in much of the affected area (Lee et al. 2015).

A number of spills also reveal the extent and habitat types where benthic communities have greatest impacts from oil releases. Monitoring following the Cayuga Inlet diesel spill focused on impacts and recovery times at varying distances downstream from the release site (Lytle and Peckarsky 2001). Benthic communities had detectable, immediate responses as far as 3 miles downstream of the release site, with expectedly greater effects closer to the release site. Within approximately a year, benthic communities in the study site nearest to the release site (0.4 mile downstream) had nearly recovered, with the only lingering effect being related to a change in species composition. Benthic organisms in the Wabamun Lake spill were most affected in sandy sediments lacking organic material (Lee et al. 2015).

Benthic communities in sandy sediments were also most affected in depositional sandy areas affected by the Marshall, Michigan, spill. Scientists concluded that recovery of benthic communities was complete 3 years following that release.

10.2.2.4.11 Fish

Freshwater fish are important components of aquatic ecosystems and food webs, as well as major economic resources in recreation and commercial fishing industries. Fish can be affected by oil releases through multiple exposure pathways and at multiple life stages, and the toxicity effects can be either acute, chronic, or indirectly related to contamination of habitat features (Enbridge 2016d).

Information on fish mortality immediately following spills is the most readily available for the spill events reviewed. The Marshall, Michigan, spill resulted in 42 dead fish immediately after the spill, which was considered negligible (USFWS 2015). Though scientists and local officials debated the exact cause, roughly 100 dead fish were found following the crude oil release to Wabamun Lake (Birtwell 2008). The Pine River spill resulted in 1,637 observed dead fish immediately following the spill. These fish tended to be larger, bottom-feeding fish, with a small proportion (<15 percent) being surface feeders. Fish mortality was noted up to 30 miles downstream of the release.

Given the difficulty in observing all dead fish, the estimate of total fish mortality within the 30-mile stretch of river ranged from 25,000 to 250,000 in Pine River (Goldberg 2011). However, fish were

reported to be returning to the affected area within 11 days. Large fish kills were also noted in response to the Cayuga Inlet and Asher Creek spills—up to 92 percent mortality was estimated for Cayuga Inlet (Lytle and Pekarsky 2001) and 42,000 dead fish were identified along a 5-mile section of Asher Creek (Crunkilton and Duchrow 1990).

Longer term effects of spills include habitat degradation and sublethal effects, including deformities. Longer term effects of the Marshall spill included declines in abundance and diversity of fish in Talmadge Creek for the year following the release. Recovery occurred shortly thereafter, but changes in fish community composition also occurred in response to habitat changes in the following 3 years (USFWS et al. 2015). Sublethal effects on fish were present for 27 miles downstream of the release site, as revealed by a fish health study 2 months following the spill (Papoulias et al. 2014). Fish consumption advisories were set forth for 2 years as a result of crude oil exposure. In Wabamun Lake, important juvenile and spawning habitat for various species were significantly affected by oil contamination, and in the 2 years following the spill, increases in fish deformities were attributed to the spill. Ten years following the spill, introduced walleye populations were present and increasingly healthy in the lake (Birtwell 2008).

10.2.2.4.12 Aquatic Plants

Aquatic plants grow in standing water and provide important services including food to aquatic ecosystems and humans, habitat areas, water quality benefits, and aesthetic and economic value. Aquatic plants can either be non-vascular (like algae, without roots) or vascular. Aquatic vascular plants can either have submerged or floating leaves. They tend to grow near shorelines in lakes to take advantage of light, and in quiet water zones of streams that experience infrequent scour.

Multiple studies found that that blue-green algae grew in response to released oil (Snow and Rosenberg 1975; Snow and Scott 1975). Effects from releases can vary by season—for instance, phytoplankton may be most affected by spills late in the growing season (Hellebust et al. 1975). Phytoplankton, in general, had varying responses to crude oil according to experiments by Kauss et al. (1973), which showed a range in growth response from inhibition to acceleration. Vascular plants tended to be diminished in abundance, but recovered in marshy areas over the course of 3 to 4 years (Burk 1977). Other conditions, like the presence of ultraviolet light, increased the effect of crude oil constituents on vascular plants (Ren et al. 1994). Increasing concentrations of oil also have increasingly harmful effects on vascular plants (Akapo et al. 2011; Lopes and Piedade 2014).

10.2.2.4.13 Amphibians and Reptiles

Amphibians are common along waterbodies in Minnesota and are important components of the aquatic ecosystem that have high potential to be affected by oil releases. Seasonal timing of spills can influence the ability of responders to clean-up released oil and reduce exposure of amphibians. For example, much of the oil released in the Grand Rapids, Minnesota, spill collected on the ice surface, which aided clean-up efforts. As a result, impacts on fish and wildlife were reported as minimal. A cracked pipeline near Tinicum, Pennsylvania, released 4,575 bbl of crude oil onto an ice-covered impoundment.

During clean-up efforts, the ice began to break up and resulted in exposure of turtles to oil (Saba and Spotila 2003). After cleaning and monitoring of the turtles, only one died after a month.

In streams, flow conditions at the time of release also can affect the distribution of oil and the extent and magnitude of effects on reptiles and amphibians. The Marshall, Michigan, spill occurred at a time of receding flood flows in the Kalamazoo River. As a result, oil was distributed into and trapped within

floodplain depressions, resulting in a substantial effect on amphibians and reptiles. Over 100 reptiles died, and nearly 4,000 turtles and 73 amphibians were captured and treated for oil effects (USFWS et al. 2015). Flood conditions can also help to distribute and dilute the effects of oil, thereby minimizing the effects on amphibians and reptiles. This was the case in the 2011 Yellowstone River release, which, as a result of high stream flow, affected areas 72 miles downstream but only affected two amphibians and one lizard (EPA 2011). The Rainbow Pipeline release also resulted in oil pooling in depressions, which resulted in at least 12 amphibians being killed (Energy Resources Conservation Board 2013).

The Red Deer River spill, Fort McMurray spill, and 2015 Yellowstone River spill of Bakken crude from the Bridger Pipeline (Montana Department of Environmental Quality 2015a) resulted in no documented impacts on reptiles or amphibians.

10.2.2.4.14 Birds

Numerous bird species spend their time near or within waterbodies and can be highly susceptible to oil spill impacts. The Ashland Oil Facility spill had significant effects on birds. The spill response involved efforts to clean birds that had been affected by the spilled diesel; however, these efforts were hindered by winter conditions. Partial ice coverage in particular limited the ability of responders to reach the areas with the greatest concentrations of birds. Ultimately, between 2,000 and 4,000 birds were killed as a result of the spill (Miklaucic and Saseen 1989).

The Grand Rapids, Minnesota, spill also occurred in winter conditions with frozen waterbodies, but the result was very different from the Ashland Oil Facility spill (NOAA 1992). A portion of the spilled oil spread onto the frozen surface of the Prairie River, which ultimately aided response personnel in clean-up efforts. Responders used vacuum trucks and squeegees to remove pooled oil from the ice surface.

Workers also allowed oil into the flowing river to take advantage of oil collection booms in the river. There were no reports of oiled birds, which was partially a result of the effective cleanup aided by the ice coverage at the time of the spill.

The Marshall, Michigan, spill affected roughly 400 birds, 52 of which died shortly after the spill (USFWS et al. 2015). An additional 144 birds affected by released oil were captured and rehabilitated, and roughly 140 birds were observed with oil effects but were not captured. Affected birds were generally waterfowl, including Canadian geese, mallard ducks, and great blue herons. For comparison, of the birds affected by the Rainbow Pipeline release, approximately one-third were waterfowl and two-thirds were shorebirds and songbirds. Impacts on birds may be minimal if response and containment efforts are successful. Responders to the Red Deer River spill, for example, successfully contained a large proportion of the light crude oil using booms. As a result, oiling of only two birds was documented (AER 2014).

10.2.2.4.15 Semi-Aquatic Mammals

Semi-aquatic mammals are those specially adapted to live near water and inhabit aquatic environments. While most mammals are terrestrial, the semi-aquatic variety are generally most prone to impacts from oil spills (Enbridge 2016d). Semi-aquatic mammals can vary in their dependence on aquatic environments. For instance, moose are considered semi-aquatic, but are considered to have the least dependence on aquatic environments. Other common semi-aquatic mammals include beaver and muskrat, mink, otter, and shrews. In general, species most dependent on aquatic environments (e.g.,

beaver and muskrat) are most likely to be affected by spilled oil distributed through surface waterbodies.

Historical spills have had relatively minor documented impacts on mammals. Following the Ashland Oil Facility spill, there were no reported incidents of oiled mammals even though the spill area was typically inhabited by beaver, mink, and river otter (Miklaucic and Saseen 1989). Similarly, there were no reports of oiled mammals following the Grand Rapids, Minnesota, spill (NOAA 1992). The lack of effects on these species was, in part, a result of the frozen surface water conditions during the spill. The Glenavon spill also did not have documented direct impacts on mammals (SLR Consulting 2008).

A number of the spills have had documented impacts on semi-aquatic mammals, including the Marshall, Rainbow Pipeline, and Red Deer River spills. The Marshall spill reportedly killed 40 mammals, and an additional 23 were captured and rehabilitated, though it was expected that additional mammals were affected but not observed during monitoring efforts (USFWS et al. 2015). Of the affected mammals, the primary species included muskrat (45 percent), raccoon (13 percent), and beaver (13 percent). The Rainbow Pipeline spill, which affected approximately 20 acres, resulted in mortality of 11 beavers and several small rodents. The Red Deer River spill had relatively few reports of wildlife impacts but did have a documented effect on two beavers (Energy Resources Conservation Board 2013).

10.2.2.4.16 Human Health

Oil spill impacts on humans are usually short term (acute), resulting from direct exposure to spilled oil or its byproducts, either by contact with skin, ingestion, or inhalation. The historical spills discussed below have either directly affected humans, or resulted in regulatory restrictions to reduce potential for exposure.

Regulatory restrictions can involve limitations on fish consumption, closing of groundwater wells, or other measures to limit human exposure risk. Responses to the Pine River spill included restrictions on fishing within the river, temporary closure of water intakes, and permanent closure of water supply groundwater wells in the vicinity of the river (Goldberg 2011). Closure of groundwater wells often depends, in part, on groundwater studies evaluating movement of the contamination plumes. For example, Cass Lake studies revealed that the plume was unlikely to affect water supply wells based on a detailed study on the direction and rate of contaminant movement (Drennan et al. 2010). Officials made a similar no-effect determination for a spill near Laurel, Montana (1,500 bbl medium crude, 2011), after installation of groundwater monitoring wells. Sampling from these and over 300 private wells revealed no detections of petroleum (Montana Department of Environmental Quality 2015b).

As a result of the oil spray into the air following the Burnaby, British Columbia, pipeline rupture, high volatile compound levels were present immediately after the incident but declined quickly. The spray covered five people and 44 residences in oil (eight residences with heavy coverage). Residents in heavily oiled houses were evacuated and placed in longer-term housing during clean-up efforts, and roughly half the 250 evacuated individuals returned to their homes within the day. Health effects in residents included headaches (15 percent), respiratory irritation (8 percent) nausea (6 percent), dizziness (3 percent), and eye irritation (3 percent) (Eykelbosh 2014).

The Marshall, Michigan, spill involved public health responses to air quality, surface water and fish, and possible groundwater impacts (Michigan Department of Community Health 2012, 2013, 2014a, 2014b, 2015). Public health was of concern because 40,000 people lived within a mile of the affected release area. Though no residents were located in the area with the highest impacts on air, nearby residences

did relocate as a result of odors. Impacts on surface waters caused officials to issue an advisory against swimming and fishing. Extensive monitoring of contamination in surface water and fish tissue ultimately led officials to reopen most of the affected streams and rivers to recreational use roughly 2 years after the event. The fish consumption advisory was also lifted at that time. Though concern for impact on drinking water sources was relatively minimal, officials also issued a precautionary bottled water advisory. After sampling of over 150 private wells revealed no samples exceeding screening levels, the precaution was lifted. Multiple public health assessments were completed in response to the event, some of which included door-to-door surveys, monitoring of local health-care trends, and assessments of risk from sediment, groundwater, and inhalation. All assessments resulted in conclusions of low risk to residents.

Though rare, loss of life has occurred for individuals engaged in land or resource use along pipelines (Enbridge 2016d). These instances tend to be associated with pipelines carrying more refined fuels with greater flammability. The victims tend to be construction or repair workers working directly on the pipeline, though victims may also include the general public. Repair of an Enbridge pipeline near Clearbrook, Minnesota, resulted in the deaths of two pipeline workers in 2010 when leaking oil ignited (Bloomberg News 2010). When a bulldozer struck a crude oil pipeline in Lufkin, Texas (2005), oil ignited and injured the operator (Propublica 2015). In California (2004), five deaths and four injuries occurred when contractors struck a gasoline pipeline (Office of State Fire Marshall 2004).

10.2.2.4.17 Land and Resource Use

The effects of oil on land and resource use can vary from permanent or temporary suspension of use to evacuation and loss of life (Enbridge 2016d). Examples of land uses potentially affected by oil spills include agriculture, aquaculture resources (including wild rice harvest), fisheries, forest resources, and recreation.

Oil spills commonly affect recreational use along waterbodies with beaches and fisheries. An example includes a release of heavy crude (1996) from a Chevron-owned pipeline, which discharged into Pearl Harbor (Kakesako et al. 1996). Strong odors resulted in closure of the visitor center for 4 days, and the 2- week clean-up efforts resulted in closure to recreational users, harbor vessel traffic, and commercial fisheries. Following a spill of 800 bbl of medium crude oil into Red Butte Creek in Salt Lake City, Utah, recreation activities were restricted near the creek for over 40 days, and direct use of the creek was restricted for 2 years during restoration (O'Donoghue 2012). In response to the Wabamun Lake spill, officials closed portions of the lake for swimming and boating for a year, and put in place fish and waterfowl consumption advisories for 2 years.

Agricultural lands have also been affected by pipeline oil spills. For example, in 2013 a 20,600-bbl leak of crude oil was discharged directly to agricultural fields in North Dakota. The farmer and Tesoro, the owner of the oil, indicated that clean-up activities were likely to take 2 to 3 years, during which time the farmer was to be compensated for losses (Associated Press 2014).

An important resource use consideration along pipelines is use by American Indian tribes. Impacts on these resources have not been well documented in the public record, but often can result in settlements between the responsible parties and tribal groups. The Wabamun Lake CN Rail derailment release resulted in lawsuits filed by the Paul First Nation, which ultimately led to a settlement of $10 million (CBC News 2008). U.S. regulations allow American Indian tribes to be included as trustees in the Natural Resource Damage Assessment (NRDA) process, which occurred after the Marshall, Michigan, spill. The

Nottawaseppi Huron and Match-E-Be-Nash-She-Wish Bands of the Potawatomi Tribe were designated as trustees in the NRDA process (USFWS et al. 2015).

10.2.3 Fire and Explosion Hazards

A complete analysis of the fate and effects of an accidental crude oil release will include the potential for consequential fire and explosion. A crude oil spill leads to the pooling and flow of liquid hydrocarbon onto a land or water surface. Flammable gas mixtures vaporize from the surface of the pool governed by numerous physical processes as shown in Figure 10.2-2 must be understood to account for fire and explosion hazards. One of the most important aspects for fire and explosion hazard representation is representing a realistic source term from a pool which has been formed by liquid escaping containment. The quantities of interest for input into a dispersion model are the rate at which vapor is produced from a pool, the size of the pool (which determines the initial dimensions of the dispersing cloud) and the temperature of the vapor.

The flammability characteristics of crude oil varies significantly by type composition. Table 10.2-7 presents the flash point, the temperature at which a mixture gives off sufficient vapor to ignite in air, for typical crude oils NA. Notice that the flash point changes from transport conditions to weathered conditions evolve such that the highest concern is at the early phase of the release. Table 10.2-7 demonstrates that light and medium crudes have very low temperature flash points, they remain volatile over a normal ambient temperature range. However heavy crudes and Dilbit require higher temperatures to evolve flammable hydrocarbon vapors, above 60°C, after initial weathering. It should also be noted that Dilbit is a proprietary composition, but mainly divides into dilution by natural gas condensate which exhibit fire/explosion concerns.

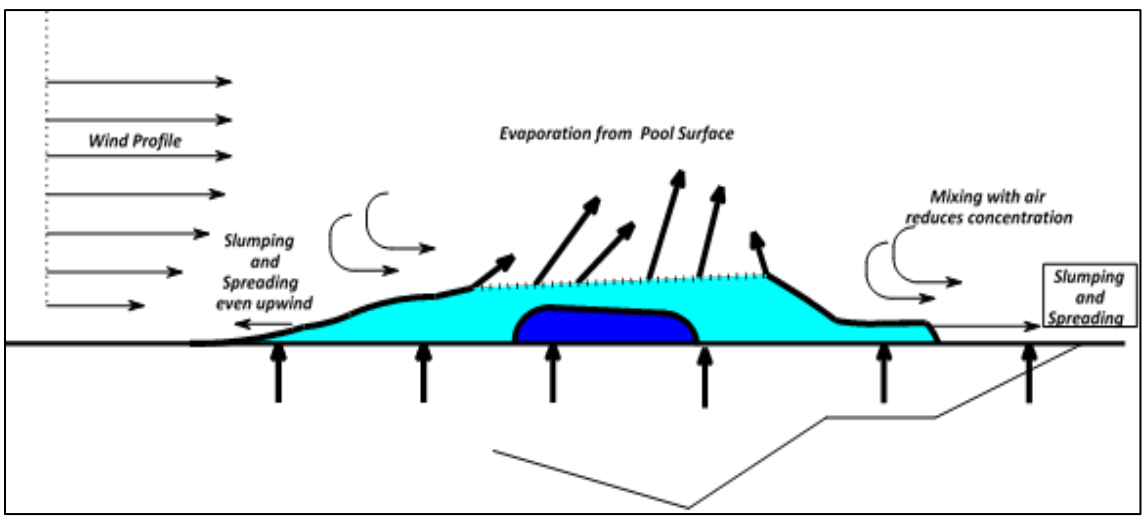

Figure 10.2-2 Hydrocarbon Evaporation Processes

Table 10.2-7. Flash Point Comparison of Typical Crude Oils

Type of Crude Oil	Flash Point Before Release[a]	Flash Point After Initial Weathering (mass % loss in weathering)	Flash Point After Additional Weathering (mass % lost in weathering)
Light Crude[b]	<−30°C	23°C (25%)	95°C (64%)
Medium Crude[c]	−10°C	33°C (10%)	>110°C (32%)
Heavy Crude[d]	−3°C	67°C (10%)	>95°C (19%)
Diluted Bitumen[e]	<−35°C	>60°C (15%)	>70°C (30%)
Bitumen	>100°C	>100°C (1%)	>110°C (2%)

Source: Hollebone, B. 2015[a] Flashpoint in degrees Centigrade (°C).

[b] Scotia Light.

[c] West Texas Intermediate.

[d] Sockeye Sour.

[e] Cold Lake Blend.

If the vapors do not ignite immediately, the vapor cloud will drift and disperse downwind decreasing in concentration as the vapors mix with air. When the vapor to oxygen ratio decreases from its initial rich concentration to within the flammability range, it can ignite. Ignition of a flammable vapor cloud in an open space leads to a flash fire, with impacts to people and structures inside and slightly beyond its volume. However, if the flammable vapor cloud ignites within an area that is both confined (walls, floor, ceilings, decks) and congested (objects densely occupying volume; such as cars, trees, industrial equipment) then a vapor cloud explosion can occur. Depending on the combination of fuel, confinement and congestion, the combustion could either be subsonic, (deflagration) or supersonic (detonation). A vapor cloud explosion, like a fire, can lead to effects on people and property. If the explosion occurs proximate to additional stored flammable materials, this can lead to escalation, the situation wherein additional fuel is additive to the initial release inventory.

The timing and location of the ignition determines the physical effect resulting from the hydrocarbon vapors, and includes these types of hazards

- **Pool Fire.** This is a fire that burns from a pool of vaporizing fuel. The primary concern associated with pool fires is hazards associated with increased temperatures from thermal radiation (heat). For crude-by-rail trains, a pool fire could occur if there is an incident leading to a release of crude oil that forms a pool and then catches fire. . For the pool fire, the flame width is essentially the diameter of the pool which also sets the flame height

- **Vapor Cloud Fire (Flash Fire).** A rapidly moving flame front characterized by combustion. Flash fires occur in an environment where fuel and air become mixed in adequate concentrations to combust.

- **Vapor Cloud Explosion.** A vapor cloud explosion is the result of a flammable material that is released into the atmosphere, at which point the resulting vapor cloud is ignited. The primary concern from a vapor cloud explosion is overpressure (pressure caused by a shockwave). For crude-by-rail trains, such an explosion could occur if oil was released during an incident and

evaporated into the air, forming a vapor cloud. This requires that there be no immediate ignition source.

All of these physical effects have been analyzed within the petrochemical industry for many years, the methods and computational models are available for such analyses (e.g. pool spread, dispersion, fire, and explosion).

Each of these processes shown in Figure 10.2-2 must be understood to account for fire and explosion hazards. One of the most important aspects for fire and explosion hazard representation is representing a realistic source term from a pool which has been formed by liquid escaping containment. The quantities of interest for input into a dispersion model are the rate at which vapor is produced from a pool, the size of the pool (which determines the initial dimensions of the dispersing cloud) and the temperature of the vapor.

10.3 CRUDE OIL TRAJECTORY AND FATE MODELING

Enbridge commissioned a modeling analysis on behalf of and with input from the Minnesota Department of Commerce, Energy Environmental Review Analysis Staff, the Minnesota Department of Natural Resources, and the Minnesota Pollution Control Agency, for seven hypothetical crude oil releases from pipeline locations along the Applicant's preferred route and route alternatives(Stantec et al. 2017). This study is relevant to the behavior of crude oil after a release, as discussed in Section 10.2, and the exposure assessment in Section 10.4. This computer modeling involves simulating the chemical and physical behavior of hypothetical oil spills in the selected environments under specified conditions, including weathering processes.

The rupture study (Stantec et al. 2017) focused on providing information about potential pipeline rupture events only. Hence this work is at the opposite extreme from the pinhole release study (Stantec and Barr Engineering 2017), evaluating the largest possible breach size -- the full diameter of the pipeline. In the case of the Line 3 Project, this is 36 inches in diameter, an area over 300,000 times larger than a pinhole. The probability analysis approach taken in the rupture study used a combination of statistical and mechanistic modeling. A modeling approach was taken to represent each pipeline failure mechanism (threat) individually and to combine them into an overall probabilistic failure rate estimate. Statistical evaluation of PHMSA Hazardous Liquids Database, 2010–2015 was used for estimating the failure probabilities due to; manufacturing defects, construction defects and incorrect operations. Mechanistic reliability models were used for estimating the failure probabilities due to; external corrosion, internal corrosion, and third party damage.

The rupture study was used to develop specific failure probabilities for seven sites selected for in-depth analysis based on (1) their distribution across the Applicant's preferred route and route alternatives,[21] and (2) how well they represented the diversity of characteristics that were identified as significant during public scoping (Figure 10.3-1). The sites were selected jointly by agency staff and the consulting team as documented in the rupture study.

[21] Stantec et al. only evaluated the Applicant's preferred route and route alternatives. The CN Alternatives, including system alternative SA-04, transportation by rail and truck, and continued use of existing Line 3 were not evaluated during their study (Stantec et al. 2017).

Stantec et al. conducted a failure probability analysis for these seven sites—six at pipeline water crossings and one in an upland location adjacent to a small creek (2017). As part of that analysis, they assessed potential causes of pipeline failures or threats. The threat components resulting in pipeline failure were evaluated based on current materials and technologies characteristic of a modern replacement pipeline. The results of these studies were applied to the failure probability analysis in this section, as well as the exposure assessment in Section 10.4.

The spill model study (Stantec et al. 2017) is available online on the DOC-EERA Project website (https://mn.gov/commerce/energyfacilities/line3/), on the Project eDockets site (Line 3 Route Permit PUC eDockets), and by CD included with hard copies.

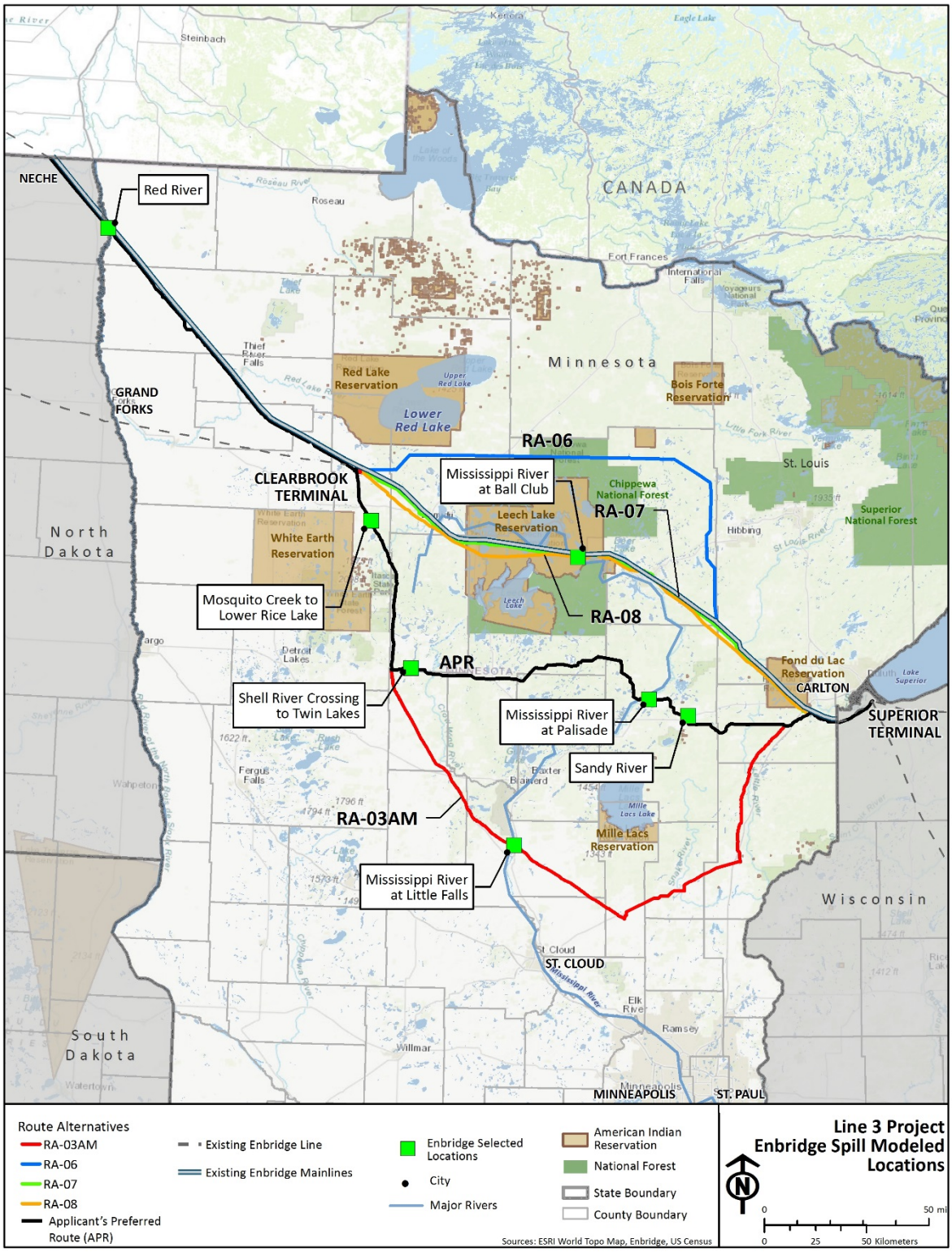

Figure 10.3-1. Seven Enbridge Spill Sites Modeled in Stantec et al. 2017 Study

10.3.1 Description of the Models Used

Stantec et al. (2017) used two different models to evaluate the trajectory and fate of crude oil releases at seven study sites: OILMAP Land is a two-dimensional predictive modeling tool for predicting the trajectory and fate of released crude oil in the horizontal downslope and downstream direction (Figures 10.3-2 and 10.3-3). SIMAP is a considerably more complex model that incorporates a third dimension, vertical movement in the water column, which provides the ability to model the transport of crude oil in the water column and potential sinking and submergence in turbulent waters after contact with in river sediments (Figure 10.3-4) (Stantec et al. 2017). The models can also be used to determine potential environmental damages based on the concentrations, dose exposures, and properties of the oils as related to toxicity, adherence, and persistence.

Both of these models have been used extensively in the US and internationally to meet regulatory requirements and other recommendations and guidelines. These models are used frequently by government, industry, and academia. Spill modeling currently provides the most comprehensive, accurate, and practical means to evaluate the outcomes of hypothetical spills.

The SIMAP modeling system was developed by RPS (formerly Applied Science Associates, ASA). It originated from the oil fate and biological effects sub-models in the Natural Resource Damage Assessment (NRDA) Models for Coastal and Marine Environments (NRDAM/CME) and Great Lakes Environments (NRDAM/GLE), which ASA developed in the early 1990s for the U.S. Department of the Interior for use in “Type A” NRDA regulations under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The most recent version of the type A models, the NRDAM/CME (Version 2.4, April 1996) was published as part of the CERCLA type A NRDA Final Rule (Federal Register, May 7, 1996, Vol. 61, No. 89, p. 20559-20614). The technical documentation for the NRDAM/CME is in French et al. (1996). This technical development involved several in-depth peer reviews, as described in the Final Rule. (The model is described in greater detail in Stantec et al. 2017).

SIMAP was used as part of the Natural Resource Damage Assessment studies conducted for NOAA in the aftermath of the Deepwater Horizon spill (French McCay et al. 2016). These spill models have been validated against actual spills (French and Hines 1997; French et al. 1997; French McCay 2004).

Detailed descriptions of the algorithms and assumptions in the model are provided in French McCay 2002, 2003, 2004, and 2009. The model has been validated with more than 20 case histories, including the Exxon Valdez and other large releases (French and Rines 1997; French McCay 2003 and 2004; French McCay and Rowe 2004), as well as test releases designed to verify the model (French et al. 1997).

OILMAP Land was selected for modeling releases at less turbulent aquatic systems (Sites 1 through 5), and SIMAP was employed for higher flow, more turbulent large rivers (Sites 6 and 7) where entrainment of crude oil droplets would be more likely to occur with vertical mixing and movement within the water column and potential deposition in bottom sediments.

OILMAP Land takes into account the overland flow of the oil when the hypothetical release occurs on land. The retention of oil in puddles and adhesion to substrates is considered and calculated based on topography, types of land cover (e.g., bare rock, evergreen forest, wetland), and oil type. In addition, the weathering (evaporation) of the oil is included. The encounter of oil with surface water during different seasons is incorporated into the model as well. In streams, OILMAP factors in the adherence of different oil types to various shoreline substrates (e.g., sand/gravel, marsh, rock , as well as the formation of tar bodies that may lead to oil submergence in turbulent waters) (Stantec et al. 2017).

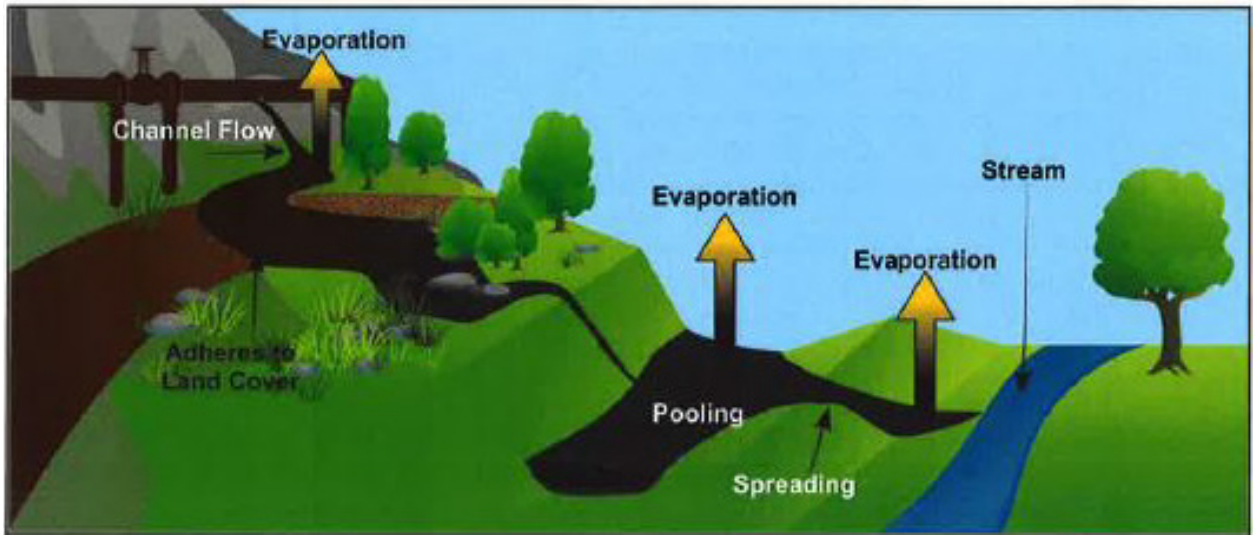

Source: Stantec et al. 2017.

Figure 10.3-2. Conceptual Diagram of Land Transport Model in OILMAP Land

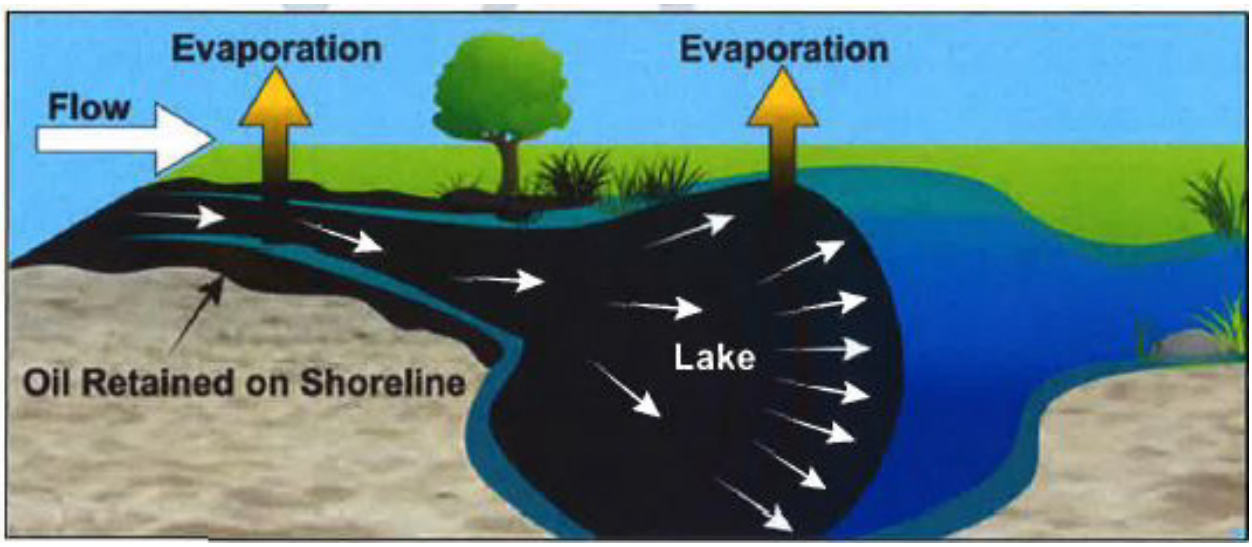

Source: Stantec et al. 2017.

Figure 10.3-3. Conceptual Diagram of Downstream Transport Model in OILMAP Land

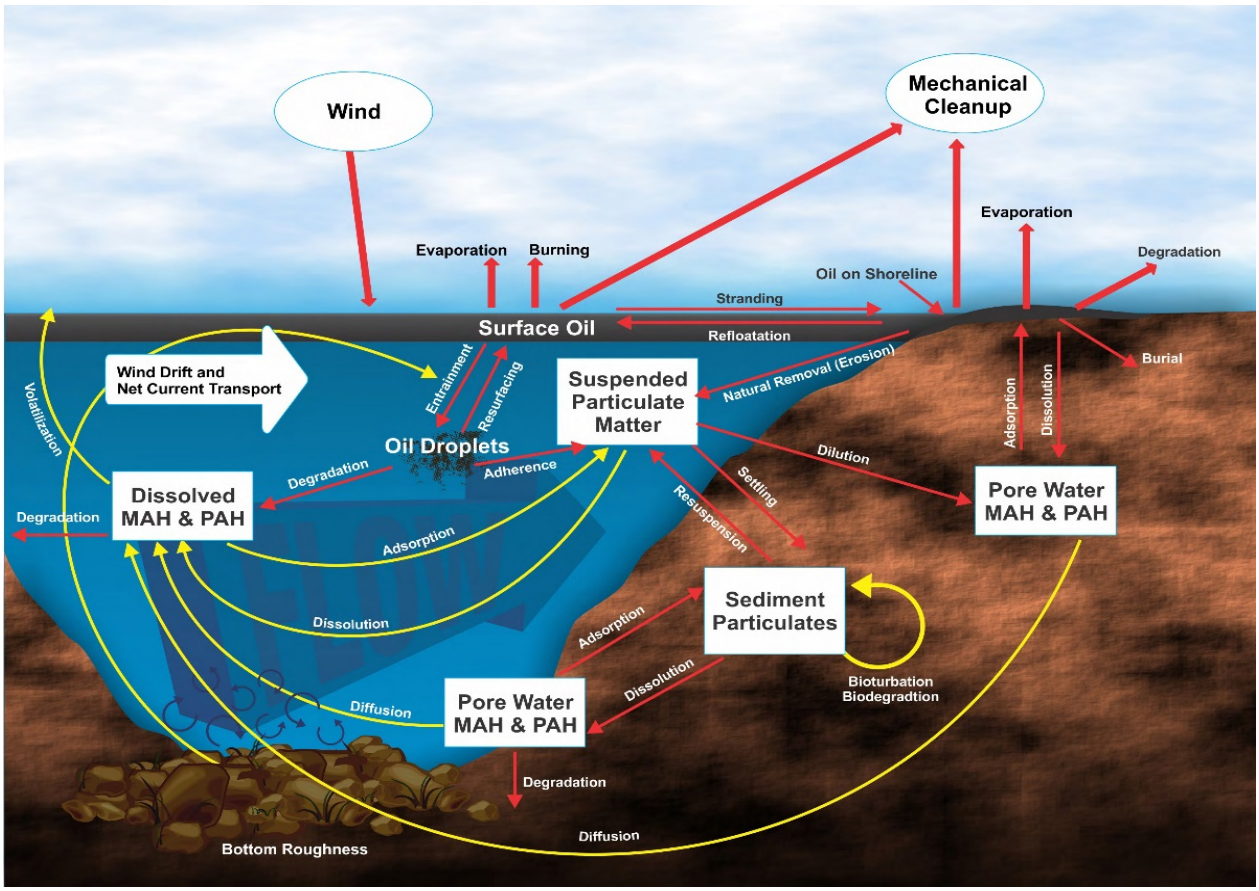

Source: Stantec et al. 2017.
MAH = monocyclic aromatic hydrocarbon, PAH = polycyclic aromatic hydrocarbon

Figure 10.3-4. Crude Oil Behavior in Aquatic Systems Simulated by SIMAP

The modeling is very specific to the conditions that would be encountered in the event of an actual spill. OILMAP and SIMAP incorporate data on the specific topographical, geographical, hydrodynamic (river currents and flow rates), weather conditions, habitats, ice conditions, and shoreline types at the selected sites.

Several release scenarios were modeled for each of the seven sites. Unmitigated releases, characterized by no emergency response for the first 24 hours, were simulated to provide a conservative, "worst-case" scenario at the hypothetical release locations[22] (Stantec et al. 2017). Two different crude oil types, a light Bakken crude oil and heavier Cold Lake Blend dilbit, were evaluated under three flow conditions (spring high flow, summer and fall average/moderate flow, and winter low flow) at the seven sites at different time intervals (6, 12, 18, and 24 hours). The spill volumes were estimated based on a 13-minute (10 minutes for response and 3 minutes of pumping out during valve closure) shutdown response and gravitational drainage of oil in the line based on distance between shut off valves and topography.

22 Another conservative assumption is that crude oil would travel unimpeded during the entire 24-hour modeled run for each release scenario.

10.3.2 Purpose of Spill Modeling

The modeling of hypothetical worst-case discharge spill scenarios was to provide insight into the behavior of different types of oils in the environments that are typical of Minnesota to help in the consideration of potential contingency planning requirements and to evaluate the range of potential environmental impacts. It was not practical to model hypothetical incidents along the entire 365-mile long Applicant's proposed route of Line 3 and the various lengths of all its alternative routes, nor to incorporate every conceivable contingency and circumstance. The purpose of the modeling was not to predict the outcomes of all the potential types of spills that might hypothetically occur from the Line 3 alternatives.

In reality, each spill is a unique event. Even with the same spill volume and oil type spilled at the same location, there can be varying outcomes depending on the weather, decisions made in the response operations, and other chance events. For example, for the 2000 PEPCO pipeline spill of 3,300 bbl of heavy oil in Chalk Point, Maryland, it was shown, through modeling, that if particular boom had not failed during the response and the directions of response officials had been followed, 57 percent of the oiled wetlands might have been spared impact (Etkin et al. 2006). In other spills, the weather has affected oil behavior. For example, in the 2010 Kalamazoo pipeline spill, heavy rain and flooding had a significant impact on the spread of the oil. Storms and other weather events could potentially affect the ability of responders to operate effectively or to carry out certain response strategies.

The modeling for Line 3 alternatives represent a reasonable and practical selection of spill outcomes that were meant to represent worst-case conditions to the extent possible.

10.3.3 Selection of Representative Sites for Modeling

Modeling of hypothetical spills from Line 3 was conducted to simulate the behavior, trajectory (path), fate, and effects of the spilled oil and determine the potential impacts from large spills. Since it was not feasible to model spills and all potential spill locations along the various Line 3 routes, it was necessary to select a reasonable number of sites that would adequately represent the variety of conditions present along the entire length of the Line 3 Applicant Preferred Route (APR) and various Route Alternatives (RA), as shown in Figure 10.3-1.

10.3.3.1 Site Selection Process

The Applicant's proposed Line 3 pipeline covers diverse landscape and habitat types, including grasslands, agricultural lands, forests, streams, rivers, lakes, and wetlands, along its over 340-mile path across the width of the state of Minnesota. There are regional and seasonal differences in climatic and environmental factors, including temperature, wind speed, precipitation (rain and snow), ice conditions, river flow, and terrain that could have a significant effect on the transport of oil over land and in water, as well as the adherence and retention of oil in various shoreline and land substrates. These factors needed to be taken into account in the site selection process.

The selection process involved a series of meetings with Minnesota Department of Commerce Energy Environmental Review and Analysis (DOC-EERA) and state and federal agencies to define not only the

selection of sites, but also the overall modeling approach. The modeling approach was based on a number of "conservative" choices. A conservative modeling approach:[23]

- Tends to maximize predicted effects and improves the understanding of worst-case outcomes in oil trajectories, behavior, and associated effects;
- Allows for the model to bound upper and lower limits, reducing the number of scenarios required, while still maintaining the integrity and likelihood [plausibility] of the model and scenario; and
- Aids pipeline engineers and emergency response planners to better understand and prepare for a potential worst-case scenario.

A primary consideration for selecting sites for modeling was the understanding that in the event of a full-bore rupture incident, crude oil releases to land often result in oil contamination of only small areas of land (i.e., a few acres). On land, crude oil will pool and collect in depressions and adhere to vegetation and soil. In contrast, if crude oil was accidentally released into water, it can travel over larger distances due to water movement and its behavior in water, thereby potentially exposing a larger area to contact with crude oil. The effects of a release of crude oil on land are not inconsequential. However, the selection of locations for the hypothetical releases of crude oil that would result in oil entering watercourses (rivers or lakes) was in keeping with a conservative approach with respect to the fate, transport, and potential effects of released oil. Modeling scenarios therefore focused on locations where the hypothetical release of oil would either occur directly into a watercourse or would travel overland before eventually reaching a watercourse.

Issues and concerns that were raised as a result of the regulatory review process were used to identify the type and range of conditions that would need to be considered in the assessment of large crude oil releases in the modeling including:[24]

- Sites where the downstream movement of a crude oil release could overlap with and potentially affect a range of human uses (e.g., sources of drinking water, wild rice cultivation, agricultural lands, fishing, recreational uses, urban areas), as well as sensitive ecosystems (wetlands, sensitive fish spawning habitat for species such as walleye and trout, sensitive vegetation communities, forested regions, rare and endangered species).
- The need to assess potential effects of crude oil releases into large watercourses such as the Mississippi River. This reflected concerns for effects on environmental and human receptors, as well as concerns for interaction of the crude oil with suspended sediments in the water column and the potential for the oil-mineral aggregates, which may result in "sinking oil."
- The importance of considering differences in the characteristic of water features, including river width, the length of watercourses before entering larger water bodies, and differences in turbulence (e.g., flat calm water, riffles, rapids, and waterfalls) and other water feature characteristics (e.g., sediment loads, presence of emergent vegetation).

[23] Based on information in Stantec et al. 2017.

[24] Stantec et al. 2017.

With these factors in mind, a set of selection criteria for sites were established to address engineering and environmental/socio-economic considerations. The criteria mandated that the sites should:[25]

- Be located so that a hypothetical large release of crude oil could potentially enter a watercourse either directly into a watercourse or through travel overland into a watercourse;
- Be located where shut-off valves would not overly restrict the volume of crude oil that could potentially be released (i.e., hydraulic drain down of pipeline would be a substantial contributor to the oil release volume);
- Include sites along both the preferred and alternate routes for Line 3;
- Be representative of the geographic and environmental conditions and land uses along the proposed right of way (ROW) for Line 3 to aid in the evaluation of the range of potential effects to the natural and human environment along the pipeline;
- Include a range of watercourse types (e.g., size, flow, energy level) and water bodies, including wetlands;
- Support evaluation of potential effects to environmentally sensitive resources (e.g., spawning grounds for fish, wild rice lakes, or other sensitive habitats);
- Represent areas of expressed concern by American Indian tribes, the general public, and/or state and federal agencies; and
- Support evaluation of potential effects to traditional use, other human use or infrastructure (e.g., potable water intakes or treatment facilities)

Working with the state and federal agencies, technical support for DOC-EERA, and Enbridge and their technical support,[26] nearly 1,000 watercourses were considered. There were 274 watercourses transected by the Line 3 APR, and 641 watercourses transected by the various ARs. The final selection of sites was made by summarizing the attributes with respect to six basic criteria:

- Location (within portion of Minnesota crossed by preferred and alternate routes for Line 3);
- Geomorphology;
- Location of sensitive resources or habitats in proximity to the preferred and alternate routes;
- Ecological land classification (province);[27]
- Watercourse characteristics (i.e., flat water, rapids/falls, lake); and
- Potential human uses (i.e., recreational, drinking water, populated area, sensitive ecosystem).

[25] Stantec et al. 2017.

[26] Stantec, RPS, and Dynamic Risk.

[27] Based on Minnesota's Ecological Classification System for ecological mapping and landscape classification (MN DNR 1999). Provinces are units of land defined using major climate zones, native vegetation, and biomes such as prairies, deciduous forests, or boreal forests. There are four provinces in Minnesota.

The seven sites selected are described in Table 10.3-1, and characterized by these attributes as in Table 10.3-2. The site locations are shown in Figure 10.3-1.

For each of the seven representative locations, the modeling included two oil types (heavy crude and light crude) and three different time periods. The time periods took into account seasonal differences in environmental factors, such as river flow rate, snow/ice coverage, temperature, and wind speed. This created a total of 42 scenarios: 7 locations x 2 oil types x 3 environmental conditions.

10.3.4 Benefits and Limitations of Representative Site Modeling Approach

The representative-site modeling approach, as applied and presented in the EIS has the benefit of providing a means to analyze the potential trajectory (movement), fate (behavior and weathering), and effects of hypothetical spill scenarios under a variety of environmental circumstances. The locations and environmental conditions (as well as the hypothetical volumes of oil in the release scenarios) were selected in a conservative manner to effectively maximize oil transport and impacts to create simulations of worst-case scenarios. The modeling results can be used to qualify and quantify the consequences of a worst-case discharge for risk assessment purposes. The conservatively-developed site approach also fosters the understanding of the potential worst-case circumstances that pipeline engineers and emergency and spill response officials need to factor into planning.

That said, the modeling of representative sites can never comprehensively forecast all conceivable outcomes of hypothetical spill scenarios at the virtually infinite number of unique locations along the along the Line 3 pipeline. Each oil spill incident is a unique event in terms of the specific circumstances that affect the behavior, trajectory, fate, and effects of the oil. Case studies of past spill events in the US and around the world have demonstrated that many different factors determine the outcome of each incident.

The representative sites were selected to favor circumstances that would tend to exacerbate potential impacts and effects of the hypothetical spills along the Line 3 pipeline. In all likelihood, a spill of equivalent volume as the hypothetical scenarios that occurred at another location and time would have an outcome that would be of lesser consequences, or, at most similar consequences to one of the representative scenarios. It is also highly likely that any spill that does occur would be significantly smaller than the release volumes assumed for the hypothetical scenarios. (This is discussed in greater detail in Section 10.3.6 and Appendix S.[28])

A number of public comments have raised the issue of the lack of modeling in specific locations of concern. The potential outcomes of hypothetical spills in many of those locations may be addressed by applying the approach of selecting reasonably similar sites based on Table 10.3.-2.

[28] Etkin 2017.

Table 10.3-1. Description of Representative Release Locations

Site	Overland/Watercourse Factors	Represented Environmental Conditions
Site 1: Mosquito Creek to Lower Rice Lake *47.4604* *-95.3066*	• Potential for overland flow of and downstream transport of oil in very small watercourse. • Release point in relatively flat, forested region that forms drainage area with gentle slope towards agricultural and grassland habitats. • Swale collects into narrow and seasonal water crossing that ultimately forms Mosquito Creek (channel 3 ft wide). • After 12.5 miles, creek grows to 35 ft in width, before entering Lower Rice Lake (1,600 acres with large areas of wild rice).	• Small quiescent watercourse with wetlands, marsh, and fen. • Agricultural lands, nature preserve, and wild rice representative of lands that may be used as source of food and recreation. • Portions of ecosystem classified as sensitive.
Site 2: Mississippi River at Ball Club *47.2360* *-93.9596*	• Sinuous water channel 80 ft wide. • Flows through relatively well defined channel that with many oxbows. • Banks lined with extensive wetlands and forested areas. • Under high river flows, connects to White Oak Lake, before extending through more sinuous channels and marshy wetlands.	• Quiescent watercourse of intermediate size with wetlands, marsh, and fen. • Lake is approximately 9 miles downstream of hypothetical release location. • Representative of lands where food may be harvested, including fish and wild rice. • Includes upstream portion of Mississippi River and forested land. • Region is used for outdoor recreation, near the populated area of Deer River. • Sensitive ecosystems present.
Site 3: Sandy River *46.6363* *-93.2431*	• Bifurcated channel 30 ft wide. • South channel has natural sinuous feature; northern channel has straight drainage ditch. • Mainly lined by marshy grasses and wetland with some forests. • Flows through Steamboat and Davis lakes to Flowage Lake and eventually Big Sandy Lake (6 and 12 miles downstream) • Known to contain fish spawning habitat.	• Small ditch/creek type watercourse that enters into lakes and ponds after passing through wetlands, marsh, and fen. • Representative of forested and agricultural lands where food may be harvested. • Used for recreation, specifically focused around recreational fishing. • Sensitive ecosystems present.
Site 4: Shell River Crossing to Twin Lakes *46.8196* *-95.0430*	• Straight marshy channel 80 feet wide passes through forested areas and agricultural lands. • Enters Upper Twin Lake before draining into small reach that feeds Lower Twin Lake (0.6 to 1.2 miles downstream) • Houses line lakes, with docks for swimming and boating.	• Medium-width quiescent watercourse that enters directly into lakes after passing through areas with wetlands, marsh, and fen. • Representative of inhabited areas used recreationally. • Sensitive ecosystems present.

Table 10.3-1. Description of Representative Release Locations

Site	Overland/Watercourse Factors	Represented Environmental Conditions
Site 5: Red River *48.70533* *-97.1148*	• Located along border of Minnesota and North Dakota; runs north into Canada. • Downstream from site Red River is large, wide (150–400 ft) river that flows north along well-defined sinuous channel. • Passes communities of Pembina, North Dakota and St. Vincent, Minnesota 32 river miles downstream. • Crosses into Canada 34.5 miles downstream. • Communities of Emerson and West Lyme, Manitoba located on Canadian side of border.	• Large, low-gradient watercourse, with sinuous channel subject to flooding. • Shore predominantly vegetated, often with shrubs and trees above level of ice-scour. • Patches of forest often present where river meanders; • Surrounding land use primarily agricultural. • Known to be major area for recreation use. • Passes through or adjacent to sensitive ecosystems. • River is subject to moderate to extreme flooding, particularly in spring. • Under low or average flow, stream banks are combination of grass and soil; under higher flow river can overtop banks and spread into surrounding farm and grassland.
Site 6: Mississippi River at Palisade *46.6983* *-93.4950*	• At release site, large river 250 ft wide. • Sinuous channel mostly flat water passing through number of oxbows. • Some turbulent waters with presence of flood diversion dam and spillway. • Under high flow rates, small region has very turbulent waters containing rapids from waterfall.	• Large and relatively quiescent watercourse with predominantly forested banks. • Includes midstream portion of Mississippi River and forested lands. • Majority of channel relatively flat water. • Flood diversion channel, with dam and spillway, have potential for localized turbulence that could entrain oil. • Sinuous channel used recreationally. • Sensitive ecosystems present. • Drinking water source to area residences.
Site 7: Mississippi River at Little Falls *46.0483* *-94.3420*	• At release site, large river 820 ft wide, which flows to the south. • Release site 5 miles north of small urban area (Little Falls). • Little Falls Dam has large waterfall that induces large amount of turbulence, which would entrain surface oil into water column, if oil were to travel downstream to dam. • Second dam and waterfall (Blanchard Dam) 8 miles downstream of Little Falls, provides the potential for further entrainment of oil.	• Shore types mainly forested, with some small portions of agricultural lands and urban areas along banks. • Waters used recreationally/ • Sensitive ecosystems present.

Table 10.3-2. Summary of Characteristics of Each Representative Release Location

Representative Release Location		Mississippi River at Ball Club	Mississippi River at Little Falls	Mississippi at Palisade	Mosquito Creek to Lower Rice Lake	Red River	Sandy River	Shell River Crossing to Twin Lakes
EcoProvince		Laurentian Mixed Forest	East Broadleaf Forest	Laurentian Mixed Forest	Laurentian Mixed Forest	Prairie Parkland	Laurentian Mixed Forest	Laurentian Mixed Forest
Site Features								
Hydrology Features	Ditch/Creek				X		X	
	Watercourse (Stream/River)	X	X	X	X	X	X	X
	Lake/Pond	X			X		X	X
	Flat Water	X		X	X	X	X	X
	Rapids/Falls		X	X				
	Dams		X	X				
	Wetland/Marsh/Fen	X			X		X	X
Watercourse Width	Small (<10 m)				X		X	
	Medium (10–50 m)	X		X				X
	Large (>50 m)		X			X		
Watercourse Features	Agricultural Land		X		X	X	X	X
	Forested Region	X		X			X	X
	Mississippi River	X	X	X				
	Urban Area		X					
	Wild Rice	X			X		X	X
Identified Uses	Recreational	X	X	X	X	X	X	X
	Drinking Water			X		X		
	Populated Area		X			X		
	Sensitive Ecosystem	X	X	X	X	X	X	X
Includes Overland Transport					X			

Source: Stantec et al. 2017.

If an interested party has concerns over potential impacts to a particular watercourse or location not selected for the modeling, the sites in Table 10.3-2 can be used to find an equivalent representative site to the one of concern. In the modeling report,[29] it states:

> "As an example, should an individual near Bemidji be concerned about the possible effects of a release into Lake Irving, they can refer to Table 10.3-2 to find an equivalent site. The Lake Irving location includes a small watercourse (<10 m) that travels a short distance and connects to a lake/pond with recreational use and sensitive ecosystems. Upon comparison, the Shell River representative release location would be a logical substitute. Similarly, if one were to consider another release location that entered a medium watercourse that traveled a longer distance before entering a lake/pond system, they could consider the Sandy River representative release location as an equivalent site."

10.3.4.1 24-Hour Time Frame

The modeling of the 42 hypothetical spill scenarios (7 locations x 2 oil types x 3 seasons) was conducted to determine the trajectory (path) and fate (behavior and weathering) of the oil only over the course of the first 24 hours. According to the modeling study report:[30]

> "The analysis was carried out following a highly conservative assumption that the released crude oil would travel downstream unimpeded for that length of time. This is a conservative assumption because Enbridge would immediately mobilize a response that would contain and collect oil in the event that a release [were] to be detected. The 24-hour time frame is consistent with guidance from the US Environmental Protection Agency (EPA), which stipulates a 27-hour period, representing 24-hours for arrival and 3-hours for deployment.[31] As such, modeled results should not be interpreted as representative of expected effects, but rather as an unlikely, unmitigated worst-case potential outcome."

10.3.4.1.1 Justification for the 24-Hour Time Frame for Spill Modeling

According to the study report,[32] in addition to the referenced EPA guidance, a further justification for the 24-hour time frame is that a similar duration and time steps were used for the ecological and human health risk assessment for Line 3 in Canada that was submitted to the National Energy Board of Canada.[33]

The modeling simulations assumed that the release was "unmitigated," meaning that there were no deflection or blockage of the oil in its movement downstream, nor any reductions in the amount of oil in the water, that might be "mitigated" by the strategic placement of booms and the use of skimming or vacuuming devices, respectively. In an actual spill scenario, the pipeline would be shut-in and emergency responders would be expected to begin to arrive on-scene within a few hours after

29 Stantec et al. 2017.

30 Stantec et al. 2017.

31 USEPA 2003.

32 Stantec et al. 2017.

33 Enbridge 2015.

notification of the incident to begin spill response operations. The former would be meant to stop the flow of oil, which would be the most effective mitigation strategy. The latter would be to take measures to reduce the movement of oil in the water and begin removing oil from the environment.

10.3.4.1.2 Concerns about 24-Hour Time Frame for Modeling

While it is possible to incorporate mitigation measures (spill response into SIMAP modeling),[34] that is usually done to analyze the potential effectiveness of response or compare strategies. The modeling of "unmitigated" responses is standard for most studies associated with EISs and other purposes. The entire "conservative" approach is based on maximizing the effects to examine the worst-case scenarios. Assuming "no response" in the modeling, i.e., not including hypothetical reductions in the amount of oiling through effective recovery methods, is actually in keeping with that.

According to Enbridge's *Line 3 Replacement Project Safety Report*, submitted with its application in April 2015 and its update in January 2017,[35] Enbridge's Controller in the primary incident detection system in the Control Center has 10 minutes to analyze information to initiate a shut-down. However, there is no specific estimate of the time in which the spill response measures would commence or be successfully completed to stop the further flow of oil downstream. However, the response plan would need to comply with EPA regulations.

According to the EPA requirements for inland responses,[36] the "substantial harm planning time" requirement in "all other rivers and canals, inland, and nearshore areas"[37] is 24 hours for arrival and a three-hour time period for deployment.[38] This would be for a Tier 1 response. Tiers 2 and 3 would roll out at 36 and 60 hours, respectively, for a worst-case discharge. The worst-case discharge volumes from Line 3 were calculated as inputs for the modeling.[39] In the Tier 1 response (within 24 hours), the response equipment that would have arrived would only be required to be capable of recovering 15 percent of the total discharge.[40]

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34 For example, see Buchholz et al. 2016a, 2016b, 2016c; Etkin et al. 2006, 2008.

35 Enbridge 2015e; Enbridge 2017.

36 40 CFR 112 (Table 3, Appendix C).

37 i.e., Any place that is not in the Great Lakes or a higher-volume port area.

38 The specified time intervals in Table 3 of Appendix C are to be used only to aid in the identification of whether a facility could cause substantial harm to the environment. Once it is determined that a plan must be developed for the facility, the owner or operator shall reference Appendix E to this part to determine appropriate resource levels and response times. The specified time intervals of this appendix include a 3-hour time period for deployment of boom and other response equipment. (40 CFR 112).

39 From 30 CFR 254.47: "For a pipeline facility, the size of your worst case discharge scenario is the volume possible from a pipeline break. You must calculate this volume as follows: (1) Add the pipeline system leak detection time to the shutdown response time. (2) Multiply the time calculated in paragraph (c)(1) of this section by the highest measured oil flow rate over the preceding 12-month period. For new pipelines, you should use the predicted oil flow rate in the calculation. (3) Add to the volume calculated in paragraph (c)(2) of this section the total volume of oil that would leak from the pipeline after it is shut in. Calculate this volume by taking into account the effects of hydrostatic pressure, gravity, frictional wall forces, length of pipeline segment, tie-ins with other pipelines, and other factors."

40 Planning requirements are not the equivalent of response requirements. In other words, it is not expected that this volume of oil would be recovered in this time, only that the equipment that is on-scene is capable of recovering this amount of liquid (which could be oil and water) in this time.

This means, that while the oil spill response plan and associated emergency measures would most likely be well underway in the 24-hour time frame, it is highly unlikely that there would have been significant mitigation of a worst-case discharge release of 10,000 bbl or more, as in some of the hypothetical spill scenarios.

Even in the presence of spill response measures, the movement of oil downstream, particularly in a fast-moving current with a large volume of oil, would continue for some time after the 24- hour period. It is possible that there would be some changes in the movement of the oil with the strategic placement of certain booms to deflect oil, but unless the currents were less than 1.0 knots (0.36 m/s), it would not be possible to completely stop the flow of oil.

This is acknowledged to some extent in the modeling report, though the assumption of the effectiveness of mitigation is stated:[41]

> "Crude oil release simulations that reach the 24 hour time limit may still have oil remaining on the surface of the river or lake that has not adhered to a shoreline or spread to the defined minimum thickness. If there was oil on the water surface after 24 hours, it could (if not mitigated) continue to move downstream, further oiling shorelines until it either evaporated or stranded. The simulations assumed the releases were un-mitigated for the modeled 24 hour period (i.e., no benefits of emergency response operations were incorporated into the model). In a real-life scenario, emergency response procedures would mitigate the effects of the modeled incidents."

10.3.4.1.3 Limitations of the 24-Hour Time Frame for Spill Modeling

Given that the oil is still in the watercourse after 24 hours and that it would most likely still continue to move downstream, stranding in various places depending on the oil type, release site, and environmental conditions, it would be most informative to have modeling results from longer time frames – i.e., until the oil stops moving downstream at significant concentrations. Modeling beyond the first 24 hours would also allow a more accurate assessment of the behavior of the oil with respect to further weathering and interaction with sediments that might affect submergence in the case of the diluted bitumen.

More extended modeling runs of OILMAPL and SIMAP have been conducted in other projects, such as for a study conducted for the Northern Gateway Pipeline in Canada. In that study, modeling runs were conducted with six day to 50 day simulations. The variations in time were based on flow conditions, length of river section modeled, oil parameters, and the mapping of the geography.[42]

10.3.4.1.4 Oil Behavior after 24 Hours

Without modeling the trajectory (path) and fate (behavior and weathering) of the two types of oil in each of the seven locations under different seasons using OILMAPLand and SIMAP beyond the 24-hour time frame, it is not possible to predict with any degree of reliability the outcome of the spill scenarios.

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41 Stantec et al. 2017.

42 Horn and French-McCay 2015.

Based solely on the properties of the two types of oils selected for modeling (Bakken crude and Cold Lake Blend diluted bitumen),[43] the further weathering of the oils can be simulated past the 24-hour time frame using a different model, the National Oceanic and Atmospheric Administration's (NOAA) Automated Data Inquiry on Oil Spills (ADIOS) 2.[44] Note that this model only addresses the weathering (evaporation) and does not take into account the specific environmental conditions at the seven selected sites beyond a designated temperature, static wind speed, water type (freshwater), and average sediment load. The results of that modeling for five days (120 hours) after the hypothetical releases of the two oil types are shown in Table 10.3-3 through Table 10.3-6. The tables show the amount of oil remaining in the environment after evaporation. There are significant differences in evaporation rates for the two oil types because of their different chemical properties. There is also a somewhat higher percentage of evaporation with smaller quantities of oil and in warmer weather.

For Bakken crude, the evaporation at 24 hours is about 46 percent, meaning 54 percent is still in the environment. At 120 hours (five days), an additional 10 percent has evaporated, leaving 44 percent in the environment. In winter, about 49 percent remains in the environment after five days. Considerable evaporation continues after the first 24 hours. For Cold Lake diluted bitumen, only about 2 percent more oil evaporates after the first 24 hours.

Table 10.3-3. Weathering of Hypothetical Summer Releases of Bakken Crude (ADIOS2)

Site	Percent of Volume Remaining in Environment by Hour						
	1 hour	12 hours	24 hours	48 hours	72 hours	96 hours	120 hour
Site 1	93%	61%	54%	49%	46%	45%	44%
Site 2	94%	62%	54%	49%	46%	45%	44%
Site 3	95%	63%	55%	49%	47%	46%	45%
Site 4	95%	63%	55%	50%	47%	46%	45%
Site 5	95%	63%	55%	49%	47%	46%	45%
Site 6	95%	63%	55%	49%	47%	46%	45%
Site 7	95%	65%	57%	50%	47%	46%	45%

Note:

Bakken crude (°API 42.5; windspeed 5 mph; water temperature 60°F; sediment load 50 g/m^3).

43 Note that subsequent to the original modeling conducted (as presented in Stantec et al. 2017), the Bakken crude oil was replaced with a "light Canadian crude oil" for which there was no further information. The properties of a light crude oil would differ from that of Bakken crude, as explained further in Section 10.2.1.1.

44 http://response.restoration.noaa.gov/ADIOS

Table 10.3-4. Weathering of Hypothetical Summer Releases of Cold Lake Diluted Bitumen (ADIOS2)

Site	Percentage of Volume Remaining in Environment by Hour						
	1 hour	12 hours	24 hours	48 hours	72 hours	96 hours	120 hour
Site 1	90%	78%	76%	74%	74%	74%	73%
Site 2	91%	78%	76%	75%	74%	74%	74%
Site 3	92%	78%	76%	74%	74%	74%	74%
Site 4	91%	78%	75%	74%	74%	74%	74%
Site 5	92%	78%	75%	74%	74%	74%	74%
Site 6	91%	78%	75%	74%	74%	74%	74%
Site 7	92%	78%	75%	74%	74%	74%	74%

Note:
Cold Lake blend diluted bitumen (°API 22.6; windspeed 5 mph; water temperature 60°F; sediment load 50 g/m^3).

Table 10.3-5. Weathering of Hypothetical Winter Releases of Bakken Crude (ADIOS2)

Site	Percentage of Spill Volume Remaining in Environment by Hour						
	1 hour	12 hours	24 hours	48 hours	72 hours	96 hours	120 hour
Site 1	96%	66%	58%	53%	51%	49%	48%
Site 2	96%	66%	59%	53%	51%	50%	49%
Site 3	97%	68%	60%	54%	51%	50%	49%
Site 4	97%	67%	59%	53%	51%	50%	49%
Site 5	97%	68%	60%	51%	51%	50%	49%
Site 6	97%	67%	59%	53%	51%	50%	49%
Site 7	97%	68%	60%	54%	51%	50%	49%

Note:
Bakken crude (°API 42.5; windspeed 5 mph; water temperature 38°F; sediment load 50 g/m^3).

Table 10.3-6. Weathering of Hypothetical Winter Releases of Cold Lake Diluted Bitumen (ADIOS2)

Site	Percentage of Spill Volume Remaining in Environment by Hour						
	1 hour	12 hours	24 hours	48 hours	72 hours	96 hours	120 hour
Site 1	92%	79%	77%	76%	75%	75%	75%
Site 2	92%	79%	77%	76%	75%	75%	75%
Site 3	93%	79%	77%	76%	75%	75%	75%
Site 4	93%	79%	77%	76%	75%	75%	75%
Site 5	93%	79%	77%	76%	75%	75%	75%
Site 6	92%	79%	77%	76%	75%	75%	75%
Site 7	93%	79%	77%	76%	75%	75%	75%

Table 10.3-6. Weathering of Hypothetical Winter Releases of Cold Lake Diluted Bitumen (ADIOS2)

Site	Percentage of Spill Volume Remaining in Environment by Hour						
	1 hour	12 hours	24 hours	48 hours	72 hours	96 hours	120 hour

Note:
Cold Lake blend diluted bitumen (°API 22.6; windspeed 5 mph; water temperature 38°F; sediment load 50 g/m^3).

The major changes that would be expected in the hypothetical scenarios after the first 24 hours are:

- Additional evaporation (about 10 percent more) of Bakken crude oil over the course of the next four days;
- Bakken crude would continue to move downriver;
- Additional evaporation (about 2 percent more) of Cold Lake Blend diluted bitumen over the course of the next four days;
- Diluted bitumen would continue to move downriver; and
- Additional time for diluted bitumen in turbulent, sediment-laden waters could increase the amount of submerged oil.

It is important to take into account that these scenarios, as well as the ones that were modeled, involved completely unmitigated releases. In an actual spill situation, the trajectory of the oil would be modified to some extent by spill response measures, such as the placement of boom that would deflect the oil to other locations or possibly block its movement in some cases.

10.3.5 Summary of Results

This section summarizes some of the primary behaviors predicted by the modeling for the three crude oil types, Bakken Crude, Cold Lake Blend (spring summer scenarios), and Cold Lake Winter Blend (winter scenarios). As expected, higher river flows (during spring) typically resulted in greater downstream extents for both crude oil type scenarios (Table 10.3-7). Thick surface oil slicks and evaporative losses of crude oil constituents occurred in low-energy systems. Substantial loss of the spill shoreline oiling was also observed under these conditions, which resulted in the complete loss of the spill volume to surface adhesion, evaporation, and similar factors in less than 24 hours, as noted in Table 10.3-7. Dissolved hydrocarbon concentrations tended to be greater in more turbulent, high-energy systems due to dissolution, aided by dispersion and entrainment. Sediment oiling was also more extensive at these locations due to vertical mixing and interaction with suspended particles, which resulted in deposition on the river bottom. During low-flow conditions (winter), downstream extents were primarily dependent on river flow and oil density.[45]

[45] During low-flow conditions characteristic of winter, lighter Bakken crude more readily rose vertically through the water column and became trapped beneath the ice, effectively removing a portion of the oil mass from further downstream transport. In addition, shoreline oiling was limited during low-flow conditions compared to the other flow conditions when the river surface was free of ice.

These modeling results provide useful context when evaluating the potential effects of crude oil releases on the environment, and were considered during the exposure assessment in Section 10.4. For example, the predicted downstream extents of oil transport from the Stantec et al. modeling, along with the results of other relevant spill studies, were considered during the development of downstream region of interest (ROI) criteria (see Section 10.4.1).

Table 10.3-7. Predicted Downstream Transport Distances of Two Crude Oil Types

Study Site	Predicted Volume Out (bbl)[a]	Approximate River Width (feet)	Maximum Distance Traveled in First 24 Hours (miles)[b,c]	
			Bakken Crude	Cold Lake Blend
Site 1 – Mosquito Creek to Lower Rice Lake		3–35	10.4[c]	3.5[c]
Site 2 – Mississippi River at Ball Club		80	23.0	8.1[c]
Site 3 – Sandy River		30	12.2	8.1[c]
Site 4 – Shell River to Twin Lakes		95–184	21.9	3.7[c]
Site 5 – Red River		150–400	40.3	19.2
Site 6 – Mississippi River at Palisades		250	17.8	17.9
Site 7 – Mississippi River at Little Falls		820	31.2	32.3

Source: Stantec et al. 2017.

[a] The Applicant has identified this data as non-public. Classification is still under review by the Administrative Law Judge in this matter.

[b] Predicted maximum distance traveled (typically under spring, high-flow conditions) following a 24-hour unmitigated release scenario unless otherwise noted. Potential further migration after 24 hours was not modeled.

[c] Spill volume exhausted prior to 24 hours.

10.3.6 Benchmarking of Volumes of Enbridge Line 3 Hypothetical Spill Scenarios

Hypothetical spill scenarios were modeled in the draft EIS at seven selected sites with the spill volumes in Table 10.3-7. The volumes were benchmarked against spill volumes from past spills throughout the U.S. and in Minnesota for different time periods. (Note that throughout this section, the hypothetical spills are referred to by their site numbers for convenience. The site itself is not pertinent to the benchmarking analysis as the scenario volumes are compared to historical spills throughout the U.S. and throughout the state of Minnesota. The sites themselves are not benchmarked in this analysis in any manner.) The benchmarking of spill volumes does not imply that the impacts, consequences, or behavior of the spills are directly related to those in actual spills based on volume. The outcome of a spill is greatly affected by the oil type, location, and environmental conditions at the time of the spill. Two spills of similar volumes do not necessarily have similar outcomes.

10.3.6.1 Benchmarking of Hypothetical Volumes Against U.S. National Spills

The hypothetical spills in Table 10.3-7 were benchmarked against U.S. pipeline spills (crude and refined) based on data from 1968 through 2015 and on data from 2006 through 2015 (as presented in Section 10.2.6). All of the scenarios exceeded the 99th percentile of pipeline spills regardless of spilled product. In other words, less than 1 percent of historical pipeline spills throughout the U.S. over 48 years were that size or larger.

Table 10.3-8 shows the percentile value for the hypothetical spill scenarios relative only to crude pipeline spills throughout the U.S. for different time periods.

Table 10.3-8. Hypothetical Line 3 Spills Relative to U.S. National Crude Pipeline Incidents

Hypothetical Spill[a]	U.S. 1968-2015		U.S. 2000-2015		U.S. 2006-2015	
	Percentile[b]	% Spills Larger[c]	Percentile	% Spills Larger	Percentile	% Spills Larger
Site 1	98.82	1.18%	99.53	0.47%	99.66	0.34%
Site 2	99.19	0.81%	99.69	0.31%	99.72	0.28%
Site 3	99.52	0.48%	99.80	0.20%	99.83	0.17%
Site 4	99.44	0.56%	99.77	0.23%	99.77	0.23%
Site 5	99.52	0.48%	99.84	0.16%	99.85	0.15%
Site 6	99.27	0.73%	99.73	0.27%	99.72	0.28%
Site 7	99.52	0.48%	99.80	0.20%	99.84	0.16%

[a] The hypothetical spills are referred to by their "site numbers" for convenience. The sites themselves are not benchmarked in any manner in this analysis.

[b] A percentile spill volume is the percentage of spills that are that volume or less. e.g., a 99th percentile spill of 1,100 bbl means that 99 percent of spills are 1,100 bbl or less. Only 1 percent of spills are larger.

[c] The percent of historical crude pipeline spills that were larger than the volume of the hypothetical scenario.

10.3.6.2 Benchmarking of Hypothetical Volumes Against Historical Minnesota Spills

The same analyses were conducted comparing the hypothetical spill scenario volumes to historical crude pipeline spills in Minnesota, as summarized in Table 10.3-9. The data involved spills that occurred from 1968 through the present (end of June 2017). There have been no spills over 6,000 bbl since 2000. For this reason, all of the hypothetical Line 3 spill scenarios would represent the largest spills in this time period.

There have been larger spills prior to 2000. The hypothetical Line 3 scenarios represent the 96th to 99th percentiles. That means that 1 percent to 3.5 percent of crude pipeline spills during 1968 through 2015 were larger. In other words, if these hypothetical incidents had occurred, they would have fallen into the designated percentiles and only the percentage shown would have been larger. If these hypothetical Line 3 spills had occurred in 2000 or later, they would have been the largest crude pipeline spills in that time period.

Table 10.3-9. Hypothetical Line 3 Spills Relative to Minnesota Crude Pipeline Incidents

Hypothetical Spill	Minnesota 1968–2017		Minnesota 2000–2017		Minnesota 2006–2017	
	Percentile	% Spills Larger	Percentile	% Spills Larger	Percentile	% Spills Larger
Site 1	96.45	3.55%	100.00	0.00%	100.00	0.00%
Site 2	97.87	2.13%	100.00	0.00%	100.00	0.00%

Table 10.3-9. Hypothetical Line 3 Spills Relative to Minnesota Crude Pipeline Incidents

Hypothetical Spill	Minnesota 1968–2017		Minnesota 2000–2017		Minnesota 2006–2017	
	Percentile	% Spills Larger	Percentile	% Spills Larger	Percentile	% Spills Larger
Site 3	99.01	0.99%	100.00	0.00%	100.00	0.00%
Site 4	98.87	1.13%	100.00	0.00%	100.00	0.00%
Site 5	99.15	0.85%	100.00	0.00%	100.00	0.00%
Site 6	97.87	2.13%	100.00	0.00%	100.00	0.00%
Site 7	99.08	0.92%	100.00	0.00%	100.00	0.00%

10.3.6.3 Return Period Calculation for Hypothetical Line 3 Scenario Volumes

The return periods for the volumes of the hypothetical Line 3 spills *in the entire U.S.* were calculated based on the national data for the three time periods with the results shown in Table 10.3-10. In other words, spills of this volume would be expected *somewhere in the U.S.* every 2 to 4 years based on the data from the last decade. *This does not indicate that these spills would occur in Minnesota on Line 3 (or any other pipeline in Minnesota).*

Table 10.3-10. Estimated Return Periods for Hypothetical Crude Pipeline Spill Volumes in the U.S.

Hypothetical Spill Volume	U.S. 1968–2015		U.S. 2000–2015		U.S. 2006–2015	
	Frequency per Year	Return Period (Years)	Frequency per Year	Return Period (Years)	Frequency per Year	Return Period (Years)
Site 1	1.58	0.6	0.75	1.3	0.60	1.7
Site 2	1.09	0.9	0.50	2.0	0.50	2.0
Site 3	0.64	1.6	0.32	3.1	0.30	3.3
Site 4	0.75	1.3	0.37	2.7	0.41	2.5
Site 5	0.64	1.6	0.26	3.9	0.27	3.8
Site 6	0.98	1.0	0.43	2.3	0.50	2.0
Site 7	0.64	1.6	0.32	3.1	0.28	3.5

Based on analyses of historical data for Minnesota, the frequency of a spill of large volume in the state is much lower (see Section 10.2.6). As shown in Table 10.3-6, there have been no spills of the magnitude of the volumes for the hypothetical Line 3 scenarios since prior to 2000. The last spill of this volume or greater in Minnesota was in March 1991.

The return period calculation based solely on Minnesota data for the years 1968 through June 2017 is shown in Table 10.3-12. Note that for the 2000–2017 time period, the calculation returns a value of zero

for the frequency as there are no historical incidents in this time period. This may be attributed to a very low likelihood or probability of a large spill incident and a short time frame.[46]

The estimated return periods based on the 1968–2017 data are over-estimates with regard to frequency, and, correspondingly, under-estimates for return periods. In other words, the frequencies would be expected to be lower and the return periods would be expected to be longer.

Table 10.3-11. Estimated Return Periods for Hypothetical Crude Pipeline Spill Volumes in Minnesota

Hypothetical Spill Volume	Minnesota 1968-2017	
	Frequency per Year	Return Period (Years)
Site 1	0.101	9.9
Site 2	0.061	16.5
Site 3	0.028	35.5
Site 4	0.032	31.1
Site 5	0.024	41.3
Site 6	0.061	16.5
Site 7	0.026	38.2

An alternative approach to calculating the return period for the Minnesota spills was also taken. The return periods estimated for the U.S. as a whole (in Table 10.3-7) were used to calculate the relative reduction in frequencies for the time periods (1968–2015, to 2000–2015, to 2006–2015) as shown in Table 10.3-12.

Table 10.3-12. Reduction in Frequencies for Hypothetical Crude Pipeline Spill Volumes in the U.S.

Hypothetical Spill Volume	U.S. 1968–2015 Frequency per Year	U.S. 2000–2015		U.S. 2006–2015	
		Frequency per Year	Reduction from 1968–2015	Frequency per Year	Reduction from 1968–2015
Site 1	1.58	0.75	52.5%	0.6	62.0%
Site 2	1.09	0.5	54.1%	0.5	54.1%
Site 3	0.64	0.32	50.0%	0.3	53.1%
Site 4	0.75	0.37	50.7%	0.41	45.3%
Site 5	0.64	0.26	59.4%	0.27	57.8%
Site 6	0.98	0.43	56.1%	0.5	49.0%
Site 7	0.64	0.32	50.0%	0.28	56.3%

[46] This would be analogous to rolling dice a limited number of times and never getting a particular result. With more rolls (more time), eventually the number may come up.

The reduction factors in Table 10.3-12 were applied to the frequencies in Table 10.3-11 to derive the extrapolated frequencies and return periods in Table 10.3-13. These results indicate that the expected return period of the hypothetical spills ranges from about once every 21 to 26 years for the lowest volume Spill 1) to once every 99 to 103 years for the highest volume (Spill 5). Note that these return periods do not necessarily correspond to the specific sites (Table 10.3-7) for which these volumes were calculated—only these spill volumes within the state.

It is important to bear in mind that this estimation approach is conservative. That is, it is cautionary by over-estimating the probability of these incidents.

Table 10.3-13. Extrapolated Frequencies/Return Periods for Hypothetical Large Spills in Minnesota

Hypothetical Spill Volume	Minnesota 1968–2017		Minnesota 2000–2017 Extrapolated from U.S. 2000–2015 Reduction		Minnesota 2006–2017 Extrapolated from U.S. 2006–2015 Reduction	
	Frequency per Year	Return Period (Years)	Frequency per Year	Return Period (Years)	Frequency per Year	Return Period (Years)
Site 1	0.101	9.9	0.0479	20.9	0.0384	26.1
Site 2	0.061	16.5	0.0280	35.7	0.0280	35.7
Site 3	0.028	35.5	0.0140	71.4	0.0131	76.2
Site 4	0.032	31.1	0.0158	63.3	0.0175	57.2
Site 5	0.024	41.3	0.0098	102.6	0.0101	98.8
Site 6	0.061	16.5	0.0268	37.4	0.0311	32.1
Site 7	0.026	38.2	0.0130	76.9	0.0114	87.9

10.3.6.4 Return Period Calculation for Smaller Spills

Based on the data in Section 10.2.6, the return periods for smaller spills were calculated, as shown in Table 10.3-14. Since there were no spills in the larger spill categories, the frequencies were zero. However, this is merely be indicative of a lower probability and a return period that exceeds the time period for the data—17.5 years for the 2000–2017 data set, and 7.5 years for the 2010–2017 set.

Table 10.3-14. Frequencies and Return Period by Spill Volumes for Minnesota Crude Pipelines

Spill Volume Category	Based on Minnesota 2000–2017 Data		Based on Minnesota 2010–2017 Data	
	Frequency per Year	Return Period (Years)	Frequency per Year	Return Period (Years)
0.01 – 0.09 bbl	0.29	3.5	3.07	0.3
0.1 -0.9 bbl	1.26	0.8	0.93	1.1
1-9 bbl	2.11	0.5	0.80	1.3
10-99 bbl	0.97	1.0	0.13	7.5
100-999 bbl	0.29	3.5	0.00	0.0
1,000-9,999 bbl	0.29	3.5	0.00	0.0
10,000-90,000 bbl	0.00	0.0	0.00	0.0
TOTAL	**5.20**	**0.2**	**4.93**	**0.2**

10.3.6.5 Summary of Benchmarking Analysis Findings for Selected Spill Models

Using a conservative (cautionary over-estimating) approach, it was estimated that the volumes of spillage approaching the volumes used in the seven hypothetical Line 3 spill scenarios (Table 10.3-7) might be expected once in 26 to 99 years somewhere in the state of Minnesota[47]. *This does not indicate that the incidents would occur at the specific sites selected for modeling.*

10.4 ASSESSMENT OF POTENTIAL CRUDE OIL EXPOSURES AND IMPACTS

This section identifies the resources in the vicinity of the Applicant's preferred route and alternatives (CN Alternatives—Section 10.4.2; route alternatives—Section 10.4.3) that may be exposed to crude oil in the case of a release. The alternatives cross a wide range of habitats and conditions, including a variety of land uses, human uses, and ecosystems. Therefore, each alternative differs in terms of its potential exposure to crude oil and the resultant impacts on resources if a crude oil release were to occur. Resources within specific distances of each alternative were identified to evaluate the potential for impacts due to a spill. For this analysis, ROIs for potential releases were identified (as described in Section 10.4.1) to reflect the potential extent of a large-volume incident that could occur at any point along each route. Alternatives with a higher number of resources within the ROIs would have a greater probability of exposure and potential adverse effects following a release compared to alternatives with fewer resources within the ROIs.

10.4.1 Resources and Regions of Interest for the Comparison of Alternatives

The following three HCAs, as defined by the PHMSA criteria for hazardous liquid pipelines (PHMSA 2011), were considered in the exposure analysis (and provided directly by Enbridge):

[47] This is based on existing pipeline data and does not account for better corrosion control, steel and construction standards (thicker steel under water crossings) which would reduce the risk and increase the time expected for a major spill.

- **Populated Areas** include both high-population areas (referred to as "urbanized areas" by the U.S. Census Bureau) and other populated areas (referred to as "designated places" by the U.S. Census Bureau).
- **Unusually Sensitive Ecological Areas** include locations of critically imperiled and imperiled species and ecological communities, federally listed threatened and endangered species, and concentrations of migratory waterbirds. Individual species and habitats are not identified for this analysis; rather it provides a general overview of potential impacts on all unusually sensitive ecological areas should a spill occur.
- **Drinking Water Sources** include those supplied by surface water or wells and where a secondary source of water supply is not available. The land area in which spilled hazardous liquid could affect the water supply is also treated as an HCA. This HCA was derived from state Wellhead Protection Area or Source Water Area.

Areas of interest (AOIs) have been identified by Minnesota Department of Natural Resources (Minnesota DNR) and Minnesota Department of Health (Minnesota DH) as sensitive areas where a crude oil release may have long-term and/or permanent impacts on resources. The following AOI categories and subcategories were considered:

- Drinking Water AOIs
  - Drinking Water Supply Management Areas (DWSMAs) and vulnerability,
  - Wellhead protection areas (WPAs),
  - Hydrogeologic sensitivity,
  - Domestic wells and sensitivity, and
  - Public wells.
- Cultural Resources AOIs
  - Archaeological resources,
  - Historical resources, and
  - Reservations.
- Biological AOIs
  - Aquatic Management Areas,
  - Lakes of Biological Significance,
  - Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites),
  - Native plant communities,
  - Wetland bank easements,
  - Wild rice lakes,
  - Muskie lakes,
  - Sensitive lakeshore areas,

  - Minnesota Board of Water and Soil Resources (Minnesota BWSR) conservation easements,
  - Marginal cropland – limited,
  - Marginal cropland – perpetual, and Scientific and natural Areas.
- Commodity Production AOIs
  - National forests,
  - Other forest land
  - State forests, and
  - Wild rice harvest areas.
- Recreation and Tourism AOIs
  - State plan/recreational areas,
  - State parks,
  - Wildlife Management Areas (WMAs), and
  - Waterfowl production areas.

As part of consultation with Minnesota Department of Health (and with support from Minnesota DNR and Minnesota PCA), appropriate distances for the protection of drinking water supplies, in support of a screening-level GIS approach, were determined based on a consensus of existing information and case studies.

The ROI for comparisons among alternatives encompasses a 2,500-foot-wide distance extending in each direction from the centerline of the alternative (pipeline routes and transportation mode corridor); thus, the total area assessed is a 5,000-foot-wide corridor centered on the pipeline route, rail bed, or roadway. The ROI was identified as the distance that released oil would typically spread on flat ground (calculated to be 1,214 feet from the centerline) plus an additional distance of 1,050 feet for estimated downgradient migration in groundwater (if groundwater were contacted); the estimated total distance of approximately 2,264 feet was rounded up to 2,500 feet. Based on case studies presented above, the 2,500 foot ROI is conservative and does not suggest that any single release will impact resources at these distances. The ROI of groundwater in the Bemidji and Cass lake case studies was less than 1,000 feet.

This ROI was determined to be an appropriate distance, based on a review of existing information and relevant case studies to be applied comprehensively across the HCA and AOI resources listed above, with the exception of certain drinking water resources, which are discussed in more detail in Section 10.4.2.1.1. The numbers and/or acres of HCAs and AOIs within the ROI for each alternative were determined by overlaying GIS layers for each HCA and AOI with the ROI.

10 miles downstream was selected for the ROI, because it was considered to be not overly conservative, and crossing widths for the RAs were unavailable. The Applicant surveyed the streams and rivers for the APR only, so small (less than 30 feet wide) and large (30 feet wide or greater) crossings are only known for this route. It would be biased to only run the two downstream buffers (30 miles for large rivers, and

10 miles for small streams) along the APR. Furthermore, it was determined that it would be overly conservative to run a 30-mile downstream buffer for all water crossings, especially since many of these water bodies are ditches and terminate within a few miles.

In addition to assessing exposure of resources within 2,500 feet on either side of the alternative centerlines for upland areas, a downstream exposure analysis was conducted to identify and enumerate resources that could be at risk of exposure to crude oil if a release occurred at a waterbody crossing. Based on the Stantec et al. trajectory and fate modeling analysis (2017), which modeled spill 24-hour maximum travel distances of 3.5 to 30 miles for dilbit and 10.4 to 40.3 miles for Bakken Crude, and available survey data, a 10-mile-long downstream ROI was applied to all waterbody crossings for this downstream exposure analysis of the Project and its alternatives (Figure 10.4-1).

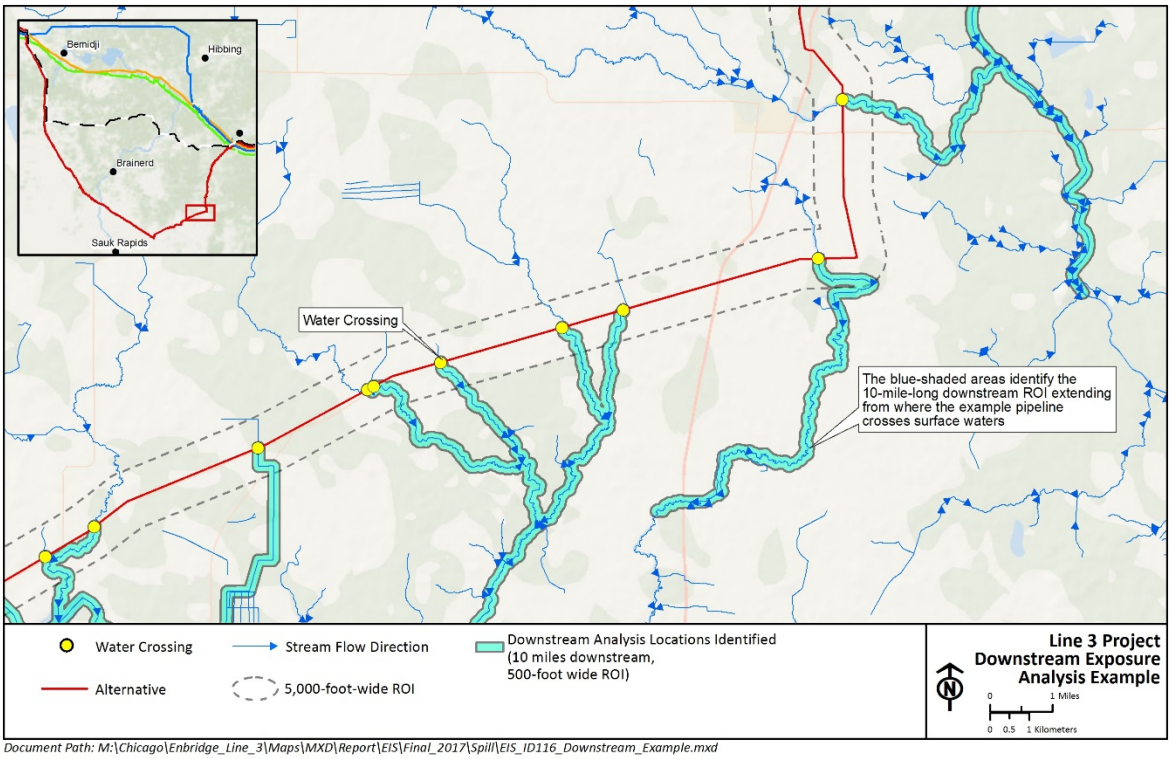

Figure 10.4-1. Example of 10-Mile-Long Downstream Region of Interest for a Pipeline Route Segment

The 10-mile-long downstream ROI was calculated in GIS starting at the point where each waterbody intersects with each alternative. Flow direction was determined using the National Hydrography Dataset flowline direction. River segments were combined and traced downstream for 10 miles. In addition, the 10-mile-long downstream ROI was extended to a width of 500 feet from the centerline of the flow to create a 1,000-foot-wide corridor of potential exposure from a spill up to 10 miles downstream of each waterbody crossing. This ROI was overlaid with HCA- and AOI-specific data layers to determine potential resources that could be exposed should a release occur.

Given the scale of the alternatives, maps of HCAs and AOIs do not include the analysis ROIs. A single map for each HCA or the AOIs is included in the 2,500-foot-wide ROI discussion and referenced in the 10-mile-long, 1,000-foot-wide downstream ROI discussion.

The adoption of 10-mile-long downstream ROIs from watercrossings, as well as a 2,500-foot-wide ROIs across the waterbodies, is generally based on conservative, precautionary assumptions about potential spill impacts (i.e., likely tending to over-estimate impacts). These criteria assume that spilled oil would affect all of these areas by actually contact through overland flow and/or dispersion through substrates adjacent to the streams in sufficient concentrations and for a sufficient length of time to cause impacts through toxicity, absorption, and/or adherence. In reality, the degree to which oil that spilled into a stream or other watercourse would either overflow the banks of the river or penetrate through the substrates along the shorelines would depend on location- and situation-specific factors. These factors would include the water level in the stream and degree of flooding and rainfall that would affect overland flow of oil at the time of the spill, as well as the topography on either side of the stream. Streams would generally form and flow at low points rather than at high points, although it is possible to have a stream in relatively flat terrain. For example, flooding and stream overflow was a significant factor in the behavior of the spilled oil in the 2010 spill in Marshall, Michigan (Kalamazoo River).The effects that might occur would be determined by the sensitivity of the resources and populations at risk, as well as the actual exposure dose. The exposure dose would be determined by both the concentrations of hydrocarbons and the duration of the exposure. For example, oil in the water column (i.e., oil that is dissolved or physically dispersed into the water rather than floating on the surface) does not generally cause biological impacts unless the concentrations are at least one part per billion (ppb). The duration of exposure at this concentration would determine the degree of impacts.

The usual impact thresholds that are used to determine the impacts of oil are as follows:

- Surface concentrations (10 g/m^2 for ecological impacts; 0.01 g/m^2 for socioeconomic impacts);
- Shoreline concentrations (100 g/m^2 for ecological impacts; 1 g/m^2 for socioeconomic impacts); and
- Water column impact (1 ppb for ecological impacts) (French et al. 1996; French McCay 2009).

The reason that the thresholds for socioeconomic impacts are lower than those for ecological impacts is that there has been shown that it would take considerably higher concentrations to cause impacts to biological resources based on toxicity, adherence, or persistence of hydrocarbons than the concentrations that would trigger cleanup responses or affect cultural, social, and economic activities due to cause concern and because of visual or esthetic reasons (French et al. 1996; French McCay 2009).

10.4.2 Exposure Analysis for Comparison of Certificate of Need Alternatives

Areas potentially exposed to oil spills along the CN Alternatives were identified based on the GIS methodology described above. It should be noted that the majority of system alternative SA-04 occurs outside of Minnesota, and because many of the AOIs are Minnesota-specific metrics, there are limited data available in other states, which has likely resulted in an underestimate of acreages of AOIs affected by that route.

10.4.2.1 Region of Interest Analysis

10.4.2.1.1 HCA Comparisons among Applicant's Preferred Route and Certificate of Need Alternatives

Populated Areas

Oil spills in populated areas have the potential to affect public health, public resources and infrastructure, socioeconomics, and transportation. The acreages of HCA populated areas that could be exposed to crude oil after a release along the CN Alternative routes are listed in Table 10.4-1. The CN Alternative with the greatest acreage of HCA populated area within 2,500 feet on either side of its centerline is existing Line 3 supplemented by truck, followed by existing Line 3 supplemented by rail, transportation by truck, transportation by rail, continued use of existing Line 3, and SA-04. The Applicant's preferred route has the lowest acreage of affected HCA populated area within the ROI. Potential impacts from a release of crude oil in HCA populated areas are discussed below.

Table 10.4-1. HCA Populated Areas within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres)

Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
6,545.2	22,318.7	13,075.3	76,793.4	41,630.0	99,112.1	63,948.7

Source: Enbridge 2016c.

HCA = high consequence area

Public Health

Public health can be affected by oil contamination of air, water, soil, and food resources. Effects from oil exposure can be acute or chronic. Exposure may occur immediately following, or in response to, a spill through dermal contact, ingestion, or inhalation.

For most people, brief dermal contact with a small amount of oil would do no harm; however, some people are more sensitive to chemicals, including those found in crude oil (Centers for Disease Control and Prevention and Agency for Toxic Substances and Disease Registry 2010). Dermal contact with sticky bitumen would increase exposure, although toxicity implications are not clear given limited data (National Academies of Sciences, Engineering, and Medicine 2016). People exposed directly to oil could experience dermatitis; however, the potential for a large proportion of the population to have direct exposure to oil would be small due to restricted access to contaminated areas. Ingestion has the potential to occur through various pathways, including contaminated drinking water sources and fish tissues. In historical studies reviewed by Stantec et al. (2017), groundwater-supply wells were rarely affected, but surface water supply intakes downstream of pipeline ruptures were affected. In some cases, impacts were minimal; in others, water treatment was required. Impacts on water supplies in these case studies were short term. Long-term impacts on water supply could occur under certain

circumstances, though protective measures (i.e., using a different water supply) would reduce direct impact on human health. While the general public could be exposed to oil through contamination of aquatic food sources, fisheries are usually closed and monitored for a period after a spill to ensure food safety, reducing this mode of exposure.

People in the immediate area of a spill would experience inhalation exposure and impacts as the oil evaporates. Inhalation of petroleum-related vapors tends to include lighter weight, volatile compounds that evaporate after spills. People such as first responders and residents near an incident site could be exposed to harmful volatile compounds and would likely experience temporary health impacts such as respiratory irritation, headache, or eye irritation. Emergency responders and spill cleanup response crews would experience the greatest exposure, though they would have appropriate protective gear and would have Hazardous Waste Operations and Emergency Response (HAZWOPER) training to reduce risks.

Vulnerable populations, such as children, those with respiratory diseases, and the elderly, could be particularly sensitive to airborne pollutant releases following a spill and would likely experience moderate respiratory impacts depending on their proximity to the incident, current health status, and seasonal/weather conditions in the aftermath of the spill. Overall, air quality effects are predicted to be similar for light and heavy crude oil, as both would be similarly transported downstream during spring and summer conditions. During winter, volatilization, downstream transport, and potential human exposures to crude oil would be more limited due to lower air and water temperatures, the presence of ice on the water surface, and absorption of crude oil into the snow pack.

While acute toxicity and other short-term effects of oil spills have been studied to some extent (as reviewed in IOM 2010), longer-term health effects of oil spills are not well documented. While various of the individual components of crude oil, such as benzene, toluene, ethylbenzene, and xylene (BTEX) are known or suspected carcinogens (International Agency for Research on Cancer 1989), it has not been established that exposure to crude oil in the aftermath of a spill increases the risk of cancer in responders or the public.

Public Resources and Infrastructure

Oil releases have the potential to affect public resources and infrastructure that occur within the ROI as well as emergency response resources. The increased demand on emergency response resources following a large release could divert emergency response personnel from other duties, increasing delays in responding to other service calls.

Socioeconomics and Transportation

Spills can affect local economies through impacts on transportation infrastructure, business operations, property values, or natural resources. Minority and lower income populations could be affected if they are close to the site of a release and not able to easily evacuate.

Increased congestion of roadways could occur as a result of roadway closure and emergency response near the release site. Such disruption could prevent the public from reaching their workplaces. Train lines and highway shipping routes may also be disrupted, resulting in economic impacts over a broader region.

A crude oil spill could require a large response effort including the mobilization of nonlocal response workers who would temporarily relocate to the spill area. A prolonged response effort could affect population and housing. Impacts could include the provision of housing for a number of nonlocal response personnel, leading to an increase in the local population for the duration of the response effort. Potentially negative impacts could include increased traffic and demand for services.

Property value impacts could occur following a spill. The duration of property value effects resulting from contamination has been generally found to be temporary (Jackson 2001). Property values for residents within 1,000 feet of a ruptured petroleum product pipeline have decreased by 0.2 to 4.6 percent within the first 6 months following an event, and the mean sale prices within 100 feet of a ruptured pipeline have remained between 2 and 3 percent lower approximately 5 years following the event (Hansen et al. 2006).

Unusually Sensitive Ecological Areas

HCA unusually sensitive ecological area acres that are within 2,500 feet of the alternative centerlines and would potentially be exposed to a spill are listed in Table 10.4-2. Among the CN Alternatives, existing Line 3 supplemented by rail has the most acres of HCA unusually sensitive ecological areas within 2,500 feet of either side of its centerline, followed by existing Line 3 supplemented by truck, transportation by rail, transportation by truck, continued use of existing Line 3, and SA-04. The Applicant's preferred route has the least acres of HCA unusually sensitive ecological areas within 2,500 feet of either side of its centerline. General impacts on HCA unusually sensitive ecological areas that have the potential to be affected by an oil spill are discussed below.

Table 10.4-2. HCA Unusually Sensitive Ecological Areas within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres)

Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
5,774.5	15,067.3	10,530.3	35,919.9	32,400.4	50,987.2	47,467.7

Source: Enbridge 2016c.

HCA = high consequence area

Terrestrial Vegetation and Habitat

Terrestrial vegetation is affected when released oil contaminates adjacent soils or comes into direct contact with plant tissues (McKendrick 1999). Petroleum released to the ground surface can have harmful effects on soil and important resident microorganisms (Stantec et al. 2017). Oil flowing over land can infiltrate into soil, and the extent to which this occurs depends on oil type and volume, topography, soil porosity and permeability, organic matter content, and seasonal conditions. Oil penetrates more readily and deeply into more porous soils like sand and gravel and to a lesser degree into silty or clayey soils. Organic matter in soils or frozen ground can impede infiltration. Though oil can

become highly weathered (especially near the surface), it can remain in soil for many years (greater than 25 years; Wang et al. 1998); therefore, remediation techniques often involve excavation and removal of contaminated soil until risk of exposure is acceptably low, which would affect vegetation and availability of terrestrial habitat in the vicinity of a spill.

Plants tend to experience significant damage when oil covers leaves and other sensitive tissue. Herbaceous vegetation is particularly sensitive to oiling (Walker et al. 1978), whereas protective bark makes shrubs and trees more resistant. However, oil reaching root systems can ultimately cause mortality of shrubs and trees (Collins et al. 1994). Spills of light crude oil would be more likely to penetrate soils, spread more quickly, and exhibit higher toxicity to vegetation, especially during the growing season. Spills of heavy crude would be less likely to penetrate soils, would spread more slowly, and would cause more physical damage by coating vegetation. Numerous studies examining the impacts of crude oil on vegetation have been completed in northern latitudes that have applicability to climate and vegetation types that could be affected by this Project. An experimental application of oil onto terrestrial vegetation by Wein and Bliss (1973) in the Northwest Territories of Canada revealed that oil-contaminated deciduous plants showed effects within hours of oil application, whereas evergreen vegetation took weeks to show stress. Regrowth in oil-exposed plants was less robust than would typically occur. Plants in oil-saturated soil showed no regrowth. After a growing season, recovery varied between 20 and 55 percent, depending on the oil treatment rate.

Spills could affect special-status plants that have been documented within the ROI (see Section 5.2.5). Soil impacts that directly affect plant communities include reduced moisture and nutrient availability, impacts on essential microorganisms, and root uptake. Clean-up efforts may also result in removal of oil-saturated plants or trampling damage by workers. Response and containment activities could affect vegetation communities and terrestrial habitat through the removal of contaminated vegetation and soils. In some cases, in situ burning could be used as a response measure and could destroy or damage vegetation. Overall, cleanup activities would benefit vegetation more than no response.

Terrestrial Wildlife

Important wildlife, including amphibians, reptiles, birds, and mammals, which are present in many habitats along the ROIs (see Section 5.2.5), could ingest oil or experience external oiling as a result of a spill. The ability of birds and mammals to maintain proper body temperature can be compromised by external oiling, which can lead to hypothermia and death. Oil that is ingested during preening/grooming of residual external oiling or consumption of oil-contaminated food may result in toxicological effects. Ingestion of oil by wild birds has been associated with severe weight loss, hemolytic anemia, kidney damage, liver damage, foot problems, gut damage, and immunosuppression (Troisi et al. 2006). When oil penetrates into the feathers, it causes marked loss of insulation, waterproofing, and buoyancy in the plumage (Burger and Fry 1993). These alterations increase the risk of hypothermia and impair flight, making birds susceptible to starvation and predation. Exposure to oil could reduce reproductive success because of pathological effects on liver or endocrine systems that interfere with the reproductive process (Tseng 1999). Stress from ingested oil can be additive to ordinary environmental stresses, such as low temperatures and metabolic costs of migration. Oil also could adversely affect food resources, which could decrease survival, future reproduction, and growth of individual receptor species.

Onsite burning to remove oil, if allowed, could create smoke plumes and particulates that could affect birds and mammals through inhalation. Clean-up activities from a spill could also result in direct disturbance and displacement of wildlife, potentially over a relatively large area. Overall, however,

clean-up activities would benefit wildlife more than no response, and disturbance effects from containment and clean-up activities are usually short term.

For large spills that are not immediately or successfully cleaned up, the potential for contamination would persist for a longer time and increase the likelihood of terrestrial wildlife being exposed to the weathered oil. Clean-up success could vary, depending on the environment; but over time, remaining oil would gradually degrade. Toxic products could remain in soil, plant tissues, or prey items after cleanup and continue to bio-accumulate up the food chain.

Wetlands

Wetlands are sensitive to oil spills, with potentially immediate effects following exposure (Overstreet and Galt 1995). A crude spill could affect wetland resources directly through contamination with oil or indirectly from response vehicles, equipment, and operations that could affect wetland hydrology, vegetation, and soils. The nature and extent of impacts relates to the oil spill type and volume, surface topography, wetland type, and wetland hydrology. Unless the water is deep enough that submergence of oil poses an issue, dilbit and commonly transported crude oils pose many similar challenges following release in wetlands, but there are three factors specific to dilbit: (1) the amount of residual oil would be large compared to that produced by spills of conventional crude oils; (2) the increased level of adhesion of bitumen may complicate operations in a wetland environment; and (3) dilbit residues may persist longer in wetlands than in other environments because of their greater resistance to biodegradation (National Academies of Sciences, Engineering, and Medicine 2016).

Various wetland plant species respond differently to oil spills; plants are more sensitive to oiling during the growing season than during other periods (Zhu et al. 2004). Sediment type also plays an important role. In general, oil remains longer in soils with higher organic matter and, therefore, has greater impact on resident plants. Lin and Mendelssohn (1996) found that organic matter in soils made wetlands and plants particularly sensitive to crude oil. Some wetland sediment can act as a reservoir, absorbing oil and later releasing it into adjacent coastal habitats, causing chronic impacts on biota (Zhu et al. 2004). Hutchinson and Freedman (1978) found that intensive releases of oil were generally more damaging than spray releases, and that releases during winter months tended to be less damaging than summer releases. A study of plant recovery following a release in Alaska (Racine 1994) found that understory revegetation was nearly complete within 20 years, but areas with pooled oil had little recovery. Leck and Simpson (1992) found that contaminated soil reduced plant survival and growth from seeds, and diminished growth of plant seedlings in tidal freshwater marshes.

The type of wetland and the corresponding hydrology affect the persistence and concentration of spilled oil. Generally, marshes and swamps near larger bodies of water have water flow that helps to flush and disperse oil. Released oil also has potential to alter oxygen and microbial levels as well as overall chemistry in wetlands (Leck and Simpson 1992; Mendelssohn et al. 2012). Changes to hydrology and vegetation would likely be temporary, but soil compaction and/or contaminated soil removal could result in persistent hydrologic impacts on wetlands.

Aquatic Environment

Crude oil exposure can result in adverse effects on aquatic receptors such as benthic invertebrates, fish, and aquatic plants (emergent, floating, and submerged). Receptors present in waterbodies during and following a release would be most vulnerable to crude oil exposures and potential adverse effects.

Effects on aquatic receptors depend not only on the physical and chemical characteristics of different crude oils, but also on the site-specific environmental conditions at the time of the initial release and the spatial and temporal extent of the oiling, including lateral and downstream migration. For instance, low-energy environments promote greater concentration of oiling effects, resulting in greater toxicity within a relatively small area. Conversely, greater dispersal (e.g., from a high-energy environment or wind) would result in a broader impact, but with lower impacts on individual organisms (i.e., greater prevalence of sublethal effects). Higher, flood flows tend to disperse oil onto floodplains, where oil could become trapped in floodplain depressions and wetlands. Floods also have greater concentrations of suspended sediment, which promotes formation of tarballs. During low-flow conditions, oil tends to have greater contact with the streambed and therefore may more readily contaminate bed sediments.

The season during which the spill occurs would also affect the extent of effects on aquatic receptors. If a spill were to occur in the winter during full ice coverage, oil discharged on the surface of the ice would have a smaller impact on water, shoreline, sediments, and aquatic biota as it would not enter the aquatic system. The presence of full ice coverage could also facilitate clean-up efforts, though partial ice coverage can have the opposite effect (Miklaucic and Saseen 1989). Additionally, snow can increase oil absorption and reduce oil dispersion. If a spill were to occur when there is open water (e.g., spring, summer, and fall), oil would be more likely to enter the aquatic system. The duration of water quality and toxicity impacts on aquatic receptors within a given waterbody would depend on oil dispersal area, oil type and quantity spilled, and the degree of entrainment within bed substrates. Contaminated substrates can be scoured and mobilized well after the release to cause lingering water quality impacts and toxicity to biota.

Impacts on aquatic habitats and species would result from oil contamination within the area of surface spreading and lateral and vertical movement through the water column. Habitat degradation associated with a spill would result from the physical presence of floating and/or partially submerged (depending on its relative density) crude oil, the presence of toxic water-soluble or suspended fractions of crude oil and petroleum derivatives, and reduced dissolved oxygen concentration. The oil could come into contact with shorelines and aquatic vegetation. Lighter crudes generally have lower impacts on shorelines than heavy crudes due to differences in persistence and adhesion. Flow, scour, and depositional conditions influence effects of oils in a similar manner as discussed with respect to bed sediments. Shoreline substrates also affect the retention of oil, with impermeable materials (e.g., bedrock) absorbing less oil than sands and gravels with greater permeability. Riparian vegetation, particularly dense vegetation, tends to protect shorelines from oiling effects (Fraser et al. 1989). However, vegetation can have a trapping effect if oil initially penetrates vegetation or enters the shoreline area from land (Baca et al. 1983).

Effects on biota can be lethal or sublethal. Exposures of light crude oil can have unique effects on different categories of aquatic receptors in the freshwater environment. Light crude oil contains more soluble compounds, which can dissolve in the water column immediately following a release (and prior to significant volatilization from the water surface) and result in elevated hydrocarbon concentrations that are potentially toxic to receptors such as invertebrates and fish. Exposures and acute toxicity to fish and invertebrates can occur in high-energy aquatic systems where light crude oil can be entrained in droplets and move throughout the water column. Sublethal and lethal effects on fish are more likely for light than heavy crude oils.

Mortality may occur as a result of direct oiling or exposure to high concentrations of oil. Sensitivity to spill effects also depends on mobility and dependence of a given species on aquatic habitats. Benthic

macroinvertebrates are commonly filter feeders and immobile, meaning they can be greatly affected by oiling effects. Semi-aquatic mammals are capable of moving away from the spill site, have greater flexibility in their habitat and food sources, and would therefore generally have lower relative sensitivity to spills in aquatic environments. The magnitude of impacts also depends on the relative location of the organism within the water column. Biota dwelling at depth may be less exposed to oiling effects. Conversely, species that primarily inhabit the near-surface water column and adjacent shorelines have a greater likelihood of direct oiling effects and toxicity (Dicks 1998). Impacts on fish would depend on life stage. Some fish may not be affected at all, or, in the case of fish in larval or spawning stages, impacts may be quite detrimental (NOAA 2011) due to smothering of eggs and/or larvae. Larval/juvenile fish are generally more sensitive to toxicity than adults (Hose et al. 1996). Increased mortality of larval/juvenile fish would be expected because they are often found at the water's surface, where contact with oil is most likely, and because they are relatively immobile, whereas adult fish would be able to swim away from the spill.

Fish that have been exposed to oil may suffer from changes in heart and respiratory rate, enlarged livers, reduced growth, fin erosion, deformities, and a variety of effects at biochemical and cellular levels (USFWS 2010). Oil may also affect the reproductive capacity of fish and may result in deformed fry (United Nations Environment Programme 2011). Indirect effects on fish from an oil spill include interference with movements to feeding or spawning areas; localized reduction in food resources; and effects from consumption of contaminated prey (Brannon et al. 1986; Morrow 1974; Purdy 1989). Floating oil can contaminate plankton, which includes algae, fish eggs, and the larvae of various fish and invertebrates. Fish that feed on these organisms can subsequently become contaminated (USFWS 2010).

Floating plants are particularly vulnerable to crude oil released to the water surface, while submerged vegetation is less sensitive, especially to temporary dissolved hydrocarbon exposures. Vegetation can absorb oil and effectively protect bank sediments from oil, as was the case in the 1988 Shell oil release in Martinez, California (Fraser et al. 1989), and the 2000 M/T Westchester oil release into the Mississippi River (Michel et al. 2002). Vegetation can also absorb and hold oil on the banks, thereby increasing the length of time that oil has an effect on shorelines and banks. For example, after an oil spill in Buzzards Bay, Massachusetts, in 1969, areas with marshy vegetation retained oil residues, whereas un-vegetated areas did not (Peacock et al. 2005). Damages to aquatic plants can have impacts on the aquatic habitat in terms of both biological health and productivity as well as physical integrity (e.g., loss of plants that reduce the potential for riverbank erosion).

Immediate response would minimize a spill's spatial extent and the duration that oil would be in the water, and would thus decrease the potential for crude oil settling and adhering to streambed sediments, shoreline areas, and other aquatic habitats. However, spill response and clean-up activities could result in damage and disturbance to aquatic vegetation and habitats and displace aquatic species that are present.

Drinking Water Sources

The alternative with the greatest acreage of HCA drinking water sources within 2,500 feet of either side of its centerline is existing Line 3 supplemented by truck, followed by transportation by truck, existing Line 3 supplemented by rail, transportation by rail, system alternative SA-04, and continued use of existing Line 3. The Applicant's preferred route would have the least acres of HCA drinking water sources within the 2,500-foot-wide ROI (Table 10.4-3). Figure 10.4-2 shows HCA drinking water sources along the Applicant's preferred route and CN Alternative routes.

Table 10.4-3. HCA Drinking Water Sources within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres)

Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
1,614.6	3,975.2	11,058.9	27,347.8	29,524.1	31,323.0	33,499.3

Source: Enbridge 2016c.

HCA = high consequence area

Drinking water sources can be affected when groundwater and/or surface water become contaminated. Released crude oil can enter underlying groundwater aquifers and form plumes that migrate with the natural flow of groundwater. The migration of the contaminated plumes could result in contamination of nearby drinking water supply wells and other local wells. The ultimate fate and transport of these contaminated plumes is dictated by the amount and type of oil released, groundwater flow rate, geological properties of the aquifer, chemical reactions occurring within the plume, and the presence of microbes that degrade contaminants (Stantec et al. 2017). In general, these processes tend to limit the length of groundwater plumes to 600 feet or less.

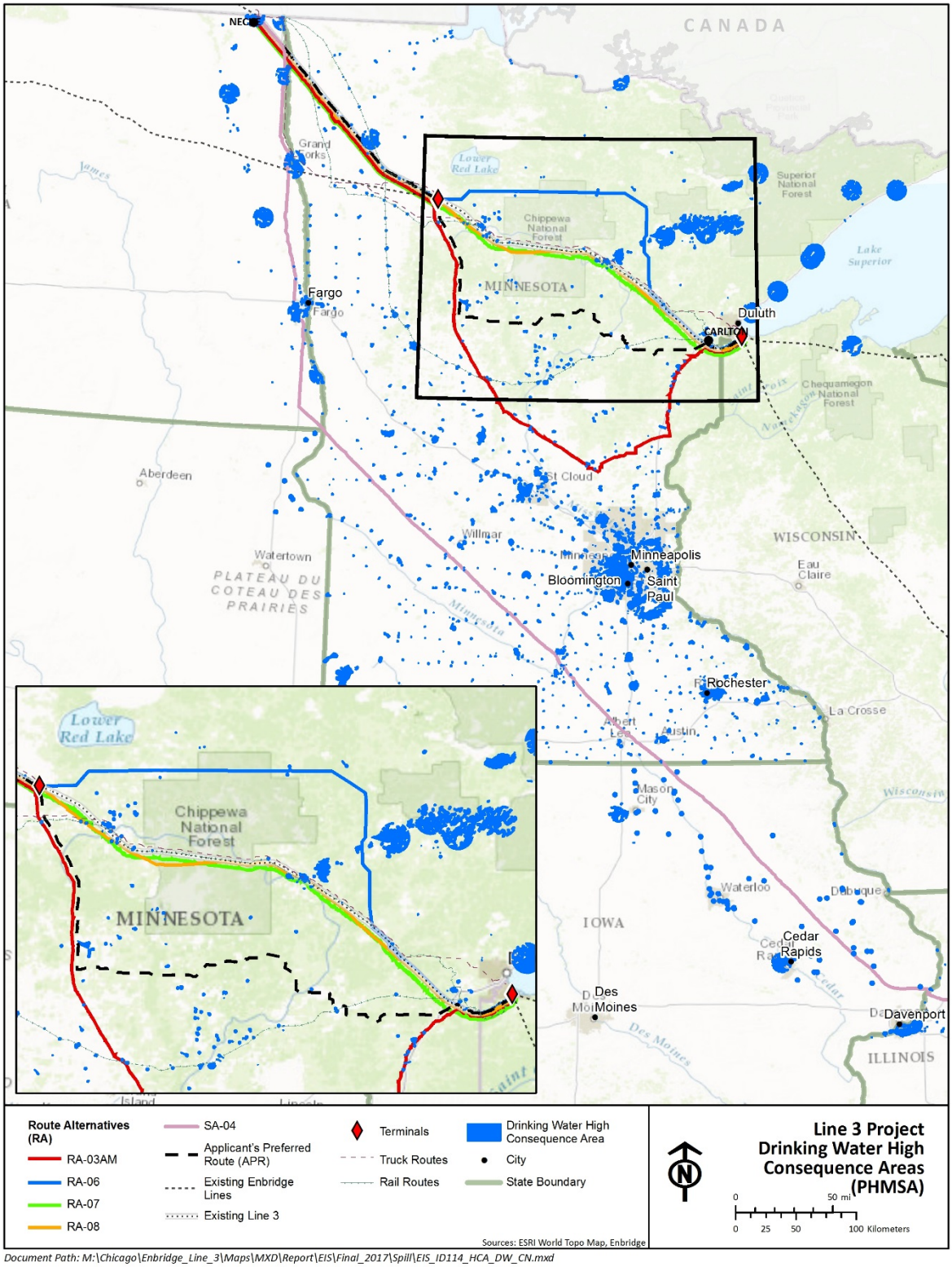

Figure 10.4-2. High Consequence Area Drinking Water Sources along the Applicant's Preferred Route and Certificate of Need Alternative Routes

A significant proportion of crude oil released in the subsurface could accumulate at the water table. A smaller portion, particularly lighter compounds with greater water solubility, would dissolve into the groundwater (O'Reilly et al. 2001). Contaminated groundwater plumes typically have a central zone of high contamination, with decreasing contamination toward the plume margins. Migration of crude oil constituents depends on groundwater flow rates, aquifer properties, and the constituent being considered. Lighter compounds (e.g., BTEX) are generally more mobile, spreading farther and faster, whereas heavier compounds (e.g., PAHs) are more likely to adhere to soils and sediments. As a contaminant plume migrates, it also is weathered and degraded by processes of evaporation volatilization, adsorption, dissolution, dispersion, and biodegradation. These processes of natural attenuation typically cause a plume to stabilize at a maximum distance in the hundreds of feet from the original spill source, and ultimately decline in size (Connor et al. 2015). If a contaminant plume intersects groundwater discharge points like surface waterbodies, or intersected groundwater extraction points, or water supply wells, contaminants can reach these receptors. Remediation techniques such as groundwater pumping and treatment, air injection to increase volatilization (evaporation), point-of-use treatment (carbon filtration), and bioremediation can be employed to mitigate the contaminant plume and reduce spreading.

Water supplies in the vicinity of an oil spill are often temporarily shut off to prevent contamination, and total petroleum hydrocarbons in drinking water are detectable by human taste and odor at concentrations below levels of concern for acute human health effects. As a result, even short-term human exposure to total petroleum hydrocarbons in drinking water is highly unlikely (World Health Organization 2004).

10.4.2.1.2 Areas of Interest Comparisons for the Applicant's Preferred Route and Certificate of Need Alternatives

Drinking Water Areas of Interest

In addition to the HCA drinking water sources, Minnesota DH identified other drinking water resources that may be susceptible to exposures of crude oil. Potential impacts on drinking water resources from a crude spill would be the same as those described above for HCA drinking water sources.

Drinking Water Supply Management Areas and Vulnerability

Data characterizing DWSMAs are not available outside of Minnesota; therefore, this metric has not been analyzed for the CN Alternatives. An analysis of DWSMA data is included in Section 10.4.3.1.2 for the route alternatives.

Wellhead Protection Areas

WPAs are Minnesota DH-approved surface and subsurface areas surrounding public water supply wells or well fields that supply a public water system and through which potential contaminants would be likely to move toward and reach the well or well field (Minnesota DH 2014). Among the alternatives, the most WPA acres are within 2,500 feet of either side of the centerline of existing Line 3 supplemented by truck, followed by existing Line 3 supplemented by rail, transportation by truck, system alternative SA-04, transportation by rail, and continued use of existing Line 3. The fewest WPA acres are within 2,500 feet of either side of the centerline for the Applicant's preferred route (Table 10.4-4 and Figure 10.4-3).

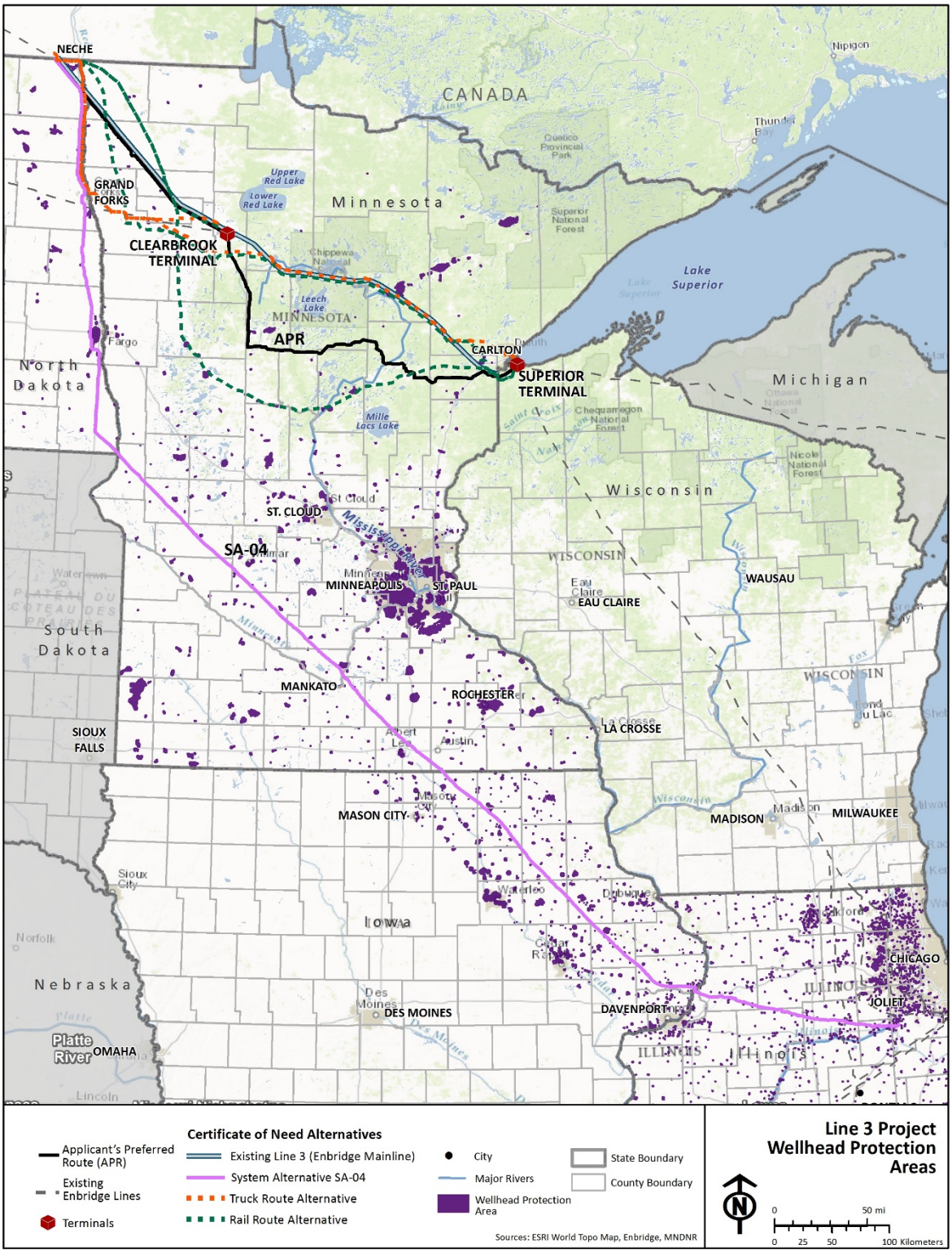

Figure 10.4-3. Wellhead Protection Areas along the Applicant's Preferred Route and Certificate of Need Alternative Routes

Table 10.4-4. Wellhead Protection Areas within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres)

Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
189.7	1,391.3	3,579.7	6,863.3	5,591.7	8,254.6	6,983.0

Sources: Iowa DNR 2017; Konczyk 2017, pers. comm.; Minnesota DH 2016; North Dakota Department of Health 2017.

Note:

Wisconsin well data were not available.

Domestic Wells and Associated Geological Sensitivity Ratings

Domestic (private) drinking water wells and their geological sensitivity were identified within the 2,500-foot-wide ROI for the Applicant's preferred route and the CN Alternatives. These wells are potentially at risk from released oil plumes. The alternative with the highest number of domestic drinking water wells within 2,500 feet of either side of its centerline is existing Line 3 supplemented by rail, followed by existing Line 3 supplemented by truck, system alternative SA-04, transportation by rail, the Applicant's preferred route and continued use of existing Line 3 (which have the same number of wells), and transportation by truck (Table 10.4-5).

Table 10.4-5. Numbers of Domestic Wells within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Certificate of Need Alternative Routes

Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04[a]	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
618	618	920	1,374	608	1,992	1,226

Sources: Iowa DNR 2017; Konczyk 2017, pers. comm.; Minnesota DH 2017, pers. comm.; North Dakota Department of Health 2017.

[a] In Illinois, 509 wells within 2,500 feet of either side of the centerline for system alternative SA-04 have not been field verified; only 16 have been field verified as non-community water supply wells. Information regarding the other 493 wells is not available; therefore, they are not included in the total for SA-04.

Note:

Wisconsin well data were not available.

Public Drinking Water Supplies

Public water supply wells were identified within the 2,500-foot-wide ROI for the Applicant's preferred route and the CN Alternatives. The alternative with the highest number of public water supply wells within 2,500 feet of either side of the centerline is existing Line 3 supplemented by truck, followed by existing Line 3 supplemented by rail, continued use of existing Line 3, SA-04, the Applicant's preferred route, transportation by truck, and transportation by rail (Table 10.4-6).

Table 10.4-6. Numbers of Public Water Supply Wells within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Certificate of Need Alternative Routes

Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04[a]	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
20	72	26	2	4	74	76

Sources: Minnesota DH 2017, pers. comm.; Iowa DNR 2017; Konczyk 2017, pers. comm.; North Dakota Department of Health 2017.

[a] In Illinois, 509 wells within 2,500 feet of either side of the alternative centerline for system alternative SA-04 have not been field verified; only 1 is listed as a community water supply well. Information regarding the other 508 wells is not available; therefore, they are not included in the total for SA-04.

Note:

Wisconsin well data were not available.

Cultural Resources Areas of Interest

A crude oil release along the Applicant's preferred route and the CN Alternative routes has the potential to result in exposure of reservation lands (Table 10.4-7). Reservations contain cultural resources, which include both archaeological and historic resources. These lands also may support natural resources that are treated in the same manner as cultural resources (see Section 9.4.4.1.1). For instance, wild rice lakes are considered to be traditional cultural properties (see Section 9.4.1).

Table 10.4-7. Reservation Lands within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres)

Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
48.0	33,737.6	6,738.1	31,854.3	30,280.4	65,591.9	64,018.0

Source: ESRI 2017; Minnesota Department of Transportation 2003.

Within 2,500 feet of the centerline of the routes, existing Line 3 supplemented by rail crosses the greatest acreage of reservation lands, followed by existing Line 3 supplemented by truck, the continued use of existing Line 3, transportation by rail, transportation by truck, system alternative SA-04, and the Applicant's preferred route.

Direct impacts on tribal resources could occur by direct damage to archaeological and historic resources or secondary damage during clean-up activities. Impacts on reservations would be similar to those described for terrestrial and aquatic habitats under HCA unusually sensitive ecological areas. Temporary access limitations are possible, especially during response efforts. In general, tribal resources related and/or in close proximity to surface waters have the most potential to be affected by oil releases. Surface water-related resources of particular concern are fisheries and wild rice harvest areas.

Biological Areas of Interest

Various biological AOIs were identified within 2,500 feet of either side of the centerlines for the Applicant's preferred route and CN Alternative routes (Table 10.4-8 and Figure 10.4-4). The most biological AOI acres are contained within the 2,500-foot-wide ROI of existing Line 3 supplemented by rail and existing Line 3 supplemented by truck, followed by the Applicant's preferred route, continued use of existing Line 3, transportation by rail, and transportation by truck. The ROI of SA-04 does not contain any of the Minnesota recorded biological AOIs; however, the biological AOIs evaluated are Minnesota-specific and comparable data were not available from other states.

Point data identifying locations of calcareous fens in Minnesota within the ROI indicate that the most calcareous fens occur along existing Line 3 supplemented by rail (average of 9), followed by continued use of existing Line 3 and the Applicant's preferred route (five each), and SA-04 (1). Trout streams and lakes were not analyzed for the CN Alternatives as comparable data for SA-04 are not available, and therefore a comparative analysis across all routes could not be conducted.

The alternatives overlap with marginal cropland in limited or preputial conservation easements, as identified by the Minnesota Board of Water and Soil Resources. These former agriculture areas have been taken out of production, typically funded by forgiveness of public debt or similar mechanism, to allow for soil and natural habitat restoration. Among the CN Alternatives, existing Line 3 supplemented by rail has the greatest number of marginal cropland acres within 2,500 feet of either side of its centerline, while system alternative SA-04 has no marginal cropland within this distance (Table 10.4-8). Existing Line 3 supplemented by rail encompasses 90 acres of limited marginal cropland, and is followed by transportation by rail, existing Line 3 supplemented by truck, continued use of existing Line 3, the Applicant's preferred route, and transportation by truck. A spill into marginal croplands could affect the publically funded habitat restoration by killing new growth and contaminating soils. The cleanup process may also cause compaction and loss of topsoil, further reducing the quality of the marginal cropland. Impacts on biological AOIs would be similar to those described above for HCA unusually sensitive ecological areas. Wild rice is considered an aquatic grass, and effects on it from a crude oil spill would be similar to those described above for wetland vegetation. Given the high organic matter found in wetland soils, plants found in this environment are particularly sensitive to crude oil (Lin and Mendelssohn 1996).

Table 10.4-8. Biological Areas of Interest within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres)

Area of Interest	Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04[a]	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Aquatic Management Area	125.0	227.5	0	228.6	93.9	456.0	321.4
Scientific and Natural Area	0	7.5	0	186.7	0	380.8	7.5
Minnesota BWSR conservation easement	15.8	167.1	0	736.0	33.0	903.1	200.1
Lakes of Biological Significance	406.7	2,209.8	0	1,951.5	2,617.9	4,161.4	4,827.8
Marginal Cropland – Limited	15.6	16.1	0	73.9	5.4	90	21.5
Marginal Cropland - Perpetual	0	0	0	13.5	0	13.5	0
MBS Sites	28,046.8	12,992.6	0	18,309.7	6,285.4	31,302.3	19,278.1
Muskie lakes	41.4	976.6	0	1,060.9	1,882.1	2,037.5	2,858.8
Native plant communities	38,173.8	40,195.4	0	33,852.4	35,643.9	74,047.8	75,839.3
Sensitive lakeshore areas	300.5	1,329.8	0	743.4	1,387.9	2,073.2	2,717.7
Wetland bank easement	0	70.6	0	120.3	33.6	190.9	104.2
Wild rice lakes	675.4	1,240.4	0	1,474.1	1,661.0	1,240.4	2,901.4
TOTAL	**67,801.0**	**59,433.4**	**0.0**	**58,751.0**	**49,644.1**	**116,896.9**	**109,077.8**

Sources: Enbridge 2016c; Minnesota DNR 2016.

[a] The ROI of SA-04 does not contain any of the Minnesota recorded biological areas of interest (AOIs); however, the biological AOIs evaluated are Minnesota-specific and comparable data were not available from other states.

MBS Sites = Minnesota Biological Survey Sites of Biodiversity Significance, Minnesota BWSR = Minnesota Board of Water and Soil Resources

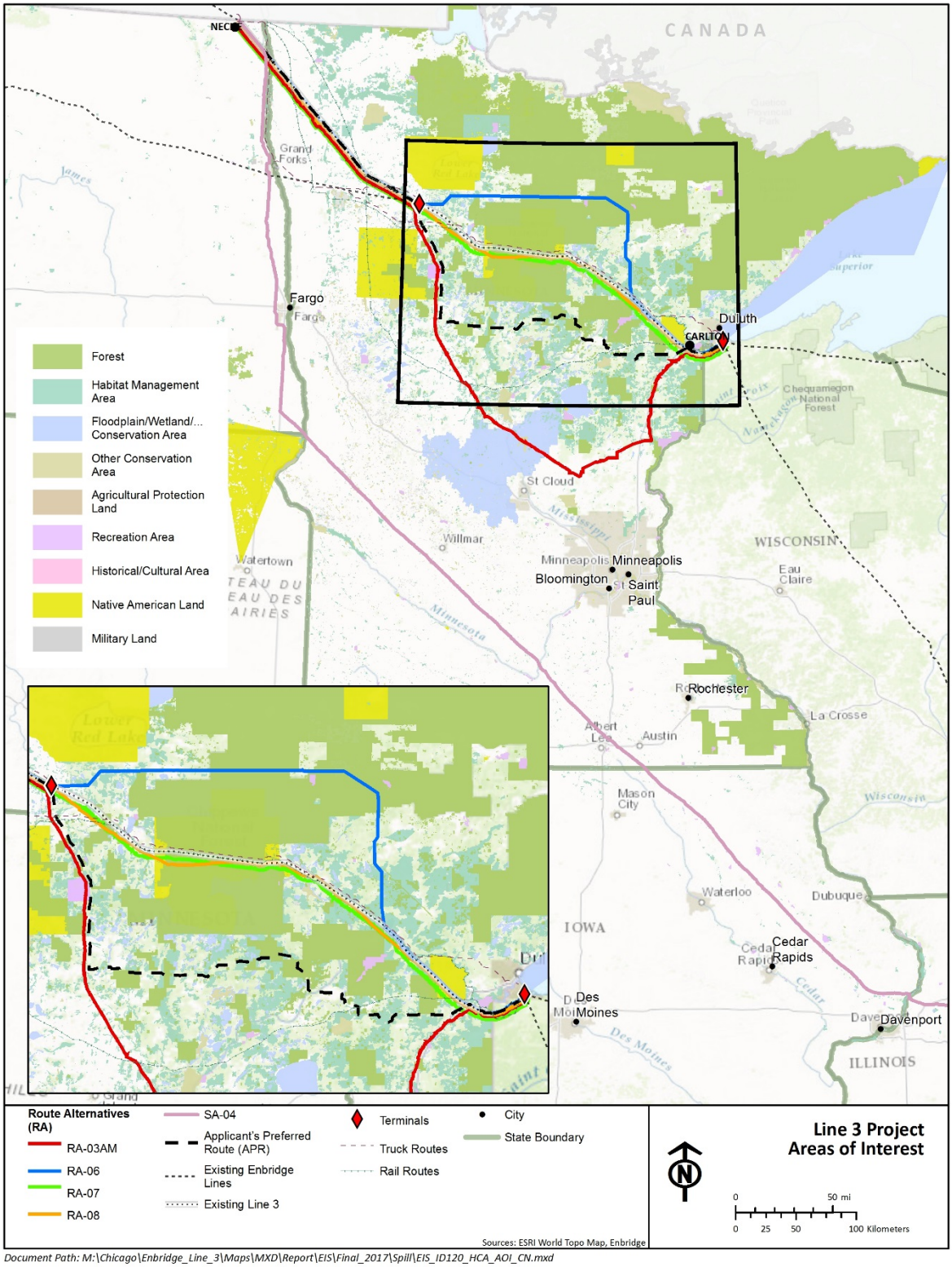

Figure 10.4-4. Areas of Interest along the Applicant's Preferred Route and Certificate of Need Alternative Routes

Contaminated soil reduces plant survival and growth from seeds and results in diminished growth of plant seedlings (Leck and Simpson 1992). A study of plant recovery following a release (Racine 1994) found that understory revegetation was nearly complete within 20 years, but areas with pooled oil had little recovery. If a spill were to occur, plants would be more sensitive to oiling during the growing season than during other periods (Zhu et al. 2004).

Commodity Production Areas of Interest

The 2,500-foot-wide ROI of all alternatives overlaps with various government managed areas of commodity production. Among the CN Alternatives, existing Line 3 supplemented by truck would affect the greatest state, national, and other forest acres, followed by existing Line 3 supplemented by rail (Table 10.4-9). In contrast, system alternative SA-04 has the lowest state, national, or other forest acreage within 2,500 feet of either side of its centerline. The Applicant's preferred route has no national forests within this ROI, but it has 31,764.3 acres of state forest and 3,349.5 acres of other forest land within the ROI. Impacts on forested land from a crude spill would be similar to those described under HCA unusually sensitive ecological areas for terrestrial vegetation and habitat.

Table 10.4-9. Commodity Production Areas of Interest within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres)

Area of Interest	Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
National forests	0	21,055.0	145.9	10,149.0	20,018.2	31,203.9	41,073.1
Other forest land	3,349.5	2,827.2	45.7	2,735.5	2,954.0	5,562.7	5,781.2
State forests	31,764.3	27,806.9	0	17,505.5	25,451.2	45,312.4	53,258.1
Harvested Wild Rice Lakes	181.6	241.9	0	384.7	328.5	345.1	430.1
TOTAL	**35,295.4**	**51,931.0**	**191.6**	**30,774.7**	**48,751.9**	**82,424.1**	**100,542.5**

Source: Enbridge 2016c; Minnesota DNR 2016.

Of the wild rice lake listed in Table 10.4-8, with the exception of SA-04, all CN alternatives are located within 2,500 feet of waterbodies used for harvesting wild rice (Figure 10.4-5), as documented 2006 rice harvester survey (Minnesota DNR 2007). Among the CN Alternatives, existing Line 3 supplemented by rail has the greatest number of harvested wild rice lake acres within 2,500 feet of either side of its centerline, followed by existing Line 3 supplemented by truck, continued use of existing Line 3, and the Applicant's preferred route (Table 10.4-9). It should be noted that many rice lakes are undergoing habitat restoration and areas of harvested wild rice may have expanded since 2006. In addition to effects from oiling, wild rice is a delicate crop that is subject to shattering, or having the seed fall to the ground in the wind, making the crop susceptible to failure if disturbed. If crude oil did reach a wild rice lake pre-harvest, not only would the plant itself be exposed to contamination, but the clean-up efforts would affect the year's harvest.

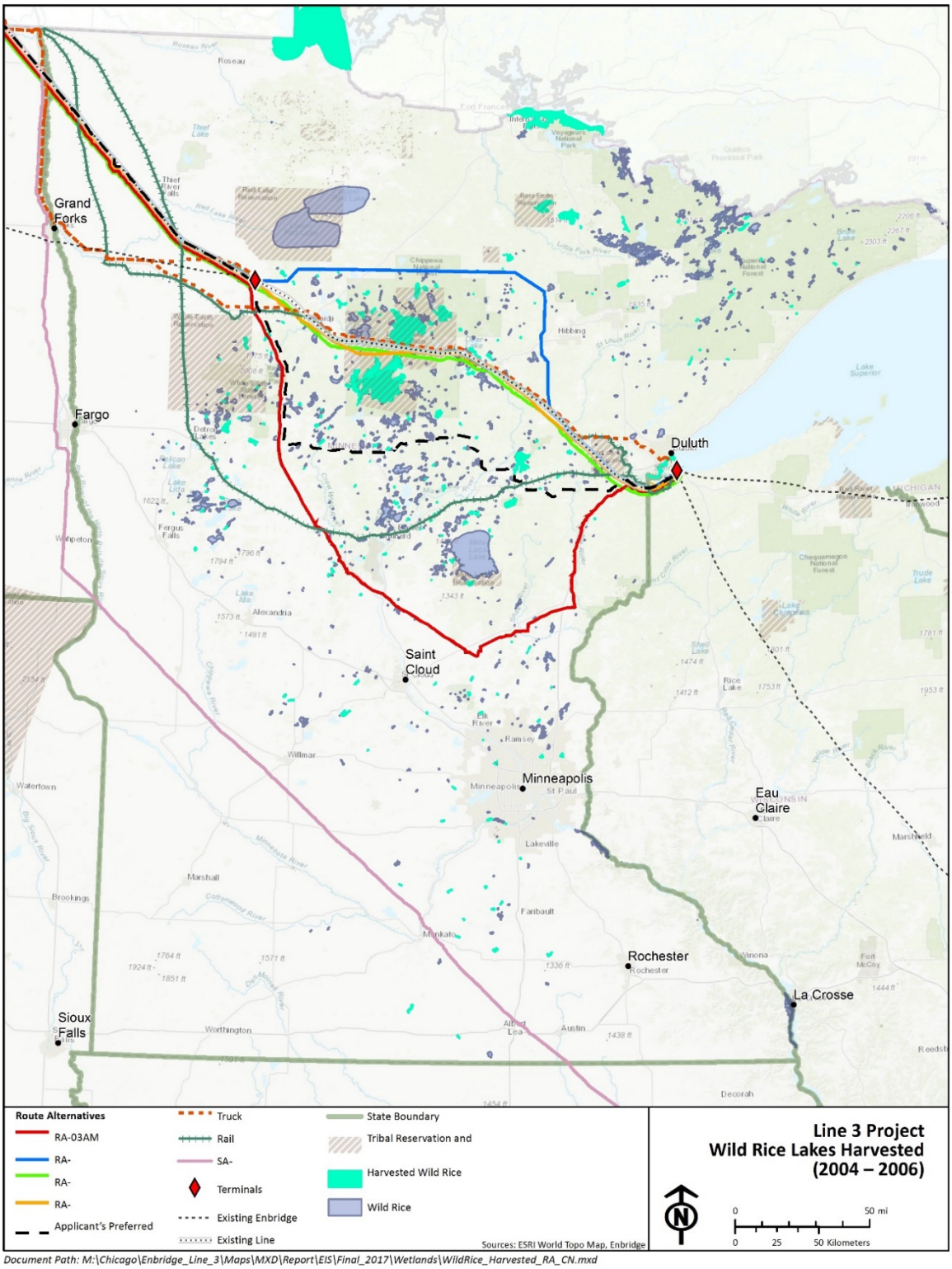

Figure 10.4-5. Wild Rice Harvested along the Applicant's Preferred Route and Certificate of Need Alternative Routes

The market value of wild rice is variable and dependent on source, means of cultivation and harvesting (e.g. traditional hand-harvested versus use of a combine), etc. Limited information pertaining to commodity values of Minnesota wild rice, both generally and traditionally hand-harvested, is available. According to a report on wild rice prepared by the Minnesota Department of Natural Resources, the price paid for unprocessed rice from the Leech Lake Band of Ojibwe (LLBO) reservation between 1990 and 2007 was between $1.00 and $1.50 per pound (Minnesota DNR 2008). Data gathered from the 2006 rice harvester survey estimated a total harvest estimate of almost 700,000 pounds of natural wild rice in 2006, based on 1,625 state issued licenses and an estimated 430 pounds harvested per license (Minnesota DNR 2007). Some tribal areas allow harvesting of wild rice by non-band members, but require an on-reservation license for state residents wishing to harvest. Approximately 70 percent of the 2004 to 2006 harvesters surveyed operated only under a state license. Tribal members are more frequently required to obtain multiple licenses based on where they plan to harvest, including off-reservation permit for treaty ceded lands and tribal licenses for reservation lakes, in addition to state license for other areas.

Based on the 2015 Annual Report of the LLBO, the LLBO Department/Division of Resource Management purchased over 89,000 pounds of wild rice from LLBO Band members, resulting in $178,000 injected into the local economy (LLBO 2015). While the Applicant's preferred route would not cross any American Indian reservations, areas of wild rice on American Indian reservations are located within the 10-mile downstream ROI for potential spills.

Using the resulting rudimentary assumption that the average price for traditionally harvested unprocessed wild rice is $2.00 per pound, and a yield assumption of approximately 300 pounds per acre, the approximate annual market values of unprocessed wild rice within the construction work area and permanent right-of-way of the Applicant's preferred route are $3,000 and $2,000, respectively. These estimates assume that the entire waterbody acreage contains harvestable wild rice. The estimates do not consider the economic value of other activities, such as finishing/processing for consumption.

Recreation and Tourism Areas of Interest

Existing Line 3 supplemented by rail and transportation by rail contain the most recreation and tourism AOI acres within 2,500 feet of either side of their centerlines. These are followed by the Applicant's preferred route, existing Line 3 supplemented by truck, transportation by truck, continued use of existing Line 3, and system alternative SA-04 (Table 10.4-10).

Impacts on land, water, and natural resources can, in turn, affect recreational and land use. Impacts on parks and recreation areas may be environmental, cultural, or visual in nature. Specific recreational resources of concern include trails, state parks, hunting and fishing areas, and lakes, which may be closed to the public following a spill and during response activities. Other areas affected by oil spills could include residential, commercial, industrial, agriculture, and forestry lands, and associated uses and business operations.

Table 10.4-10. Recreation and Tourism Areas of Interest within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Certificate of Need Alternatives (acres)

Area of Interest	Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
State plan/ recreational areas	317.7	0	0	2,079.3	485.6	2,079.3	485.6
State parks	629.9	0	790.5	3,910.3	0	3,910.3	0
Wildlife Management Areas	1,299.3	16.4	105.5	3,352.1	820.55	3,368.5	836.9
Waterfowl production areas	92.0	185.80	0	632.0	485.0	817.8	670.7
TOTAL	**2,338.9**	**202.2**	**896.0**	**9,763.0**	**1,641.3**	**9,965.2**	**1,843.4**

Sources: Enbridge 2016c; Minnesota DNR 2016.

The tourism industry is a major source of direct and indirect employment and wages. It includes fishing, land and water touring, and retail and service firms, including lodging providers, restaurants, automobile service stations, and other businesses. A crude oil spill could lead to both temporary and long-term closures and restricted access for recreation resources including boat launch restrictions, fishing restrictions, and waterway closures. A large spill could also lead to closure or restricted access to roads, bike paths, trails, scenic overlooks, and other recreation resources. Depending on the location and extent of the spill, these resources could be inaccessible to the public for days to several weeks or longer during cleaning efforts. Longer-term impacts on fishing could result if aquatic resources were fouled or there was a reduction in the amount and/or quality of fish available for harvest. Impacts on vegetation and scenic views, both of which are draws for recreationists, could last longer. Economic damages could persist if a diminished public perception of an area occurred (Chang et al. 2014).

10.4.2.2 Downstream Exposure Analysis for Spills

10.4.2.2.1 High Consequence Area Downstream Exposure Comparisons

Populated Areas

Existing Line 3 supplemented by truck has the most HCA populated areas acres within 10 miles downstream of its waterbody crossings, followed by SA-04, existing Line 3 supplemented by rail, transportation by truck, transportation by rail, the Applicant's preferred route, and continued use of existing Line 3 (Table 10.4-11). Potential effects on HCA populated areas from a crude oil spill would be the same as described in Section 10.4.2.1.1.

Table 10.4-11. HCA Populated Areas within the 10-Mile-Long Downstream ROI for the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres)

Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
4,414.6	3,379.2	12,053.4	15,614.9	10,558.3	18,994.1	13,937.5

Source: Enbridge 2016c.

HCA = high consequence area, ROI = region of interest

Unusually Sensitive Ecological Areas

Existing Line 3 supplemented by rail has the most HCA unusually sensitive ecological area acres within 10 miles downstream of its waterbody crossings, followed by existing Line 3 supplemented by truck, transportation by rail, transportation by truck, SA-04, continued use of existing Line 3, and the Applicant's preferred route (Table 10.4-12). Potential effects on HCA unusually sensitive ecological areas from a crude oil spill would be the same as described in Section 10.4.2.1.1.

Table 10.4-12. Unusually Sensitive Ecological Area HCAs within the 10-Mile-Long Downstream ROI for the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres)

Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
4,453.3	5,932.6	9,848.1	20,518.7	12,078.1	26,451.3	18,010.7

Source: Enbridge 2016c.

HCA = high consequence area, ROI = region of interest

Drinking Water Sources

SA-04 has the greatest acreage of HCA drinking water sources within the 10-mile-long downstream ROI for its waterbody crossings, followed by existing Line 3 supplemented by truck, transportation by truck, existing Line 3 supplemented by rail, transportation by rail, the Applicant's preferred route, and continued use of existing Line 3 (Table 10.4-13). Potential effects on HCA drinking water sources from a crude oil spill would be the same as those described in Section 10.4.2.1.1.

Table 10.4-13. HCA Drinking Water Sources within the 10-Mile-Long Downstream ROI for the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres)

Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
829.3	546.7	13,409.8	8,263.2	17,186.1	8,809.9	17,732.8

Source: Enbridge 2016c.

HCA = high consequence area, ROI = region of interest

10.4.2.2.2 Areas of Interest Downstream Exposure Comparisons

Drinking Water Areas of Interest

Drinking Water Supply Management Areas and Vulnerability

Data characterizing DWSMAs are specific to Minnesota; therefore, this metric was not analyzed for the CN Alternatives. An analysis of DWSMA data is included in Section 10.4.3.1.2 for the route alternatives.

Wellhead Protection Areas

SA-04 has the greatest number of WPA acres within the 10-mile-long downstream ROI (11,906 acres), while the Applicant's preferred route has the least (approximately 130 acres). Existing Line 3 supplemented by truck would affect significantly more acres than the existing Line 3 supplemented by rail, 6,258 acres vs. 687 acres, respectively (Table 10.4-14). Potential effects on WPAs from a crude oil spill would be the same as described in Section 10.4.2.1.2.

Table 10.4-14. Wellhead Protection Areas within the 10-Mile-Long Downstream ROI for the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres)

Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
130.0	208.6	11,906.4	1,025.5	11,656.2	1,234.1	11,864.8

Sources: Iowa DNR 2017; Konczyk 2017, pers. comm.; Minnesota DH 2016; North Dakota Department of Health 2017.

Note:

Wisconsin well data were not available.

ROI = region of interest

Domestic Wells

The geographic scope of the alternatives required domestic wells data to be compiled from multiple state databases. However, the 10-mile-long downstream ROI was limited to capturing domestic wells within 1 mile of the route (or 1 mile downstream in most cases). However, because the same reduced area of analysis was applied for all alternatives, the results are considered useful for comparison purposes.

Domestic water wells within 1 mile of each alternative centerline and 500 feet from either side of the flowing waterbody were identified and are presented below in Table 10.4-15. Existing Line 3 supplemented by rail has the highest number of wells within the downstream ROI, followed by transportation by rail, SA-04, existing Line 3 supplemented by truck, transportation by truck, the Applicant's preferred route, and continued use of existing Line 3. Potential effects on domestic wells from a crude oil spill would be the same as those described in Section 10.4.2.1.2.

Table 10.4-15. Number of Domestic Wells within the 1-Mile Downstream ROI for the Applicant's Preferred Route and Certificate of Need Alternative Routes

Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
146	39	228	367	184	406	223

Sources: Iowa DNR 2017; Konczyk 2017, pers. comm.; Minnesota DH 2017, pers. comm.; North Dakota Department of Health 2017.

Note:

Wisconsin well data were not available.

ROI = region of interest

Public Water Drinking Supplies

Comparable public water wells data were not obtained for all CN Alternatives, so no meaningful analysis can be done. An analysis of public water wells is included in Section 10.4.3 for the route alternatives.

Cultural Resources Areas of Interest

Within the 10-mile-long downstream ROI, existing Line 3 supplemented by rail overlaps with the most acreage of reservation land, followed by transportation by rail, existing Line 3 supplemented by truck, continued use of existing Line 3, and SA-04 (Table 10.4-16). The Applicant's preferred route does not overlap with any reservation lands within the 10-mile-long downstream ROI. Potential effects on cultural resource AOIs from a crude oil spill would be the same as those described in Section 10.4.2.1.2.

Table 10.4-16. Reservation Lands within the 10-Mile-Long Downstream ROI for the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres)

Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
0	10,400	4,868.3	23,502.5	9,956.2	33,902.0	20,356.0

Sources: Enbridge 2016c; Minnesota DNR 2016.

ROI = region of interest

Biological Areas of Interest

Biological AOIs were identified within the 10-mile-long downstream ROIs of the CN Alternatives and the Applicant's preferred route (Table 10.4-17). SA-04 overlaps the fewest AOIs (three), and all other alternatives overlap all AOIs to a varying degree. Overall, existing Line 3 supplemented by rail or truck contains the greatest acreage of AOIs within 10 miles, with the exception of Scientific and Natural Areas—the Applicant's preferred route has the greatest acreage of Scientific and Natural Areas within the 10-mile-long downstream ROI. The Applicant's preferred route would cross the greatest acreage of marginal cropland among all routes (44.1 acres). The existing Line 3 supplemented by rail and truck alternatives both overlap approximately twice the total acreage of biological AOIs than the continued use of existing Line 3 or the Applicant's preferred route. SA-04 has significantly less acreage within the ROI than all other routes given it only crosses three AOI types (Minnesota BWSR conservation easement, MBS Sites, and native plant communities).

Point data identifying locations of calcareous fens in Minnesota within the 10-mile-long downstream ROI indicate limited fen crossings. The Applicant's preferred route would cross the most calcareous fens (two), followed by existing Line 3 supplemented by rail (one). Continued use of existing Line 3 and SA-04 would not cross any calcareous fens.

Potential effects on biological AOIs from a crude oil spill would be the same as those described in Section 10.4.2.1.2.

Table 10.4-17. Biological Areas of Interest within the 10-Mile-Long Downstream ROI for the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres)

Area of Interest	Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Aquatic Management Area	209.8	320.0	0	196.3	183.5	516.4	503.5
Scientific and Natural Area	342.9	192.7	0	63.4	0	256.1	192.7
Minnesota BWSR conservation easement	262.0	260.7	29.8	158.2	90.9	418.8	351.5
Lakes of Biological Significance	3,608.9	3,400.1	0	3,659.1	4,559.4	7,059.2	7,959.5
Marginal Cropland[a]	44.2	10	0	0	0	10	0
MBS Sites	11,589.4	8,001.2	120.6	11,117.4	5,740.2	19,118.6	13,741.5
Muskie lakes	676.0	2,107.0	0	1,990.8	3,526.5	4,097.8	5,633.5
Native plant communities	14,015.3	22,744.8	219.0	16,735.5	19,166.4	39,480.3	41,911.3
Sensitive lakeshore areas	441.9	513.4	0	305.3	373.6	818.7	887.0
Wetland bank easement	38.5	30.3	0	49.7	21.9	80.0	52.2
Wild rice lakes	3,396.3	2,956.4	0	3,298.6	3,899.3	6,255.0	6,855.7
TOTAL	**34,625.2**	**40,536.6**	**369.4**	**37,574.3**	**37,561.7**	**78,110.9**	**78,088.4**

Sources: Enbridge 2016c; Minnesota DNR 2016.

[a] Perpetual and limited.

MBS Sites = Minnesota Biological Survey Sites of Biodiversity Significance, Minnesota BWSR = Minnesota Board of Water and Soil Resources, ROI = region of interest

Commodity Production Areas of Interest

The route for the existing Line 3 supplemented by truck contains the most commodity production AOI acres within the 10-mile-long downstream ROI. It is followed by the routes of existing Line 3

supplemented by rail, continued use of existing Line 3, and the Applicant's preferred route. SA-04 would not contain commodity production AOIs within the 10-mile-long downstream ROI (Table 10.4-18).

Table 10.4-18. Commodity Production Areas of Interest within the 10-Mile-Long Downstream ROI for the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres)

Area of Interest	Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
National/ state forests	12054.9	8,496.3	0	20,762.9	16,965.6	29,259.2	31,384.8
Other forested land	1,910.9	2,207.8	0	3,222.6	2,451.7	5,430.4	4,659.5
Harvested wild rice lakes	982.3	773.7	0	1,603.6	914.2	1,612.6	935.3
TOTAL	**14,948.1**	**11,477.8**	**0.0**	**25,589.1**	**20,331.5**	**36,302.2**	**36,979.6**

Sources: Enbridge 2016c; Minnesota DNR 2016.

ROI = region of interest

The 10-mile-long downstream ROI from SA-04 would not cross any national or state forests, while continued use of existing Line 3, the Applicant's preferred route, and existing Line 3 supplemented by rail and truck would. Existing Line 3 supplemented by truck would cross approximately 1.4 times more acreage than existing Line 3 supplemented by rail. The Applicant's preferred route and continued use of existing Line 3 would cross similar acreages of "Other forested land"; inclusion of the rail or truck supplementation would increase the acreage, with the truck route doubling the potential area exposed. Potential effects on commodity production AOIs from a crude oil spill would be the same as those described in Section 10.4.2.1.2.

Recreation and Tourism Areas of Interest

Existing Line 3 supplemented by rail and truck contain the most recreation and tourism AOI acres within the 10-mile-long downstream ROI. These are followed by continued use of existing Line 3, transportation by rail, the Applicant's preferred route, system alternative SA-04, and transportation by truck (Table 10.4-19). Potential effects on recreation and tourism AOIs from a crude oil spill would be the same as those described in Section 10.4.2.1.2.

Table 10.4-19. Recreation and Tourism Areas of Interest within the 10-Mile-Long Downstream Region of Interest for the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres)

Area of Interest	Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
State plan/ recreational areas	180.7	543.7	41.6	0	108.2	543.7	597.8
State parks	0.2	941.3	0	7,497.2	0	8,438.5	941.3
Wildlife Management Areas	1,240.8	3.0	0	3,288.3	699.1	3,291.3	702.1
Waterfowl production areas	11.5	182.2	0	0	0	182.2	182.2
TOTAL	**1,433.2**	**1,670.2**	**41.6**	**10,785.5**	**807.3**	**12,455.7**	**2,423.4**

Sources: Enbridge 2016c; Minnesota DNR 2016.

10.4.3 Exposure Analysis for Comparison of Applicant's Preferred Route and Route Alternatives

The comparison of the exposure due to an oil spill for the Applicant's preferred route and the route alternatives assessed the presence of HCA and AOI resources along the routes from where the Applicant's preferred route diverges from the other routes at the Clearbrook terminal to where all the Applicant's preferred route and the route alternatives remerge at Carlton. The analysis was completed for the this portion Applicant's preferred route and route alternatives to identify the extent of HCA and AOI resources that could be exposed if a spill were to occur. The types of impacts on the identified resources from a crude oil spill would be the same as those described in Section 10.4.2 and are not repeated here.

10.4.3.1 Region of Interest Analysis

10.4.3.1.1 HCA Comparisons among Applicant's Preferred Route and Route Alternatives

Populated Areas

Between Clearbrook and Carlton, the RA-07 route has the greatest number of HCA populated areas acres within 2,500 feet of either side of its centerline, and the Applicant's preferred route has the least (Table 10.4-20). RA-06 has 1.3 times more HCA populated areas acres than the Applicant's preferred route, RA-03AM has 4.7 times more, RA-08 has 7.5 times more, and RA-07 has almost 10 times more.

Table 10.4-20. Populated HCAs within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Route Alternatives in Minnesota (acres)

Segment	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Clearbrook to Carlton	1,759.5	8,264.9	2,271.8	17,427.4	13,261.2

Source: Enbridge 2016c.

HCA = high consequence area

Unusually Sensitive Ecological Areas

From Clearbrook to Carlton, RA-07 has the greatest number of HCA unusually sensitive ecological area acres within 2,500 feet of either side of its centerline (14,801 acres), and RA-03AM has the least (2,650acres) (Table 10.4-21). Compared to the Applicant's preferred route, RA-03AM has half as many HCA unusually sensitive ecological area acres, RA-06 has 1.4 times more, and RA-07 and RA-08 have about 2.5 times more.

Table 10.4-21. Unusually Sensitive Ecological HCAs within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Route Alternatives in Minnesota (acres)

Segment	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Clearbrook to Carlton	5,508.4	2,650.5	7,577.4	14,801.2	14,002.3

Source: Enbridge 2016c.

HCA = high consequence area

Drinking Water Sources

The RA-07 route has the greatest number of HCA drinking water sources acres within 2,500 feet of either side of its centerline from Clearbrook to Carlton, and the Applicant's preferred route has the least (Table 10.4-22). Figure 10.4-6 shows HCA drinking water sources along all route options.

Table 10.4-22. Drinking Water Sources HCAs within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Route Alternatives in Minnesota (acres)

Segment	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Clearbrook to Carlton	83.4	1,322.5	168.2	2,395.3	2,105.6

Source: Enbridge 2016c.

HCA = high consequence area

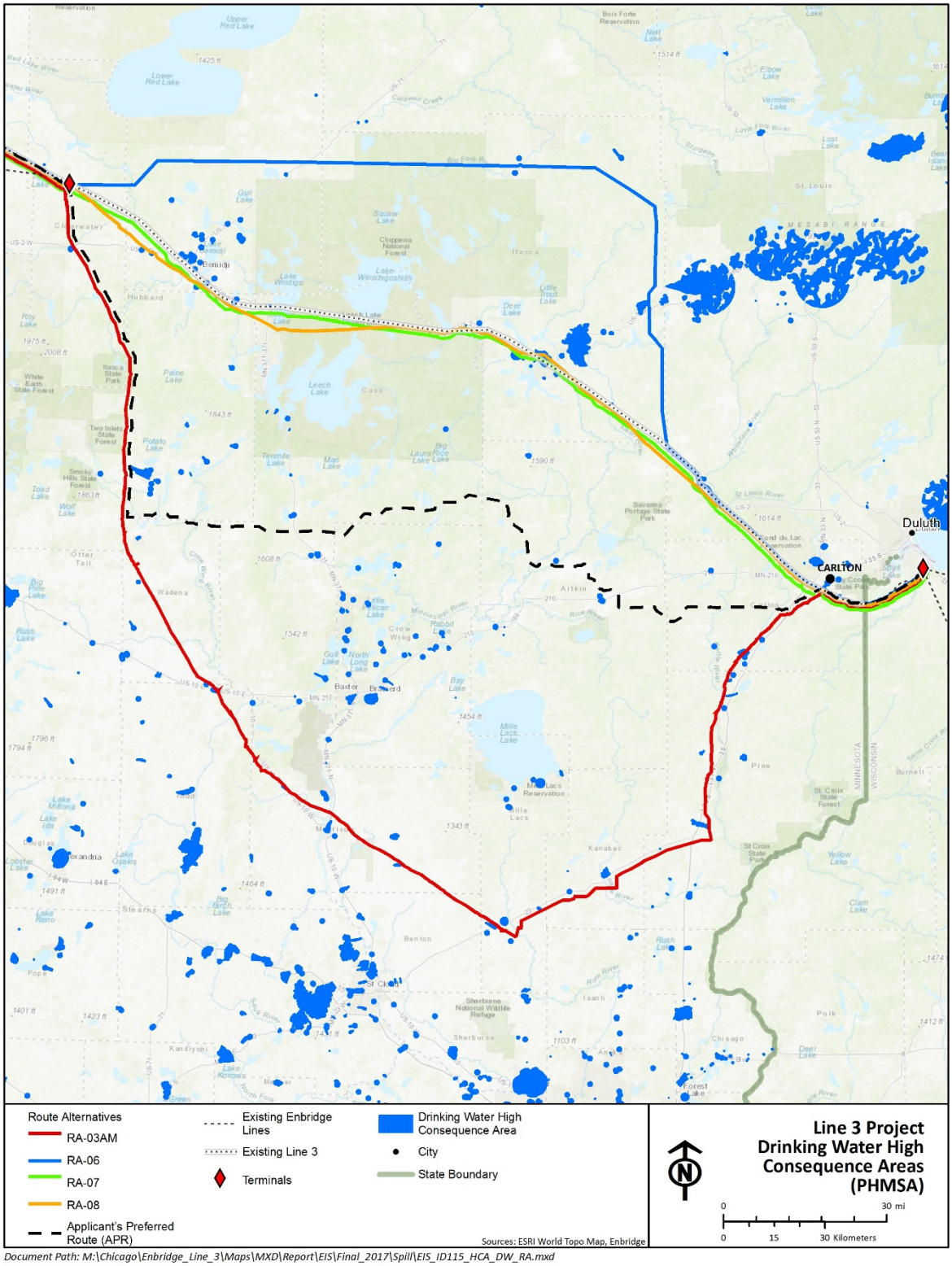

Figure 10.4-6. High Consequence Area Drinking Water Sources between Clearbrook and Carlton

10.4.3.1.2 AOI Comparisons between Applicant's Preferred Route and Route Alternatives

Drinking Water Areas of Interest

In addition to the HCA drinking water sources, Minnesota DH identified additional drinking water resources that may be susceptible to exposures of crude oil. As part of consultation with Minnesota DH (and with support from Minnesota DNR and Minnesota PCA), appropriate ROI distances for the protection of drinking water supplies were determined based on a consensus of existing information and case studies.

Drinking Water Supply Management Areas and Vulnerability

Minnesota Department of Health DWSMAs are approved surface and subsurface area surrounding a public water supply well that completely contains the scientifically calculated wellhead protection area and is managed by the entity identified in a wellhead protection plan. The boundaries of the drinking water supply management area are delineated by identifiable physical features, landmarks or political and administrative boundaries. DWSMA vulnerability is defined as "an assessment of the likelihood for a potential contaminant source within the drinking water supply management area to contaminate a public water supply well, based on geologic sensitivity and the chemical and isotopic composition of the ground water" (Minnesota DH 2015).

The numbers and acres of DWSMAs were determined, as well as the vulnerability of the DWSMAs within 1 mile of the centerline of each route. From Clearbrook to Carlton, RA-03AM has the greatest number of DWSMAs (11) within 1 mile, the most DWSMA acres, and the most acres of High and Very High vulnerability (Table 10.4-23). The Applicant's preferred route has the fewest number of DWSMAs (one) within 1 mile, fewest DWSMA acres, and fewest acres of High vulnerability; there are no Very High vulnerability areas within 1 mile of that route. Figure 10.4-7 shows the DWSMAs and their vulnerability ranking within 1 mile of the route centerlines.

Wellhead Protection Areas

A 1-mile-wide ROI was established for this drinking water resource. Minnesota WPAs are shown in Figure 10.4-8. The numbers and areas of WPAs within a 1-mile-wide ROI of each route are listed in Table 10.4-24. From Clearbrook to Carlton, RA-03AM has the greatest number of WPAs (11) and the most WPA acres. The Applicant's preferred route has the fewest number of WPAs (one) and the fewest WPA acres.

Table 10.4-23. Drinking Water Supply Management Areas with Vulnerability within 1 Mile of the Applicant's Preferred Route and Route Alternatives in Minnesota

Route	Number of DWSMAs	DWSMA Vulnerability (acres)					
		Very Low	Low	Moderate	High	Very High	Total
Applicant's preferred route	1	0	0	0	790.6	0	790.6
Route alternative RA-03AM	11	0	941.6	2,098.1	2,471.0	166.0	5,676.7
Route alternative RA-06	3	0	350.8	651.2	0	109.0	1,111.0
Route alternative RA-07	4	0	523.4	394.6	2,272.5	0	3,190.5
Route alternative RA-08	3	0	208.9	428.5	2,338.0	0	2,975.4

Source: Minnesota DH 2016.
DWSMA = drinking water special management area

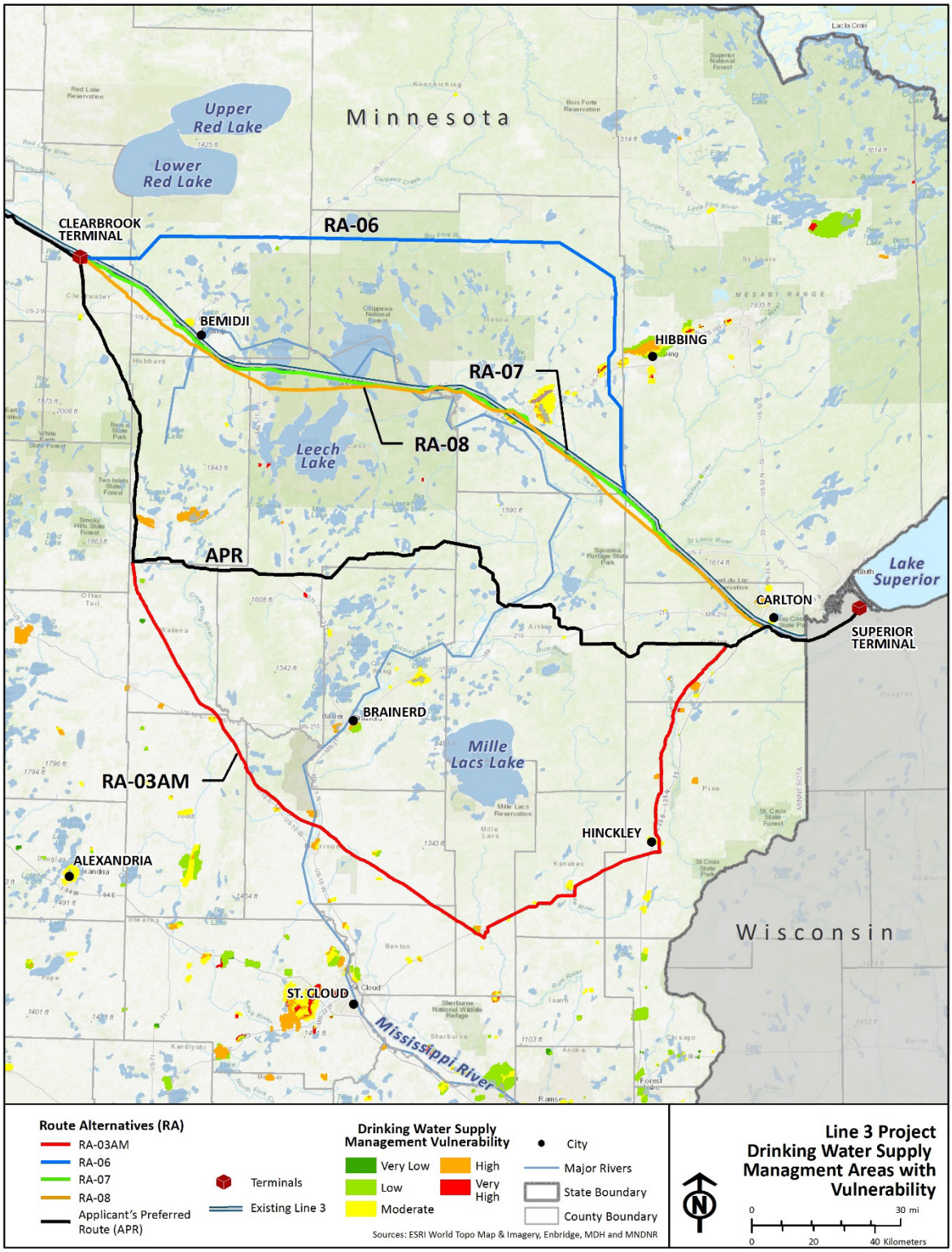

Figure 10.4-7. Drinking Water Supply Management Areas with Vulnerability between Clearbrook and Carlton

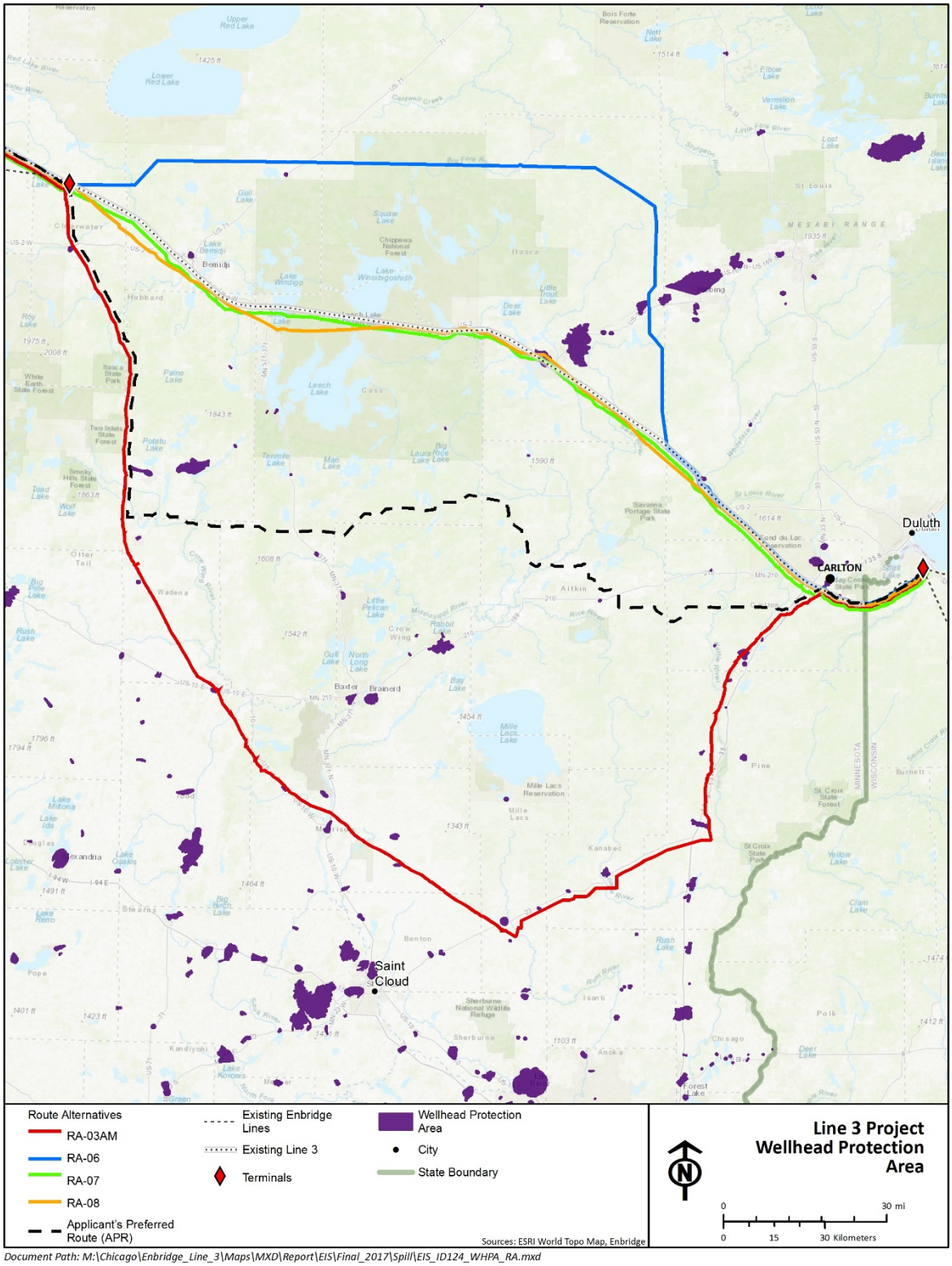

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Figure 10.4-8. Wellhead Protection Areas between Clearbrook and Carlton

Table 10.4-24. Wellhead Protection Areas within 1 Mile of the Applicant's Preferred Route and Route Alternatives in Minnesota

Segment	Applicant's Preferred Route		Route Alternatives							
			RA-03AM		RA-06		RA-07		RA-08	
	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.
Clearbrook to Carlton	219.5	1	3,159.1	11	653.6	2	2,646.5	7	2,626.8	8

Source: Minnesota DH 2016.

Hydrogeologic Sensitivity of Near-Surface Materials

The hydrogeologic sensitivity of near-surface materials close to a pipeline is an important factor in influencing the potential migration of a plume should a crude oil release occur. Hydrogeologic sensitivity is a qualitative measure of the ability of near-surface materials to transmit contaminants vertically to the water table and is ranked as follows by Minnesota DH:

- Low: fine-grained materials such as clays and clay-silt mixtures;
- Moderate: clay-silt-sand mixtures, sandy or silty tills, and colluvium;
- High: sands and sandy mixtures; and
- Very High: gravels, or coarse sands mixed with gravel.

Areas of hydrogeologic sensitivity within 0.5 mile of each route are depicted on Figure 10.4-9 and listed in Table 10.4-25. RA-03AM has the greatest number of acres with Very High and High hydrogeologic sensitivity, followed by the Applicant's preferred route, RA-07, RA-08, and RA-06.

Table 10.4-25. Hydrogeologic Sensitivity of Near-Surface Materials within 0.5 Mile of the Applicant's Preferred Route and Route Alternatives in Minnesota (acres)

Route	Not Evaluated	Low	Moderate	High	Very High	Total
Applicant's Preferred Route	223.9	29,427.9	31,222.4	80,661.7	1,143.8	142,679.7
Route Alternative RA-03AM	467.7	16,431.8	28,539.7	109,134.8	31,402.0	185,975.9
Route Alternative RA-06	3,618.1	44,841.4	69,391.8	9,935.2	3,993.2	131,779.6
Route Alternative RA-07	1,323.1	22,960.6	27,083.6	52,506.8	3,612.8	107,486.8
Route Alternative RA-08	1,364.2	25,050.1	24,248.5	52,100.7	3,156.4	105,919.9

Source: Minnesota DH 2017, pers. comm.

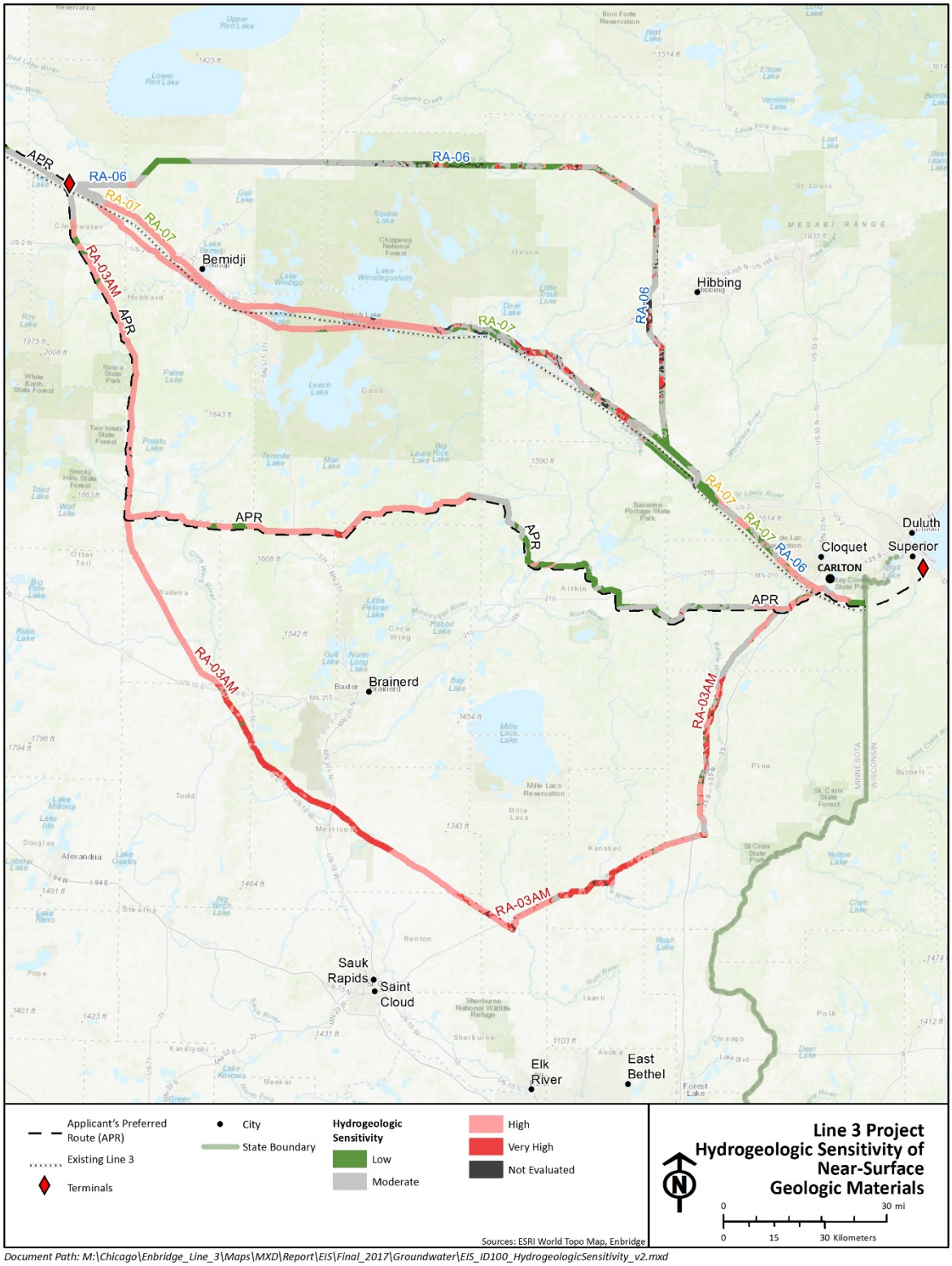

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Figure 10.4-9. Areas of Groundwater Hydrogeologic Sensitivity within 0.5 Mile of the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Domestic Wells and Associated Geological Sensitivity Ratings

Domestic (private) drinking water wells and their sensitivity were identified within an established 1,000-foot-wide ROI of each route's centerline. The method of determining Low, Moderate, High, or Very High geologic sensitivity for a well considers the thickness of fine-grained geologic material (clay or shale) overlying an aquifer that is penetrated by a well. From Clearbrook to Carlton, RA-03AM has the greatest number of Very High and High sensitivity domestic wells, and RA-06 has the fewest number (Table 10.4-26).

Table 10.4-26. Geological Sensitivity Ratings of Domestic Wells within 1,000 Feet of the Applicant's Preferred Route and Route Alternatives in Minnesota (number of domestic wells)

Route	Low	Moderate	High	Very High	TOTAL
Applicant's Preferred Route	87	35	25	17	164
Route Alternative RA-03AM	242	99	24	31	396
Route Alternative RA-06	33	3	1	3	40
Route Alternative RA-07	118	46	10	9	183
Route Alternative RA-08	105	46	5	6	162

Source: Minnesota DH 2017, pers. comm.

Public Drinking Water Supplies

Sources of drinking water for the Minnesota public include groundwater (public water wells) and surface water (surface water intakes). The locations of public water wells were provided by Minnesota DH. According to Minnesota DH, no surface water intakes or sources of public drinking water are within the 2,500-foot-wide ROI of any route (Table 10.4-27 and Figure 10.4-10).

Table 10.4-27. Number of Public Wells and Geologic Sensitivity within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Route Alternatives

Route	Low	Moderate	High	Very High	TOTAL
Applicant's Preferred Route	3	1	0	5	**9**
Route Alternative RA-03AM	17	6	1	10	**34**
Route Alternative RA-06	0	0	0	3	**3**
Route Alternative RA-07	22	6	2	29	**59**
Route Alternative RA-08	13	0	0	13	**26**

Source: Minnesota DH 2017, pers. comm.

Figure 10.4-10. Public Drinking Water Wells (Groundwater) and Associated Geologic Sensitivity within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

From Clearbrook to Carlton, RA-07 has the most wells within the ROI, followed by RA-03AM, RA-08, the Applicant's preferred route, and RA-06. RA-07 also has the most wells with a Very High sensitivity rating, followed by RA-08, RA-03AM, the Applicant's preferred route, and RA-06.

Figure 10.4-11 shows sensitive drinking water resources within 2,500 feet of either side of the centerlines for all routes.

Cultural Resources Areas of Interest

A crude oil release along any of the routes has the potential to result in exposure of reservation lands, archaeological resources, and historical resources (Table 10.4-28). Between Clearbrook and Carlton, RA-07 and RA-08 ROIs overlap with the greatest amounts of reservation land, followed by RA-06 and RA-03AM ROIs. The ROI for Applicant's preferred route does not overlap with any reservation land AOIs.

Within the 2,500-foot-wide ROI, RA-07 and RA-08 contain the greatest number of archaeological resources, while RA-06 contains the least. RA-07 also has the greatest number of historic sites, and RA-06 has the least.

Biological Areas of Interest

Biological AOIs were identified within the 2,500-foot-wide ROI of the routes from Clearbrook to Carlton (Table 10.4-29 and Figure 10.4-12). The ROI of the Applicant's preferred route has the most MBS Sites acres and the fewest acres of Aquatic Management Area, Minnesota BWSR conservation easement, and Muskie lakes. It is the only route that overlaps with trout lakes (16 acres).

RA-03AM has the most Scientific and Natural Area acres, Minnesota BWSR conservation easement acres, and Marginal Cropland acres, and has the fewest native plant community and sensitive lakeshore acres. RA-06 has the fewest number of Lakes of Biological Significance, Marginal Croplands, and MBS Sites acres.

RA-07 has the most acreage of Aquatic Management Area, Lakes of Biological Significance, Muskie lakes, sensitive lakeshore, and wild rice lakes. It has the fewest Scientific and Natural Area acres. RA-07 and RA-08 both overlap with wetland bank easement acres (71 and 113 acres, respectively), while the other three routes do not. RA-08 has the most native plant community acres and is the only route that overlaps with native prairies (less than 2 acres).

As identified above, the Applicant's preferred route is the only route that overlaps with trout lakes within its 2,500-foot-wide ROI. All routes would overlap with trout streams. RA-06 has the greatest overlap with trout streams (20.3 miles), followed by RA-03AM (14.9 miles), RA-07 (14.7 miles), RA-08 (12.9 miles), and the Applicant's preferred route (9.4 miles). There are five calcareous fens within 2,500 feet of each side of the common alignment of the routes in the North Dakota-to-Clearbrook segment.

Limited marginal cropland is a temporary conservation easement, while perpetual marginal cropland is a permanent easement as identified by the Minnesota Board of Water and Soil Resources. RA-03AM overlaps with the most acreage of marginal cropland within the 2,500-foot-wide ROI, followed by RA-08, RA-07, the Applicant's preferred route, and RA-06.

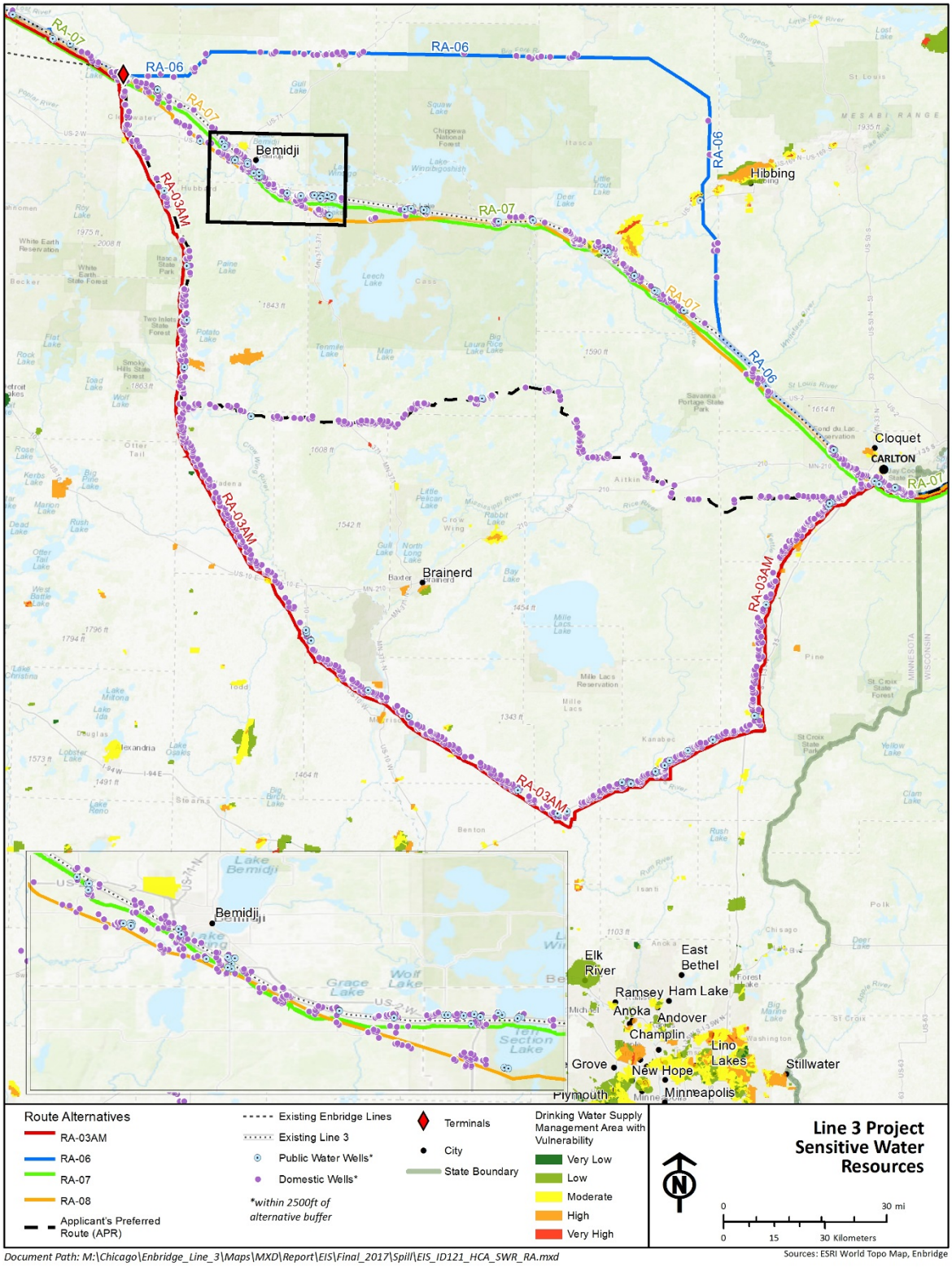

Figure 10.4-11. Drinking Water Sources within 2,500 Feet of the Centerlines of Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Table 10.4-28. Cultural Resource Areas of Interest within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Route Alternatives in Minnesota

Segment	Acres of Reservation Land					Number of Archaeological Resources[a]					Number of Historic Resources[1]				
	APR	RA-03AM	RA-06	RA-07	RA-08	APR	RA-03AM	RA-06	RA-07	RA-08	APR	RA-03AM	RA-06	RA-07	RA-08
Clearbrook to Carlton	0	13.5	7,858.1	33,689.6	33,894.5	50	51	8	97	103	21	73	11	83	35

Source: ESRI 2017; Minnesota Department of Transportation 2003.

[a] The archaeological and historic resources noted here are those that are found within the databases from the Minnesota Historical Society. The numbers do not account for the confluence of cultural and natural resources unless the resource was recorded in the database (see Chapter 9).

APR = Applicant's preferred route, RA = route alternative

Table 10.4-29. Biological Areas of Interest within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Route Alternatives from Clearbrook to Carlton (acres)

Area of Interest	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Aquatic Management Area	125.0	112.5	204.6	227.5	190.5
Scientific and Natural Area	0	234.5	63.7	7.5	85.2
Minnesota BWSR conservation easement	14.0	1,288.5	25.9	165.2	183.7
Lakes of Biological Significance	300.2	220.3	99.2	2,103.4	1,280.8
Marginal Cropland	13.7	88.3	6.7	14.2	23.5
MBS Sites	25,016.2	16,339.8	8,952.1	9,962.2	12,257.6
Muskie lakes	41.4	0	0	976.6	55.8
Native plant communities	35,273.1	18,742.8	26,368.1	37,247.1	39,868.2
Native prairies	0	0	0	0	1.6
Sensitive lakeshore areas	300.5	178.6	0	1,329.8	1,151.6
Trout lakes[a]	16.3	0	0	0	0
Wetland bank easement	0	0	0	70.6	112.5
Wild rice lakes	675.4	708.6	92.4	1,240.4	1,119.5
TOTAL	**61,775.8**	**37,913.9**	**35,812.7**	**53,344.5**	**56,330.5**

Sources: Enbridge 2016c; Minnesota DNR 2016.

[a] Data are for acres of trout lakes; miles of trout streams potentially affected are described in the text.

MBS = Minnesota Biological Survey Sites of Biodiversity Significance, Minnesota BWSR = Minnesota Board of Water and Soil Resources

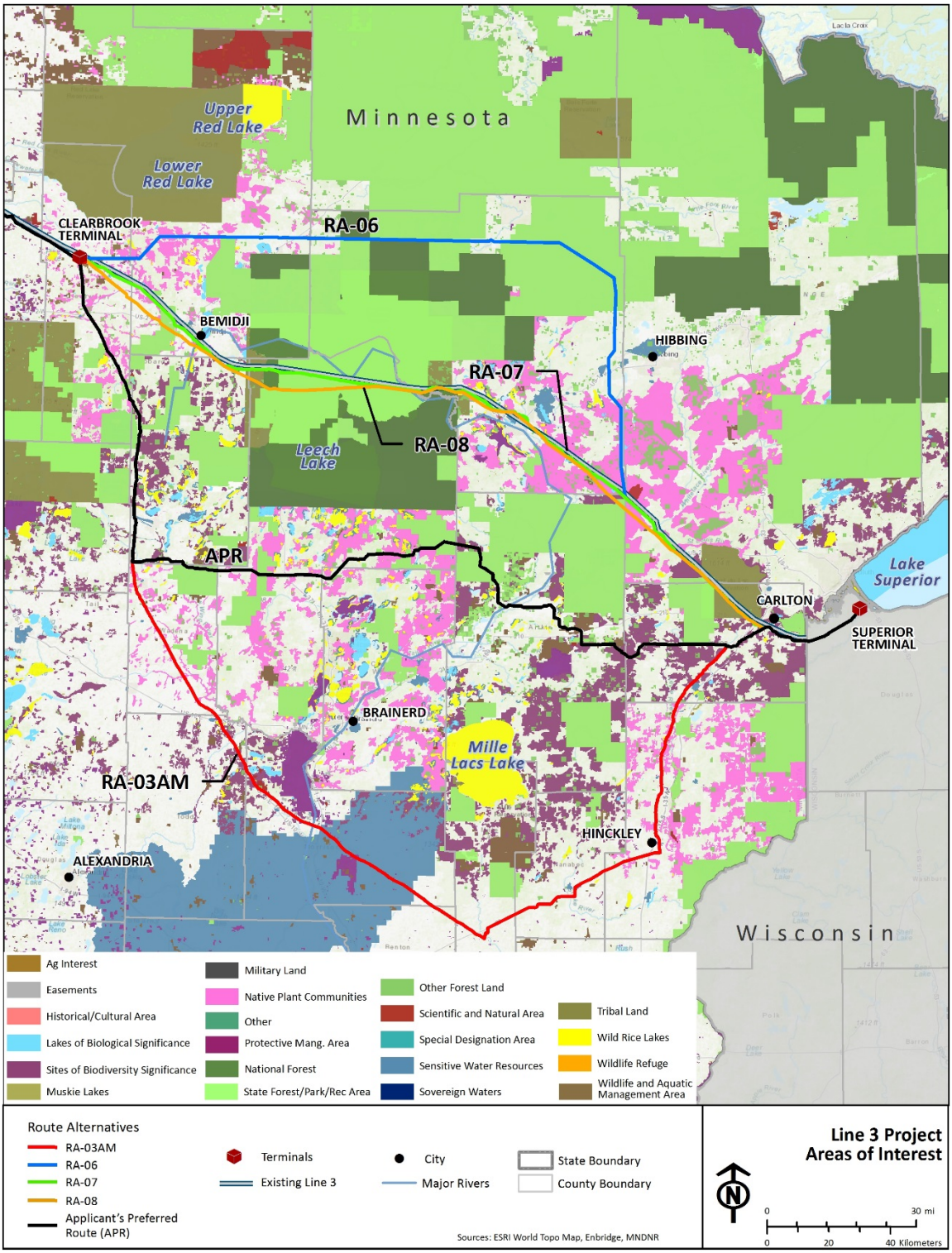

Figure 10.4-12. Areas of Interest along the Applicant's Preferred Route and Route Alternatives in Minnesota

Commodity Production Areas of Interest

The 2,500-foot-wide ROIs of all of the routes overlap with various forested lands (Figure 10.4-12). From Clearbrook to Carlton, RA-06 has the greatest number of national/state forest acres within its ROI, followed by RA-08, RA-07, the Applicant's preferred route, and RA-03AM (Table 10.4-30). All of the routes contain "other forested land" acres within their ROIs—RA-06 contains the most, followed by the Applicant's preferred route, RA-07, RA-08, and RA-03AM.

Table 10.4-30. Commodity Production Areas of Interest within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Route Alternatives from Clearbrook to Carlton (acres)

Area of Interest	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
National/state forest	31,764.3	2,334.7	55,377.7	48,861.8	52,121.1
Other forested land	3,312.4	1,640.2	5,884.7	2,790.1	2,593.9
Harvested Wild Rice[a]	181.6	180.7	72.1	241.9	761.8
TOTAL	**35,258.3**	**4,155.6**	**61,334.5**	**51,893.8**	**55,476.8**

Sources: Minnesota DNR 2016; Enbridge 2016c.

[a] Based on 2006 Minnesota Natural Wild Rice Harvester Survey data (Minnesota DNR 2007)

The route ROIs also overlap with areas of harvested wild rice identified in the 2006 Minnesota Natural Wild Rice Harvester Survey data (Minnesota DNR 2007). The 2,500-foot-wide ROIs cross greater areas of wild rice, as shown Table 10.4-29, the wild rice areas identified as harvested in the 2006 survey (Minnesota DNR 2007) indicated roughly 70 to 80 percent of the wild rice areas within 2,500 feet of RA-06 and RA-08 were harvested in 2006 and less than 30 percent of the areas of wild rice within 2,500 feet of the Applicant's preferred route, RA-03AM, and RA-07. The largest total acreage of wild rice harvest is in the ROI for RA-08, followed by RA-07, Applicant's preferred route, RA-03AM, and RA-06.

Recreation and Tourism Areas of Interest

The 2,500-foot-wide ROIs for RA-03AM and the Applicant's preferred route both overlap with approximately 318 acres of state recreation area and approximately 630 acres of state park from Clearbrook to Carlton. RA-06, RA-07, and RA-08 do not encompass any state recreation areas or state parks (Table 10.4-31).

WMAs and waterfowl protection areas are present within the ROIs of all of the route alternatives. The ROI for the Applicant's preferred route has the greatest acreage of WMAs, followed by RA-03AM, RA-08, RA-06, and RA-07. RA-06 has the greatest acreage of waterfowl production areas in its ROI, followed by RA-08, RA-03AM, RA-07, and the Applicant's preferred route. The ROI for the Applicant's preferred route crosses the most total recreation and tourism AOI acres, followed by RA-03AM, RA-08, RA-06, and RA-07.

Table 10.4-31. Recreation and Tourism Areas of Interest within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Route Alternatives from Clearbrook to Carlton (acres)

Area of Interest	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
State plan/recreational areas	317.7	317.7	0	0	0
State parks	629.9	630.3	0	0	0
Wildlife Management Areas	1,299.3	477.7	294.1	16.4	439.5
Waterfowl production areas	92.0	260.8	418.0	185.8	277.2
TOTAL	**2,339.0**	**1,686.5**	**712.1**	**202.2**	**716.7**

Sources: Minnesota DNR 2016; Enbridge 2016c.

10.4.3.2 Potential Downstream Spill Exposure

10.4.3.2.1 High Consequence Area Downstream Comparisons

Populated Areas

From Clearbrook to Carlton, RA-03AM has the most HCA populated area acres within the 10-mile-long ROI downstream of its waterbody crossings, followed by RA-08, RA-07, the Applicant's preferred route, and RA-06 (Table 10.4-32).

Table 10.4-32. Populated HCAs within the 10-Mile-Long Downstream ROI for the Applicant's Preferred Route and Route Alternatives in Minnesota (acres)

Segment	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Clearbrook to Carlton	3,054.6	4,564.3	958.2	3,379.2	4,102.5

Source: Enbridge 2016c.

HCA = high consequence area, ROI = region of interest

Unusually Sensitive Ecological Areas

From Clearbrook to Carlton, RA-08 has the most HCA unusually sensitive ecological area acres within the 10-mile-long ROI downstream of its waterbody crossings, followed by RA-07, RA-03AM, the Applicant's preferred route, and RA-06 (Table 10.4-33).

Table 10.4-33. Unusually Sensitive Ecological HCAs within the 10-Mile-Long Downstream ROI for the Applicant's Preferred Route and Route Alternatives In Minnesota (acres)

Segment	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Clearbrook to Carlton	3,788.8	4,681.9	3,418.5	5,932.6	7,040.8

Source: Enbridge 2016c.

HCA = high consequence area, ROI = region of interest

Drinking Water Sources

From Clearbrook to Carlton, RA-03AM has the greatest number of HCA drinking water source acres within the 10-mile-long downstream ROI of its waterbody crossings, followed by RA-08, RA-06, RA-07, and the Applicant's preferred route (Table 10.4-34).

Table 10.4-34. Drinking Water Source HCAs within the 10-Mile-Long Downstream ROI for the Applicant's Preferred Route and Route Alternatives in Minnesota (acres)

Segment	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Clearbrook to Carlton	417.7	1,076.6	549.8	546.7	892.7

Source: Enbridge 2016c.

HCA = high consequence area, ROI = region of interest

10.4.3.2.2 Areas of Interest Downstream Comparisons

Drinking Water Areas of Interest

Drinking Water Supply Management Areas and Vulnerability

From Clearbrook to Carlton, RA-03AM has the most DWSMA acres within the 10-mile-long downstream ROI as well as the most acres of Moderate, High, and Very High vulnerability DWSMAs (Table 10.4-35). It has approximately three times as many DWSMA acres as RA-06, RA-07, and RA-08. The Applicant's preferred route has the fewest DWSMA acres. The 10-mile-long downstream ROI for RA-03AM overlaps with 11 DWSMAs; RA-06, RA-07, and RA-08 overlap with four DWSMAs each; and the Applicant's preferred route overlaps with two.

Wellhead Protection Areas

From Clearbrook to Carlton, RA-03AM has the greatest number of WPA acres within the 10-mile-long downstream ROI (almost 502 acres), while the Applicant's preferred route has the least (approximately 30 acres). RA-03AM also overlaps with the most WPAs (eight), and all of the other routes overlap with two.

Domestic Wells and Associated Geological Sensitivity Ratings

Domestic water wells within 1 mile downstream of each water crossing and 500 feet from either side of the flowing waterbody were identified and are presented in Table 10.4-36. RA-03AM has the highest

number of wells within the 1-mile-long downstream ROI, followed by the Applicant's preferred route, RA-08, RA-07, and RA-06. RA-03AM also has the greatest number of High and Very High sensitivity wells (40) and RA-06 and RA-07 have the least (each have two).

Public Water Drinking Supplies

Public water well data also were available only within 1 mile of the centerline of each route. Thus, the 10-mile-long downstream ROI was limited to capturing public water wells within approximately 1 mile of the route (or 1 mile downstream in most cases).

Public water wells that fall within 1 mile of the route and 500 feet from either side of the flowing waterbody were identified. From Clearbrook to Carlton, the approximately 1-mile-long downstream ROI for the Applicant's preferred route overlaps with three public water wells, while RA-03AM and RA-08 overlap with two, RA-07 overlaps with one, and RA-06 does not overlap with any.

Cultural Resources Areas of Interest

From Clearbrook to Carlton, the 10-mile-long downstream ROI for RA-08 overlaps with the most acreage of tribal reservation boundary, followed by RA-07 and RA-06. The Applicant's preferred route and RA-03AM do not overlap with any reservation boundaries within the downstream ROI. Table 10.4-37 identifies the extent of cultural resource AOIs for the Applicant's preferred route and the route alternatives. As described above, data on archaeological sites and historic resources were not available for all CN Alternatives.

Table 10.4-35. Drinking Water Special Management Areas with Vulnerability within the 10-Mile-Long Downstream ROI for the Applicant's Preferred Route and Route Alternatives in Minnesota

Route/Segment	Number of DWSMAs	Drinking Water Special Management Area Vulnerability (acres)					
		Very Low	Low	Moderate	High	Very High	Total
Applicant's Preferred Route	2	0	0	45.2	0	0	45.2
Route Alternative RA-03AM	11	0	197.5	334.0	423.6	41.0	996.0
Route Alternative RA-06	3	0	190.7	64.8	11.1	0.9	267.4
Route Alternative RA-07	3	0	312.6	13.1	11.1	0	336.7
Route Alternative RA-08	3	0	286.3	13.1	11.1	0	310.4

Source: Minnesota DH 2016.

DWSMA = drinking water special management area, ROI = region of interest

Table 10.4-36. Domestic Wells within the Approximately 1-Mile-Long Downstream ROI for the Applicant's Preferred Route and Route Alternatives in Minnesota (number of domestic wells)

Route/Segment	Low	Moderate	High	Very High	Total
Applicant's Preferred Route	73	16	14	19	122
Route Alternative RA-03AM	101	36	20	20	177
Route Alternative RA-06	21	5	0	2	28
Route Alternative RA-07	29	8	1	1	39
Route Alternative RA-08	30	11	2	1	44

Source: Enbridge 2016c; Minnesota DH 2017, personal communication.

ROI = region of interest

Table 10.4-37. Cultural Resources Areas of Interest within the 10-Mile-Long Downstream ROI for the Applicant's Preferred Route and Route Alternatives from Clearbrook to Carlton (acres)

Segment	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Clearbrook to Carlton	0	0	3,567.5	10,357.2	11,871.5

Source: Minnesota Department of Transportation 2003.

ROI = region of interest

Biological Areas of Interest

Biological AOIs were identified within the 10-mile-long downstream ROIs for the routes from Clearbrook to Carlton (Table 10.4-38). The ROI for the Applicant's preferred route overlaps with the most MBS Sites acres and wetland bank easement acres. It overlaps with the fewest Aquatic Management Area and native plant community acres. The Applicant's preferred route and RA-03AM are the only two routes whose ROIs overlap with Scientific and Natural Areas (approximately 150 and 238 acres, respectively).

Table 10.4-38. Biological Areas of Interest within the 10-Mile-Long Downstream ROI for the Applicant's Preferred Route and Route Alternatives from Clearbrook to Carlton (acres)

Area of Interest	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
Aquatic Management Area	209.8	267.0	241.0	320.0	336.9
Scientific and Natural Areas	149.6	238.1	0	0	0
Minnesota BWSR conservation easement	37.4	385.1	0	36.1	35.9
Lakes of Biological Significance	3,608.9	1,952.6	1,222.5	3,400.1	4,286.4
Marginal Cropland	11.3	69.3	0	10	10

Table 10.4-38. Biological Areas of Interest within the 10-Mile-Long Downstream ROI for the Applicant's Preferred Route and Route Alternatives from Clearbrook to Carlton (acres)

Area of Interest	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
MBS Sites	9,692.7	5,138.5	4,774.4	5,834.6	6,531.2
Muskie lakes	676.0	0	0	2,107.0	2,676.3
Native plant communities	14,015.3	16,937.9	15,591.9	20,211.6	21,661.8
Sensitive lakeshore areas	441.9	188. 4	158.3	513.4	713.7
Wetland bank easement	38.5	0	0	30.3	30.3
Wild rice lakes	3,396.3	2,385.1	1,021.5	2,956.4	3.902.3
TOTAL	**32,277.7**	**27,373.6**	**23,009.6**	**35,419.5**	**36,282.5**

Sources: Enbridge 2016c; Minnesota DNR 2016.

MBS Sites = Minnesota Biological Survey Sites of Biodiversity Significance, Minnesota BWSR = Minnesota Board of Water and Soil Resources, ROI = region of interest

The RA-03AM ROI overlaps with the most Minnesota BWSR conservation easement acres. It does not overlap with any Muskie lakes or wetland bank easement acres.

The RA-06 ROI overlaps with the fewest acres of Lakes of Biological Significance, MBS Sites, sensitive lakeshore area, and wild rice lakes. It also does not overlap with any Scientific and Natural Area, Minnesota BWSR conservation easement, Muskie lakes, or wetland bank easement acres. The RA-07 ROI also does not overlap with any Scientific and Natural Area acres.

The RA-08 ROI overlaps with the most Aquatic Management Area, Lakes of Biological Significance, Muskie lakes, native plant community, sensitive lakeshore, and wild rice lake acres.

All route ROIs overlap trout streams with the mileage of trout stream crossed ranging from 29.6 miles for RA-08 to 37.0 miles for RA-03AM.

Only the Applicant's preferred route ROI overlaps calcareous fens: none of the other route ROIs overlap calcareous fens.

None of the 10-mile-long downstream ROIs of any of the routes overlap with native prairies.

The RA-03AM ROI overlaps with the most acreage of marginal cropland, followed by the Applicant's preferred route, and RA-08 and RA-07 (approximately 10 acres each). The RA-06 ROI does not overlap with any marginal cropland.

Commodity Production Areas of Interest

The 10-mile-long downstream ROIs of all of the routes overlap with various forested lands. From Clearbrook to Carlton, the RA-06 ROI overlaps with the greatest number of national/state forest acres, followed by RA-08, RA-07, the Applicant's preferred route, and RA-03AM. All of the route ROIs contain

"other forested land" acres: RA-08 contains the most, followed by RA-07, RA-06, the Applicant's preferred route, and RA-03AM (Table 10.4-39).

Table 10.4-39. Commodity Production Areas of Interest within the 10-Mile-Long Downstream ROI of the Applicant's Preferred Route and Route Alternatives from Clearbrook to Carlton (acres)

Area of Interest	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
National/state forest	12,054.9	653.9	24,550.0	17,132.8	20,897.7
Other forested land	1,904.1	838.7	2,154.5	2,207.8	2,495.8
Harvested Wild Rice[a]	982.3	0	324.0	773.7	1,983.2
TOTAL	**14,941.3**	**1,492.6**	**27,028.5**	**20,114.3**	**25,376.7**

Source: Enbridge 2016c; Minnesota DH 2017, personal communication.

[a] Based on 2006 Minnesota Natural Wild Rice Harvester Survey data (Minnesota DNR 2007)

ROI = region of interest

While all 10-mile-long downstream ROIs cross areas of wild rice, as shown Table 10.4-38, the RA-03AM ROI did not intersect any wild rice areas identified as harvested in the 2006 survey (Minnesota DNR 2007). Of the harvested wild rice areas, RA-08 crossed more than double the acreage of the Applicant's preferred route and RA-07 and six times the amount crossed by the RA-06 10-mile-long downstream ROI. It should again be noted that these ROIs (10-mile-long, 1,000-foot-wide downstream corridors of potential exposure from spills) are calculating areas that intersect these corridors and do account for additional acreage resulting from spreading of a spill that may occur when entering a larger body of water, such as ponds and lakes.

Recreation and Tourism Areas of Interest

The 10-mile-long downstream ROI of RA-03AM overlaps with the most state recreational area acres, and the Applicant's preferred route ROI overlaps with the least. RA-06, RA-07, and RA-08 ROIs all overlap with the same amount of state recreational area acres. The RA-03AM ROI also overlaps with the most state park acres, followed by RA-06, RA-07, and RA-08 (which overlap with the same amount), and the Applicant's preferred route (Table 10.4-40).

Table 10.4-40. Recreation and Tourism Areas of Interest within the 10-Mile-Long Downstream ROI of the Applicant's Preferred Route and Route Alternatives from Clearbrook to Carlton

Area of Interest	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
State plan/recreational areas	180.7	1,178.0	543.7	543.7	543.7
State parks	0.2	1,740.3	941.3	941.3	941.3
Wildlife Management Areas	1,172.7	385.6	3.0	299.5	293.1
Waterfowl production areas	11.5	11.5	182.2	0	0
TOTAL	**1,365.2**	**3,315.3**	**1,670.2**	**1,784.5**	**1,778.1**

Source: Enbridge 2016c; Minnesota DH 2017, personal communication.

ROI = region of interest

The 10-mile-long downstream ROI of the Applicant's preferred route overlaps with the most WMA acres, followed by RA-03AM, RA-07, RA-08, and RA-06. The RA-06 ROI overlaps with the most waterfowl production acres, followed by the Applicant's preferred route and RA-03AM, and then RA-08. The RA-07 ROI does not overlap with any waterfowl production areas. The RA-03AM ROI crosses the most total recreation and tourism AOI acres, followed by RA-07, RA-08, RA-06, and the Applicant's preferred route.

10.5 SPILL PREVENTION, PREPAREDNESS, AND RESPONSE

Spill prevention is the most critical component to avoiding impacts from a crude oil release. If a release occurs, the most important actions to reduce environmental impacts are to minimize the size and spread of the release by implementing a rapid, coordinated, and effective spill response based on an established action plan. This section provides information on those activities in the following sections:

- Crude Oil Release Prevention Programs and Measures (Section 10.5.1),
- Emergency Response Planning and Preparedness (Section 10.5.2), and
- Initial Oil Spill Containment and Response Methods (Section 10.5.3).

10.5.1 Crude Oil Release Prevention Programs and Measures

The following sections address plans and programs to prevent, prepare, and respond to a crude oil release. Many of these plans are pursuant to safety standards and regulations described in Section 10.1.1.

10.5.1.1 Spill Prevention Measures

10.5.1.1.1 Pipeline Plans and Measures

The Applicant has proposed various oil spill prevention measures for the Applicant's preferred route that could also apply to operation and maintenance of system alternative SA-04 and any of the pipeline route alternatives. Enbridge's integrity management program (IMP) is a key component to preventing crude oil releases. It includes highly sensitive tools that travel through and scan the internal and external conditions of the pipeline. Data collected are analyzed to identify integrity risks to the pipeline, such as corrosion or cracking, which could lead to a release of crude oil.

The proposed pipeline would have cathodic protection systems[48] to prevent corrosion of pipes. Enbridge patrols all permanent pipeline rights-of-way by air at least 26 times per year (at maximum 3-week intervals). These inspections review conditions on or adjacent to the permanent right-of-way. Line walking inspections are also used, as warranted, to supplement aerial inspections in some areas. Enbridge regularly checks operation of isolating valves (at least twice per year) and equipment used to limit, regulate, control, or relieve pipeline pressure.

In 2010 and 2014, Enbridge added the following measures and procedures into its routine operation and maintenance activities (DOS 2017):

- Augmented Control Center staff, including additional engineering and operator positions;
- Provided additional training and technical support;
- Re-organized the functional areas responsible for pipeline and facility integrity;
- Increased the number of in-line inspection programs and integrity digs (excavation, examination, maintenance, and repair);
- Revised and improved many procedures within the IMP;
- Implemented additional leak detection analysis procedures, including improvements to the leak detection escalation process, shift change transitions, alternate leak detection procedures, and analysis and communication procedures;
- Formalized a quality management system to execute more effectively the critical work activities that meet pre-defined quality objectives;
- Established a Pipeline Control Systems and Leak Detection Department, doubling the number of employees and contractors dedicated to leak detection and pipeline control;
- Implemented a Leak Detection Instrumentation Improvement Program to add and upgrade instrumentation across its system based on the assessments;
- Enhanced the Leak Detection Analyst Training Program; and
- Made changes to its pipeline remote monitoring and control systems.

A component of Enbridge's IMP is the Geohazard Management Program, which monitors for extreme weather events and for potential pipeline exposures at flowing water crossings. When an inspection is triggered by an event (such as flooding), the regional engineering group is notified and they deploy a local pipeline maintenance crew to make a visual site inspection. If the inspection finds damage within the permanent right-of-way, it is examined and repair work is completed as needed on a site-by-site basis.

Public Awareness Program

Since third-party damage is a leading cause of pipeline releases, Enbridge has a comprehensive Public Awareness Program in place. Enbridge maintains this Public Awareness Program to improve public awareness of the presence of its underground pipelines and related facilities. As a part of the program,

[48] Cathodic protection systems inhibit corrosion by applying a low-voltage electrical current to pipelines (see Section 2.3.2.3).

Enbridge installs aboveground markers to identify the presence of pipelines and identifies ways to prevent damage to the pipelines from excavating equipment. The program includes communication with local, state, and national officials and agencies; emergency responders; local fire and law enforcement departments; state pipeline safety and emergency management agencies; landowners along their pipeline rights-of-way; excavators; and others. Enbridge also facilitates face-to-face communication, advertising, e-campaigns, sponsorships, events, mailings, publications in local newspapers, and grants.

10.5.1.1.2 Rail Plans and Measures

Four companies operate on major railroads in Minnesota and could transport crude oil—Burlington Northern Santa Fe, Canadian National, Canadian Pacific, and Union Pacific (Minnesota Department of Transportation 2017a). Each of these railroad companies are required to follow the national safety regulations described in Section 10.1.1.2, which are designed to prevent accidents from occurring. Railroad companies have voluntarily agreed to slow down trains carrying crude oil in 45 “high-threat urban areas,” including the Twin Cities. Rail inspections to examine the tracks for flaws that could result in track failure are a key component to preventing rail accidents. The FRA specifies how many inspections should be done. Because of the risks, however, railroads have increased their own inspections well above required levels (Minnesota Department of Transportation 2017b).

10.5.1.1.3 Truck Plans and Measures

Accident prevention for transporting crude oil by truck would depend on the company hauling the crude oil. Plans would typically involve specialized employee training and safety awareness programs. Trucking companies are required to follow the national and state safety standards discussed in Section 10.1.1.3, which are designed to prevent accidents from occurring on the roads and highways. For instance the Federal Motor Carrier Safety Administration initiated the Federal Hazardous Materials Safety Permit Program for intrastate, interstate, and foreign trucks transporting certain types and amounts of hazardous materials, including crude oil. These carriers must maintain a certain level of safety in their operations and certify they have programs in place as required by regulations (Federal Motor Carrier Safety Administration 2017).

10.5.2 Emergency Response Planning and Preparedness

Spill response timing and effectiveness have a large effect on the extent, severity, and persistence of impacts from an accidental release of crude oil. A well-executed spill response that quickly stops the flow of oil and recovers the oil quickly can substantially reduce potential environmental impacts. This section addresses national oil spill response planning (Section 10.5.2.1) and regional oil spill response planning (Section 10.5.2.2) that would apply to all CN Alternatives and route alternatives. Applicant spill response planning that would apply to the Applicant’s preferred route and could also apply to system alternative SA-04 and any of the route alternatives are summarized in Section 10.5.2.3.

10.5.2.1 National Spill Response Planning

Provisions of the Clean Water Act of 1972 and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) mandated development of a National Oil and Hazardous Substances Pollution Contingency Plan (NCP) to establish standard protocol for responding to oil spills and other hazardous substance releases in the United States. The NCP, developed by the U.S. EPA, ensures that the federal government’s resources and expertise are available immediately for emergencies that are beyond the capabilities of local and state responders. The NCP established the federal National Response System (NRS), provides the framework for the NRS and establishes how it

works. The NRS routinely and effectively responds to a wide range of oil and hazardous substance releases. It is a multi-layered system of individuals and teams from local, state, and federal agencies, industry, and other organizations. These groups share expertise and resources to ensure that cleanup activities are timely, efficient, and minimize threats to human health and the environment. The NRS is made up of a network of cooperating response teams consisting of personnel from federal, state, and local agencies as well as organizations with specialized skills and knowledge that can be called on to respond to spill emergencies. To facilitate a rapid and effective response, NRS teams ensure that technical, financial, and operational information on responding to oil spills is available; the roles of different agencies on the NRS teams are clearly outlined; regional plans to respond to spills are maintained; oversight and consistency reviews for response plans are undertaken; and appropriate technical advice, equipment, or manpower are available to assist with a response.

10.5.2.2 Regional Spill Response Planning

The NCP also established Regional Response Teams (RRTs) with defined roles and responsibilities within the NRS. Each RRT consists of a core team (made up of federal and state government representatives) that can be supplemented with appropriate incident-specific teams during a response. Minnesota is included in Region 5 of the NCP (Region 5 RRT), which also includes Illinois, Indiana, Michigan, Ohio, and Wisconsin (Region 5 RRT 2017). Since Region 5 includes areas along the U.S.-Canada border, Canadian agencies often work with members of the RRT during response plan development and may provide or request assistance in the event of a spill along the border.

The RRT acts as a regional planning and coordination body for preparedness and response actions. Preparedness activities are carried out in conjunction with appropriate state emergency response committees, area committees, local emergency planning committees, and tribal councils.

The governor of each state in Region 5 designates a lead agency that can direct state-led response operations (Region 5 RRT 2017). The primary agency representative to the Region 5 RRT for Minnesota is the Minnesota PCA. The state of Minnesota has an Emergency Operations Plan as does each state agency. In case of a spill, Minnesota PCA's emergency response plan would be implemented in coordination with the regional and area plans. Minnesota PCA has environmental emergency management staff in five offices throughout the state: Duluth Office, Brainerd Office, Marshall Office, St. Paul Office, and Rochester Office. These staff lead and coordinate Minnesota PCA's oversight and response to environmental emergencies which include oil spills.

10.5.2.3 Pipeline Spill Response Planning

Control of the Applicant's preferred route (or any of the pipeline alternative routes) would be incorporated into the existing Enbridge Supervisory Control and Data Acquisition system, which can automatically initiate pump station shutdowns to maintain safe operating pressures. Pipeline control operators also can manually initiate pipeline shutdown if abnormal conditions are suspected or observed. Enbridge enforces a "10-minute rule" that requires operators to shut down a pipeline within 10 minutes of observation of an abnormal condition that cannot be attributed to normal fluctuations in pressures and operating conditions.

In addition to the operations and maintenance measures described in Chapter 2 of this EIS, contingency oil spill response plans for the Project would require approval by appropriate federal agencies prior to construction and operation if a pipeline were approved. For example, PHMSA regulations require the submission of emergency response plans to PHMSA for review and approval (49 CFR 194). Minnesota

Statute 115E requires submission of emergency response plans to Minnesota PCA for review and approval.

Following the July 2010 rupture of Enbridge's Line 6B pipeline and subsequent major oil release into wetlands and the Kalamazoo River in Marshall, Michigan, Enbridge developed an Integrated Contingency Plan (ICP) that serves as the emergency response plan for Enbridge's pipelines for the Superior Region (from the Canadian border near Neche, North Dakota, across Minnesota, and into Wisconsin and Michigan). Input on the ICP was provided by the EPA, U.S. Coast Guard (USCG), Occupational Safety and Health Administration, and other agencies. Enbridge's ICP was approved by PHMSA on July 11, 2013, for other Enbridge pipelines, and Enbridge would require approval of the ICP from PHMSA in order for the plan to cover a Line 3 pipeline. The Applicant's preferred route and route alternatives are within the Superior Region. System alternative SA-04 is partially within the North Dakota and Mid-Continent regions.[49]

Each of the four U.S. regional annexes to the ICP contains an Emergency Response Action Plan (ERAP),[50] which is an Enbridge region-specific, concentrated version of the ICP focused on the unique features of the region. Each region-specific ERAP is designed to be used by first responders and Enbridge personnel in the field. The ERAPs provide first responders and others with important information needed to work with Enbridge spill response equipment and personnel in the event of an emergency. They contain notification lists and protocols, detailed lists of response equipment maintained by Enbridge along the pipeline routes, organization charts, decision-making flowcharts, evacuation information, mitigation and recovery efforts information, specific response and recovery techniques, Safety Data Sheets for the products transported by Enbridge, and other important forms.

Enbridge's ICP and ERAPs are prepared to fulfill the requirements of local, state, and federal regulatory agencies mandating written procedures to address planning and response to emergencies, including PHMSA's pipeline safety regulations specified in 49 CFR Parts 194 and 195, Minnesota Statute 115E, and applicable Occupational Safety and Health Administration, USCG, and API national technical standards.

At EPA's direction, Enbridge has also developed a Submerged Oil Recovery Plan to describe tactical methods that could be employed to recover spills submerged in water.[51] The plan includes methods to identify areas containing submerged oil after a spill including geomorphologic assessment, pooling surveys, and sediment sampling and core logging. The plan also provides methods that would be used to recover submerged oil including raking, tilling, air injection, chain dragging, and other procedures.

Enbridge owns and maintains spill response equipment stored in several locations across the United States. Enbridge has established pipeline maintenance shops along the Enbridge Mainline system, including at Bemidji and Thief River Falls, Minnesota, and in Superior, Wisconsin. Equipment stored in these shops includes apparatus to contain and absorb oil released to water including various booms (e.g., river booms, sorbent booms, and containment booms), pumps and portable dam systems,

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49 The Enbridge Central Region ICP is available at http://www.cnpl.enbridge.com/Projects-and-Infrastructure/Public-Awareness/Emergency-Response-Action-Plans.aspx.

50 ERAPs are sometimes referred to as Field Emergency Response Plans in other planning documents.

51 The Enbridge Submerged Oil Recovery Plan is available at http://dnr.wi.gov/files/PDF/pubs/ea/EA0230.pdf.

skimmers, sorbent pads and rolls; boats and response vessels to handle water-based activities; and specialized equipment for land-based activities including portable tanks, generators, and trailers.

Enbridge also has portable emergency response trailers, which contain hard boom, sorbent boom, skimmers, and portable water tanks as well as various tools for initial emergency response to both land and water releases. Response equipment and supplies also include personal protective equipment for responders including respiratory equipment, hard hats, gloves, safety glasses, safety boots, and chemically protective clothing. The ICP contains guidance on personal protective equipment requirements, use, maintenance, storage, and disposal. Periodic inspection and maintenance is performed on each piece of equipment in accordance with recommendations from the manufacturer. After an equipment deployment exercise or actual response, each piece of deployed equipment is inspected to assess its condition and determine if any repairs or replacements need to be made. Equipment is also periodically inspected and if found to be defective, is repaired or replaced.

Enbridge employees in the United States and Canada participate in regular emergency response drills and simulations to practice and improve preparedness procedures. Employees are trained through workshops, tabletop and full-scale exercises, and procedural drills, often in partnership with local response agencies, regulators, and external observers.

The National Transportation Safety Board (NTSB) identified deficiencies in training of first responders and emergency response resources as one of the inadequacies of the response following the 2010 Line 6B rupture in Marshall, Michigan (NTSB 2012). To improve safety training, the Enbridge Enterprise Emergency Response Team was created in 2011 as a cross-company team with specialized training. The team regularly conducts major training exercises involving emergency response contractors and consultants, as well as emergency response agencies at the local, state/provincial, and federal levels. The Enbridge Enterprise Emergency Response Team is trained to respond to large-scale events in Enbridge operational locations in North America. Enbridge states that its training programs meet the National Preparedness for Response Exercise Program standards, which were developed by PHMSA, the USCG, the EPA, and the U.S. Department of the Interior to establish a minimum preparedness exercise program for federally regulated companies. Enbridge also operates Pipeline Public Awareness and Emergency Response Programs, as described in Section 2.8.1, to address the problems noted by NTSB.

10.5.3 Initial Oil Spill Containment and Response Methods

The following sections describe the response framework designed to contain a release of crude oil and minimize the potential effects on the natural and human environment due to a release:

- Notification, Mobilization, and Response (Section 10.5.3.1); and
- Potential Spill Response Challenges (Section 10.5.3.2).

10.5.3.1 Notification, Mobilization, and Response

In the event of a pipeline crude oil release, leak detection systems would be in place to alert the Control Center (see Section 2.8.1 for details on leak detection systems). The amount of time required to identify a leak depends on the nature of the release. Large ruptures result in multiple leak triggers and alarms that notify the controller almost instantaneously. Small leaks are typically detected by the computational pipeline monitoring systems and the line balance calculation process, both of which are

tuned to detect large and small leaks. The smaller the leak, the more time it takes for an alarm to be triggered by these systems.

Although leak detection systems would be in place, some leaks might not be detected by the system for an extended period of time. A pinhole leak, for example, could remain undetected for a period of time if the release volume rate is below detectable levels. Detection of such leaks would likely occur through visual or olfactory identification, either by regular pipeline aerial inspections, ground patrols, or landowner or citizen observation. Pinhole leaks can also be detected by an acoustical pipeline inspection gauge (see Section 2.8.2.1).

In the event of a release of crude oil from an Enbridge pipeline during operations, the Control Center would shut down the pumps and close the MLVs in the area of the release. Following pump shutdown and valve closure, on-call operations personnel and managers would be notified internally by the Control Center. Notifications would occur for both internal and external parties, including the National Response Center, the state, and local police. Enbridge first responders would work to confirm the nature and location of the incident as notifications occur. The ERAP provides specific response steps and tactics to be used within each region, considering the unique topography and features along a pipeline route within the region. First responders would generally arrive on the scene within minutes of being alerted of an incident and work to secure the scene, undertake evacuations when necessary, and implement the ERAP procedures (Enbridge 2015a).

Enbridge's ERAP includes predetermined steps to take in the event of an incident. Maps and tables based on information in established regional response plans are included to identify HCAs along pipeline routes for each region. The maps and tables allow responders to know where to direct response resources, so that emergency responders can begin work immediately upon deployment. For example, ERAPs contain information on the location of resources of concern, such as wetland vegetation, sensitive shoreline areas, and other features. Emergency responders use the maps and tables to place booms and take other necessary response measures to protect resources and limit the scope of an oil spill incident.

In the event of an oil spill, Enbridge emergency response staff would inform the appropriate public agencies, which would determine if evacuation is necessary to safeguard human health. Evacuation parameters include consideration of the potential for fire, explosion, and presence of hazardous gases. Containment and absorbent materials would be applied to spills with the potential to reach surface waters or wetlands. If a spill did reach a waterbody, sorbent booms and pads would be applied to initiate containment and recovery of released materials in standing water. For large spills in waterbodies, Enbridge would secure emergency response contractors to further contain and clean up the spill. Spills to waters require immediate notification of the NRC (for any oil sheen, sludge or emulsification in waters as required under 40 CFR 110) and Minnesota PCA (for spills greater than five gallons as required under Minnesota Statute 115.061).

Except on federal lands, response actions are generally monitored and/or implemented by the most immediate level of government with authority and capability to conduct such activities (Region 5 RRT 2017). The first level of response to a spill during Project operations would generally be onsite Enbridge personnel and contractors followed by local government agencies, or state agencies if local capabilities are exceeded (Region 5 RRT 2017). The Minnesota PCA has regulatory authority to oversee pipeline spill cleanups and would work closely with Enbridge to ensure appropriate response actions are taken. When incident response is beyond the capability of the state, the EPA is authorized to take response measures deemed necessary to protect the public health or welfare or the environment from discharges of oil or

releases of hazardous substances, pollutants, or contaminants. The EPA also has authority to respond to spills on reservations.

If an oil spill required additional response measures, the national and regional plans described in Section 10.5.2 could be implemented to contain and control the release. In a large response effort, a Unified Command and an Incident Management Team made up of NRS personnel would be created to address site/spill-specific concerns. In the event of a pipeline spill on land or in inland waters, the EPA would be the lead federal agency in charge of the response. In the event of a pipeline spill in coastal or international border waters, the USCG is the lead federal agency in charge of the response.

The actions that could be taken with the resources outlined in the Region 5 RRT Regional Contingency Plan/Area Contingency Plan include, but are not limited to, the following:

- Placing containment and recovery booms and pads,
- Sampling runoff and surface waters,
- Excavating soil,
- Performing hydrogeological investigations,
- Conducting wildlife rescue and rehabilitation,
- Closing drinking water intakes, and
- Providing an alternate water supply (Region 5 RRT 2017).

The Regional Contingency Plan/Area Contingency Plan identifies environmentally and economically sensitive areas in an atlas series and a set of GIS products intended to provide oil spill contingency planners and spill responders in Region 5 with the most accurate and relevant information possible for spill preparedness and response (Region 5 RRT 2017). Information mapped in GIS includes:

- Species data including federal and state-listed threatened and endangered species;
- Federal, state, regional, and privately owned and managed natural resource areas;
- Reservations;
- Federal, state, regional, and private designations of natural resource areas (no ownership);
- Drinking water intakes;
- Industrial water intakes;
- Locks and dams;
- Marinas and boat accesses;
- Oil storage (above 1,000 bbl [42,000 gallons]) and oil pipelines; and
- Federal, state, and tribal trustees (Region 5 RRT 2017).

The Region 5 RRT has developed an Inland Response Tactics Manual to direct responders on appropriate response methods depending on the spill location, prevailing environmental factors, and response technique considerations and limitations (Region 5 RRT 2013). For example, the manual describes and diagrams containment methods on ice with trenches and sumps, various land barriers that can be

constructed with available materials (e.g., earth, gravel, snow), and the purposes of different booming configurations in streams, rivers, and open water (Region 5 RRT 2013).

10.5.3.2 Potential Spill Response Challenges

The immediate response to a crude oil release from the Project would be by local first response agencies to secure the area, along with public and environmental health officials, local response contractors, and other parties qualified to assist with the response effort. Response times for first responders would depend on the location of the incident; crude oil releases in or near populated areas would likely result in faster response times than incidents occurring in more remote areas since there are typically more response facilities and personnel in more developed areas. Weather conditions, topography, visibility and proximity of access roads to the spill area may also retard response times.

In Minnesota, the Applicant's preferred route and route alternatives generally pass through rural, sparsely populated areas. Rural communities can face challenges regarding emergency preparedness and response, such as proximity to adequate response personnel and equipment, and may lack needed space, supplies, and staff to respond quickly and effectively to emergencies (see Section 10.5.3.2.1 below). If an oil spill incident becomes too large or complex for the responsible party's local and onsite capabilities, the regional or national response capabilities described above would be mobilized to support the response effort.

Oil released into aquatic environments can be difficult to contain and recover in large quantities, since water surface and weather conditions must be sufficiently calm to permit the selected equipment to function well and for response personnel to safely operate equipment. In addition, spilled oil must be recoverable with available skimmers and other equipment that would be used in waterbodies. Oil spills that enter large, flowing waterbodies can spread rapidly and be difficult to completely contain and recover. Riverine currents can make spills particularly difficult to contain because oil can be rapidly carried to shorelines, wetlands, and flats. Containment in these environments can be increased with the use of underflow dams, overflow dams, containment boom, sorbent barriers, or a combination of these techniques (Crosby et al. 2013).

Some crude oil spills into waterbodies can sink, making it more difficult to detect, track, and map. In addition, submerged oil is often highly viscous, making it difficult to pump. Every submerged oil spill is a unique combination of conditions based on oil type, environmental setting, and physical processes (U.S. Department of Homeland Security 2013). Dilbit that reaches or is directly released to waterbodies may pose unique challenges because of its propensity to form dense residues during weathering and sink to the bottom, or combine with particles present in the water column (forming tarballs) to submerge and then remain in suspension or sink (National Academies of Sciences, Engineering, and Medicine 2016).

Winter oil spills may be harder to detect and more difficult to contain and recover due to the presence of snow and ice cover. An oil spill that results in oil reaching waterbodies during freeze-up[52] or breakup[53] may also be difficult to manage because ice may not be strong enough to support people or equipment. In rivers, spilled oil may be transported several miles under ice or in broken ice before it can be contained. If ice cover is not strong enough to support people and equipment, oil spilled underneath

[52] The freezing over of a waterbody.

[53] The breaking, melting, and loosening of ice in the spring.

may be more difficult to detect and it may be more difficult to implement rapid containment and cleanup at and near the spill site. Major flooding or adverse weather conditions (e.g., high winds, blizzards, and extreme cold) may also hinder spill response contractors from implementing timely and effective oil spill containment and clean-up operations. Enbridge and its response contractors have access to specialized response equipment in case of a spill during harsh winter conditions. Such response equipment includes:

- Remotely operated vehicles that can move below the surface of ice to detect oil with sensors and can transport equipment below the surface to remove oil;
- Ice drills or augers that cut holes in the ice to allow hoses and pumps to suction oil from beneath ice;
- Arctic-specific water skimming equipment that can be used in both open water and icy conditions;
- Specialized ice and fire booms that can be deployed to contain oil; and
- Vessels with water cannons that move spilled oil to containment and collection areas (Enbridge n.d.).

Training in winter conditions is undertaken by response personnel to improve readiness for such situations (Enbridge n.d.).

Five organizations are recognized in the NCP with specialized expertise that can be used to respond to difficult situations. These organizations are:

- USCG National Strike Force,
- USCG Public Information Assist Team,
- EPA Environmental Response Team,
- NOAA's Scientific Support Coordinators, and
- Natural Resource Trustees.

The lead agencies designated within the NRS are responsible for coordinating spill response efforts.

10.5.3.2.1 Remote Area Analysis

The magnitude of potential impacts on a resource may be directly related to response time and response time may be related to the accessibility of the spill. Rapid detection and response can reduce crude oil exposures and impacts on resources. Remote areas may be less accessible to spill response teams and therefore potentially more vulnerable to effects from crude oil spills. When a final route is selected, spill response strategies will be developed for areas with difficult access.

10.6 CLEANUP, RESTORATION, AND RECOVERY

After the initial spill response (focused on containment and recovery as discussed in Section 10.5.3), further cleanup would be undertaken, followed by more long-term restoration and recovery efforts. The following sections address those activities:

- Clean-Up Techniques and Equipment (Section 10.6.1),
- Restoration and Recovery Framework and Methods (Section 10.6.2), and
- Liability and Compensation (Section 10.6.3).

10.6.1 Clean-Up Techniques and Equipment

Typically implemented techniques for containment, recovery and cleanup of spilled crude oil are described in Table 10.6-1.

Table 10.6-1. Oil Spill Containment, Recovery and Clean-Up Techniques and Equipment

Technique	Actions and Equipment	Additional Supporting Equipment	Locations Typically Used
Containment of oil	Booms contain, deflect, or divert oil	Trucks or vessels to install, reposition, and maintain the booms	Open water
	Barriers and booms prevent the entry of oil into an area of concern	Vehicles or small vessels to transport equipment/personnel	Land, shoreline, and open water
	Sorbent booms, pillows and socks	Trucks or vessels to install, reposition, and maintain the sorbent materials	Land, shoreline, and open water
Recovery of oil	Sorbent pads or rolls are placed in water to contain and remove floating oil	Trucks or vessels to install, reposition, and maintain the sorbent materials	Land, shoreline, and open water
	Mechanized skimmers, pumps, and vacuums collect oil from puddles and the water surface into containers or storage tanks	Vessels to position the skimmers Pumps and hoses Truck-mounted vacuums Truck tankers to offload vacuum trucks Trucks to place or remove containers and tanks Oil/water separator to remove water and treat or return the water to the environment, if necessary	Land, shoreline, open water, and near shore
	Hand tools and earth moving equipment are used to manually collect solid waste with oil residue and contaminated soil into containers for transport	All-terrain vehicles, vessels, and trucks to transport personnel and equipment	Land, shorelines, and areas with lots of organic debris

Table 10.6-1. Oil Spill Containment, Recovery and Clean-Up Techniques and Equipment

Technique	Actions and Equipment	Additional Supporting Equipment	Locations Typically Used
Cleanup	Hand tools and earth moving equipment are used to manually collect solid waste with oil residue and contaminated soil into containers for transport	All-terrain vehicles, vessels, and trucks to transport personnel and equipment	Land, shorelines, and areas with lots of organic debris
	Oil is passively collected through sorbent materials	All-terrain vehicles to transport personnel and equipment Vessel to transport sorbent Bags, containers and trucks for used sorbent	Land/shoreline/open water/nearshore, and storm sewers, trenches, and low areas
Chemical dispersion	Cleaning agents are sprayed onto the oil slick.	Boats or Airplane to spray dispersants	Open water
In situ burning	Oil is contained in wetlands/bogs or corralled into a fire-resistant boom on water and burned	Backhoes and dozers to create a fire barrier on land Vessel to transport boom Diesel fuel to start the burn Fire department resources on standby	Open water and nearshore wetlands and bogs
Natural attenuation	Oil is allowed to degrade naturally or with tilling and possible fertilizer application to enhance bio-degradation	Tractor, cultivator, applicator	Areas where removal of oiled soil could damage resources of concern and land areas with suitable conditions for degradation

The use of these and other clean-up techniques would be determined on a case-by-case basis, with approval from regulatory agencies and according to regional or site-specific plans. For example, EPA Region 5 does not recommend the use of dispersants or other oil emulsifiers in fresh water because of limited effectiveness, so this clean-up method would not be used within Minnesota freshwater systems (Region 5 RRT 2017). The Minnesota PCA also does not recommend the use of dispersants. In addition, the use of burning on surface waters in Region 5, particularly near wetlands or water supplies, must be approved by state and/or federal agencies (Region 5 RRT 2017).

Recovery and cleanup for sunken/submerged crude oil may require additional techniques and equipment such as diver-directed pump and vacuum systems, remotely operated vehicles in the water column, sub-bottom profiling, manned submersibles, manual removal by divers, the use of nets and trawls, and dredging. Each of these recovery and clean-up methods for sunken/submerged oil has advantages and disadvantages, and the use of these clean-up strategies would be determined on a case-by-case basis.

10.6.2 Restoration and Recovery Framework and Methods

Effective oil spill remediation, habitat restoration, and environmental recovery can influence the magnitude and duration of impacts on receptors and resources. Recovery and restoration plans are prepared by the Responsible Party[54] and submitted to the federal or state agency in charge of spill response for a particular event. After review and approval of these plans, the Responsible Party and its contractors implement these plans, with ongoing oversight by agencies.

If it appears that there are impacts on natural resources due to a spill, a NRDA may be initiated. NRDA is a legal process under the Oil Pollution Act of 1990 (OPA 90) that is used by federal, state, and tribal governments (referred to as "trustees") to seek compensation for natural resource damages and restore vegetation; fish, wildlife, and their habitat; recreation resources; and other affected resources to pre-spill baseline conditions. Natural resource trustees conduct NRDAs on behalf of the public. Trustees assess and collect data on spill impacts on natural resources and use these data to identify and select projects to restore affected resources. For example, NRDA trustees for the July 2010 oil spill in Marshall, Michigan, were the U.S. Fish and Wildlife Service (USFWS), NOAA, affected tribes, and Michigan state agencies. Restoration planning by these trustees consisted of two steps: (1) assessment of impacts on instream habitats including riverine and lake habitats; floodplain habitats, including wetlands; upland habitats; specific species; public recreational uses; and tribal uses; and (2) restoration project selection. The NRDA trustees for the Marshall, Michigan, spill coordinated with the larger spill response efforts via the Incident Command System and began assessment of impacts within days of the spill occurring (USFWS 2015; USFWS et al. 2015).

Studies and programs conducted in support of natural resource recovery may include:

- Submerged oil assessment and recovery;
- Overbank assessment and recovery;
- Shoreline Cleanup Assessment Technique and Shoreline and Habitat Reassessment Technique;
- Water and sediment sampling;
- Contaminant monitoring and recovery;
- Emerging oil management program;
- Geomorphic assessments;
- Rapid vegetation assessments;
- Wildlife and avian surveys and rehabilitation; and
- Fish and benthic invertebrate surveys.

The primary responsibility for conducting these surveys lies with the Responsible Party, but the surveys may be conducted by the lead federal or state agency, assisting agencies, and/or NRDA trustees, either

[54] The term "Responsible Party" has a specific meaning for different sources of oil spills. For oil pipelines, the Responsible Party is the owner or operator of the pipeline (OPA 90, Section 1001[32][E]).

independently or jointly with the Responsible Party. In addition, volunteers may be allowed to participate in certain aspects of these programs, such as providing support for wildlife programs.

Restoration efforts in natural environments may include the following:

- Wetlands: sediment dredging, compensatory wetland restoration and creation actions, and monitoring for wetland functions and values.
- Fresh water: improvement of fish passage, stream and floodplain connectivity, and water quality, and reduction of erosion and sedimentation. Specific actions may include replacement of inadequate or undersized culverts, monitoring fish health, removal of invasive species, restoration of wild rice beds, dam removal, and channel restoration.
- Agricultural land: restoring upland habitats, controlling invasive species, pasture enhancement, and planting cover crops.
- Forest/woodland: planting, wildlife rehabilitation and tracking/monitoring, and enhancement of wildlife habitat.

Selection of specific projects and methods for restoration of affected resources varies based on the types and extents of habitats affected and the time needed for resource recovery (which is highly variable but can require decades). The costs of recovery and restoration efforts are addressed in the following section.

10.6.3 Liability and Compensation

OPA 90 establishes a framework that addresses the liability of Responsible Parties in connection with discharge of oil into navigable waters of the United States, adjoining shorelines, or the exclusive economic zone. OPA 90 replaced the liability limitations previously established in the Clean Water Act with much higher liability limits and expanded the class of persons authorized to recover removal costs from the Responsible Party to include any person rather than only the federal government. Liability limits are set by OPA 90 and differ depending on the type of facility. The Responsible Party of an incident is the person, business, or entity that has been identified as owning the pipeline that caused the spill. The Responsible Party is liable for the removal costs and damages up to their limit of liability unless the spill was caused by an act of God, an act of war, negligence on the part of the U.S. government, and/or an act or omission of a third party.

Under the provisions of CERCLA, OPA 90, and several state statutes, cost recovery can be obtained from industry for natural resource damage caused by the release of oil or hazardous substances to the environment. Natural resources are defined as land, air, biota, groundwater, and surface water. A federal or state government entity, an Indian tribe, or other entity acting as a public trustee of a natural resource may file claims for damages to natural resources. Costs for damages that are recoverable under OPA 90 include the following:

- Natural Resources: Damages for injury to, destruction of, loss of, or loss of use of natural resources, including the reasonable costs of assessing the damage, which are recoverable by a U.S. trustee, a state trustee, an Indian tribe trustee, or a foreign trustee.
- Real or Personal Property: Damages for injury to, or economic losses resulting from destruction of, real or personal property, which are recoverable by a claimant who owns or leases that property.

- Subsistence Use: Damages for loss of subsistence use of natural resources, which are recoverable by any claimant who uses natural resources for subsistence that have been injured, destroyed, or lost, without regard to the ownership or management of the resources.
- Revenues: Damages equal to the net loss of taxes, royalties, rents, fees, or net profit shares due to the injury, destruction, or loss of real property, personal property, or natural resources, which are recoverable by the federal government, a state, or a political subdivision thereof.
- Profits and Earning Capacity: Damages equal to the loss of profits or impairment of earning capacity due to the injury, destruction, or loss of real property, personal property, or natural resources, which are recoverable by any claimant.
- Public Services: Damages for net costs of providing increased or additional public services during or after removal activities, including protection from fire, safety, or health hazards, due to a discharge of oil, which are recoverable by a state, or political subdivision of a state.

Table 10.6-2 provides descriptions of federal and state laws and regulations that establish liability for crude oil spills that may be applicable to the Project.

OPA 90 also authorized use of the Oil Spill Liability Trust Fund (OSLTF), which currently contains $1 billion. To ensure rapid, effective response to oil spills, the U.S. president has the authority to make available—without Congressional appropriation—up to $50 million each year from the OSLTF to fund removal activities and initiate NRDAs (USCG 2016). Fund uses delineated by OPA 90 include:

- Removal costs incurred by the USCG and EPA;
- State access to the OSLTF for removal activities;[55]
- Payments to federal, state, and Indian tribe trustees to conduct NRDAs and restorations;
- Payment of claims for uncompensated removal costs and damages;
- Research and development; and
- Other specific appropriations (USCG 2016).

Enbridge maintains comprehensive insurance for its subsidiaries and affiliates. Coverage includes commercial general liability insurance that applies to Enbridge's legal liability for third-party property damage and injuries arising from operational activities, including an oil spill. Since the July 2010 rupture of Enbridge's Line 6B pipeline and subsequent oil release into wetlands and the Kalamazoo River in Marshall, Michigan, Enbridge has paid over $1.2 billion in response, clean-up, and restoration costs as well as fines from state and federal agencies (U.S. Securities and Exchange Commission 2014). Enbridge currently maintains a general liability insurance program with a total limit of $860 million for the policy period. The retention (deductible) for sudden and accidental pollution events is $30 million per event, and the program is renewed annually (Enbridge 2015b).

[55] To encourage greater state participation in response to actual or threatened discharges of oil.

Table 10.6-2. Potentially Applicable Federal and State Laws and Regulations That Establish Liability for Crude Oil Spills

Statute/Regulation	Description
Oil Pollution Act of 1990 (OPA 90), 33 U.S. Code 2701 et seq.	OPA 90 established a program of prevention, response, liability, and compensation to address vessel and facility-caused oil pollution to navigable waters of the United States. Section 1002(a) provides that the Responsible Party for a pipeline from which oil is discharged, or which poses a substantial threat of a discharge, is liable for (1) certain specified damages resulting from the discharged oil; and (2) removal costs incurred in a manner consistent with the National Contingency Plan. Per Section 1018(a), OPA 90, does not preempt state law. States may impose additional liability (including unlimited liability), funding mechanisms, requirements for removal actions, and fines and penalties for Responsible Parties.
Resource Conservation and Recovery Act (RCRA), 42 U.S. Code 6973	The U.S. Environmental Agency (EPA) may issue an order or bring a suit in district court against any person who has contributed or who is contributing to the handling, treatment, storage, transportation, or disposal of solid or hazardous waste that may present an imminent and substantial endangerment to health or the environment. Persons who violate an order are subject to civil penalties of up to $7,500 per day. RCRA Section 7003(a), 42 U.S. Code 6973(a), authorizes the EPA "upon receipt of evidence that the past or present handling, storage, treatment, transportation or disposal of any solid waste or hazardous waste may present an imminent and substantial endangerment to health or the environment" to "bring suit in district court or to issue an administrative order to any person who contributed or is contributing to that handling, storage, treatment, transportation," to restrain or take any other action in response. Oil released from a pipeline would constitute solid or hazardous waste, and the authority allows the EPA to require action if the spill "may present an imminent and substantial endangerment."
Safe Drinking Water Act (SDWA), 42 U.S. Code 300f et seq.	The EPA may issue orders to any person in circumstances where a "contaminant" is present in or is likely to enter a public water system or an underground source of drinking water (defined broadly to include almost all groundwater), which may present an imminent and substantial endangerment to the health of persons and states (to whom primary responsibility is granted under the SDWA) that are not acting. The orders may require that person to take such actions as the EPA deems necessary to protect health (42 U.S. Code 300i [a]). Civil penalties are available for failure to comply with such an order. SDWA Section 1431(a), 42 U.S. Code 300i(a), authorizes the EPA "upon receipt of information that a contaminant which is present in or is likely to enter a public water system or an underground source of drinking water, which may present an imminent and substantial endangerment to the health of persons," to take "such actions as [it] deems necessary," including issuance of orders and civil judicial actions. This authority is quite broad. An underground source of drinking water is virtually any underground water that has the potential to be used for drinking water, and a "contaminant" is any biological, chemical, or physical substance in water.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S. Code 9601 et. seq.	This act is similar to OPA 90 but addresses releases of hazardous substances and specifically *excludes* oil and petroleum. CERCLA created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. It provides for liability for response costs and natural resource damages against owners or operators of a pipeline who arranged for disposal of hazardous substances. The act contains similar defenses as OPA 90, as well as contribution rights. It also provides the EPA authority to issue administrative orders requiring response actions. Local CERCLA access provides funds (limited to $25,000) in the form of reimbursements for expenses, to local, county, and tribal governments that respond to a hazardous substance release in their jurisdiction (Region 5 RRT 2017).

Table 10.6-2. Potentially Applicable Federal and State Laws and Regulations That Establish Liability for Crude Oil Spills

Statute/Regulation	Description
Environmental Response and Liability Act (MERLA) Minnesota Statutes § 115B	MERLA is the Minnesota State Superfund law. Among other things, it allows the Minnesota Pollution Control Agency and the Minnesota Department of Agriculture to clean up contaminated sites and seek recovery of their expenses from those persons who are responsible for the contamination. The law creates a Superfund account to provide funding for the cleanup and provides that any money recovered shall be deposited in the account. The law provides a statute of limitations for the state to bring a cost recovery lawsuit.
Oil and Hazardous Substance Discharge Preparedness Minnesota Statutes § 115E	Statute 115E requires persons handling oil and hazardous substances to prevent discharges that endanger the environment or public health. It also requires certain kinds of facilities to prepare spill response plans.

10.7 COMPARISONS OF ALTERNATIVES BASED ON FAILURE PROBABILITY AND POTENTIAL EXPOSURES OF RESOURCES

The following sections summarize and compare the key results of the failure probability analysis among the transport mode alternatives and an evaluation of resources of concern that could be exposed following a crude oil release:

- Comparison of Failure Probability Estimates for the Applicant's Preferred Route and Certificate of Need Alternatives (Section 10.7.1),
- Comparisons of Potential Exposure Assessment Results for the Applicant's Preferred Route and Certificate of Need Alternatives (Section 10.7.3), and
- Comparisons of Potential Exposure Assessment Results for the Applicant's Preferred Route and Route Alternatives (Section 10.7.4).

10.7.1 Comparison of Failure Probability Estimates for the Applicant's Preferred Route and Certificate of Need Alternatives

The potential causes for spills for truck, rail, and pipeline are presented in section 10.1.2 and the baseline crude oil pipeline spill risk analysis is presented in section 10.1.3.

Compared to pipelines, both truck and rail transportation alternatives have a higher likelihood of accidents and spills due to the number of transits required to transport the crude oil and the associated increase in risk due to human error. Tanker trucks use major roadways and present a greater risk of injury and fatalities to personnel and the public; this transport mode has a substantially greater annual probability of a spill incident and an estimated recurrence interval of 1.46 days (0.004 years multiplied by 365 days per year). Even though the risk of an event occurring is higher for trains and trucks, the size of the release, if an incident occurs, is typically much smaller because the volume of a tanker truck or train car is smaller. The average size of crude oil from a truck incident is 16 barrels (687 gallons); from a train incident, 40 barrels (1,688 gallons); and from a pipeline incident, 462 barrels (19,412) gallons

The very large number of trucks required for this alternative would greatly increase the risk of releases and impacts on other roadway users along the major routes between loading and offloading facilities.

Similarly, the large number of unit trains required to transport 760,000 bpd of crude oil results in a relatively high estimated annual probability of a spill incident, with such an incident estimated to occur approximately once per year. When total volume of releases is compared to the volume of crude oil transported, rail and truck transport release a significantly higher percentage of the volume transported, 0.309 percent and 0.154 percent respectively. Comparatively, pipeline transport releases an average of 0.006 percent of the volume of crude oil transported.

Table 10.7-1 provides additional context in the form of historical incident data for truck and rail transport of hazardous materials, a category that includes crude oil, normalized to reportable incidents per year. Figure 10.7-1 shows the average annual volume of crude oil transported and percent of transported crude oil spilled for different transportation modes.[56]

Table 10.7-1. Annual Number of Incidents for Rail and Truck Transportation of Hazardous Materials

Mode	Number of Incidents per Year[a]
Rail (2007–2017)	623
Truck (2007–2017)	1,199
Pipeline (2010–2017)	391

Sources: PHMSA 2017a, 2017b.

[a] Hazardous material transport includes the transport of crude oil; hazardous materials transportation incidents required to be reported are defined in 49 CFR 171.15, 171.16 (Form F 5800.1).

[56] Average number of crude oil (49 CFR 171.15, 171.16 [Form F 5800.1]) transport incidents based on Pipeline and Hazardous Materials Safety Administration data. Average number of rail incidents per year based on data spanning the period 2007–2017. Average number of truck incidents per year based on data spanning the period 2007–2017. Average number of pipeline incidents per year based on data spanning the period 2010–2017. Average volume of yearly transport based on Energy Information Administration U.S. Refinery Receipts of Crude Oil by Method of Transportation data spanning the period 2010–2016.

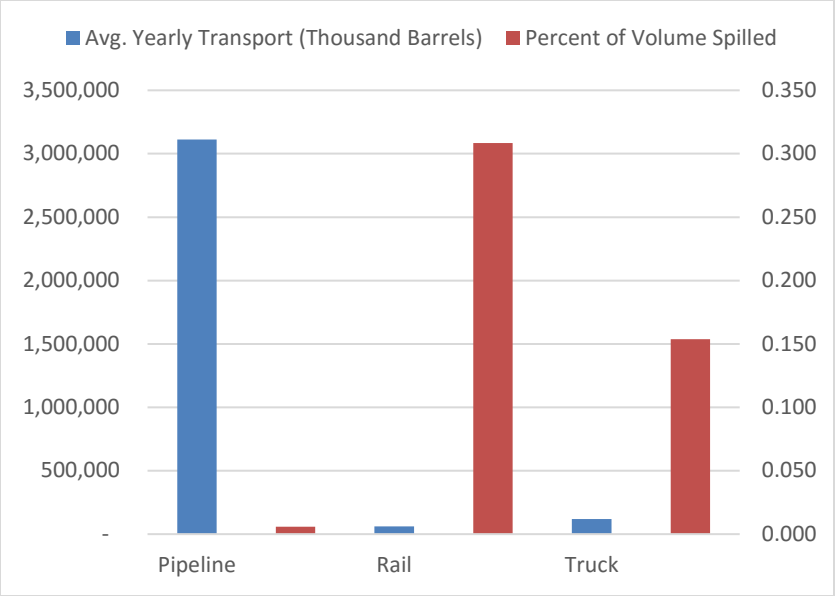

Figure 10.7-1. Annual Average Volume of Oil Transported and Percent Spilled

10.7.2 Comparisons of Potential Exposure Assessment Results for the Applicant's Preferred Route and Certificate of Need Alternatives

The presence of HCAs and AOIs within the ROIs, as described in Section 10.4.1, was compared among the Applicant's preferred route and the CN Alternatives. These are considered the resources of concern. The two ROIs consist of a 5,000-foot-wide (2,500 feet on each side of the centerline of the pipeline or train or truck route) ROI corridor for releases on land and a 10-mile-long, 1,000-foot-wide (500 feet on each side of the centerline of the waterbody crossed) downstream ROI corridor for releases to water; these were established as areas within which oil could be present after a release. Table 10.7-2 summarizes the exposure of resources of concern in the ROIs and is presented along a color gradient (green to red). CN Alternatives are coded in a gradient from green to red based on the extent of the potential exposure of resources in their ROIs in comparison to the other alternatives.

A more detailed listing of each HCA and AOI category is provided in Table 10.7-3, and this table also codes CN Alternatives using the same gradient from red to green. The same approach to comparing the Applicant's preferred route and route alternatives is provided associated with resources of concern and HCA and AOI categories in Tables 10.7-4- and 10.7-5-.

As shown in Tables 10.7-2 and 10.7-3 for the Applicant's preferred route compared to the CN Alternatives, system alternative SA-04 has the lowest total acreage of AOIs, followed by the Applicant's preferred route, existing use of Line 3, transportation by rail, and transportation by truck. Existing Line 3 supplemented by truck and existing line 3 supplemented by rail have the greatest total AOI acreages, being over three times greater than that of the Applicant's preferred route and system alternative SA-04.

With respect to total acreages of AOIs for the Applicant's preferred route compared to the other route alternatives (Tables 10.7-4 and 10.7-5), which range from about 193,000 to 334,000 acres, RA-06 has the lowest total acreage of AOIs, followed by RA-03AM, and the Applicant's preferred route. RA-07 and RA-08 have the highest total acreages of AOIs.

Table 10.7-2. Summary of Potentially Exposed Resources of Concern from an Unanticipated Release of Crude Oil along the Applicant's Proposed Project and Certificate of Need Alternatives (acres)

Resources of Concern	Applicant's Proposed route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
HCA populated area	10,959.8	25,697.9	25,128.7	41,579.2	44,431.8	67,277.1	70,129.6
HCA unusually sensitive ecological area	12,318.0	27,527.8	20,378.4	27,578.6	37,272.0	55,106.4	64,799.8
HCA drinking water source	2,443.9	4,521.9	24,468.7	14,787.2	27,941.9	19,309.1	32,463.8
Drinking water AOIs	319.7	1,599.9	15,486.1	3,838.0	9,796.9	5,428.9	11,396.8
Cultural resources AOIs	48.0	44,137.6	11,606.4	55,356.8	40,236.6	99,493.9	84,374.0
Biological AOIs	102,426.2	99,970.0	369.4	96,325.3	87,205.8	195,007.8	187,166.2
Commodity production AOIs	38,188.6	63,408.8	191.6	56,363.8	69,083.4	118,726.3	137,522.1
Recreation/tourism AOIs	3,704.1	1,872.3	1,791.9	11,325.5	2,394.5	13,197.9	4,266.8
TOTAL	**170,408.3**	**268,736.2**	**99,421.2**	**307,154.4**	**318,362.9**	**573,547.4**	**592,119.1**

Notes:

Acreages are the sum of acres within the 2,500-foot-wide and 10-mile-long downstream ROIs for each metric, with the exception of Drinking Water AOIs, which reflects Wellhead Protection Areas within a 1-mile ROI.

Drinking Water Areas of Interest include only Wellhead Protection Areas, as other resources were specific to Minnesota.

AOI = area of interest (see Section 10.4.1 for descriptions of AOIs); HCA = high consequence area (see Section 10.4.1 for descriptions of HCAs)

Table 10.7-3. High Consequence Areas and Areas of Interest within 2,500 Feet of Either Side of the Centerline and 10 Miles Downstream of the Applicant's Proposed Project and Certificate of Need Alternative Routes

Resources of Concern	Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck	Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
	Within 2,500 Feet of Either Side of the Centerline							Within 10 Miles Downstream						
High Consequence Areas														
HCA populated area (acres)	6,545.2	22,318.7	13,075.3	34,724.2	35,639.4	57,042.9	57,958.1	4,414.6	3,379.2	12,053.4	6,855.0	8,792.4	10,234.2	12,171.6
HCA unusually sensitive ecological area (acres)	6,903.4	19,045.5	10,530.3	17,960.0	26,016.8	37,005.4	45,062.3	5,414.6	8,482.3	9,848.1	9,618.7	11,255.2	18,101.0	19,737.5
HCA drinking water source (acres)	1,614.6	3,975.2	11,058.9	11,862.6	18,726.6	15,837.8	22,701.8	829.3	546.7	13,409.8	2,924.6	9,215.3	3,471.3	9,762.0
Drinking Water Areas of Interest														
Wellhead protection area (acres)	189.7	1,391.3	3,579.7	3,350.2	3,747.0	4,741.5	5,138.3	130.0	208.6	11,906.4	487.8	6,049.9	687.4	6,258.5
Number of domestic and public wells	638.0	690.0	946.0	648.0	568.0	1,338.0	1,258.0	146.0	39.0	228.0	367.0	184.0	406.0	223.0
Cultural Resources Areas of Interest														
Reservation land (acres)	48.0	33,737.6	6,738.1	31,854.3	30,280.4	65,591.9	64,018.0	0.0	10,400.0	4,868.3	23,502.5	9,956.2	33,902.0	20,356.0

Table 10.7-3. High Consequence Areas and Areas of Interest within 2,500 Feet of Either Side of the Centerline and 10 Miles Downstream of the Applicant's Proposed Project and Certificate of Need Alternative Routes

Resources of Concern	Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck	Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Biological Areas of Interest														
Aquatic Management Area (acres)	125.0	227.5	0.0	228.6	93.9	456.0	321.4	209.8	320.0	0.0	196.4	183.5	516.4	503.5.52
Scientific and Natural Area (acres)	0.0	7.5	0.0	186.7	0.0	380.8	7.5	342.3	192.7	0.0	63.4	0.0	256.1	192.7
Minnesota BWSR conservation easement (acres)	15.8	167.1	0.0	736.0	33.0	903.1	200.1	262.0	260.7	29.8	158.2	90.9	418.8	351.5
Lakes of Biological Significance (acres)	406.7	2,209.8	0.0	1,951.5	2,617.9	4,161.4	4,827.8	3,608.9	3,400.1	0.0	3,659.1	4,559.4	7,059.2	7,959.5
Marginal cropland (acres)	15.6	16.1	0.0	87.4	5.4	103.5	21.5	44.2	10.0	0.0	0.0	0.0	10.0	0.0
MBS Sites of Biodiversity Significance (acres)	28,046.8	12,992.7	0.0	18,309.7	6,285.4	31,302.3	19,278.1	11,589.4	8,001.2	120.6	11,117.4	5,740.2	19,118.6	13,741.5
Muskie lakes (acres)	41.4	976.6	0.0	1,060.9	1,882.1	2,037.5	2,858.8	676.0	2,107.0	0.0	1,990.8	3,526.5	4,097.8	5,633.5
Native plant communities	38,173.8	40,195.4	0.0	33,852.4	35,643.9	74,047.8	75,839.3	14,015.3	22,744.8	219.0	16,735.5	19,166.4	39,480.3	41,911.3

Table 10.7-3. High Consequence Areas and Areas of Interest within 2,500 Feet of Either Side of the Centerline and 10 Miles Downstream of the Applicant's Proposed Project and Certificate of Need Alternative Routes

Resources of Concern	Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck	Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
(acres)														
Sensitive lakeshore areas (acres)	300.5	1,329.8	0.0	743.4	1,387.9	2,073.2	2,717.7	441.9	513.4	0.0	305.3	373.6	818.7	887.0
Wetland bank easements (acres)	0.0	70.6	0.0	120.3	33.6	190.9	104.2	38.5	30.3	0.0	49.7	21.9	80.0	52.2
Wild rice lakes (acres)	675.4	1,240.4	0.0	1,474.05	1,661.0	1,240.4	2,901.4	3,396.3	2,956.4	0.0	3,298.6	3,899.3	6,255.0	6,855.7
Commodity Production Areas of Interest														
Federal and state forests (acres)	31,764.3	48,861.8	145.9	27,654.5	45,469.4	76,516.3	94,331.2	0.0	8,496.3	0.0	14,417.2	16,965.6	22,915.5	31,384.8
Other forested land (acres)	3,349.5	2,827.2	45.7	2,735.5	2,954.0	5,562.7	5,781.2	1,910.9	2,207.8	0.0	1,311.3	2,451.7	3,519.1	4,659.5
Harvested Wild Rice Lakes	181.6	241.9	0	384.7	328.5	345.1	430.1	982.3	773.7	0.0	1603.6	914.2	1612.6	935.3
Recreation/Tourism Areas of Interest														
State park and recreation areas (acres)	947.6	0.0	790.5	5,989.6	335.8	5,989.6	335.8	180.9	1,485.0	790.5	0.0	54.1	1,485.0	1,539.1
Waterfowl production areas (acres)	92.0	185.8	0.0	421.3	484.9	607.1	670.7	11.5	182.2	0.0	0.0	0.0	182.2	182.2
Wildlife	1,299.3	16.4	105.5	3,352.1	820.6	3,368.5	836.9	1,172.7	3.0	105.5	1,562.5	699.1	1,565.5	702.1

Table 10.7-3. High Consequence Areas and Areas of Interest within 2,500 Feet of Either Side of the Centerline and 10 Miles Downstream of the Applicant's Proposed Project and Certificate of Need Alternative Routes

Resources of Concern	Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck	Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
Management Areas (acres)														
TOTALS														
AOI Total (acres)	**121,374.2**	**192,724.6**	**47,015.8**	**198,213.8**	**215,015.7**	**390,843.6**	**407,600.0**	**49,817.3**	**76,740.3**	**53,579.3**	**100,224.4**	**104,099.2**	**176,192.5**	**185,496.2**
Combined AOI Total (acres)	**171,191.5**	**269,464.9**	**100,595.1**	**298,438.2**	**319,114.9**	**567,036.1**	**593,096.2**							

Notes:

The establishment of ROIs and GIS analysis methods are described in Section 10.4.1.

Acreages are the sum of acres within the 2,500-foot-wide and 10-mile-long downstream ROIs for each metric, with the exception of Drinking Water AOIs, which reflects Wellhead Protection Areas within a 1-mile ROI.

Minnesota BWSR = Minnesota Board of Water and Soil Resources; HCA = high sequence area (see Section 10.4.1 for descriptions of HCAs)

Table 10.7-4. Summary of Potentially Exposed Resources of Concern from an Unanticipated Release of Crude Oil from the Applicant's Preferred Route and Route Alternatives (acres)

Resources of Concern	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
HCA populated area (acres)	4,814.1	12,829.2	3,230.0	20,806.6	17,363.7
HCA unusually sensitive ecological area (acres)	10,978.1	7,752.3	12,674.4	26,854.4	27,566.9
HCA drinking water source (acres)	501.1	2,399.1	718.0	2,942.0	2,998.3
Drinking water AOIs	83,833.7	153,971.9	16,196.0	64,785.5	63,726.0
Cultural resources AOIs	0.0	13.5	11,425.6	44,046.8	45,766.0
Biological AOIs	94,053.5	65,287.5	58,822.3	88,764.0	92,613.0
Commodity production AOIs	50,199.6	5,648.2	88,363.0	72,008.1	80,853.5
Recreation/tourism AOIs	3,704.1	4,100.9	1,838.6	1,443.0	1,924.3
TOTAL	**248,084.2**	**252,002.6**	**193,267.9**	**321,650.4**	**332,811.7**

Notes:

Acreages are the sum of acres within the 2,500-foot-wide and 10-mile-long downstream ROIs for each metric, with the exception of Drinking Water AOIs, which reflect: DWSMAs and Wellhead Protection Areas within a 1-mile ROI, and Hydrogeologic Sensitivity within a 0.5-mile ROI.

HCA = high consequence area (see Section 10.4.1 for descriptions of HCAs); AOI = area of interest (see Section 10.4.1 for descriptions of AOIs)

Table 10.7-5. High Consequence Areas and Areas of Interest within 2,500 Feet of Either Side of the Centerline and 10-Mile-Long Downstream ROI of the Applicant's Preferred Route and Route Alternatives Between Clearbrook and Carlton

Resources of Concern	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
	Within 2,500 of Either Side of the Centerline					Within 10-Mile-Long Downstream ROI				
High Consequence Areas										
HCA populated area (acres)	1,759.5	8,264.9	2,271.8	17,427.4	13,261.2	3,054.6	4,564.3	958.2	3,379.2	4,102.5
HCA unusually sensitive ecological area (acres)	6,230.0	2,906.9	8,468.7	18,372.1	18,498.1	4,748.1	4,845.4	4,205.7	8,482.3	9,068.8
HCA drinking water source (acres)	83.4	1,322.5	168.2	2,395.3	2,105.6	417.7	1,076.6	549.8	546.7	892.7
Drinking Water Areas of Interest										
DWSMA (acres)	790.6	5,676.7	1,111.0	3,190.5	2,975.4	197.1	996.0	267.4	336.7	310.4
High/very high DWSMA vulnerability (acres)	790.6	2,637.0	109.0	2,272.5	2,338.0	0.0	464.5	12.0	11.1	11.1
WPAs (acres)	219.5	3,159.1	653.6	2,646.5	2,626.8	30.4	501.9	114.6	208.6	207.2
High/very high hydrogeologic sensitivity (acres)	81,805.5	140,536.7	13,928.4	56,119.6	55,257.1	N/A	N/A	N/A	N/A	N/A
Number of domestic and public wells	173.0	430.0	43.0	242.0	188.0	125.0	179.0	28.0	40.0	46.0
Cultural Resources Areas of Interest										
Reservation land (acres)	0.0	13.5	7,858.1	33,689.6	33,894.5	0.0	0.0	3,567.5	10,357.2	11,871.5
Number of archaeological and historical sites	71.0	124.0	19.0	180.0	138.0	N/A	N/A	N/A	N/A	N/A
Biological Areas of Interest										
Aquatic Management Areas	125.0	112.5	204.6	227.5	190.5	209.8	267.0	241.0	320.0	336.9

Table 10.7-5. High Consequence Areas and Areas of Interest within 2,500 Feet of Either Side of the Centerline and 10-Mile-Long Downstream ROI of the Applicant's Preferred Route and Route Alternatives Between Clearbrook and Carlton

Resources of Concern	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
	Within 2,500 of Either Side of the Centerline					Within 10-Mile-Long Downstream ROI				
(acres)										
Scientific and Natural Areas (acres)	0.0	234.5	63.7	7.5	85.2	149.6	238.1	0.0	0.0	0.0
Minnesota BWSR conservation easement (acres)	14.0	1,288.5	25.9	165.2	183.7	37.4	385.1	0.0	36.1	35.9
Lakes of Biological Significance (acres)	300.2	220.3	99.2	2,103.4	1,280.8	3,608.9	1,952.6	1,222.5	3,400.1	4,286.4
Marginal cropland (acres)	13.7	88.3	6.7	14.2	23.5	11.3	69.3	0.0	10.0	10.0
MBS Sites of Biodiversity Significance (acres)	25,016.2	16,339.8	8,952.1	9,962.2	12,257.6	9,692.7	5,138.5	4,774.4	5,834.6	6,531.2
Muskie lakes (acres)	41.4	0.0	0.0	976.6	55.8	676.0	0.0	0.0	2,107.1	2,676.3
Native plant communities (acres)	35,273.1	18,742. 8	26,368.1	37,247.1	39,868.2	14,015.3	16,937.9	15,591.9	20,211.6	21,661.8
Sensitive lakeshore areas (acres)	300.5	178.6	0.0	1,329.8	1,151.6	441.9	188.4	158.3	513.4	713.7
Trout stream/lake (acres)	16.3	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	N/A
Wetland bank easements (acres)	0.0	0.0	0.0	70.6	112.5	38.5	0.0	0.0	30.3	30.3
Wild rice lakes (acres)	675.4	708.6	92.4	1,240.4	1,119.5	3,396.3	2,385.1	1,021.5	2,956.4	3,902.3
Commodity Production Areas of Interest										
Federal and state forests	31,764.3	2,334.7	55,377.7	48,861.8	52,121.1	12,054.9	653.9	24,550.0	17,132.8	20,897.7

Table 10.7-5. High Consequence Areas and Areas of Interest within 2,500 Feet of Either Side of the Centerline and 10-Mile-Long Downstream ROI of the Applicant's Preferred Route and Route Alternatives Between Clearbrook and Carlton

Resources of Concern	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08	Applicant's Preferred Route	Route Alternative RA-03AM	Route Alternative RA-06	Route Alternative RA-07	Route Alternative RA-08
	Within 2,500 of Either Side of the Centerline					Within 10-Mile-Long Downstream ROI				
(acres)										
Other forested land (acres)	33,12.4	1,640.2	5,884.7	2,790.1	2,593.9	1,904.1	838.7	2,154.5	2,207.8	2,495.8
Harvested Wild Rice	181.6	180.7	72.1	241.9	761.8	982.3	0	324	773.7	1,983.20
Recreation/Tourism Areas of Interest										
State park and recreation areas (acres)	947.8	947.8	0.0	0.0	0.0	180.8	1,920.9	941.3	941.3	914.3
Waterfowl production areas (acres)	92.0	260.8	418.0	185.8	277.2	11.5	11.5	182.2	0.0	0.2
Wildlife Management Areas (acres)	1,299.3	477.7	294.1	16.4	439.5	1,172.7	482.2	3.0	299.5	293.1
TOTALS										
AOI Total (acres)	**187,983.9**	**190,084.3**	**132,490.1**	**241,976.0**	**243,805.1**	**57,156.9**	**44,096.9**	**60,867.8**	**80,136.5**	**93,279.3**
Combined AOI Total (acres)	**244,771.8**	**233,448.2**	**193,267.9**	**321,650.5**	**336,712.4**					

Notes:

The establishment of ROIs and GIS analysis methods are described in Section 10.4.1.

Acreages are the sum of acres within the 2,500-foot-wide and 10-mile-long downstream ROIs for each metric, with the exception of Drinking Water AOIs, which reflect: DWSMAs and Wellhead Protection Areas within a 1-mile ROI, and Hydrogeologic Sensitivity within a 0.5-mile ROI.

AOI = area of interest, MBS Sites = Minnesota Biological Survey Sites of Biodiversity Significance; Minnesota BWSR = Minnesota Board of Water and Soil Resources; HCA = high consequence area (see Section 10.4.1 for descriptions of HCAs); DWSMA = Drinking Water Supply Management Area, ROI = region of interest; WPAs = Wellhead Protection Areas

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Chapter 11
Environmental Justice

11.1 INTRODUCTION

Environmental justice (EJ) refers to the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income. In general, EJ is intended to ensure that all people benefit from equal levels of environmental protection and have the same opportunities to participate in decisions that may affect their environment or health (Minnesota PCA 2017; EPA 2017). Minority and/or low-income communities are often concentrated in small geographical areas within the larger geographically and/or economically defined population. Minority communities and low-income communities may constitute a very small percentage of the total population and/or geographical area. Therefore, the assumptions, inputs, and analytical tools typically used to evaluate the environmental and human health impacts associated with a proposed project may not fully reflect the impacts that may be borne by these historically (and currently) disenfranchised communities or populations. A quantitative analysis of disproportionate impacts provides a better understanding of how the total potential impacts vary across individual communities. This allows analysts and decision makers to identify and understand what portion of the total impacts may be borne by minority or low-income communities, to assess whether the impacts are disproportionately high and adverse, and to develop alternatives and mitigation measures to minimize impacts on these communities, if necessary.

A quantitative analysis is conducted in accordance with the existing regulatory framework. Additionally, this section acknowledges that the affected environment includes American Indian populations who use, reside, utilize, or rely on the lands within the project area. The presence and location of these unique populations may not be fully captured by the data, and for these communities, any adverse impact may be perceived as a disproportionately high and adverse impact. As such, a qualitative analysis of potential impacts to these populations is included herein (see also Chapter 9 for a description of impacts to tribal resources).

Regulatory Context and Methodology

The Council on Environmental Quality's (CEQ's) "Environmental Justice: Guidance Under the National Environmental Policy Act" (1997) and the U.S. Environmental Protection Agency's (EPA's) "Promising Practices for EJ Methodologies in NEPA Reviews" (2016) were developed to provide EPA and other agencies with a process for identifying EJ communities and addressing potential impacts on them. According to these guidance documents, the basic components of an EJ assessment should include:

- A demographic assessment of the potentially affected communities to identify minority and low-income populations that may be present;
- An integrated assessment to determine whether any adverse impacts would disproportionately affect minority or low-income populations; and
- An opportunity for the public to participate in the process, including community, minority, low-income, and tribal participation.

These two guidance documents also encourage agencies to consider the following:

1. Context and intensity are factors that can inform an agency's determination whether an impact is disproportionately high and adverse.

2. In addition to collecting data, agencies may identify and describe unique conditions of the potentially affected minority populations and low-income populations that may be affected by the proposed action. These conditions may include human health, socioeconomic, and cultural vulnerabilities.

3. Notably, the identification of a disproportionately high and adverse impact on low-income or minority populations neither precludes a proposed action from going forward, nor does it compel a conclusion that a proposed action is environmentally unsatisfactory. An agency may consider a heightened focus on meaningful public engagement regarding community preferences, considering an appropriate range of alternatives, and mitigation and monitoring measures (EPA 2016).

4. The disproportionately high and adverse impacts determination can help inform how an agency develops and/or selects alternatives and mitigation measures to avoid, minimize, rectify, reduce, or compensate for adverse impacts.

To perform the EJ analysis in accordance with the guidance documents noted above, Commerce established a geographic area within which potential impacts from the proposed Project could occur (the "region of interest", or ROI). The ROI comprises census tracts intersected by the right-of-way for the Applicant's preferred route and route alternatives. Publicly available census tract data were then obtained from the U.S. Census Bureau American Community Survey (ACS) to identify the presence of minority and low-income populations within the ROI (U.S. Census Bureau 2017). The ACS provides estimates based on a rolling survey conducted over 5 years. The most recent survey data are from 2011 to 2015. Census tracts are relatively permanent subdivisions of a county, created for the purpose of collecting statistical data, with boundaries confirmed or updated every 10 years. Populations in census tracts can vary from 1,200 to 8,000 people, with an optimal size of 4,000 people. To ensure census tract populations in counties are fairly equal, the geographic size of each census tract can vary widely depending on its population density. Data was also gathered for counties and census tracts outside of the ROI to gain an understanding of the characteristics and demographics in the state, region, and vicinity of the proposed Project as a whole (see Appendix Q).

Census tract data was then compared to their respective county data to determine whether the potential for disproportionate impacts exist. The following guidelines were used in the comparison:

- Low-income and minority populations were determined to be present in an area when the percentage of minority group or low-income population exceeded 50 percent of the county population, or was "meaningfully greater" than the general population of the county.
- A difference of 10 percentage points or more was used to determine whether the percentage of a minority or low-income group in a census tract in the ROI was "meaningfully greater" than that group's percentage in the respective county.
- Minority populations were calculated as the populations excluding those persons who self-reported as being white (and no other race) and not Hispanic or Latino. The minority population

includes persons who self-reported as Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, some other race, having two or more races, or being of Hispanic or Latino origin.

- Based on recommendations from the Minnesota PCA, low-income populations are those individuals with income below 185 percent of the poverty level (1.85 multiplier). While PCA generally uses a metric of 40 percent of population below 185 percent of the poverty level to establish EJ status (i.e., more than 40 percent of the households have a household income of less than 185 percent of the federal poverty level), this analysis uses a difference of 10 percentage points or more to establish the "meaningfully greater" measure consistent with the comparison of minority populations.

As outlined above, the metric used to identify EJ populations in this EIS is the comparison of census tracts to the whole of a county, which allows comparison of population groups within the same general vicinity. This provides a quantitative comparison of proportional impact. The EIS uses a comparison against county data rather than statewide data, because the statewide data combine data from widely varying areas and are not representative of any particular area. Additionally, the state is a dichotomy of urban and rural communities. In general, urban areas have higher percentages of minority populations, while rural areas have lower average incomes. Combining those data does not provide a clear comparison to establish levels of EJ at a local level.

In general, the data bear out these assumptions. In north central Minnesota, numerous census tracts qualify as low-income. The counties through which the proposed Project and its alternatives would run are predominately rural. In 20 of the 21 counties, the percentage of the population below 185 percent of the poverty level is greater than for the state as a whole. In only one of the 21 counties, Cass County, is the percentage of the minority population greater than at the state level. In contrast, 13 of the 21 counties have a greater percentage of American Indian populations than at the state level. Figure 11-1 depicts the locations of the census tracts and counties in the ROI and indicates the census tracts with minority and low-income populations that are considered EJ communities according to the methodology identified herein.

It is also important to note that census tract data, while providing a comparison of population groups within the same general vicinity, may not capture smaller, micro-populations within a larger census tract, such as the East Lake Community or other geographic clusters of tribal populations that are not within the boundaries of a federally recognized reservation. The impacts described, and the mitigation measures proposed, however, do take into account all potential high and adverse impacts of the proposed action and alternatives.

Once EJ communities are identified (Section 11.3), a summary of resource-specific impacts on those communities are described (see Section 11.4). The EIS identifies the potential for disproportionately high and adverse impacts and describes the types of impacts, as well as mitigation measures.

The EIS also describes the unique issues and intensity of impacts that may exist in the context of the ROI. Mitigation measures are provided where appropriate to address the potential for the identified disproportionately high and adverse impacts.

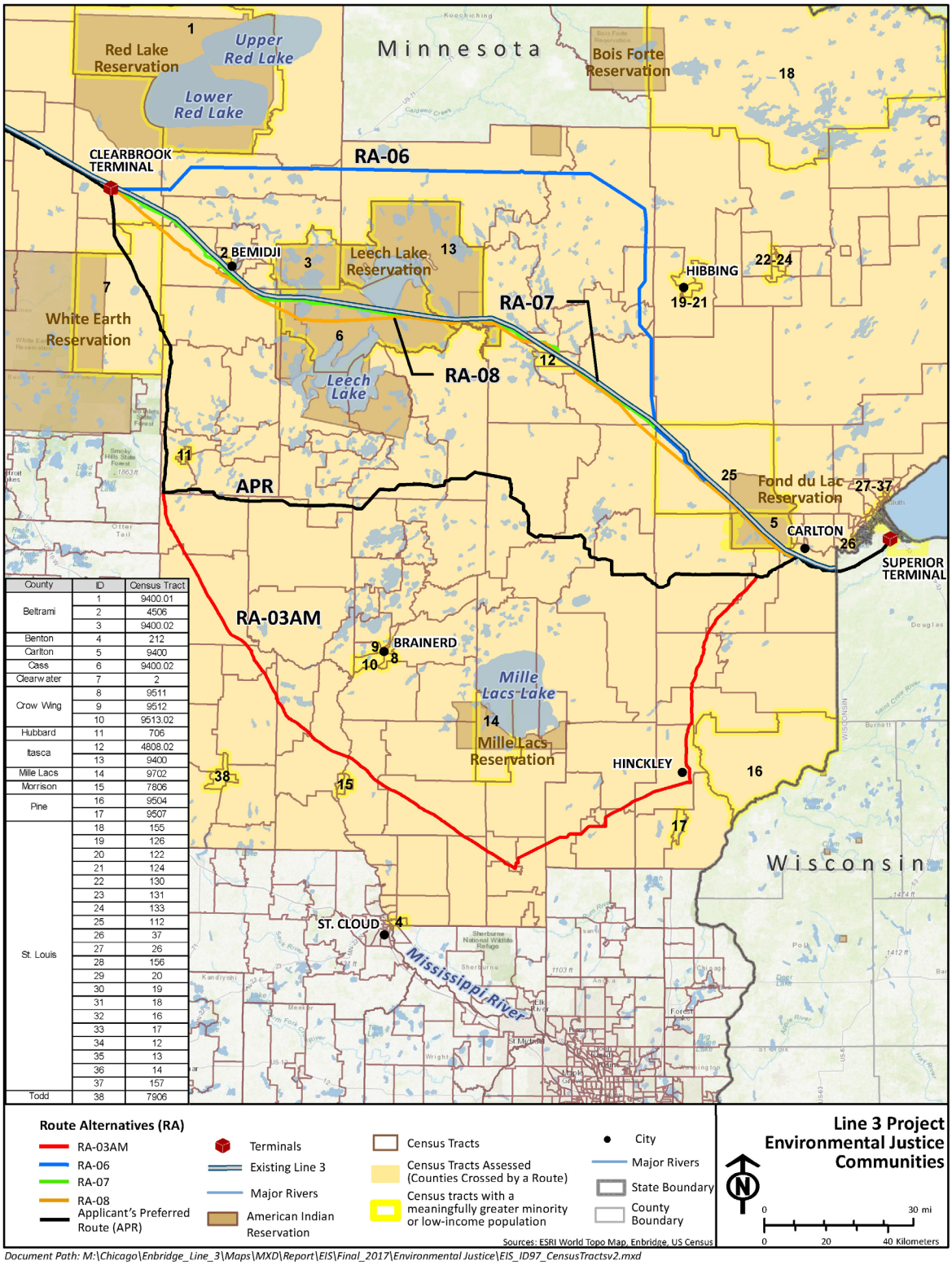

Figure 11-1. Areas of Concern for Environmental Justice in the Region of Interest (Route Alternatives)

Lastly, while the technical analysis is conducted in accordance within the existing regulatory framework, a qualitative discussion of unique communities, cultural considerations, and impacts is also included.

11.2 EXISTING ENVIRONMENT

11.2.1 Minority Populations

The Applicant's preferred route and the route alternatives would cross one or more census tracts with a meaningfully higher minority population than the surrounding county (see Figure 11-1). The percentage of the county with a minority population is provided in Table 11.2-1; this table also includes those census tracts within the county that are crossed by the Applicant's preferred route and/or one of the route alternatives. A listing of all census tracts crossed by the Applicant's preferred route or the route alternatives is provided in Appendix Q. Appendix Q also includes census tracts within the ROI.

Table 11.2-1. Minority Population

State/County	Percent Minority Population	10 Percentage Points Higher than County Level	50 Percent of Total Population Minority
Minnesota	18.3	-	-
Aitkin County	5.6	-	No
Beltrami County	26.6	-	No
Census tract 9400.01	96.8	Yes	Yes
Census tract 9400.02	46.1	Yes	No
Benton County	7.3	-	No
Carlton County	11.4	-	No
Census tract 9400[a]	49.7	Yes	No
Cass County	15.8	-	No
Census tract 9400.02[a]	72.9	Yes	Yes
Clearwater County	14.2	=	No
Census tract 2[a]	25.3	Yes	No
Crow Wing County	4.5	=	No
Hubbard County	6.5	=	No
Itasca County	7.7	=	No
Census Tract 9400[a]	34.7	Yes	No
Kanabec County	4.7	-	No
Kittson County	3.6	-	No
Marshall County	6.0	-	No
Mille Lacs County	10.1	-	No
Census tract 9702	40.4	Yes	No
Morrison County	3.7	-	No

Table 11.2-1. Minority Population

State/County	Percent Minority Population	10 Percentage Points Higher than County Level	50 Percent of Total Population Minority
Pennington County	8.7	-	No
Pine County	10.1	-	No
Census tract 9540	25.9	Yes	No
Polk County	11.0	-	No
Census tract 207[a]	25.9	Yes	No
Red Lake County	6.9	-	No
St. Louis County	8.3	-	No
Census tract 112[a]	20.1	Yes	No
Census tract 12	22.0	Yes	No
Census tract 131	19.7	Yes	No
Census tract 155	23.6	Yes	No
Census tract 156	33.2	Yes	No
Census tract 16	26.3	Yes	No
Census tract 18	24.7	Yes	No
Census tract 19	27.9	Yes	No
Todd County	8.1	-	No
Wadena County	5.0	=	No

Source: See Appendix Q.

[a] Crossed by CN alternative(s).

The Applicant's preferred route bisects, and RA-03AM crosses the edge of Census Tract 002 in Clearwater County, where the minority population of 25.3 percent exceeds the county level by more than 10 percentage points (Figure 11-1; Appendix Q). This census tract includes a portion of the White Earth Reservation, and the minority population in the tract is overwhelmingly American Indian (23.2 percent of the population; Appendix Q). Even though the Applicant's preferred route crosses the census tract, it does not cross the reservation (see Chapter 2.1 for further detail regarding the White Earth Reservation boundary). With respect to the CN Alternatives, Alternate Rail route to Superior North and the Truck Route Gretna to Superior Terminal also cross Census Tract 002 in Clearwater County (Figure 11-2).

Alternatives RA-06, RA-07 and RA-08 each cross two or more census tracts with minority populations that meaningfully exceed their county levels, indicating potential EJ concerns. All CN Alternatives except the Alternate Rail route to Clearbrook cross census tracts with EJ concerns.

Specifically, the alternatives affect Census Tracts within the ROI as follows:

- All three route alternatives cross Census Tract 9400 through the Fond du Lac Reservation in Carlton County. The American Indian population of this Census Tract is 46.9 percent compared to the county level of 7.2 percent (Figure 11-3).
- Alternate Rail Route to Superior North and Superior South cross this Census tract (see Figure 11-4).
- All three route alternatives would cross Census Tract 112 in part through the Fond du Lac Reservation in St. Louis County, with an American Indian population of 17.5 percent compared to the county level of 3.4 percent (Figure 11-5).
- Alternate Rail Route to Superior North and Truck Route Gretna to Superior Terminal also cross Census Tract 112 (see Figure 11-4).

Route alternatives RA-07 and RA-08 each pose the following additional EJ concerns:

- Both routes would cross Census Tract 9400 through the Leech Lake Reservation in Itasca County, with an American Indian population of 29.9 percent compared to the county level of 5.0 percent (Figure 11-6).
- With respect to the CN Alternatives, Alternative rail route to Superior North and Alternate Truck Route Gretna to Superior Terminal also cross Itasca County Census Tract 9400.
- Both route alternatives cross Census Tract 9400.02 through Leech Lake Reservation in Cass County, with an American Indian population of 69.2 percent compared to the county level of 13.2 percent. The entire census tract is located within the Leech Lake Reservation (Figure 11-7).
- With respect to the CN Alternatives, Alternate Rail Route to Superior North and Alternate Truck Route Gretna to Superior Terminal also cross Cass County CT 9400.02 (see Figure 11-2).
- With respect to the CN Alternatives, Alternate Rail Route to Superior North, and both truck routes, would impact Polk County census tract 207, which has a minority population of 25.9 percent as compared to the county level of 11 percent (see Figure 11-4). This is the only census tract with EJ concerns impacted by Truck Route Gretna to Clearbrook terminal.

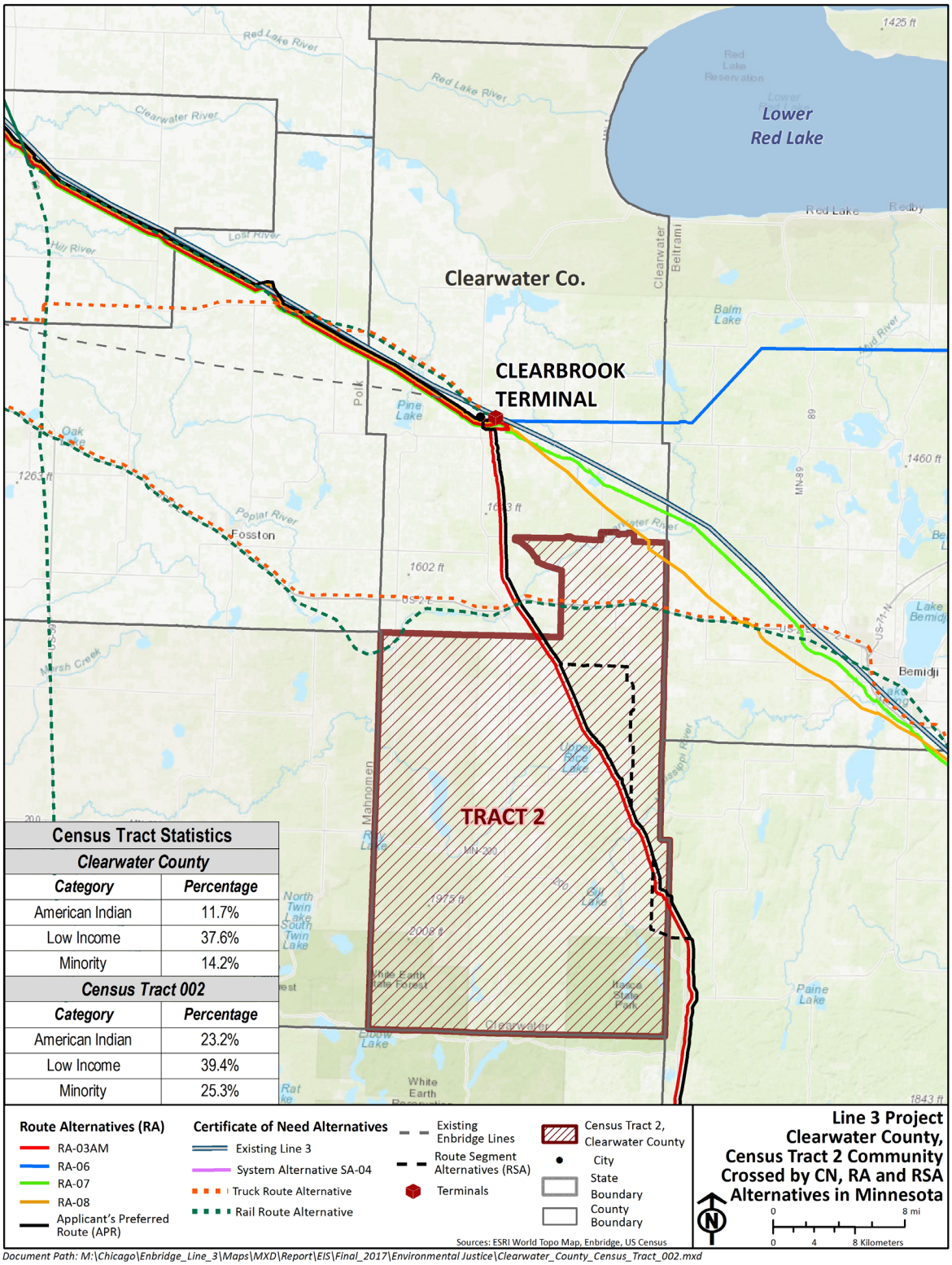

Figure 11-2. Clearwater County, Census Tract 2 Community Crossed by CN, RA, and RSA Alternatives in Minnesota

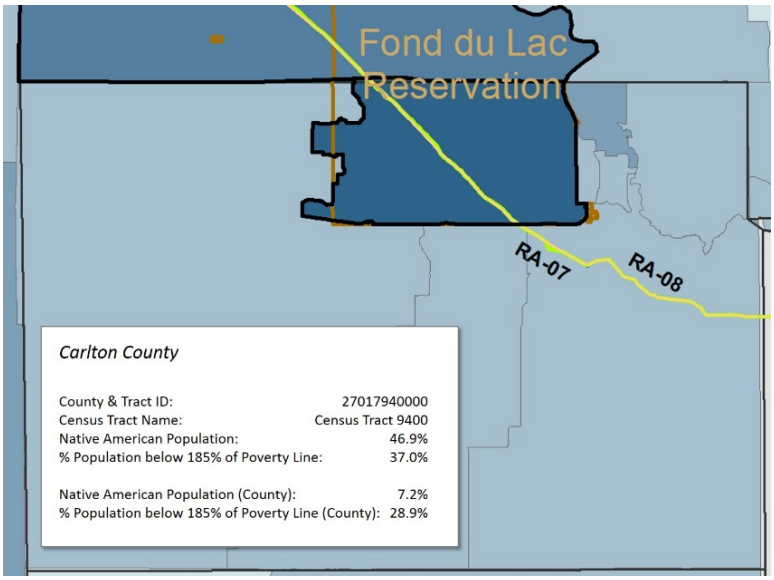

Figure 11-3. Carlton County Areas of Environmental Justice Concern

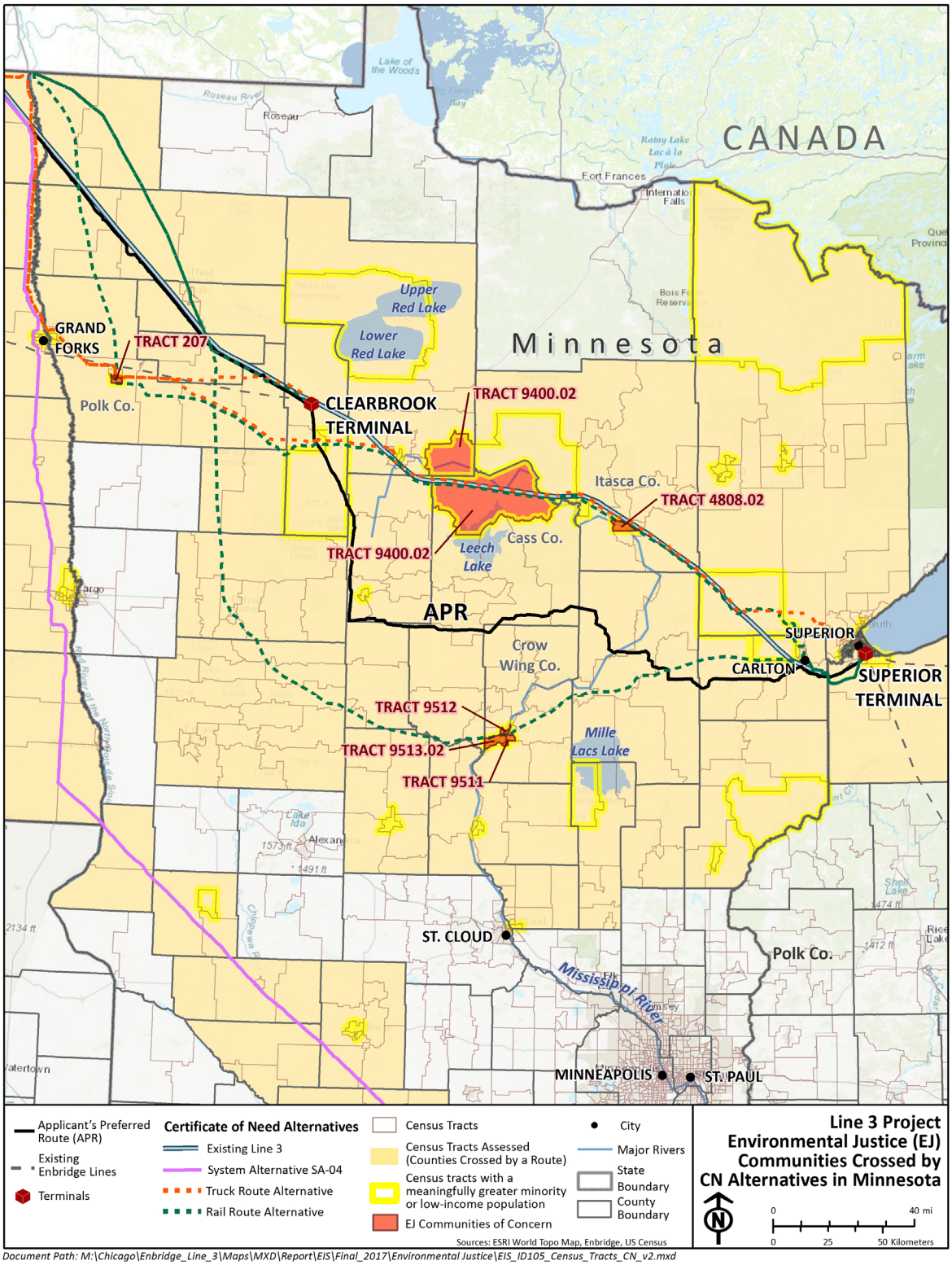

Figure 11-4. Areas of Concern for Environmental Justice in the Region of Interest (Certificate of Need Alternatives)

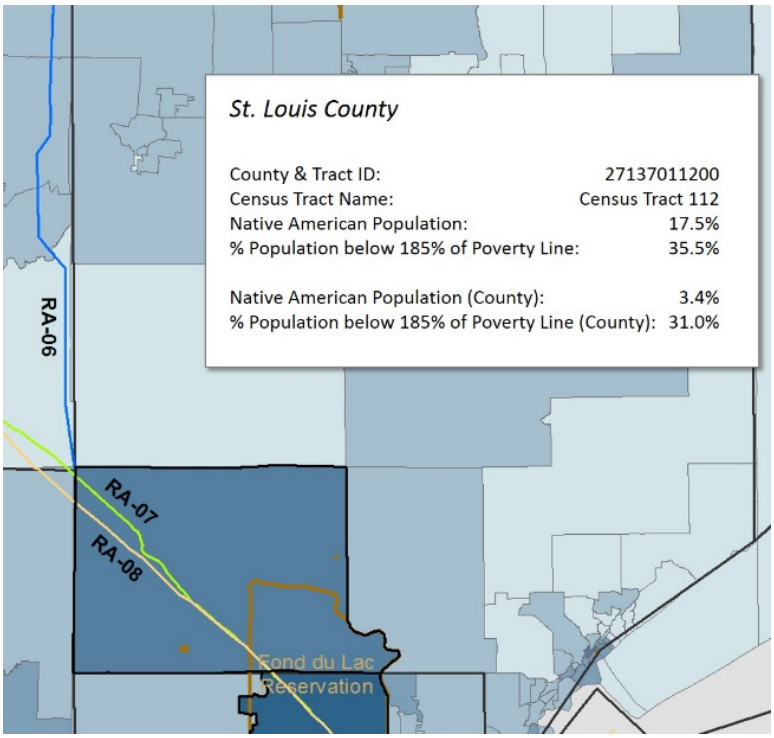

Figure 11-5. St. Louis County Areas of Environmental Justice Concern

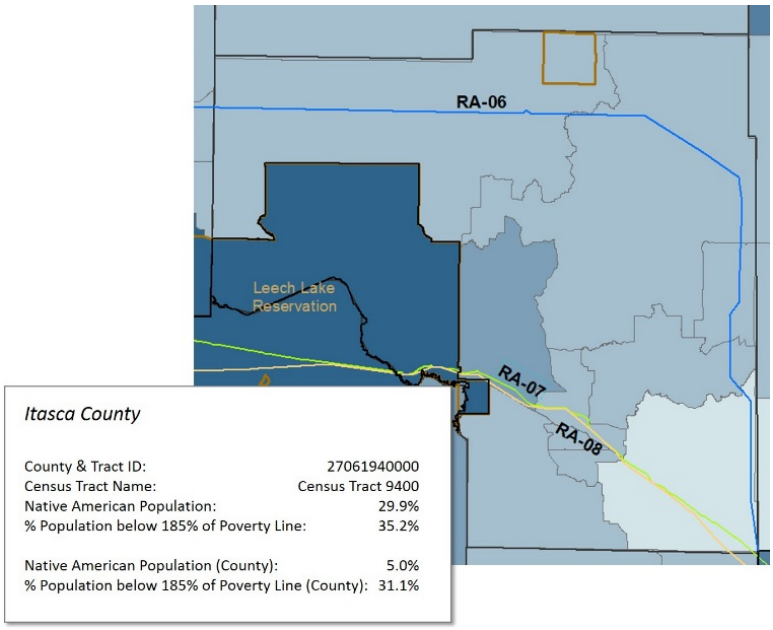

Figure 11-6. Itasca County Areas of Environmental Justice Concern

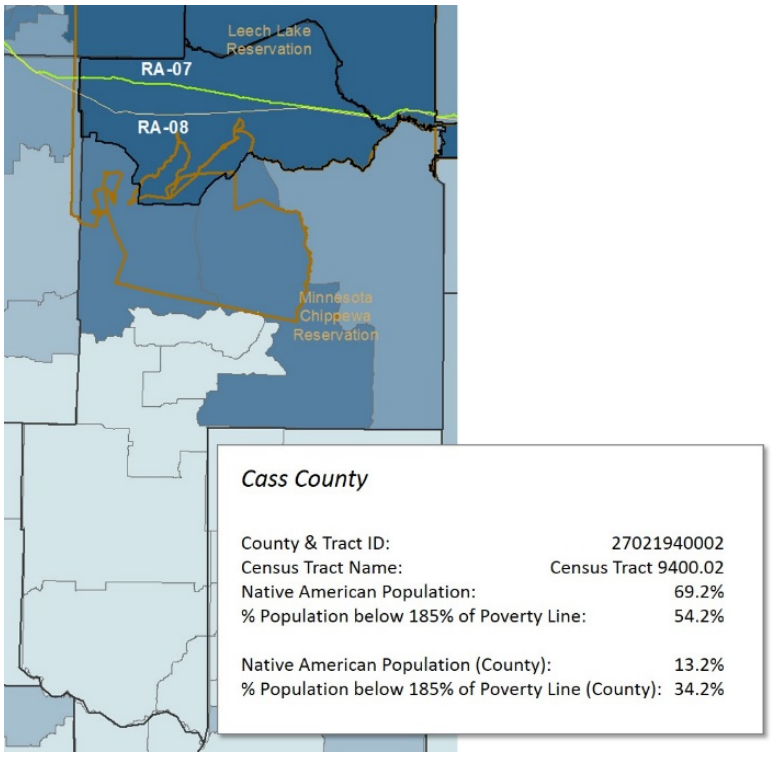

Figure 11-7. Cass County Areas of Environmental Justice Concern

11.2.2 Low-Income Populations

None of the census tracts crossed by the Applicant's preferred route, RA-06, or RA-03AM has a meaningfully greater proportion of the population with income less than 185 percent of the poverty level compared to their respective county level (Appendix Q).

With respect to the CN Alternatives, the Alternate Rail Route to Superior North, Alternate Rail Route to Superior South, and Alternate Truck Route Gretna to Superior Terminal would cross several census tracts with poverty-related EJ concerns (see Figure 11-4).

Table 11.2-2. Low Income Populations

State/County	Percentage Below 185 Percent of Poverty Level	10 Percentage Points Higher than County Level	40 Percent of Population Below 185 Percent
Minnesota	24.3	-	-
Aitkin County	34.0	-	No
Census Tract 7703	42.3	-	Yes
Census Tract 7704	42.5	-	Yes
Beltrami County	38.9	-	No
Census tract 4506	54.6	Yes	Yes
Census tract 4507.02	42.7	No	Yes

Table 11.2-2. Low Income Populations

State/County	Percentage Below 185 Percent of Poverty Level	10 Percentage Points Higher than County Level	40 Percent of Population Below 185 Percent
Census tract 9400.01	69.1	Yes	Yes
Census tract 9400.02	40.2	No	Yes
Benton County	30.5	-	No
Census tract 211.01	40.2	No	Yes
Census tract 212	51.6	Yes	Yes
Carlton County	28.9	-	No
Cass County	34.2	-	No
Census tract 9400.02[a]	54.2	Yes	Yes
Clearwater County	37.6	=	No
Census tract 1	41.6	No	Yes
Crow Wing County	29.0	=	No
Census tract 9511[a]	47.3	Yes	Yes
Census tract 9512[a]	44.1	Yes	Yes
Census tract 9513.02[a]	39.7	Yes	No
Hubbard County	30.7	=	No
Census tract 706	41.8	Yes	Yes
Itasca County	31.1	-	No
Census tract 4808.02[a]	42.1	Yes	Yes
Kanabec County	33.1	-	No
Census tract 4803	41.7	No	Yes
Kittson County	27.7	-	No
Marshall County	22.2	-	No
Mille Lacs County	30.4	-	No
Census tract 9702	47.8	Yes	Yes
Morrison County	29.1	-	No
Census tract 7806	40.8	Yes	Yes
Pennington County	28.7	-	No
Pine County	34.3	-	No
Census tract 9507	45.7	Yes	Yes
Polk County	27.3	-	No
Census tract 202	43.3	Yes	Yes
Red Lake County	26.6	-	No
St. Louis County	31.0	-	No

Table 11.2-2. Low Income Populations

State/County	Percentage Below 185 Percent of Poverty Level	10 Percentage Points Higher than County Level	40 Percent of Population Below 185 Percent
Census tract 12	71.4	Yes	Yes
Census tract 122	60.9	Yes	Yes
Census tract 124	50.0	Yes	Yes
Census tract 126	41.3	Yes	Yes
Census tract 13	61.8	Yes	Yes
Census tract 130	47.1	Yes	Yes
Census tract 131	55.7	Yes	Yes
Census tract 133	45.4	Yes	Yes
Census tract 14	62.1	Yes	Yes
Census tract 156	70.7	Yes	Yes
Census tract 157	51.3	Yes	Yes
Census tract 16	68.9	Yes	Yes
Census tract 17	69.1	Yes	Yes
Census tract 18	58.7	Yes	Yes
Census tract 19	80.4	Yes	Yes
Census tract 20	53.9	Yes	Yes
Census tract 26	44.7	Yes	Yes
Census tract 33	40.7	No	Yes
Census tract 37	49.1	Yes	Yes
Todd County	33.1	-	No
Wadena County	38.1	=	No
Census tract 4803	45.0	No	Yes

[a] Crossed by CN alternative(s).

Route alternatives RA-07 and RA-08 each pose EJ concerns based on poverty. Both cross Census Tract 9400.02 (located entirely within the Leech Lake Reservation) in Cass County, where 54.2 percent of the population is below 185 percent of the poverty level, exceeding the county level of 34.2 percent (see Figure 11-7). None of the other census tracts through which these two alternatives cross exceeds its respective county levels. Two CN Alternatives, Alternate Rail Route to Superior North and Alternate Truck Route Gretna to Superior Terminal, also cross this census tract.

Although none of the other census tracts through which RA-07 and RA-08 cross exceeds their respective county levels, both RA-07 and RA-08 are adjacent or near census tracts that may have EJ concerns, depending on the proximity of the pipeline or construction work areas. The first is Census Tract 4506 in Beltrami County with 54.6 percent of the population below 185 percent of poverty level compared to a

county level of 38.9 percent. The other is Census Tract 4808.02 in Itasca County with 42.1 percent of the population below 185 percent of the poverty level compared to a county level of 31.1 percent. Additionally, CN Alternatives Alternate Rail Route to Superior North and Alternate Truck Route Gretna to Superior Terminal cross Itasca County census tract 4808.02.

Lastly, CN alternative rail route to Superior South poses EJ concerns with respect to poverty, crossing four census tracts in Crow Wing County. These census tracts (census tracts 9511, 9512, 9513.02) have 47.3 percent, 44.1 percent, and 39.7 percent of their populations below 185 percent of the poverty level, respectively, compared to a county level of 29 percent.

11.2.3 Reservations

The Applicant's preferred route and RA-03AM do not cross any reservation lands, but would cross within approximately 3.1 miles of the White Earth Reservation and within approximately 5.0 miles of the Fond du Lac Reservation.[1] Route alternatives RA-06, RA-07, and RA-08 each cross reservation land—RA-07 and RA-08 would cross both the Leech Lake and Fond du Lac Reservations, whereas RA-06 would cross the Fond du Lac Reservation. All routes, including the Applicant's preferred route, would cross treaty lands that are off-reservation; these lands may be used for traditional tribal uses, such as fishing, wild ricing, hunting and trapping, and/or gathering activities (as described in Chapter 9). Several CN Alternatives—Alternate Rail Route to Superior North, Alternate Rail Route to Superior South, and Alternate Truck Route Gretna to Superior Terminal—also cross the Leech Lake and Fond du Lac reservations.

Reserved treaty rights include access to traditional fishing areas. Tribal resources include walleye and trout fisheries, which are predominately used for subsistence. Traditional terrestrial game and waterfowl hunting grounds are habitat for a variety of subsistence resources, including deer, elk, ducks, geese, and turkey. Several federal treaties have reserved wild rice lakes for use by American Indian tribes, some of which are also considered Traditional Cultural Properties (Technical Assistance Services for Communities 2016). Wild rice, fish, and other treaty resources are sources of income and subsistence for tribes in the area. Treaty rights and tribal resources are important to American Indian tribes as both natural and cultural resources that reinforce their cultural identity. Additionally, the mental well-being of American Indian tribal members is linked to their tribal resources and access to their treaty rights.

Various land uses would be crossed by the route alternatives (RA-06, RA-07, and RA-08) within reservation boundaries. In addition to the individual land use categories that would be affected by the routes, various waterbodies and streams would be crossed. On the Fond du Lac Reservation, RA-06 and RA-07 would each cross seven rivers or streams and one waterbody, and RA-08 would cross five rivers or streams and one waterbody. On the Leech Lake Reservation, RA-07 would cross seven rivers or streams and four waterbodies, and RA-08 would cross 22 rivers or streams and five waterbodies. For RA-08, one of these waterbodies includes Nushka Lake, which is identified as a wild rice lake. RA-08 would directly affect less than 0.1 acre of the wild rice lake. No wild rice lakes would be crossed within the Fond du Lac Reservation (see Chapter 9 for additional detail with respect to tribal resources).

[1] As shown in the Executive Summary, in Chapter 2, and in Chapter 9 (Figure 9-3), please note that the White Earth Reservation boundary used in this EIS is from the U.S. Census Bureau. Different boundaries would indicate that the Applicant preferred route and RA-03AM would cross the White Earth Reservation.

11.3 IMPACTS

As noted in Section 11.2, the route alternatives and the CN Alternatives cross several census tracts that present EJ concerns based on minority population and/or poverty. These are shown in Table 11.3-1.

Table 11.3-1. Census Tracts with Environmental Justice Concerns

County	Census Tract	Route Alternative/ CN Alternative	Environmental Justice Indicator
Carlton	9400	RA06, RA07, RA08 / Alternate Rail Route to Superior North, Alternate Rail Route to Superior South	Minority population
Clearwater	002	Applicant's preferred route, RA-03AM / Alternate Rail Route to Superior North, Alternate Truck Route Gretna to Superior Terminal	Minority population
St. Louis	112	RA06, RA07, RA08 / Alternate Rail Route to Superior North, Alternate Truck Route Gretna to Superior Terminal	Minority population
Itasca	9400	RA07, RA08 / Alternate Rail Route to Superior North, Alternate Truck Route Gretna to Superior Terminal	Minority population
Cass	9400.02	RA07, RA08 / Alternate Rail Route to Superior North, Alternate Truck Route Gretna to Superior Terminal	Minority and Low-Income populations
Crow Wing	9511, 9512, 9513.02	Alternate Rail Route to Superior South	Low-income population

- Additionally, as noted in Table 11.3-1, route alternatives RA-06, RA-07, and RA-08 each cross reservation land—RA-07 and RA-08 would cross both the Fond du Lac and Leech Lake Reservations, permanently impacting between an estimated 80 acres and 260 acres, respectively; and RA-06 would cross the Fond du Lac Reservation, permanently impacting approximately 80 acres.
- The Applicant's preferred route and RA-03AM would not cross reservation lands; however, they would cross ceded lands on which tribes exercise their treaty rights to access tribal resources. The other route alternatives (RA-06, RA-07, and RA-08) cross reservations, as well as ceded lands. These lands are used by American Indian tribes for fishing, wild ricing, hunting and trapping, and gathering activities. Wild rice lakes, many of which are designated for use by American Indians or designated as Traditional Cultural Properties, are present throughout the ROI and would be impacted.
- Route alternatives RA-07 and RA-08 would have the greatest direct impact on tribal resources, as they cross two reservations and ceded lands. RA-06 could also have some minor to major impacts on tribal resources within the Fond du Lac Reservation. Although the Applicant's preferred route and RA-03AM do not cross reservation lands, they would impact resources on ceded lands.

- The EIS describes most impacts as minor to negligible in Chapters 5 and 6, with potential for major impacts in the absence of mitigation. The EJ analysis indicates that American Indian populations residing in the census tracts noted in Table 11.3 will experience disproportionately high and adverse impacts. As described in Chapter 9 of this EIS, the intensity of impacts felt by American Indian populations will be greater than depicted by quantitative analysis alone because of their cultural and spiritual relationship with the natural environment.

As described throughout Chapter 6, most of the impacts associated with the Project are construction-related and would be considered short term and localized primarily along the pipeline. Long-term impacts associated with operation would generally be limited to maintenance of a permanent pipeline right-of-way, the presence of pump stations, and the potential for accidental crude oil releases. However, low-income and minority communities have historically been burdened by pipelines and other projects resulting in adverse impacts. EJ communities typically lack resources, opportunity, mobility, and the power to influence decisions that affect the environment and their health. Thus, impacts that may be minor or moderate for the general population have the potential to have disproportionately high and adverse impacts on EJ communities who reside, work, recreate, or utilize the lands within or near the ROI.

Disproportionate and adverse impacts would occur on both low-income and minority populations in the ROI, as well as those populations residing or using lands in the vicinity of the Project, in particular, American Indian populations. RA-06, RA-07, and RA-08 would have direct impacts on reservation lands (Leech Lake and Fond du Lac Reservations). It is also important to note that while separate minority and low-income analyses were conducted above, most communities identified in this section as EJ communities based on income are also American Indian.

Resource-area impacts that have the potential to present disproportionately high and adverse impacts are summarized below. The impact discussion is based on both quantitative analysis (e.g., percentages of minority or low-income populations residing in ROI census tracts as compared to their respective counties) and factors that are unable to be quantified, such as the well documented American Indian connections to reservation land, treaty land, and natural resources within the ROI.

Based on the discussion of tribal resources in Chapter 9, any of the routes, route segments, and system alternatives would cross treaty lands and would have a long-term detrimental effect on tribal members. To further address local concerns, the sections herein also expand on unique impacts to American Indian populations residing in or utilizing lands in the ROI.

Impacts of the Project include the following:

- **Noise Impacts:** As noted in Section 6.2.2, increased noise levels could result from normal construction activities, such as clearing, grading, and trenching. The most significant noise impacts during construction would be the result of horizontal directional drilling (HDD) operations or blasting, if needed. During operation, sound levels associated with pump stations would increase over existing ambient levels. These levels would comply with Minnesota Noise Standards and would decrease over distance.
- **Visual Impacts:** As described in Section 6.2.3, generally, construction impacts on visual resources would be temporary to short-term and minor, as impacts would be limited to the period of construction until vegetation has reestablished. However, because of the proximity of some receptors such as residences, reservations, agricultural or open land, scenic byways and

special management areas—to active construction in the immediate foreground, impacts during construction could be major for some observers. During operation, aboveground facilities represent the biggest visual impact and would primarily affect residences. Several residences near would have direct views of pump station sites, resulting in permanent impacts on their viewsheds.

- **Air Quality Impacts:** Section 5.2.7 and 6.3.7 indicate that during construction, minor impacts on air quality would include an increase in dust from construction activities and an increase in emissions from vehicles, both from construction vehicles and worker vehicles.
- **Hunting, fishing and farming activities:** During construction, there would be prohibitions on hunting, fishing, and farming within the construction work area. The duration of these impacts would be temporary and short term. Any impacts resulting in a loss of access to treaty resources would disproportionately impact tribal communities and members culturally and have the potential to impact tribal economies.
- **Vegetation impacts:** As noted in Sections 5.2.3 and 6.3.3., the introduction of invasive species following construction alters plant composition within the construction and operation area and often extends well beyond the area. The duration of these impacts would vary. Some impacts would be temporary and short term. Long-term impacts on vegetation would be associated with maintenance of a permanent pipeline right-of-way and aboveground facilities. The loss of native vegetation and alteration of species composition would impact tribal use of resources.
- **Water resources:** As indicated in Sections 5.2.1 and 6.3.1, construction across waterbodies could result in increased turbidity and sedimentation, stormwater runoff and erosion from cleared vegetation, changes to stream flow due to HDD testing water, or degradation of aquatic habitat from instream construction. With implementation of mitigation measures, impacts would be minor and temporary. These impacts could result in the loss or health of wild rice beds and fisheries on reservation lands and in the ceded territories.
- **Impacts resulting from accidental crude oil releases:** A pipeline failure incident could result in the accidental release of oil. In the event of an accidental release of oil, the severity of impacts would depend on the location and type of resources within the area of the release, the amount of oil released, the location and existing conditions such as time of year. Details on resources exposed to a crude oil release are detailed in Section 10.4.

11.3.1 Tribal Impacts

Direct impacts from construction and operation would occur to tribal resources. The largest potential impact on low-income and minority populations, particularly those within the reservations that would be crossed, is a pipeline failure incident that would result in the accidental release of oil. Other impacts include water quality concerns and the introduction of invasive species and their effects on hunting, fishing, farming, gathering, and health.

A crude oil release along any of the routes has the potential to affect reservation lands, treaty lands, archaeological sites, and historical sites (see Table 10.4-28 in Chapter 10). An accidental release of oil within the boundary of the Leech Lake Reservation, the Fond du Lac Reservation, or on ceded lands, or a release affecting resources used by the tribes, would disproportionately and adversely affect these communities and would affect important tribal resources depending on the location and magnitude of the release. Between Clearbrook and Carlton, RA-07 and RA-08 overlap with the greatest amounts of reservation lands, followed by RA-06 and RA-03AM. The Applicant's preferred route does not overlap

with any reservation land. Using a 10-mile downstream ROI, from Clearbrook to Carlton, RA-08 overlaps with the most acreage of reservation land, followed by RA-07 and RA-06. The Applicant's preferred route and RA-03AM do not overlap with any reservation lands within the downstream ROI. None of the alternatives cross reservation land in the North Dakota-Minnesota border to Clearbrook or Carlton to Minnesota-Wisconsin border segments. However, all of the alternative cross ceded territories. Details on downstream impacts from an accidental release are discussed in Section 10.4.

From an American Indian perspective, waterbodies at risk from the proposed pipeline include any water directly downstream from a pipeline crossing. Pollution of these waters from a petroleum spill would create a significant hardship to traditional lifeways and spiritual and religious needs of the people. The risk of harm to the people who depend on these waters for sustenance of physical and spiritual needs is greatly magnified by the presence of traditional food sources, such as wild rice (Manoomin) and walleyed pike (ogaa). Depending on the location, severity, and magnitude of a spill, American Indian economies could be impacted. Socioeconomic impacts are described in Sections 5.3 and 6.5.

Impacts to water resources may be generally considered temporary to short term and minor, but could alter tribal access and use of water resources. However, the introduction of invasive species following construction would alter plant composition. Invasive plants diminish the overall health and well-being of the land and the enjoyment of the land by tribal members. Indirect impacts could occur on tribal members from temporary restrictions during construction of the Applicant's preferred route on non-reservation lands used by the tribe for hunting, fishing, wild ricing, or gathering. As discussed in Chapter 9, these activities are an essential part of the tribal community. A temporary loss of these activities during construction would result in negative economic and cultural impact on tribal members. The duration of the impacts would vary; some may be perceived as temporary and short term, but would affect tribal members in different ways. Permanent impacts to tribal use and access to resources would occur as a result of altering plant composition and the introduction of invasive species.

Wild parsnip (*Pastinaca sativa*) recognized by the Minnesota Department of Natural Resources to be an invasive noxious weed has been introduced to the Fond du Lac Reservation along existing pipeline rights-of-way. Contact with this plant can lead to extremely painful rashes over the skin. This is particularly important in the context of a pipeline within reservation lands and ceded territories that are used by local indigenous groups for food gathering. The Applicant's preferred route risks introducing wild parsnip into a new area because introduction is particularly susceptible in disturbed areas. Further introduction of invasive plants, such as wild parsnip, in the ceded territories of northern Minnesota and Wisconsin poses a clear danger to the safe exercise of Ojibwe treaty rights.

Along the Applicant's preferred route, RA-03AM, and RA-08, one census tract in Clearwater County was identified with a significantly higher minority population than the county level. This census tract includes a portion of the White Earth Reservation. None of the three routes would cross the reservation; however, they cross ceded lands used by the tribe for hunting, fishing, wild ricing, and gathering. Impacts on various resources (as described above) would occur throughout the census tract.

Of the three remaining route alternatives (RA-06, RA-07, and RA-08), each would cross one or more census tracts with meaningfully greater minority populations, specifically American Indian populations, and one tract with a meaningfully greater low-income population compared to the county levels. While various resources would be affected during construction, the greatest impact on the tribes would be associated with health and well-being and traditional use activities. Any Project-related activities that reduce or harm traditional uses or resources also negatively affects health and well-being. Impacts on

air quality and groundwater are expected to be minor and temporary. Impacts on several land use categories crossed by these three routes, including impacts on forested habitat, agricultural land, and water resources, indicate that the tribal communities would be disproportionately affected. Both RA-07 and RA-08 would cross the Leech Lake Reservation, and both routes would result in the loss of hundreds of acres of forested land. During construction, access to these areas would be restricted, limiting tribal members from hunting various wildlife that reside within forested cover. Given the importance of hunting to tribal members, both culturally and economically, this would represent a disproportionate adverse impact on the Leech Lake Reservation and its members. Construction of RA-07 and RA-08 could also impact agricultural operations on approximately 3 acres of cultivated crop land. Additionally, the loss of plant species that are used for subsistence and medicinal purposes would cause a disproportionate impact on the Leech Lake Band of Ojibwe. Lastly, an additional pipeline would contribute to the cumulative impacts already borne by the Leech Lake Reservation, which is currently crossed by 6 existing crude oil pipelines and 2 natural gas pipelines.

RA-06, RA-07, and RA-08 would cross the Fond du Lac Reservation. Closing of the hunting ground near the construction work area and the loss of access to hunting and gathering during construction would result in both a cultural and economic impact on the community. Given the importance of subsistence activities, this may represent a disproportionate adverse impact on the Fond du Lac Reservation and its members. Additionally, construction of RA-06, RA-07, and RA-08 could impact agricultural operations on up to approximately 1.5 acres of cultivated crop land. The abandonment and removal of the existing Line 3 would also affect American Indian tribes along RA-07, RA-08, and the Applicant's preferred route. If the existing Line 3 is abandoned and a new Line 3 is constructed within the Mainline corridor, the Leech Lake and Fond du Lac Reservations would see disproportionate and adverse impacts as a result of construction and abandonment. If the existing Line 3 is abandoned and the Applicant's preferred route, RA-06, or RA-03AM is selected, not only would the Leech Lake and Fond du Lac Reservations be subjected to impacts associated with abandonment or removal, but they also would experience new impacts associated with construction and operation of the pipeline across ceded lands. Selection of any new route would increase the impacts and associated risks of a pipeline. This includes the potential development of an entirely new pipeline corridor, effectively spreading the impacts and risks over a much larger area.

While the White Earth Reservation is not crossed by a route alternative or CN alternative, impacts to this reservation would be similar to the Leech Lake Band of Ojibwe and the Fond du Lac Reservation as noted above, affecting hunting, gathering, and harvesting activities.

An additional concern during construction are the influx of temporary workers. A recent study on the economic impacts of replacing Line 3 indicates that approximately half of the workers employed during the construction of the proposed Line 3 pipeline are expected to come from outside the 15-county area along the Applicant's preferred route.[2] The report estimates that 4,200 workers will be employed. Off those, 2,100 non-local construction workers are expected to be employed for 1.3 years, 6 days a week. The purpose of the report is to present the contribution this workforce will have on local economies, yet it also reinforces concerns that come with a large influx of temporary workers for an extended period of time. Concerns have been raised regarding the link between an influx of temporary workers and the potential for an associated increase in sex trafficking, which is well documented, particularly among Native populations (National Congress of American Indians Policy Research Center 2016). American Indian and minority

[2] See *Enbridge Pipeline Construction Economic Impact Study*, April 2017 prepared by the University of Minnesota Duluth.

populations are often at higher risk if they are low-income, homeless, have a lack of resources, addiction, and other factors often found in tribal communities (MDH 2014). The addition of a temporary, cash-rich workforce increases the likelihood that sex trafficking or sexual abuse will occur. Additionally, rural areas often do not have the resources necessary to detect and prevent these activities.

An accidental release of oil within the boundary of the Leech Lake Reservation or the Fond du Lac Reservation, or a release affecting resources used by the tribes, would disproportionately adversely affect these communities and could affect culturally significant resources depending on the location and magnitude of the release.

From an Ojibwe perspective, waterbodies at risk from the proposed pipeline include any water directly downstream from a pipeline crossing. Pollution of these waters from a petroleum spill would create a significant hardship to traditional lifeways and spiritual and religious needs of the people. The risk of harm to the people who depend on these waters for sustenance of physical and spiritual needs is greatly magnified by the presence of traditional food sources such as wild rice (Manoomin) and walleyed pike (ogaa).

11.3.2 Operations Impacts

As described throughout Chapter 6, operations impacts would largely be associated with impacts on vegetation associated with maintenance of a permanent pipeline right-of-way and aboveground facilities, as well as increase in nearby noise levels from pump stations over existing ambient levels. However, as described in Section 6.2.2, sound level increases would comply with Minnesota Noise Standards and would decrease over distance. None of the proposed pump stations along the Applicant's preferred route are located in census tracts within significantly greater minority or low-income populations. Therefore, any operations impacts related to noise or air quality impacts from pump stations are not expected to disproportionally affect minority groups or low-income populations. While locations for pump stations along the route alternatives have not been identified, applicants typically site these facilities in locations away from heavily populated areas and areas of cultural significance. Given the higher occurrence of EJ populations along the route alternatives, the chance of these communities being affected by aboveground facilities would be higher.

As described in Chapter 9, American Indian communities and individuals have unique health issues associated with historical and current trauma and structural racism. Data from the Minnesota Department of Health (MDH) indicate that American Indians in Minnesota have greater health disparities and poorer health outcomes compared to other racial and ethnic groups in Minnesota (MDH 2014). In its 2014 Report to the Legislature, the MDH concludes (MDH 2014):

> *Causes of health inequities in American Indian communities are directly linked to determined and deliberate efforts of American federal, state and local governments to uproot the American Indian people from their land, eradicate their languages and destroy their way of life. First among these is the uprooting of the people from their traditional lands, a major factor that scientists recognize creates psychological and health impacts for generations. Displacement brought about a loss of traditional ways of making a living, of providing food for the table, and of being in relationship with one another. To replace these losses the American government provided "commodity" foods: bleached white flour instead of whole grain wild rice; processed pasta and cheese instead of lean protein. Diabetes rates are now endemic among American Indians throughout the U.S., including Minnesota, and the rise of these rates can be directly related to the introduction of foodstuffs with poor nutritional value. The loss of a way of life also*

> *has led to unemployment, poverty, and the high-risk behaviors that accompany the loss of hope and meaning: these are some of the systemic, socially-determined health inequities that need to be overcome to achieve health equity for American Indians in Minnesota.*

The impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities, such as diabetes, asthma, addiction, poverty, and unemployment.

11.4 SUMMARY AND MITIGATION

Disproportionate and adverse impacts would occur to both low-income and minority populations in the ROI, as well as those populations residing or using lands in the vicinity of the Project, in particular, American Indian populations. RA-06, RA-07, and RA-08 would have direct impacts on reservation lands (Leech Lake and Fond du Lac Reservations). Based on the discussion of tribal resources in Chapter 9, any of the routes, route segments, and system alternatives would cross treaty lands and would have a long-term detrimental effect on tribal members. A quantitative analysis of impacts contained in Chapter 6 and summarized above characterizes impacts as short-term or permanent (construction-related or operations), or by extent (ROI, construction work area, permanent right-of-way), and identifies a preferred route based on the types/magnitude of impacts and other factors. However, as summarized in Chapter 9, from a tribal perspective, the impacts cannot be categorized by duration or extent. Additionally, from a tribal perspective, each alternative affects tribal resources, tribal identity, and tribal health, and each route would negatively affect tribal resources and tribal members.

Within the existing regulatory framework, a finding of “disproportionate and adverse impacts” does not preclude selection of any given alternative (EPA 2016). This finding does, however, require detailed efforts to avoid, mitigate, minimize, rectify, reduce, or eliminate the impact associated with the construction of the Project or any alternatives. The CEQ recommends evaluating mitigation options by eliciting “the views of the affected populations on measures to mitigate a disproportionately high and adverse human health or environmental effect on a low-income population, minority population, or American Indian tribe and should carefully consider community views in developing and implementing mitigation strategies.” Furthermore, mitigation measures identified in an EIS “should reflect the needs and preferences of affected low-income populations, minority populations, or Indian tribes to the extent practicable.” As described by the tribes, however, there are no mitigation measures that could restore or replace the loss of any tribal resources.

11.4.1 Resource-Specific Mitigation

To address the impacts identified in the above sections, the following mitigation measures may be employed by the Applicant. These measures would reduce most impacts to EJ communities to minor or negligible.

- Pump stations would likely be sited away from heavily populated areas and areas of tribal significance.
- Air quality impacts would be reduced by Applicant-proposed measures, such as dust suppression, limiting idling by construction vehicles, and covering spoil piles. Specific mitigation plans may be developed to address impacts of concern to affected communities.

- To address the potential for sexual abuse or sex trafficking, Enbridge can fund or prepare and implement an education plan or awareness campaign around this issue with the companies and subcontractors it hires to construct, restore, and operate the pipeline. Enbridge can also provide funding to local and tribal law enforcement to identify and stop sex trafficking.
- Impacts on water resources would be addressed by implementation of an Environmental Protection Plan (Appendix E).
- Development of site specific and resource specific mitigation plans with affected communities if permits are issued.
- Spill prevention is the most critical component to avoiding impacts from a crude oil release. If a release occurs, the most important actions to reduce environmental impacts are to minimize the size and spread of the release by implementing a rapid, coordinated, and effective spill response based on an established action plan. Section 10.5 provides information on Crude Oil Release Prevention Programs and Measures, Emergency Response Planning and Preparedness, and Initial Oil Spill Containment and Response Methods.
- Cost recovery can be obtained from industry for natural resource damage caused by the release of oil or hazardous substances to the environment under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Oil Pollution Act (OPA 90), and several state statutes. Natural resources are defined as land, air, biota, groundwater, and surface water. A federal or state government entity, an American Indian tribe, or other entity acting as a public trustee of a natural resource may file claims for damages to natural resources. Costs for damages that are recoverable under OPA 90 include the following:
- Natural Resources: Damages for injury to, destruction of, loss of, or loss of use of natural resources, including the reasonable costs of assessing the damage, which are recoverable by a U.S. trustee, a state trustee, an American Indian tribe trustee, or a foreign trustee.
- Real or Personal Property: Damages for injury to, or economic losses resulting from destruction of, real or personal property, which are recoverable by a claimant who owns or leases that property.
- Subsistence Use: Damages for loss of subsistence use of natural resources, which are recoverable by any claimant who uses natural resources for subsistence that have been injured, destroyed, or lost, without regard to the ownership or management of the resources.
- Revenues: Damages equal to the net loss of taxes, royalties, rents, fees, or net profit shares due to the injury, destruction, or loss of real property, personal property, or natural resources, which are recoverable by the federal government, a state, or a political subdivision thereof.
- Profits and Earning Capacity: Damages equal to the loss of profits or impairment of earning capacity due to the injury, destruction, or loss of real property, personal property, or natural resources, which are recoverable by any claimant.
- Public Services: Damages for net costs of providing increased or additional public services during or after removal activities, including protection from fire, safety, or health hazards, due to a discharge of oil, which are recoverable by a state, or political subdivision of a state.

Details on liability and compensation in the event of a release are detailed in Section 10.6.

11.4.2 Tailored Mitigation

A primary goal of Executive Order 12898 is to provide EJ communities with meaningful access to public information on, and an opportunity for public participation in, matters related to human health and the environment. Mitigation measures beyond those already described in Chapters 5 and 6 may include a variety of approaches for addressing potential effects and balancing the needs and concerns of the affected community with the requirements of the action or activity.

With respect to the development of this EIS, the following outreach methods were employed to ensure that residents and stakeholders within the ROI were able to participate in the regulatory process:

1. Potential effects and mitigation measures were identified through direct consultation with American Indian tribes, and through coordination with the natural resources and cultural resources departments of the tribal bands;

2. Scoping and Draft EIS public meetings were held on reservations and in each county within the ROI, and at varying times to ensure maximum participation ;

3. Large display advertisements announcing each public meeting were placed in local newspapers throughout the ROI;

4. Notices were drafted in plain English, including language regarding accessibility. The Notice was distributed to landowners along each proposed route and to stakeholders who requested to be added to the Applicant's mailing list;

5. Copies of the Draft EIS were available at public libraries within the project area and at tribal libraries;

6. The format of the Draft EIS meetings allowed for direct, one-on-one interaction with agency staff, as well as a more formal opportunity to submit public comments through a facilitated comment session.

7. Draft EIS meeting materials were public-friendly (posters, handouts, meeting guide), and copies of the Draft EIS were available in both hard copy and electronic format.

While the mitigation measures may be appropriate and straightforward within the framework of the existing regulatory process, the combination of tribal identity and relationship to the land and the rights tribal members have in the ceded territories complicates the traditional notion of mitigation. The ceded territories and the rights that go with them are not mobile and cannot be transferred. Tribal impacts are magnified because there would be impacts associated with abandonment and removal of the existing Line 3, and there would be additional impacts associated with the construction of Line 3 in a new location. While non-quantifiable impacts are difficult, if not impossible, to mitigate, tribes feel they should be entrusted with the inspection, monitoring, and maintenance activities in and through their lands and territories, as they are most familiar with their resources. If tribes were given a more active role in the monitoring and inspection of pipelines, they would be better prepared to address leaks or spills that could occur within reservation boundaries.

If the Project is approved, additional mitigation measures can be evaluated in the final Certificate of Need or route permit decision. This provides an additional avenue for public notice and involvement. The types of mitigation that can be considered include the following:

- Planning for and addressing indirect impacts prior to Project construction with affected populations;
- Providing assistance to an affected community to ensure that it receives at least its fair (i.e., proportional) share of the anticipated benefits of the proposed action (e.g., through job training, community infrastructure improvements);
- Establishing a community oversight committee to monitor progress and identify potential community concerns;
- Requiring financing at the outset of the Project for both implementing the measure and monitoring its effectiveness, and ensuring clearly defined monitoring guidelines are in place;
- Requiring monitoring reporting, which should be made available to the public; and
- Identifying clear consequences and penalties for failure to implement effective mitigation measures.

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Chapter 12
Cumulative Potential Effects

12.1 PURPOSE AND DESCRIPTION OF CUMULATIVE POTENTIAL EFFECTS ANALYSIS

Cumulative potential effects result when impacts associated with the proposed Line 3 Project (Project) are combined with impacts associated with past, present, or reasonably foreseeable future actions within the area affected by the proposed Project. Analysis of cumulative potential effects accounts for the possibility that, added together, the minor impacts of many separate actions could be significant. This cumulative potential effects analysis considers resources that are expected to be affected by the proposed Project or its alternatives and assesses past, present, and reasonably foreseeable future actions to identify any geographic or temporal overlap in impacts on these resources.

Although Project-Specific, This Analysis Also Considers Wider Effects on Air Resources

The environmentally relevant area for evaluating cumulative potential effects varies in size depending on the types of resources and potential impacts considered. This cumulative effects analysis provides a focused, Project-specific review of cumulative potential effects and does not address impacts outside of the environmentally relevant area at a broad regional level.[1] For example, the geographic area over which the Project and its alternatives may affect air resources (related to the airshed) is larger than the geographic area over which the Project and its alternatives may affect some habitats (the pipeline construction work area). As a result, in this instance, a broader geographic region is explored in assessing the potential for past, present, and reasonably foreseeable actions to have a compounding impact on air resources, while the exploration of the potential for past, present, and reasonably foreseeable actions to have a compounding impact on certain habitat types is limited to the pipeline's construction footprint.

Both Temporary and Long-Term Effects Are Considered

The time period over which cumulative potential effects are evaluated also varies depending on the types of resources and potential impacts being considered. Impacts associated with construction noise, for example, are limited to the construction period, while impacts on wooded habitat within the permanent right-of-way could persist for decades. As a result, in this instance, the time window considered in the search for past, present, and reasonably foreseeable actions with noise impacts that may overlap with noise impacts from pipeline construction is limited to the construction period, while the timeframe considered in the search for past, present, and reasonably foreseeable actions with overlapping impacts on wooded habitat extends several decades.

The sections that follow identify reasonably foreseeable actions (Section 12.2) and review cumulative potential effects of these reasonably foreseeable actions in combination with Enbridge's proposed Project and the Certificate of Need (CN) Alternatives considered in Chapter 5 (Section 12.3) and with the route alternatives considered in Chapter 6 (Section 12.4). It primarily evaluates projects within

[1] Card v. Kandiyohi County Board of Commissioners, 713 N.W.2d 817

Minnesota. The final section of this chapter considers more broadly the cumulative potential effects of these projects on climate change and the impacts of climate change on resources that are affected both by the proposed Project and by climate change (Section 12.5). Cumulative potential effects associated with route segment alternatives are addressed in Chapter 7. Cumulative potential effects relevant to tribal uses and environmental justice communities are discussed in Chapters 9 and 11, respectively.

Cumulative potential effects for each resource analyzed in Chapters 5 and 6 were evaluated. Resources included the following:

- Water resources;
- Geology and soils;
- Vegetation;
- Fish and wildlife;
- Unique natural resources;
- Public lands;
- Air quality;
- Commodity production;
- Recreation and tourism;
- Population;
- Employment, income, and tax revenues;
- Cultural resources;
- Planning and zoning;
- Noise and vibration;
- Aesthetics/visual resources;
- Housing; and
- Transportation and public services.

Within the discussion for each cumulative potential effect in the following sections, resources identified as potentially affected are listed and described. Other resources, however, that are not anticipated to be potentially affected are not mentioned or discussed.

12.2 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

Future Actions Include Other Projects and the Possibility of Corridor Sharing

This Environmental Impact Statement (EIS) accounts for past, present, or reasonably foreseeable actions with impacts that could overlap with impacts at the same time or place as the proposed Project or its alternatives. For the purposes of this EIS, past and present actions and their associated impacts are now

part of the existing environment and are included in the affected environment described in Chapters 5 and 6.[2] In determining what is "reasonably likely to occur," this cumulative potential effects assessment considers whether any applications for permits have been filed with any units of government or whether detailed plans and specifications have been prepared for a project, among other considerations. A project need not be permitted to be reasonably likely to occur.

In addition, this analysis considers potential future corridor sharing. The Minnesota Public Utilities Commission (Commission) is required to consider corridor sharing in determining which route to select and permit (*Minnesota Rules 7852.1900 Subp. 2 F*). This cumulative potential effects analysis acknowledges that if a new pipeline corridor is permitted for this Project outside of the existing Enbridge Mainline, the new corridor creates an opportunity for future corridor sharing that could ultimately result in accumulation of multiple pipelines within the corridor chosen for the Line 3 Project. To address potential cumulative effects, the impacts of an additional pipeline in the Line 3 Project corridor have been assessed.

The future actions considered in this cumulative potential effects analysis are summarized in Table 12.2-1 and presented in Figure 12.2-1.

Table 12.2-1. Reasonably Foreseeable Actions Considered in the Analysis

Plans, Programs, or Project	Description	Type
1. Line 67 Expansion Project *Recently constructed, environmental review for increase in throughput underway*	Line 67 began transporting 450,000 barrels per day (bpd) from Canada in 2010. It received a CN from the Commission to expand its capacity to 800,000 bpd in November 2014, but is awaiting the issuance of a Presidential Permit from the U.S. Department of State, which is required of pipeline projects that cross an international boundary. The increased capacity required construction of four new pumping stations and upgrades to three existing pump stations along the existing line. Construction of the pumping stations has been completed and increased volumes have been achieved by transferring oil to a reinforced section of existing Line 3 to cross the U.S.-Canada border and then transferring the oil back to Line 67. The design capacity of Line 67, with the current number of pumping units installed, is approximately 890,000 bpd for heavy crude oil (U.S. Department of State 2017). Environmental Review Document: https://www.state.gov/documents/organization/267747.pdf	Crude oil pipeline

[2] Minn. R. 4410.0200, Subp. 11a

Table 12.2-1. Reasonably Foreseeable Actions Considered in the Analysis

Plans, Programs, or Project	Description	Type
2. Minnesota Pipe Line Company, LLC (MPL) Reliability Project *Construction*	The MPL Reliability Project will add six pump stations along MPL Line 4 or the "MinnCan Pipeline" route and upgrade two existing stations in Clearbrook and Albany. MPL Line 4, constructed in 2008, is a 300-mile-long, 24-inch-diameter crude oil pipeline that runs from Clearbrook to Rosemount, Minnesota. Currently MPL Line 4 is configured to transport approximately 165,000 bpd, but after improvements will be able to transport 350,000 bpd. The work related to the new pump stations will occur on six parcels of land located in the counties of Hubbard, Wadena, Morrison, Meeker, McLeod, and Scott, on parcels (each approximately 5–7 acres) owned or to be purchased by MPL (Department of Commerce, Energy Environmental Review and Analysis [DOC-EERA] 2015a). Environmental Review Document: http://mn.gov/commerce/energyfacilities/documents/34034/Environmental%20Review%20of%20Alternatives_Final.pdf	Pump stations
3. Koch Pipeline Company, Clearbrook Tanks Project *In permitting*	Expansion is proposed at the existing Clearbrook terminal by constructing four 300,000-barrel crude oil breakout tanks. The project will require a new 1,500-foot access road, two small buildings to house power zone centers and necessary pumps, and piping. The project footprint would affect approximately 18.0 acres of primarily agricultural land and some fragmented wooded forest land (Minnesota PCA 2015). Environmental Review Document: https://www.pca.state.mn.us/sites/default/files/p-ear2-69a.pdf	Crude oil breakout tanks
4. Menahga Area 115-kilovolt (kV) Transmission Line Project *Preconstruction*	Great River Energy's Menahga Project will construct approximately 22.5 miles of a 115-kV high-voltage transmission line (HVTL) in Hubbard, Wadena, and Becker counties to meet existing and future electric load requirements and provide electric service to a proposed Todd-Wadena distribution substation that will serve the proposed MPL Sebeka pump station. The transmission line would generally require a 500-foot right-of-way, and wider widths would be required to accommodate associated facilities (DOC-EERA 2015b). Environmental Review Document: http://mn.gov/commerce/energyfacilities//resource.html?Id=34290	Transmission line
5. MPL-Laporte 115-kV Transmission Line Project *In permitting*	Minnkota Power Cooperative proposes to build an approximately 9.4-mile 115-kV HVTL and a new 115/4.16-kV distribution substation to serve a new pumping station to be constructed and operated by MPL (DOC-EERA 2016). Based on the project docket, the Commission approved the Route Permit for the project preferred route in June 2017. Environmental Review Document: http://mn.gov/commerce/energyfacilities//resource.html?Id=34630	Transmission line
6. Motley Area 115kV Transmission Project *Construction*	Great River Energy has received approval from the Commission to construct and operate 16 miles of new 115-kV overhead transmission near Motley in Morrison, Cass, and Todd Counties to ensure the reliability of electric service to members of Crow Wing Power. The project will connect to an existing Minnesota Power 115kV transmission line in Cass County and extend approximately 5 miles south to the existing Crow Wing Motley Substation; the line will then continue westward along Azalea Road to U.S. Highway 10, and then southward along U.S. 10 approximately 7 miles to serve a new distribution substation. In most areas, the project will require a 100-foot-wide right-of-way. Environmental Review Document: https://mn.gov/commerce/energyfacilities//resource.html?Id=34336	Transmission Line

Table 12.2-1. Reasonably Foreseeable Actions Considered in the Analysis

Plans, Programs, or Project	Description	Type
7. Valley Expansion Pipeline Project *In permitting*	WBI Energy has proposed to construct a 38.0-mile, 16-inch natural gas pipeline that would connect WBI Energy's existing system near Mapleton, North Dakota, with the Viking Gas Transmission Company pipeline near Felton, Minnesota. Survey work has begun on the route and construction is proposed to start in early 2018.[3] Environmental Review Document: May 2017 Draft Applicant-Prepared EA for Valley Expansion Completed *http://www.wbienergy.com/docs/default-source/valley-expansion-project/may-2017-draft-applicant-prepared-ea-for-valley-expansion-project.pdf?sfvrsn=2*	Natural gas pipeline
8. Great Northern Transmission Line *Preconstruction*	On April 8, 2016, the Commission published an order issuing a route permit to Minnesota Power to construct a 500-kV transmission line from the Minnesota-Manitoba border to the Blackberry 500-kV substation near Grand Rapids, Minnesota, as well as associated substation facilities and transmission system modifications. On November 16, 2016, Minnesota Power received a Presidential Permit from the U.S. Department of Energy for the Minnesota-Manitoba border crossing (DOC-EERA; U.S. Department of Energy 2015). Environmental Review Document: http://mn.gov/commerce/energyfacilities//resource.html?Id=34321	Transmission line
9. Fargo-Moorhead Metropolitan Area Flood Risk Management Project *Preconstruction*	The Fargo-Moorhead Metropolitan Area Flood Risk Management Project is a 30.0-mile-long, 1,500-foot-wide diversion channel including a 12.0-mile-long southern embankment, 19 highway bridges, four railroad bridges, three gated control structures, and two aqueduct structures. The project would provide flood risk reduction for more than 230,000 people and 70.0 square miles of infrastructure in the communities of Fargo, Moorhead, West Fargo, Horace, and Harwood (Minnesota Department of Natural Resources [Minnesota DNR] 2016). Environmental Review Document: http://www.dnr.state.mn.us/input/environmentalreview/fm_flood_risk/feis.html	Water diversion channel
10. Addition of pipeline in same corridor	If a new pipeline corridor is permitted for this Project, outside of the existing Enbridge Mainline, the new corridor creates an opportunity for future corridor sharing that could ultimately result in accumulation of multiple pipelines within the corridor chosen for the Line 3 Project. This analysis considers the future addition of another pipeline to a new Line 3 pipeline corridor.	Crude oil pipeline

[3] Federal Register / Vol. 82, No. 3 / Thursday, January 5, 2017

Figure 12.2-1. Reasonably Foreseeable Actions for Cumulative Potential Effects Analysis

12.3 CUMULATIVE POTENTIAL EFFECTS – CERTIFICATE OF NEED ALTERNATIVES

12.3.1 Applicant's Preferred Route

The duration and geographical extent of impacts associated with construction and operation of the Applicant's preferred route are summarized in Chapter 5. Based on the temporal and geographic extent of impacts described in Chapter 5, this analysis of cumulative potential effects for the Applicant's preferred route focuses on five reasonably foreseeable projects located within several miles of the Applicant's preferred route that are expected to be under construction or operational during or after the time the Project would be constructed, as early as spring 2018, but more likely later in 2018. According to the Applicant, construction would be expected to begin as soon as all applicable regulatory approvals have been obtained:

- Line 67 Expansion Project;
- Minnesota Pipeline Company, LLC Reliability Project;
- Koch Pipeline Company, Clearbrook Tanks Project;
- MPL-Laporte 115-kilovolt (kV) Transmission Line Project; and
- Menahga Area 115-kV Transmission Line Project.

12.3.1.1 Line 67 Expansion Project

The potential cumulative effects of the Line 67 Expansion Project in combination with the Line 3 Project were evaluated in the 2017 Draft EIS prepared by the U.S. Department of State for the former. That environmental review document is incorporated here by reference (U.S. Department of State 2017).

Enbridge's Line 67 is located within the Enbridge Mainline corridor; between Neche, North Dakota, and Clearbrook, Minnesota, the Applicant's preferred route and Line 67 would run parallel within the Mainline corridor (Figure 12.2-1).

Increased Throughput on Line 67 Would Not Increase Cumulative Potential Effects

Line 67 was constructed in 2009 and began transporting 450,000 barrels per day (bpd) from Canada in 2010. It received a CN from the Commission to expand its capacity to 800,000 bpd in November 2014, but is awaiting the issuance of a Presidential Permit from the U.S. Department of State, which is required of pipeline projects that cross an international boundary. Construction activities for the Line 67 upgrade are complete and the increased throughput volumes that the project was designed to handle have been achieved by transferring oil to a reinforced section of existing Line 3 to cross the U.S.-Canada border and then transferring the oil back to Line 67. As noted above, for the purposes of this EIS, past and present actions and their associated impacts are now part of the existing environment and are included in the affected environment described in Chapters 5 and 6.[4]

The issuance of a Presidential Permit will authorize the movement of the increased throughput volumes in Line 67, but will not materially change the environmental impacts already present as a result of

[4] Minn. R. 4410.0200, Subp. 11a

construction and operation of the Line 67 Expansion Project. No net increase of volume is anticipated to occur. Therefore, issuance of the Presidential Permit and operation of Line 67 at full capacity is not expected to cause any new cumulative potential effects with the Applicant's preferred route for the Line 3 Project.

12.3.1.2 Minnesota Pipeline Company Reliability Project

The impacts of the Minnesota Pipe Line Company (MPL) Reliability Project were evaluated in the 2015 Comparative Environmental Review completed by the Minnesota Department of Commerce, Energy Environmental Review and Analysis (DOC-EERA) for that project. That environmental review document is incorporated here by reference and its conclusions form the basis for this assessment of the potential for cumulative effects (DOC-EERA 2015a).

New and Upgraded Pump Stations Would Increase Capacity of MPL Line 4

The MPL Reliability Project would install six new pumping stations and upgrade two others in order to increase the pumping capacity of the 305-mile-long MPL Line 4. The Commission issued a route permit for MPL Line 4 ("MinnCan pipeline") on April 13, 2007, and the newly installed pipeline went into operation before the end of 2008. MPL Line 4 has a designed capacity of approximately 350,000 bpd, but is currently limited to a throughput capability of approximately 165,000 bpd.

The MPL Reliability Project would optimize the throughput capacity of MPL Line 4 without altering the actual pipeline by upgrading the existing pump stations in Clearbrook, Minnesota, and Albany, Minnesota, and installing new pump stations along the current MPL Line 4 route in rural areas of Hubbard, Wadena, Morrison, Meeker, McLeod, and Scott counties. The work related to the new pump stations will occur on six small parcels of land, each approximately 5 to 7 acres, owned or to be purchased by MPL. No new pipeline would be required and no new pipeline right-of-way would be acquired for the project.

A Portion of MPL Line 4 Shares Corridor with the Line 3 Project and One Pump Station Would Be Nearby; Widening the Corridor Could have Negligible Cumulative Potential Effects

The Applicant's preferred route is located within the same general corridor as MPL Line 4 between Clearbrook and the southern corner of Hubbard County, where the Applicant's preferred route turns east while MPL Line 4 continues south to the Twin Cities area (Figure 12.2-1). Pump upgrades at the MPL/Koch Pipeline Company Clearbrook terminal proposed as part of the MPL Reliability Project will occur immediately south of the proposed Line 3 Project pump upgrades at Enbridge's Clearbrook terminal. One of the new MPL Line 4 pump stations, to be located near Laporte, Minnesota, would be situated adjacent to the Applicant's preferred route for the Line 3 Project. The potential corridor widening that would result from the Line 3 Project located parallel to MPL Line 4 would be evaluated for cumulative potential effects.

The other new pump stations and pump station upgrades proposed as part of the MPL Line 4 Reliability Project are located well south of where the Applicant's preferred route splits from the MPL Line 4 corridor and travels east.

The MPL Reliability Project is anticipated to be constructed and operational by the fourth quarter of 2017, well before construction of the Line 3 Project would be anticipated to begin (as early as spring 2018, but likely later in 2018). As a result, no cumulative potential effects are anticipated from construction activities (e.g., construction stormwater, construction noise), assuming that all post-

construction restoration activities associated with the MPL Reliability Project have been completed prior to commencing construction activities on Line 3 Project.

12.3.1.2.1 Noise and Vibration

Added Pump Stations Would Increase Noise, but Would Still Be Within Statutory Limits

Operational impacts of the MPL Reliability Project are primarily associated with pump station noise that will contribute to higher noise levels at local receptors, particularly residences. Near the MPL Clearbrook terminal, pump station upgrades at Enbridge's Clearbrook terminal will also contribute noise impacts. MPL has calculated that the closest residence to any pump station is approximately 0.1 mile (over 500 feet); at that distance, noise impacts from the MPL Reliability Project should be well within the state standard. See Section 6.2.2 for a discussion of noise associated with the proposed Project and alternatives to the proposed Project as well as state noise standards.

As discussed in Section 6.2.2, Enbridge has also modeled compliance with the state noise standard. In addition, both MPL and Enbridge have committed to post-construction monitoring and mitigation, if necessary, to maintain compliance with the state noise standard. As a result, cumulative potential effects on noise in the Clearbrook area are not anticipated to be significant. In the vicinity of the MPL Laporte terminal, no noise impacts are expected from operation of the Line 3 Project, so no cumulative potential effects are anticipated.

As previously noted, construction of the MPL Reliability Project is anticipated to be complete prior to the commencement of construction activities related to the Line 3 Project; therefore, cumulative potential effects associated with construction are not anticipated.

12.3.1.2.2 Vegetation

Need to Clear Forested Land is Minimized by Corridor Sharing

Permanent impacts of the new MPL Laporte pump station include clearing approximately 10 acres of forested land. The Applicant's preferred route for the Line 3 Project would result in loss or alteration of up to 5,617 acres of existing vegetation during construction in North Dakota, Minnesota, and Wisconsin.

The clearing of vegetation and conversion from forested to open habitats could impede native vegetation by increasing potential for spread of invasive species and noxious weeds and could also increase the effects of light penetration, wind, and humidity that are more prominent on edges between different habitat types. These impacts could have significant cumulative potential effects on a large scale; the use of a shared corridor, however, tends to minimize the introduction of new impacts. Due to the use of a shared corridor and the relatively small area that would be cleared, no significant cumulative potential effect to vegetation resources due to clearing are anticipated.

12.3.1.2.3 Wildlife

Potential Cumulative Effects on Wildlife Are Not Anticipated to Be Significant

The new MPL Laporte pump station is not anticipated to have a significant impact on wildlife. The forested area to be converted for the Laporte pump station is already a fragmented habitat, due to the existing MPL pipeline corridor. The pump station would be in immediate proximity to the pipeline, creating a nominal incremental effect. The addition of the proposed Line 3 pipeline along this corridor would further widen the cleared area, but it would be in immediate proximity to the MPL pipeline,

creating a nominal, incremental effect on wildlife. Therefore, no significant cumulative potential effects are anticipated.

12.3.1.2.4 Risk of Accidental Release

Increased Capacity of MPL Line 4 Would Not Significantly Increase Spill Risk

As discussed in Chapter 10, increases in throughput do not directly translate into greater risk of accidental release. The addition of the proposed Line 3 pipeline within the MPL corridor increases total risk of incident within the corridor by adding an entirely new pipeline. The increase in throughput on MPL Line 4 is not anticipated to significantly add to the risk profile in terms of likelihood of an event, exposure of resources, or measurable change in the ultimate size of a spill.

12.3.1.3 Koch Pipeline Company, Clearbrook Tanks Project

The potential cumulative effects of the Koch Pipeline Company's Clearbrook Tanks Project in combination with the Line 3 Project were evaluated in a 2015 Environmental Assessment Worksheet prepared by Minnesota Pollution Control Agency (Minnesota PCA) for that project (Minnesota PCA 2015). That environmental review document is incorporated here by reference, and its conclusions are summarized below.

The Clearbrook Tanks Project Would Require Four New Tanks and Other Infrastructure

The Clearbrook Tanks Project involves the addition of four field-erected 300,000-barrel (approximately 50,400,000 gallons total) external floating roof crude oil tanks at Koch Pipeline Company's existing Clearbrook terminal. The new tanks will be 196 feet in diameter and 56 feet high, and will have foundations that extend below the ground surface. In addition to the tanks and their associated containment areas, the project will require new infrastructure that would include a new 1,500-foot access road, two small buildings to house power zone centers as well as necessary pumps, and piping.

Clearbrook Tanks Project is Not Anticipated to Have Cumulative Short-Term Construction Effects

The MPL/Koch Pipeline Company Clearbrook terminal is located south of Enbridge's Clearbrook terminal. The Applicant's preferred route and proposed Line 3 Project upgrades to the Enbridge Clearbrook station would occur in the immediate vicinity of the Clearbrook Tanks Project.

Construction of the Clearbrook Tanks Project is expected to be complete before construction of the Line 3 Project would begin. As a result, no cumulative potential effects are anticipated from construction activities (e.g., construction stormwater, construction noise).

Cumulative potential effects of operations of the two projects that have been identified are described below, organized by potentially affected resource.

12.3.1.3.1 Water Resources

One-Time Water Appropriations Would Not Overlap, So Would Have No Cumulative Effects

The Clearbrook Tanks Project will require a one-time water appropriation from Steenerson Lake under an existing permit for hydrostatic testing of the tanks before they are put into service.

Approximately 120 million gallons of water would be requested through water appropriation permits for hydrostatic testing for the 340 miles of the Applicant's preferred route in Minnesota. The total amounts

of water needed for these activities for the Applicant's preferred route have not been determined for North Dakota and Wisconsin. While a time lag is anticipated between commissioning of the Clearbrook Tanks and commissioning of the proposed Line 3 pipeline, resulting in no overlap in hydrostatic test water appropriations (and consequently, no cumulative potential effects), if hydrostatic testing activities for the tanks overlap with hydrostatic testing of the pipeline, cumulative potential effects may occur if source water for the hydrostatic testing activity for both projects is drawn from Steenerson Lake. At this time, Enbridge has not selected a specific water source; per discussion in Section 5.2.1.1.3, the Applicant would source water from surface water and private and public wells; the proportion of water that would be obtained from groundwater versus surface water has not been determined.

Mitigation of said cumulative potential effects may be accomplished through utilization of other water sources in order to avoid adverse effects on a single waterbody.

12.3.1.3.2 Air Quality

Volatile Organic Compound Emissions Would Have Negligible Cumulative Potential Effect Compared to Actual Statewide Emissions

The primary cumulative potential effect of the Clearbrook Tanks Project is related to increases in air emissions in the environmentally relevant area around the Clearbrook terminal due to operation of tanks and pump stations. The Clearbrook Tanks Project's main potential environmental effects would be an increase in permitted air emissions (primarily volatile organic compounds [VOCs] and hazardous air pollutants [HAPs]). Koch Pipeline Company holds an air permit from Minnesota PCA to operate their terminal, including the new tanks, and will continue to operate within the limitations set forth in the air permit. Impacts from the Clearbrook Tanks Project air emissions would be localized and limited to the Clearbrook terminal and immediate surrounding area.

Actual VOC emissions for the Koch Pipeline Company's Clearbrook terminal were 20.91 tons per year. As indicated in Section 5.2.7, VOC emissions at Enbridge's Clearbrook terminal after the proposed Project are expected to be approximately 21 tons per year. Understanding the regional transport nature of ozone generation due to VOC emissions, the cumulative emissions from both the Koch Pipeline Company and Enbridge terminals are negligible in comparison to statewide actual VOC emissions from stationary sources and appropriate air permit requirements would apply.

12.3.1.4 MPL-Laporte 115-kV Transmission Line Project

The potential for cumulative effects resulting from the MPL-Laporte 115-kV Transmission Line Project with the Line 3 Project was evaluated in a 2016 Environmental Assessment prepared by DOC-EERA for that project (DOC-EERA 2016a). That environmental review document is incorporated here by reference and the primary areas where cumulative potential effects were identified in that assessment are summarized below.

The MPL-Laporte 115-kV Transmission Line Project involves the construction of approximately 9.4 miles of 115-kV high-voltage transmission line (HVTL) as well as a new 115/4.16-kV distribution substation to serve the Laporte pump station proposed as part of the MPL Line 4 Reliability Project discussed in Section 12.3.1.2.

MPL-Laporte Transmission Line Project Would Have No Cumulative Short-Term Construction Effects

The Applicant's preferred route for the Line 3 Project overlaps the environmentally relevant area of the MPL-Laporte 115-kV HVTL, south of the location at which the approved Applicant's preferred route diverts from the existing Line 3 and follows the MPL pipeline corridor south across the Clearwater-Hubbard county line.

Construction of the MPL-Laporte 115-kV HVTL is anticipated to be complete in the fourth quarter of 2017, prior to construction of the Line 3 Project would be expected to begin. As a result, no cumulative potential effects are anticipated from construction (e.g., construction stormwater, construction noise).

12.3.1.4.1 Aesthetics/Visual Resources

With Line 3 Project Underground, Cumulative Aesthetic/Visual Impacts Would Be Compatible with Existing Conditions

The preferred route for the Laporte 115-kV would not parallel the existing MPL pipeline corridor and would not result in a cumulative widening of this treeless linear feature. The approved Laporte preferred route would primarily parallel road right-of-way in the general area, potentially resulting in some additional clearing. While some tree clearing could occur at the north end of the proposed transmission line, collocated with the existing MPL pipeline corridor. The potential cumulative aesthetic effects along the route for the Laporte 115-kV are not expected to be significant as this infrastructure would be anticipated to be compatible with existing aesthetic conditions.

12.3.1.4.2 Water Resources

MPL-Laporte 115-kV Transmission Line Project Could Cumulatively Affect Wetlands and Wetland Vegetation

The MPL-Laporte 115-kV HVTL and the Applicant's preferred route for the Line 3 Project could collectively result in adverse, regional cumulative impacts on wetlands. Linear projects, such as transmission lines and pipelines, require removal of woody vegetation from the project rights-of-way for construction and operation. Should woody vegetation be removed from forested or shrub wetlands, it would convert the wetland to a different vegetation community and wetland type (see Sections 5.2.1.3 and 6.3.1.3). For the MPL-Laporte project, the total estimated acres of forested/shrub wetlands within the right-of-way of the various routing options ranges from 0.28 acres to 13.21 acres. With regard to the Line 3 Project, the Applicant's proposed project would potentially impact 618.2 acres of wetlands during construction. Of these 618.2 acres of wetland construction wetland impact, 195.7 acres of these will consist of forested wetlands. When considered collectively, the MPL-Laporte 115-kV HVTL in combination with the Applicant's preferred route for the Line 3 Project would be expected to cumulatively result in a conversion of wetland vegetation community and wetland type.

MPL-Laporte 115-kV Transmission Line Project and Line 3 Project Crossings May Result in Cumulative Potential Effects

The MPL-Laporte 115-kV HVTL would cross LaSalle Creek; the Applicant's preferred route also crosses LaSalle Creek. Portions of LaSalle Creek are identified as a designated trout stream; clearing vegetation adjacent to trout streams can result in increased water temperature, potentially resulting in less suitable trout habitat. Additionally, portions of LaSalle Creek are also identified as Aquatic Management Areas.

The MPL-Laporte 115-kV HVTL can be designed to span watercourses, floodplains, and wetlands, thereby minimizing direct impacts. Vegetation maintenance would also be required for the right-of-way for the Applicant's preferred route, and pipeline construction at LaSalle Creek is anticipated to be accomplished through the dry crossing method, resulting in temporary impacts on LaSalle Creek. However, cumulative potential effects to LaSalle Creek itself are not anticipated as the MPL-Laporte HVTL is expected to avoid directly impacting LaSalle Creek (DOC-EERA 2016). No structures are expected to be located in wetlands as a result of the MPL-Laporte 115-kV HVTL project.

12.3.1.4.3 Vegetation

Clearing of Vegetation Would Be Minimized by Using Parallel Existing Corridors

Potential cumulative effects on vegetation resources can occur if multiple projects are constructed in close proximity to each other. As noted above, the clearing of vegetation and conversion from forested to open habitats could impede native vegetation by increasing potential for spread of invasive species and noxious weeds and could also increase the effects of light penetration, wind, and humidity that are more prominent on edges between different habitat types. Permanent removal of trees and shrubs would be required along the rights-of-way for both the Minnkota MPL-Laporte 115-kV Transmission Line Project and the Line 3 Project; these impacts could have significant cumulative potential effects. In this case, however, these impacts are minimized to the extent possible through paralleling existing corridors.

12.3.1.4.4 Fish and Wildlife

Cumulative Long-Term Effects on Wildlife is Anticipated to Be Minimal

The MPL-Laporte 115-kV transmission line and Applicant's preferred route for the Line 3 Project could result in cumulative potential effects on wildlife resources; specifically, the clearing of vegetation and disturbance of wildlife habitats could physically harm or displace wildlife species. These projects could further alter the amount and quality of habitat available to wildlife in the vicinity due to tree clearing for rights-of-way. The Applicant's preferred route and the MPL-Laporte 115-kV preferred (selected) route interact at the northern and southern ends of the transmission preferred route within the MPL corridor, so while these impacts would be long term, their localized nature and the availability of abundant forested habitat in the vicinity are anticipated to result in insignificant cumulative potential effects.

12.3.1.4.5 Unique Natural Resources

The MPL-Laporte 115-kV transmission line and the Line 3 Project both involve tree removal, which could contribute to cumulative potential effects on the northern long-eared bat, which relies on forested habitat for summer foraging and roosting.

Field Surveys Would Be Necessary to Confirm the Presence of Rare/Protected Species or Communities

If rare/protected species are located in disturbed areas of projects constructed in close proximity to one another, the cumulative potential effects could be detrimental to individual rare communities. Field

surveys would be required, however, to confirm the presence or probable absence of rare/protected species in the respective project rights-of-way prior to construction. If rare/protected species are found, the permittee would be required to coordinate with the U.S. Fish and Wildlife Service (USFWS) or Minnesota Department of Natural Resources (Minnesota DNR) regarding avoidance or mitigation.

Potentially Significant Effects on Rare/Protected Species or Communities Would Be Minimized by Using Parallel Existing Corridors

Permanent loss of forest would lead to fragmentation by reducing intact blocks of forest vegetation. Removal of vegetation and conversion to open habitats would increase the potential for spread of invasive species and would alter the structure and function of rare communities, potentially making them less suitable for the species that would typically inhabit them. Cumulative potential effects on rare communities could be significant if projects are constructed in close proximity. In this case, however, they are minimized by paralleling existing corridors.

12.3.1.4.6 Commodity Production

Project Overlap Would Minimize Cumulative Effects on Forestry and Timber Operations

Potential impacts on forestry from the MPL-Laporte 115-kV transmission line are direct and long term because, in order to operate transmission lines safely, tall growing trees are not allowed in transmission line rights-of-way. The same requirement would apply to the Line 3 Project. No active timber management lands (state forest, private tree farms) have been identified, however, within the preferred route for the MPL-Laporte 115-kV Transmission Line Project. Cumulative potential effects on forestry and timber operations are expected to be minimal.

12.3.1.5 Menahga Area 115-kV Transmission Line Project

The potential effects of the Menahga Area 115-kV Transmission Line Project were evaluated in a 2015 Environmental Assessment prepared by DOC-EERA for that project (DOC-EERA 2015b). That environmental review document is incorporated here by reference, and its conclusions form the basis for this assessment of the potential for cumulative effects.

The Menahga Area 115-kV Transmission Line Project involves the construction of approximately 22.5 miles of new 115-kV transmission line from the existing Hubbard substation in southwestern Hubbard County westward to a new Straight River substation, and then southward to a new substation near the city of Menahga and to a new Red Eye substation. The proposed project is expected to relieve potential overloads on the existing 34.5-kV transmission system near the city of Menahga. It will serve the Sebeka pump station proposed as part of the MPL Reliability Project discussed above.

Menahga Area Transmission Line Would Have No Cumulative Short-Term Construction Effects

The Applicant’s preferred route for the Line 3 t Project overlaps the environmentally relevant area of the Menahga Area 115-kV transmission line where the two would share a corridor for approximately 1 mile (Figure 12.2-1), following the existing MPL pipeline corridor to the southern border of Hubbard County. The Straight River substation would be located adjacent to this shared corridor.

Construction of the Menahga Area 115-kV transmission line is anticipated to be complete in 2017, prior to the start of Line 3 Project construction activities. As a result, no cumulative potential short-term effects are anticipated from construction (e.g., construction stormwater, construction noise).

12.3.1.5.1 Aesthetics and Visual Resources

With Line 3 Project Underground, Cumulative Aesthetic Impacts Would Be Compatible with Existing Conditions

The Menahga Area 115-kV transmission line would follow the existing MPL pipeline corridor near the Hubbard-Wadena county line and would result in a cumulative widening of this treeless linear feature. The addition of the proposed Line 3 pipeline in this area would cumulatively create an even wider, longer area of visual disturbance. The proposed Line 3 pipeline, however, would be located underground, so while the addition of the pipeline would further increase the width of the cleared corridor, there would be no structures or conductors added to the viewshed as a result of the Line 3 Project. The potential cumulative aesthetic/visual effects are not expected to be significant as this infrastructure would not be incompatible with existing conditions.

12.3.1.5.2 Vegetation

Clearing of Vegetation Would Be Minimized by Using Parallel Existing Corridors

As noted above, vegetation clearing would be required to maintain the right-of-way for both the Menahga Area 115-kV transmission line and the Applicant's preferred route for the Line 3 Project. The Menahga Area 115-kV project was anticipated to impact approximately 60 acres of forested land (DOC-EERA 2015b). The Applicant's preferred route for the Line 3 Project would result in loss or alteration of up to 5,617 acres of existing vegetation during construction in North Dakota, Minnesota, and Wisconsin. Conversion from forested to open habitats could impede native vegetation by increasing potential for spread of invasive species and noxious weeds and could also increase the effects of light penetration, wind, and humidity that are more prominent on edges between different habitat types. The cumulative potential effects of multiple corridors would be minimized by establishing parallel facilities in one corridor. A shared corridor anticipated to be utilized for these facilities; therefore, cumulative potential effects are anticipated to be minimal when compared with the cumulative potential effects resulting from a separate corridor for each facility within the environmentally relevant area.

12.3.1.5.3 Wildlife

Cumulative Long-Term Effects on Wildlife Are Anticipated to Be Minimal

The Menahga Area 115-kV transmission line and Applicant's preferred route for the Line 3 Project both pass approximately 0.5 mile from the Lowe Wildlife Management Area. The projects could result in cumulative potential effects on wildlife resources; specifically, the clearing of vegetation and disturbance of wildlife habitats could physically harm or displace wildlife species. These projects could further alter the amount and quality of habitat available to wildlife in their vicinity due to tree clearing for rights-of-way for transmission lines and a pipeline. The localized nature and the availability of abundant forested habitat in the vicinity mean that these cumulative potential effects are not expected to be significant.

12.3.1.5.4 Unique Natural Resources

The Menahga Area 115-kV transmission line and the Line 3 Project both involve tree removal, which could contribute to cumulative potential effects on the northern long-eared bat, which relies on forested habitat for summer foraging and roosting.

Field Surveys Would Be Necessary to Confirm the Presence of Rare/Protected Species or Communities

If rare/protected species are located in disturbed areas of projects constructed in close proximity to one another, the cumulative potential effects could be detrimental to individual rare communities. Field surveys, however, would be required to confirm the presence or probable absence of rare/protected species in the respective project rights-of-way prior to construction. If rare/protected species are found, the permittee would be required to coordinate with USFWS or Minnesota DNR regarding avoidance or mitigation.

Potentially Significant Effects on Rare/Protected Species or Communities Would Be Minimized by Using Parallel Existing Corridors

Permanent loss of forest would lead to fragmentation by reducing intact blocks of forest vegetation. Removal of vegetation and conversion to open habitats would increase the potential for spread of invasive species and would alter the structure and function of rare communities, potentially making them less suitable for the species that would typically inhabit them. Cumulative potential effects on rare communities could be significant if projects are constructed in close proximity. In this case, however, they are minimized by paralleling existing corridors.

12.3.1.5.5 Commodity Production

Project Overlap Would Minimize Cumulative Potential Effects on Forestry and Timber Operations

Potential impacts on forestry from the Menahga Area 115-kV transmission line are direct and long term because, in order to operate transmission lines safely, tall growing trees are not allowed in transmission line rights-of-way. The same requirement would apply to the Line 3 Project. No active timber management lands (state forest, private tree farms) are located in or adjacent to the shared corridor. Because parts of the Menahga Area 115-kV transmission line and the Applicant's preferred route for the Line 3 Project overlap, the cumulative potential effects on forestry and timber operations are expected to be minimal.

Expanded or New Rights-of-Way Could Create New Utility Corridors

An important incremental effect associated with a new pipeline along the Applicant's preferred route in combination with past, present, and reasonably foreseeable actions is expansion of existing and creation of new rights-of-way. The amount of area necessary for new permanent rights-of-way would vary in width depending on the terms of existing easements and the current alignment of existing pipelines or utilities within existing easements.

The Applicant's preferred route for the Line 3 pipeline would create approximately 60 miles of a new right-of-way, which could potentially cause new utility corridors to be established, as the Commission considers permitting routes for future projects that co-locate within existing corridors.

New Utility Corridors Could Change Land Use, Reduce Vegetation, and Affect Wildlife Habitats

The addition of rights-of-way could cumulatively affect existing land uses. Adding pipelines in a new or expanded right-of-way could incrementally cause further reductions in forested and agricultural lands, associated reductions in commodity production, and loss of important vegetation and wildlife habitats, including unique habitats. A new utility corridor could also contribute to industrial character and new air pollutant sources from constructed facilities.

12.3.1.6 Potential for Cumulative Spills – Applicant's Preferred Route

Identifying the potential cumulative effects from crude oil spills is based on the following assumptions: (1) that spills would have to occur "simultaneously" (temporal nature may vary based on resource) between the Project and a reasonably foreseeable future action; (2) that spills would have to be significant enough to result in appreciable environmental impacts; and (3) that the simultaneous spills would have to occur in collocated, adjacent, or nearby locations. There are four reasonably foreseeable actions identified in Section 12.2 that would potentially contribute to cumulative effects from inadvertent spills when combined with the Line 3 Project during operations. These include:

- Line 67 Expansion Project,
- MPL Reliability Project,
- Clearbrook Tanks Project, and
- The addition of pipeline in the same corridor.

Product pipeline spills can have adverse effects on various environmental resources, including: air quality; water resources (groundwater, surface water features, wetlands, etc.); soils; vegetation; wildlife; human health; and land/resource use. Specific impacts on these resources are discussed in greater detail in Chapter 10; similarly, potential cumulative effects as a result of spills is further discussed in Section 12.5.

12.3.2 Continued Use of Existing Line 3

The duration and geographical extent of impacts associated with the continued use of Line 3 are summarized in Chapter 5. Based on the temporal and geographic extent of the impacts described in Chapter 5, this analysis of cumulative potential effects for the continued use of existing Line 3 focuses on two reasonably foreseeable projects located within the same environmentally relevant area as existing Line 3:

- Line 67 Expansion Project, and
- Clearbrook Tanks Project.

12.3.2.1 Line 67 Expansion Project

As noted above, Enbridge's Line 67 is located within the Enbridge Mainline corridor. Thus, for their entire lengths the existing Line 3 and Line 67 run parallel to one another within the Mainline corridor (Figure 12.2-1).

Presidential Permit for Line 67 Expansion Project Would Not Lead to Any New Cumulative Effects

As noted above, construction activities for the Line 67 expansion are complete, and the increased throughput volumes that the project was designed to handle have already been achieved by transferring oil to a reinforced section of existing Line 3 to cross the U.S.-Canada border and then transferring the oil back to Line 67. The issuance of a Presidential Permit will authorize the movement of the increased throughput volumes through Line 67, but will not materially change the environmental impacts already present as a result of construction and operation of the Line 67 Expansion Project. Therefore, the Presidential Permit is not expected to cause any new cumulative potential effects in combination with the continued use of existing Line 3.

12.3.2.2 Koch Pipeline Company, Clearbrook Tanks Project

As noted above, Koch Pipeline Company's Clearbrook terminal is located south of Enbridge's Clearbrook terminal. Construction activities are not anticipated for the continued use of existing Line 3. As a result, no cumulative potential effects are anticipated from construction activities (e.g., construction stormwater, construction noise) associated with the Clearbrook Tanks Project.

While the continued use of existing Line 3 would not require upgrades to the Enbridge Clearbrook terminal, it is possible that integrity dig activity required for the ongoing maintenance of existing Line 3 would occur in the vicinity of the Clearbrook Tanks Project.

12.3.2.2.1 Air Quality

Line 3 Integrity Digs Are Not Anticipated to Have Significant Cumulative Potential Effects on Air Quality

As described above in Section 12.3.1.3, the primary long-term impact of the Clearbrook Tanks Project is increased air emissions, created by the operation of tanks and pump stations around the Clearbrook terminal. If integrity digs were to become necessary along the portion of the existing Line 3 that is within the airshed around the Clearbrook Tanks Project, operation of equipment for the dig would contribute to air emissions. Any emissions associated with integrity digs, however, would be minor and temporary, so no significant cumulative effects are anticipated.

12.3.2.2.2 Water Resources

Line 3 Integrity Digs Are Not Anticipated to Have Significant Cumulative Potential Effects on Water Resources

As excavation activities associated with integrity digs may result in erosion and sedimentation to nearby waterbodies, cumulative potential effects of integrity digs occurring during of around the same time as construction of the Clearbrook Tanks Project, and the construction of the Clearbrook Tanks Project, on water quality of nearby waterbodies such as Steenerson Lake were considered. As appropriate erosion and sediment control measures are anticipated to be utilized for both integrity digs and the Clearbrook Tanks Project, with the former occurring over a matter of days, cumulative potential effects are anticipated to be minimal at most.

12.3.2.3 Potential for Cumulative Spills – Continued Use of Existing Line 3

There are two reasonably foreseeable actions identified in Section 12.2 that would potentially contribute to cumulative effects from inadvertent spills when combined with the continued use of existing Line 3:

- Line 67 Expansion Project, and
- Clearbrook Tanks Project.

Product pipeline spills can have adverse effects on various environmental resources, including: air quality; water resources (groundwater, surface water features, wetlands, etc.); soils; vegetation; wildlife; human health; and land/resource use. Specific impacts on these resources are discussed in greater detail in Chapter 10; similarly, potential cumulative effects as a result of spills is further discussed in Section 12.5.

12.3.3 System Alternative SA-04

The duration and geographical extent of impacts associated with constructing and operating system alternative SA-04 are summarized in Chapter 5. Based on the temporal and geographic extent of the impacts described in Chapter 5, this analysis of cumulative potential effects for system alternative SA-04 focuses on three reasonably foreseeable projects located within several miles of SA-04 that are expected to be under construction or operational during or after the time SA-04 would be constructed (as early as spring 2018, but more likely later in 2018):

- Line 67 Expansion Project,
- Valley Expansion Pipeline Project, and
- Fargo-Moorhead Metropolitan Area Flood Risk Management Project.

12.3.3.1 Line 67 Expansion Project

Presidential Permit for Line 67 Would Have No Potential Cumulative Effects

As noted above, Enbridge's Line 67 is located within the Enbridge Mainline corridor. Thus, from Neche to the junction near the North Dakota-Minnesota border where system alternative SA-04 splits from Enbridge's Mainline corridor in a southerly direction, system alternative SA-04 and Line 67 would run parallel to one another within the Mainline corridor (Figure 12.2-1).

As noted above, construction of the Line 67 expansion is complete, and the increased throughput volumes that the project was designed to handle have been achieved by transferring oil to a reinforced section of existing Line 3 to cross the U.S.-Canada border and then transferring the oil back to Line 67. The issuance of a Presidential Permit will authorize the movement of the increased throughput volumes through Line 67, but will not materially change the environmental impacts already present as a result of construction and operation of the Line 67 Expansion Project. Therefore, the Presidential Permit is not expected to cause any new cumulative potential effects in combination with system alternative SA-04.

12.3.3.2 Valley Expansion Pipeline Project

WBI Energy has proposed to construct a 38.0-mile, 16-inch natural gas pipeline that would connect WBI Energy's existing system in North Dakota with the Viking Gas Transmission Company pipeline in Minnesota. The project would provide 40 million cubic feet per day (MMcf/d) of bidirectional capacity from an interconnection with WBI Energy's existing pipeline located near the town of Mapleton in Case County, North Dakota, to Viking Gas Transmission's existing pipeline located near the town of Felton in Clay County, Minnesota.

With Construction Anticipated to Begin in 2018, Timing of the Two Projects Could Overlap

This project would serve new and existing customers in eastern North Dakota and western Minnesota. In January 2017, the Federal Energy Regulatory Commission published *Notice of Intent to Prepare an Environmental Assessment for the Planned Valley Expansion Project and Request for Comments on Environmental Issues*.[5] In May 2017, WBI Energy prepared a Draft EA. According to WBI Energy, survey

[5] Federal Register / Vol. 82, No. 3 / Thursday, January 5, 2017

work started in 2016, and actual construction activities are proposed to start in summer 2018, with a proposed in-service date of November 1, 2018 (WBI Energy 2017).

System alternative SA-04 overlaps the environmentally relevant area of the Valley Expansion Pipeline Project where SA-04 crosses the proposed Valley Expansion Pipeline Project corridor just north of the Fargo-Moorhead metropolitan area. With construction of the Valley Expansion Pipeline Project proposed to begin in 2018, it is possible that the timing of construction would overlap for the two projects for a duration of several days to a month or more. Therefore, cumulative potential effects on resources resulting from construction activities is considered in the following sections.

12.3.3.2.1 Noise and Vibration

If Construction Activities Overlap, Noise Effects Would Be Short Term and Potentially Significant in Localized Areas

As discussed above, construction activities of these two projects may occur simultaneously, whether for a single day, several weeks or longer. For a single construction project, noise impacts are typically short-term and transient. However, should construction in the overlapping environmentally relevant area of both projects occur during simultaneous time periods, especially for a duration of several weeks or longer, temporary noise effects would be exacerbated during concurrent construction phases and could result in significant, adverse cumulative potential effects in localized areas. Cumulative potential effects are variable and dependent on various factors, including duration of simultaneous construction activities; nature of construction activities; and distance from residences, schools, churches, and hospitals.

12.3.3.2.2 Aesthetics/Visual Resources

Overlapping Corridors Are Not Anticipated to Result in Significant Cumulative Potential Effects on Visual Aesthetics But Are Potentially Significant in Localized Areas But Maybe Would Not Significantly Affect Visual Aesthetics

If construction of these two projects occurred simultaneously, temporary aesthetic impacts could overlap, and be potentially significant for any residences, schools, churches and/or hospitals within the viewshed of the overlapping environmentally relevant area. However, given the short-term nature of construction activities, cumulative potential effects are not anticipated to be significant from a visual/aesthetic perspective, even in the case that construction for both projects occurred in the same localized area.

During operation, aesthetic impacts are primarily associated with the maintenance of a cleared right-of-way. Where the two corridors cross, the cleared corridors would overlap, changing the viewshed in both directions. Both projects would, however, be located underground, and their visual impacts would overlap parallel to Interstate 29, where no notable tree or brush clearing would be required. Therefore, the cumulative potential effect of these changes is unlikely to significantly alter the existing visual character of the area.

12.3.3.2.3 Transportation and Public Services

Simultaneous Construction Would Have a Short-Term, Adverse Cumulative Potential Effect on Local Transportation

If the two projects were constructed simultaneously, increased construction vehicle traffic could result in localized short-term, adverse traffic impacts, as well as potentially adverse impacts on public services. The small number of residents living in the construction overlap area could experience cumulative potential effects of an adverse nature, such as delays in travel and receiving public services, e.g. emergency medical, fire, police, and would likely face the need to take alternate routes for the duration of construction activities. However, simultaneous construction activities would not likely be anticipated to last more than several weeks. Furthermore, coordinated construction would likely occur outside of peak commute hours and include traffic management plans to allow emergency services to reach residents without difficulty. Therefore, cumulative potential effects would be localized and adverse but unlikely to be significant.

12.3.3.2.4 Wildlife

Clearing Vegetation in Overlapping Area Would Not Significantly Affect Wildlife

The clearing of vegetation and disturbance of wildlife habitats for these projects could directly harm or displace wildlife species. In addition, indirect impacts such as disturbance related to construction noise could occur. For non-listed wildlife species, these impacts are not be expected to be significant. Furthermore, in the area where the two projects overlap, they are located adjacent to Interstate 29, so nearby wildlife are likely habituated to disturbance and noise in the area.

12.3.3.2.5 Commodity Production

Simultaneous Construction Would Have Little Cumulative Effect on Agriculture

The construction of these two projects could result in short-term, adverse cumulative potential effects on agricultural operations and practices, which may need to be altered in certain areas to avoid conflicts with construction activities. However, these effects would remain insignificant relative to overall commodity production in the area.

Since pipeline land uses are compatible with agriculture practices, operation of these utilities are anticipated to have minimal cumulative potential effects on agriculture.

12.3.3.2.6 Employment/Income/Tax Revenues

Simultaneous Construction May Positively Affect Direct and Indirect Jobs and Increase Tax Revenue

If the projects were constructed at the same time, cumulative socioeconomic benefit with respect to employment could result. Direct positive effects on local employment could occur if both projects were to occur as there may be increased incentive to hire local labor for construction if the projects are staged to occur simultaneously or in immediate succession. This may also appear to non-technical pipeline construction labor such as excavation and restoration. Along with these construction jobs, tax revenues, gross output, and value-added spending would occur from development and construction of the proposed projects.

12.3.3.3 Fargo-Moorhead Metropolitan Area Flood Risk Management Project

The impacts of the Fargo-Moorhead Metropolitan Area Flood Risk Management Project were evaluated in the 2016 EIS completed by Minnesota DNR for that project (Minnesota DNR 2016). That environmental review document is incorporated here by reference, and its conclusions form the basis for this assessment of the potential for cumulative effects.

As indicated in Table 12.2-1, the Fargo-Moorhead Metropolitan Area Flood Risk Management Project is a 30-mile-long, 1,500-foot-wide diversion channel including a 12.0-mile-long southern embankment, 19 highway bridges, four railroad bridges, three gated control structures, and two aqueduct structures. The project would provide flood risk reduction for more than 230,000 people and 70 square miles of infrastructure in the communities of Fargo, Moorhead, West Fargo, Horace, and Harwood.

Feasibility of Co-Locating the Two Projects Has Not Yet Been Analyzed

The system alternative SA-04 corridor coincides with the proposed diversion channel west of the Fargo-Moorhead metropolitan area, from a point just south of where system alternative SA-04 splits from Interstate 29 to the point just south of the Fargo-Moorhead metropolitan area where SA-04 re-joins Interstate 29. As proposed, SA-04 would be co-located along the diversion channel and would require a number of crossings of the channel and associated facilities (e.g., staging areas). A detailed engineering analysis of the feasibility of this arrangement has not been conducted. The description of cumulative potential effects below assumes collocation in this area is a viable option and describes the general impacts that could result.

12.3.3.3.1 Displacement

Corridor Sharing Could Cause Additional Displacement of Homes

The Fargo-Moorhead Metropolitan Area Flood Risk Management Project is expected to result in some displacement of homes/residences. Depending on how system alternative SA-04 were configured in relation to the final design of the diversion project, the impact of locating these two projects in a shared corridor through a relatively restricted area could cause additional displacement of homes/residences.

12.3.3.3.2 Noise and Vibration

Simultaneous Construction Would Only Have a Short-Term Effect on Noise Levels

If construction of these two projects occurred simultaneously, temporary noise effects would be exacerbated during concurrent construction phases, but their short-term nature would mean these adverse impacts are not expected to be significant.

12.3.3.3.3 Aesthetics and Visual Resources

Simultaneous Construction Would Only Have a Short-Term Effect on Aesthetics

If construction of these two projects occurred simultaneously, temporary aesthetic impacts could overlap, but their short-term nature would mean these adverse impacts are not expected to be significant.

12.3.3.3.4 Housing

Increased Demand for Housing Would Be Short Term

If construction of these two projects occurred simultaneously in this area, the influx of workers would result in a cumulative increase in demand for housing. These impacts would, however, be short term, and neither project has identified a risk of housing shortage.

12.3.3.3.5 Transportation and Public Services

Simultaneous Construction Would Have Only a Short-Term Effect on Transportation Services

If constructed simultaneously, increased construction vehicle traffic could result in short-term, adverse traffic impacts. Both projects would be required to comply with all applicable road authorities' management standards and policies during construction, however, so cumulative potential effects are not anticipated to be significant.

12.3.3.3.6 Water Resources

Potentially Significant Cumulative Effects Could Be Mitigated by Permitting, Zoning, and Use of BMPs

Together, these two projects could collectively result in adverse, regional cumulative impacts on wetlands, floodplains, and surface waters. Both projects would cause wetland impacts in this region, including construction impacts and fill or type conversion. The addition of a pipeline in the same corridor would exacerbate the impacts of both construction and operation of the Fargo-Moorhead Metropolitan Area Flood Risk Management Project, increasing potential impacts associated with construction stormwater, further altering the floodplain, and potentially causing additional impacts on local hydrology. These cumulative effects have the potential to be significant, but may be managed through compliance with wetland permitting requirements, local floodplain zoning, application of stormwater control best management practices (BMPs) during construction, and proper restoration following construction.

12.3.3.3.7 Fish and Wildlife

Potentially Significant Effects on Fish and Aquatic Habitats Could Also Be Mitigated

To the extent that these two projects could collectively result in adverse, regional cumulative potential impacts on wetlands, floodplains, and surface waters, they could also affect fish and aquatic habitat. As noted above, these cumulative effects have the potential to be significant, but may be managed through compliance with wetland permitting requirements, local floodplain zoning, application of stormwater control BMPs during construction, and proper restoration following construction.

12.3.3.3.8 Employment/Income/Tax Revenues

Simultaneous Construction Would Create Jobs and Increase Tax Revenue

If the projects were constructed at the same time, there would be a cumulative socioeconomic benefit, primarily in the form of short-term construction employment and long-term revenue from taxes. Along with these construction jobs, tax revenues, gross output, and value-added spending would occur from development and construction of the proposed projects.

12.3.3.4 Potential for Cumulative Spills – SA-04

There are two reasonably foreseeable actions identified in Section 12.2 that would potentially contribute to cumulative effects from inadvertent spills where operation of the reasonably foreseeable action is combined with the operation of SA-04:

- Line 67 Expansion Project, and
- Valley Pipeline Expansion Project.

Product pipeline spills can have adverse effects on various environmental resources, including: air quality; water resources (groundwater, surface water features, wetlands, etc.); soils; vegetation; wildlife; human health; and land/resource use. Specific impacts on these resources are discussed in greater detail in Chapter 10; similarly, potential cumulative effects as a result of spills is further discussed in Section 12.5.

12.3.4 Transportation by Rail

The duration and geographical extent of impacts associated with transportation by rail are summarized in Chapter 5. Based on the temporal and geographic extents described in Chapter 5, this analysis of cumulative potential effects for transportation by rail focuses on reasonably foreseeable projects located within several miles of the loading facilities and rail access construction and upgrades described in Chapter 4.

Because this construction is localized near Gretna, Manitoba; Clearbrook, Minnesota; and Superior, Wisconsin, the search for reasonably foreseeable projects with the potential to overlap the environmentally relevant area was focused in these three general locations. Koch Pipeline Company's Clearbrook Tanks Project was identified as having the potential to overlap with rail loading and access expansion at Clearbrook required under the transportation by rail alternative.

As noted above, Koch Pipeline Company's Clearbrook terminal is located south of Enbridge's Clearbrook terminal. The proposed rail upgrades would likely occur in the vicinity of the Clearbrook Tanks Project.

Construction of Rail Upgrades and Clearbrook Tank Project Would Not Overlap

Construction of the Clearbrook Tanks Project is expected to be completed well before construction of the rail loading and access facilities would begin. As a result, no cumulative potential effects are anticipated from construction activities (e.g., construction stormwater, construction noise).

12.3.4.1 Noise and Vibration

Rail Facilities Would Not Have Significant Cumulative Effects on Noise Levels

Operational impacts of the MPL Reliability Project are primarily associated with pump station noise that will contribute to higher noise levels at local receptors, particularly residences. In the vicinity of the MPL Clearbrook terminal, pump station upgrades at Enbridge's Clearbrook terminal would also contribute to noise impacts. MPL has calculated that the closest residence to any pump station is approximately 0.1 mile (over 500 feet); at that distance, noise impacts from the MPL Project should be well within the state standard.

Noise from rail loading and access facilities in the Clearbrook area would further contribute to industrial noise in the area. Post-construction monitoring and mitigation might be necessary to maintain compliance with the state noise standard. If post-construction noise monitoring is conducted and mitigation is applied, cumulative potential effects on noise in the Clearbrook area are not anticipated to be significant.

12.3.4.2 Water Resources

New Rail Facilities Would Have No Significant Cumulative Effects on Water Resources

Both the Clearbrook Tanks Project and potential new rail loading and access facilities in the Clearbrook area would add new impervious surfaces—18.27 acres—(MPCA 2015) and would be new sources of industrial stormwater in the area. Construction of the new tanks, secondary containment, and new internal roads will increase the impervious area of the Koch Pipeline Company's Clearbrook terminal site by approximately 18 acres and therefore requires a National Pollutant Discharge Elimination System/State Disposal System Construction Stormwater General permit.

Most of the runoff from the new impervious surfaces would be collected and retained in the secondary containment system. As a result, the new impervious surfaces would not significantly increase the rate at which water is discharged from the site to the surrounding watershed area. Accumulated stormwater would be inspected prior to discharge and would be discharged in a manner that prevents erosion or scouring in the conveyance ditch. Potential new rail loading and access facilities in the Clearbrook area would be subject to the same regulations and would not significantly increase the rate at which water is discharged from the site to the surrounding watershed area. As a result, no significant cumulative effects are anticipated.

12.3.4.3 Air Quality

New Rail Facilities Would Have No Significant Cumulative Effects on Air Quality

The primary cumulative potential effect of the Clearbrook Tanks Project would be air emissions from operating tanks and pump stations, which could potentially increase permitted air emissions (primarily VOCs and HAPs). A new rail loading facility could contribute air emissions of a similar nature during loading. Understanding the regional transport nature of ozone generation due to VOC emissions, the cumulative emissions from both the Koch Pipeline Company terminal and a new rail loading facility are negligible in comparison to regional actual VOC emissions from stationary sources.

12.3.4.4 Potential for Cumulative Spills – Transportation by Rail

Should spills occur during operations of one of the reasonably foreseeable future actions and transportation by rail (either simultaneously or relatively simultaneously, depending on the affected resource), there is a potential for significant cumulative effects. Air quality; water resources (groundwater, surface water features, wetlands, etc.); soils; vegetation; wildlife; human health; and land/resource use would be potentially adversely impacted from a single spill.

There is one reasonably foreseeable actions identified in Section 12.2 that would potentially contribute to cumulative effects from inadvertent spills when combined with the Transportation by Truck alternative. This is the Clearbrook Tanks project.

Product pipeline spills can have adverse effects on various environmental resources, including: air quality; water resources (groundwater, surface water features, wetlands, etc.); soils; vegetation; wildlife; human health; and land/resource use. Specific impacts on these resources are discussed in greater detail in Chapter 10; similarly, potential cumulative effects as a result of spills is further discussed in Section 12.5.

These adverse effects, both anticipated and observed in historic situations, would be exacerbated if a spill or accident occurring during rail transport or loading were to happen in a similar time period and in a nearby location as a spill during operations of one of the aforementioned reasonably foreseeable actions. Stringent preventative measures would be anticipated to minimize this potential. Refer to Section 12.5 for additional details.

12.3.5 Transportation by Truck

The duration and geographical extent of impacts associated with construction and operation of transportation by truck are summarized in Chapter 5. Based on the temporal and geographic extents described in Chapter 5, this analysis of cumulative potential effects for transportation by truck focuses on reasonably foreseeable projects located within several miles of the loading facilities and truck access construction and upgrades described in Chapter 4.

Because this construction would be localized near Gretna, Manitoba; Clearbrook, Minnesota; and Superior, Wisconsin, the search for reasonably foreseeable projects with the potential to overlap the environmentally relevant area was focused in these three general locations. Koch Pipeline Company's Clearbrook Tanks Project was identified as having the potential to overlap with truck loading and access expansion at Clearbrook required under the transportation by truck alternative.

As noted above, Koch Pipeline Company's Clearbrook terminal is located south of Enbridge's Clearbrook terminal. The proposed truck upgrades would likely occur in the vicinity of the Clearbrook Tanks Project.

Construction of Clearbrook Tanks Project and Truck Facilities Would Not Overlap

Construction of the Clearbrook Tanks Project is expected to be complete well before construction of the truck loading and access facilities for the Line 3 Project would begin. As a result, no cumulative potential short-term effects are anticipated from construction (e.g., construction stormwater, construction noise).

12.3.5.1 Noise

Truck Facilities Would Not Have Significant Cumulative Potential Effects on Noise Levels

Operational impacts of the MPL Reliability Project are primarily associated with pump station noise that would contribute to higher noise levels at local receptors, particularly residences. In the vicinity of the MPL Clearbrook terminal, pump station upgrades at Enbridge's Clearbrook terminal would also contribute noise impacts. MPL has calculated that the closest residence to any pump station is approximately 0.1 mile (over 500 feet); at that distance, noise impacts from the MPL Reliability Project should be well within the state standard.

Noise from truck loading and access facilities in the Clearbrook area would further contribute to industrial noise in the area. Post-construction monitoring and mitigation might be necessary to maintain compliance with the state noise standard. If post-construction noise monitoring is conducted and

mitigation is applied, cumulative potential effects on noise in the Clearbrook area are not anticipated to be significant.

12.3.5.2 Water Resources

New Truck Facilities Would Have No Significant Cumulative Potential Effects on Water Resources

Both the Clearbrook Tanks Project and potential new truck loading and access facilities in the Clearbrook area would add new impervious surfaces and would be new sources of industrial stormwater in the area. Construction of the new tanks, secondary containment, and new internal roads will increase the impervious area of the Koch Pipeline Company's Clearbrook terminal site by approximately 18 acres and therefore requires a National Pollutant Discharge Elimination System/State Disposal System Construction Stormwater General permit.

Most of the runoff from the new impervious surfaces would be collected and retained in the secondary containment system. As a result, the new impervious surfaces would not significantly increase the rate at which water is discharged from the site to the surrounding watershed area. Accumulated stormwater would be inspected prior to discharge and would be discharged in a manner that prevents erosion or scouring in the conveyance ditch. Potential new truck loading and access facilities in the Clearbrook area would be subject to the same regulations and would not significantly increase the rate at which water is discharged from the site to the surrounding watershed area. As a result, no significant cumulative effects are anticipated.

12.3.5.3 Air Quality

New Truck Facilities Would Have No Significant Cumulative Potential Effects on Air Quality

The primary cumulative potential effect of the Clearbrook Tanks Project would be air emissions from operating tanks and pump stations, which could potentially increase permitted air emissions (primarily VOCs and HAPs). A new truck loading facility could contribute air emissions of a similar nature during loading. Understanding the regional transport nature of ozone generation due to VOC emissions, the cumulative emissions from both the Koch Pipeline Company terminal and a new truck loading facility are negligible in comparison to actual regional VOC emissions from stationary sources.

12.3.5.4 Potential for Cumulative Spills – Transportation by Truck

Should spills occur during operations of one of the reasonably foreseeable future actions and transportation by truck (either simultaneously or relatively simultaneously, depending on the affected resource), there is a potential for significant cumulative effects. Air quality; water resources (groundwater, surface water features, wetlands, etc.); soils; vegetation; wildlife; human health; and land/resource use would be potentially adversely impacted from a single spill.

There is one reasonably foreseeable actions identified in Section 12.2 that would potentially contribute to cumulative effects from inadvertent spills when combined with the Transportation by Rail alternative. This is the Clearbrook Tanks Project.

Product pipeline spills can have adverse effects on various environmental resources, including: air quality; water resources (groundwater, surface water features, wetlands, etc.); soils; vegetation; wildlife; human health; and land/resource use. Specific impacts on these resources are discussed in

greater detail in Chapter 10; similarly, potential cumulative effects as a result of spills is further discussed in Section 12.5.

These adverse effects, both anticipated and observed in historic situations, would be exacerbated if a spill or accident occurring during truck transport or loading were to happen in a similar time period and in a nearby location as a spill during operations of one of the aforementioned reasonably foreseeable actions. It is anticipated that the potential cumulative effects would be lesser than those discussed previously for the Applicant's preferred route or SA-04, as the quantity held by a truck would be less than that held by another pipeline. However, given the general rate at which truck transport accidents occur relative to pipeline releases, the likelihood of cumulative spills occurring for this alternative relative to others may be higher. Stringent preventative measures would be anticipated to minimize this potential. Refer to Section 12.5 for additional details.

12.3.6 Existing Line 3 Supplemented by Rail

Continuing to Use Existing Line 3 Supplemented by Rail Would Have Negligible to Minor Cumulative Potential Effects

The duration and geographical extent of impacts from continuing to use existing Line 3 supplemented by constructing and operating the transportation by rail alternative are summarized in Chapter 5. Based on these temporal and geographic extents, this analysis of cumulative potential effects for existing Line 3 supplemented by rail considers two reasonably foreseeable projects located within several miles of the both the existing Line 3 and the rail routes previously identified in Chapter 4:

- Line 67 Expansion Project, and
- Clearbrook Tanks Project.

As described in the preceding sections, cumulative potential effects include possible stormwater, noise, and air quality impacts. The potential for effects of cumulative spills is also a consideration.

12.3.7 Existing Line 3 Supplemented by Truck

Continuing to Use Existing Line 3 Supplemented by Truck Would Have Negligible to Minor Cumulative Potential Effects

The duration and geographical extent of impacts from continuing to use existing Line 3 supplemented by constructing and operating the transportation by truck alternative are summarized in Chapter 5. Based on these temporal and geographic extents, this analysis of cumulative potential effects for existing Line 3 supplemented by truck considers two reasonably foreseeable projects located within several miles of the both the existing Line 3 and the truck routes identified in Chapter 4:

- Line 67 Expansion Project, and
- Clearbrook Tanks Project.

As described in the preceding sections, cumulative potential effects include possible stormwater, noise, and air quality impacts. The potential for effects of cumulative spills is also a consideration.

12.4 CUMULATIVE POTENTIAL EFFECTS – ROUTE ALTERNATIVES

12.4.1 Applicant's Preferred Route

Cumulative potential effects of the Applicant's preferred route are described above in Section 12.3.1.

12.4.2 Route Alternative RA-03AM

The duration and geographical extent of impacts from constructing and operating RA-03AM are summarized in Chapter 6. Based on these temporal and geographic extents, this analysis of cumulative potential effects for RA-03AM focuses on six reasonably foreseeable projects located within several miles of RA-03AM that are expected to be under construction or operational during or after the time the Project is constructed, as early as spring 2018, but likely later in 2018:

- Line 67 Expansion Project (same as Applicant's preferred route),
- MPL Reliability Project,
- Koch Pipeline Company, Clearbrook Tanks Project (same as Applicant's preferred route),
- MPL-Laporte 115-kV Transmission Line Project (same as Applicant's preferred route),
- Menahga Area 115-kV Transmission Line Project, and
- Motley Area 115-kV Transmission Project.

12.4.2.1 Line 67 Expansion Project

Cumulative Effects of Line 67 Expansion Project Would Be the Same as Those for the Applicant's Preferred Route

As indicated previously, Enbridge's Line 67 is located within the Enbridge Mainline corridor. Between Neche, North Dakota, and Clearbrook, Minnesota, RA-03AM follows the same route as that proposed by the Applicant, running parallel to Line 67 within the Mainline corridor (Figure 12.2-1). The potential for cumulative effects is the same as described for the Applicant's preferred route in Section 12.3.1.1.

12.4.2.2 Minnesota Pipeline Company Reliability Project

Similar to the Applicant's preferred route, RA-03AM is located within the same general corridor as MPL Line 4 between Clearbrook and the southern corner of Hubbard County. However, where the Applicant's preferred route turns east at the southern corner of Hubbard County, RA-03AM continues to follow MPL Line 4 south before splitting from MPL Line 4 to head east as it enters Morrison County (Figure 12.2-1).

Therefore, between Clearbrook and the southern corner of Hubbard County, the potential for cumulative effects resulting from construction and operation of RA-03AM and the MPL Reliability Project is the same as described for the Applicant's preferred route in Section 12.3.1.2. Where RA-03AM follows the same general corridor as MPL Line 4 through Hubbard and Wadena counties and into Morrison County, however, the additional cumulative potential effects that may occur where the Sebeka and Fish Trap pump stations are proposed to be constructed adjacent to the shared MPL Line 4/RA-03AM corridor are described below. The other four pump stations/pump station upgrades proposed as part of the MPL Reliability Project are located well south of where the RA-03AM route splits from the MPL Line 4 corridor and heads east.

Construction of the MPL Reliability Project Would Have No Cumulative Potential Effects

The MPL Reliability Project is anticipated to be constructed and operational by the fourth quarter of 2017, which is before construction of the Line 3 Project would be anticipated to begin (as early as spring 2018, but more likely later in 2018). As a result, no cumulative potential short-term effects are anticipated from construction (e.g., construction stormwater, construction noise).

12.4.2.2.1 Noise and Vibration

Operating the MPL Reliability Project Would Have No Cumulative Potential Effects on Noise

Operational impacts of the MPL Reliability Project are primarily associated with pump station noise that will contribute to higher noise levels at local receptors, particularly residences. In the vicinity of the MPL Sebeka and Fish Trap pump stations, no noise impacts are expected from operation of the Line 3 Project, so no cumulative potential effects are anticipated.

12.4.2.2.2 Vegetation

Corridor Sharing Would Minimize Cumulative Effects on Vegetation

Constructing the new MPL Fish Trap pump station will require clearing approximately 9 acres of forested land. Permanent impacts of the new MPL Sebeka pump station will include conversion of approximately 40 acres of land. This land, however, is predominantly agricultural. Constructing and operating RA-03AM would result in further clearing within the nearby corridor, adding to the loss of forest vegetation in this Fish Trap area.

The clearing of vegetation and conversion from forested to open habitats could impede native vegetation by increasing potential for spread of invasive species and noxious weeds and could also increase the effects of light penetration, wind, and humidity that are more prominent on edges between different habitat types. These impacts could have significant cumulative potential effects. The use of a shared corridor, however, tends to minimize the introduction of new impacts.

12.4.2.2.3 Wildlife

New MPL Pump Stations Would Have No Significant Cumulative Potential Effects on Wildlife

The new MPL pump stations at Sebeka and Fish Trap are not anticipated to have a significant impact on wildlife. The forested area to be converted for the Fish Trap station is already a fragmented habitat, due to the existing MPL pipeline corridor. The pump station would be right next to the pipeline, and would have a nominal, incremental effect. The addition of the Line 3 pipeline on the RA-03AM route along this corridor would further widen the cleared area, but it similarly would be in immediate proximity to the MPL pipeline, creating a nominal, incremental effect on wildlife. Therefore, no significant cumulative potential effects are anticipated.

12.4.2.2.4 Commodity Production

Land Conversions Would Have Only Temporary Cumulative Effects on Agriculture

As noted above, the permanent impacts of the new MPL Sebeka station will include conversion of approximately 40 acres of predominantly agricultural land to industrial use. The construction of RA-03AM could result in short-term cumulative potential effects on agricultural operations and practices, which may need to be altered in certain areas to avoid conflicts with construction activities. Since

pipeline land uses are compatible with agriculture practices, cumulative potential effects on agriculture are expected to be temporary and negligible.

12.4.2.3 Koch Pipeline Company, Clearbrook Tanks Project

Potential Cumulative Effects of Clearbrook Tanks Project Are the Same as Those for the Applicant's Preferred Route

As noted above Koch Pipeline Company's Clearbrook terminal is located south of Enbridge's Clearbrook terminal. The Line 3 Project upgrades to the Enbridge Clearbrook station would occur in the immediate vicinity of the Clearbrook Tanks Project. The upgrades required for RA-03AM are the same as those required for the Applicant's preferred route. Therefore, the potential for cumulative effects is the same as described for the Applicant's preferred route in Section 12.3.1.3.

12.4.2.4 MPL-Laporte 115-kV Transmission Line Project

Potential Cumulative Effects of MPL-Laporte 115-kV Transmission Line Project Are the Same as Those for the Applicant's Preferred Route

The RA-03AM route and the Applicant's preferred route are the same in the environmentally relevant area for the MPL-Laporte 115-kV transmission line. Therefore, the potential for cumulative effects is the same as described for the Applicant's preferred route in Section 12.3.1.4.

12.4.2.5 Menahga Area 115-kV Transmission Line Project

Cumulative Potential Effects of Menahga Project Are the Same as Those for the Applicant's Preferred Route

The RA-03AM route and the Applicant's preferred route are the same in the environmentally relevant area for the Menahga Area 115-kV transmission line. Therefore, the potential for cumulative effects is the same as described for the Applicant's preferred route in Section 12.3.1.5.

12.4.2.6 Motley Area 115-kV Transmission Line Project

The RA-03AM route is the only route alternative that would be anticipated to share a common environmentally relevant area with the Motley Area 115-kV Transmission Line Project. As described in Table 12.2-1, the latter project would be constructed and operated by Great River Energy and includes 16 miles of new 115-kV overhead transmission near Motley in Morrison, Cass, and Todd Counties. In most areas, the project will require a 100-foot-wide right-of-way.

According to Great River Energy, construction of the Motley Area 115-kV project commenced in January 2017, with energization scheduled for August 2017.

Motley Area Transmission Line Would Have No Cumulative Short-Term Construction Effects

The RA-03AM route alternative's environmentally relevant area overlaps that of the Motley Area 115-kV transmission line west of Lake Alexander. A common corridor or adjacent corridors would likely be utilized near the intersection of U.S. 10 and County Highway 7. Just south, RA-03AM would run adjacent to a new distribution substation associated with the Motley Area transmission line (Figure 12.2-1).

Construction of the Motley Area 115-kV transmission line is anticipated to be complete in 2017, prior to the start of Line 3 Project construction activities. As a result, no cumulative potential short-term effects are anticipated from construction (e.g., construction stormwater, construction noise).

12.4.2.6.1 Aesthetics and Visual Resources

Line 3 Project RA-03AM would Follow Existing MPL, Negligible Anticipated Cumulative Potential Effects With Respect to Aesthetics and Visual Resources

RA-03AM would follow the existing MPL Line 4 corridor in the environmentally relevant area common to the Motley Area transmission line. The addition of the Line 3 pipeline within this corridor would be anticipated to result in no or minimal additional tree clearing through corridor widening in this area; thus potential cumulative aesthetic/visual effects are not expected to be significant.

12.4.2.6.2 Vegetation

Clearing of Vegetation Would Be Minimized by Use of Existing Corridors for Both the Motley Area Transmission Line and the Line 3 Project RA-03AM Alternative

Minimal vegetation clearing would be required for construction and operation of rights-of-way for both the Motley Area 115-kV transmission line and the Line 3 Project RA-03AM alternative. The Motley Area 115-kV project would utilize US 10 right-of-way (DOC-EERA 2015b); while some clearing would be anticipated; use of the existing corridor would minimize vegetation clearing. Additionally, minimal clearing would be anticipated for RA-03AM; as previously stated, the route alternative would follow existing MPL Line 4 corridor.

Conversion from forested to open habitats could impede native vegetation by increasing potential for spread of invasive species and noxious weeds and could also increase the effects of light penetration, wind, and humidity that are more prominent on edges between different habitat types. The cumulative potential effects of multiple corridors would be minimized by establishing parallel facilities in one corridor. A shared corridor anticipated to be utilized for these facilities; therefore, cumulative potential effects are anticipated to be negligible to minimal when compared with the cumulative potential effects resulting from a separate corridor for each facility within the environmentally relevant area.

12.4.2.6.3 Wildlife

Cumulative Long-Term Effects on Wildlife Are Anticipated to Be Minimal

The Motley Area 115-kV transmission line and Applicant's preferred route for the Line 3 Project both pass approximately 0.5 mile from the Lowe Wildlife Management Area. The projects could result in cumulative potential effects on wildlife resources; specifically, the clearing of vegetation and disturbance of wildlife habitats could physically harm or displace wildlife species. These projects could further alter the amount and quality of habitat available to wildlife in their vicinity due to tree clearing for rights-of-way for transmission lines and a pipeline.

Portion of the Applicant's preferred route and the preferred route for the Laporte 115-kV project parallel the MPL corridor, so while impacts on wildlife would be long term, their localized nature and the availability of abundant forested habitat in the vicinity mean that these cumulative potential effects are not expected to be significant.

12.4.2.6.4 Unique Natural Resources

The Motley Area 115-kV transmission line and the Line 3 Project RA-03AM would both involve some tree removal, which could contribute to cumulative potential effects on the northern long-eared bat, which relies on forested habitat for summer foraging and roosting.

Field Surveys Would Be Necessary to Confirm the Presence of Rare/Protected Species or Communities

If rare/protected species are located in disturbed areas of projects constructed in close proximity to one another, the cumulative potential effects could be detrimental to individual rare communities. Field surveys, however, would be required to confirm the presence or probable absence of rare/protected species in the respective project rights-of-way prior to construction. If rare/protected species are found, the permittee would be required to coordinate with USFWS or Minnesota DNR regarding avoidance or mitigation.

Potentially Significant Effects on Rare/Protected Species or Communities Would Be Minimized by Using Parallel Existing Corridors

Permanent loss of forest would lead to fragmentation by reducing intact blocks of forest vegetation. Removal of vegetation and conversion to open habitats would increase the potential for spread of invasive species and would alter the structure and function of rare communities, potentially making them less suitable for the species that would typically inhabit them. Cumulative potential effects on rare communities could be significant if projects are constructed in close proximity. In this case, however, they are minimized by paralleling existing corridors.

12.4.2.6.5 Commodity Production

Project Overlap Would Minimize Cumulative Potential Effects on Forestry and Timber Operations

Potential impacts on forestry from the Motley Area 115-kV transmission line are direct and long term because, in order to operate transmission lines safely, tall growing trees are not allowed in transmission line rights-of-way. The same requirement would apply to the Line 3 Project RA-03AM. No active timber management lands (state forest, private tree farms) appear to be crossed by or are adjacent to the corridors. Due to the use of existing rights-of-way, the cumulative potential effects on forestry and timber operations are expected to be minimal.

12.4.2.7 Potential for Cumulative Spills – RA-03AM

There are four reasonably foreseeable actions identified in Section 12.2 that would potentially contribute to cumulative effects from inadvertent spills when combined with the Line 3 Project RA-03AM alternative during operations:

- Line 67 Expansion Project,
- MPL Reliability Project,
- Clearbrook Tanks Project, and
- The addition of pipeline in the same corridor.

Product pipeline spills can have adverse effects on various environmental resources, including: air quality; water resources (groundwater, surface water features, wetlands, etc.); soils; vegetation; wildlife; human health; and land/resource use. Specific impacts on these resources are discussed in greater detail in Chapter 10; similarly, potential cumulative effects as a result of spills is further discussed in Section 12.5.

12.4.3 Route Alternative RA-06

The duration and geographical extent of impacts associated with constructing and operating RA-06 are summarized in Chapter 6. Based on these temporal and geographic extents, this analysis of cumulative potential effects for RA-06 focuses on three reasonably foreseeable projects located within several miles of RA-06 that are expected to be under construction or operational during or after the time the Project would be constructed (as early as spring 2018, but more likely later in 2018):

- Line 67 Expansion Project,
- Clearbrook Tanks Project, and
- Great Northern Transmission Line (GNTL) Project.

12.4.3.1 Line 67 Expansion Project

Cumulative Potential Effects of Line 67 Project Are the Same as Those for the Applicant's Preferred Route

As indicated previously, Enbridge's Line 67 is located within the Enbridge Mainline corridor. Between Neche, North Dakota, and Clearbrook, Minnesota, RA-06 follows the same route as that proposed by the Applicant, running parallel to Line 67 within the Mainline corridor (Figure 12.2-1). The potential for cumulative effects is the same as described for the Applicant's preferred route in Section 12.3.1.1.

12.4.3.2 Koch Pipeline Company, Clearbrook Tanks Project

Cumulative Potential Effects of Clearbrook Tanks Project Would Be the Same as Those for the Applicant's Preferred Route

As noted above, Koch Pipeline Company's Clearbrook terminal is located south of Enbridge's Clearbrook terminal. The Line 3 Project upgrades to the Enbridge Clearbrook terminal would occur in the immediate vicinity of the Clearbrook Tanks Project. The upgrades required for RA-06 are the same as those required for the Applicant's preferred route. Therefore, the potential for cumulative effects is the same as described for the Applicant's preferred route in Section 12.3.1.3.

12.4.3.3 Great Northern Transmission Line Project

The potential for cumulative effects to result from the GNTL Project and RA-06 was evaluated in a 2015 EIS prepared by DOC-EERA and the U.S. Department of Energy for that project (DOC-EERA and U.S. Department of Energy 2015). That environmental review document is incorporated here by reference, and the areas where cumulative potential effects were identified in that assessment are summarized below.

The GNTL Project involves constructing more than 200 miles of 500-kV HVTL and a new 500-kV substation. It would run from an international border crossing in Roseau County, Minnesota, to the new Iron Range 500-kV Substation to be constructed just east of the existing Blackberry Substation near Grand Rapids, Minnesota. It would be located on a new 200-foot-wide right-of-way with a wider area required for certain spans at angle and corner structures, for guyed structures, or where special design requirements are dictated by topography.

On April 8, 2016, the Commission published an order issuing a route permit to Minnesota Power to construct a 500-kV transmission line from the Minnesota-Manitoba border to the 500-kV Blackberry

Substation near Grand Rapids, as well as associated substation facilities and transmission system modifications. On November 16, 2016, Minnesota Power received a Presidential Permit from the U.S. Department of Energy for the Minnesota-Manitoba border crossing

The RA-06 route for the Line 3 Project overlaps the environmentally relevant area of the GNTL Project in northeastern Itasca County, where RA-06 would cross the permitted route for the transmission line, before turning south and paralleling the permitted route for the GNTL Project at a distance of approximately 4 miles for a short stretch northwest of Hibbing, Minnesota.

12.4.3.3.1 Aesthetics

Great Northern Transmission Line Project Would Have No Significant Effect on Aesthetics

Route alternative RA-06, if selected, would intersect the permitted GNTL route, but would be located underground where it would cross the 200-foot right-of-way of the GNTL Project. The potential cumulative aesthetic impacts in this area are not expected to be significant because they would only involve paralleling transmission lines for a short distance, and this infrastructure would not be incompatible with existing conditions.

12.4.3.3.2 Vegetation

Right-of-Way Clearing for Route Alternative RA-06 and Great Northern Transmission Line Would Have Significant Cumulative Potential Effects on Native Vegetation

Vegetation clearing would be required to maintain the right-of-way for both the GNTL and the Line 3 Project. Conversion from forested to open habitat could impede native vegetation by increasing potential for spread of invasive species and noxious weeds and could also increase the effects of light penetration, wind, and humidity that are more prominent on edges between different habitat types. These cumulative impacts could be significant, particularly where existing corridors are not used.

In the case of RA-06 and the GNTL, there is notable distance (approximately 4 miles) between the corridors that would be cleared and maintained free of woody vegetation. While the permitted route for the GNTL will parallel existing transmission infrastructure in this area, the addition of cleared right-of-way 4 miles east for RA-06 would exacerbate potential for spread of invasive species and noxious weeds and could also increase the effects of light penetration, wind, and humidity in the area.

12.4.3.3.3 Wildlife

Right-of-Way Clearing for Route Alternative RA-06 and Great Northern Transmission Line Would Further Fragment Wildlife Habitat

The GNTL Project and RA-06 could result in cumulative potential effects on wildlife resources; specifically, the clearing of vegetation and disturbance of wildlife habitats could directly harm or displace wildlife species. These projects could further alter the amount and quality of habitat available to wildlife in the vicinity due to tree clearing for rights-of-way for transmission lines and a pipeline.

As noted above, there is notable distance (approximately 4 miles) between the corridors that would be cleared. While the permitted route for the GNTL will parallel existing transmission infrastructure in this area, the addition of cleared right-of-way 4 miles east for RA-06 would contribute to a cumulative fragmentation of wildlife habitat in the area.

12.4.3.3.4 Unique Natural Resources

The GNTL Project and the Line 3 Project both involve tree removal, which could contribute to cumulative potential effects on the northern long-eared bat, which relies on forested habitat for summer foraging and roosting.

Field Surveys Would Be Necessary to Confirm the Presence of Rare/Protected Species or Communities

If rare/protected species are located in disturbed areas of projects constructed in close proximity to one another, the cumulative potential effects could be detrimental to individual rare communities. Field surveys would be required, however, to confirm the presence or absence of rare/protected species in the respective project rights-of-way prior to construction. If rare/protected species are found, the permittee would be required to coordinate with USFWS or Minnesota DNR regarding avoidance or mitigation.

Cumulative Fragmentation of Wildlife Habitat Could Potentially Affect Rare/Protected Species and Communities

Permanent loss of forest would lead to fragmentation by reducing intact blocks of forest vegetation. Removal of vegetation and conversion to open habitat would increase the potential for spread of invasive species and would alter the structure and function of rare communities, potentially making them less suitable for the species that would typically inhabit them. As noted above, the addition of cleared right-of-way for RA-06 4 miles east of the GNTL Project would contribute to a cumulative fragmentation of wildlife habitat in the area including rare/protected species and communities.

12.4.3.3.5 Commodity Production

Route Alternative RA-06 or Great Northern Transmission Line Might Need to Be Relocated to Protect Mineral Resources

The GNTL and RA-06 would both cross areas of known mineral resources. If both projects were eventually constructed in these areas, portions of one or both of these projects may need to be relocated in the future to protect access to mineral resources.

12.4.3.3.6 Employment/Income/Tax Revenues

Route Alternative RA-06 and Great Northern Transmission Line Would Create New Jobs but not Significantly Affect Housing

The GNTL Project and RA-06 would both create new employment during construction and could contribute to a temporary housing shortage if both projects were to be constructed at the same time. Because Grand Rapids is within commuting distance of the construction area of the GNTL Project, any housing shortage would not be expected to be significant.

12.4.3.4 Potential for Cumulative Spills – RA-06

There are three reasonably foreseeable actions identified in Section 12.2 that would potentially contribute to cumulative effects from inadvertent spills when combined with the Line 3 Project RA-06 alternative during operations. These actions are:

- Line 67 Expansion Project,
- Clearbrook Tanks Project, and

- The addition of pipeline in the same corridor.

Product pipeline spills can have adverse effects on various environmental resources, including: air quality; water resources (groundwater, surface water features, wetlands, etc.); soils; vegetation; wildlife; human health; and land/resource use. Specific impacts on these resources are discussed in greater detail in Chapter 10; similarly, potential cumulative effects as a result of spills is further discussed in Section 12.5.

12.4.4 Route Alternative RA-07

The duration and geographical extent of impacts associated with constructing and operating RA-07 are summarized in Chapter 6. Based on these temporal and geographic extents, this analysis of cumulative potential effects for RA-07 focuses on two reasonably foreseeable projects located within several miles of RA-07 that are expected to be under construction or operational during or after the time the Project would be constructed (as early as spring 2018, but more likely later in 2018):

- Line 67 Expansion Project, and
- Clearbrook Tanks Project.

12.4.4.1 Line 67 Expansion Project

Potential Cumulative Effects of Route Alternative RA-07 and Line 67 Expansion Project Are the Same as Those for the Applicant's Preferred Route

As indicated previously, Enbridge's Line 67 is located within the Enbridge Mainline corridor. Between Neche, North Dakota, and Clearbrook, Minnesota, RA-07 follows the same route as that proposed by the Applicant, running parallel to Line 67 within the Mainline corridor (Figure 12.2-1). The potential for cumulative effects is the same as described for the Applicant's preferred route in Section 12.3.1.1.

12.4.4.2 Koch Pipeline Company, Clearbrook Tanks Project

Potential Cumulative Effects of Route Alternative RA-07 and Clearbrook Tanks Project Are the Same as Those for the Applicant's Preferred Route

As noted above, Koch Pipeline Company's Clearbrook terminal is located south of Enbridge's Clearbrook terminal. The Line 3 Project upgrades to the Enbridge Clearbrook terminal would occur in the immediate vicinity of the Clearbrook Tanks Project. The upgrades required for RA-07 are the same as those required for the Applicant's preferred route. Therefore, the potential for cumulative effects is the same as described for the Applicant's preferred route in Section 12.3.1.3.

12.4.4.3 Potential for Cumulative Spills – RA-07

There are two reasonably foreseeable actions identified in Section 12.2 that would potentially contribute to cumulative effects from inadvertent spills when combined with the Line 3 Project RA-07 alternative during operations. These actions are:

- Line 67 Expansion Project; and
- Clearbrook Tanks Project.

12.4.5 Clearbrook Tanks Project.

Product pipeline spills can have adverse effects on various environmental resources, including: air quality; water resources (groundwater, surface water features, wetlands, etc.); soils; vegetation; wildlife; human health; and land/resource use. Specific impacts on these resources are discussed in greater detail in Chapter 10; similarly, potential cumulative effects as a result of spills is further discussed in Section 12.5.

12.4.6 Route Alternative RA-08

The duration and geographical extent of impacts associated with constructing and operating RA-08 are summarized in Chapter 6. Based on these temporal and geographic extents, this analysis of cumulative potential effects for RA-08 focuses on two reasonably foreseeable projects located within several miles of RA-08 that are expected to be under construction or operational during or after the time the Project would be constructed (as early as spring 2018, but more likely later in 2018):

- Line 67 Expansion Project, and
- Clearbrook Tanks Project.

12.4.6.1 Line 67 Expansion Project

Potential Cumulative Effects of Route Alternative RA-08 and Line 67 Expansion Project Are the Same as Those for the Applicant's Preferred Route

As indicated previously, Enbridge's Line 67 is located within the Enbridge Mainline corridor. Between Neche, North Dakota, and Clearbrook, Minnesota, RA-08 follows the same route as that proposed by the Applicant, running parallel to Line 67 within the Mainline corridor (Figure 12.2-1). The potential for cumulative effects is the same as described for the Applicant's preferred route in Section 12.3.1.1.

12.4.6.2 Koch Pipeline Company, Clearbrook Tanks Project

Potential Cumulative Effects of Route Alternative RA-08 and Clearbrook Tanks Project Are the Same as Those for the Applicant's Preferred Route

As noted above Koch Pipeline Company's Clearbrook terminal is located south of Enbridge's Clearbrook terminal. The Line 3 Project upgrades to the Enbridge Clearbrook terminal would occur in the immediate vicinity of the Clearbrook Tanks Project. The upgrades required for RA-08 are the same as those required for the Applicant's preferred route. Therefore, the potential for cumulative effects is the same as described for the Applicant's preferred route in Section 12.3.1.3.

12.4.6.3 Potential for Cumulative Spills – RA-08

There are two reasonably foreseeable actions identified in Section 12.2 that would potentially contribute to cumulative effects from inadvertent spills when combined with the Line 3 Project RA-03AM alternative during operations. These actions are:

- Line 67 Expansion Project, and
- Clearbrook Tanks Project.

Product pipeline spills can have adverse effects on various environmental resources, including: air quality; water resources (groundwater, surface water features, wetlands, etc.); soils; vegetation; wildlife; human health; and land/resource use. Specific impacts on these resources are discussed in greater detail in Chapter 10; similarly, potential cumulative effects as a result of spills is further discussed in Section 12.5.

12.4.7 Additional Pipeline in a New Route Corridor

Additional Pipeline Could Increase Spill Risk and Affect Vegetation, Wildlife, and Water Resources

If a new pipeline corridor outside of the existing Enbridge Mainline (such as the Applicant's preferred route, RA-03AM, or RA-06) were to be permitted for the proposed Project, the new corridor would create an opportunity for future corridor sharing that could ultimately result in accumulation of multiple pipelines within the corridor chosen for the Line 3 Project. To address the cumulative potential effects, the effects of an additional pipeline in a new Line 3 Project corridor generally are discussed below.

The addition of another pipeline within a new pipeline corridor would require widening of the right-of-way and would introduce additional spill risk. In general, the widening of the corridor would incrementally increase the effects on the resources described for each of the routes in Chapter 6 of this EIS. In the case of RA-06, for example, adding another pipeline in the corridor would result in additional clearing of forest in what is otherwise a densely forested, relatively undisturbed area with high-quality habitat and relatively pristine watersheds, but relatively few populated areas.

In the case of RA-03AM, adding another pipeline in the corridor would result in additional clearing in fairly forested areas with slightly more disturbed habitat and affected watersheds, but relatively more populated areas. In addition, adding an additional pipeline in any of these new corridors would increase the accidental release risk exposure of the same resources described along each of the routes in Chapter 10.

These types of general impacts are described in further detail below.

12.4.7.1 Planning and Zoning

Altering Land Use for New Pipeline Could Cumulatively Affect Planning and Zoning

Incrementally expanding right-of-way width within a new corridor could result in permanent minor cumulative potential effects on planning and zoning by alteration of existing (and in some areas protected) land uses to establish a new right-of-way.

12.4.7.2 Aesthetics

Expanding Right-of-Way for New Pipeline Could Cumulatively Affect Aesthetics

The addition of another pipeline within a new corridor would incrementally expand right-of-way width within the new corridor and could result in permanent minor cumulative potential effects on aesthetics, particularly if the new corridor passes through heavily forested and relatively undisturbed areas (e.g., RA-06).

12.4.7.3 Vegetation

Clearing Trees Now or in the Future Would Permanently Affect Forest Communities

Clearing trees within forest communities along new rights-of-way would result in long-term to permanent effects on these communities, which would be exacerbated if new pipelines were sited in new rights-of-way in the future.

12.4.7.4 Wildlife

Habitat Fragmentation Could Significantly Affect Wildlife in Some Areas

Clearing trees within forest communities along new rights-of-way would result in long-term to permanent effects on wildlife through habitat fragmentation. If new pipelines were sited within these new rights-of-way in the future, the cumulative potential effect would be minimal, because new fragmentation of habitat would not occur.

The cumulative permanent loss of wildlife habitats (including wetlands and forest lands) would affect wildlife inhabiting these areas. These cumulative potential effects could be major in areas where high-value wildlife habitat is altered.

12.4.7.5 Commodity Production

A New Corridor Could Cumulatively Affect Agriculture and Timber Production

Siting a future pipeline along a new corridor and expanding rights-of-way would incrementally affect land uses and opportunities for commodity production in agricultural and forested areas used for timber production.

12.4.7.6 Accidental Releases and Potential for Cumulative Spills Effects

Spill Risk Would Increase with Additional Pipelines but Would Still Be Low

The likelihood of multiple concurrent pipeline failures resulting in oil spills is low. However, the addition of multiple pipelines in a new corridor incrementally increases the risk of an incident occurring, so resources along the corridor are exposed to a higher probability of an incident occurring. Refer to Chapter 10 for a detailed discussion of oil spill risk and associated environmental impacts. Please refer to Section 12.5 for additional discussion on the potential for cumulative effects from spills that result from additional pipelines.

12.5 Cumulative Spills

Spilled oil will typically spread over land until it reaches a depression, a surface waterbody, or is absorbed into the ground. In addition to topography, migration of the oil can be affected by vegetation cover and seasonal conditions. Oil spilled into surface waterbodies generally floats initially and is transported by winds and currents, depending on the waterbody type and conditions during the spill. Spills tend to spread shorter distances in standing water such as lakes and ponds with minimal currents; however, wind can increase oil dispersal in those surface waters. Currents in streams and rivers transport oil downstream, and thus impacts are likely to occur over greater areas than in lakes or ponds.

In the human environment, crude oil can reach public and private lands used for commercial, agricultural, industrial, residential, and recreational purposes. Water intakes in shallow lakes and rivers

can be susceptible to contamination from an oil spill, and paved surfaces and conduits such as ditches/sewers can act as preferential pathways for spills, extending the spread of oil. If a crude oil spill occurs in a developed area, oil can migrate into stormwater and sewer collection systems, particularly during rain events, and result in contamination of the infrastructure and associated treatment systems.

Of the projects identified as reasonably foreseeable actions in Section 12.2, four would potentially contribute to cumulative effects from inadvertent spills when combined with the Line 3 Project. These projects are:

- Line 67 Expansion Project,
- MPL Reliability Project,
- Clearbrook Tanks Project, and
- The addition of pipeline in the same corridor.

Other reasonably foreseeable actions include a construction component that could result in minor spills, but these would not contribute to significant cumulative potential effects.

There is no way to identify precise cumulative impacts of spills from the Line 3 Project when taken into consideration with the previously identified past, present, and reasonably foreseeable future actions identified in Section 12.2. There are numerous variables, including location (near or far from Line 3), land use/cover (natural habitat, developed land, or water resource), spill quantity (amount of petroleum product released), and responsiveness of the pipeline operator, that determine the magnitude of the potential cumulative effect. Any analysis would be speculative at best, and the significance of spill-related cumulative effects could vary between negligible to significant, depending on specific parameters.

Section 10.3.2.4 in this EIS discusses the observed impacts of product pipeline spills on various resources, including: air quality; water resources (groundwater, surface water features, wetlands, etc.); soils; vegetation; wildlife; human health; and land/resource use. The adverse effects, both anticipated and observed in historic situations, would be exacerbated if more than one pipeline experienced a failure in a similar time period and in a nearby location. Both time period and geography would be defined differently from resource to resource, and by the response/containment/remediation actions required. While a quantified impact is impossible to determine, the potential cumulative effect could be significant.

However, it is important to recognize that the likelihood of spills (individual or multiple) is extremely low. Spill prevention is the most critical component to avoiding impacts from a crude oil release. If a release occurs, the most important actions to reduce environmental impacts are to minimize the size and spread of the release by implementing a rapid, coordinated, and effective spill response based on an established action plan. Sections 10.5 and 10.6 of this EIS contain comprehensive information pertaining to spill prevention, preparedness, and response; and clean-up, restoration, and recovery for the Line 3 Project (respectively). The other projects identified previously would also employ similar methods and plans to prevent ruptures and spills. Therefore, while the potential cumulative effects from spills could be significant, multiple factors would need to coincide for that to effectively occur. Additionally, stringent preventative planning procedures would be in place for all product pipeline projects in the area, which ensures that the likelihood of a significant cumulative effect would be extremely low.

12.6 CUMULATIVE POTENTIAL EFFECTS – CLIMATE CHANGE

Climate Change Is Not Attributable to Any Single Action, but to a Series of Actions

As noted in the Council on Environmental Quality's 2016 Final Guidance on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change (Executive Office of the President, Council on Environmental Quality 2016), all greenhouse gas emissions contribute to cumulative climate change impacts. Recognizing that the totality of climate change is not attributable to any single action, but is exacerbated by a series of actions, this analysis does not attempt to directly link the emissions from a single action to an incremental change in climate.

This Section Considers Direct and Indirect Effects of Greenhouse Gases on the Environment in Minnesota

Instead, this section considers that collectively the proposed Project and other reasonably foreseeable actions across the world would contribute to global climate change. This section describes the cumulative potential climate change effects of greenhouse gas emissions on the environment in Minnesota and identifies resources that could experience cumulative impacts due to both the effects of climate change as well as the direct and indirect impacts of the proposed Project and its alternatives.

Chapters 5 and 6 Address Greenhouse Gas Emissions of the Proposed Project and its Alternatives

While this section focuses on the cumulative potential effects of greenhouse gas emissions on climate, the specific greenhouse gas emissions associated with the proposed Project and its alternatives are discussed in Sections 5.2.7 and 6.3.7 of this EIS. The analysis in Sections 5.2.7 and 6.3.7 accounts for greenhouse gas emissions from the proposed Project and each of the alternatives, including:

- Direct effects: greenhouse gas emissions associated with construction (e.g., on and off road equipment combustion, burning) and operation (fugitive emissions, storage tank withdrawal losses, lost carbon sequestration) of the Project and its alternatives.
- Indirect effects: electricity generation, greenhouse gas emissions associated with any changes in upstream (oil production) or downstream (oil consumption) activities that may result from the Project or its alternatives.

In Sections 5.2.7 and 6.3.7 of this EIS, the social cost of carbon is used to relate the direct and indirect greenhouse gas emissions from the proposed Project and its alternatives to the costs to society that the climate change impacts described below may create (e.g., human health impacts, loss of tourism, agricultural losses). Please refer to Sections 5.2.7 and 6.3.7 for a comparison of the CN and route alternatives on this basis. As discussed above, this analysis does not attempt to directly link the emissions from a single action to an incremental change in climate and the impacts discussed below can potentially be exacerbated by a series of actions.

Furthermore, the lifecycle GHG intensity of various crude oils is discussed in Section 5.2.7.3. The average life cycle GHG emissions for heavy Western Canadian Sedimentary Basin crude are calculated based on higher value of carbon dioxide equivalent/bbl of crude oil. This provides conservative estimates of life cycle gas emissions in Table 5.27-11. It is expected that technological development has substantially reduced the energy intensity of extracting Alberta oil sands.

12.6.1 Midwest Climate Change Trends

Midwest climate change trends are discussed in detail in the National Climate Assessment (Pryor et al. 2014). That document is incorporated by reference here and key points from this assessment, as well as other regional climate assessments, are summarized below.

Warming in Minnesota Is More Pronounced in Winter and in Northern Portions of the State

Minnesota is undergoing rapid warming, especially during typically cold conditions. From 1895 to 2014, annual temperatures in Minnesota increased at an average rate of 0.2 degrees Fahrenheit (°F) per decade. Between 1895 and 1970, average Minnesota surface temperature increased at an average rate of about 0.13°F per decade. Subsequently, beginning in 1970 and extending to 2016, this accelerated to an average rate of warming of about 0.57°F per decade. Warming is occurring during all seasons, but is proceeding 10 times faster in winter than in summer: the 1970 to 2014 summer warming rate averaged 0.1°F per decade, compared to winter warming of 1.0°F per decade over the same interval (Minnesota DNR 2015).

All warming trends in all seasons are more pronounced in northern Minnesota than in southern Minnesota (Minnesota DNR 2015). Although there has been no increase in extreme heat events in Minnesota in recent decades, research summarized in the 2014 National Climate Assessment indicates that by mid-century, much of the state may see dramatic increases in the number of days reaching or exceeding 95°F (Pryor et al. 2014).

Water Temperatures Are Increasing Faster than Air Temperatures

Temperatures of surface waters in Lake Superior are increasing at a rate much greater than air temperature change, and are projected to rise by as much as 12.1°F by 2100 (Minnesota PCA 2013). An observed impact of increasing temperature is the decline in the number of days of ice cover in the Great Lakes, including Lake Superior (Minnesota PCA 2013).

Minnesota Is Becoming Wetter and the Likelihood of Extreme Rainfall Events Is Increasing

Minnesota is also becoming wetter, with increases in annual precipitation and greater rainfall extremes. From 1895 to 2014, statewide annual precipitation increased at an average rate of 0.25 inch per decade (Minnesota DNR 2015). Potentially disastrous events that produce 6 inches of rainfall or more over a 1,000-square-mile area have become more common as well, with 7 of the 10 instances documented since 1973 occurring after the year 2000 (Minnesota State Climatology Office 2016). Projections summarized in the Midwest chapter of the 2014 National Climate Assessment indicate that both annual precipitation and extreme events will continue to increase during the twenty-first century (Pryor et al. 2014). Even with these projected precipitation increases, the same models indicate more consecutive dry days between precipitation events as the twenty-first century progresses (Pryor et al. 2014).

Changes in Temperature and Precipitation Also Affect Forests, Water and Air Quality, and Agriculture

- In the next few decades, longer growing seasons and rising carbon dioxide levels will increase yields of some crops, though those benefits will be progressively offset by extreme weather events. Though adaptation options can reduce some of the detrimental effects, in the long term, the combined stresses associated with climate change are expected to decrease agricultural productivity.
- The composition of the region's forests is expected to change as rising temperatures drive suitable climates for many tree species northward. The role of the region's forests as a net

absorber of carbon is at risk from disruptions to forest ecosystems, in part due to climate change.

- Increased heat wave intensity and frequency, increased humidity, degraded air quality, and reduced water quality will increase public health risks related to heat and sensitivity to poor air quality. For example, increased humidity could lead to increased mold levels in homes, which may aggravate asthma or may cause allergic reactions.

12.6.2 Potential Impacts of Climate Change on the Project

Main Concerns Include Severe Weather, Freeze-Thaw Cycles, and Flooding, All of Which Could Damage Project Facilities

The proposed pipeline would be buried underground at a depth of 3 feet, which would protect it from most surface impacts of climate change, including higher surface temperatures and increased precipitation. However, severe weather conditions can affect the normal operation of pipelines. For example, tornadoes can damage or disrupt communications with the monitoring systems or directly damage aboveground elements such as tanks, pumps, sensors, small pipes, and support equipment (U.S. Department of State 2017). The continued trend of greater annual average precipitation and heavy precipitation in Minnesota has the potential to increase flooding and alter hydrological patterns from increased runoff and greater volumes of water in rivers. Flooding can cause inundation of equipment and facilities by floodwaters and streambank erosion from floods and channel migration. Streams with high sediment loads and active floodplains can migrate during floods or overflow into secondary channels, increasing the potential to damage Project facilities including the pipeline. Frequent major flood events could scour the streambed and expose the buried pipeline, or changes in hydrology can cause channels to migrate over time and expose the pipeline. In addition, heavy rains, snowfall, and high winds may produce conditions that would affect the pipeline system integrity over time. Lightning and wildfires would be unlikely to damage the system integrity directly, but could cause the loss of supervisory control and data acquisition (SCADA) (U.S. Department of State 2017).

The Minnesota State Climatology Office looked at three long-term Cooperative National Weather Service temperature observation sites near the Applicant's preferred route (Crookston, Park Rapids, and Cloquet, Minnesota), each with records dating back over 100 years. In the twenty-first century (through the 2016–2017 winter), the number of days between November 1 and March 31 where the low temperature was at or above the hard freeze criterion (28°F) and the high was at or above 36°F (to indicate a strong thaw) has increased over long-term twentieth and late-nineteenth century values by 26 percent (Crookston) to 70 percent (Park Rapids). This indicates significantly more thaw days during the traditional winter period in the Project region. The Minnesota State Climatology Office did not see a significant change in the number of days with highs at or above 36°F and lows at or below 28°F, indicating no increase in same-day freeze-thaw cycles. Frost depth, and whether and for how long frost reaches the proposed Project depth of 3 feet, will be controlled heavily by the absence or presence of snow cover, with soil frost responding much faster to warm or cold periods when no snow cover is present. Significant winter thaw periods are increasingly likely during the Project.

Climate Change Could Intensify Spill Impacts

Climate factors can impact the fate and trajectory of spilled oil and can also affect how spilled oil interacts with the environment. For example, higher ambient temperatures could increase the volatilization of air contaminants from an accidental release or flooding to cause spilled oil to be

transported farther downstream. In addition, heavy rain events could potentially have an adverse effect on spill response, including containment and cleanup actions.

12.6.3 Potential Impacts of the Project in Combination with Climate Change Impacts

Operation of the proposed Project may affect resources that are experiencing or may experience impacts as a result of climate change. Figure 12.5-1 identifies areas where the Project's operational impacts would overlap with the impacts of climate change. These overlapping impacts are discussed further below.

Warmer Water Temperatures and Loss of Shading and Habitat Features Could Affect Aquatic Species

Increased water temperatures in rivers due to climate change can have detrimental effects on aquatic species, which could be exacerbated by the permanent loss of shading, nutrients, and habitat features for fish at some waterbody crossings during pipeline operations from vegetation removal maintenance activities along the permanent right-of-way. The use of pesticides and herbicides for maintenance during pipeline operation could also add stress to aquatic species.

Higher Temperatures and Changes in Vegetation and Habitat Could Affect Wildlife

Changing composition of vegetation in the future could affect resident wildlife unable to adapt to changing conditions, which could be worsened by the permanent loss of trees and shrubs, habitat fragmentation, and changes in vegetation cover through large blocks of forest habitats within the pipeline right-of-way.

Habitat fragmentation can decrease species dispersal, increase mortality, and reduce genetic diversity, and may obstruct the free movement of species seeking new habitats in adaptation to climate change effects. The pipeline right-of-way could attract migratory waterfowl earlier in the year if it becomes snow free before surrounding habitats. Federally listed species with the potential to occur along the Applicant's preferred route include the gray wolf, northern long-eared bat, and whooping crane (see Section 6.3.5).

Gray Wolf Is Highly Adaptable but Northern Long-Eared Bat and Whooping Crane Are Less So

The gray wolf is highly adaptable to a wide variety of climates, habitats, and food sources. Prior to its near extinction in North America due to human predation, the gray wolf's territory ranged from the Pacific to Atlantic coasts and from Alaska to Mexico (USFWS 2011a). Therefore, this species is anticipated to be adaptable to the effects of climate change. A species, despite being adaptable, can face risks from human pressure on habitats and landscape-level changes from climate change.

	Natural Resources			Human Environment		
	water resources	vegetation/ forests	wildlife/unique resources	environmental justice	infrastructure	Land-based economies
rising temperatures	heat related quality degradation, wetland change/loss wetland conversions intensify change/loss	community/ecosystem change including faunal species	habitat loss and changes intensified spread of invasive plants; loss of cool aquatic habitat/vegetated habitat	heat/air quality deaths/illness air quality impacts intensified	stress on utility infrastructure freeze-thaw cycles can affect pipeline and equipment	longer growing season/ productivity; lost winter recreation opportunities and revenues; altered timber productivity
heavy precipitation	flash-flooding of surface waters; increased groundwater quantity; excess pesticide /fertilizer runoff increased surface runoff/ sediment from digs and spills	flood/erosional damage	flood/erosional damage to habitat/ individuals	degraded water quality; sewage contamination, drowning, death	landslides, washed out roads/bridges, road closures	damage to businesses/ business outages during repair/recovery; no wake laws/watercraft restrictions affecting tourism disturbance from digs/ maintenance intensifies impacts to agriculture
severe storms	erosion/runoff quality degradation increased surface runoff/ sediment from digs and spills	tree loss/damage	damage to habitat/ individuals	storm damage costs/ deaths	wind damage to power utilities; outages along transportation networks	damage to businesses and business outages during repair/recovery disturbance from digs/ maintenance intensifies impacts to agriculture
drought	groundwater depletion; degraded water quality; water restrictions	vegetation loss/damage; increased fire risk	damage to habitat/ individuals intensified spread of invasive species	impacts to subsistence uses; drought-associated wildfire	drought-associated wildfire shrink and swell of soil associated with drought can affect pipeline infrastructure	watercraft hazards from low water affecting resorts/ tourism; drought-associated wildfire; tree damage; crop losses

Climate impact
Climate impact/Project Impact Overlap

Figure 12.5-1. Potential for Overlapping Impacts from Climate Change and from Normal Operations of the Proposed Project

The northern long-eared bat is particularly sensitive to changes in temperature and humidity and is not anticipated to adapt well to climate change. The northern long-eared bat's winter habitat (e.g., caves and mines) and summer maternity habitat (e.g., tree cracks, crevices, or hollows) have specific thermal microclimates and physical features that are essential to the species' survival. As such, climate change could lead to shifts in the long-eared bat's range, which could indirectly affect the northern long-eared bat through changes in food availability, availability of habitat, the timing of hibernation/migration, and reproductive cycles (USFWS 2015). The northern long-eared bat population is more vulnerable to climate change due to their low population numbers, low annual birth rate (i.e., one individual per female per year), and long lifespan relative to body size.

The whooping crane is not anticipated to adapt well to climate change. Their vulnerability is due to their low population numbers (about 350 individuals in the wild) and their dependence on wintering habitat along the U.S. coast of the Gulf of Mexico (Audubon 2014a). Coastal habitat is being lost primarily due to human development, but its loss is also being exacerbated by climate change.

Most State-Listed Species Are Not Very Adaptable to the Effects of Climate Change

State-listed species along the Applicant's preferred route include the northern pocket gopher, Henslow's sparrow, Blanding's turtle, wood turtle, pugnose shiner fish, a caddisfly, and several mussel species including the elktoe, fluted-shell, mucket, and spike. The northern pocket gopher's range is widespread in western to mid-North America (with northwestern Minnesota being the eastern limit of its range), and it can live in a variety of open habitats throughout its range. It has a flexible diet of both aboveground and belowground plant parts (MacMahon 1999; Verts and Carraway 1999). Since this species' life requirements are not highly specific, it is anticipated to be able to adapt to climate change.

Henslow's sparrow requires large, undisturbed grasslands in the Midwestern United States during the summer breeding season, and it spends the winters along the U.S. coast of the Gulf of Mexico (Cornell University 2015). Climate change is expected to cause a significant loss of coastal habitat in the next several decades (Audubon 2014b). Although Henslow's sparrow could expand its range to adjust to climate change, due to an already dwindling population, it is not anticipated to be highly adaptable to climate change.

North American turtles, including the Blanding's turtle and the wood turtle, can be affected by climate change, primarily through climate-induced habitat alteration (Wisconsin Department of Natural Resources 2016a, b). Historically, turtles have adapted to climate change by shifting their geographic ranges. It is more difficult for turtles to shift ranges today, however, due to managed waterways, urbanization, and agriculture (National Institute for Mathematical and Biological Synthesis 2015). Due to these limitations, the Blanding's turtle and wood turtle are not anticipated to be highly adaptable to climate change.

The pugnose shiner has strict habitat requirements, which make it less adaptable to both direct and indirect effects of climate change. One study (Doka et al. 2006) ranked the pugnose shiner as highly vulnerable (ranked sixth most vulnerable of 99 species) to climate change as a result of the loss of wetlands due to climate change (Committee on the Status of Endangered Wildlife in Canada 2013).

Caddisflies were once widely distributed across most of the western half of the United States and Canada (NatureServe 2009). Sightings today, however, are extremely rare. This is likely due to habitat loss, as species of *Limnephilus* are very sensitive to changes in the riparian corridor. Climate change effects would likely exacerbate habitat loss that is already occurring due to agriculture and urban

development. A caddisfly is therefore not anticipated to be adaptable to climate change (Minnesota DNR 2012).

The elktoe, fluted-shell, mucket, and spike mussels are also not anticipated to be adaptable to climate change. Once widely distributed, elktoes, muckets, and spikes are now only found living in a small number of drainages due stream alteration/degradation, pollution, and the spread of invasive species (Minnesota DNR 2017a, b, c). The fluted-shell is more widespread than the other mussels, but its population numbers are very low (Minnesota DNR 2017d). This restricted distribution, along with specific habitat requirements (e.g., low turbidity waters, narrow thermal preference) and limited mobility, make all four species of mussels vulnerable to catastrophic events (e.g., drought, flood) (Minnesota DNR 2017a, b, c, d).

Environmental Justice Communities are Affected By Climate Change, As Well As the Proposed Project and Its Alternatives

Climate change impacts threaten tribal lands and resources, way of life, culture, and economies. As discussed in Chapters 9 and 11 in greater detail and incorporated here, RA-06, RA-07, and RA-08 would have direct impacts on tribal reservations (Leech Lake and Fond du Lac Reservations). The lands and resources affected by the Project are important to preserving the traditional ways of life, including fishing, hunting, wild ricing, maple sugar gathering, and collecting plants for medicines, spiritual and ceremonial purposes, shelter, and other needs. Project impacts on tribal resources would be further exacerbated by climate change impacts that affect native communities—for example, decreases in water quality and quantity in the Great Lakes region, threats to human health and safety, economic losses, and loss of culturally important species, medicinal plants, cultural sites, and traditional foods, such as wild rice.

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Chapter 13
List of Preparers

Chapter 13 provides information on primary roles in preparation of the Environmental Impact Statement (EIS). Throughout the EIS process, multiple individuals have contributed in varying degrees related to their areas of expertise. Individual staff involvement has ranged from development of text in the Final EIS, to review of text in the document prepared by others.

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Minnesota Department of Commerce
Energy Environmental Review and Analysis

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MINNESOTA

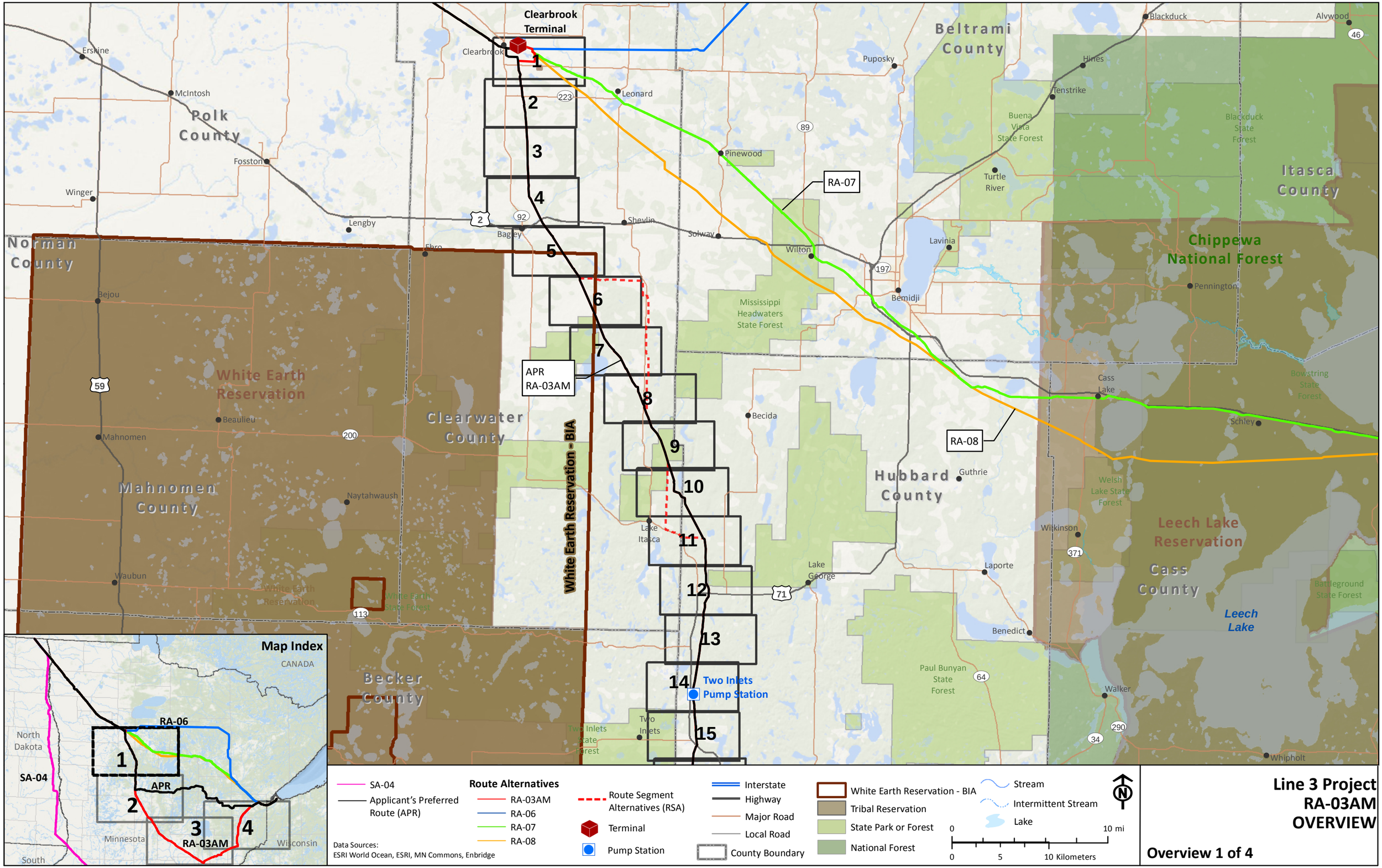

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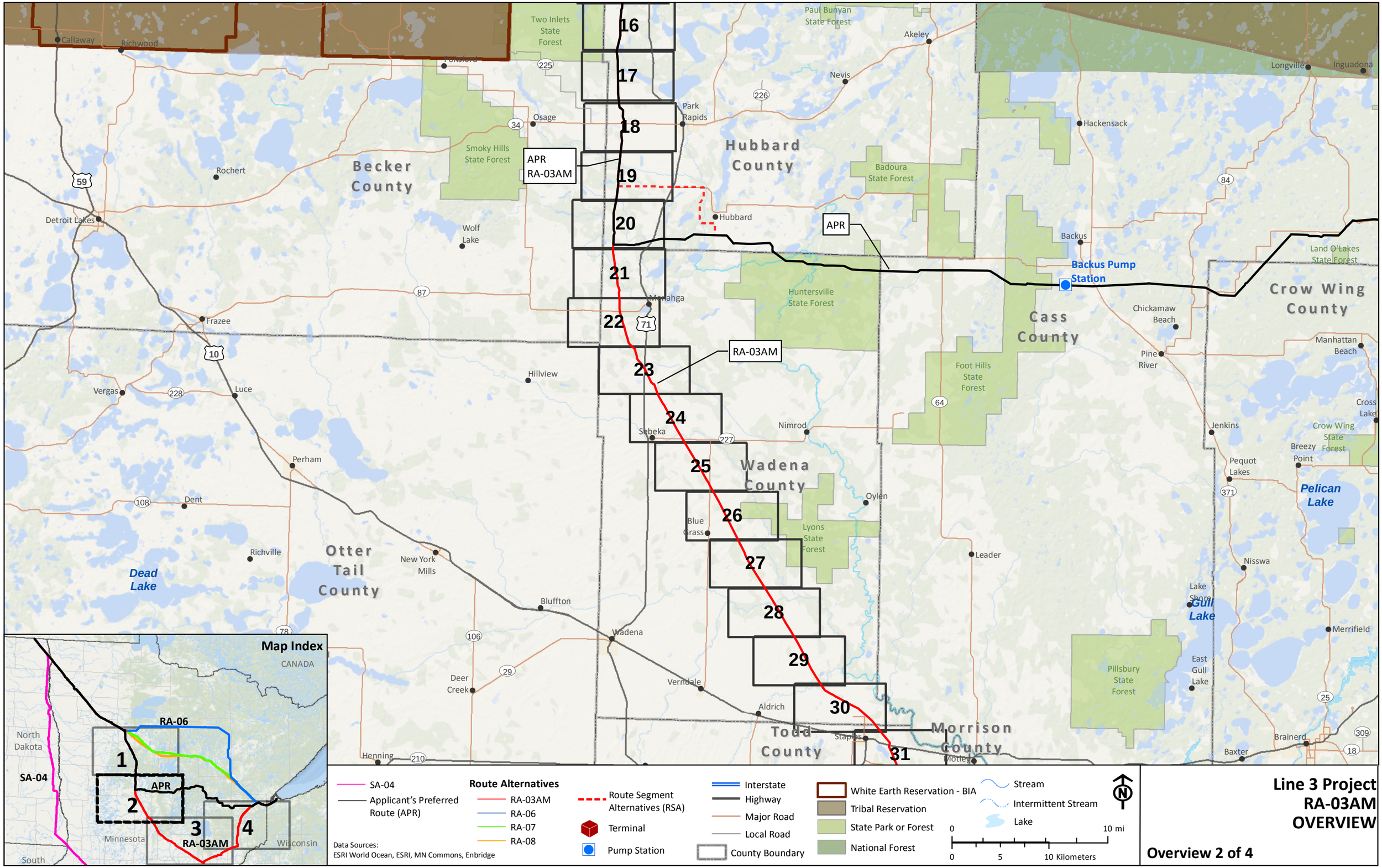
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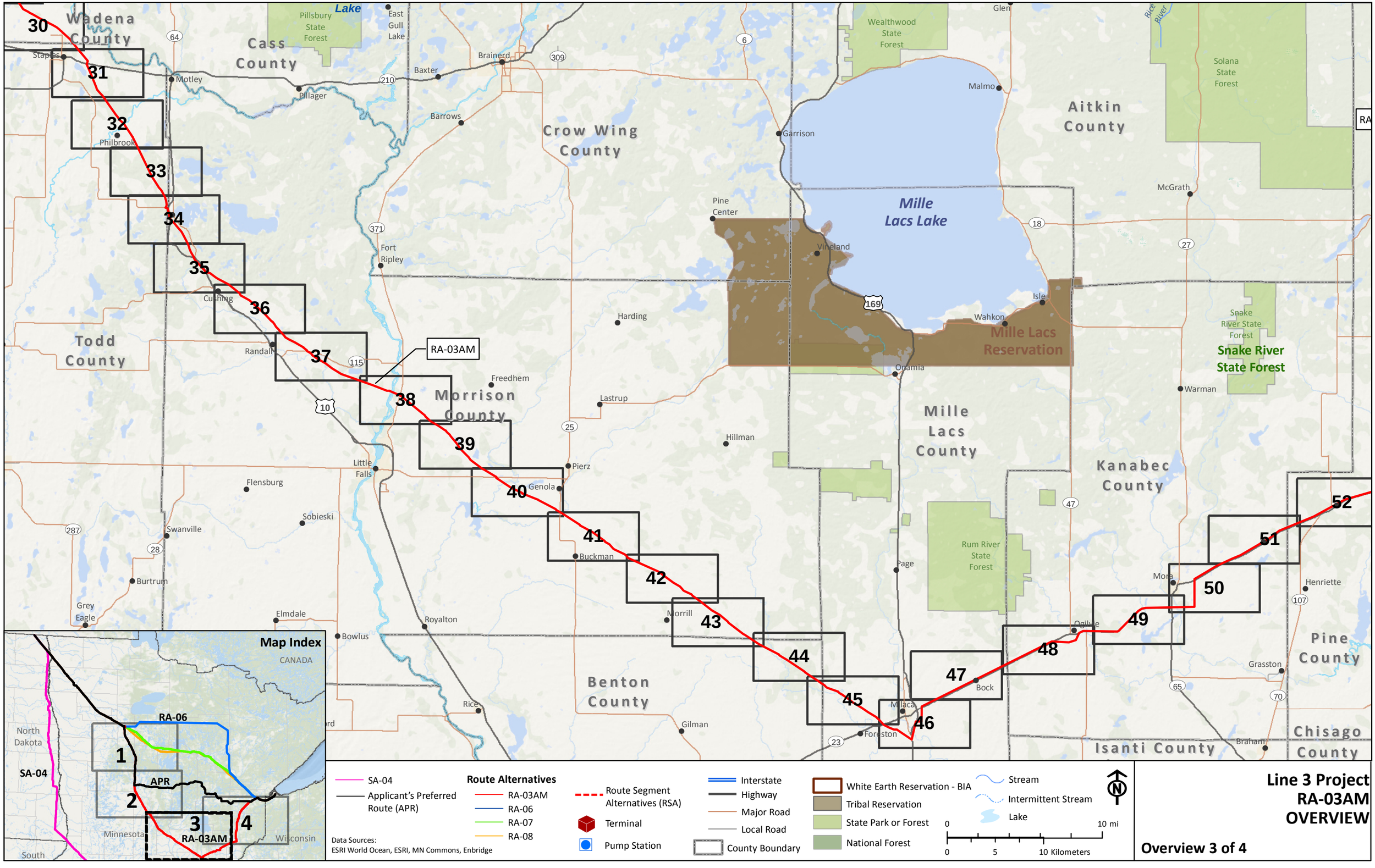
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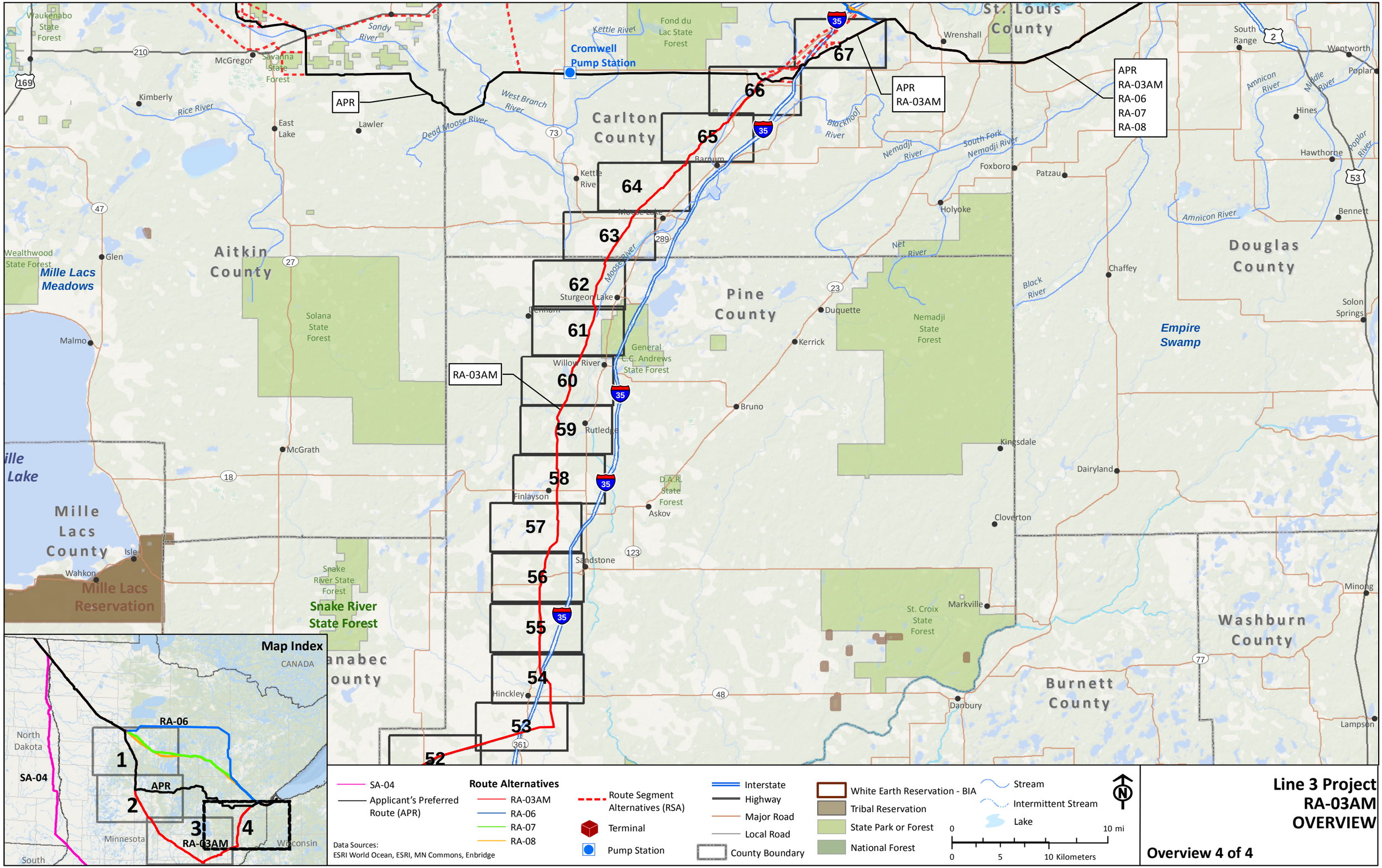
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Interstate
Highway
Major Road
Local Road
County Boundary
White Earth Reservation - BIA
Tribal Reservation
State Park or Forest
National Forest
Stream
Intermittent Stream
Lake
0
10 mi
0
5
10 Kilometers
Data Sources:
ESRI World Ocean, ESRI, MN Commons, Enbridge
Line 3 Project
RA-03AM
OVERVIEW
Overview 4 of 4

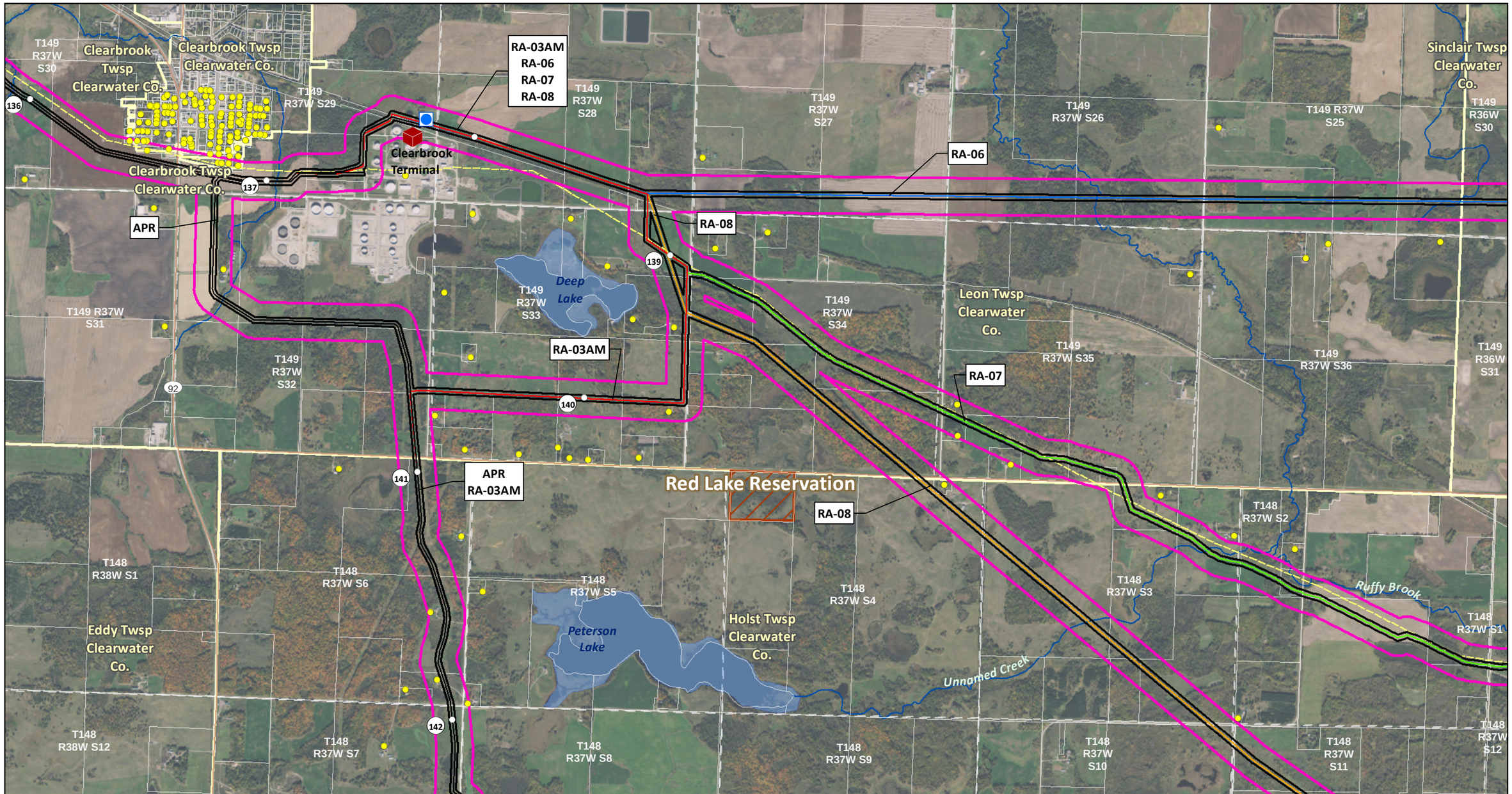

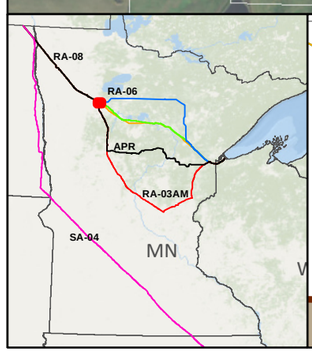

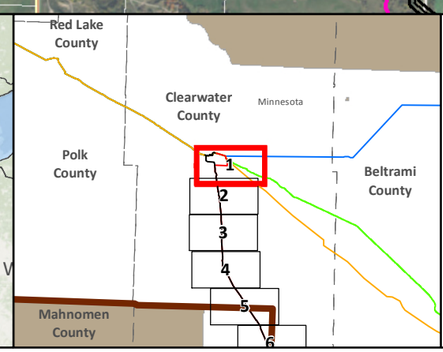

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 1A of 67

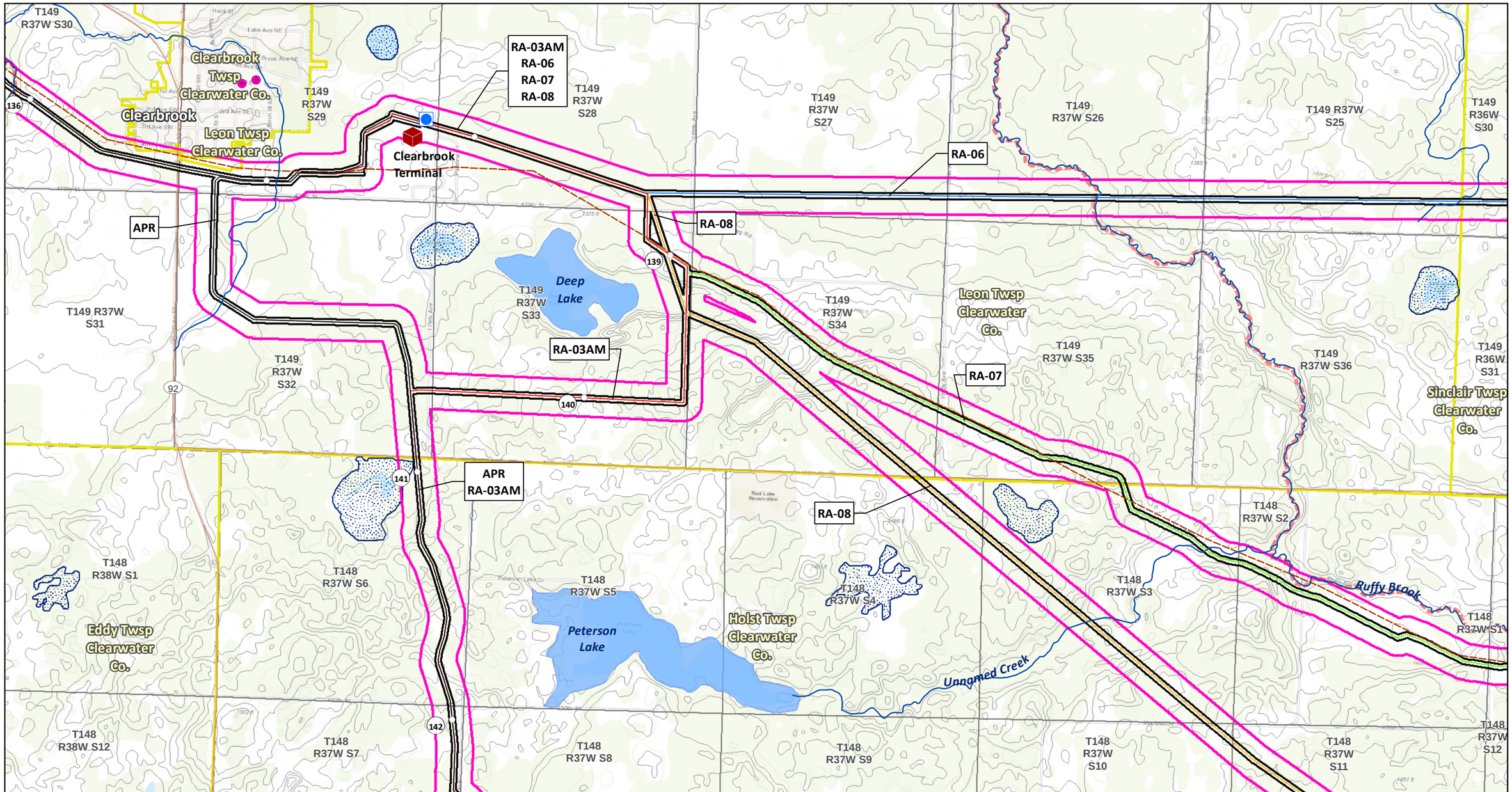

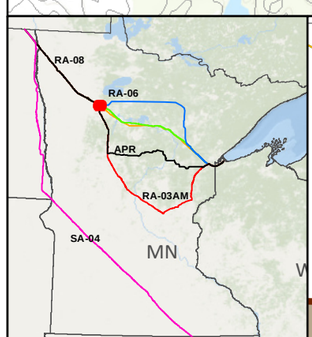

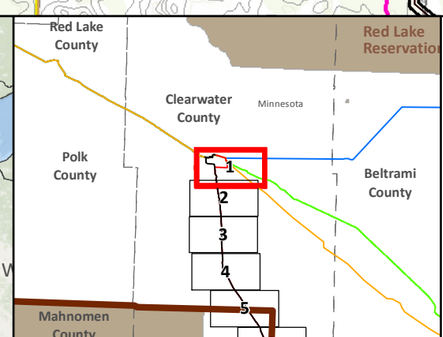

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 1B of 67

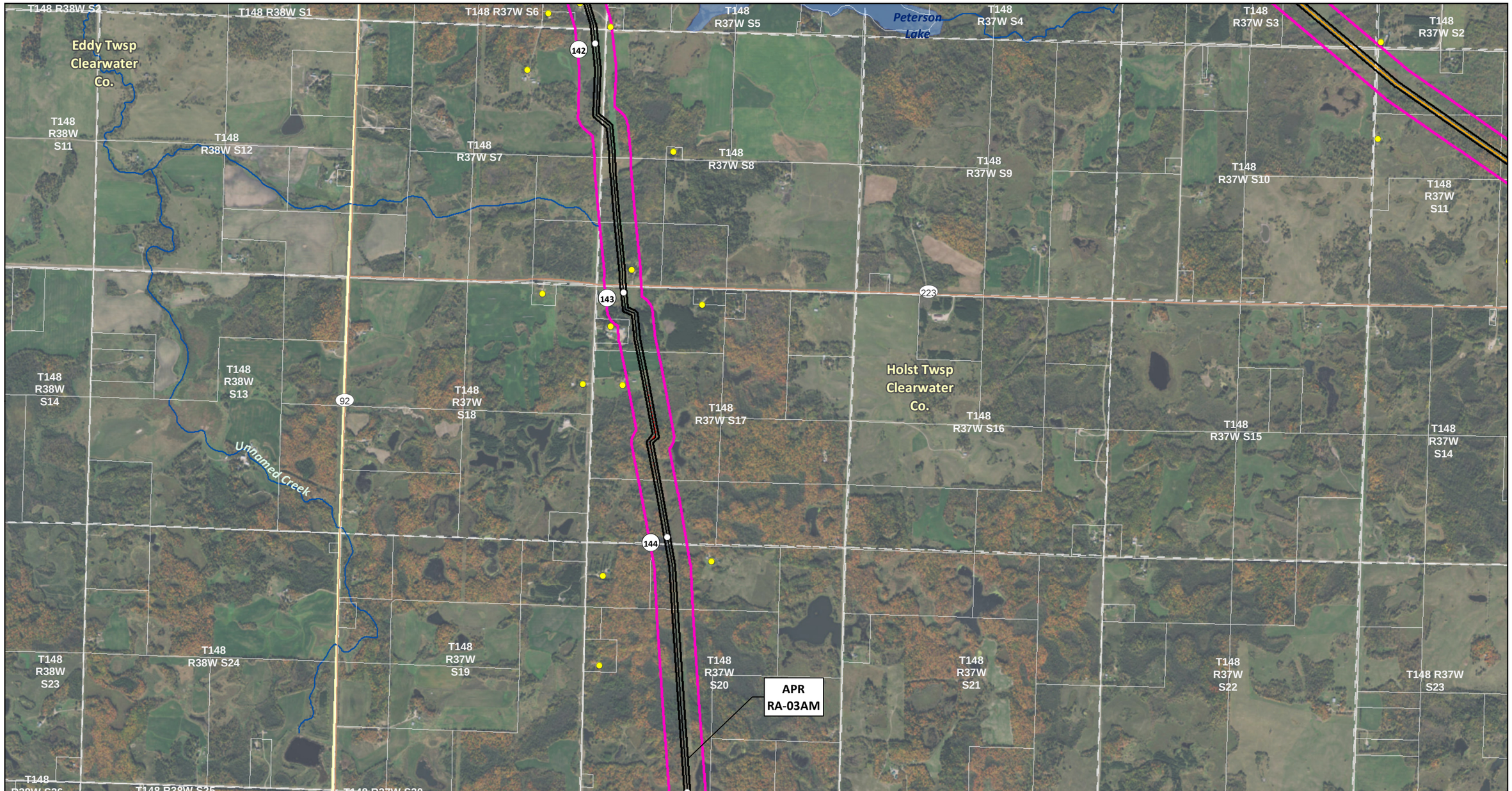

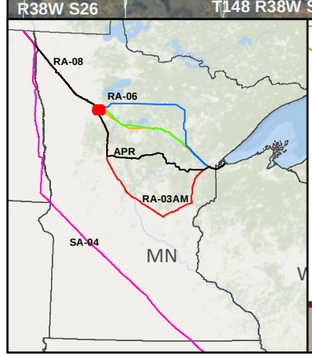

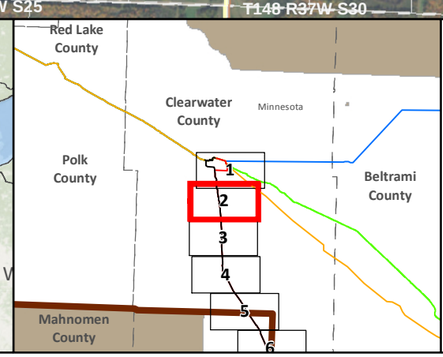

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 2A of 67

T148 R38W S2
T148 R38W S1
T148 R37W S6
T148 R37W S5
Peterson Lake
T148 R37W S4
T148 R37W S3
T148 R37W S2
T148 R38W S11
T148 R38W S12
T148 R37W S7
T148 R37W S8
T148 R37W S9
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T148 R37W S11
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143
223
T148 R38W S13
T148 R38W S14
Eddy Twsp Clearwater Co.
92
T148 R37W S18
T148 R37W S17
Holst Twsp Clearwater Co.
T148 R37W S16
T148 R37W S15
T148 R37W S14
Unnamed Creek
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T148 R38W S23
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T148 R37W S19
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APR
RA-03AM
T148 R37W S21
T148 R37W S22
T148 R37W S23
Old Red Lake Trail WMA
T148 R38W S26
T148 R38W S25
T148 R37W S30

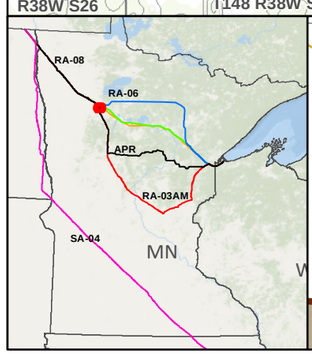

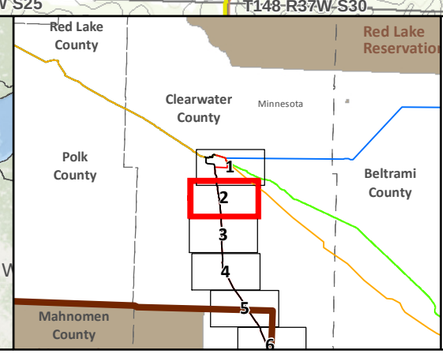

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 2B of 67

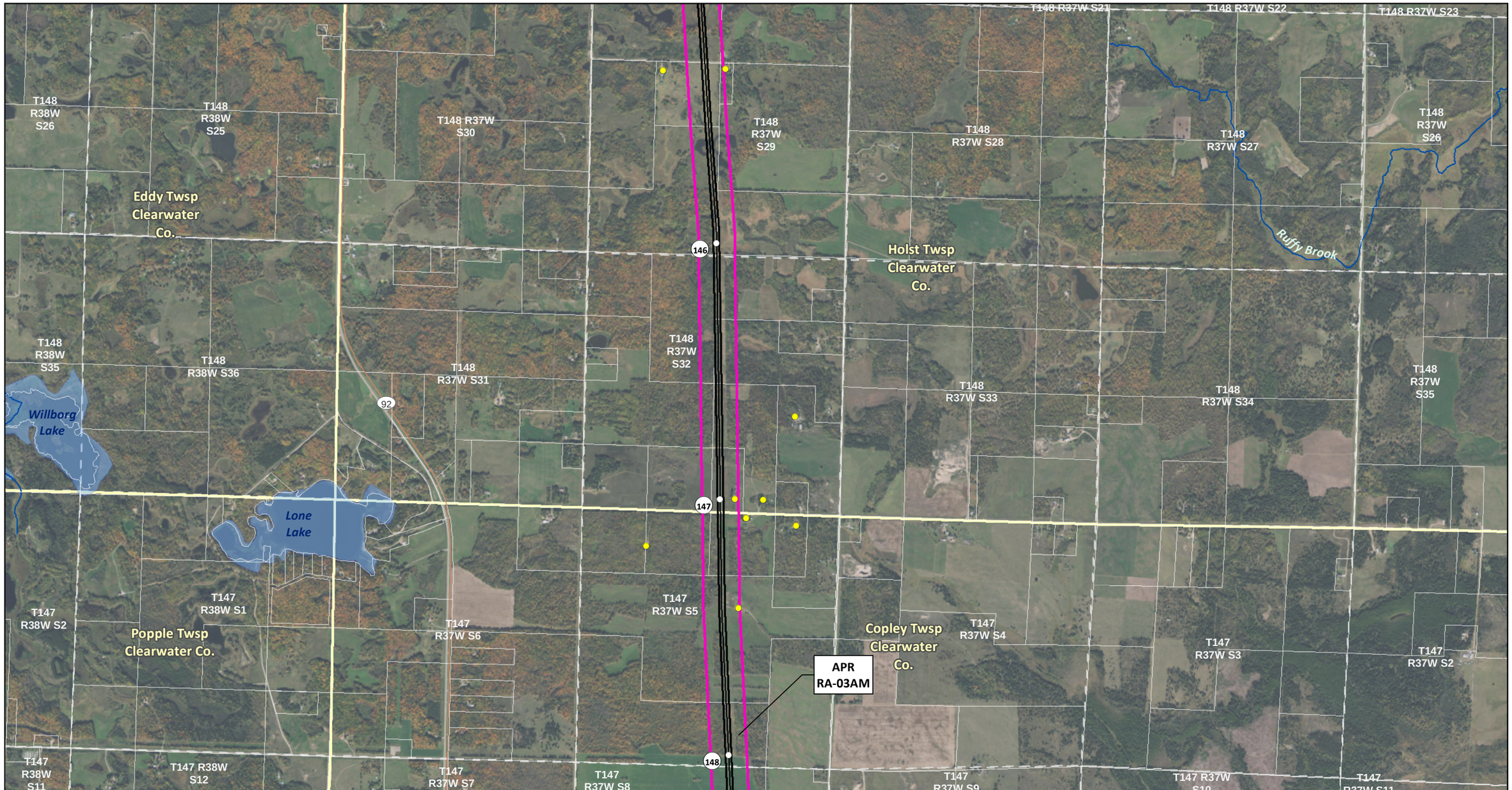

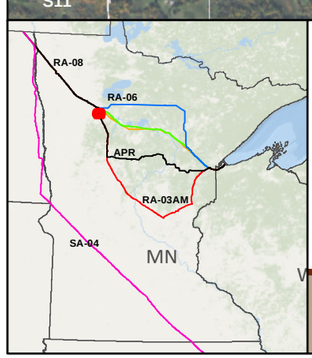

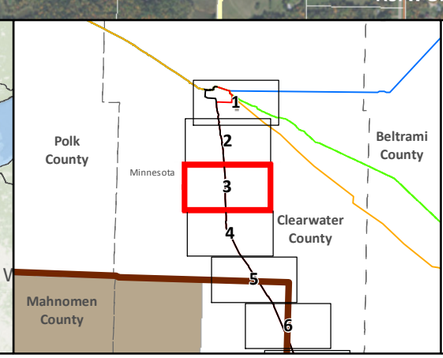

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 3A of 67

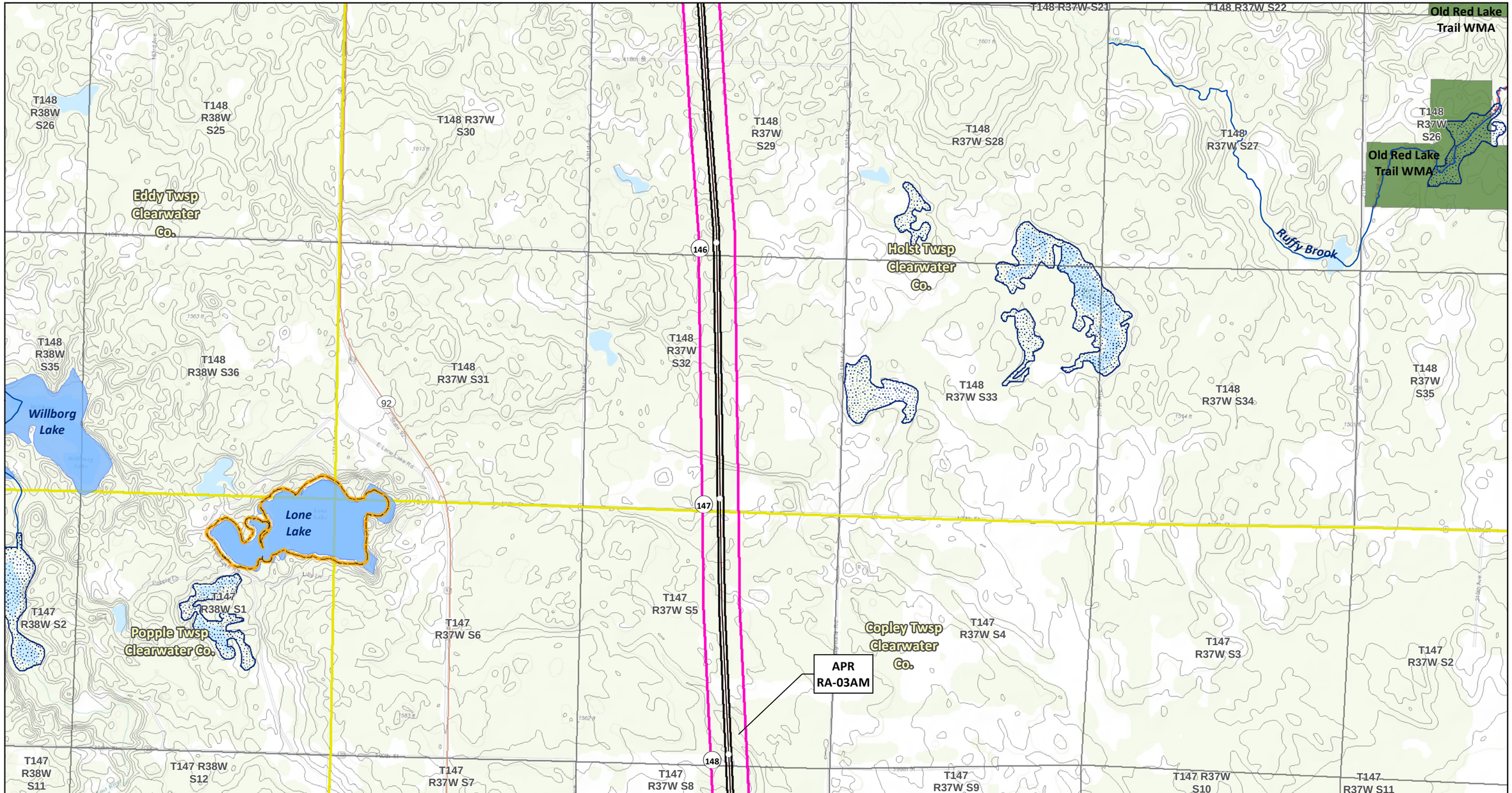

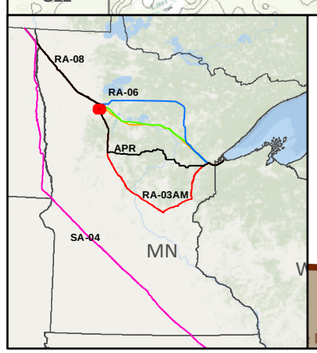

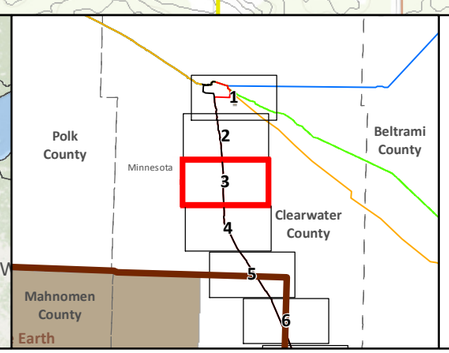

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 3B of 67

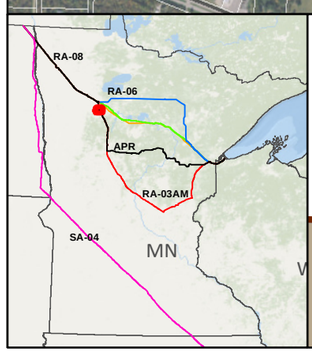

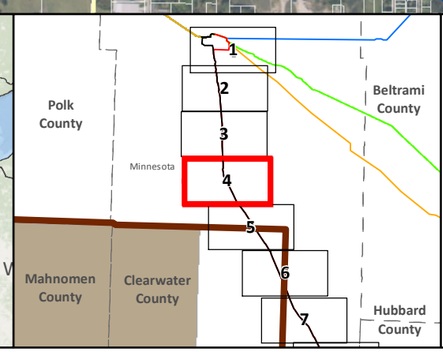

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 4A of 67

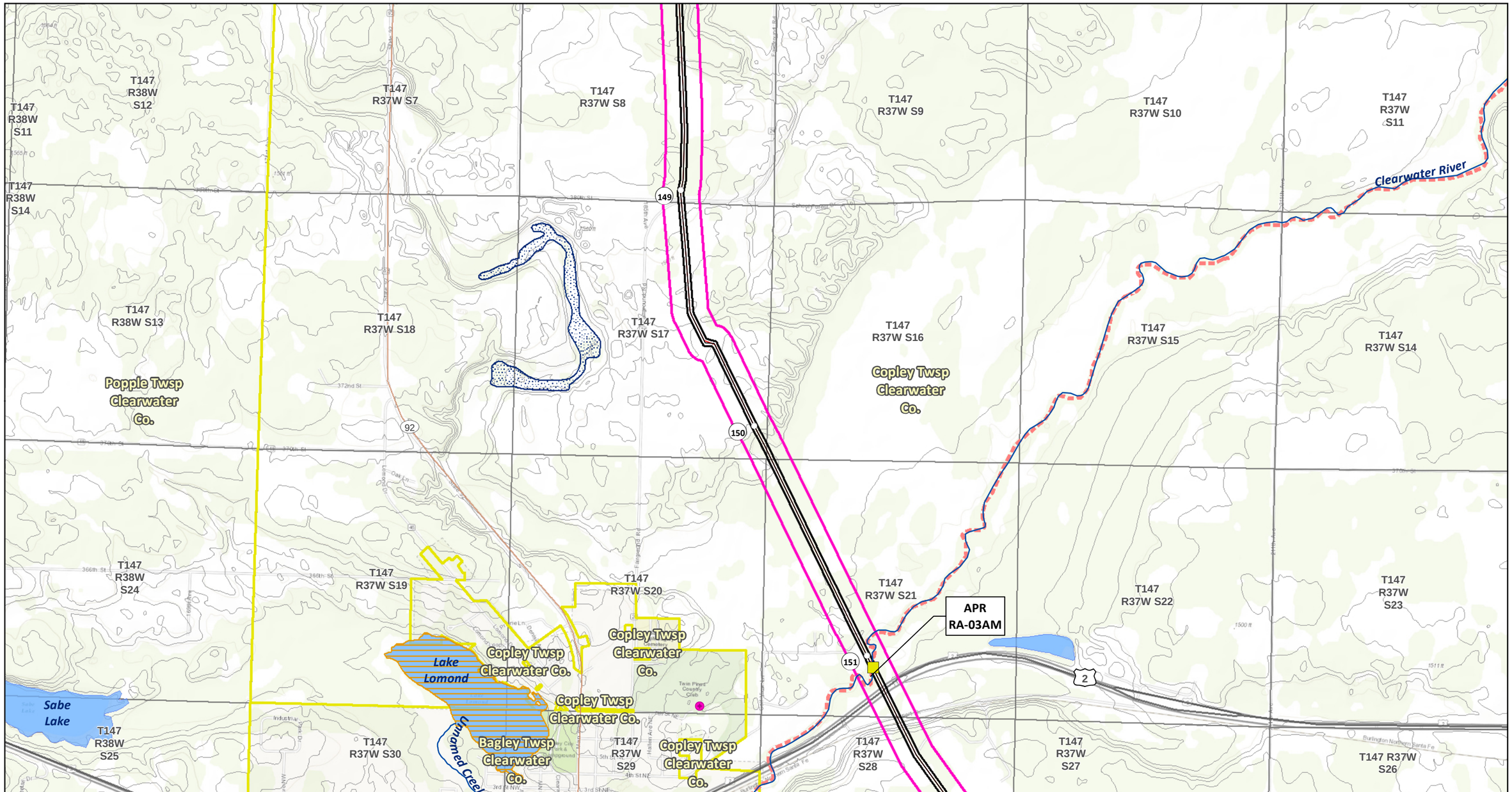

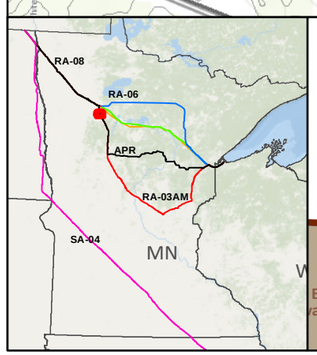

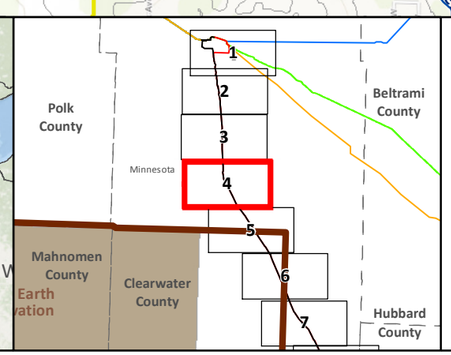

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
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- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
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Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 4B of 67

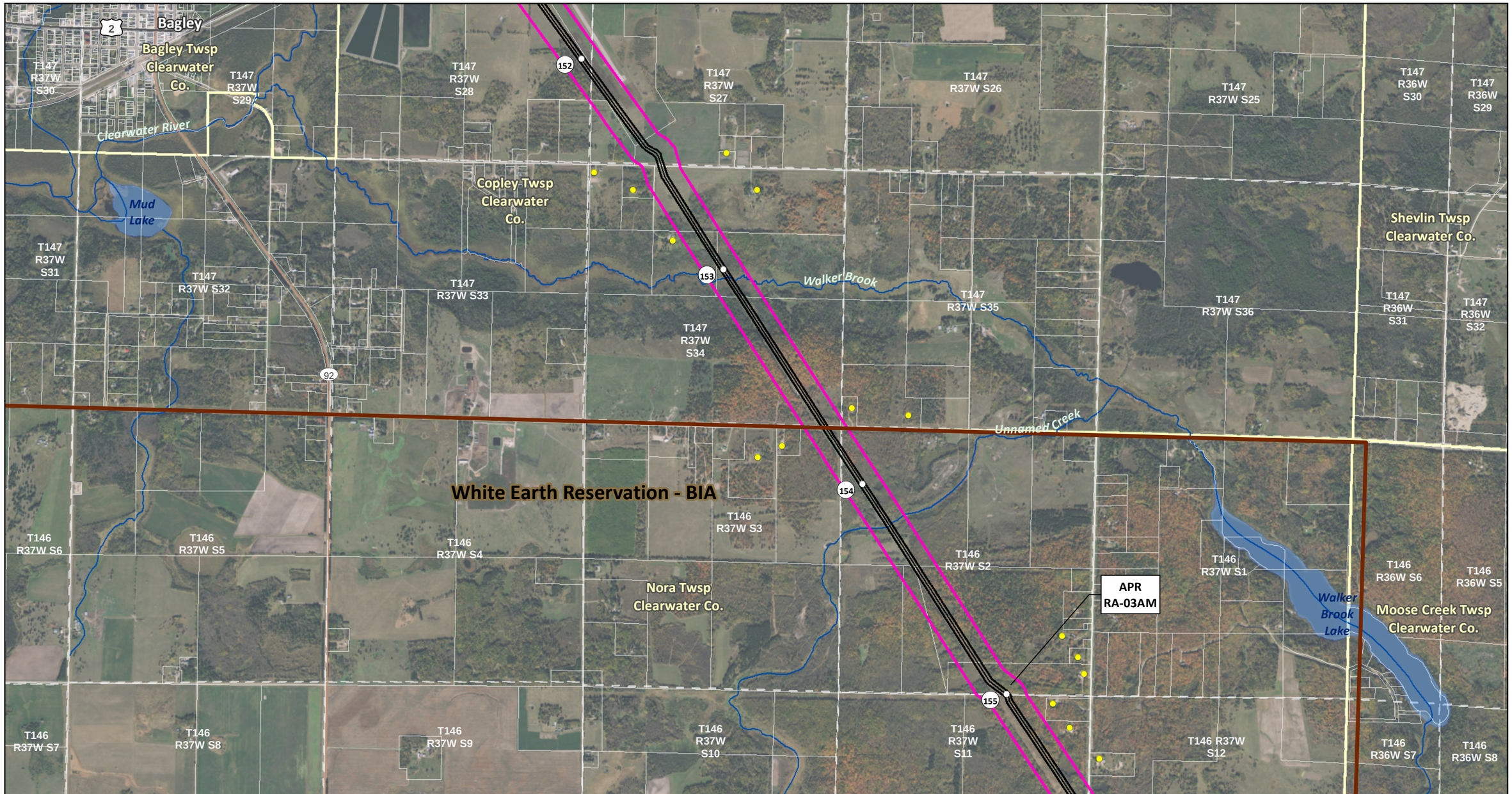

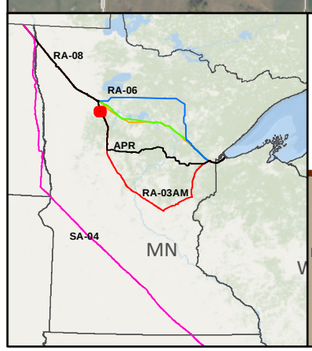

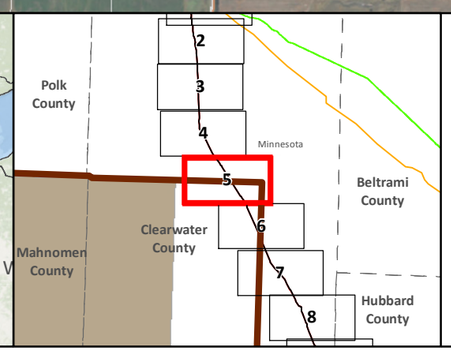

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

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Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 5A of 67

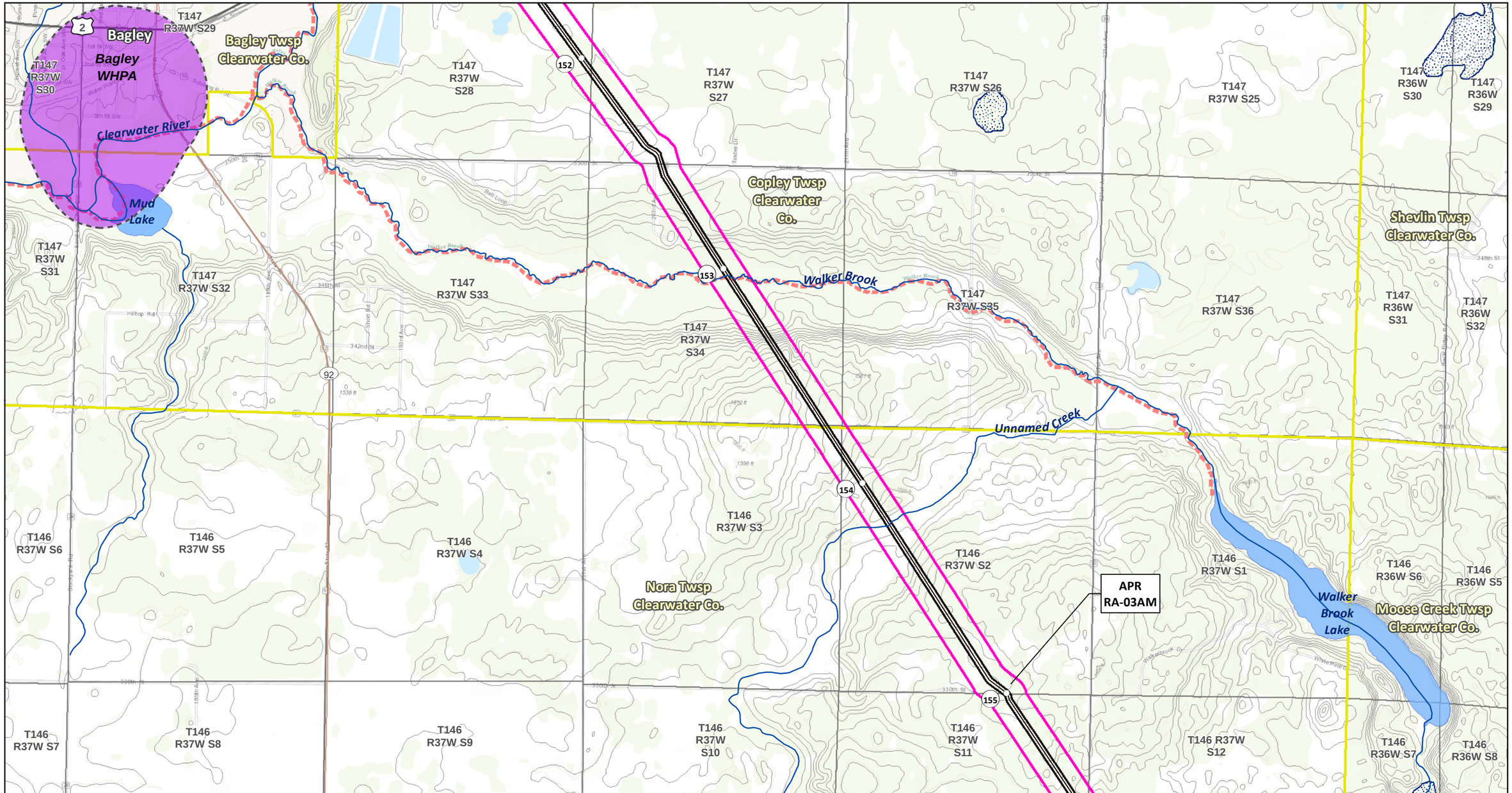

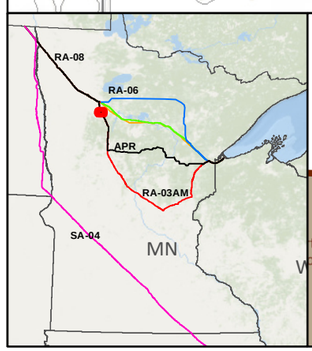

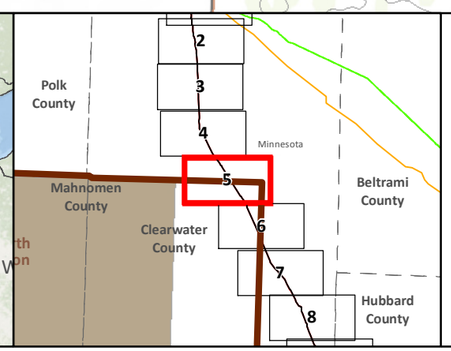

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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Wellhead Protection Area (WHPA)

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- Moderate

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- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 5B of 67

T146 R37W S10
T146 R37W S11
T146 R37W S12
T146 R36W S7
Walker Brook
T146 R36W S8
T146 R36W S9
T146 R36W S10
Unnamed Creek
White Earth Reservation - BIA
T146 R37W S13
T146 R37W S15
T146 R37W S14
T146 R36W S18
T146 R36W S17
T146 R36W S16
T146 R36W S15
Nora Twsp Clearwater Co.
Moose Creek Twsp Clearwater Co.
T146 R37W S22
T146 R37W S23
T146 R37W S24
T146 R36W S19
T146 R36W S20
T146 R36W S21
T146 R36W S22
Mosquito Creek
APR RA-03AM
T146 R37W S27
T146 R37W S26
T146 R37W S25
White Earth State Forest
T146 R36W S30
T146 R36W S29
T146 R36W S28
T146 R36W S27

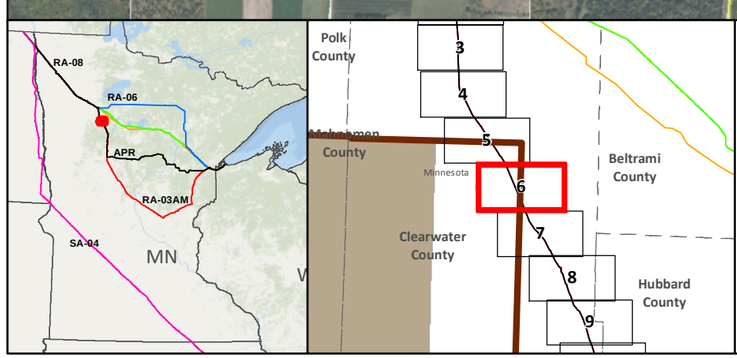

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

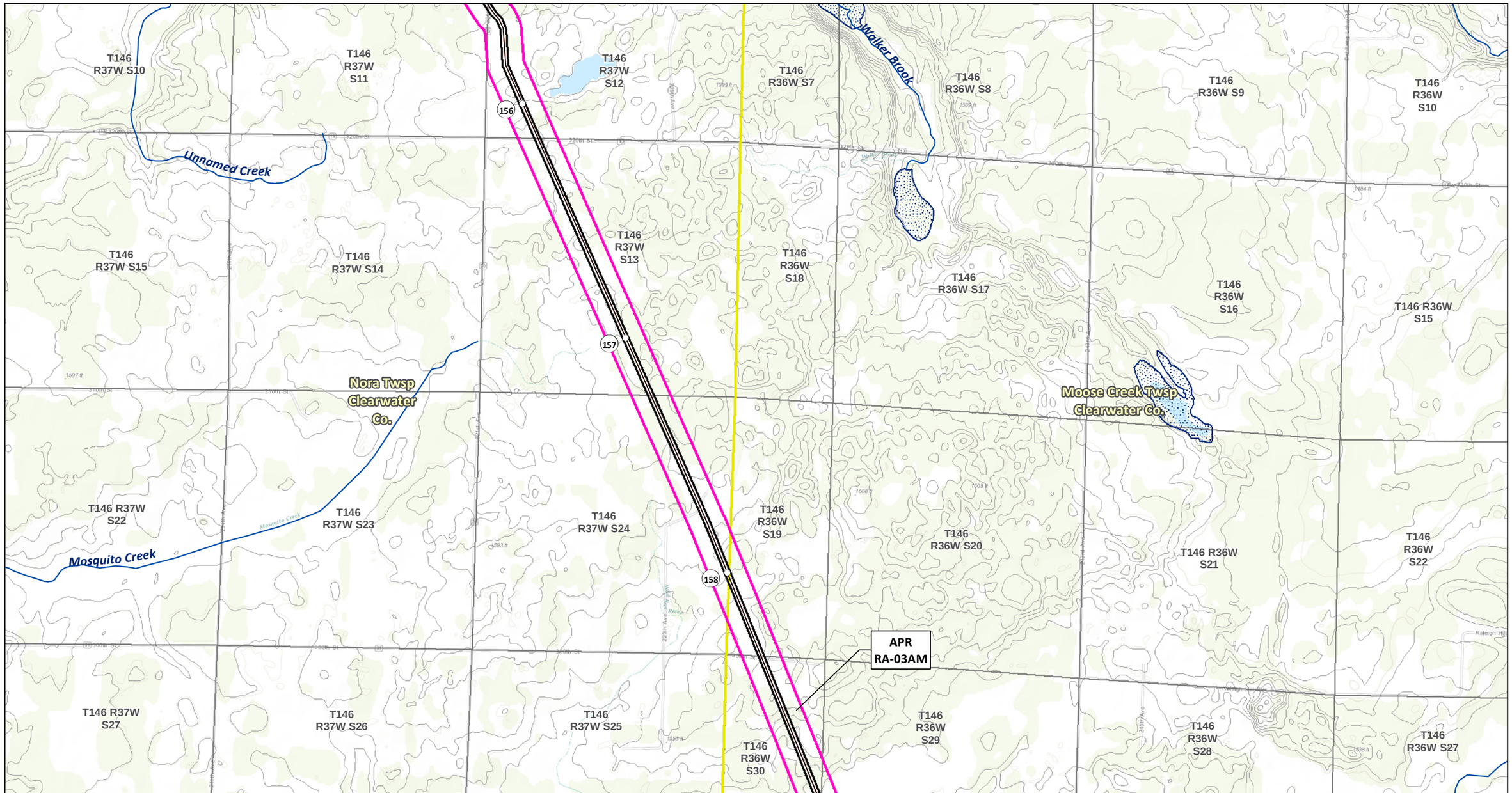

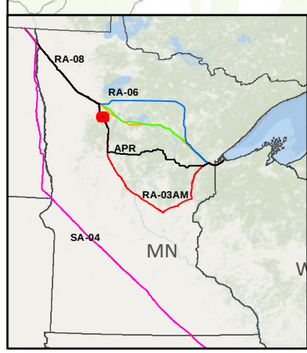

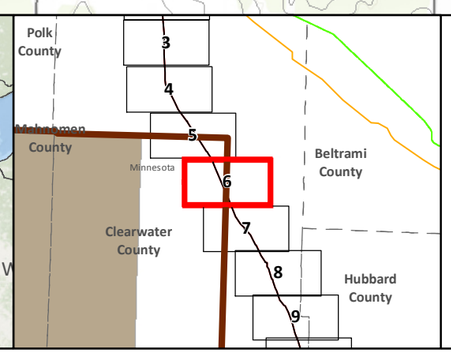

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 6B of 67

T146 R37W S26
T146 R37W S25
T146 R36W S30
T146 R36W S29
T146 R36W S28
T146 R36W S27
T146 R36W S26
T146 R36W S25
Mud Lake
Nora Twsp Clearwater Co.
T146 R36W S31
T146 R36W S32
Moose Creek Twsp Clearwater Co.
T146 R37W S35
T146 R37W S36
160
T146 R36W S33
T146 R36W S34
T146 R36W S35
White Earth Reservation - BIA
White Earth State Forest
T146 R36W S36
161
T145 R37W S2
T145 R37W S1
T145 R36W S6
T145 R36W S5
T145 R36W S4
APR RA-03AM
T145 R36W S3
T145 R36W S2
T145 R36W S1
Minerva Twsp Clearwater Co.
Upper Rice Lake
Bear Creek Twsp Clearwater Co.
162
T145 R37W S11
T145 R37W S12
T145 R36W S7
T145 R36W S8
T145 R36W S9
T145 R36W S10
T145 R36W S11
T145 R36W S12

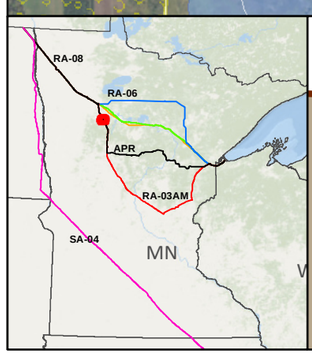

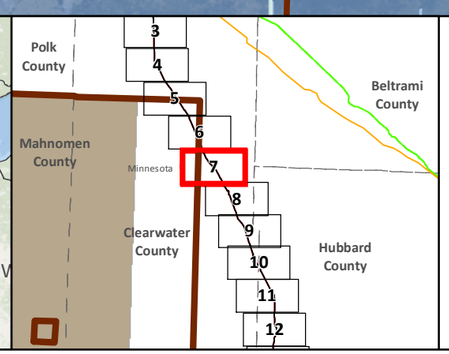

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
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- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 7A of 67

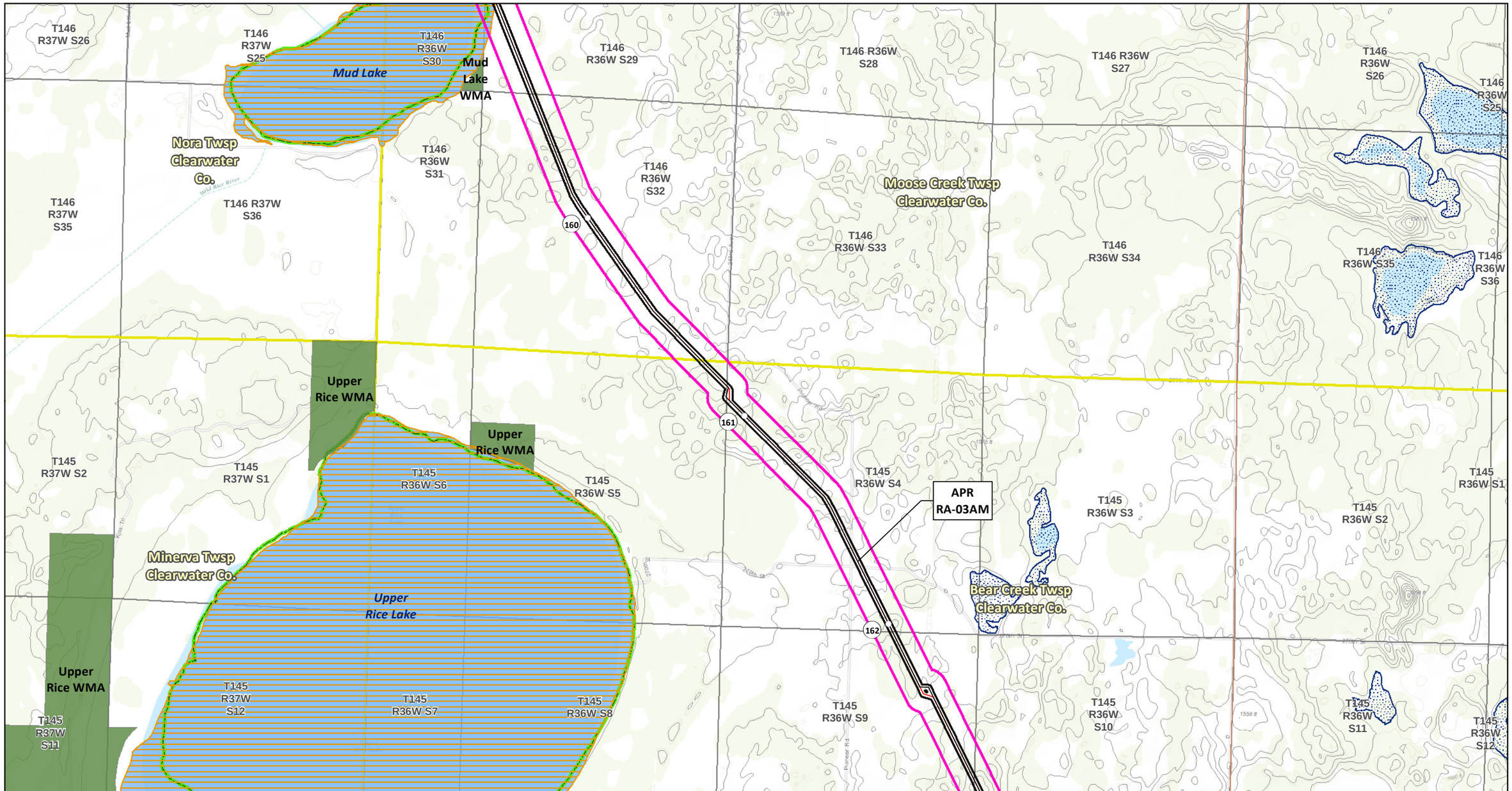

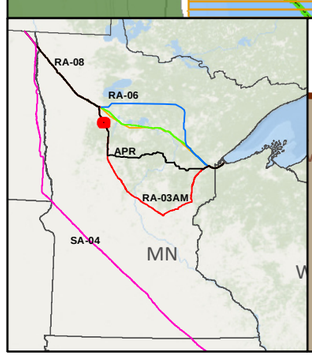

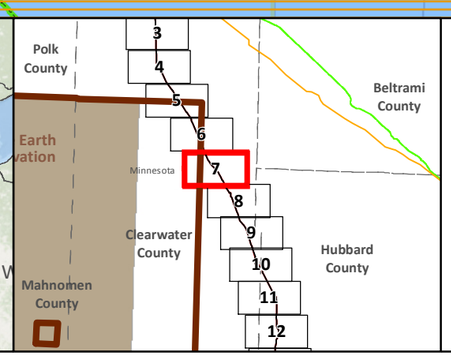

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 7B of 67

T145 R36W S8
T145 R36W S9
T145 R36W S10
T145 R36W S11
T145 R36W S12
T145 R35W S7
T145 R35W S8
T145 R36W S17
T145 R36W S16
T145 R36W S15
T145 R36W S14
T145 R36W S13
T145 R35W S18
T145 R35W S17
Mississippi Headwaters State Forest
Bear Creek Twsp
Clearwater Co.
Fern Twsp
Hubbard Co.
T145 R36W S20
T145 R36W S21
T145 R36W S22
T145 R36W S23
T145 R36W S24
T145 R35W S19
T145 R35W S20
APR
RA-03AM
Unnamed Stream
Mississippi River
LaSalle Creek
T145 R36W S29
T145 R36W S28
T145 R36W S27
T145 R36W S26
T145 R36W S25
T145 R35W S30
T145 R35W S29
LaSalle Lake
163
164
165
166

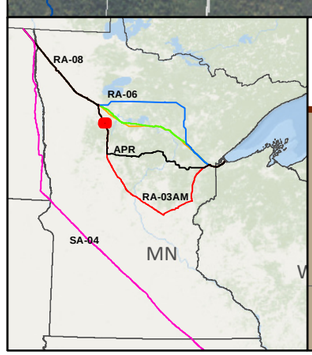

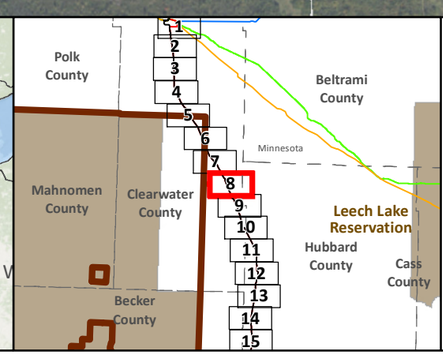

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

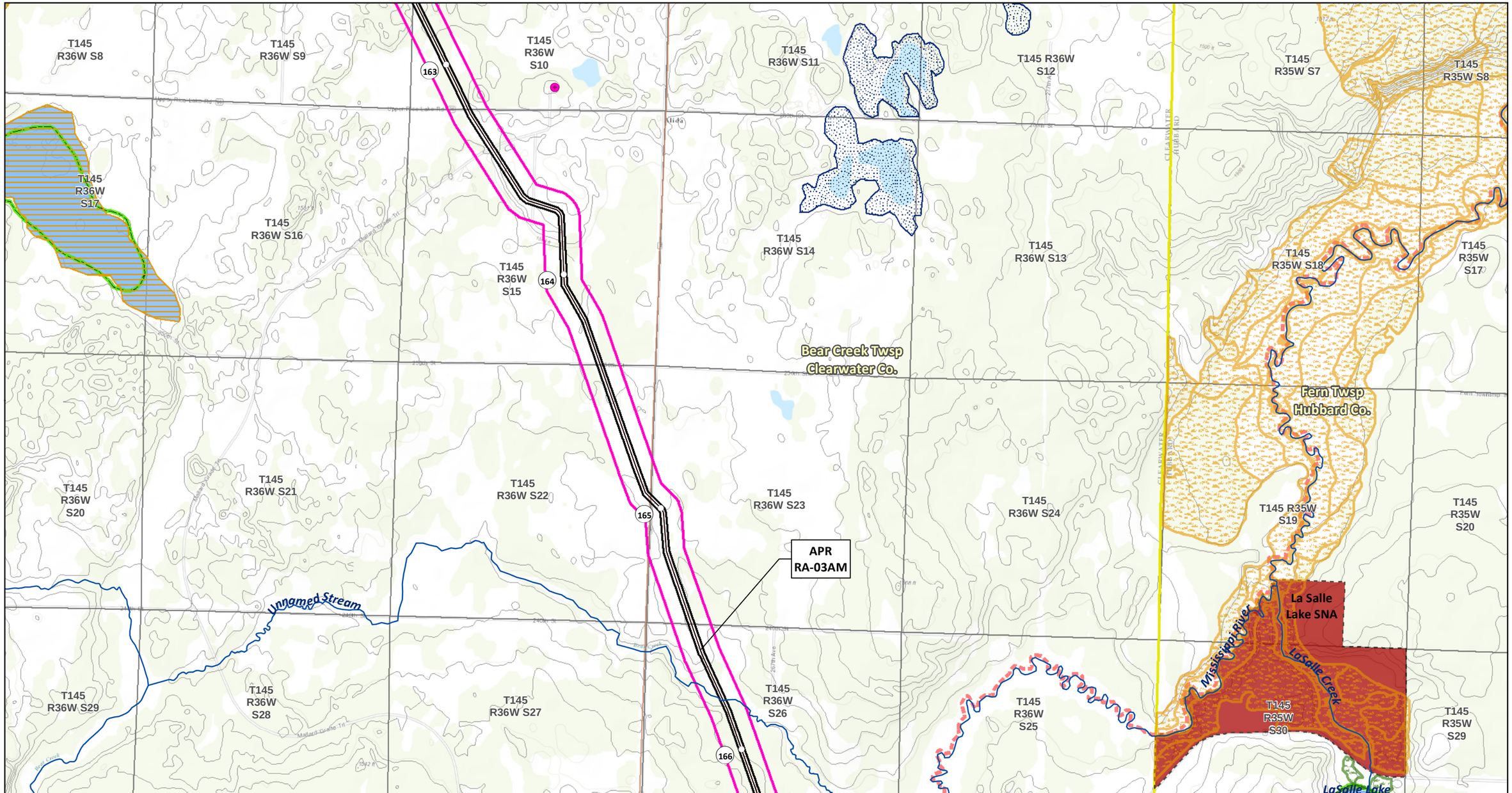

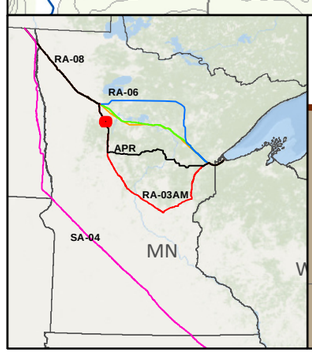

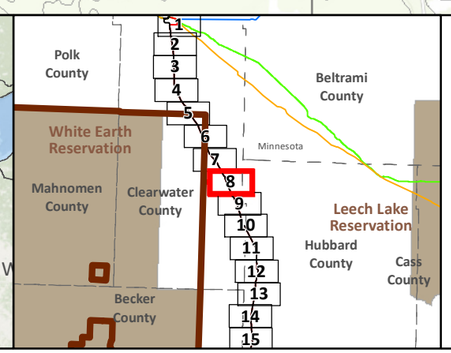

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 8B of 67

T145 R36W S28
T145 R36W S27
T145 R36W S26
T145 R36W S25
T145 R35W S30
T145 R35W S29
T145 R35W S28
LaSalle Lake
Bear Creek Twsp Clearwater Co.
Fern Twsp Hubbard Co.
T145 R36W S33
T145 R36W S34
T145 R36W S35
T145 R36W S36
T145 R35W S31
T145 R35W S32
LaSalle Creek
T145 R35W S33
Mississippi River
167
168
Mississippi Headwaters State Forest
T144 R36W S4
T144 R36W S3
T144 R36W S2
T144 R36W S1
T144 R35W S6
T144 R35W S5
T144 R35W S4
Itasca Twsp Clearwater Co.
Lake Hattie Twsp Hubbard Co.
APR RA-03AM
169
Middle LaSalle Lake
T144 R36W S9
T144 R36W S10
T144 R36W S11
T144 R36W S12
T144 R35W S7
T144 R35W S8
T144 R35W S9
Unnamed Stream
Big LaSalle Lake

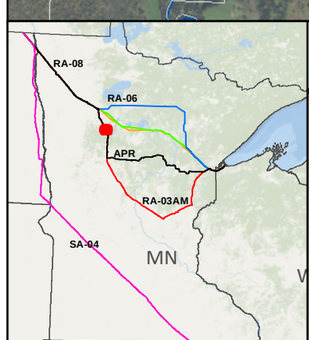

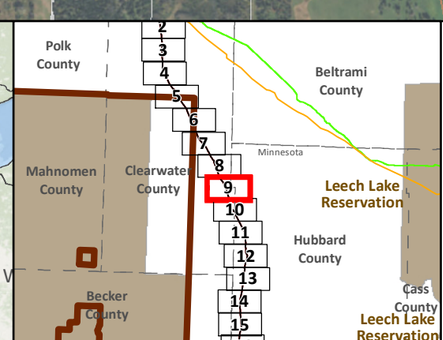

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 9A of 67

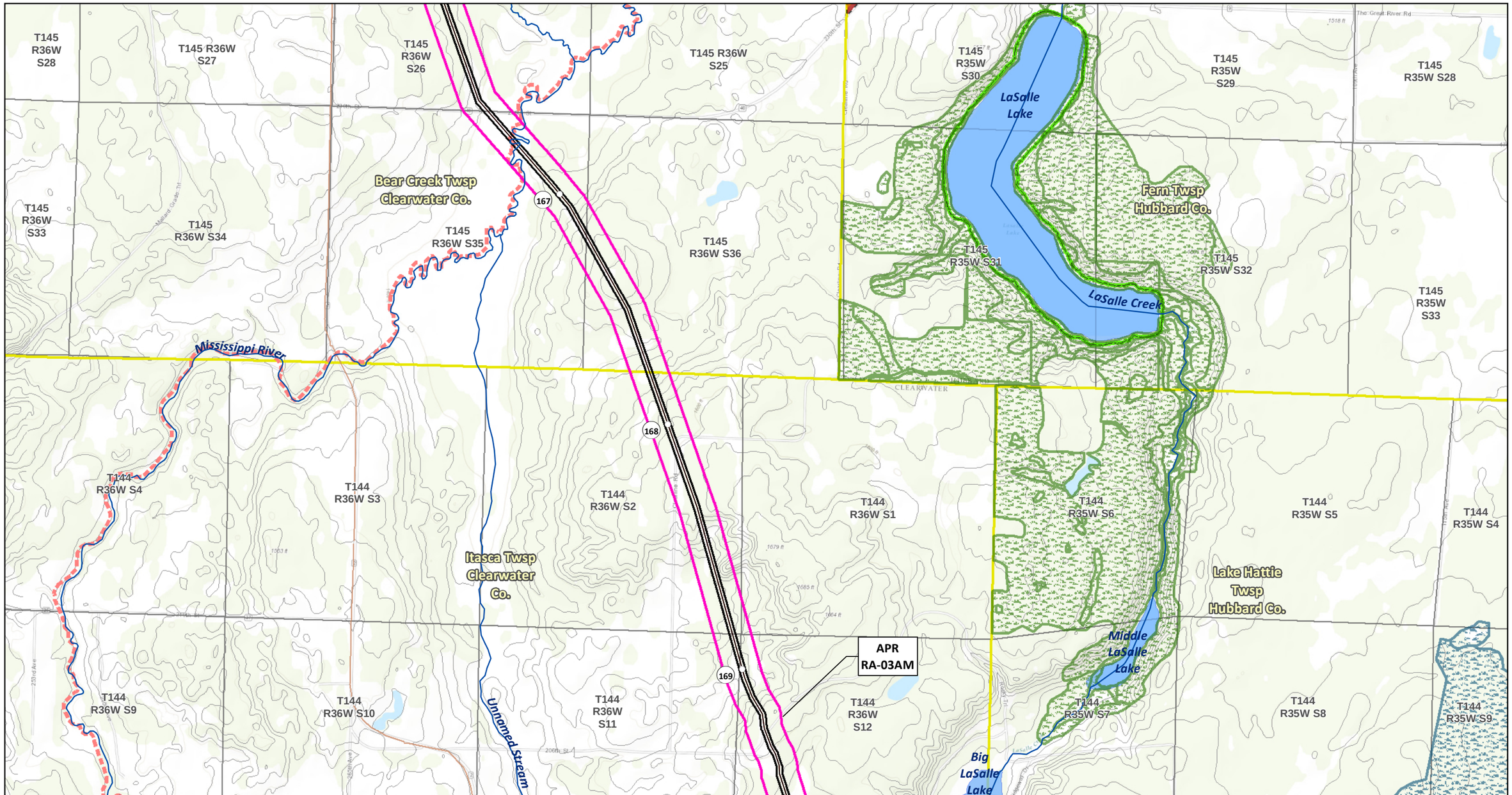

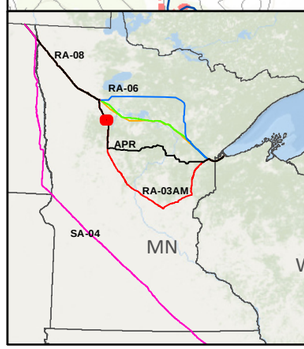

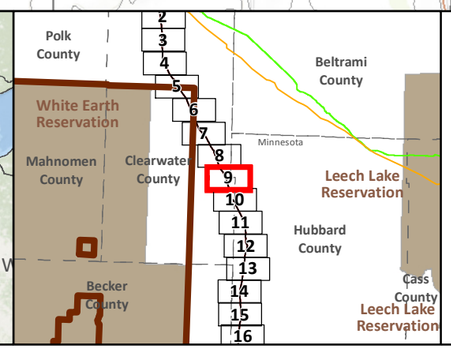

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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Water Resources
- Navigable Waterway Crossings
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Public Waters Watercourse
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- Outstanding
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 9B of 67

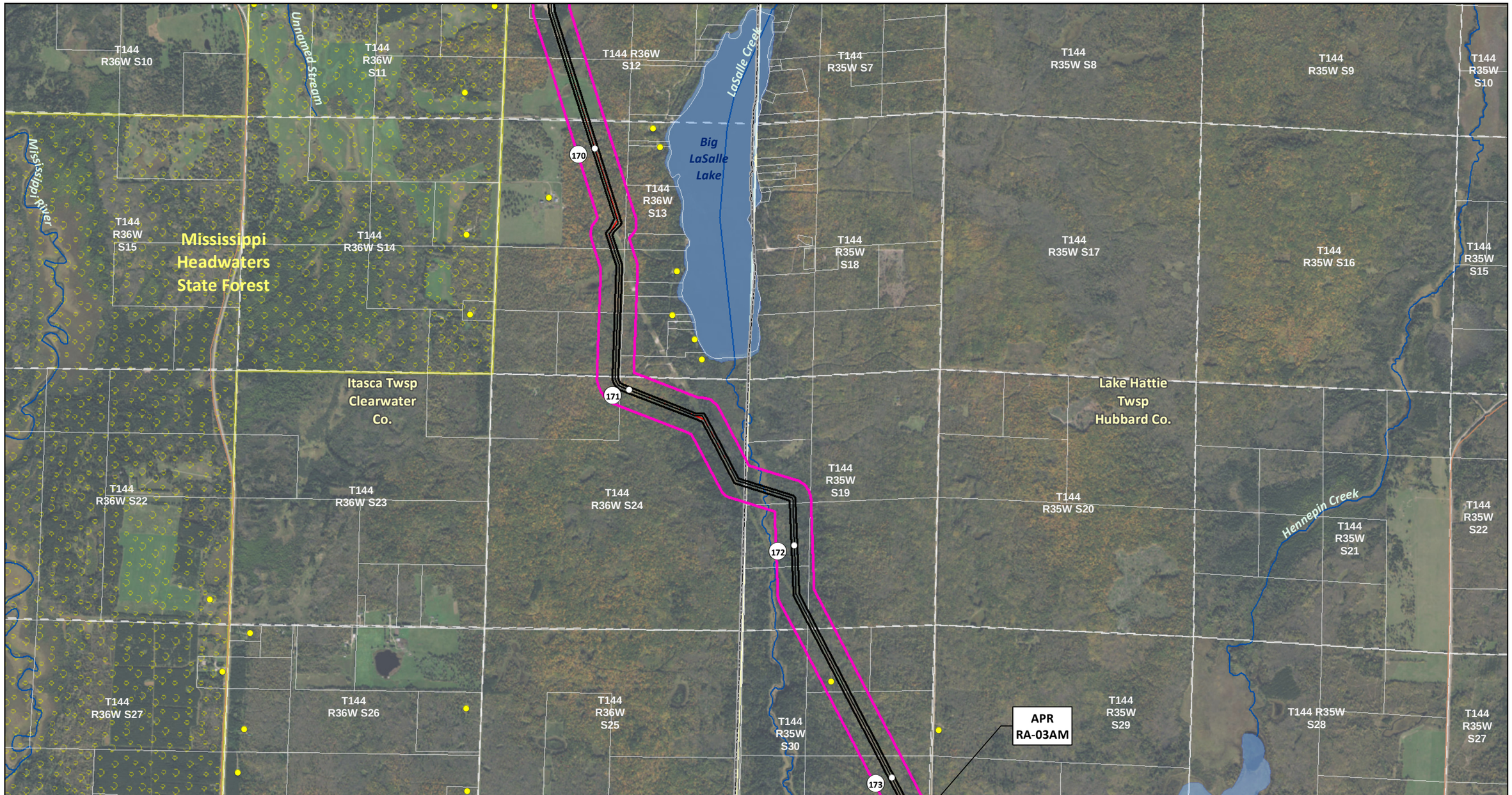

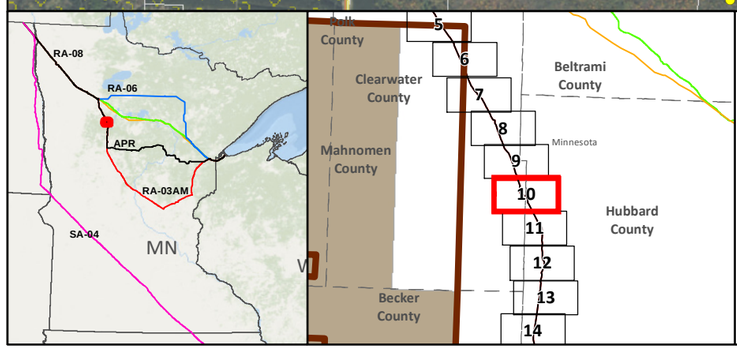

SA-04

Applicant's Preferred Route (APR)

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Anticipated 120' Construction ROW

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Major Road

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0 0.125 0.25 0.5 Miles

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LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 10A of 67

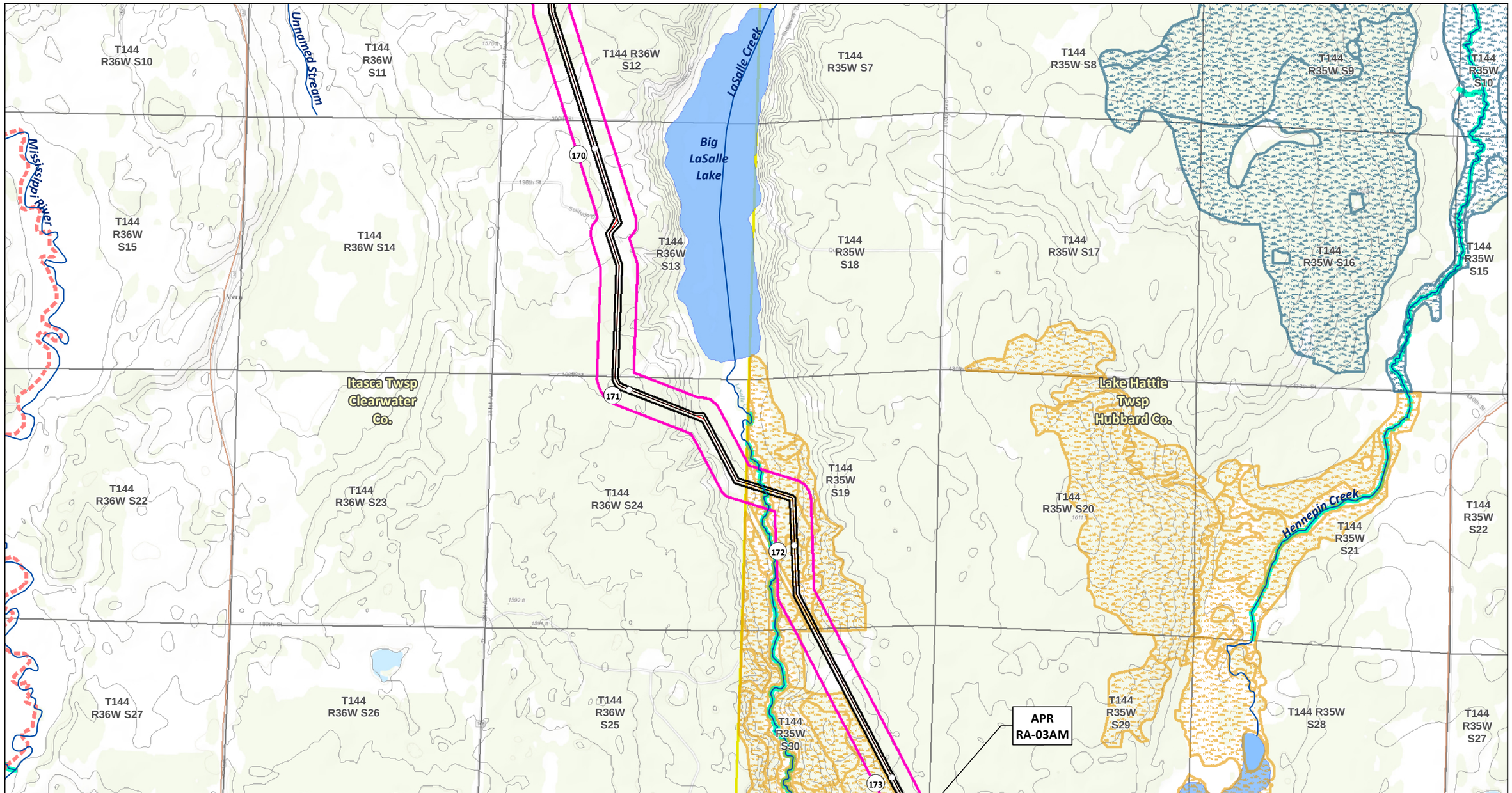

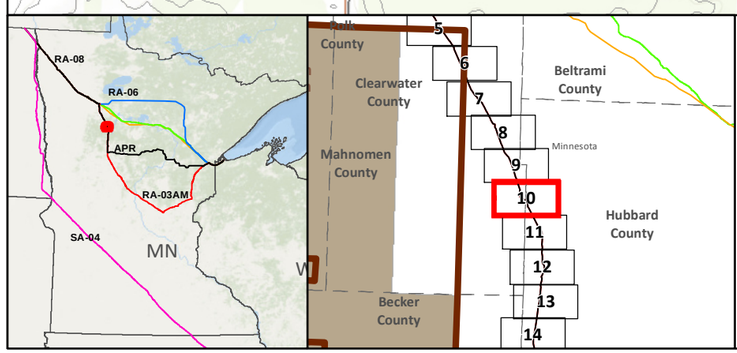

SA-04
Applicant's Preferred Route (APR)

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 10B of 67

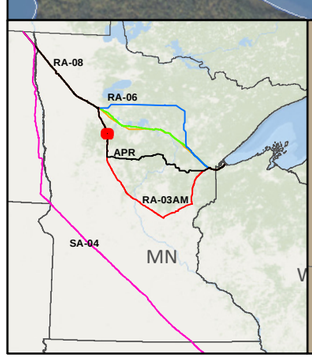

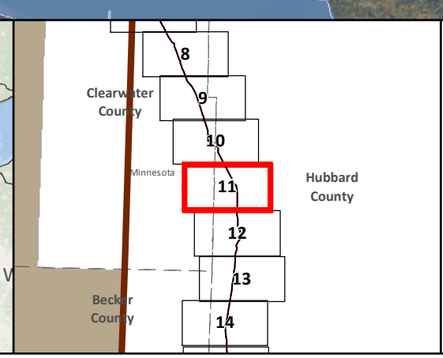

SA-04
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- RA-06
- RA-07
- RA-08

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Anticipated 120' Construction ROW
Route Width (750')
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Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 11A of 67

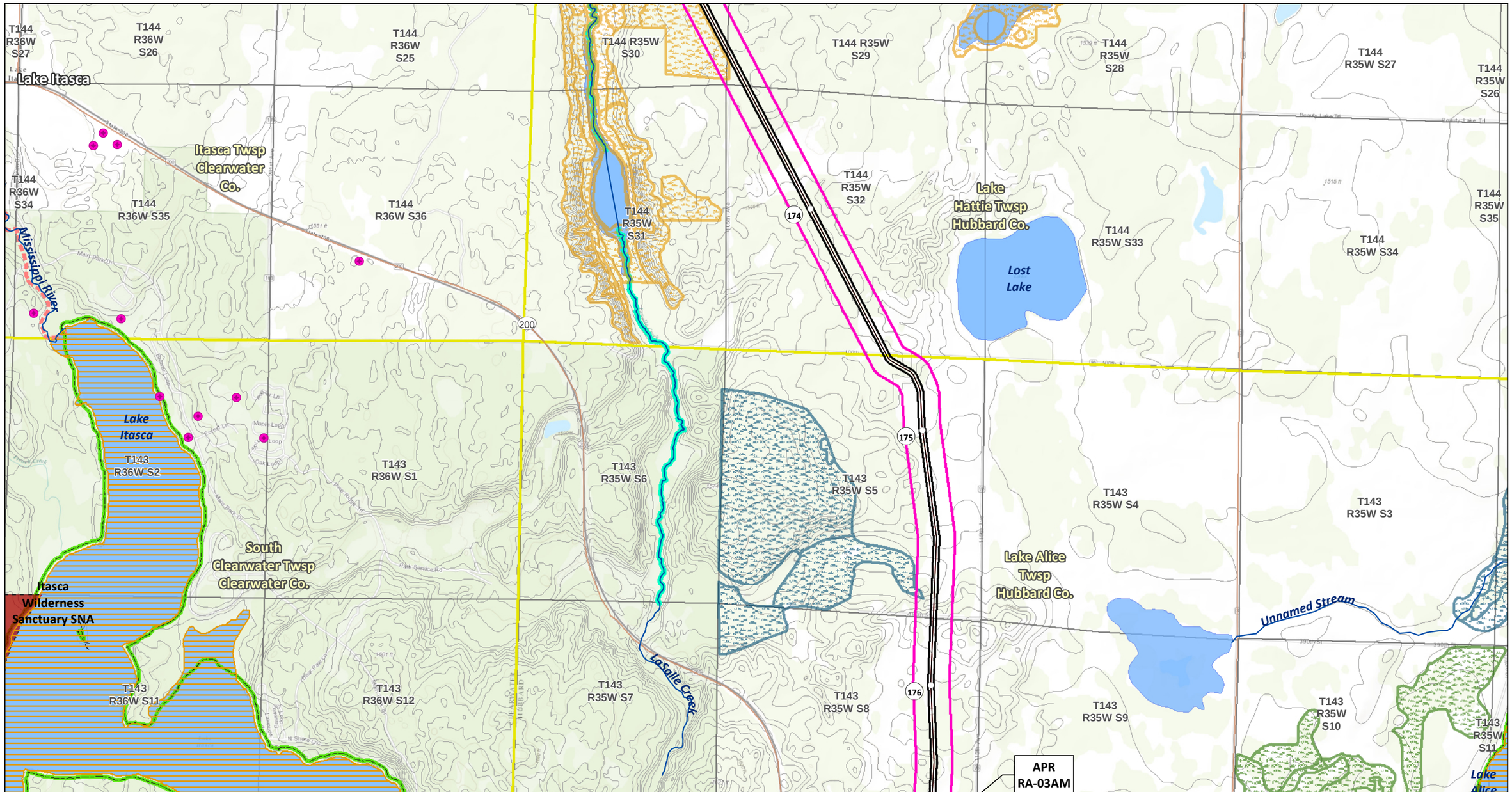

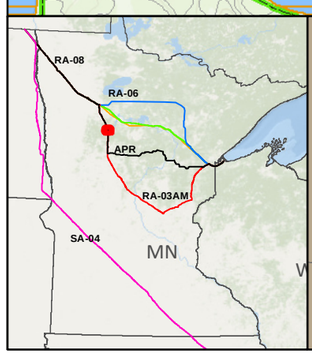

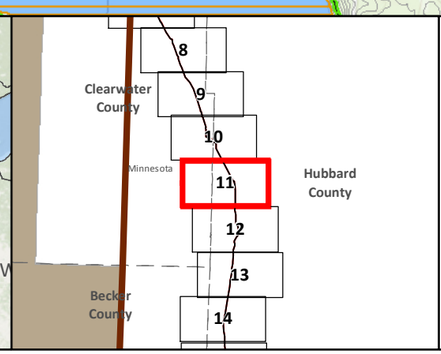

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 11B of 67

T143 R36W S11
T143 R36W S12
Lake Itasca
T143 R35W S7
T143 R35W S8
T143 R35W S9
T143 R35W S10
Lake Alice
T143 R35W S11
T143 R36W S14
T143 R36W S13
T143 R35W S18
T143 R35W S17
T143 R35W S16
Paul Bunyan State Forest
T143 R35W S15
Birch Creek
T143 R35W S14
Lyendecker Lake
Goodwin Lake
Lake Alice Twsp Hubbard Co.
T143 R36W S23
Wettersten Lake
South Clearwater Twsp Clearwater Co.
T143 R36W S24
T143 R35W S19
T143 R35W S20
T143 R35W S21
T143 R35W S22
T143 R35W S23
Mary Lake
Allen Lake
Deer Park Lake
Clarke Lake
T143 R36W S26
T143 R36W S25
Myrtle Lake
Twin Lakes
T143 R35W S30
T143 R35W S29
APR RA-03AM
T143 R35W S28
T143 R35W S27
T143 R35W S26
Spider Lake
Deming Lake
McKay Lake
Beauty Lake
177
178
179
200
71

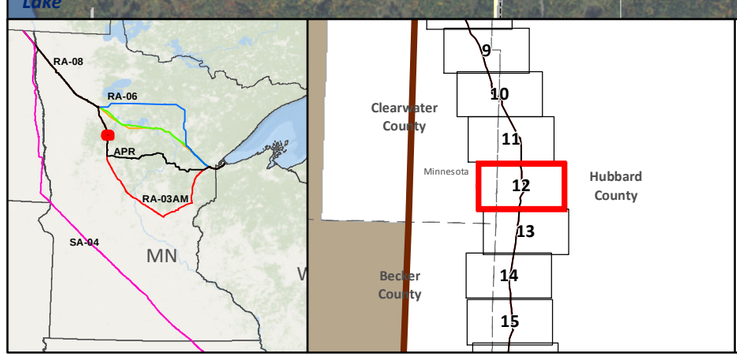

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation
Tribal Trust Land
White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 12A of 67

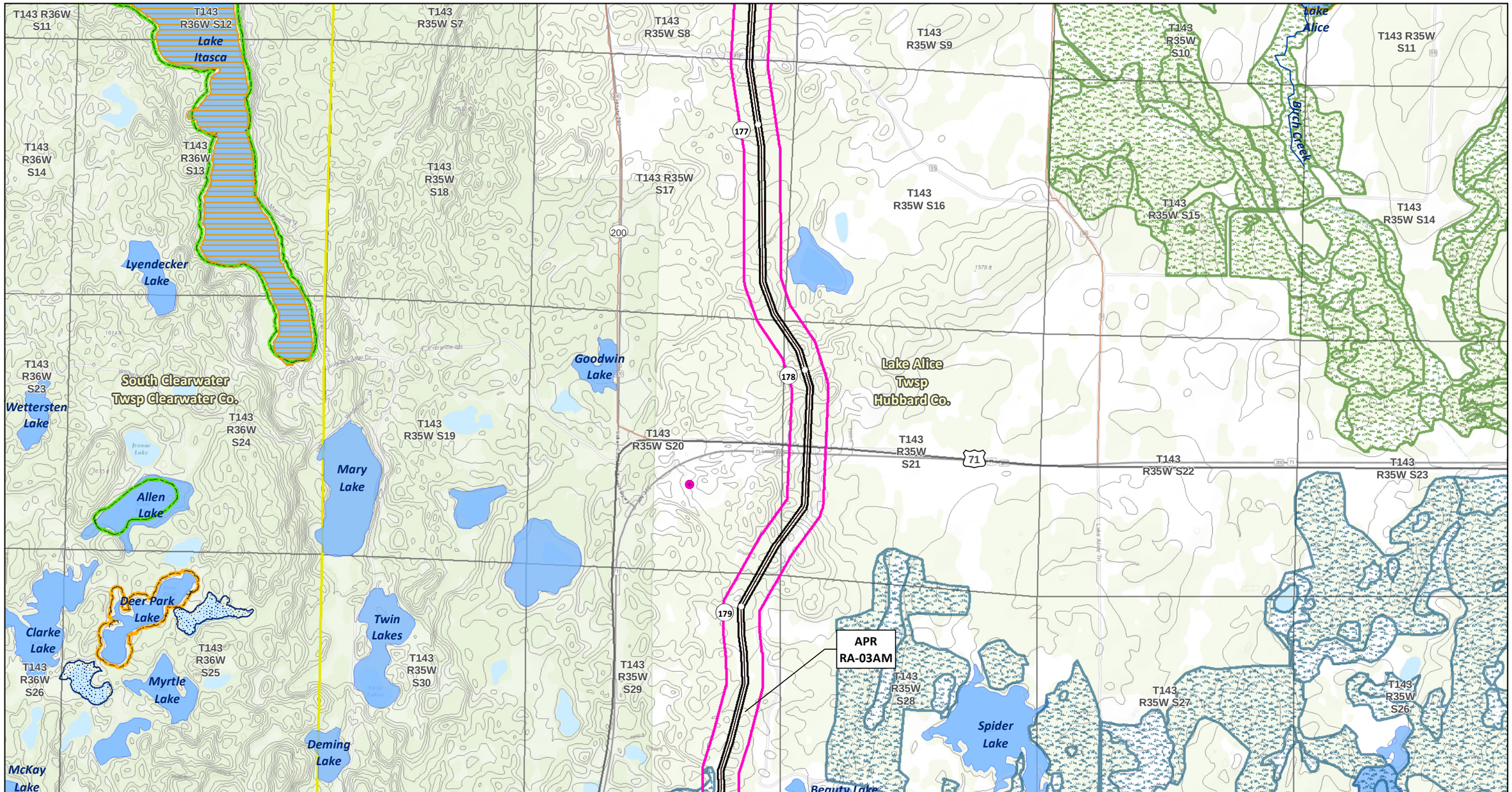

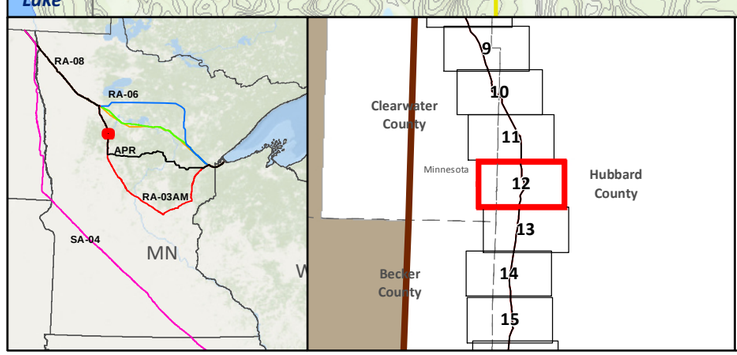

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 12B of 67

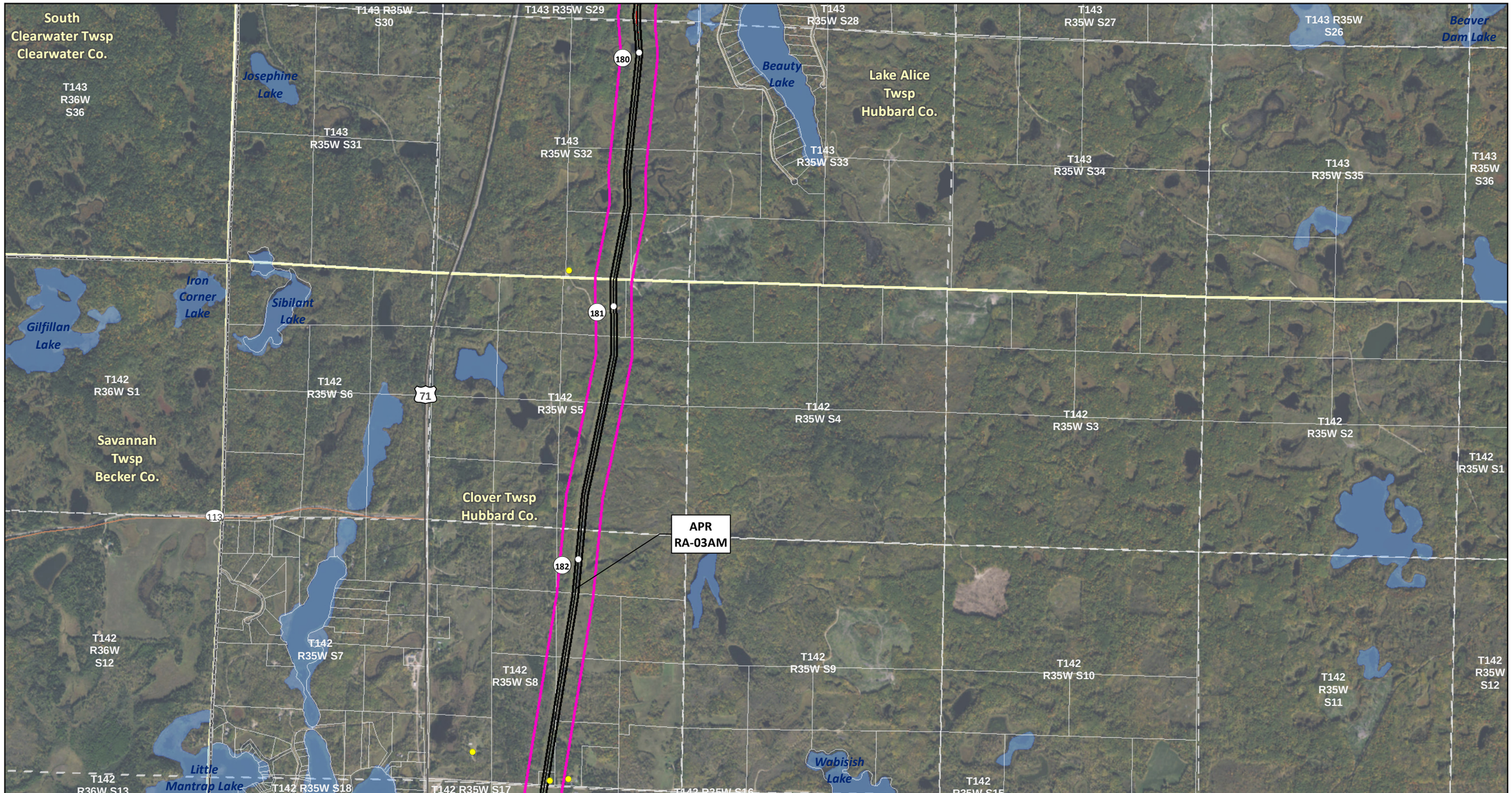

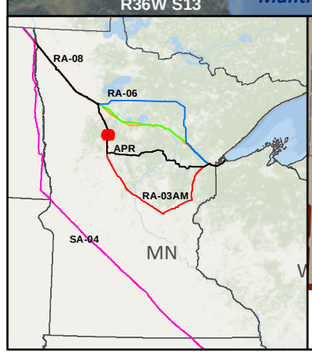

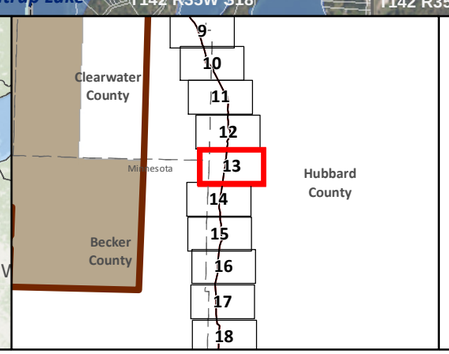

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 13A of 67

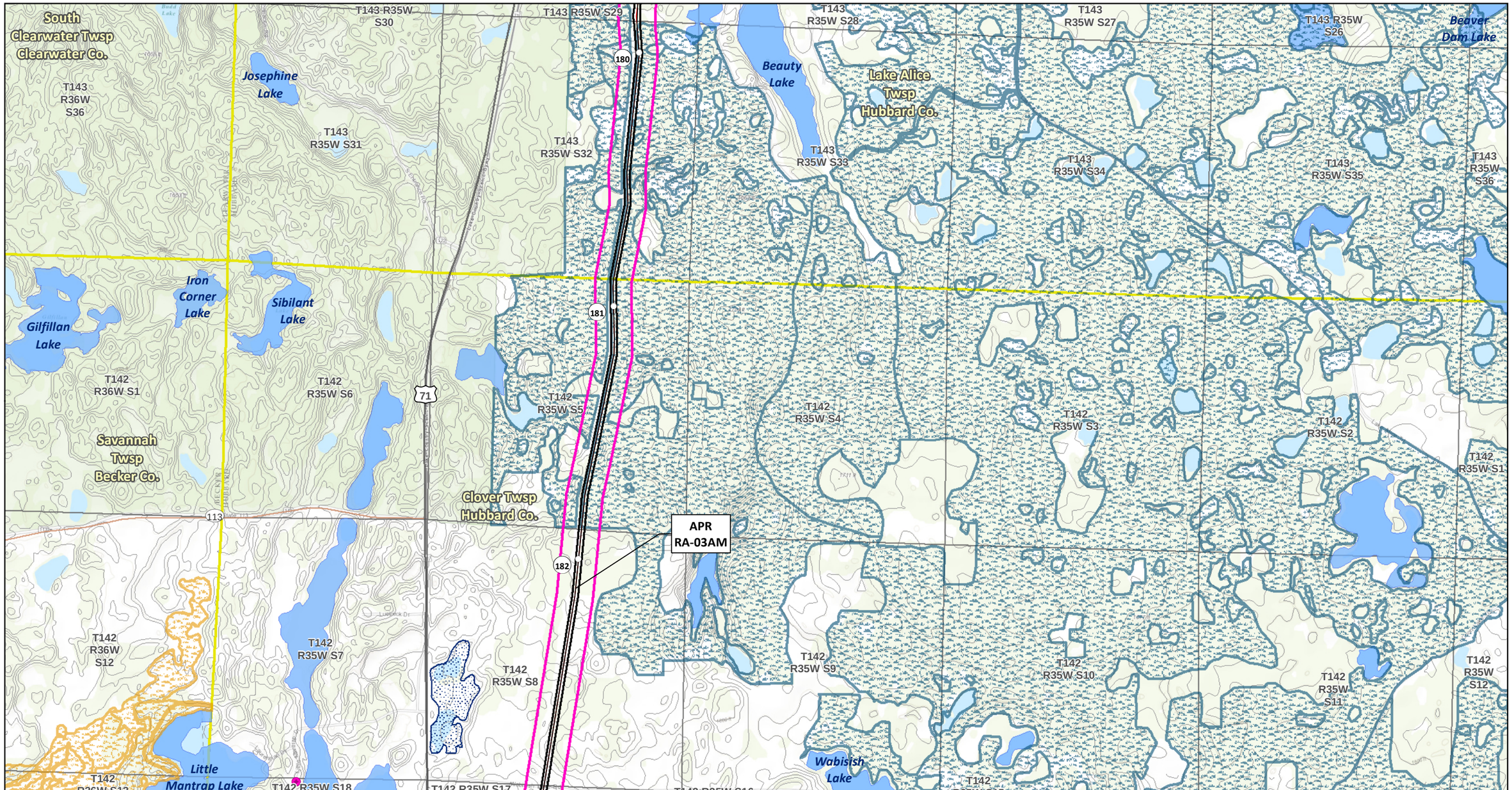

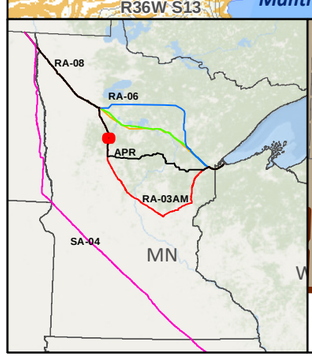

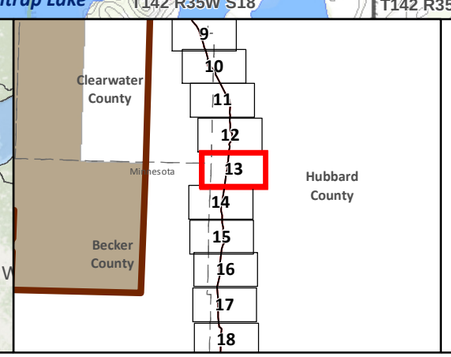

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 13B of 67

T142 R36W S12
T142 R35W S7
Little Mantrap Lake
T142 R35W S8
T142 R35W S9
Wabisish Lake
T142 R35W S10
T142 R35W S11
T142 R36W S14
T142 R36W S13
T142 R35W S18
T142 R35W S17
T142 R35W S16
T142 R35W S15
T142 R35W S14
Coon Lake
T142 R36W S23
Savannah Twsp Becker Co.
T142 R36W S24
T142 R35W S19
T142 R35W S20
Clover Twsp Hubbard Co.
T142 R35W S21
T142 R35W S22
T142 R35W S23
Upper Camel Lake
183
184
185
71
APR RA-03AM
T142 R36W S26
T142 R36W S25
T142 R35W S30
T142 R35W S29
T142 R35W S28
T142 R35W S27
T142 R35W S26
Unnamed Creek
Two Inlets State Forest
T142 R36W S35
T142 R36W S36
T142 R35W S31
T142 R35W S32
T142 R35W S33
Rose Lake
T142 R35W S34

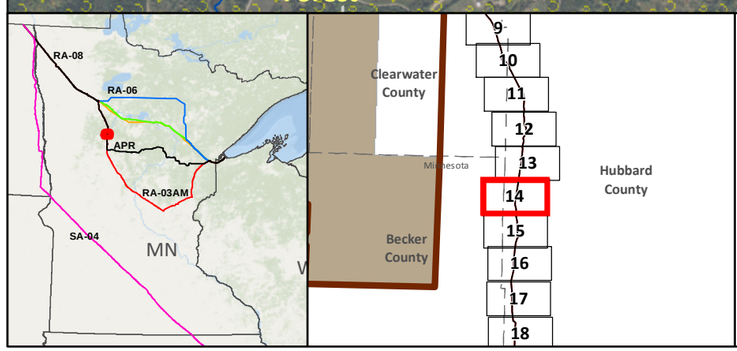

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 14A of 67

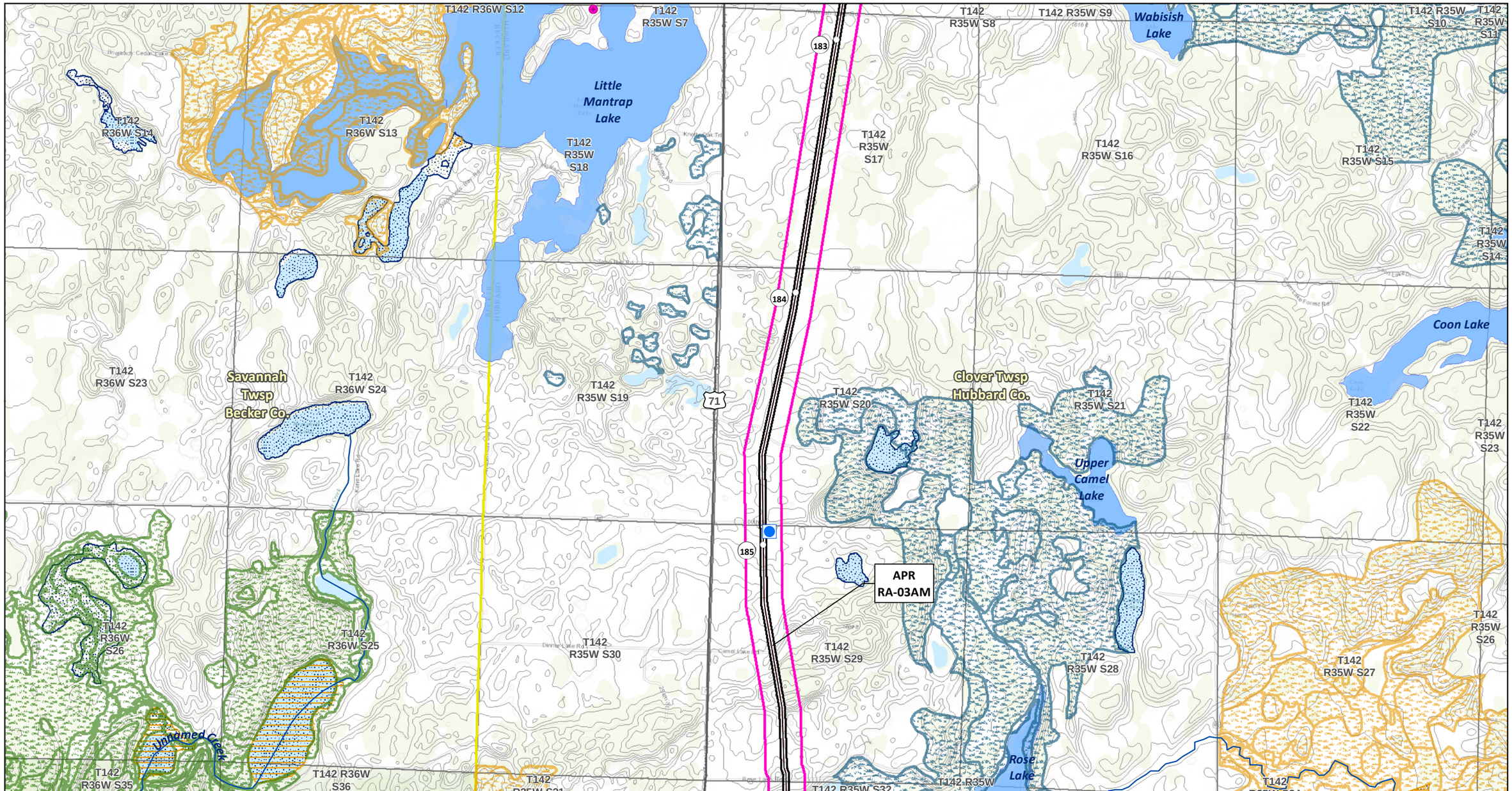

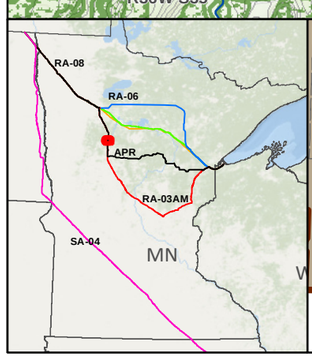

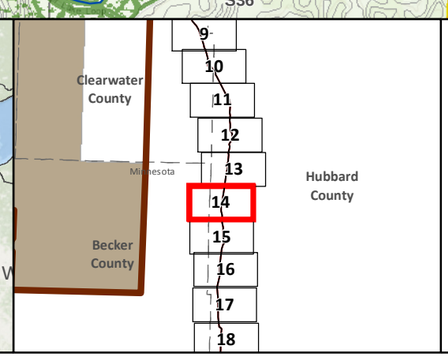

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 14B of 67

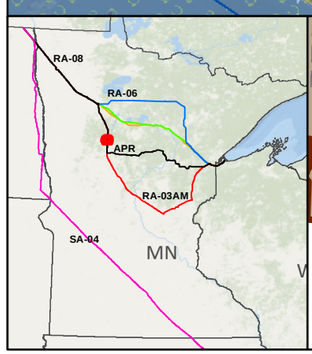

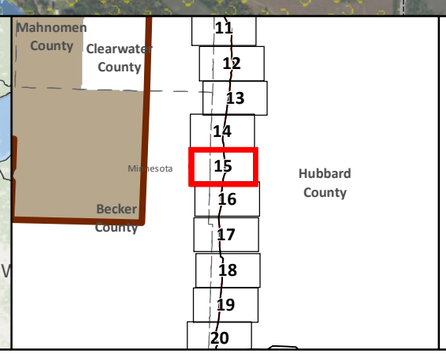

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 15A of 67

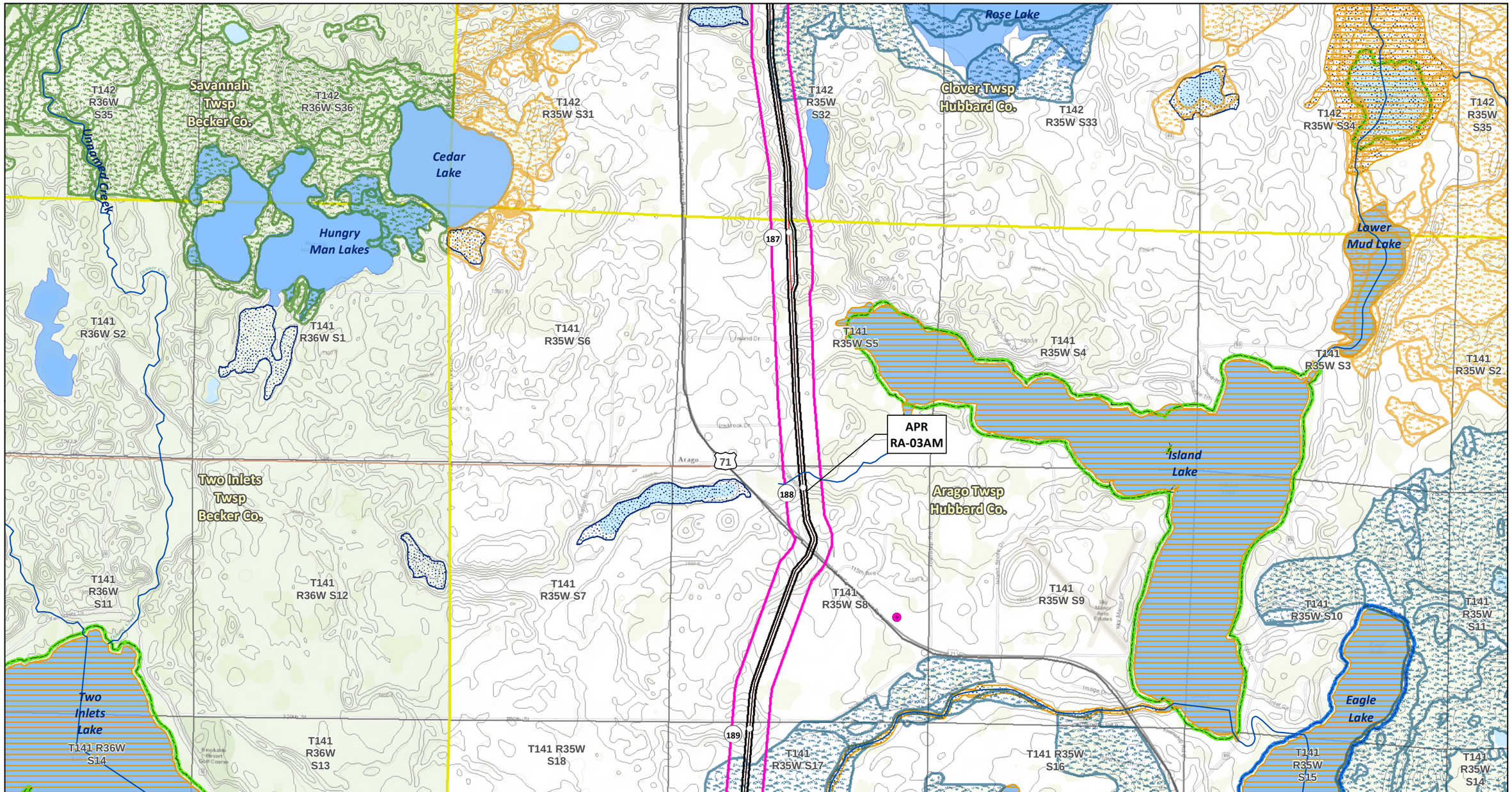

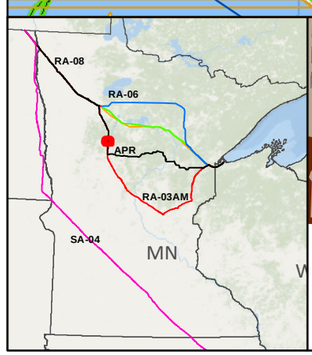

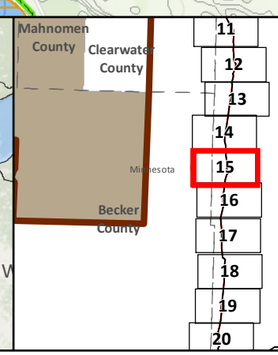

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 15B of 67

Two Inlets Lake
T141 R36W S14
T141 R36W S13
Unnamed Creek
Arago Twsp
Hubbard Co.
T141 R35W S18
T141 R35W S17
T141 R35W S16
T141 R35W S15
Eagle Lake
T141 R35W S14
Many Arm Lake
190
T141 R36W S23
T141 R36W S24
T141 R35W S19
T141 R35W S20
APR RA-03AM
T141 R35W S21
T141 R35W S22
71
T141 R35W S23
Two Inlets Twsp
Becker Co.
Mud Lake
Two Inlets State Forest
Potato Lake
Ten Acre Lake
T141 R36W S25
T141 R35W S30
T141 R35W S29
Beden Lake
T141 R35W S28
T141 R35W S27
T141 R35W S26
T141 R36W S26
T141 R36W S35
Fools Lake
T141 R36W S36
192
T141 R35W S31
Sloan Lake
T141 R35W S32
T141 R35W S33
T141 R35W S34
T141 R35W S35

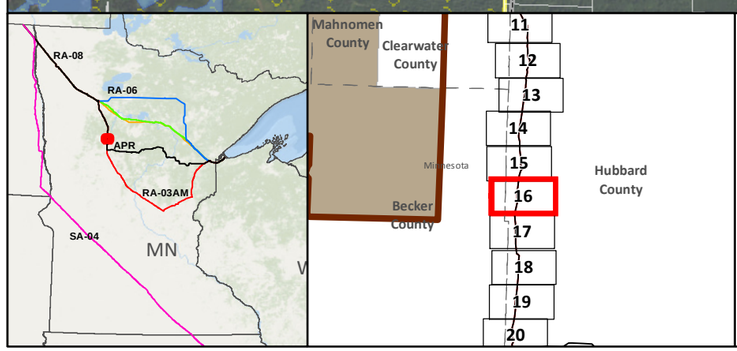

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
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Major Road
Township Boundary

Land Ownership
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- Tribal Trust Land
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Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
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1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

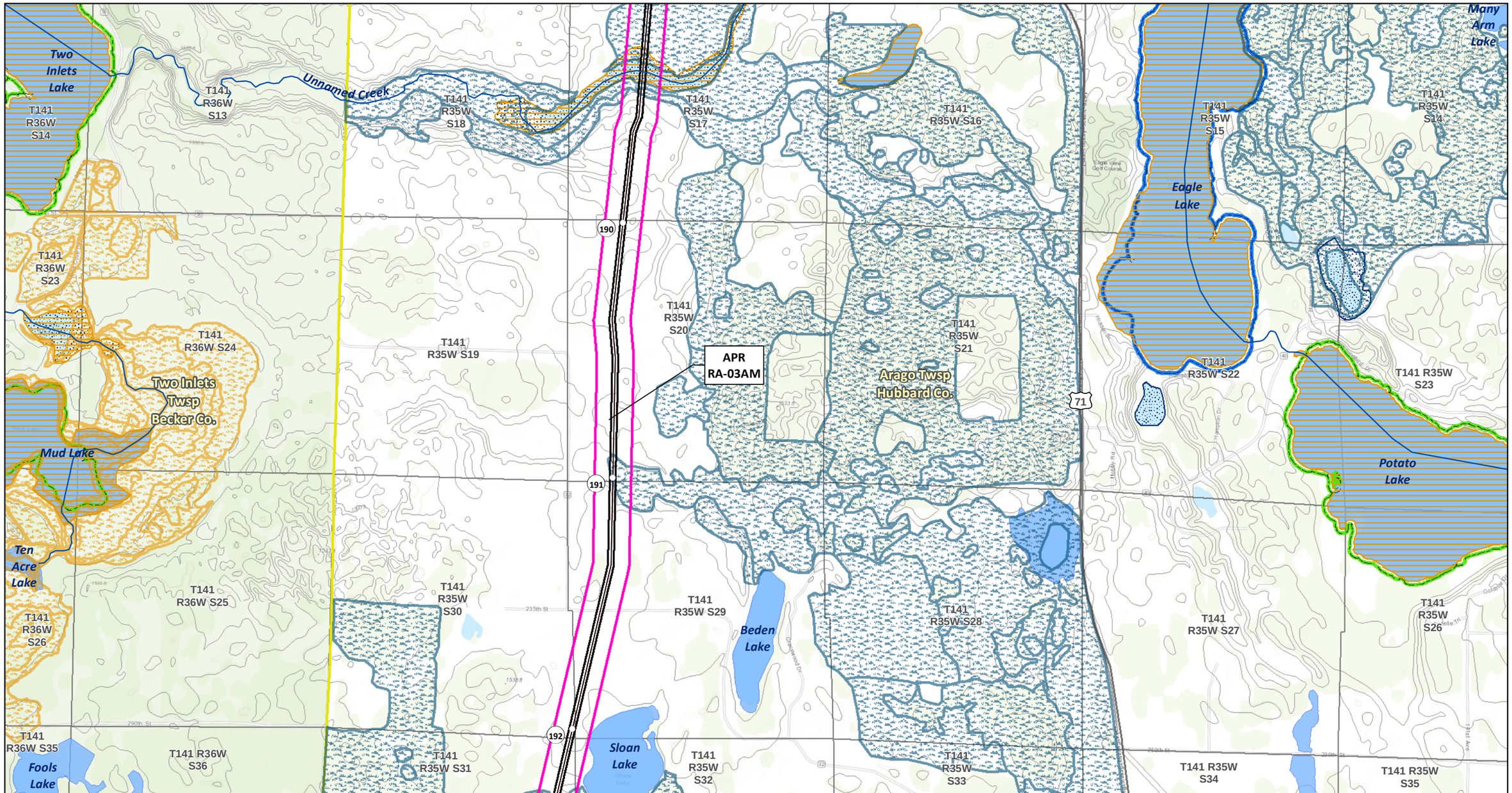

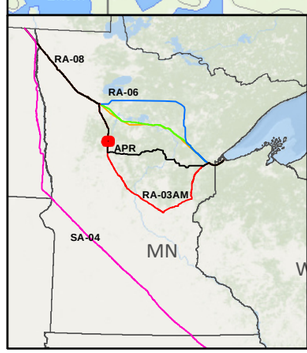

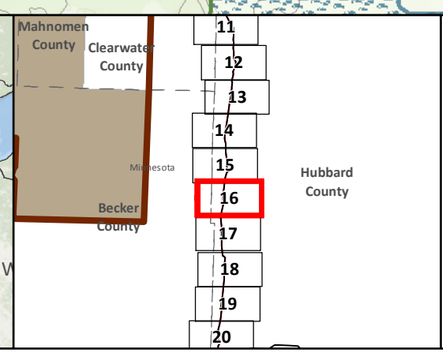

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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Water Resources
- Navigable Waterway Crossings
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- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
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- Wellhead Protection Area (WHPA)

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Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 16B of 67

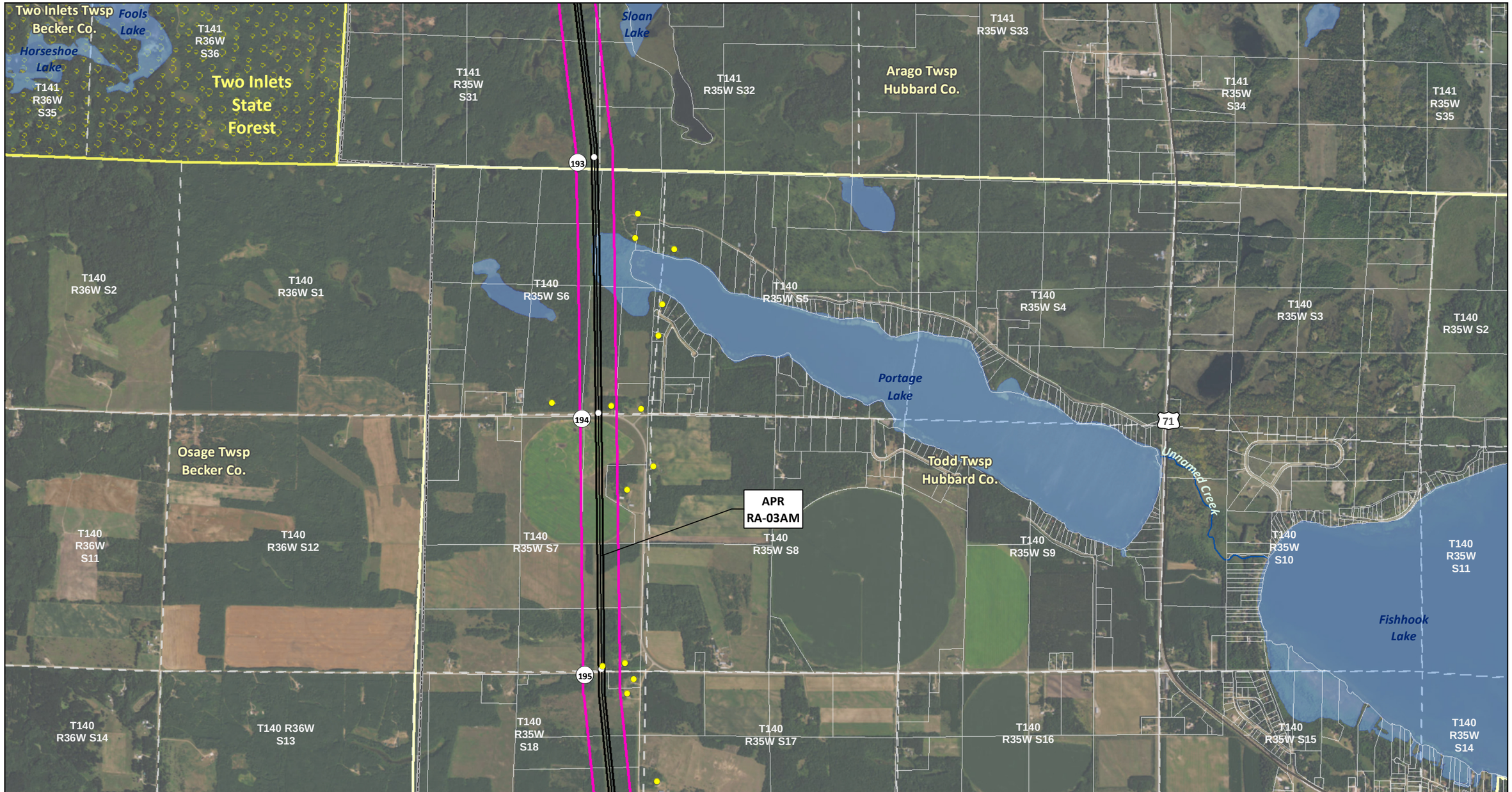

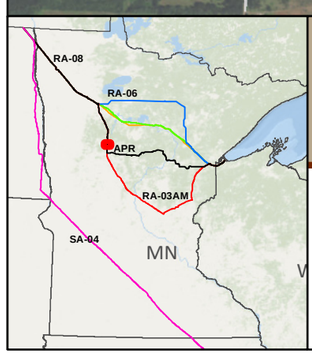

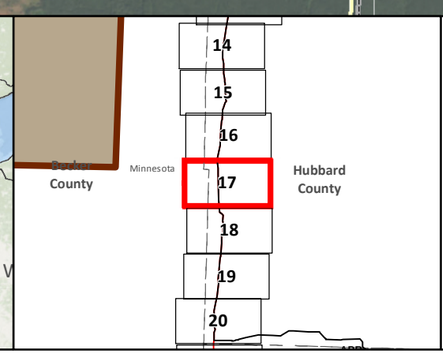

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 17A of 67

Fools Lake
Horseshoe Lake
Two Inlets Twsp
Becker Co.
T141 R36W S35
T141 R36W S36
T141 R35W S31
Sloan Lake
T141 R35W S32
Arago Twsp
Hubbard Co.
T141 R35W S33
T141 R35W S34
T141 R35W S35
193
T140 R36W S2
T140 R36W S1
T140 R35W S6
T140 R35W S5
T140 R35W S4
T140 R35W S3
T140 R35W S2
Portage Lake
194
71
Osage Twsp
Becker Co.
Todd Twsp
Hubbard Co.
Unnamed Creek
APR
RA-03AM
T140 R36W S11
T140 R36W S12
T140 R35W S7
T140 R35W S8
T140 R35W S9
T140 R35W S10
T140 R35W S11
Fishhook Lake
Park Rapids Game Refuge
195
T140 R36W S14
T140 R36W S13
T140 R35W S18
T140 R35W S17
T140 R35W S16
T140 R35W S15
T140 R35W S14

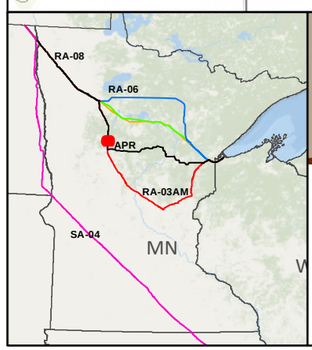

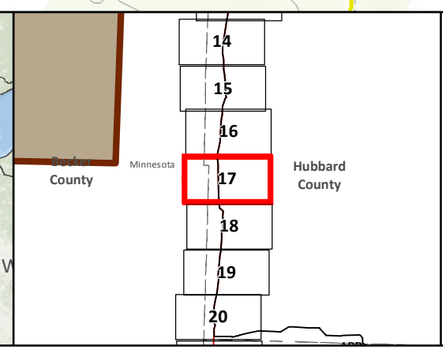

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 17B of 67

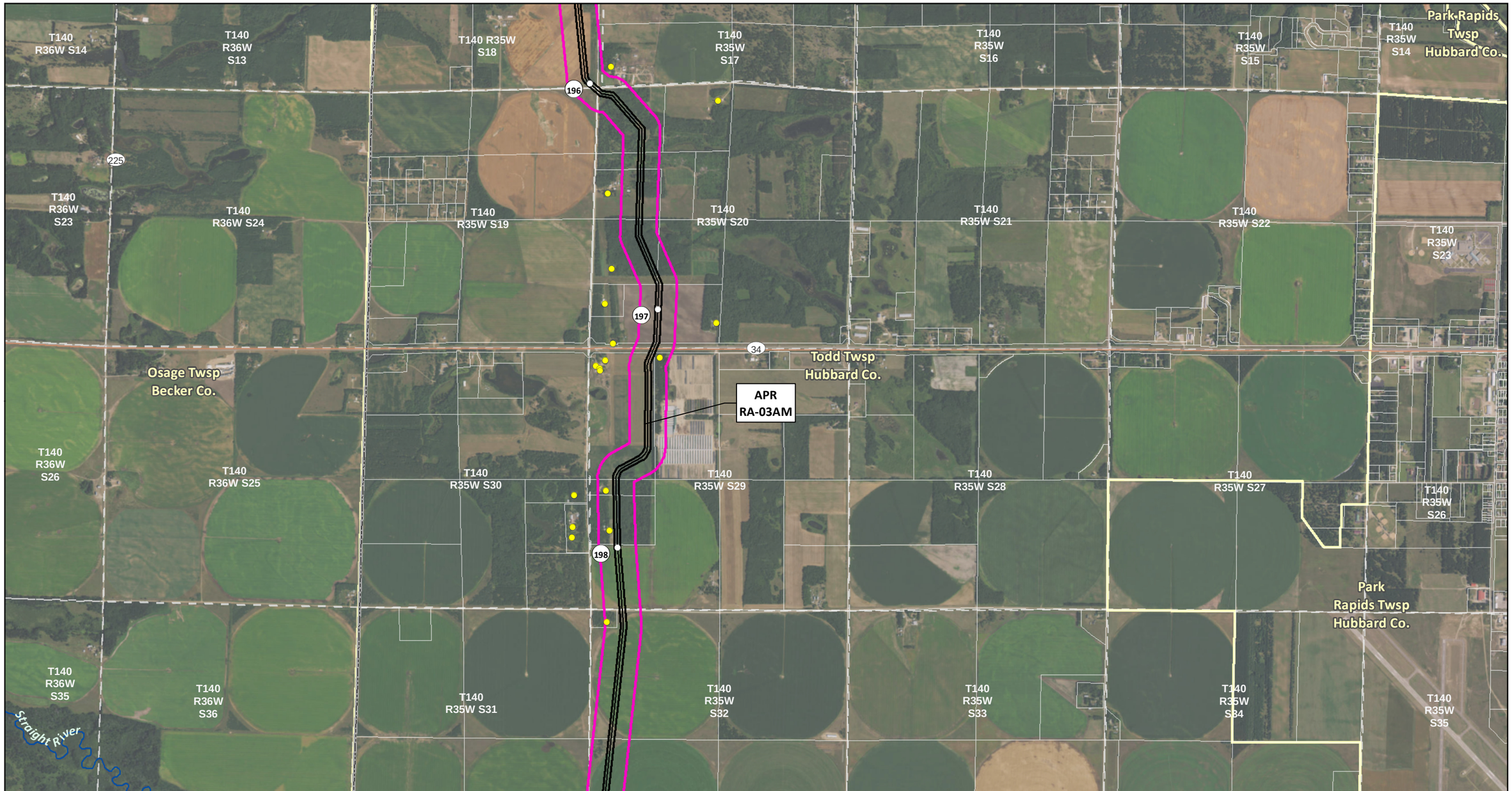

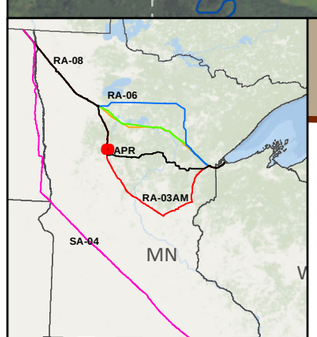

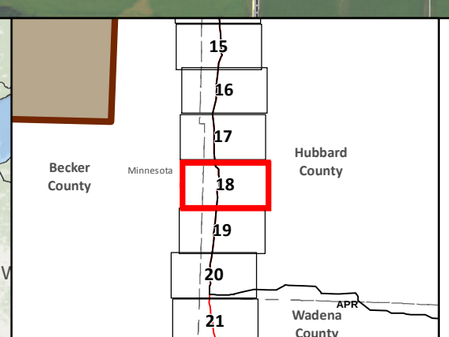

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 18A of 67

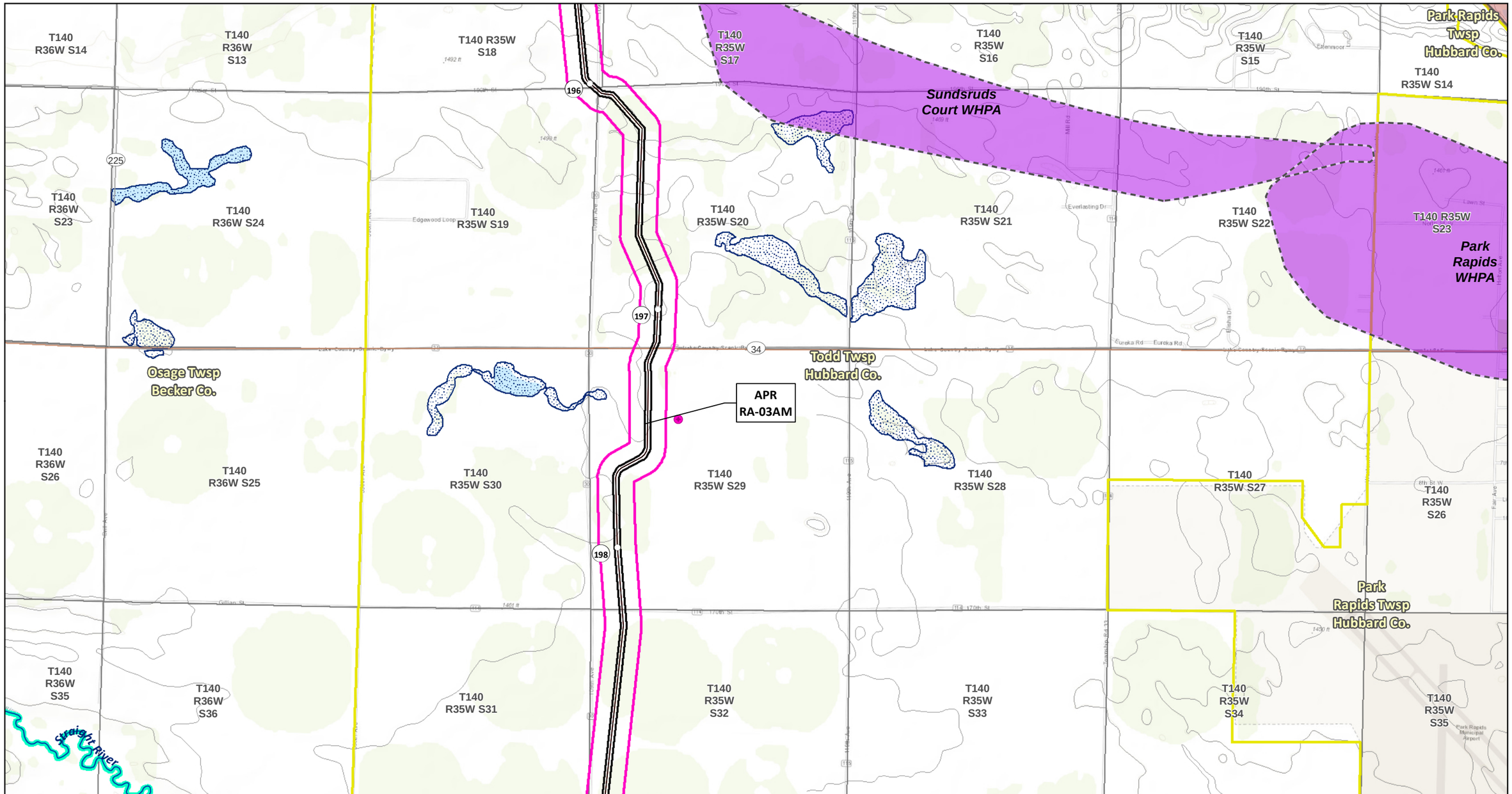

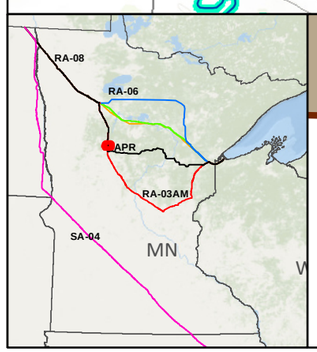

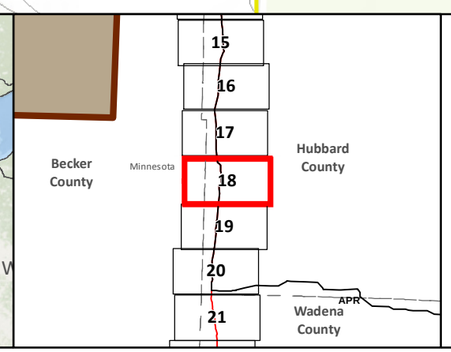

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 18B of 67

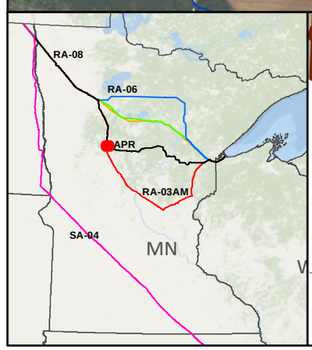

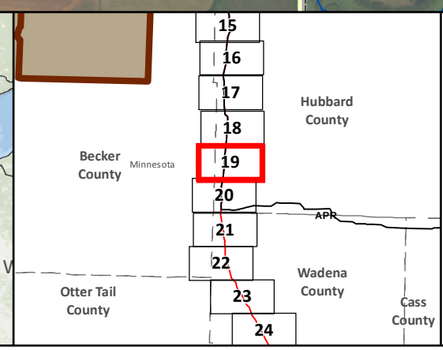

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 19A of 67

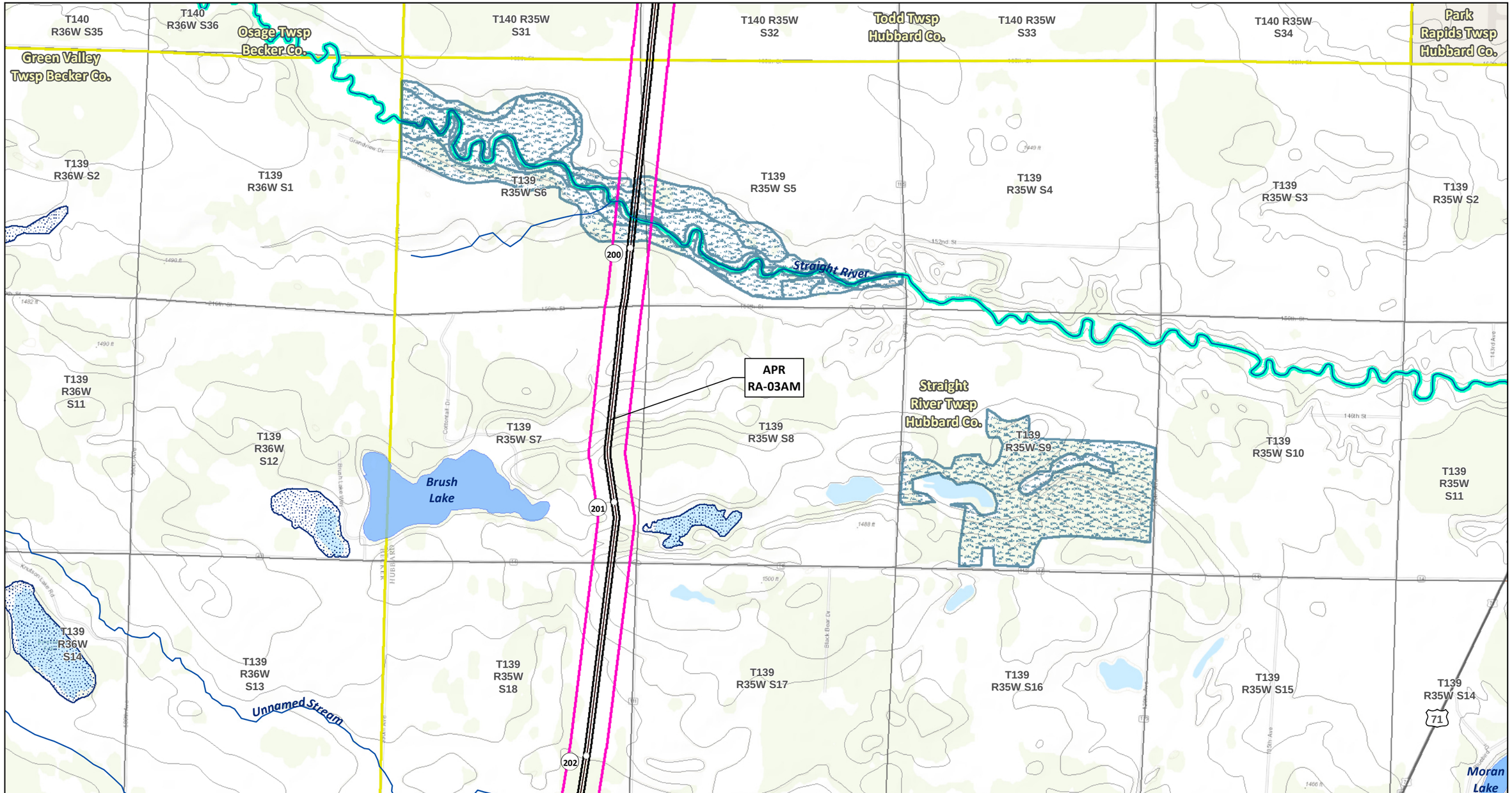

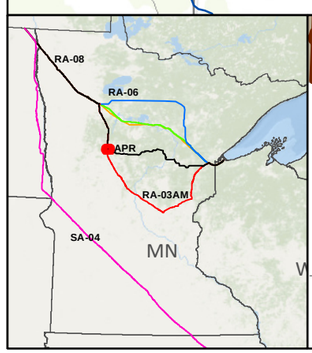

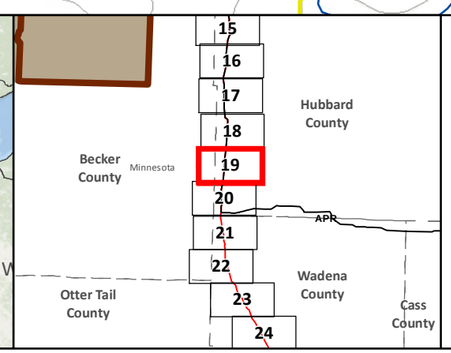

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 19B of 67

T139 R36W S15
T139 R36W S14
T139 R36W S13
T139 R35W S18
Unnamed Stream
T139 R35W S17
T139 R35W S16
T139 R35W S15
T139 R36W S22
T139 R36W S23
T139 R36W S24
T139 R35W S19
T139 R35W S20
T139 R35W S21
T139 R35W S22
203
Little Long Lake
Straight River Twsp Hubbard Co.
Green Valley Twsp Becker Co.
T139 R36W S26
T139 R36W S25
T139 R35W S30
APR RA-03AM
T139 R35W S29
T139 R35W S28
T139 R35W S27
71
204
T139 R36W S35
T139 R36W S36
T139 R35W S31
T139 R35W S32
APR
T139 R35W S33
T139 R35W S34
205
Runeberg Twsp Becker Co.
T138 R36W S2
T138 R36W S1

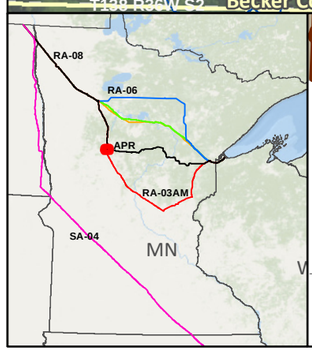

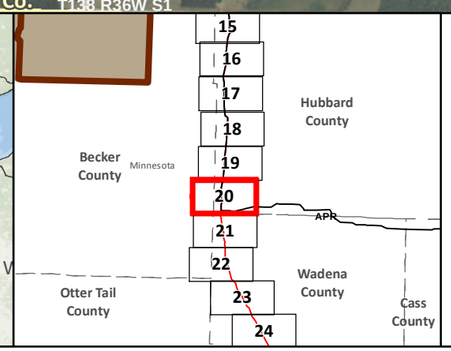

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

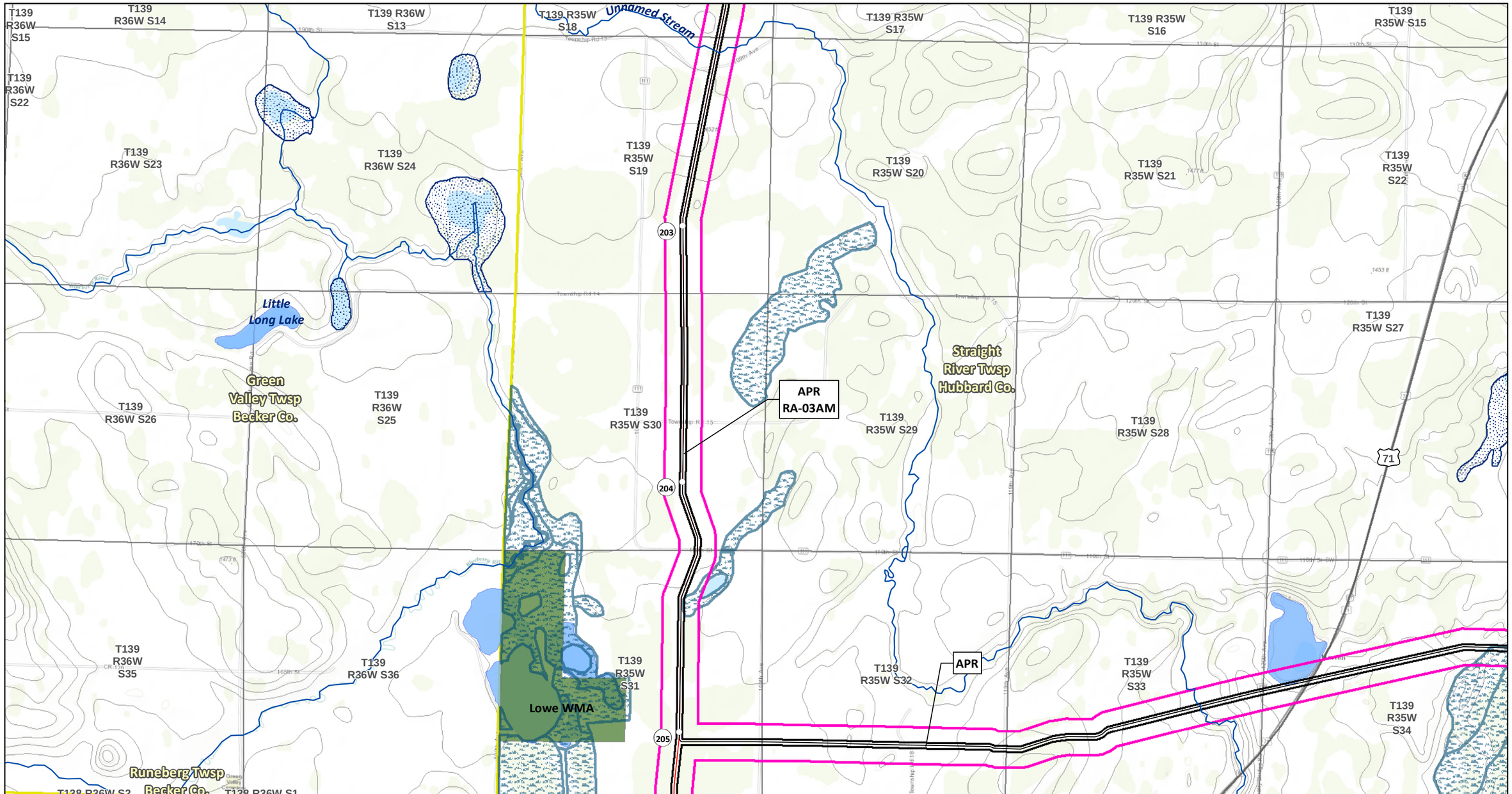

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

Map 20B of 67

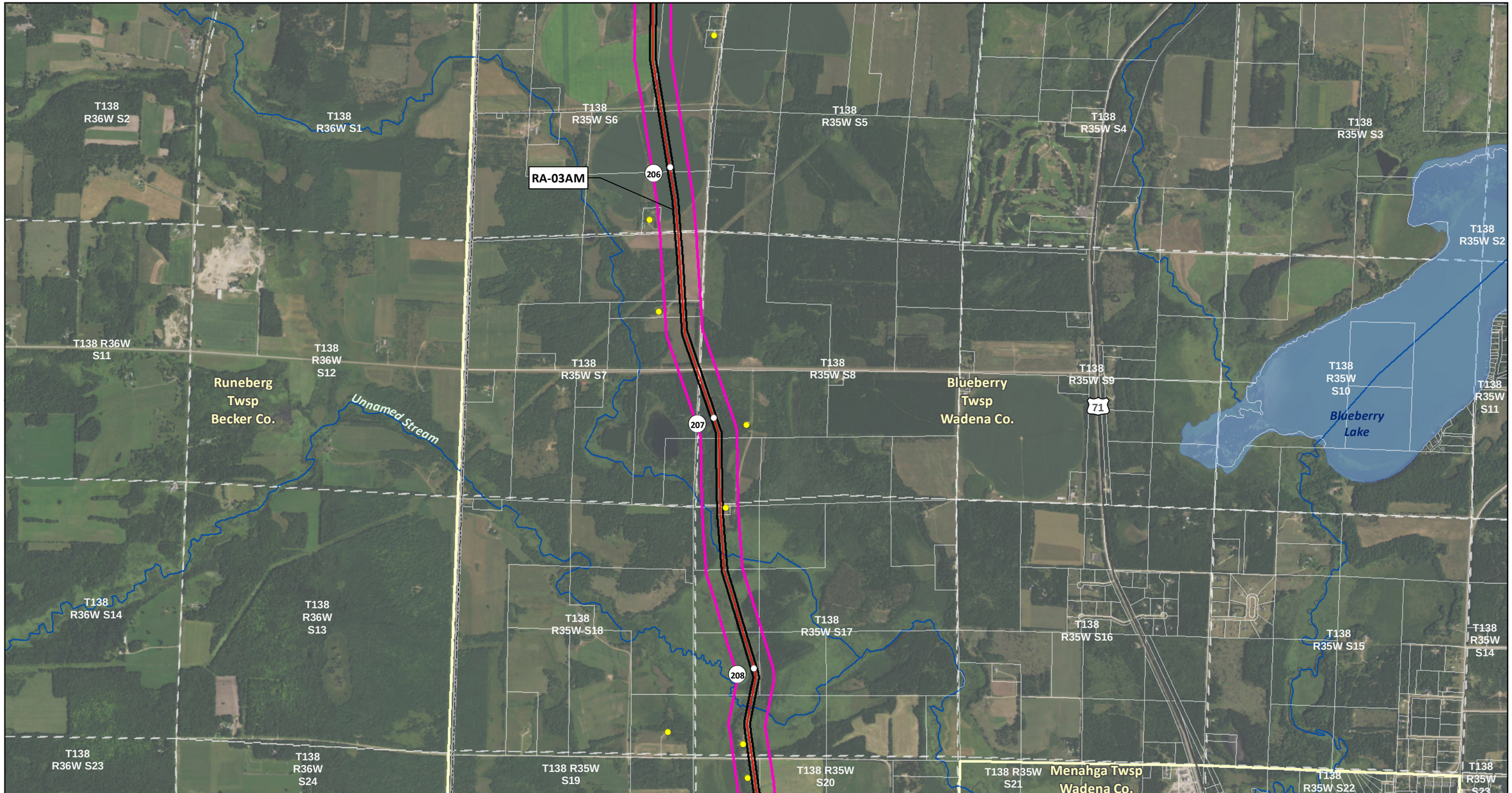

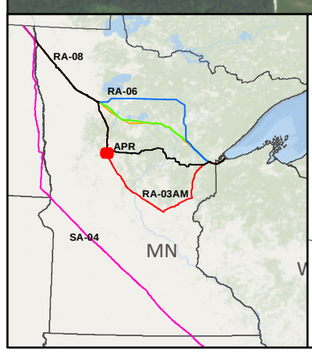

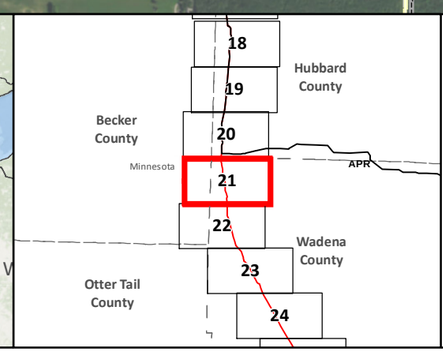

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

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- Tribal Trust Land
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0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 21A of 67

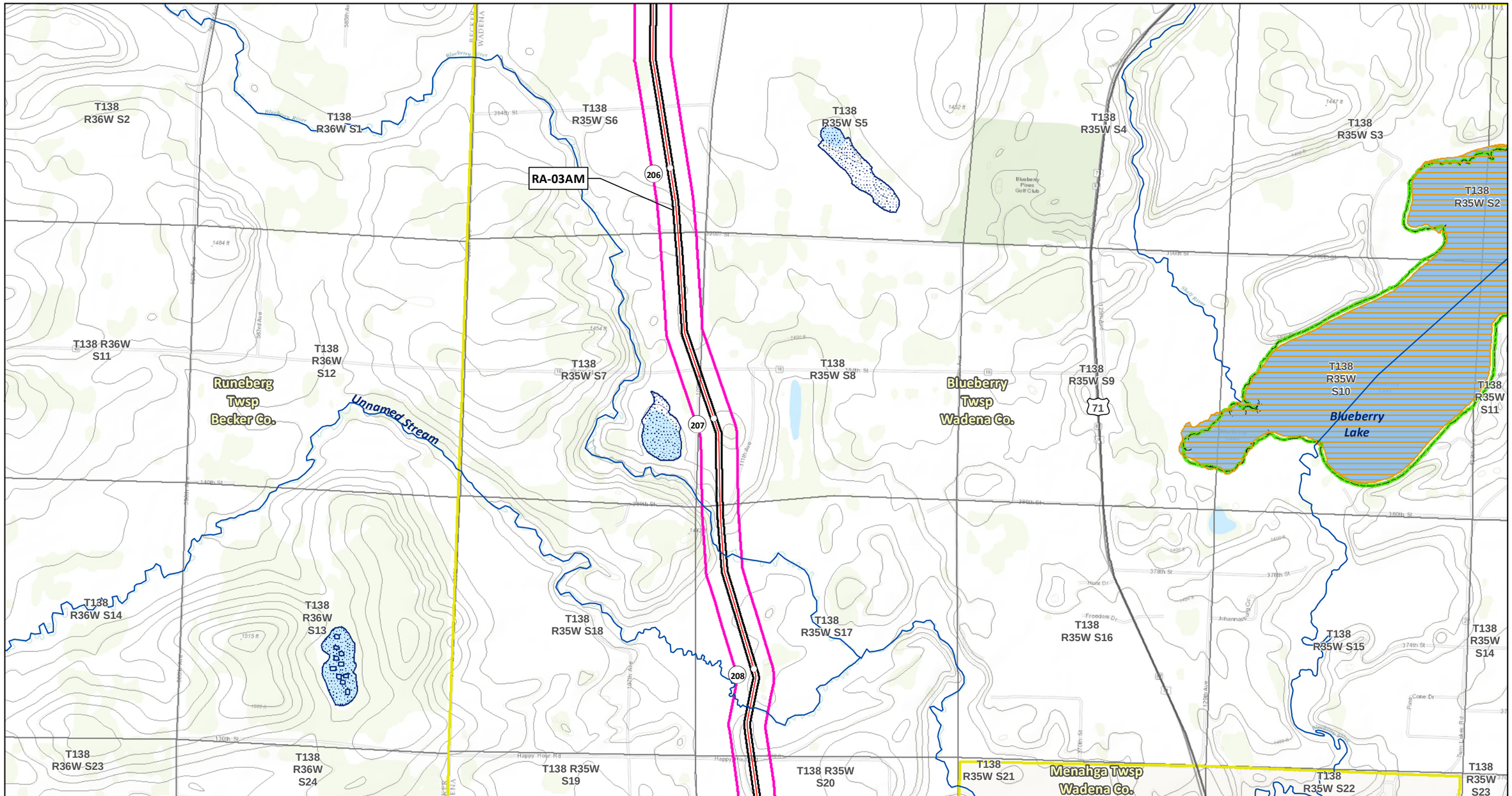

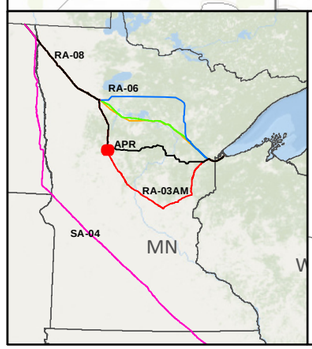

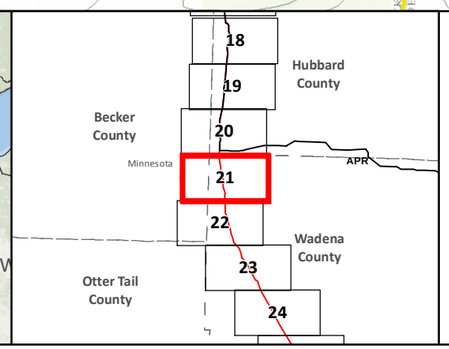

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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- SNA - Scientific and National Area

Water Resources
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- National River Inventory Crossing
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- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
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Lakes of Biological Significance
- Outstanding
- High
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Native Plant Communities with Biodiversity Significance
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- High
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- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 21B of 67

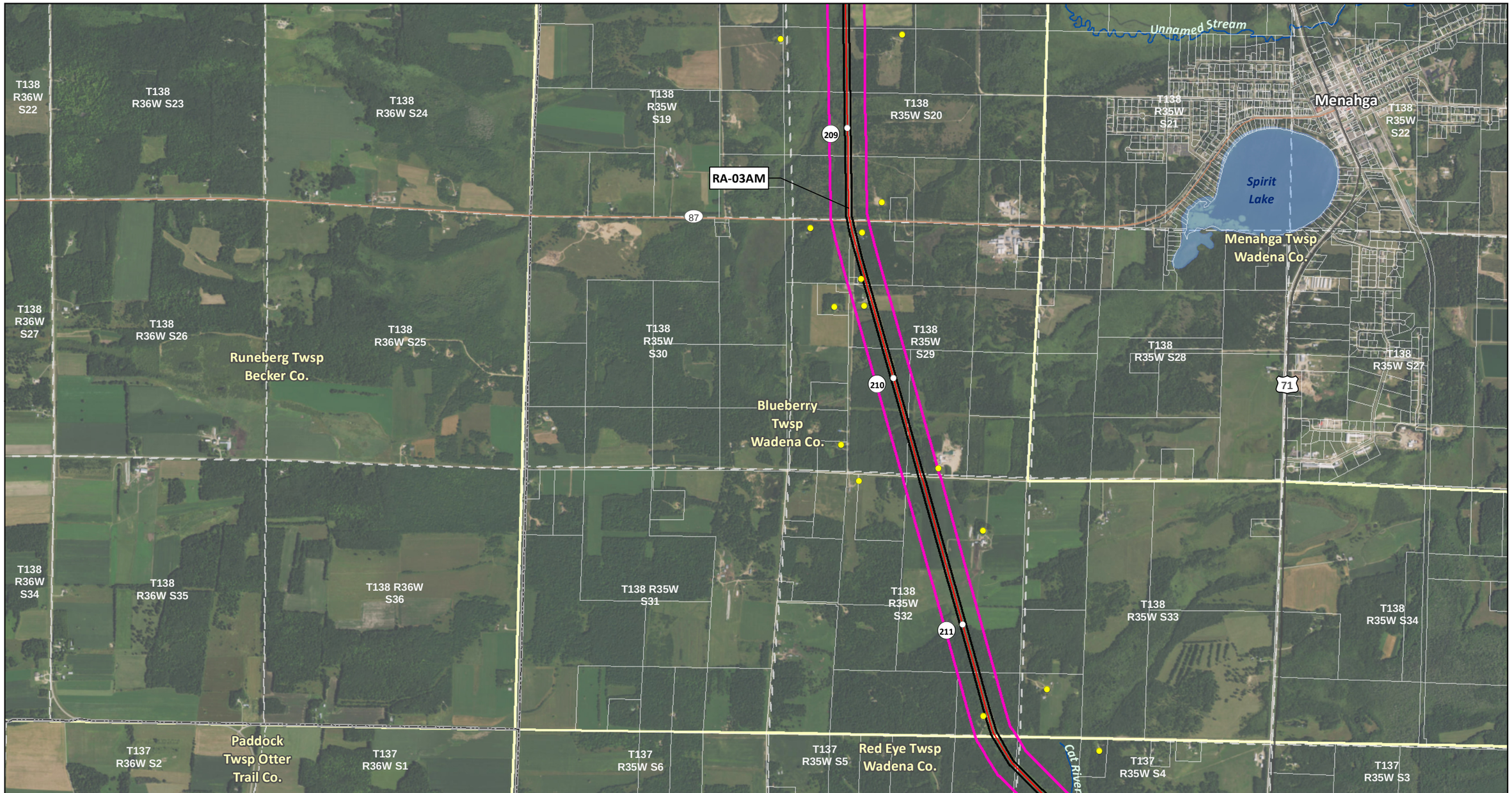

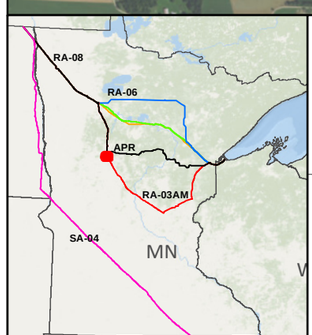

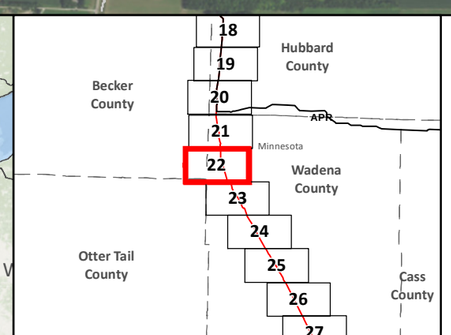

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

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- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 22A of 67

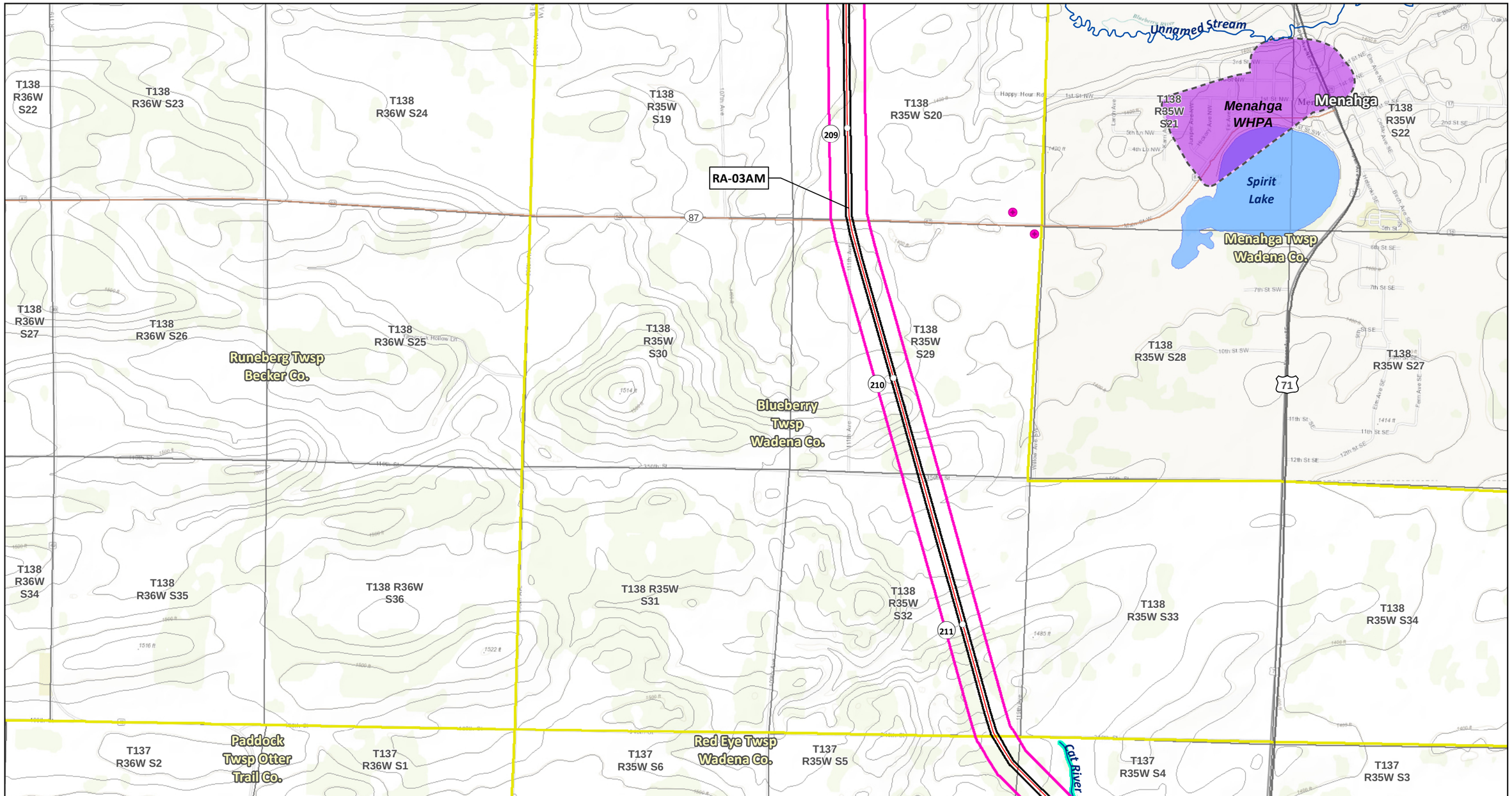

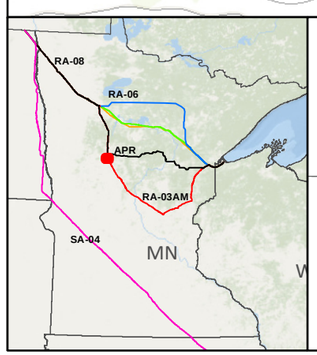

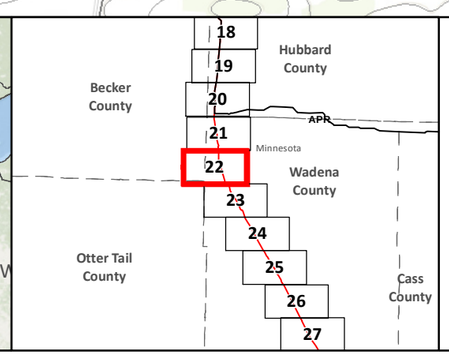

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 22B of 67

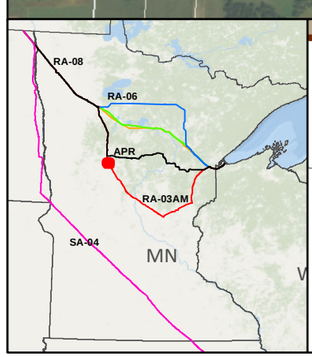

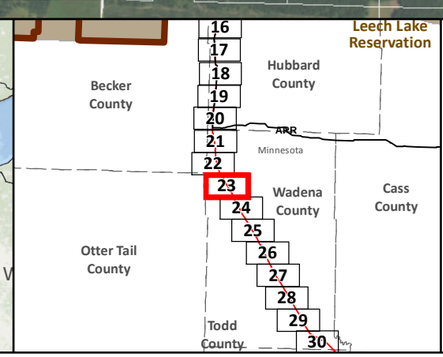

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 23A of 67

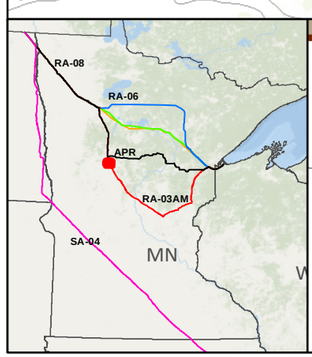

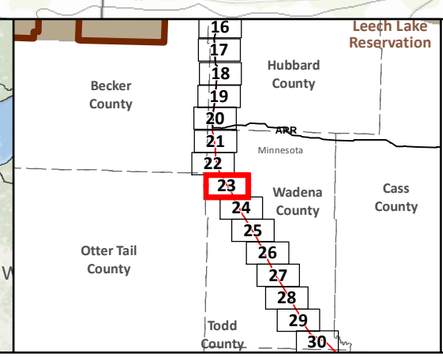

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 23B of 67

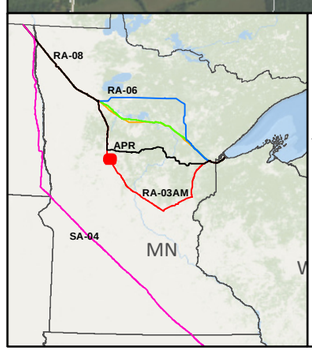

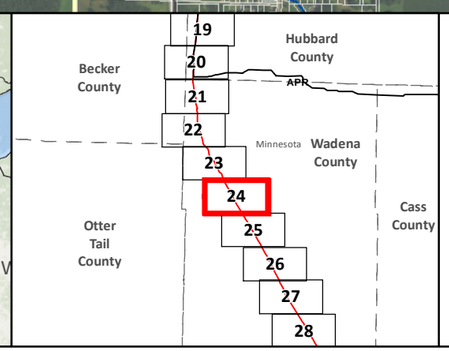

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 24A of 67

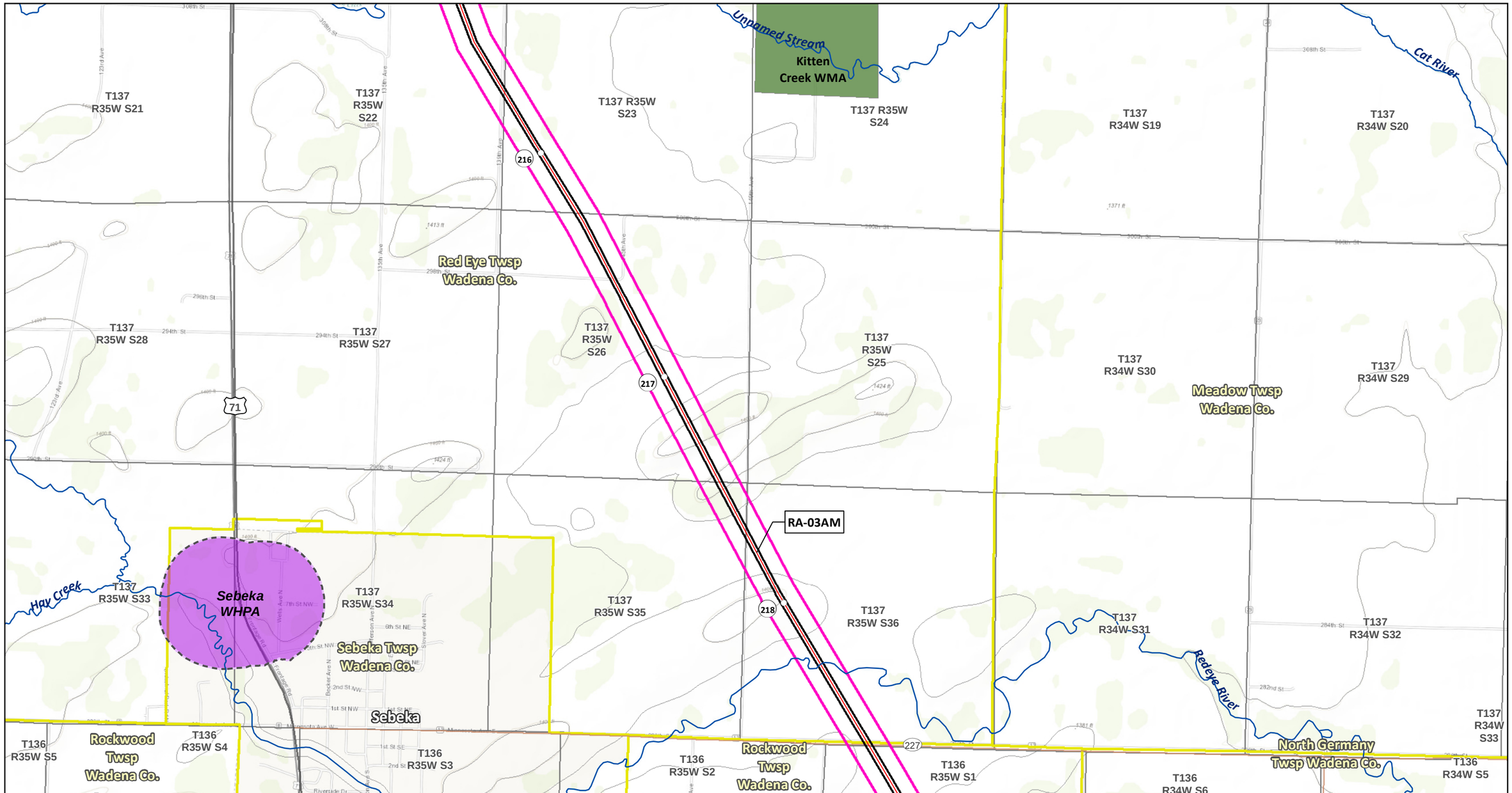

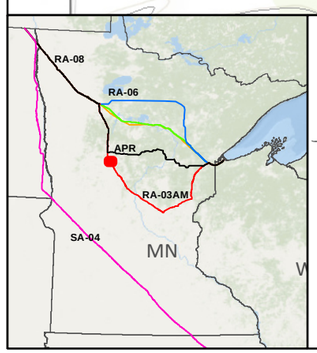

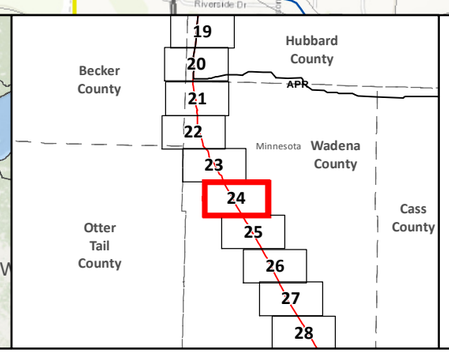

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 24B of 67

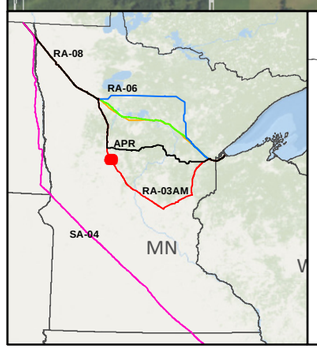

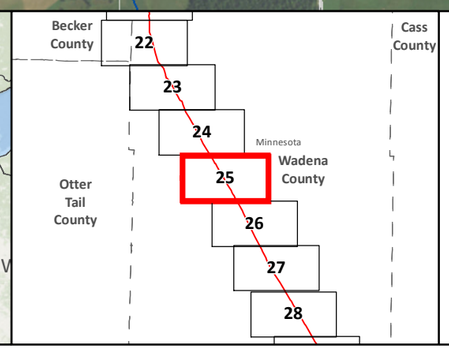

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 25A of 67

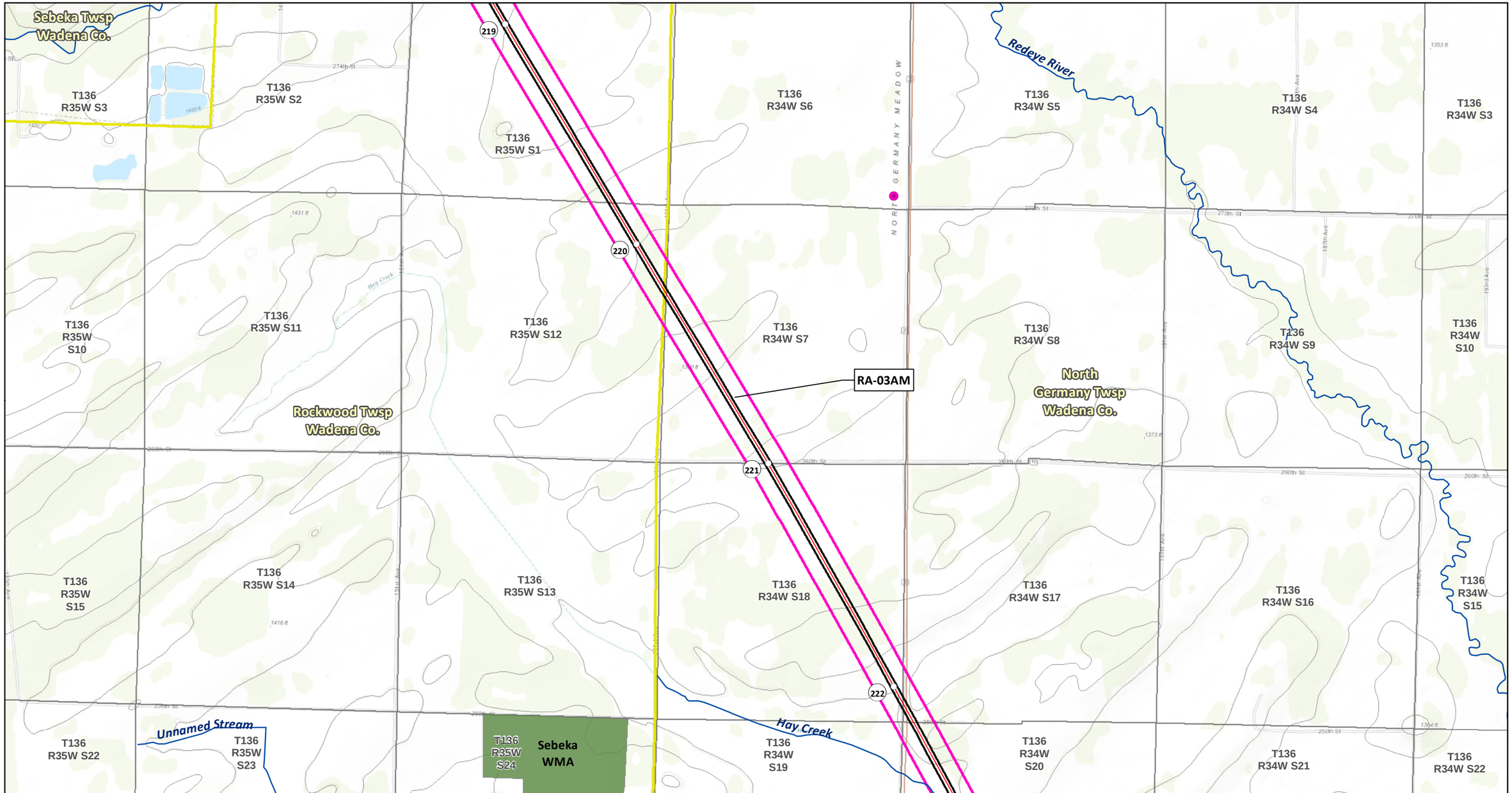

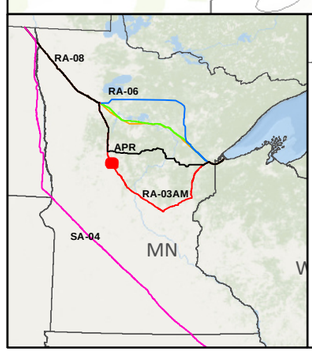

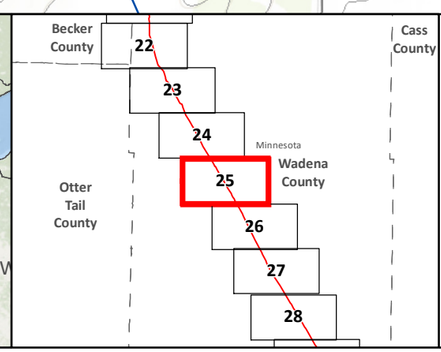

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 25B of 67

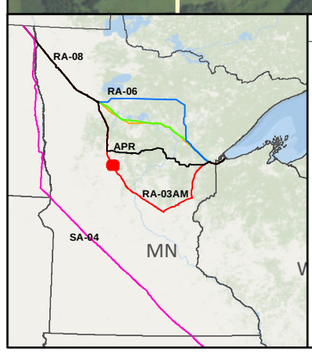

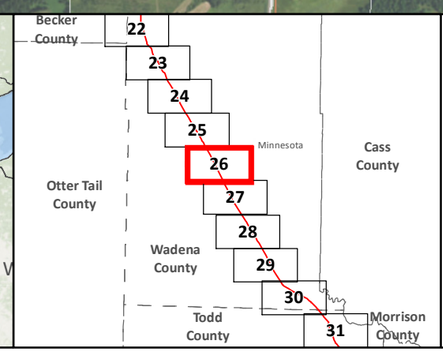

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 26A of 67

Sebeka WMA

North Germany WMA

North Germany Twsp Wadena Co.

Rockwood Twsp Wadena Co.

Leaf River Twsp Wadena Co.

Wing River Twsp Wadena Co.

Blue Grass

Hay Creek

Unnamed Stream

Redeye River

RA-03AM

223

224

225

T136 R35W S24

T136 R34W S19

T136 R34W S20

T136 R34W S21

T136 R34W S22

T136 R34W S23

T136 R34W S24

T136 R35W S25

T136 R34W S30

T136 R34W S29

T136 R34W S28

T136 R34W S27

T136 R34W S26

T136 R34W S25

T136 R35W S36

T136 R34W S31

T136 R34W S32

T136 R34W S33

T136 R34W S34

T136 R34W S35

T136 R34W S36

T135 R34W S6

T135 R34W S5

T135 R34W S4

T135 R34W S3

T135 R34W S2

T135 R34W S1

T135 R35W S1

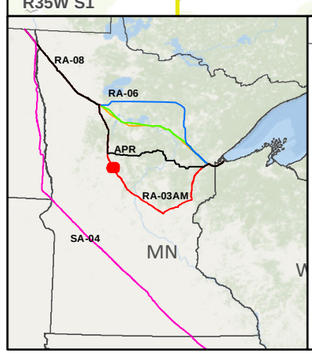

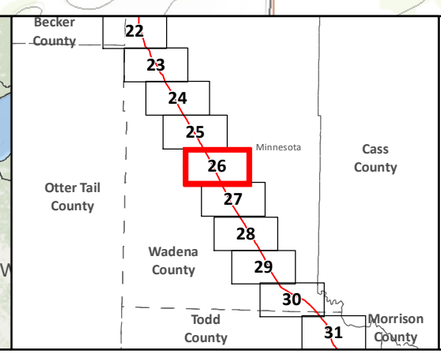

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

RA-03AM

RA-06

RA-07

RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

WMA - Wildlife Management Areas

Wildlife Refuge Inventory

SNA - Scientific and Natural Area

Water Resources

Navigable Waterway Crossings

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Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

Outstanding

High

Moderate

Native Plant Communities with Biodiversity Significance

Outstanding

High

Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 26B of 67

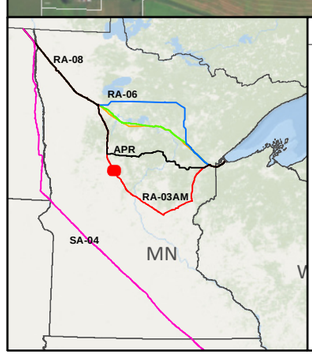

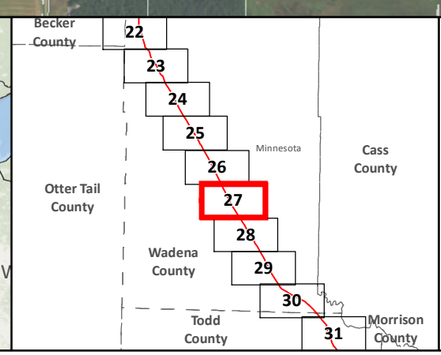

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
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0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 27A of 67

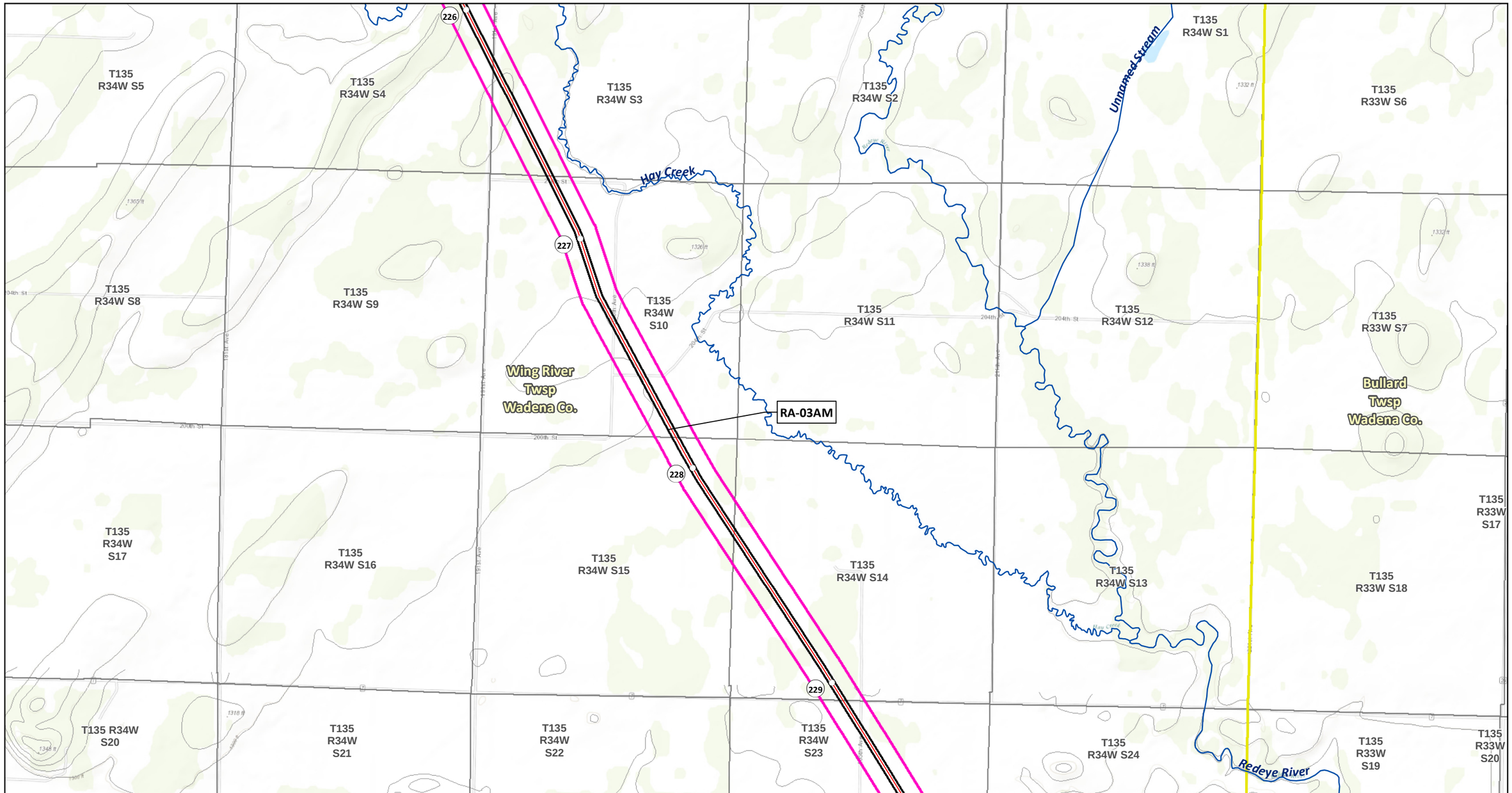

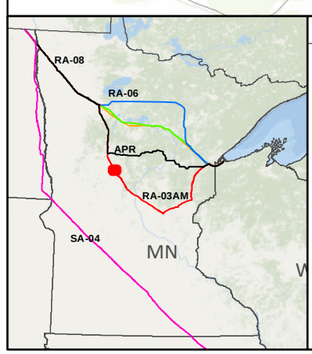

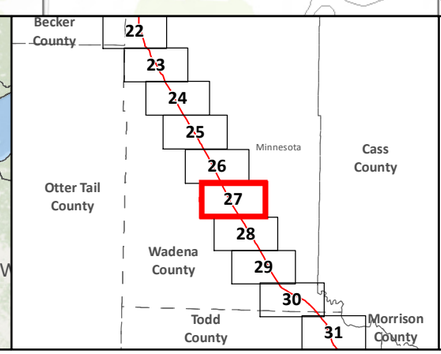

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
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Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 27B of 67

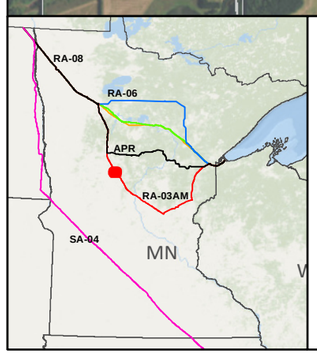

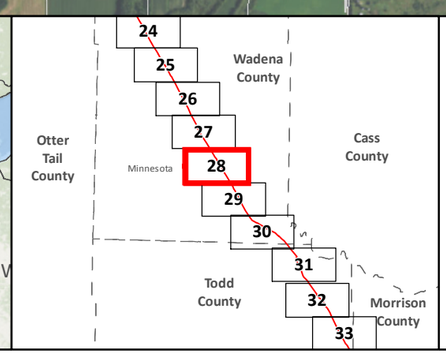

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

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- Tribal Trust Land
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0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 28A of 67

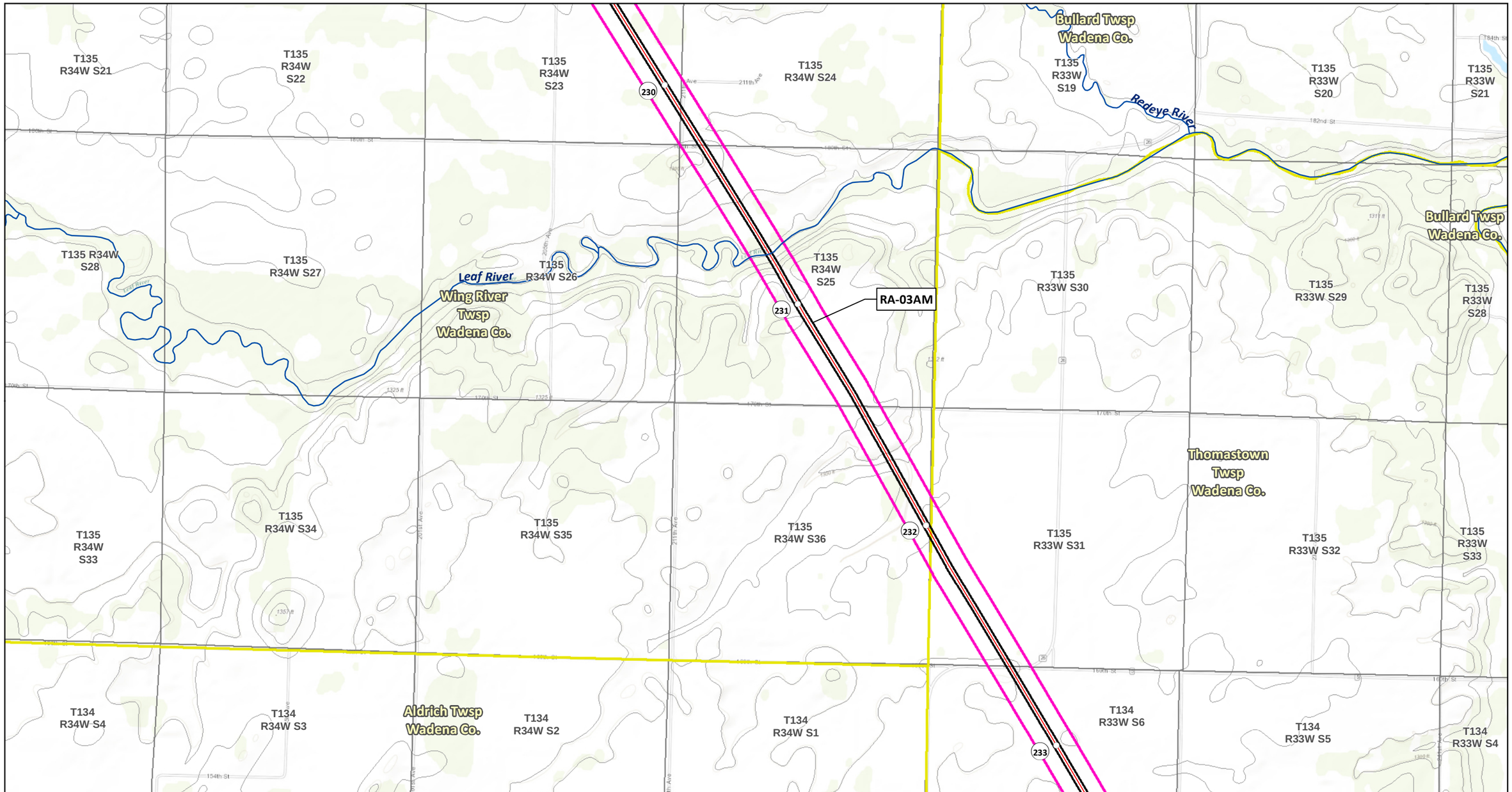

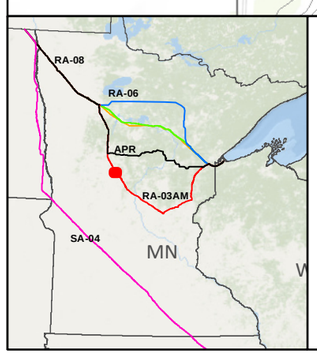

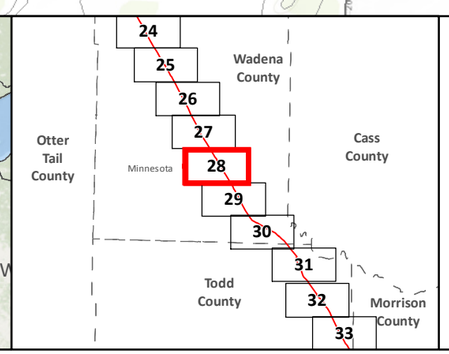

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

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- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

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303d Imparied Waters
Designated Trout Stream
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Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
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- High
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Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 28B of 67

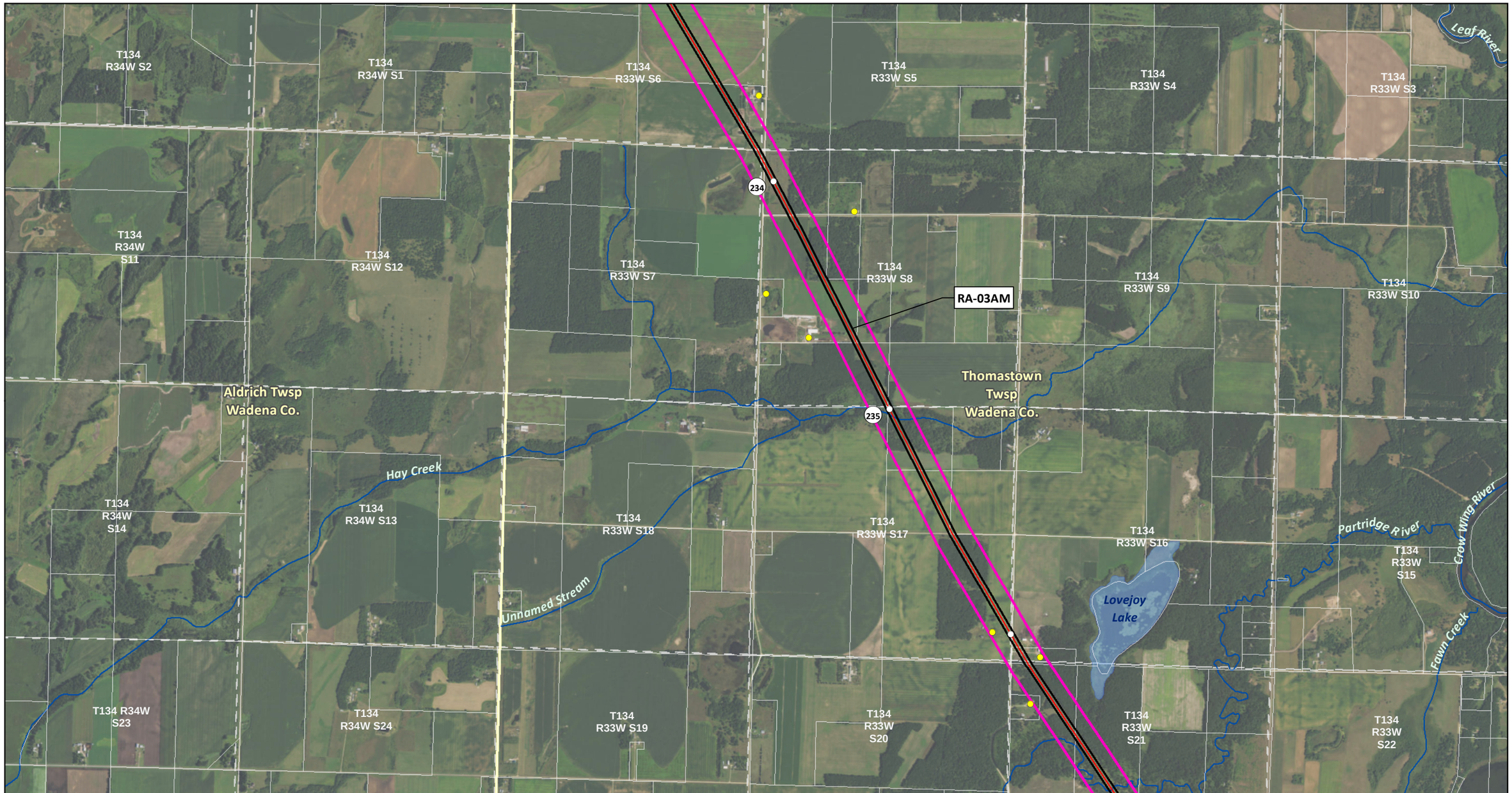

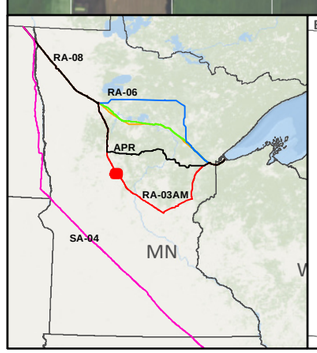

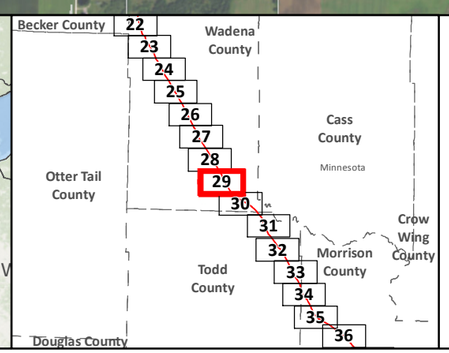

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 29A of 67

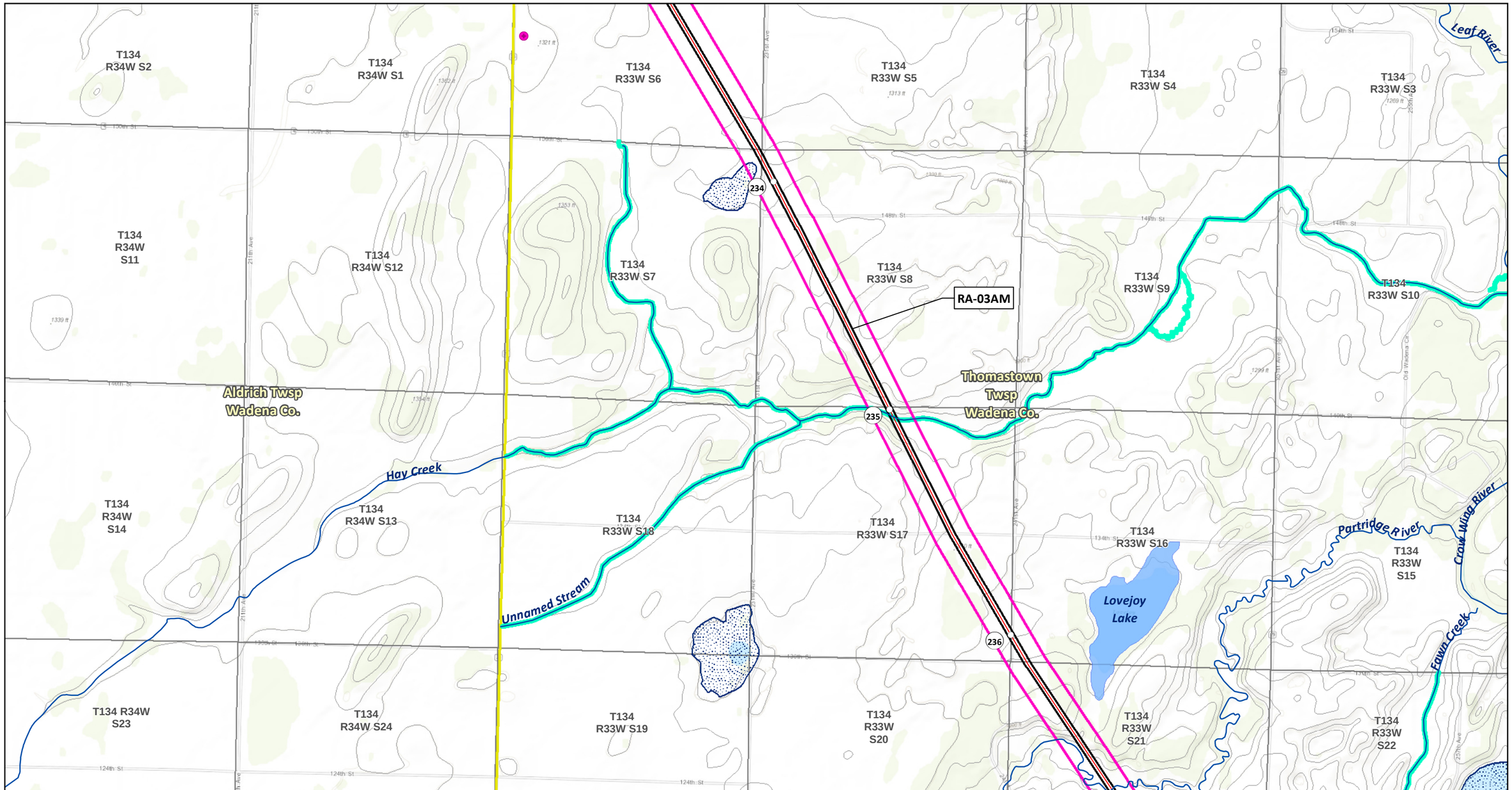

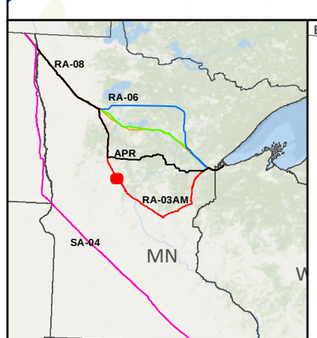

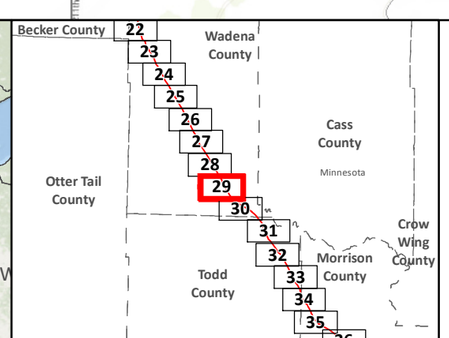

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 29B of 67

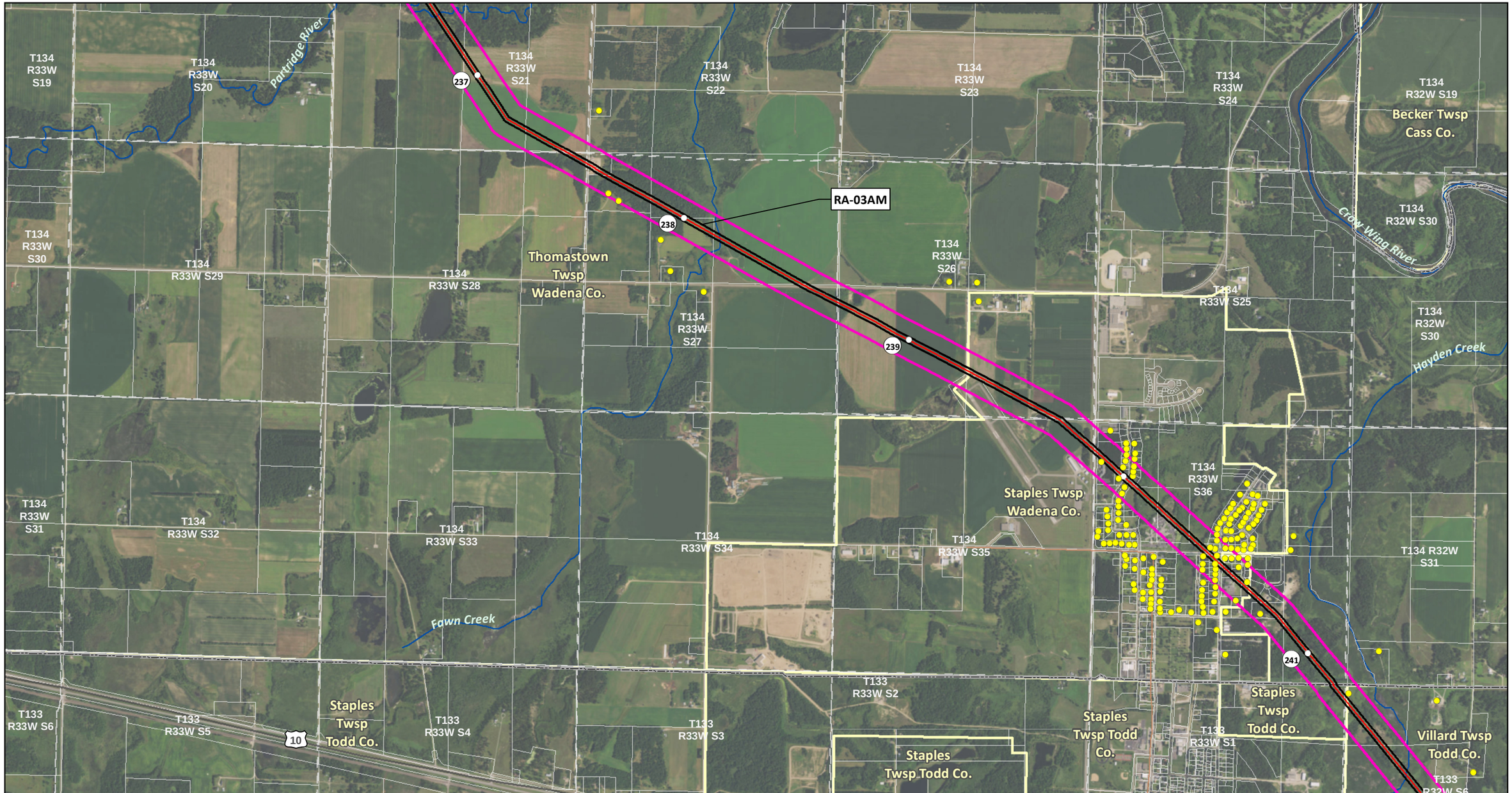

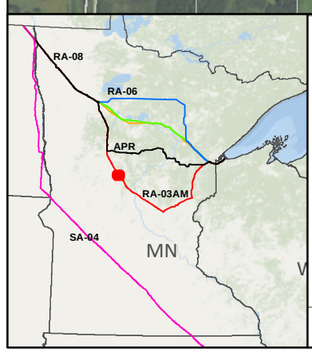

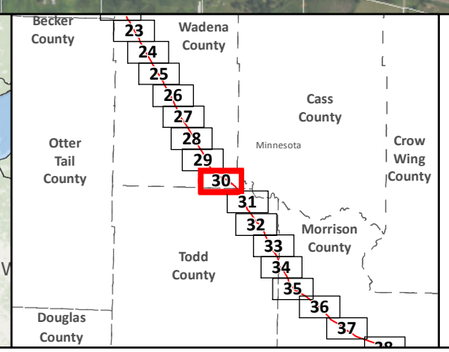

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 30A of 67

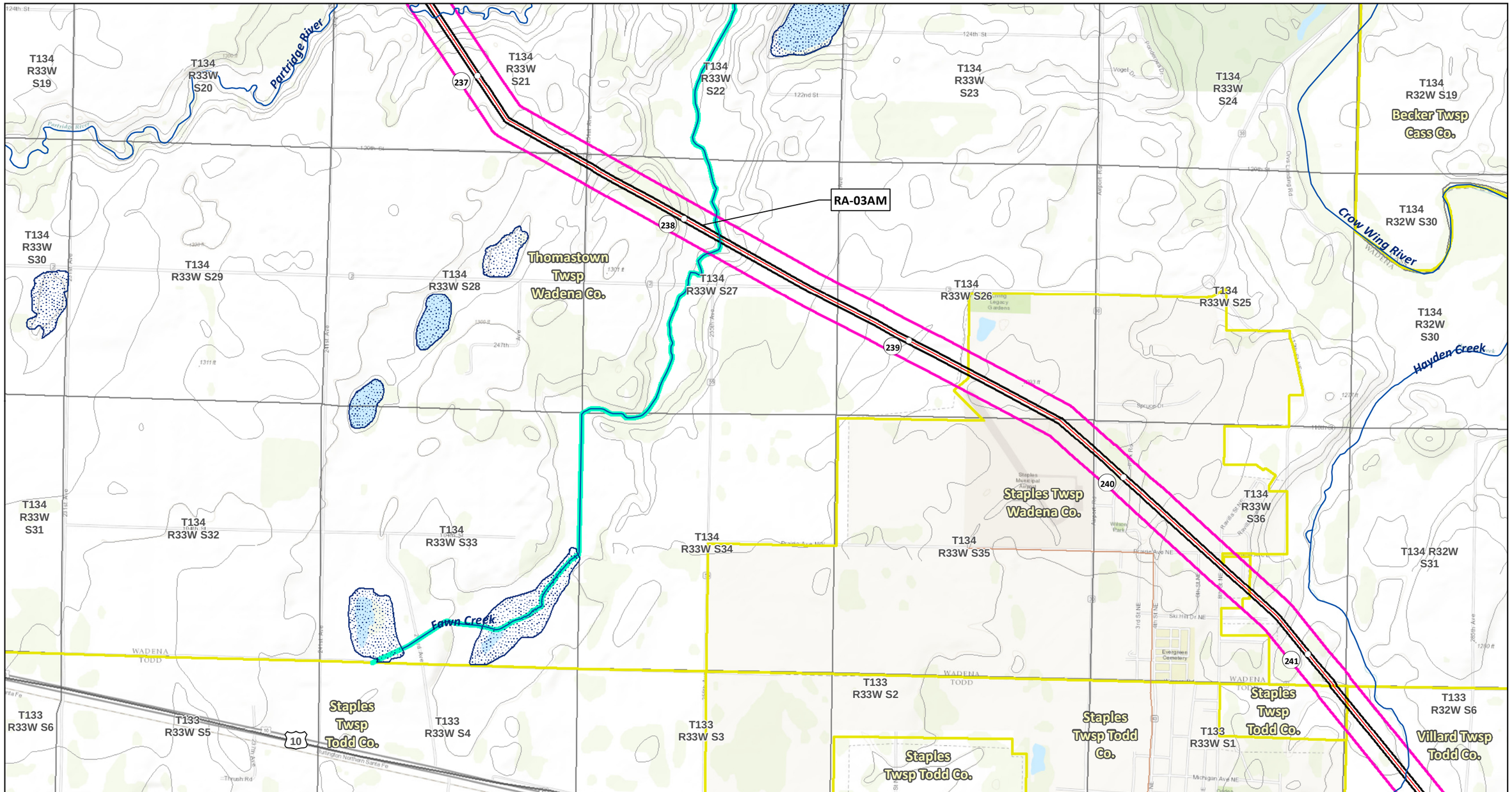

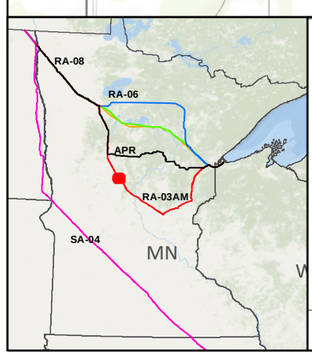

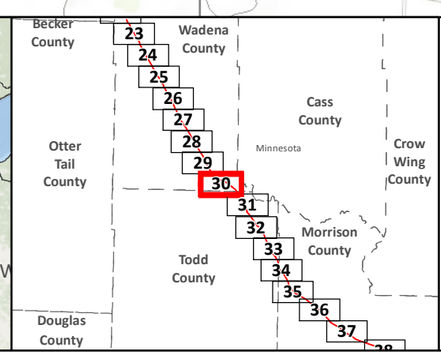

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 30B of 67

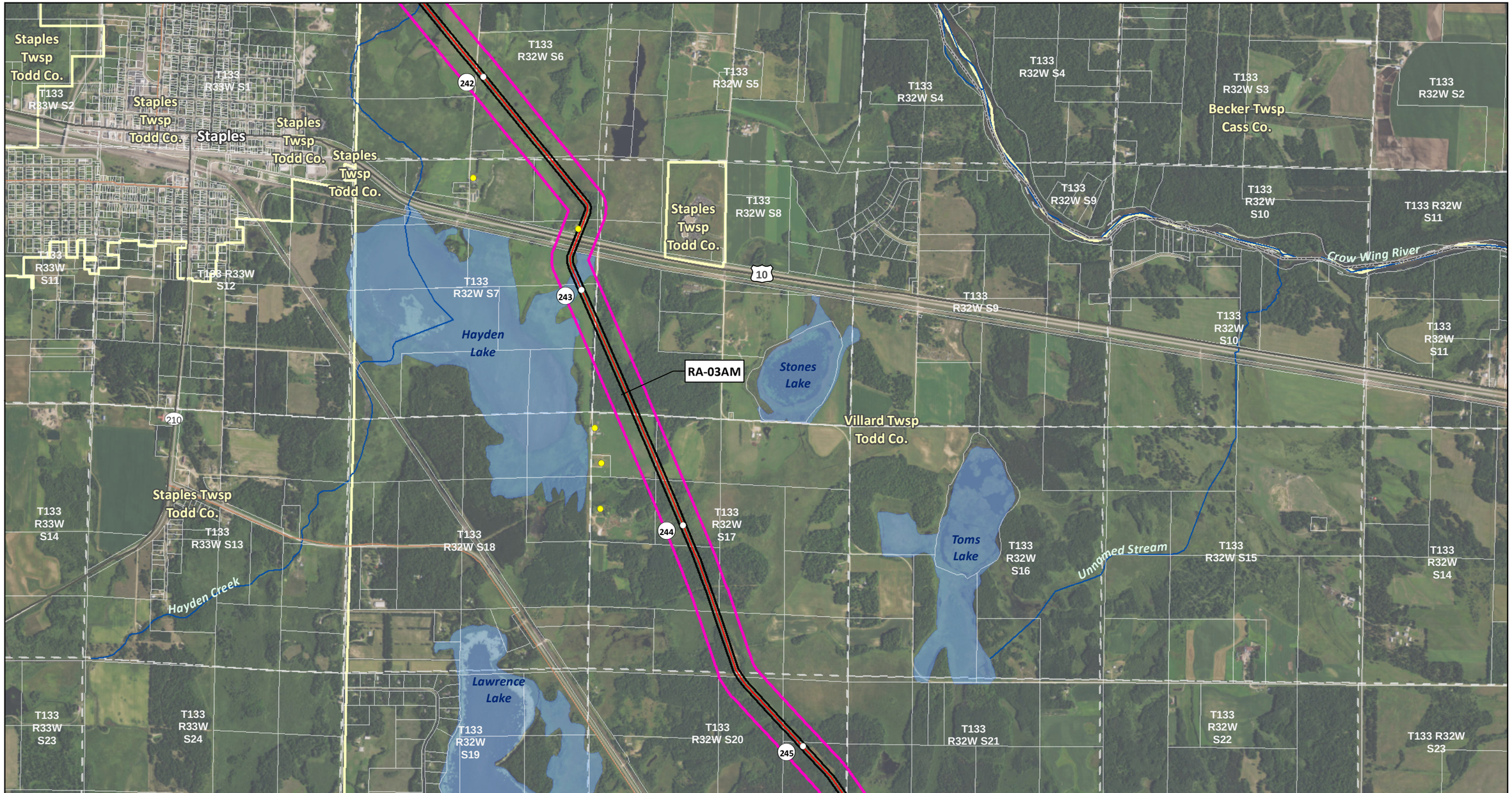

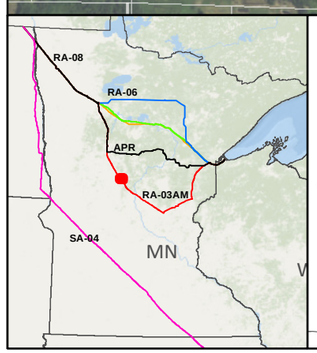

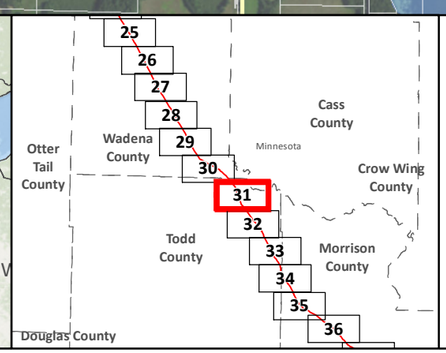

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 31A of 67

Staples Twsp Todd Co.
T133 R33W S2
T133 R33W S1
Staples Twsp Todd Co.
Staples
Staples Twsp Todd Co.
Staples Twsp Todd Co.
Staples WHPA
T133 R33W S11
T133 R33W S12
T133 R32W S6
T133 R32W S5
T133 R32W S4
T133 R32W S3
T133 R32W S4
Becker Twsp Cass Co.
T133 R32W S2
T133 R32W S8
Staples Twsp Todd Co.
T133 R32W S9
T133 R32W S10
T133 R32W S11
Crow Wing River
T133 R32W S7
Hayden Lake
Staples Waterfowl Refuge
RA-03AM
Stones Lake
T133 R32W S9
T133 R32W S10
T133 R32W S11
Villard Twsp Todd Co.
Staples Twsp Todd Co.
T133 R33W S14
T133 R33W S13
T133 R32W S18
T133 R32W S17
Toms Lake
T133 R32W S16
Unnamed Stream
T133 R32W S15
T133 R32W S14
Hayden Creek
Lawrence Lake WMA
T133 R32W S19
Lawrence Lake
T133 R33W S23
T133 R33W S24
T133 R32W S20
T133 R32W S21
T133 R32W S22
T133 R32W S23

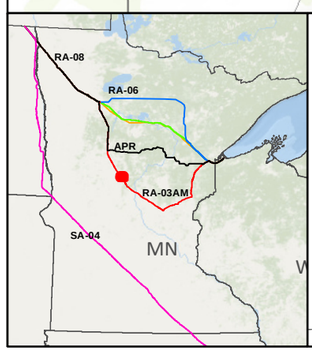

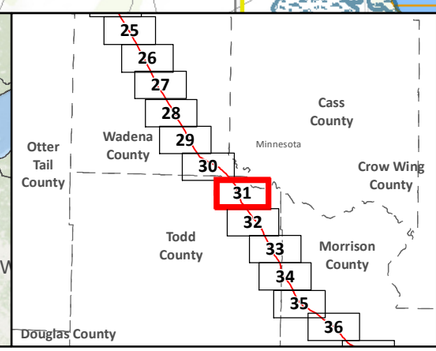

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
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- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 31B of 67

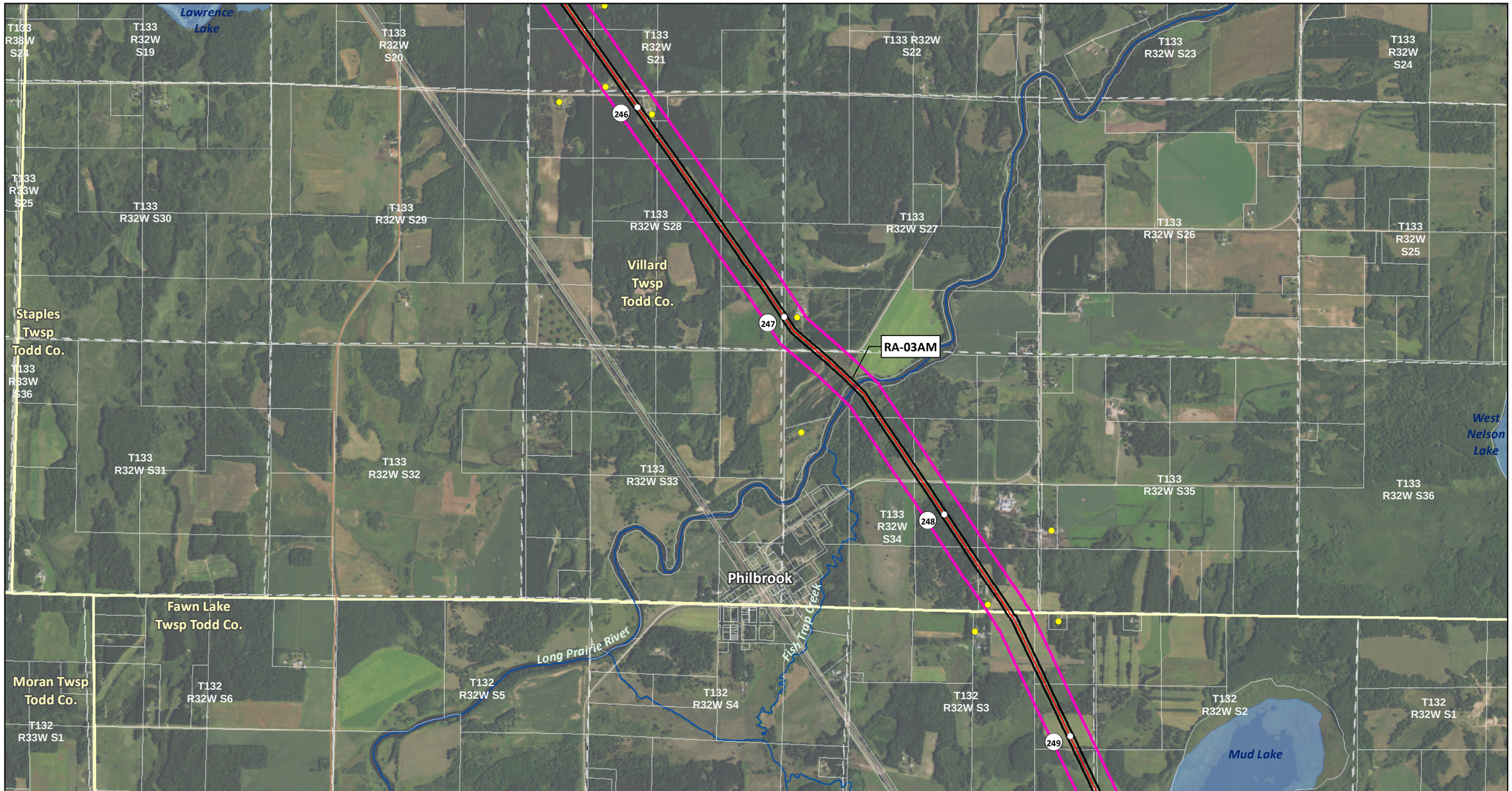

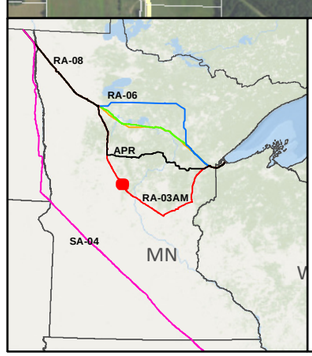

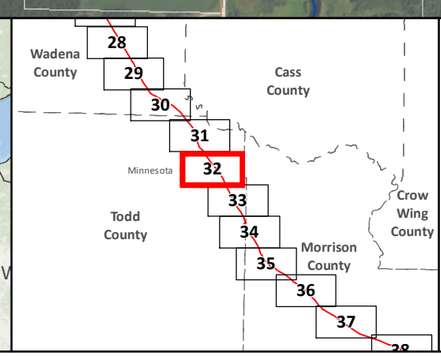

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 32A of 67

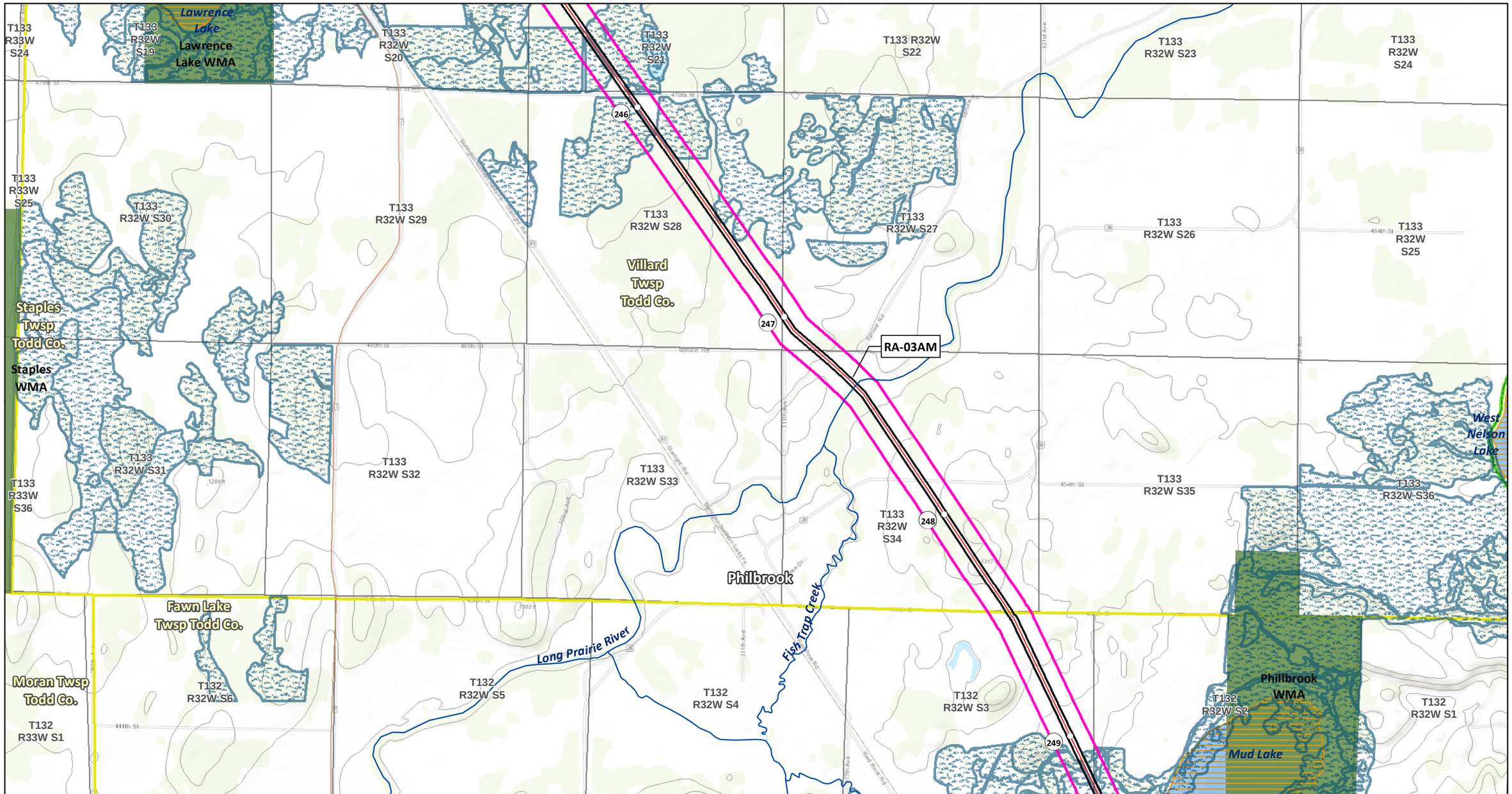

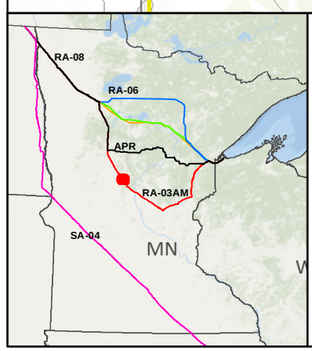

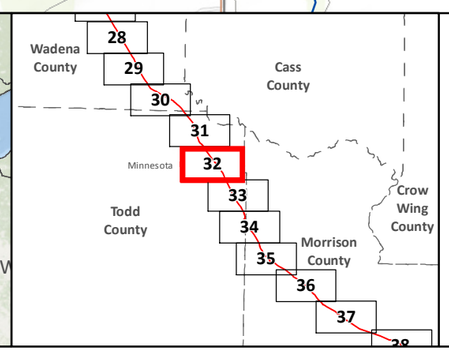

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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- Navigable Waterway Crossings
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Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 32B of 67

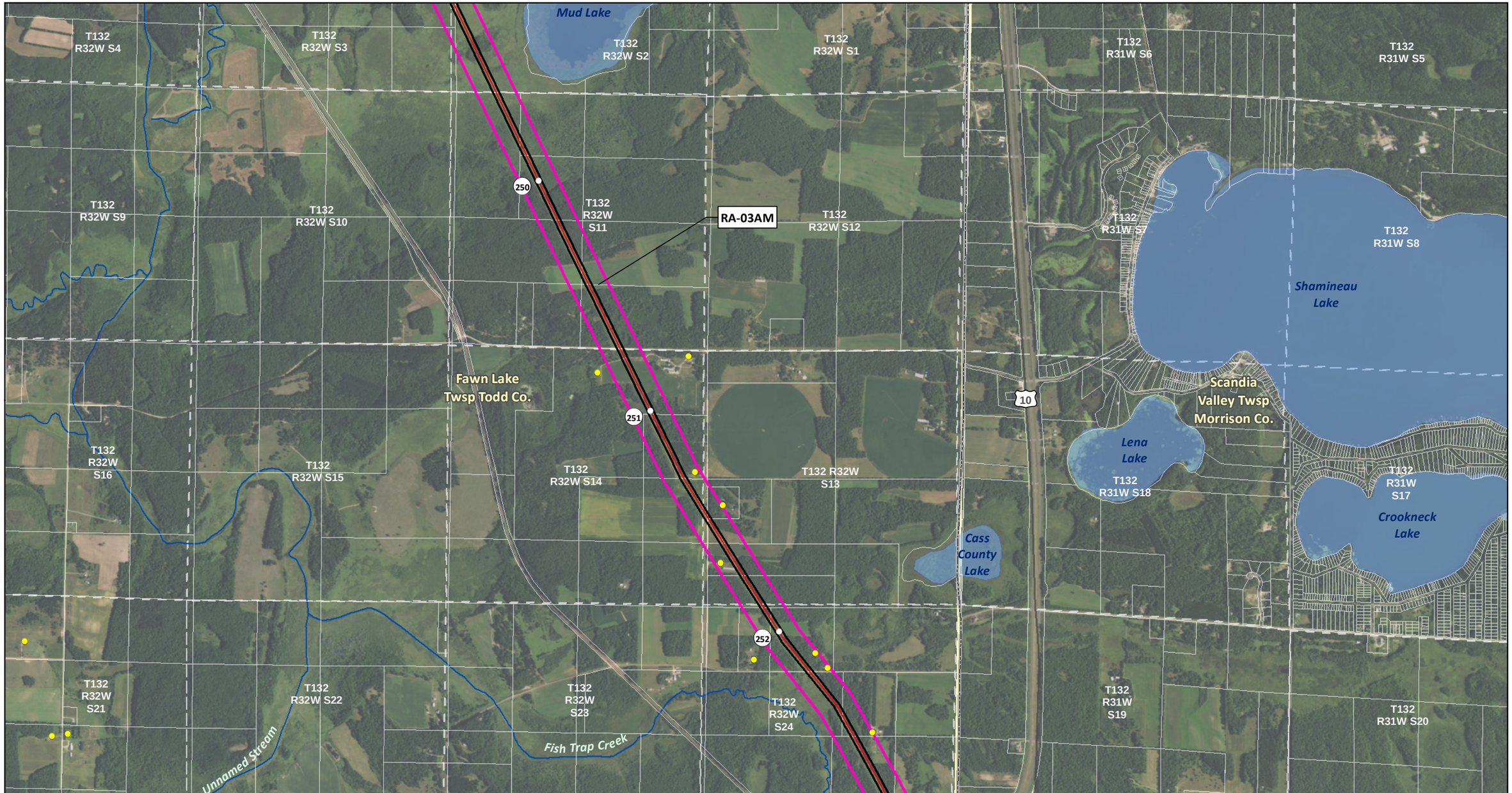

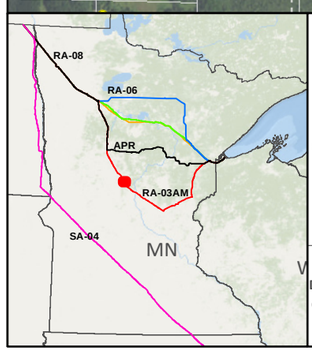

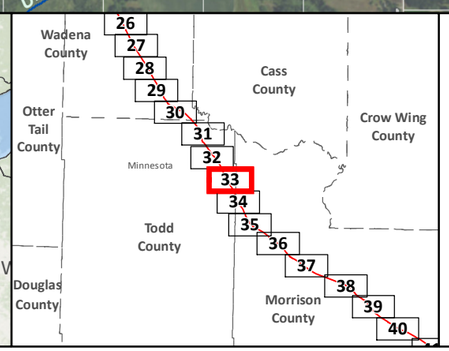

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
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Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
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- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 33A of 67

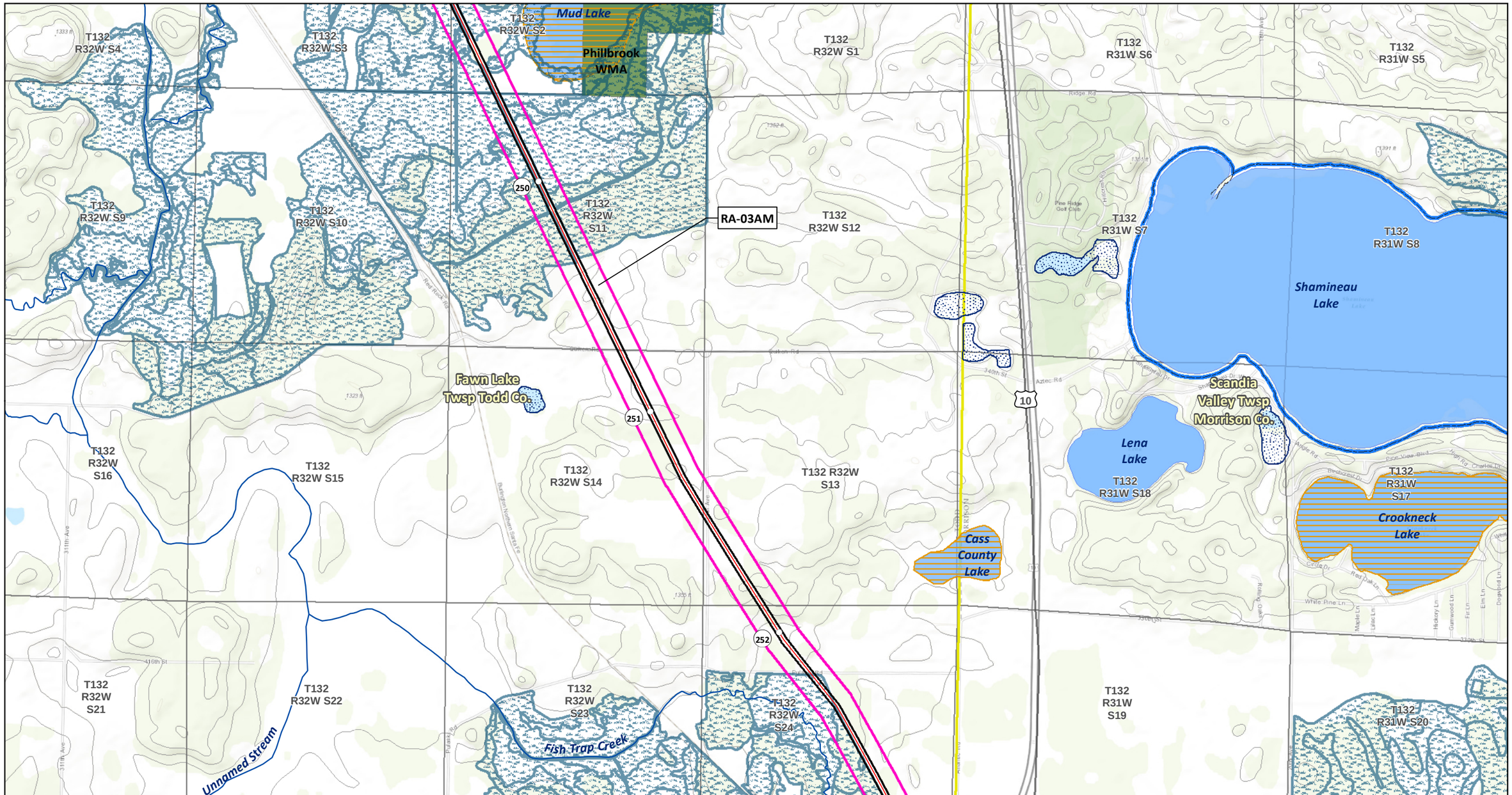

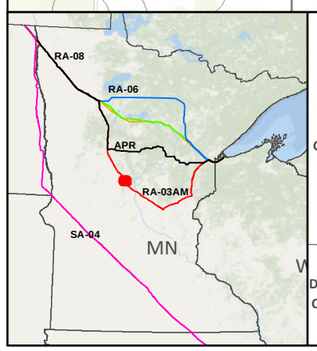

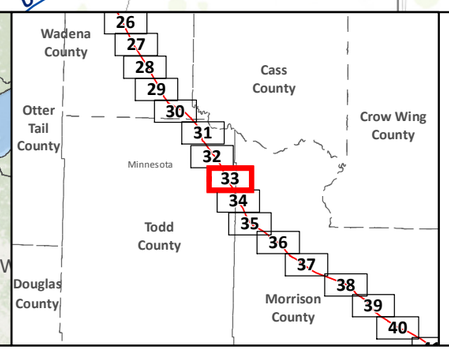

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

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- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 33B of 67

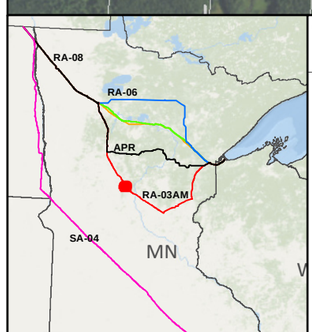

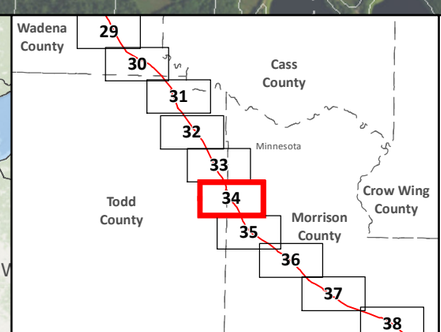

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
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- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 34A of 67

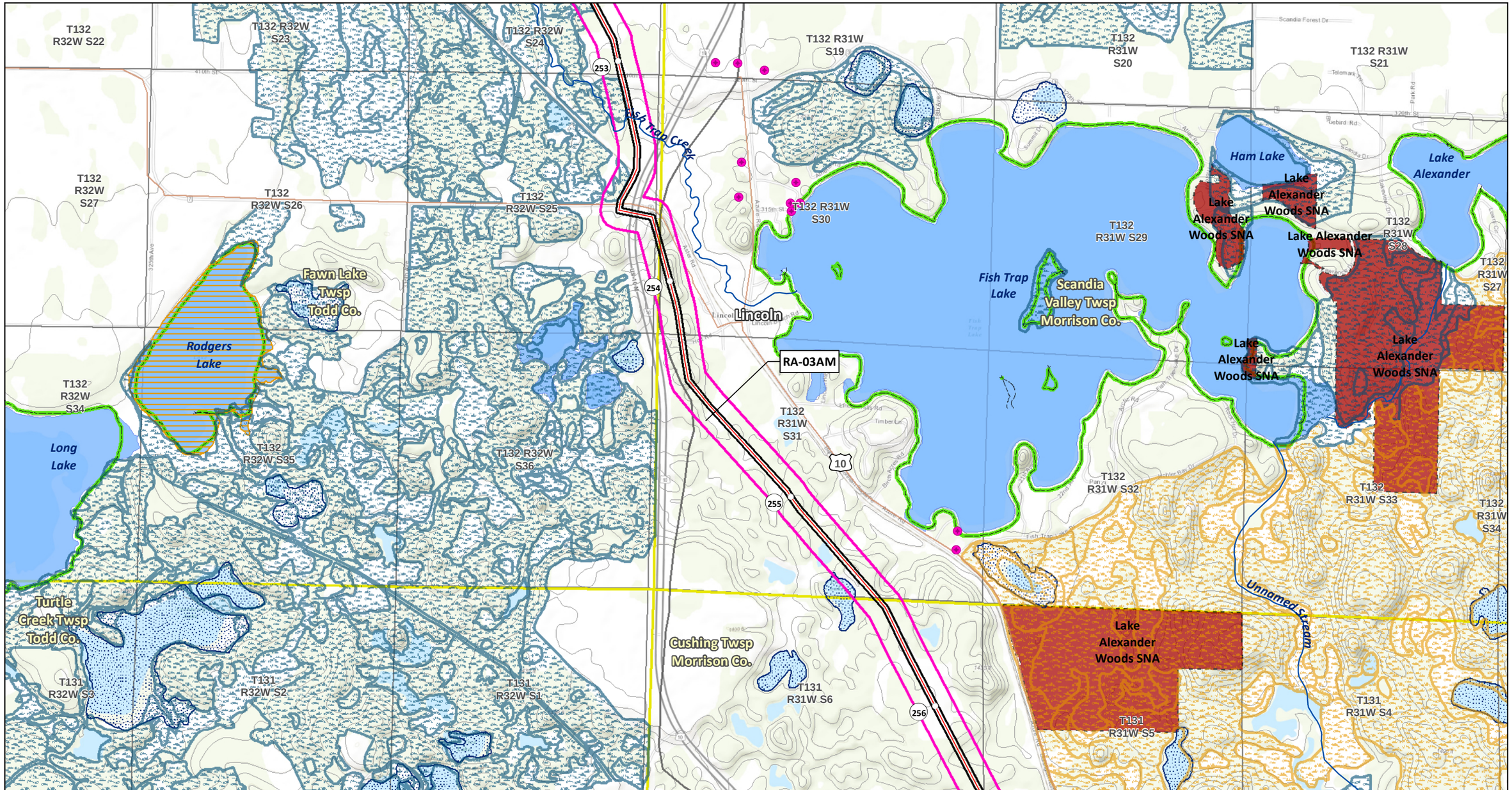

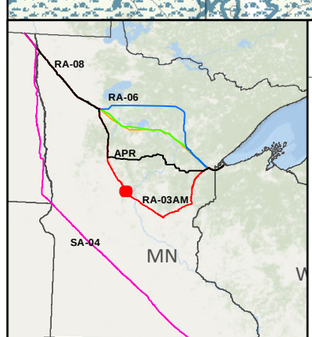

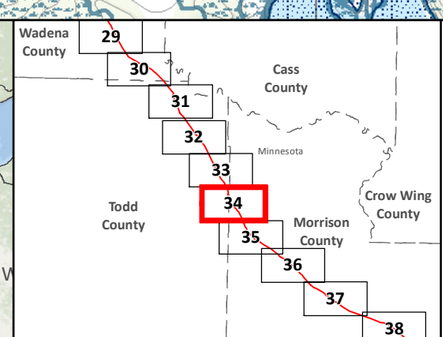

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 34B of 67

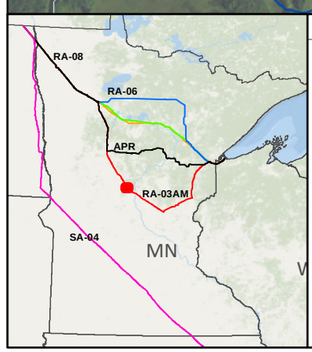

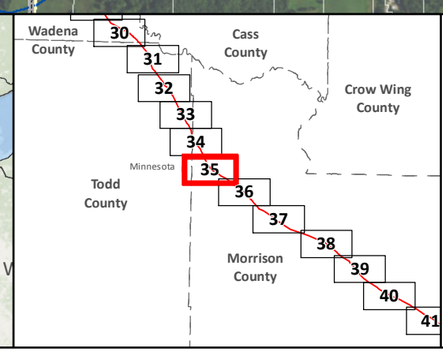

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 35A of 67

T131 R32W S1
T131 R31W S6
T131 R31W S5
T131 R31W S4
T131 R31W S3
T131 R31W S2
Lake Madaline
T131 R32W S12
T131 R31W S7
T131 R31W S8
T131 R31W S9
Lake Alexander Woods SNA
T131 R31W S10
T131 R31W S11
RA-03AM
257
258
10
Cushing Twsp Morrison Co.
Turtle Creek Twsp Todd Co.
T131 R31W S18
T131 R31W S17
T131 R31W S16
Millers Lake
T131 R31W S15
T131 R31W S14
T131 R32W S13
259
T131 R32W S24
Ruff-Nik WMA
T131 R31W S19
Little Elk River
Unnamed Stream
T131 R31W S20
T131 R31W S21
T131 R31W S22
T131 R31W S23
260
Cushing
261

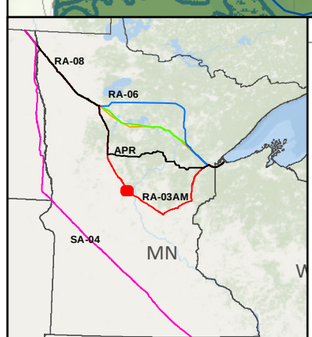

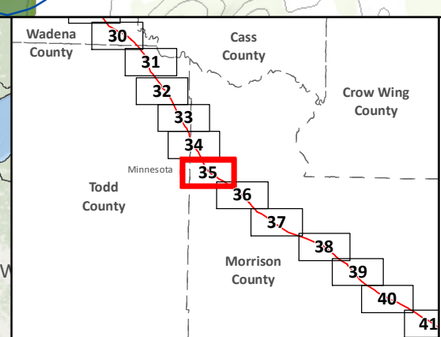

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 35B of 67

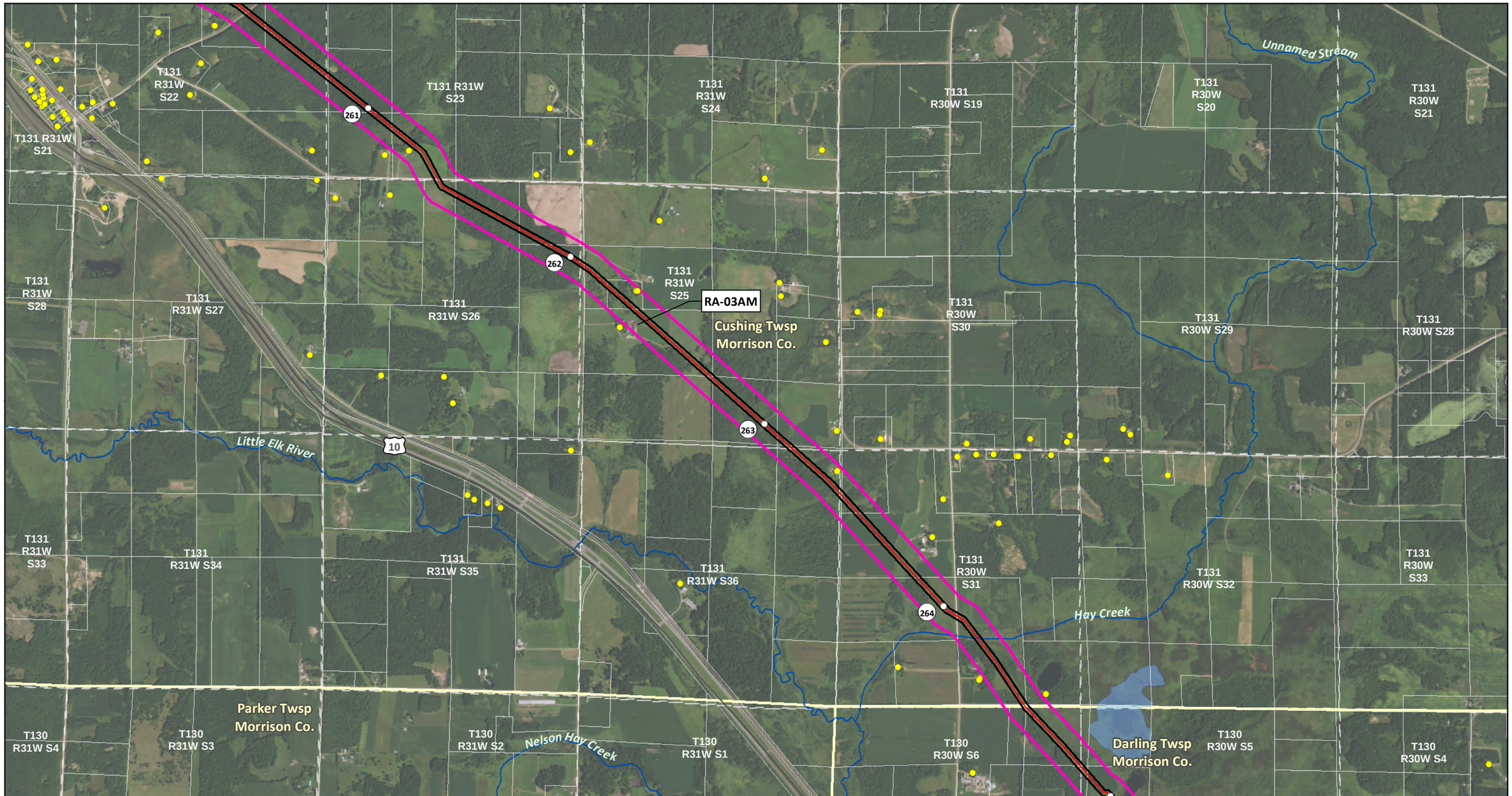

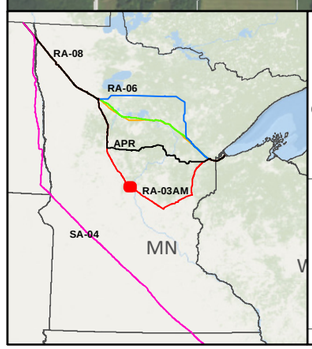

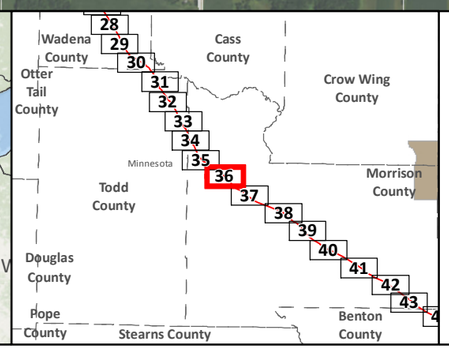

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 36A of 67

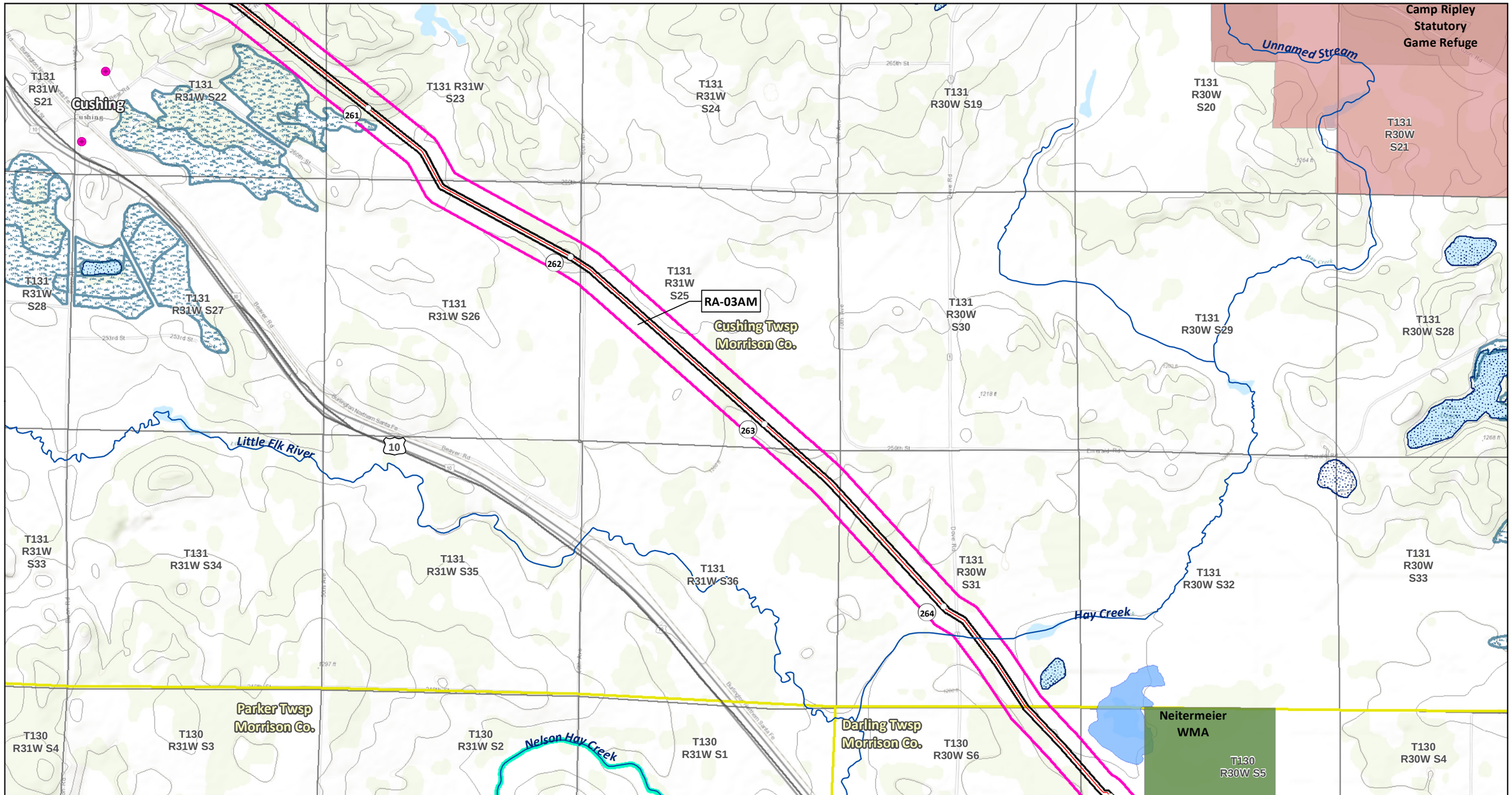

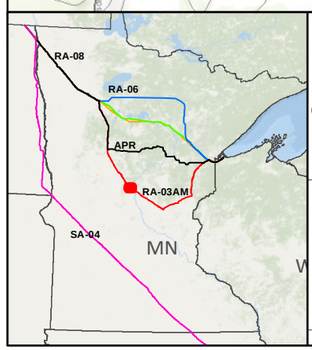

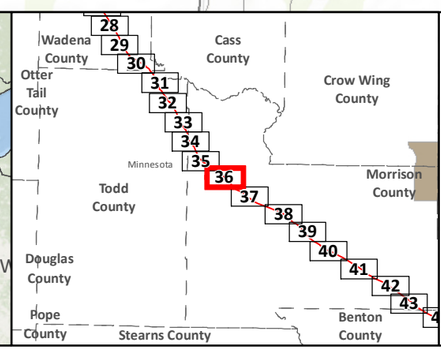

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 36B of 67

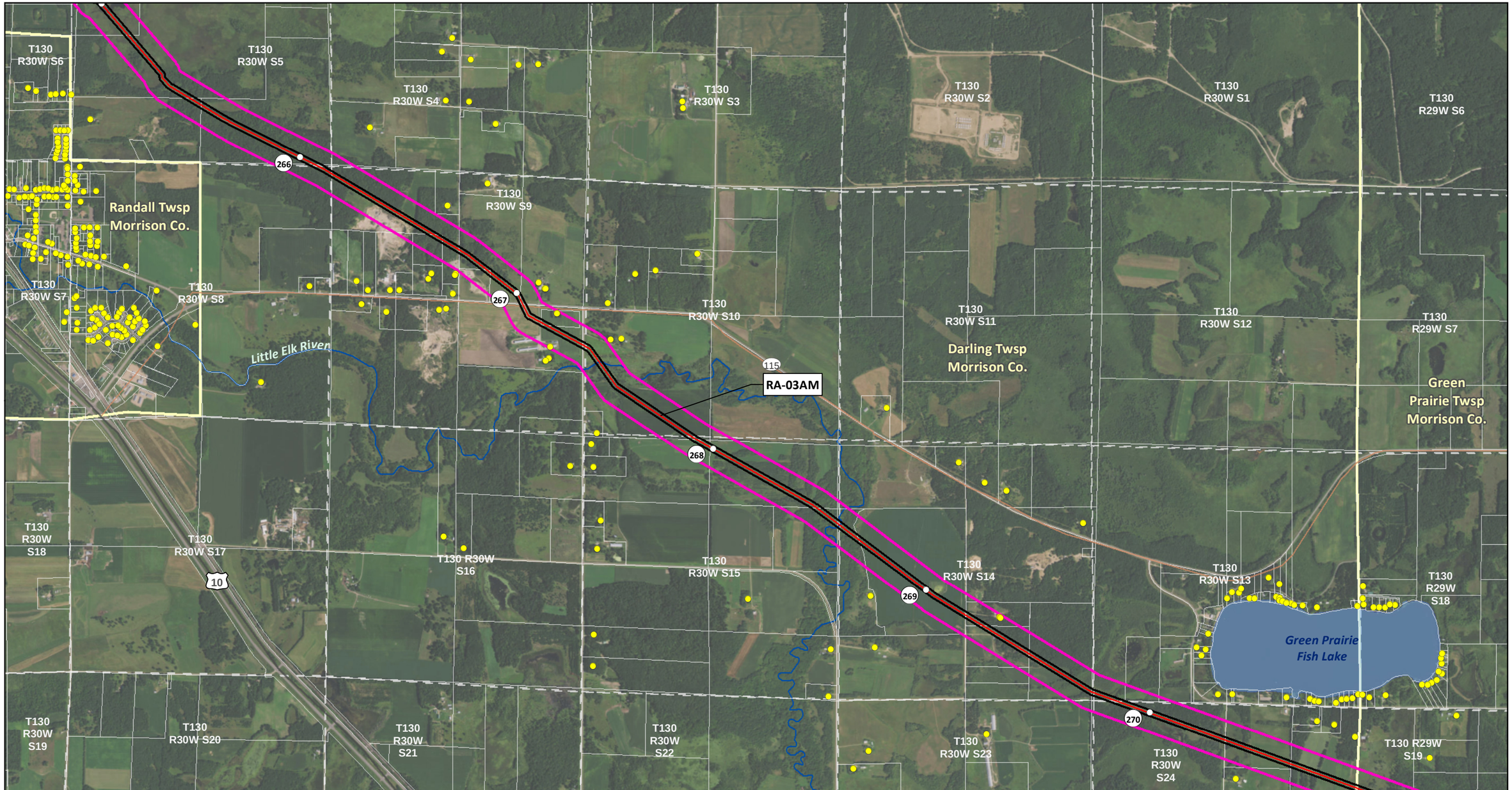

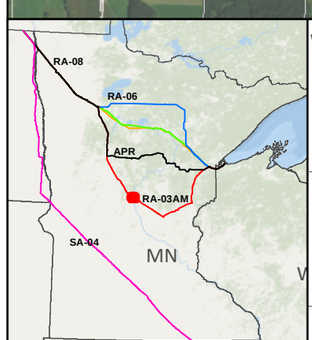

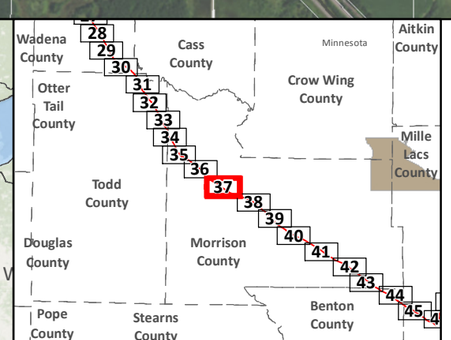

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 37A of 67

Neitermeier WMA

Camp Ripley Statutory Game Refuge

T130 R30W S6 | T130 R30W S5 | T130 R30W S4 | T130 R30W S3 | T130 R30W S2 | T130 R30W S1 | T130 R29W S6

Randall Twsp Morrison Co.

T130 R30W S7 | T130 R30W S8 | T130 R30W S9 | T130 R30W S10 | T130 R30W S11 | T130 R30W S12 | T130 R29W S7

Little Elk River

RA-03AM

Darling Twsp Morrison Co.

Green Prairie Twsp Morrison Co.

T130 R30W S18 | T130 R30W S17 | T130 R30W S16 | T130 R30W S15 | T130 R30W S14 | T130 R30W S13 | T130 R29W S18

Green Prairie Fish Lake

T130 R30W S19 | T130 R30W S20 | T130 R30W S21 | T130 R30W S22 | T130 R30W S23 | T130 R30W S24 | T130 R29W S19

266 267 268 269 270 115 10

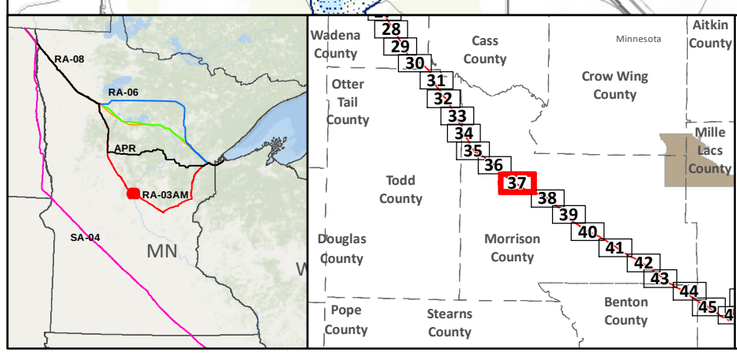

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 37B of 67

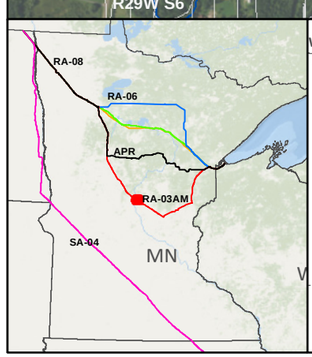

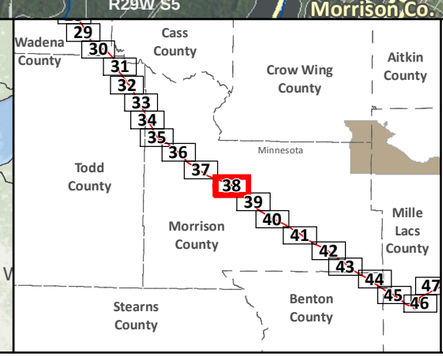

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 38A of 67

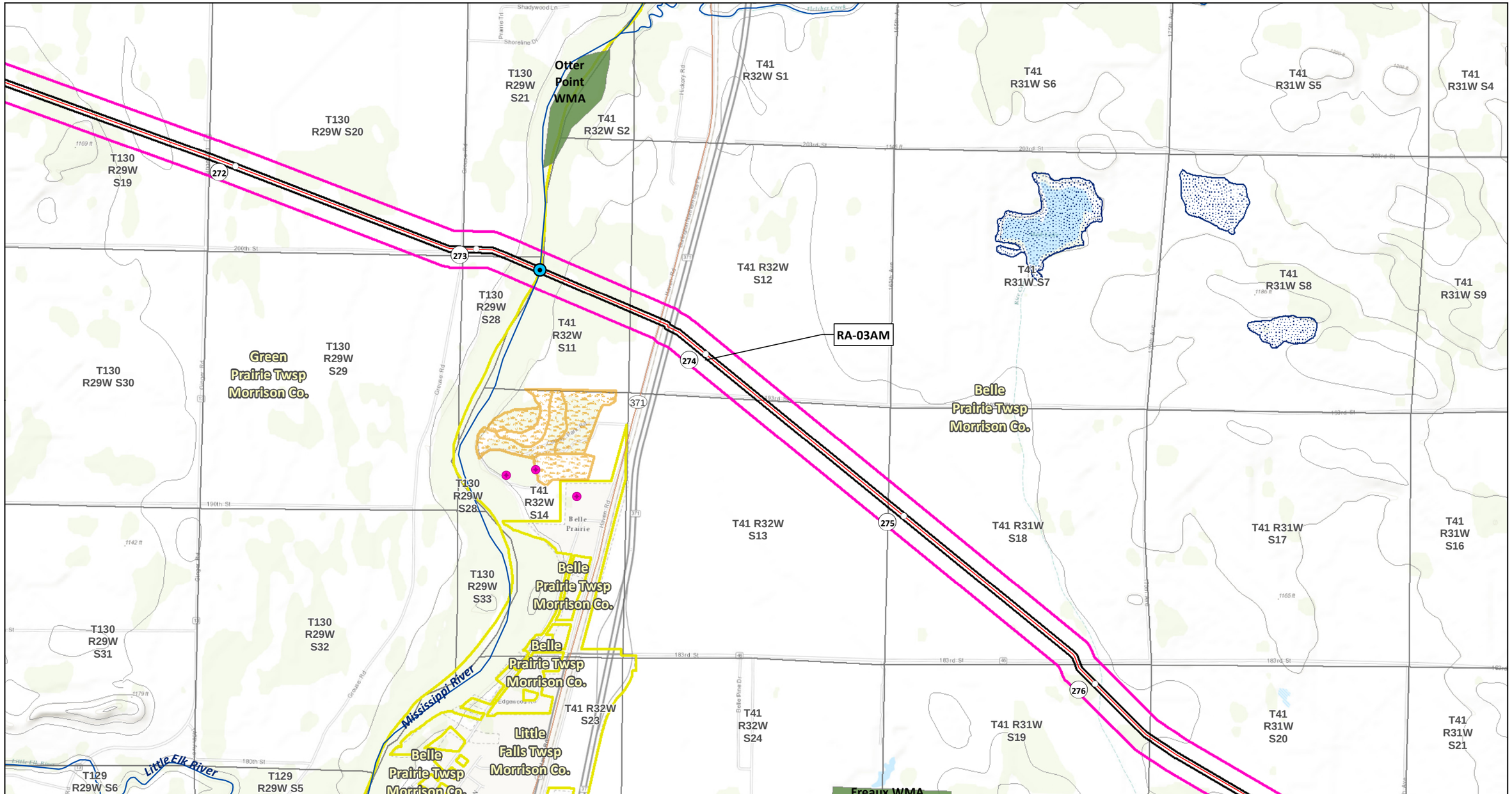

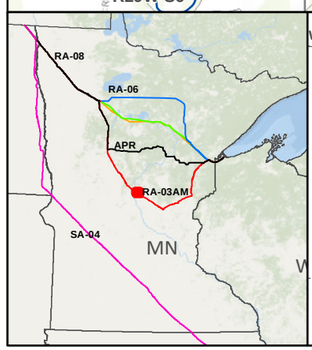

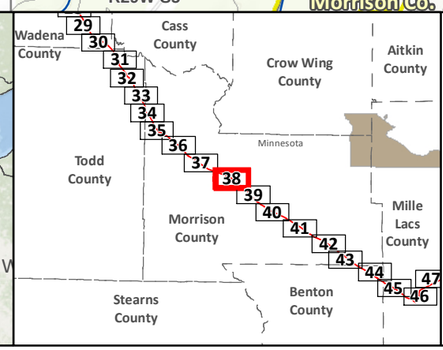

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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National River Inventory Crossing

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Wild Rice Lakes (DNR)
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
Outstanding
High
Moderate

Native Plant Communities with Biodiversity Significance
Outstanding
High
Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 38B of 67

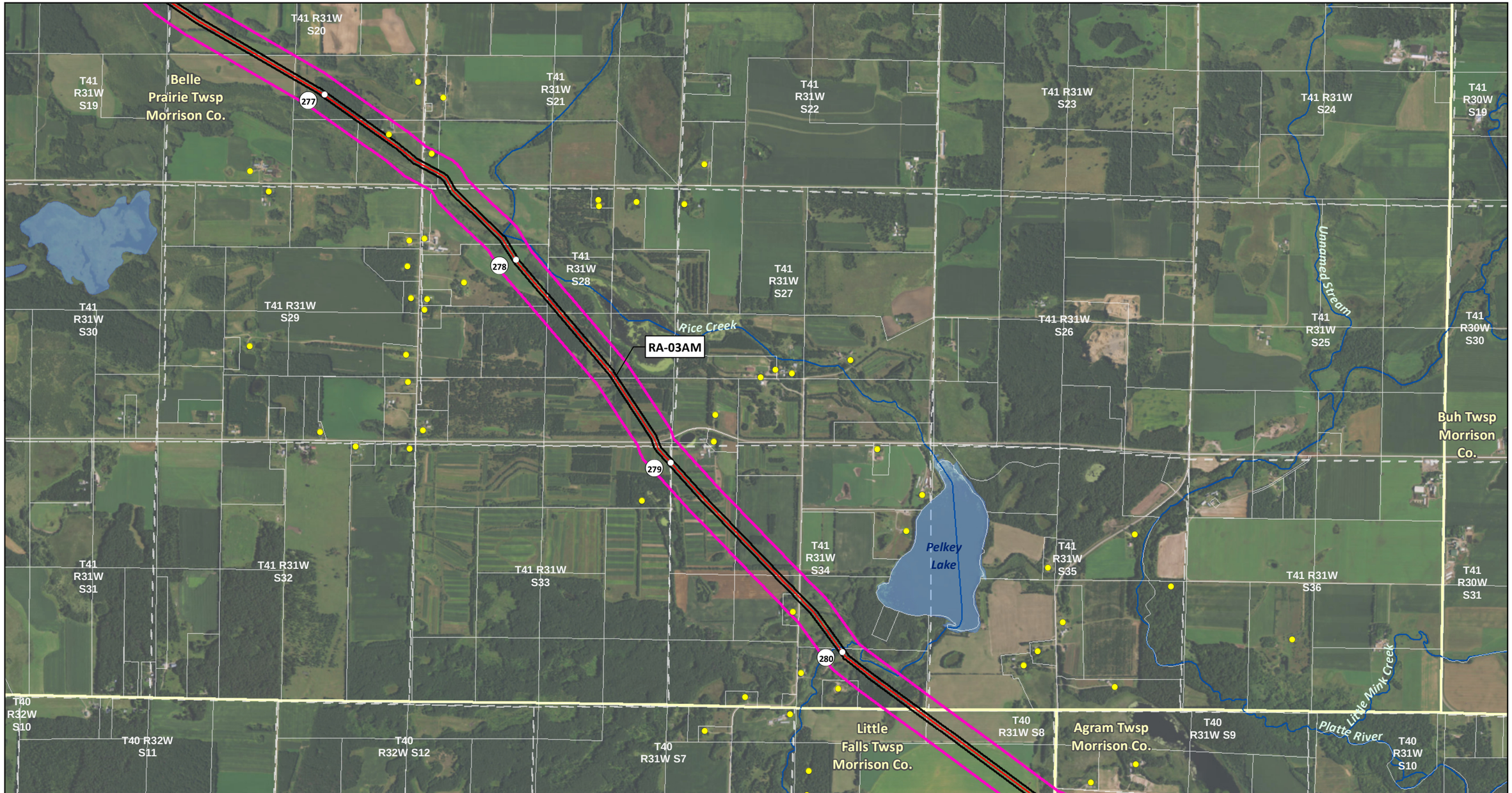

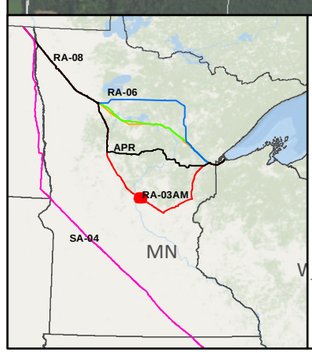

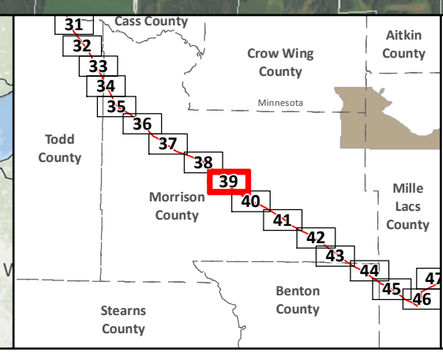

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
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Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

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0 0.125 0.25 0.5 Miles

1:24,000

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LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 39A of 67

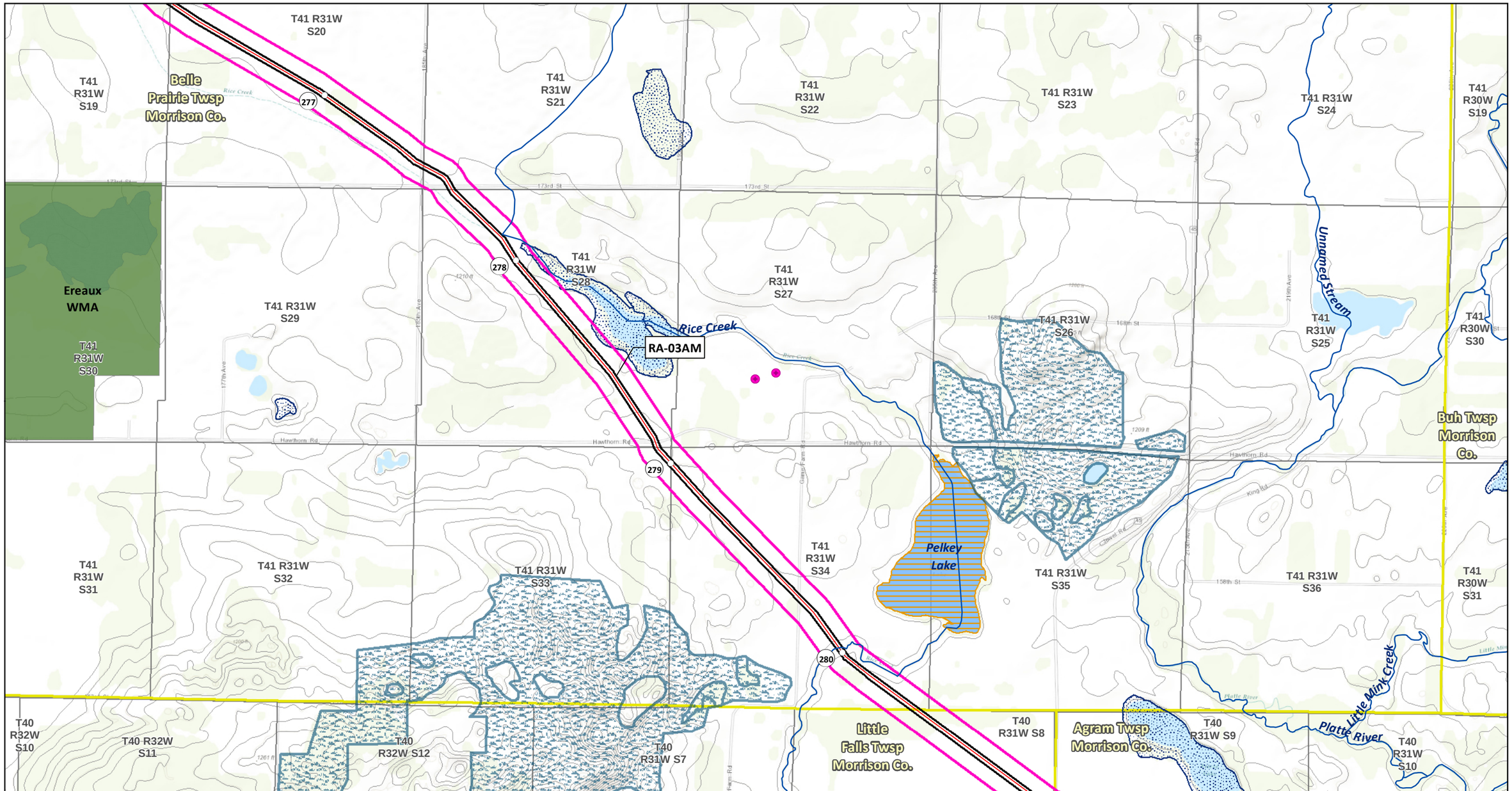

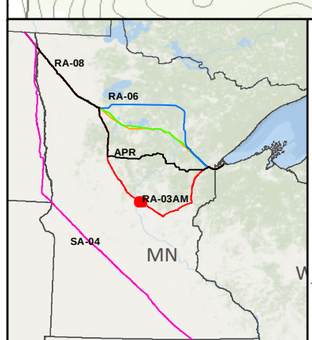

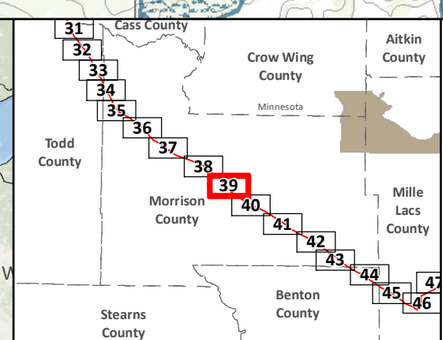

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
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Township Boundary

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- WMA - Wildlife Management Areas
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Native Plant Communities with Biodiversity Significance
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Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 39B of 67

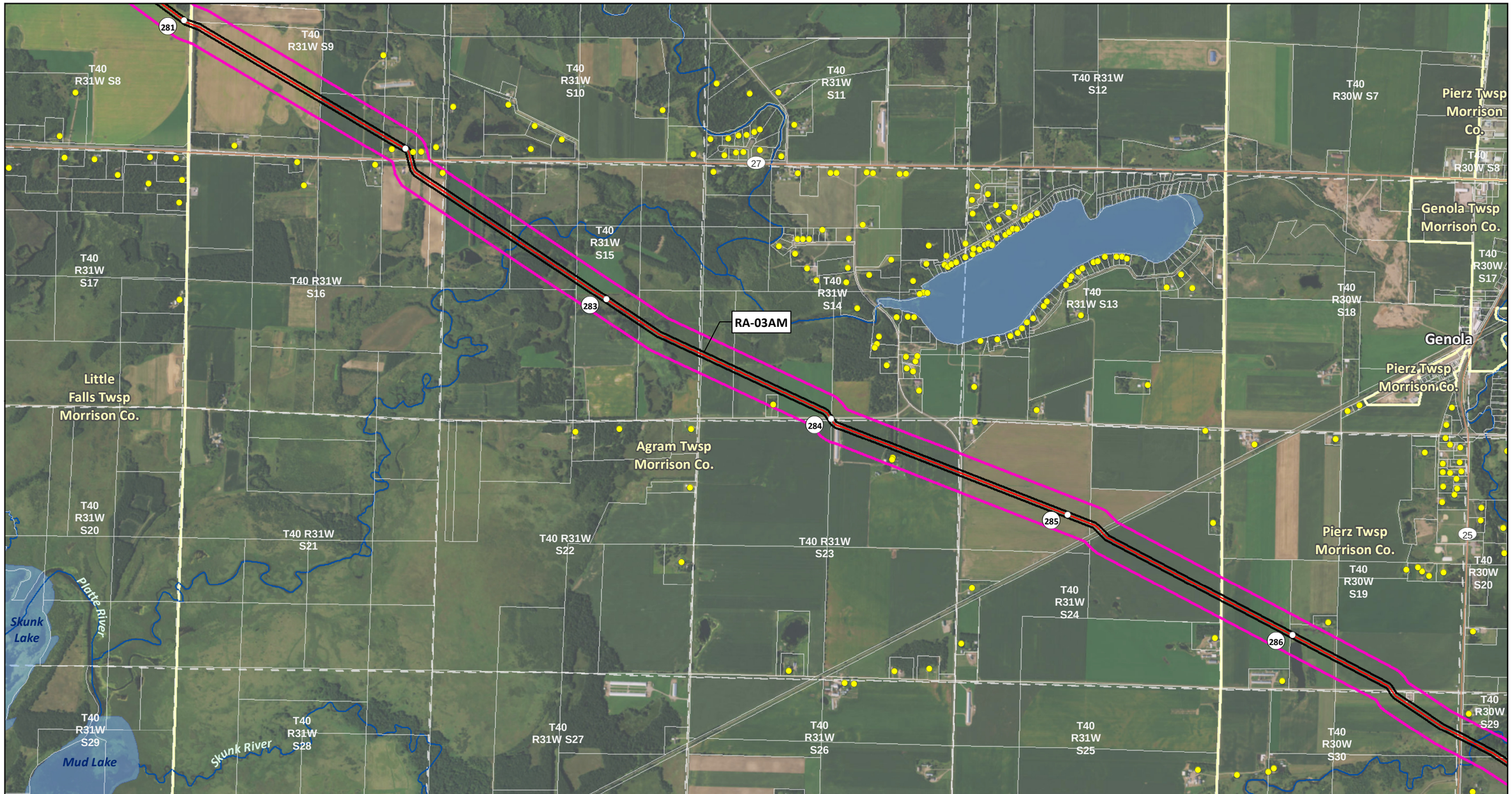

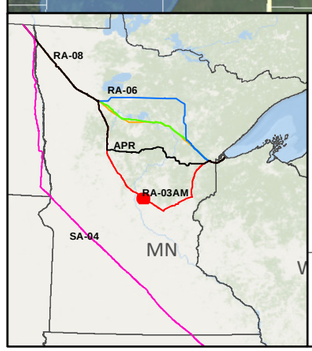

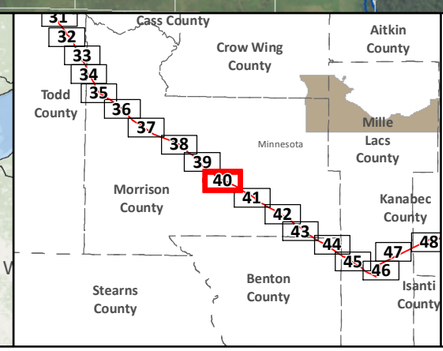

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 40A of 67

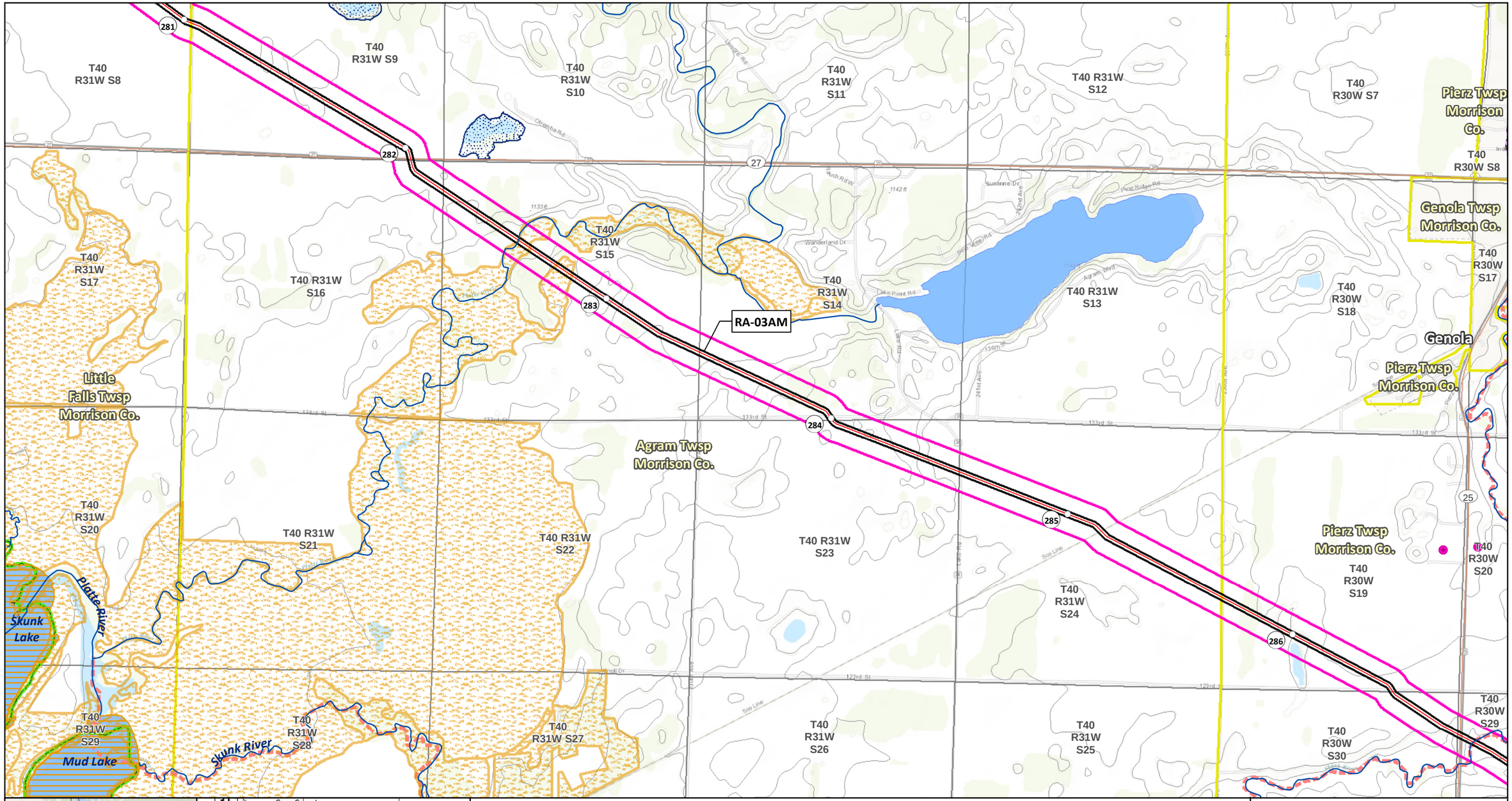

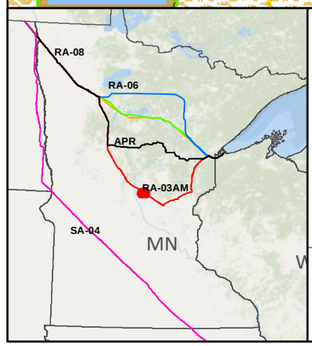

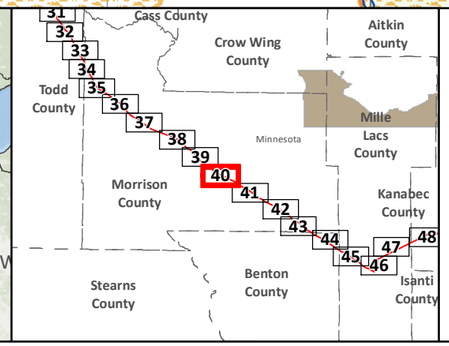

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 40B of 67

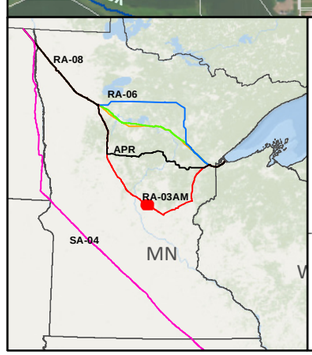

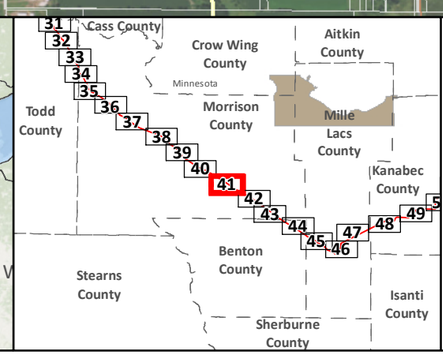

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Tribal Trust Land

White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 41A of 67

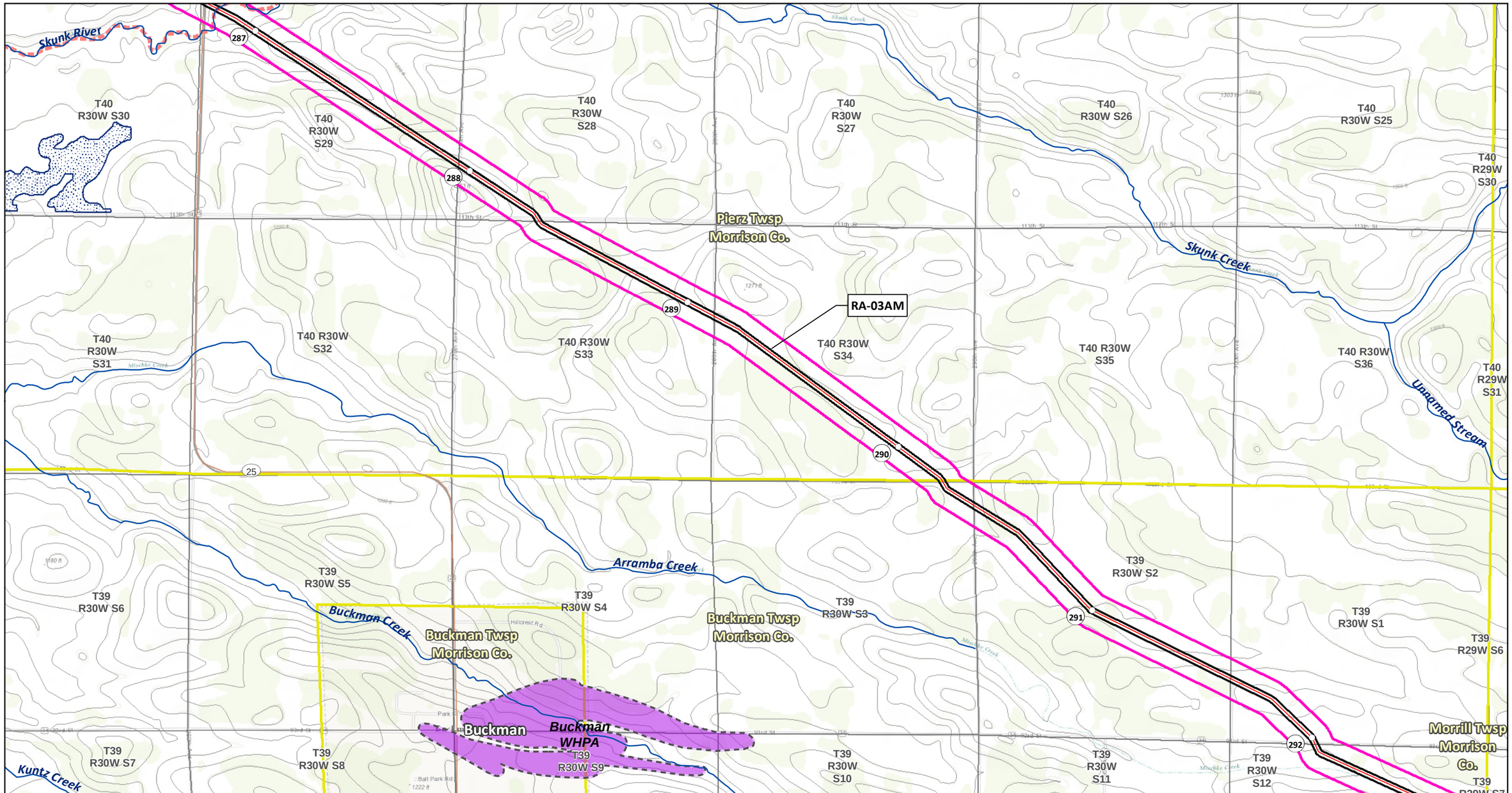

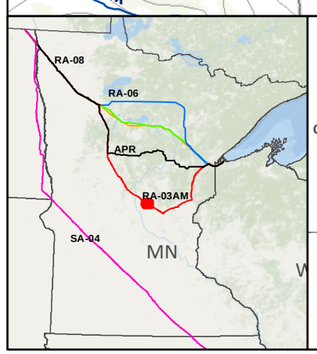

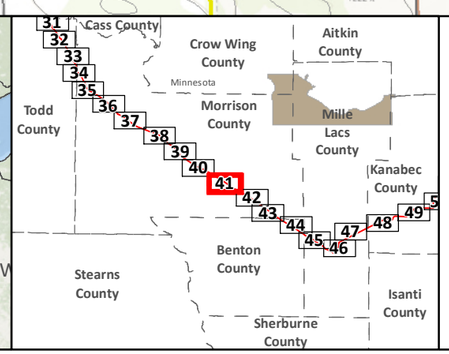

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 41B of 67

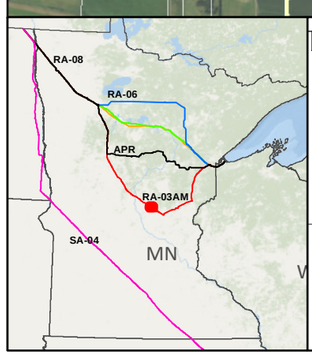

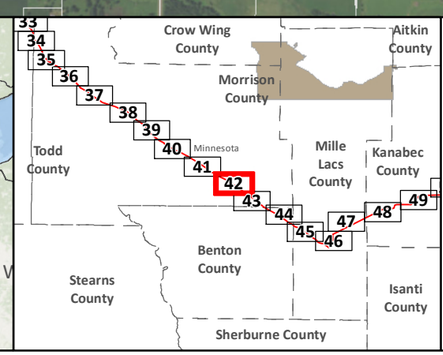

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 42A of 67

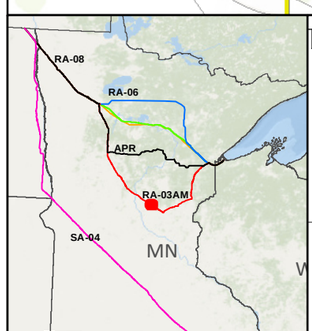

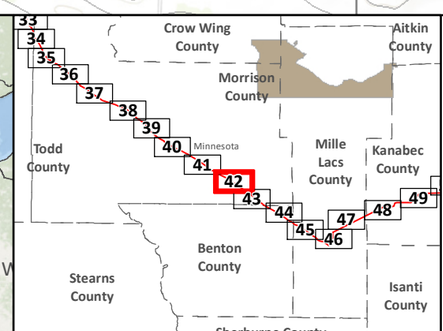

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 42B of 67

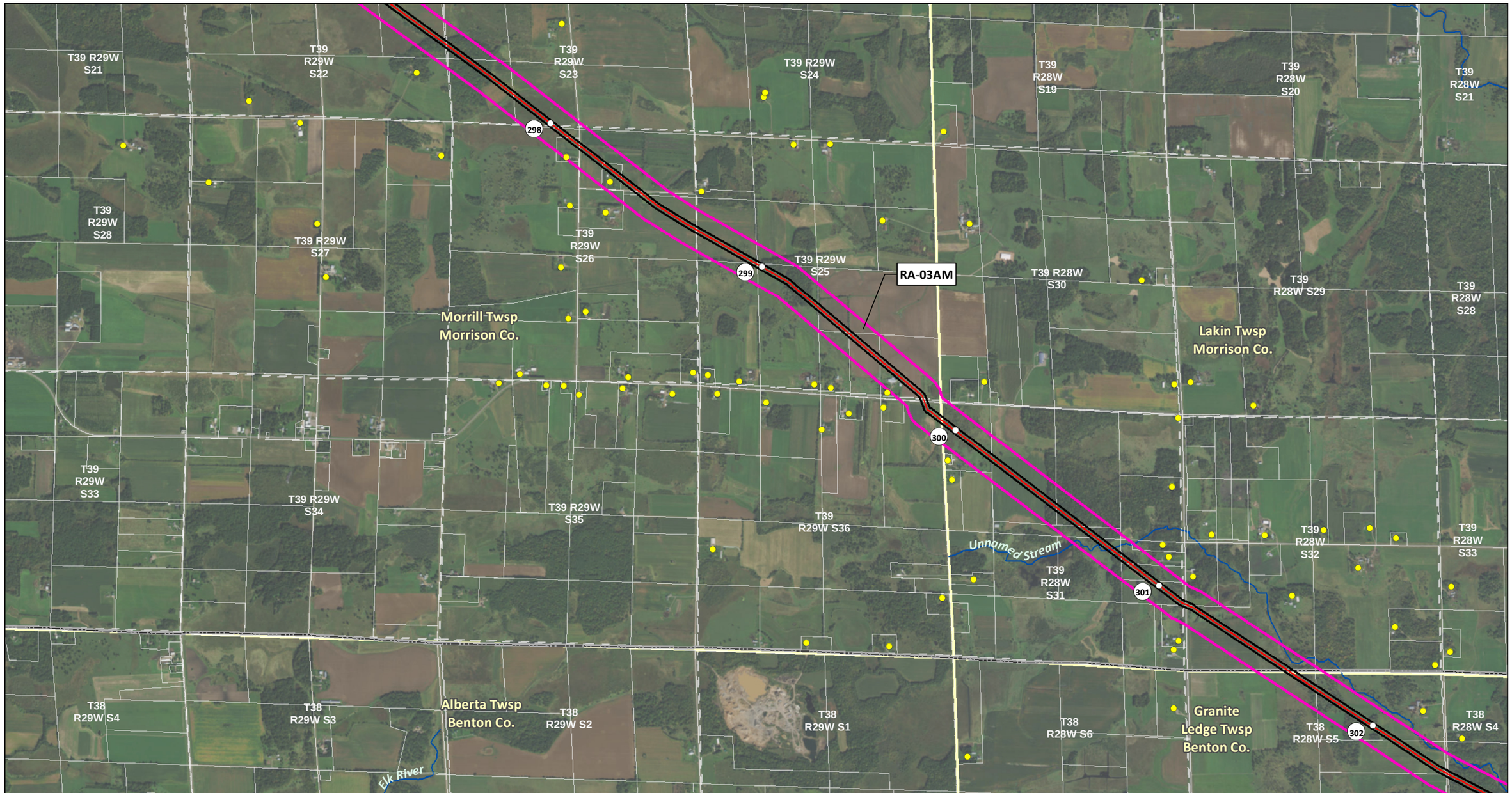

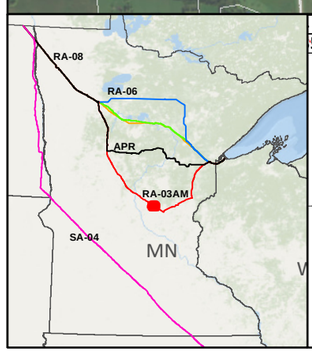

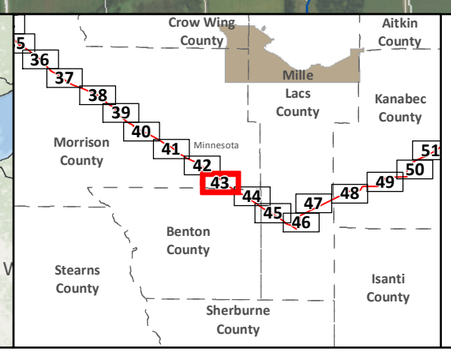

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 43A of 67

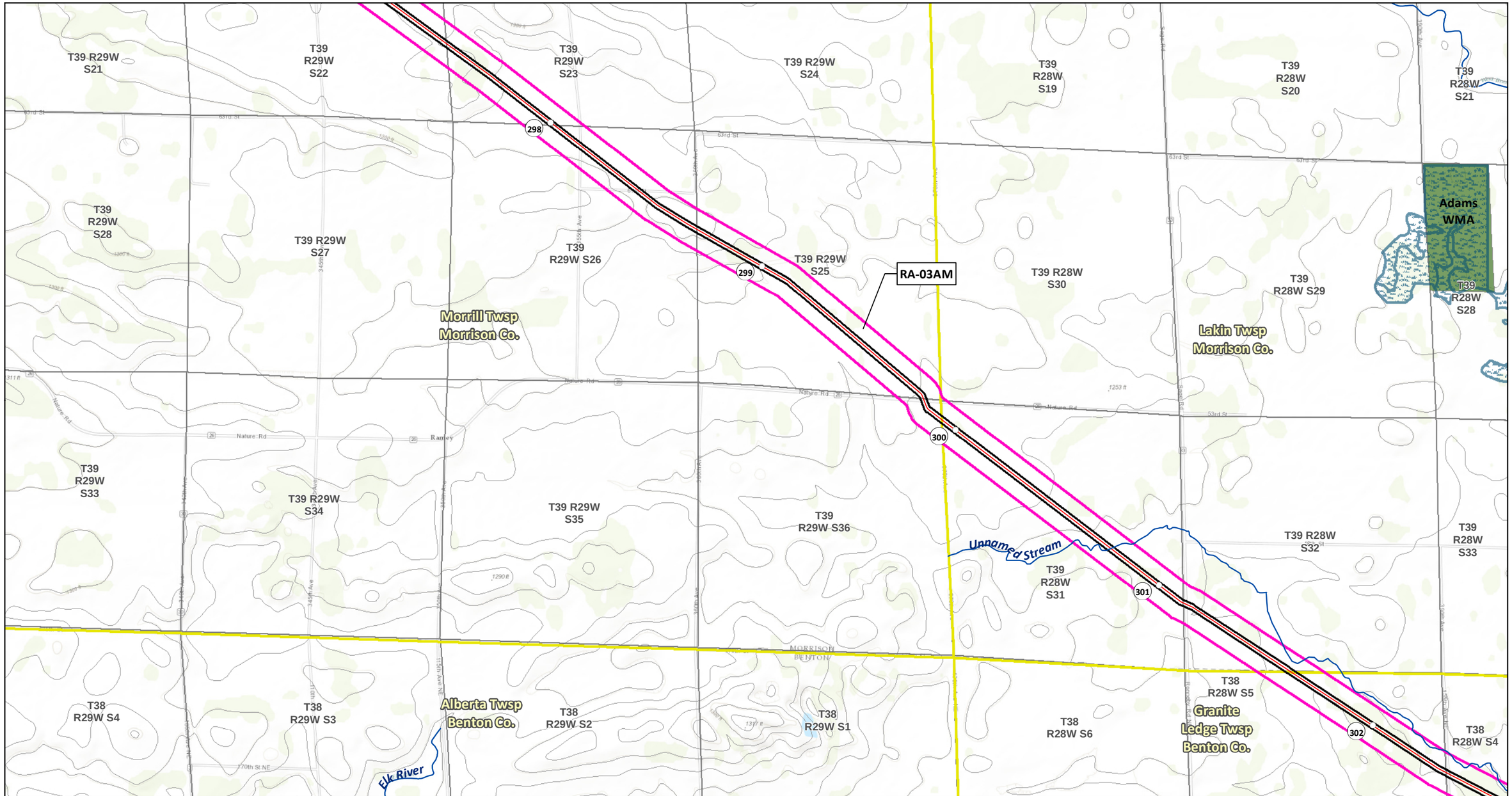

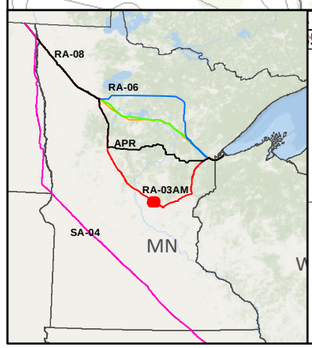

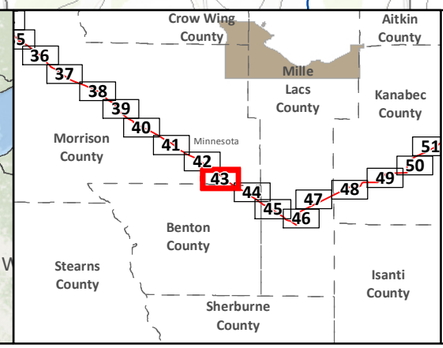

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 43B of 67

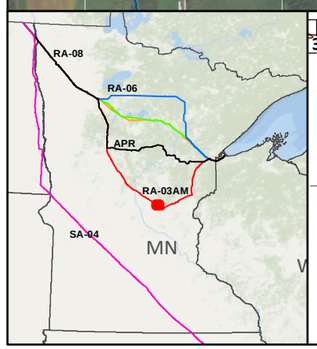

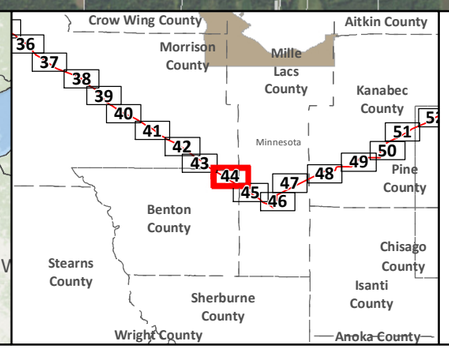

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 44A of 67

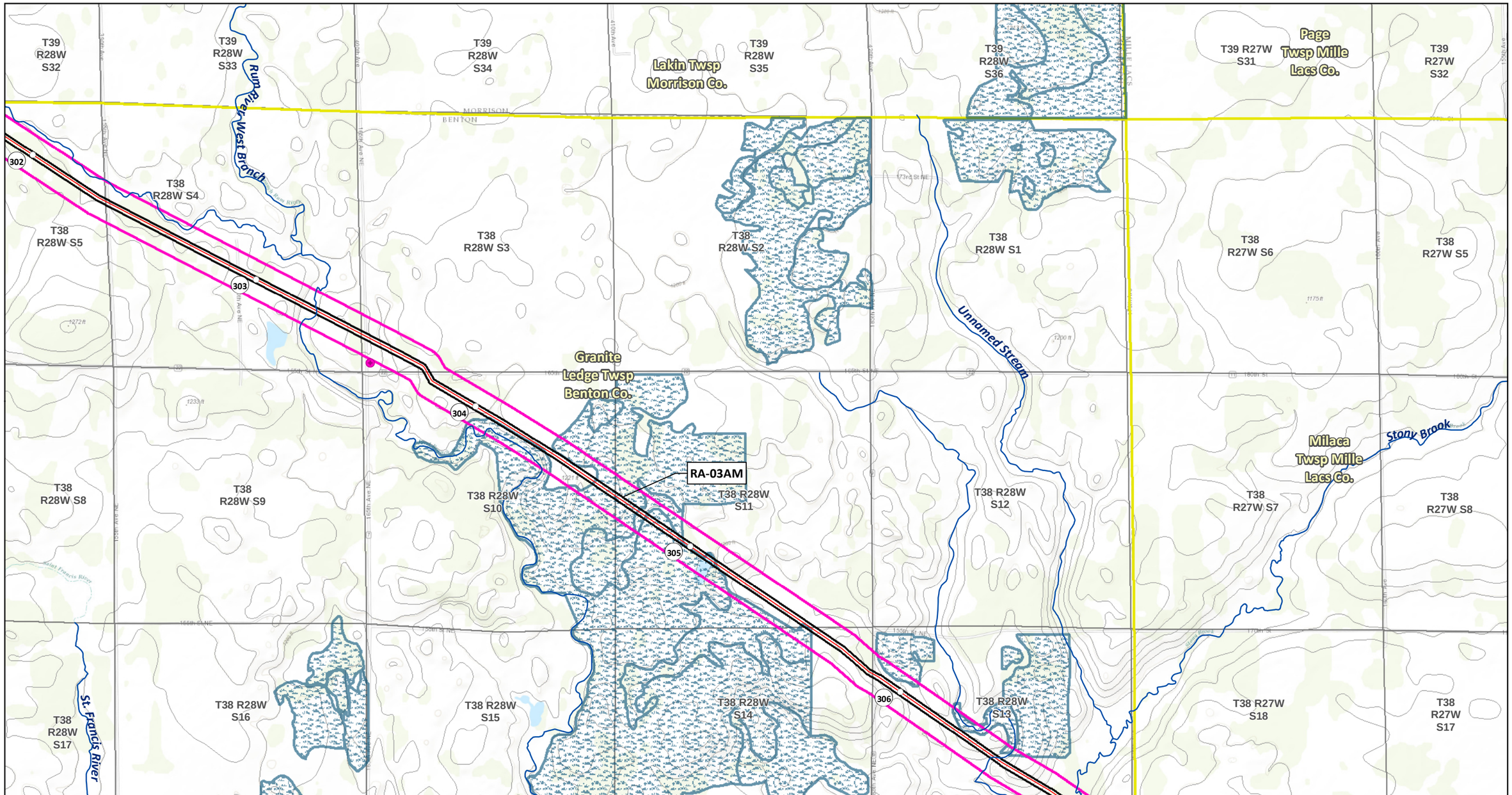

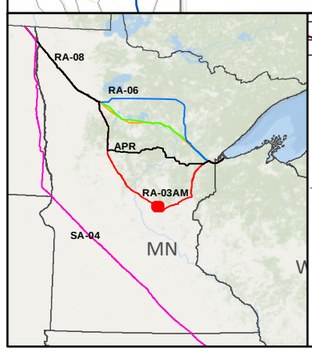

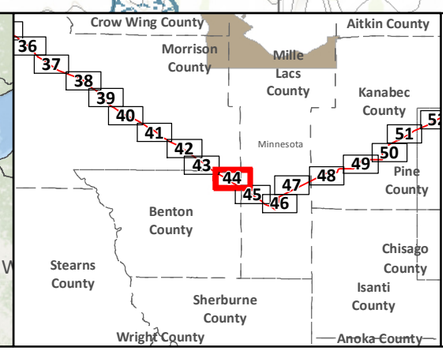

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 44B of 67

T38 R28W S13
T38 R27W S18
T38 R27W S17
T38 R27W S16
T38 R27W S15
T38 R27W S14
Rum River
Chase Brook
Stony Brook
307
308
309
310
23
T38 R28W S24
T38 R27W S19
T38 R27W S20
T38 R27W S21
T38 R27W S22
T38 R27W S23
RA-03AM
Granite Ledge Twsp Benton Co.
Milaca Twsp Mille Lacs Co.
Rum River, West Branch
Unnamed Stream
T38 R28W S25
T38 R27W S30
T38 R27W S29
T38 R27W S28
T38 R27W S27
T38 R27W S26
Milaca Twsp Mille Lacs Co.
T38 R28W S36
T38 R27W S31
T38 R27W S32
T38 R27W S33
T38 R27W S34
T38 R27W S35

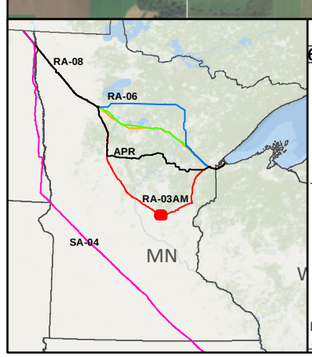

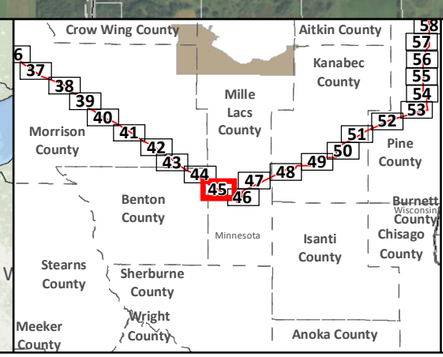

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 45A of 67

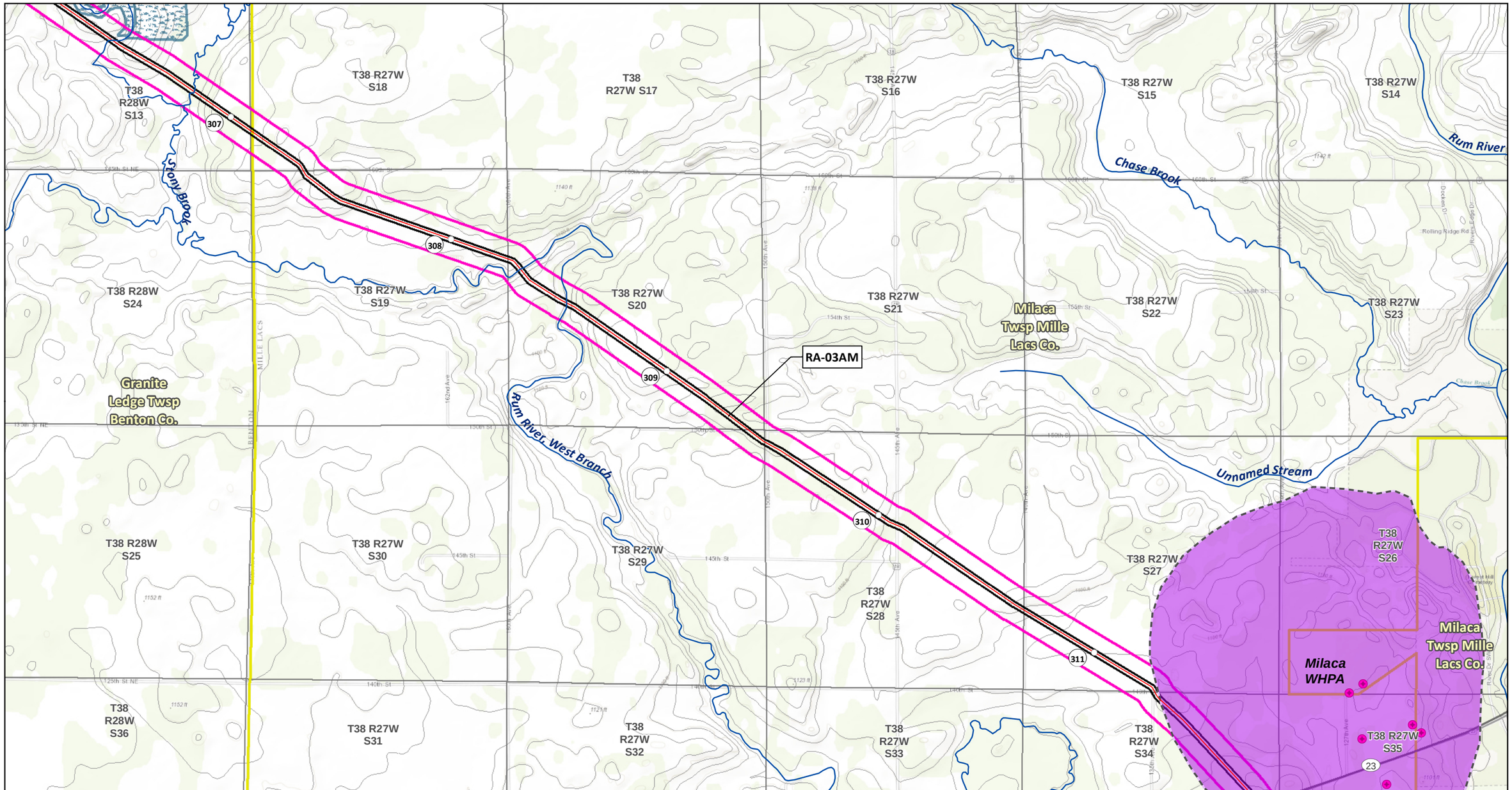

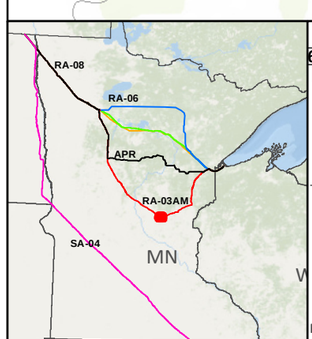

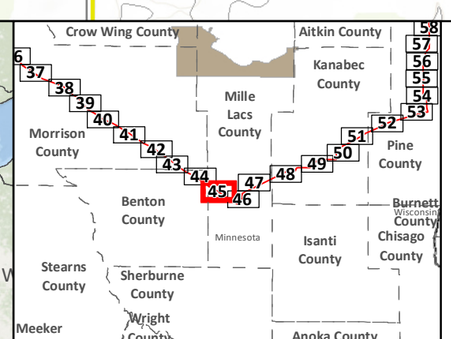

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

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- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

Map 45B of 67

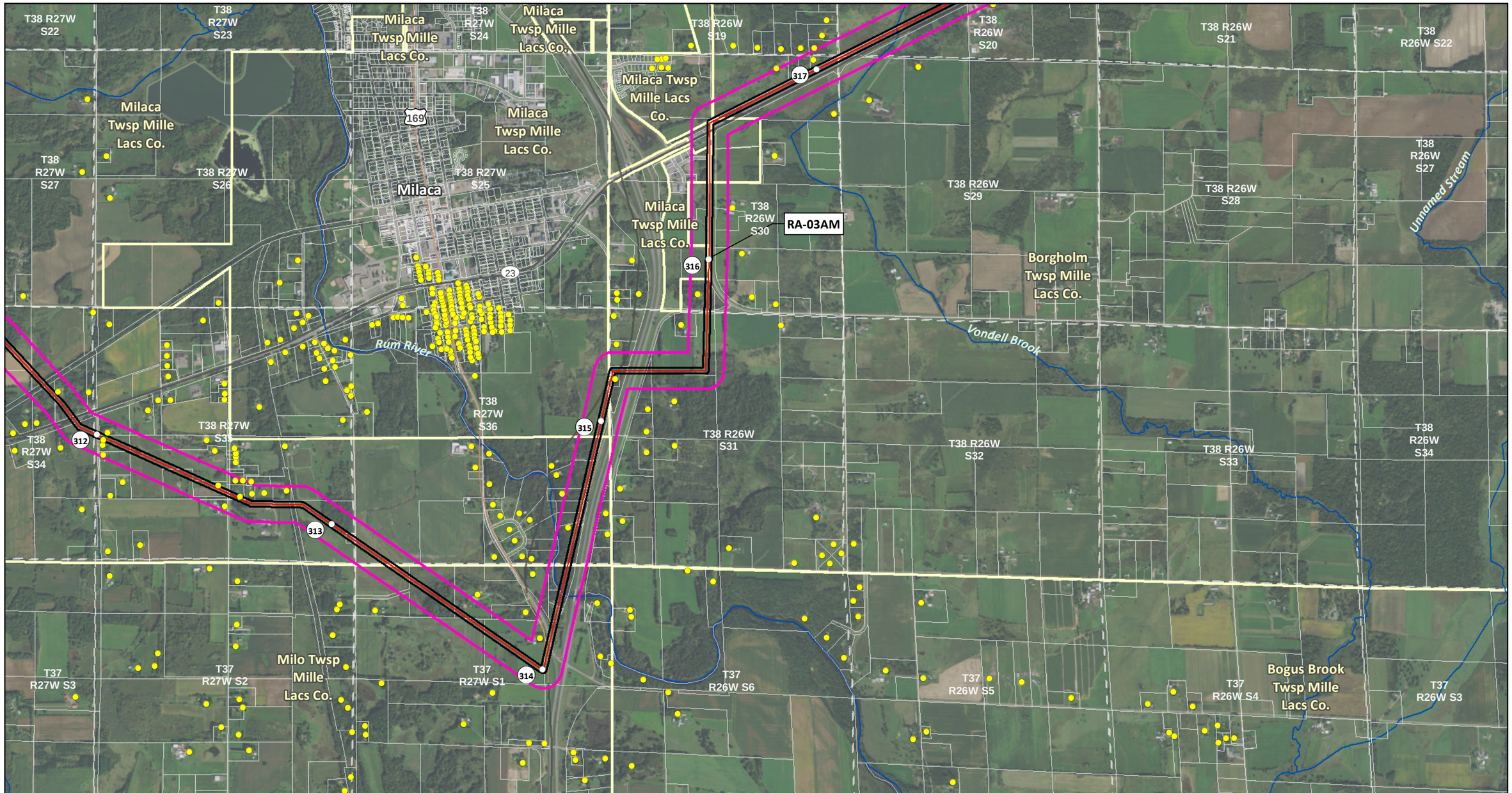

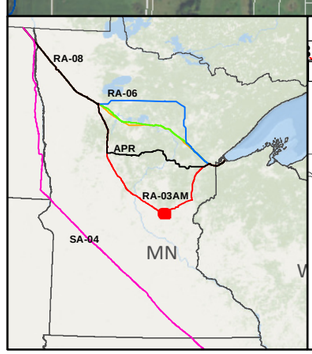

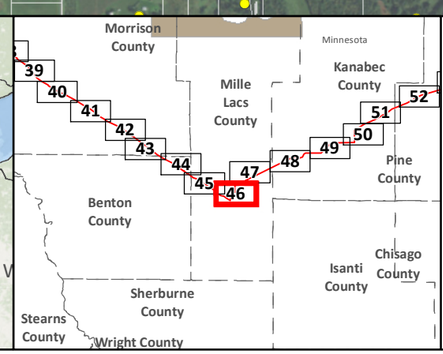

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

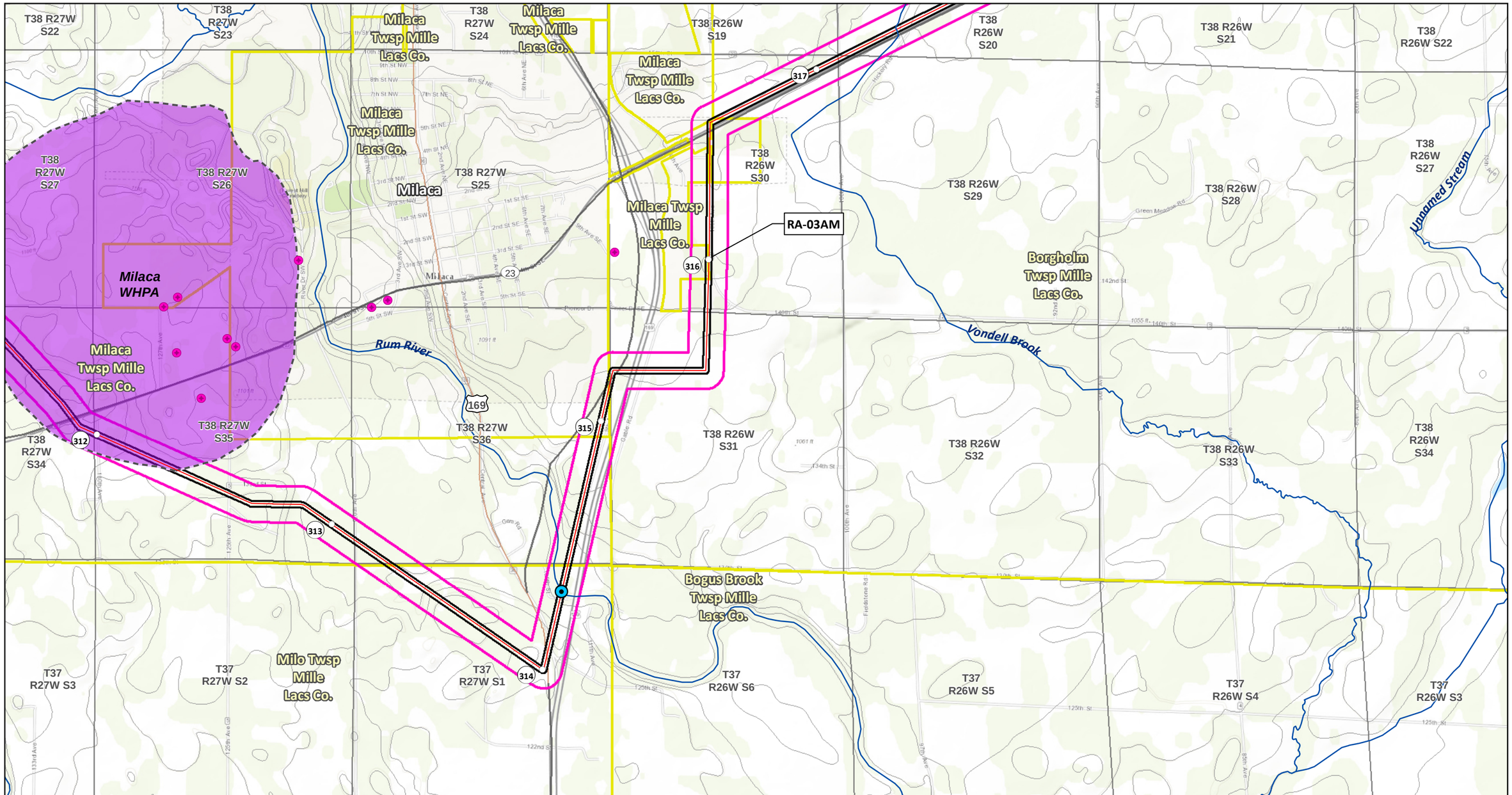

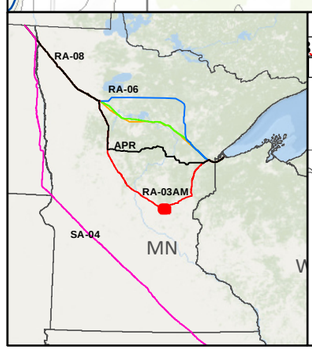

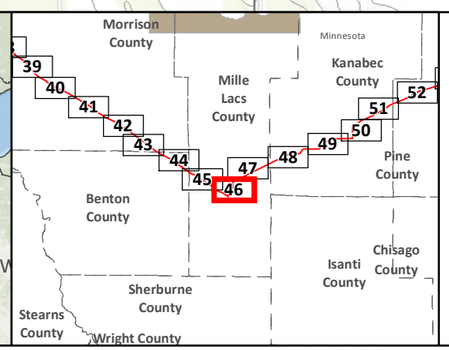

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 46B of 67

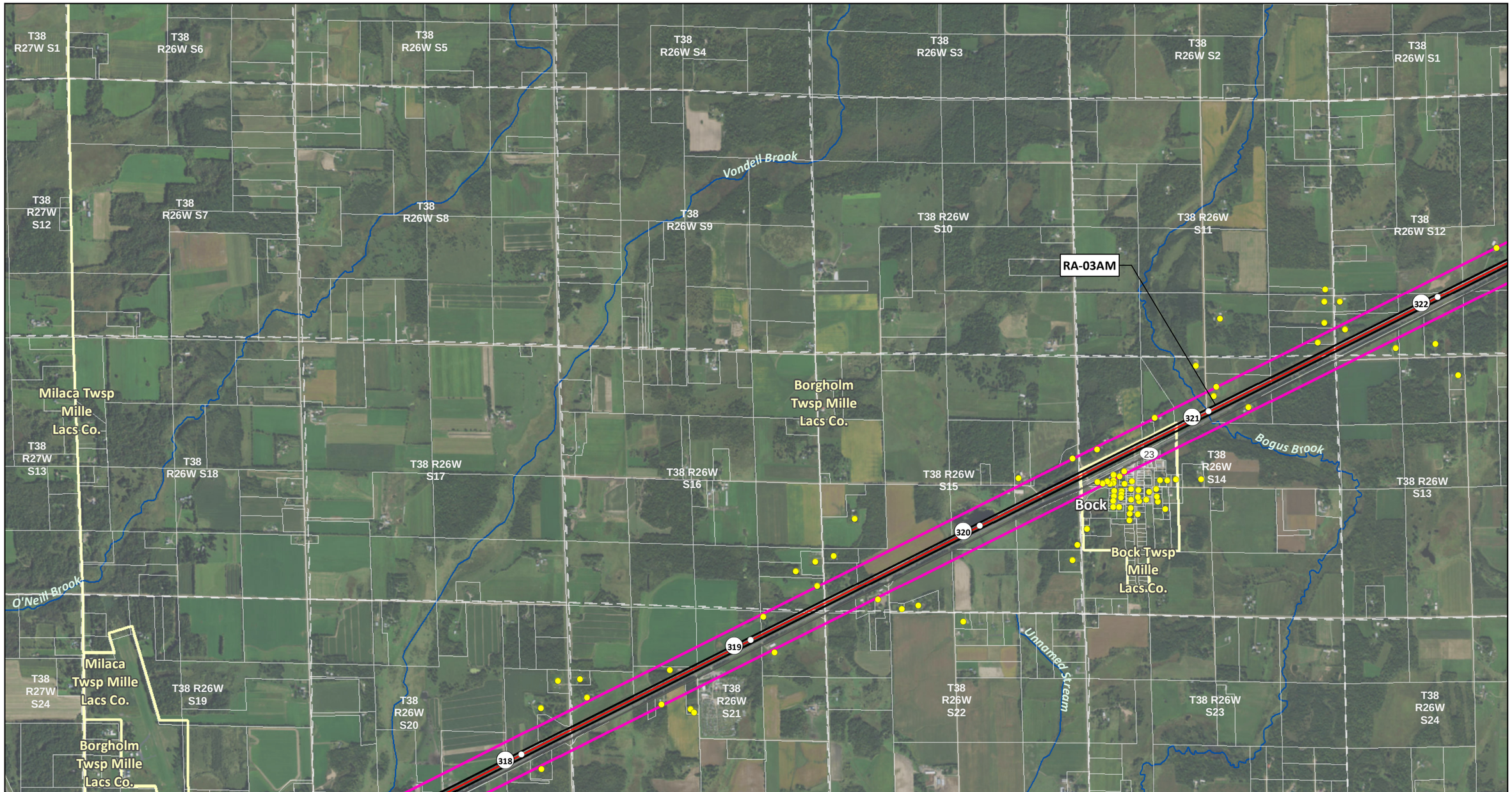

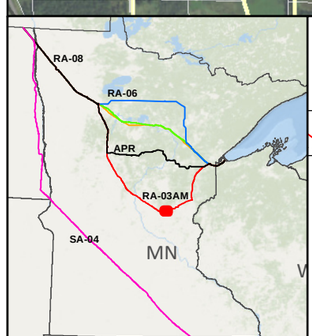

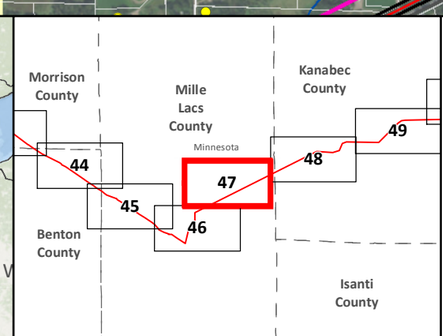

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 47A of 67

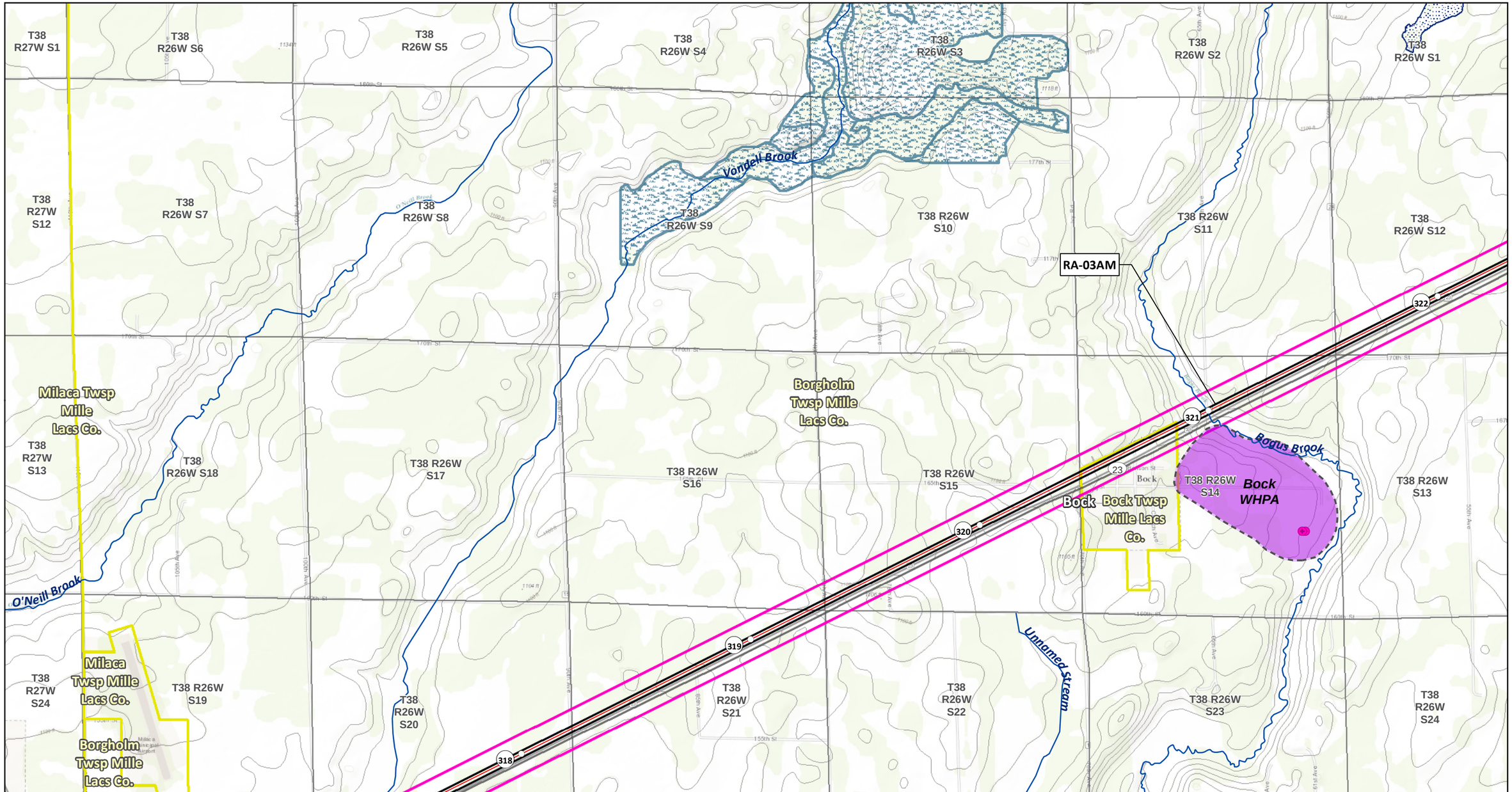

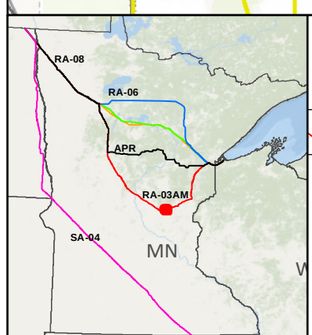

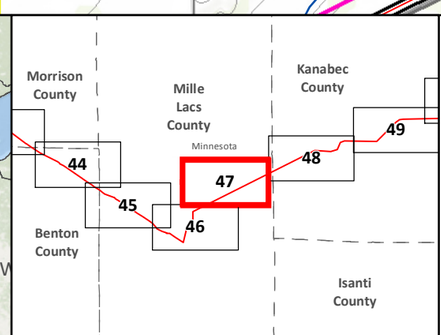

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 47B of 67

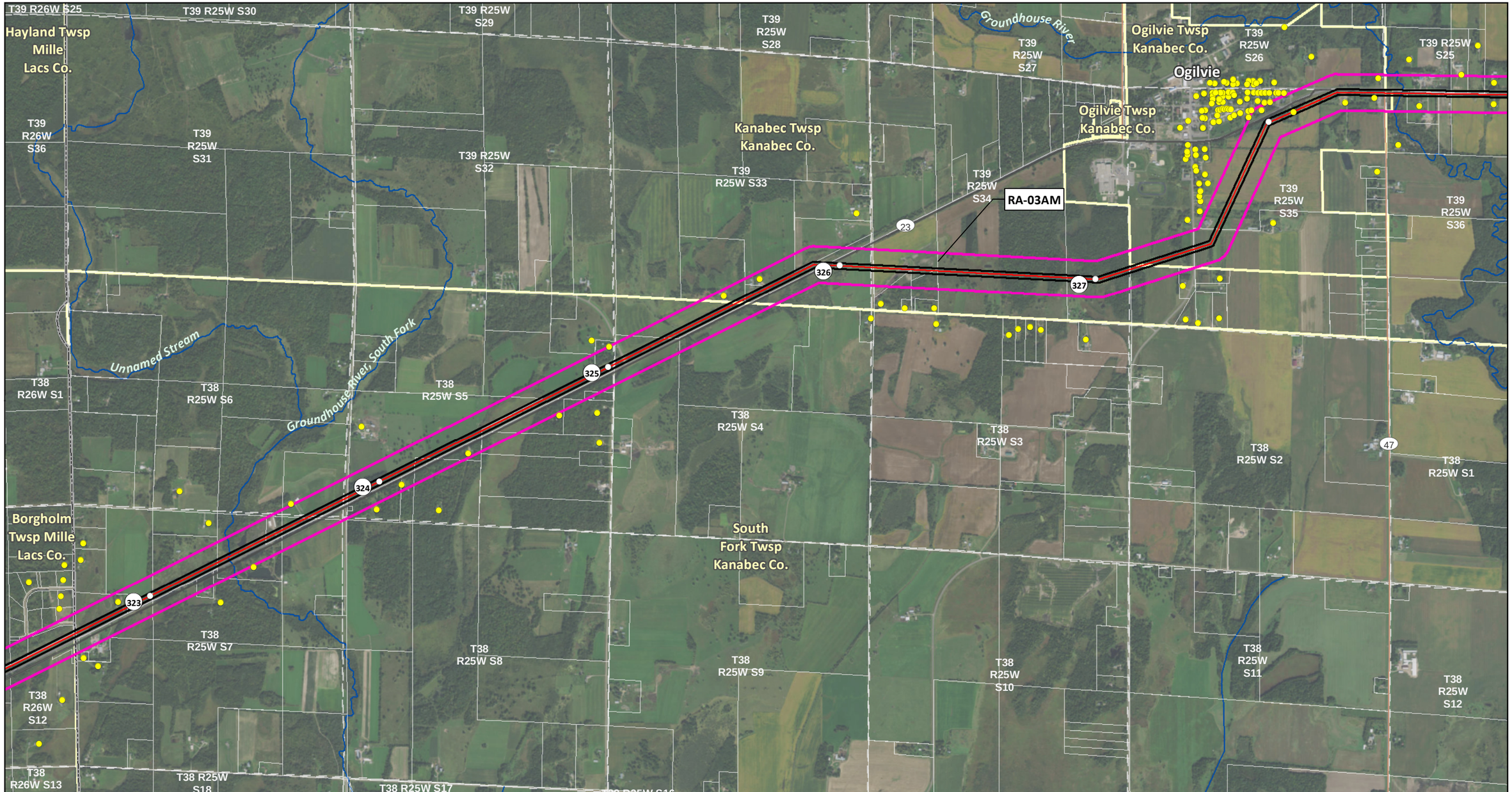

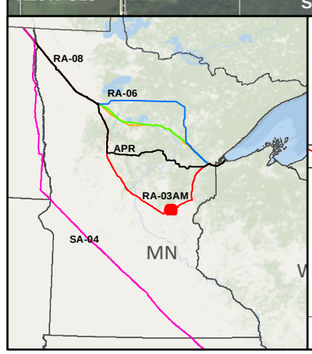

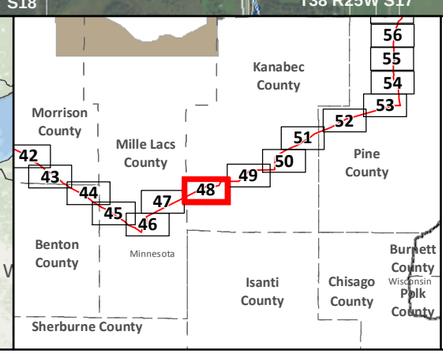

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

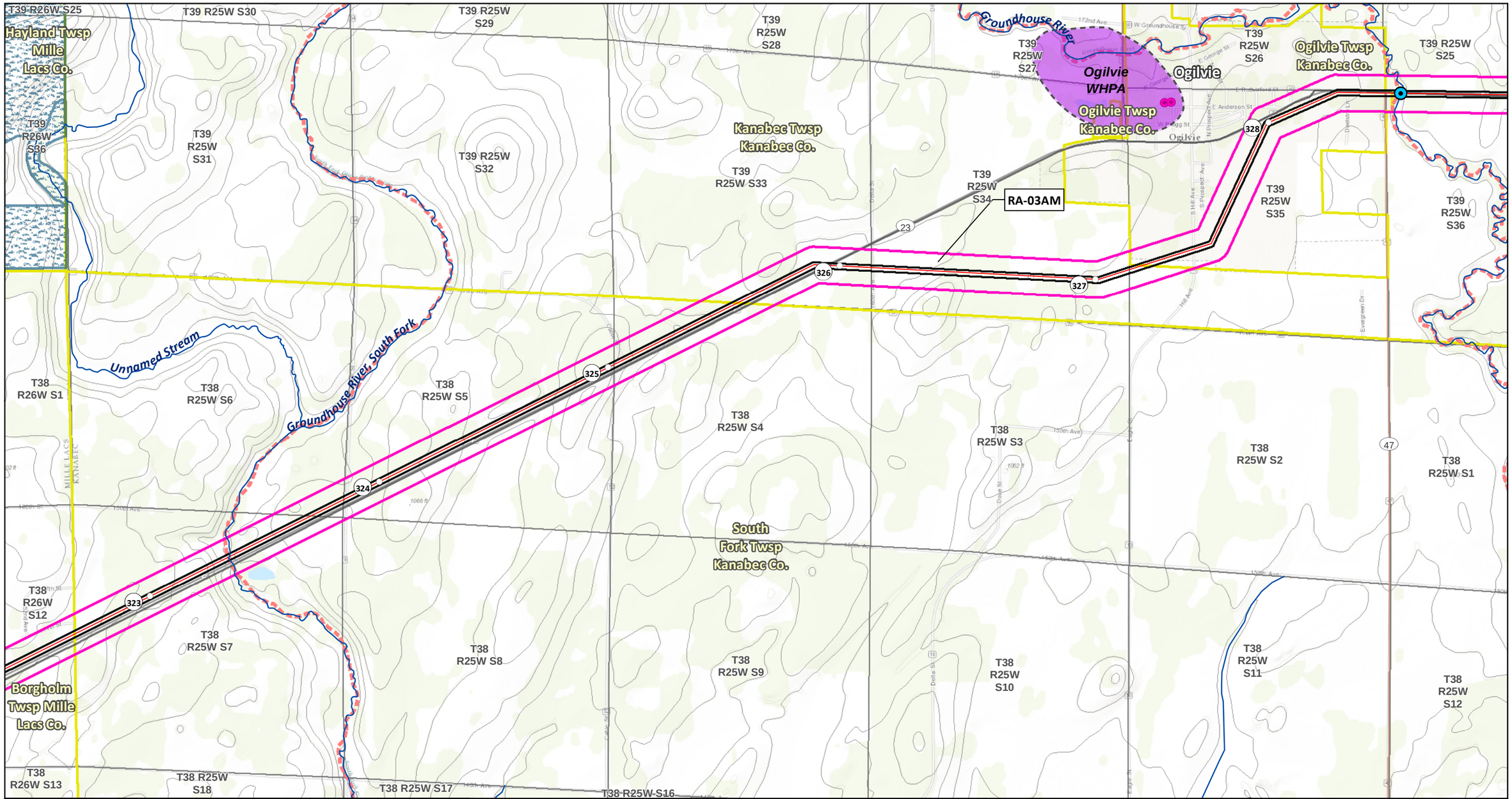

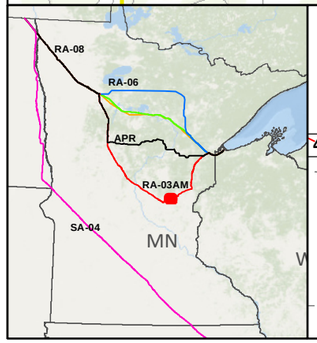

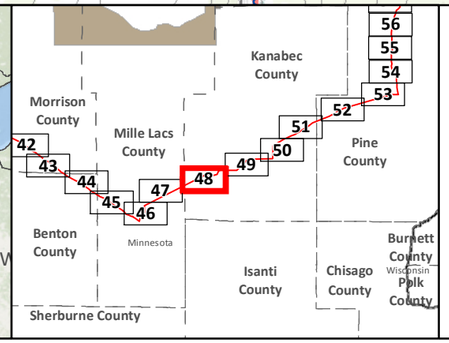

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

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- Navigable Waterway Crossings
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Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
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Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 48B of 67

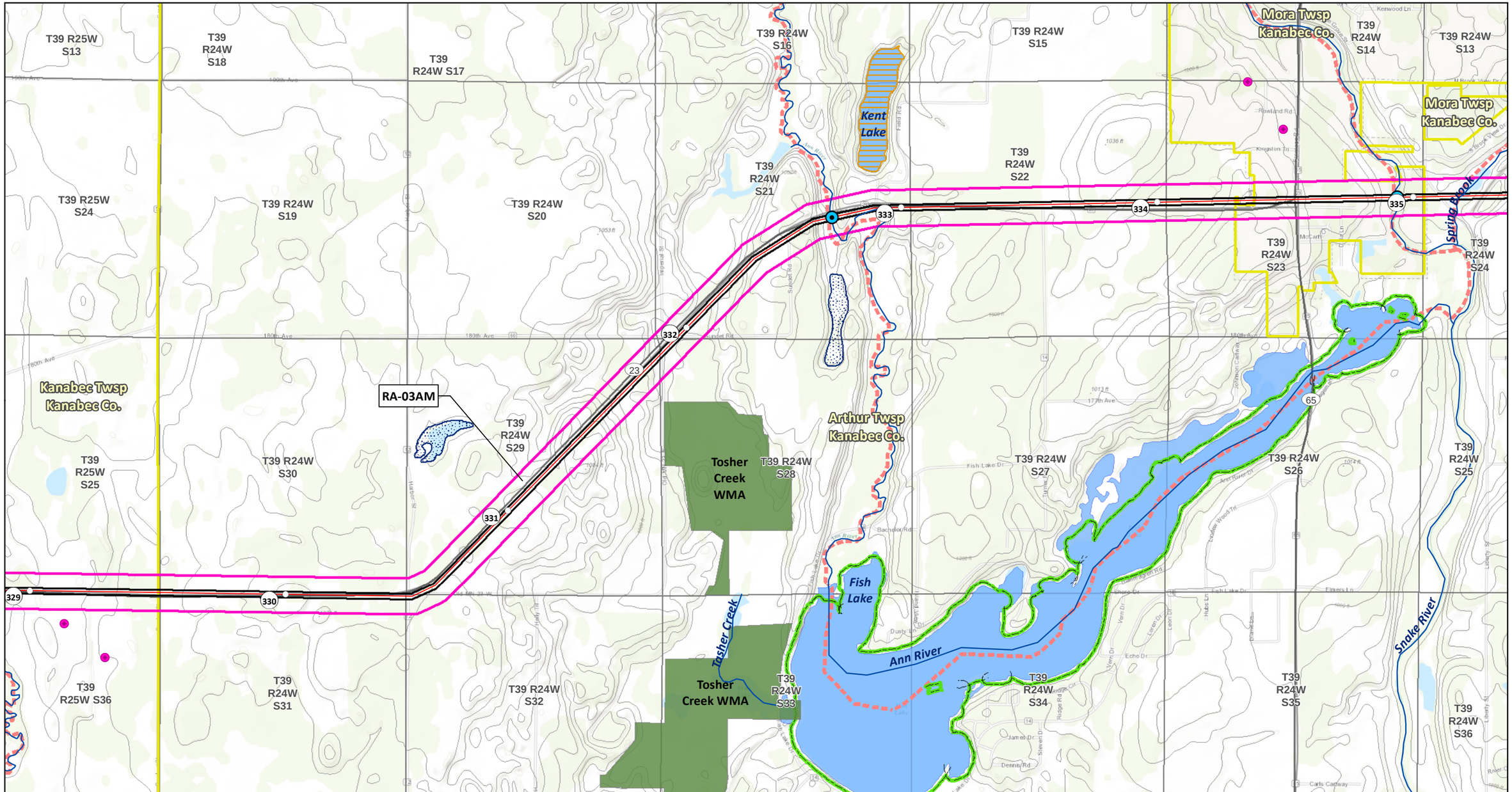

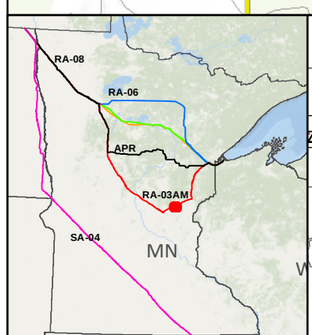

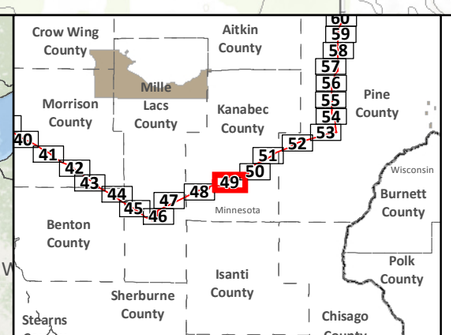

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

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Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 49B of 67

T39 R25W S13
T39 R24W S18
T39 R24W S17
T39 R24W S16
T39 R24W S15
Mora Twsp Kanabec Co.
T39 R24W S14
T39 R24W S13
Mora Twsp Kanabec Co.
Kent Lake
T39 R24W S21
T39 R24W S22
T39 R25W S24
T39 R24W S19
T39 R24W S20
333
334
335
Spring Brook
T39 R24W S23
T39 R24W S24
332
23
Kanabec Twsp Kanabec Co.
RA-03AM
T39 R24W S29
Arthur Twsp Kanabec Co.
65
T39 R25W S25
T39 R24W S30
T39 R24W S28
T39 R24W S27
T39 R24W S26
T39 R24W S25
331
330
Fish Lake
Tasher Creek
Ann River
Snake River
T39 R25W S36
T39 R24W S31
T39 R24W S32
T39 R24W S33
T39 R24W S34
T39 R24W S35
T39 R24W S36

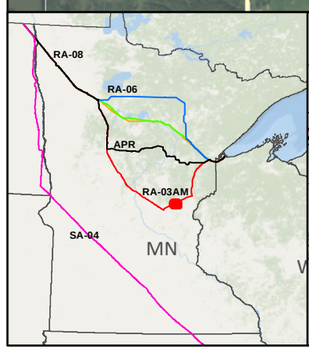

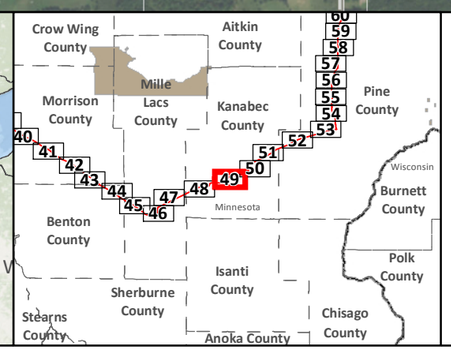

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 49A of 67

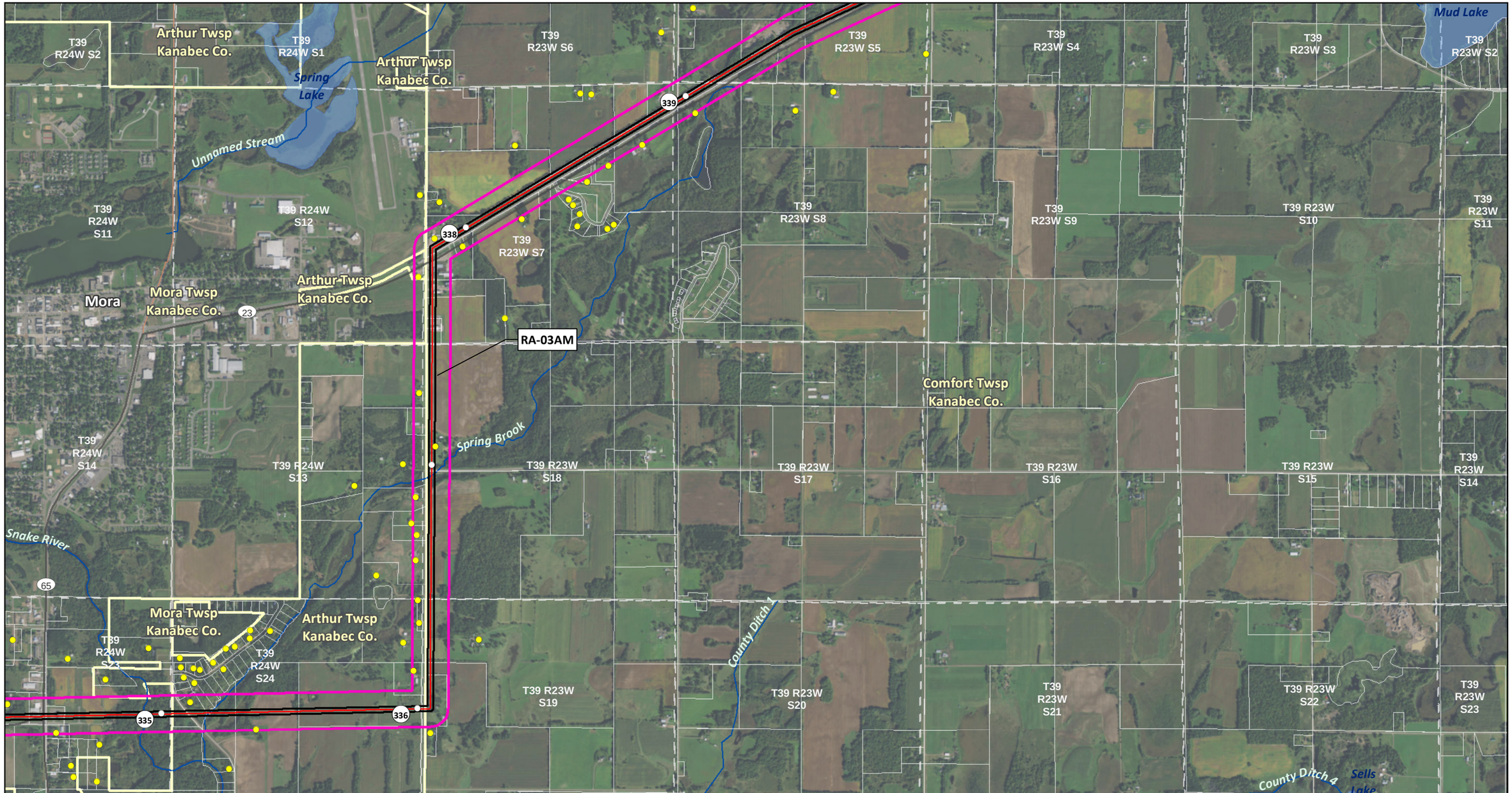

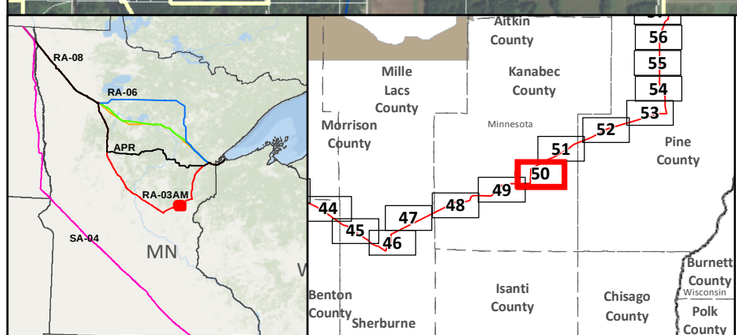

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

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Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Tribal Trust Land

White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 50A of 67

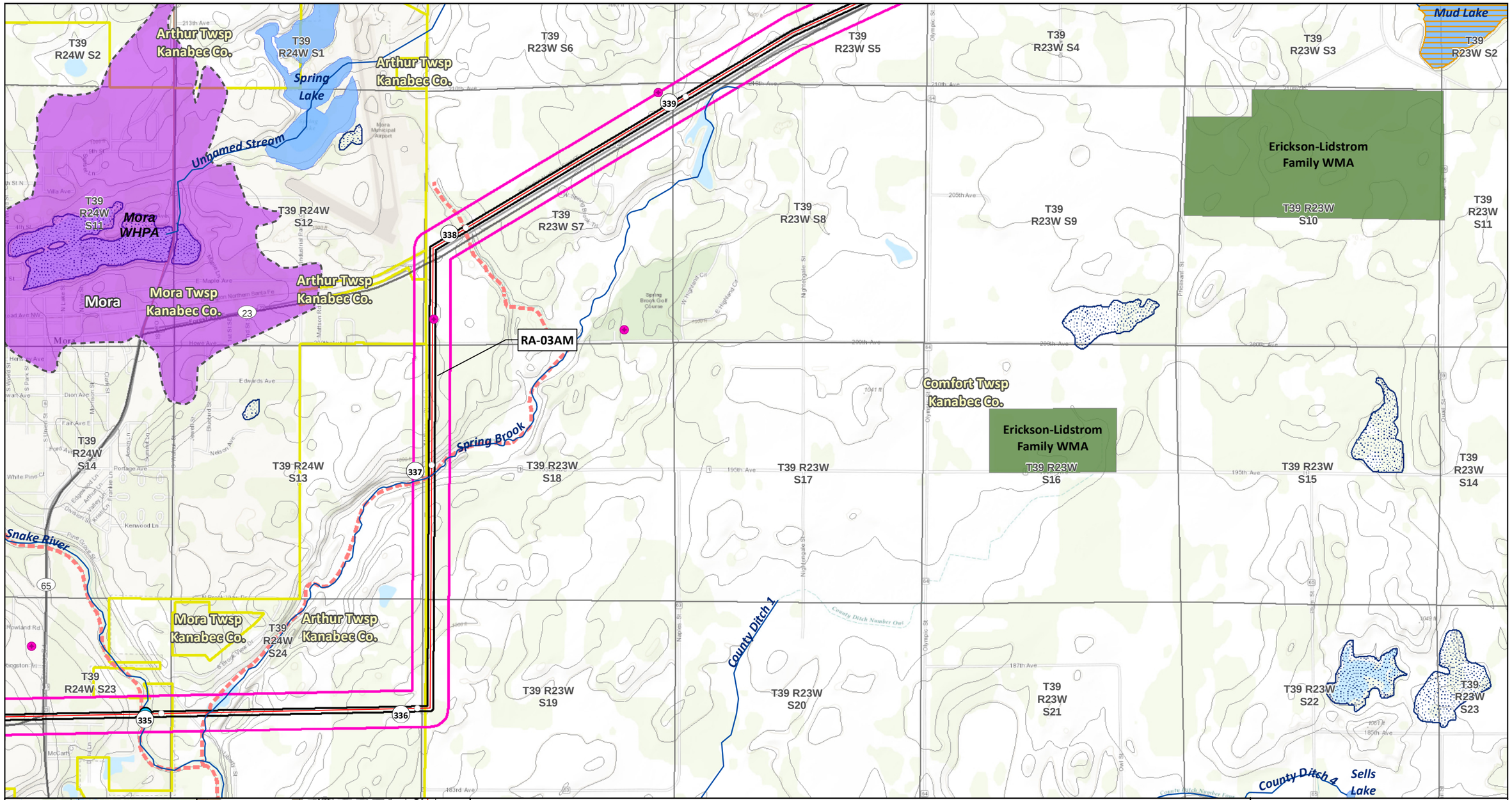

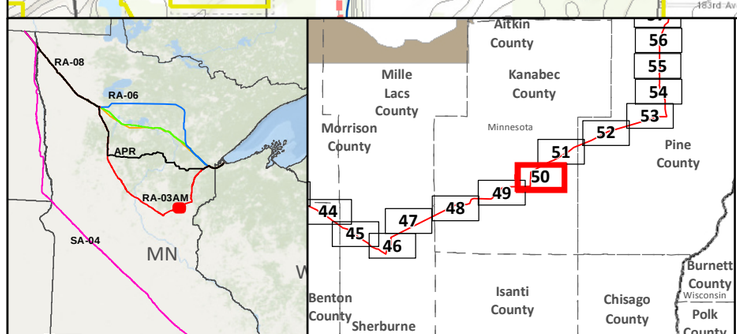

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

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Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

Outstanding High

Moderate

Native Plant Communities with Biodiversity Significance

Outstanding High

Moderate

Terminal Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 50B of 67

T40 R23W S19
T40 R23W S20
T40 R23W S21
T40 R23W S22
T40 R23W S23
T40 R23W S24
T40 R22W S19
T40 R23W S29
T40 R23W S28
T40 R23W S27
T40 R23W S26
T40 R23W S25
T40 R22W S30
Whited Twsp Kanabec Co.
Quamba Twsp Kanabec Co.
Brook Park Twsp Pine Co.
RA-03AM
Inlet To Mud Lake
T40 R23W S32
T40 R23W S33
T40 R23W S34
T40 R23W S35
T40 R23W S36
T40 R22W S31
T40 R23W S31
Unnamed Stream
Mud Creek
T39 R23W S6
T39 R23W S5
T39 R23W S4
T39 R23W S3
T39 R23W S2
T39 R23W S1
T39 R22W S6
Comfort Twsp Kanabec Co.
Mud Lake
Pokegama Twsp Pine Co.
341
342
343
344
345
23

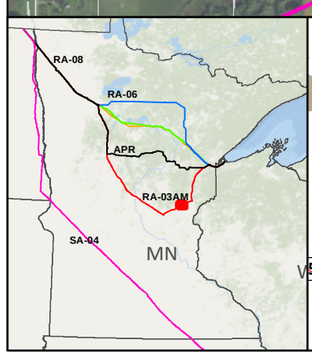

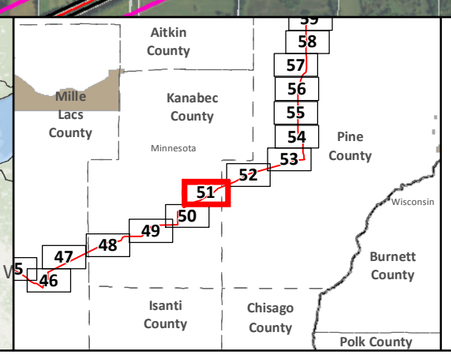

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
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Public Waters Watercourse

Residences within 1/2 mile
Mile Post
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Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 51A of 67

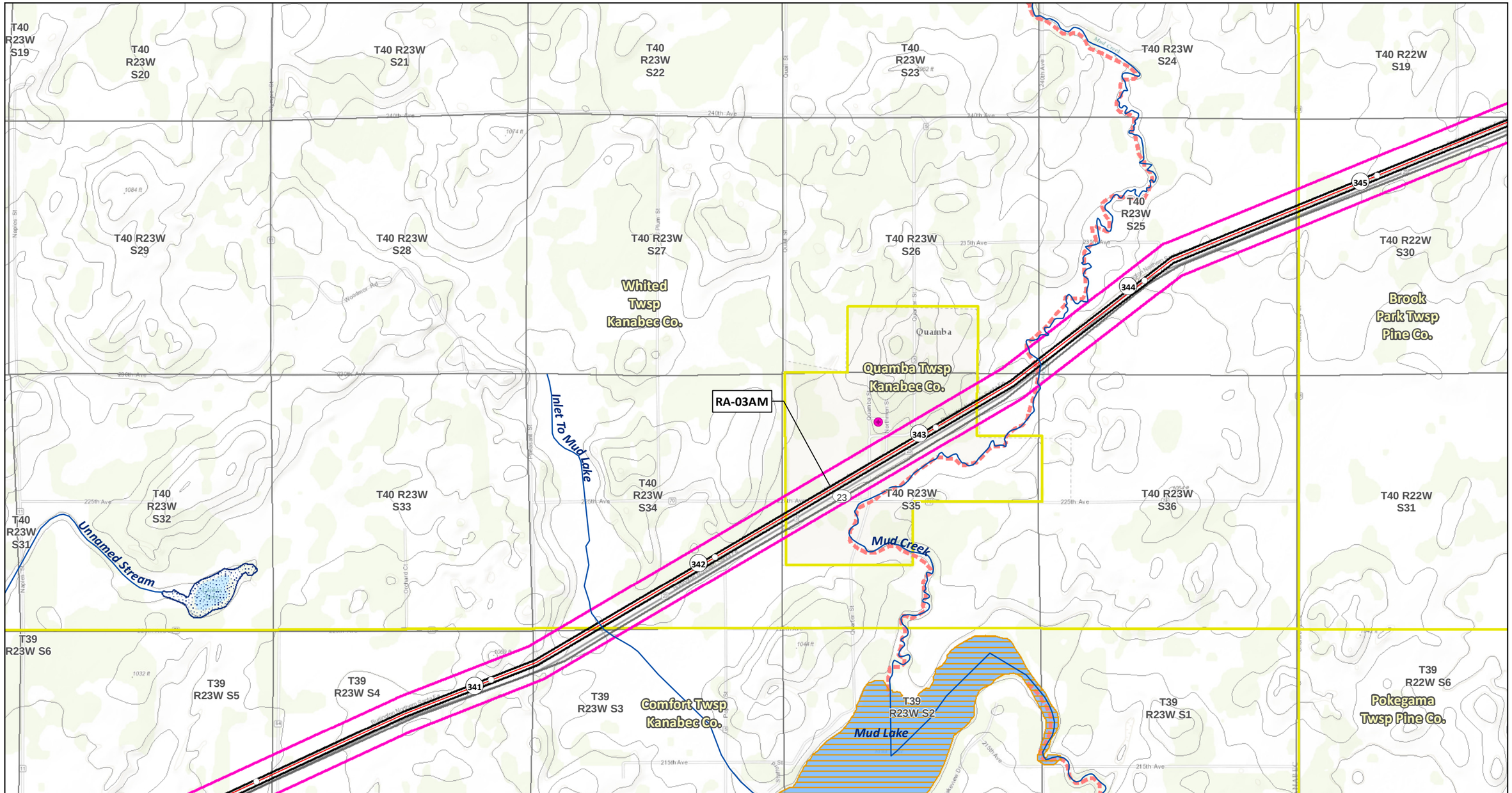

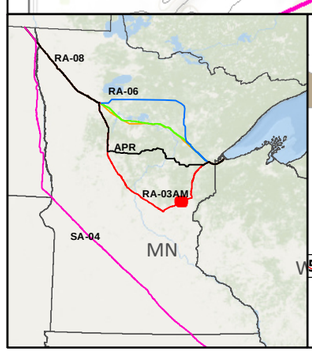

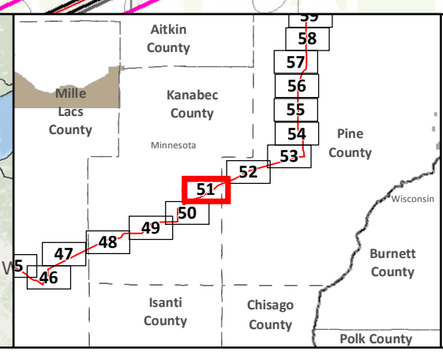

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 51B of 67

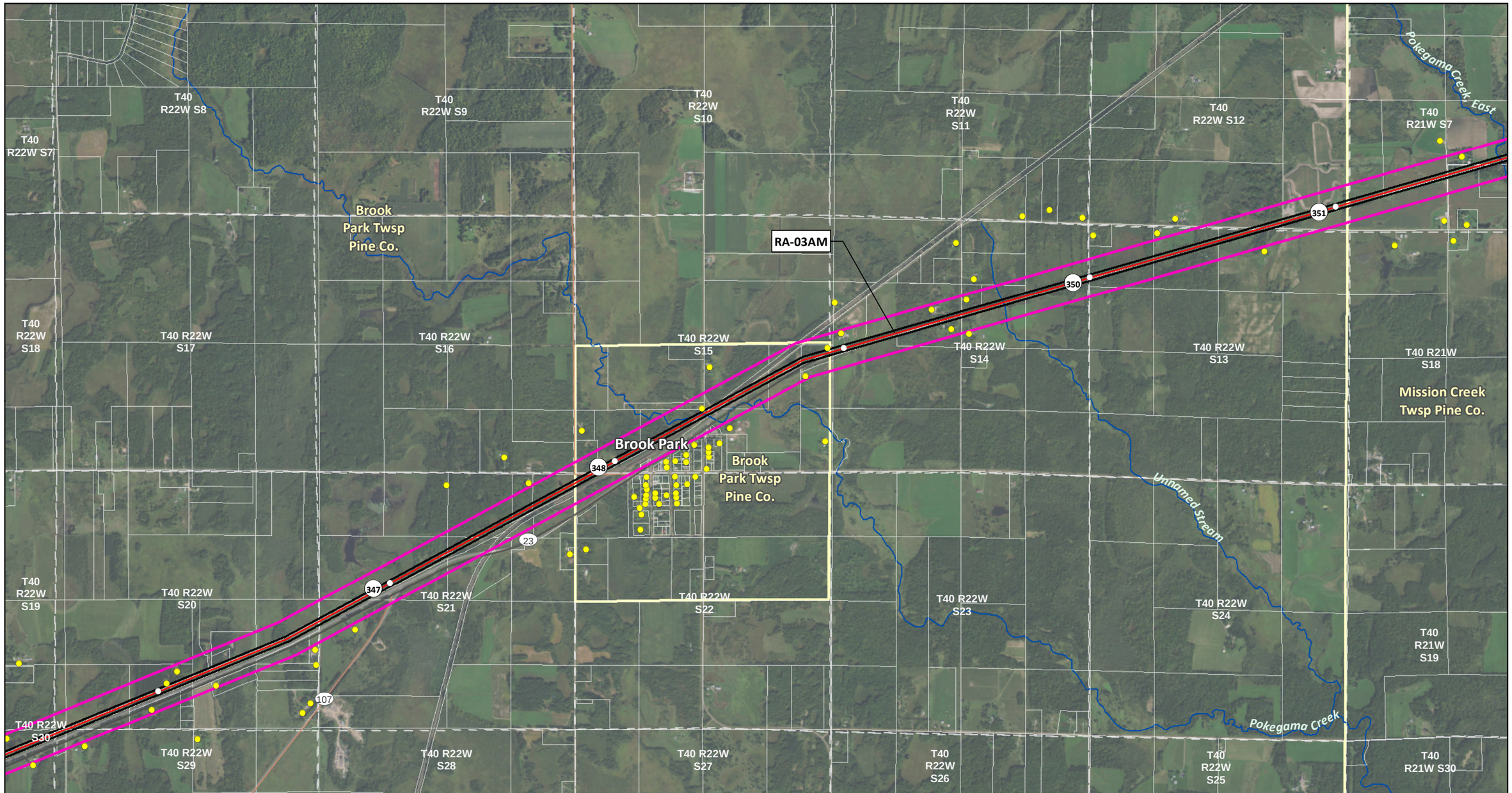

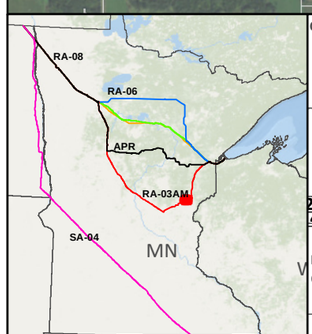

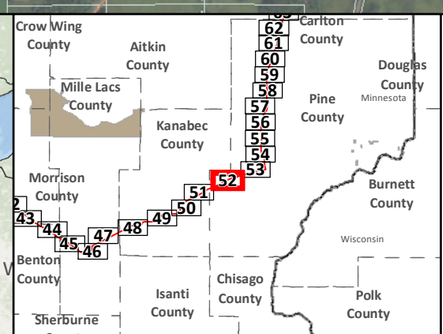

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 52A of 67

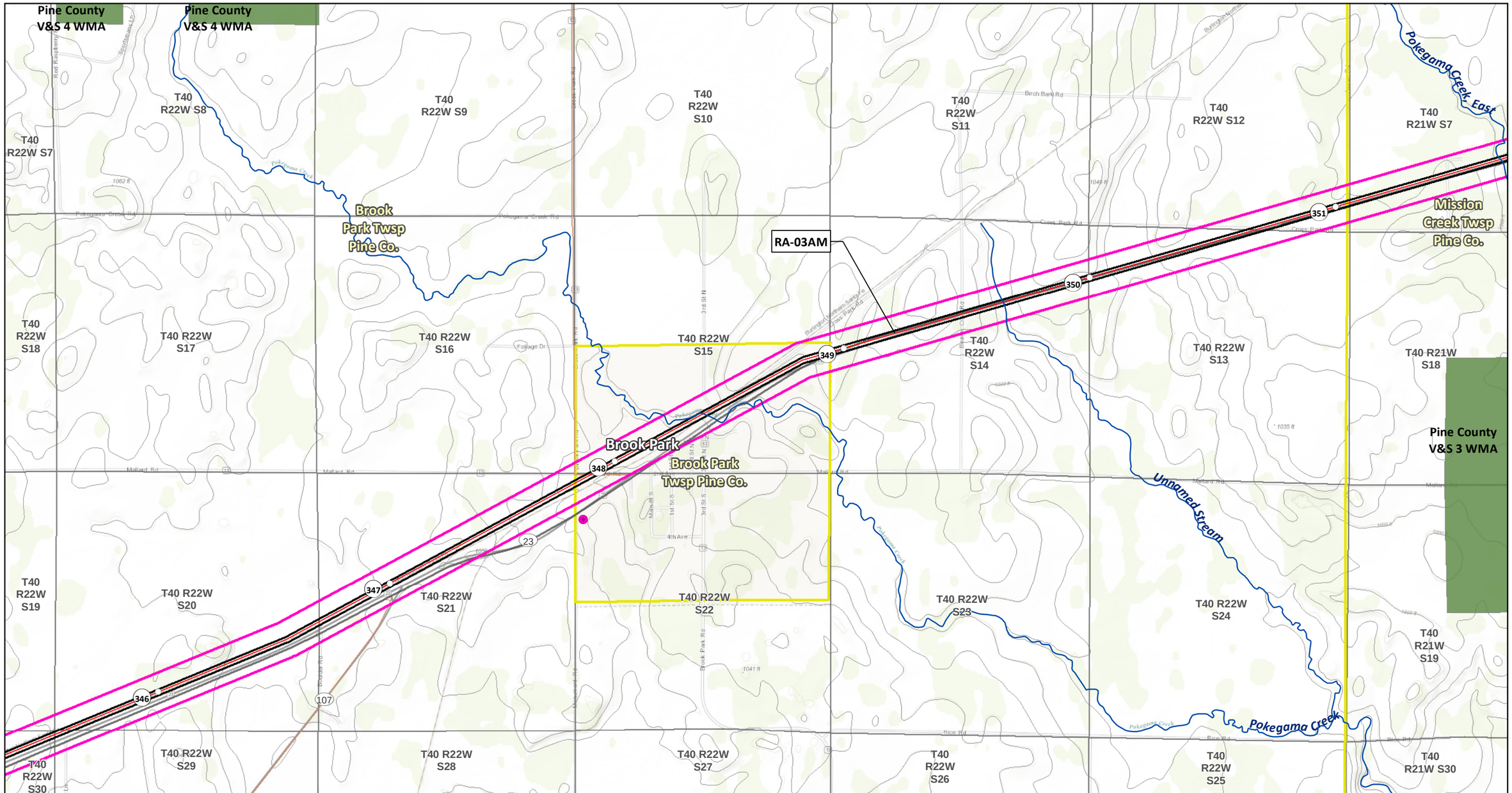

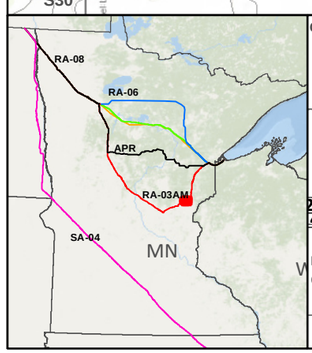

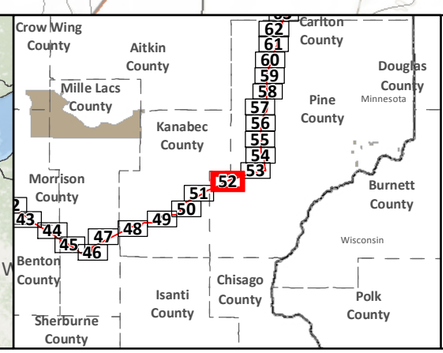

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 52B of 67

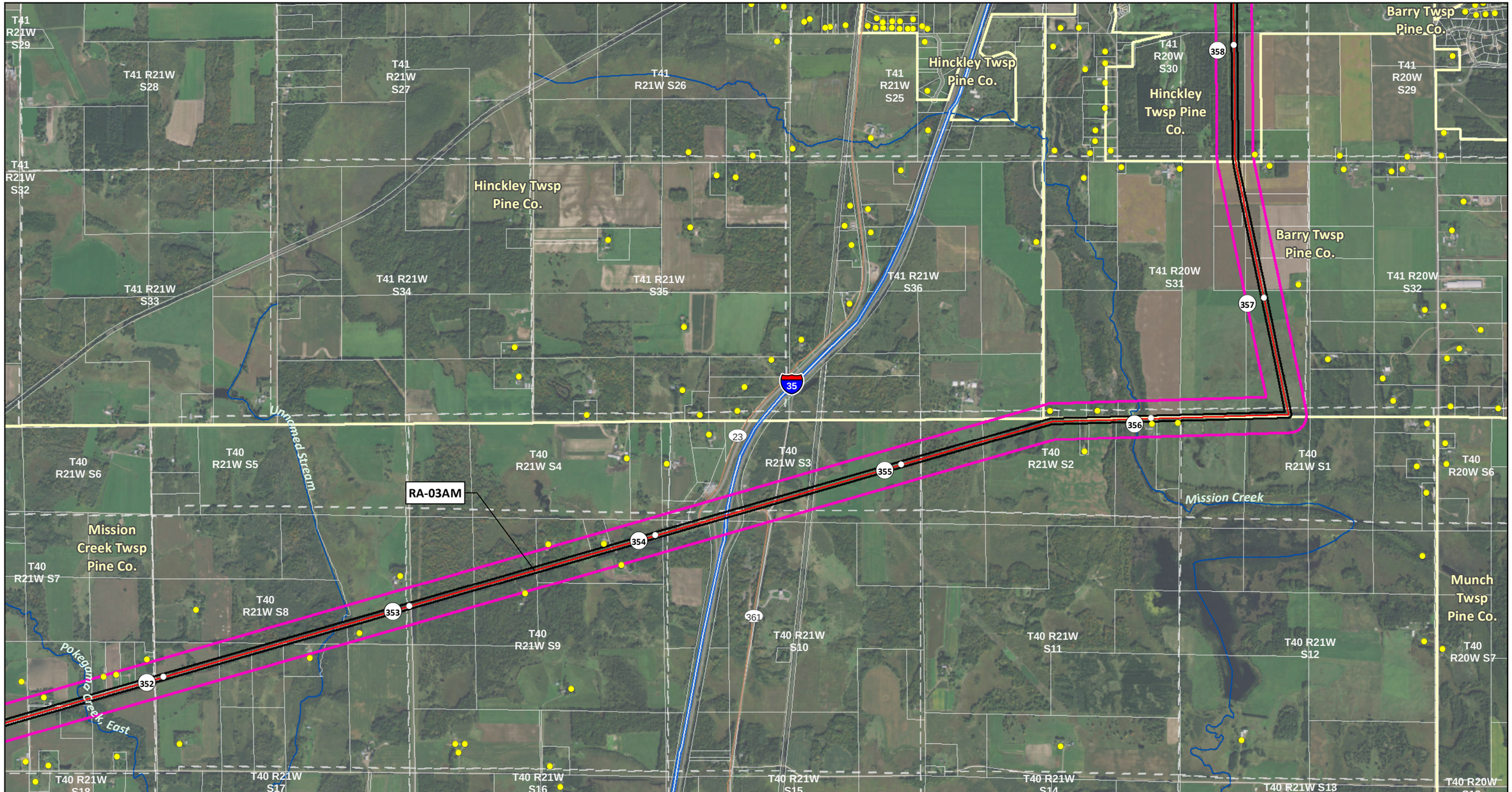

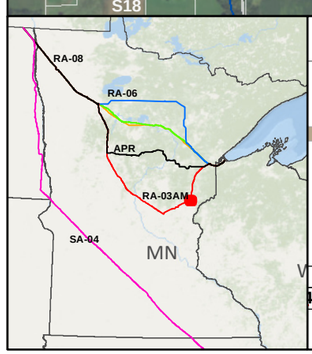

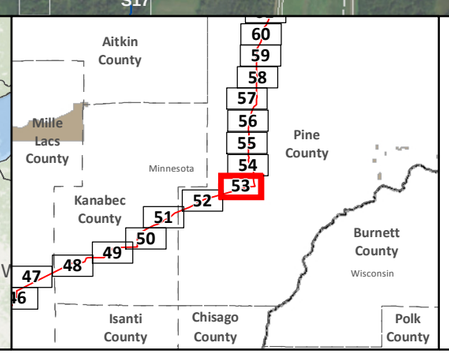

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 53A of 67

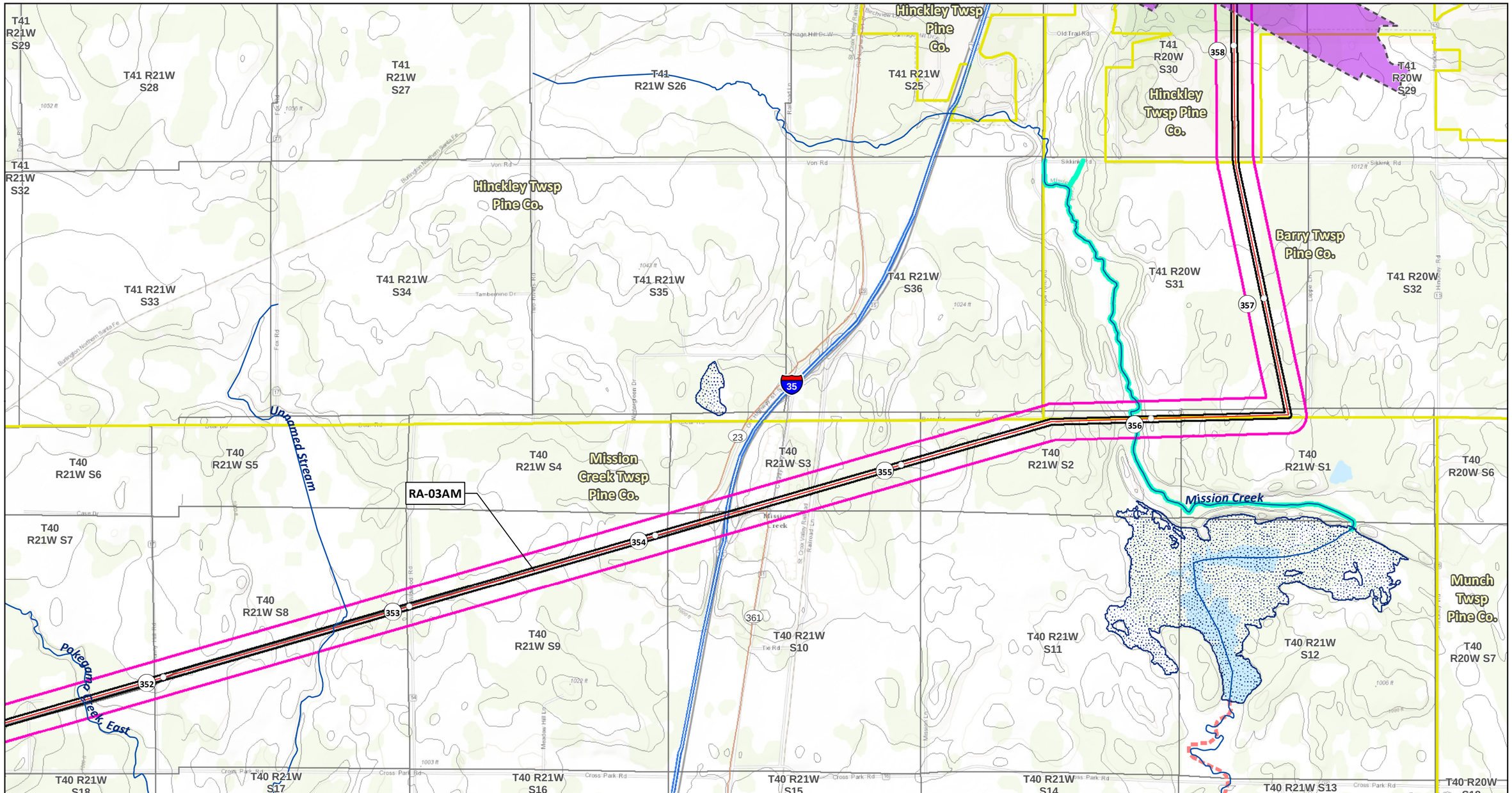

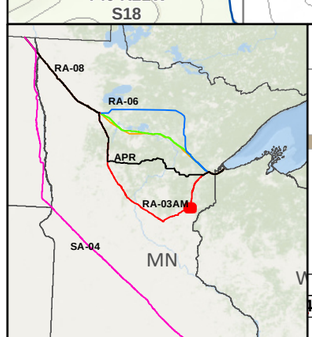

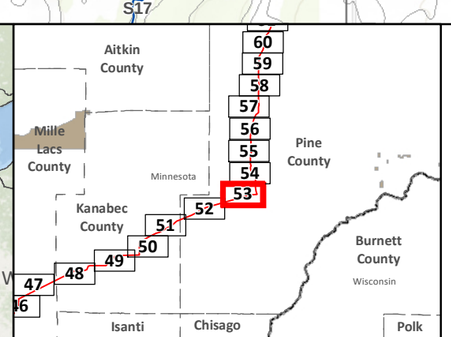

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 53B of 67

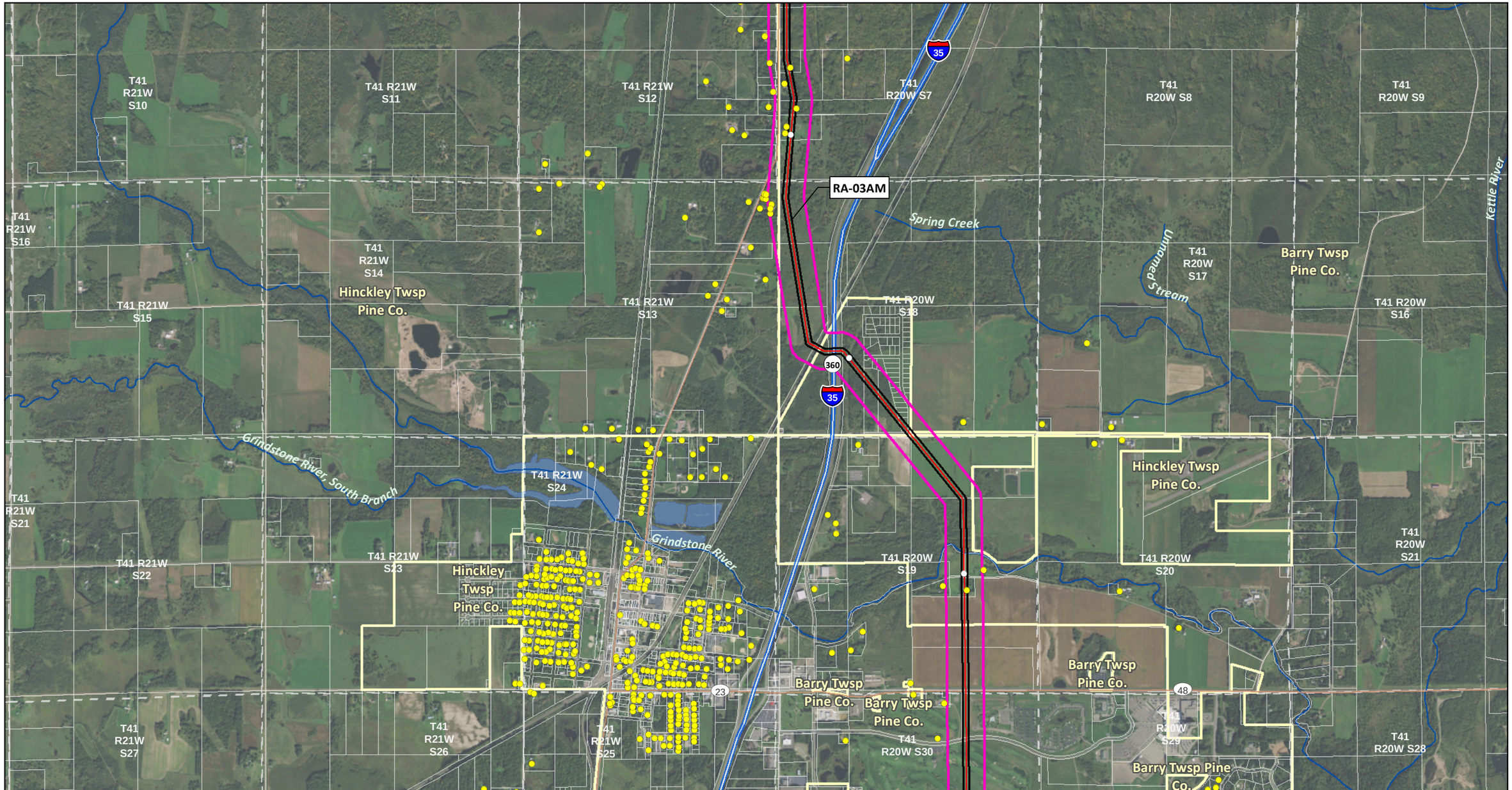

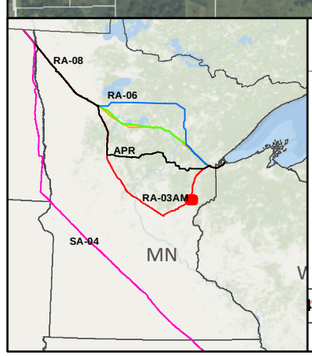

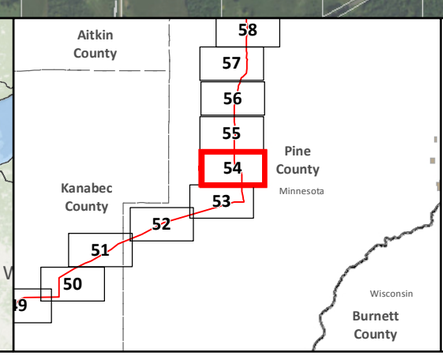

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 54A of 67

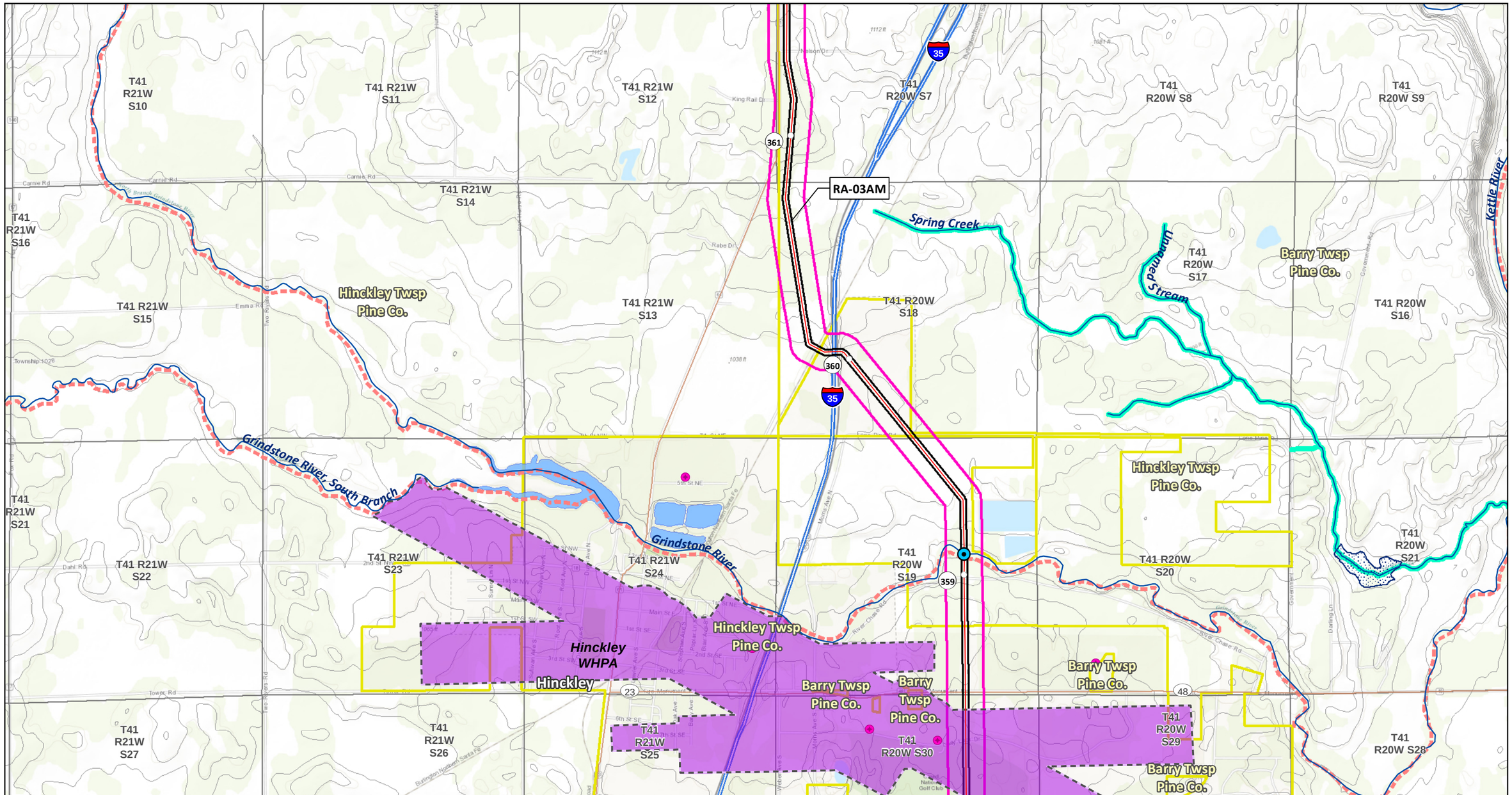

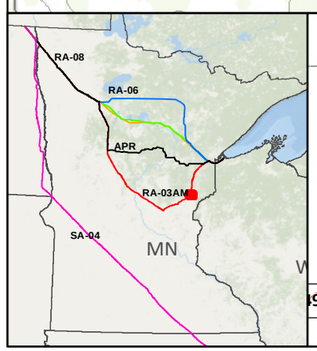

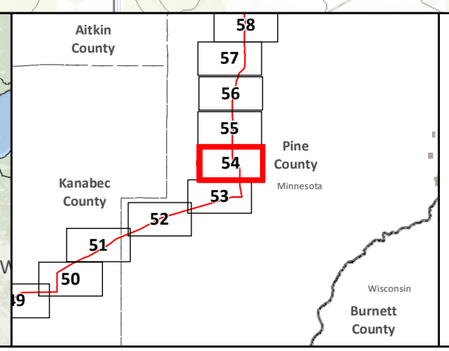

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 54B of 67

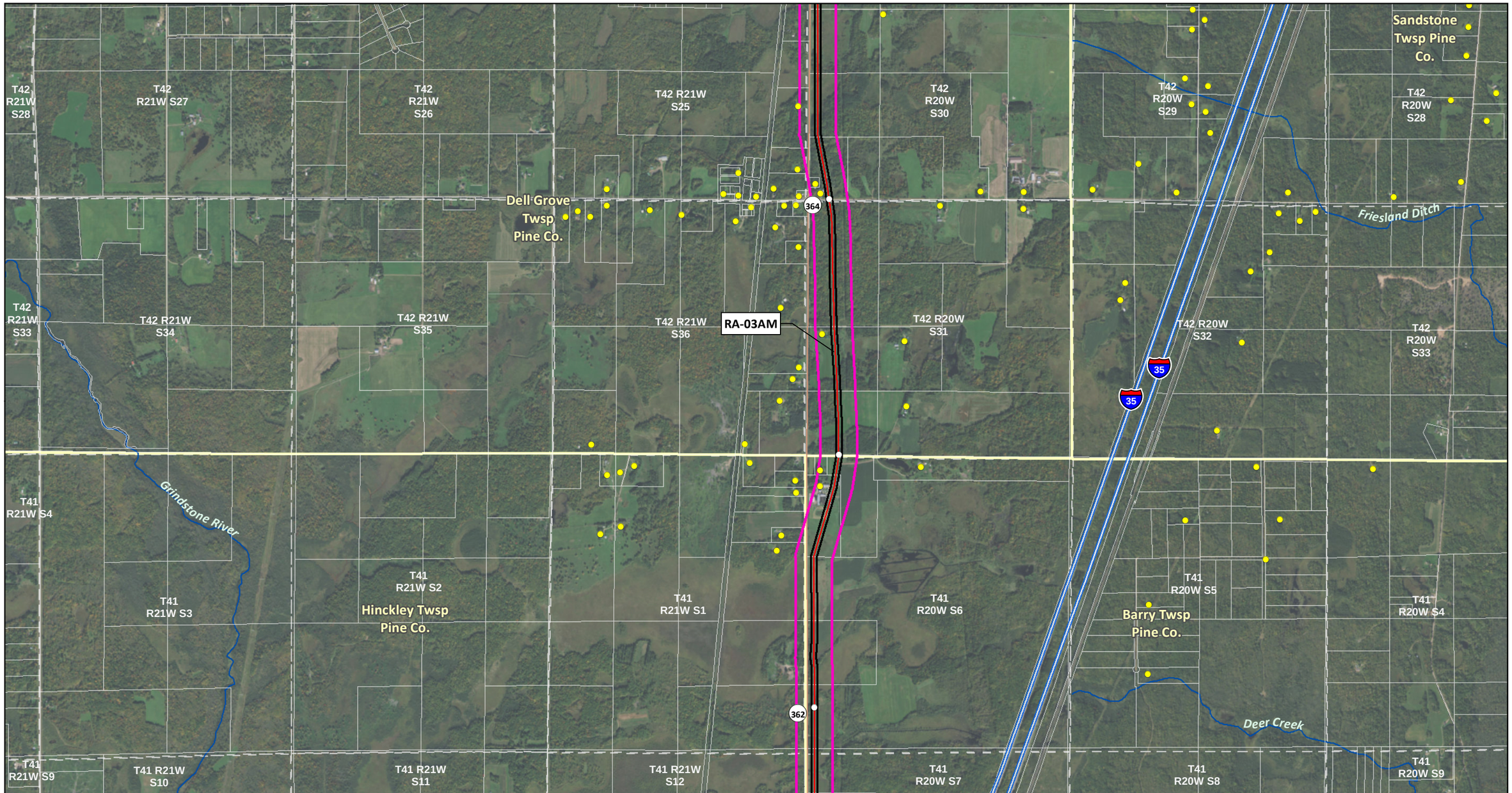

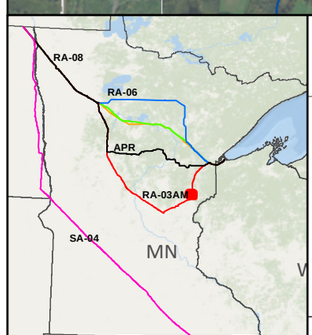

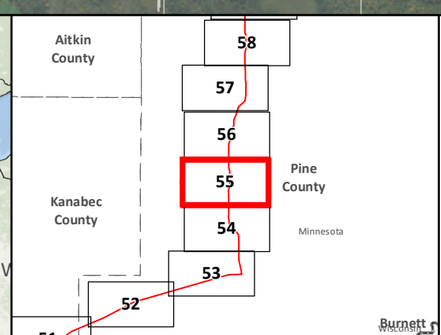

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 55A of 67

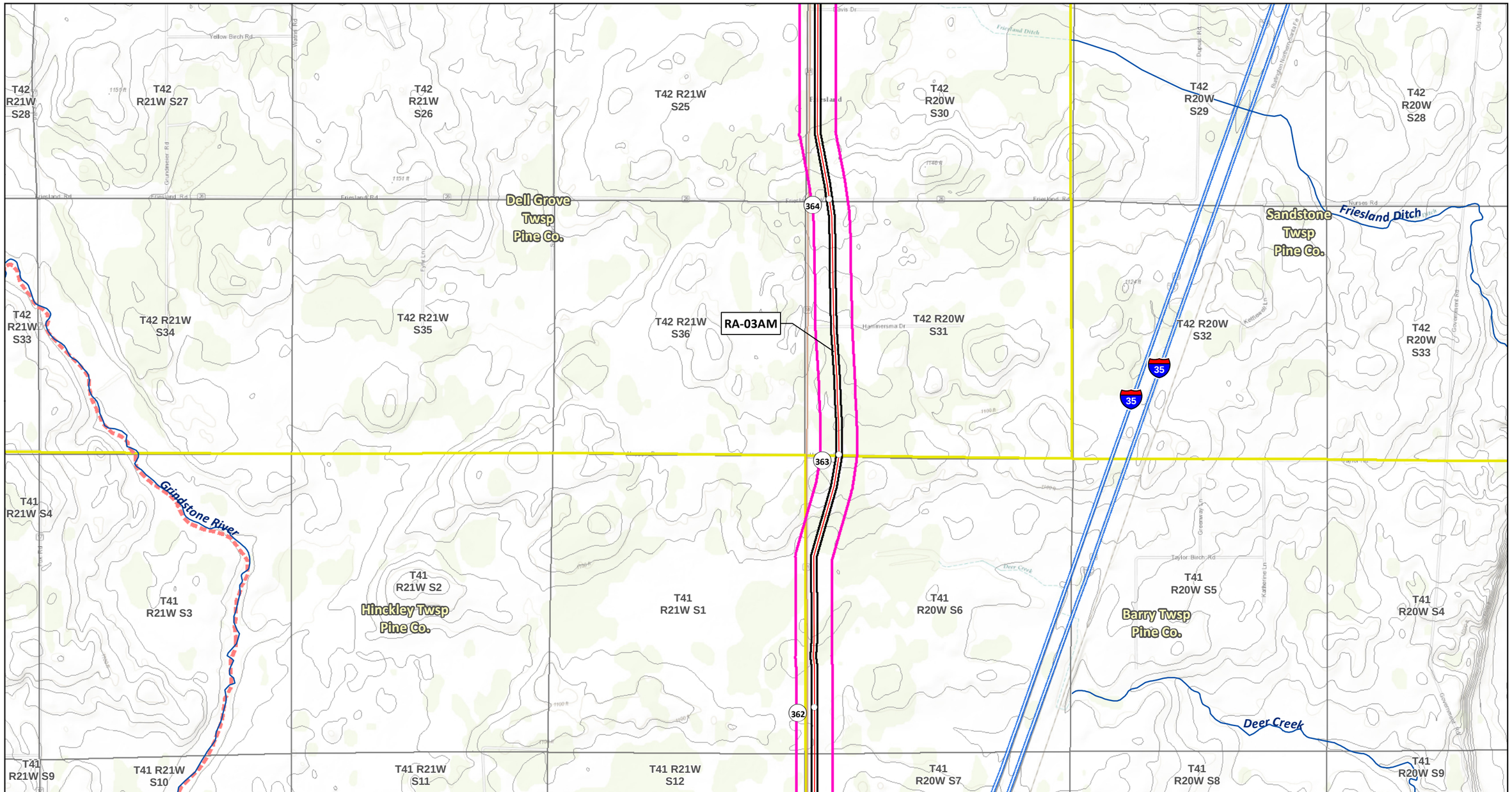

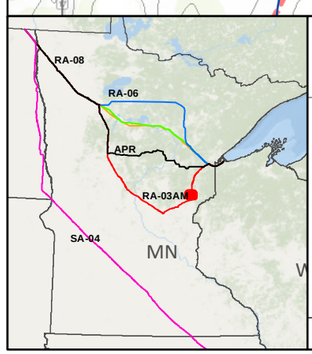

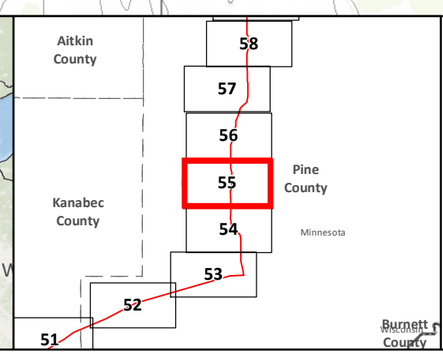

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 55B of 67

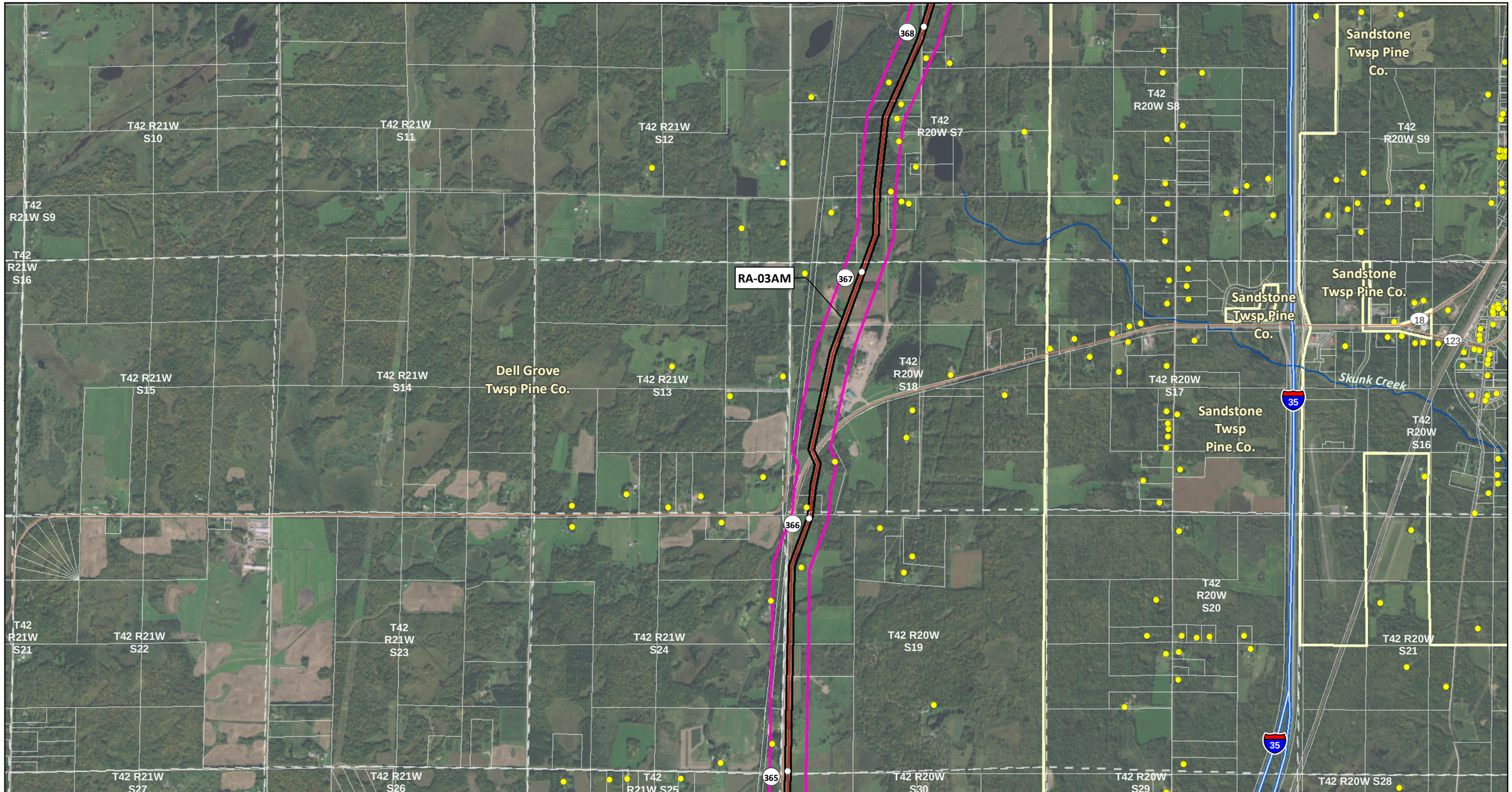

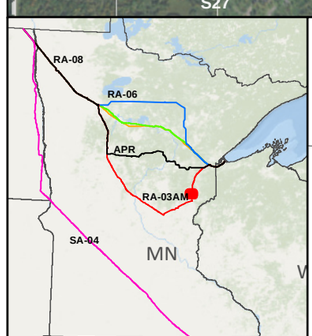

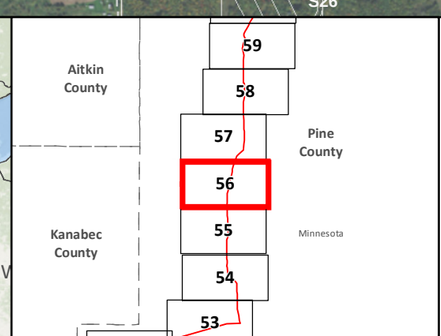

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Tribal Trust Land

White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 56A of 67

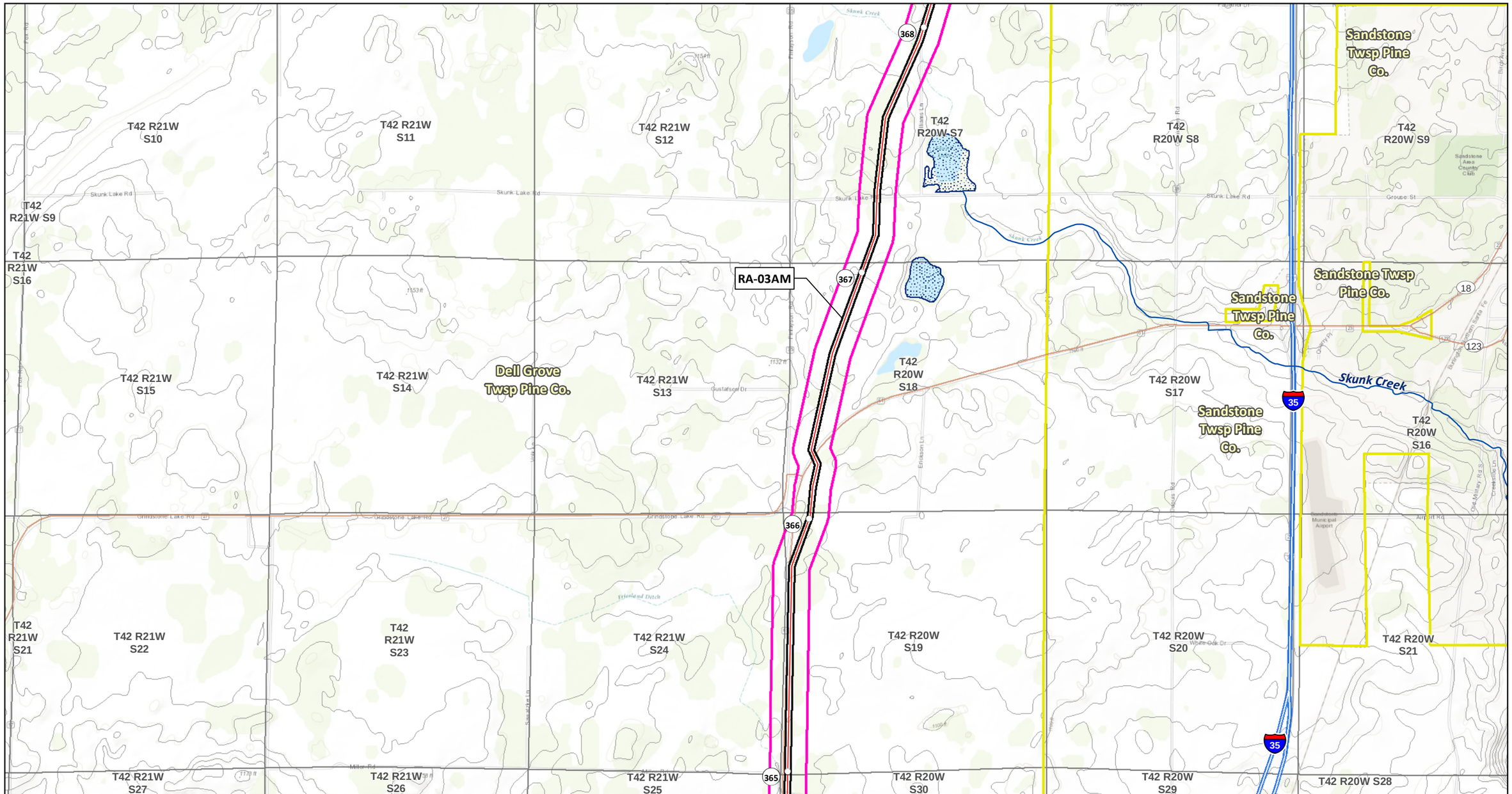

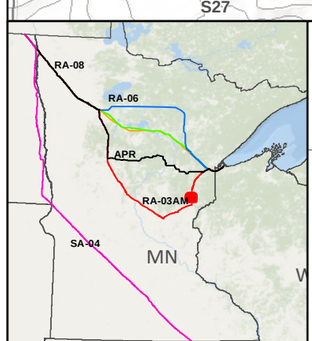

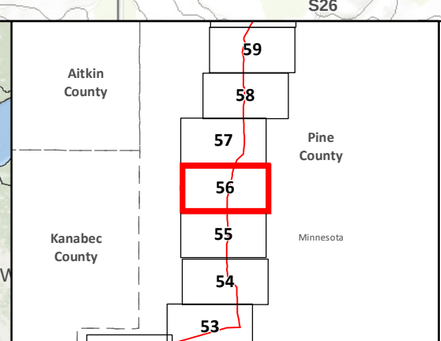

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 56B of 67

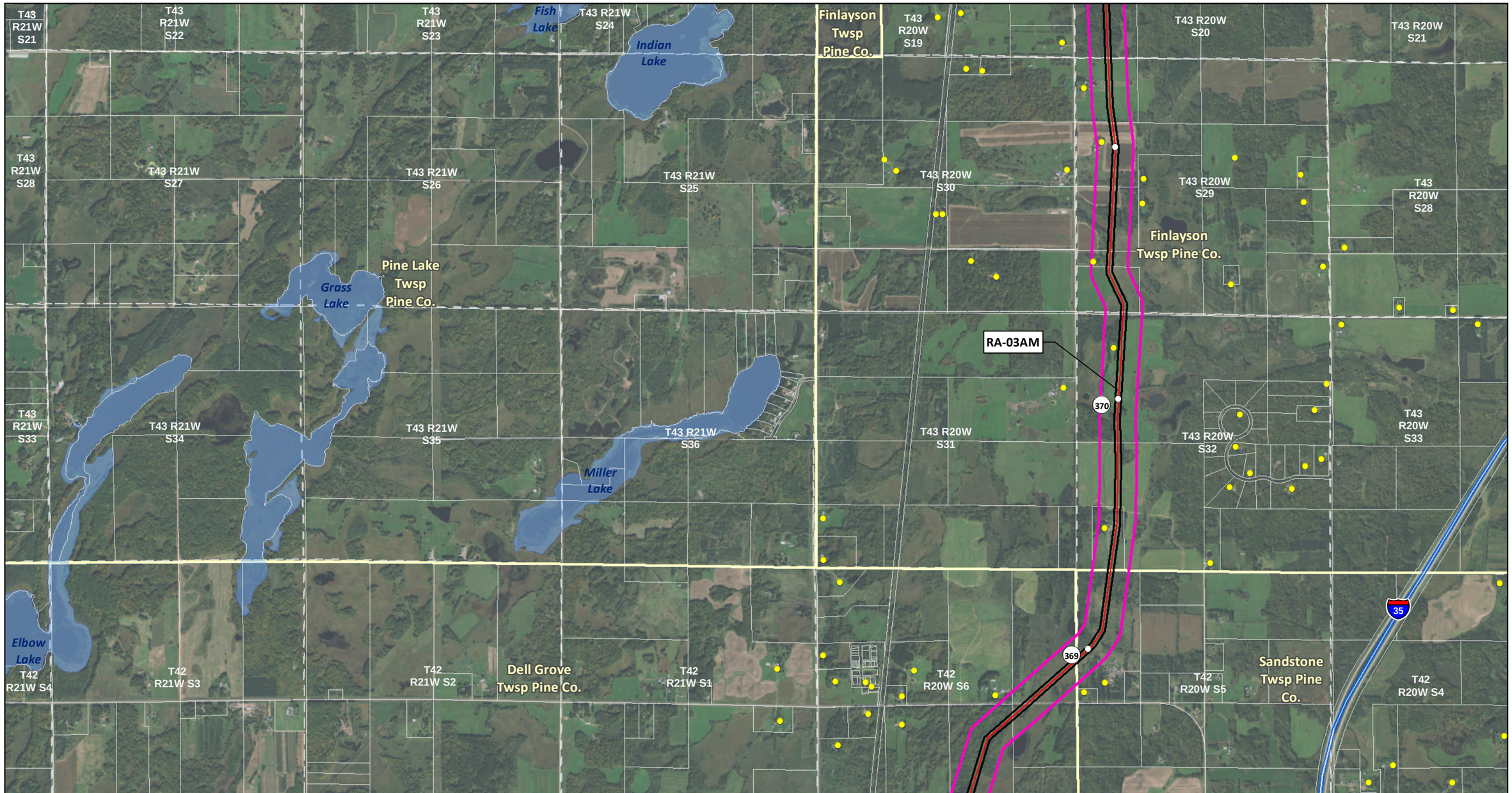

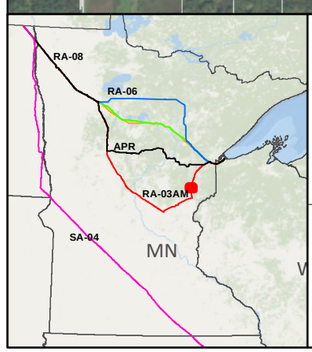

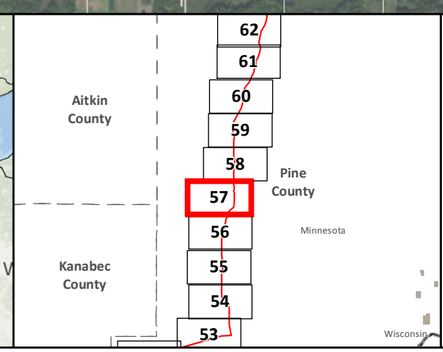

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 57A of 67

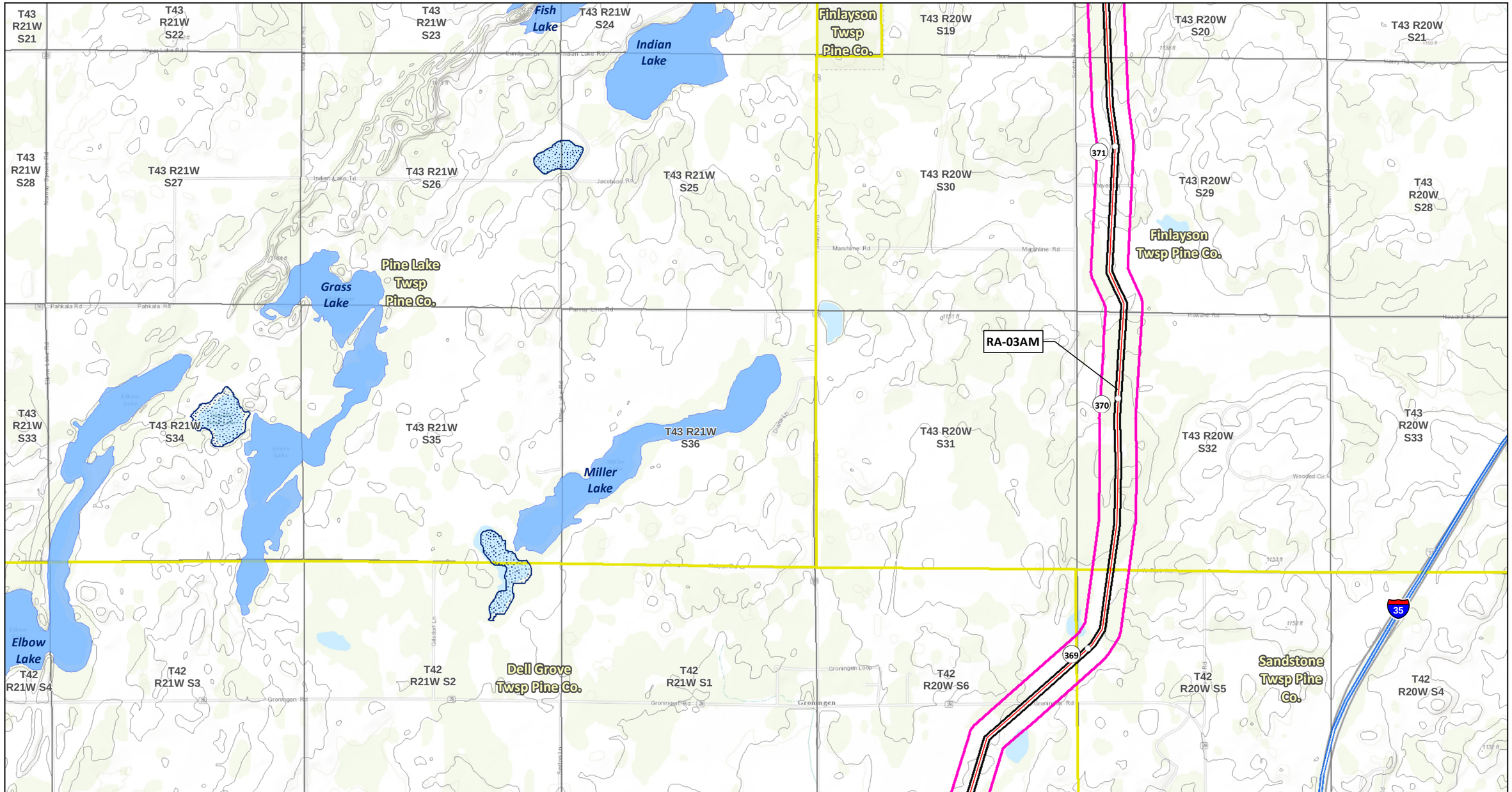

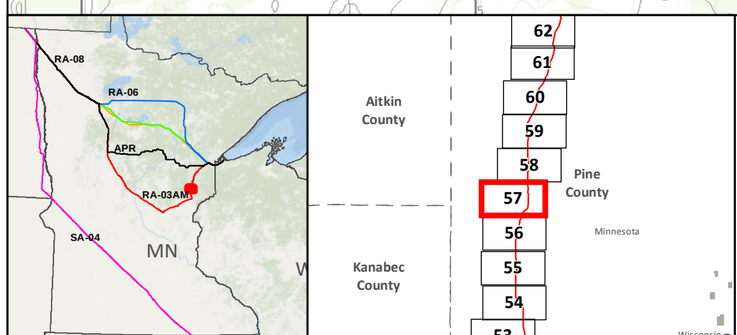

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 57B of 67

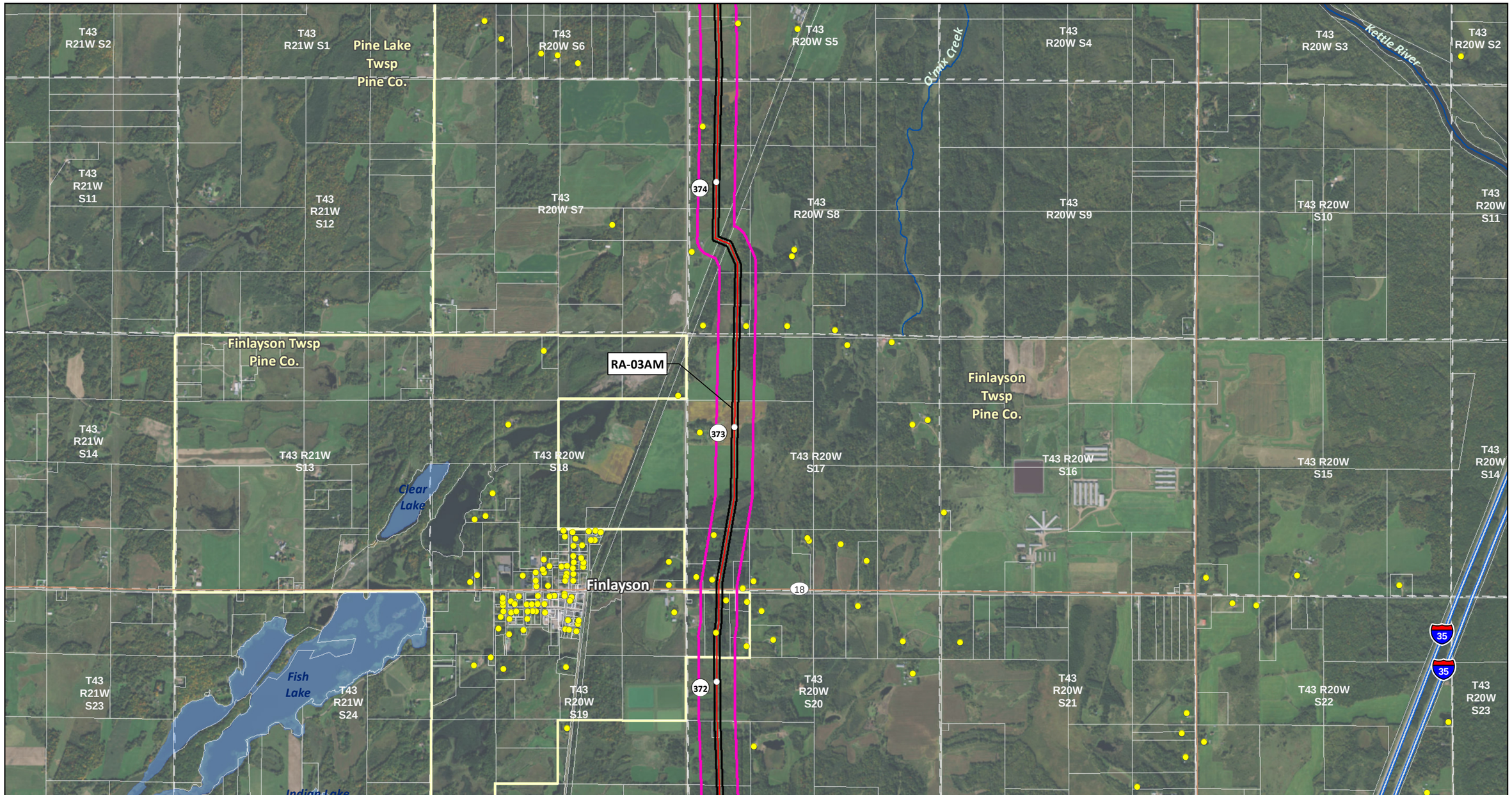

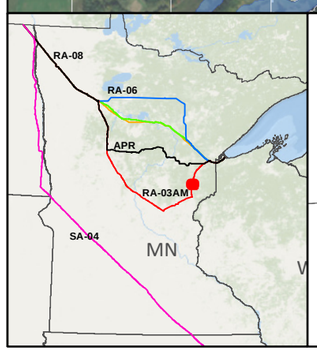

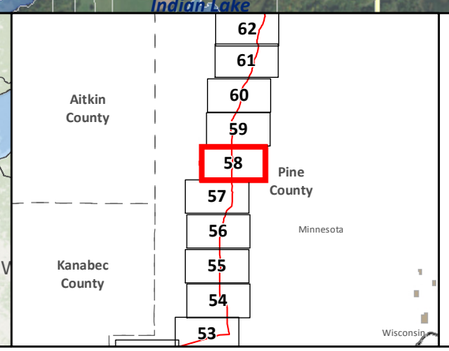

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

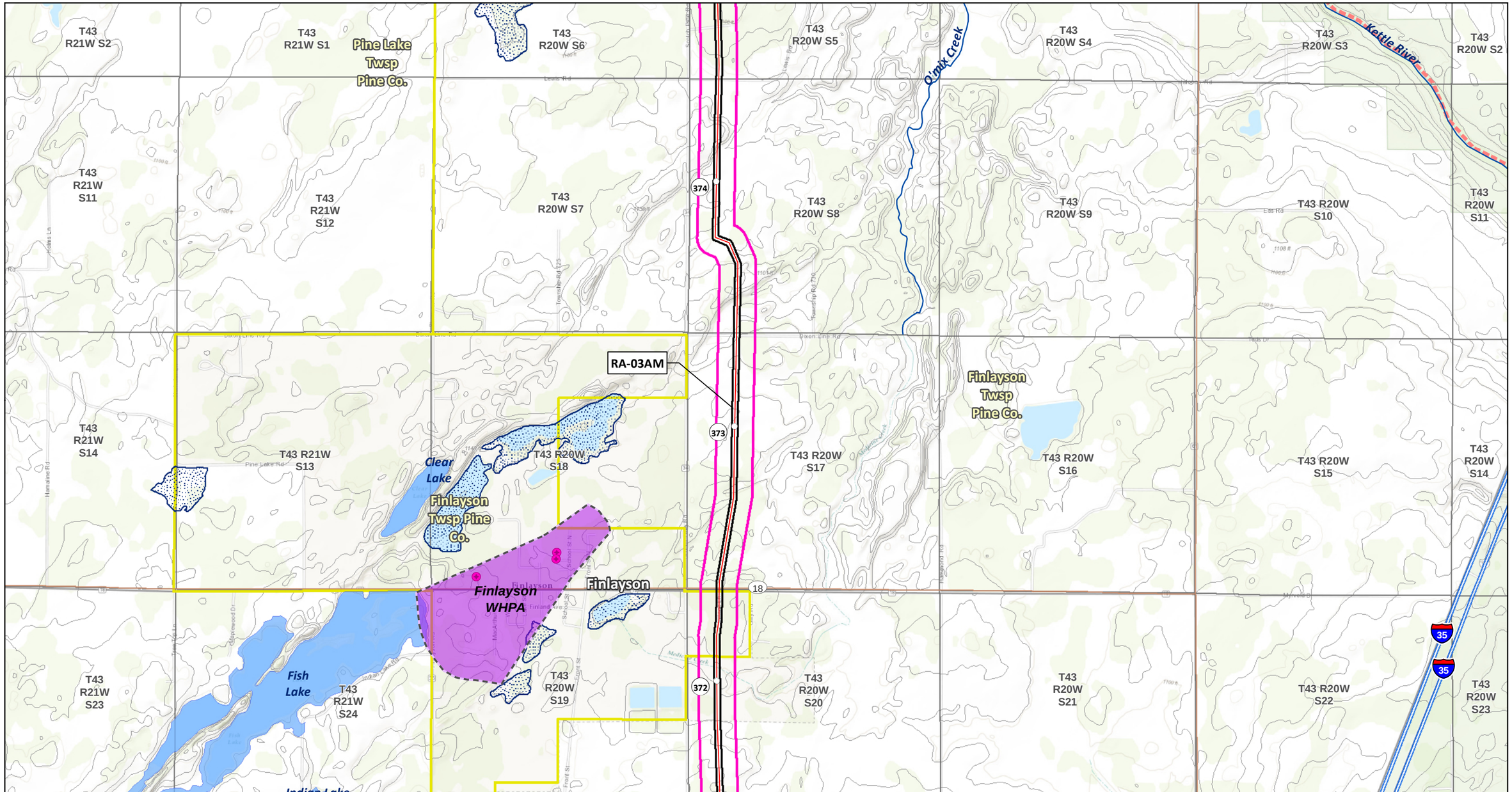

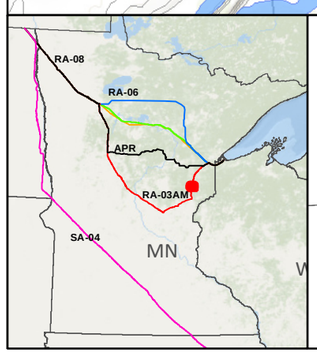

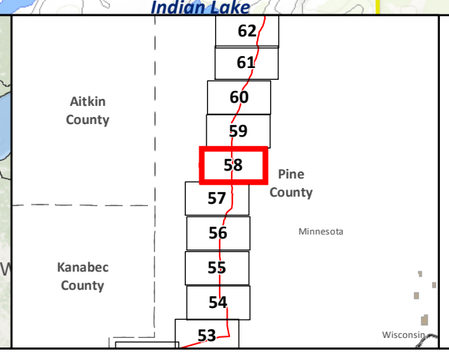

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 58B of 67

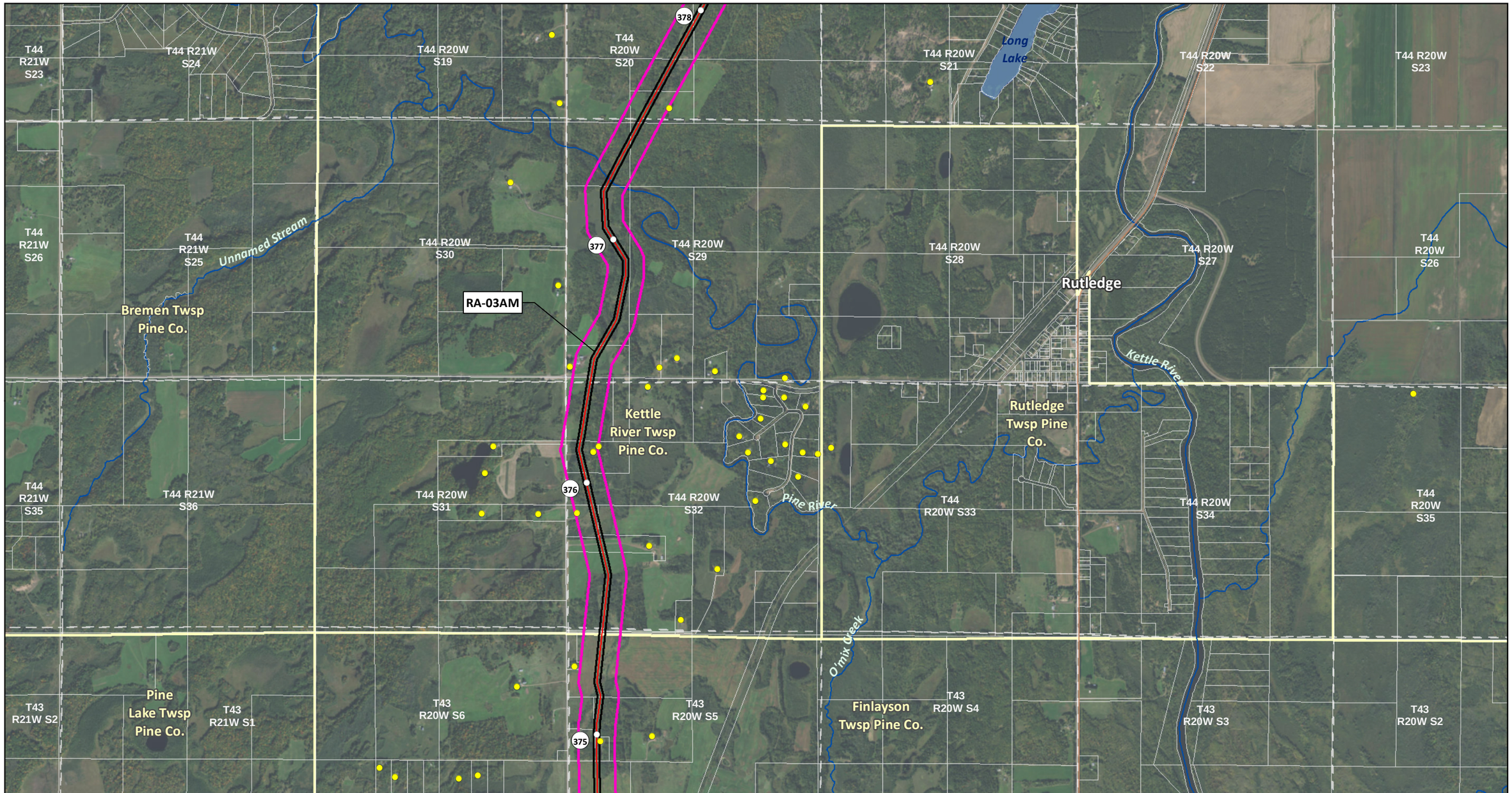

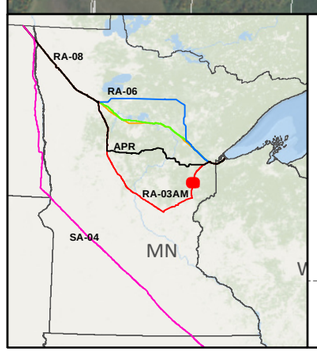

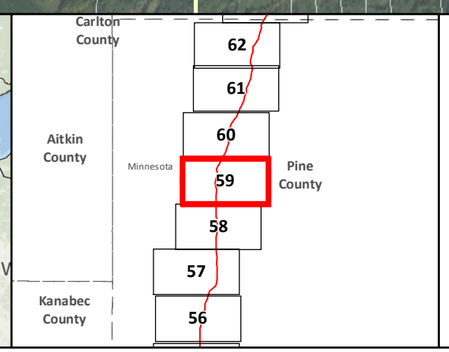

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 59A of 67

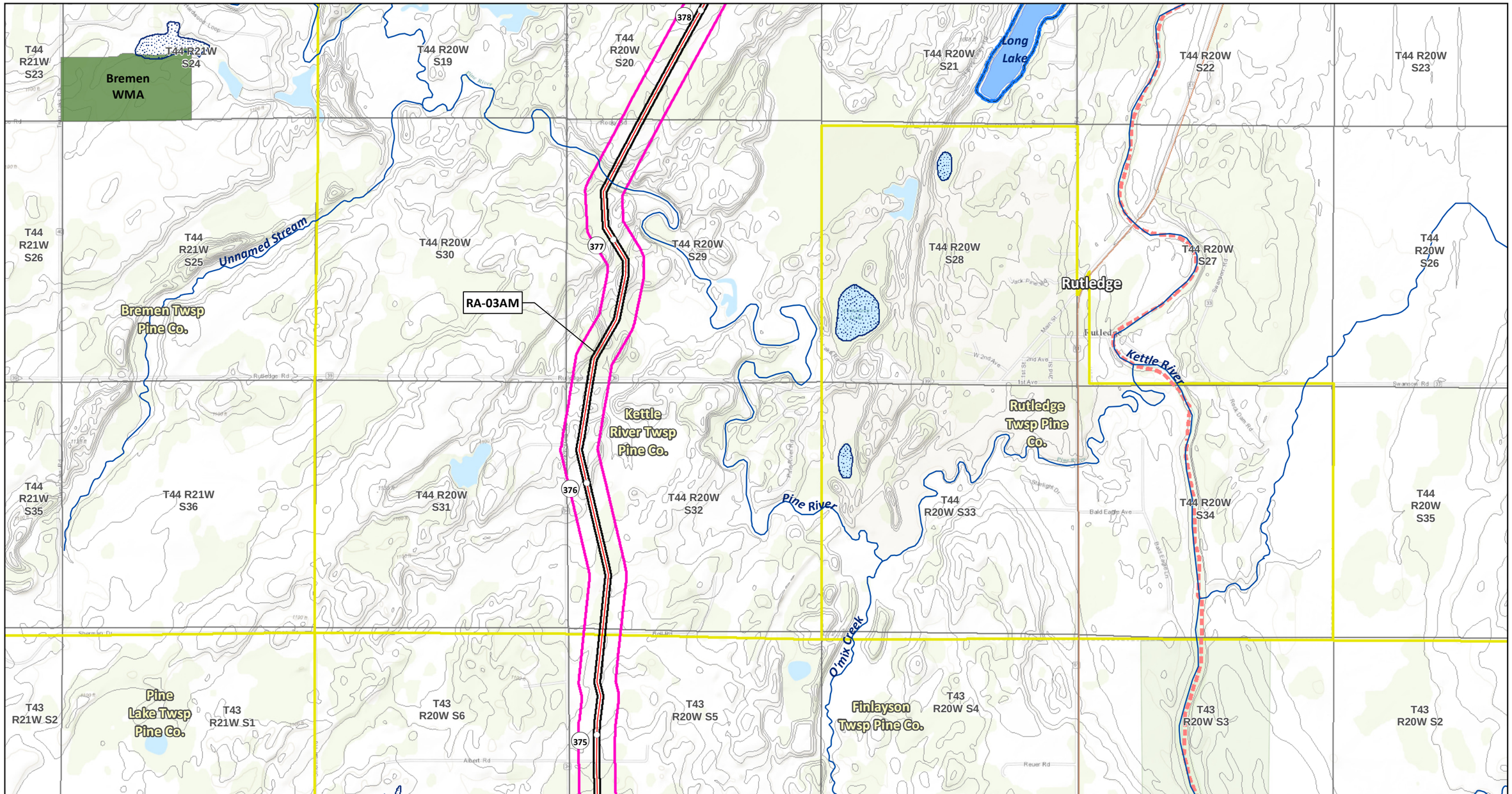

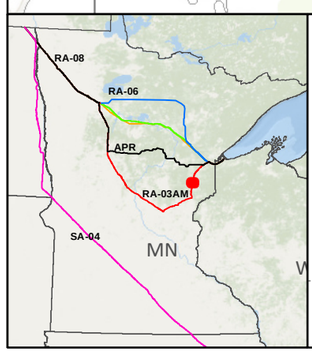

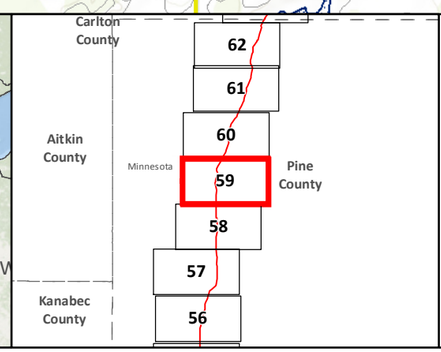

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 59B of 67

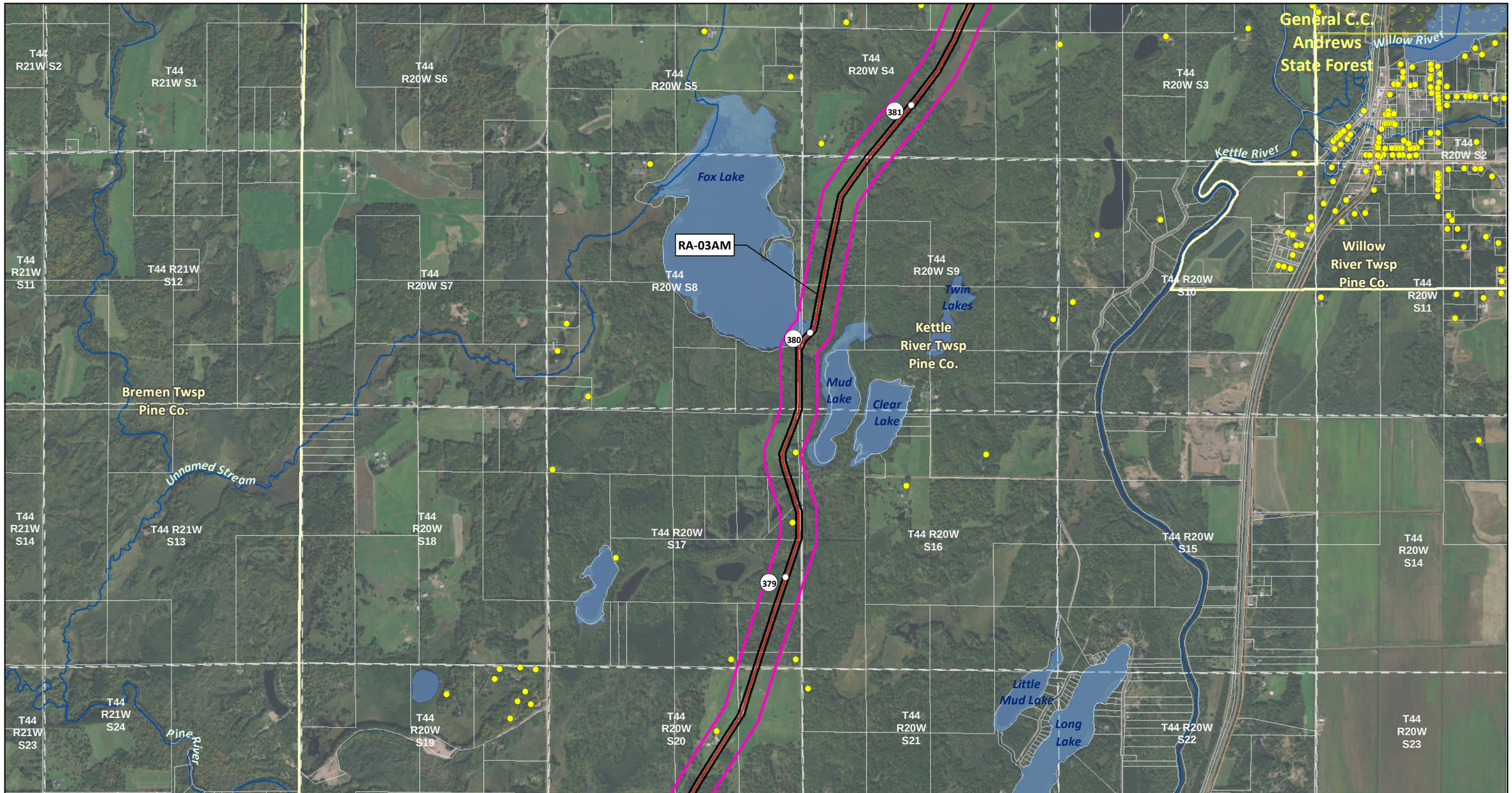

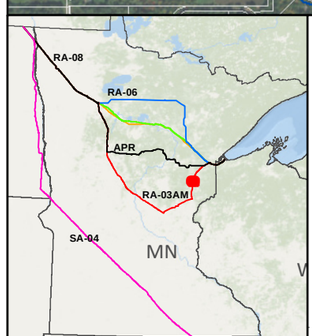

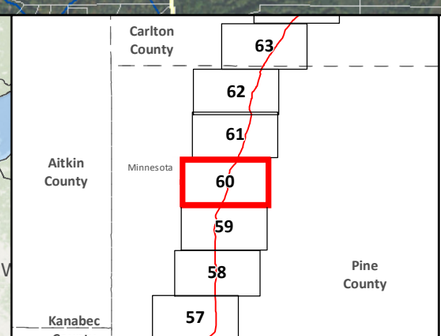

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 60A of 67

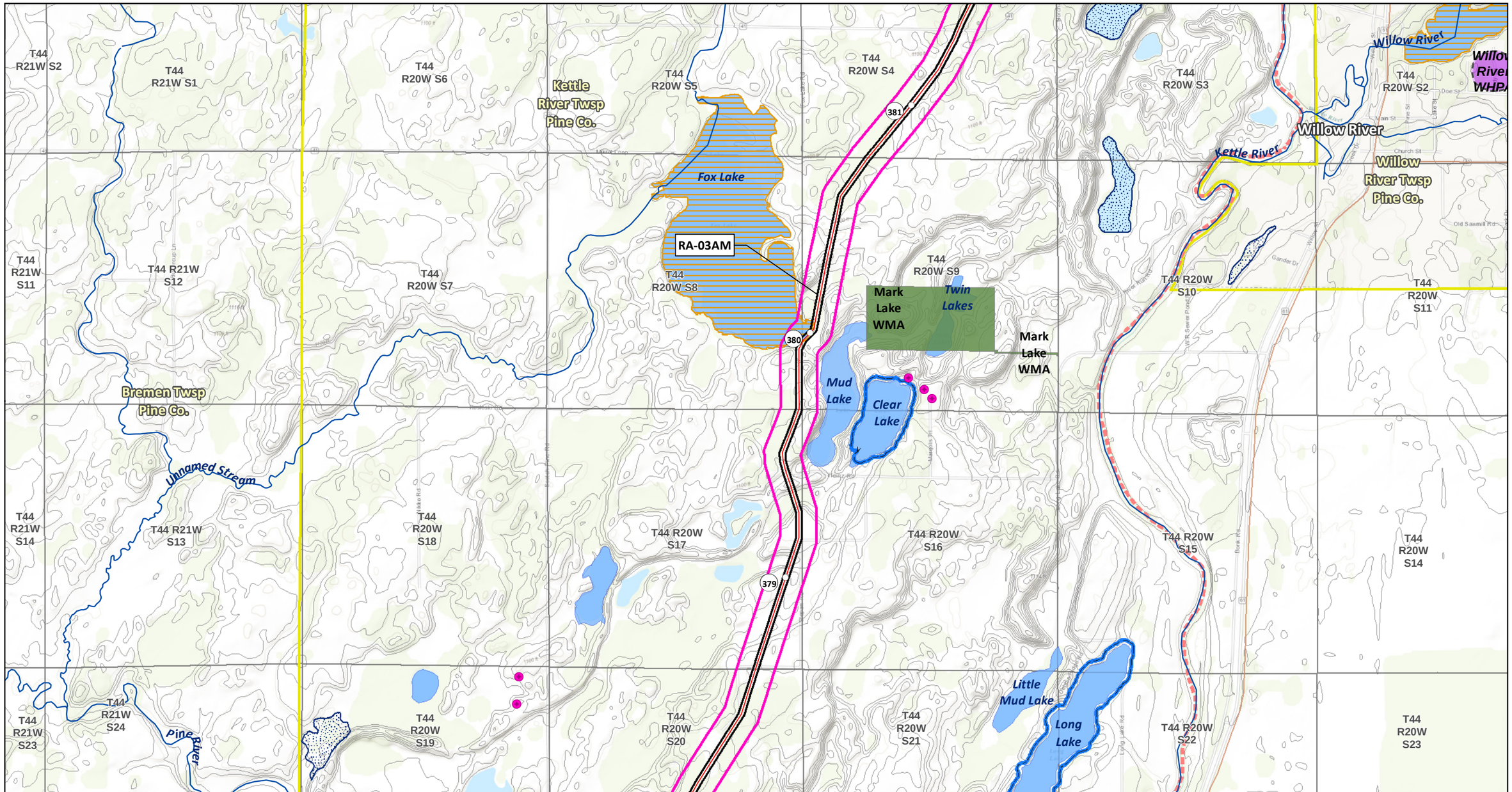

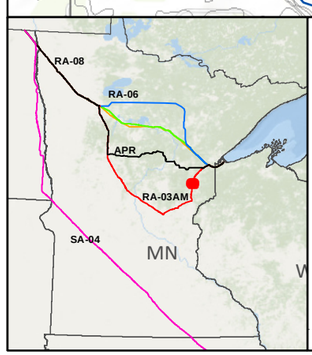

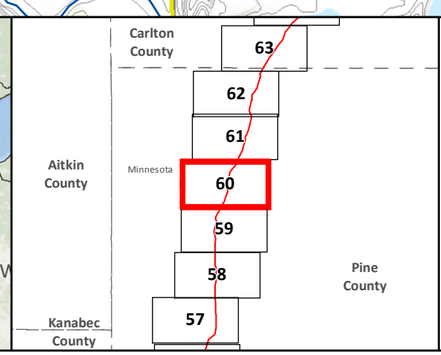

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

Outstanding High

Moderate

Native Plant Communities with Biodiversity Significance

Outstanding High

Moderate

Terminal Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 60B of 67

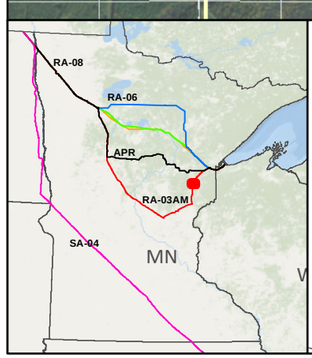

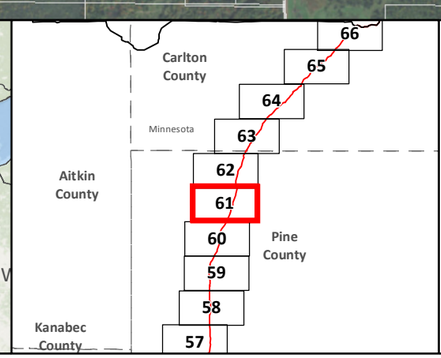

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 61A of 67

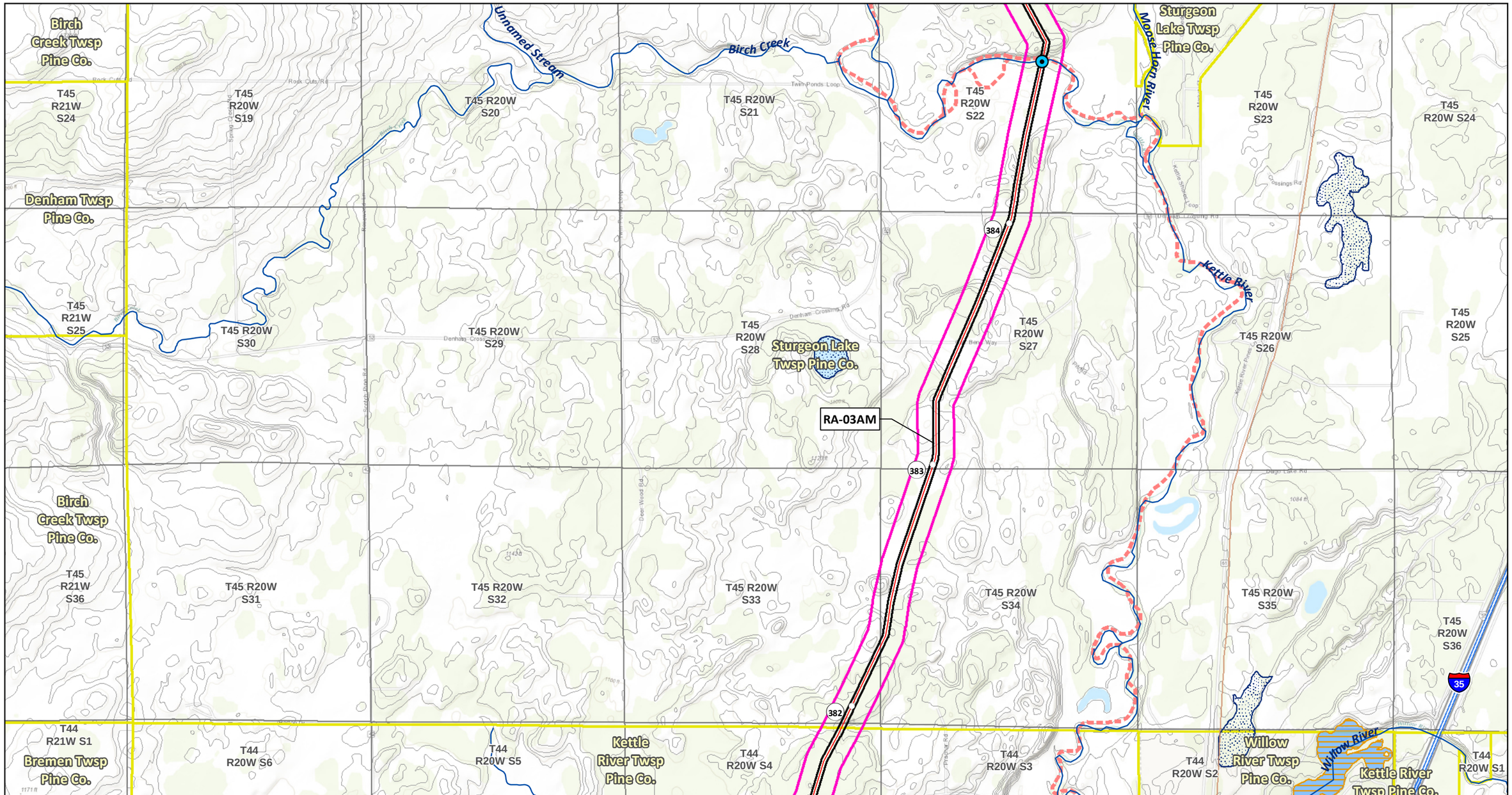

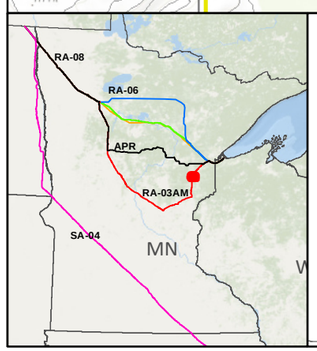

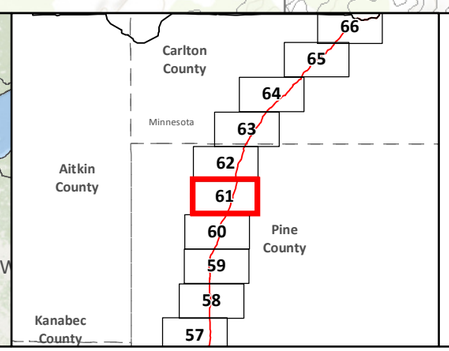

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM
CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 61B of 67

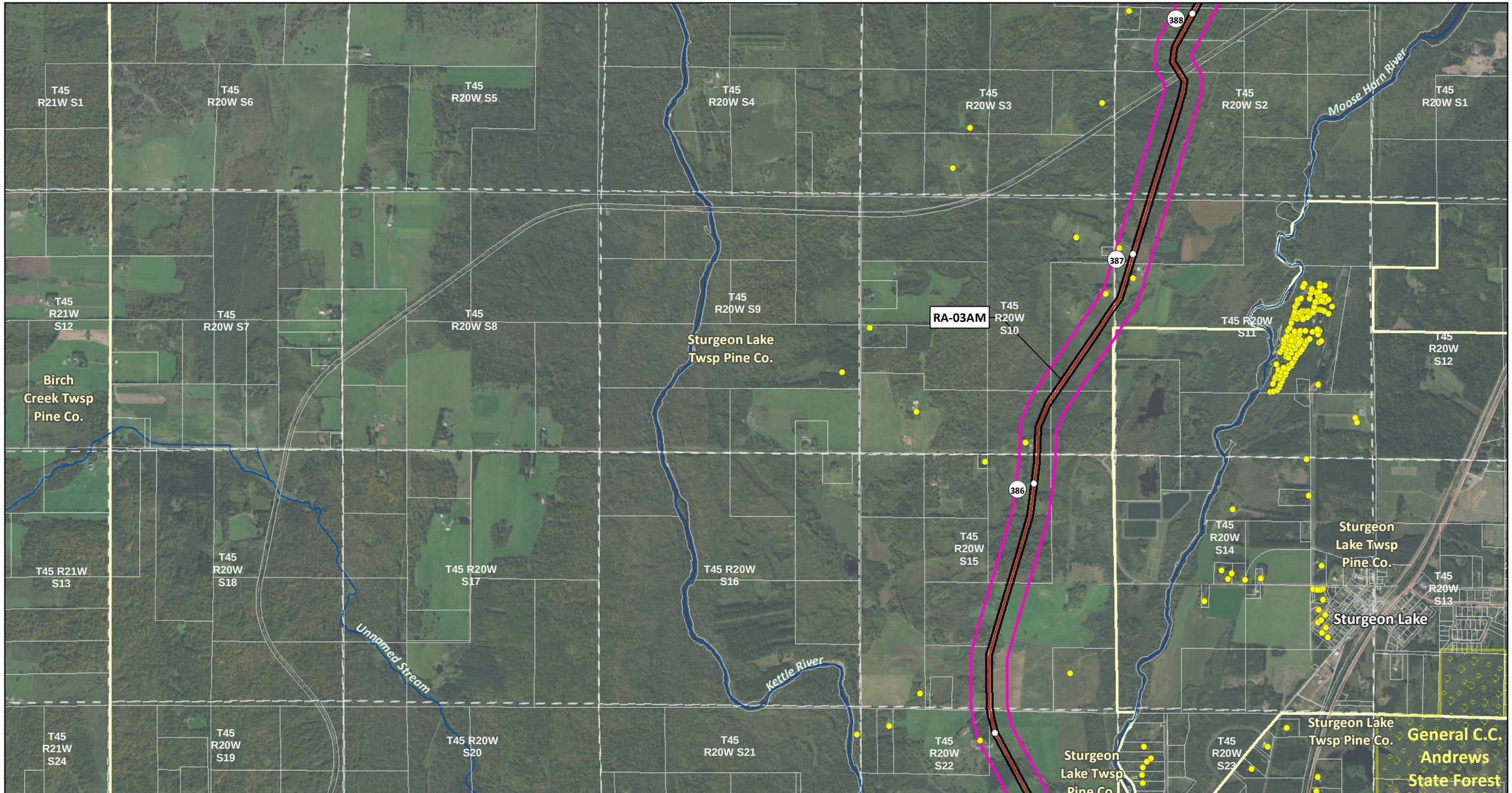

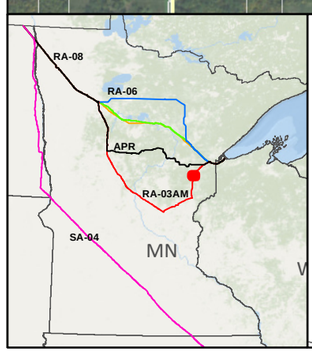

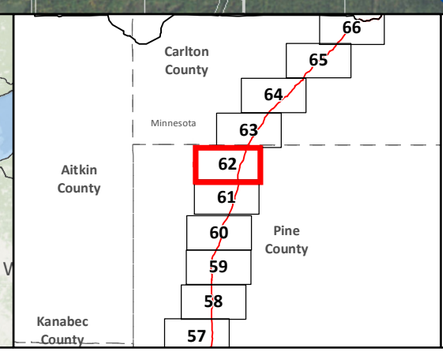

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 62A of 67

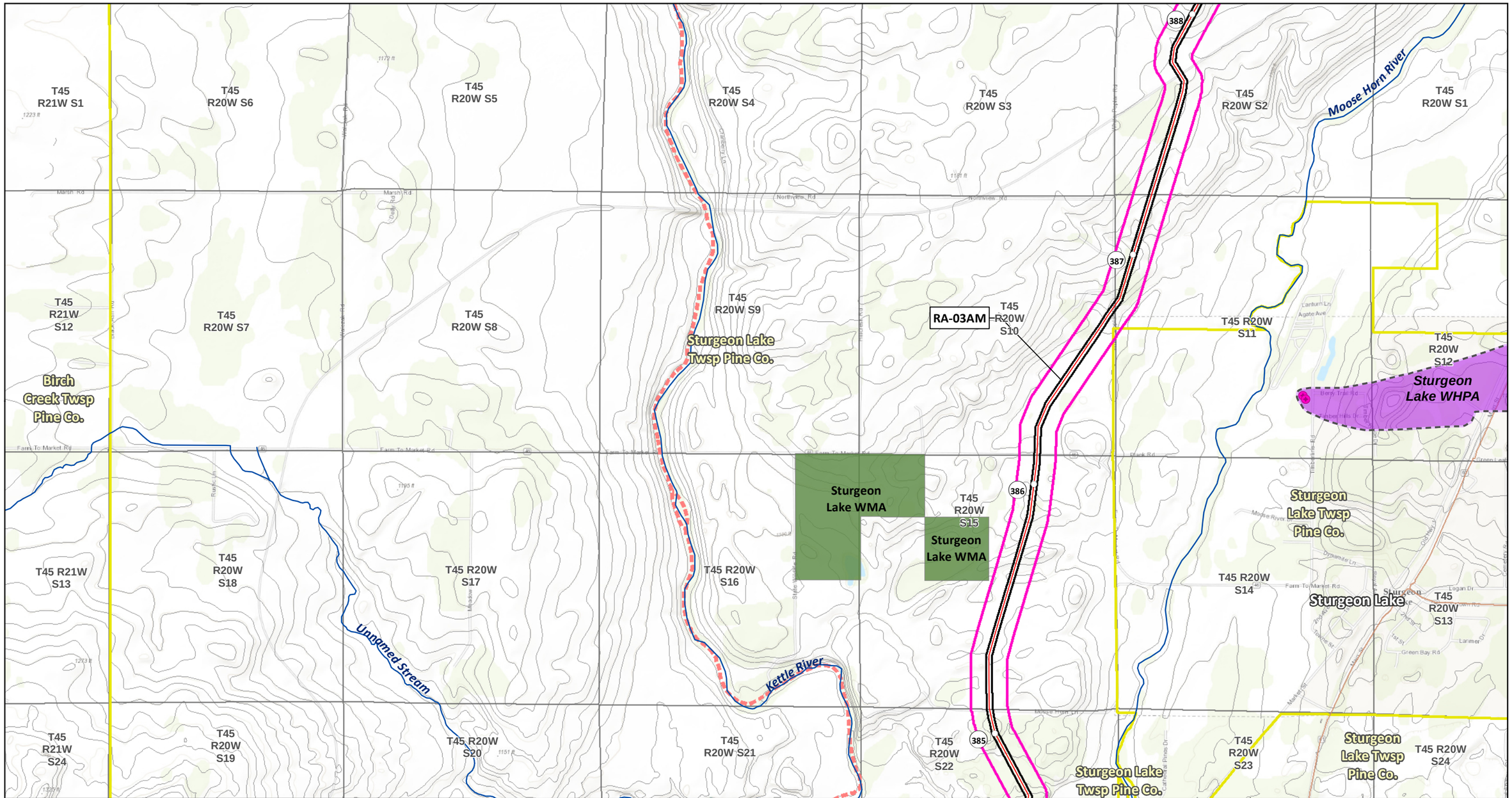

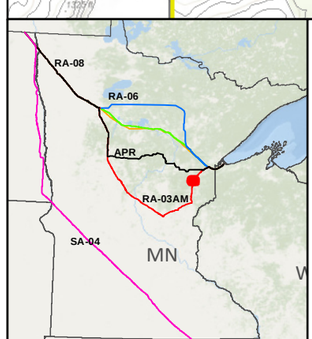

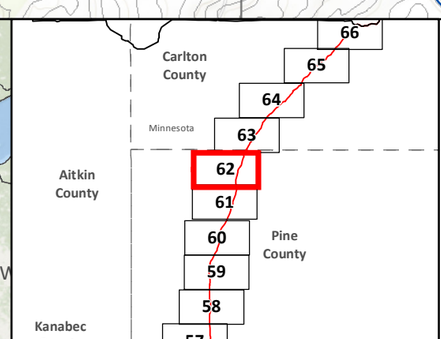

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 62B of 67

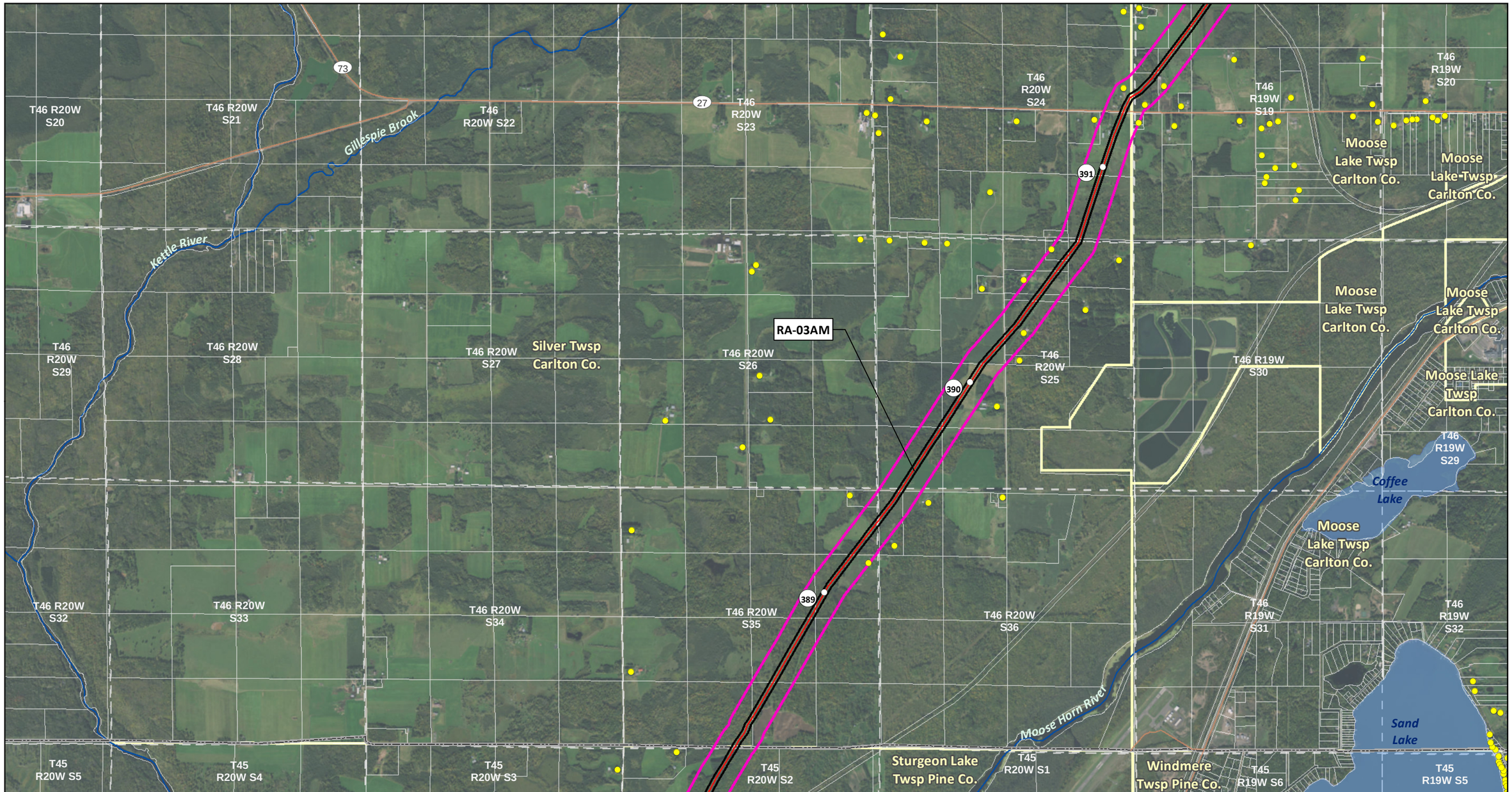

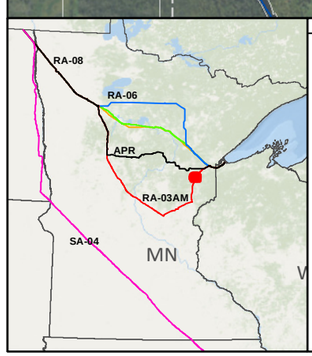

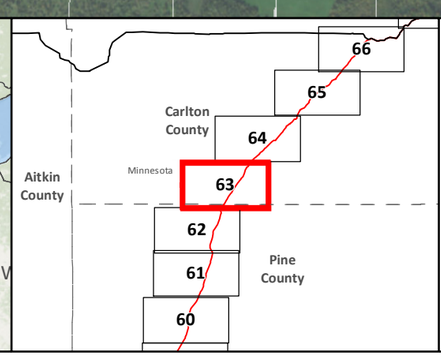

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 63A of 67

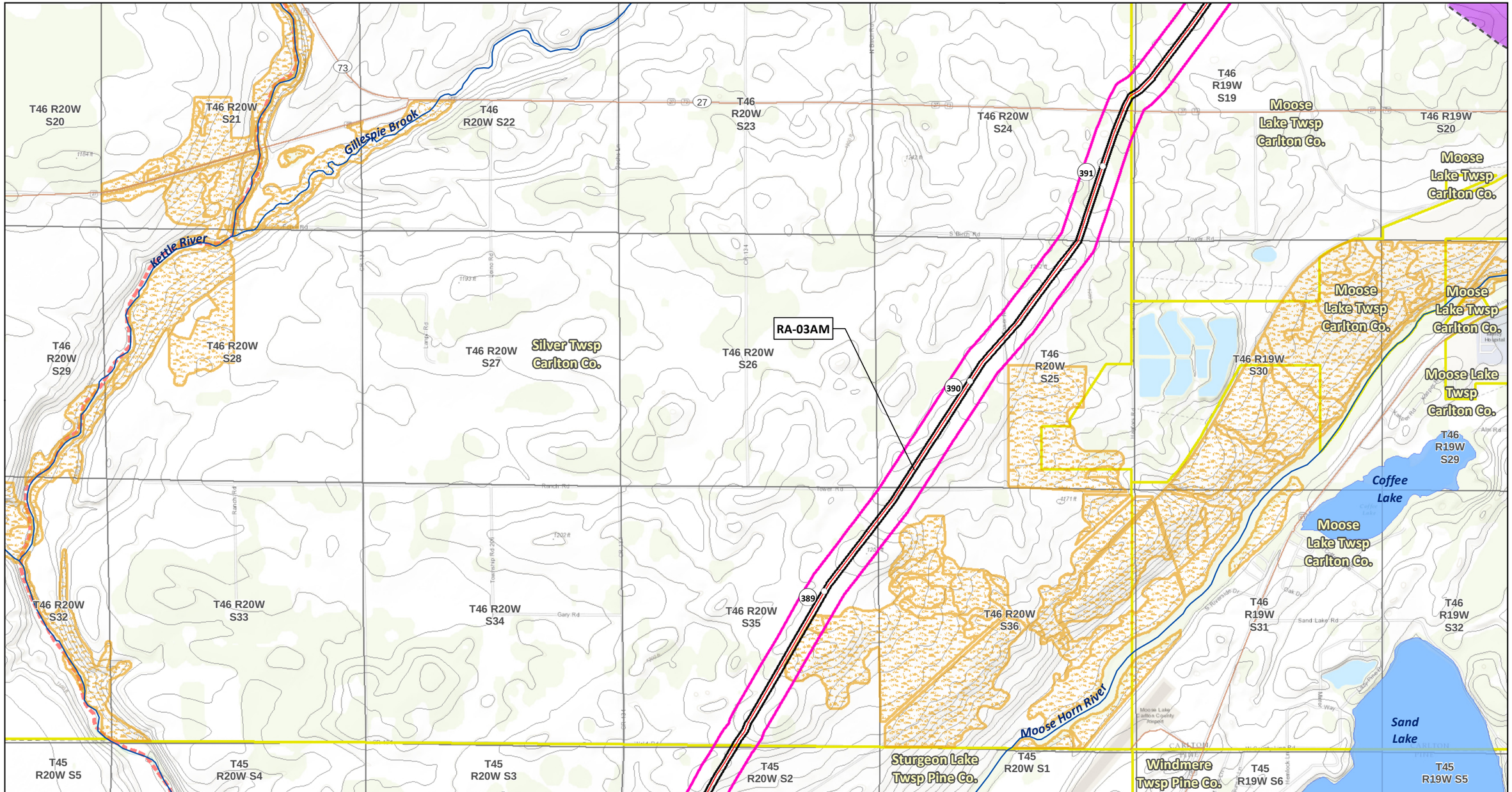

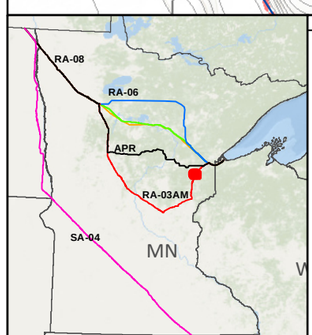

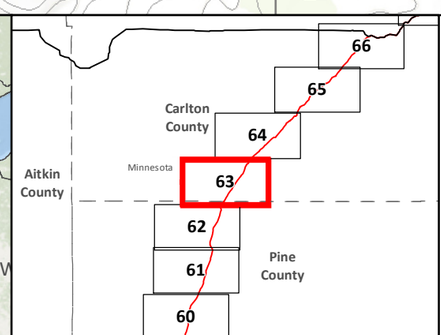

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
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- RA-06
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- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

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Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
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Native Plant Communities with Biodiversity Significance
- Outstanding
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- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 63B of 67

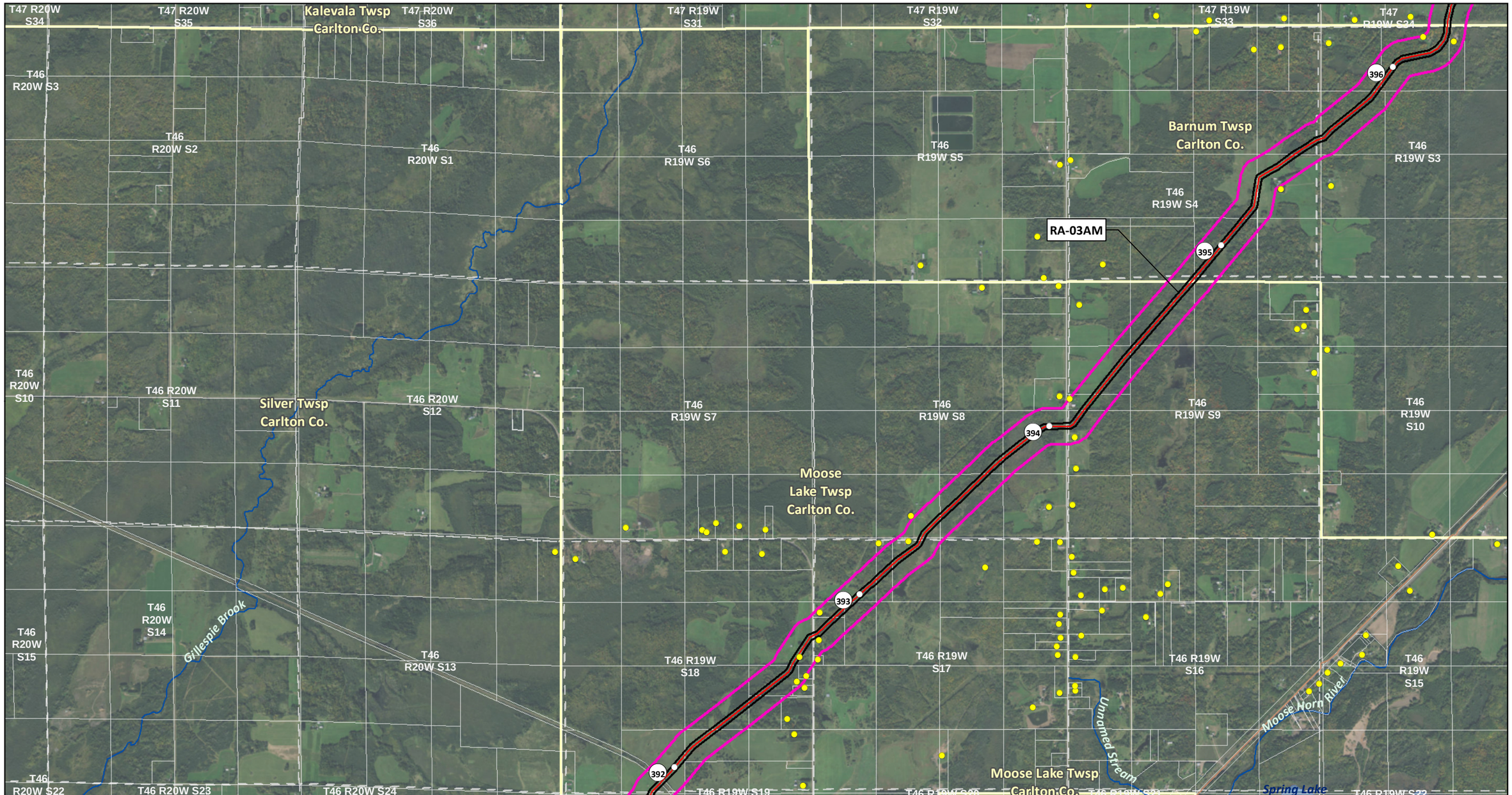

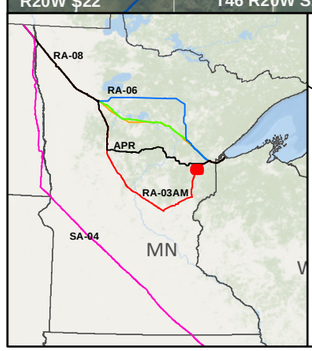

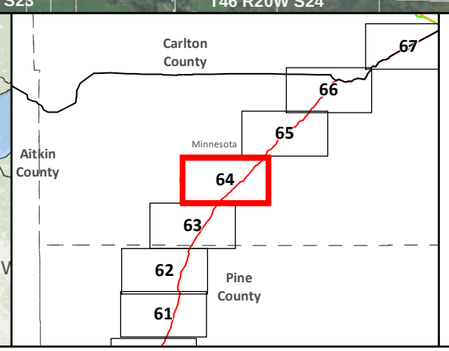

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 64A of 67

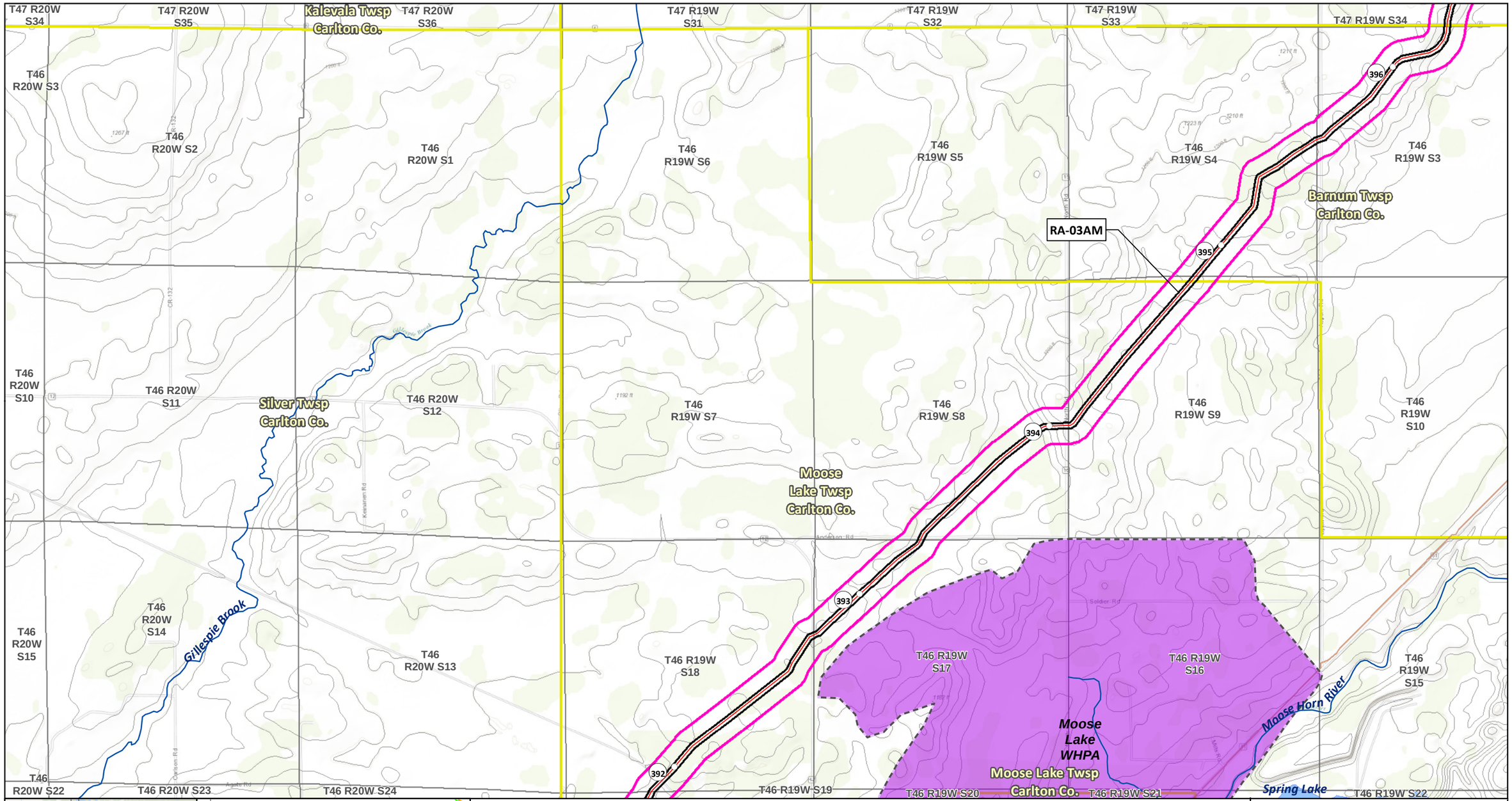

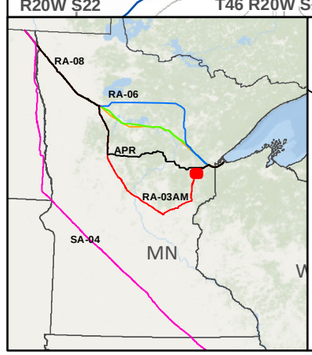

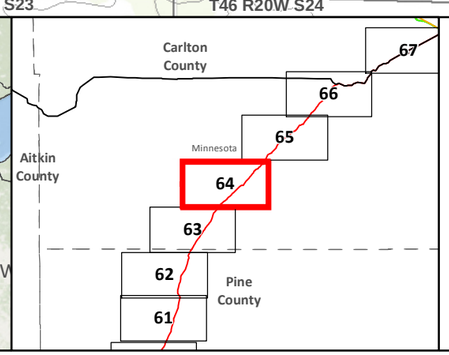

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 64B of 67

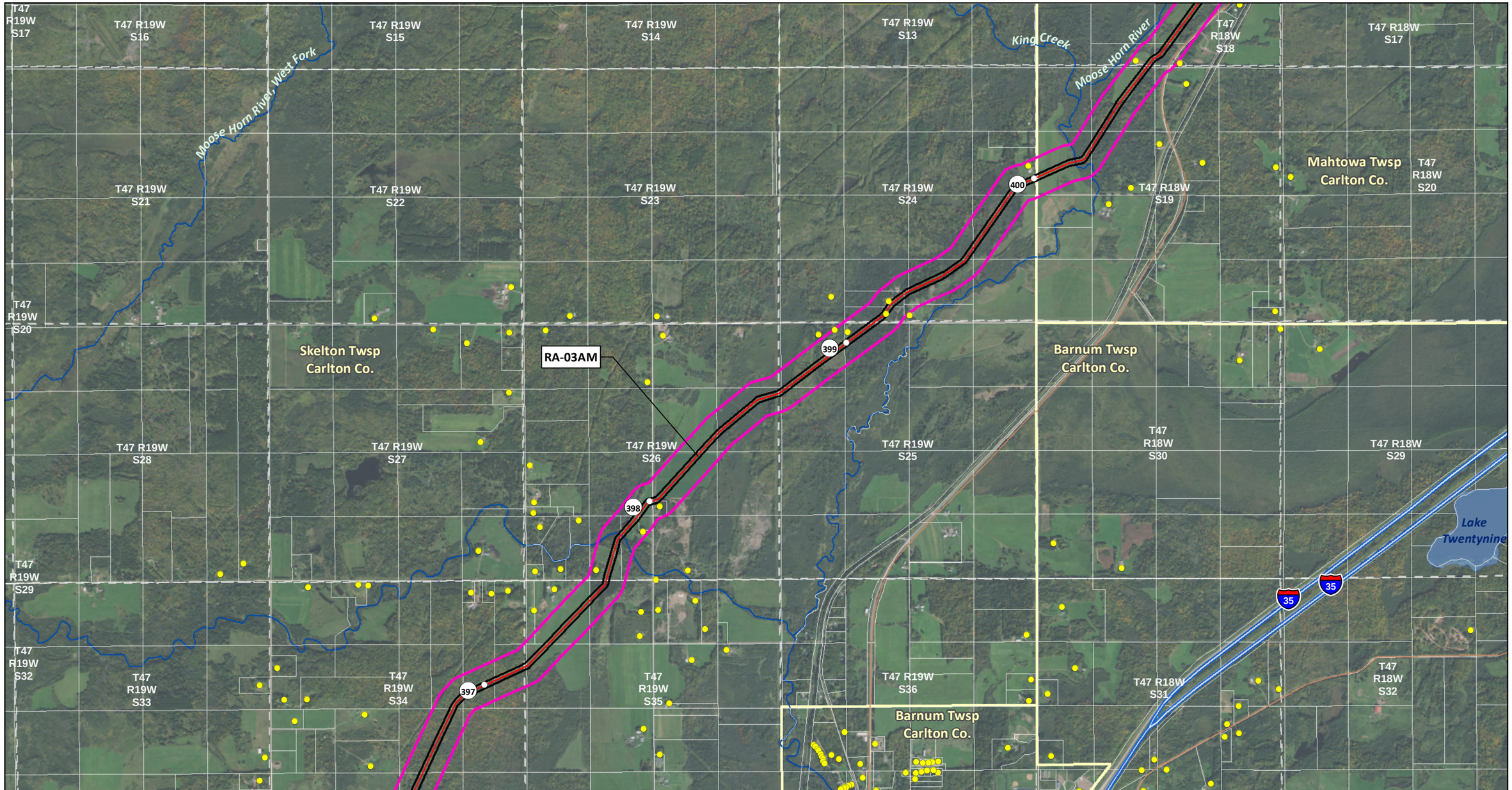

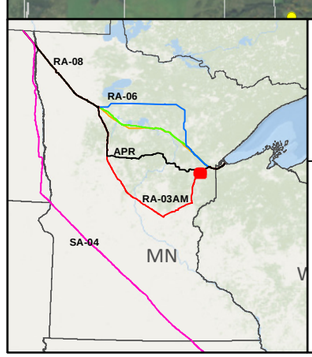

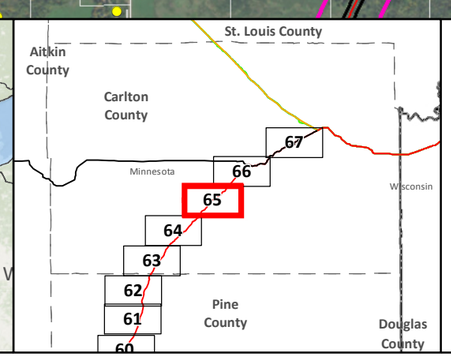

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
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Anticipated 120' Construction ROW
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Parcels
Public Water Basin
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Residences within 1/2 mile
Mile Post
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Pump Station
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Highway
Major Road
Township Boundary

Land Ownership
- State Forest
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Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 65A of 67

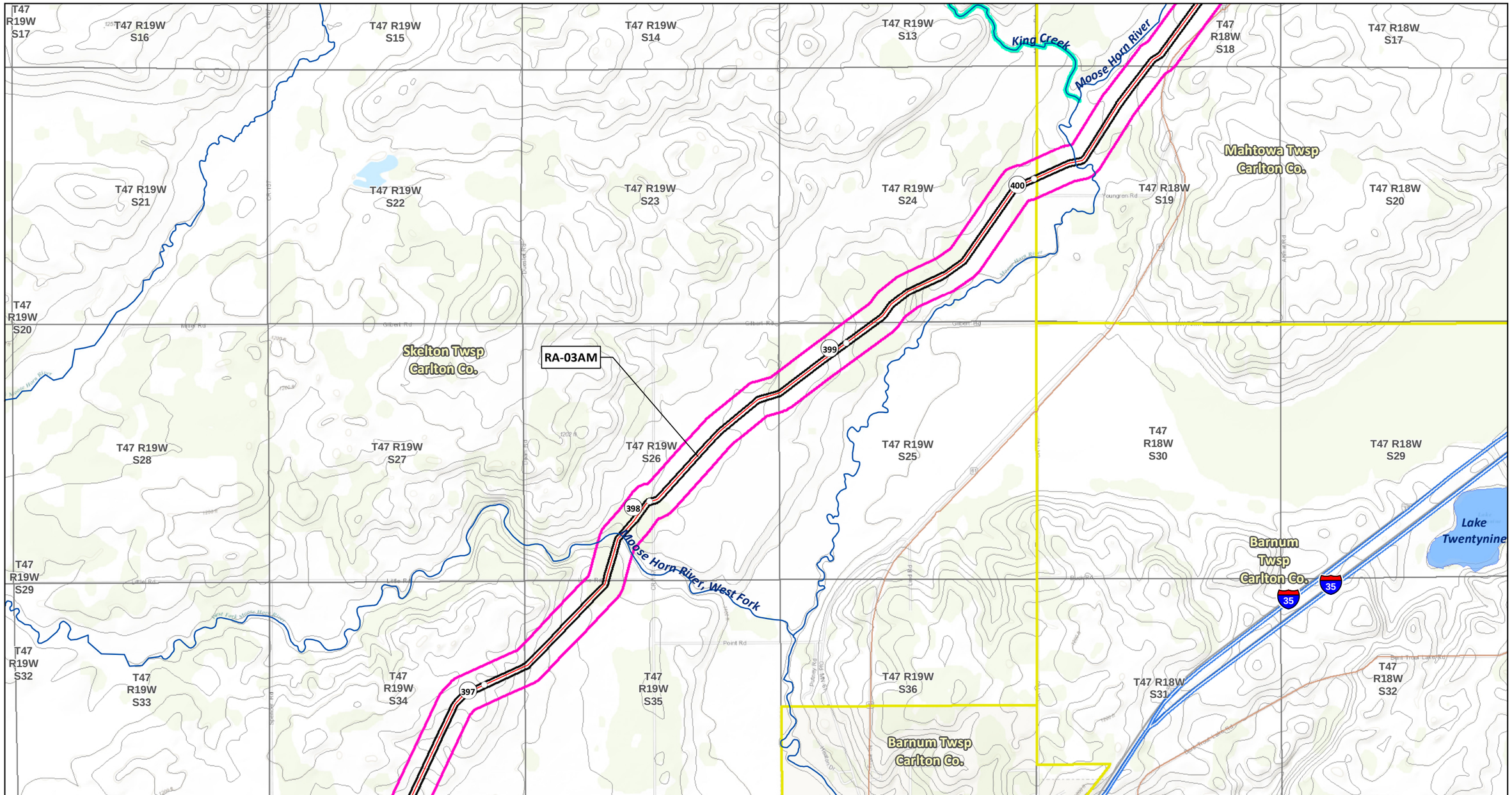

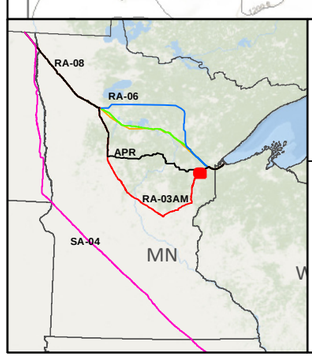

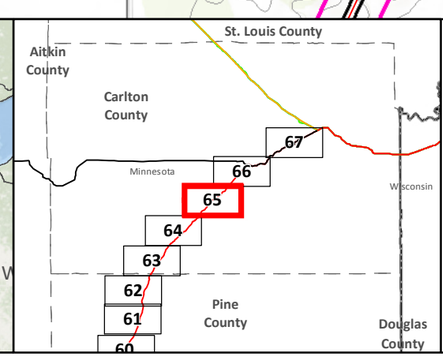

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
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Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

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Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
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Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 65B of 67

APR
North Carlton Twsp Carlton Co.
T48 R19W S36
Atkinson Twsp Carlton Co.
T48 R18W S31
T48 R18W S32
T48 R18W S33
T48 R18W S34
T48 R18W S35
T48 R18W S36
Moose Horn River
T47 R19W S1
King Creek
T47 R18W S6
T47 R18W S5
Park Lake Creek
T47 R18W S4
T47 R18W S3
T47 R18W S2
404
405
406
403
402
401
RA-03AM
Mahtowa Twsp Carlton Co.
T47 R18W S11
T47 R19W S12
Skelton Twsp Carlton Co.
T47 R18W S7
T47 R18W S8
T47 R18W S9
T47 R18W S10
35
Unnamed Stream
Hizer Lake
T47 R19W S13
T47 R18W S18
T47 R18W S17
T47 R18W S16
T47 R18W S15
T47 R18W S14
Fond du Lac State Forest
Munson Lake

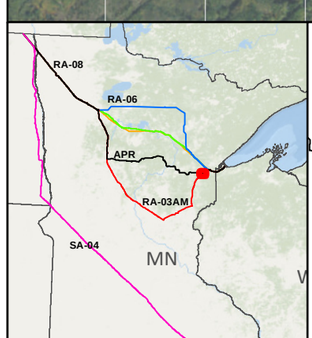

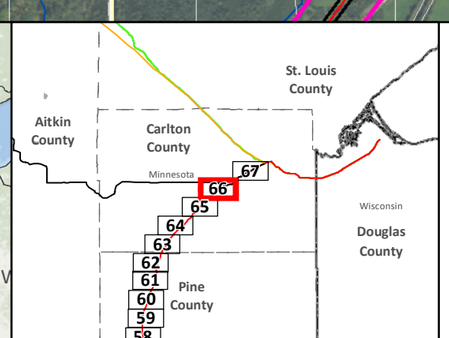

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
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- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
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- National Forest
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- Tribal Trust Land
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0 0.125 0.25 0.5 Miles
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LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 66A of 67

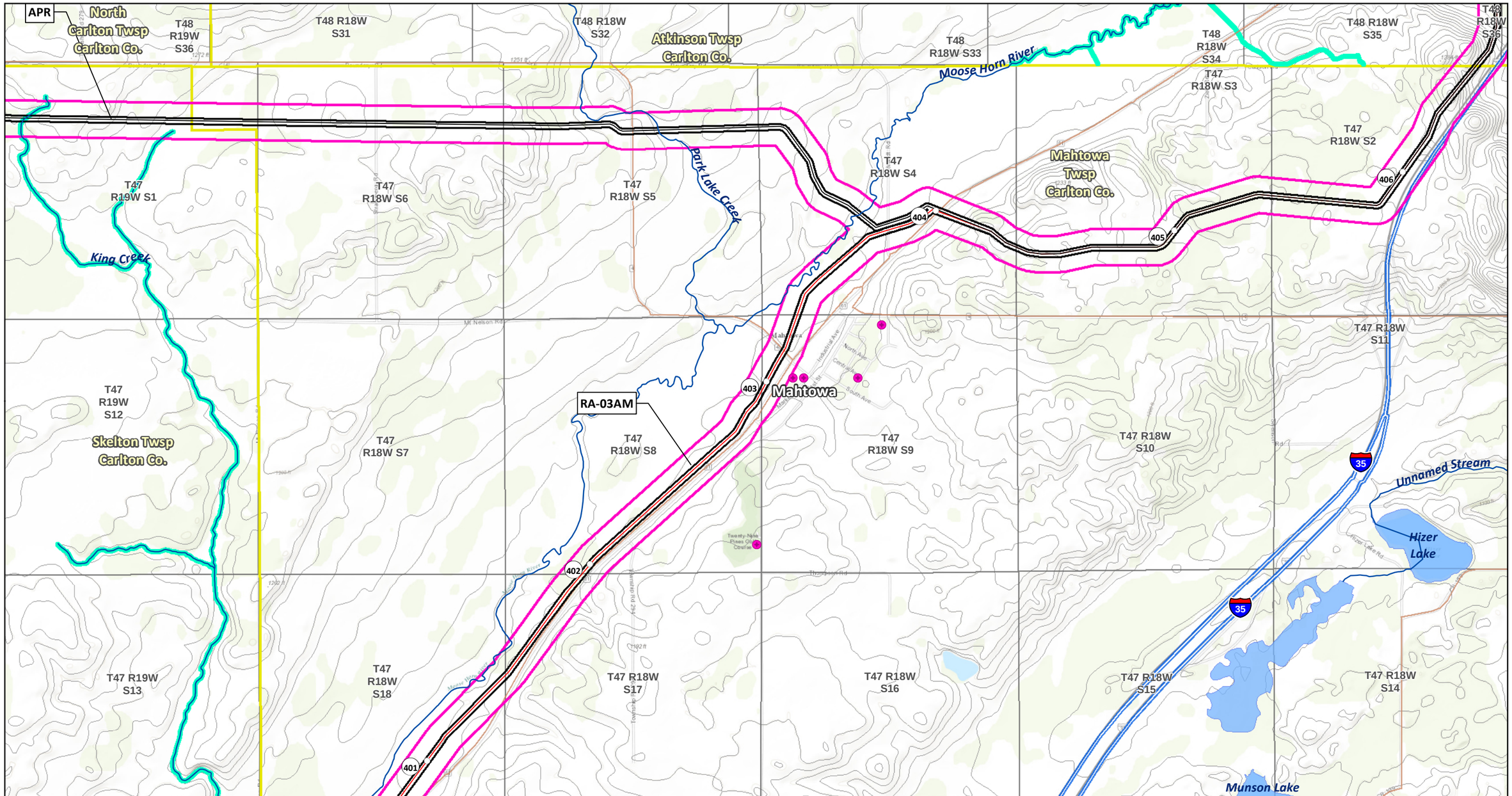

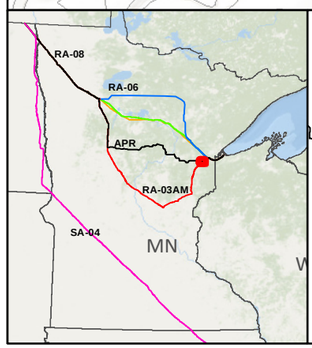

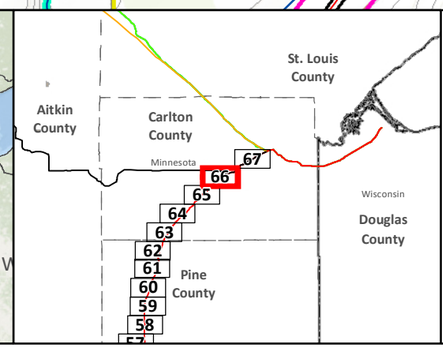

SA-04
Applicant's Preferred Route (APR)

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Terminal
Pump Station

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 66B of 67

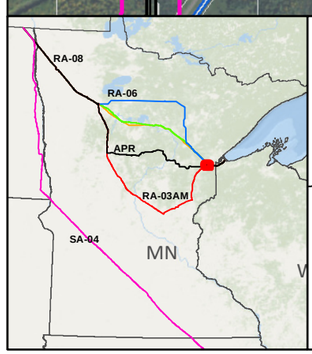

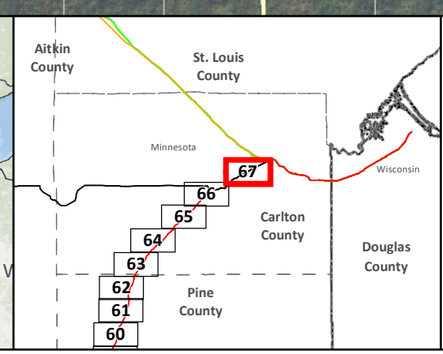

SA-04

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LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-03AM

CLEARBROOK TO CARLTON

Map 67A of 67

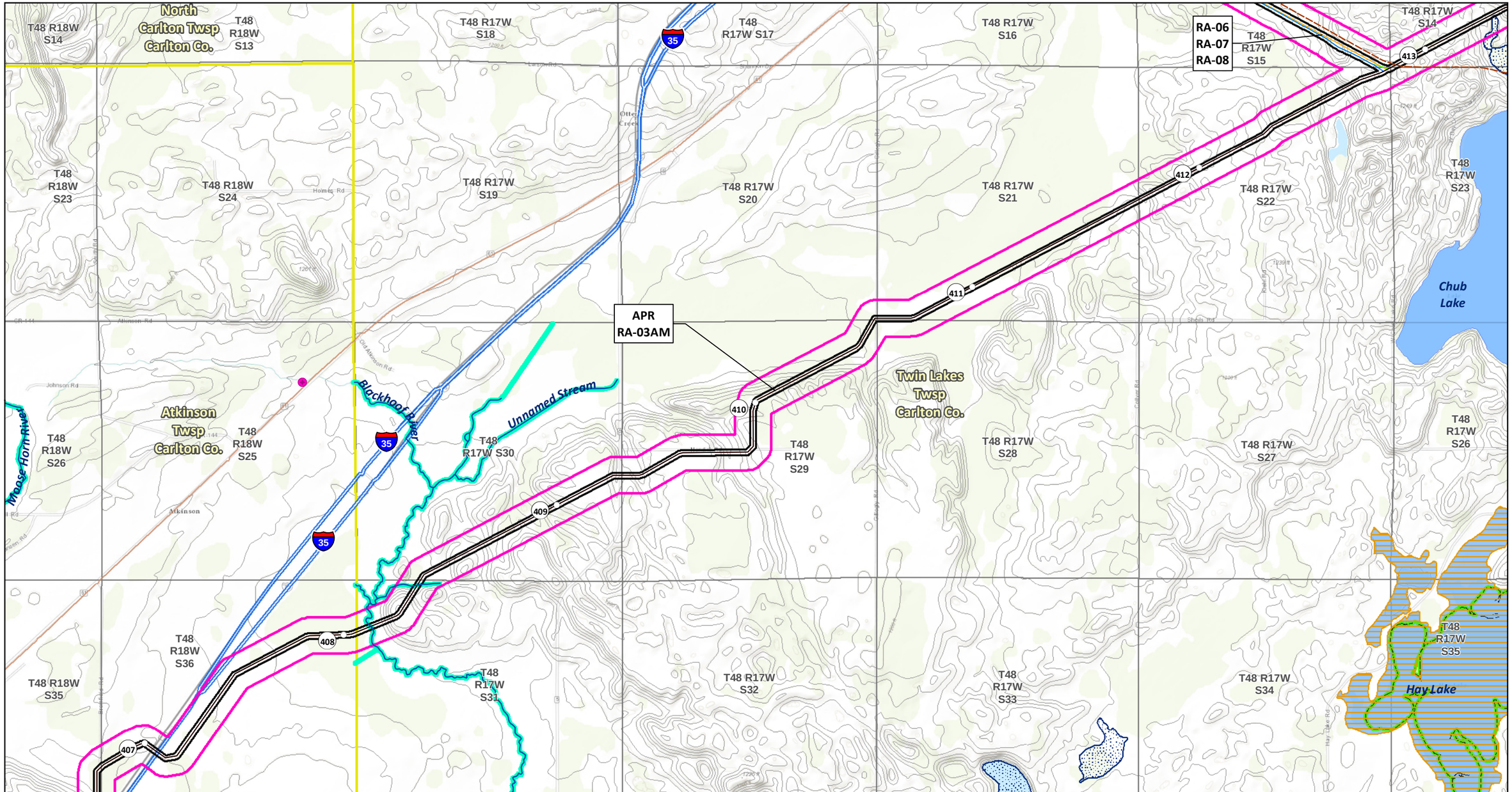

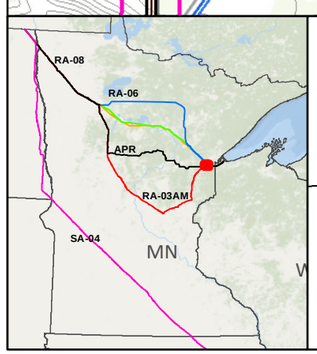

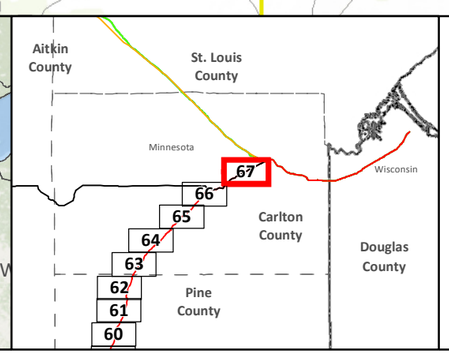

SA-04
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-03AM

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 67B of 67

Appendix A

Line 3 Project Mapbook

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Minnesota Department of Commerce
Energy Environmental Review and Analysis

Final Environmental Impact Statement
Line 3 Project

Mapbook
Applicant's Preferred Route

Docket Nos. PPL-15-137/CN-14-916

August 17, 2017

MINNESOTA

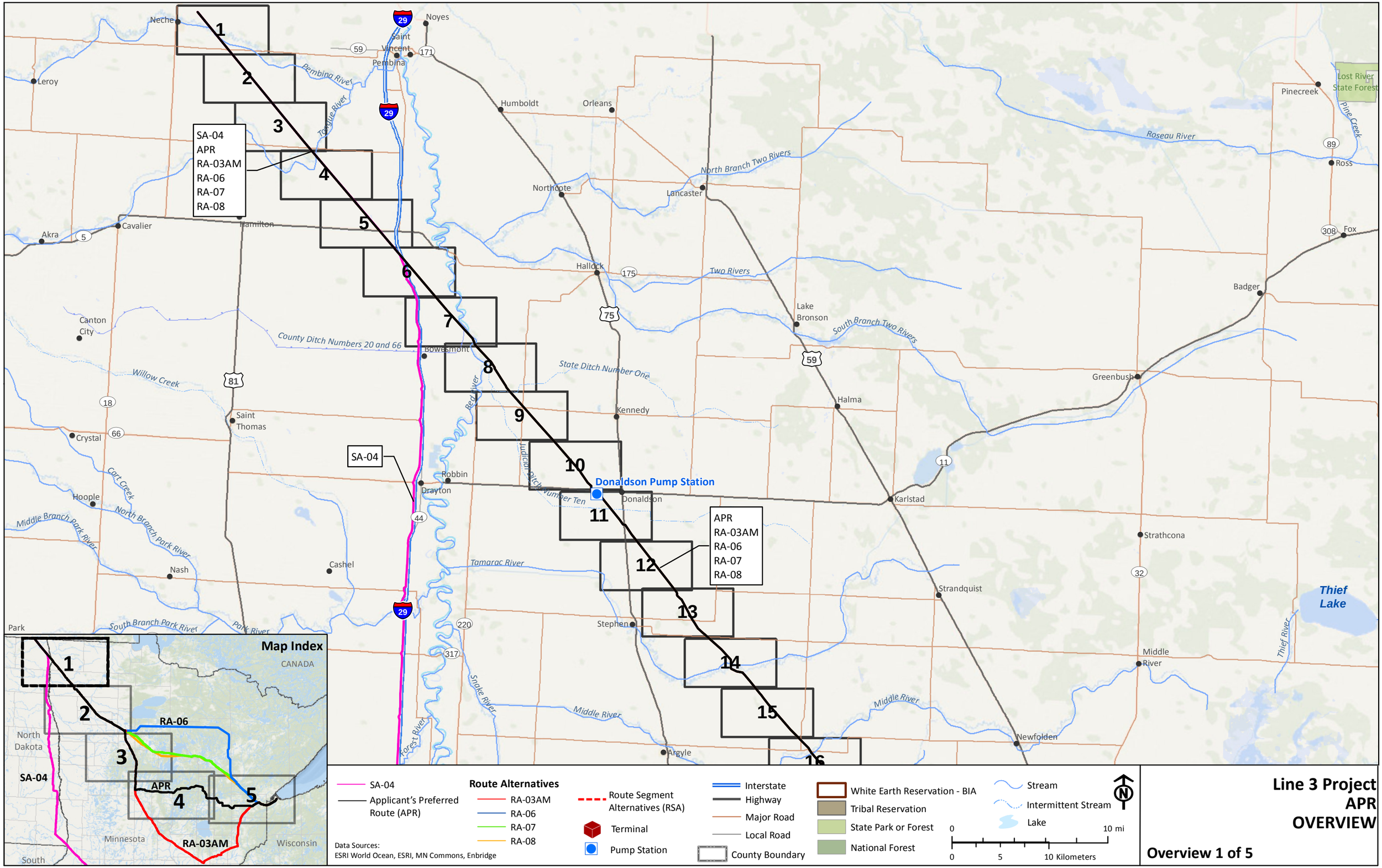
Neche
Noyes
Saint Vincent
Pembina
Leroy
Pembina River
Tongue River
Humboldt
Orleans
Roseau River
North Branch Two Rivers
Northcote
Lancaster
Pinecreek
Lost River State Forest
Pine Creek
Ross
Fox
Akra
Cavalier
Hamilton
Hallock
Two Rivers
Lake Bronson
South Branch Two Rivers
Badger
Canton City
County Ditch Numbers 20 and 66
Bowesmont
State Ditch Number One
Willow Creek
Red River
Kennedy
Halma
Greenbush
Saint Thomas
Crystal
Judicial Ditch Number Ten
Robbin
Drayton
Donaldson Pump Station
Donaldson
Karlstad
Cart Creek
Hoople
North Branch Park River
Middle Branch Park River
Nash
Cashel
Tamarac River
Strathcona
Strandquist
Thief Lake
Park
South Branch Park River
Park River
Stephen
Snake River
Middle River
Thief River
Middle River
Newfolden
Argyle
Forest River
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RA-03AM
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Tribal Reservation
State Park or Forest
National Forest
Stream
Intermittent Stream
Lake
0
10 mi
0
5
10 Kilometers
N
Data Sources:
ESRI World Ocean, ESRI, MN Commons, Enbridge
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OVERVIEW
Overview 1 of 5

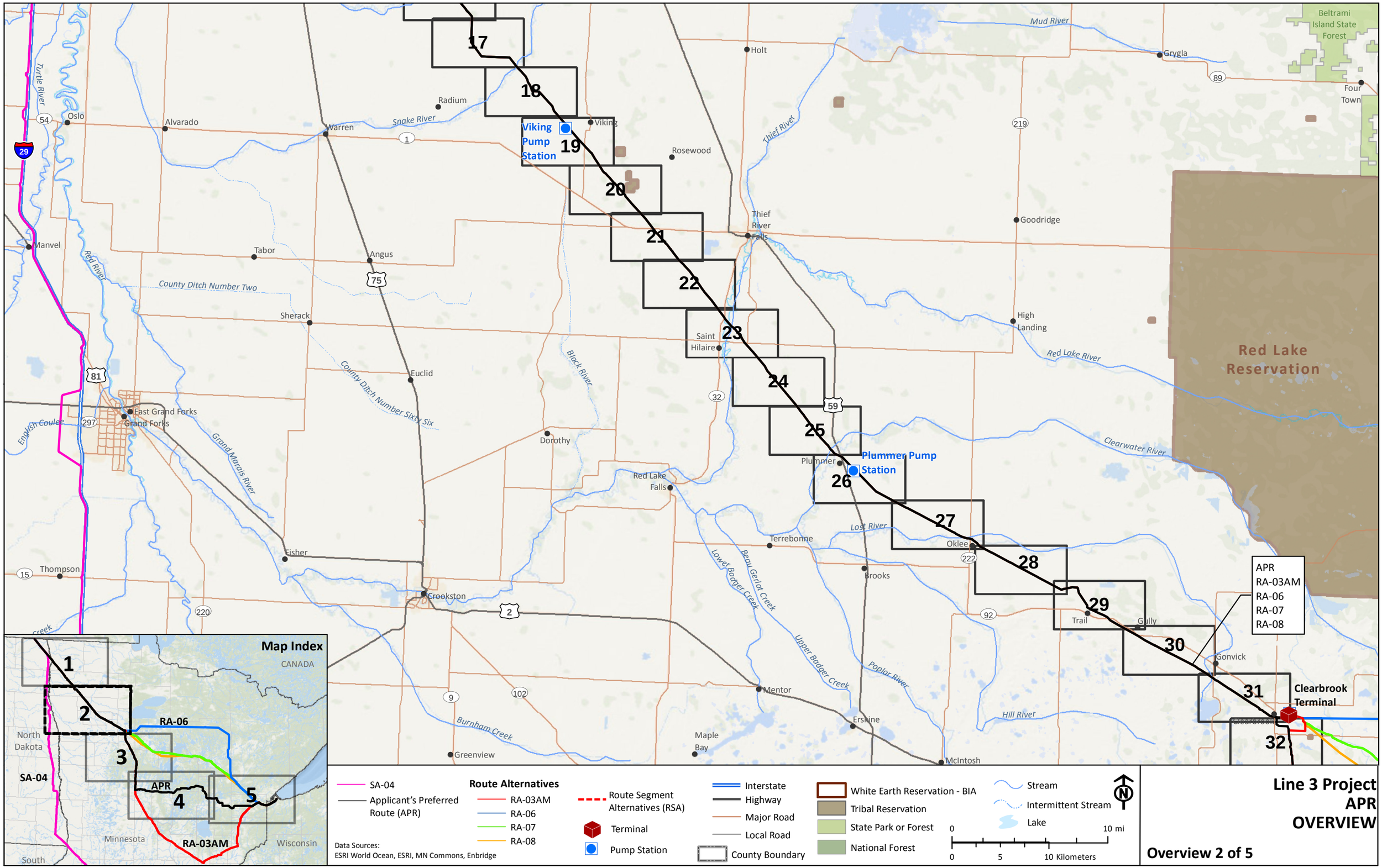

Line 3 Project
APR
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Overview 2 of 5

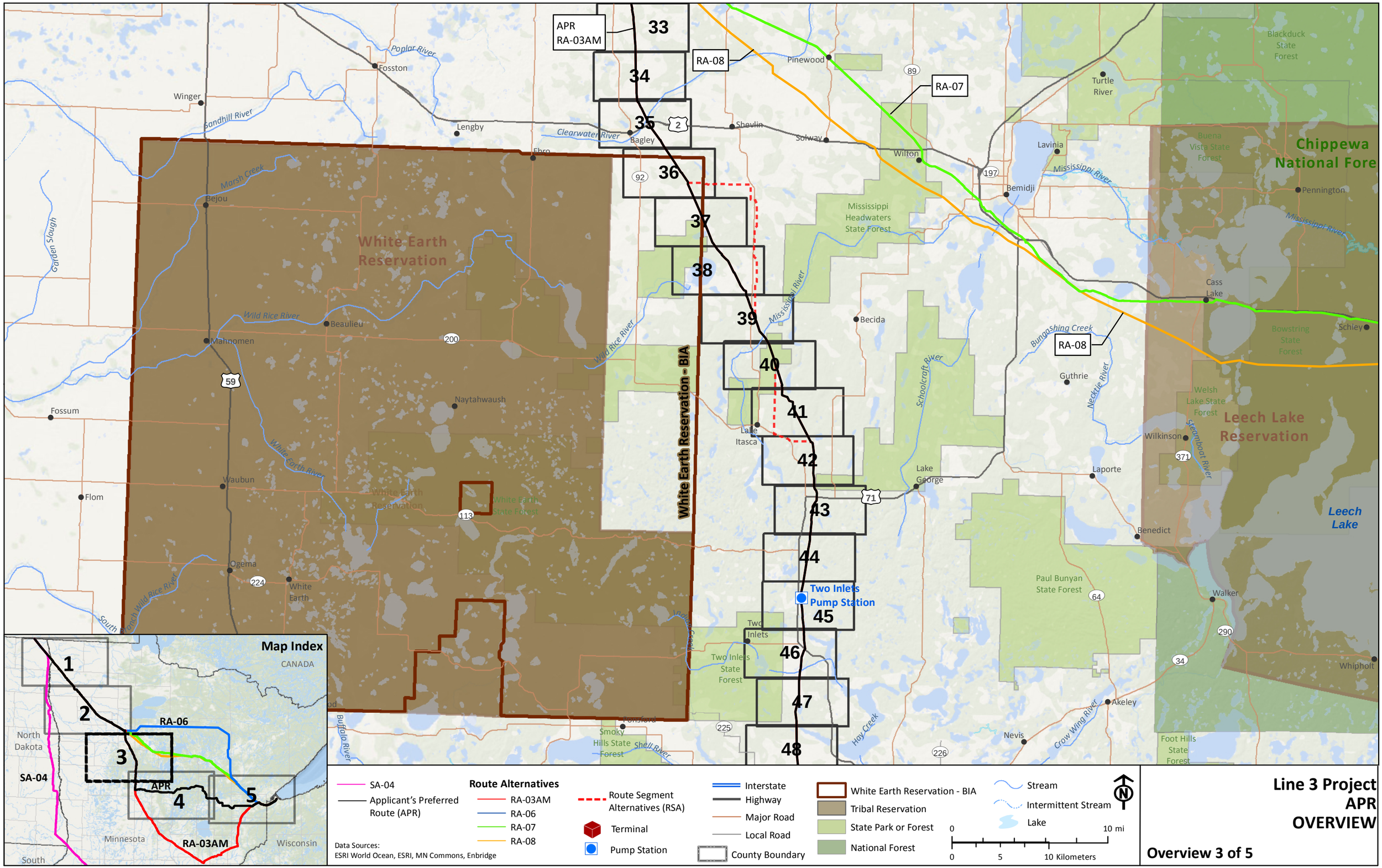

Line 3 Project
APR
OVERVIEW

Overview 3 of 5

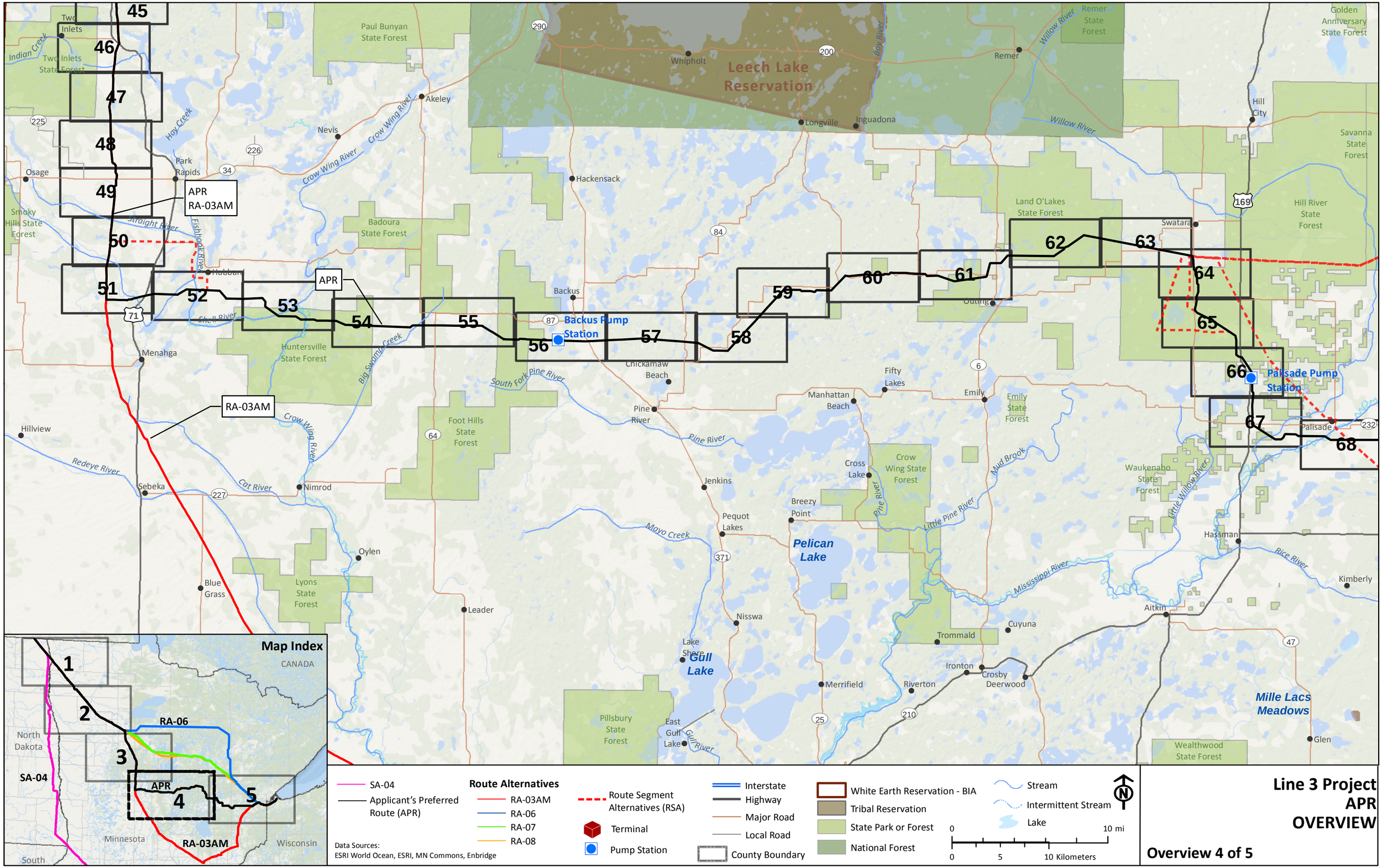
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Local Road
County Boundary
White Earth Reservation - BIA
Tribal Reservation
State Park or Forest
National Forest
Stream
Intermittent Stream
Lake
0 10 mi
0 5 10 Kilometers
Data Sources:
ESRI World Ocean, ESRI, MN Commons, Enbridge
Line 3 Project
APR
OVERVIEW
Overview 4 of 5

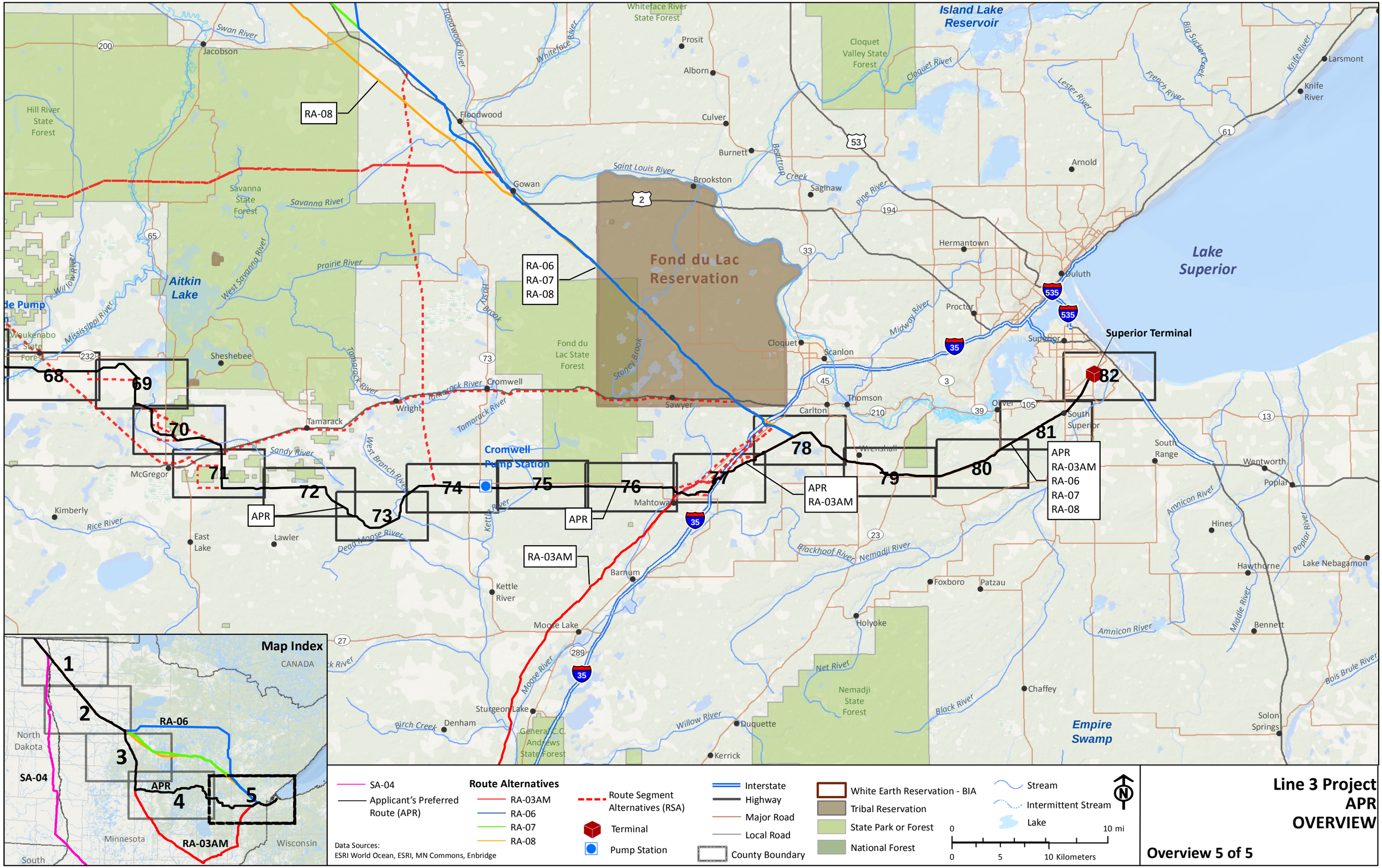

Line 3 Project
APR
OVERVIEW

Overview 5 of 5

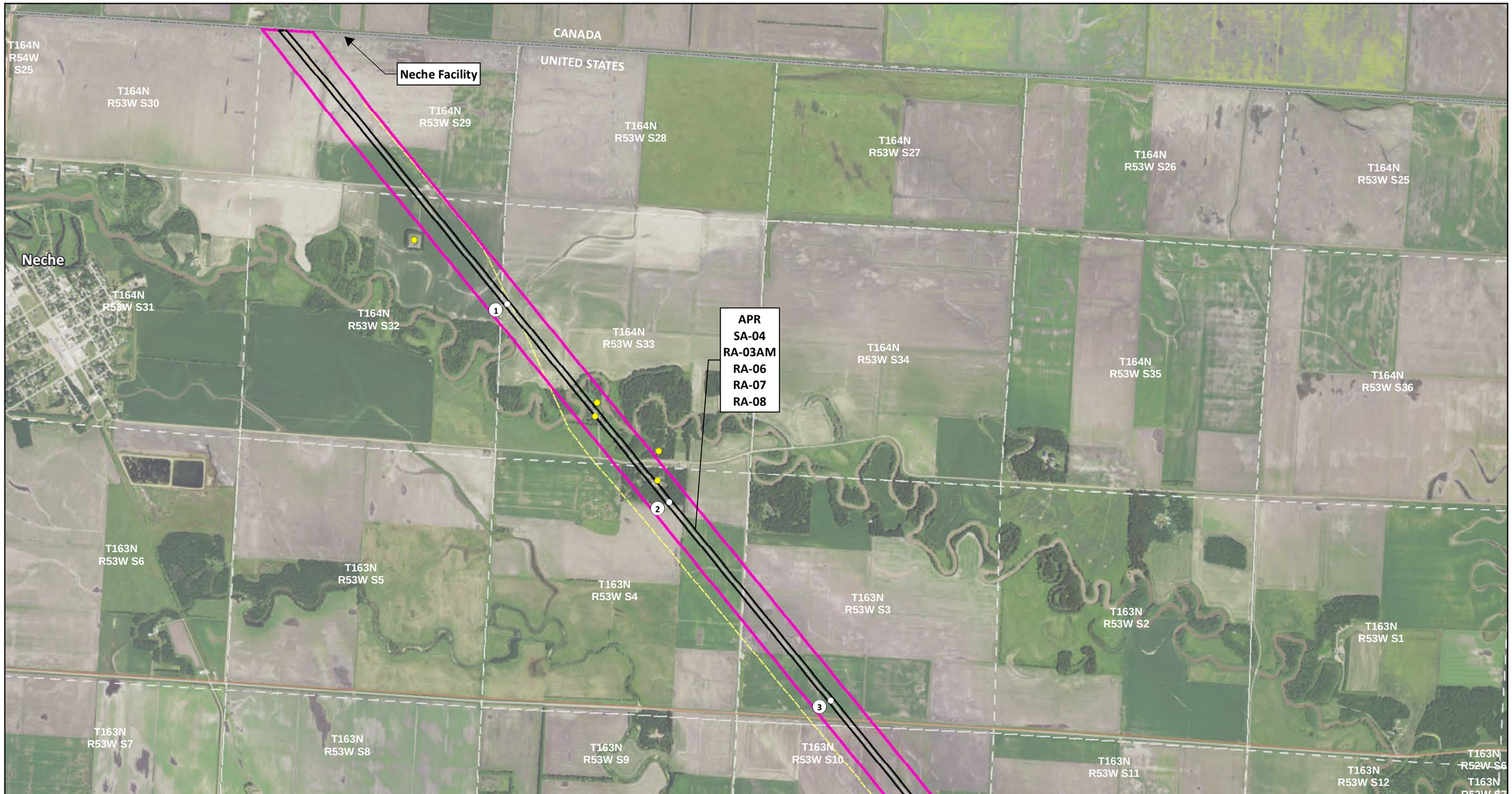

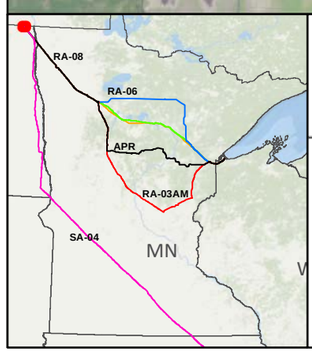

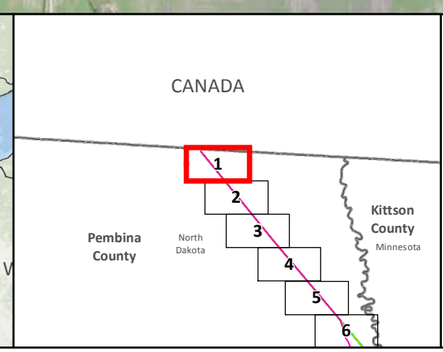

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 1A of 82

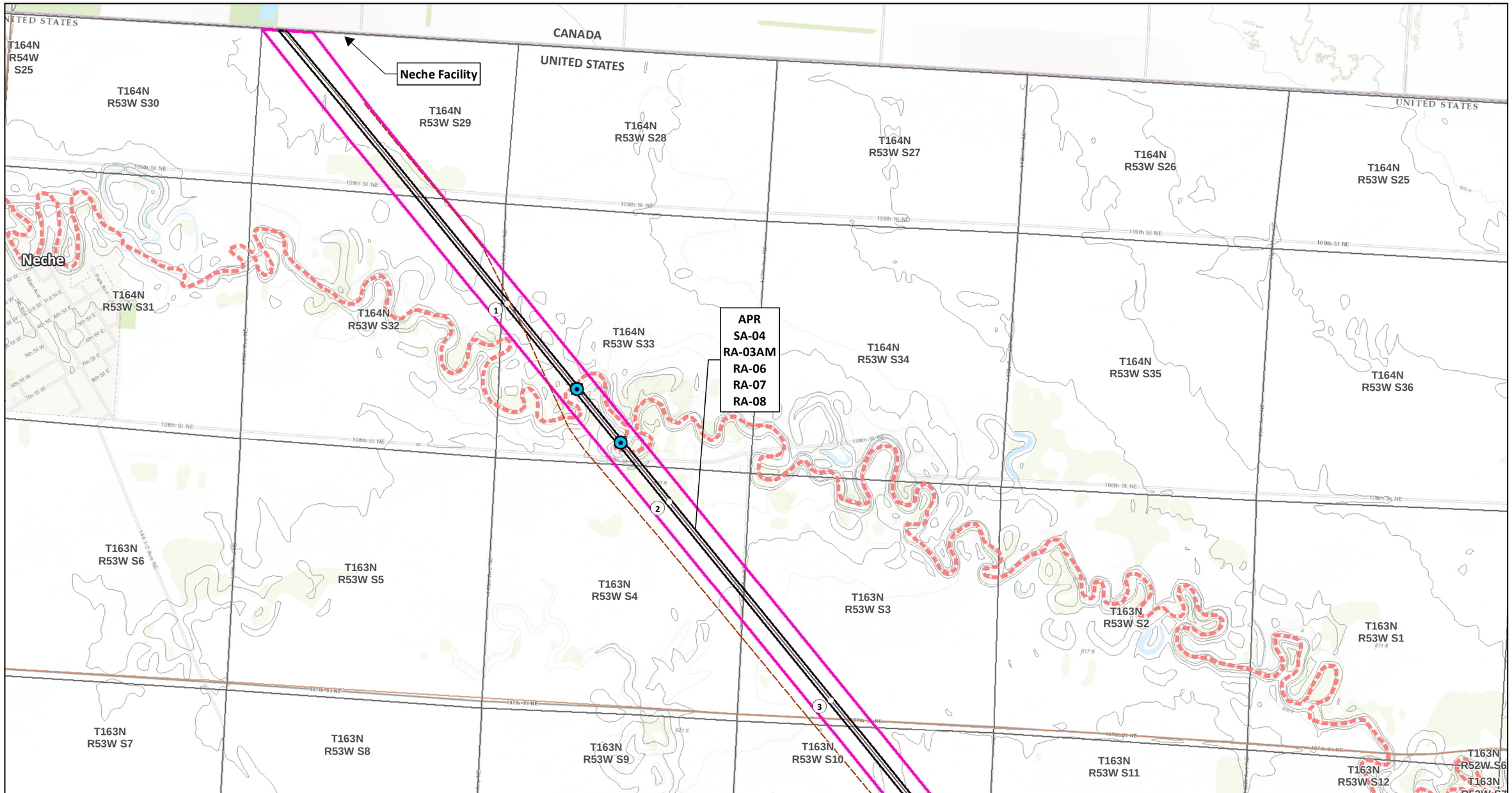

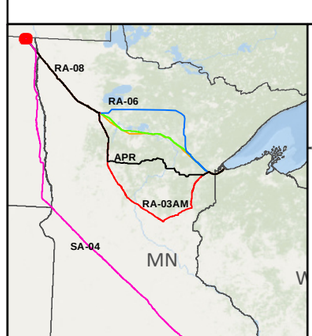

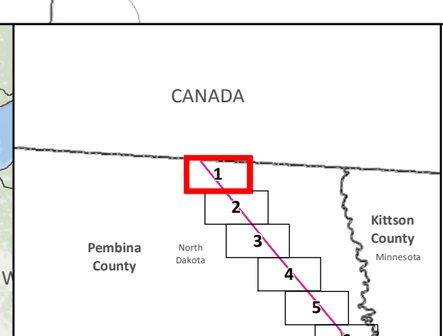

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 1B of 82

T163N R53W S8
T163N R53W S9
T163N R53W S10
T163N R53W S11
T163N R53W S12
T163N R52W S7
T163N R52W S8
T163N R53W S17
T163N R53W S16
T163N R53W S15
T163N R53W S14
T163N R53W S13
T163N R52W S18
T163N R52W S17
T163N R53W S20
T163N R53W S21
T163N R53W S22
T163N R53W S23
T163N R53W S24
T163N R52W S19
T163N R52W S20
T163N R53W S28
T163N R53W S27
T163N R53W S26
T163N R53W S25
T163N R52W S30
T163N R52W S29

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APR
SA-04
RA-03AM
RA-06
RA-07
RA-08

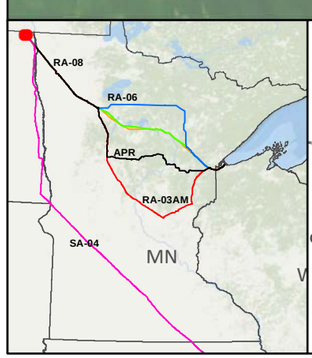

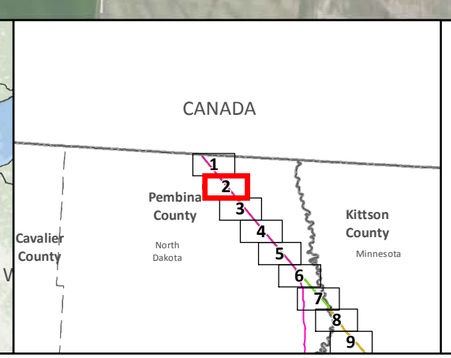

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Existing Pipelines
Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
State Forest
National Forest
Tribal Reservation
Tribal Trust Land
White Earth Reservation - BIA

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

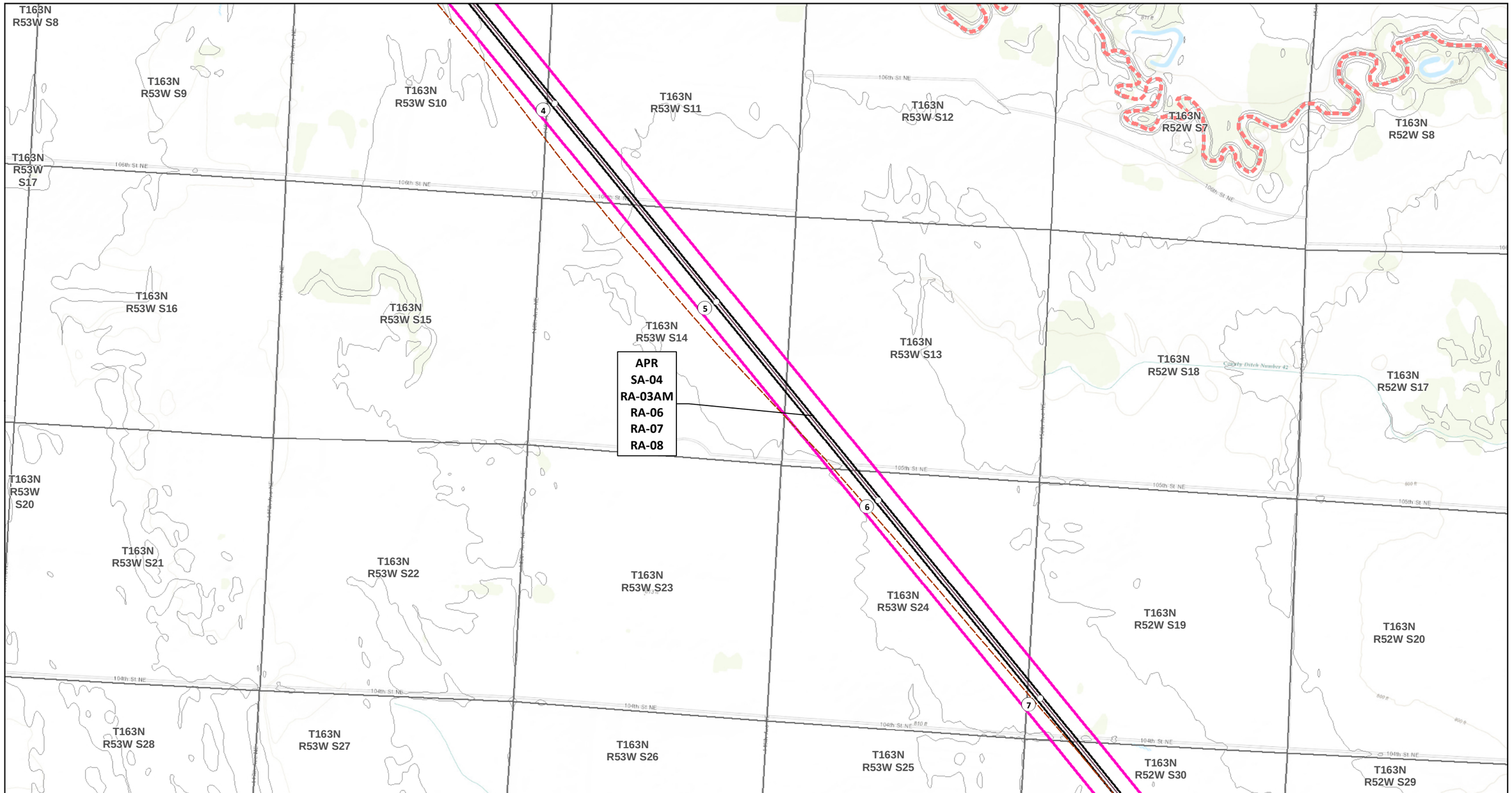

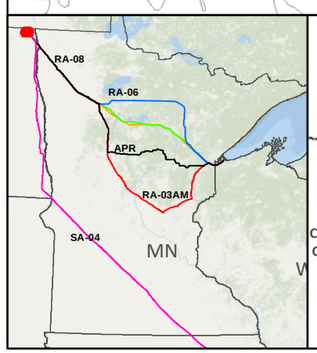

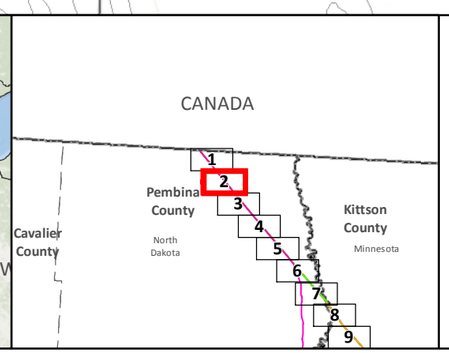

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 2B of 82

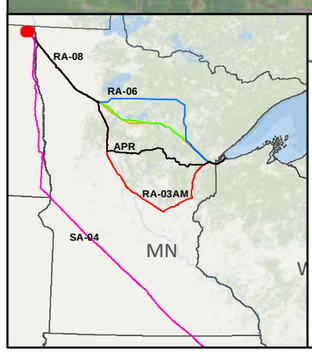

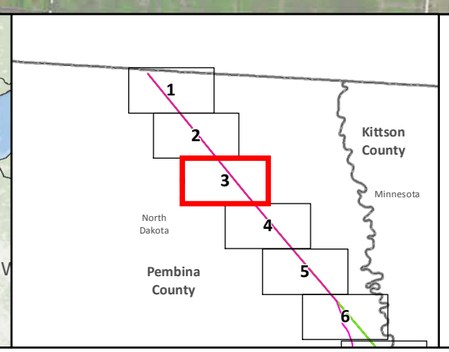

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET

AERIAL

APR

Map 3A of 82

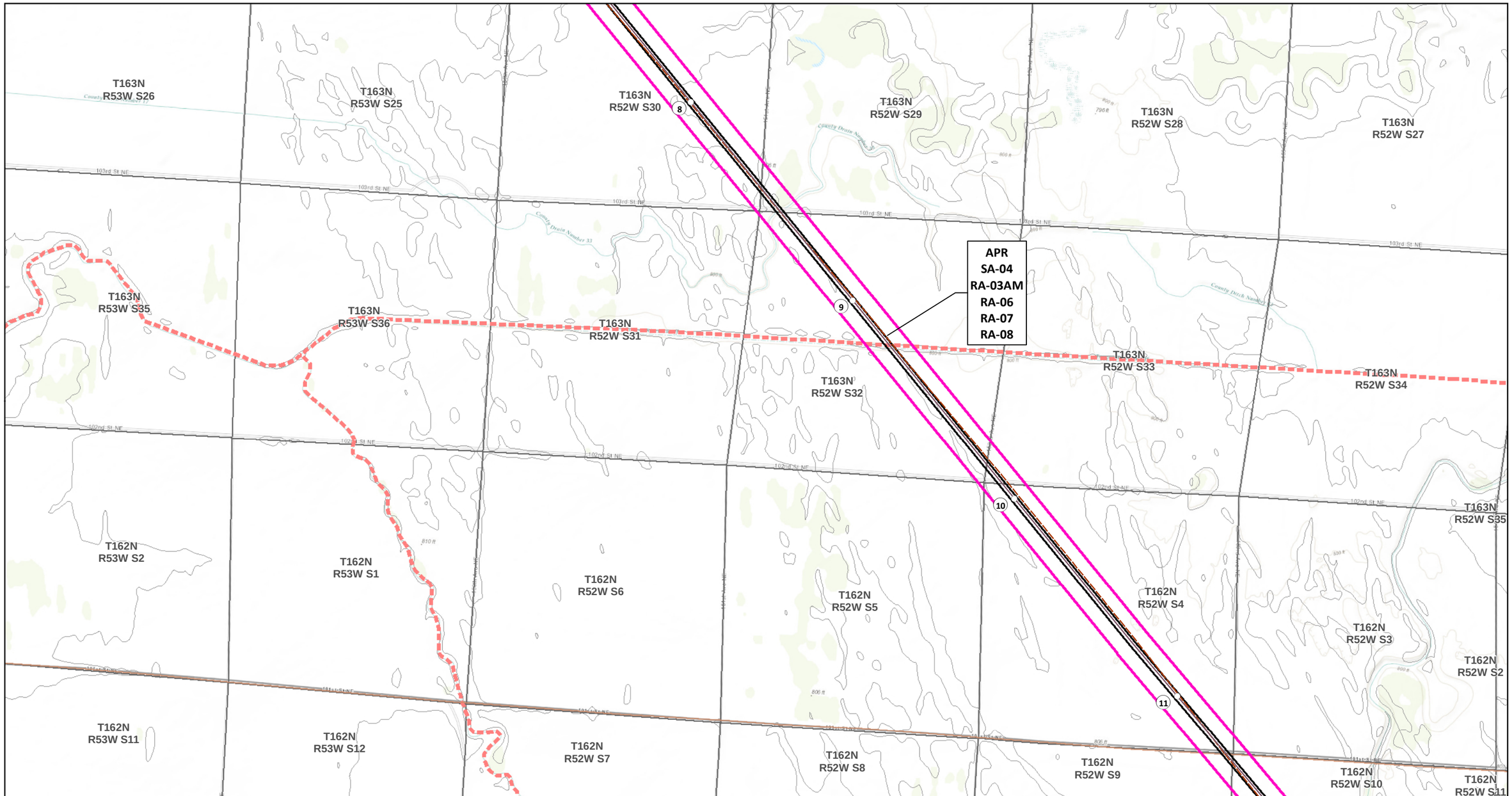

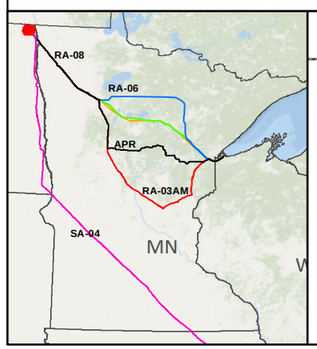

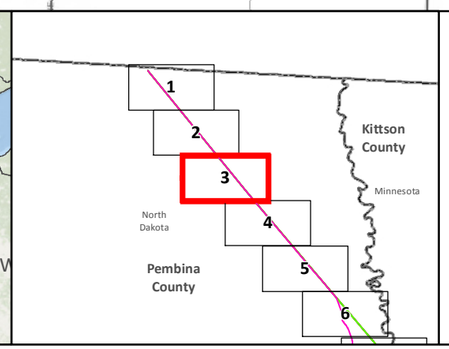

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET

TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 3B of 82

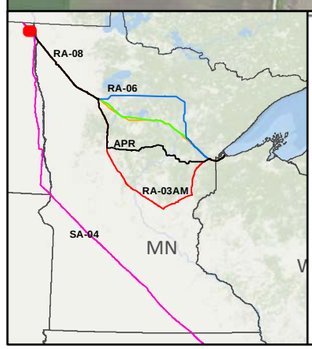

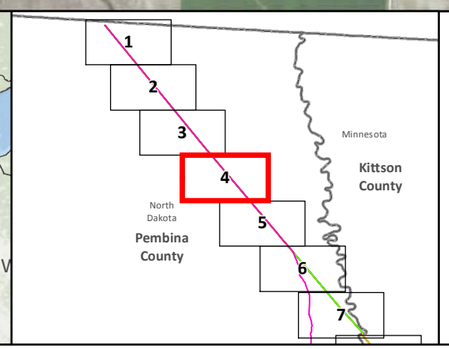

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 4A of 82

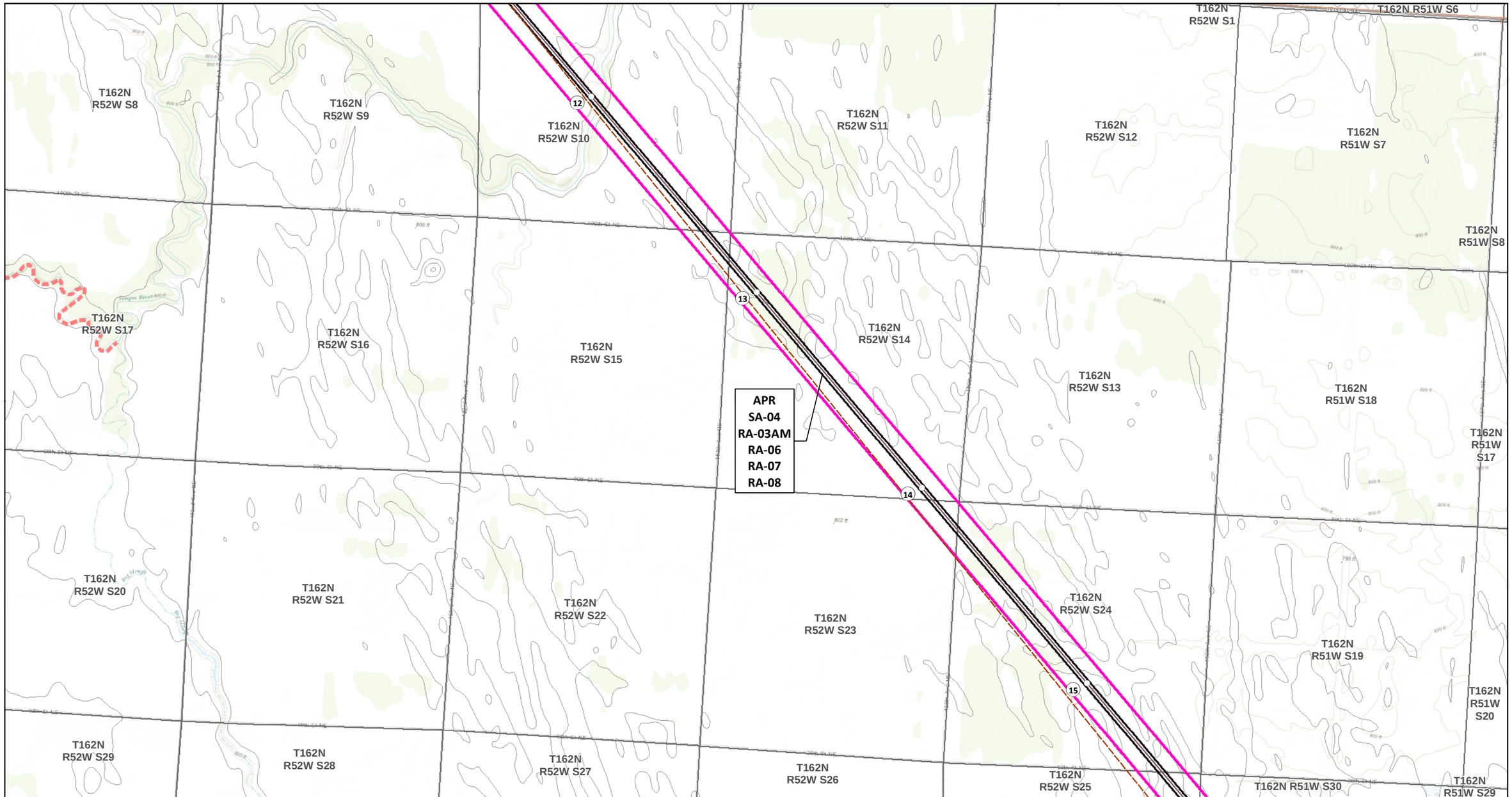

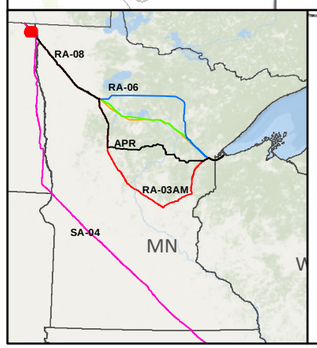

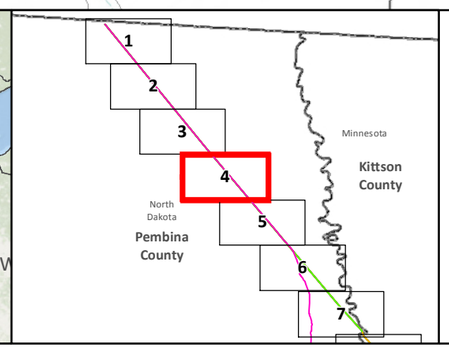

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 4B of 82

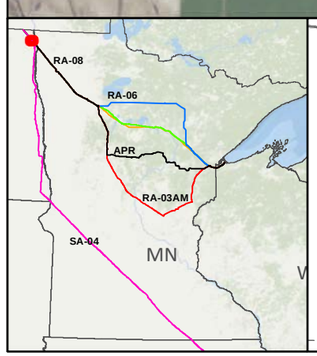

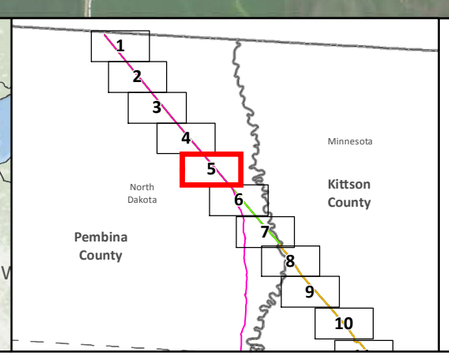

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 5A of 82

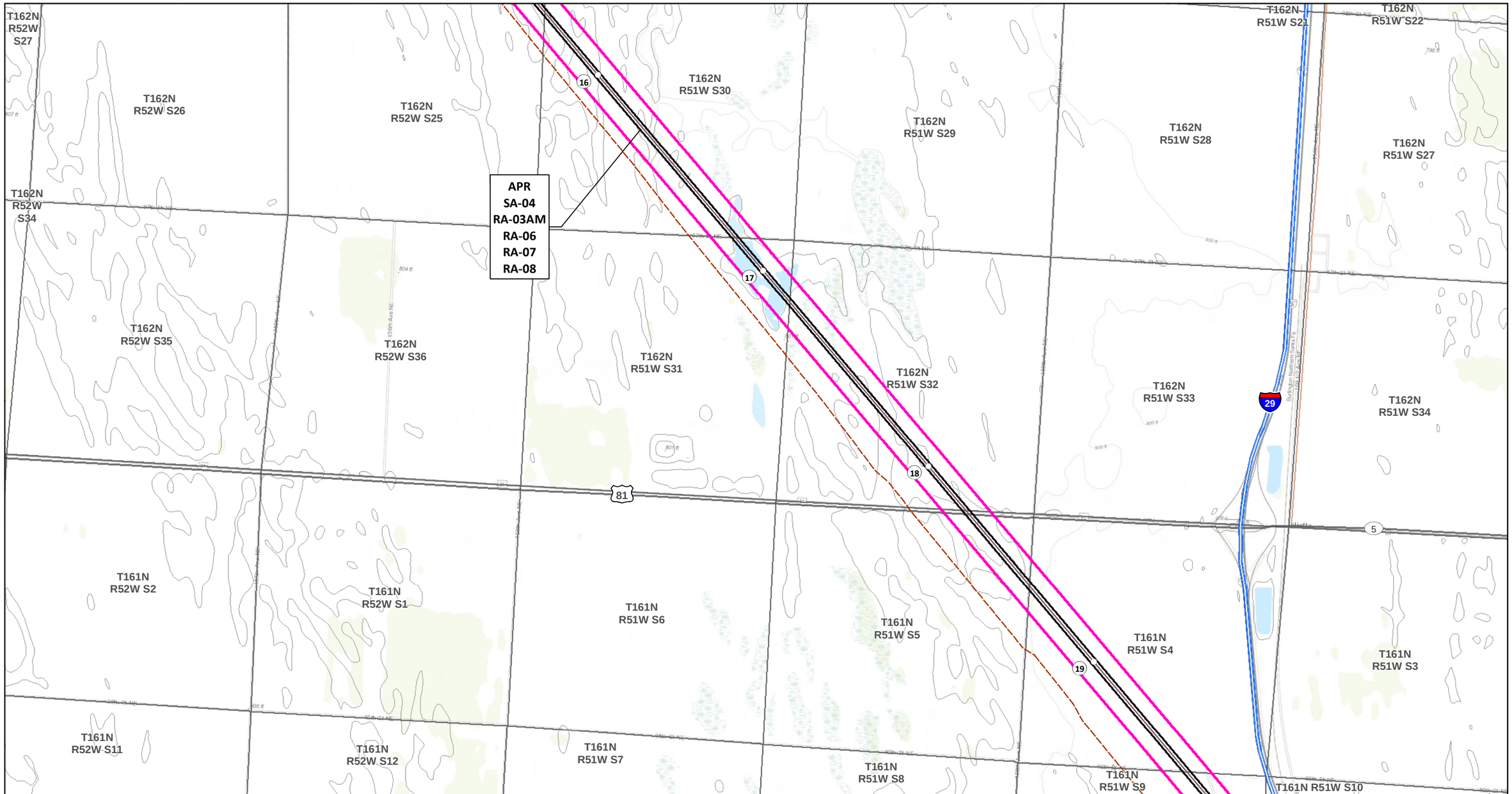

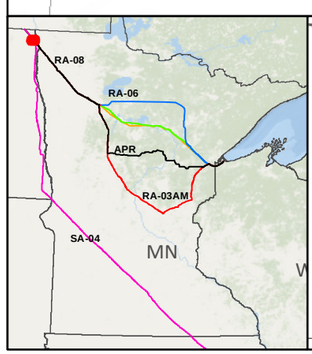

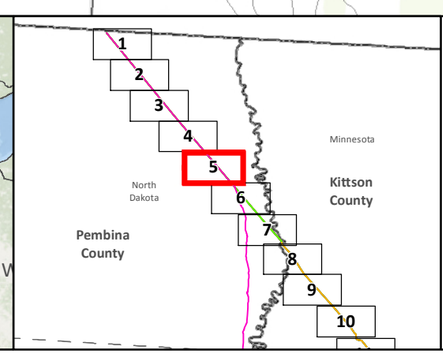

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

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Wild Rice Lakes (DNR)
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 5B of 82

T161N R51W S2
T161N R51W S1
T161N R50W S6
T161 R50W S5
T161 R50W S4
T161N R51W S7
T161N R51W S8
T161N R51W S9
T161N R51W S10
T161N R51W S11
T161N R51W S12
T161 R50W S8
T161N R50W S7
T161N R51W S18
T161 R50W S8
T161 R50W S17
T161N R51W S17
T161N R51W S16
T161N R51W S15
T161N R51W S14
T161N R51W S13
T161 R50W S16
T161N R50W S18
T161N R51W S19
T161N R51W S20
T161N R51W S21
T161N R51W S22
T161N R51W S23
T161N R51W S24
T161 R50W S20
T161 R50W S21
T161N R50W S19
T161N R51W S30
T161N R51W S29
T161N R51W S28
T161N R51W S27
T161N R51W S26
T161N R51W S25
T161N R50W S30

North Red River Twsp
Kittson Co.

Red River

APR
RA-03AM
RA-06
RA-07
RA-08

SA-04

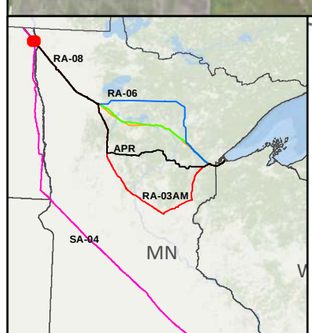

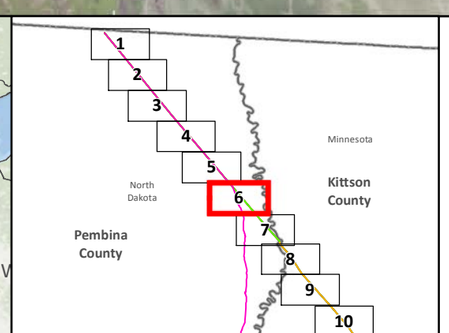

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Existing Pipelines
Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
State Forest
National Forest
Tribal Reservation
Tribal Trust Land
White Earth Reservation - BIA

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 6A of 82

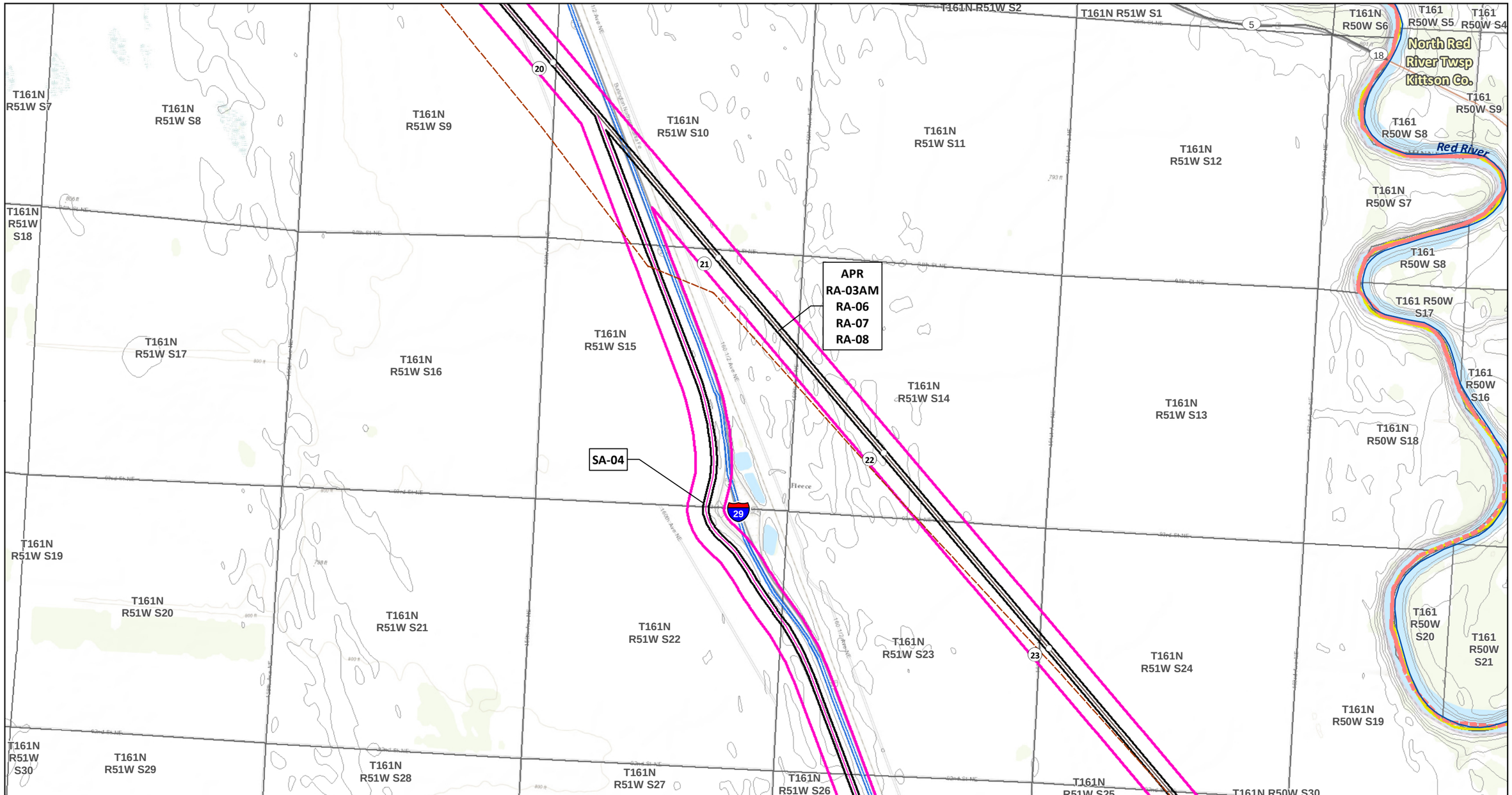

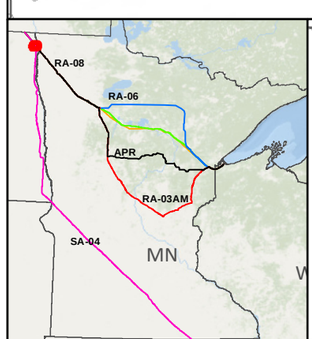

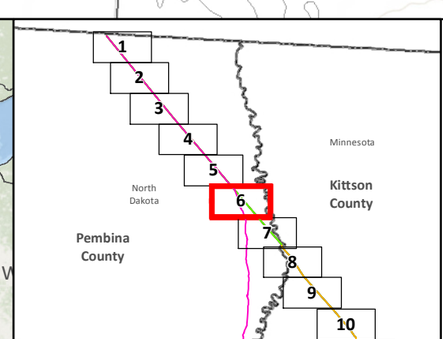

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
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Wellhead Protection Area (WHPA)

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Terminal
Pump Station

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 6B of 82

T161N R51W S27
T161N R51W S26
T161N R51W S25
T161N R50W S30
T161N R50W S29
T161 R50W S28
T161 R50W S27
T161 R50W S22
T161 R50W S23
T161 R50W S26
Red River
T161N R50W S29
North Red River Twsp Kittson Co.
T161N R51W S35
T161N R51W S34
T161N R51W S36
T161N R50W S31
T161 R50W S33
T161 R50W S34
T161 R50W S35
T161N R50W S32
T161 R50W S36
SA-04
APR
RA-03AM
RA-06
RA-07
RA-08
T160 R50W S4
T160N R51W S3
T160N R51W S2
T160N R51W S1
T160N R50W S6
T160N R50W S5
South Red River Twsp Kittson Co.
T160 R50W S3
T160 R50W S2
T160N R51W S10
T160N R51W S11
T160N R51W S12
T160N R50W S7
T160N R50W S8
T160 R50W S9
T160 R50W S10
T160 R50W S11
24
25
26
27
29

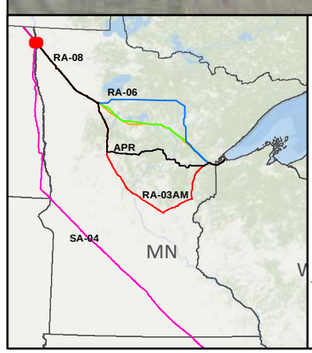

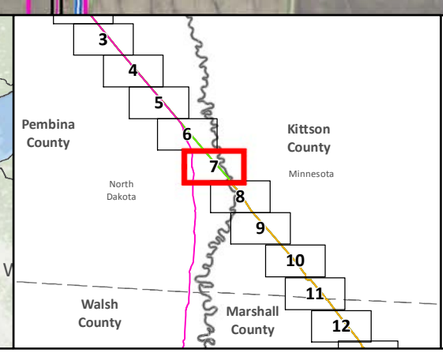

SA-04
Applicant's Preferred Route (APR)

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- RA-03AM
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- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

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Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
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Residences within 1/2 mile
Mile Post
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Pump Station

Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
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- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 7A of 82

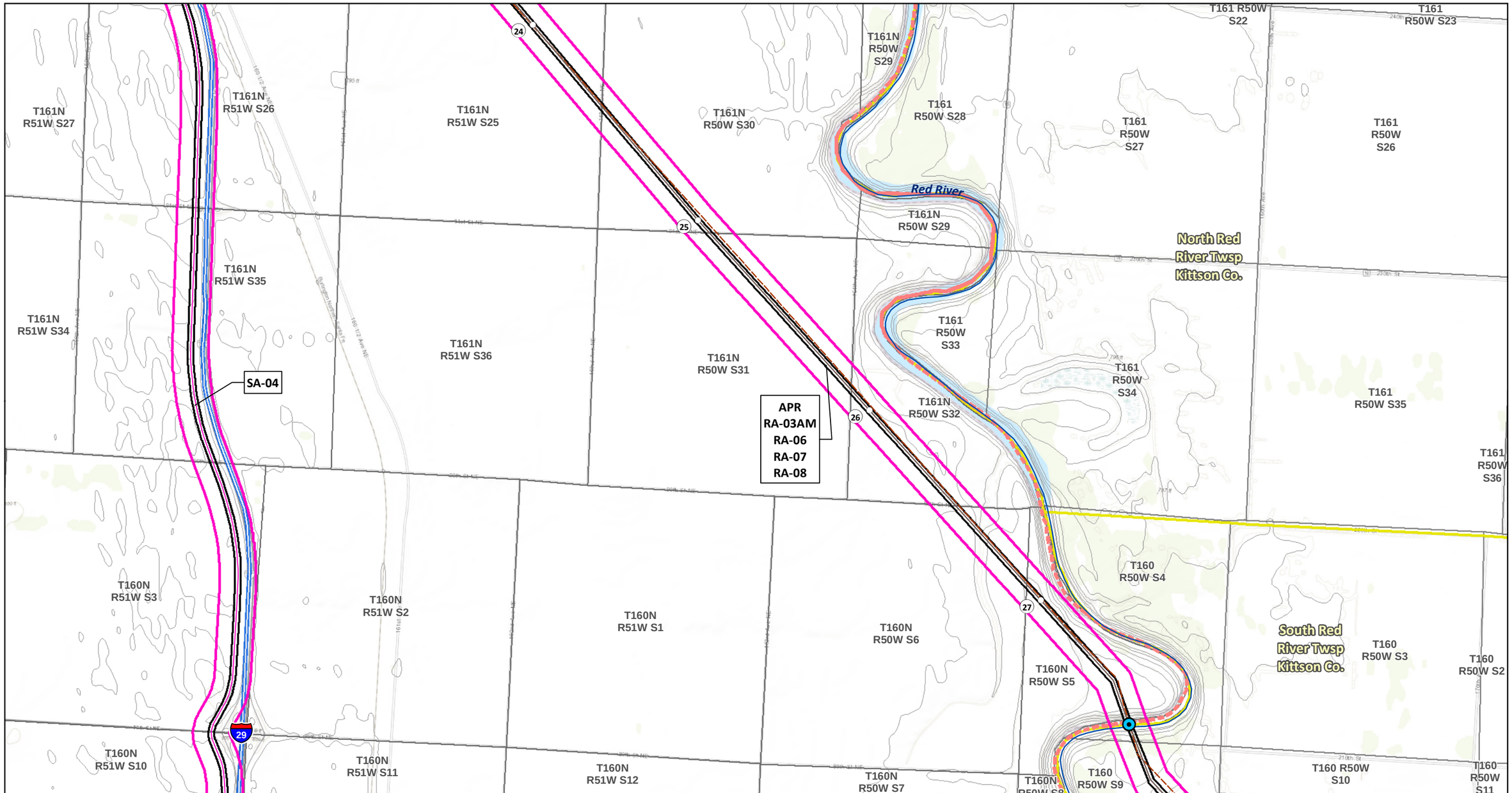

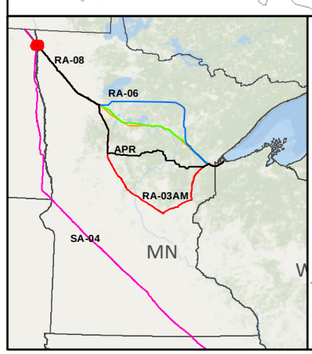

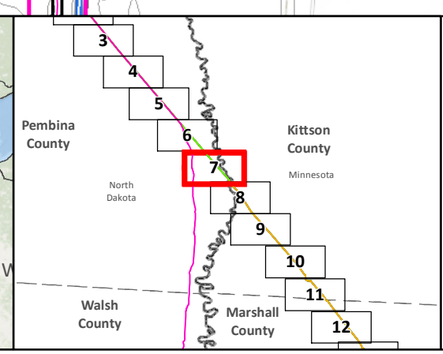

SA-04
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Mile Post
Anticipated 120' Construction ROW
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Terminal
Pump Station

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 7B of 82

T160N R51W S1
T160N R50W S6
T160N R50W S5
T160 R50W S3
T160 R50W S2
T160 R50W S1
T160 R49W S6
28
T160 R50W S9
T160 R50W S10
T160 R50W S11
T160 R50W S12
T160 R49W S7
T160N R51W S12
T160N R50W S7
T160N R50W S8
29
T160N R50W S9
APR
RA-03AM
RA-06
RA-07
RA-08
T160N R50W S16
T160N R51W S13
T160N R50W S18
T160N R50W S17
T160 R50W S14
T160 R50W S13
Skane Twsp
Kittson Co.
T160 R49W S18
T160 R50W S15
South Red River Twsp Kittson Co.
30
T160N R50W S21
T160N R51W S24
T160N R50W S19
T160N R50W S20
T160 R50W S22
T160 R50W S23
31
T160 R50W S24
T160 R49W S19
Red River
Unnamed Creek
T160N R50W S21
T160 R50W S27
T160 R50W S26
T160 R50W S25
T160N R51W S25
T160N R50W S30
T160N R50W S29

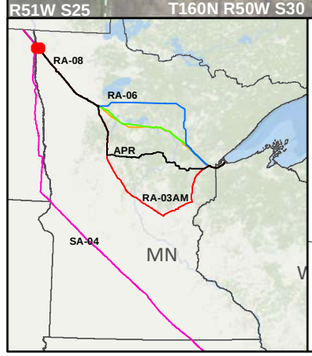

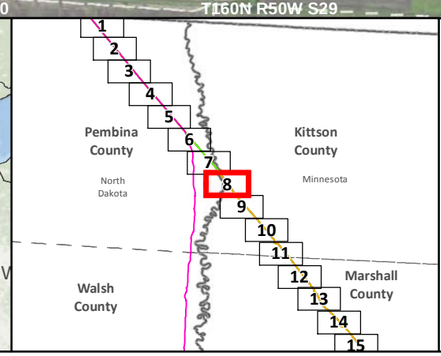

SA-04
Applicant's Preferred Route (APR)

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- RA-03AM
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Interstate
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Data Sources: MNDNR, NHD, Enbridge

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0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

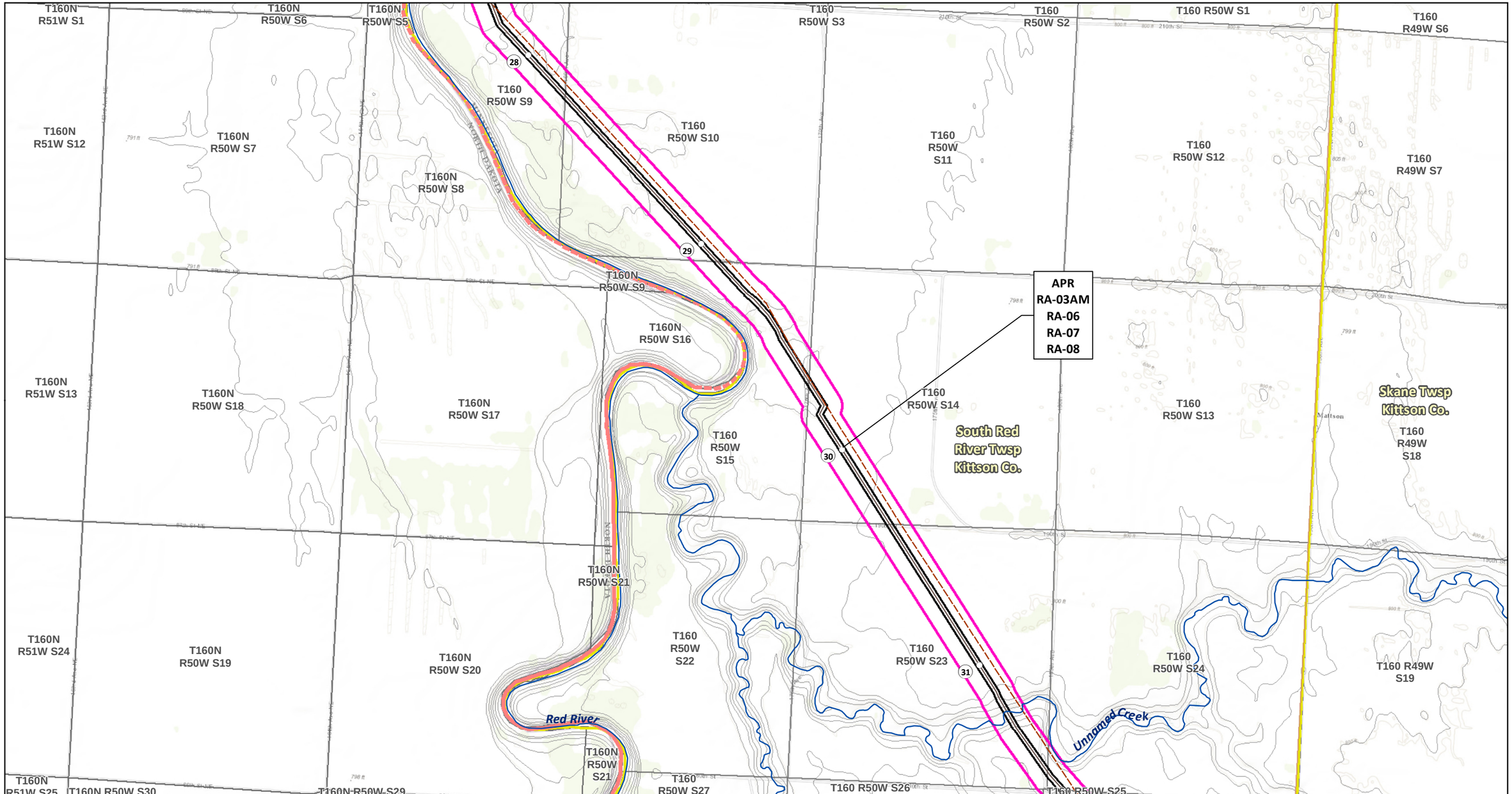

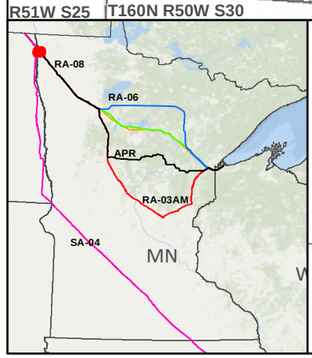

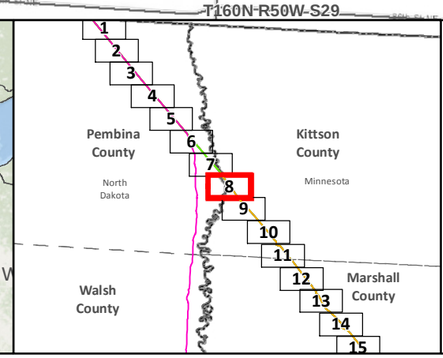

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
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- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
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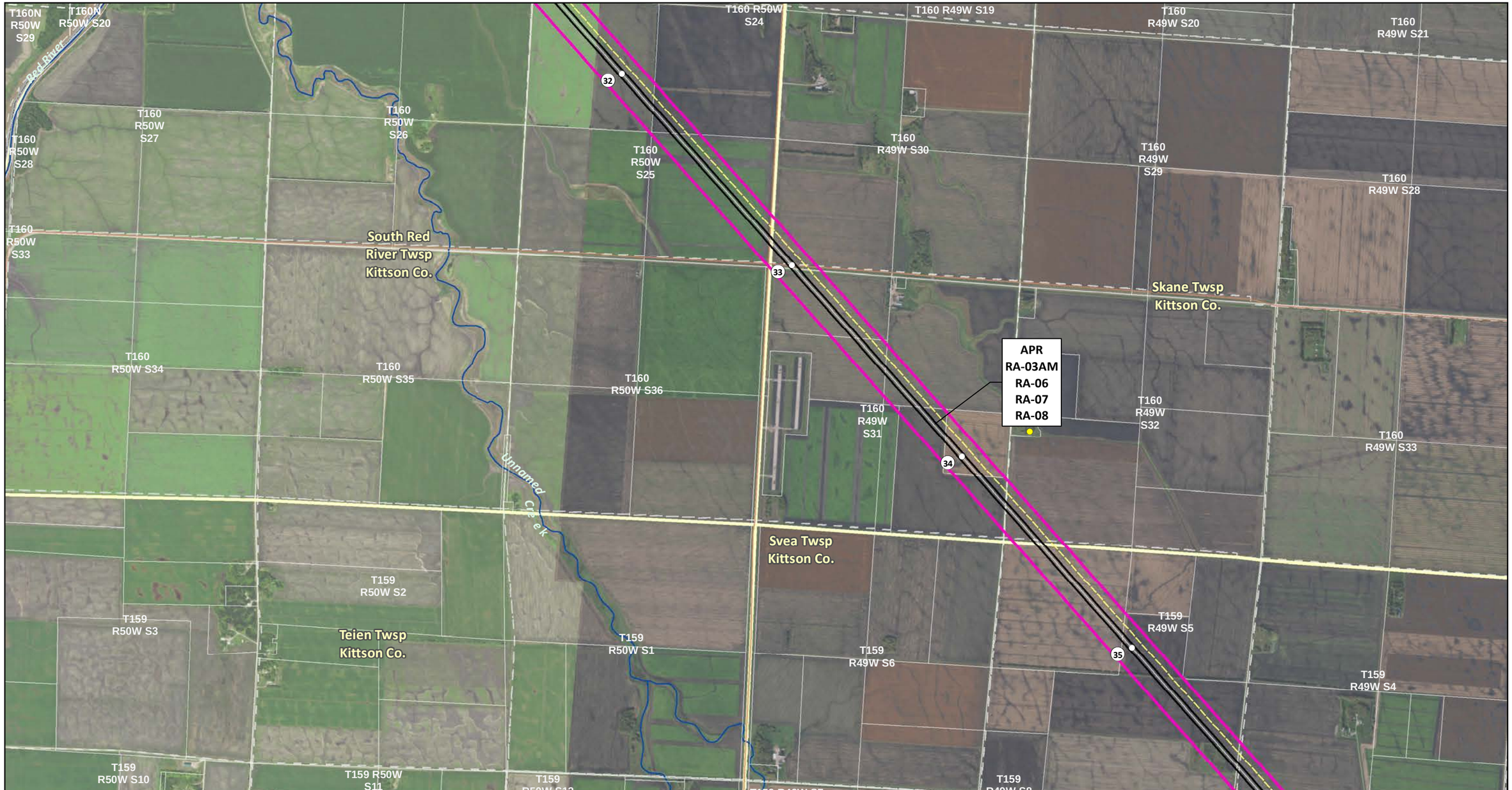

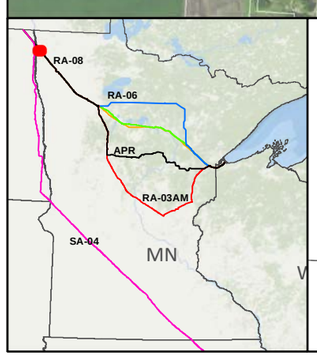

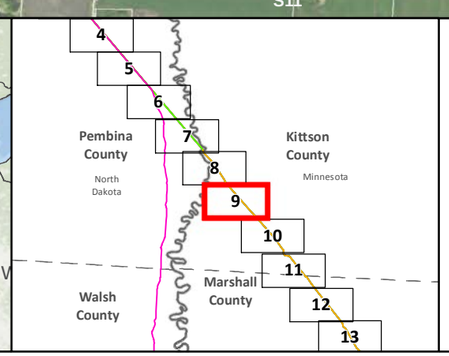

SA-04

Applicant's Preferred Route (APR)

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- RA-06
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- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

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Pump Station

Interstate

Highway

Major Road

Land Ownership

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- National Forest
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- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

T160N R50W S29
T160N R50W S21
Red River
T160 R50W S28
T160 R50W S27
T160 R50W S26
T160 R50W S25
T160 R50W S24
T160 R49W S19
T160 R49W S20
T160 R49W S21
T160 R49W S30
T160 R49W S29
T160 R49W S28
T160 R50W S33
South Red River Twsp Kittson Co.
Skane Twsp Kittson Co.
T160 R50W S34
T160 R50W S35
T160 R50W S36
T160 R49W S31
T160 R49W S32
T160 R49W S33
APR
RA-03AM
RA-06
RA-07
RA-08
Unnamed Creek
Svea Twsp Kittson Co.
T159 R50W S3
Teien Twsp Kittson Co.
T159 R50W S2
T159 R50W S1
T159 R49W S6
T159 R49W S5
T159 R49W S4
T159 R50W S10
T159 R50W S11
T159 R50W S12
T159 R49W S7
T159 R49W S8

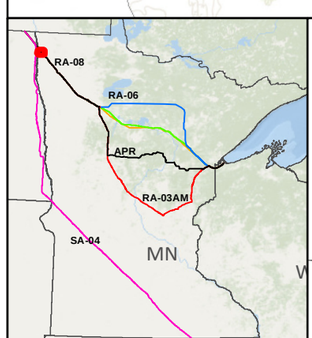

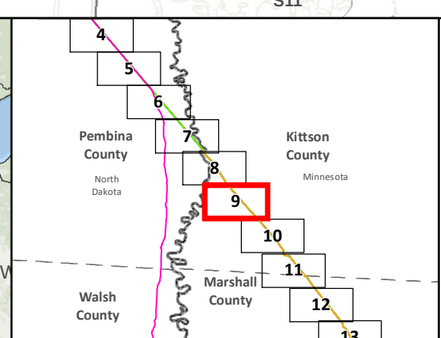

SA-04
Applicant's Preferred Route (APR)

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 9B of 82

T159 R49W S4
T159 R49W S3
T159 R49W S2
T159 R49W S1
T159 R48W S6
Svea Twsp
Kittson Co.
T159 R49W S8
T159 R49W S9
T159 R49W S10
T159 R49W S11
T159 R49W S12
T159 R48W S7
T159 R49W S7
36
37
APR
RA-03AM
RA-06
RA-07
RA-08
75
T159 R49W S18
T159 R49W S17
T159 R49W S16
Davis Twsp
Kittson Co.
38
T159 R49W S14
T159 R49W S13
T159 R48W S18
T159 R49W S15
T159 R49W S19
T159 R49W S20
T159 R49W S21
T159 R49W S22
39
T159 R49W S23
T159 R49W S24
T159 R48W S19
Donaldson
Twsp
Kittson Co.
Unnamed Creek
T159 R49W S30
T159 R49W S29
T159 R49W S28
11
T159 R49W S27
T159 R49W S26

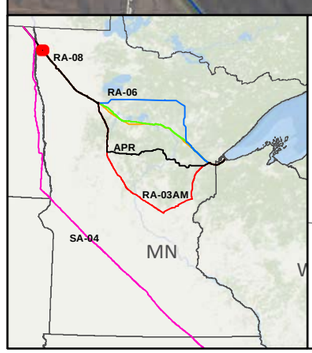

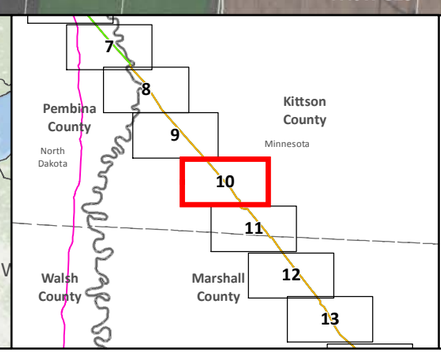

SA-04
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LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 10A of 82

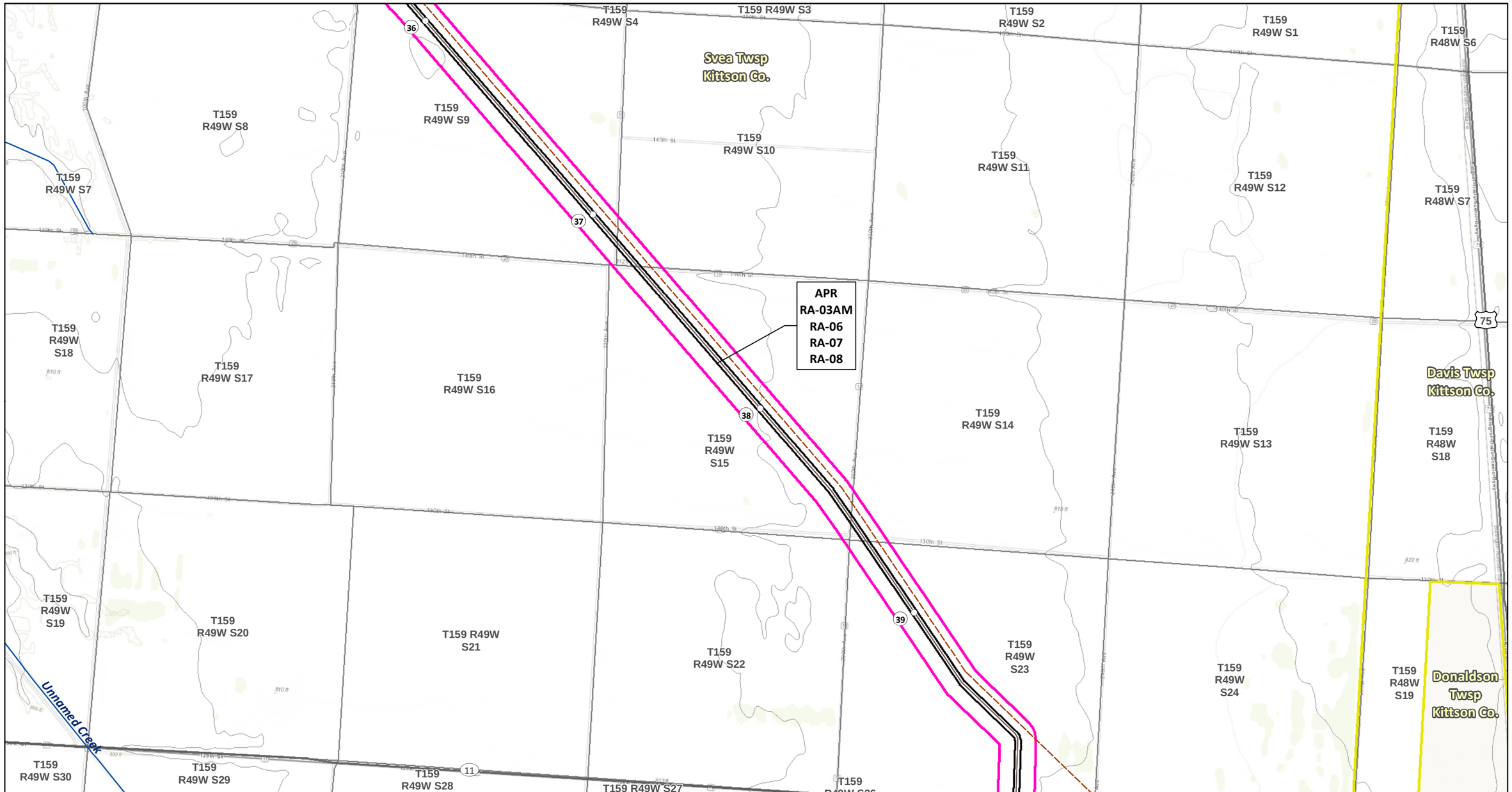

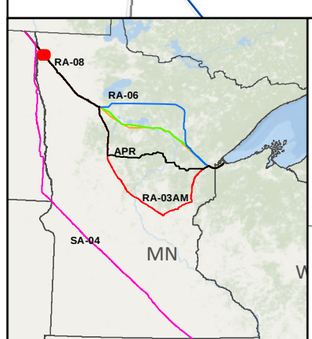

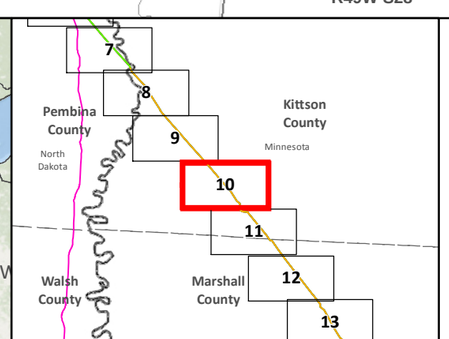

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 10B of 82

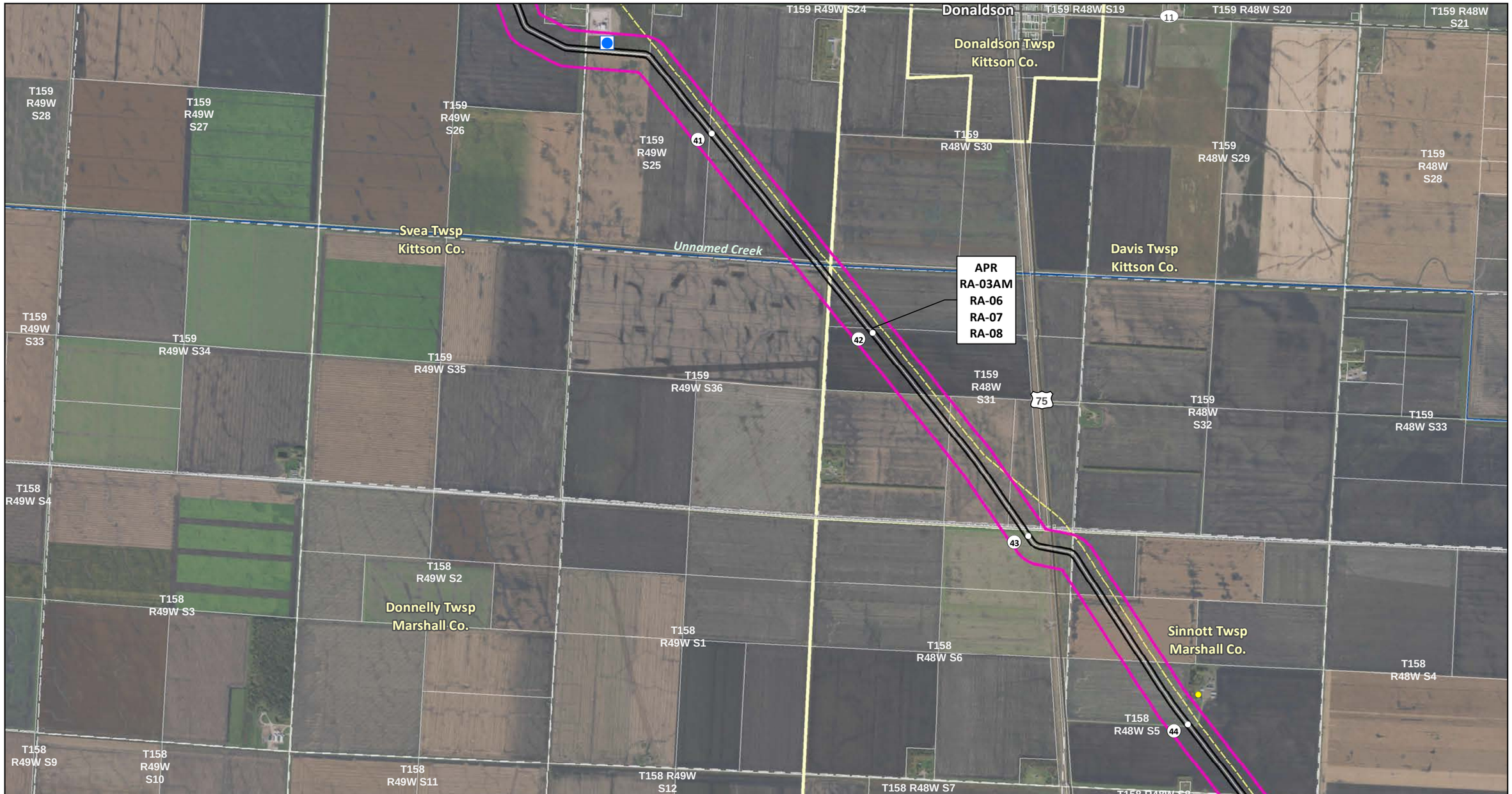

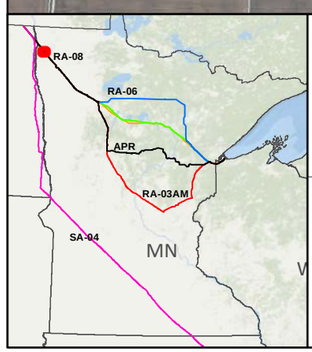

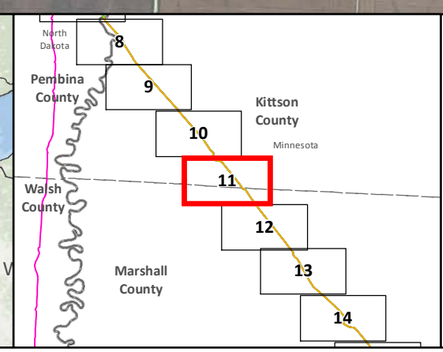

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 11A of 82

T159 R49W S24
T159 R48W S19
Donaldson
T159 R48W S20
T159 R48W S21
Donaldson Twsp
Kittson Co.
T159 R49W S28
T159 R49W S27
T159 R49W S26
T159 R49W S25
T159 R48W S30
T159 R48W S29
T159 R48W S28
Svea Twsp
Kittson Co.
Unnamed Creek
Davis Twsp
Kittson Co.
APR
RA-03AM
RA-06
RA-07
RA-08
T159 R49W S33
T159 R49W S34
T159 R49W S35
T159 R49W S36
T159 R48W S31
T159 R48W S32
T159 R48W S33
T158 R49W S4
T158 R49W S3
T158 R49W S2
Donnelly Twsp
Marshall Co.
T158 R49W S1
T158 R48W S6
T158 R48W S5
Sinnott Twsp
Marshall Co.
T158 R48W S4
T158 R49W S9
T158 R49W S10
T158 R49W S11
T158 R49W S12
T158 R48W S7
T158 R48W S8

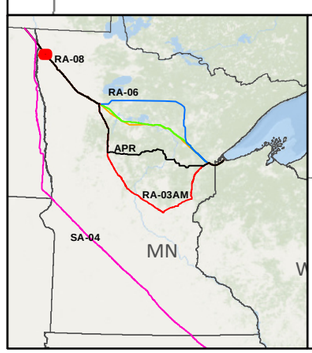

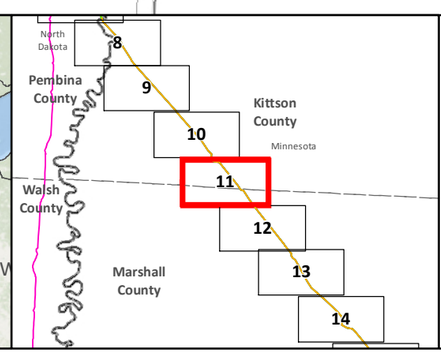

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 11B of 82

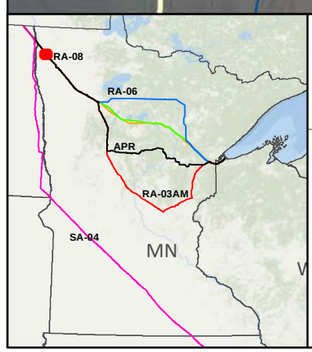

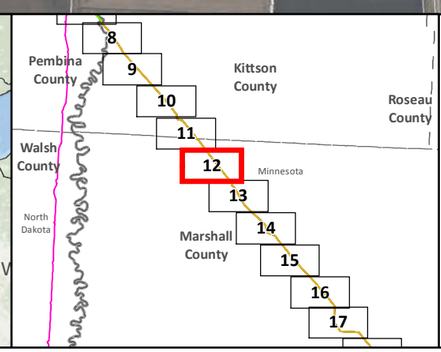

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 12A of 82

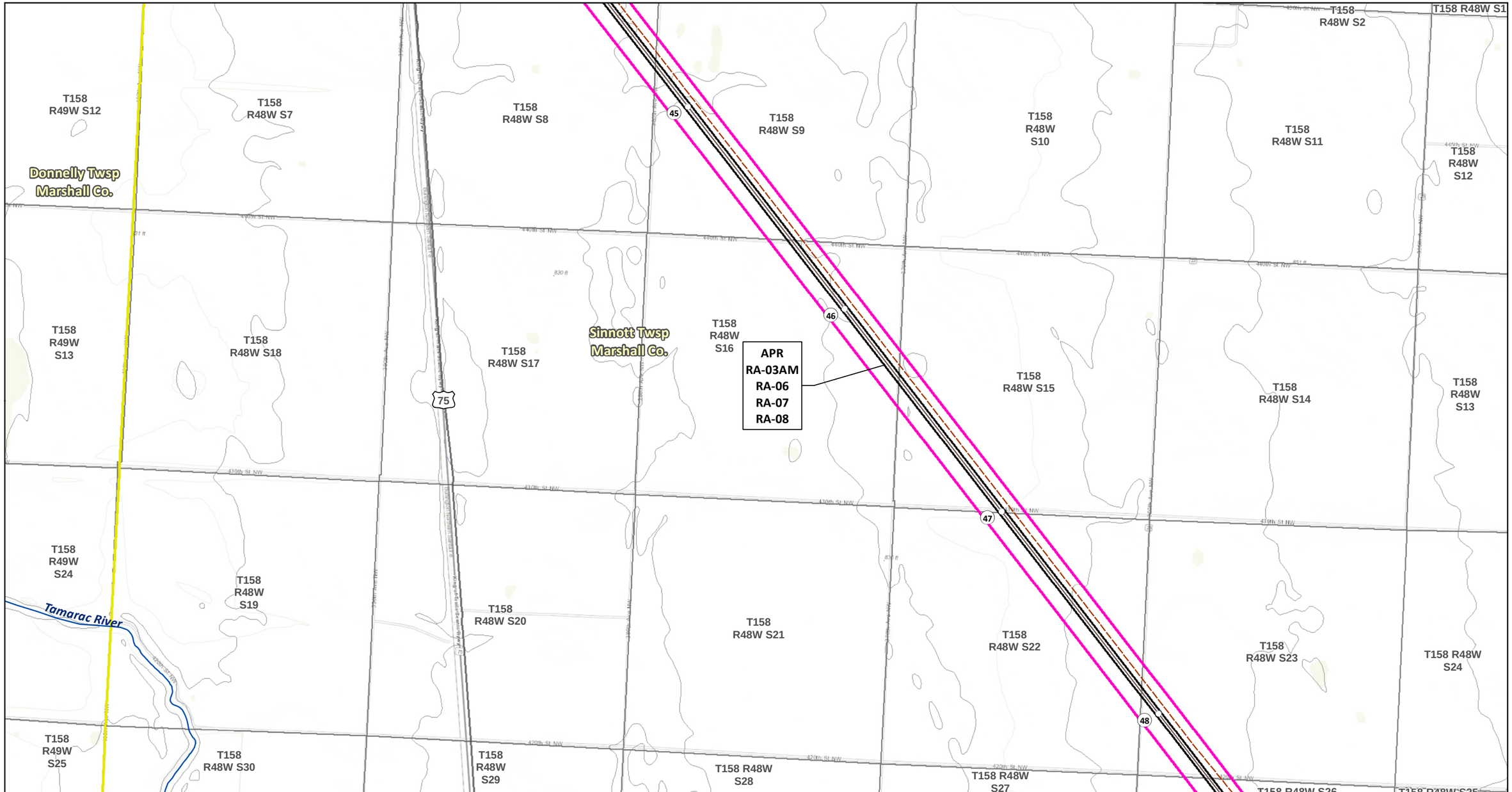

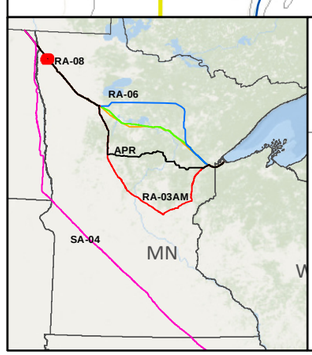

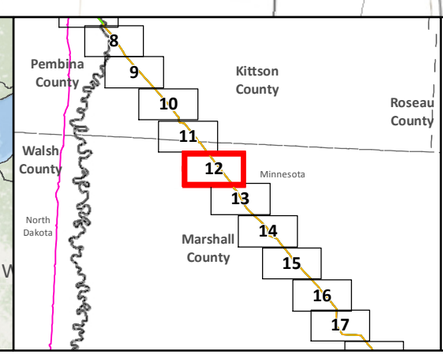

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 12B of 82

T158 R48W S23
T158 R48W S24
T158 R47W S19
T158 R47W S20
T158 R47W S21
T158 R48W S28
T158 R48W S27
T158 R48W S26
T158 R48W S25
T158 R47W S30
T158 R47W S29
T158 R47W S28
Sinnott Twsp
Marshall Co.
Augsburg Twsp
Marshall Co.
T158 R48W S33
T158 R48W S34
T158 R48W S35
T158 R48W S36
T158 R47W S31
T158 R47W S32
T158 R47W S33
APR
RA-03AM
RA-06
RA-07
RA-08
49
50
51
Tamarac Twsp
Marshall Co.
T157 R48W S4
T157 R48W S3
T157 R48W S2
T157 R48W S1
T157 R47W S6
Wanger Twsp
Marshall
Co.
T157 R47W S5
T157 R47W S4
Tamarac River
T157 R48W S9
T157 R48W S10
T157 R48W S11
T157 R48W S12
T157 R47W S7

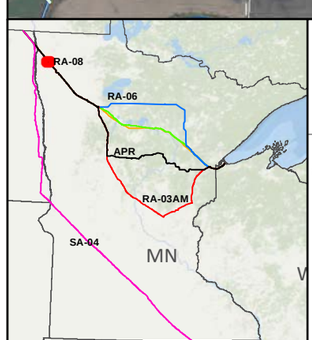

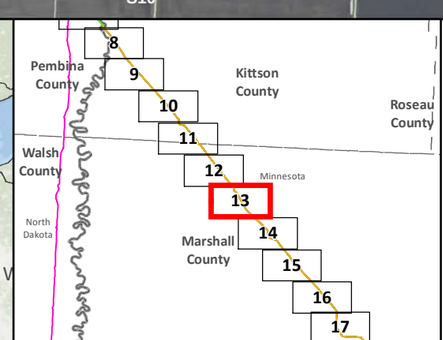

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 13A of 82

T158-R48W S23
T158 R48W S24
T158 R47W S19
T158 R47W S20
T158 R47W S21
T158 R48W S28
T158 R48W S27
T158 R48W S26
T158 R48W S25
T158 R47W S30
T158 R47W S29
T158 R47W S28
Sinnott Twsp Marshall Co.
Augsburg Twsp Marshall Co.
T158 R48W S33
T158 R48W S34
T158 R48W S35
T158 R48W S36
T158 R47W S31
T158 R47W S32
T158 R47W S33
APR
RA-03AM
RA-06
RA-07
RA-08
Tamarac Twsp Marshall Co.
T157 R48W S4
T157 R48W S3
T157 R48W S2
T157 R48W S1
T157 R47W S6
Wanger Twsp Marshall Co.
T157 R47W S5
T157 R47W S4
T157 R48W S9
T157 R48W S10
T157 R48W S11
T157 R48W S12
T157 R47W S7
Tamarac River

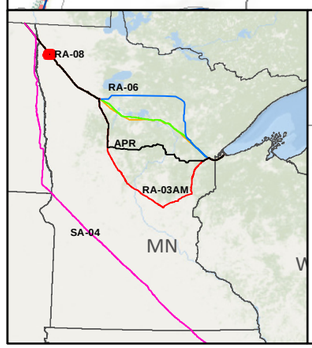

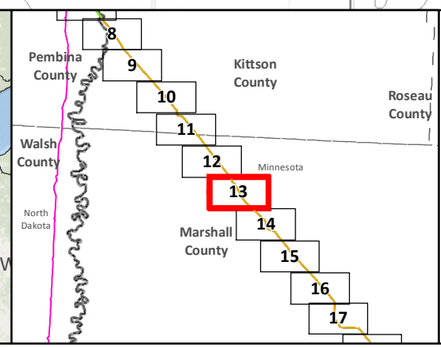

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 13B of 82

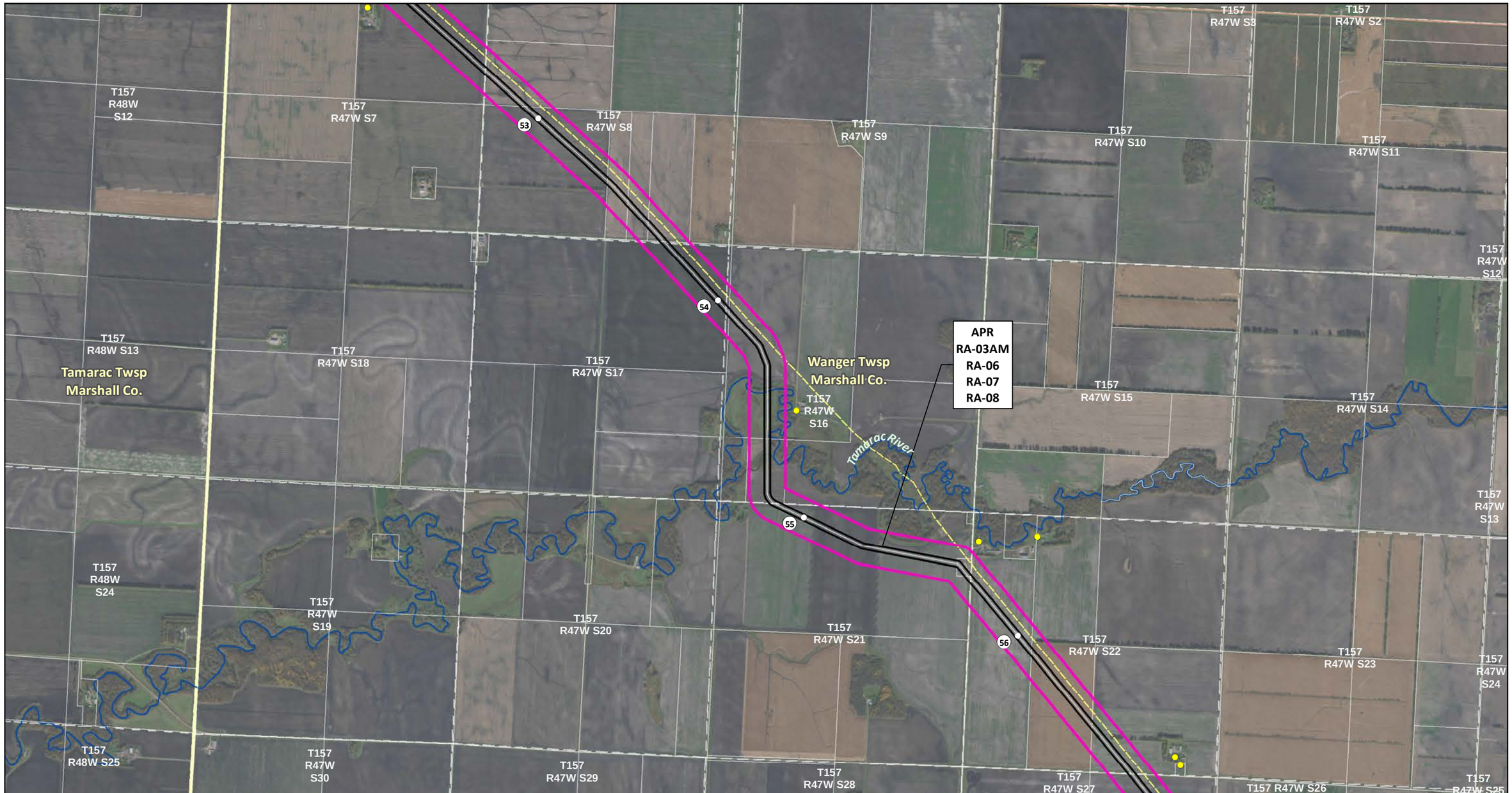

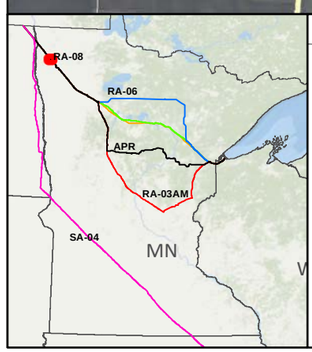

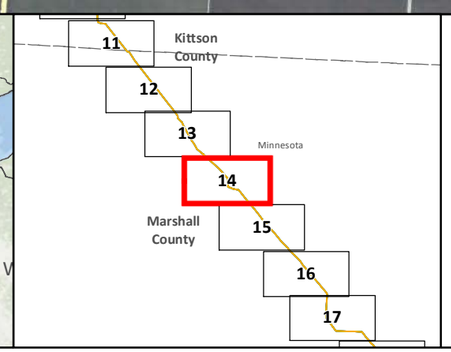

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 14A of 82

Wanger Twsp
Marshall Co.

T157 R48W S12
T157 R47W S7
T157 R47W S8
T157 R47W S9
T157 R47W S10
T157 R47W S11
T157 R47W S3
T157 R47W S2
T157 R47W S12
T157 R48W S13
Tamarac Twsp
Marshall Co.
T157 R47W S18
T157 R47W S17
T157 R47W S16
T157 R47W S15
T157 R47W S14
T157 R47W S13
T157 R48W S24
T157 R47W S19
T157 R47W S20
T157 R47W S21
T157 R47W S22
T157 R47W S23
T157 R47W S24
T157 R48W S25
T157 R47W S30
T157 R47W S29
T157 R47W S28
T157 R47W S27
T157 R47W S26
T157 R47W S25

Tamarac River

APR
RA-03AM
RA-06
RA-07
RA-08

53
54
55
56

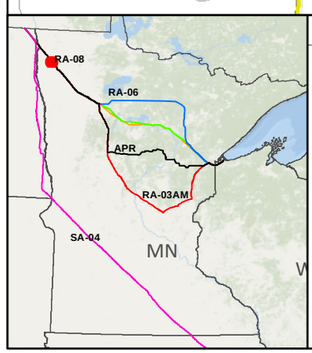

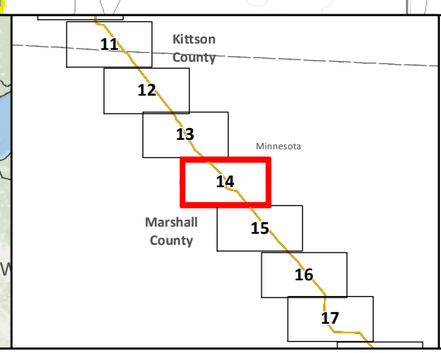

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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Public Waters Watercourse
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Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 14B of 82

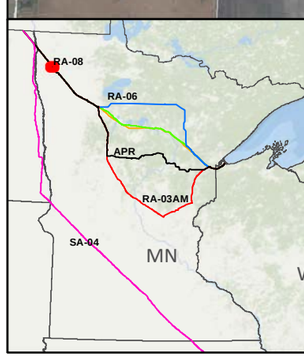

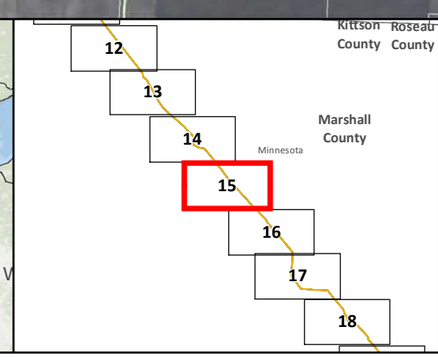

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 15A of 82

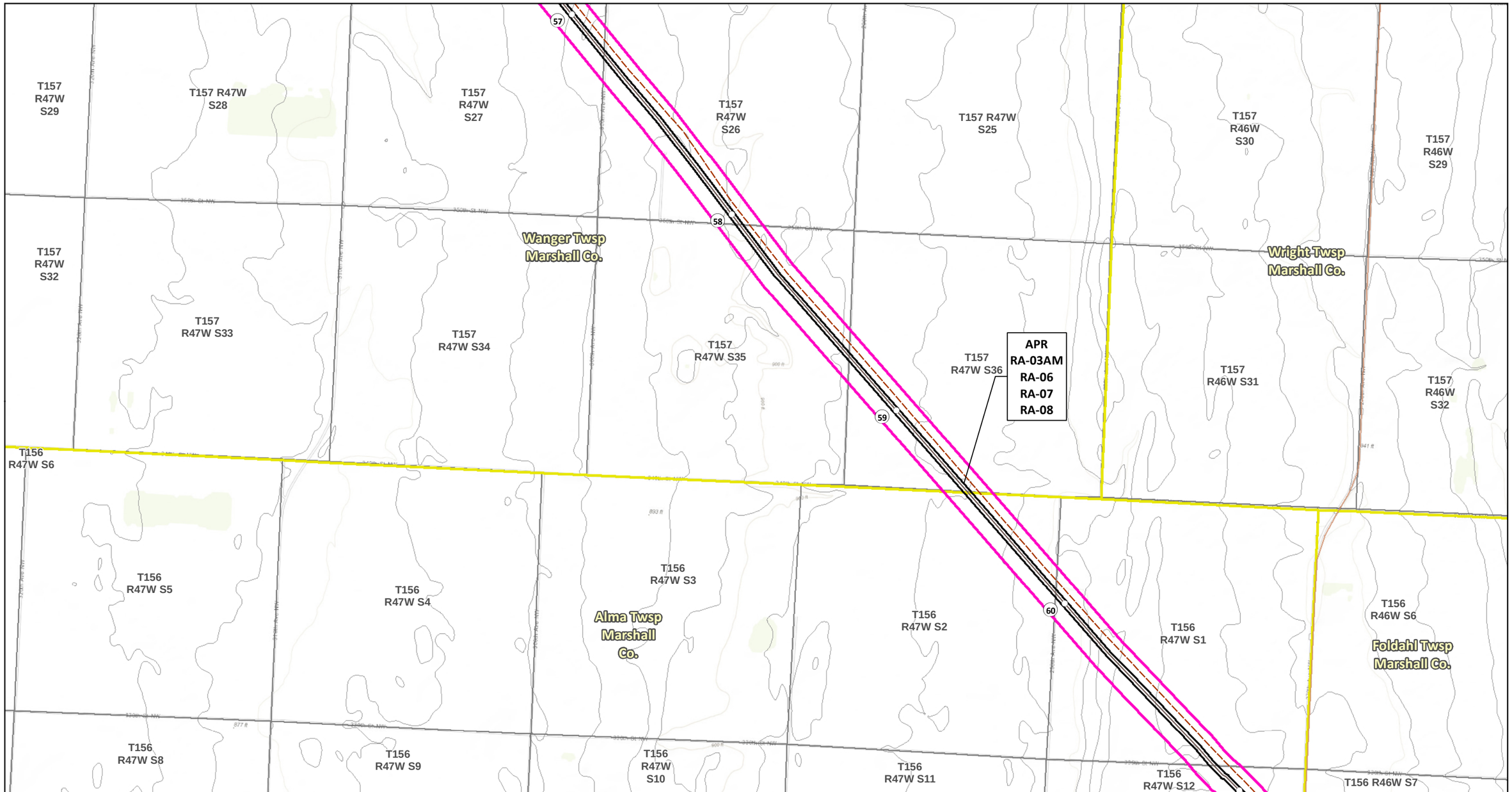

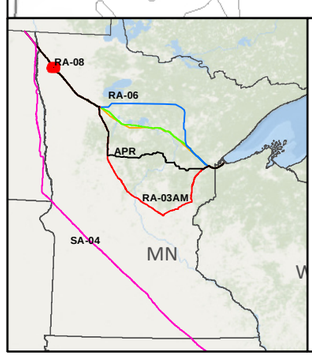

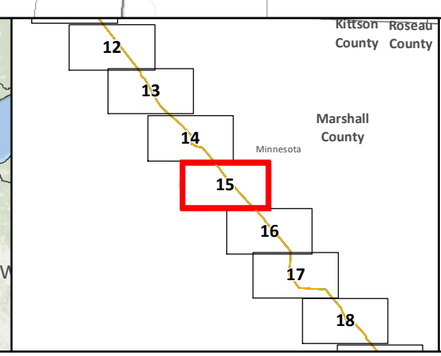

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 15B of 82

T156 R47W S11
T156 R47W S12
T156 R46W S7
T156 R46W S8
T156 R46W S9
T156 R46W S10
T156 R47W S14
T156 R47W S13
T156 R46W S18
T156 R46W S17
T156 R46W S16
T156 R46W S15
T156 R47W S23
T156 R47W S24
T156 R46W S19
T156 R46W S20
T156 R46W S21
T156 R46W S22
T156 R47W S26
T156 R47W S25
T156 R46W S30
T156 R46W S29
T156 R46W S28
T156 R46W S27

Middle River

Alma Twsp
Marshall Co.

Foldahl Twsp
Marshall Co.

APR
RA-03AM
RA-06
RA-07
RA-08

62
63
64
65

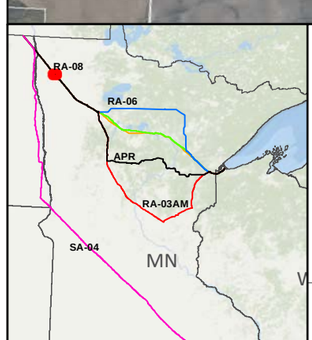

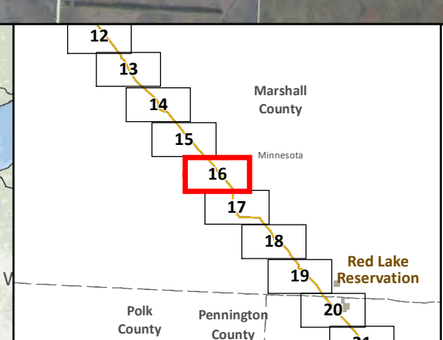

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Existing Pipelines
Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
State Forest
National Forest
Tribal Reservation
Tribal Trust Land
White Earth Reservation - BIA

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 16A of 82

T156 R47W S11
T156 R47W S12
T156 R46W S7
T156 R46W S8
T156 R46W S9
T156 R46W S10
T156 R47W S14
T156 R47W S13
T156 R46W S18
T156 R46W S17
T156 R46W S16
T156 R46W S15
T156 R47W S23
T156 R47W S24
T156 R46W S19
T156 R46W S20
T156 R46W S21
T156 R46W S22
T156 R47W S26
T156 R47W S25
T156 R46W S30
T156 R46W S29
T156 R46W S28
T156 R46W S27

Middle River

Alma Twsp
Marshall Co.

Foldahl Twsp
Marshall Co.

APR
RA-03AM
RA-06
RA-07
RA-08

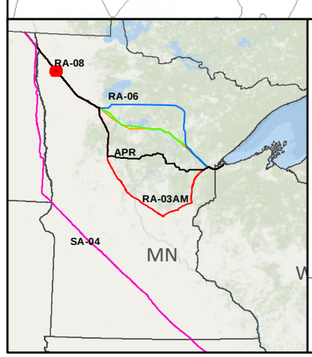

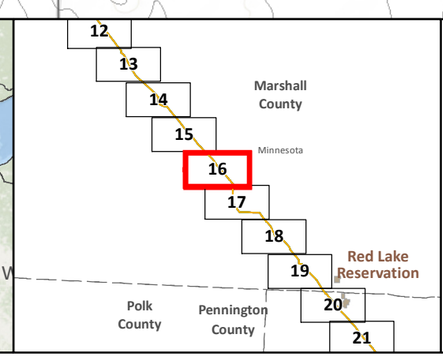

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
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Calcareous Fens
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Public Drinking Water Supply
Wellhead Protection Area (WHPA)

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Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 16B of 82

T156 R46W S24
T156 R46W S30
T156 R47W S25
T156 R46W S29
T156 R46W S28
T156 R46W S27
T156 R46W S26
T156 R46W S25
T156 R47W S36
66
Foldahl Twsp
Marshall Co.
T156 R46W S33
T156 R46W S31
T156 R46W S32
T156 R46W S34
APR
RA-03AM
RA-06
RA-07
RA-08
T156 R46W S35
T156 R46W S36
67
Comstock Twsp
Marshall Co.
T155 R46W S6
T155 R46W S5
T155 R46W S4
T155 R46W S3
T155 R46W S2
68
69
T155 R46W S1
Snake River
70
T155 R46W S7
T155 R46W S8
T155 R46W S9
T155 R46W S10
T155 R46W S11
T155 R46W S12

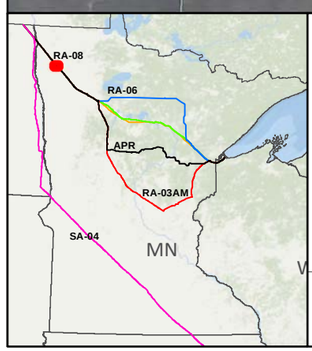

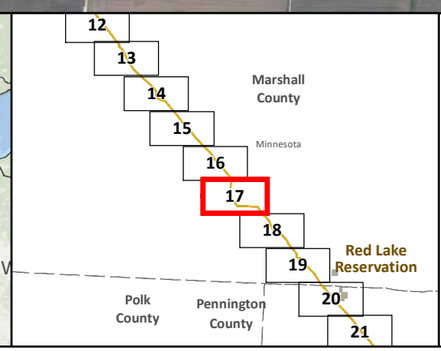

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 17A of 82

T156 R46W S24
T156 R47W S25
T156 R46W S30
T156 R46W S29
T156 R46W S28
T156 R46W S27
T156 R46W S26
T156 R46W S25
T156 R47W S36
Great Eastern
290th St NW
Foldahl Twsp
Marshall Co.
T156 R46W S31
T156 R46W S32
T156 R46W S33
T156 R46W S34
T156 R46W S35
T156 R46W S36
APR
RA-03AM
RA-06
RA-07
RA-08
Comstock Twsp
Marshall Co.
T155 R46W S6
T155 R46W S5
T155 R46W S4
T155 R46W S3
T155 R46W S2
T155 R46W S1
Snake River
T155 R46W S7
T155 R46W S8
T155 R46W S9
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T155 R46W S11
T155 R46W S12
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67
68
69
70

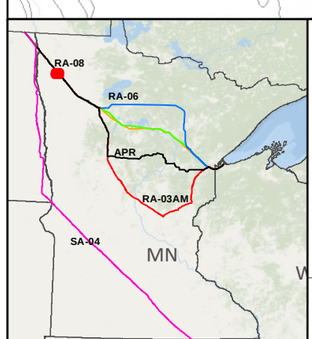

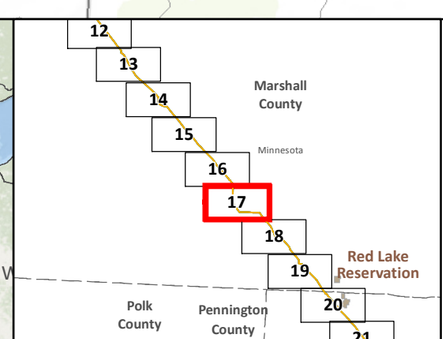

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 17B of 82

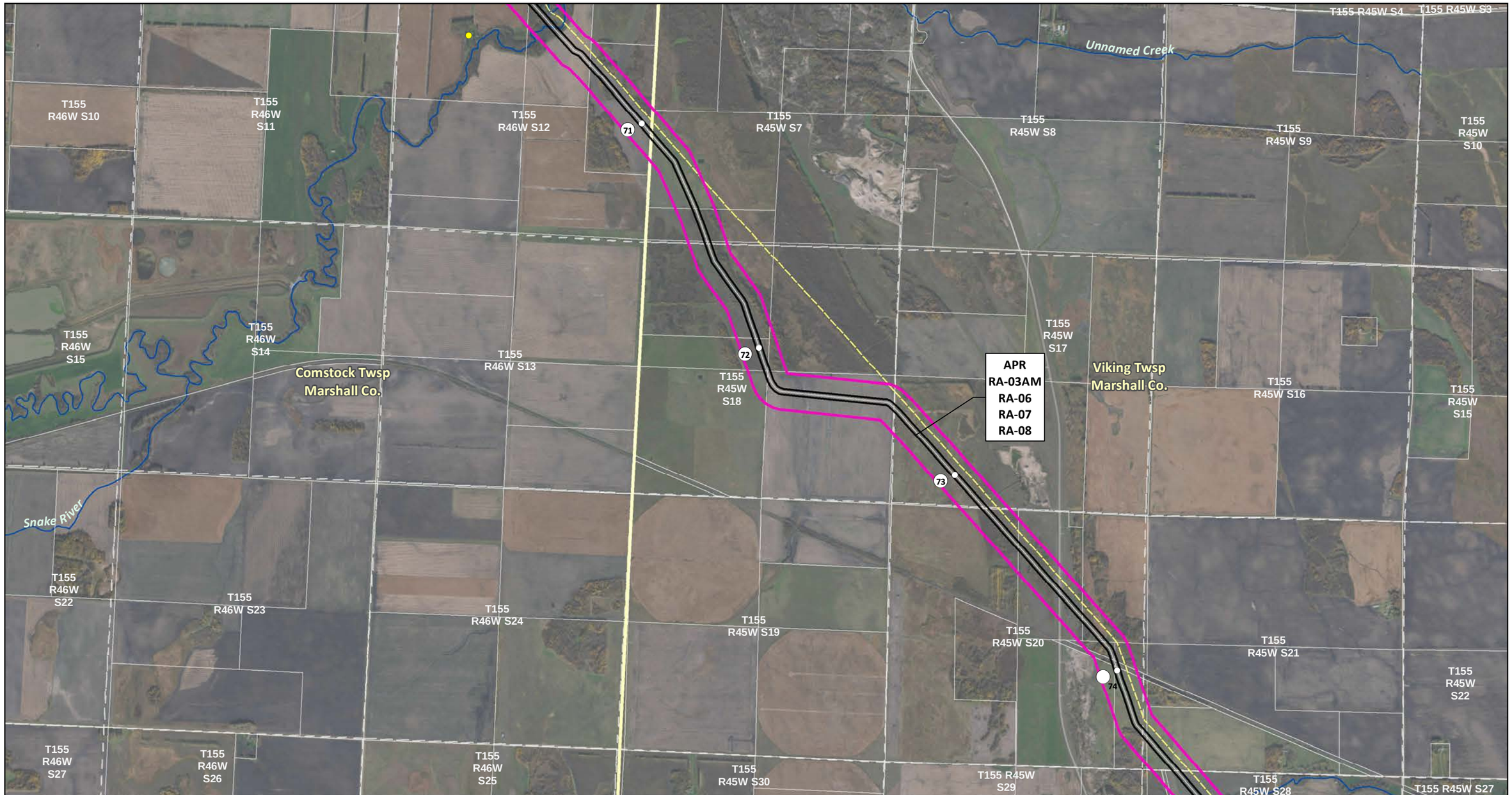

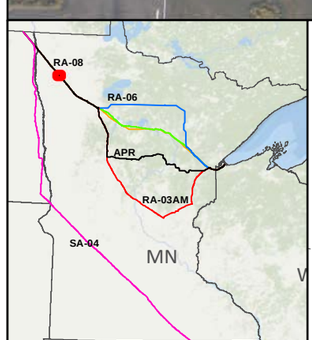

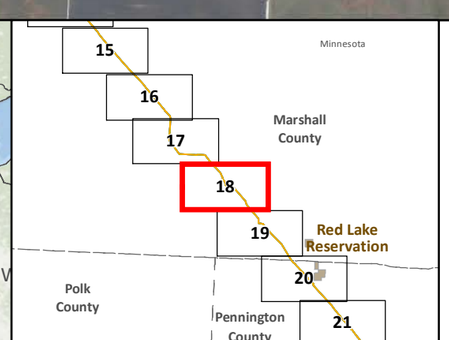

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 18A of 82

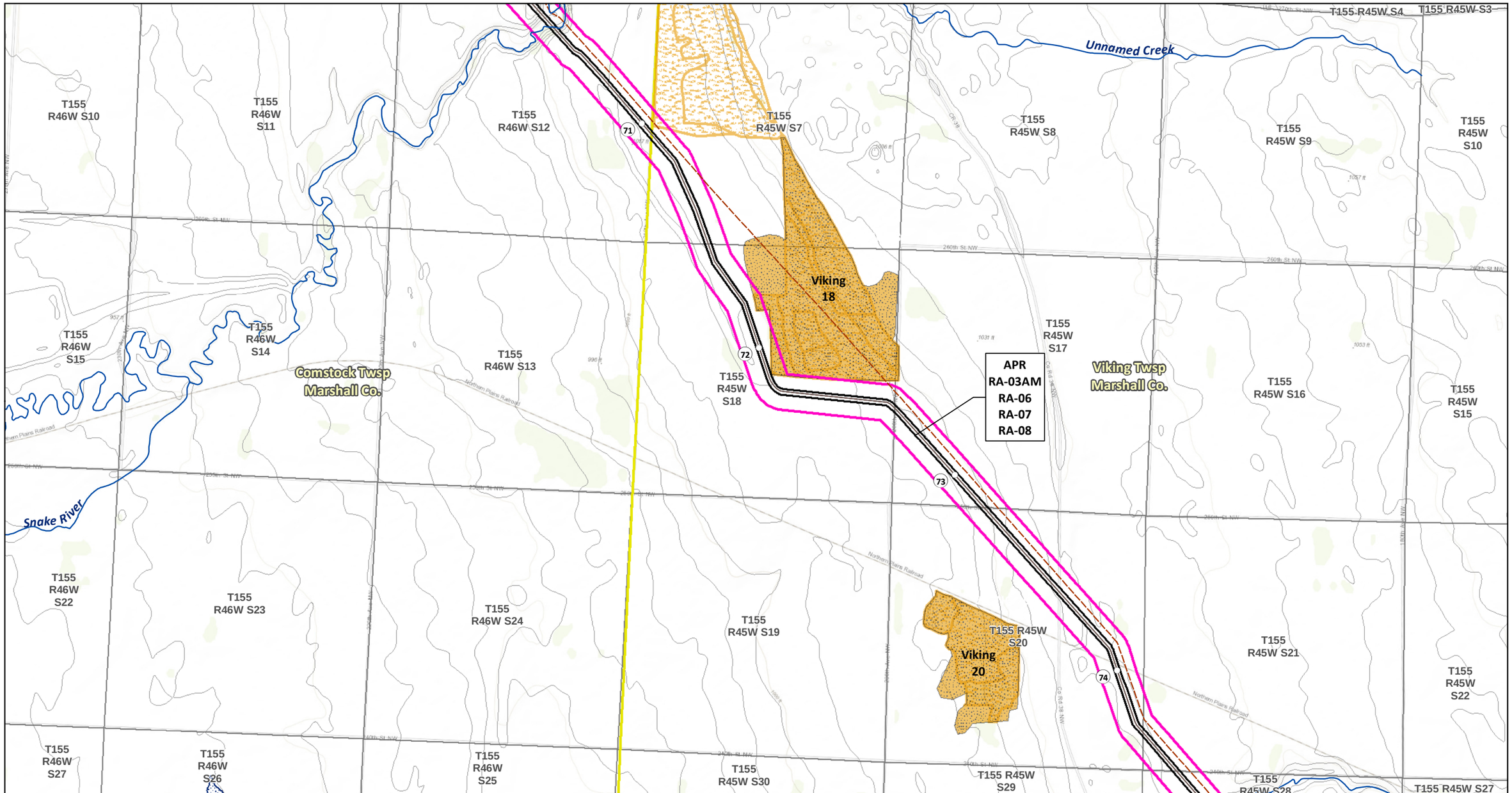

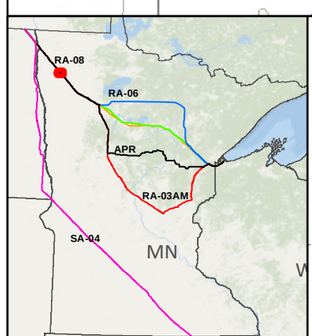

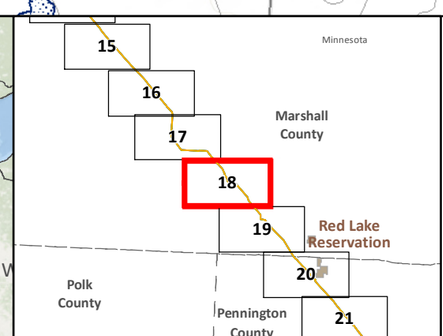

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
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Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 18B of 82

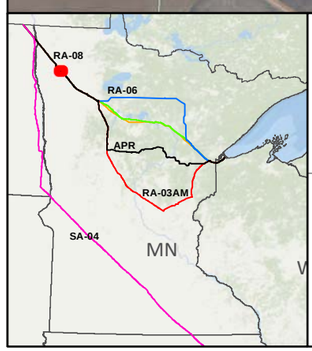

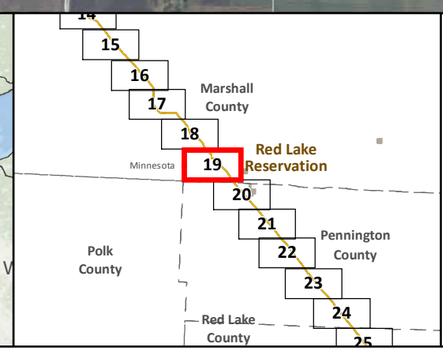

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
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- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 19A of 82

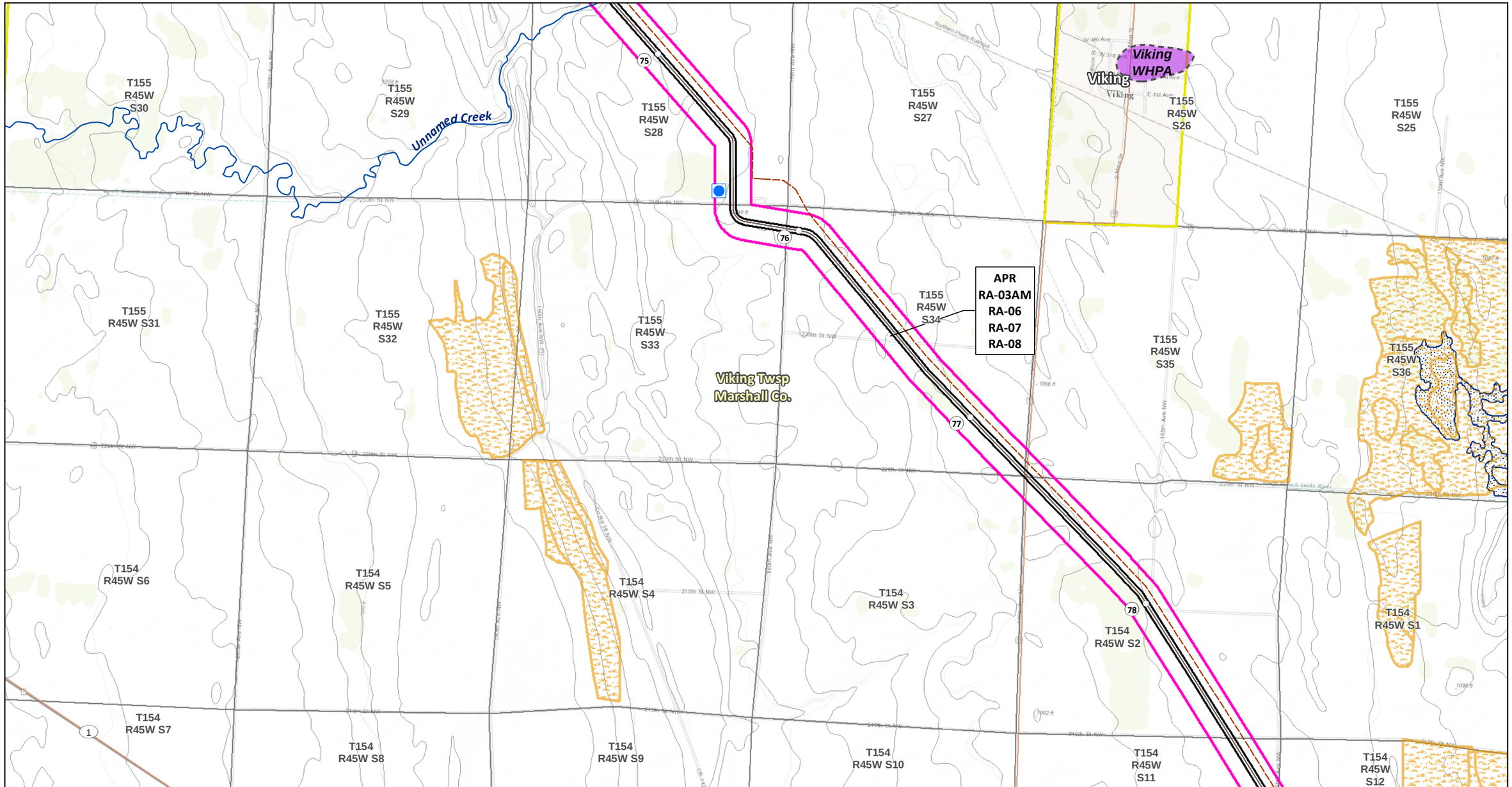

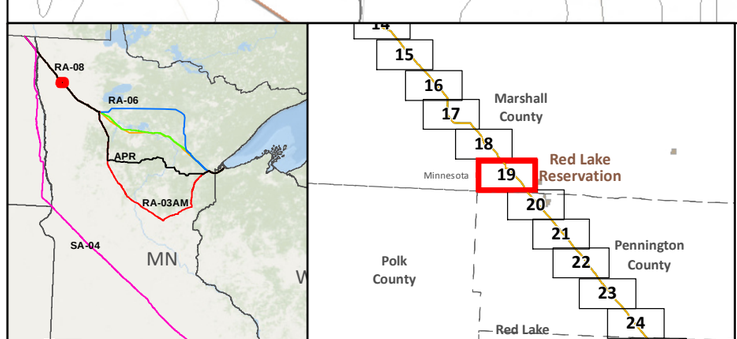

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
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- Mile Post
- Anticipated 120' Construction ROW
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 19B of 82

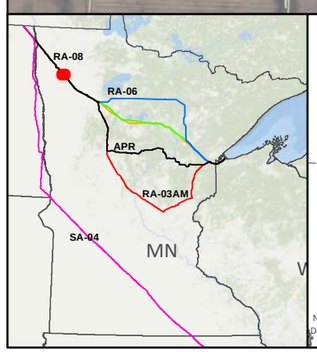

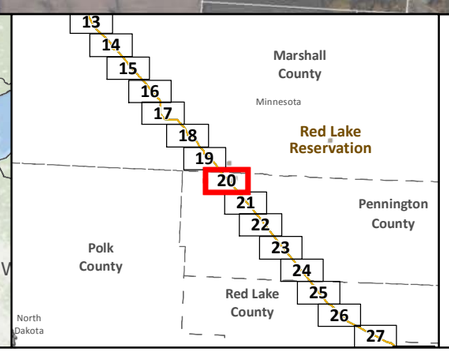

SA-04

Applicant's Preferred Route (APR)

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0 0.125 0.25 0.5 Miles

1:24,000

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LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 20A of 82

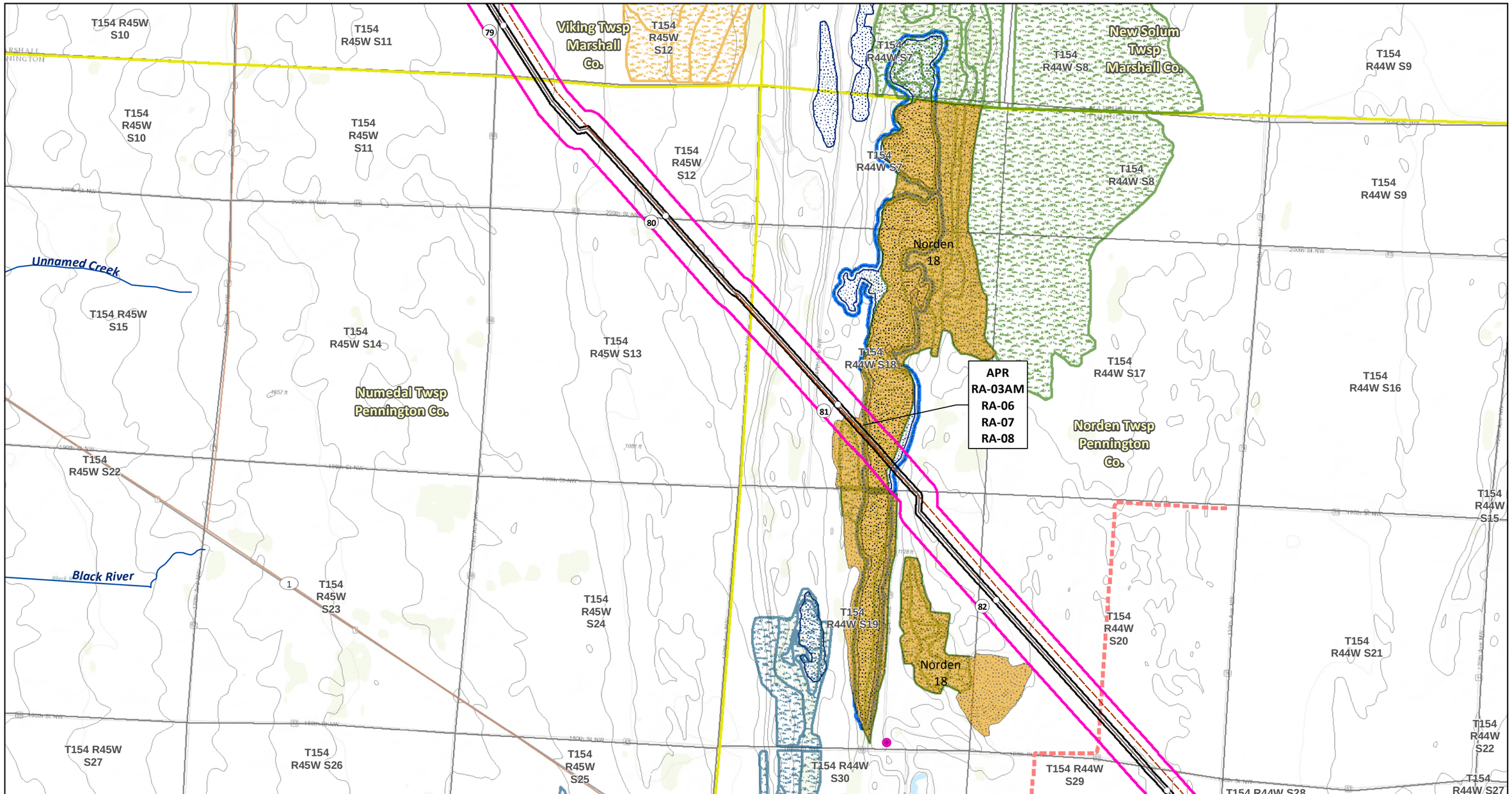

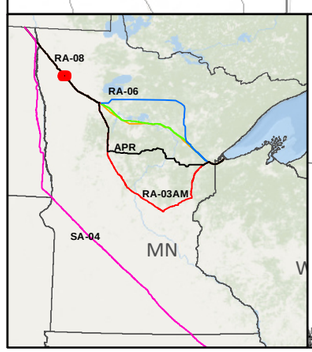

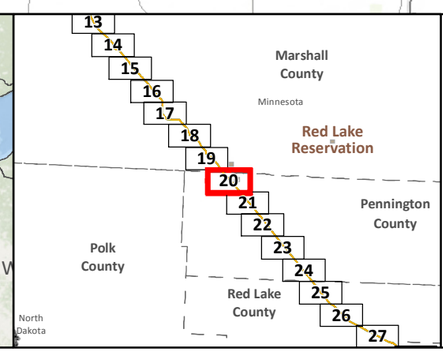

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

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Existing Pipelines
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- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 20B of 82

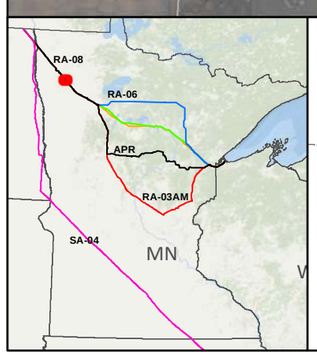

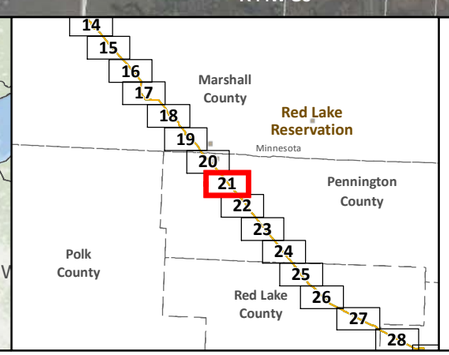

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 21A of 82

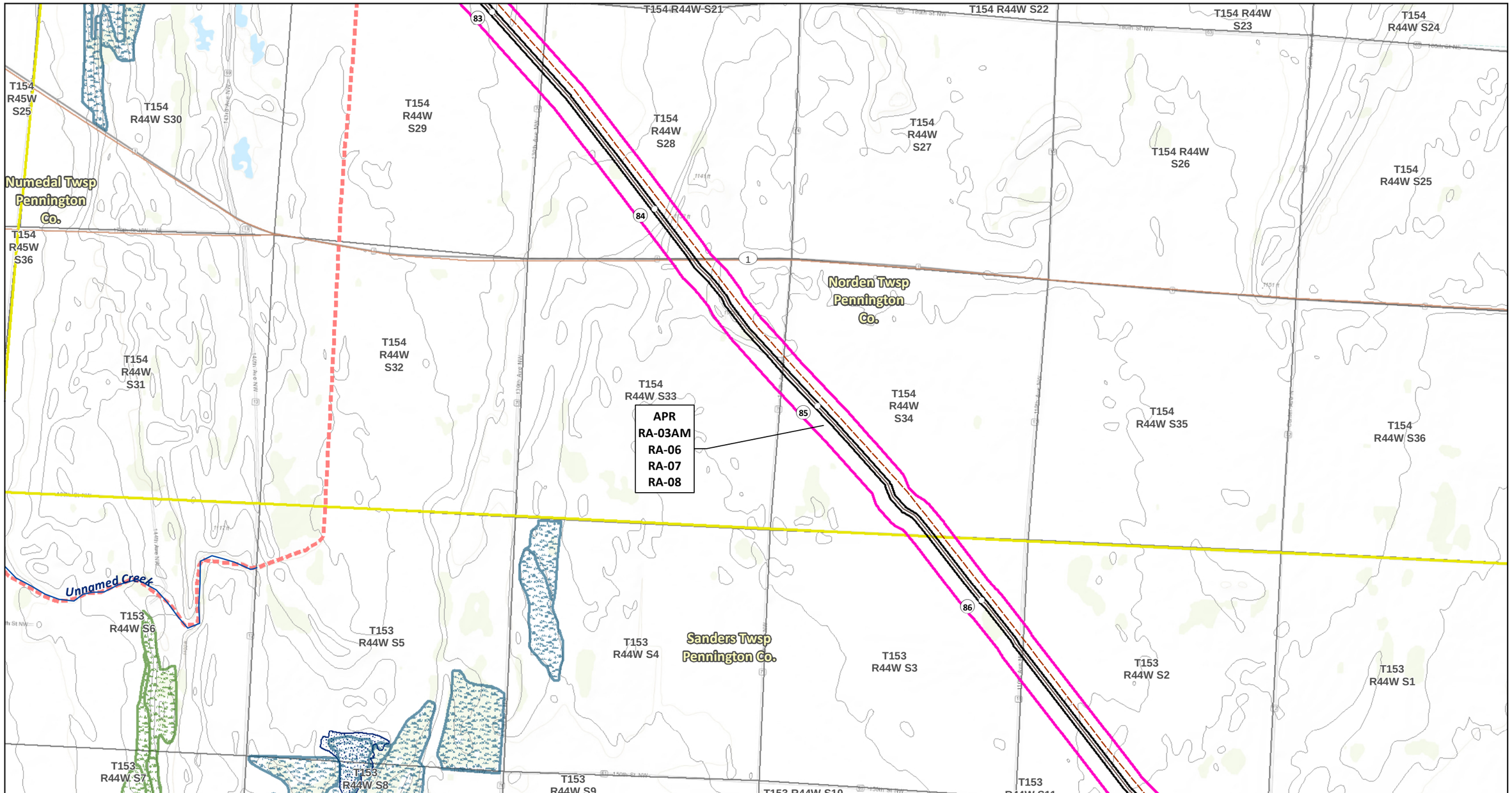

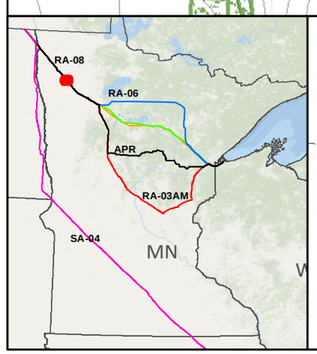

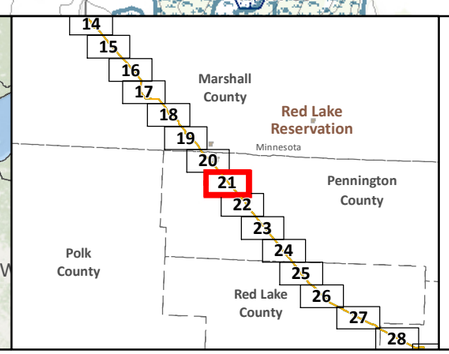

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 21B of 82

T153 R44W S4
T153 R44W S3
T153 R44W S2
T153 R44W S1
T153 R43W S6
T153 R43W S5
T153 R44W S9
T153 R44W S10
T153 R44W S11
T153 R44W S12
T153 R43W S7
T153 R43W S8
Thief River Falls Twsp Pennington Co.
T153 R43W S9
87
88
89
90
32
APR
RA-03AM
RA-06
RA-07
RA-08
Sanders Twsp Pennington Co.
T153 R44W S16
T153 R44W S15
T153 R44W S14
T153 R44W S13
T153 R43W S18
Rocksbury Twsp Pennington Co.
T153 R43W S17
T153 R43W S16
T153 R44W S21
T153 R44W S22
T153 R44W S23
T153 R44W S24
T153 R43W S19
T153 R43W S20
T153 R43W S21
Red Lake River
T153 R44W S28
T153 R44W S27
T153 R44W S26

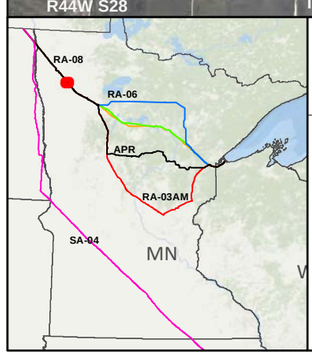

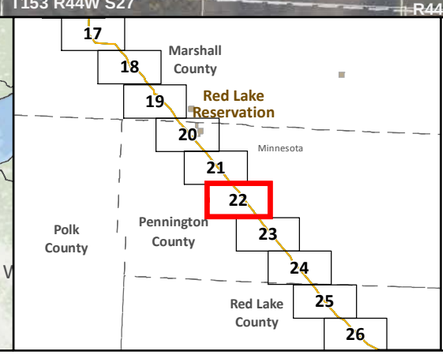

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 22A of 82

T153 R44W S4
T153 R44W S3
T153 R44W S2
T153 R44W S1
T153 R43W S6
T153 R43W S5
T153 R44W S9
T153 R44W S10
T153 R44W S11
T153 R44W S12
T153 R43W S7
T153 R43W S8
Thief River Falls Twsp Pennington Co.
T153 R43W S9
APR
RA-03AM
RA-06
RA-07
RA-08
T153 R44W S16
T153 R44W S15
Sanders Twsp Pennington Co.
T153 R44W S14
T153 R44W S13
T153 R43W S18
Rocksbury Twsp Pennington Co.
T153 R43W S17
T153 R43W S16
T153 R44W S21
T153 R44W S22
T153 R44W S23
T153 R44W S24
T153 R43W S19
T153 R43W S20
T153 R43W S21
Red Lake River
T153 R44W S28
T153 R44W S27
T153 R44W S26

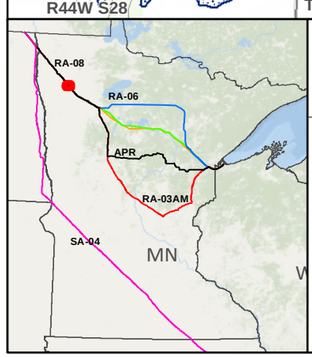

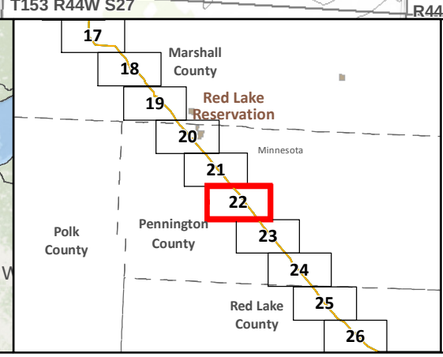

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 22B of 82

T153 R43W S19
T153 R43W S20
T153 R43W S21
T153 R43W S22
T153 R43W S23
T153 R44W S25
T153 R43W S30
T153 R43W S29
T153 R43W S28
T153 R43W S27
T153 R43W S26
Sanders Twsp
Pennington Co.
Rocksbury Twsp
Pennington Co.
T153 R44W S36
T153 R43W S31
T153 R43W S32
APR
RA-03AM
RA-06
RA-07
RA-08
T153 R43W S33
T153 R43W S34
T153 R43W S35
T152 R43W S6
Saint Hilaire Twsp
Pennington Co.
T152 R44W S2
Black
River Twsp
Pennington Co.
T152 R44W S1
Saint Hilaire
Red Lake River
Unnamed Creek
T152 R43W S5
River Falls Twsp
Pennington Co.
T152 R43W S4
T152 R43W S3
T152 R43W S2
T152 R44W S11
T152 R44W S12
T152 R43W S7
T152 R43W S8
T152 R43W S9
T152 R43W S10

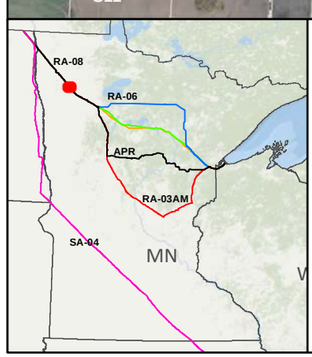

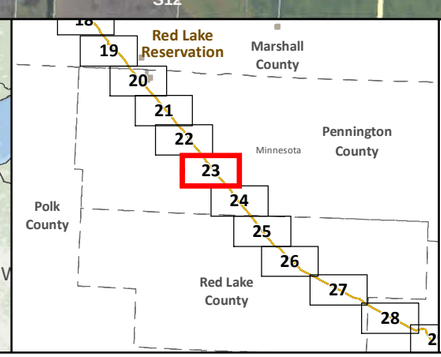

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 23A of 82

T153 R43W S19
T153 R43W S20
T153 R43W S21
T153 R43W S22
T153 R43W S23
T153 R44W S25
T153 R43W S30
T153 R43W S29
T153 R43W S28
T153 R43W S27
T153 R43W S26
Sanders Twsp Pennington Co.
Rocksbury Twsp Pennington Co.
T153 R44W S36
T153 R43W S31
T153 R43W S32
T153 R43W S33
T153 R43W S34
T153 R43W S35
APR
RA-03AM
RA-06
RA-07
RA-08
Saint Hilaire Twsp Pennington Co.
T152 R43W S6
T152 R44W S2
Black River Twsp Pennington Co.
T152 R44W S1
Saint Hilaire
Saint Hilaire WHPA
Red Lake River
Unnamed Creek
T152 R43W S5
River Falls Twsp Pennington Co.
T152 R43W S4
T152 R43W S3
T152 R43W S2
T152 R44W S11
T152 R44W S12
T152 R43W S7
T152 R43W S8
T152 R43W S9
T152 R43W S10

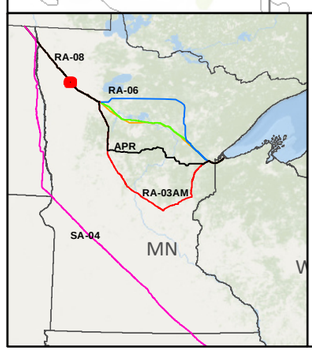

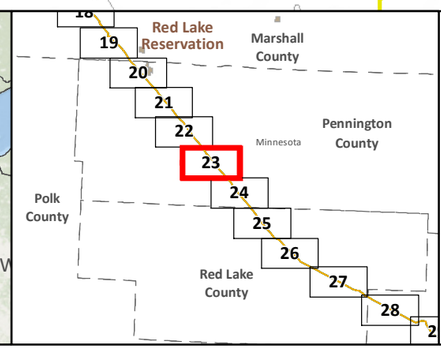

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 23B of 82

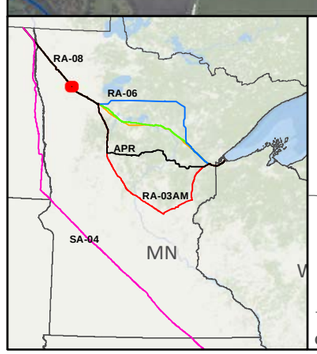

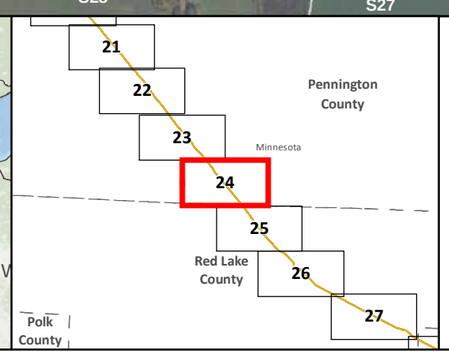

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 24A of 82

T152 R43W S8
T152 R43W S9
T152 R43W S10
T152 R43W S11
T152 R43W S12
T152 R43W S13
T152 R43W S14
T152 R43W S15
T152 R43W S16
T152 R43W S17
T152 R43W S20
T152 R43W S21
T152 R43W S22
T152 R43W S23
T152 R43W S24
T152 R43W S25
T152 R43W S26
T152 R43W S27
T152 R43W S28
T152 R43W S29
T152 R43W S2
T152 R43W S3
T152 R43W S1
T152 R42W S6
T152 R42W S5
T152 R42W S7
T152 R42W S8
T152 R42W S18
T152 R42W S17
T152 R42W S19
T152 R42W S20
T152 R42W S30

APR
RA-03AM
RA-06
RA-07
RA-08

Unnamed Creek
Red Lake River

River Falls Twsp
Pennington Co.

Wyandotte Twsp
Pennington Co.

River Twsp Red Lake Co.

Emardville Twsp
Red Lake Co.

95
96
97
98

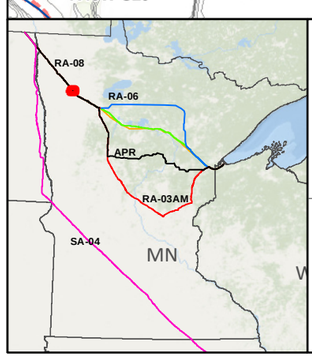

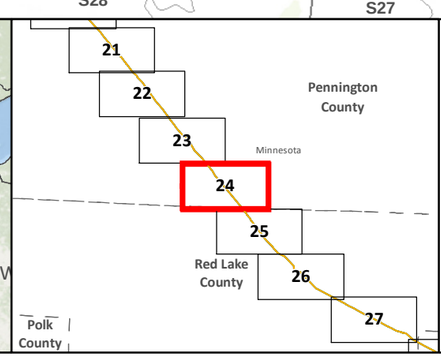

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 24B of 82

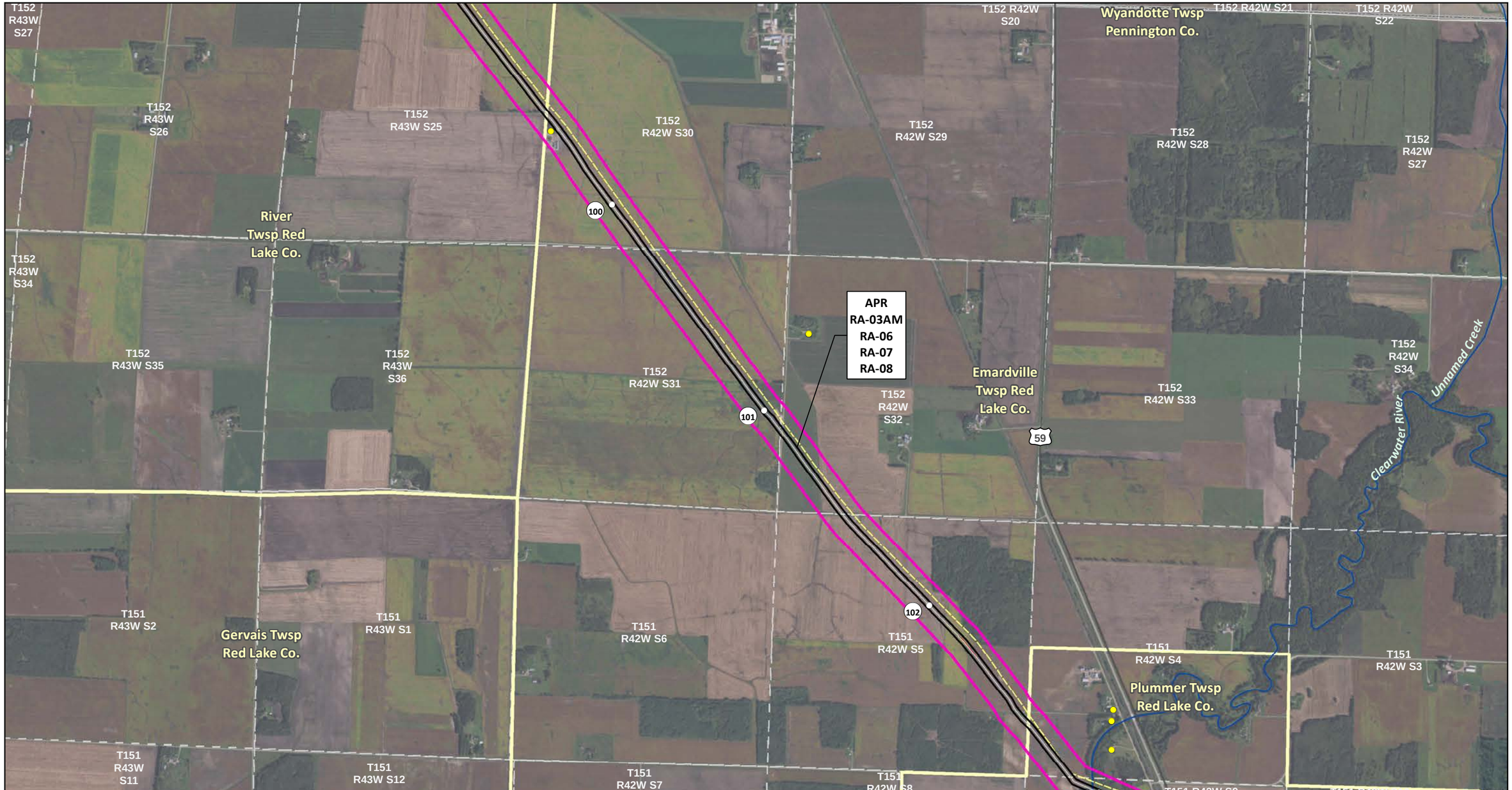

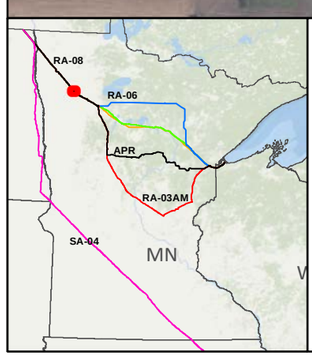

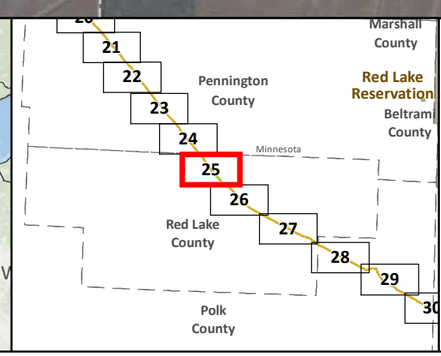

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 25A of 82

T152 R43W S27
T152 R43W S26
T152 R43W S25
T152 R42W S30
T152 R42W S29
T152 R42W S20
Wyandotte Twsp Pennington Co.
T152 R42W S21
T152 R42W S22
T152 R42W S28
T152 R42W S27
River Twsp Red Lake Co.
T152 R43W S34
T152 R43W S35
T152 R43W S36
T152 R42W S31
T152 R42W S32
Emardville Twsp Red Lake Co.
T152 R42W S33
T152 R42W S34
Unnamed Creek
Clearwater River
APR
RA-03AM
RA-06
RA-07
RA-08
100
101
102
59
T151 R43W S2
Gervais Twsp Red Lake Co.
T151 R43W S1
T151 R42W S6
T151 R42W S5
T151 R42W S4
T151 R42W S3
Plummer Twsp Red Lake Co.
T151 R43W S11
T151 R43W S12
T151 R42W S7
T151 R42W S8
T151 R42W S9
T151 R42W S10

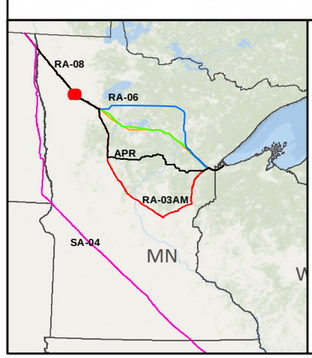

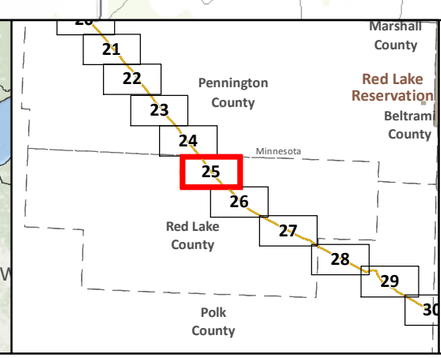

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 25B of 82

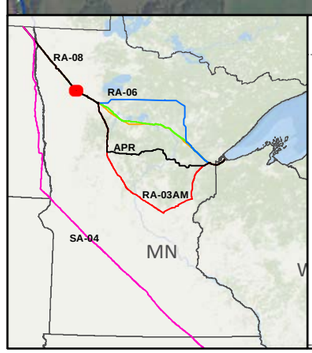

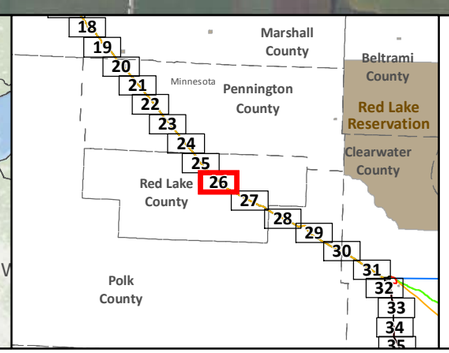

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 26A of 82

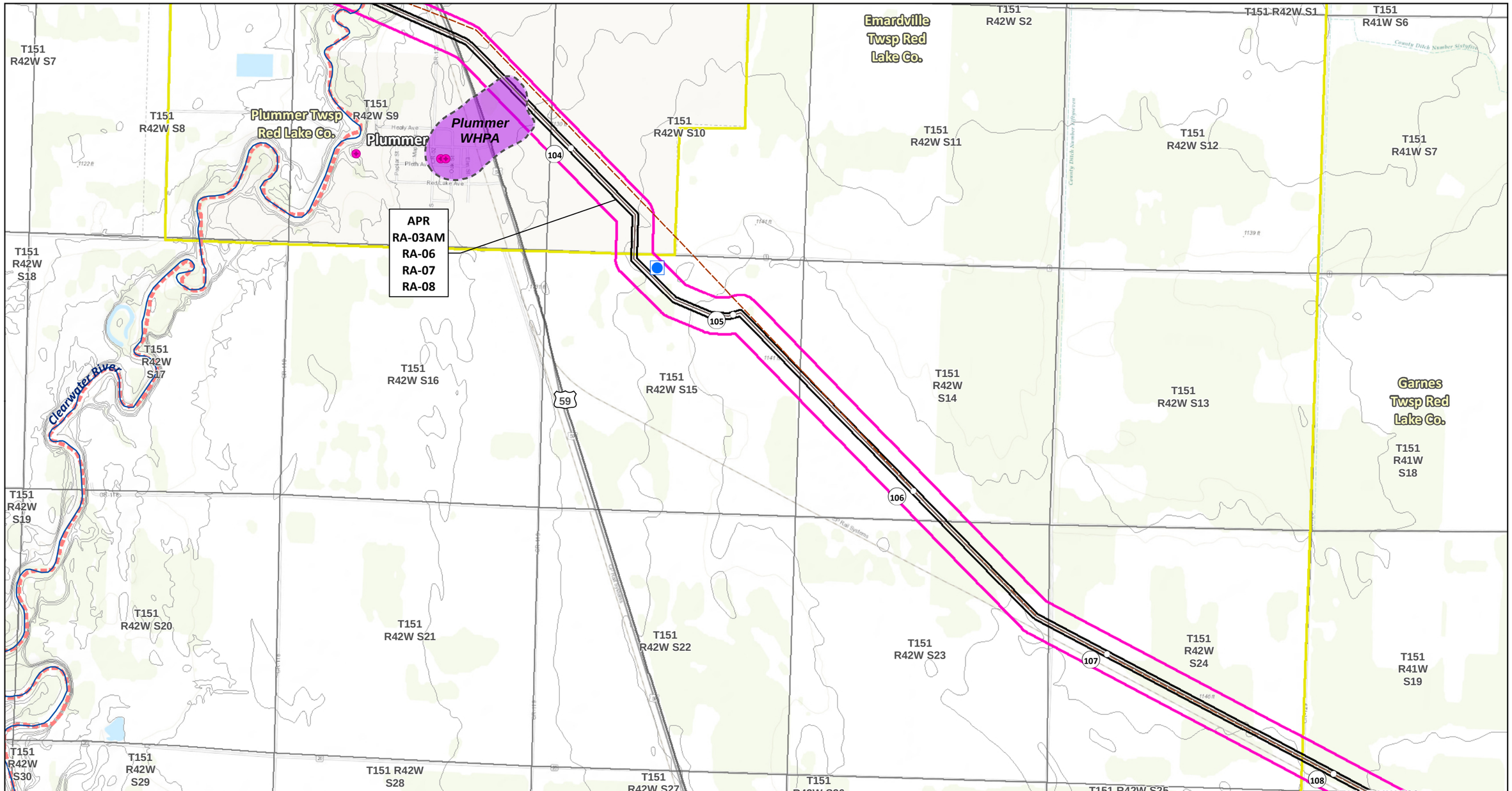

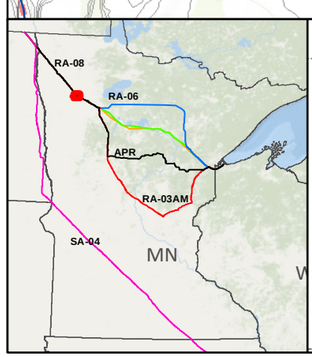

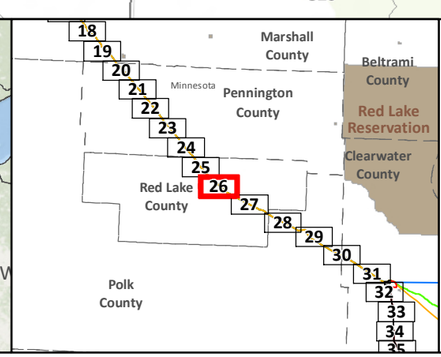

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 26B of 82

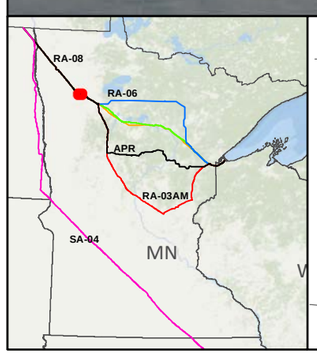

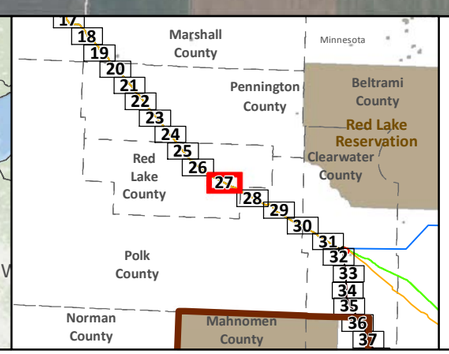

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 27A of 82

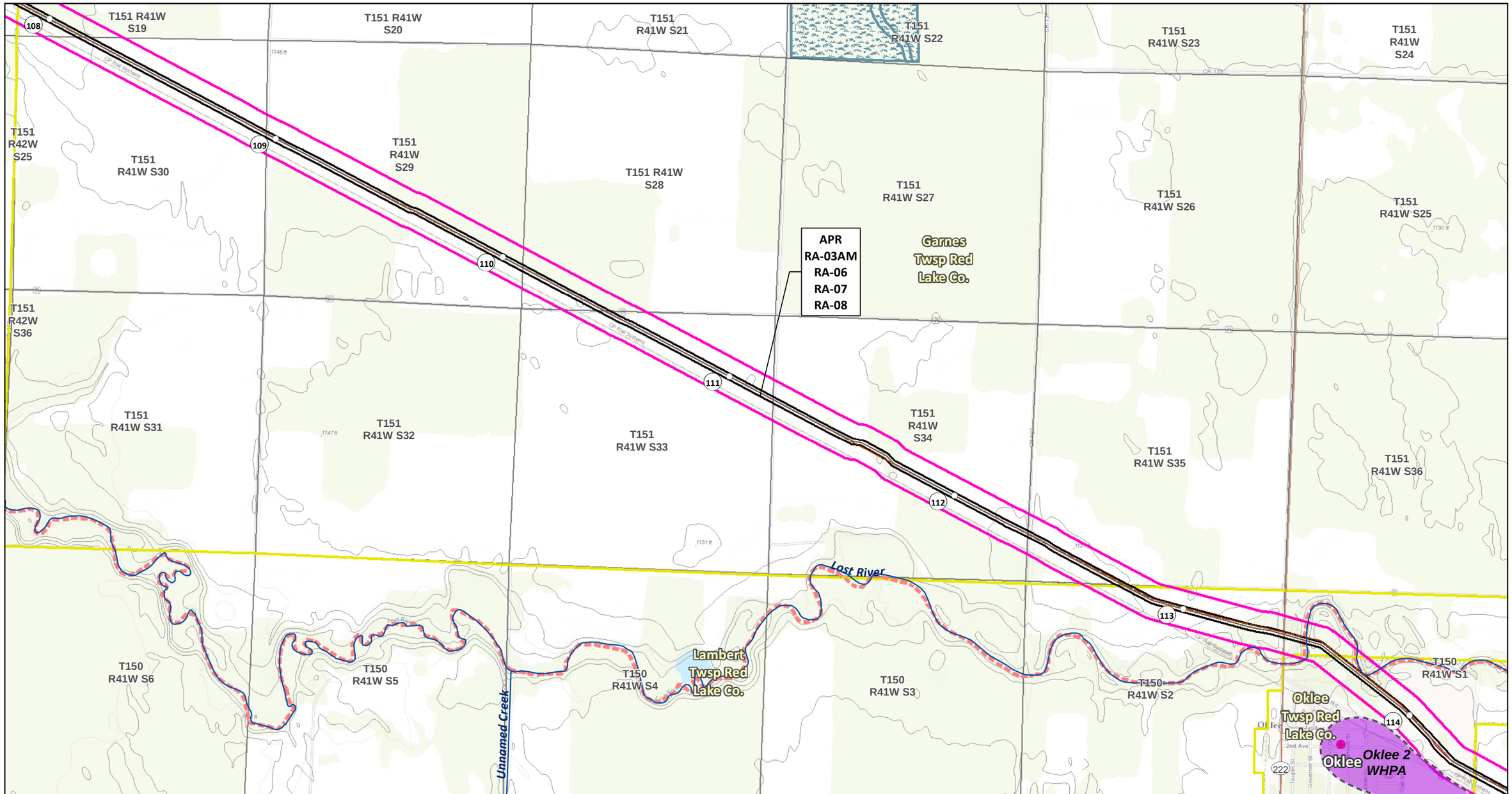

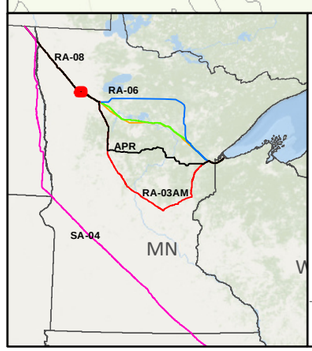

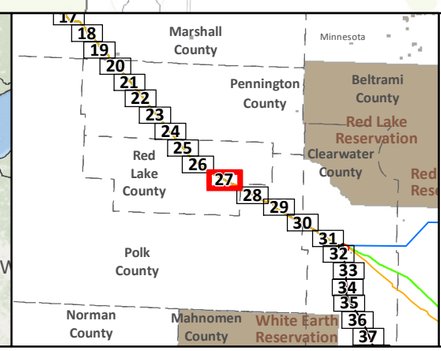

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 27B of 82

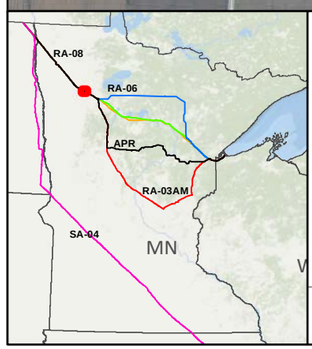

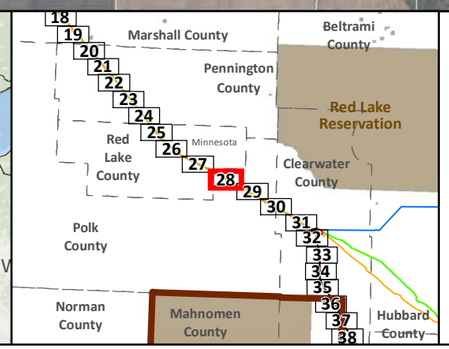

- SA-04
- Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

- Anticipated 120' Construction ROW
- Route Width (750')
- County Boundary
- Parcels
- Public Water Basin
- Public Waters Watercourse
- Township Boundary

- Residences within 1/2 mile
- Mile Post
- Terminal
- Pump Station
- Interstate
- Highway
- Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

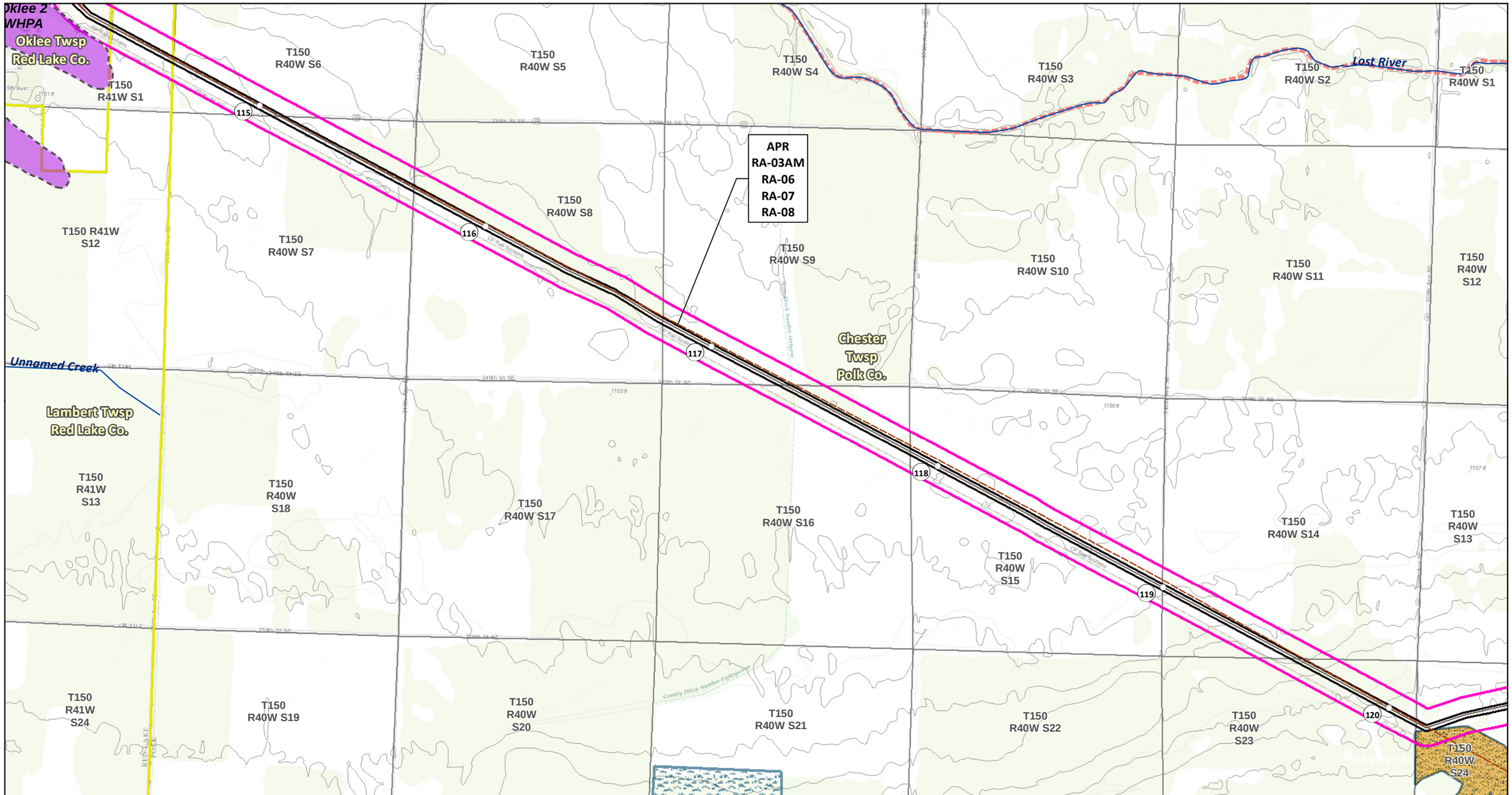

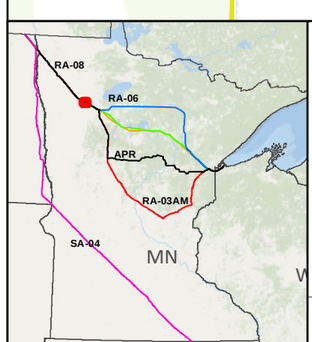

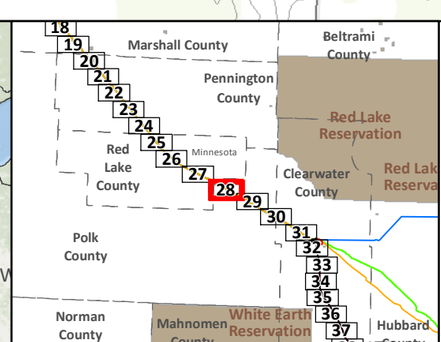

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 28B of 82

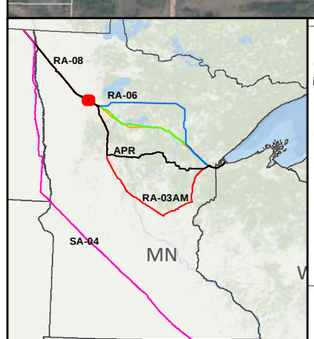

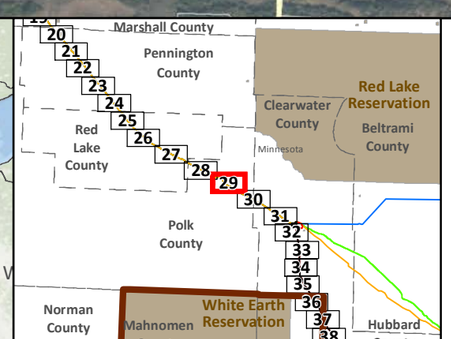

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 29A of 82

T150 R40W S14
T150 R40W S13
T150 R39W S18
T150 R39W S17
T150 R39W S16
T150 R39W S15
Gully Fen SNA
T150 R39W S14
T150 R40W S23
T150 R40W S24
Chester 24
T150 R39W S19
T150 R39W S20
T150 R39W S21
T150 R39W S22
Larix WMA
T150 R39W S23
Gully Fen SNA
Gully 30
Gully Twsp Polk Co.
Chester Twsp Polk Co.
T150 R39W S30
Trail Twsp Polk Co.
T150 R40W S26
T150 R40W S25
T150 R39W S29
T150 R39W S28
T150 R39W S27
T150 R39W S26
Trail
APR
RA-03AM
RA-06
RA-07
RA-08
Hangaard WMA
T150 R40W S35
T150 R40W S36
T150 R39W S31
T150 R39W S32
T150 R39W S33
T150 R39W S34
T150 R39W S35
Gully

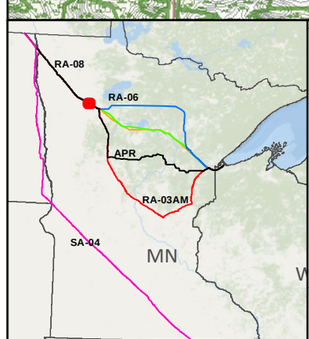

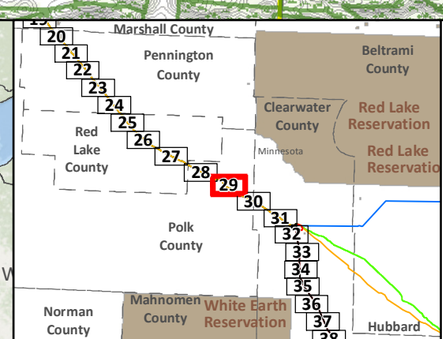

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
WMA - Wildlife Management Areas
Wildlife Refuge Inventory
SNA - Scientific and Natural Area

Water Resources
Navigable Waterway Crossings
National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
Outstanding
High
Moderate

Native Plant Communities with Biodiversity Significance
Outstanding
High
Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 29B of 82

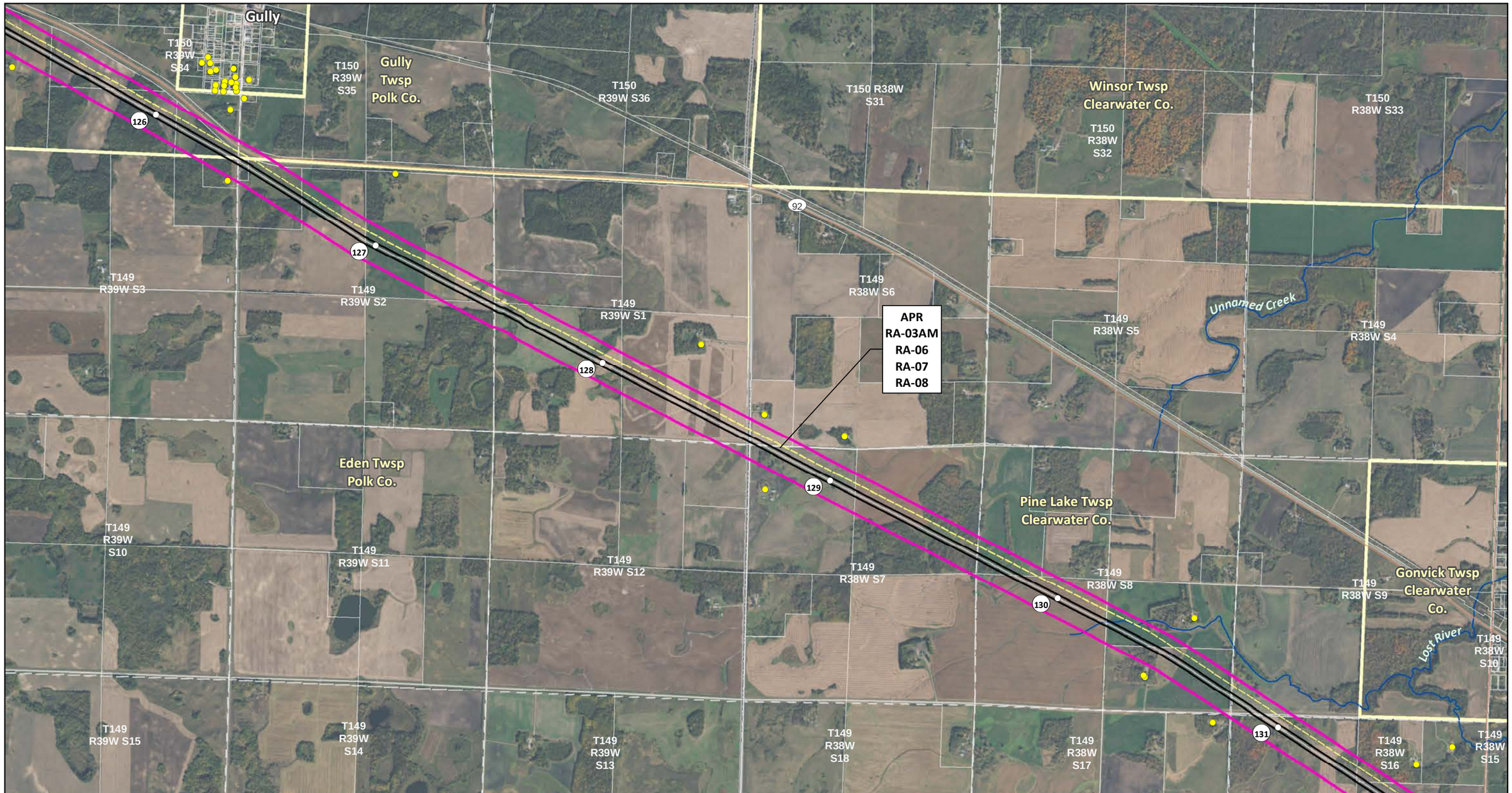

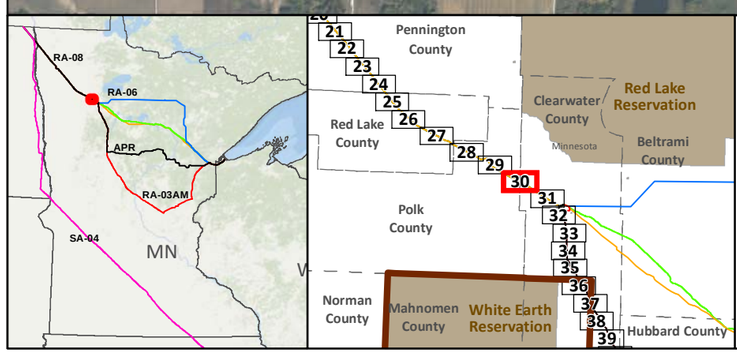

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 30A of 82

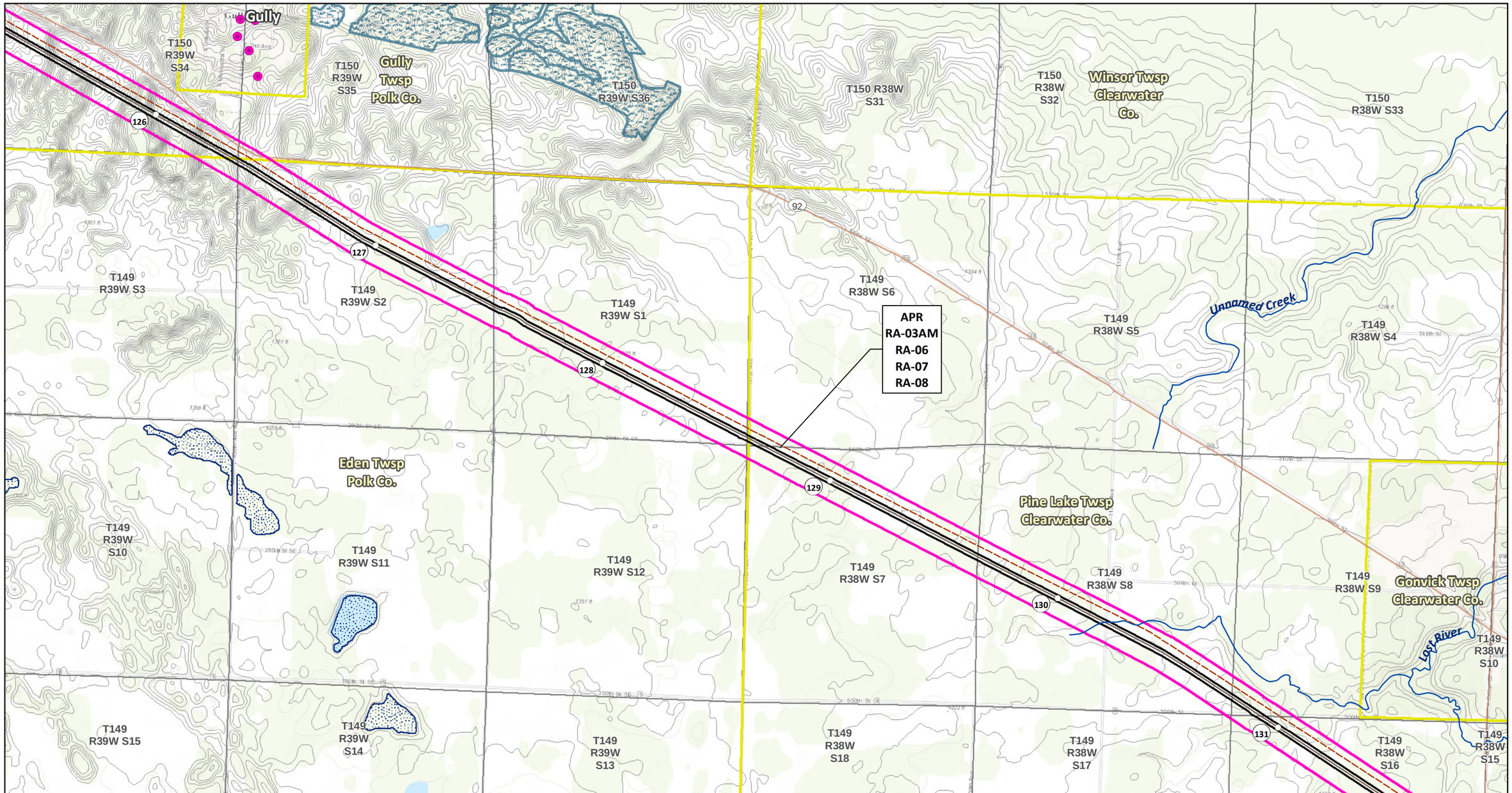

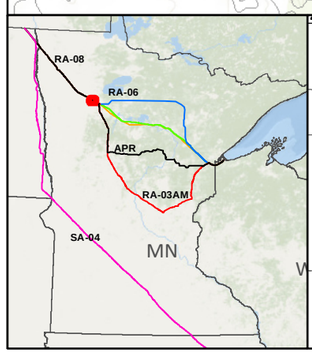

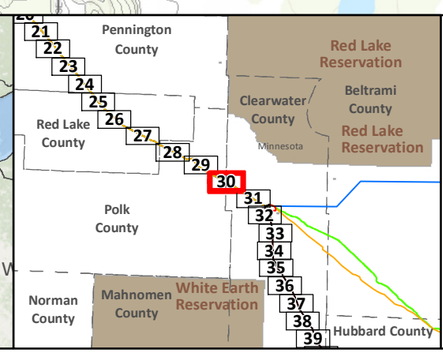

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 30B of 82

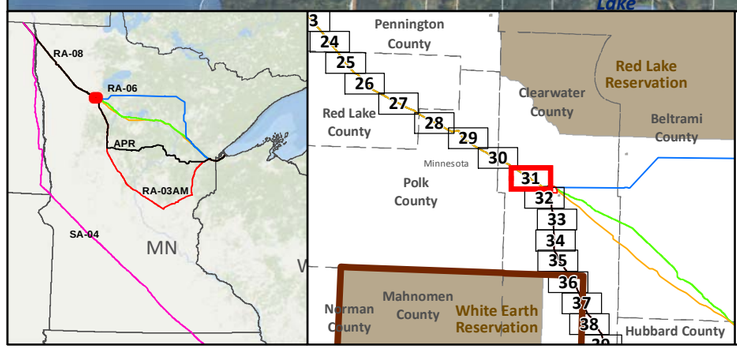

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 31A of 82

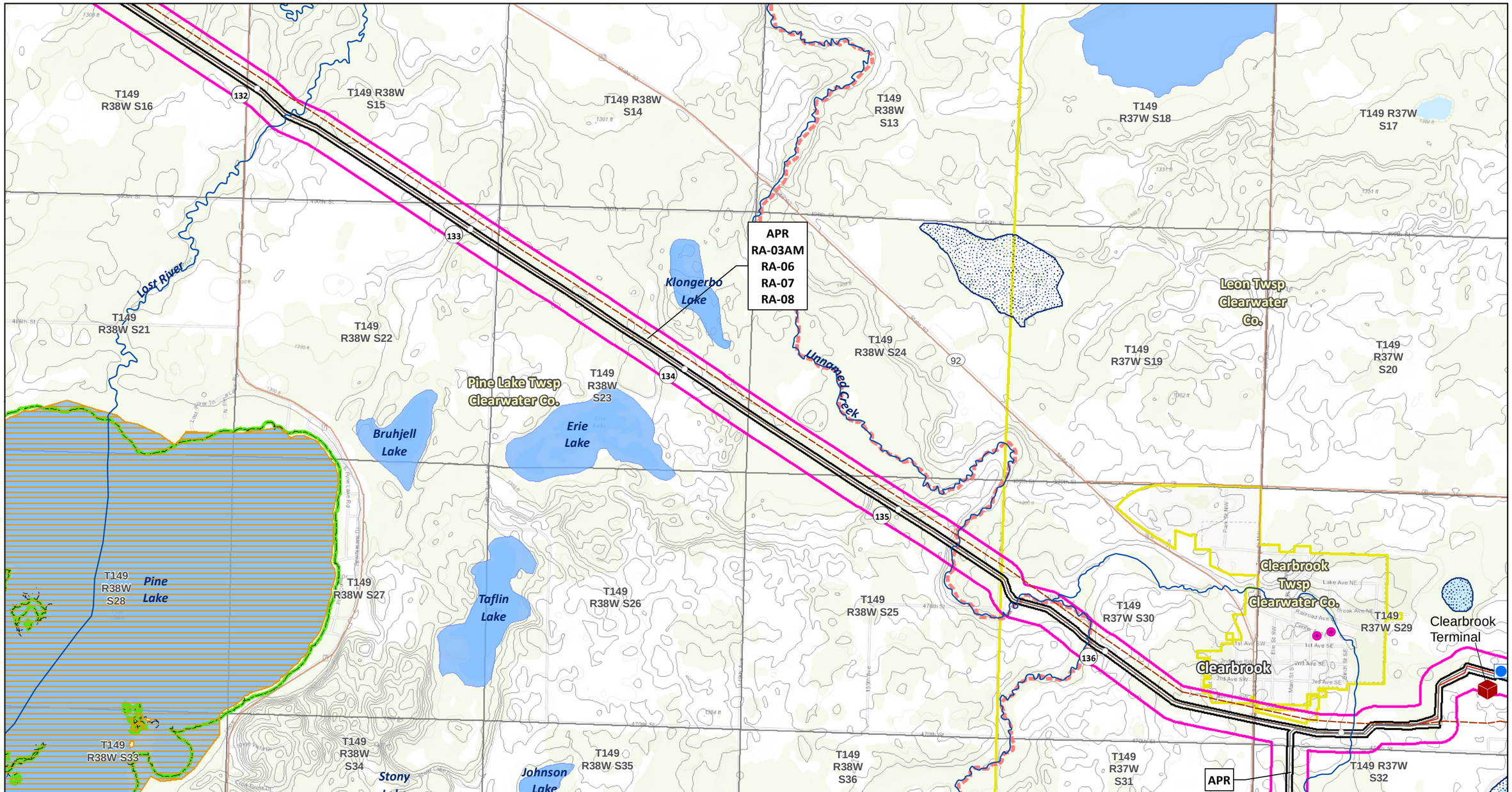

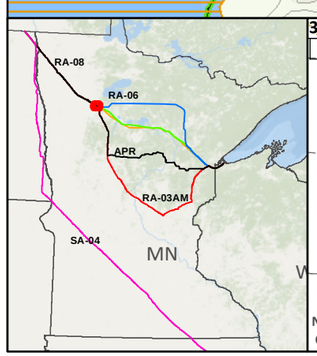

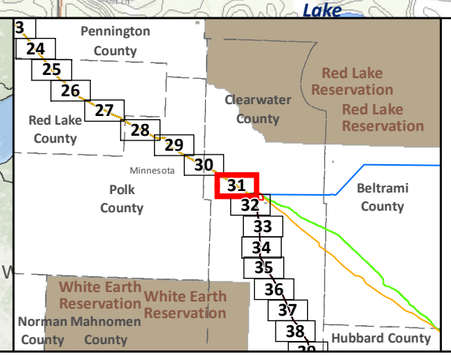

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Route Segment Alternatives (RSA)

Existing Pipelines

Township Boundary

State Managed Lands

WMA - Wildlife Management Areas

Wildlife Refuge Inventory

SNA - Scientific and Natural Area

Water Resources

Navigable Waterway Crossings

National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

Outstanding

High

Moderate

Native Plant Communities with Biodiversity Significance

Outstanding

High

Moderate

Terminal

Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 31B of 82

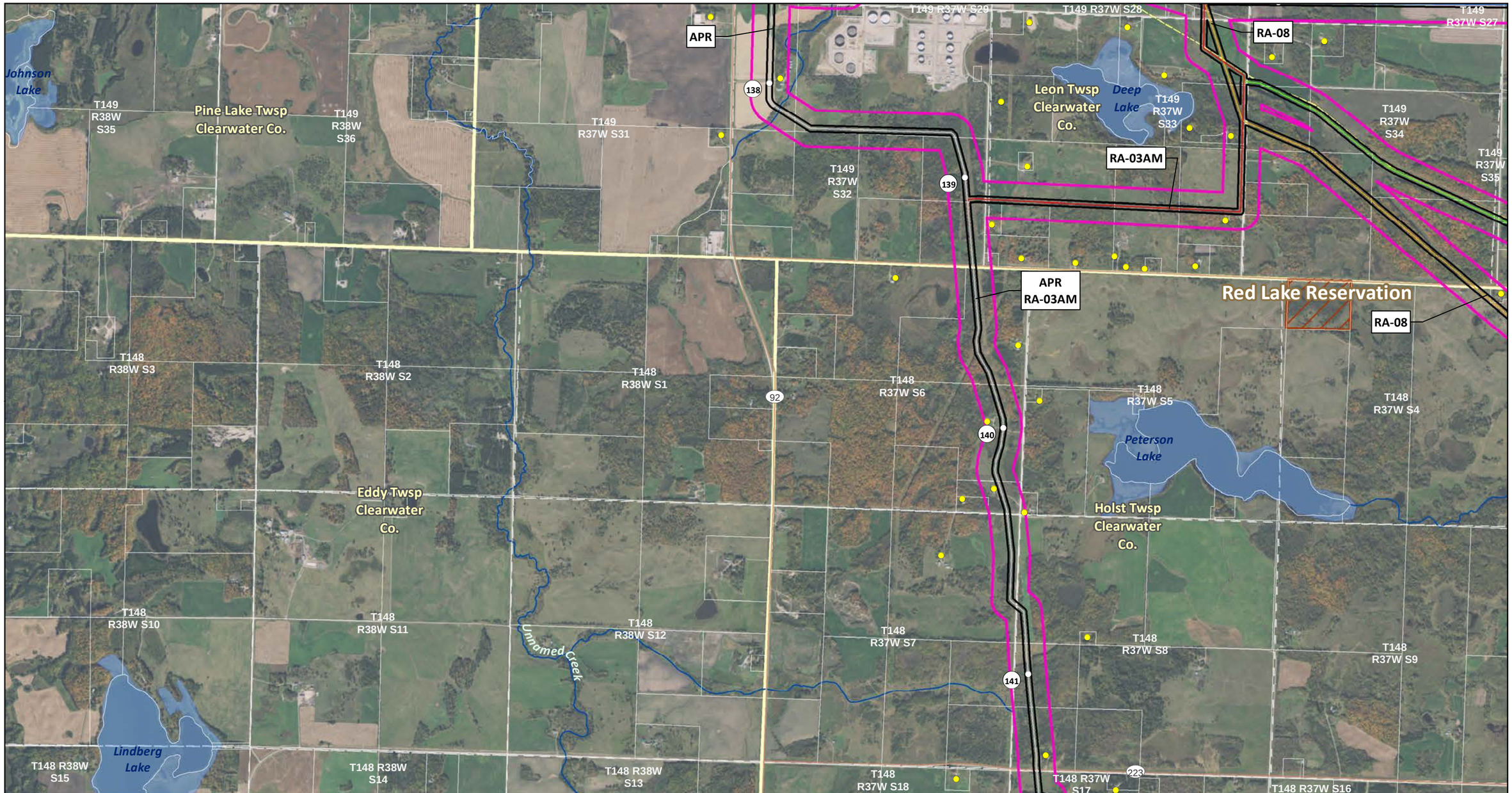

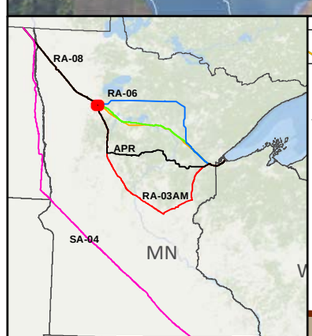

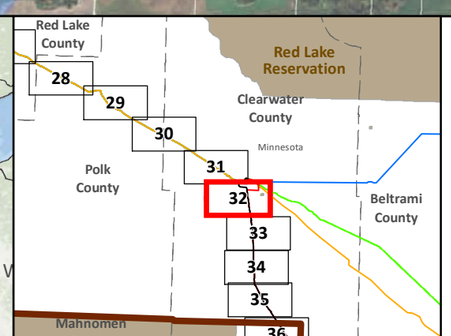

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

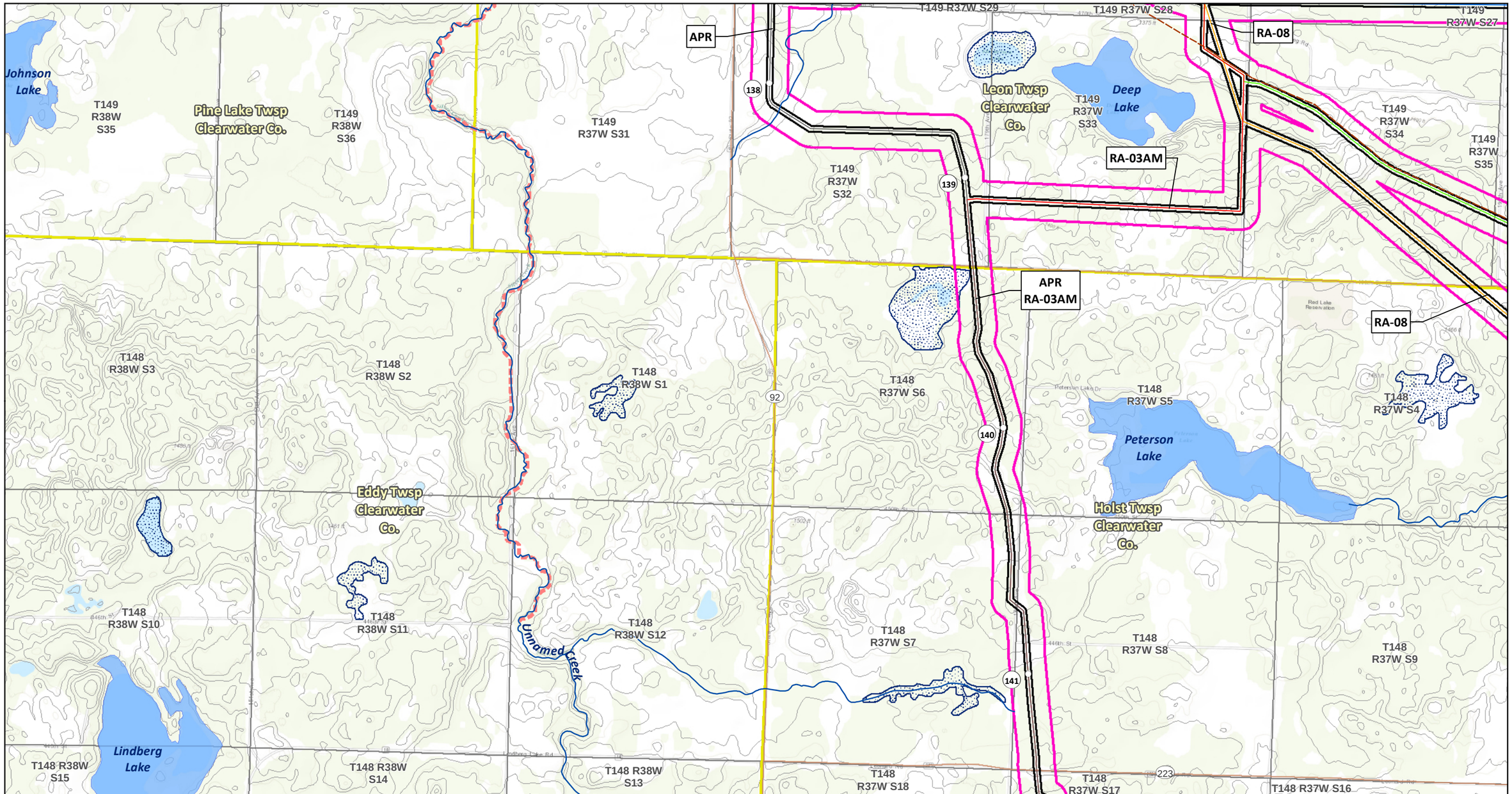

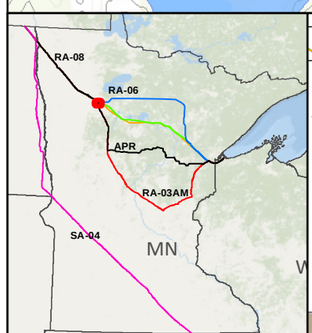

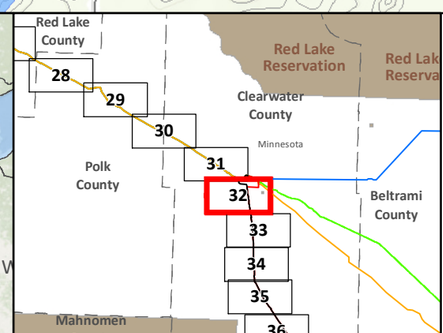

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 32B of 82

T148 R38W S14
T148 R38W S13
Unnamed Creek
T148 R37W S18
142
T148 R37W S17
T148 R37W S16
T148 R37W S15
T148 R37W S14
T148 R38W S23
T148 R38W S24
T148 R37W S19
143
T148 R37W S20
APR RA-03AM
T148 R37W S21
T148 R37W S22
T148 R37W S23
Eddy Twsp Clearwater Co.
92
Holst Twsp Clearwater Co.
T148 R38W S26
T148 R38W S25
T148 R37W S30
144
T148 R37W S29
T148 R37W S28
T148 R37W S27
T148 R37W S26
Ruffy Brook
T148 R38W S36
T148 R37W S31
T148 R37W S32
T148 R37W S33
T148 R37W S34
T148 R37W S35

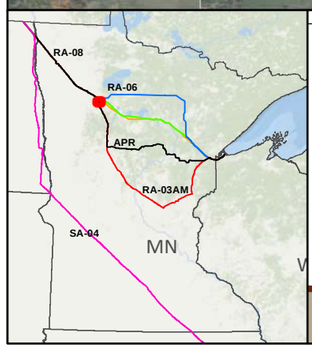

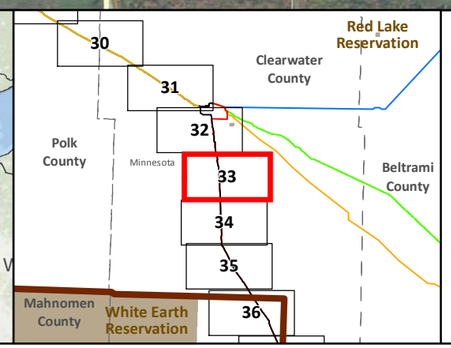

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 33A of 82

T148 R38W S14
T148 R38W S13
Unnamed Creek
T148 R37W S18
142
T148 R37W S17
T148 R37W S16
T148 R37W S15
T148 R37W S14
T148 R38W S23
T148 R38W S24
T148 R37W S19
143
T148 R37W S20
APR RA-03AM
T148 R37W S21
T148 R37W S22
T148 R37W S23
Eddy Twsp Clearwater Co.
92
Holst Twsp Clearwater Co.
Old Red Lake Trail WMA
T148 R38W S26
T148 R38W S25
T148 R37W S30
144
T148 R37W S29
T148 R37W S28
T148 R37W S27
T148 R37W S26
Old Red Lake Trail WMA
Ruffy Brook
T148 R38W S36
T148 R37W S31
T148 R37W S32
T148 R37W S33
T148 R37W S34
T148 R37W S35

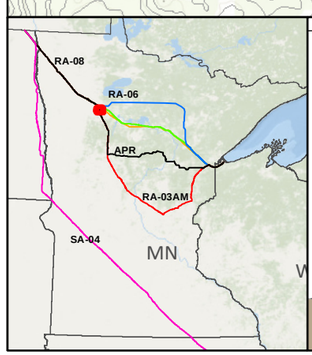

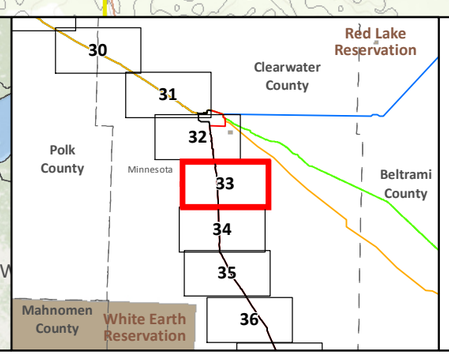

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 33B of 82

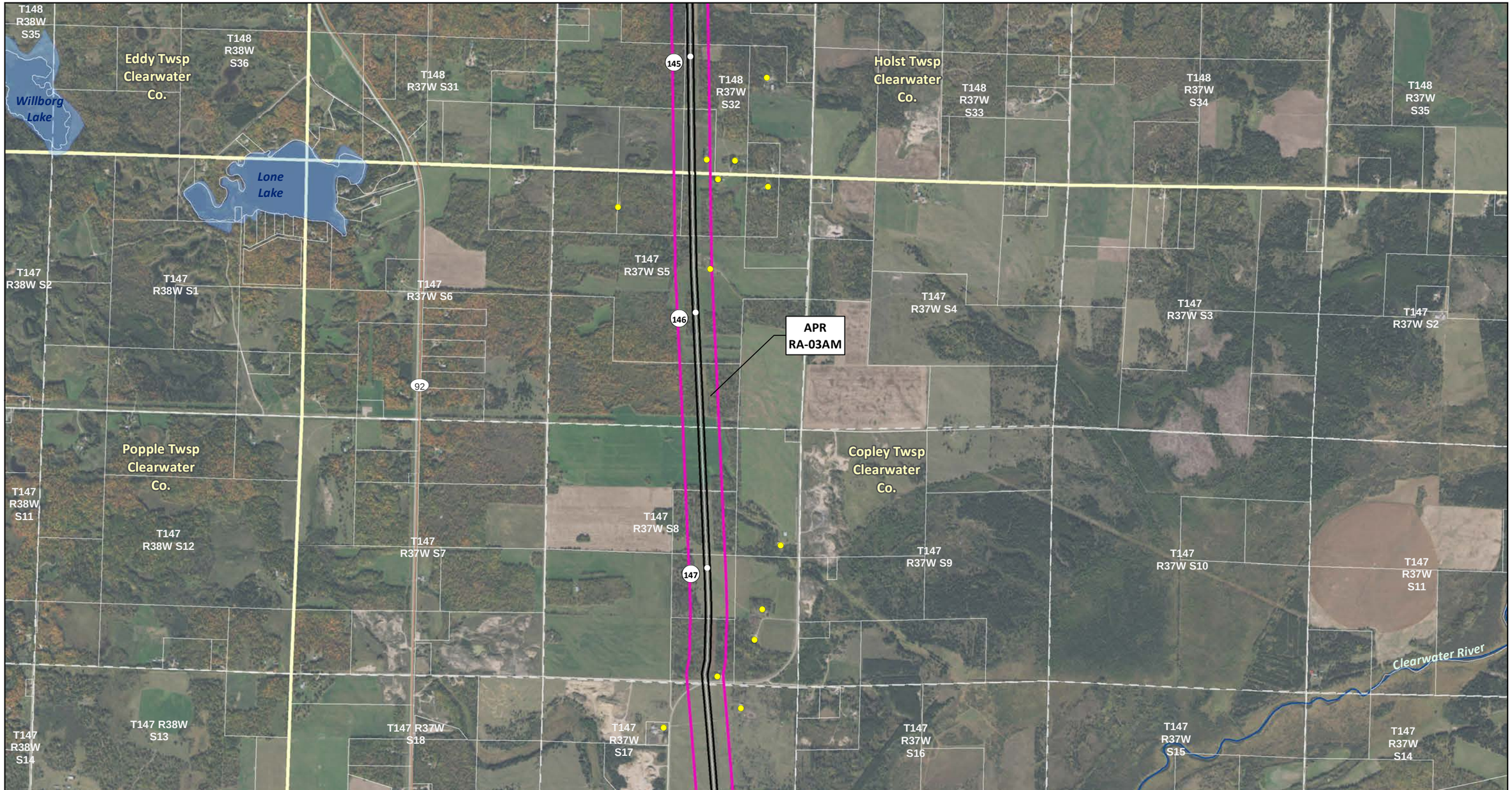

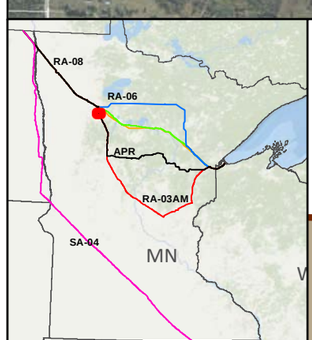

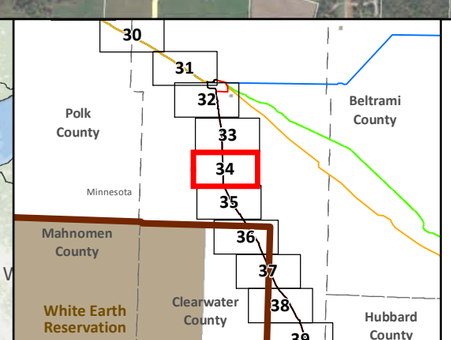

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 34A of 82

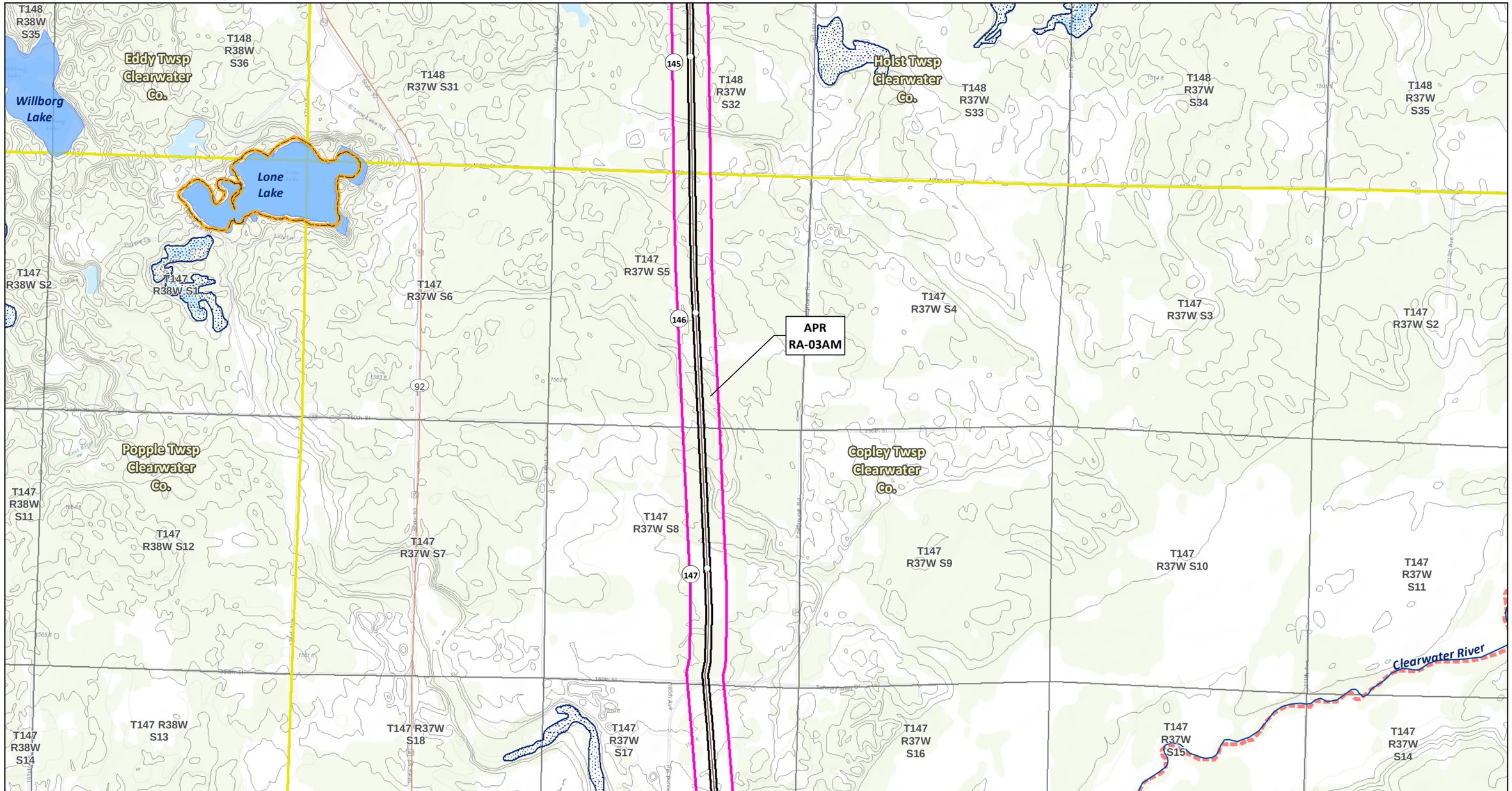

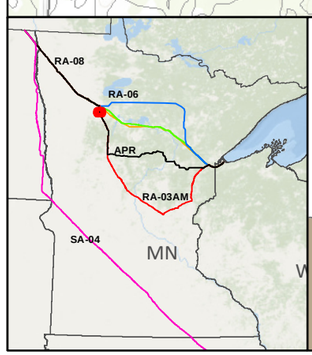

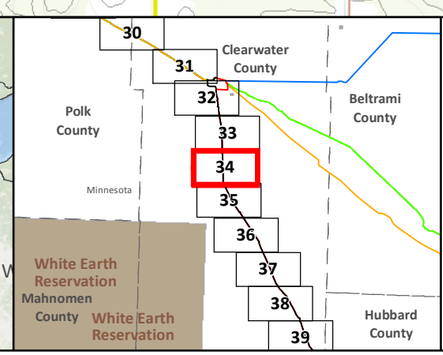

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 34B of 82

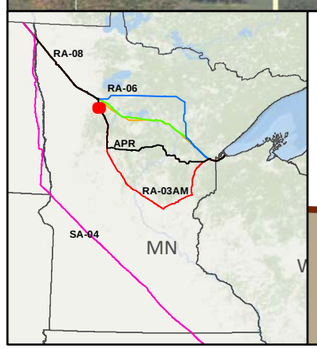

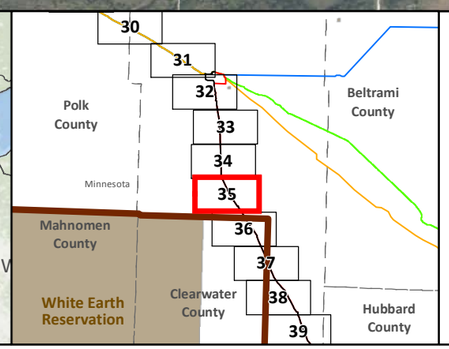

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 35A of 82

T147 R38W S13
T147 R37W S18
T147 R37W S17
T147 R37W S16
T147 R37W S15
T147 R37W S14
T147 R37W S13
T147 R38W S24
T147 R37W S19
T147 R37W S20
T147 R37W S21
T147 R37W S22
T147 R37W S23
T147 R37W S24
T147 R38W S25
T147 R37W S30
T147 R37W S29
T147 R37W S28
T147 R37W S27
T147 R37W S26
T147 R37W S25
T147 R38W S36
T147 R37W S31
T147 R37W S32
T147 R37W S33
T147 R37W S34
T147 R37W S35
T147 R37W S36

148
149
150
151
92
2

APR
RA-03AM

Copley Twsp
Clearwater
Co.

Popple Twsp
Clearwater
Co.

Sabe
Lake

Lake
Lomond

Bagley Twsp
Clearwater
Co.

Bagley

Bagley
WHPA

Unnamed Creek

Clearwater River

Mud
Lake

Walker Brook

Burlington Northern Santa Fe

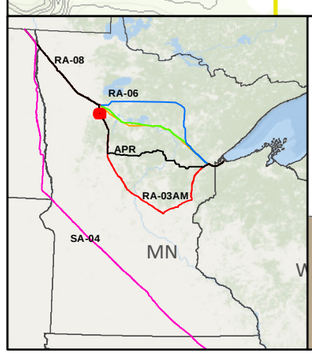

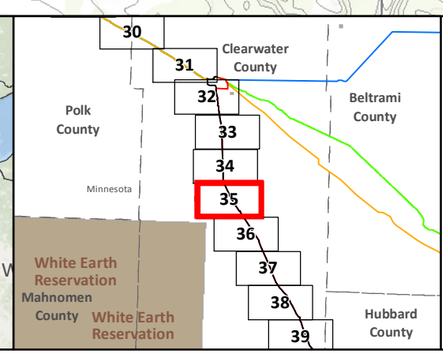

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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Water Resources
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- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 35B of 82

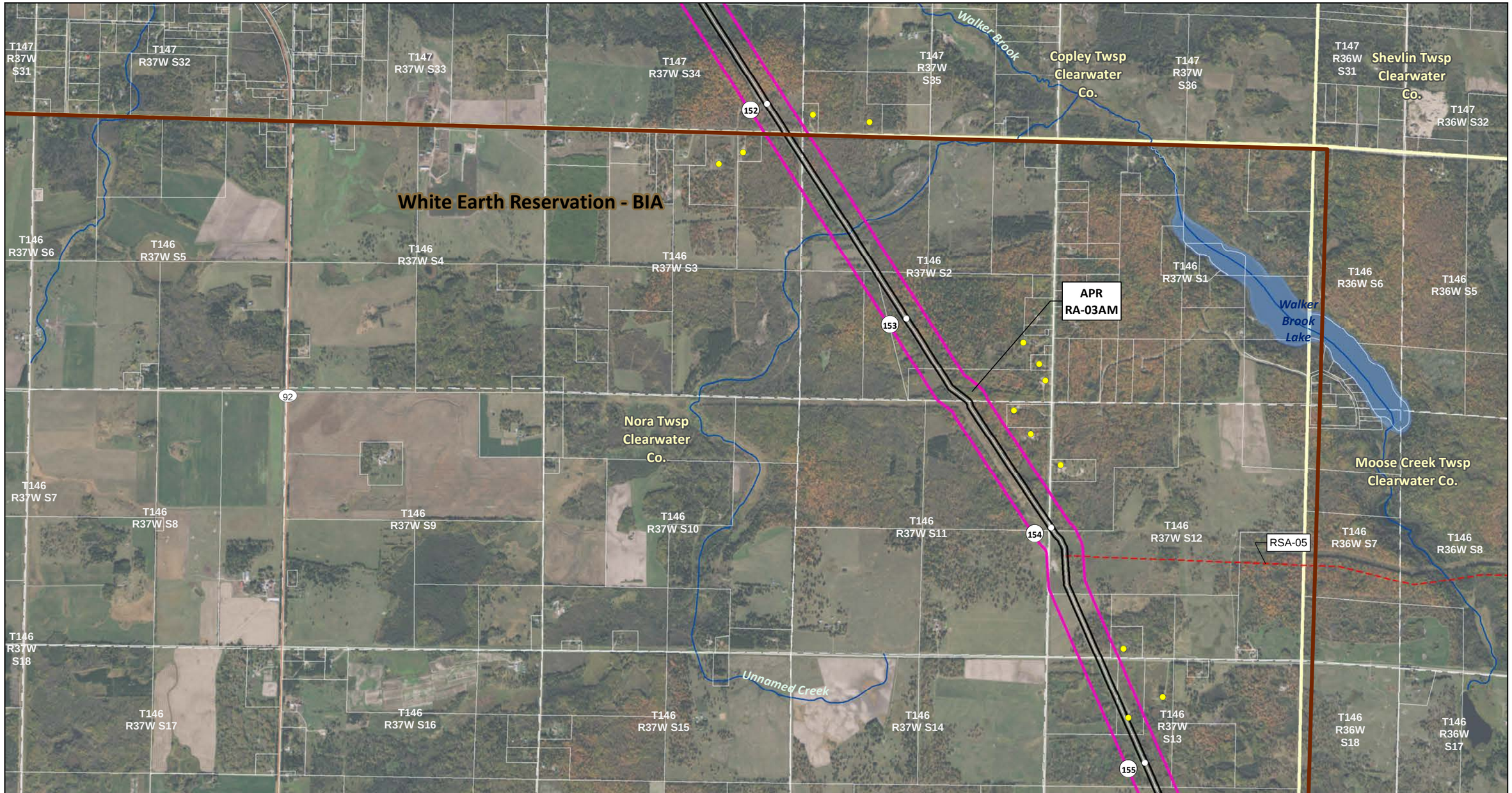

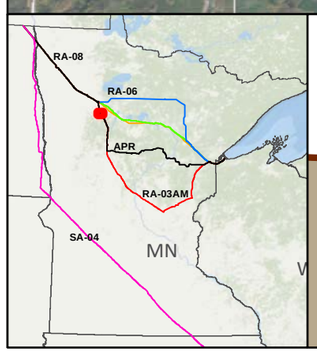

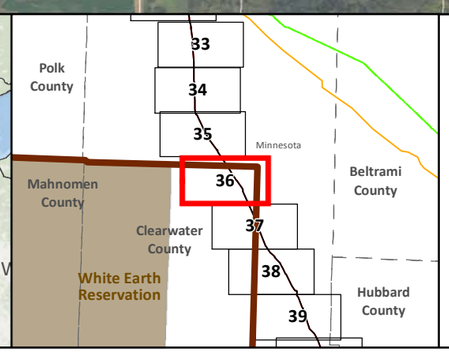

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
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Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

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Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 36A of 82

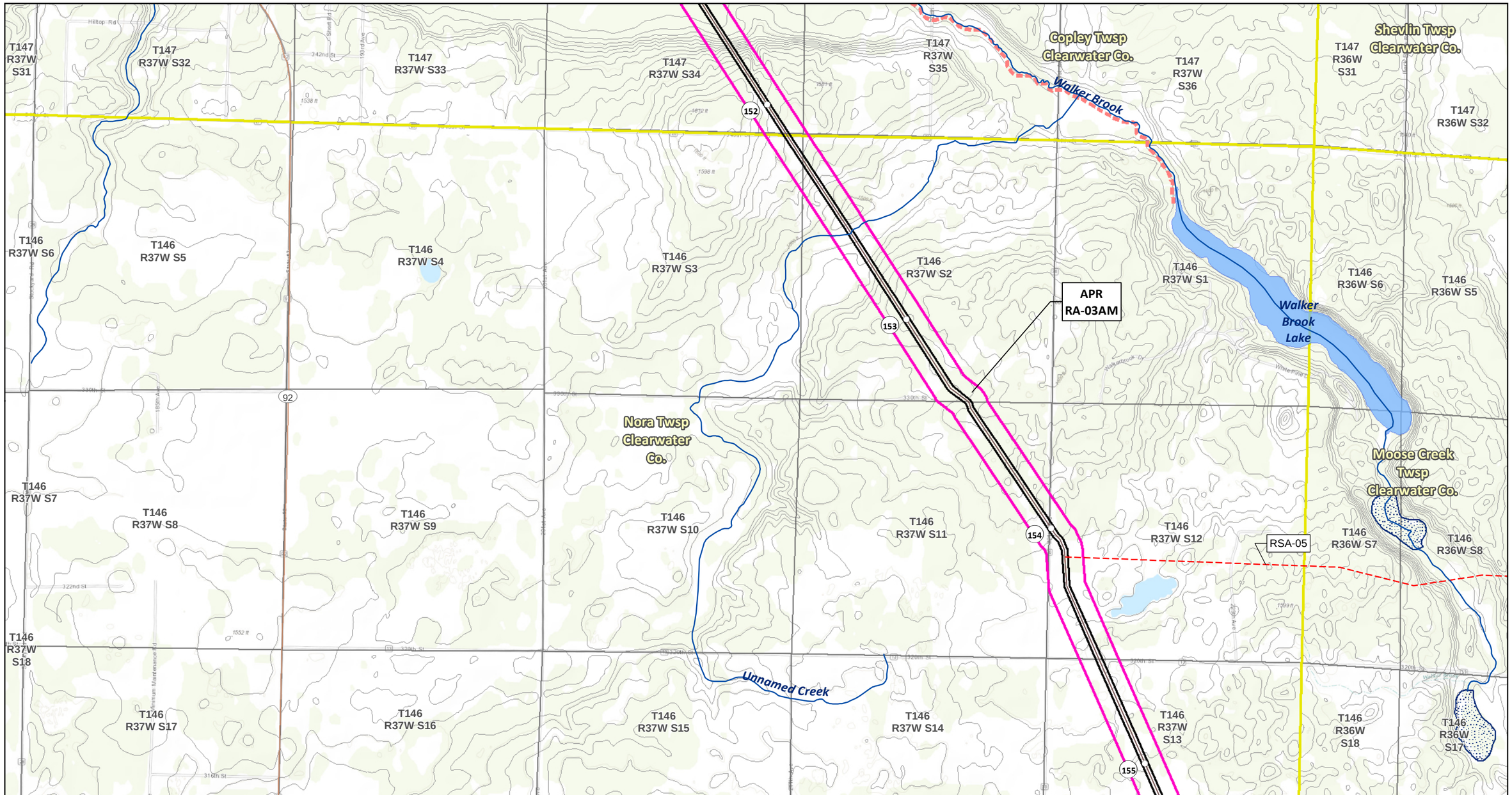

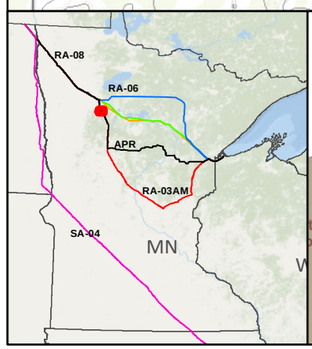

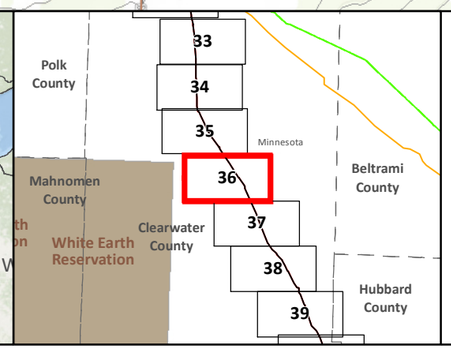

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
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Route Segment Alternatives (RSA)
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Native Plant Communities with Biodiversity Significance
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Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 36B of 82

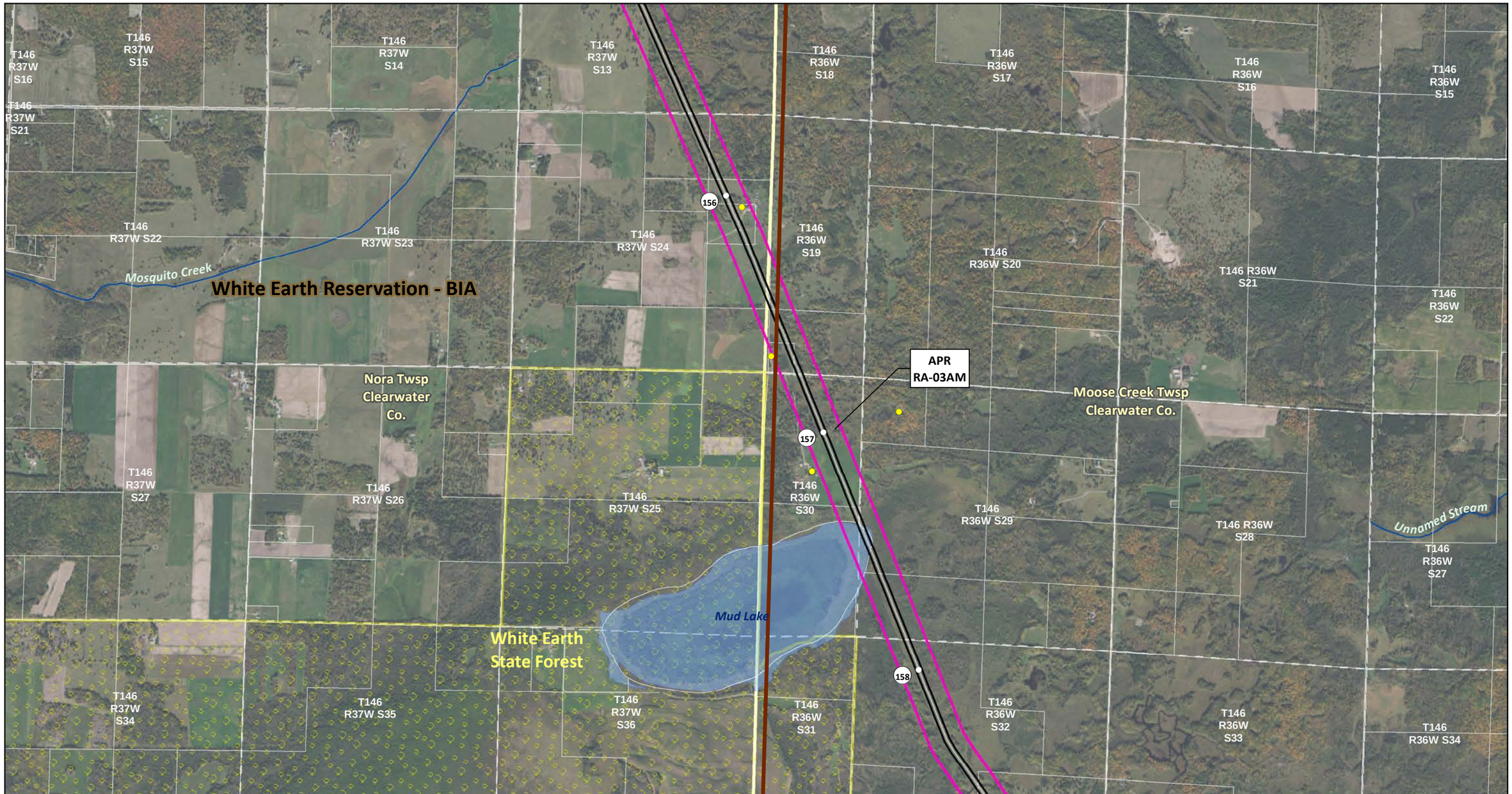

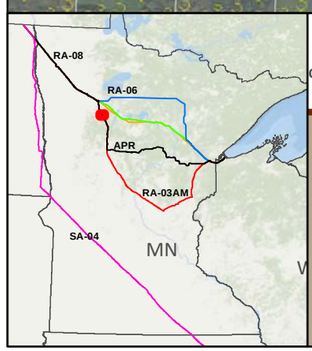

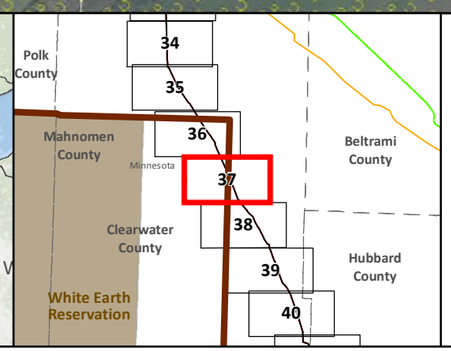

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 37A of 82

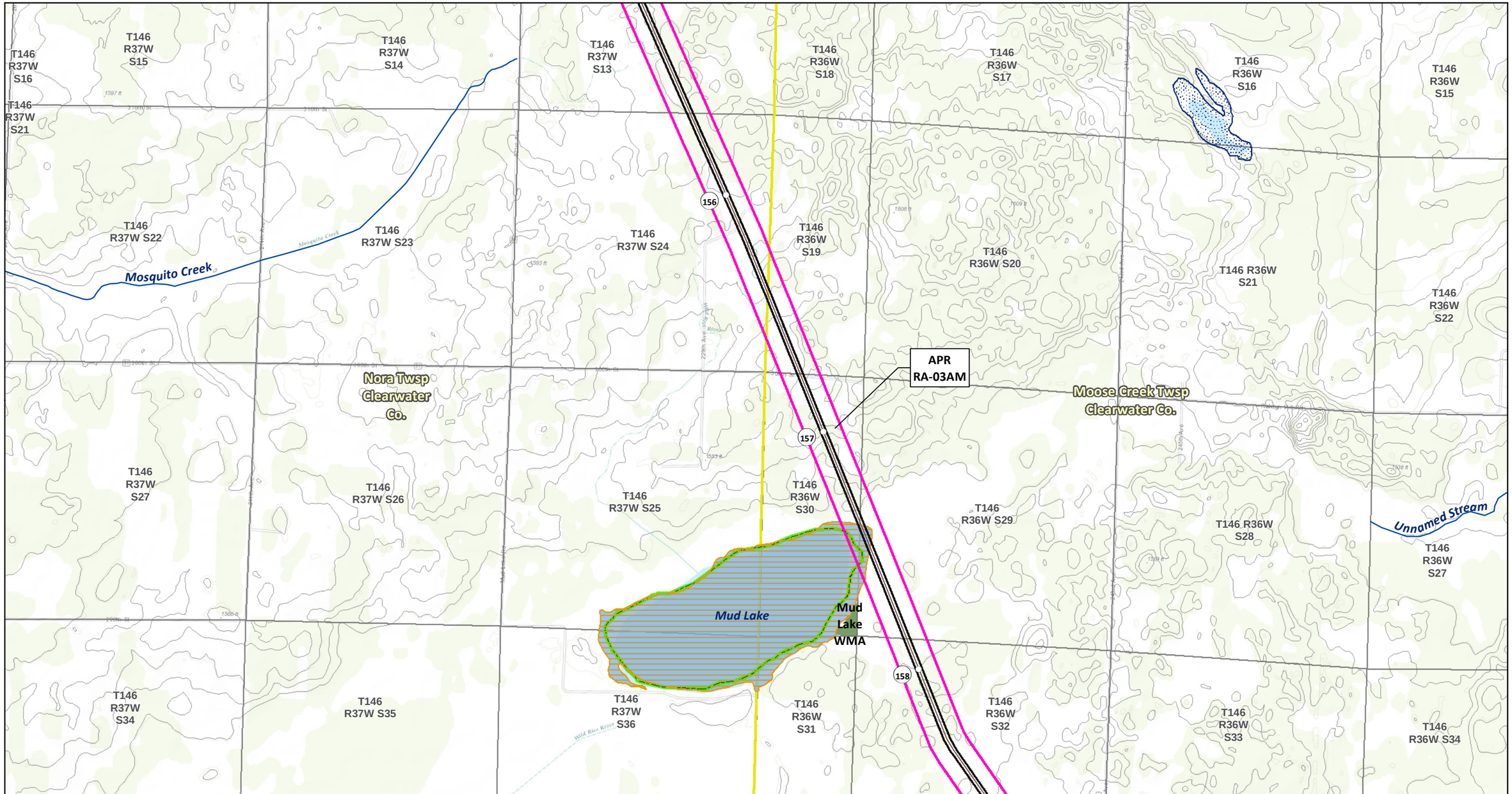

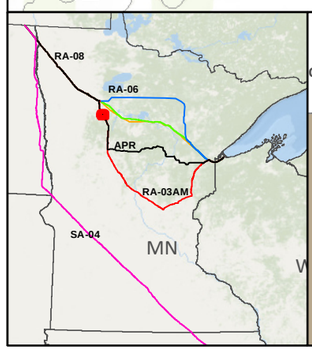

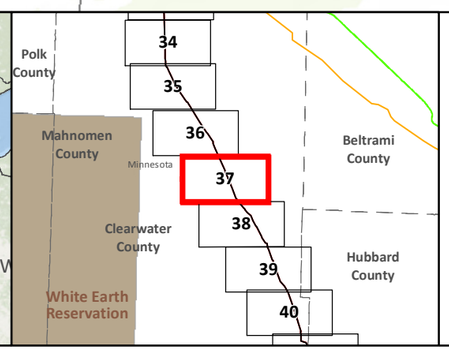

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 37B of 82

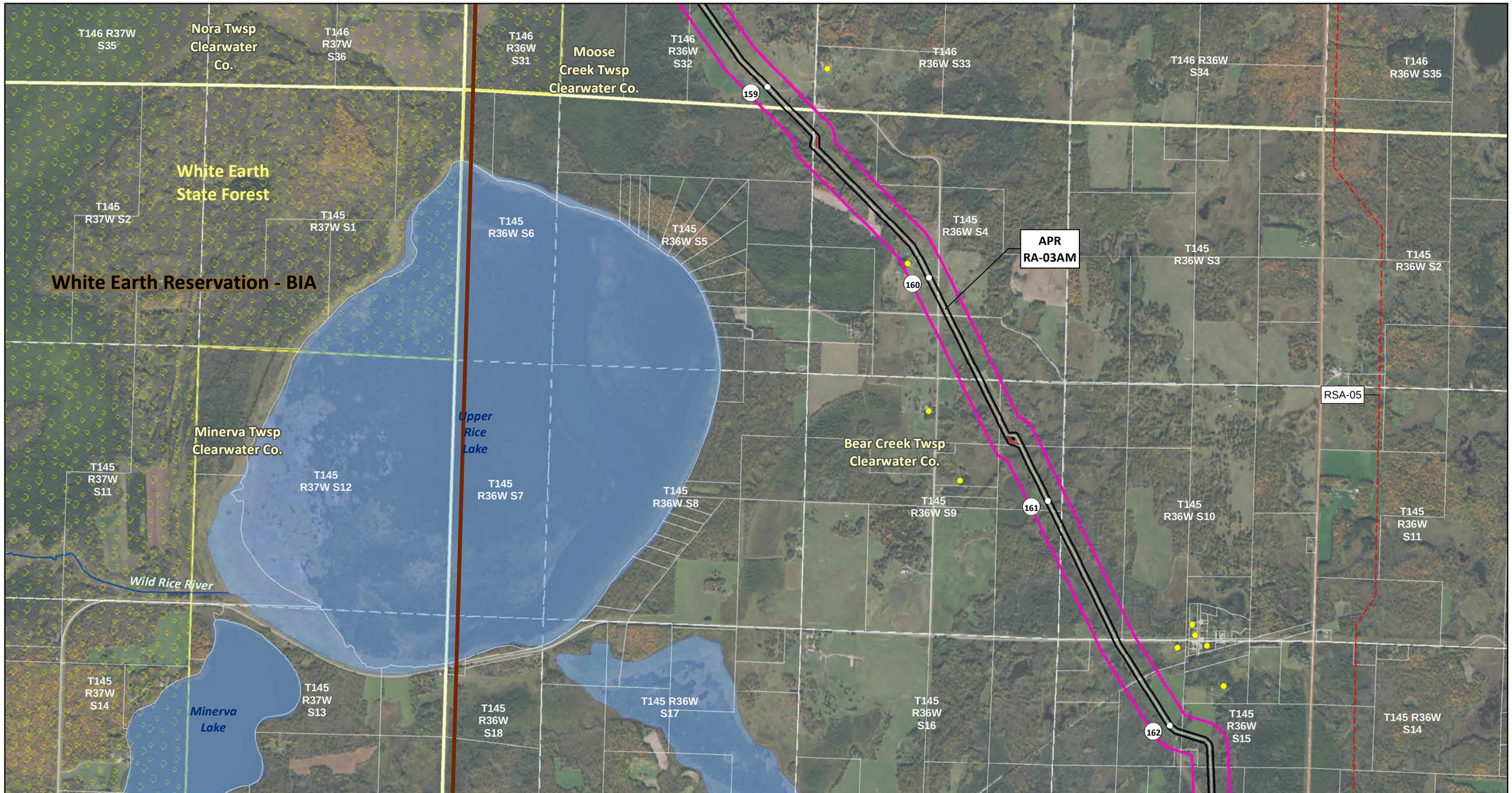

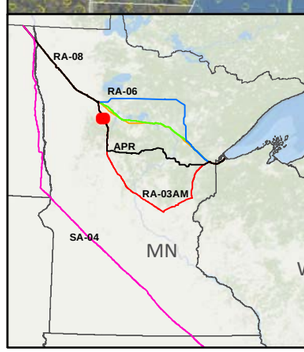

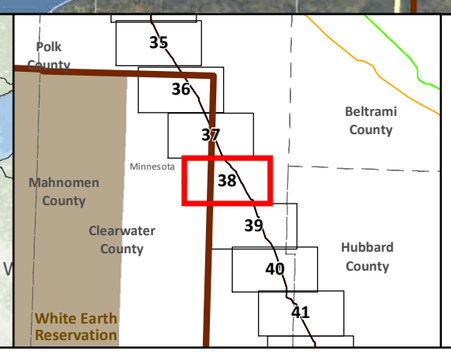

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 38A of 82

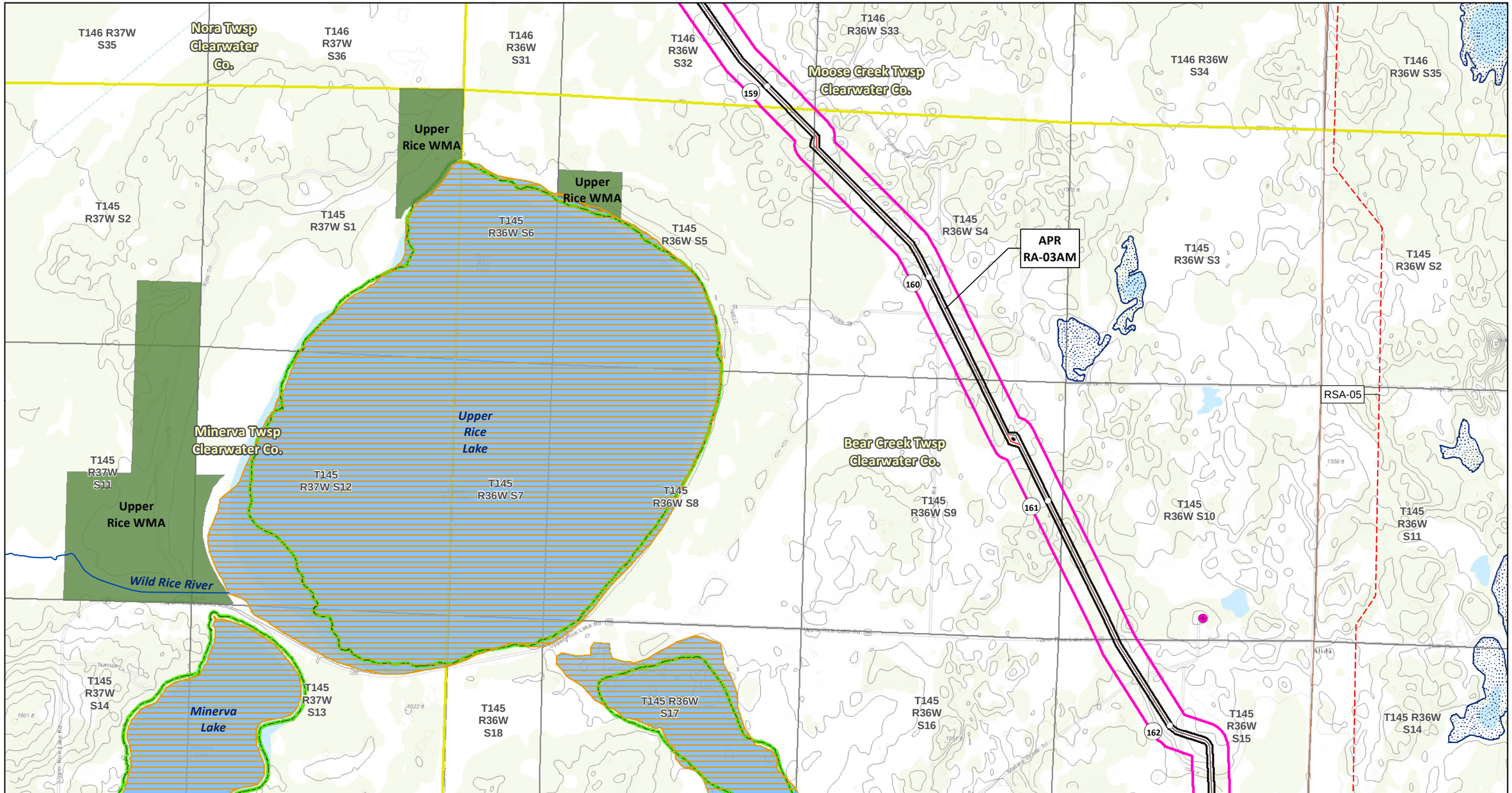

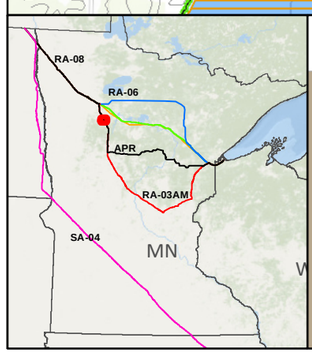

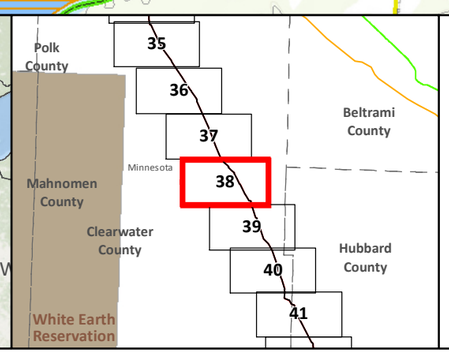

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 38B of 82

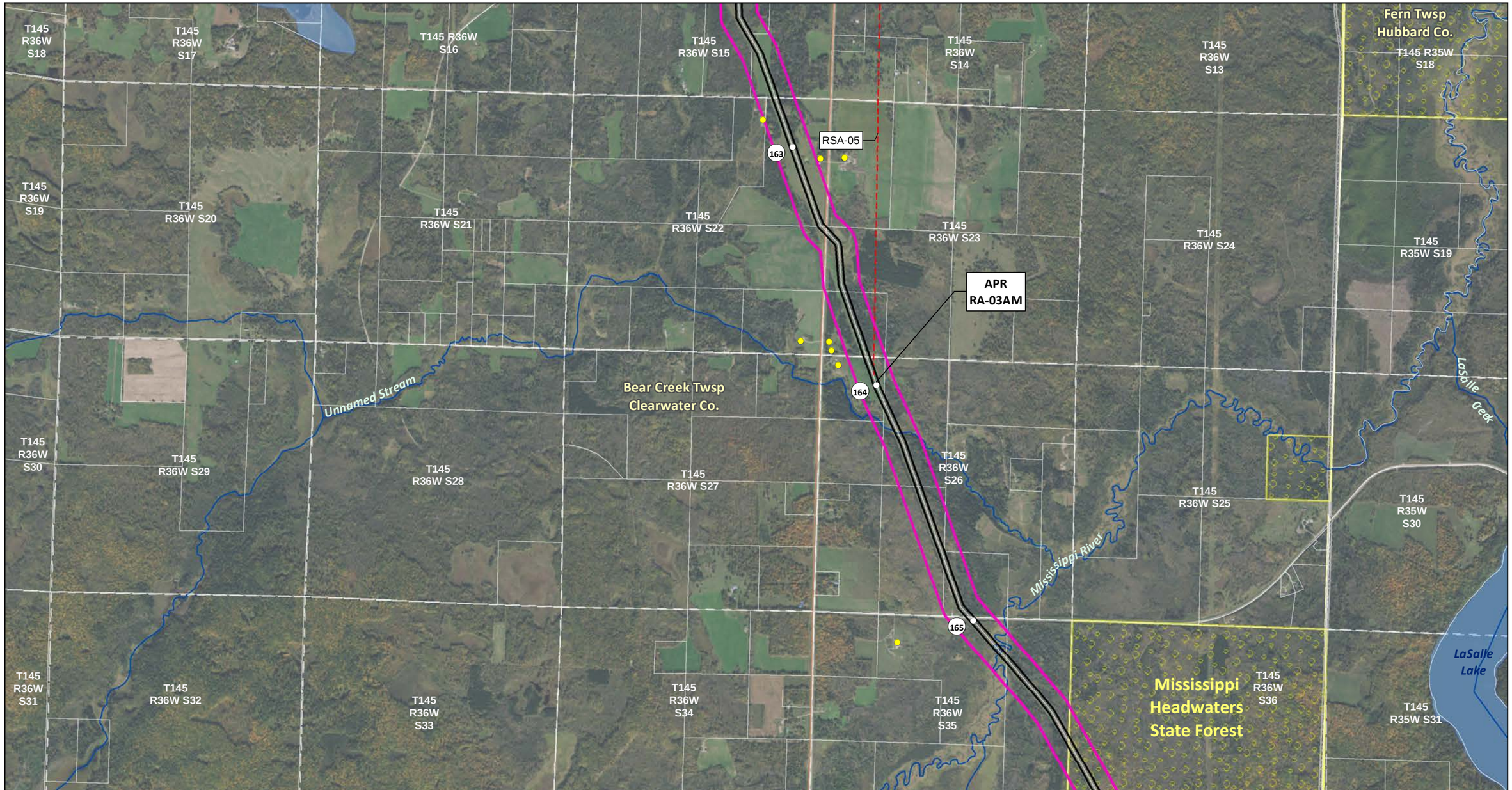

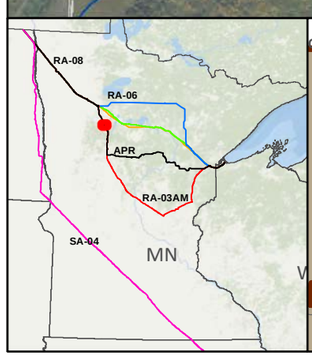

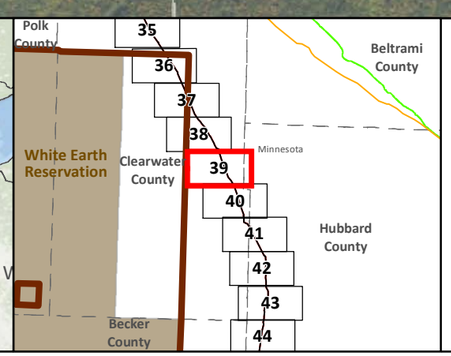

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 39A of 82

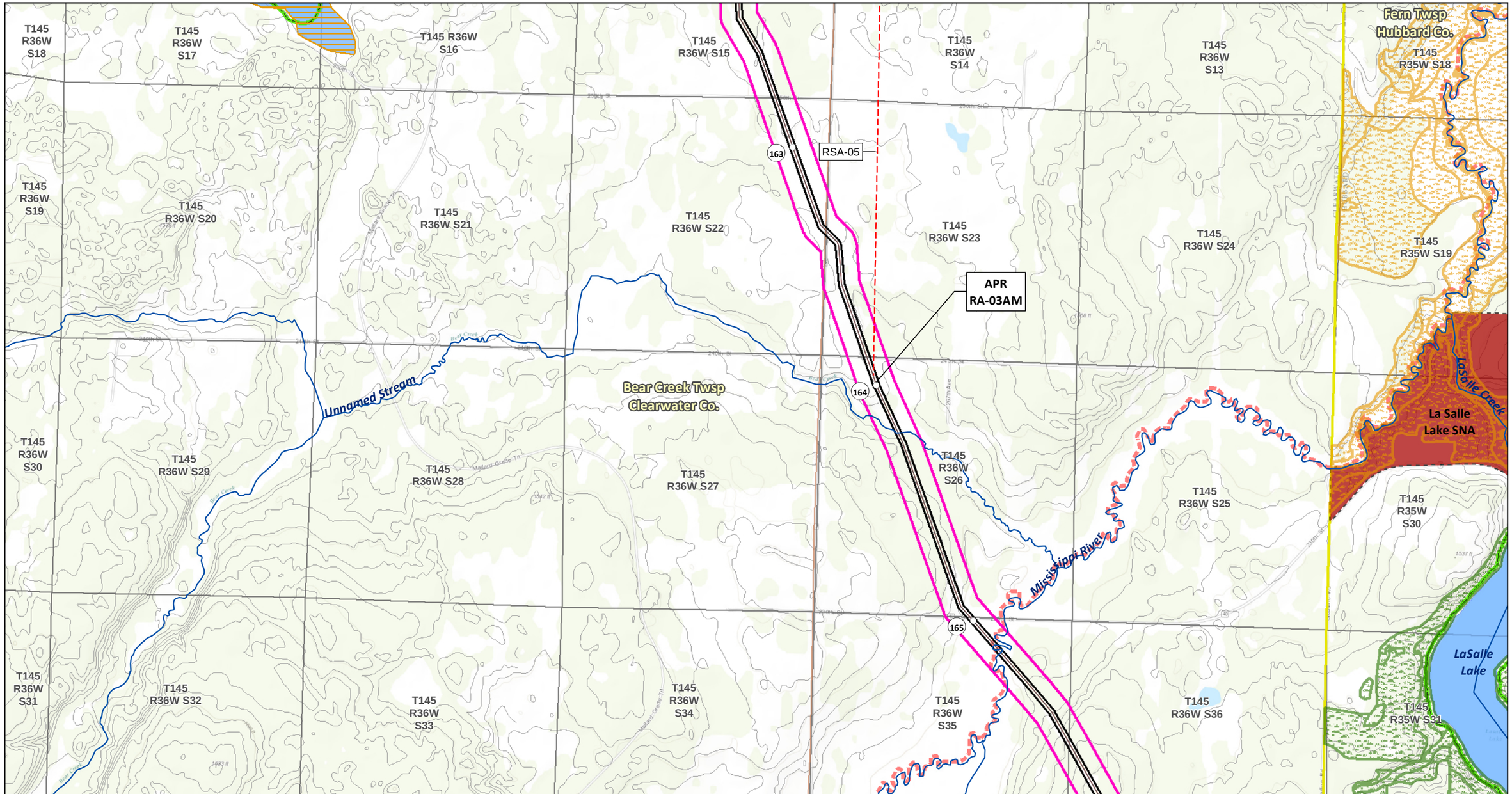

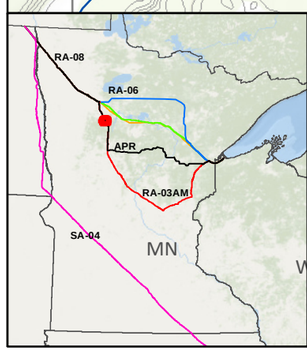

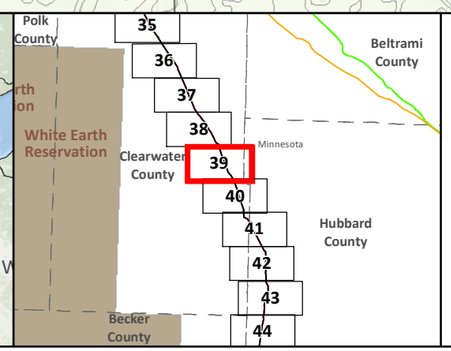

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 39B of 82

T145 R36W S33
T145 R36W S34
T145 R36W S35
Bear Creek Twsp Clearwater Co.
T145 R36W S36
Fern Twsp Hubbard Co.
T145 R35W S31
LaSalle Lake
T145 R35W S32
T145 R35W S33
Mississippi River
166
Itasca Twsp Clearwater Co.
Mississippi Headwaters State Forest
T144 R36W S5
Robinson Lake
T144 R36W S4
T144 R36W S3
T144 R36W S2
T144 R36W S1
T144 R35W S6
T144 R35W S5
APR RA-03AM
Middle LaSalle Lake
Lake Hattie Twsp Hubbard Co.
T144 R36W S8
T144 R36W S9
T144 R36W S10
Unnamed Stream
T144 R36W S11
T144 R36W S12
LaSalle Creek
T144 R35W S7
T144 R35W S8
168
RSA-10
Big LaSalle Lake
T144 R36W S17
T144 R36W S16
T144 R36W S15
T144 R36W S14
T144 R36W S13
T144 R35W S18
T144 R35W S17

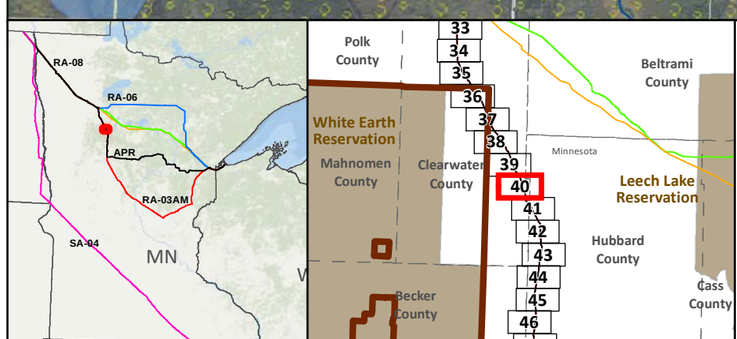

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 40A of 82

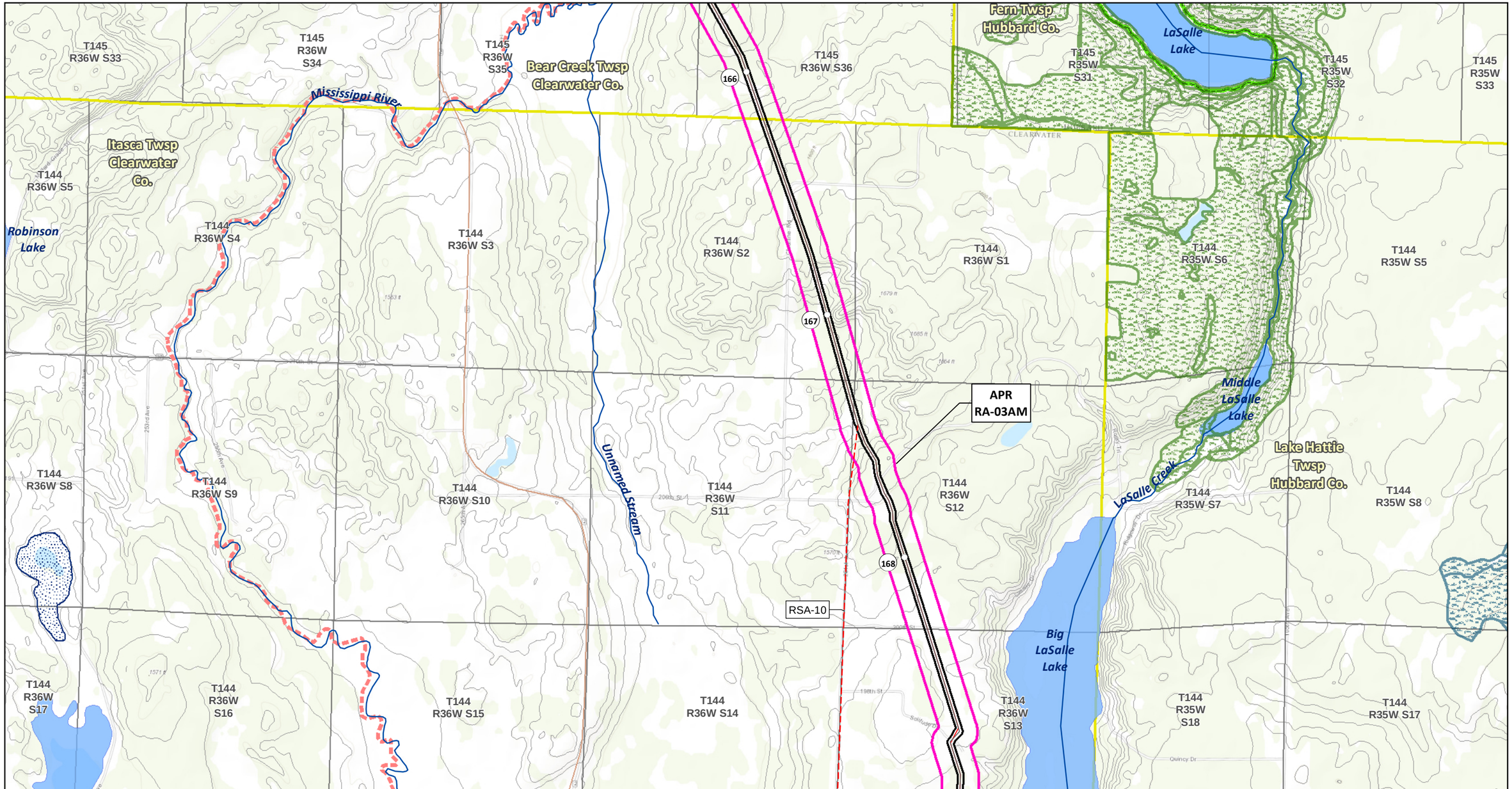

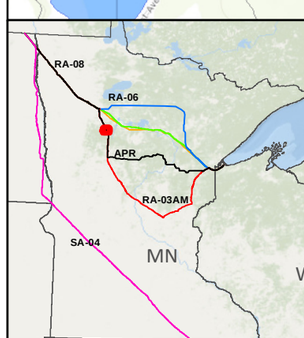

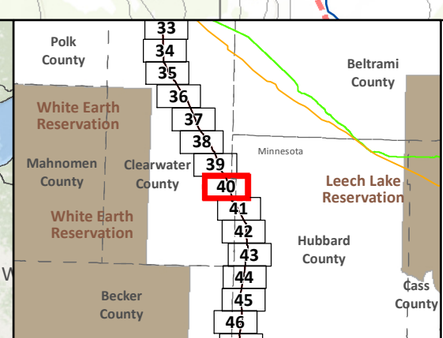

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 40B of 82

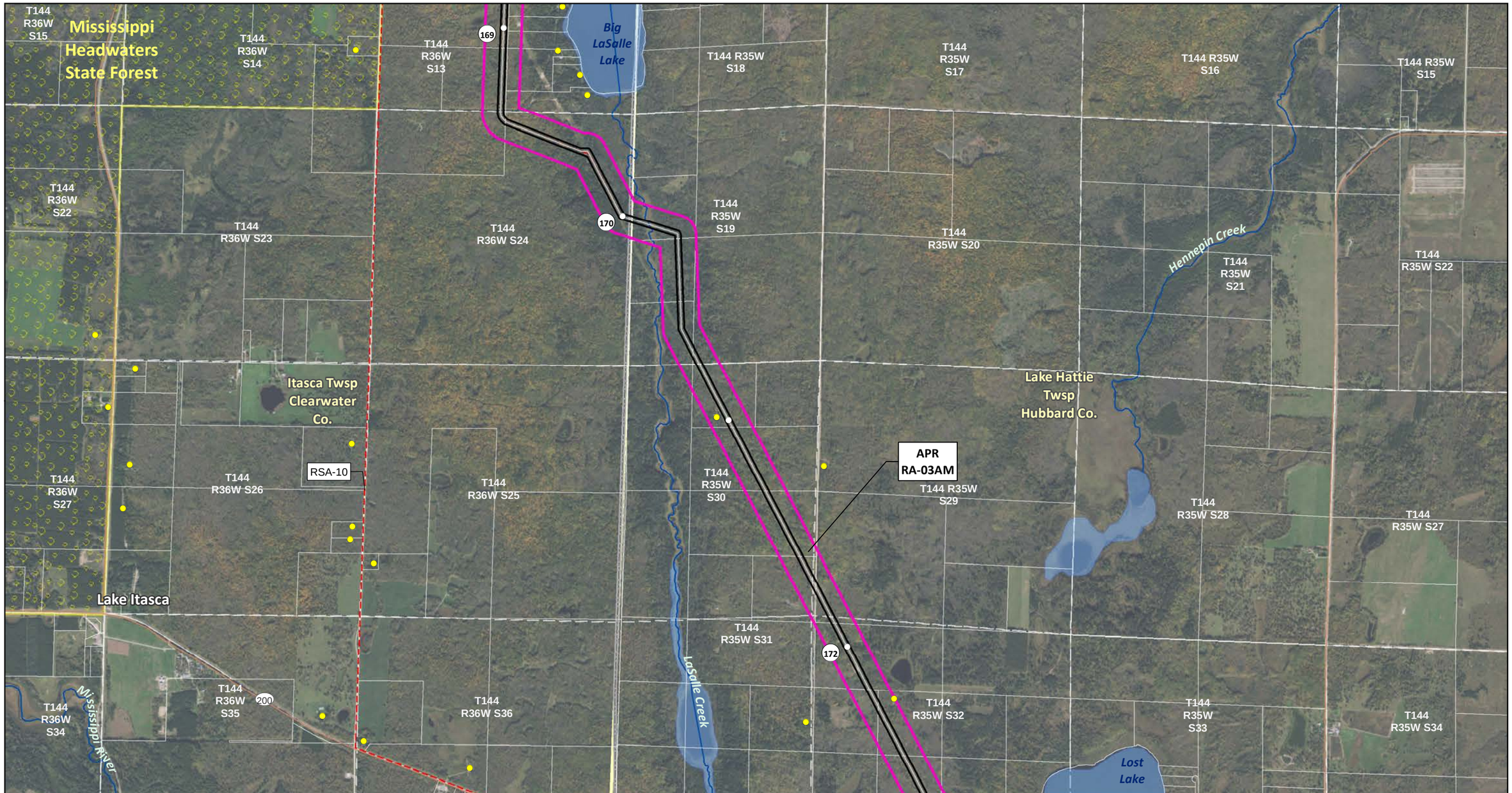

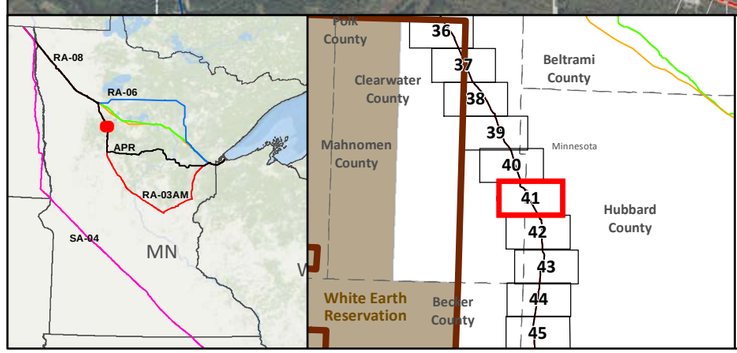

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 41A of 82

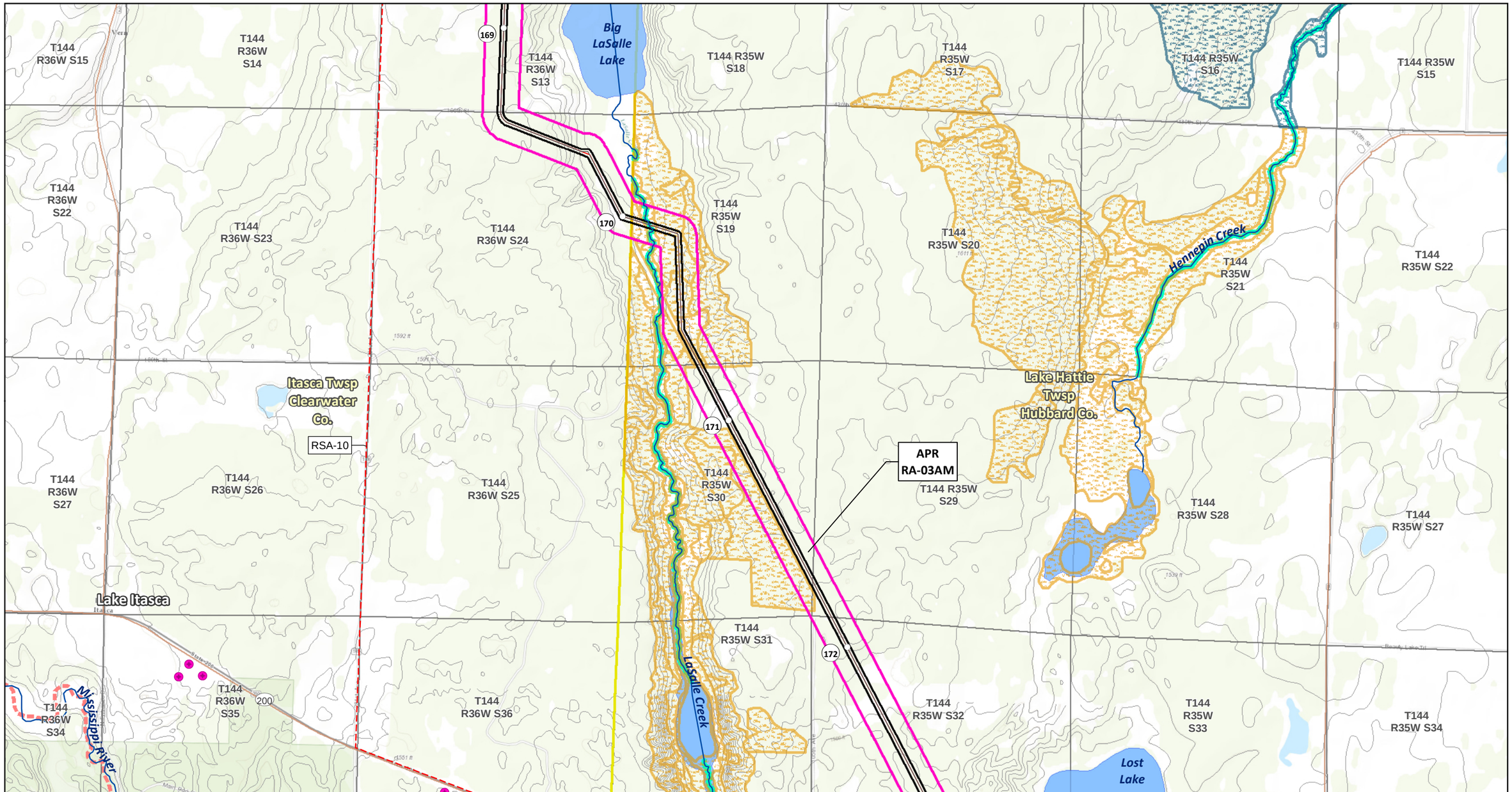

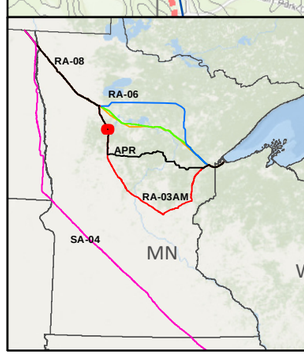

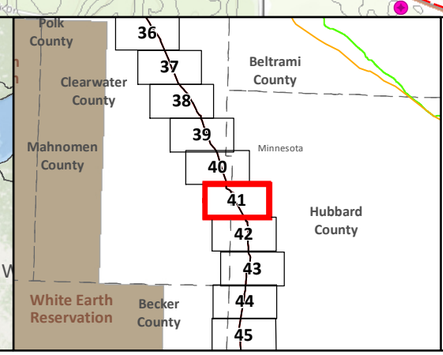

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
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- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 41B of 82

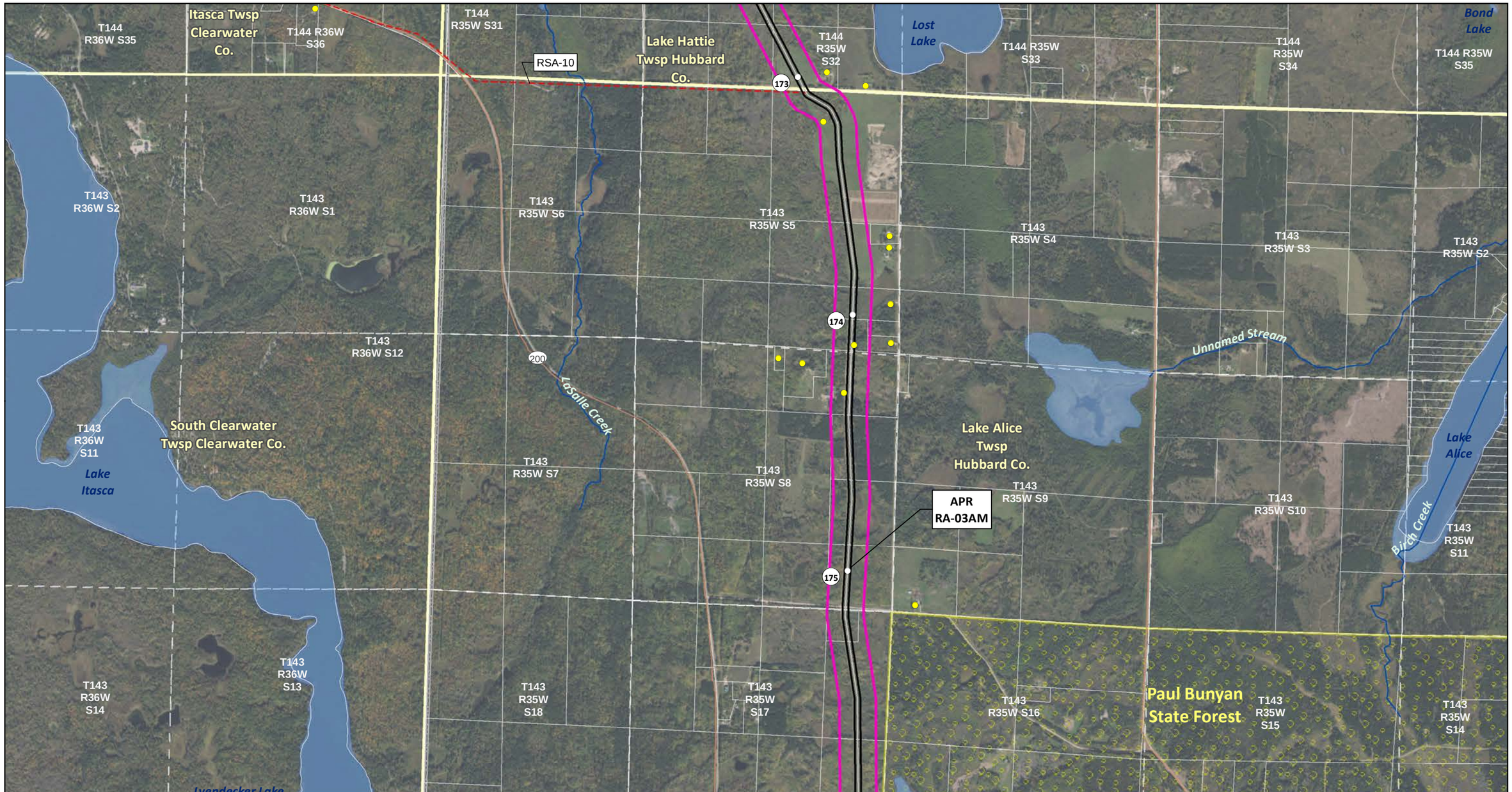

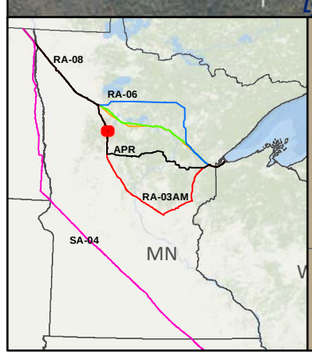

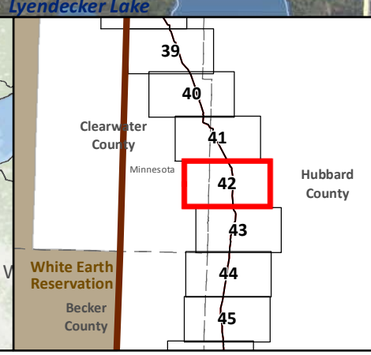

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 42A of 82

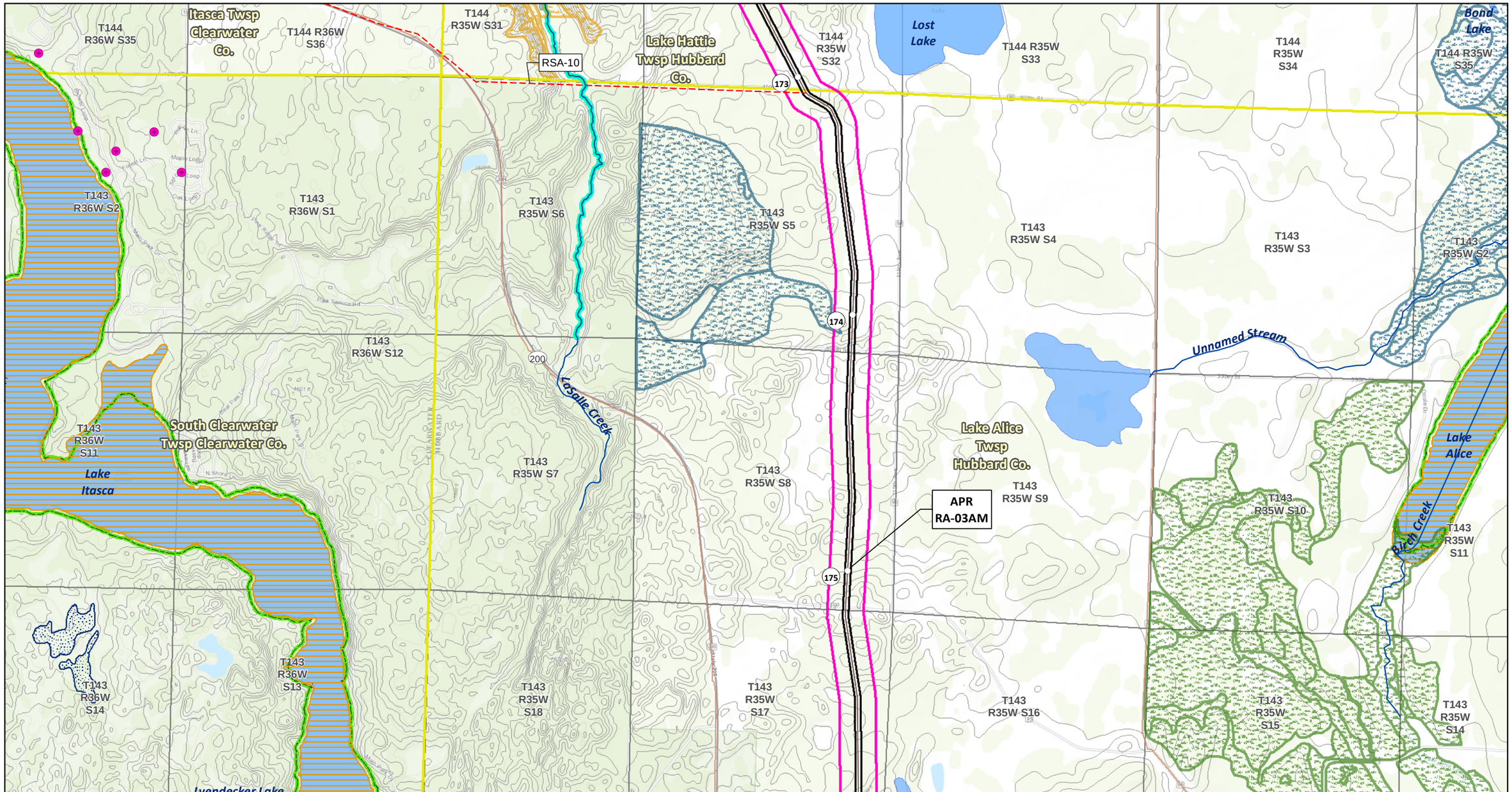

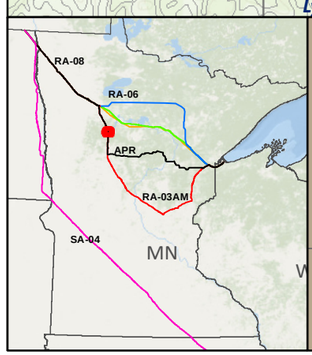

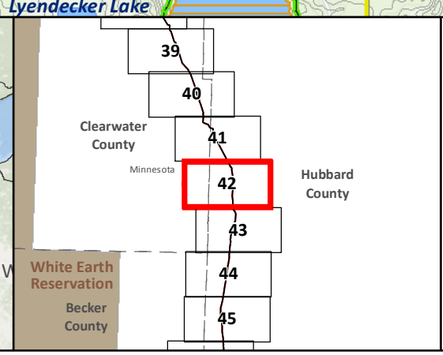

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 42B of 82

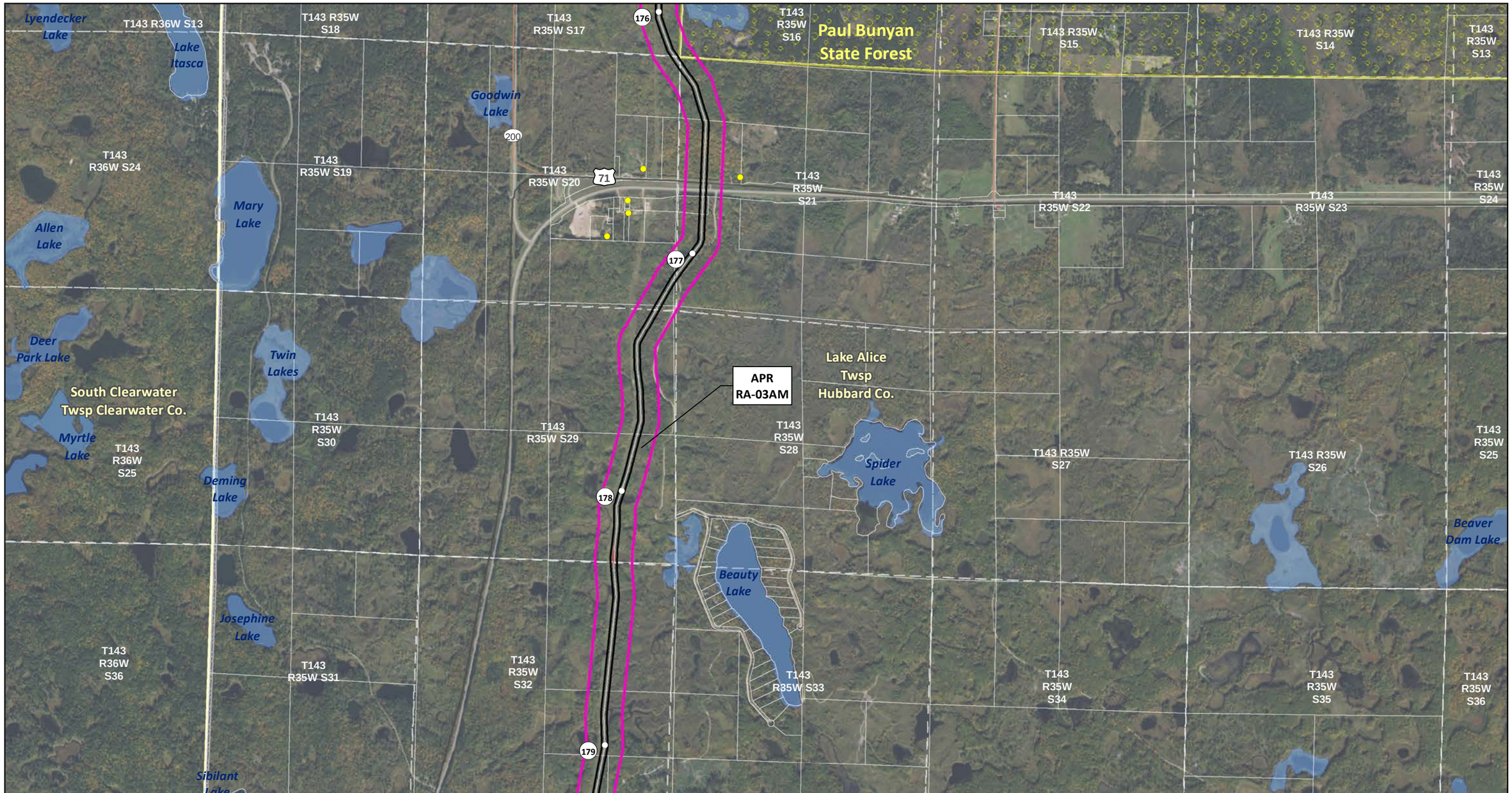

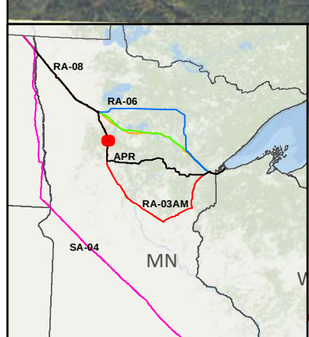

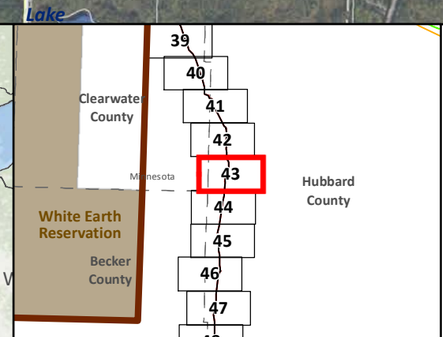

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 43A of 82

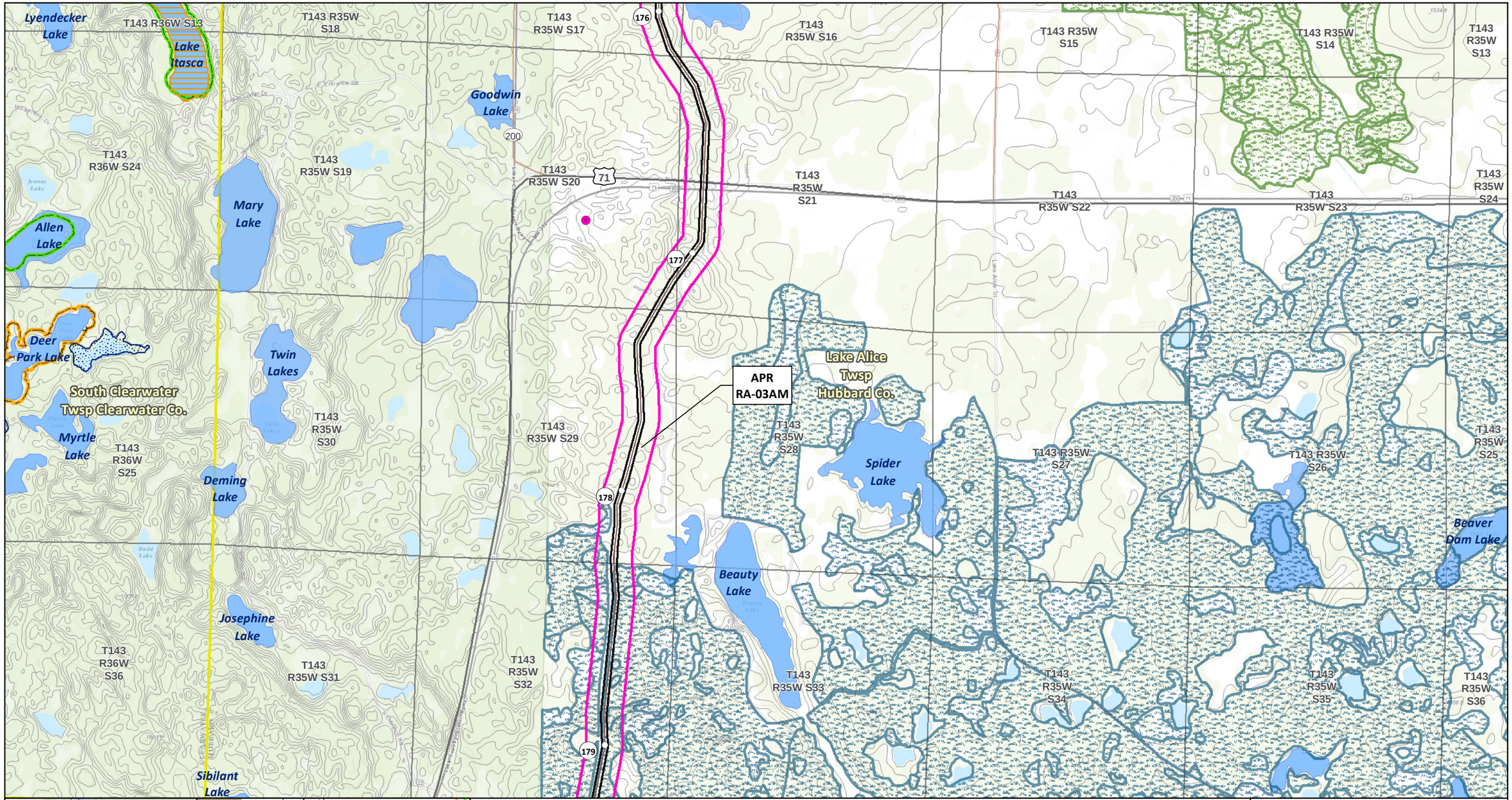

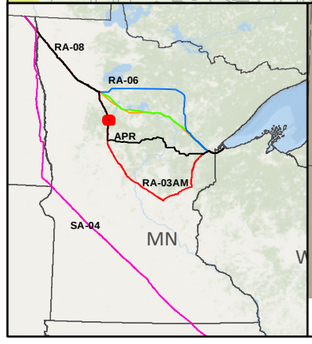

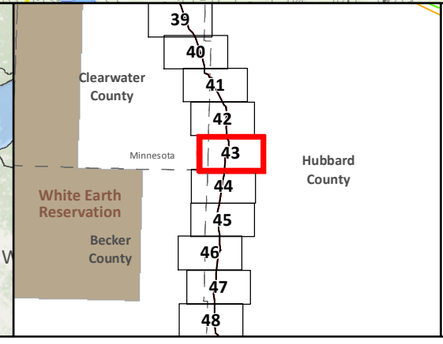

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 43B of 82

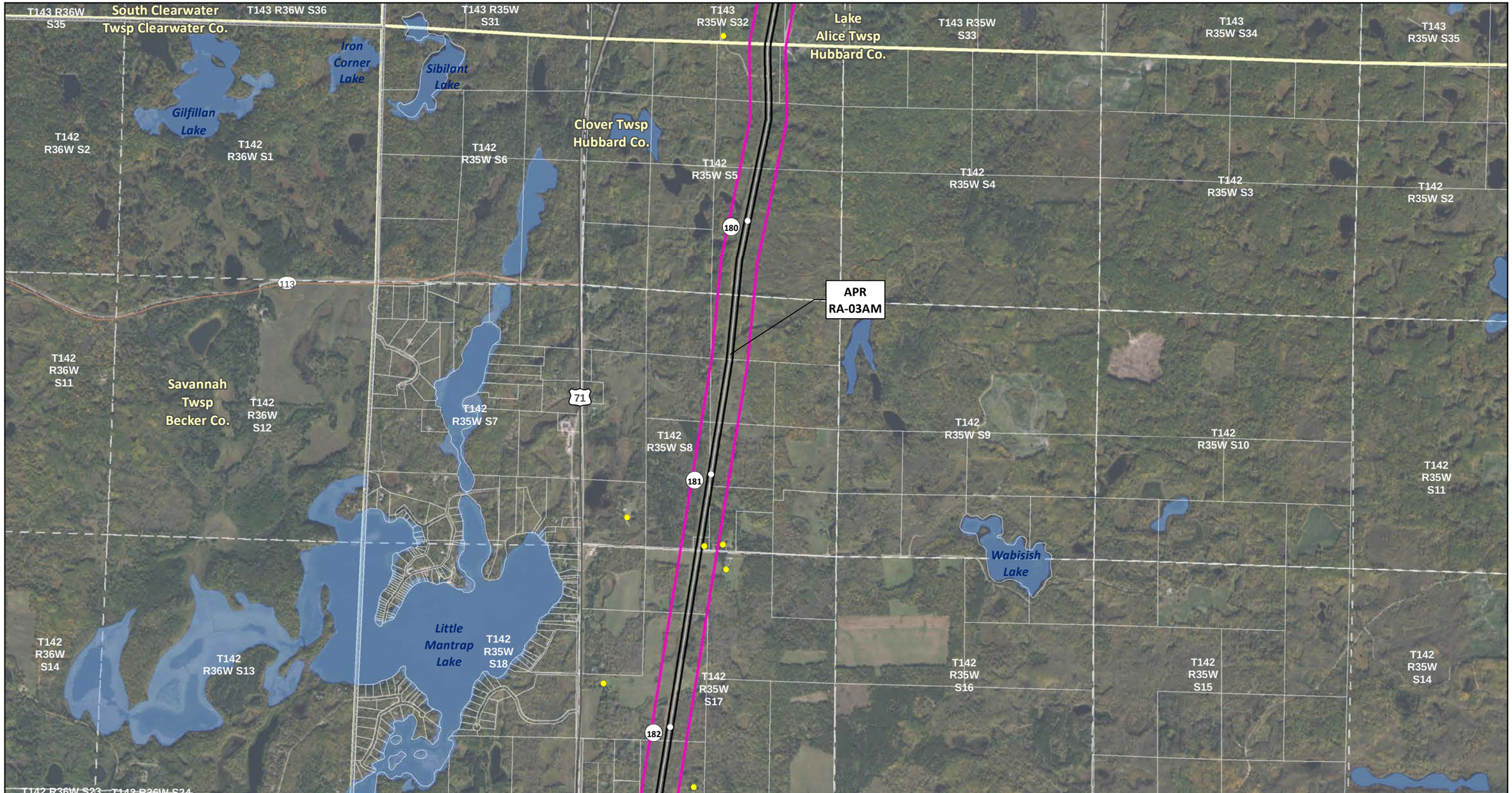

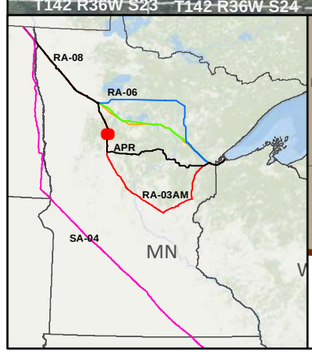

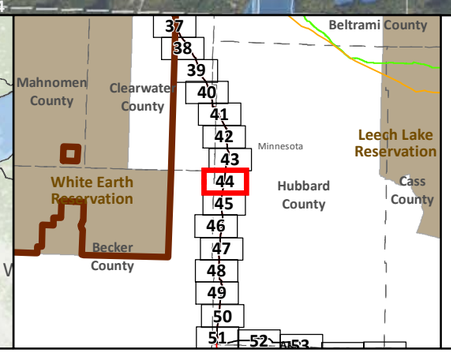

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 44A of 82

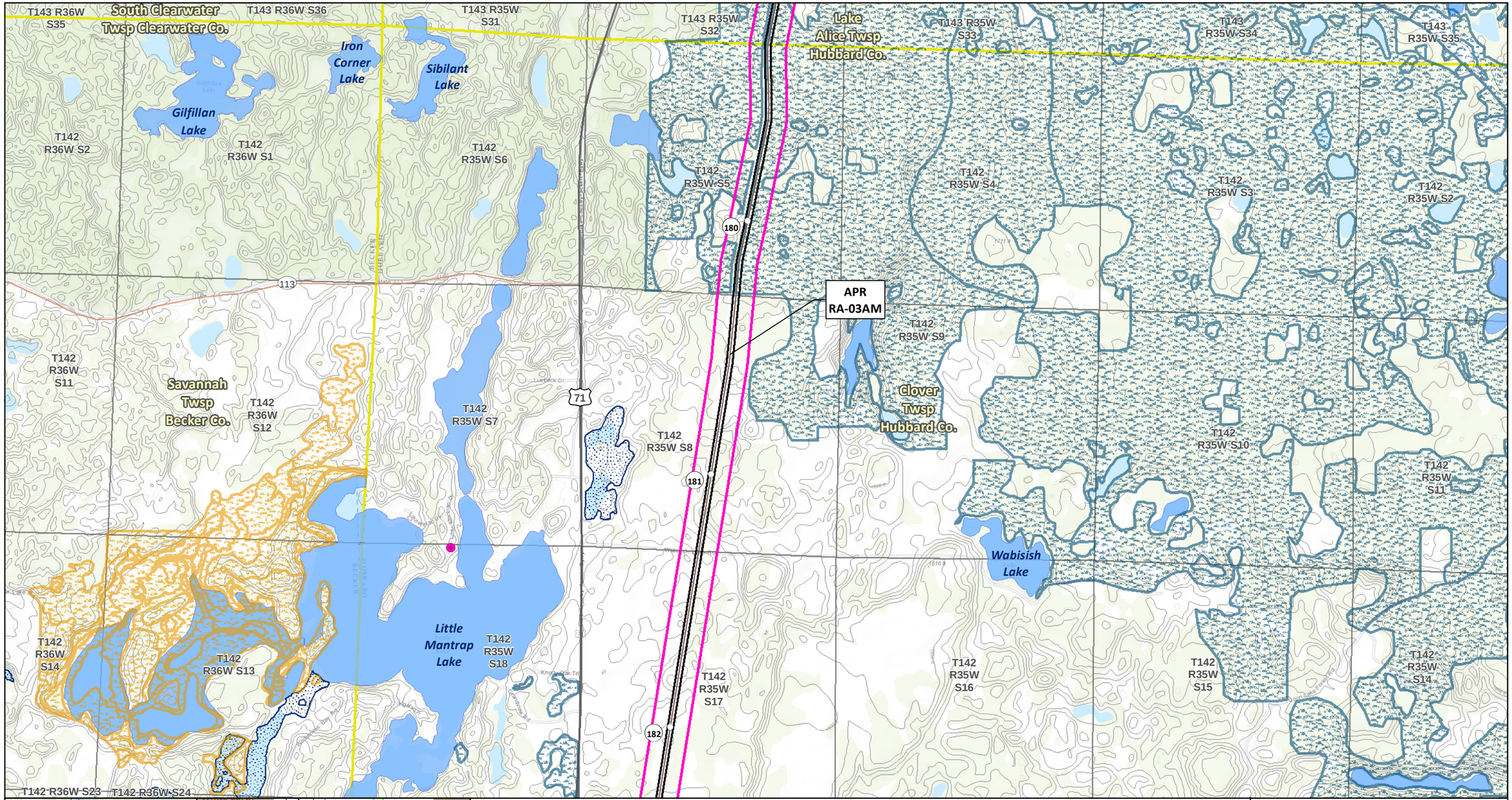

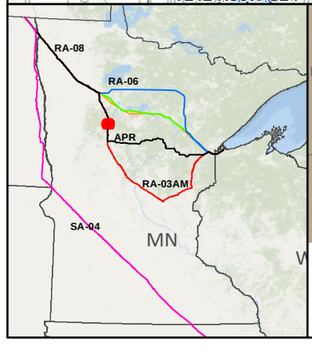

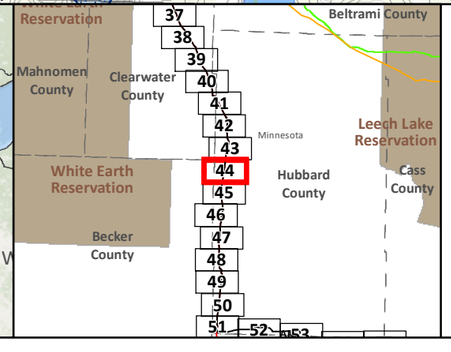

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 44B of 82

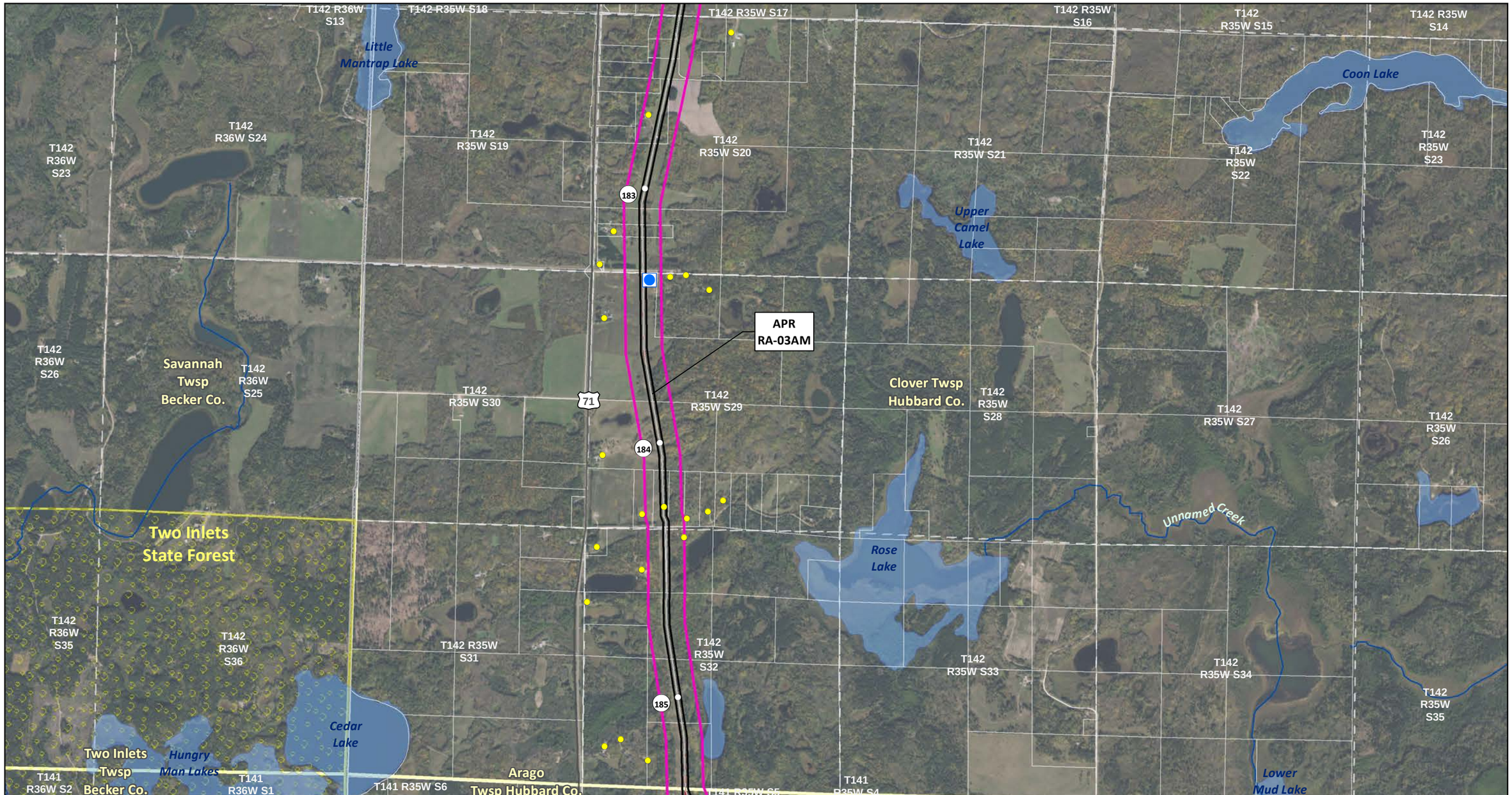

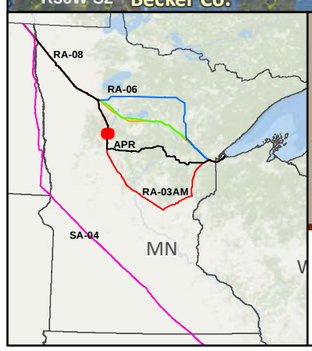

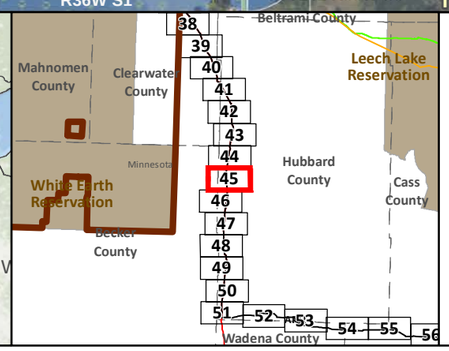

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 45A of 82

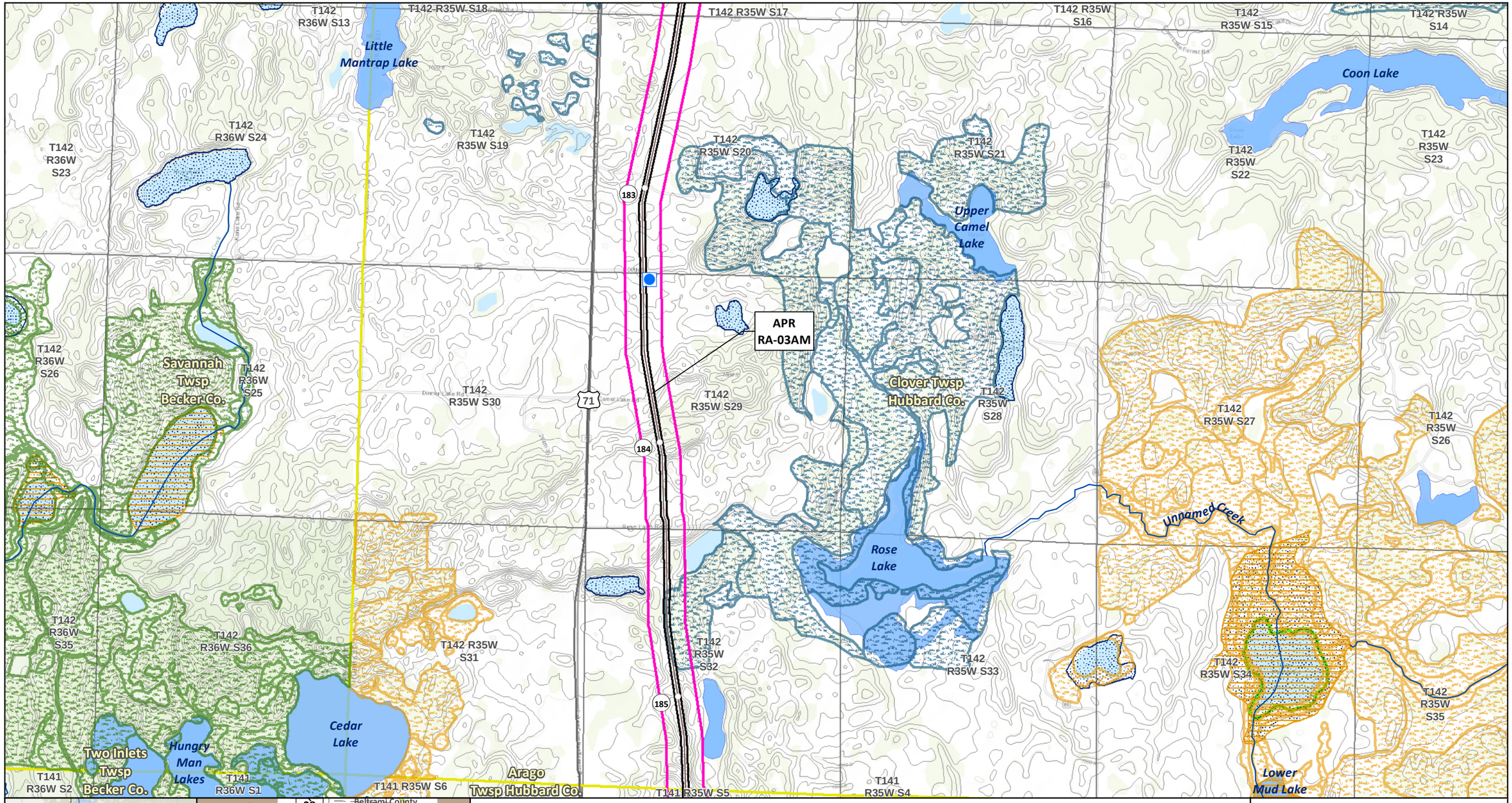

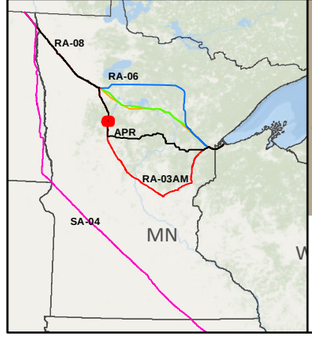

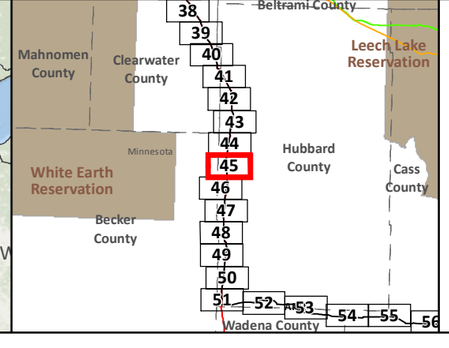

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Route Segment Alternatives (RSA)

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles 1:24,000

0 125 250 500 Meters 10ft Contours

N

Map 45B of 82

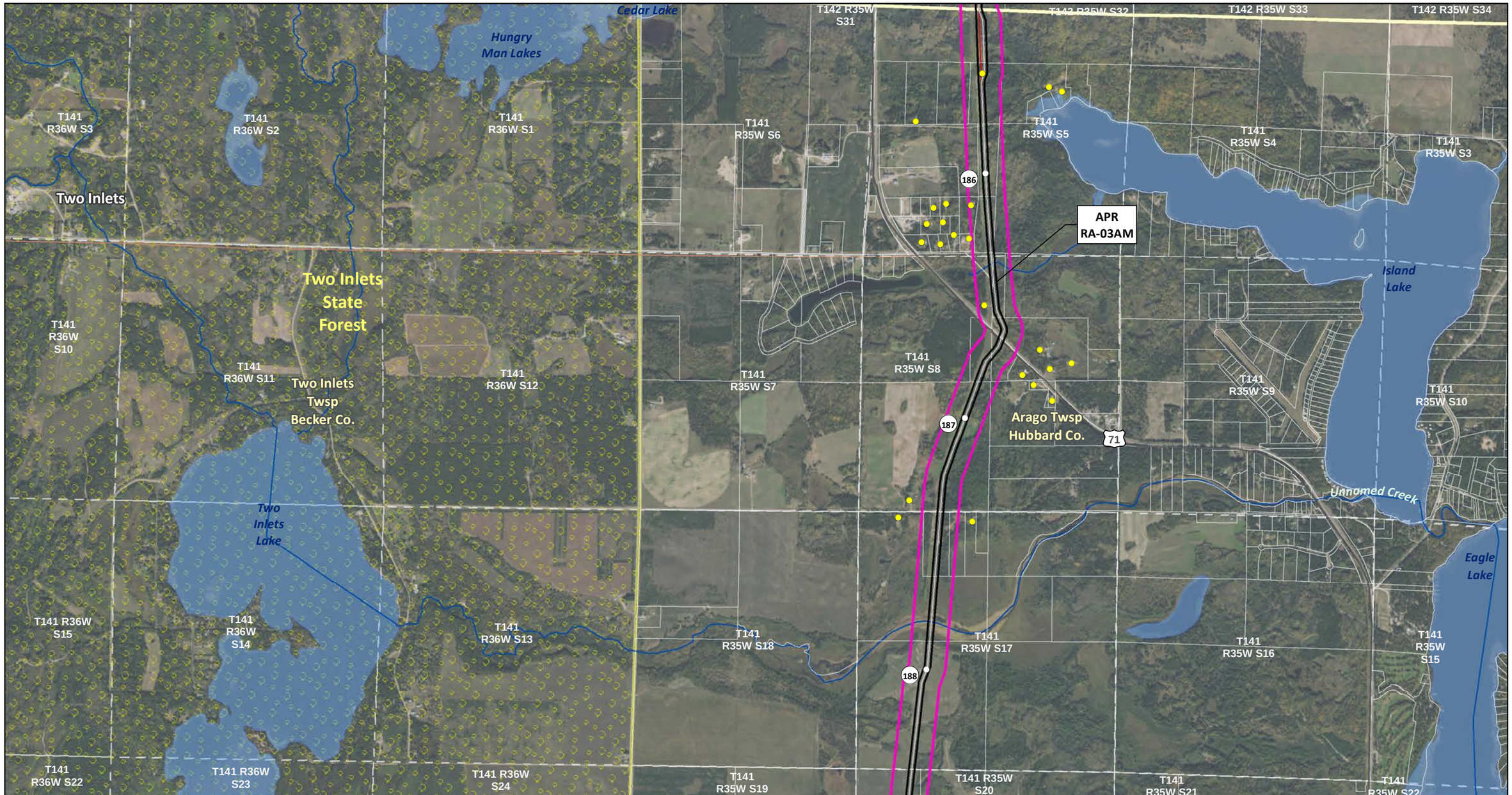

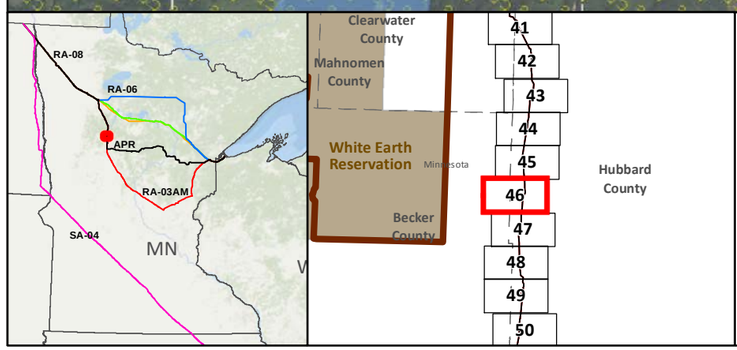

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 46A of 82

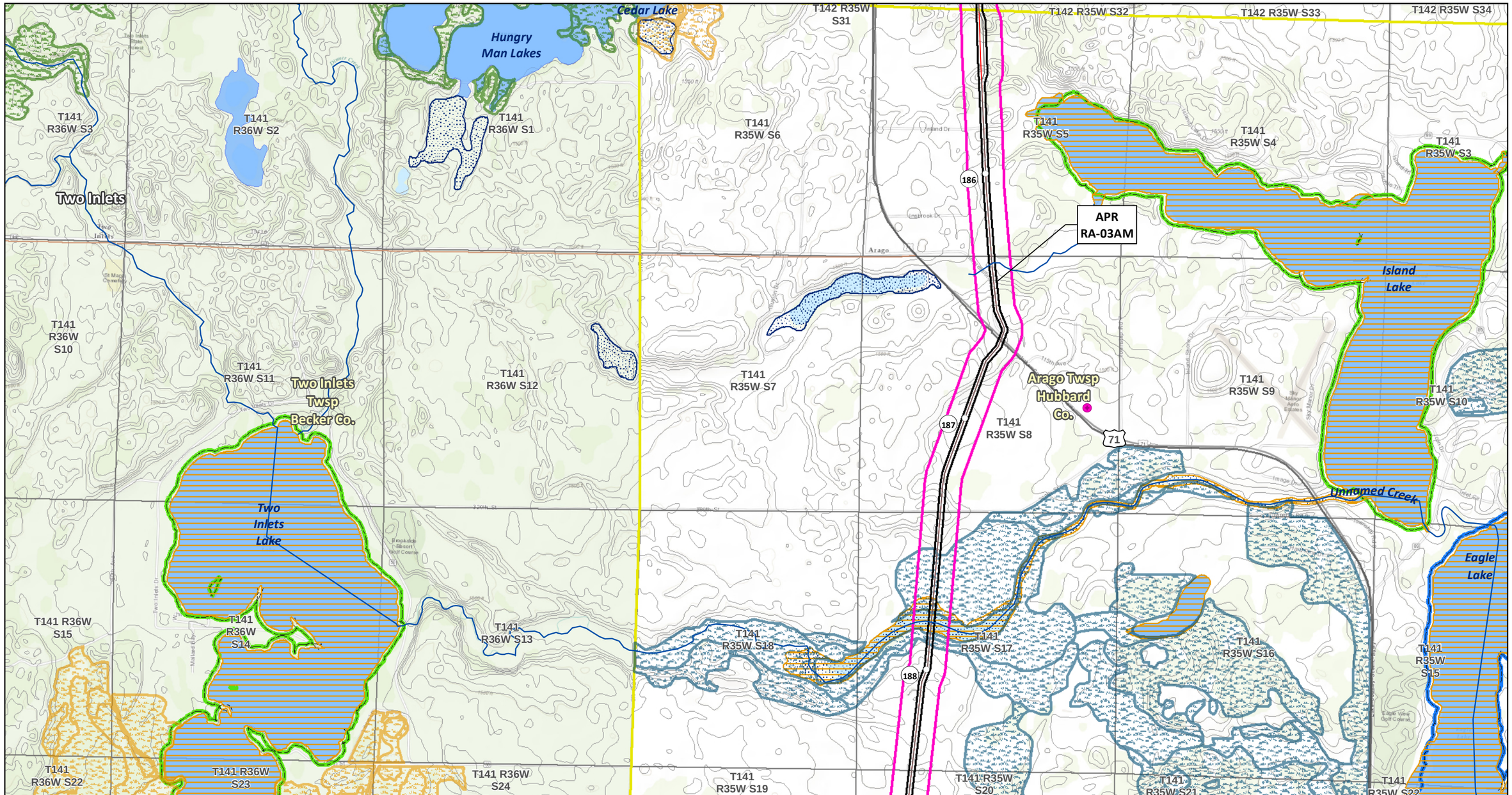

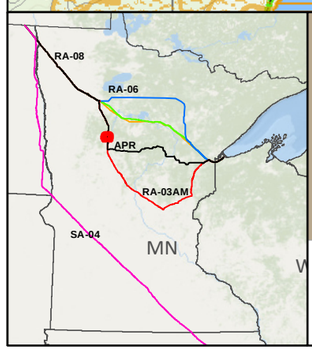

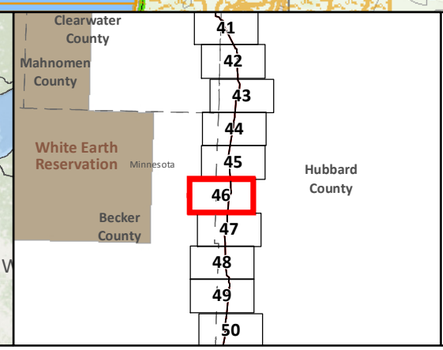

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
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Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 46B of 82

Two Inlets Lake
Unnamed Creek
T141 R36W S23
T141 R36W S24
Mud Lake
Ten Acre Lake
T141 R36W S26
T141 R36W S25
Two Inlets Twsp Becker Co.
Two Inlets State Forest
T141 R36W S35
Fools Lake
Horseshoe Lake
T141 R36W S36
T141 R35W S19
T141 R35W S20
APR RA-03AM
189
T141 R35W S21
Eagle Lake
T141 R35W S22
T141 R35W S23
Potato Lake
T141 R35W S30
190
T141 R35W S29
Beden Lake
Arago Twsp Hubbard Co.
T141 R35W S28
T141 R35W S27
T141 R35W S26
71
Sloan Lake
T141 R35W S31
191
T141 R35W S32
T141 R35W S33
T141 R35W S34
T141 R35W S35
T140 R36W S2
Osage Twsp Becker Co.
T140 R36W S1
T140 R35W S6
Portage Lake
T140 R35W S5
Todd Twsp Hubbard Co.
T140 R35W S4
T140 R35W S3

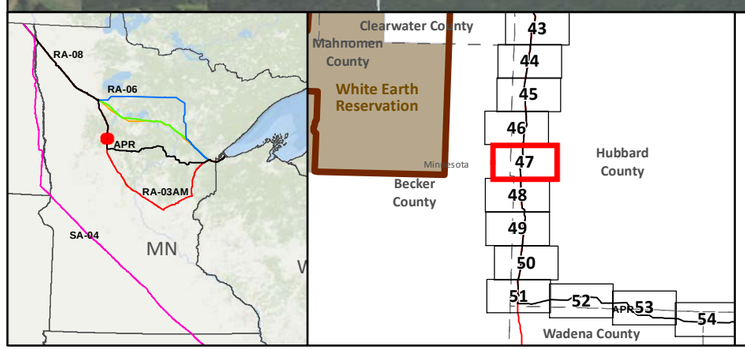

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

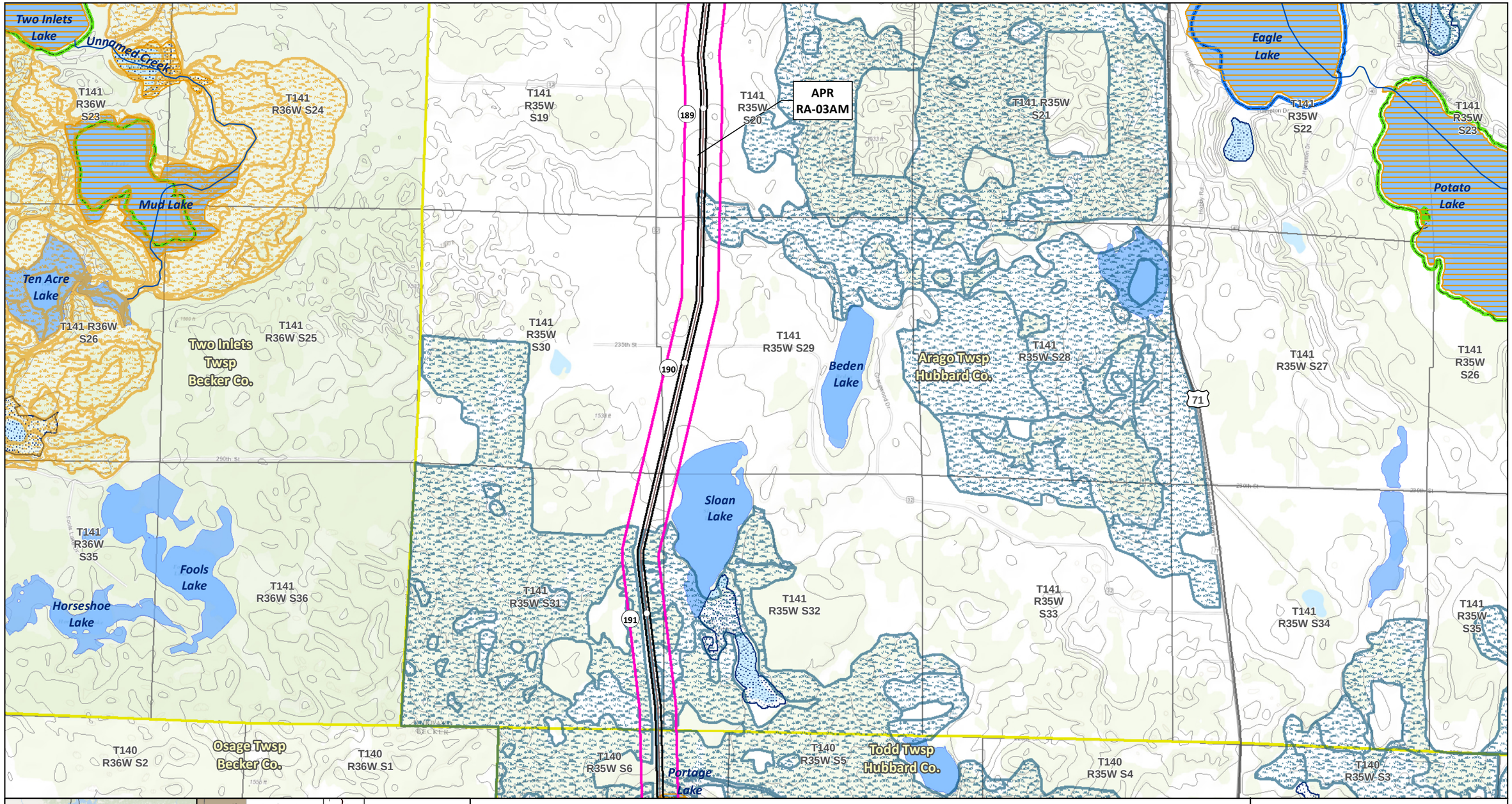

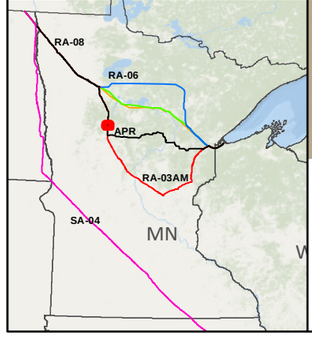

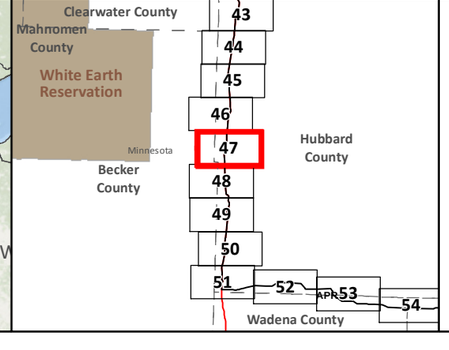

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Route Segment Alternatives (RSA)

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 47B of 82

T140 R36W S3
T140 R36W S2
T140 R36W S1
T140 R35W S6
192
T140 R35W S5
T140 R35W S4
T140 R35W S3
Portage Lake
Unnamed Creek
71
T140 R36W S10
T140 R36W S11
T140 R36W S12
T140 R35W S7
193
APR RA-03AM
T140 R35W S8
T140 R35W S9
T140 R35W S10
Fishhook Lake
Osage Twsp Becker Co.
Todd Twsp Hubbard Co.
T140 R36W S15
T140 R36W S14
T140 R36W S13
T140 R35W S18
194
T140 R35W S17
T140 R35W S16
T140 R35W S15
225
T140 R36W S22
T140 R36W S23
T140 R36W S24
T140 R35W S19
T140 R35W S20
T140 R35W S21
T140 R35W S22

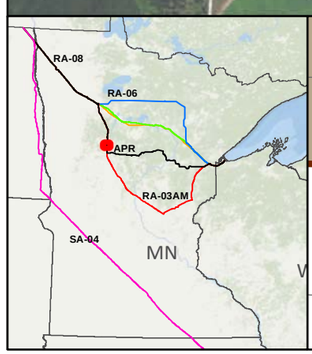

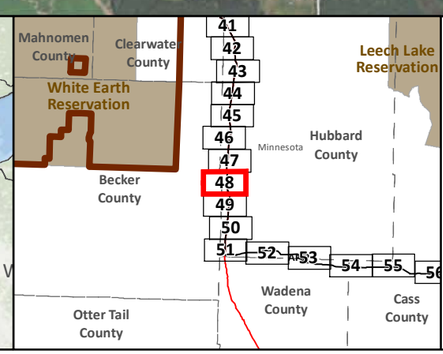

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

T140 R36W S3
T140 R36W S2
T140 R36W S1
T140 R35W S6
T140 R35W S5
T140 R35W S4
T140 R35W S3
Portage Lake
Unnamed Creek
APR RA-03AM
T140 R36W S10
T140 R36W S11
T140 R36W S12
T140 R35W S7
T140 R35W S8
T140 R35W S9
T140 R35W S10
Osage Twsp Becker Co.
Todd Twsp Hubbard Co.
Fishhook Lake
Park Rapids Game Refuge
T140 R36W S15
T140 R36W S14
T140 R36W S13
T140 R35W S18
T140 R35W S17
T140 R35W S16
T140 R35W S15
T140 R36W S22
T140 R36W S23
T140 R36W S24
T140 R35W S19
T140 R35W S20
Sundsruds Court WHPA
T140 R35W S21
T140 R35W S22

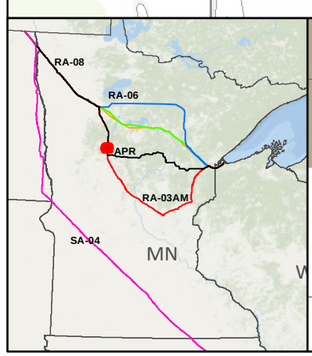

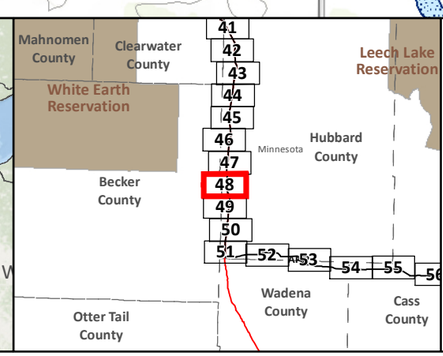

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
WMA - Wildlife Management Areas
Wildlife Refuge Inventory
SNA - Scientific and Natural Area

Water Resources
Navigable Waterway Crossings
National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
Outstanding
High
Moderate

Native Plant Communities with Biodiversity Significance
Outstanding
High
Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 48B of 82

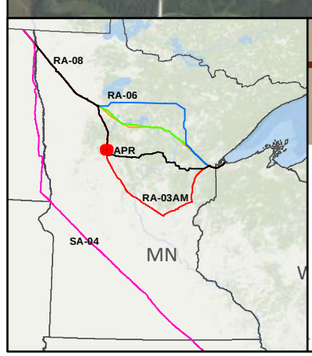

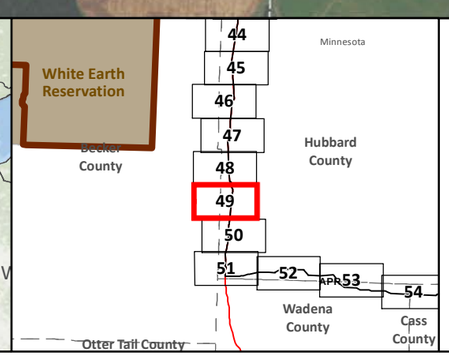

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 49A of 82

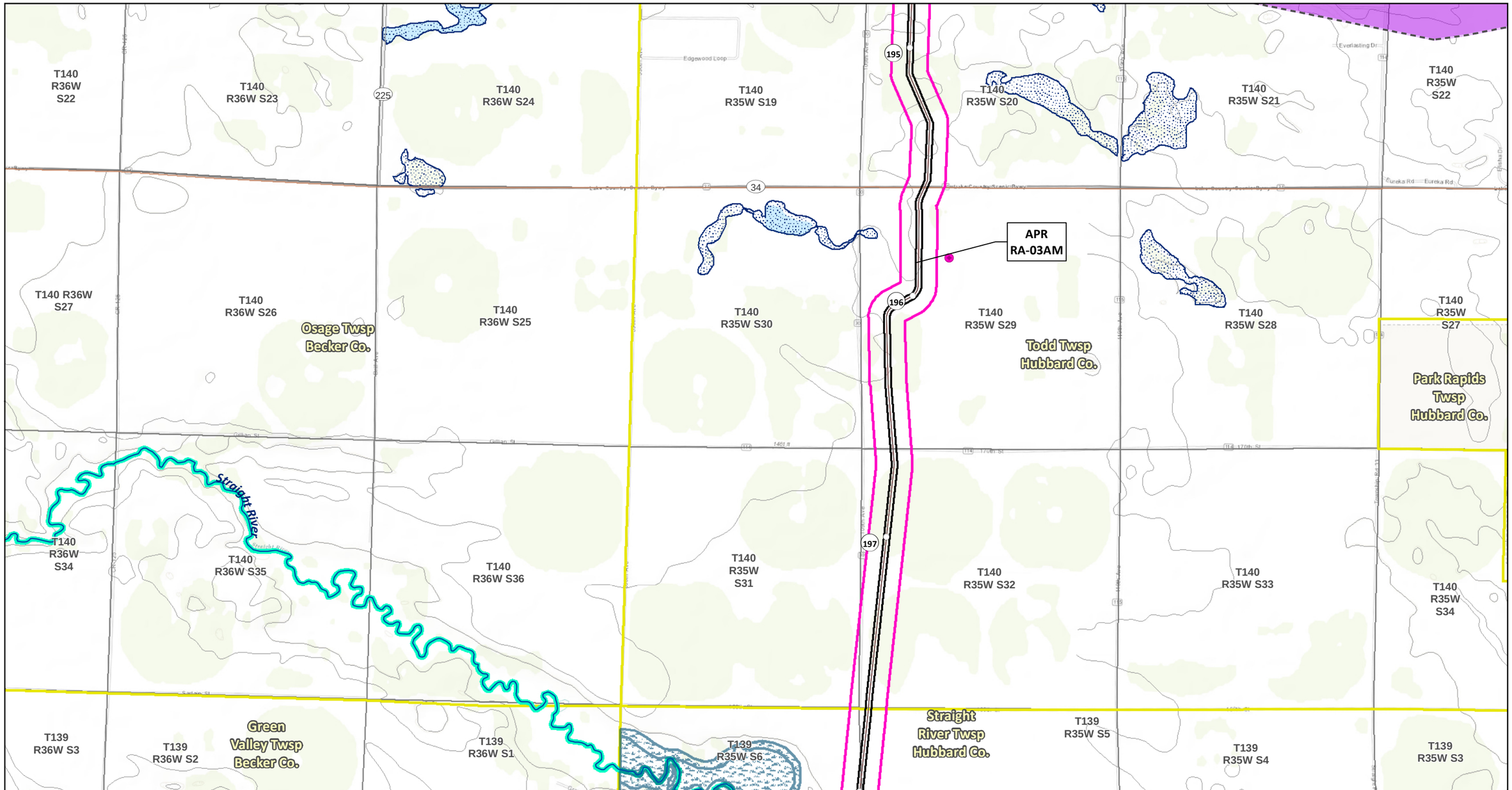

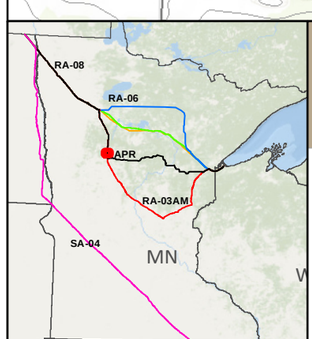

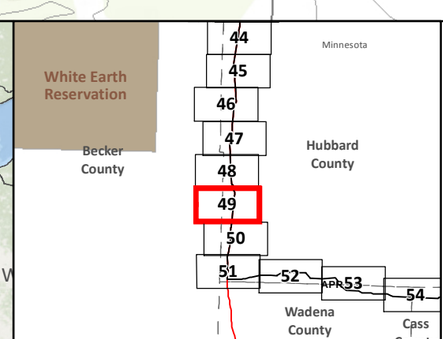

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 49B of 82

T139 R36W S2
T139 R36W S1
T139 R35W S6
T139 R35W S5
T139 R35W S4
T139 R35W S3
T139 R35W S2
Straight River
APR RA-03AM
199
T139 R36W S11
T139 R36W S12
T139 R35W S7
T139 R35W S8
T139 R35W S9
T139 R35W S10
T139 R35W S11
Brush Lake
Straight River Twsp Hubbard Co.
RSA-15
Green Valley Twsp Becker Co.
T139 R36W S13
200
T139 R36W S14
T139 R35W S18
T139 R35W S17
T139 R35W S16
T139 R35W S15
T139 R35W S14
Unnamed Stream
71
T139 R36W S23
T139 R36W S24
T139 R35W S19
201
T139 R35W S20
T139 R35W S21
T139 R35W S22
Moran Lake
T139 R35W S23

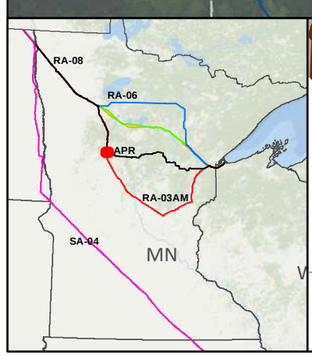

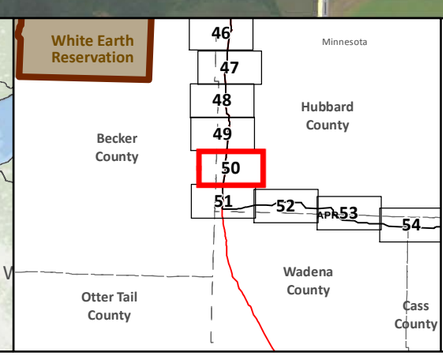

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 50A of 82

T139 R36W S2
T139 R36W S1
T139 R35W S6
T139 R35W S5
T139 R35W S4
T139 R35W S3
T139 R35W S2
Straight River
APR RA-03AM
199
T139 R36W S11
T139 R36W S12
T139 R35W S7
T139 R35W S8
T139 R35W S9
T139 R35W S10
T139 R35W S11
Brush Lake
Straight River Twsp Hubbard Co.
RSA-15
Green Valley Twsp Becker Co.
T139 R36W S13
T139 R36W S14
200
T139 R35W S18
T139 R35W S17
T139 R35W S16
T139 R35W S15
T139 R35W S14
Unnamed Stream
71
T139 R36W S23
T139 R36W S24
T139 R35W S19
201
T139 R35W S20
T139 R35W S21
T139 R35W S22
Moran Lake
T139 R35W S23

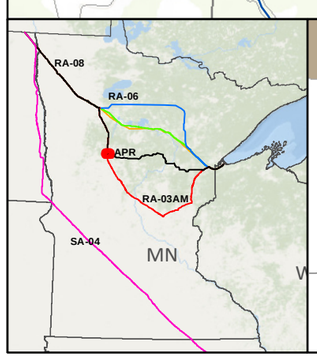

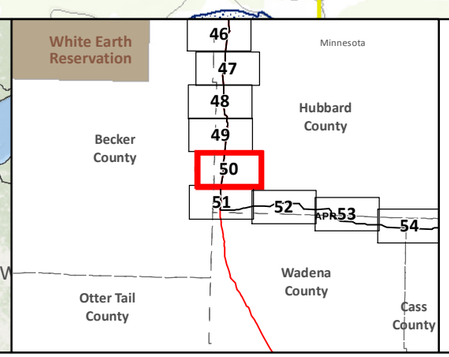

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 50B of 82

T139 R36W S22
Blueberry Lake
T139 R36W S23
Unnamed Stream
T139 R36W S24
T139 R35W S19
T139 R35W S20
T139 R35W S21
T139 R35W S22
Little Long Lake
T139 R36W S27
T139 R36W S26
T139 R36W S25
202
APR RA-03AM
T139 R35W S30
T139 R35W S29
T139 R35W S28
T139 R35W S27
Green Valley Twsp Becker Co.
Straight River Twsp Hubbard Co.
203
71
T139 R36W S34
T139 R36W S35
T139 R36W S36
T139 R35W S31
T139 R35W S32
APR
T139 R35W S33
206
T139 R35W S34
204
205
T138 R36W S3
T138 R36W S2
Runeberg Twsp Becker Co.
T138 R36W S1
RA-03AM
T138 R35W S6
T138 R35W S5
Blueberry Twsp Wadena Co.
T138 R35W S4
T138 R35W S3

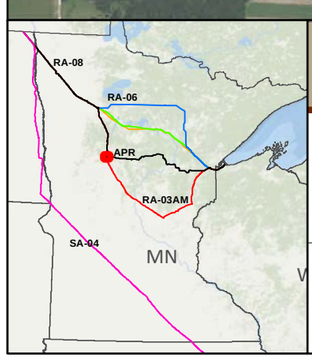

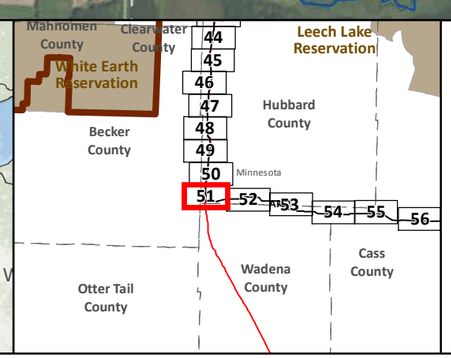

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 51A of 82

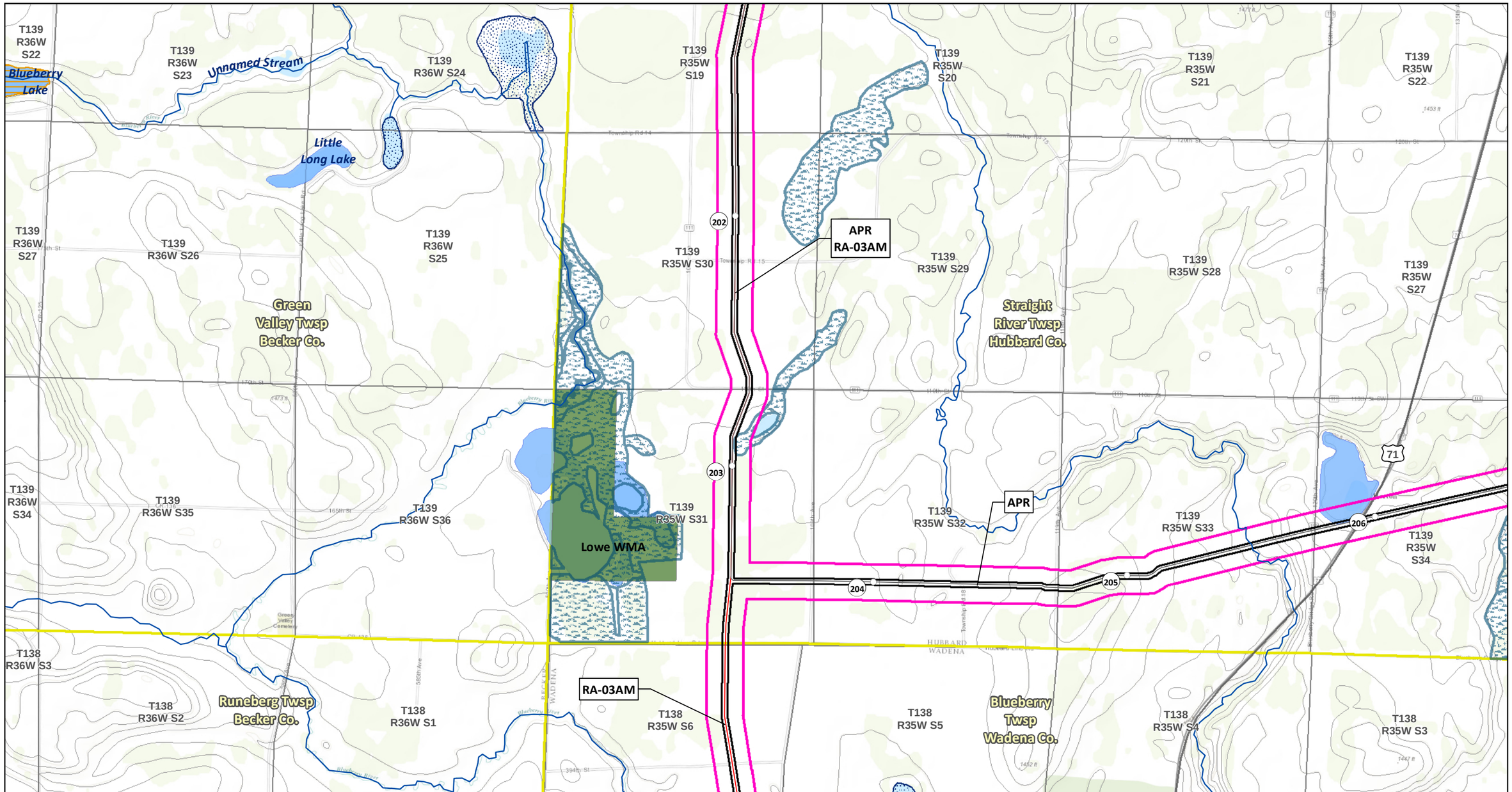

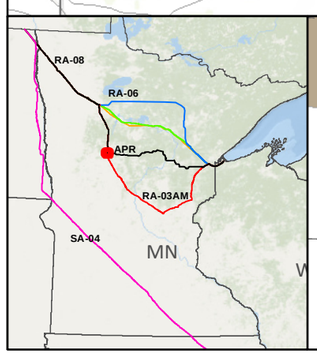

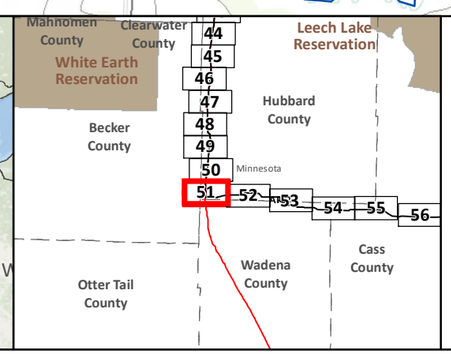

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 51B of 82

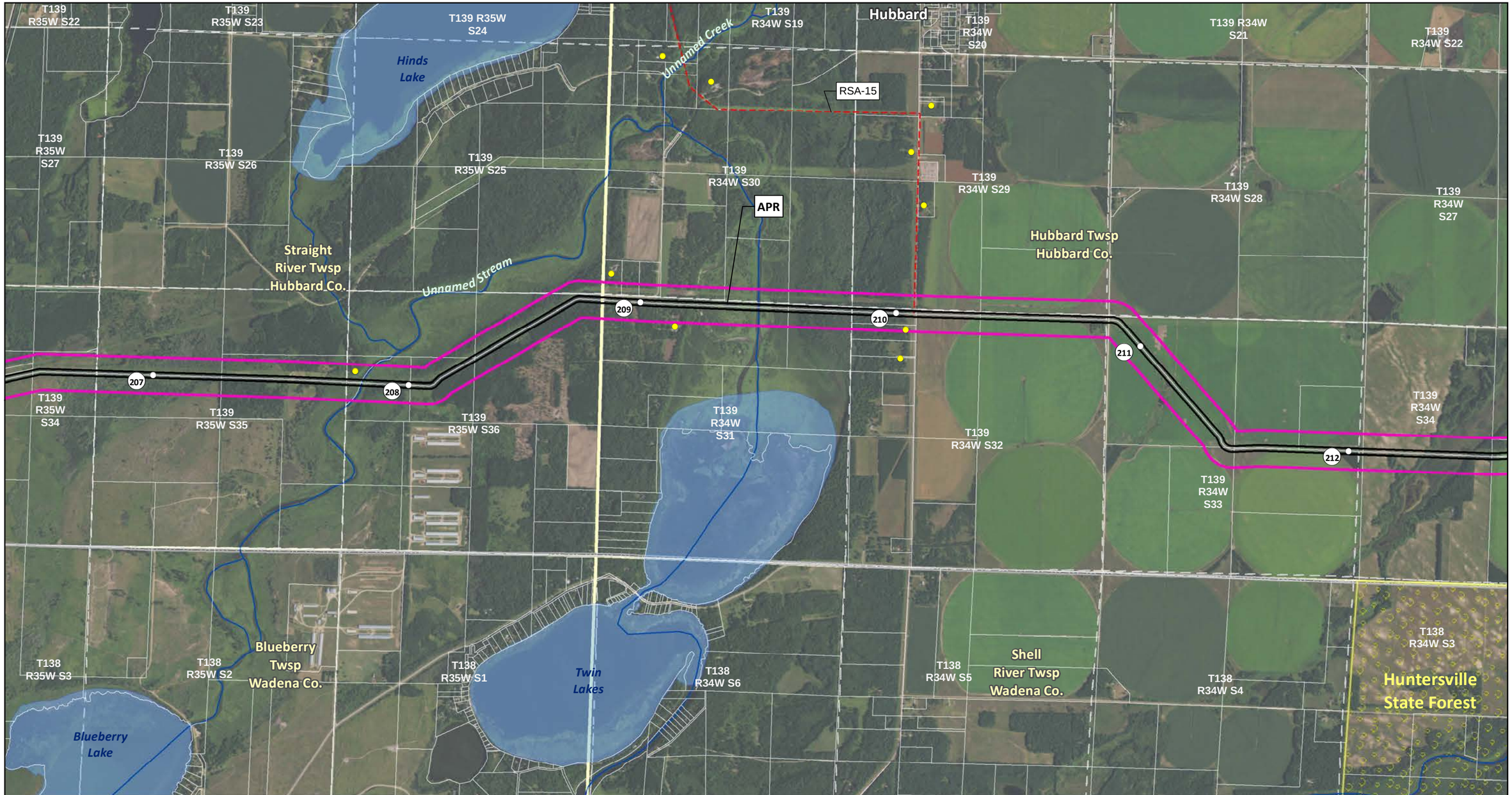

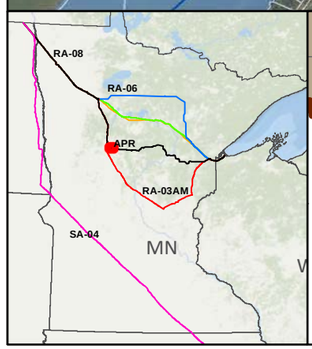

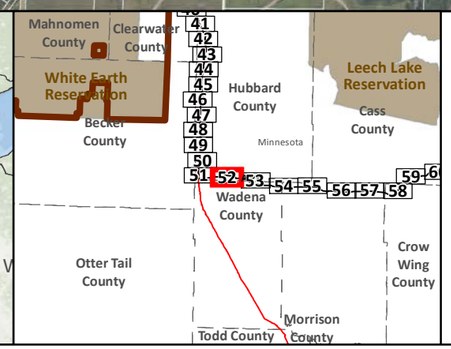

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 52A of 82

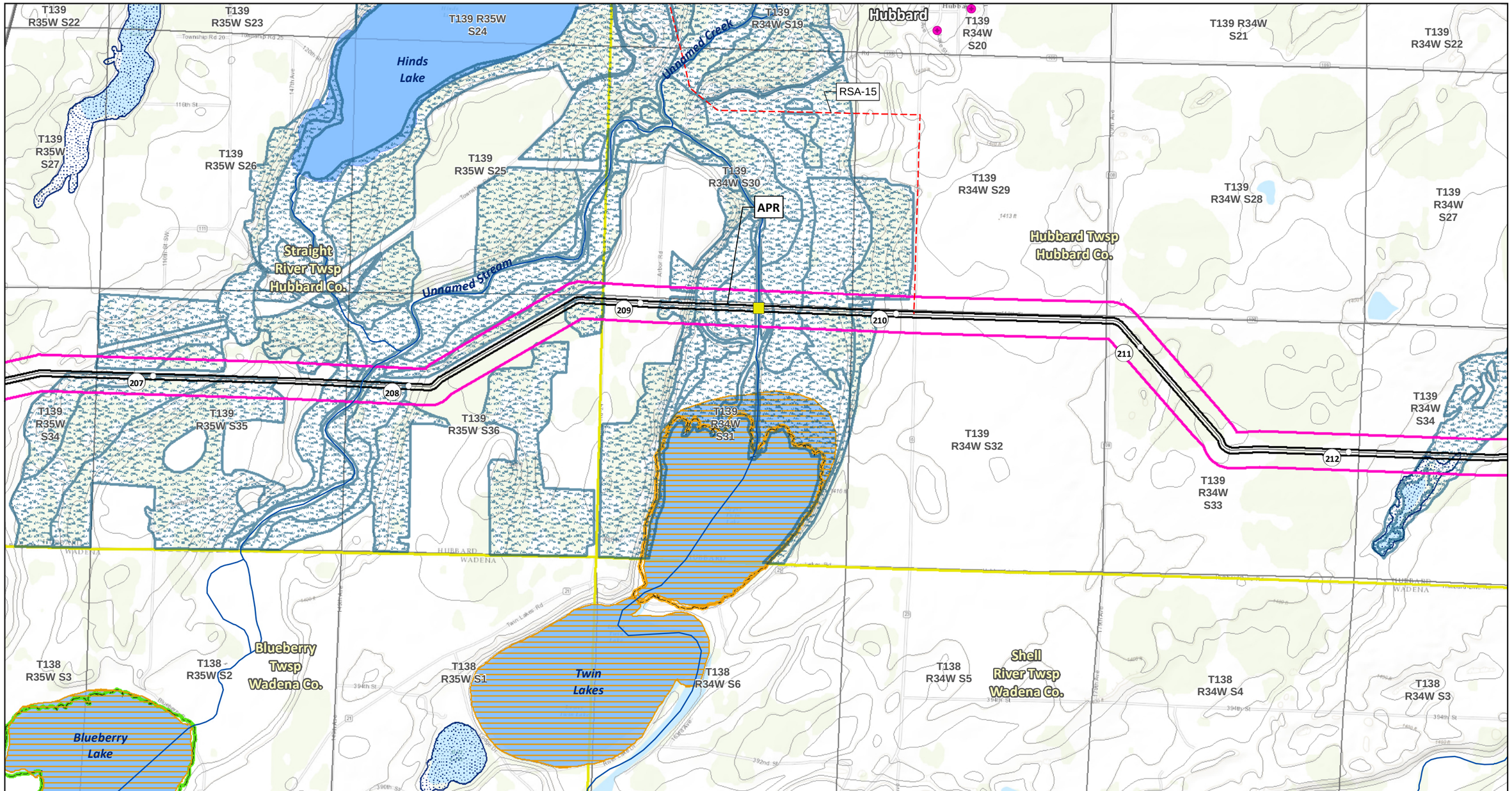

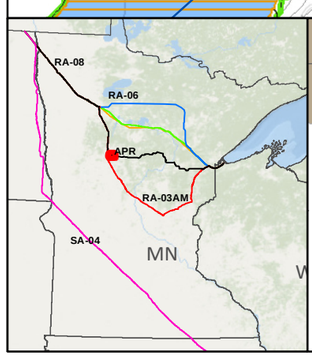

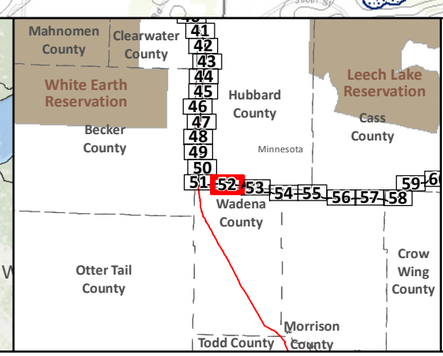

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 52B of 82

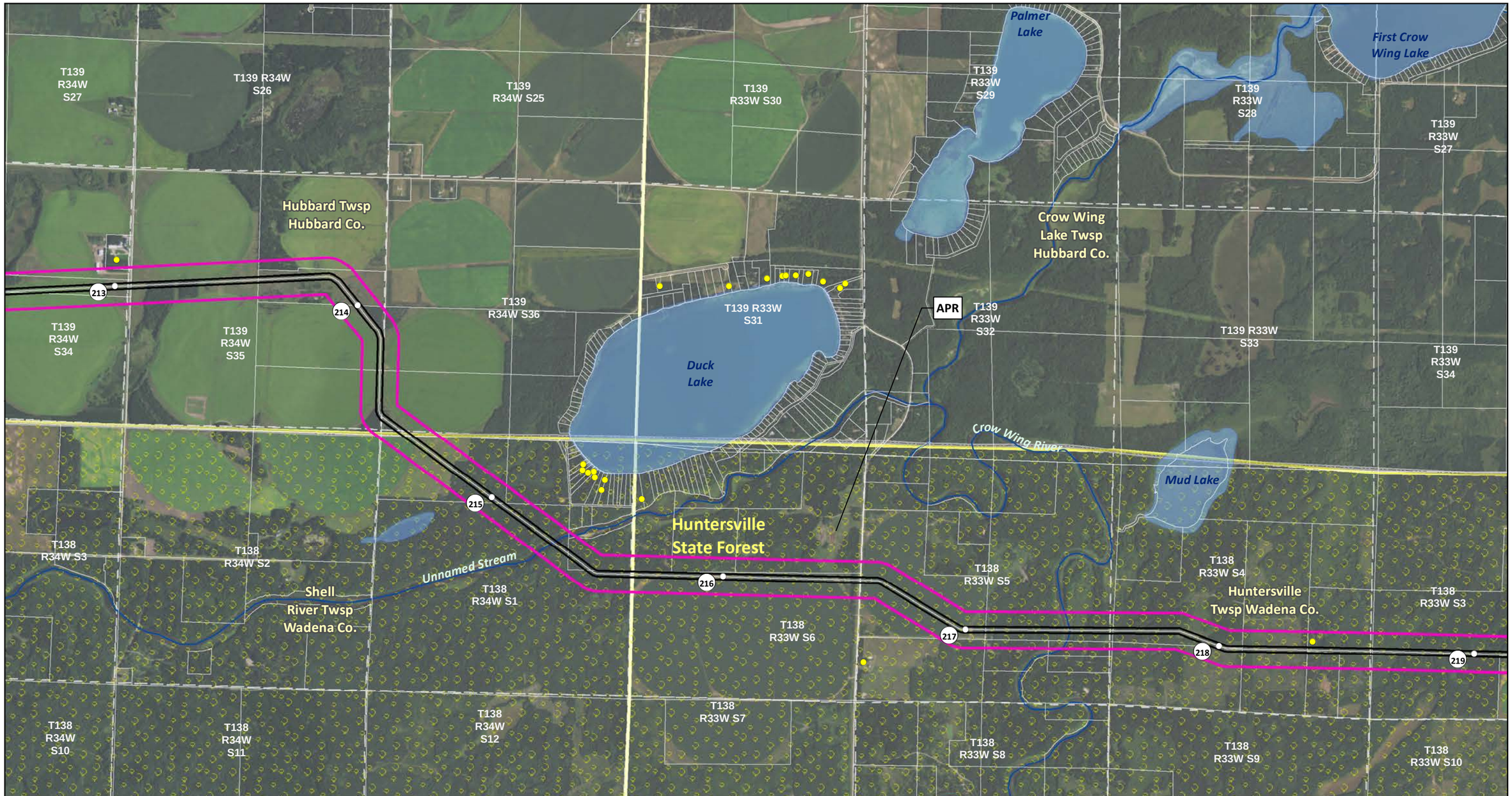

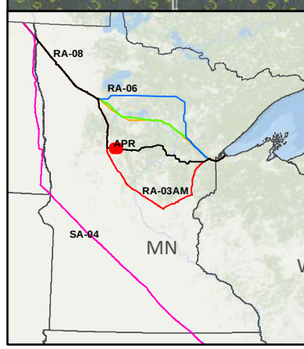

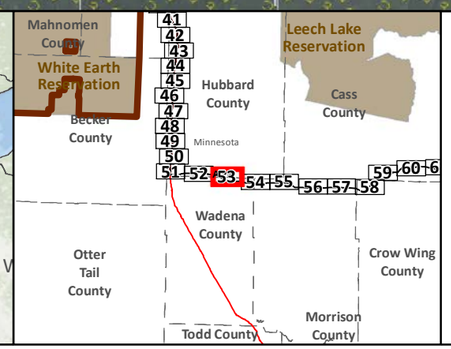

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 53A of 82

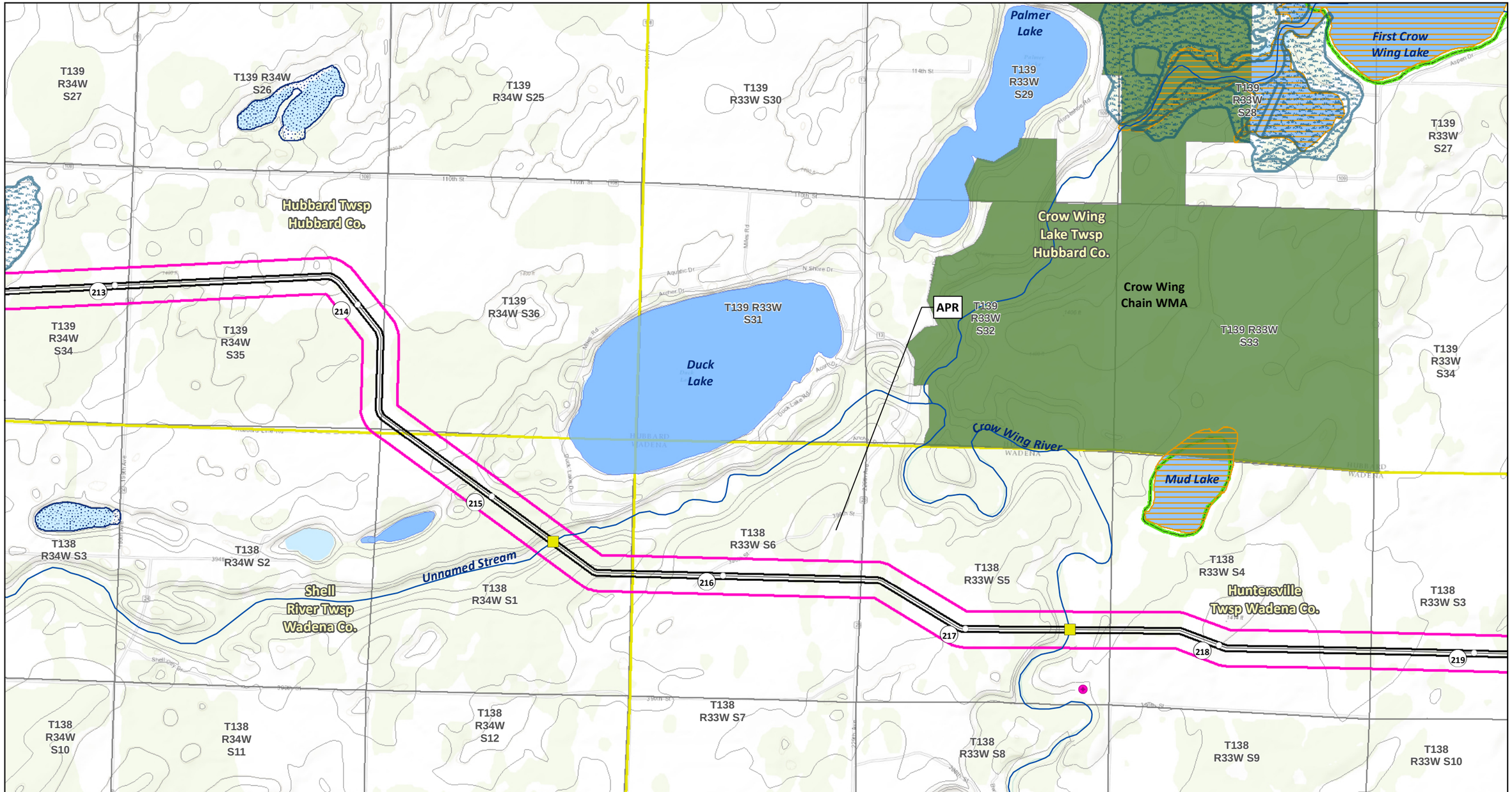

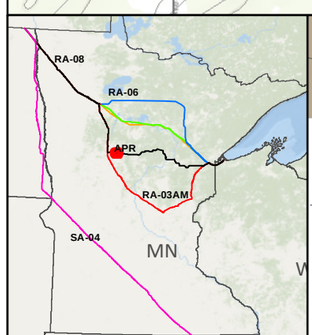

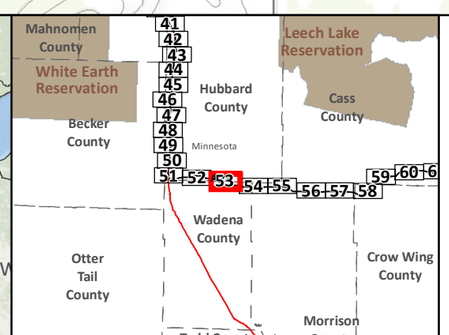

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 53B of 82

Crow Wing Lake Twsp Hubbard Co.

T139 R33W S34

T139 R33W S35

T139 R33W S36

T139 R32W S31

T139 R32W S32

Badoura Twsp Hubbard Co.

T139 R32W S33

Badoura State Forest

64

T139 R32W S34

T138 R33W S3

T138 R33W S2

T138 R33W S1

T138 R32W S6

APR

T138 R32W S5

T138 R32W S4

T138 R32W S3

220

221

222

223

224

Huntersville Twsp Wadena Co.

Huntersville State Forest

T138 R33W S10

McKinley Twsp Cass Co.

T138 R33W S11

T138 R33W S12

T138 R32W S7

T138 R32W S8

T138 R32W S9

T138 R32W S10

Unnamed Stream

Big Swamp Creek

T138 R33W S15

T138 R33W S14

T138 R33W S13

T138 R32W S18

T138 R32W S17

T138 R32W S16

T138 R32W S15

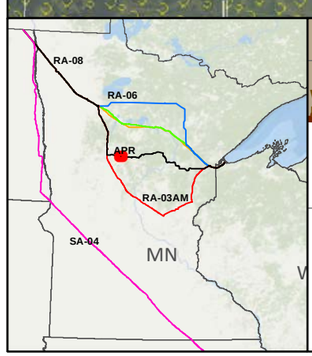

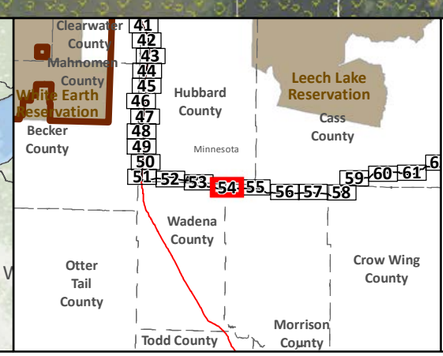

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 54A of 82

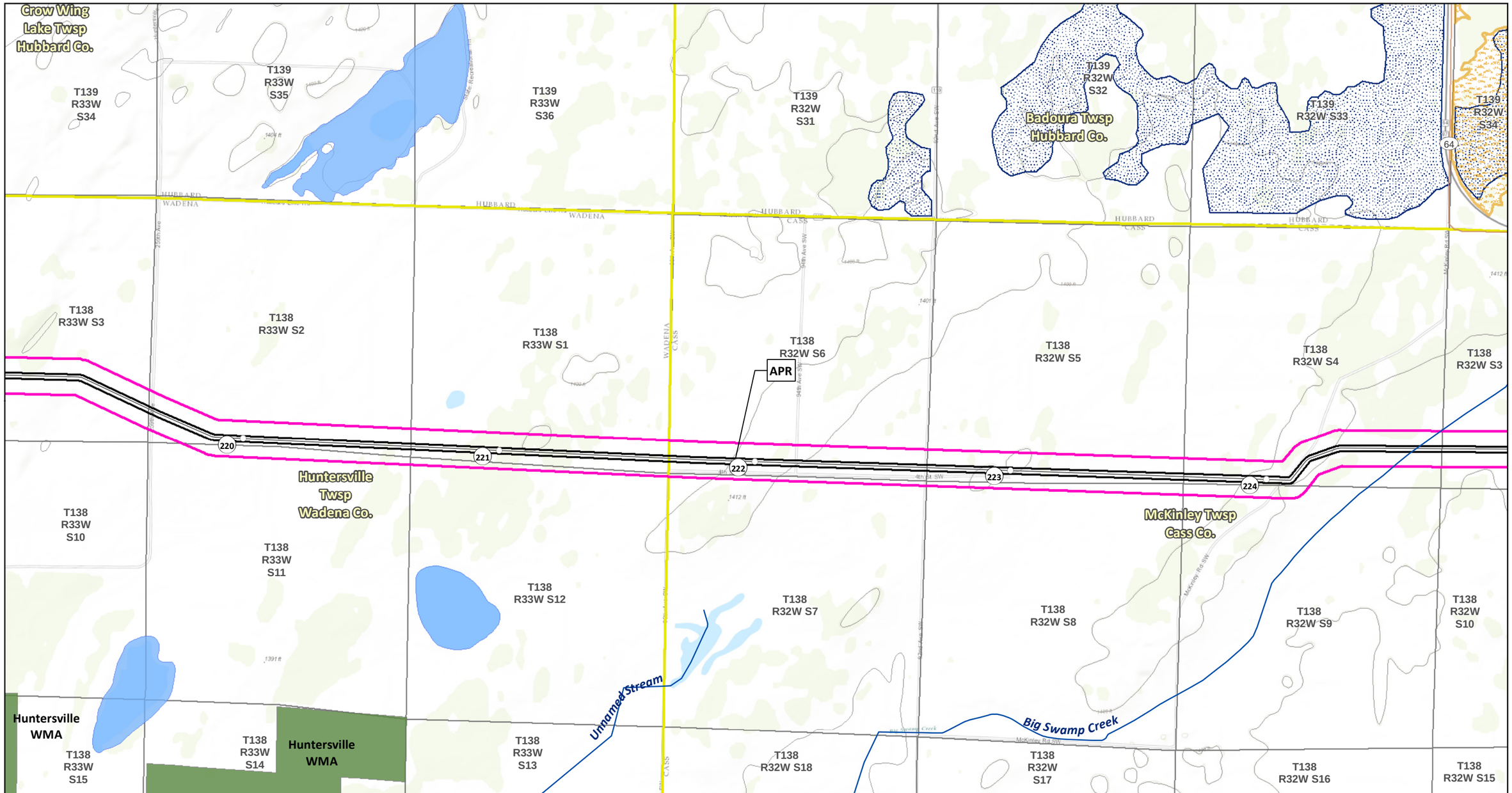

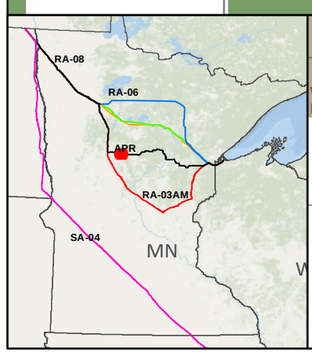

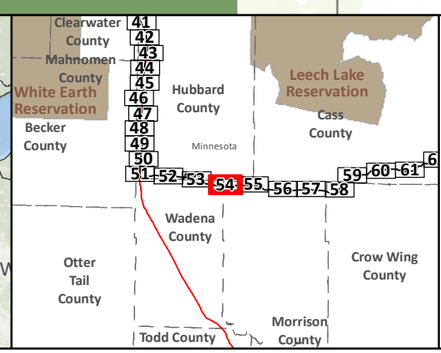

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 54B of 82

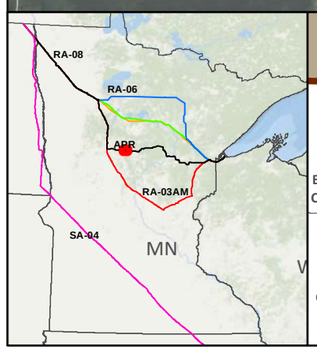

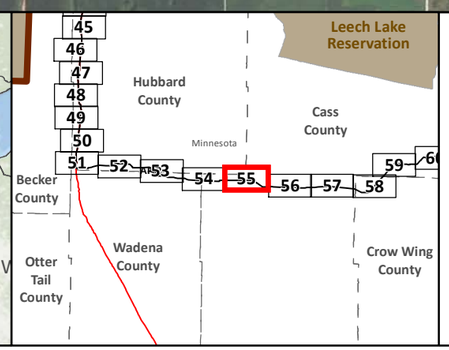

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 55A of 82

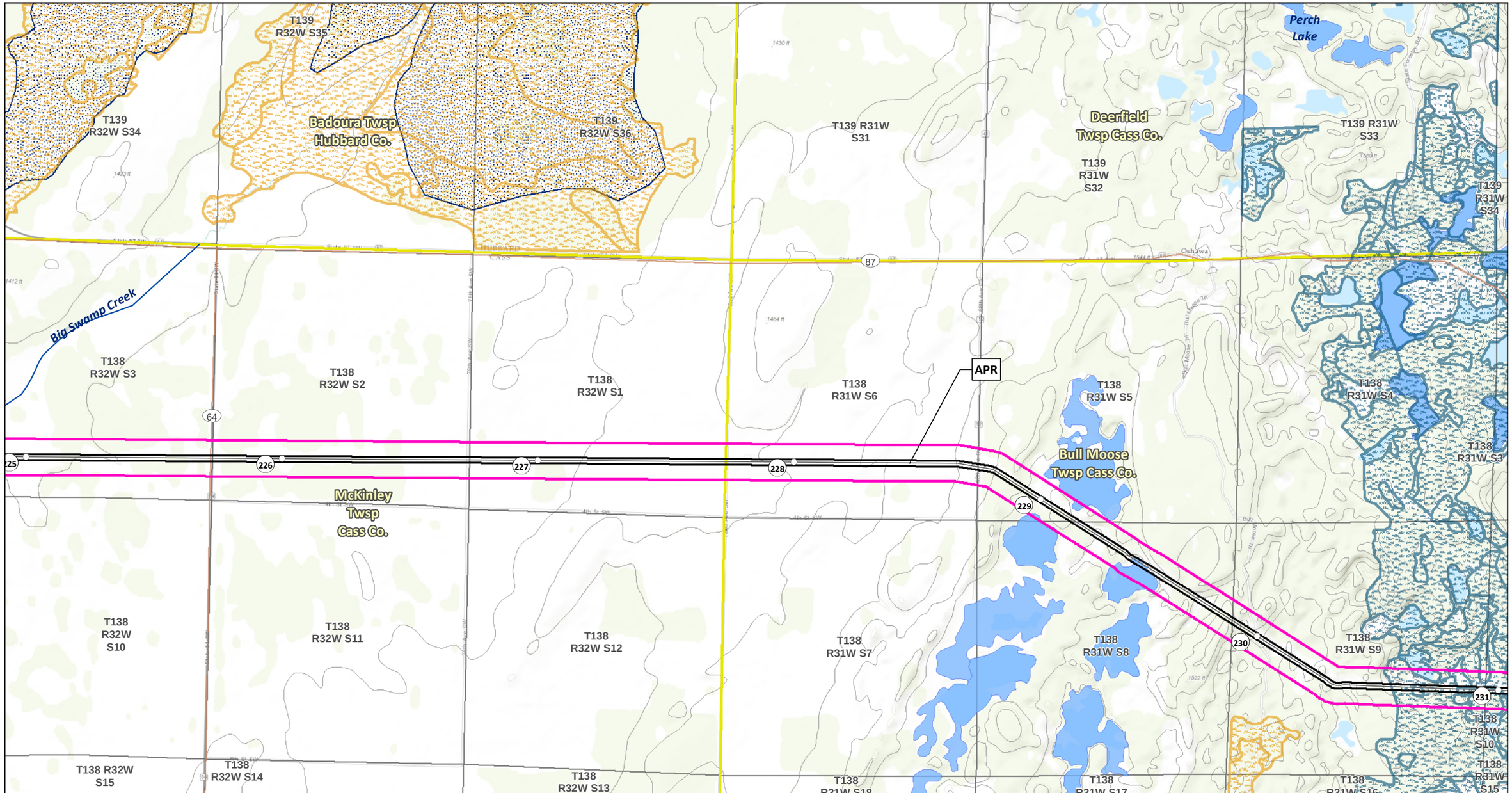

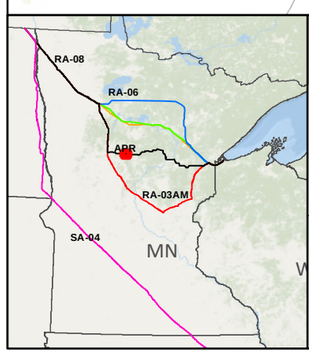

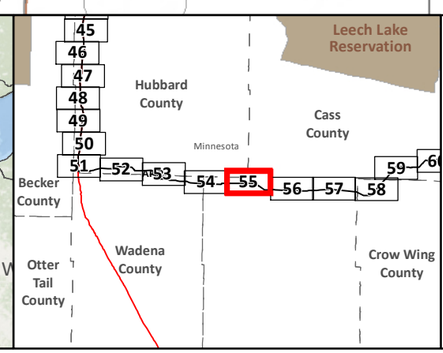

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 55B of 82

T139 R31W S34
T139 R31W S35
T139 R31W S36
Pine Mountain Lake
T139 R30W S31
Pine River
Powers Twsp Cass Co.
T139 R30W S32
Bowen Lake
T139 R30W S33
T139 R30W S34
T138 R30W S3
Minnow Lake
T138 R31W S3
T138 R31W S2
87
T138 R31W S1
T138 R30W S6
T138 R30W S5
T138 R30W S4
Scribner Lake
T138 R30W S10
Pig Lake
T138 R30W S8
T138 R31W S11
Foot Hills State Forest
Bull Moose Twsp Cass Co.
T138 R31W S10
T138 R31W S12
T138 R30W S7
APR
Pine River Twsp Cass Co.
371
T138 R30W S9
232
233
234
235
236
237
Abel Lake
T138 R31W S14
T138 R31W S15
T138 R31W S13
T138 R30W S18
Cow Lake
T138 R30W S17
T138 R30W S16
T138 R30W S15
Pine River, South Fork
Unnamed Stream
Dick Lake
Boot Lake
T138 R31W S22
T138 R31W S23
T138 R31W S24
T138 R30W S19
T138 R30W S20
T138 R30W S21

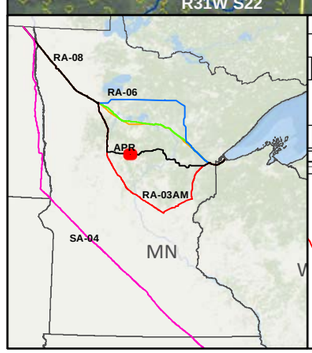

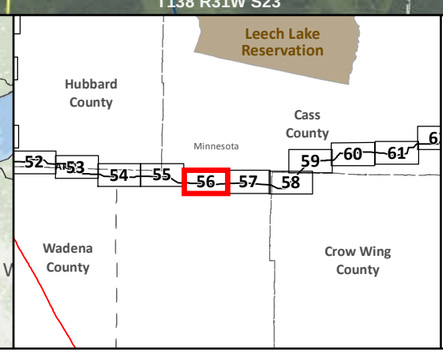

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 56A of 82

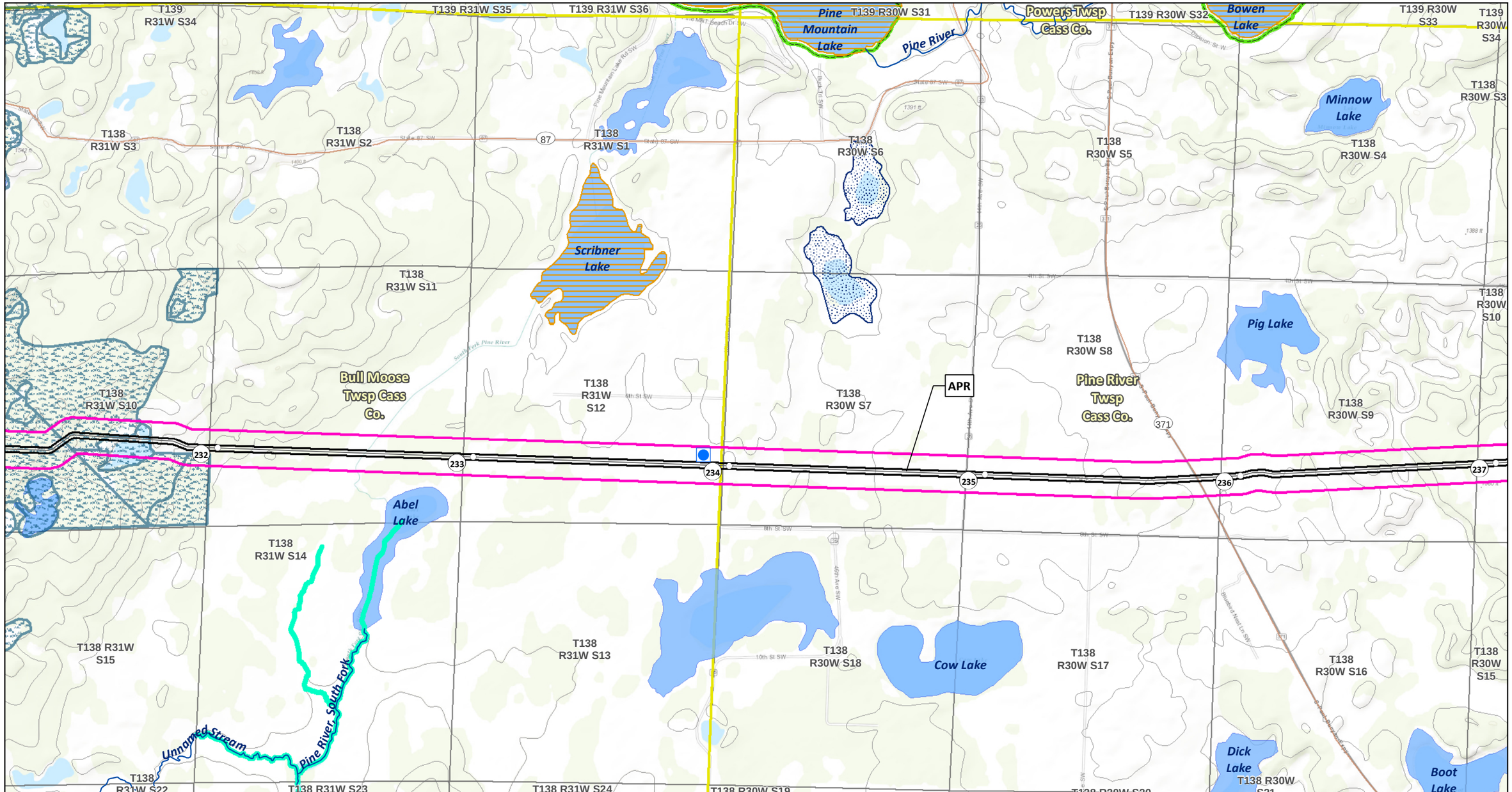

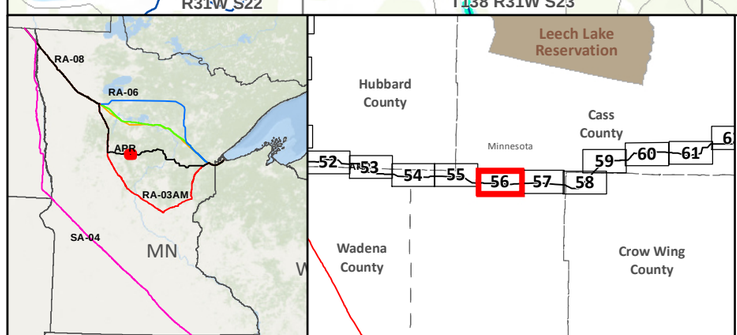

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 56B of 82

T139 R30W S33
T139 R30W S34
T139 R30W S35
T139 R30W S36
T139 R29W S31
T139 R29W S32
T139 R29W S33
Pine River Twsp Cass Co.
Ponto Lake Twsp Cass Co.
Barclay Twsp Cass Co.
Lake Hattie
Harriet Lake
Little Sand Lake
Horse Lake
Ding Pot Lake
Lizzie Creek
Horseshoe Lake
Clear Lake
Boot Lake
Pine River
Swede Lake
Lizotte Lake
T138 R30W S4
T138 R30W S3
T138 R30W S2
T138 R30W S1
T138 R29W S6
T138 R29W S5
T138 R29W S4
T138 R30W S11
T138 R30W S12
T138 R30W S10
T138 R29W S7
T138 R29W S8
T138 R29W S9
T138 R30W S15
T138 R30W S14
T138 R30W S13
T138 R29W S18
T138 R29W S17
T138 R29W S16
APR
237
238
239
240
241
242
84

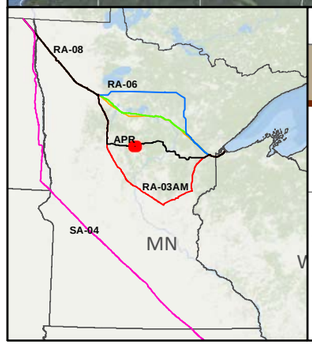

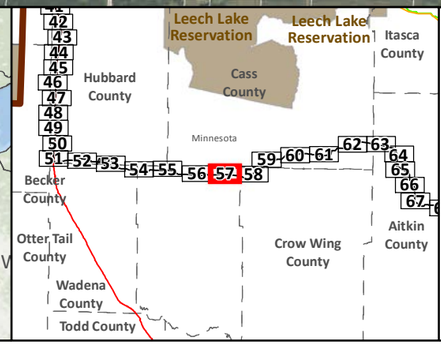

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 57A of 82

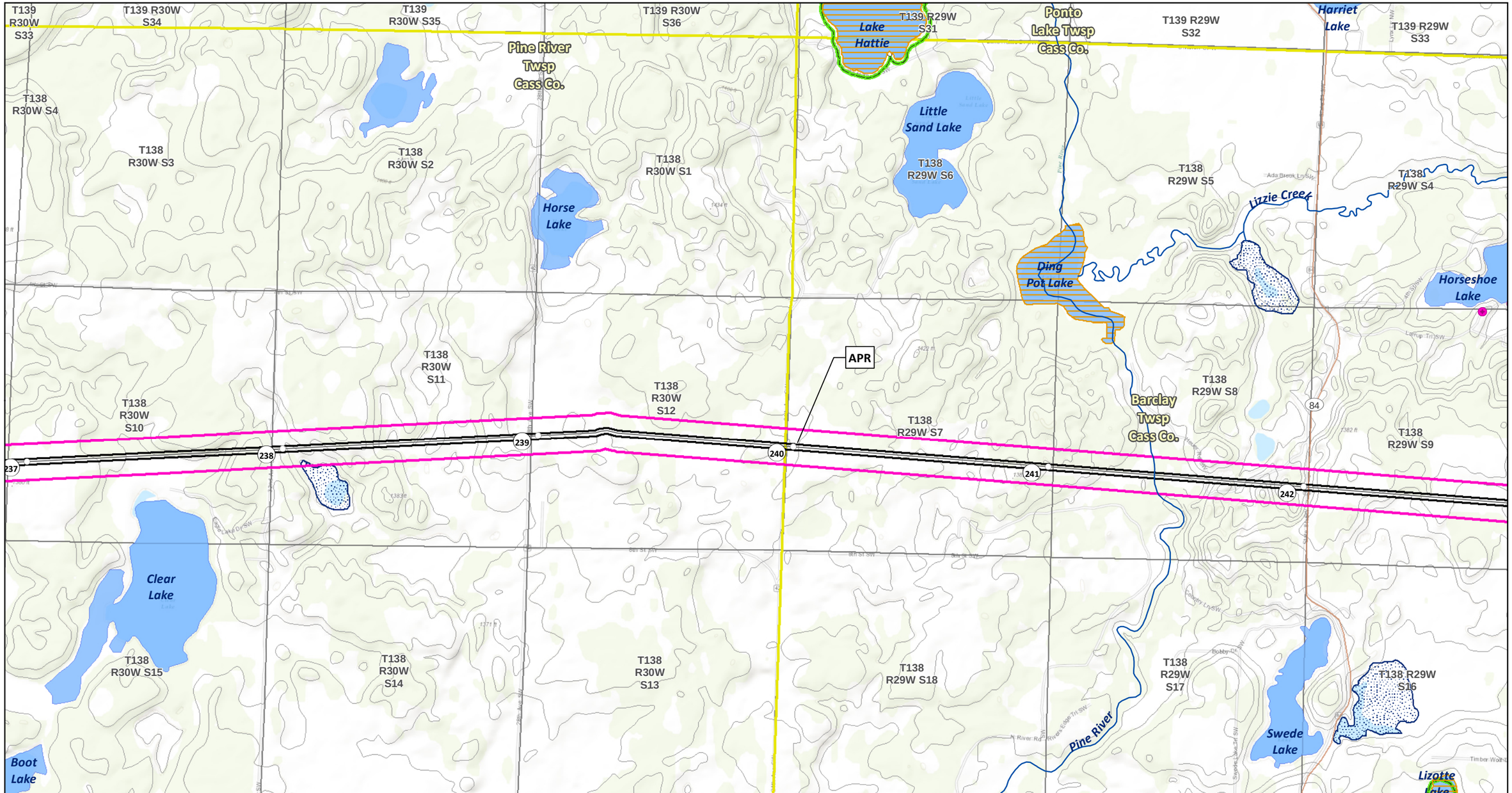

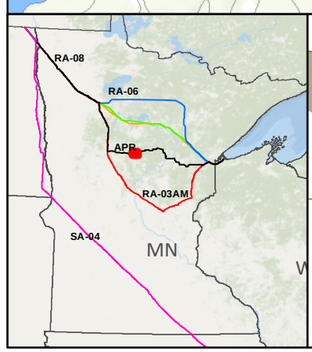

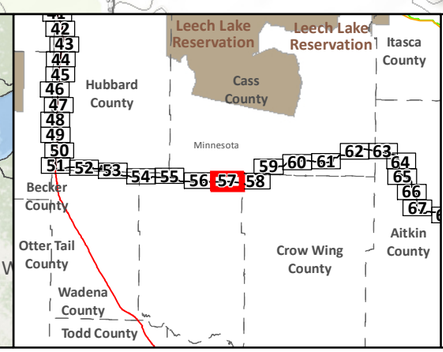

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Route Segment Alternatives (RSA)

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 57B of 82

T139 R29W S33
T139 R29W S34
T139 R29W S35
Ponto Lake Twsp Cass Co.
T139 R29W S36
T139 R28W S31
Blind Lake Twsp Cass Co.
T139 R28W S32
T139 R28W S33
Barclay Twsp Cass Co.
Lizzie Lake
T138 R29W S4
Lizzie Creek
T138 R29W S3
T138 R29W S2
Jail Lake
T138 R29W S1
T138 R28W S6
T138 R28W S5
T138 R28W S4
Island Lake
Horseshoe Lake
Unnamed Stream
APR
Stewart Lake
Clough Lake
Gail Lake Twsp Crow Wing Co.
T138 R29W S9
T138 R29W S10
T138 R29W S11
T138 R29W S12
T138 R28W S7
Timothy Twsp Crow Wing Co.
T138 R28W S8
T138 R28W S9
243
244
245
246
247
248
T138 R29W S16
T138 R29W S15
T138 R29W S14
T138 R29W S13
T138 R28W S18
T138 R28W S17
T138 R28W S16

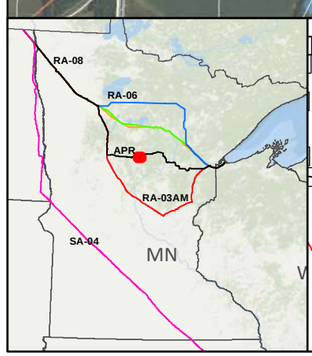

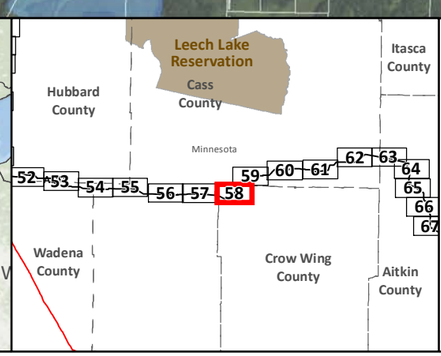

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Existing Pipelines
Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
State Forest
National Forest
Tribal Reservation
Tribal Trust Land
White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 58A of 82

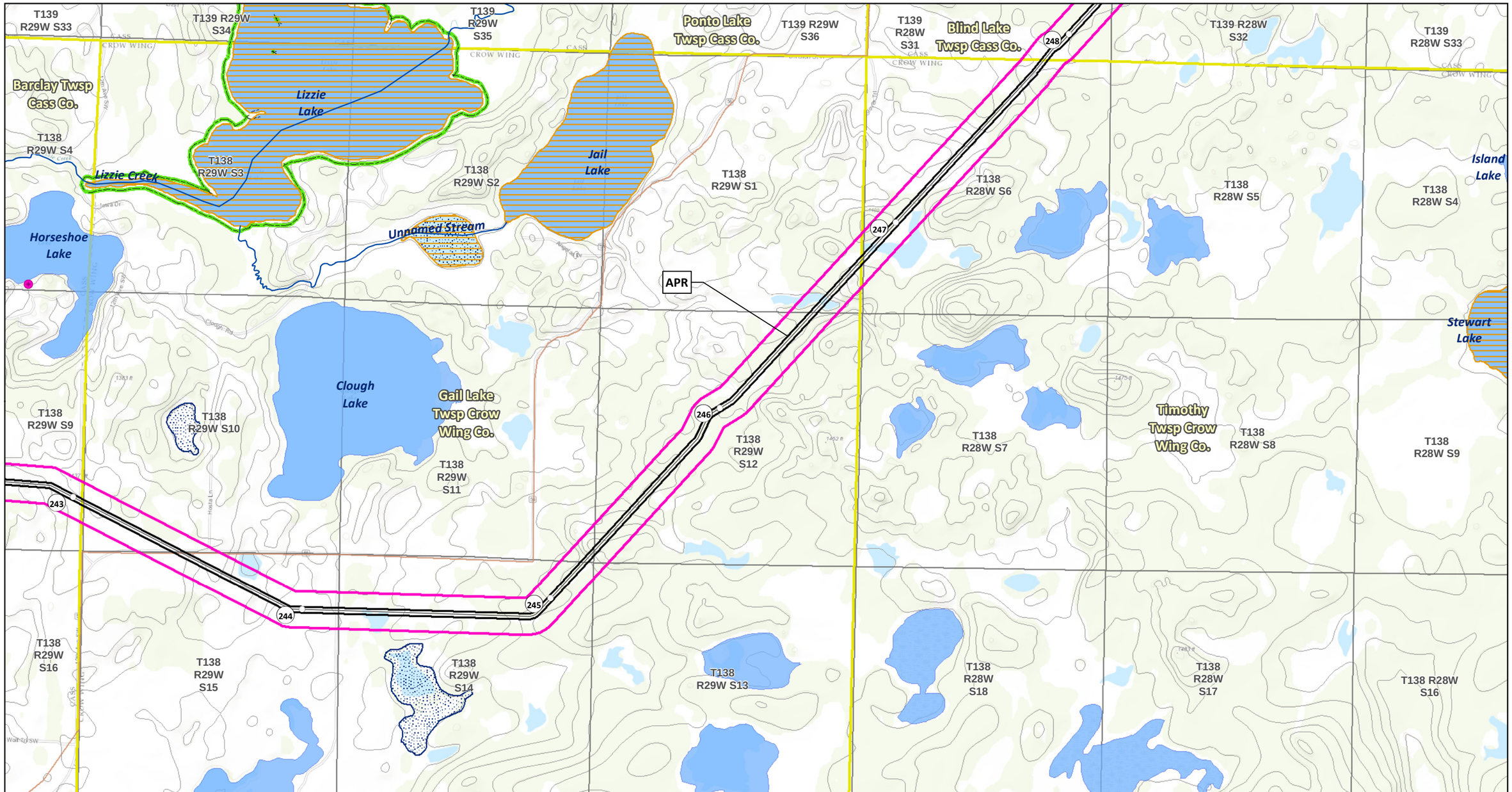

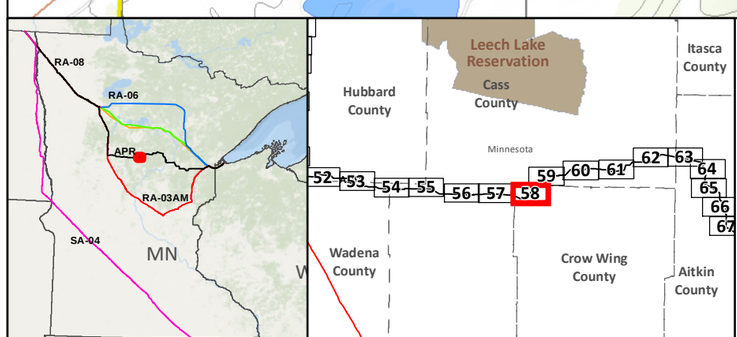

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 58B of 82

T139 R29W S13
T139 R28W S18
T139 R28W S17
T139 R28W S16
T139 R28W S15
T139 R28W S14
T139 R28W S13
Tamarack Lake
Swede Lake
Blind Lake Twsp Cass Co.
T139 R29W S24
T139 R28W S19
T139 R28W S20
T139 R28W S21
T139 R28W S22
T139 R28W S23
T139 R28W S24
APR
Blind Lake Creek
Louise Lake
Ponto Lake Twsp Cass Co.
T139 R29W S25
T139 R28W S30
T139 R28W S29
T139 R28W S28
T139 R28W S27
T139 R28W S26
T139 R28W S25
Blind Lake
Peterson Lake
Stony Lake
Big Cranberry Lake
T139 R29W S36
T139 R28W S31
T139 R28W S32
T139 R28W S33
T139 R28W S34
T139 R28W S35
T139 R28W S36
Land O'Lakes State Forest
Little Cranberry Lake
250
252
253
249
248

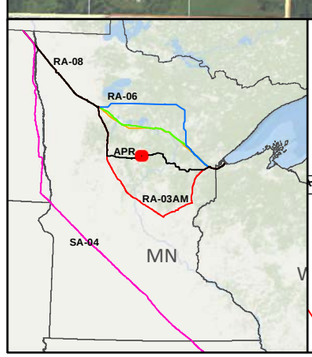

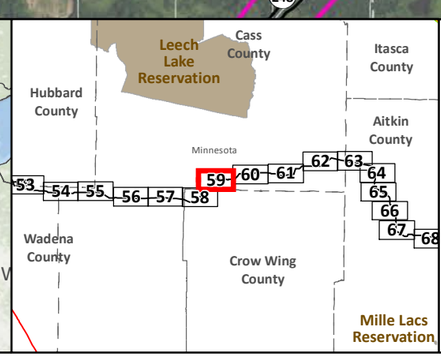

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 59A of 82

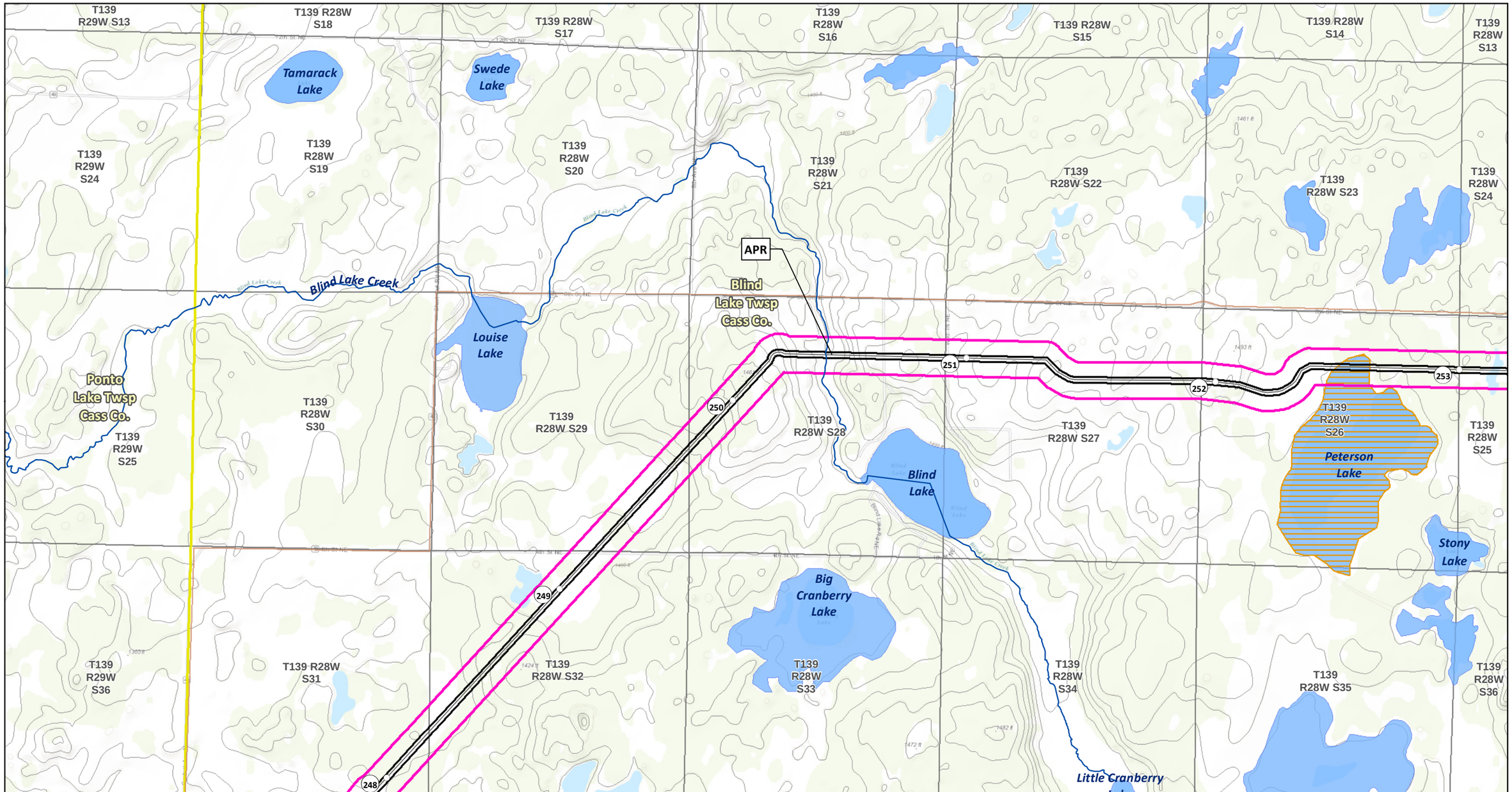

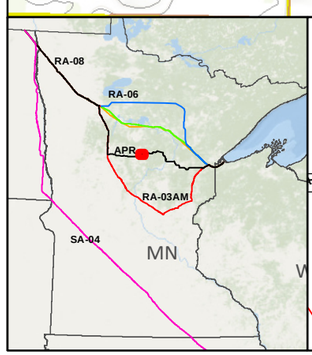

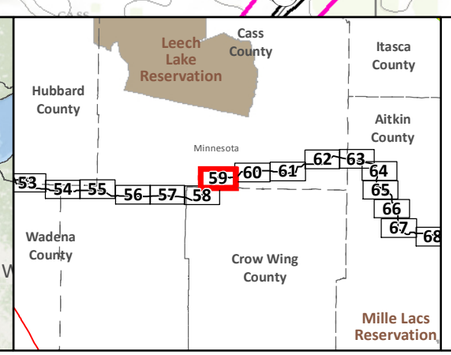

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 59B of 82

T139 R28W S12
T139 R27W S7
T139 R27W S8
T139 R27W S9
T139 R27W S10
T139 R27W S11
T139 R27W S12
Land O'Lakes State Forest
T139 R28W S13
T139 R27W S18
T139 R27W S17
T139 R27W S16
T139 R27W S15
T139 R27W S14
T139 R27W S13
APR
Blind Lake Twsp Cass Co.
T139 R28W S24
T139 R27W S19
T139 R27W S20
T139 R27W S21
First Dog Lake
Second Dog Lake
West Dog Lake
Trelipe Twsp Cass Co.
T139 R27W S22
T139 R27W S23
T139 R27W S24
T139 R28W S25
T139 R27W S30
T139 R27W S29
T139 R27W S28
T139 R27W S27
T139 R27W S26
T139 R27W S25
Unnamed Stream
Hay Creek
Dirty House Lake
Lee Lake
Stony Lake
Pistol Lake
254
255
256
257
258
259

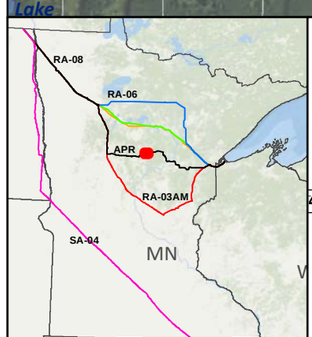

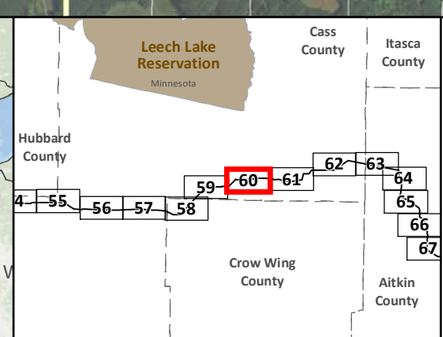

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 60A of 82

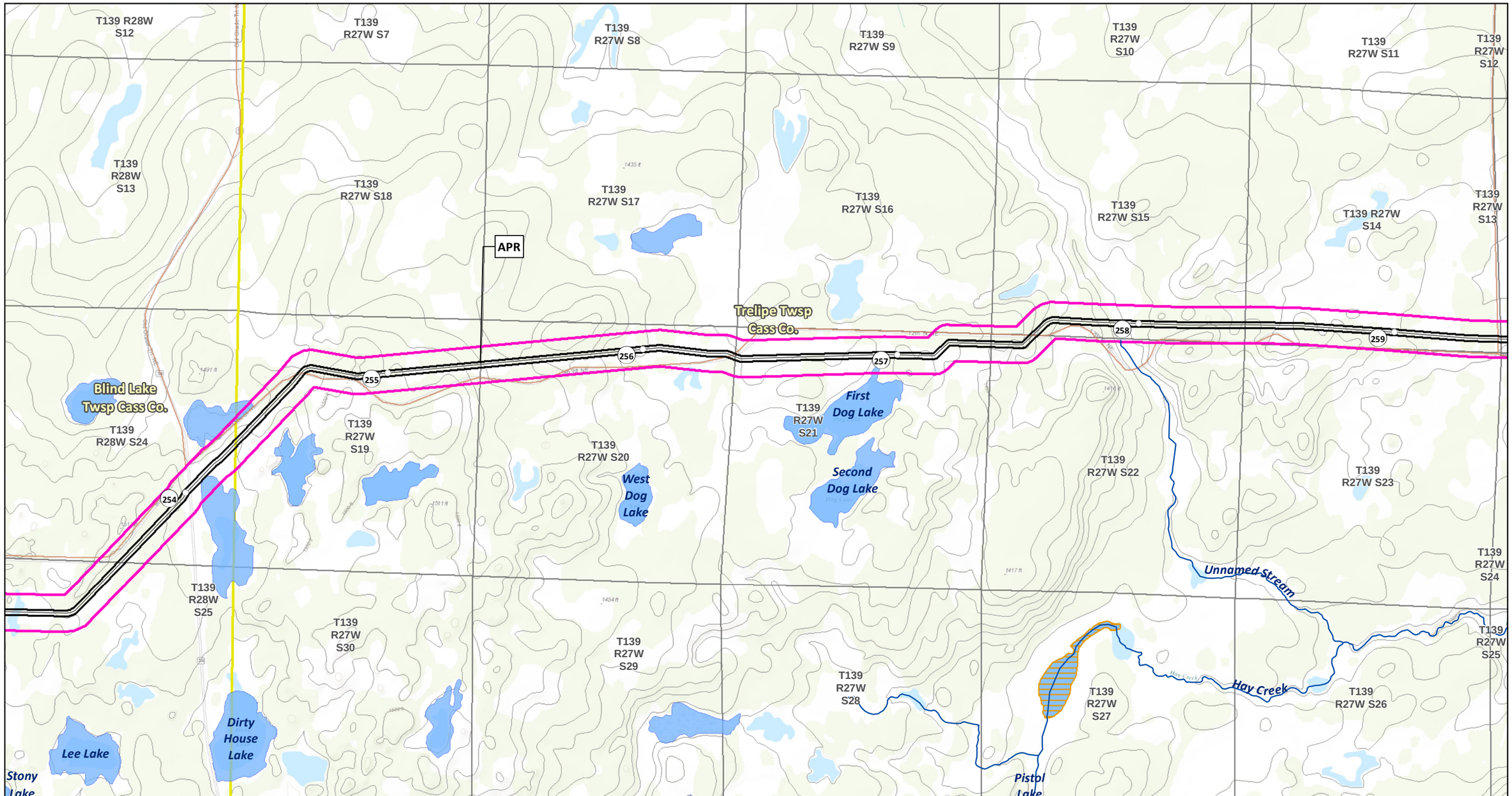

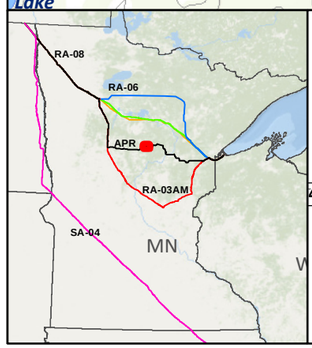

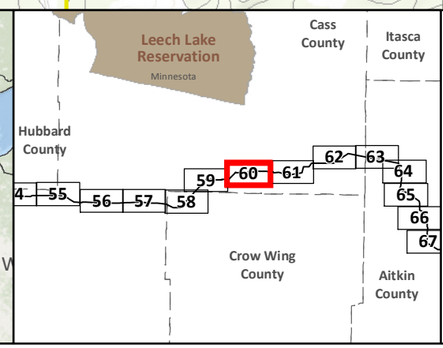

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 60B of 82

Lake George
T139 R27W S12
T139 R26W S7
T139 R26W S8
T139 R26W S9
T139 R26W S10
T139 R26W S11
Washburn Lake
Spring Brook
T139 R27W S13
T139 R26W S18
T139 R26W S17
T139 R26W S16
T139 R26W S15
T139 R26W S14
Margaret Lake
Trelipe Twsp Cass Co.
APR
Marion Lake
Crooked Lake Twsp Cass Co.
Mule Lake
Snake Lake
Daggett Brook
260
261
262
263
264
265
266
6
T139 R27W S24
T139 R26W S19
T139 R26W S21
T139 R26W S22
T139 R26W S23
T139 R26W S20
Andrus Lake
Land O'Lakes State Forest
Grasshopper Lake
Roosevelt Lake
Hay Creek
Snowshoe Lake
Pavelgrit Lake
T139 R27W S25
T139 R26W S30
T139 R26W S29
T139 R26W S28
T139 R26W S27
T139 R26W S26
Lawrence Lake

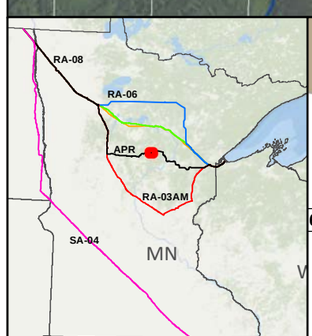

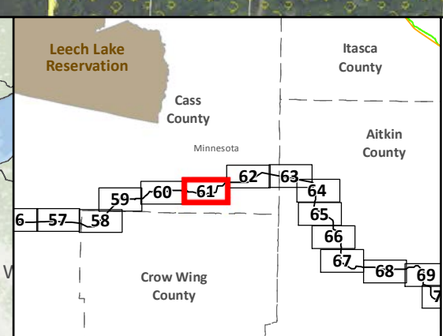

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 61A of 82

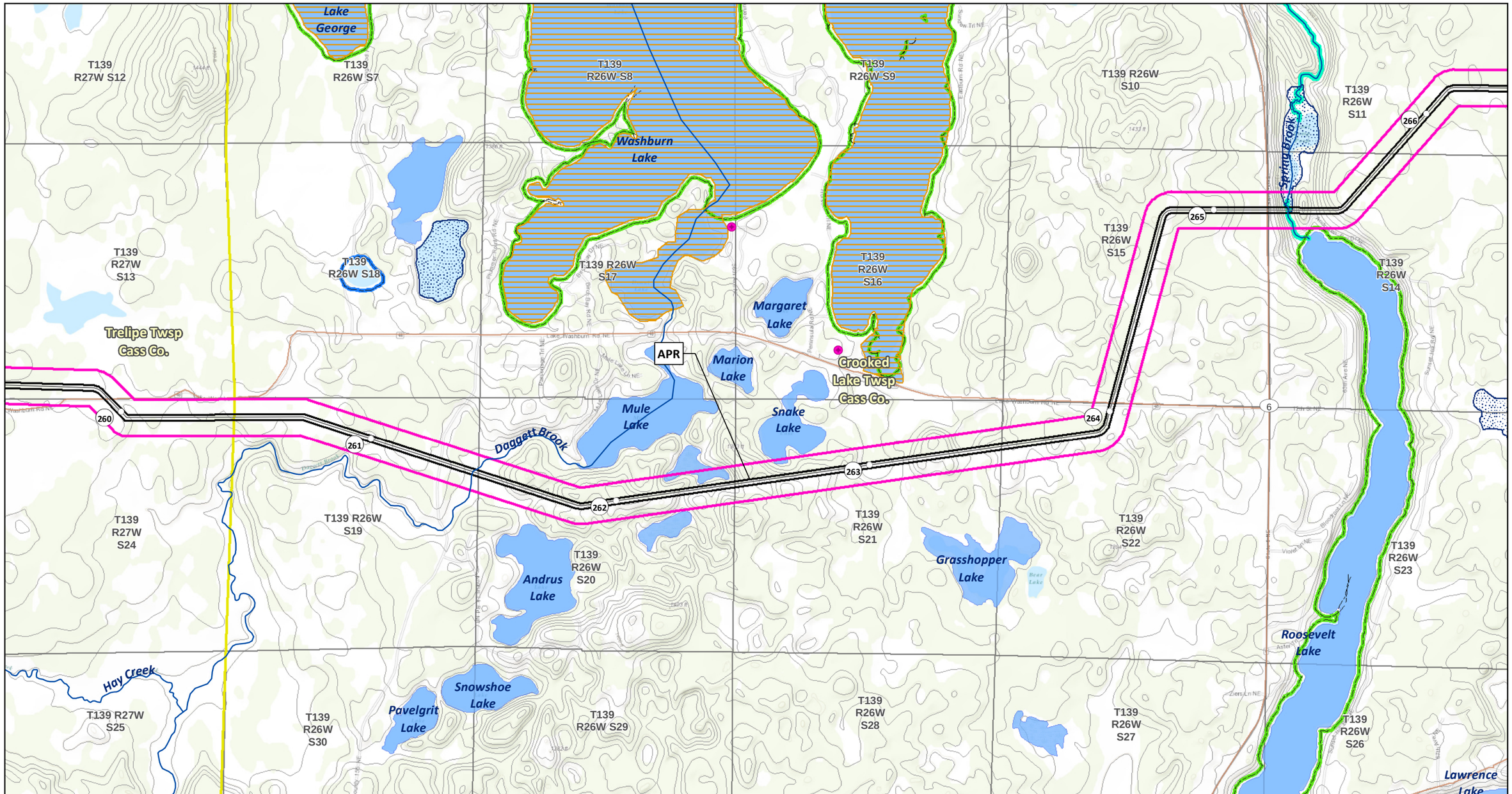

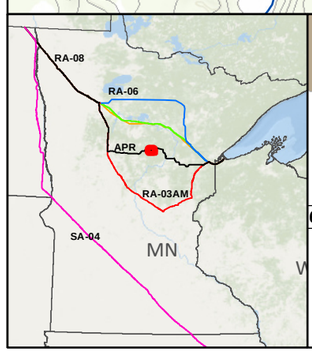

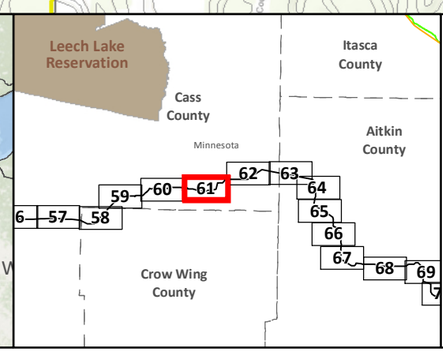

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 61B of 82

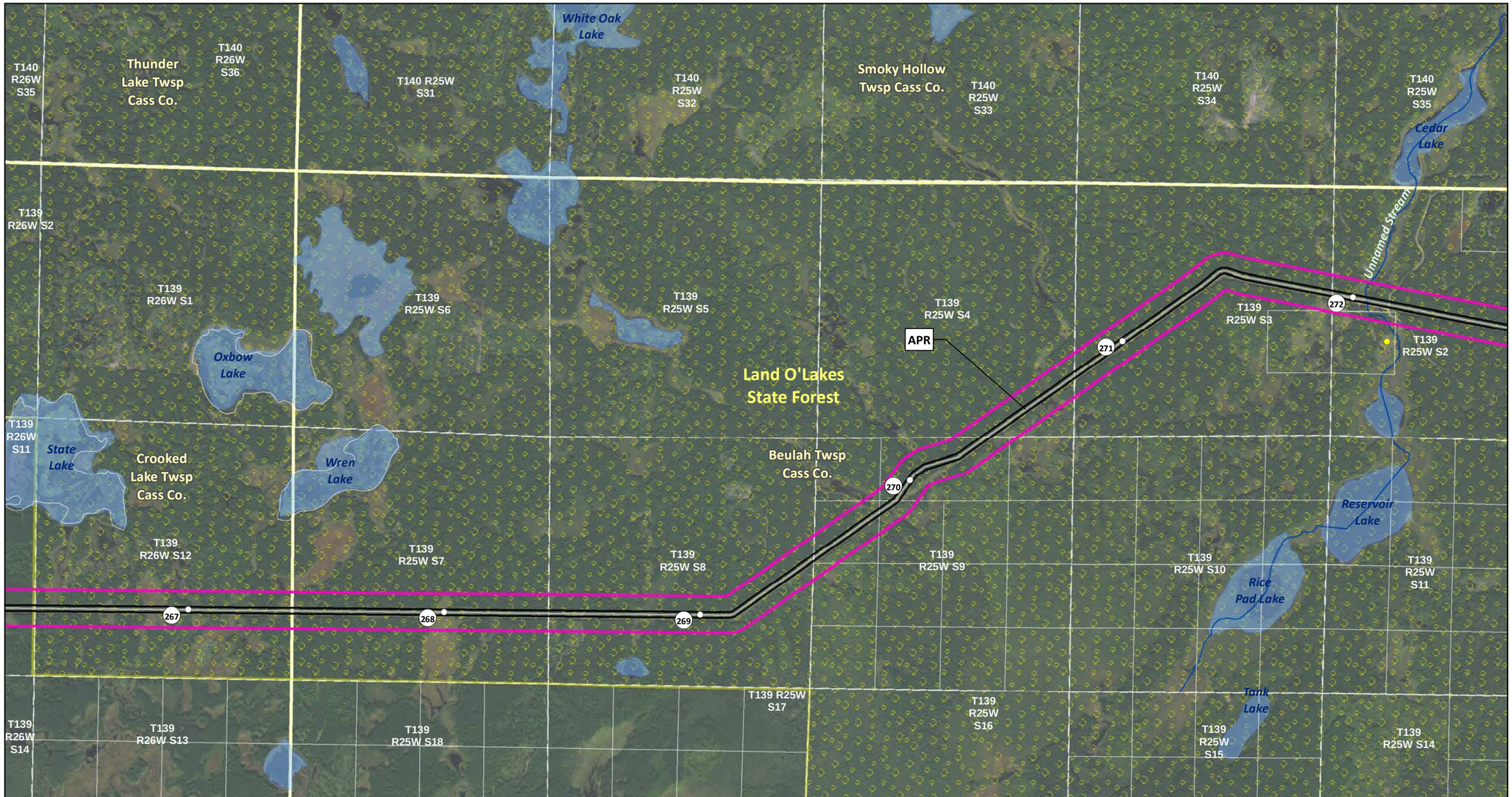

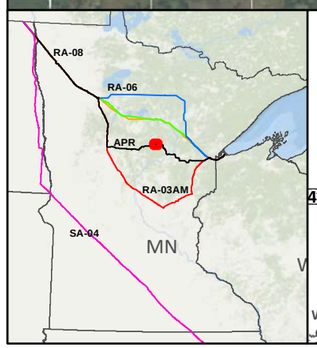

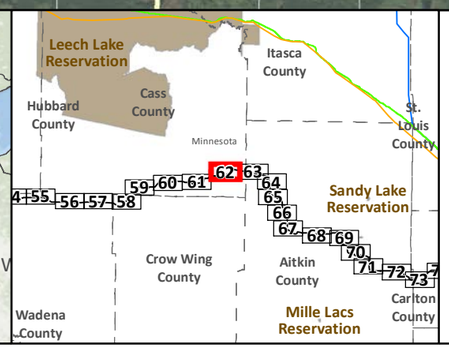

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

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Mile Post

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Pump Station

Interstate

Highway

Major Road

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0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 62A of 82

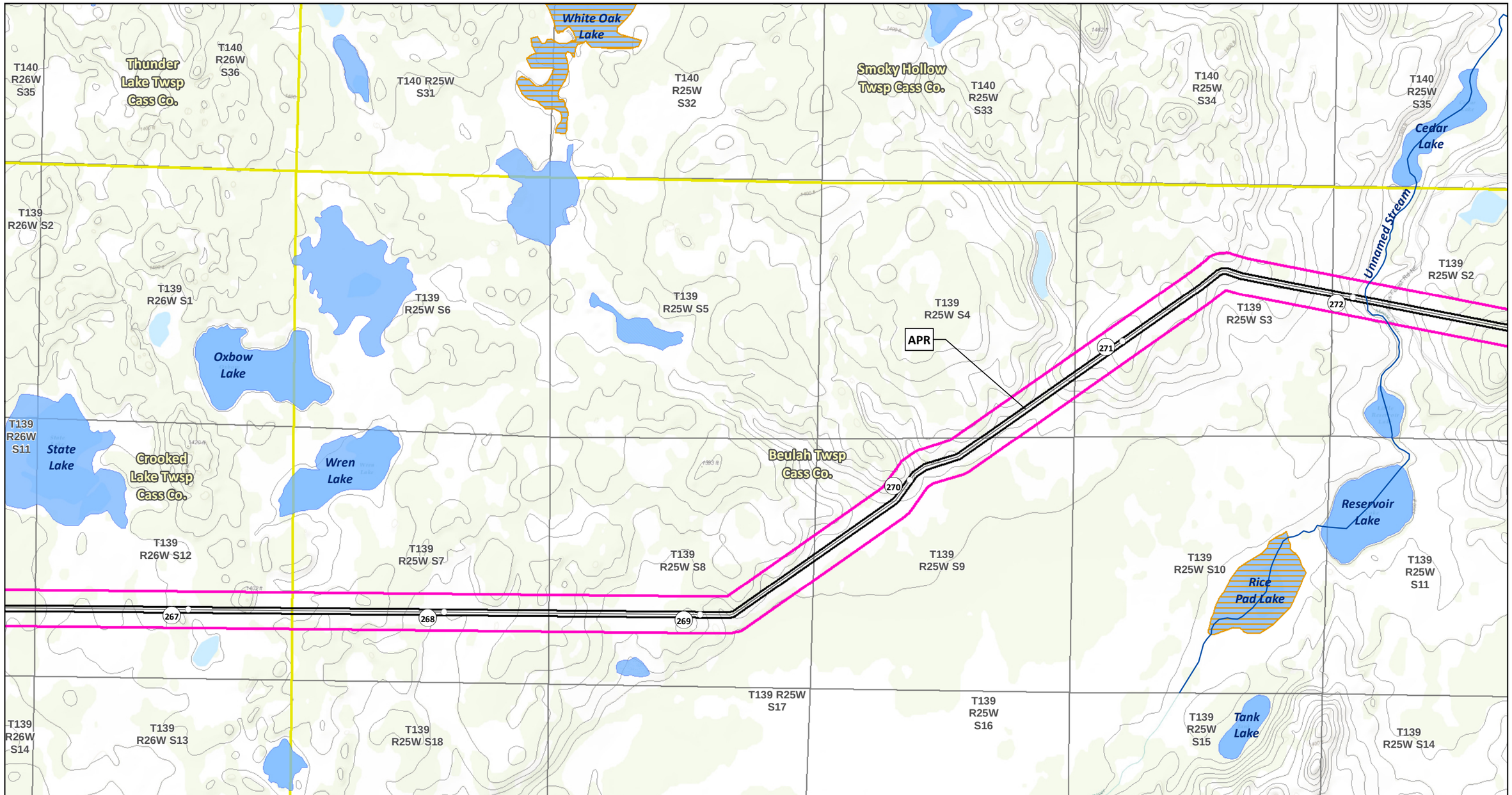

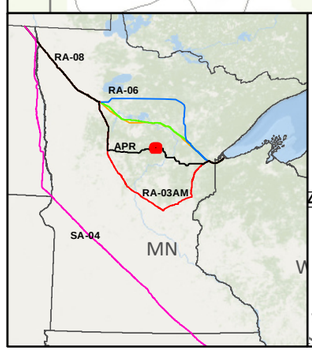

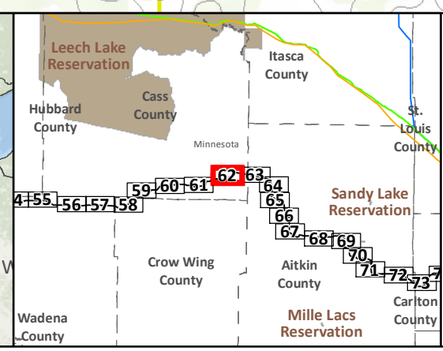

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
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Township Boundary

State Managed Lands
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Water Resources
- Navigable Waterway Crossings
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Public Waters Watercourse
303d Imparied Waters
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Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 62B of 82

Land O'Lakes State Forest
Smoky Hollow Twsp Cass Co.
Cedar Lake
T140 R25W S35
T140 R25W S36
T51 R27W S16
T51 R27W S15
T51 R27W S14
T51 R27W S13
T51 R26W S18
T51 R27W S22
T51 R27W S23
T51 R27W S24
T51 R26W S19
T51 R27W S21
T139 R25W S2
T139 R25W S1
Unnamed Stream
Little McKinney Lake
Blackwater Lake
Third Guide Lake
APR
Northwest Aitkin Twsp Aitkin Co.
McKinney Lake
Macville Twsp Aitkin Co.
T51 R27W S27
T51 R27W S25
T51 R26W S30
T51 R27W S28
T51 R27W S26
Beulah Twsp Cass Co.
T51 R26W S31
T139 R25W S11
T139 R25W S12
T51 R27W S36
RSA-White Elk Lake
T51 R27W S33
T51 R27W S34
Otter Lake
T51 R27W S35
T139 R25W S14
T139 R25W S13
RSA-Blandin
T50 R27W S4
273
274
275
276
277
278

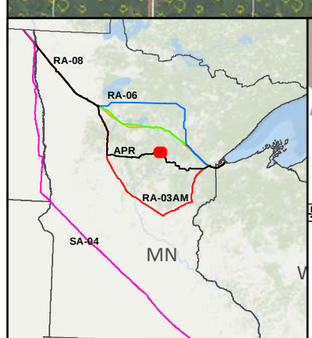

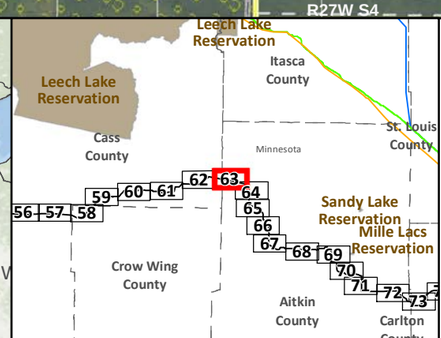

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 63A of 82

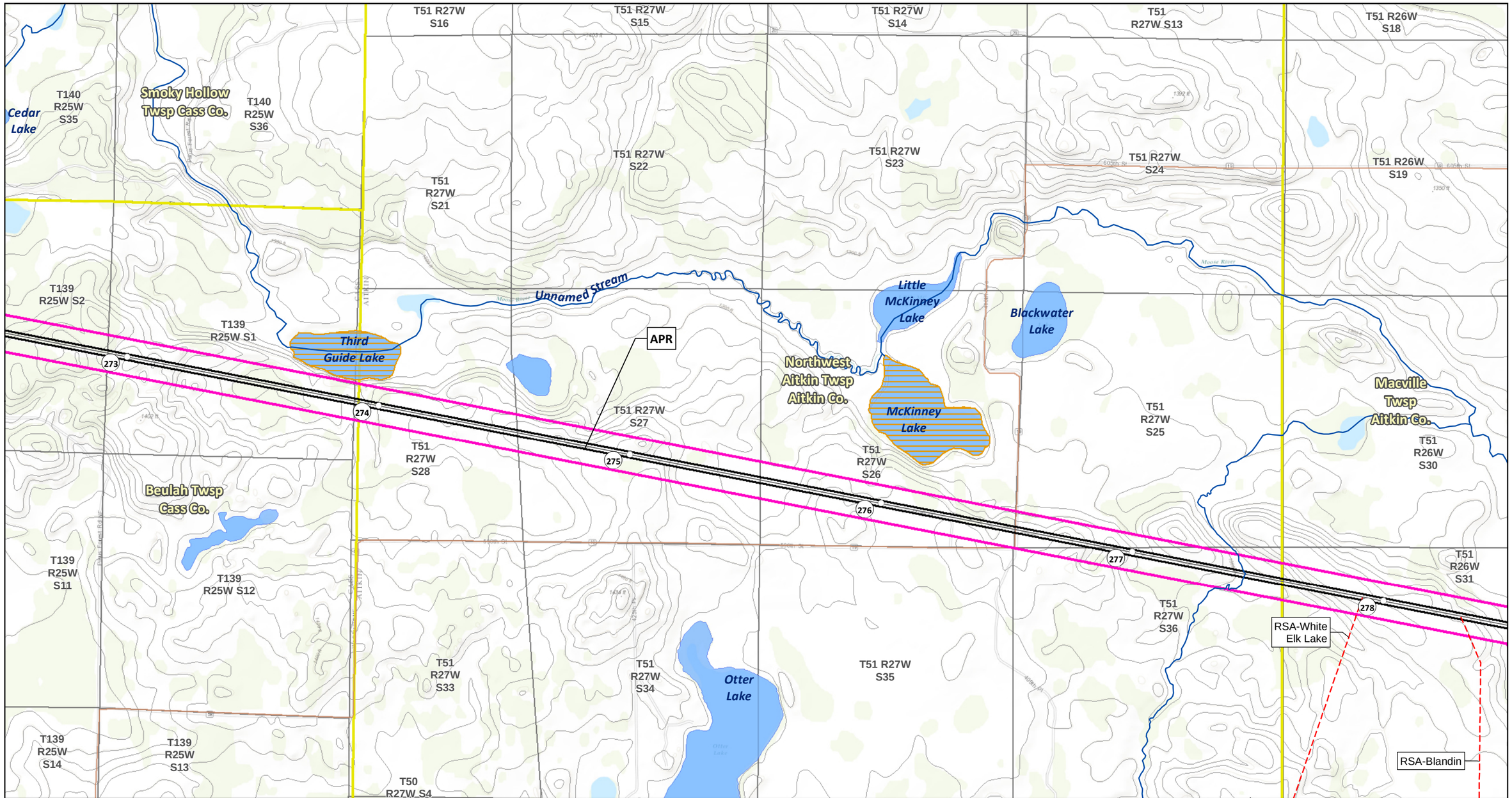

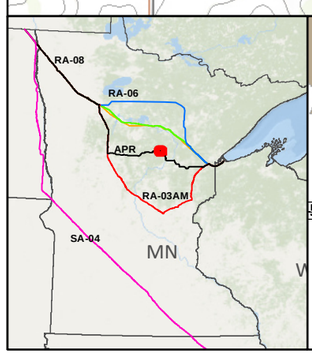

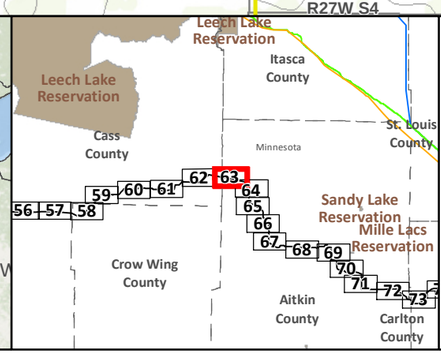

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Route Segment Alternatives (RSA)

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

Outstanding High Moderate

Native Plant Communities with Biodiversity Significance

Outstanding High Moderate

Terminal Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 63B of 82

T51 R27W S26
T51 R27W S25
T51 R26W S30
T51 R26W S29
T51 R26W S28
T51 R26W S27
T51 R26W S26
T51 R27W S36
T51 R27W S35
Unnamed Stream
T51 R26W S31
T51 R26W S32
T51 R26W S33
T51 R26W S34
T51 R26W S35
Moose Lake
Macville Twsp
Aitkin Co.
RSA-22
RSA-21
RSA-23
277
278
280
281
169
Buss Lake
RSA-White Elk Lake
RSA-Blandin
APR
T50 R27W S2
T50 R27W S1
T50 R26W S6
T50 R26W S5
T50 R26W S4
T50 R26W S3
T50 R26W S2
Hill River State Forest
Northwest Aitkin Twsp
Aitkin Co.
T50 R27W S11
T50 R27W S12
T50 R26W S7
T50 R26W S8
T50 R26W S9
T50 R26W S10
T50 R26W S11

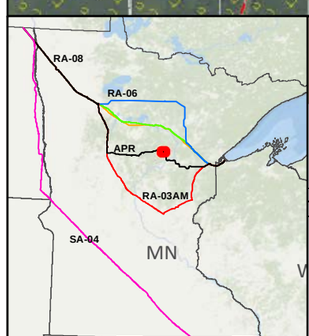

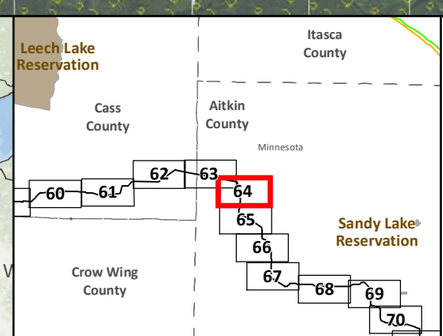

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 64A of 82

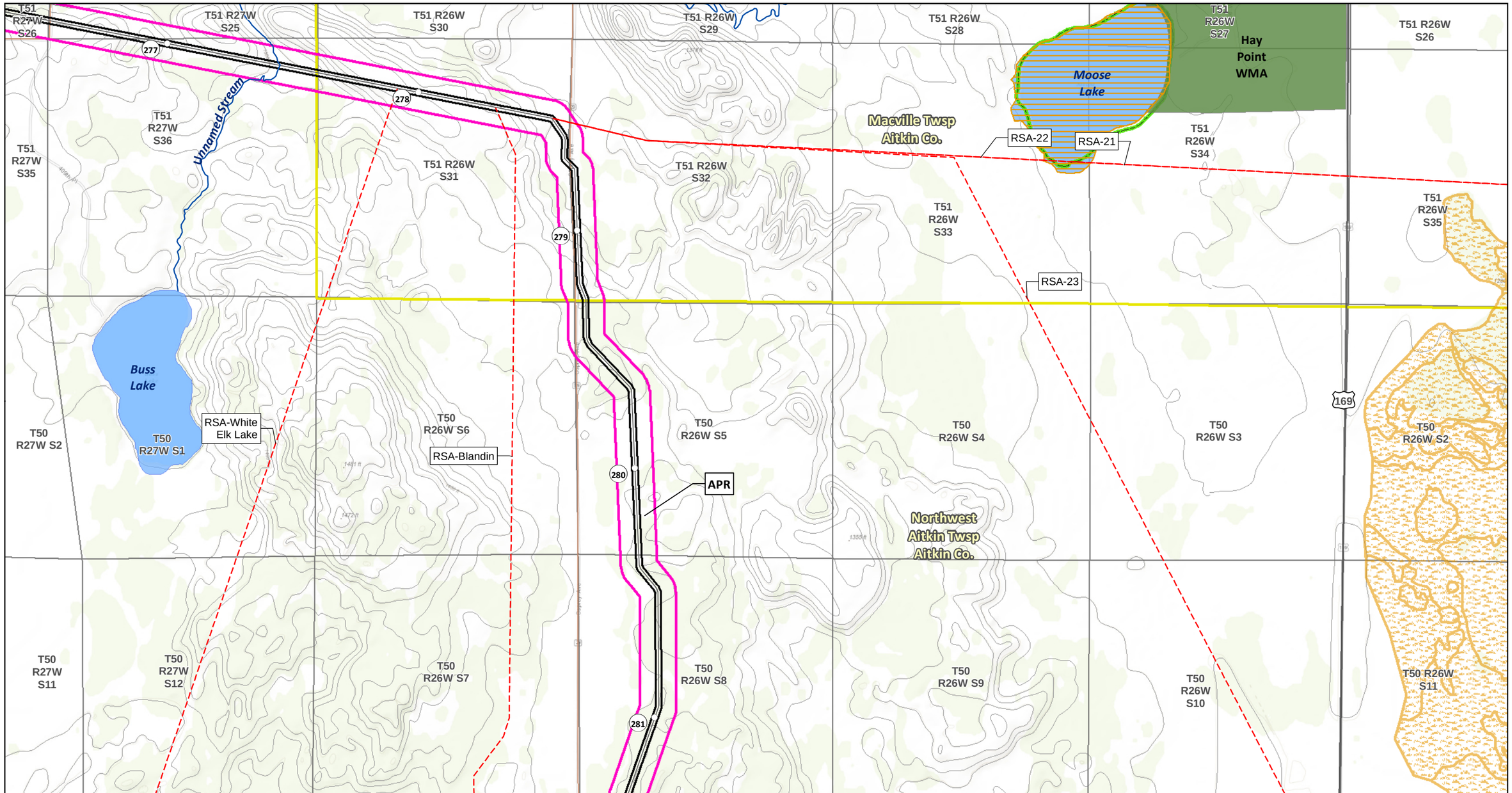

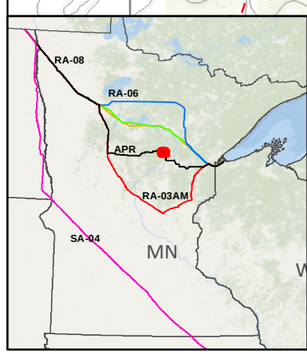

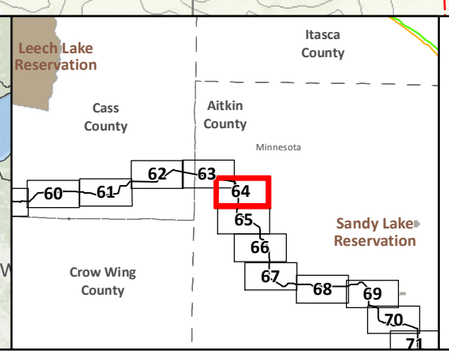

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 64B of 82

RSA-White Elk Lake

Hill River State Forest

T50 R27W S14

T50 R27W S13

T50 R26W S18

RSA-Blandin

T50 R26W S8

T50 R26W S9

T50 R26W S10

T50 R26W S11

T50 R26W S17

T50 R26W S16

T50 R26W S15

T50 R26W S14

282

White Elk Lake

RSA-23

283

T50 R26W S19

APR

T50 R26W S20

Northwest Aitkin Twsp Aitkin Co.

T50 R26W S21

T50 R27W S24

T50 R26W S22

169

T50 R26W S23

284

T50 R27W S23

RSA-White Elk Lake

Unnamed Stream

T50 R27W S26

285

T50 R27W S25

T50 R26W S30

Kingsleys Pothole

T50 R26W S29

T50 R26W S28

T50 R26W S27

T50 R26W S26

T50 R27W S35

T50 R27W S36

T50 R26W S31

T50 R26W S32

T50 R26W S33

T50 R26W S34

T50 R26W S35

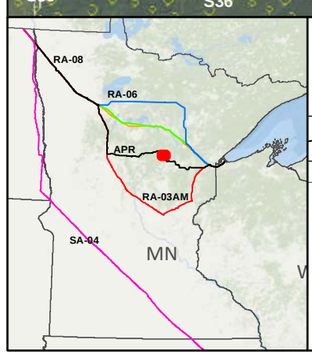

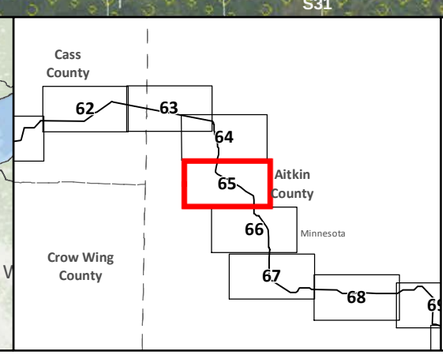

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 65A of 82

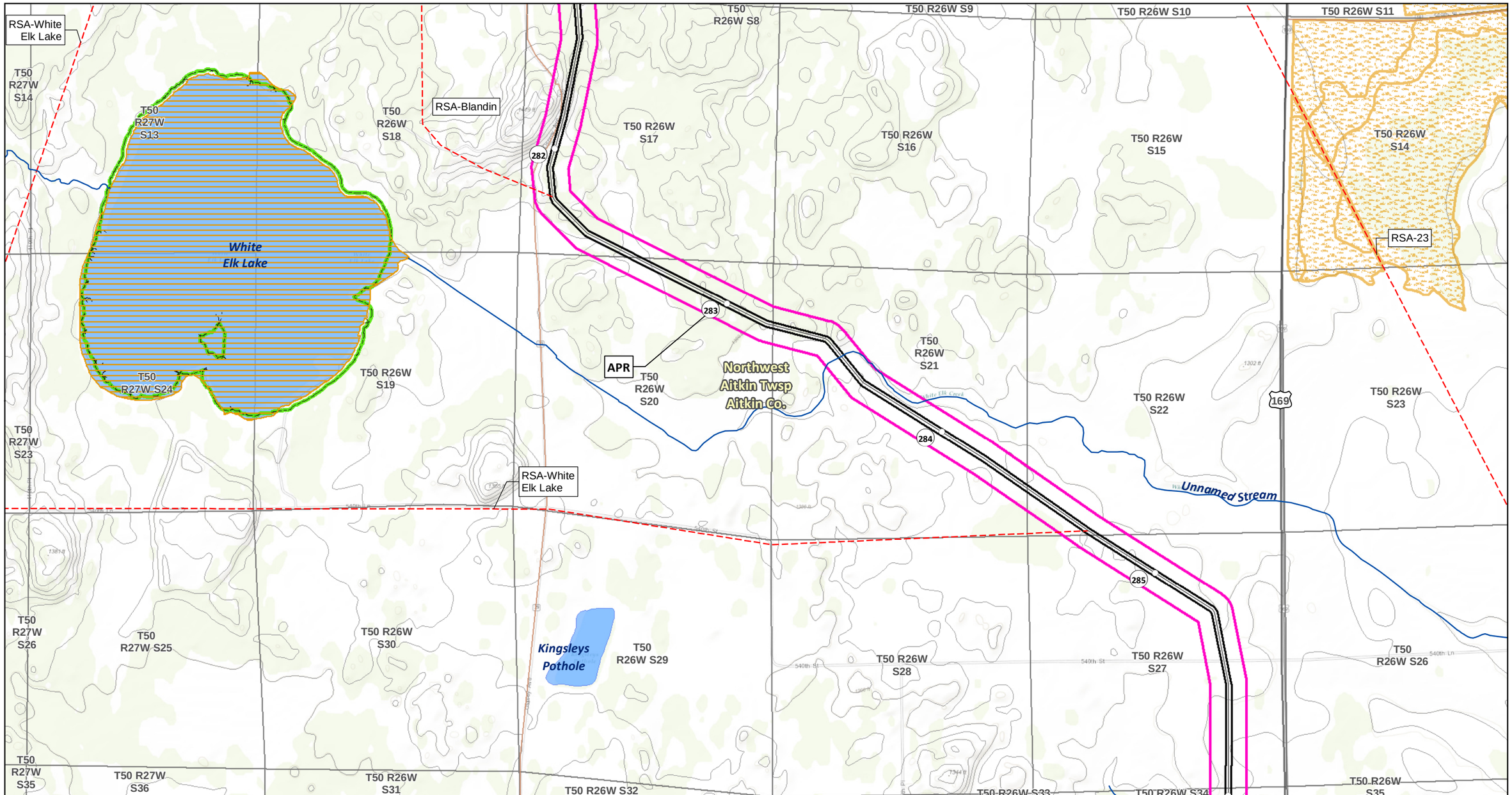

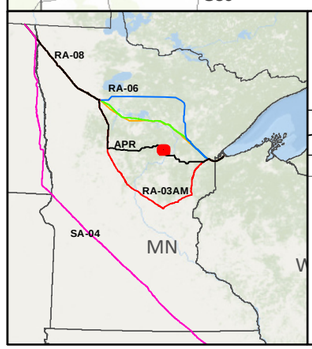

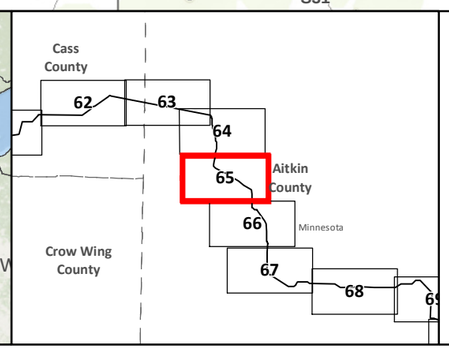

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 65B of 82

Hill River State Forest
T50 R26W S31
T50 R26W S32
T50 R26W S33
T50 R26W S34
Unnamed Stream
Northwest Aitkin Twsp Aitkin Co.
T50 R26W S35
T50 R26W S36
T50 R25W S31
287
RSA-23
T49 R26W S6
T49 R26W S5
T49 R26W S4
T49 R26W S3
169
T49 R26W S1
T49 R25W S6
Packer Lake
T49 R26W S2
288
Waukenabo State Forest
Sitas Lake
APR
Waukenabo Twsp Aitkin Co.
Logan Twsp Aitkin Co.
West Lake
T49 R26W S8
T49 R26W S9
T49 R26W S10
T49 R26W S11
T49 R26W S12
T49 R25W S7
T49 R26W S7
289
Esquagamah Lake
Waukenabo Lake
T49 R26W S18
T49 R26W S17
T49 R26W S16
T49 R26W S15
T49 R26W S14
T49 R26W S13
T49 R25W S18

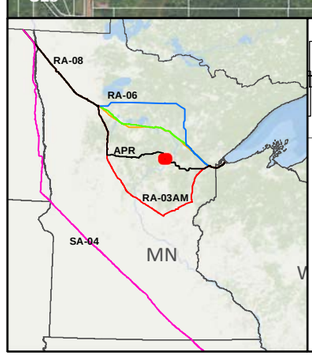

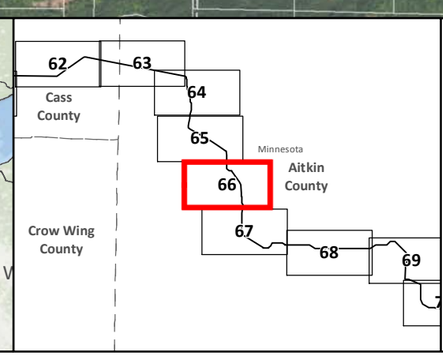

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 66A of 82

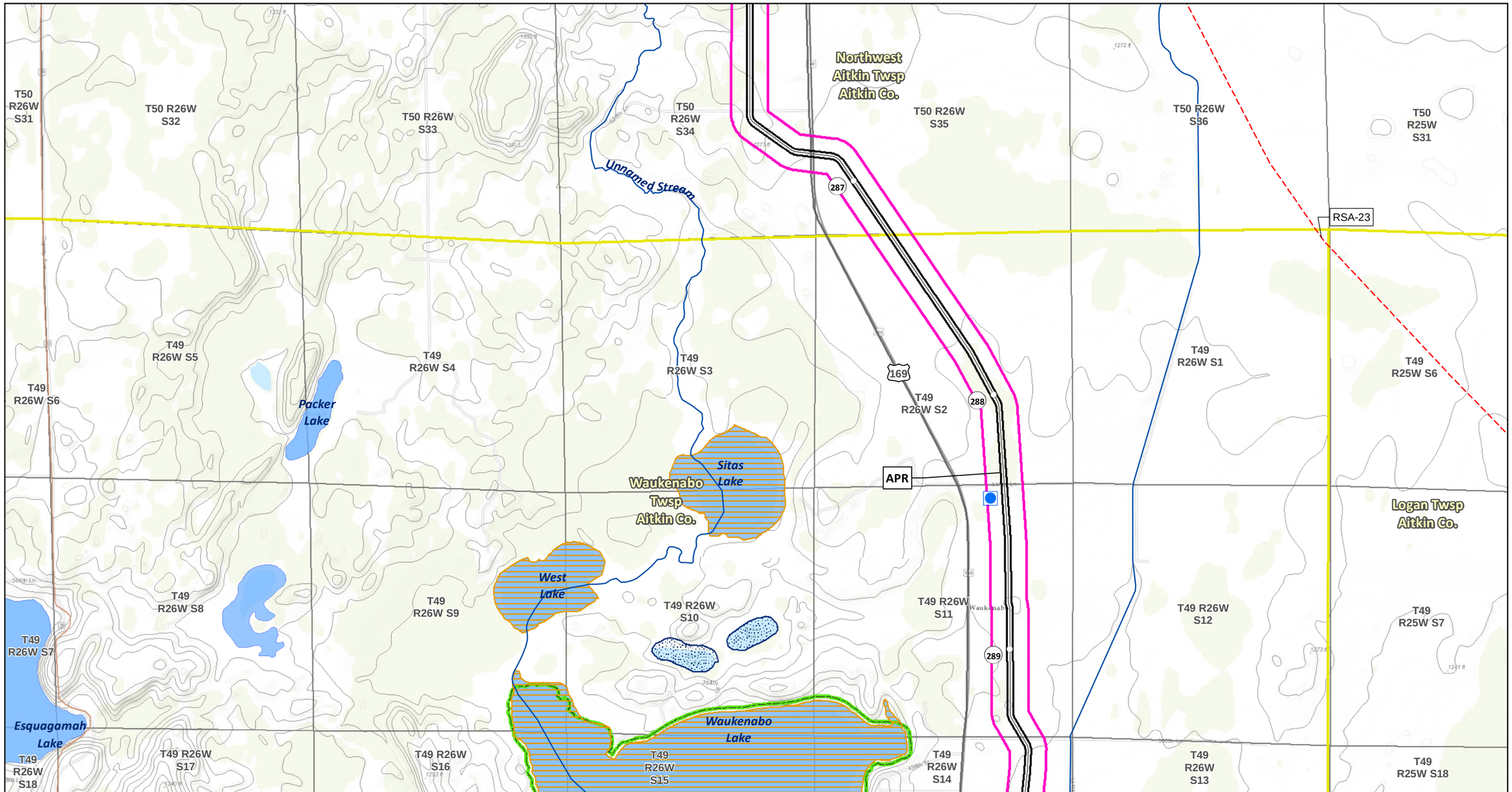

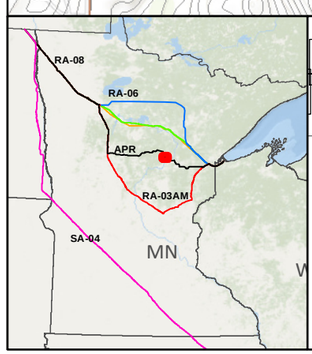

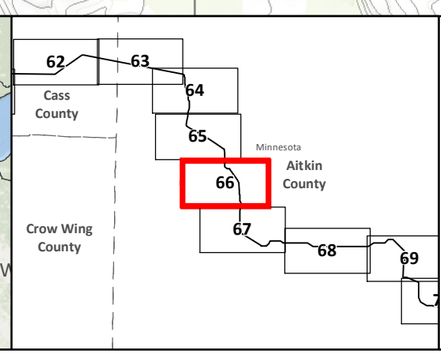

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 66B of 82

Waukenabo Lake
Round Lake
Rice Lake
T49 R26W S16
T49 R26W S15
T49 R26W S14
T49 R26W S13
T49 R25W S18
T49 R25W S17
T49 R26W S23
APR
T49 R26W S21
T49 R26W S22
T49 R26W S24
T49 R25W S19
T49 R25W S20
Willow River
Waukenabo Twsp Aitkin Co.
Logan Twsp Aitkin Co.
Waukenabo State Forest
Unnamed Stream
T49 R26W S27
T49 R26W S26
T49 R26W S28
T49 R26W S25
T49 R25W S30
T49 R25W S29
T49 R26W S35
T49 R26W S36
T49 R26W S33
T49 R26W S34
T49 R25W S31
T49 R25W S32
290
291
292
293
294
295
169
232

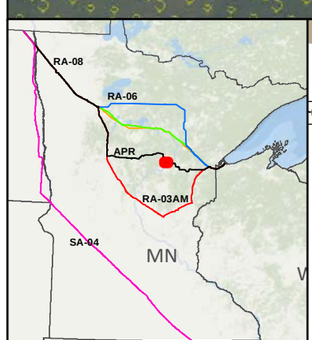

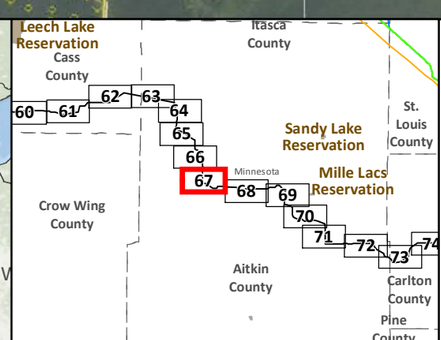

SA-04
Applicant's Preferred Route (APR)

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- RA-03AM
- RA-06
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- RA-08
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- Route Segment Alternatives (RSA)

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Route Width (750')
County Boundary
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Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
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- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 67A of 82

Waukenabo Lake
Round Lake
Rice Lake
Unnamed Stream
Willow River
Waukenabo Twsp Aitkin Co.
Logan Twsp Aitkin Co.
APR
T49 R26W S16
T49 R26W S15
T49 R26W S14
T49 R26W S13
T49 R25W S18
T49 R25W S17
T49 R26W S21
T49 R26W S22
T49 R26W S23
T49 R26W S24
T49 R25W S19
T49 R25W S20
T49 R26W S28
T49 R26W S27
T49 R26W S26
T49 R26W S25
T49 R25W S30
T49 R25W S29
T49 R26W S33
T49 R26W S34
T49 R26W S35
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T49 R25W S31
T49 R25W S32
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294
295
169
232

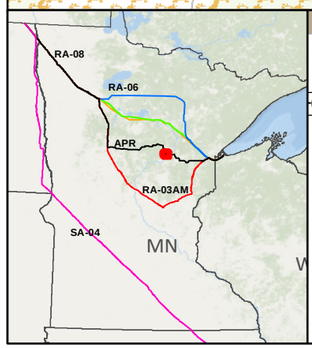

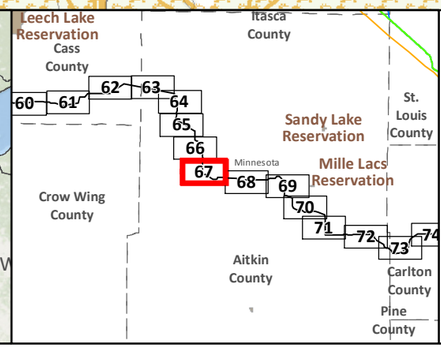

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
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WMA - Wildlife Management Areas
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SNA - Scientific and Natural Area

Water Resources
Navigable Waterway Crossings
National River Inventory Crossing

Public Waters Watercourse
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Designated Trout Stream
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Lakes of Biological Significance
Outstanding
High
Moderate

Native Plant Communities with Biodiversity Significance
Outstanding
High
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Terminal
Pump Station

Data Sources:
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 67B of 82

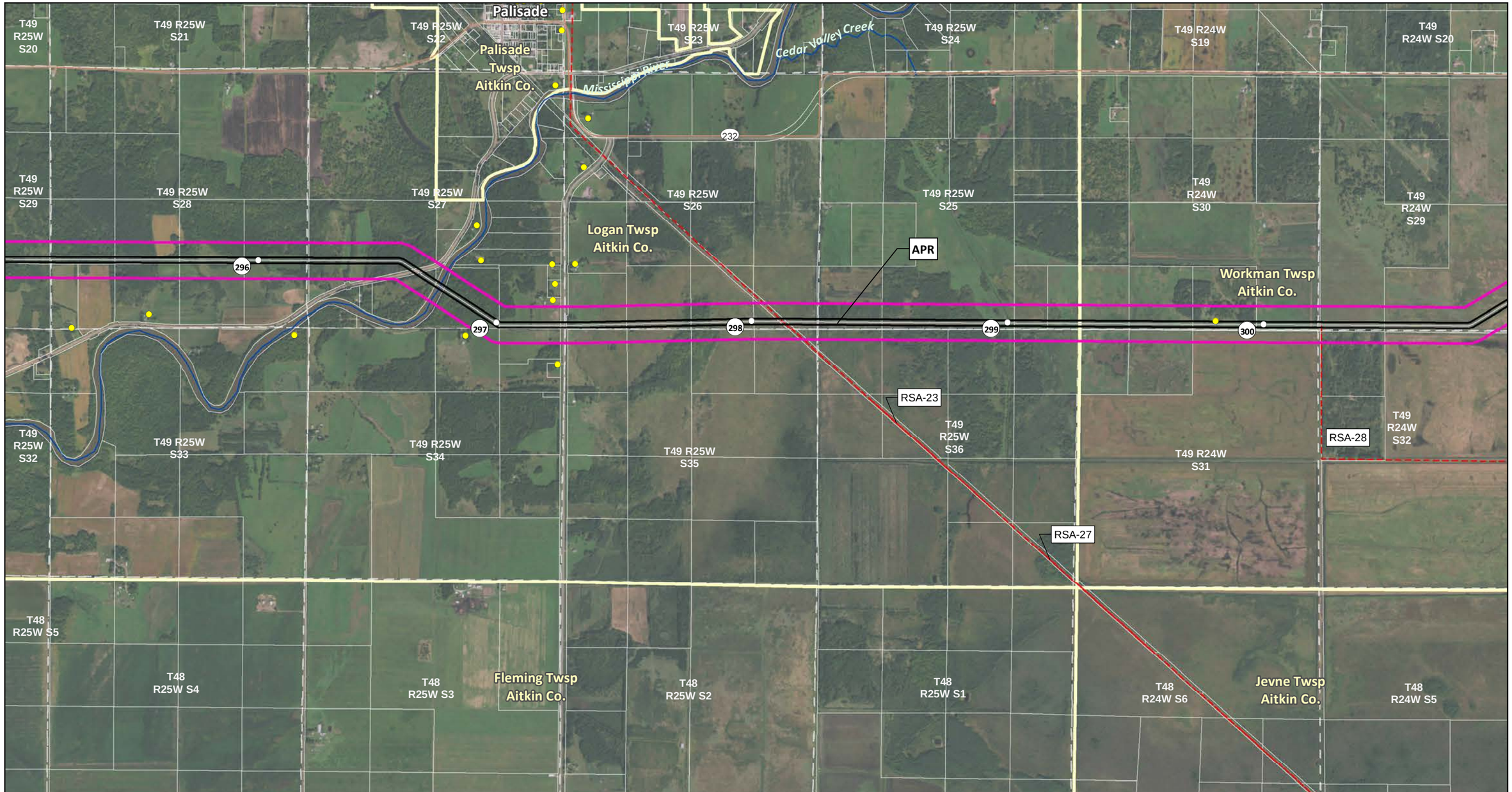

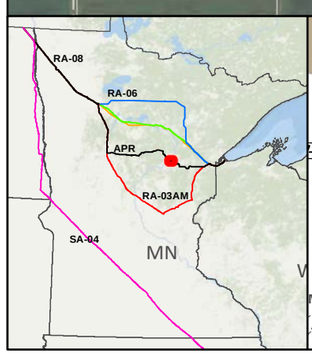

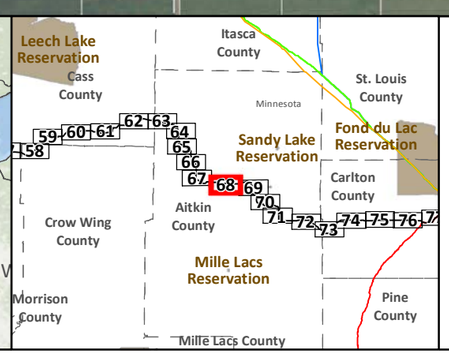

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 68A of 82

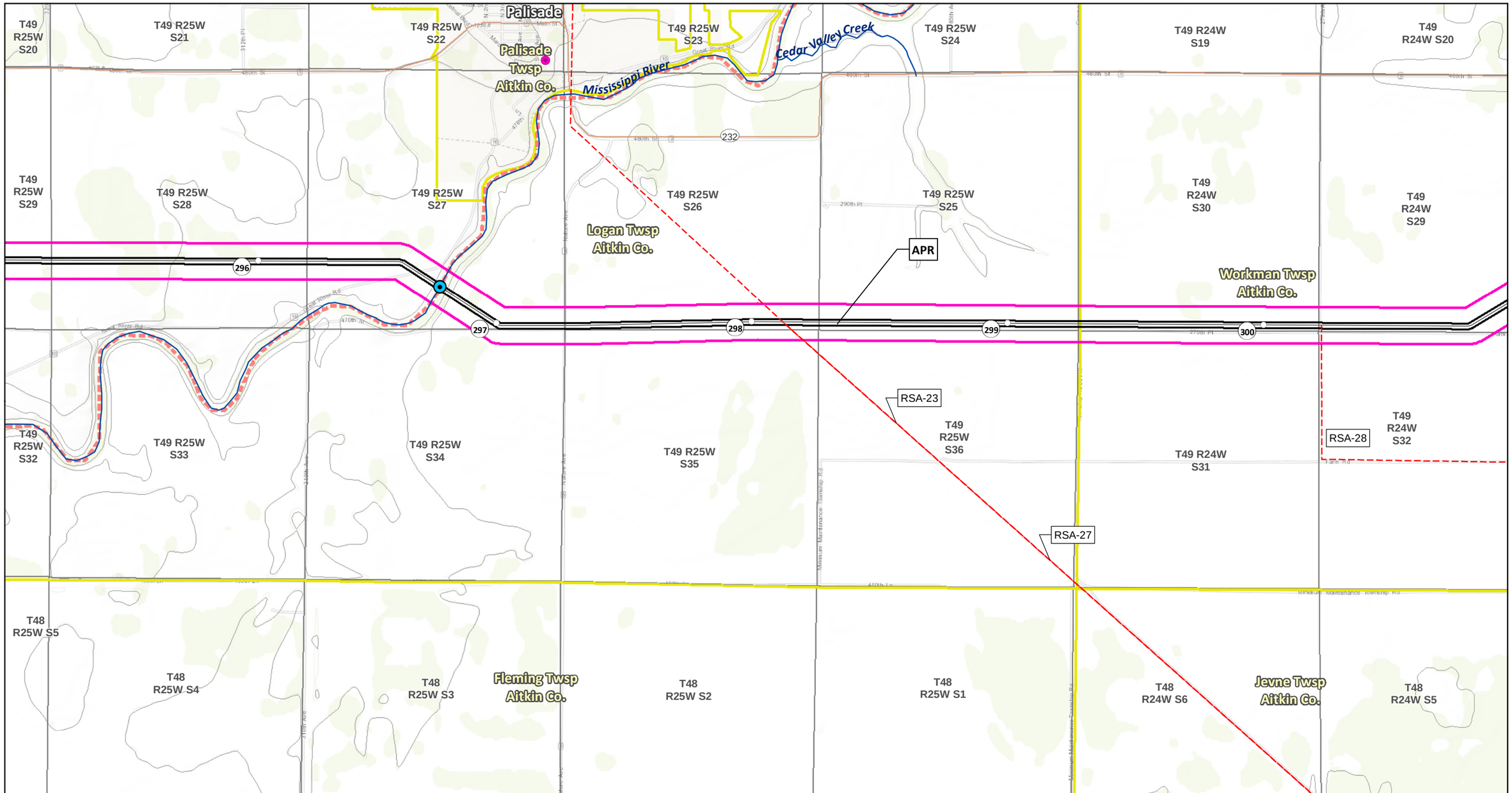

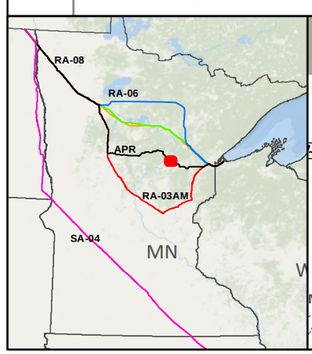

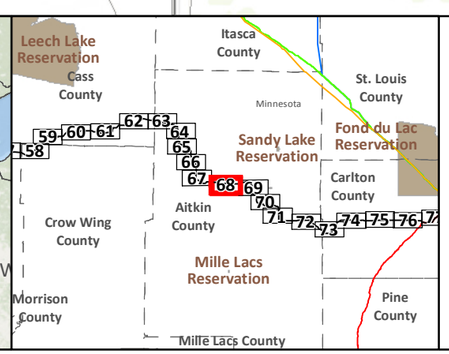

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 68B of 82

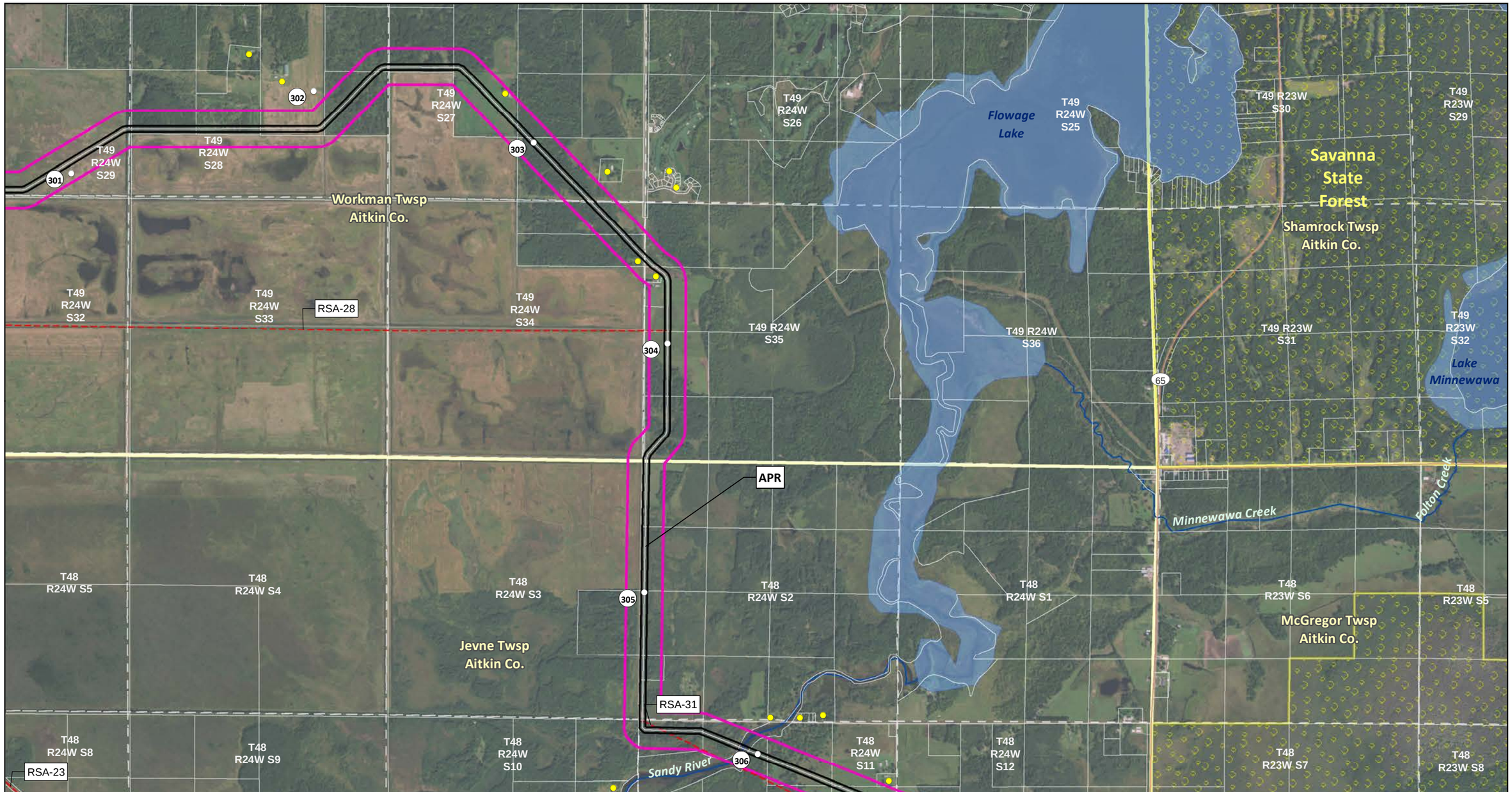

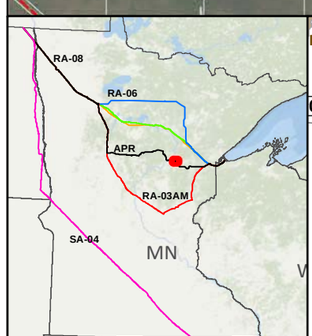

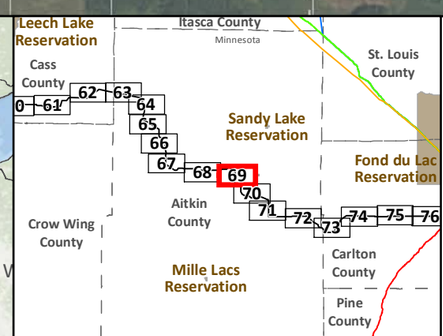

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 69A of 82

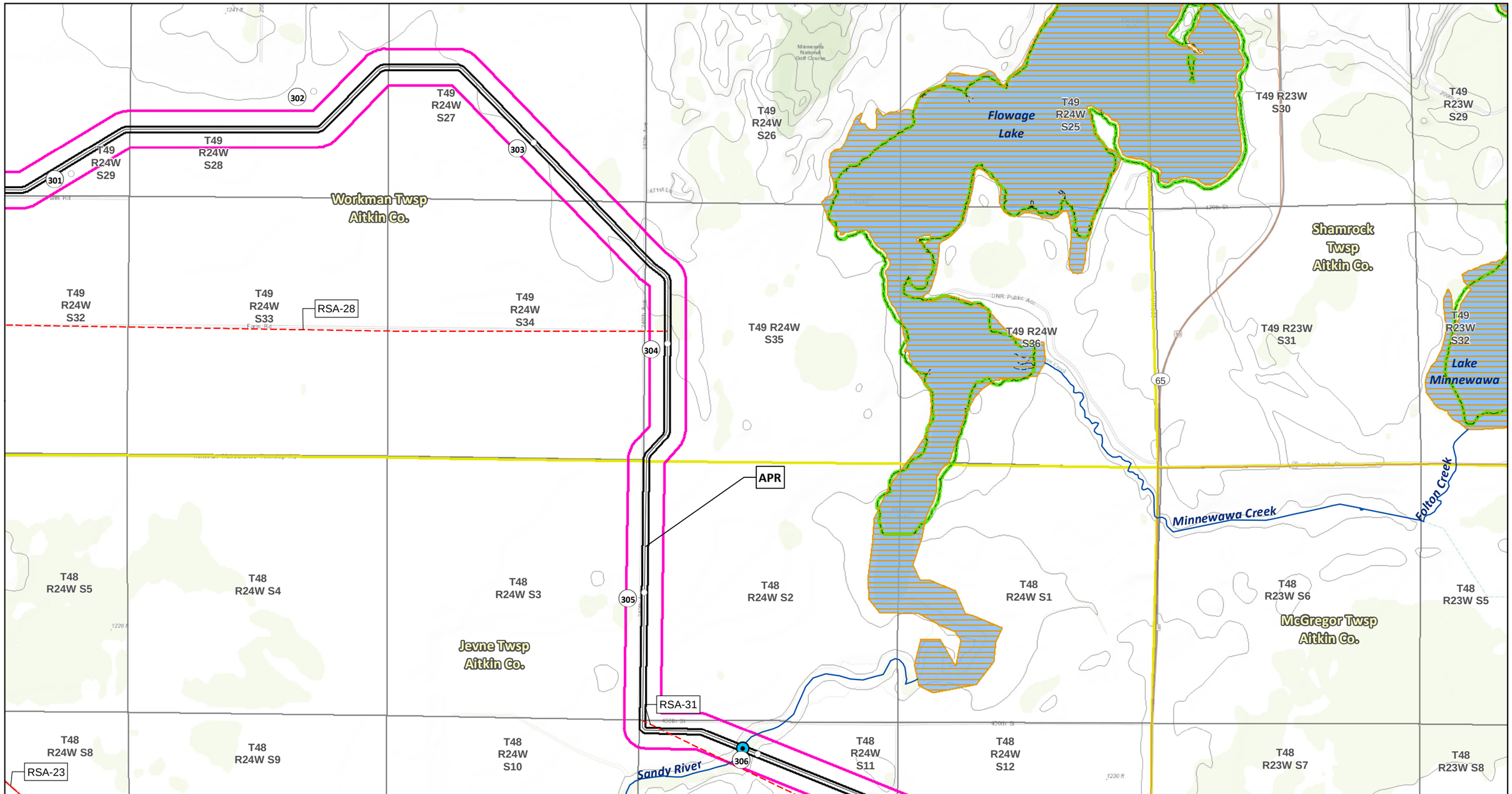

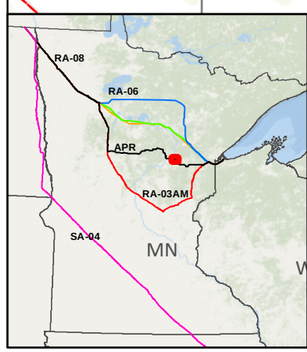

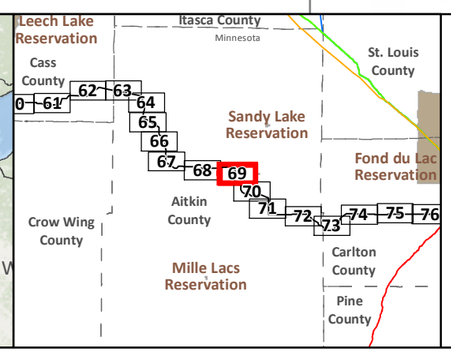

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 69B of 82

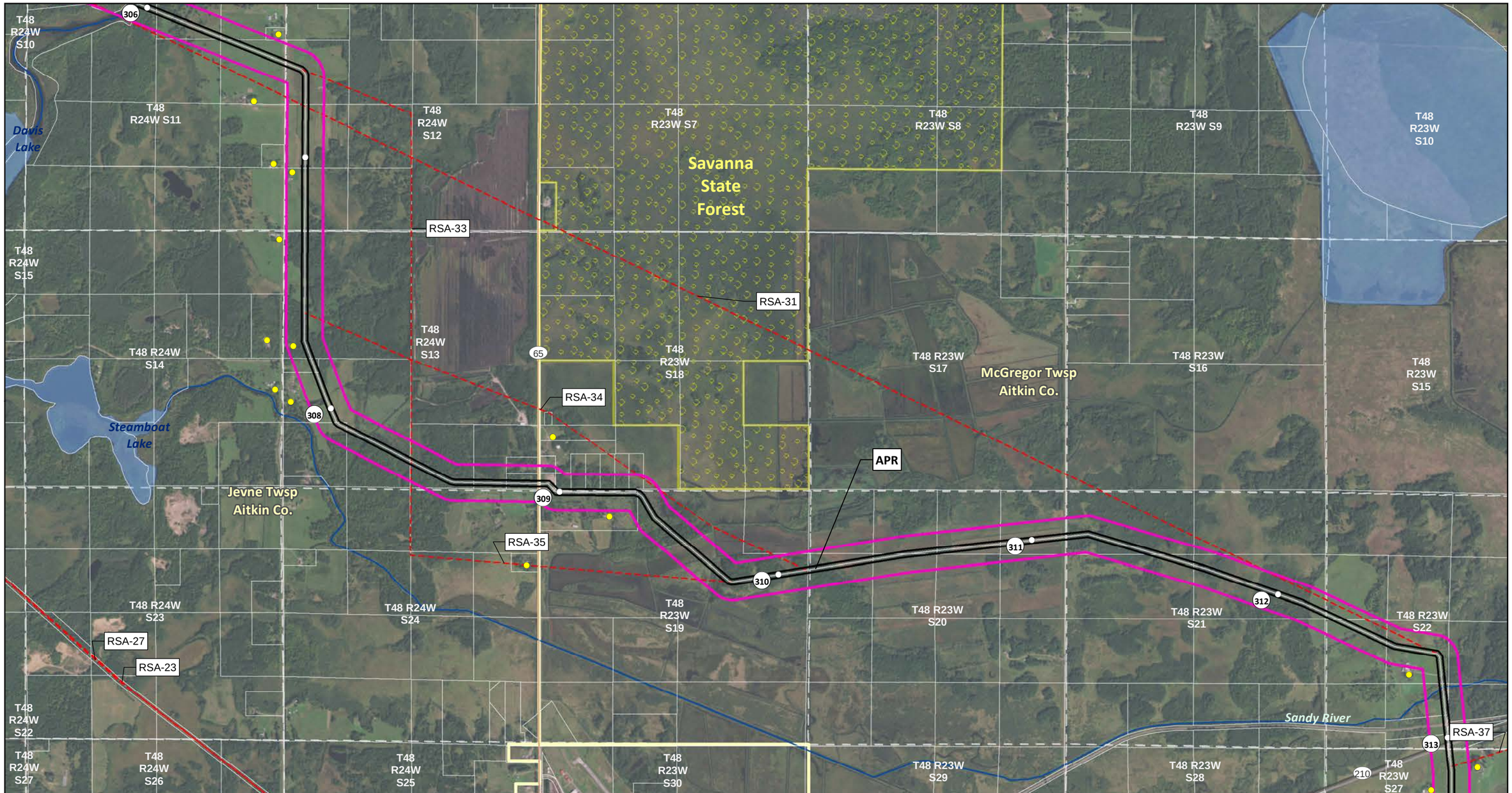

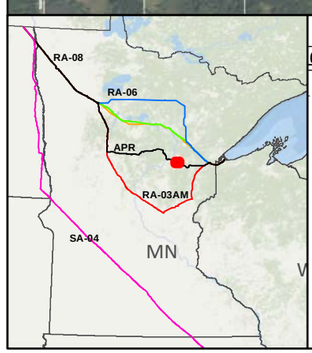

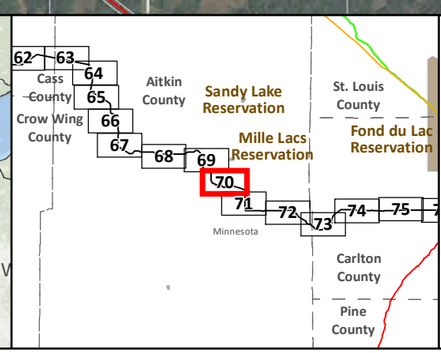

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 70A of 82

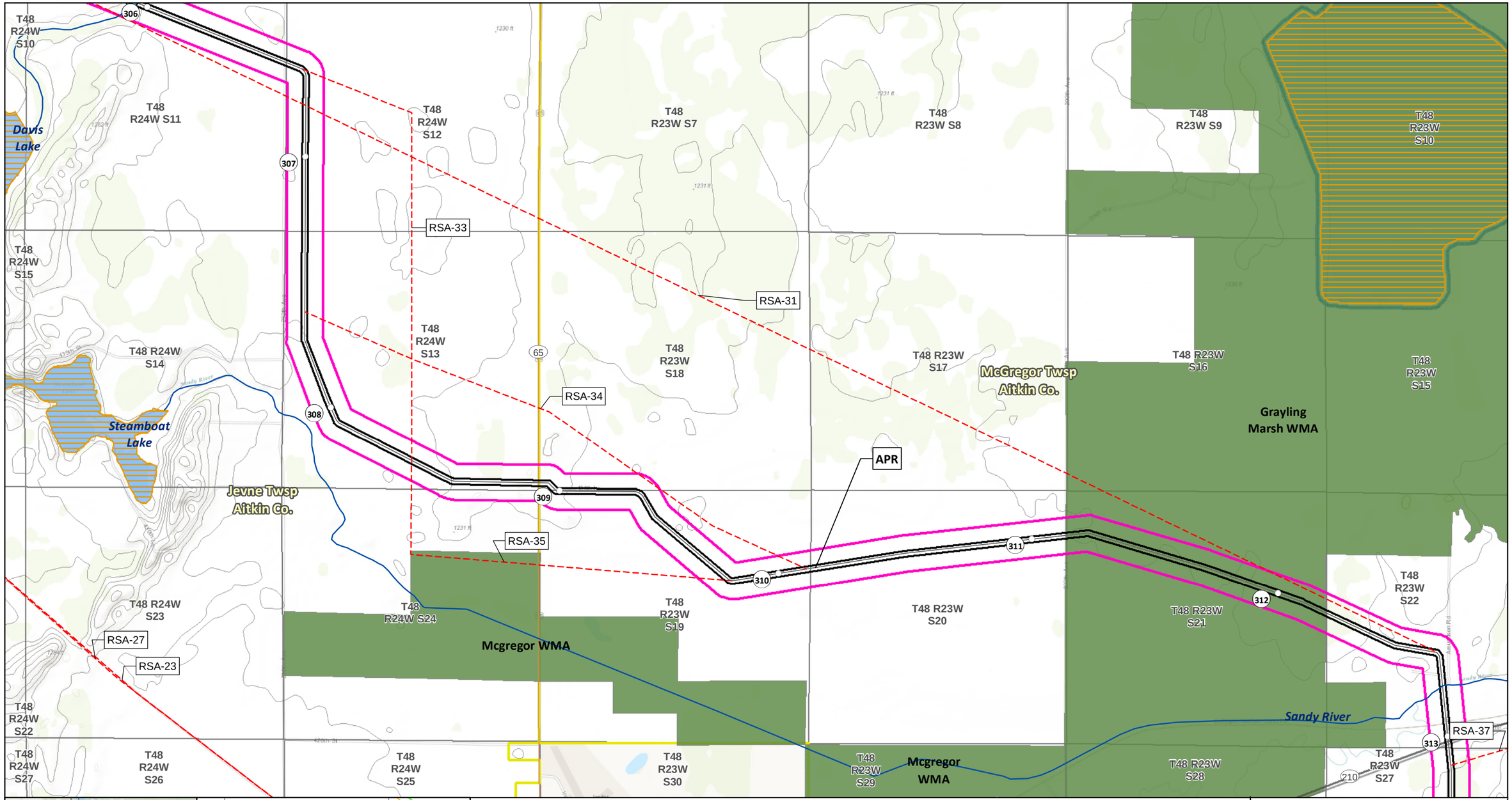

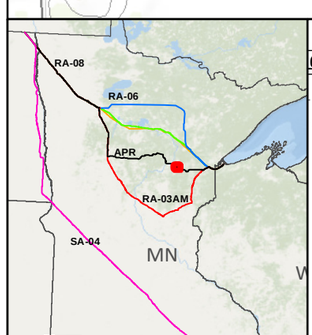

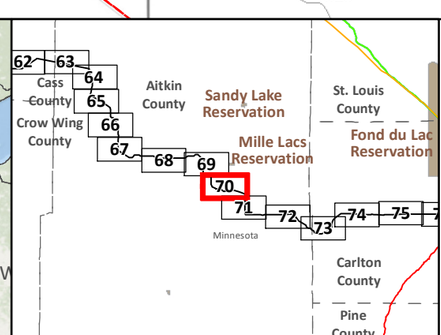

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 70B of 82

T48 R23W S19
T48 R23W S20
T48 R23W S21
T48 R23W S22
RSA-37
T48 R23W S23
T48 R23W S24
T48 R22W S19
Sandy River
T48 R23W S29
T48 R23W S30
T48 R23W S28
T48 R23W S27
T48 R23W S26
T48 R23W S25
T48 R22W S30
RSA-27
McGregor Twsp Aitkin Co.
Clark Twsp Aitkin Co.
Savanna State Forest
RSA-23
T48 R23W S34
T48 R23W S31
T48 R23W S32
T48 R23W S33
T48 R23W S35
T48 R23W S36
T48 R22W S31
T47 R23W S3
APR
T47 R23W S2
T47 R23W S1
Little Sheriff Lake
T47 R23W S4
T47 R23W S6
T47 R23W S5
Spalding Twsp Aitkin Co.
Sheriff Lake
Lost Lake
313
314
315
316
317
318
210
65

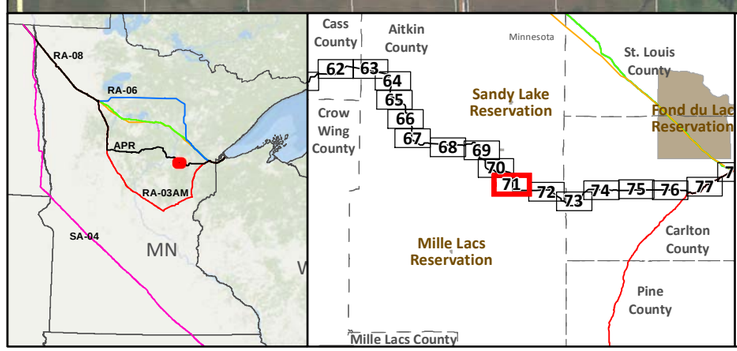

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 71A of 82

Mcgregor WMA
T48 R23W S20
T48 R23W S21
T48 R23W S22
RSA-37
T48 R23W S23
T48 R23W S24
T48 R22W S19
T48 R23W S29
Sandy River
Grayling Marsh WMA
Mcgregor WMA
T48 R23W S30
T48 R23W S28
T48 R23W S27
T48 R23W S26
T48 R23W S25
T48 R22W S30
RSA-27
McGregor Twsp Aitkin Co.
Clark Twsp Aitkin Co.
T48 R23W S31
T48 R23W S32
RSA-23
T48 R23W S33
T48 R23W S34
T48 R23W S35
T48 R23W S36
T48 R22W S31
T47 R23W S3
APR
T47 R23W S2
T47 R23W S1
Little Sheriff Lake
T47 R23W S4
McGregor Marsh SNA
McGregor Marsh SNA
T47 R23W S5
T47 R23W S6
Kimberly Marsh WMA
Spalding Twsp Aitkin Co.
Sheriff Lake
Lost Lake

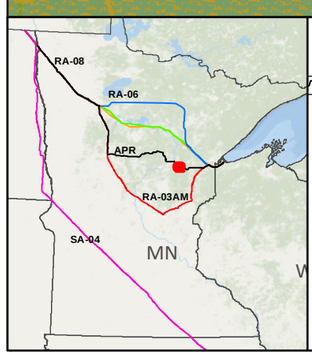

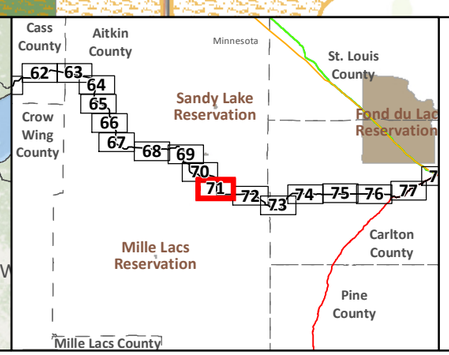

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
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- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 71B of 82

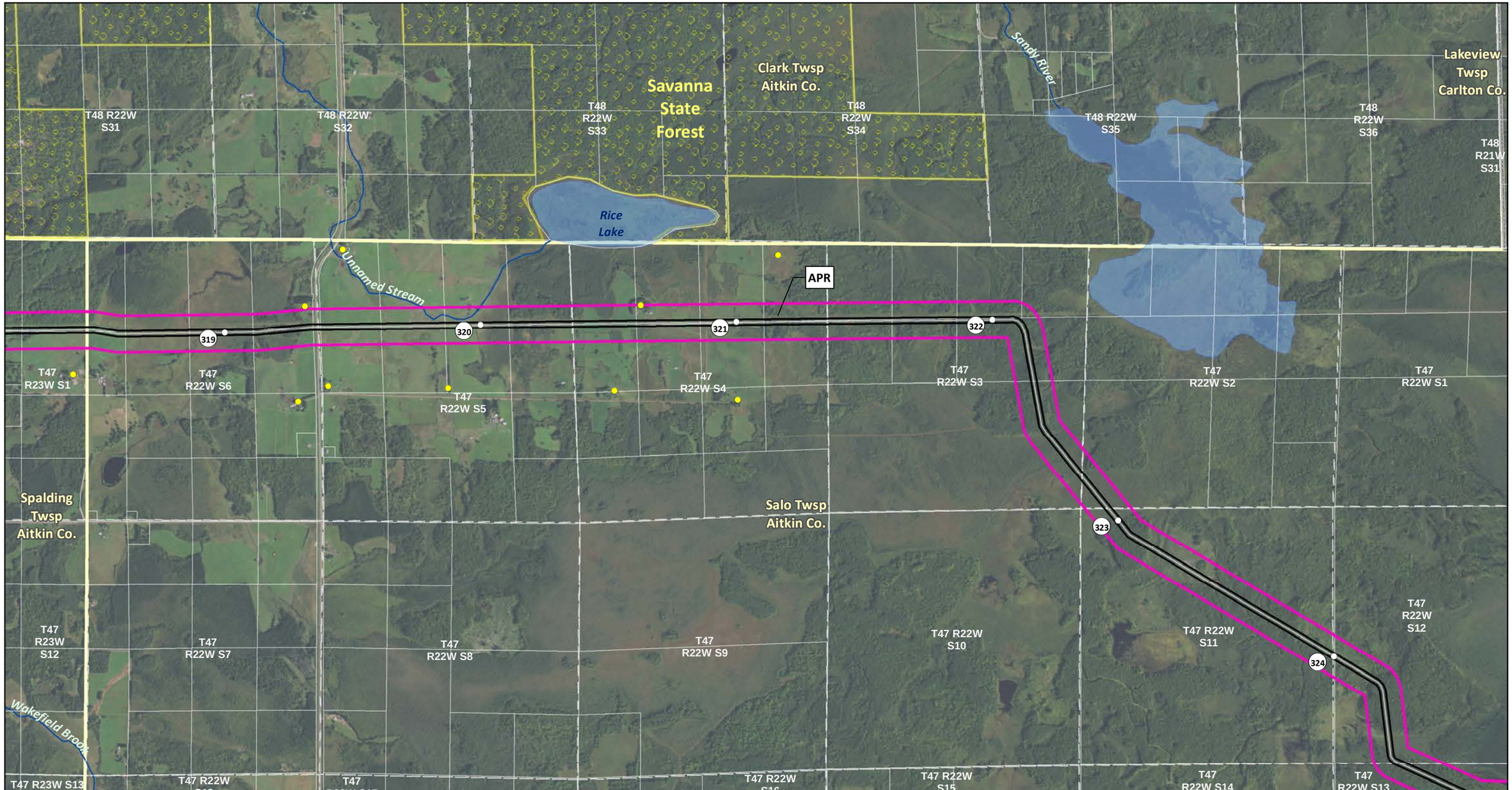

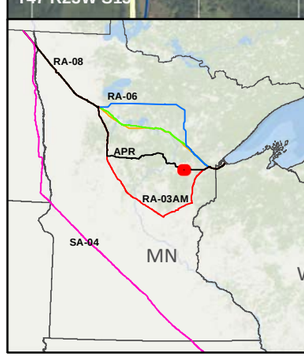

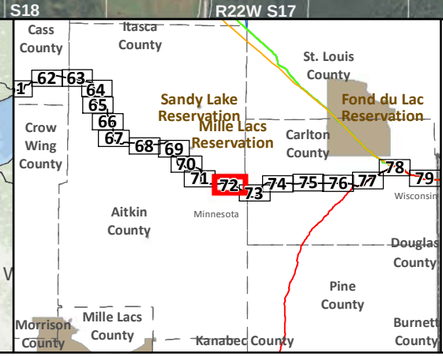

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

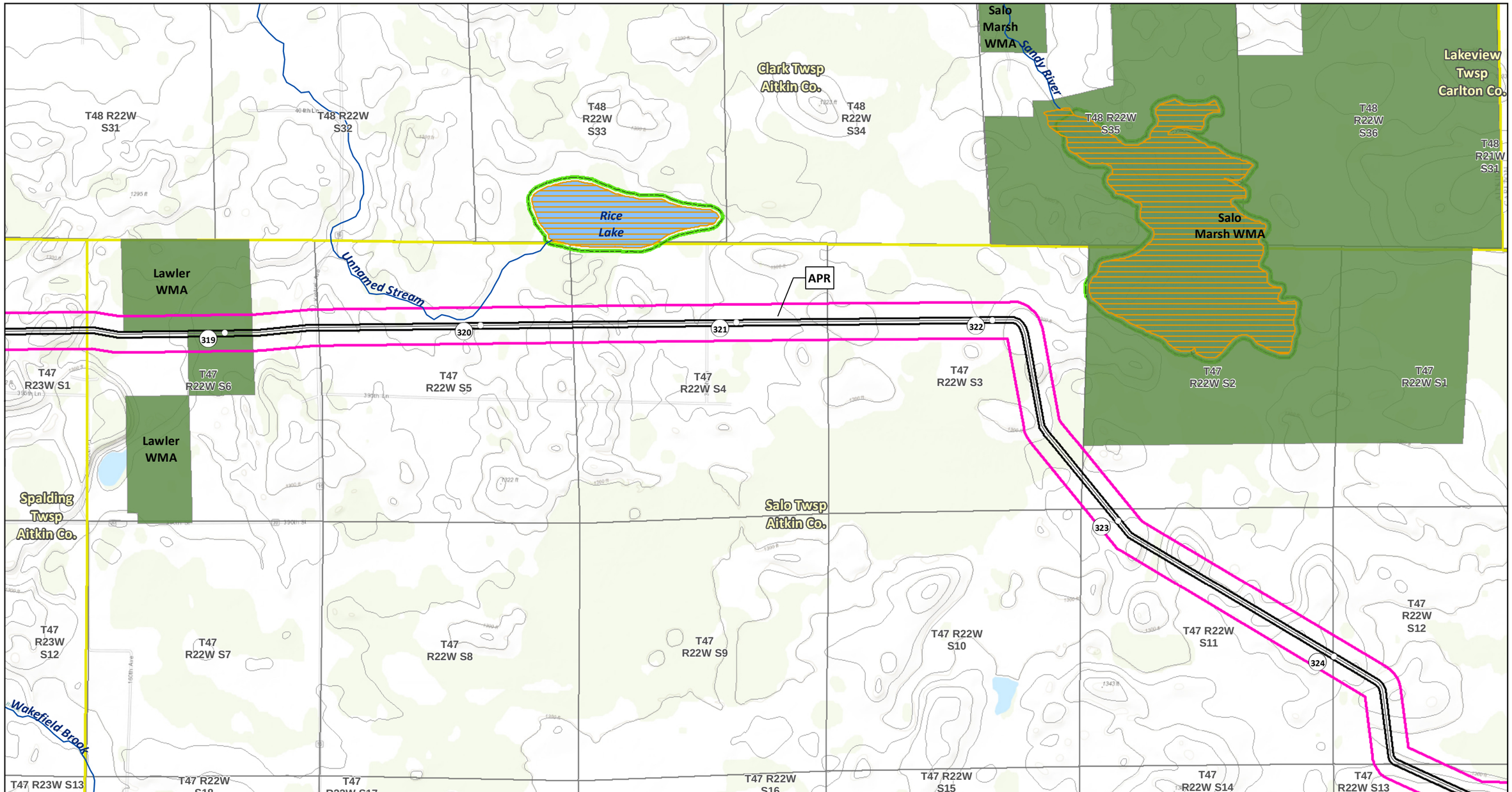

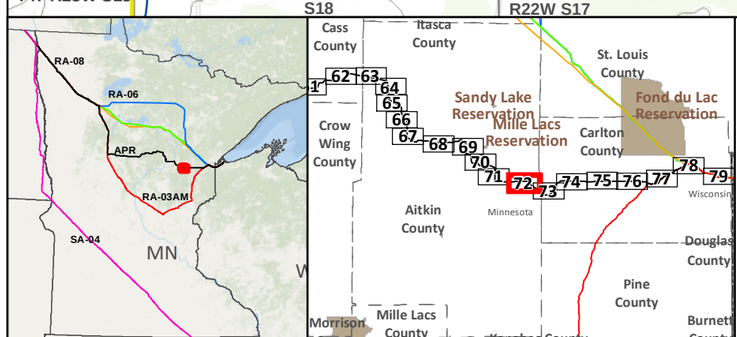

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Route Segment Alternatives (RSA)

Existing Pipelines

Township Boundary

State Managed Lands

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Public Waters Watercourse

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Designated Trout Stream

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Wild Rice Lakes (DNR)

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Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

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Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 72B of 82

T47 R22W S2
T47 R22W S1
T47 R21W S6
T47 R21W S5
T47 R21W S4
T47 R21W S3
T47 R21W S2
T47 R21W S9
T47 R22W S12
T47 R21W S7
T47 R21W S8
T47 R21W S10
T47 R21W S11
T47 R22W S11
Automba Twsp
Carlton Co.
APR
Salo Twsp
Aitkin Co.
T47 R22W S13
T47 R21W S18
T47 R21W S17
T47 R21W S16
T47 R21W S15
Kettle River, West Branch
T47 R22W S14
T47 R21W S14
Dead Moose River
T47 R22W S23
T47 R22W S24
T47 R21W S19
T47 R21W S20
T47 R21W S21
T47 R21W S22
T47 R21W S23

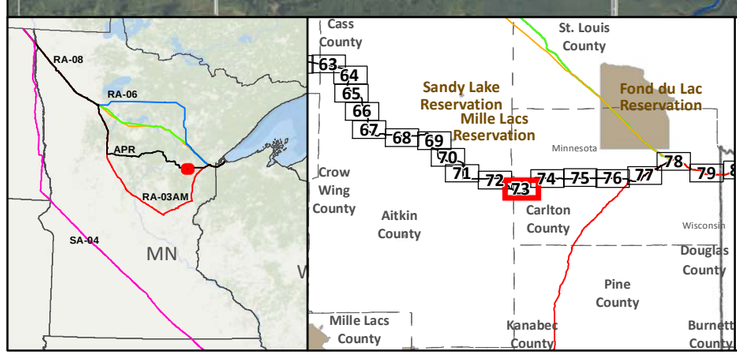

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Existing Pipelines
Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
State Forest
National Forest
Tribal Reservation
Tribal Trust Land
White Earth Reservation - BIA

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 73A of 82

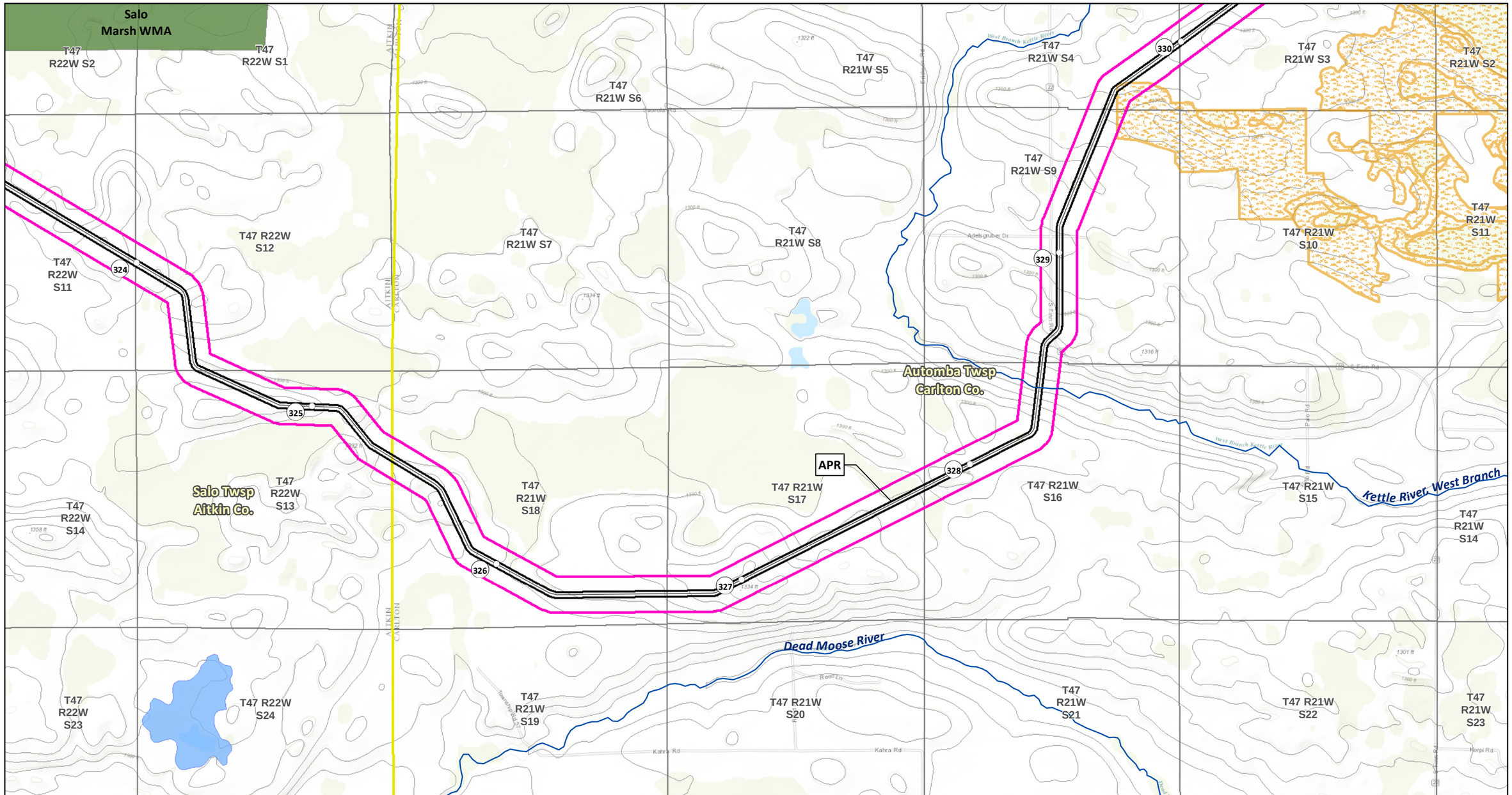

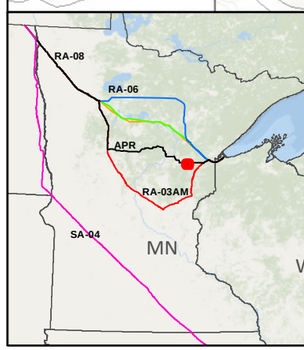

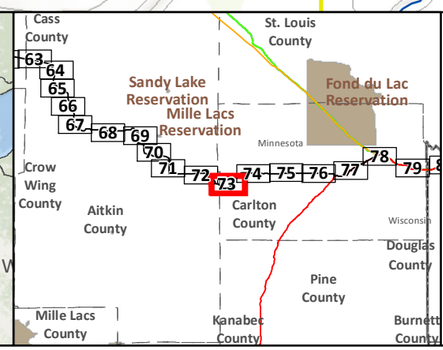

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 73B of 82

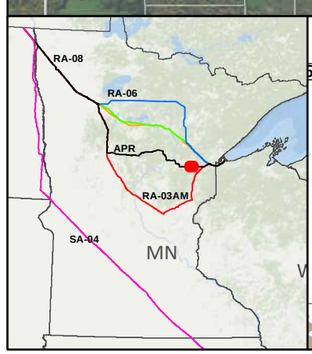

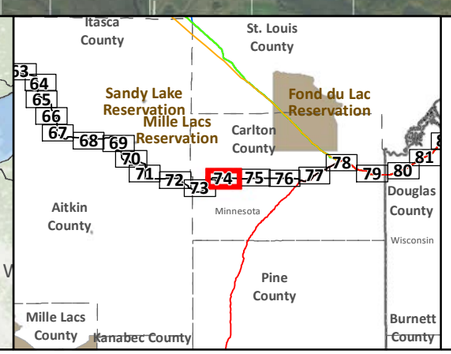

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 74A of 82

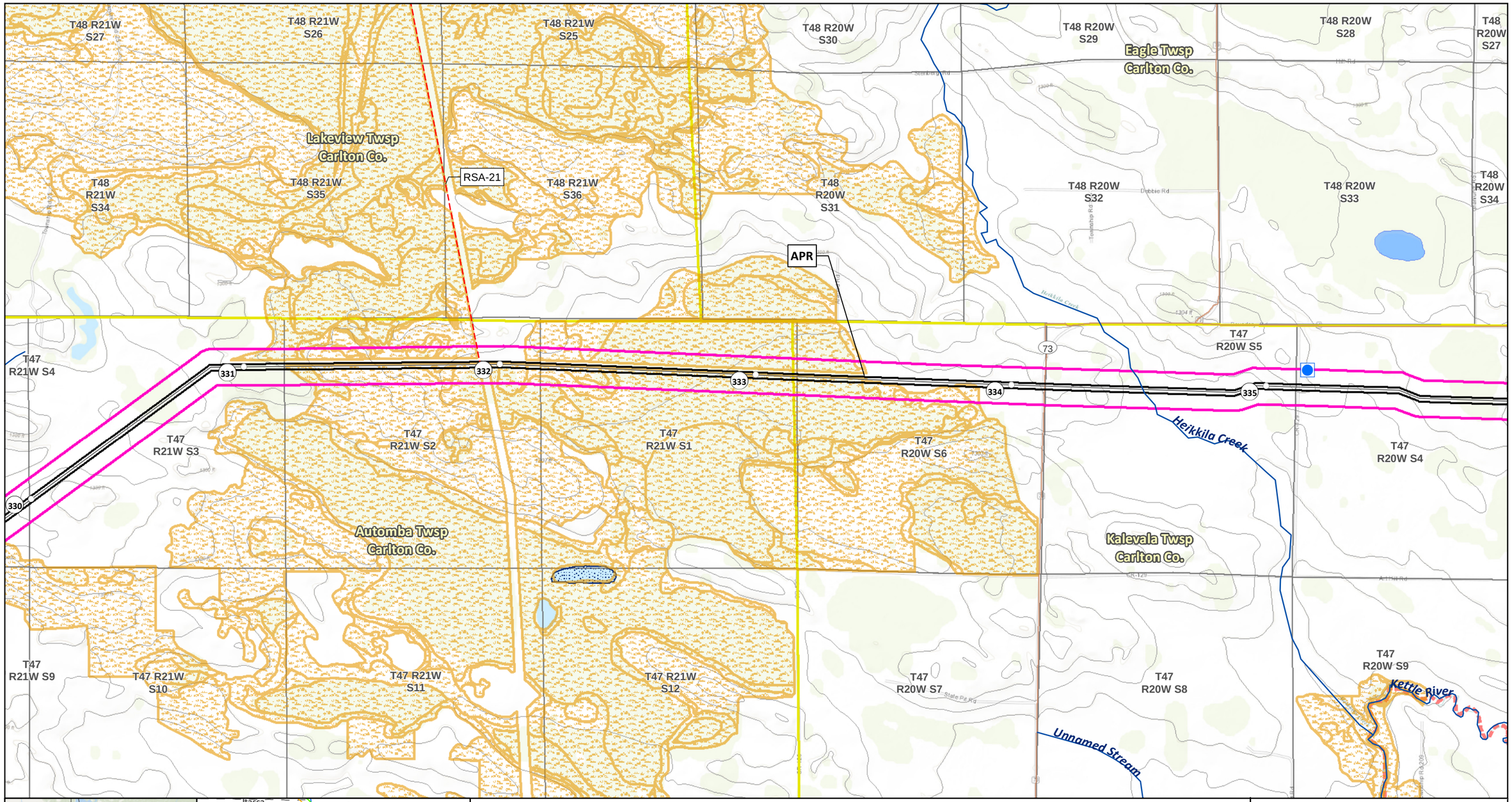

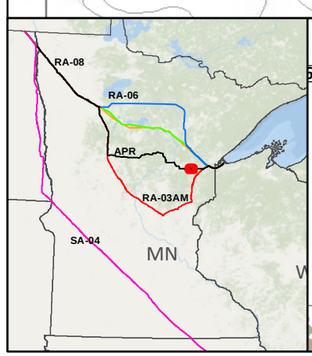

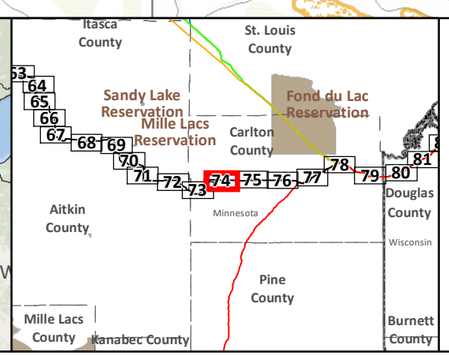

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Route Segment Alternatives (RSA)

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

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- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters 10ft Contours

N

Map 74B of 82

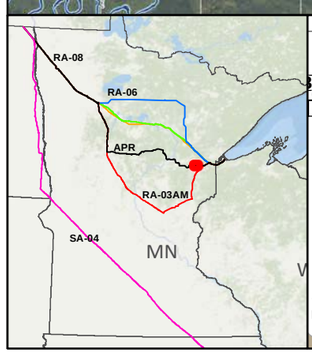

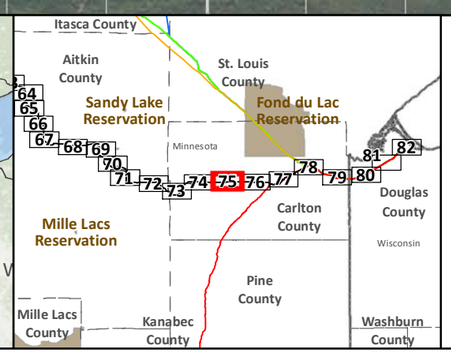

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 75A of 82

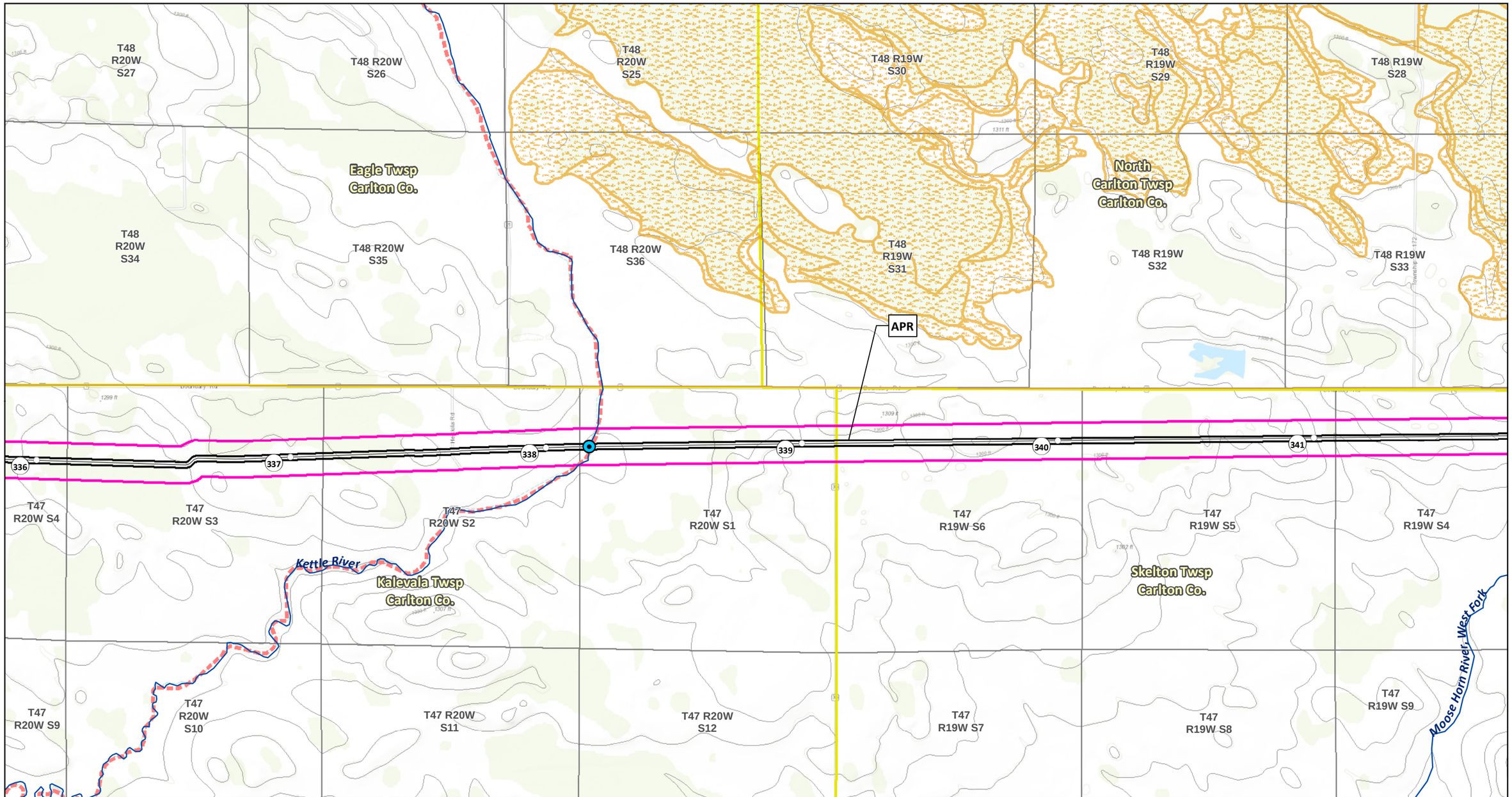

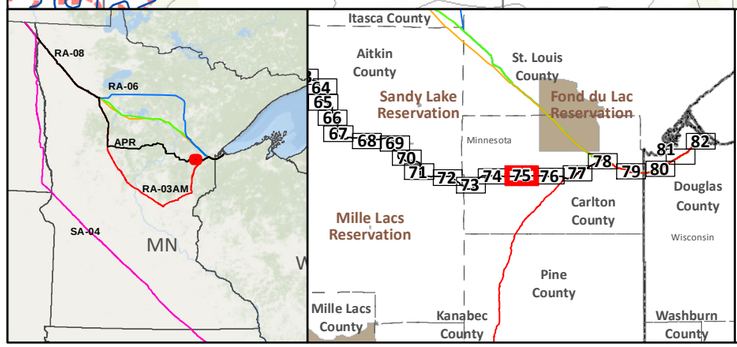

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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Water Resources
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Public Waters Watercourse
303d Imparied Waters
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Calcareous Fens
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Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 75B of 82

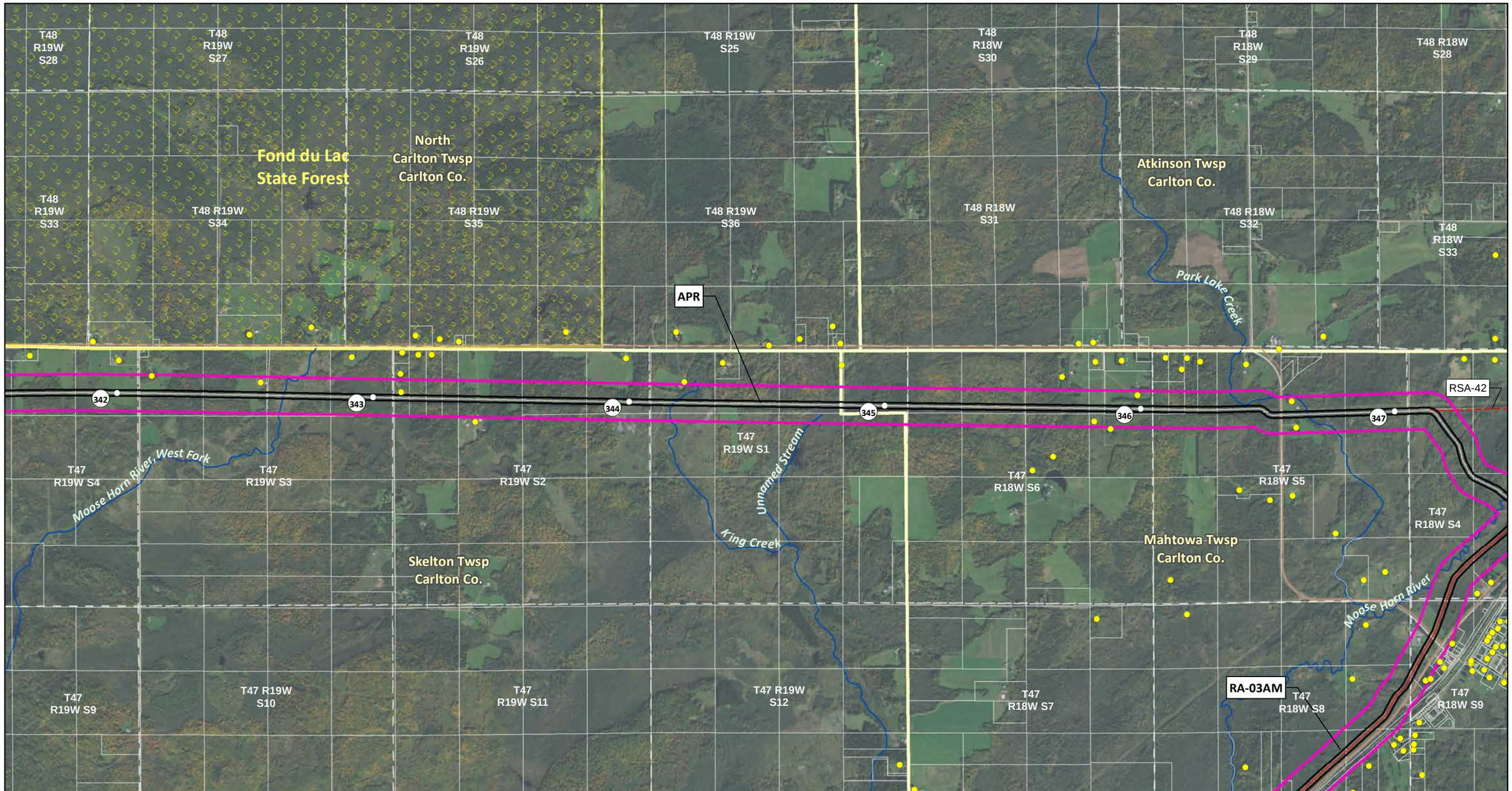

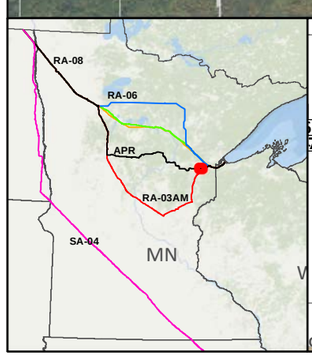

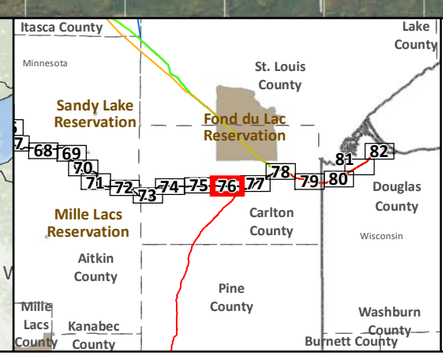

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
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- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 76A of 82

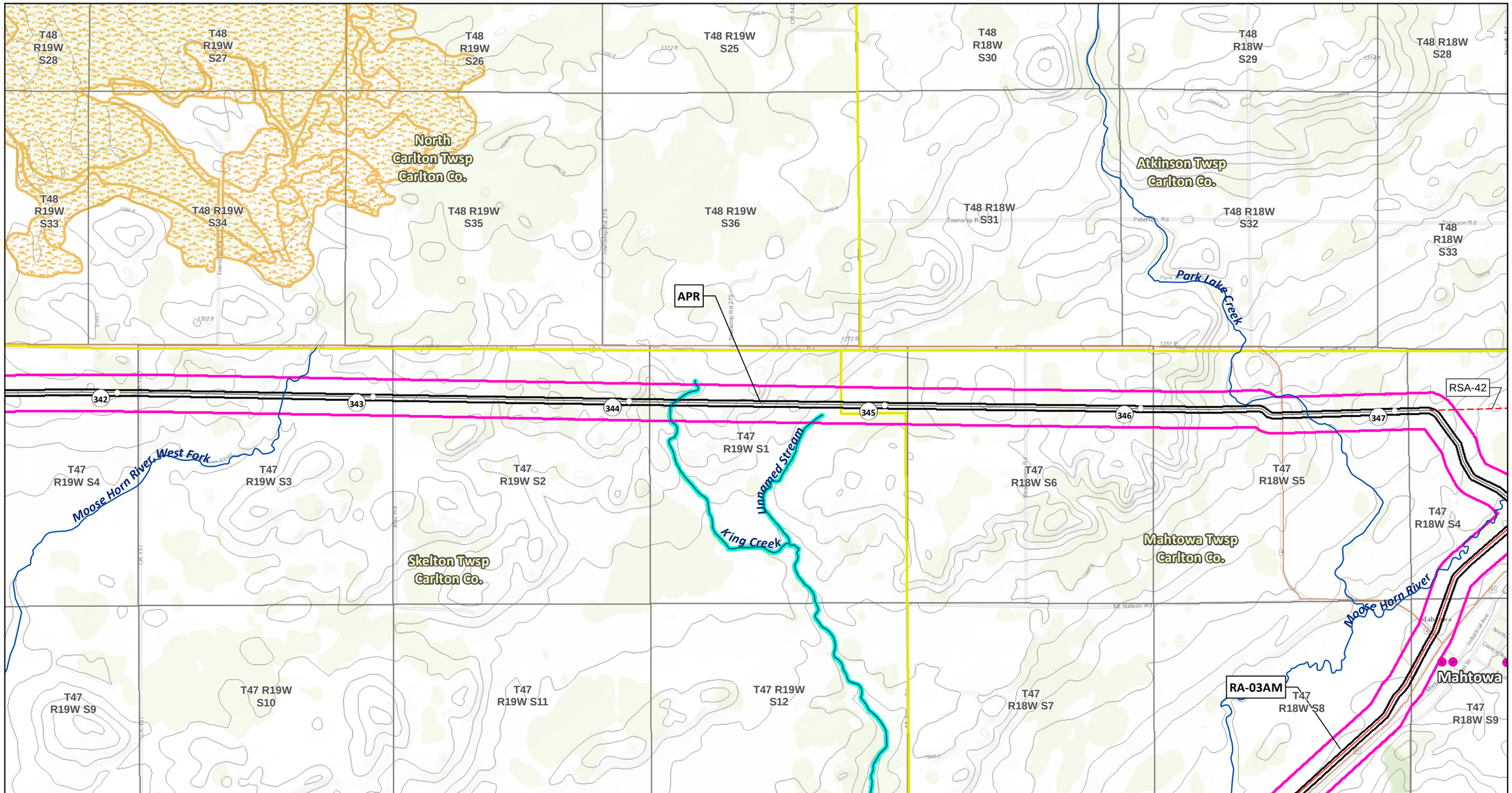

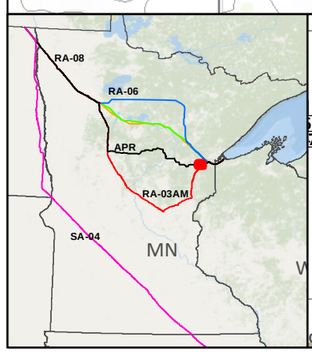

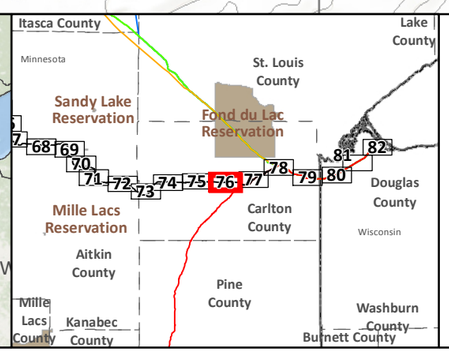

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
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Route Segment Alternatives (RSA)
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters 10ft Contours

N

Map 76B of 82

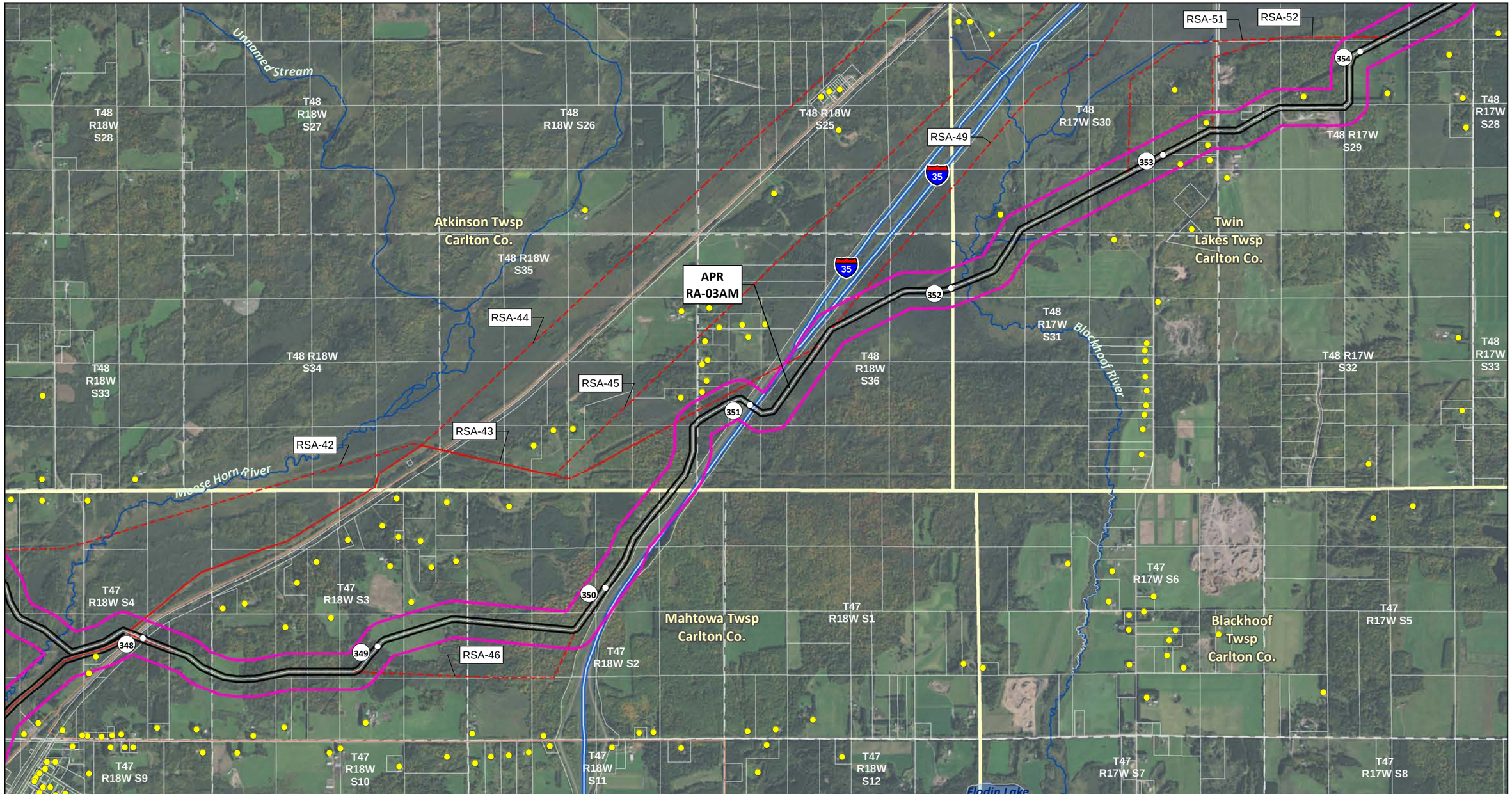

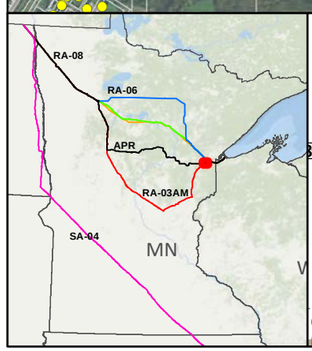

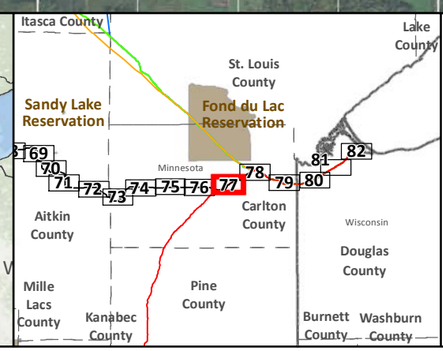

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
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- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 77A of 82

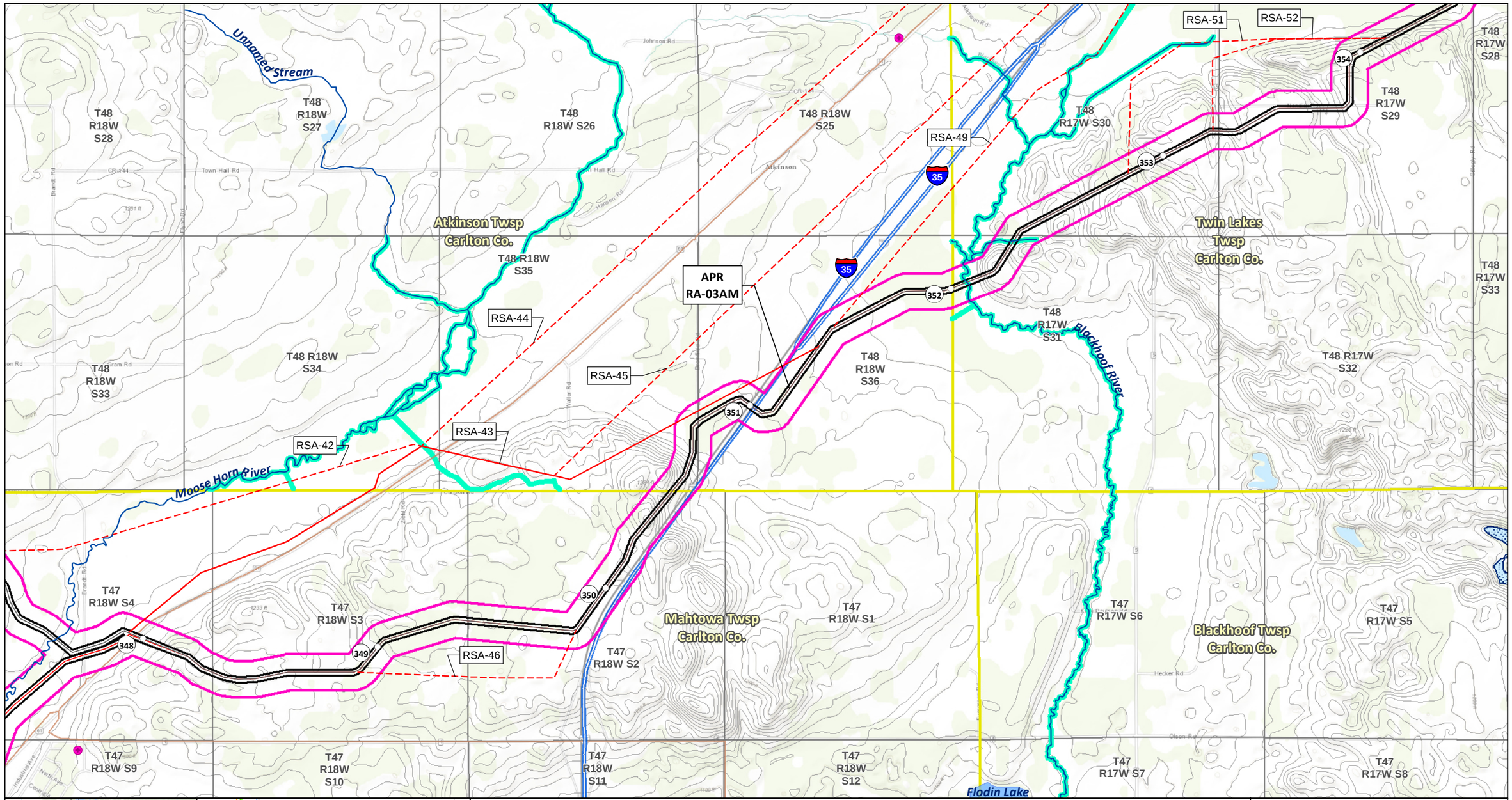

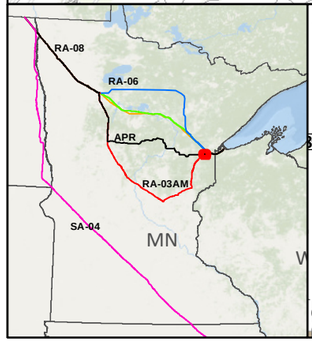

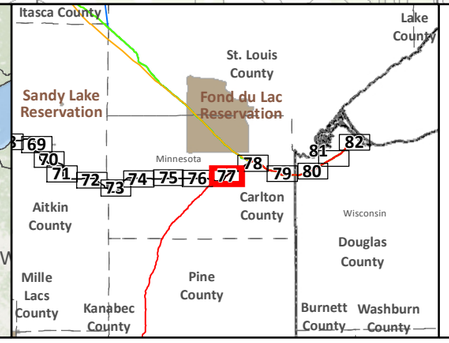

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
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- RA-08
- Mile Post
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Route Segment Alternatives (RSA)
Existing Pipelines
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Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
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Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 77B of 82

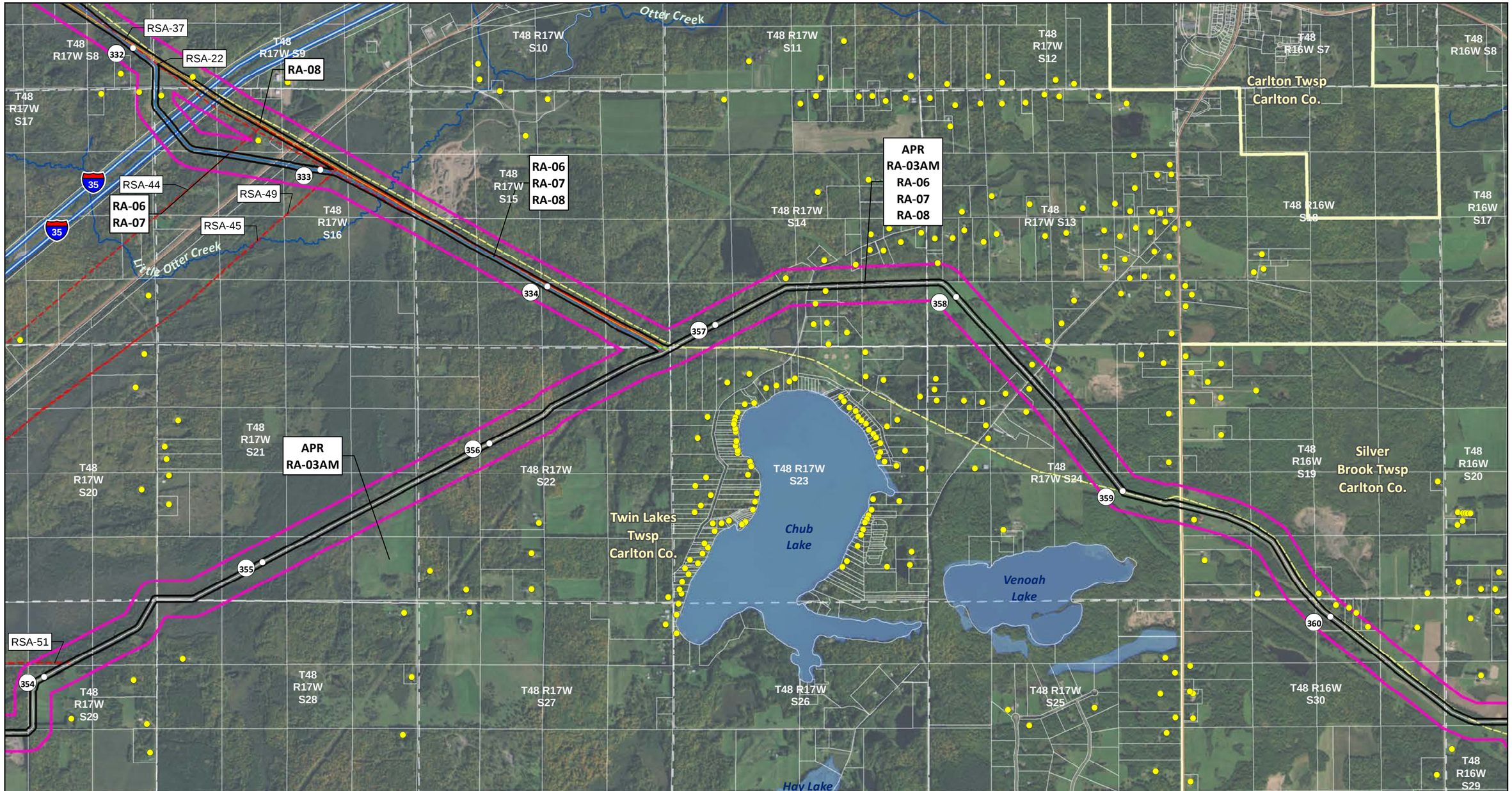

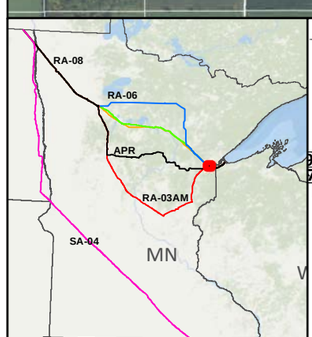

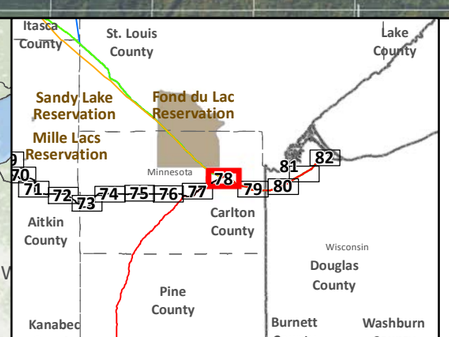

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
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- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

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Pump Station

Interstate

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Major Road

Land Ownership

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- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 78A of 82

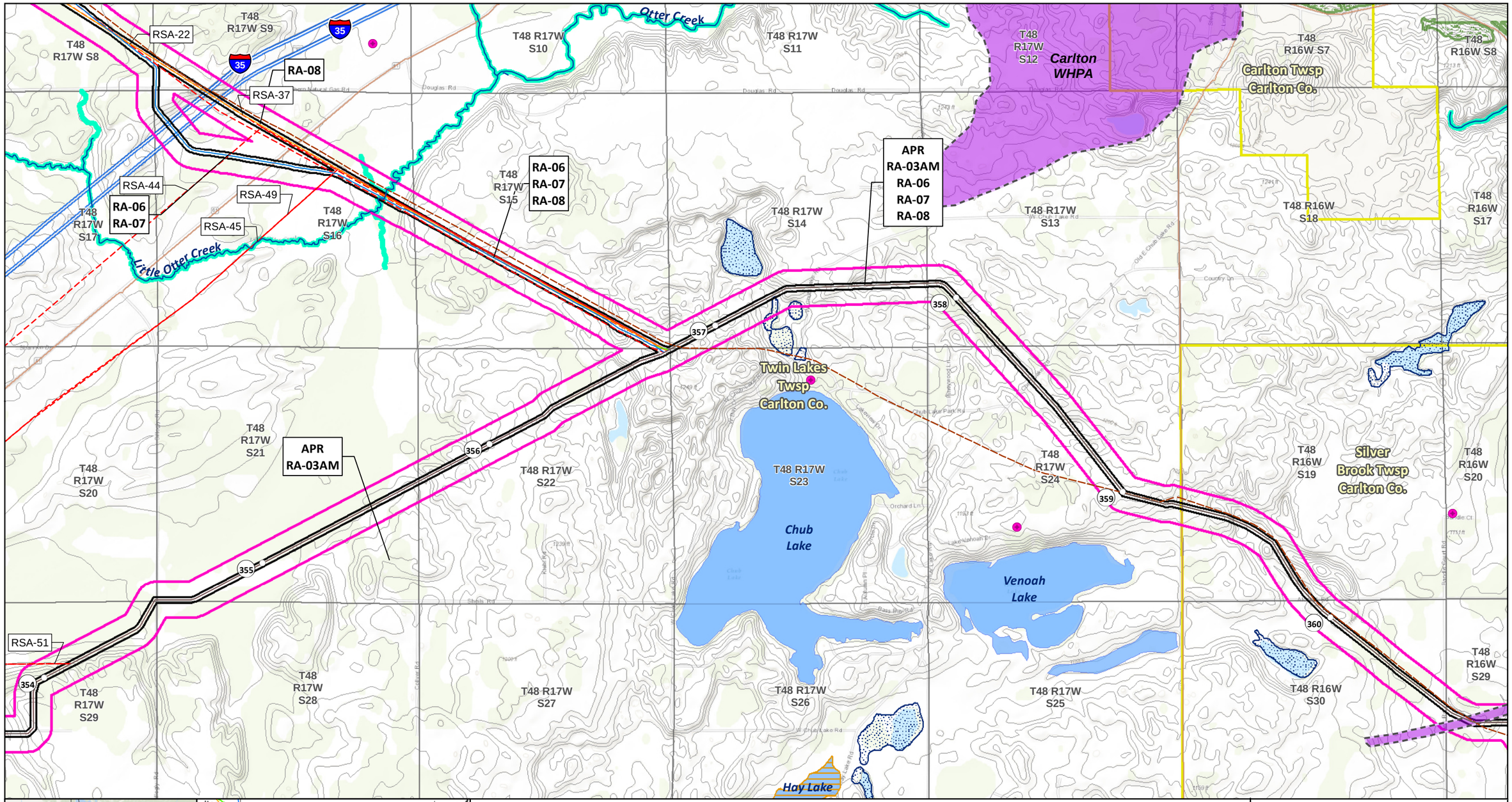

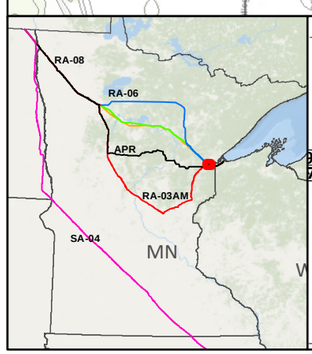

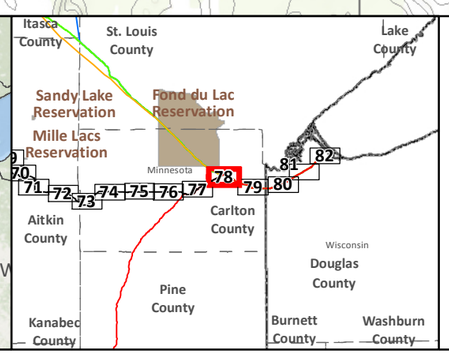

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

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Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 78B of 82

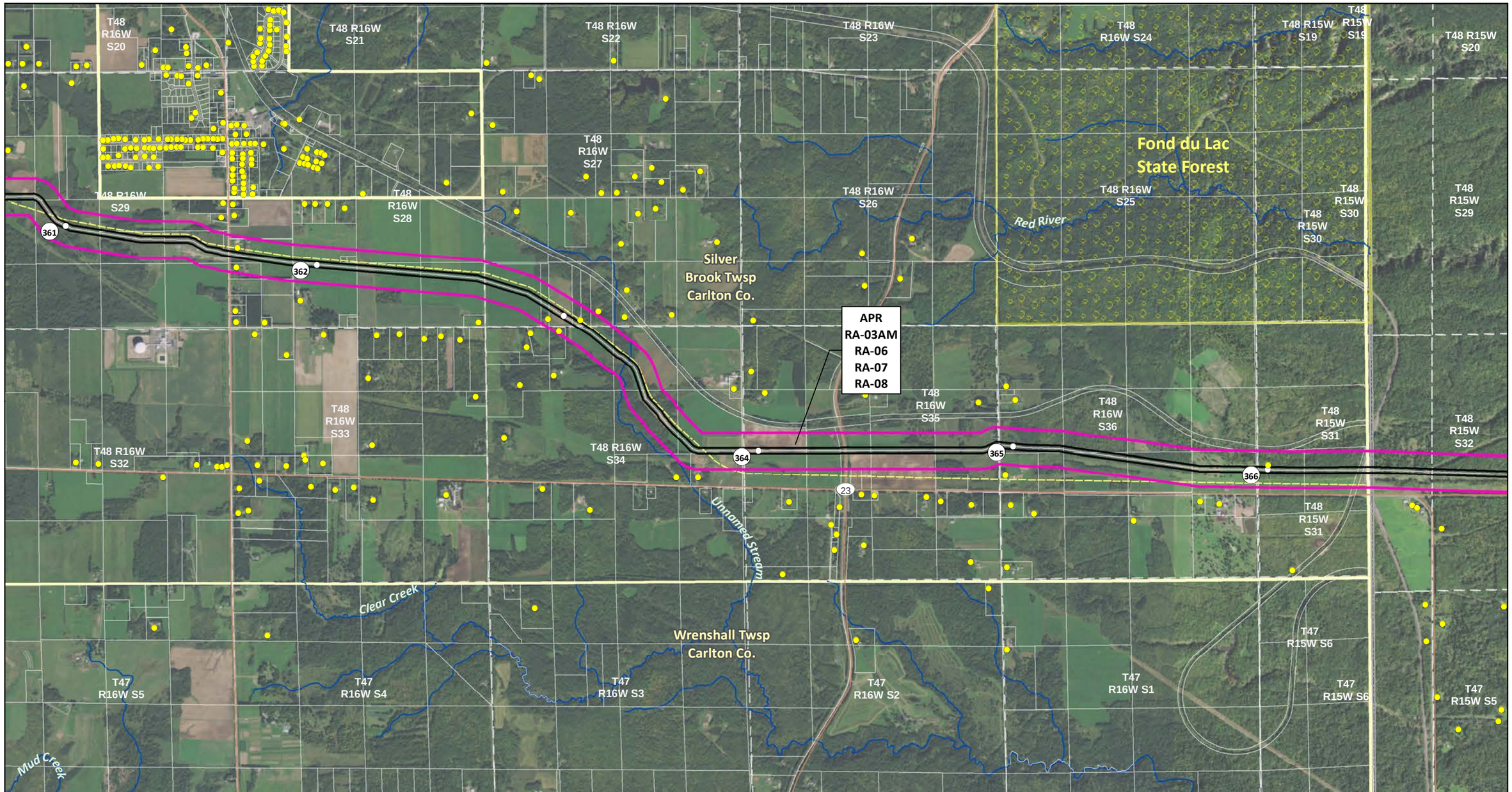

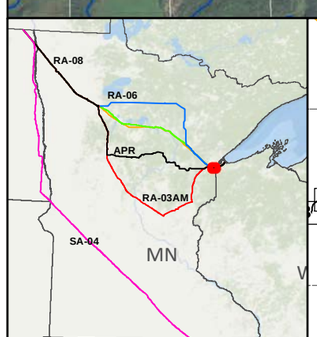

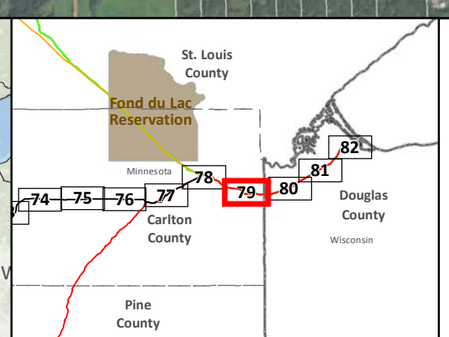

SA-04

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- RA-06
- RA-07
- RA-08
- Existing Pipelines
- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Township Boundary

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 79A of 82

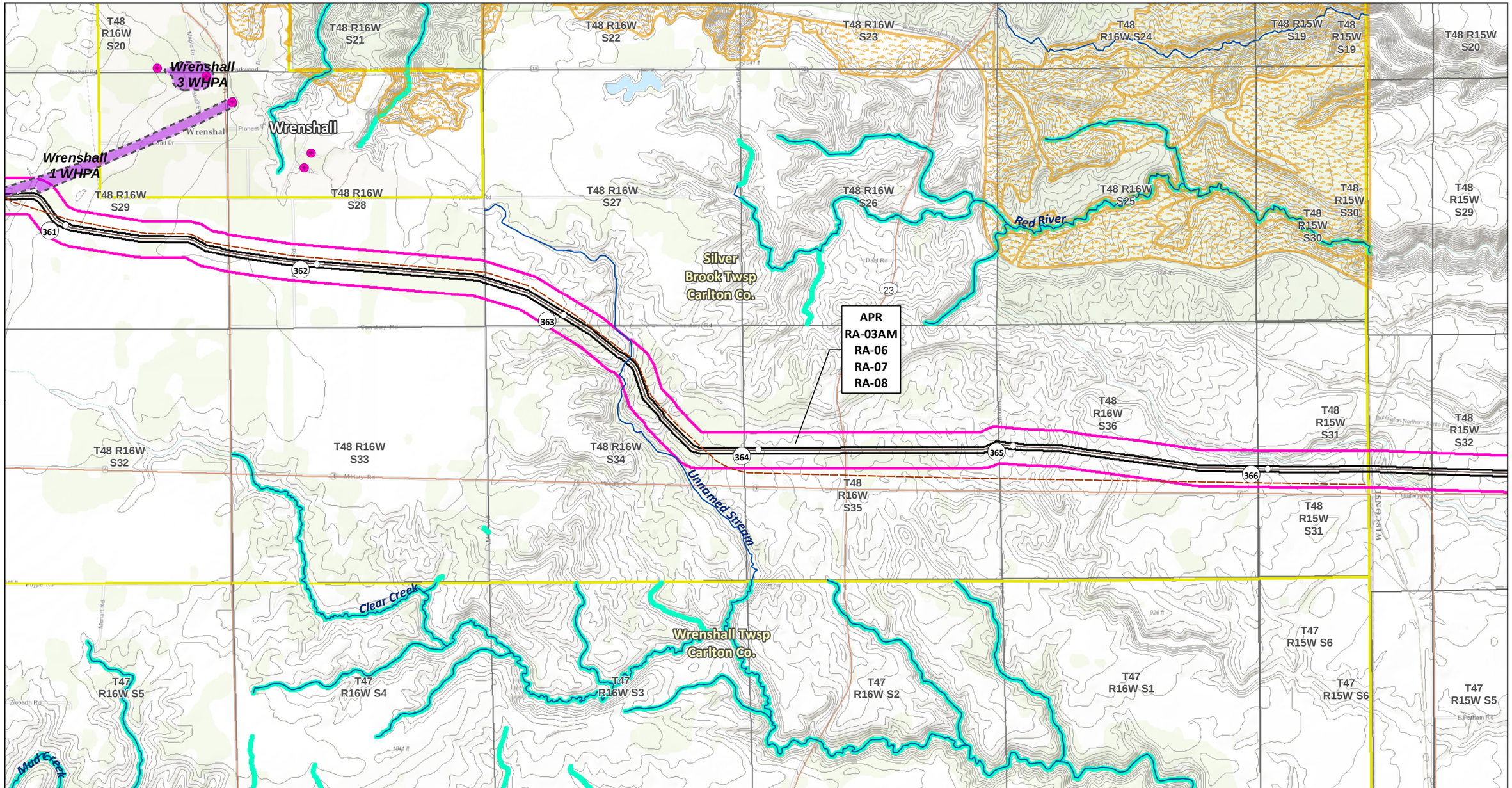

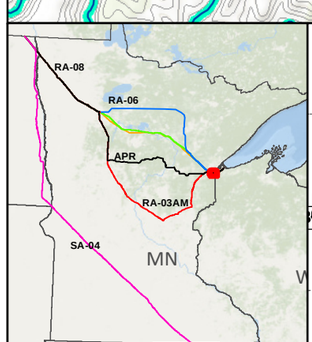

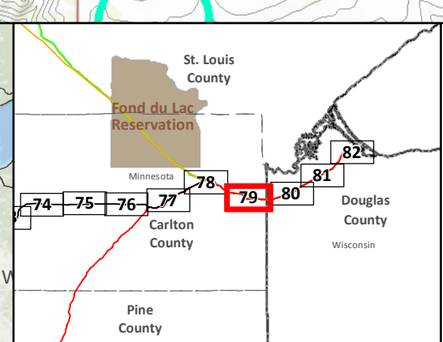

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Route Segment Alternatives (RSA)
Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 79B of 82

T48 R15W S20
T48 R15W S21
T48 R15W S22
T48 R15W S23
T48 R15W S24
T48 R14W S19
T48 R14W S20
T48 R15W S29
T48 R15W S28
APR
RA-03AM
RA-06
RA-07
RA-08
T48 R15W S27
T48 R15W S26
T48 R15W S25
T48 R14W S30
T48 R14W S29
369
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T48 R15W S33
T48 R15W S34
T48 R15W S35
T48 R15W S36
T48 R14W S31
T48 R14W S32
T48 R15W S32
T47 R15W S5
T47 R15W S4
T47 R15W S3
T47 R15W S2
T47 R15W S1
T47 R14W S6
T47 R14W S5

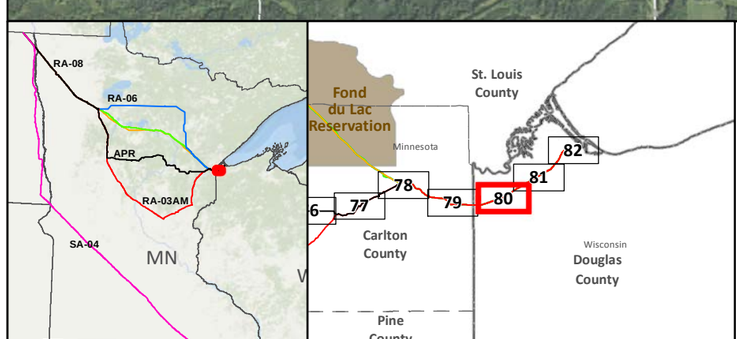

SA-04
Applicant's Preferred Route (APR)

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- RA-03AM
- RA-06
- RA-07
- RA-08
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- Route Segment Alternatives (RSA)

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse
Township Boundary

Residences within 1/2 mile
Mile Post
Terminal
Pump Station

Interstate
Highway
Major Road

Land Ownership
- State Forest
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- Tribal Reservation
- Tribal Trust Land
- White Earth Reservation - BIA

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 80A of 82

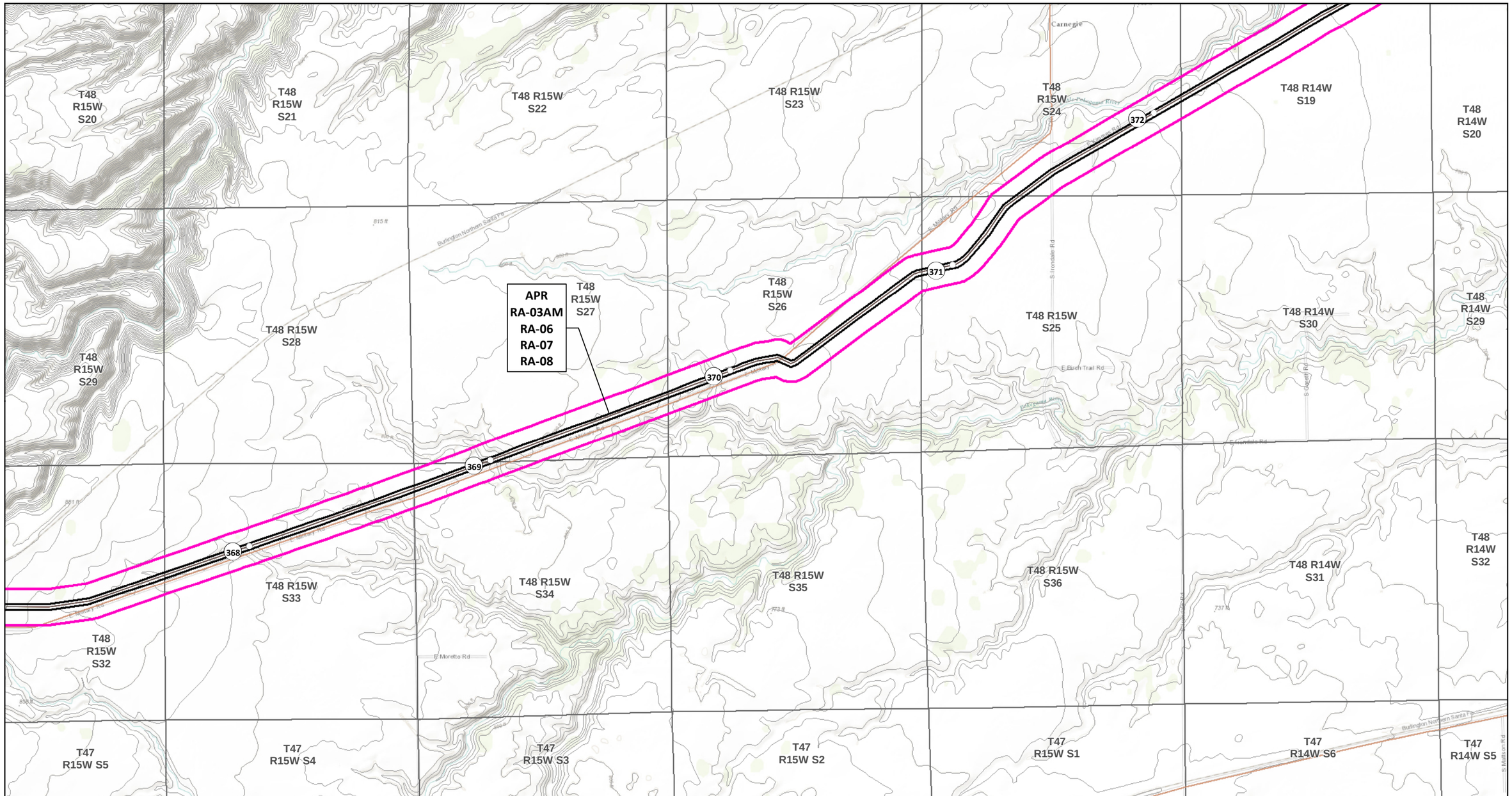

SA-04
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Mile Post
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

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0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 80B of 82

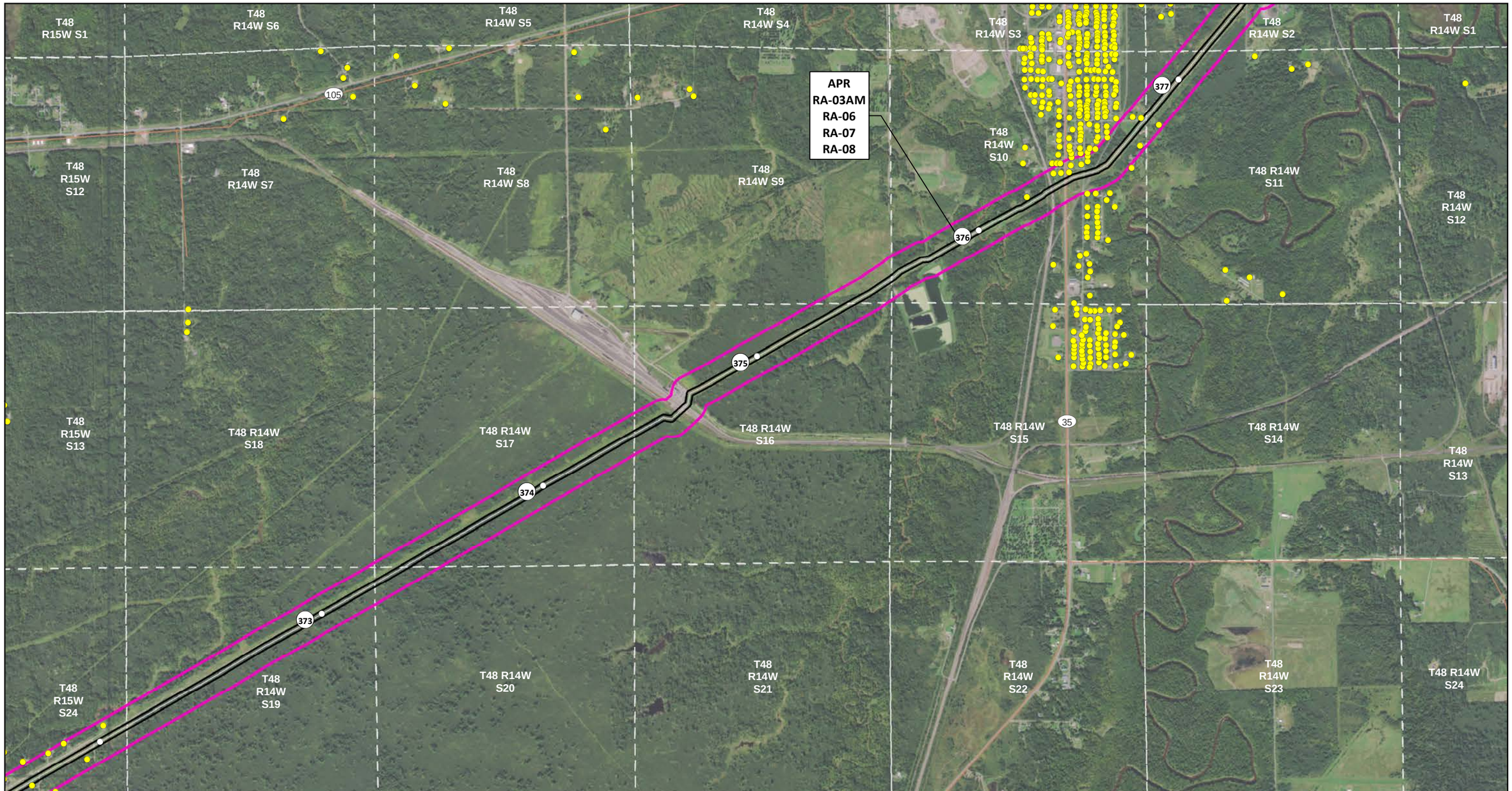

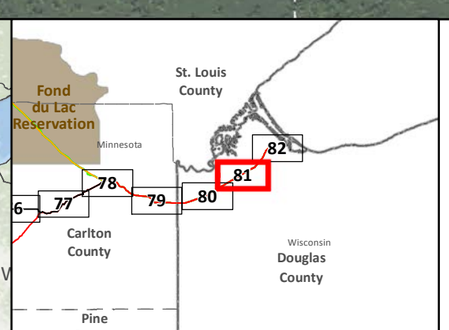

SA-04

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- RA-08
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0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

APR

Map 81A of 82

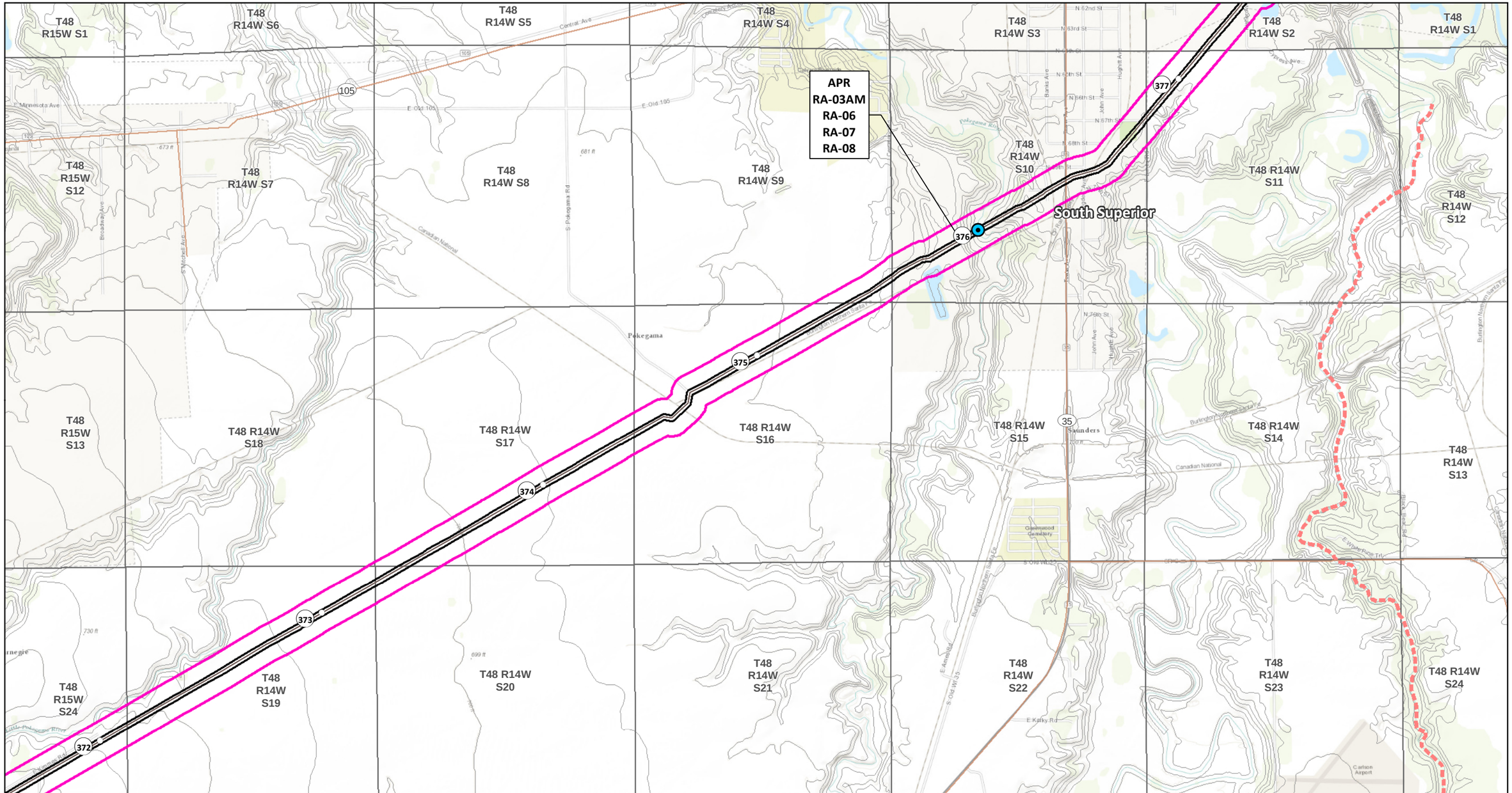

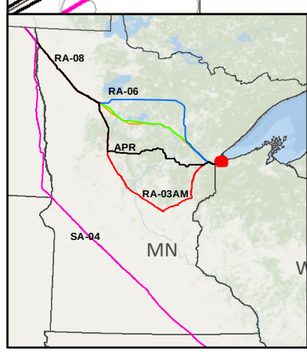

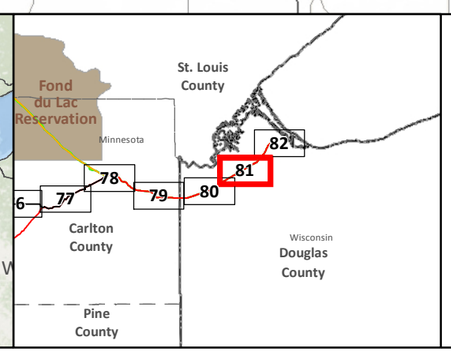

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- RA-08

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 81B of 82

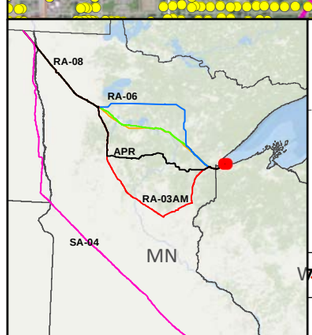

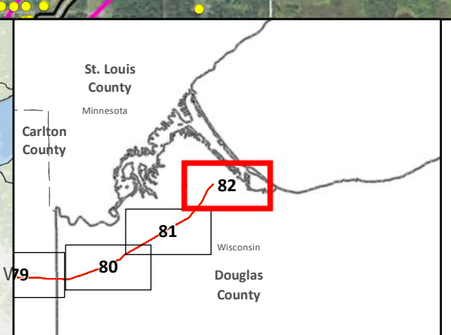

SA-04

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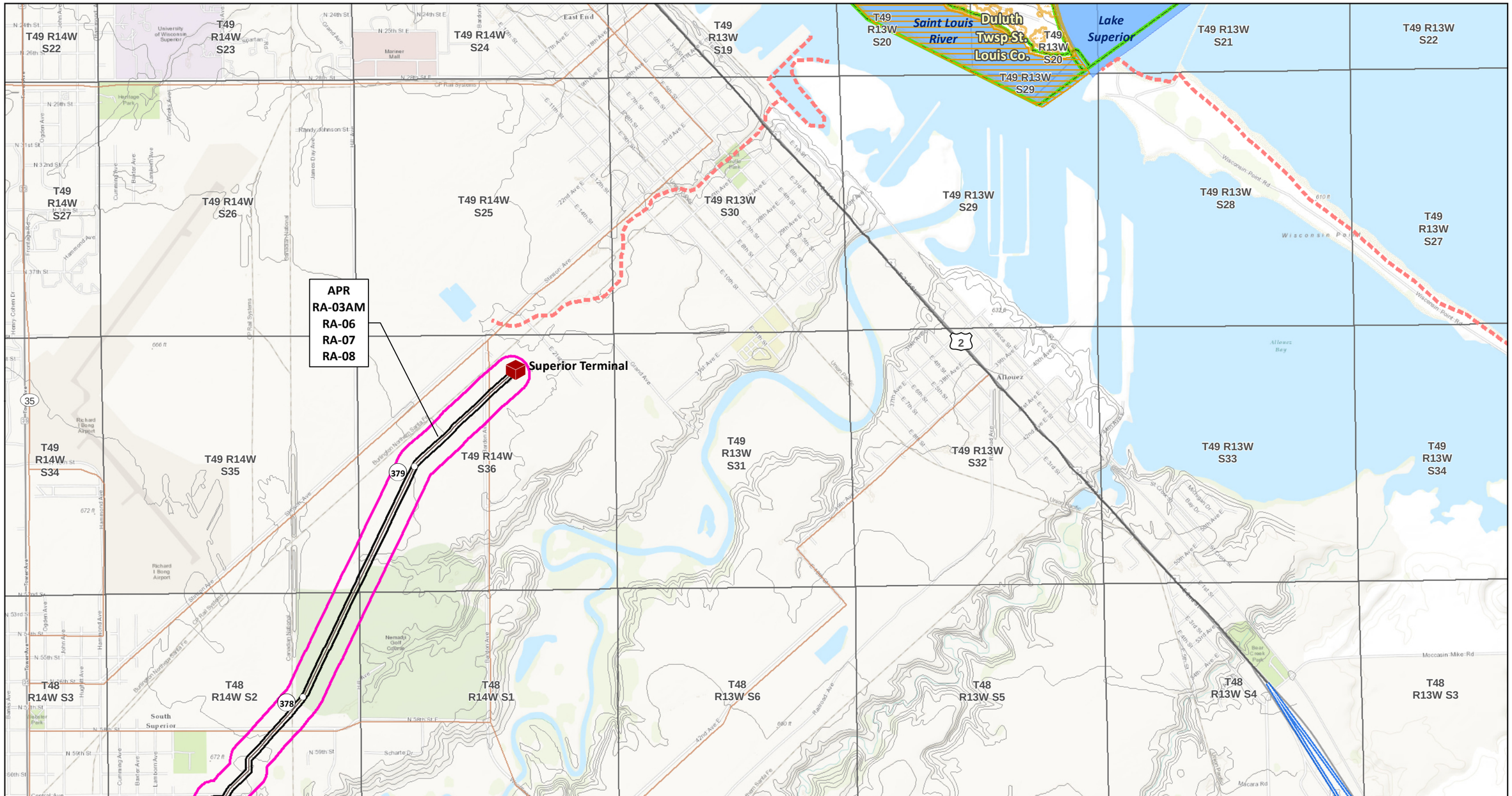

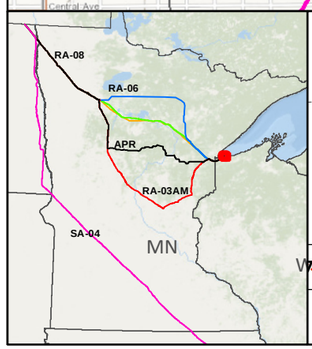

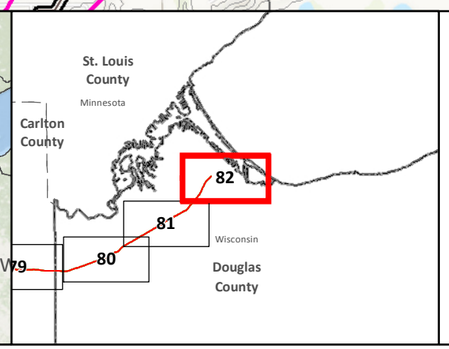

SA-04
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Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

APR

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

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Minnesota Department of Commerce
Energy Environmental Review and Analysis

Final Environmental Impact Statement
Line 3 Project

Mapbook
RA-06

Docket Nos. PPL-15-137/CN-14-916

August 17, 2017

MINNESOTA

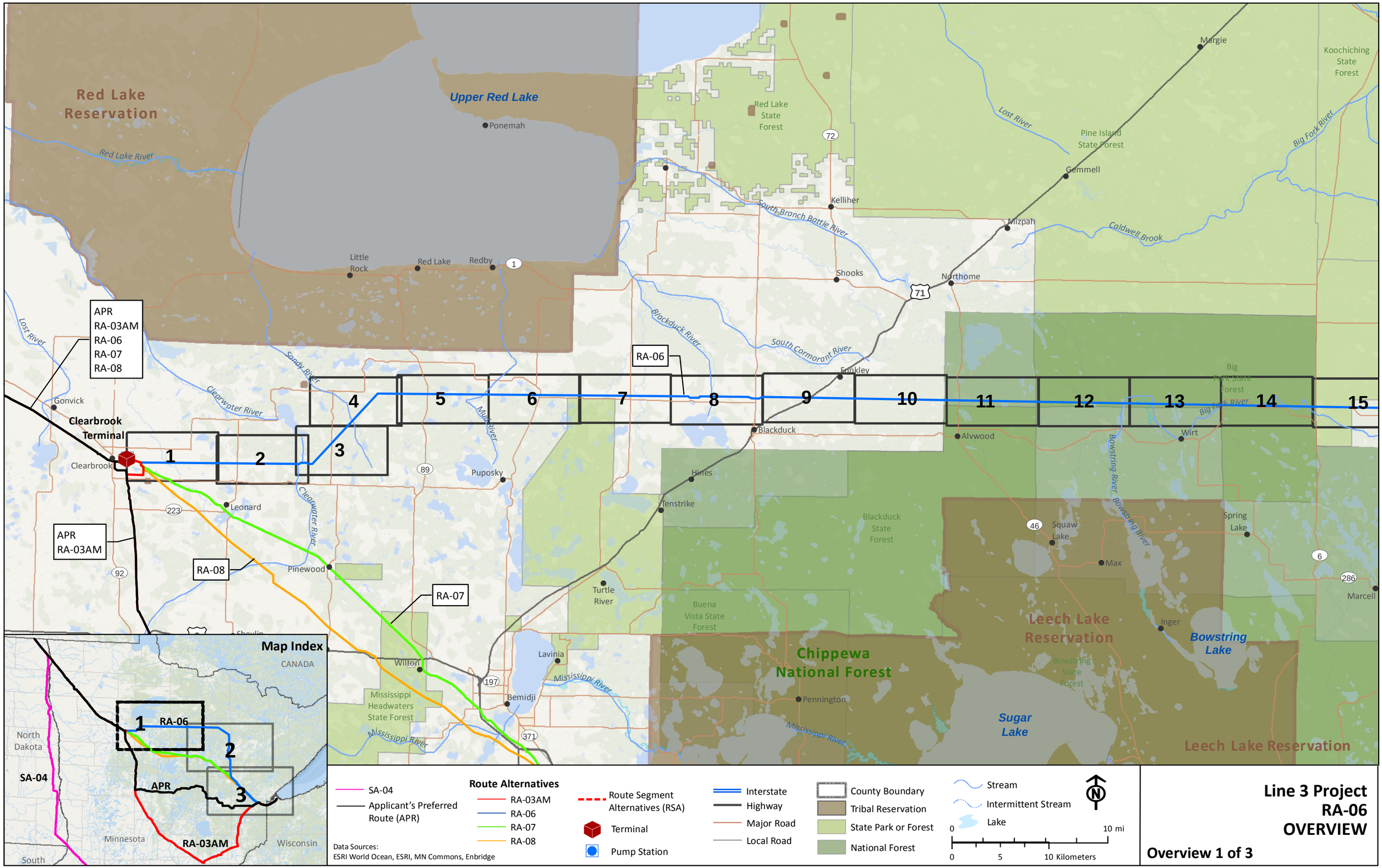
Red Lake Reservation
Upper Red Lake
Ponemah
Red Lake River
Little Rock
Red Lake
Redby
Red Lake State Forest
Kelliher
South Branch Battle River
Shooks
Northome
Mizpah
Gemmell
Margie
Pine Island State Forest
Lost River
Caldwell Brook
Big Fork River
Koochiching State Forest
Big Fork State Forest
Blackduck River
South Cormorant River
Funkley
Blackduck
Alvwood
Wirt
Bowstring River
Hines
Tenstrike
Puposky
Blackduck State Forest
Squaw Lake
Spring Lake
Max
Marcell
Turtle River
Buena Vista State Forest
Leech Lake Reservation
Inger
Bowstring Lake
Chippewa National Forest
Bowstring State Forest
Pennington
Sugar Lake
Leech Lake Reservation
Lavinia
Mississippi River
Wilton
Bemidji
Mississippi Headwaters State Forest
Sandy River
Clearwater River
Mud River
Gonvick
Clearbrook Terminal
Clearbrook
Leonard
Pinewood
Shevlin
APR
RA-03AM
RA-06
RA-07
RA-08
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Interstate
Highway
Major Road
Local Road
County Boundary
Tribal Reservation
State Park or Forest
National Forest
Stream
Intermittent Stream
Lake
0
10 mi
0
5
10 Kilometers
Data Sources:
ESRI World Ocean, ESRI, MN Commons, Enbridge
Line 3 Project
RA-06
OVERVIEW
Overview 1 of 3

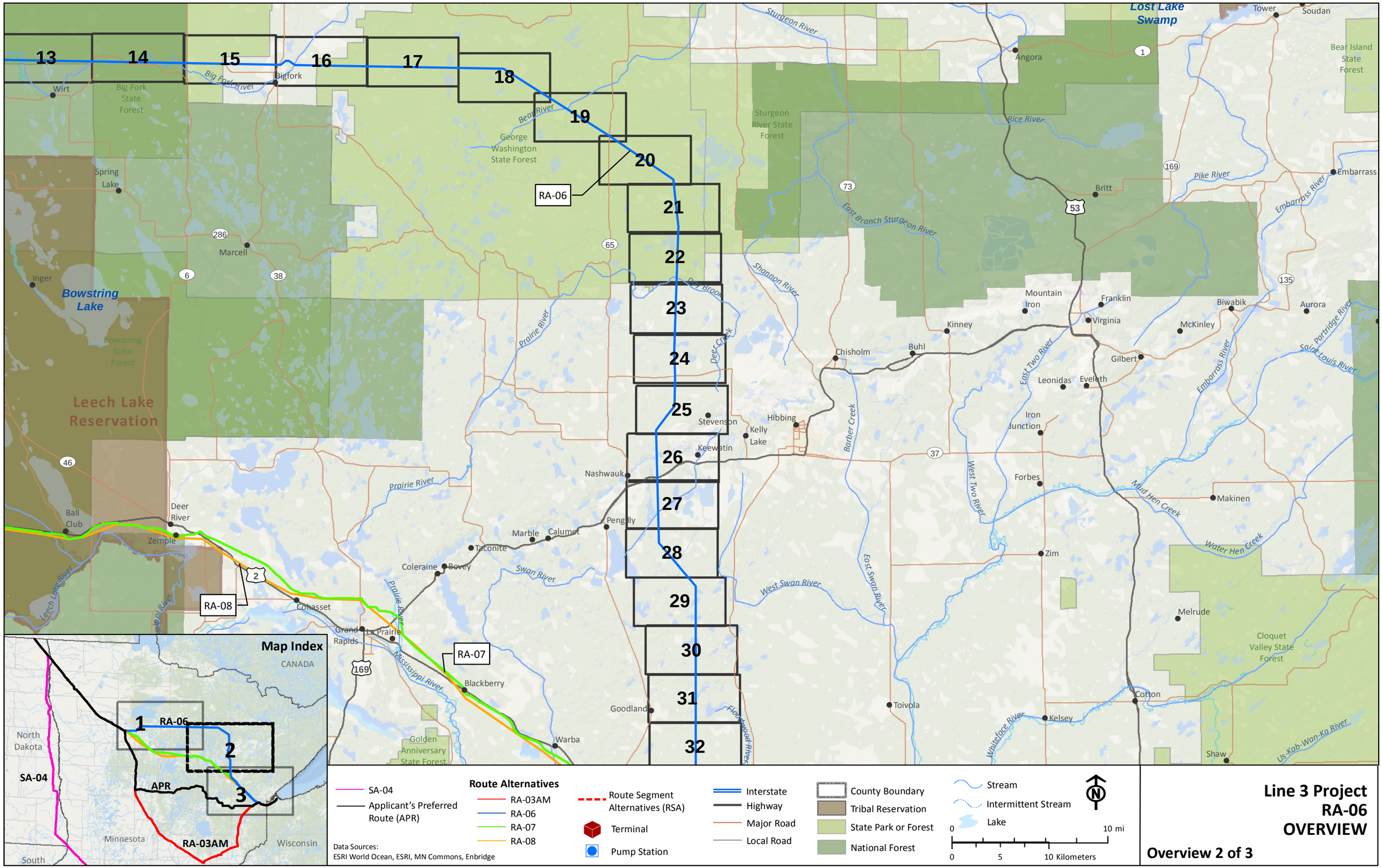
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Bigfork
Big Fork State Forest
George Washington State Forest
Sturgeon River State Forest
Bear Island State Forest
Bowstring State Forest
Golden Anniversary State Forest
Cloquet Valley State Forest
Spring Lake
Marcell
Inger
Ball Club
Deer River
Zemple
Cohasset
Grand Rapids
La Prairie
Blackberry
Warba
Goodland
Toivola
Coleraine
Bovey
Taconite
Marble
Calumet
Pengilly
Nashwauk
Keewatin
Stevenson
Kelly Lake
Hibbing
Chisholm
Buhl
Kinney
Mountain Iron
Franklin
Virginia
Gilbert
Leonidas
Eveleth
Iron Junction
Forbes
Zim
Kelsey
Cotton
Melrude
Makinen
Shaw
Biwabik
McKinley
Aurora
Britt
Angora
Tower
Soudan
Embarrass
Sturgeon River
Big Fork River
Bear River
Prairie River
Swan River
Mississippi River
Leech Lake River
Rice River
East Branch Sturgeon River
Shannon River
Dry Brook
Deer Creek
Barber Creek
East Two River
West Two River
West Swan River
East Swan River
Floodwood River
Whiteface River
Pike River
Embarrass River
Saint Louis River
Partridge River
Mud Hen Creek
Water Hen Creek
Us-Kab-Wan-Ka River
1
2
6
38
46
65
73
169
286
53
37
135
SA-04
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RA-07
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0
10 mi
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5
10 Kilometers
N
Data Sources:
ESRI World Ocean, ESRI, MN Commons, Enbridge
Line 3 Project
RA-06
OVERVIEW
Overview 2 of 3

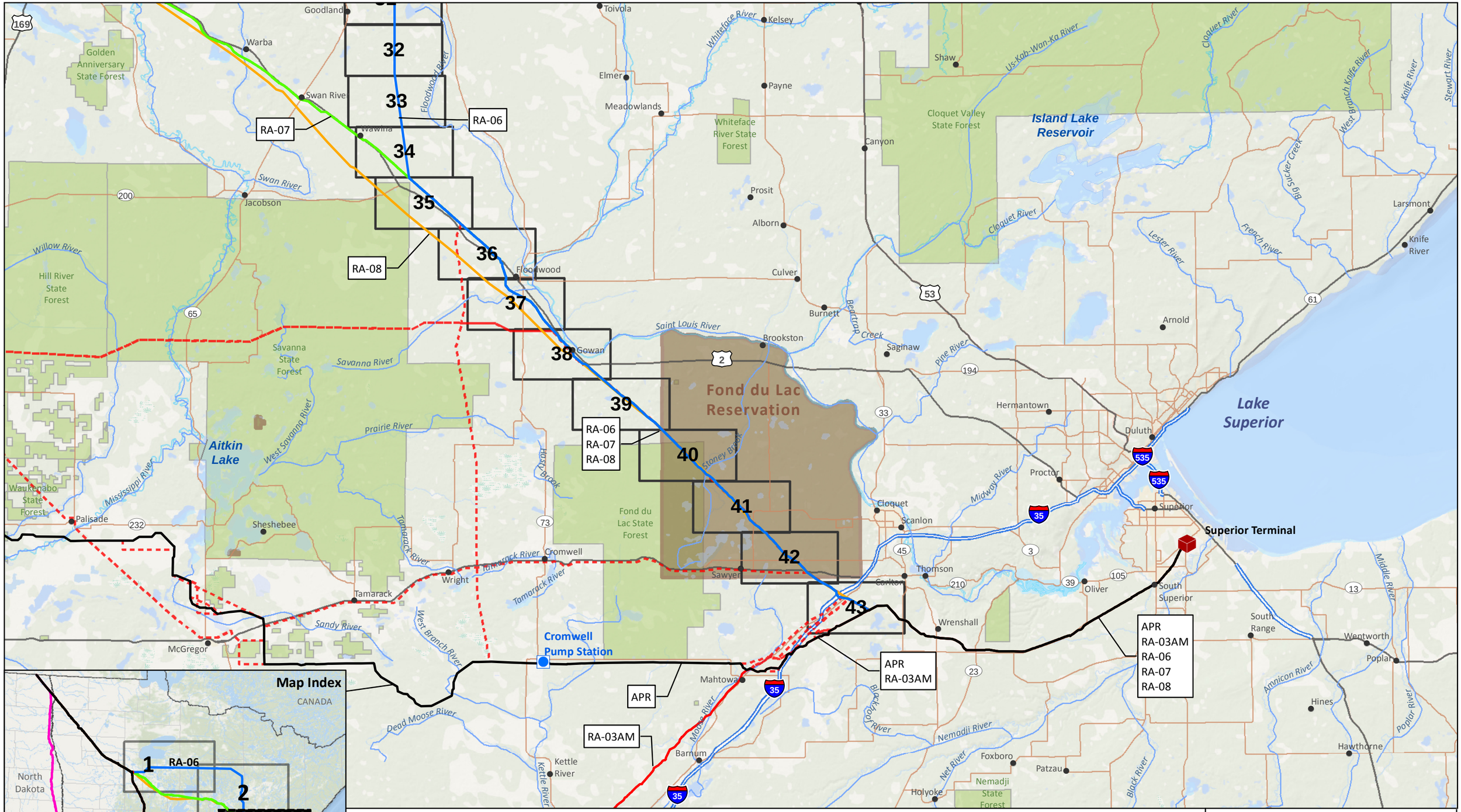
32
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RA-07
RA-08
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RA-03AM
Superior Terminal
Cromwell Pump Station
Fond du Lac Reservation
Island Lake Reservoir
Lake Superior
Aitkin Lake
Golden Anniversary State Forest
Cloquet Valley State Forest
Whiteface River State Forest
Hill River State Forest
Savanna State Forest
Fond du Lac State Forest
Waukenabo State Forest
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Line 3 Project
RA-06
OVERVIEW
Overview 3 of 3

T149 R37W S16
T149 R37W S15
T149 R37W S14
T149 R37W S13
T149 R36W S18
T149 R36W S17
Nels Olson Lake
T149 R37W S21
T149 R37W S22
T149 R37W S23
T149 R37W S24
T149 R36W S19
T149 R36W S20
Falk Lake
T149 R37W S20
T149 R37W S29
Unnamed Creek
Leon Twsp Clearwater Co.
RA-03AM
RA-06
RA-07
RA-08
T149 R37W S28
T149 R37W S27
T149 R37W S26
T149 R37W S25
T149 R36W S30
Sinclair Twsp Clearwater Co.
T149 R36W S29
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139
140
141
142
143
RA-06
Ruffy Brook
RA-08
Deep Lake
T149 R37W S33
T149 R37W S32
T149 R37W S34
RA-03AM
T149 R37W S35
T149 R37W S36
T149 R36W S31
T149 R36W S32
RA-07
RA-08
Holst Twsp Clearwater Co.
T148 R37W S6
T148 R37W S5
Red Lake Reservation
T148 R37W S4
T148 R37W S3
T148 R37W S2

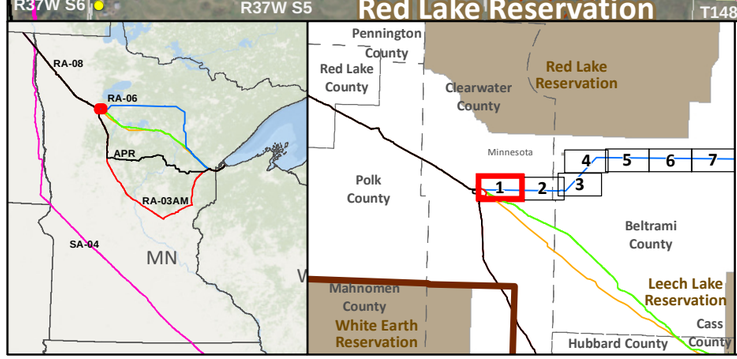

SA-04
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0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

N

Map 1A of 43

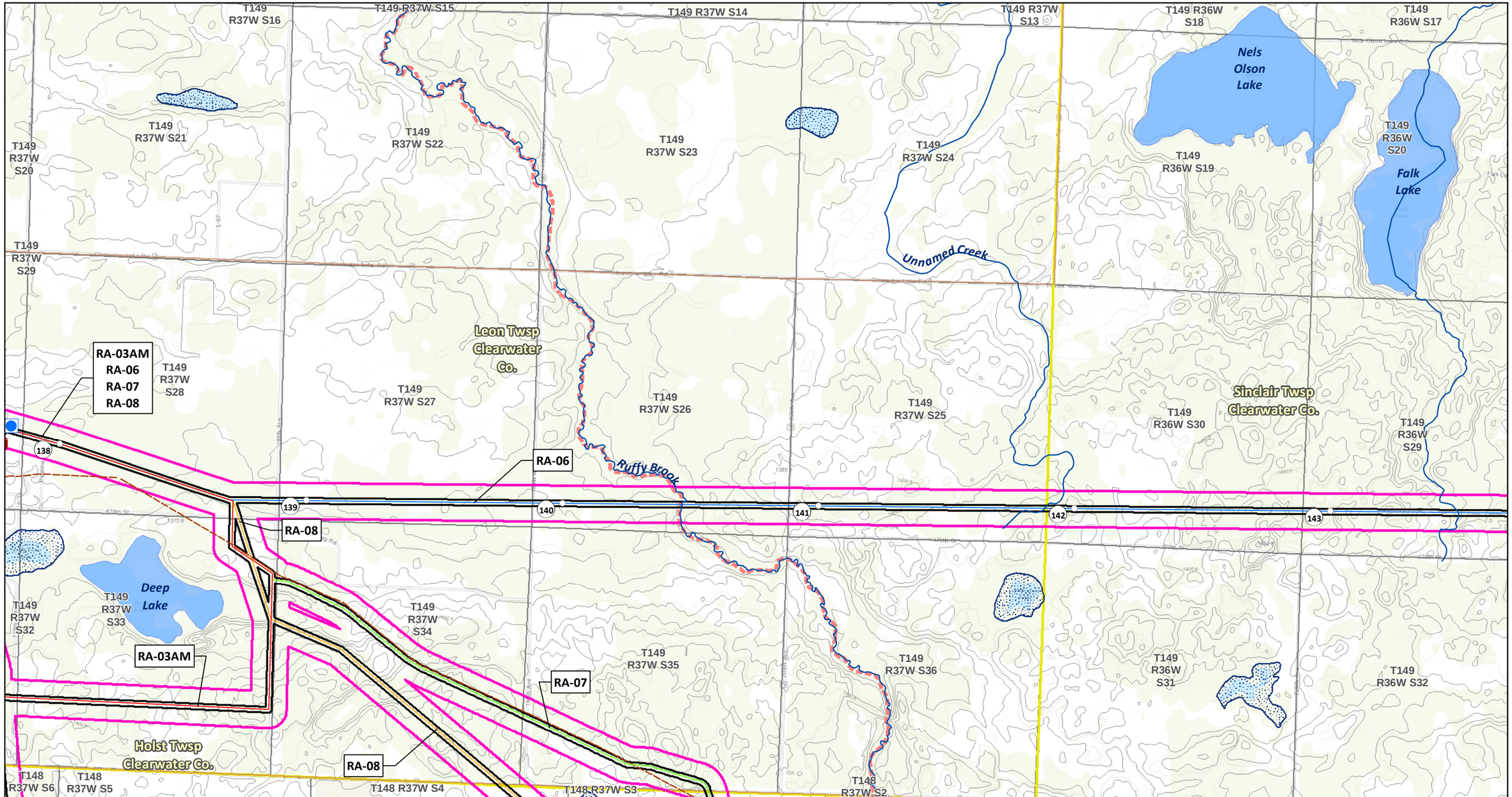

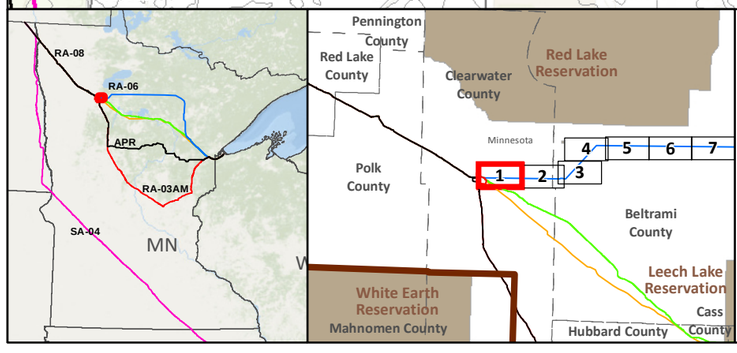

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- SNA - Scientific and Natural Area

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- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 1B of 43

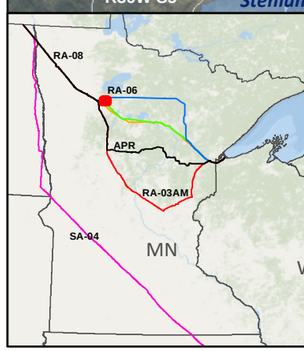

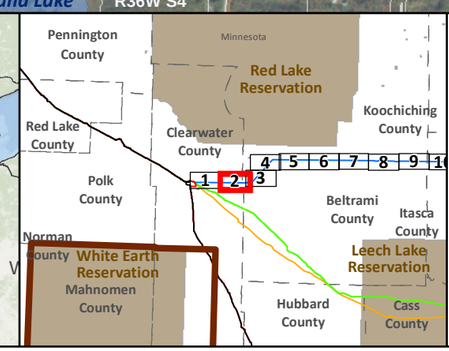

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 2A of 43

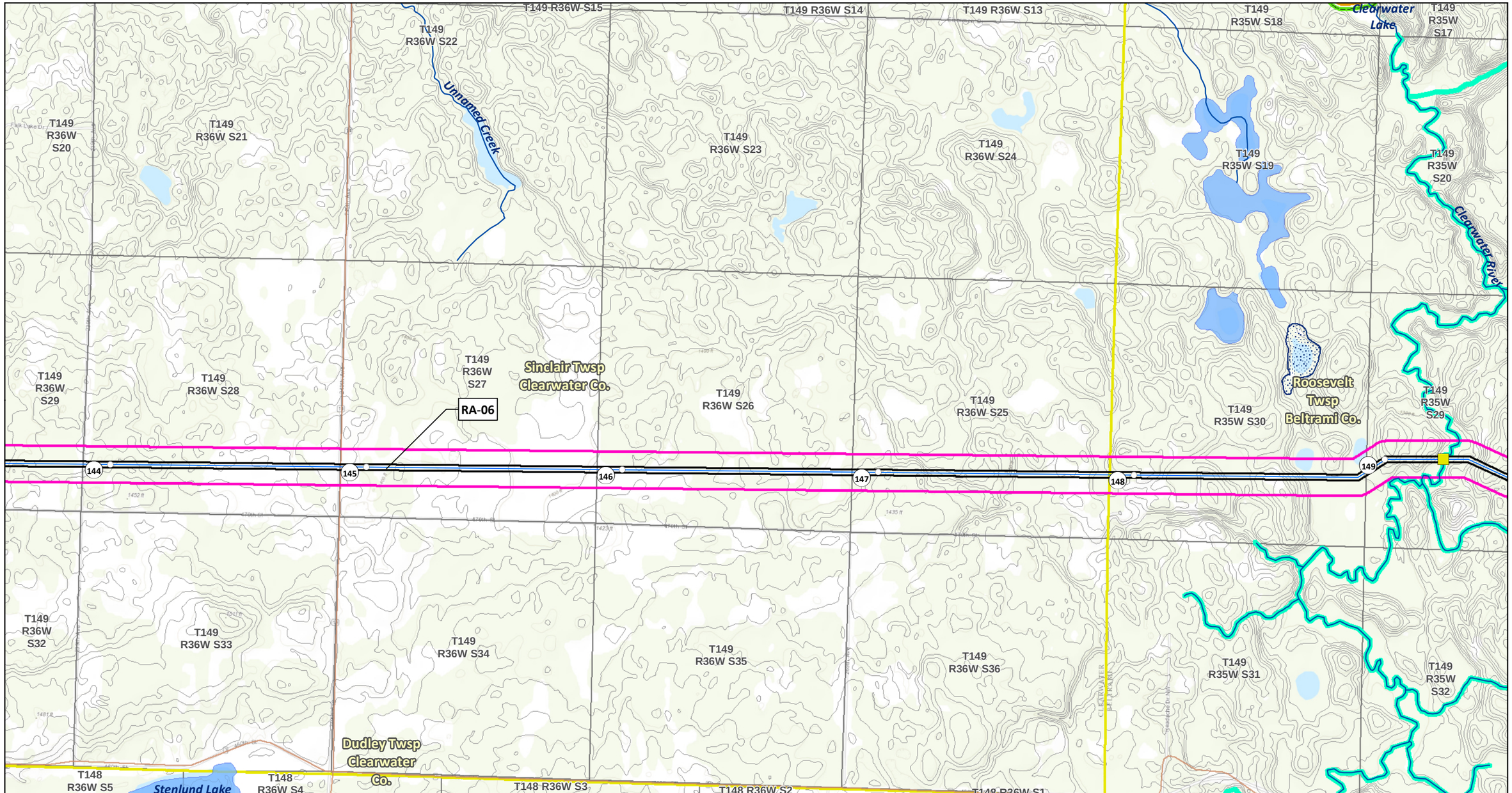

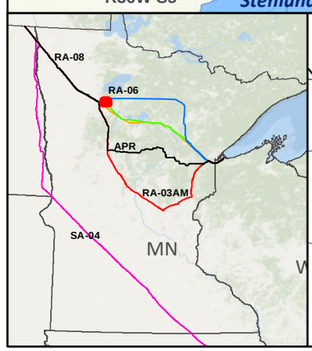

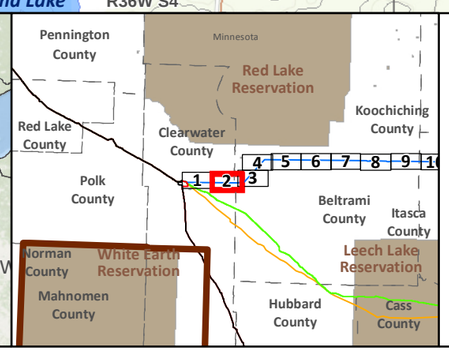

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 2B of 43

T149 R35W S18
Clearwater Lake
T149 R35W S17
T149 R35W S16
T149 R35W S15
T149 R35W S14
T149 R35W S13
T149 R34W S18
153
152
RA-06
T149 R35W S19
T149 R35W S20
Clearwater River
T149 R35W S21
T149 R35W S22
Unnamed Creek
T149 R35W S23
Sandy Lake
T149 R35W S24
T149 R34W S19
Maple Ridge Twsp Beltrami Co.
151
Roosevelt Twsp Beltrami Co.
Perch Lake
T149 R35W S30
T149 R35W S29
150
149
T149 R35W S28
T149 R35W S27
T149 R35W S26
T149 R35W S25
T149 R34W S30
Sandy River
Whitefish Lake
T149 R35W S31
T149 R35W S32
T149 R35W S33
T149 R35W S34
T149 R35W S35
T149 R35W S36
T149 R34W S31
Braas Lake

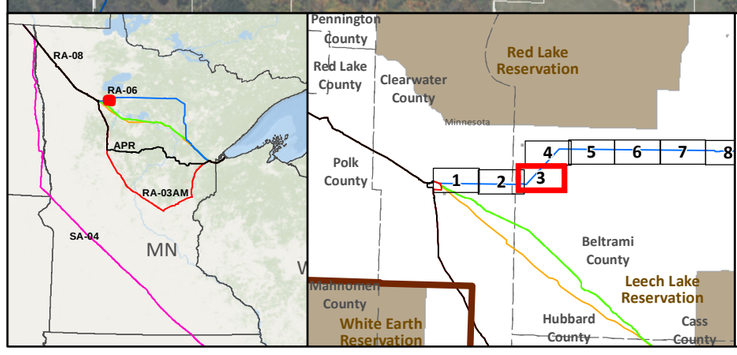

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 3A of 43

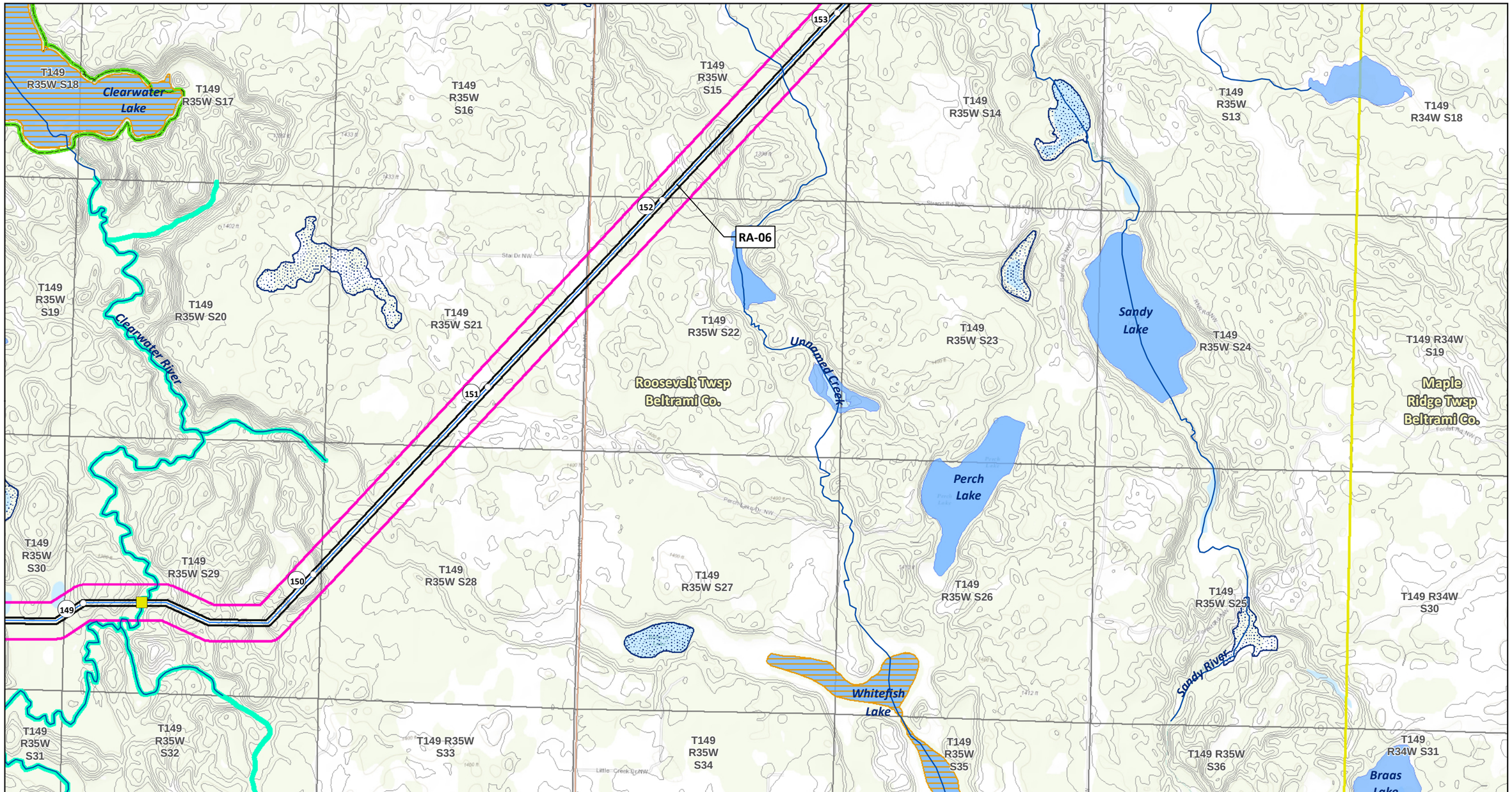

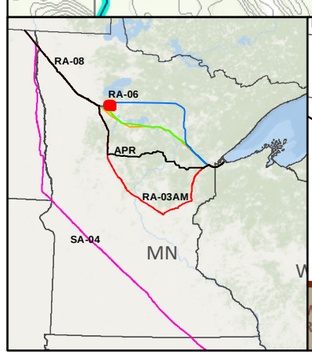

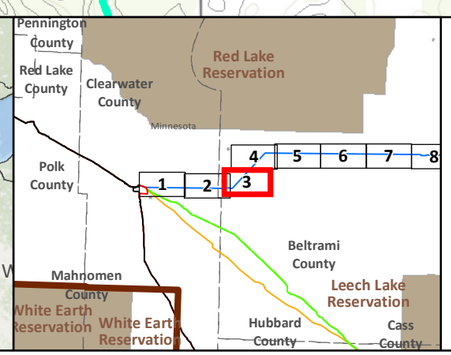

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 3B of 43

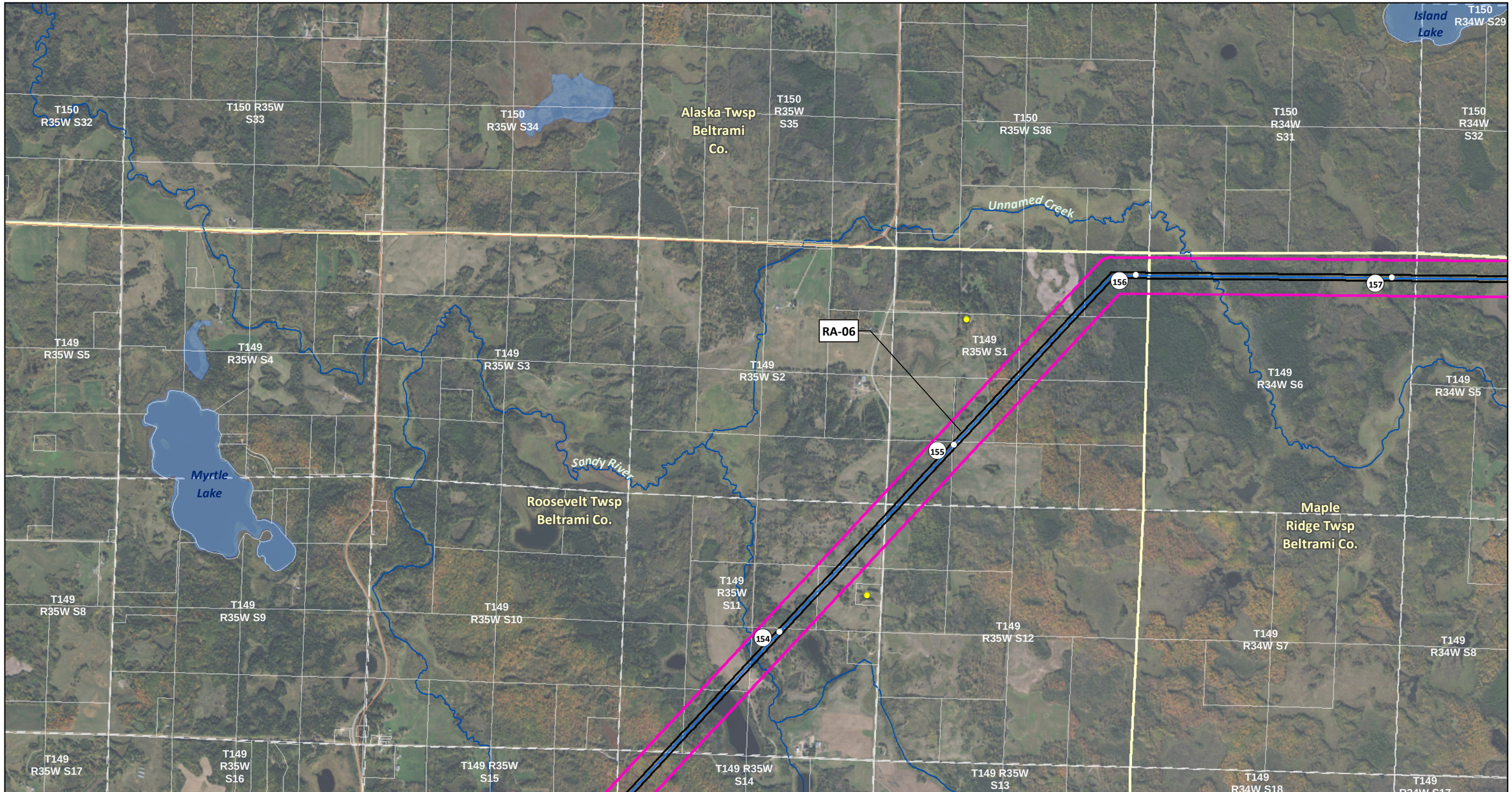

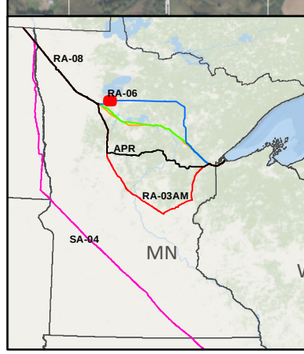

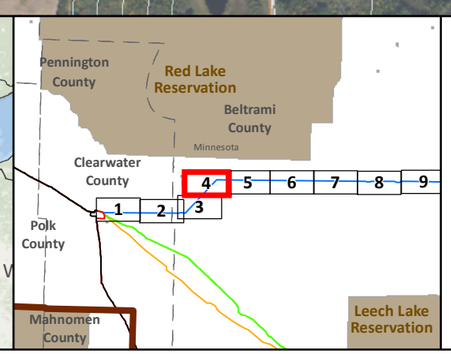

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 4A of 43

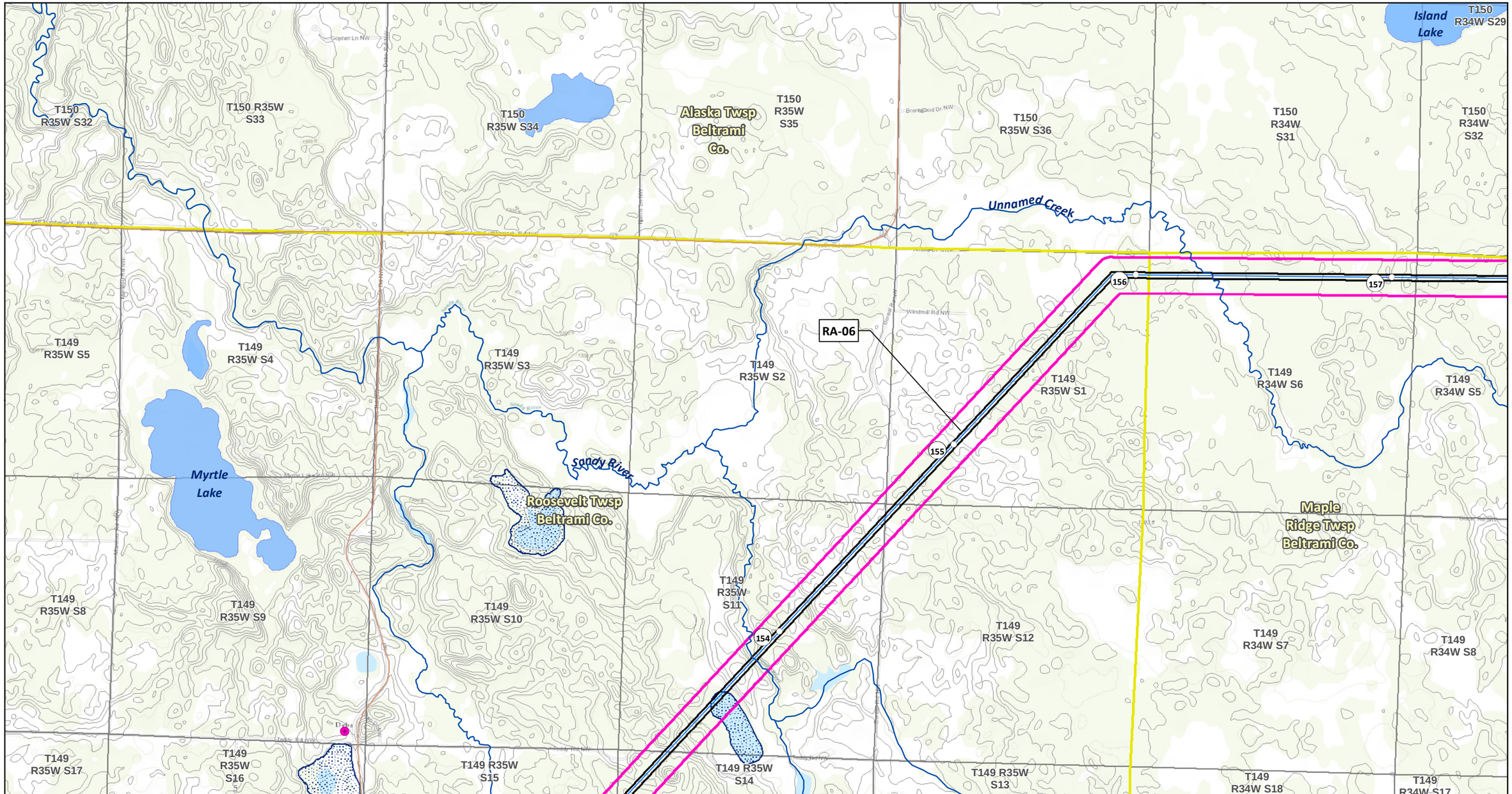

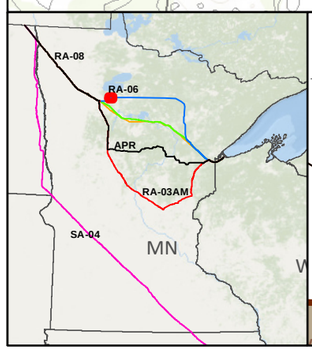

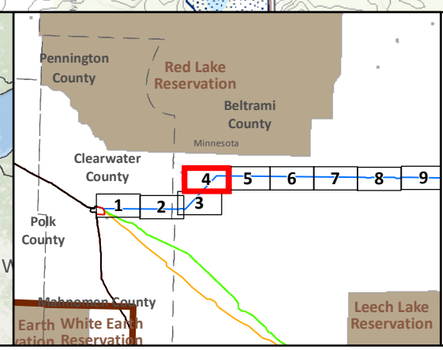

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 4B of 43

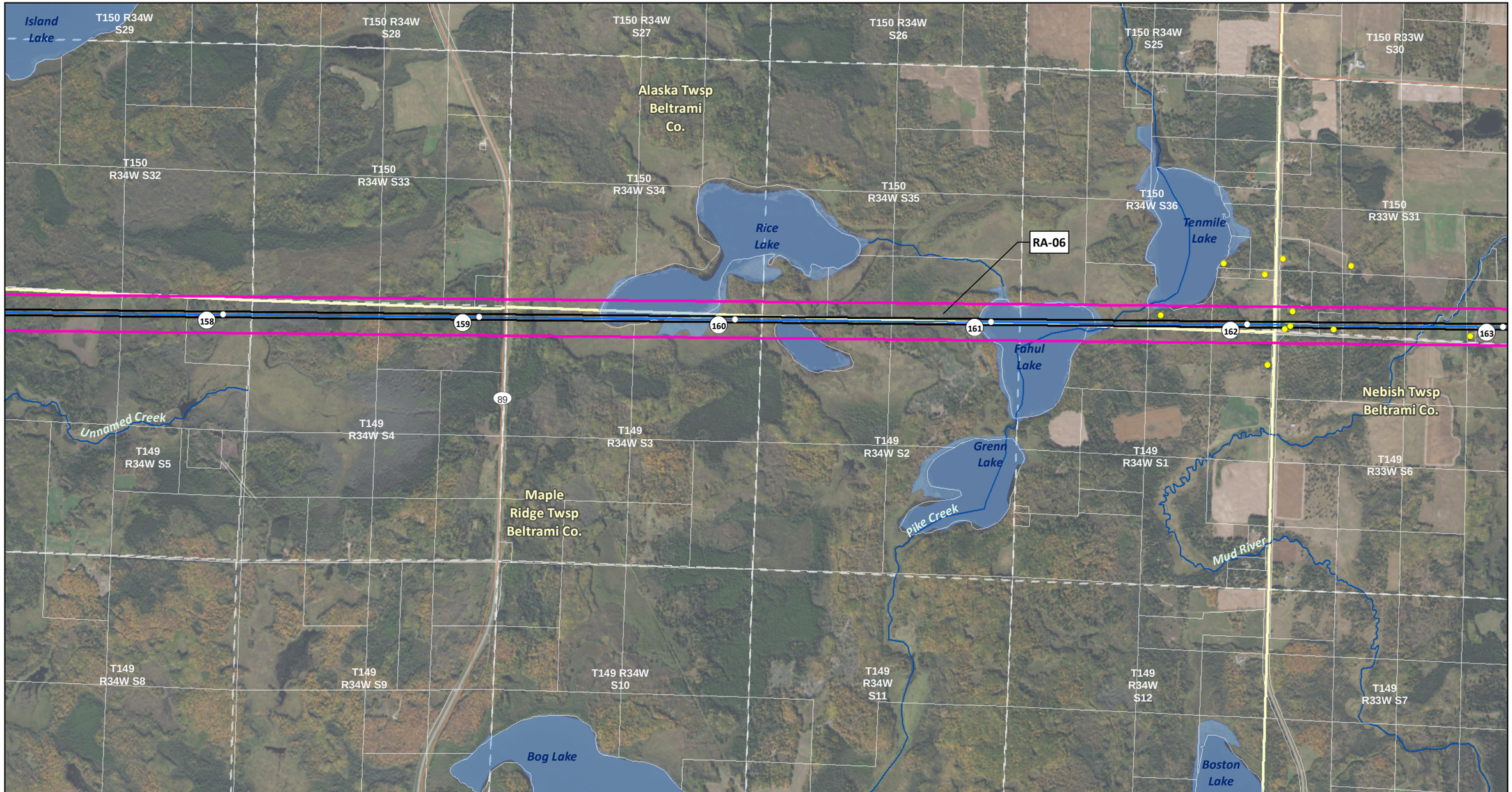

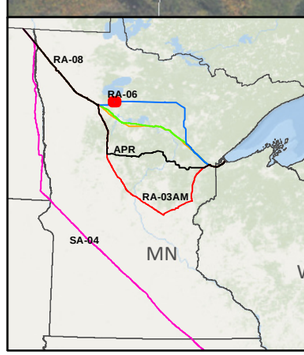

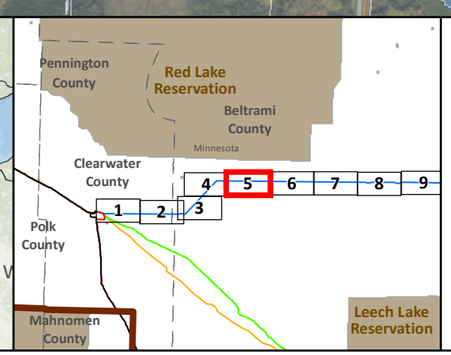

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 5A of 43

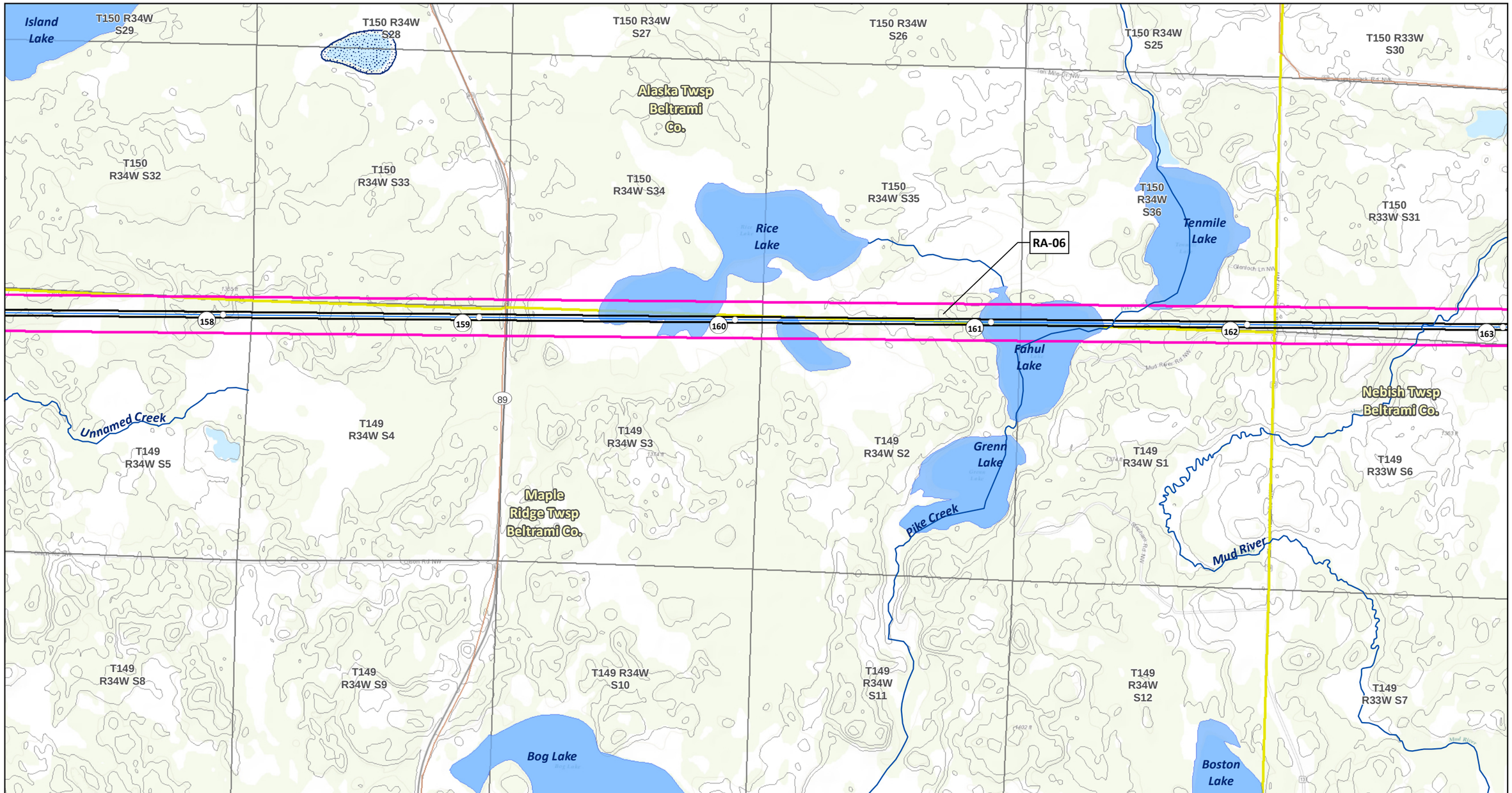

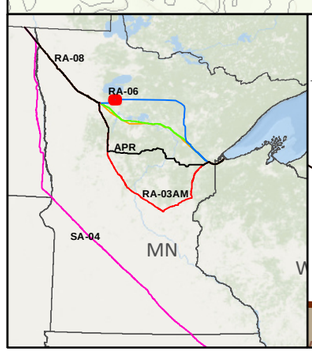

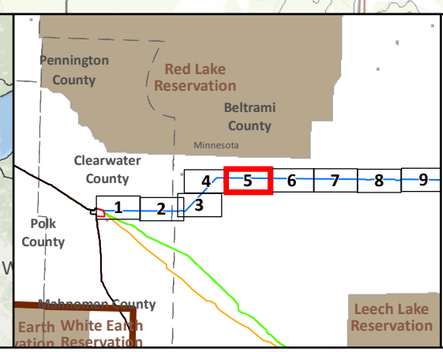

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 5B of 43

T150 R33W S30
T150 R33W S29
T150 R33W S28
T150 R33W S27
T150 R33W S26
T150 R33W S25
T150 R32W S30
Nebish Lake
Bass Lake
Mud River
T150 R33W S32
T150 R33W S33
T150 R33W S31
Smyth Lake
T150 R33W S34
T150 R33W S35
RA-06
T150 R33W S36
OBrien Twsp Beltrami Co.
T150 R32W S31
164
165
166
167
168
Nebish Twsp Beltrami Co.
Little Rice Lake
Marcus Lake
T149 R32W S6
T149 R33W S6
T149 R33W S5
T149 R33W S4
T149 R33W S3
T149 R33W S2
Dark Lake
T149 R33W S1
Hagali Lake
Buena Vista State Forest
Pollywog Lake
Hagali Twsp Beltrami Co.
T149 R33W S7
Hay Creek
Darrigans Creek
T149 R33W S8
T149 R33W S9
T149 R33W S10
T149 R33W S11
T149 R33W S12
White Fish Lake
T149 R32W S7
Anderson Lake

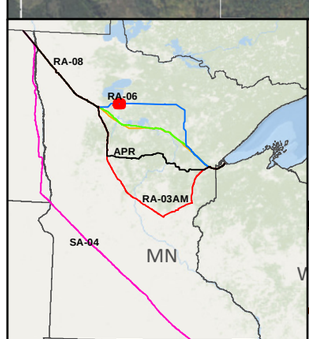

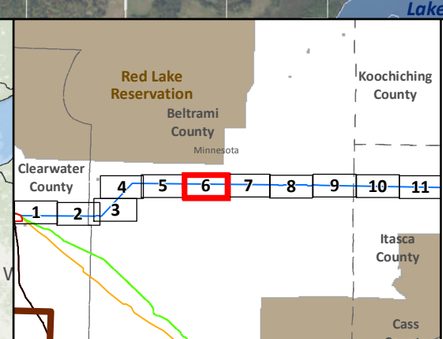

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation
Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 6A of 43

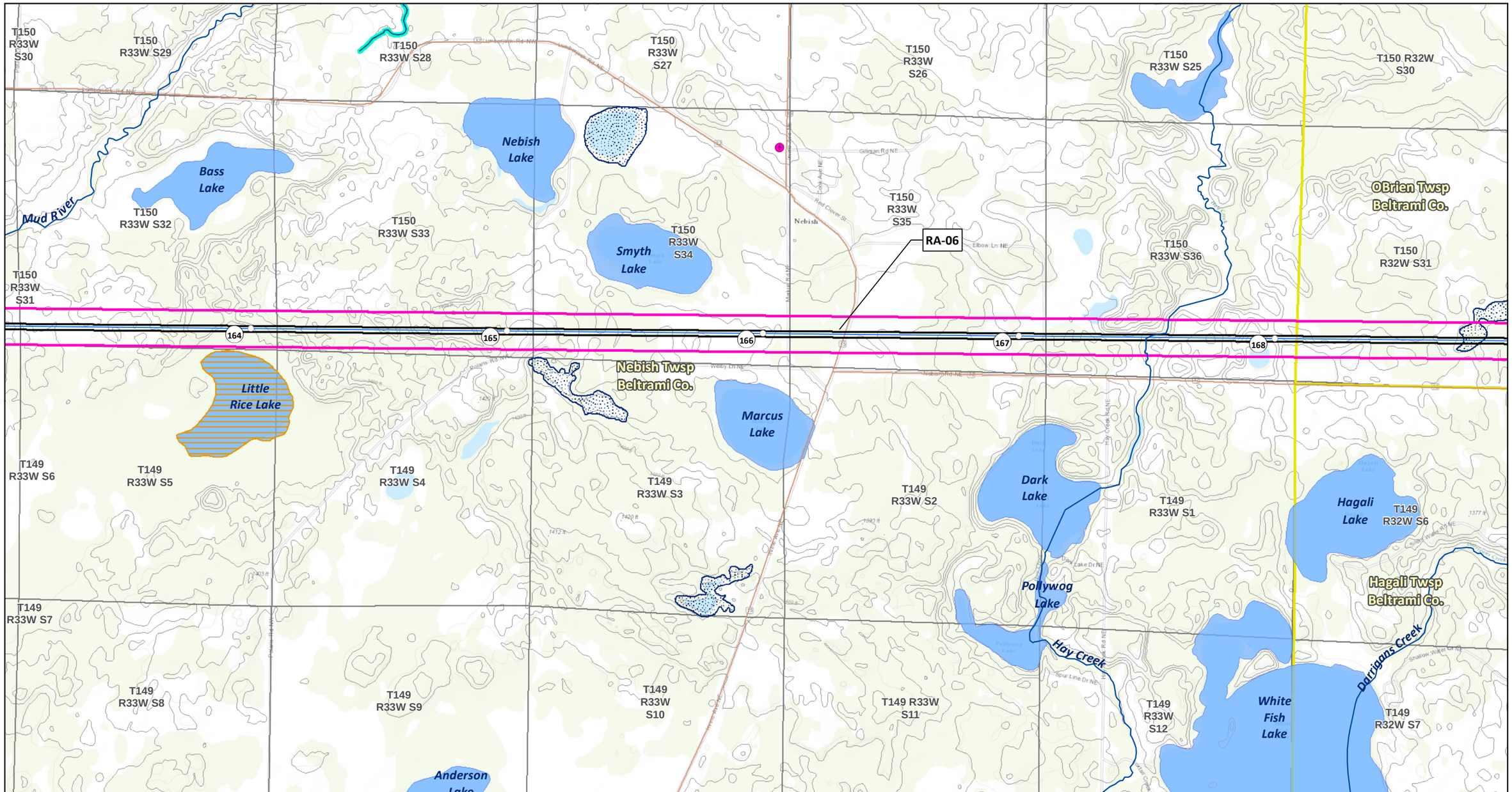

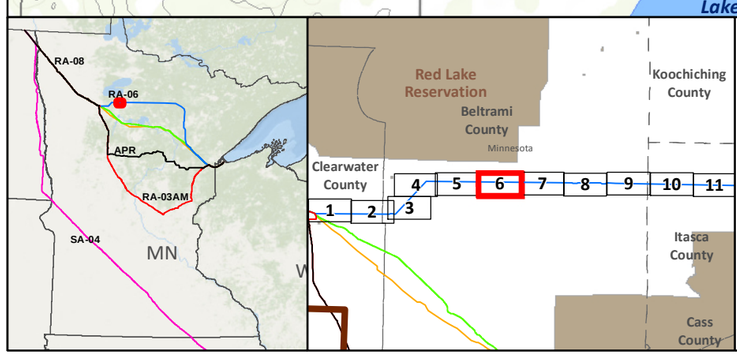

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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- National River Inventory Crossing
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Native Plant Communities with Biodiversity Significance
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- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 6B of 43

T150 R32W S30
T150 R32W S29
T150 R32W S28
T150 R32W S27
T150 R32W S26
T150 R32W S25
Unnamed Creek
T150 R31W S30
OBrien Twsp Beltrami Co.
Langor Twsp Beltrami Co.
T150 R32W S31
T150 R32W S32
T150 R32W S33
RA-06
T150 R32W S34
T150 R32W S35
T150 R32W S36
T150 R31W S31
169
170
171
172
173
174
T149 R32W S6
T149 R32W S5
T149 R32W S4
T149 R32W S3
Hagali Twsp Beltrami Co.
T149 R32W S2
T149 R32W S1
T149 R31W S6
Buena Vista State Forest
Darrigans Creek
Rice Lake
O'Brien Creek
Hines Twsp Beltrami Co.
T149 R32W S7
T149 R32W S8
T149 R32W S9
T149 R32W S10
T149 R32W S11
T149 R32W S12
T149 R31W S7

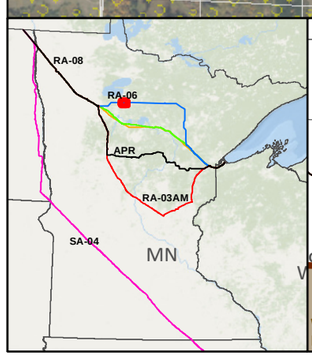

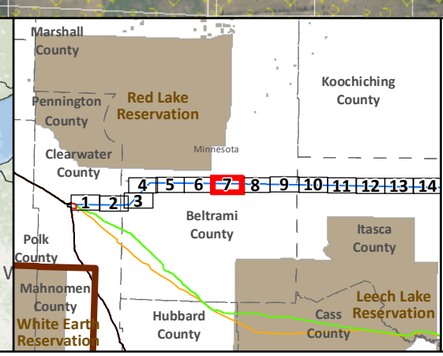

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

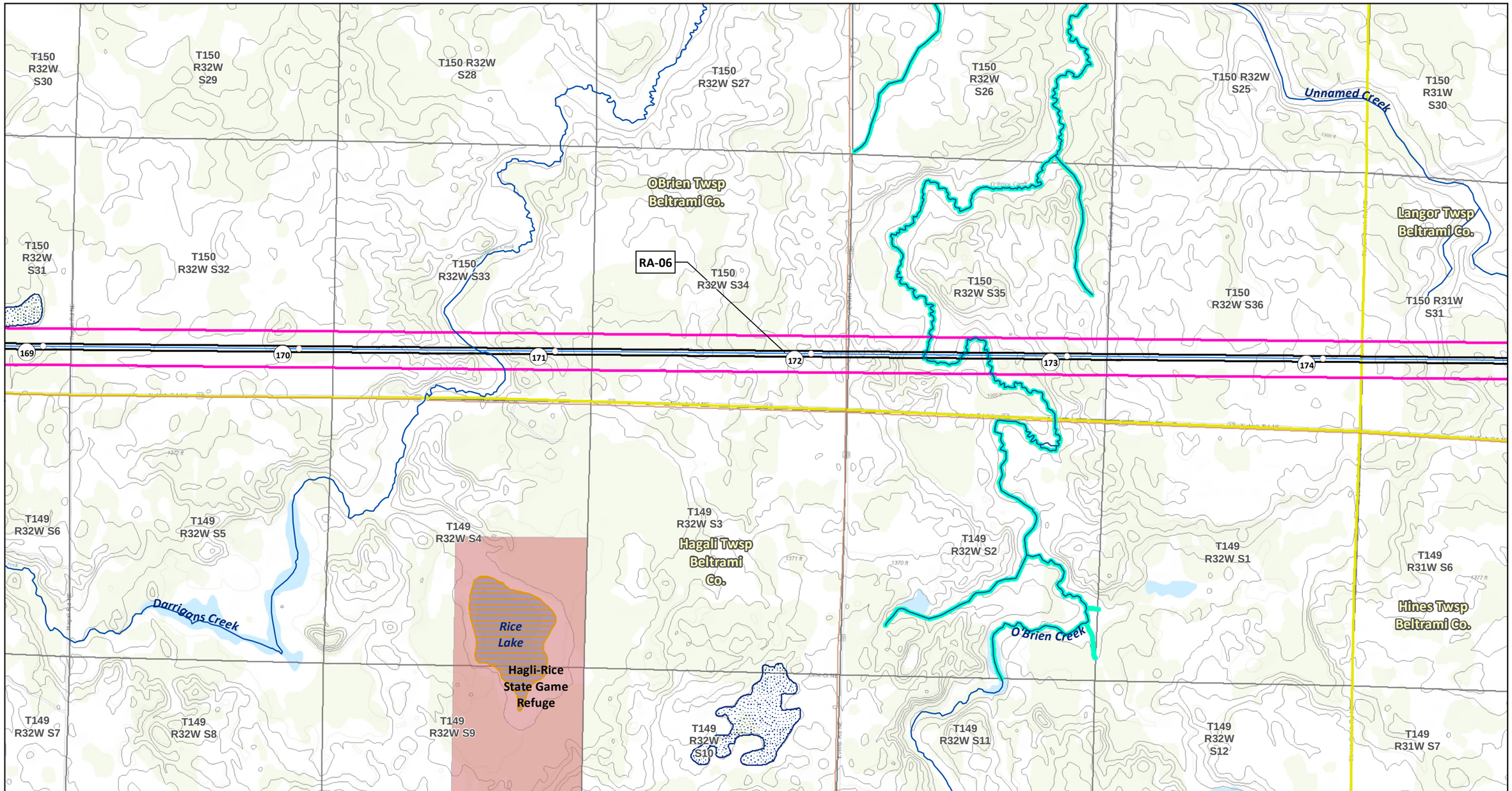

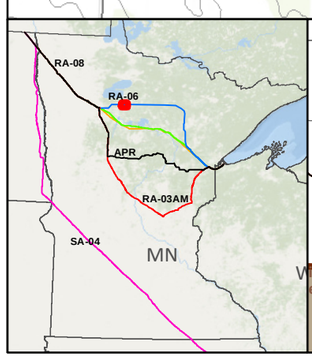

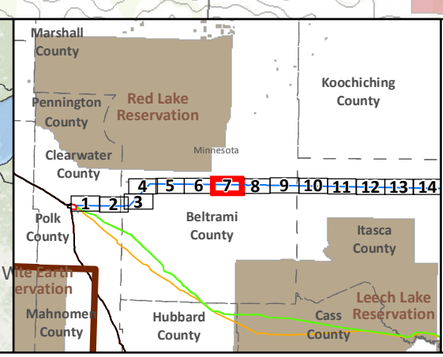

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 7B of 43

T150 R31W S30
T150 R31W S29
T150 R31W S28
T150 R31W S27
T150 R31W S26
T150 R31W S25
T150 R30W S30
Langor Twsp Beltrami Co.
Hornet Twsp Beltrami Co.
T150 R31W S31
T150 R31W S32
T150 R31W S33
T150 R31W S34
RA-06
T150 R31W S35
T150 R31W S36
T150 R30W S31
175
176
177
178
179
180
72
Unnamed Creek
Smith Lake
T149 R31W S3
Hines Twsp Beltrami Co.
T149 R31W S6
T149 R31W S5
T149 R31W S4
T149 R31W S2
T149 R31W S1
T149 R30W S6
Summit Twsp Beltrami Co.
Blackduck River
Blackduck Lake
T149 R31W S7
T149 R31W S8
T149 R31W S9
T149 R31W S10
T149 R31W S11
T149 R31W S12
T149 R30W S7
Blackduck Twsp Beltrami Co.

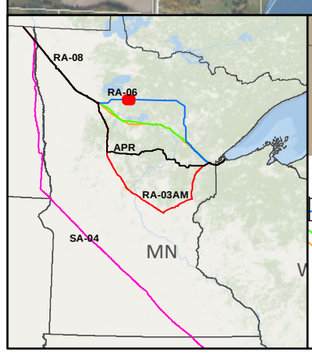

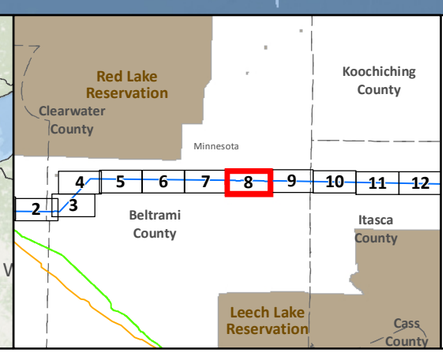

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 8A of 43

T150 R31W S30
T150 R31W S29
T150 R31W S28
T150 R31W S27
T150 R31W S26
T150 R31W S25
T150 R30W S30
Langor Twsp Beltrami Co.
Hornet Twsp Beltrami Co.
T150 R31W S31
T150 R31W S32
T150 R31W S33
T150 R31W S34
RA-06
T150 R31W S35
T150 R31W S36
T150 R30W S31
175
176
177
178
179
180
72
Unnamed Creek
Smith Lake
T149 R31W S6
T149 R31W S5
T149 R31W S4
T149 R31W S3
Hines Twsp Beltrami Co.
T149 R31W S2
T149 R31W S1
T149 R30W S6
Summit Twsp Beltrami Co.
Blackduck River
Blackduck Lake
T149 R31W S7
T149 R31W S8
T149 R31W S9
T149 R31W S10
T149 R31W S11
T149 R31W S12
T149 R30W S7
Blackduck Twsp Beltrami Co.

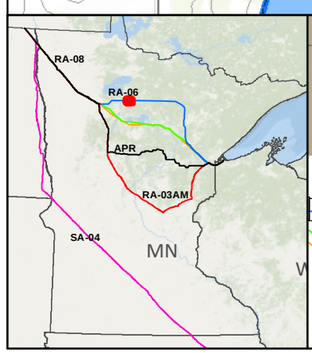

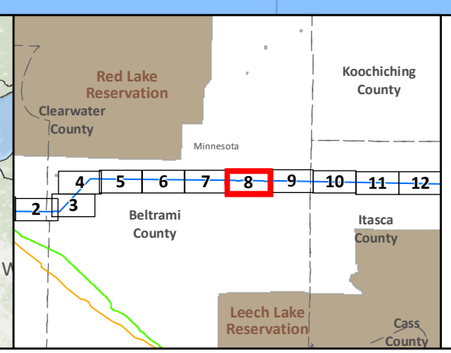

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 8B of 43

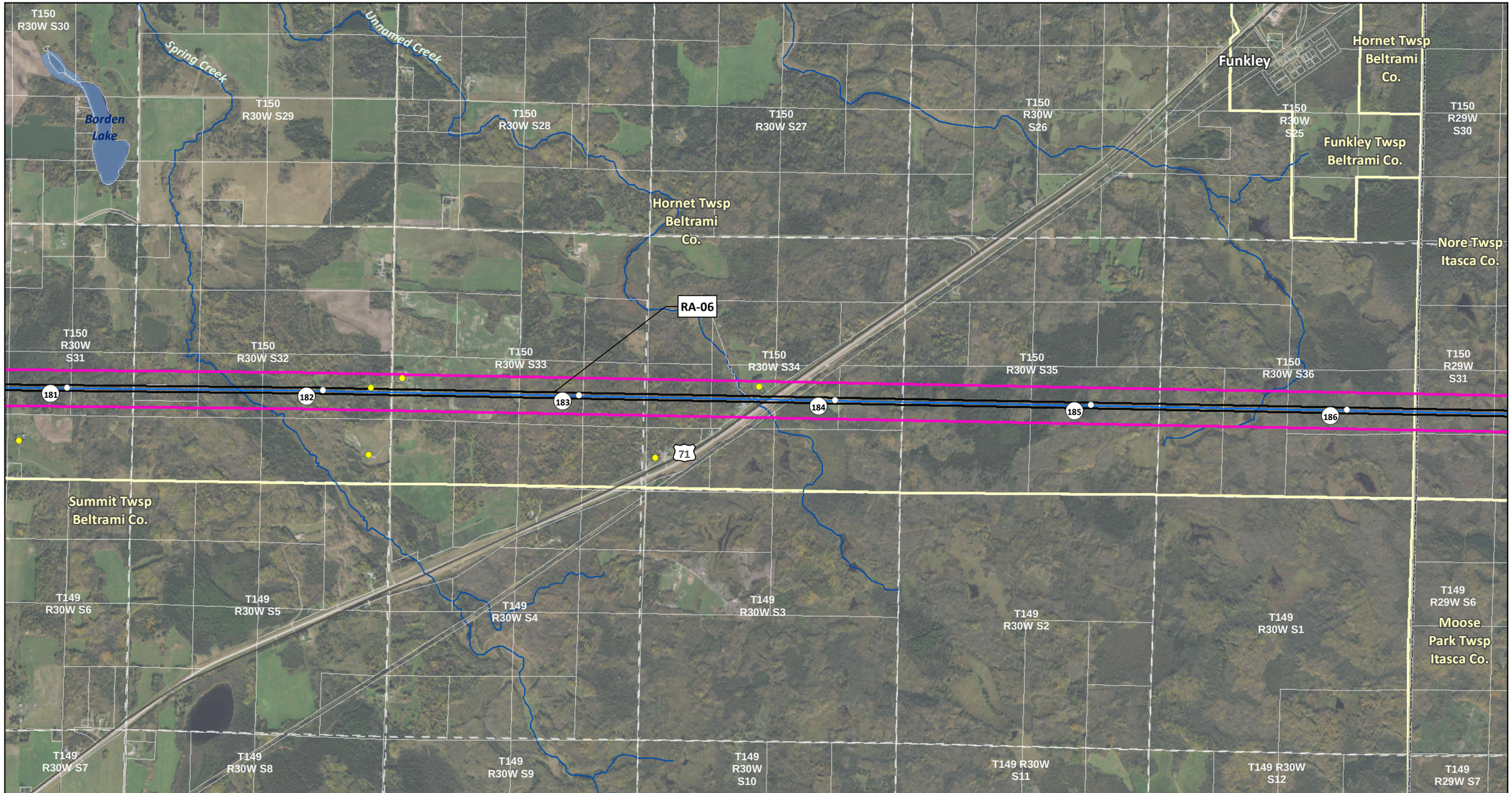

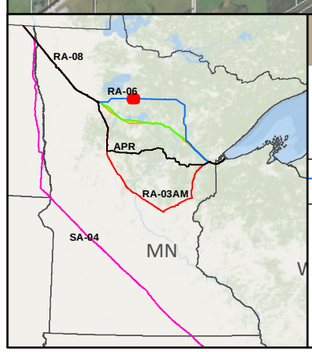

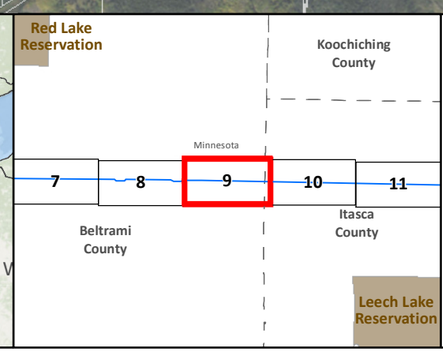

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 9A of 43

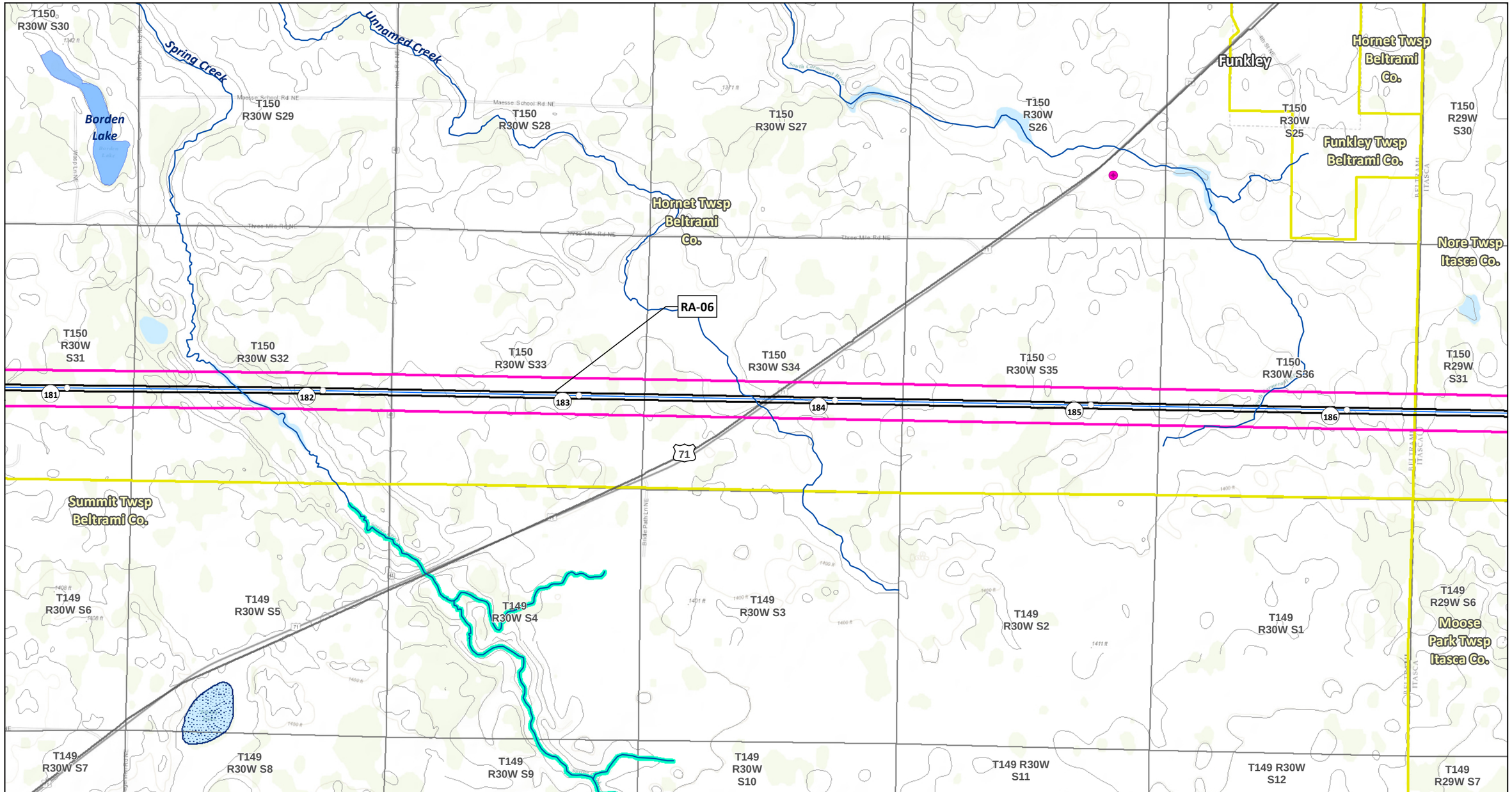

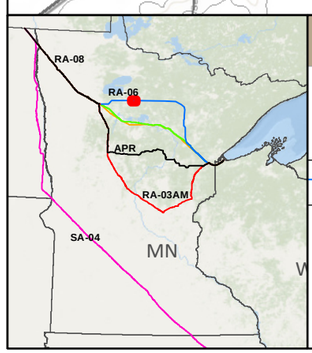

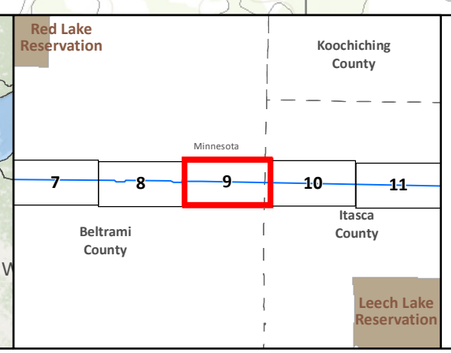

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

Outstanding High

Moderate

Native Plant Communities with Biodiversity Significance

Outstanding High

Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 9B of 43

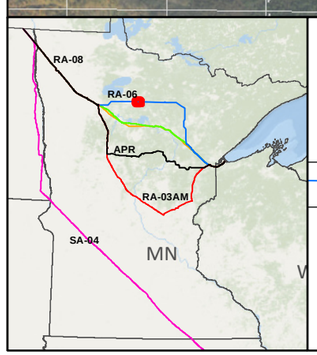

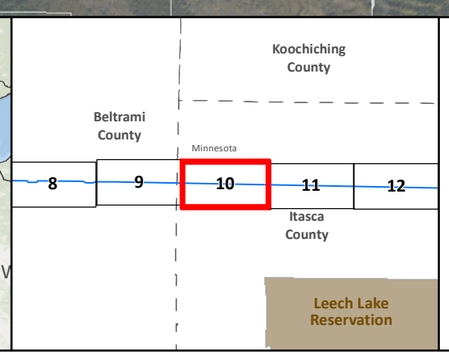

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 10A of 43

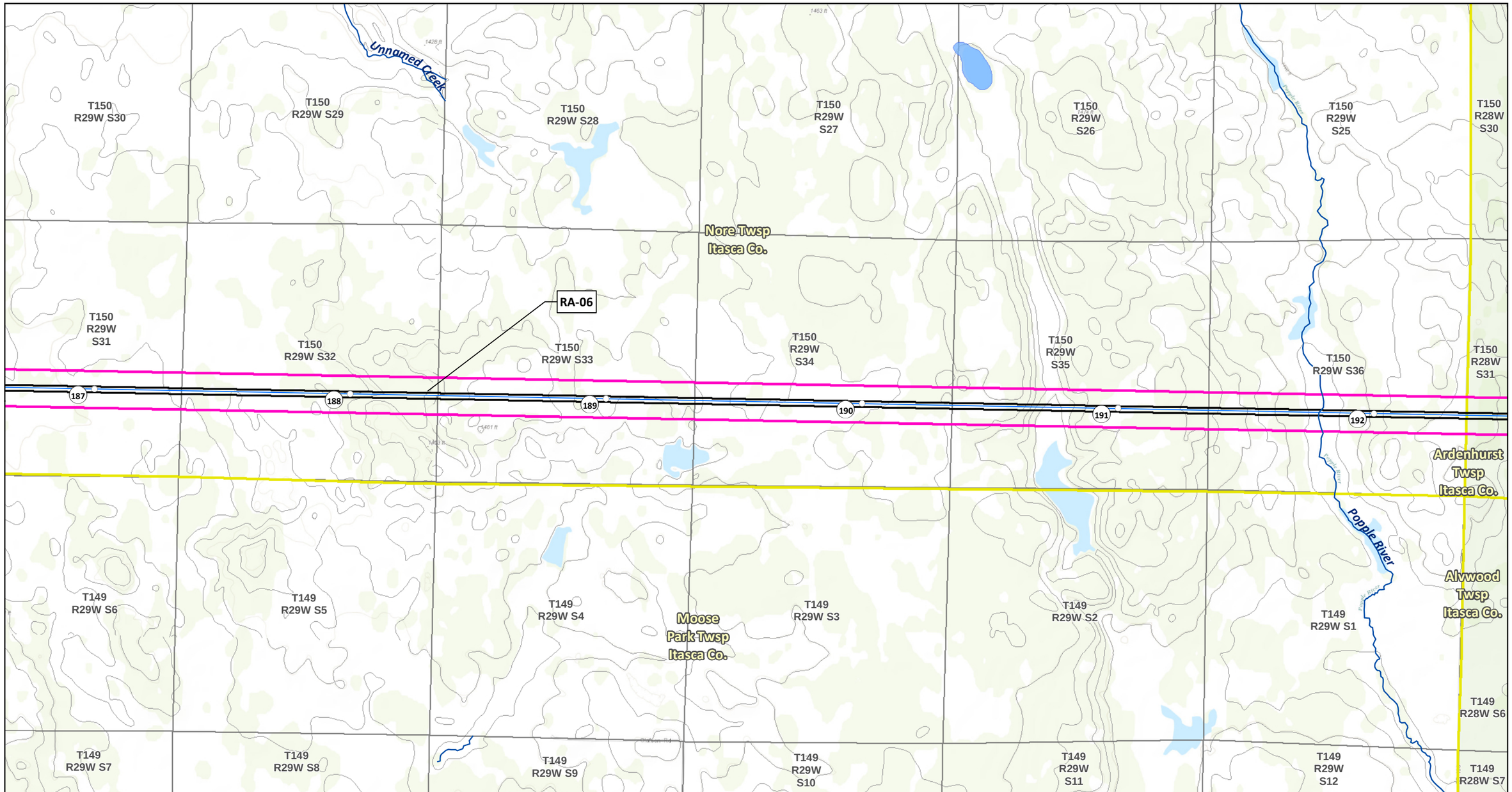

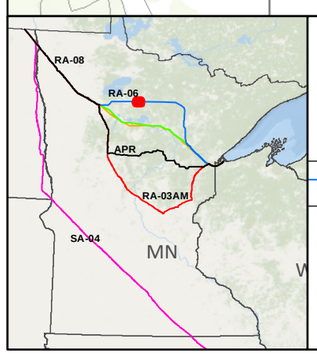

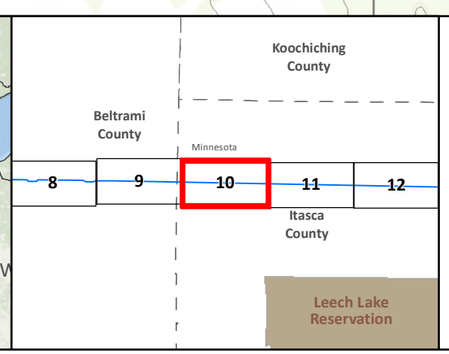

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 10B of 43

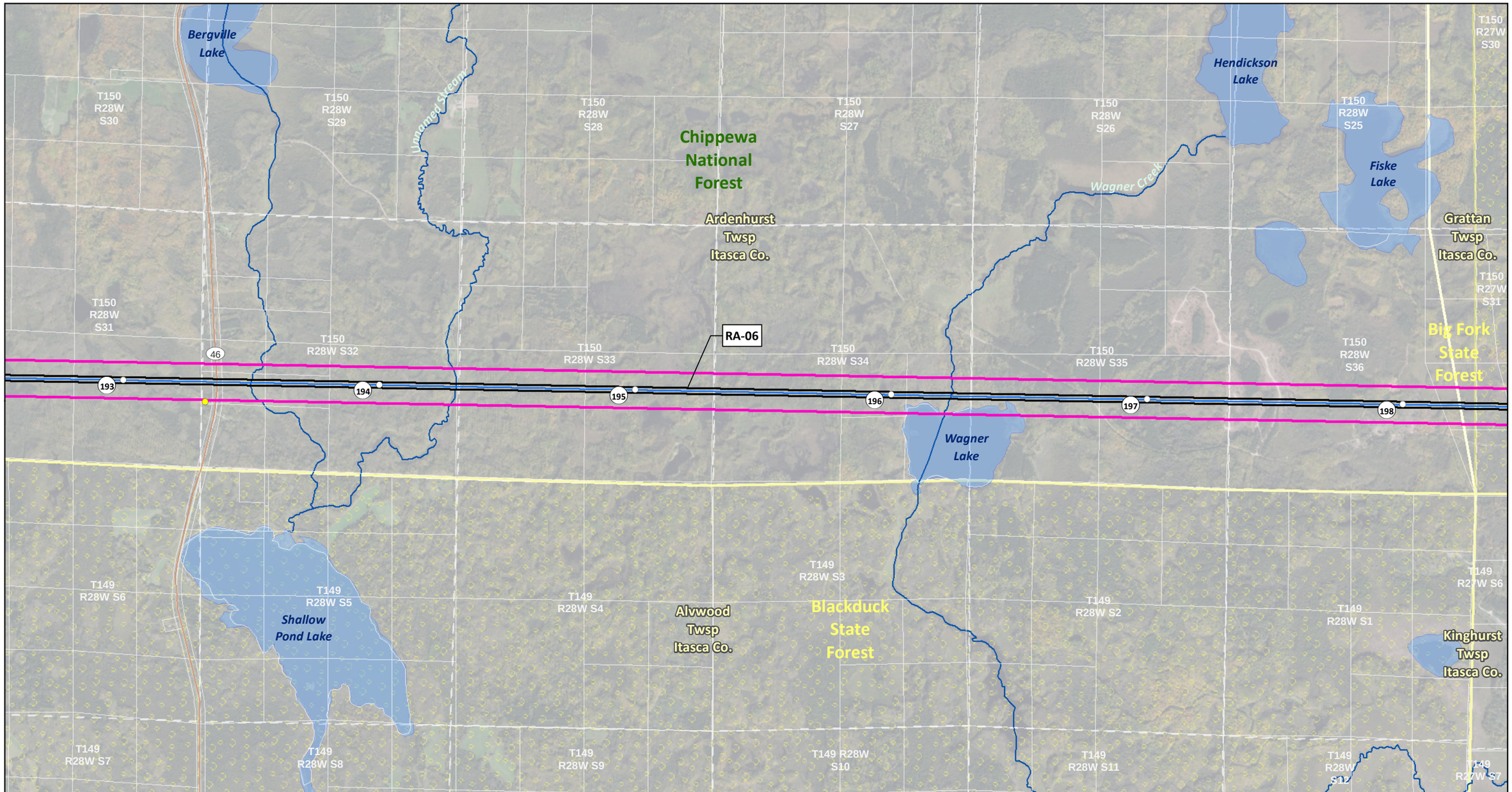

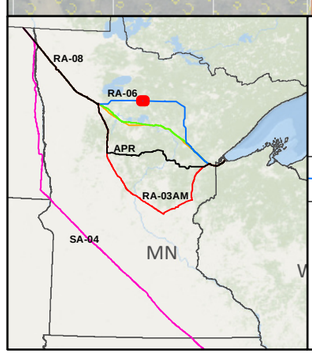

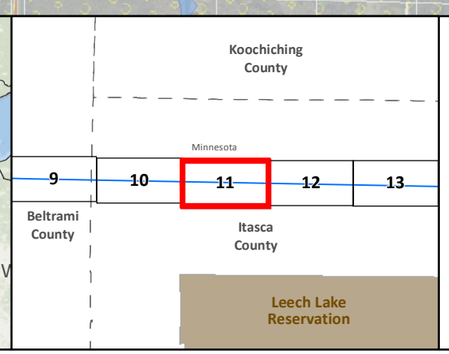

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 11A of 43

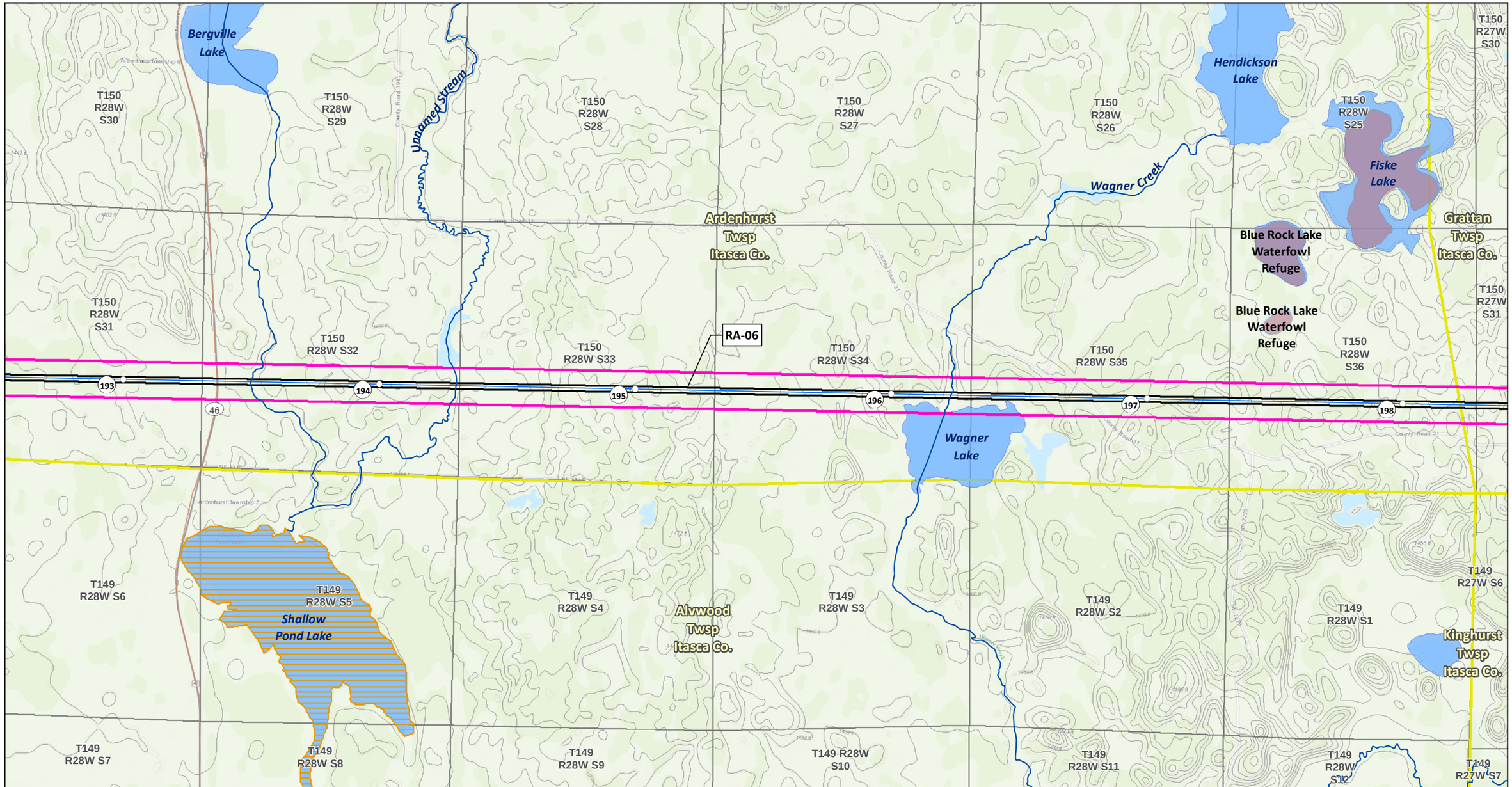

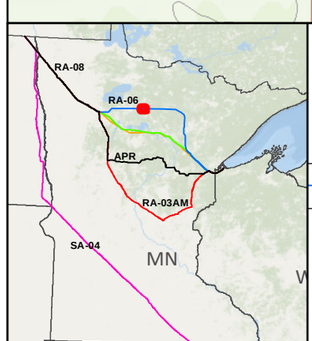

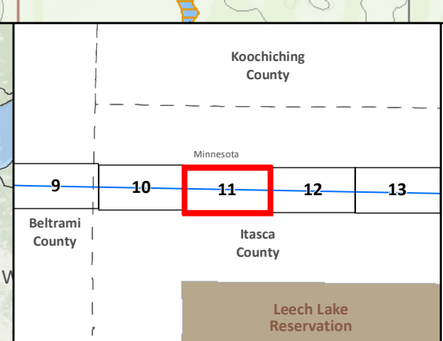

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 11B of 43

T150 R27W S30
T150 R27W S29
Wildlife Marsh
T150 R27W S28
Unnamed Stream
T150 R27W S27
T150 R27W S26
T150 R27W S25
T150 R26W S30
Big Fork State Forest
Grattan Twsp Itasca Co.
Dishpan Lake
Moose Brook
Windego Creek
Chippewa National Forest
RA-06
T150 R27W S31
T150 R27W S32
T150 R27W S33
T150 R27W S34
T150 R27W S35
T150 R27W S36
T150 R26W S31
199
200
201
202
203
Pomroy Twsp Itasca Co.
Coddington Lake
Dora Lake
T149 R27W S6
T149 R27W S5
T149 R27W S4
Kinghurst Twsp Itasca Co.
T149 R27W S3
T149 R27W S2
T149 R27W S1
T149 R26W S6
Wirt Twsp Itasca Co.
Big Fork River
T149 R27W S7
T149 R27W S8
T149 R27W S9
T149 R27W S10
T149 R27W S11
T149 R27W S12
T149 R26W S7

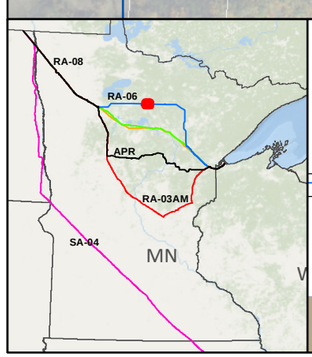

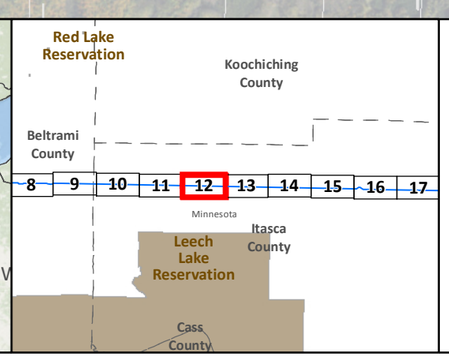

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
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Highway
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Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 12A of 43

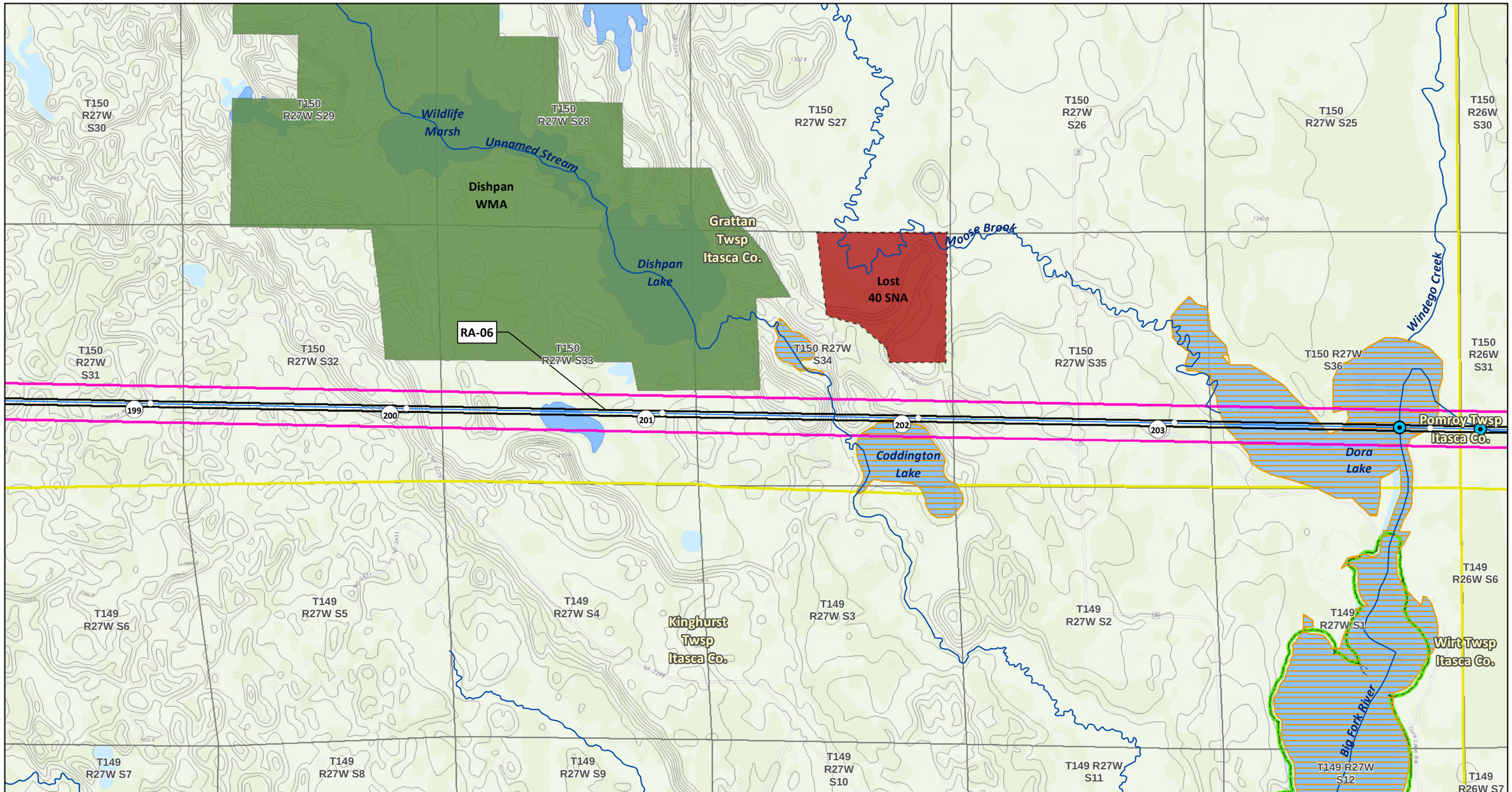

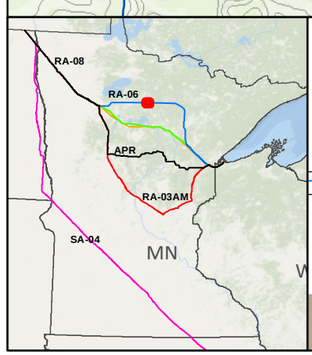

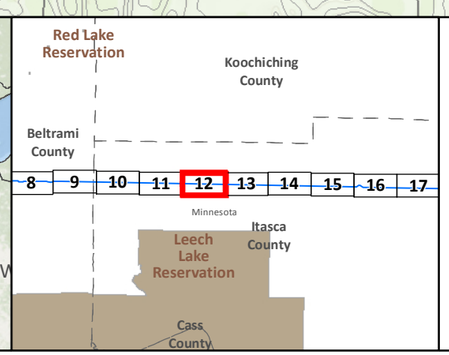

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 12B of 43

T150 R26W S30
T150 R26W S29
Hay Creek
T150 R26W S28
T150 R26W S27
T150 R26W S26
T150 R26W S25
Harrison Creek
Unnamed Stream
Big Fork State Forest
Pomroy Twsp Itasca Co.
T150 R26W S33
RA-06
Spruce Lake
Chippewa National Forest
T150 R26W S31
Big Fork River
T150 R26W S32
T150 R26W S34
T150 R26W S35
T150 R26W S36
205
206
207
208
209
210
Bay Lake
Clear Lake
Noma Lake
Wirt Twsp Itasca Co.
T149 R26W S6
T149 R26W S5
T149 R26W S4
T149 R26W S3
T149 R26W S2
T149 R26W S1
T149 R26W S7
T149 R26W S8
T149 R26W S9
T149 R26W S10
T149 R26W S11
T149 R26W S12

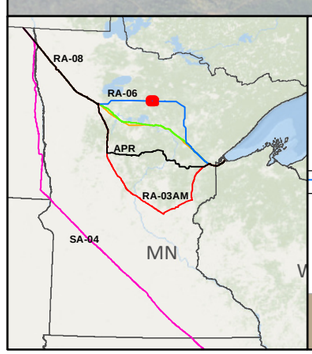

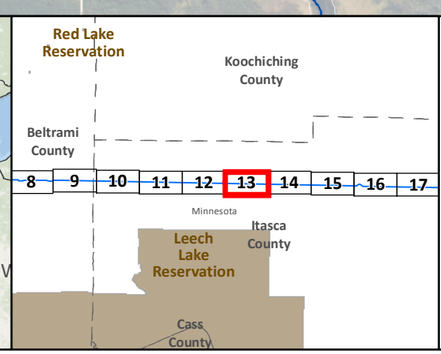

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 13A of 43

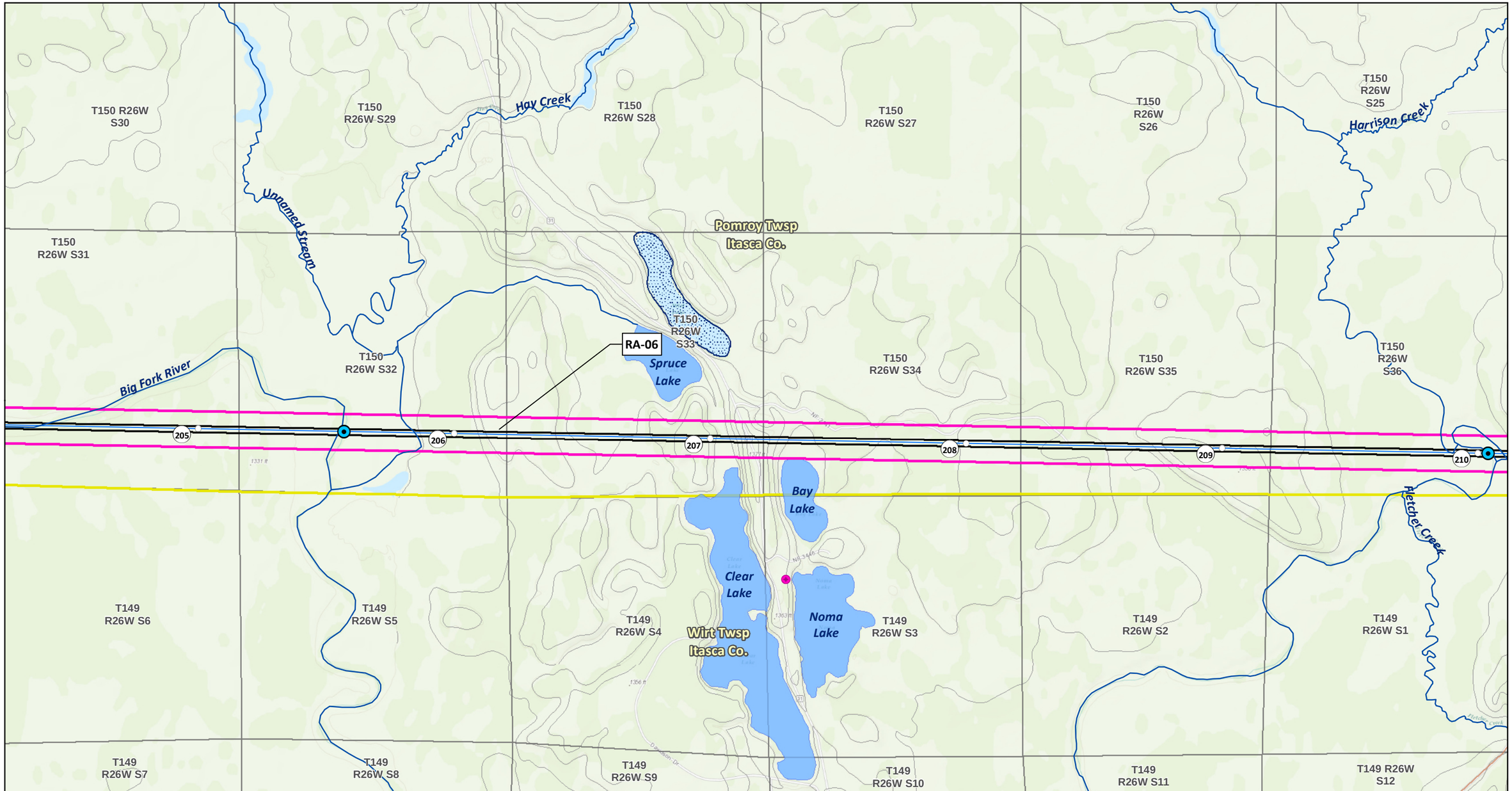

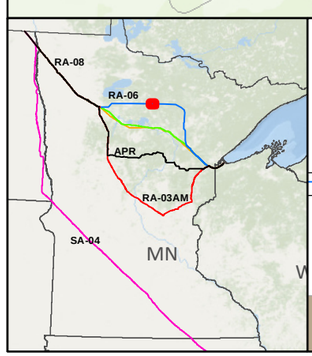

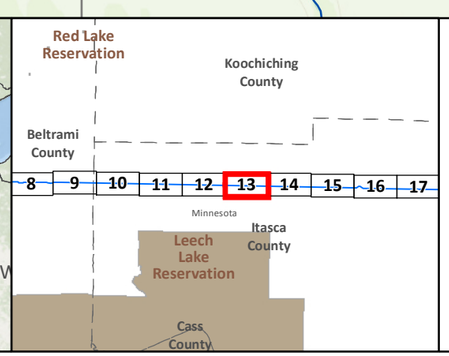

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 13B of 43

Pomroy Twsp
Itasca Co.

T150 R25W S25
T150 R25W S30
T150 R25W S29
T150 R25W S28
T150 R25W S27
T150 R25W S26
T150 R25W S22
T150 R25W S23
T150 R25W S24
T150 R25W S25

Bowman Creek

Chippewa National Forest

T150 R25W S32
Big Fork State Forest
RA-06
T150 R26W S36
T150 R25W S31
T150 R25W S33
Liberty Twsp
Itasca Co.
T150 R25W S34
T150 R25W S35
T150 R25W S36

Unnamed Stream

211
212
213
214
215
216

Wirt Twsp
Itasca Co.

Big Fork River

T149 R26W S1
T149 R25W S6
T149 R25W S5
T149 R25W S4
T149 R25W S3
T149 R25W S2
T149 R25W S1

Fletcher Creek

T149 R26W S12
T149 R25W S7
T149 R25W S8
T149 R25W S9
T149 R25W S10
T149 R25W S11
T149 R25W S12

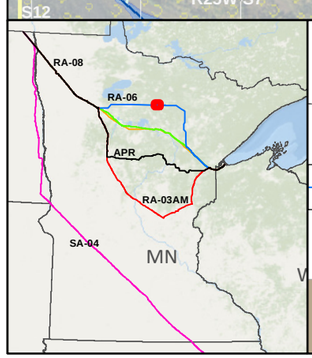

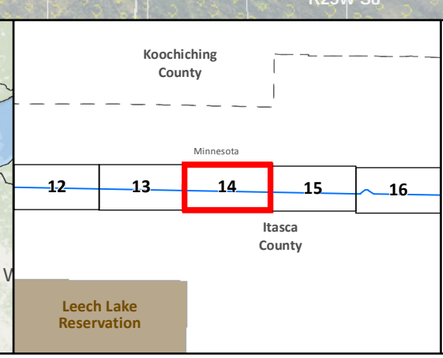

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 14A of 43

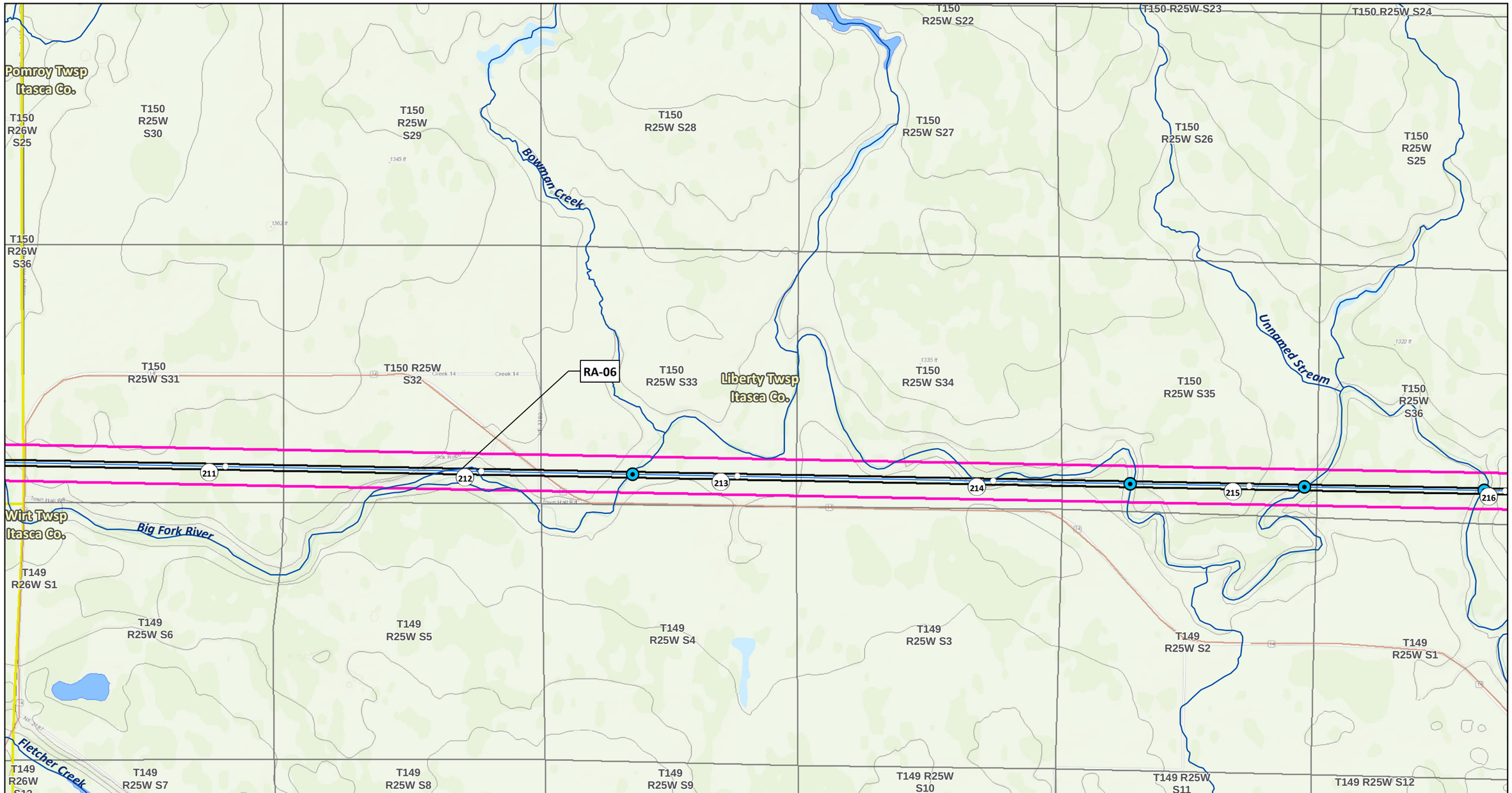

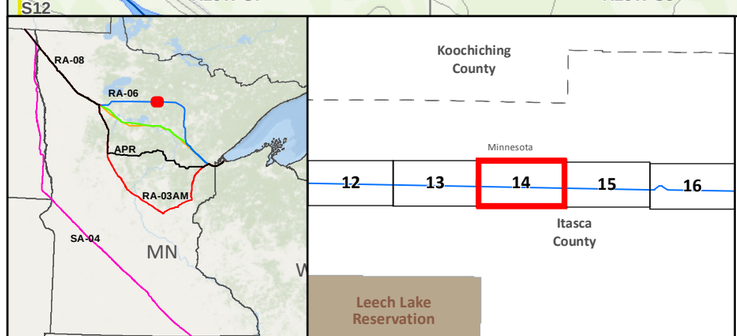

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 14B of 43

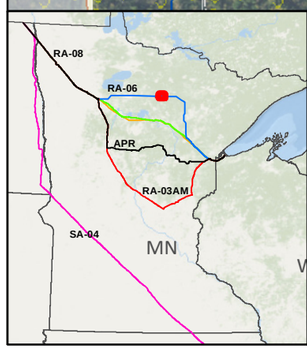

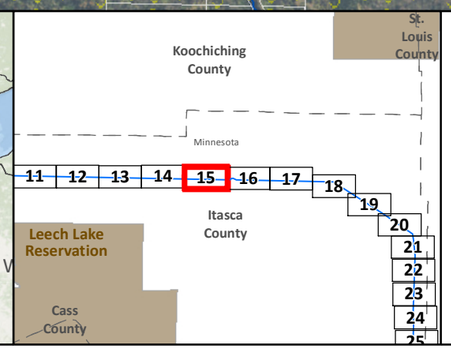

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 15A of 43

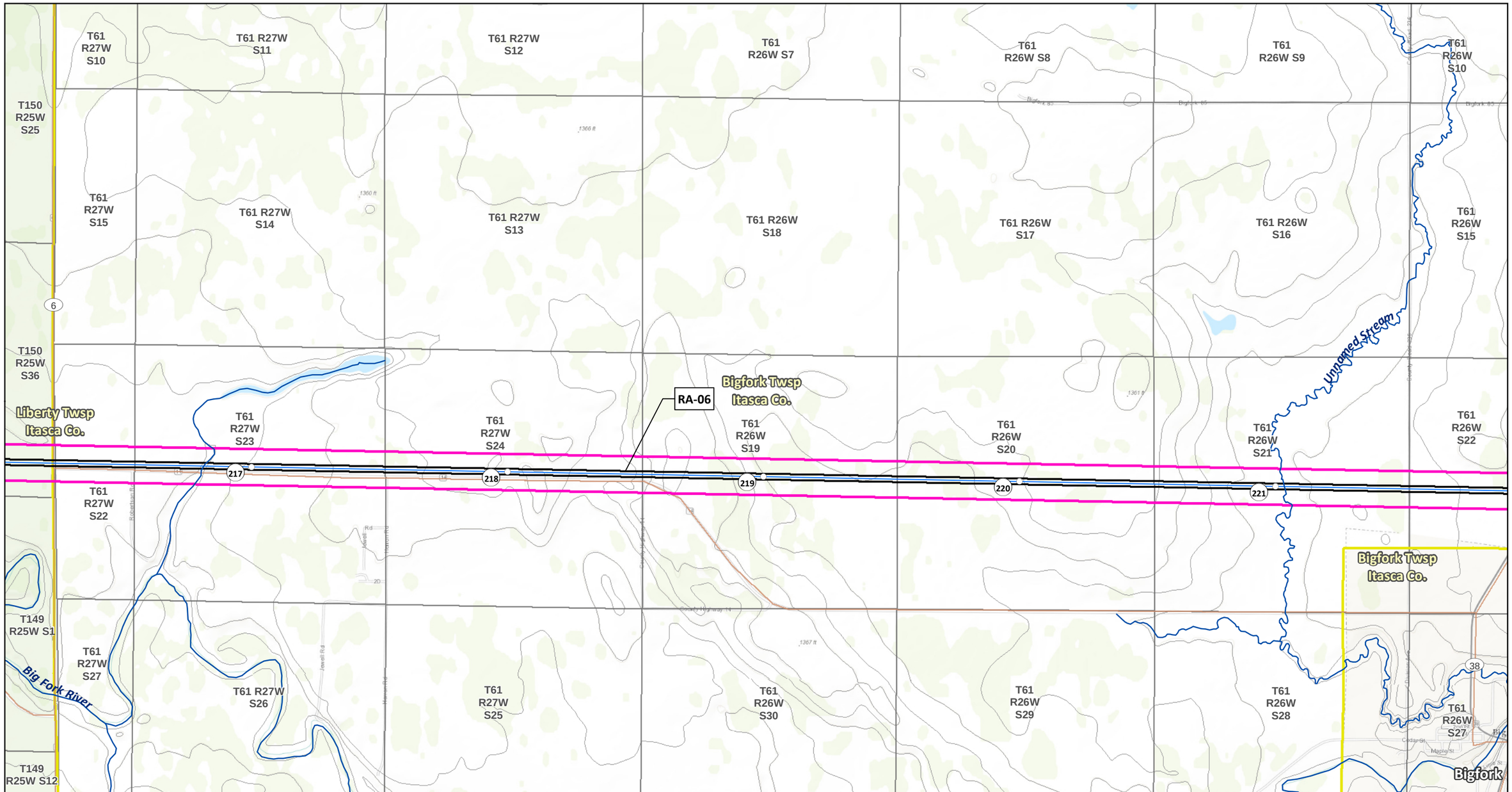

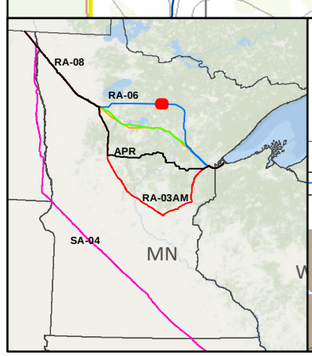

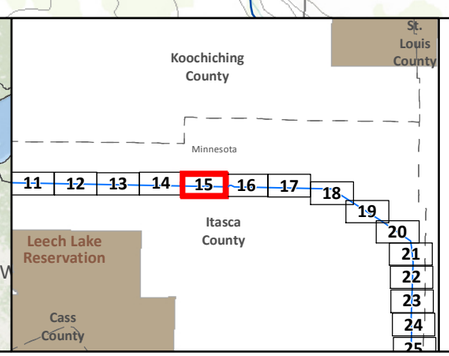

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 15B of 43

T61 R26W S10
T61 R26W S11
T61 R26W S12
T61 R25W S7
T61 R25W S8
T61 R25W S9
T61 R25W S10
Connors Lake
T61 R26W S14
T61 R26W S13
T61 R25W S18
T61 R25W S17
T61 R25W S16
T61 R25W S15
T61 R26W S15
38
Rice Creek
Bigfork Twsp
Itasca Co.
T61 R26W S24
RA-06
Northeast
Itasca Twsp
Itasca Co.
Coon Creek
T61 R25W S19
T61 R25W S20
T61 R25W S21
T61 R25W S22
222
223
224
225
226
227
T61 R26W S23
T61 R26W S22
George
Washington
State Forest
T61 R26W S27
Big Fork River
Unnamed Stream
T61 R26W S26
T61 R26W S25
T61 R25W S30
T61 R25W S29
T61 R25W S28
T61 R25W S27
Coon Creek South Fork
Bigfork Twsp
Itasca Co.
Rice River
Cemetery Lake

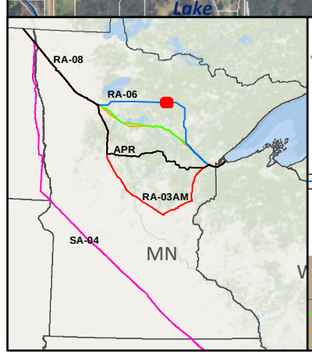

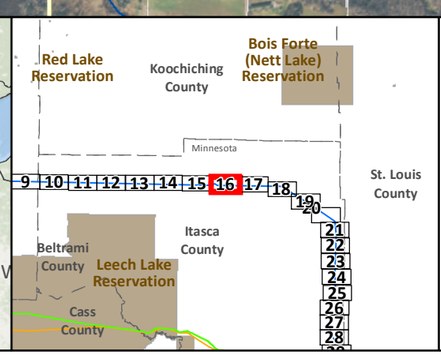

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 16A of 43

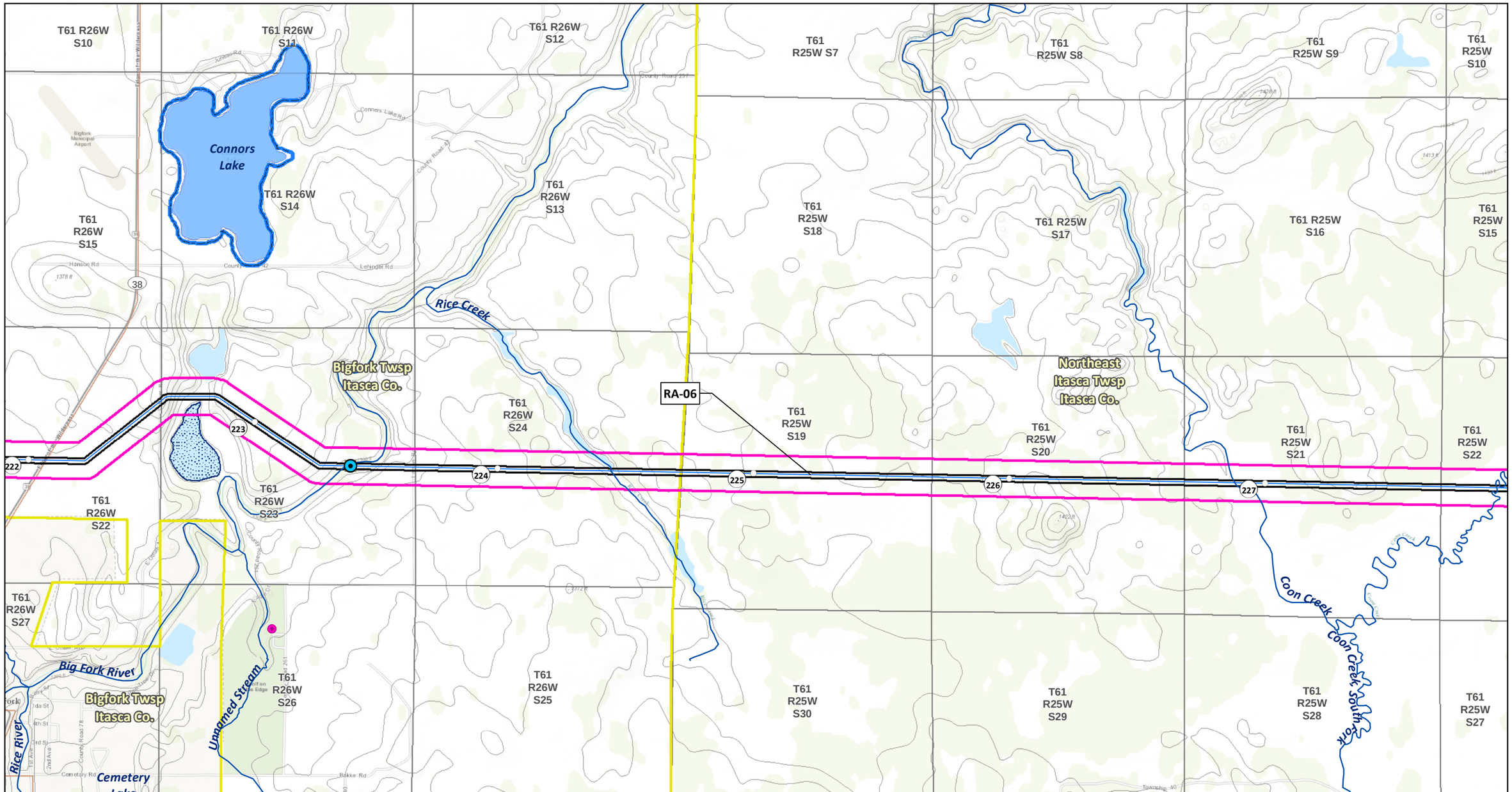

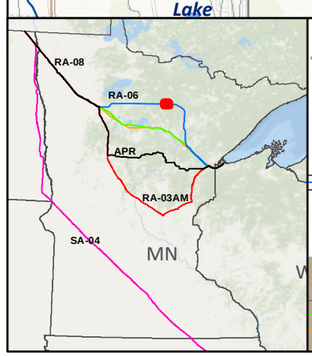

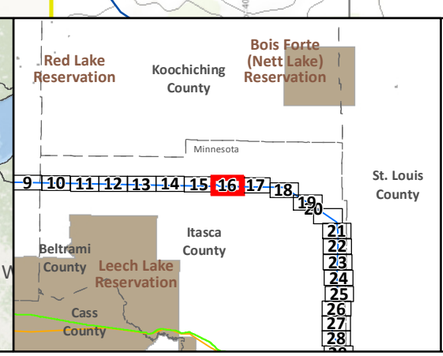

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 16B of 43

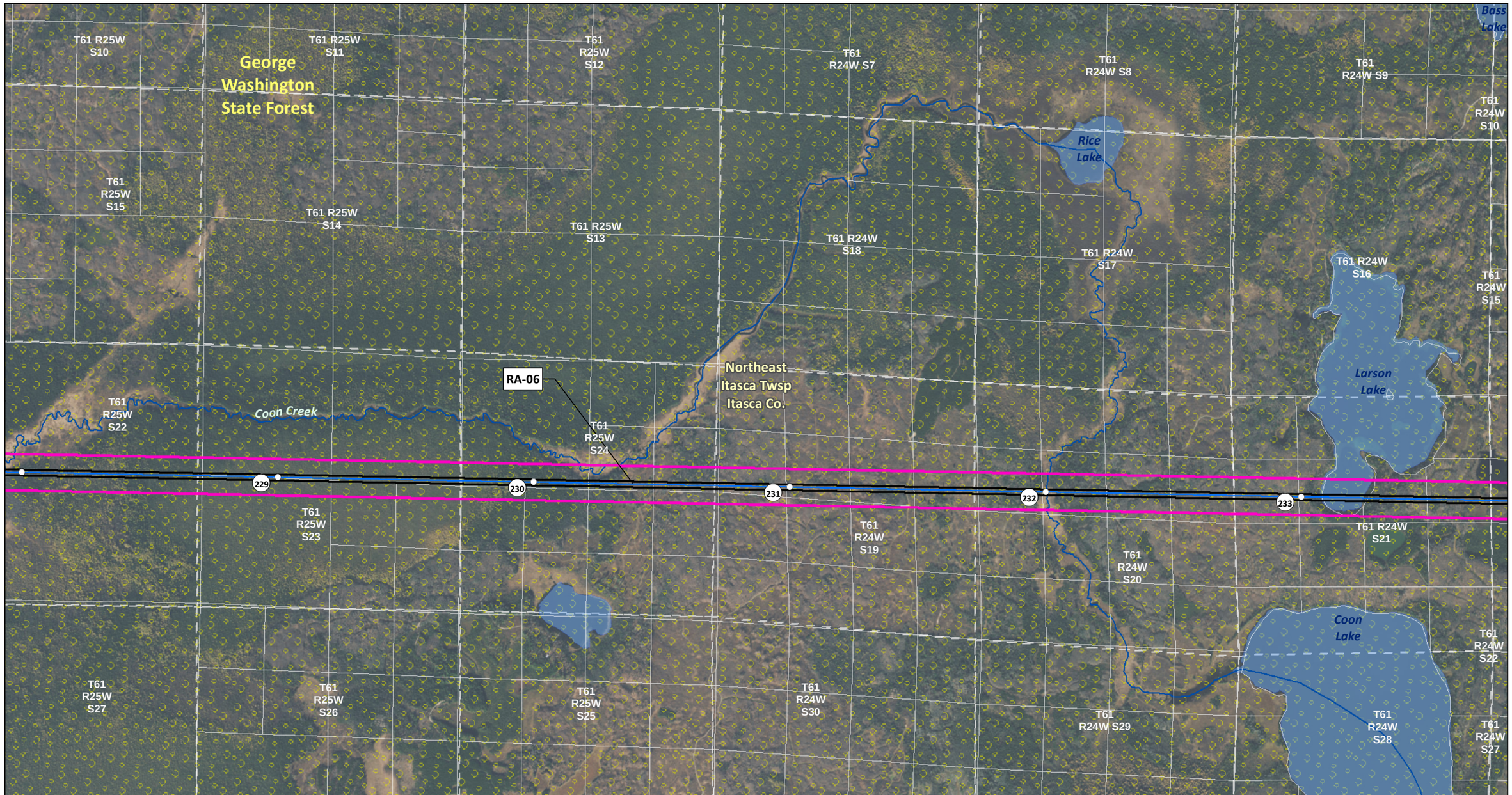

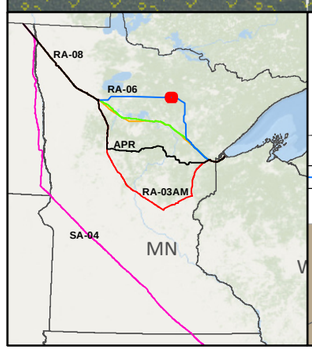

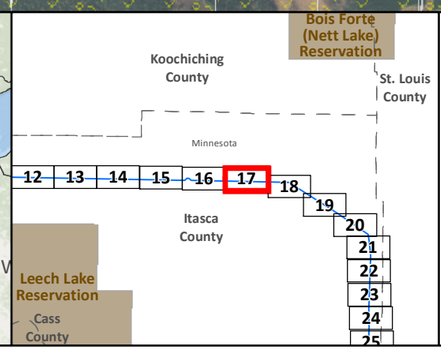

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 17A of 43

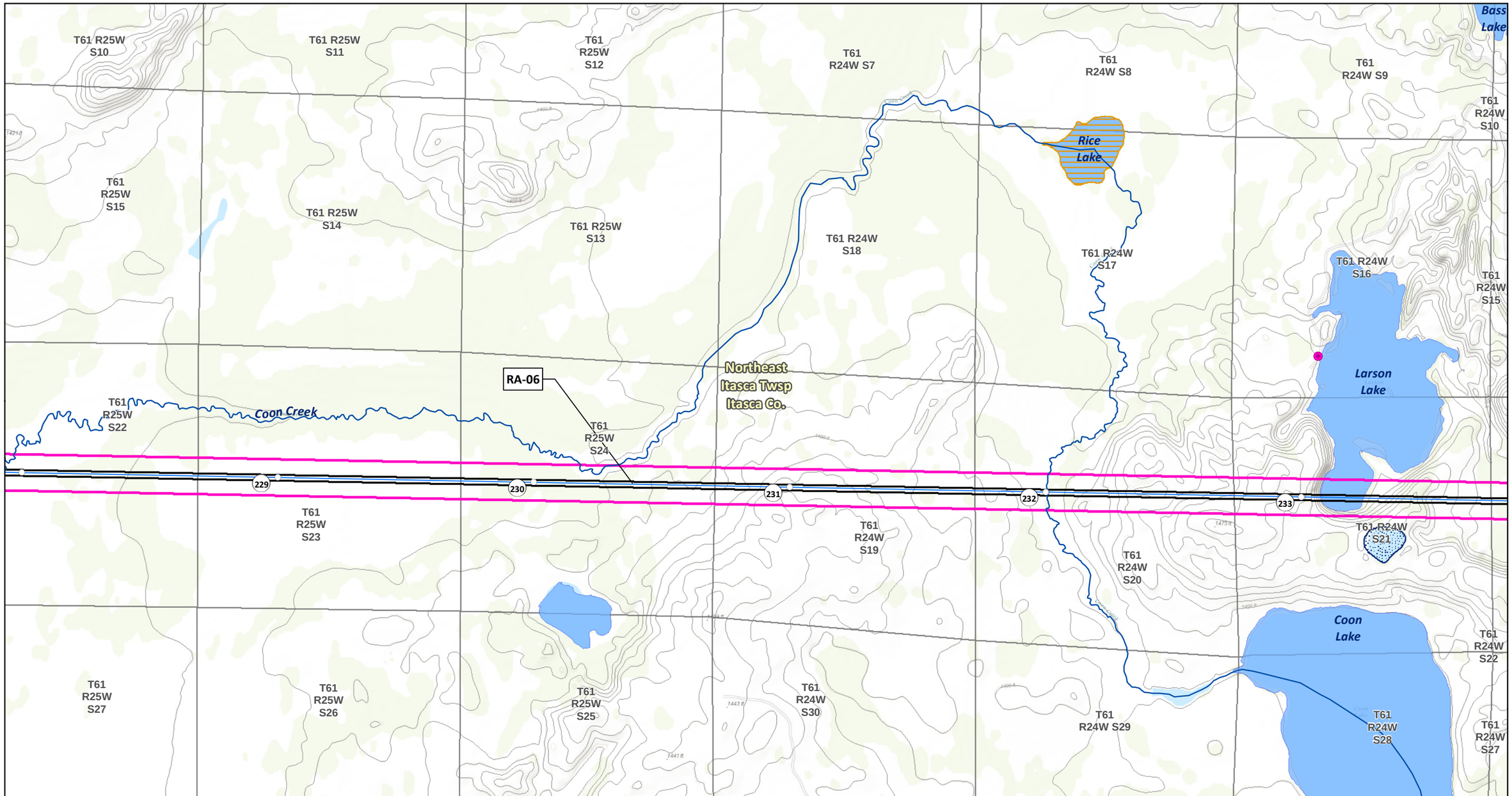

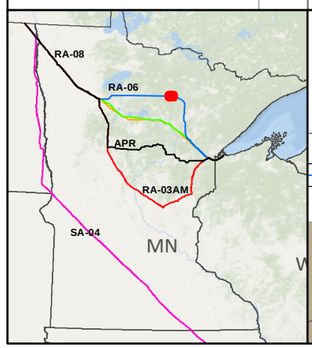

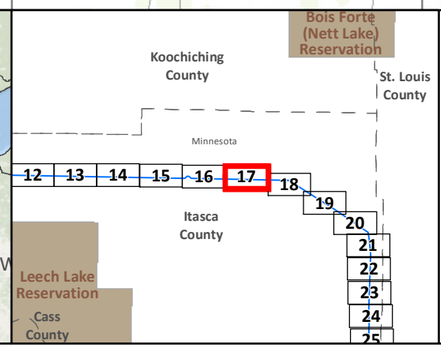

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 17B of 43

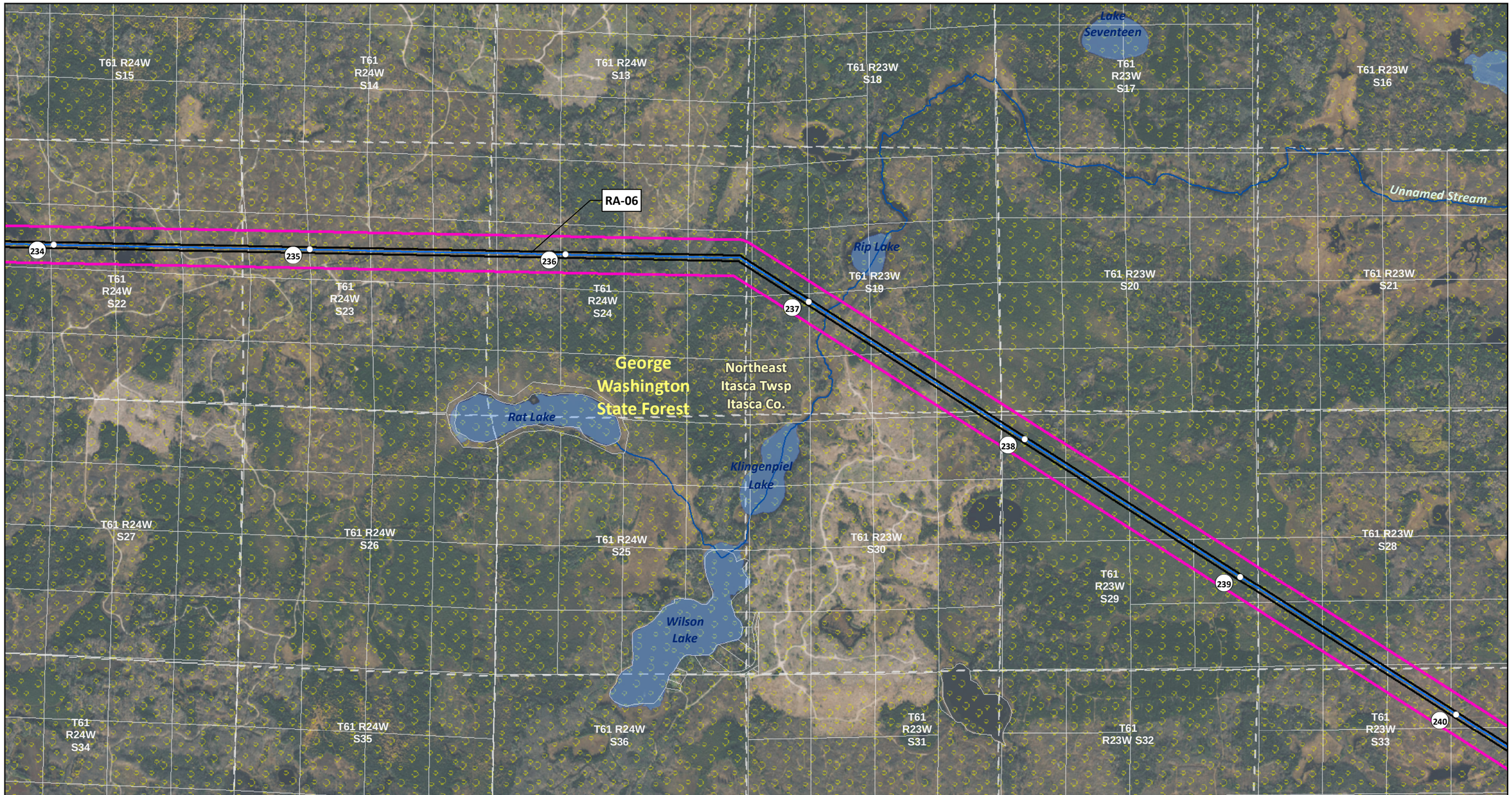

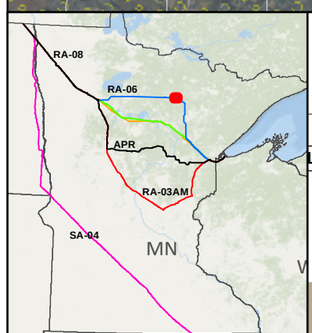

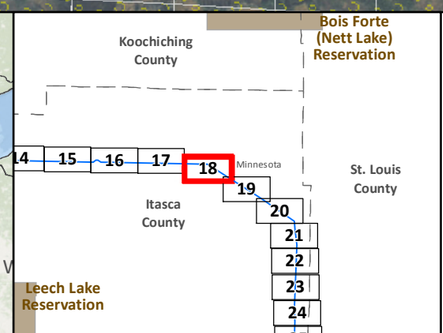

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 18A of 43

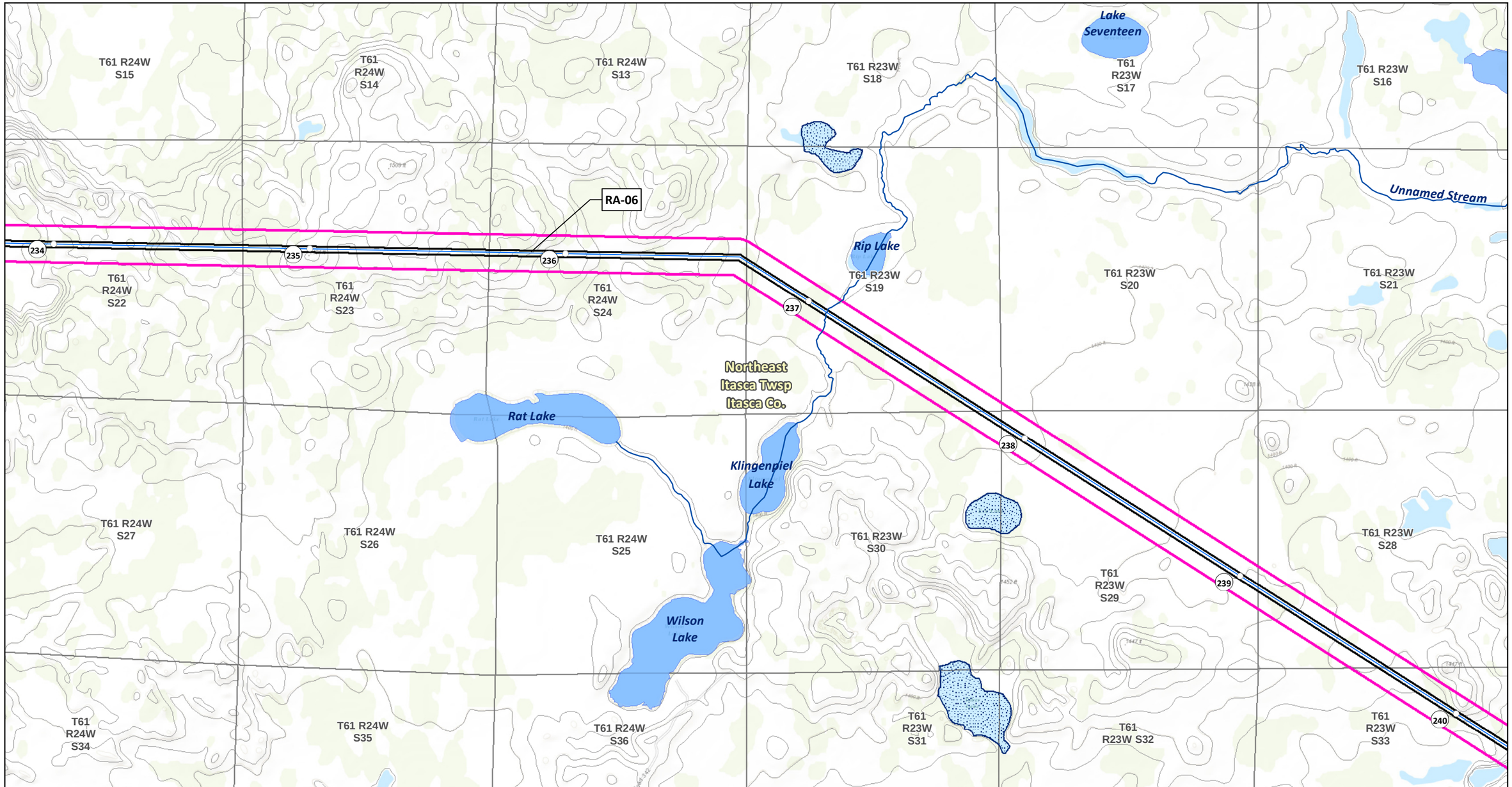

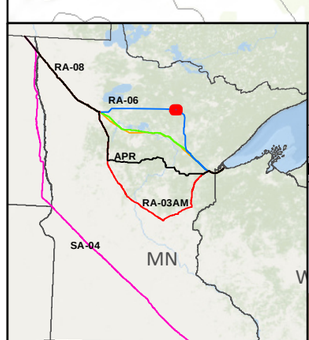

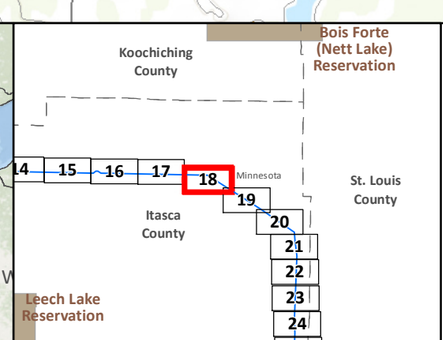

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 18B of 43

T61 R23W S29
T61 R23W S28
T61 R23W S27
T61 R23W S26
T61 R23W S25
T61 R22W S30
T61 R22W S29
T61 R23W S32
T61 R23W S33
T61 R23W S34
T61 R23W S35
T61 R23W S36
T61 R22W S31
T61 R22W S32
240
241
242
243
244
245
Unnamed Stream
RA-06
George Washington State Forest
Northeast Itasca Twsp Itasca Co.
Bearville Twsp Itasca Co.
65
T60 R23W S5
T60 R23W S4
T60 R23W S3
T60 R23W S2
T60 R23W S1
T60 R22W S6
Bear River
Venning Creek
Little Bear Lake
T60 R23W S8
T60 R23W S9
T60 R23W S10
T60 R23W S11
T60 R23W S12
T60 R22W S7

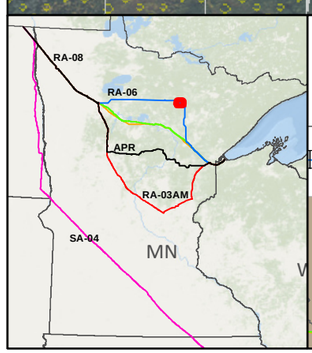

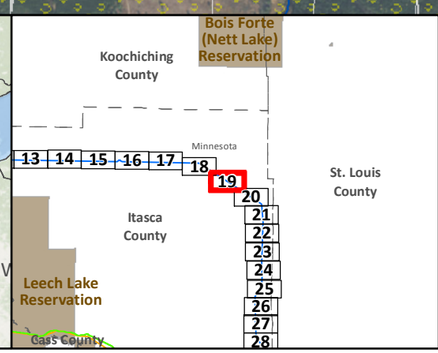

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation
Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 19A of 43

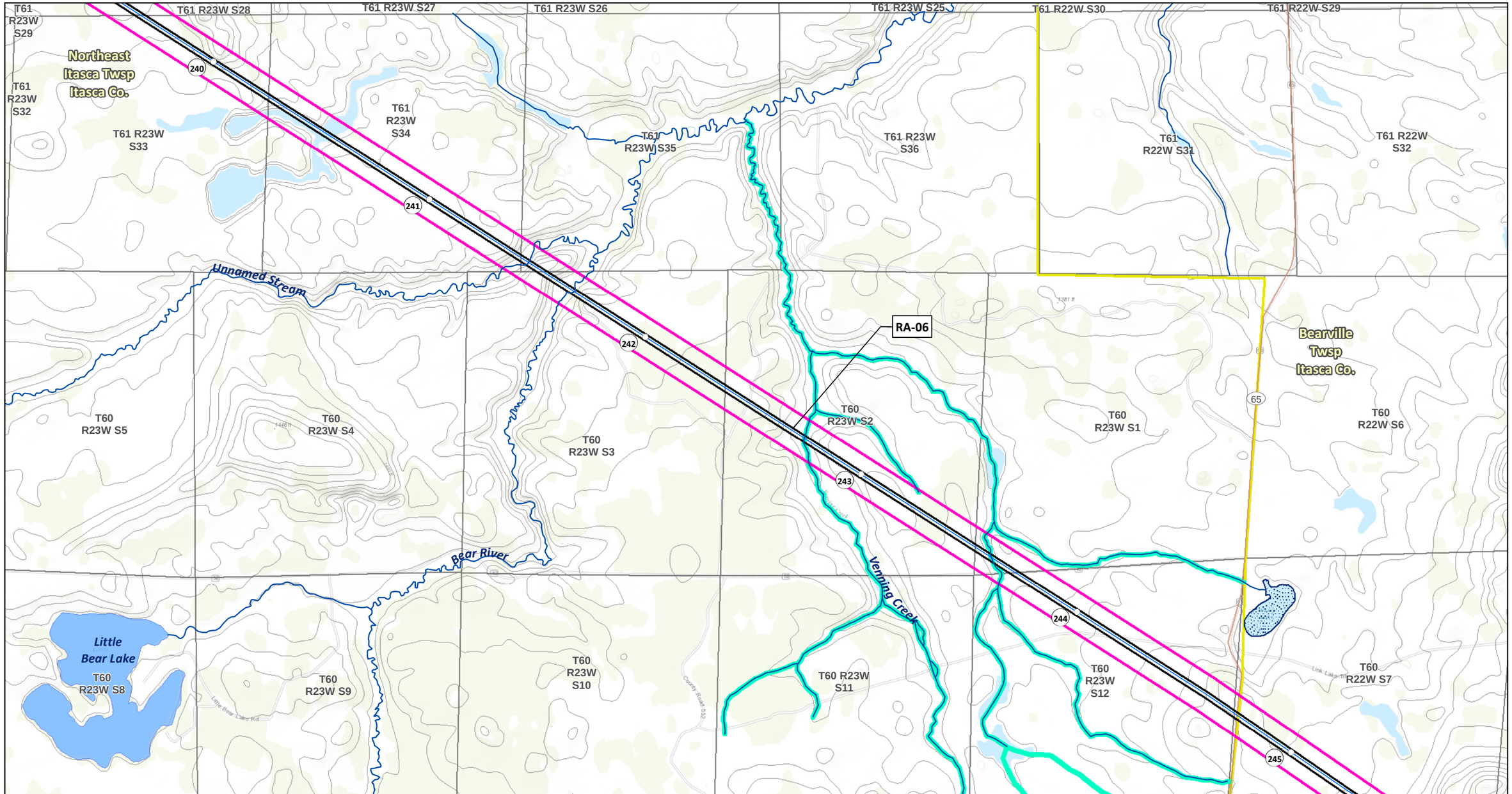

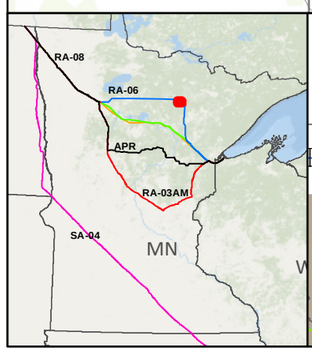

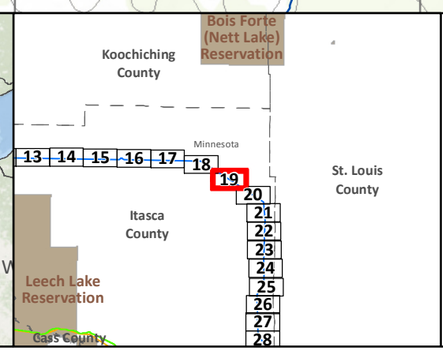

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 19B of 43

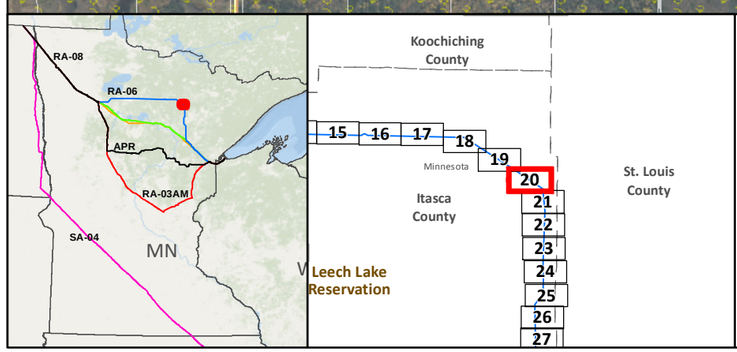

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 20A of 43

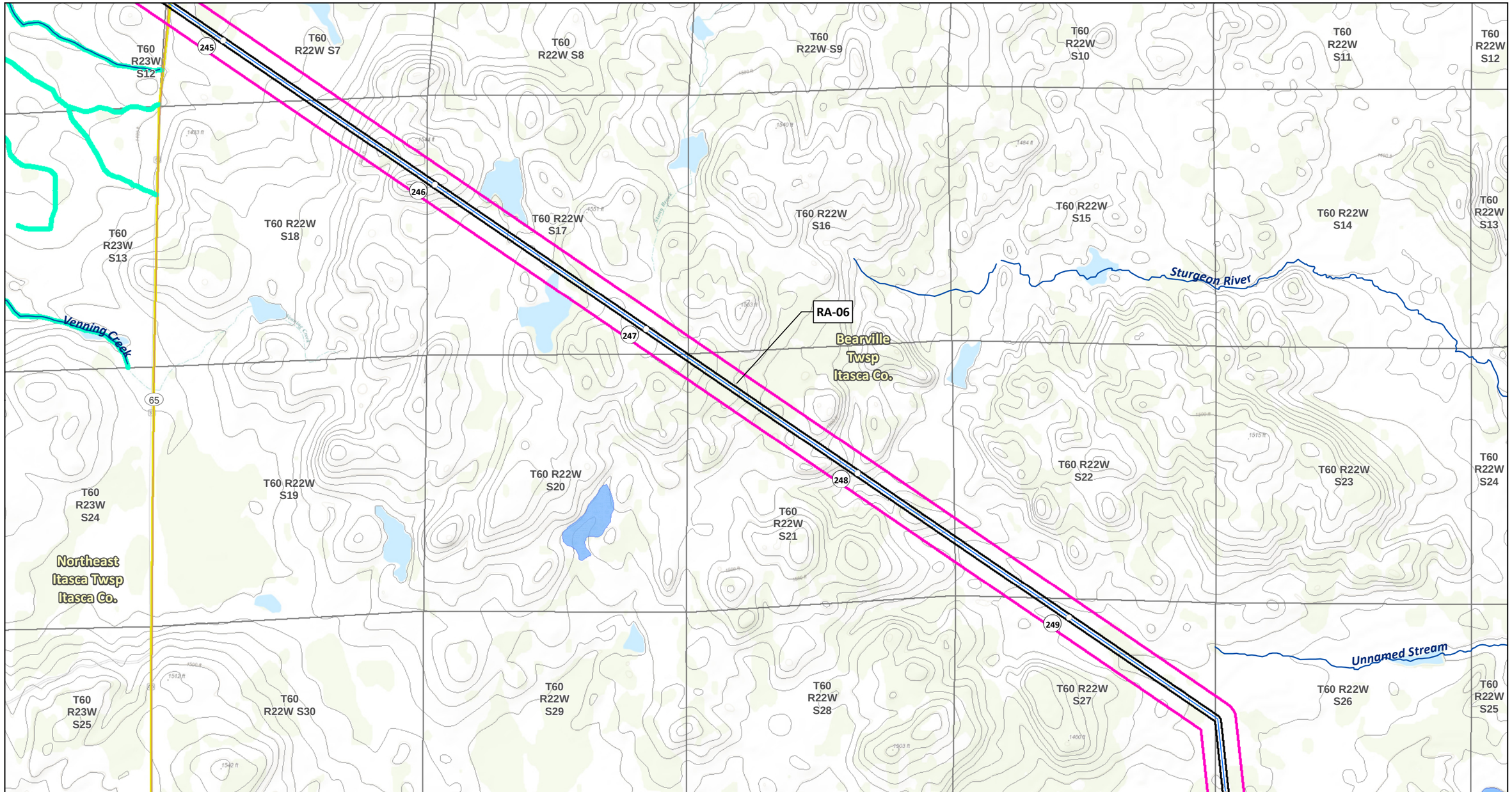

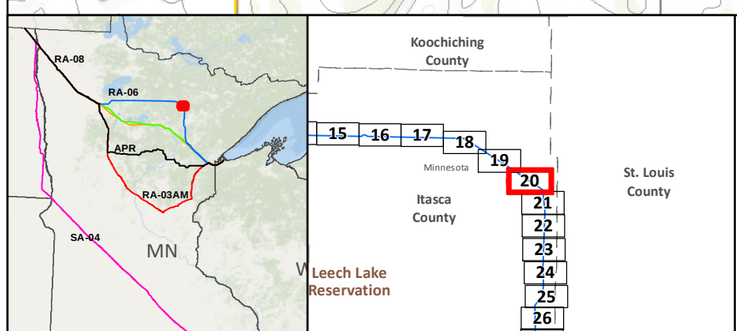

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 20B of 43

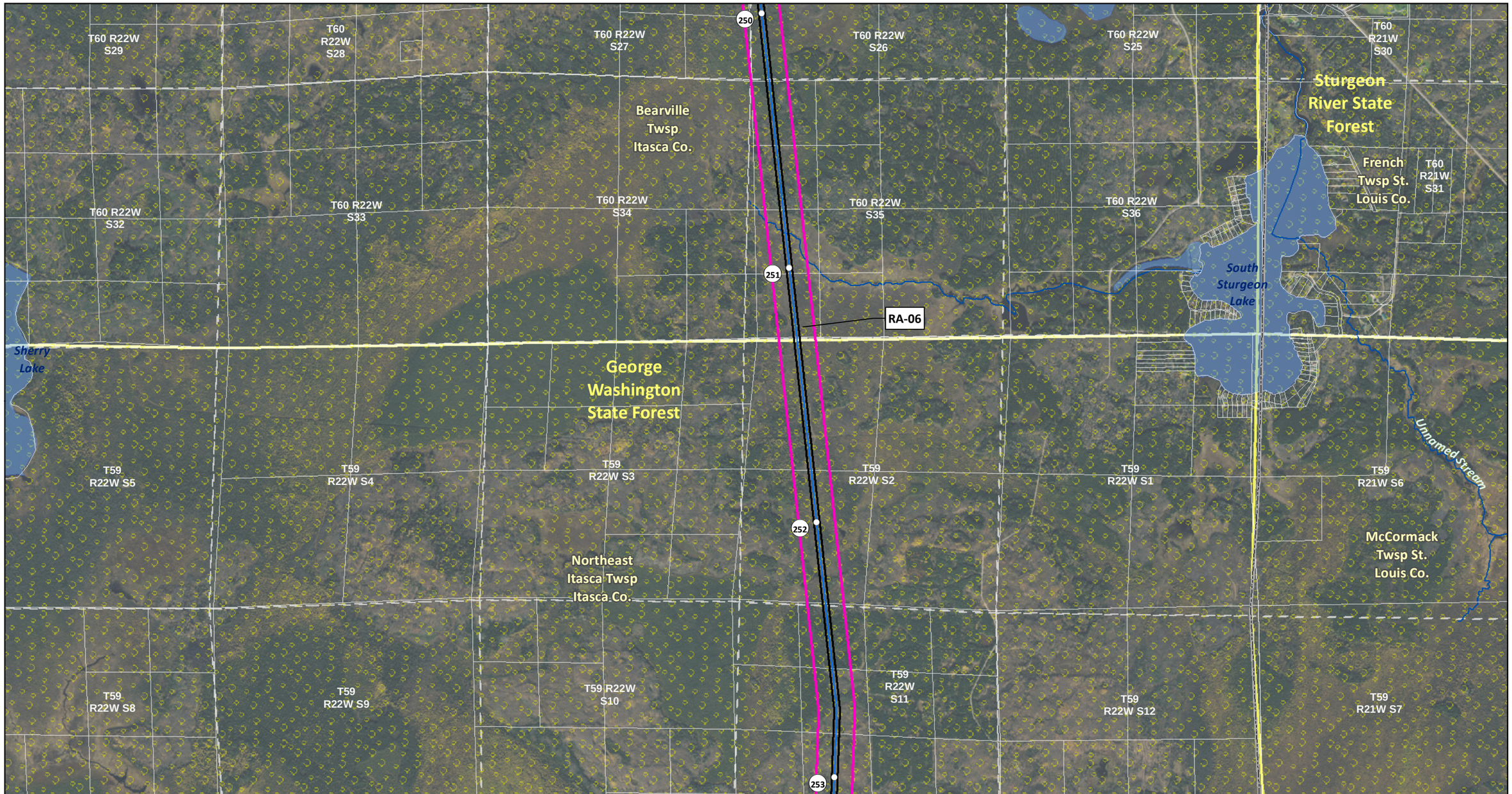

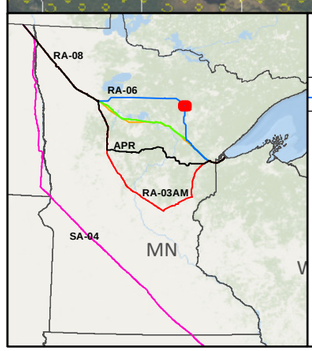

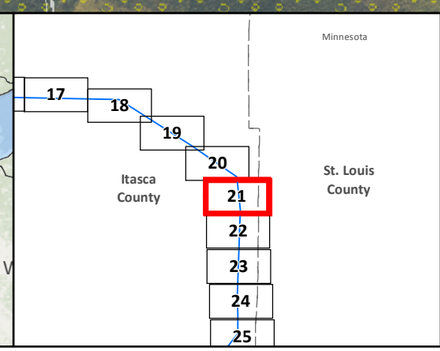

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
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- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 21A of 43

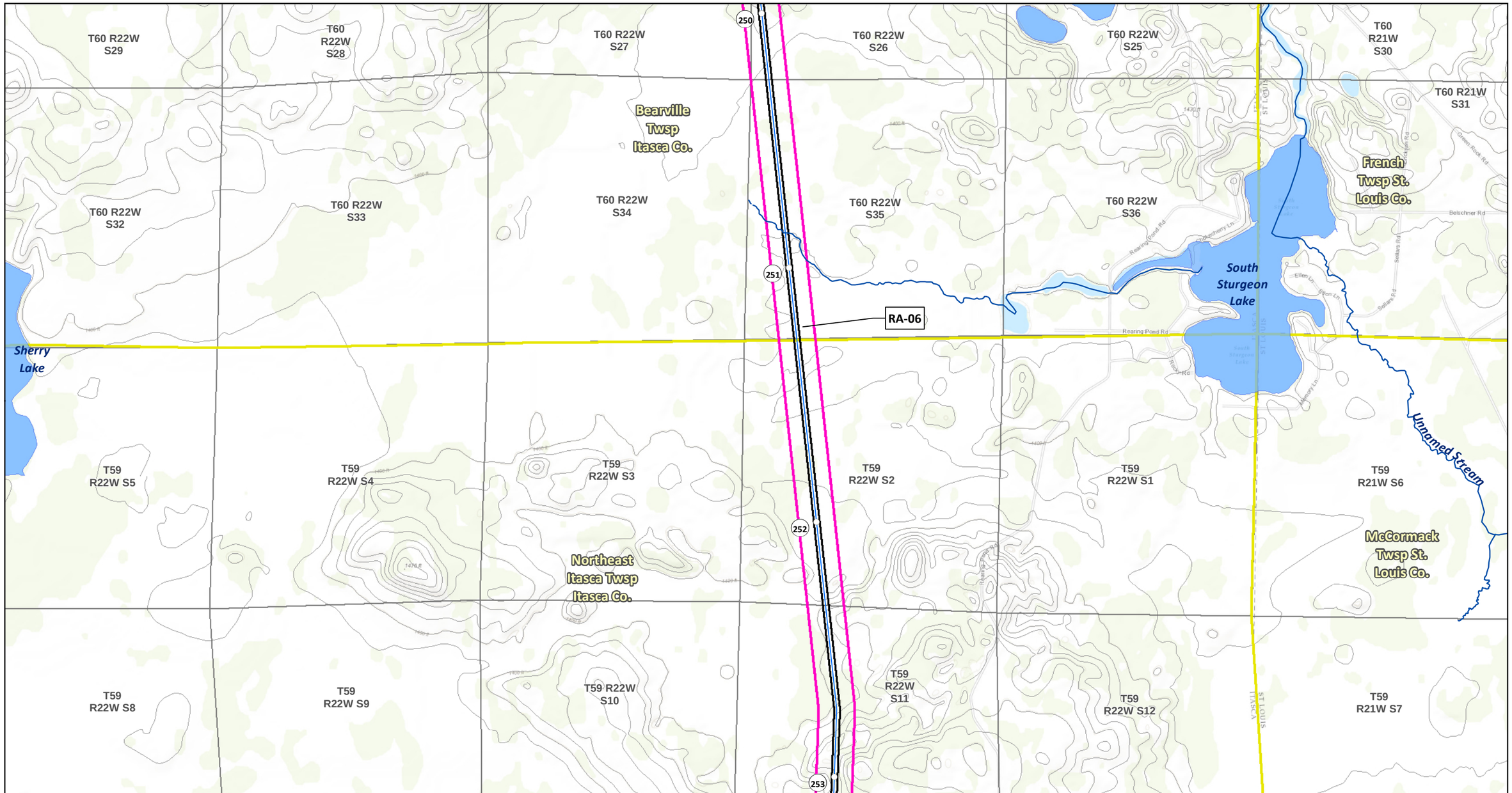

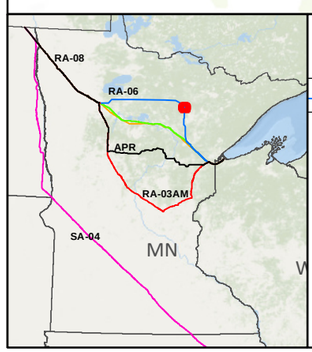

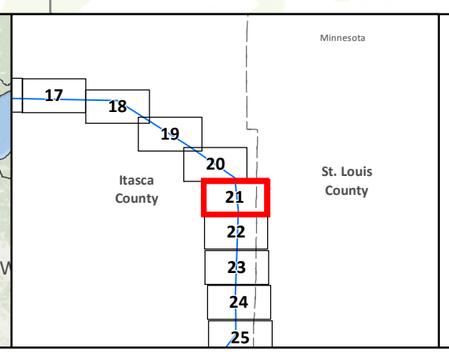

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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303d Imparied Waters
Designated Trout Stream
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Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 21B of 43

T59 R22W S8
T59 R22W S9
T59 R22W S10
T59 R22W S11
T59 R22W S12
T59 R21W S7
T59 R21W S8
Northeast Itasca Twsp Itasca Co.
Prairie River
Unnamed Stream
Stingy Lake
T59 R22W S15
T59 R22W S16
T59 R22W S17
T59 R22W S14
T59 R22W S13
Sturgeon River State Forest
T59 R21W S17
T59 R21W S18
Bower Lake
254
RA-06
George Washington State Forest
McCormack Twsp St. Louis Co.
T59 R22W S20
T59 R22W S21
T59 R22W S22
T59 R22W S23
T59 R22W S24
T59 R21W S20
T59 R21W S19
255
Lake Twentyfour
Gansey Lake
T59 R22W S29
T59 R22W S28
T59 R22W S27
T59 R22W S26
T59 R22W S25
T59 R21W S30
T59 R21W S29
256
Stuart Lake
Day Brook

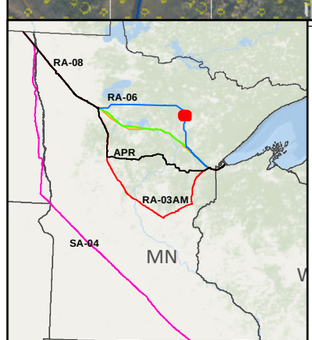

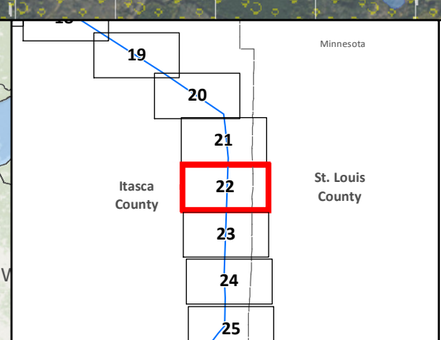

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
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Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
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Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 22A of 43

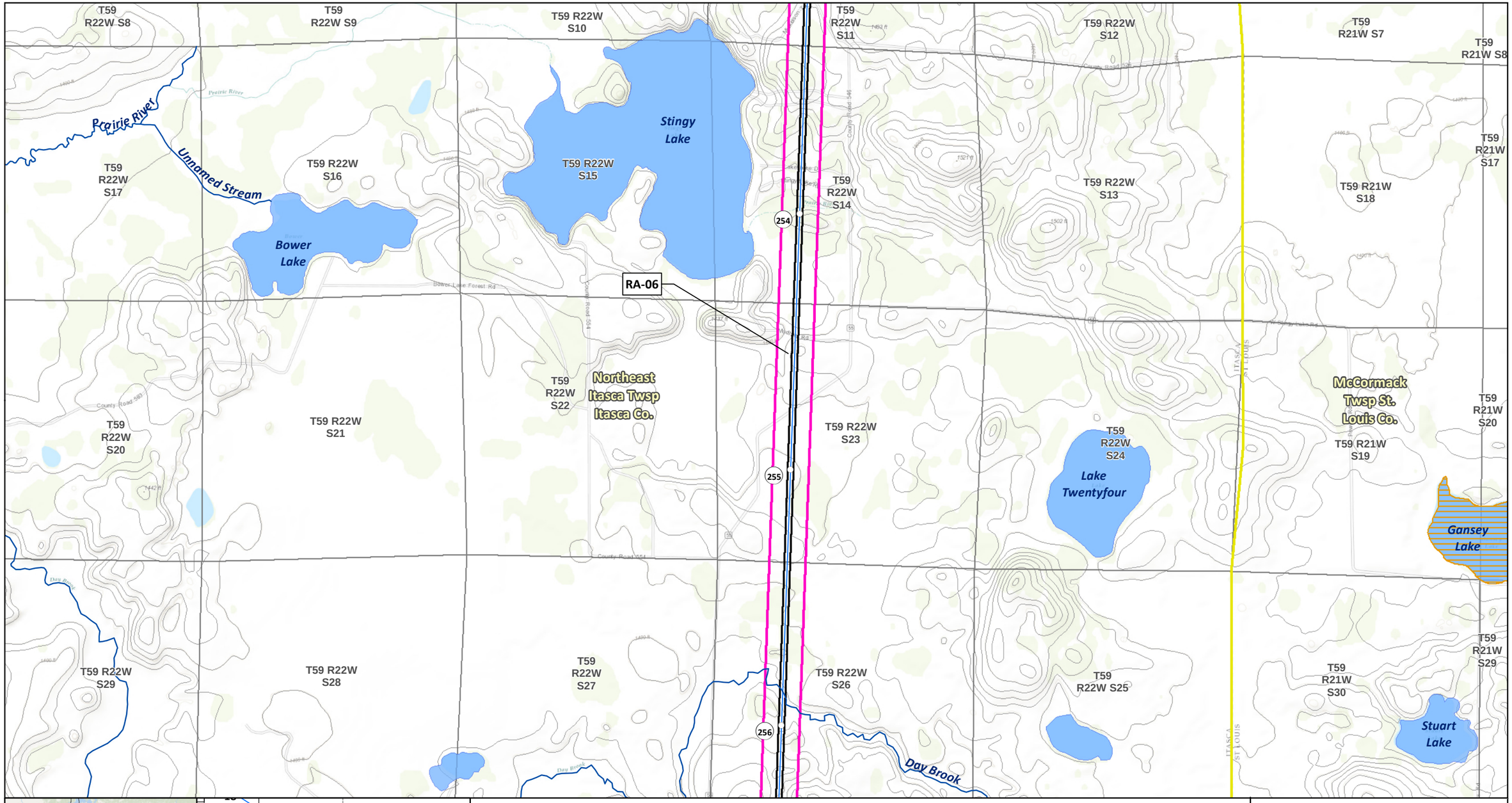

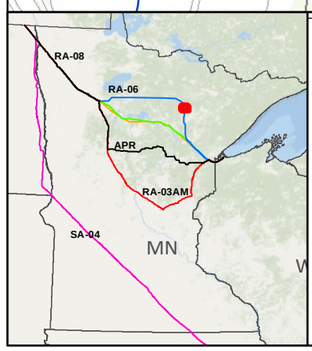

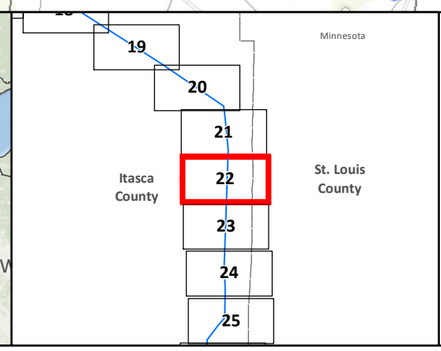

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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Public Drinking Water Supply
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Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 22B of 43

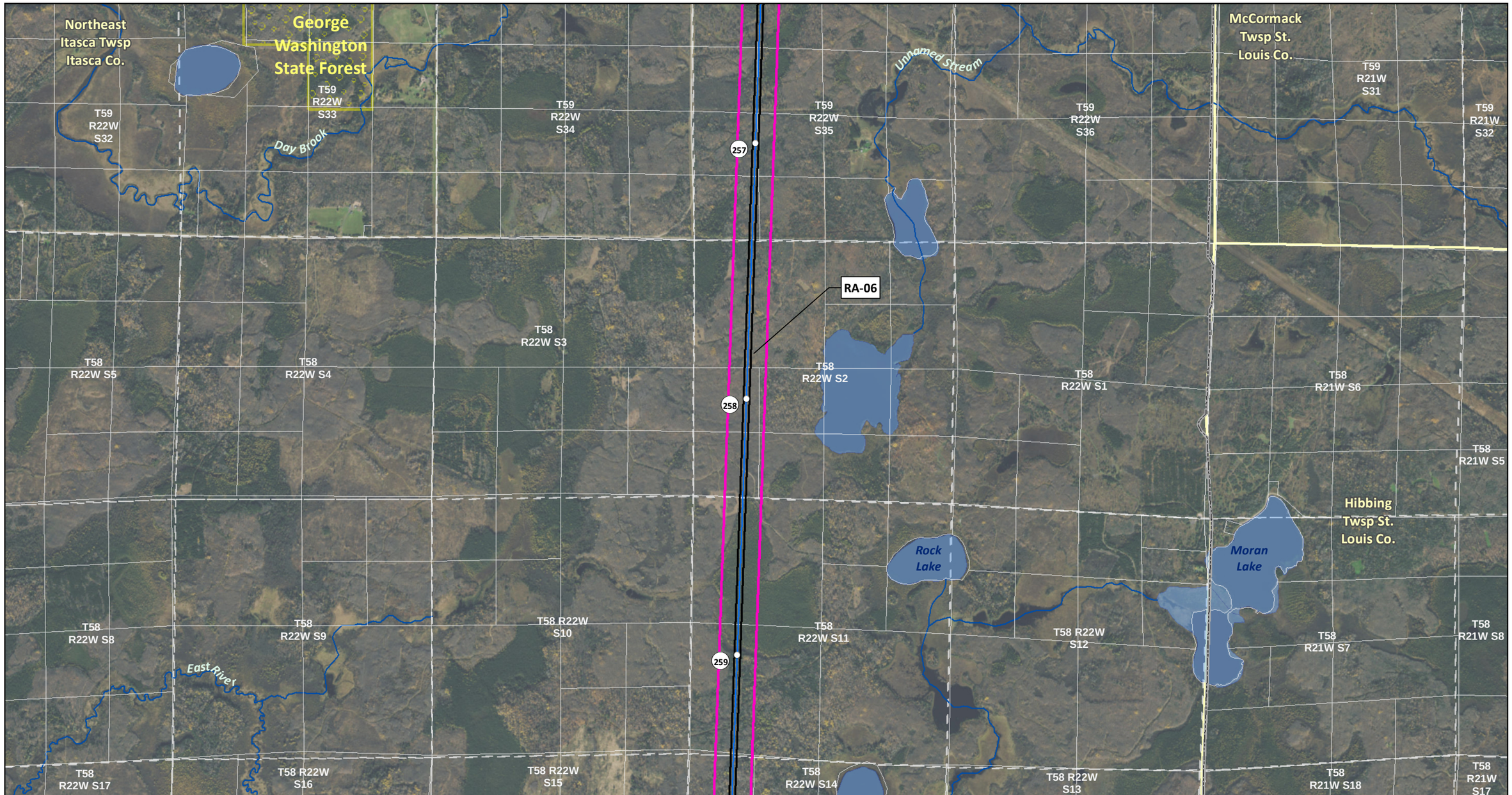

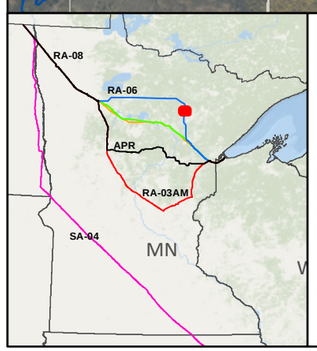

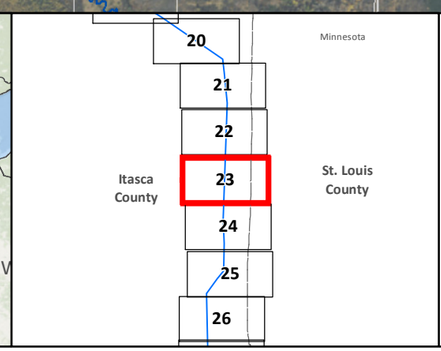

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Tribal Trust Land

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 23A of 43

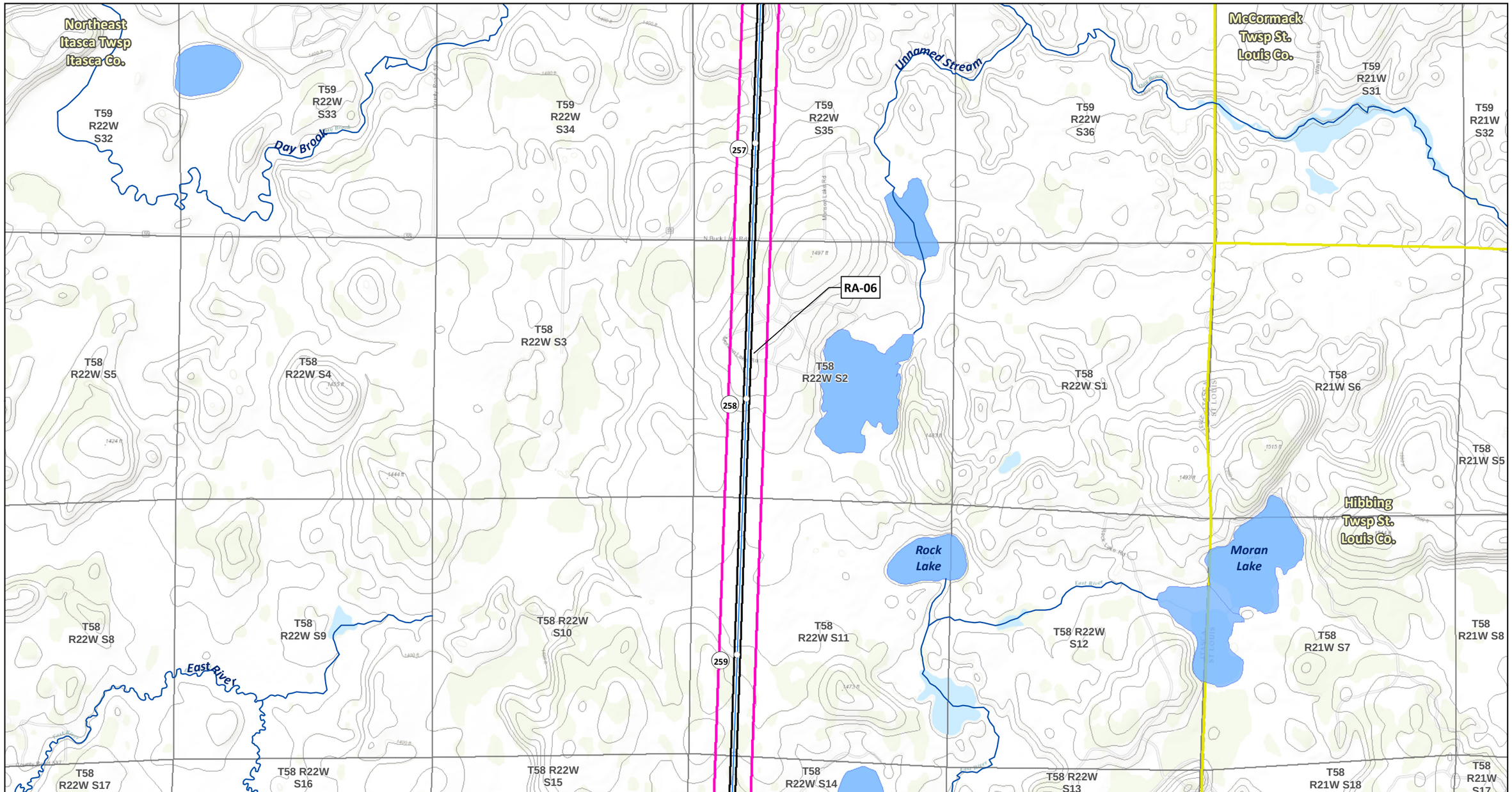

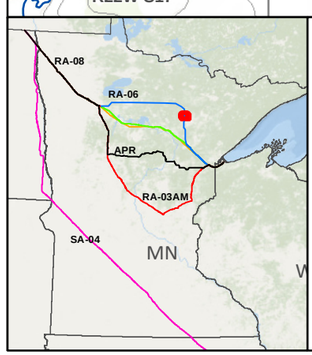

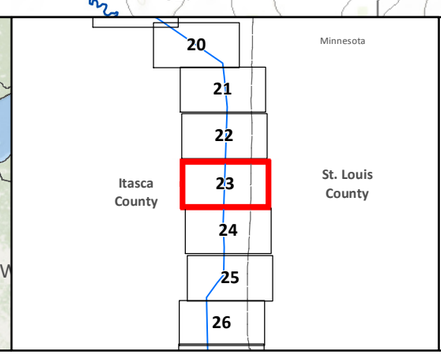

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 23B of 43

T58 R22W S17
T58 R22W S16
T58 R22W S15
260
T58 R22W S14
T58 R22W S13
T58 R21W S18
T58 R21W S17
Long Lake
East River
Johnson Lake
Rock Creek
T58 R22W S23
T58 R22W S20
T58 R22W S21
T58 R22W S22
Horsehead Lake
261
T58 R22W S24
T58 R21W S19
T58 R21W S20
RA-06
Northeast Itasca Twsp Itasca Co.
Libby Lake
Hibbing Twsp St. Louis Co.
Shafer Lake
T58 R22W S29
T58 R22W S28
T58 R22W S27
T58 R22W S26
T58 R22W S25
T58 R21W S30
T58 R21W S29
262
Deer Creek
T58 R22W S32
T58 R22W S33
Unnamed Stream
T58 R22W S34
T58 R22W S35
T58 R22W S36
T58 R21W S31
T58 R21W S32

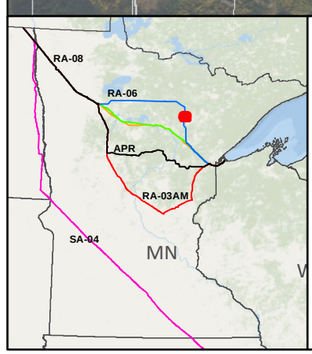

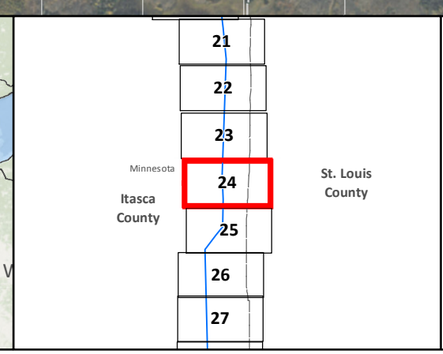

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

N

Map 24A of 43

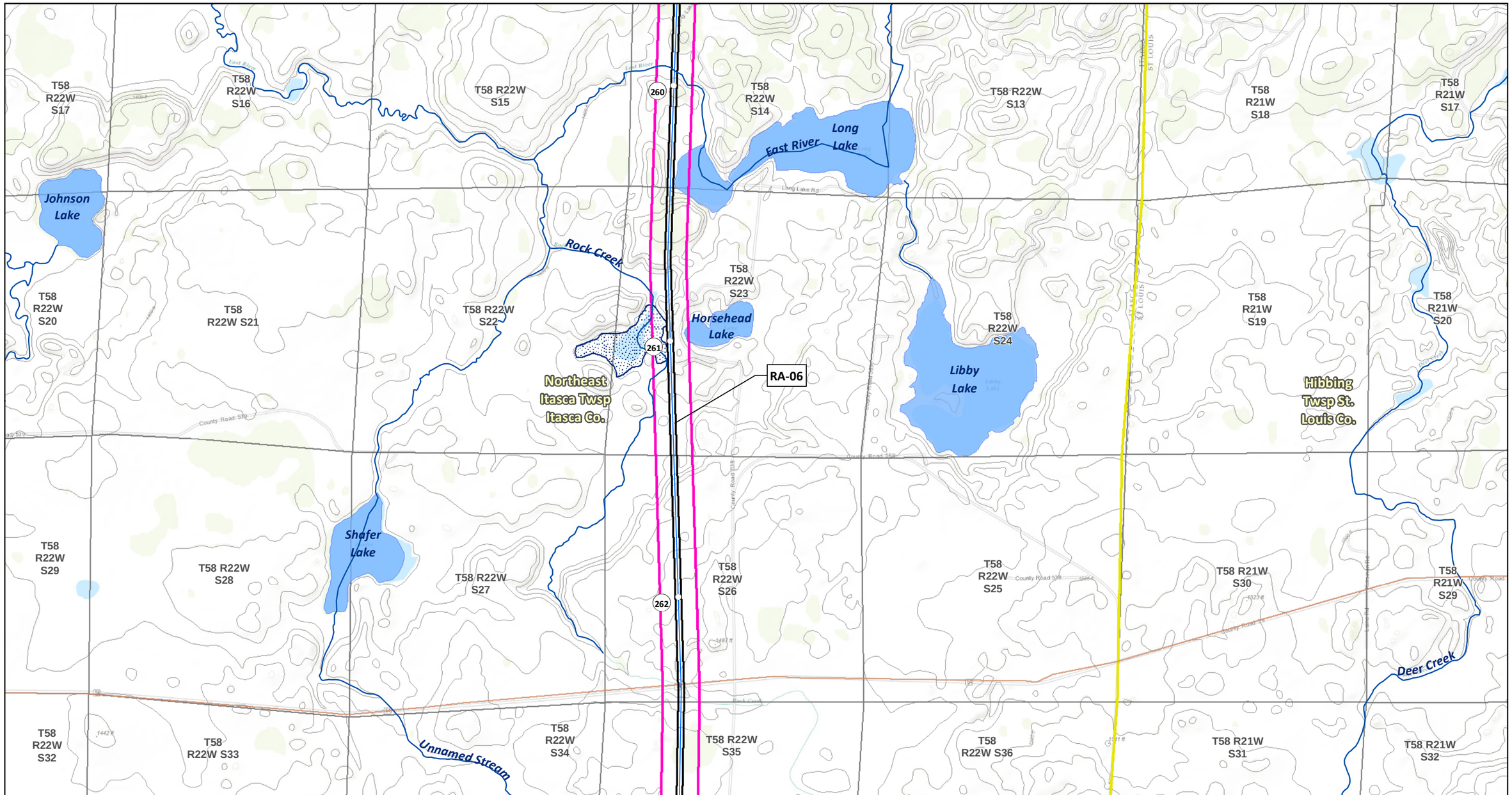

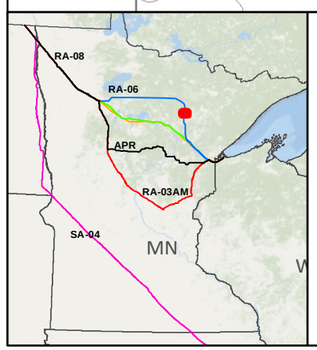

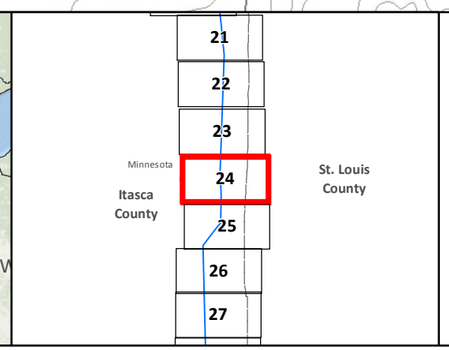

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 24B of 43

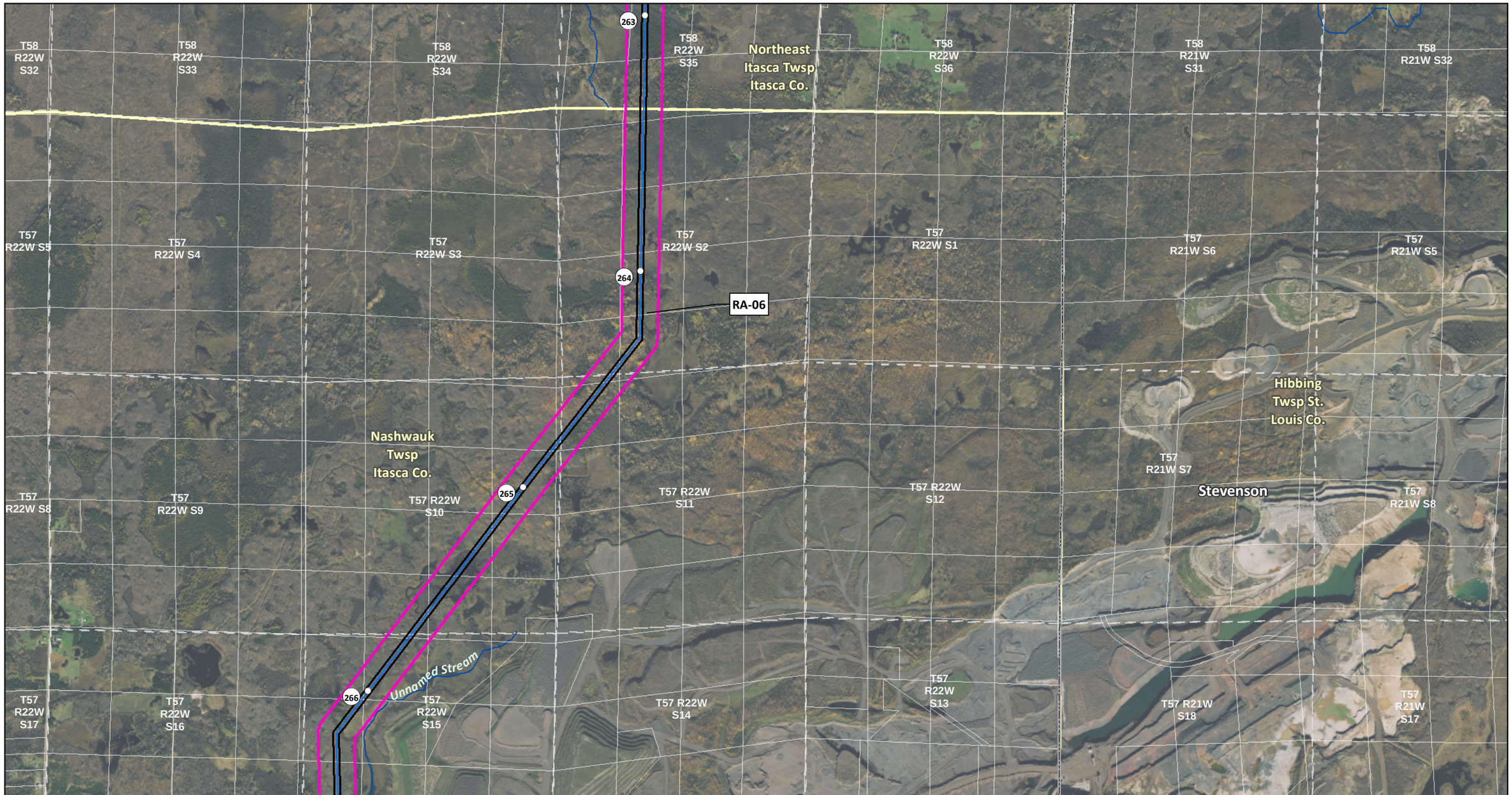

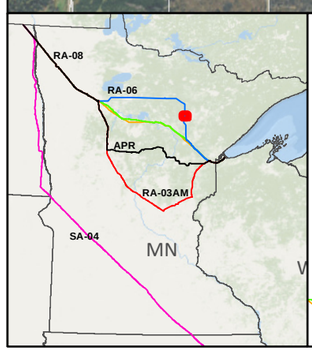

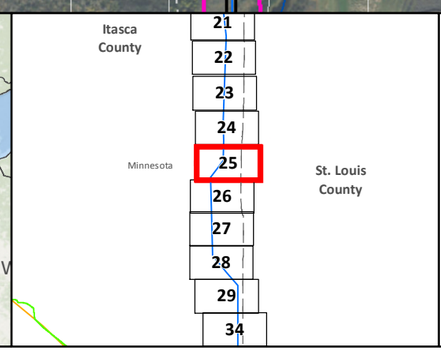

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 25A of 43

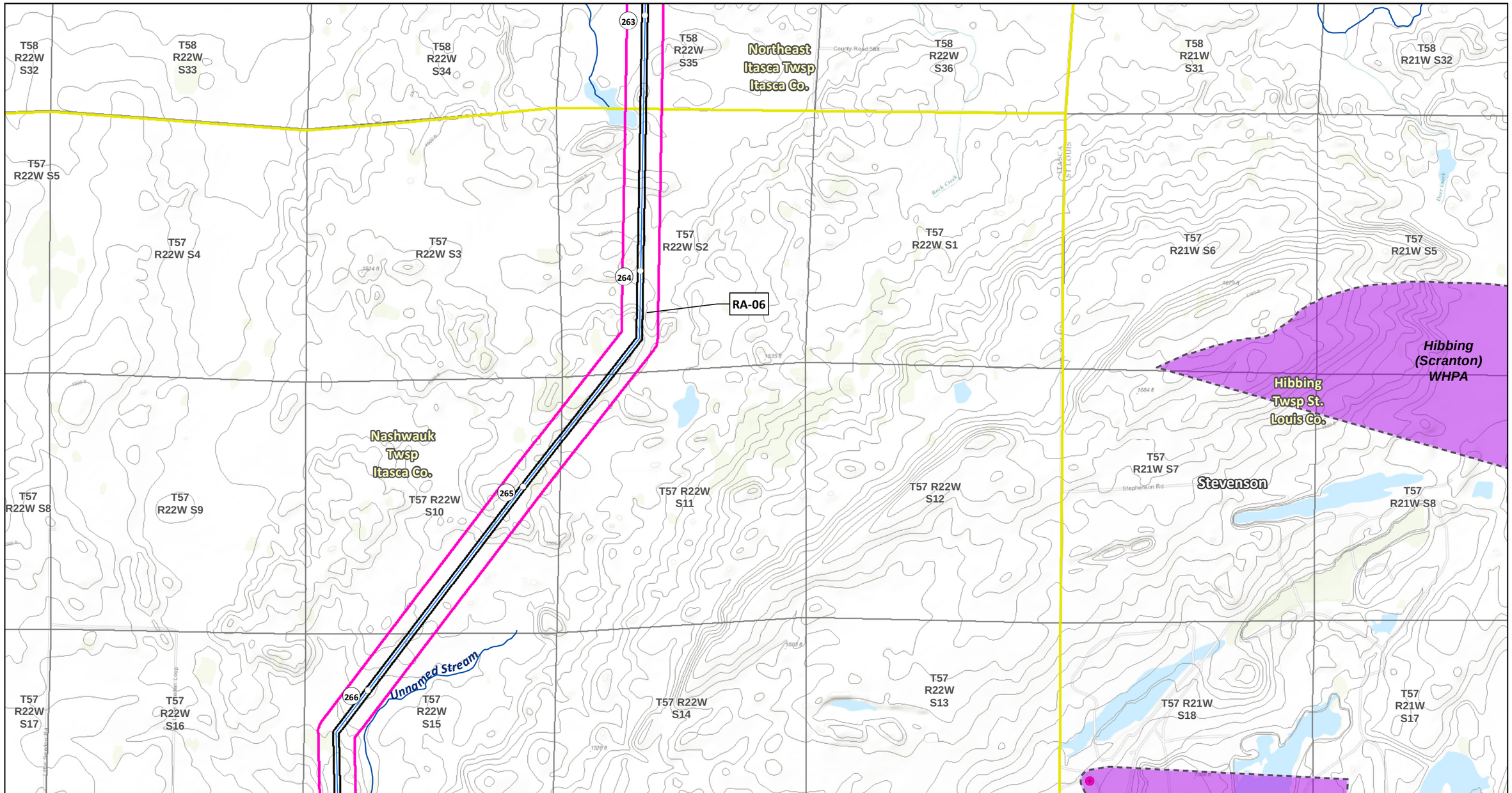

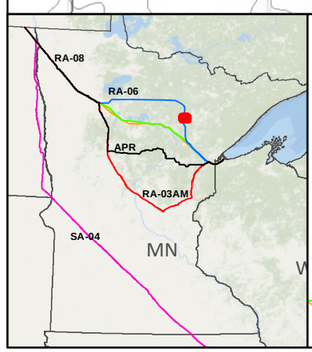

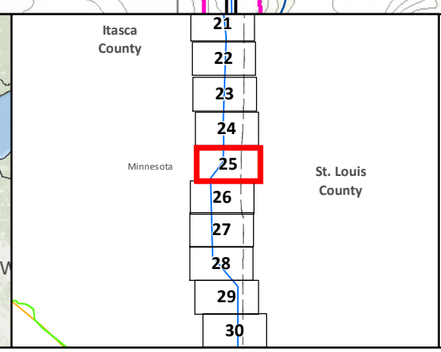

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
10ft Contours
0 125 250 500 Meters

N

Map 25B of 43

T57 R22W S17
T57 R22W S16
T57 R22W S15
T57 R22W S14
T57 R22W S13
T57 R21W S18
T57 R21W S17
Nashwauk Twsp Itasca Co.
267
T57 R22W S20
T57 R22W S21
T57 R22W S22
T57 R22W S23
Keewatin Twsp Itasca Co.
T57 R22W S24
T57 R21W S19
T57 R21W S20
RA-06
Keewatin
Hibbing Twsp St. Louis Co.
268
T57 R22W S29
T57 R22W S28
T57 R22W S27
T57 R22W S26
T57 R22W S25
T57 R21W S30
T57 R21W S29
Nashwauk Twsp Itasca Co.
169
65
Unnamed Stream
T57 R22W S32
269
Nashwauk
T57 R22W S33
T57 R22W S34
T57 R22W S35
T57 R22W S36
T57 R21W S31
T57 R21W S32

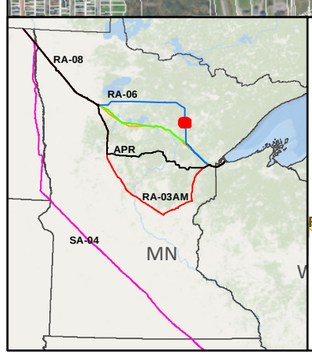

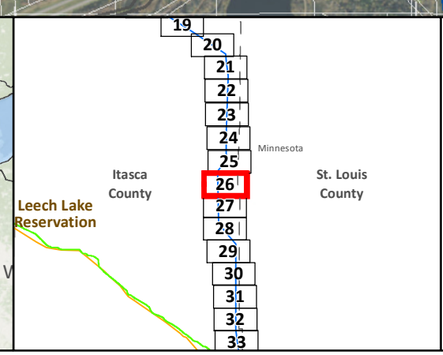

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 26A of 43

T57 R22W S17
T57 R22W S16
T57 R22W S15
T57 R22W S14
T57 R22W S13
T57 R21W S18
T57 R21W S17
Nashwauk Twsp Itasca Co.
267
Keetac WHPA
T57 R21W S19
T57 R21W S20
T57 R22W S20
T57 R22W S21
T57 R22W S22
T57 R22W S23
T57 R22W S24
Keewatin Twsp Itasca Co.
RA-06
Keewatin
Keewatin WHPA
Hibbing Twsp St. Louis Co.
268
T57 R22W S29
T57 R22W S28
T57 R22W S27
T57 R22W S26
T57 R22W S25
T57 R21W S30
T57 R21W S29
Nashwauk WHPA
Nashwauk Twsp Itasca Co.
169
65
Unnamed Stream
T57 R22W S32
T57 R21W S32
Nashwauk
269
T57 R22W S33
T57 R22W S34
T57 R22W S35
T57 R22W S36
T57 R21W S31

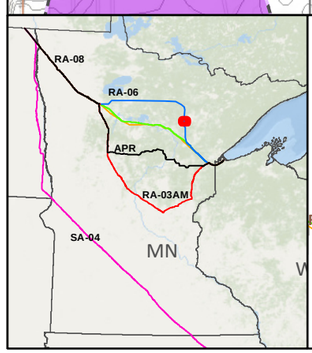

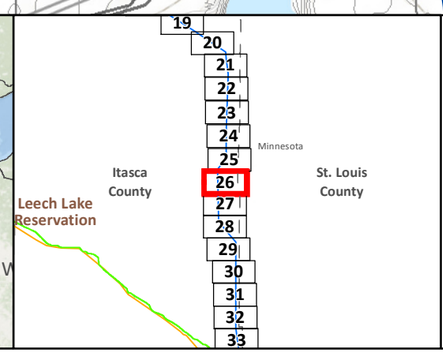

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 26B of 43

Nashwauk Twsp
Itasca Co.

T57 R22W S32

T57 R22W S33

T57 R22W S34

T57 R22W S35

T57 R22W S36

T57 R21W S31

T57 R21W S32

65

169

270

Unnamed Stream

Reservoir Two

Reservoir Number Six

T56 R22W S5

T56 R22W S4

T56 R22W S3

T56 R22W S2

T56 R22W S1

T56 R21W S6

RA-06

271

Lone Pine Twsp Itasca Co.

Hibbing Twsp St. Louis Co.

T56 R22W S8

T56 R22W S9

T56 R22W S10

T56 R22W S11

T56 R22W S12

T56 R21W S7

272

T56 R22W S17

T56 R22W S16

T56 R22W S15

T56 R22W S14

T56 R22W S13

T56 R21W S18

Swan River

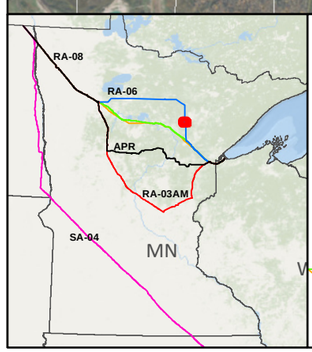

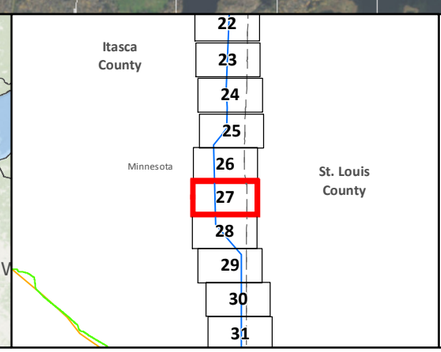

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
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- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 27A of 43

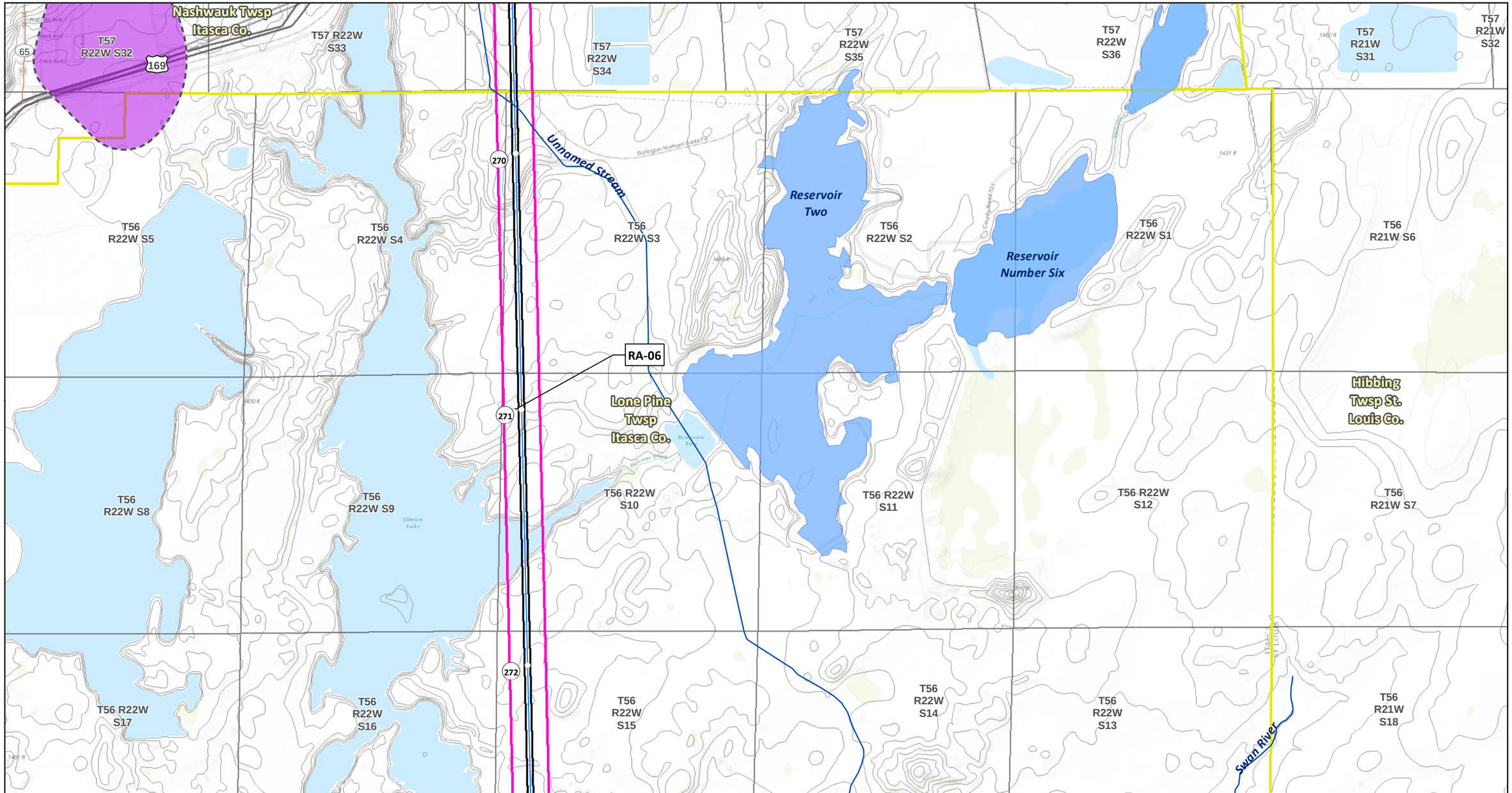

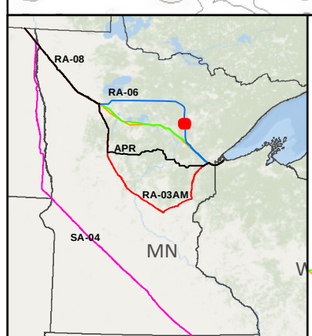

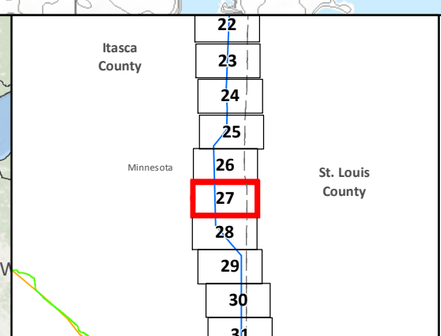

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
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Mile Post
Anticipated 120' Construction ROW
Route Width (750')

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Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 27B of 43

T56 R22W S17
T56 R22W S16
T56 R22W S15
T56 R22W S14
T56 R22W S13
T56 R21W S18
T56 R22W S20
T56 R22W S21
T56 R22W S22
T56 R22W S23
T56 R22W S24
T56 R21W S19
T56 R22W S26
T56 R22W S29
T56 R22W S28
T56 R22W S27
T56 R22W S25
T56 R21W S30
T56 R22W S32
T56 R22W S33
T56 R22W S34
T56 R22W S35
T56 R22W S36
T56 R21W S31

Unnamed Stream
O'Brien Creek
Swan River
West Swan River
Swan Lake

Lone Pine Twsp Itasca Co.
Hibbing Twsp St. Louis Co.

RA-06

273
274
275
276

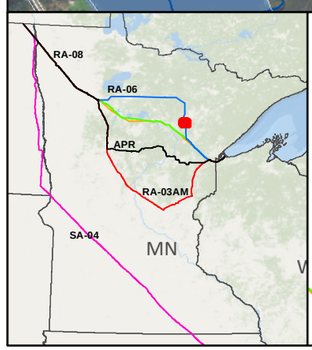

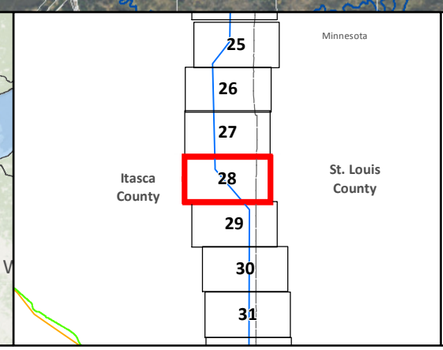

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation
Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 28A of 43

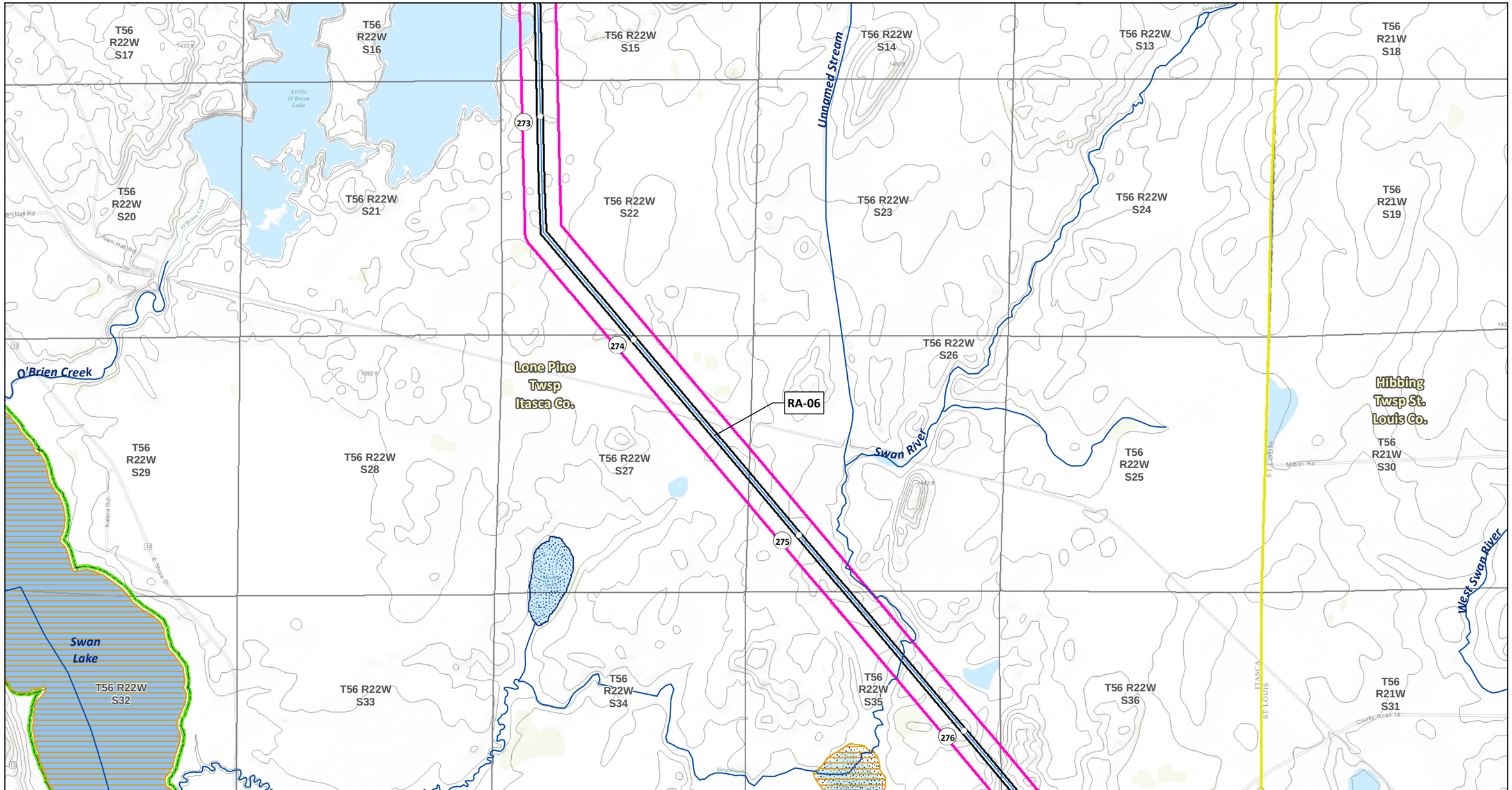

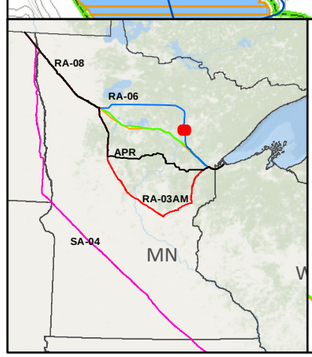

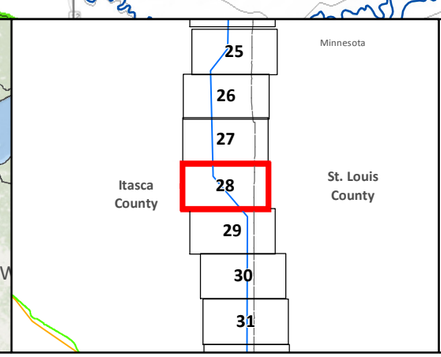

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 28B of 43

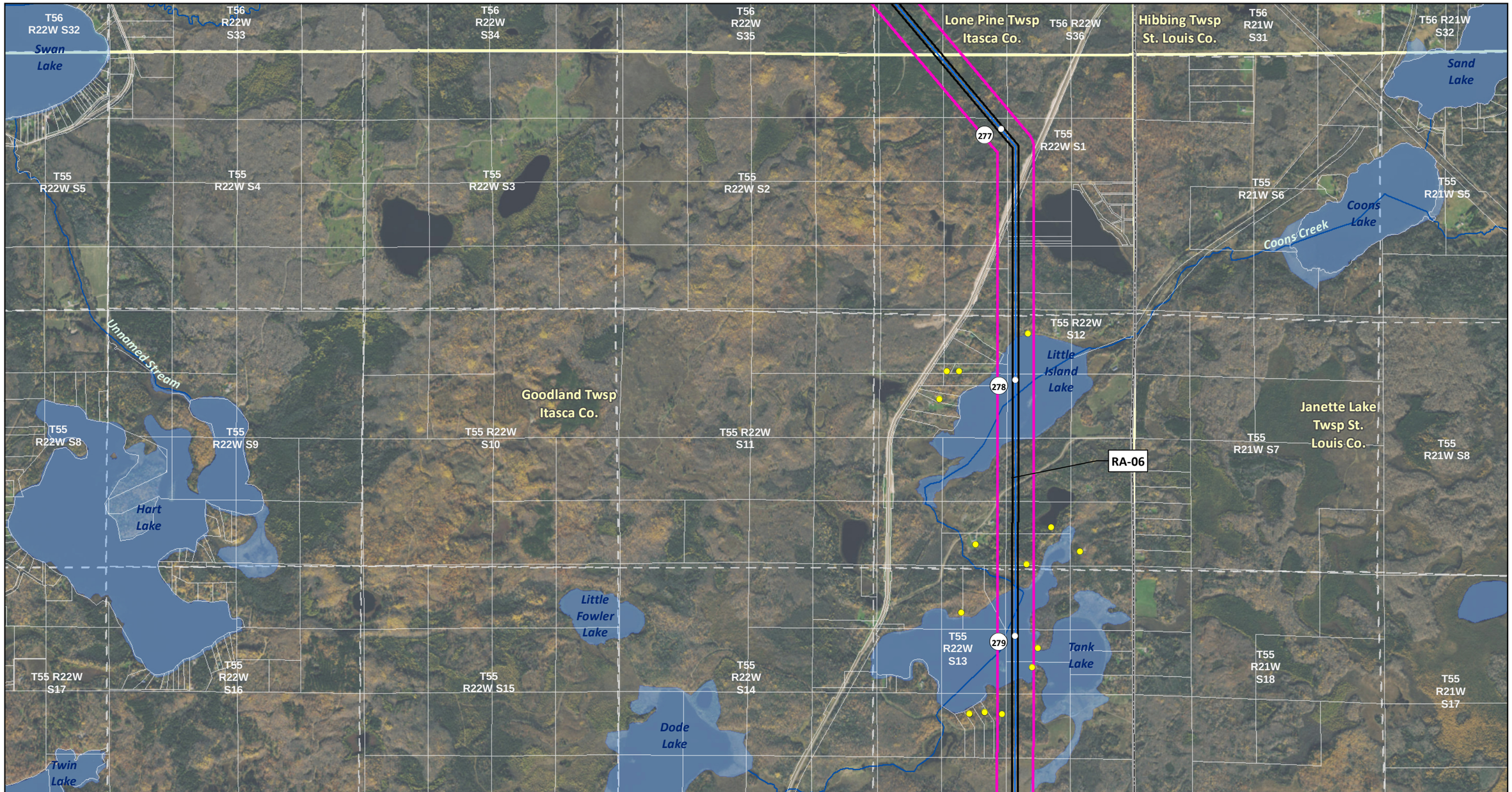

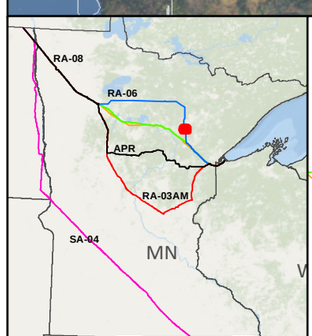

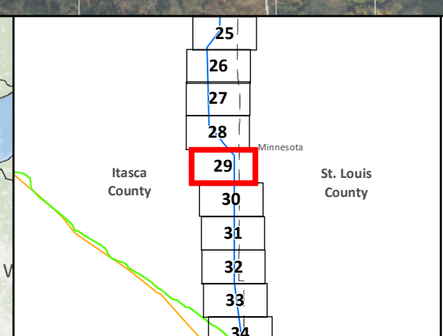

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 29A of 43

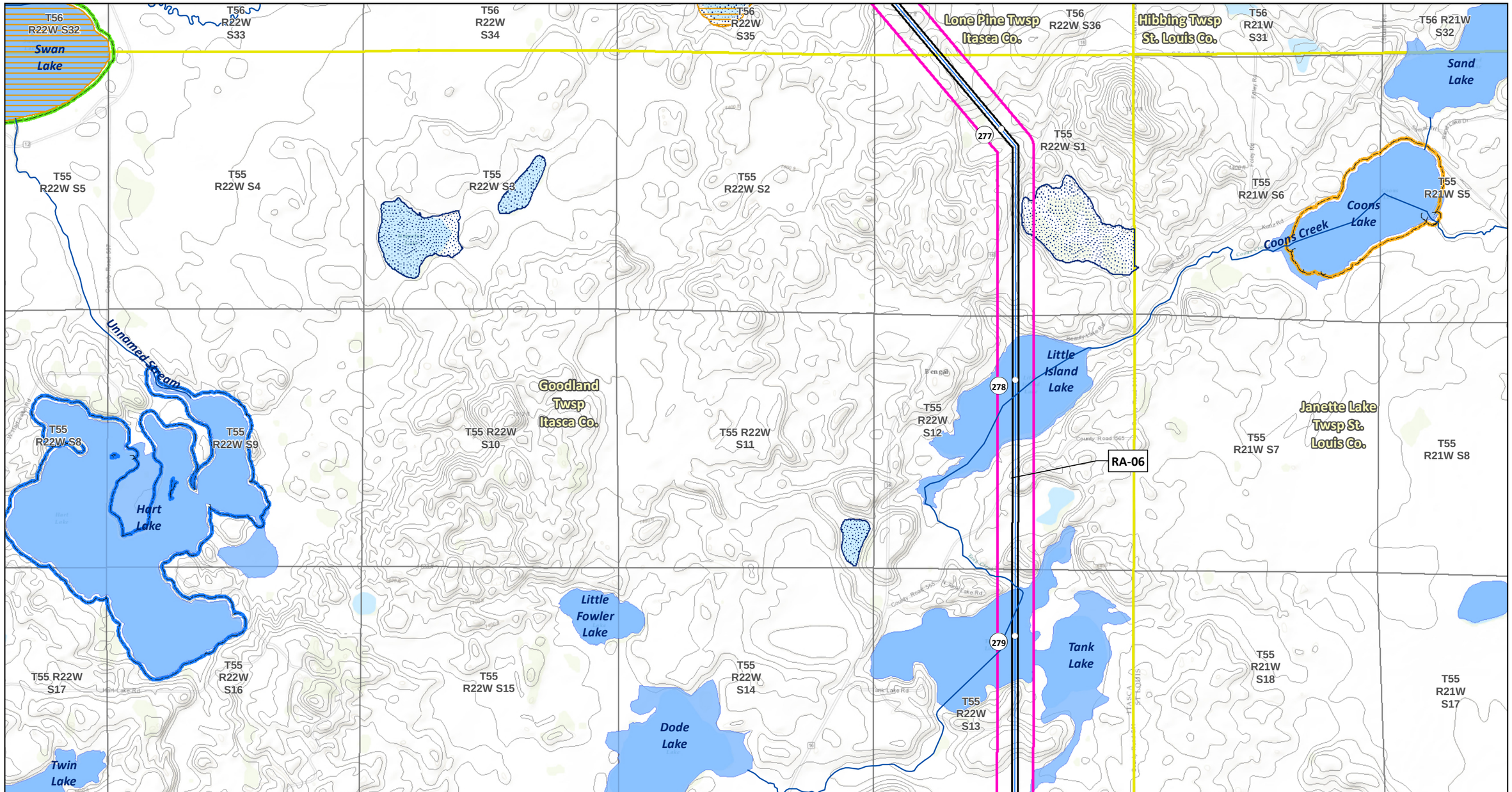

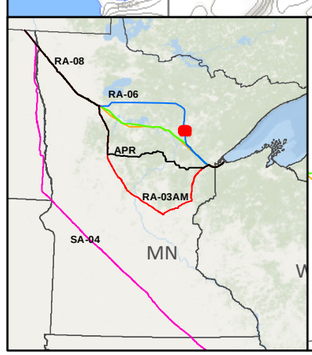

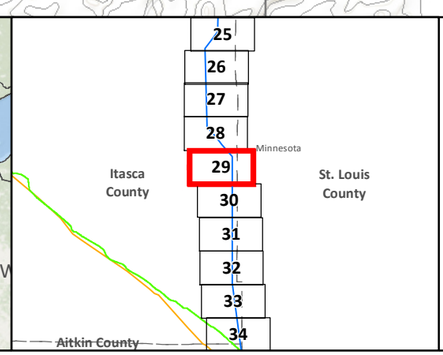

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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- SNA - Scientific and Natural Area

Water Resources
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- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
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- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

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- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 29B of 43

T55 R22W S16
T55 R22W S15
Dode Lake
T55 R22W S14
T55 R22W S13
Tank Lake
T55 R21W S18
Bay Lake
T55 R21W S17
T55 R21W S16
280
T55 R22W S24
T55 R22W S22
T55 R22W S23
T55 R21W S19
T55 R21W S20
T55 R21W S21
T55 R22W S21
Beauty Lake
Island Lake
281
T55 R22W S28
T55 R22W S27
Goodland Twsp Itasca Co.
T55 R22W S26
Mary Lake
T55 R22W S25
T55 R21W S30
Janette Lake Twsp St. Louis Co.
T55 R21W S29
T55 R21W S28
Merrill Lake
RA-06
282
T55 R22W S33
T55 R22W S34
T55 R22W S35
T55 R22W S36
T55 R21W S31
T55 R21W S32
73
T55 R21W S33
Finberg Lake
Unnamed Creek
T54 R22W S4
T54 R22W S3

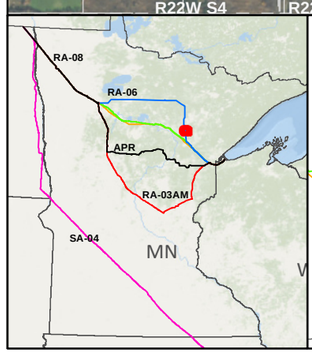

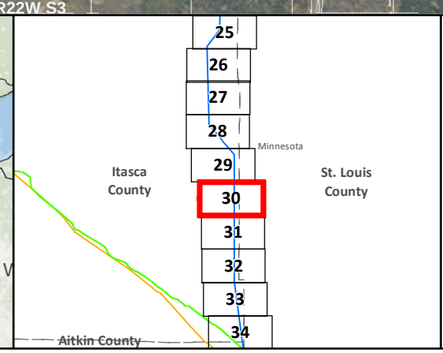

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 30A of 43

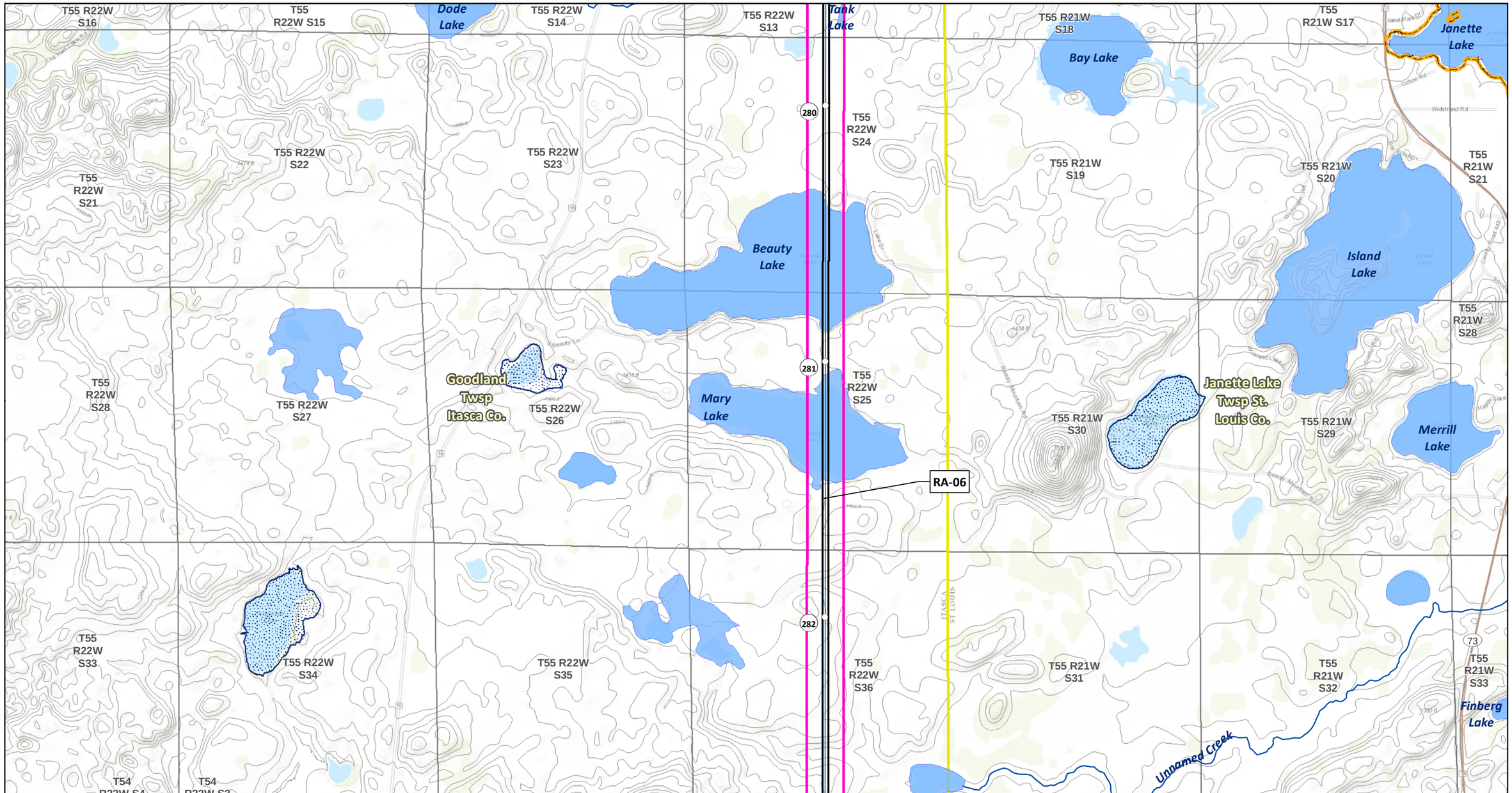

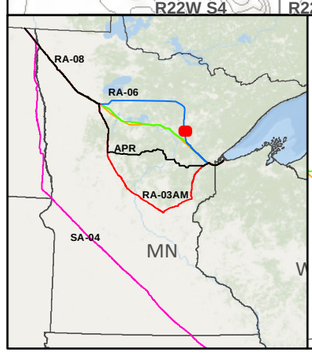

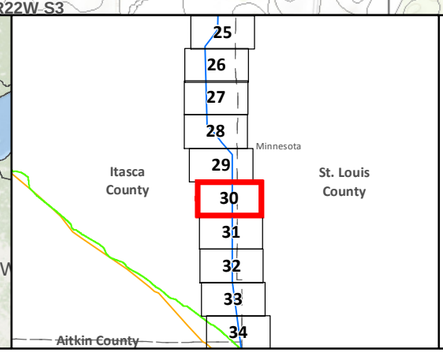

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 30B of 43

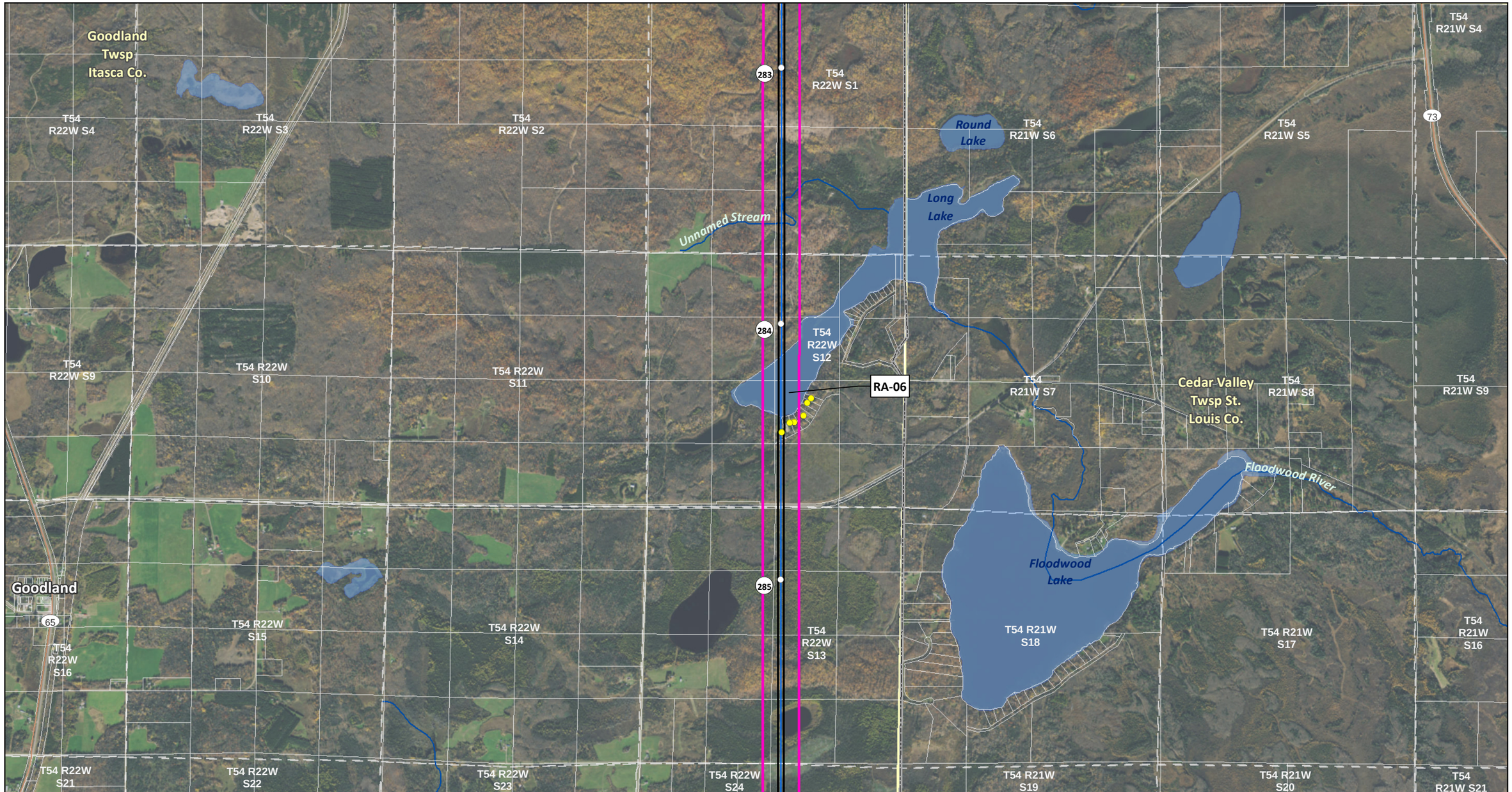

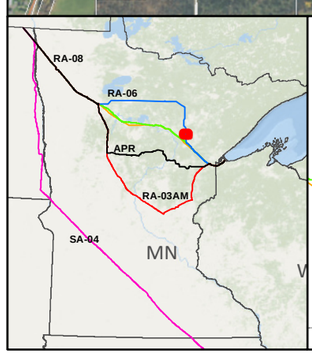

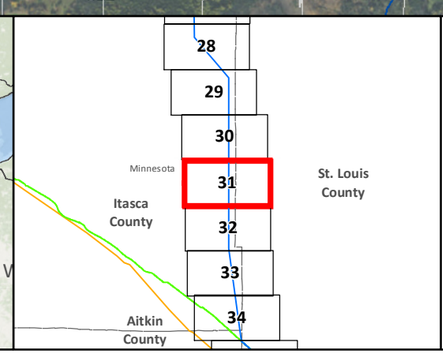

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 31A of 43

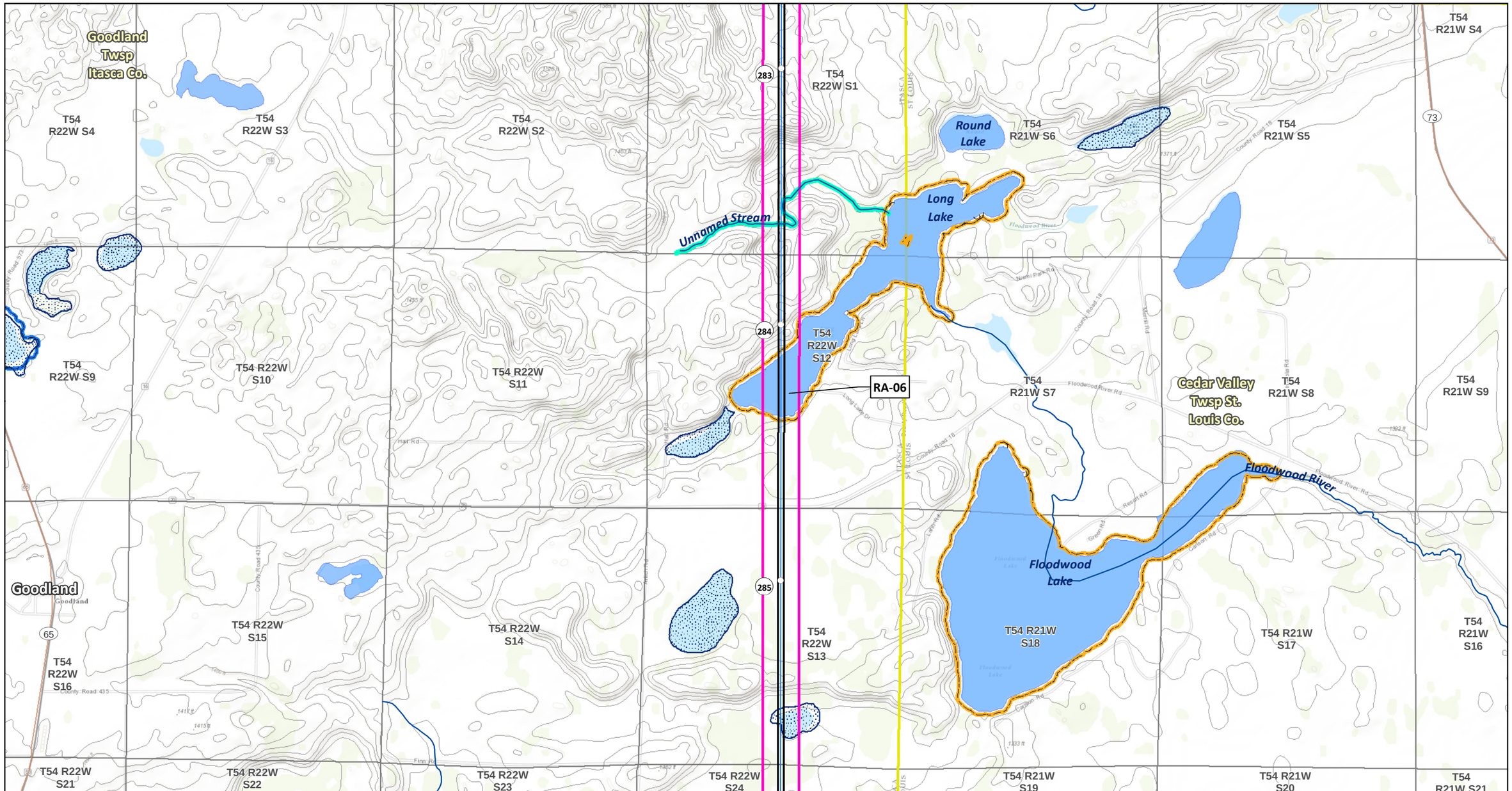

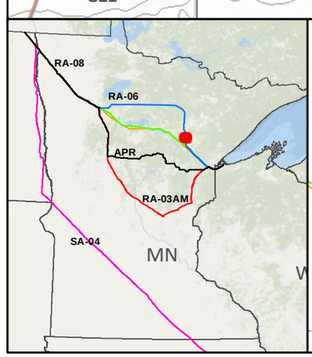

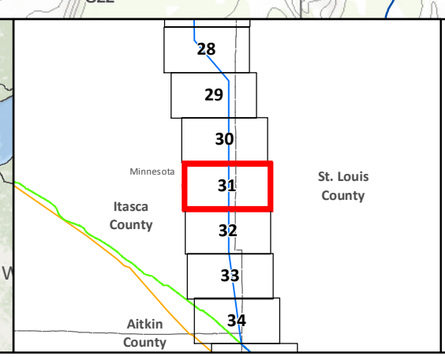

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 31B of 43

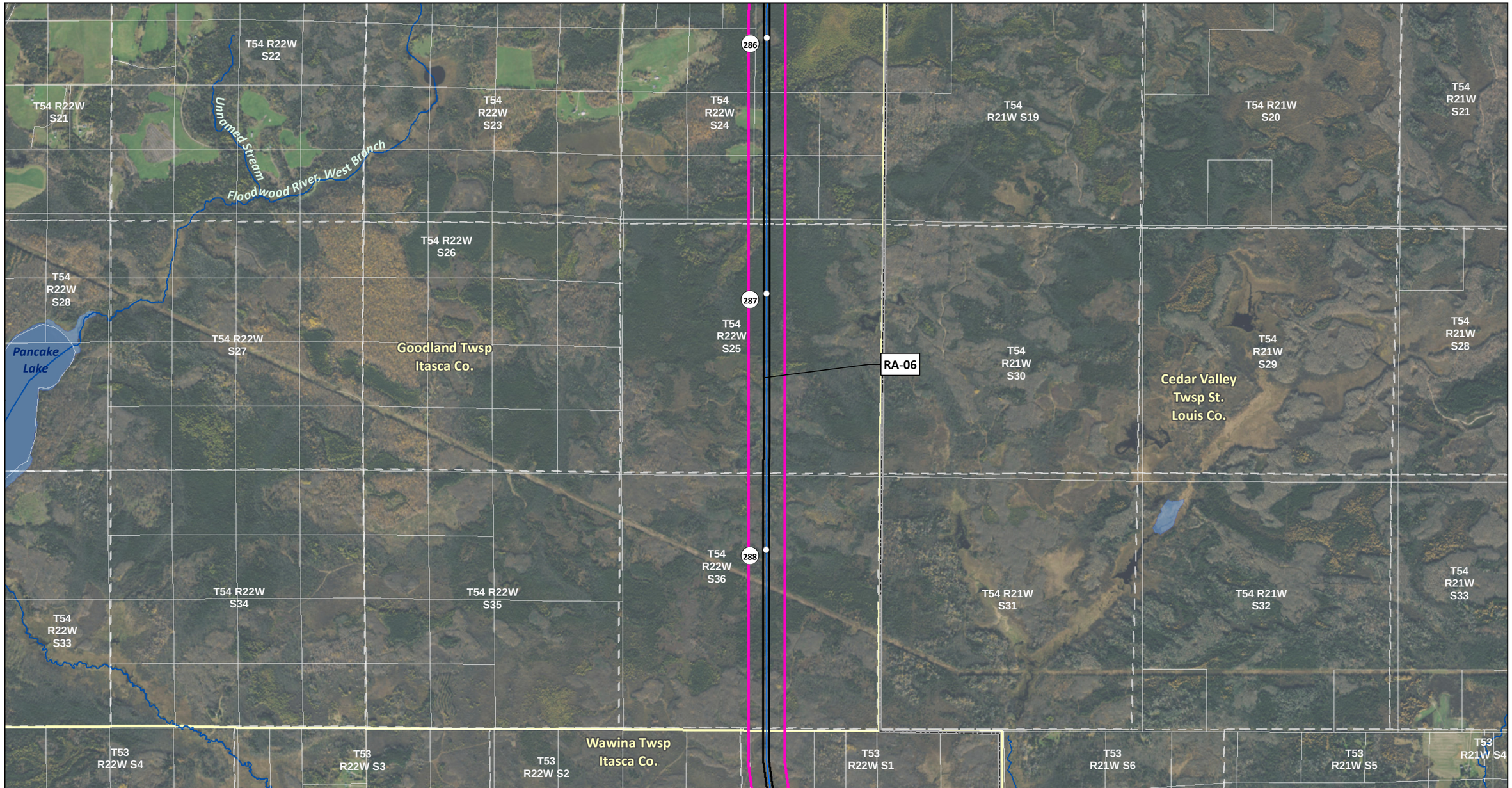

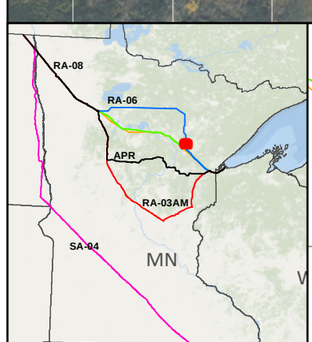

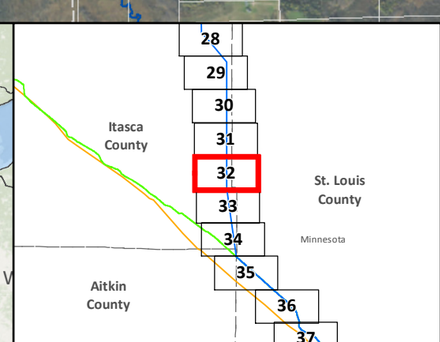

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 32A of 43

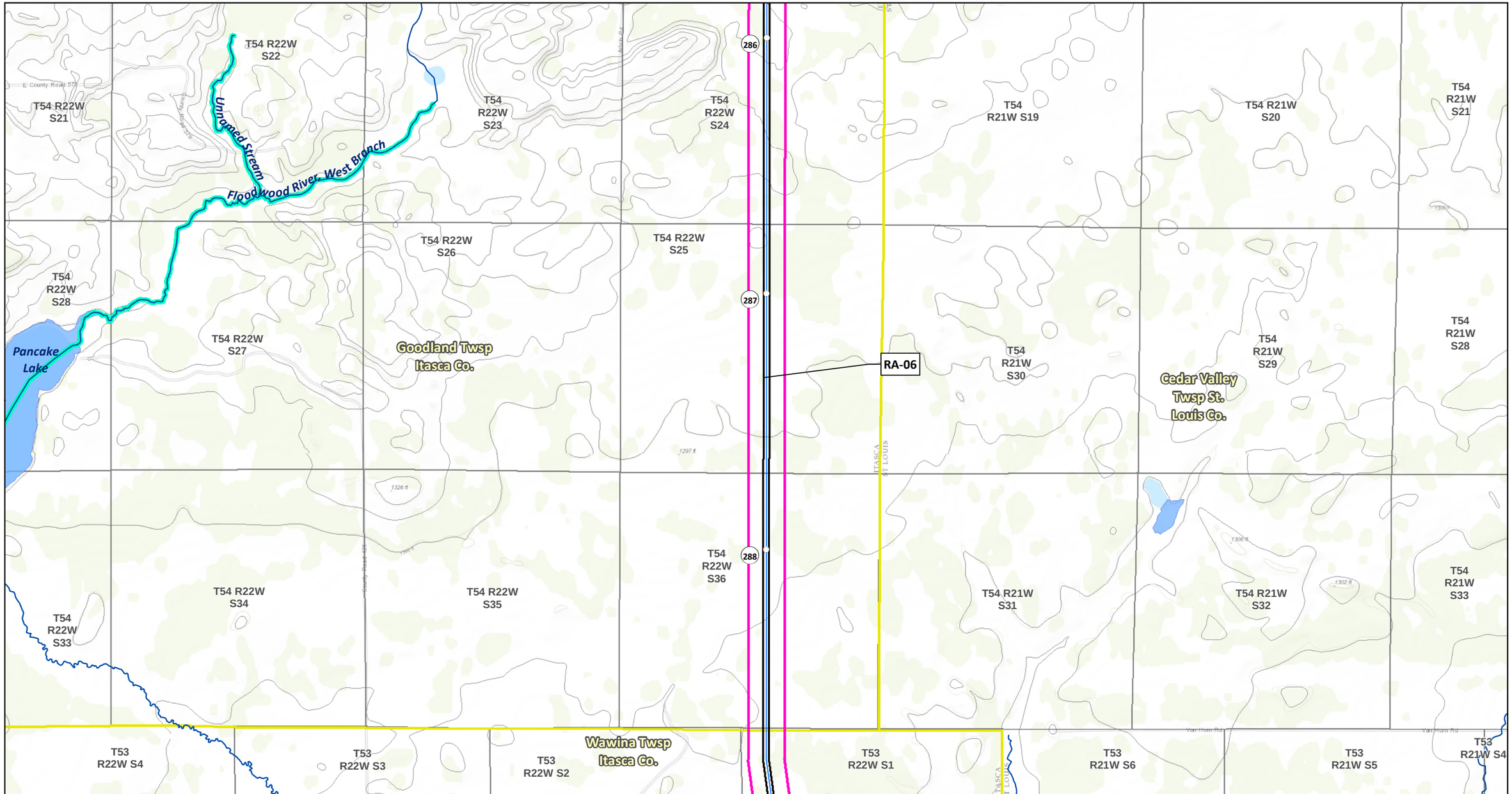

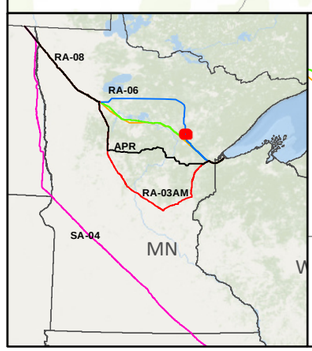

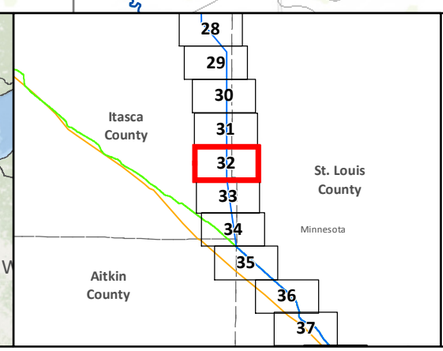

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
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Lakes of Biological Significance
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Native Plant Communities with Biodiversity Significance
- Outstanding
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Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 32B of 43

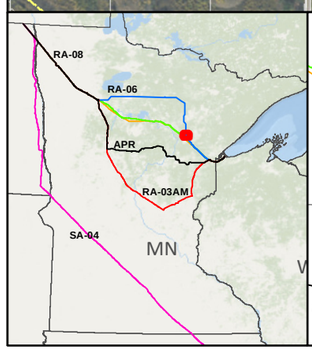

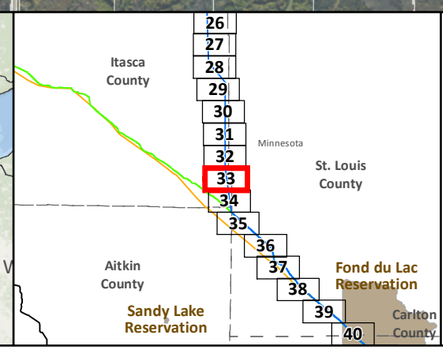

SA-04

Applicant's Preferred Route (APR)

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LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 33A of 43

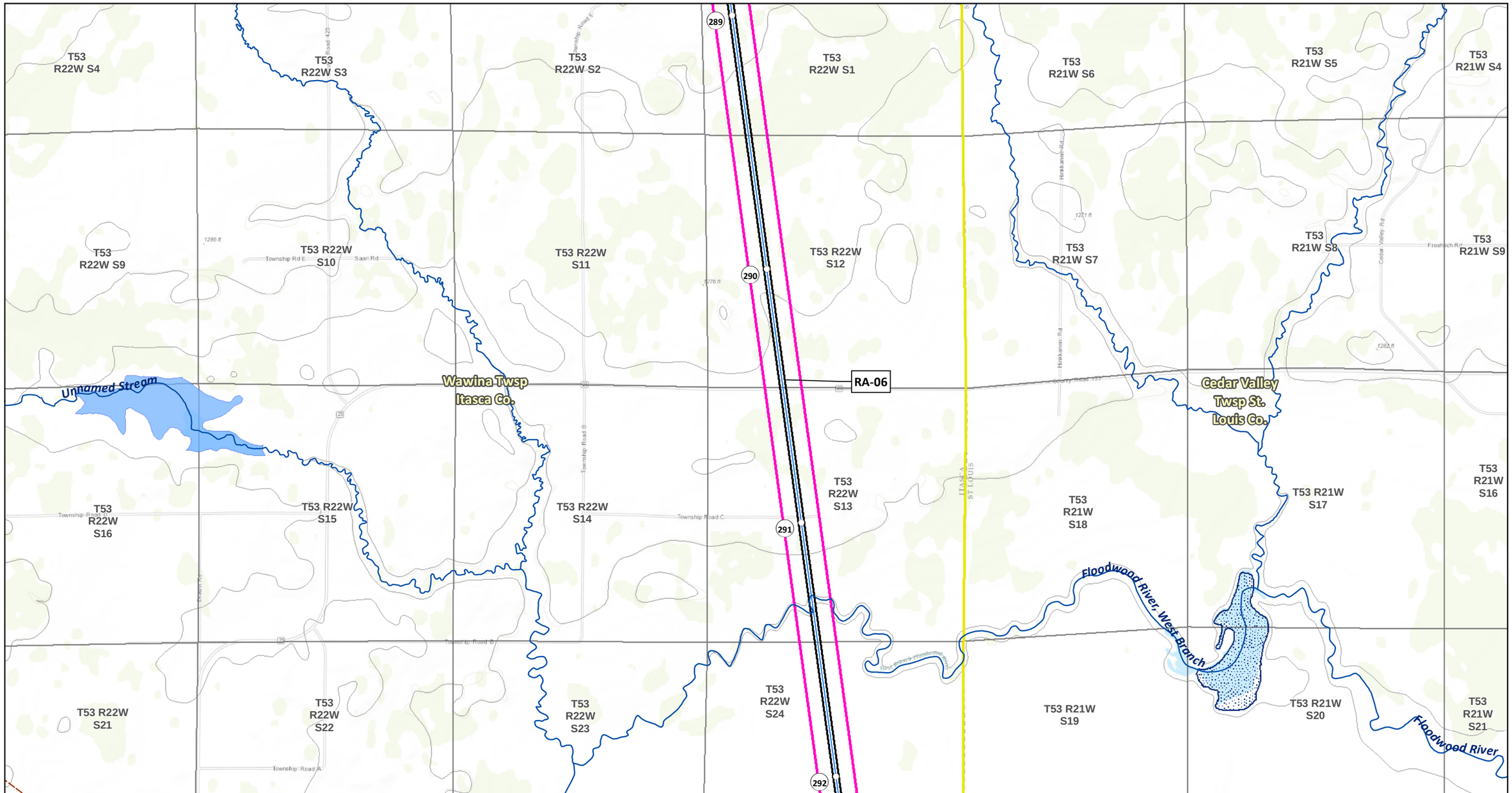

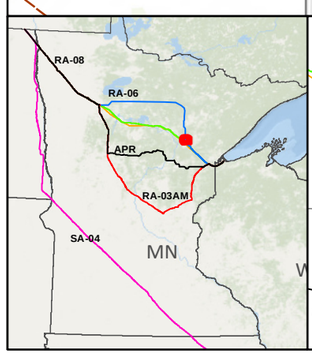

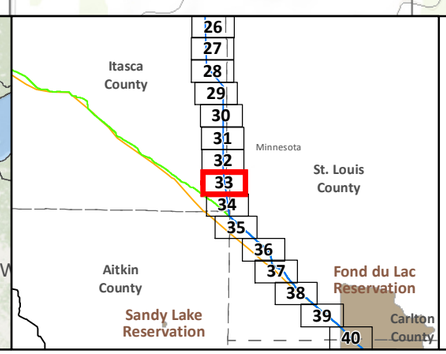

SA-04
Applicant's Preferred Route (APR)

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RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 33B of 43

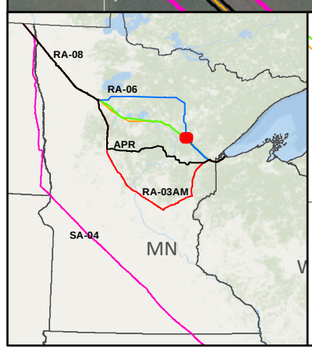

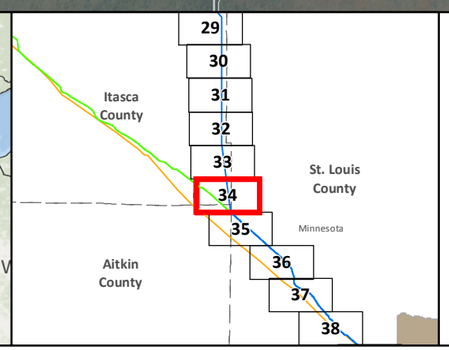

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 34A of 43

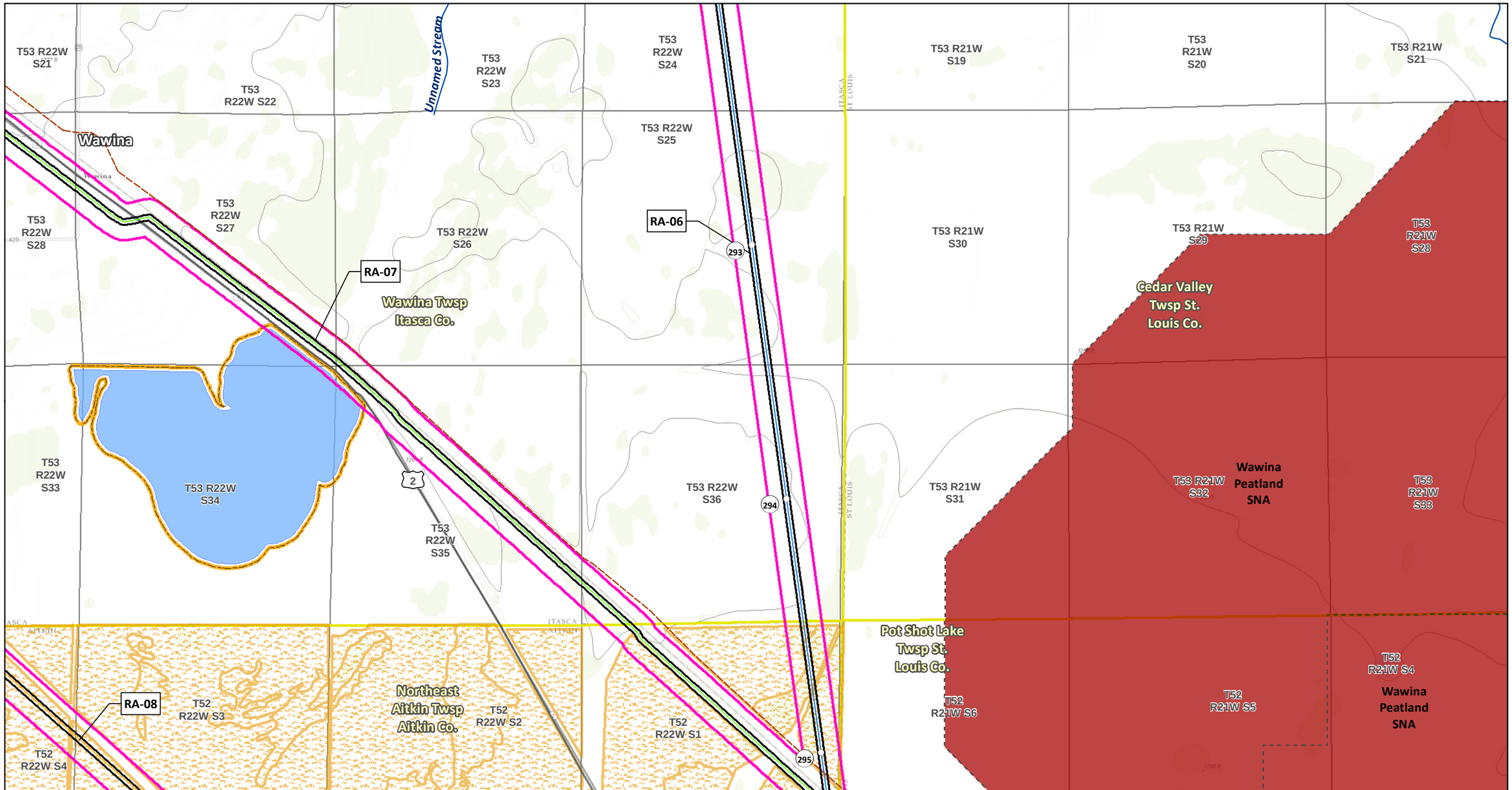

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

Map 34B of 43

T52 R22W S2
T52 R22W S1
T52 R21W S6
T52 R21W S5
T52 R21W S4
T52 R21W S3
T52 R22W S11
T52 R22W S12
T52 R21W S7
T52 R21W S8
T52 R21W S9
T52 R21W S10
T52 R22W S10
RA-08
RA-06
RA-07
T52 R22W S15
Pot Shot Lake Twsp St. Louis Co.
T52 R22W S13
T52 R21W S18
T52 R21W S17
T52 R21W S16
T52 R21W S15
T52 R22W S14
Northeast Aitkin Twsp Aitkin Co.
Savanna State Forest
T52 R21W S19
T52 R21W S20
T52 R21W S21
T52 R21W S22
T52 R22W S23
T52 R22W S24
296
297
298
299
200
2

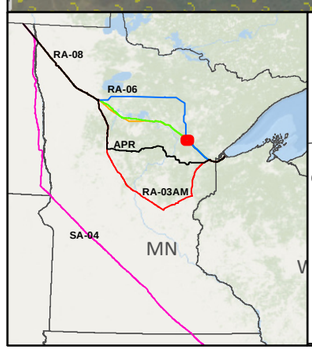

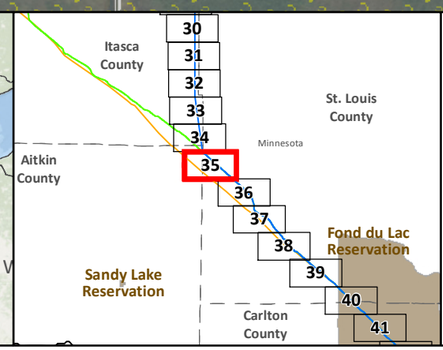

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation
Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 35A of 43

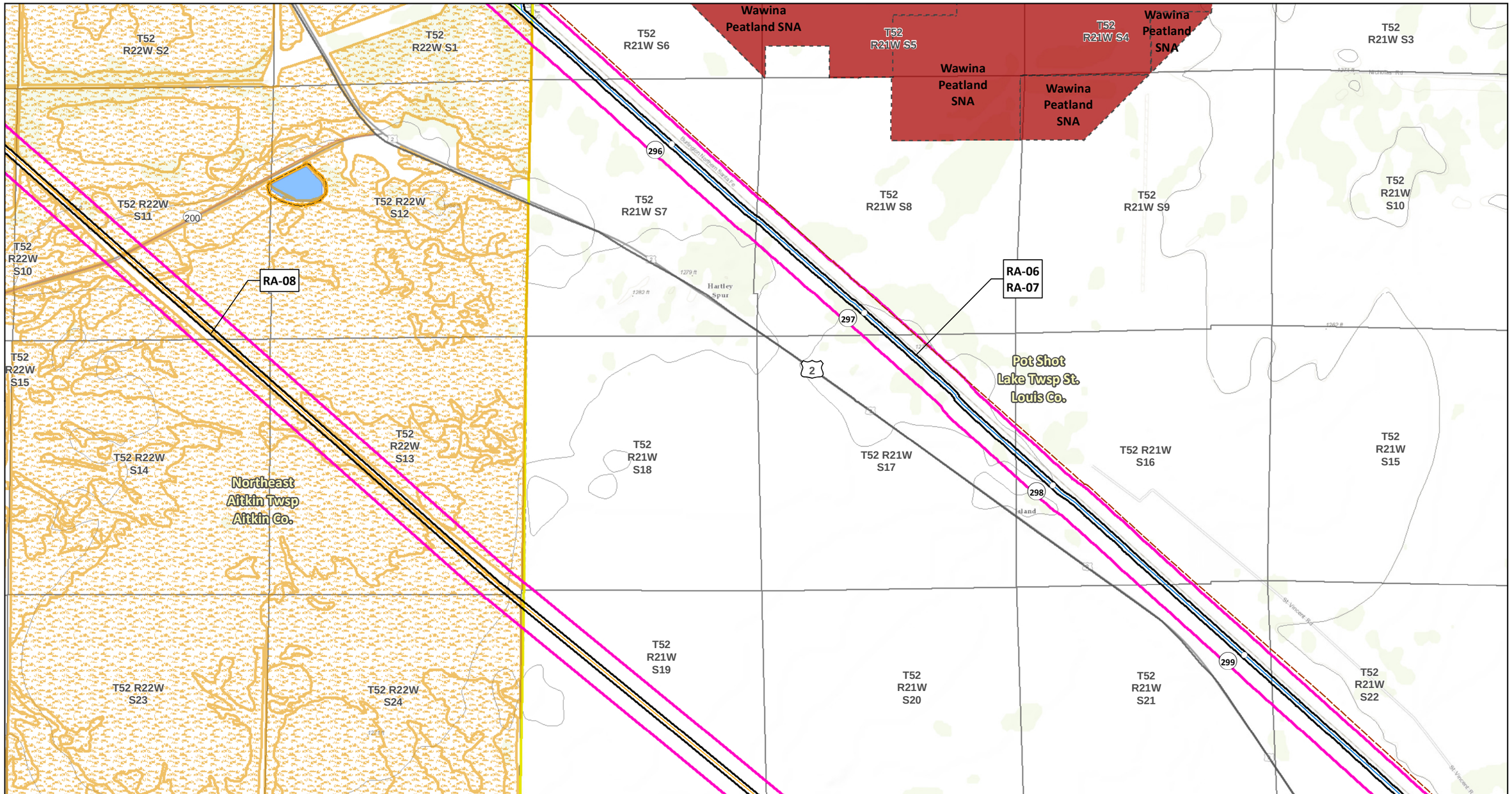

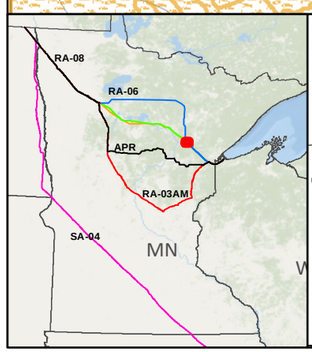

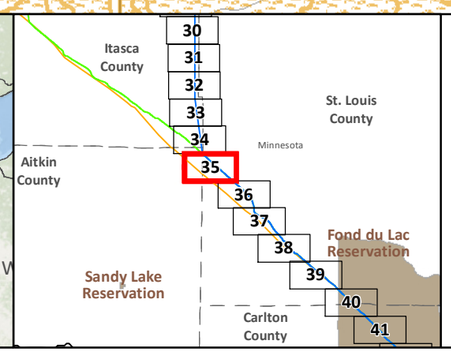

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 35B of 43

T52 R21W S20
T52 R21W S21
T52 R21W S22
T52 R21W S23
T52 R21W S24
T52 R20W S19
T52 R20W S20
T52 R21W S28
T52 R21W S27
T52 R21W S26
T52 R21W S25
T52 R20W S30
T52 R20W S29
T52 R21W S29
T52 R21W S32
T52 R21W S33
T52 R21W S34
T52 R21W S35
T52 R21W S36
T52 R20W S31
T52 R20W S32
T51 R21W S4
T51 R21W S5
T51 R21W S3
T51 R21W S2
T51 R21W S1
T51 R20W S6
T51 R20W S5

300
301
302
303
2
73

RA-06
RA-07
RA-08

Pot Shot Lake
Twsp St.
Louis Co.

Van Buren
Twsp St.
Louis Co.

Potshot Lake

Floodwood River

St. Louis River

Unnamed Stream

Halden
Twsp St.
Louis Co.

Floodwood
Twsp St.
Louis Co.

Floodwood

Floodwood Twsp
St. Louis Co.

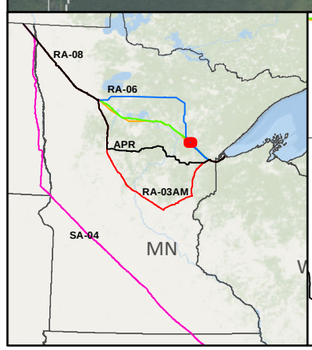

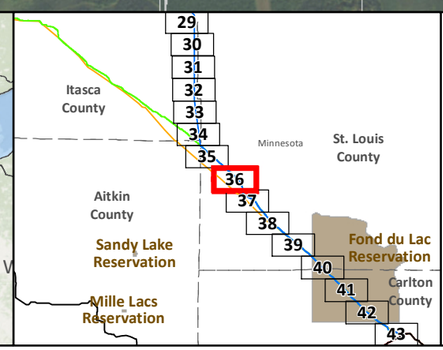

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources:
MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 36A of 43

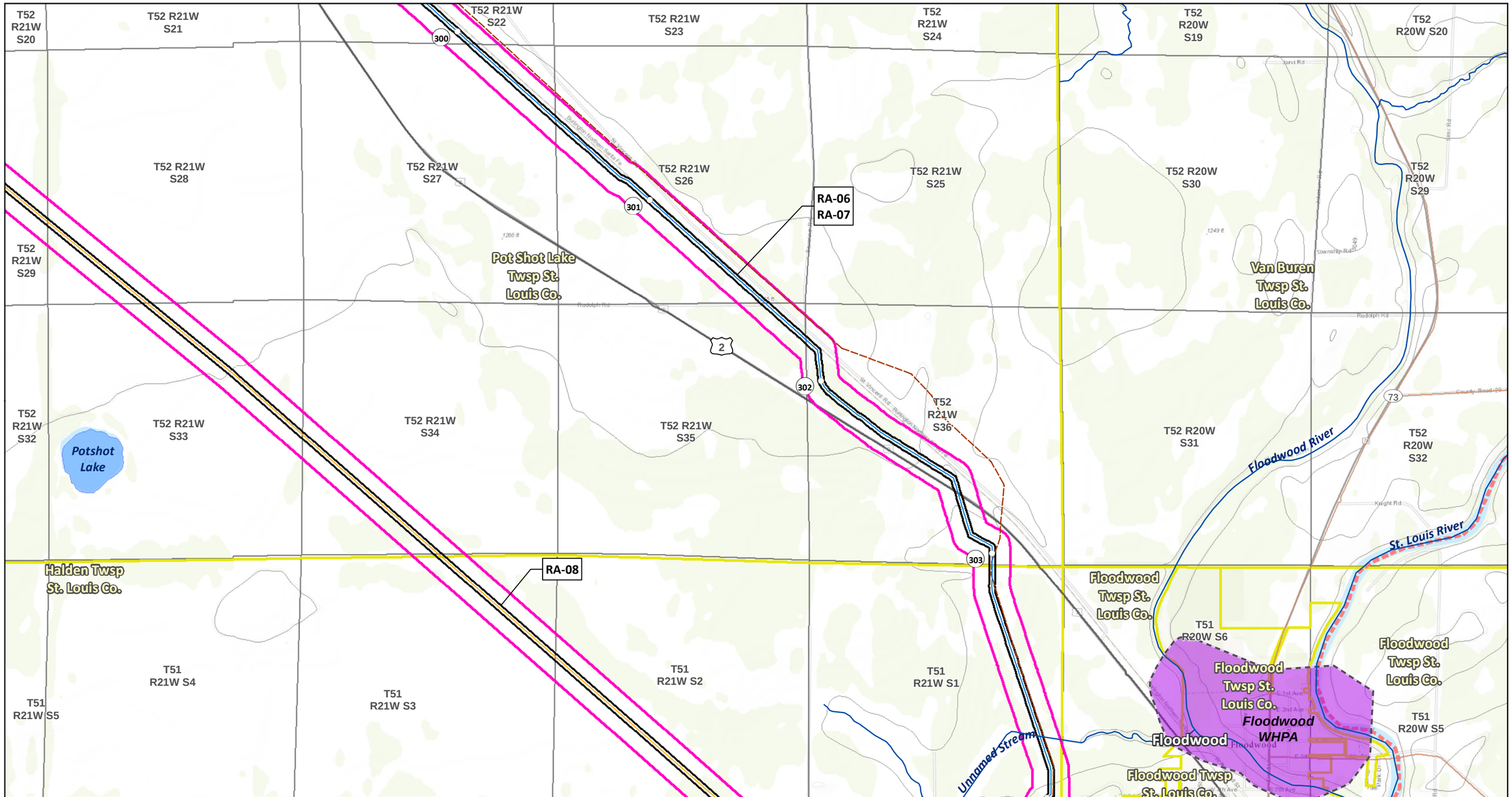

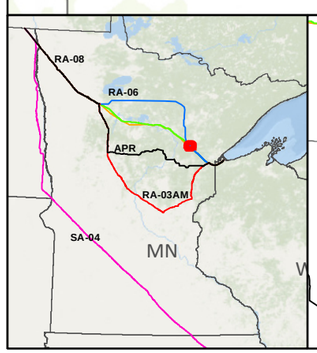

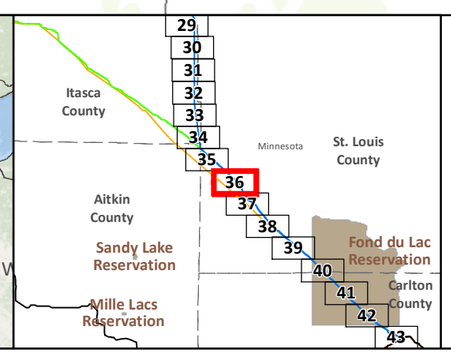

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 36B of 43

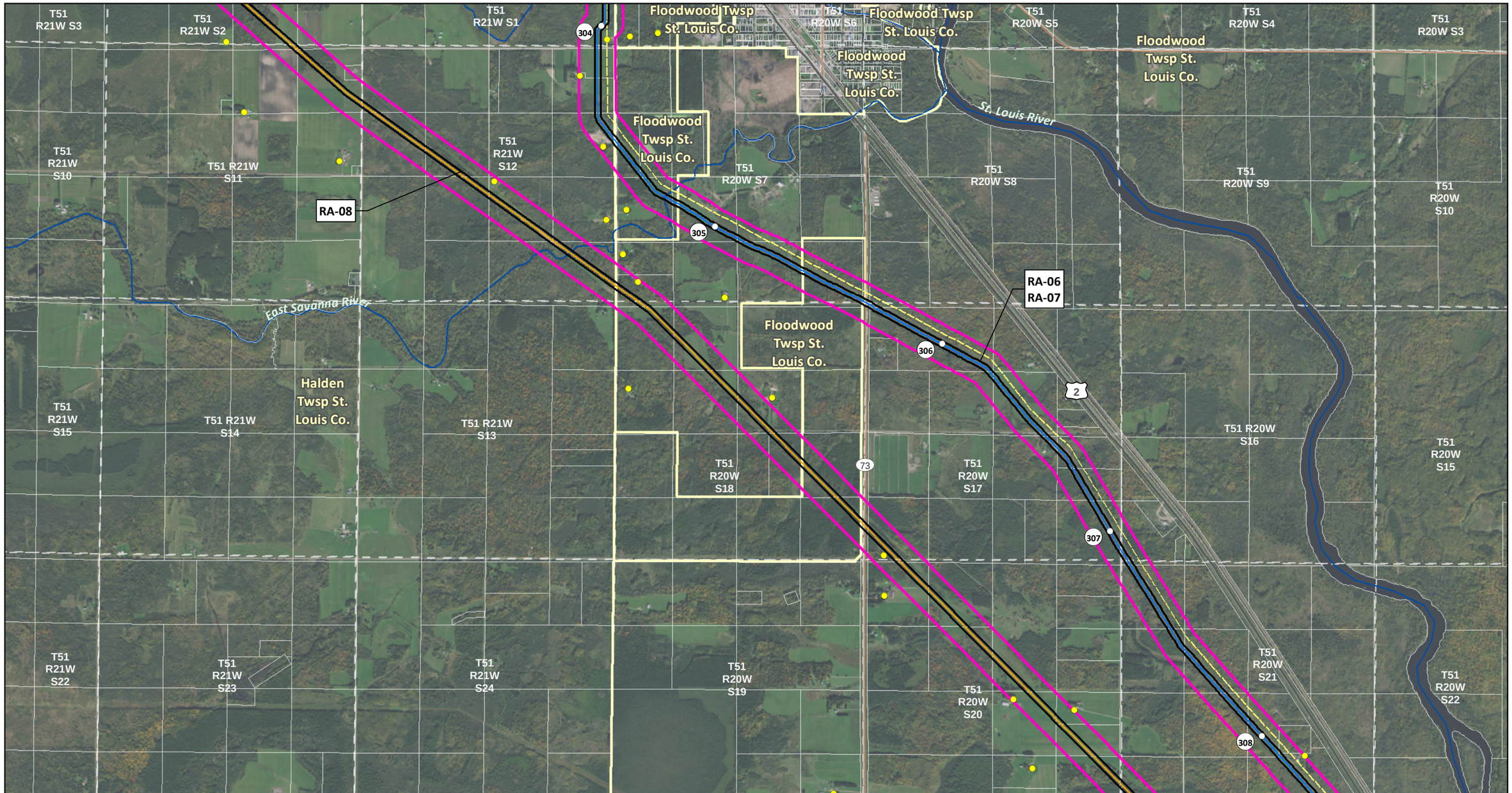

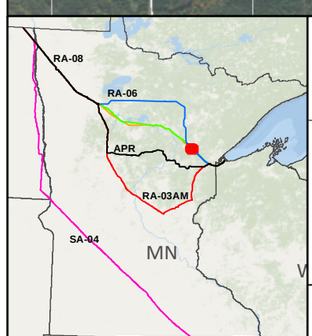

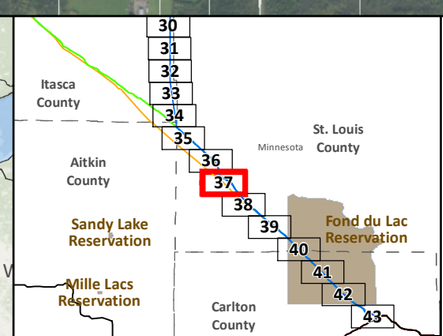

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

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Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

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Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

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- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 37A of 43

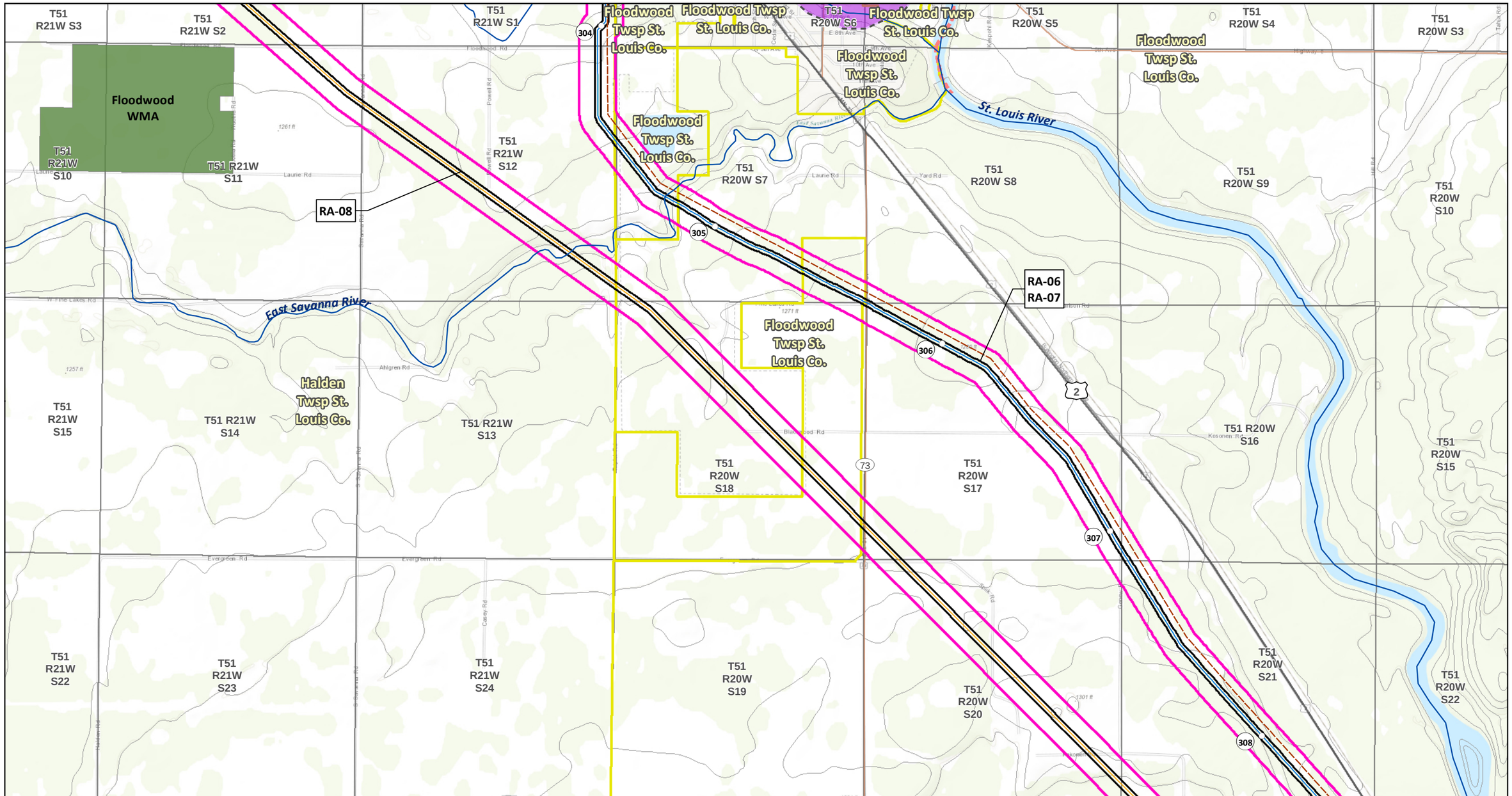

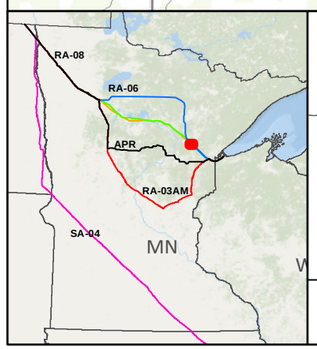

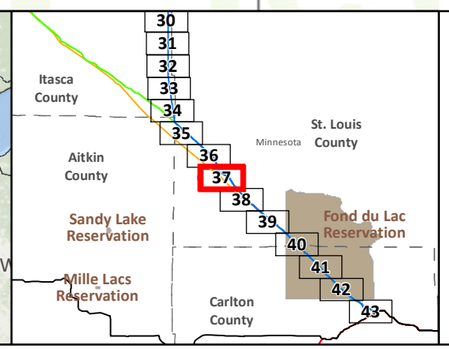

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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- National River Inventory Crossing

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303d Imparied Waters
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Public Water Basin
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Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 37B of 43

T51 R20W S19
T51 R20W S20
T51 R20W S21
T51 R20W S22
T51 R20W S23
T51 R20W S24
T51 R19W S19
T51 R20W S30
T51 R20W S29
T51 R20W S27
T51 R20W S26
T51 R20W S25
T51 R19W S30
T51 R20W S28
RA-08
RA-06
RA-07
Floodwood Twsp St. Louis Co.
Gowan
T51 R19W S31
T51 R20W S31
T51 R20W S32
Section Nine Lake
T51 R20W S33
T51 R20W S34
T51 R20W S35
St. Louis River
T51 R20W S36
Arrowhead Twsp St. Louis Co.
T50 R20W S5
Unnamed Stream
T50 R20W S6
T50 R20W S4
Fine Lakes Twsp St. Louis Co.
T50 R20W S3
T50 R20W S2
Ahmik Creek
T50 R20W S1
T50 R19W S6
T50 R20W S7
T50 R20W S8
T50 R20W S9
T50 R20W S10
T50 R20W S11

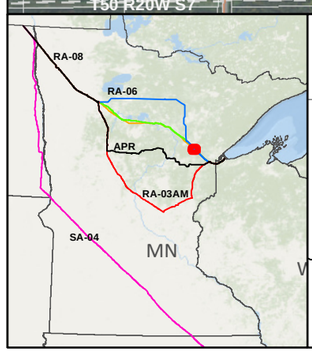

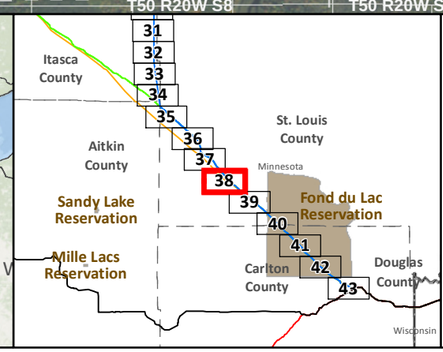

SA-04
Applicant's Preferred Route (APR)

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- RA-03AM
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- RA-08

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Land Ownership
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- Tribal Reservation
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Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

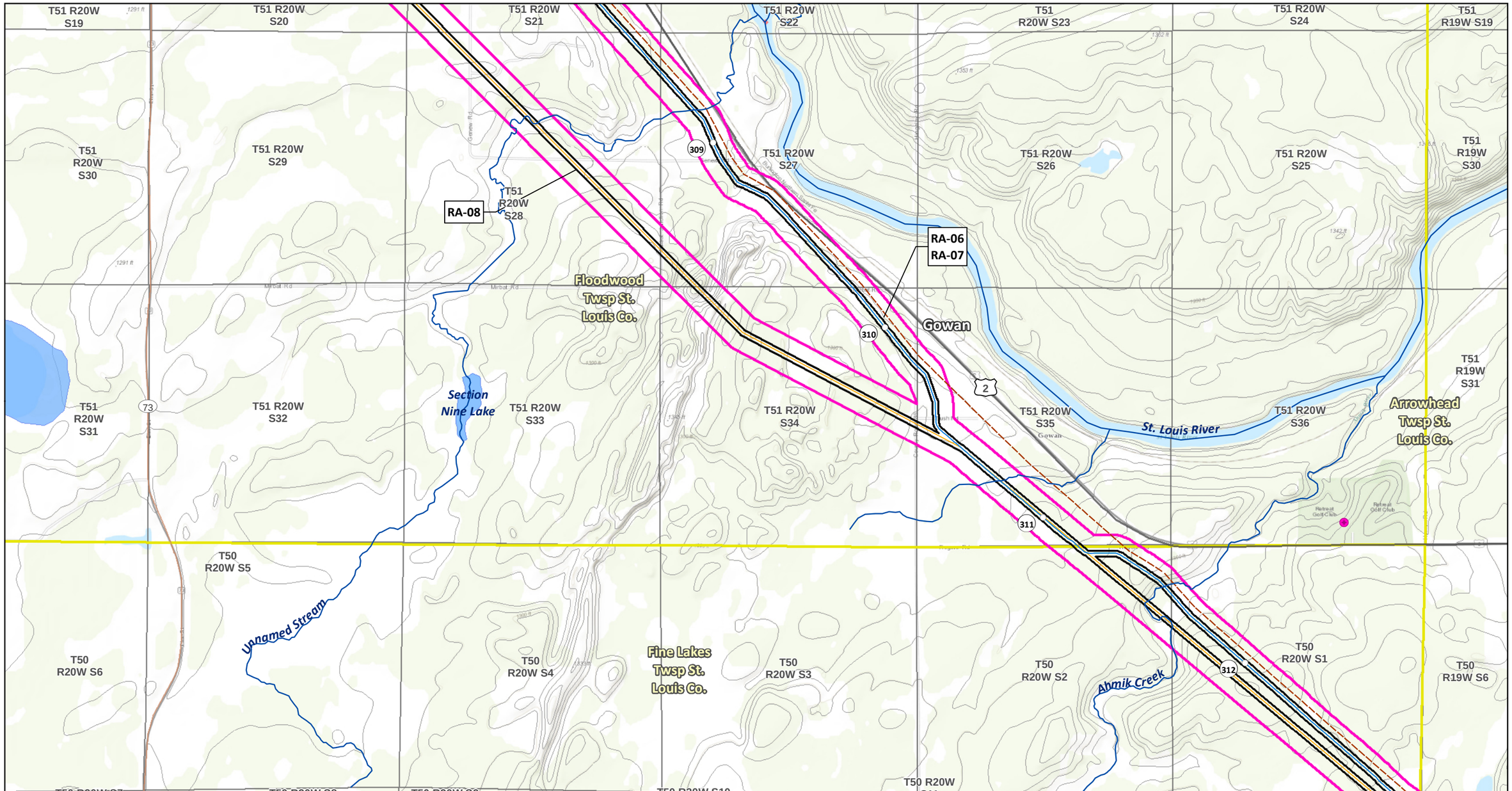

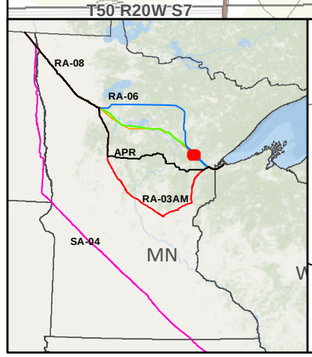

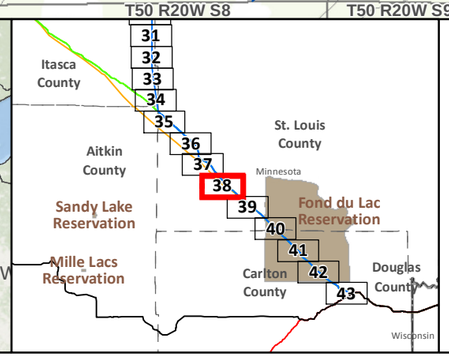

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
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Existing Pipelines
Township Boundary

State Managed Lands
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- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
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- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 38B of 43

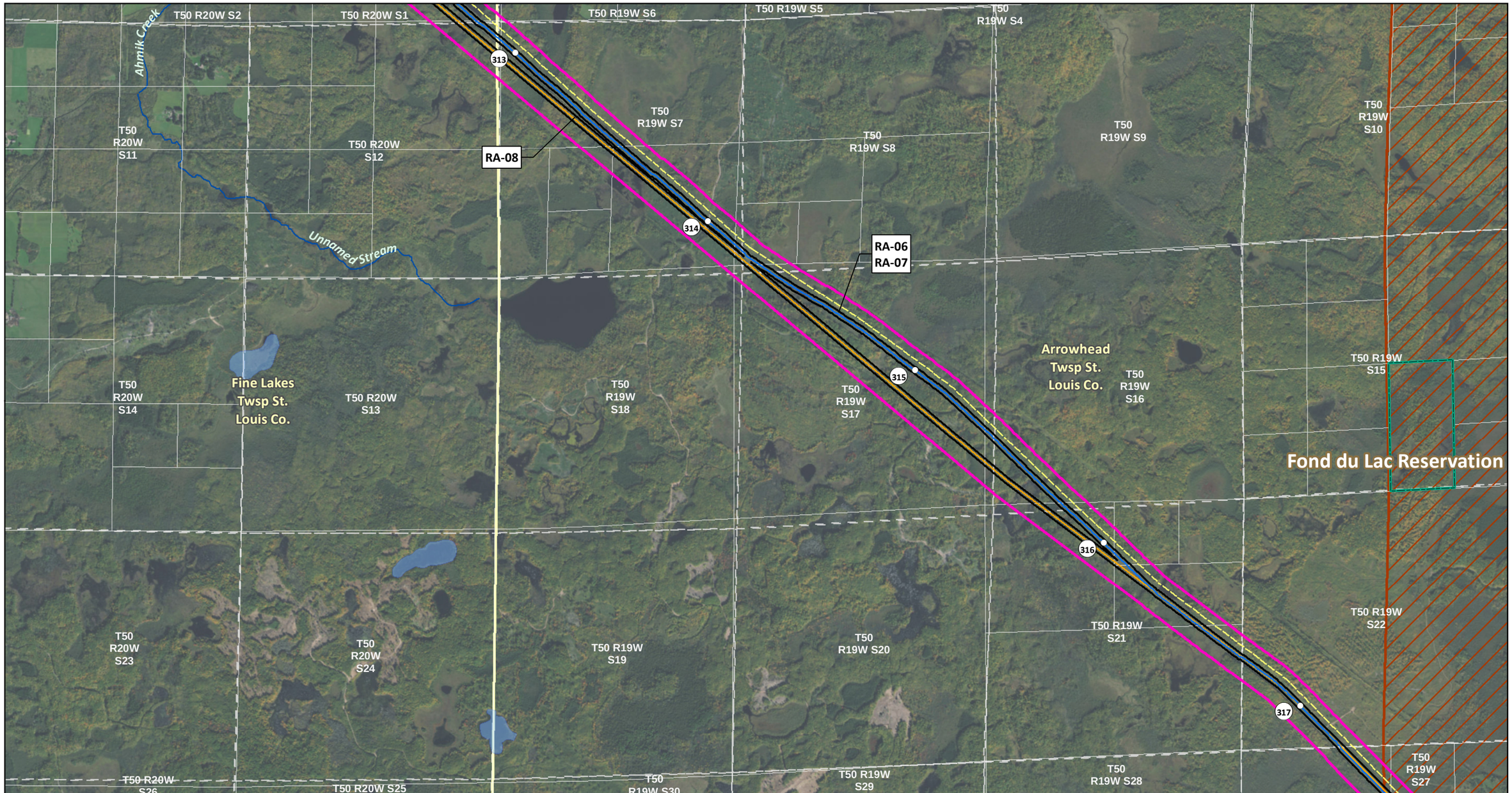

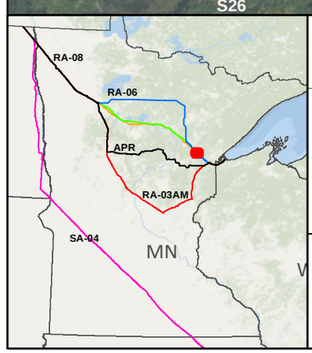

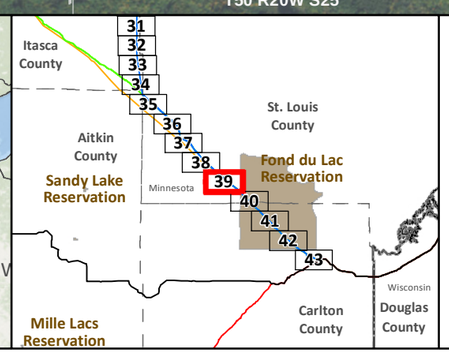

SA-04
Applicant's Preferred Route (APR)

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- RA-03AM
- RA-06
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Anticipated 120' Construction ROW
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- Tribal Trust Land

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0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 39A of 43

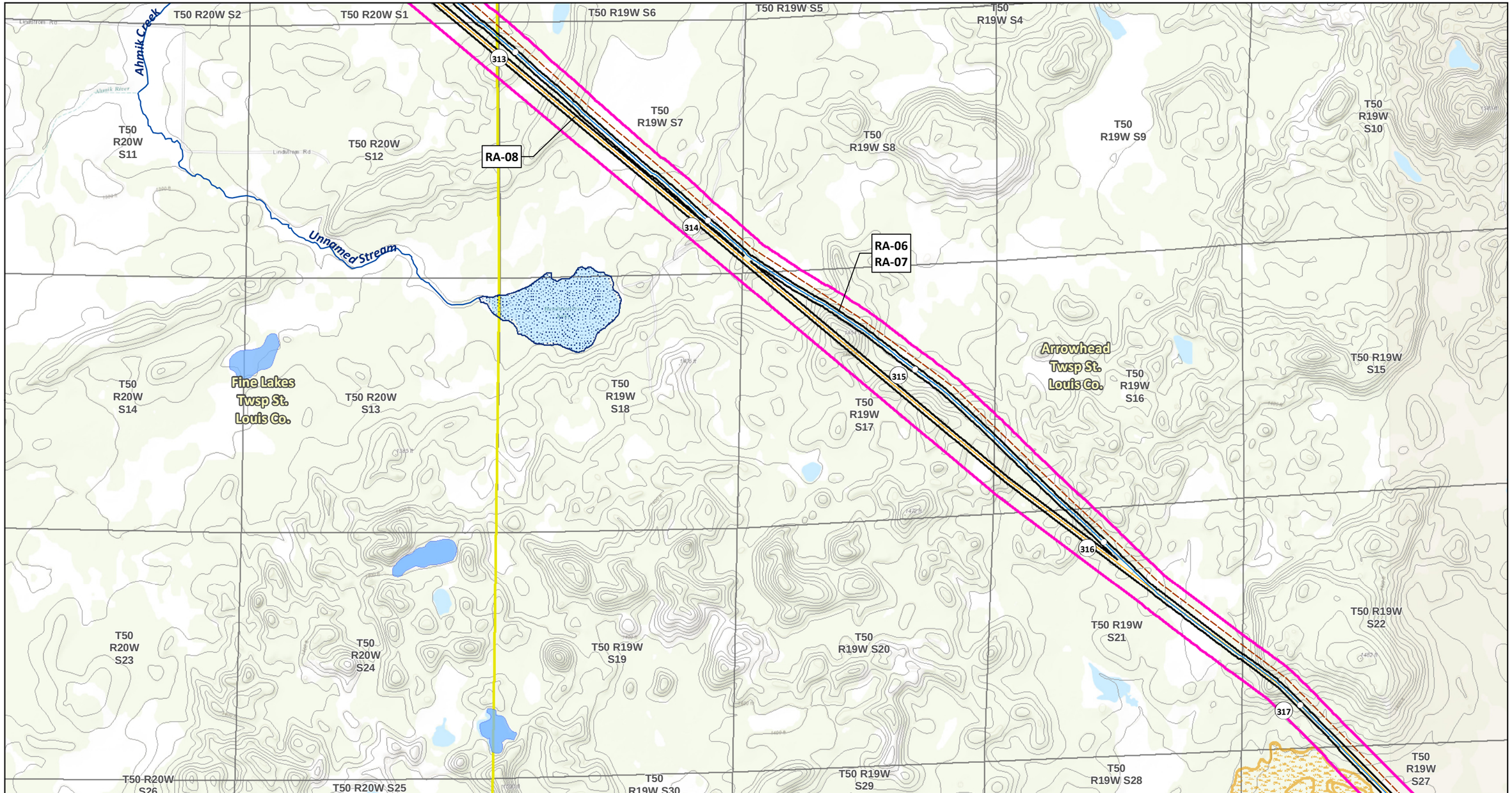

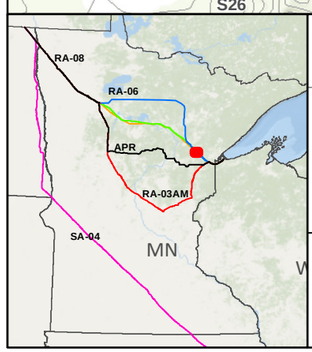

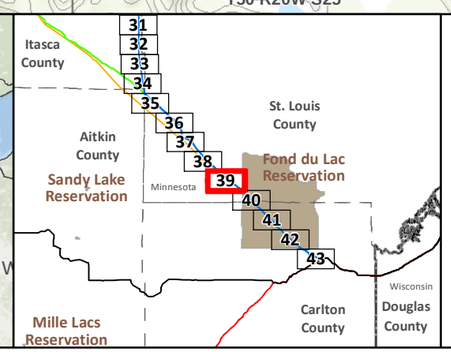

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SETTOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 39B of 43

T50 R19W S28
T50 R19W S27
T50 R19W S26
T50 R19W S25
T50 R18W S30
T50 R18W S29
Lost Lake
Arrowhead Twsp St. Louis Co.
Stoney Brook Twsp St. Louis Co.
Unnamed Stream
RA-08
T50 R19W S33
T50 R19W S34
T50 R19W S35
T50 R19W S36
T50 R18W S31
T50 R18W S32
Fond du Lac Reservation
Stoney Brook
Fond du Lac State Forest
RA-06
RA-07
Hardwood Lake
T49 R19W S4
T49 R19W S3
North Carlton Twsp Carlton Co.
T49 R19W S2
T49 R19W S1
T49 R18W S6
Perch Lake Twsp Carlton Co.
T49 R18W S5
Dead Fish Lake
T49 R19W S12
T49 R19W S9
T49 R19W S10
T49 R19W S11
T49 R18W S7
T49 R18W S8

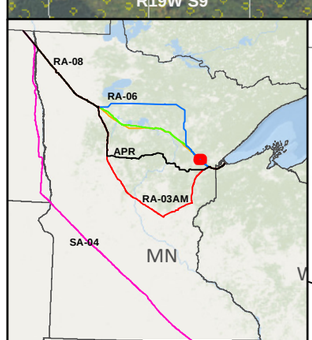

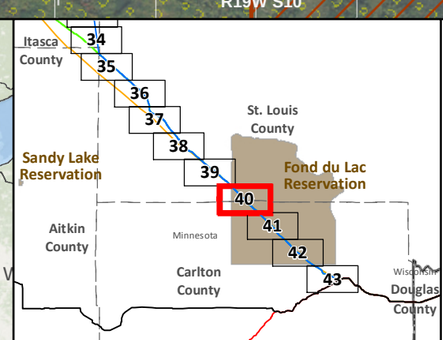

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 40A of 43

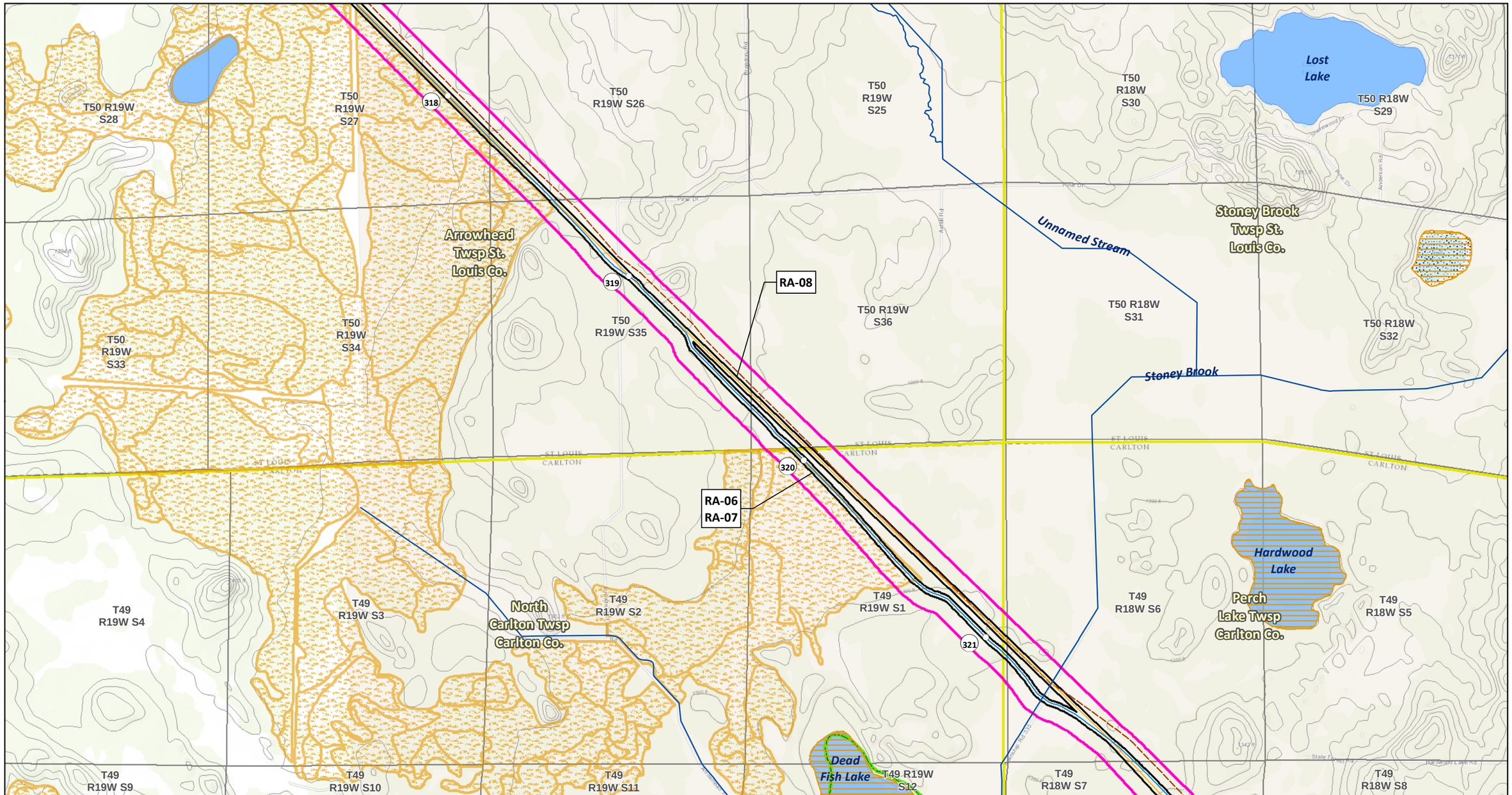

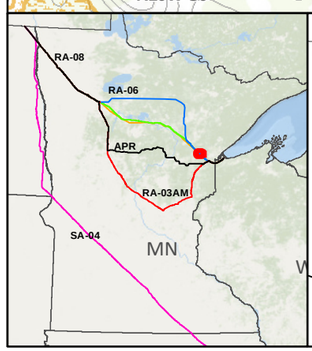

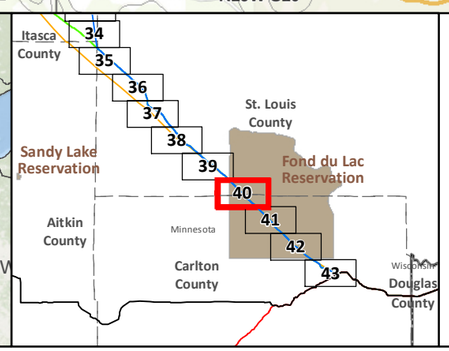

SA-04
Applicant's Preferred Route (APR)

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- RA-07
- RA-08
- Mile Post
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- National River Inventory Crossing

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303d Imparied Waters
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Wild Rice Lakes (DNR)
Public Waters Wetlands
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Public Drinking Water Supply
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- High
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- Outstanding
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Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 40B of 43

Dead Fish Lake
Stoney Brook
Unnamed Stream
Cedar Lake
Lac Lake
Fond du Lac State Forest
T49 R19W S12
T49 R18W S7
T49 R18W S8
T49 R18W S9
T49 R18W S10
T49 R18W S11
T49 R18W S12
323
RA-08
T49 R19W S13
T49 R18W S18
T49 R18W S17
T49 R18W S16
Perch Lake Twsp Carlton Co.
T49 R18W S15
T49 R18W S14
T49 R18W S13
324
RA-06
RA-07
North Carlton Twsp Carlton Co.
Fond du Lac Reservation
T49 R18W S21
325
T49 R18W S19
T49 R18W S20
T49 R18W S22
T49 R18W S23
T49 R18W S24
T49 R19W S24
Rice Portage Lake
T49 R19W S25
T49 R18W S30
T49 R18W S29
Big Lake
T49 R18W S28
326
T49 R18W S27
T49 R18W S26
T49 R18W S25
Perch Lake

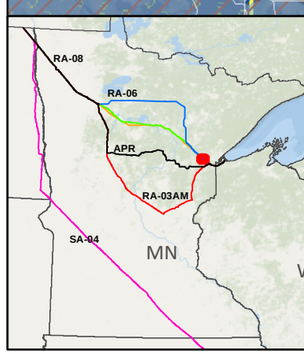

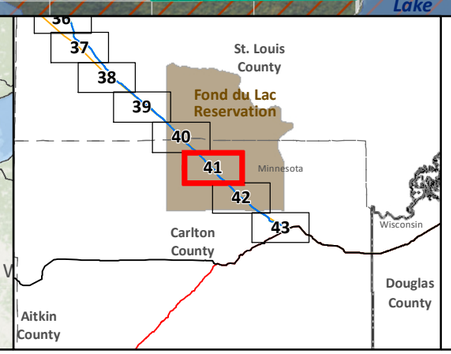

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 41A of 43

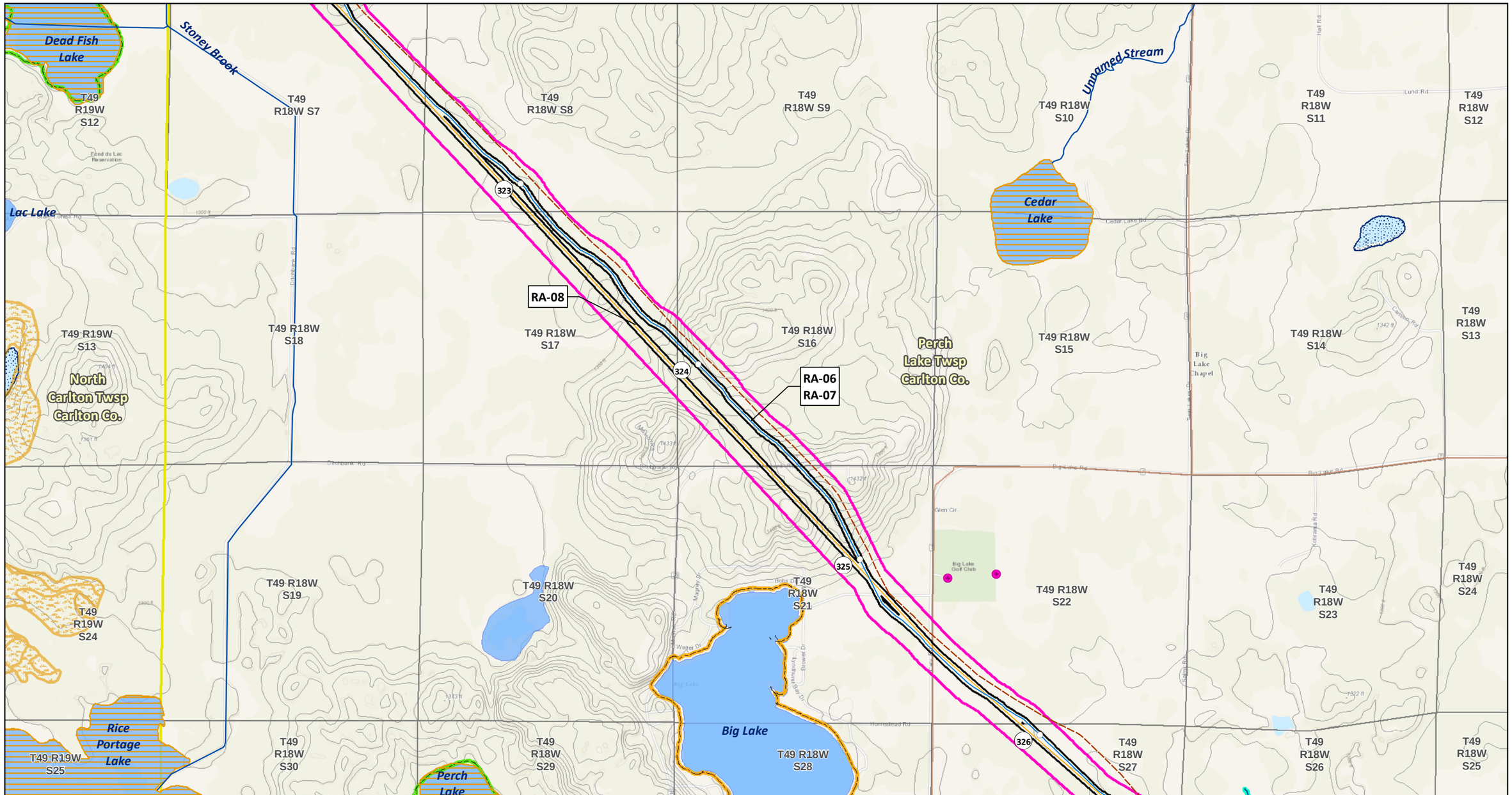

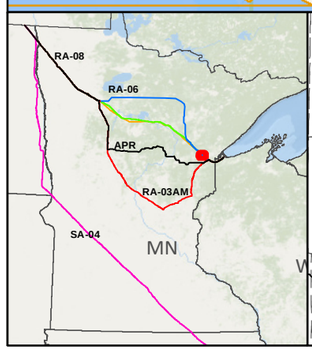

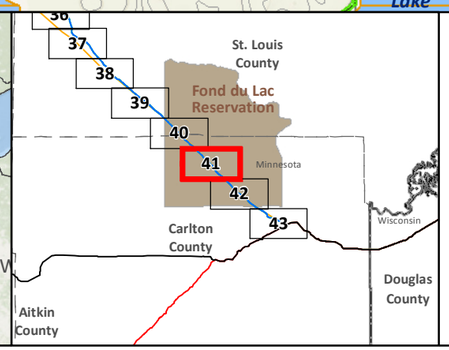

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 41B of 43

Big Lake
T49 R18W S28
T49 R18W S27
T49 R18W S26
T49 R18W S25
T49 R17W S30
T49 R17W S29
T49 R17W S28
327
Otter Creek
Perch Lake Twsp Carlton Co.
Cloquet Twsp Carlton Co.
T49 R18W S33
T49 R18W S34
T49 R18W S35
328
T49 R18W S36
T49 R17W S31
T49 R17W S32
T49 R17W S33
Fond du Lac Reservation
RA-06
RA-07
329
RA-08
Unnamed Stream
Wild Rice Lake
T48 R18W S4
T48 R18W S3
T48 R18W S2
T48 R18W S1
T48 R17W S6
T48 R17W S5
T48 R17W S4
210
North Carlton Twsp Carlton Co.
Twin Lakes Twsp Carlton Co.
330
Moose Horn River
T48 R18W S9
T48 R18W S10
T48 R18W S11
T48 R18W S12
T48 R17W S7
T48 R17W S8
T48 R17W S9
Little Otter Creek
331

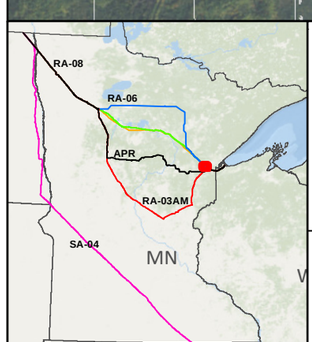

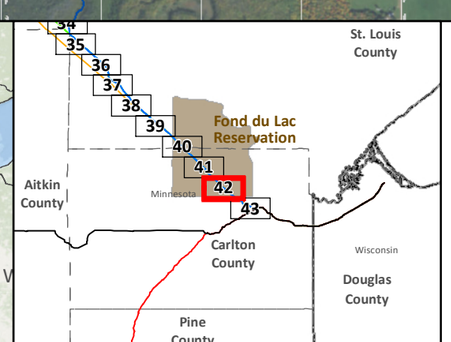

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 42A of 43

Big Lake
T49 R18W S28
T49 R18W S27
T49 R18W S26
T49 R18W S25
T49 R17W S30
T49 R17W S29
T49 R17W S28
Ottet Creek
Perch Lake Twsp Carlton Co.
Cloquet Forest Game Refuge
Cloquet Twsp Carlton Co.
T49 R18W S33
T49 R18W S34
T49 R18W S35
T49 R18W S36
T49 R17W S31
T49 R17W S32
T49 R17W S33
RA-06
RA-07
RA-08
Unnamed Stream
Wild Rice Lake
T48 R18W S4
T48 R18W S3
T48 R18W S2
T48 R18W S1
T48 R17W S6
T48 R17W S5
T48 R17W S4
North Carlton Twsp Carlton Co.
Twin Lakes Twsp Carlton Co.
Moose Horn River
T48 R18W S9
T48 R18W S10
T48 R18W S11
T48 R18W S12
T48 R17W S7
T48 R17W S8
T48 R17W S9
Little Otter Creek
327
328
329
330
331
210

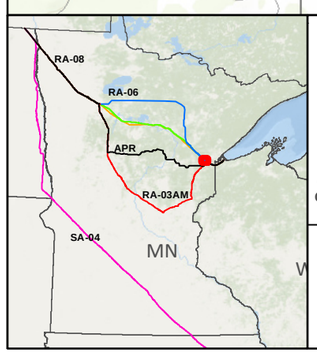

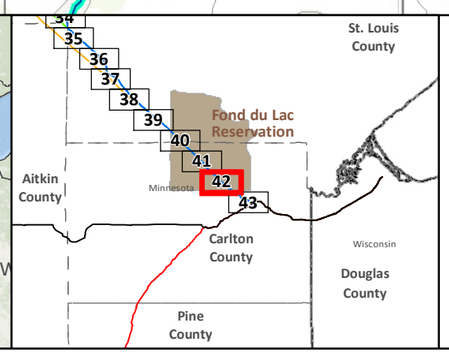

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
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Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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Lakes of Biological Significance
- Outstanding
- High
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Native Plant Communities with Biodiversity Significance
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Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 42B of 43

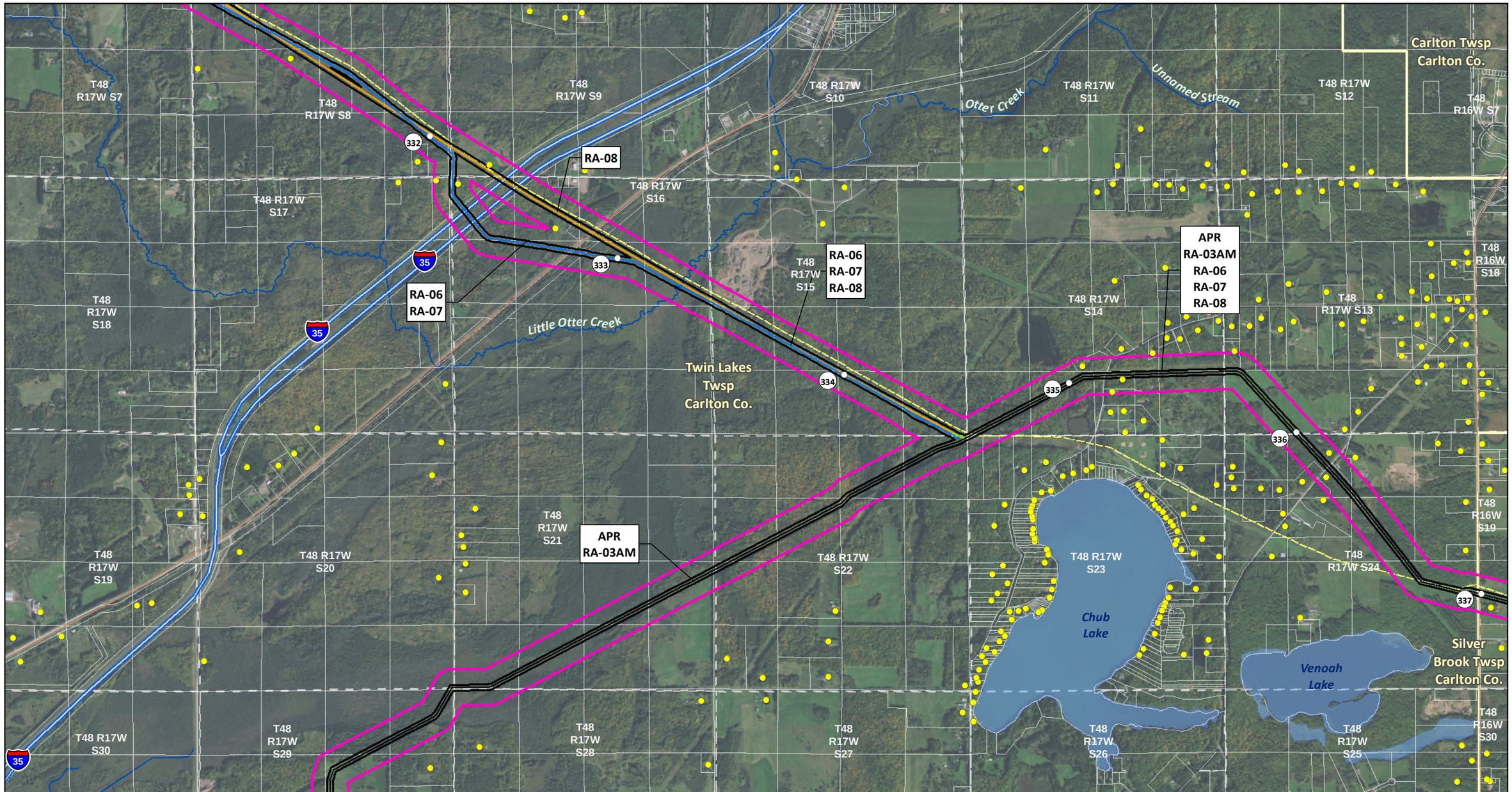

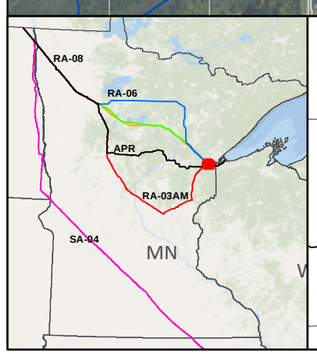

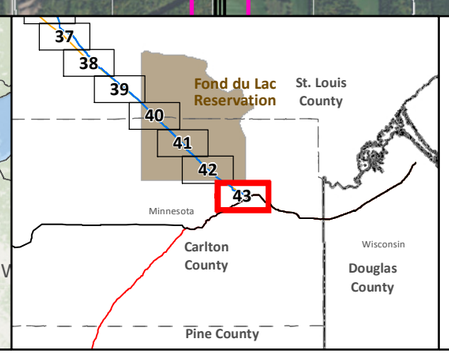

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
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0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-06

CLEARBROOK TO CARLTON

Map 43A of 43

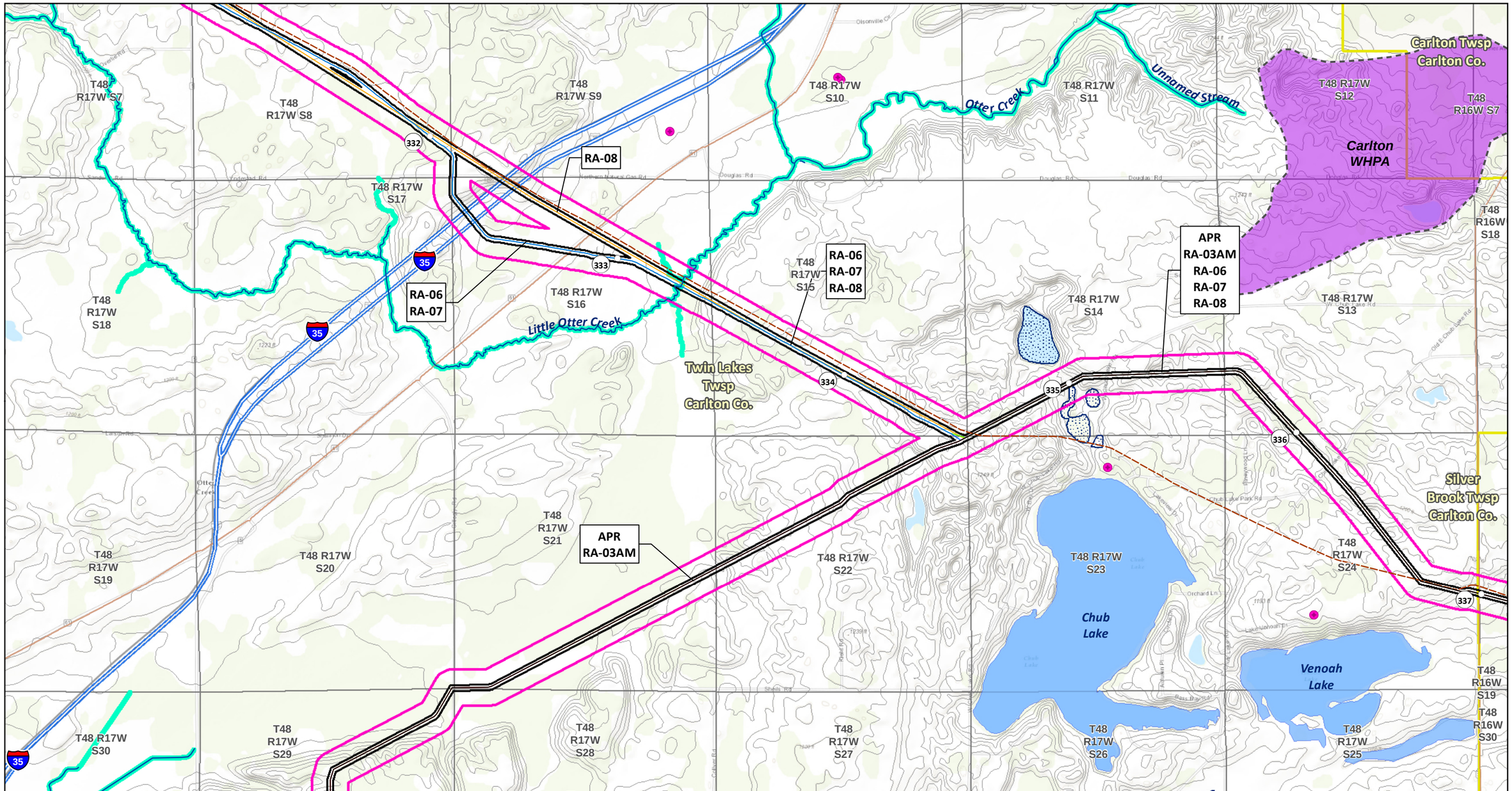

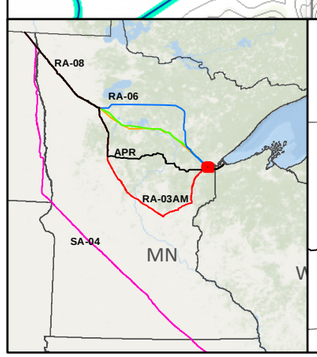

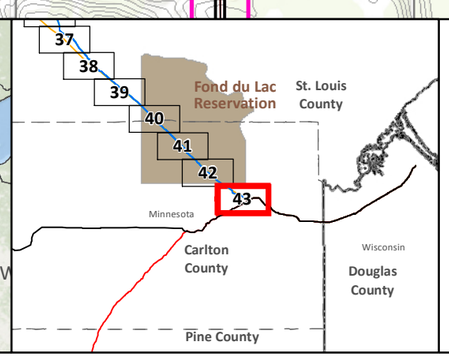

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-06

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 43B of 43

Minnesota Department of Commerce
Energy Environmental Review and Analysis

Final Environmental Impact Statement
Line 3 Project

Mapbook
RA-07 and RA-08

Docket Nos. PPL-15-137/CN-14-916

August 17, 2017

MINNESOTA

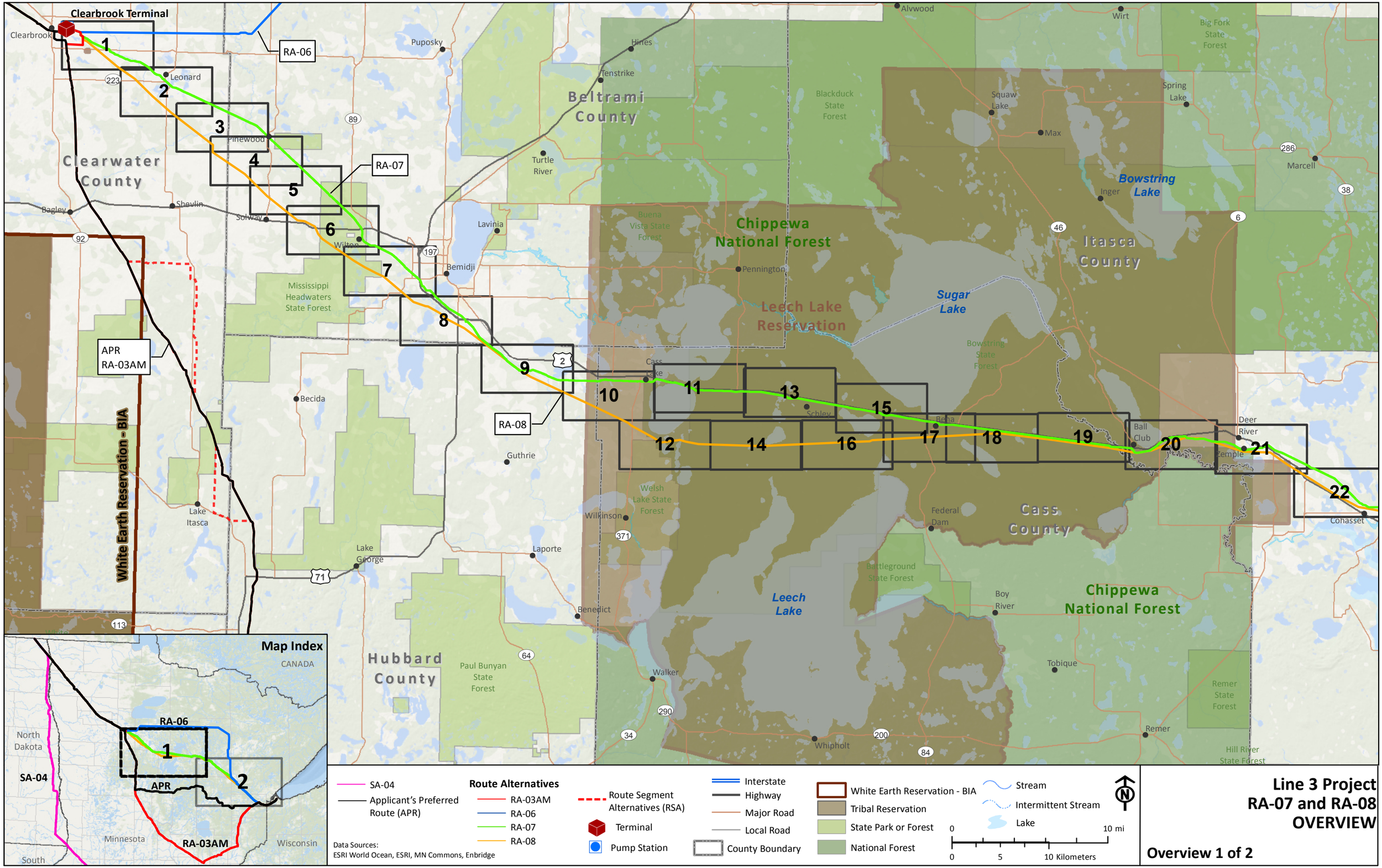
Clearbrook Terminal
Clearbrook
RA-06
RA-07
RA-08
APR
RA-03AM
Clearwater County
Beltrami County
Hubbard County
Cass County
Itasca County
Chippewa National Forest
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White Earth Reservation - BIA
Tribal Reservation
State Park or Forest
National Forest
Stream
Intermittent Stream
Lake
0 10 mi
0 5 10 Kilometers
Data Sources:
ESRI World Ocean, ESRI, MN Commons, Enbridge
Line 3 Project
RA-07 and RA-08
OVERVIEW
Overview 1 of 2

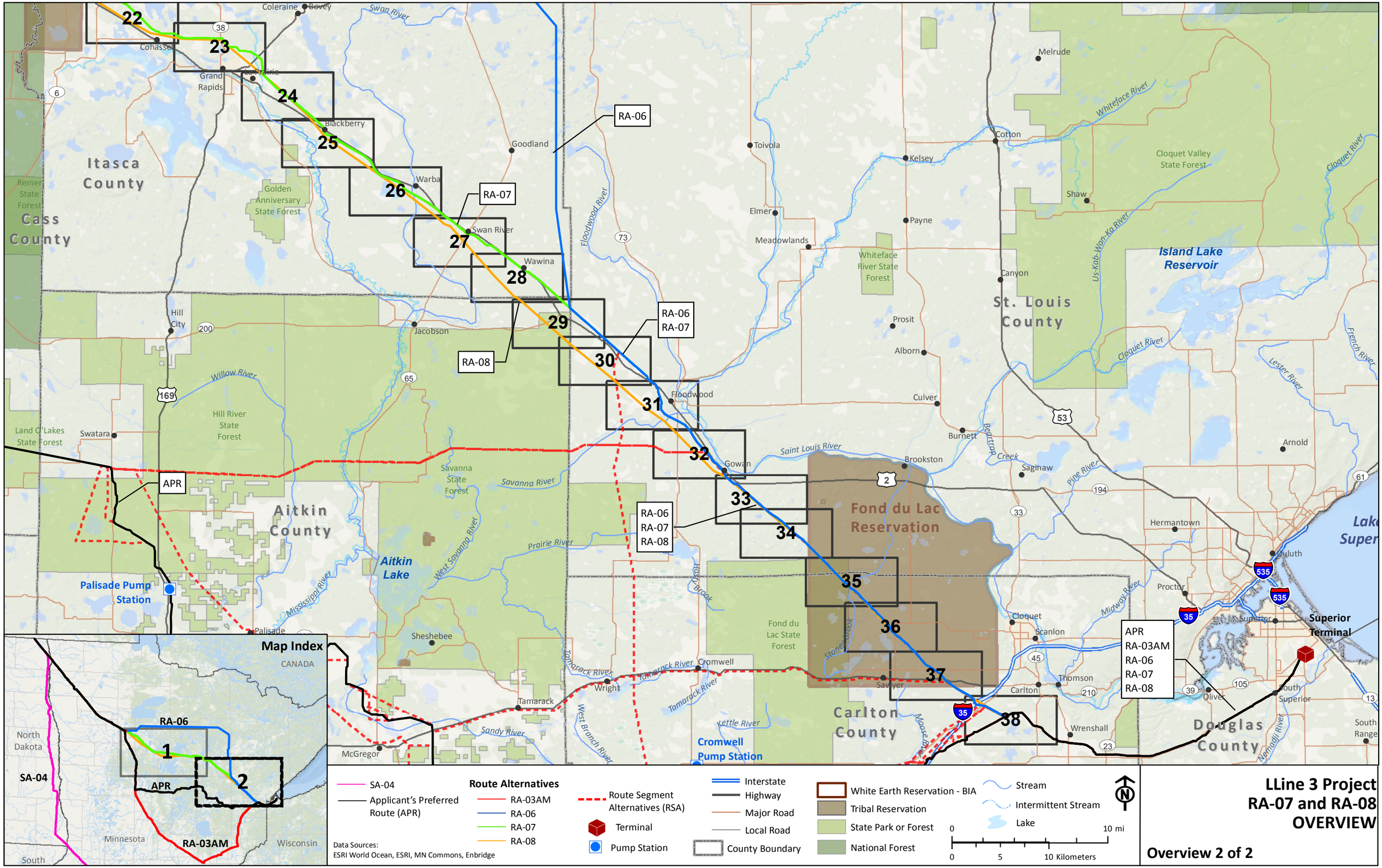
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St. Louis County
Douglas County
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Island Lake Reservoir
Aitkin Lake
Palisade Pump Station
Cromwell Pump Station
Superior Terminal
Coleraine
Bovey
Cohasset
Grand Rapids
Blackberry
Goodland
Warba
Swan River
Wawina
Jacobson
Hill City
Swatara
Floodwood
Gowan
Brookston
Toivola
Elmer
Meadowlands
Kelsey
Payne
Prosit
Alborn
Culver
Burnett
Saginaw
Cotton
Melrude
Shaw
Canyon
Arnold
Hermantown
Duluth
Proctor
Superior
Cloquet
Scanlon
Thomson
Carlton
Wrenshall
Oliver
South Superior
South Range
Sheshebee
Palisade
Tamarack
Wright
Cromwell
Sawyer
McGregor
Swan River
Willow River
Savanna River
Prairie River
Mississippi River
West Savanna River
Tamarack River
Sandy River
West Branch River
Kettle River
Floodwood River
Saint Louis River
Bear Trap Creek
Pine River
Whiteface River
Us-Kab-Wan-Ka River
Cloquet River
Lester River
French River
Midway River
Nemadji River
Moose River
Stony Brook
Hoson Brook
Land O'Lakes State Forest
Remer State Forest
Golden Anniversary State Forest
Hill River State Forest
Savanna State Forest
Fond du Lac State Forest
Whiteface River State Forest
Cloquet Valley State Forest
Lake Superior
RA-06
RA-07
RA-08
RA-06
RA-07
RA-08
RA-08
APR
APR
RA-03AM
RA-06
RA-07
RA-08
SA-04
Applicant's Preferred Route (APR)
Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Route Segment Alternatives (RSA)
Terminal
Pump Station
Interstate
Highway
Major Road
Local Road
County Boundary
White Earth Reservation - BIA
Tribal Reservation
State Park or Forest
National Forest
Stream
Intermittent Stream
Lake
0 5 10 Kilometers
0 10 mi
Data Sources:
ESRI World Ocean, ESRI, MN Commons, Enbridge
LLine 3 Project
RA-07 and RA-08
OVERVIEW
Overview 2 of 2

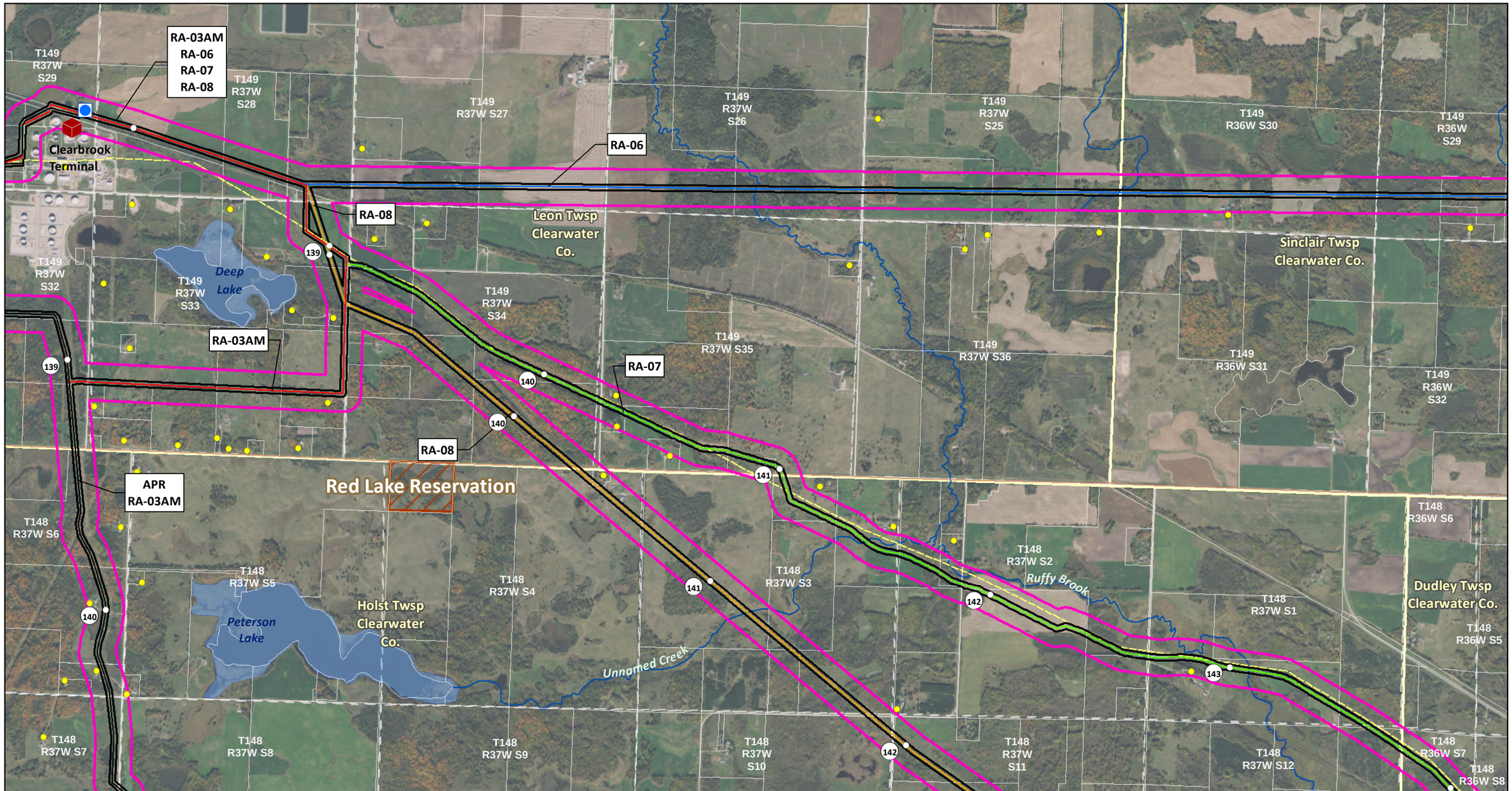

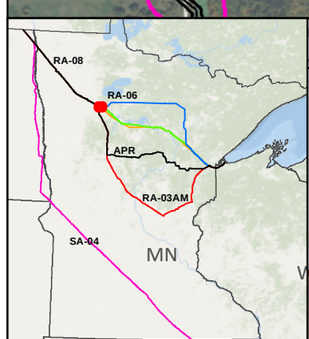

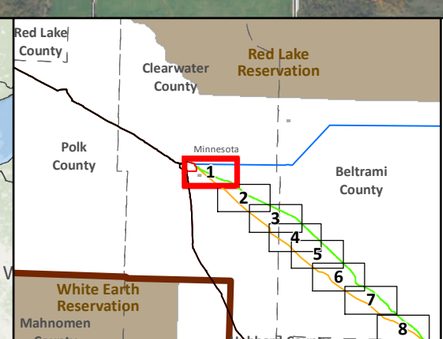

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 1A of 38

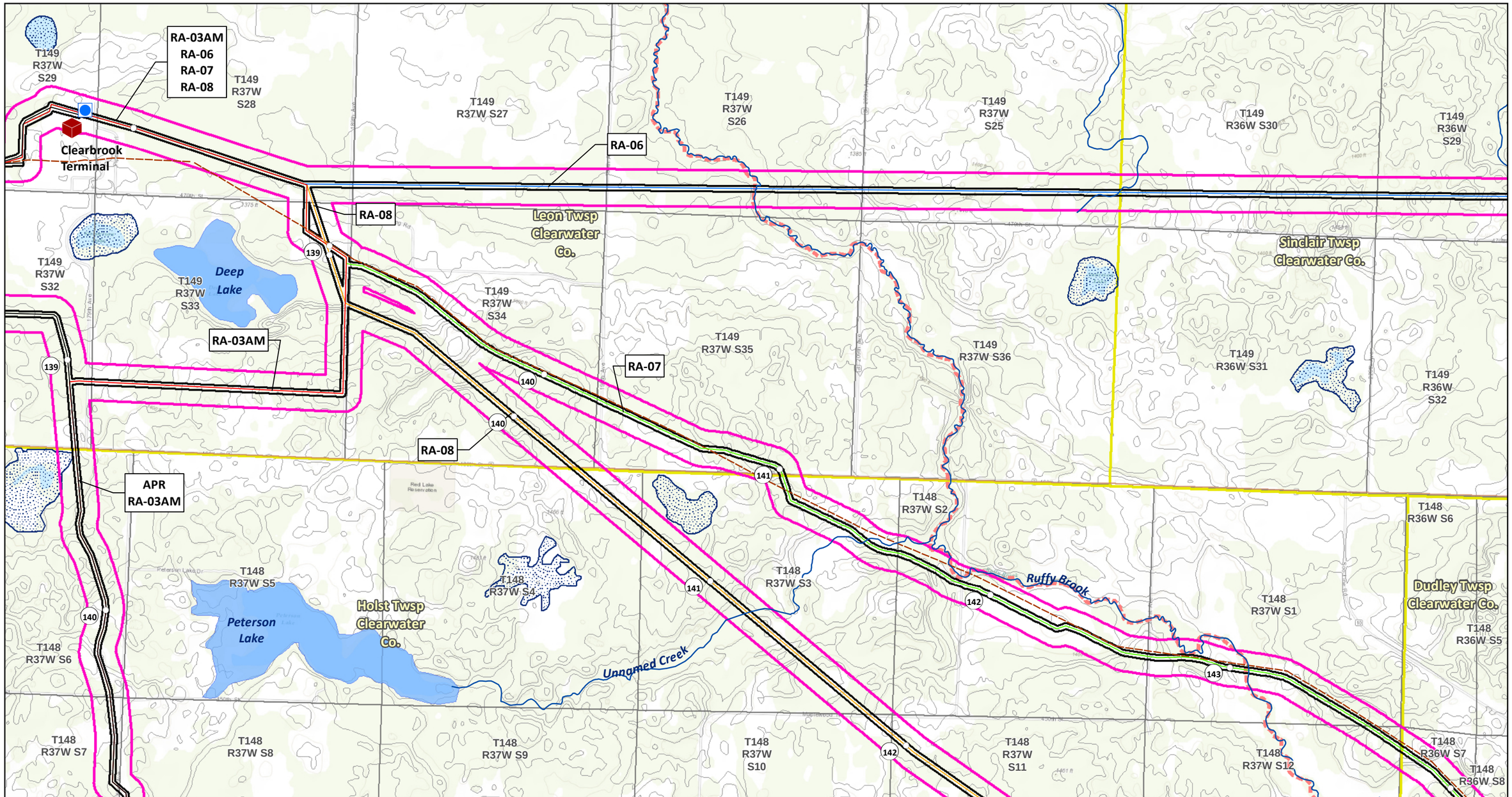

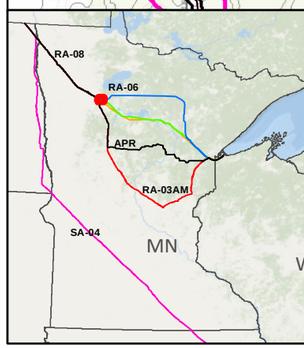

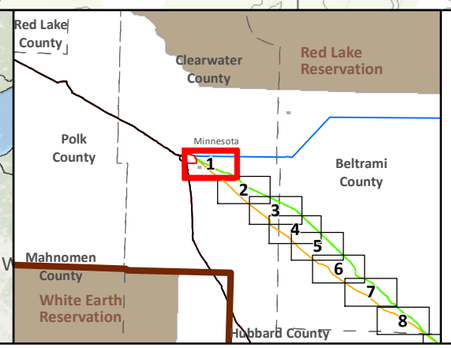

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 1B of 38

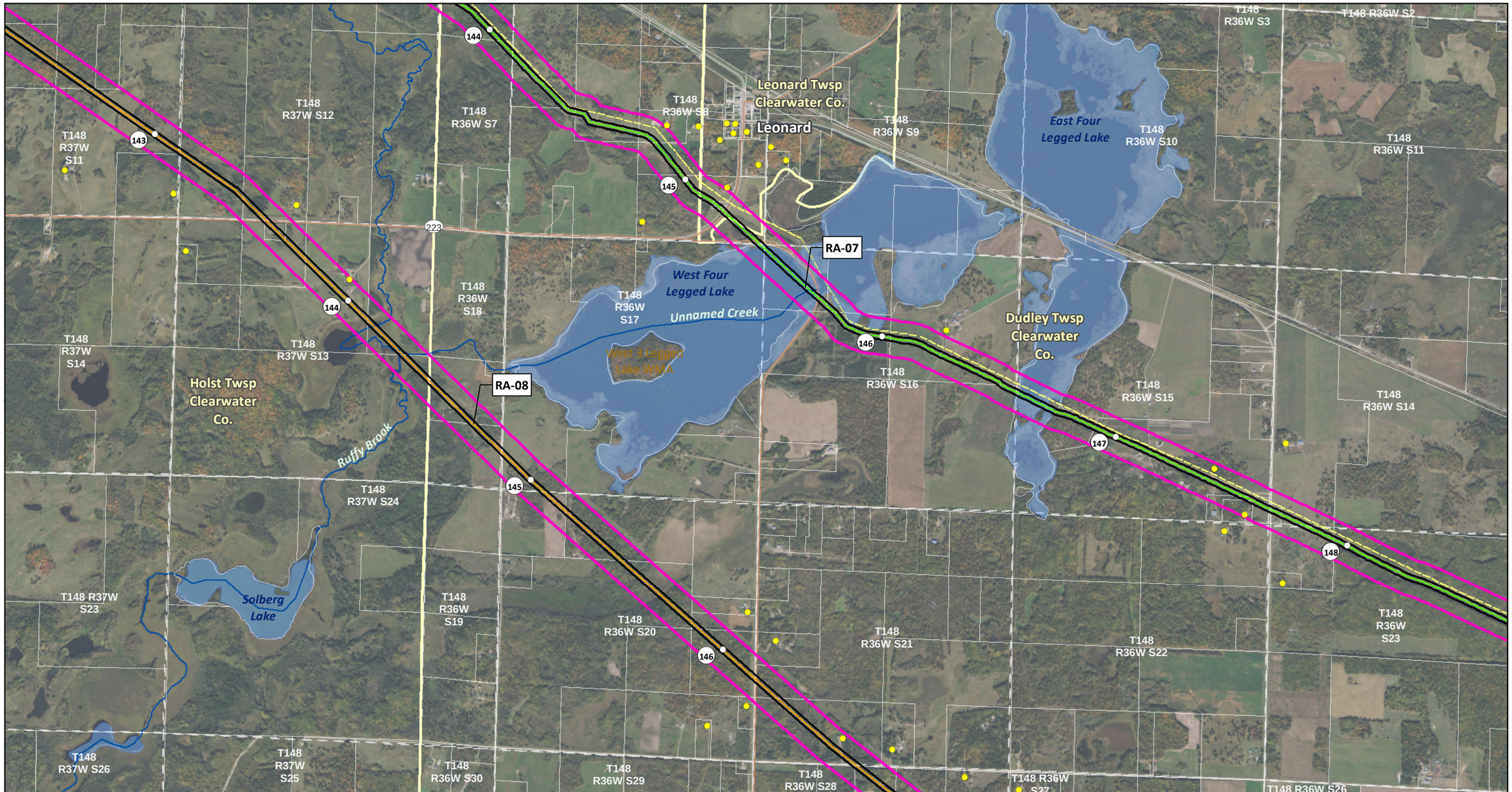

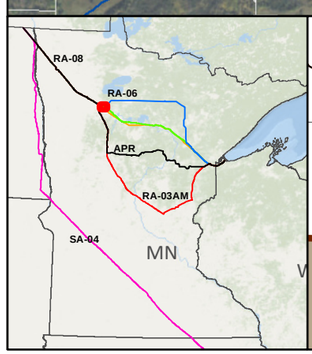

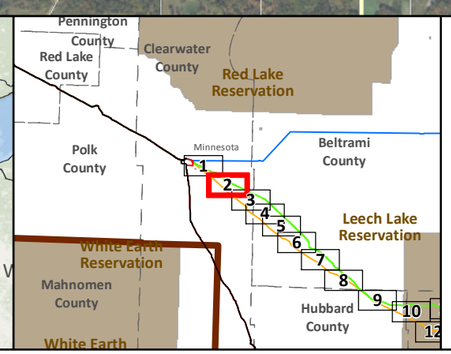

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 2A of 38

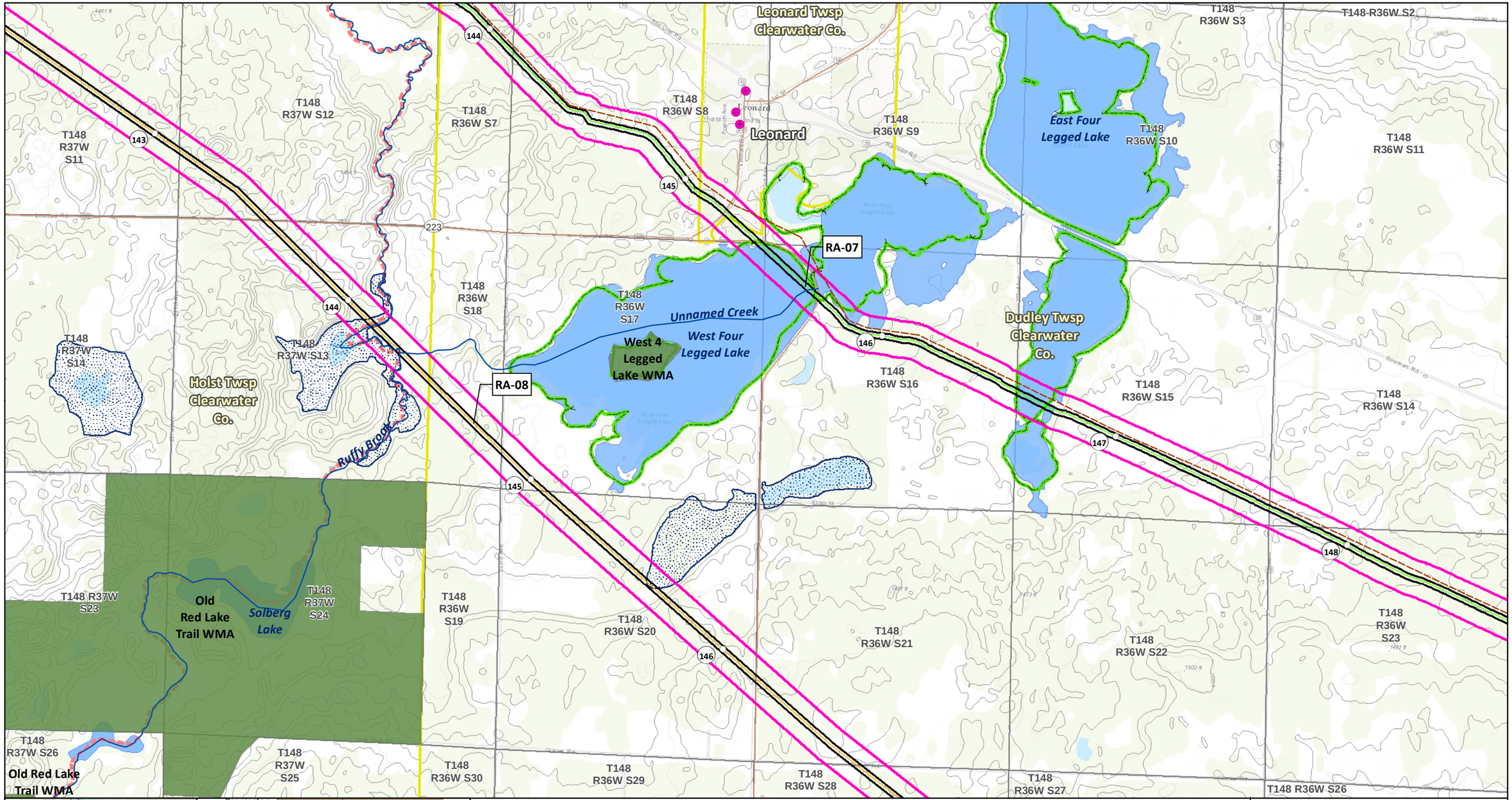

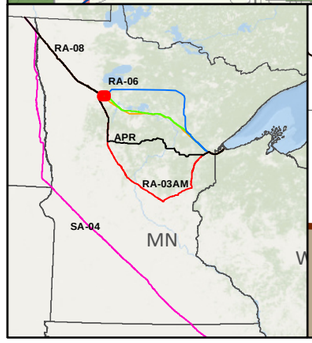

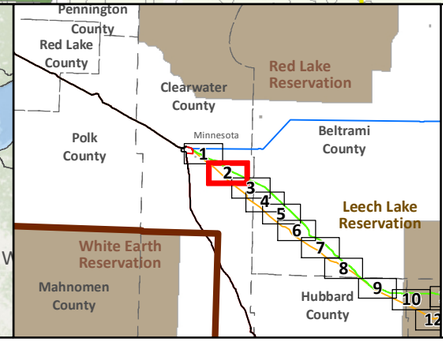

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 2B of 38

T148 R36W S21
T148 R36W S22
T148 R36W S23
T148 R36W S24
T148 R35W S19
RA-07
Clearwater River
T148 R35W S20
Buzzle Lake
T148 R35W S21
Spring Lake Creek
T148 R36W S26
T148 R36W S27
T148 R36W S28
Dudley Twsp Clearwater Co.
T148 R36W S25
T148 R35W S30
Buzzle Twsp Beltrami Co.
T148 R35W S29
T148 R35W S28
T148 R36W S33
T148 R36W S34
RA-08
T148 R36W S35
T148 R36W S36
T148 R35W S31
T148 R35W S32
T148 R35W S33
Unnamed Creek
T147 R36W S4
T147 R36W S3
T147 R36W S2
Shevlin Twsp Clearwater Co.
T147 R36W S1
T147 R35W S6
Lammers Twsp Beltrami Co.
T147 R35W S5
T147 R35W S4

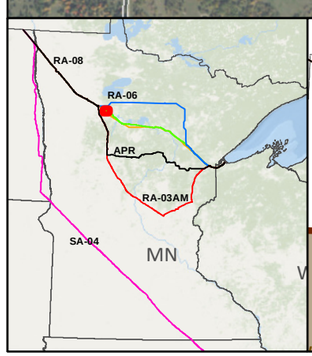

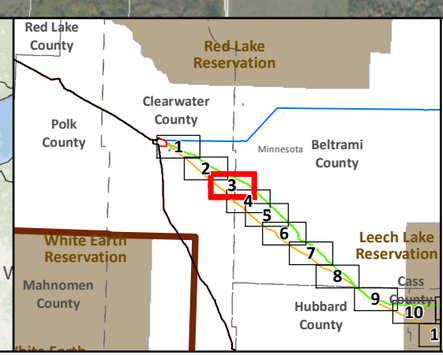

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation
Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

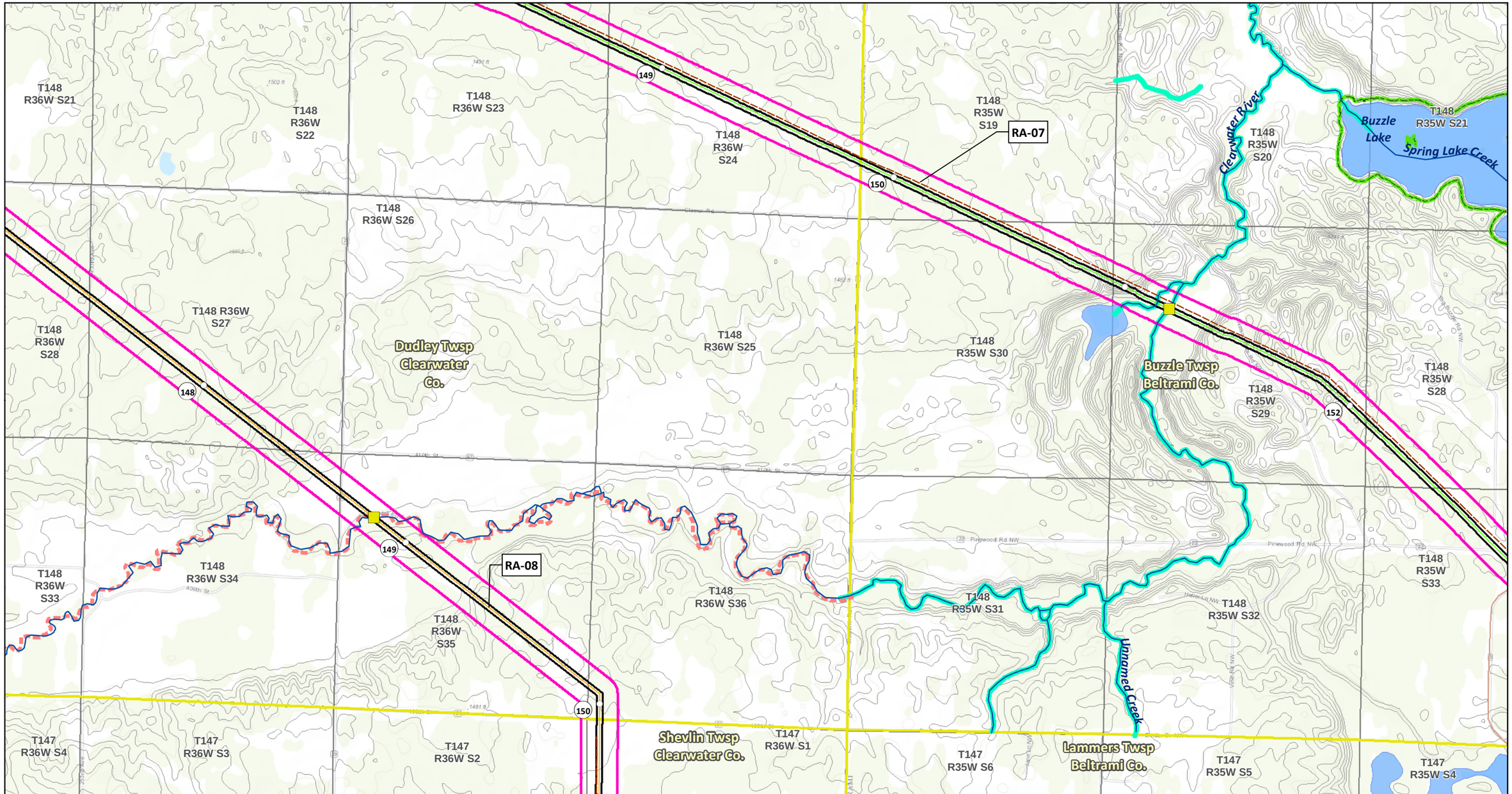

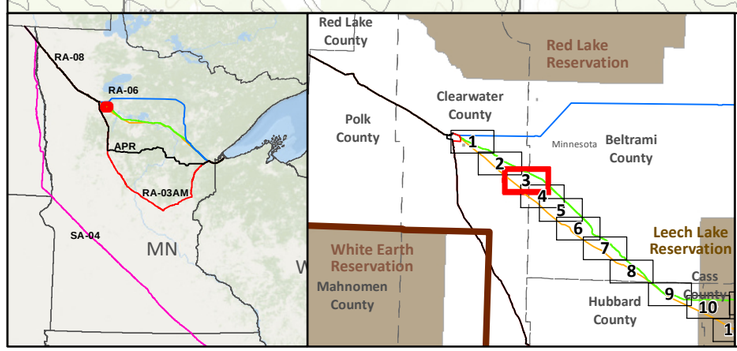

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 3B of 38

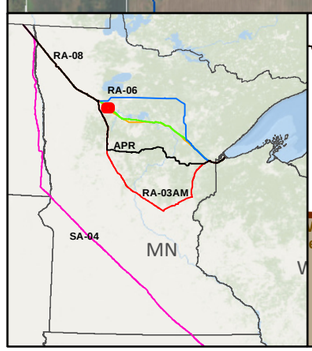

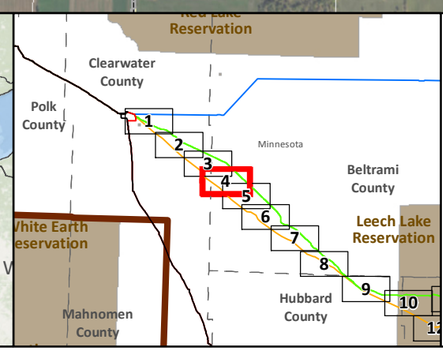

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 4A of 38

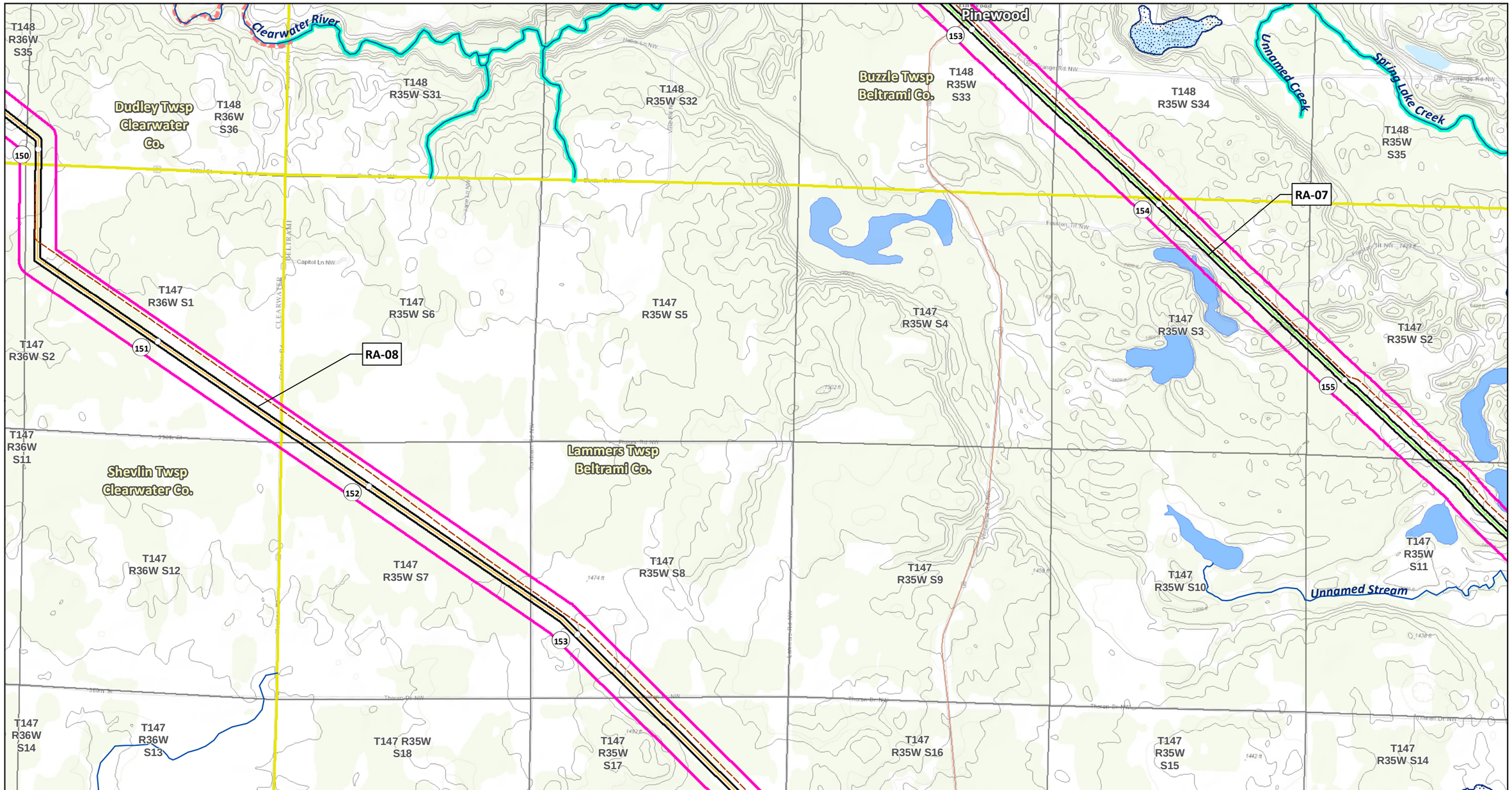

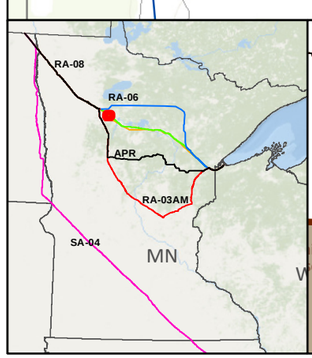

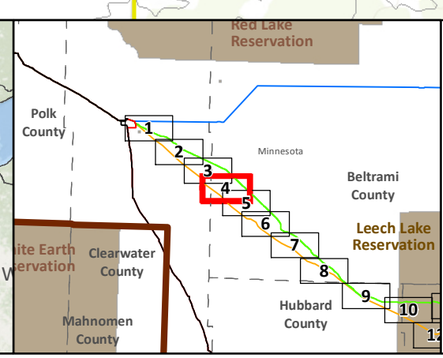

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
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Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
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Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
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- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 4B of 38

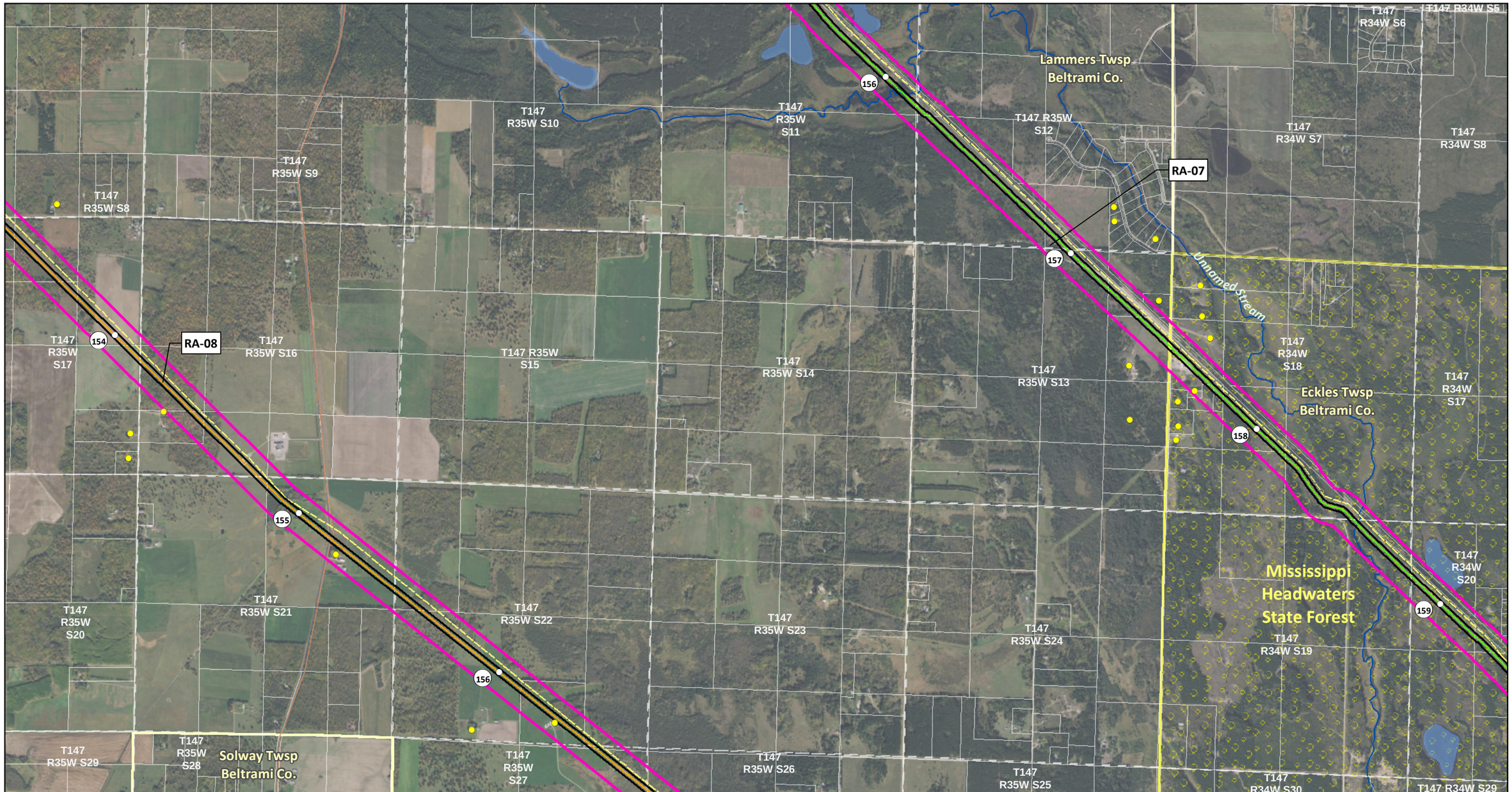

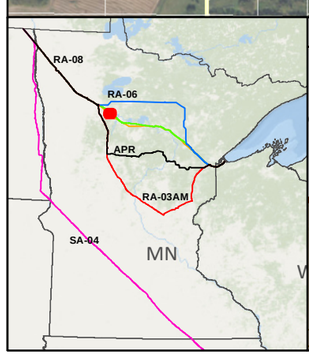

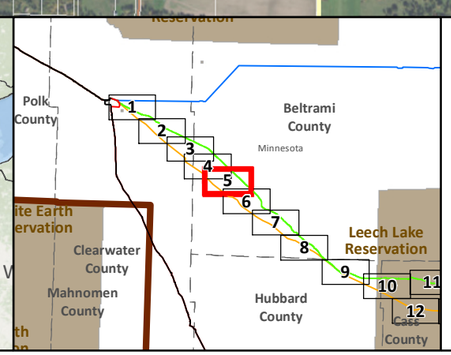

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 5A of 38

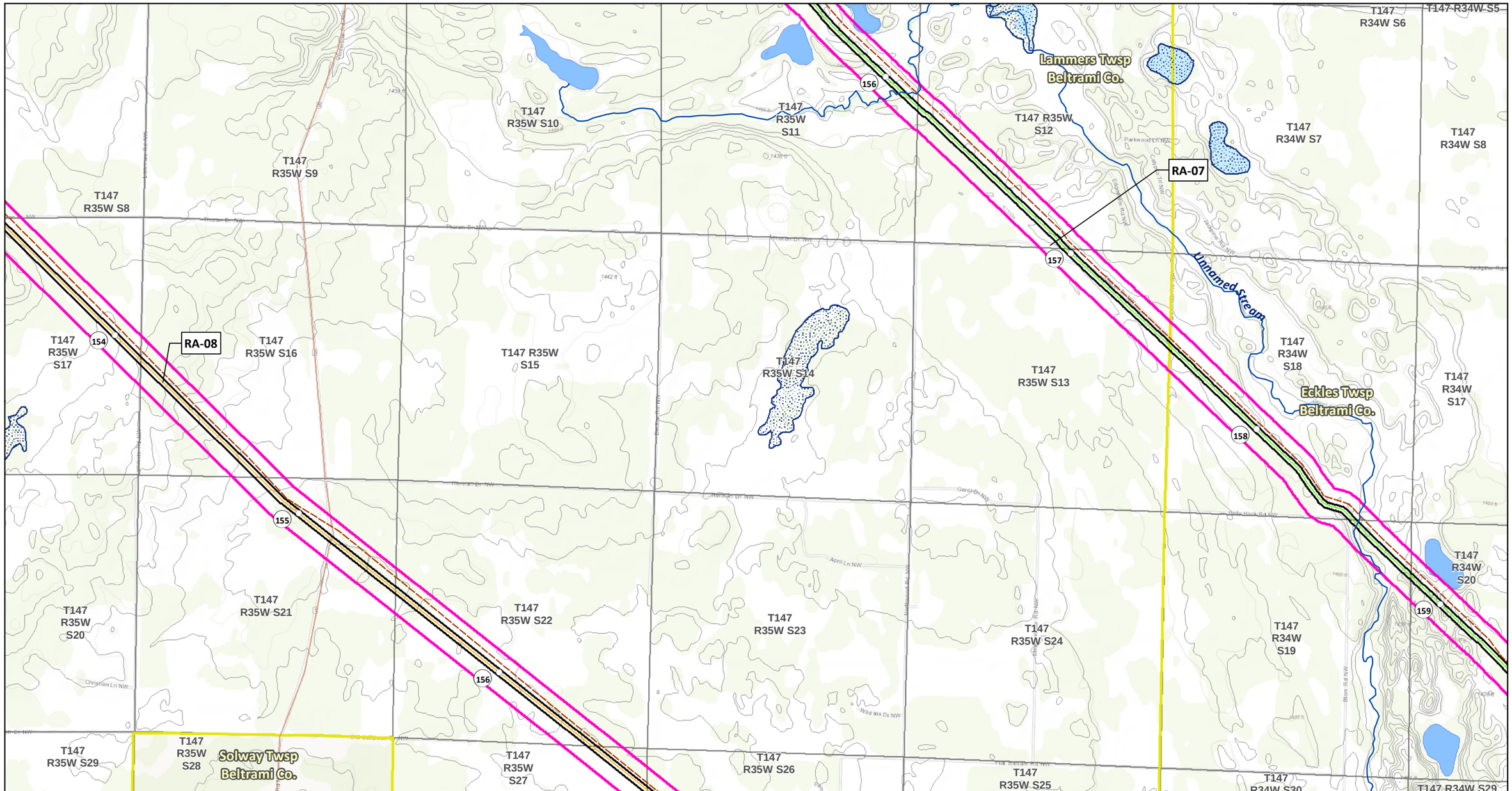

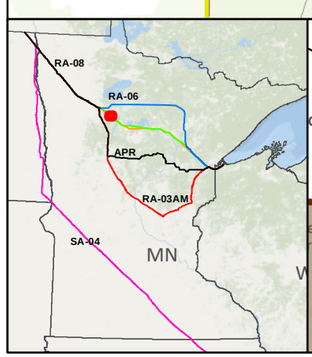

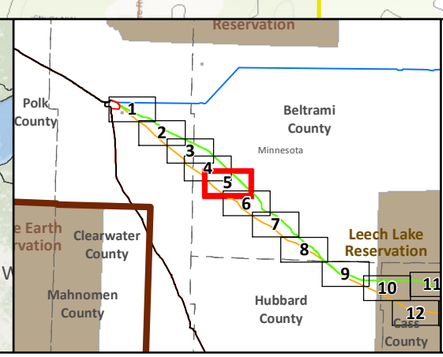

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

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303d Imparied Waters
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Lakes of Biological Significance
- Outstanding
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- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 5B of 38

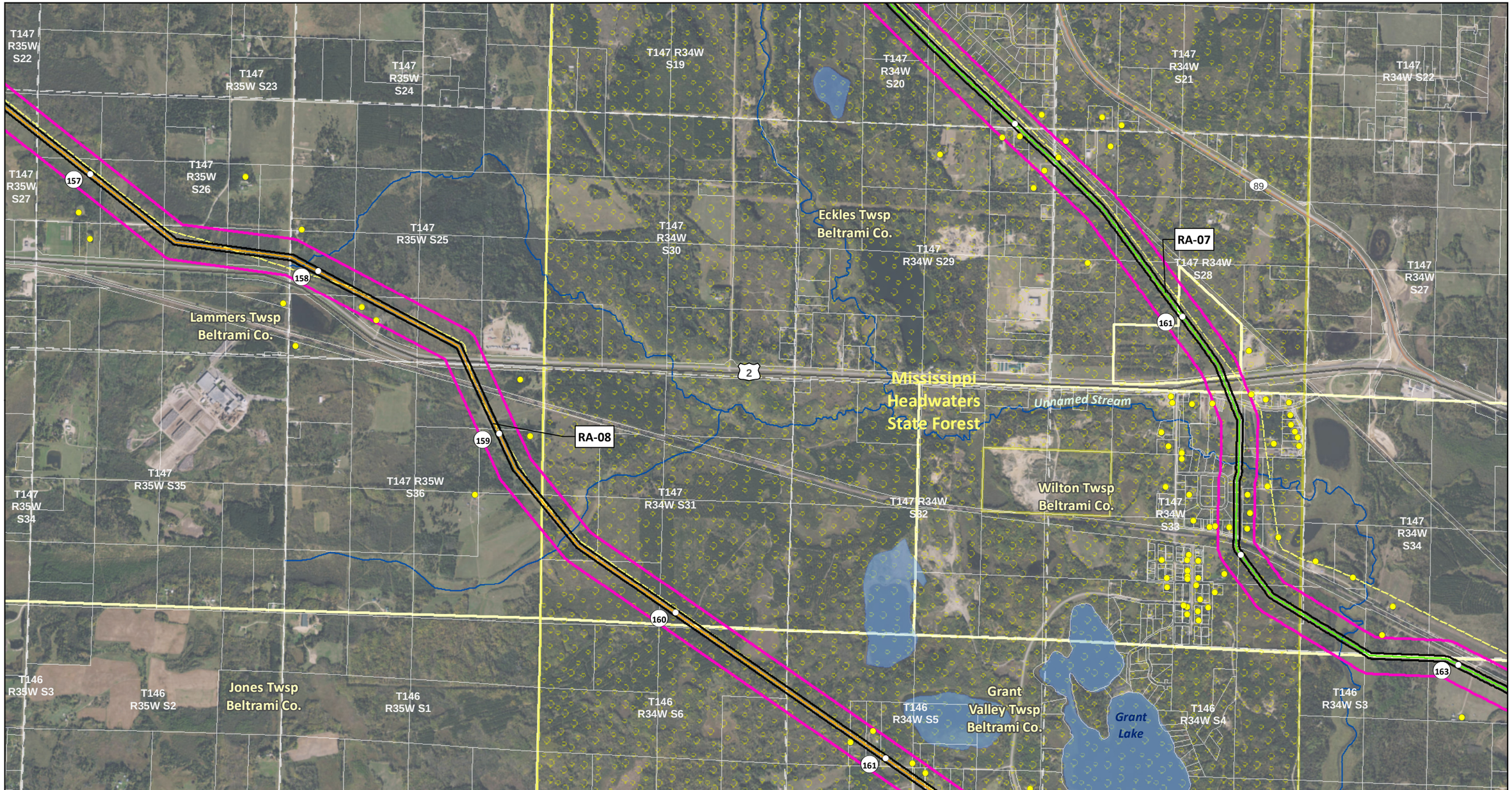

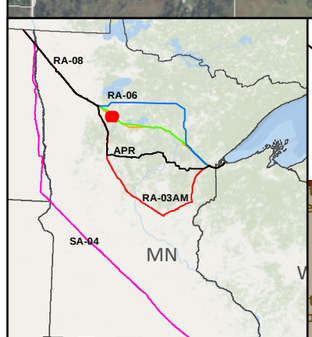

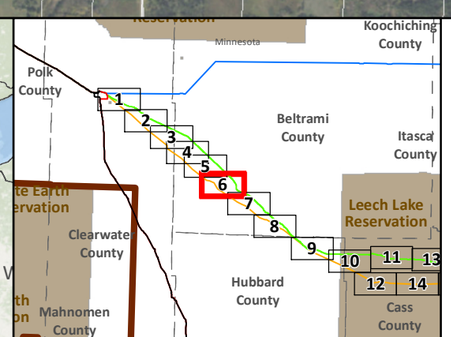

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 6A of 38

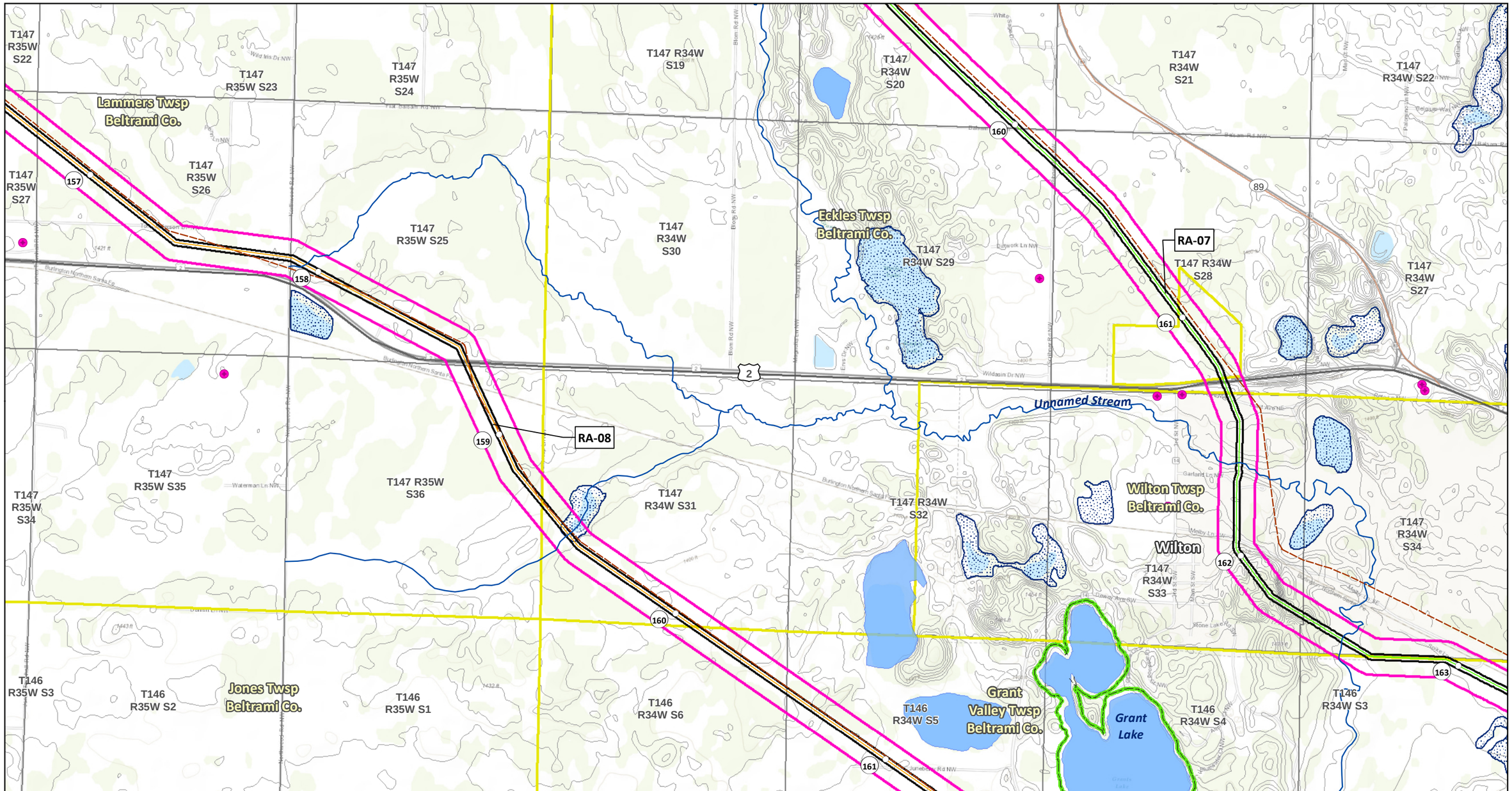

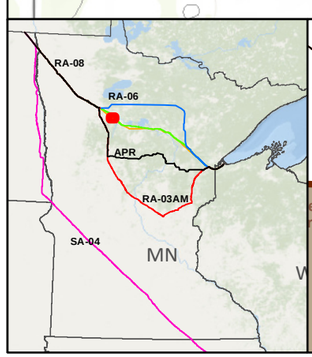

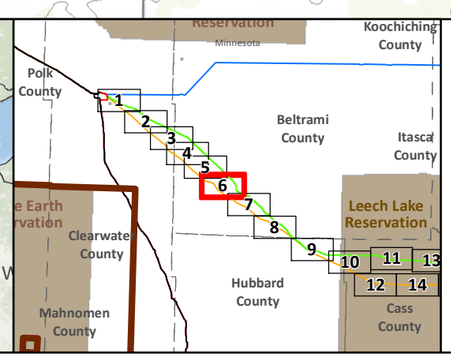

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 6B of 38

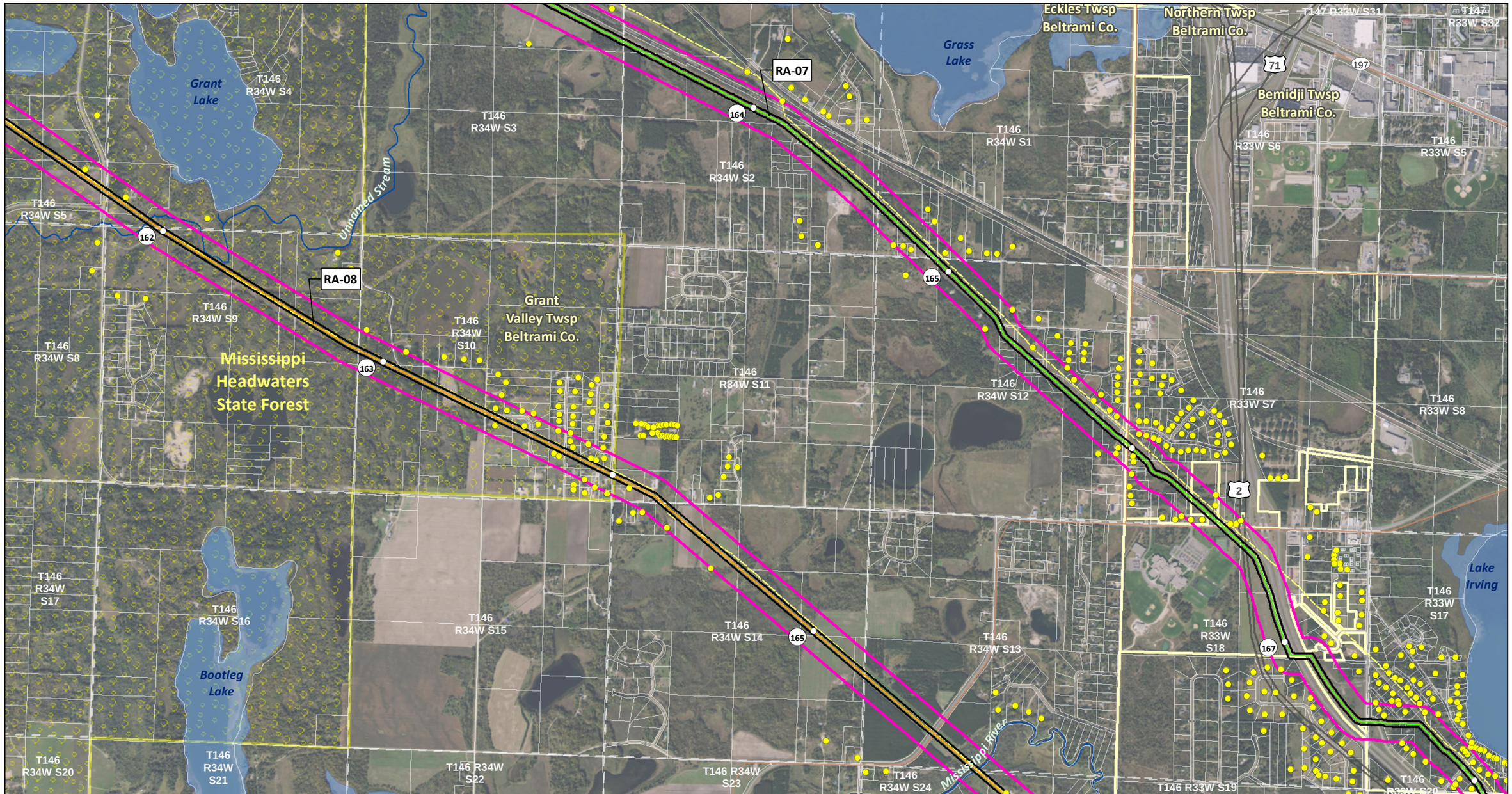

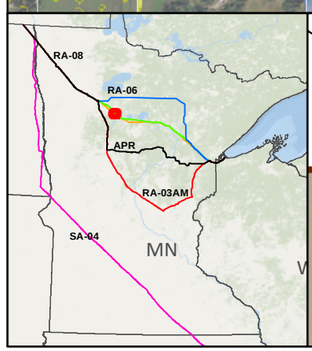

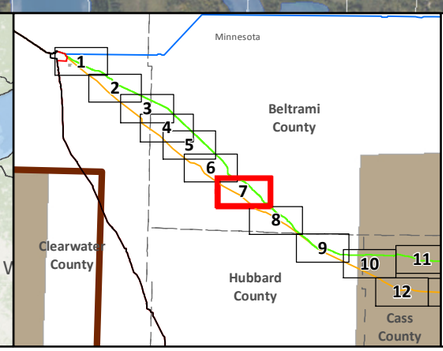

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 7A of 38

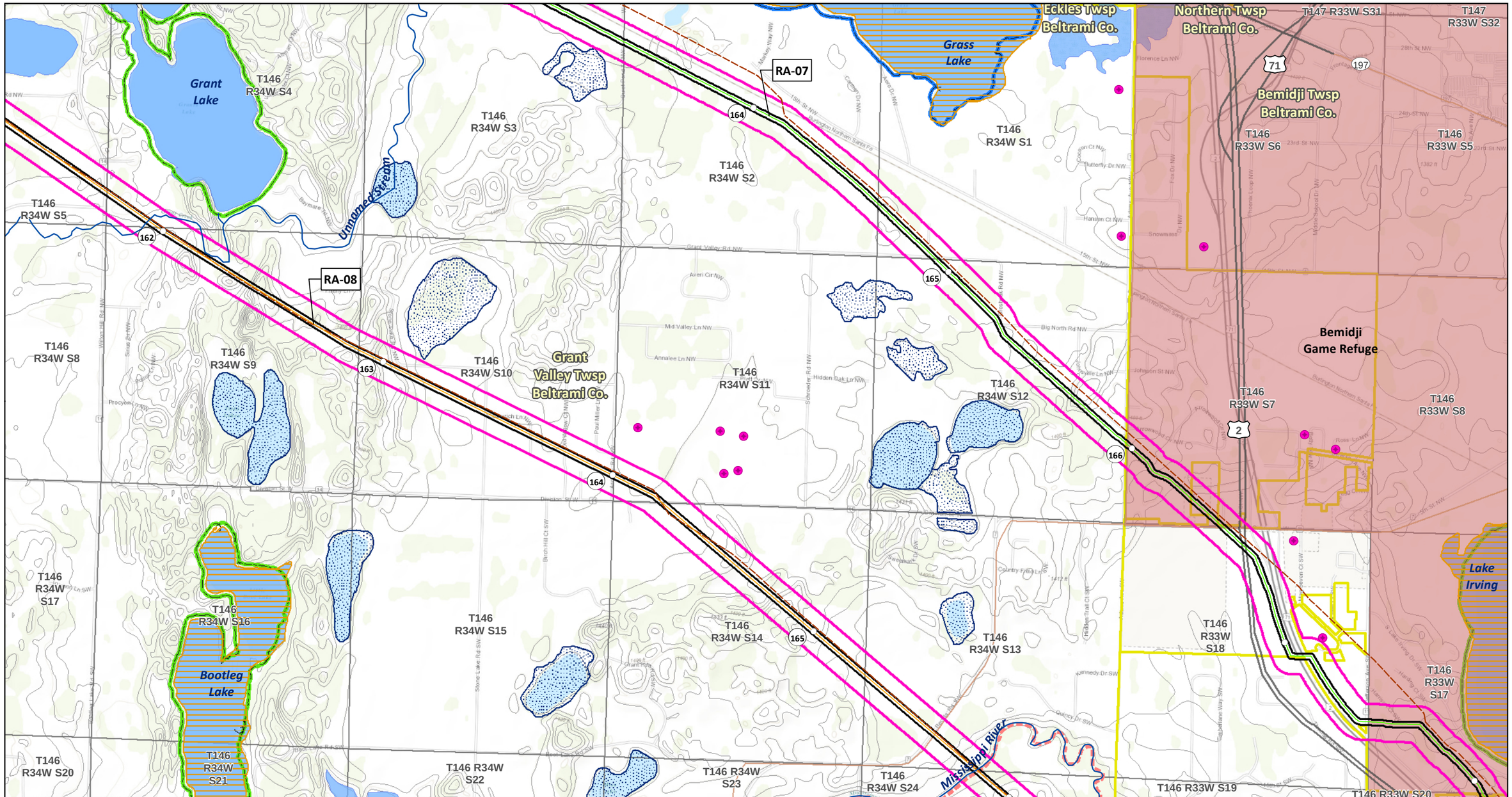

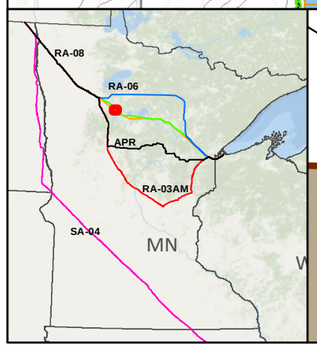

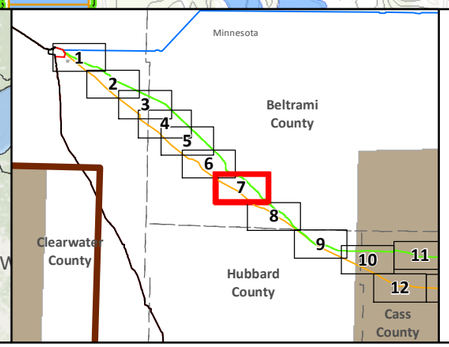

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 7B of 38

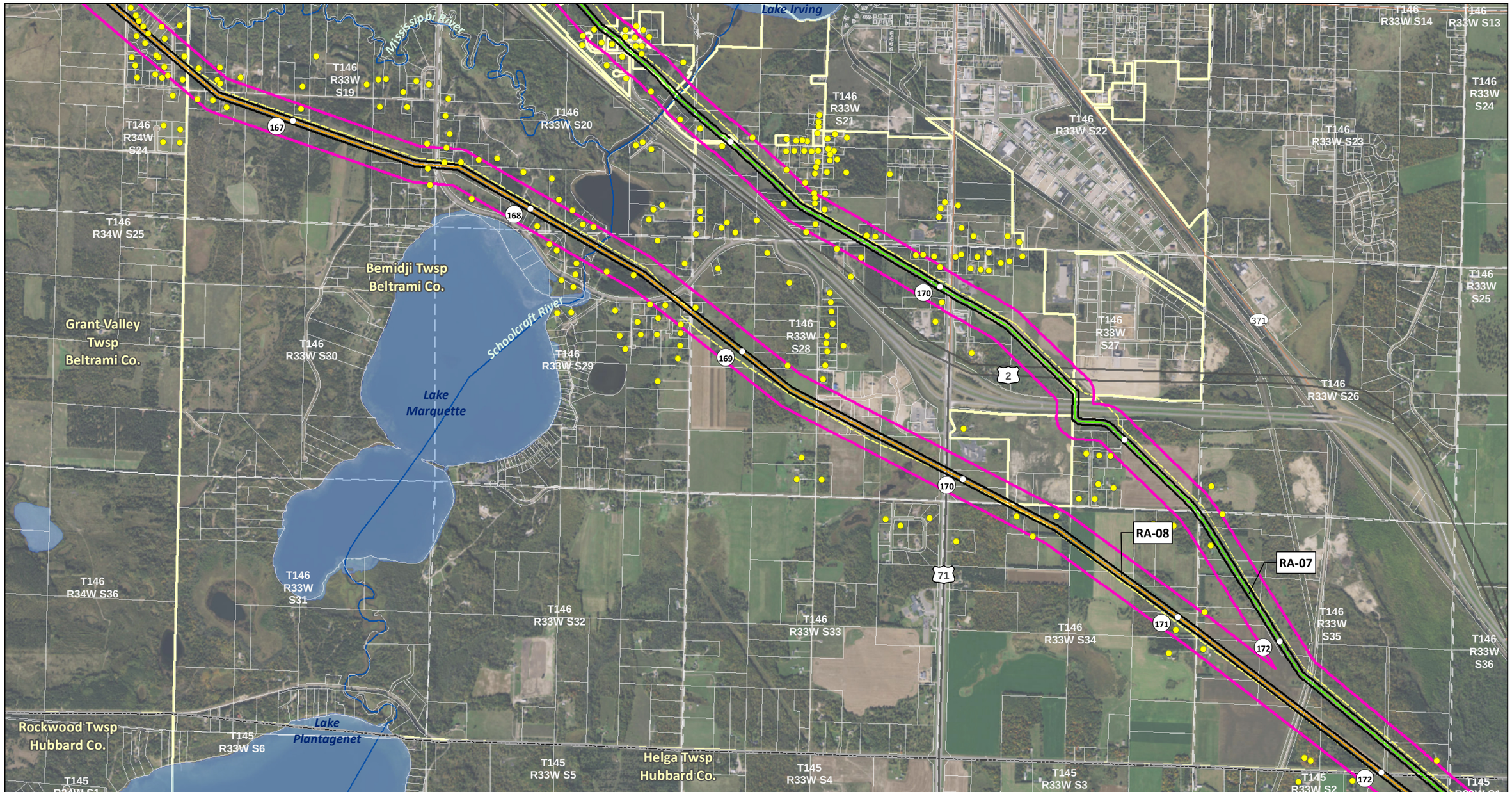

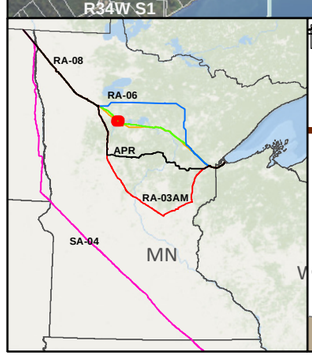

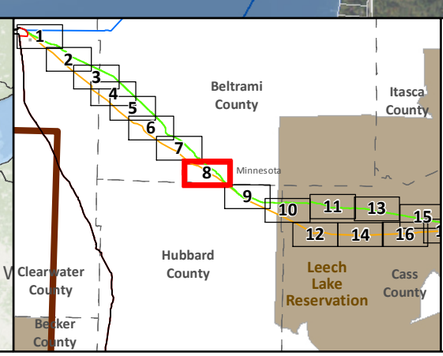

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 8A of 38

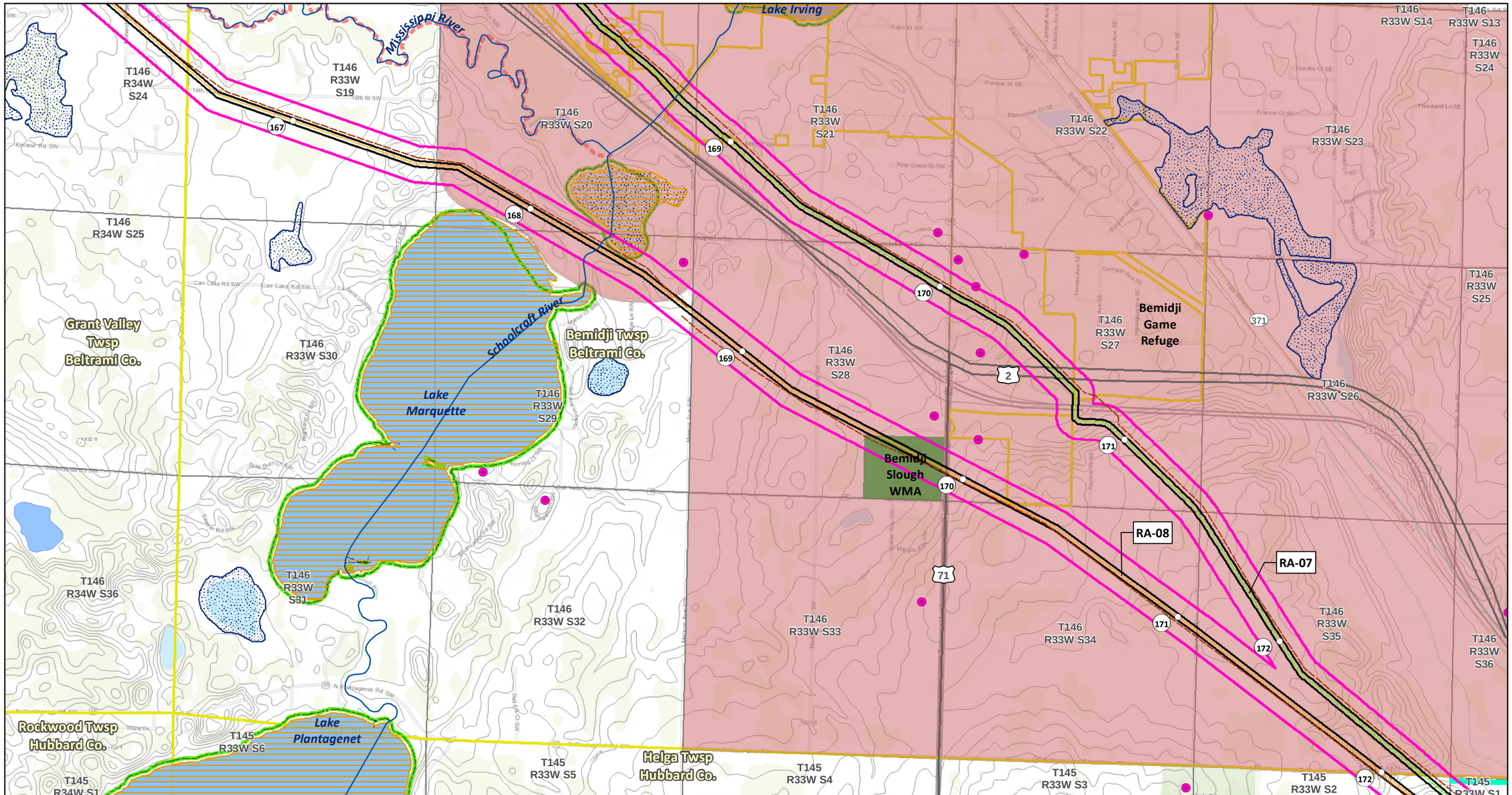

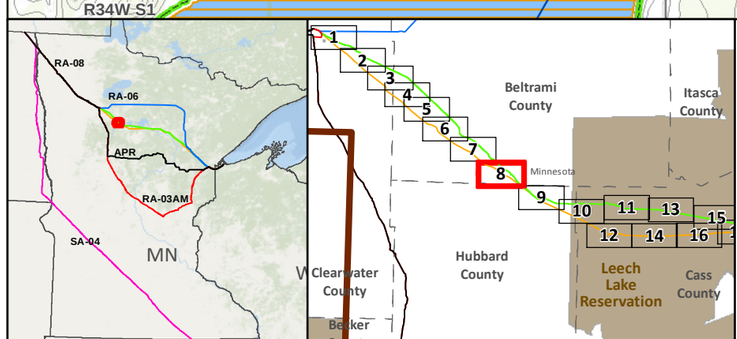

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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303d Imparied Waters
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
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- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
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Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 8B of 38

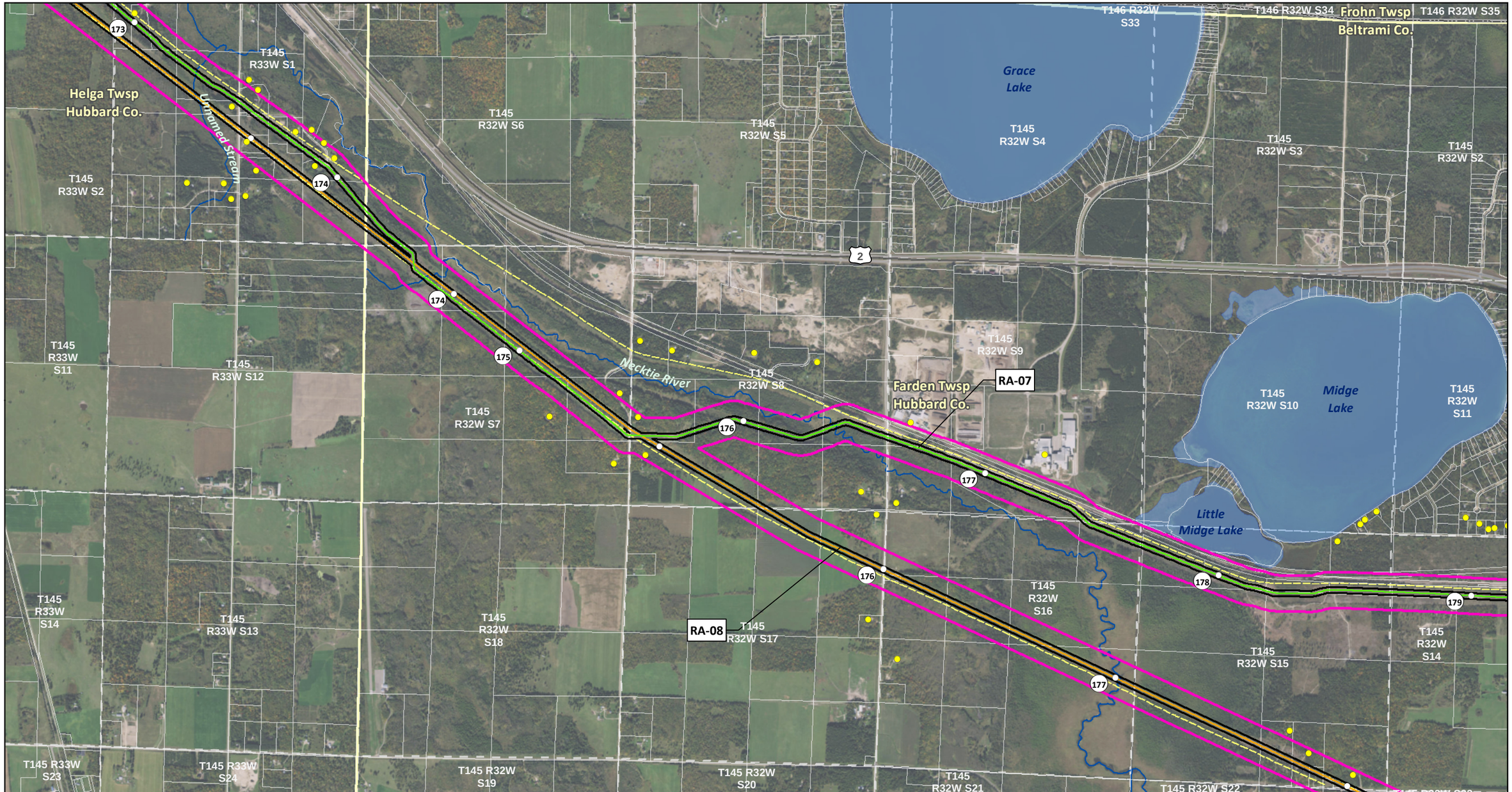

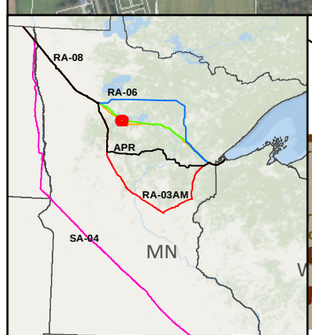

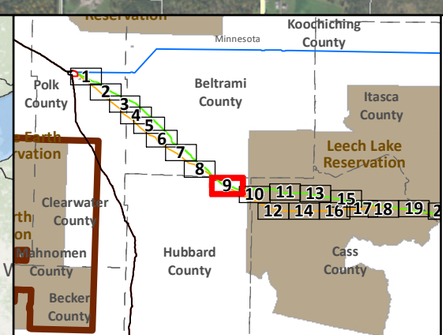

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 9A of 38

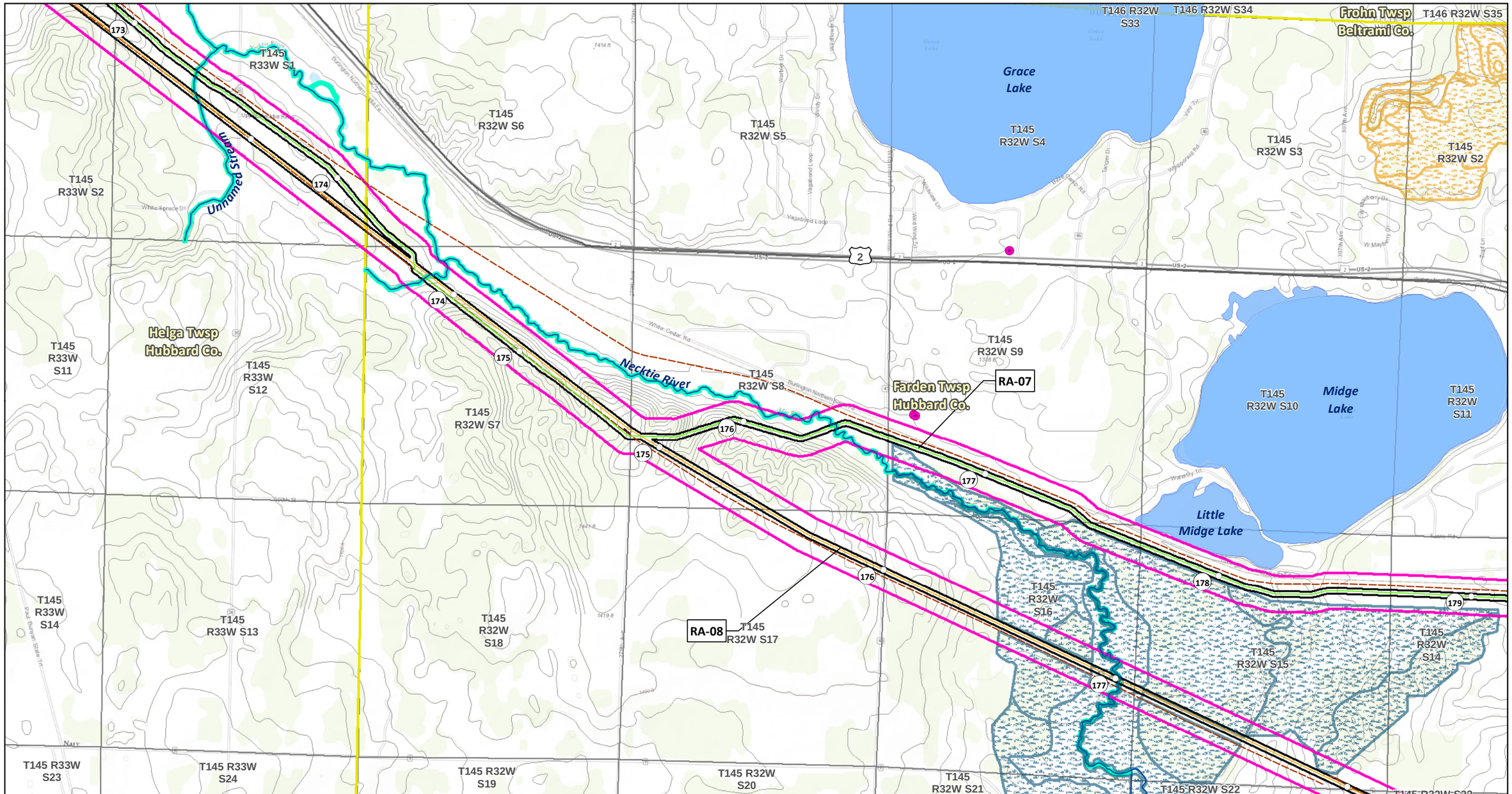

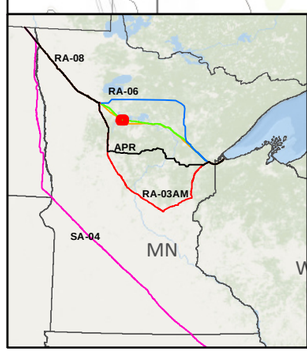

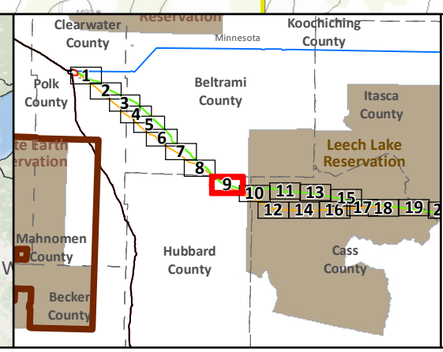

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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- SNA - Scientific and Natural Area

Water Resources
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- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 9B of 38

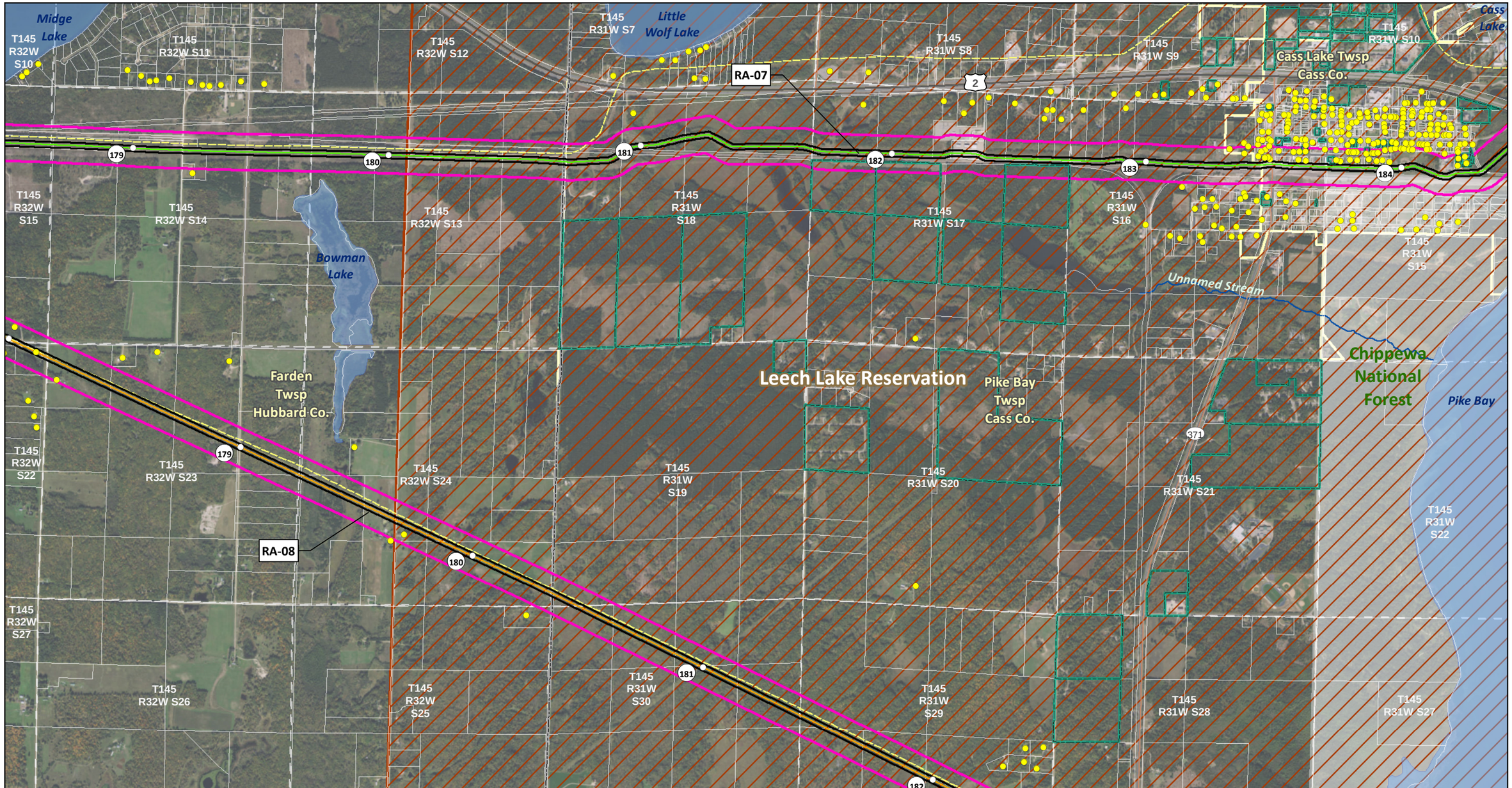

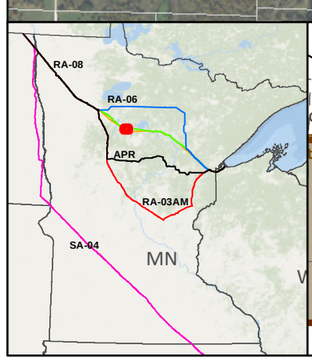

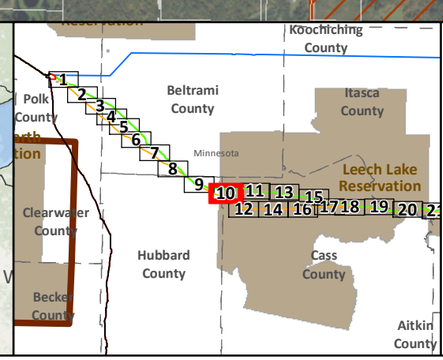

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
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- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

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0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 10A of 38

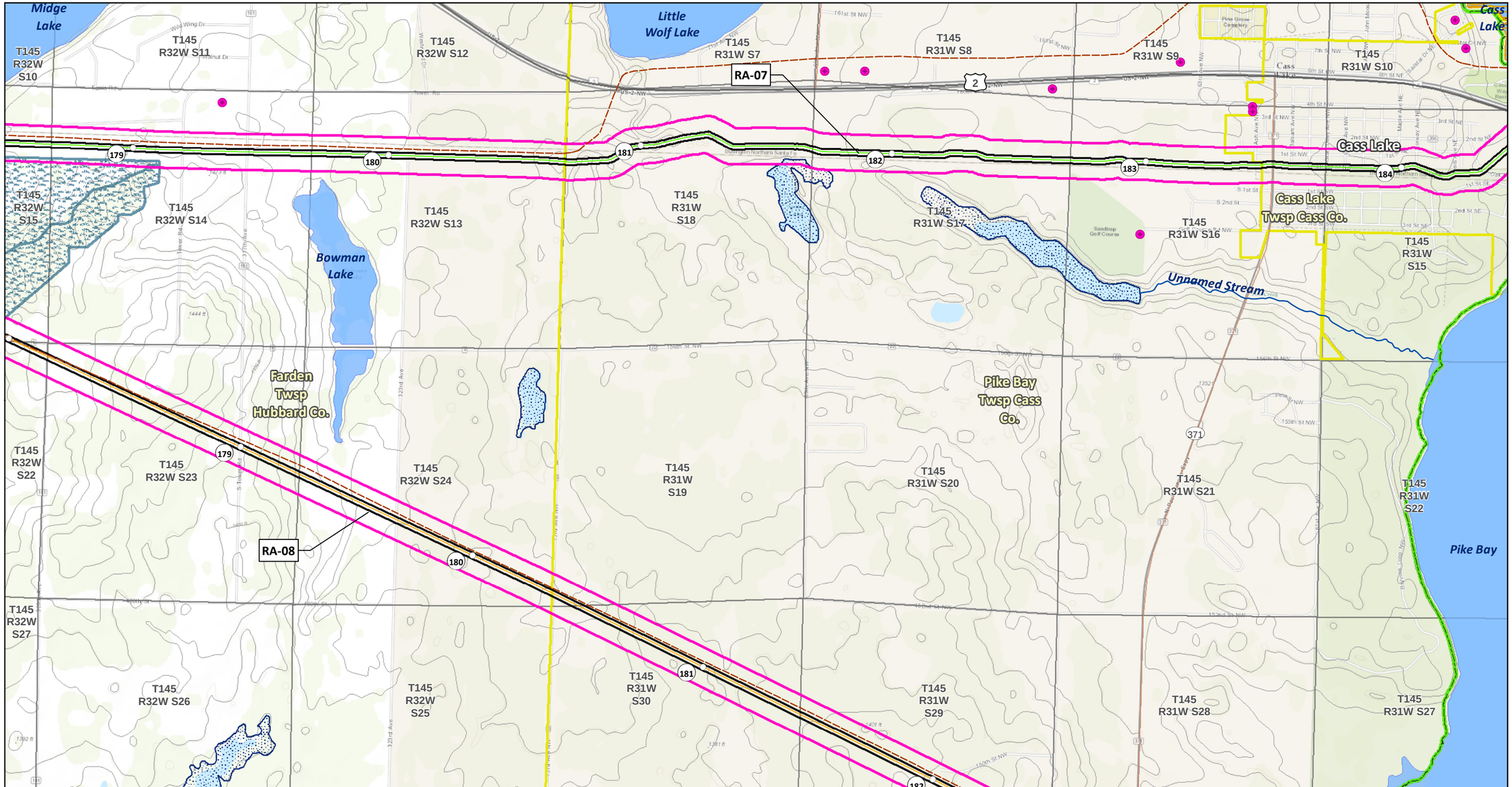

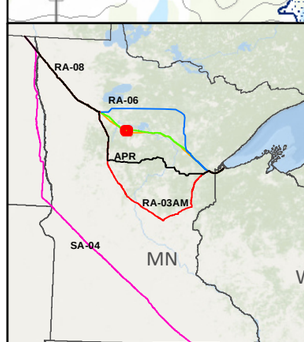

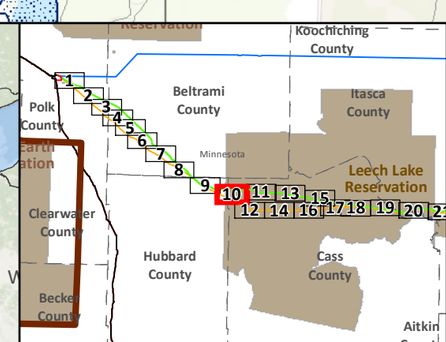

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
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- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

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Native Plant Communities with Biodiversity Significance
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Pump Station

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 10B of 38

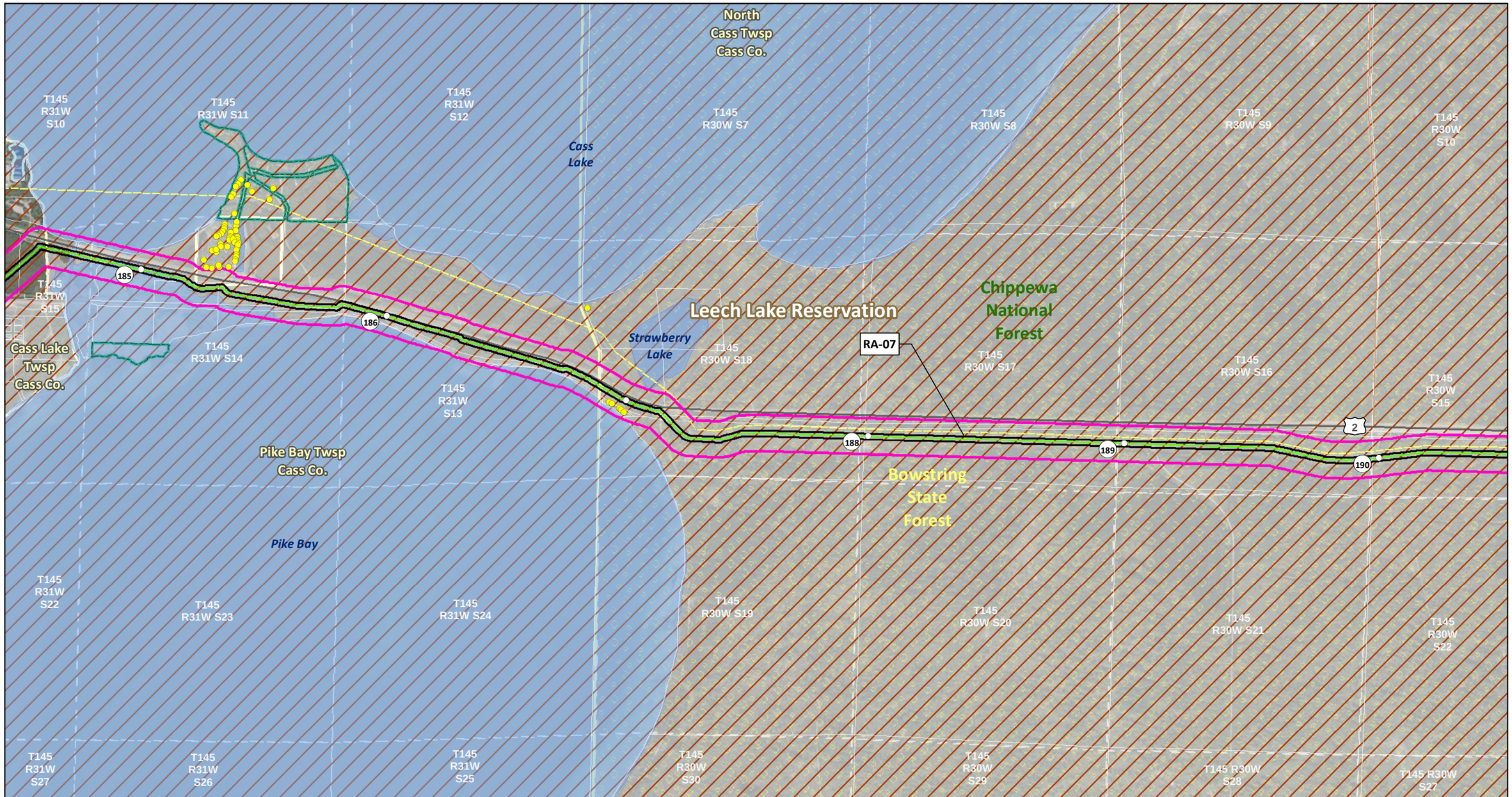

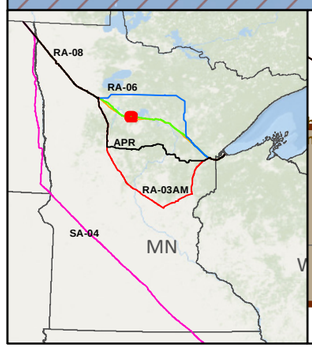

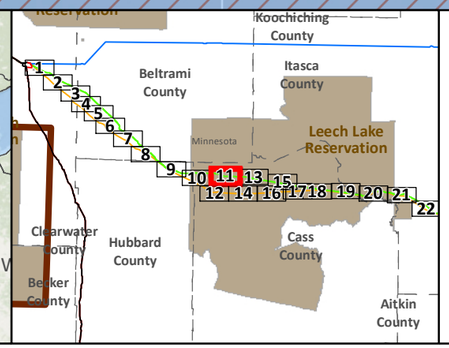

SA-04

Applicant's Preferred Route (APR)

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- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 11A of 38

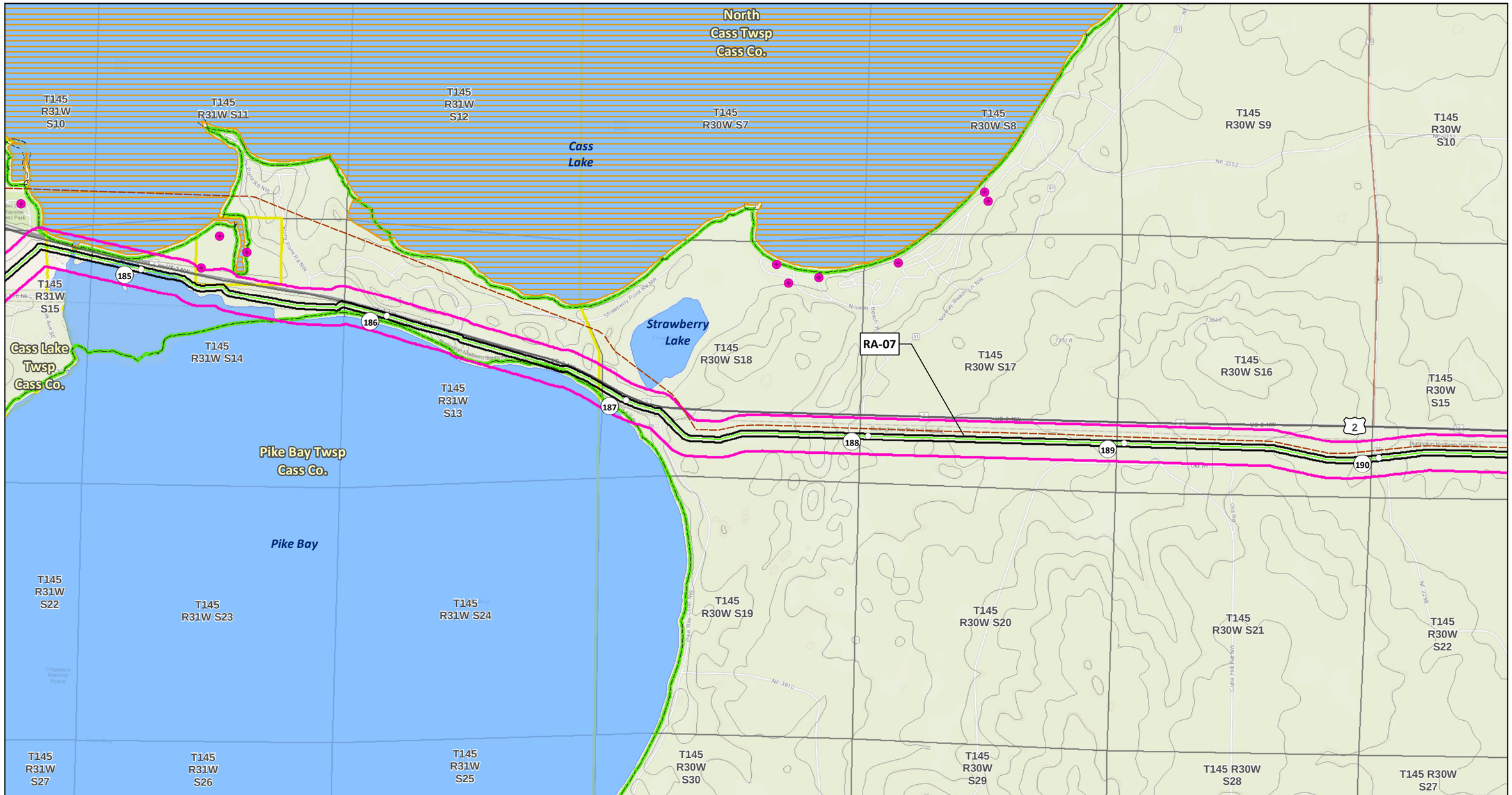

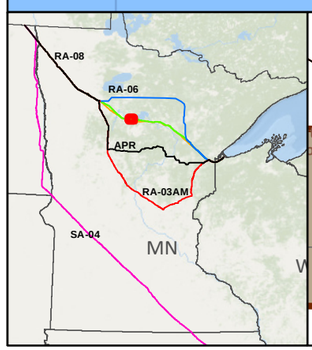

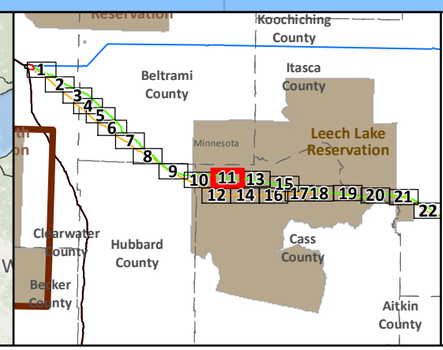

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 11B of 38

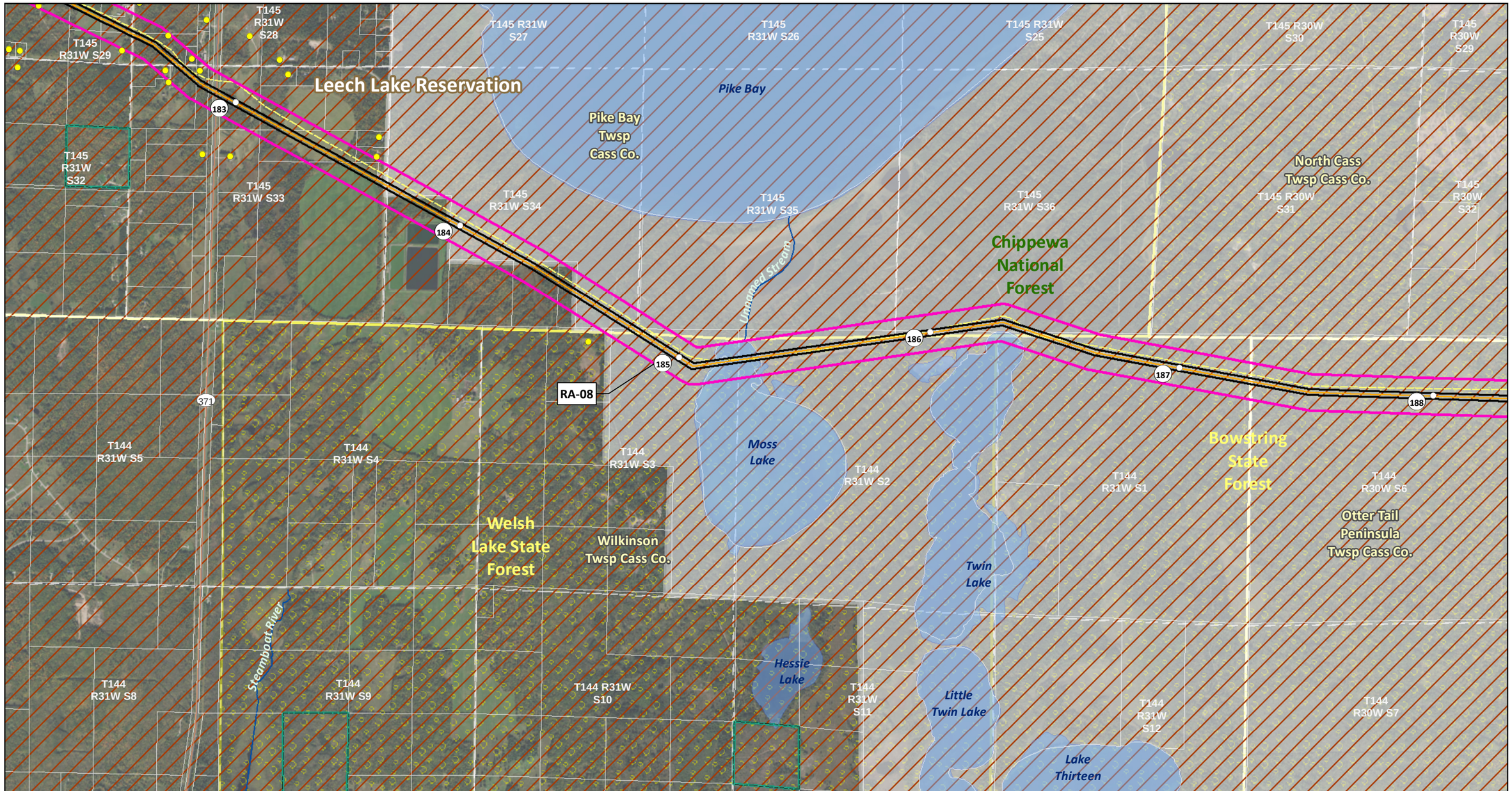

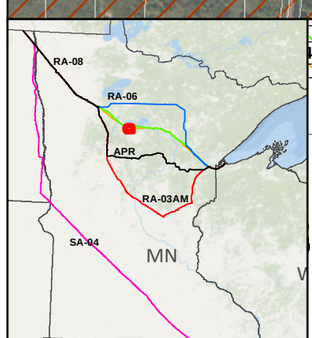

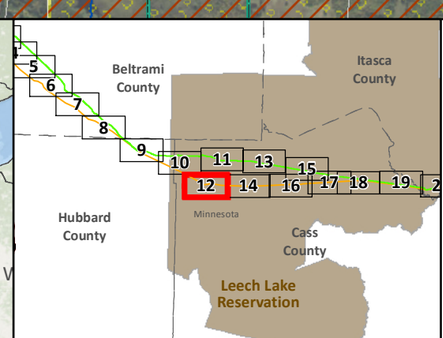

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 12A of 38

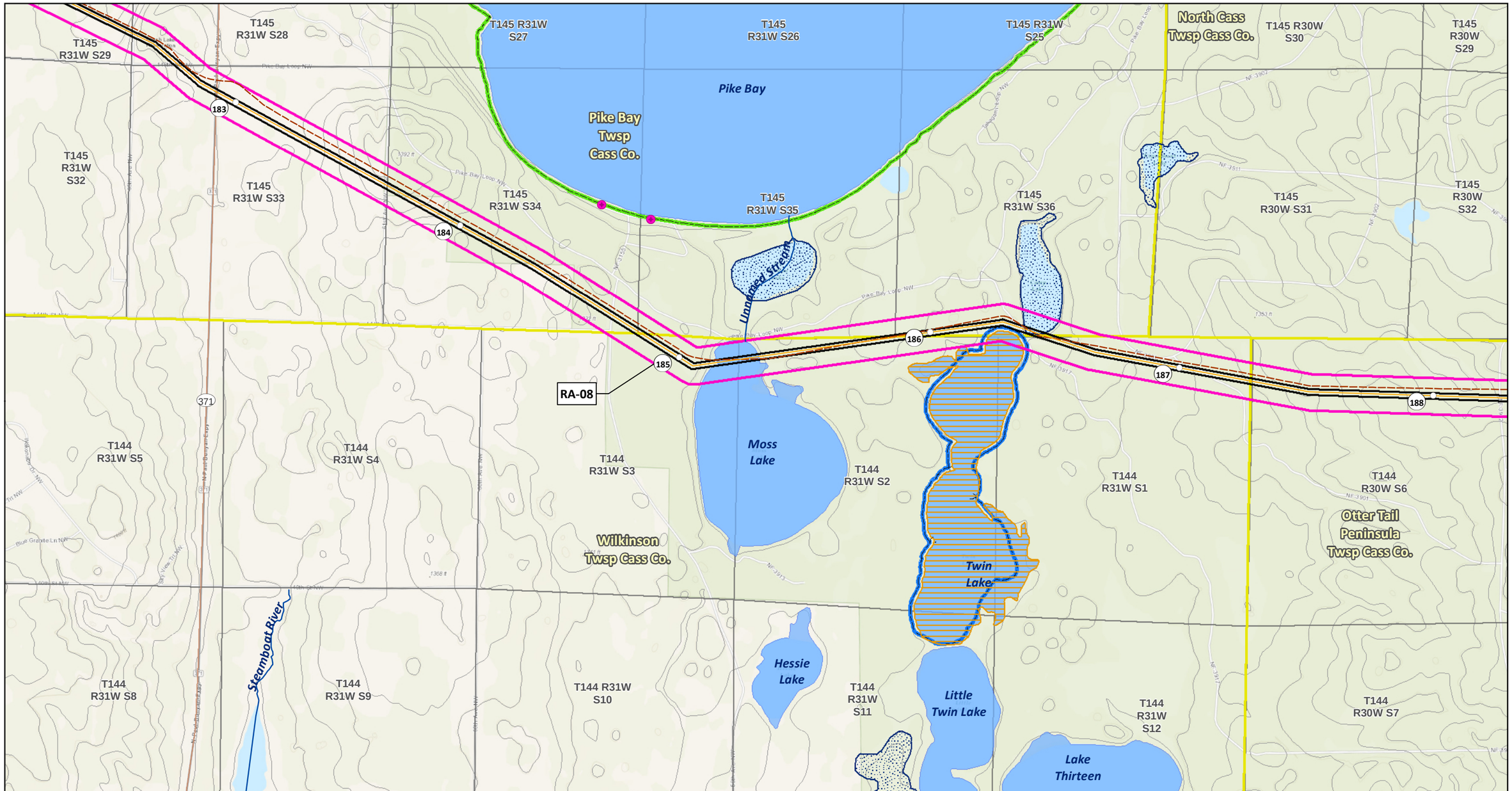

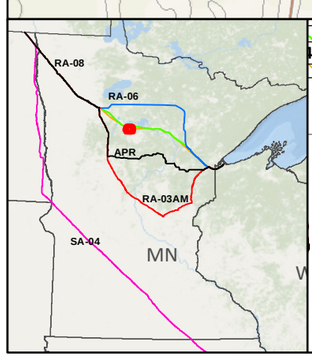

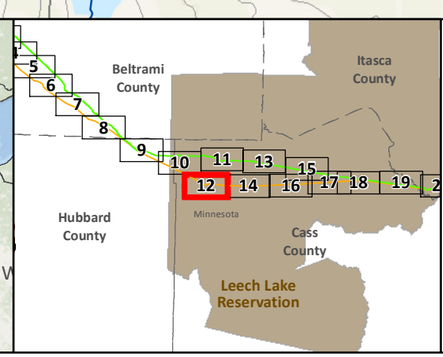

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 12B of 38

T145 R30W S10
T145 R30W S11
T145 R30W S12
T145 R29W S7
T145 R29W S8
T145 R29W S9
T145 R29W S10
Ten Lake
Leech Lake Reservation
T145 R29W S18
Grass Lake
Bowstring State Forest
Chippewa National Forest
T145 R30W S15
T145 R30W S14
T145 R30W S13
T145 R29W S17
T145 R29W S16
T145 R29W S15
North Cass Twsp Cass Co.
191
192
193
194
195
196
2
RA-07
T145 R29W S21
T145 R29W S22
T145 R30W S22
T145 R30W S23
T145 R30W S24
T145 R29W S19
Foot Lake
T145 R29W S20
Schley
T145 R30W S27
T145 R30W S26
T145 R30W S25
T145 R29W S30
T145 R29W S29
T145 R29W S28
T145 R29W S27

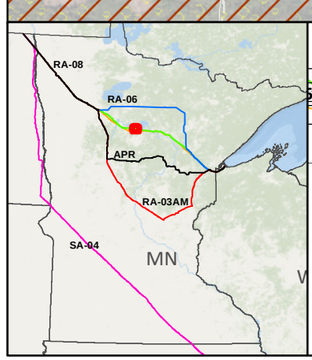

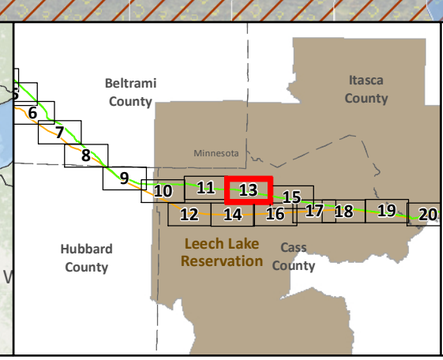

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 13A of 38

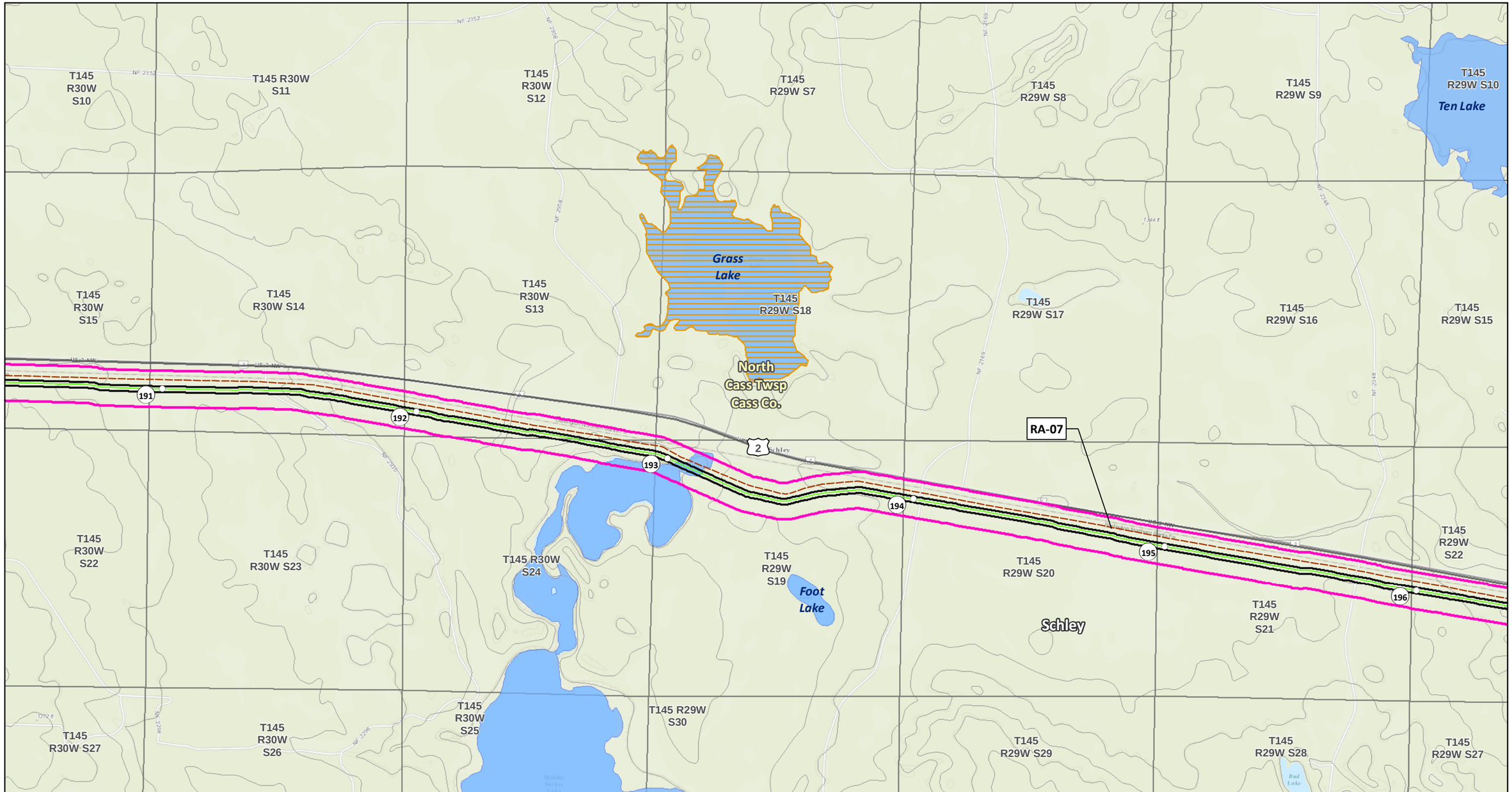

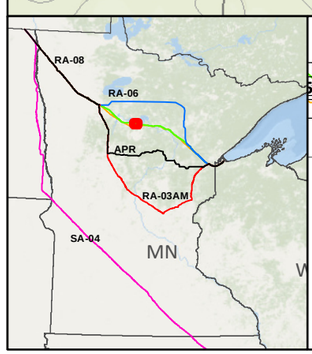

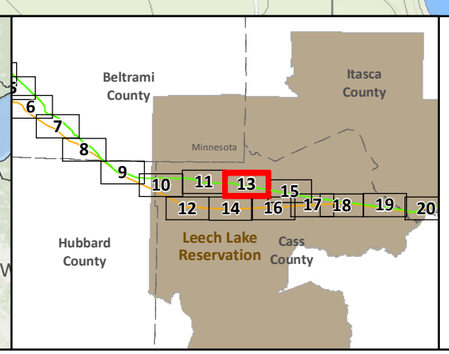

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 13B of 38

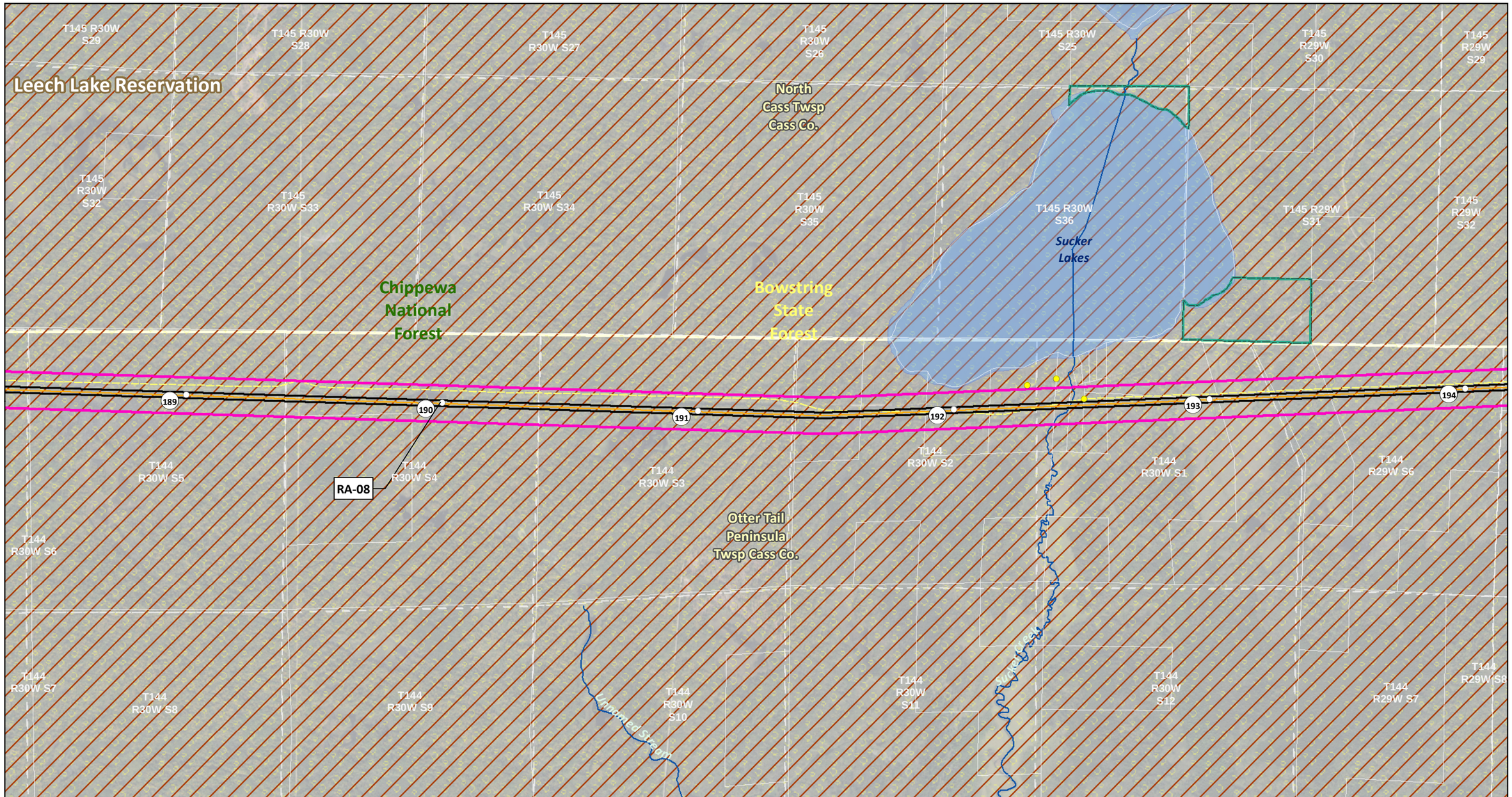

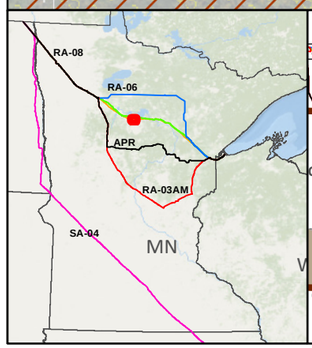

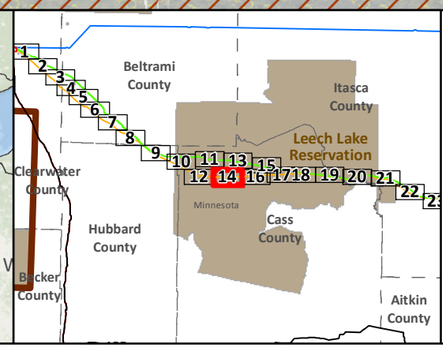

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Data Sources: MNDNR, NHD, Enbridge

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 14A of 38

N

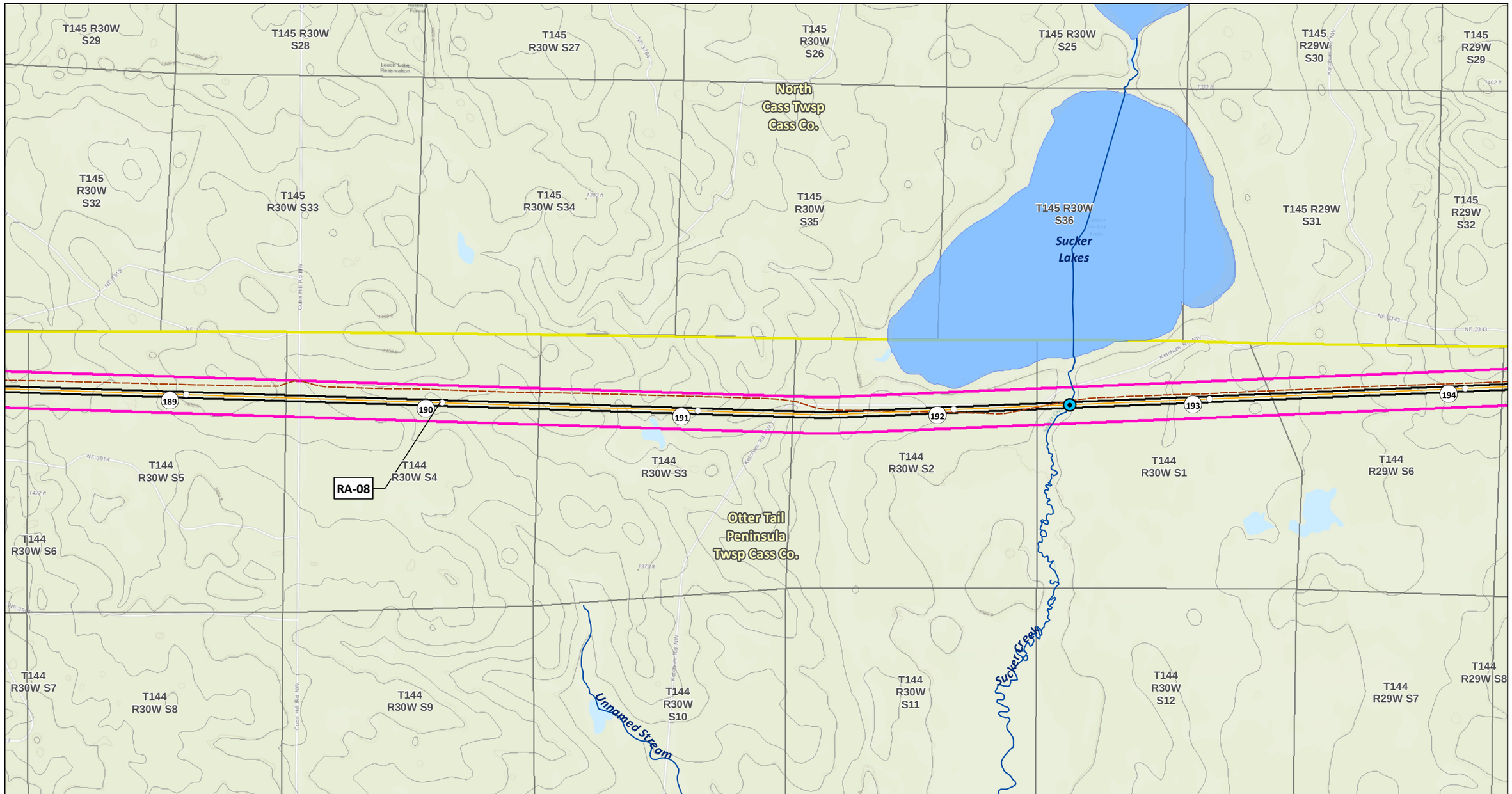

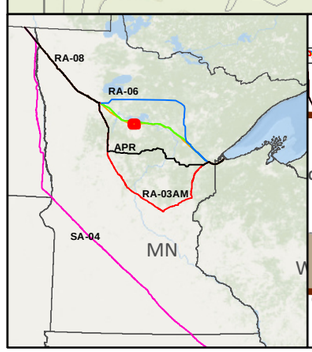

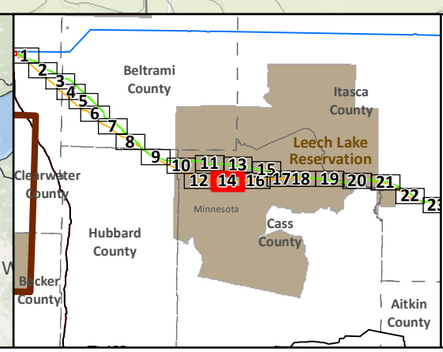

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 14B of 38

Bowstring State Forest

Little Portage Lake

Chippewa National Forest

RA-07

North Cass Twsp Cass Co.

Leech Lake Reservation

Lake Winnibigoshish

Portage Lake

T145 R29W S15
T145 R29W S14
T145 R29W S13
T145 R28W S18
T145 R28W S17
T145 R28W S16
T145 R28W S15
T145 R29W S22
T145 R29W S23
T145 R29W S24
T145 R28W S19
T145 R28W S20
T145 R28W S21
T145 R28W S22
T145 R29W S27
T145 R29W S26
T145 R29W S25
T145 R28W S30
T145 R28W S29
T145 R28W S27
T145 R28W S28
T145 R29W S34
T145 R29W S35
T145 R29W S36
T145 R28W S31
T145 R28W S32
T145 R28W S33
T145 R28W S34

197 198 199 200 201 202

2

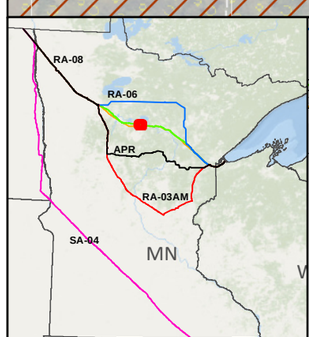

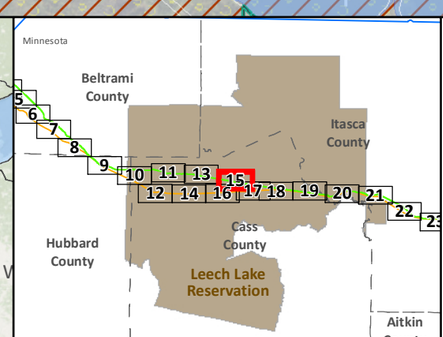

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 15A of 38

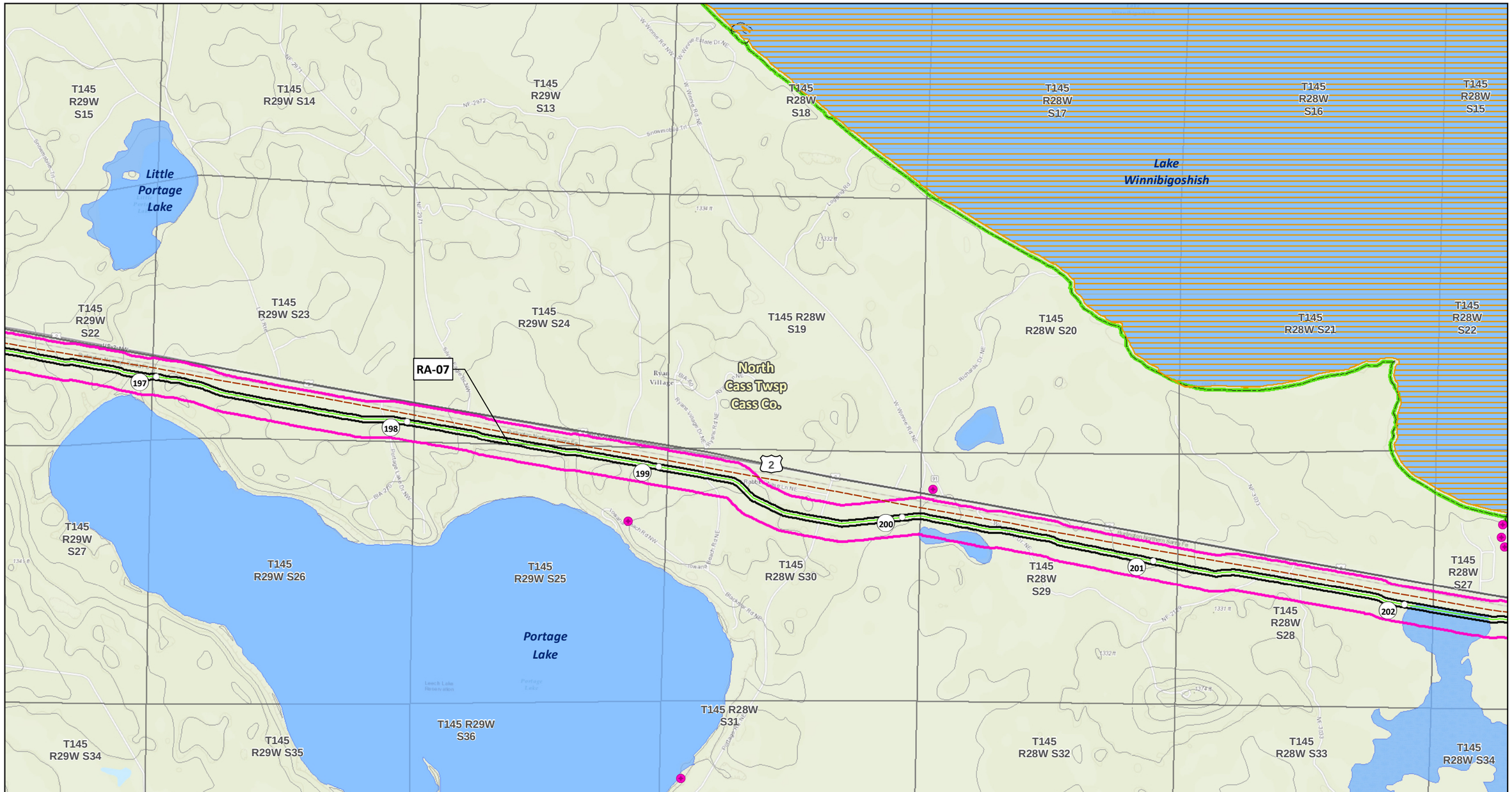

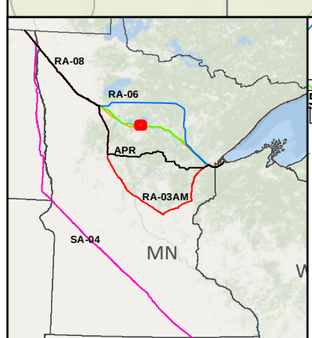

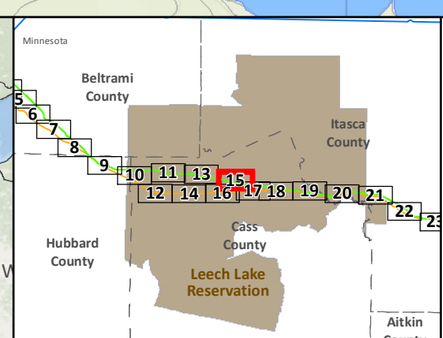

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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Public Water Basin
Public Drinking Water Supply
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Lakes of Biological Significance
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Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 15B of 38

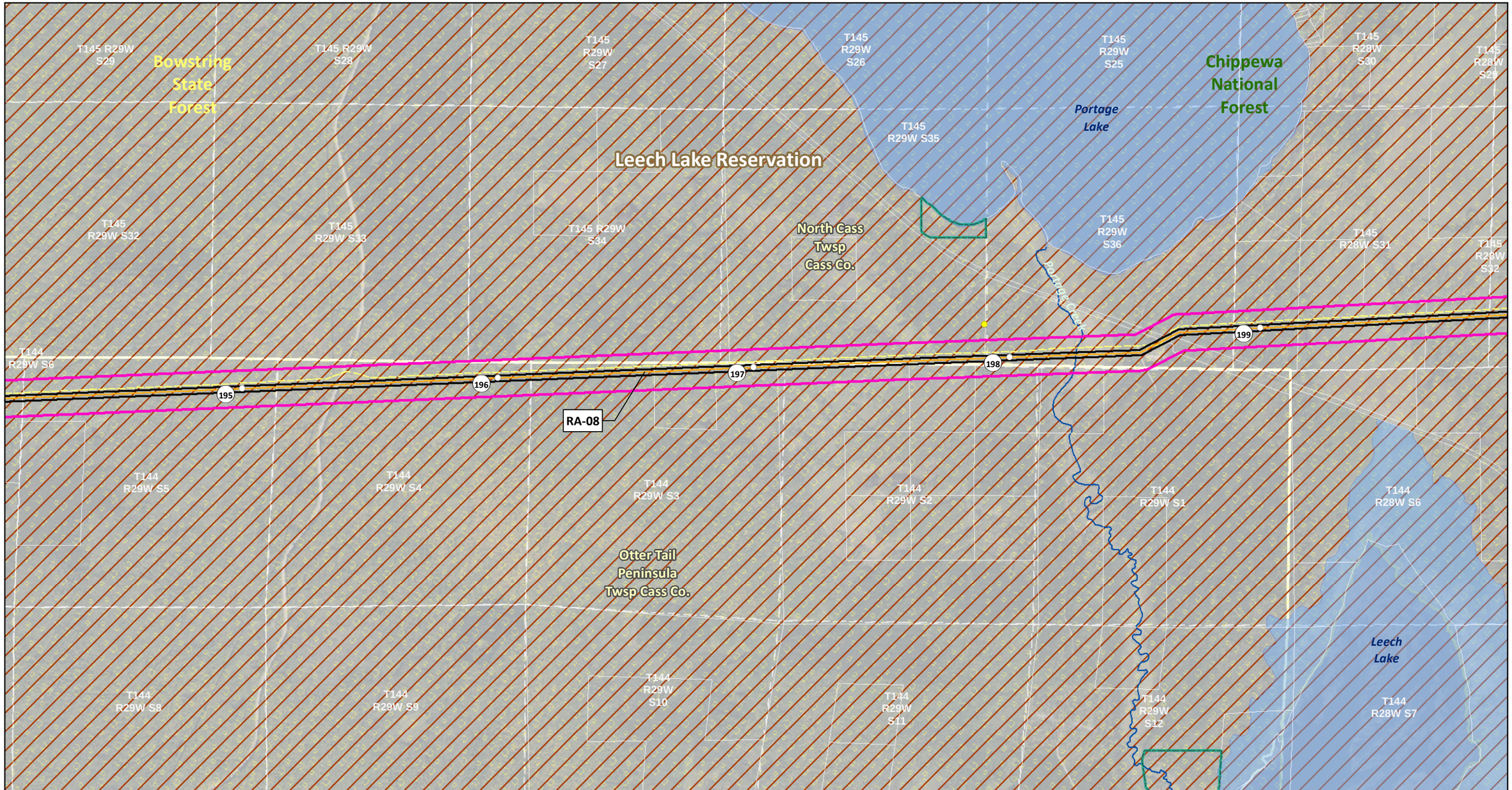

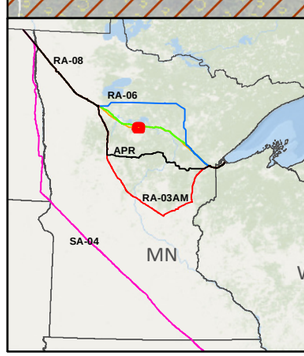

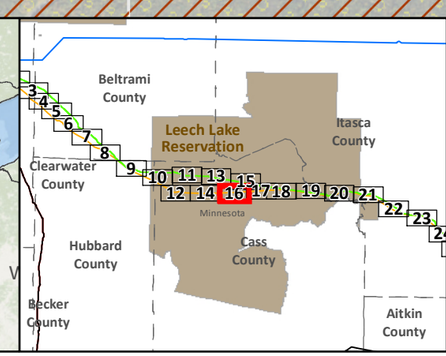

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 16A of 38

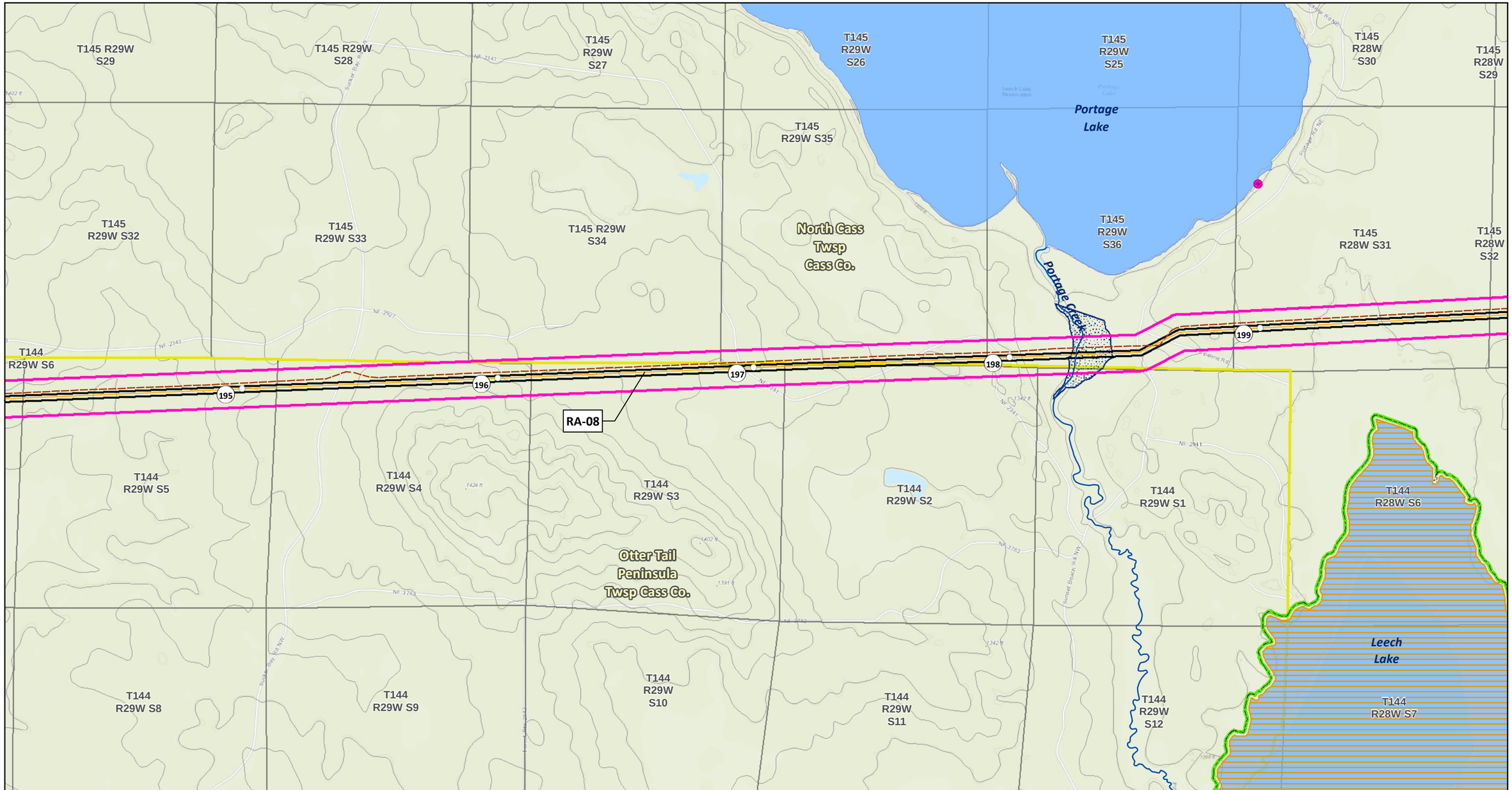

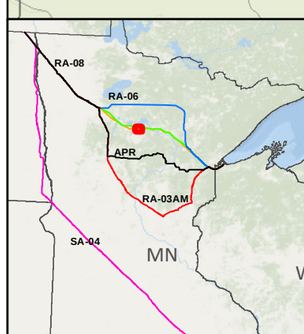

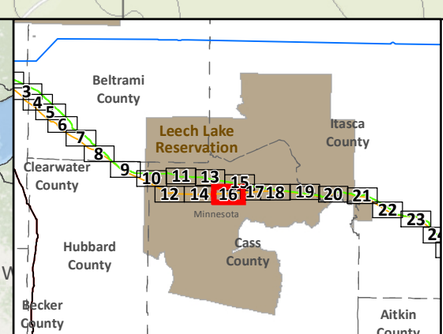

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

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- SNA - Scientific and Natural Area

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- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 16B of 38

Lake Winnibigoshish

T145 R28W S30

T145 R28W S29

T145 R28W S28

T145 R28W S27

T145 R28W S26

T145 R28W S25

T145 R27W S30

North Cass Twsp Cass Co.

RA-07

Bena

Bena Twsp Cass Co.

Leech Lake Reservation

T145 R28W S31

T145 R28W S32

T145 R28W S33

T145 R28W S34

T145 R28W S35

T145 R28W S36

T145 R27W S31

RA-08

Bowstring State Forest

Chippewa National Forest

Sixmile Lake

T144 R28W S6

T144 R28W S5

T144 R28W S4

T144 R28W S3

T144 R28W S2

T144 R28W S1

T144 R27W S6

Leech Lake

T144 R28W S7

T144 R28W S8

T144 R28W S9

T144 R28W S10

T144 R28W S11

T144 R28W S12

T144 R27W S7

Hole-in-Bog Lake

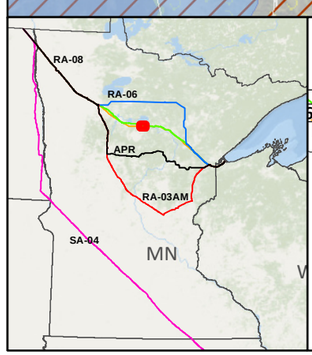

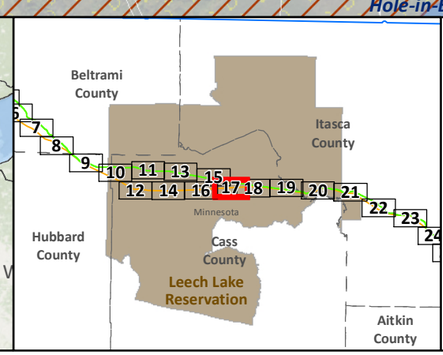

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

RA-03AM

RA-06

RA-07

RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Data Sources: MNDNR, NHD, Enbridge

Land Ownership

State Forest

National Forest

Tribal Reservation

Tribal Trust Land

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 17A of 38

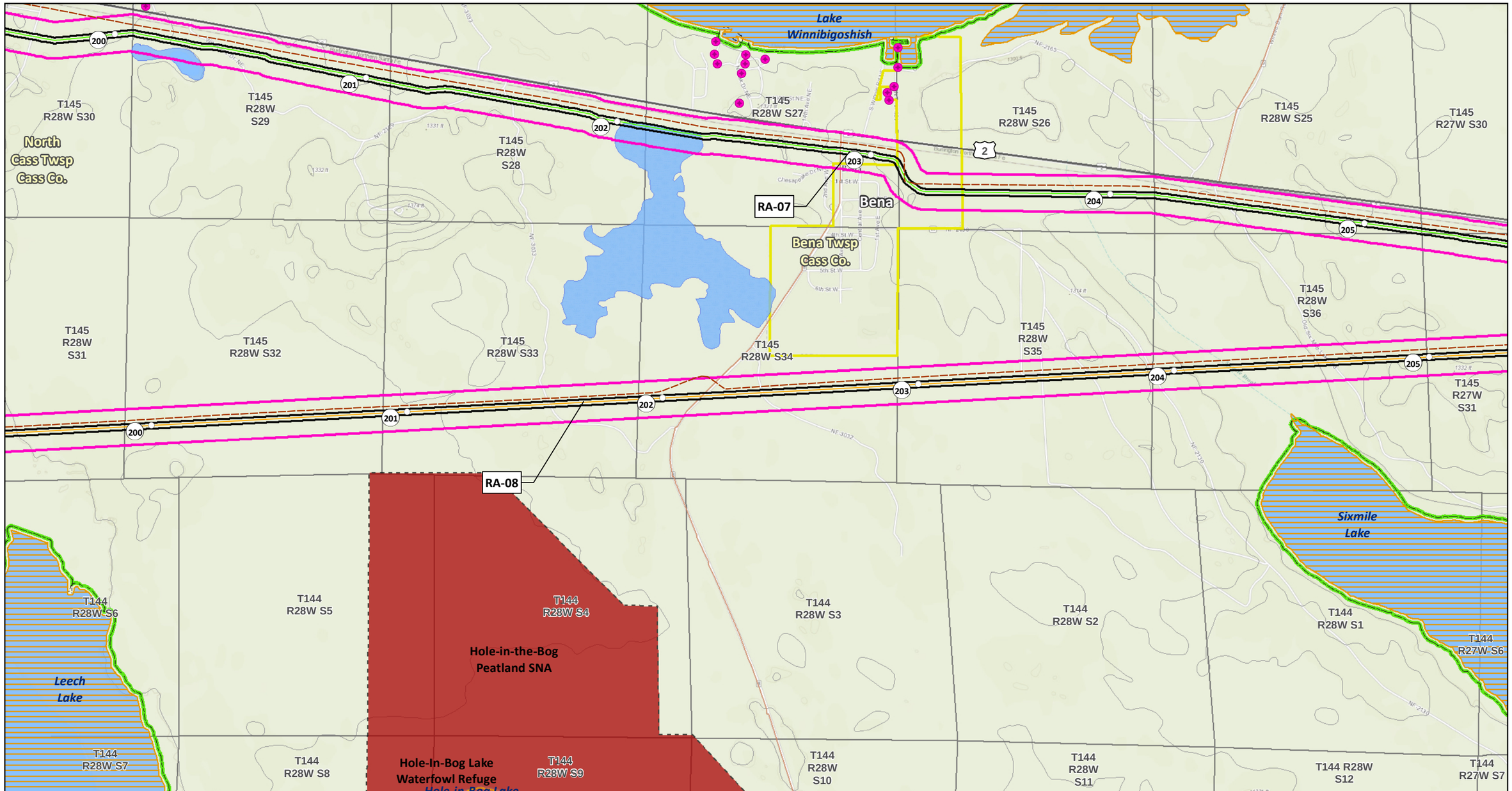

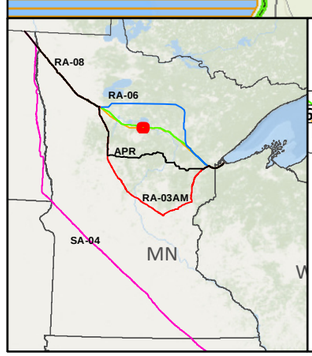

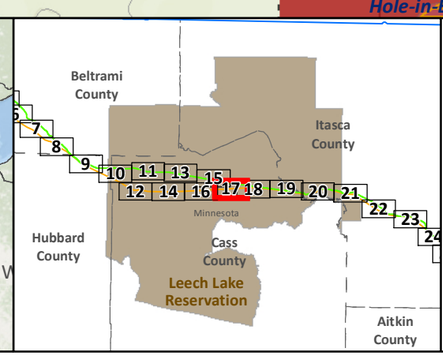

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 17B of 38

Lake Winnibigoshish
T145 R28W S25
T145 R28W S26
T145 R27W S30
T145 R27W S29
T145 R27W S28
Bowstring State Forest
T145 R27W S27
T145 R27W S26
Demro Lake
Rice Lake
T145 R28W S36
T145 R28W S35
T145 R27W S31
T145 R27W S32
T145 R27W S33
T145 R27W S34
T145 R27W S35
North Cass Twsp Cass Co.
Nushka Lake
Leech Lake Reservation
Chippewa National Forest
Sixmile Lake
Mississippi River
T144 R28W S2
T144 R28W S1
T144 R27W S6
T144 R27W S5
T144 R27W S4
T144 R27W S3
T144 R27W S2
T144 R28W S11
T144 R28W S12
T144 R27W S7
T144 R27W S8
T144 R27W S9
T144 R27W S10
T144 R27W S11
RA-07
RA-08
204
205
206
207
208
209
2

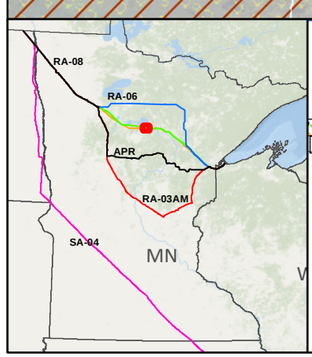

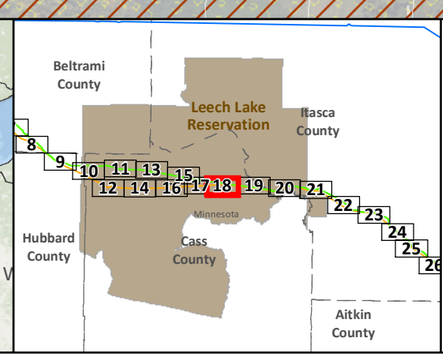

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Data Sources: MNDNR, NHD, Enbridge

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 18A of 38

Lake Winnibigoshish

T145 R28W S26

T145 R28W S25

T145 R27W S30

T145 R27W S29

T145 R27W S28

Demro Lake

T145 R27W S27

T145 R27W S26

Rice Lake

T145 R28W S35

T145 R28W S36

T145 R27W S35

T145 R27W S31

RA-08

North Cass Twsp Cass Co.

T145 R27W S32

T145 R27W S33

Nushka Lake

T145 R27W S34

RA-07

204 205 206 207 208 209

2

Sixmile Lake

Upper Sixmile Lake Rd

T144 R28W S2

T144 R28W S1

T144 R27W S6

T144 R27W S5

T144 R27W S4

Unnamed Stream

T144 R27W S3

T144 R27W S2

T144 R28W S11

T144 R28W S12

T144 R27W S7

T144 R27W S8

T144 R27W S9

T144 R27W S10

T144 R27W S11

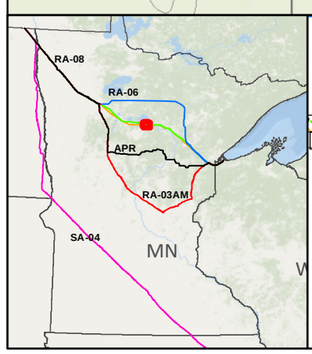

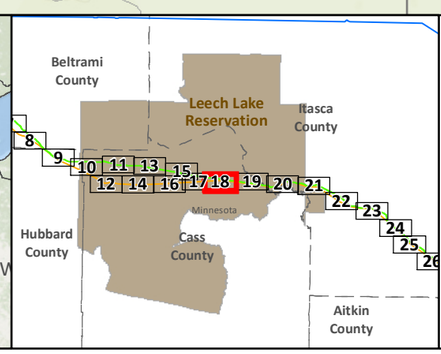

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

RA-03AM

RA-06

RA-07

RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

WMA - Wildlife Management Areas

Wildlife Refuge Inventory

SNA - Scientific and Natural Area

Water Resources

Navigable Waterway Crossings

National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

Outstanding

High

Moderate

Native Plant Communities with Biodiversity Significance

Outstanding

High

Moderate

Terminal

Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 18B of 38

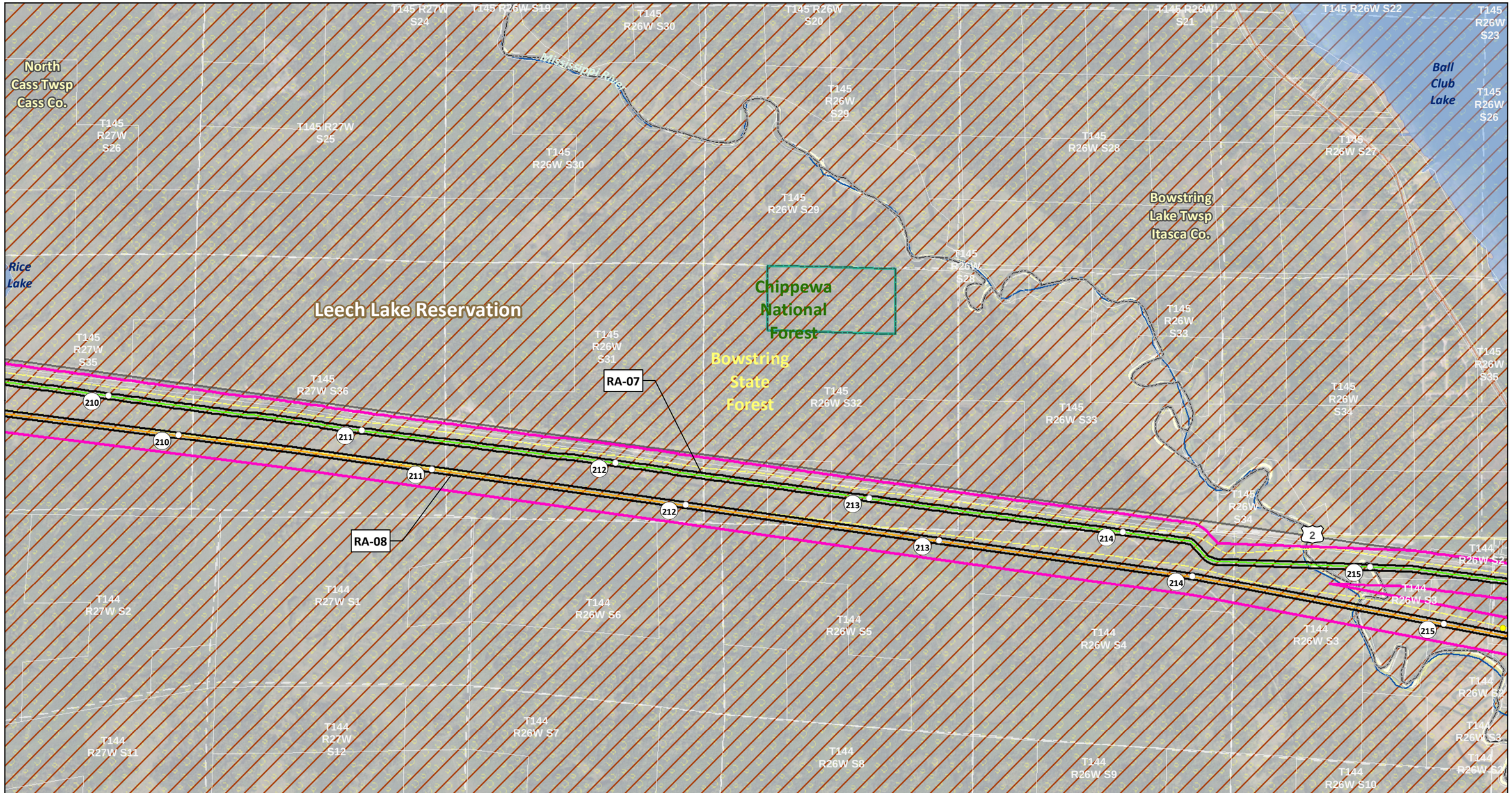

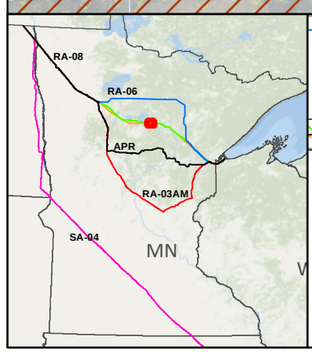

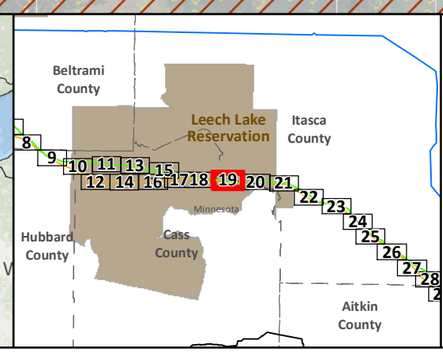

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Data Sources: MNDNR, NHD, Enbridge

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 19A of 38

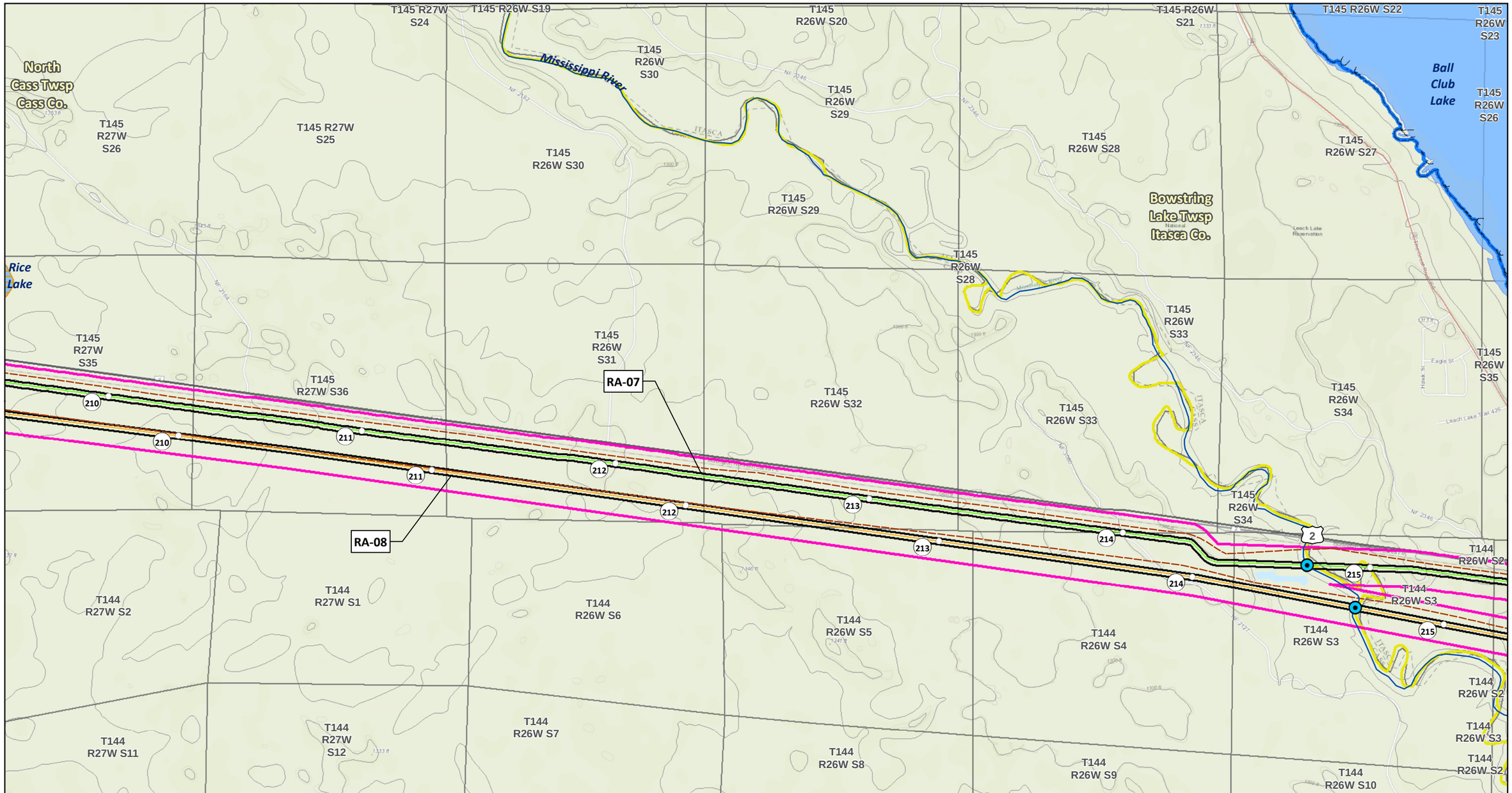

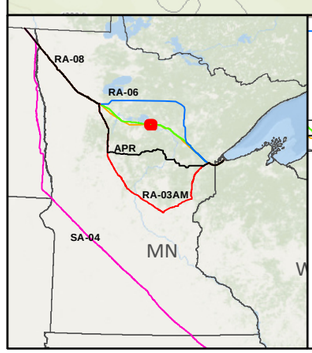

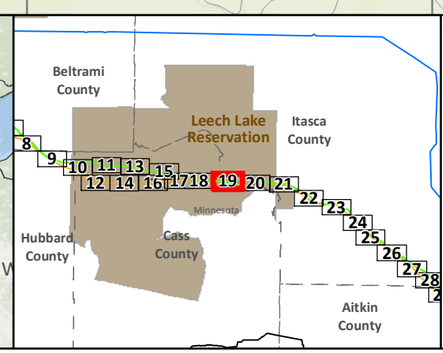

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 19B of 38

Ball Club Lake
Chippewa National Forest
Leech Lake Reservation
Bowstring State Forest
Ball Club River
Bowstring Lake Twsp Itasca Co.
Morse Twsp Itasca Co.
Wahnena Twsp Cass Co.
North Cass Twsp Cass Co.
Mississippi River
RA-07
RA-08
T145 R26W S27
T145 R26W S26
T145 R26W S25
T145 R26W S34
T145 R26W S35
T145 R26W S36
T145 R25W S30
T145 R25W S29
T145 R25W S28
T145 R25W S27
T145 R25W S31
T145 R25W S33
T145 R25W S32
T145 R25W S34
T144 R26W S3
T144 R26W S2
T144 R26W S1
T144 R26W S10
T144 R26W S11
T144 R26W S12
T144 R25W S6
T144 R25W S5
T144 R25W S4
T144 R25W S3
T144 R25W S7
T144 R25W S8
T144 R25W S9
T144 R25W S10
46
2
216
217
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219
220
221

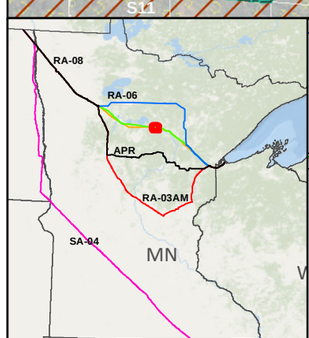

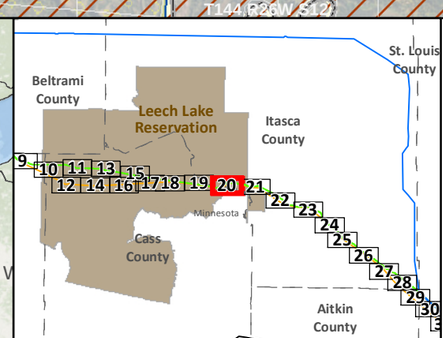

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation
Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 20A of 38

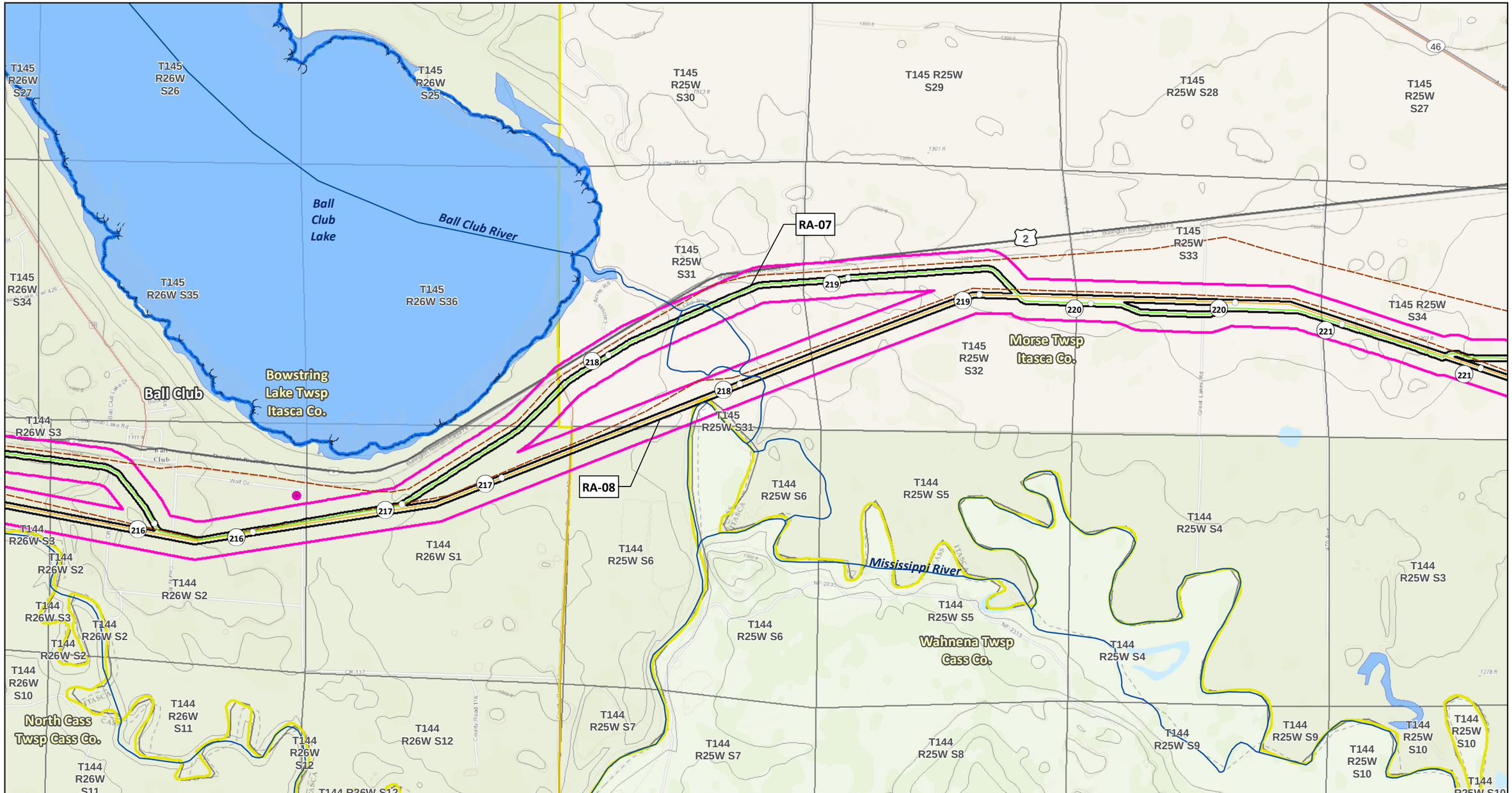
T145 R26W S27
T145 R26W S26
T145 R26W S25
T145 R25W S30
T145 R25W S29
T145 R25W S28
T145 R25W S27
Ball Club Lake
Ball Club River
RA-07
T145 R25W S31
T145 R25W S33
T145 R26W S34
T145 R26W S35
T145 R26W S36
T145 R25W S34
T145 R25W S32
Morse Twsp Itasca Co.
Bowstring Lake Twsp Itasca Co.
Ball Club
T144 R26W S3
T145 R25W S31
RA-08
T144 R25W S6
T144 R25W S5
T144 R25W S4
T144 R26W S3
T144 R26W S1
T144 R25W S6
Mississippi River
T144 R25W S3
T144 R26W S2
T144 R26W S2
T144 R25W S5
T144 R25W S6
Wahnena Twsp Cass Co.
T144 R25W S4
T144 R26W S10
T144 R26W S11
North Cass Twsp Cass Co.
T144 R26W S12
T144 R26W S12
T144 R25W S7
T144 R25W S7
T144 R25W S8
T144 R25W S9
T144 R25W S9
T144 R25W S10
T144 R25W S10
T144 R25W S10
T144 R26W S11
T144 R26W S12
RA-08
RA-06
APR
RA-03AM
SA-04
MN
Beltrami County
Leech Lake Reservation
Itasca County
Cass County
Aitkin County
St. Louis County
Minnesota
SA-04
Applicant's Preferred Route (APR)
Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Mile Post
Anticipated 120' Construction ROW
Route Width (750')
Existing Pipelines
Township Boundary
State Managed Lands
WMA - Wildlife Management Areas
Wildlife Refuge Inventory
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Public Waters Watercourse
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)
Lakes of Biological Significance
Outstanding
High
Moderate
Native Plant Communities with Biodiversity Significance
Outstanding
High
Moderate
Terminal
Pump Station
Data Sources: MNDNR, USGS, NHD, Enbridge
LINE 3 PROJECT
DETAILED MAP SET
TOPOGRAPHIC
RA-07 AND RA-08
CLEARBROOK TO CARLTON
0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours
Map 20B of 38

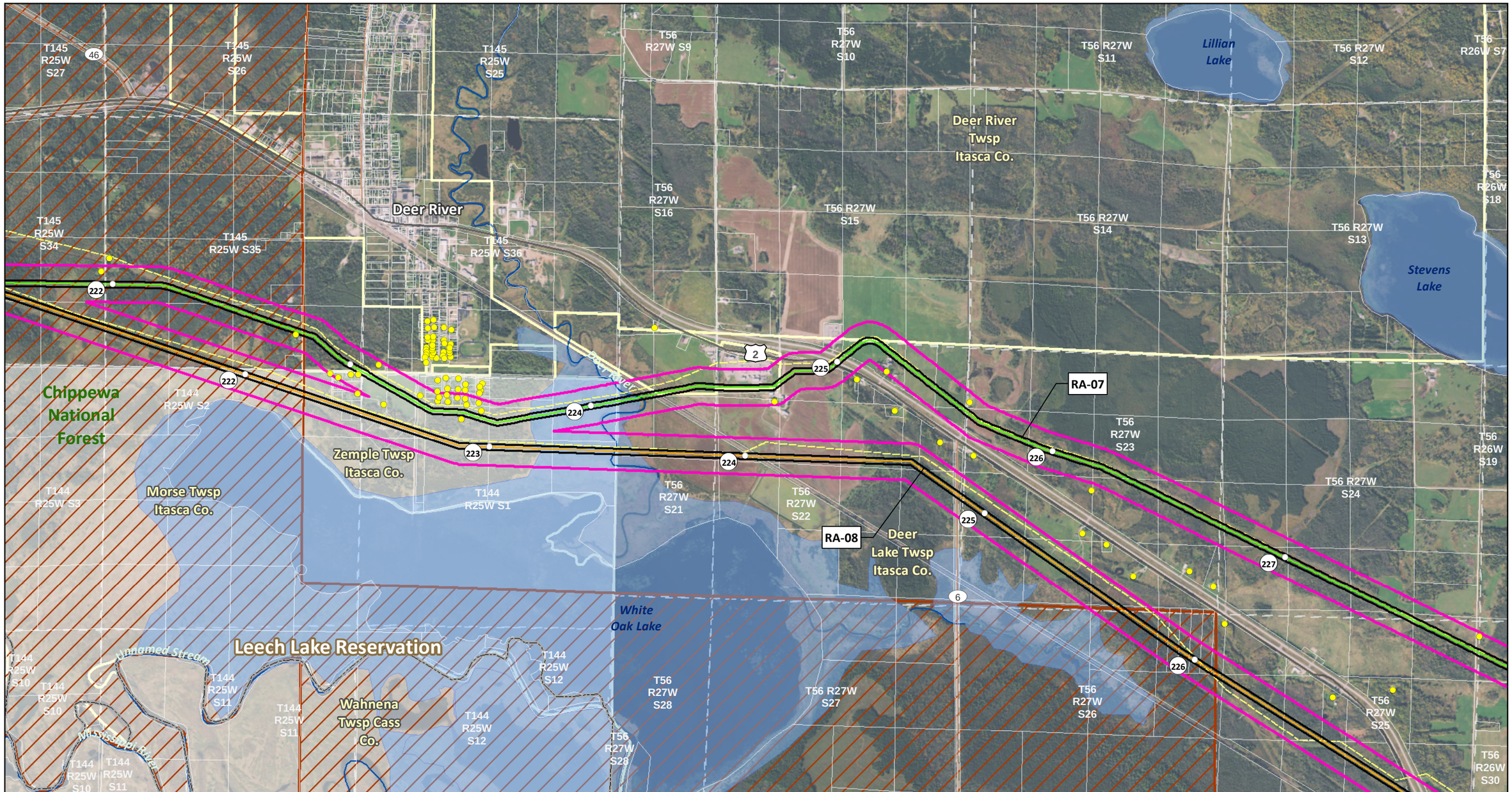

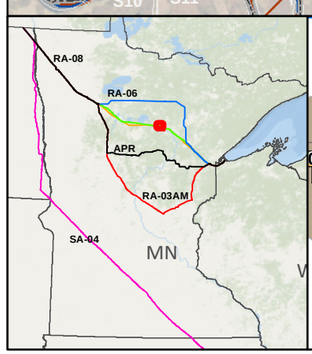

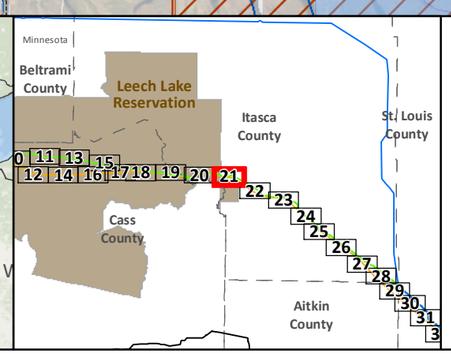

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 21A of 38

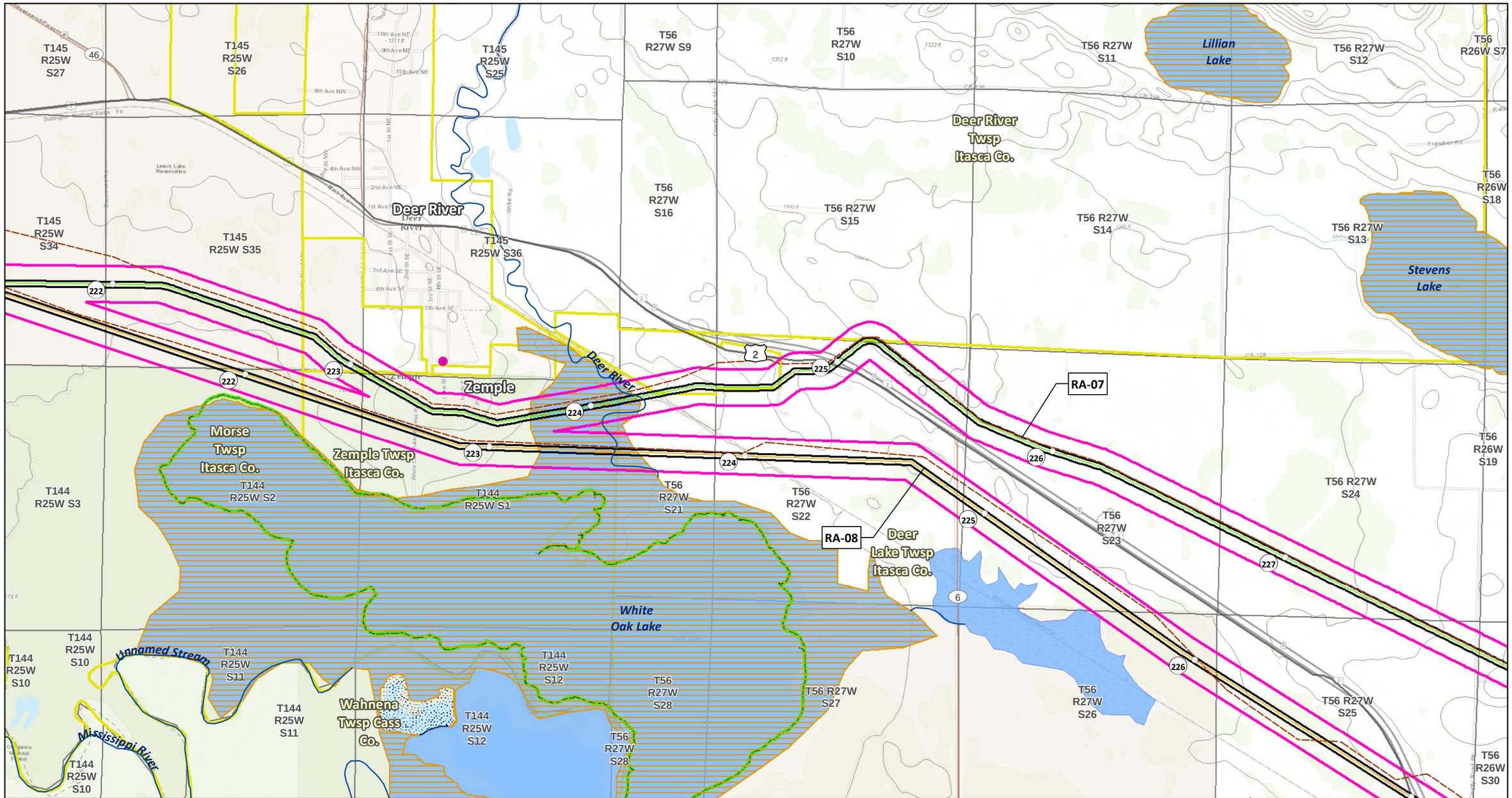

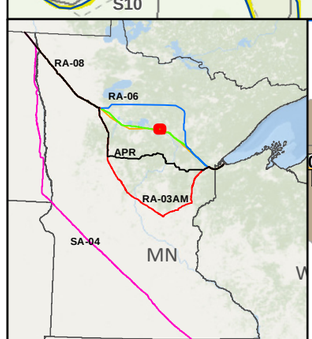

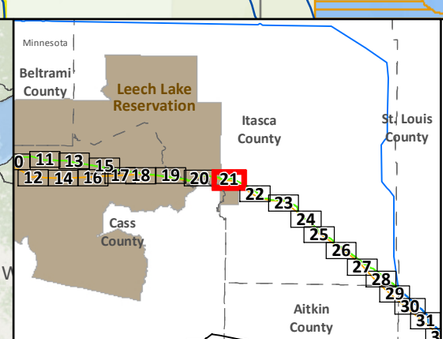

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 21B of 38

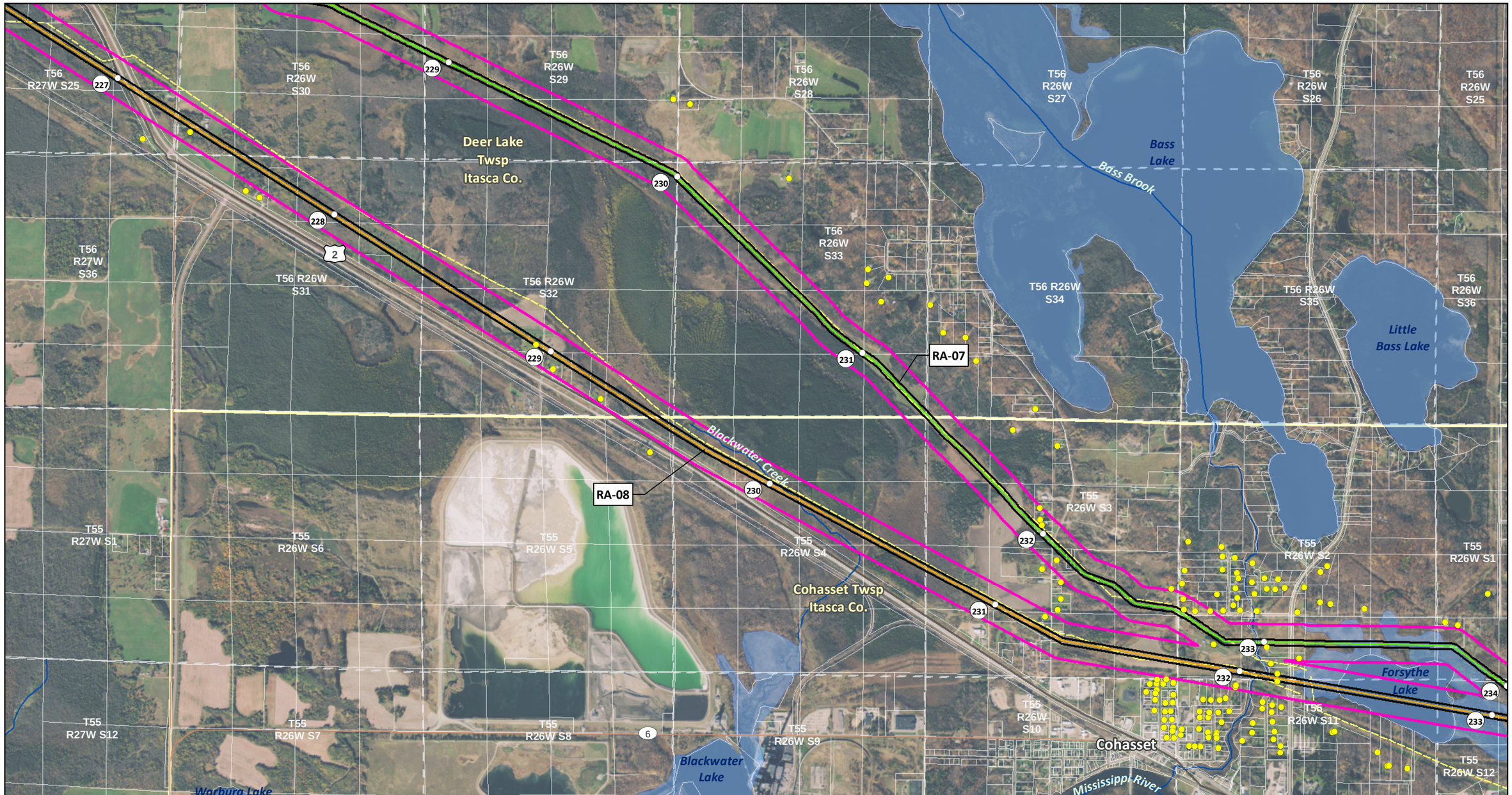

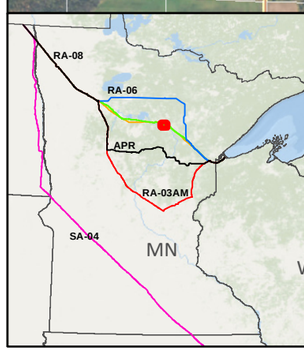

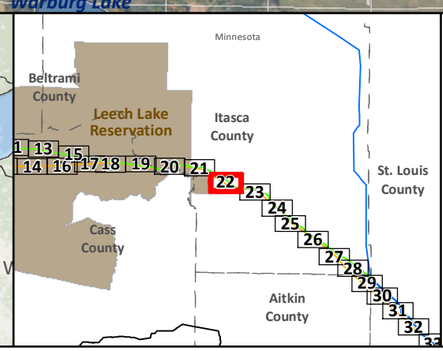

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 22A of 38

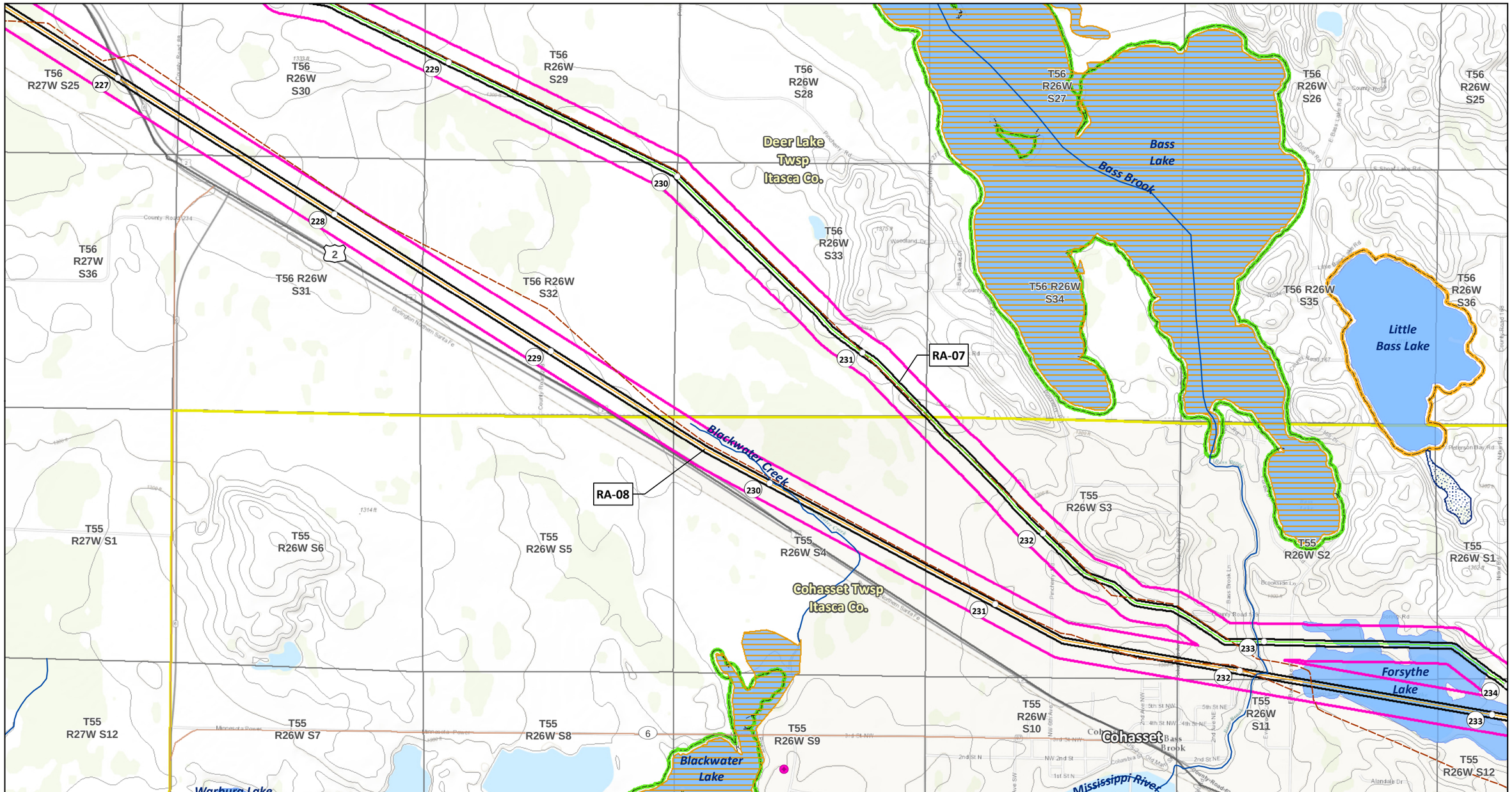

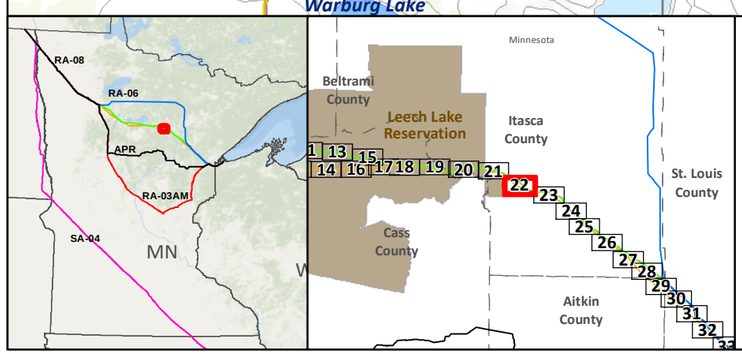

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 22B of 38

Nagel Lake
T55 R26W S1
T55 R25W S6
T55 R25W S5
T55 R25W S4
T55 R25W S3
T55 R25W S2
Grand Rapids Twsp Itasca Co.
Prairie River
T55 R25W S11
Forsythe Lake
235
236
235
237
236
RA-08
T55 R25W S8
T55 R25W S7
T55 R26W S12
Cohasset Twsp Itasca Co.
T55 R25W S9
T55 R25W S10
Unnamed Stream
RA-07
McKinney Lake
38
237
239
Coleraine Twsp Itasca Co.
Mississippi River
T55 R25W S15
T55 R26W S13
T55 R25W S18
T55 R25W S17
Hale Lake
T55 R25W S16
T55 R25W S14
240
238
Paper Mill Reservoir
2
169
Forest Lake
T55 R26W S24
T55 R25W S19
T55 R25W S20
Grand Rapids
T55 R25W S21
T55 R25W S22
La Prairie Twsp Itasca Co.
T55 R25W S23
Pokegama Lake

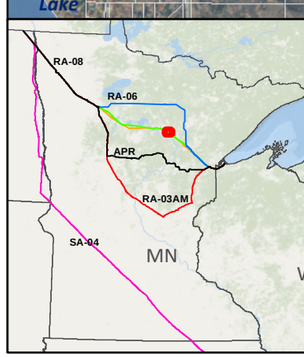

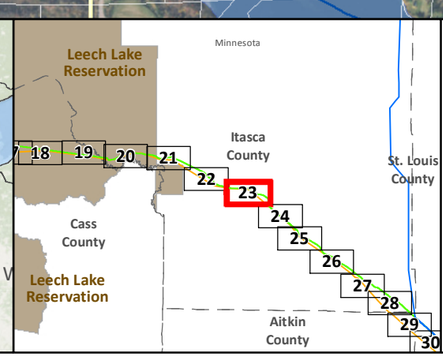

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08
CLEARBROOK TO CARLTON

Map 23A of 38

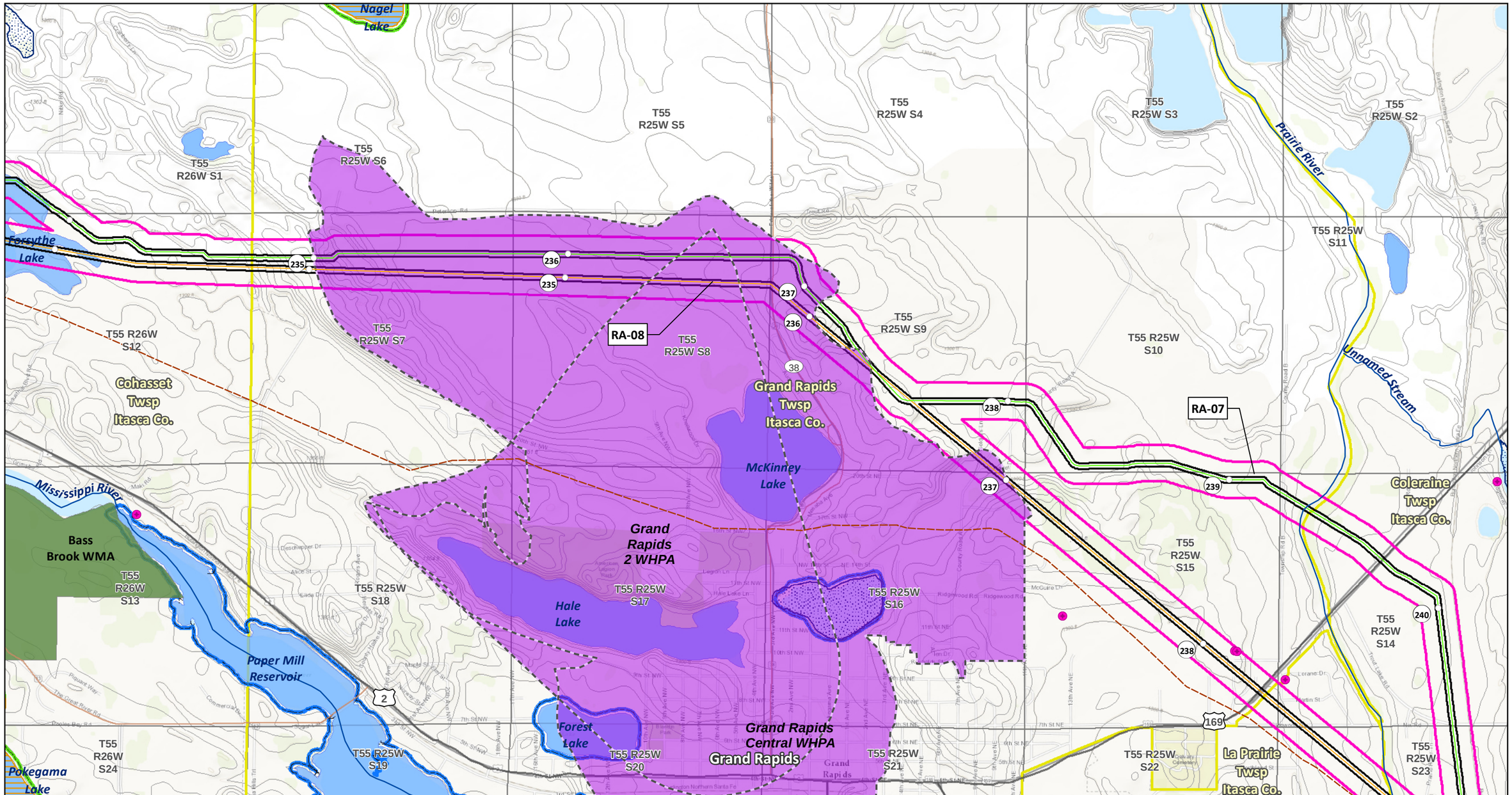

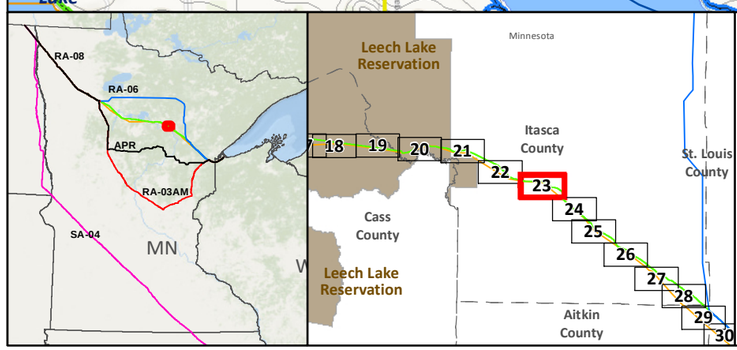

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 23B of 38

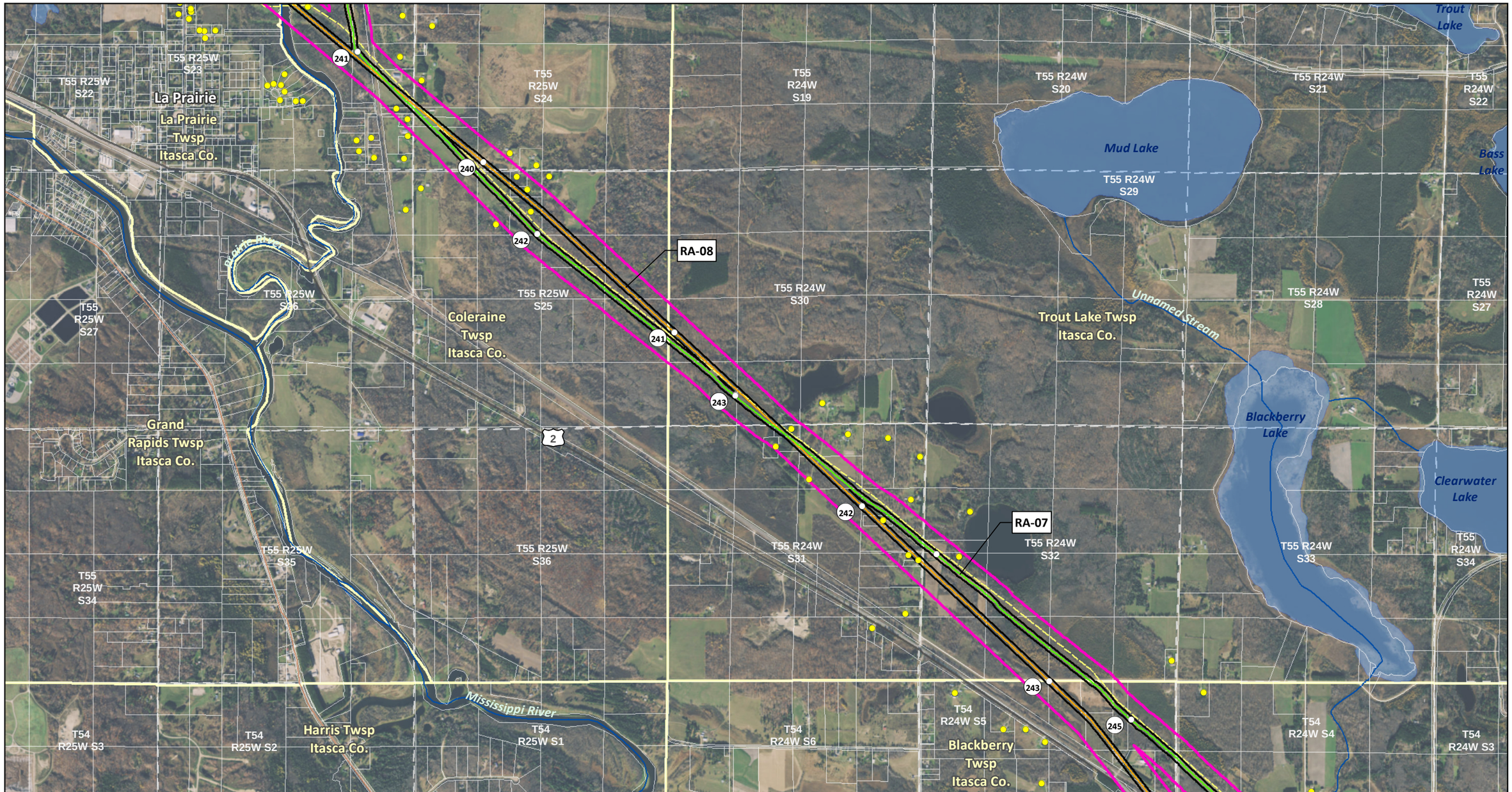

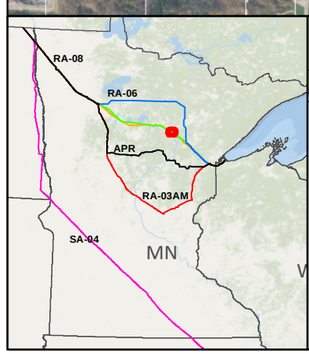

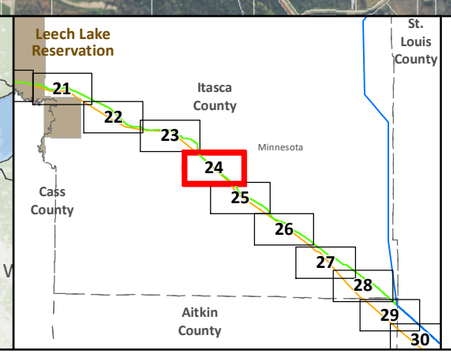

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 24A of 38

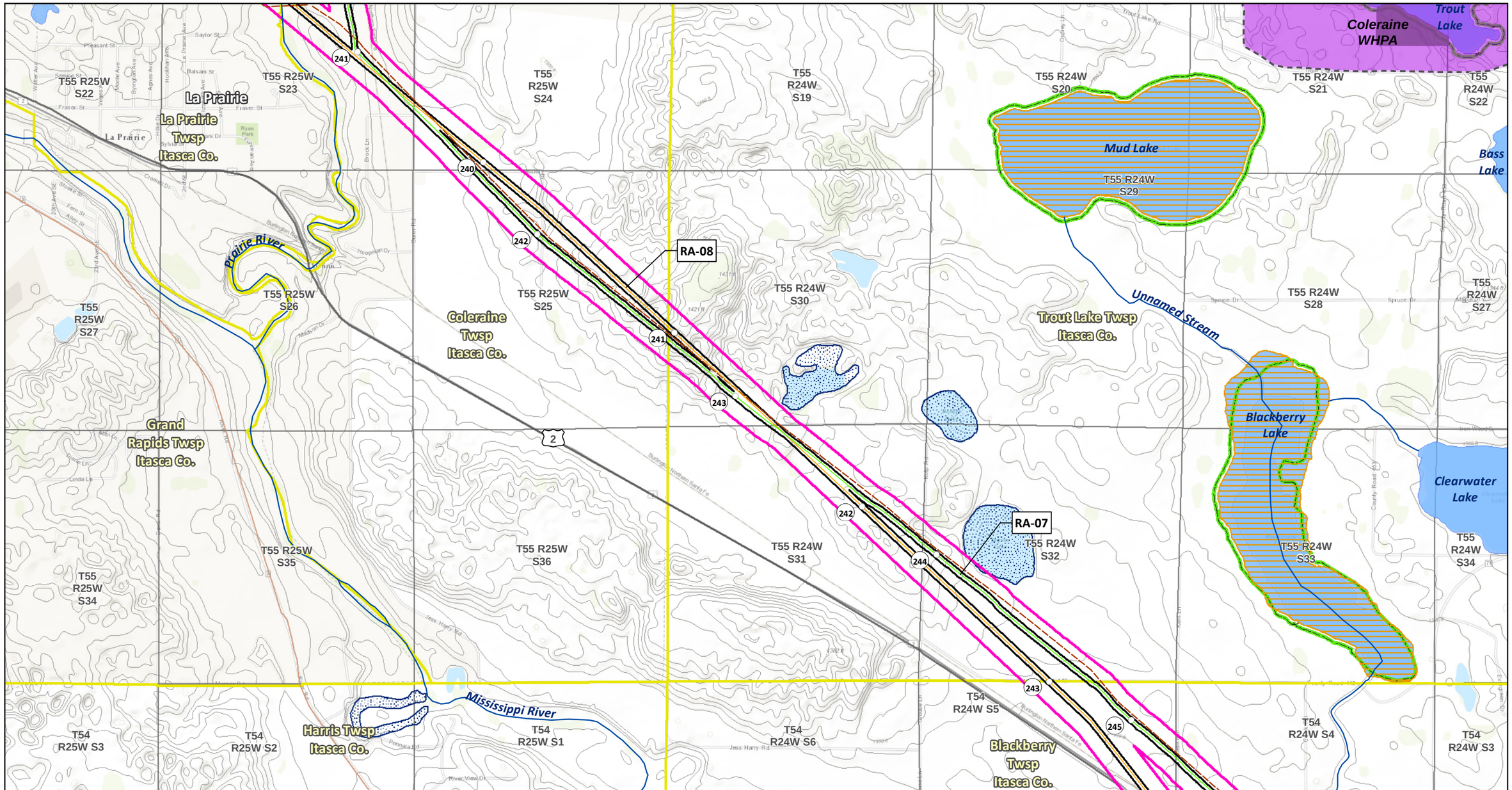

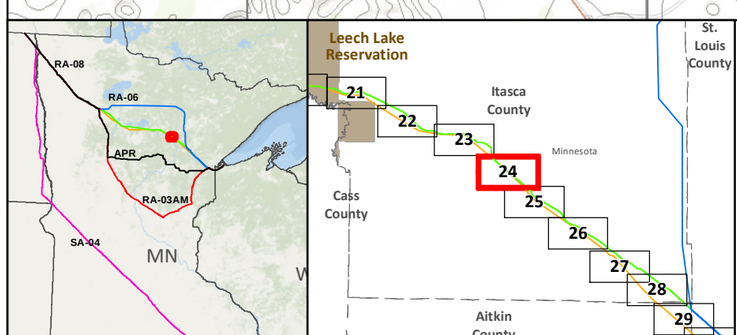

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08
CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 24B of 38

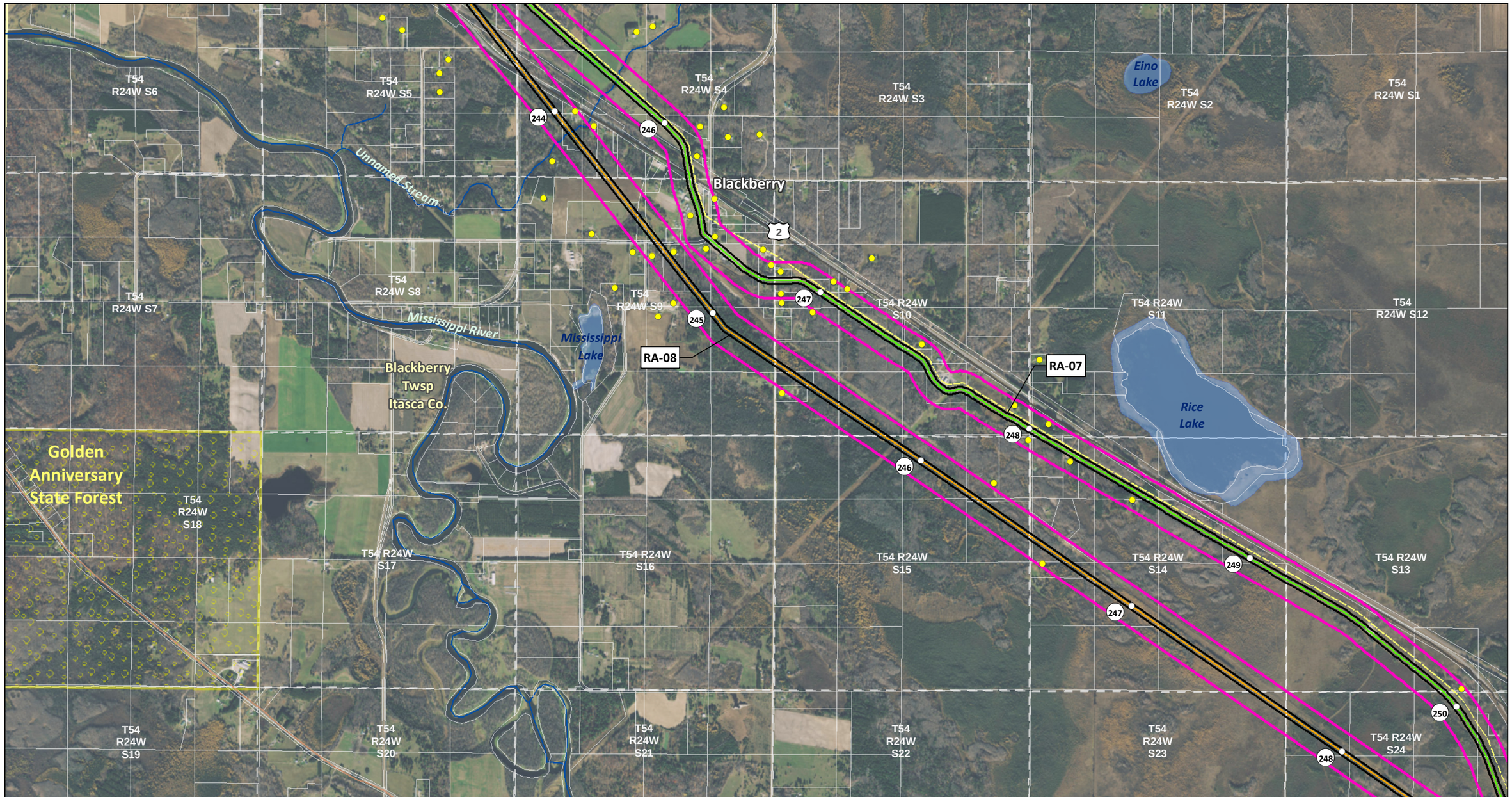

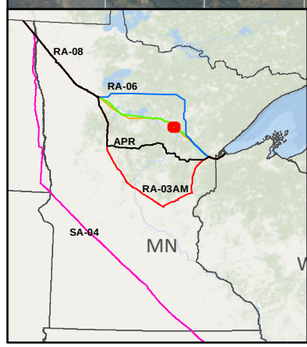

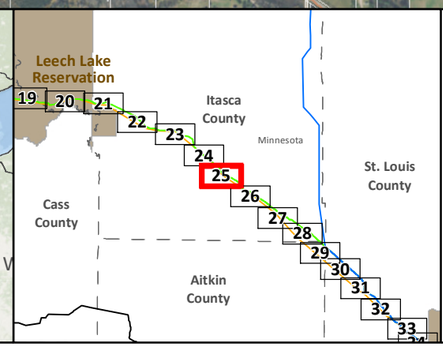

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Data Sources: MNDNR, NHD, Enbridge

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 25A of 38

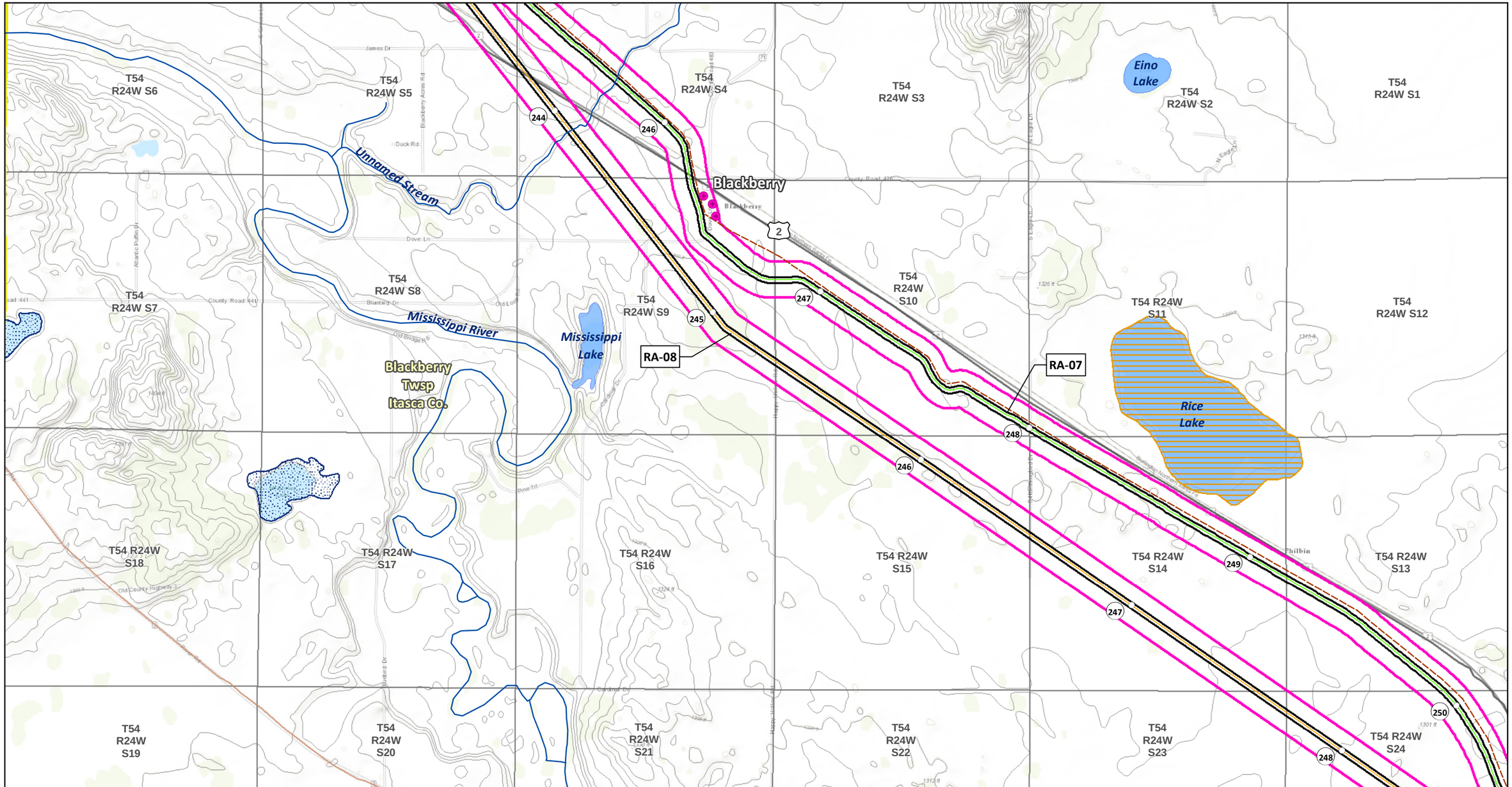

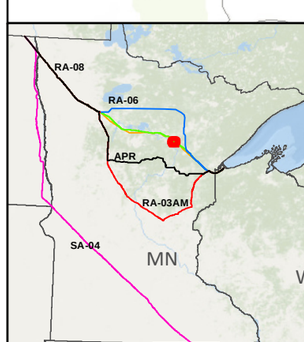

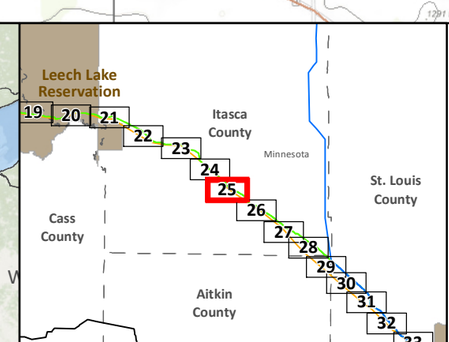

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 25B of 38

T54 R24W S23
T54 R24W S24
T54 R23W S19
Sand Lake
T54 R23W S20
T54 R23W S21
T54 R23W S22
T54 R23W S23
249
Warba Twsp Itasca Co.
252
T54 R23W S29
T54 R24W S26
T54 R24W S25
T54 R23W S30
T54 R23W S28
T54 R23W S27
T54 R23W S26
2
Warba
Blackberry Twsp Itasca Co.
Shallow Lake
253
251
Feeley Twsp Itasca Co.
Hudson Lake
RA-07
254
RA-08
T54 R24W S35
T54 R24W S36
T54 R23W S31
T54 R23W S32
T54 R23W S34
T54 R23W S35
252
T54 R23W S33
255
McGuire Lake
Sago Twsp Itasca Co.
Swan River
T53 R23W S2
T53 R24W S2
Splithand Twsp Itasca Co.
T53 R24W S1
Unnamed Stream
T53 R23W S6
T53 R23W S5
T53 R23W S4
T53 R23W S3

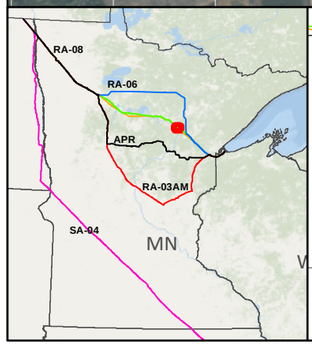

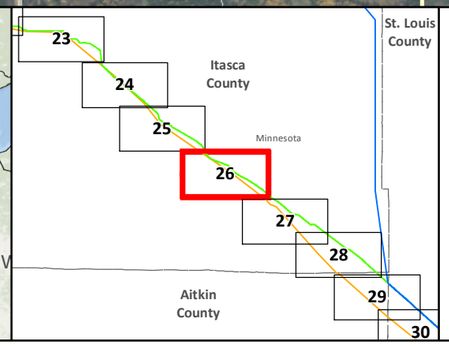

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Data Sources: MNDNR, NHD, Enbridge

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 26A of 38

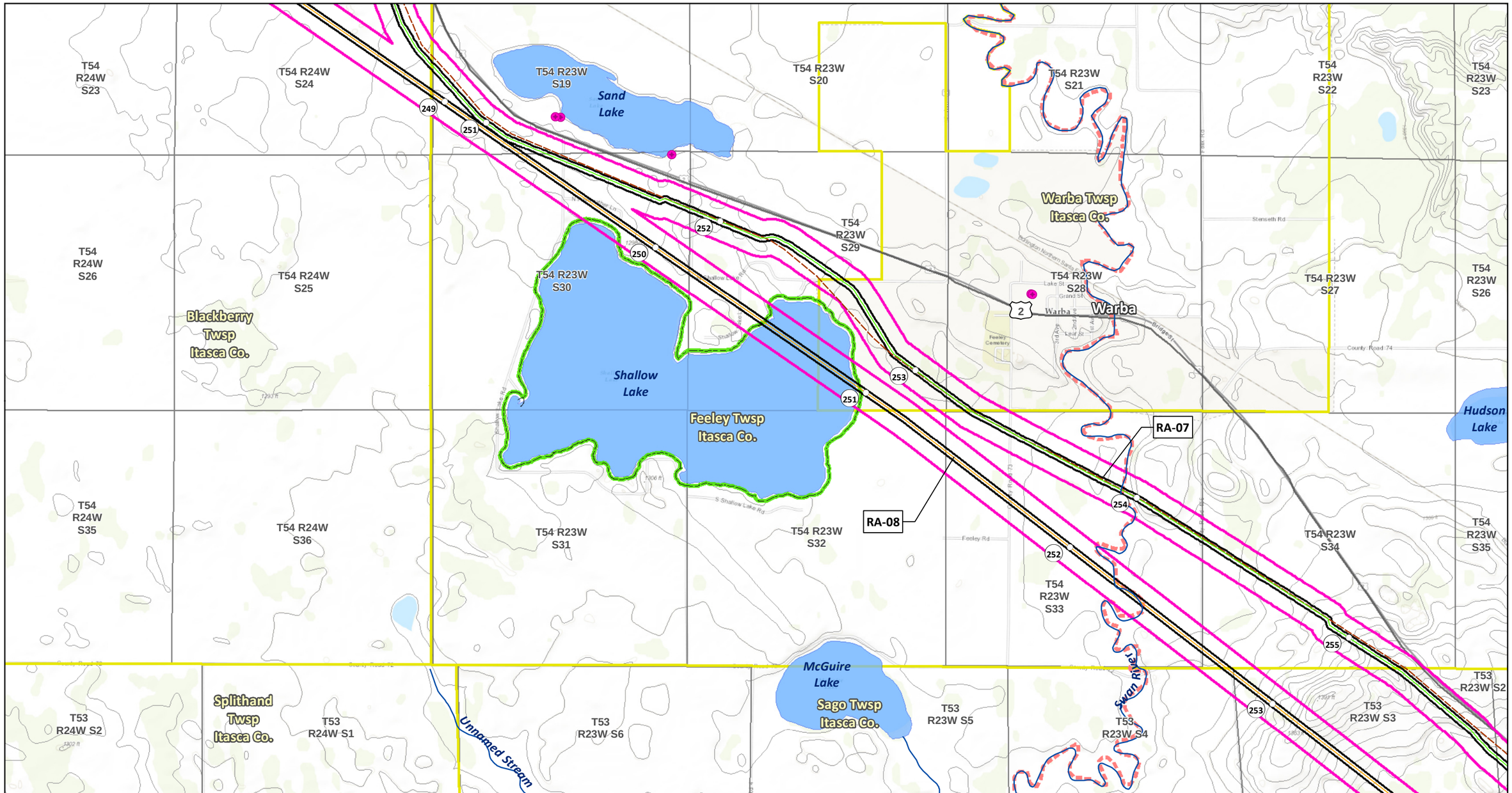

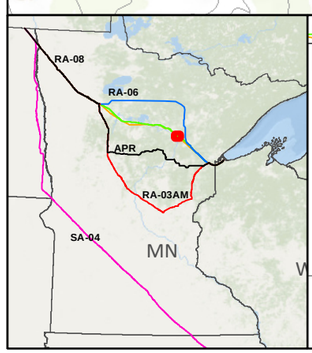

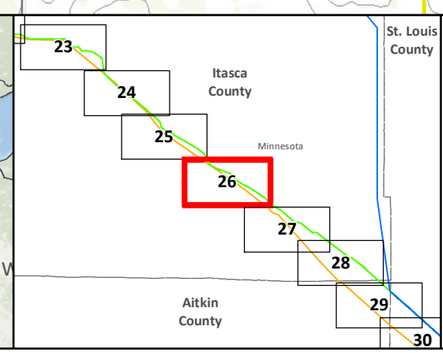

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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- Navigable Waterway Crossings
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Designated Trout Stream
Calcareous Fens
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Public Water Basin
Public Drinking Water Supply
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Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 26B of 38

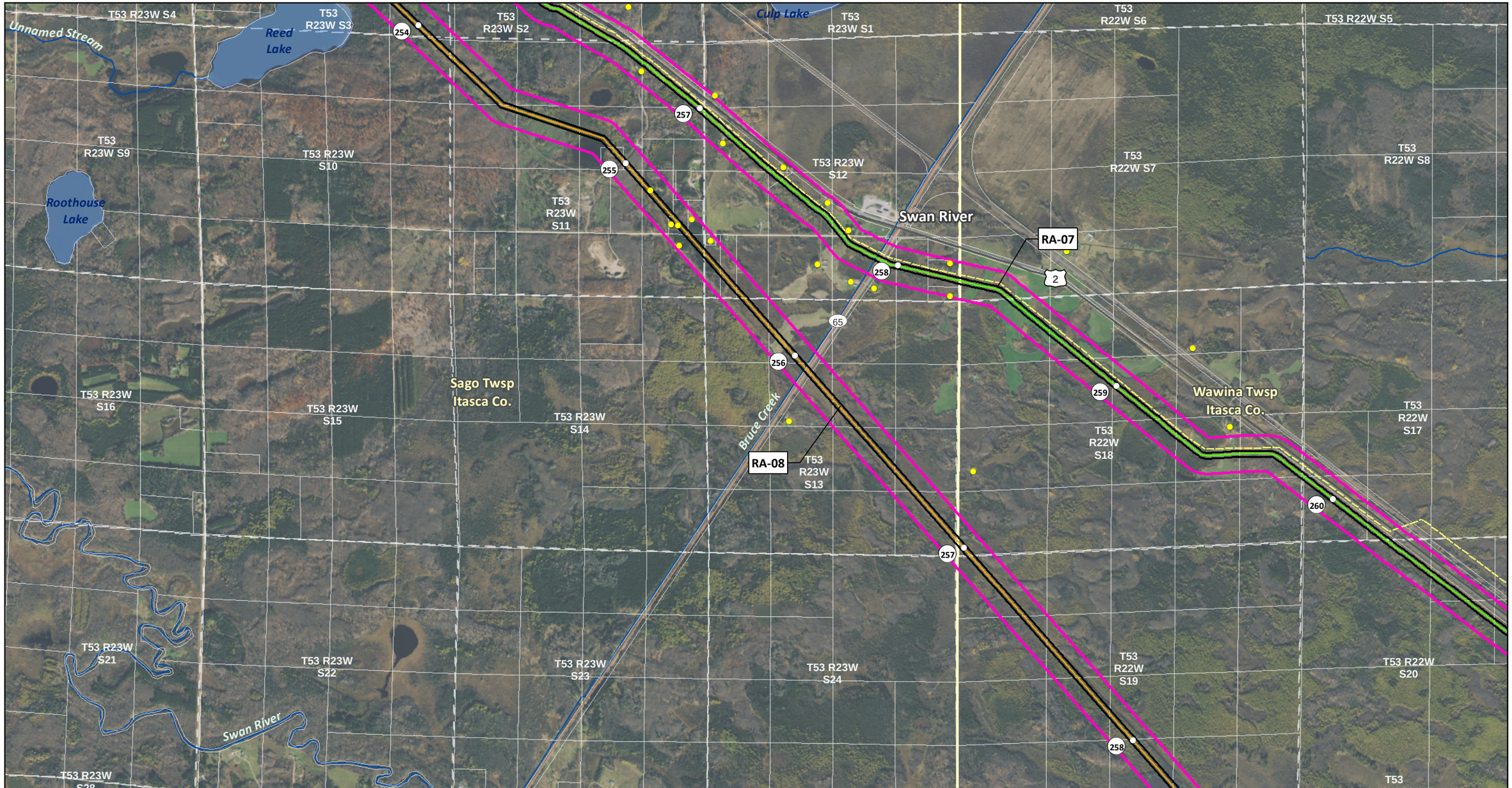

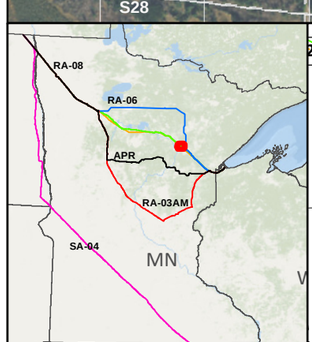

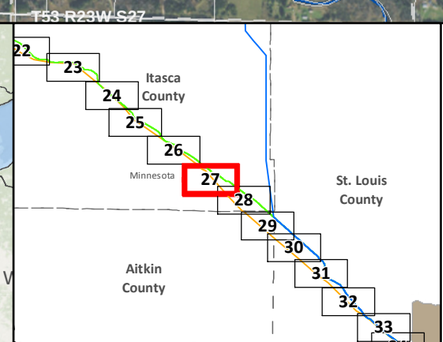

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 27A of 38

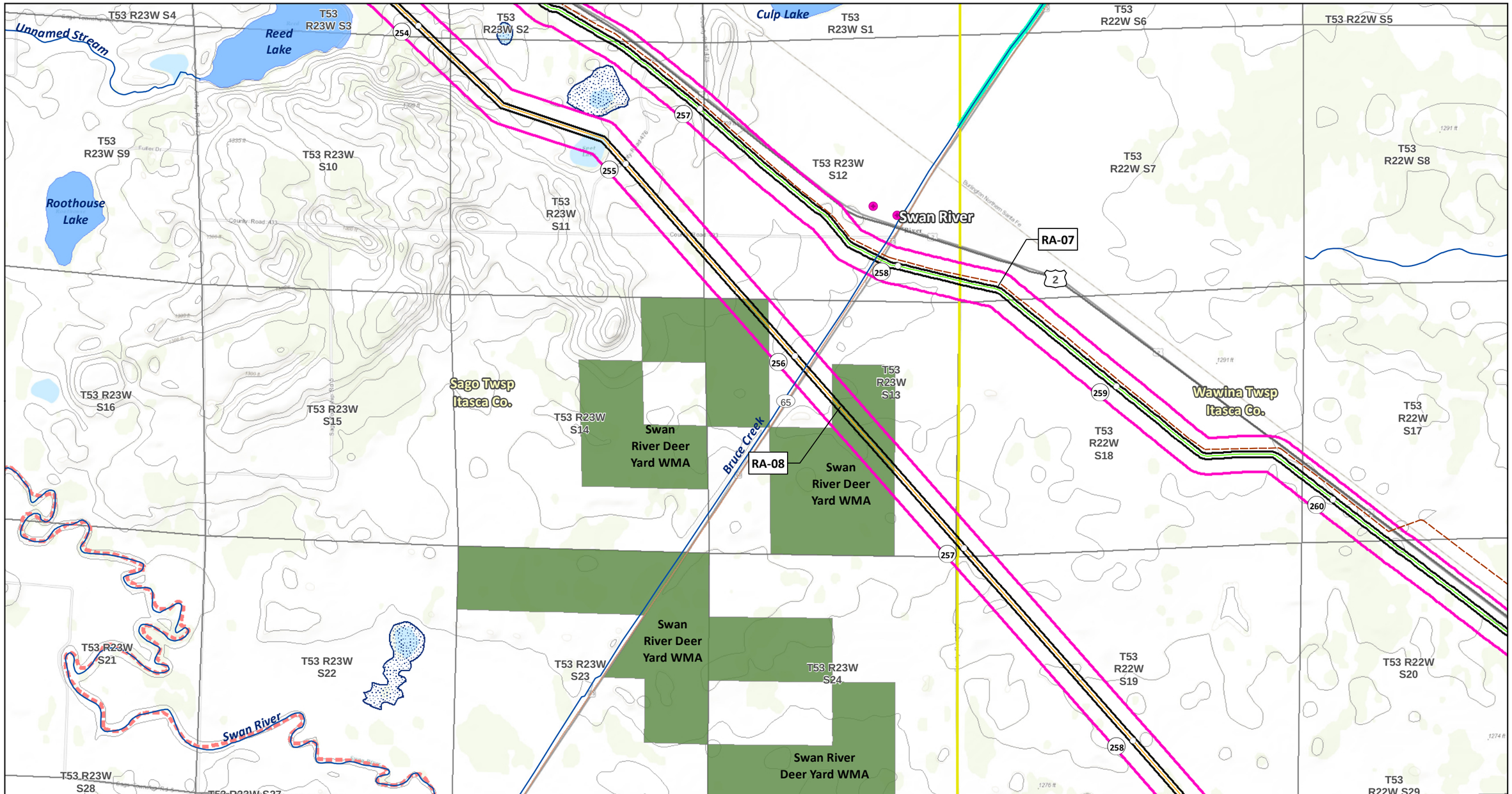

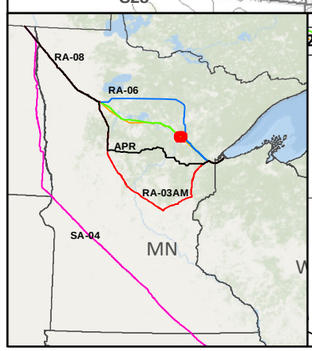

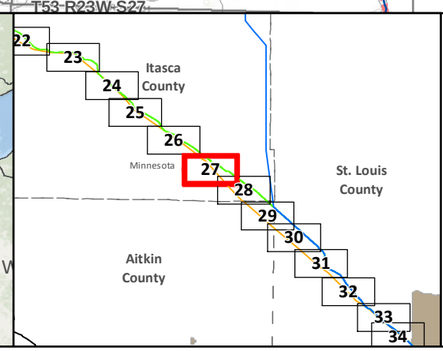

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 27B of 38

T53 R22W S23
T53 R22W S19
T53 R22W S20
T53 R22W S21
T53 R22W S22
T53 R22W S24
T53 R23W S24
T53 R23W S25
Unnamed Stream
Wawina
T53 R22W S27
T53 R22W S28
T53 R22W S26
T53 R22W S25
T53 R22W S30
T53 R22W S29
Wawina Twsp
Itasca Co.
RA-07
RA-08
T53 R22W S31
T53 R22W S32
T53 R22W S33
T53 R22W S34
T53 R22W S35
T53 R22W S36
Northeast
Aitkin Twsp
Aitkin Co.
Swan River
T52 R22W S6
T52 R22W S5
T52 R22W S4
T52 R22W S3
T52 R22W S2
T52 R22W S1

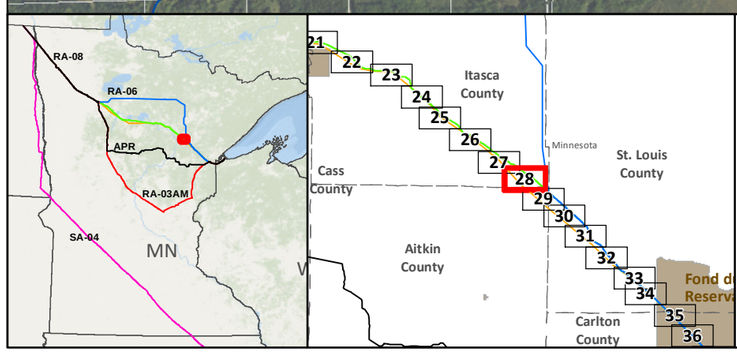

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
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Public Waters Watercourse

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Major Road
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Land Ownership
State Forest
National Forest
Tribal Reservation
Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 28A of 38

T53 R23W S24
T53 R23W S25
T53 R22W S19
T53 R22W S20
T53 R22W S21
T53 R22W S22
T53 R22W S23
T53 R22W S24
T53 R22W S30
T53 R22W S29
T53 R22W S28
T53 R22W S27
T53 R22W S26
T53 R22W S25
T53 R22W S31
T53 R22W S32
T53 R22W S33
T53 R22W S34
T53 R22W S35
T53 R22W S36
T52 R22W S6
T52 R22W S5
T52 R22W S4
T52 R22W S3
T52 R22W S2
T52 R22W S1

Unnamed Stream
Swan River
Wawina
Wawina Twsp
Itasca Co.
Northeast
Aitkin Twsp
Aitkin Co.
Burlington Northern Santa Fe
Township Road A
County Road 429
County Road 129
ITASCA
AITKIN

258
259
260
261
262
263
264
265
2

RA-07
RA-08

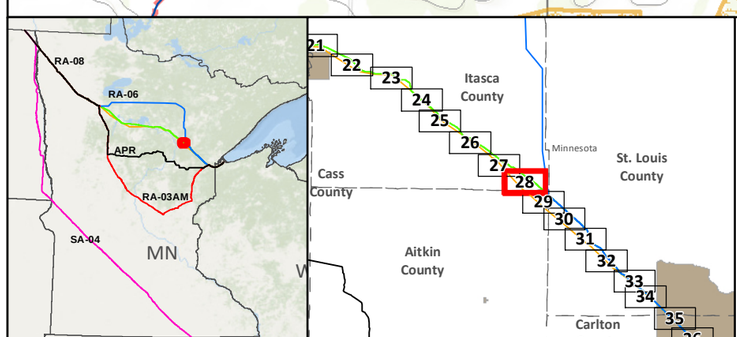

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
WMA - Wildlife Management Areas
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Wellhead Protection Area (WHPA)

Lakes of Biological Significance
Outstanding
High
Moderate

Native Plant Communities with Biodiversity Significance
Outstanding
High
Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 28B of 38

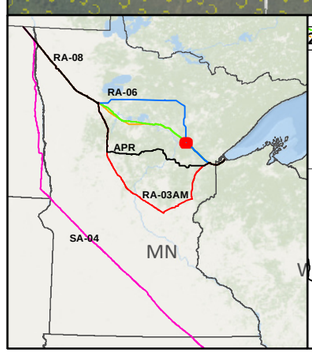

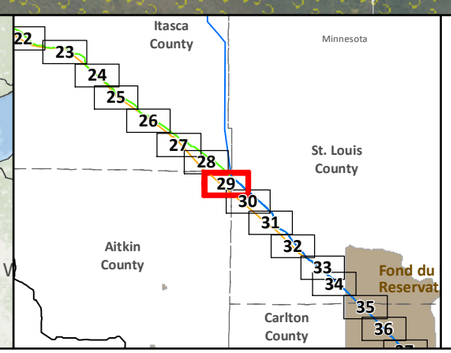

SA-04

Applicant's Preferred Route (APR)

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- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

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Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 29A of 38

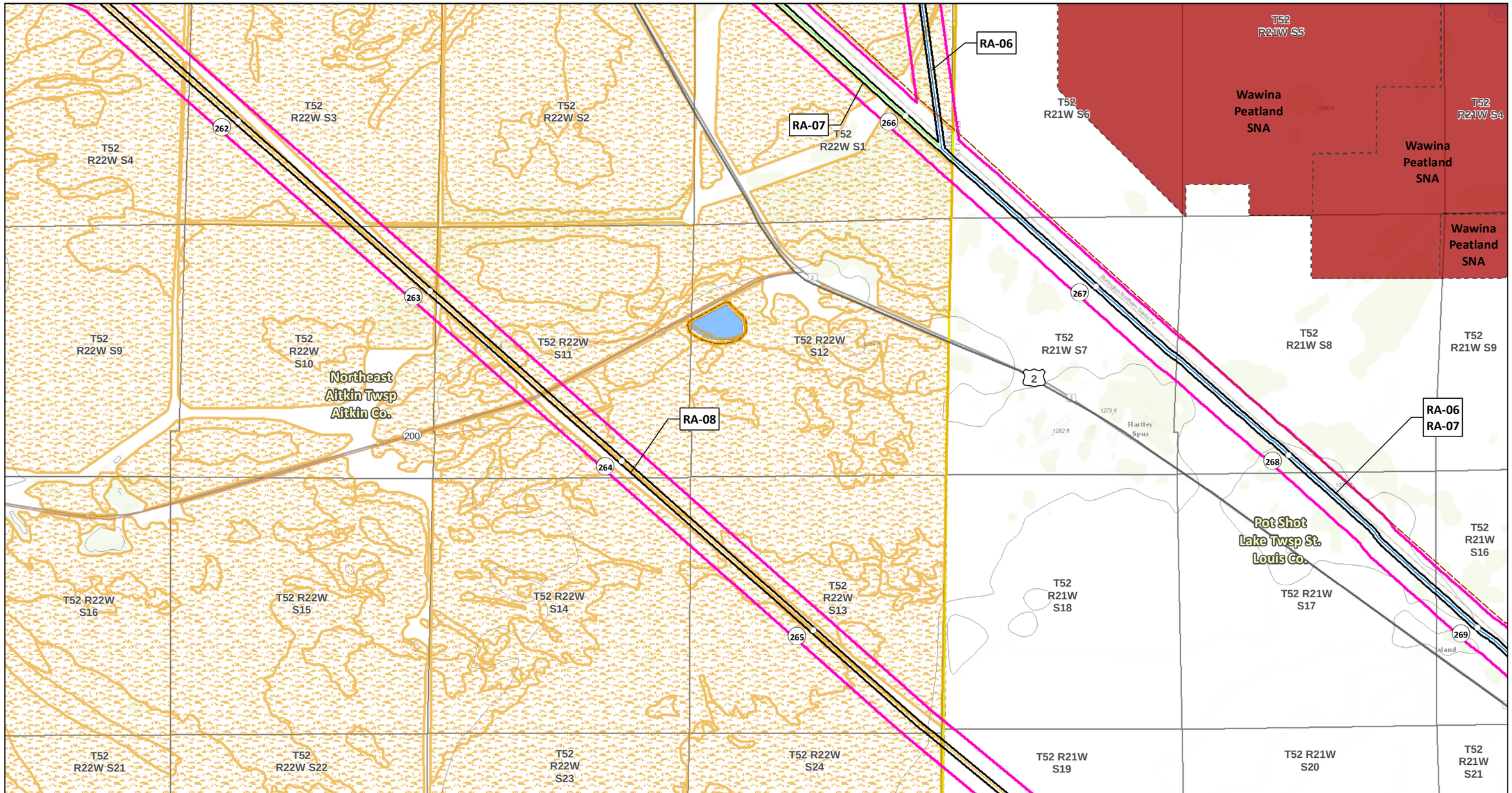

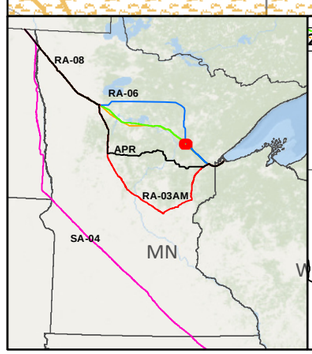

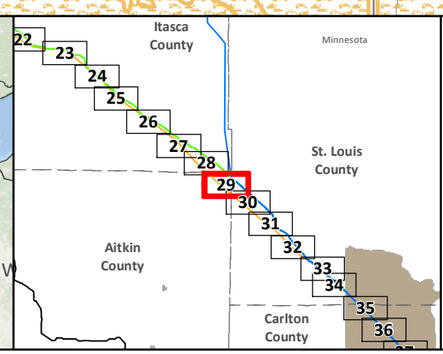

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

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- SNA - Scientific and Natural Area

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Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

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Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

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- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Terminal

Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 29B of 38

T52 R22W S13
T52 R21W S18
T52 R21W S17
T52 R21W S16
T52 R21W S15
T52 R21W S14
T52 R21W S13
Northeast Aitkin Twsp Aitkin Co.
T52 R22W S24
T52 R21W S20
T52 R21W S21
T52 R21W S22
T52 R21W S23
T52 R21W S24
T52 R21W S19
Pot Shot Lake Twsp St. Louis Co.
RA-08
Savanna State Forest
T52 R21W S30
T52 R21W S29
T52 R21W S28
T52 R21W S27
T52 R21W S26
T52 R21W S25
RA-06
RA-07
T52 R22W S25
T52 R22W S36
T52 R21W S31
T52 R21W S32
T52 R21W S33
T52 R21W S34
T52 R21W S35
T52 R21W S36
Potshot Lake

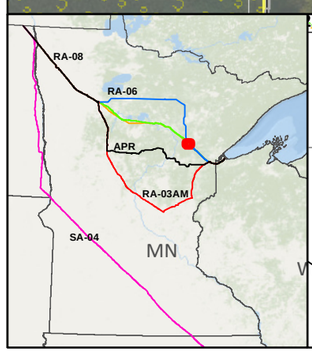

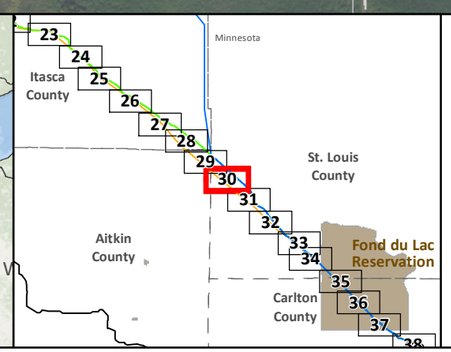

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 30A of 38

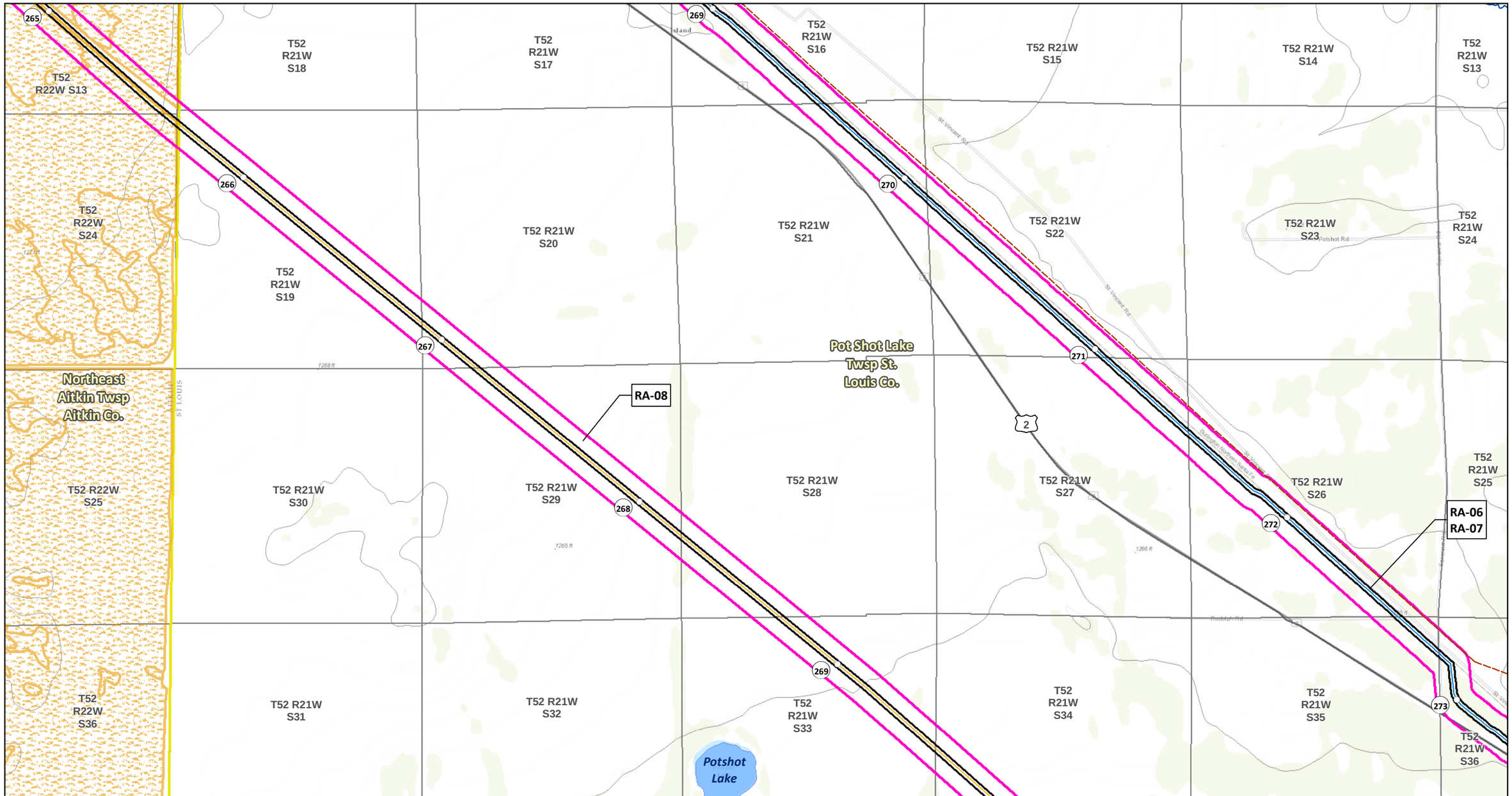

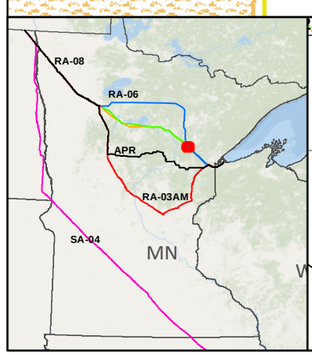

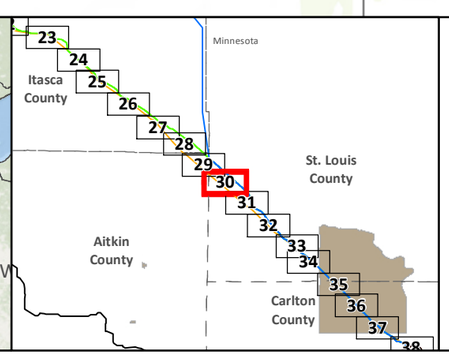

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 30B of 38

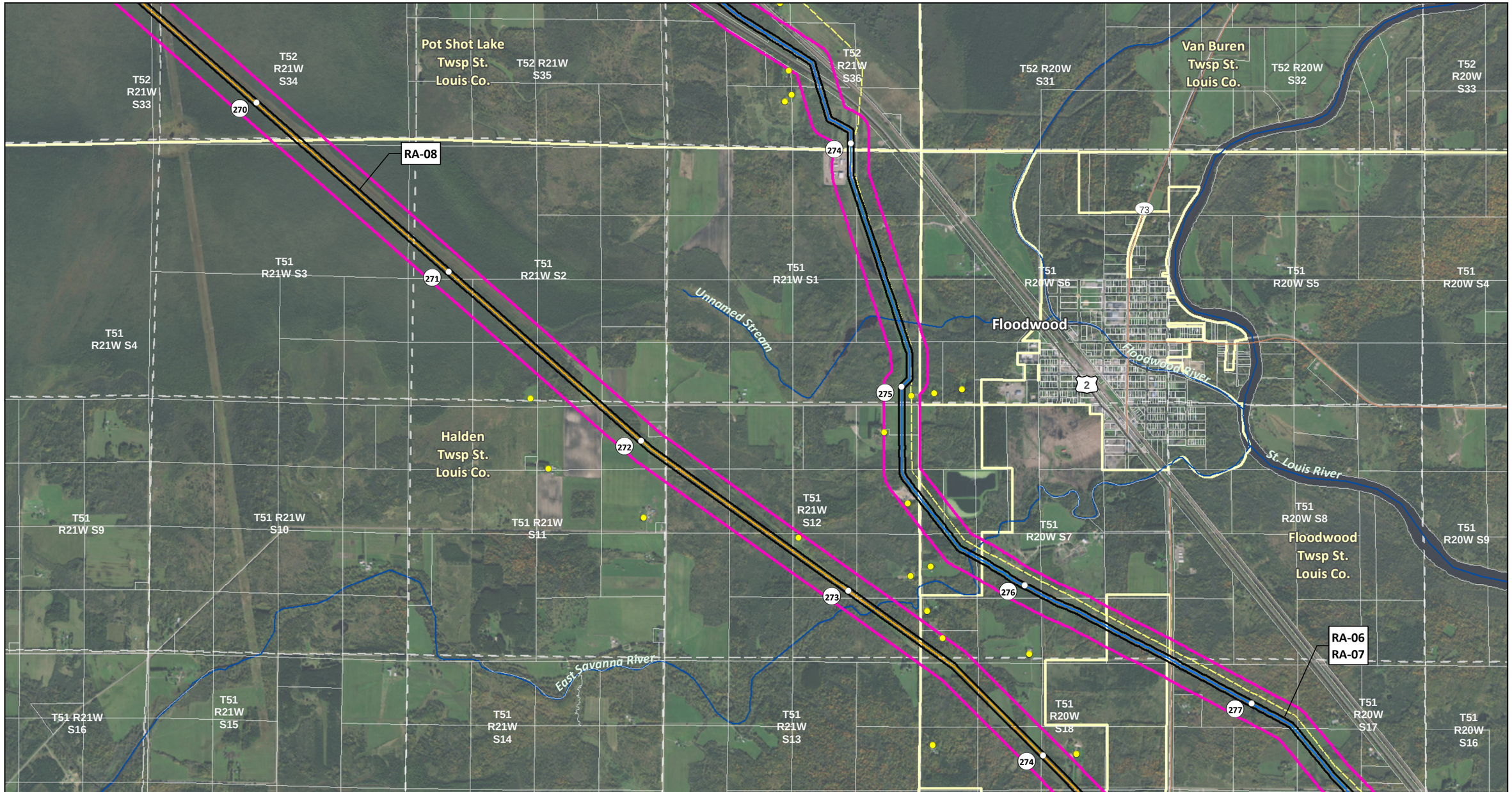

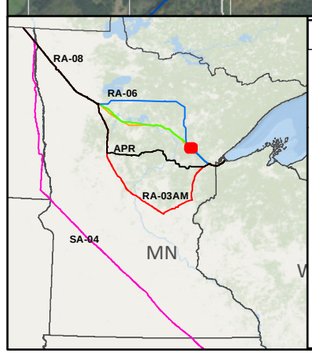

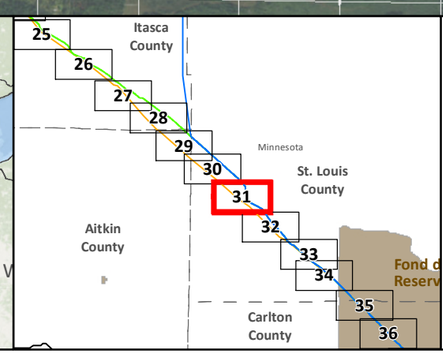

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

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Major Road

Township Boundary

Land Ownership

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0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 31A of 38

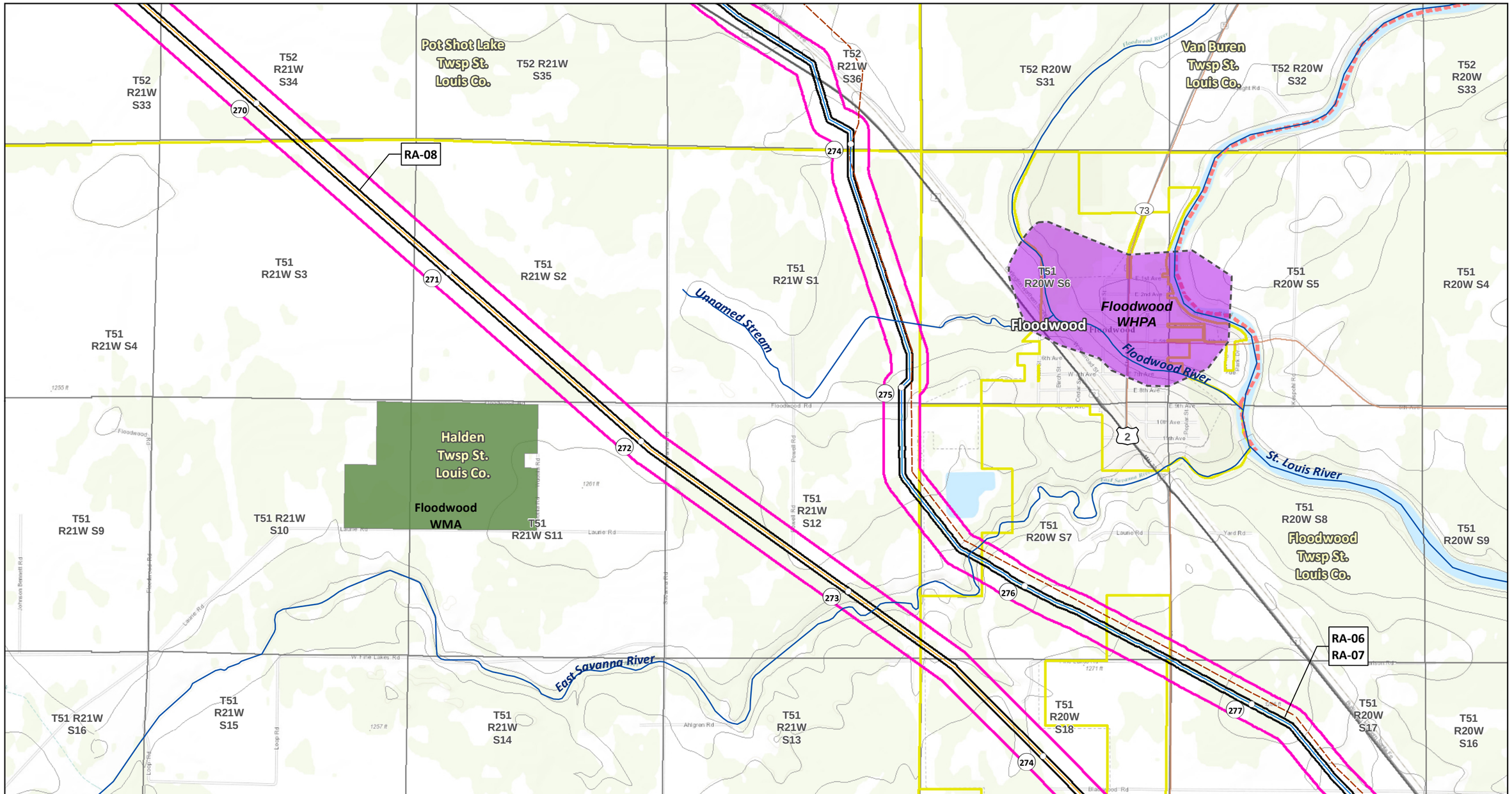

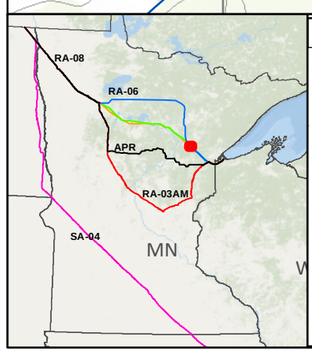

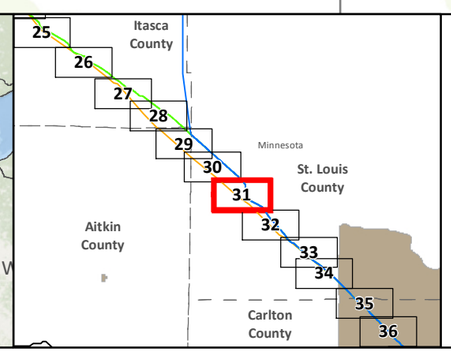

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
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Mile Post
Anticipated 120' Construction ROW
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Native Plant Communities with Biodiversity Significance
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Pump Station

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 31B of 38

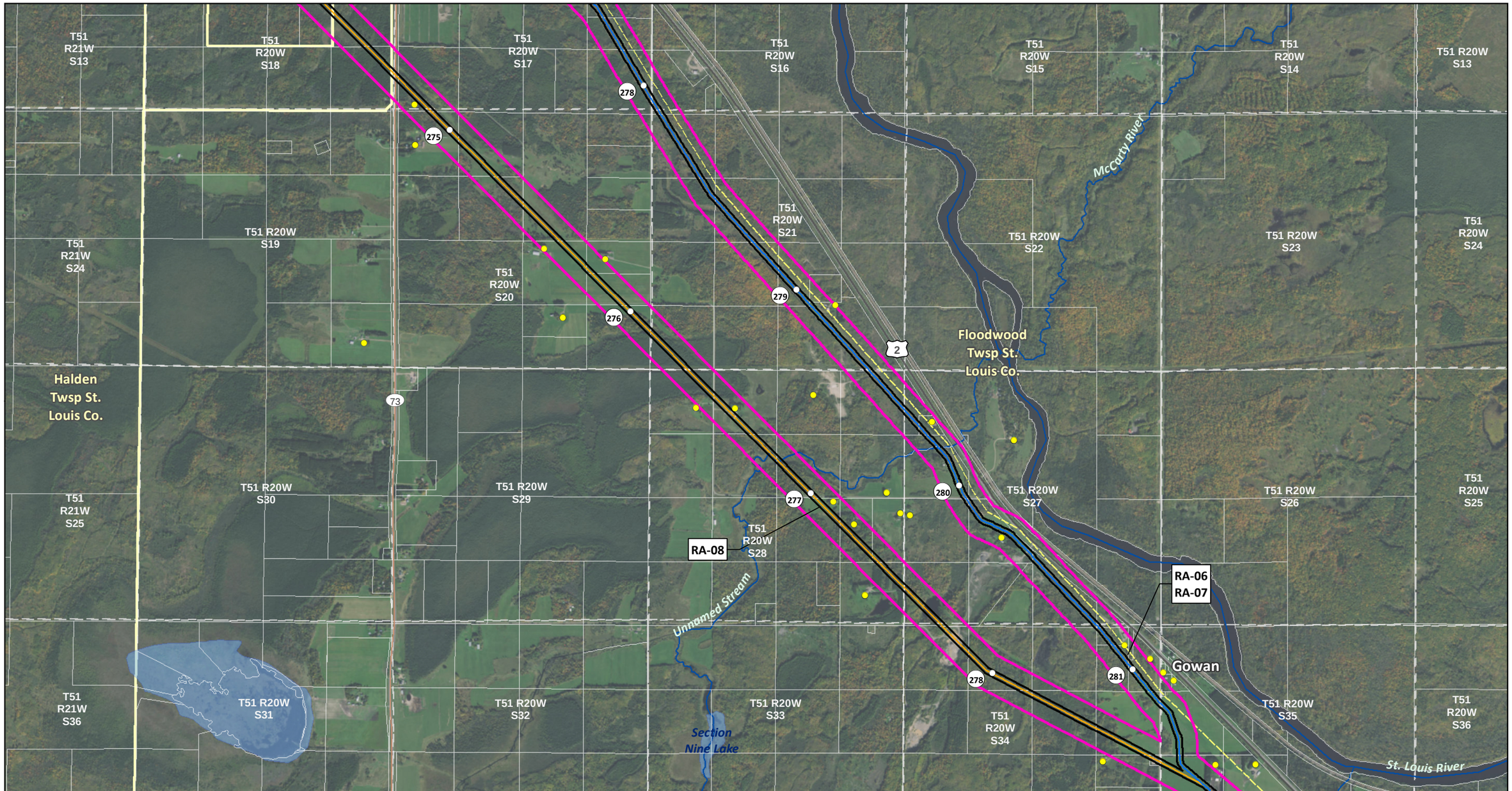

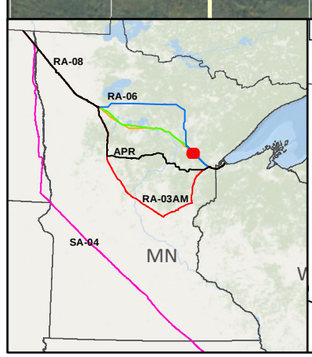

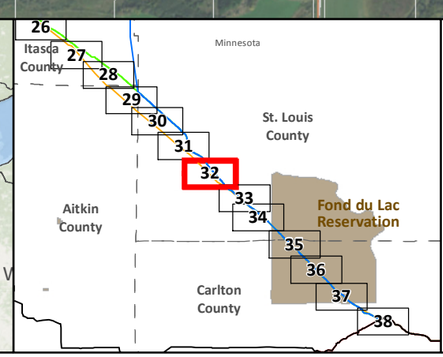

SA-04

Applicant's Preferred Route (APR)

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Existing Pipelines

Anticipated 120' Construction ROW

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LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 32A of 38

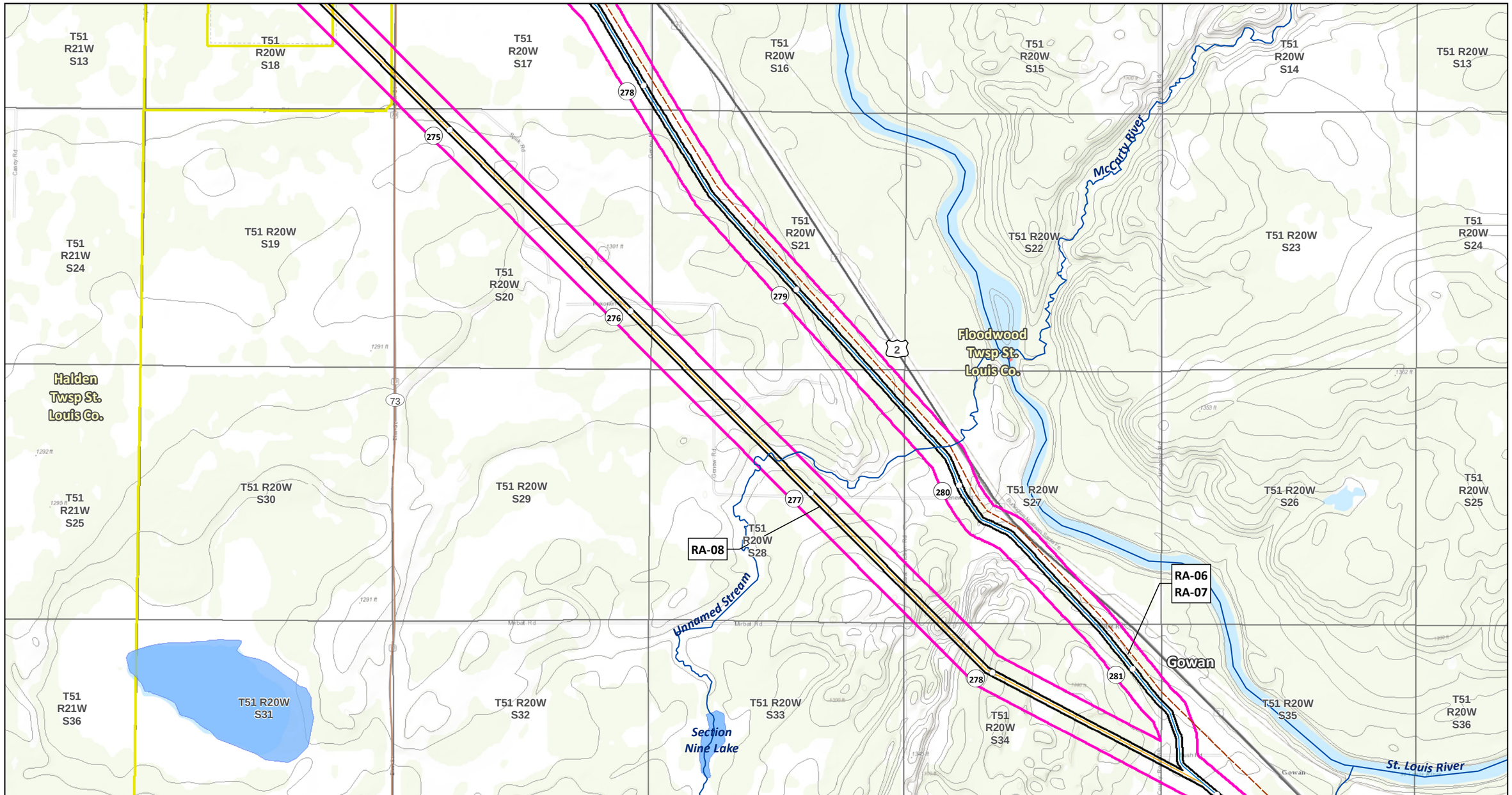

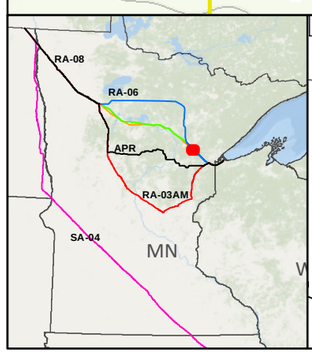

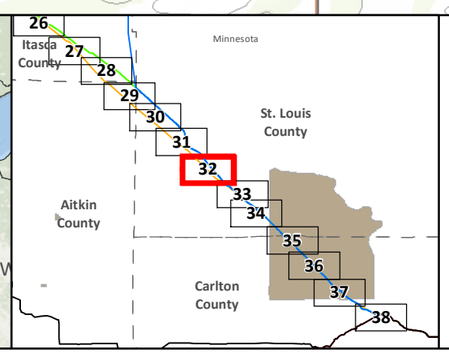

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- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 32B of 38

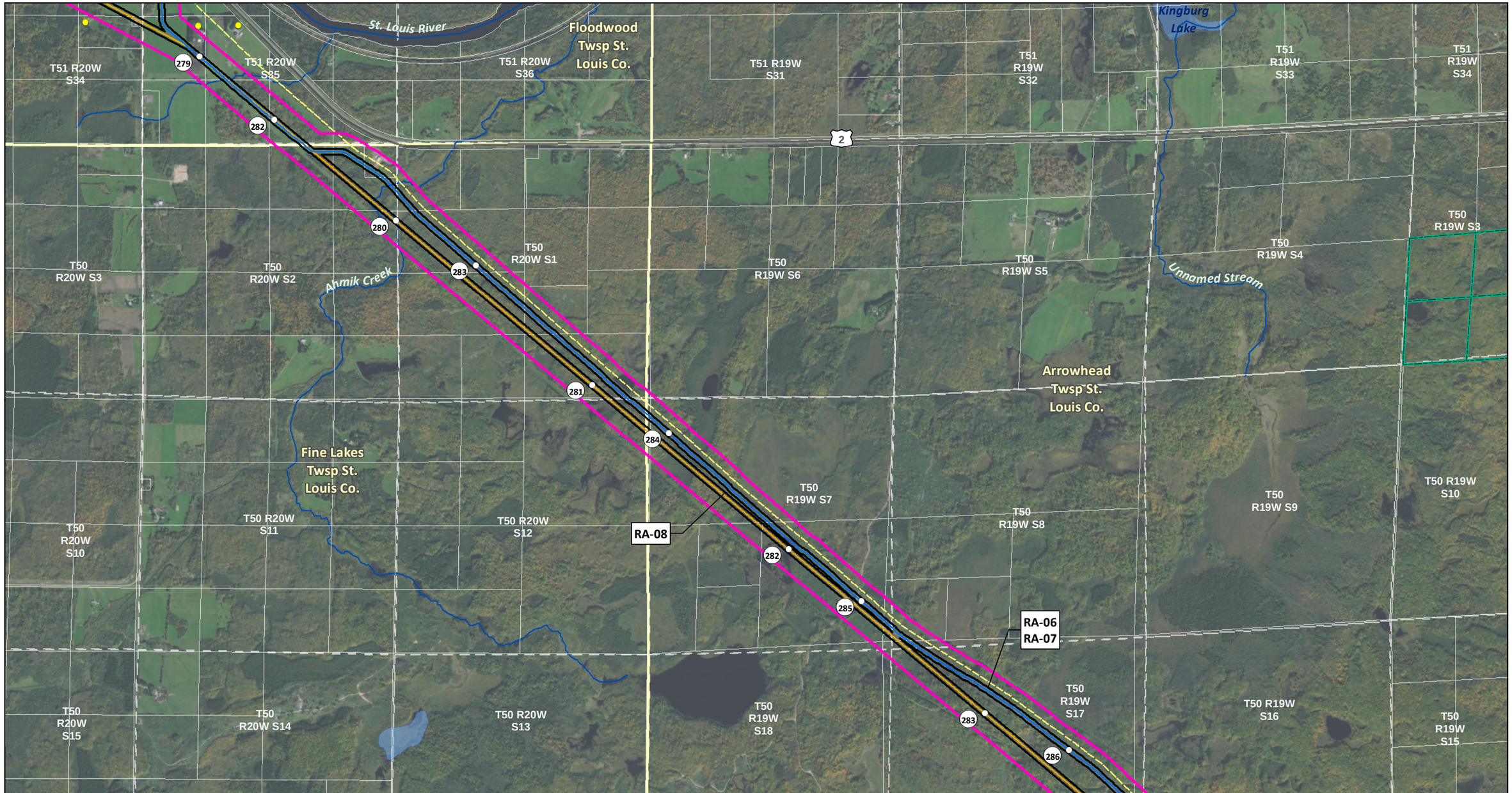

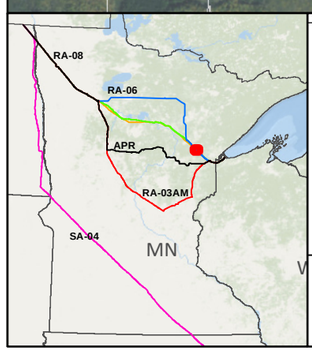

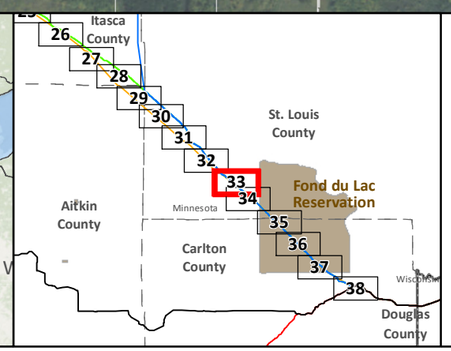

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 33A of 38

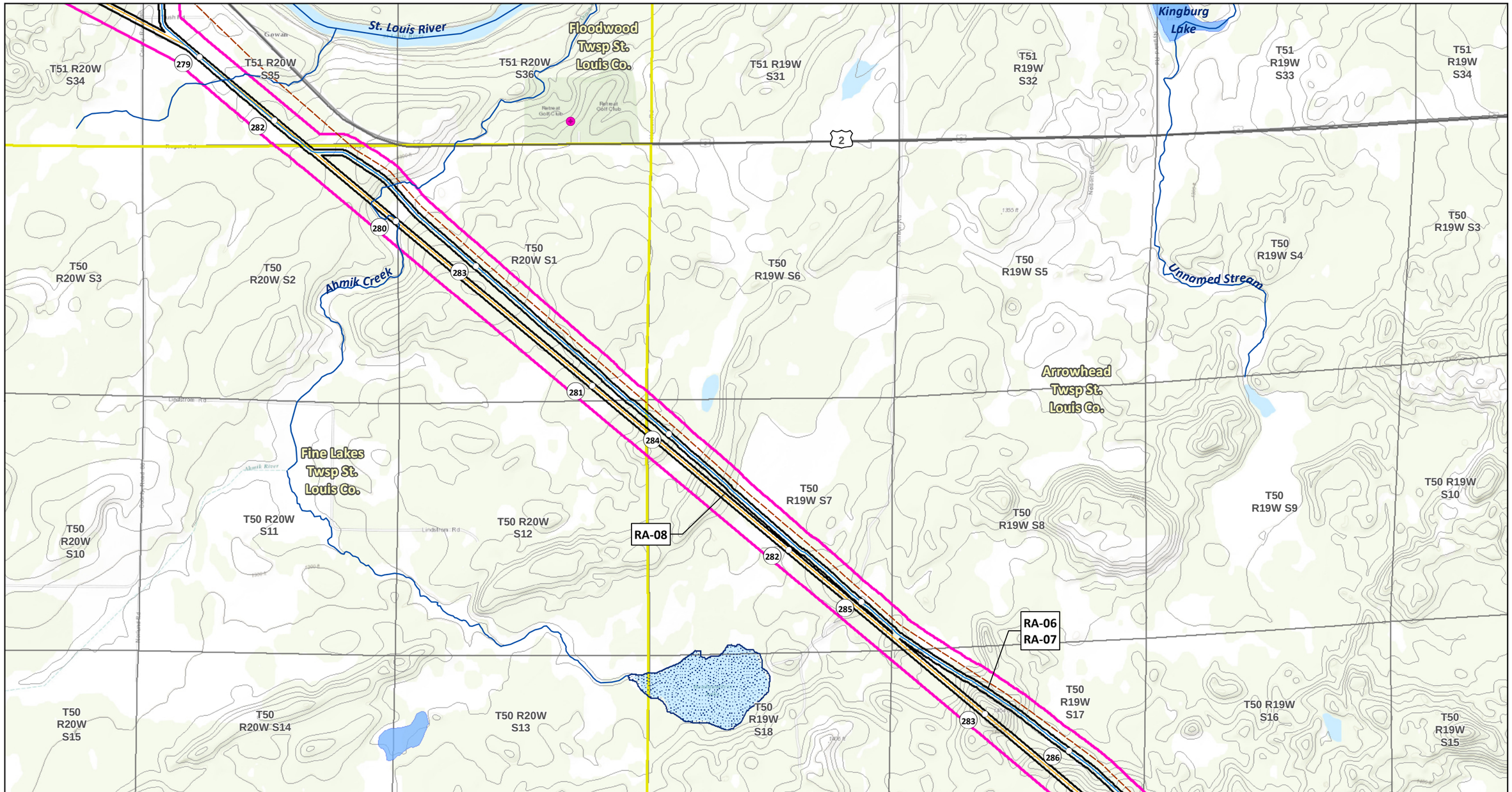

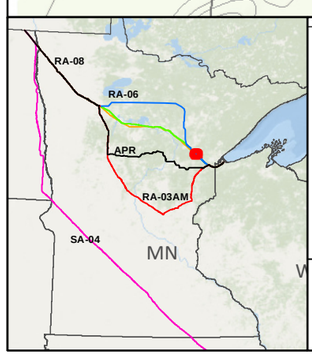

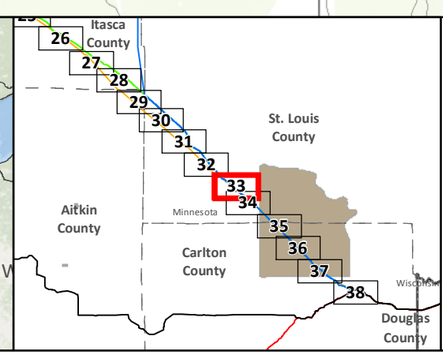

- SA-04
- Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')
- Existing Pipelines
- Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 33B of 38

T50 R20W S12
T50 R19W S7
T50 R19W S8
T50 R19W S9
T50 R19W S10
T50 R19W S11
T50 R20W S13
T50 R19W S18
T50 R19W S17
T50 R19W S16
T50 R19W S15
T50 R19W S14
RA-06
RA-07
RA-08
Arrowhead Twsp St. Louis Co.
Unnamed Stream
Fine Lakes Twsp St. Louis Co.
Fond du Lac Reservation
T50 R20W S24
T50 R19W S19
T50 R19W S20
T50 R19W S21
T50 R19W S22
T50 R19W S23
T50 R20W S25
T50 R19W S30
T50 R19W S29
T50 R19W S28
T50 R19W S27
T50 R19W S26
283
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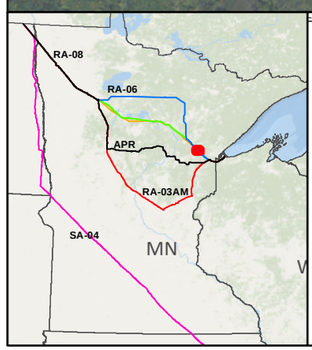

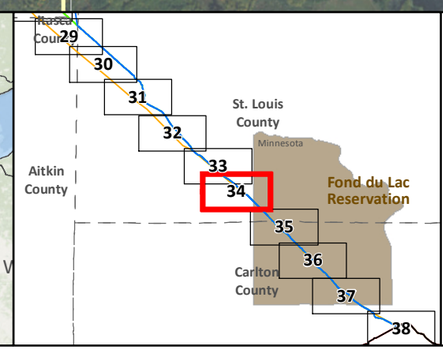

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation
Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08
CLEARBROOK TO CARLTON

Map 34A of 38

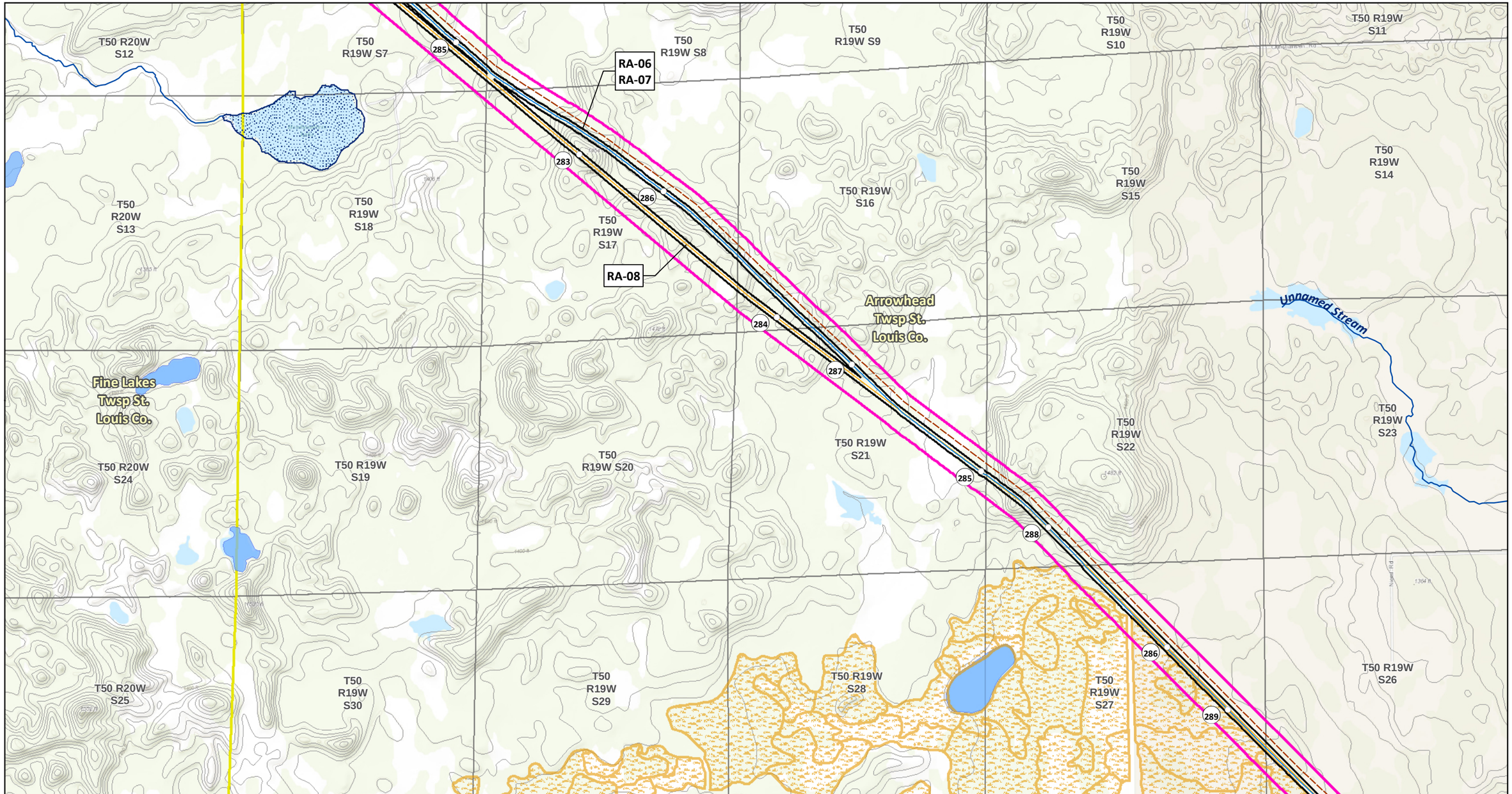

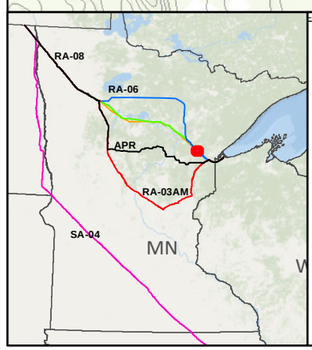

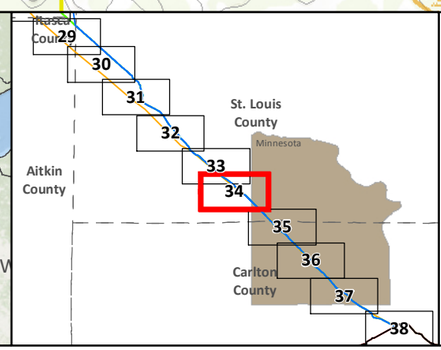

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 34B of 38

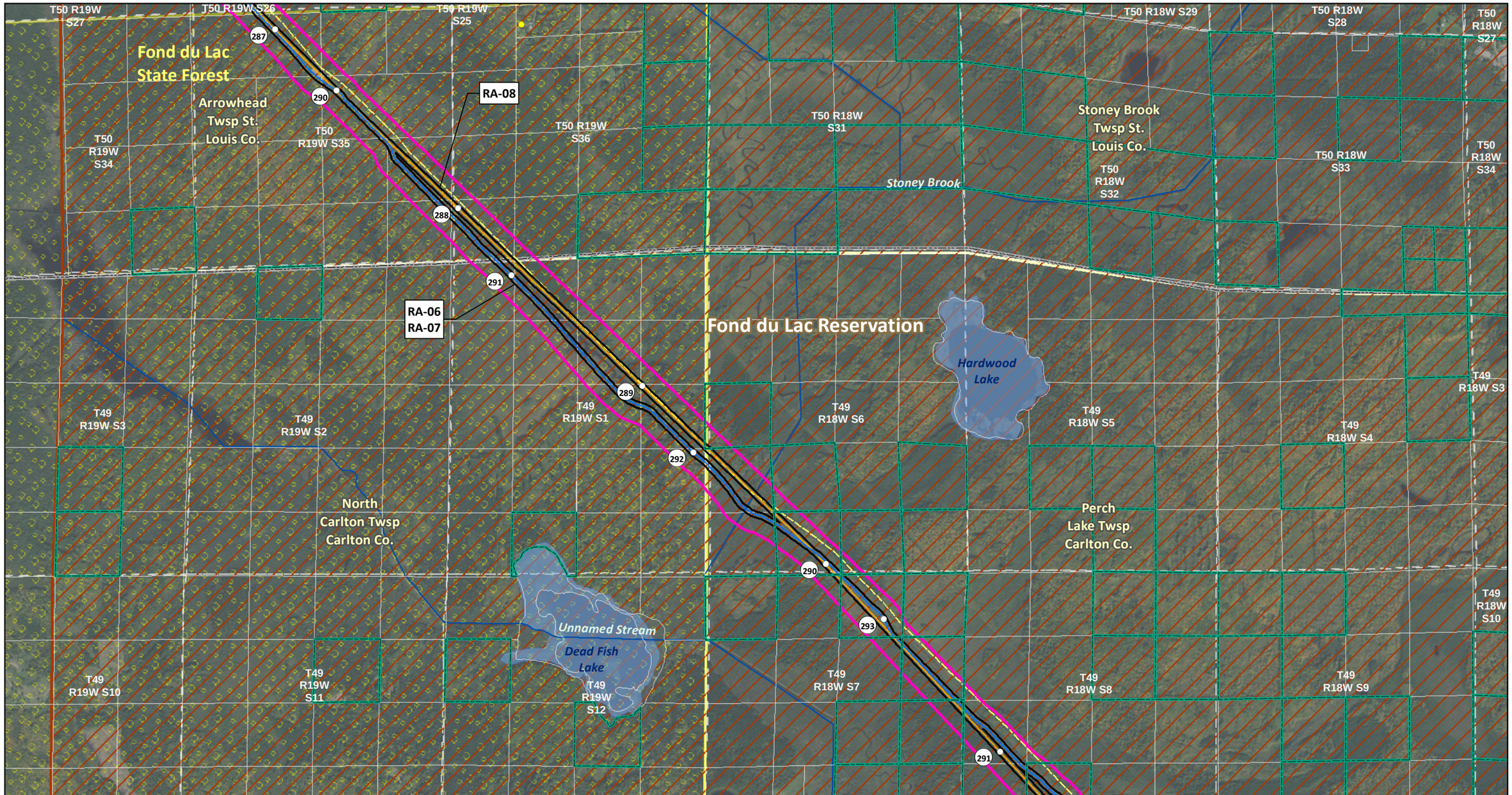

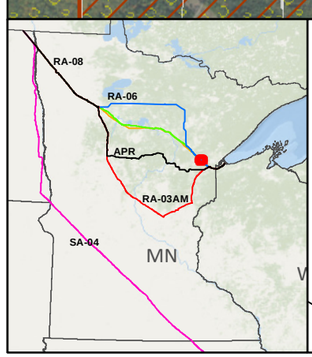

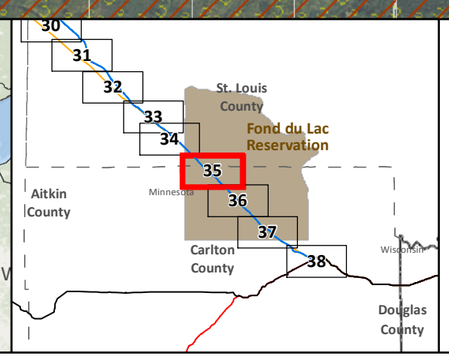

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 35A of 38

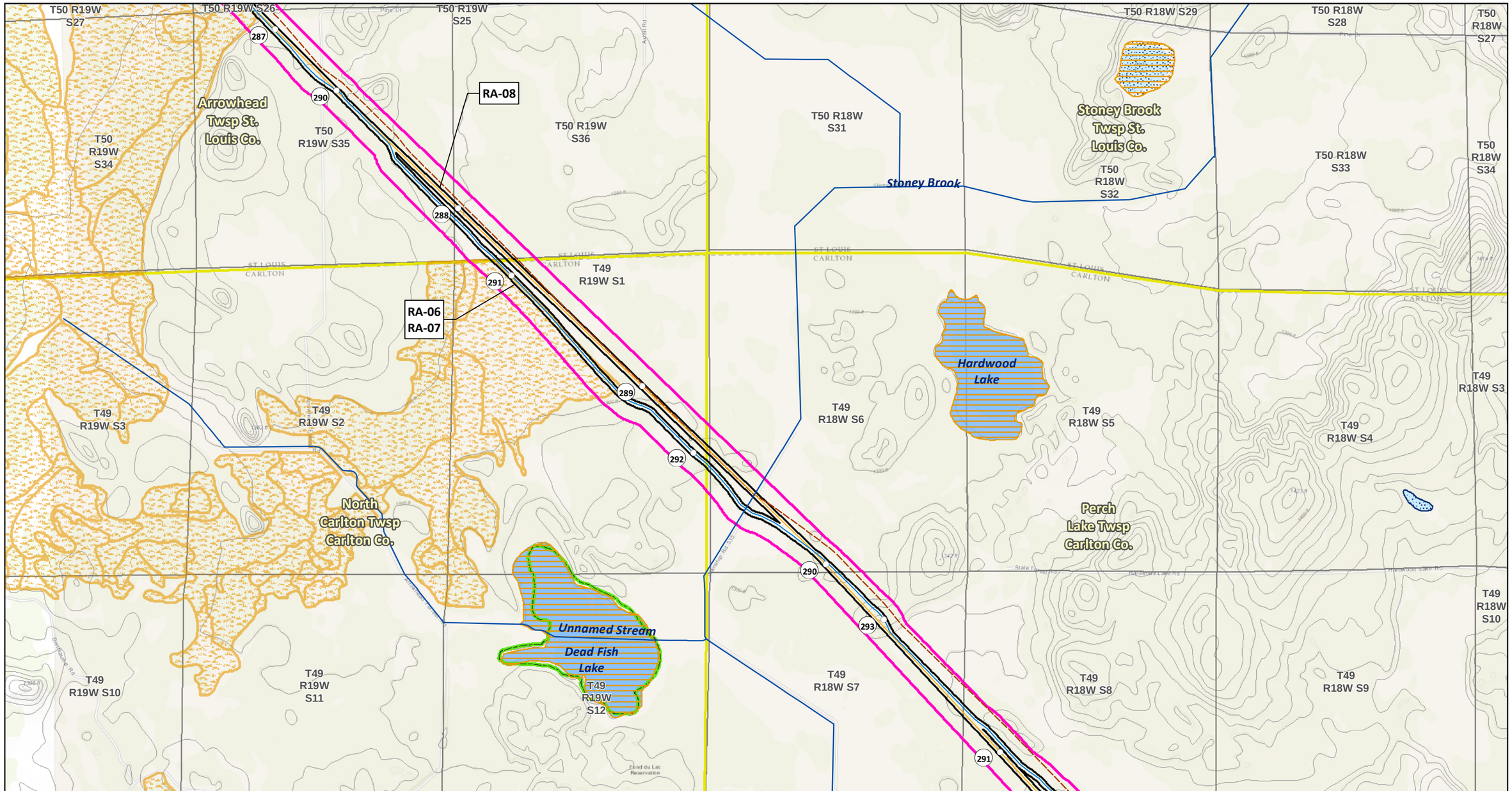

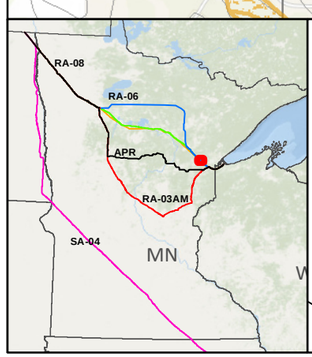

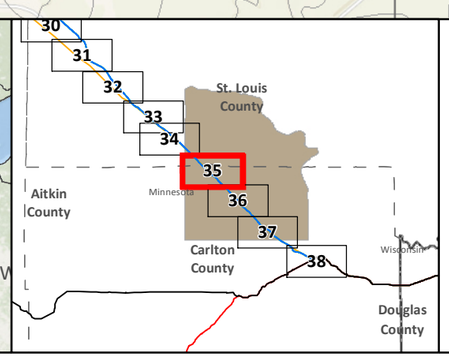

- SA-04
- Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')
- Existing Pipelines
- Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
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Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

- Terminal
- Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 35B of 38

T49 R19W S12
T49 R18W S7
T49 R18W S8
T49 R18W S9
T49 R18W S10
T49 R18W S11
T49 R18W S12
T49 R19W S13
T49 R18W S18
T49 R18W S17
T49 R18W S16
T49 R18W S15
T49 R18W S14
T49 R18W S13
T49 R19W S24
T49 R18W S19
T49 R18W S20
T49 R18W S21
T49 R18W S22
T49 R18W S23
T49 R18W S24
T49 R18W S26
T49 R18W S25
T49 R19W S25
T49 R18W S30
T49 R18W S29
T49 R18W S28
T49 R18W S27

Cedar Lake
Big Lake
Perch Lake
Sofie Lake
Rice Portage Lake
Stoney Brook
Otter Creek

North Carlton Twsp Carlton Co.
Perch Lake Twsp Carlton Co.
Fond du Lac Reservation

RA-08
RA-06
RA-07

294
292
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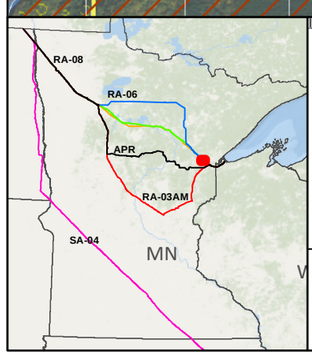

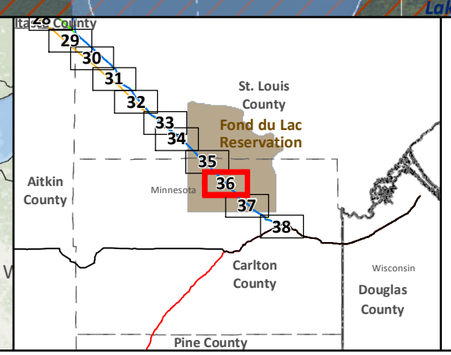

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Existing Pipelines

Anticipated 120' Construction ROW
Route Width (750')
County Boundary
Parcels
Public Water Basin
Public Waters Watercourse

Residences within 1/2 mile
Mile Post
Terminal
Pump Station
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation
Tribal Trust Land

Data Sources: MNDNR, NHD, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 36A of 38

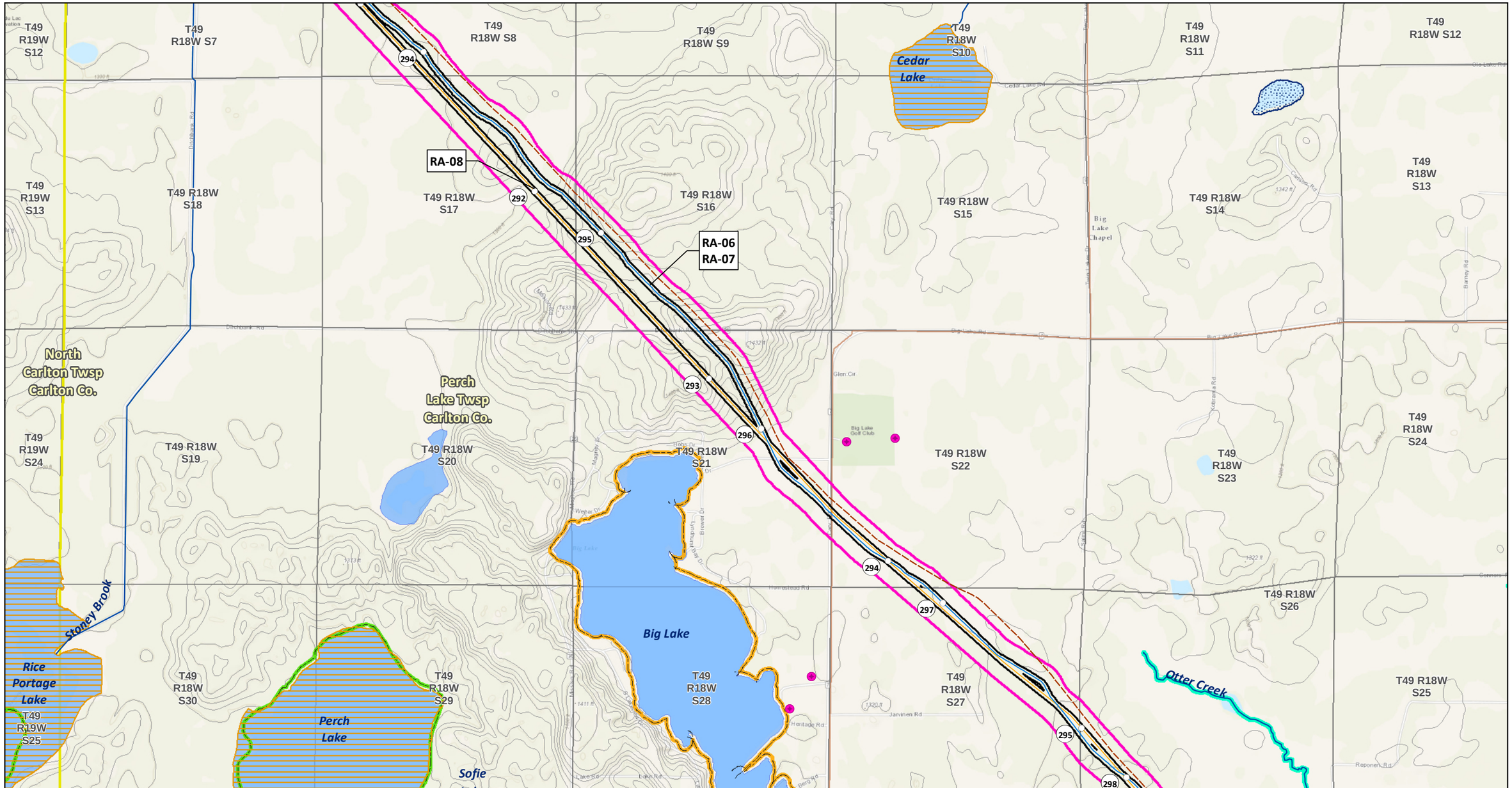

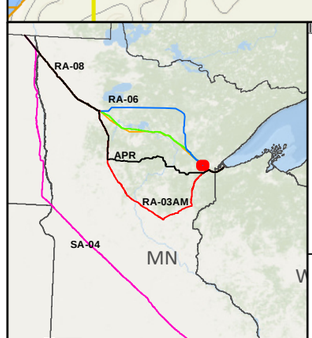

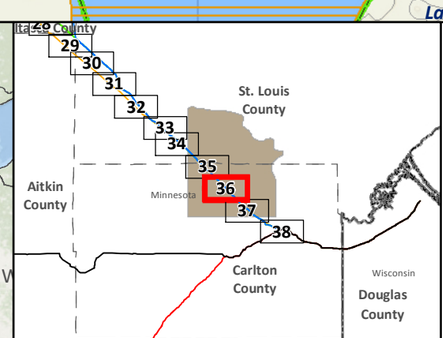

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
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Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 36B of 38

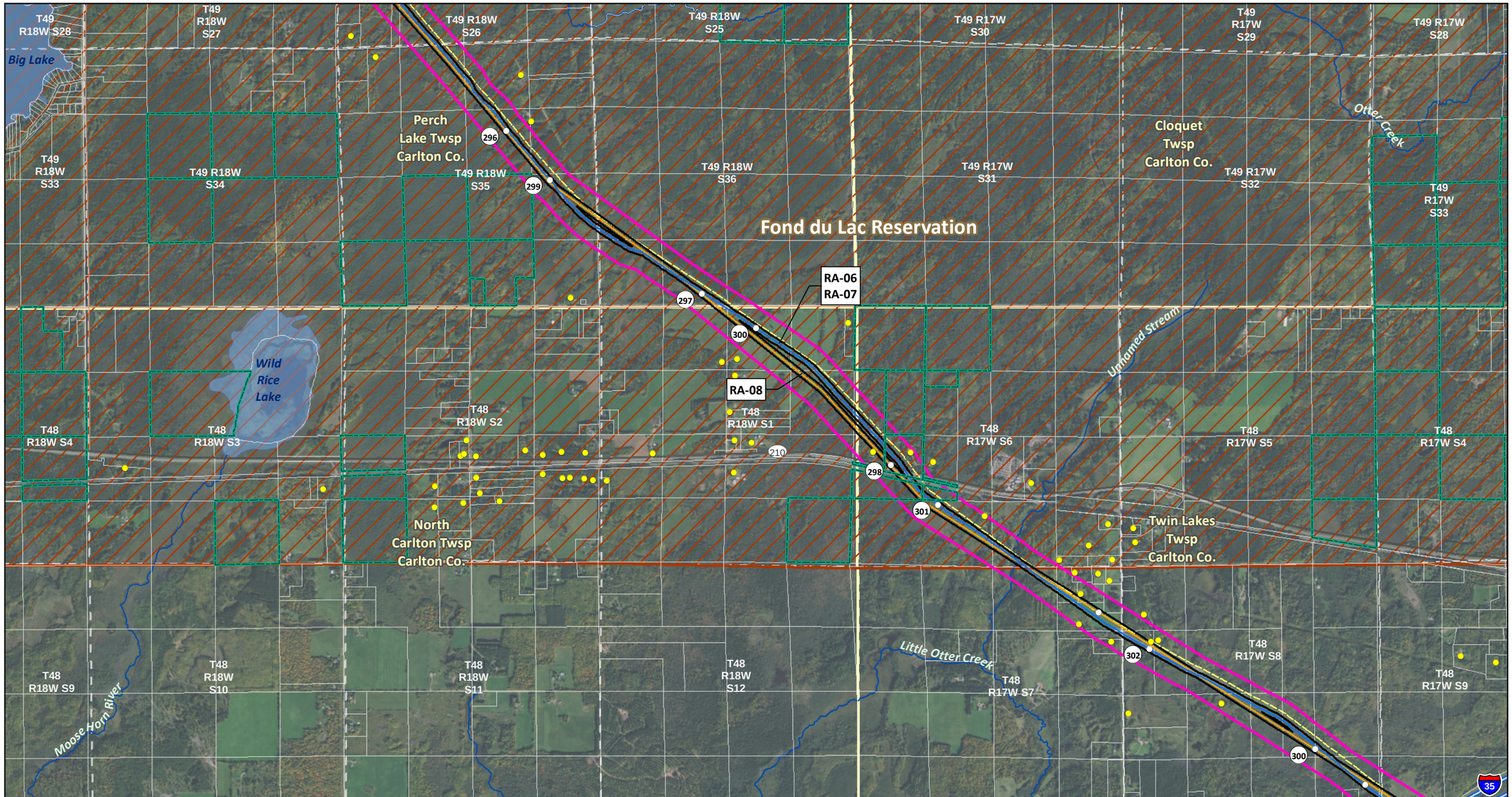

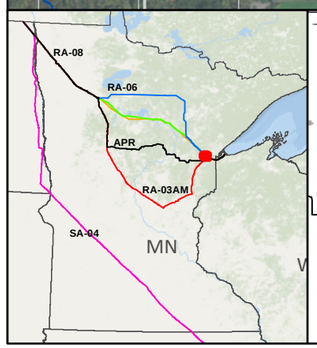

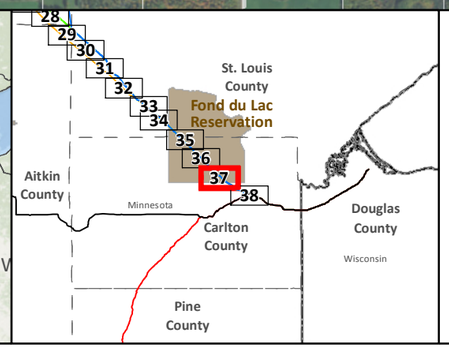

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
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- RA-08
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Anticipated 120' Construction ROW
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- Tribal Reservation
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0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
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LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08
CLEARBROOK TO CARLTON

Map 37A of 38

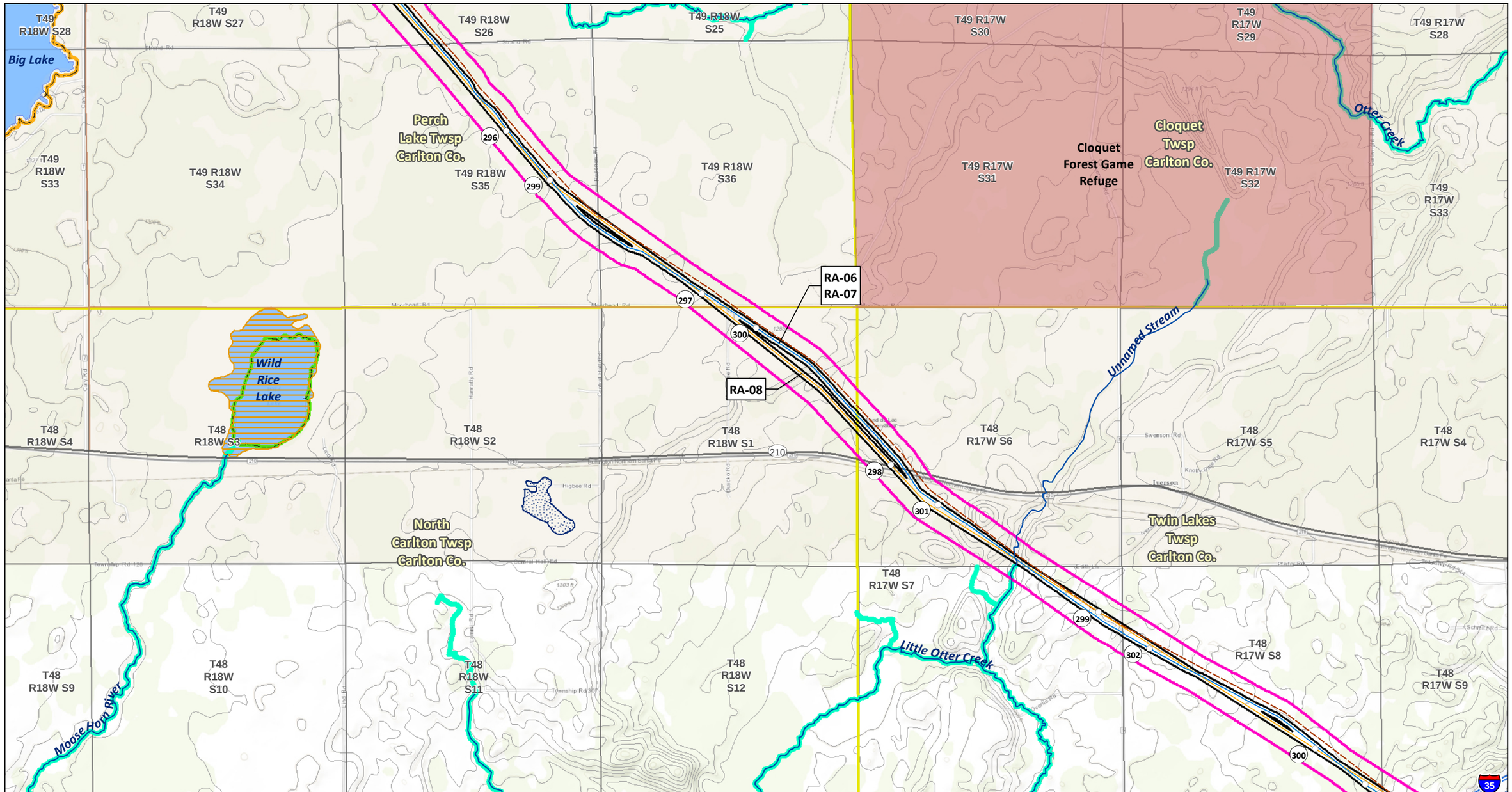

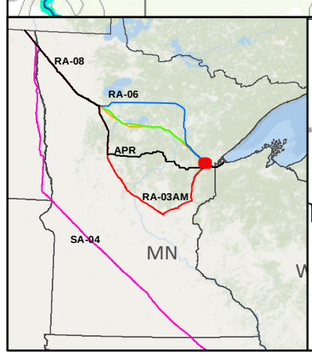

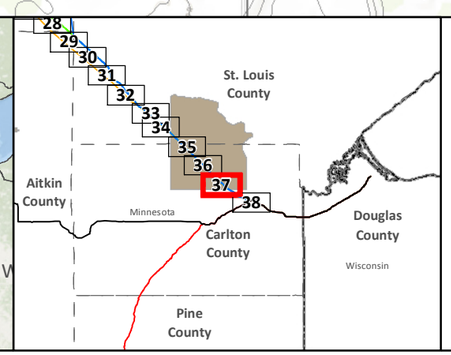

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

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Pump Station

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 37B of 38

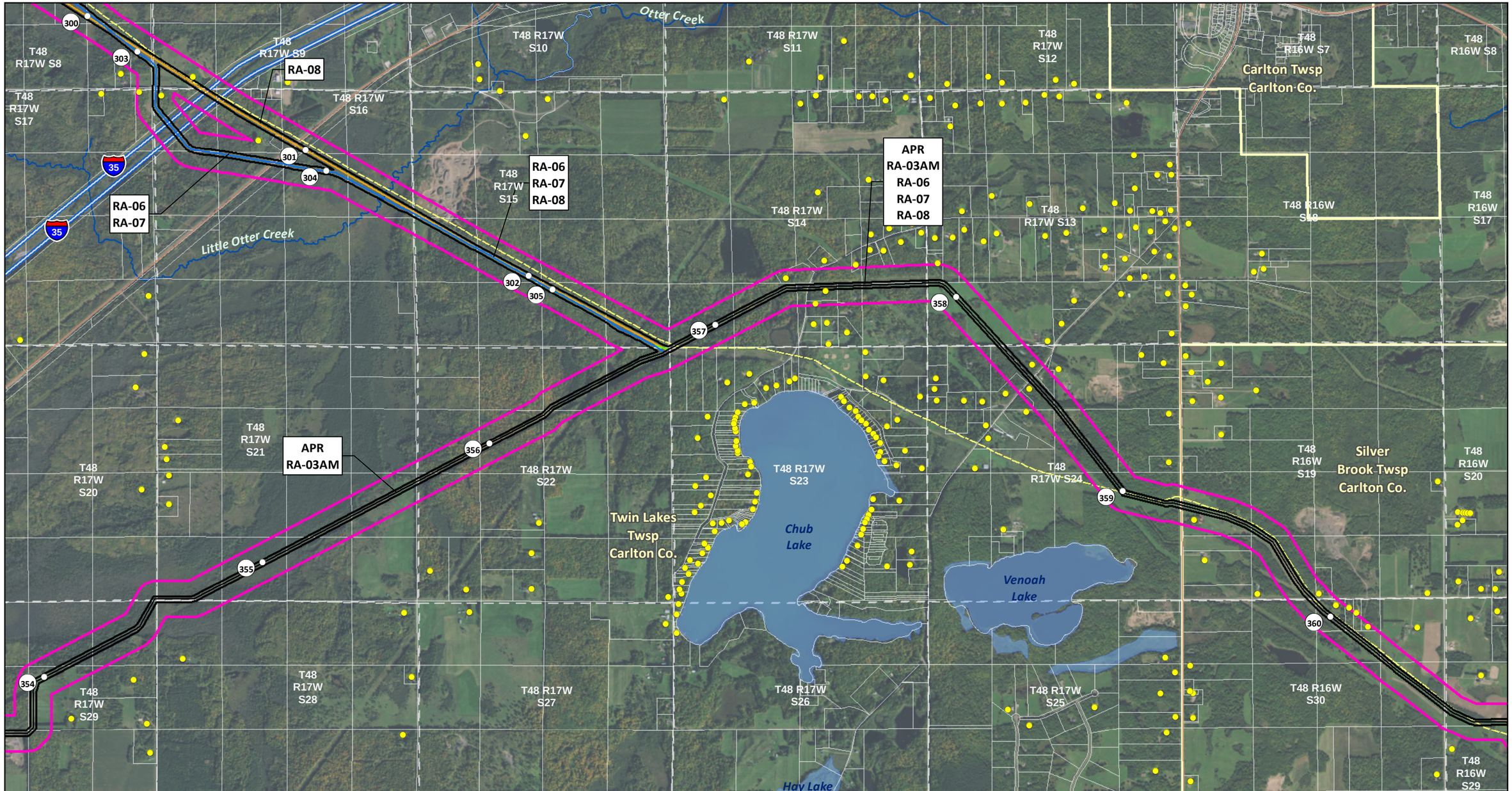

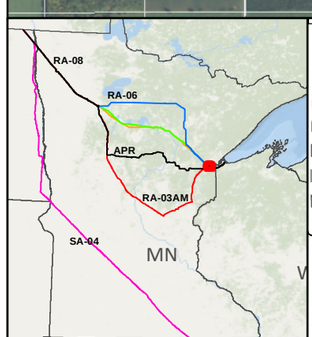

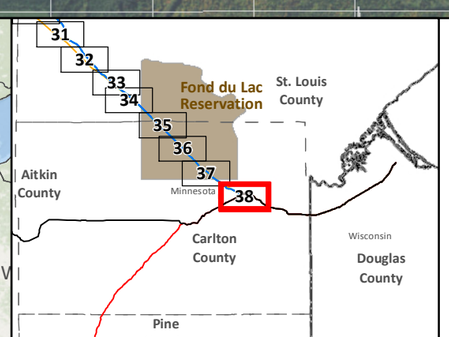

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Existing Pipelines

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Parcels

Public Water Basin

Public Waters Watercourse

Residences within 1/2 mile

Mile Post

Terminal

Pump Station

Interstate

Highway

Major Road

Township Boundary

Land Ownership

- State Forest
- National Forest
- Tribal Reservation
- Tribal Trust Land

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources: MNDNR, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

RA-07 AND RA-08

CLEARBROOK TO CARLTON

Map 38A of 38

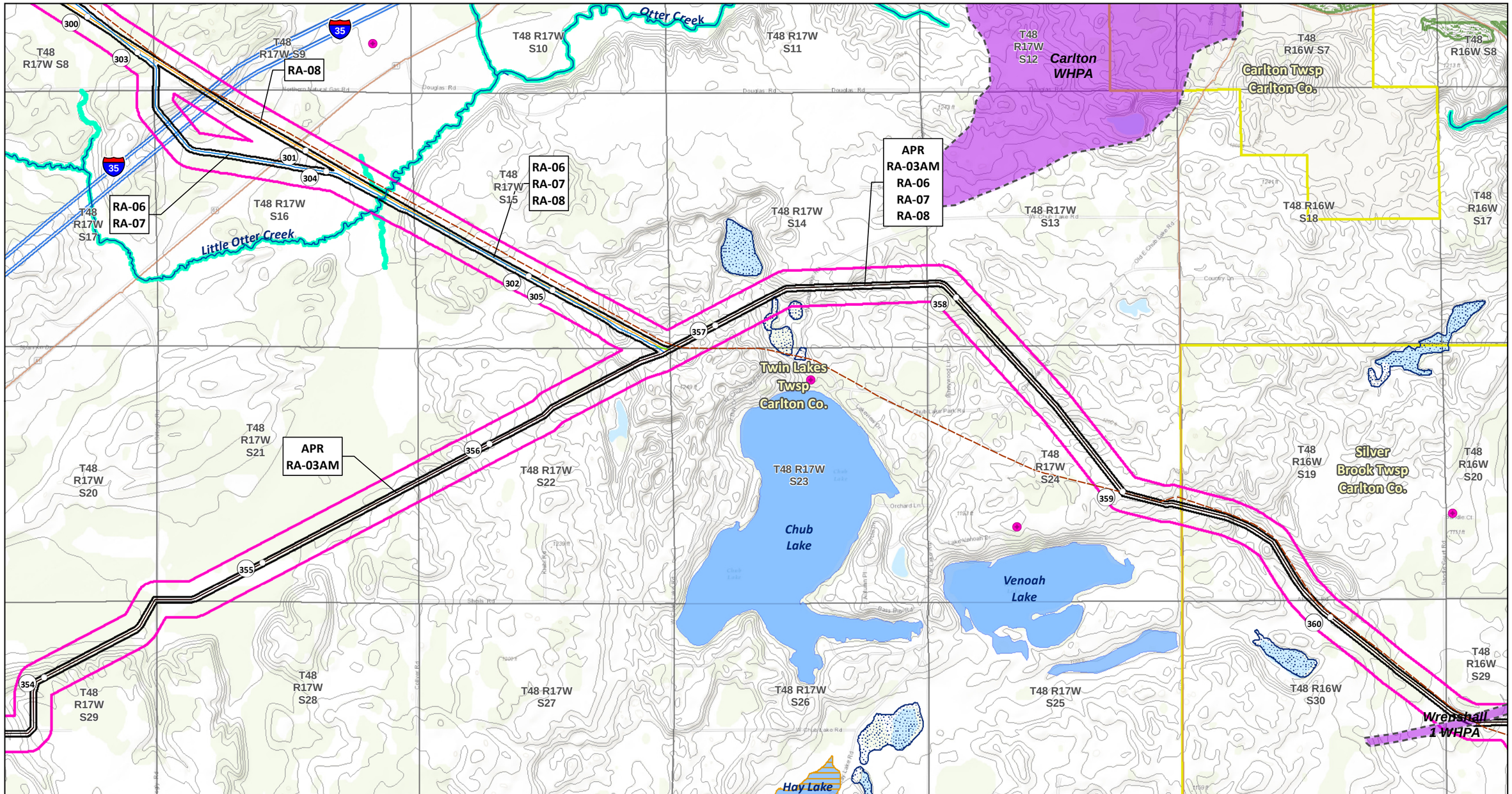

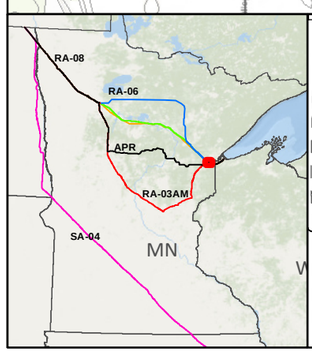

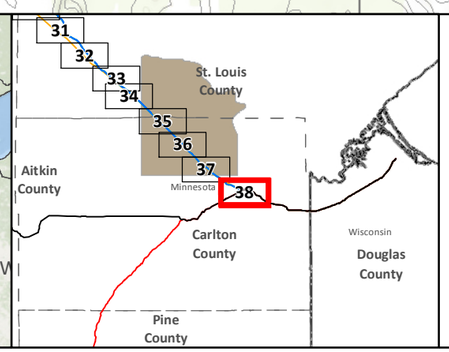

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Terminal
Pump Station

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

RA-07 AND RA-08

CLEARBROOK TO CARLTON

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

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Minnesota Department of Commerce
Energy Environmental Review and Analysis

Final Environmental Impact Statement
Line 3 Project

Mapbook
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Docket Nos. PPL-15-137/CN-14-916

August 17, 2017

MINNESOTA

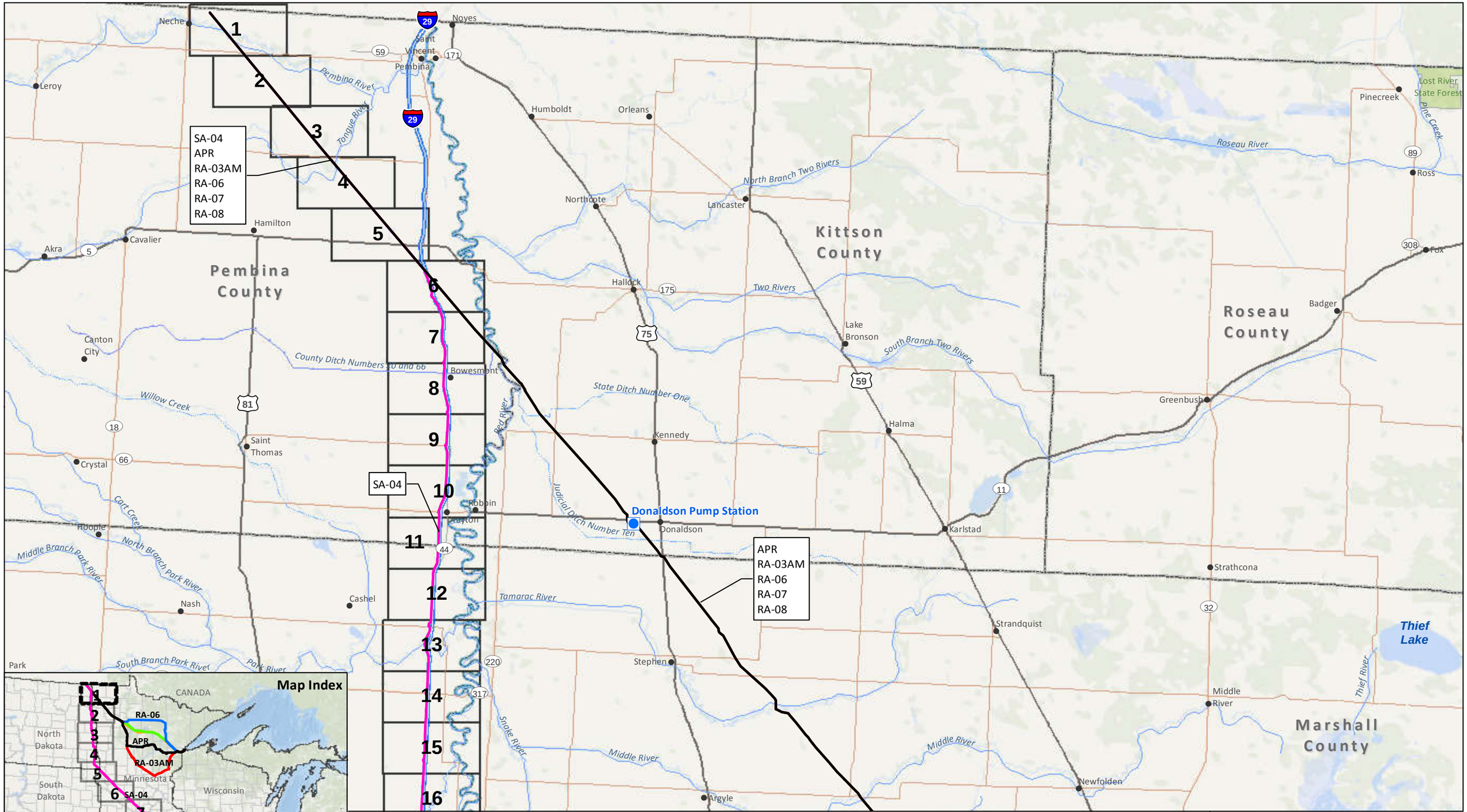

Line 3 Project
SA-04
OVERVIEW

Overview 1 of 12

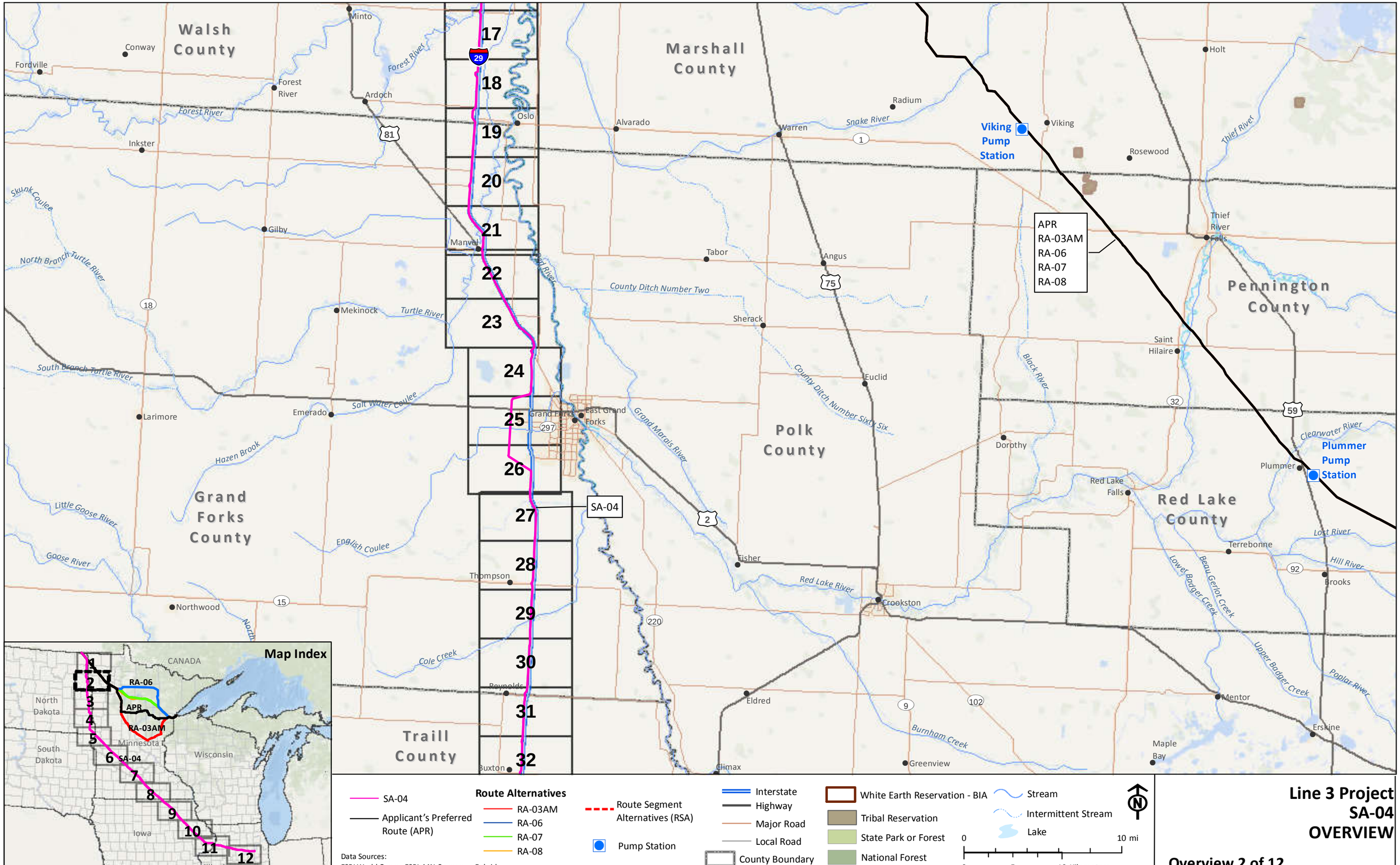

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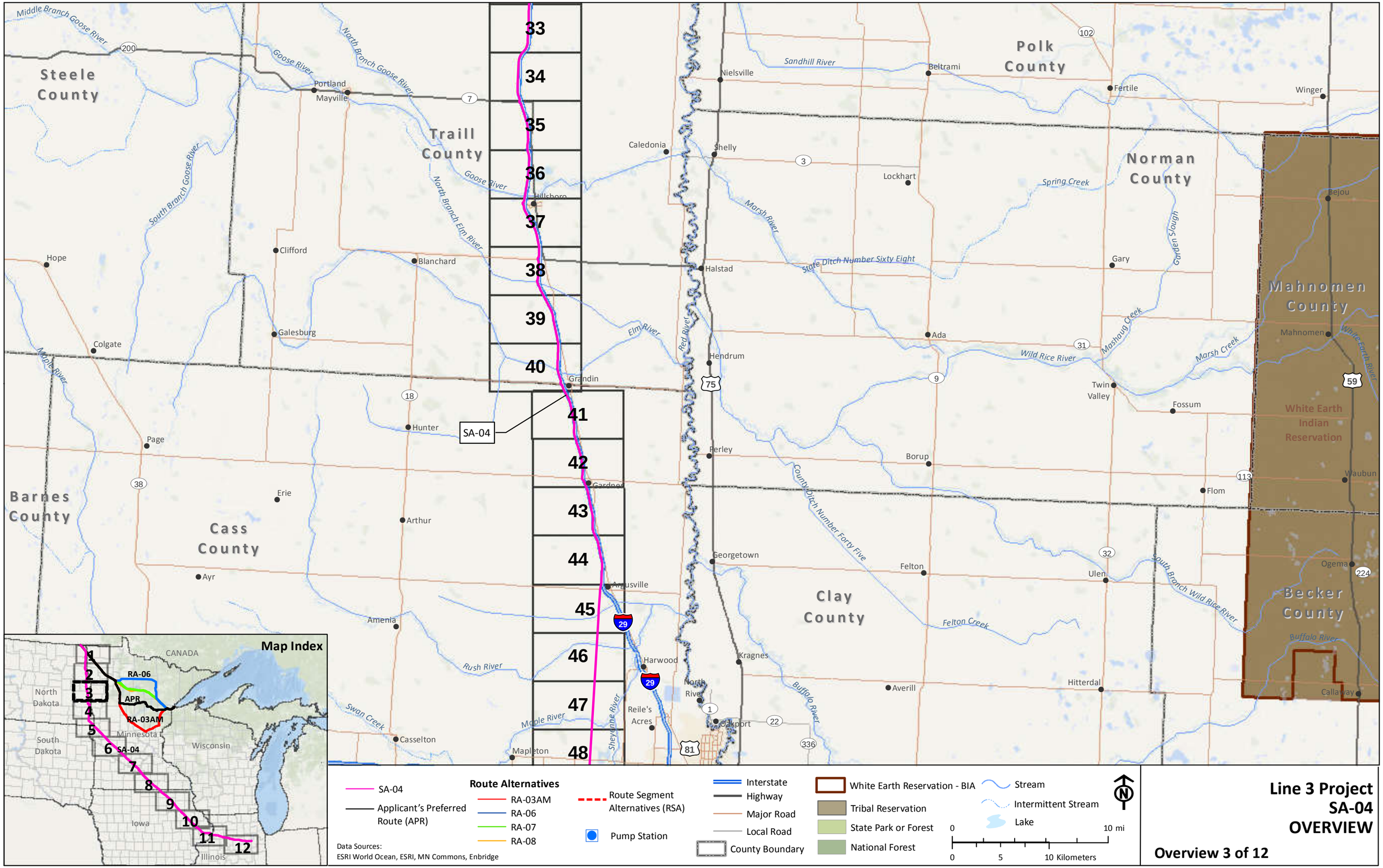

Line 3 Project
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Overview 3 of 12

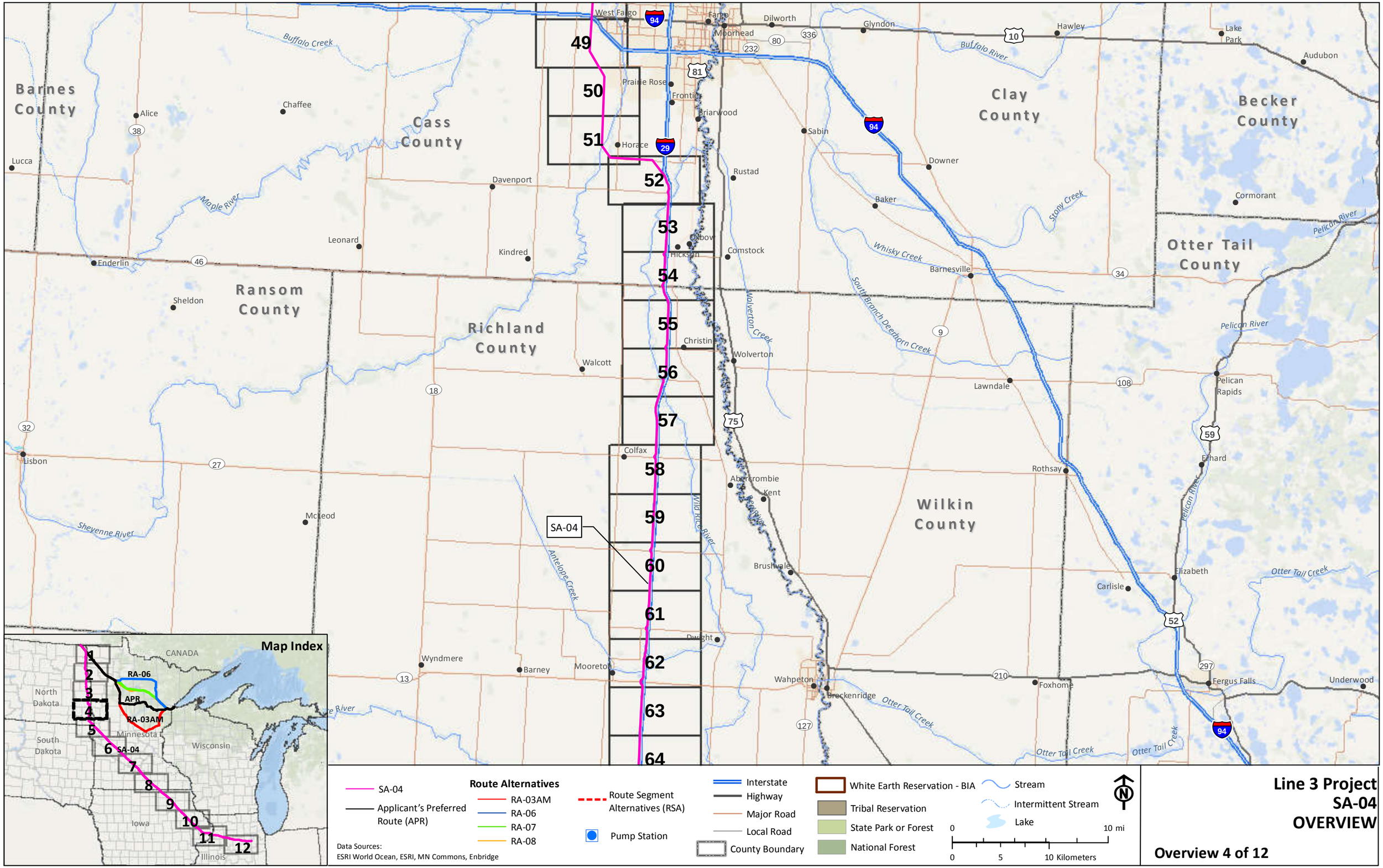
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Clay County
Becker County
Otter Tail County
Ransom County
Richland County
Wilkin County
West Fargo
Fargo
Moorhead
Dilworth
Glyndon
Hawley
Lake Park
Audubon
Buffalo Creek
Buffalo River
Prairie Rose
Frontier
Briarwood
Horace
Sabin
Downer
Rustad
Baker
Davenport
Maple River
Stony Creek
Cormorant
Pelican River
Leonard
Kindred
Oxbow
Hickson
Comstock
Whisky Creek
Barnesville
Enderlin
Sheldon
Wolverton Creek
South Branch Deerthorn Creek
Christine
Wolverton
Walcott
Lawndale
Pelican Rapids
Lisbon
Colfax
Rothsay
Ethard
Abercrombie
Kent
Sheyenne River
McLeod
Wild Rice River
Antelope Creek
Brushvale
Elizabeth
Carlisle
Otter Tail Creek
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Wyndmere
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Breckenridge
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0 10 mi
0 5 10 Kilometers
Data Sources:
ESRI World Ocean, ESRI, MN Commons, Enbridge
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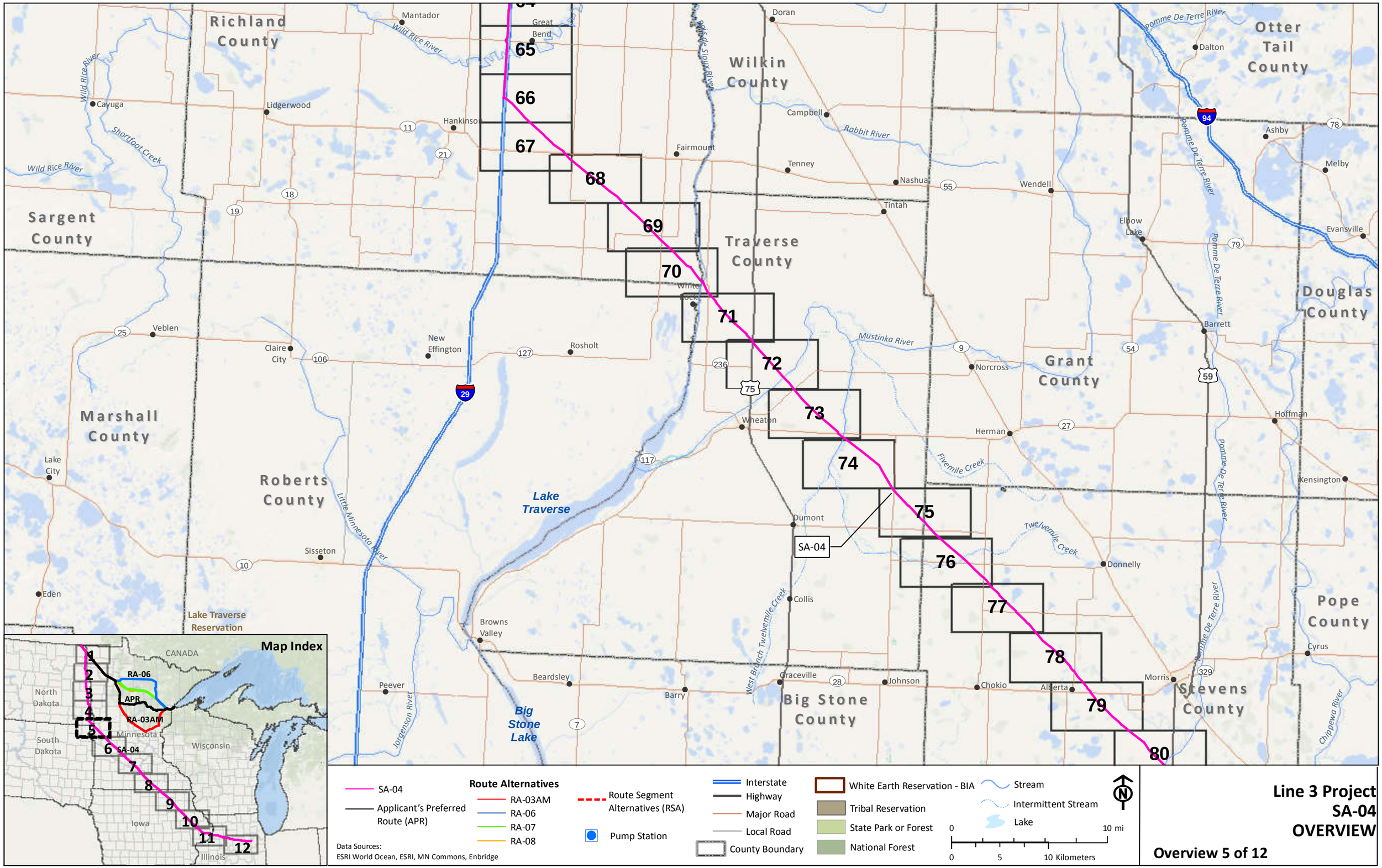
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Traverse County
Douglas County
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Grant County
Roberts County
Stevens County
Pope County
Big Stone County
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Lake Traverse
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Mantador
Great Bend
Cayuga
Lidgerwood
Hankinson
Fairmount
Doran
Campbell
Tenney
Nashua
Tintah
Wendell
Dalton
Ashby
Melby
Evansville
Elbow Lake
Barrett
Hoffman
Kensington
Cyrus
Morris
Alberta
Chokio
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Collis
Donnelly
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Herman
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Wheaton
Rosholt
New Effington
Claire City
Veblen
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Sisseton
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Beardsley
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Twelvemile Creek
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0 5 10 Kilometers
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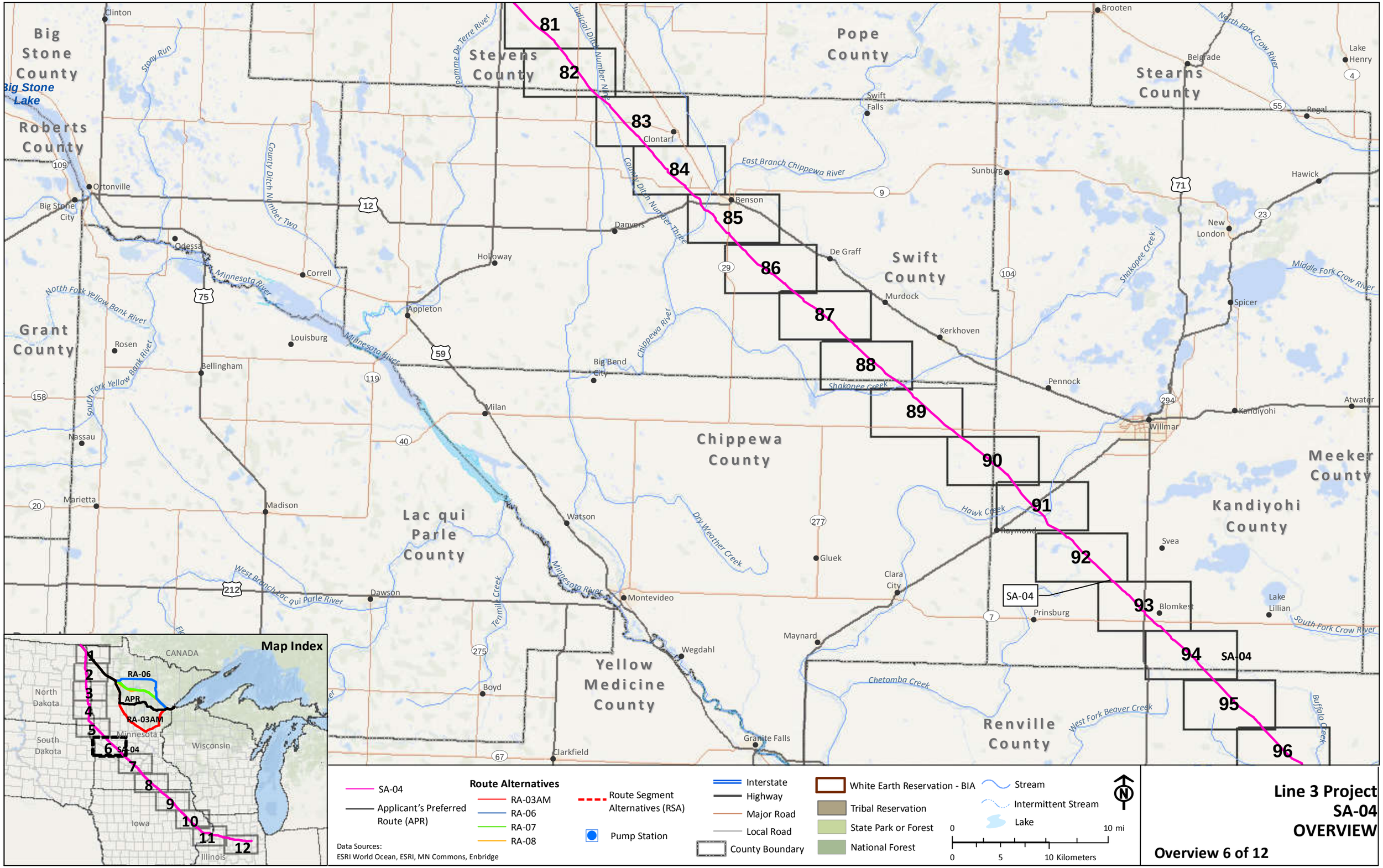
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Dawson
Montevideo
Wegdahl
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Murdock
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Blomkest
Prinsburg
Lake Lillian
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County Ditch Number Two
County Ditch Number Three
East Branch Chippewa River
Minnesota River
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South Fork Yellow Bank River
Chippewa River
Shakopee Creek
Dry Weather Creek
Hawk Creek
Tenmile Creek
West Branch Lac qui Parle River
Chetomba Creek
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ESRI World Ocean, ESRI, MN Commons, Enbridge
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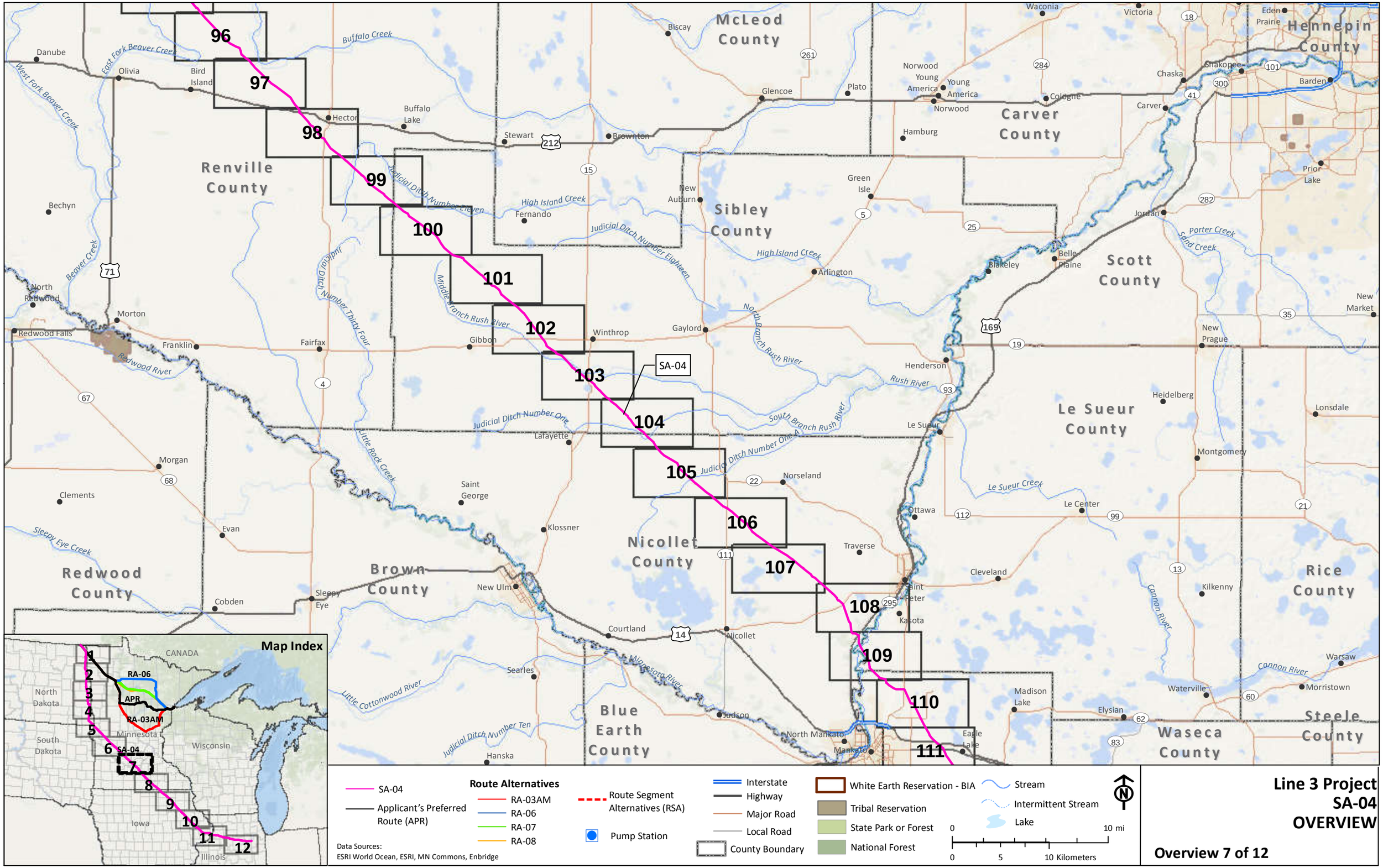
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ESRI World Ocean, ESRI, MN Commons, Enbridge
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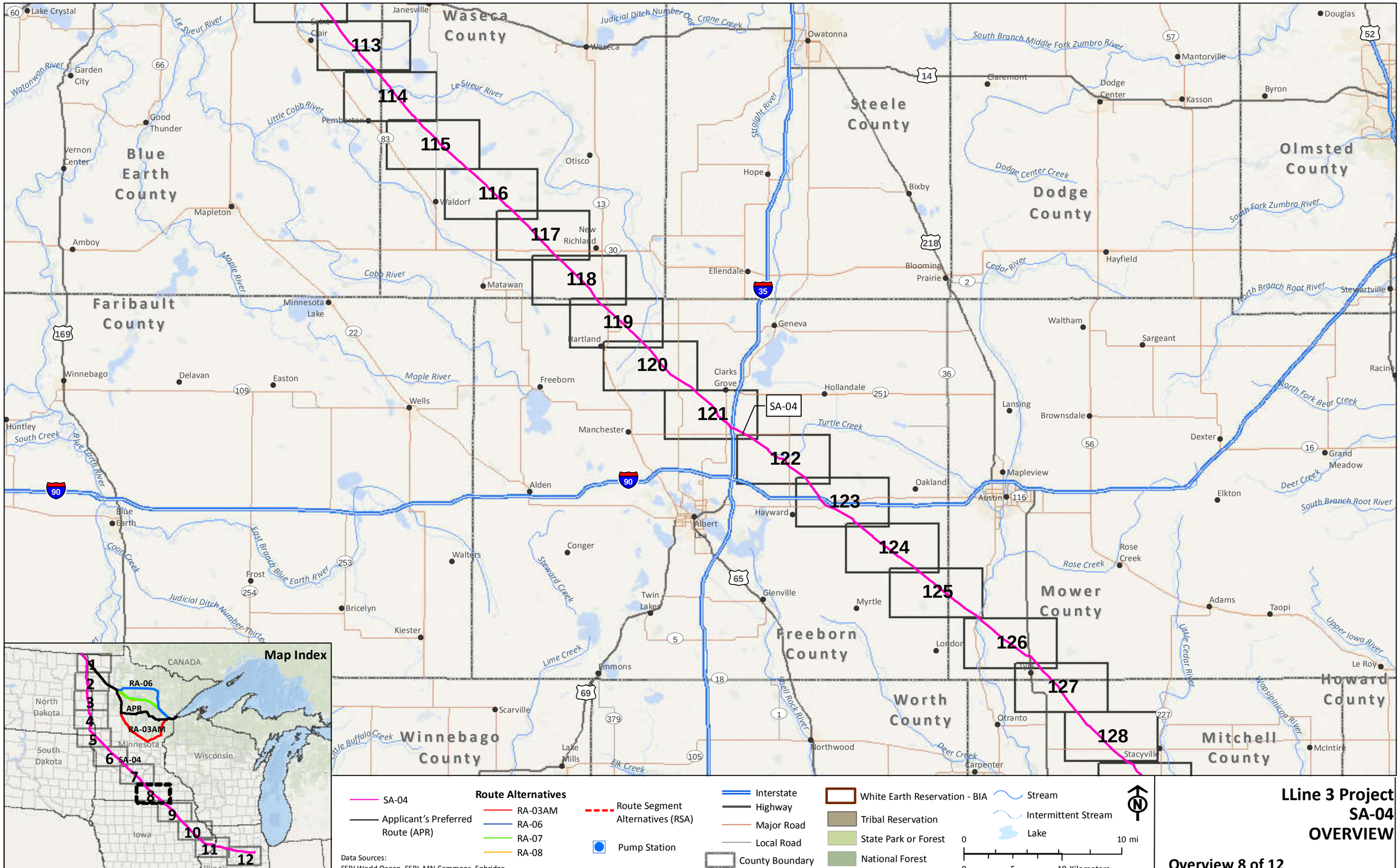

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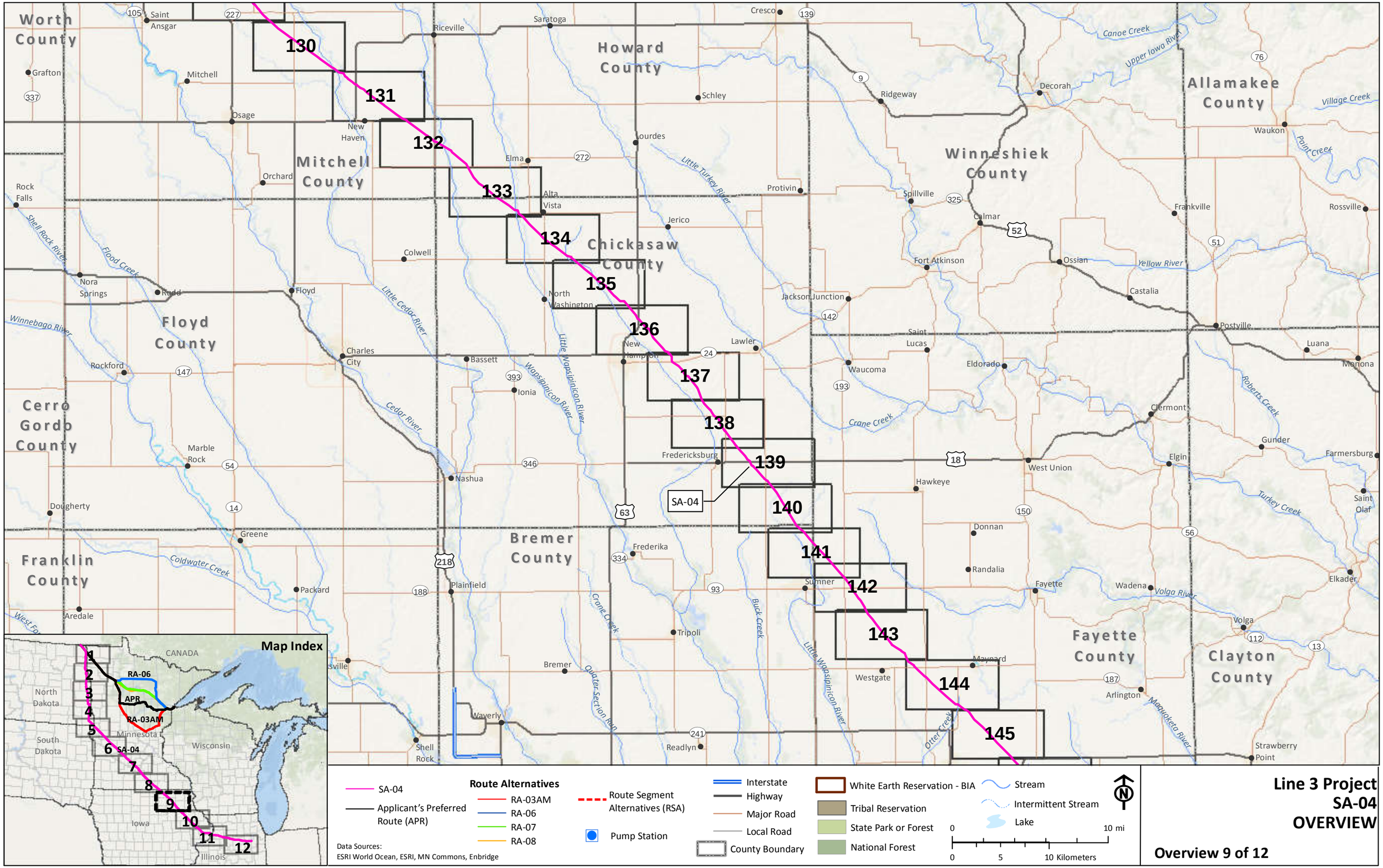
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Monona
Rockford
Charles City
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New Hampton
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Gunder
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Fredericksburg
West Union
Elgin
Farmersburg
Hawkeye
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Dougherty
Greene
Frederika
Donnan
Randalia
Packard
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Wadena
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Aredale
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Arlington
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Readlyn
Strawberry Point
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Upper Iowa River
Village Creek
Paint Creek
Little Turkey River
Shell Rock River
Flood Creek
Winnebago River
Little Cedar River
Wapsipinicon River
Little Wapsipinicon River
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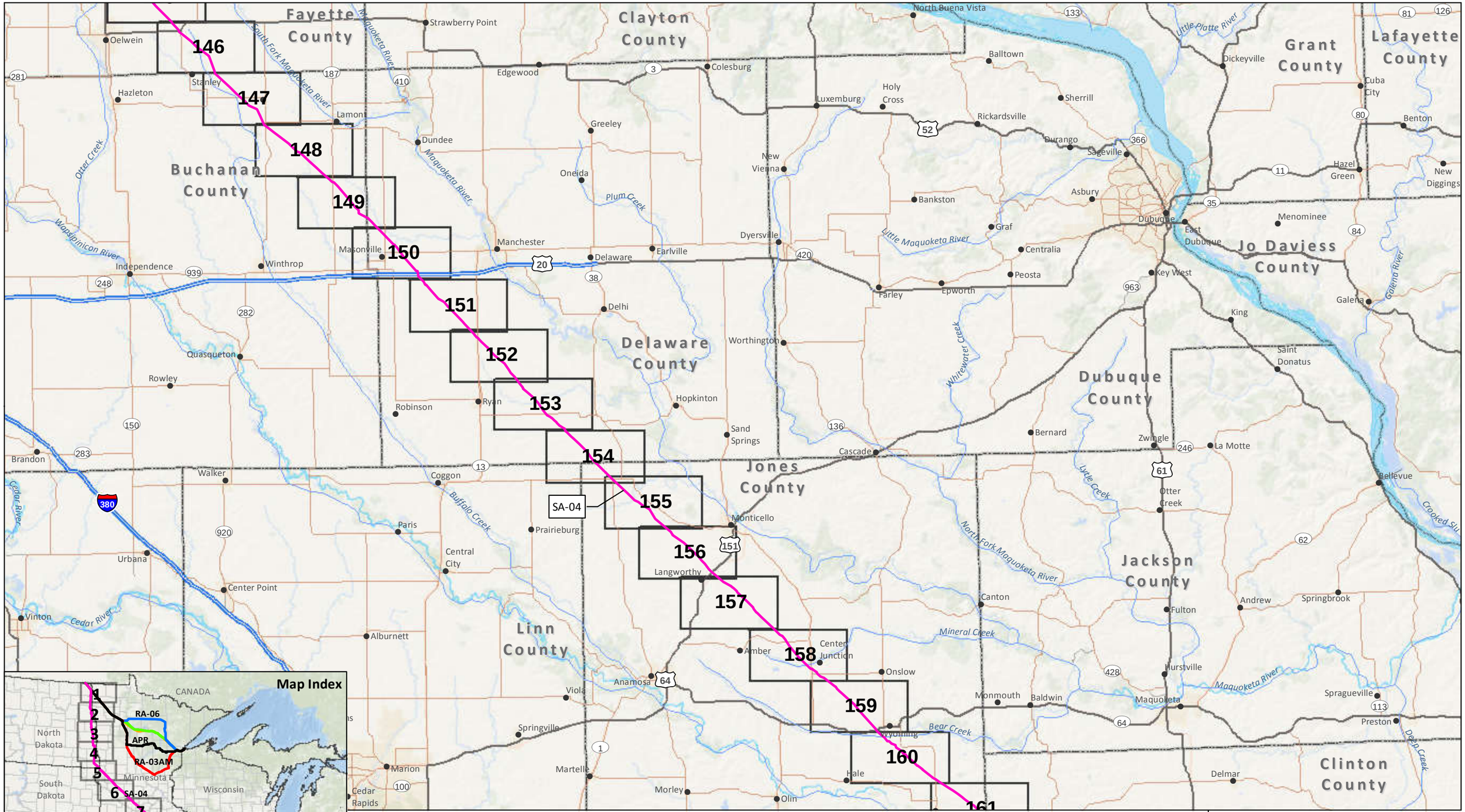

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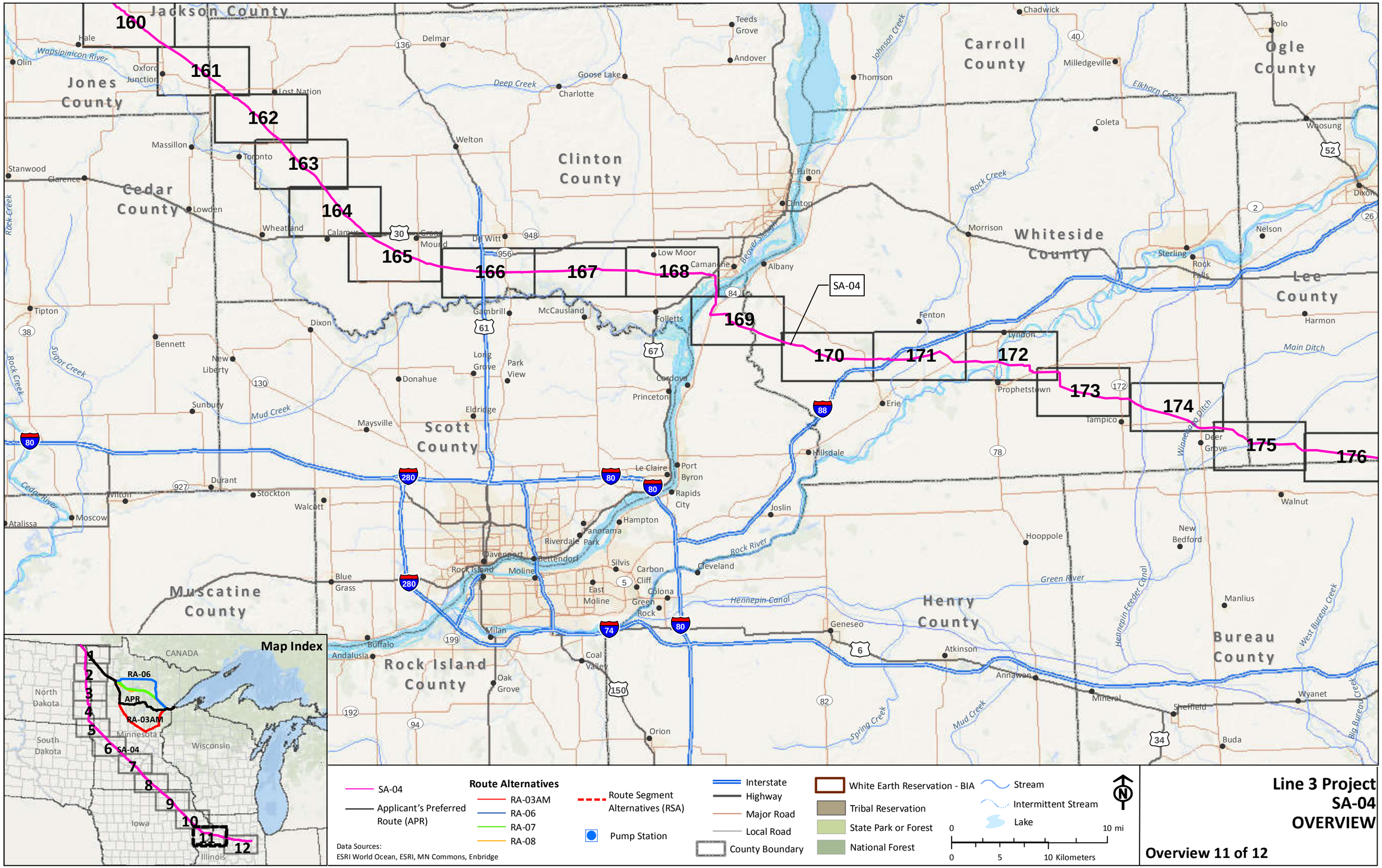
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0 5 10 Kilometers
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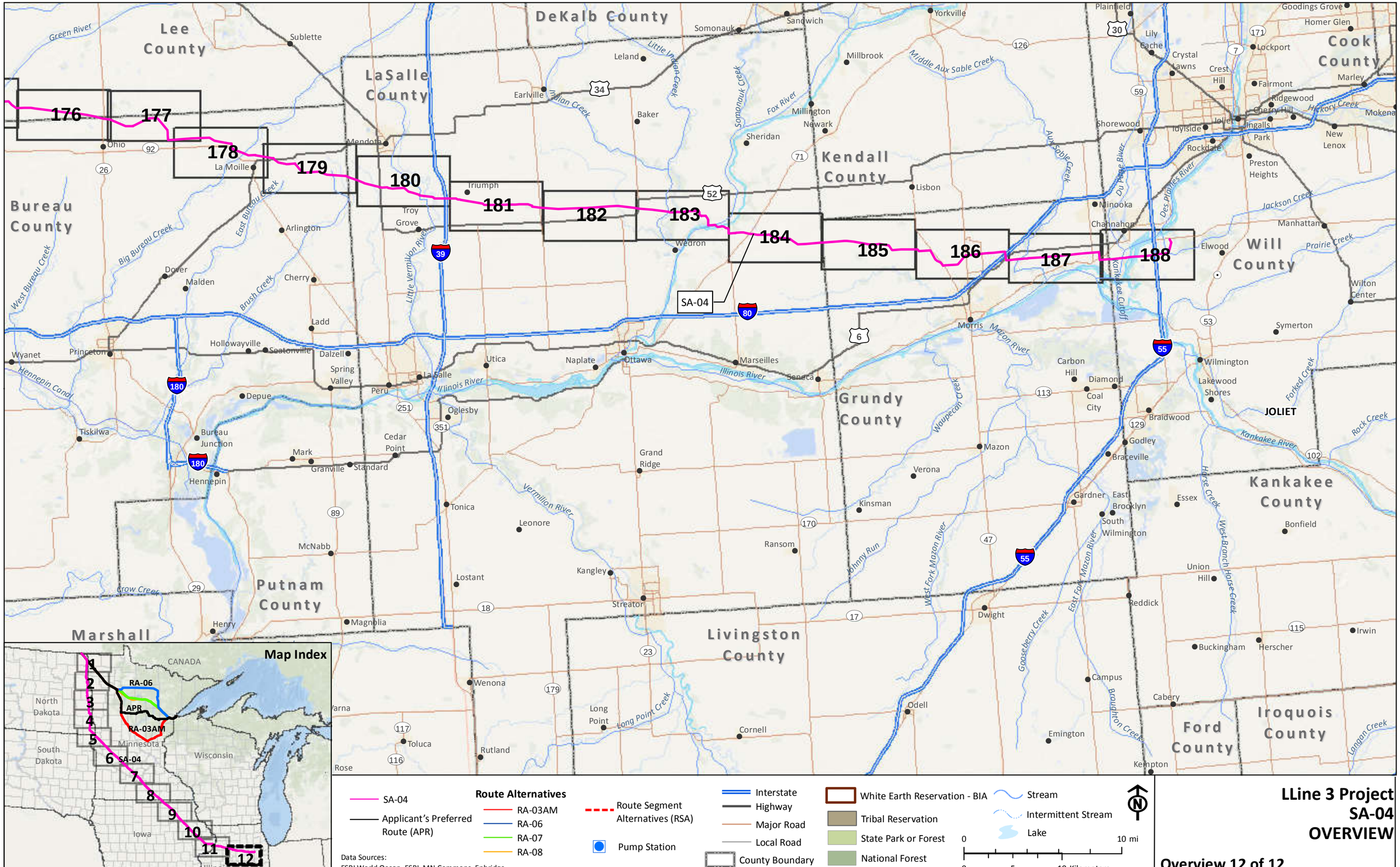
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0 5 10 Kilometers
Data Sources:
ESRI World Ocean, ESRI, MN Commons, Enbridge
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UNITED STATES

Neche Facility

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T164N R53W S31 | T164N R53W S32 | T164N R53W S33 | T164N R53W S34 | T164N R53W S35 | T164N R53W S36 | T164N R52W S31

T163N R53W S6 | T163N R53W S5 | T163N R53W S4 | T163N R53W S3 | T163N R53W S2 | T163N R53W S1 | T163N R52W S6

T163N R53W S7 | T163N R53W S8 | T163N R53W S9 | T163N R53W S10 | T163N R53W S11 | T163N R53W S12

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RA-03AM
RA-06
RA-07
RA-08

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107th

Pembina River

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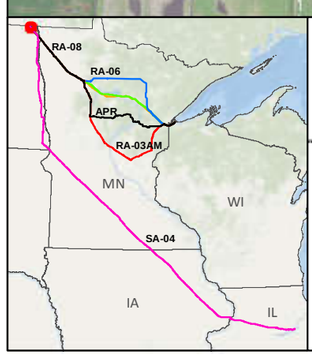

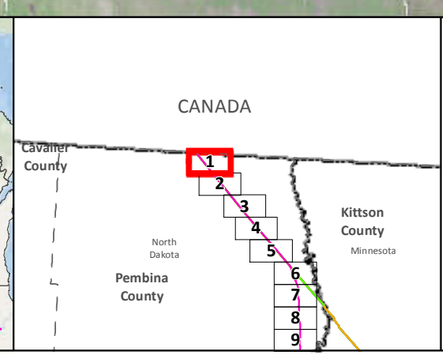

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Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

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Neche Facility

T164N R53W S30 | T164N R53W S29 | T164N R53W S28 | T164N R53W S27 | T164N R53W S26 | T164N R53W S25 | T164N R52W S30

T164N R53W S31 | T164N R53W S32 | T164N R53W S33 | T164N R53W S34 | T164N R53W S35 | T164N R53W S36 | T164N R52W S31

T163N R53W S6 | T163N R53W S5 | T163N R53W S4 | T163N R53W S3 | T163N R53W S2 | T163N R53W S1 | T163N R52W S6

T163N R53W S7 | T163N R53W S8 | T163N R53W S9 | T163N R53W S10 | T163N R53W S11 | T163N R53W S12

Pembina River

APR
SA-04
RA-03AM
RA-06
RA-07
RA-08

1 2 3

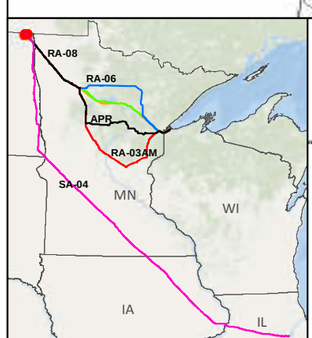

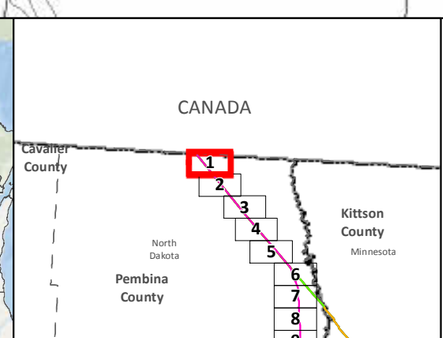

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 1B of 188

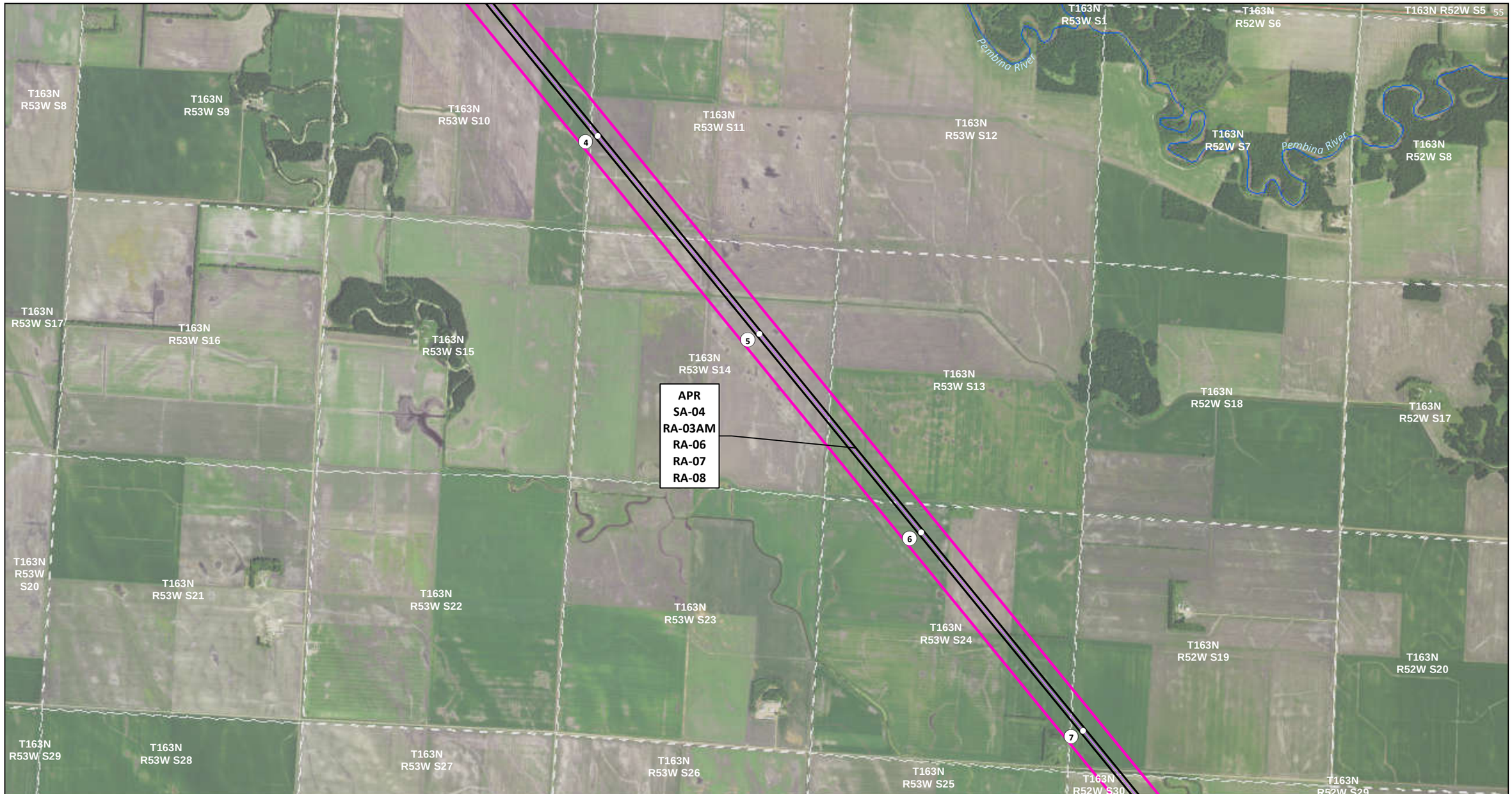

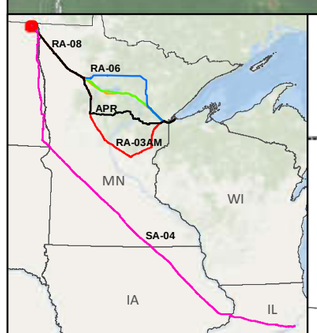

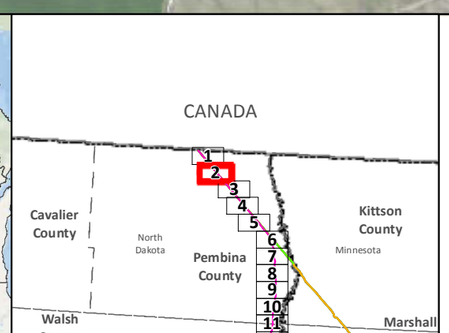

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 2A of 188

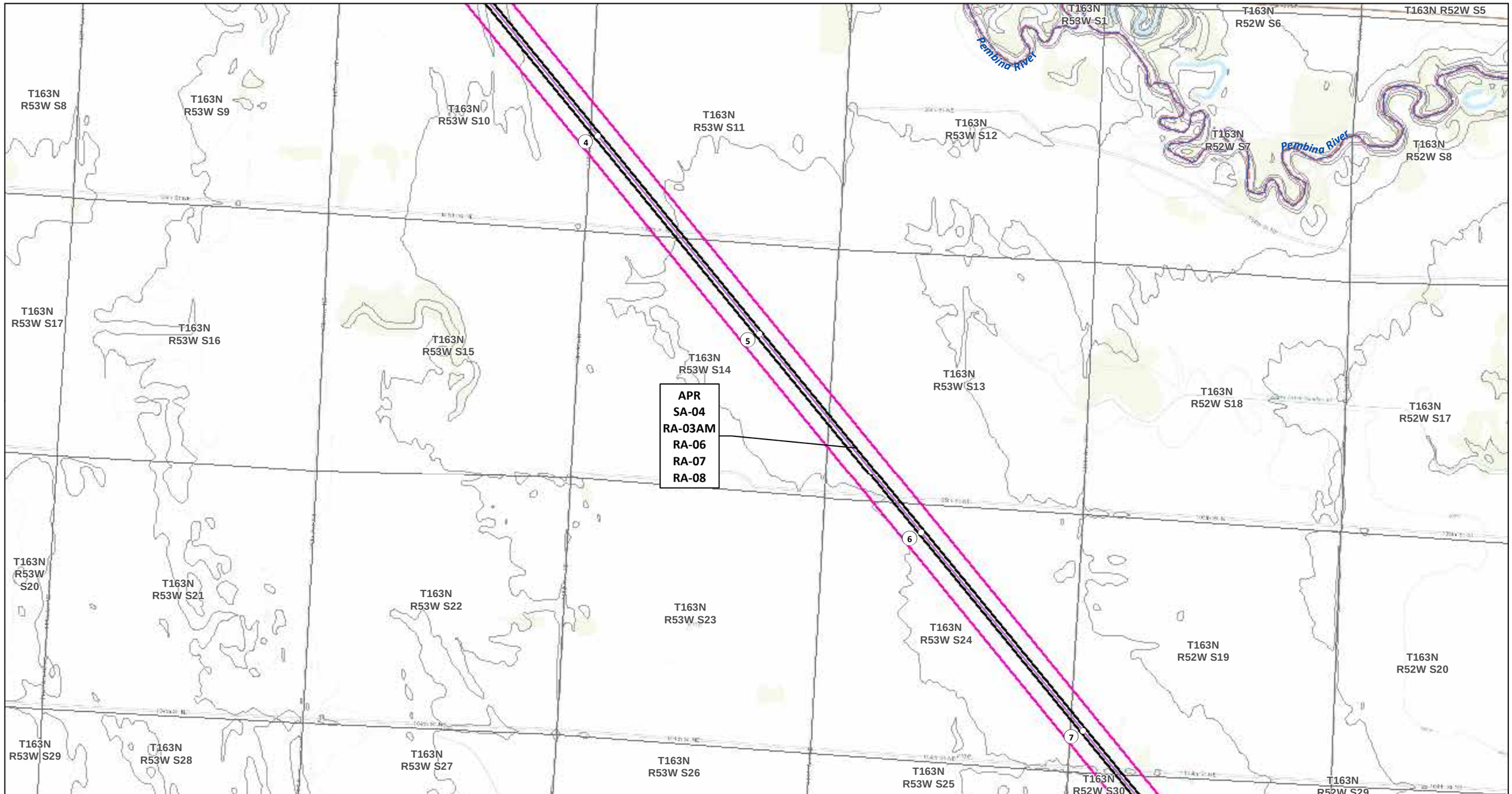

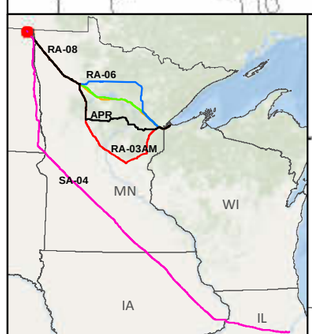

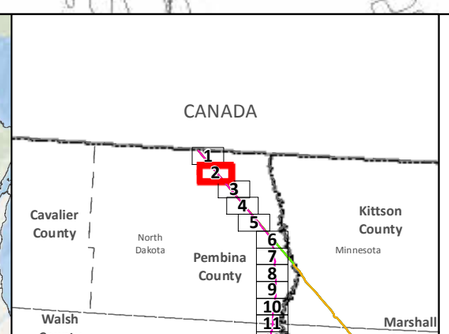

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 2B of 188

T163N R52W S20
T163N R52W S21
T163N R52W S22
T163N R52W S23
T163N R52W S24
T163N R53W S25
T163N R52W S30
T163N R52W S29
T163N R52W S28
T163N R52W S27
T163N R52W S26
T163N R52W S25
T163N R53W S36
T163N R52W S31
T163N R52W S32
T163N R52W S33
T163N R52W S34
T163N R52W S35
T163N R52W S36
T162N R53W S1
T162N R52W S6
T162N R52W S5
T162N R52W S4
T162N R52W S3
T162N R52W S2
T162N R52W S1
T162N R53W S12
T162N R52W S7
T162N R52W S8
T162N R52W S9
T162N R52W S10

8
9
10
11

APR
SA-04
RA-03AM
RA-06
RA-07
RA-08

Tongue River

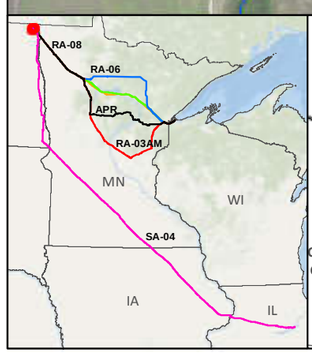

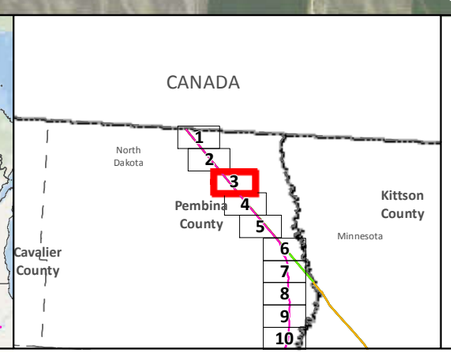

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 3A of 188

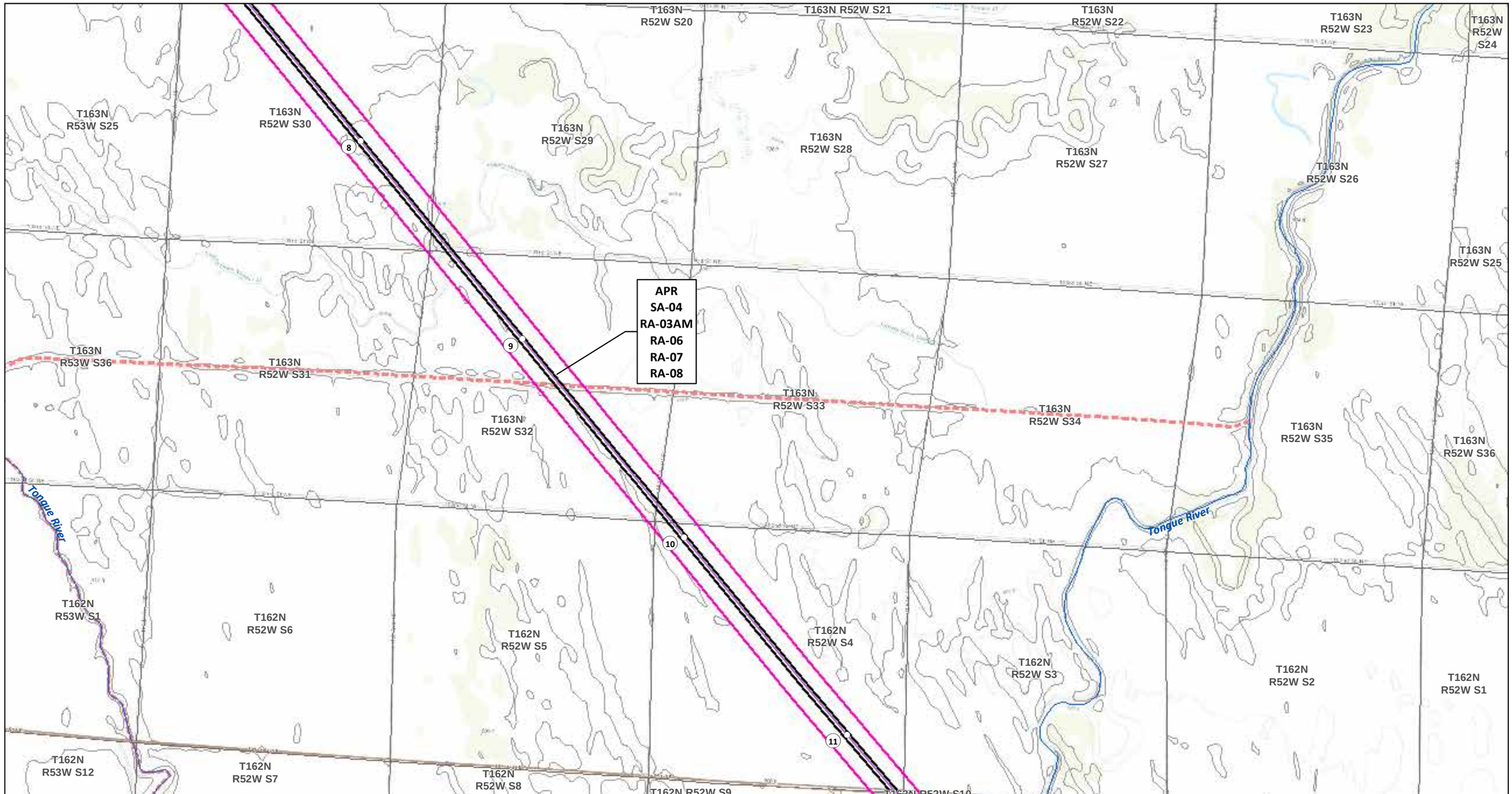

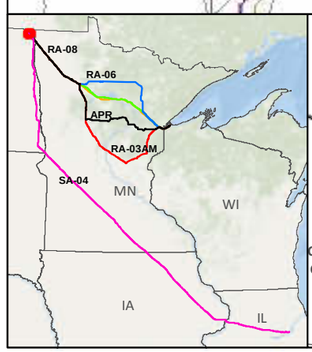

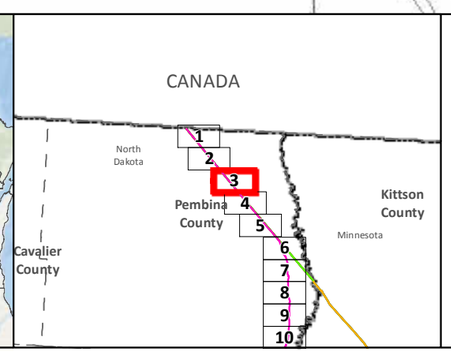

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 3B of 188

T162N R52W S3
T162N R52W S2
T162N R52W S1
T162N R51W S6
T162N R52W S8
Tongue River
T162N R52W S9
T162N R52W S10
T162N R52W S11
T162N R52W S12
T162N R51W S7
T162N R51W S8
T162N R52W S17
T162N R52W S16
T162N R52W S15
T162N R52W S14
T162N R52W S13
T162N R51W S18
APR
SA-04
RA-03AM
RA-06
RA-07
RA-08
T162N R51W S17
T162N R52W S20
Big Slough
T162N R52W S21
T162N R52W S22
T162N R52W S23
T162N R52W S24
T162N R51W S19
T162N R52W S29
T162N R52W S28
T162N R52W S27
T162N R52W S26
T162N R51W S20

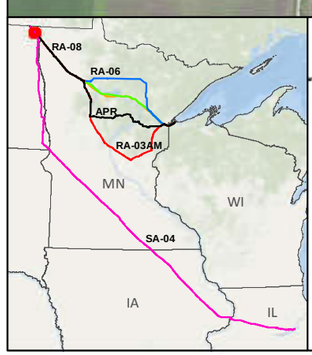

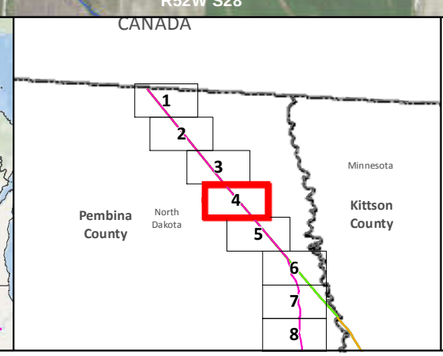

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 4A of 188

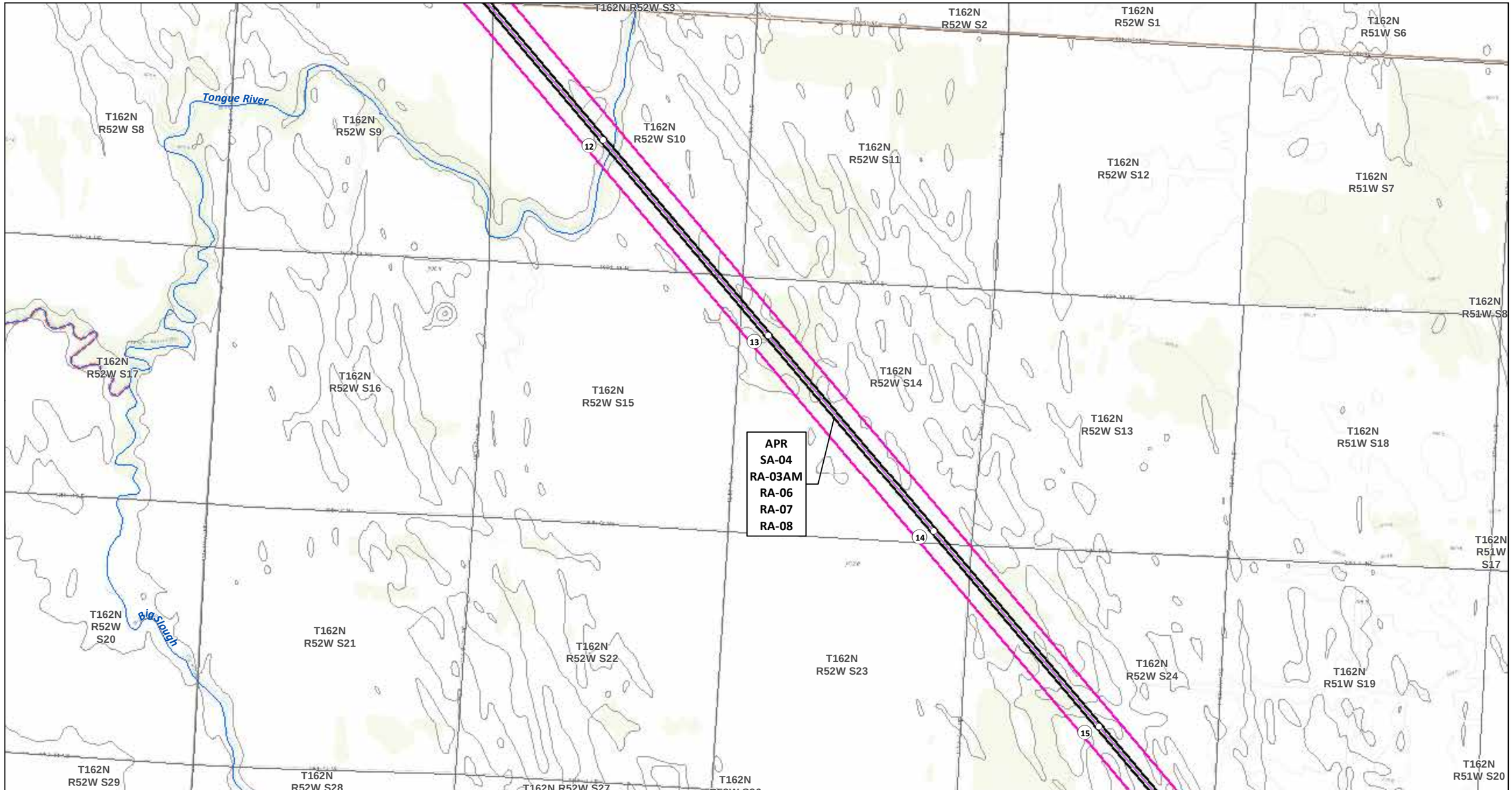

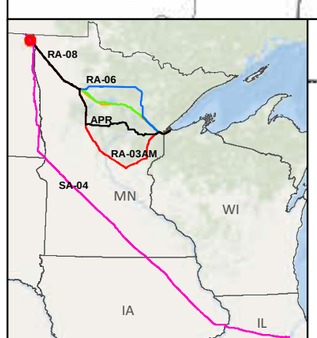

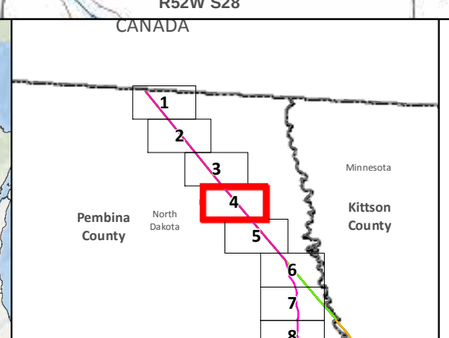

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

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- Navigable Waterway Crossings
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Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

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Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
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Native Plant Communities with Biodiversity Significance

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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 4B of 188

T162N R52W S23
T162N R52W S24
T162N R51W S19
T162N R51W S20
T162N R51W S21
T162N R51W S22
T162N R52W S27
T162N R52W S26
T162N R52W S25
T162N R51W S30
T162N R51W S29
T162N R51W S28
T162N R51W S27
APR
SA-04
RA-03AM
RA-06
RA-07
RA-08
T162N R52W S34
T162N R52W S35
T162N R52W S36
T162N R51W S31
T162N R51W S32
T162N R51W S33
T162N R51W S34
T161N R52W S3
T161N R52W S2
T161N R52W S1
T161N R51W S6
T161N R51W S5
T161N R51W S4
T161N R51W S3
T161N R52W S10
T161N R52W S11
T161N R52W S12
T161N R51W S7
T161N R51W S8
16
17
18
19
81
5
29
Old
1st

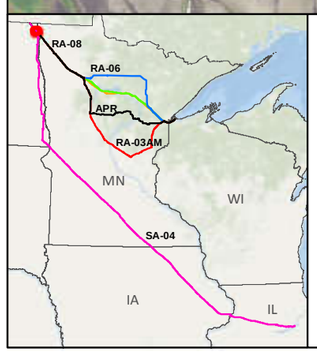

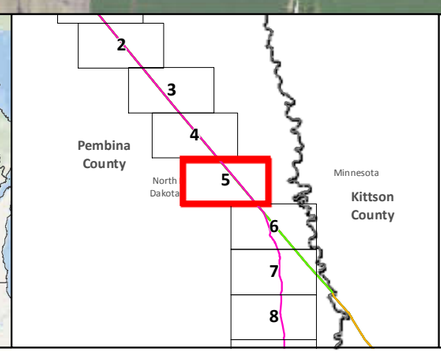

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 5A of 188

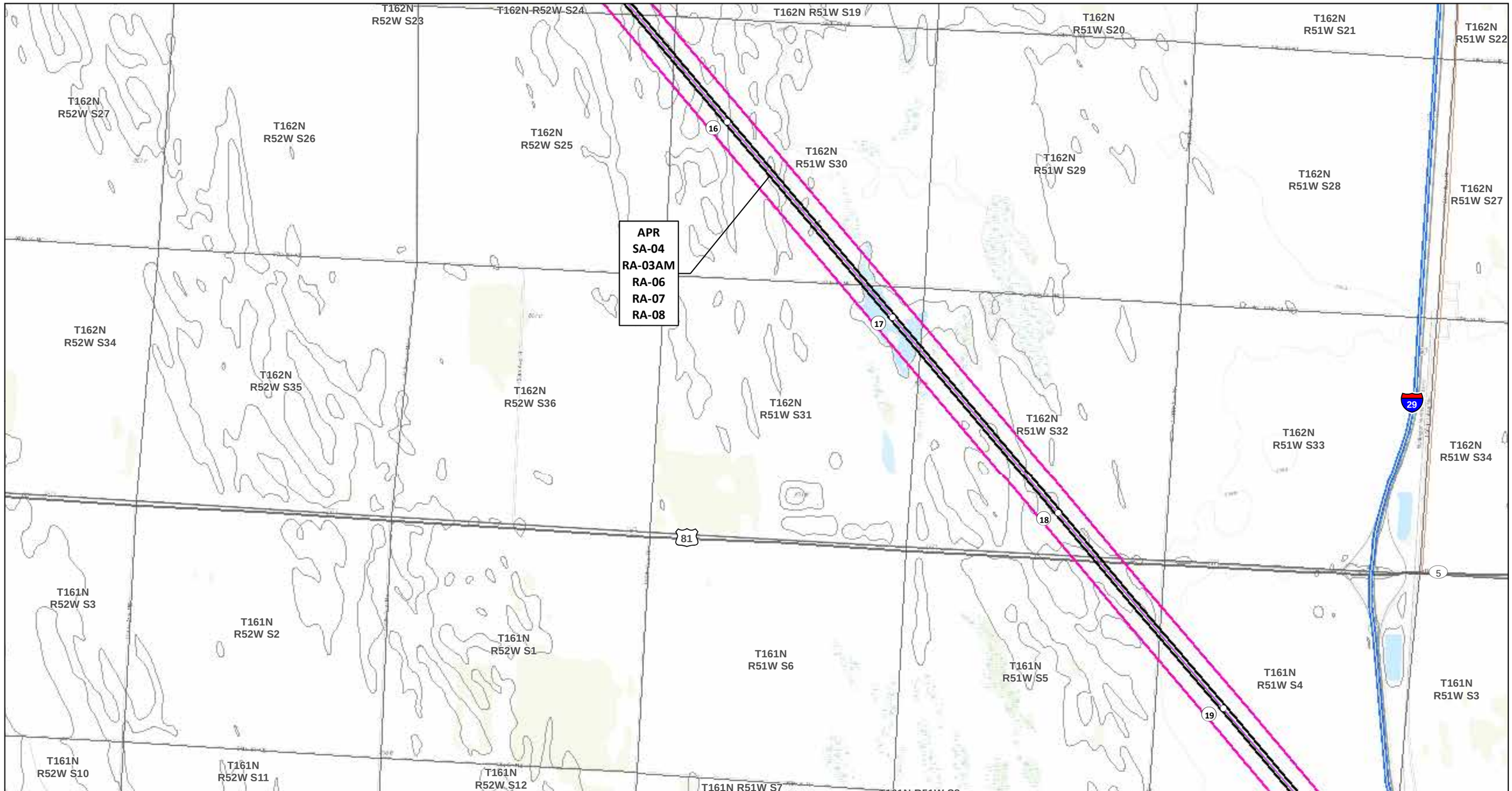

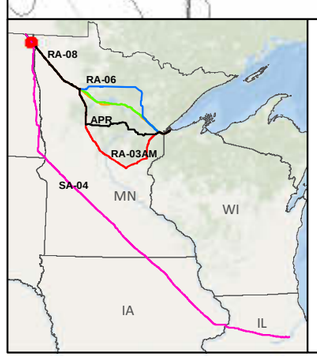

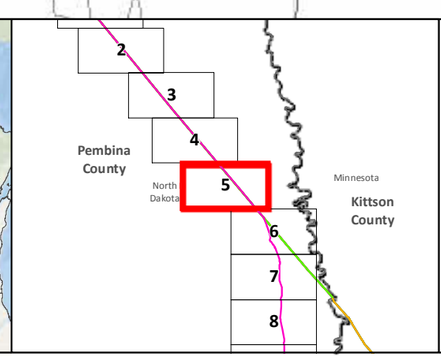

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

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- Navigable Waterway Crossings
- National River Inventory Crossing

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Lakes of Biological Significance

- Outstanding
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- Moderate

Native Plant Communities with Biodiversity Significance

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- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 5B of 188

T161N R51W S4
T161N R51W S3
T161N R51W S2
T161N R51W S1
Red River of the North
T161N R50W S6
North Red River Twsp Kittson Co.
T161N R51W S8
T161N R51W S9
T161N R51W S10
T161N R51W S11
T161N R51W S12
T161N R51W S7
T161N R50W S7
T161N R51W S18
APR
RA-03AM
RA-06
RA-07
RA-08
T161N R51W S17
T161N R51W S16
T161N R51W S15
T161N R51W S14
T161N R51W S13
T161N R50W S18
SA-04
T161N R51W S20
T161N R51W S21
T161N R51W S22
T161N R51W S23
T161N R51W S24
T161N R50W S19
T161N R51W S29
T161N R51W S28
T161N R51W S27

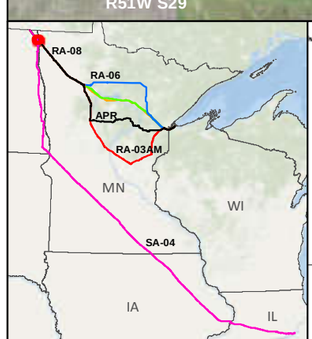

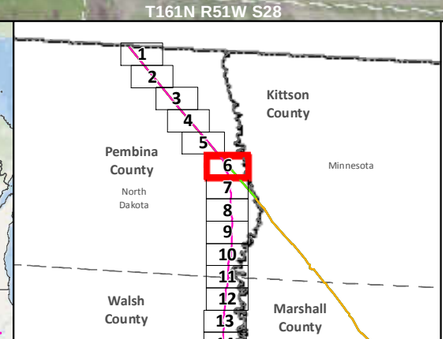

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 6A of 188

T161N R51W S4
T161N R51W S3
T161N R51W S2
T161N R51W S1
T161 R50W S6
Red River
T161 R50W S5
T161 R50W S4
T161N R50W S6
North Red River Twsp Kittson Co.
T161 R50W S8
T161N R51W S8
T161N R51W S9
T161N R51W S10
T161N R51W S11
T161N R51W S12
T161N R51W S7
T161N R50W S7
T161N R51W S18
Red River of the North
T161 R50W S9
T161 R50W S8
T161 R50W S17
APR
RA-03AM
RA-06
RA-07
RA-08
T161N R51W S17
T161N R51W S16
T161N R51W S15
T161N R51W S14
T161N R51W S13
T161 R50W S16
T161N R50W S18
SA-04
T161N R51W S20
T161N R51W S21
T161N R51W S22
T161N R51W S23
T161N R51W S24
T161 R50W S20
T161 R50W S21
T161N R50W S19
T161N R51W S29
T161N R51W S28
T161N R51W S27

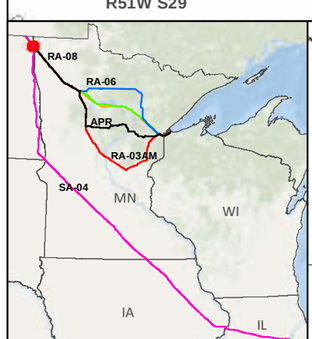

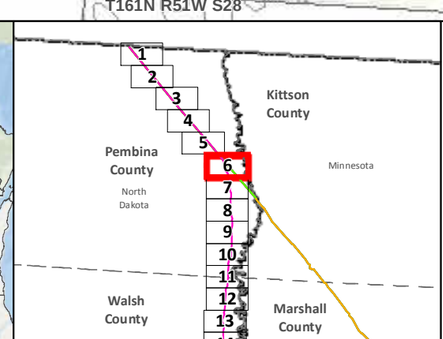

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 6B of 188

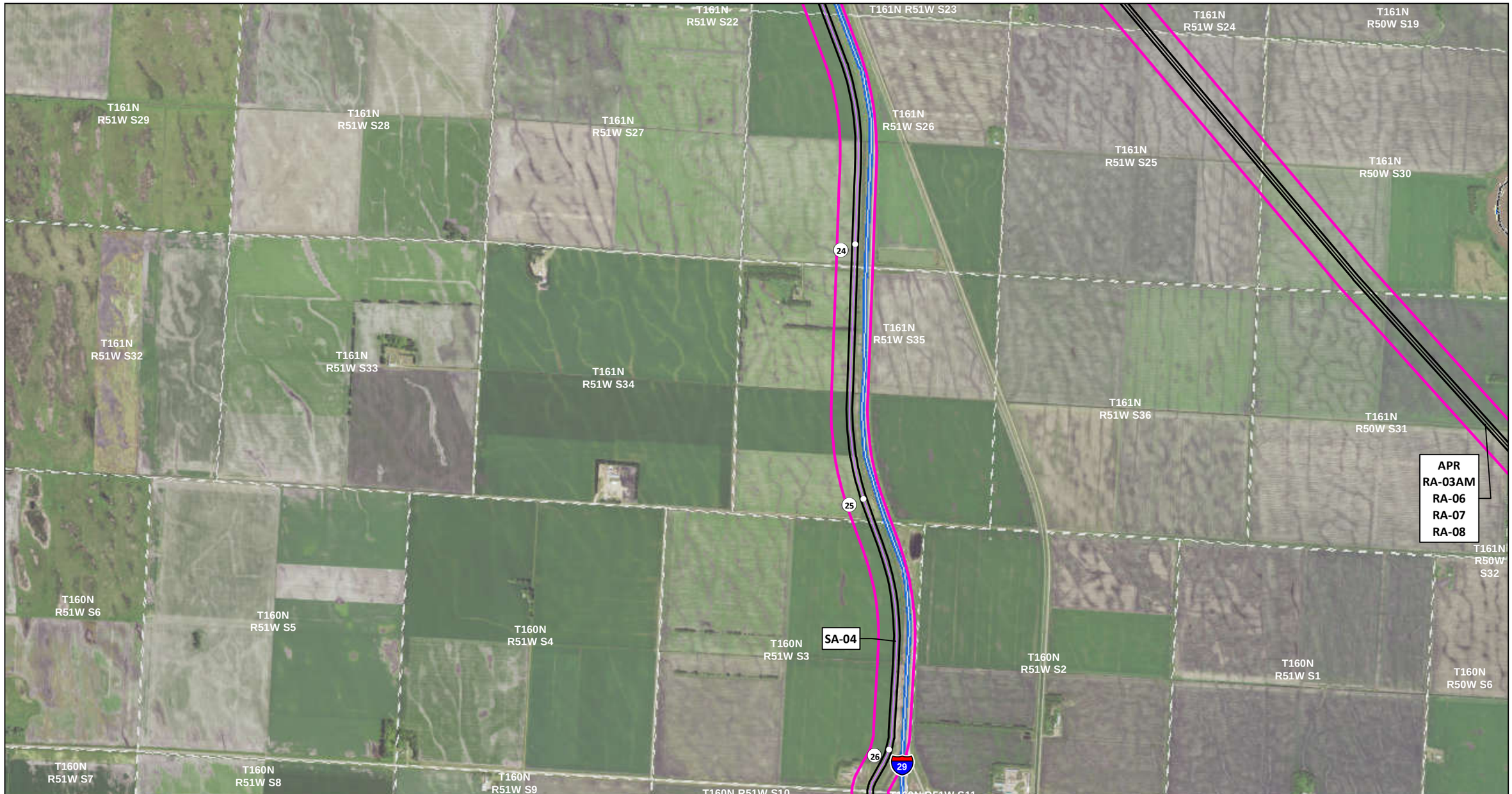

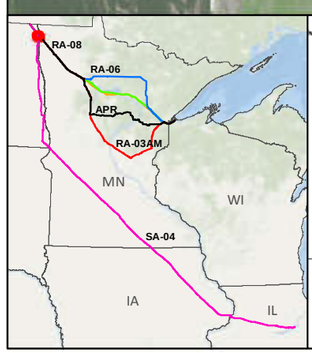

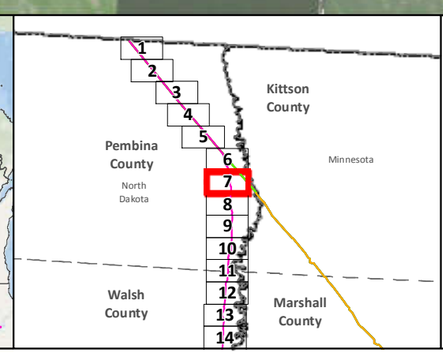

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 7A of 188

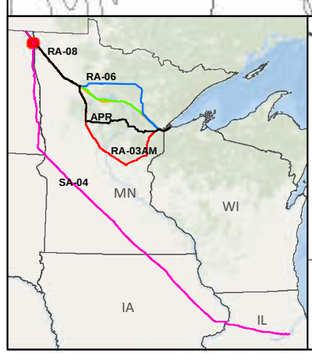

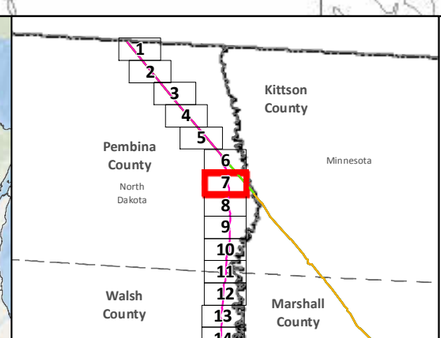

SA-04

Applicant's Preferred Route (APR)

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- RA-06
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- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

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0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 7B of 188

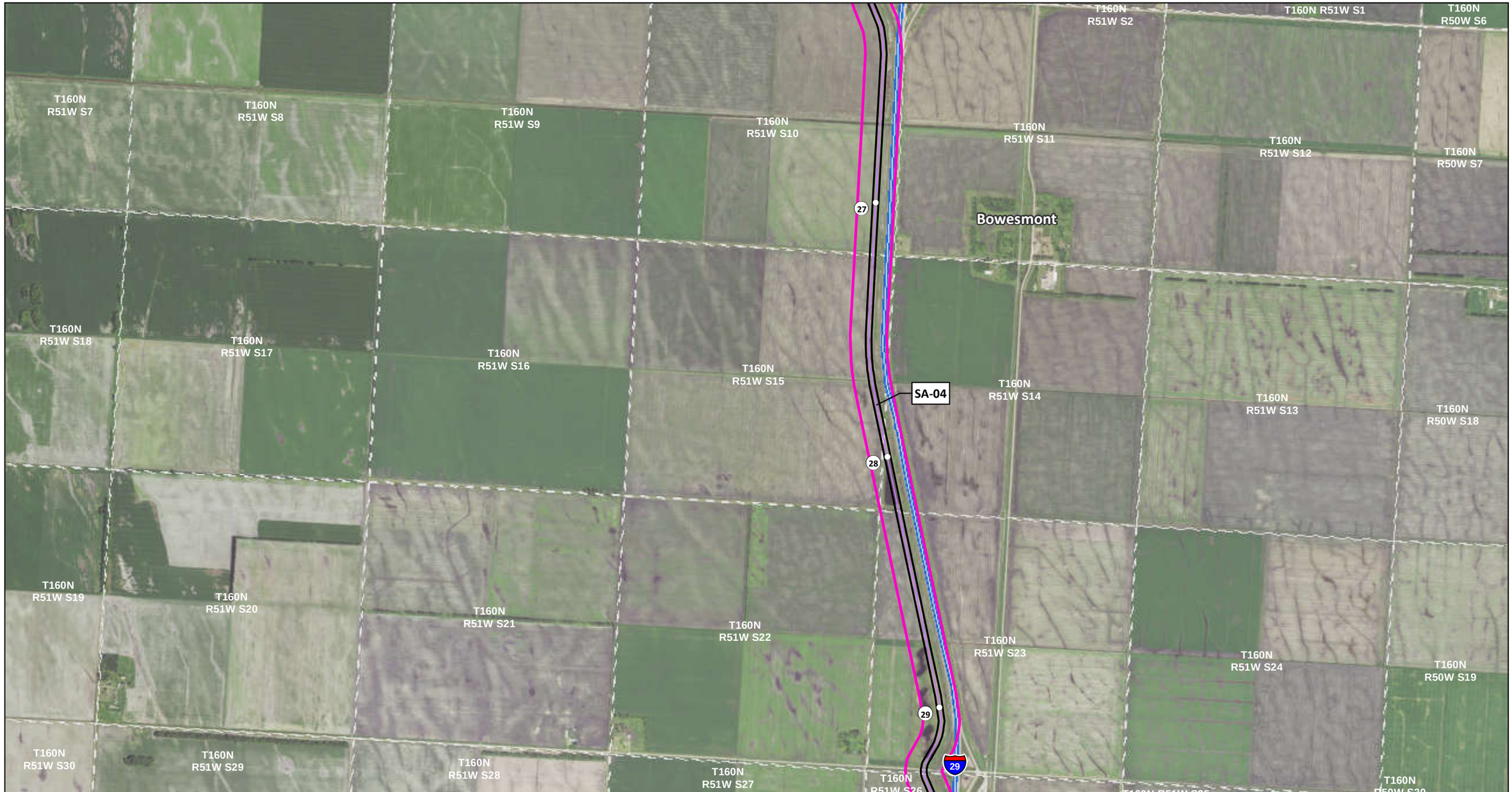

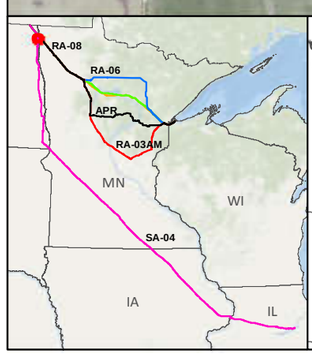

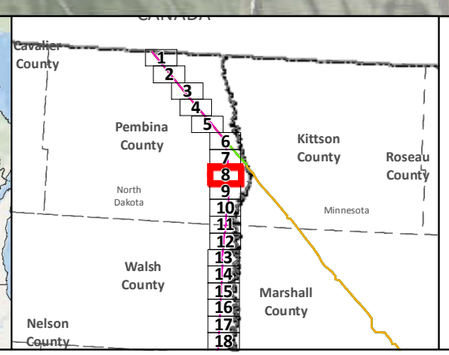

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
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Land Ownership
State Forest
National Forest
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Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
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Data Sources:
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 8A of 188

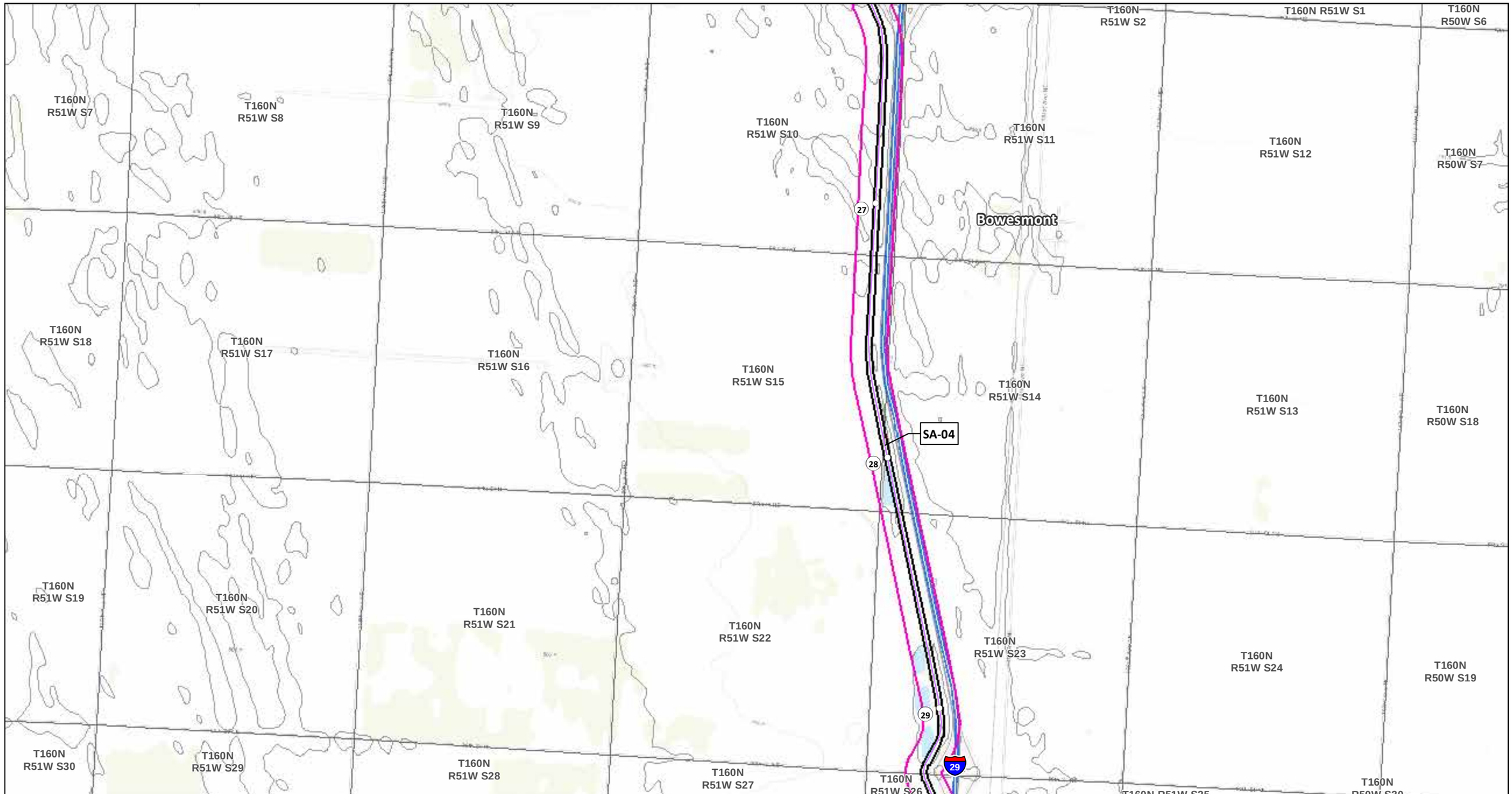

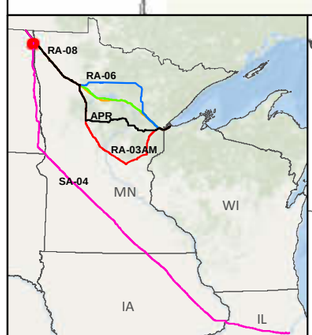

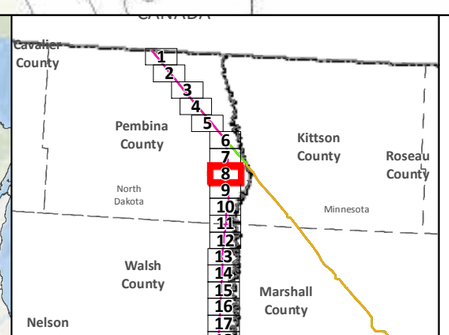

SA-04

Applicant's Preferred Route (APR)

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Anticipated 120' Construction ROW

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 8B of 188

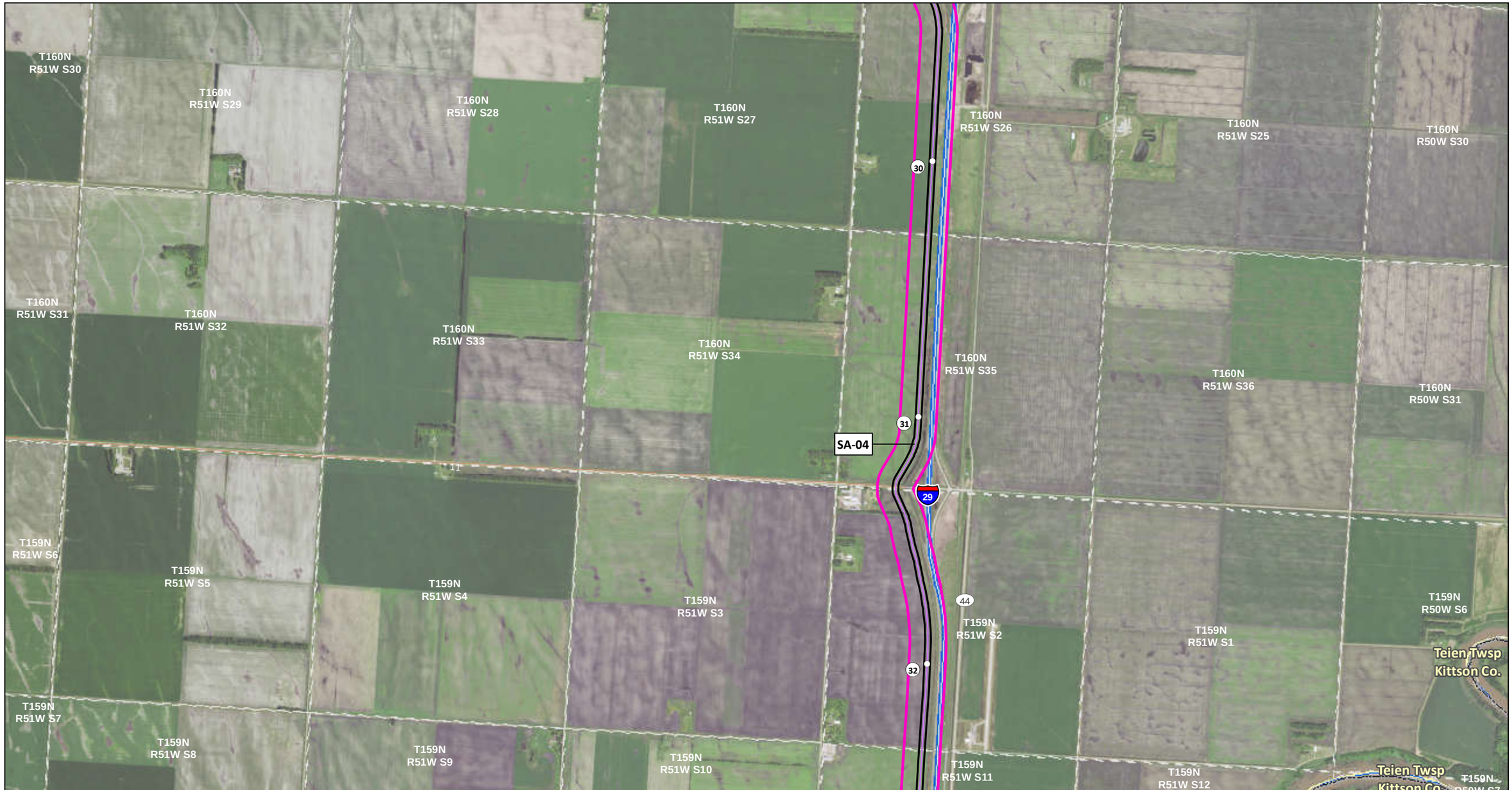

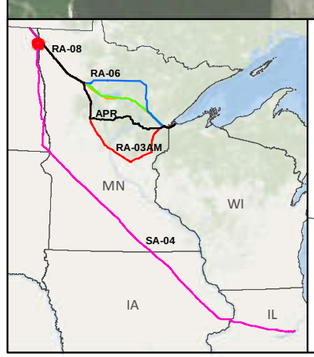

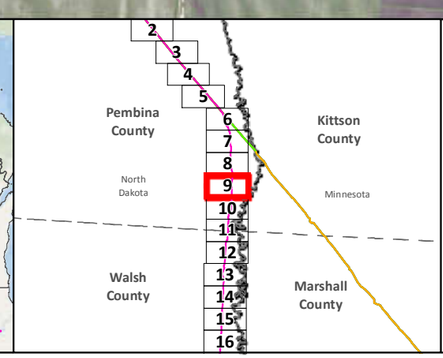

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
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Land Ownership
State Forest
National Forest
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Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 9A of 188

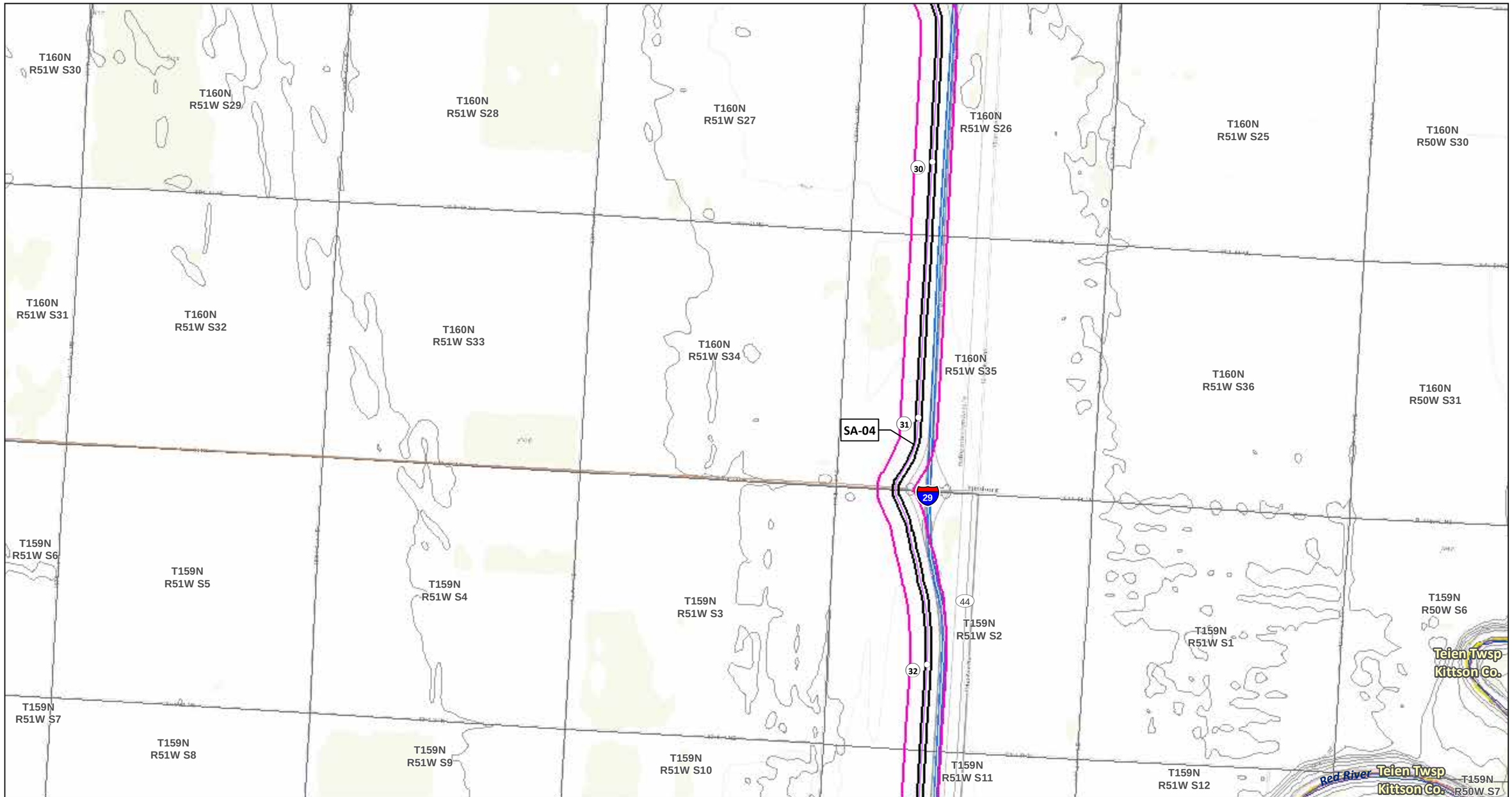

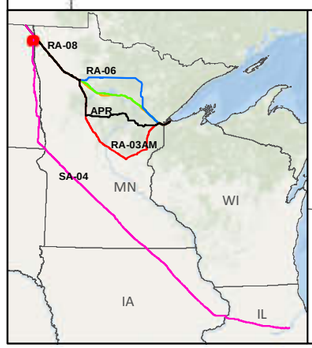

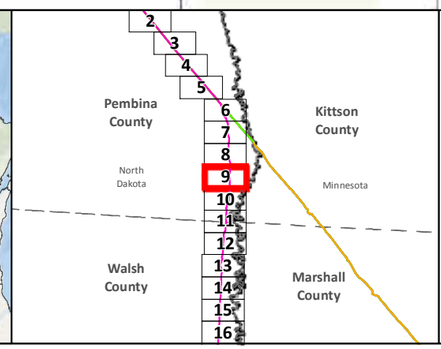

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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Mile Post

Anticipated 120' Construction ROW

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Public Water Basin

Public Drinking Water Supply

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Lakes of Biological Significance

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Native Plant Communities with Biodiversity Significance

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 9B of 188

T159N R51W S7
T159N R51W S8
T159N R51W S9
T159N R51W S10
T159N R51W S11
T159N R51W S12
T159N R50W S7
Red River of the North
T159N R50W S7
T159N R51W S18
T159N R50W S18
T159N R51W S17
T159N R51W S16
T159N R51W S15
Teien Twsp
Kittson Co.
T159N R51W S14
T159N R51W S13
T159N R50W S18
T159N R51W S19
SA-04
T159N R50W S19
T159N R51W S20
T159N R51W S21
T159N R51W S22
T159N R51W S23
T159N R51W S24
Robbin
T159N R51W S29
T159N R51W S28
T159N R51W S27
Drayton
T159N R51W S26
T159N R51W S25
33
34
44
35
66
29
11

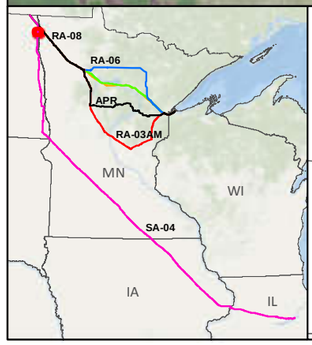

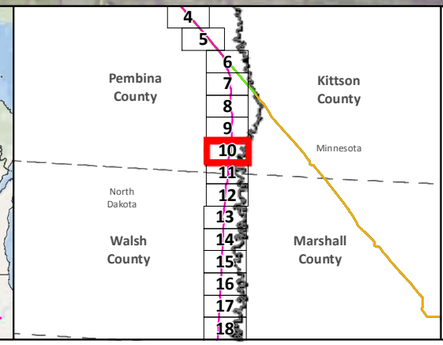

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 10A of 188

T159N R51W S7
T159N R51W S8
T159N R51W S9
T159N R51W S10
T159N R51W S11
T159N R51W S12
T159N R50W S7
T159 R50W S8
Red River
Red River of the North
T159N R51W S18
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T159N R50W S18
T159N R51W S17
T159N R51W S16
T159N R51W S15
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SA-04
T159N R50W S18
T159N R51W S19
T159N R50W S19
T159N R51W S20
T159N R51W S21
T159N R51W S22
T159N R51W S23
T159 R50W S19
T159 R50W S20
T159N R51W S24
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T159N R51W S29
T159N R51W S28
T159N R51W S27
Drayton
T159N R51W S26
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T159 R50W S21
T159 R50W S28
T159 R50W S30

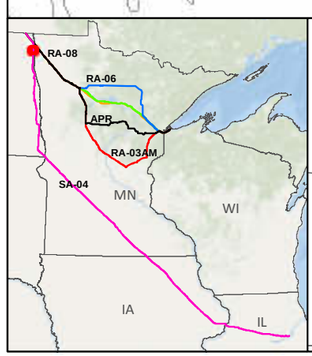

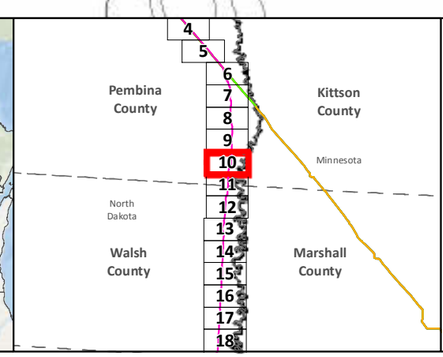

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
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- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 10B of 188

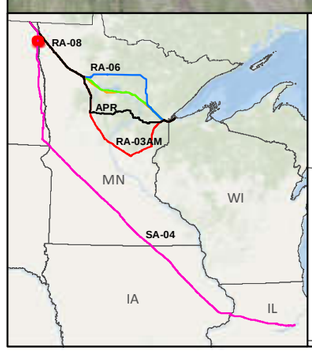

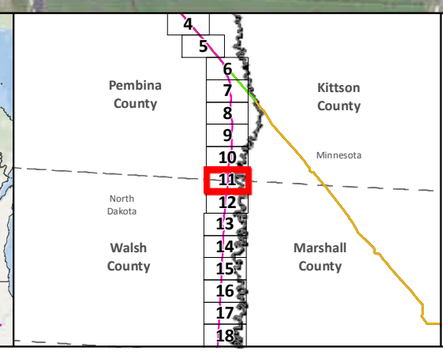

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

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0 0.125 0.25 0.5 Miles
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 11A of 188

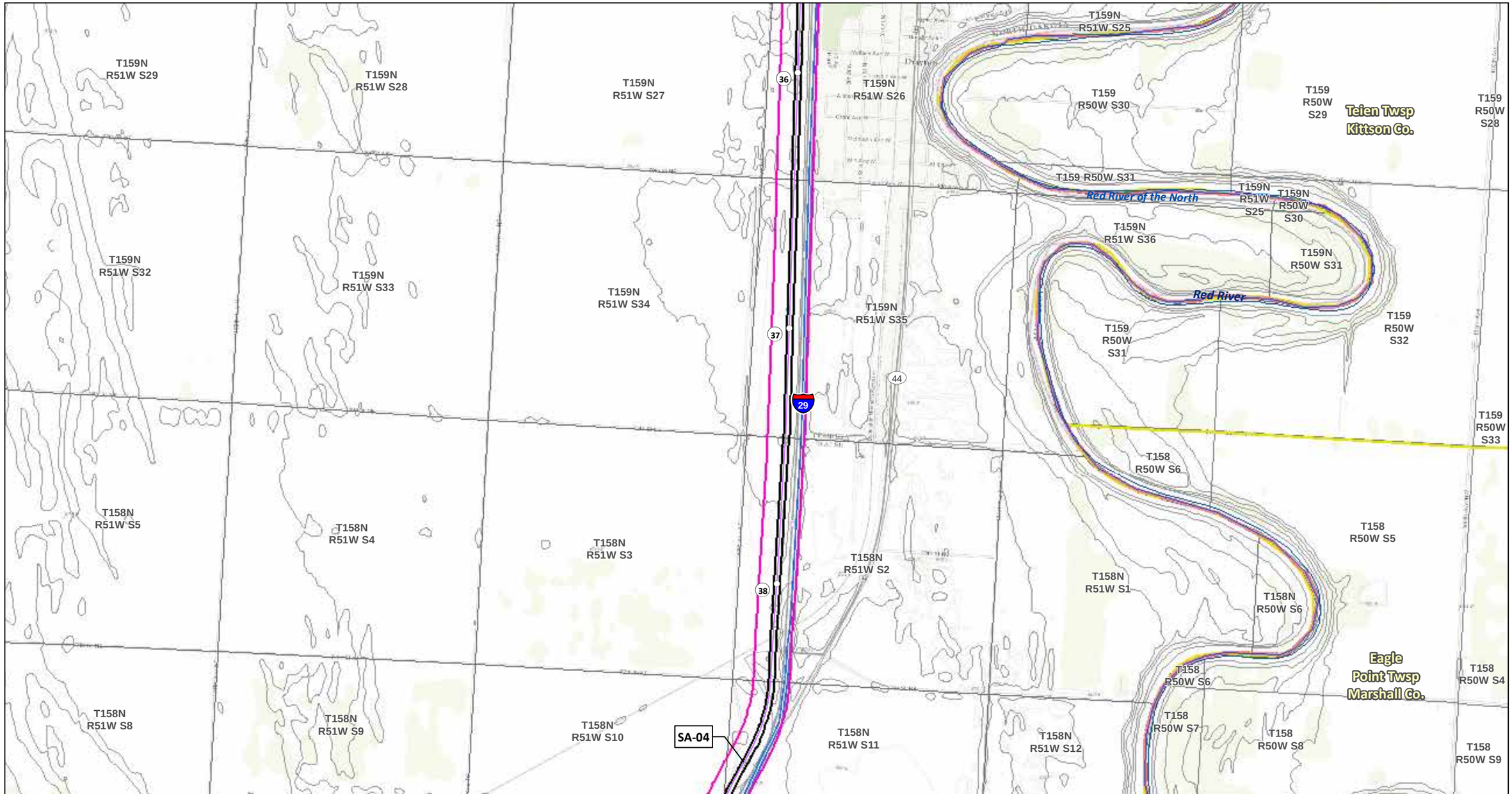

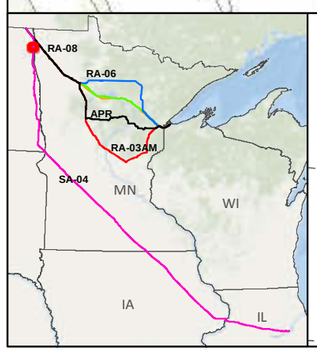

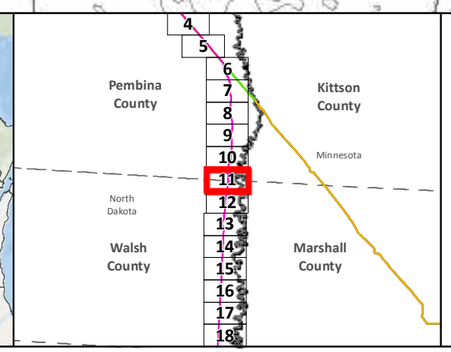

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0 0.125 0.25 0.5 Miles
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10ft Contours

Map 11B of 188

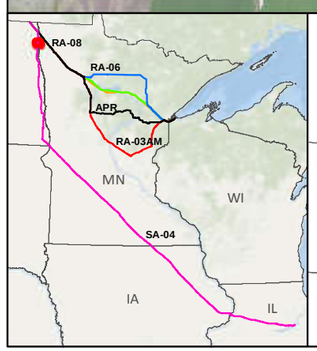

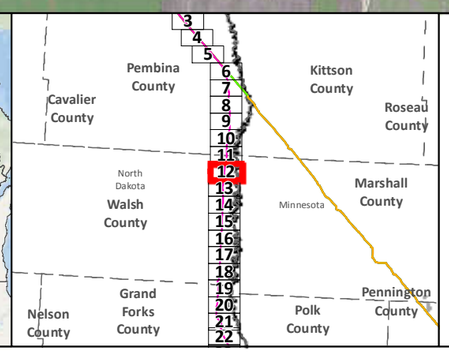

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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 12A of 188

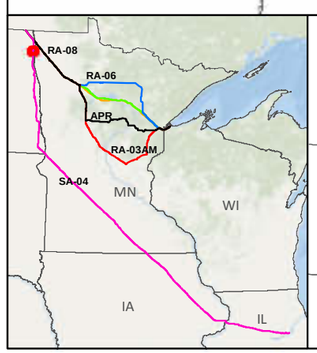

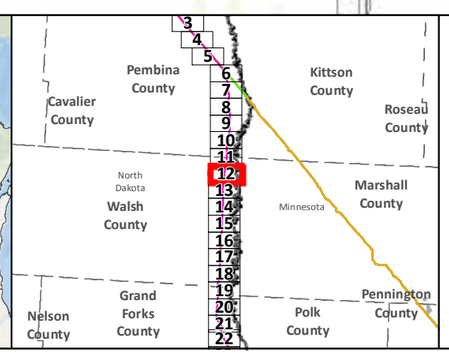

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 12B of 188

T158N R51W S29
T158N R51W S28
T158N R51W S27
T158N R51W S26
T158N R51W S25
T158N R50W S30
Red River of the North
9
73rd
29
Eagle Point Twsp Marshall Co.
T158N R51W S32
T158N R51W S33
T158N R51W S34
43
T158N R51W S35
T158N R51W S36
T158N R50W S31
SA-04
T157N R51W S5
T157N R51W S4
T157N R51W S3
44
T157N R51W S2
T157N R51W S1
T157N R50W S6
Fork Twsp Marshall Co.
Pork River
T157N R50W S6
T157N R51W S8
T157N R51W S9
T157N R51W S10
45
T157N R51W S11
T157N R51W S12
T157N R50W S7

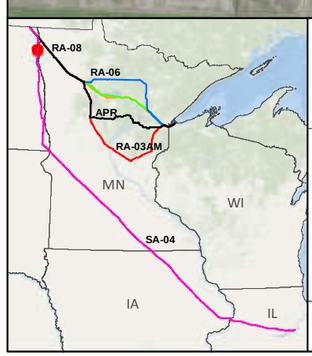

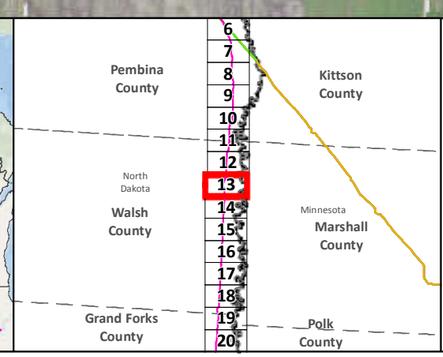

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 13A of 188

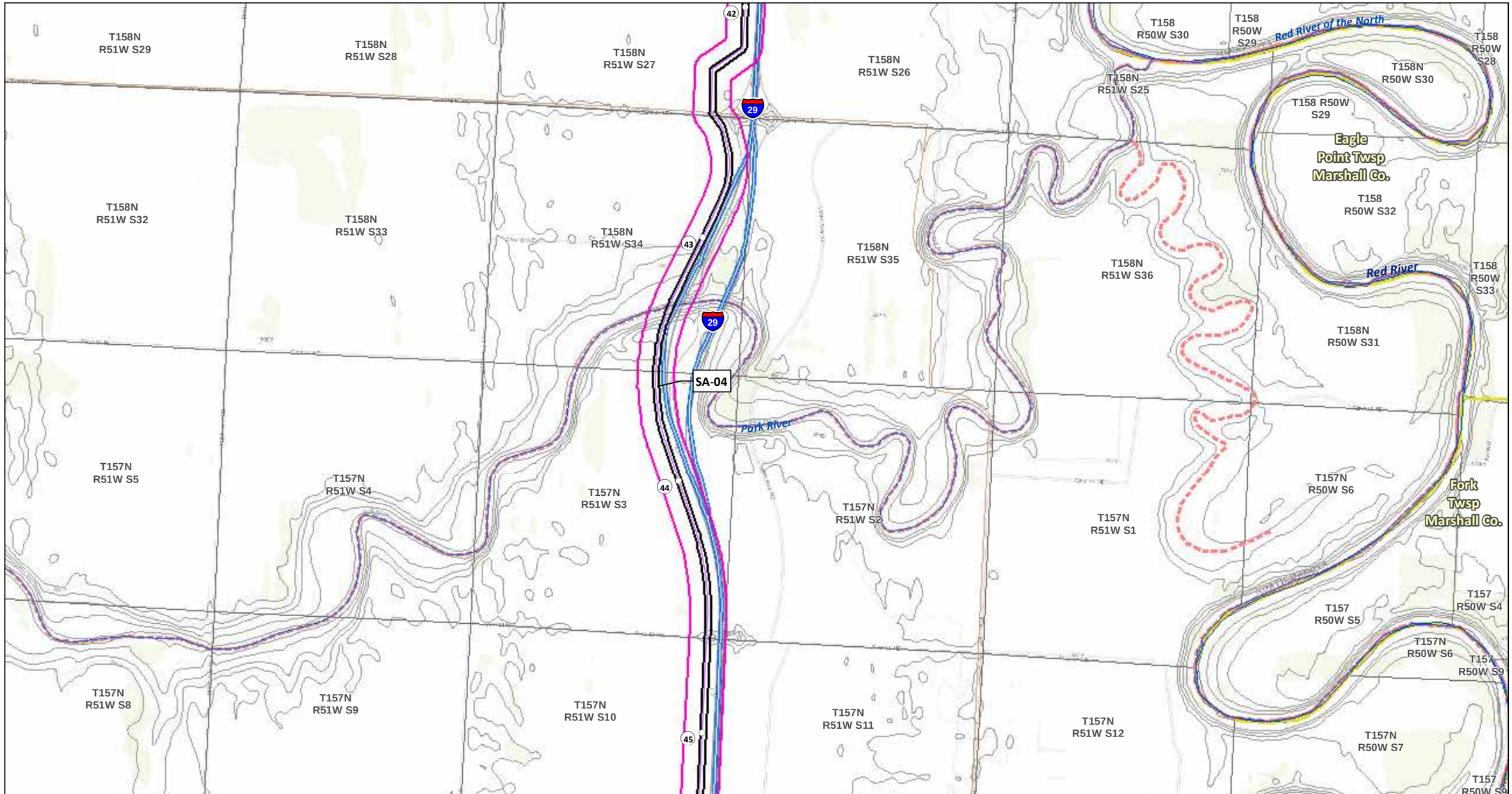

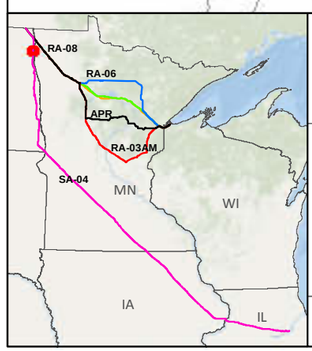

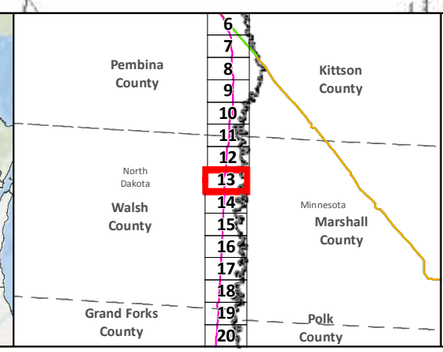

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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- SNA - Scientific and Natural Area

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- Navigable Waterway Crossings
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Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

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- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 13B of 188

T157N R51W S8
T157N R51W S9
T157N R51W S10
T157N R51W S11
T157N R51W S12
T157N R50W S7
Snake River
Fork Twsp Marshall Co.
T157N R51W S17
T157N R51W S16
T157N R51W S15
T157N R51W S14
T157N R51W S13
T157N R50W S18
T157N R50W S18
SA-04
46
17
29
317
2
47
T157N R51W S20
T157N R51W S21
T157N R51W S22
T157N R51W S23
T157N R51W S24
T157N R50W S19
T157N R51W S29
T157N R51W S28
T157N R51W S27
48
T157N R51W S26
T157N R51W S25
Red River of the North
T157N R50W S30
Fork Twsp Marshall Co.

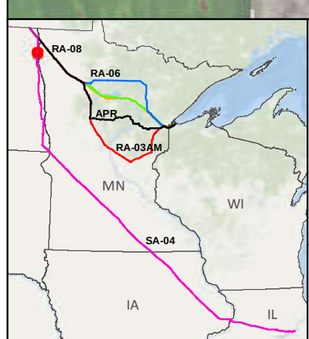

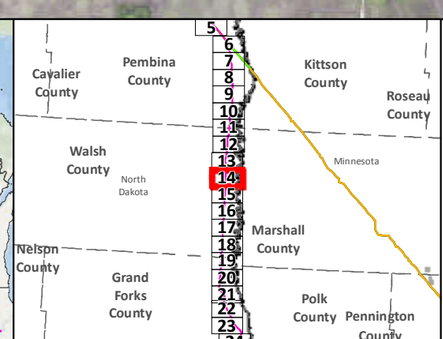

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

T157N R51W S8
T157N R51W S9
T157N R51W S10
T157N R51W S11
T157N R51W S12
T157N R50W S7
T157 R50W S8
T157 R50W S9
Fork Twsp Marshall Co.
Snake River
T157 R50W S17
Red River of the North WMA
T157N R51W S17
T157N R51W S16
T157N R51W S15
T157N R51W S14
T157N R51W S13
T157N R50W S18
Red River of the North
T157 R50W S18
T157 R50W S17
T157N R50W S18
T157 R50W S16
T157 R50W S19
T157 R50W S20
SA-04
46
47
48
29
17
317
T157N R51W S20
T157N R51W S21
T157N R51W S22
T157N R51W S23
T157N R51W S24
T157N R50W S19
T157 R50W S21
T157 R50W S20
T157N R51W S29
T157N R51W S28
T157N R51W S27
T157N R51W S26
T157N R51W S25
T157N R50W S30
Red River
T157 R50W S30
T157 R50W S29
Fork Twsp Marshall Co.
T157 R50W S28

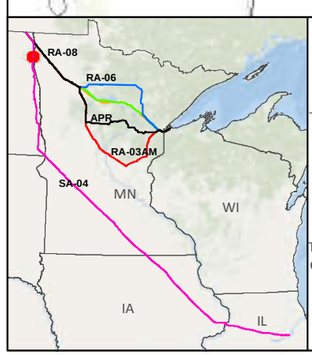

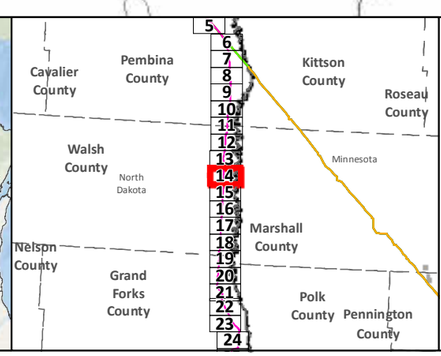

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
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- RA-08
- Mile Post
- Anticipated 120' Construction ROW
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Existing Pipelines
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- National River Inventory Crossing

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303d Imparied Waters
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Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 14B of 188

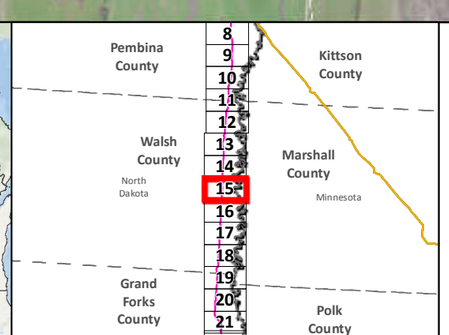

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 15A of 188

T157N R51W S29
T157N R51W S28
T157N R51W S27
T157N R51W S26
T157N R51W S25
T157 R50W S30
T157 R50W S29
T157 R50W S28
T157 R50W S31
Red River of the North
T157N R51W S32
T157N R51W S33
T157N R51W S34
T157N R51W S35
T157N R51W S36
Joliet Ferry
T157 R50W S32
Fork Twsp Marshall Co.
T157 R50W S33
T157N R50W S31
Red River
T156 R51W S1
T156N R51W S6
T156N R51W S5
T156N R51W S4
T156N R51W S3
T156N R51W S2
T156 R50W S6
T156 R50W S5
Big Woods Twsp Marshall Co.
Forest River
T156N R51W S1
T156N R51W S7
T156N R51W S8
T156N R51W S9
T156N R51W S10
T156N R51W S11
T156N R51W S12
T156 R50W S8
T156 R50W S7
SA-04
49
50
29
51

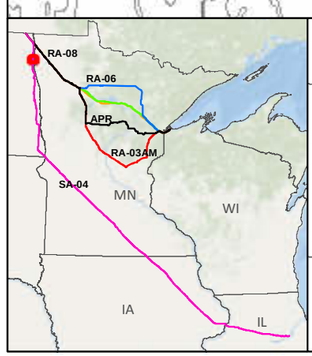

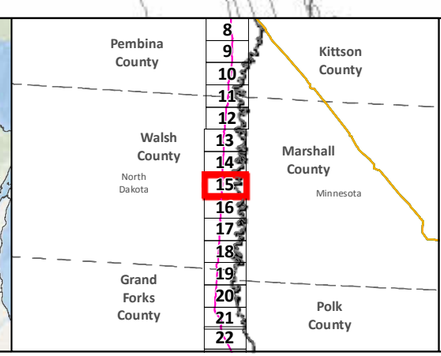

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
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- RA-06
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- RA-08
- Mile Post
- Anticipated 120' Construction ROW
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Existing Pipelines
Township Boundary

State Managed Lands
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Water Resources
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Lakes of Biological Significance
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Native Plant Communities with Biodiversity Significance
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 15B of 188

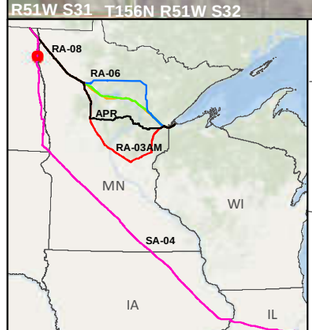

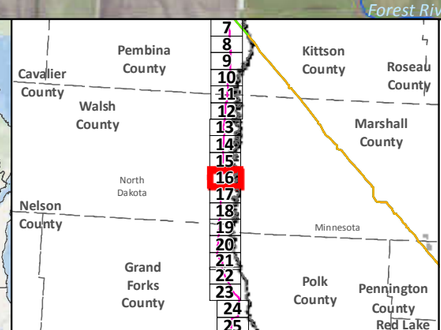

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 16A of 188

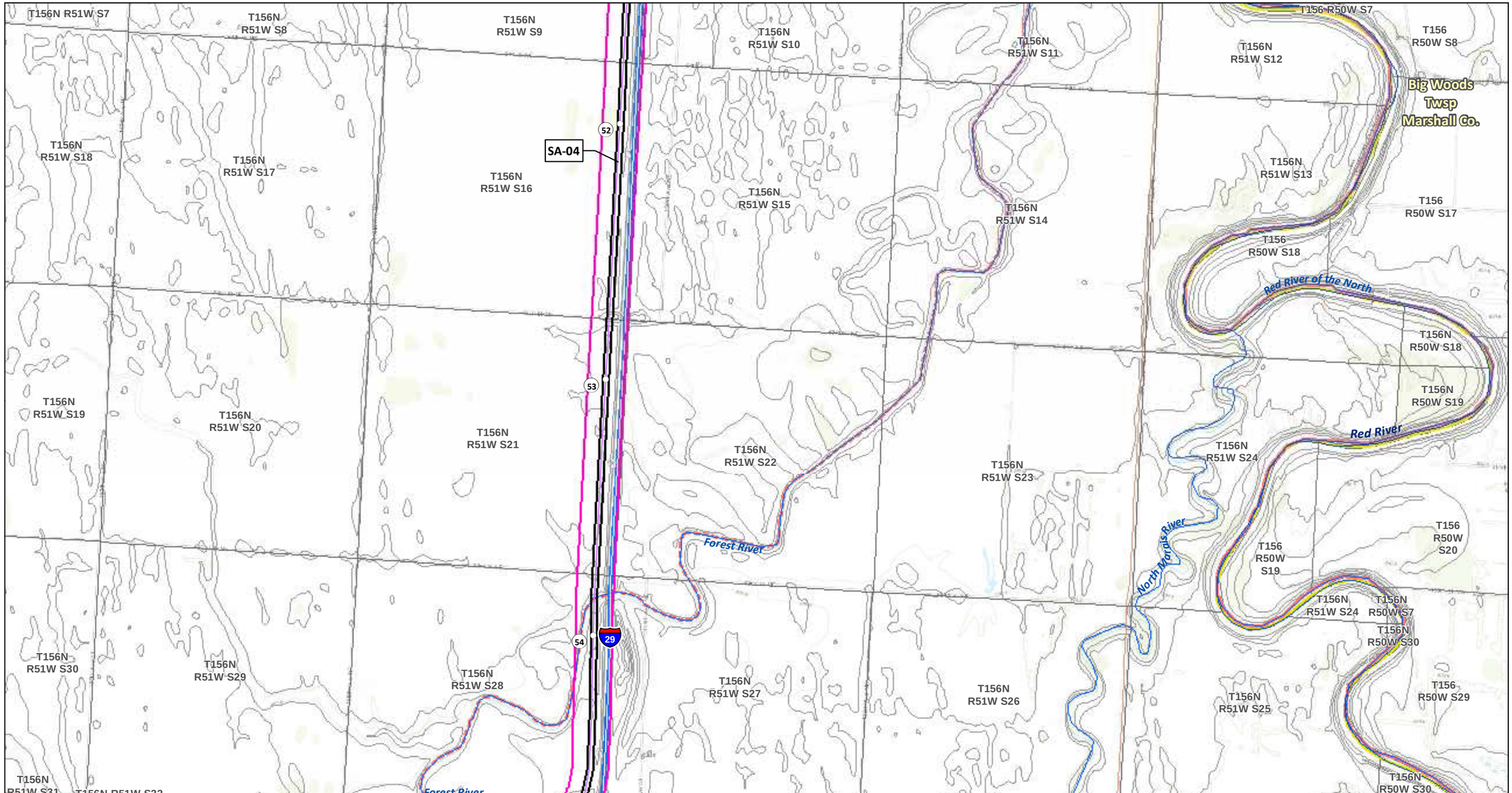

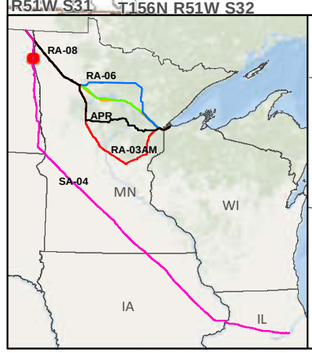

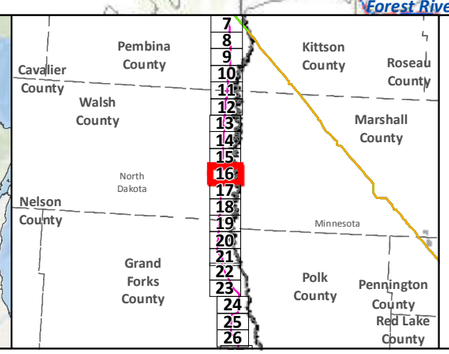

SA-04
Applicant's Preferred Route (APR)

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 16B of 188

T156N R51W S29
T156N R51W S28
T156N R51W S27
T156N R51W S26
T156N R51W S25
T156N R50W S30
T156N R50W S31
Big Woods Twsp Marshall Co.
T156N R51W S31
T156N R51W S32
T156N R51W S33
T156N R51W S34
T156N R51W S35
T156N R51W S36
T156N R50W S31
Forest River
T155N R51W S6
T155N R51W S5
T155N R51W S4
SA-04
T155N R51W S3
T155N R51W S2
T155N R51W S1
T155N R50W S6
North Maple River
T155N R51W S7
Red River of the North
Oak Park Twsp Marshall Co.
T155N R51W S8
T155N R51W S9
T155N R51W S10
T155N R51W S11
T155N R51W S12
T155N R50W S7
T155N R51W S18
T155N R51W S17
T155N R51W S16

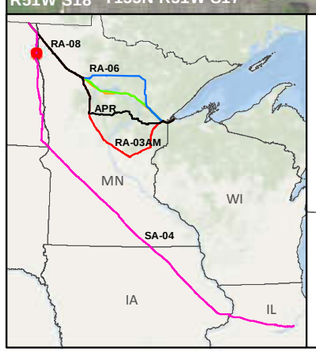

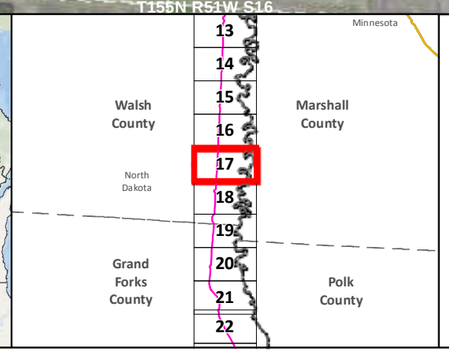

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
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National Forest
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Water Resources
Lake
River

Data Sources: MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 17A of 188

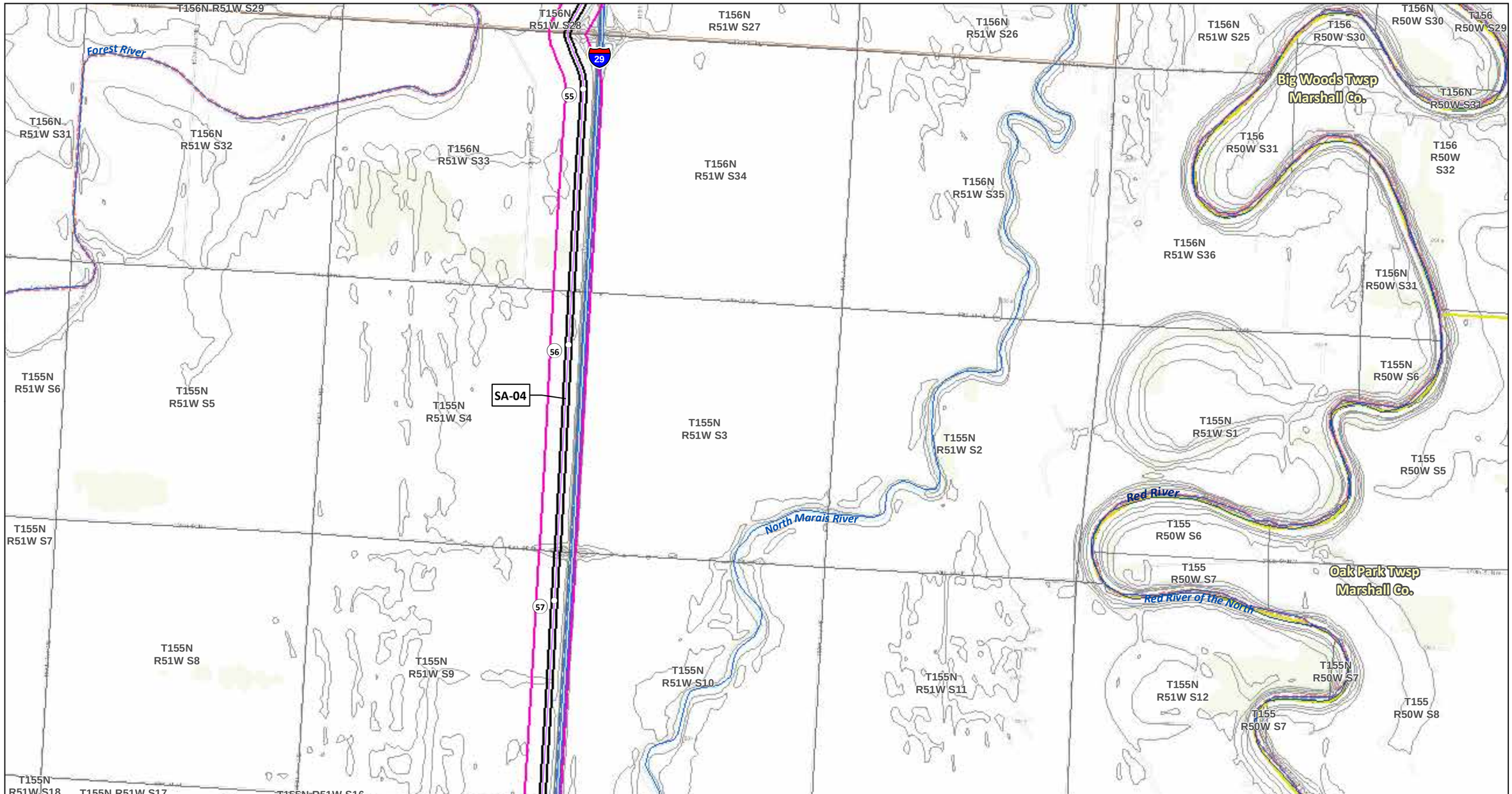

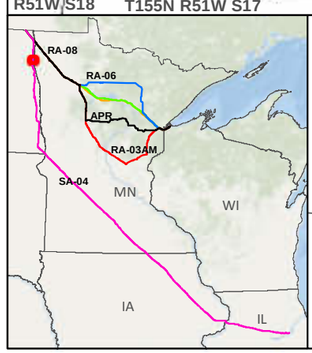

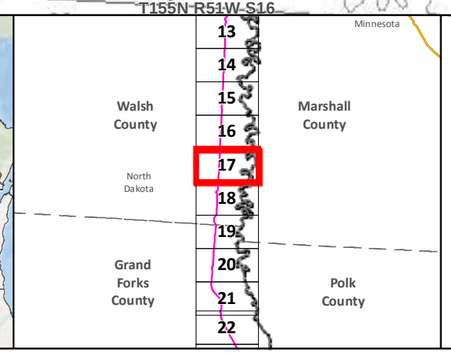

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
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Mile Post

Anticipated 120' Construction ROW

Route Width (750')

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 17B of 188

T155N R51W S18
T155N R51W S9
T155N R51W S10
T155N R51W S11
T155N R51W S12
T155N R51W S13
T155N R51W S17
T155N R51W S16
T155N R51W S15
T155N R51W S14
SA-04
Oak Park Twsp Marshall Co.
T155N R51W S19
T155N R51W S13
T155N R51W S20
T155N R51W S21
T155N R51W S22
T155N R51W S23
North Morais River
Red River of the North
T155N R51W S24
T155N R51W S30
T155N R51W S29
T155N R51W S28
T155N R51W S27
T155N R51W S26
T155N R51W S25
Red River of the North
Oak Park Twsp Marshall Co.
T155N R50W S30
T155N R51W S32
T155N R51W S33
T155N R51W S34
T155N R51W S35

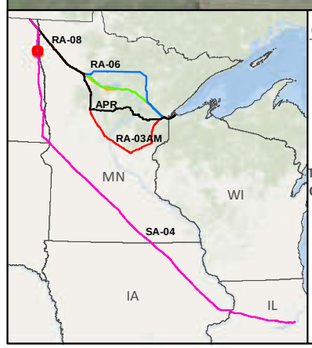

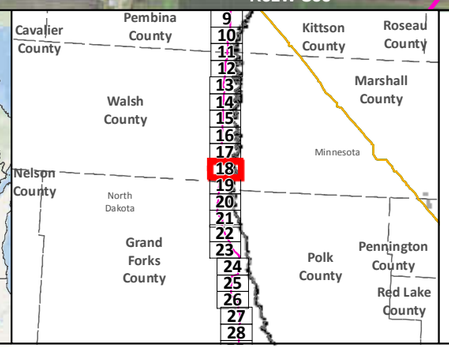

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 18A of 188

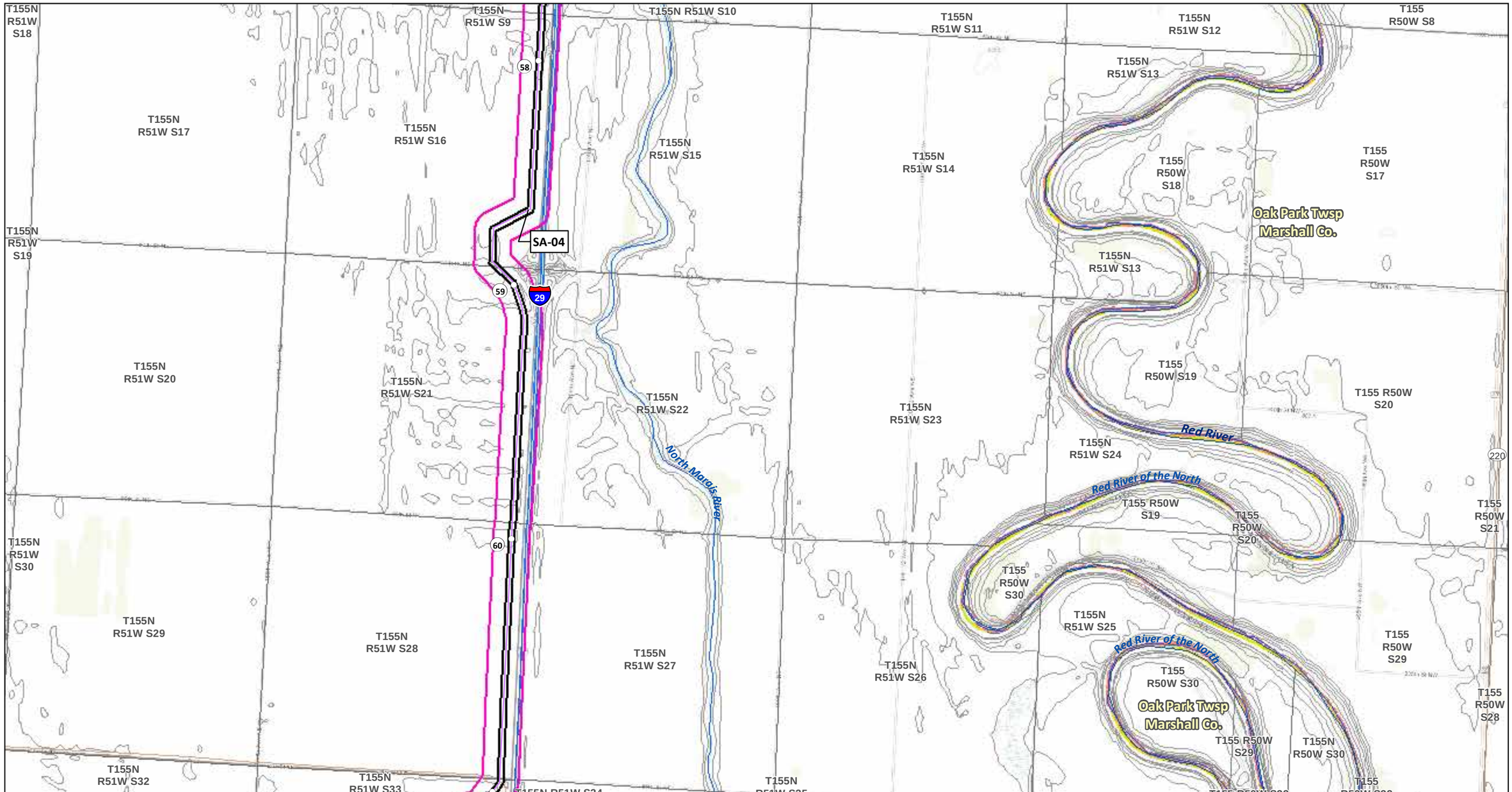

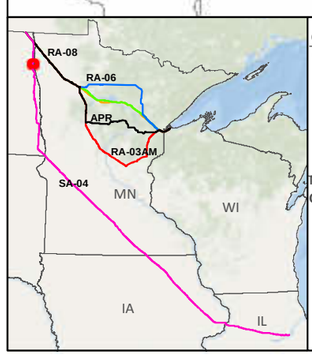

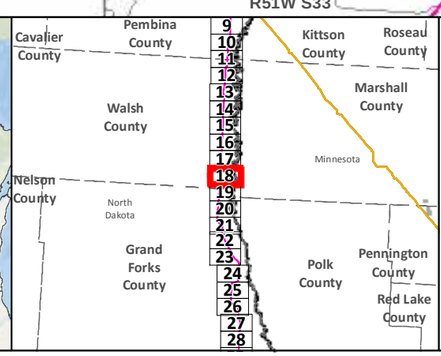

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 18B of 188

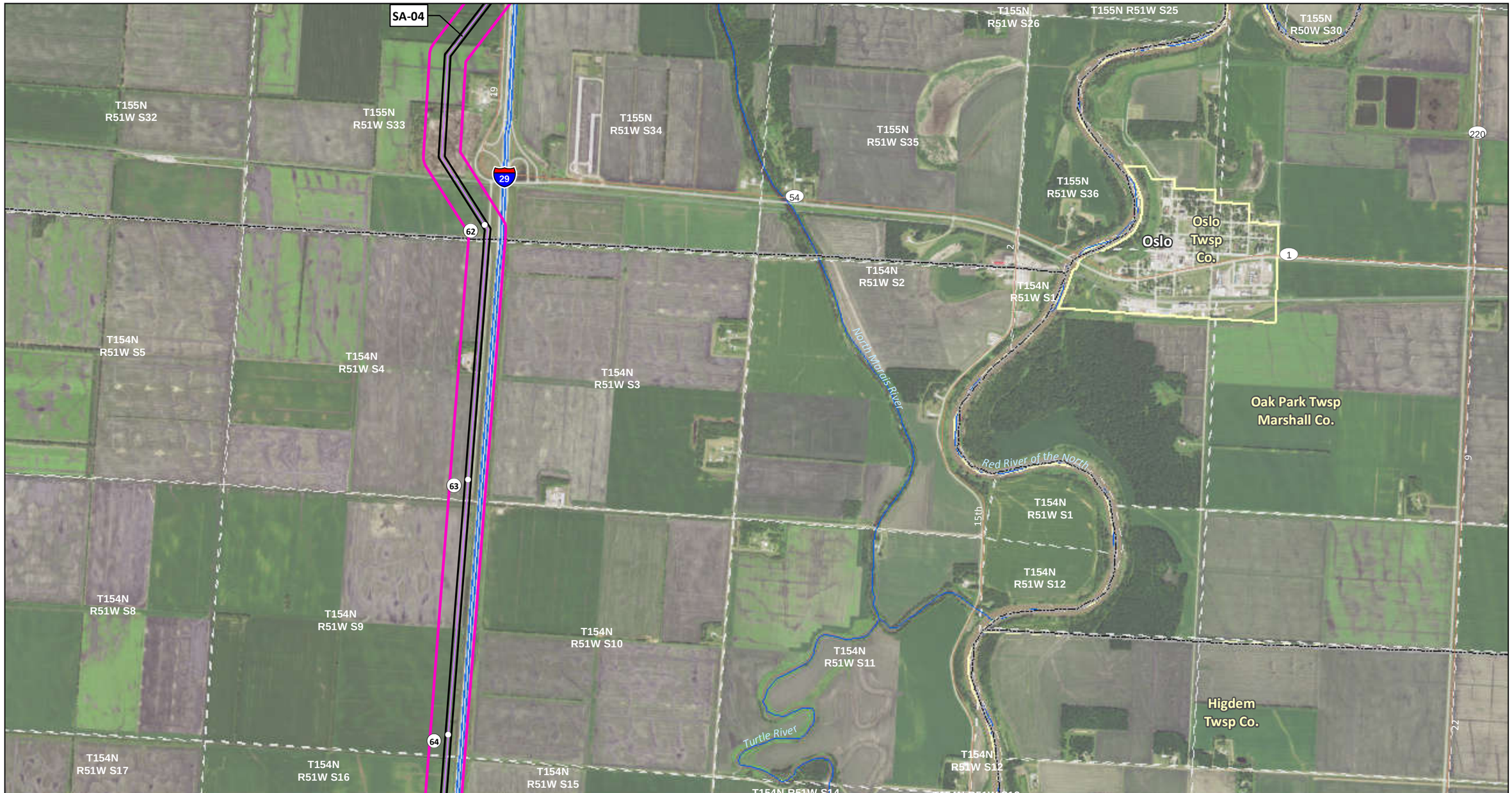

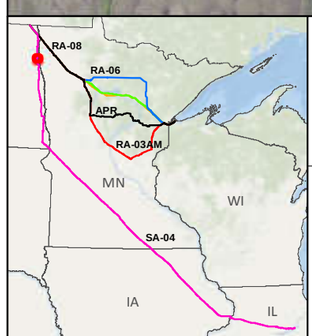

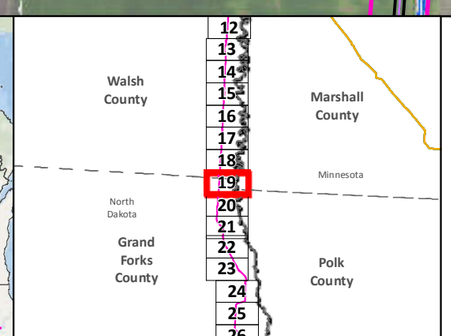

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 19A of 188

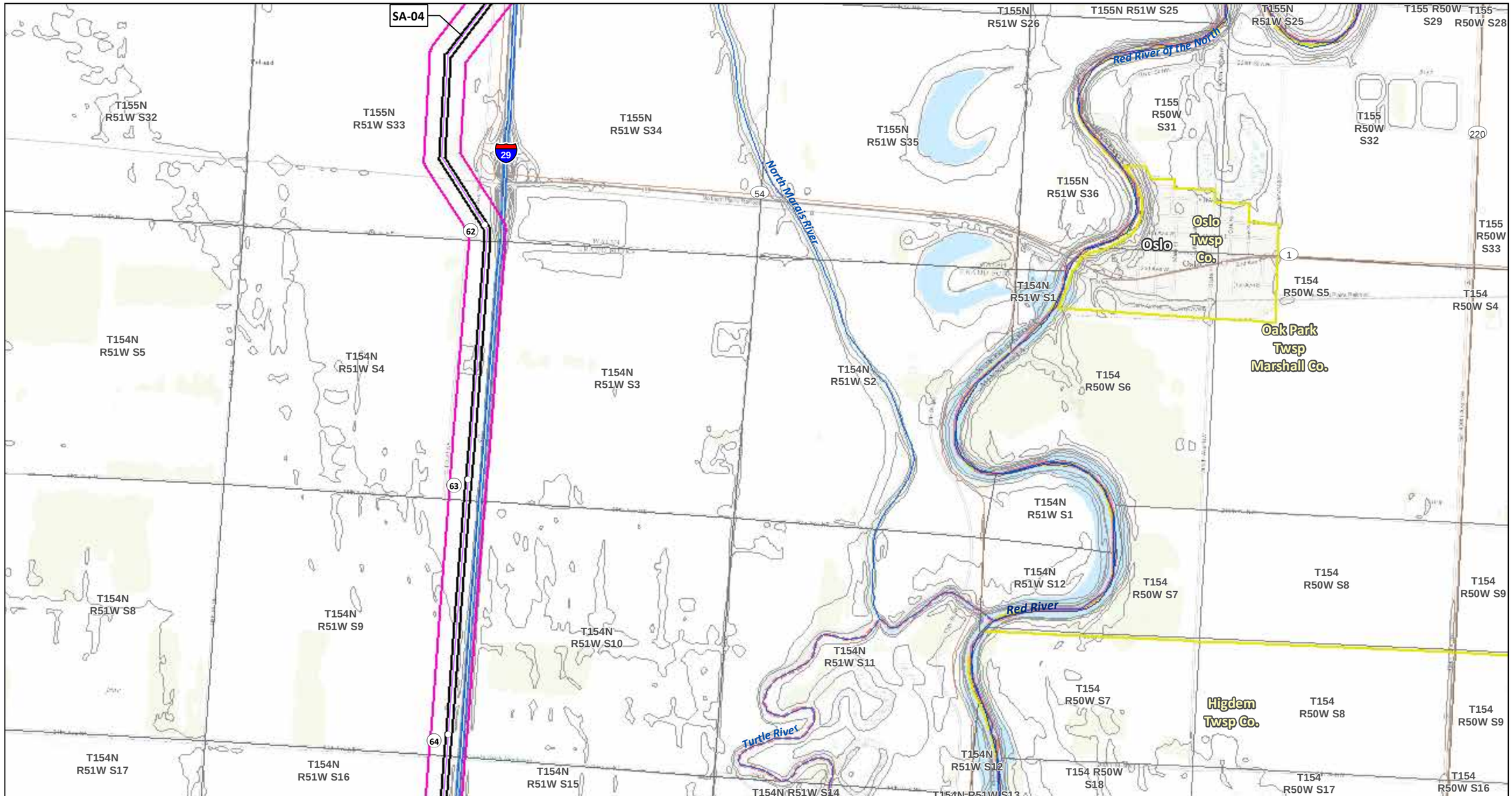

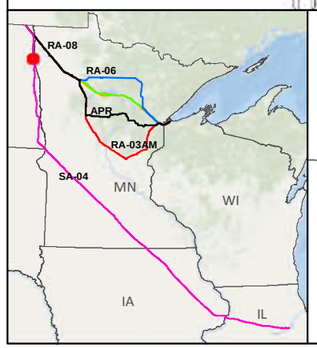

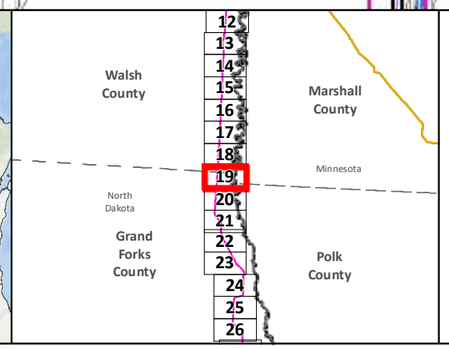

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

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Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

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- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 19B of 188

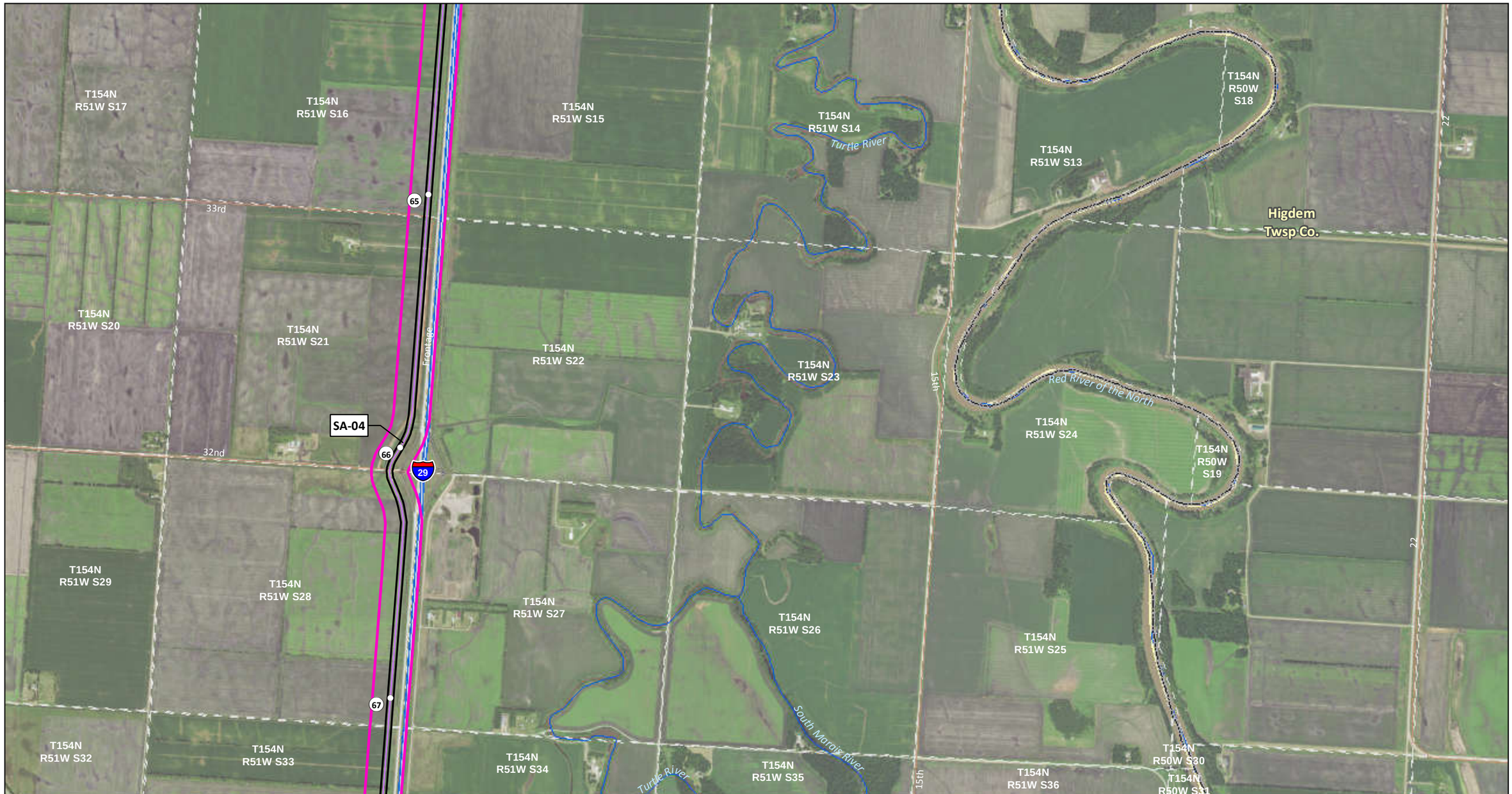

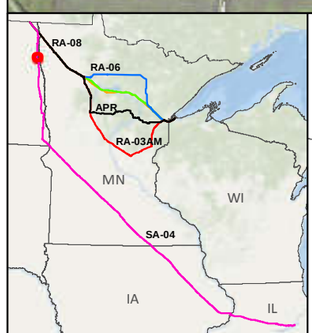

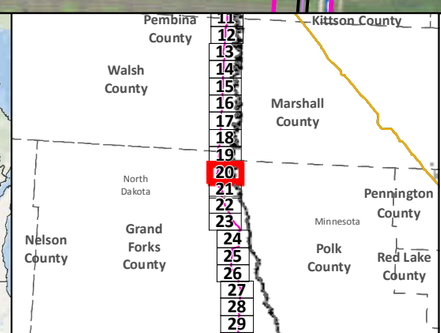

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 20A of 188

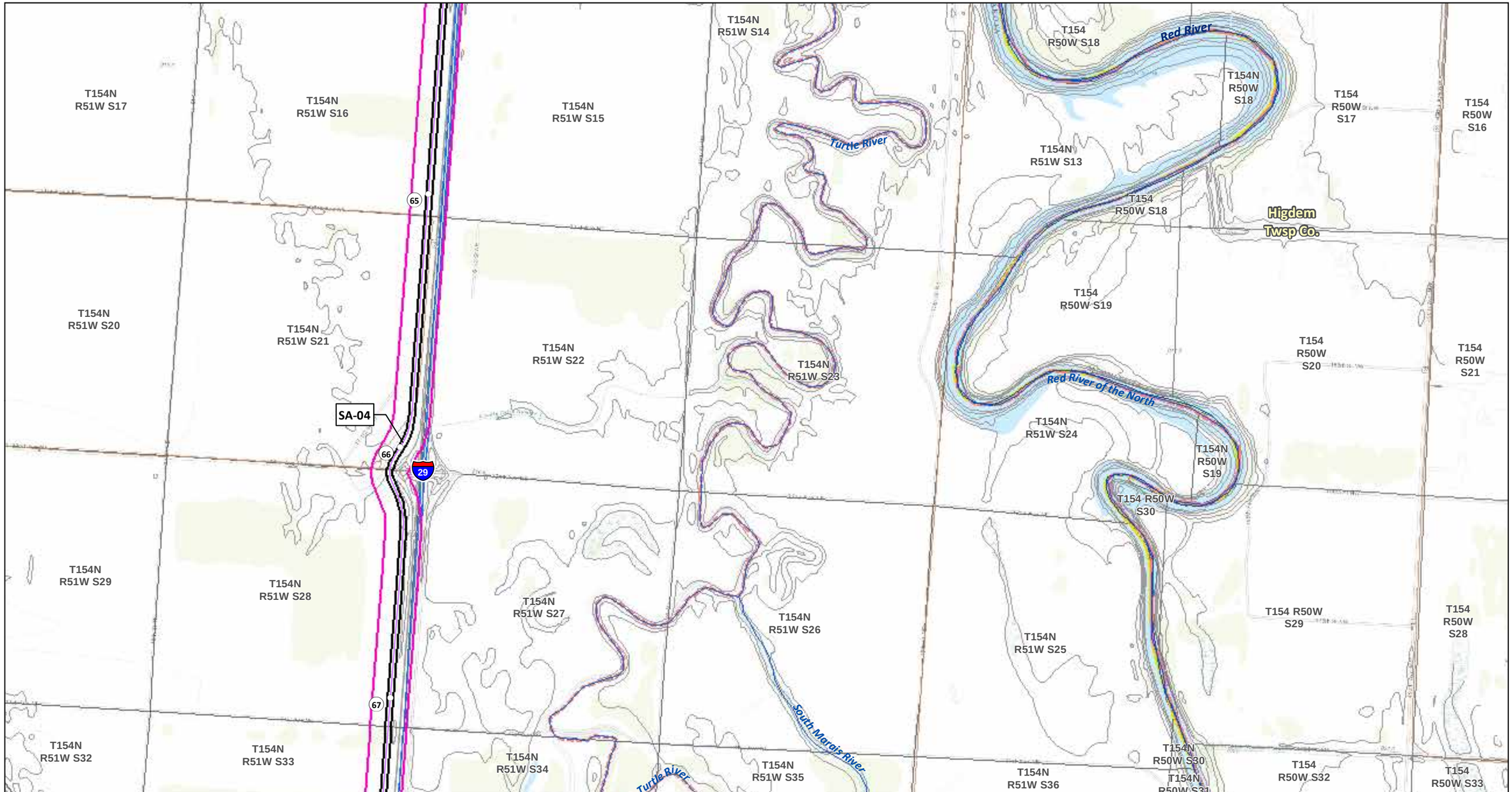

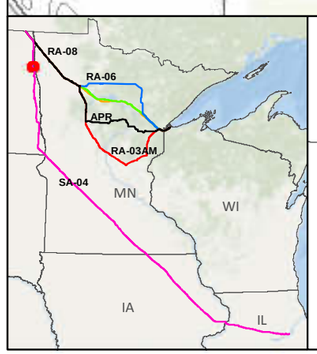

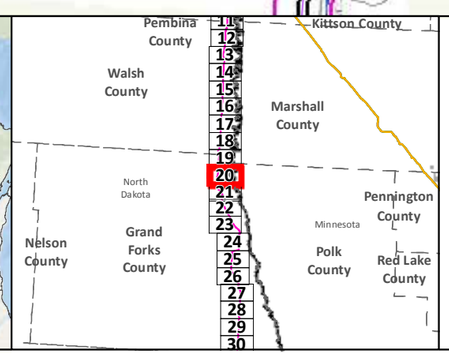

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

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- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

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Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

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- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

Map 20B of 188

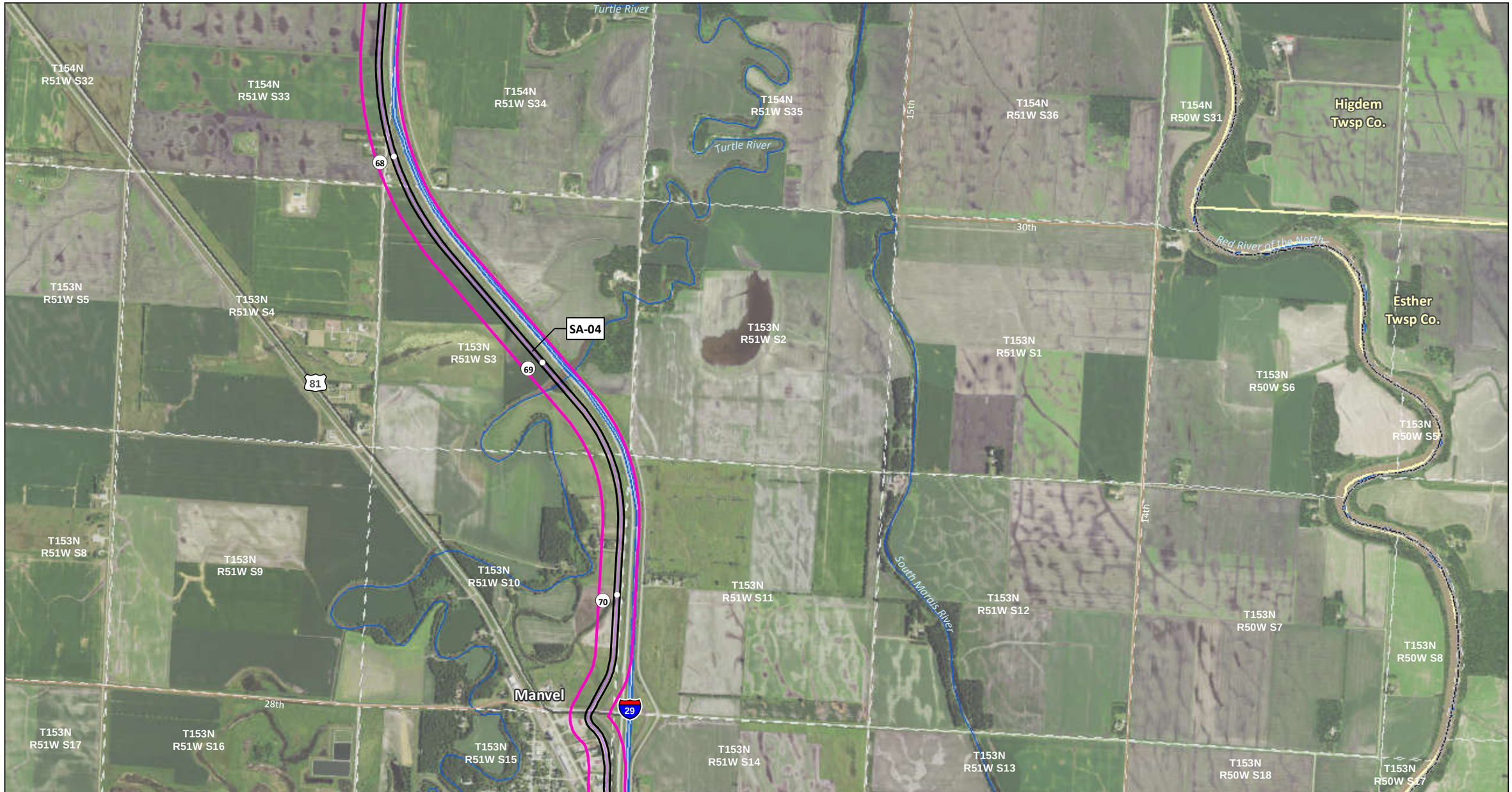

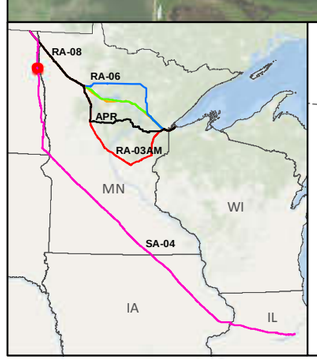

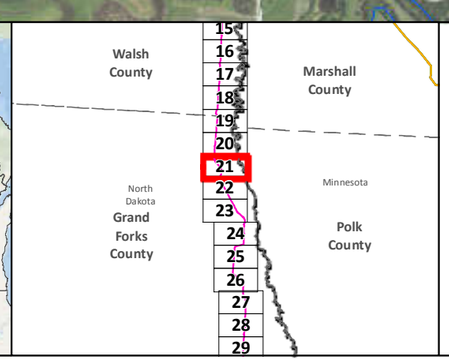

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources: MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 21A of 188

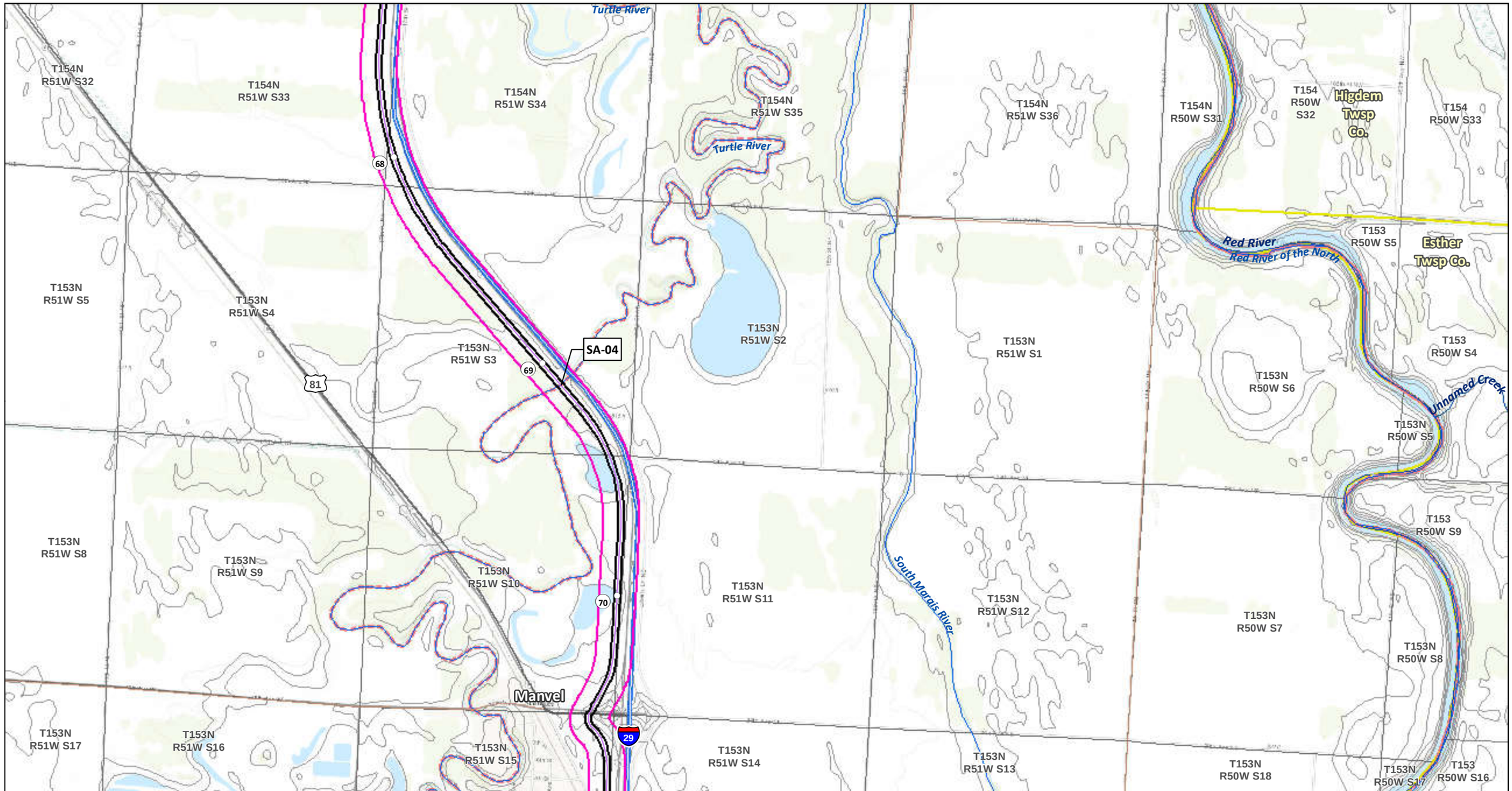

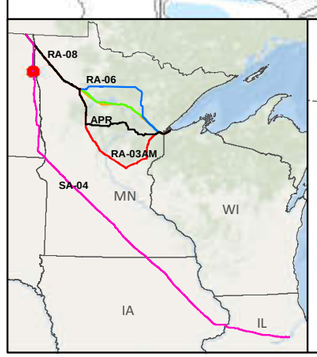

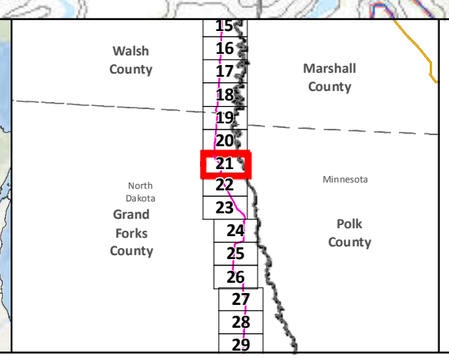

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
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Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 21B of 188

T153N R51W S9
28th
T153N R51W S10
81
29
T153N R51W S11
T153N R51W S12
T153N R50W S7
T153N R50W S8
T153N R51W S17
T153N R51W S16
T153N R51W S15
71
T153N R51W S14
T153N R51W S13
T153N R50W S18
Esther Twsp Co.
Red River of the North
T153N R50W S17
South Morais River
T153N R51W S20
T153N R51W S21
T153N R51W S22
72
SA-04
T153N R51W S23
T153N R51W S24
14th
T153N R50W S19
T153N R50W S20
Turtle River
T153N R51W S29
T153N R51W S28
T153N R51W S27
73
T153N R51W S26
T153N R51W S25
T153N R50W S30
T153N R50W S29
T153N R51W S32
T153N R51W S33
T153N R51W S34
T153N R51W S35
T153N R51W S36

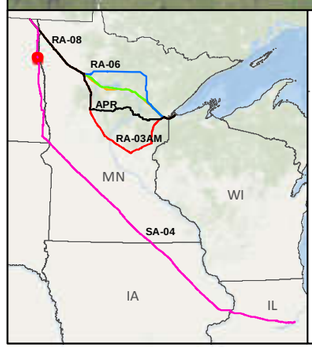

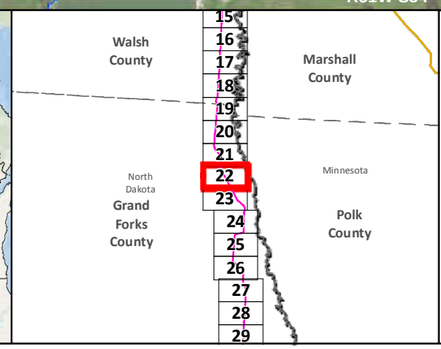

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
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Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 22A of 188

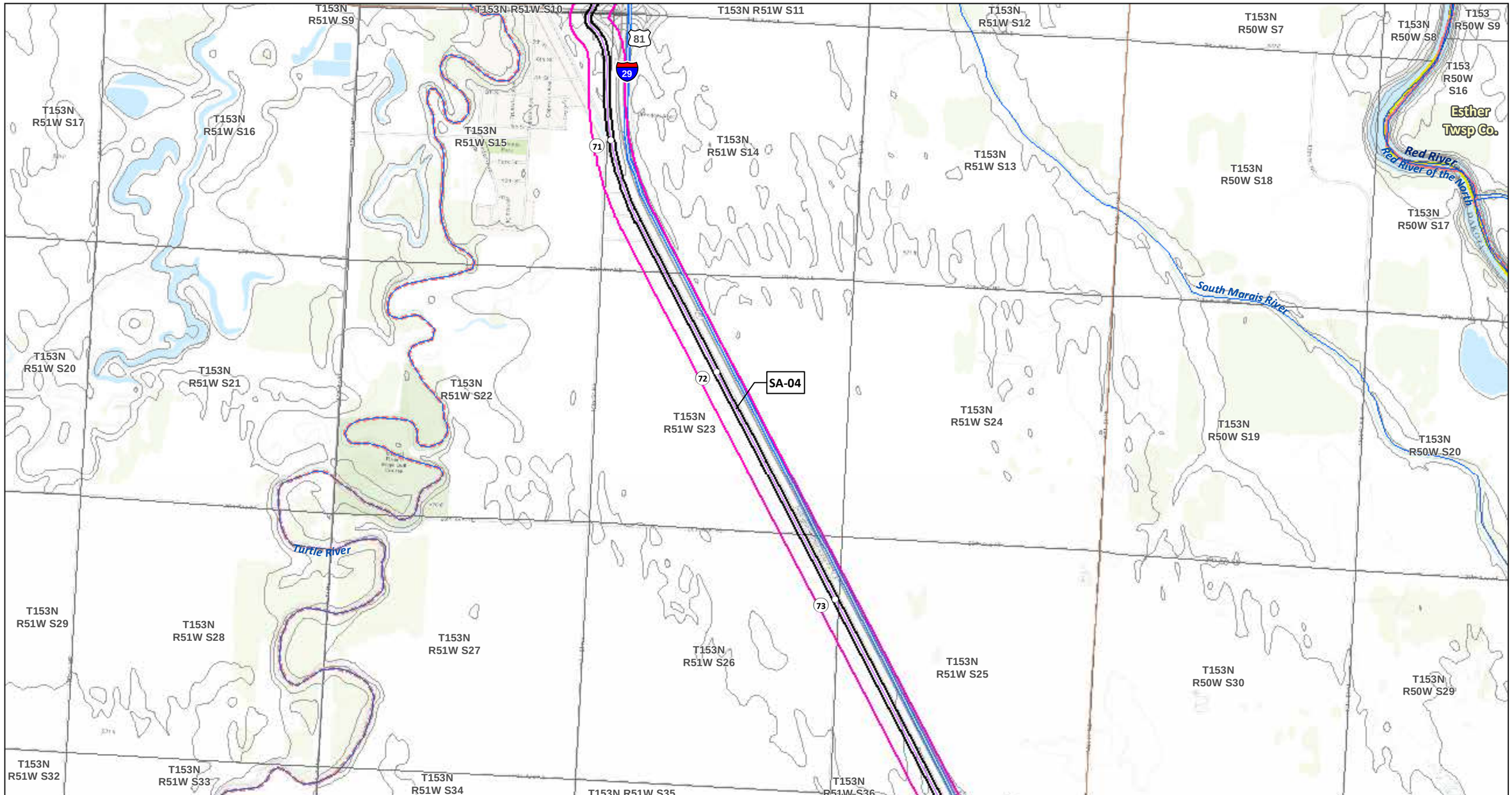

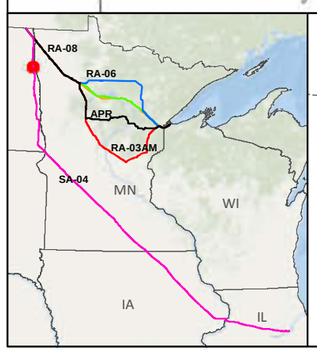

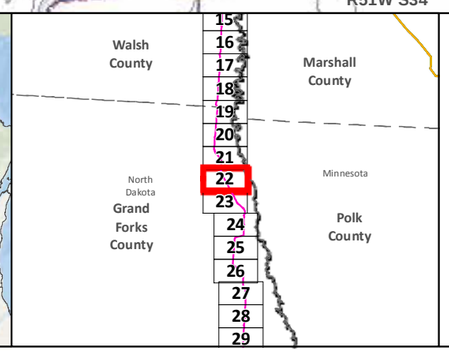

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

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Lakes of Biological Significance

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Native Plant Communities with Biodiversity Significance

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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 22B of 188

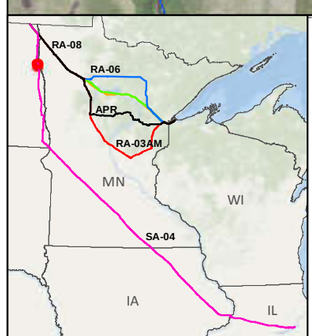

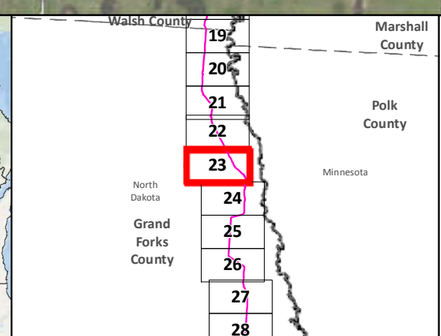

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

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Existing Pipeline
Interstate
Highway
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Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 23A of 188

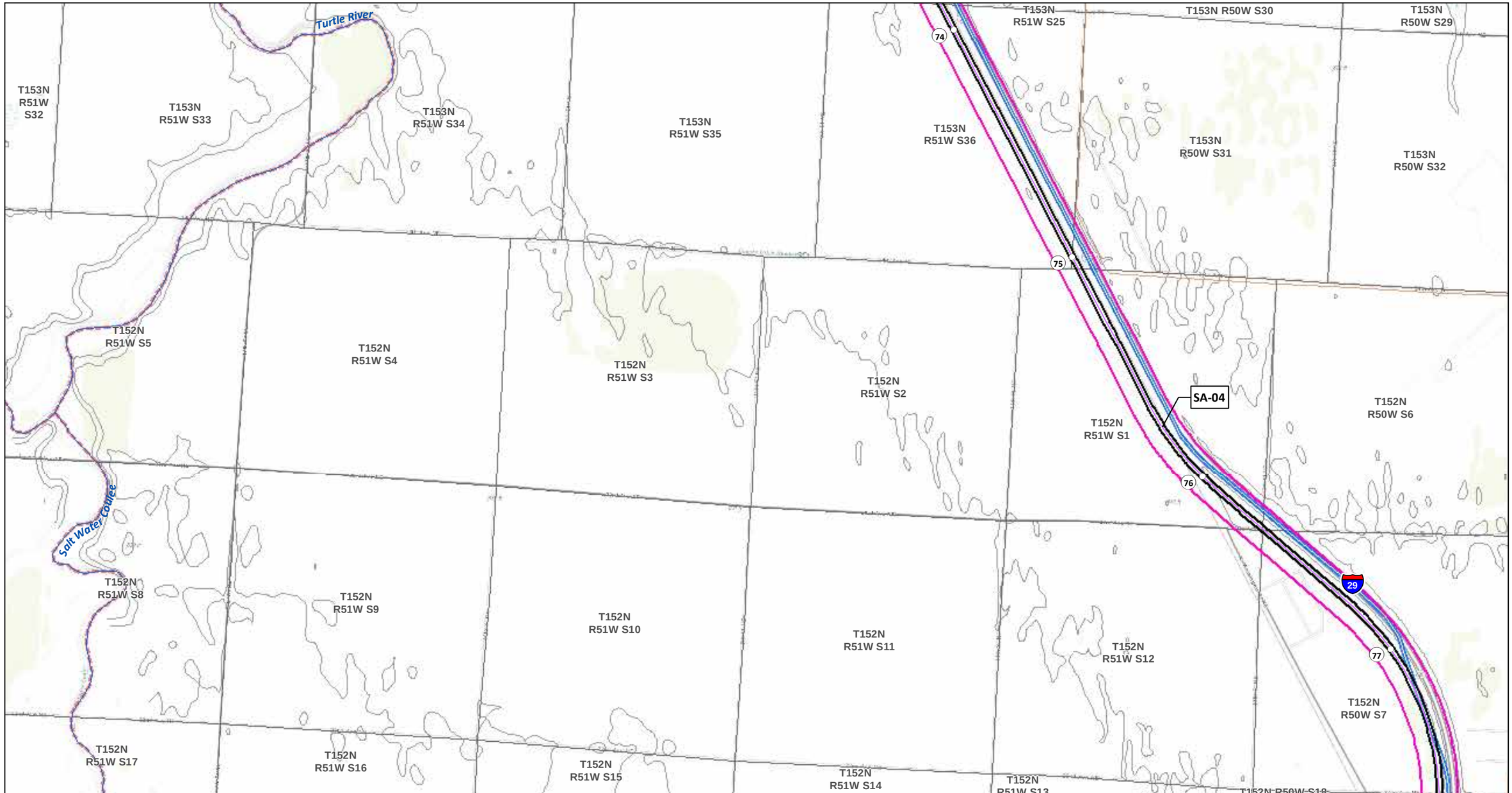

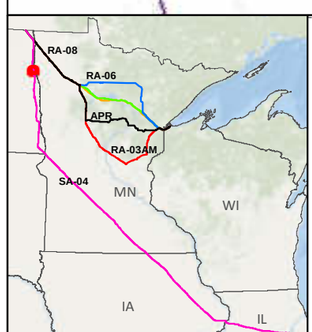

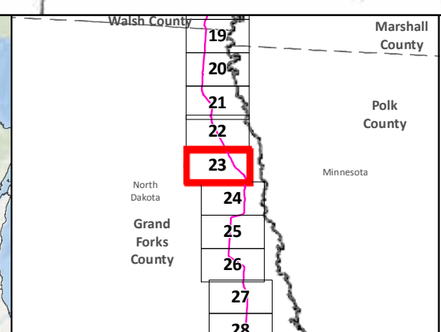

SA-04

Applicant's Preferred Route (APR)

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- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

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- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 23B of 188

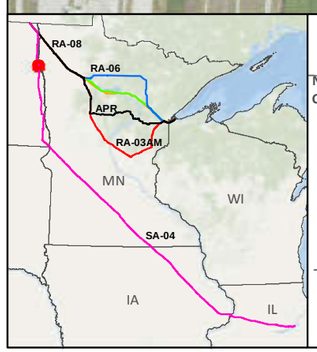

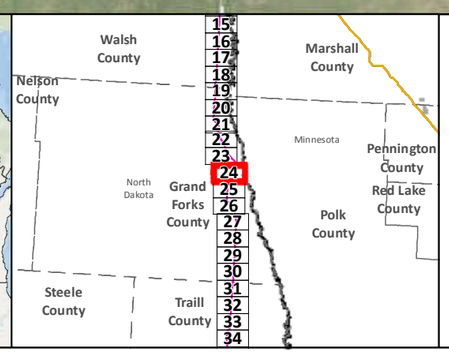

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 24A of 188

T152N R51W S16
T152N R51W S15
T152N R51W S14
T152N R51W S13
T152N R50W S18
T152N R50W S17
T152N R50W S16
T152N R50W S9
T152N R50W S8
T152 R50W S15
T152 R50W S22
T152N R51W S21
T152N R51W S22
T152N R51W S23
T152N R51W S24
T152N R50W S19
T152N R50W S20
T152N R50W S21
T152N R51W S28
T152N R51W S27
T152N R51W S26
T152N R51W S25
T152N R50W S30
T152N R50W S29
T152N R50W S28
T152N R51W S33
T152N R51W S34
T152N R51W S35
T152N R51W S36
T152N R50W S31
T152N R50W S32
T152N R50W S33

78 29 79 81 80

SA-04

Red River of the North
Red River
Grand Forks Twsp Co.
Grand Forks Twsp Co.

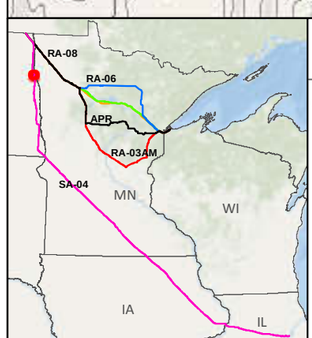

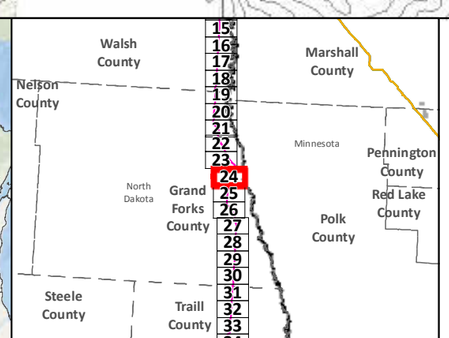

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
RA-03AM
RA-06
RA-07
RA-08
Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
WMA - Wildlife Management Areas
Wildlife Refuge Inventory
SNA - Scientific and Natural Area

Water Resources
Navigable Waterway Crossings
National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
Outstanding
High
Moderate

Native Plant Communities with Biodiversity Significance
Outstanding
High
Moderate

Data Sources:
MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 24B of 188

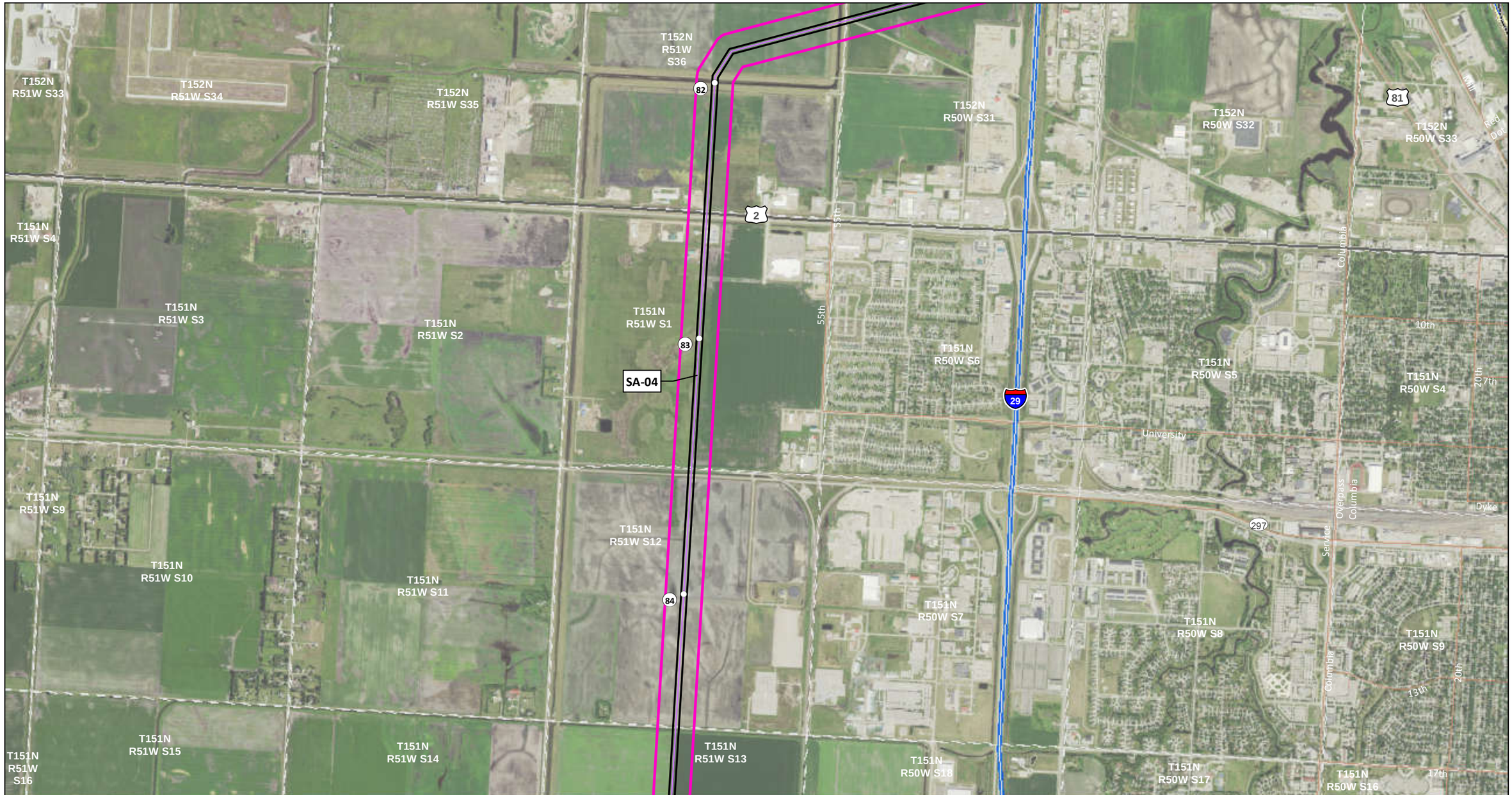

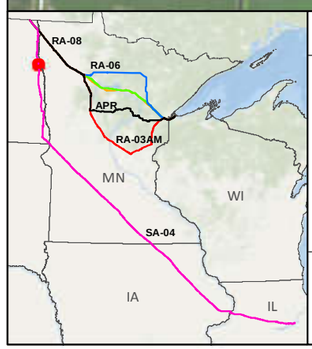

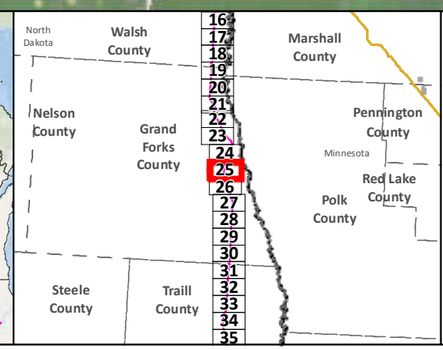

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 25A of 188

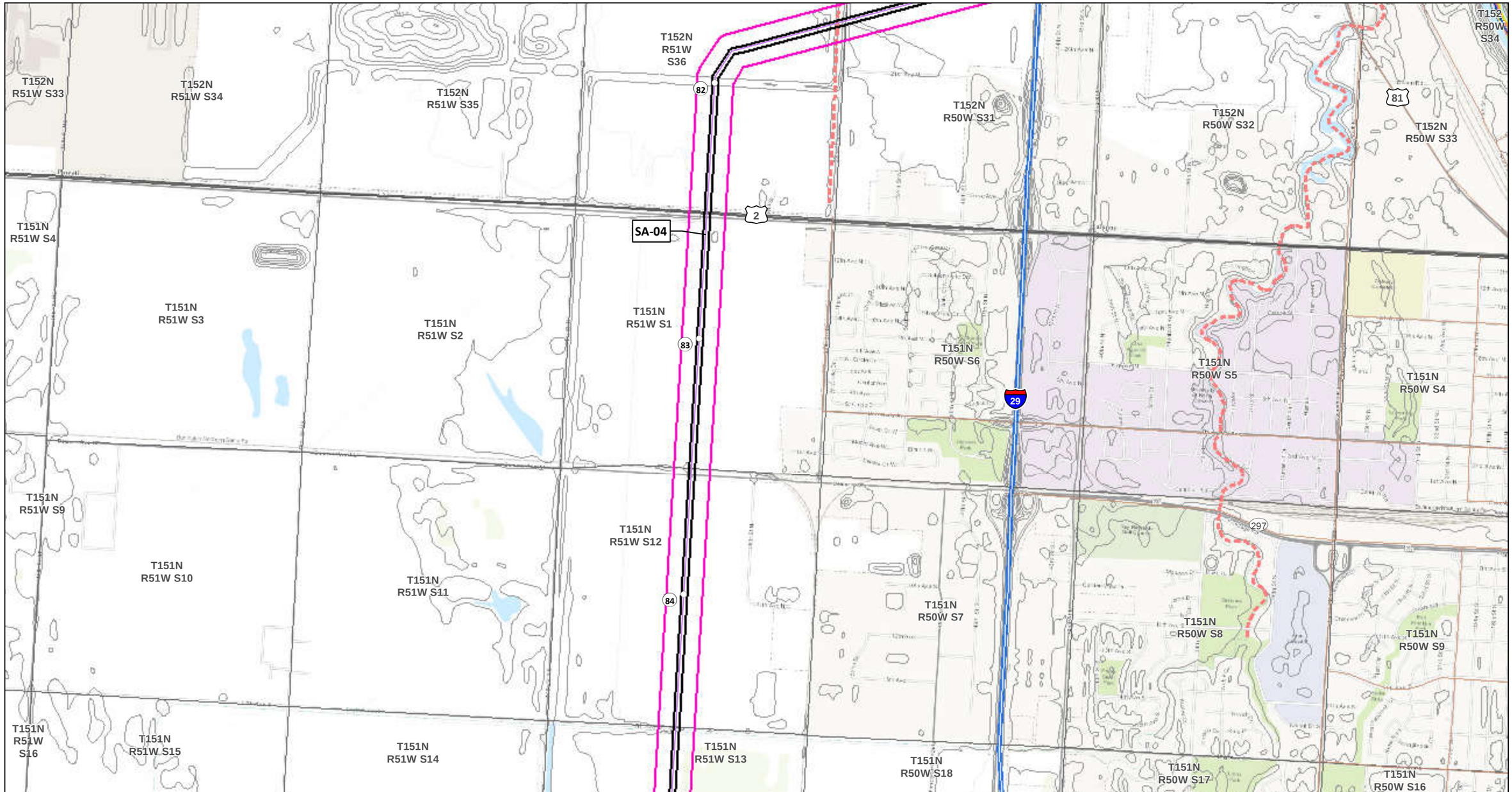

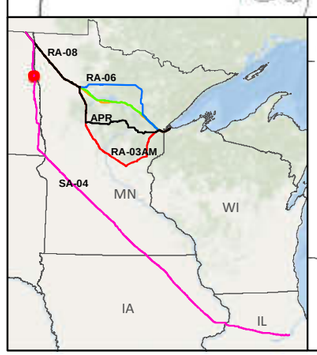

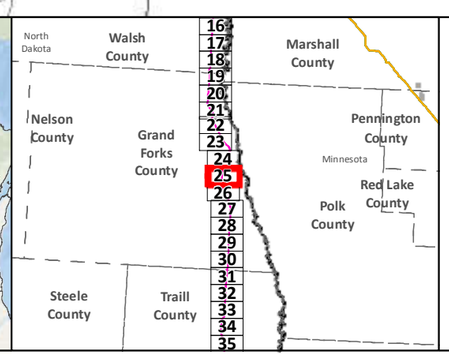

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 25B of 188

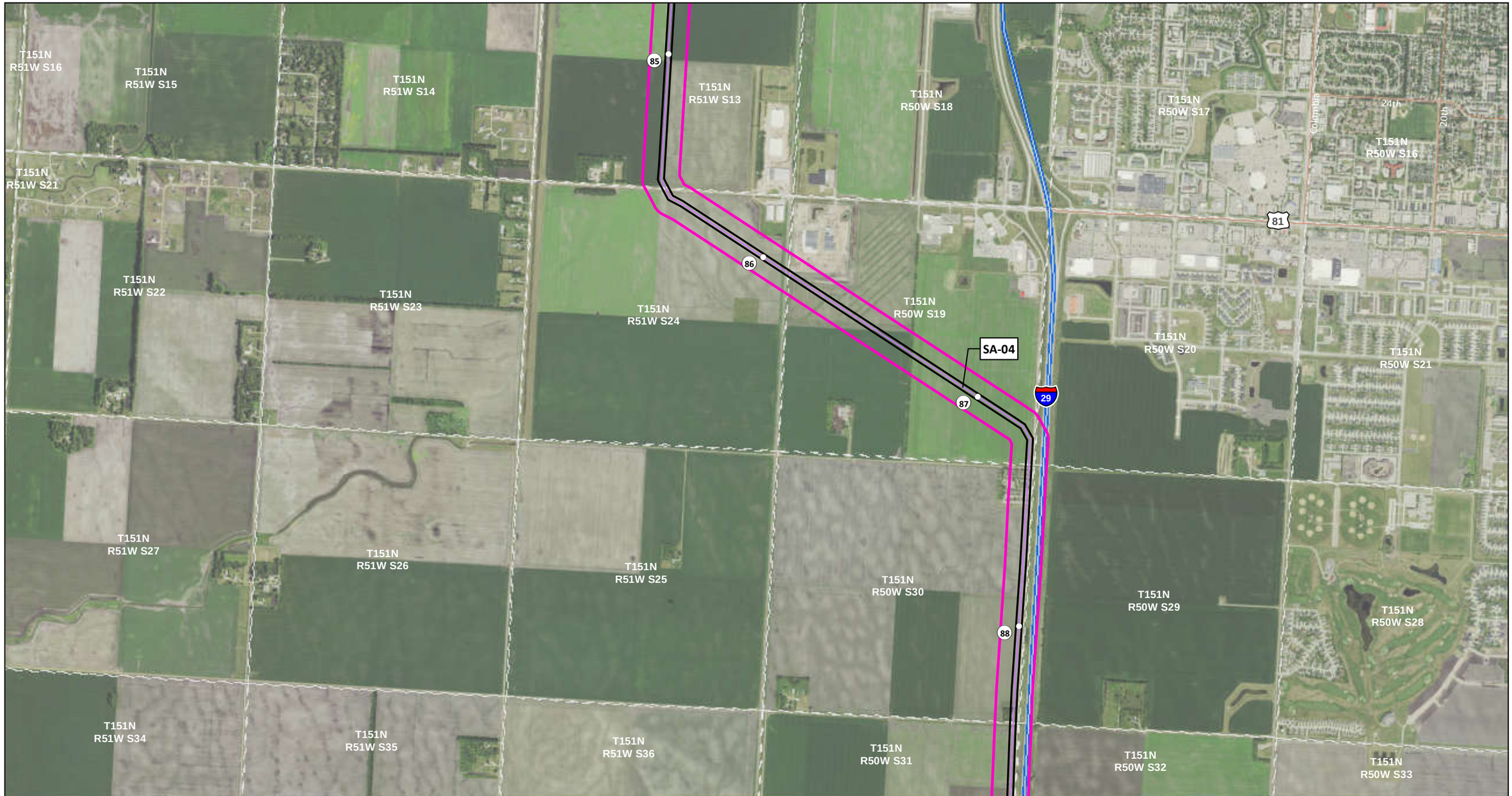

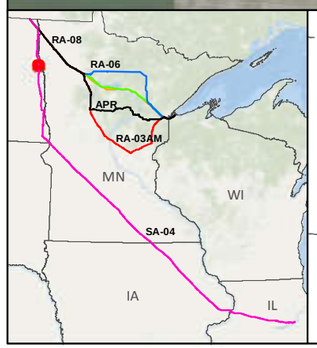

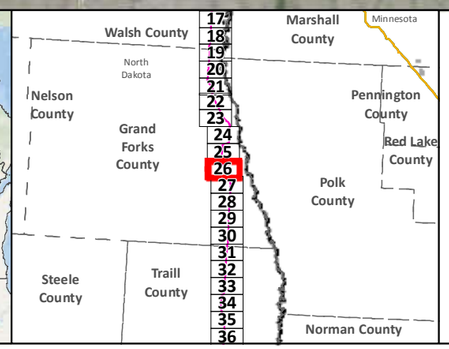

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 26A of 188

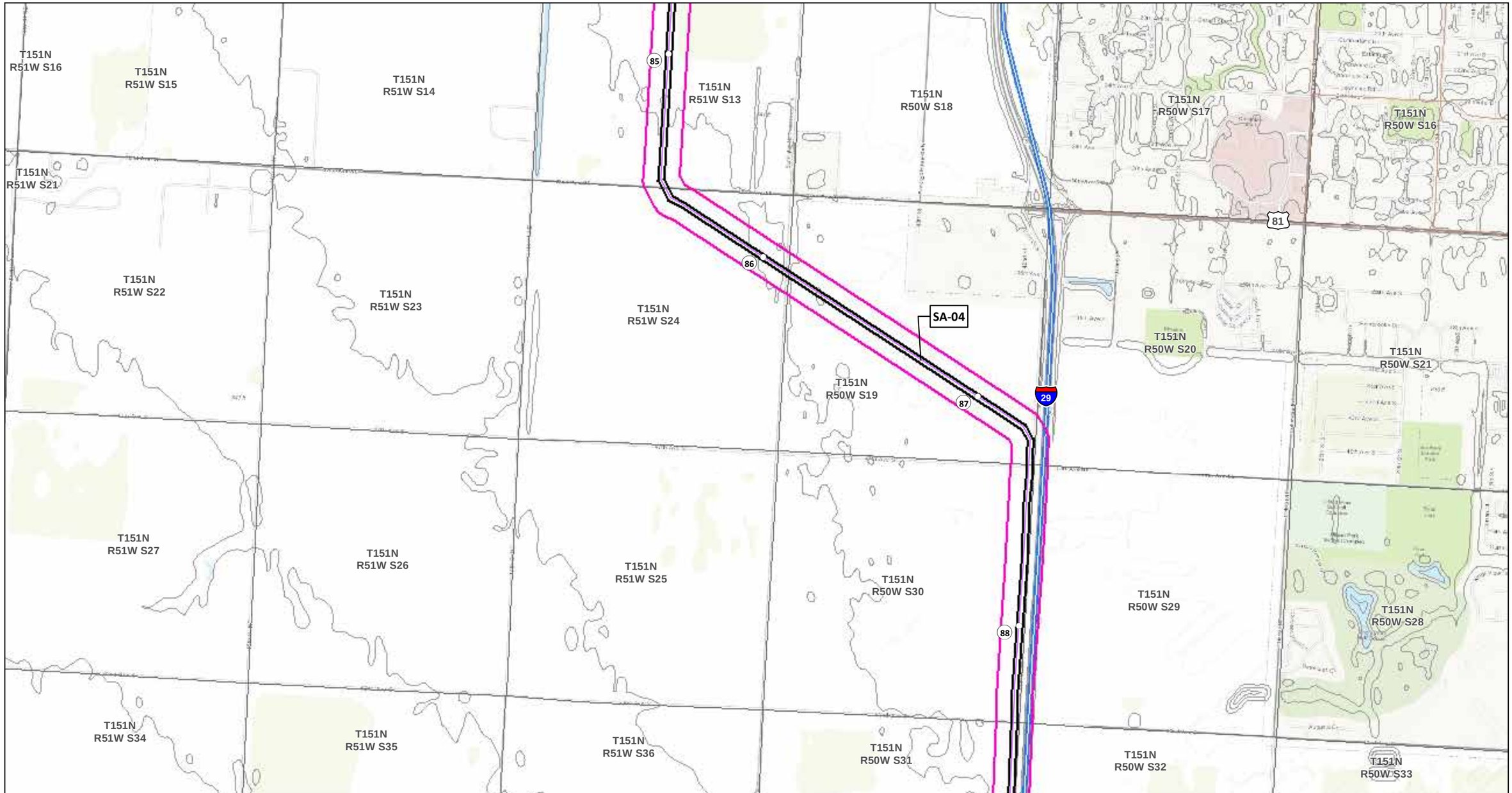

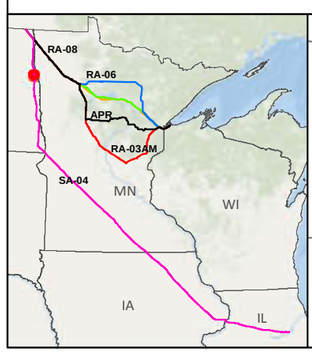

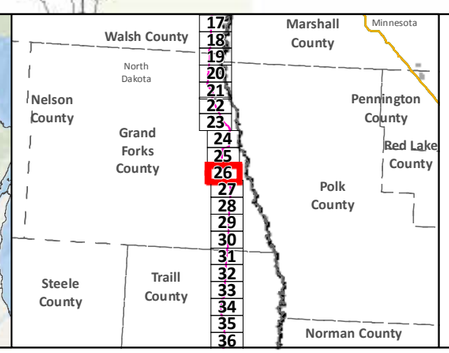

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 26B of 188

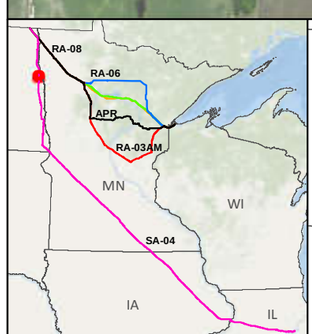

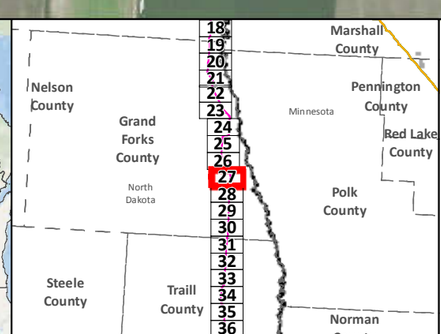

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 27A of 188

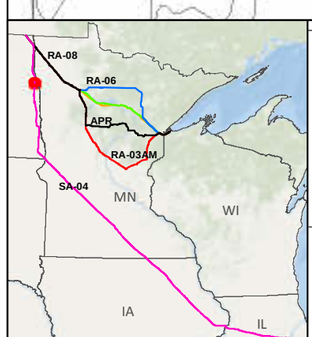

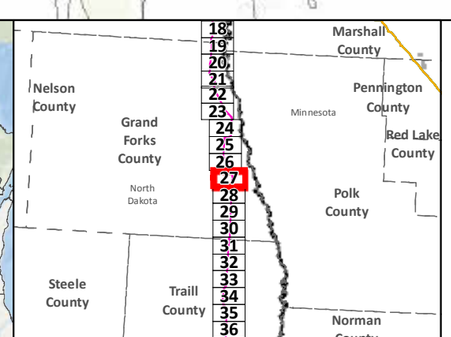

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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Public Waters Watercourse
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Designated Trout Stream
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Public Water Basin
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Native Plant Communities with Biodiversity Significance
- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 27B of 188

T150N R51W S15
T150N R51W S14
T150N R51W S13
T150N R50W S18
92
T150N R50W S17
T150N R50W S16
T150N R50W S15
T150N R51W S22
T150N R51W S23
T150N R51W S24
T150N R50W S19
93
T150N R50W S20
T150N R50W S21
Elm Coulee
T150N R50W S22
T150N R51W S26
T150N R51W S25
T150N R50W S30
T150N R50W S29
94
T150N R50W S28
T150N R50W S27
SA-04
Thompson
15
29
15
7th
T150N R51W S35
T150N R51W S36
T150N R50W S31
T150N R50W S32
T150N R50W S33
T150N R50W S34
Elm Coulee

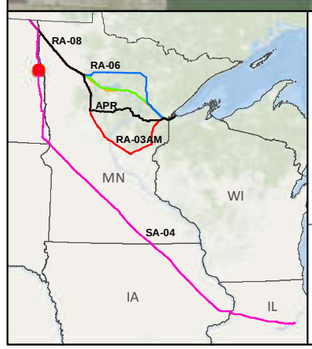

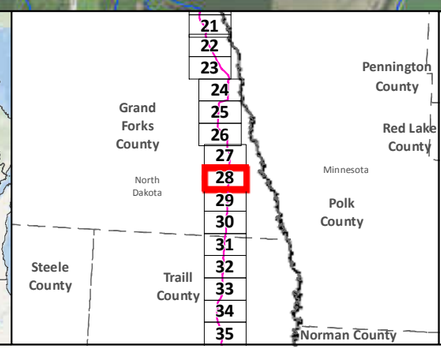

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 28A of 188

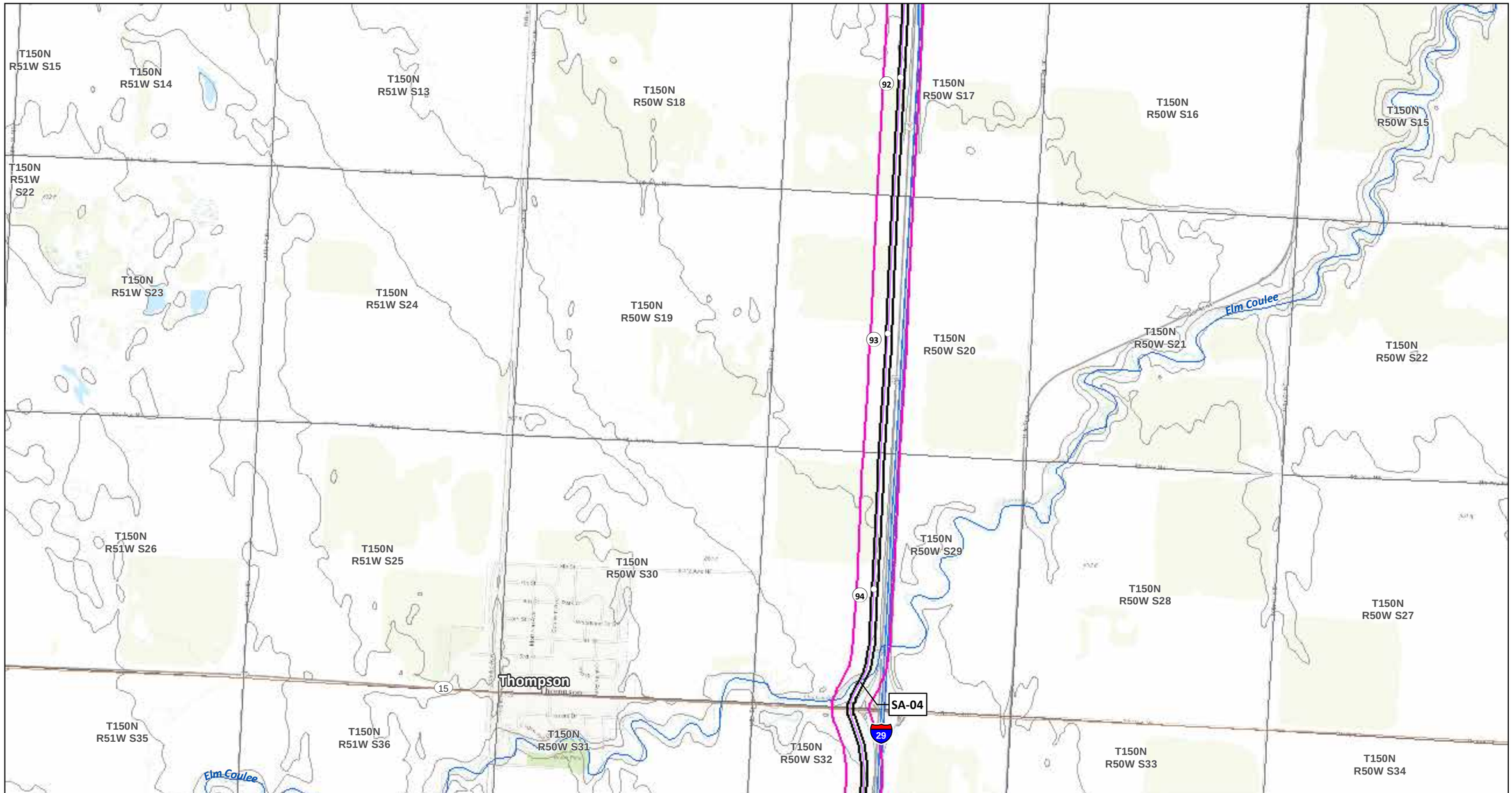

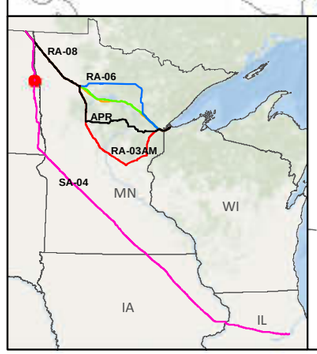

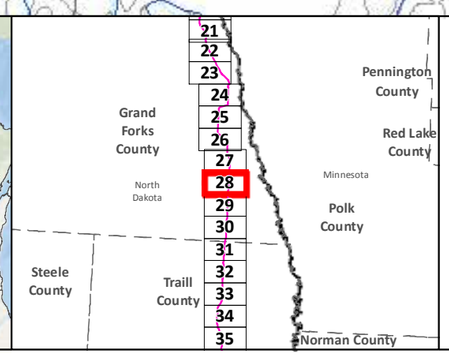

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

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Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

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- High
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Native Plant Communities with Biodiversity Significance

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- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 28B of 188

Elm Coulee
Elm Coulee
T150N R51W S35
T150N R51W S36
T150N R50W S31
T150N R50W S32
T150N R50W S33
T150N R50W S34
95
T149N R51W S2
T149N R51W S1
T149N R50W S6
96
T149N R50W S5
T149N R50W S4
T149N R50W S3
T149N R50W S2
Cole Creek
T149N R51W S11
T149N R51W S12
T149N R50W S7
97
T149N R50W S8
T149N R50W S9
T149N R50W S10
T149N R51W S14
T149N R51W S13
T149N R50W S18
T149N R50W S17
29
SA-04
T149N R50W S16
T149N R50W S15
T149N R50W S11
T149N R50W S14

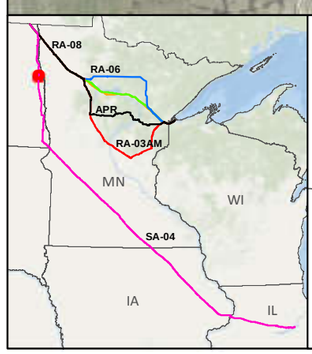

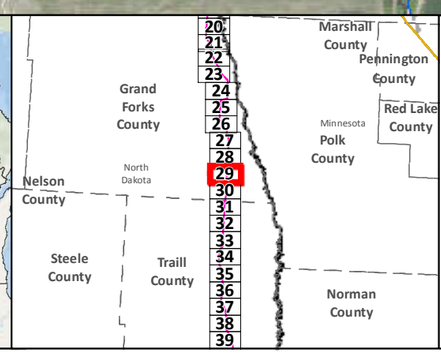

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 29A of 188

Elm Coulee
Elm Coulee
T150N R51W S35
T150N R51W S36
T150N R50W S31
T150N R50W S32
T150N R50W S33
T150N R50W S34
95
T149N R51W S2
T149N R51W S1
T149N R50W S6
96
T149N R50W S5
T149N R50W S4
T149N R50W S3
T149N R50W S2
Cole Creek
T149N R51W S11
T149N R51W S12
T149N R50W S7
97
T149N R50W S8
T149N R50W S9
T149N R50W S10
T149N R51W S14
T149N R51W S13
T149N R50W S18
T149N R50W S17
29
T149N R50W S16
T149N R50W S15
T149N R50W S11
T149N R50W S14
SA-04

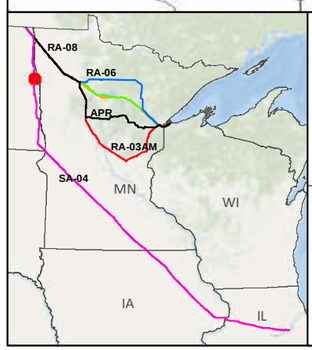

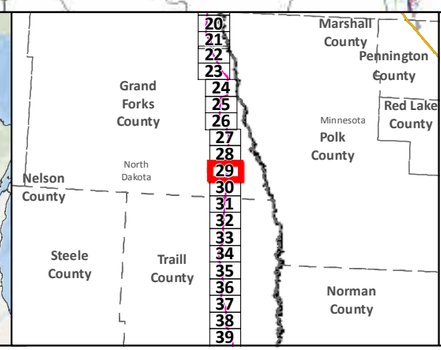

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 29B of 188

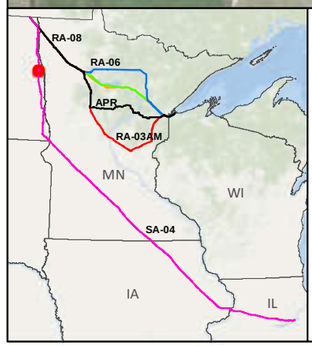

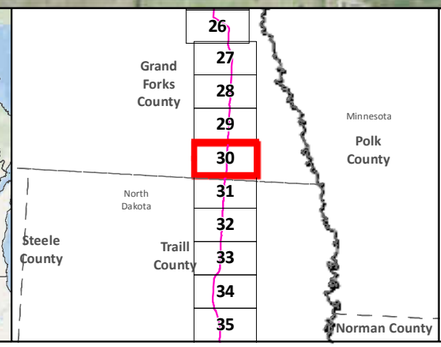

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 30A of 188

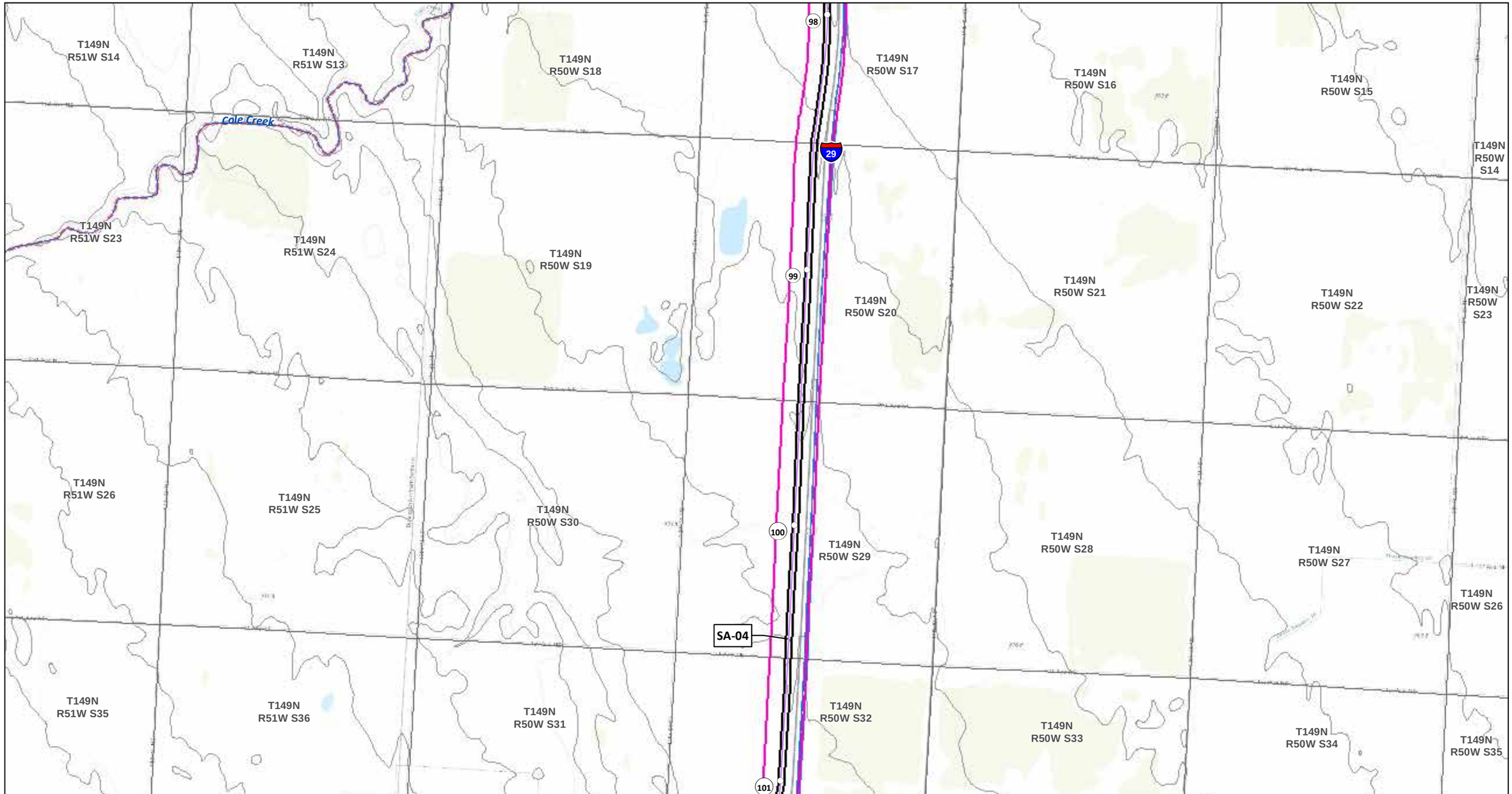

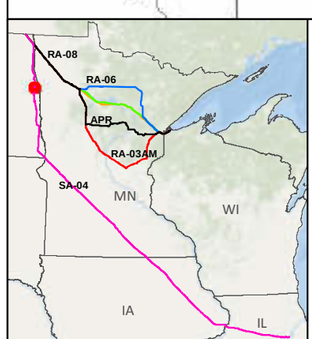

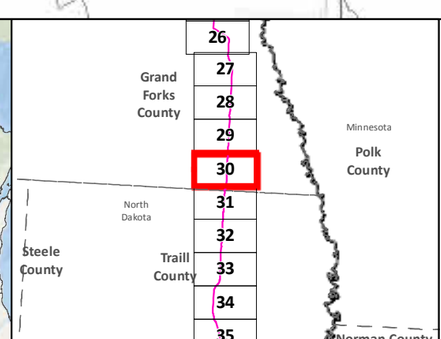

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
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- RA-06
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- RA-08
- Mile Post
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

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1:24,000
10ft Contours

Map 30B of 188

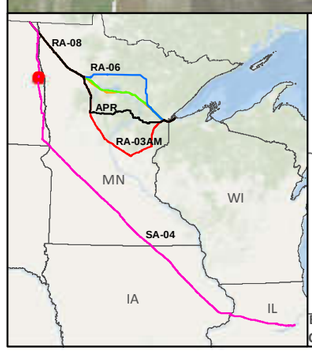

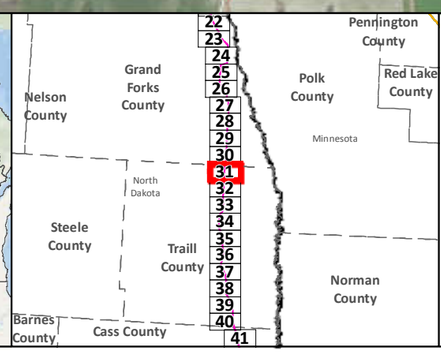

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 31A of 188

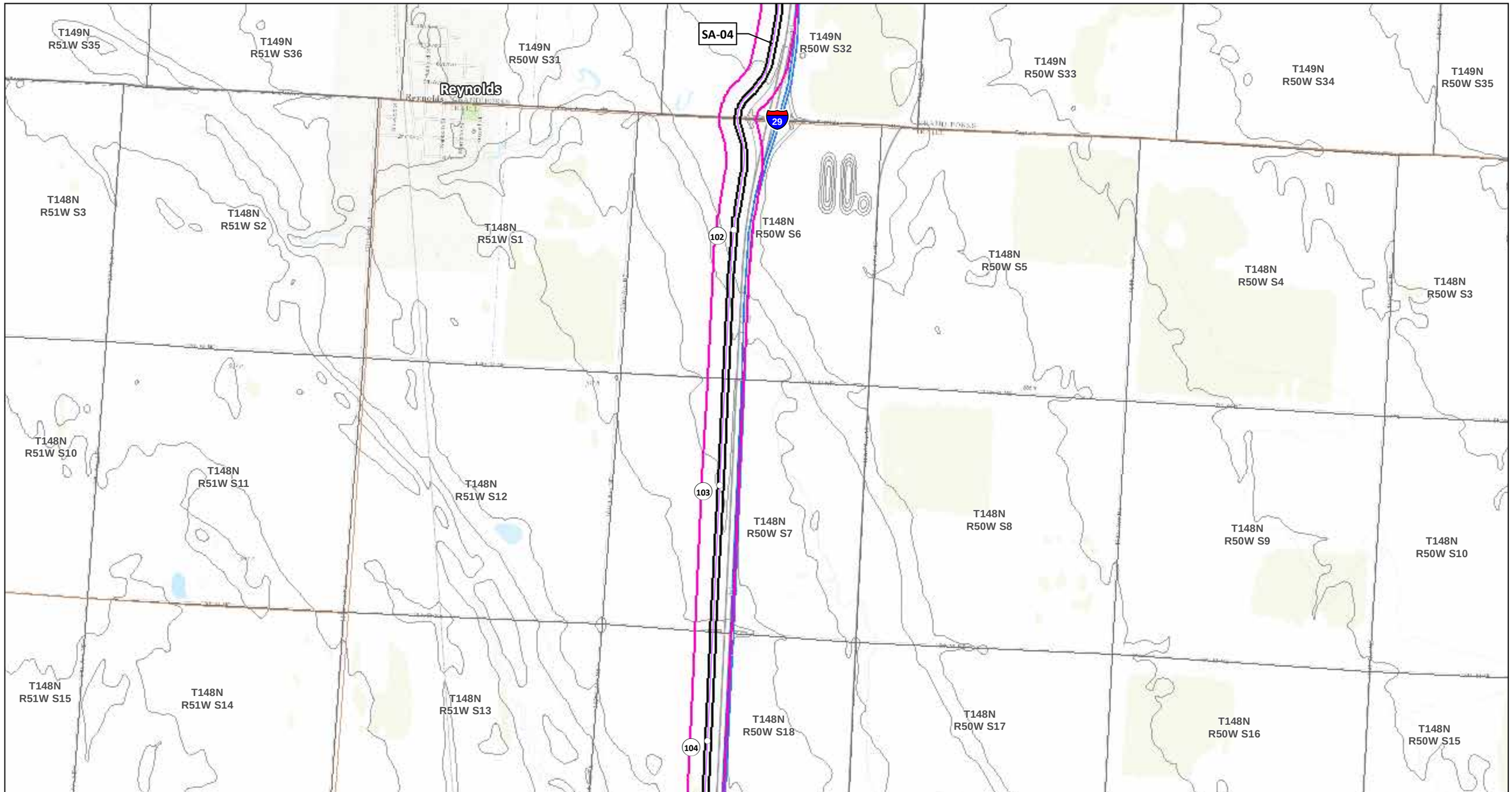

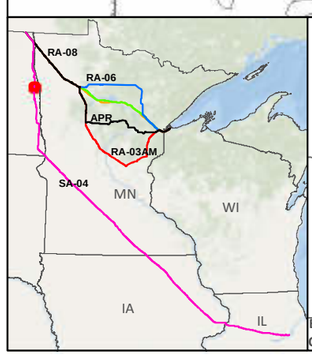

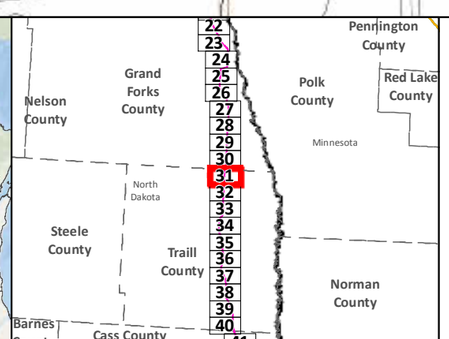

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

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Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

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Public Drinking Water Supply

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Native Plant Communities with Biodiversity Significance

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

Map 31B of 188

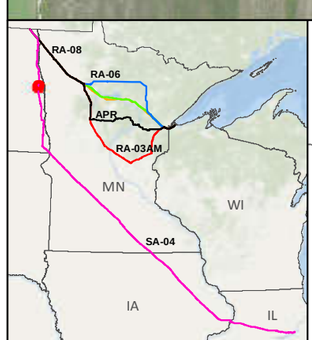

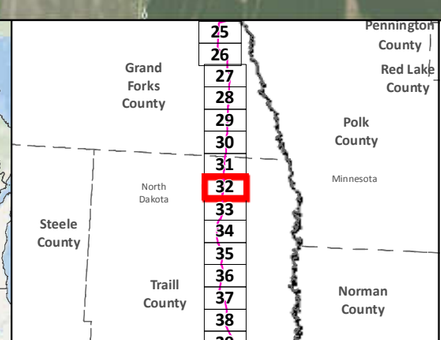

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
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Land Ownership
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Tribal Reservation

Water Resources
Lake
River

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1:24,000
0 125 250 500 Meters

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MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 32A of 188

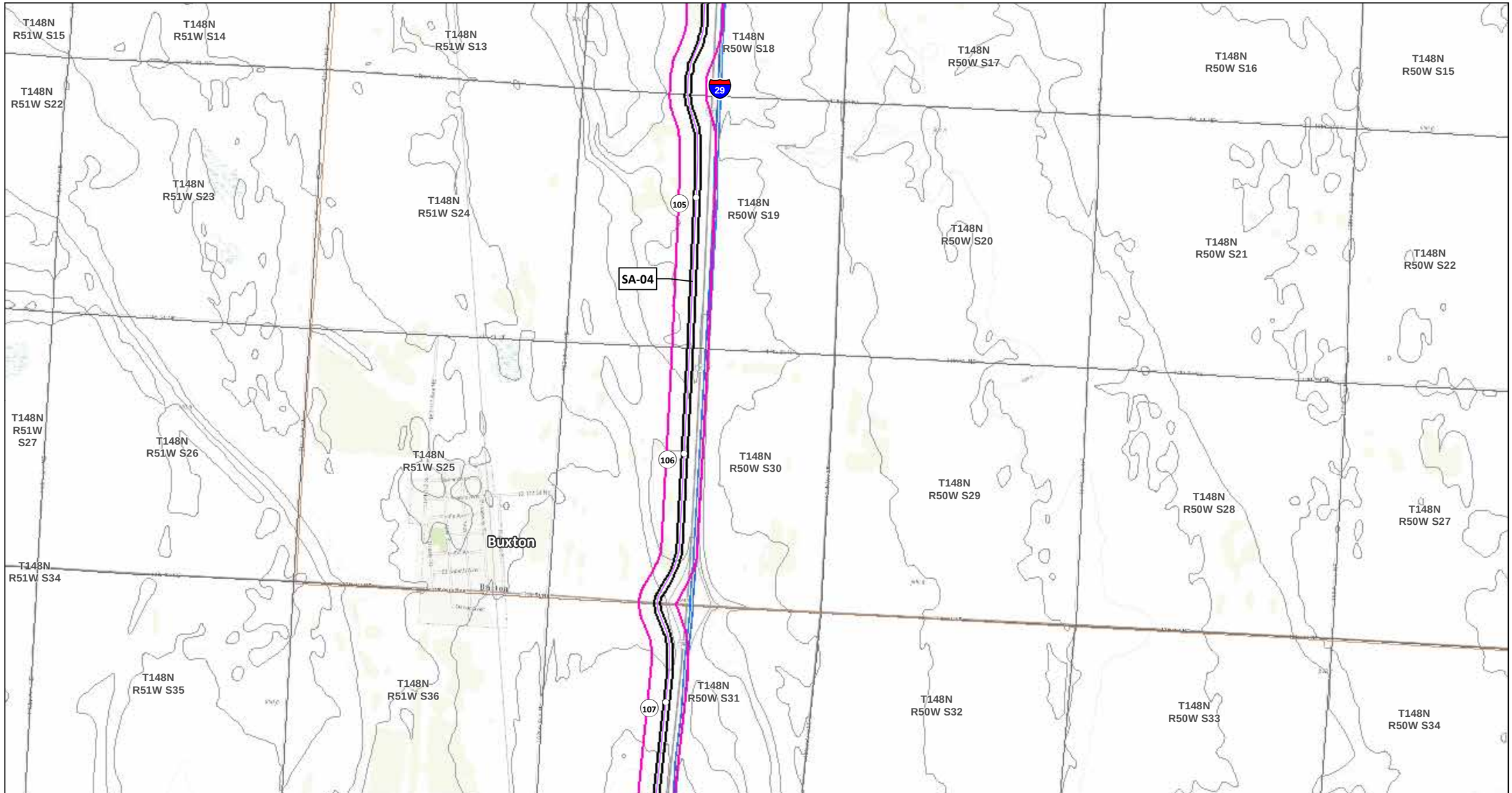

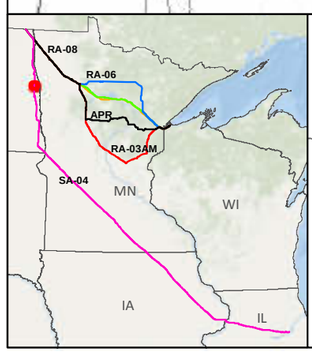

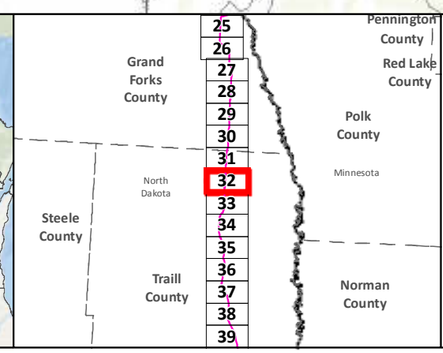

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 32B of 188

T148N R51W S34
T148N R51W S35
T148N R51W S36
T148N R50W S31
T148N R50W S32
T148N R50W S33
T148N R50W S34
T147N R51W S3
T147N R51W S2
T147N R51W S1
T147N R50W S6
T147N R50W S5
T147N R50W S4
T147N R50W S3
T147N R51W S10
T147N R51W S11
T147N R51W S12
T147N R50W S7
T147N R50W S8
T147N R50W S9
T147N R50W S10
T147N R51W S14
T147N R51W S13
T147N R50W S18
T147N R50W S17
T147N R50W S16
T147N R50W S15

29
108
109
110

Buffalo Coulee

SA-04

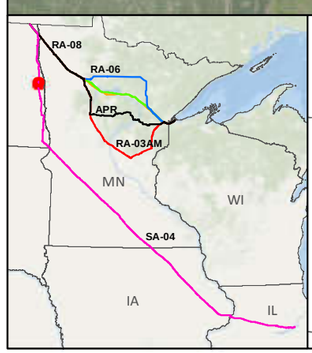

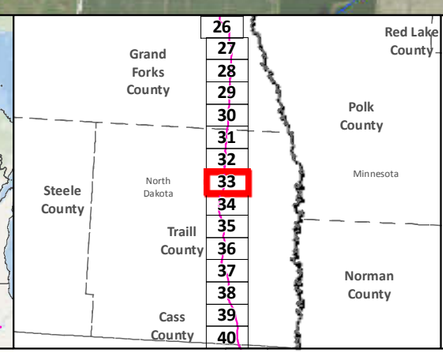

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 33A of 188

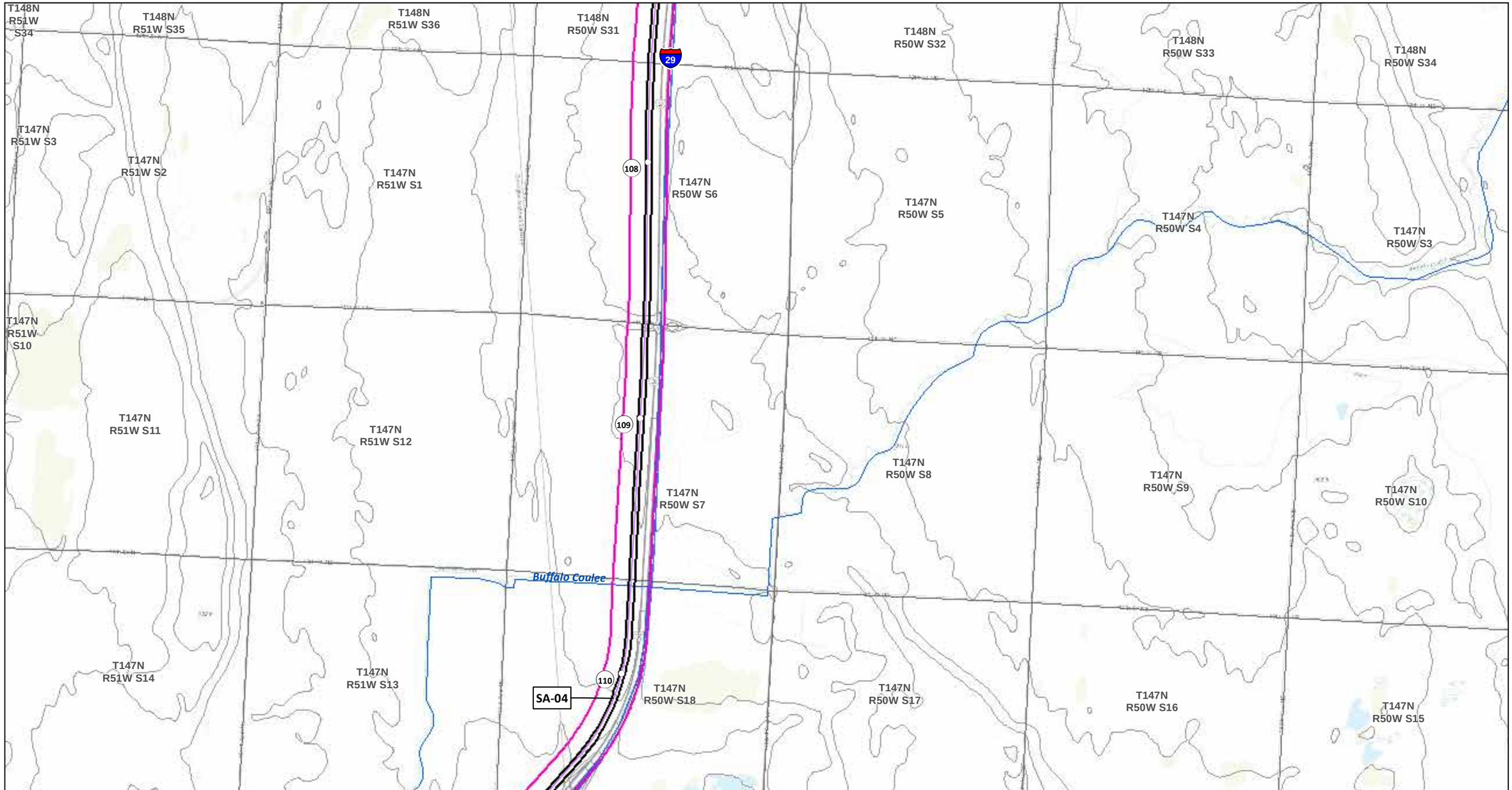

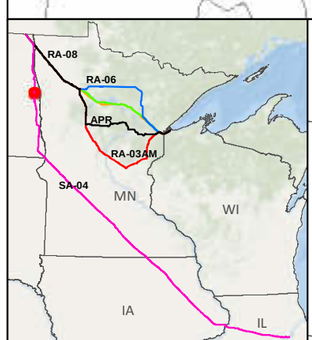

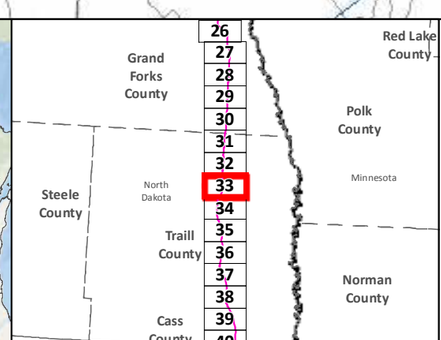

SA-04

Applicant's Preferred Route (APR)

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- RA-06
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- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 33B of 188

T147N R51W S14
T147N R51W S13
T147N R50W S18
T147N R50W S17
T147N R50W S16
T147N R50W S15
Buffalo Coulee
111
T147N R51W S23
T147N R51W S24
T147N R50W S19
T147N R50W S20
T147N R50W S21
T147N R50W S22
112
T147N R51W S26
T147N R51W S25
T147N R50W S30
T147N R50W S29
T147N R50W S28
T147N R50W S27
T147N R50W S26
113
SA-04
T147N R51W S35
T147N R51W S36
T147N R50W S31
T147N R50W S32
T147N R50W S33
T147N R50W S34
T147N R50W S35
29
T146N R51W S2
7
T146N R51W S1

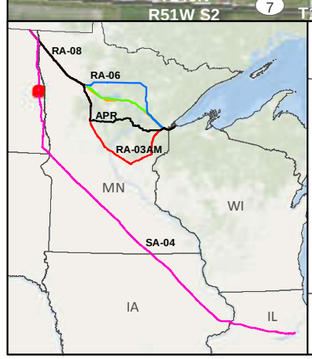

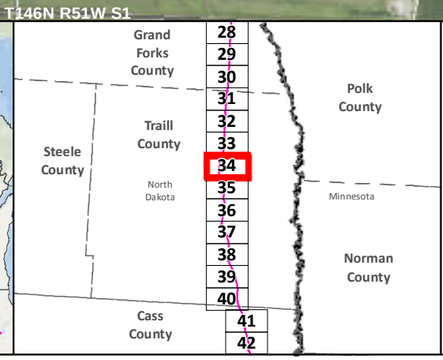

SA-04
Applicant's Preferred Route (APR)
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River

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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 34A of 188

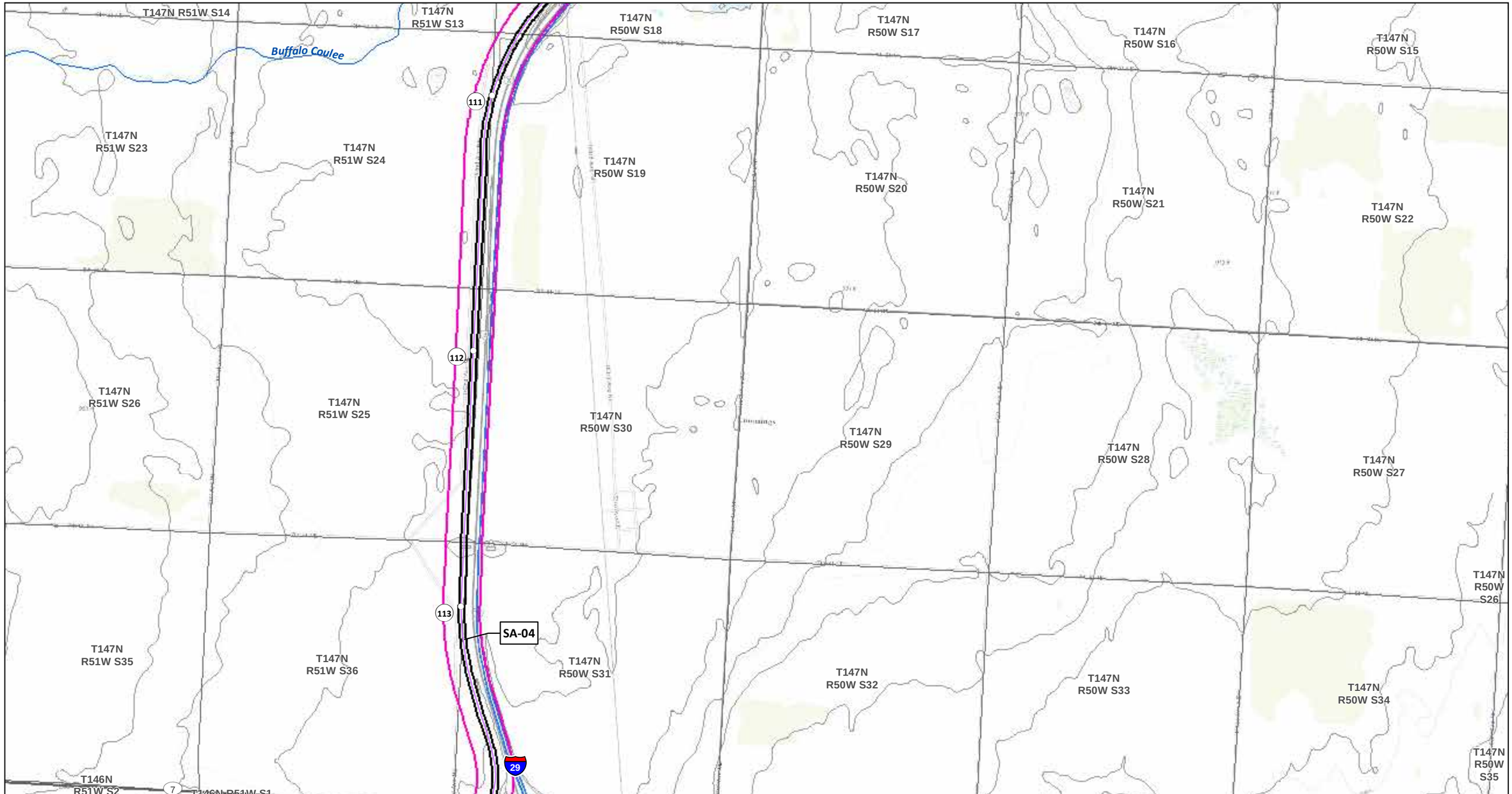

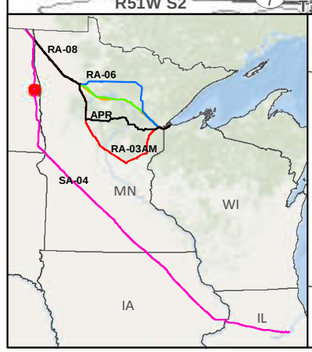

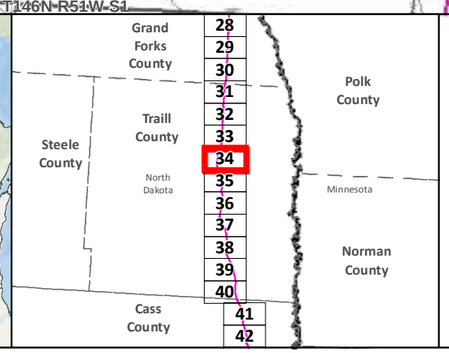

SA-04

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 34B of 188

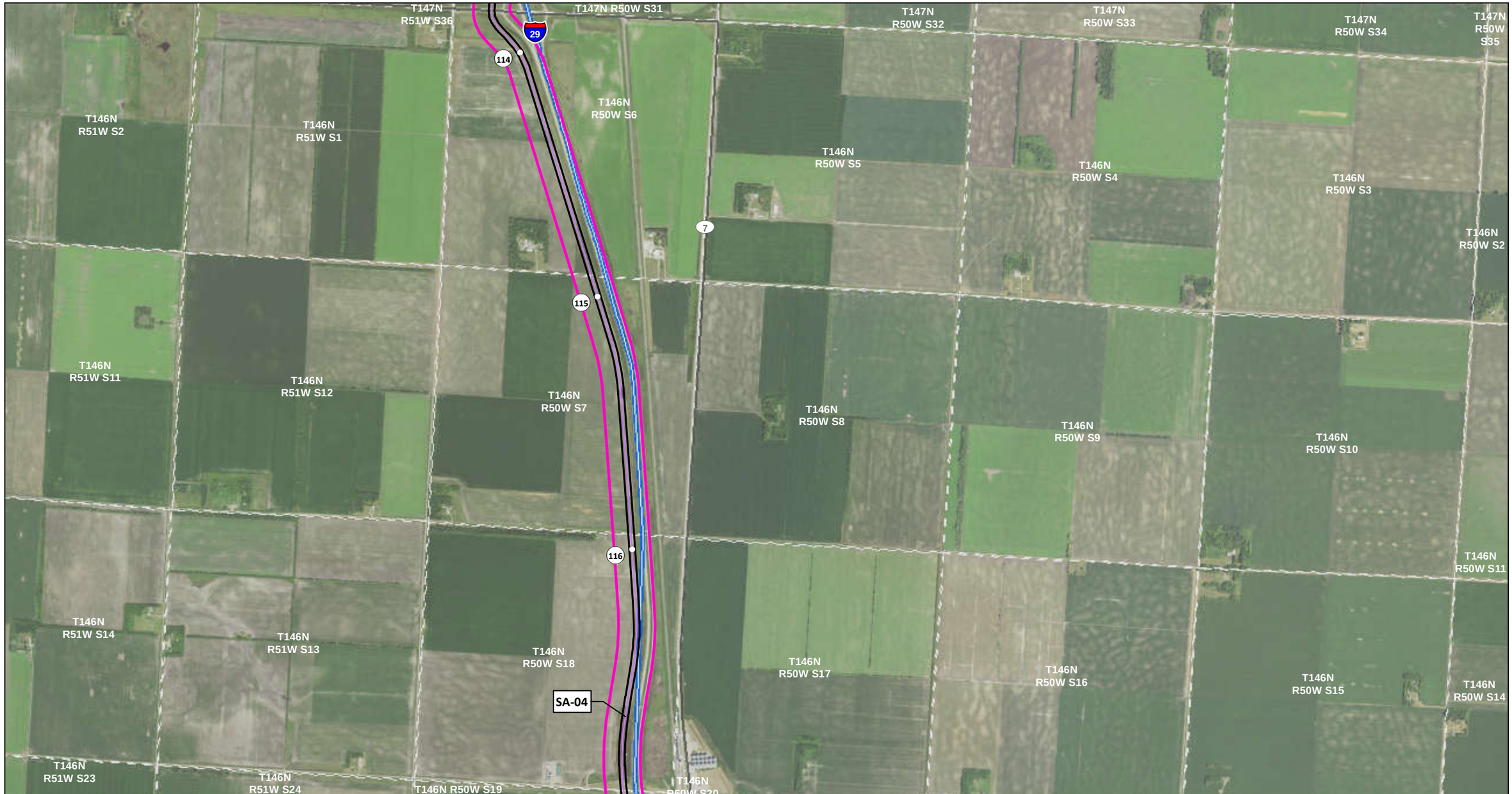

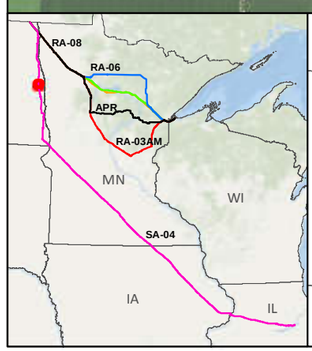

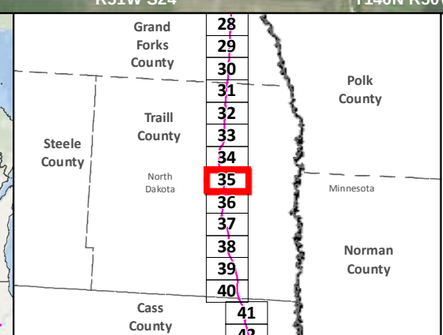

SA-04
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Route Width (750')
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 35A of 188

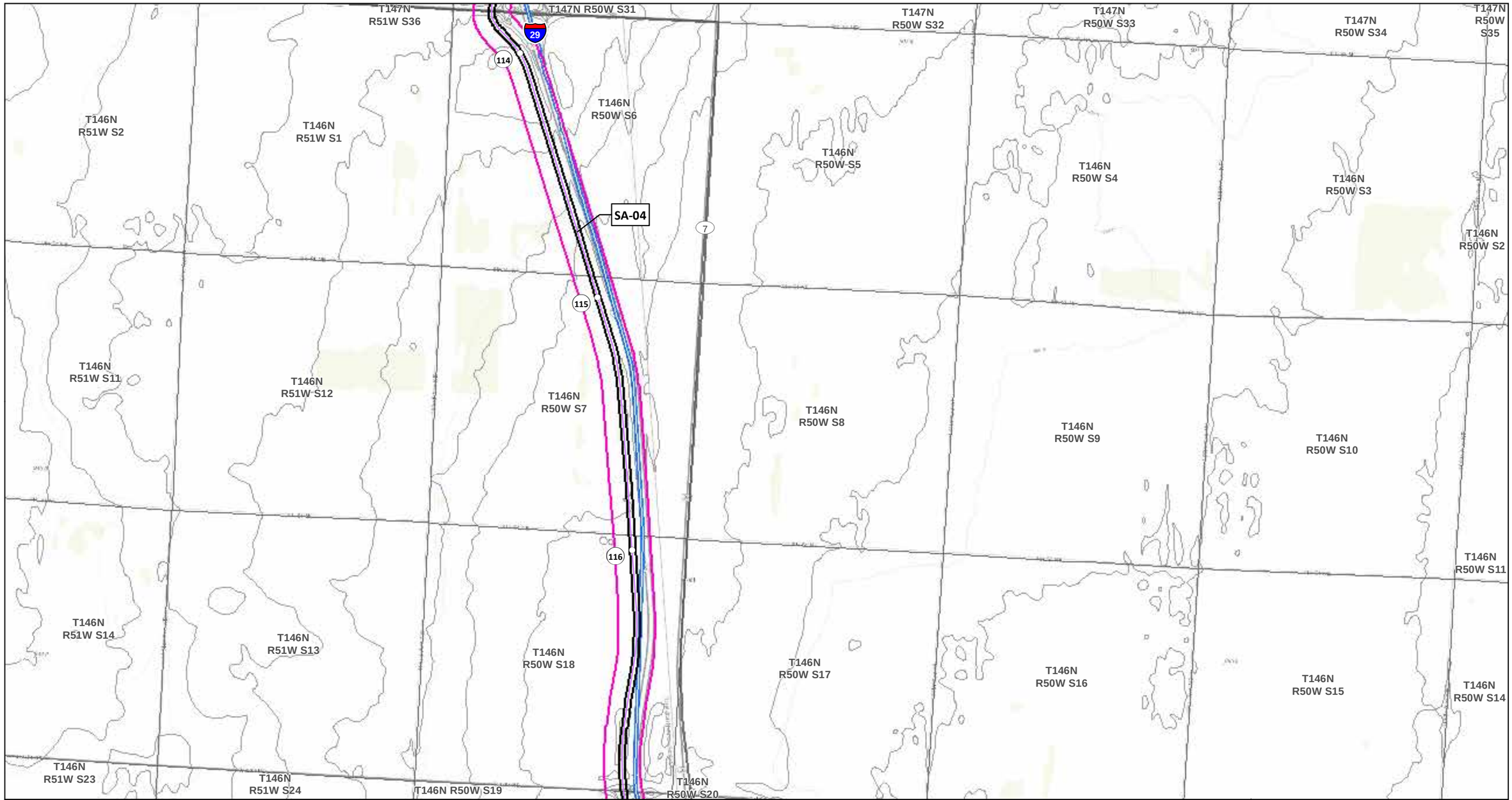

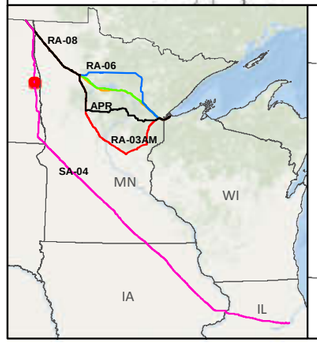

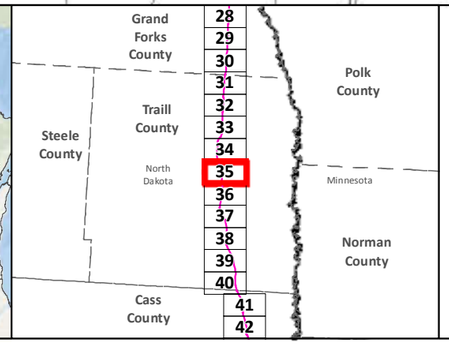

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 35B of 188

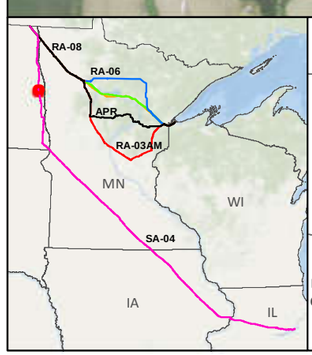

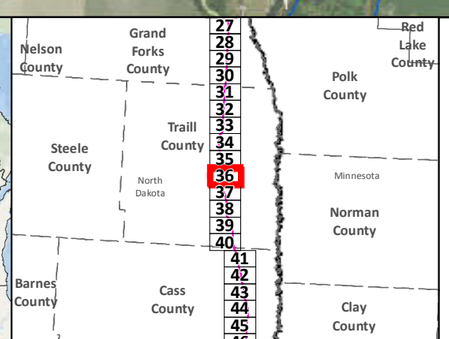

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 36A of 188

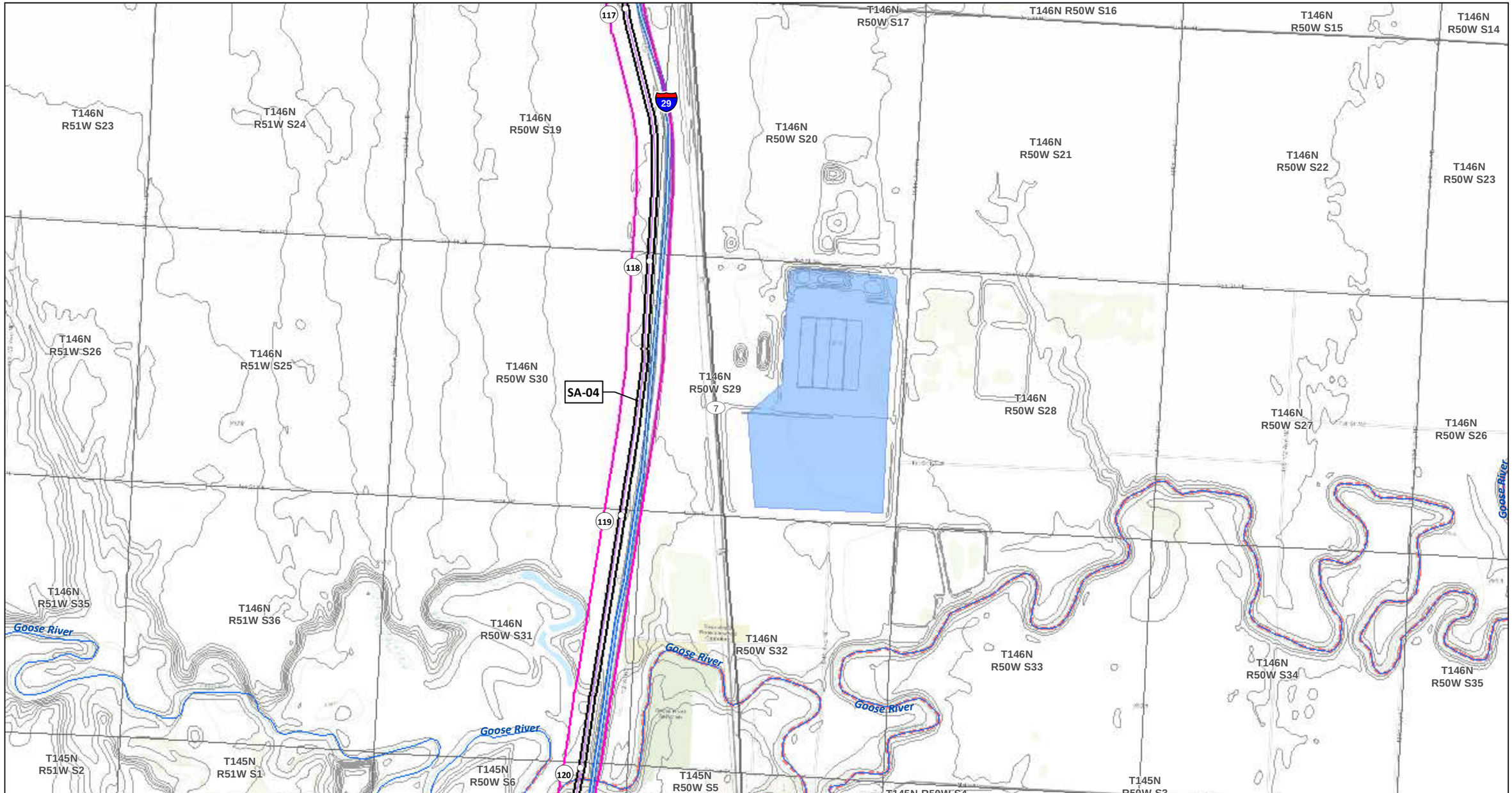

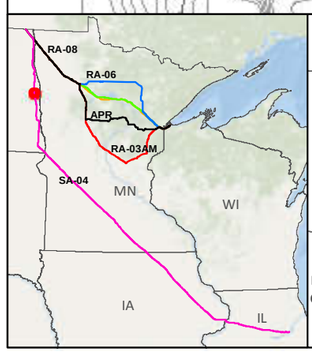

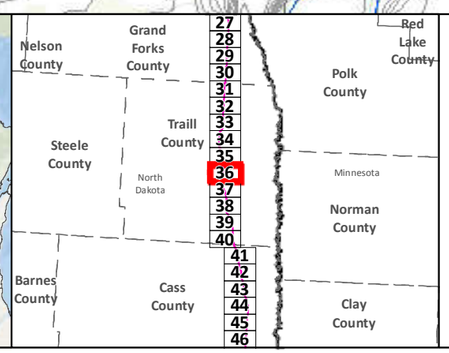

SA-04

Applicant's Preferred Route (APR)

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10ft Contours

N

Map 36B of 188

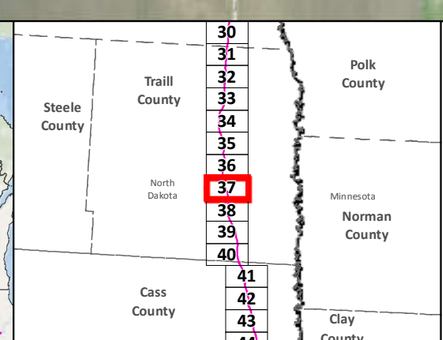

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 37A of 188

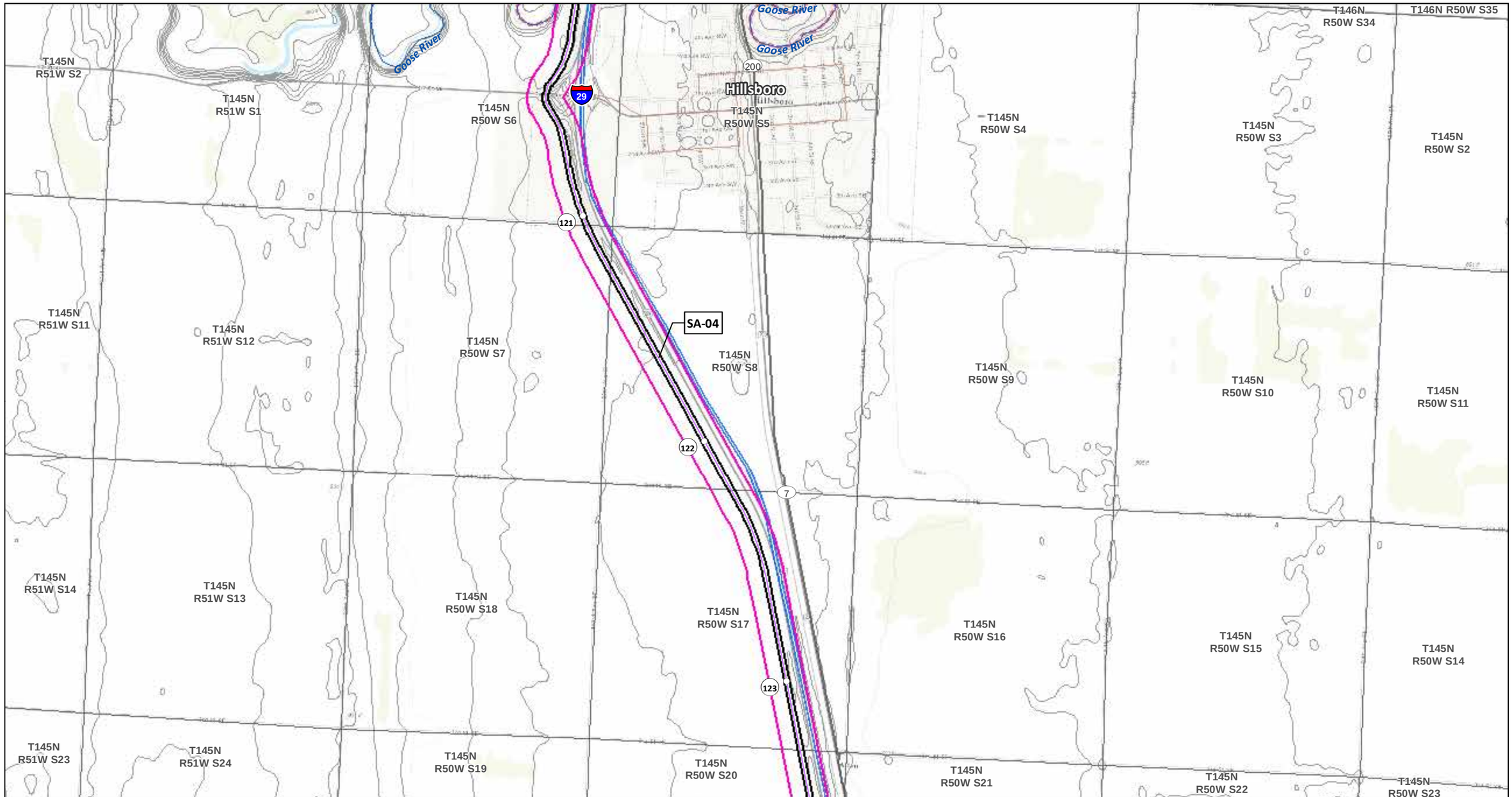

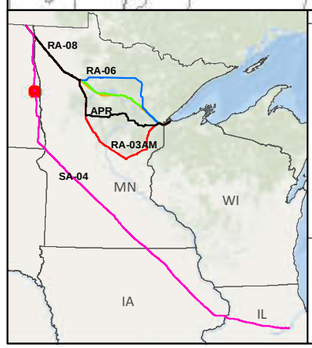

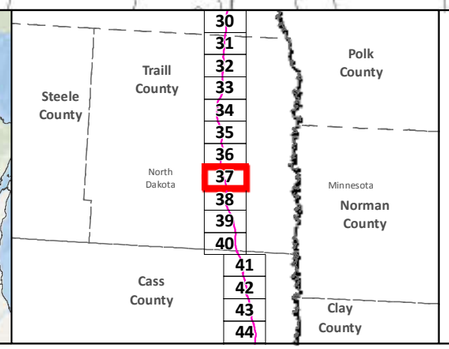

SA-04

Applicant's Preferred Route (APR)

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Mile Post

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Route Width (750')

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Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 37B of 188

T145N R51W S23
T145N R51W S24
T145N R50W S19
T145N R50W S20
T145N R50W S21
T145N R50W S22
T145N R50W S23
T145N R51W S26
T145N R51W S25
T145N R50W S30
T145N R50W S29
T145N R50W S28
T145N R50W S27
T145N R50W S26
T145N R51W S35
T145N R51W S36
T145N R50W S31
T145N R50W S32
T145N R50W S33
T145N R50W S34
T145N R50W S35
T144N R51W S3
T144N R51W S2
T144N R51W S1
T144N R50W S6
T144N R50W S5
T144N R50W S4
T144N R50W S3

North Branch Elm River

200 124 125 126 29 7 81

SA-04

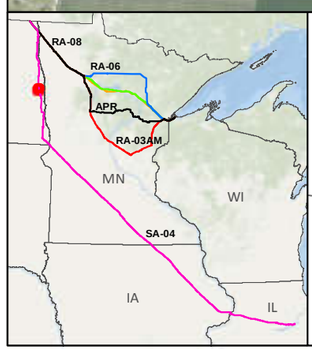

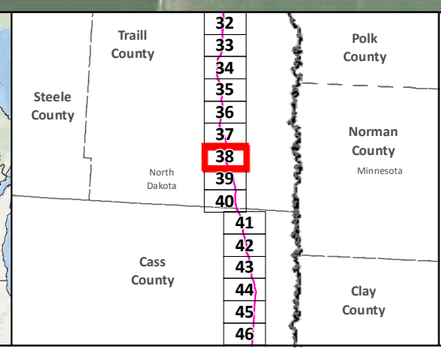

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 38A of 188

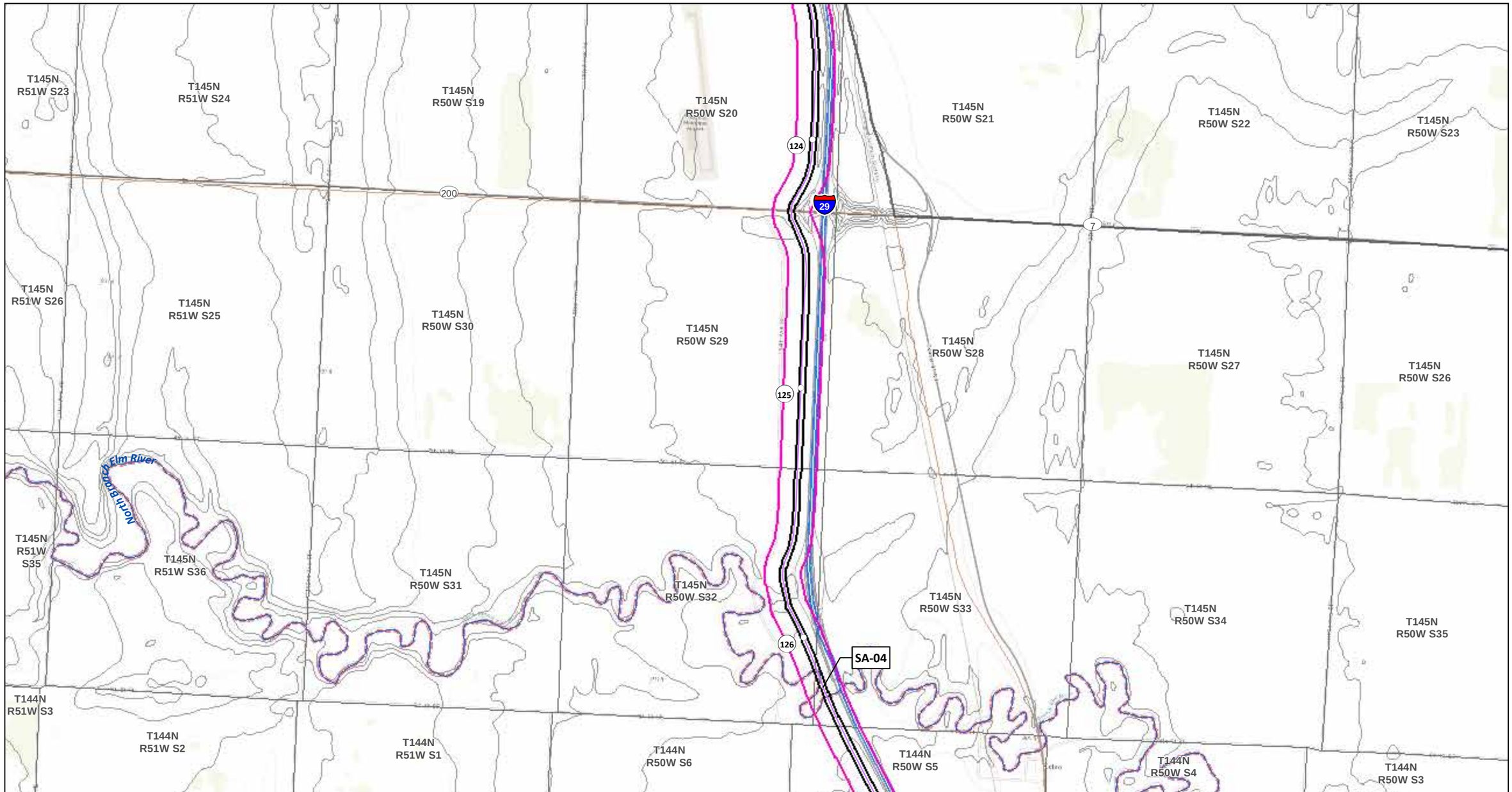

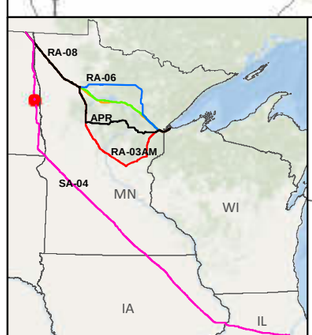

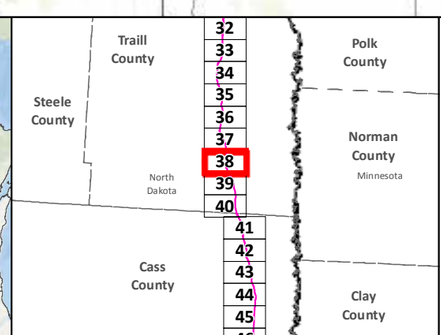

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
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Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
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Lakes of Biological Significance
- Outstanding
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Native Plant Communities with Biodiversity Significance
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 38B of 188

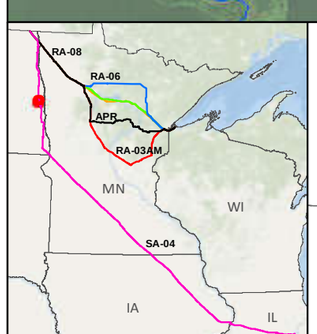

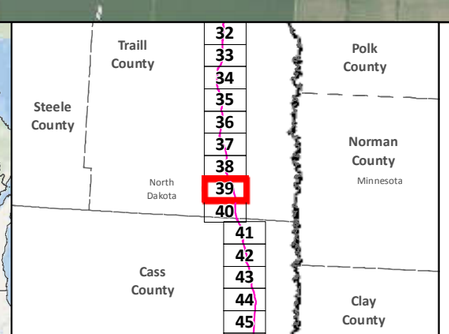

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
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Land Ownership
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Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 39A of 188

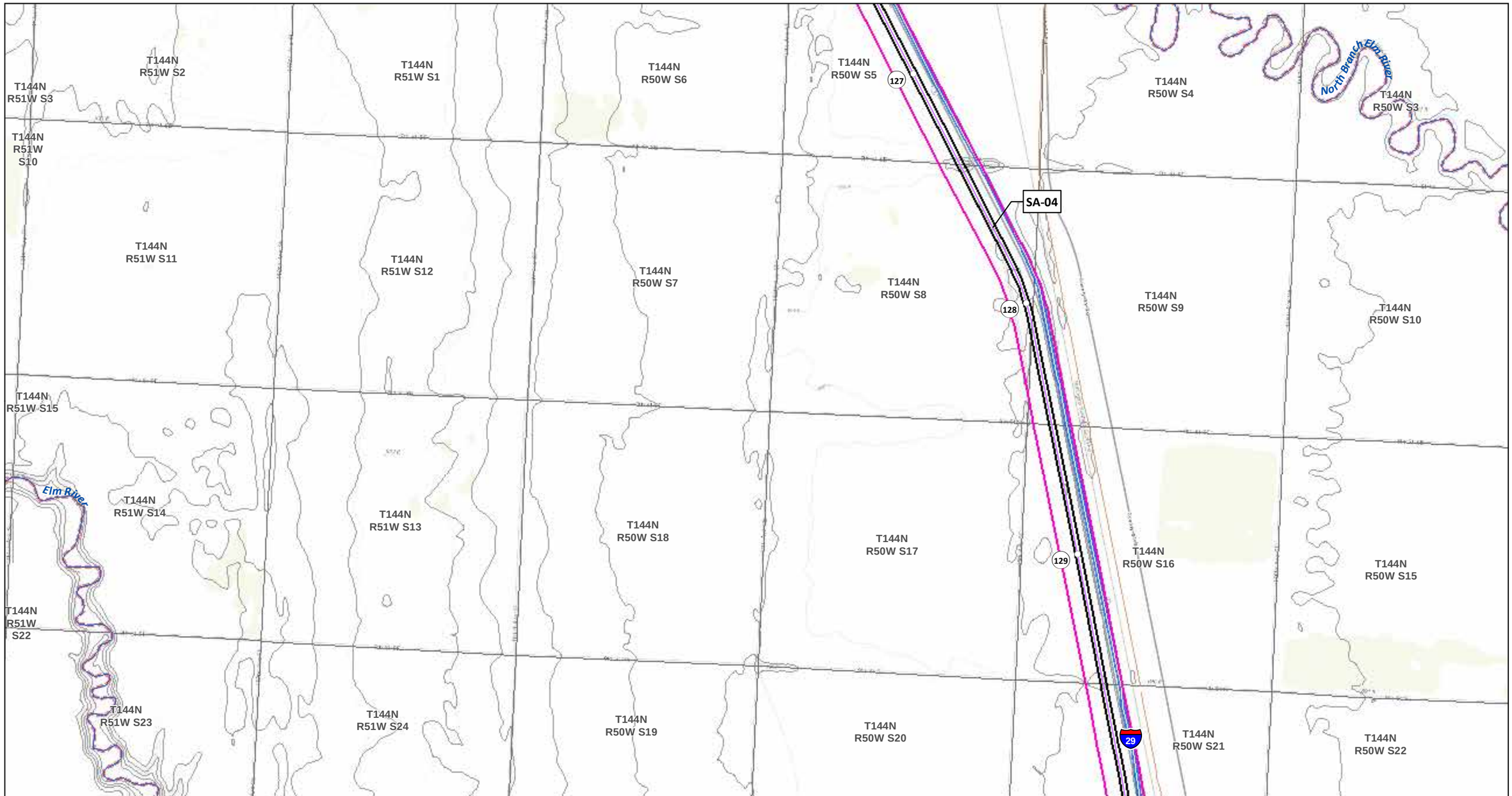

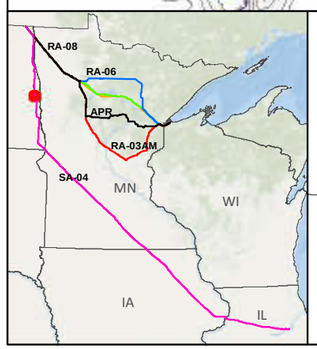

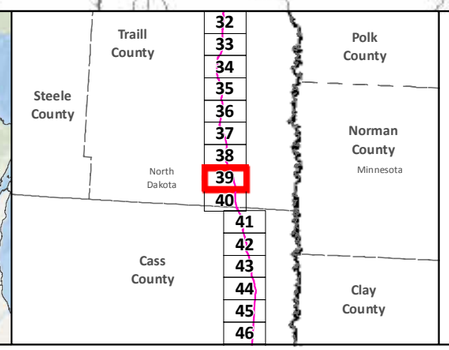

SA-04
Applicant's Preferred Route (APR)

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

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10ft Contours

Map 39B of 188

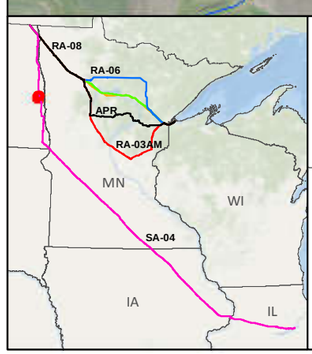

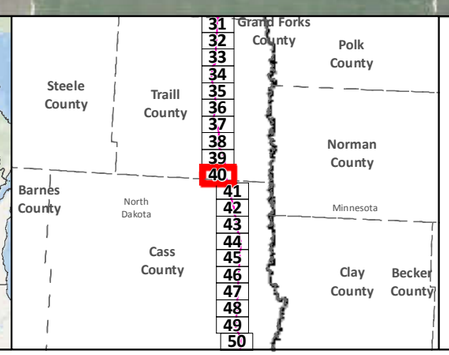

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

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Interstate

Highway

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0 0.125 0.25 0.5 Miles
1:24,000
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 40A of 188

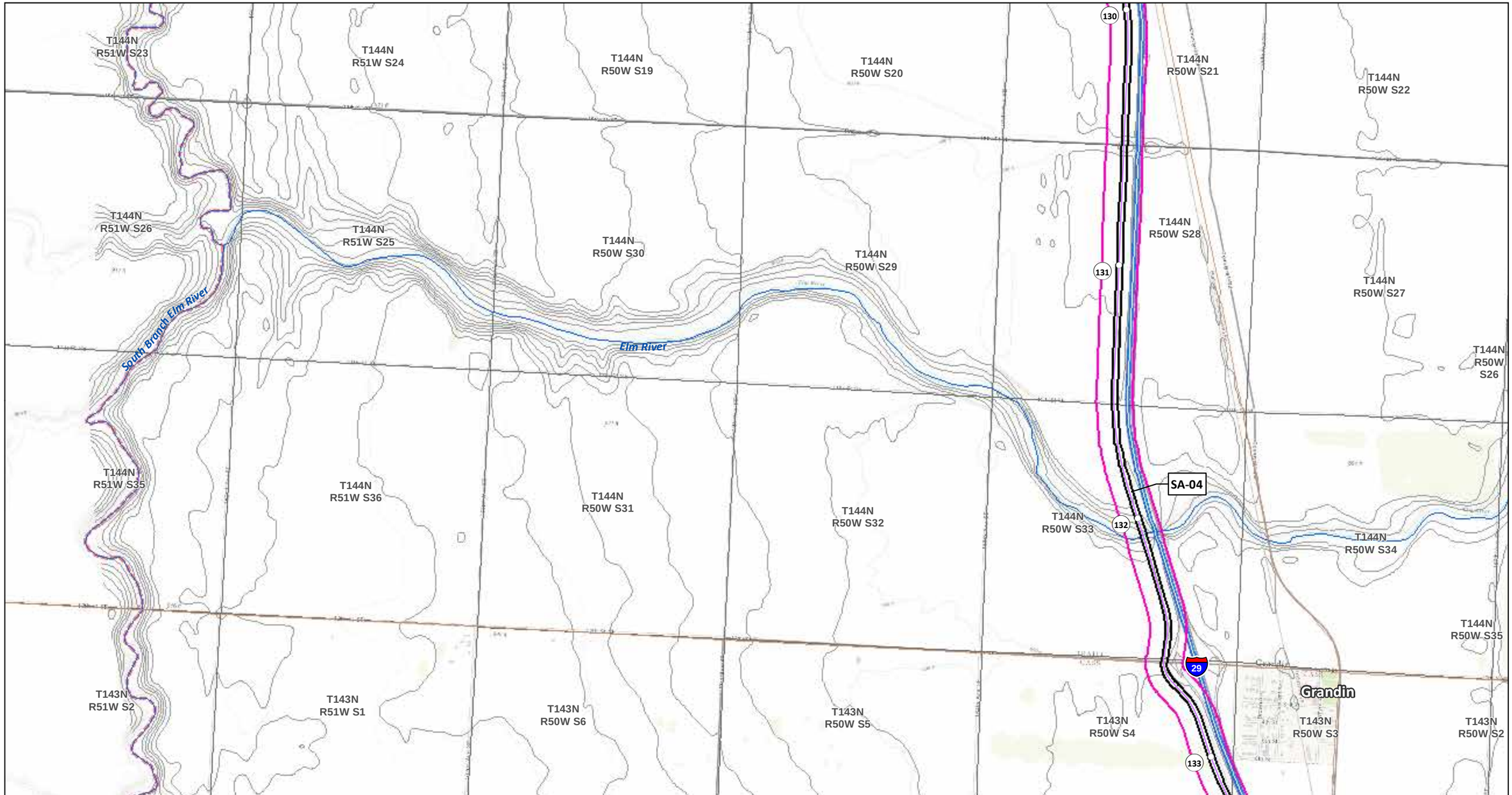

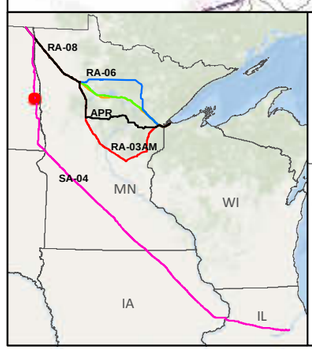

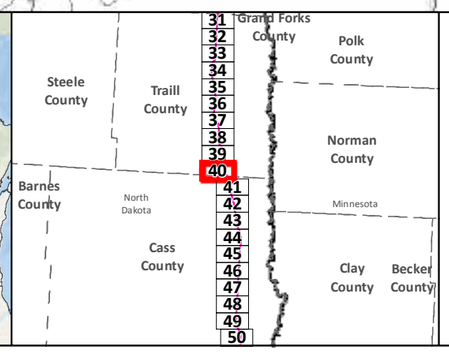

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Map 40B of 188

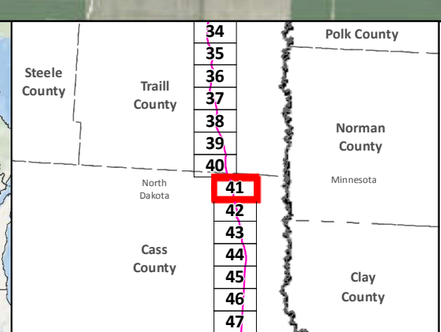

SA-04
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 41A of 188

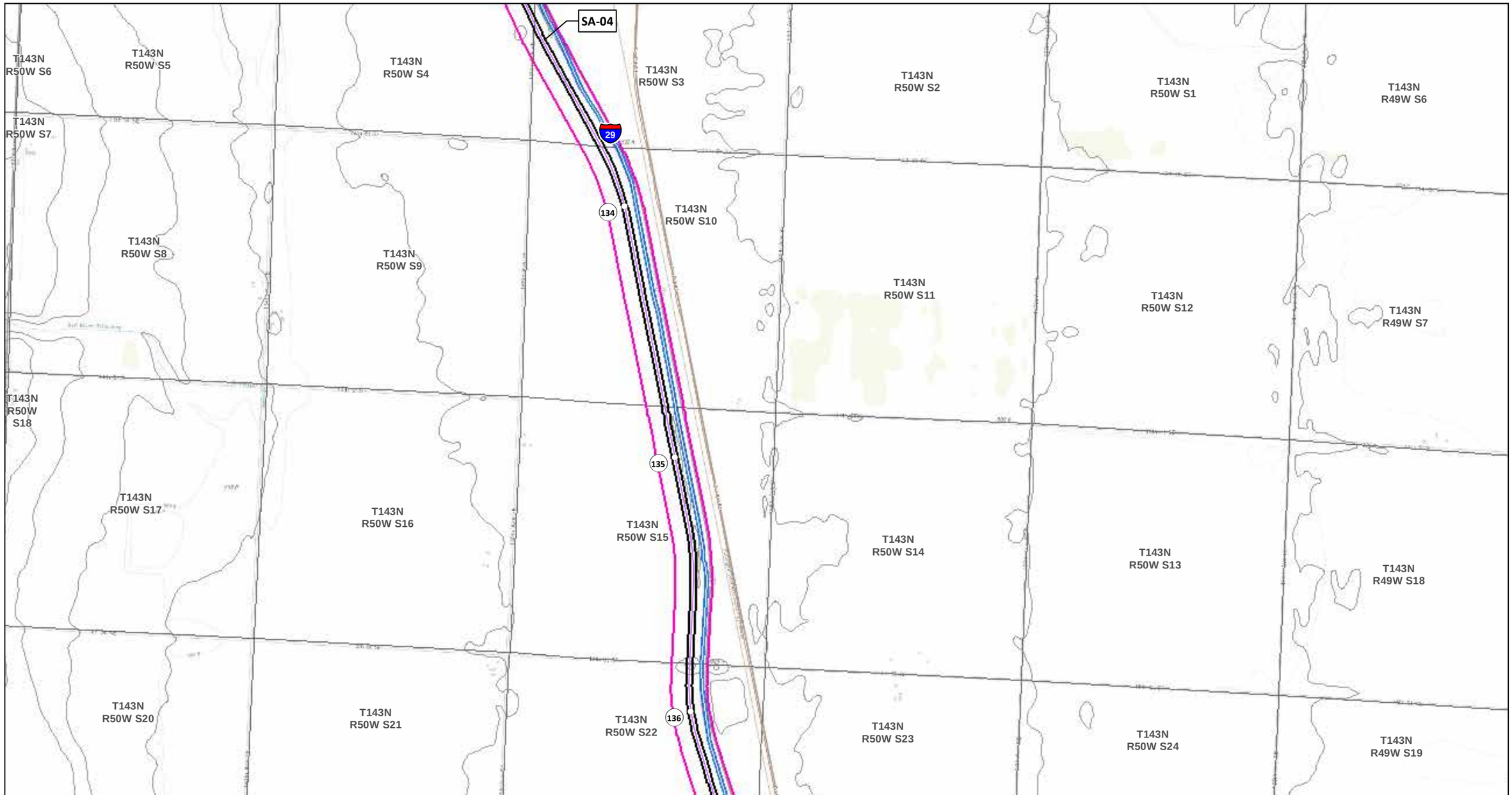

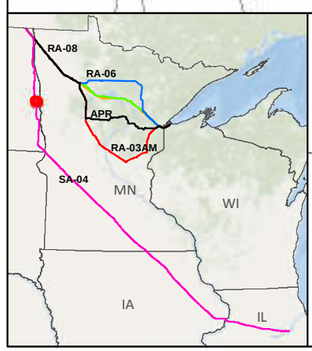

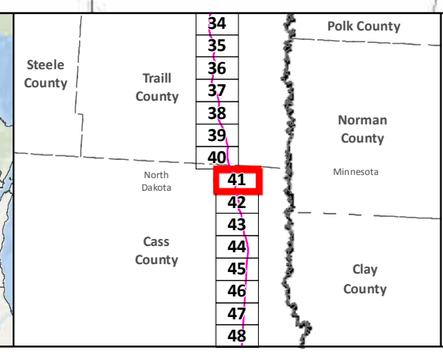

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0 125 250 500 Meters
1:24,000
10ft Contours

Map 41B of 188

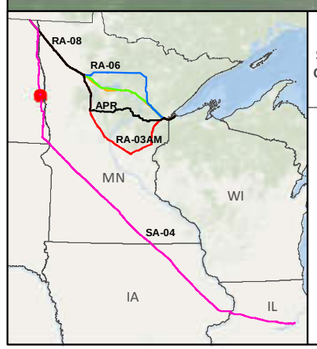

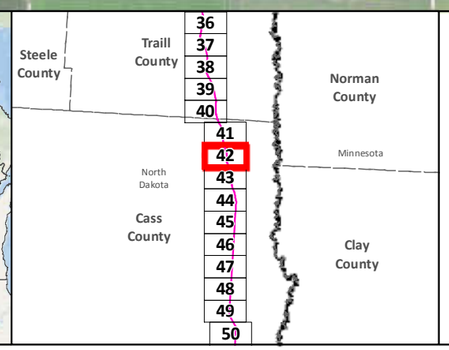

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 42A of 188

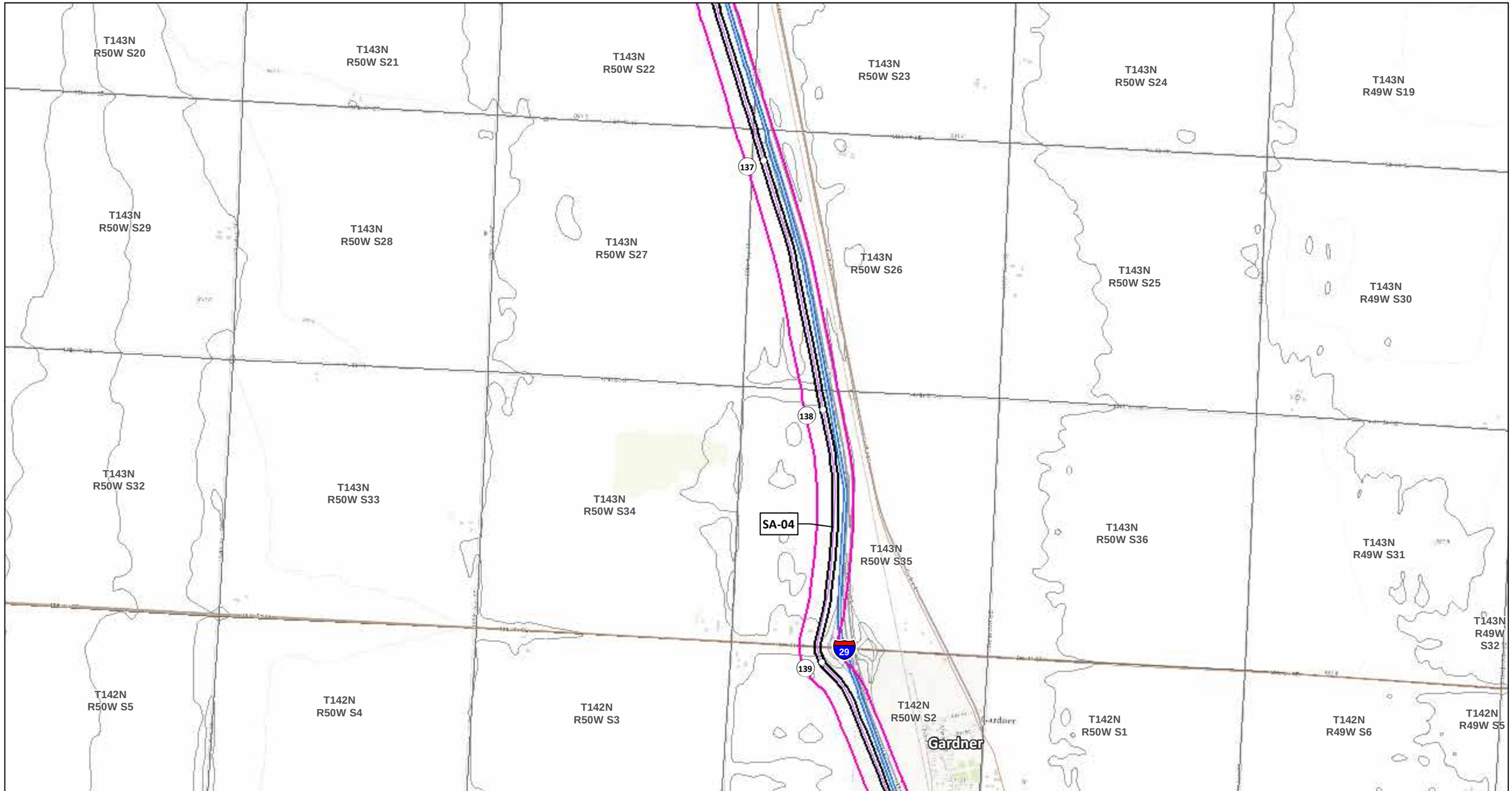

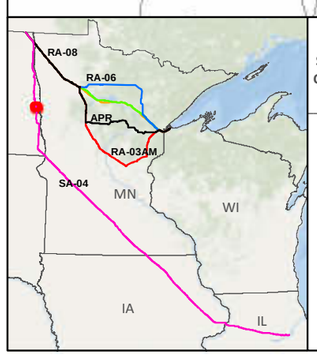

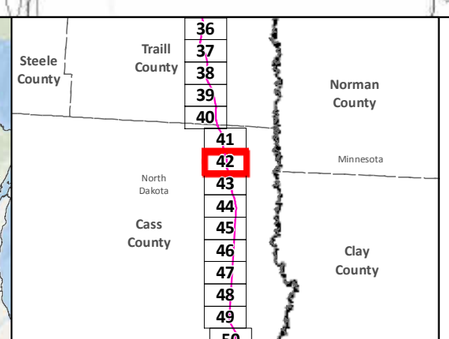

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 42B of 188

T142N R50W S5
T142N R50W S4
T142N R50W S3
T142N R50W S2
T142N R50W S1
T142N R49W S6
T142N R49W S5
T142N R50W S8
T142N R50W S9
T142N R50W S10
T142N R50W S11
T142N R50W S12
T142N R49W S7
T142N R49W S8
T142N R50W S17
T142N R50W S16
T142N R50W S15
T142N R50W S14
T142N R50W S13
T142N R49W S18
T142N R49W S17
T142N R50W S20
T142N R50W S21
T142N R50W S22
T142N R50W S23
T142N R50W S24
T142N R49W S19
T142N R49W S20

140
141
142
SA-04
81
29

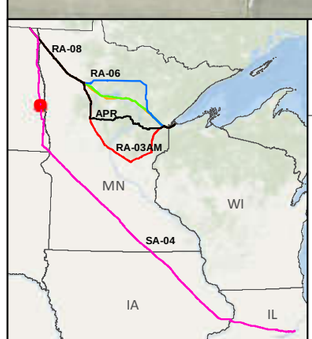

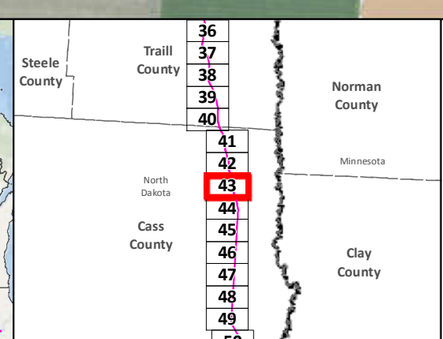

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 43A of 188

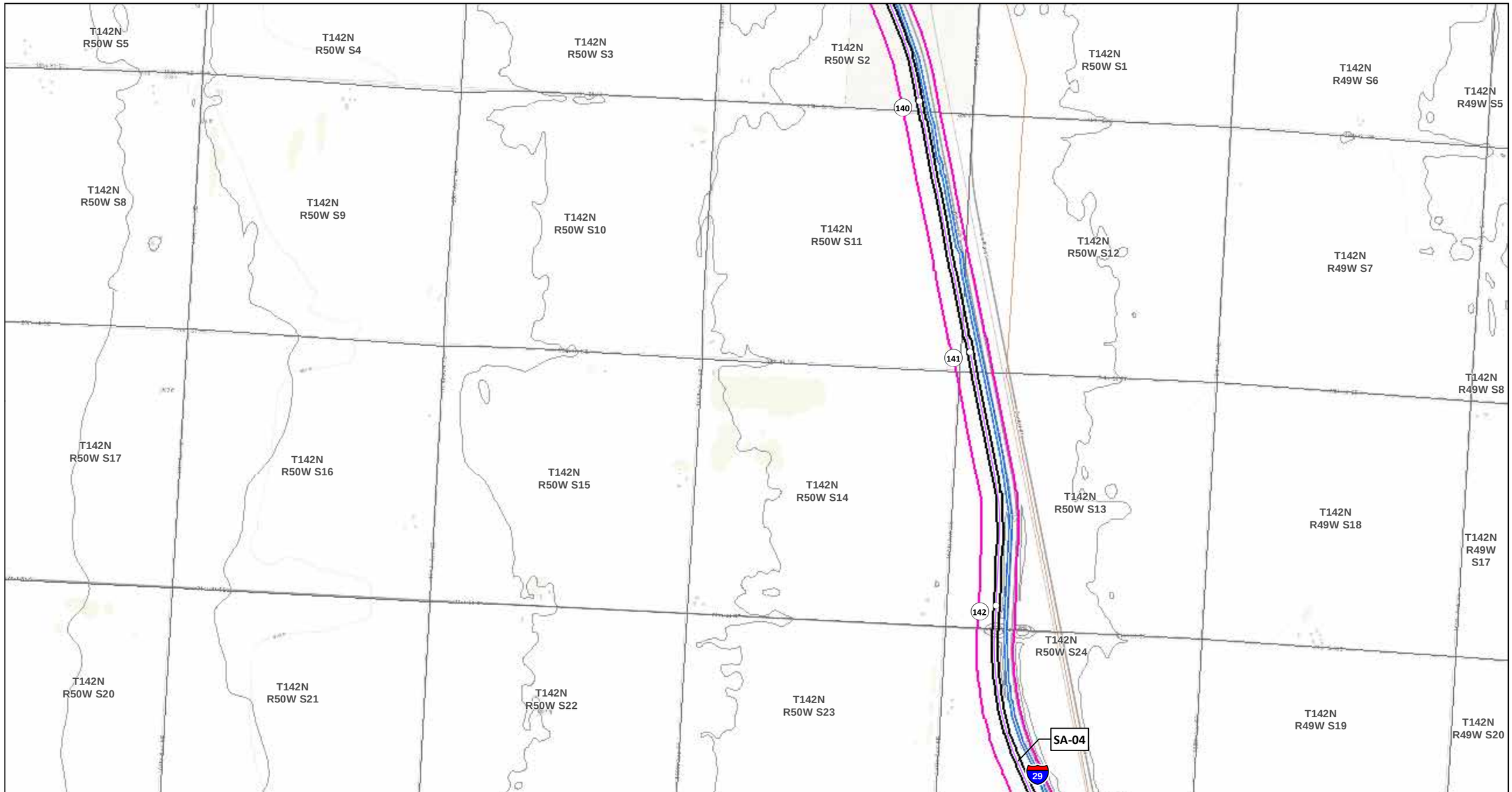

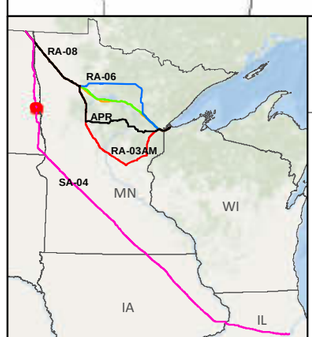

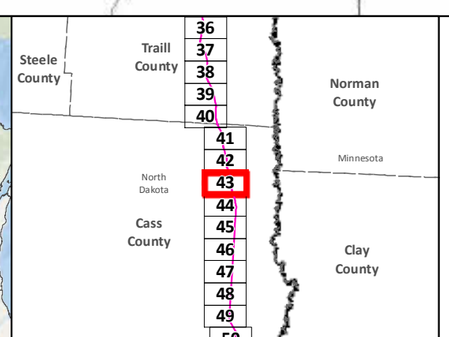

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 43B of 188

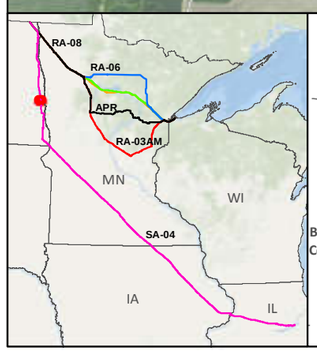

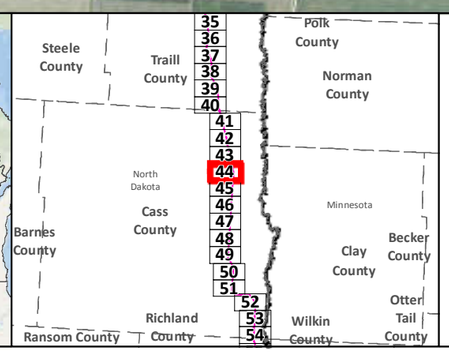

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
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National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 44A of 188

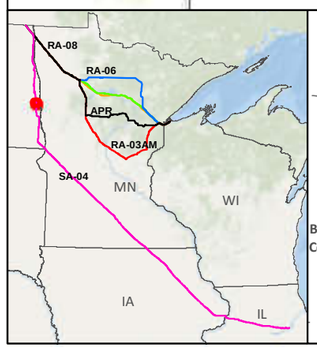

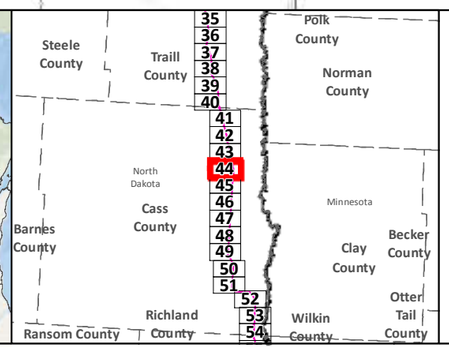

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

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303d Imparied Waters

Designated Trout Stream

Calcareous Fens

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Public Drinking Water Supply

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Native Plant Communities with Biodiversity Significance

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- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 44B of 188

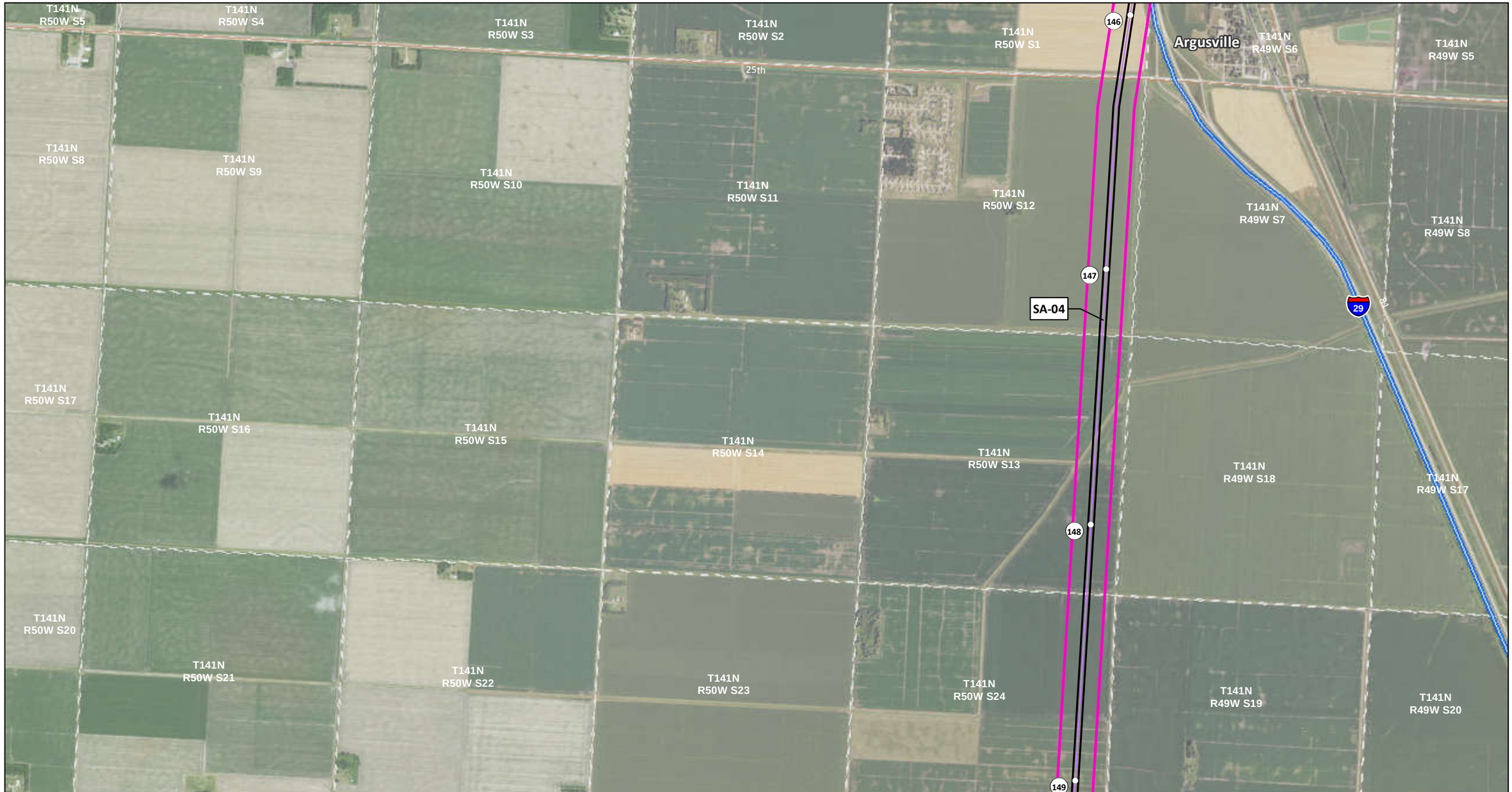

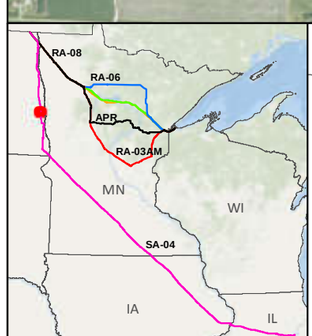

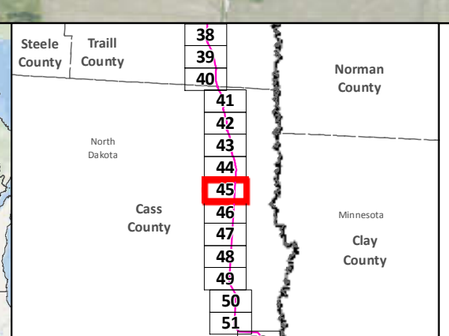

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

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State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 45A of 188

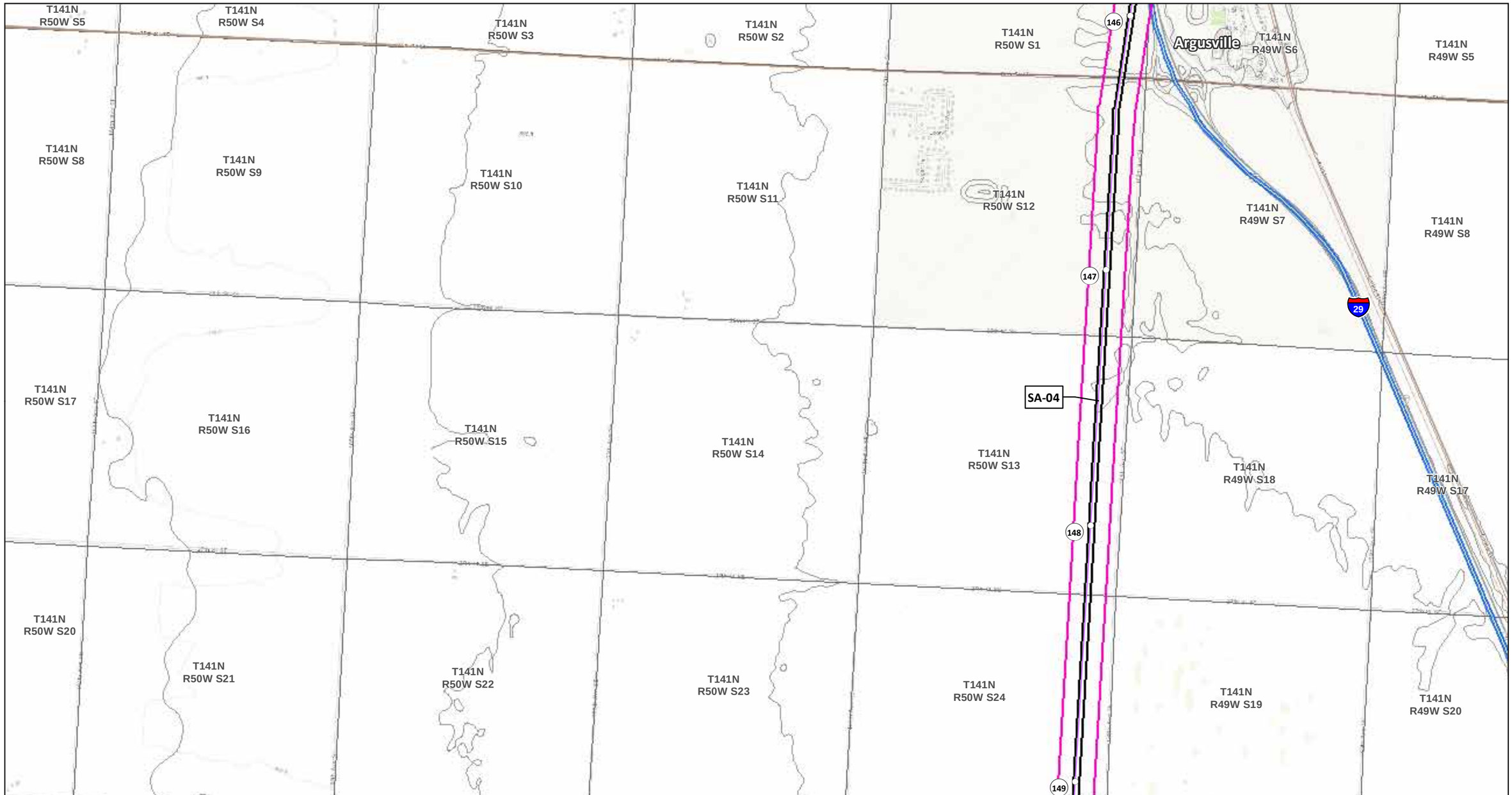

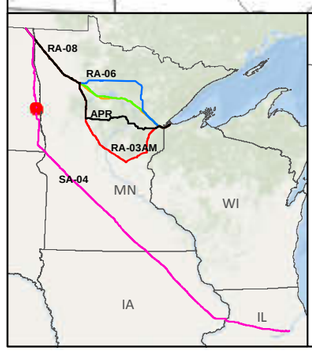

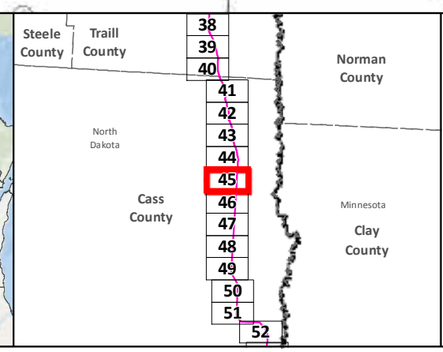

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

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- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 45B of 188

T141N R50W S20
T141N R50W S21
T141N R50W S22
T141N R50W S23
T141N R50W S24
T141N R49W S19
T141N R49W S20
T141N R50W S29
T141N R50W S28
T141N R50W S27
T141N R50W S26
Rush River
T141N R50W S25
T141N R49W S30
T141N R49W S29
150
SA-04
T141N R50W S32
T141N R50W S33
T141N R50W S34
T141N R50W S35
T141N R50W S36
T141N R49W S31
T141N R49W S32
151
T140N R50W S6
Lower Branch Rush River
T140N R50W S5
T140N R50W S4
T140N R50W S3
T140N R50W S2
T140N R50W S1
T140N R49W S6
152
T140N R50W S8
T140N R50W S9
T140N R50W S10
T140N R50W S11
T140N R50W S12

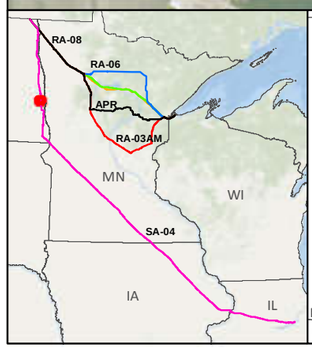

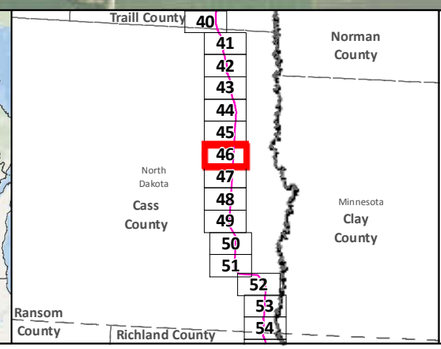

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 46A of 188

T141N R50W S20
T141N R50W S21
T141N R50W S22
T141N R50W S23
T141N R50W S24
T141N R49W S19
T141N R49W S20
T141N R50W S29
T141N R50W S28
T141N R50W S27
T141N R50W S26
Rush River
T141N R50W S25
T141N R49W S30
T141N R49W S29
150
T141N R50W S32
T141N R50W S33
T141N R50W S34
T141N R50W S35
T141N R50W S36
SA-04
T141N R49W S31
T141N R49W S32
151
T140N R50W S6
Lower Branch Rush River
T140N R50W S5
T140N R50W S4
T140N R50W S3
T140N R50W S2
T140N R50W S1
T140N R49W S6
152
T140N R50W S8
T140N R50W S9
T140N R50W S10
T140N R50W S11
T140N R50W S12

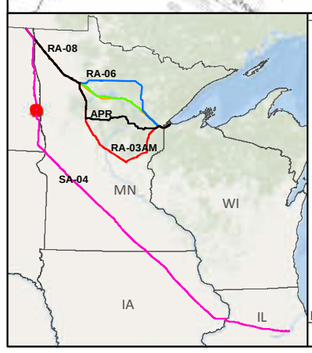

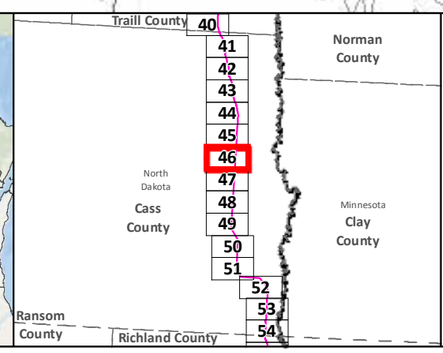

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
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Mile Post
Anticipated 120' Construction ROW
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Township Boundary

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Native Plant Communities with Biodiversity Significance
- Outstanding
- High
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 46B of 188

T140N R50W S8
T140N R50W S9
T140N R50W S10
T140N R50W S11
T140N R50W S12
T140N R50W S1
T140N R49W S6
T140N R49W S7
T140N R50W S17
T140N R50W S16
T140N R50W S15
T140N R50W S14
T140N R50W S13
T140N R49W S18
T140N R50W S20
T140N R50W S21
T140N R50W S22
T140N R50W S23
T140N R50W S24
T140N R49W S19
T140N R50W S29
T140N R50W S28
T140N R50W S27
T140N R50W S26
T140N R50W S25
T140N R49W S30

Lower Branch Rush River
Maple River
Sheyenne River
Maple River

153
154
155
SA-04

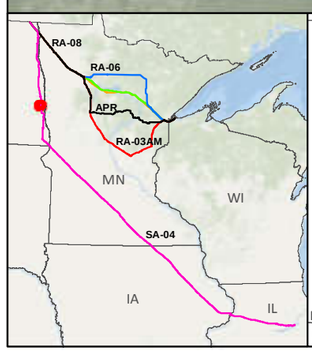

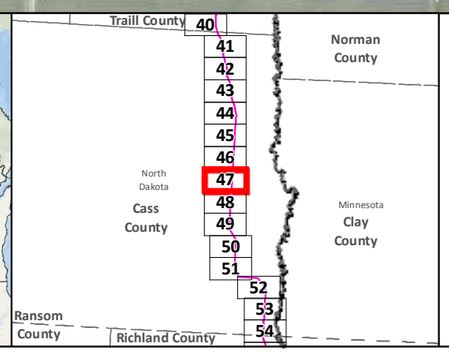

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

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Tribal Reservation

Water Resources
Lake
River

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0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 47A of 188

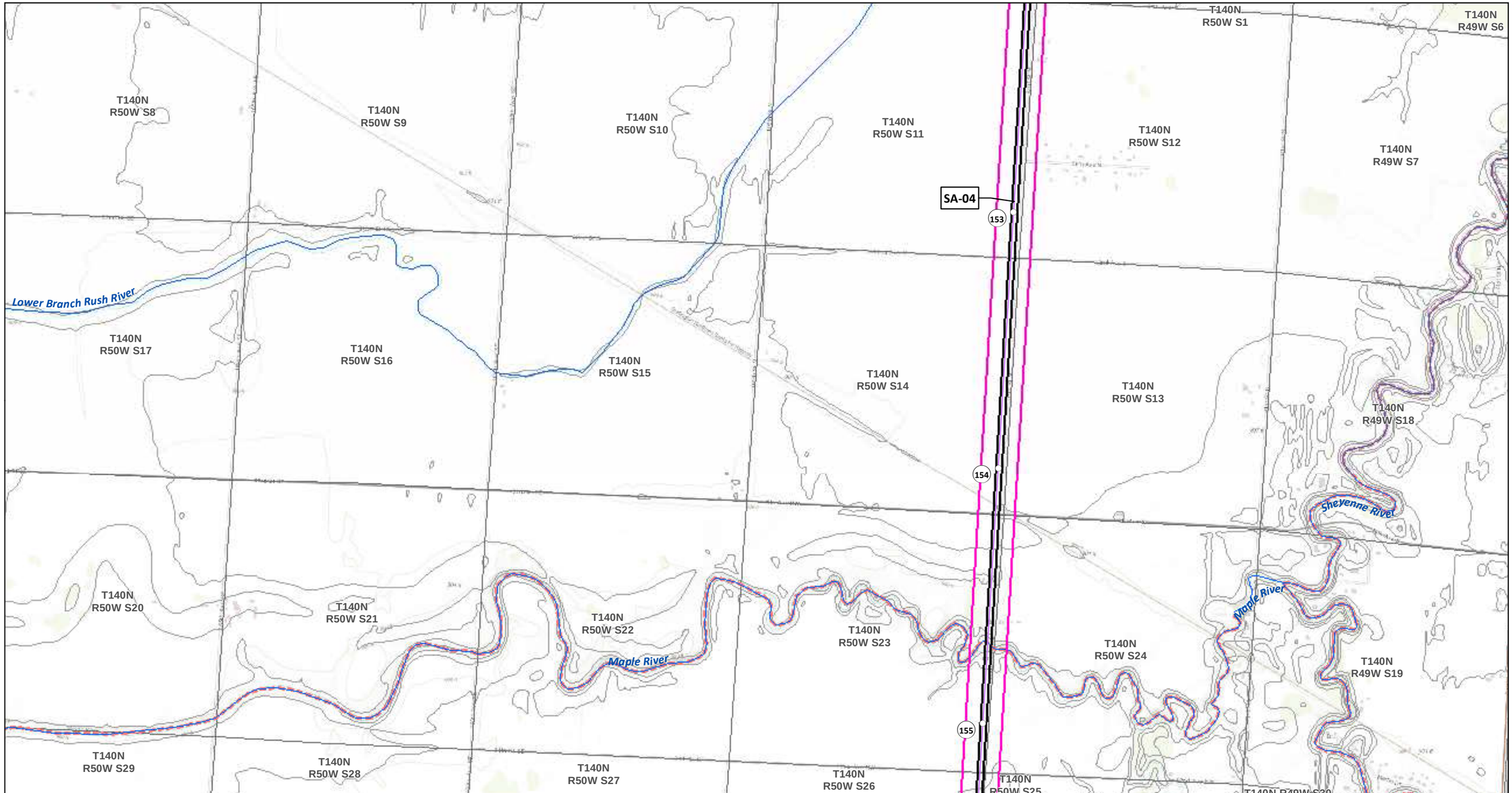

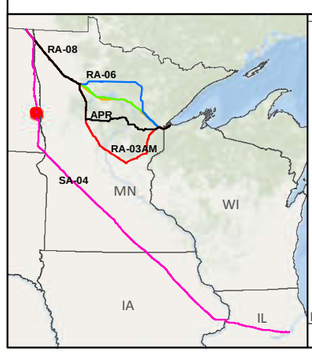

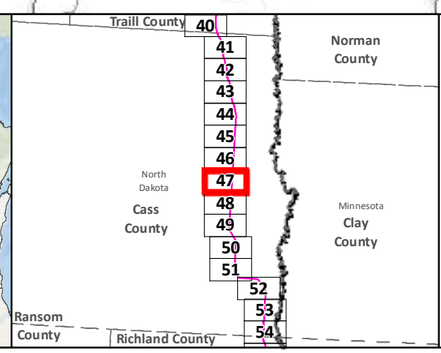

- SA-04
- Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')
- Existing Pipelines
- Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 47B of 188

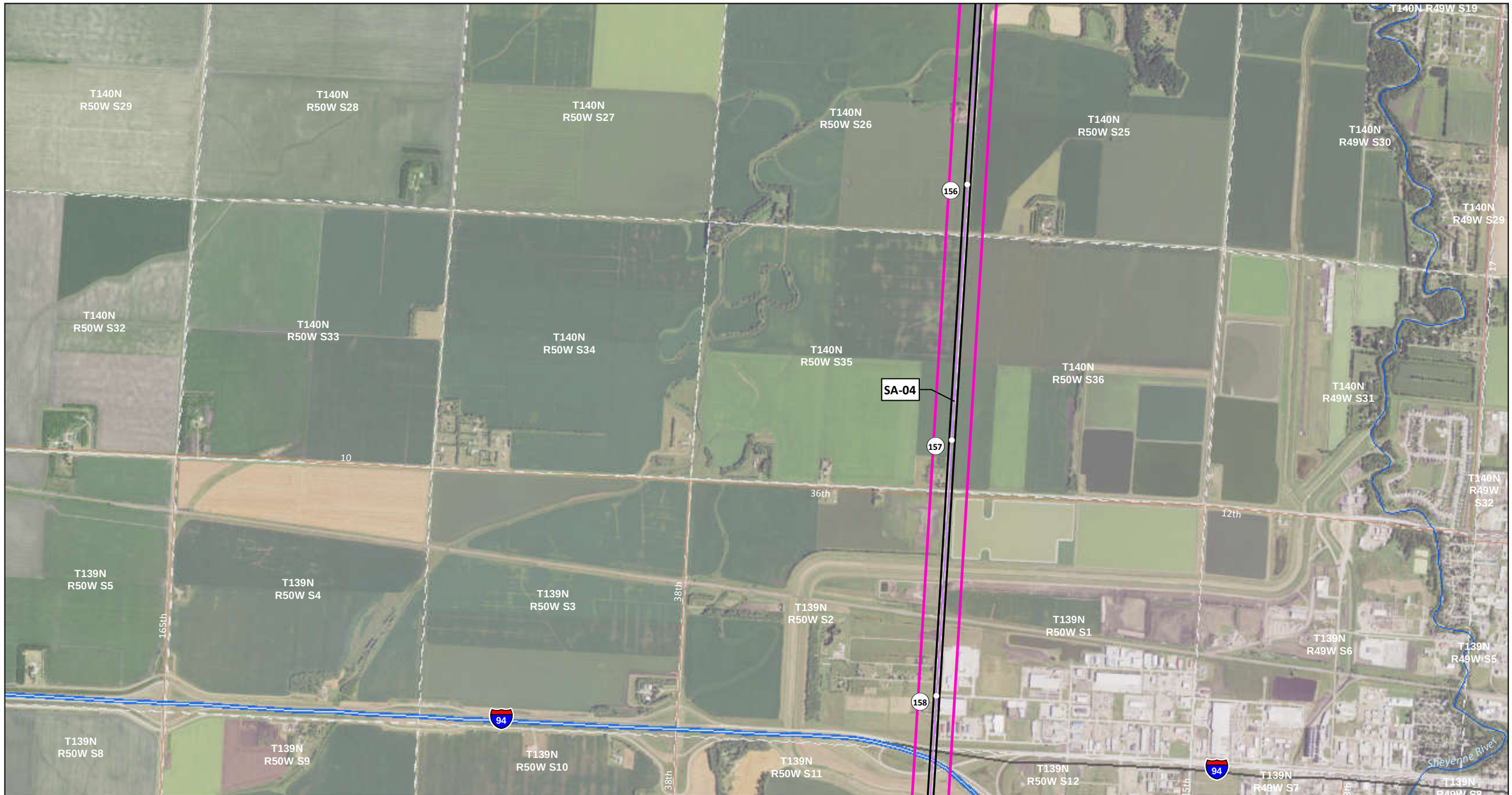

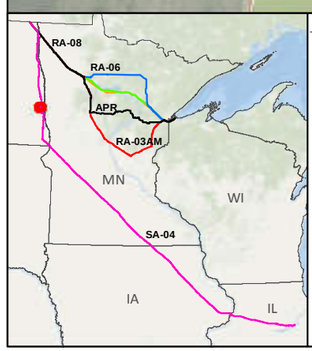

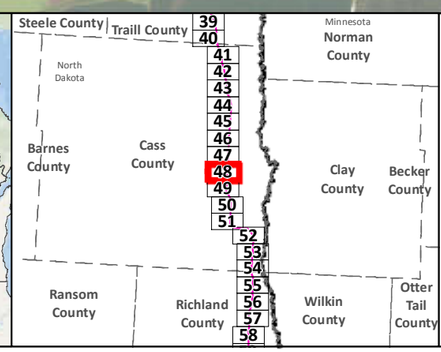

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 48A of 188

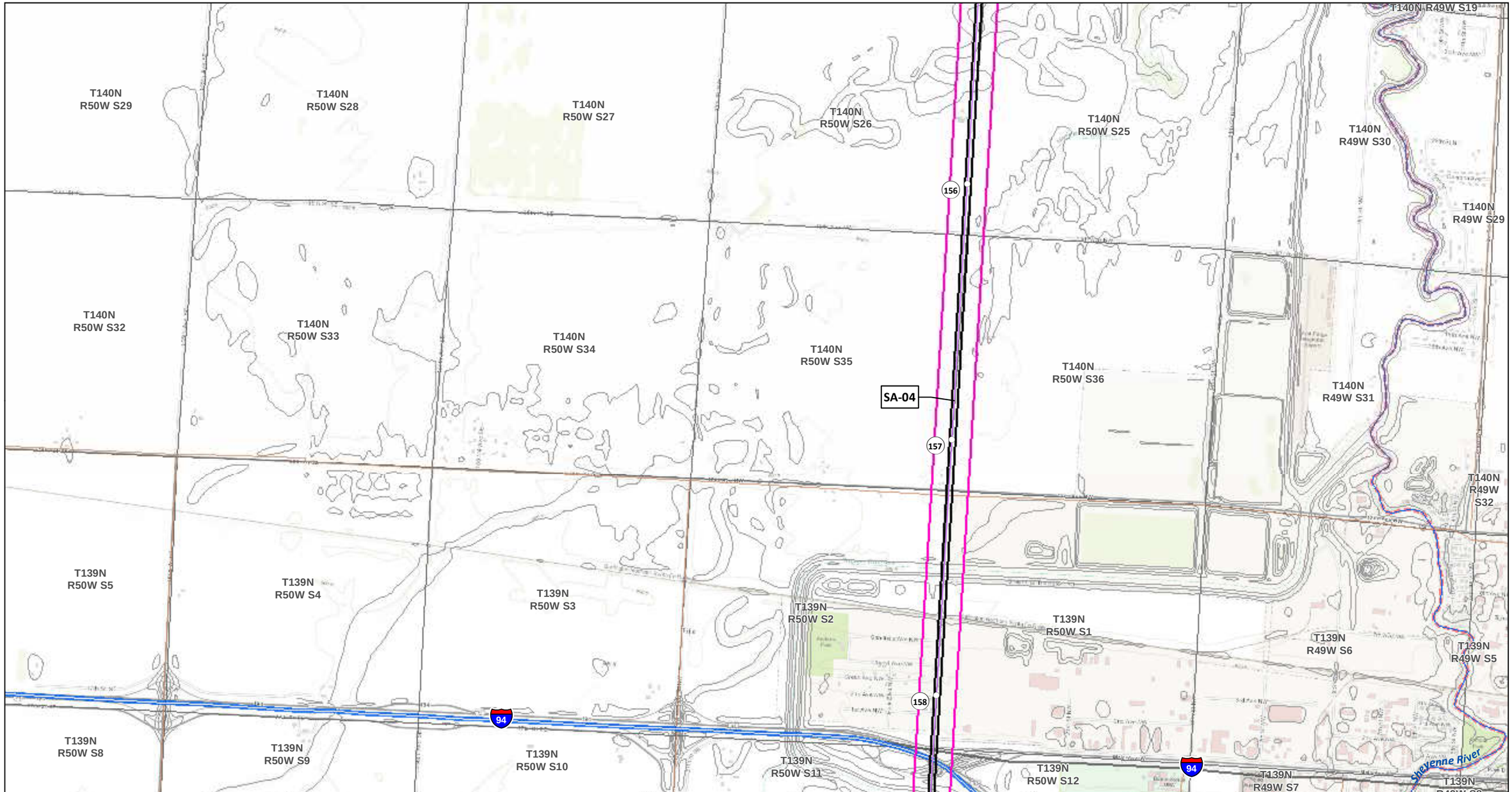

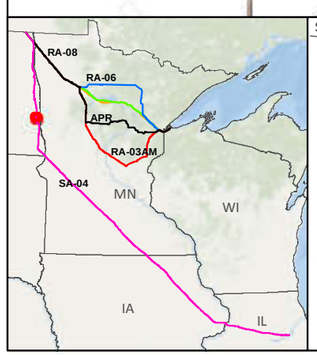

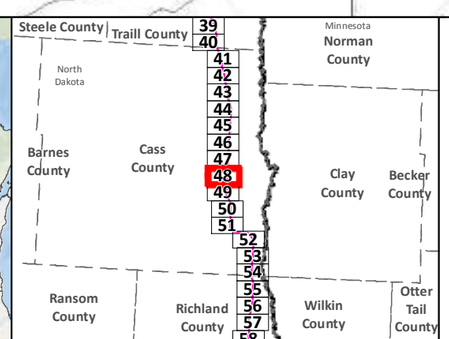

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

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- High
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

Map 48B of 188

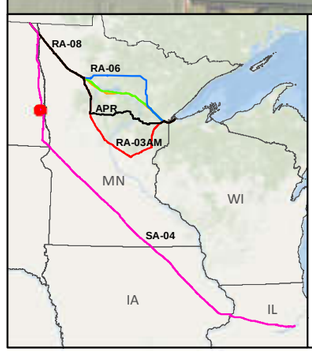

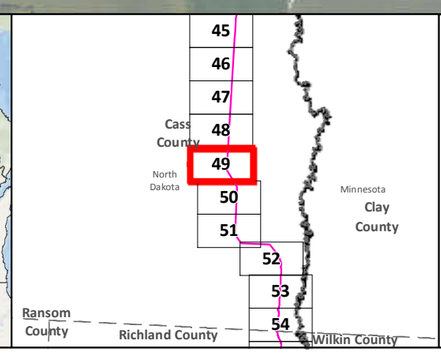

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 49A of 188

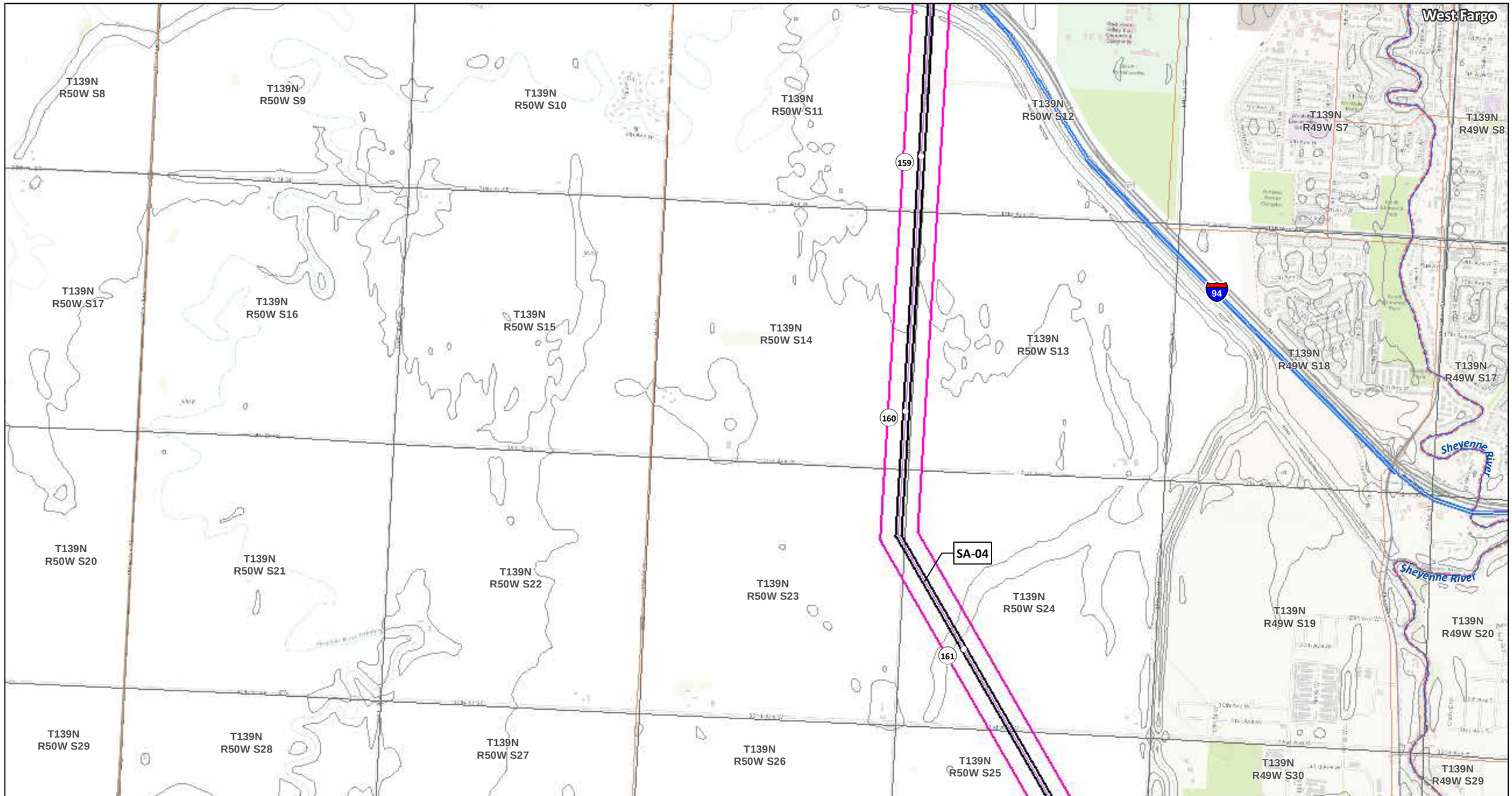

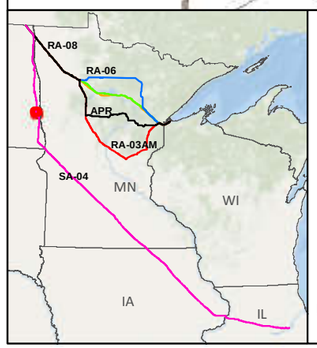

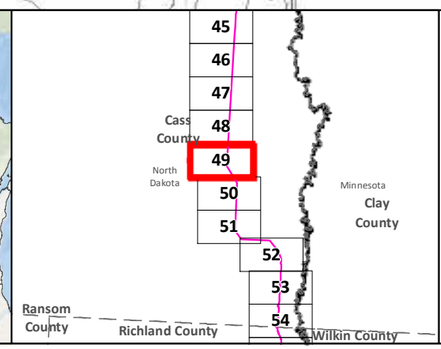

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 49B of 188

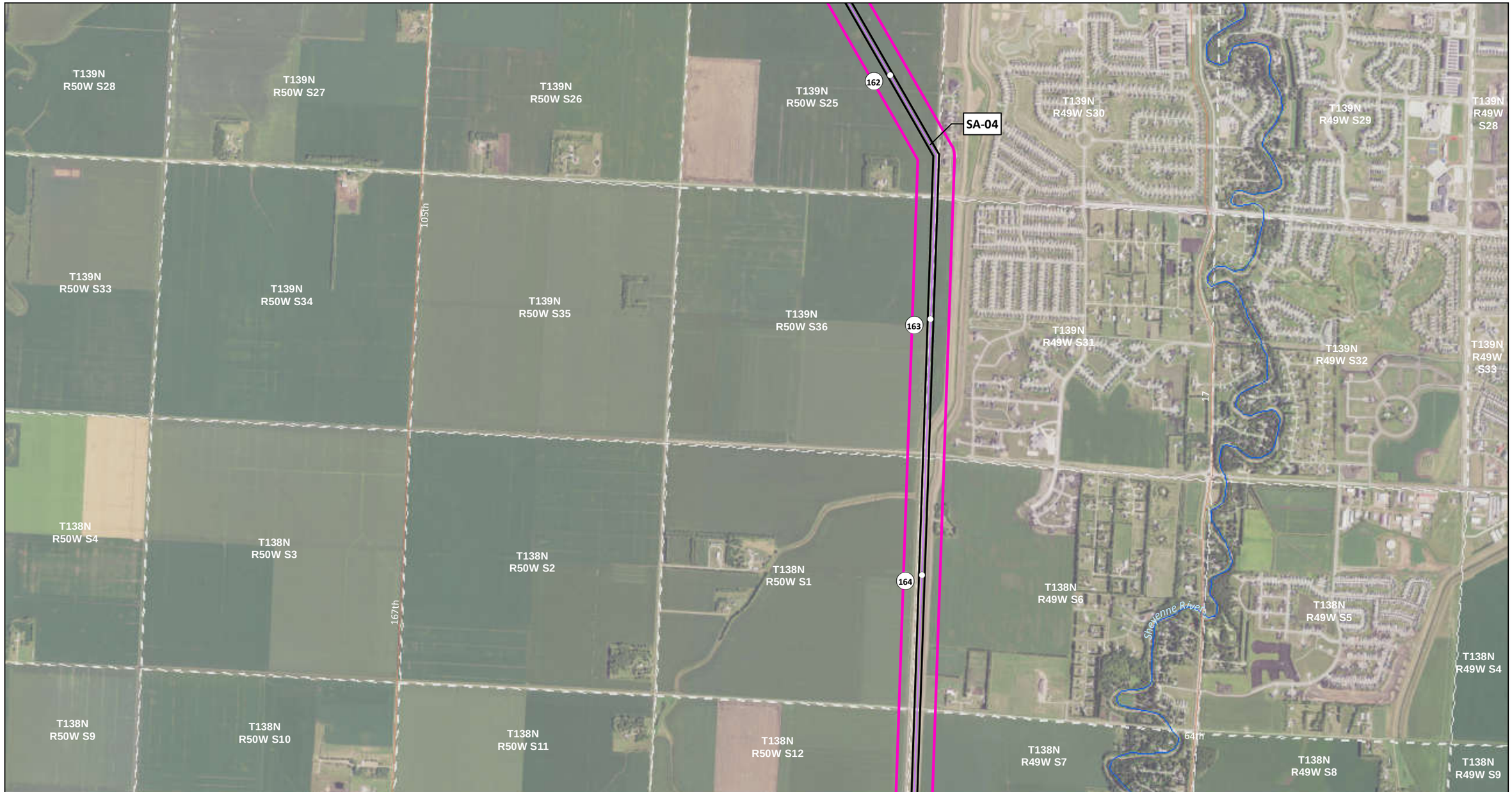

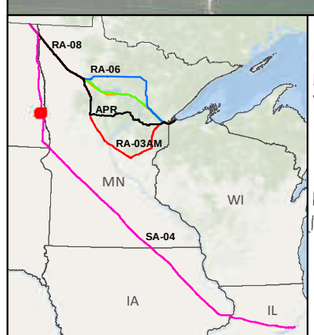

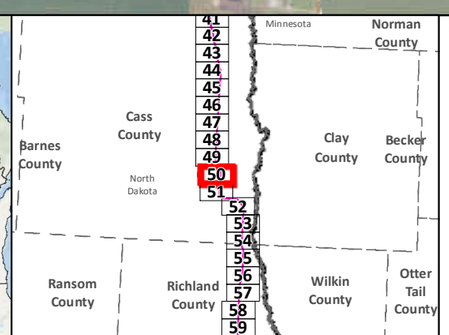

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 50A of 188

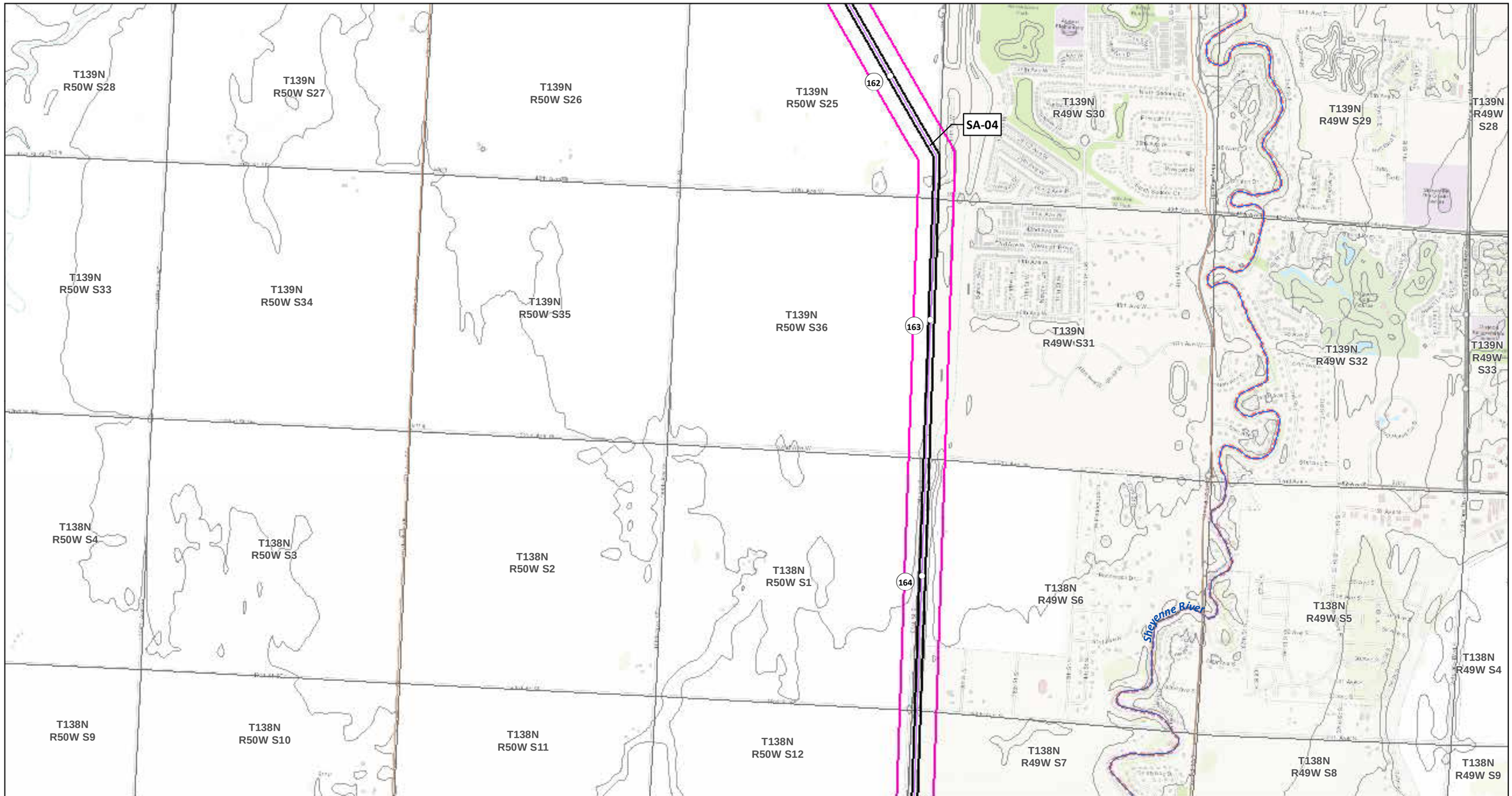

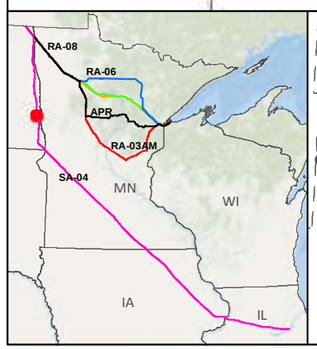

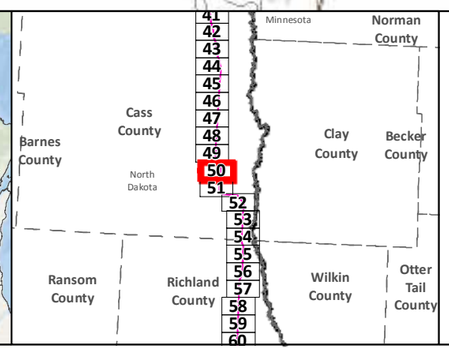

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

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Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 50B of 188

T138N R50W S9
T138N R50W S10
T138N R50W S11
T138N R50W S12
T138N R49W S7
T138N R49W S8
T138N R49W S9
73rd
17
T138N R50W S16
T138N R50W S15
T138N R50W S14
T138N R50W S13
T138N R49W S18
T138N R49W S17
T138N R49W S16
167th
Horace
Main
T138N R50W S21
T138N R50W S22
T138N R50W S23
T138N R50W S24
T138N R49W S19
T138N R49W S20
T138N R49W S21
Cheyenne River
170th
SA-04
T138N R50W S28
T138N R50W S27
T138N R50W S26
T138N R50W S25
T138N R49W S30
T138N R49W S29
T138N R49W S28
100th
165
166
167
168
169

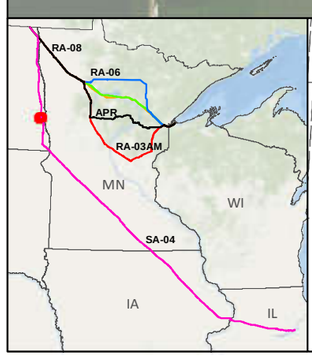

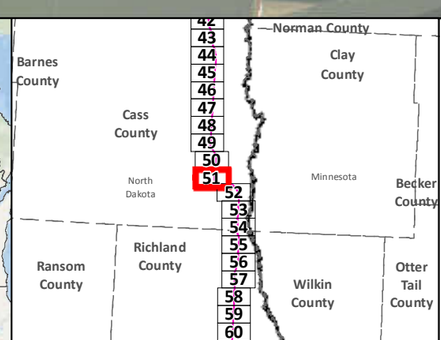

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 51A of 188

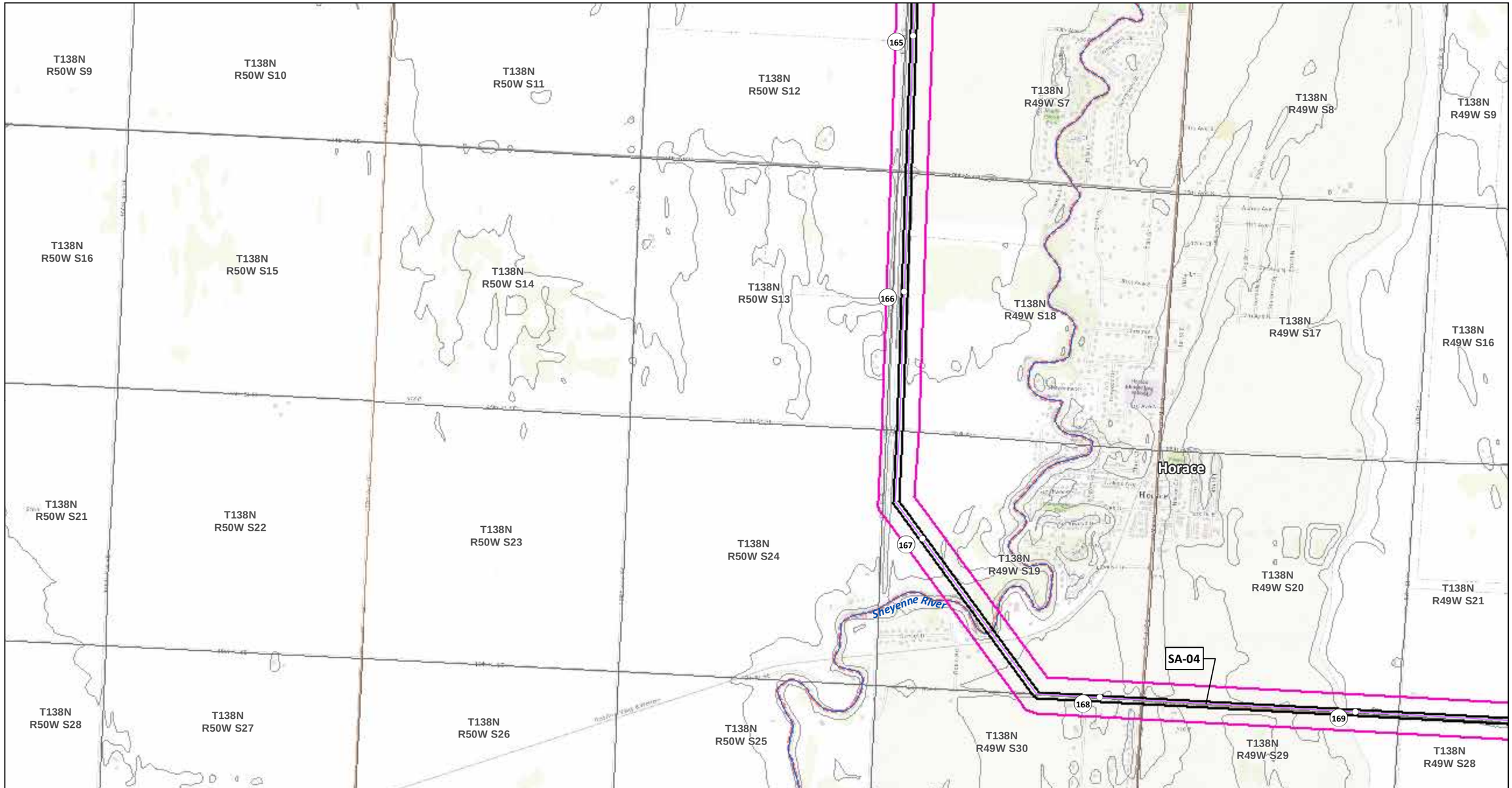

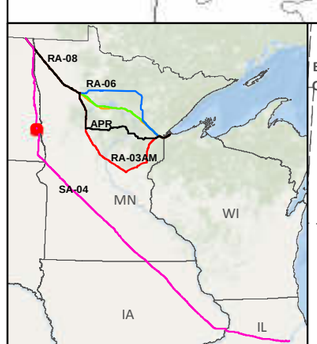

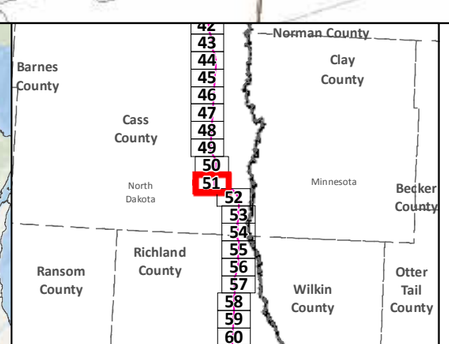

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

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Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

Map 51B of 188

T138N R49W S19
T138N R49W S20
T138N R49W S21
T138N R49W S22
T138N R49W S23
T138N R49W S24
T138N R48W S19
T138N R49W S30
T138N R49W S29
T138N R49W S28
T138N R49W S27
T138N R49W S26
T138N R49W S25
T138N R48W S30
T138N R49W S31
T138N R49W S32
T138N R49W S33
T138N R49W S34
T138N R49W S35
T138N R49W S36
T138N R48W S31
T137N R49W S6
T137N R49W S5
T137N R49W S4
T137N R49W S3
T137N R49W S2
T137N R49W S1
T137N R48W S6

169 170 171 172 173

29 14

100th 48th 124th 170th 25th 21st University

Wild Rice River

SA-04

Kurtz Twsp Co.

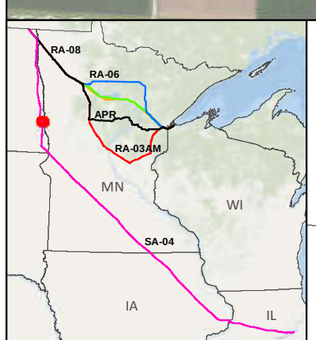

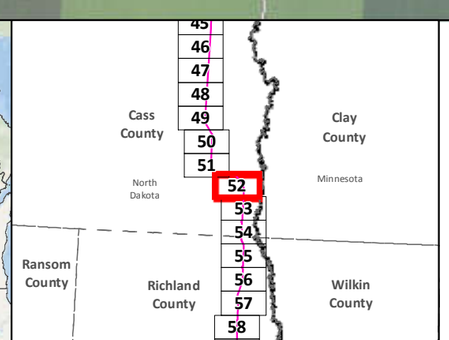

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
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National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 52A of 188

T138N R49W S19
T138N R49W S20
T138N R49W S21
T138N R49W S22
T138N R49W S23
T138N R49W S24
T138N R48W S19
T138N R49W S30
T138N R49W S29
T138N R49W S28
T138N R49W S27
T138N R49W S26
T138N R49W S25
T138N R48W S30
T138N R49W S31
T138N R49W S32
T138N R49W S33
T138N R49W S34
T138N R49W S35
T138N R49W S36
T138N R48W S31
T138 R48W S31
T137N R49W S6
T137N R49W S5
T137N R49W S4
T137N R49W S3
T137N R49W S2
T137N R49W S1
T137N R48W S6

Wild Rice River

Kurtz Twsp Co.

169 170 171 172 173

SA-04

29

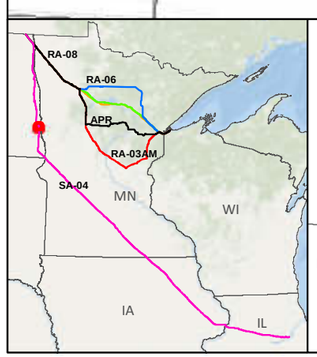

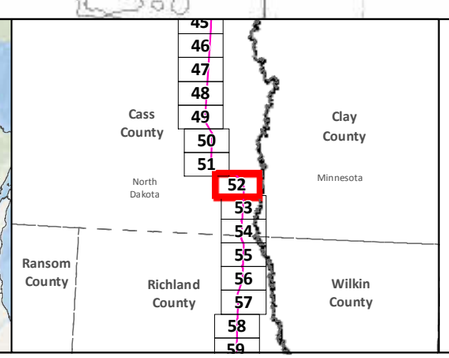

SA-04

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RA-03AM

RA-06

RA-07

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Moderate

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 52B of 188

T137N R49W S5
T137N R49W S4
T137N R49W S3
T137N R49W S2
T137N R49W S1
T137N R48W S6
Wolverton Creek
T137N R49W S8
T137N R49W S9
T137N R49W S10
Wild Rice River
174
T137N R49W S11
T137N R49W S12
T137N R48W S7
T137N R49W S17
T137N R49W S16
T137N R49W S15
175
T137N R49W S14
T137N R49W S13
T137N R48W S18
Holy Cross Twsp Co.
29
Red River of the North
176
T137N R49W S20
T137N R49W S21
T137N R49W S22
T137N R49W S23
Oxbow
T137N R48W S19
T137N R49W S24
Hickson
T137N R48W S19
SA-04

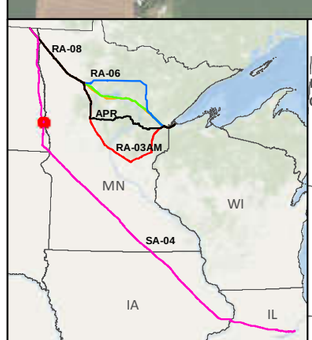

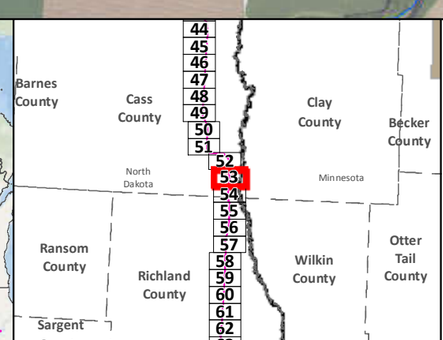

SA-04
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Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 53A of 188

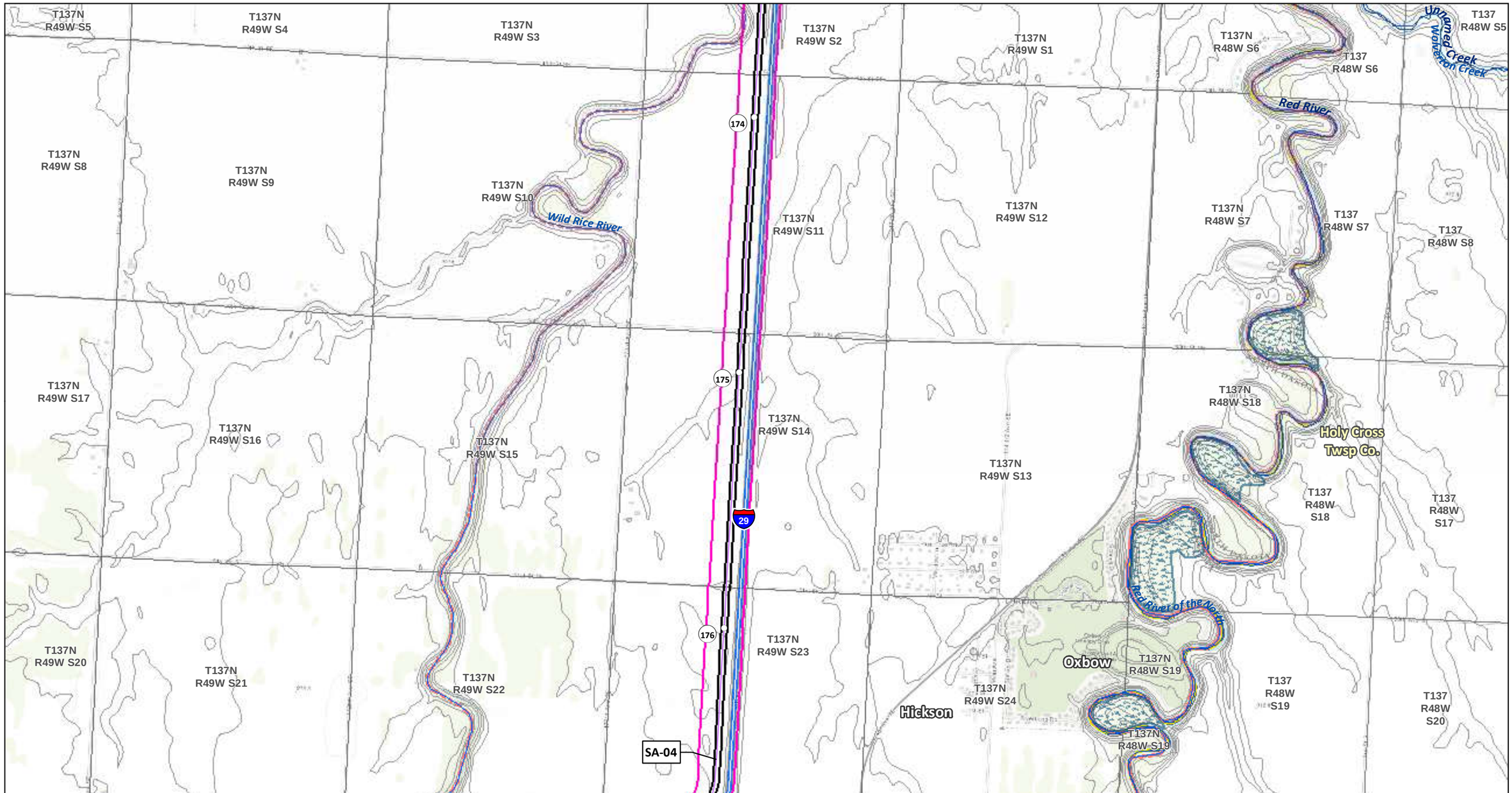

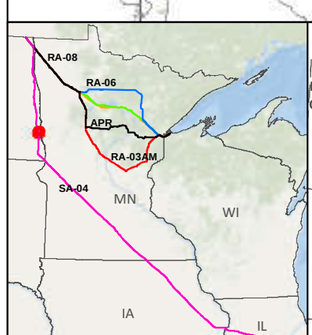

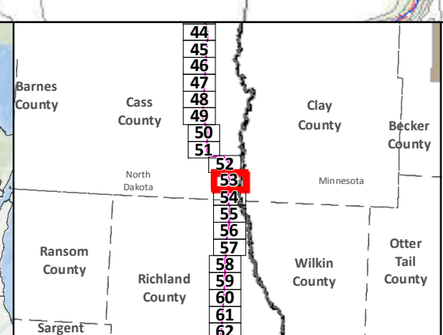

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 53B of 188

T137N R49W S20
T137N R49W S21
T137N R49W S22
T137N R49W S23
T137N R49W S24
T137N R48W S19
T137N R48W S19
160th
T137N R49W S29
T137N R49W S28
T137N R49W S27
T137N R49W S26
T137N R49W S25
T137N R48W S30
Holy Cross Twsp Co.
Wild Rice River
T137N R49W S32
T137N R49W S33
T137N R49W S34
T137N R49W S35
T137N R49W S36
T137N R48W S31
T136N R49W S6
54th
T137N R48W S31
T137N R48W S31
Wolverton Twsp Co.
169th
T136N R49W S5
T136N R49W S4
T136N R49W S3
SA-04
T136N R49W S2
T136N R49W S1
Red River of the North
T136N R48W S6
T136N R49W S7
T136N R49W S8
T136N R49W S9
T136N R48W S6

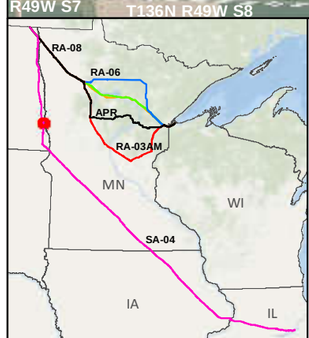

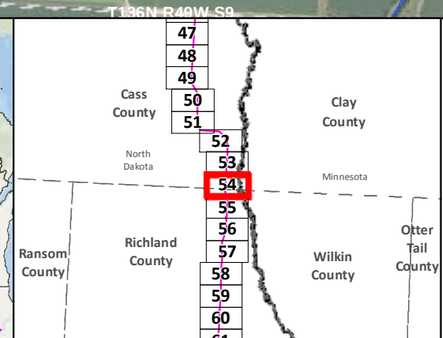

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 54A of 188

T137N R49W S20
T137N R49W S21
T137N R49W S22
T137N R49W S23
T137N R49W S24
T137N R48W S19
T137 R48W S19
T137 R48W S20
T137N R49W S29
T137N R49W S28
T137N R49W S27
T137N R49W S26
T137N R49W S25
T137 R48W S30
T137 R48W S29
T137N R48W S30
Red River of the North
Holy Cross Twsp Co.
Wild Rice River
T137N R49W S32
T137N R49W S33
T137N R49W S34
T137N R49W S35
T137N R49W S36
T137N R48W S31
T137 R48W S32
T137 R48W S31
T136N R49W S6
Dakota Tallgrass Prairie Wildlife Management Area
T137N R48W S31
T136 R49W S1
Wolverton Twsp Co.
T136N R49W S5
T136N R49W S4
T136N R49W S3
T136N R49W S2
T136N R49W S1
T136 R48W S6
Red River
T136N R48W S6
SA-04
T136N R49W S7
T136N R49W S8
T136N R49W S9

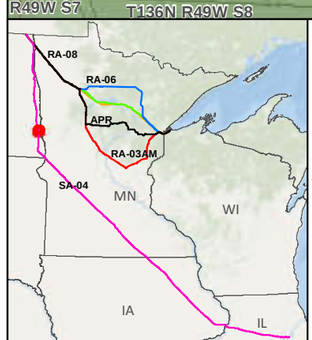

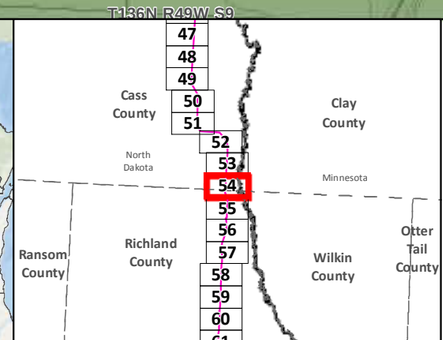

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 54B of 188

T136N R49W S7
T136N R49W S8
T136N R49W S9
T136N R49W S4
T136N R49W S3
T136N R49W S2
T136N R49W S1
T136N R48W S6
T136N R48W S7
T136N R49W S10
T136N R49W S11
T136N R49W S12
T136N R49W S18
T136N R49W S17
T136N R49W S16
T136N R49W S15
T136N R49W S14
T136N R49W S13
T136N R48W S18
T136N R49W S20
T136N R49W S21
T136N R49W S22
T136N R49W S23
T136N R49W S24
T136N R48W S19
T136N R49W S29
T136N R49W S28
T136N R49W S27
T136N R49W S26
169th
58th
81
180
181
182
29
SA-04
Wolverton Twsp Co.
Wolverton Twsp Co.
Red River of the North
Wild Rice River
Christine

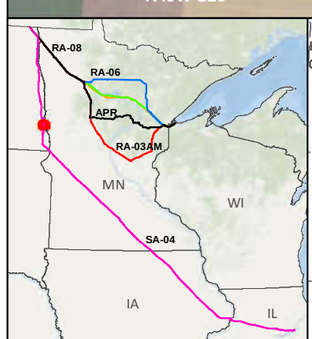

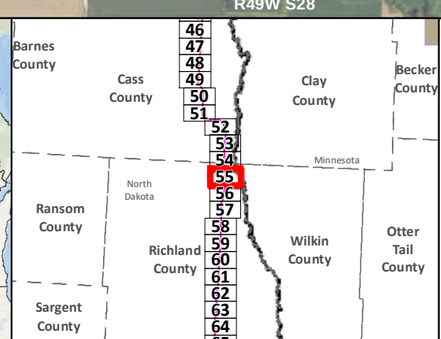

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 55A of 188

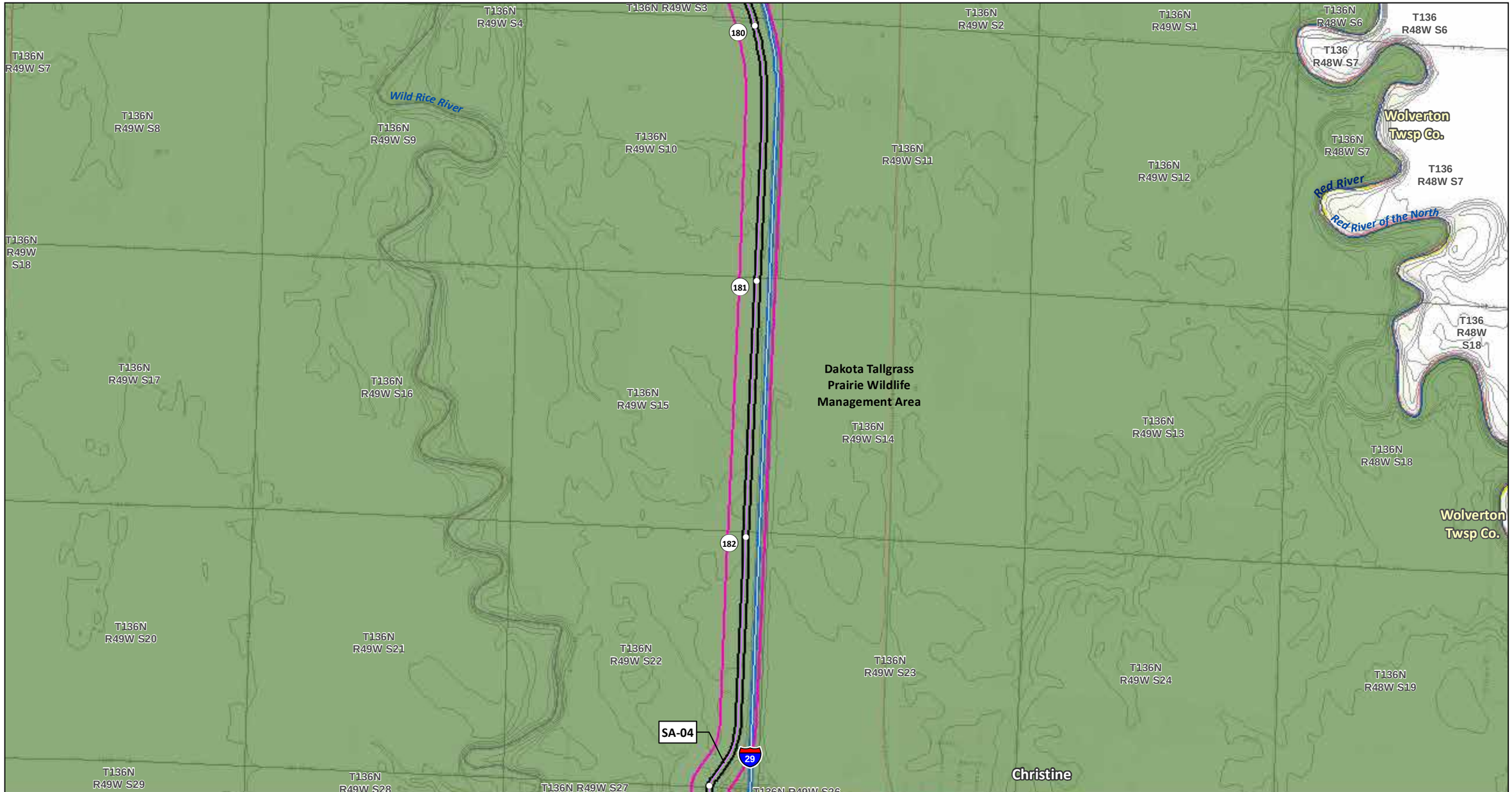

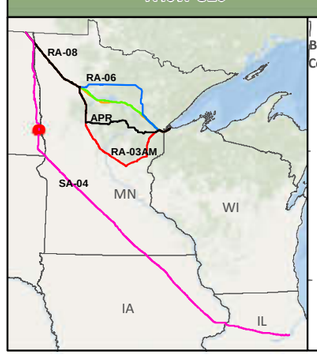

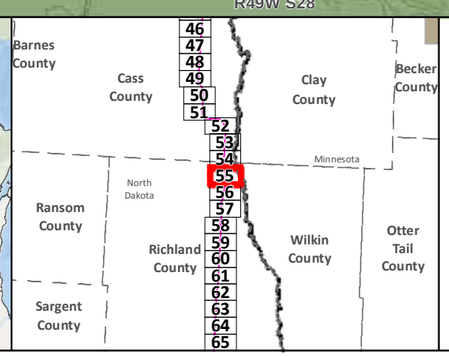

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 55B of 188

T136N R49W S29
T136N R49W S28
T136N R49W S27
T136N R49W S26
T136N R49W S23
T136N R49W S24
58th
T136N R48W S19
T136N R49W S25
T136N R48W S30
184
T136N R49W S32
T136N R49W S33
T136N R49W S34
T136N R49W S35
81
T136N R49W S36
T136N R48W S31
SA-04
185
60th
29
T135N R49W S5
T135N R49W S4
T135N R49W S3
T135N R49W S2
T135N R49W S1
T135N R48W S6
186
Wild Rice River
T135N R49W S8
T135N R49W S9
T135N R49W S10
T135N R49W S11
T135N R49W S12
T135N R48W S7

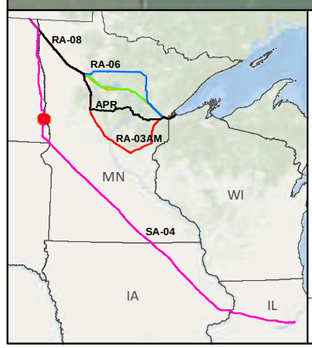

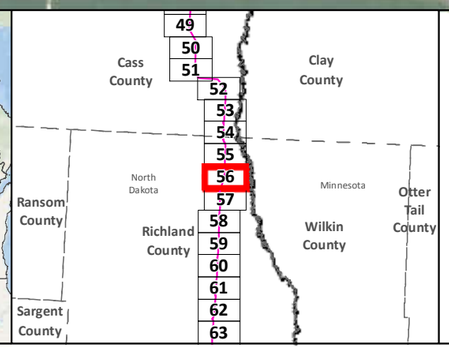

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 56A of 188

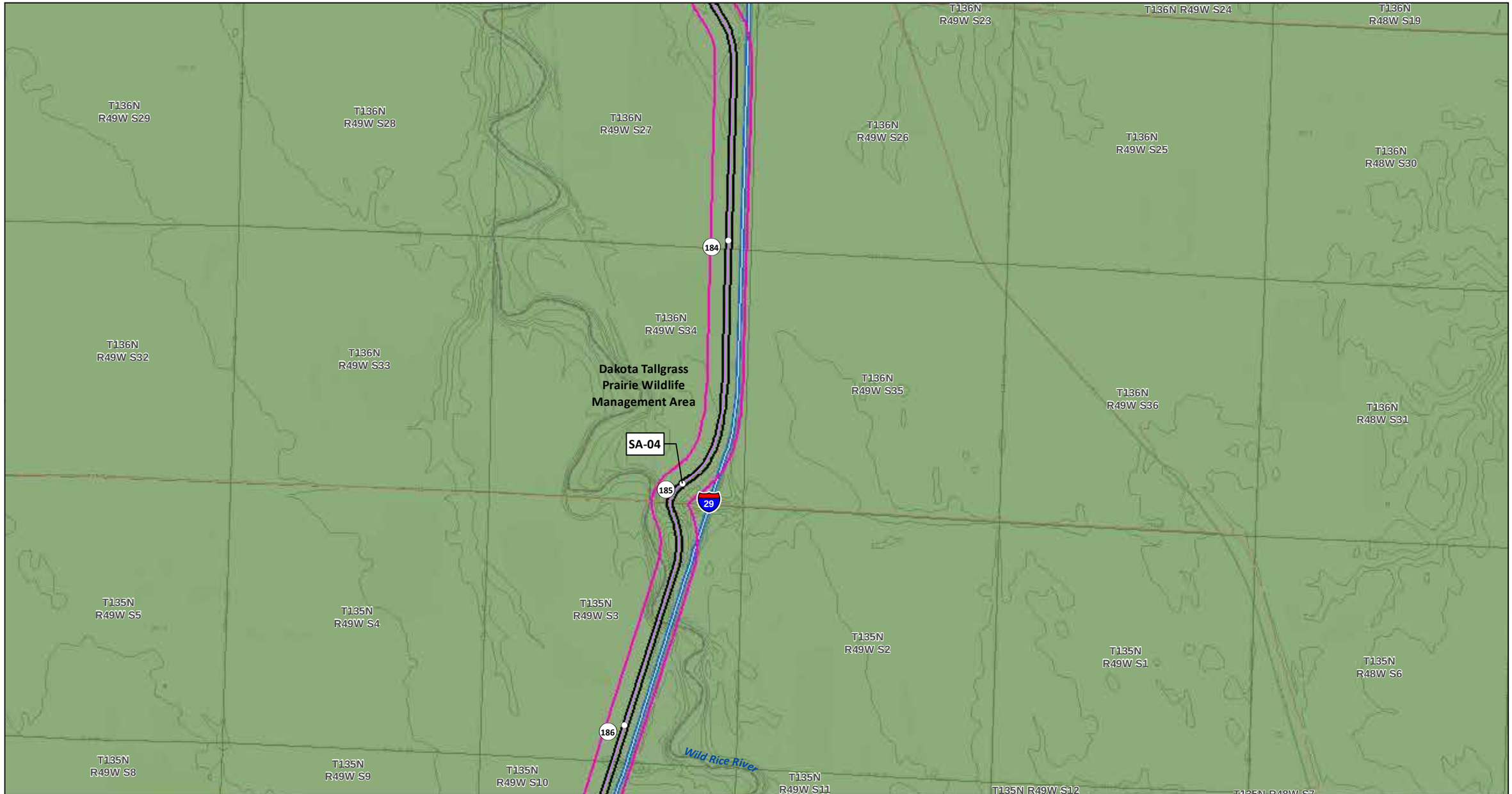

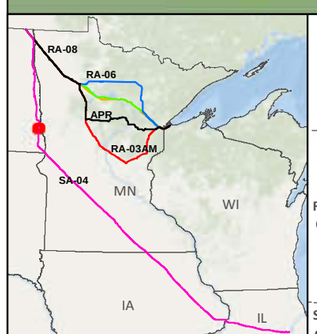

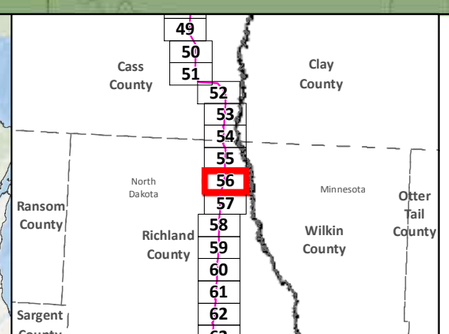

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 56B of 188

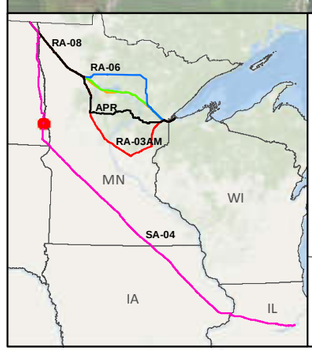

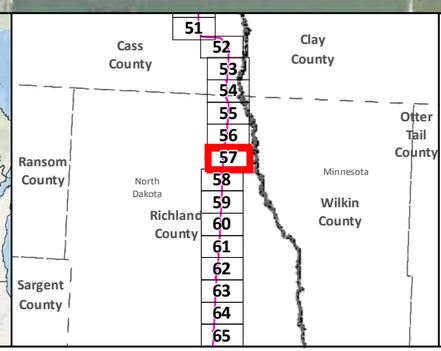

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 57A of 188

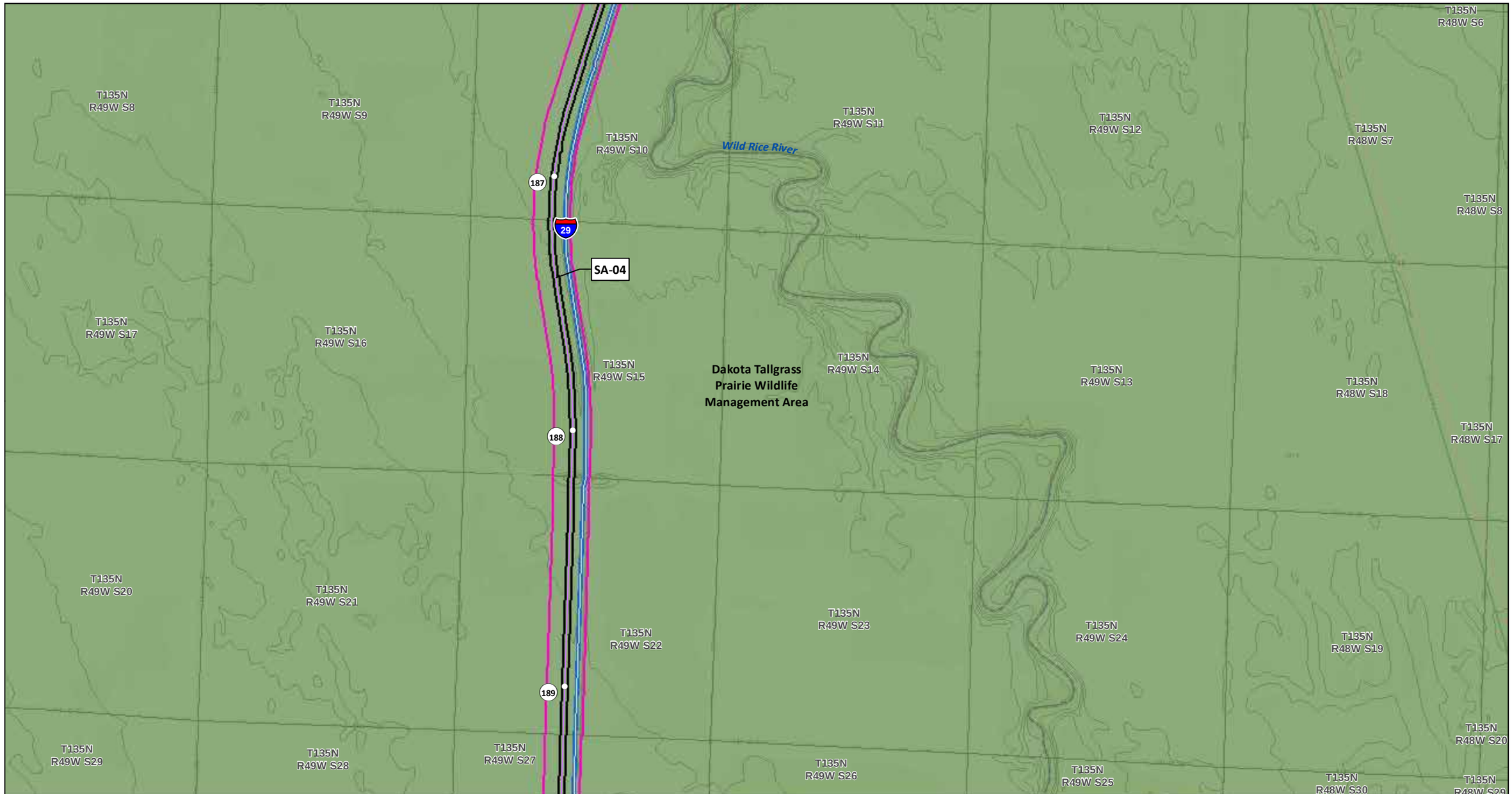

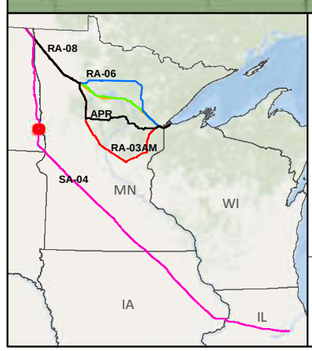

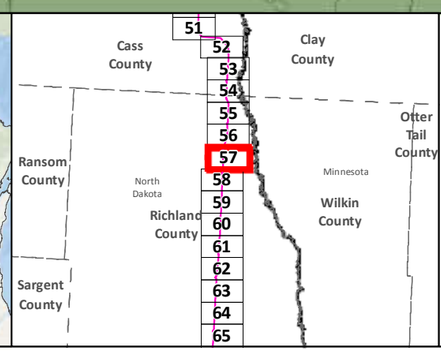

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
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Township Boundary

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- Outstanding
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- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 57B of 188

T135N R49W S30
T135N R49W S29
T135N R49W S28
T135N R49W S27
T135N R49W S26
T135N R49W S25
T135N R48W S30
65th
Colfax
4
190
29
Main
4
T135N R49W S31
T135N R49W S32
T135N R49W S33
T135N R49W S34
T135N R49W S35
T135N R49W S36
Wild Rice River
T135N R48W S31
169th
191
Pitcairn Creek
T134N R49W S6
T134N R49W S5
T134N R49W S4
T134N R49W S3
T134N R49W S2
T134N R49W S1
T134N R48W S6
SA-04
192
T134N R49W S7
T134N R49W S8
T134N R49W S9
T134N R49W S10
T134N R49W S11
T134N R49W S12
T134N R48W S7

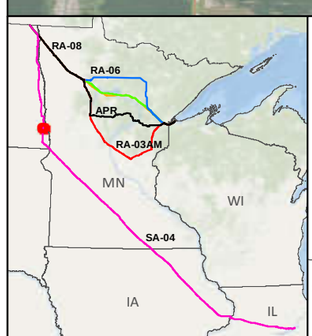

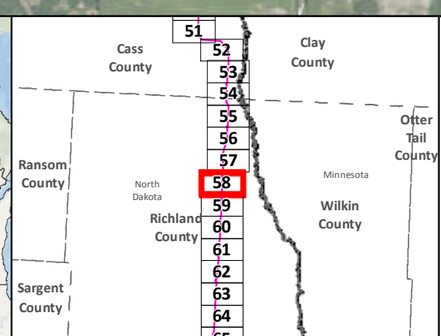

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 58A of 188

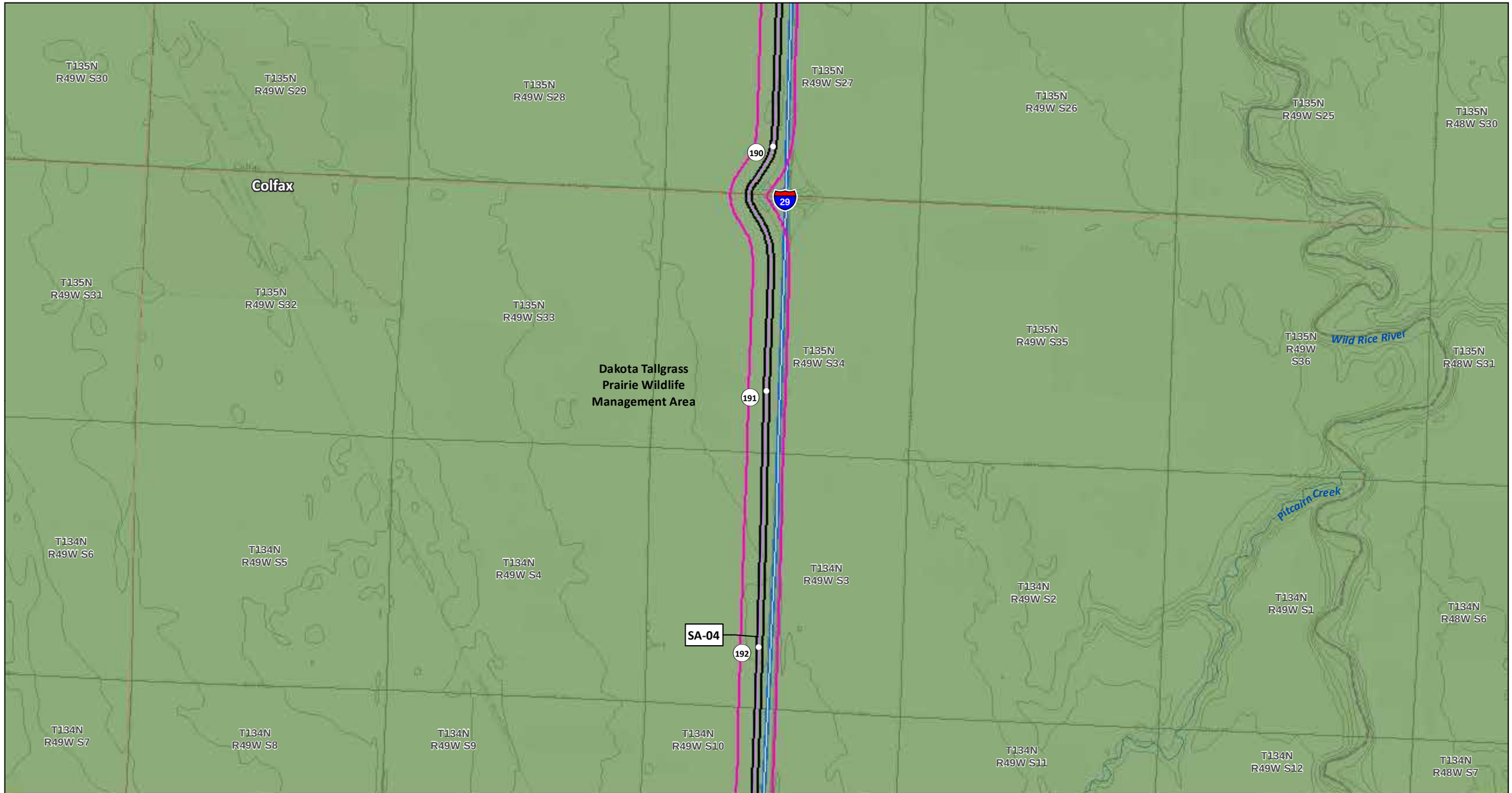

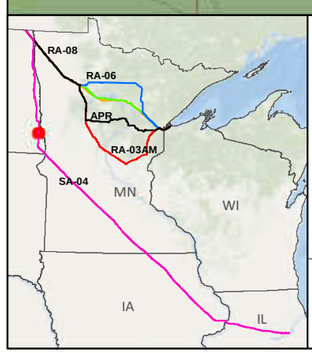

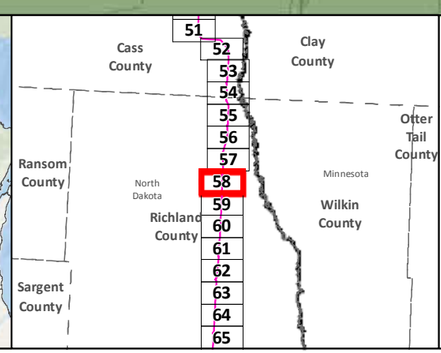

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 58B of 188

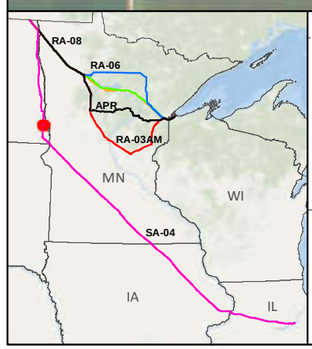

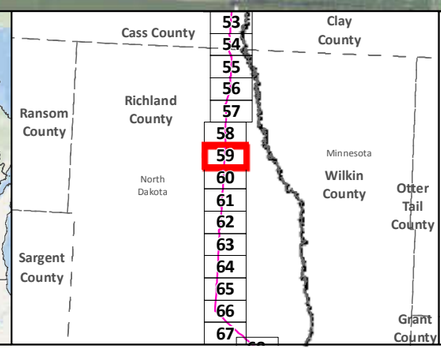

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 59A of 188

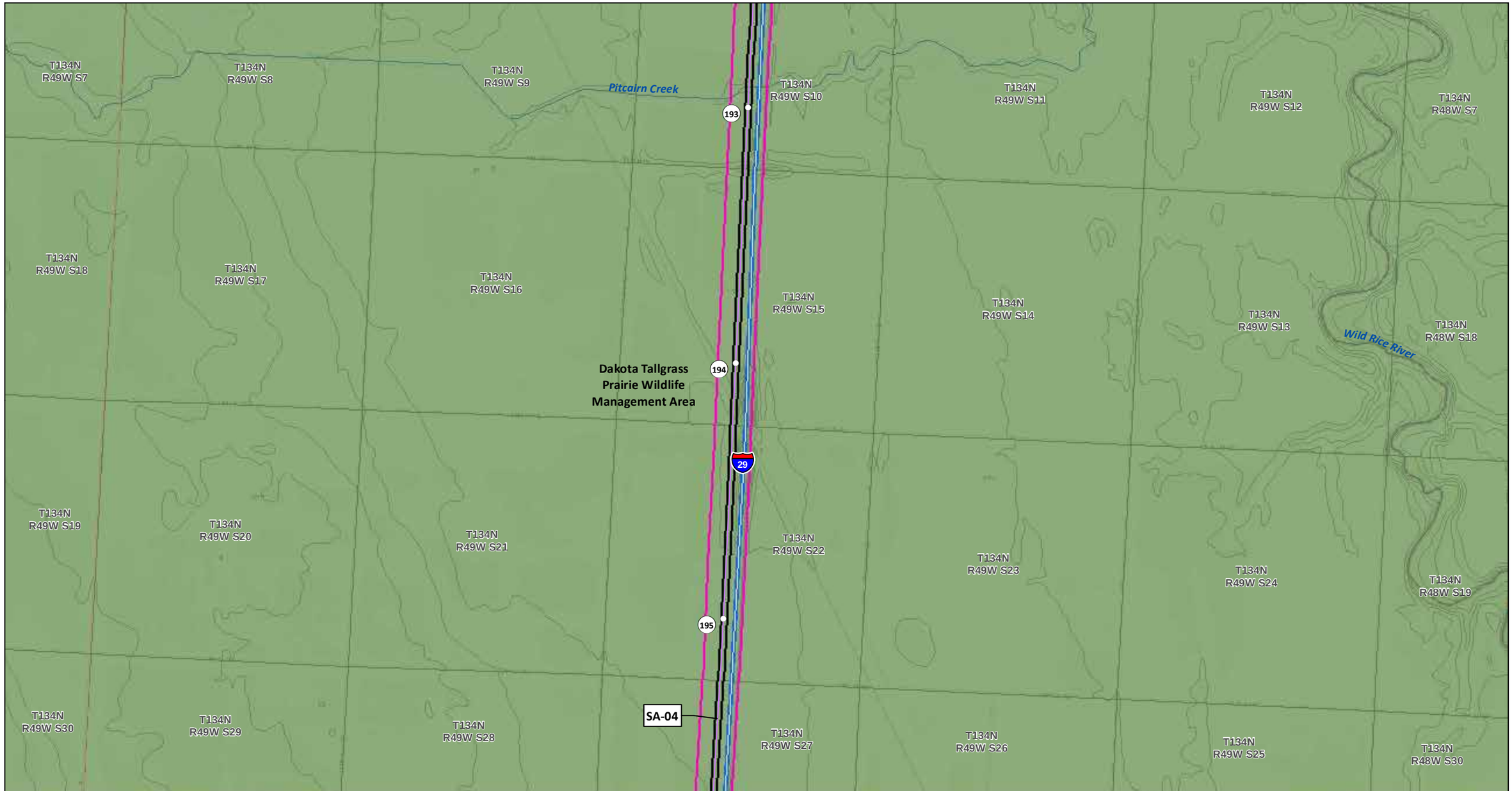

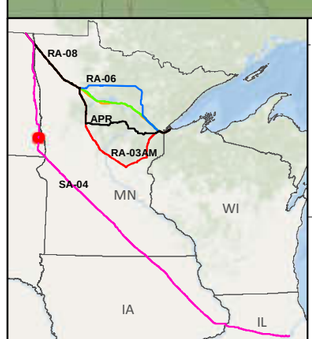

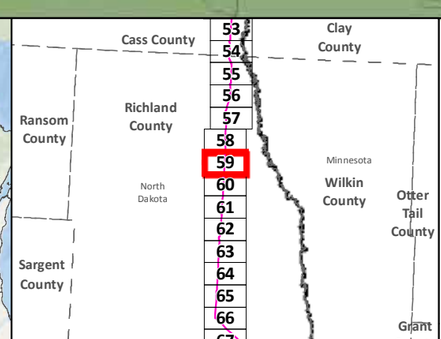

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
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Calcareous Fens
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Public Waters Wetlands
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Public Drinking Water Supply
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Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 59B of 188

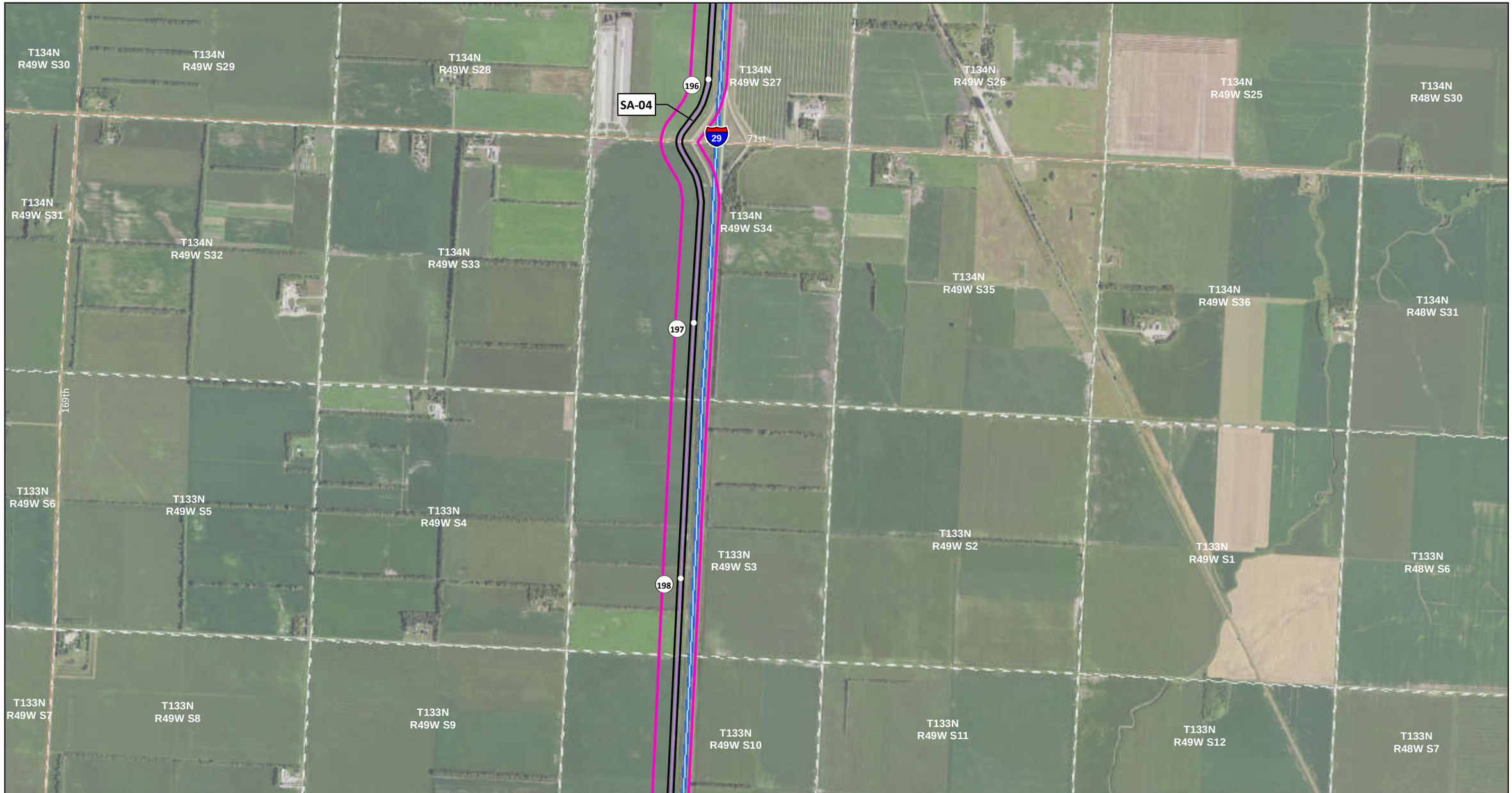

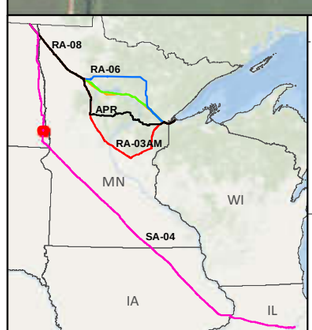

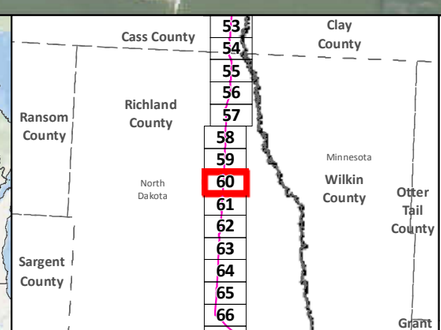

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 60A of 188

T134N R49W S30
T134N R49W S29
T134N R49W S28
T134N R49W S27
T134N R49W S26
T134N R49W S25
T134N R48W S30
T134N R49W S31
T134N R49W S32
T134N R49W S33
T134N R49W S34
T134N R49W S35
T134N R49W S36
T134N R48W S31
T133N R49W S6
T133N R49W S5
T133N R49W S4
T133N R49W S3
T133N R49W S2
T133N R49W S1
T133N R48W S6
T133N R49W S7
T133N R49W S8
T133N R49W S9
T133N R49W S10
T133N R49W S11
T133N R49W S12
T133N R48W S7

196
29
197
198
SA-04

Dakota Tallgrass Prairie Wildlife Management Area

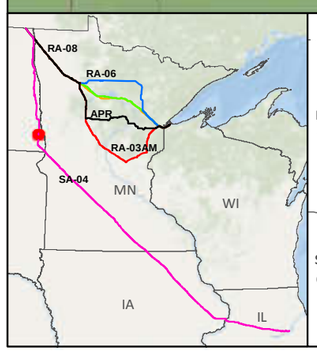

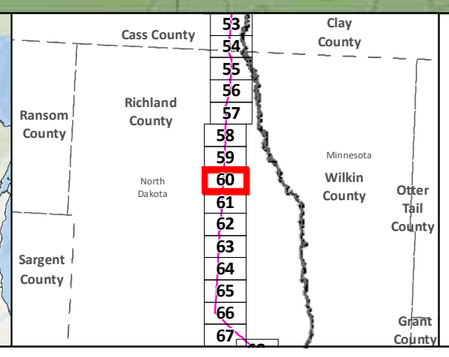

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 60B of 188

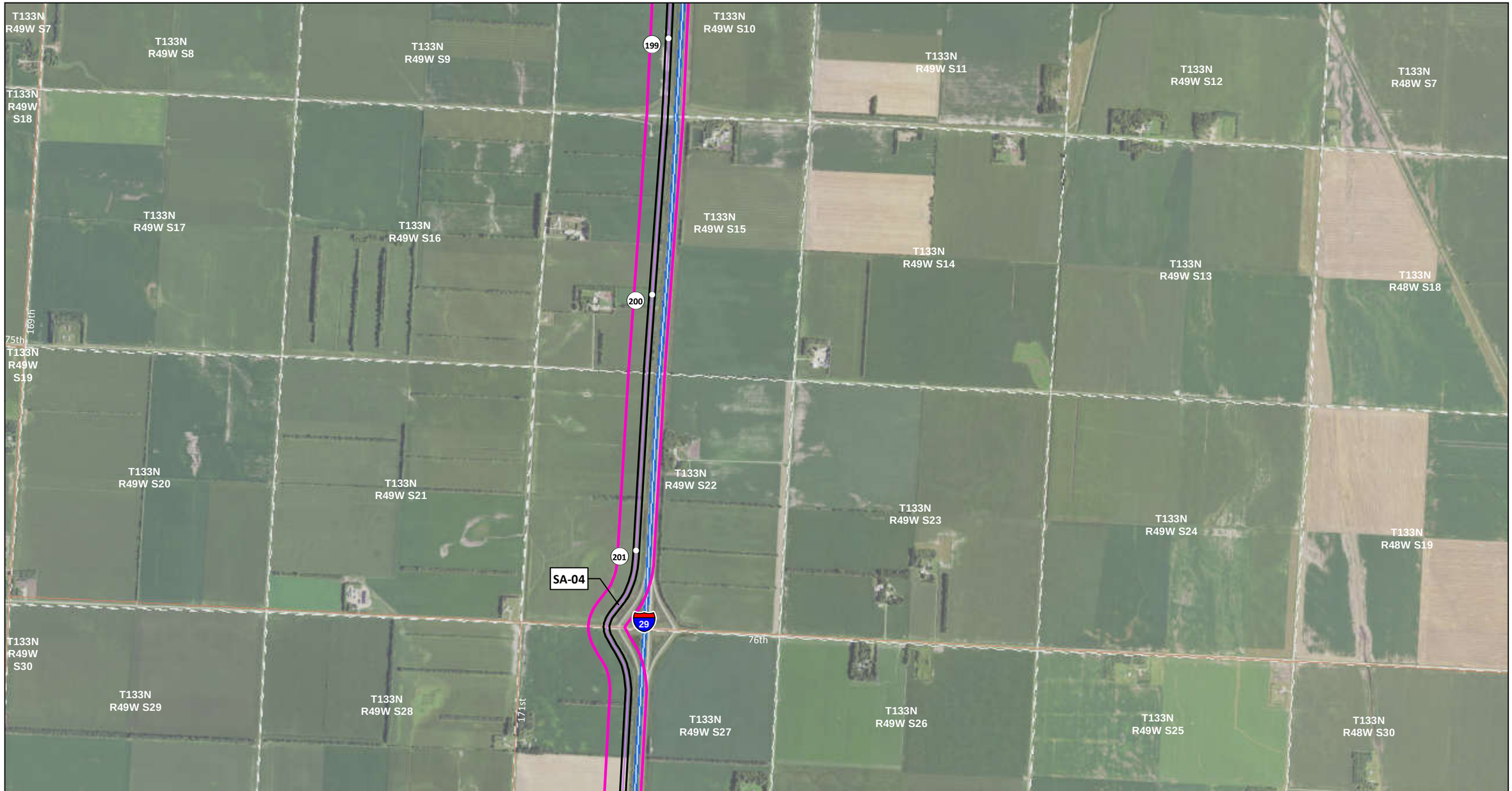

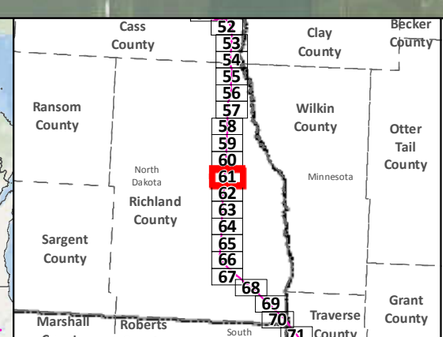

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources: MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 61A of 188

T133N R49W S7
T133N R49W S8
T133N R49W S9
T133N R49W S10
T133N R49W S11
T133N R49W S12
T133N R48W S7
T133N R49W S18
T133N R49W S17
T133N R49W S16
T133N R49W S15
T133N R49W S14
T133N R49W S13
T133N R48W S18
T133N R49W S19
Dakota Tallgrass Prairie Wildlife Management Area
T133N R49W S20
T133N R49W S21
T133N R49W S22
T133N R49W S23
T133N R49W S24
T133N R48W S19
T133N R49W S30
T133N R49W S29
T133N R49W S28
T133N R49W S27
T133N R49W S26
T133N R49W S25
T133N R48W S30

199
200
201
SA-04
29

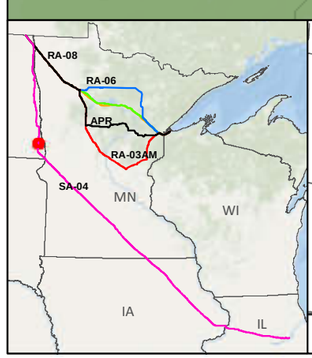

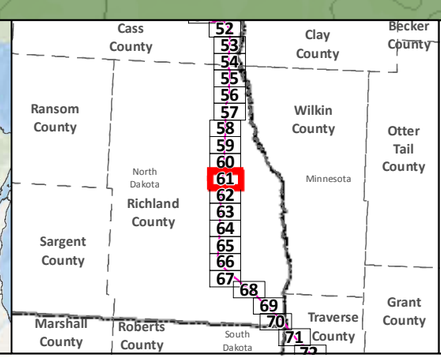

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 61B of 188

T133N R49W S29
T133N R49W S28
T133N R49W S27
T133N R49W S26
T133N R49W S25
T133N R48W S30
T133N R49W S32
T133N R49W S33
T133N R49W S34
T133N R49W S35
T133N R49W S36
T133N R48W S31
171st
169th
78th
Antelope Creek
South Branch Antelope Creek
203
29
204
205
13
T132N R49W S6
T132N R49W S5
T132N R49W S4
T132N R49W S3
T132N R49W S2
T132N R49W S1
T132N R48W S6
T132N R49W S7
T132N R49W S8
T132N R49W S9
T132N R49W S10
T132N R49W S11
T132N R49W S12
T132N R48W S7
Mooreton
SA-04

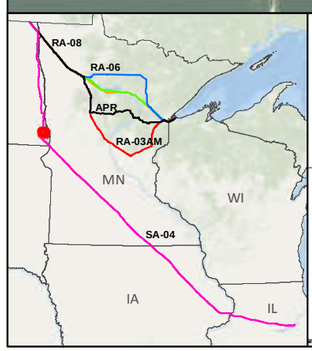

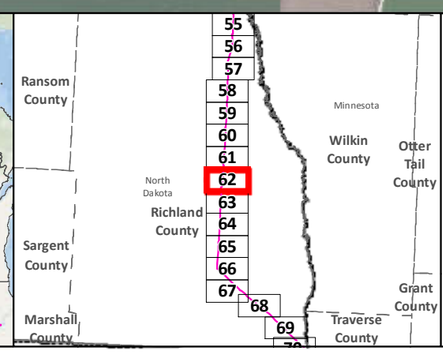

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 62A of 188

T133N R49W S29
T133N R49W S28
T133N R49W S27
T133N R49W S26
T133N R49W S25
T133N R48W S30
T133N R49W S32
T133N R49W S33
T133N R49W S34
T133N R49W S35
T133N R49W S36
T133N R48W S31
Antelope Creek
203
29
Dakota Tallgrass Prairie Wildlife Management Area
T132N R49W S6
T132N R49W S5
T132N R49W S4
T132N R49W S3
T132N R49W S2
T132N R49W S1
204
Mooreton
T132N R48W S6
SA-04
T132N R49W S7
T132N R49W S8
T132N R49W S9
T132N R49W S10
T132N R49W S11
T132N R49W S12
13
29
205
South Branch Antelope Creek
T132N R48W S7

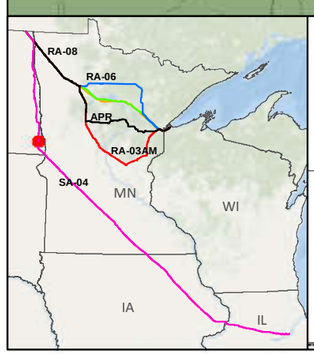

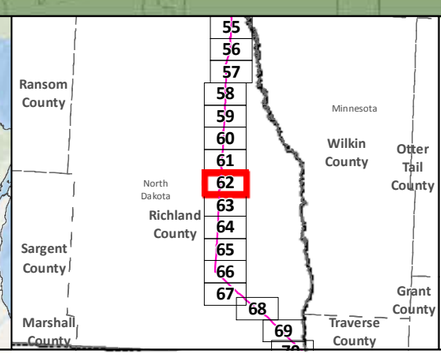

SA-04
Applicant's Preferred Route (APR)

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High
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 62B of 188

T132N R49W S7
T132N R49W S8
T132N R49W S9
T132N R49W S10
T132N R49W S11
T132N R49W S12
T132N R48W S7
T132N R49W S18
T132N R49W S17
T132N R49W S16
T132N R49W S15
T132N R49W S14
T132N R49W S13
T132N R48W S18
South Branch Antelope Creek
206
SA-04
T132N R49W S19
T132N R49W S20
T132N R49W S21
T132N R49W S22
T132N R49W S23
T132N R49W S24
T132N R48W S19
207
29
T132N R49W S30
T132N R49W S29
T132N R49W S28
T132N R49W S27
T132N R49W S26
T132N R49W S25
T132N R48W S30
208
T132N R49W S31
T132N R49W S32

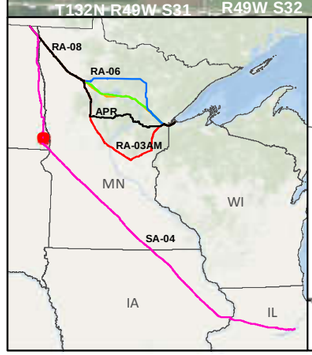

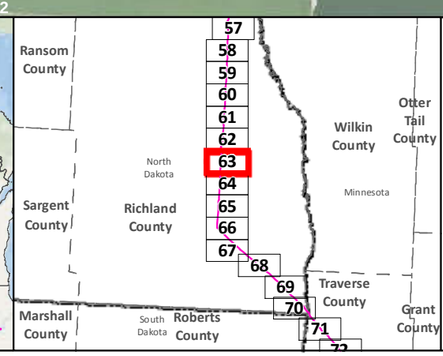

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
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Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 63A of 188

T132N R49W S7
T132N R49W S8
T132N R49W S9
T132N R49W S10
T132N R49W S11
T132N R49W S12
T132N R48W S7
T132N R49W S18
T132N R49W S17
T132N R49W S16
T132N R49W S15
T132N R49W S14
T132N R49W S13
T132N R48W S18
South Branch Antelope Creek
T132N R49W S21
Dakota Tallgrass Prairie Wildlife Management Area
SA-04
206
29
207
T132N R49W S19
T132N R49W S20
T132N R49W S22
T132N R49W S23
T132N R49W S24
T132N R48W S19
T132N R49W S30
T132N R49W S29
T132N R49W S28
T132N R49W S27
T132N R49W S26
T132N R49W S25
T132N R48W S30
208
T132N R49W S31
T132N R49W S32

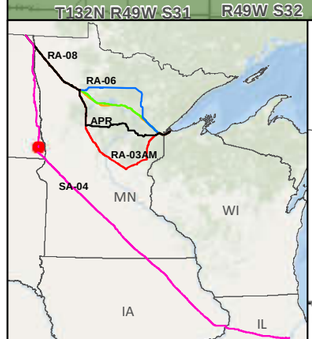

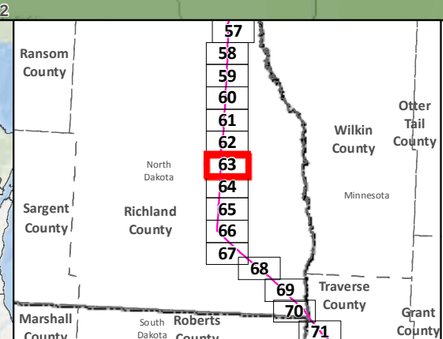

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
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- RA-08
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Township Boundary

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Calcareous Fens
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 63B of 188

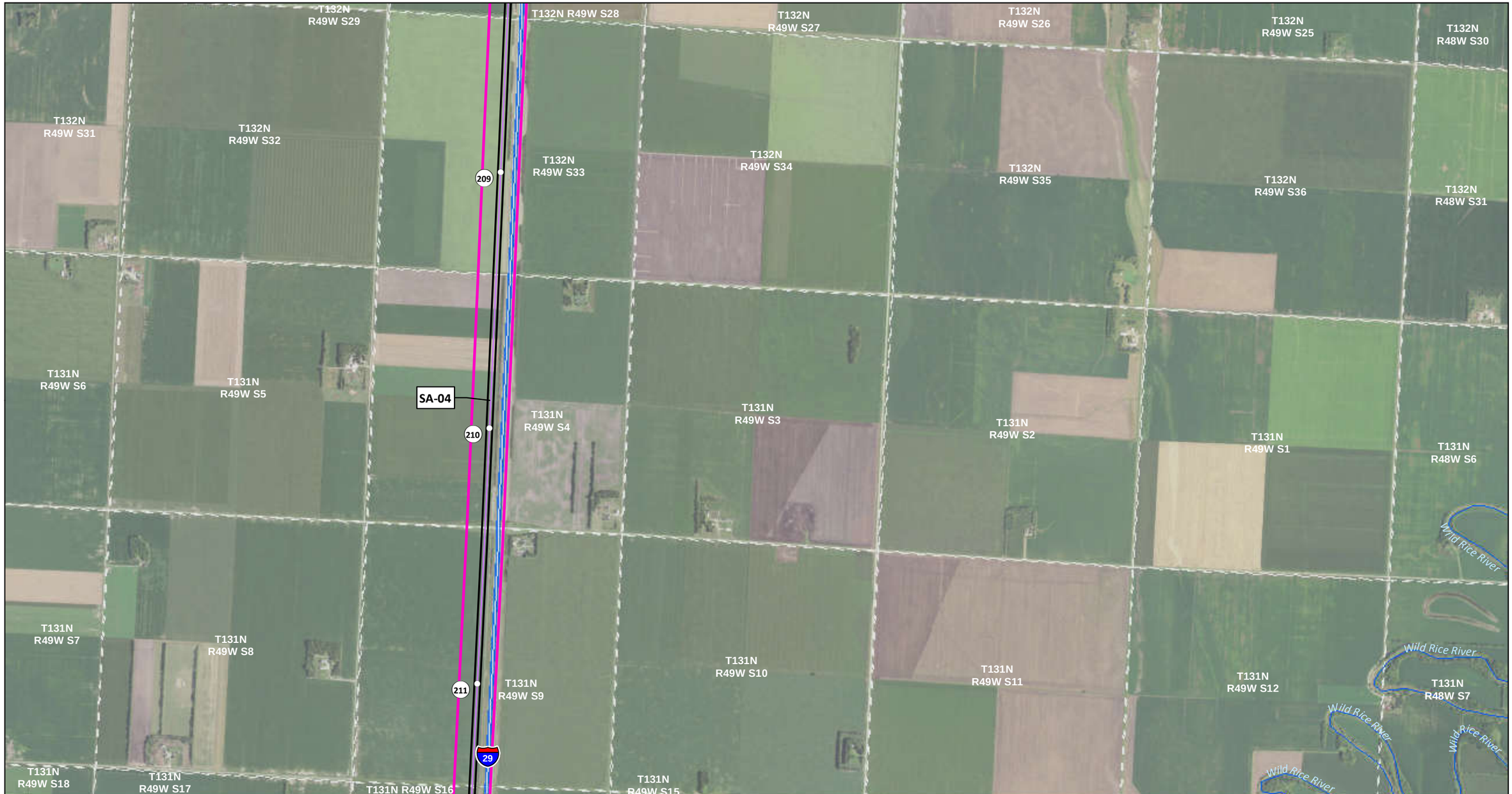

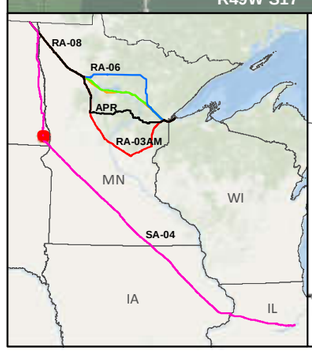

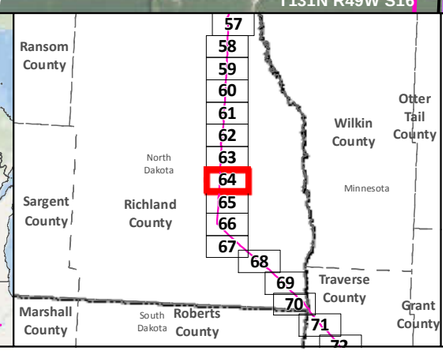

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 64A of 188

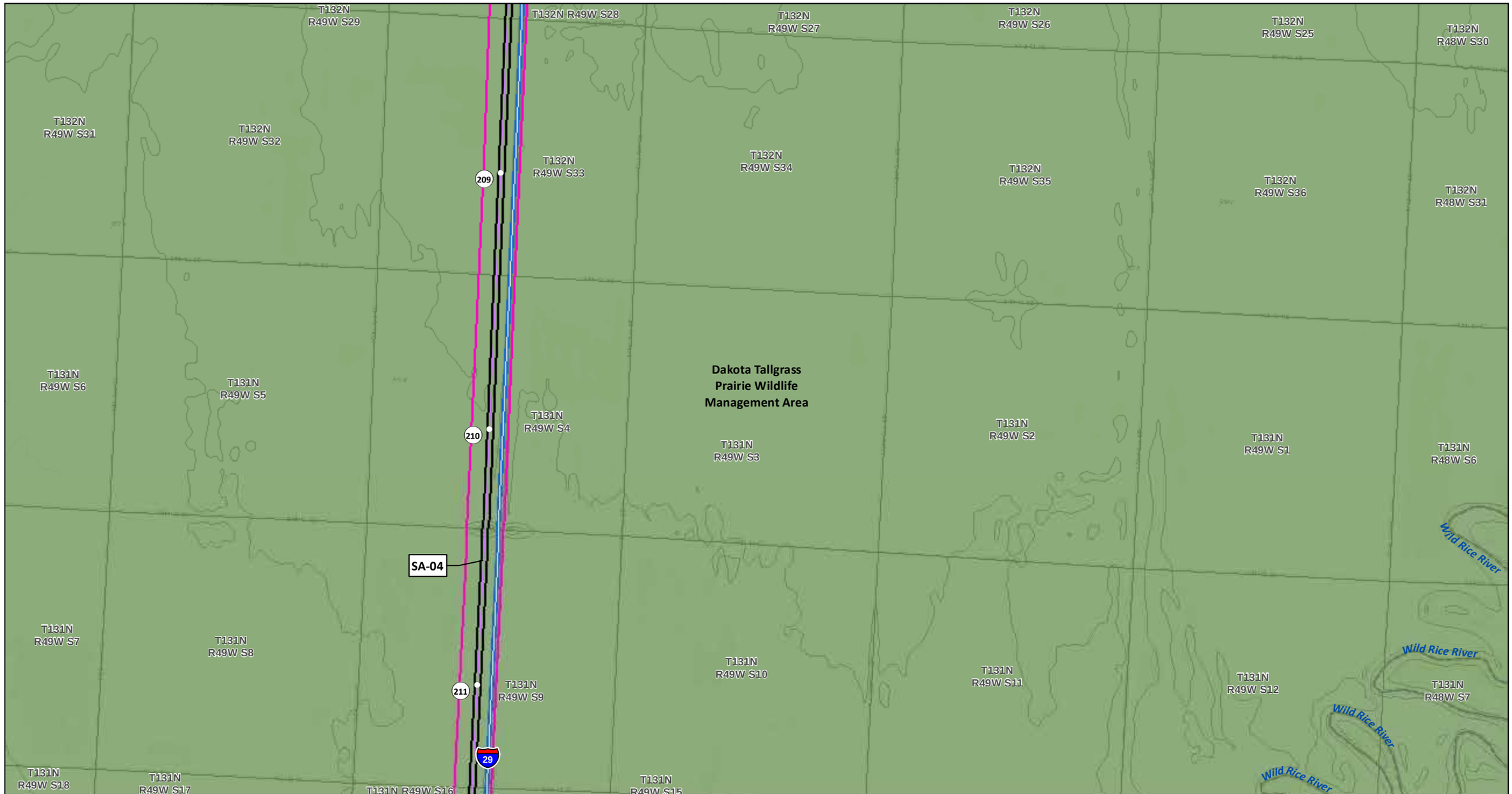

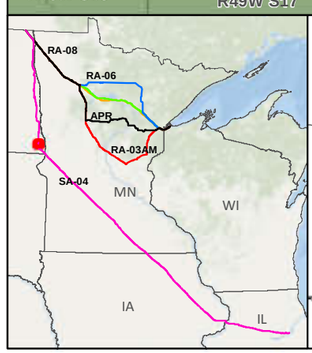

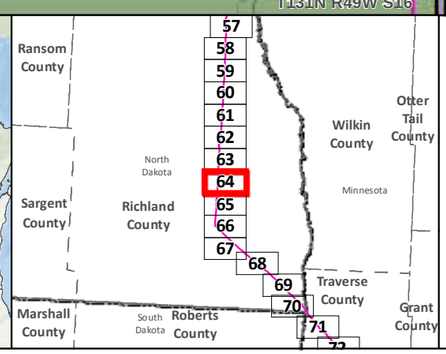

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 64B of 188

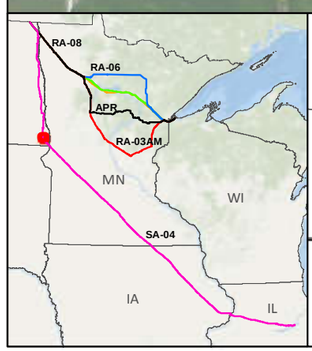

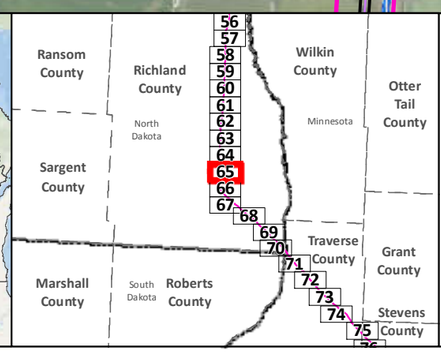

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 65A of 188

T131N R49W S10
T131N R49W S11
T131N R49W S12
T131N R48W S7
T131N R49W S18
T131N R49W S17
T131N R49W S16
T131N R49W S15
T131N R49W S14
T131N R49W S13
T131N R48W S18
Wild Rice River
212
29
Great Bend
T131N R49W S19
T131N R49W S20
T131N R49W S21
T131N R49W S22
Dakota Tallgrass Prairie Wildlife Management Area
T131N R49W S23
T131N R49W S24
T131N R48W S19
213
SA-04
T131N R49W S30
T131N R49W S29
T131N R49W S28
T131N R49W S27
T131N R49W S26
T131N R49W S25
T131N R48W S30
214
T131N R49W S31
T131N R49W S32
T131N R49W S33
T131N R49W S34
T131N R49W S35
T131N R49W S36

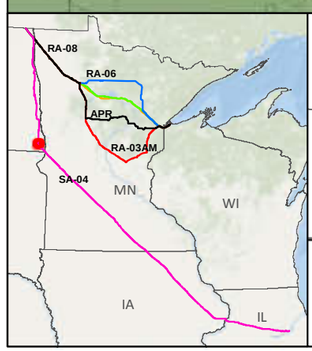

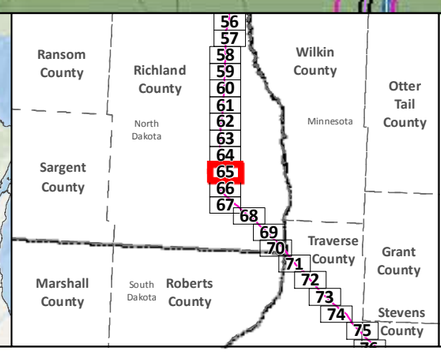

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 65B of 188

T131N R49W S33
T131N R49W S25
T131N R48W S30
T131N R49W S31
T131N R49W S32
T131N R49W S34
T131N R49W S35
T131N R49W S36
T131N R48W S31
T130N R49W S6
T130N R49W S5
T130N R49W S4
T130N R49W S3
T130N R49W S2
T130N R49W S1
T130N R48W S6
T130N R49W S7
T130N R49W S8
T130N R49W S9
T130N R49W S10
T130N R49W S11
T130N R49W S12
T130N R48W S7
T130N R49W S18
T130N R49W S17
T130N R49W S16
T130N R49W S15
T130N R49W S14
T130N R49W S13
T130N R48W S18

215
216
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SA-04

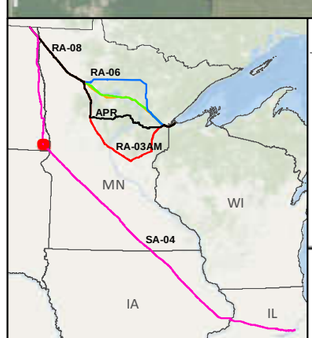

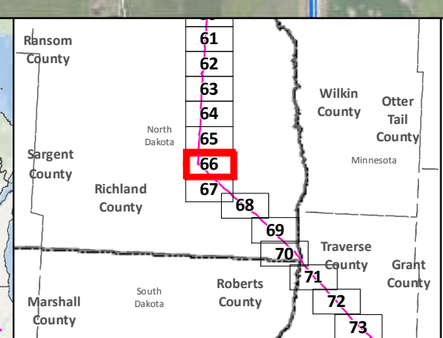

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 66A of 188

T131N R49W S33
T131N R49W S25
T131N R48W S30
T131N R49W S31
T131N R49W S32
T131N R49W S34
T131N R49W S35
T131N R49W S36
T131N R48W S31
T130N R49W S6
T130N R49W S5
T130N R49W S4
T130N R49W S3
Dakota Tallgrass Prairie Wildlife Management Area
T130N R49W S2
T130N R49W S1
T130N R48W S6
T130N R49W S7
T130N R49W S8
T130N R49W S9
T130N R49W S10
SA-04
T130N R49W S11
T130N R49W S12
T130N R48W S7
T130N R49W S18
T130N R49W S17
T130N R49W S16
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T130N R49W S14
T130N R49W S13
T130N R48W S18

215
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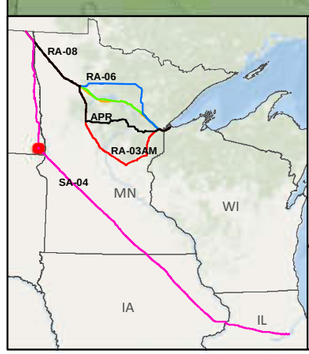

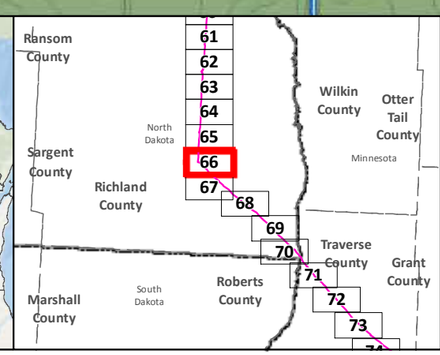

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 66B of 188

T130N R49W S17
T130N R49W S16
T130N R49W S15
T130N R49W S14
T130N R49W S13
T130N R48W S18
T130N R49W S20
T130N R49W S21
T130N R49W S22
T130N R49W S23
T130N R49W S24
T130N R48W S19
T130N R49W S29
T130N R49W S28
T130N R49W S27
T130N R49W S26
T130N R49W S25
T130N R48W S30
T130N R49W S32
T130N R49W S33
T130N R49W S34
T130N R49W S35
T130N R49W S36
T130N R48W S31

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SA-04
175th

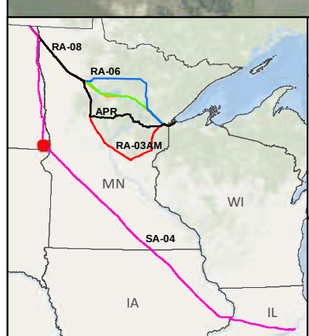

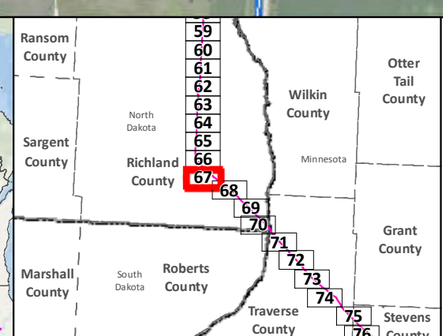

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 67A of 188

T130N R49W S17
T130N R49W S16
T130N R49W S15
T130N R49W S14
T130N R49W S13
T130N R48W S18
T130N R49W S20
T130N R49W S21
T130N R49W S22
T130N R49W S23
T130N R49W S24
T130N R48W S19
T130N R49W S29
T130N R49W S28
T130N R49W S27
T130N R49W S26
T130N R49W S25
T130N R48W S30
T130N R49W S32
T130N R49W S33
T130N R49W S34
T130N R49W S35
T130N R49W S36
T130N R48W S31

Dakota Tallgrass Prairie Wildlife Management Area

SA-04

29
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222

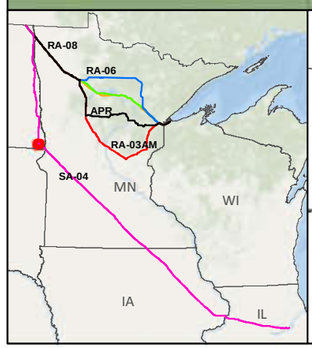

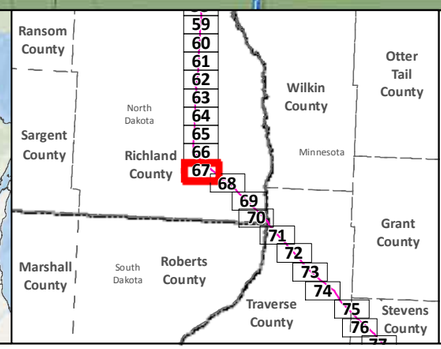

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 67B of 188

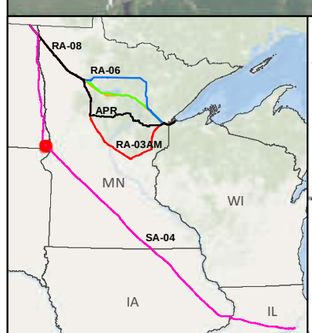

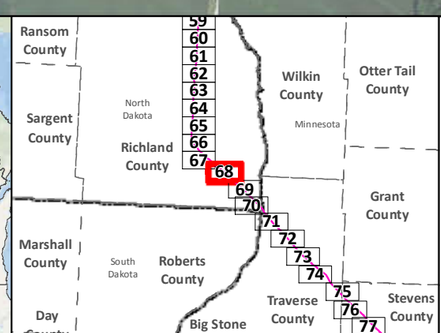

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 68A of 188

T130N R48W S22
11
T130N R48W S23
T130N R48W S24
T130N R49W S25
T130N R48W S30
T130N R48W S29
T130N R48W S28
T130N R48W S27
T130N R48W S26
T130N R48W S25
222
223
224
225
226
T130N R49W S36
T130N R48W S31
T130N R48W S32
T130N R48W S33
T130N R48W S34
T130N R48W S35
T130N R48W S36
Dakota Tallgrass Prairie Wildlife Management Area
SA-04
T129N R49W S1
T129N R48W S6
T129N R48W S5
T129N R48W S4
T129N R48W S3
T129N R48W S2
T129N R48W S1
T129N R49W S12
T129N R48W S7
T129N R48W S8
T129N R48W S9
T129N R48W S10
T129N R48W S11
T129N R48W S12

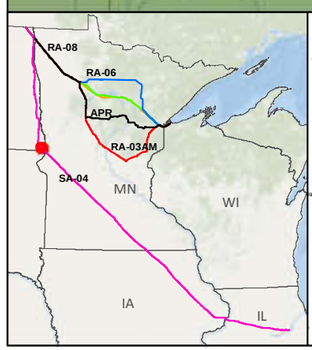

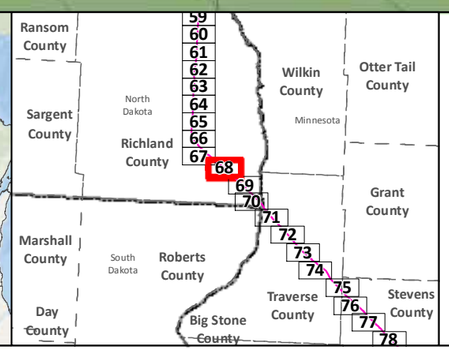

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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- Wildlife Refuge Inventory
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- High
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Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 68B of 188

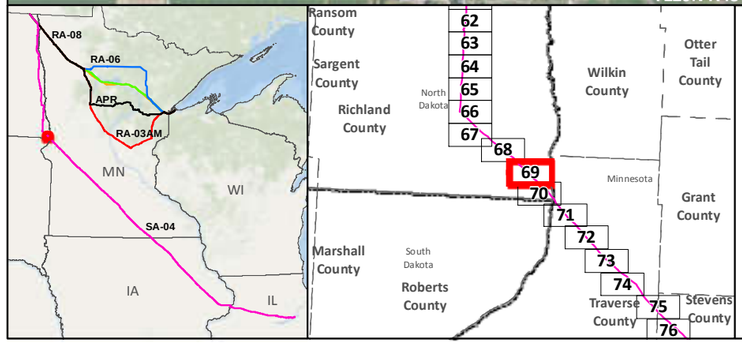

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 69A of 188

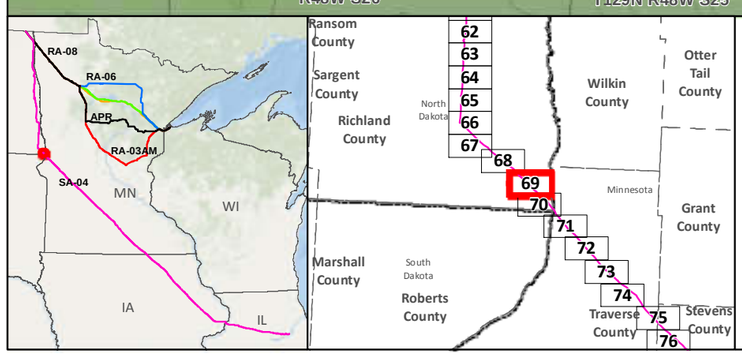

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 69B of 188

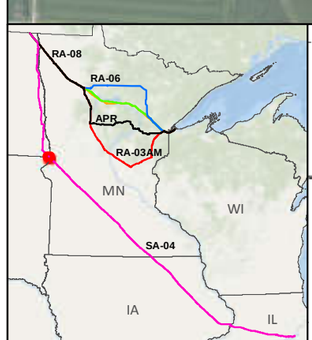

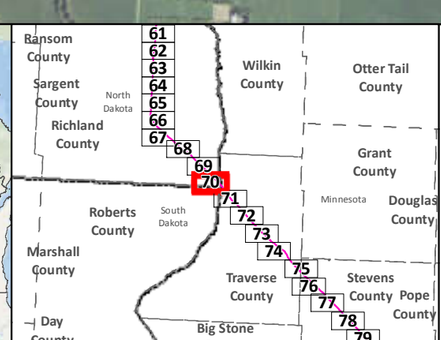

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 70A of 188

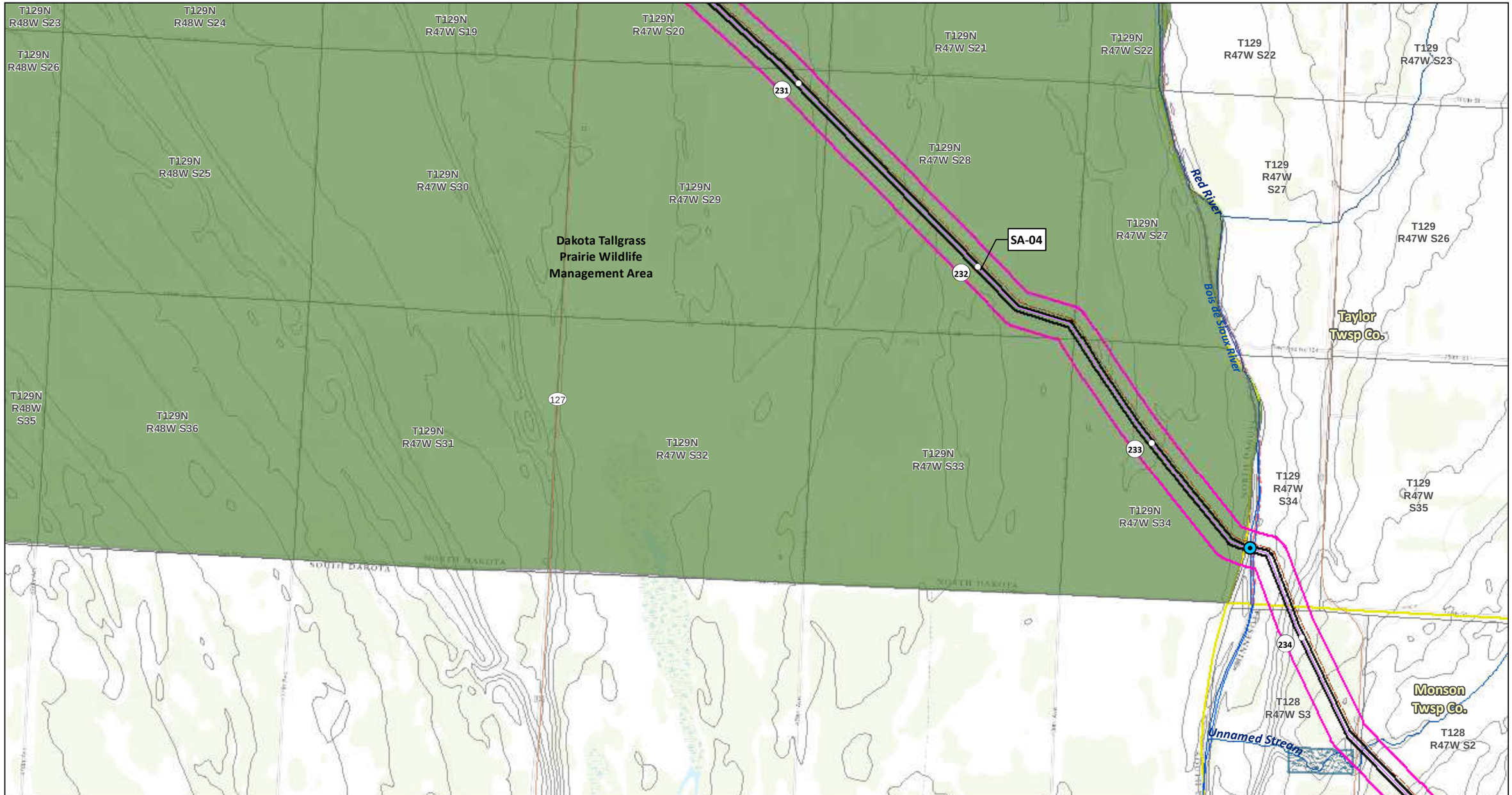

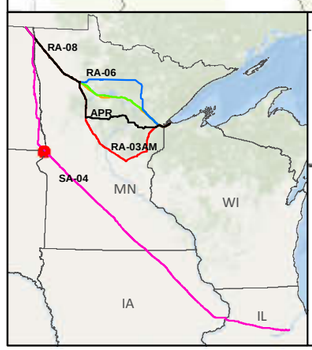

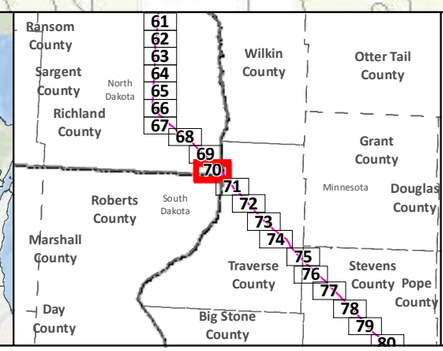

SA-04

Applicant's Preferred Route (APR)

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Mile Post

Anticipated 120' Construction ROW

Route Width (750')

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- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

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0 125 250 500 Meters

10ft Contours

N

Map 70B of 188

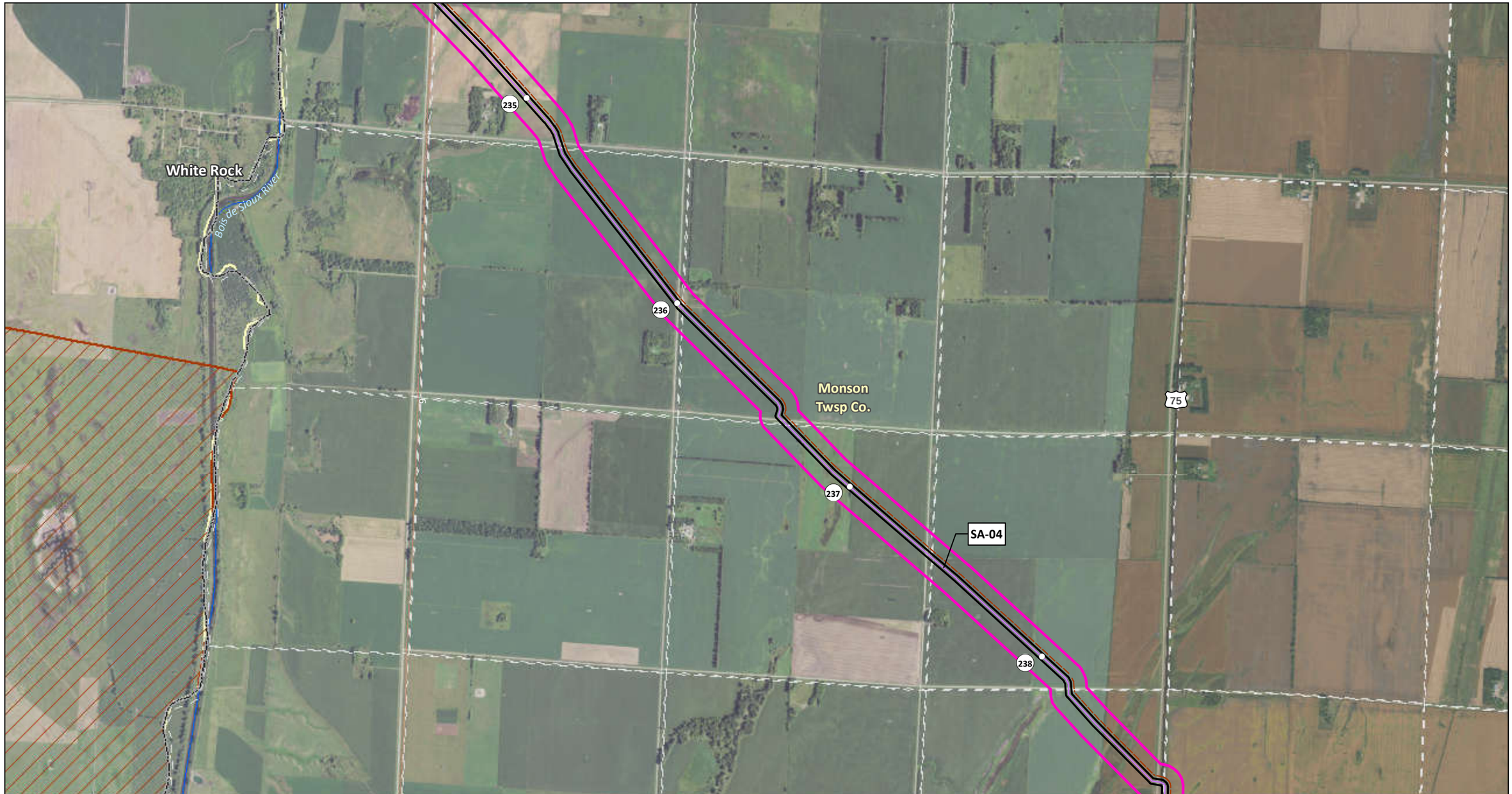

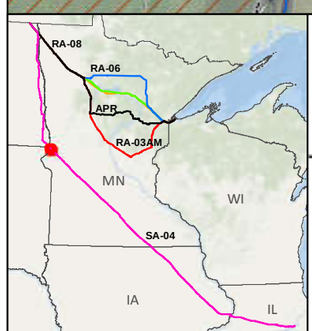

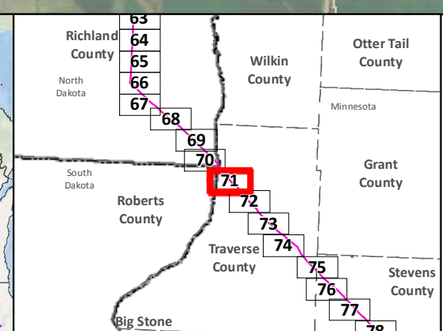

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 71A of 188

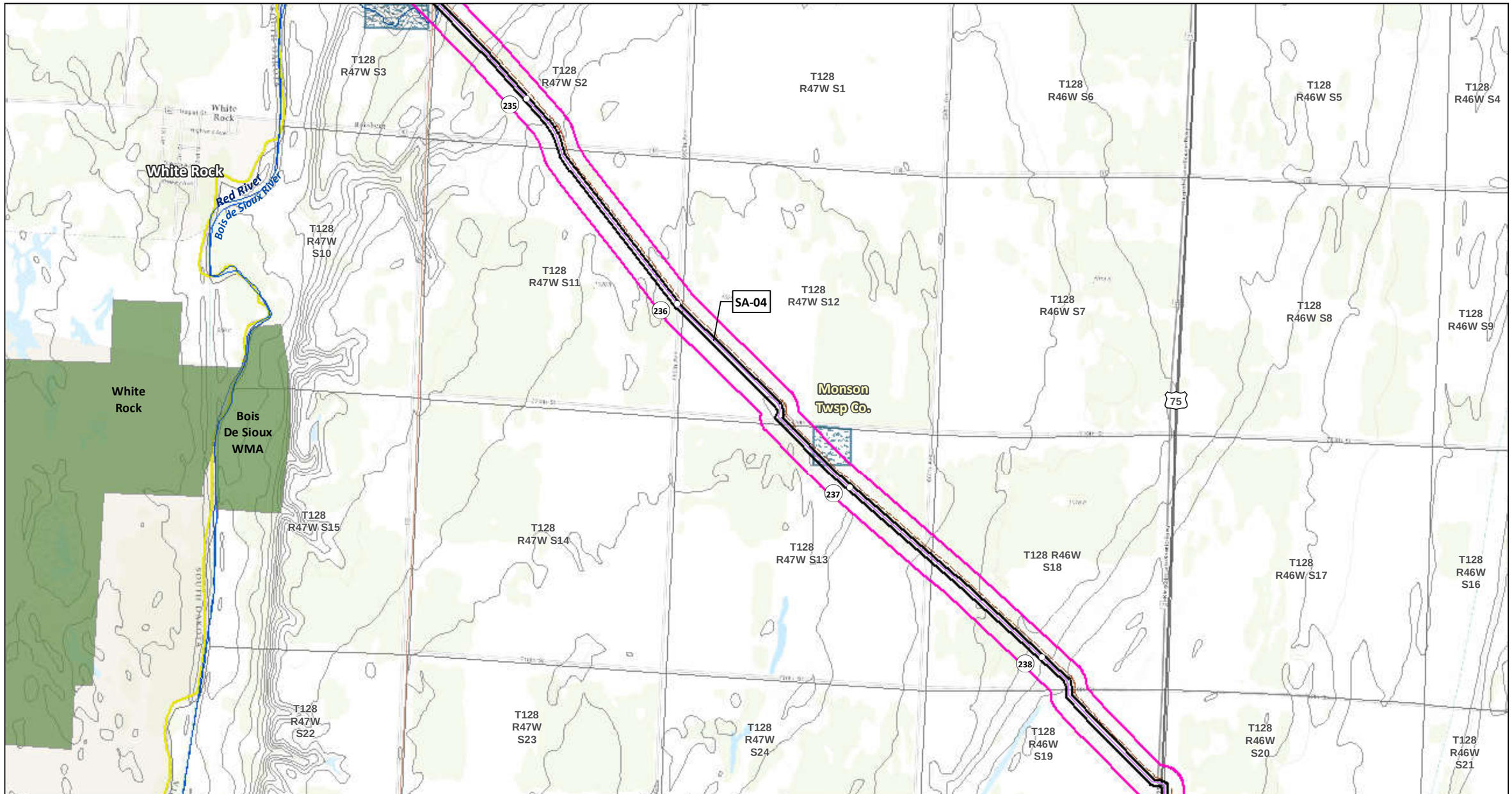

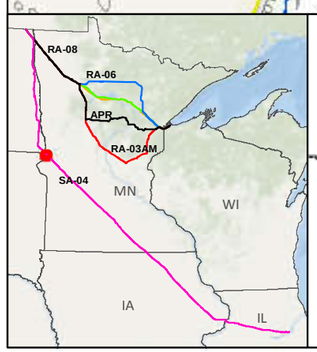

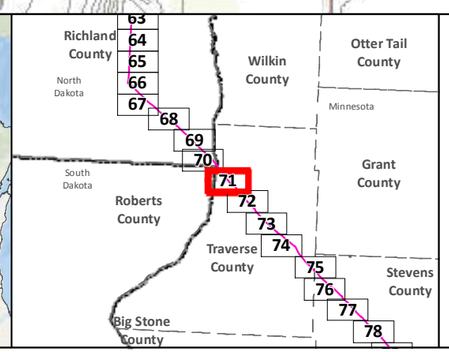

SA-04

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Public Drinking Water Supply

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Native Plant Communities with Biodiversity Significance

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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

Map 71B of 188

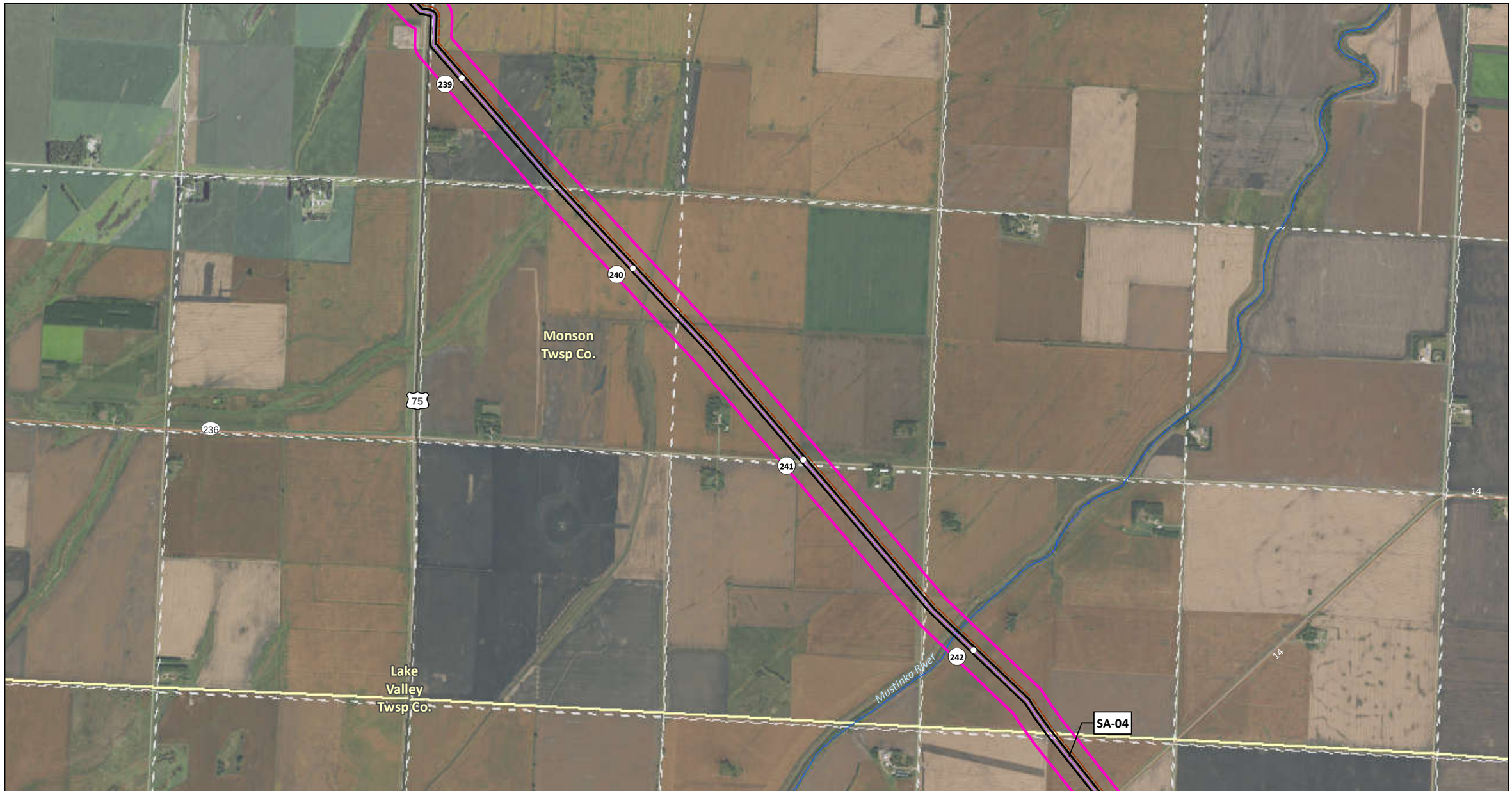

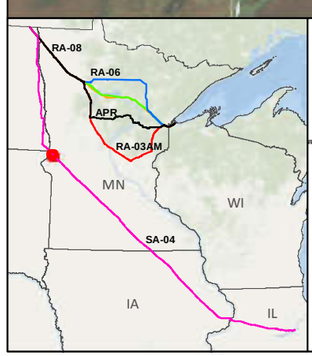

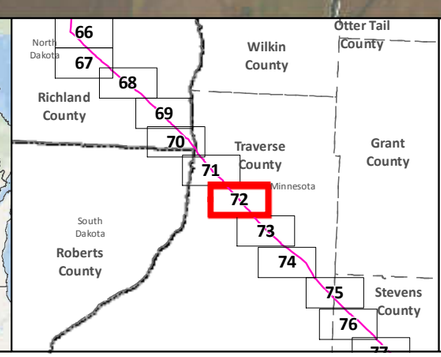

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 72A of 188

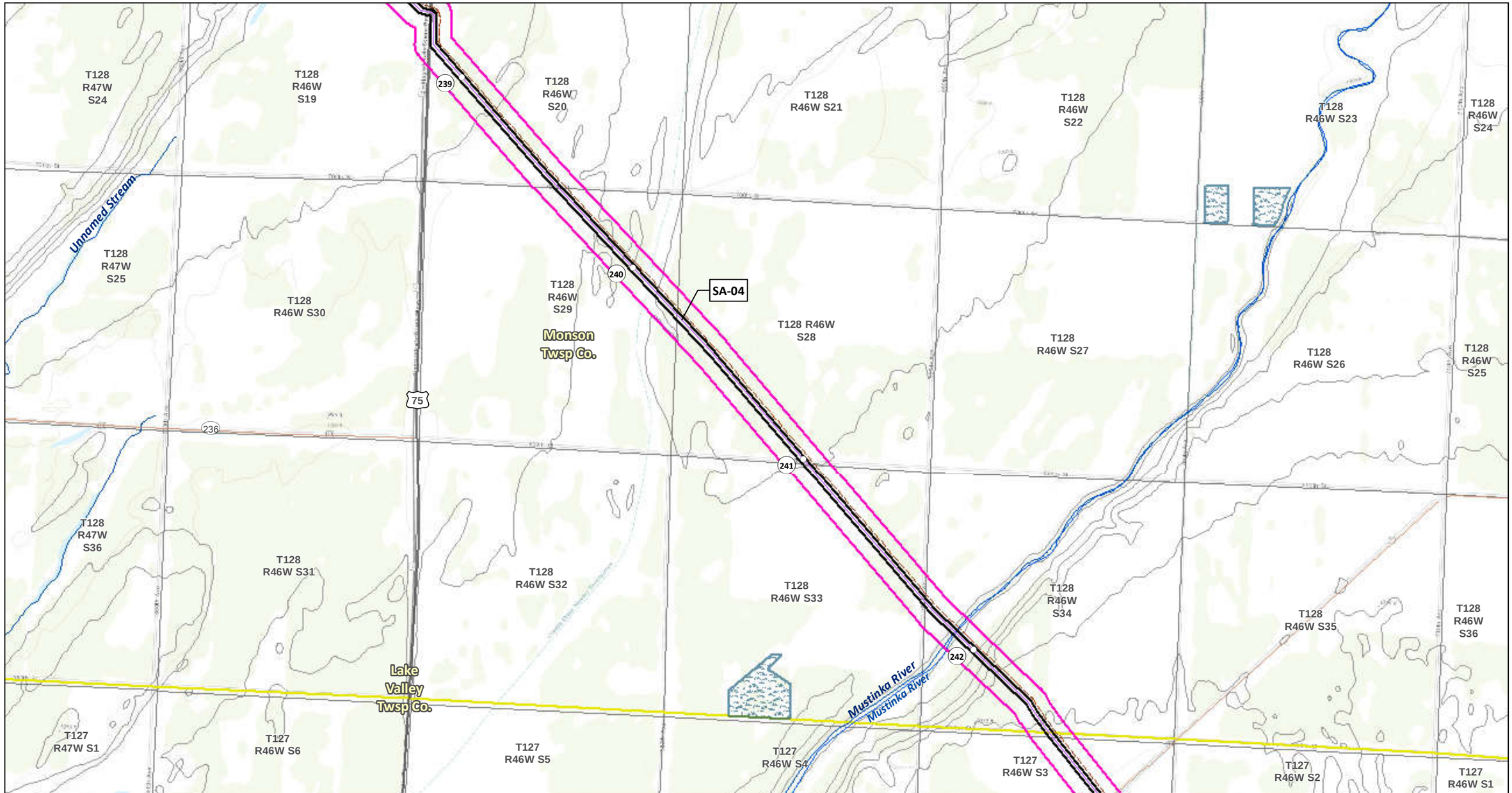

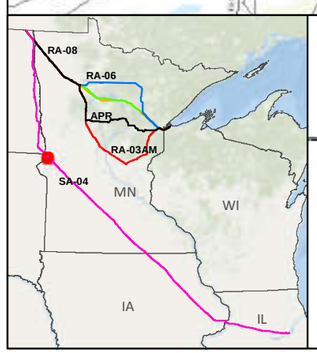

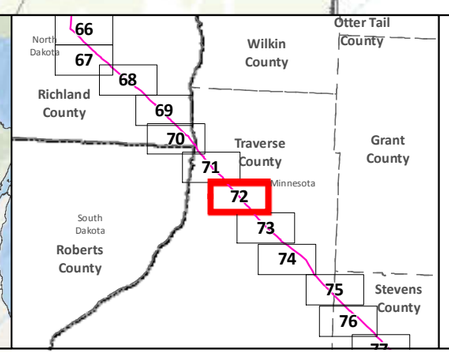

SA-04

Applicant's Preferred Route (APR)

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Route Width (750')

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Native Plant Communities with Biodiversity Significance

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 72B of 188

Mustinka River

243

244

245

246

247

14

27

Lake Valley
Twsp Co.

Clifton
Twsp Co.

West Branch Twelvemile Creek

SA-04

Eighteenmile Creek

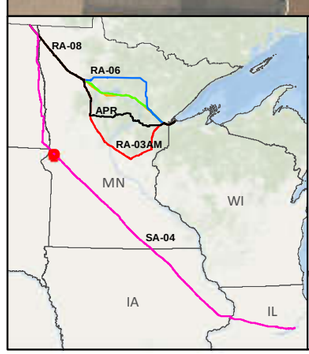

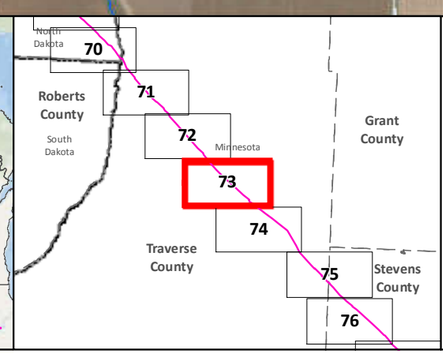

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 73A of 188

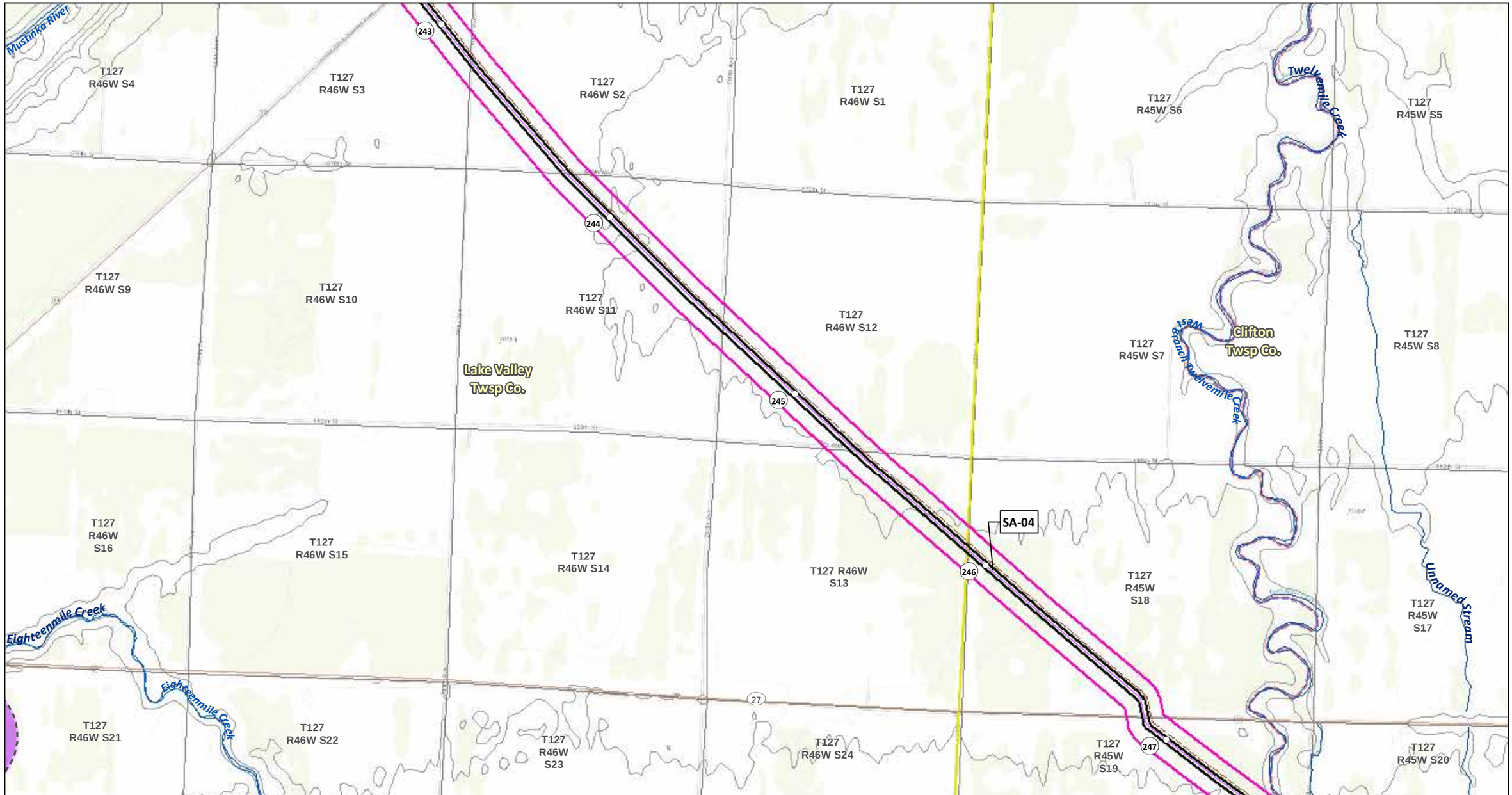

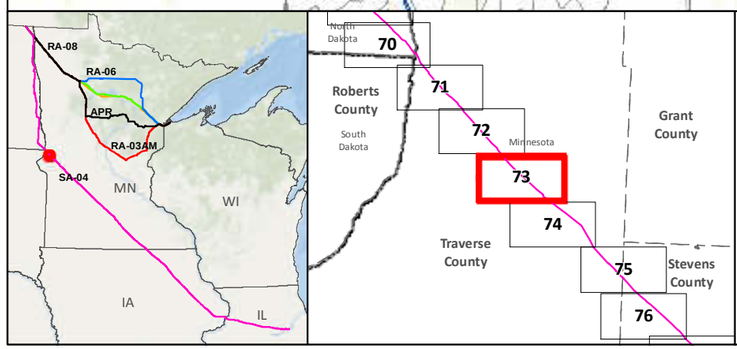

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
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- RA-08

Mile Post
Anticipated 120' Construction ROW
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

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10ft Contours

Map 73B of 188

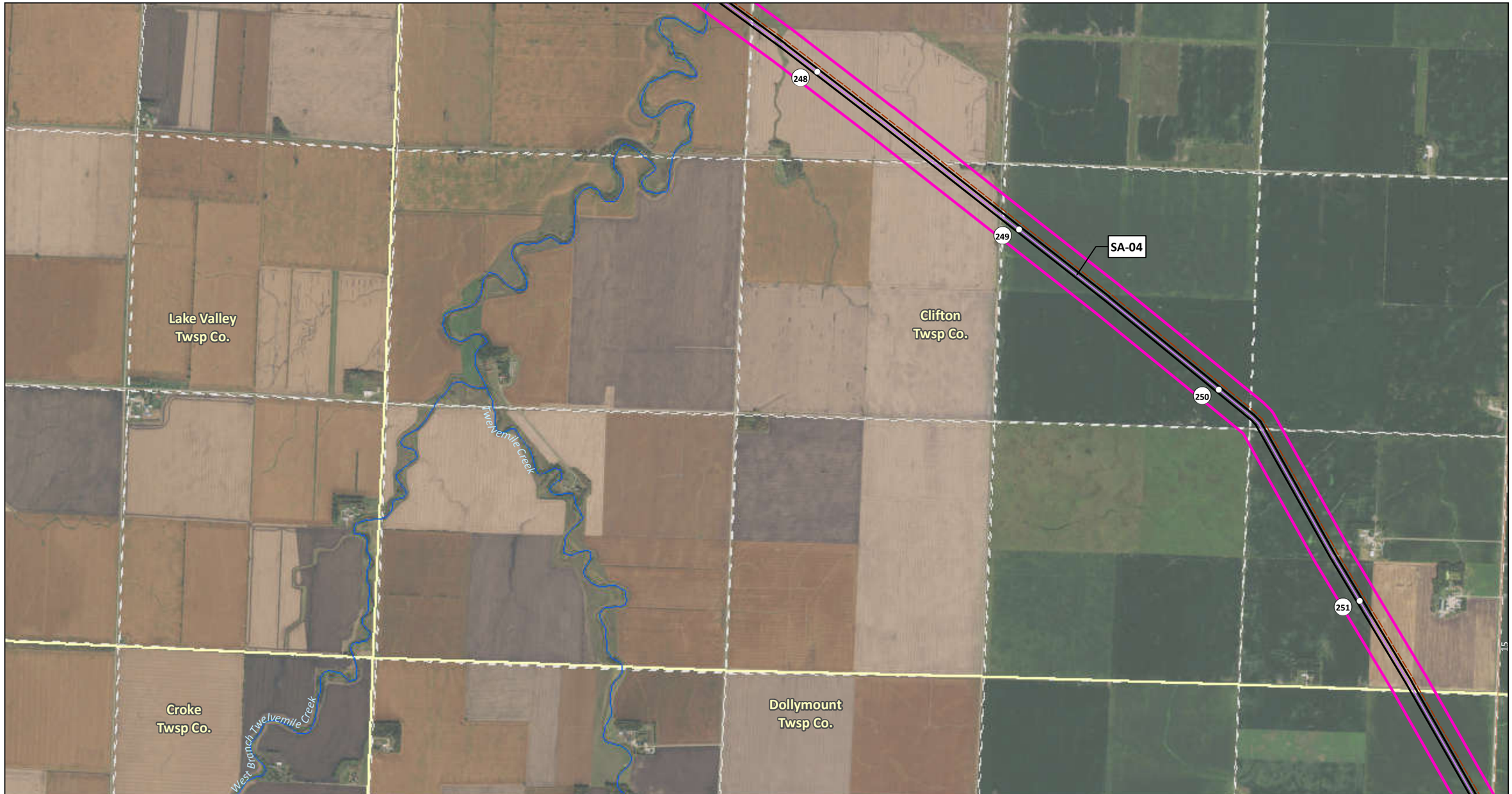

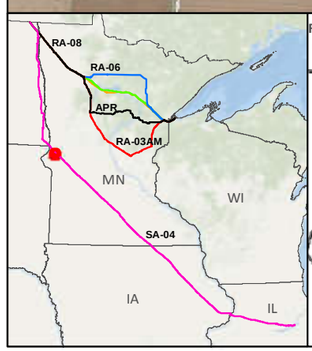

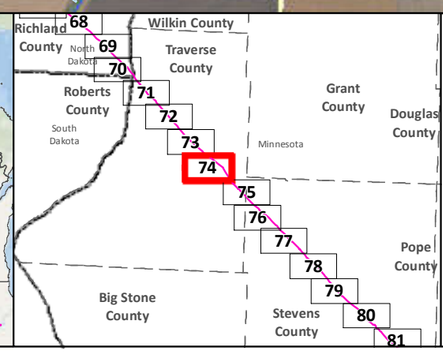

SA-04
Applicant's Preferred Route (APR)
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1:24,000
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 74A of 188

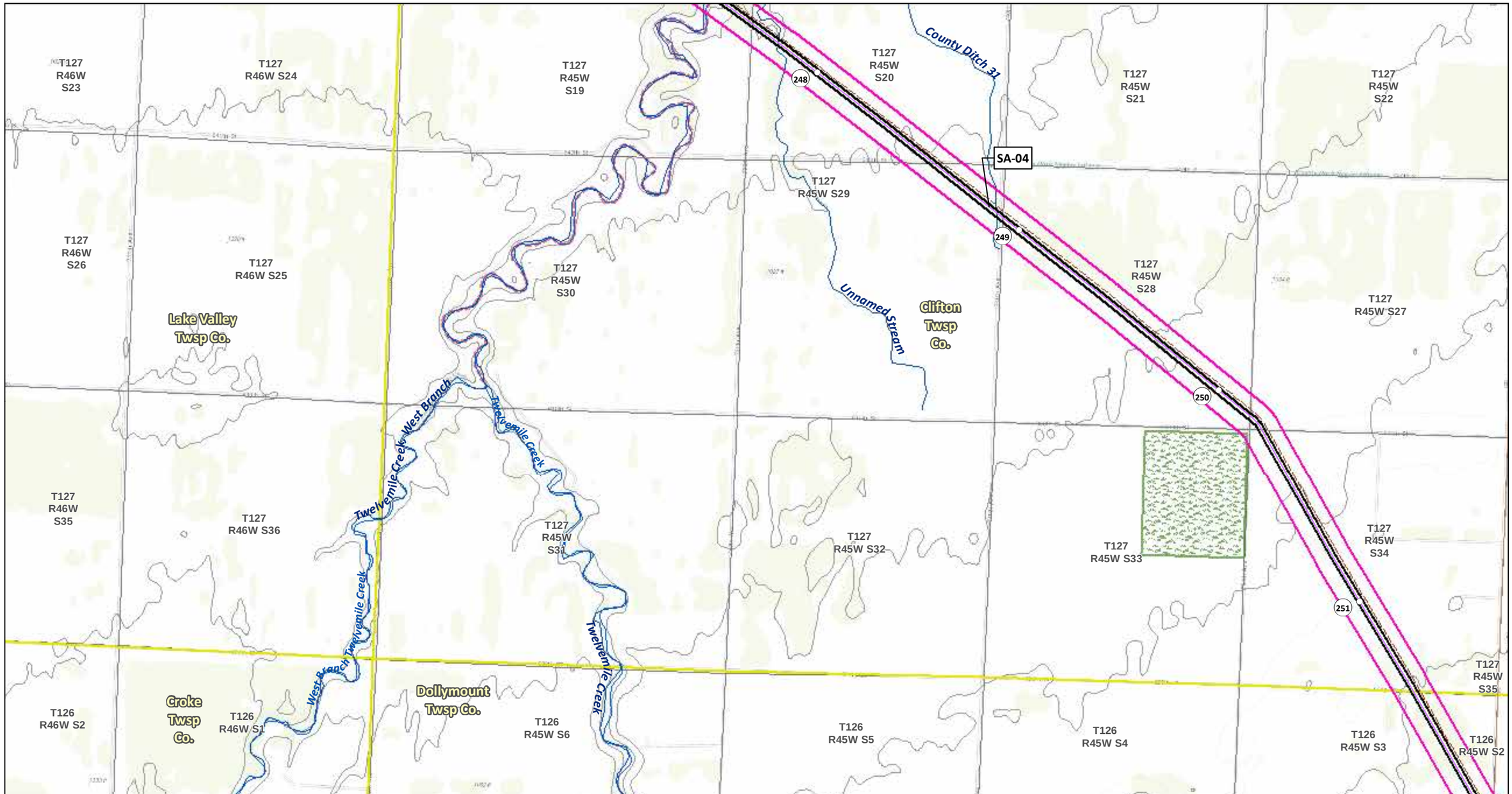

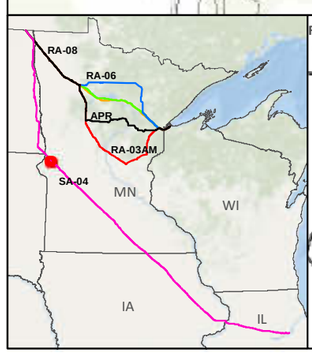

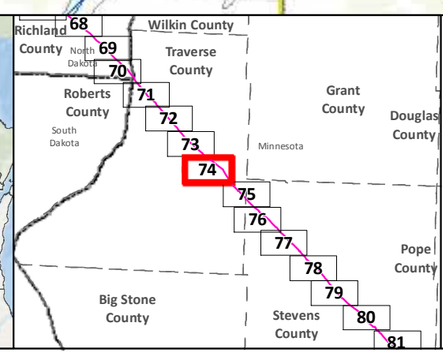

SA-04

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 74B of 188

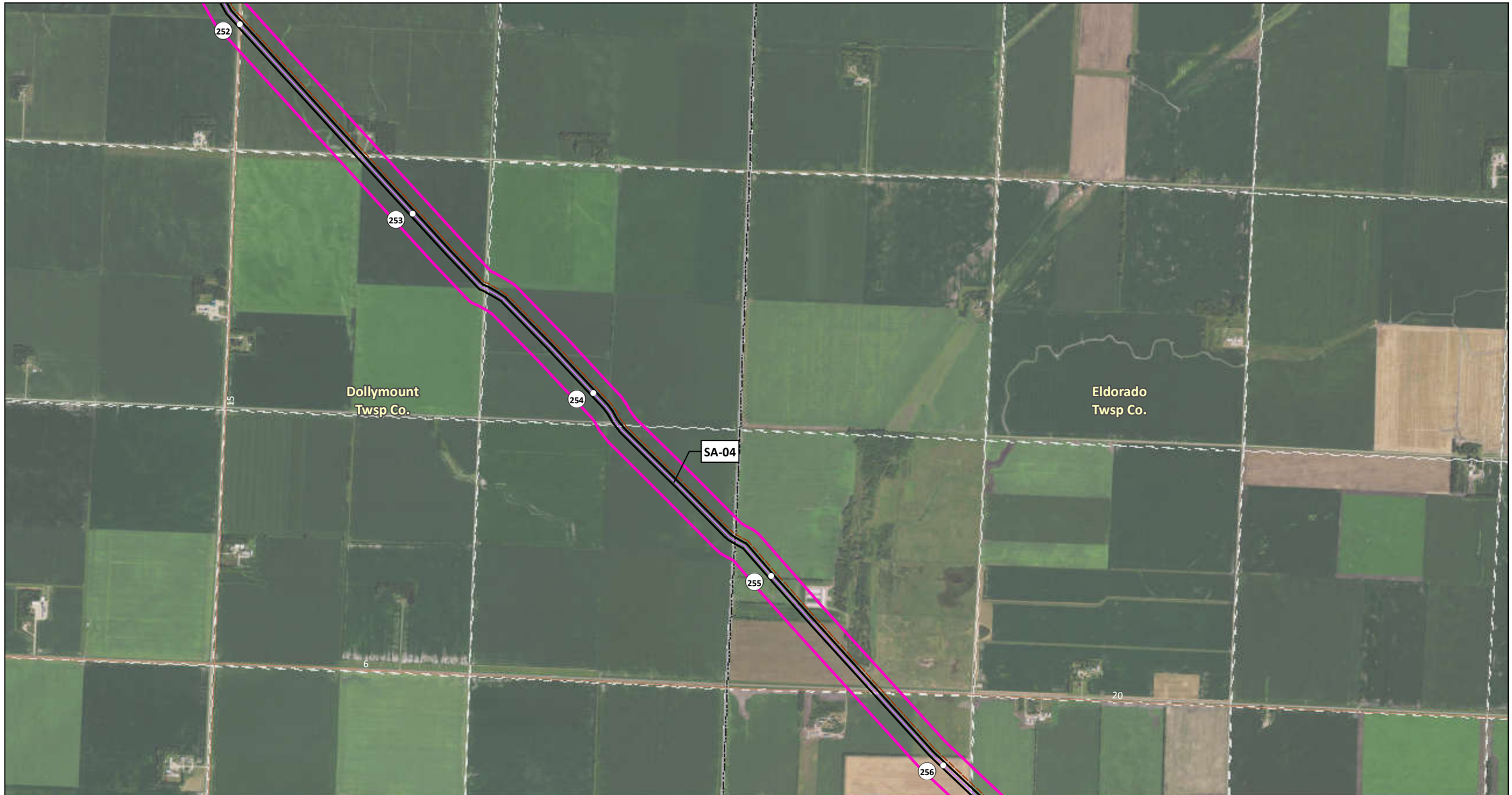

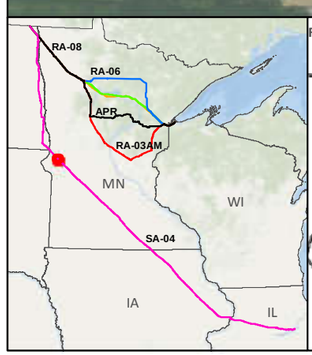

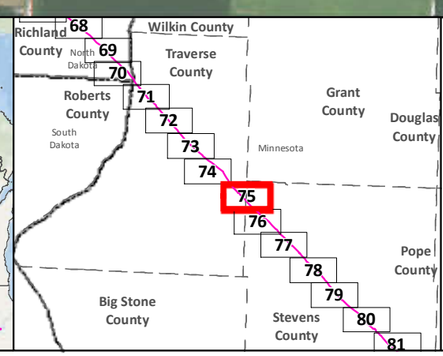

SA-04
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Route Width (750')
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Existing Pipeline
Interstate
Highway
Major Road
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National Forest
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Water Resources
Lake
River

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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 75A of 188

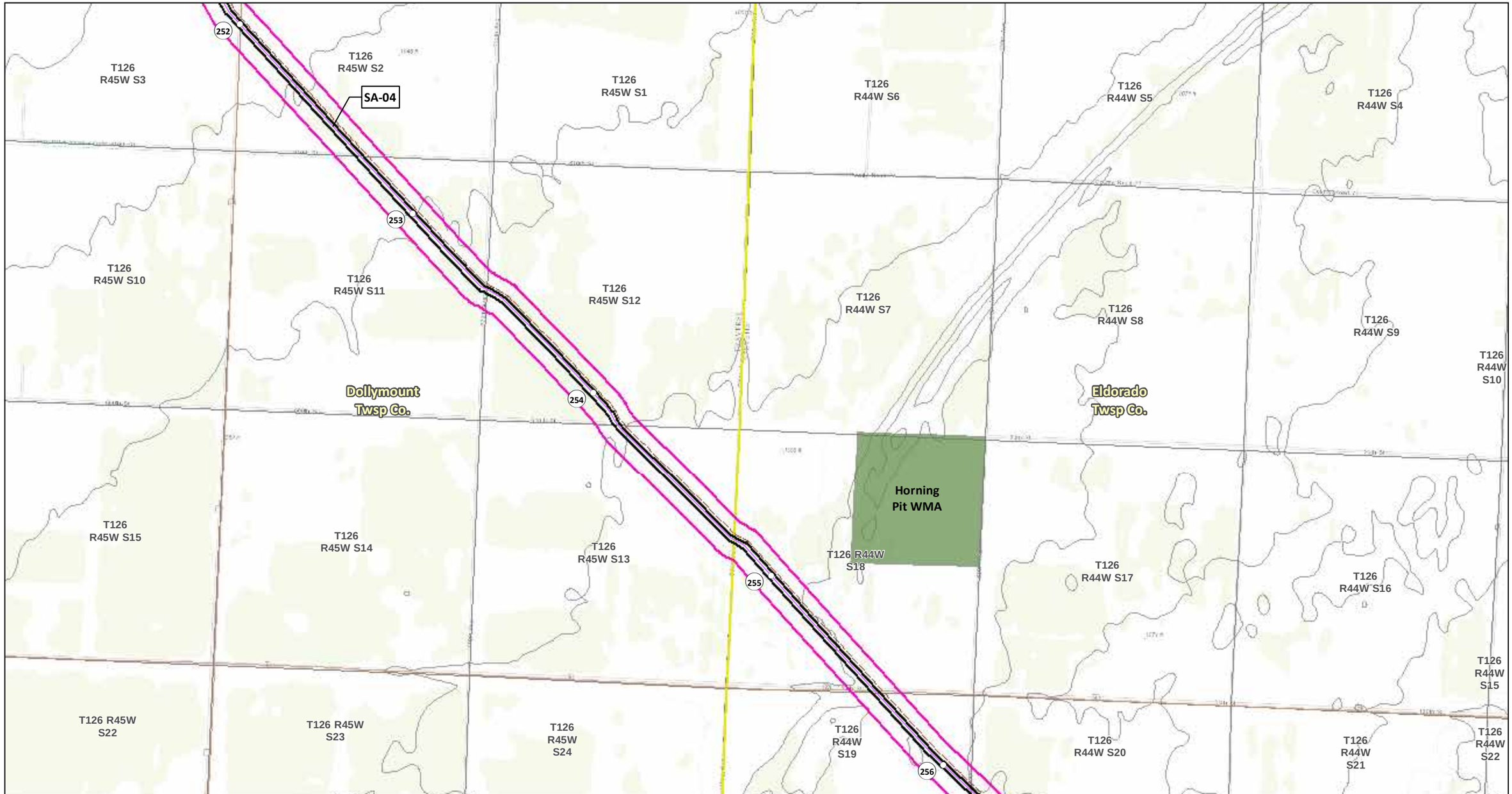

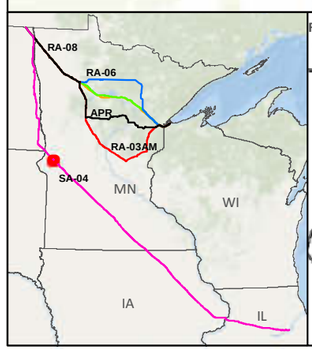

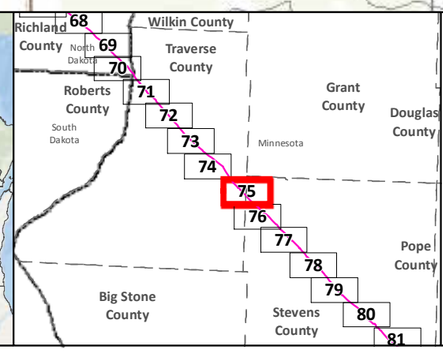

SA-04
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Mile Post
Anticipated 120' Construction ROW
Route Width (750')

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- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 75B of 188

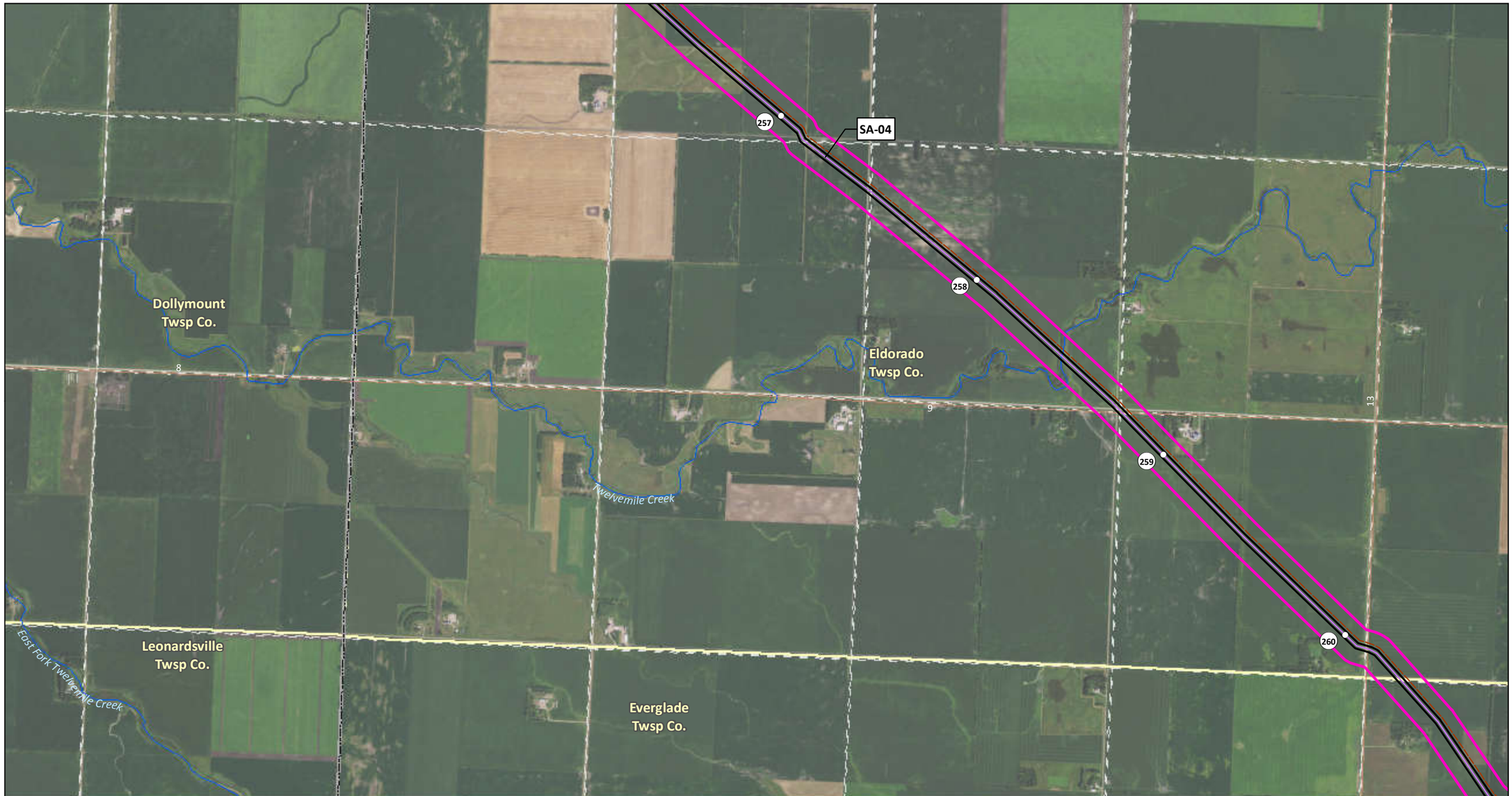

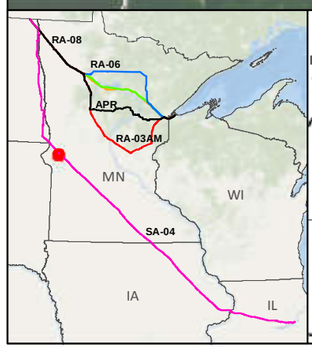

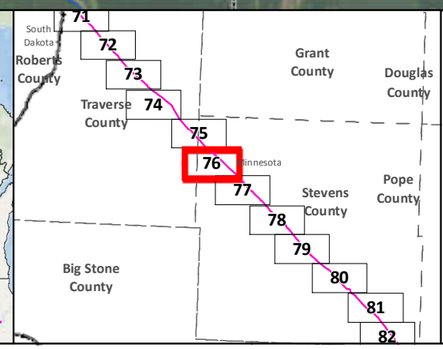

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 76A of 188

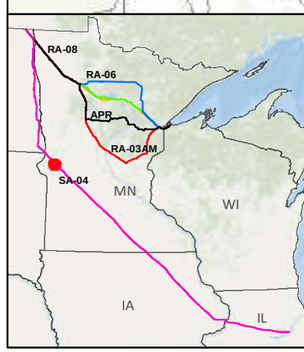

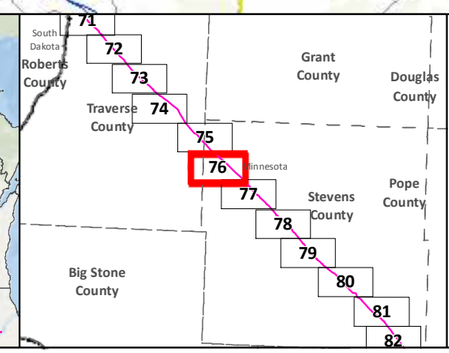

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 76B of 188

261
262
263
264
SA-04
Everglade Twsp Co.
Pepperton Twsp Co.
13
16

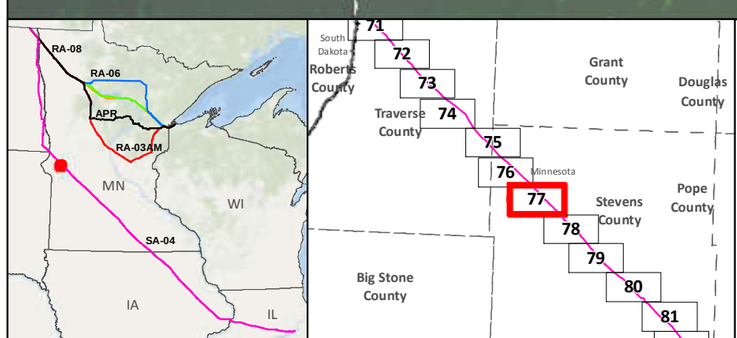

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 77A of 188

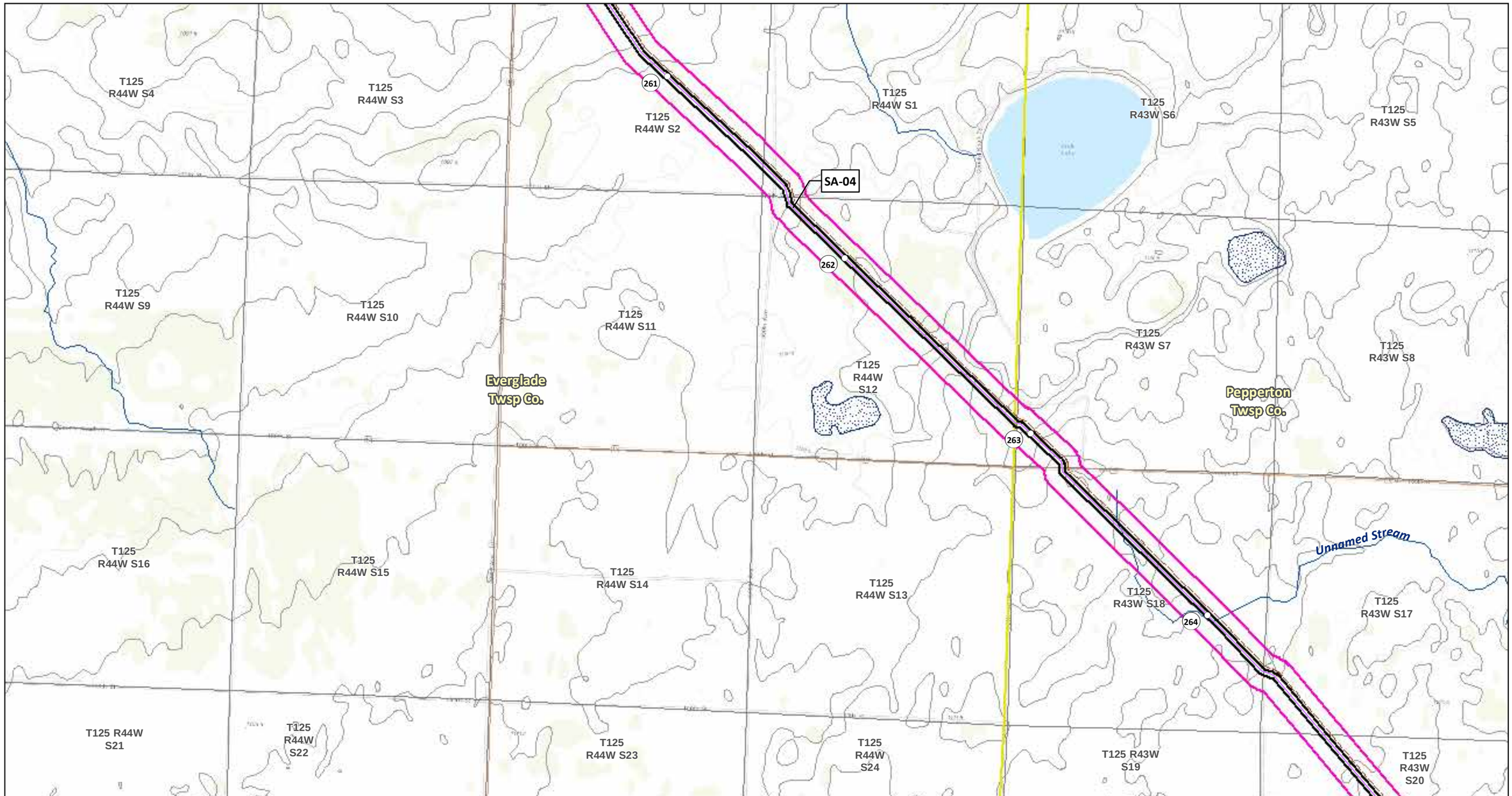

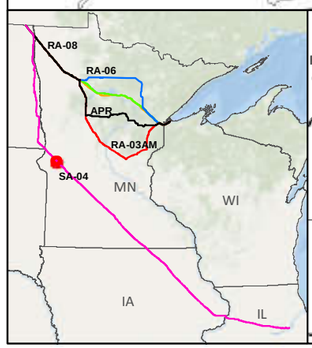

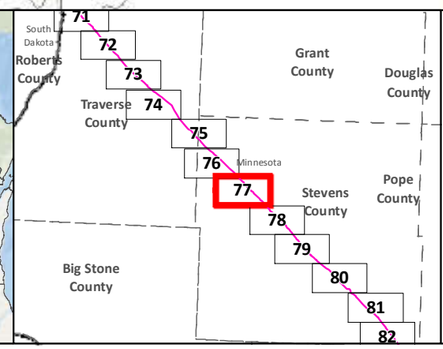

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
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Water Resources

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- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 77B of 188

Everglade Twsp Co.

Pepperton Twsp Co.

Baker Twsp Co.

Scott Twsp Co.

SA-04

266

267

268

269

Muddy Creek

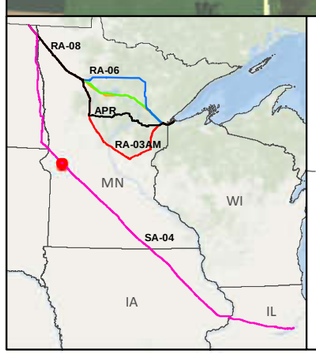

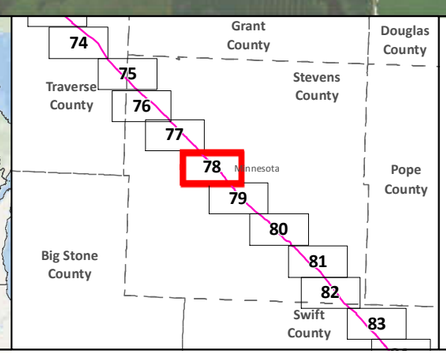

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources: MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 78A of 188

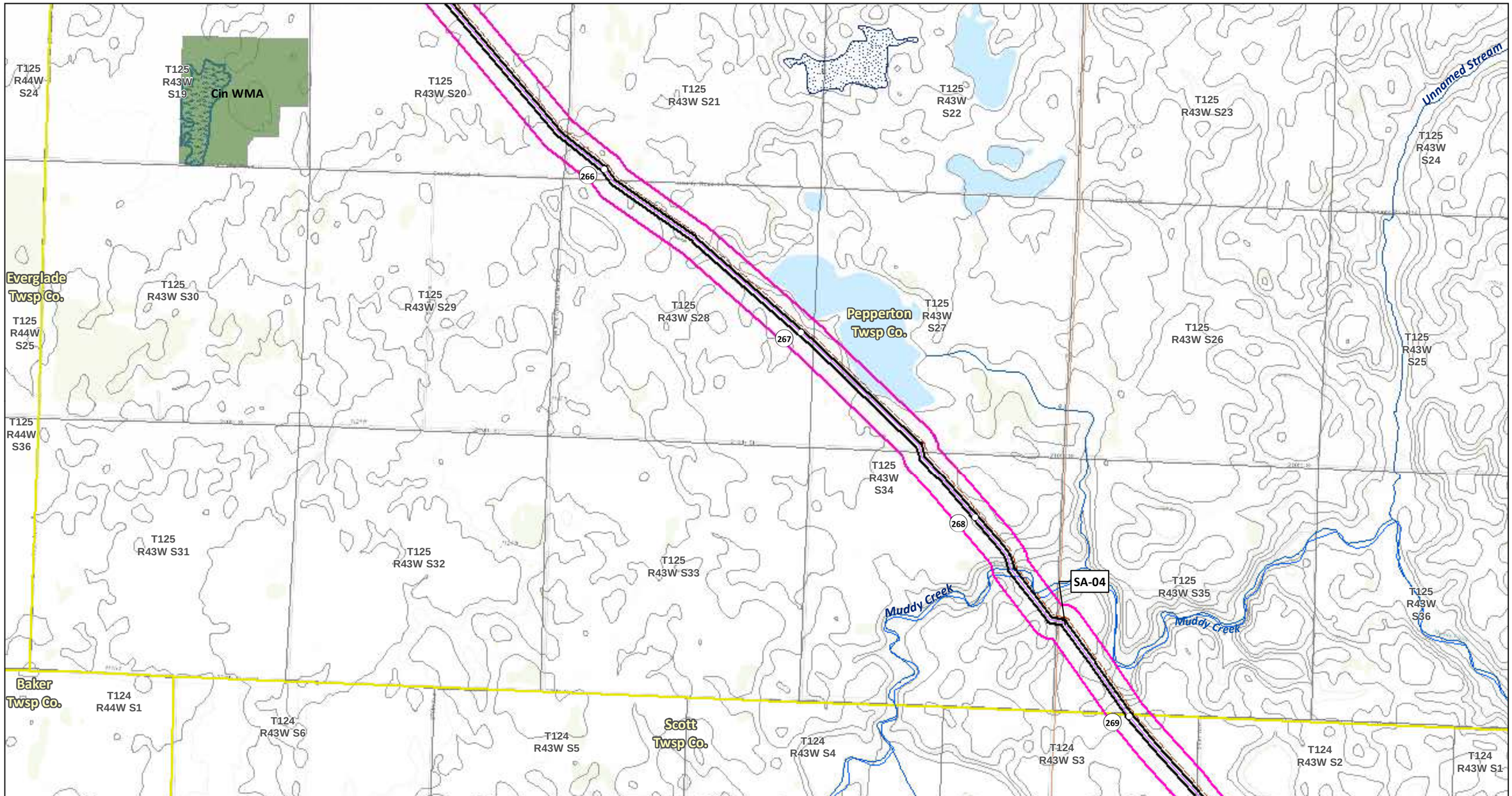

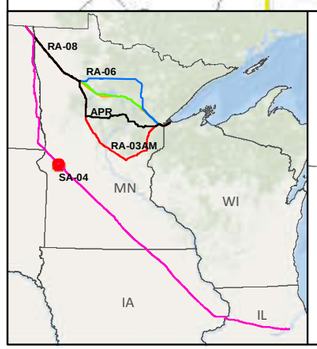

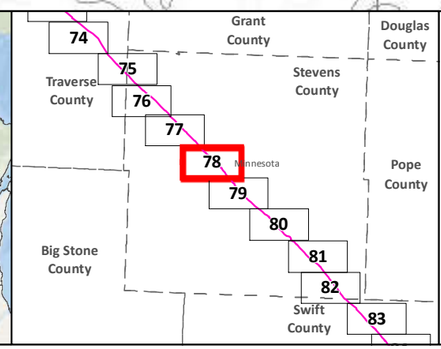

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 78B of 188

Alberta Twsp Co.

Main

Alberta

Muddy Creek

270

28

271

SA-04

Scott Twsp Co.

Muddy Creek

Darnen Twsp Co.

272

273

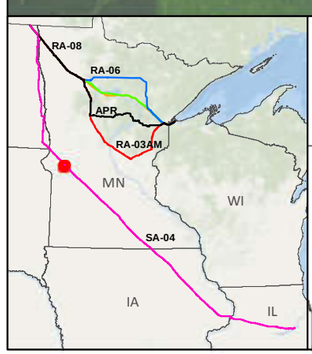

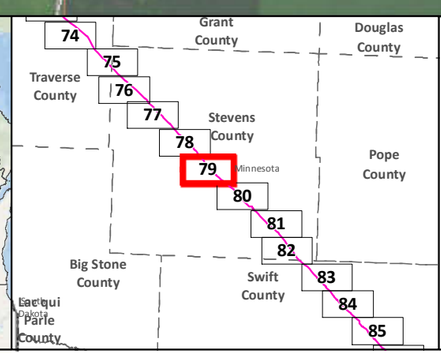

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 79A of 188

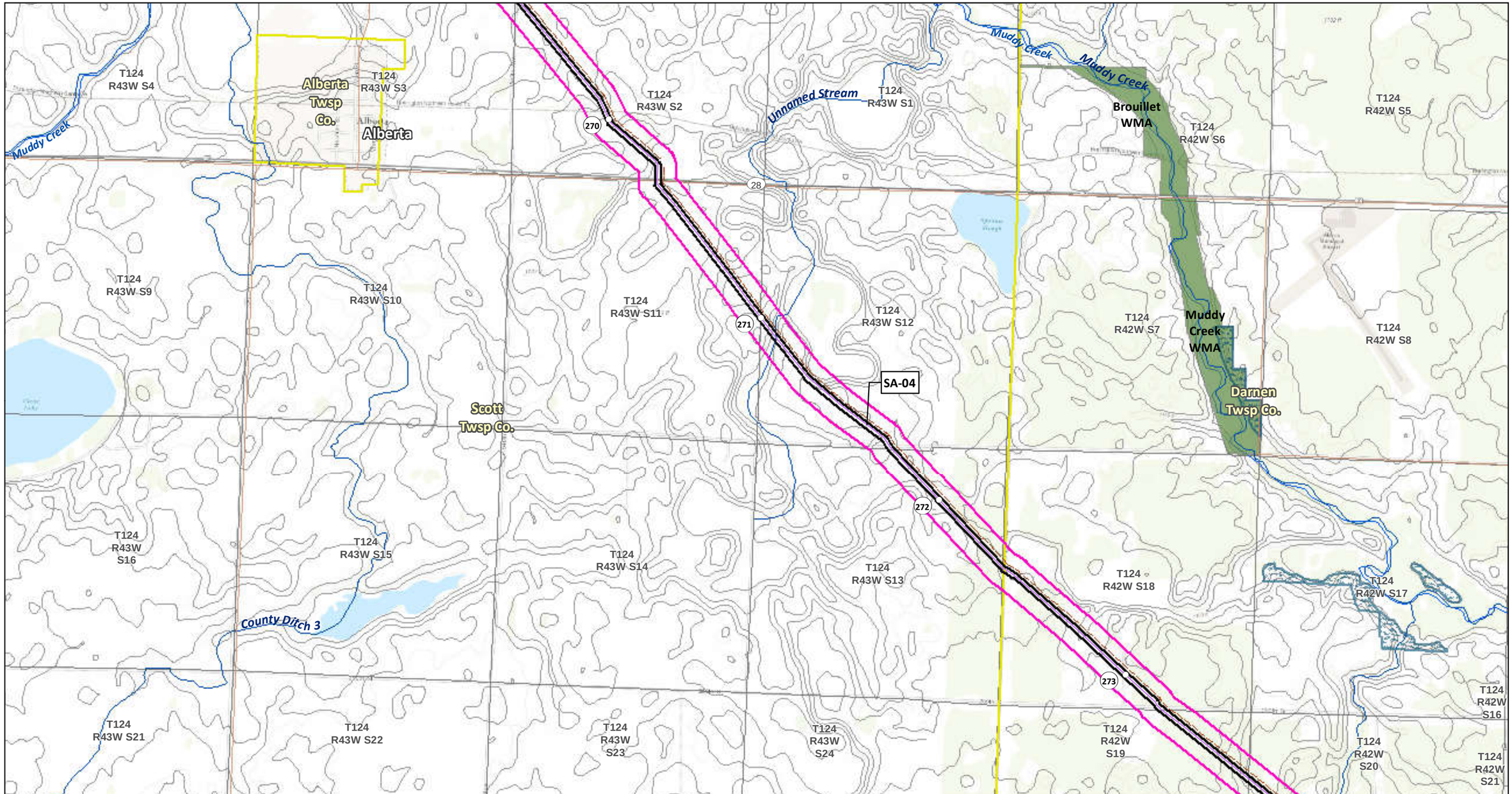

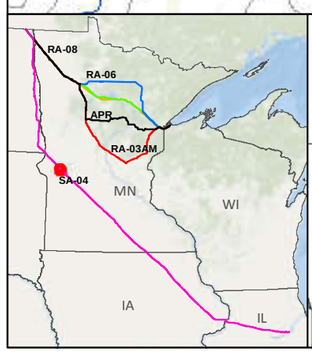

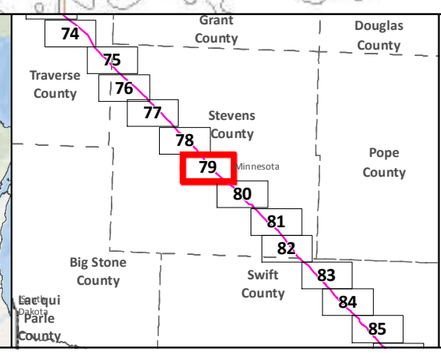

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 79B of 188

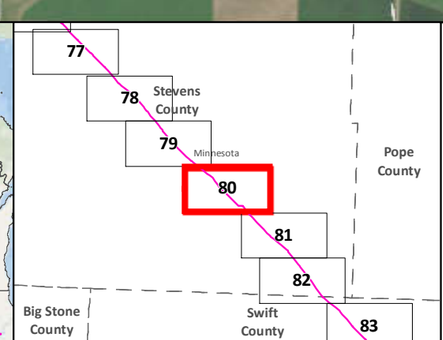

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 80A of 188

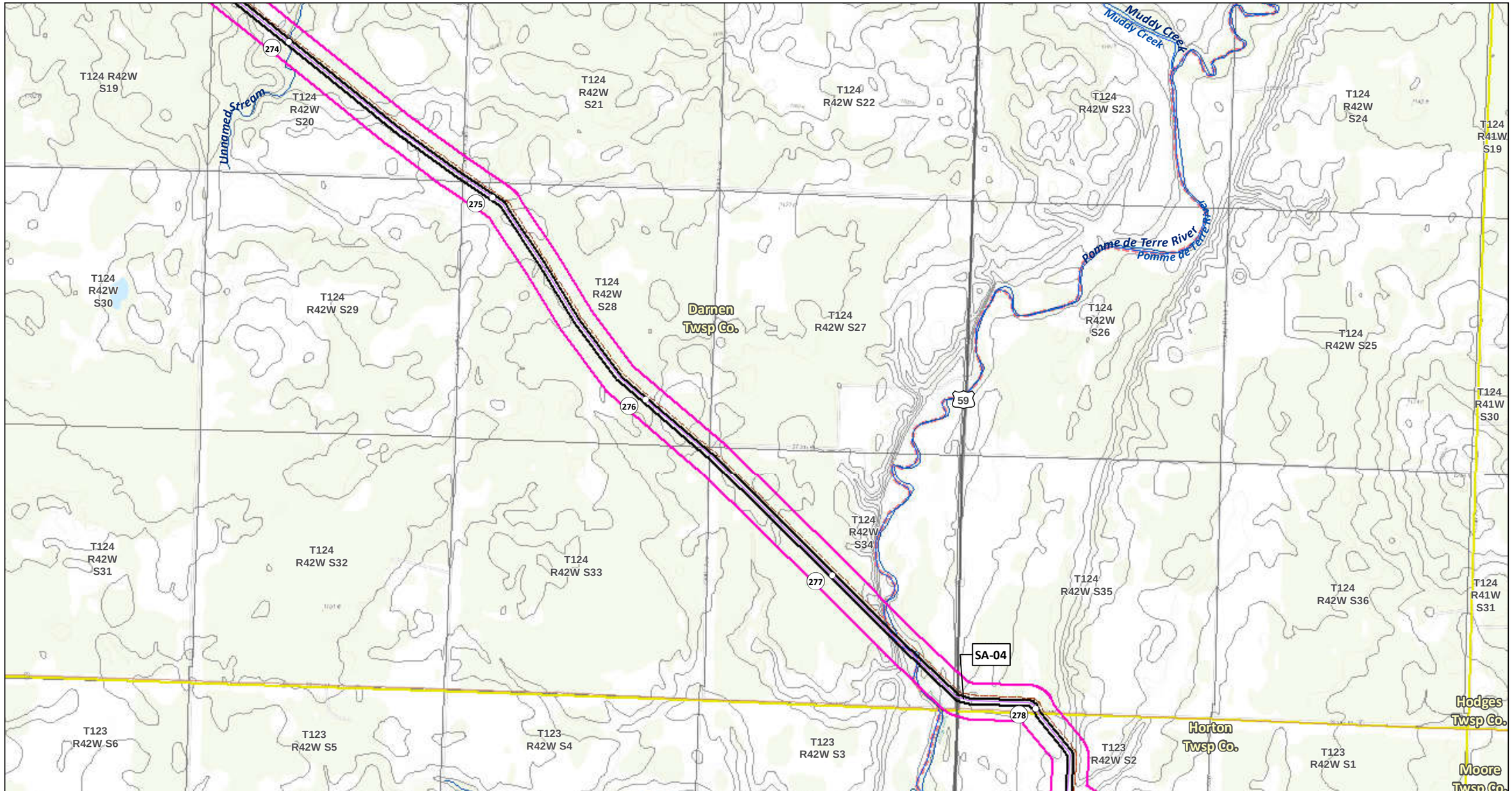

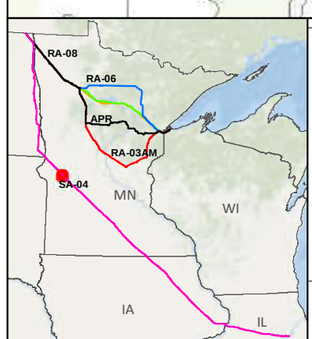

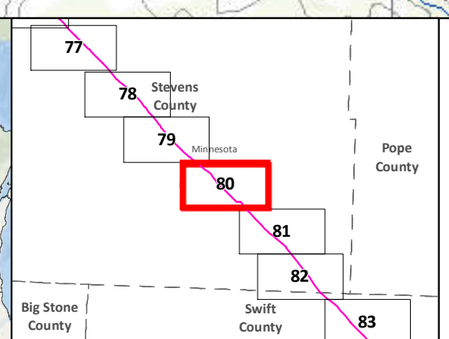

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

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- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

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- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

Map 80B of 188

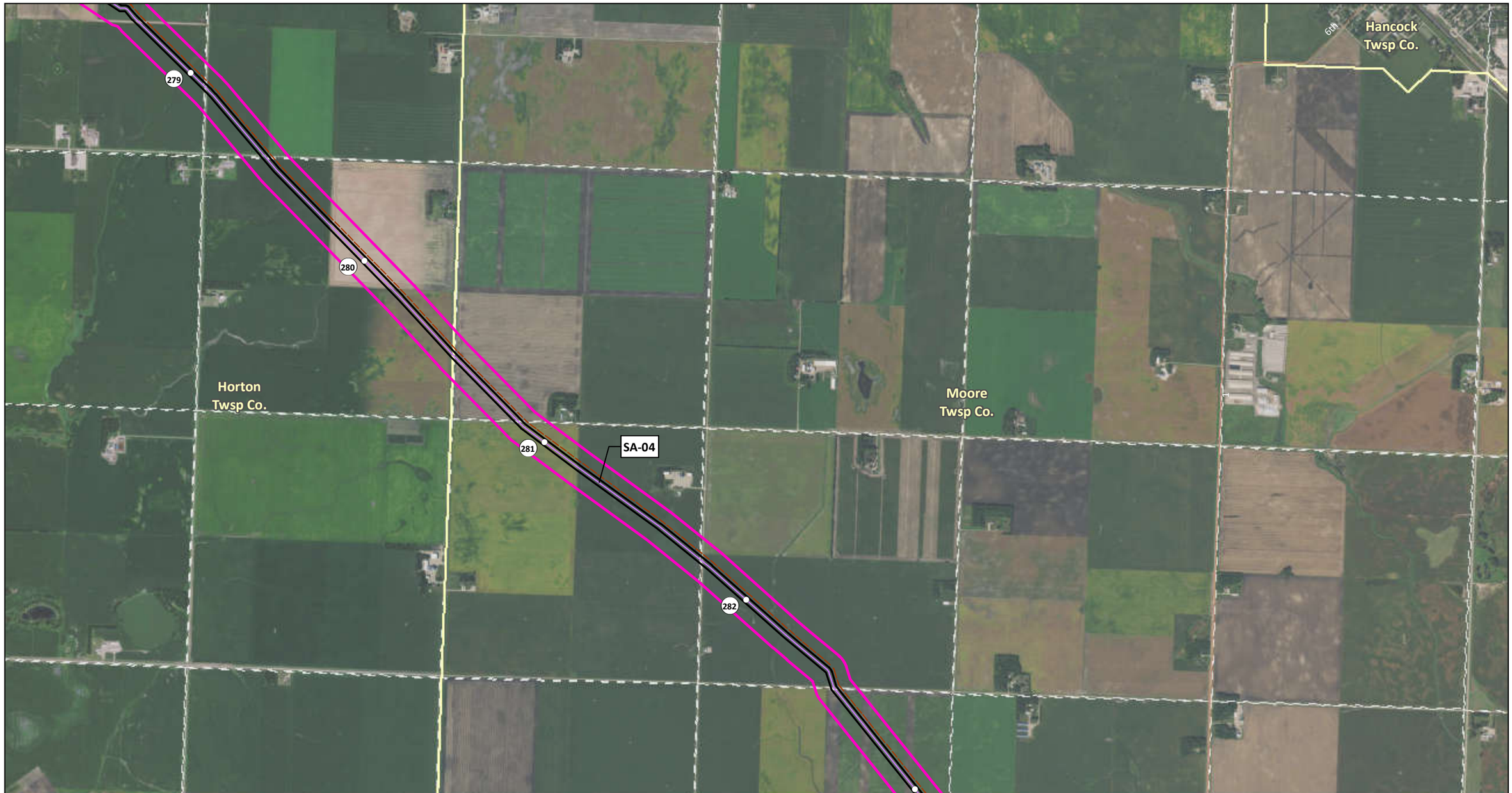

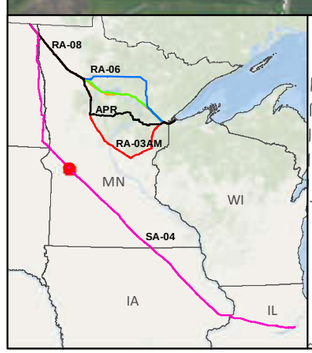

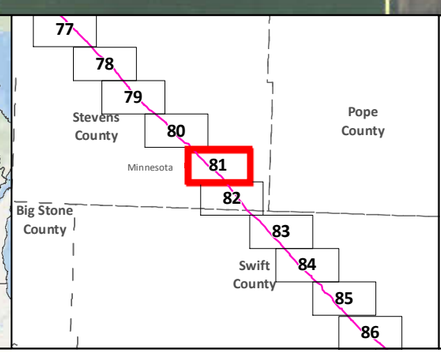

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
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Existing Pipeline
Interstate
Highway
Major Road
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State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 81A of 188

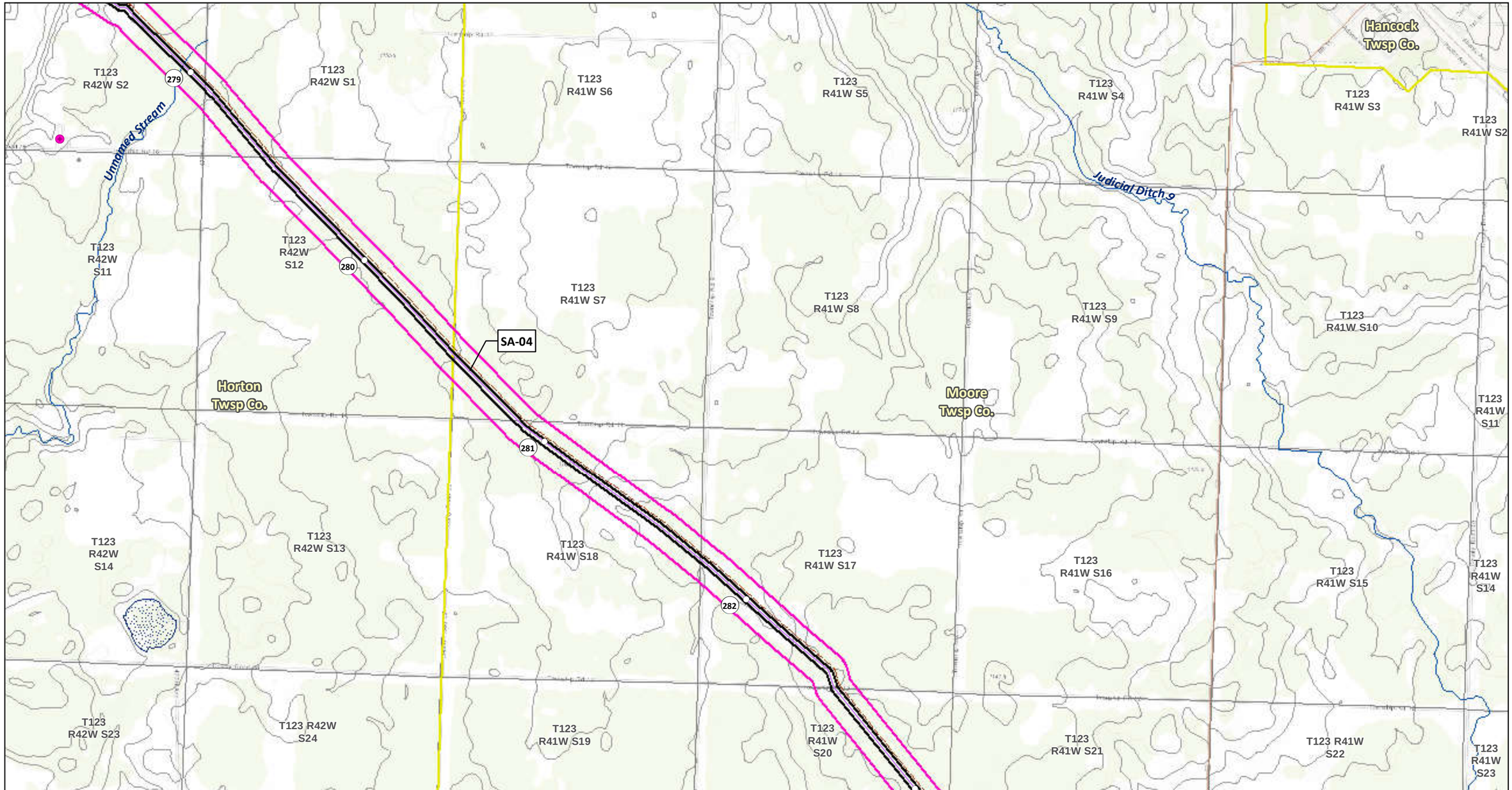

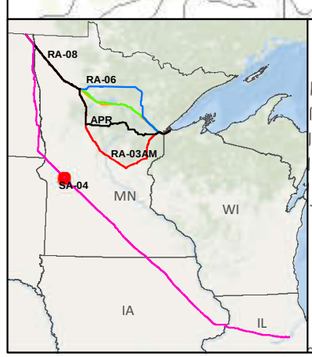

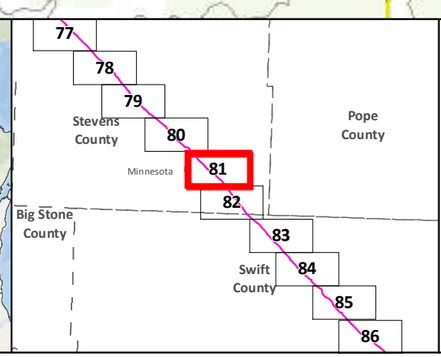

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
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Mile Post

Anticipated 120' Construction ROW

Route Width (750')

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Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

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- High
- Moderate

Native Plant Communities with Biodiversity Significance

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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 81B of 188

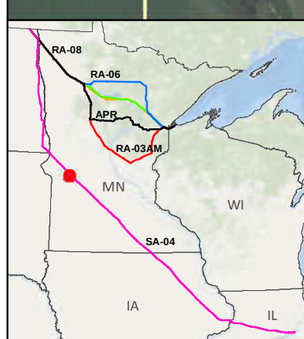

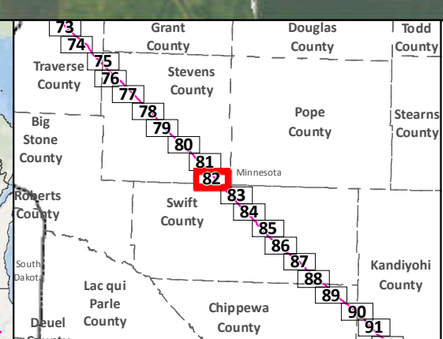

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

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Interstate

Highway

Major Road

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Land Ownership

State Forest

National Forest

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Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 82A of 188

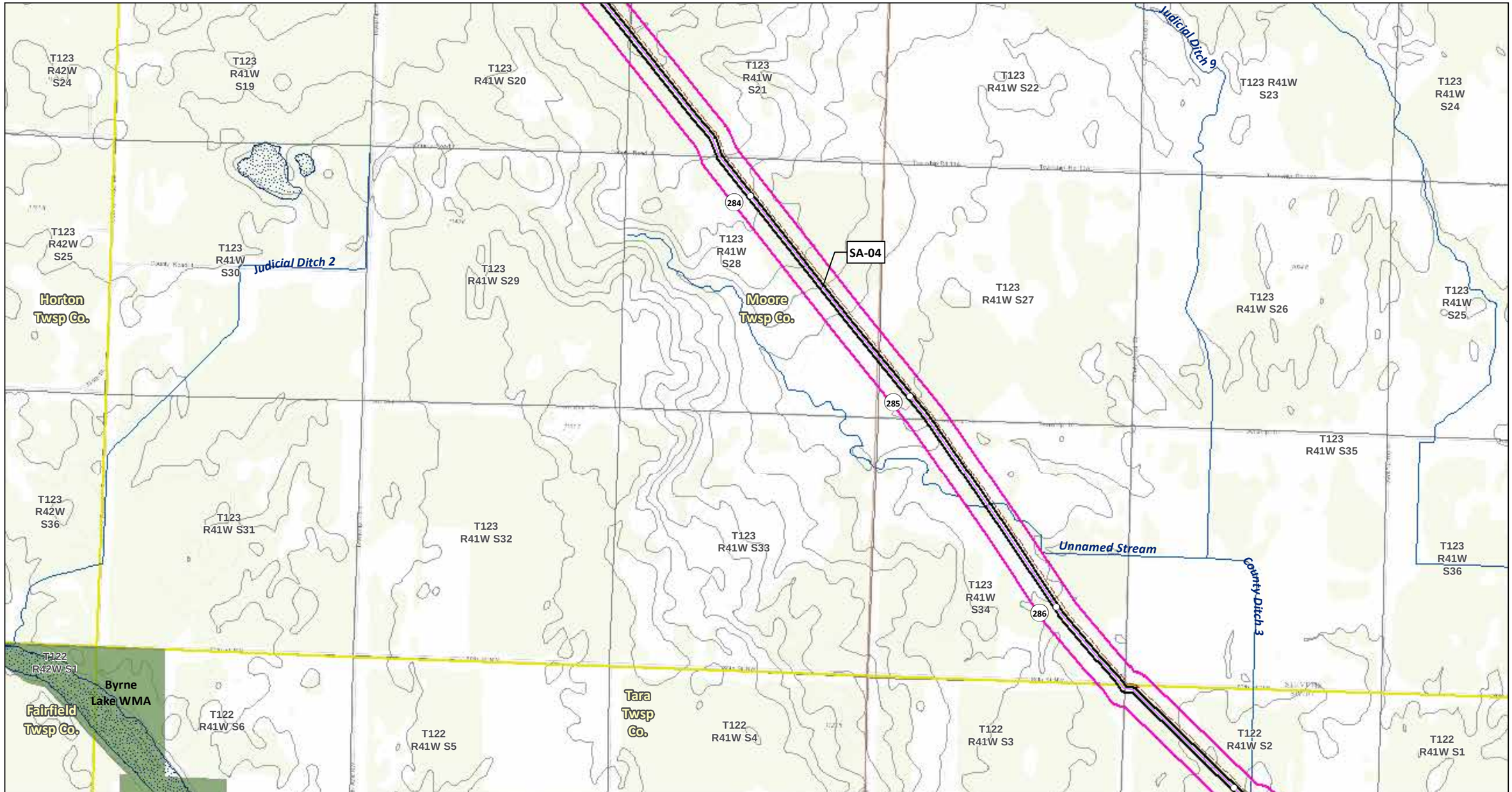

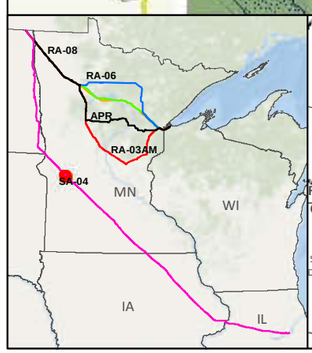

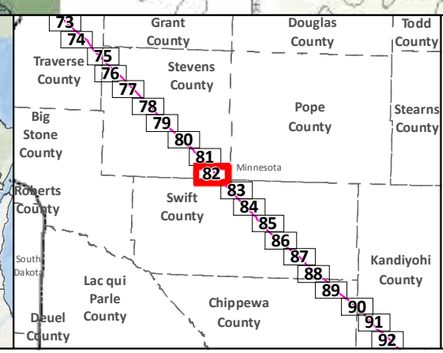

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 82B of 188

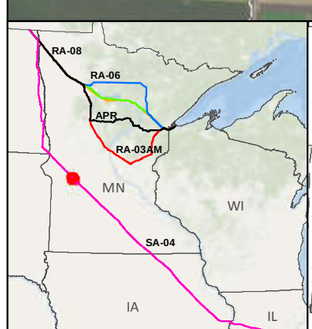

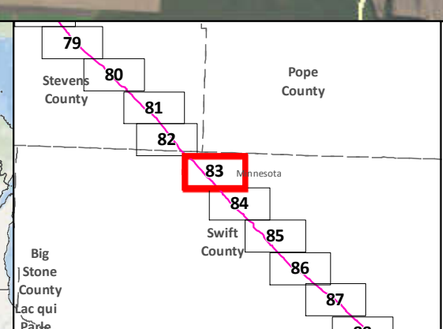

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 83A of 188

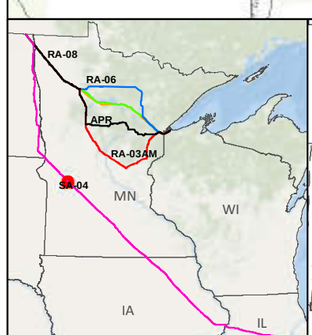

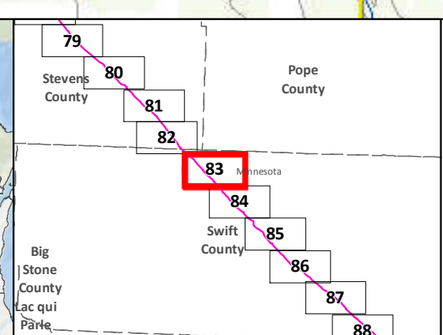

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
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Native Plant Communities with Biodiversity Significance
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 83B of 188

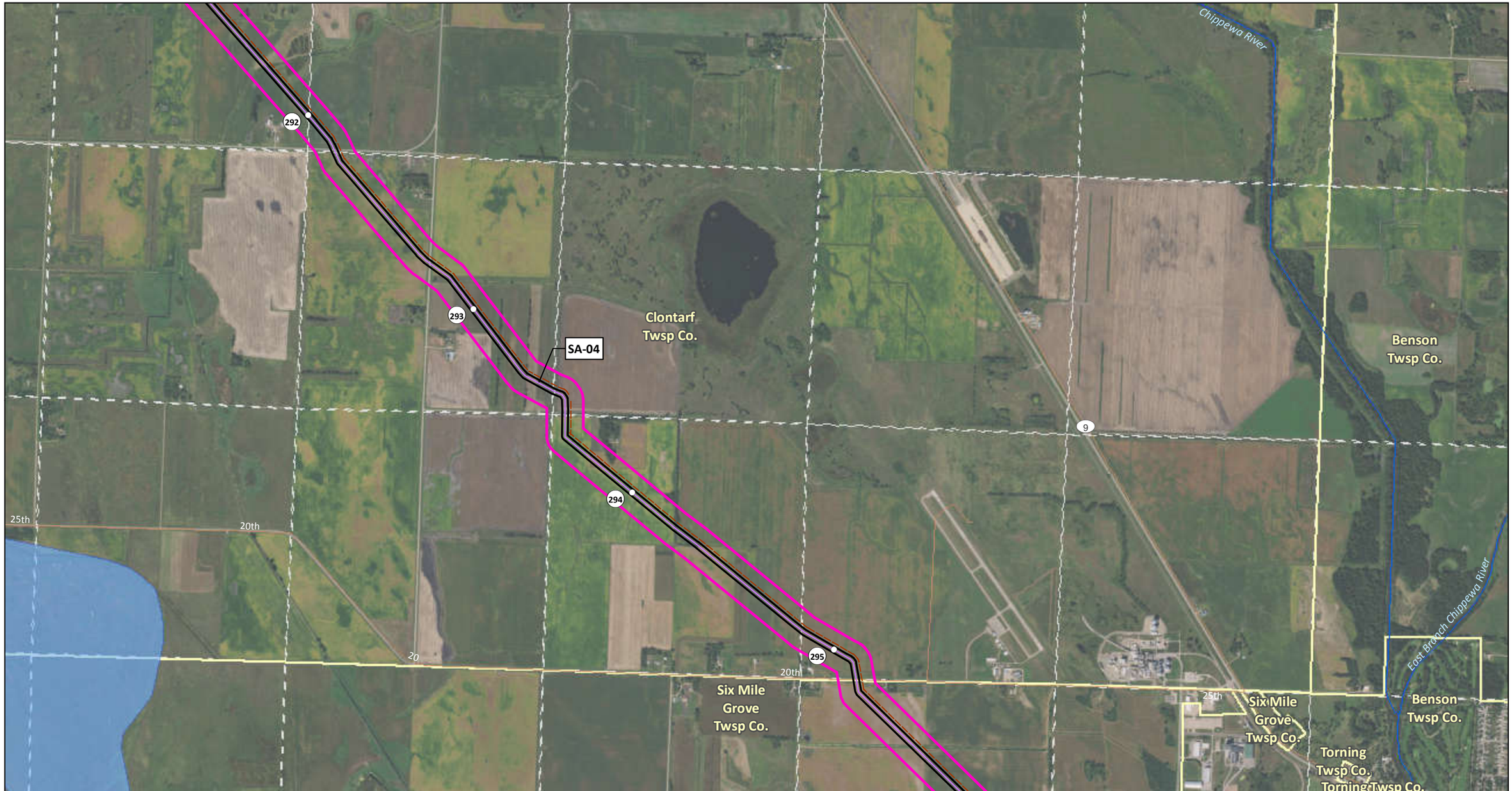

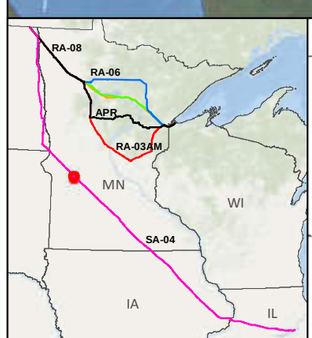

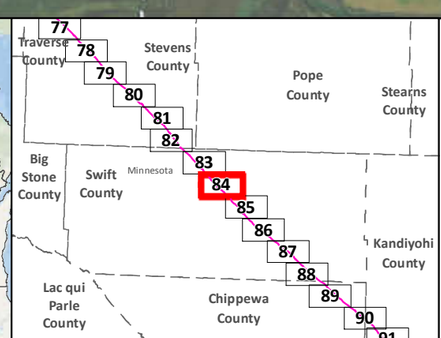

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 84A of 188

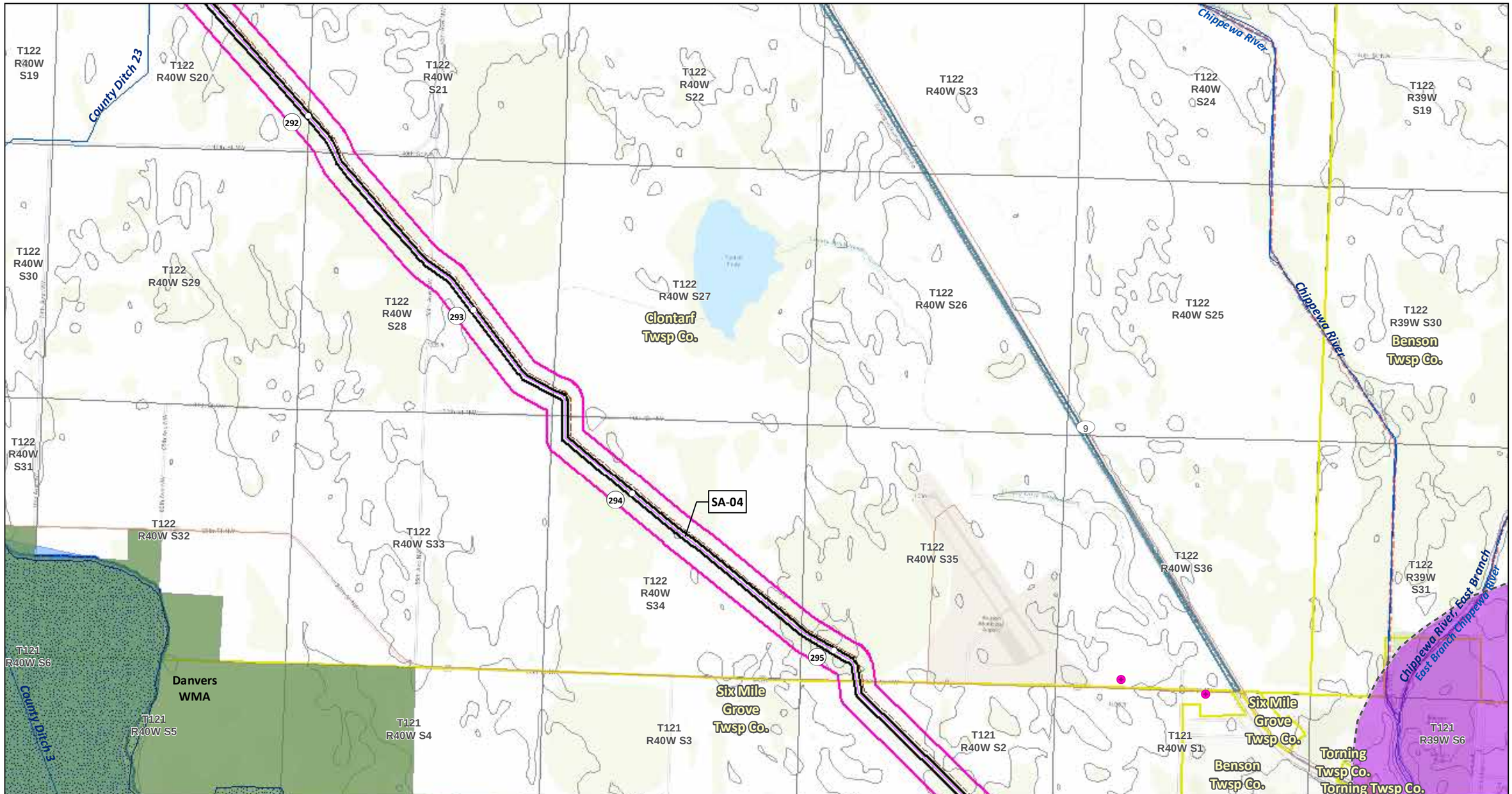

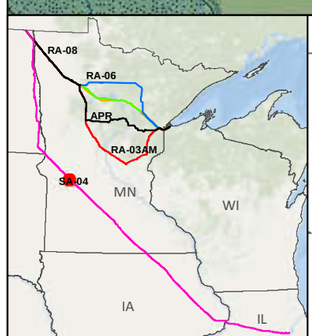

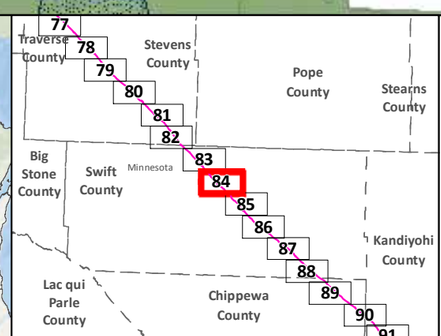

SA-04

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Route Alternatives

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- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

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Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

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Wellhead Protection Area (WHPA)

Lakes of Biological Significance

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- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 84B of 188

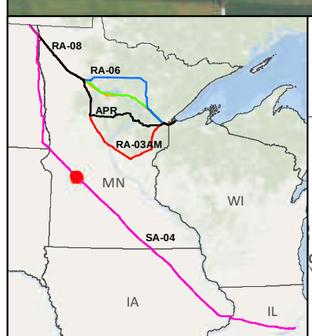

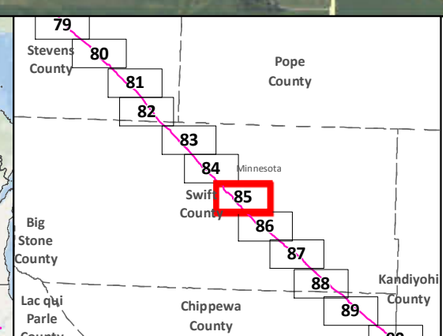

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 85A of 188

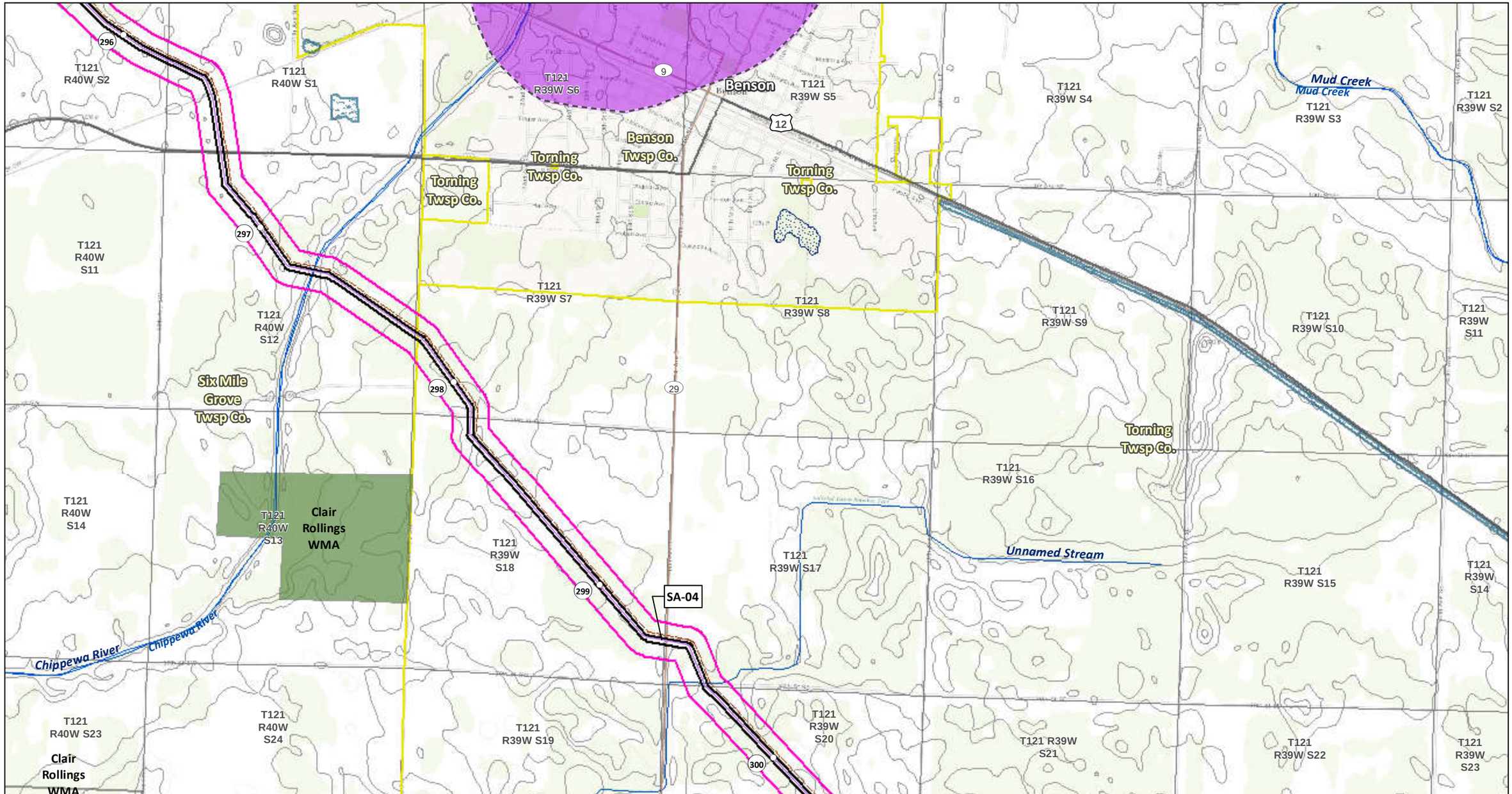

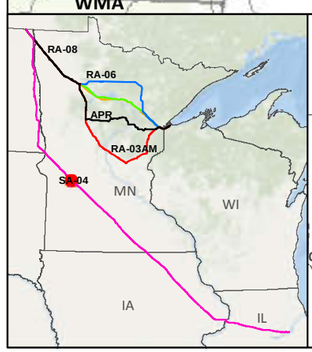

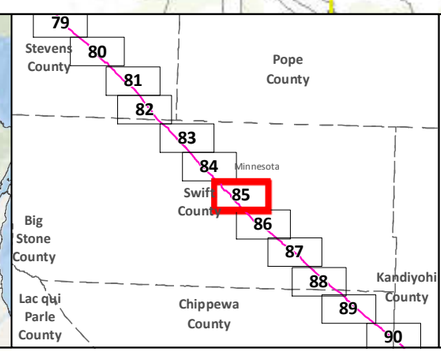

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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Native Plant Communities with Biodiversity Significance
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

N

Map 85B of 188

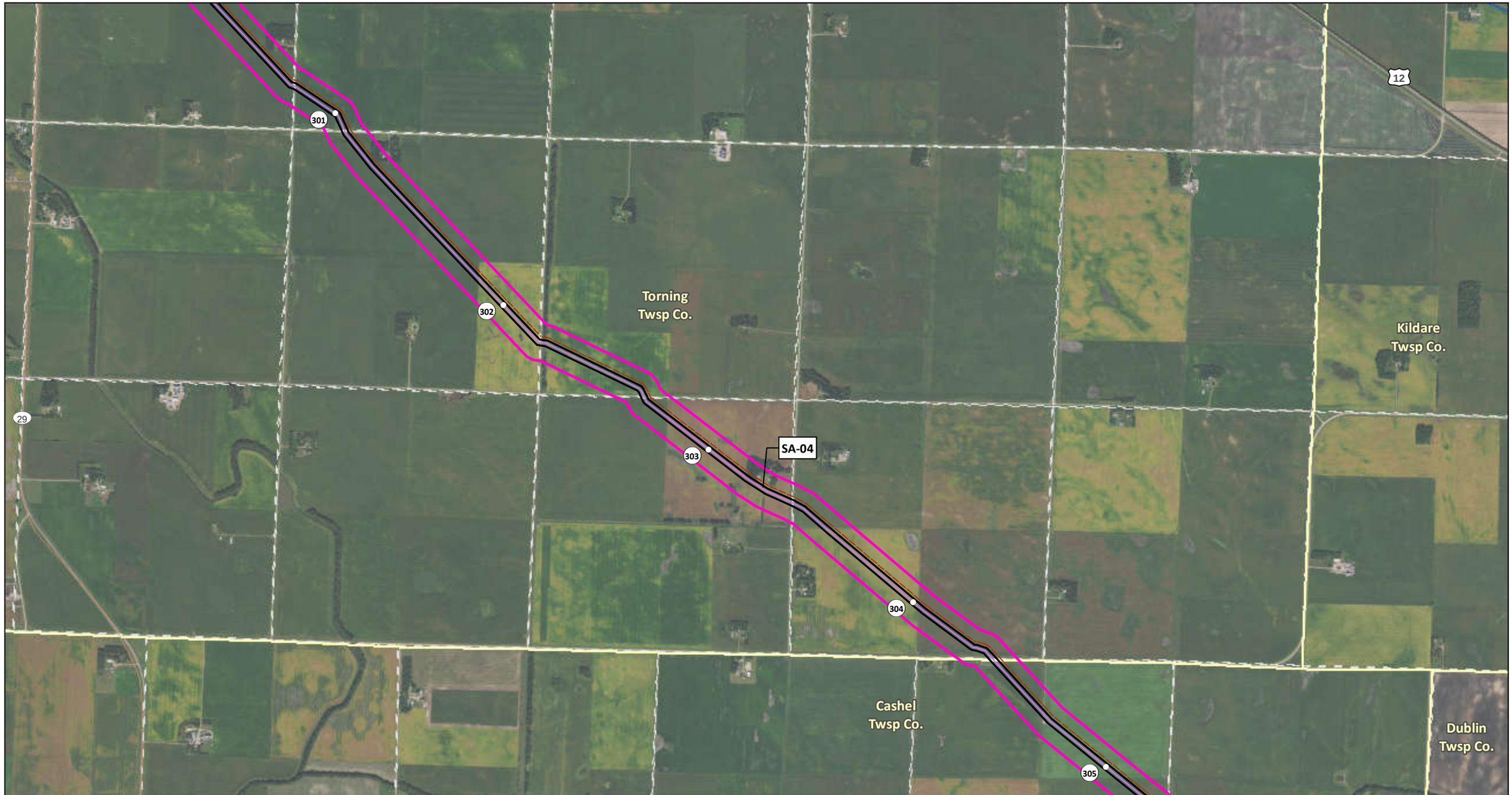

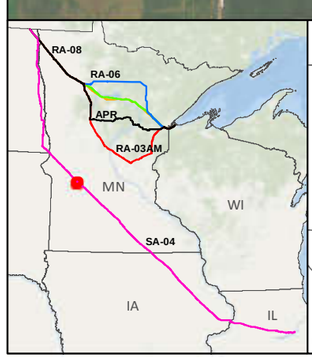

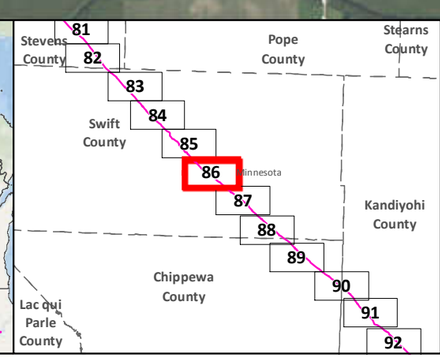

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 86A of 188

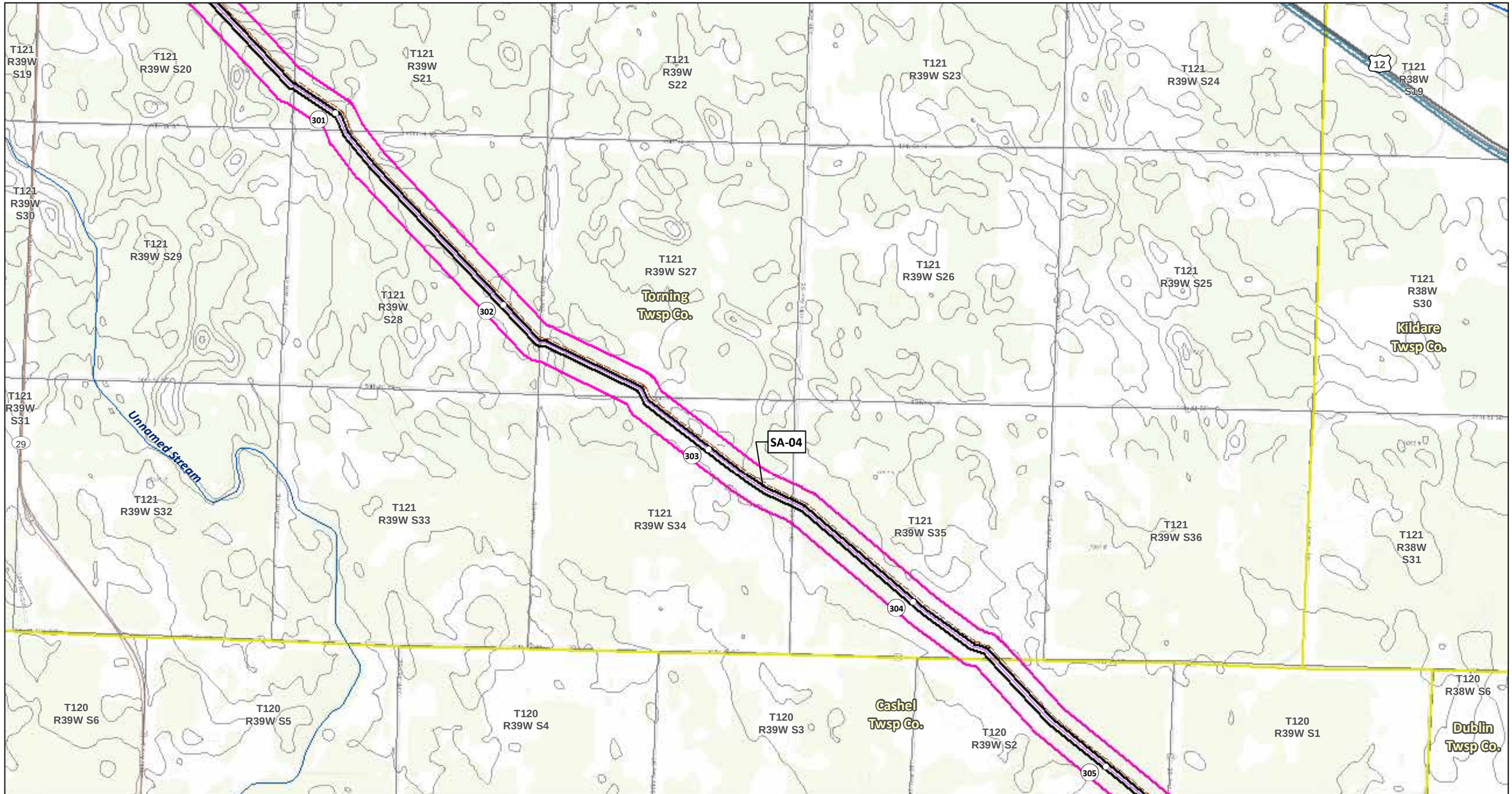

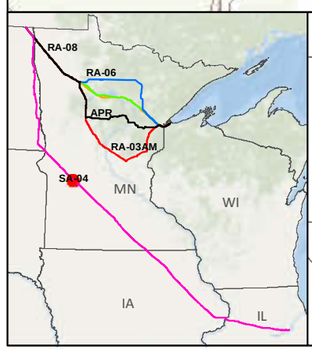

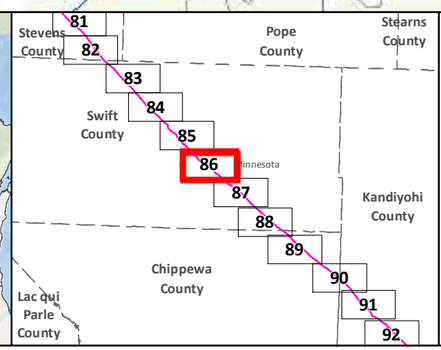

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

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Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 86B of 188

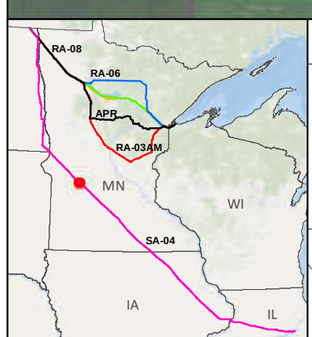

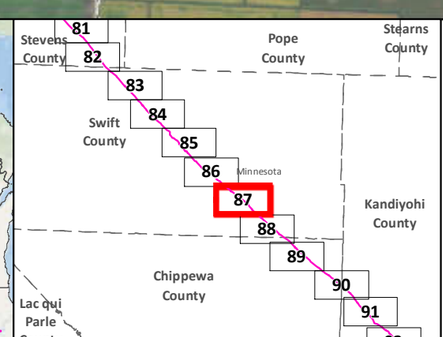

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
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Highway
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Lake
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MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 87A of 188

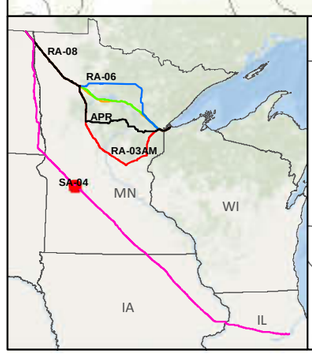

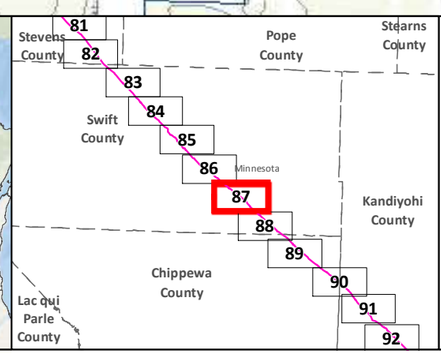

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
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- Route Width (750')

Existing Pipelines
Township Boundary

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- National River Inventory Crossing
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- 303d Imparied Waters
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 87B of 188

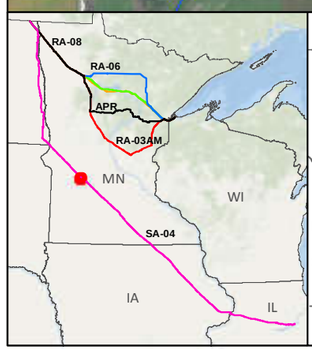

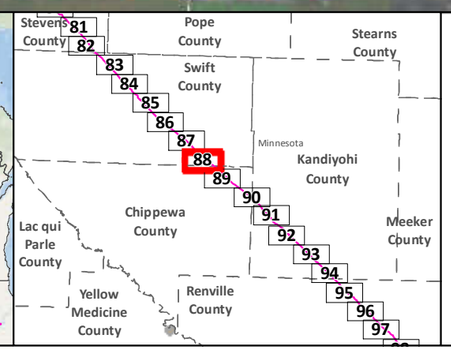

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
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Highway
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Water Resources
Lake
River

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MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 88A of 188

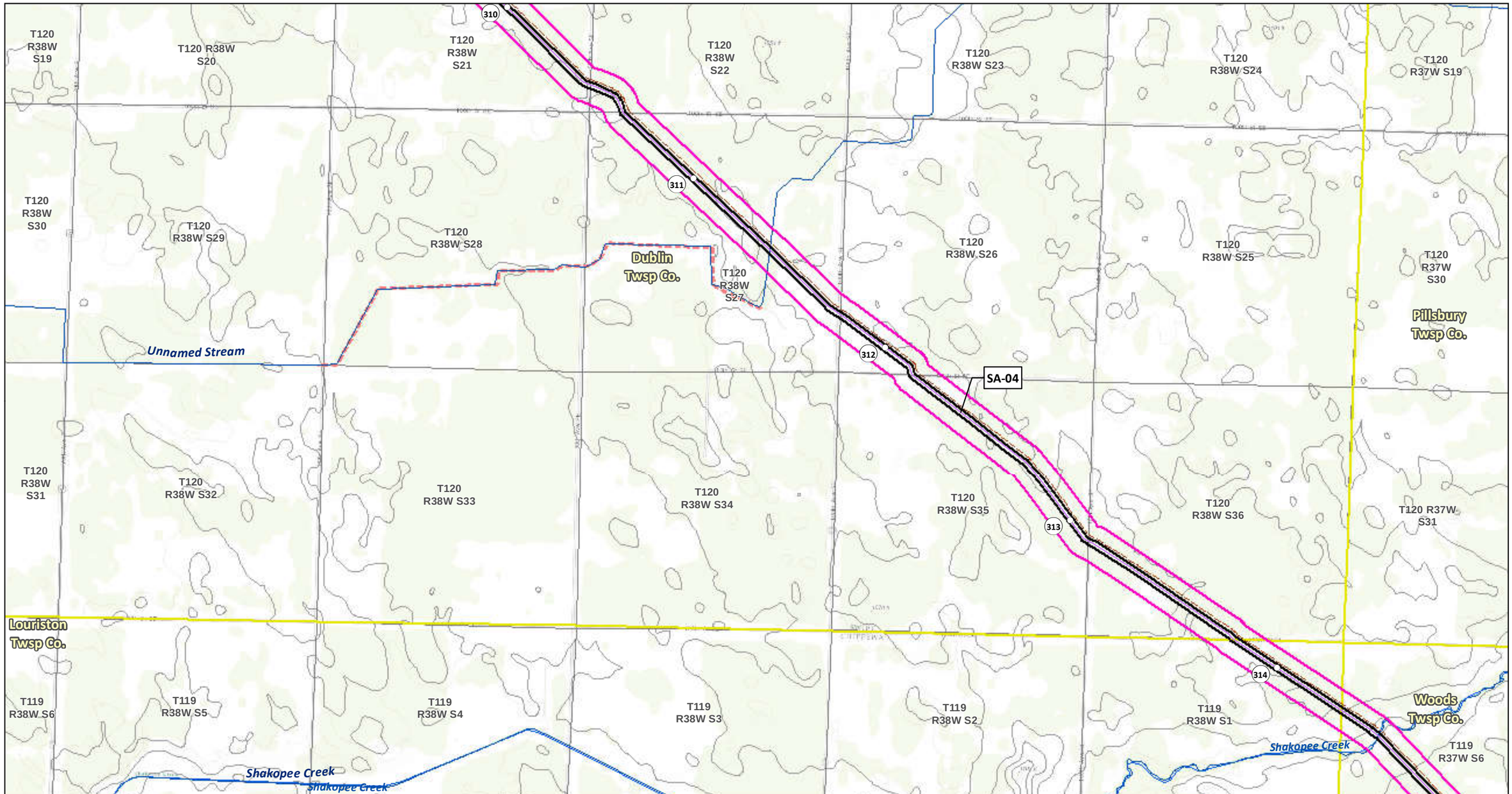

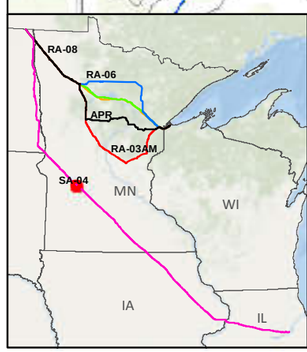

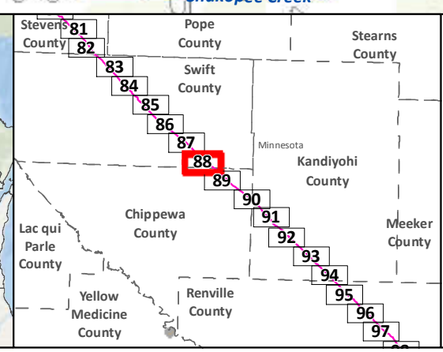

SA-04
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

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0 125 250 500 Meters
10ft Contours

Map 88B of 188

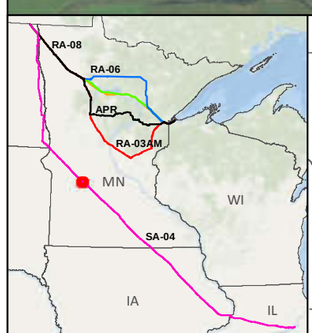

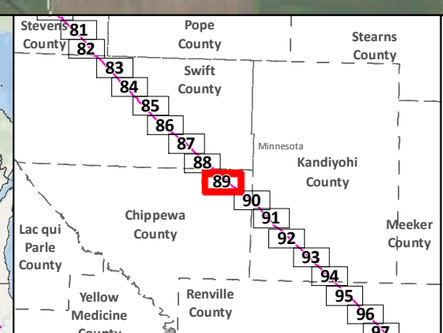

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 89A of 188

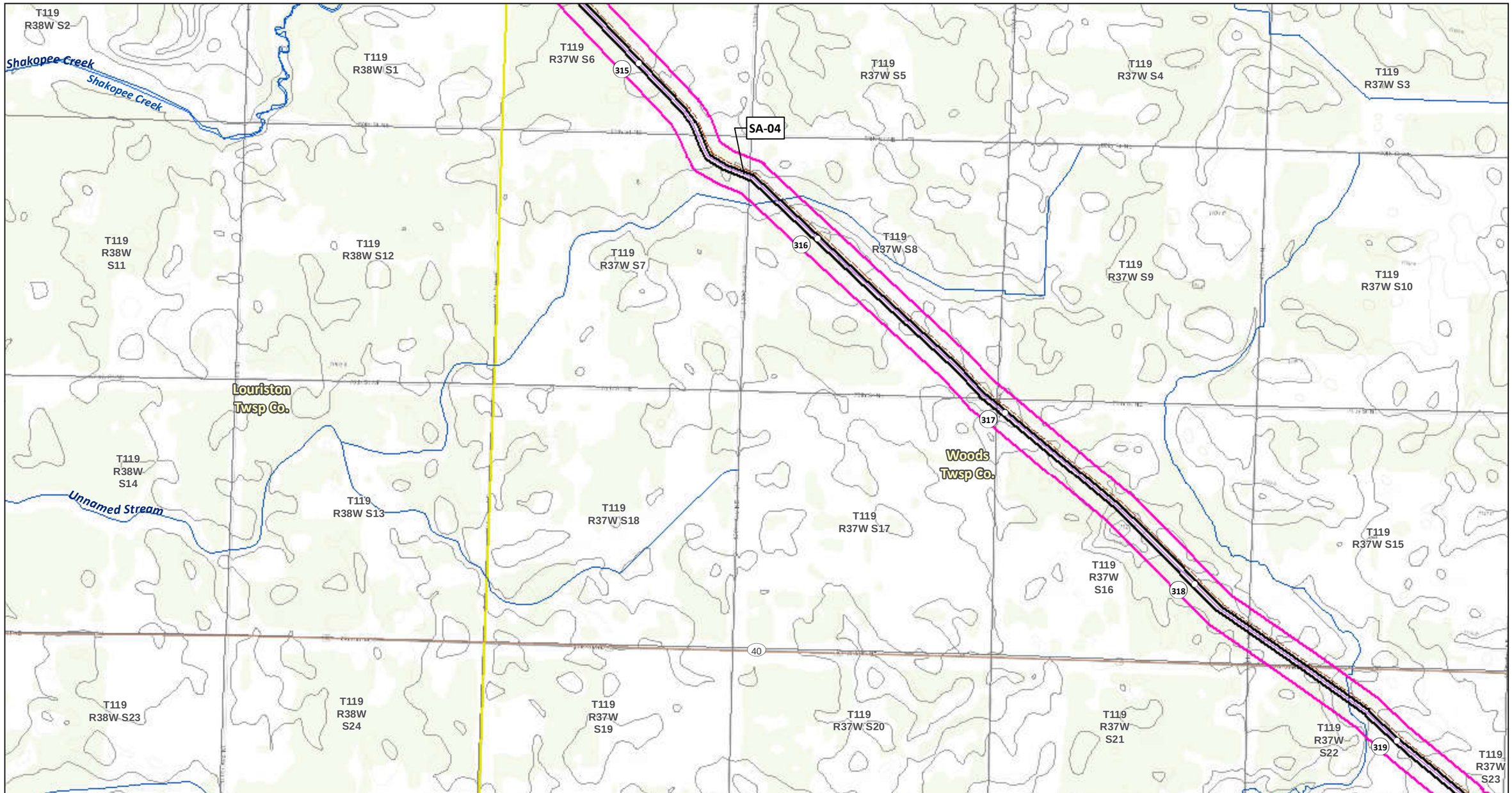

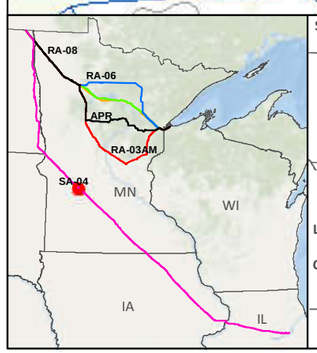

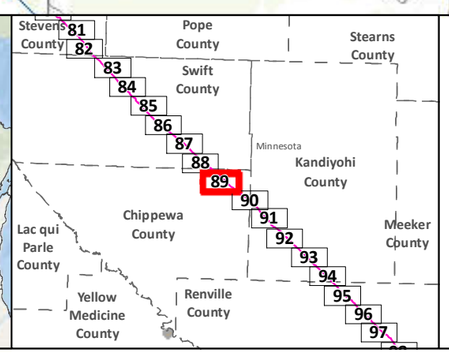

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 89B of 188

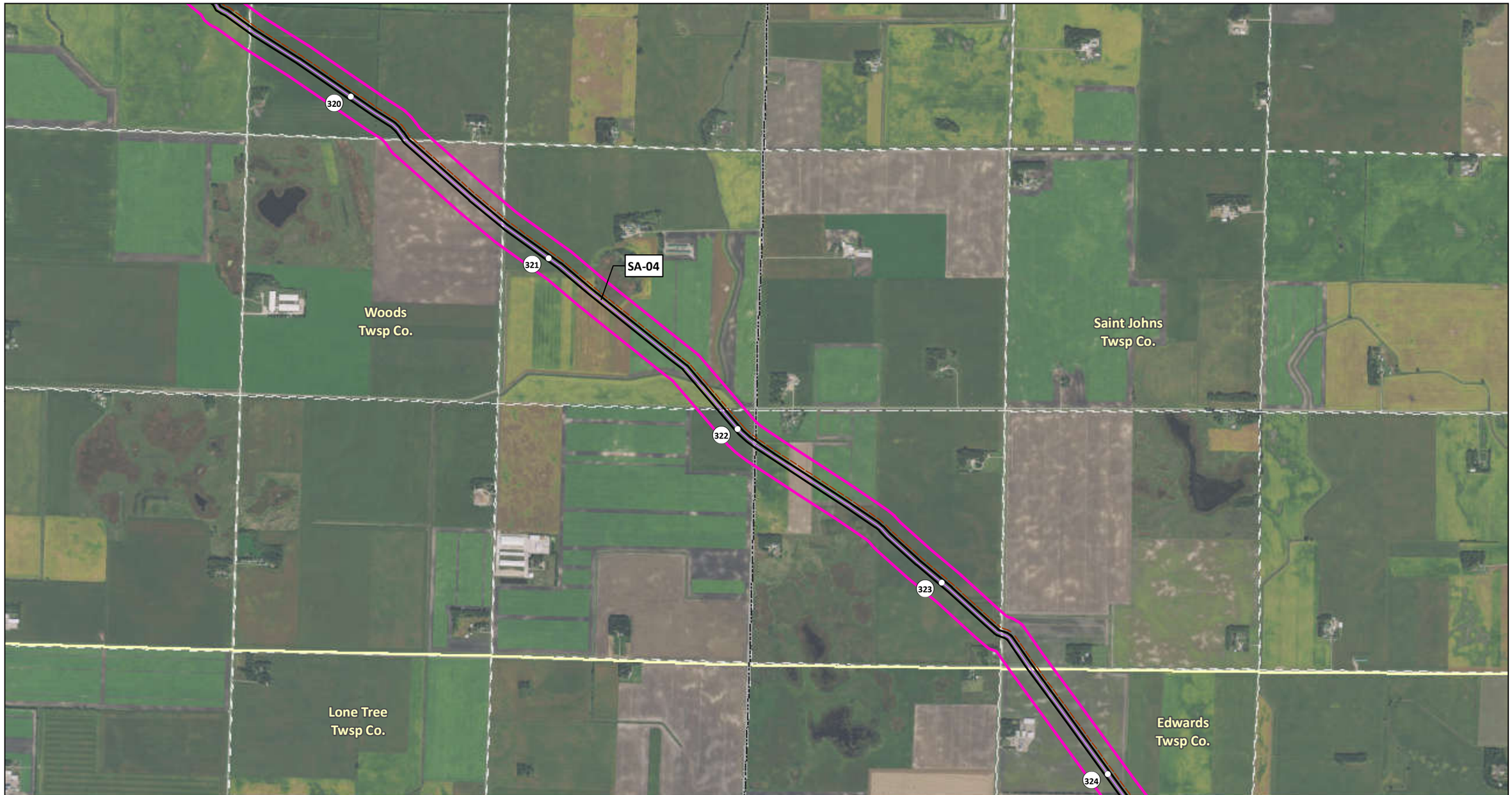

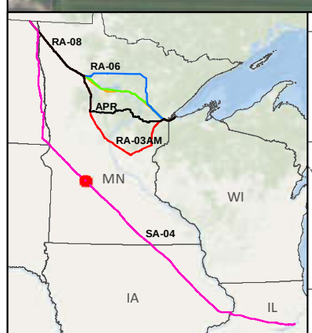

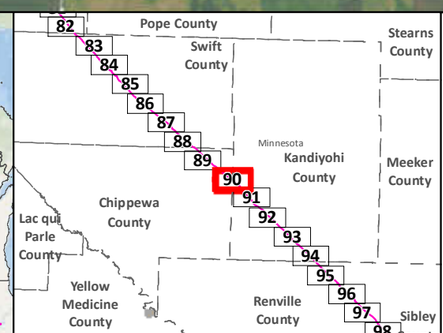

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 90A of 188

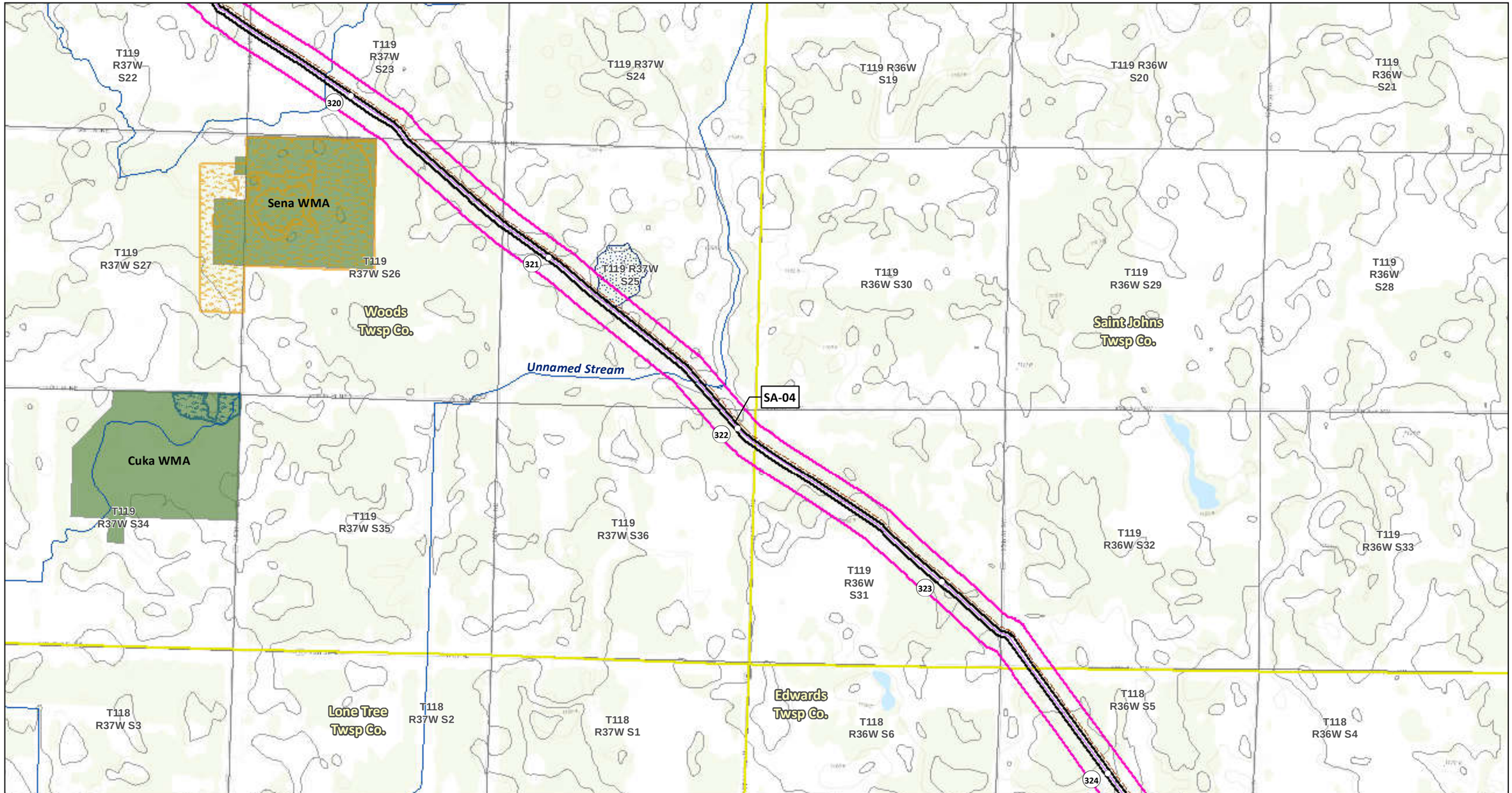

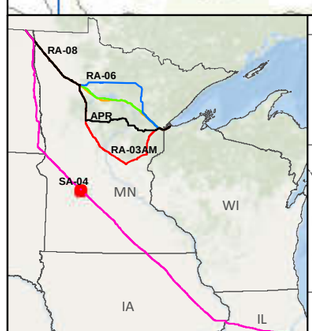

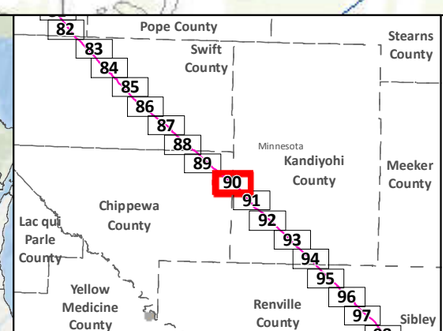

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 90B of 188

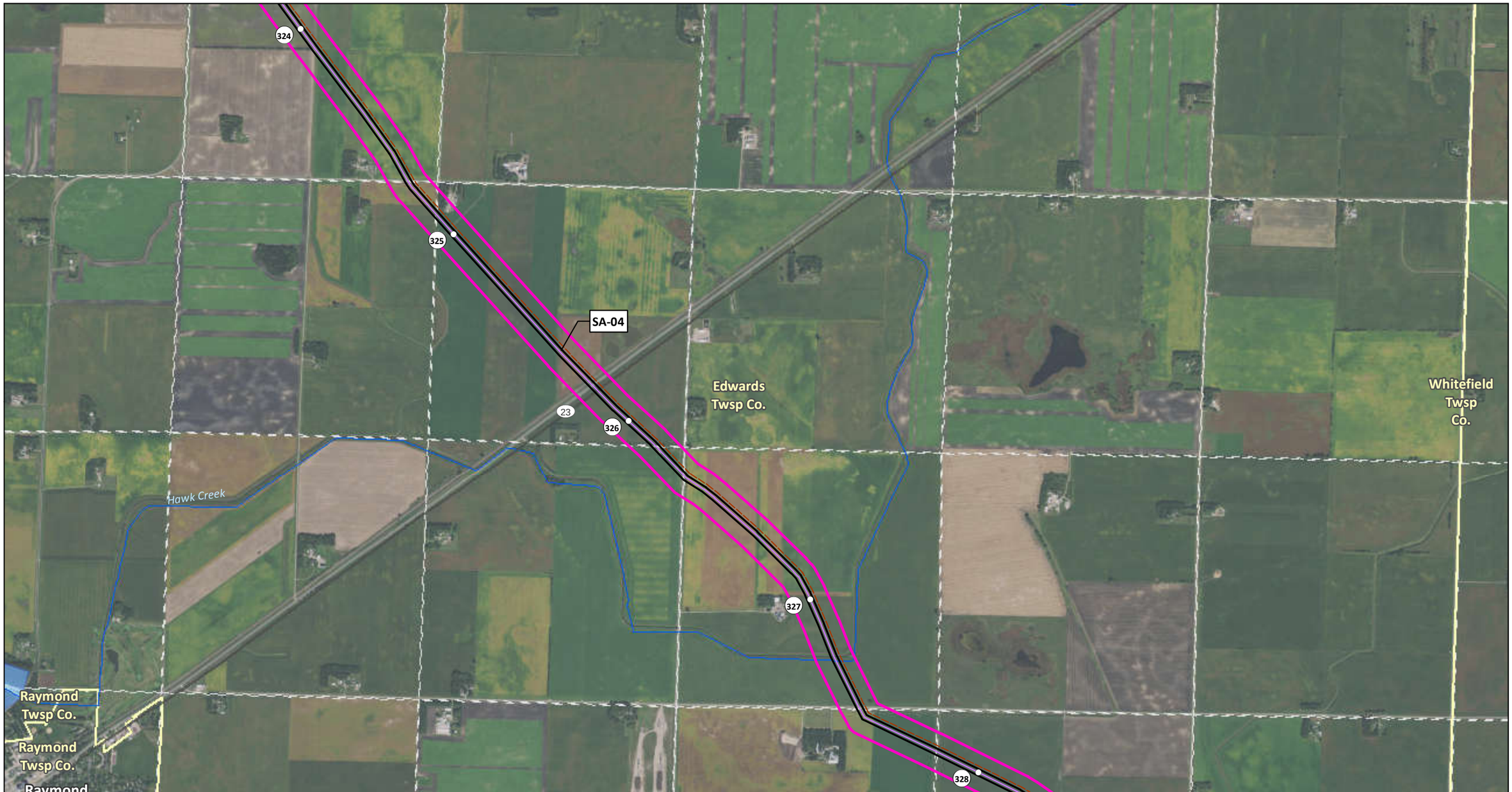

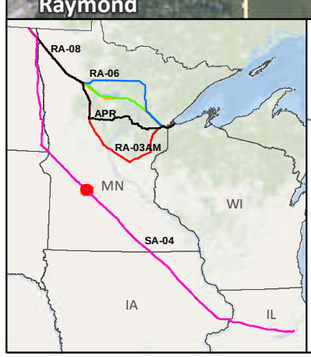

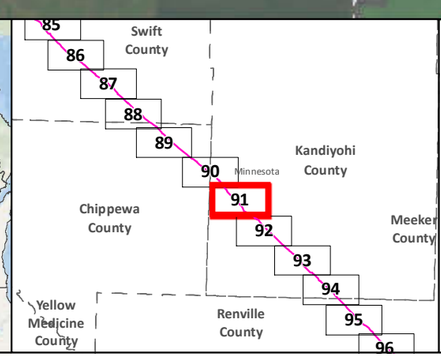

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 91A of 188

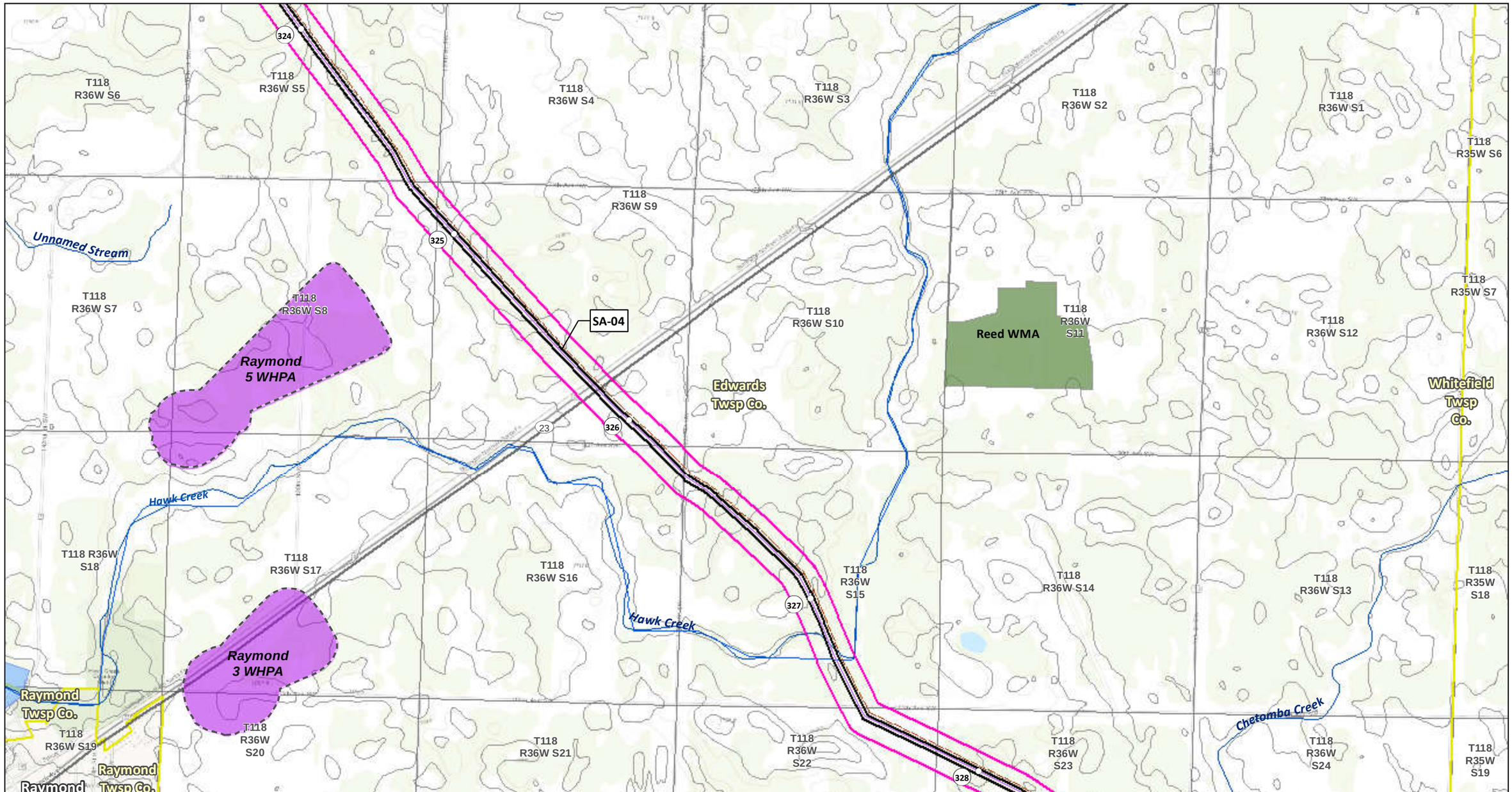

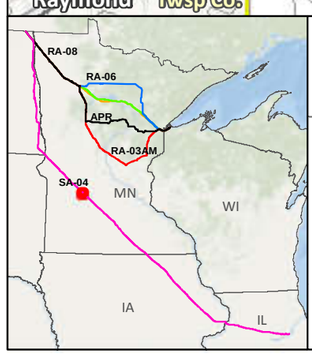

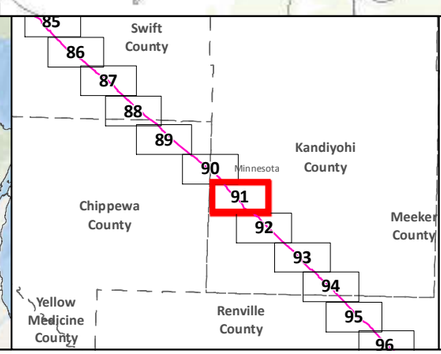

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
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Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 91B of 188

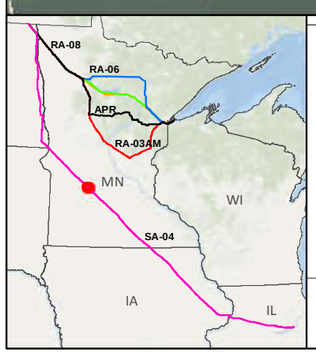

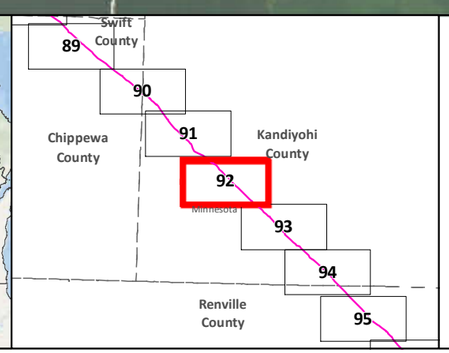

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
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Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 92A of 188

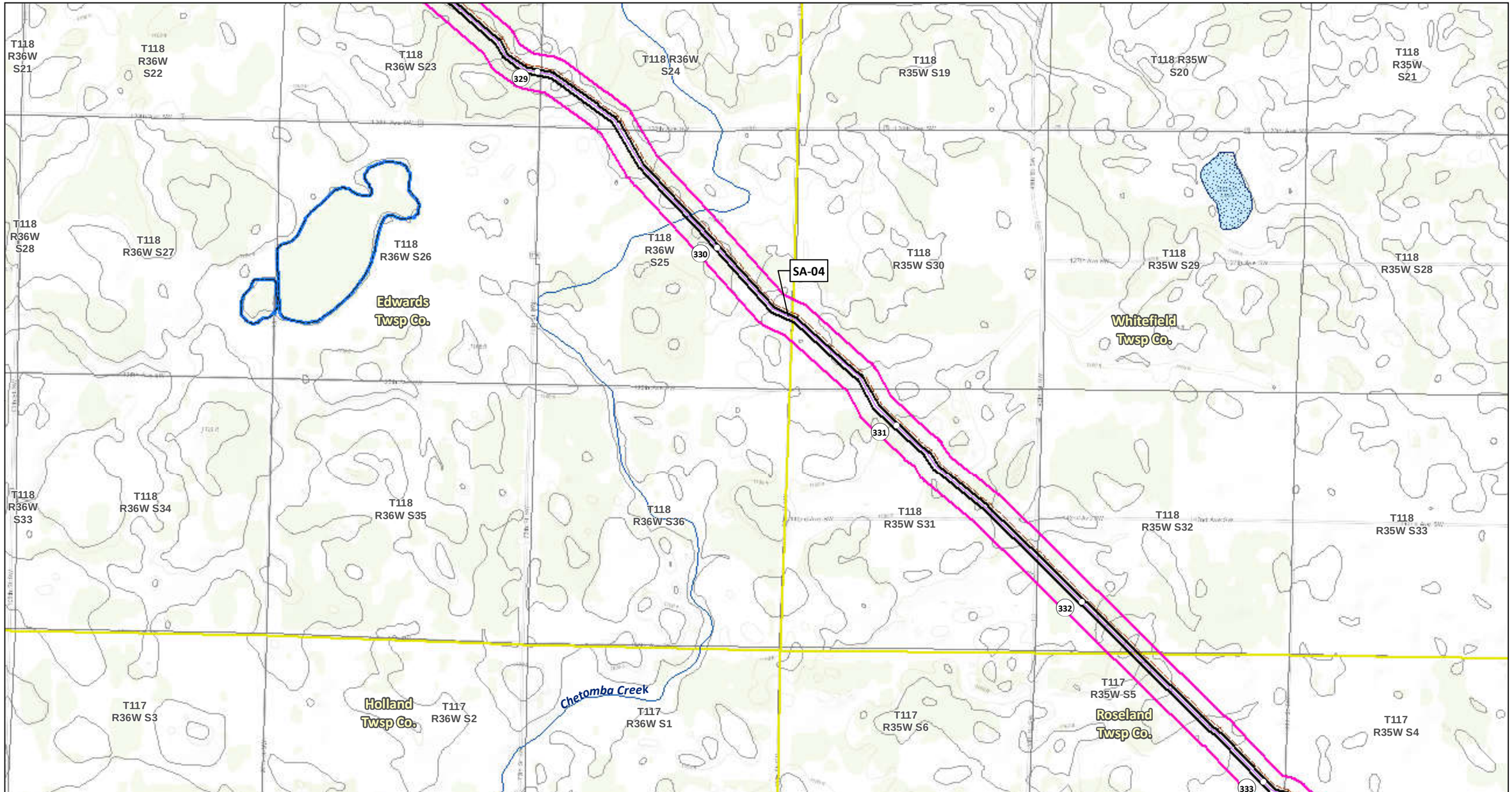

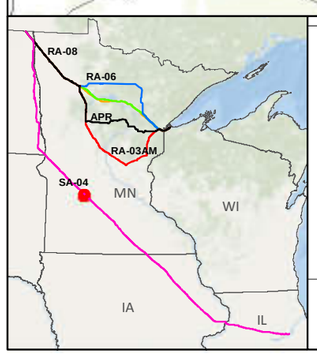

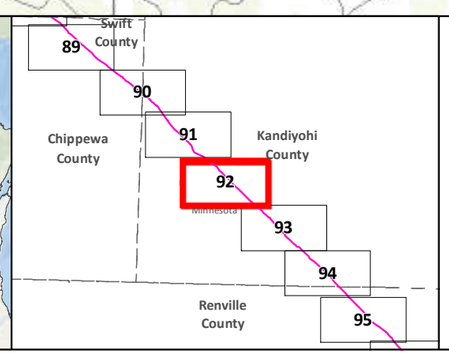

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
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Native Plant Communities with Biodiversity Significance
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 92B of 188

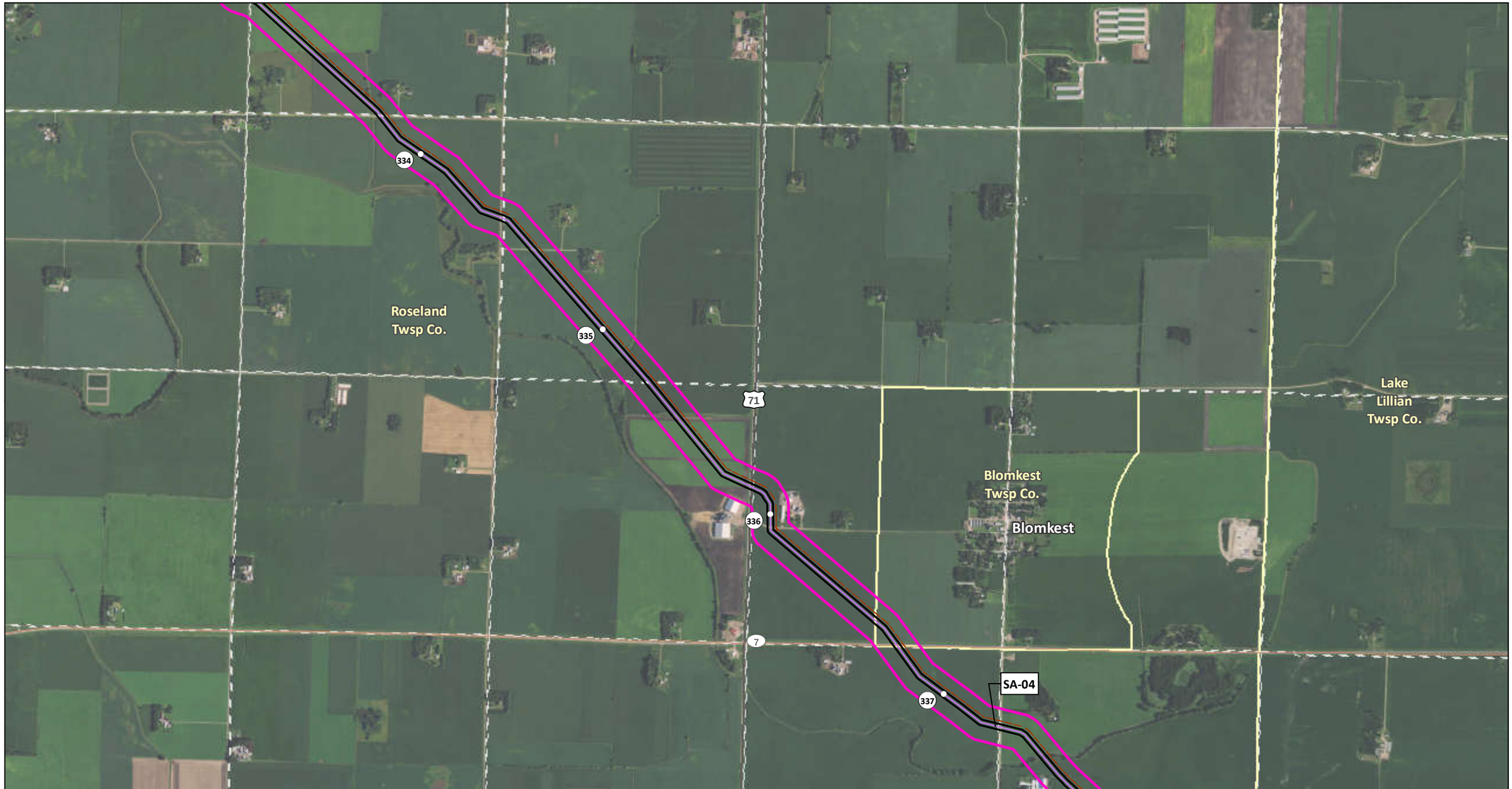

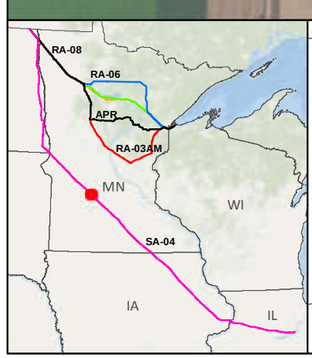

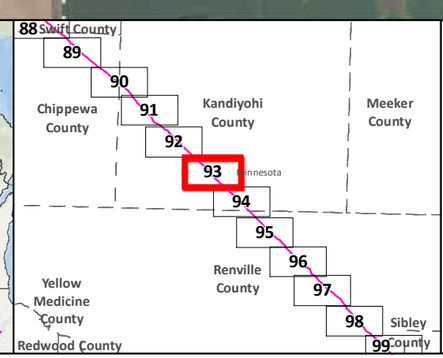

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 93A of 188

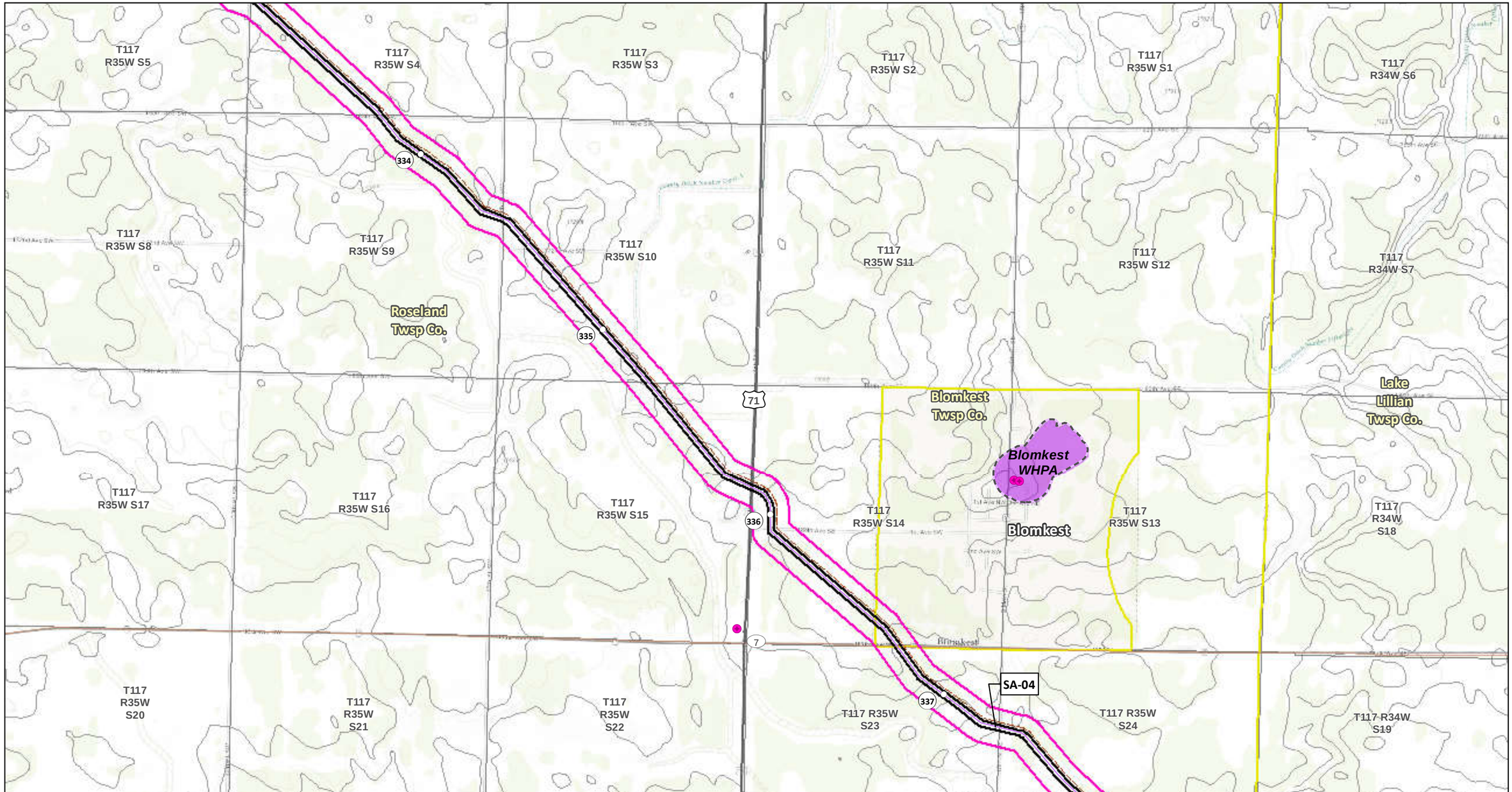

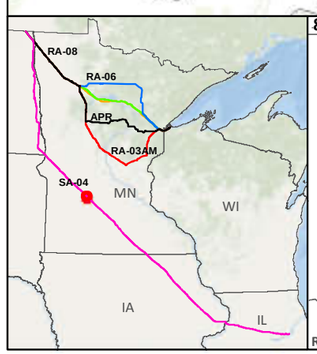

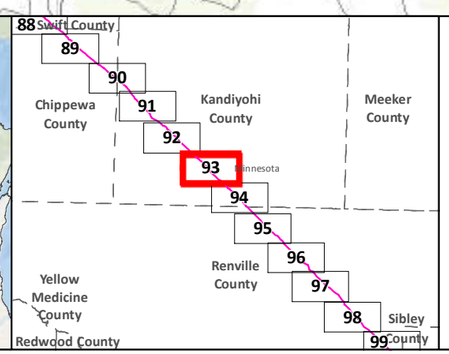

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
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- Mile Post
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- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 93B of 188

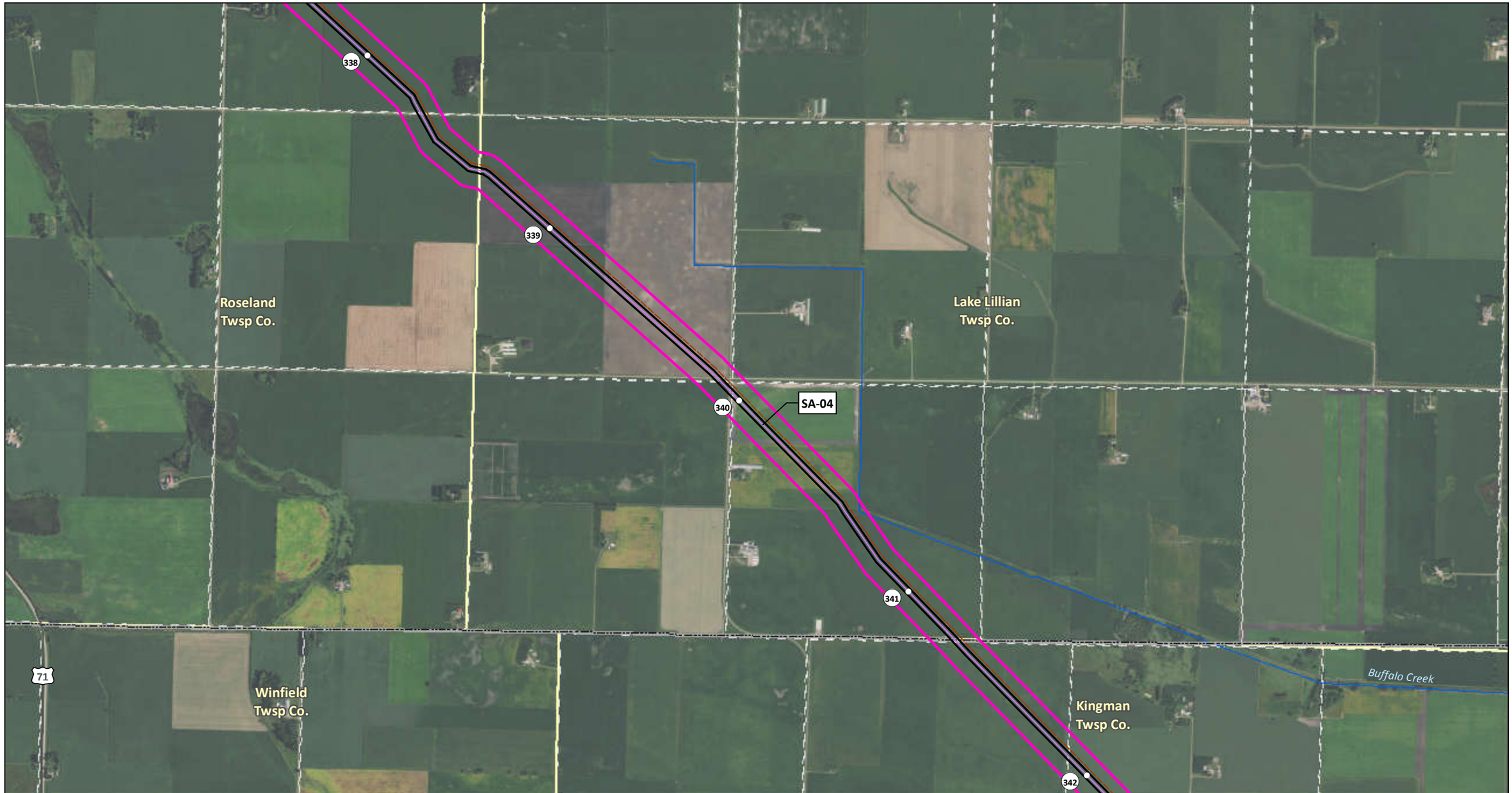

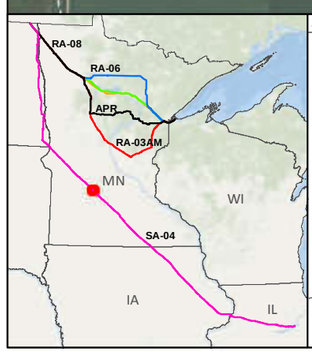

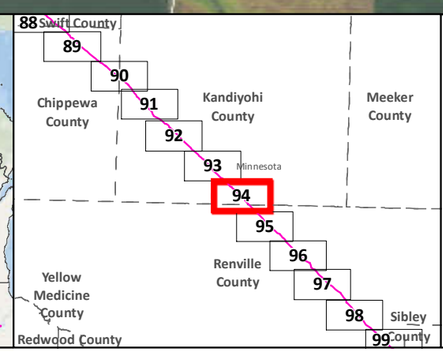

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
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Highway
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Tribal Reservation

Water Resources
Lake
River

Data Sources:
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0 0.125 0.25 0.5 Miles
1:24,000
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 94A of 188

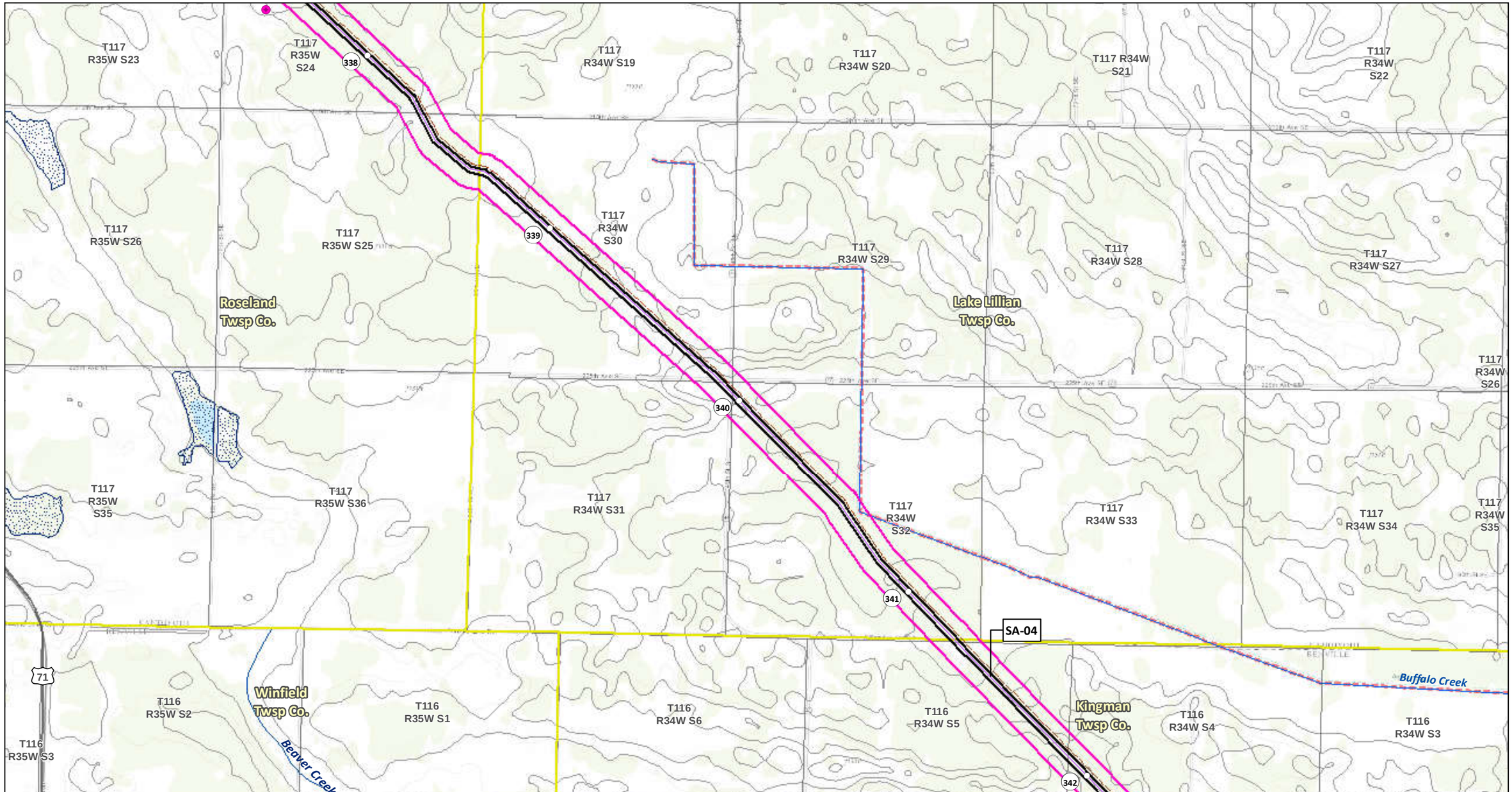

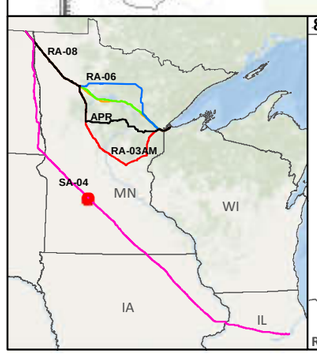

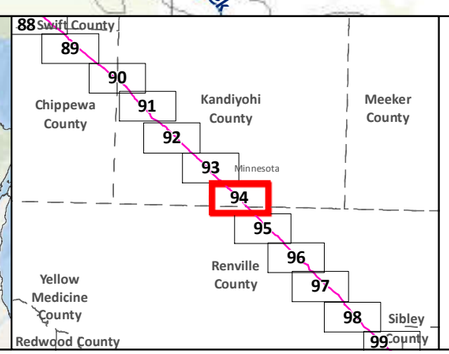

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
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Existing Pipelines
Township Boundary

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Native Plant Communities with Biodiversity Significance
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 94B of 188

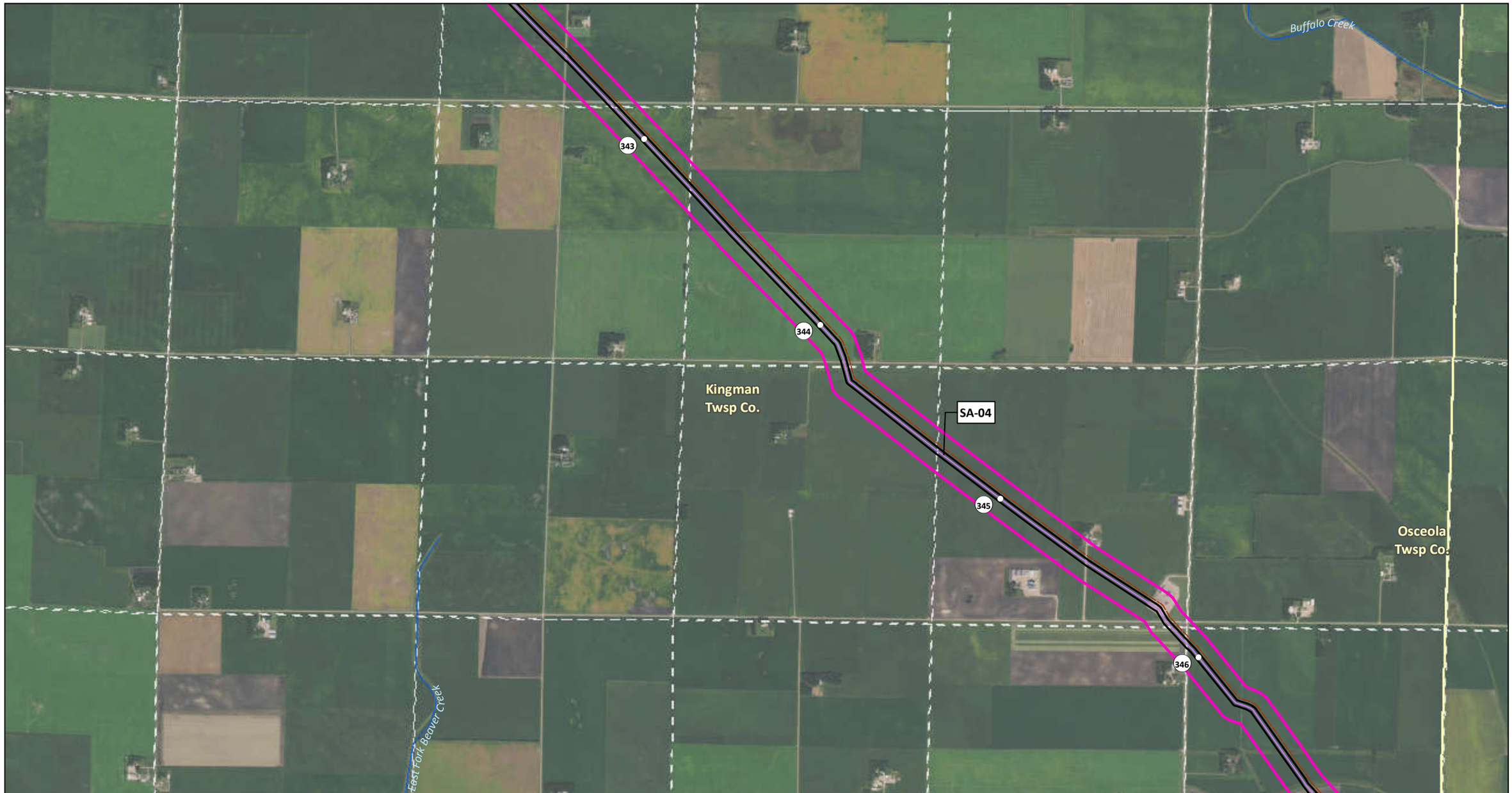

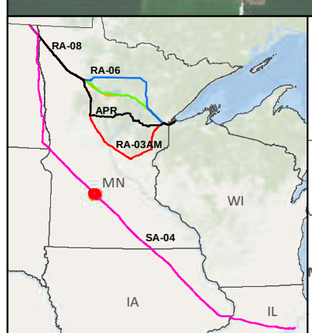

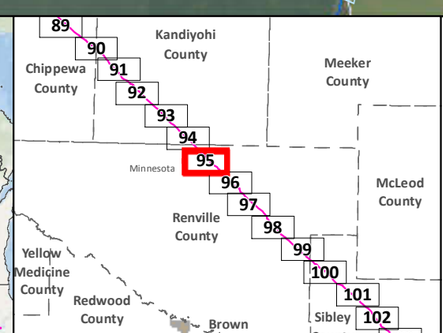

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 95A of 188

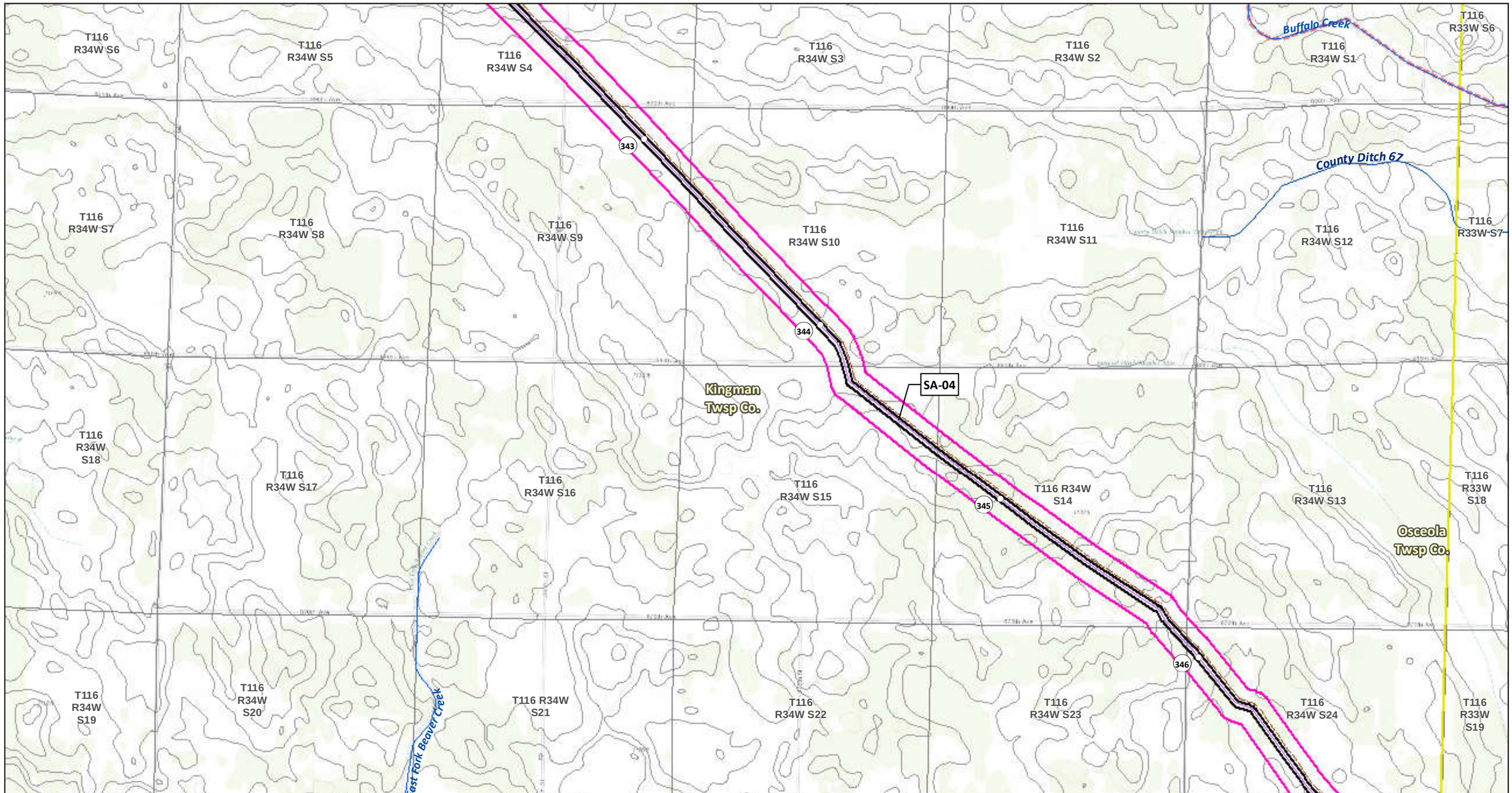

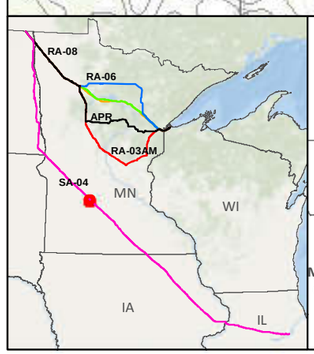

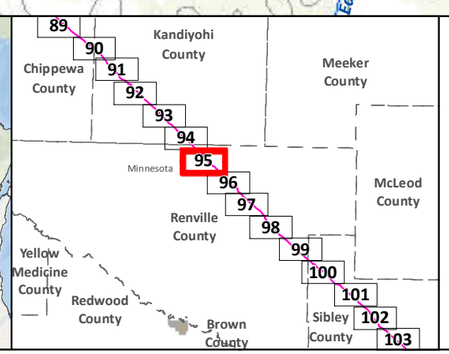

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 95B of 188

347
348
349
350
351
SA-04
Kingman Twsp Co.
Osceola Twsp Co.
Bird Island Twsp Co.
Melville Twsp Co.
East Fork Beaver Creek
Buffalo Creek

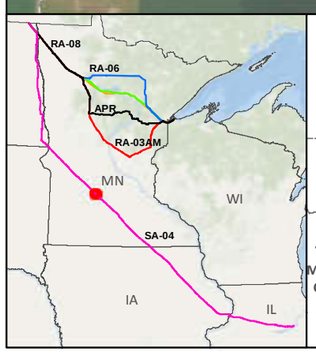

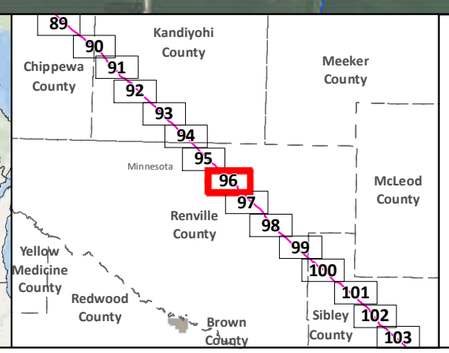

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
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Land Ownership
State Forest
National Forest
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Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 96A of 188

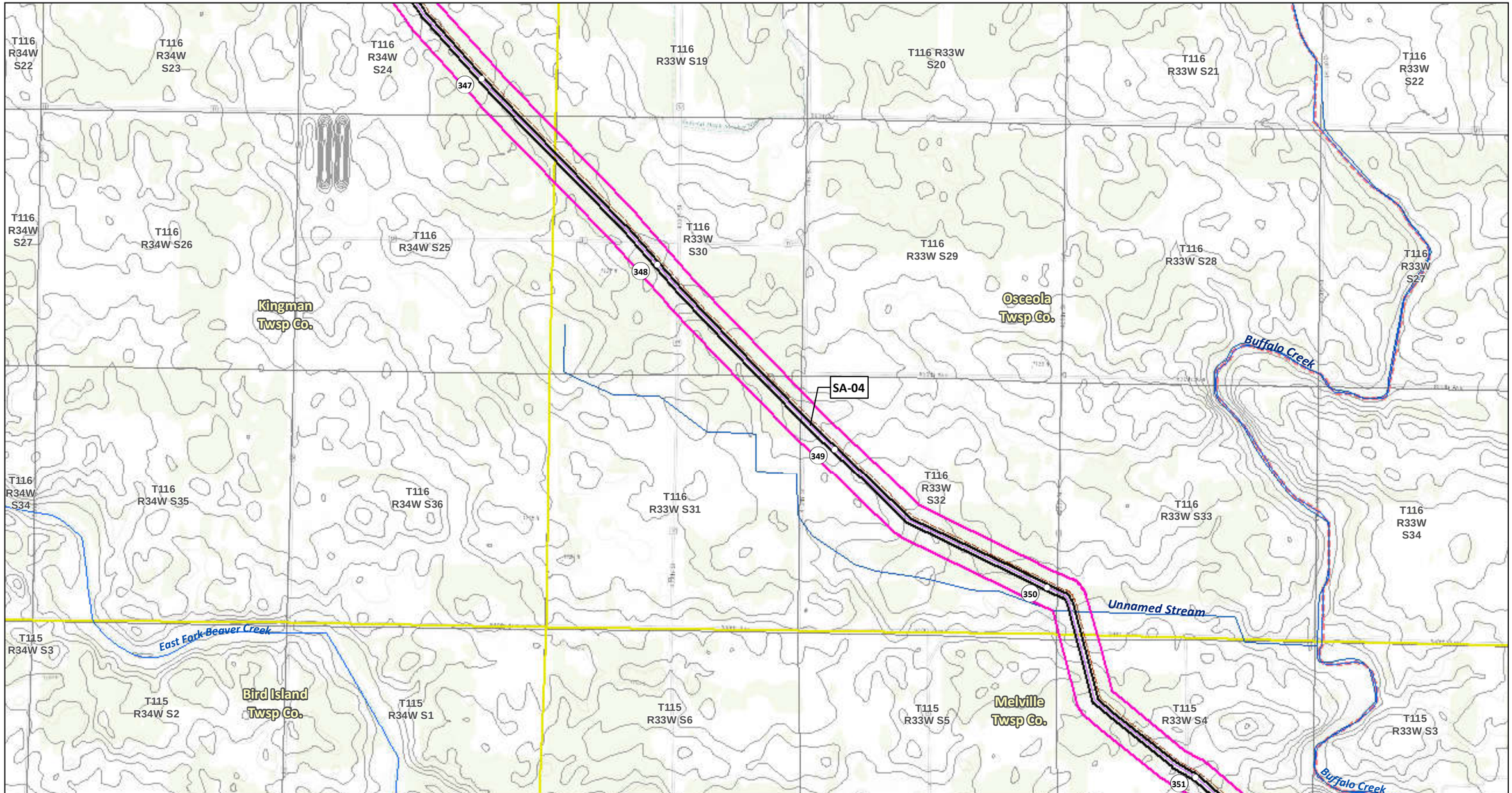

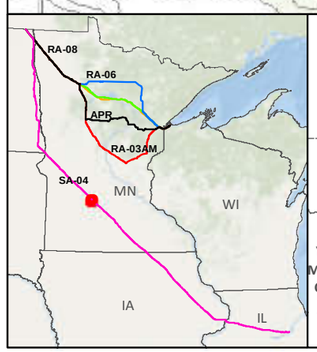

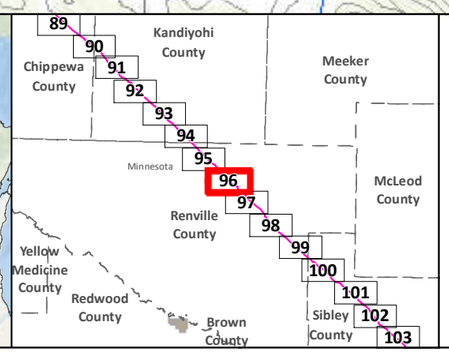

SA-04

Applicant's Preferred Route (APR)

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- RA-08
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 96B of 188

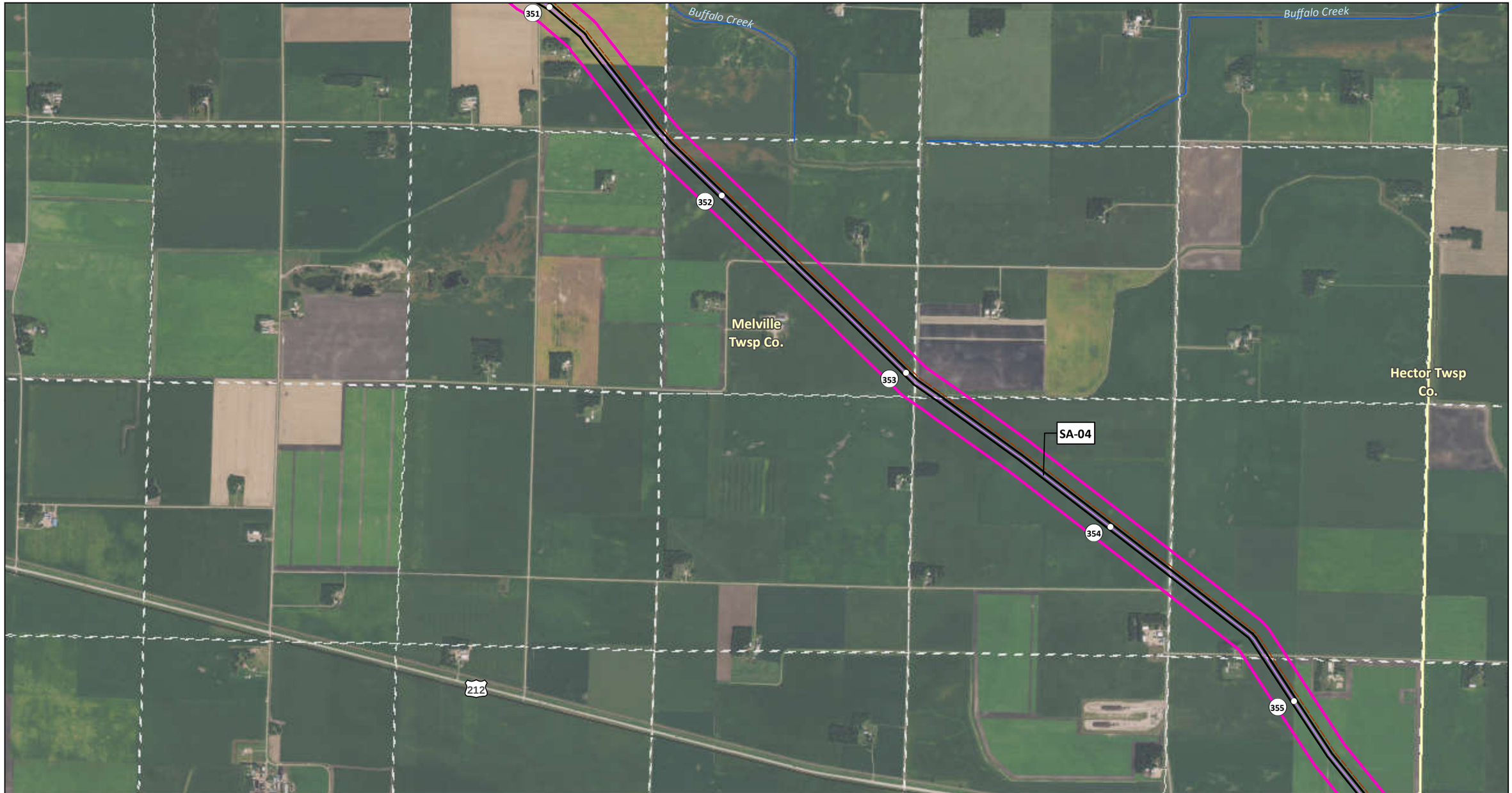

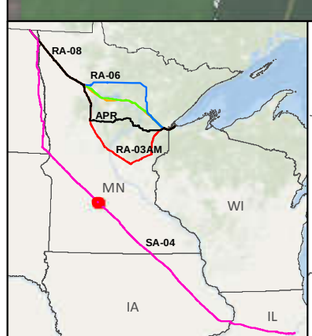

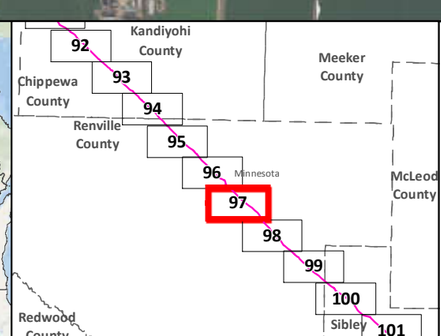

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 97A of 188

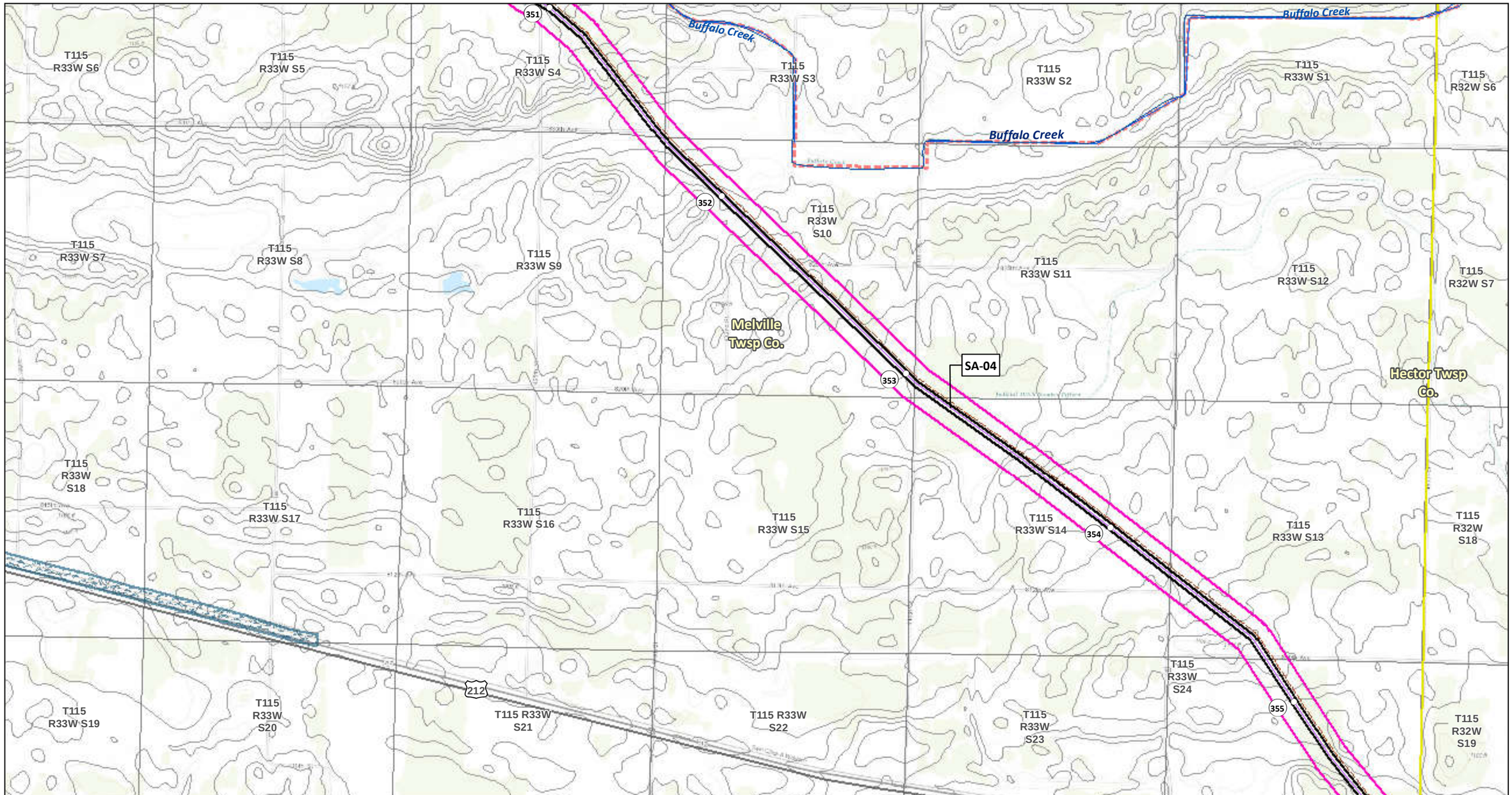

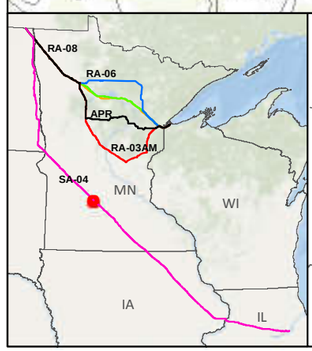

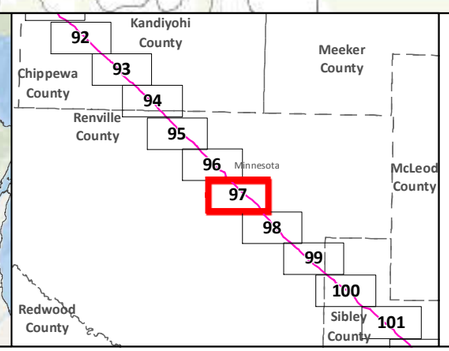

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
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Existing Pipelines
Township Boundary

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303d Imparied Waters
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Calcareous Fens
Wild Rice Lakes (DNR)
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Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 97B of 188

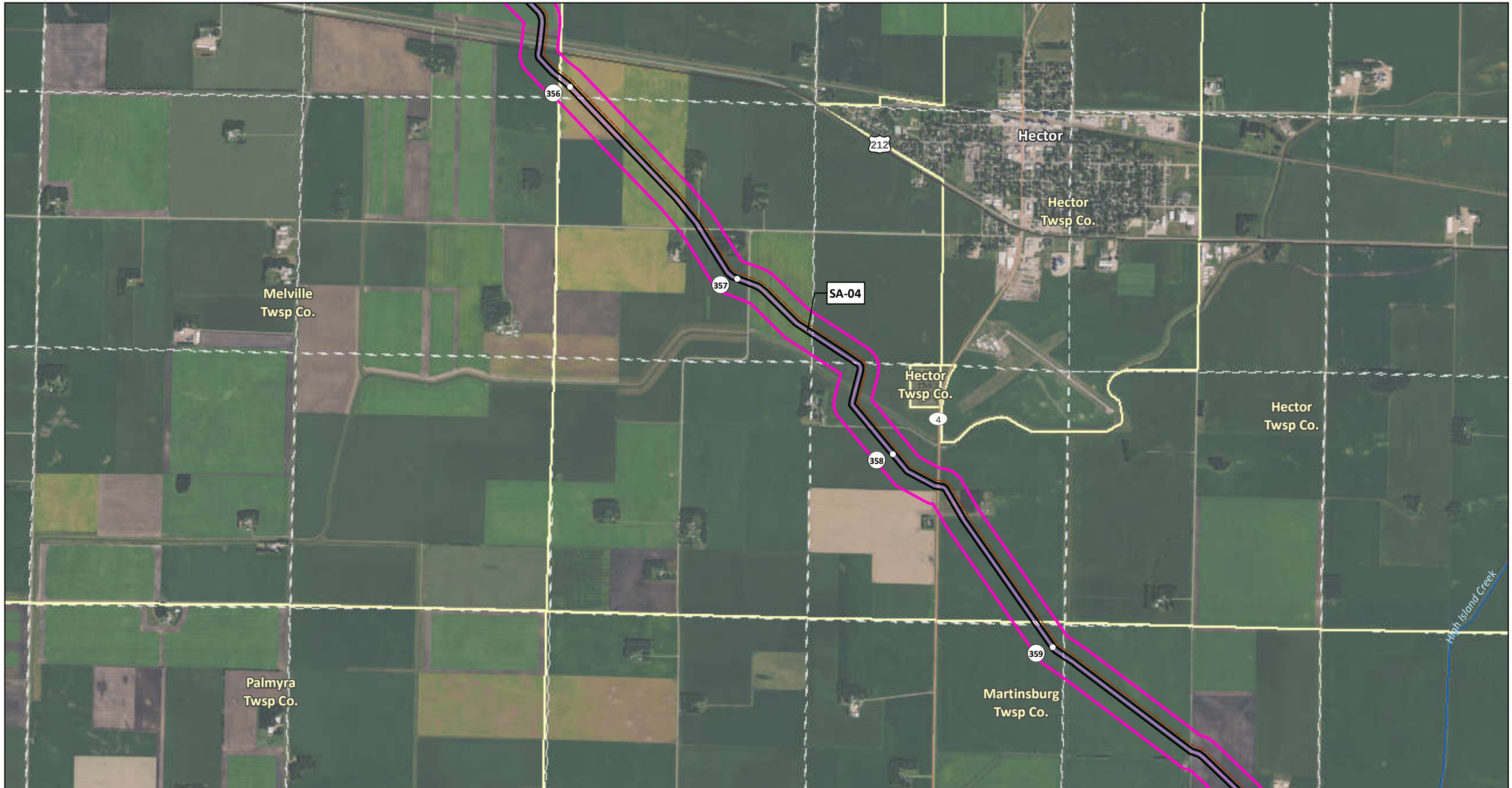

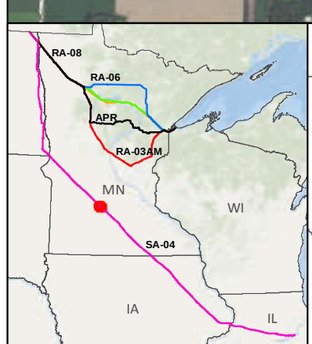

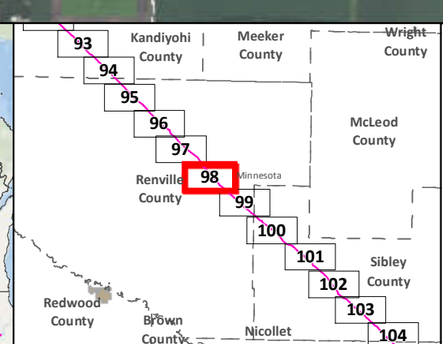

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
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Mile Post
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Highway
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Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 98A of 188

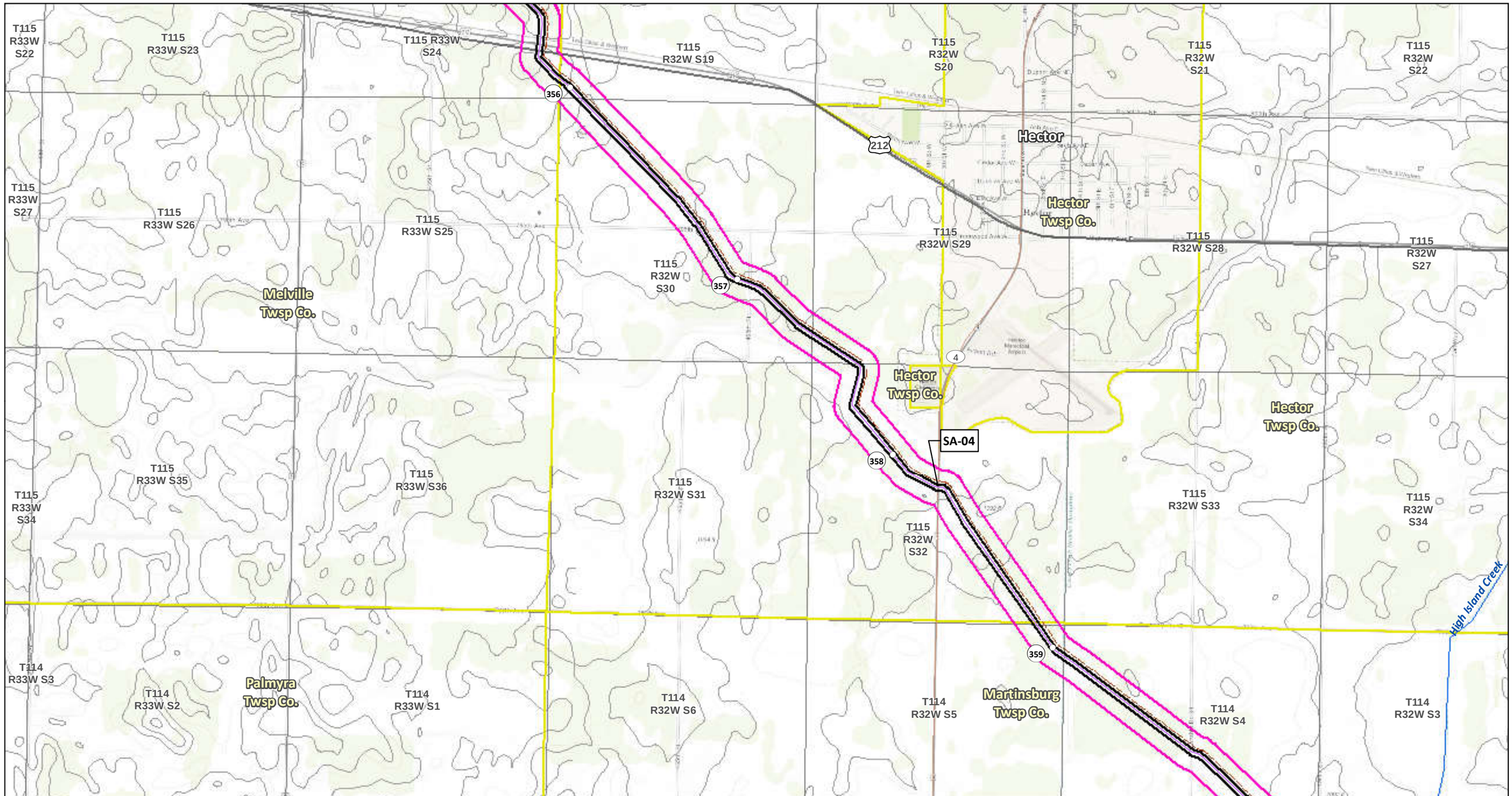

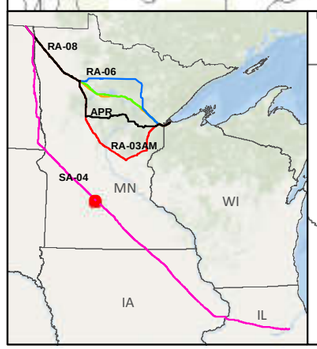

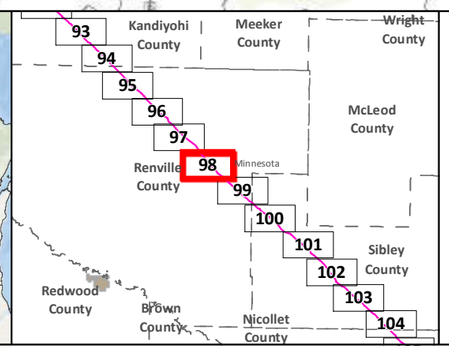

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

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Public Waters Watercourse

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 98B of 188

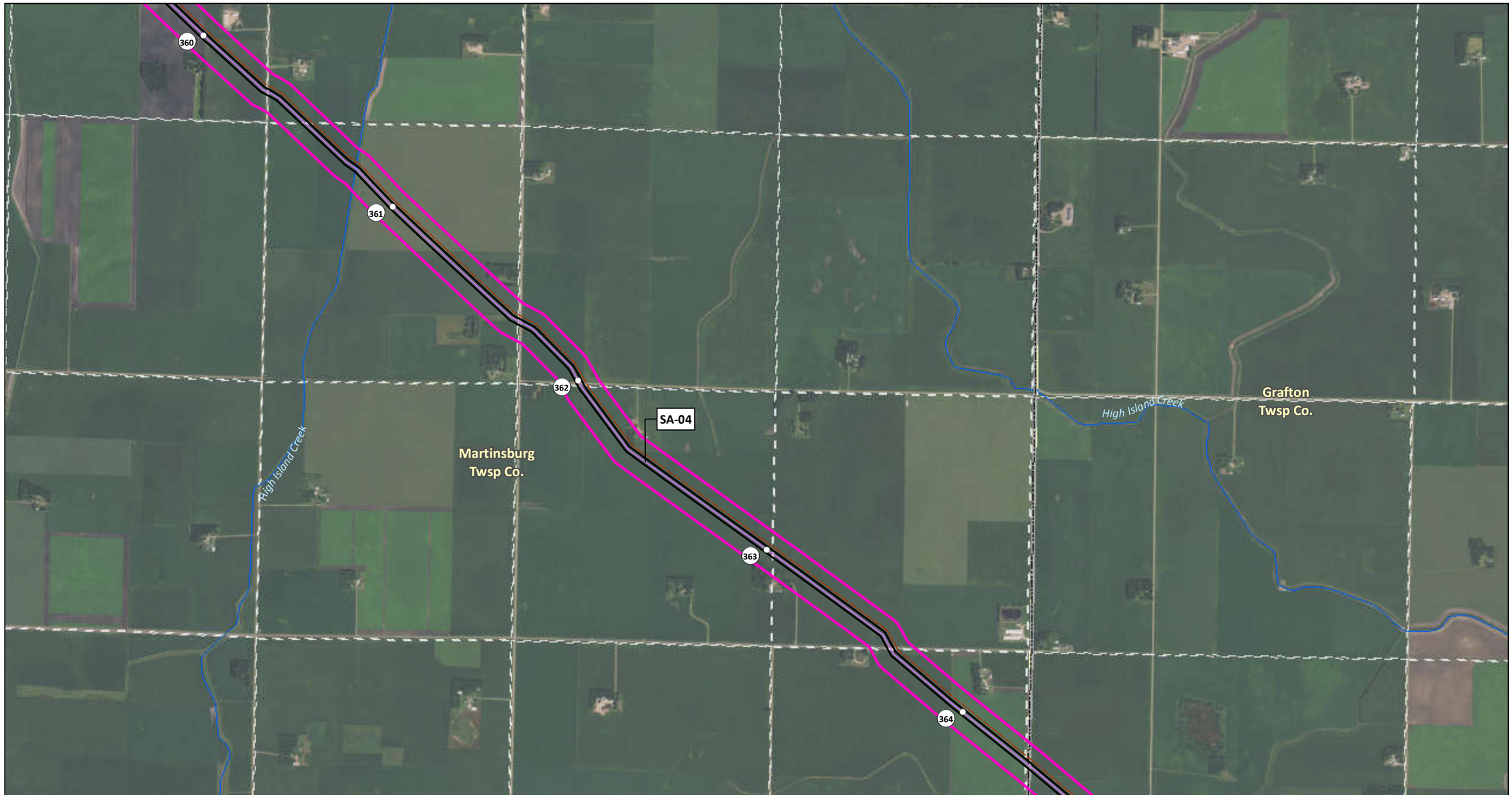

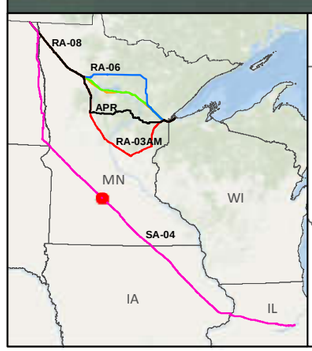

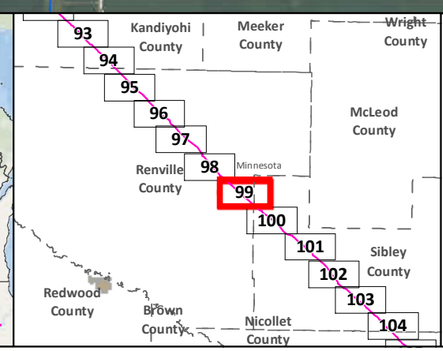

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
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Highway
Major Road
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Tribal Reservation

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0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 99A of 188

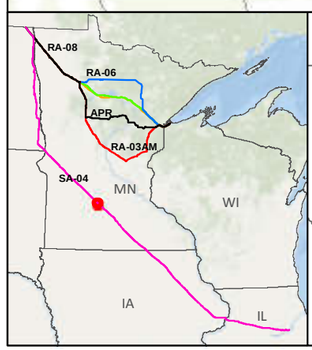

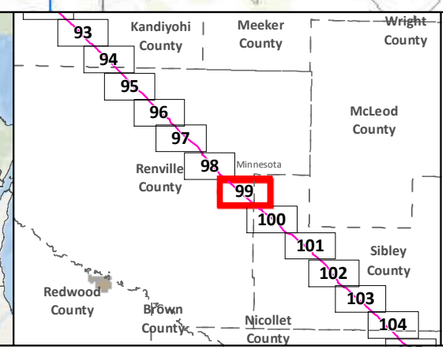

SA-04
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

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0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 99B of 188

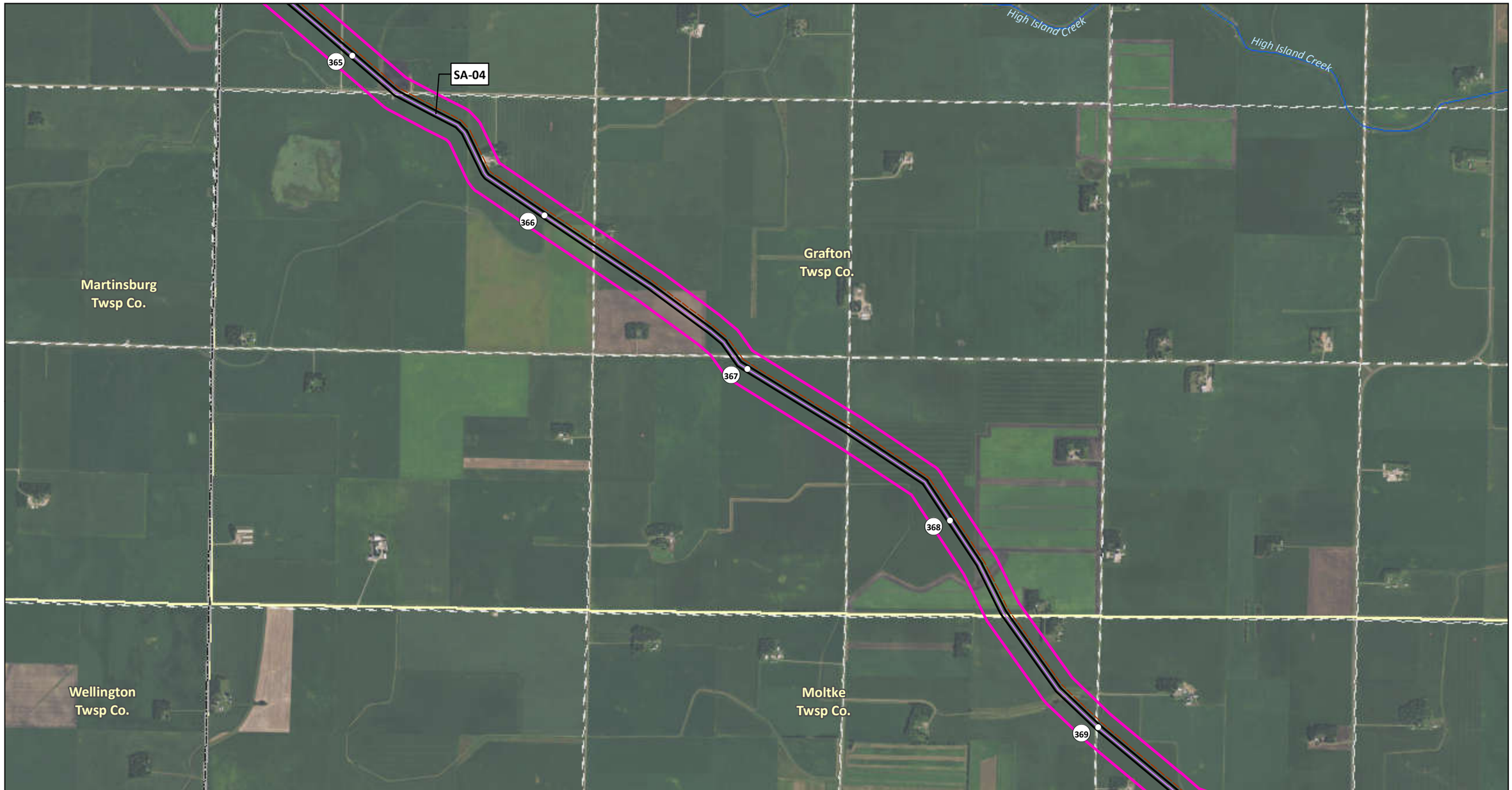

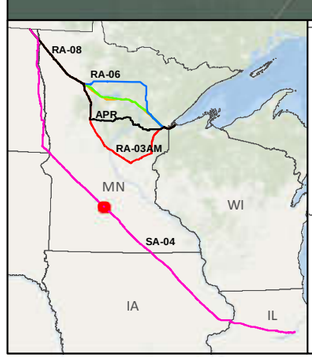

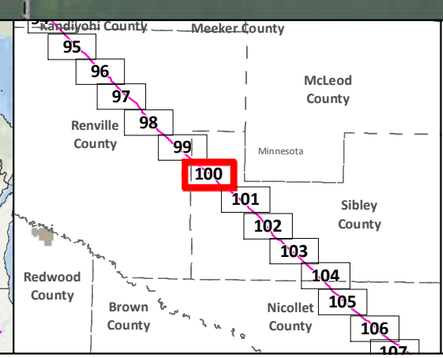

SA-04
Applicant's Preferred Route (APR)
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 100A of 188

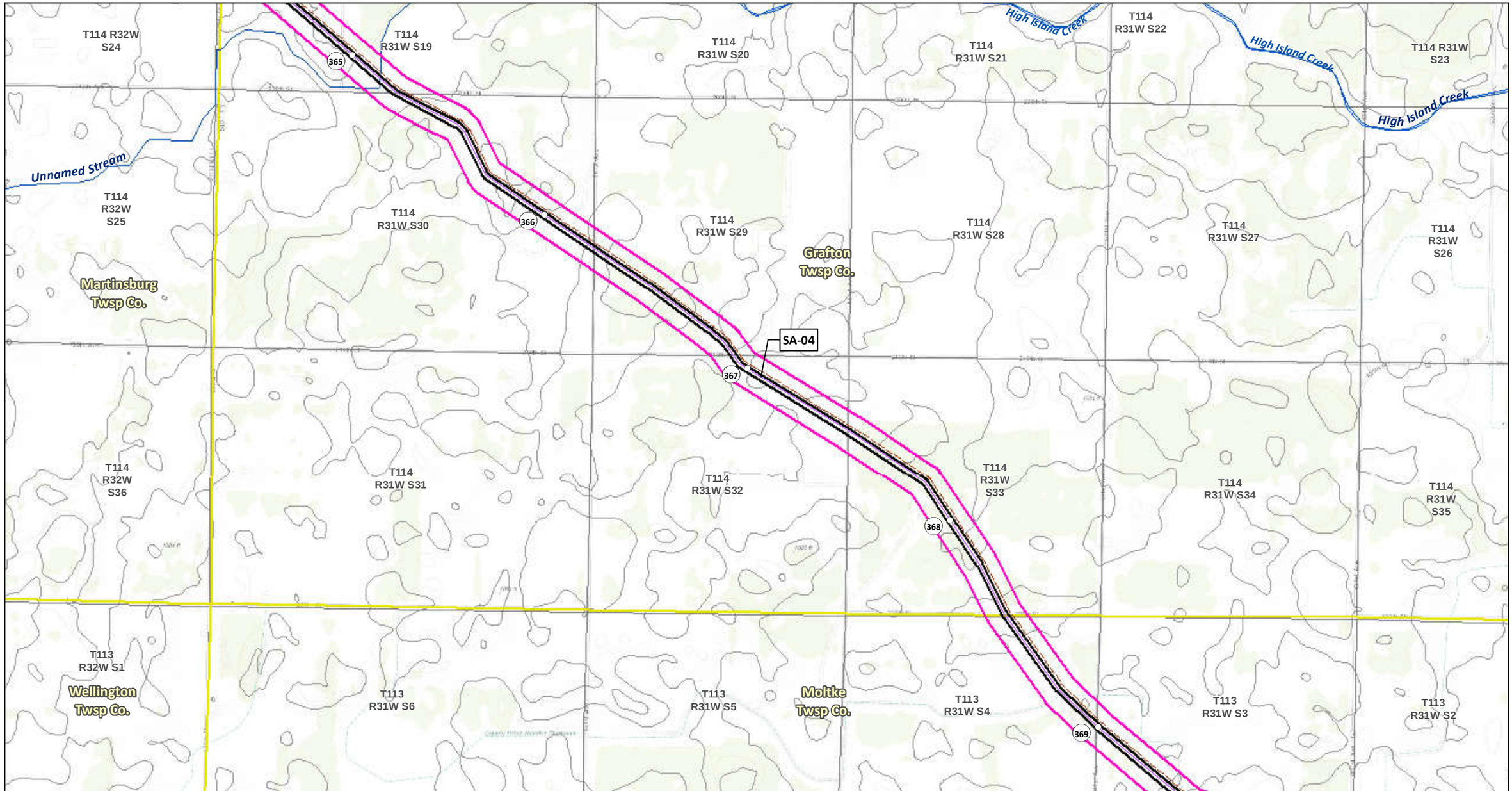

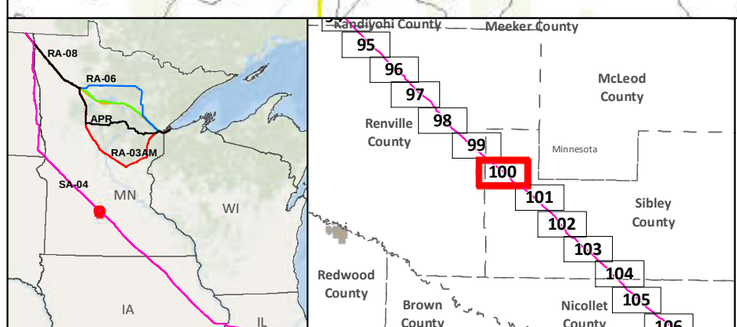

SA-04

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

Map 100B of 188

370
371
SA-04
372
373
374
Rush River
Moltke
Twsp Co.
Bismarck
Twsp Co.

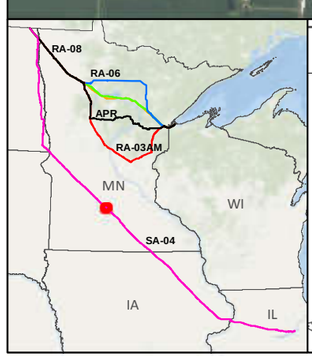

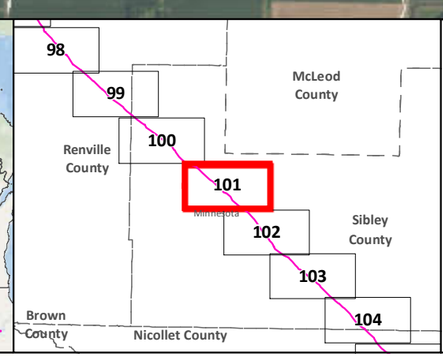

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 101A of 188

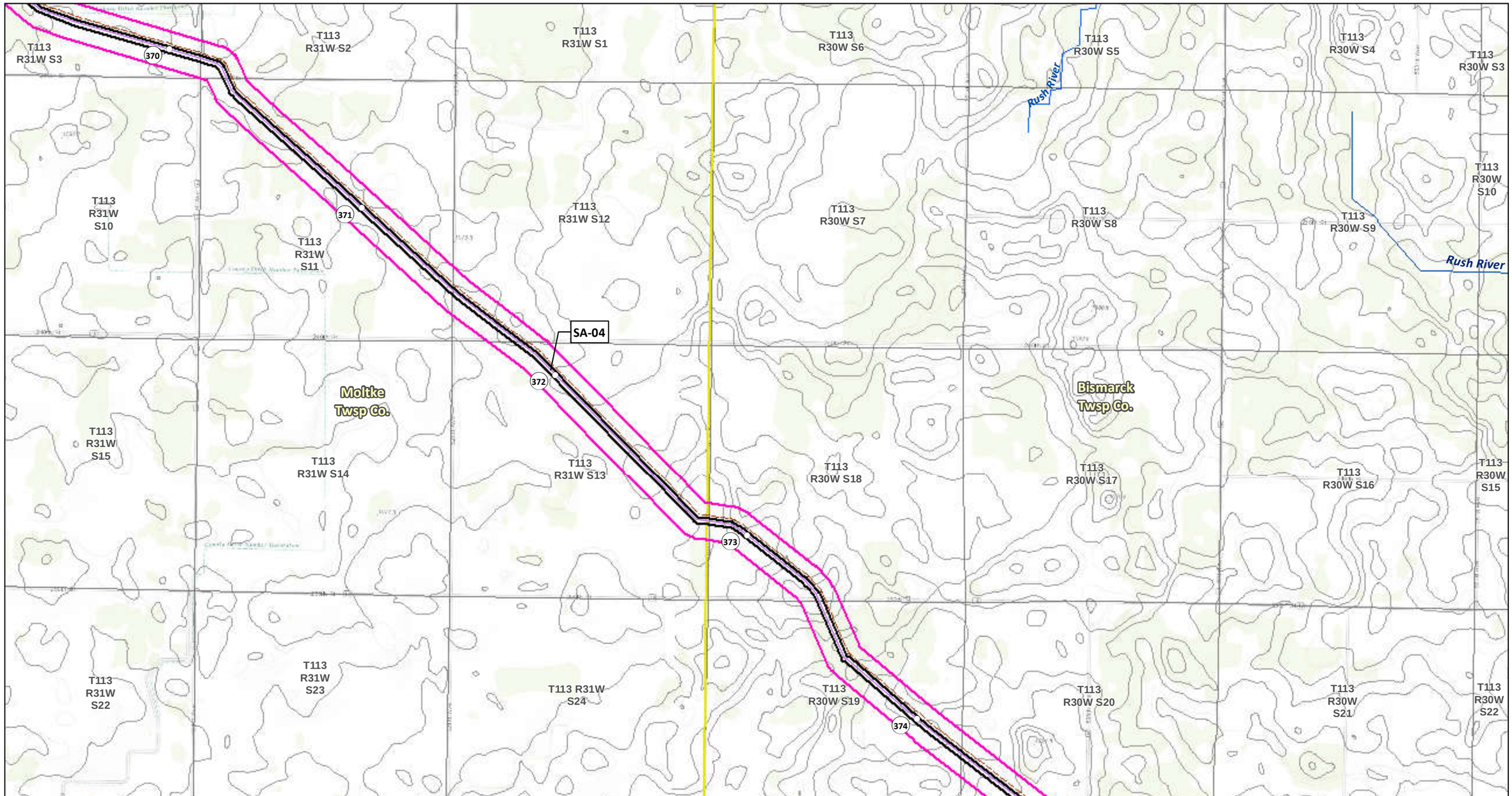

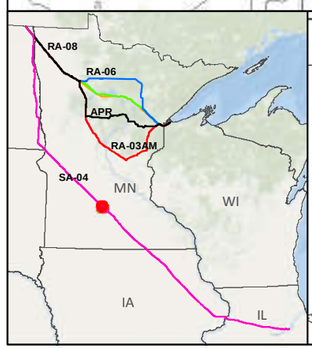

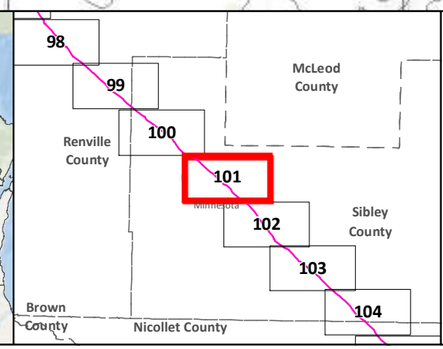

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

Map 101B of 188

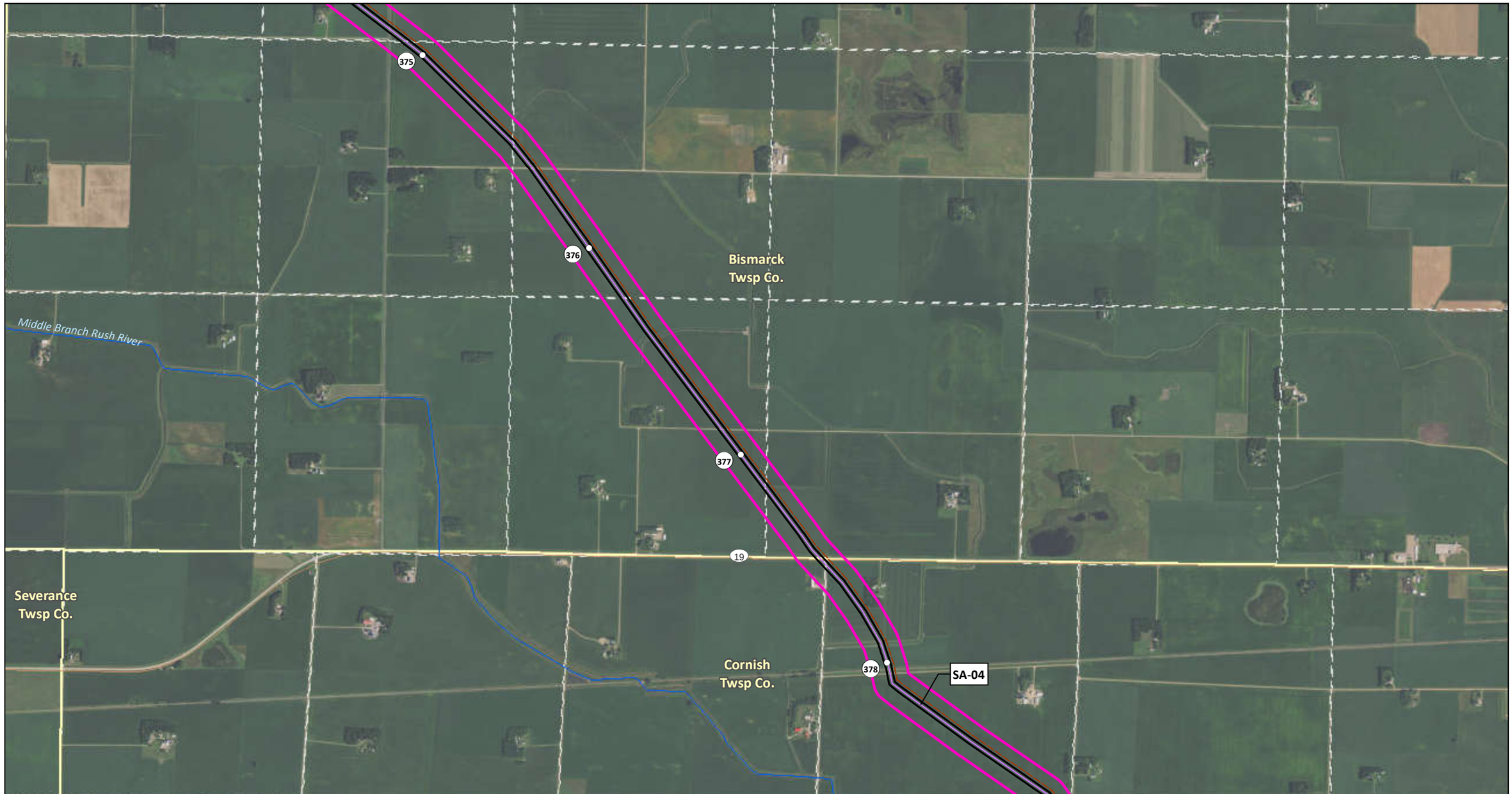

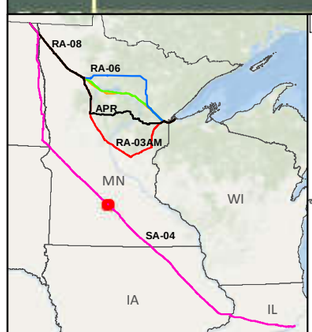

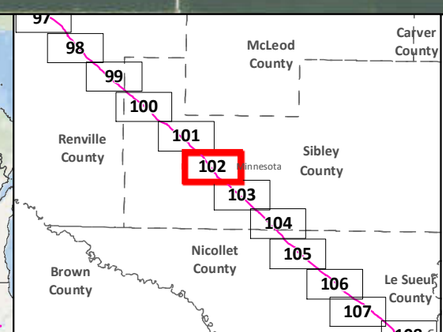

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 102A of 188

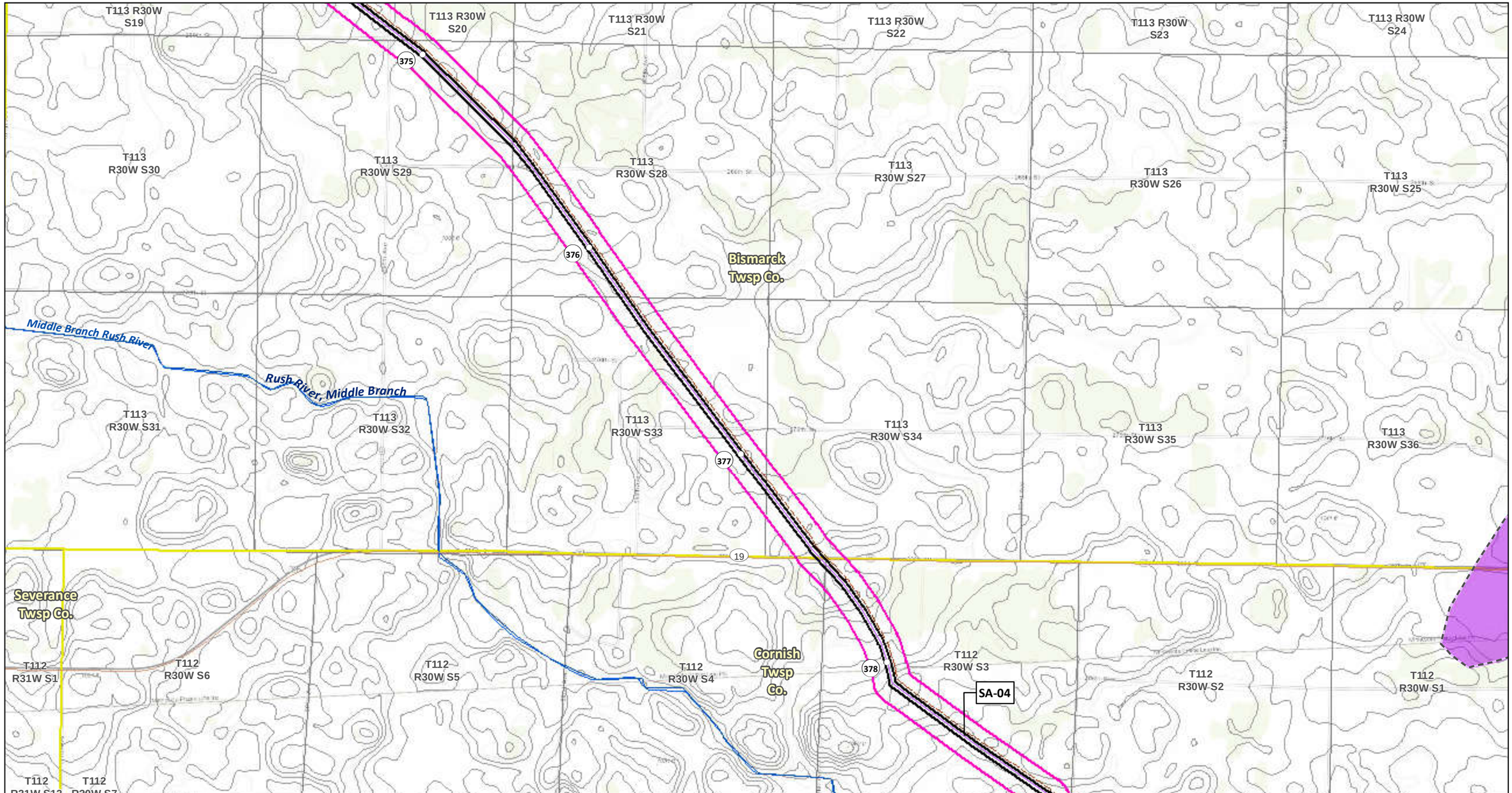

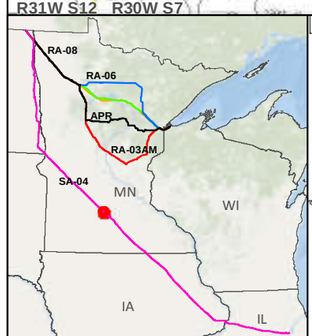

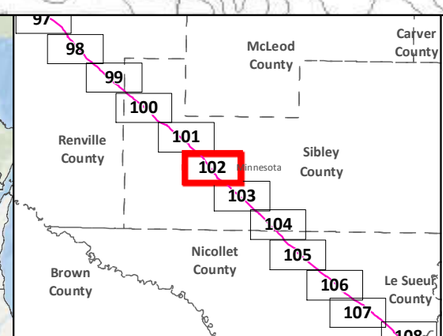

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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Mile Post

Anticipated 120' Construction ROW

Route Width (750')

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Native Plant Communities with Biodiversity Significance

- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 102B of 188

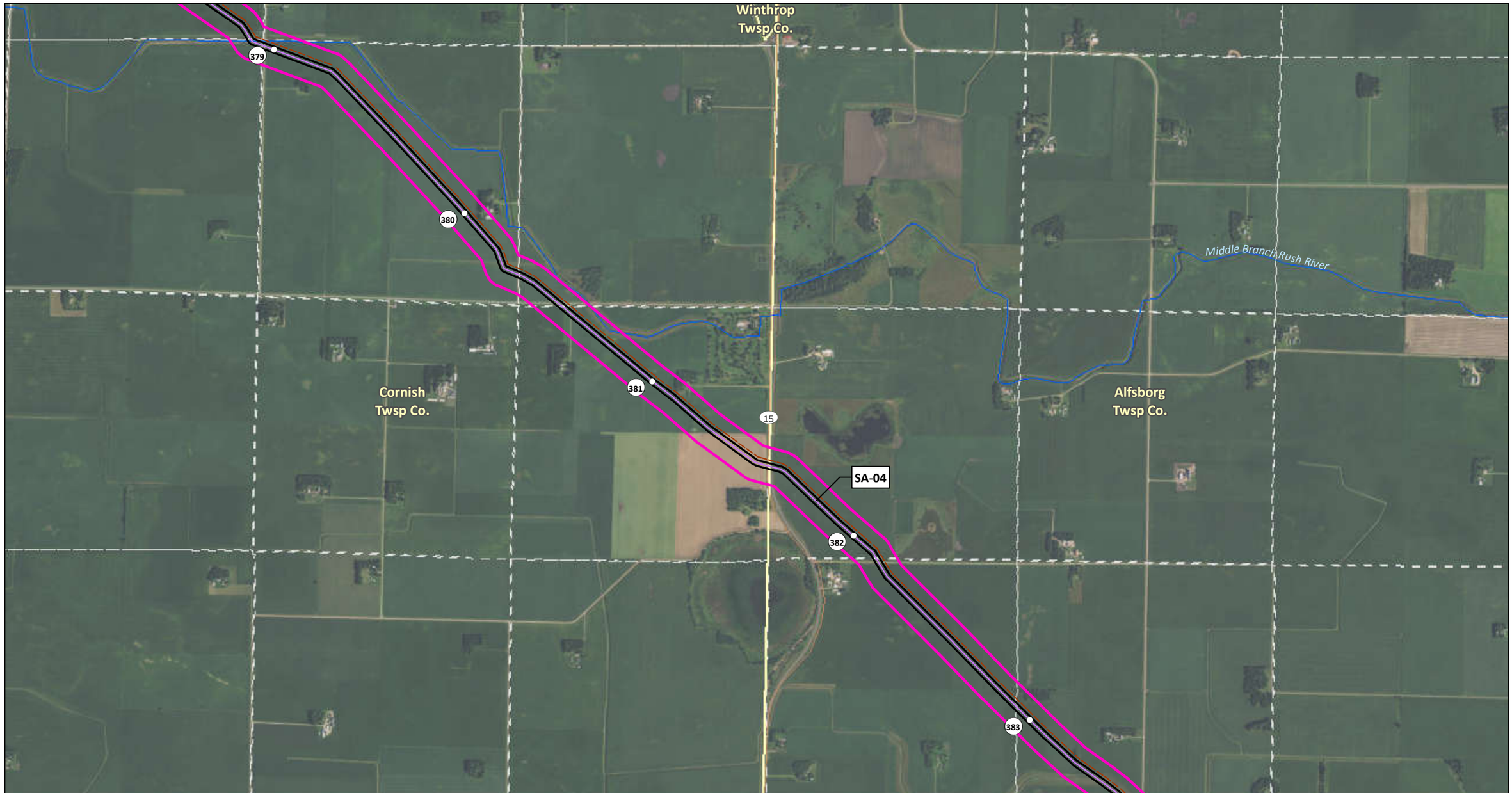

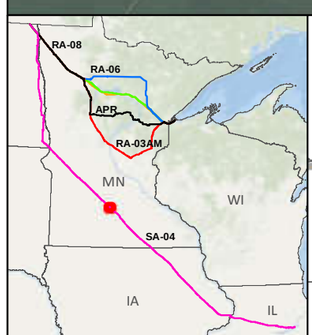

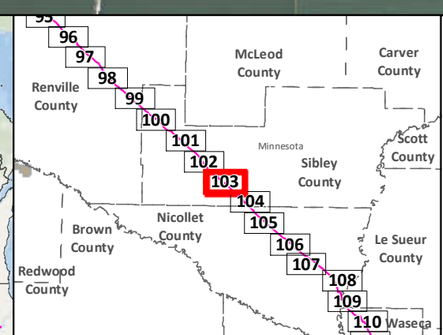

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
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National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 103A of 188

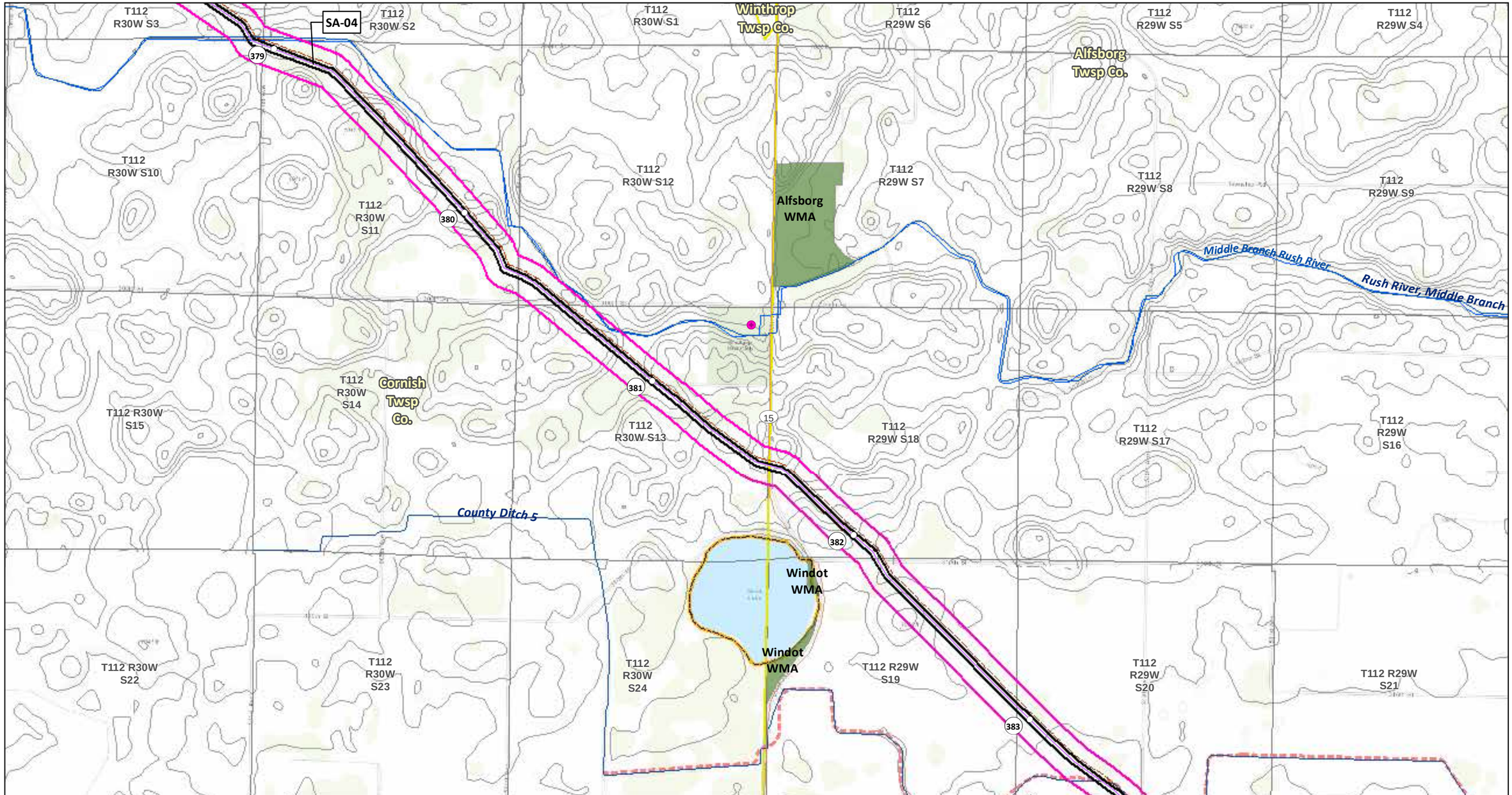

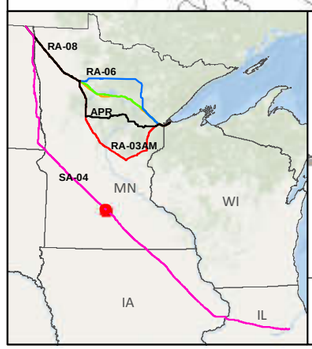

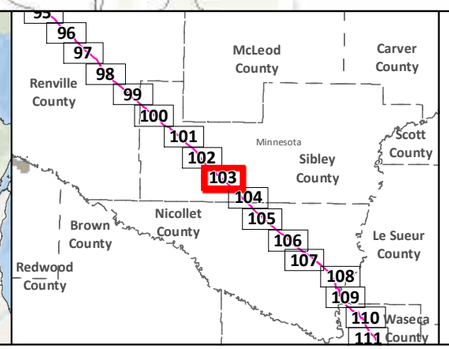

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
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- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

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State Managed Lands

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Calcareous Fens

Wild Rice Lakes (DNR)

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Public Drinking Water Supply

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- Moderate

Native Plant Communities with Biodiversity Significance

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- High
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 103B of 188

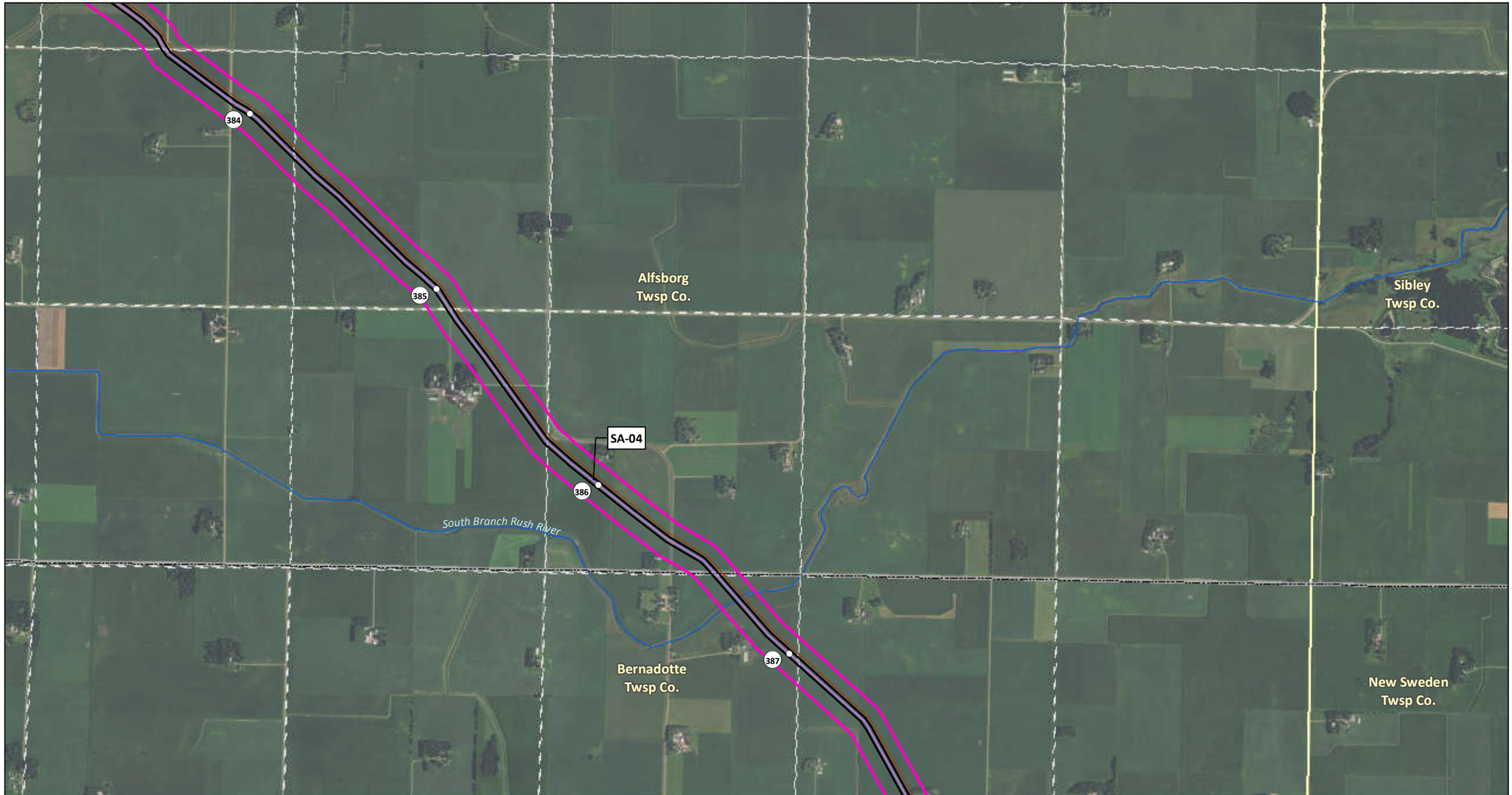

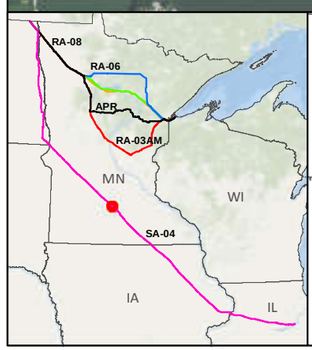

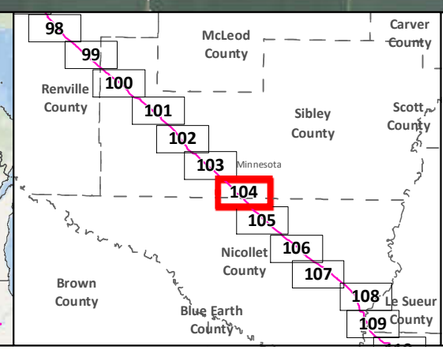

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 104A of 188

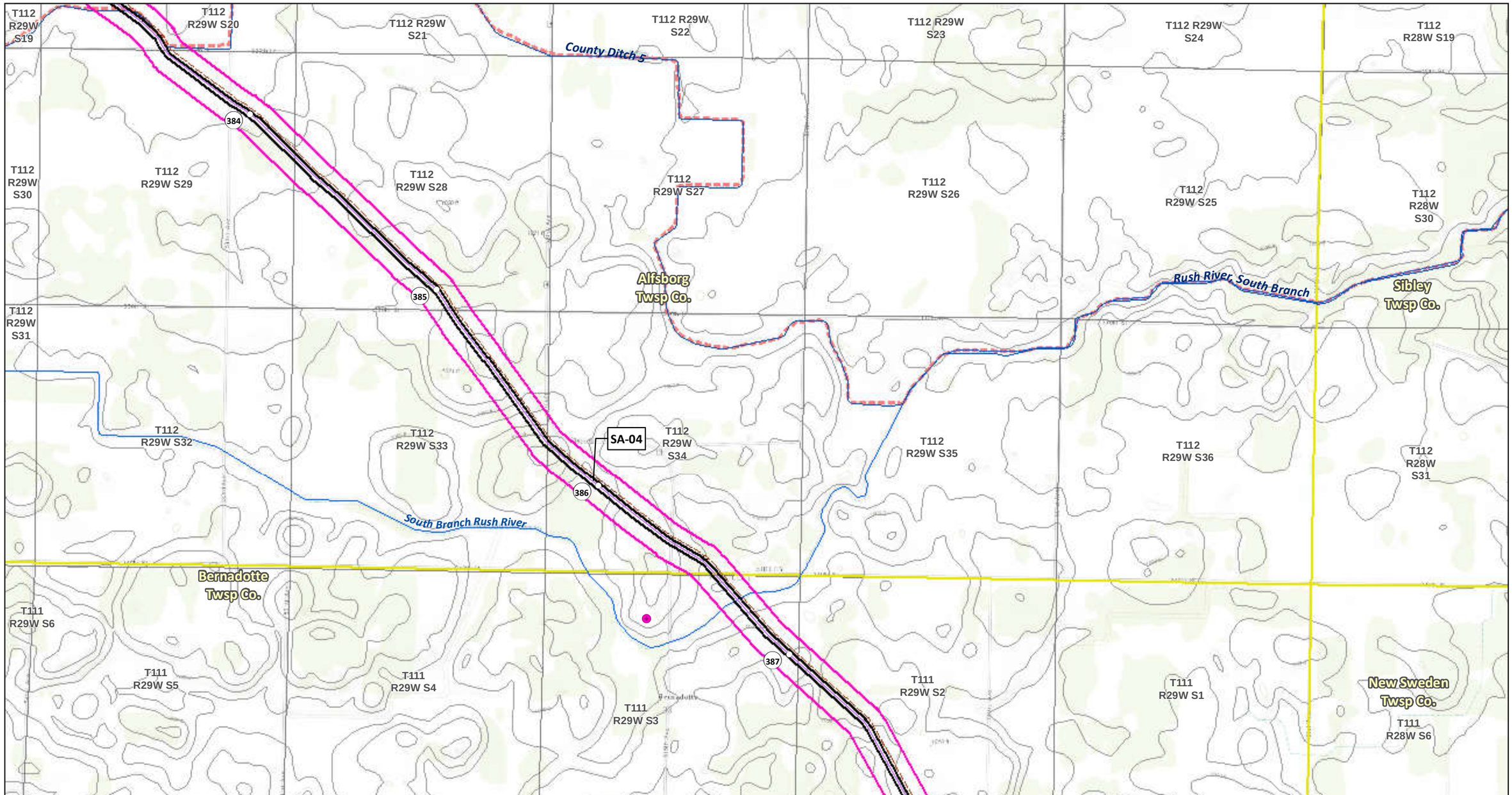

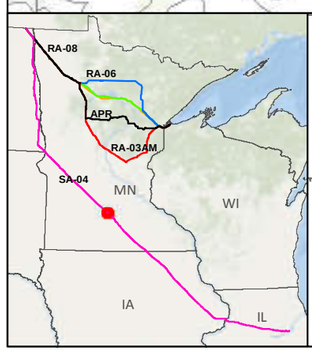

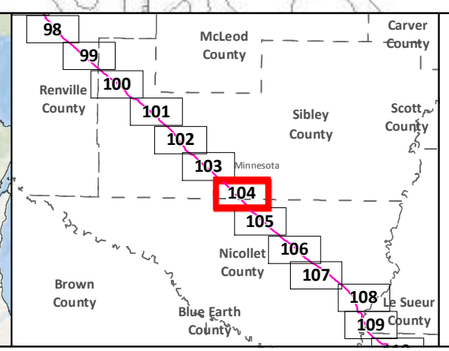

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
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- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 104B of 188

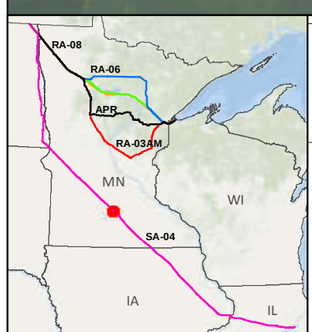

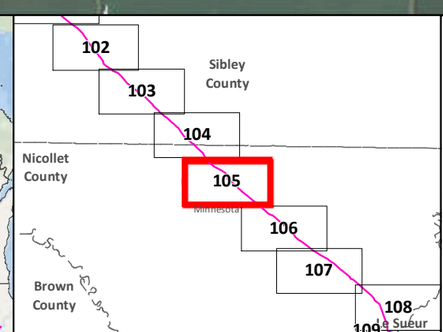

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

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0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 105A of 188

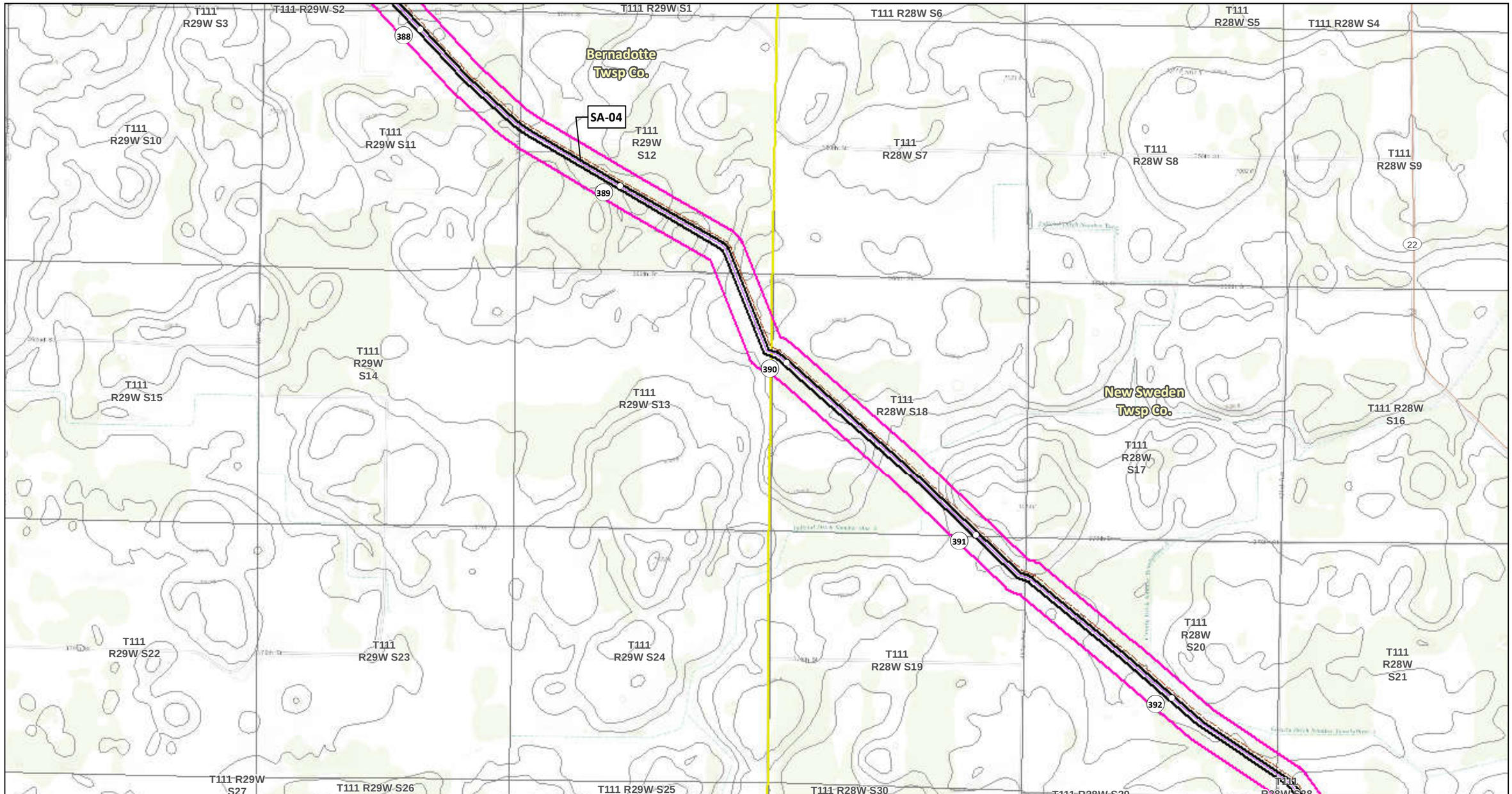

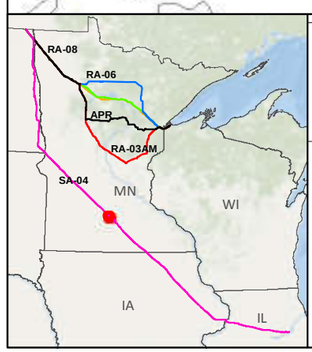

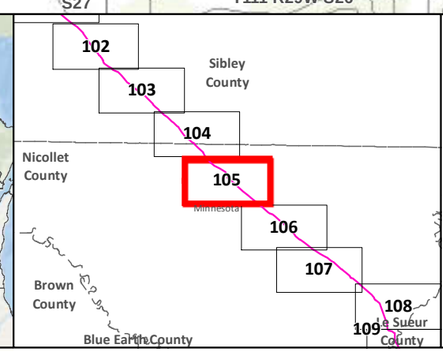

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
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- Anticipated 120' Construction ROW
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Existing Pipelines
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

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10ft Contours

Map 105B of 188

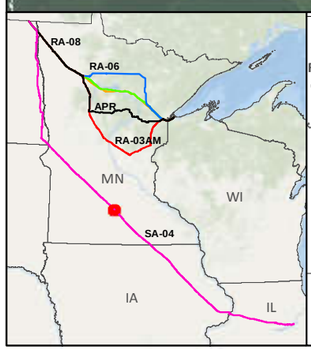

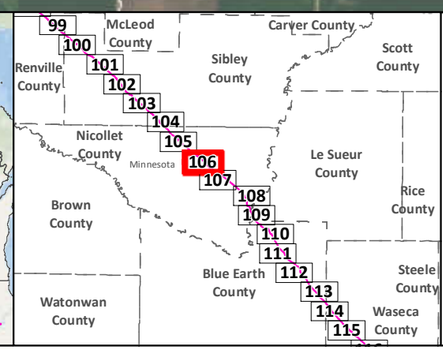

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 106A of 188

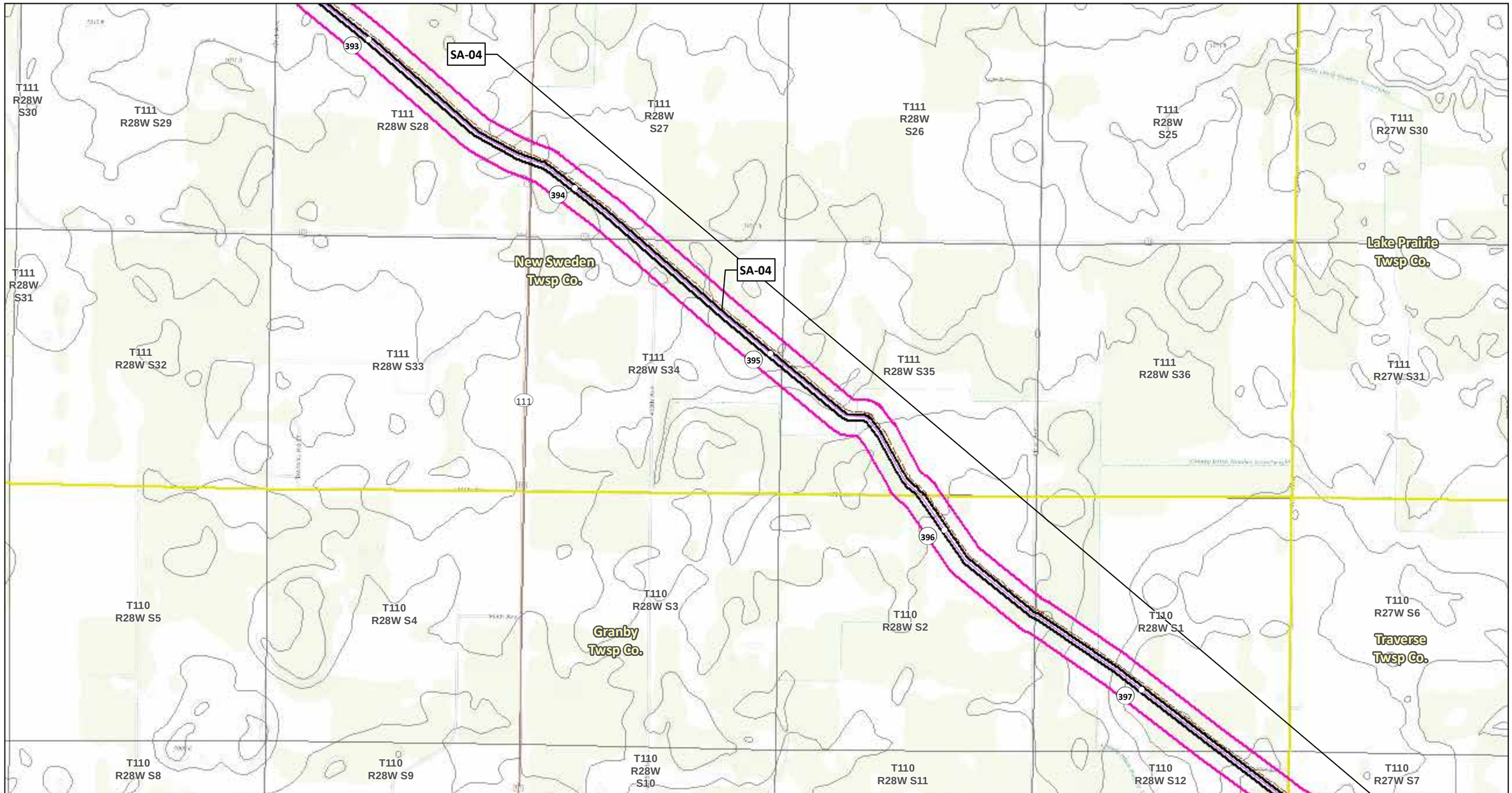

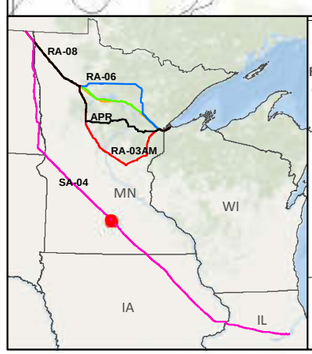

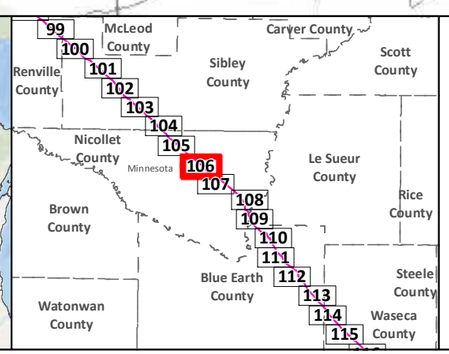

SA-04

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

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0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

Map 106B of 188

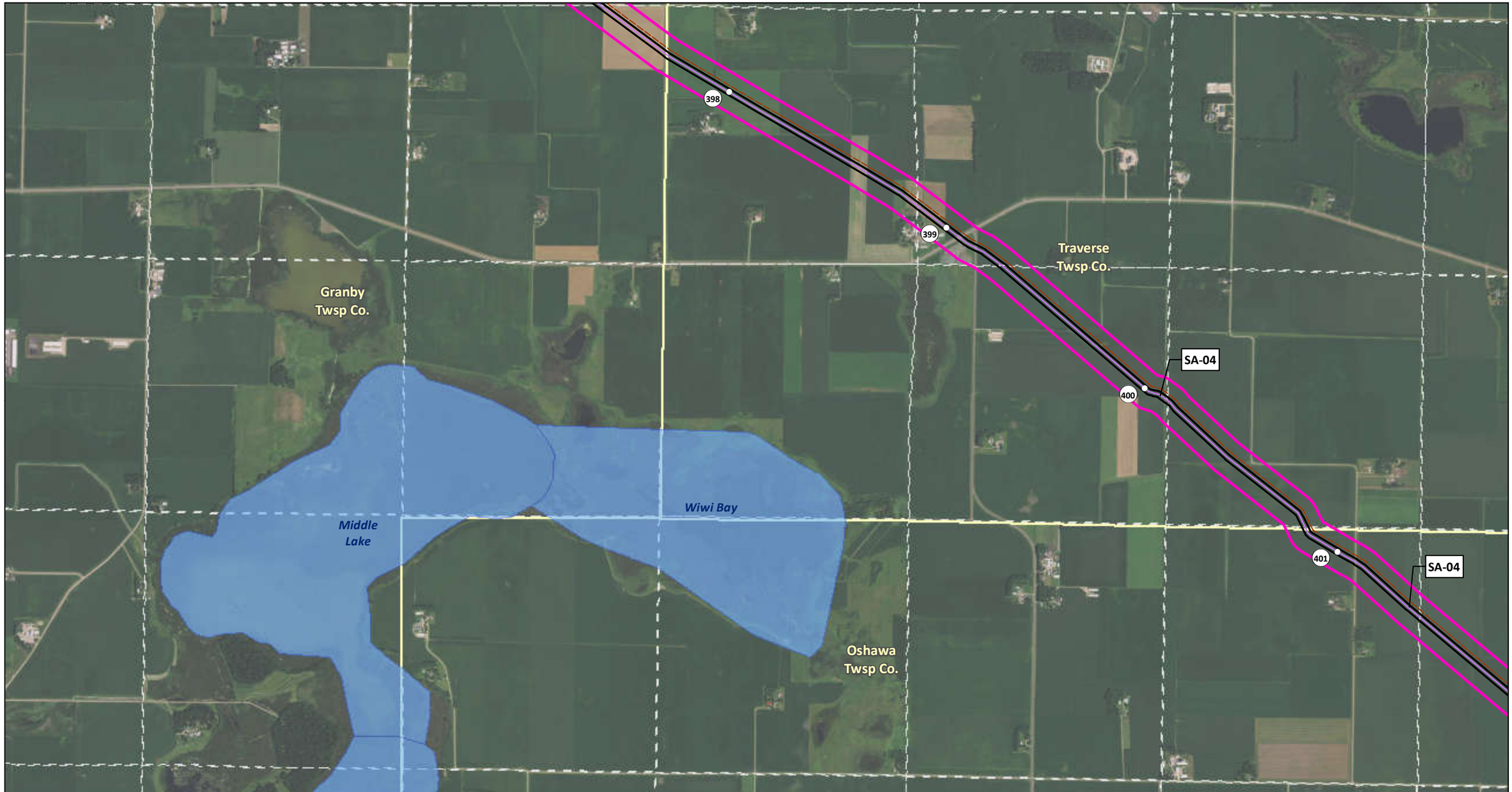

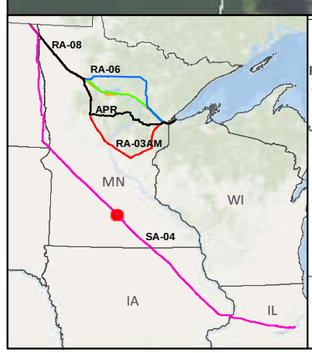

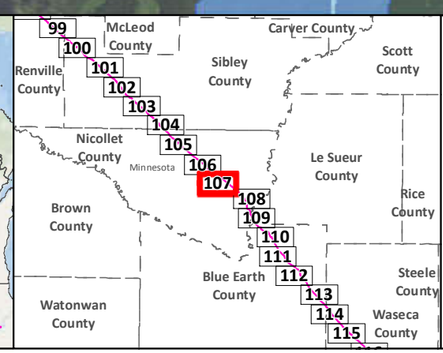

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Route Width (750')
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1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 107A of 188

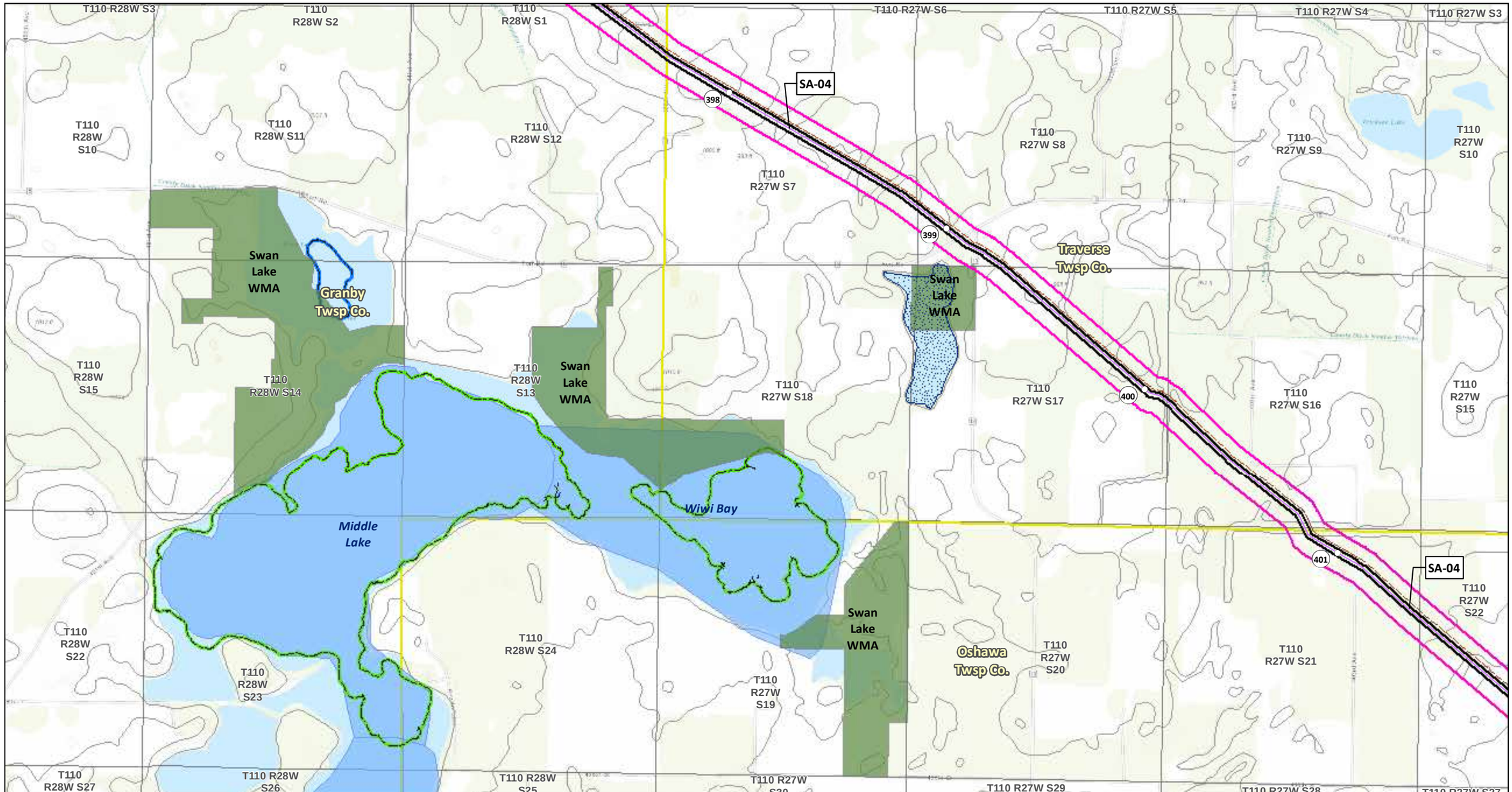

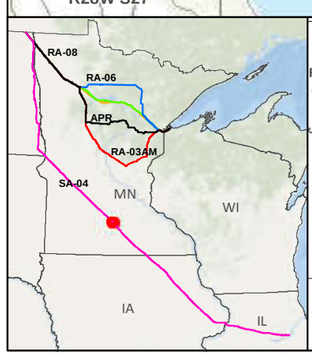

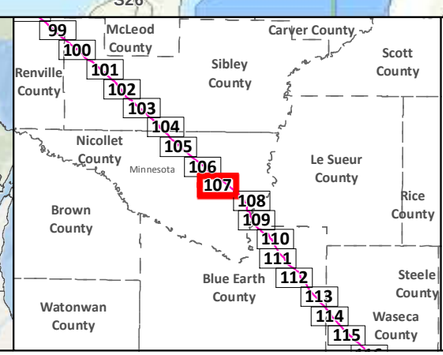

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

Map 107B of 188

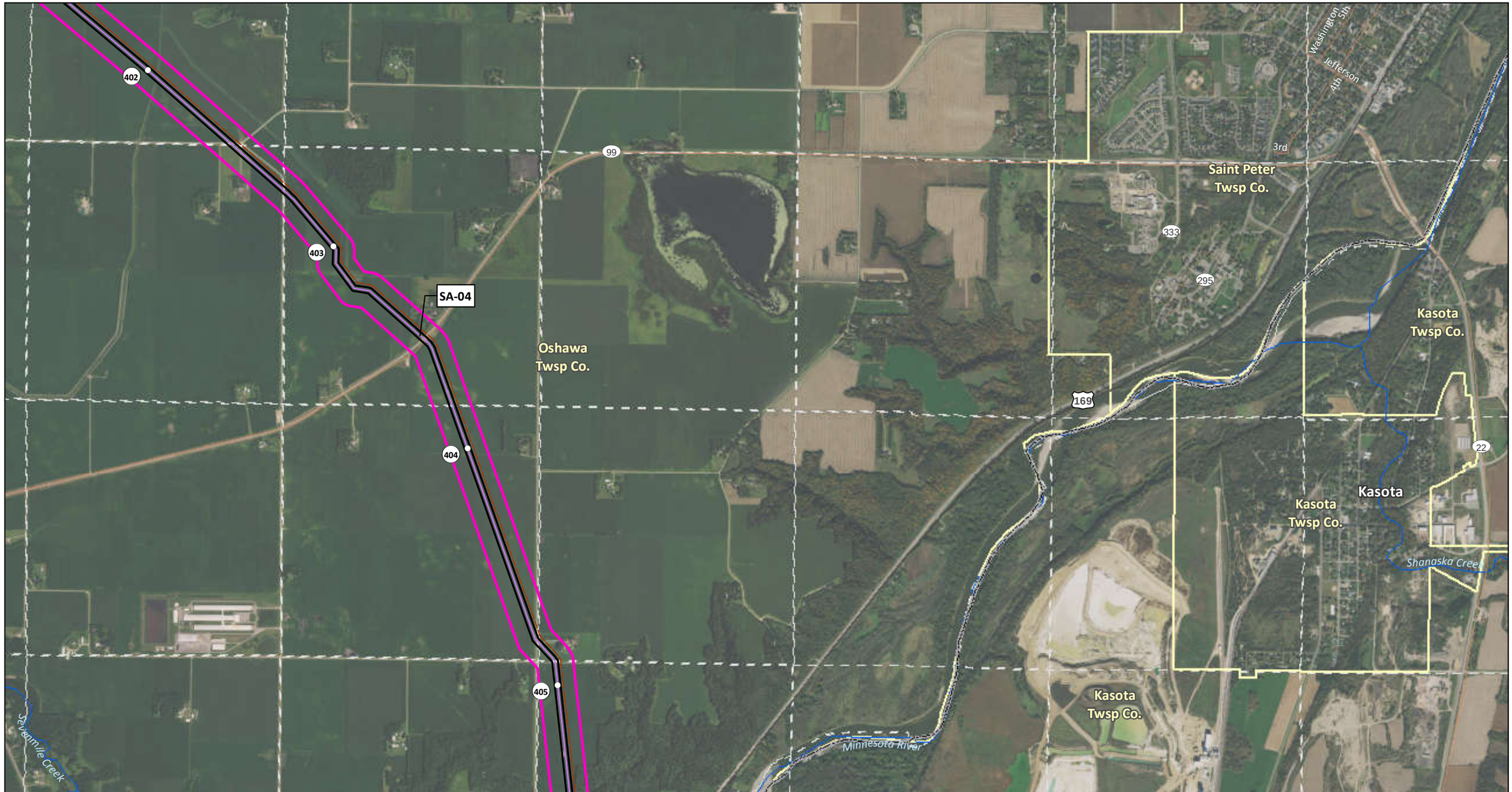

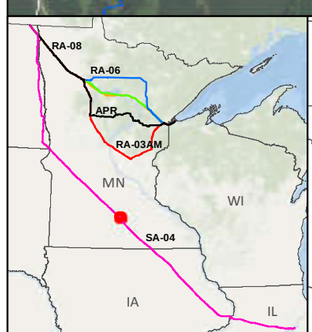

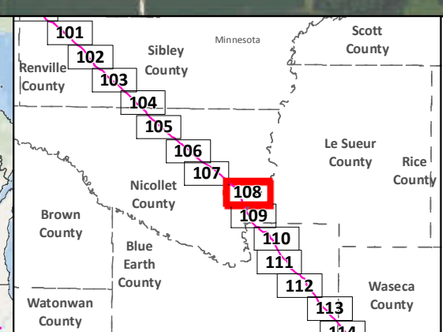

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 108A of 188

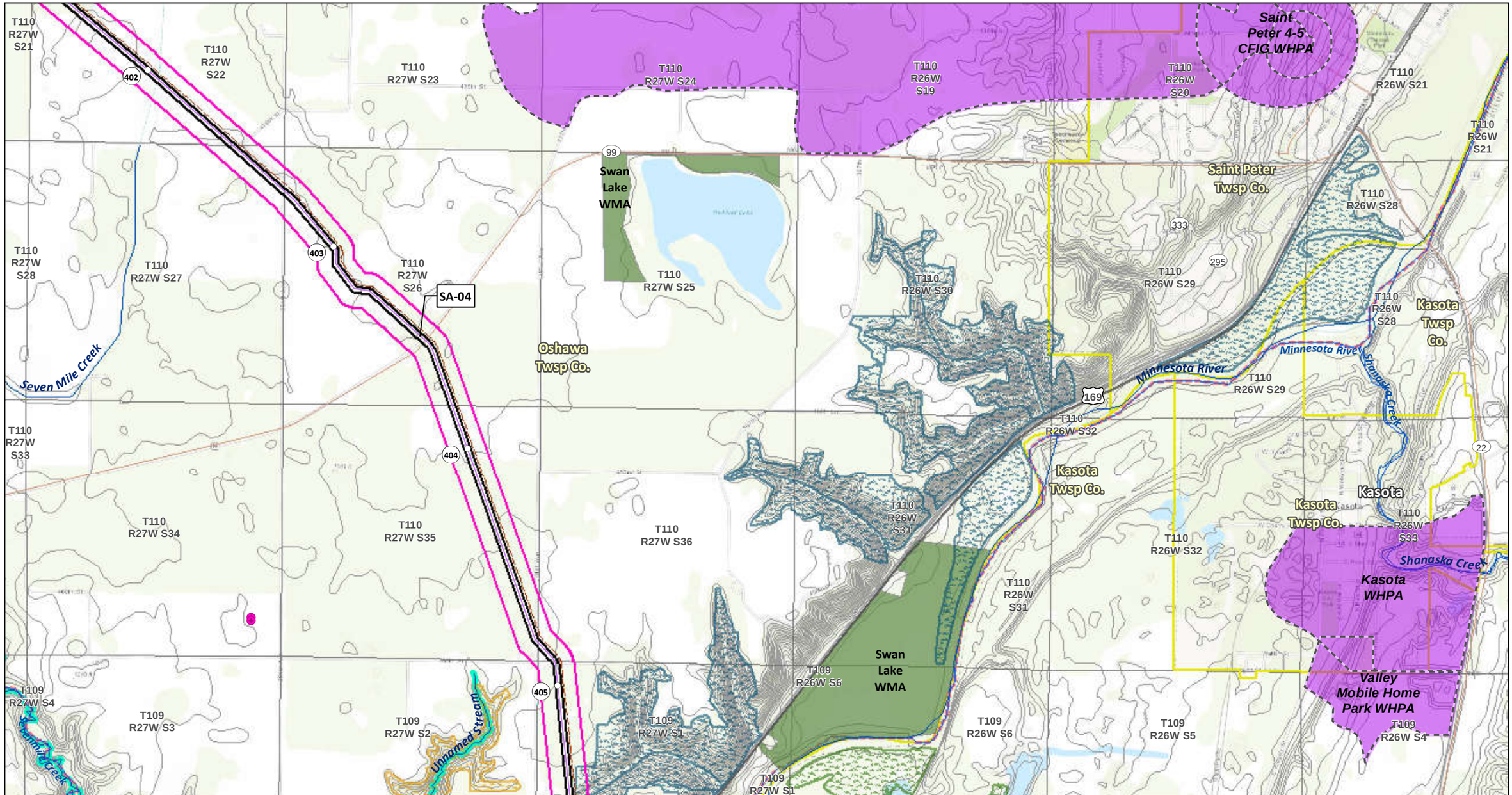

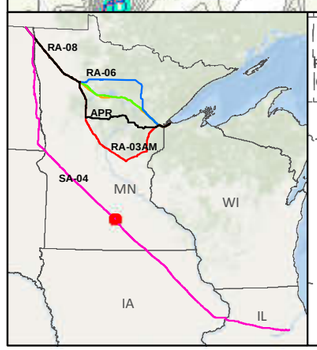

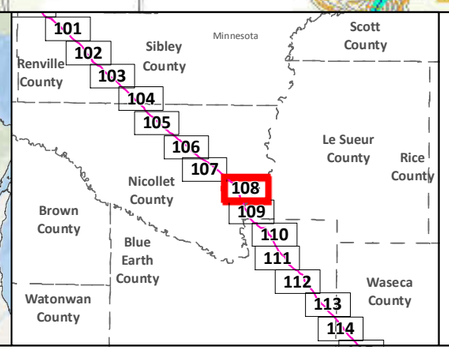

SA-04

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

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0 125 250 500 Meters

1:24,000

10ft Contours

Map 108B of 188

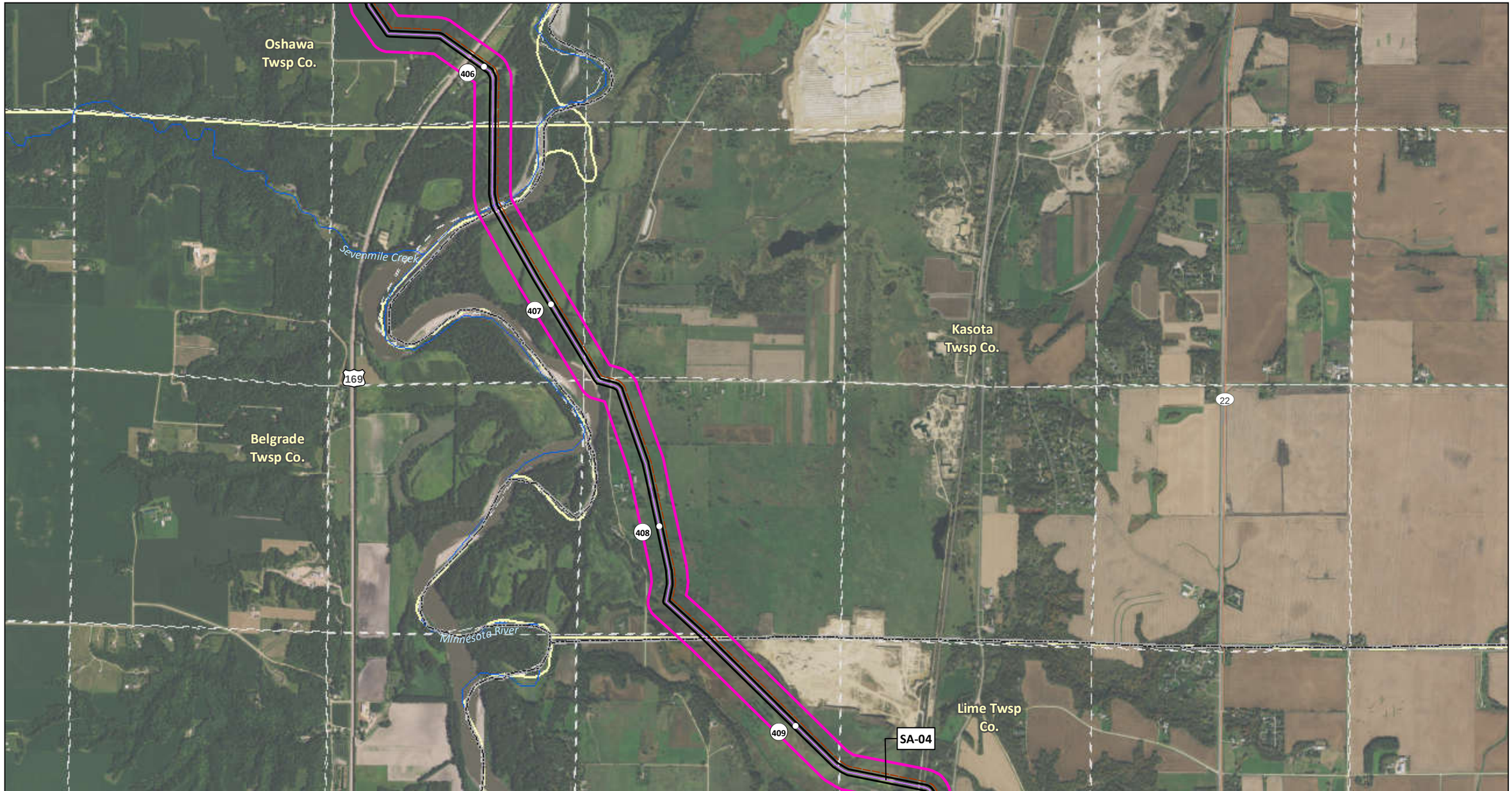

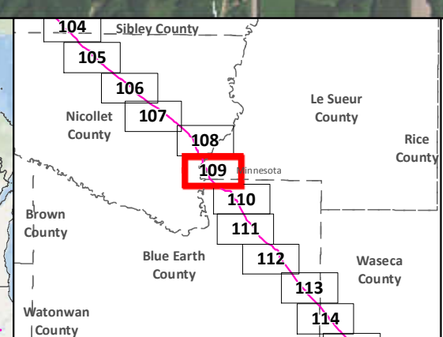

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
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Mile Post
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Highway
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Lake
River

0 0.125 0.25 0.5 Miles
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 109A of 188

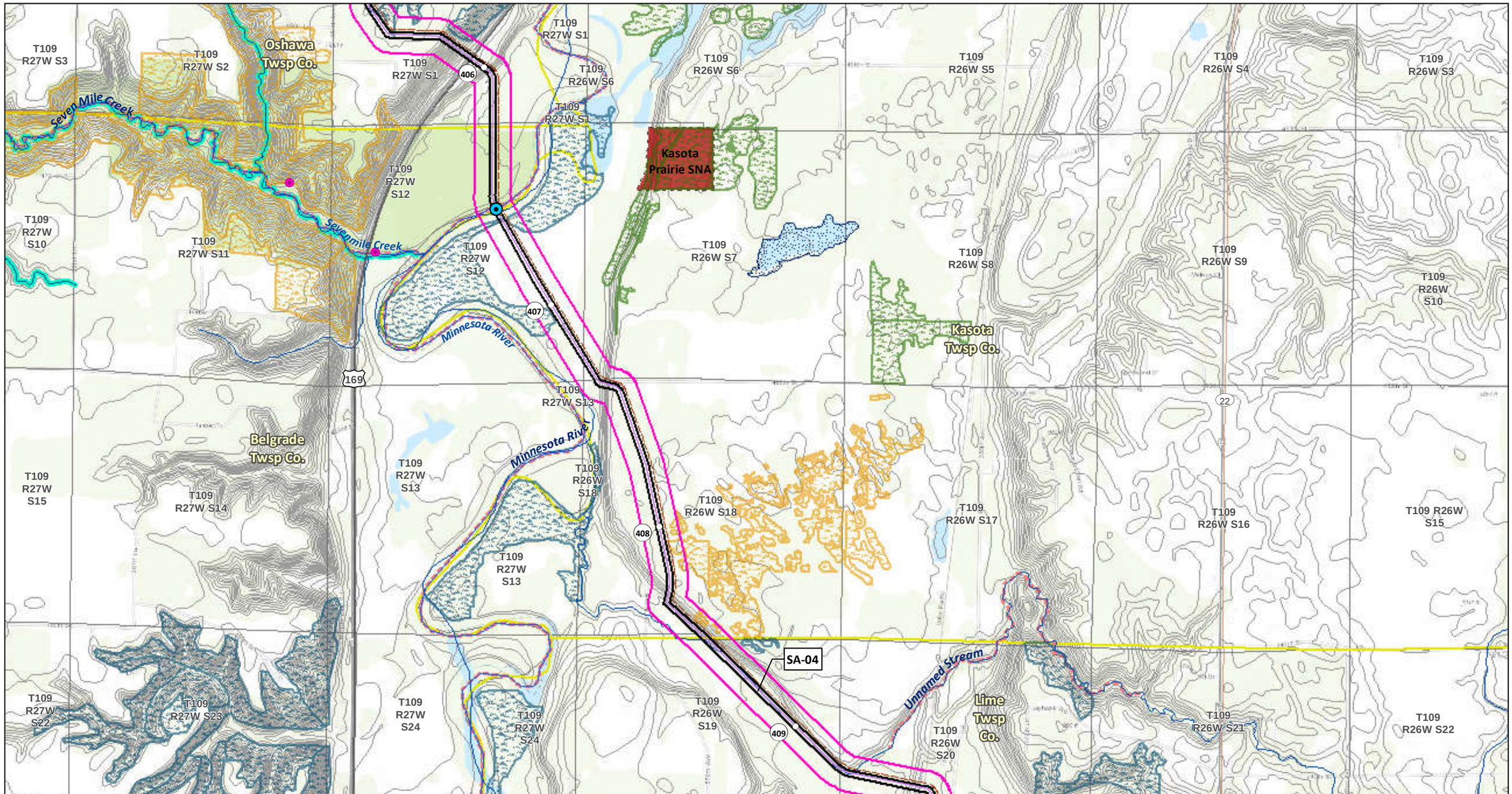

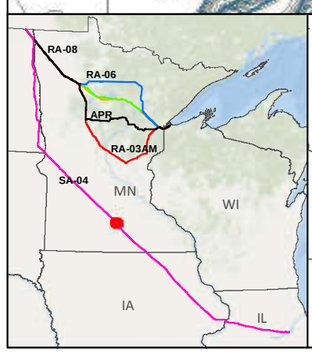

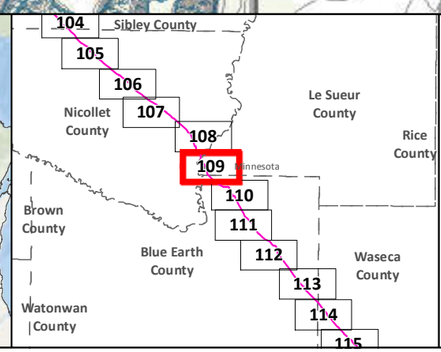

SA-04

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 109B of 188

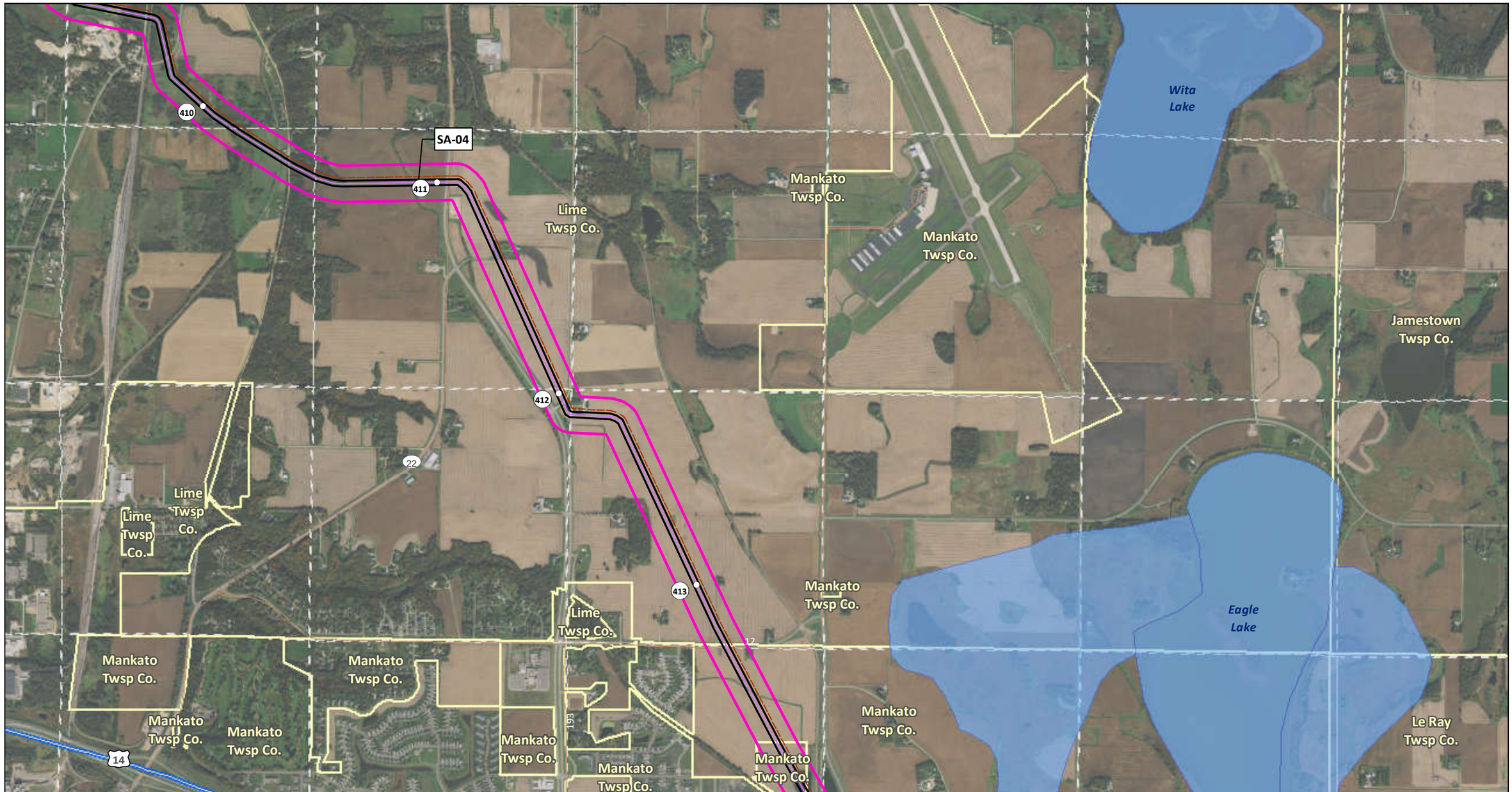

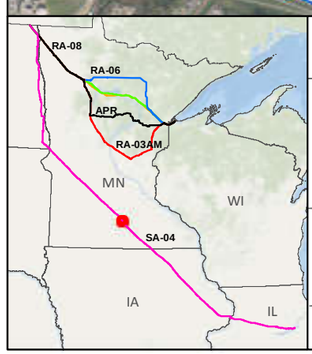

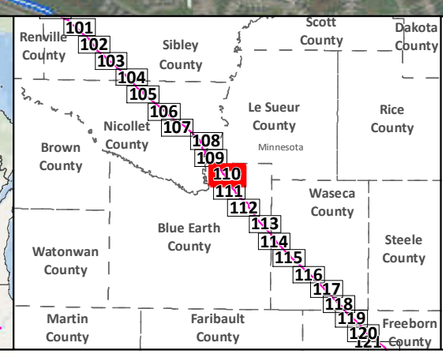

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT
DETAILED MAP SET
AERIAL

SA-04

Map 110A of 188

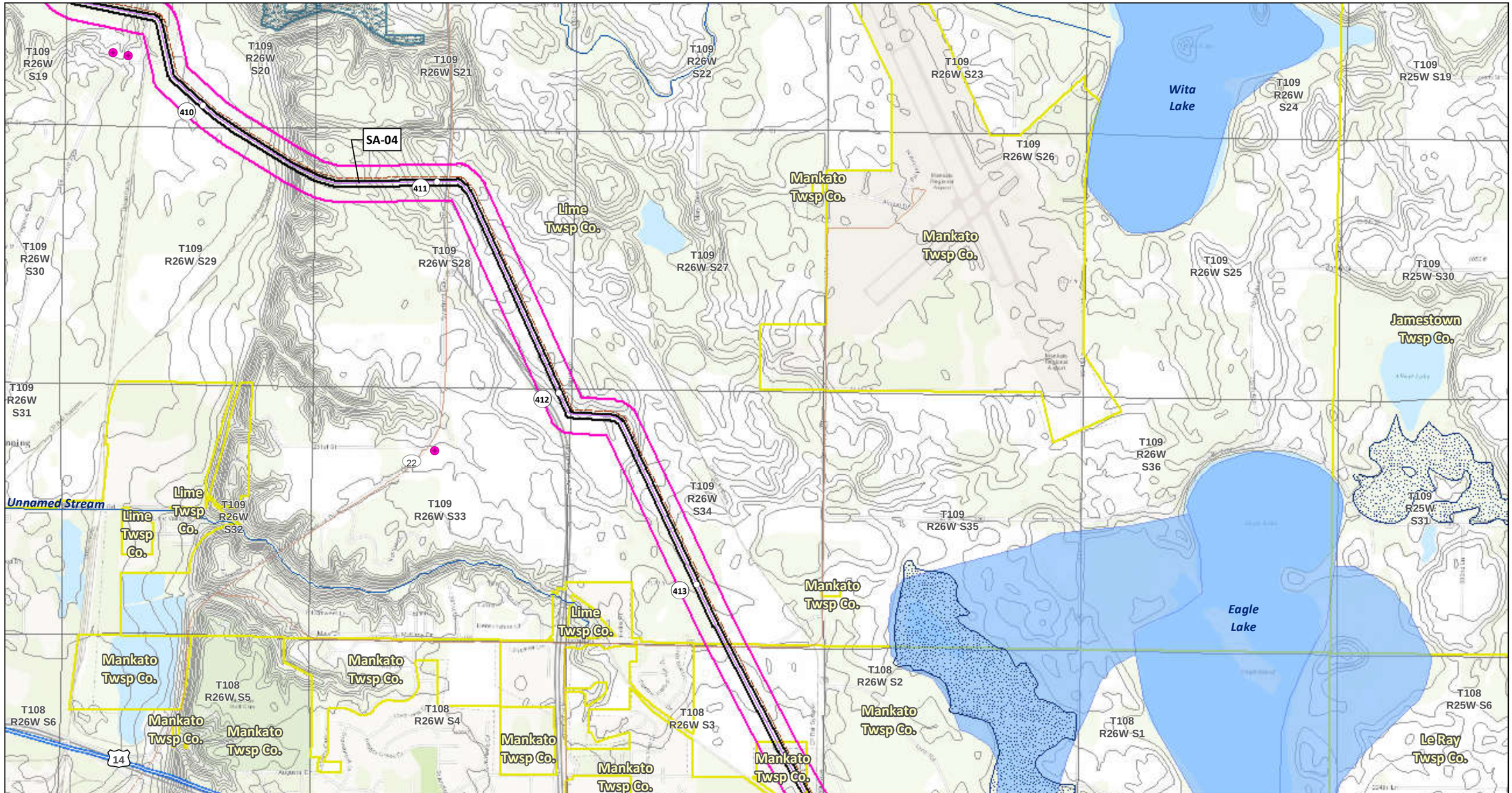

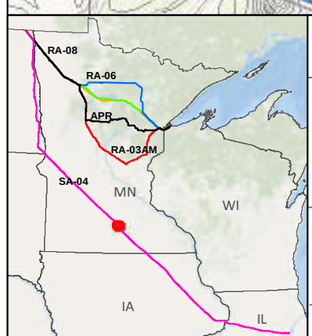

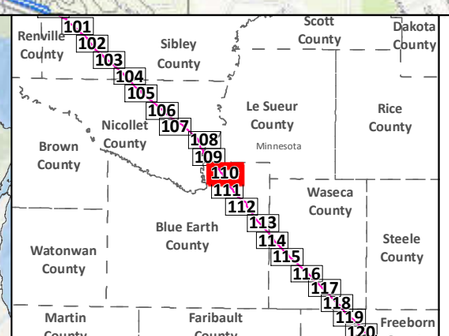

- SA-04
- Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')
- Existing Pipelines
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 110B of 188

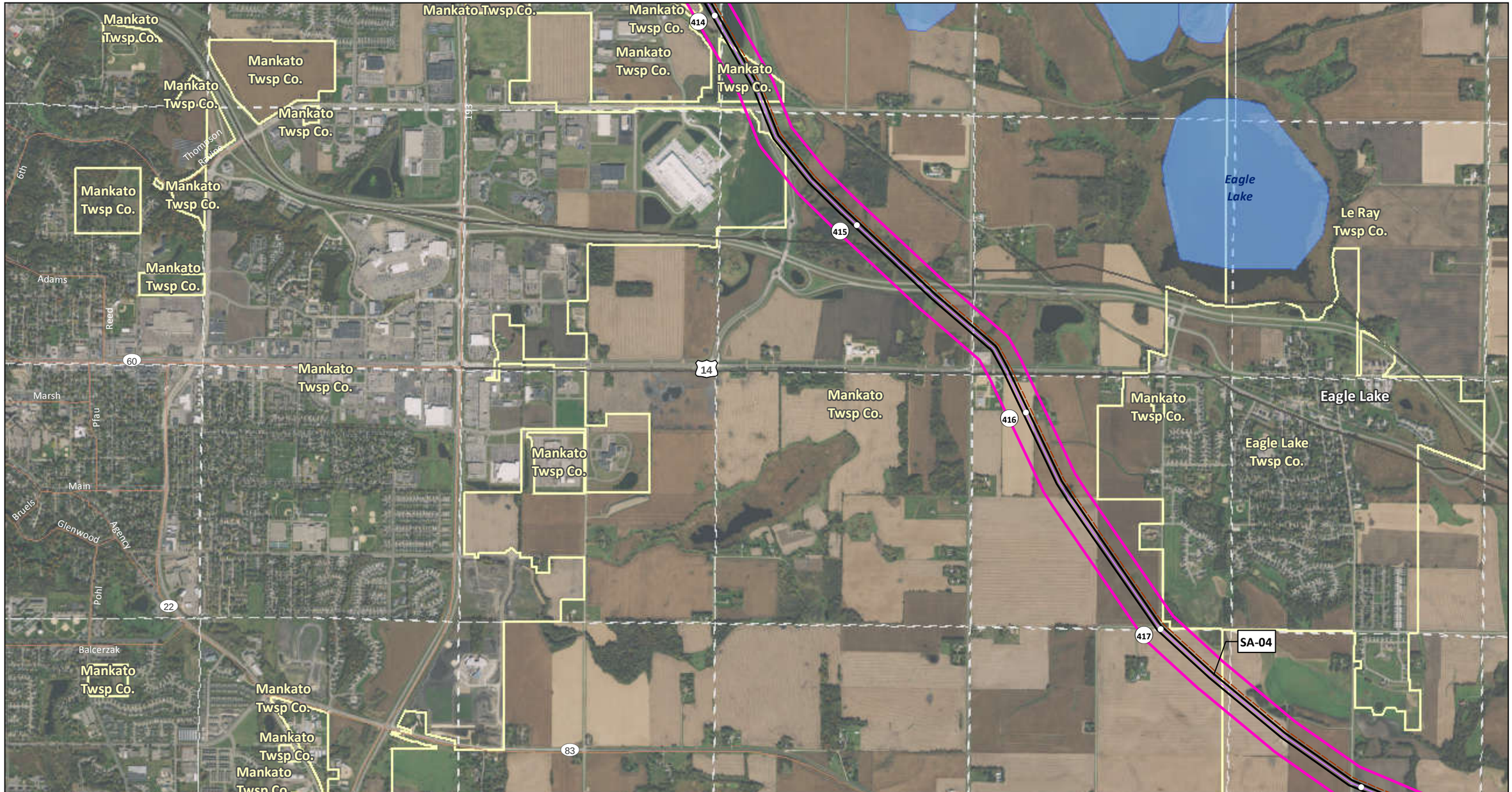

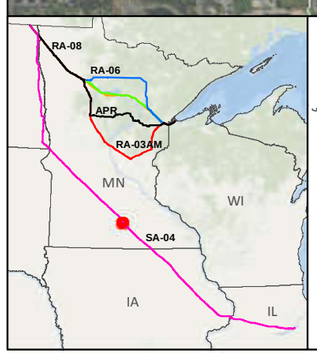

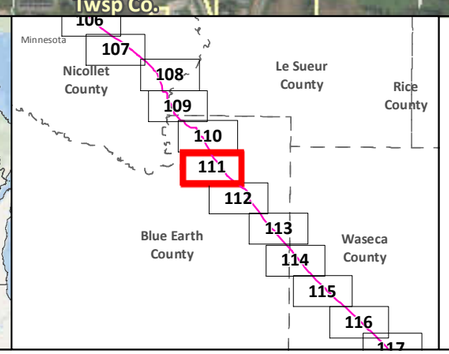

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 111A of 188

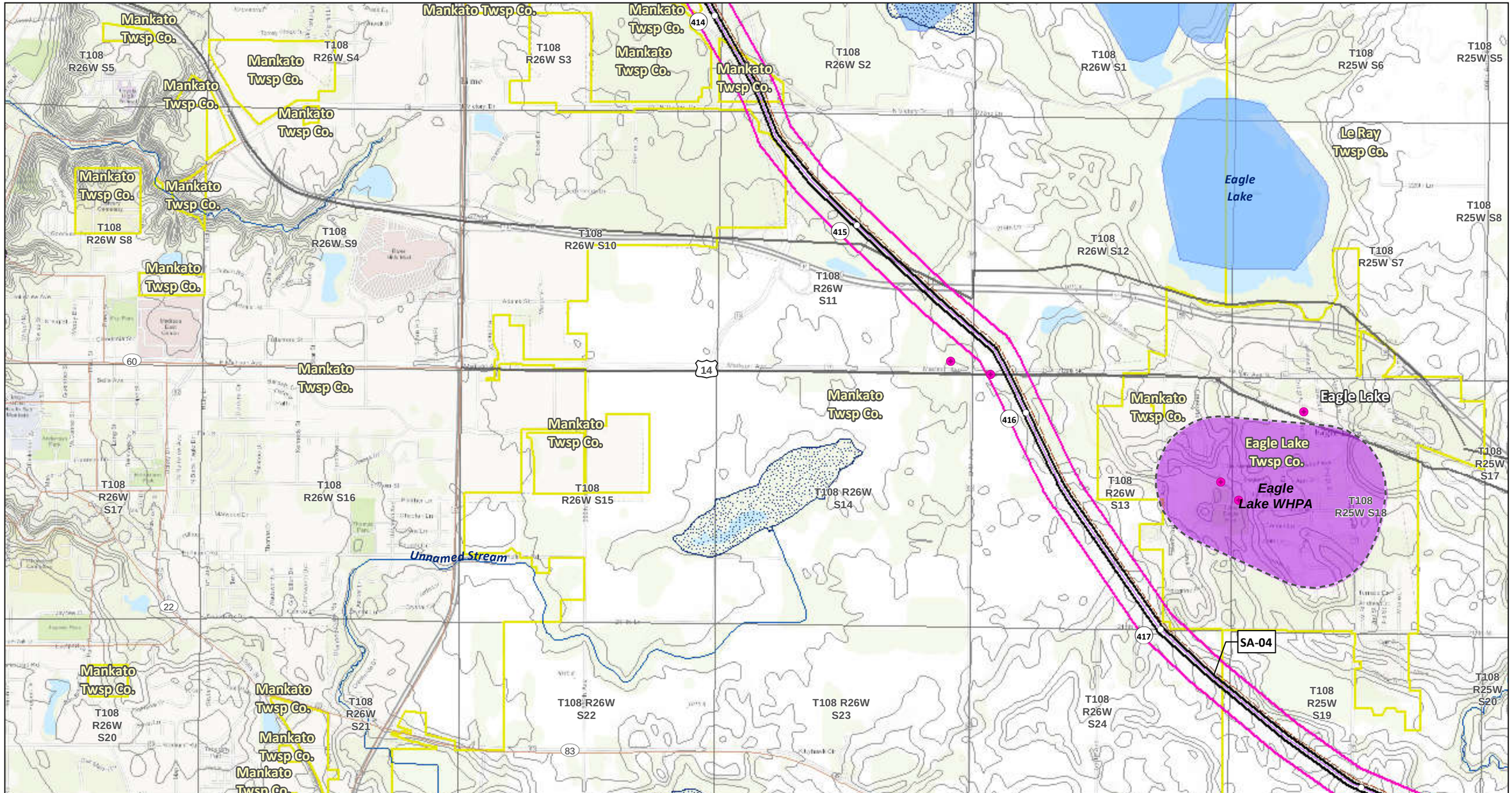

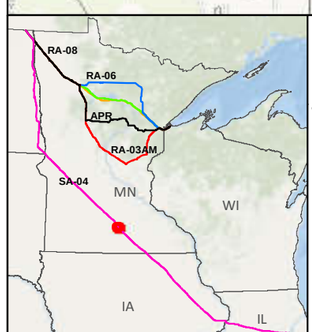

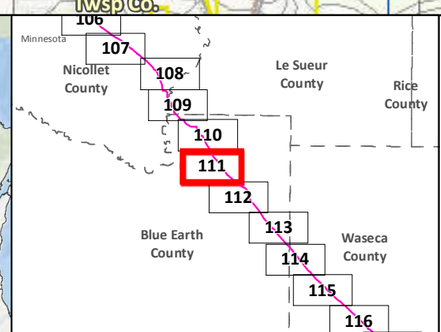

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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303d Imparied Waters

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Lakes of Biological Significance

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 111B of 188

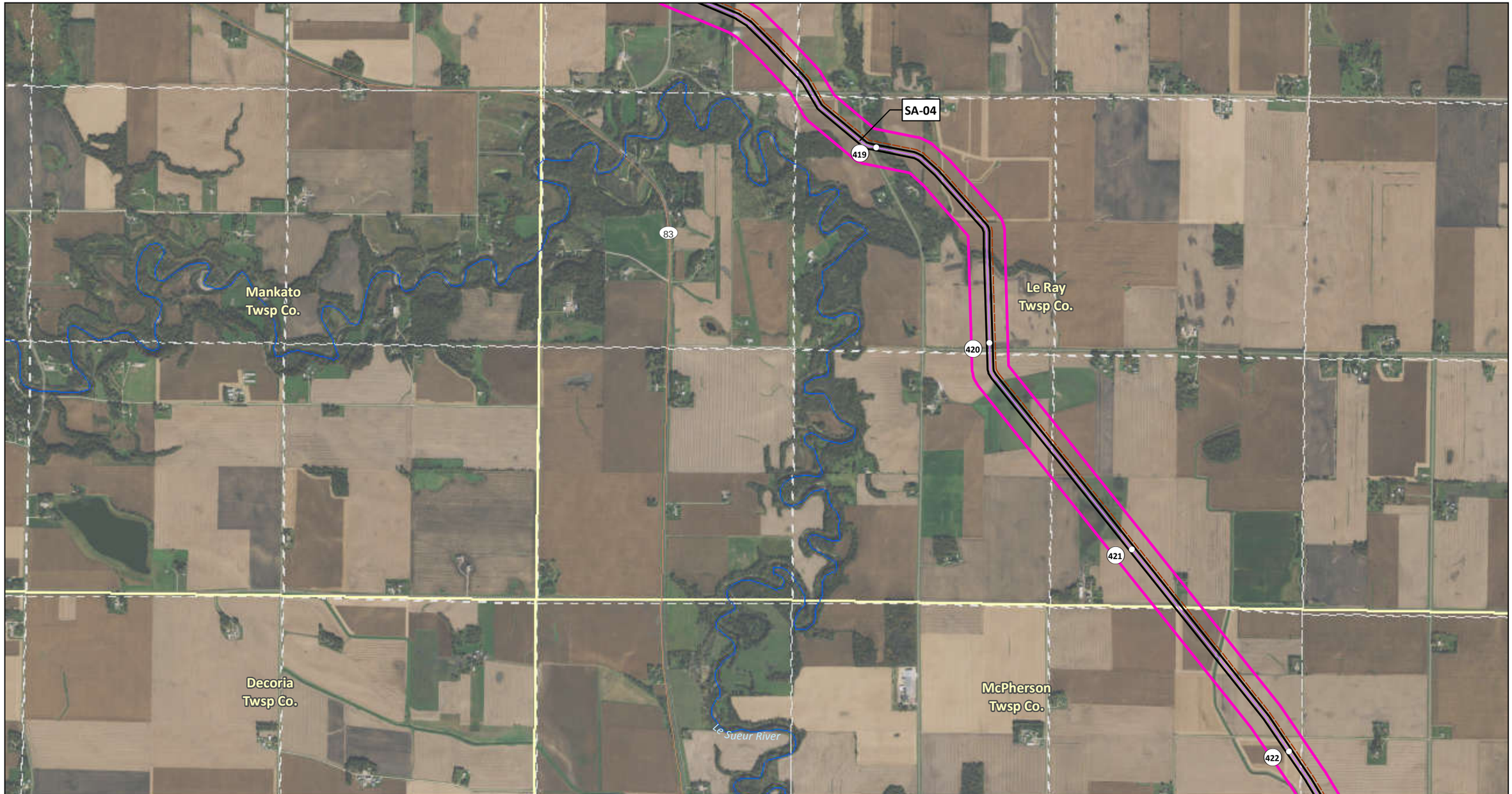

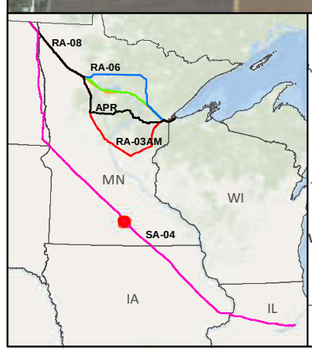

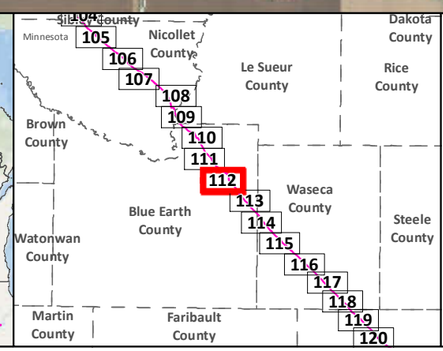

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

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State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
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0 0.125 0.25 0.5 Miles
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 112A of 188

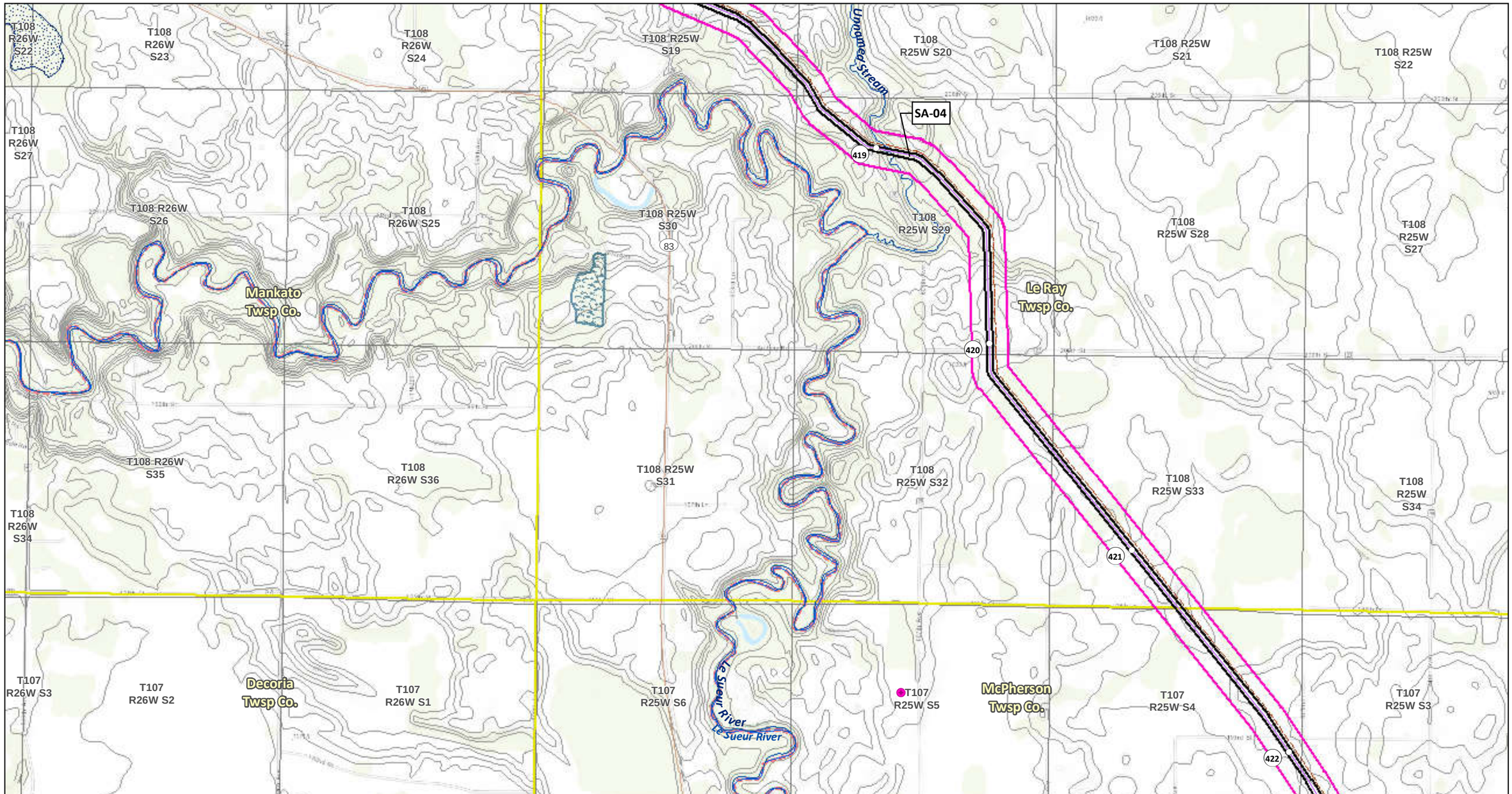

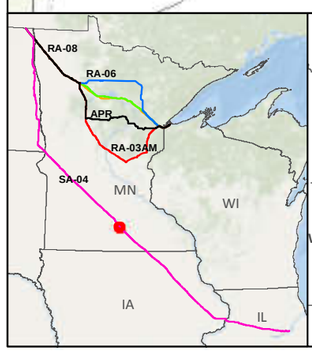

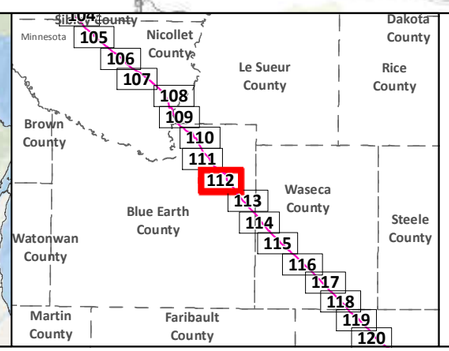

SA-04

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 112B of 188

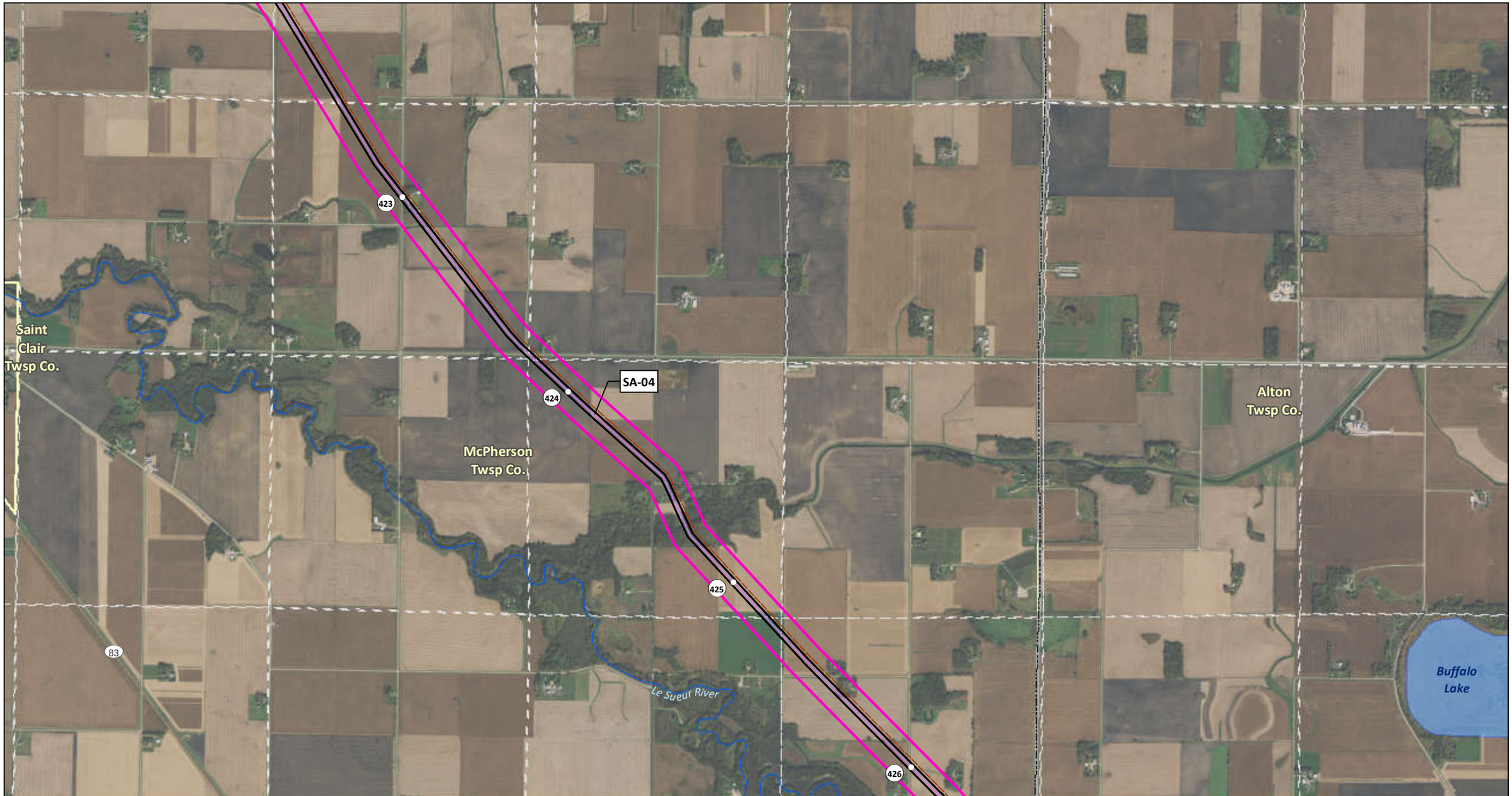

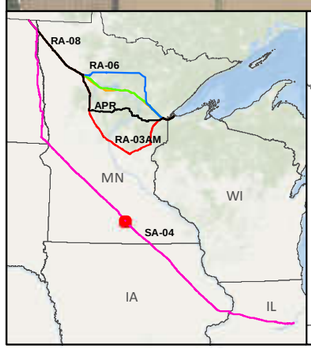

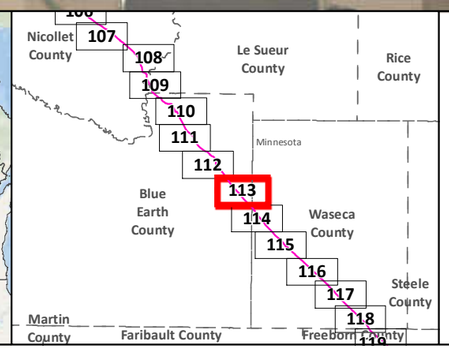

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1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 113A of 188

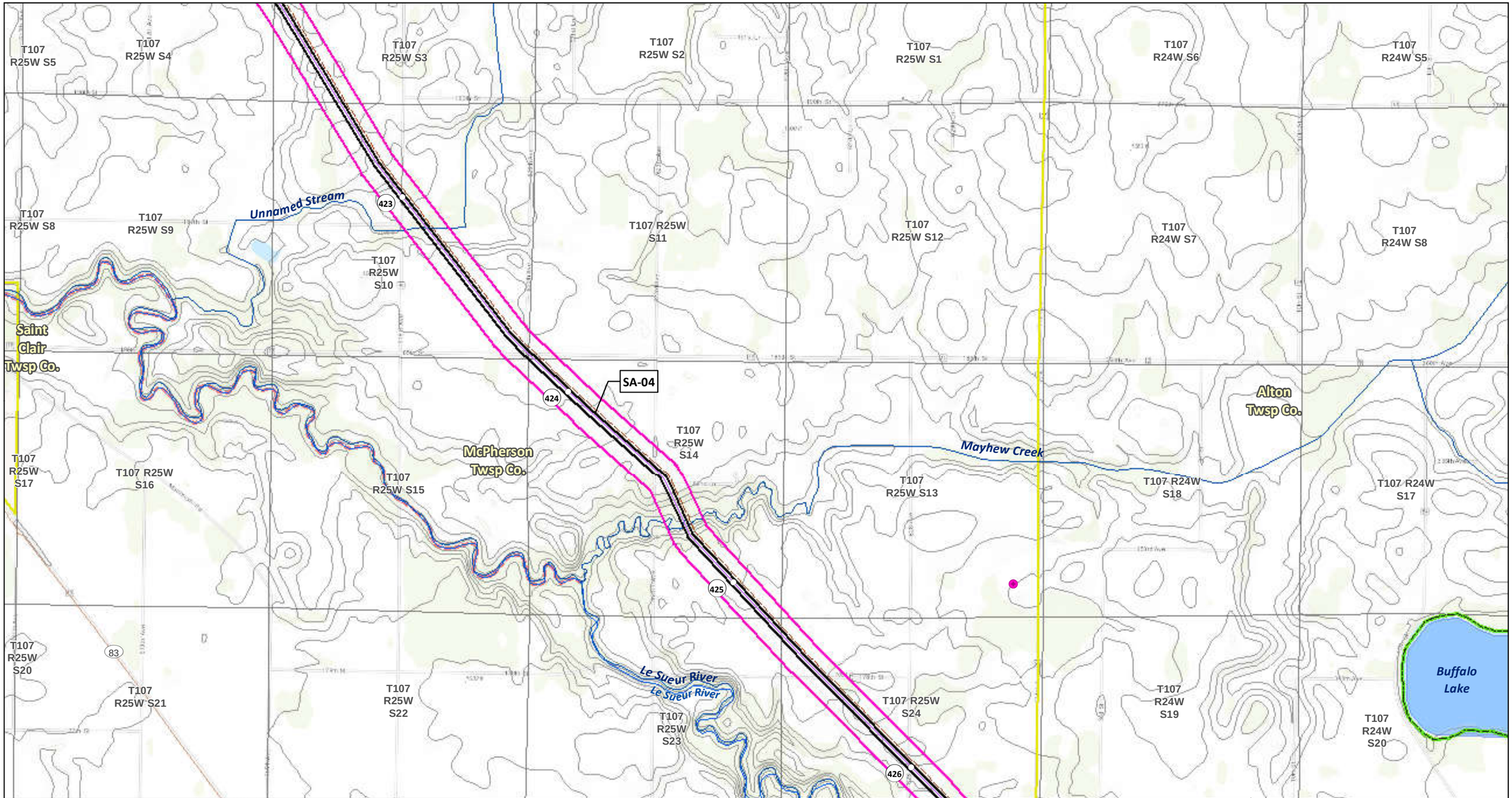

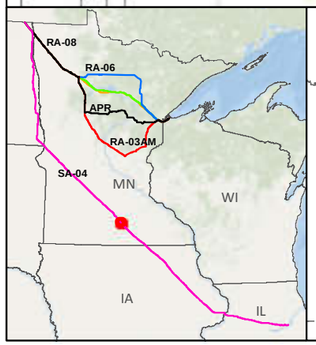

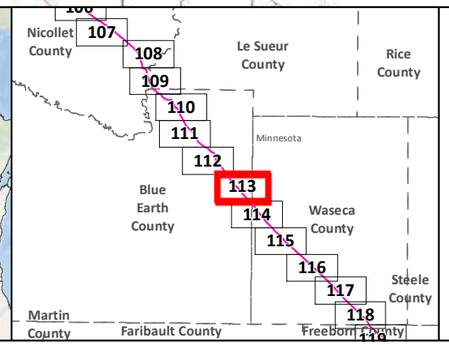

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 113B of 188

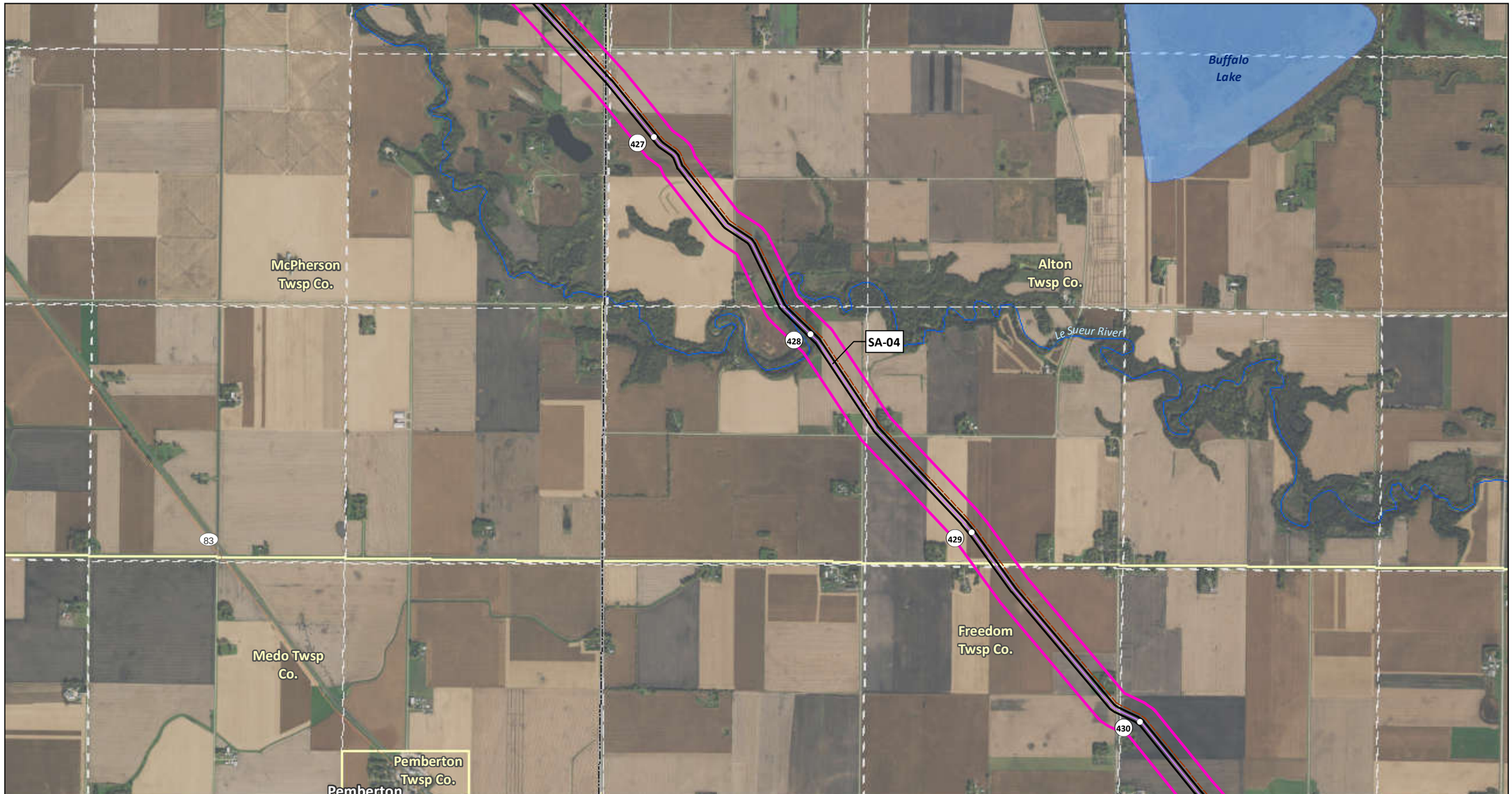

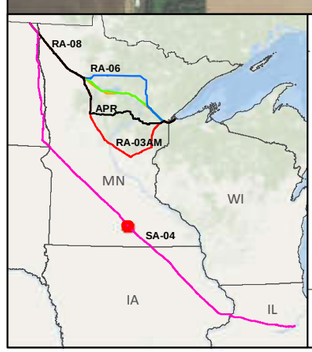

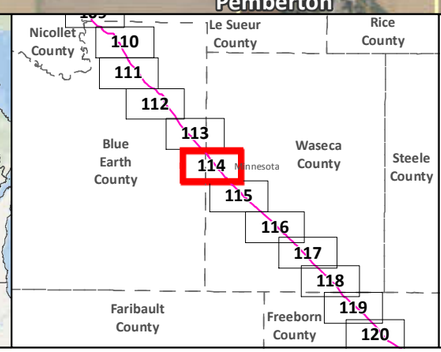

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 114A of 188

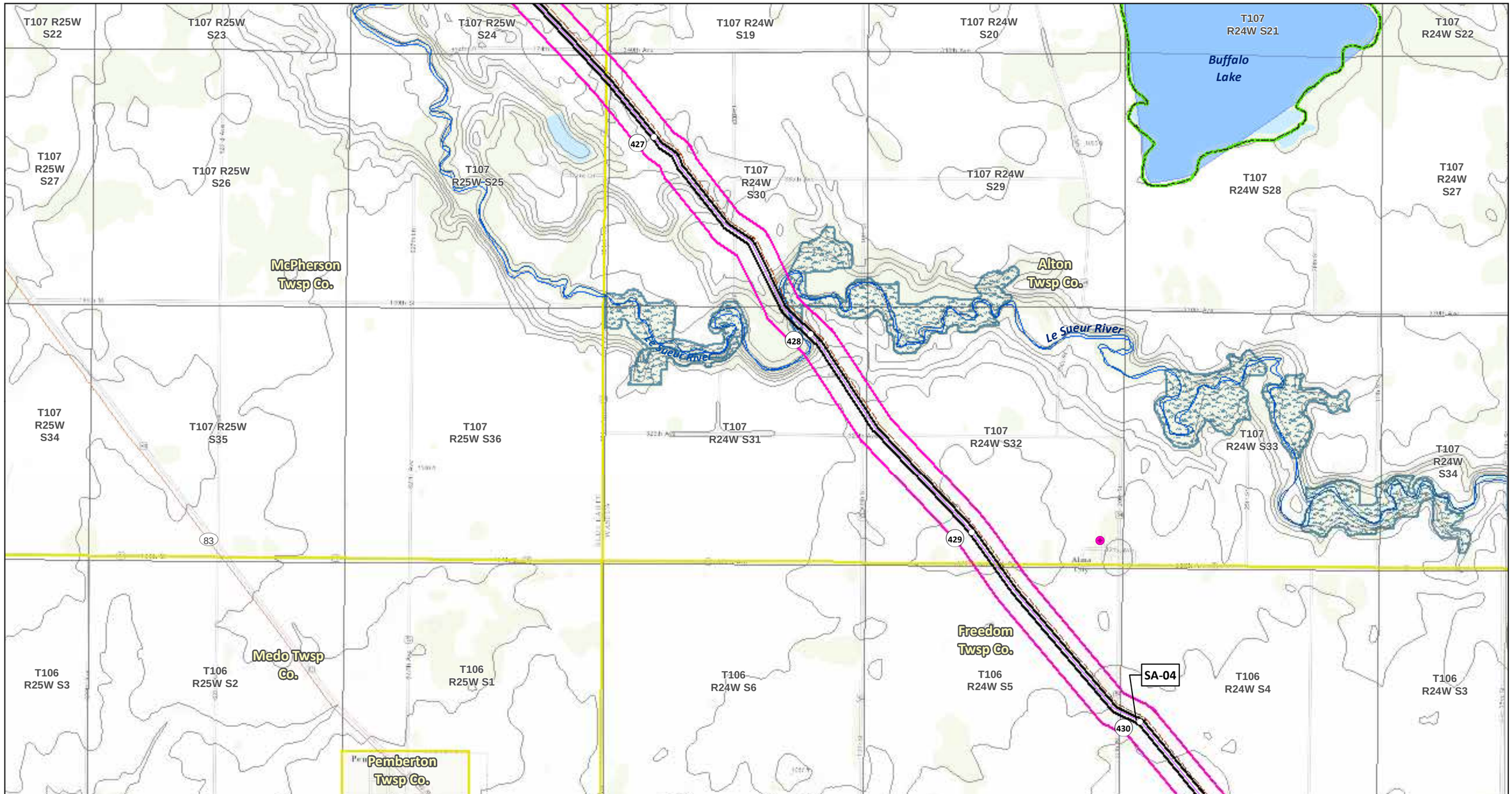

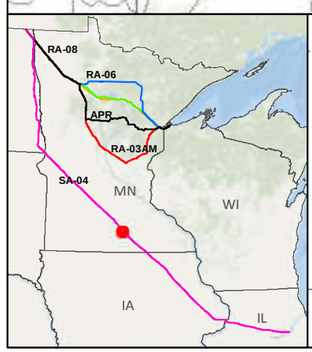

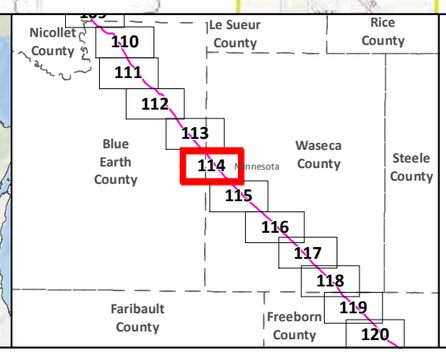

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

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- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

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Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

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- High
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Native Plant Communities with Biodiversity Significance

- Outstanding
- High
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

Map 114B of 188

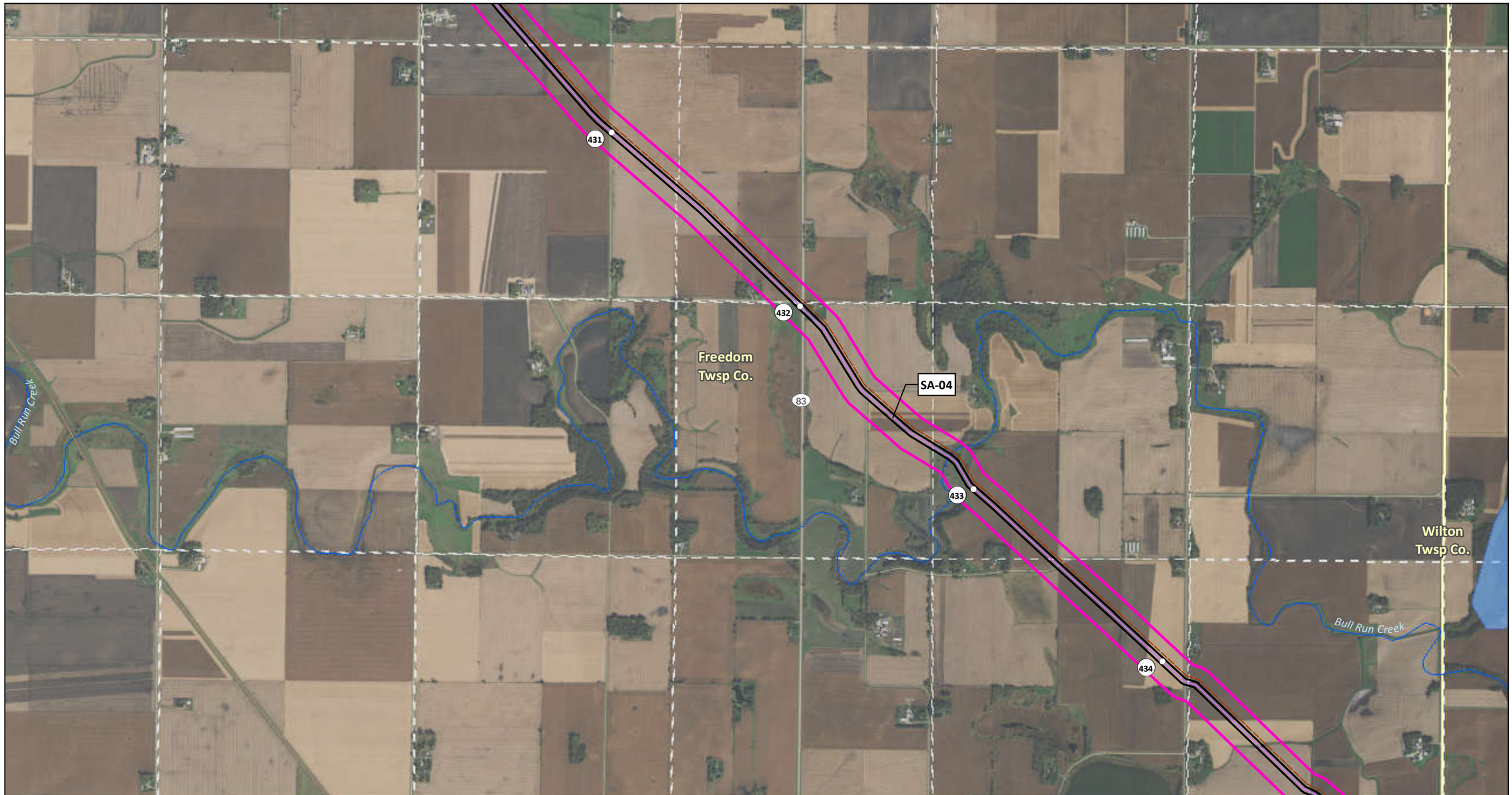

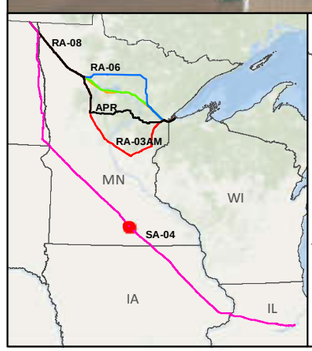

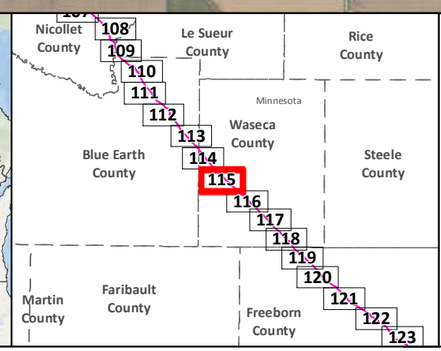

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 115A of 188

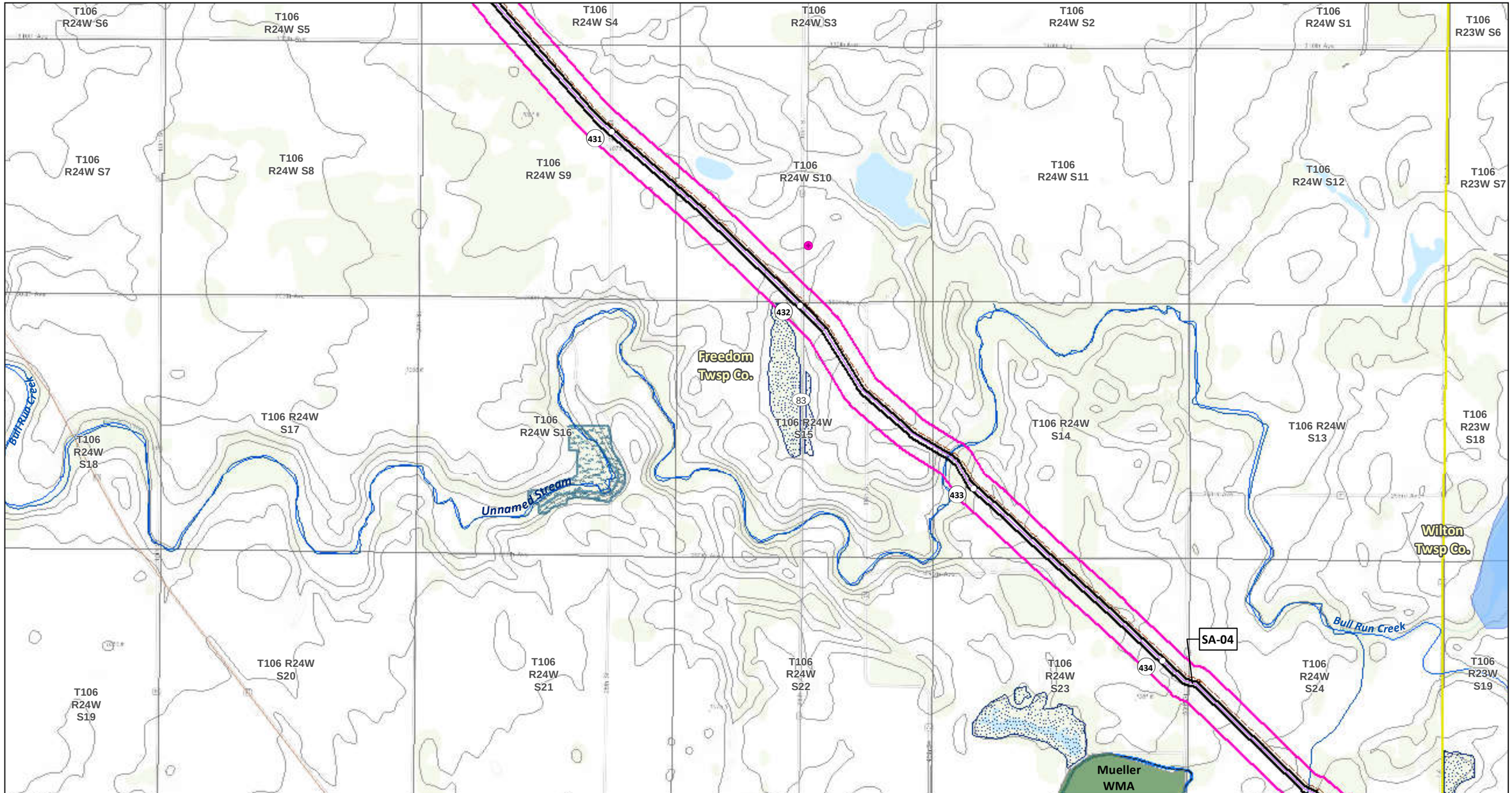

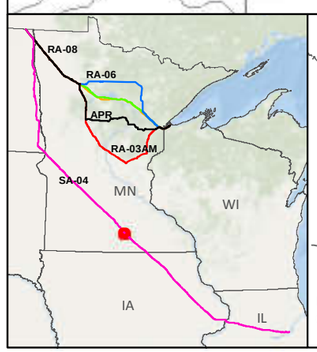

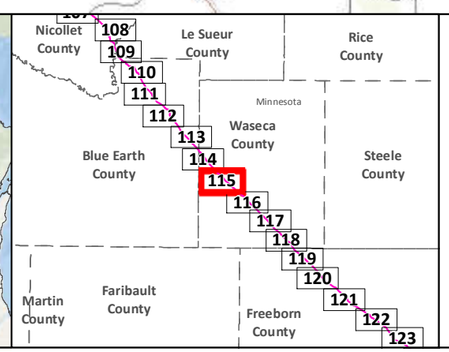

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
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Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

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Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
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Native Plant Communities with Biodiversity Significance

- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 115B of 188

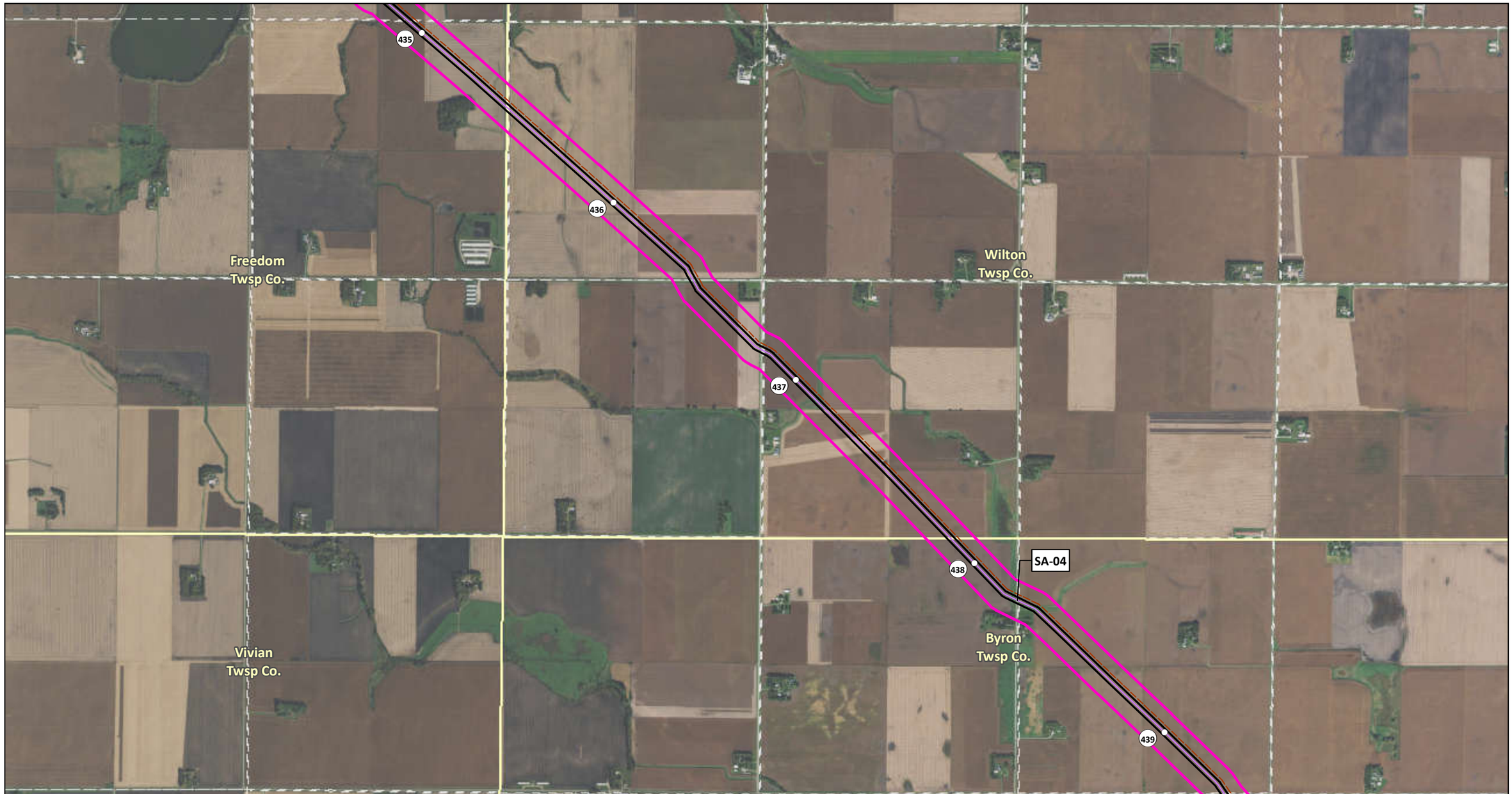

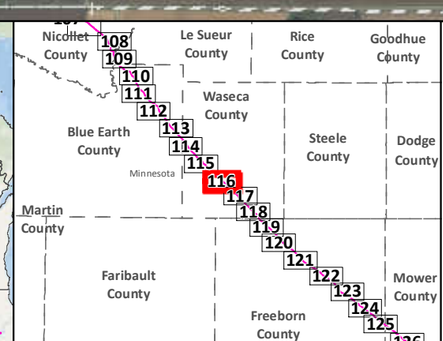

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 116A of 188

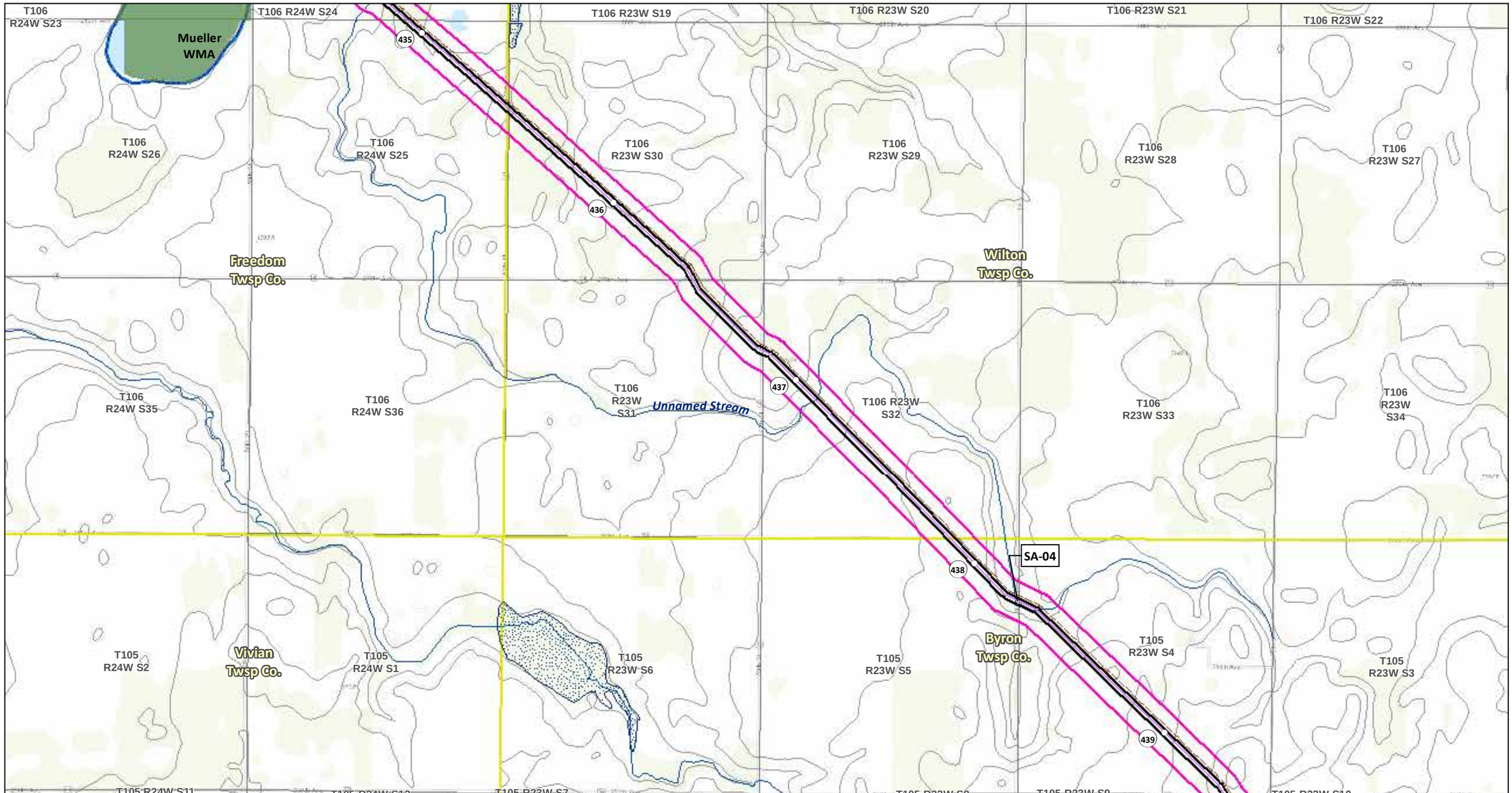

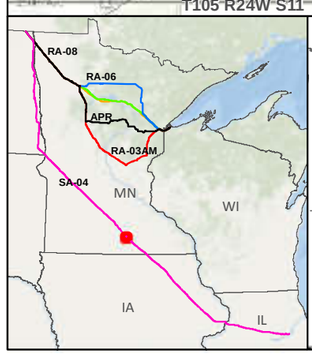

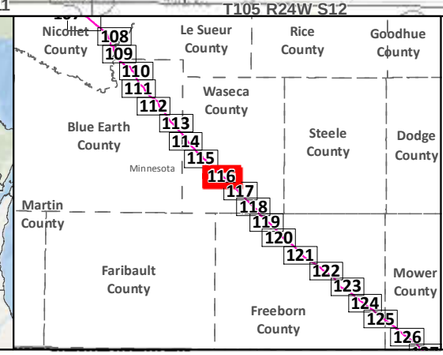

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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- RA-08

Mile Post

Anticipated 120' Construction ROW

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 116B of 188

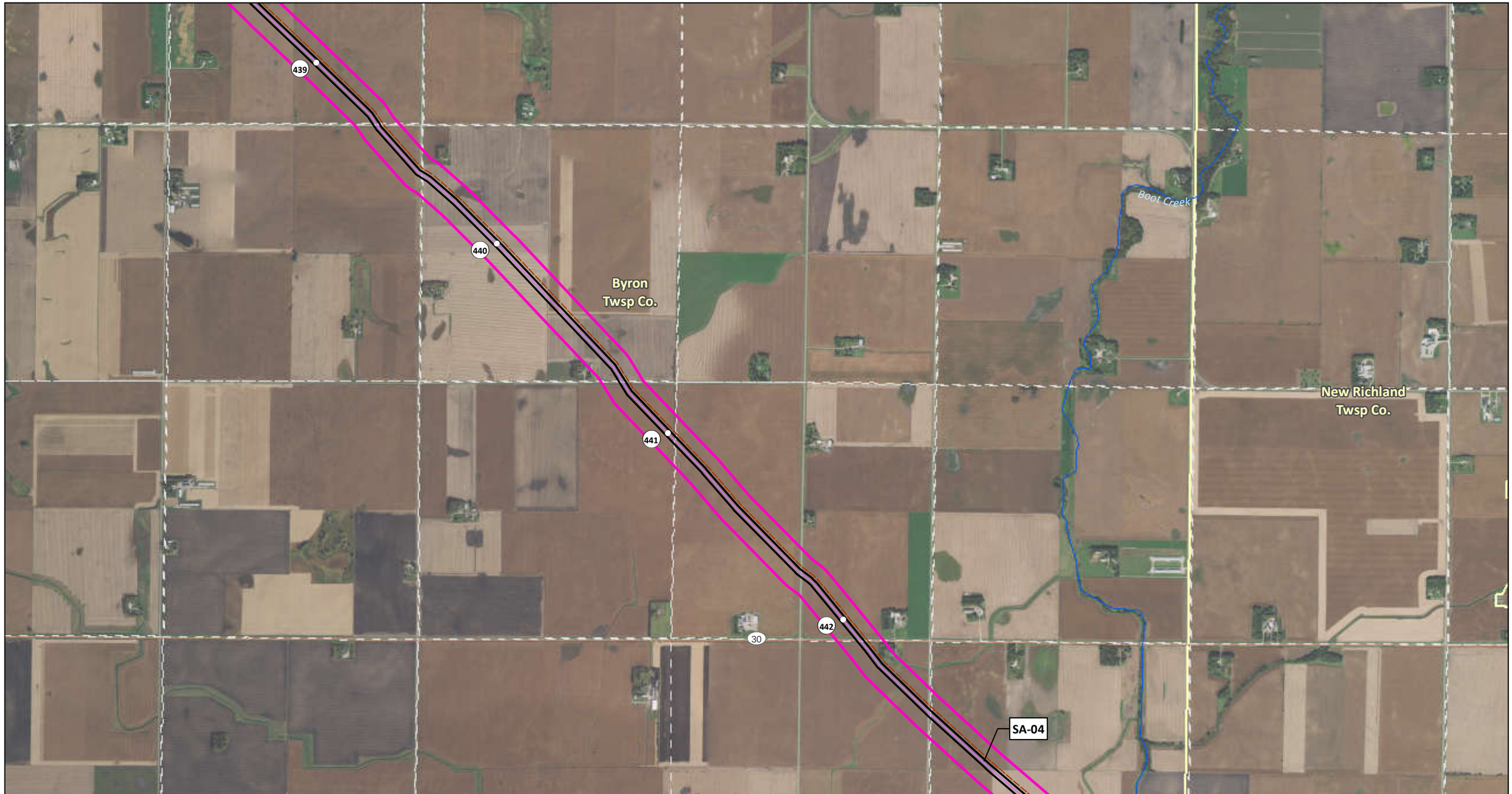

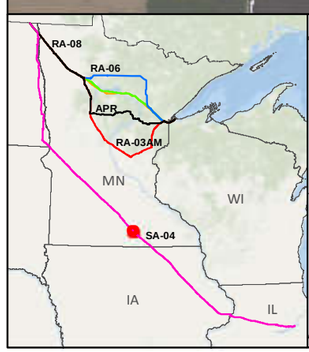

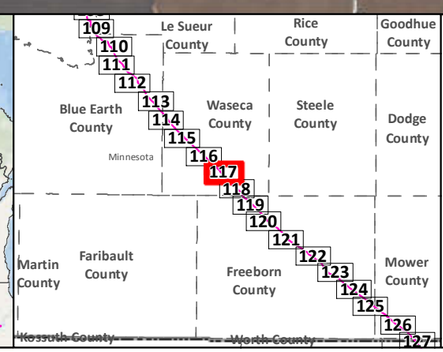

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 117A of 188

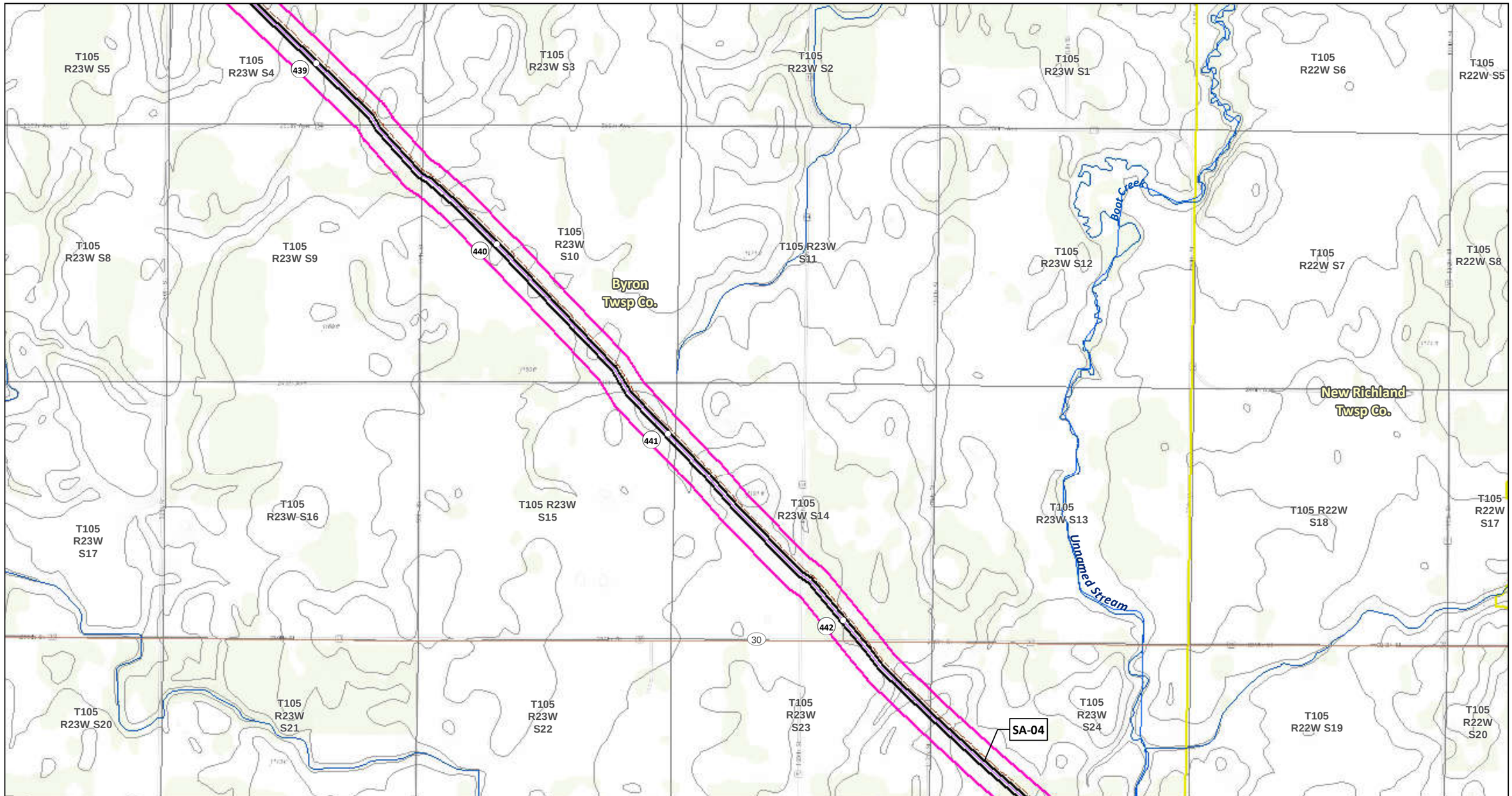

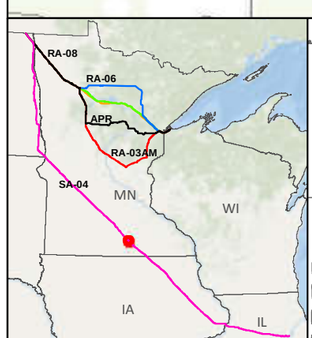

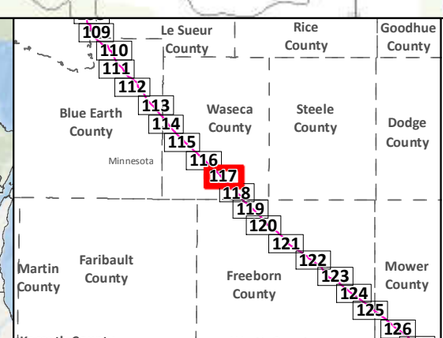

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

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Public Waters Watercourse

303d Imparied Waters

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Calcareous Fens

Wild Rice Lakes (DNR)

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Lakes of Biological Significance

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- High
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Native Plant Communities with Biodiversity Significance

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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 117B of 188

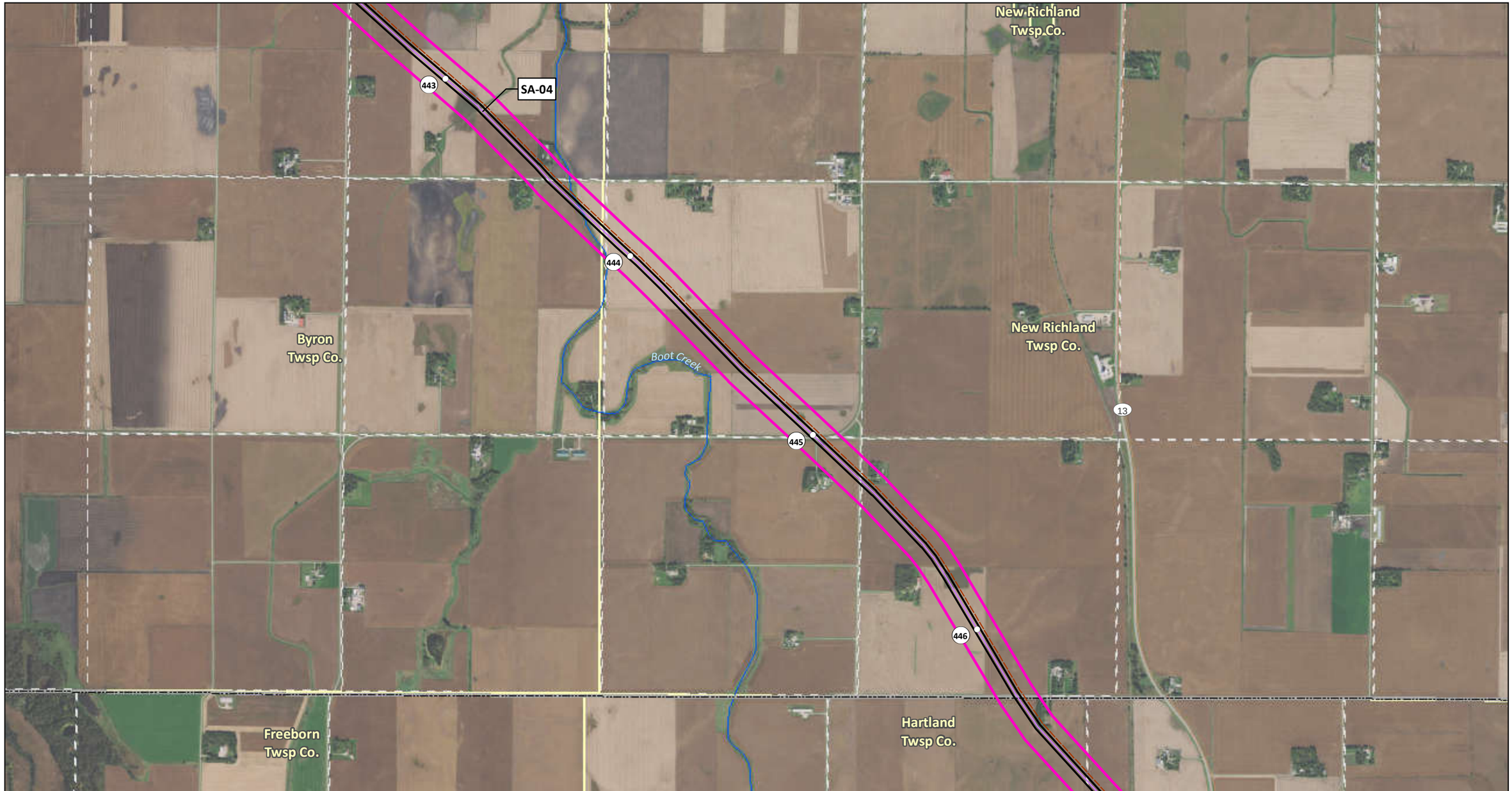

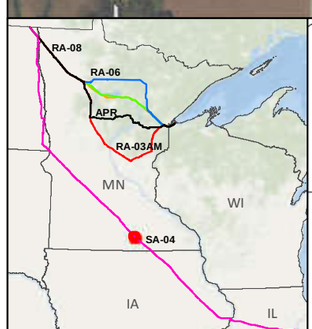

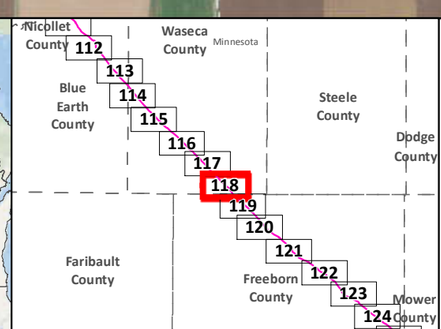

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
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Land Ownership
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National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

Data Sources:
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 118A of 188

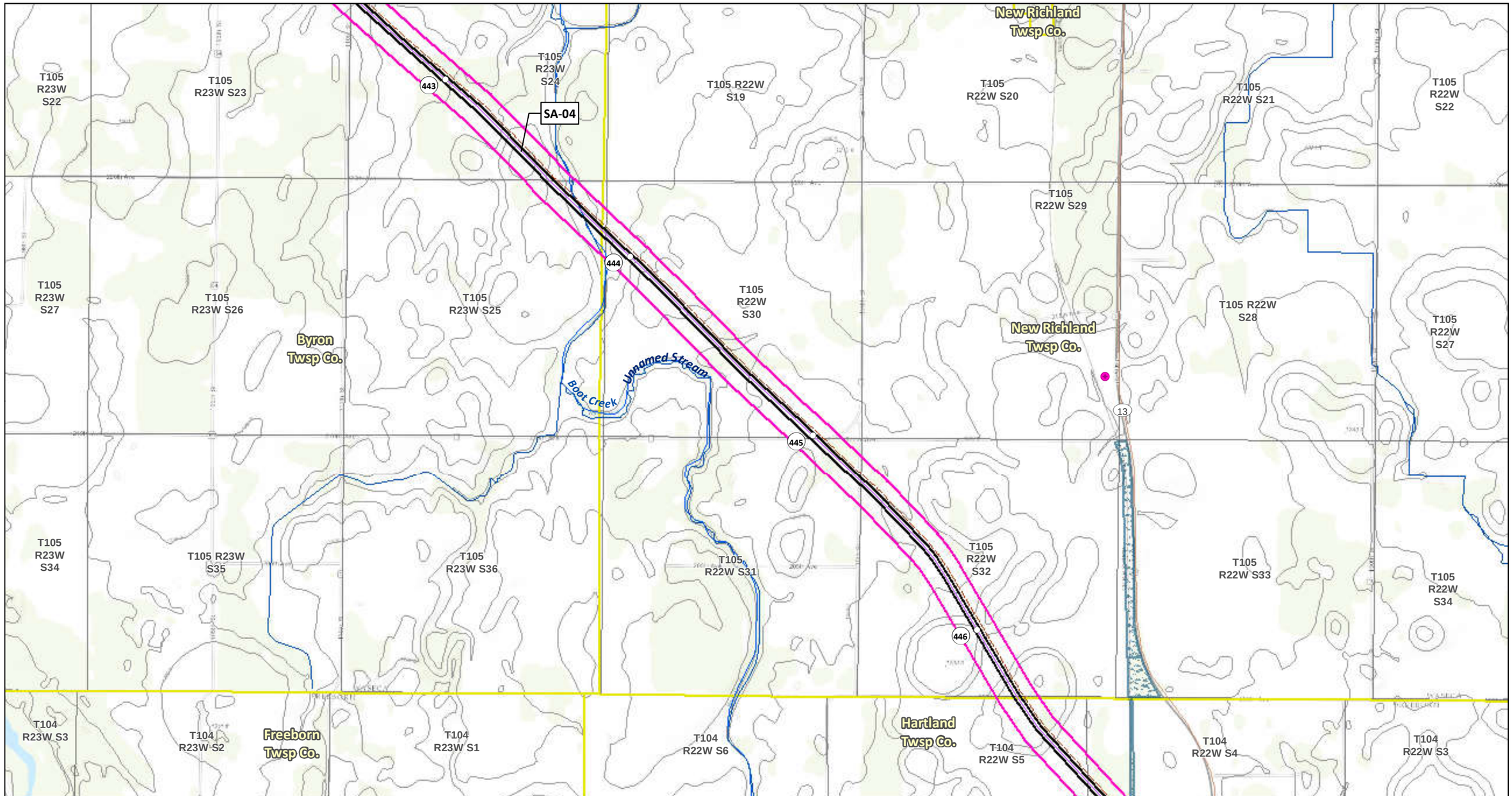

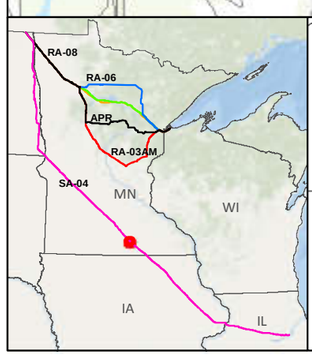

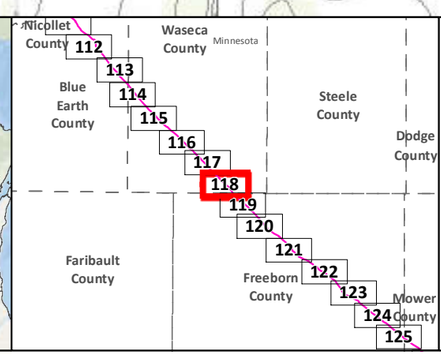

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 118B of 188

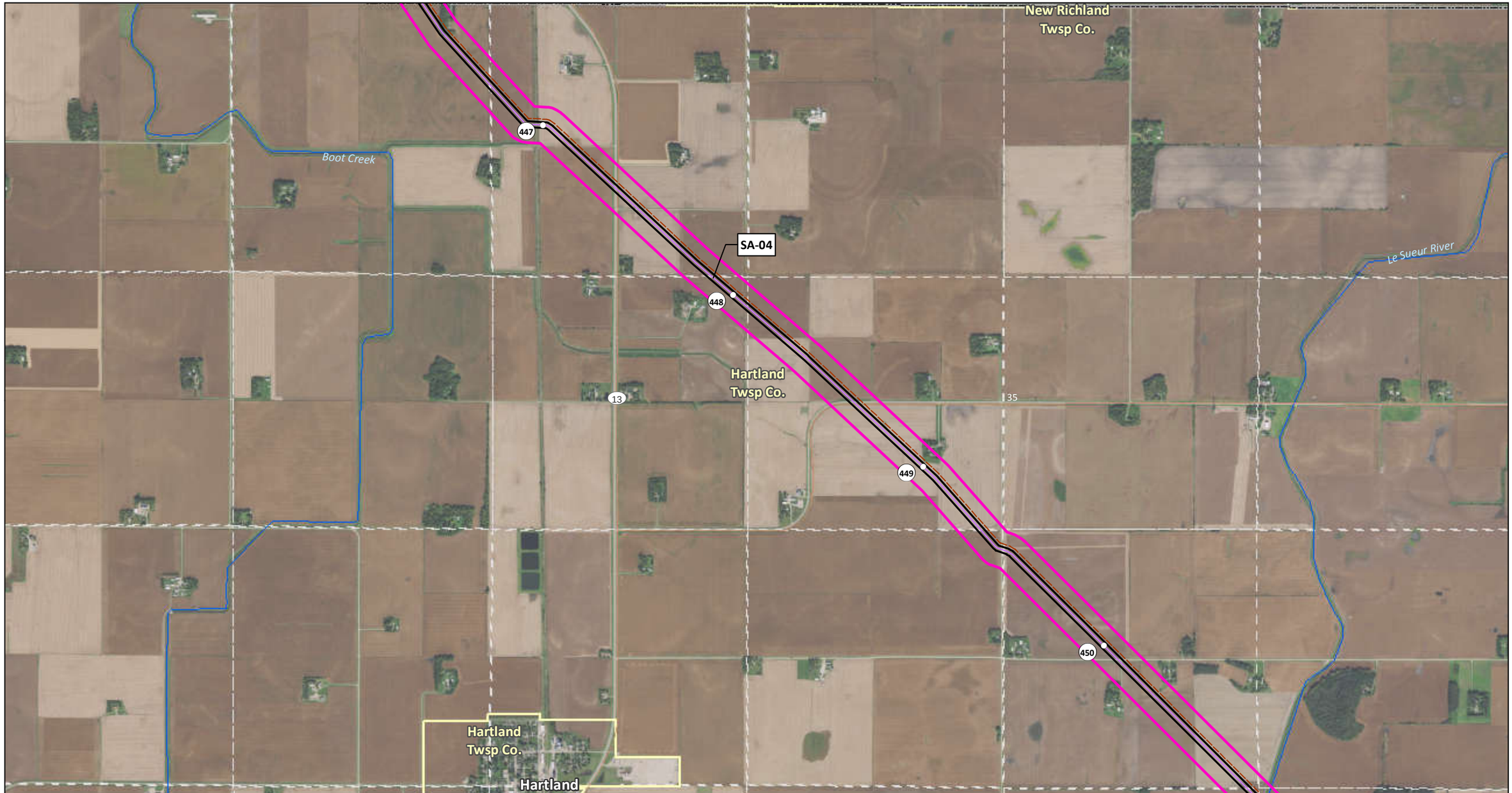

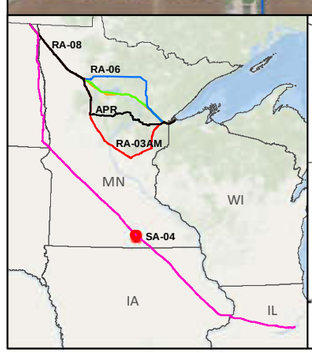

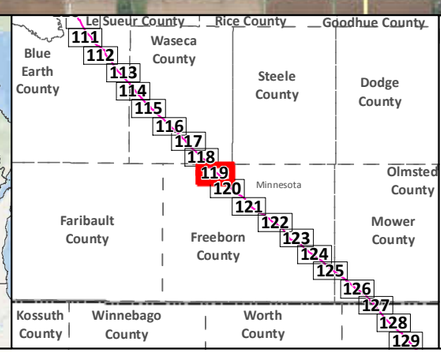

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 119A of 188

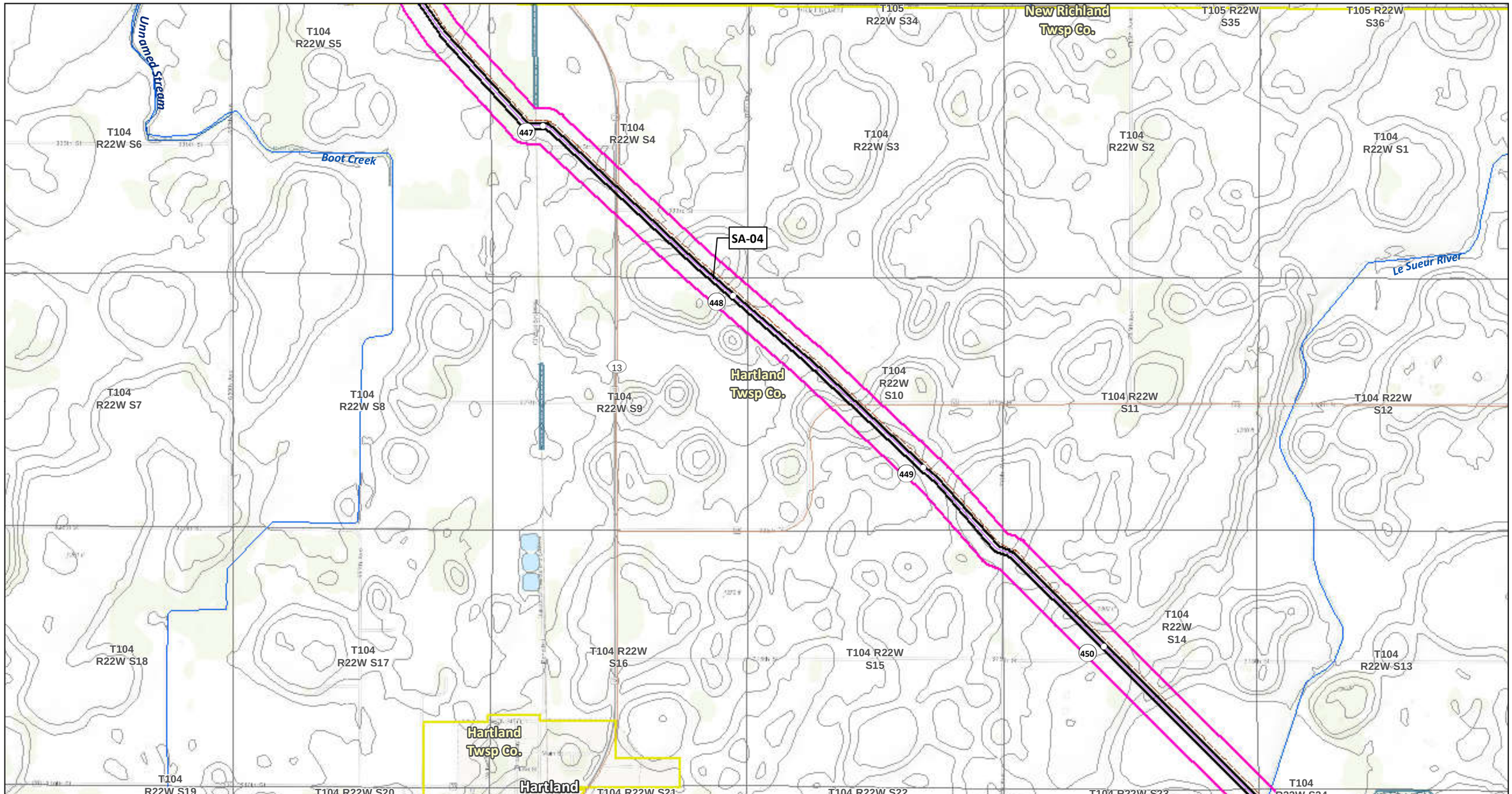

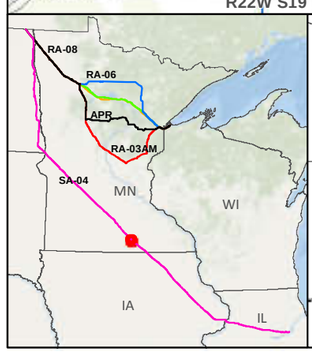

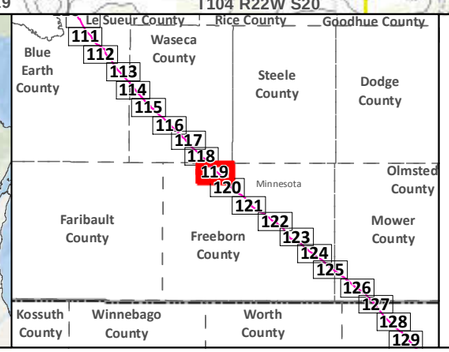

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 119B of 188

Hartland Twsp Co.

Hartland Twsp Co.

Bath Twsp Co.

Hartland Twsp Co.

451

452

453

454

SA-04

13

20

Le Sueur River

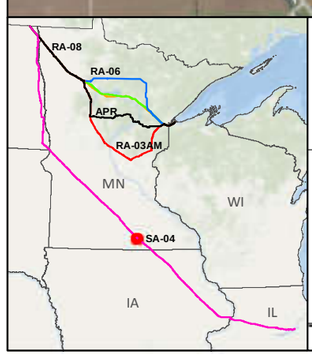

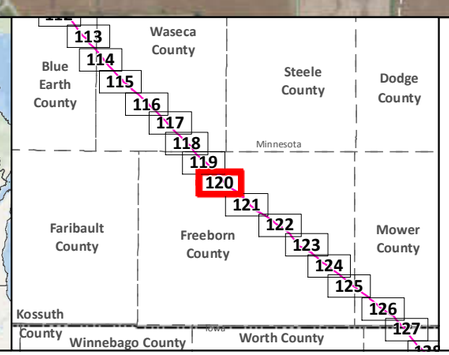

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT
DETAILED MAP SET
AERIAL

SA-04

Map 120A of 188

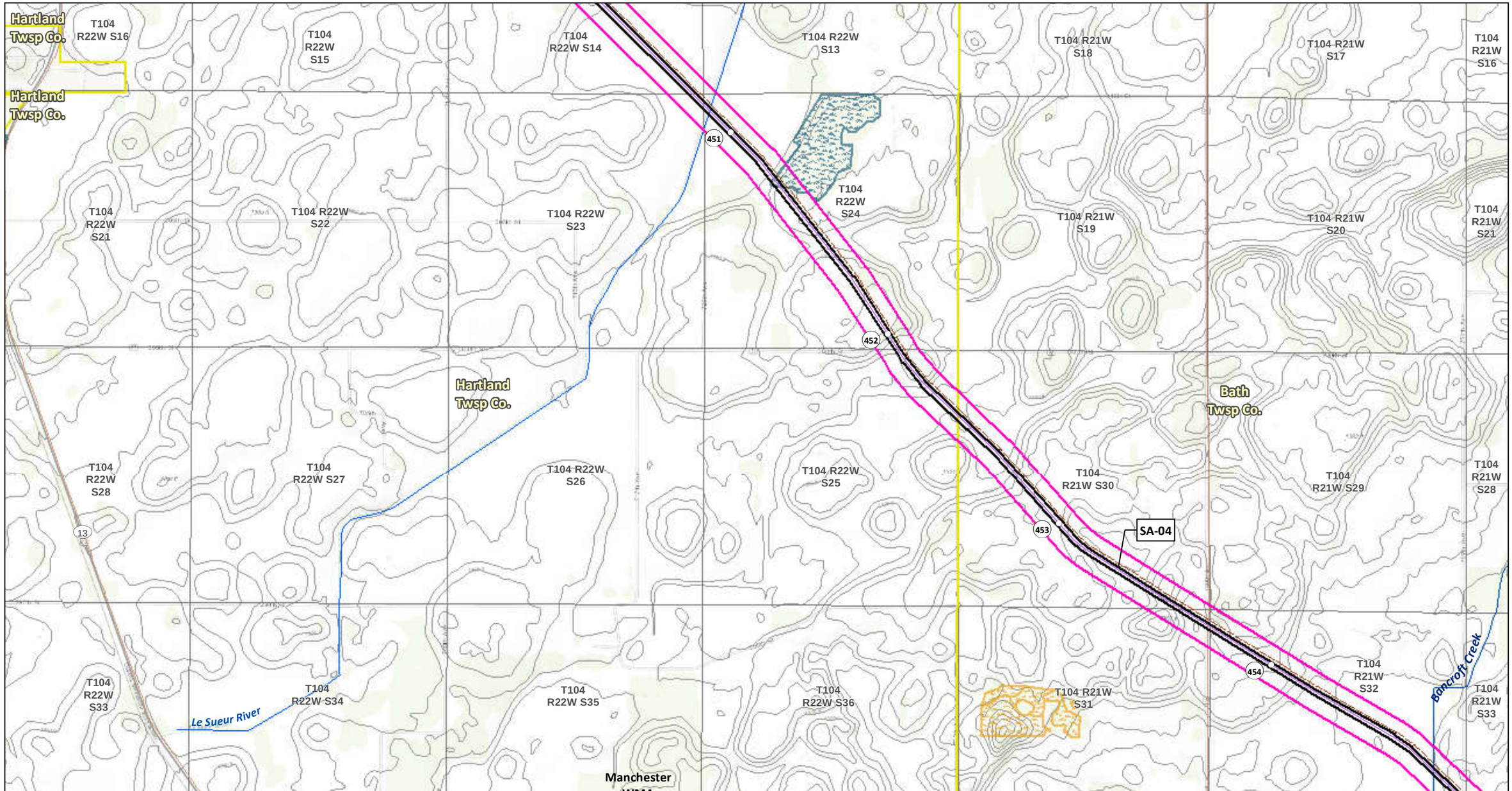

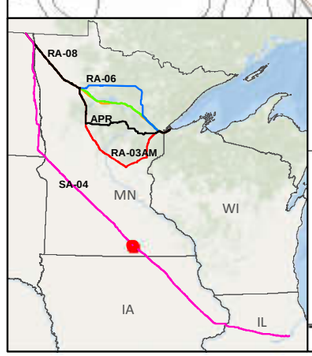

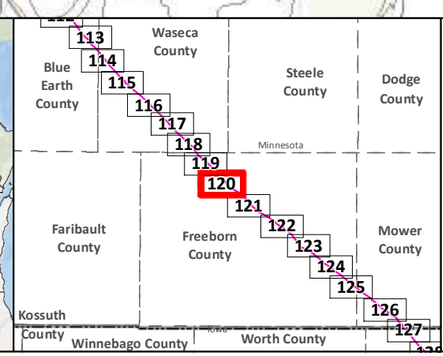

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 120B of 188

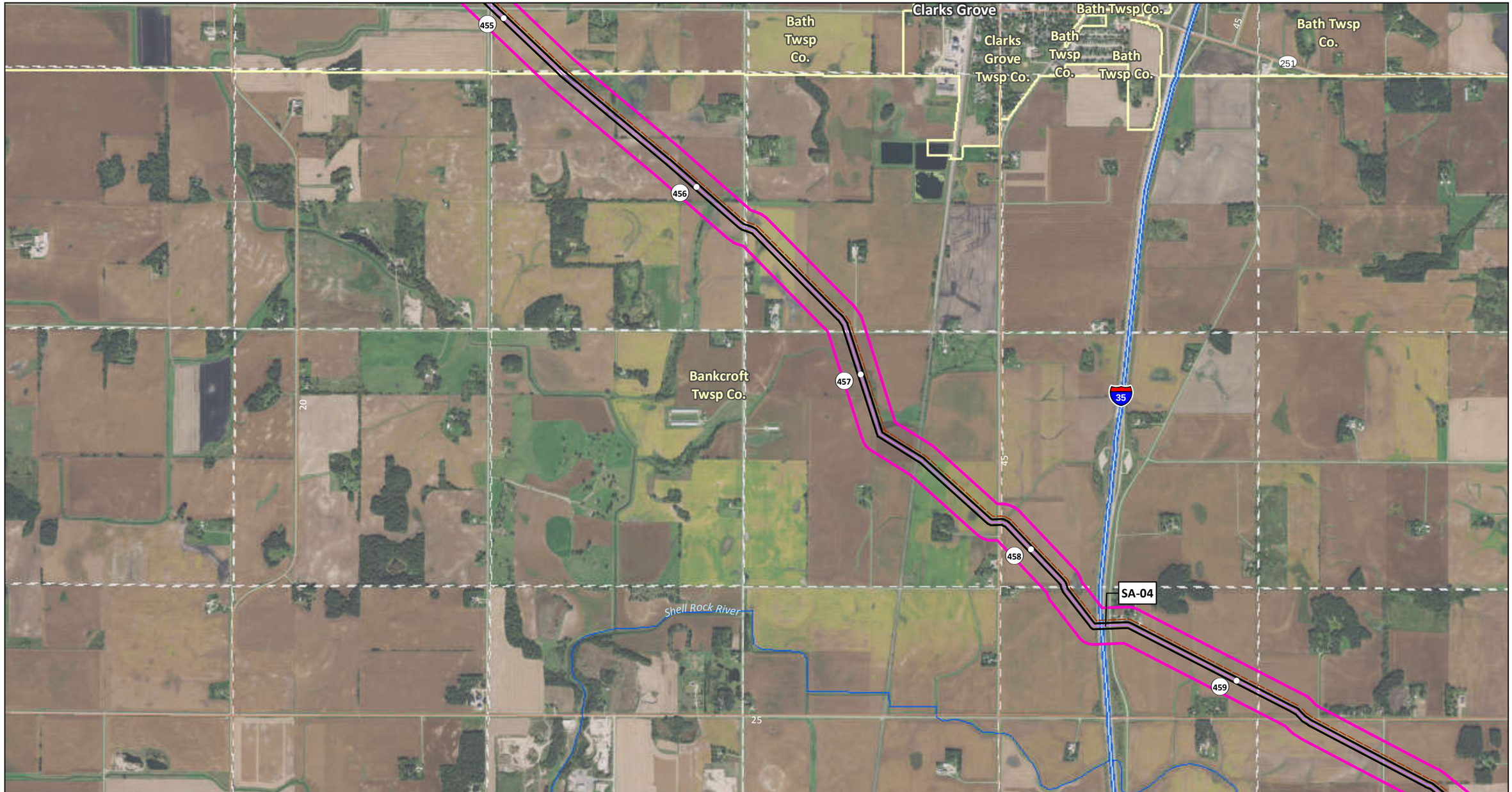

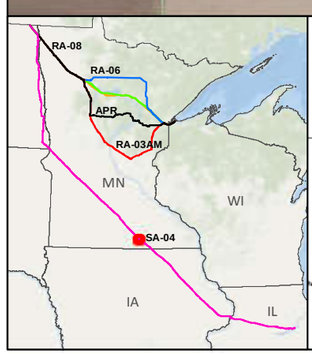

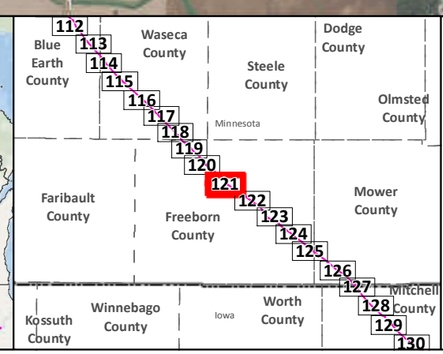

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 121A of 188

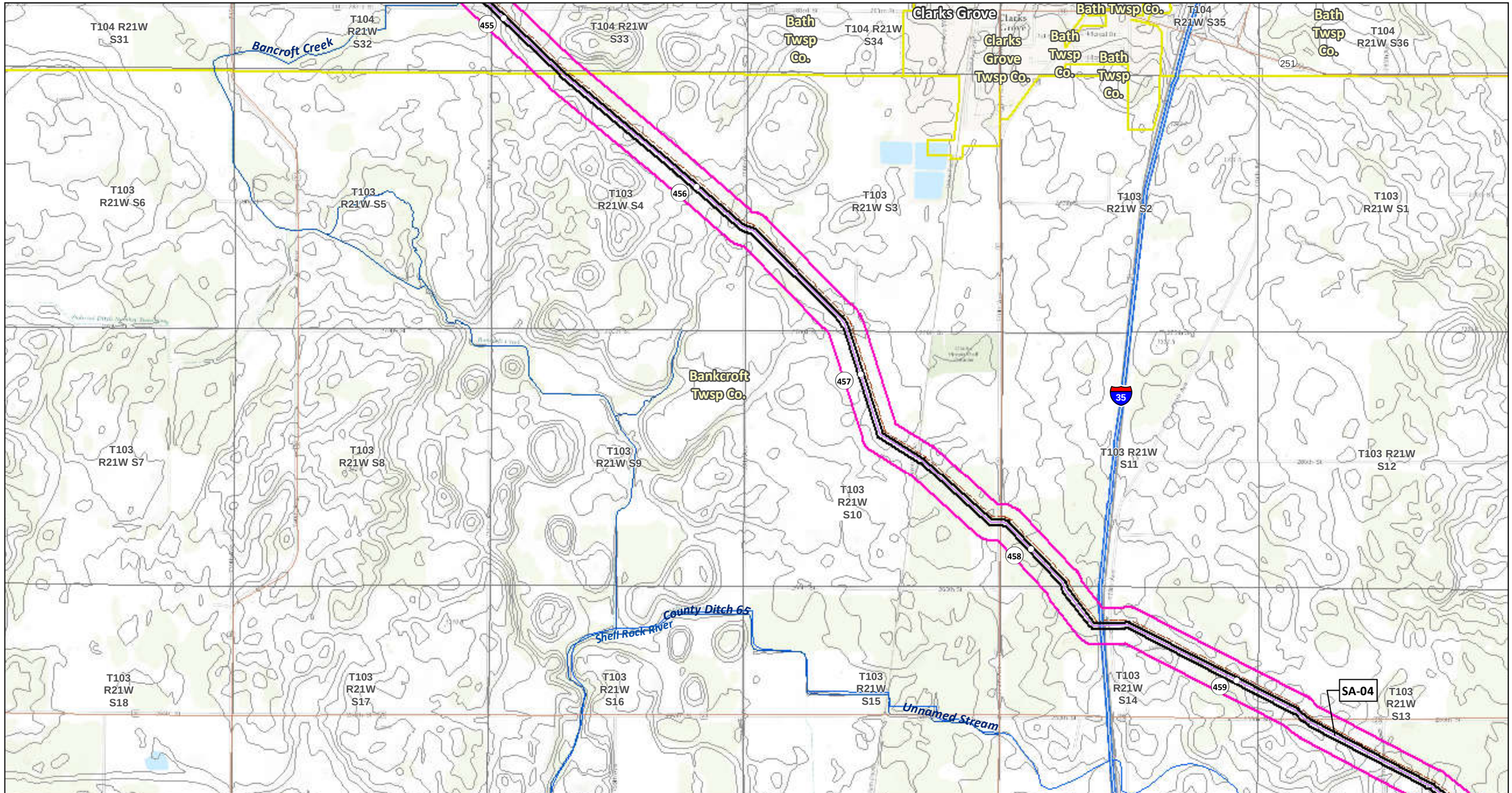

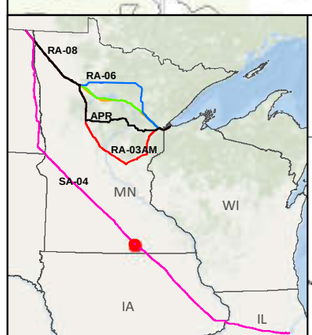

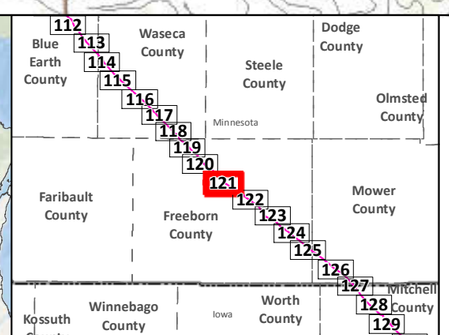

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
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Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

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- High
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Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 121B of 188

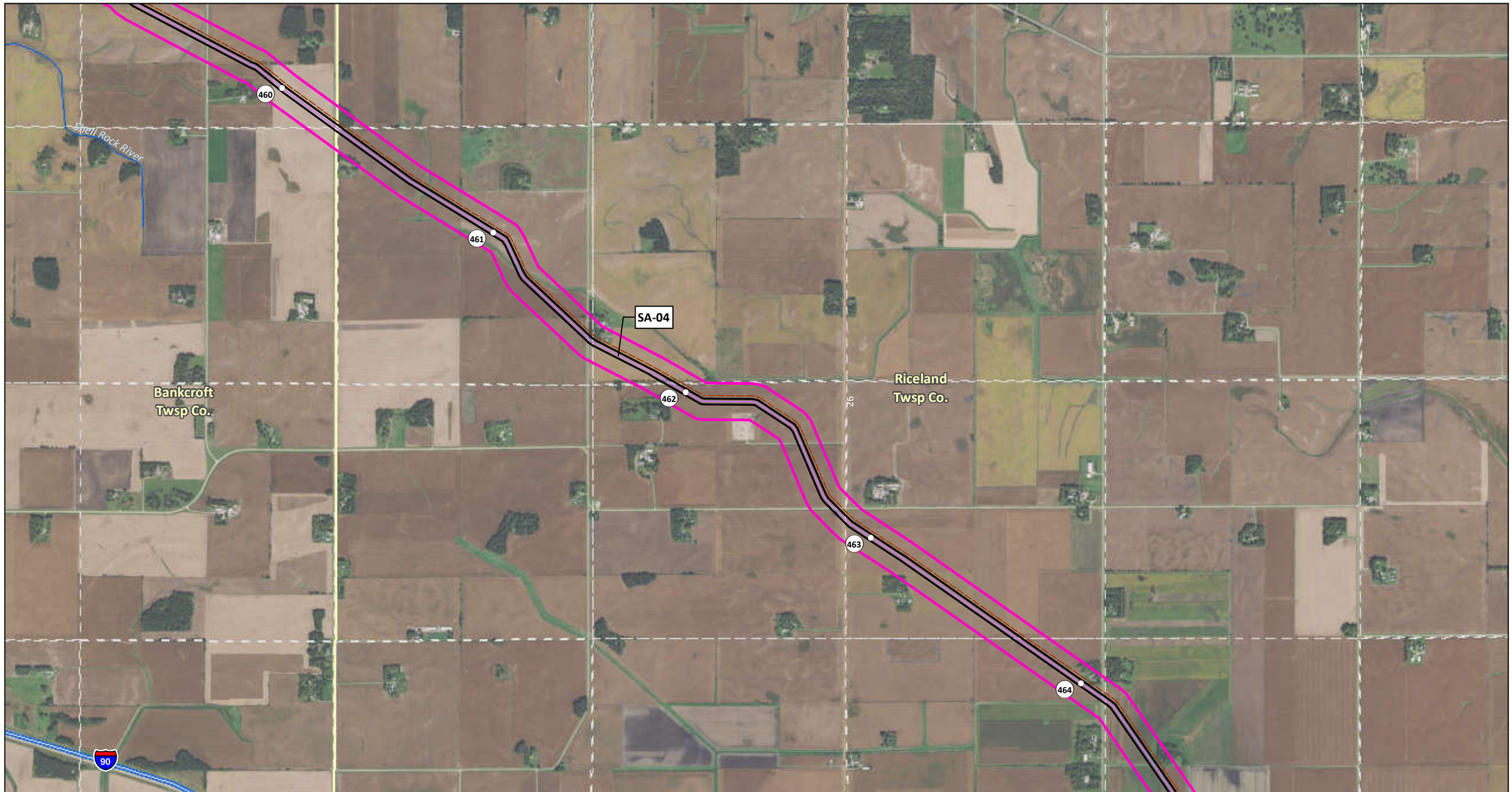

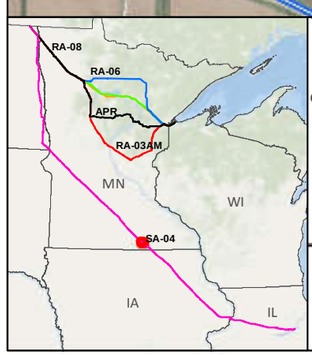

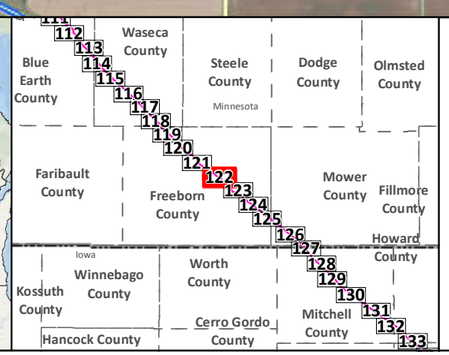

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 122A of 188

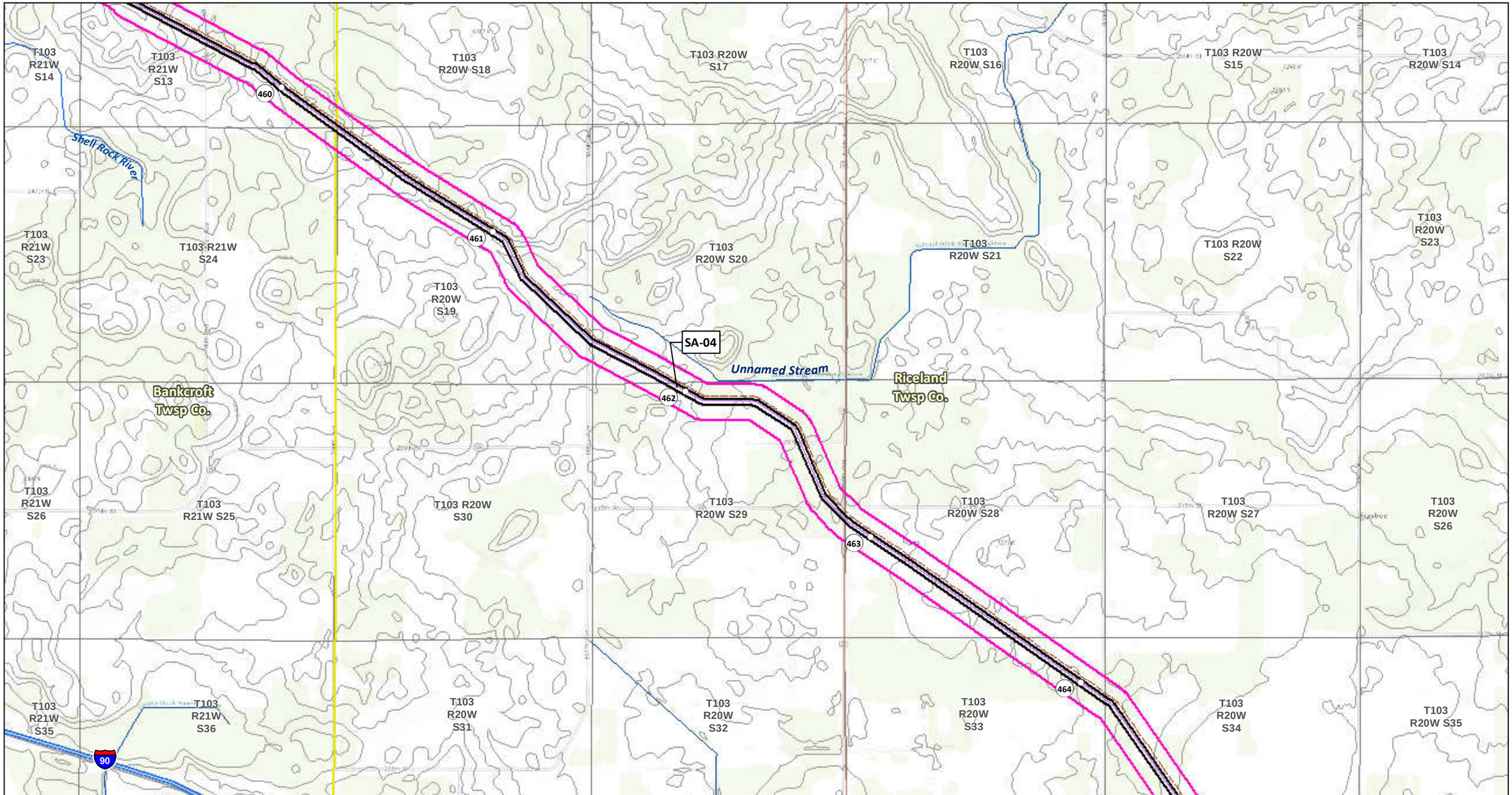

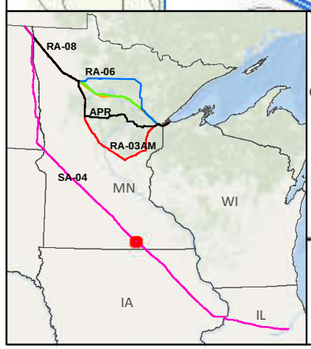

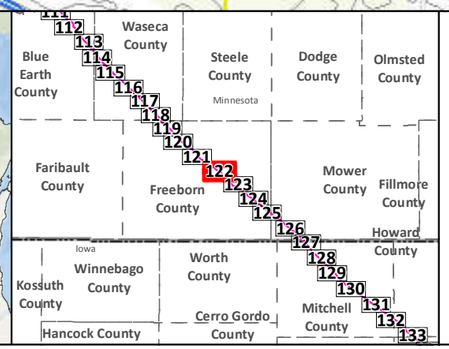

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
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- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

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Native Plant Communities with Biodiversity Significance

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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 122B of 188

Riceland Twsp Co.

Moscow Twsp Co.

465

466

467

468

46

90

SA-04

Hayward Twsp Co.

Oakland Twsp Co.

Woodbury Creek

Hayward Twsp Co.

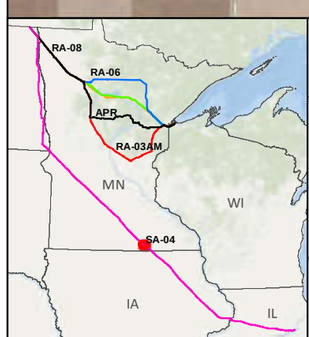

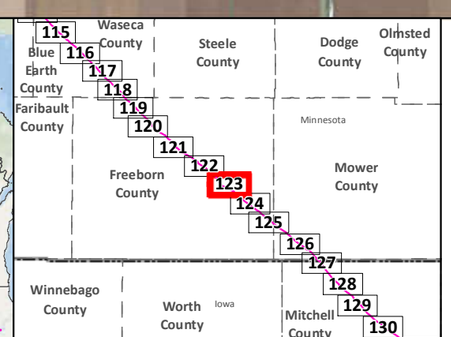

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources: MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 123A of 188

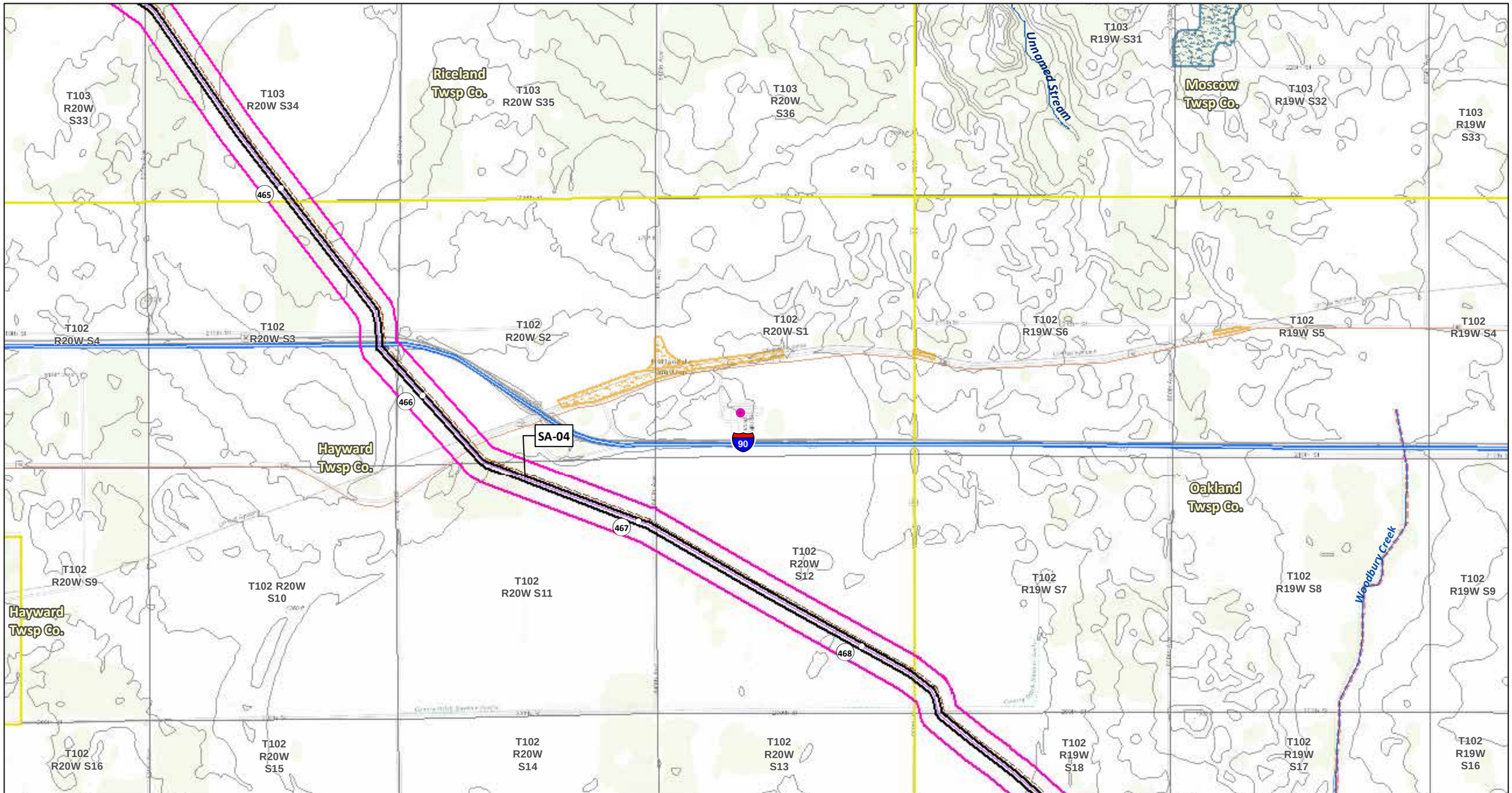

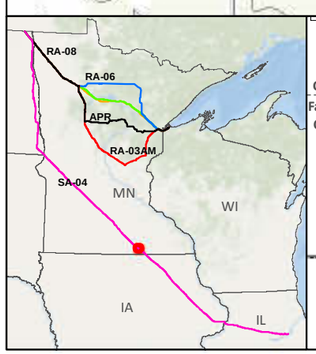

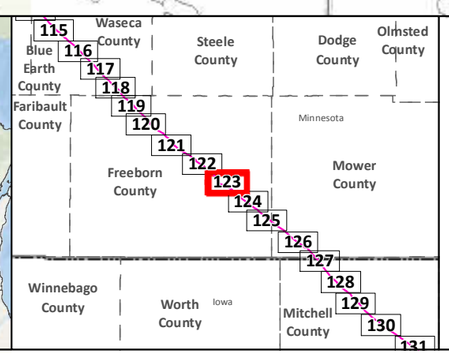

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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- RA-06
- RA-07
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Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 123B of 188

469
470
471
472
473
SA-04
Hayward Twsp Co.
Oakland Twsp Co.
Woodbury Creek
Orchard Creek
Mud Lake Creek

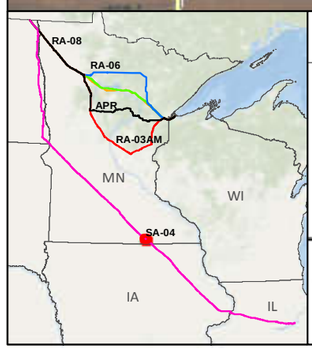

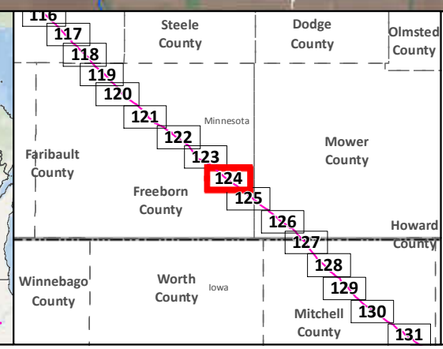

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
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State Forest
National Forest
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Water Resources
Lake
River

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0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 124A of 188

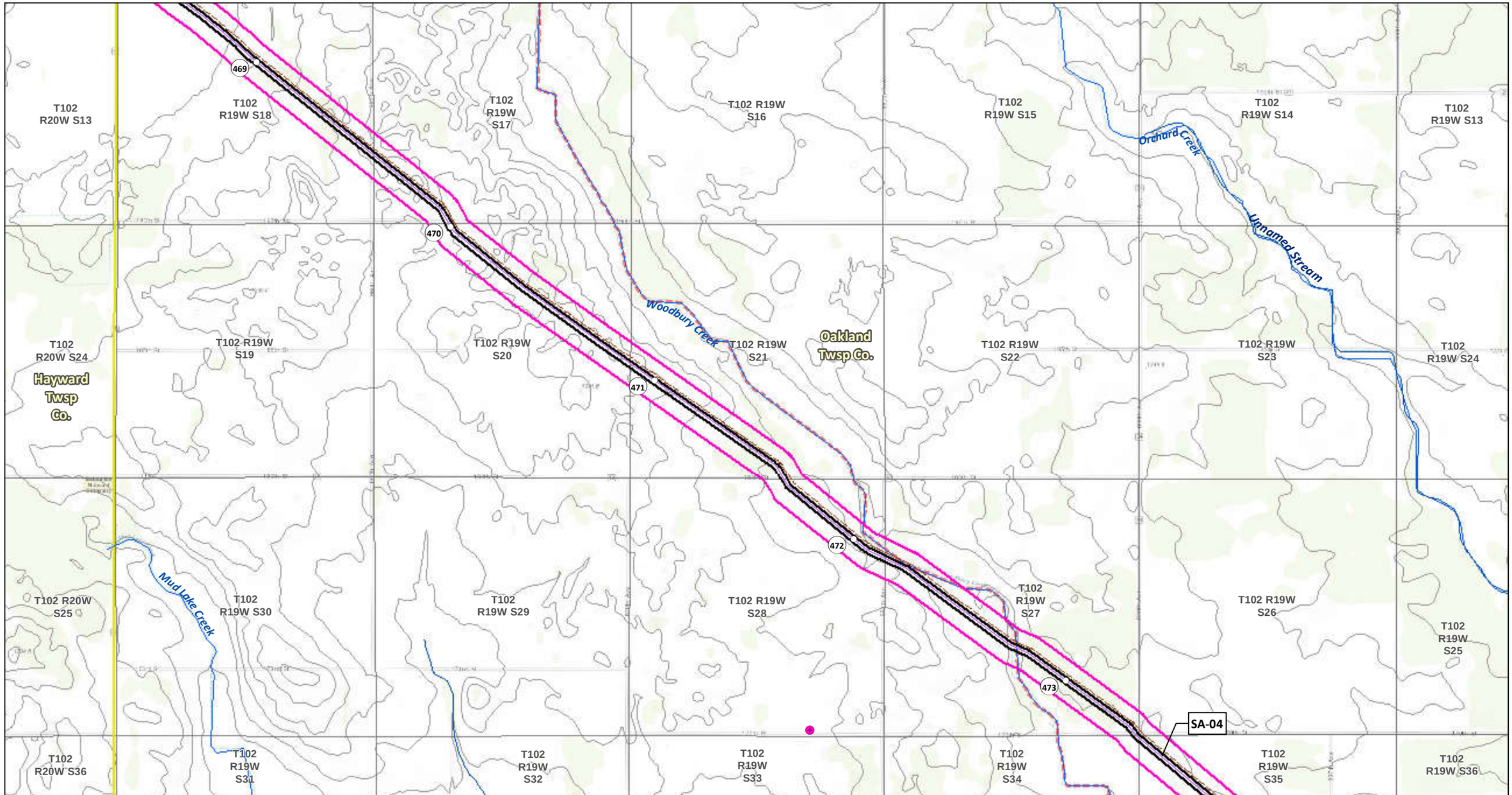

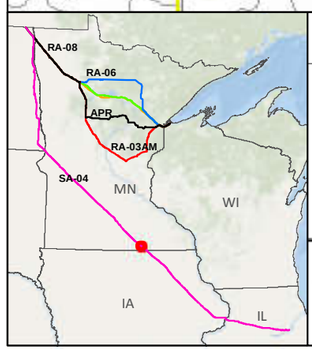

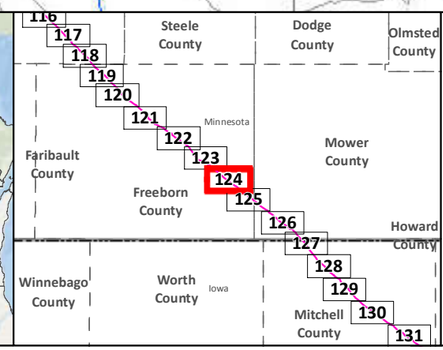

SA-04

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Anticipated 120' Construction ROW

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 124B of 188

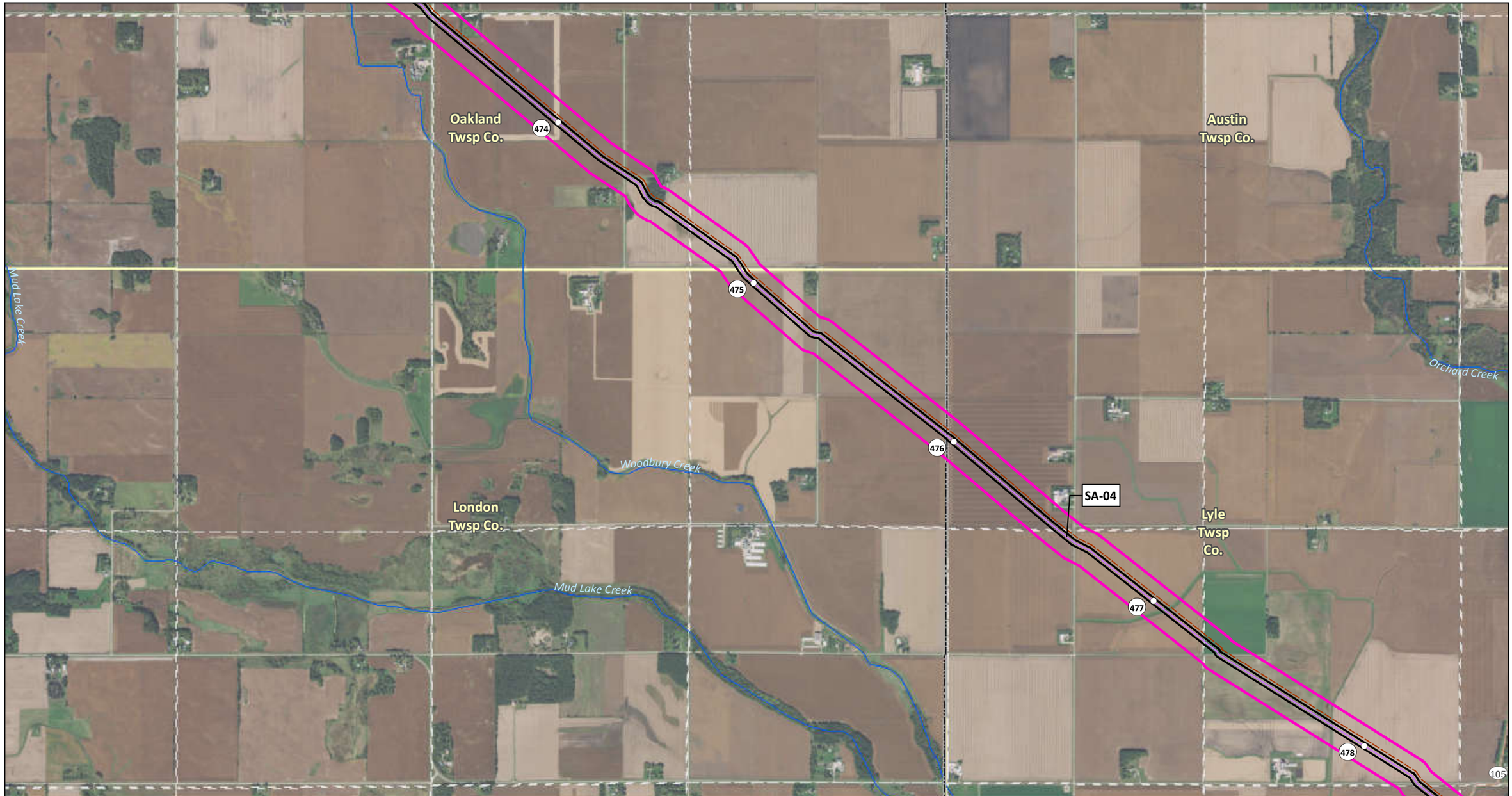

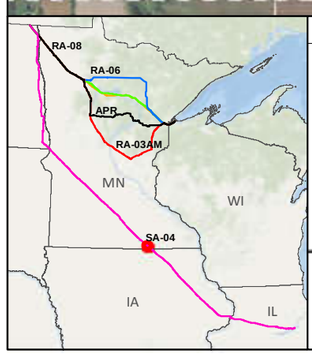

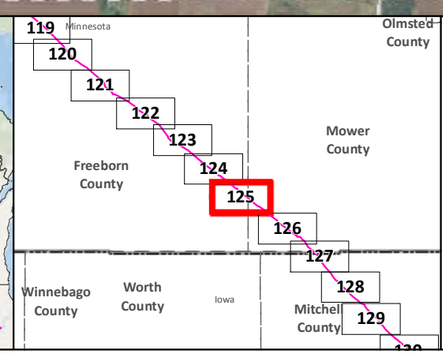

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 125A of 188

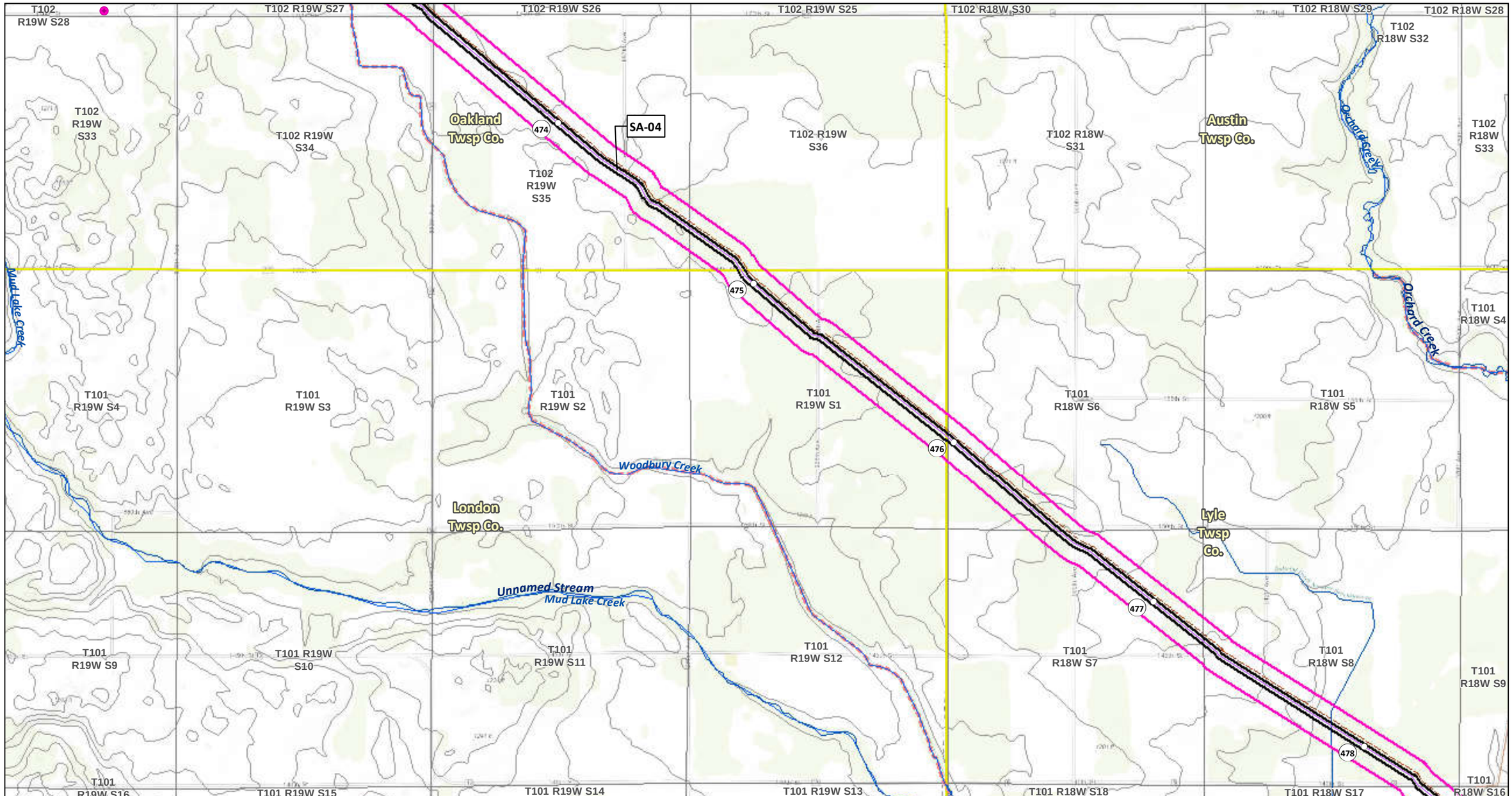

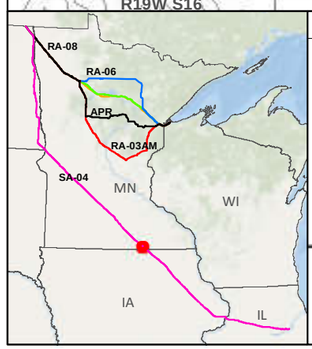

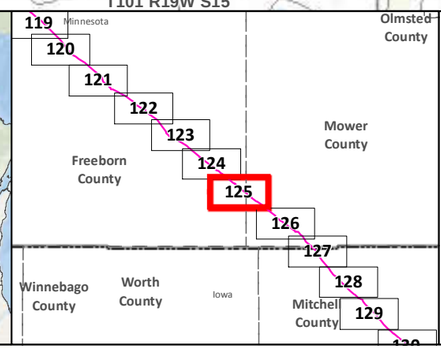

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 125B of 188

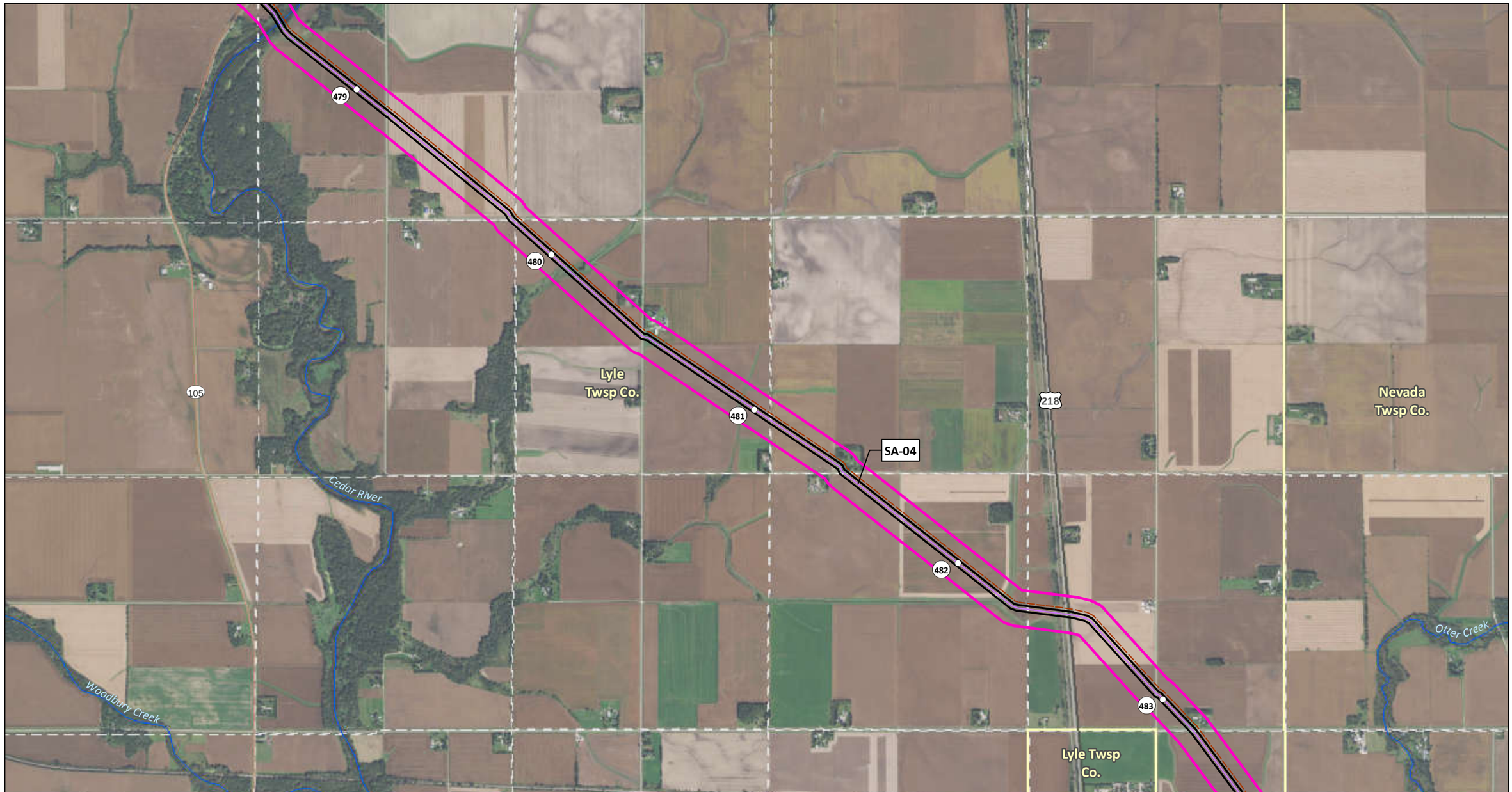

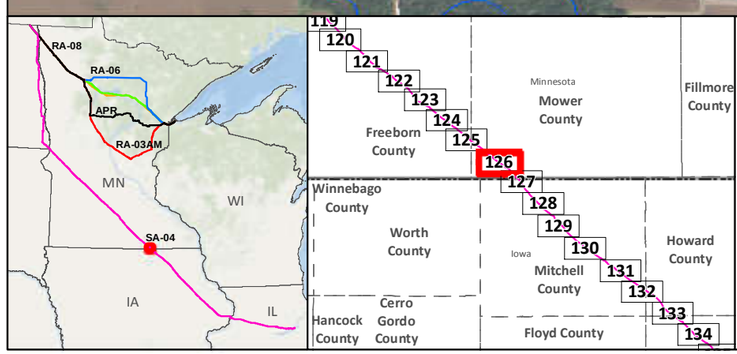

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 126A of 188

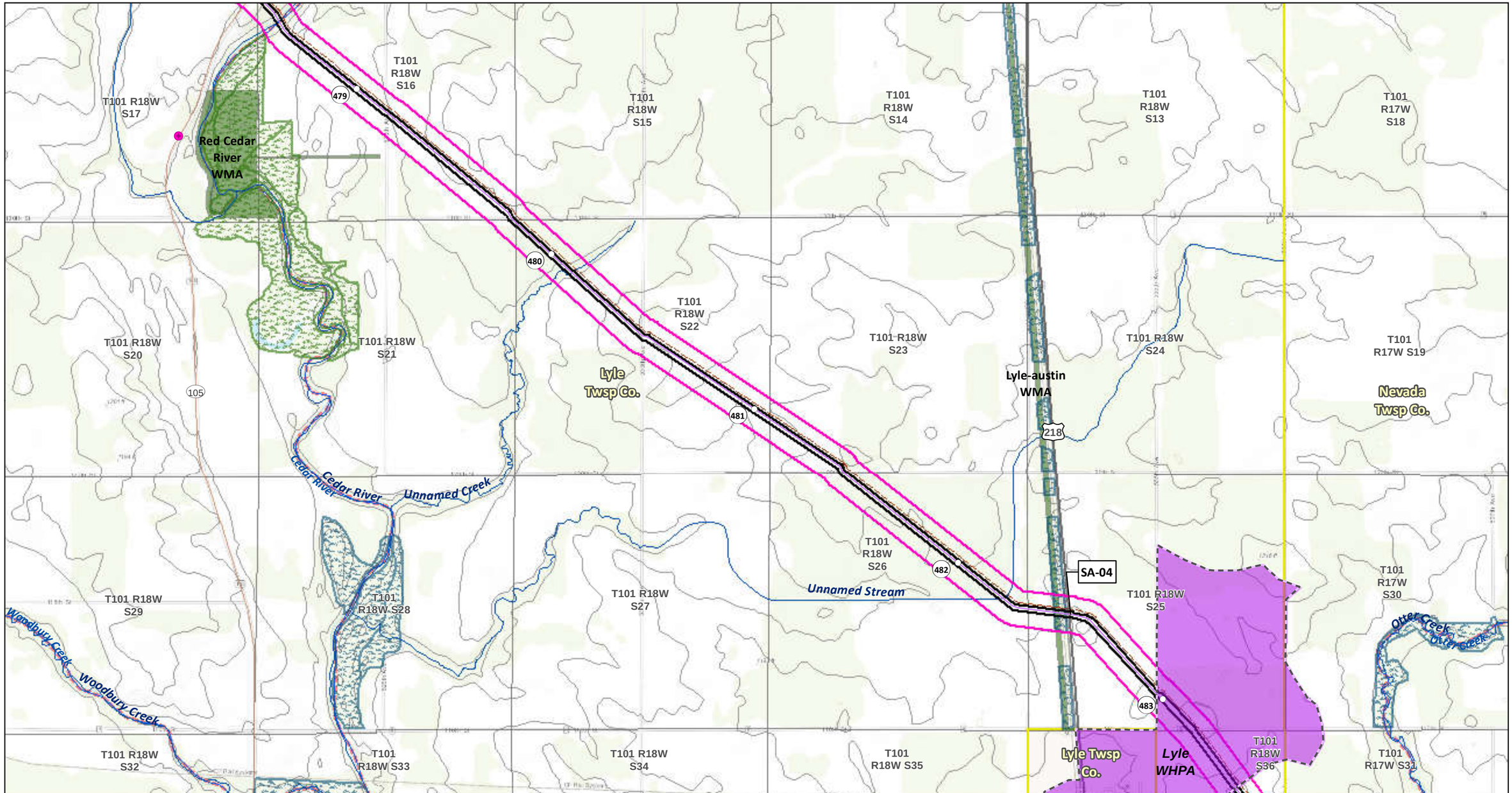

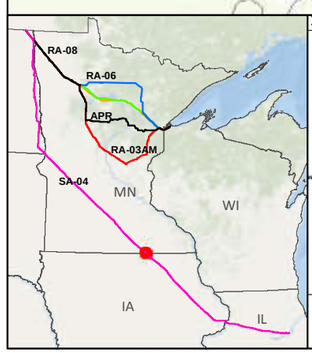

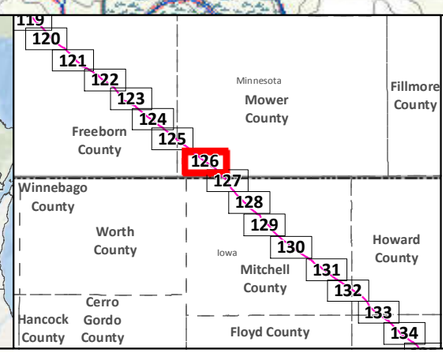

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
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Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 126B of 188

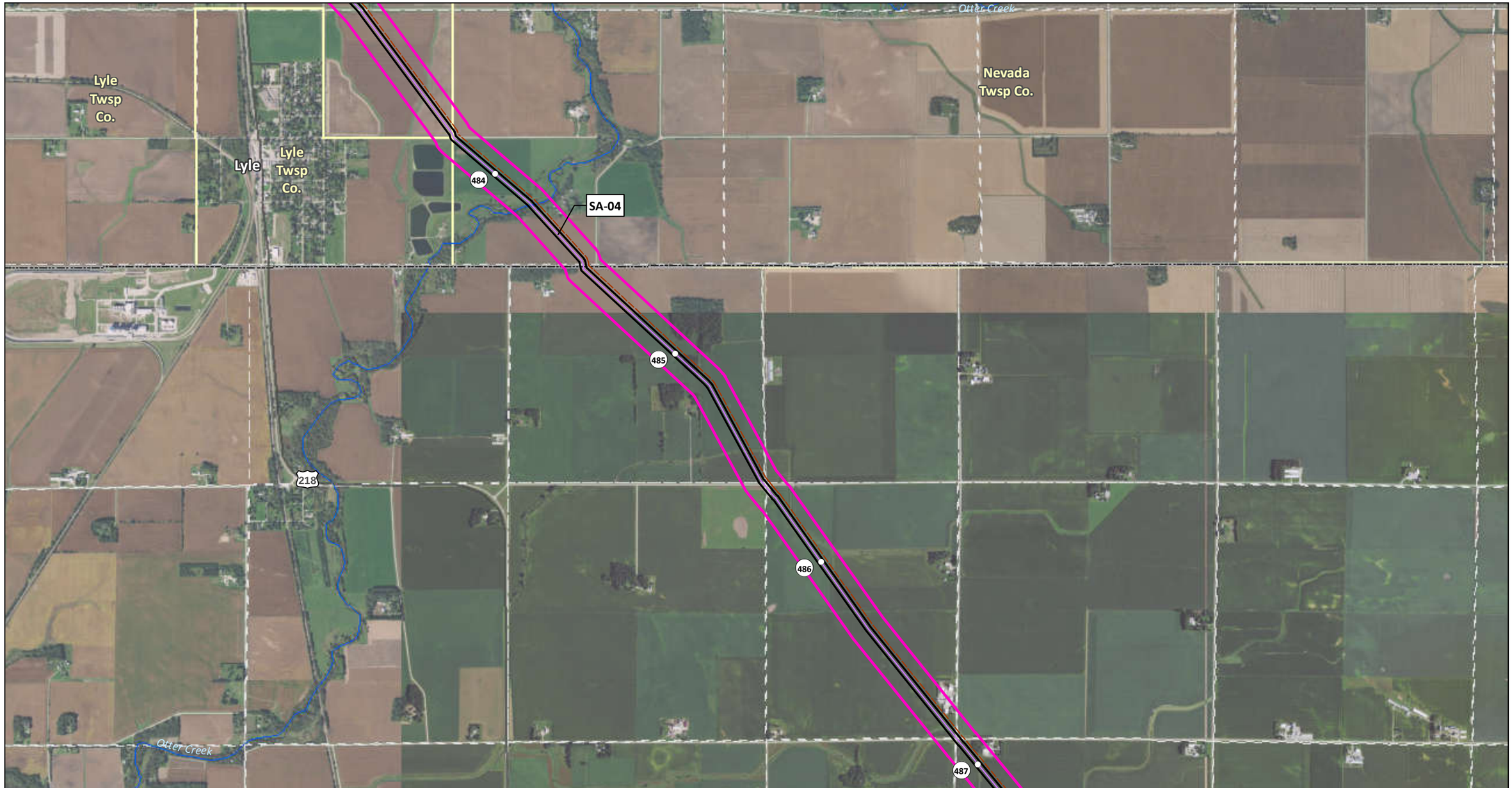

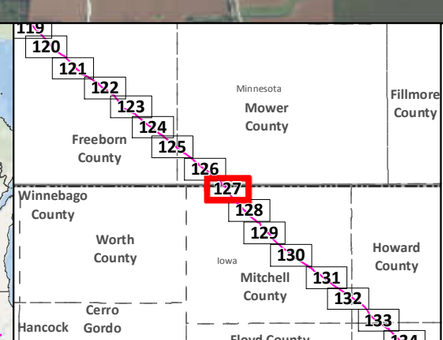

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 127A of 188

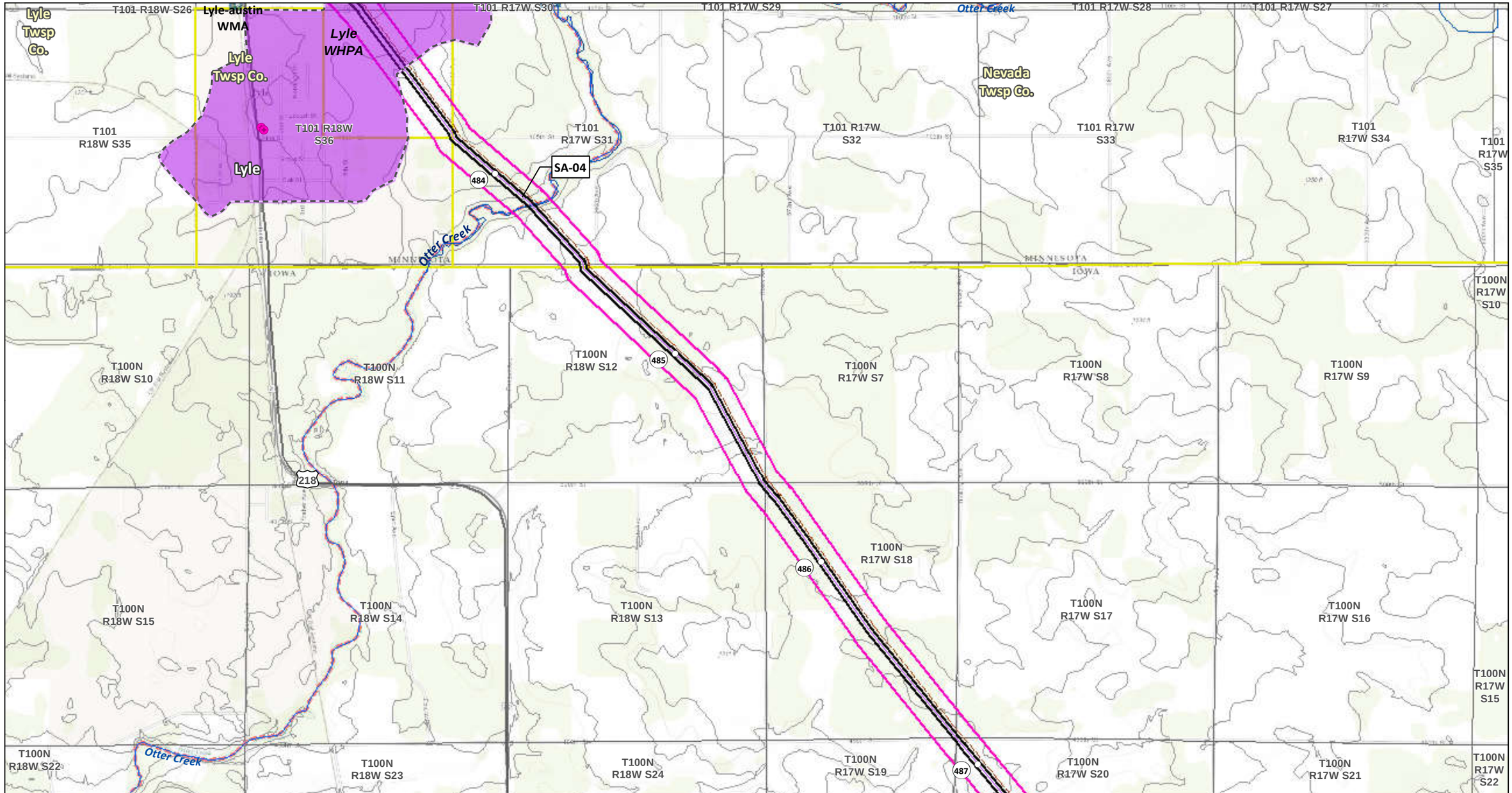

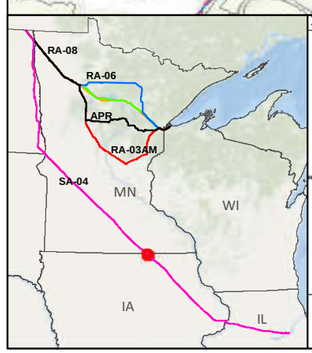

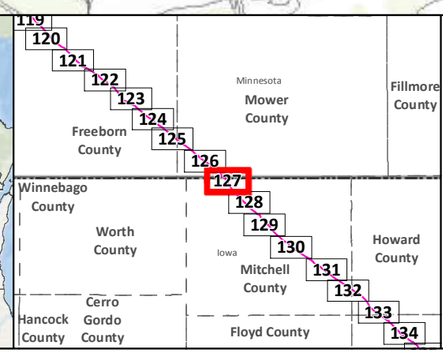

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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Mile Post

Anticipated 120' Construction ROW

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0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 127B of 188

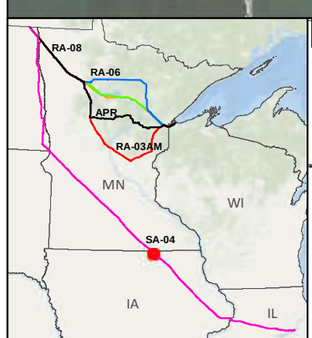

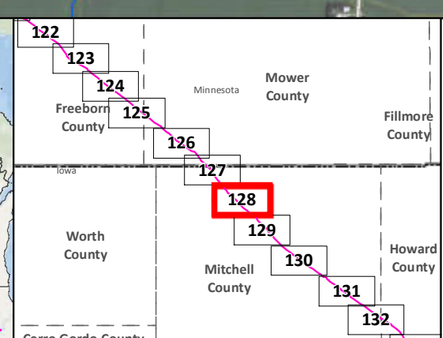

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 128A of 188

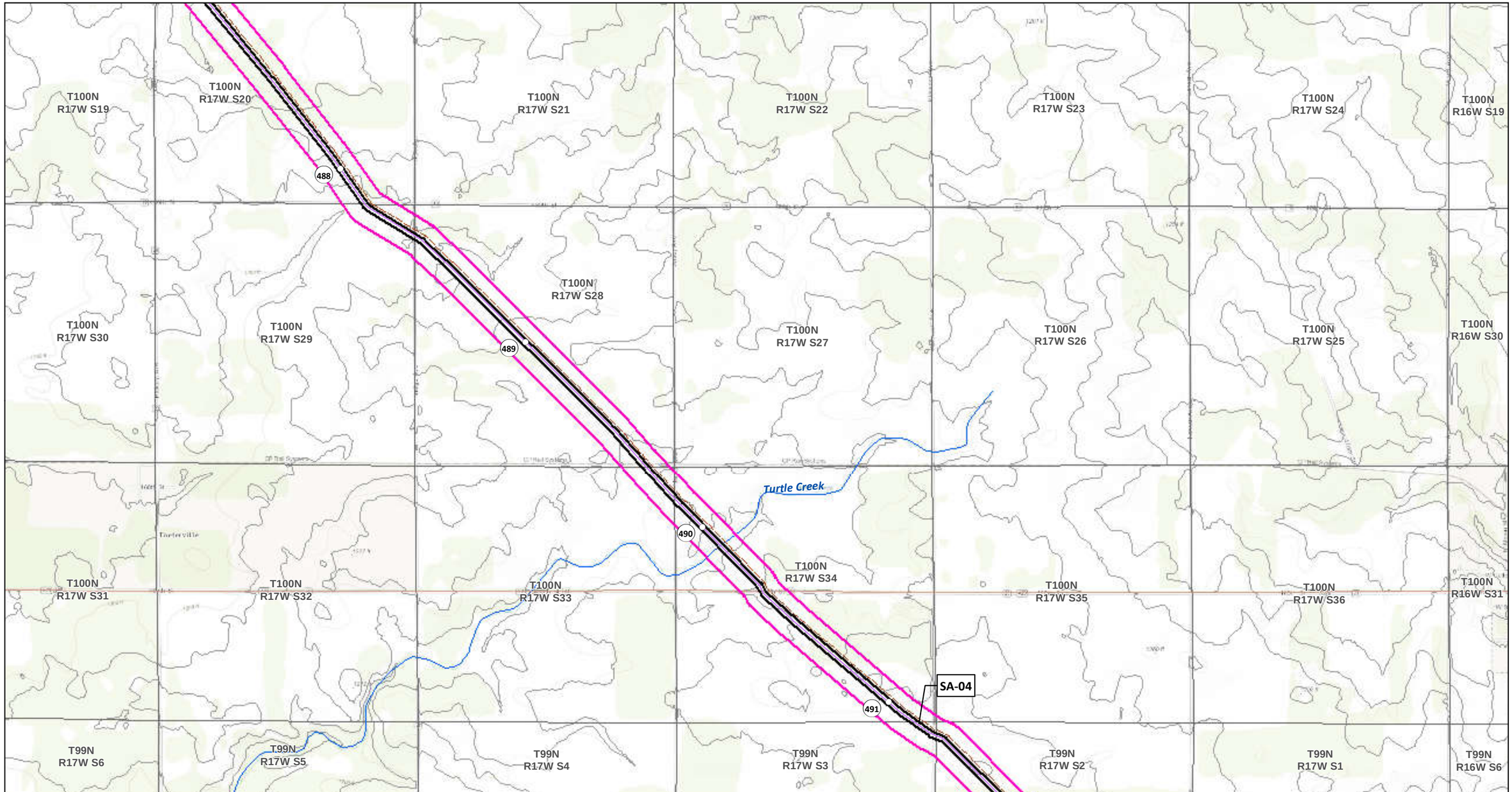

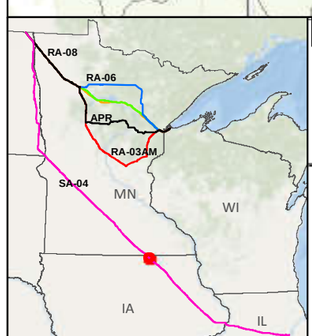

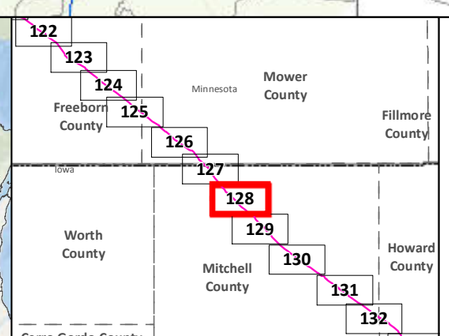

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
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- RA-06
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

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10ft Contours

Map 128B of 188

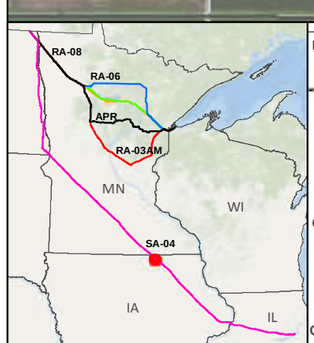

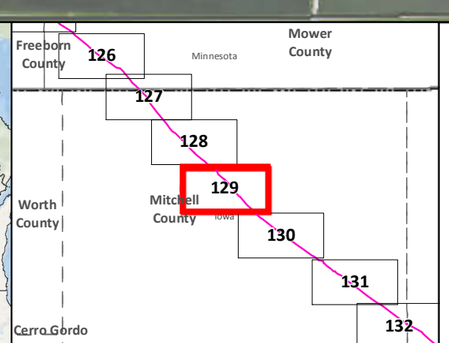

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 129A of 188

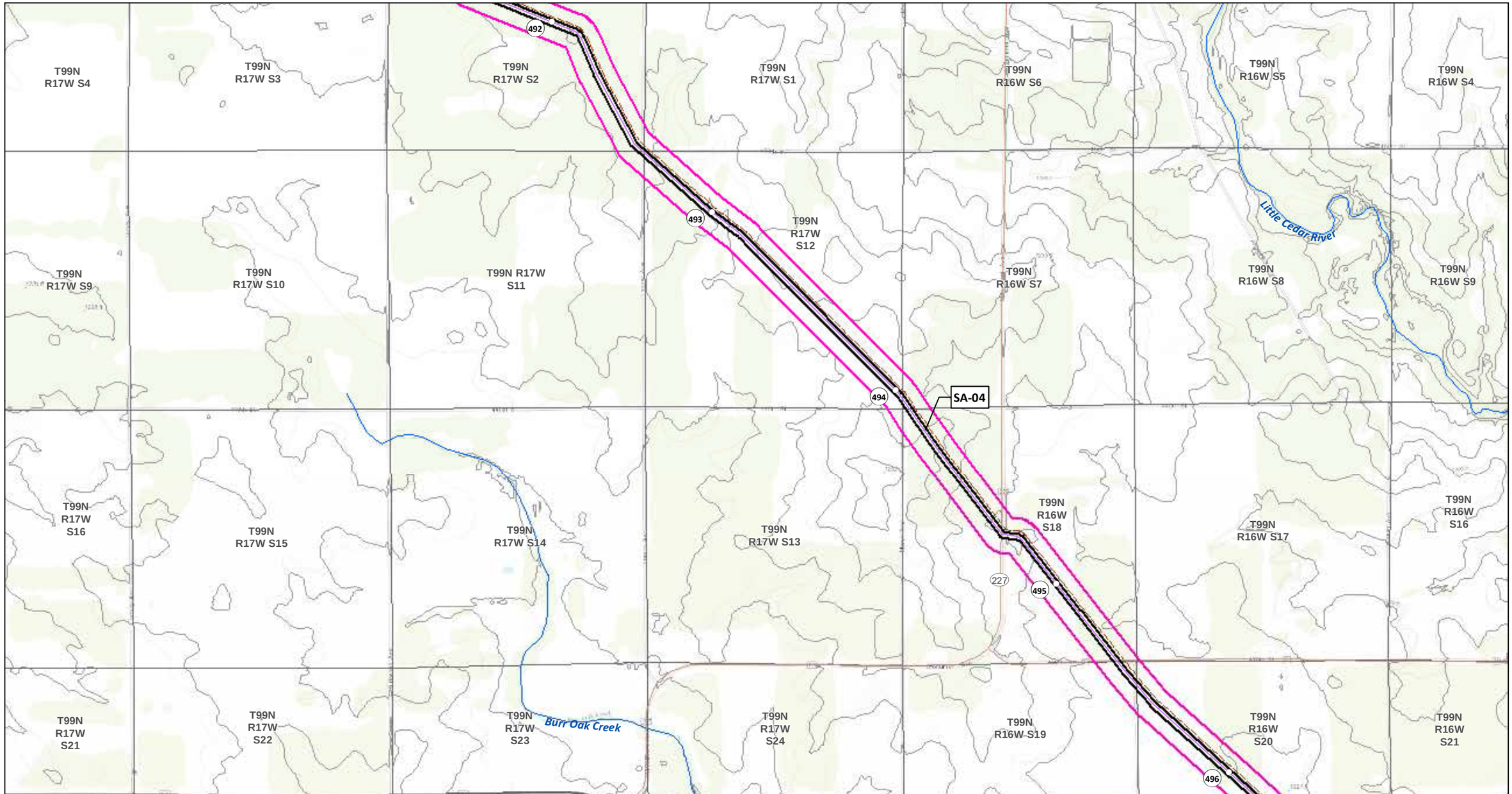

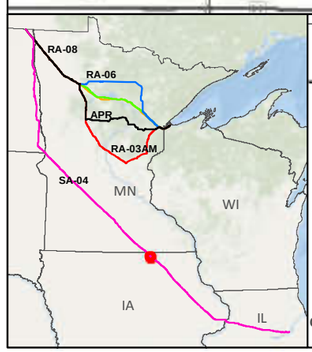

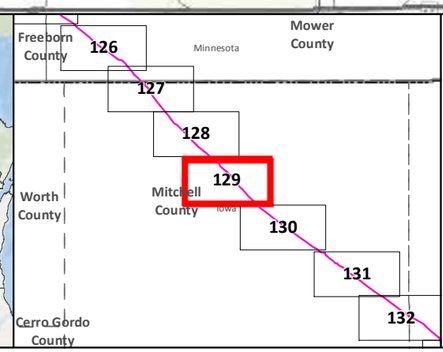

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
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Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

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0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 129B of 188

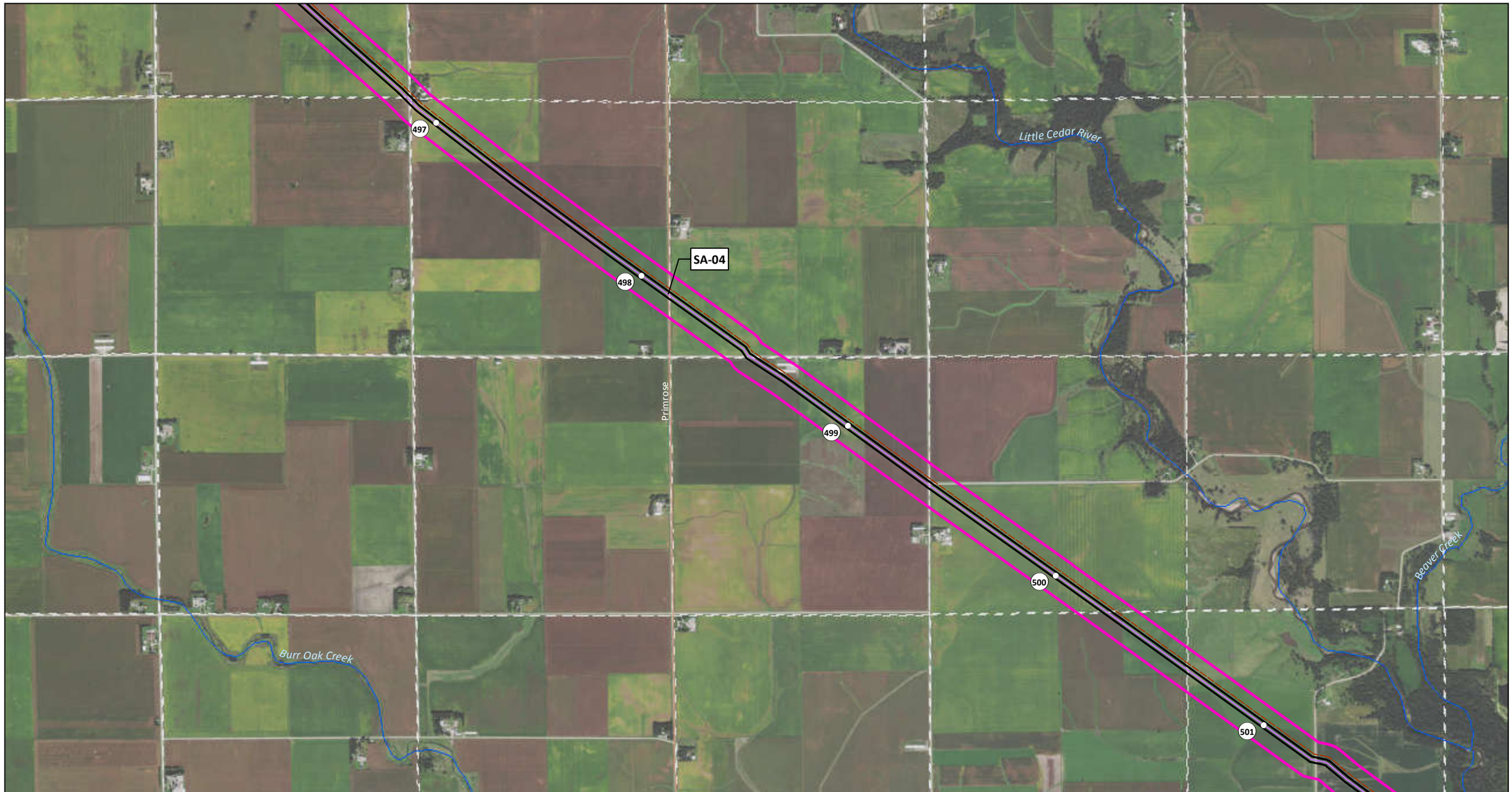

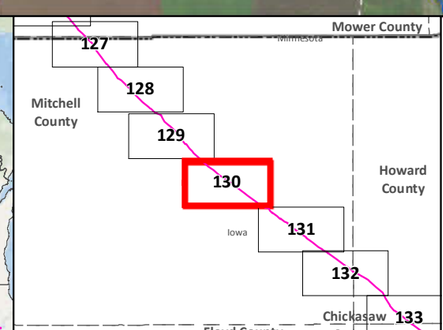

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

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Highway
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 130A of 188

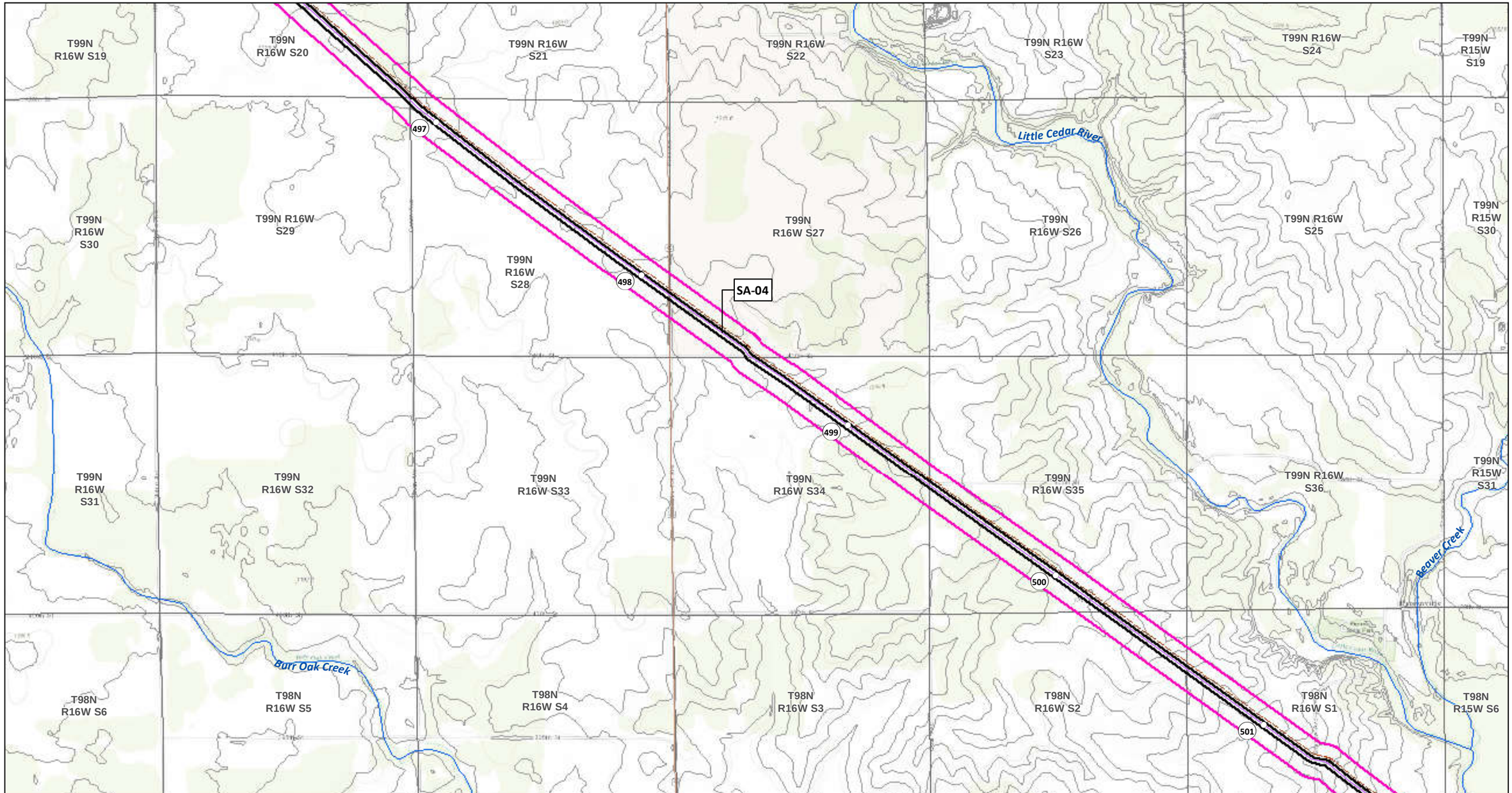

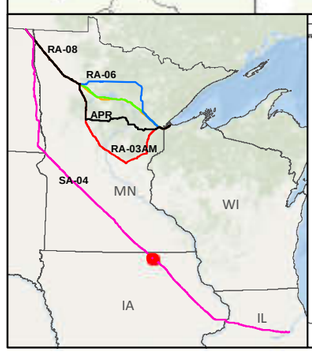

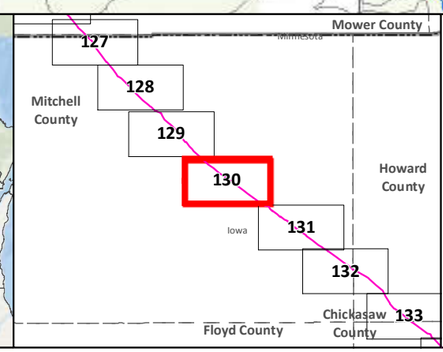

SA-04
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

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Map 130B of 188

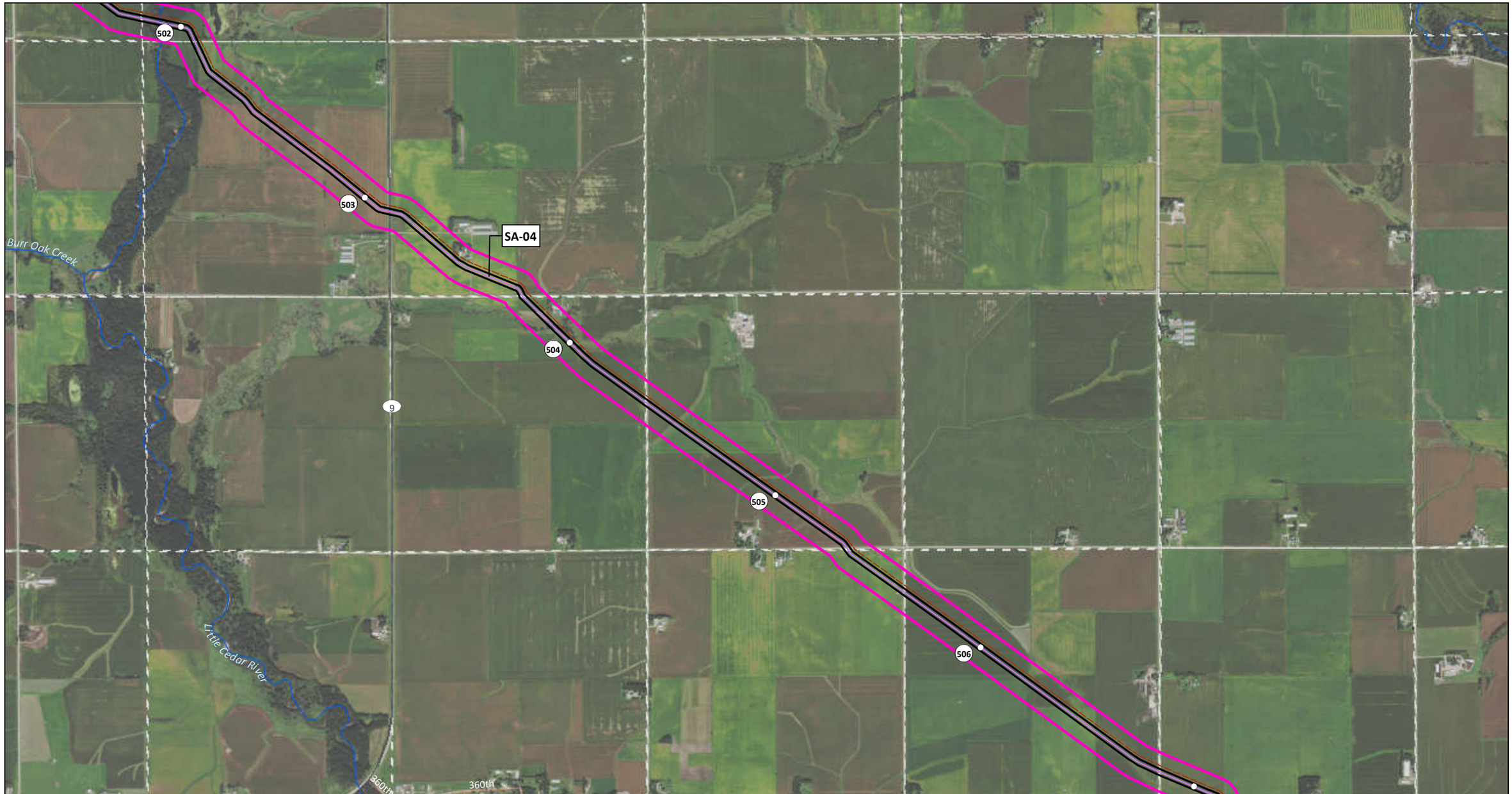

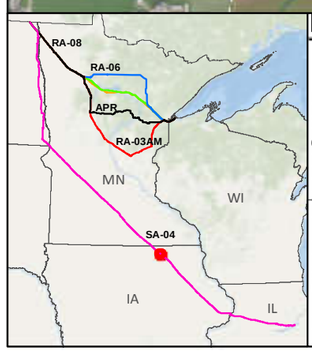

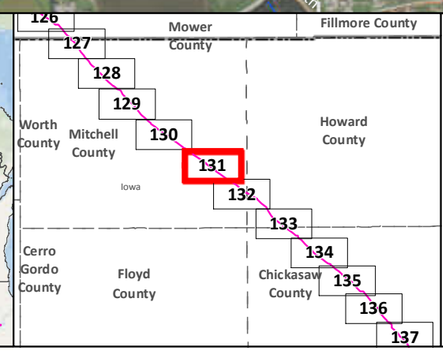

SA-04
Applicant's Preferred Route (APR)
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Route Width (750')
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1:24,000
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 131A of 188

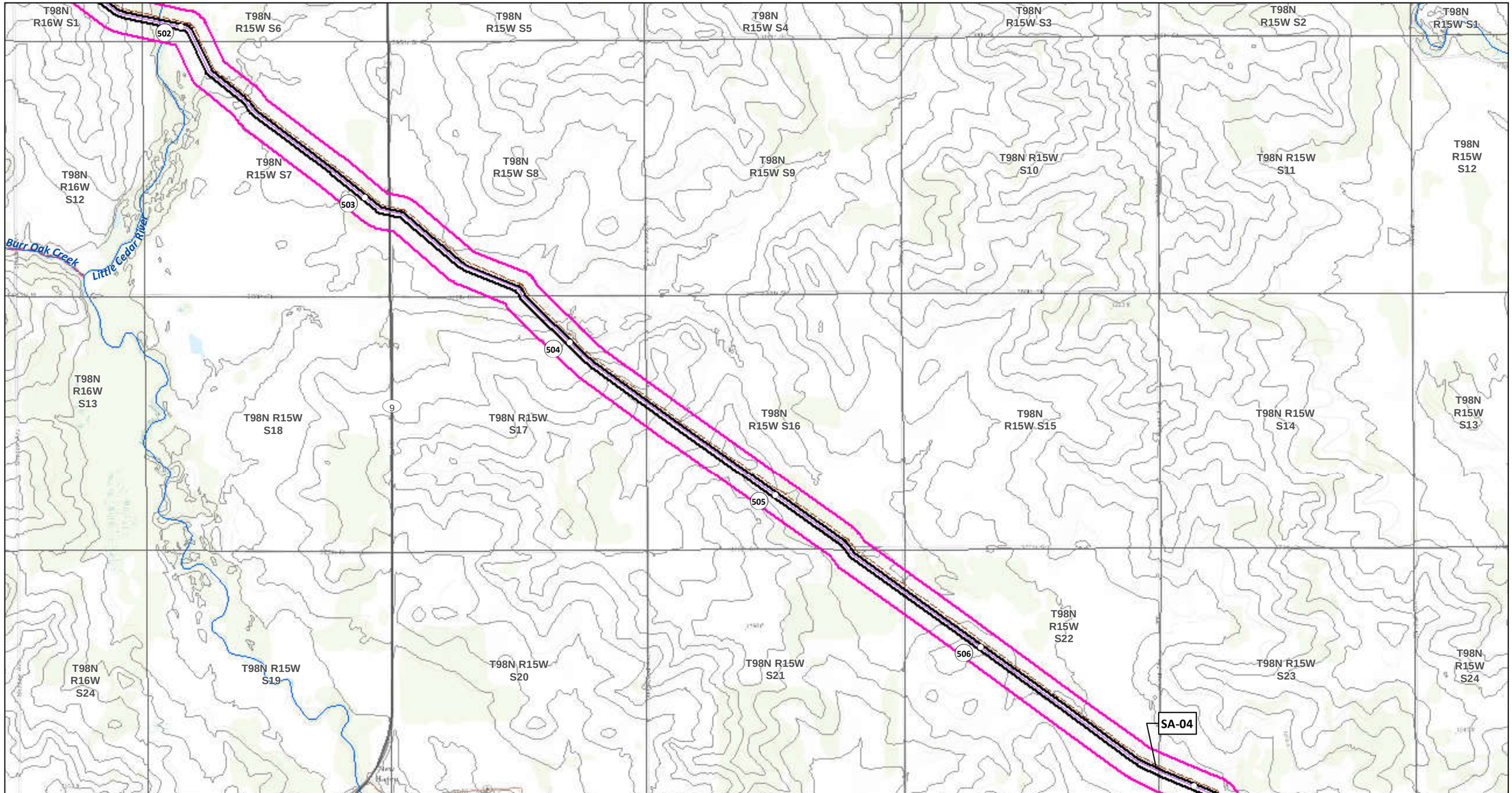

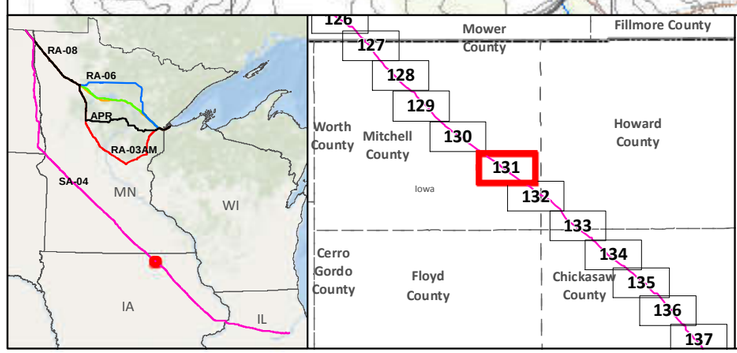

SA-04

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1:24,000

10ft Contours

N

Map 131B of 188

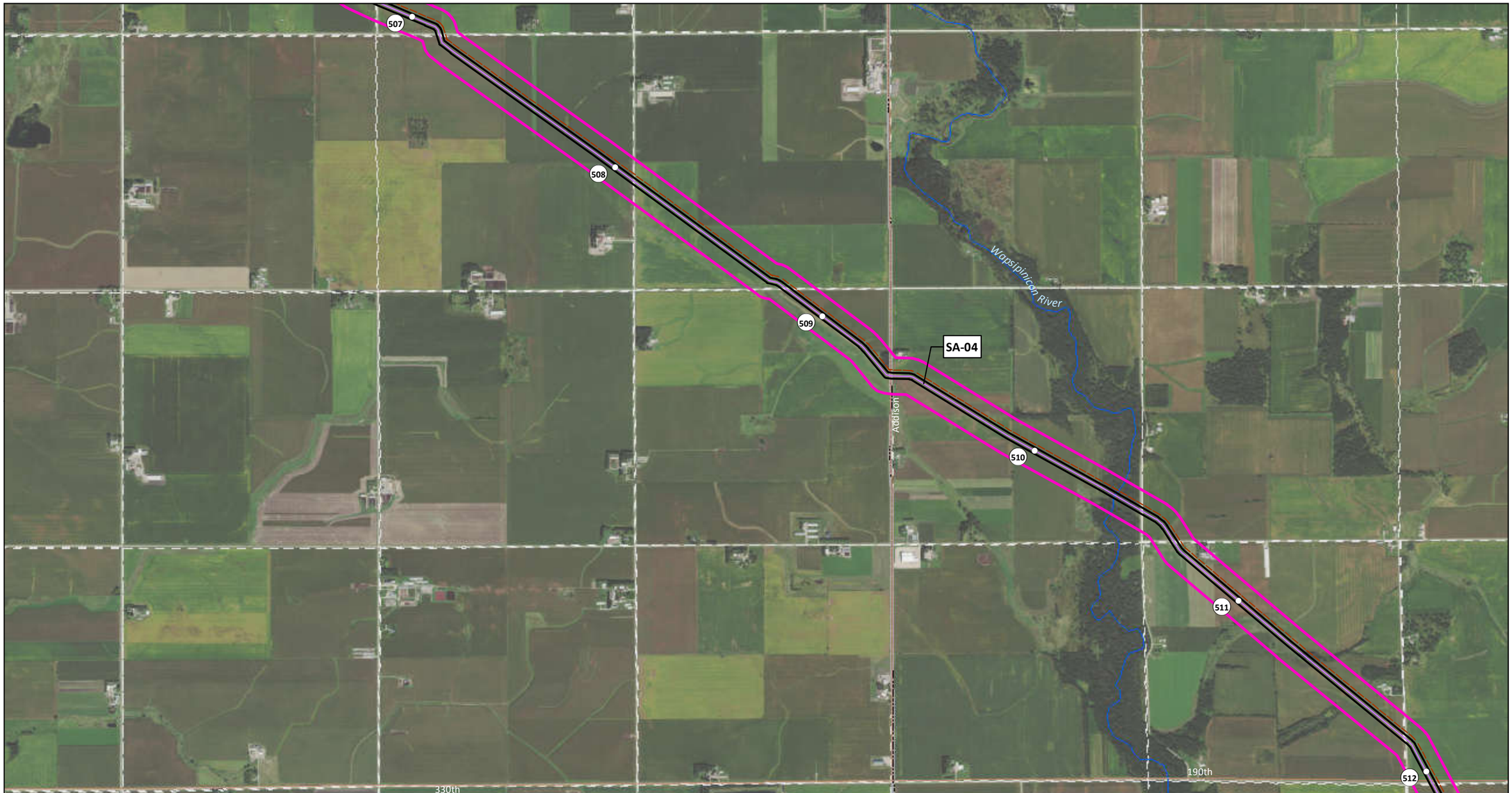

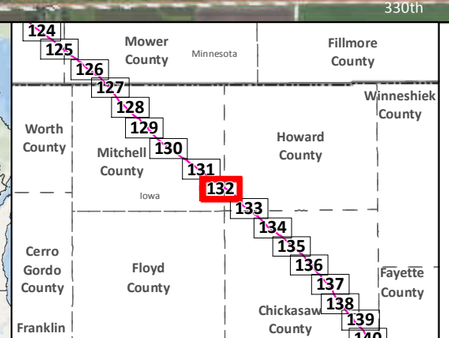

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 132A of 188

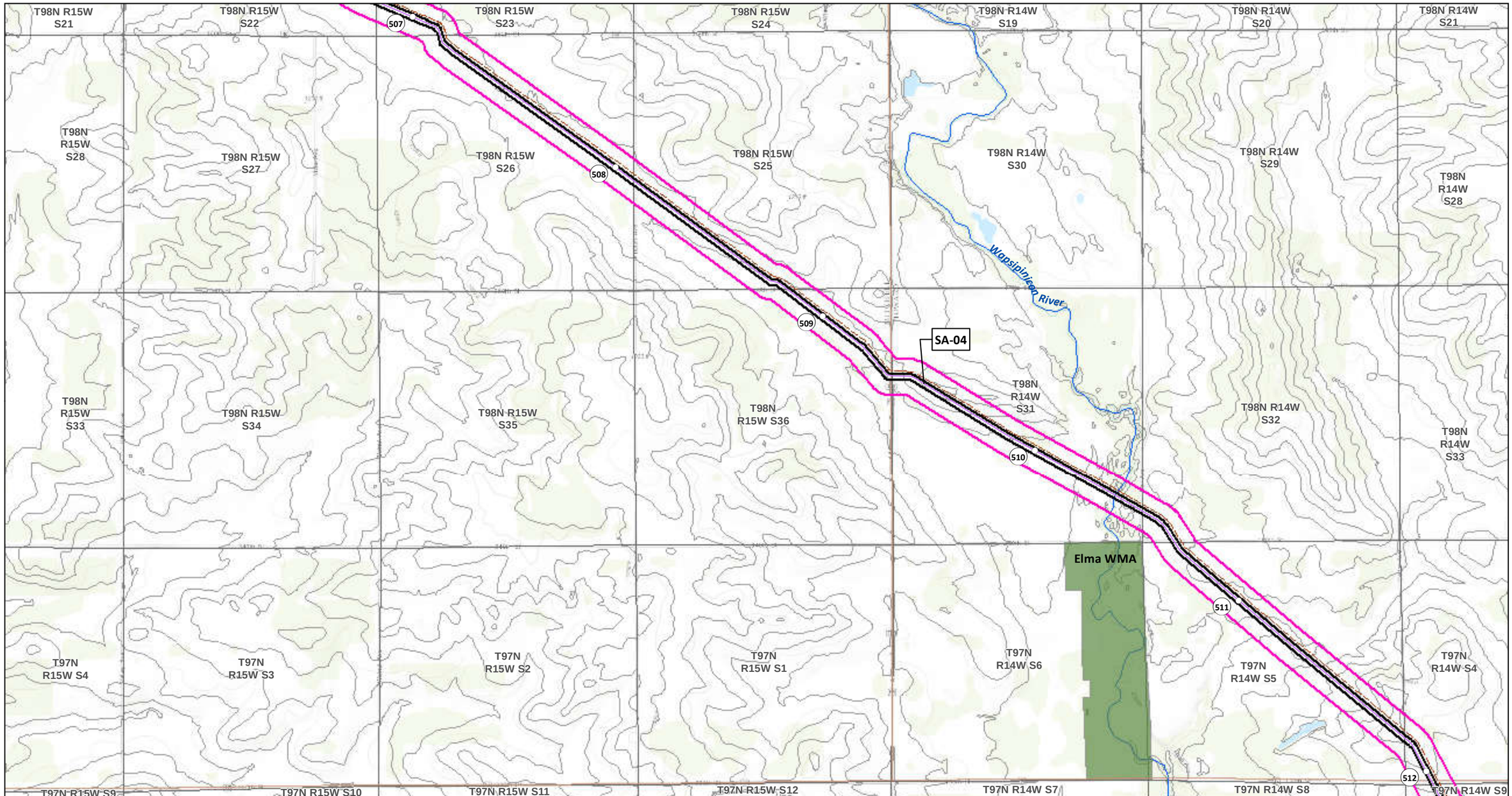

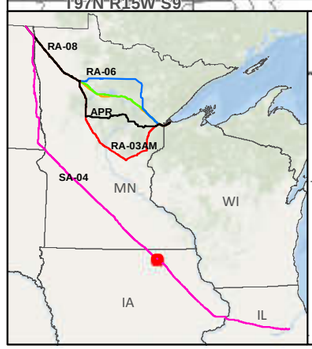

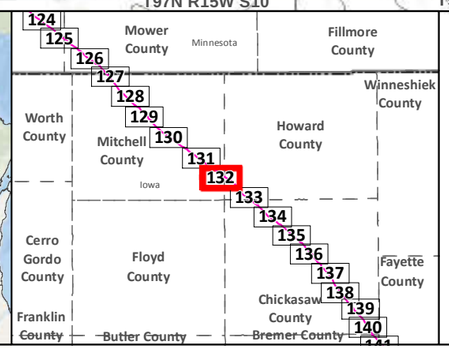

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 132B of 188

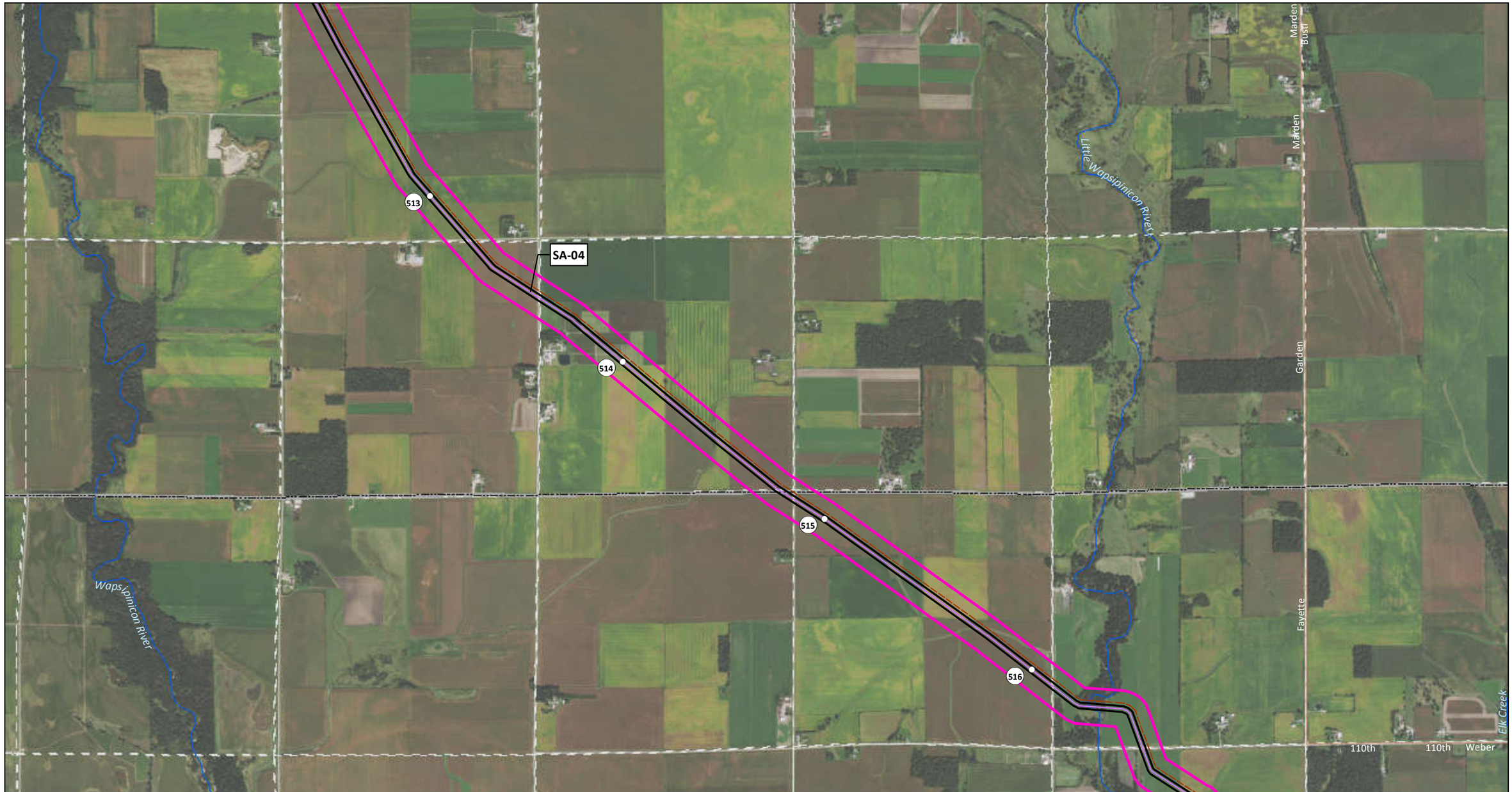

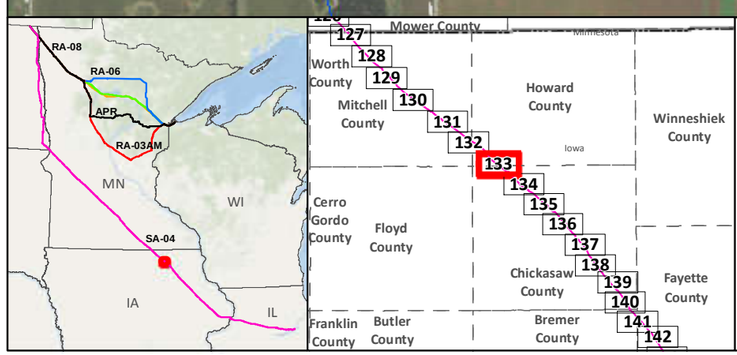

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 133A of 188

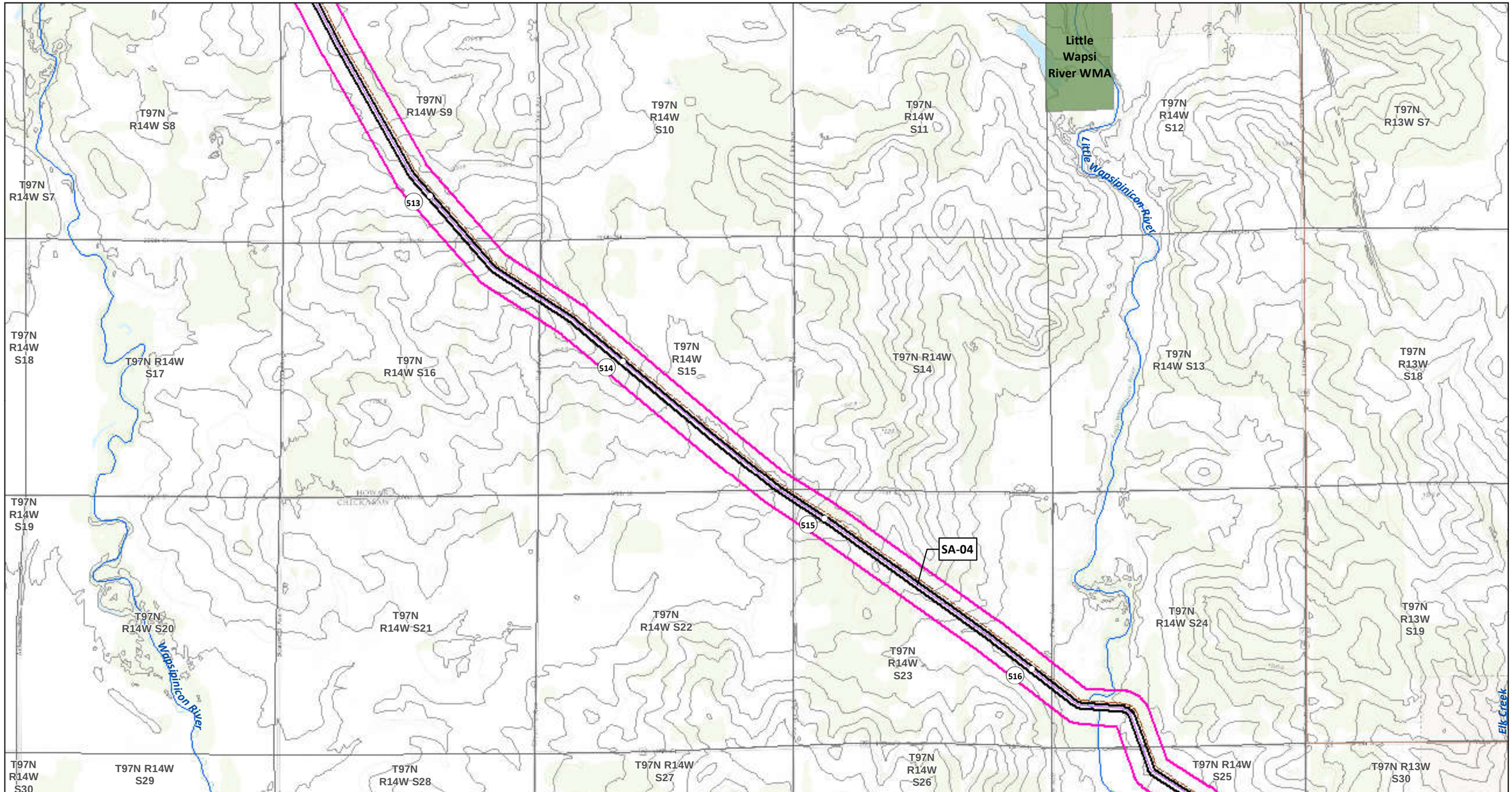

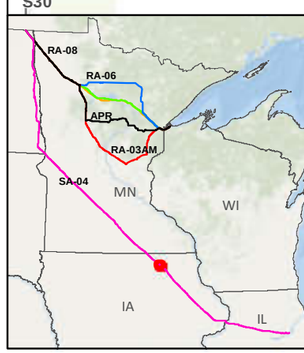

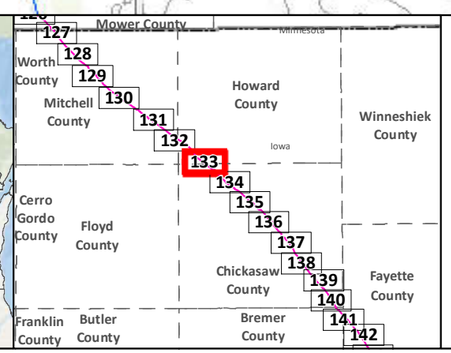

SA-04

Applicant's Preferred Route (APR)

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 133B of 188

517
518
519
520
521
SA-04
Little Wapsipinicon River
Elk Creek
East Fork Wapsipinicon River
White
Gilmore
140th

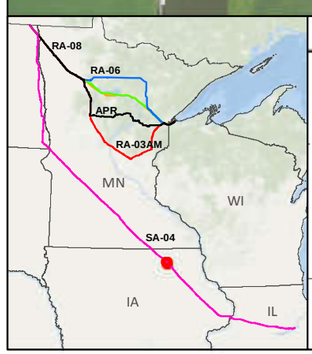

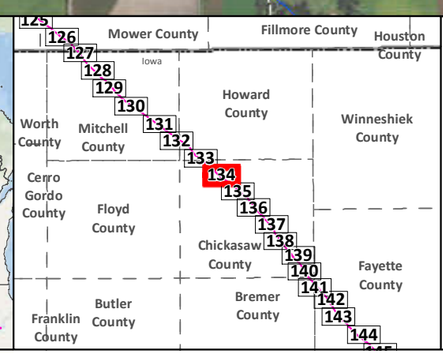

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 134A of 188

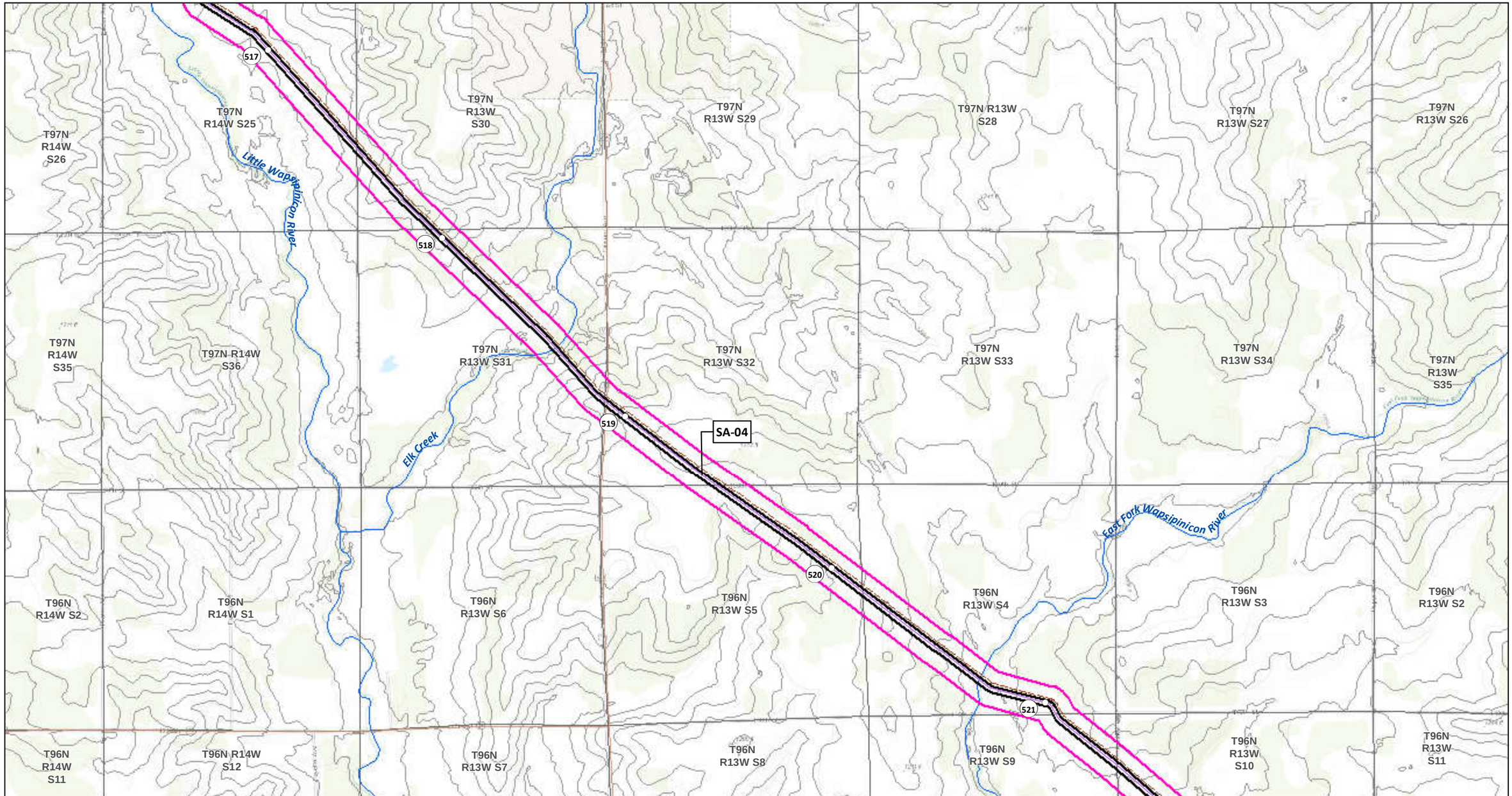

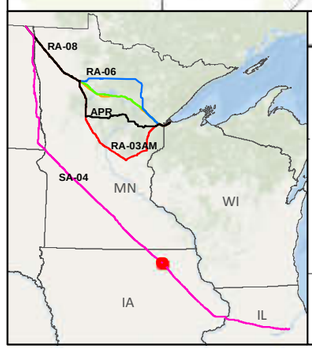

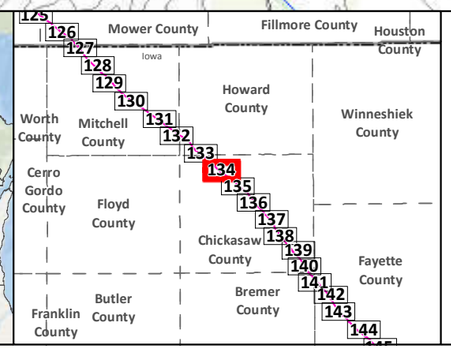

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
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- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

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Water Resources

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 134B of 188

522
523
524
525
526
SA-04
East Fork Wapsipinicon River
63

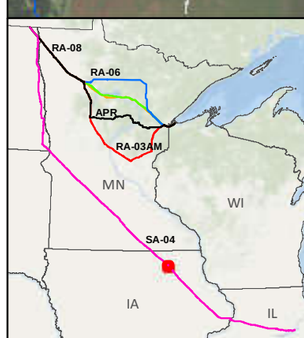

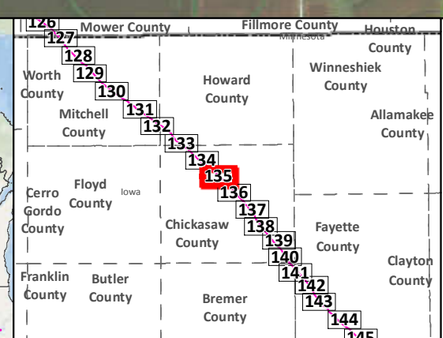

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 135A of 188

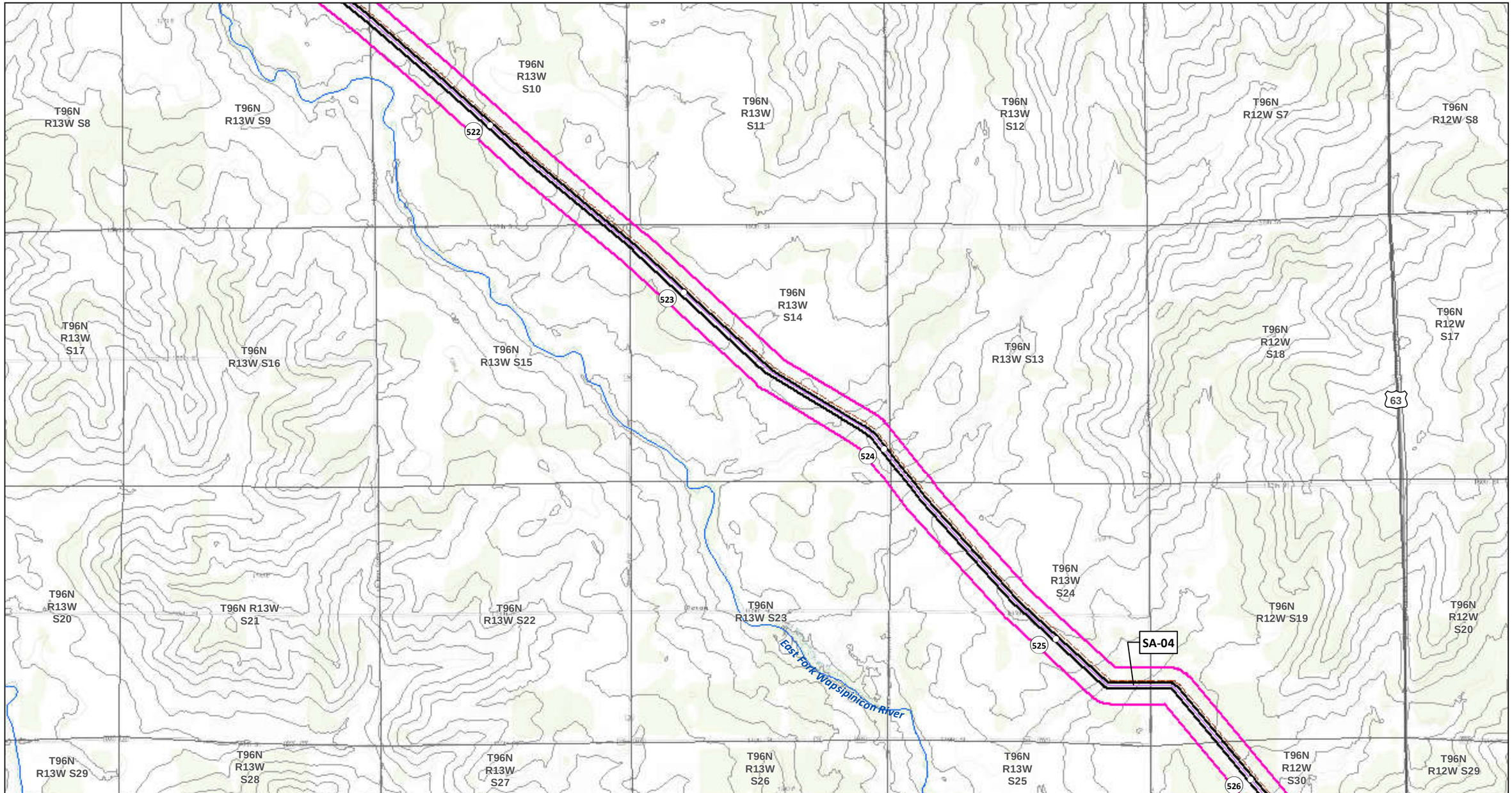

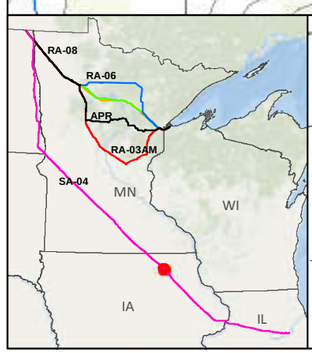

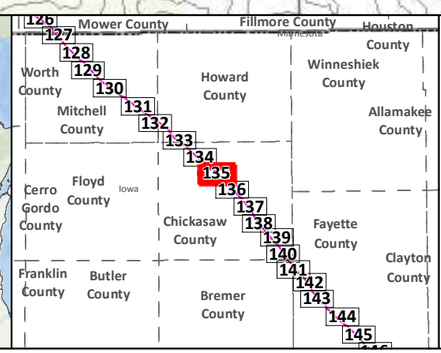

SA-04

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 135B of 188

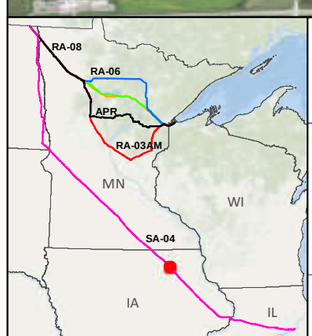

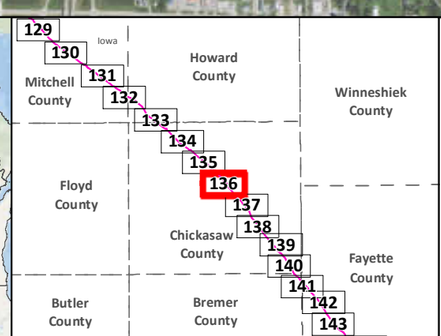

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
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National Forest
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Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 136A of 188

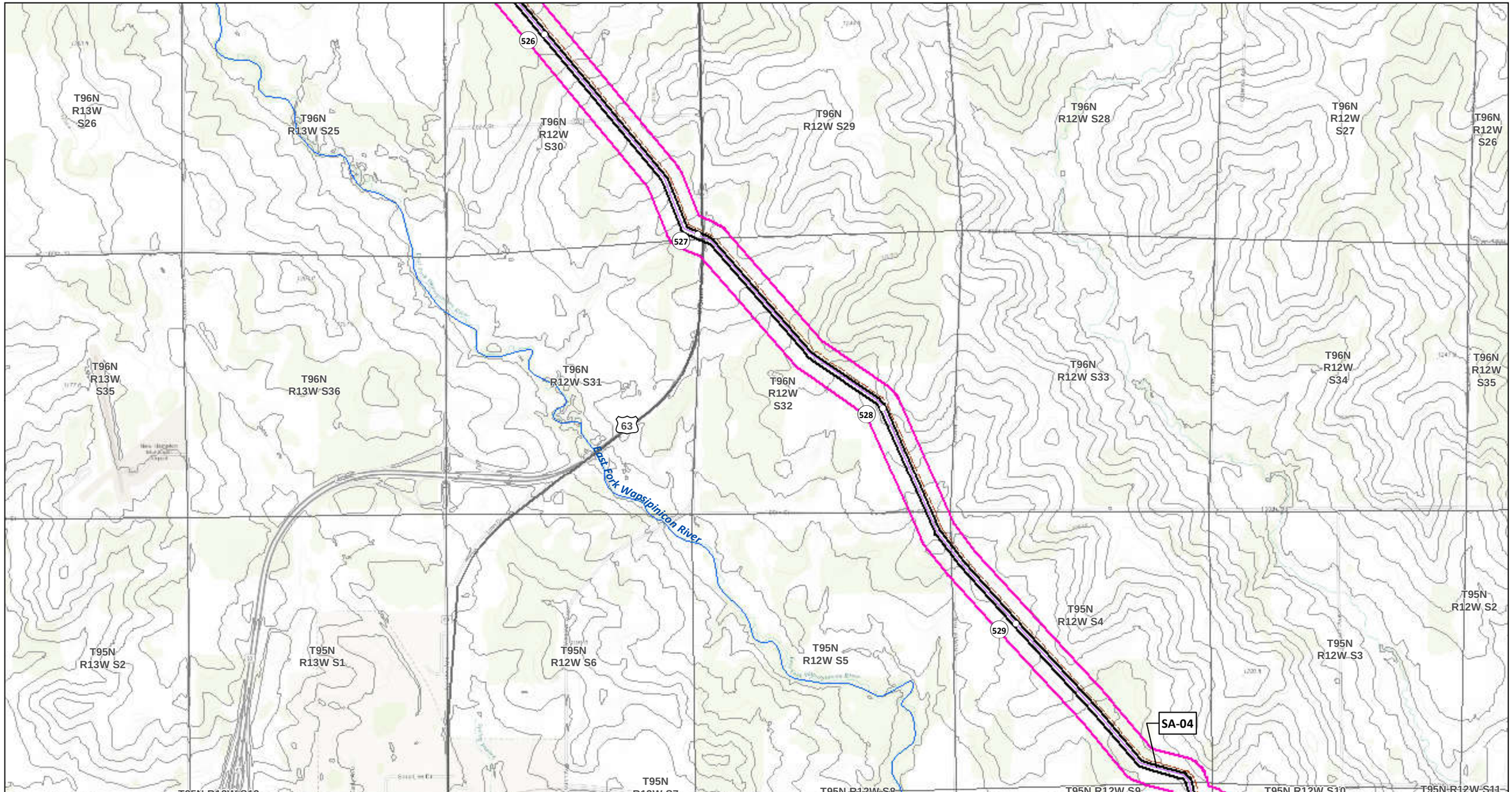

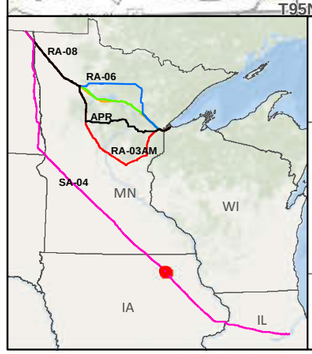

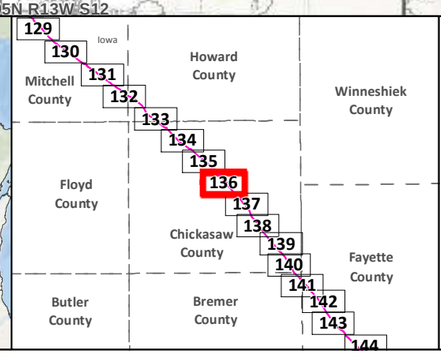

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
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Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 136B of 188

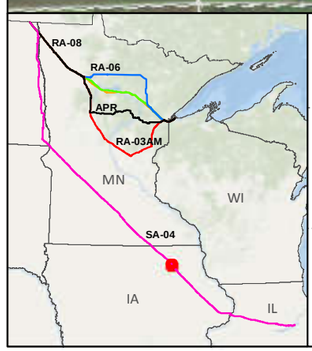

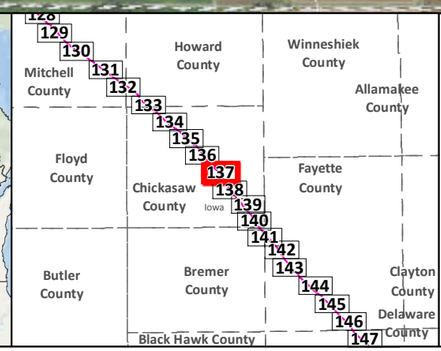

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

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Highway

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State Forest

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Lake

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MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 137A of 188

T95N R12W S5
T95N R12W S4
T95N R12W S3
T95N R12W S2
T95N R12W S1
T95N R11W S6
T95N R11W S5
T95N R12W S8
T95N R12W S9
T95N R12W S10
T95N R12W S11
T95N R12W S12
T95N R11W S7
T95N R11W S8
Simpson Creek
530
24
531
SA-04
532
533
T95N R12W S17
T95N R12W S16
T95N R12W S15
T95N R12W S14
T95N R12W S13
T95N R11W S18
T95N R11W S17
East Fork Wapsipinicon River
T95N R12W S20
T95N R12W S21
T95N R12W S22
T95N R12W S23
T95N R12W S24
T95N R11W S19
T95N R11W S20
T95N R12W S29
T95N R12W S28
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T95N R12W S25
T95N R11W S30
T95N R11W S29

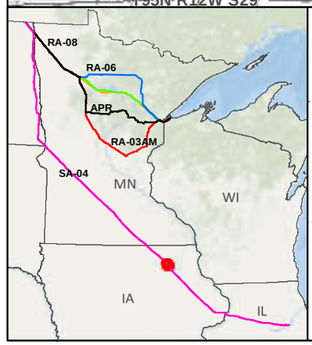

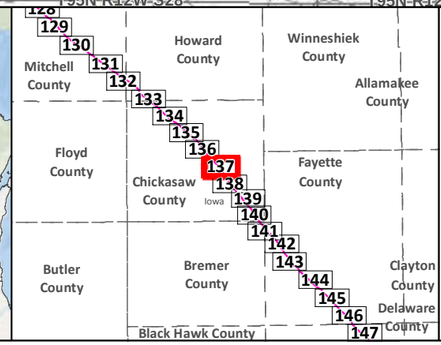

SA-04
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- RA-03AM
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- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

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Township Boundary

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Native Plant Communities with Biodiversity Significance
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 137B of 188

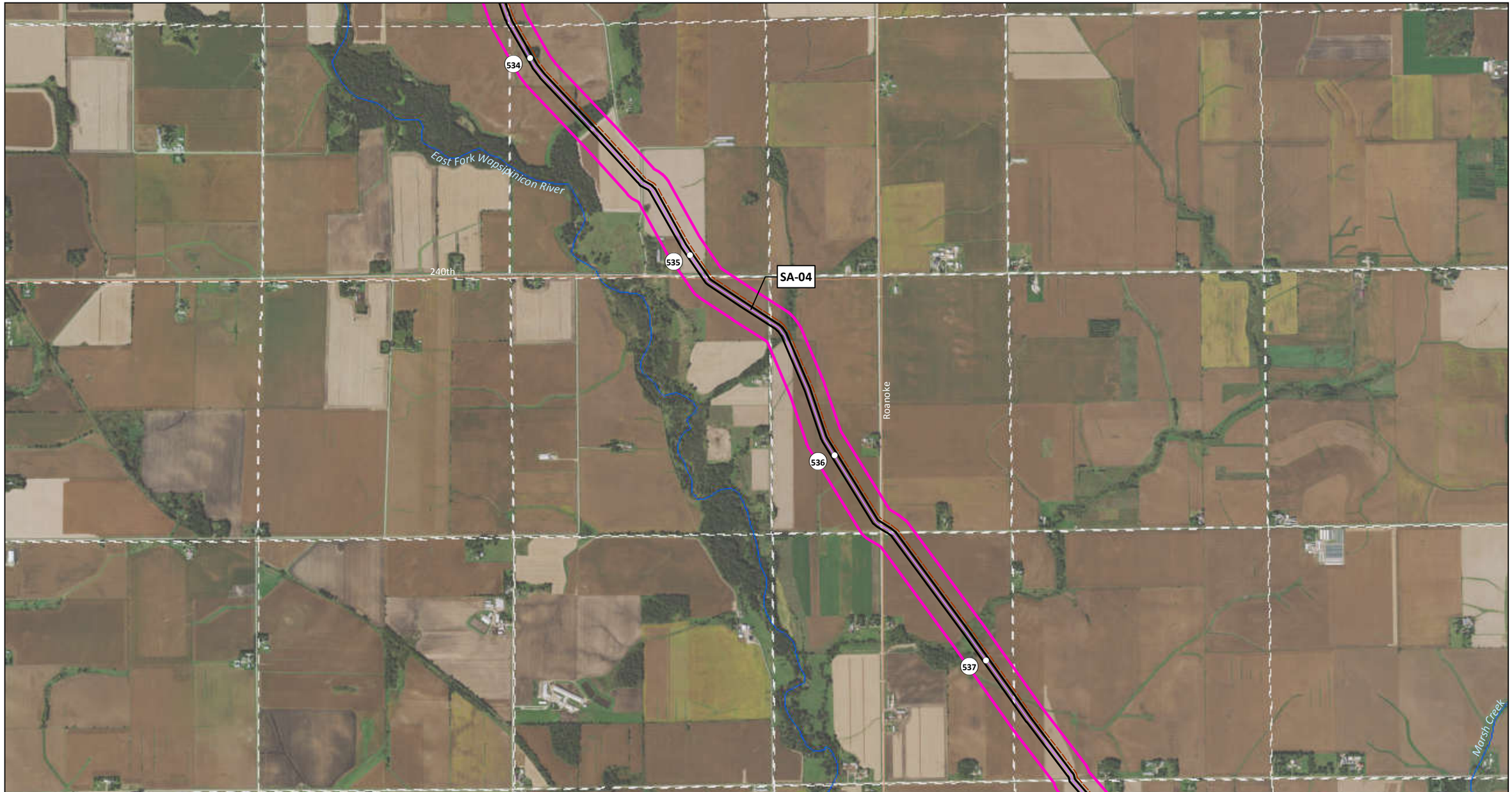

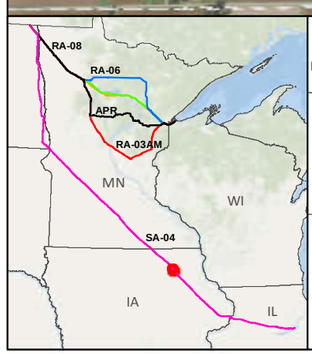

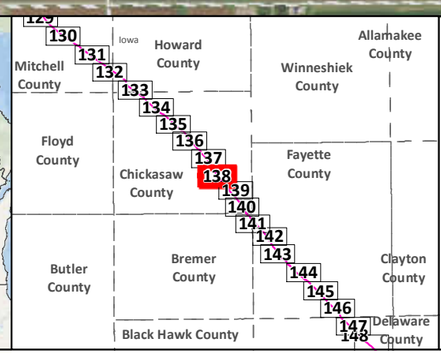

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

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Existing Pipeline

Interstate

Highway

Major Road

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Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 138A of 188

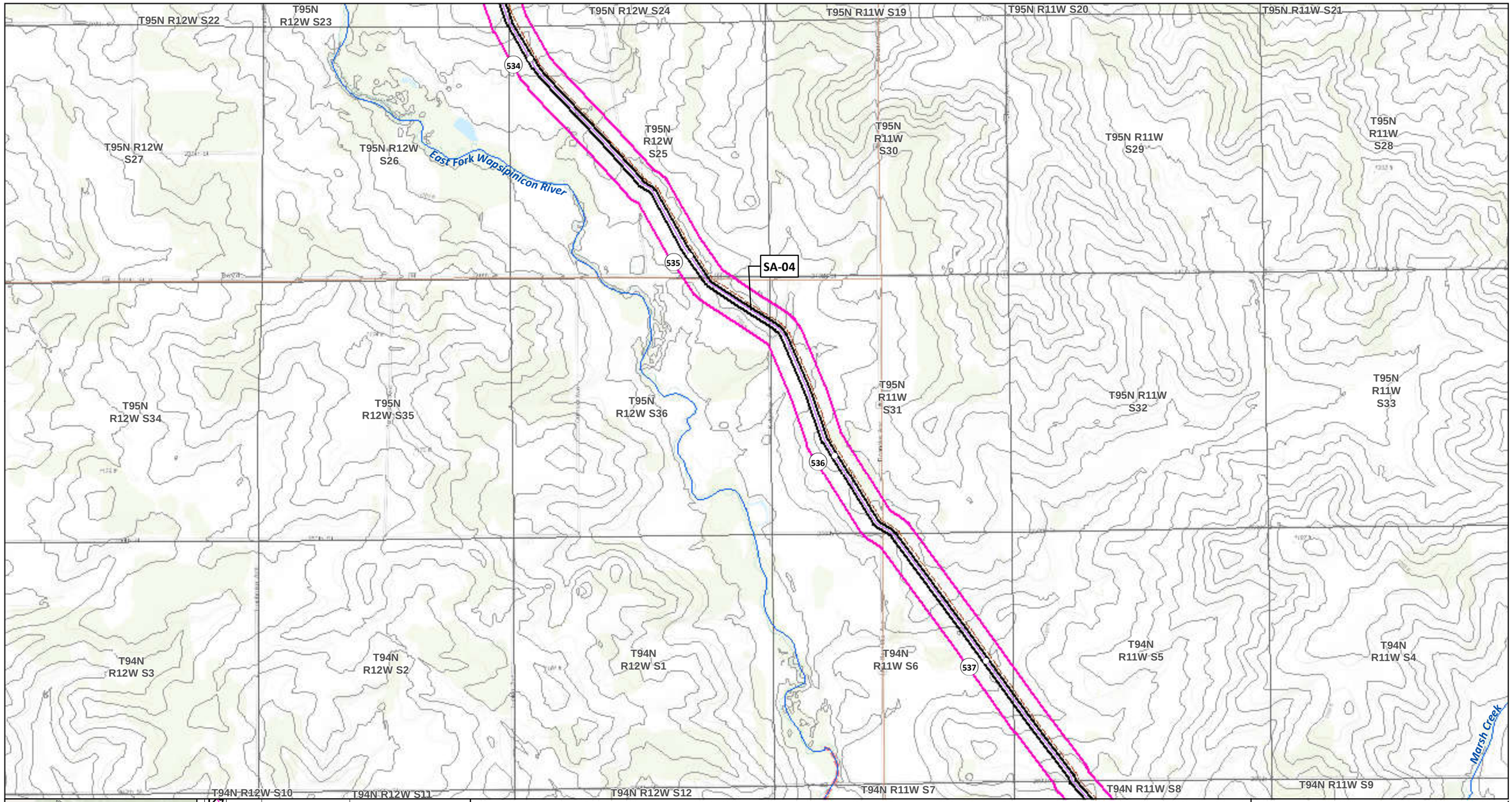

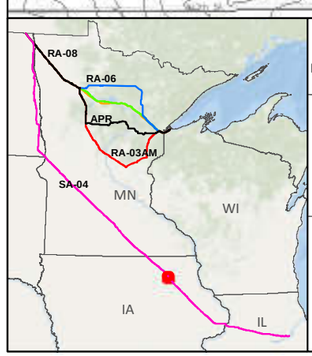

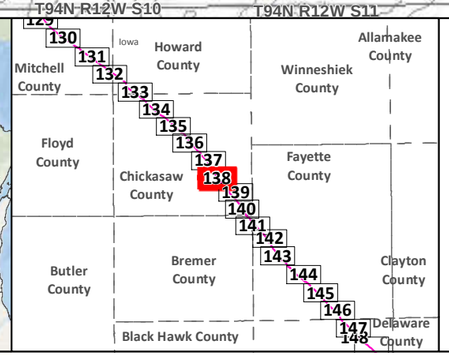

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 138B of 188

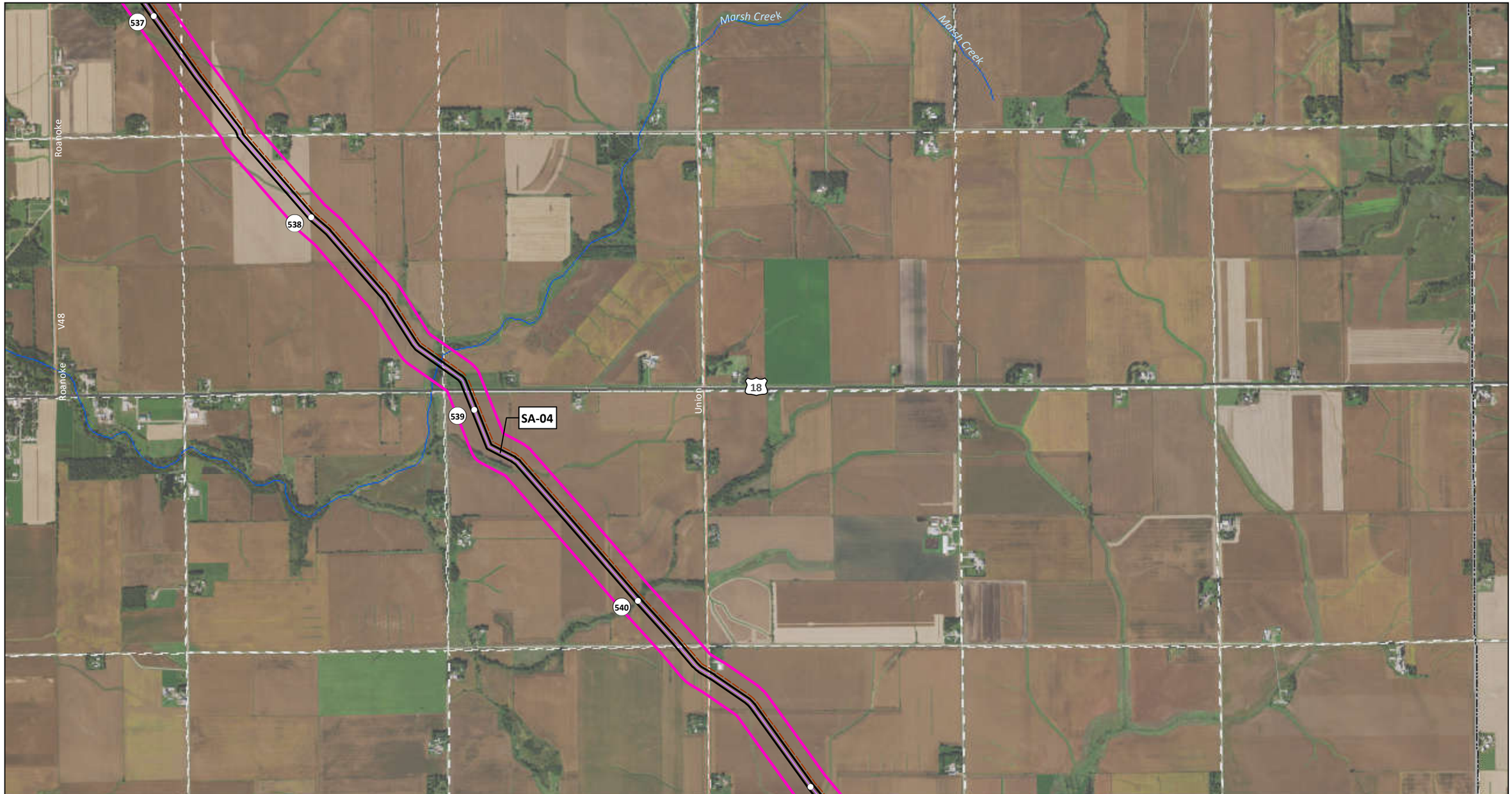

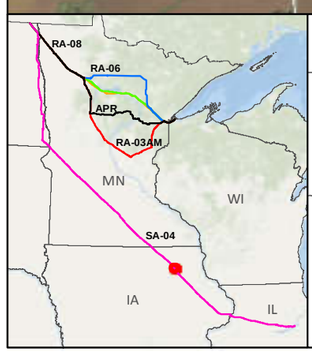

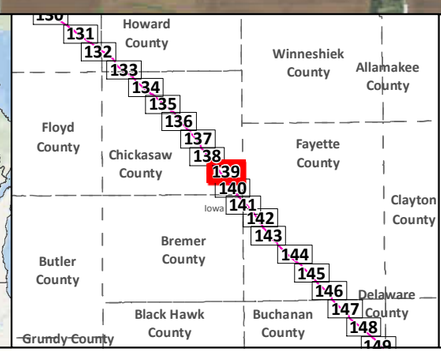

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 139A of 188

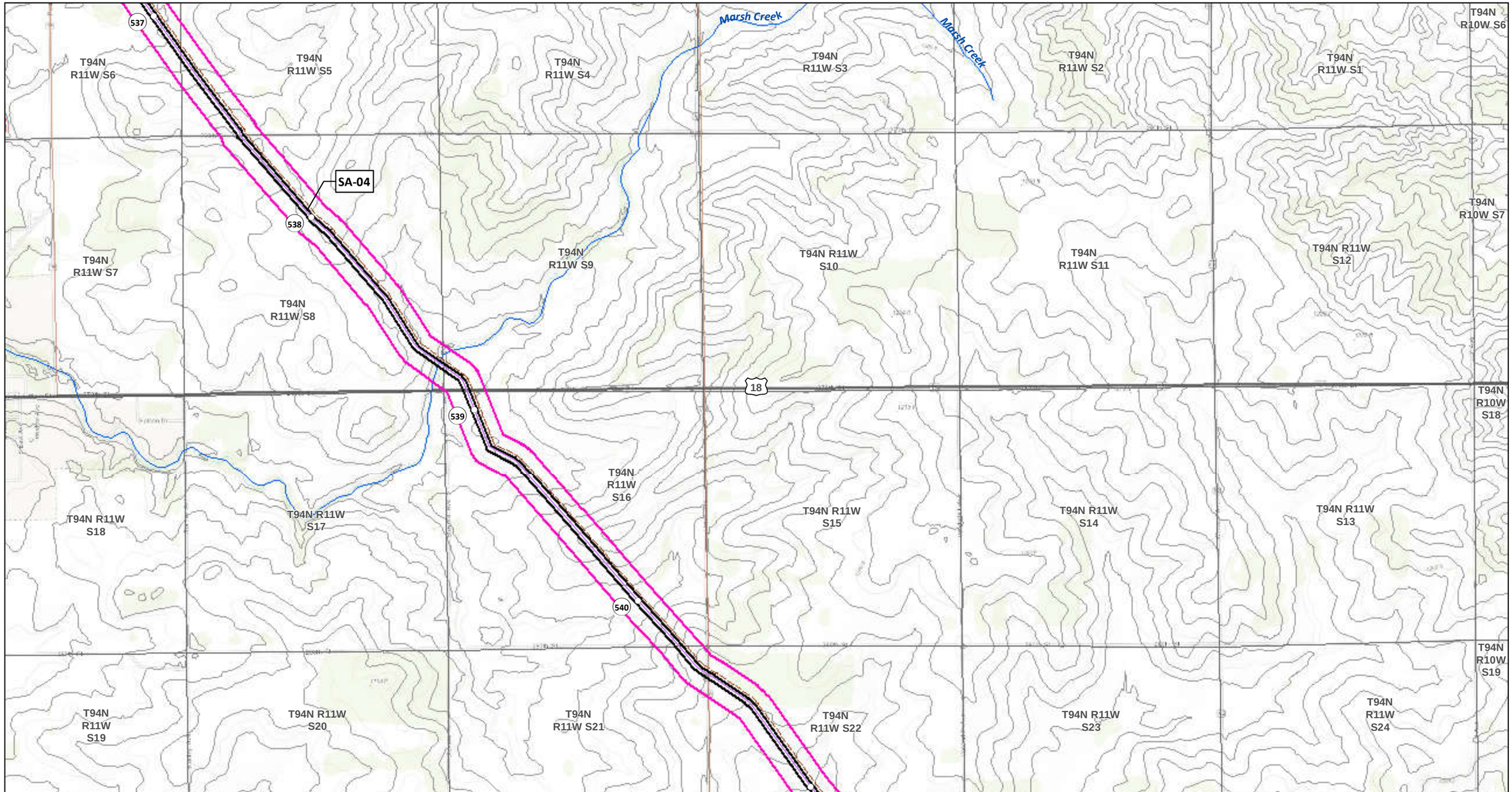

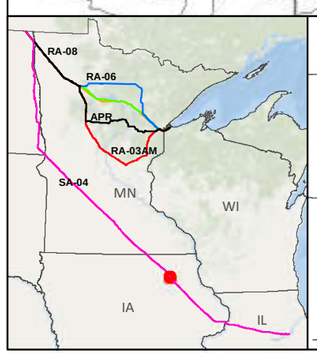

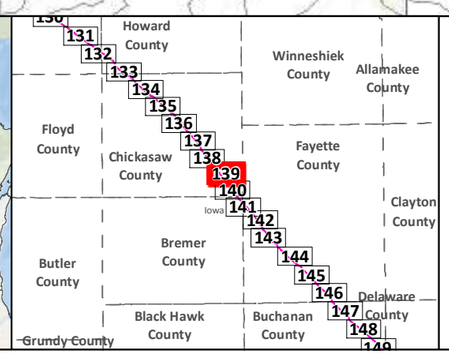

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

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- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 139B of 188

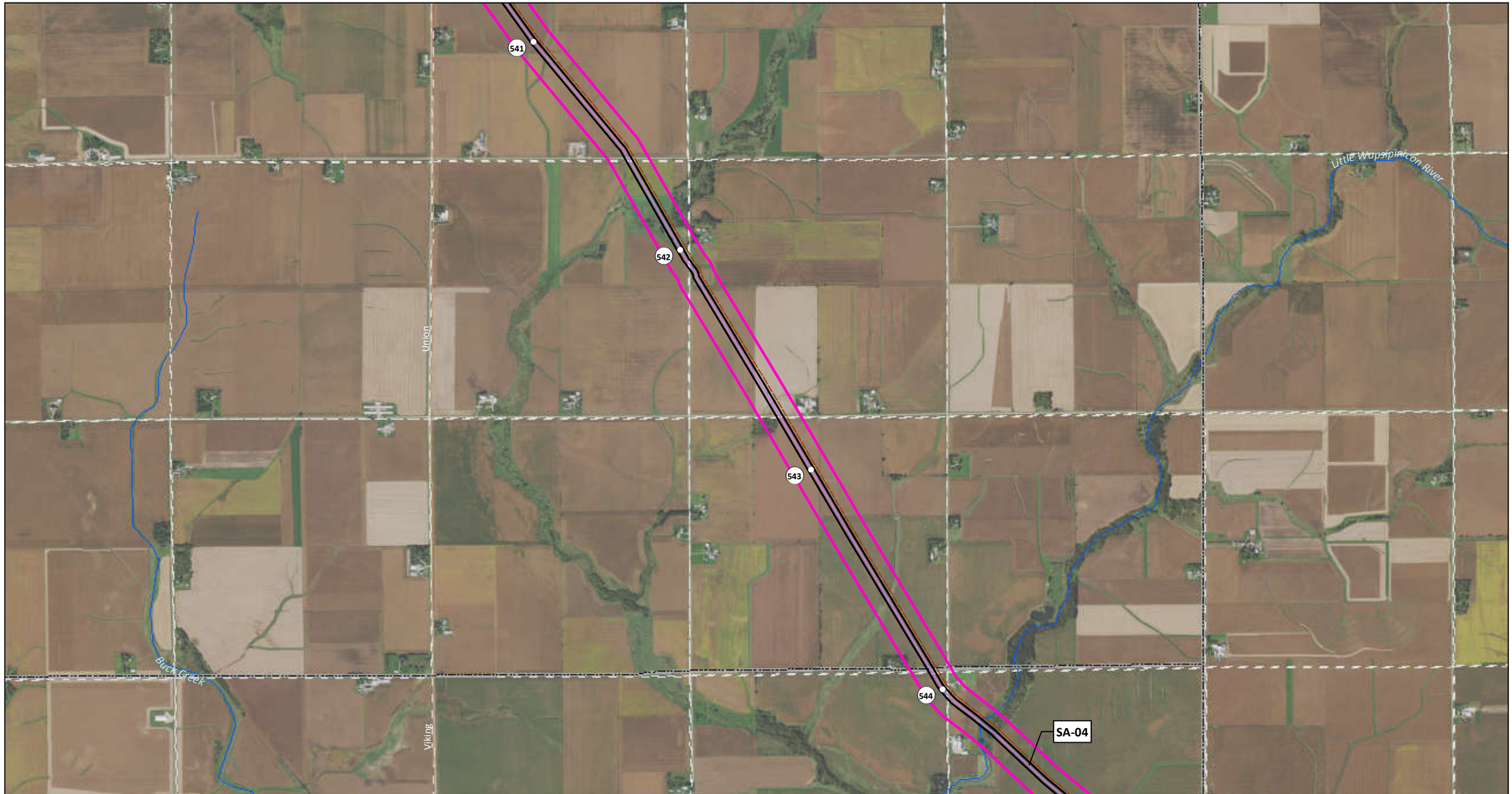

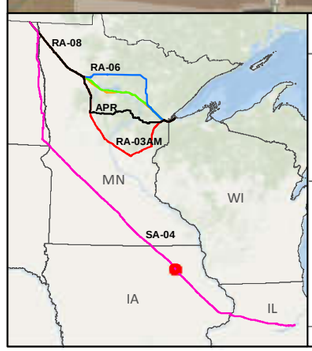

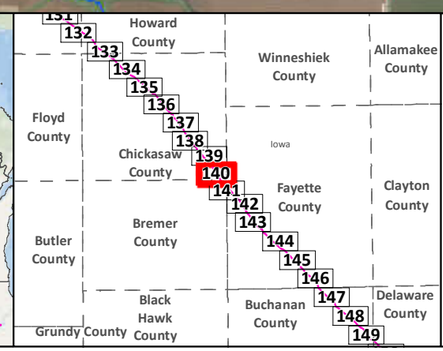

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 140A of 188

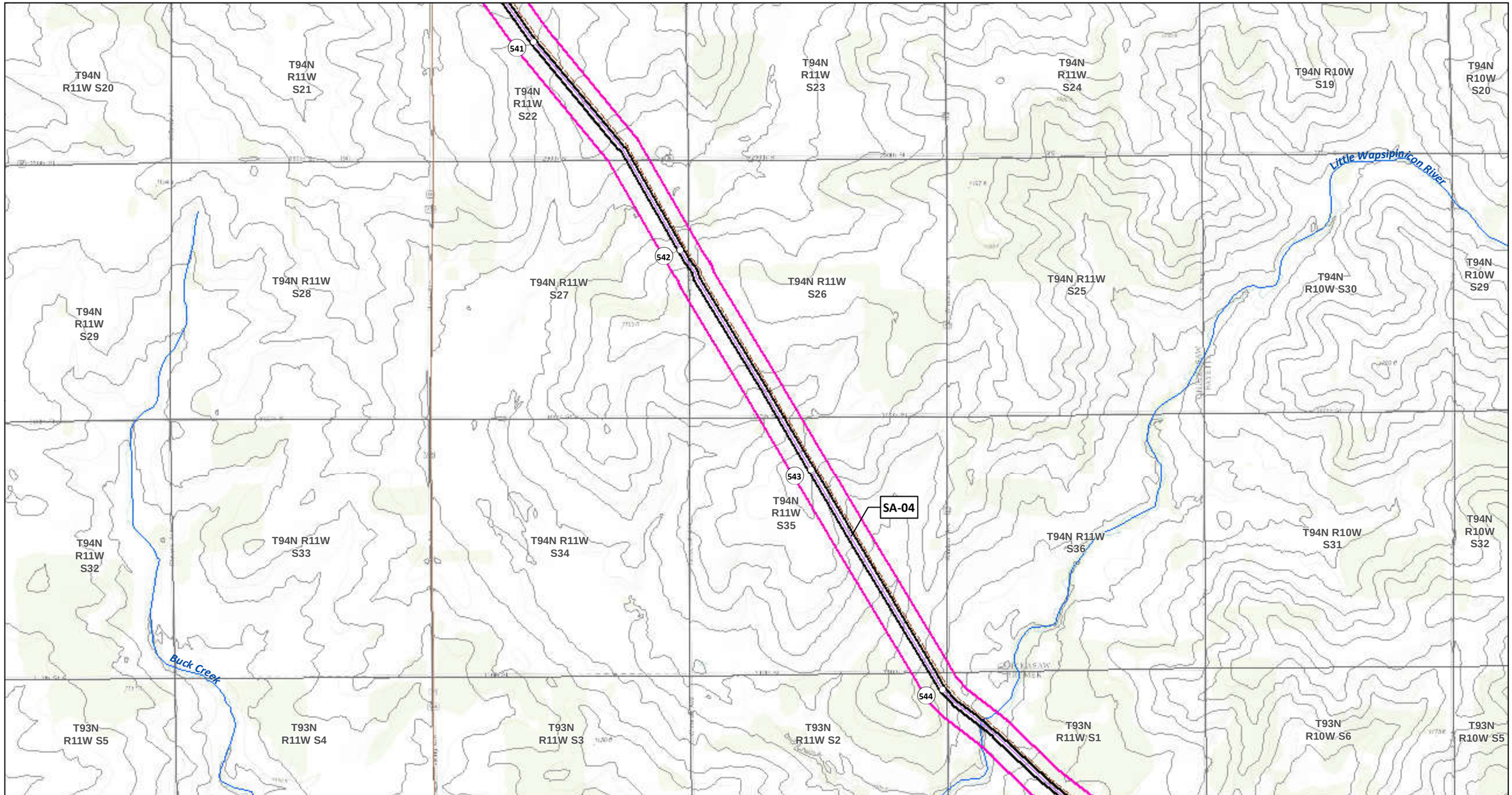

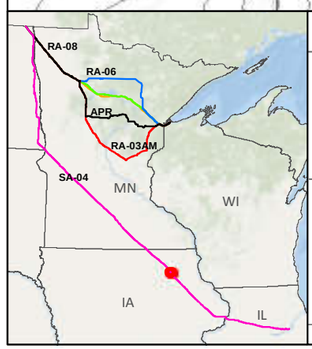

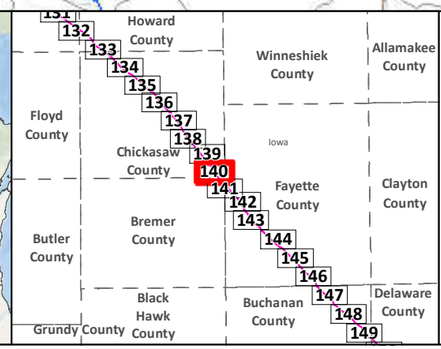

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 140B of 188

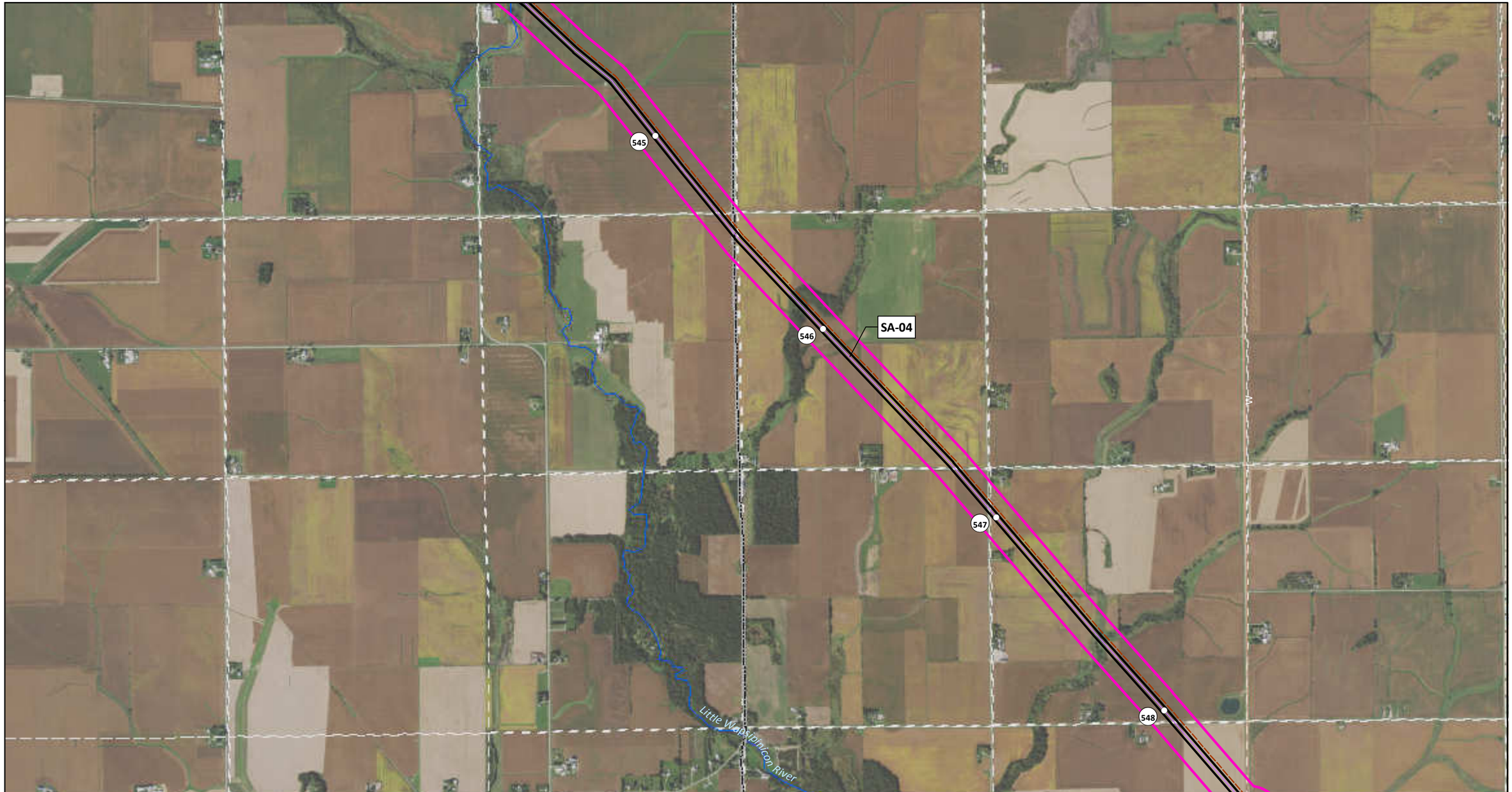

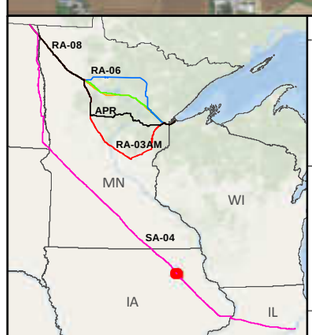

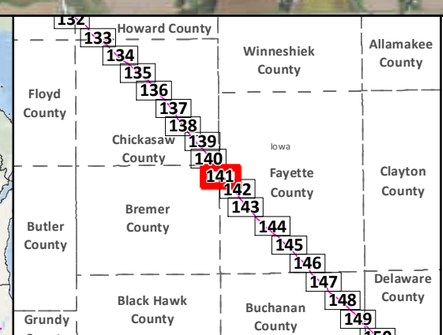

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 141A of 188

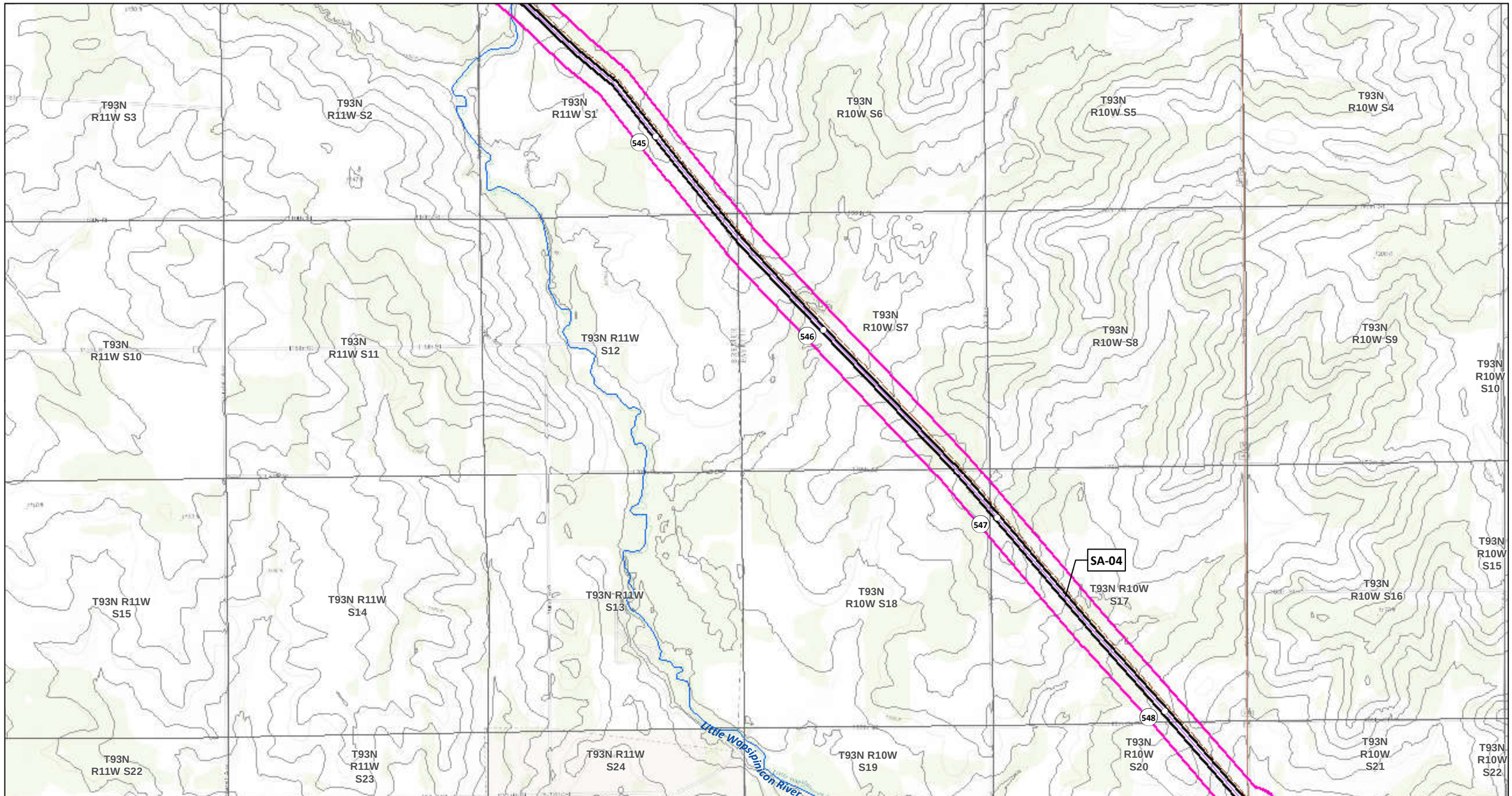

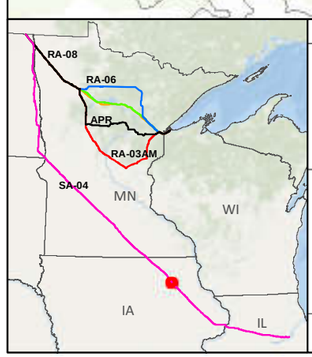

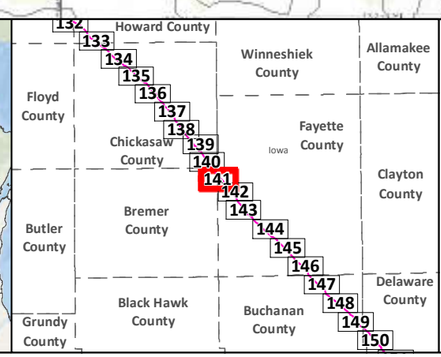

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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- RA-06
- RA-07
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Mile Post

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Route Width (750')

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Township Boundary

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Public Waters Watercourse

303d Imparied Waters

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Calcareous Fens

Wild Rice Lakes (DNR)

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Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
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Native Plant Communities with Biodiversity Significance

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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 141B of 188

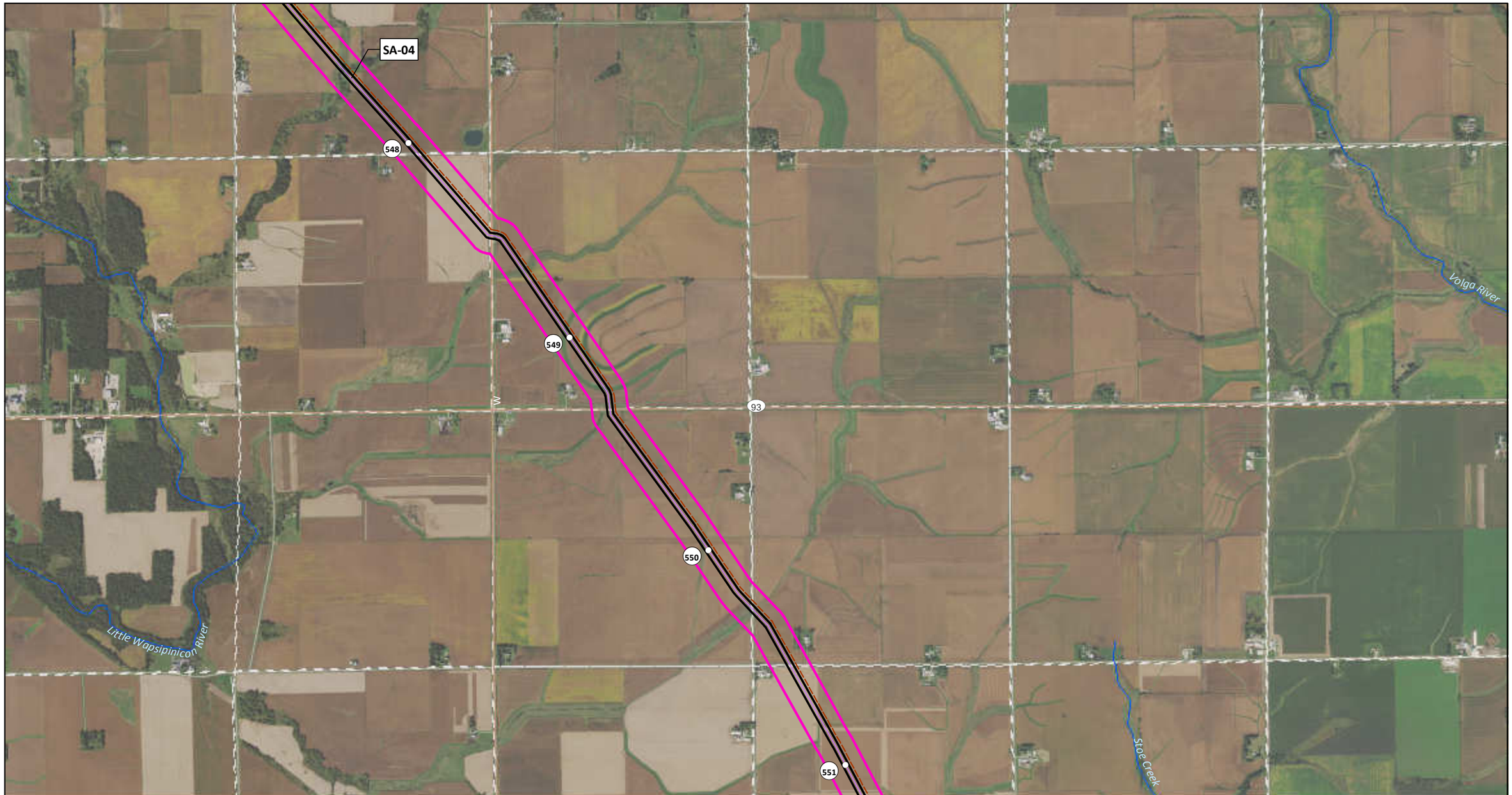

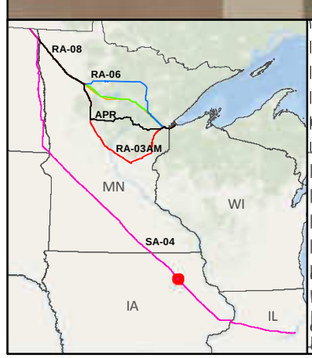

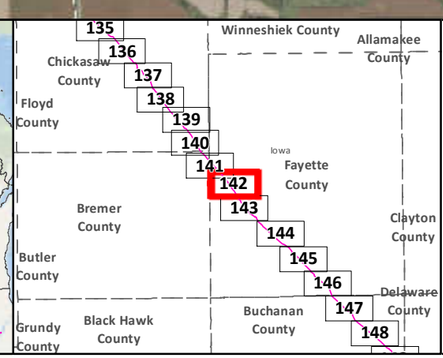

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 142A of 188

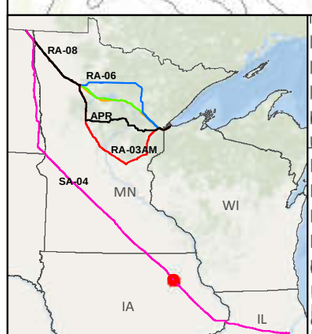

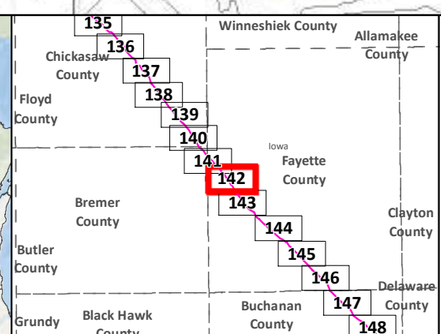

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 142B of 188

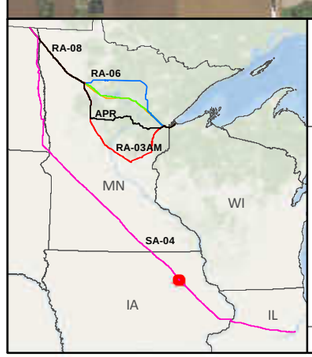

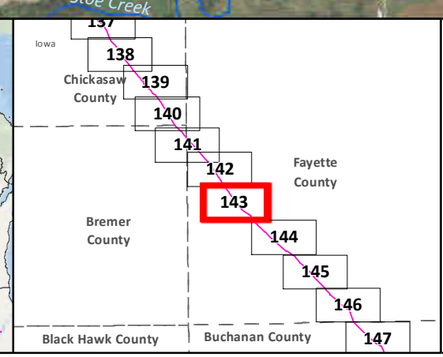

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 143A of 188

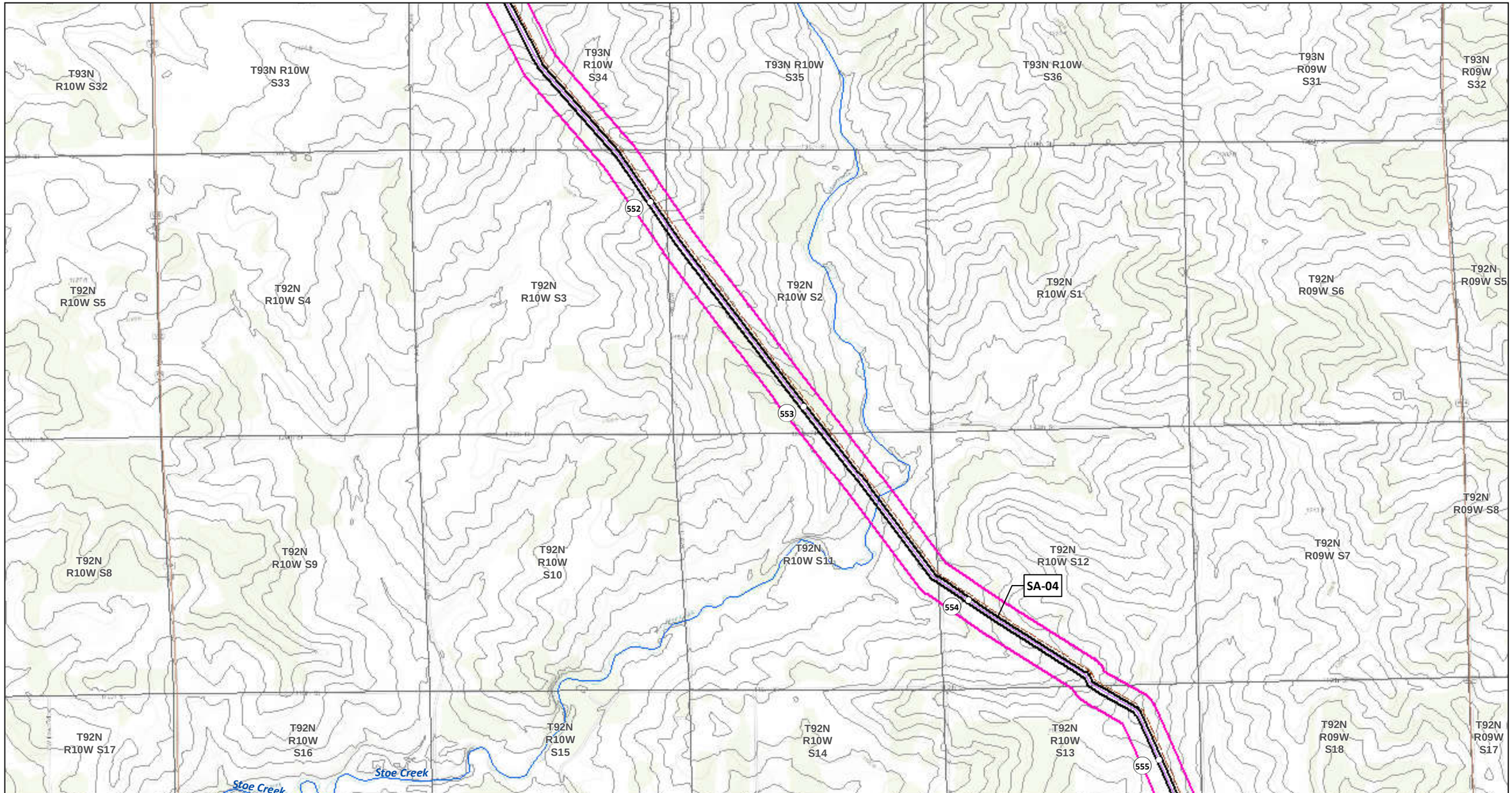

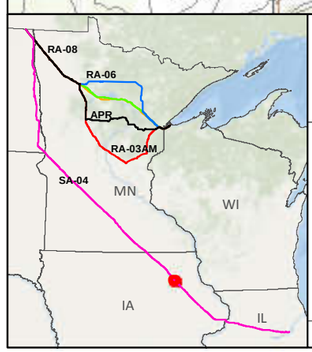

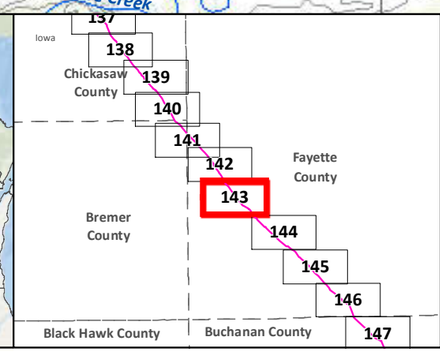

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
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- RA-08

Mile Post
Anticipated 120' Construction ROW
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 143B of 188

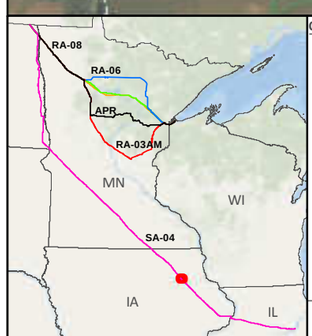

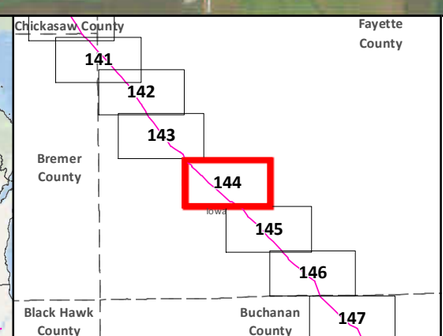

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 144A of 188

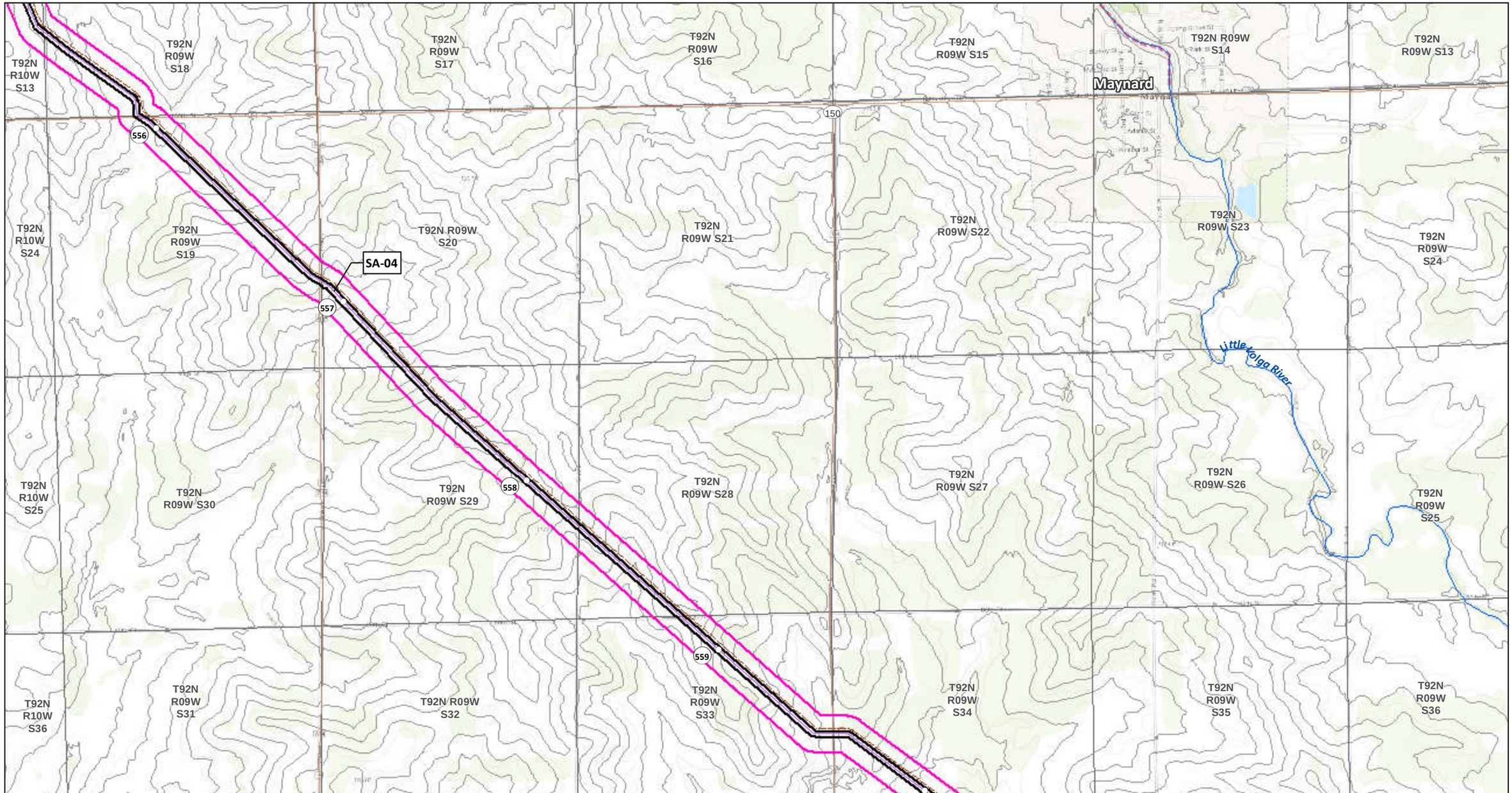

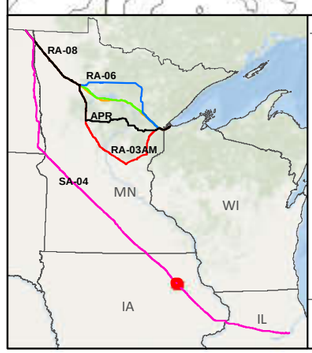

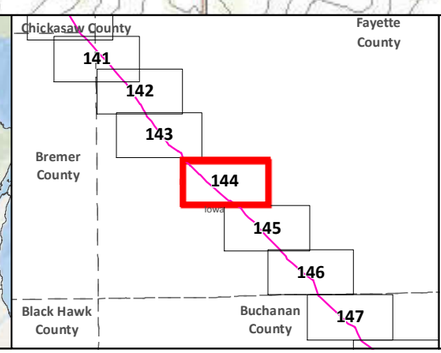

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 144B of 188

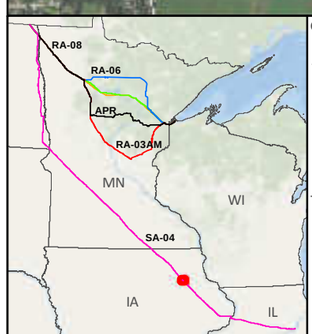

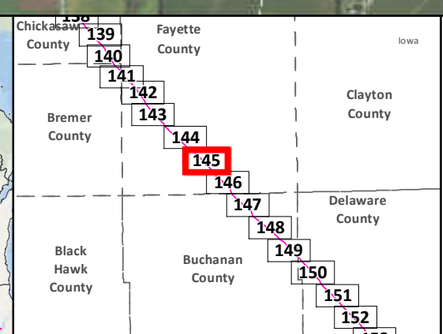

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 145A of 188

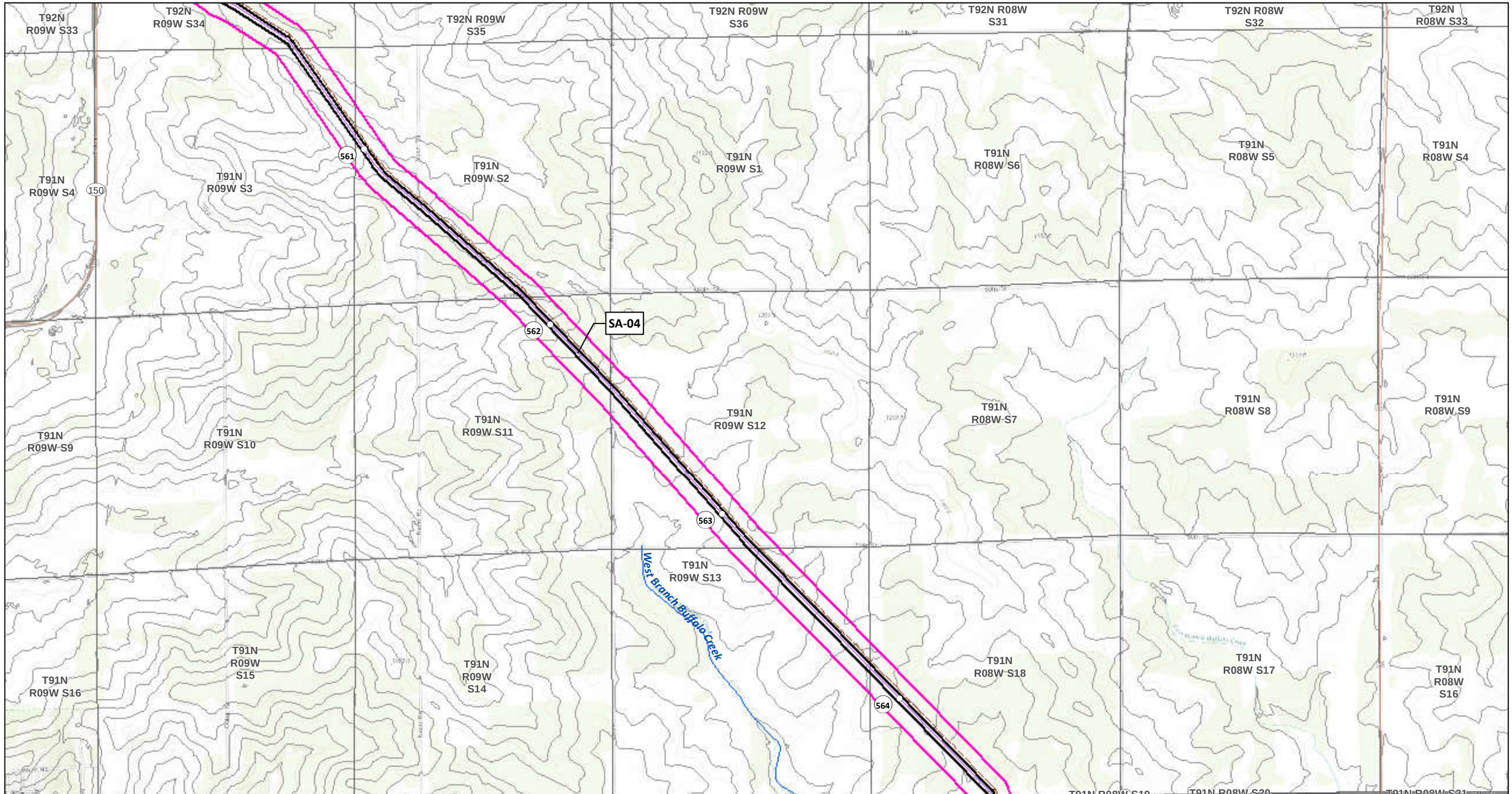

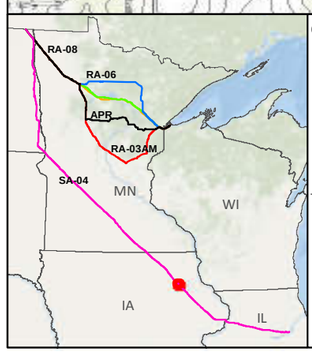

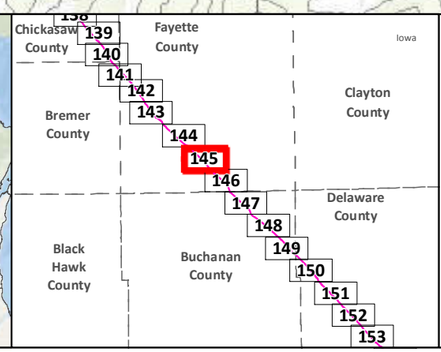

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 145B of 188

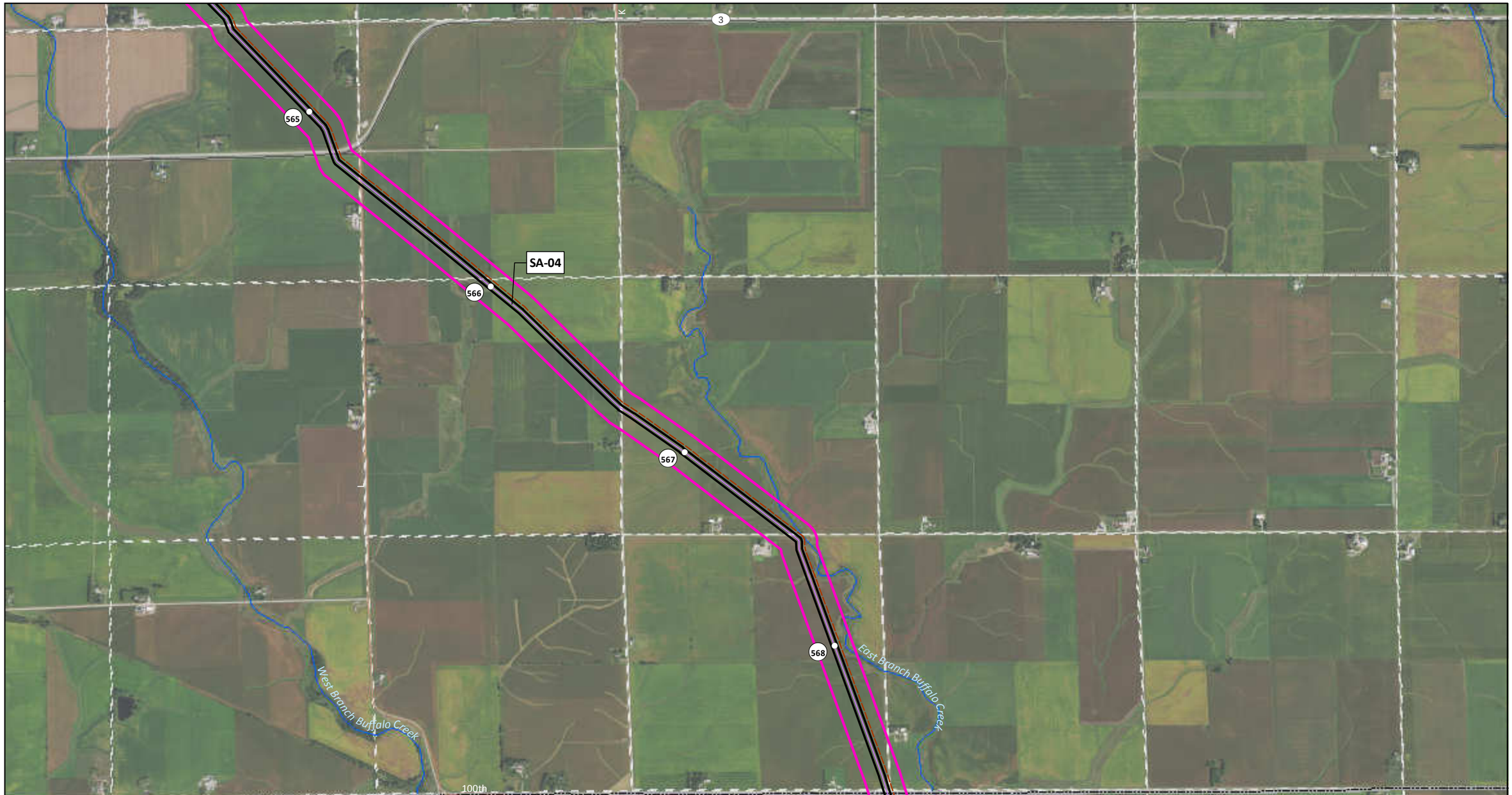

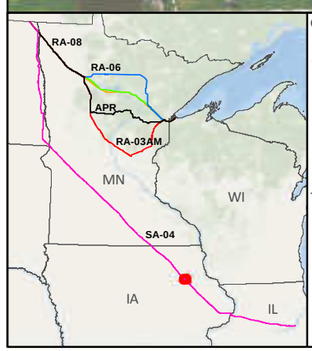

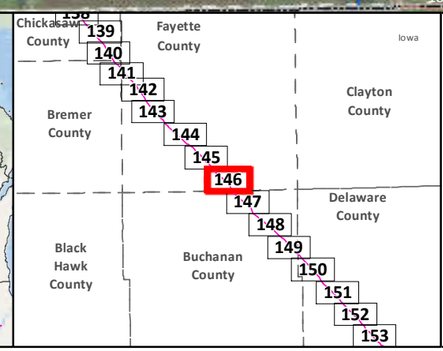

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 146A of 188

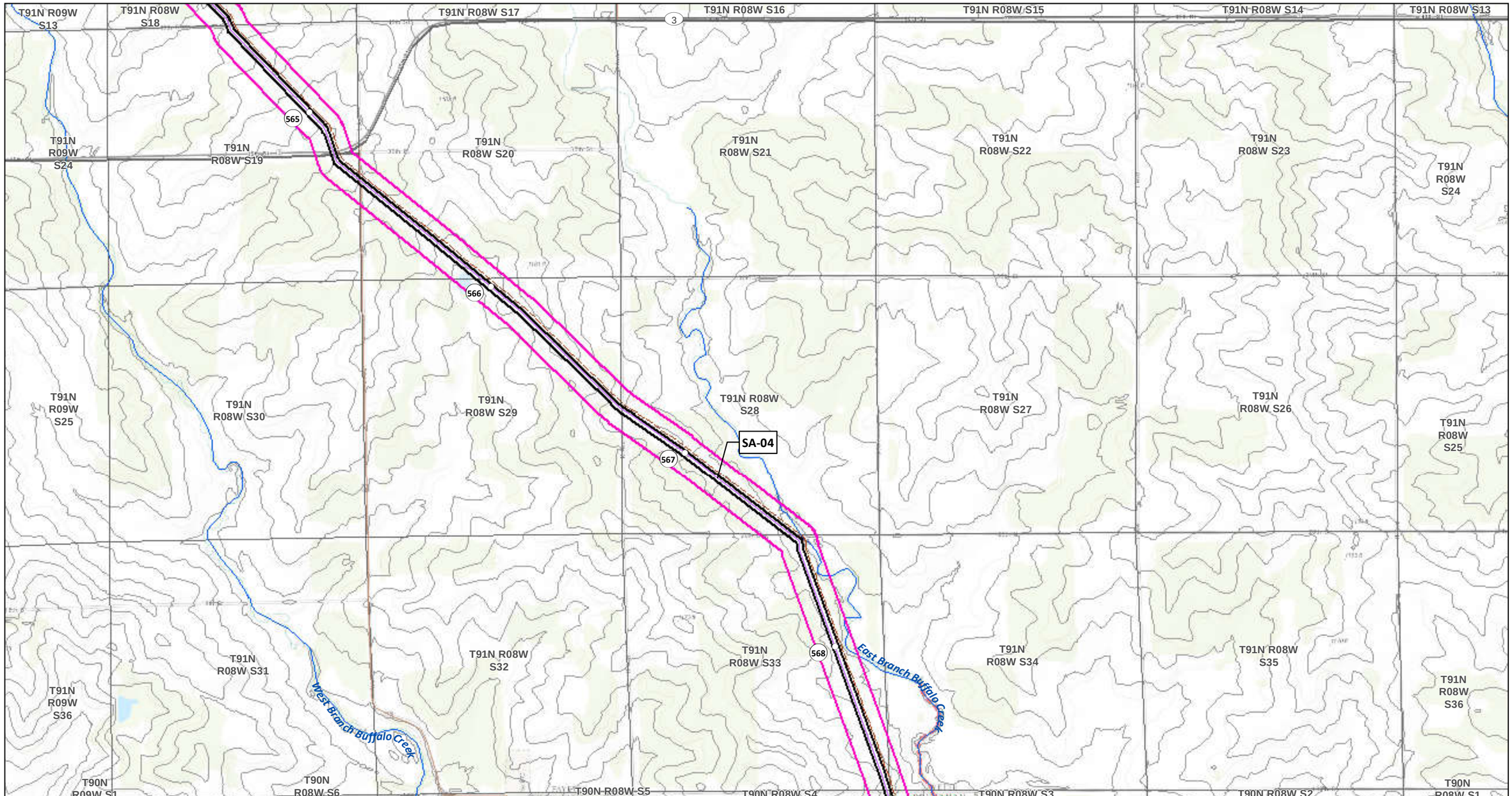

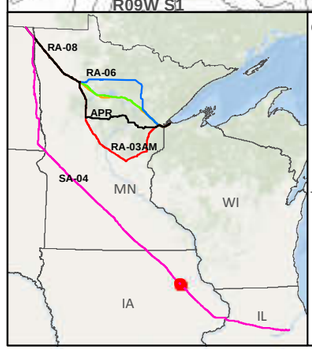

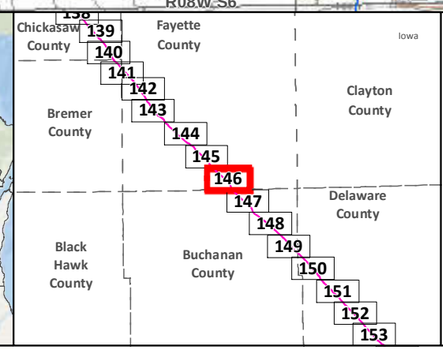

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 146B of 188

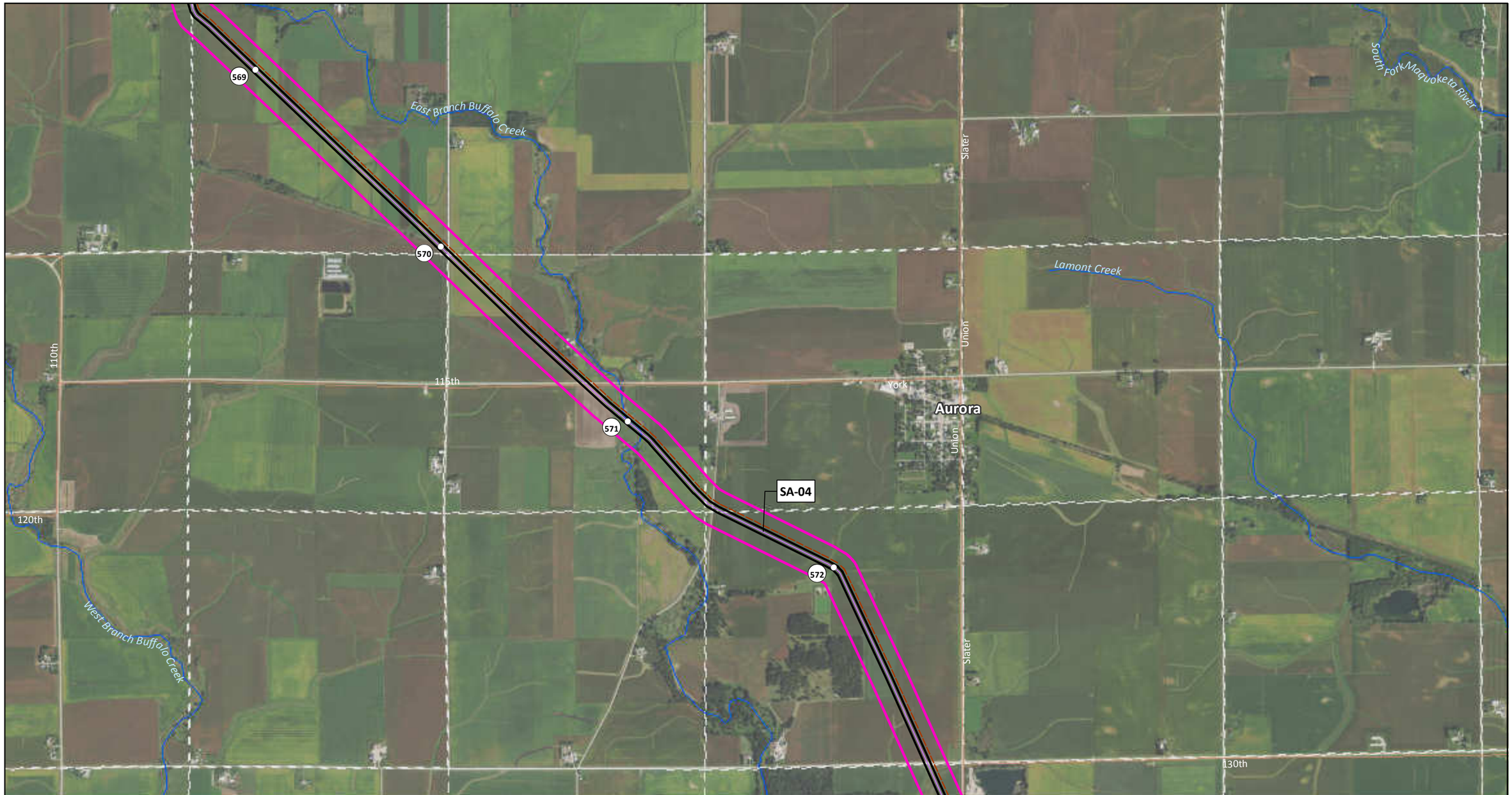

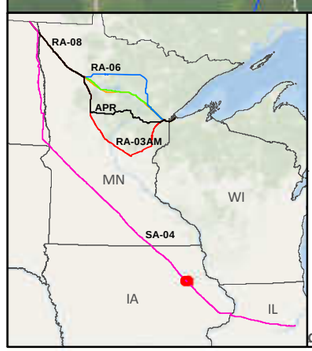

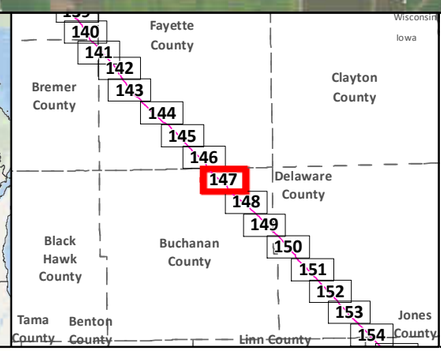

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 147A of 188

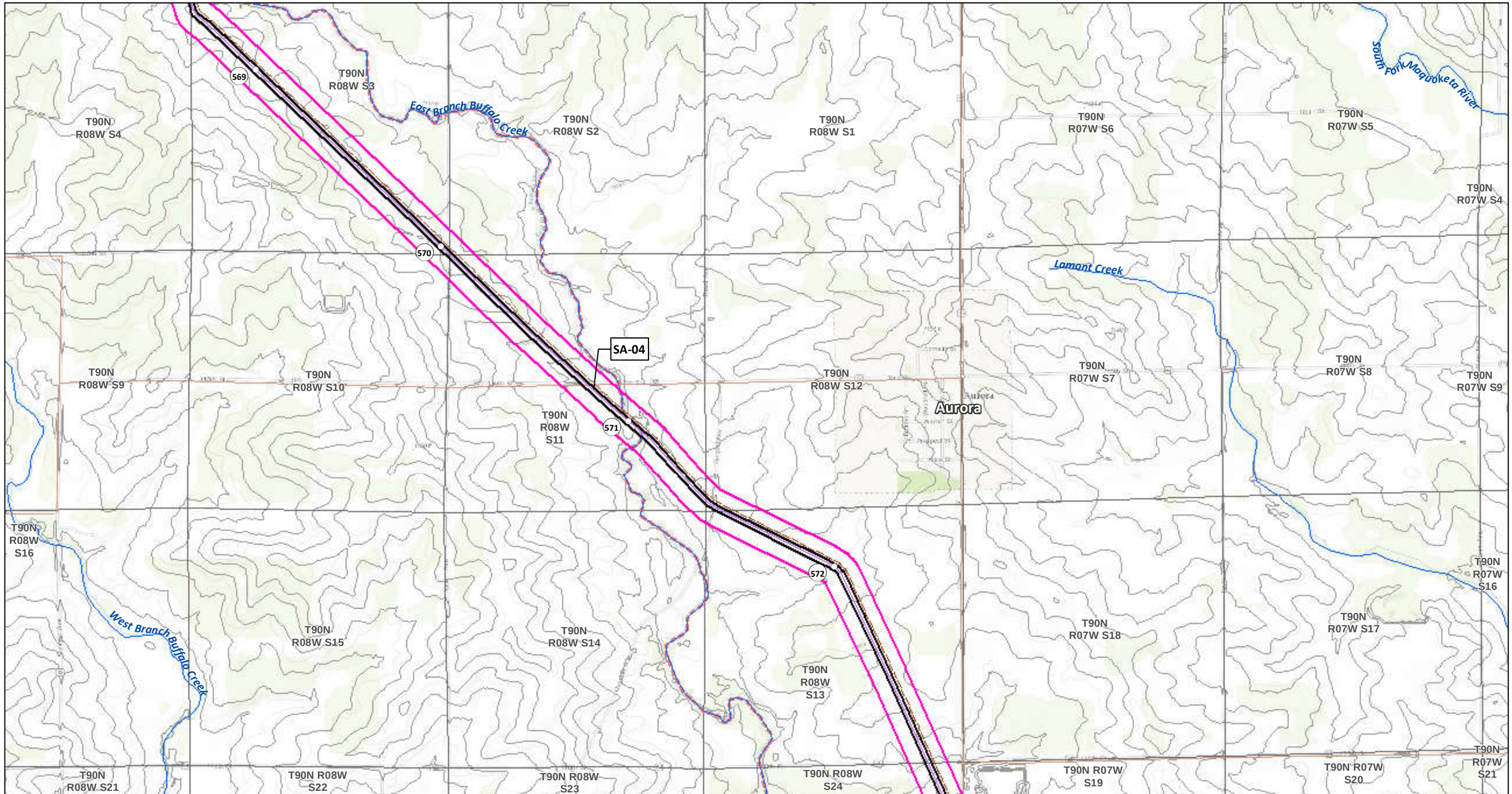

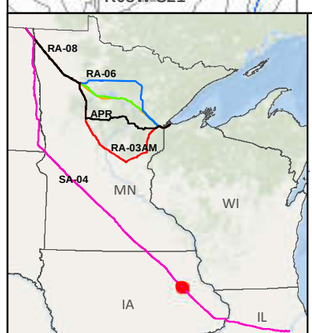

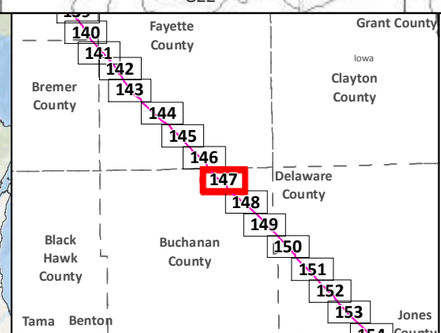

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
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- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 147B of 188

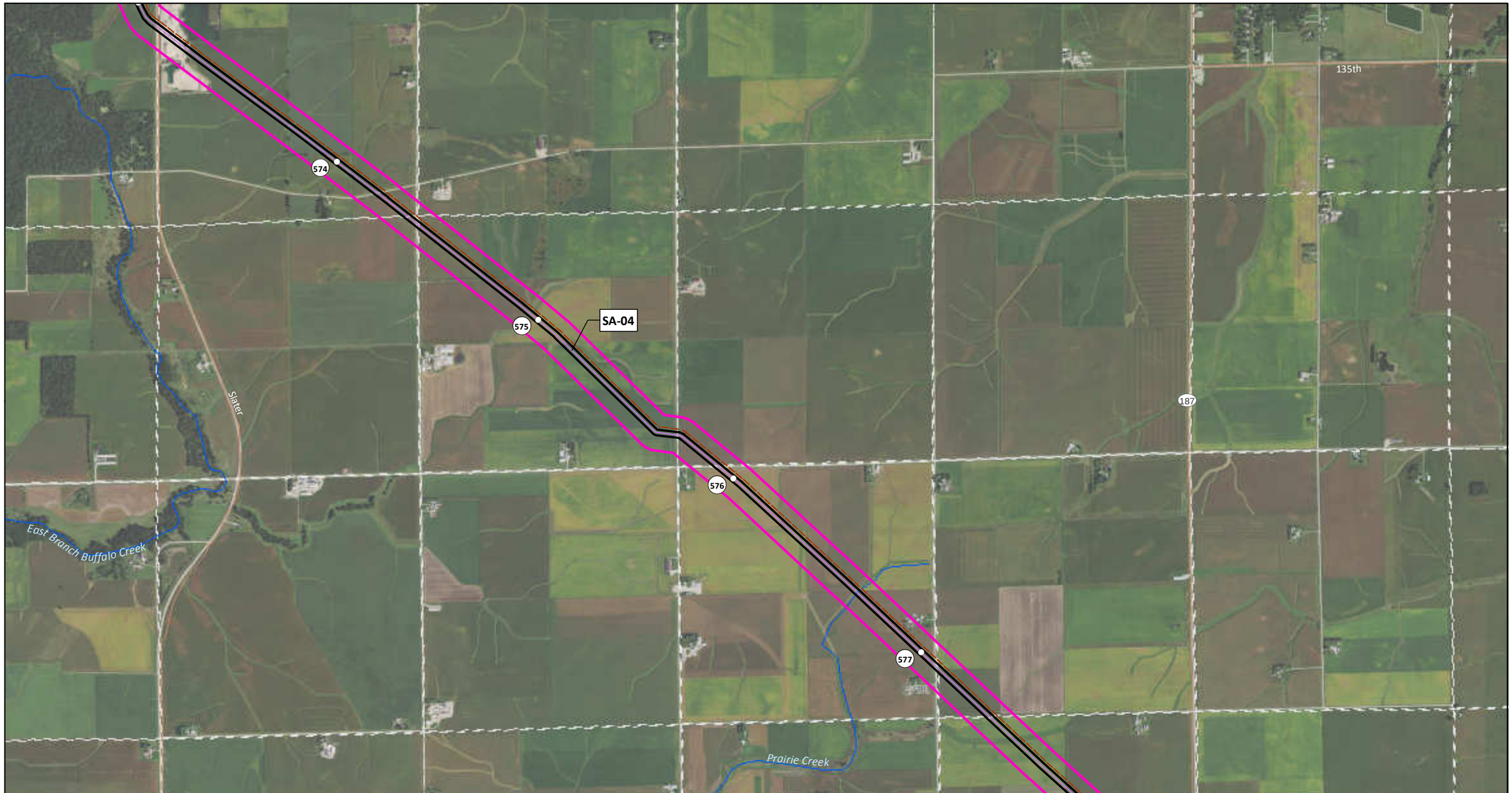

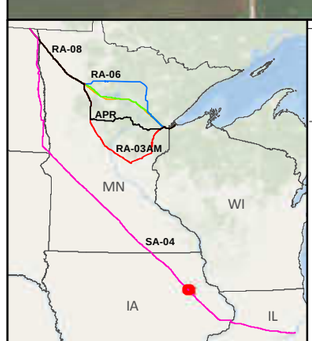

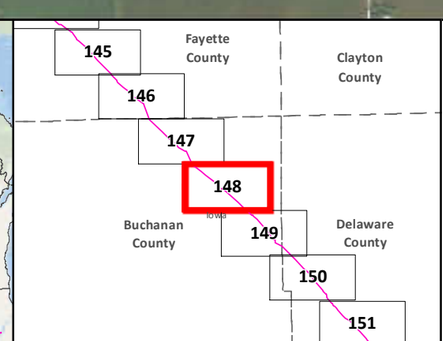

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 148A of 188

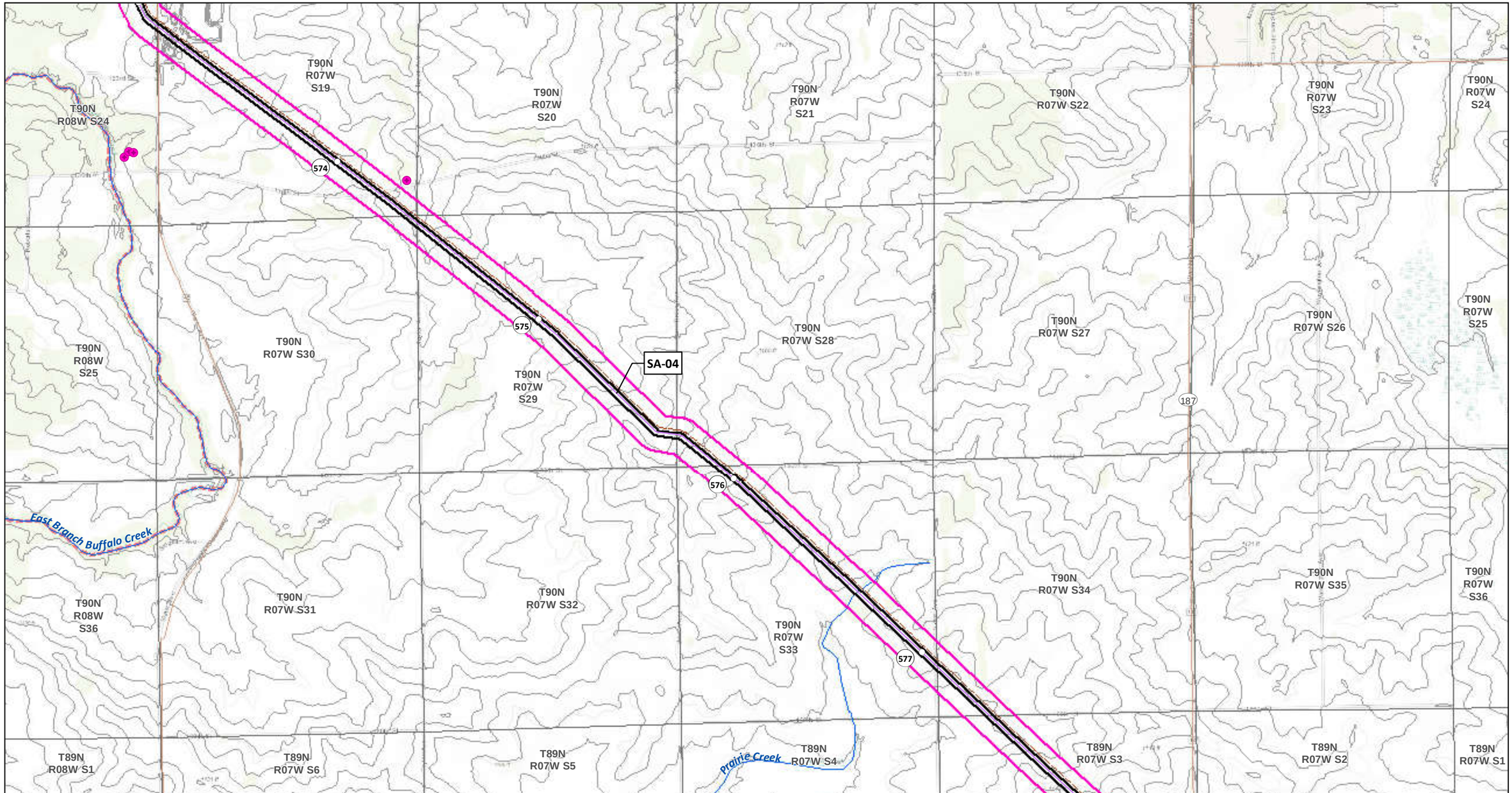

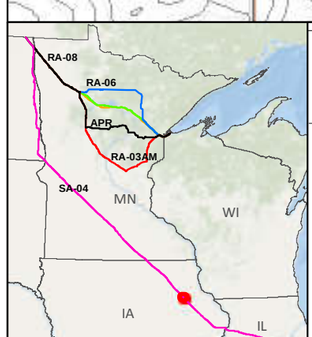

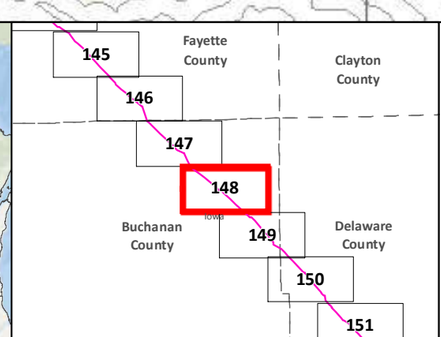

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

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Lakes of Biological Significance
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Native Plant Communities with Biodiversity Significance
- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 148B of 188

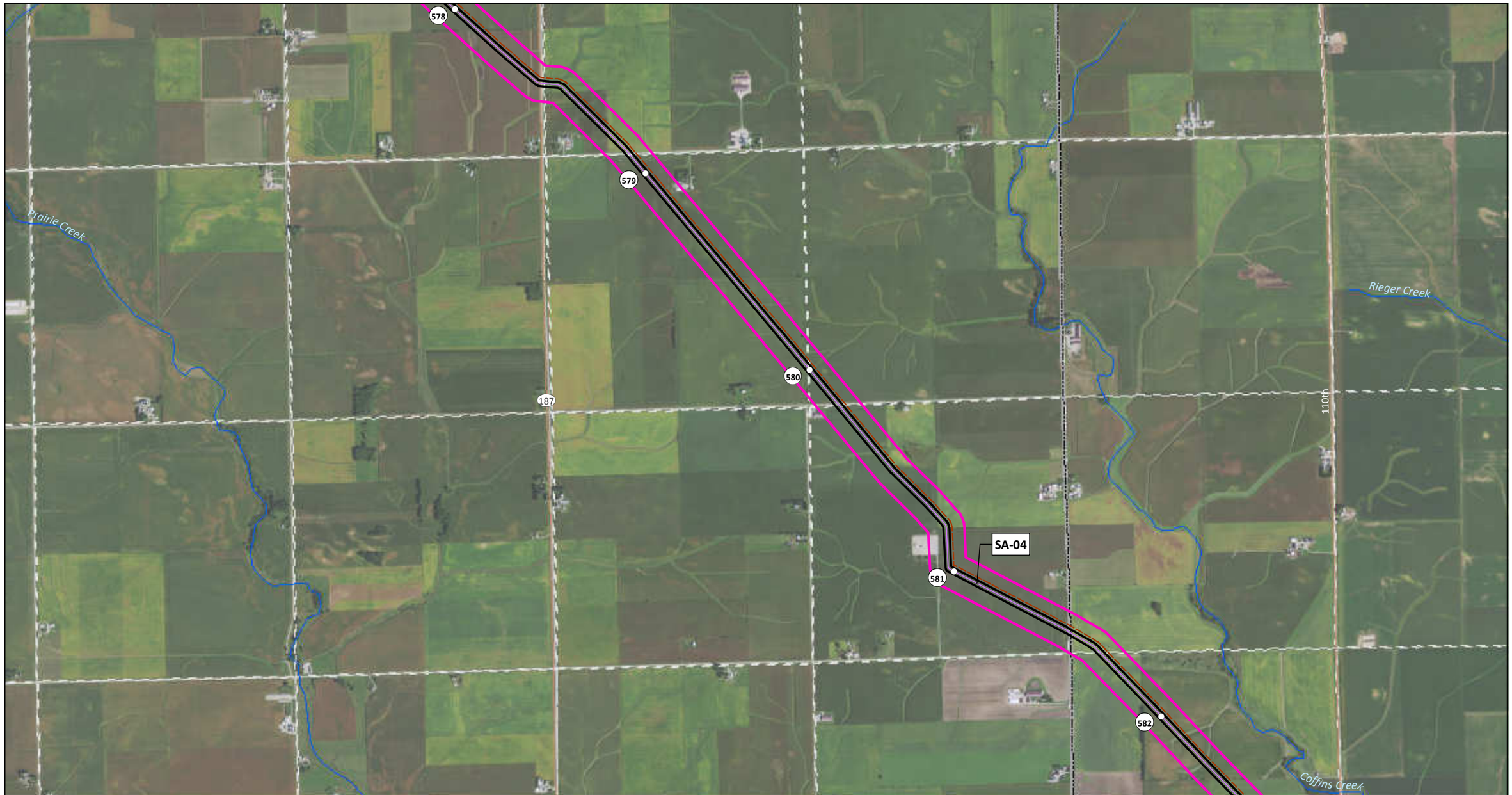

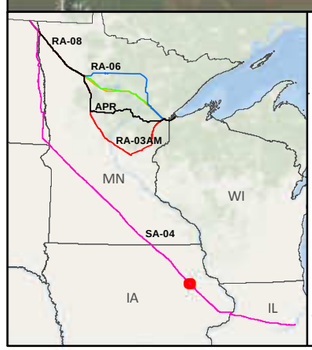

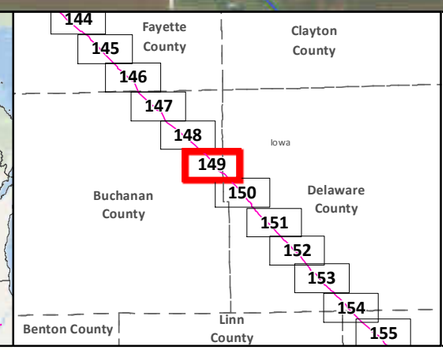

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

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State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 149A of 188

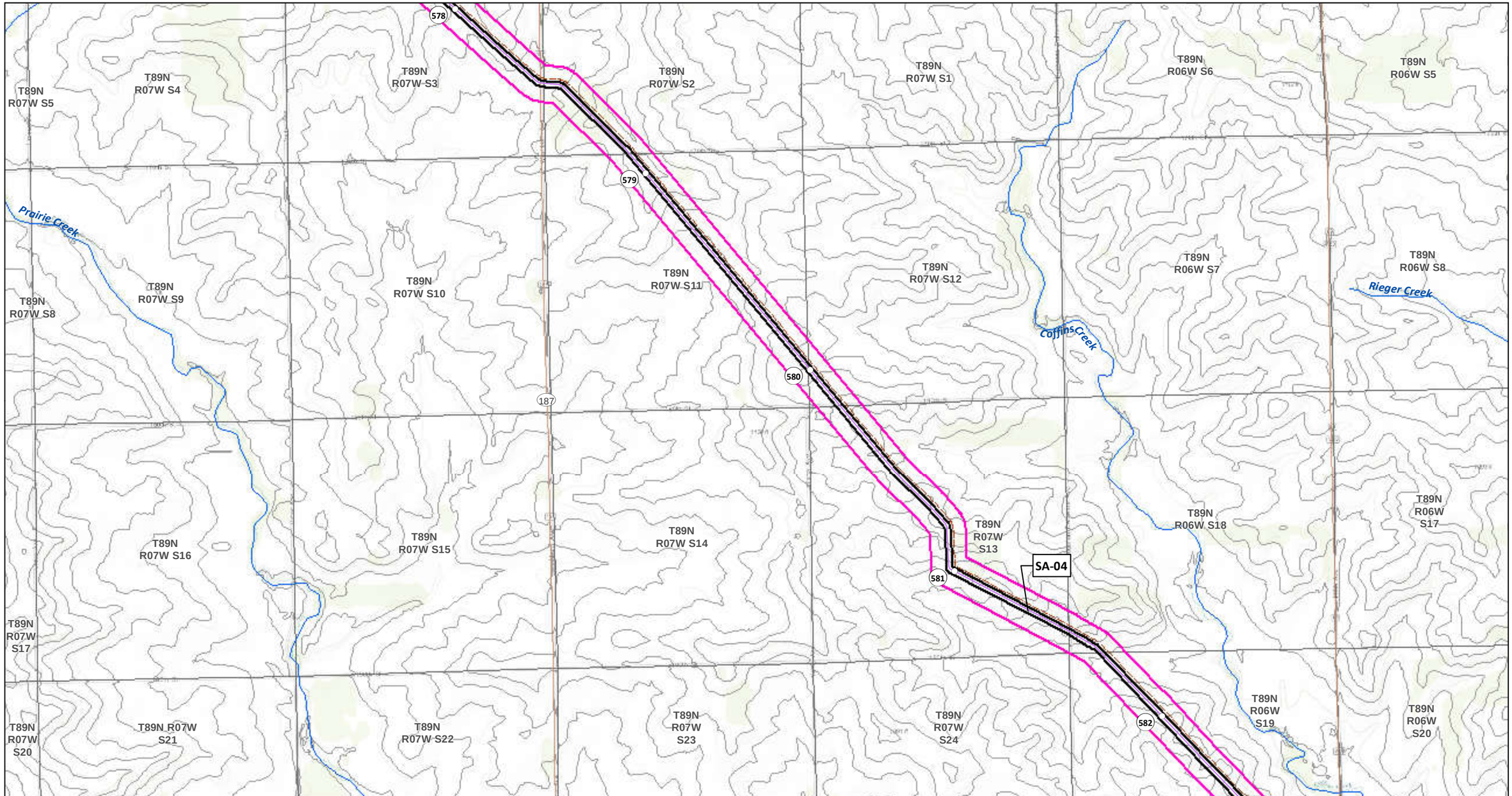

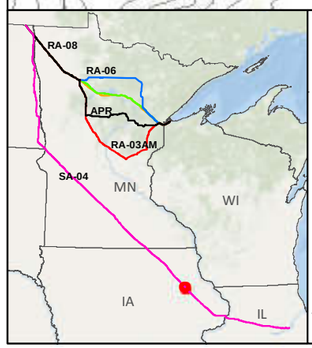

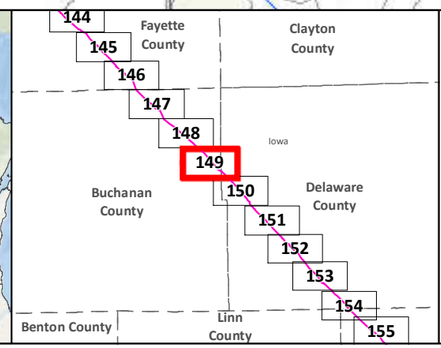

SA-04
Applicant's Preferred Route (APR)

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 149B of 188

583
Coffins Creek
SA-04
584
110th
210th
Candle
210th
Prairie Creek
Masonville
585
215th
Nottingham
Buchanan Delaware
939
220th
586
110th
20

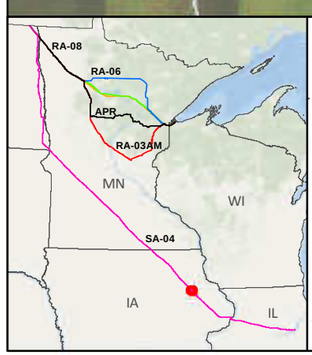

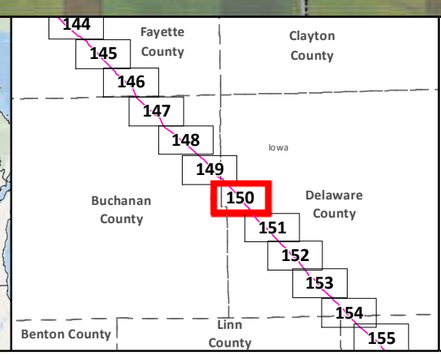

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

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State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 150A of 188

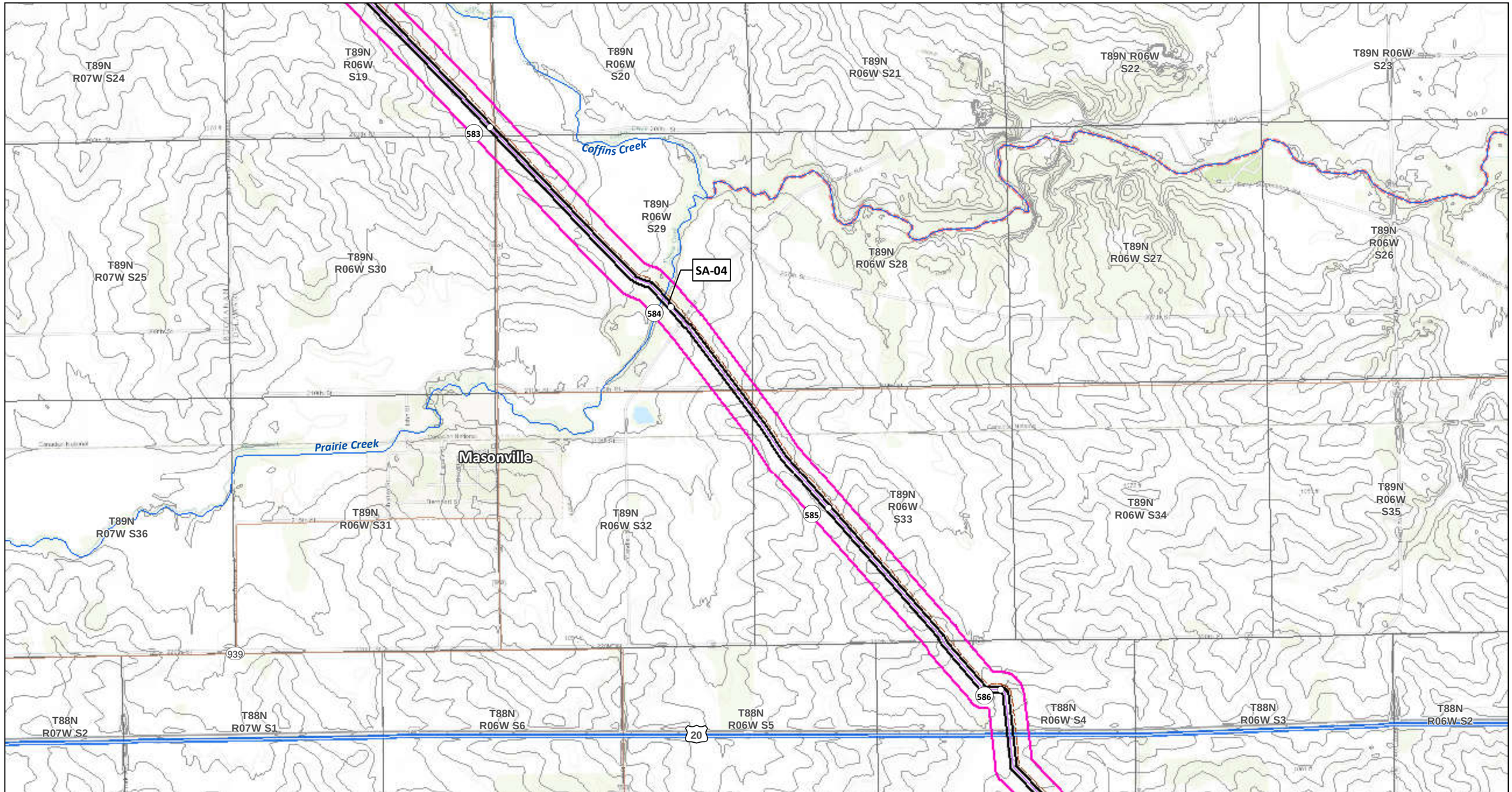

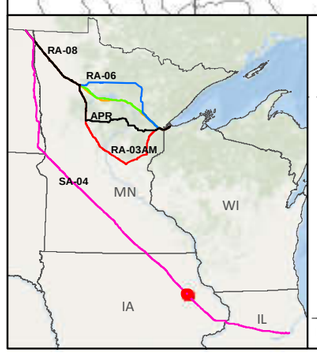

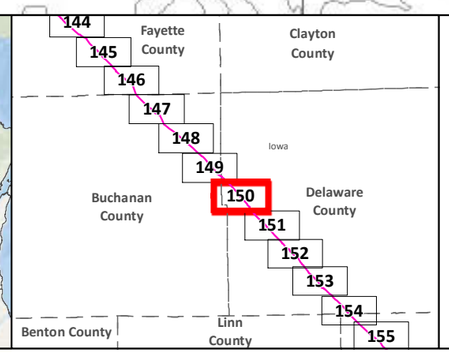

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 150B of 188

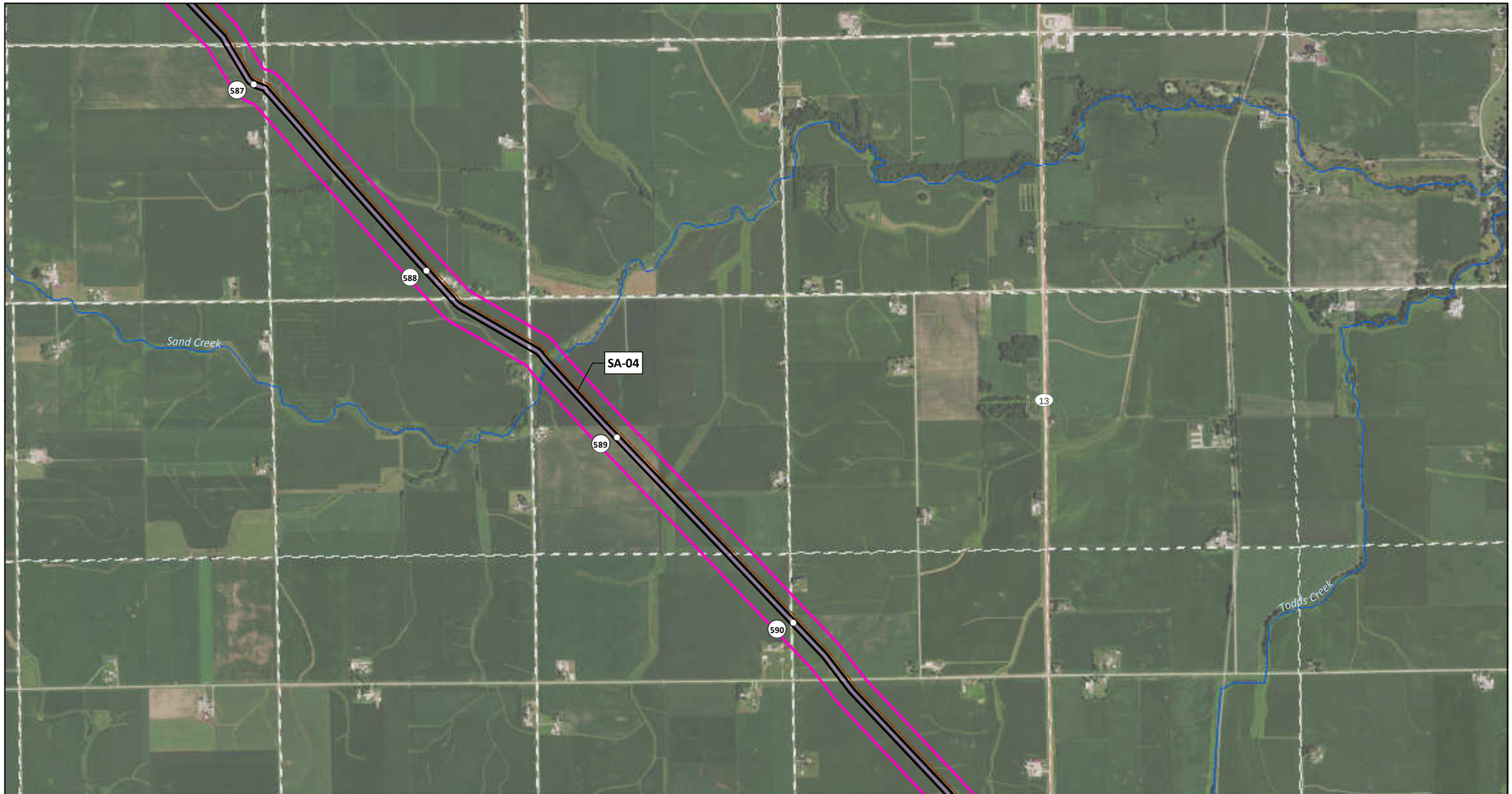

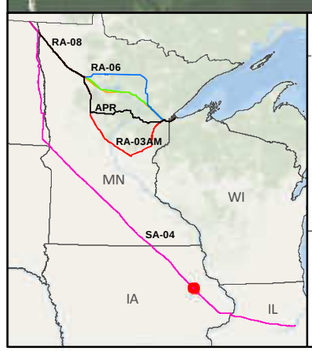

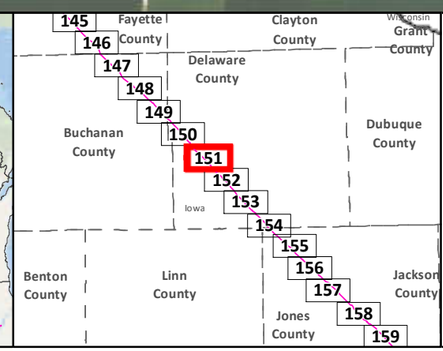

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 151A of 188

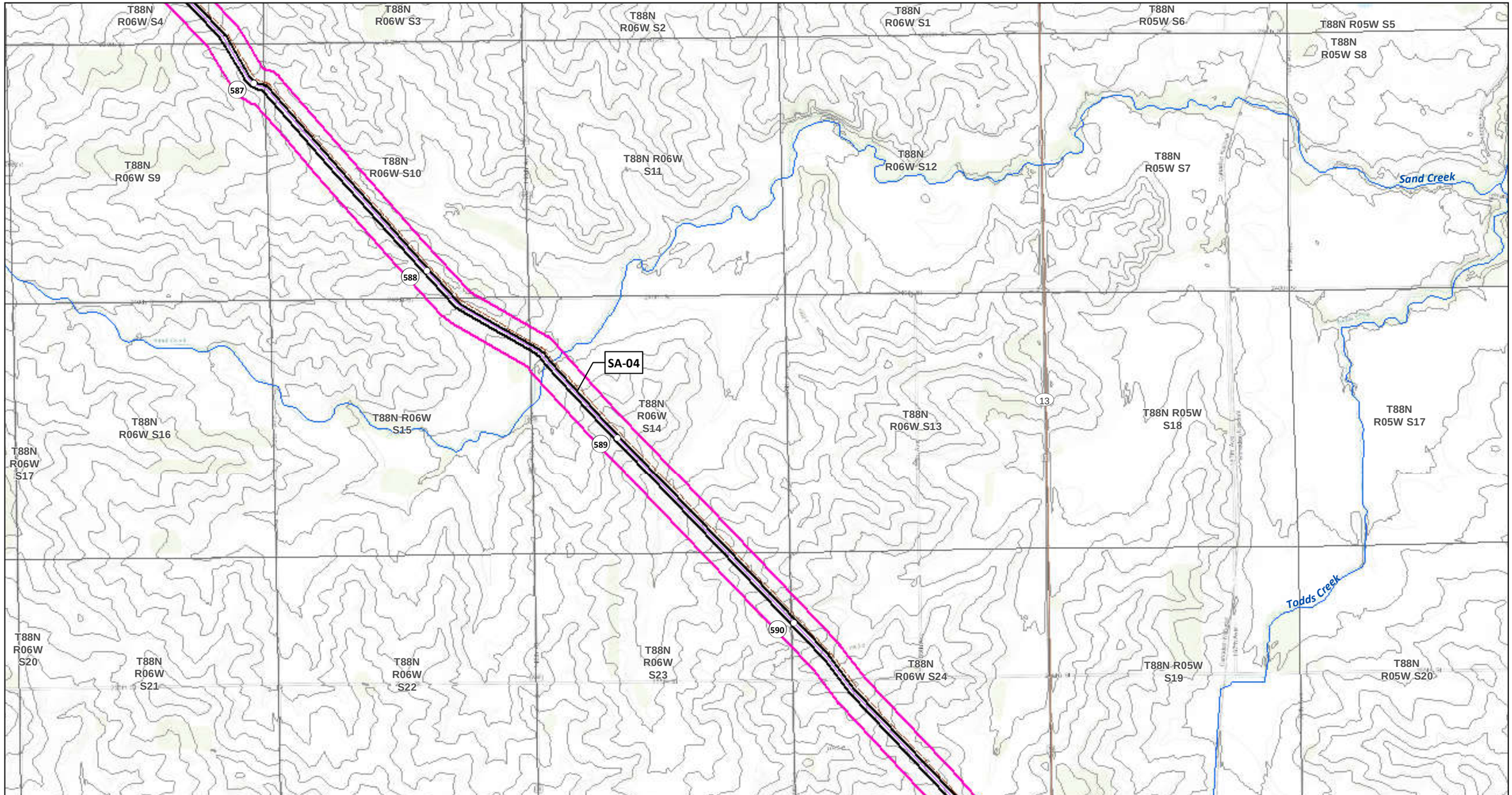

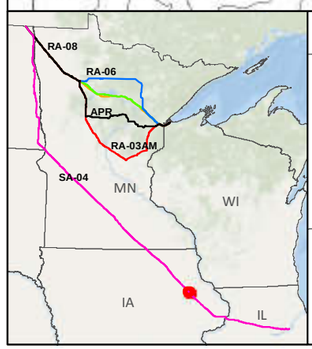

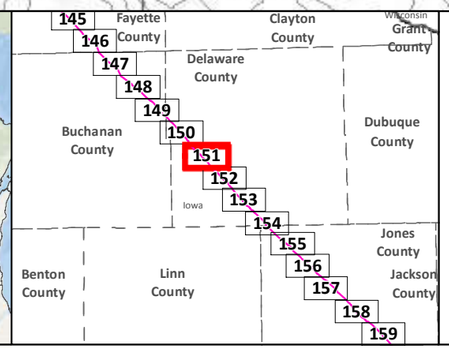

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

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Public Waters Watercourse

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Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
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Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 151B of 188

591
592
Todds Creek
13
593
SA-04
594
Golden Branch
595

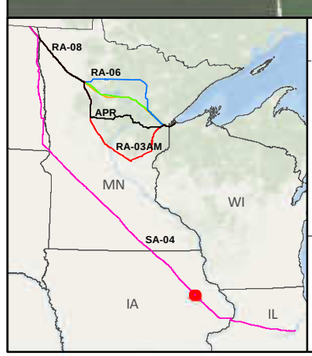

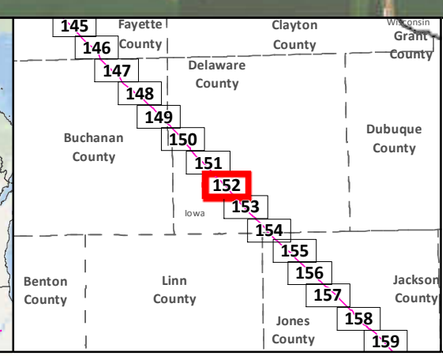

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 152A of 188

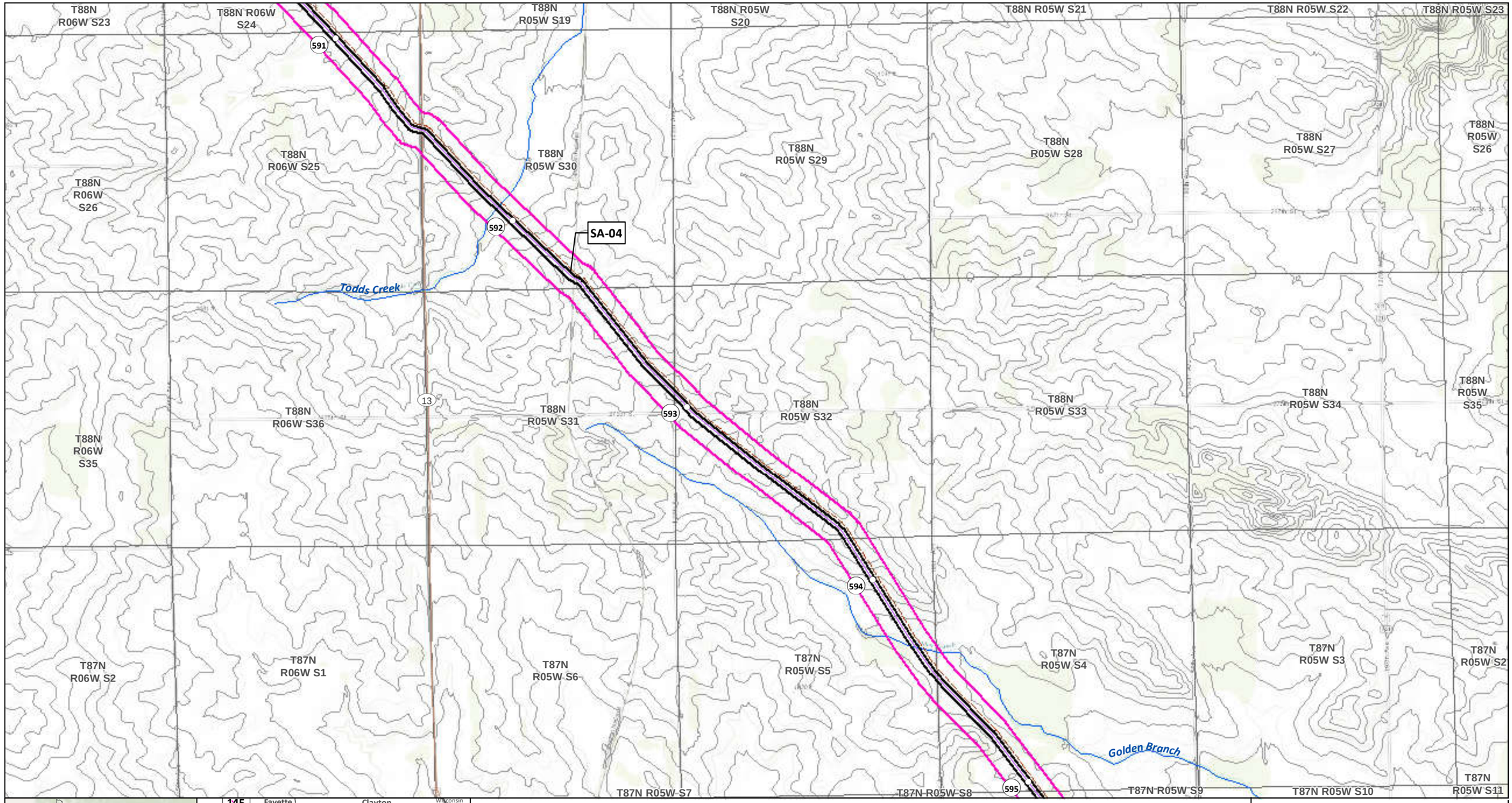

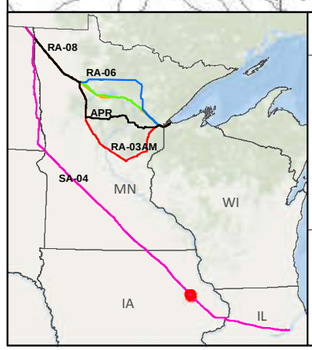

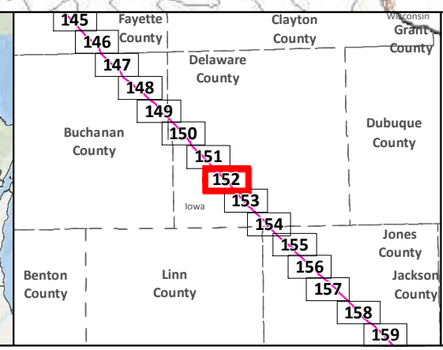

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
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- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 152B of 188

595
596
597
598
599
SA-04
Golden Branch
Buck Creek
Lime Creek
310th
220th
315th

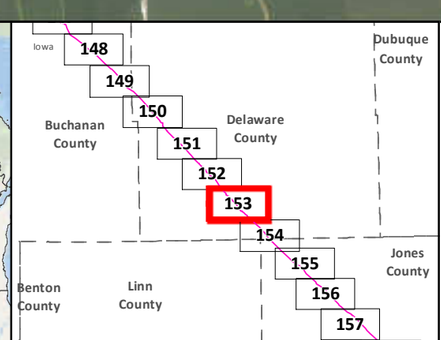

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 153A of 188

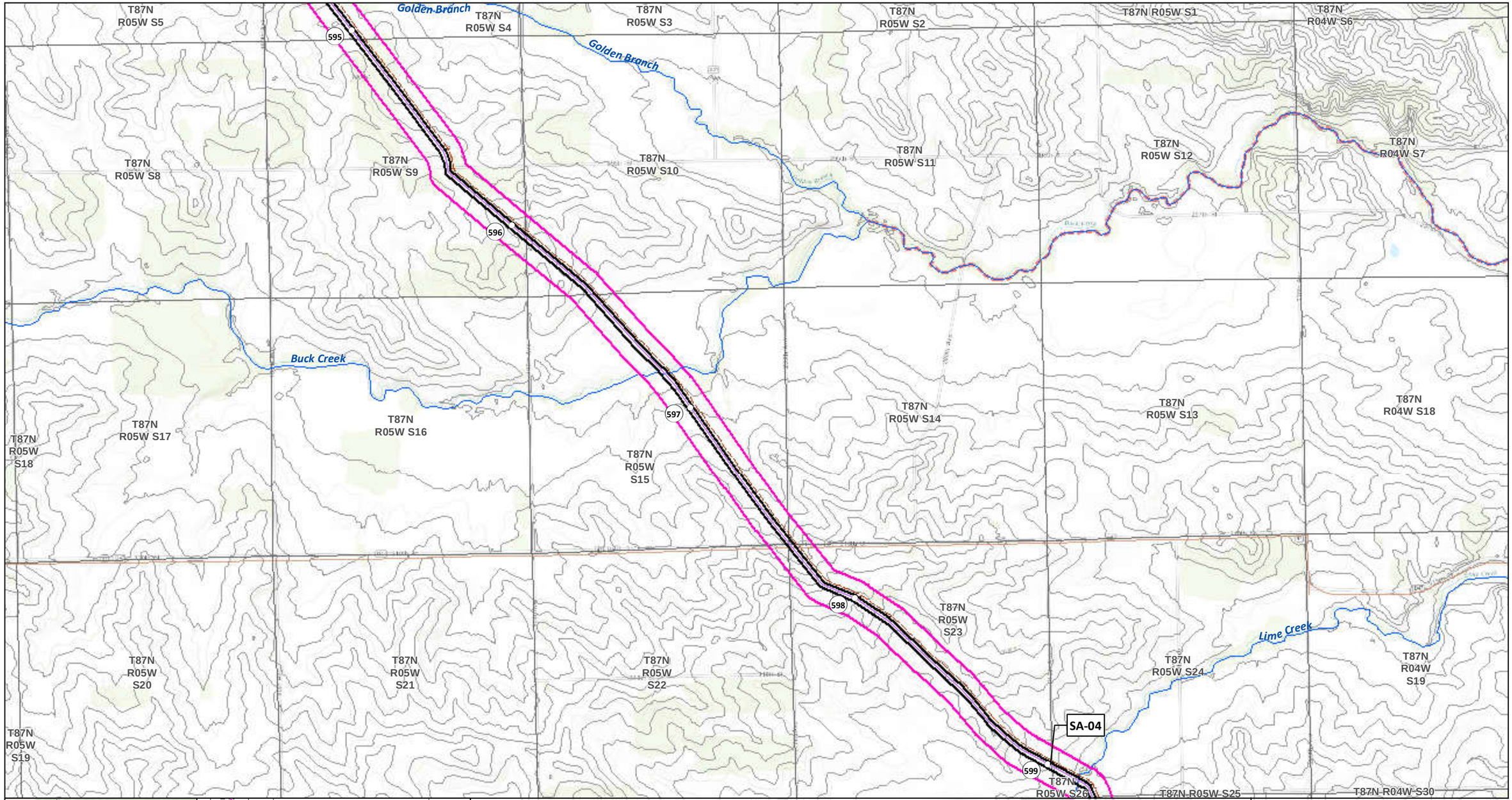

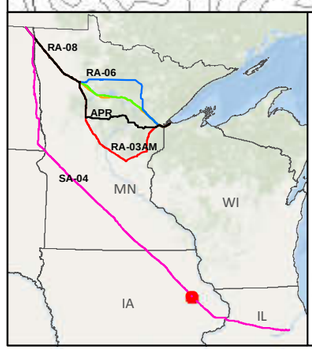

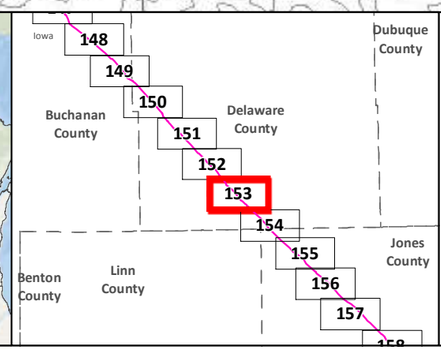

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
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- RA-08
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Township Boundary

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 153B of 188

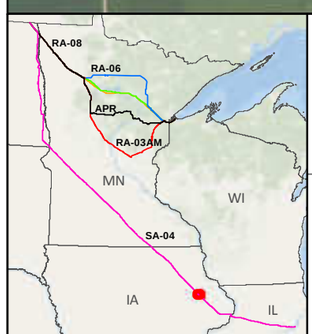

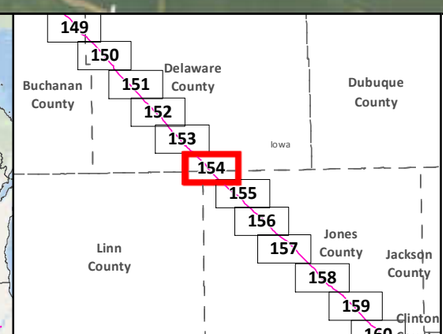

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 154A of 188

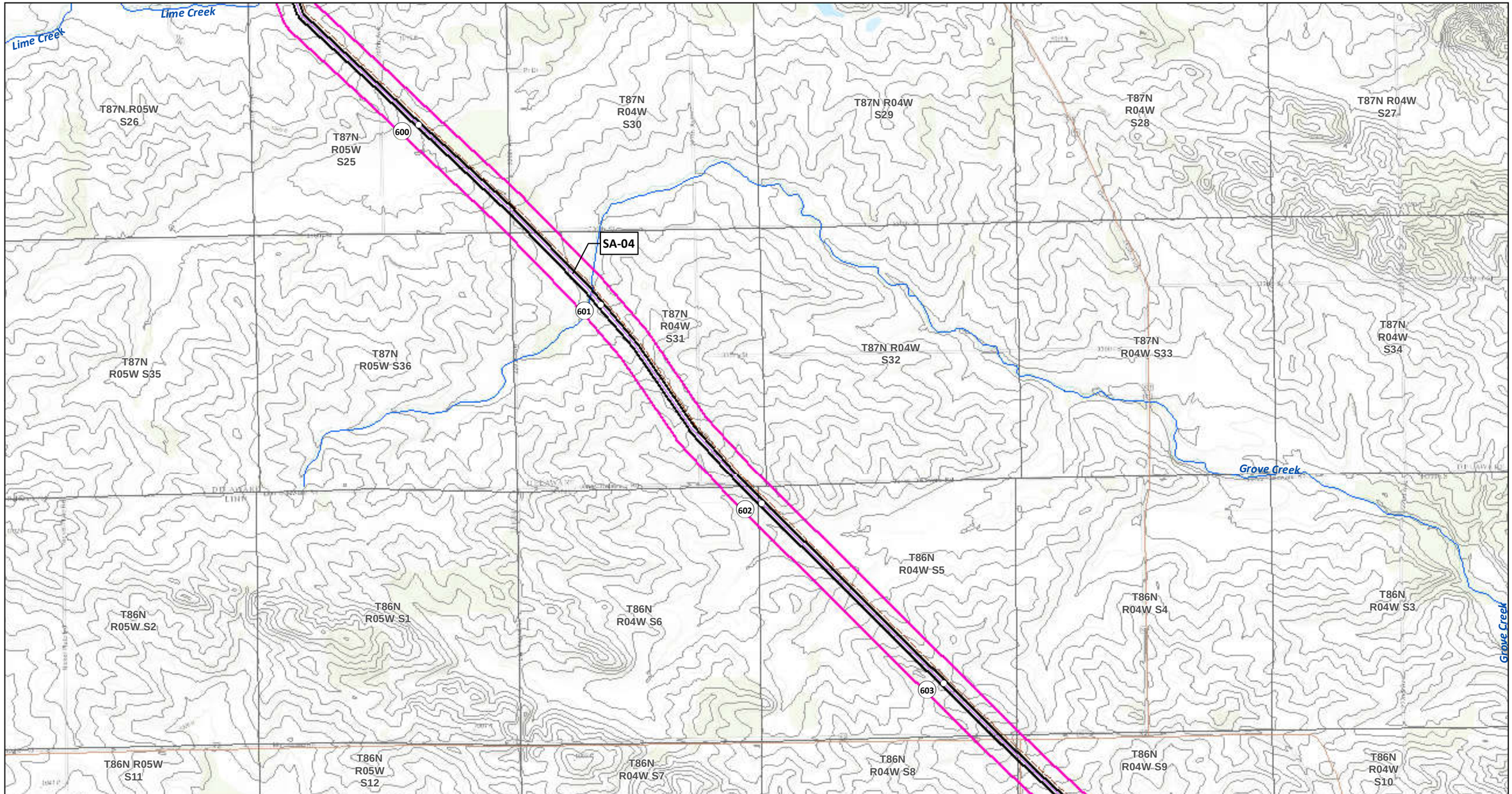

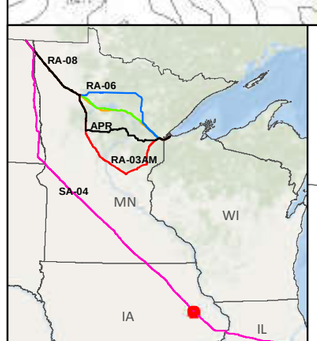

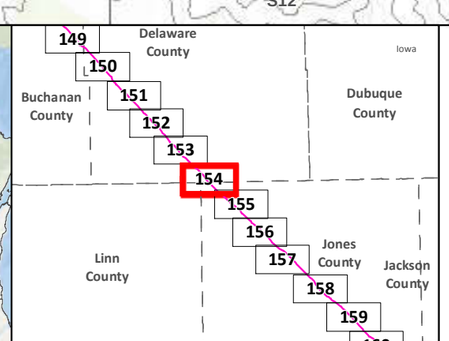

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
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- Mile Post
- Anticipated 120' Construction ROW
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Existing Pipelines
Township Boundary

State Managed Lands
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Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
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Native Plant Communities with Biodiversity Significance
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 154B of 188

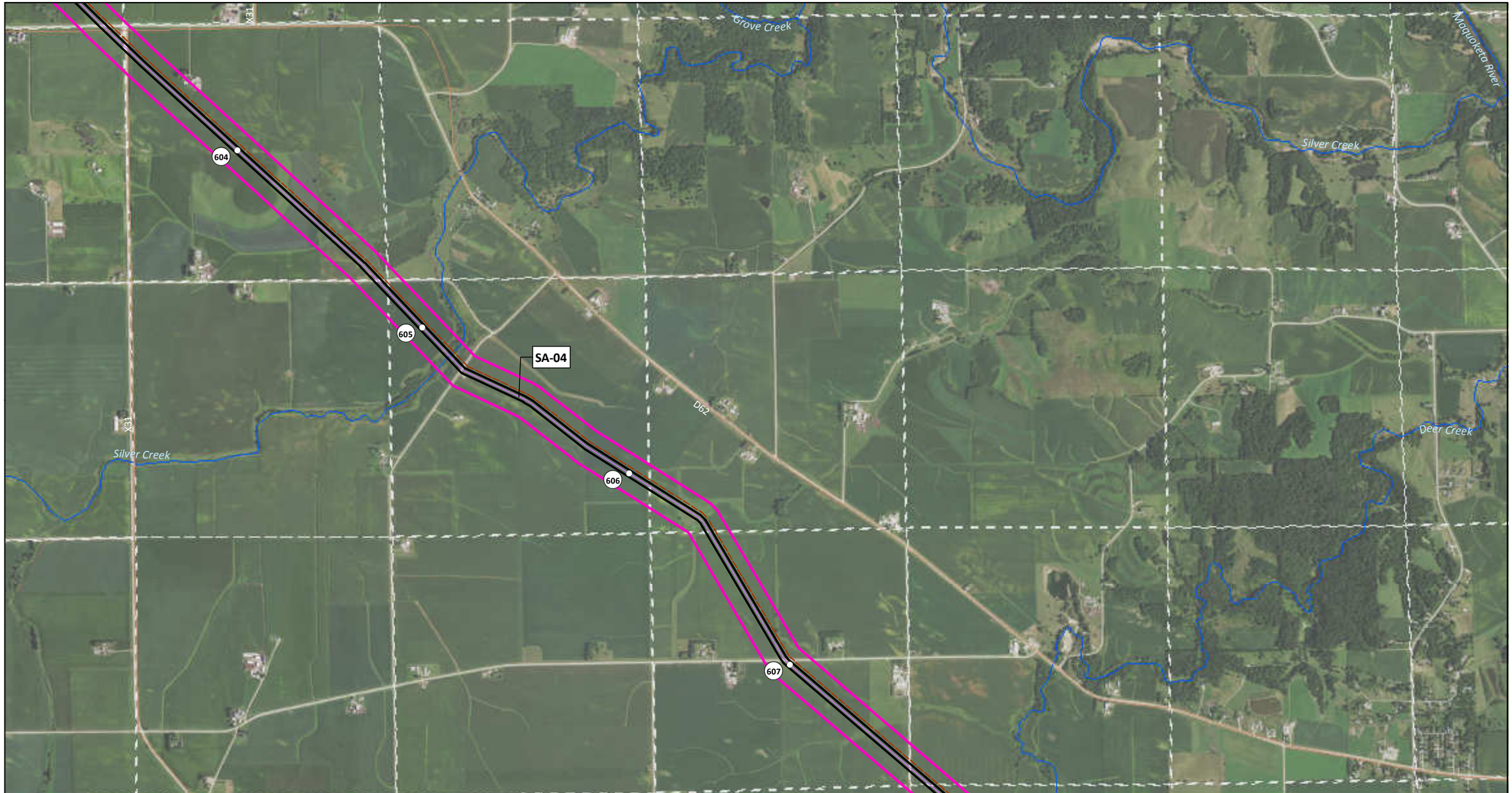

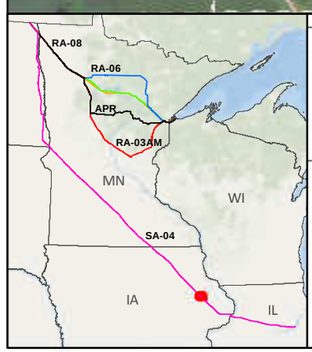

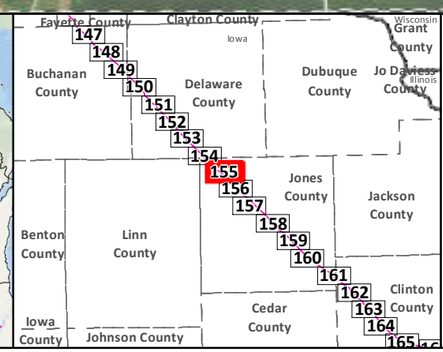

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 155A of 188

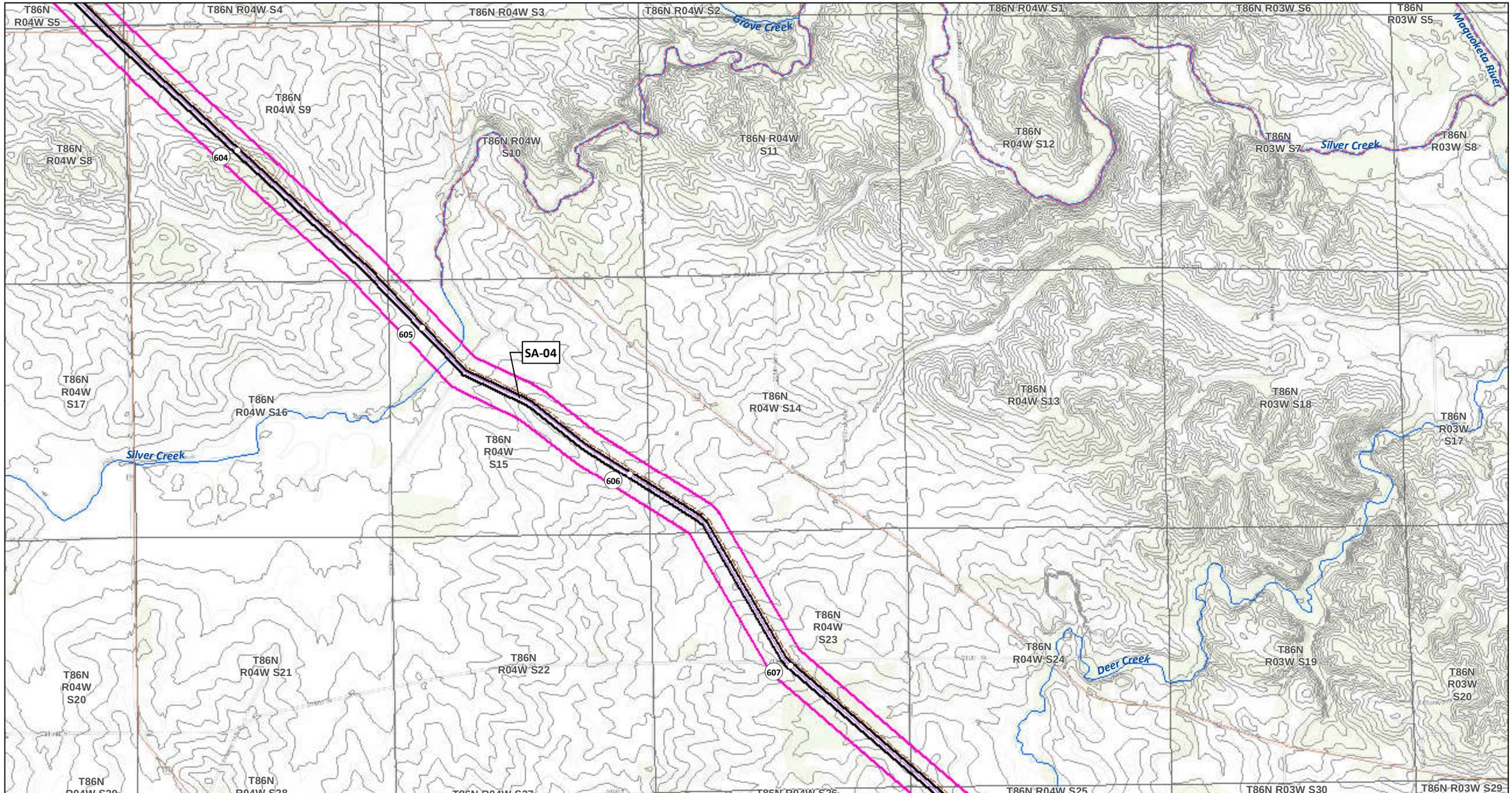

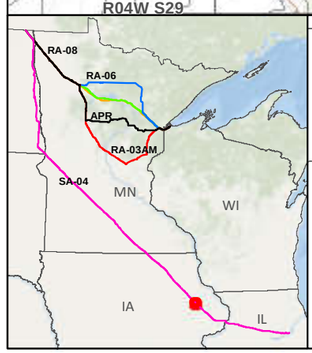

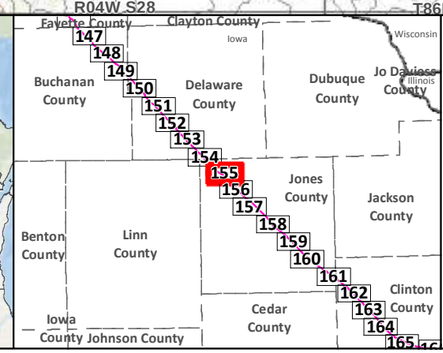

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

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Native Plant Communities with Biodiversity Significance

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- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 155B of 188

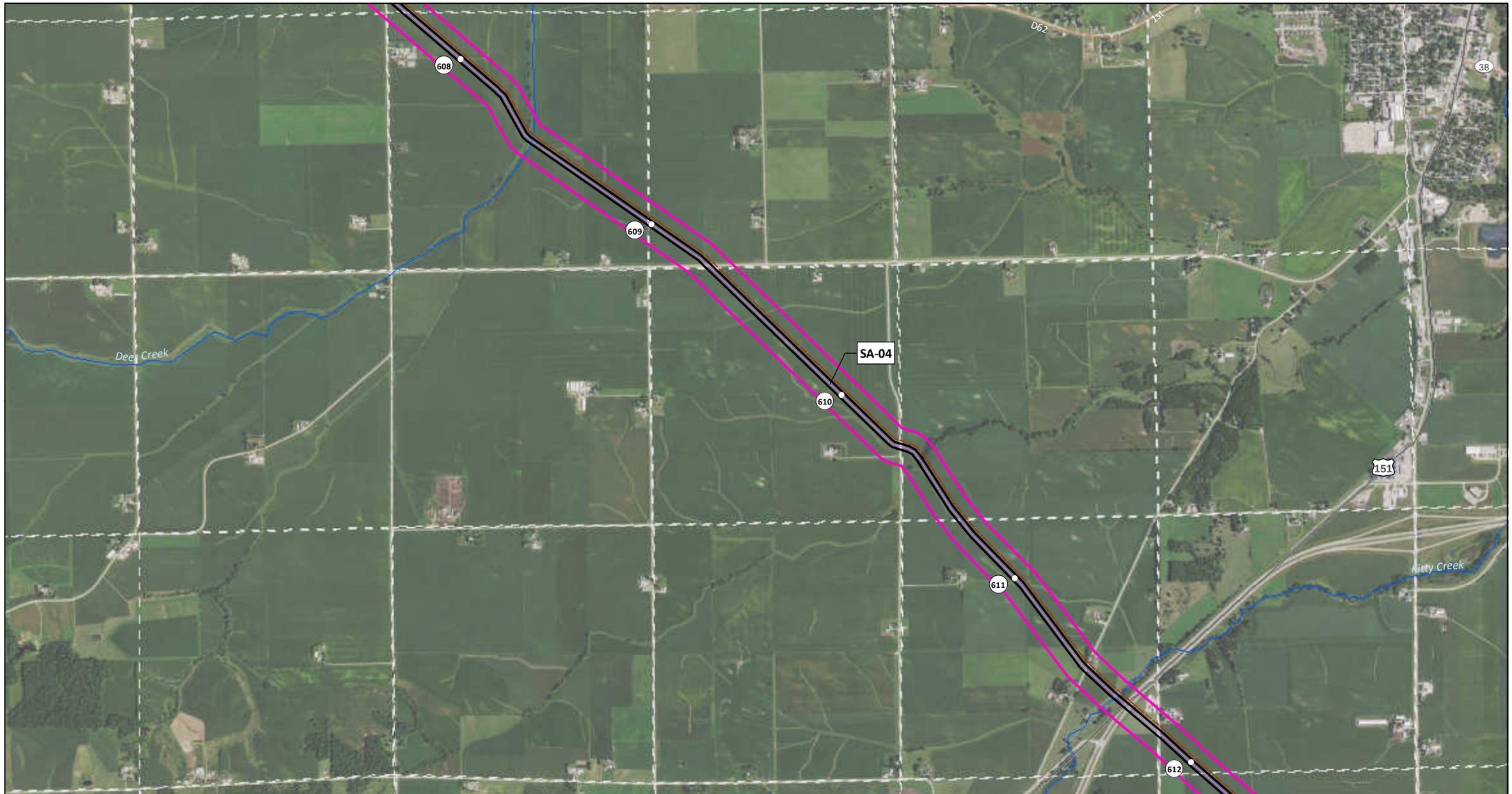

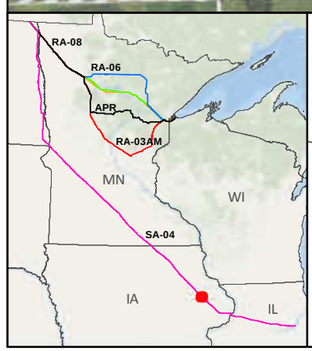

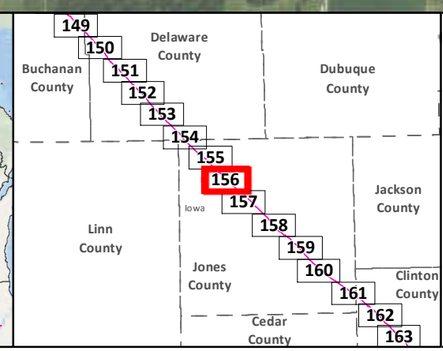

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 156A of 188

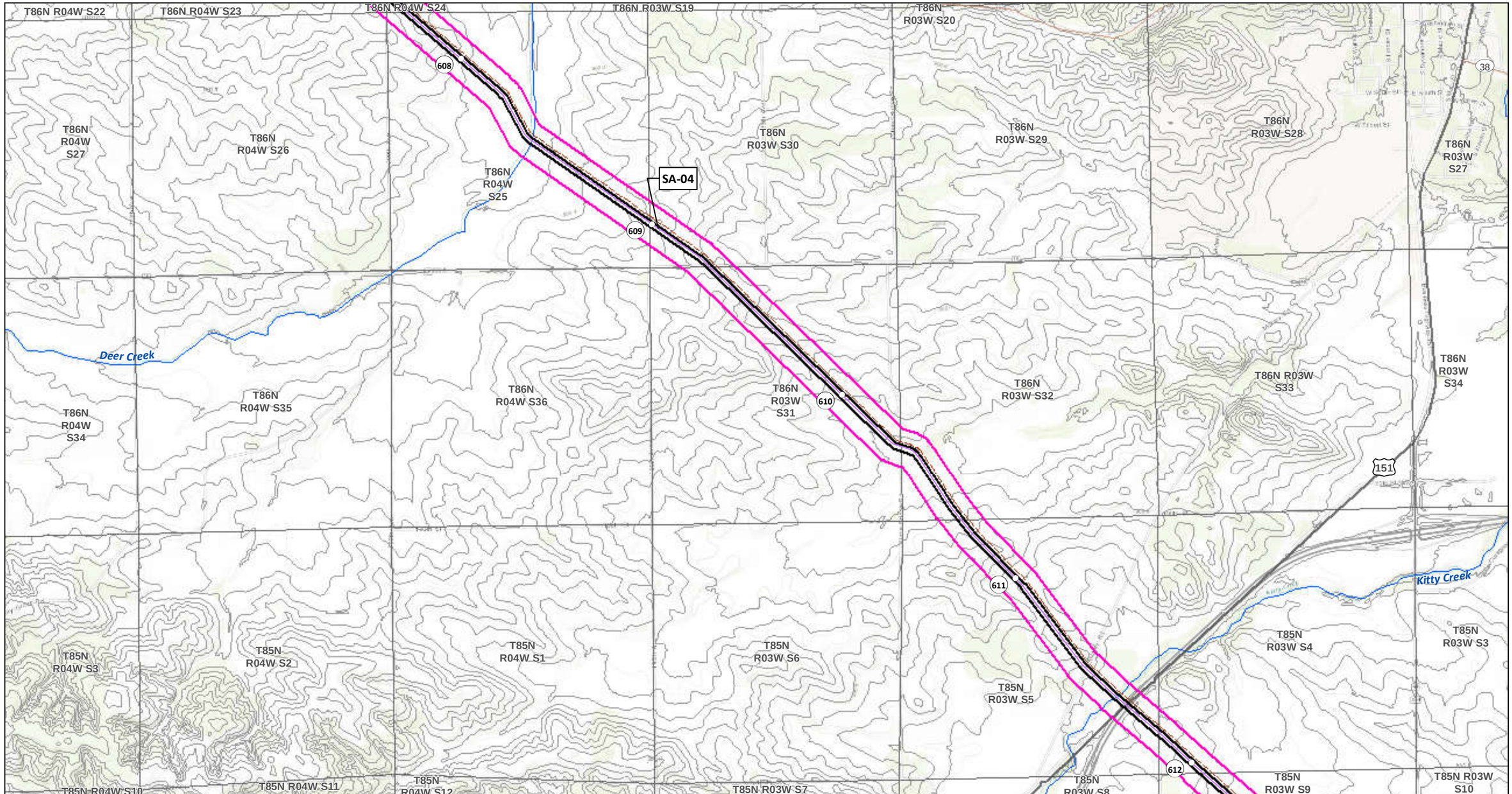

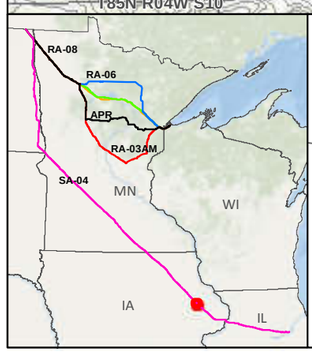

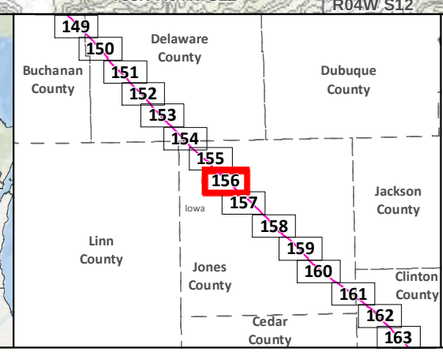

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 156B of 188

Langworthy

Kitty Creek

SA-04

613

614

615

616

151

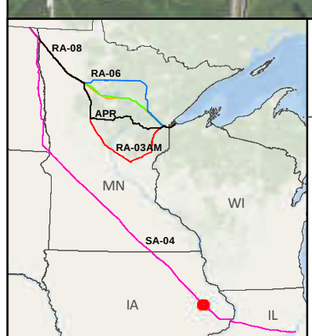

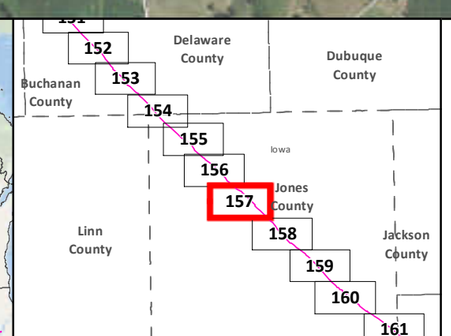

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 157A of 188

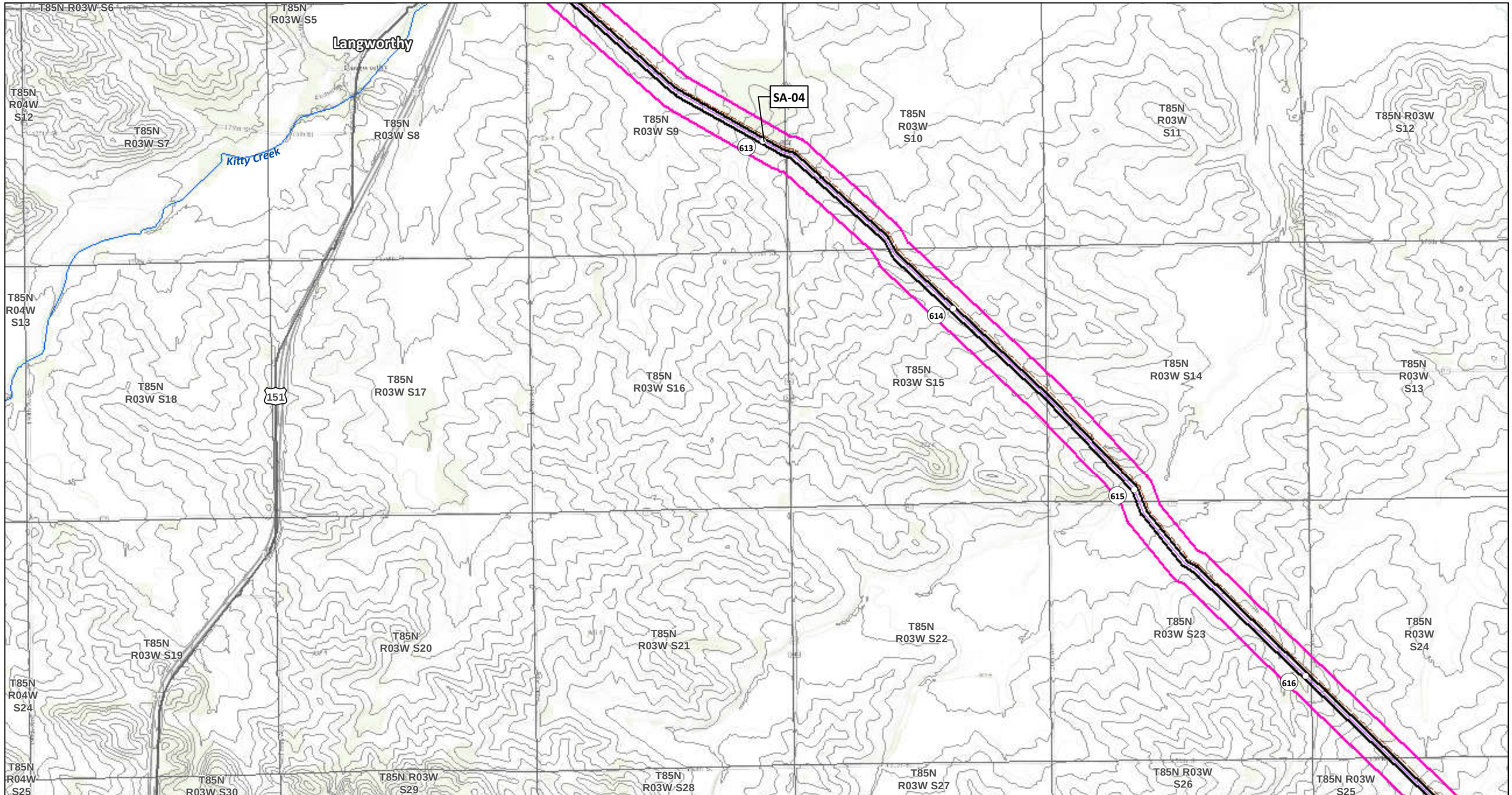

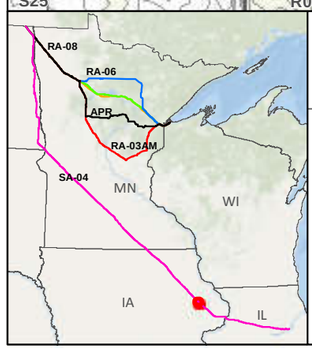

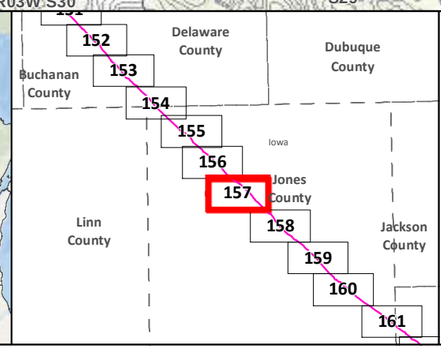

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

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- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 157B of 188

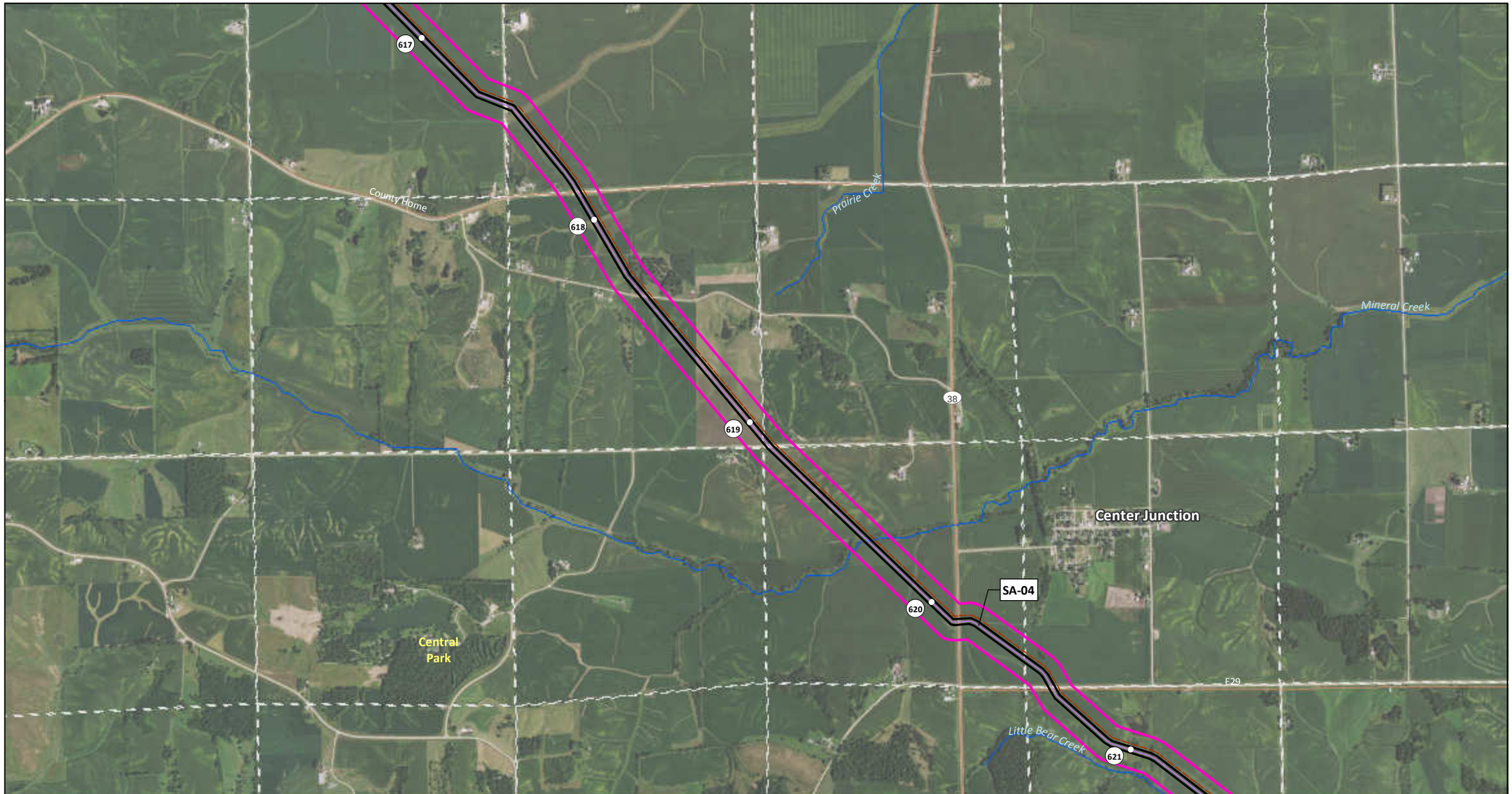

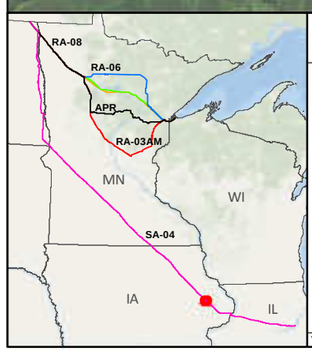

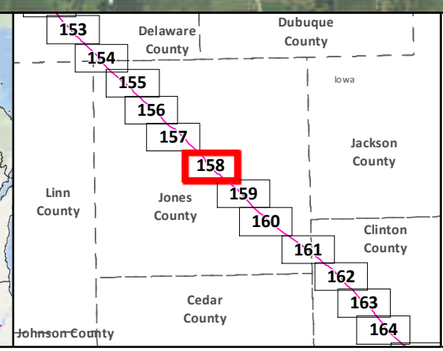

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 158A of 188

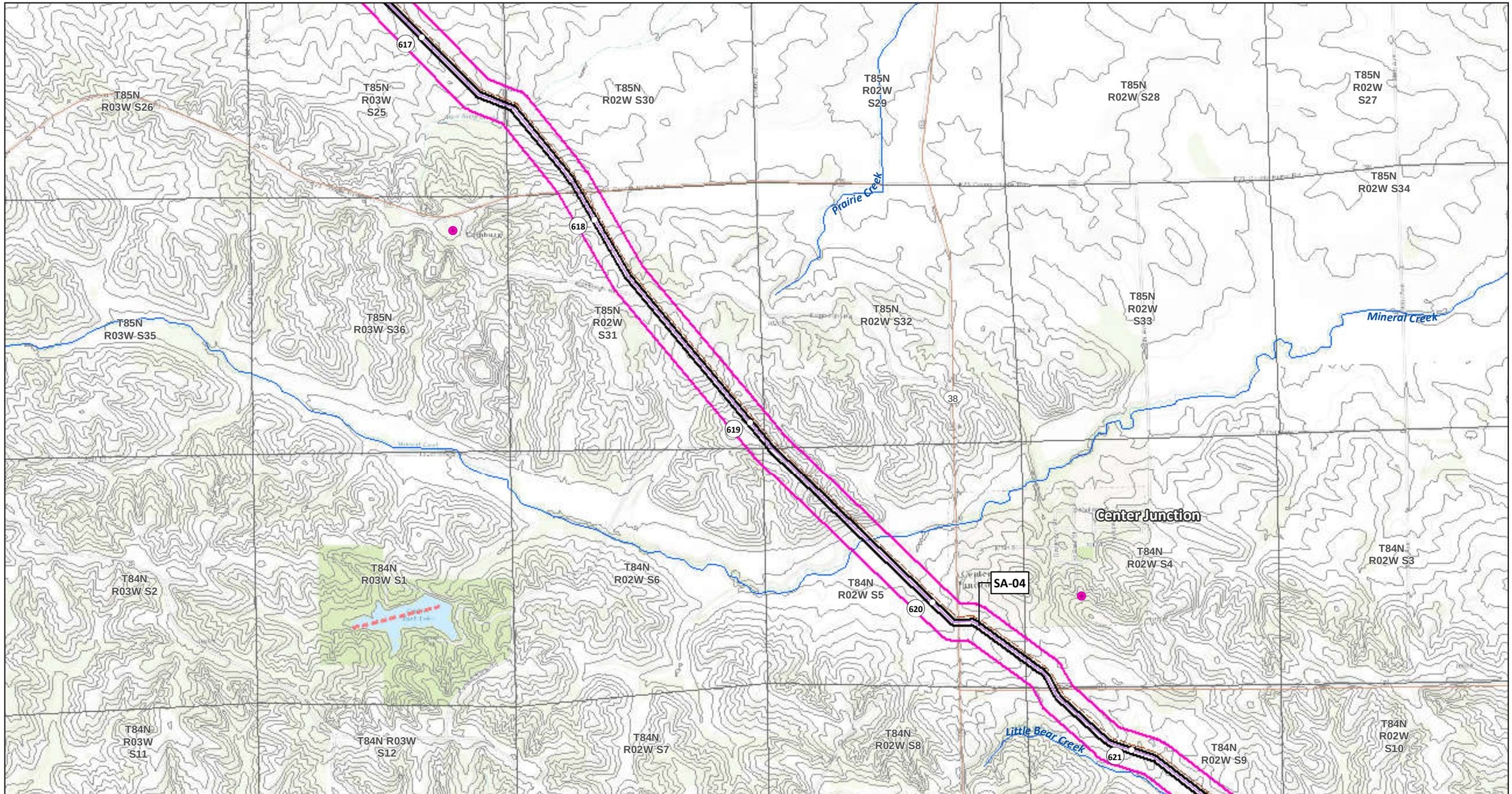

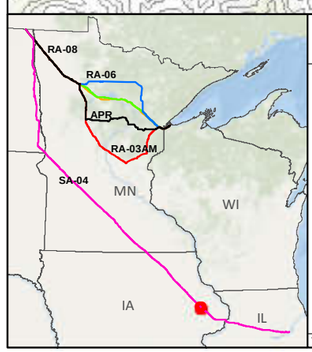

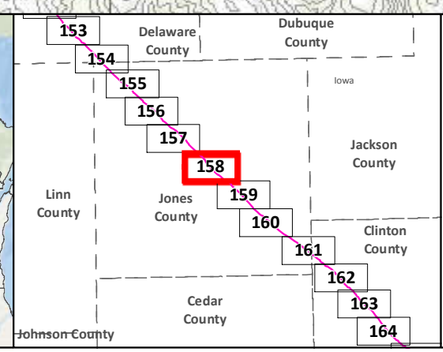

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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303d Imparied Waters
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Lakes of Biological Significance
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- High
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Native Plant Communities with Biodiversity Significance
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 158B of 188

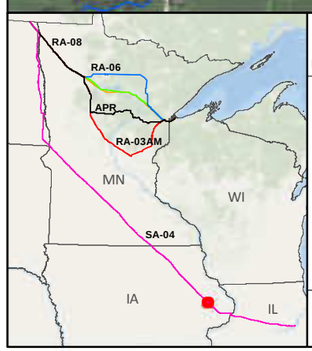

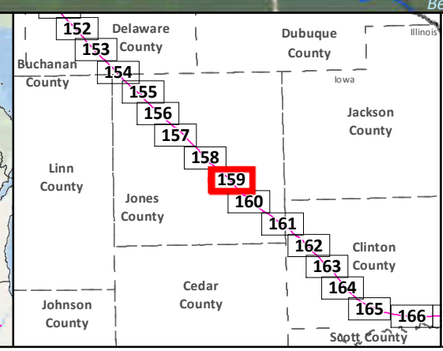

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 159A of 188

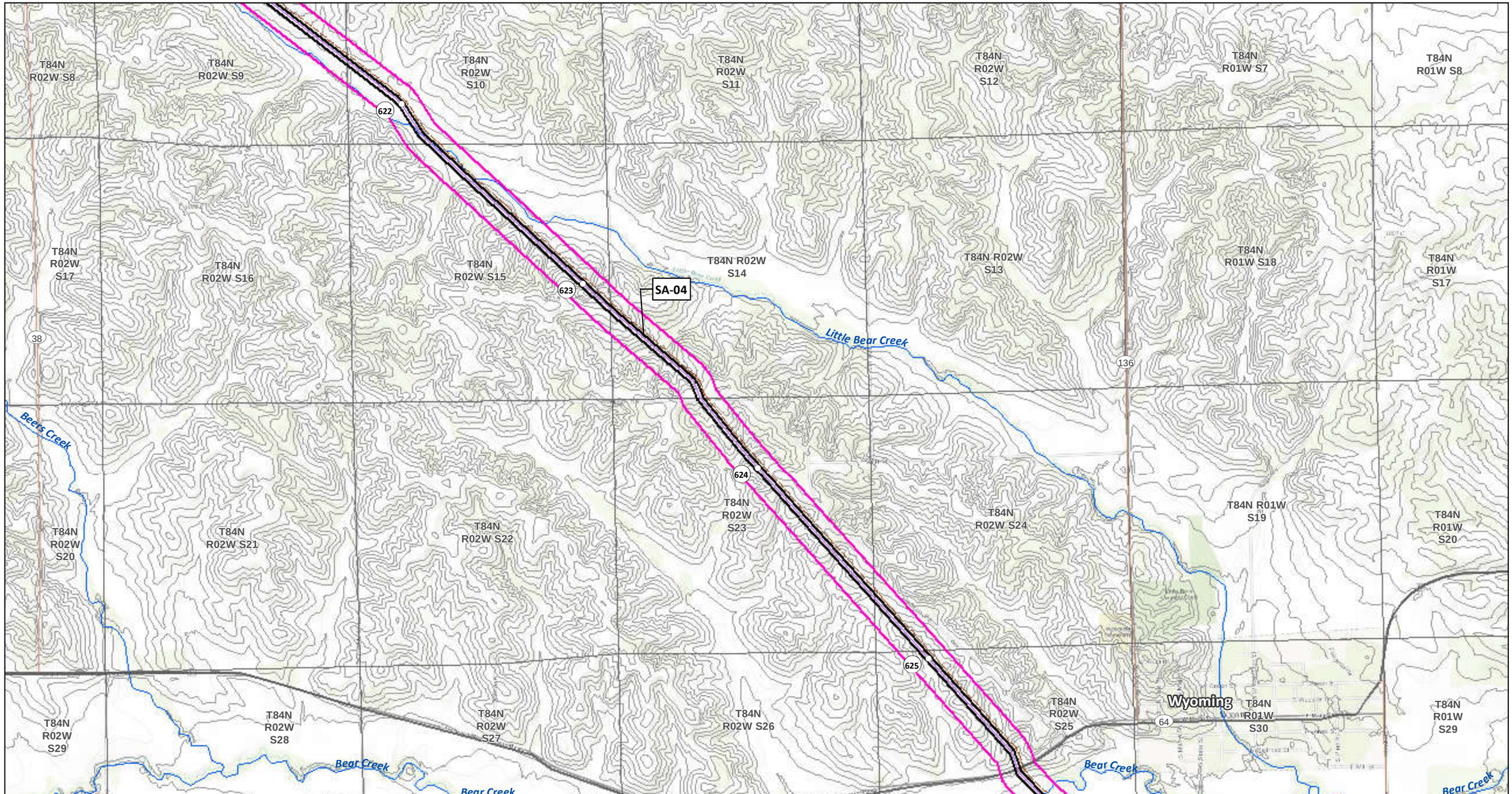

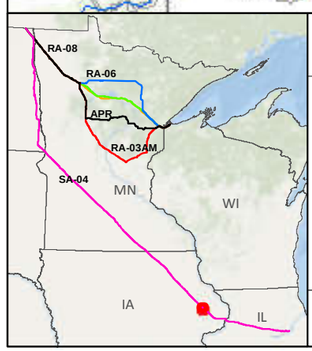

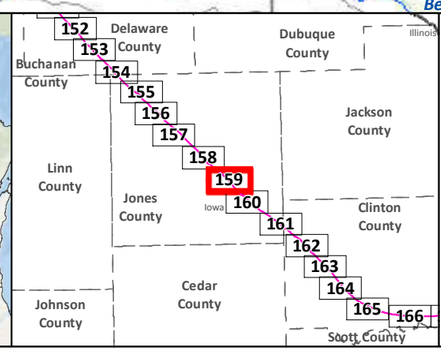

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 159B of 188

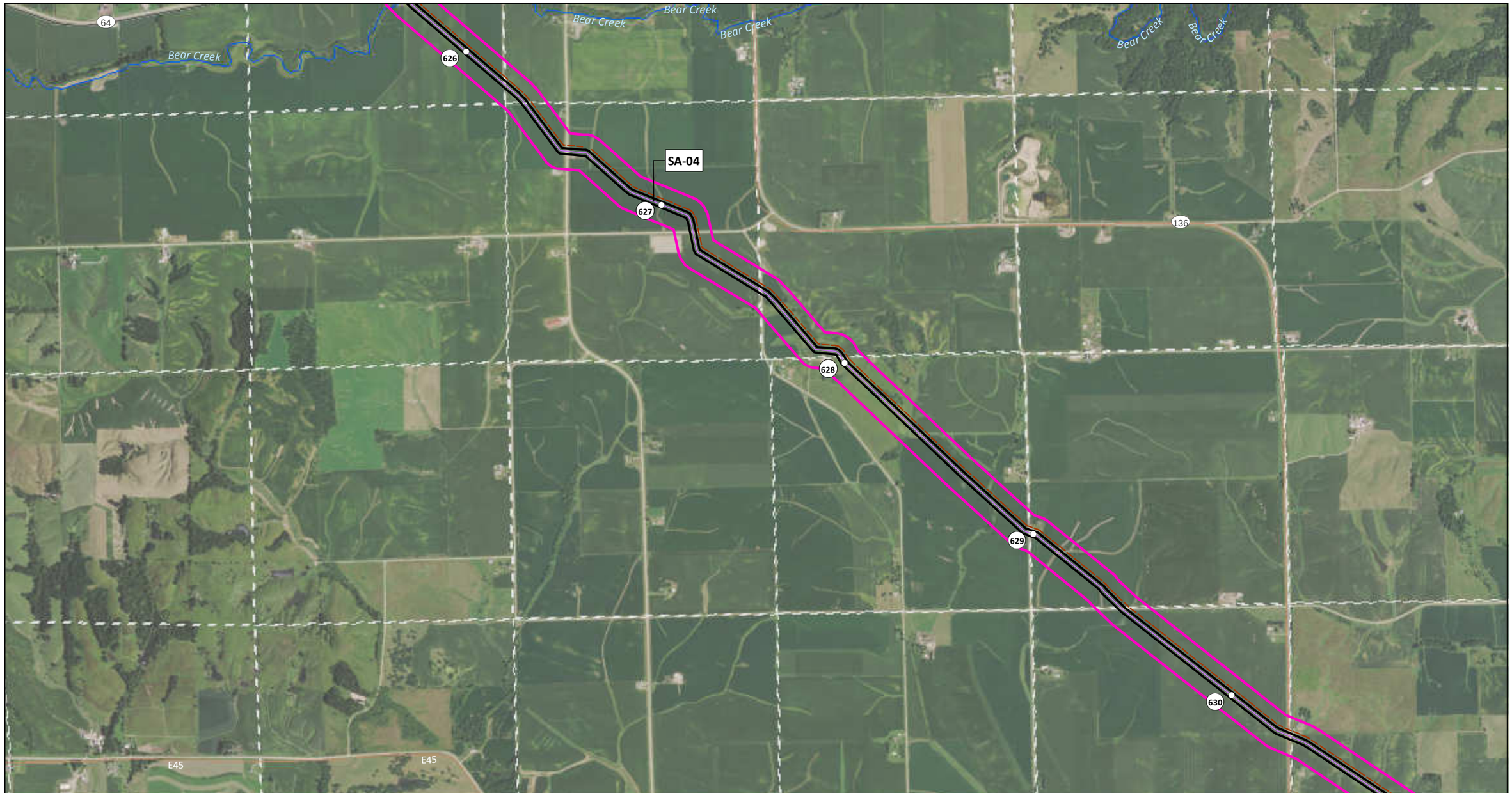

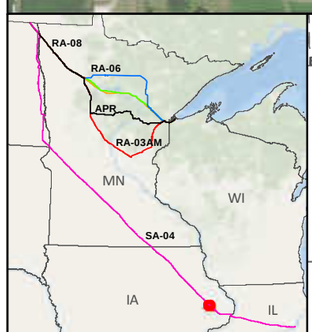

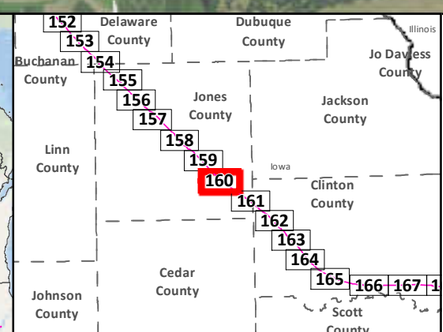

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 160A of 188

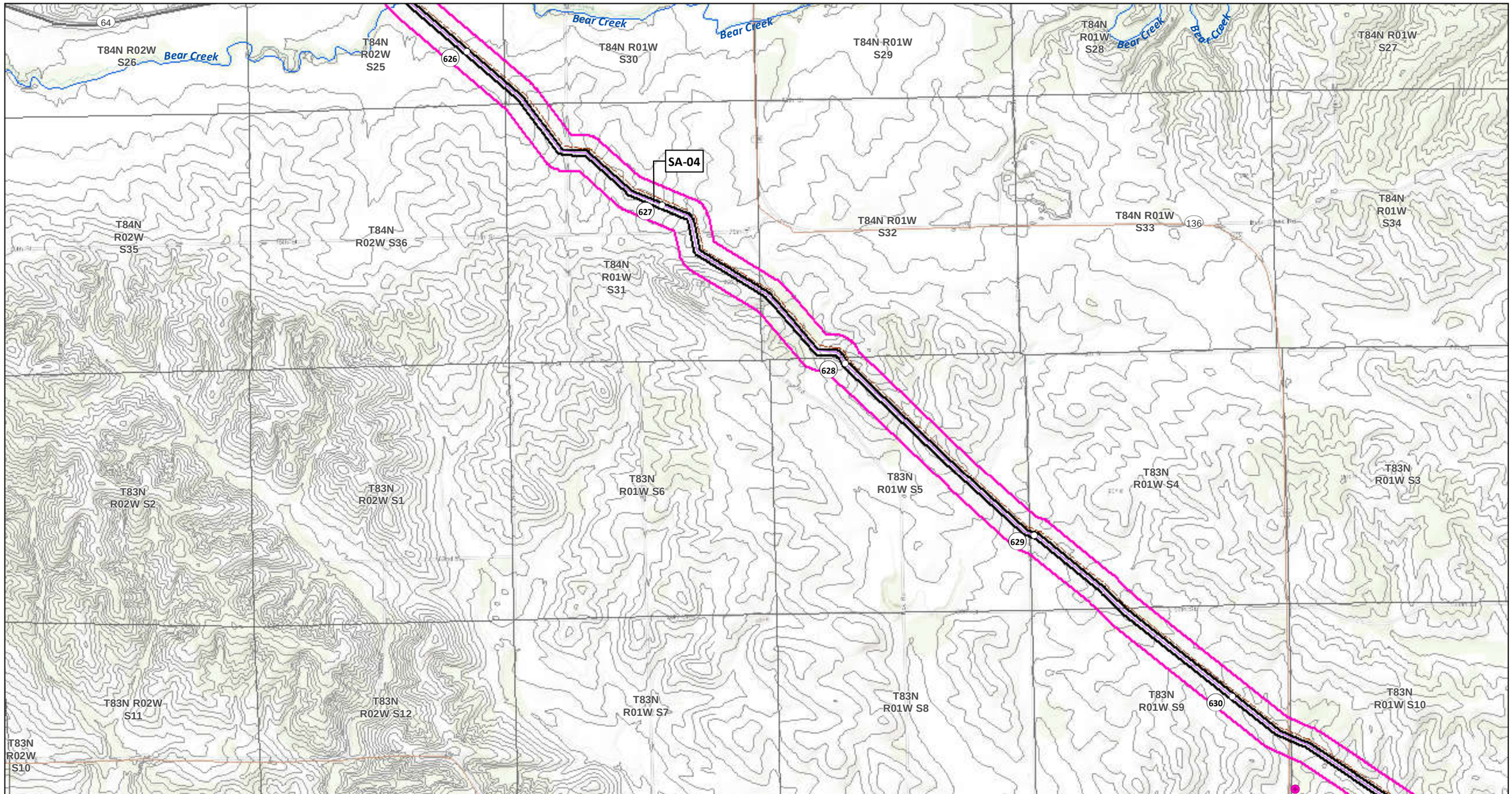

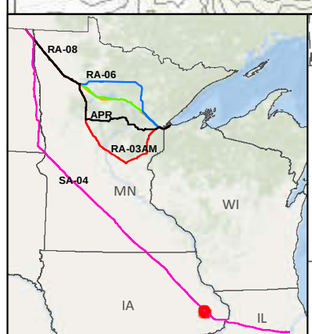

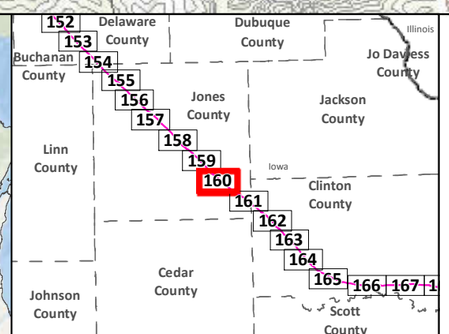

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
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Water Resources

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Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 160B of 188

631
632
633
634
635
SA-04
E45
Oxford Junction
1st
X64
136
Wapsipinicon River

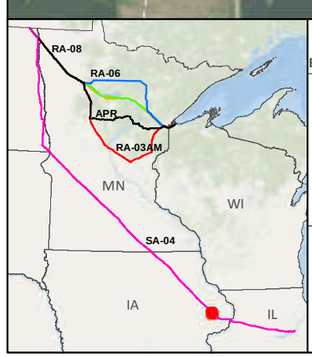

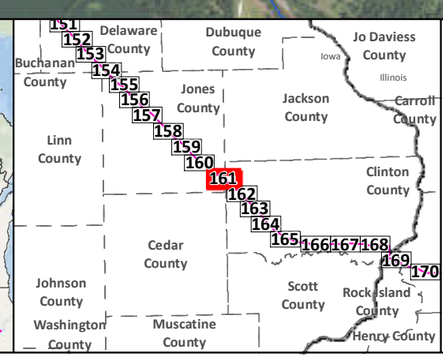

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
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Water Resources
Lake
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Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 161A of 188

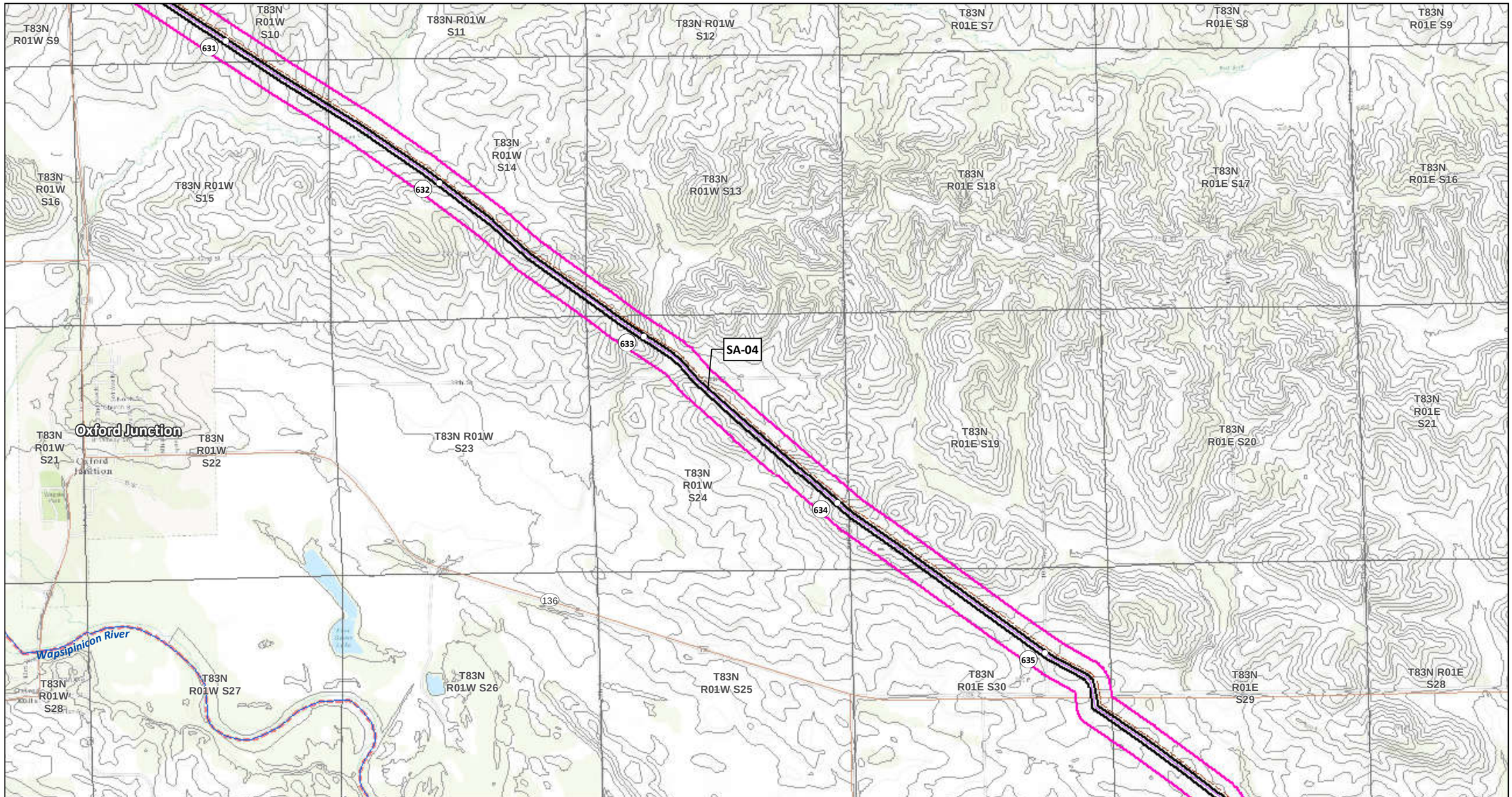

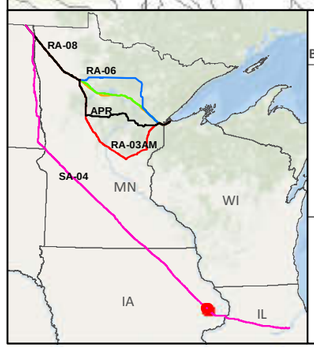

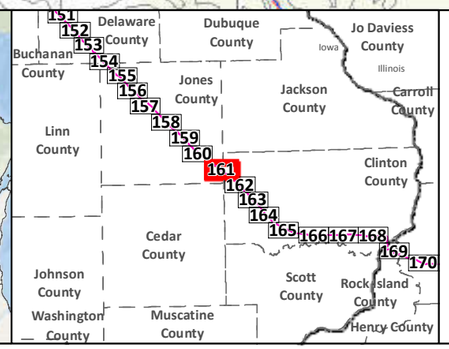

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
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Mile Post

Anticipated 120' Construction ROW

Route Width (750')

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 161B of 188

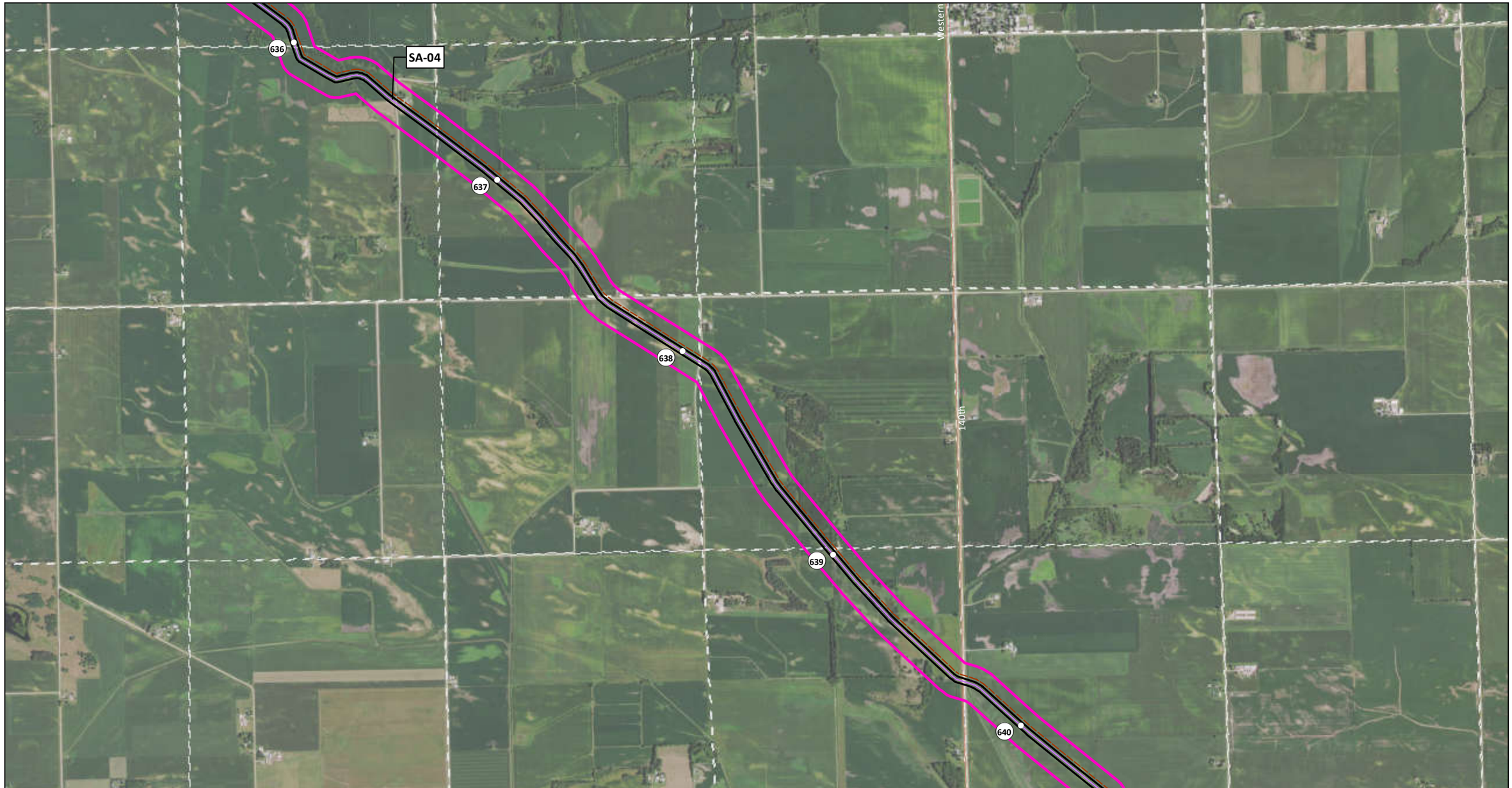

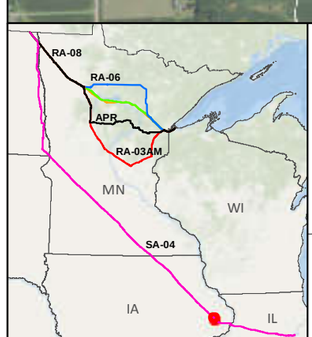

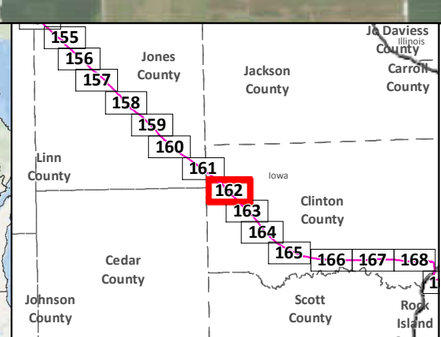

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

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Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 162A of 188

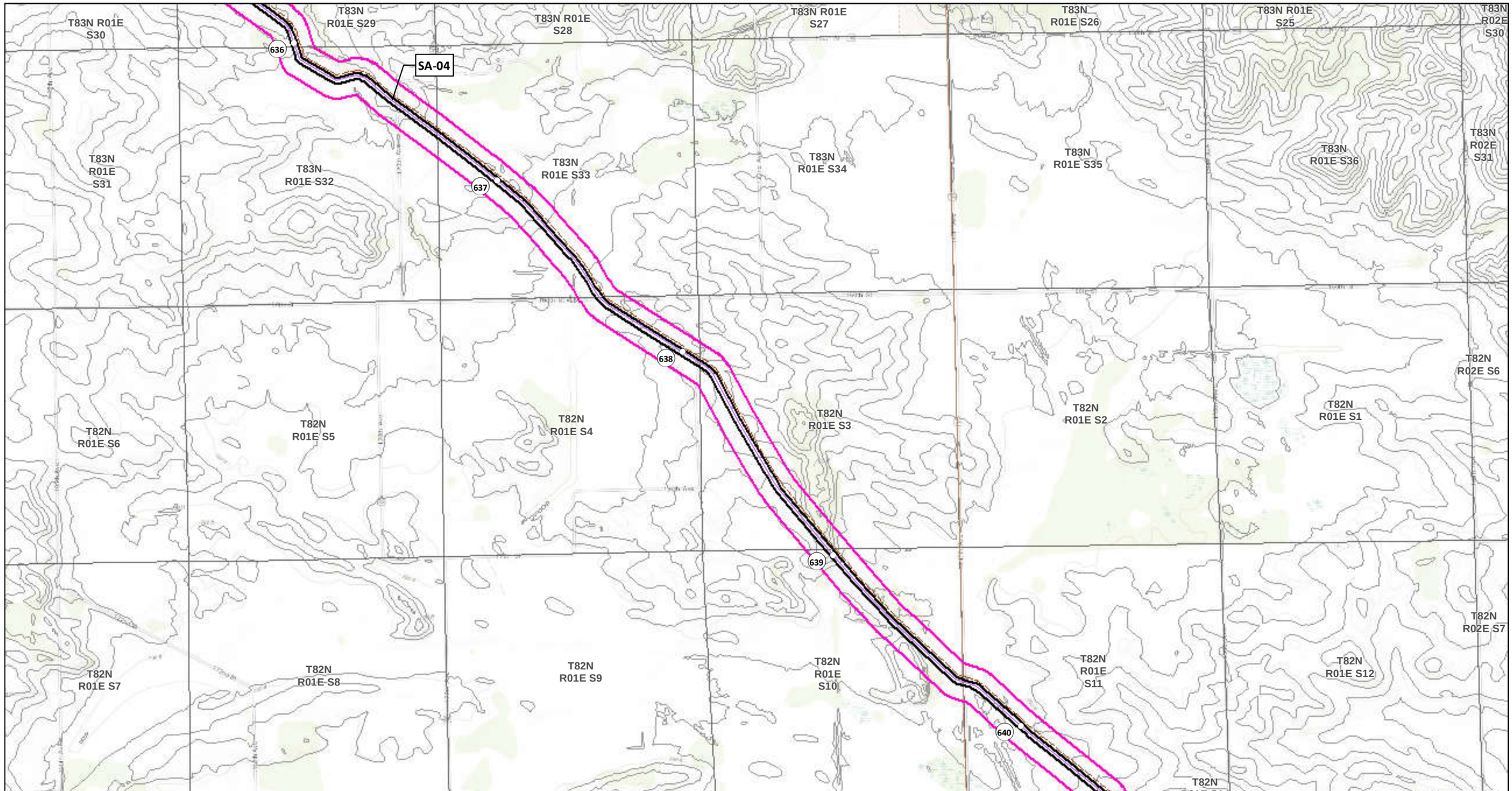

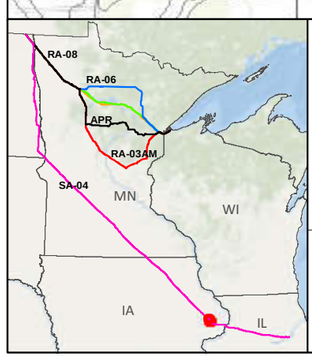

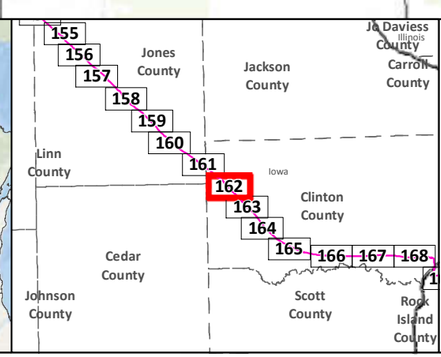

SA-04

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Route Alternatives

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- RA-06
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Anticipated 120' Construction ROW

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 162B of 188

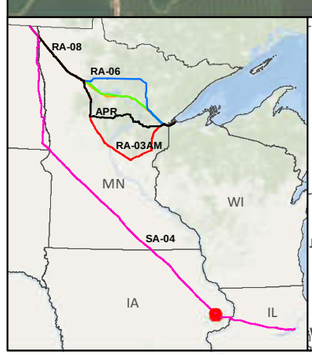

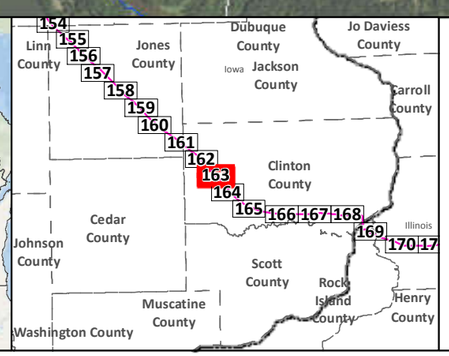

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 163A of 188

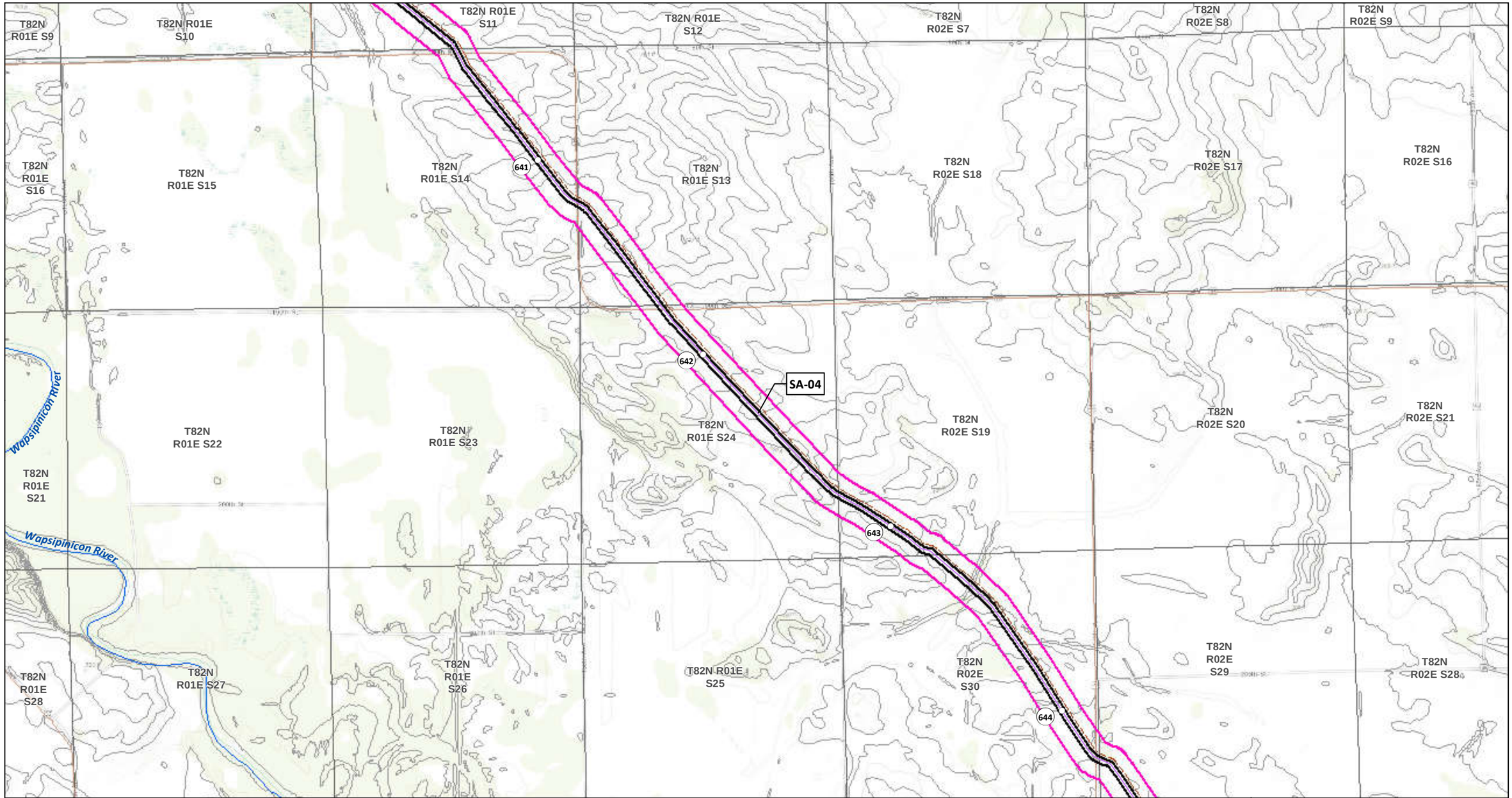

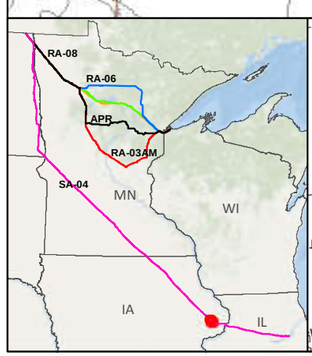

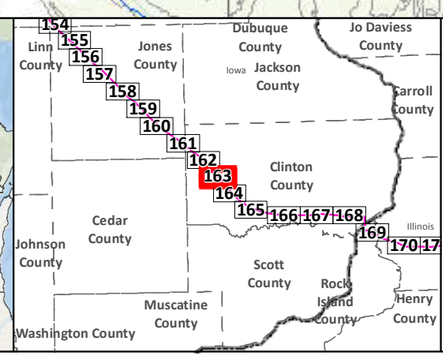

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 163B of 188

645
646
647
648
SA-04
Wapsipinicon River
Calamus Creek
30

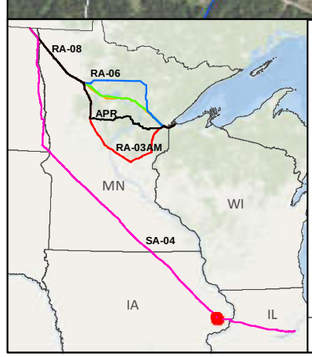

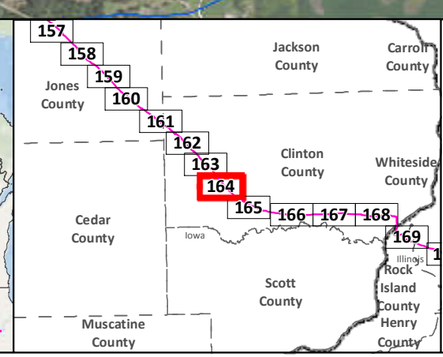

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 164A of 188

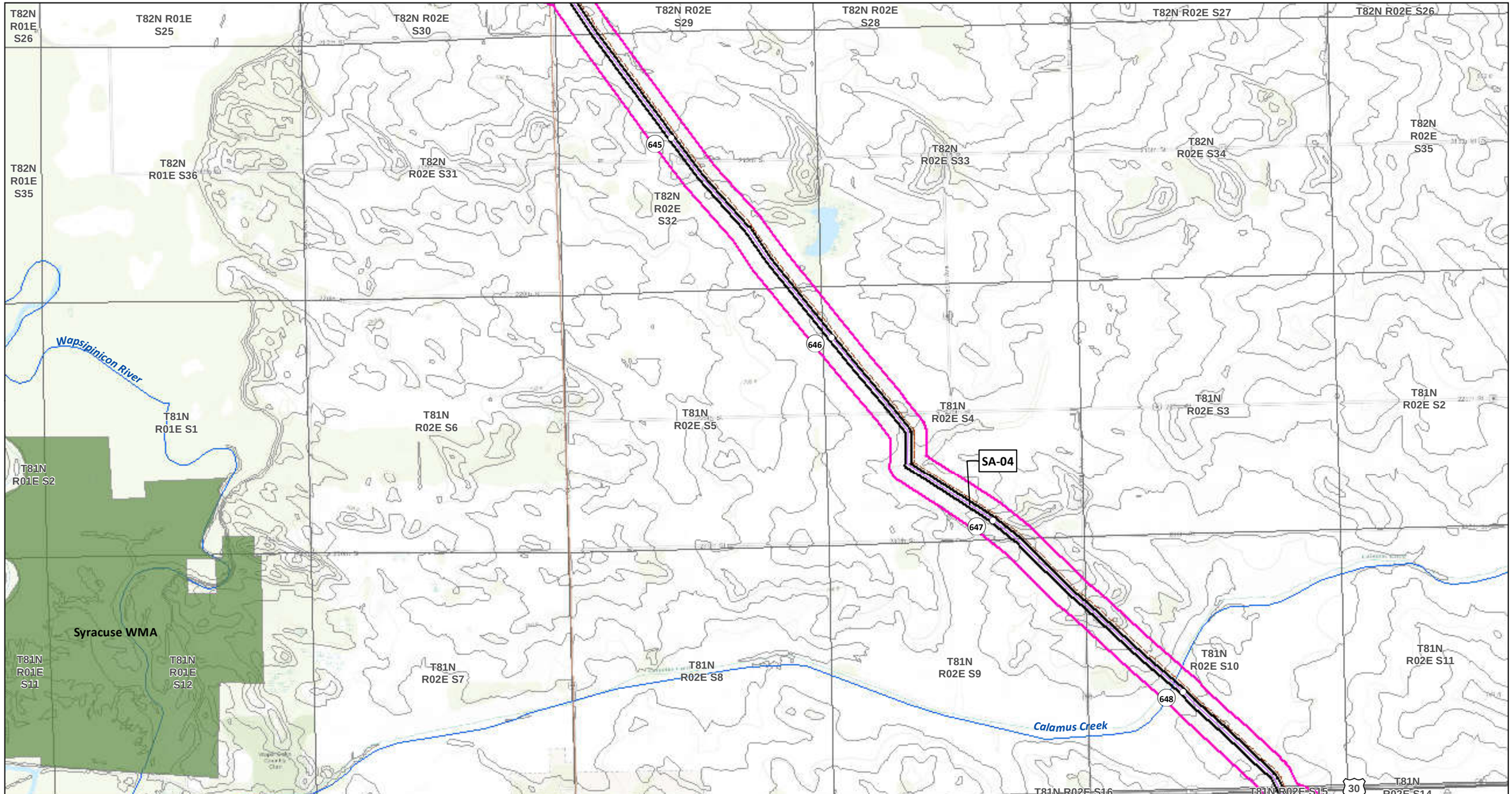

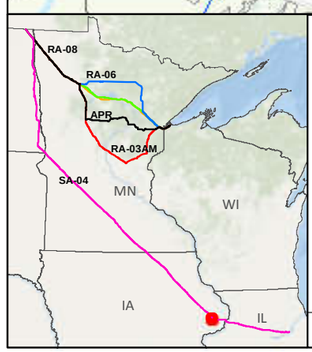

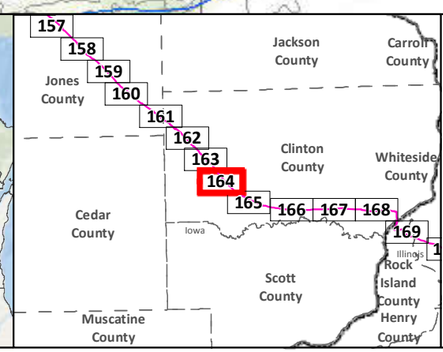

SA-04

Applicant's Preferred Route (APR)

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Mile Post

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 164B of 188

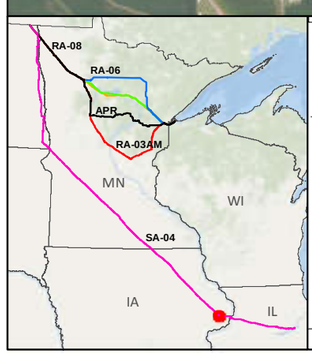

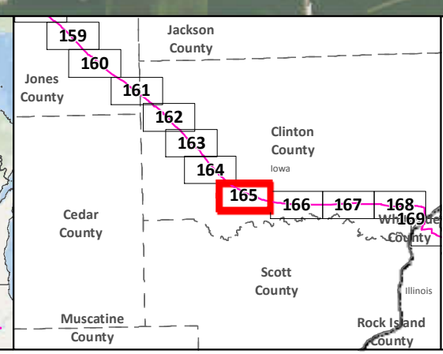

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 165A of 188

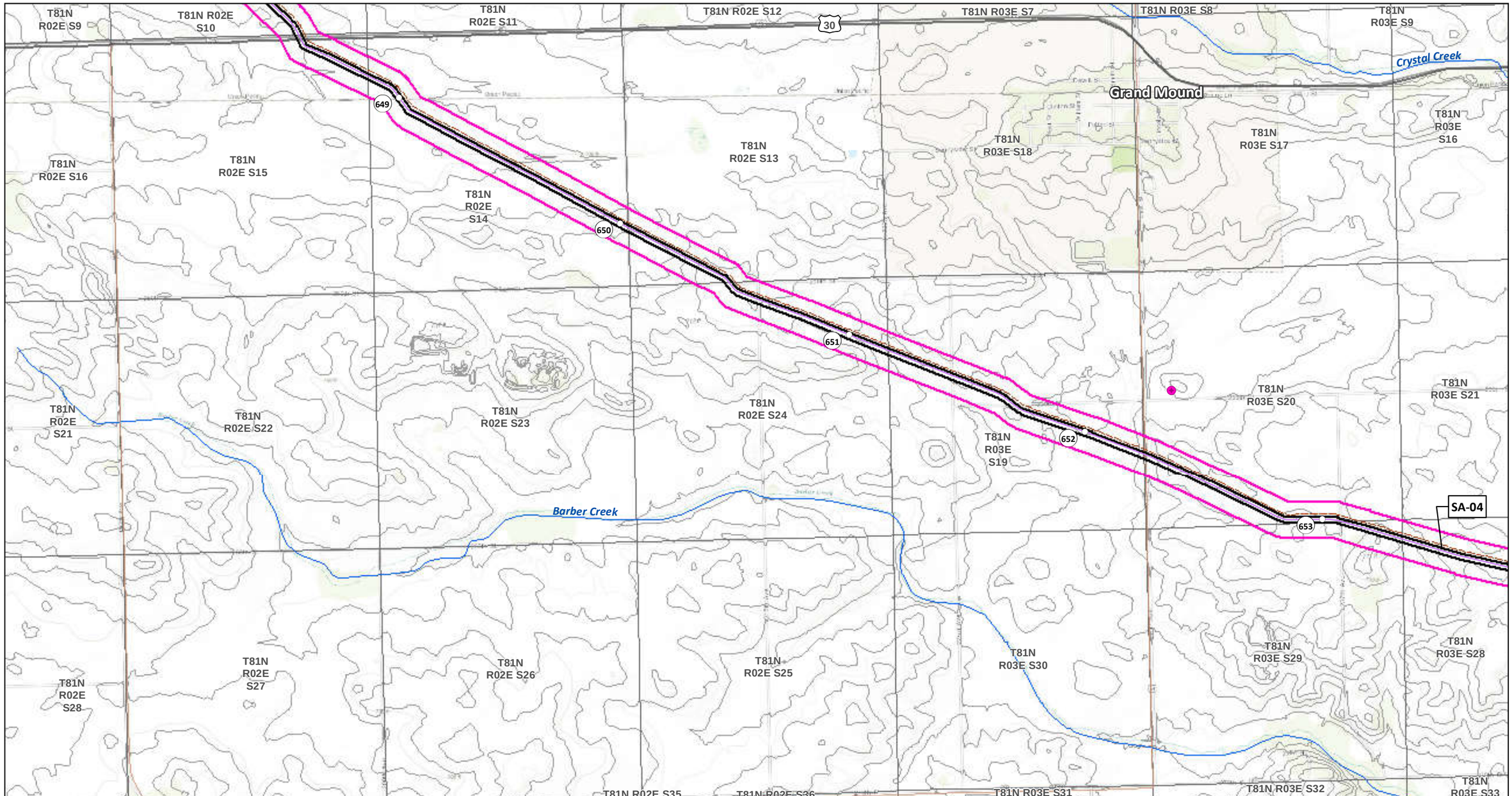

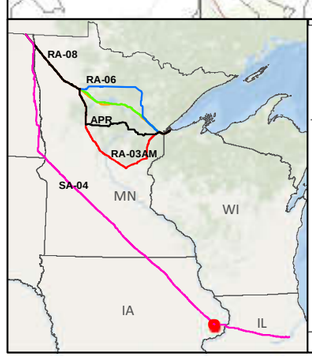

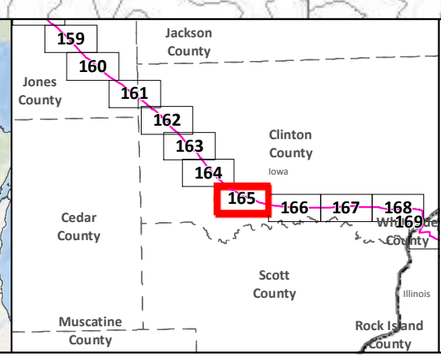

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

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Water Resources
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- National River Inventory Crossing
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Native Plant Communities with Biodiversity Significance
- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 165B of 188

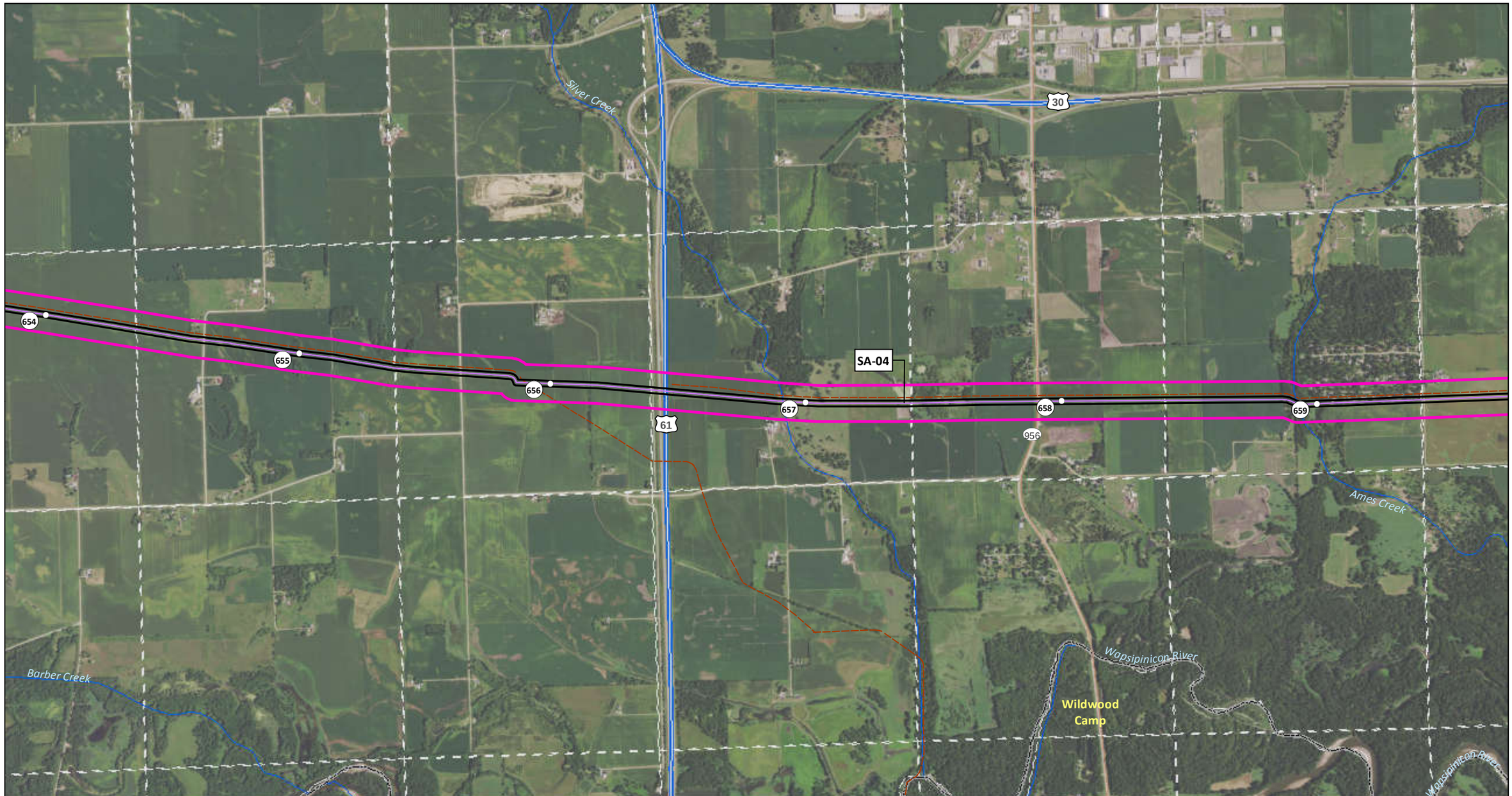

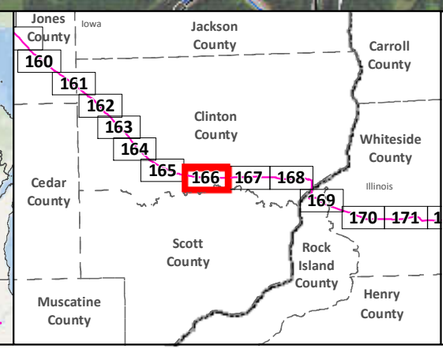

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
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Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 166A of 188

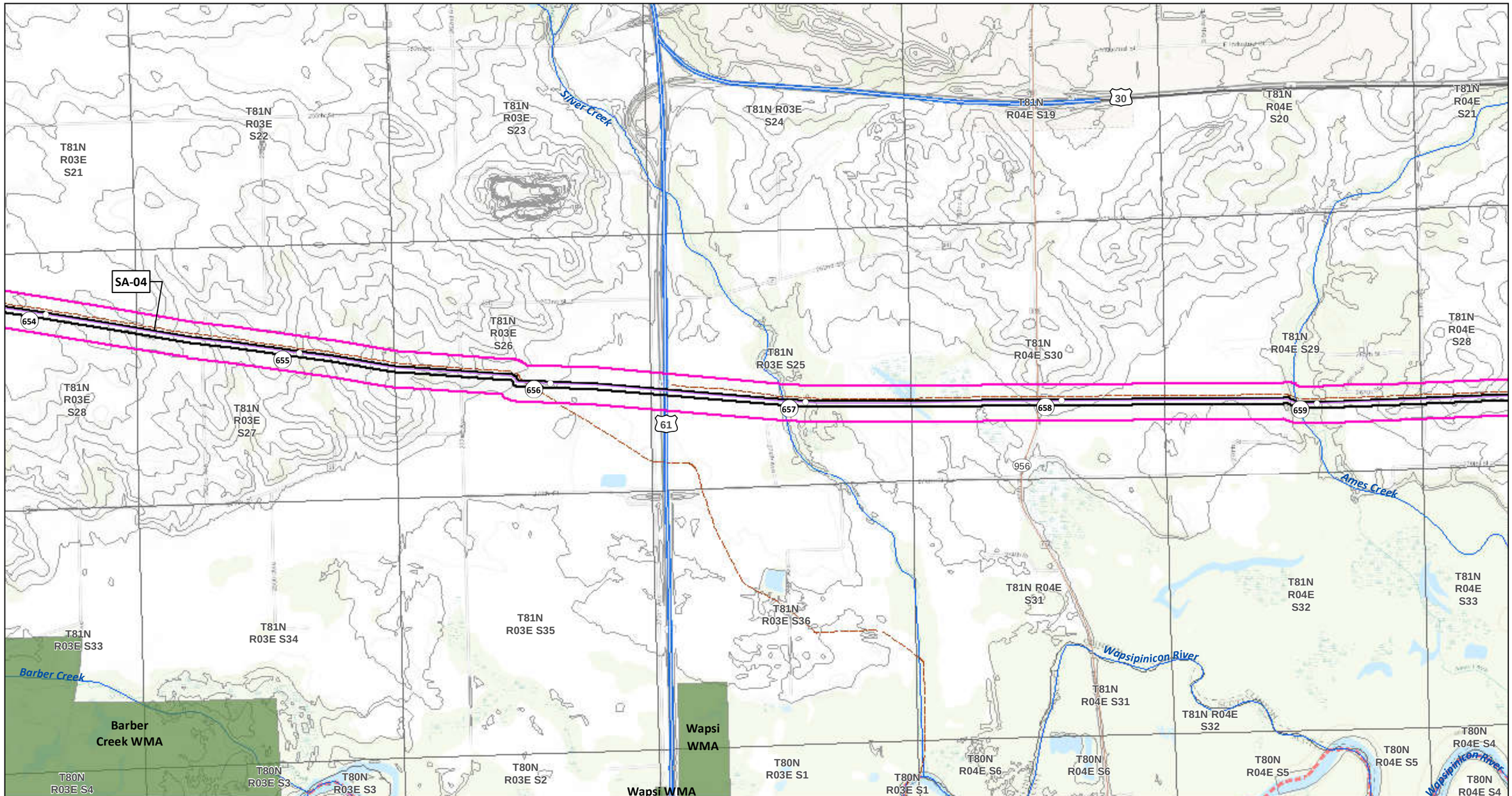

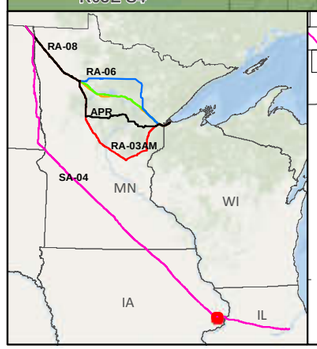

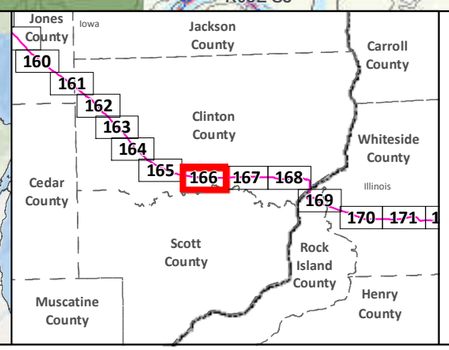

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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- RA-06
- RA-07
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Mile Post

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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 166B of 188

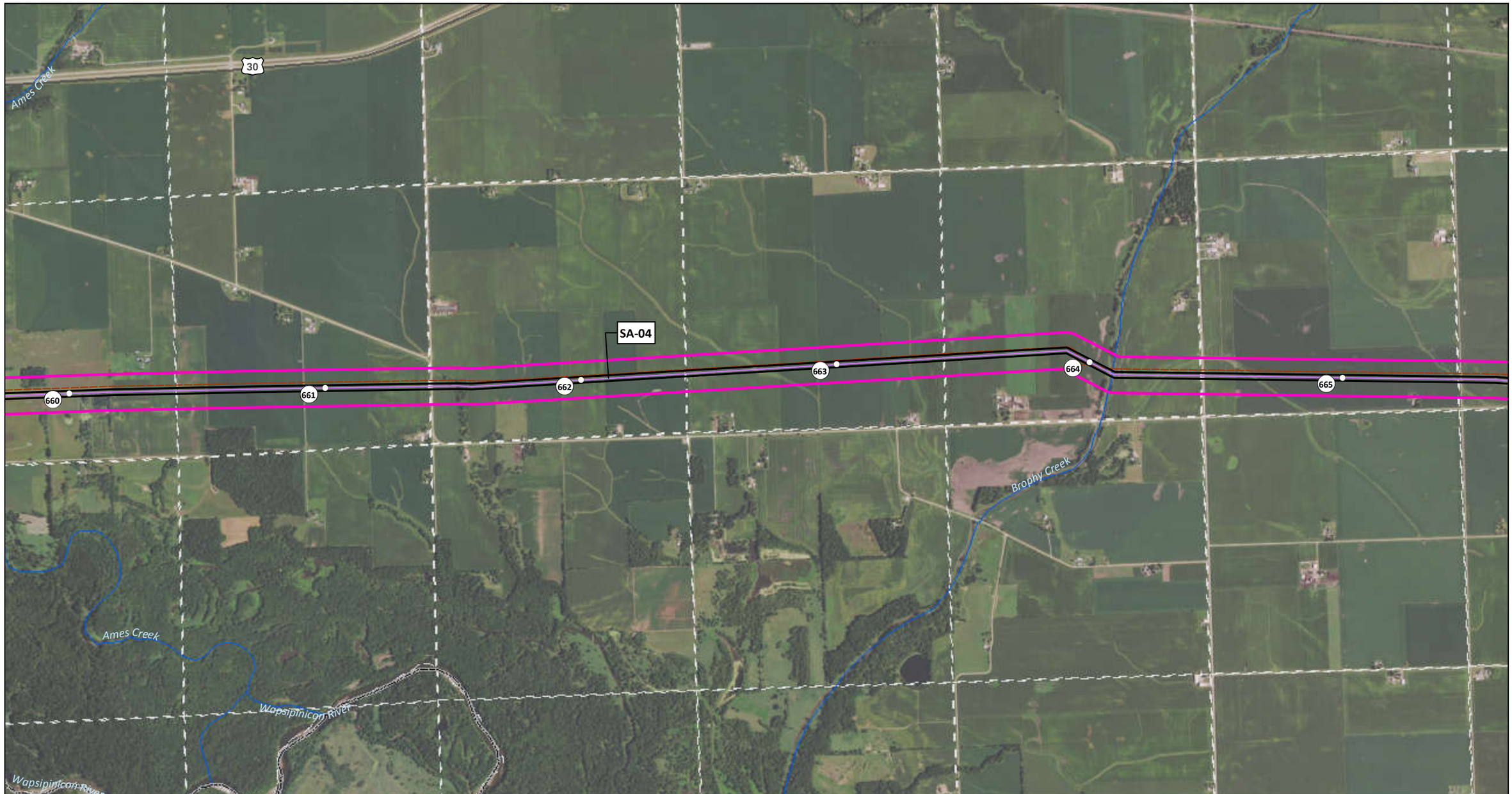

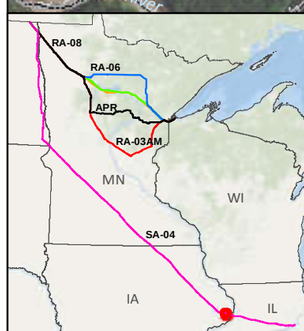

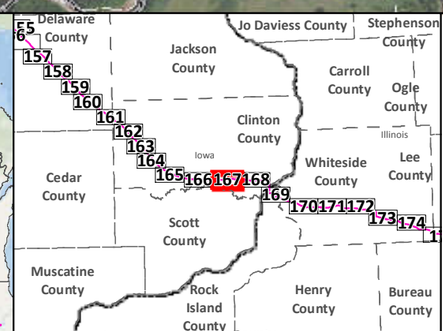

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 167A of 188

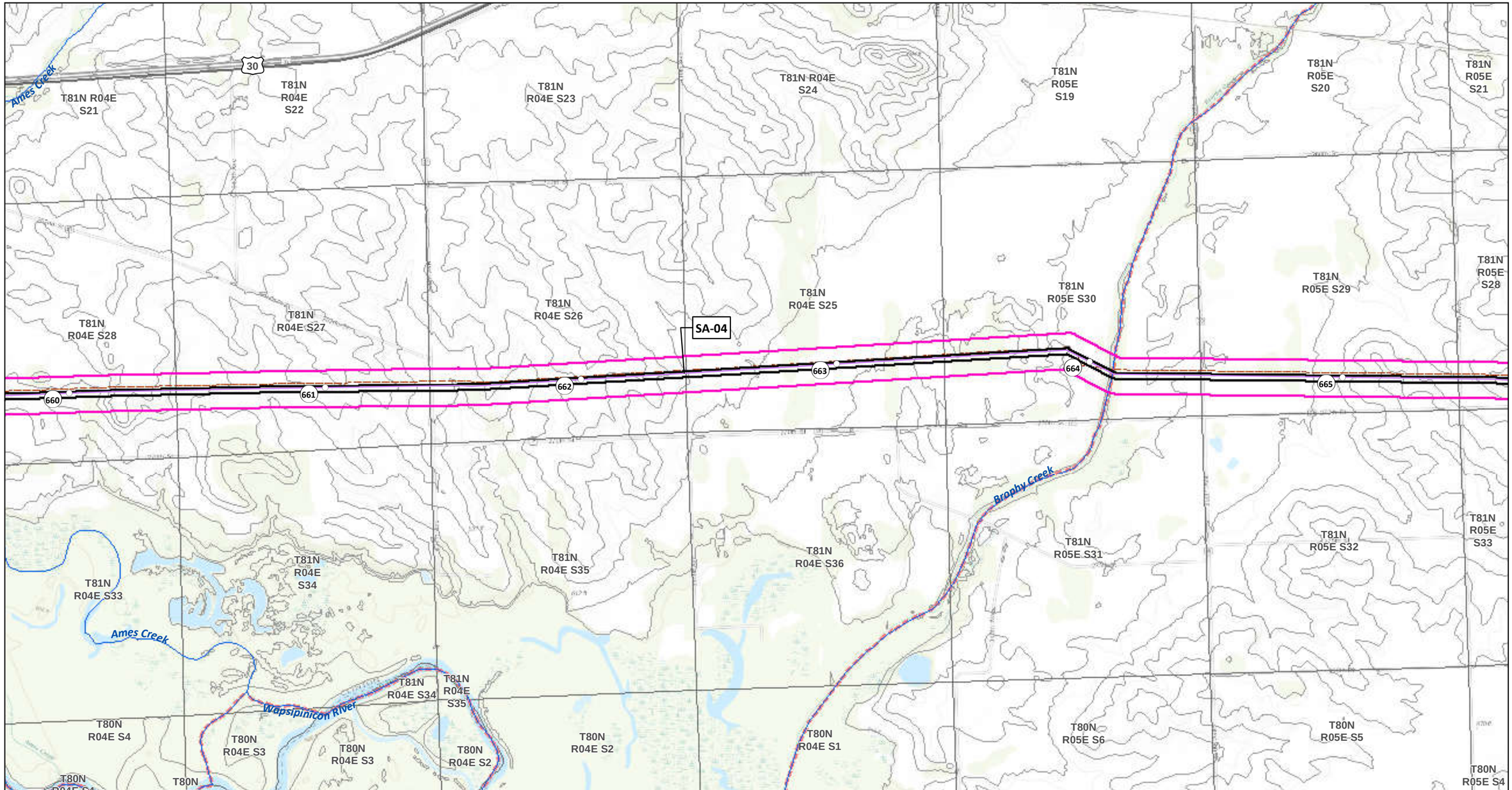

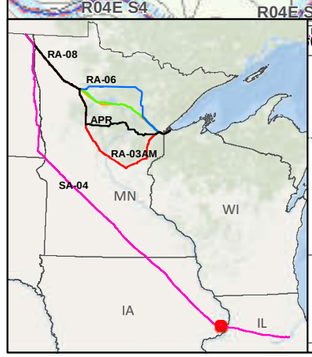

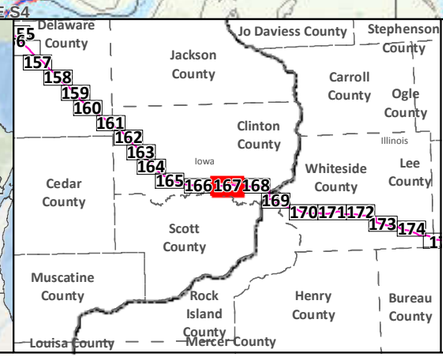

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

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Designated Trout Stream

Calcareous Fens

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Lakes of Biological Significance

- Outstanding
- High
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Native Plant Communities with Biodiversity Significance

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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 167B of 188

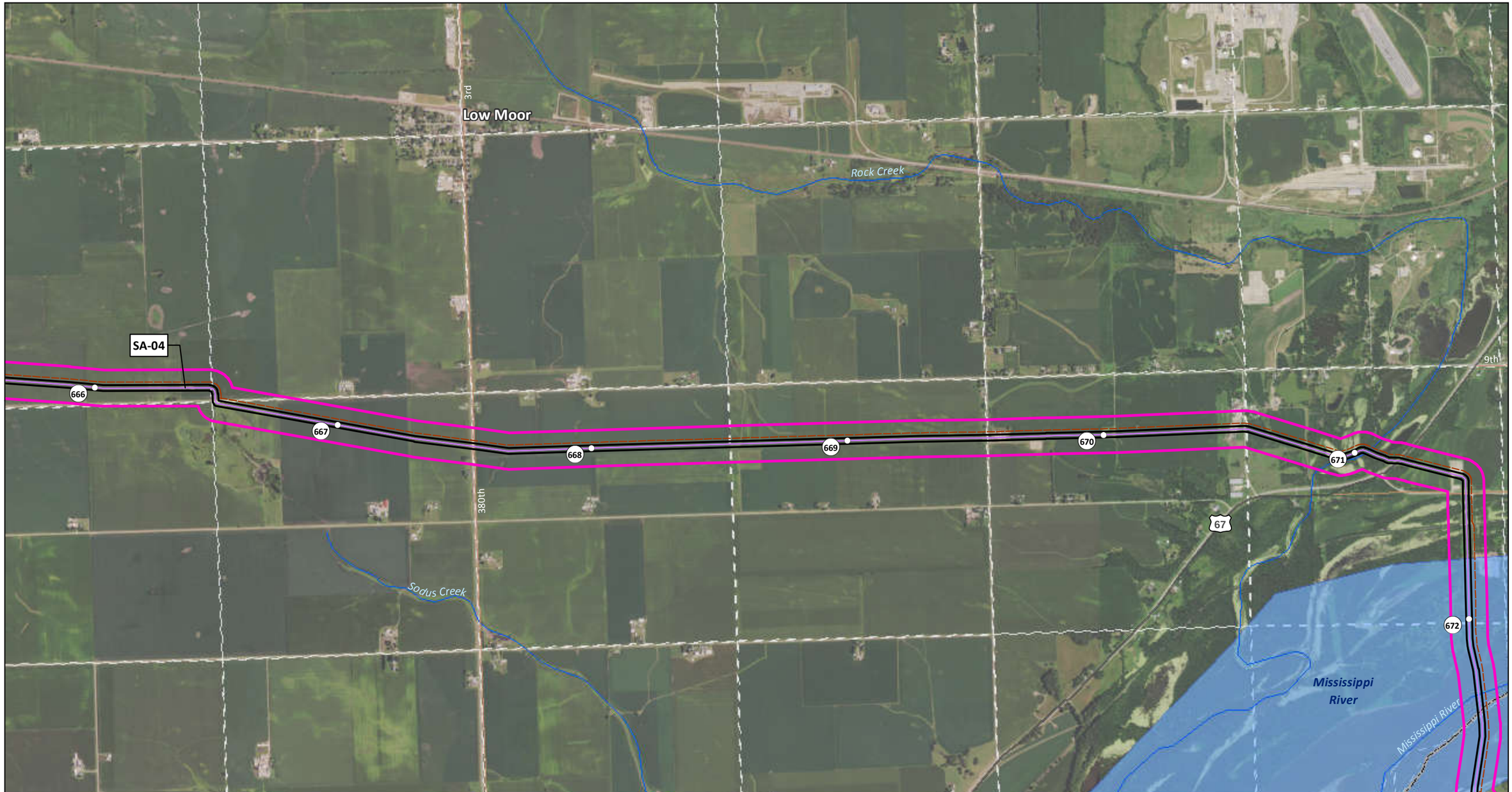

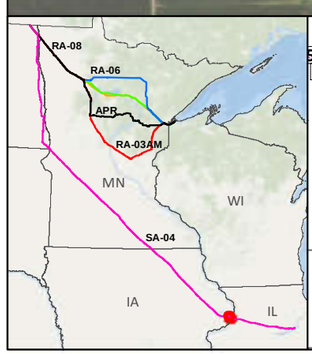

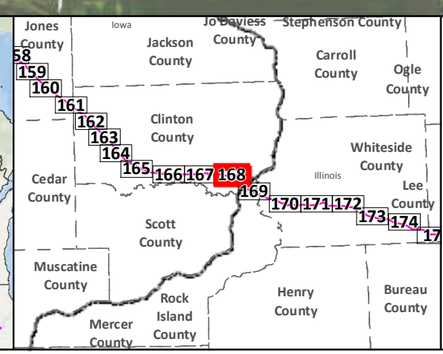

SA-04

Applicant's Preferred Route (APR)

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Route Width (750')

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River

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1:24,000

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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 168A of 188

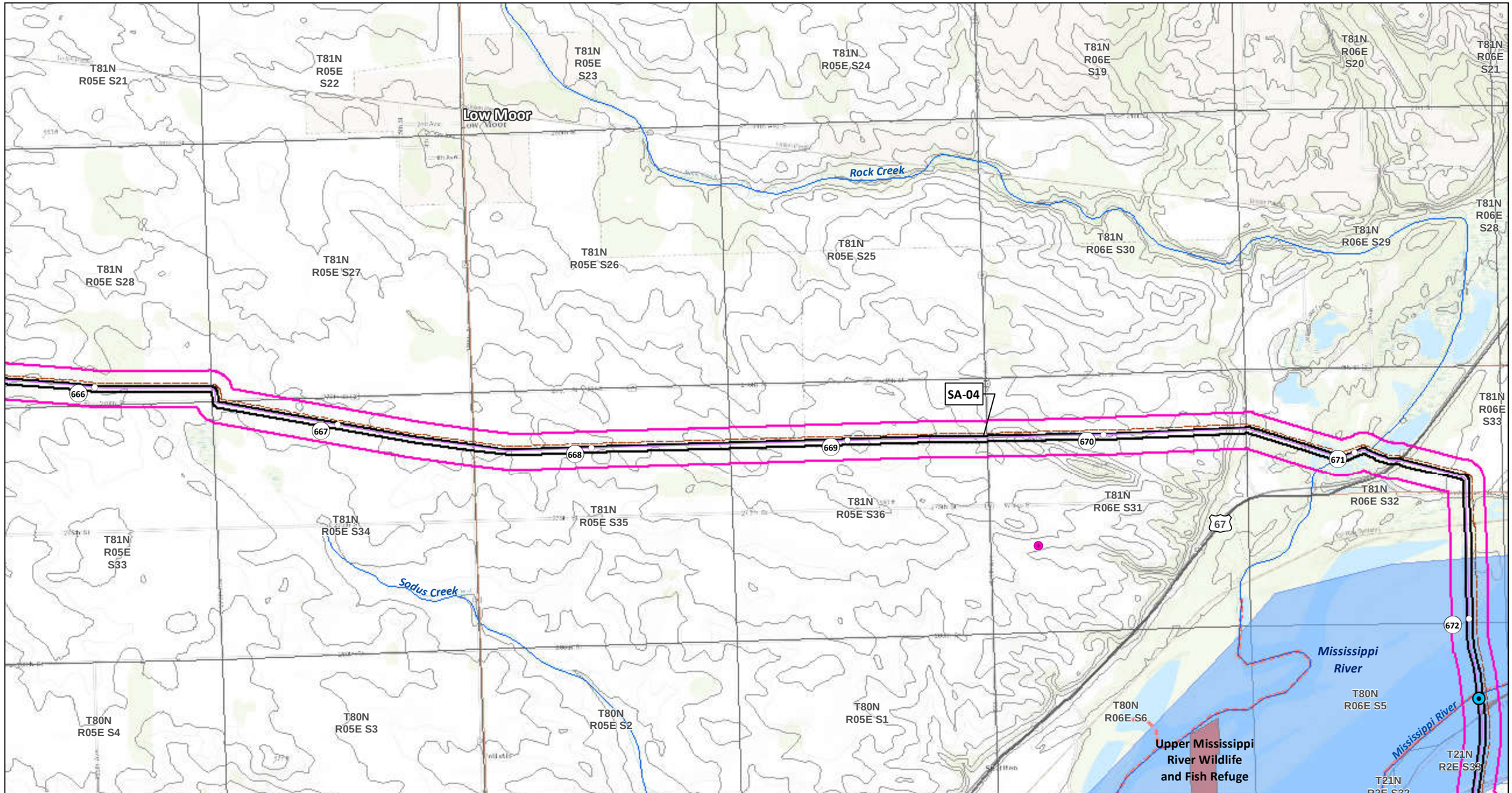

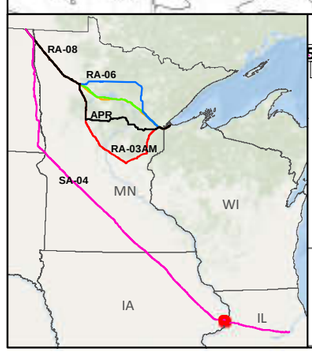

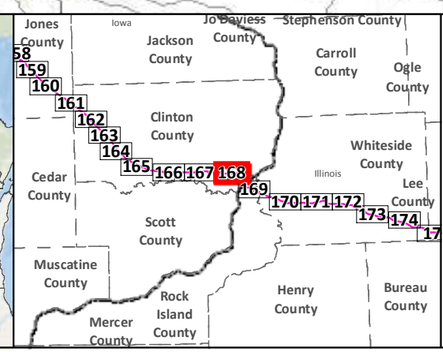

- SA-04
- Applicant's Preferred Route (APR)

Route Alternatives

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

10ft Contours

N

Map 168B of 188

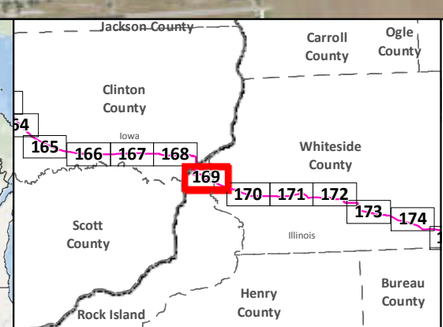

SA-04
Applicant's Preferred Route (APR)
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Route Width (750')
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Highway
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 169A of 188

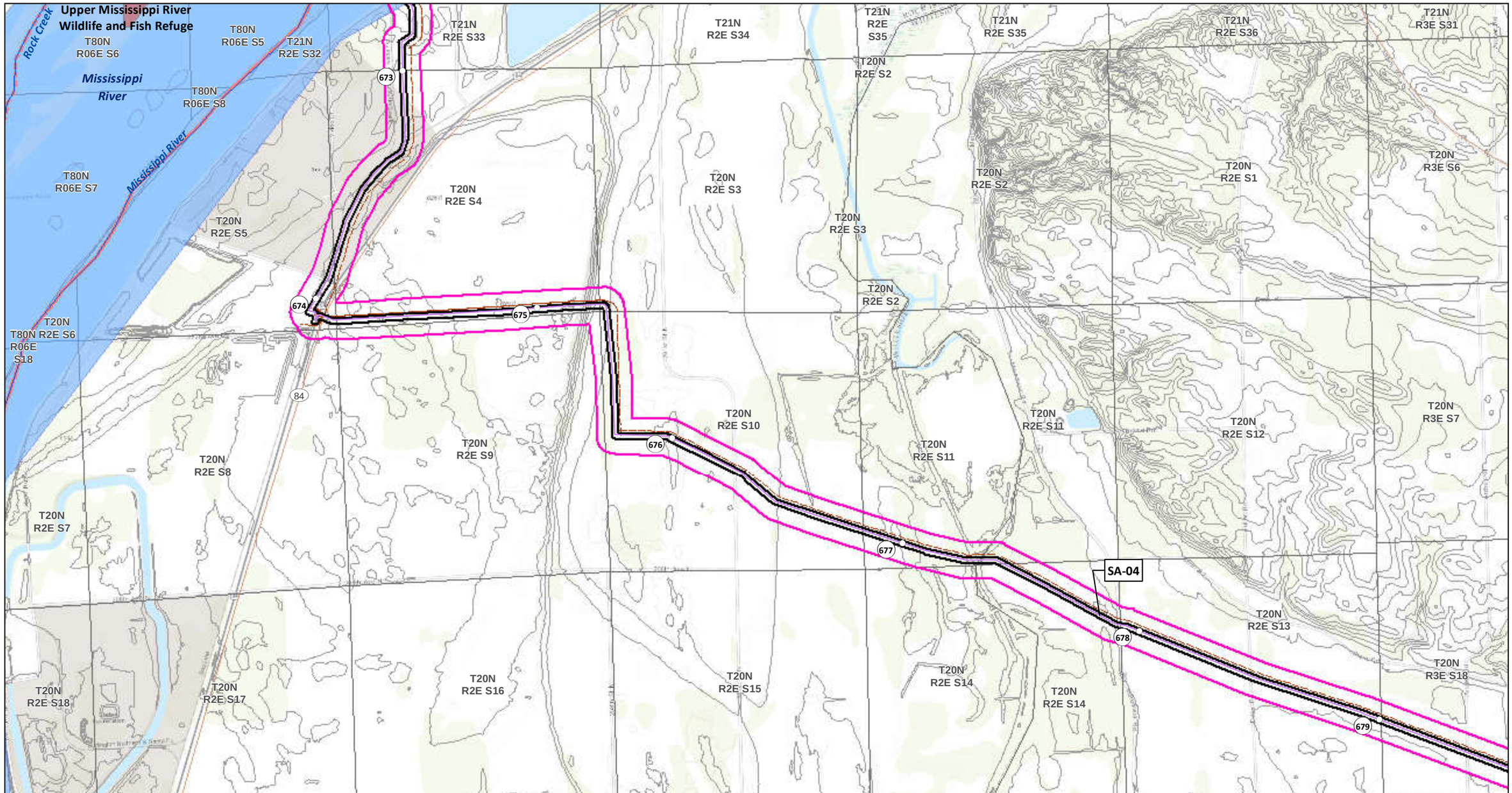

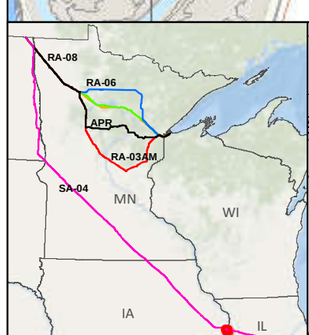

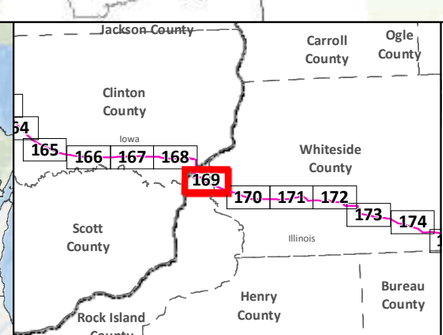

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

Map 169B of 188

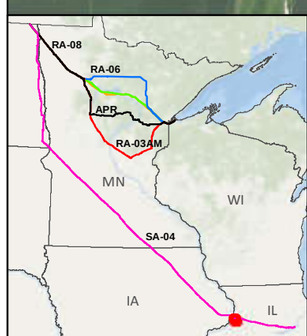

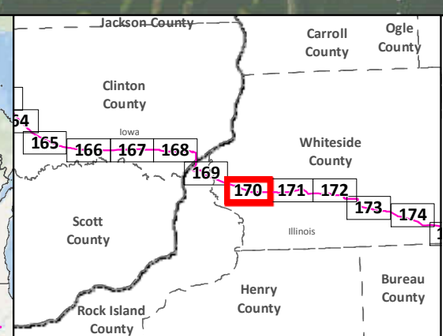

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 170A of 188

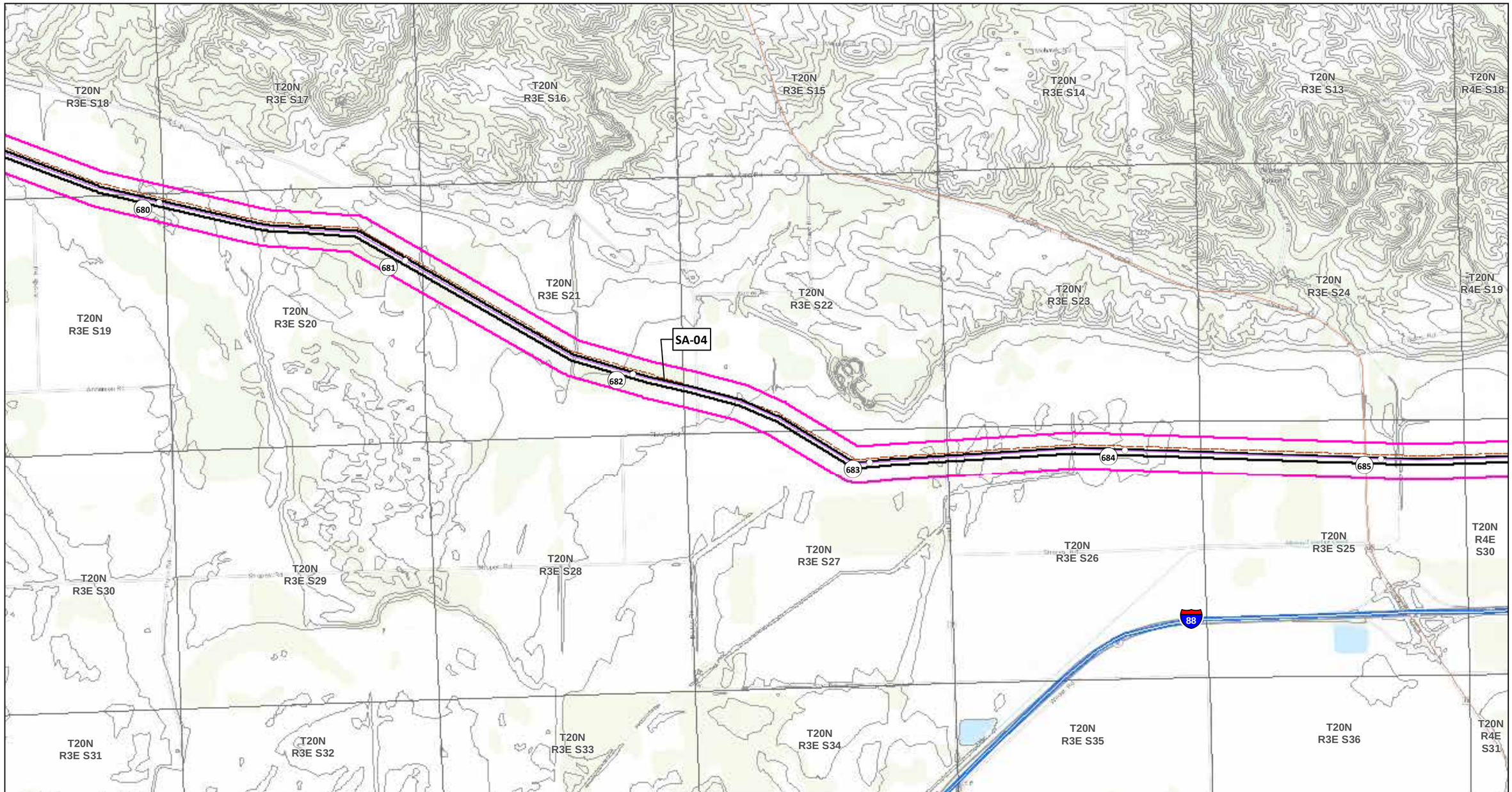

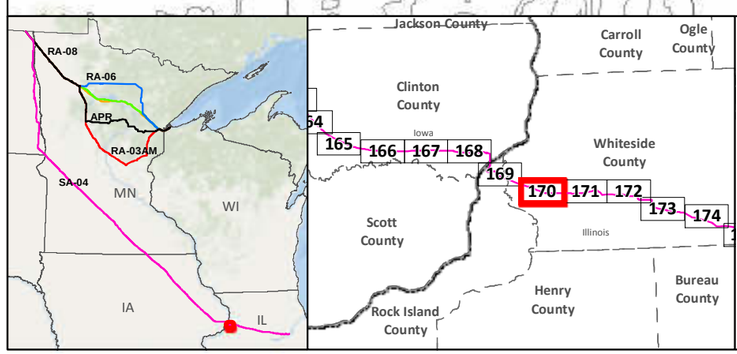

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

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303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

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Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

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- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 170B of 188

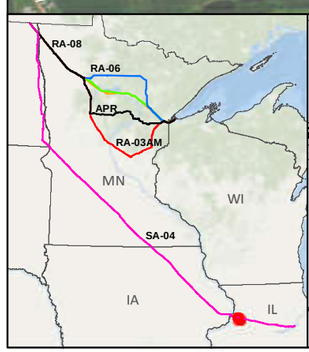

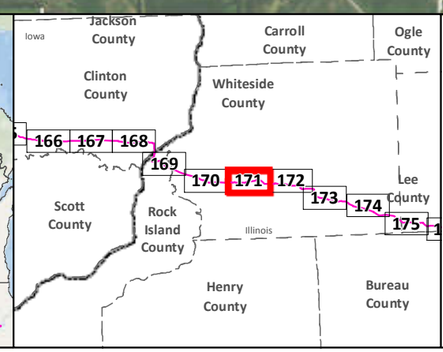

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 171A of 188

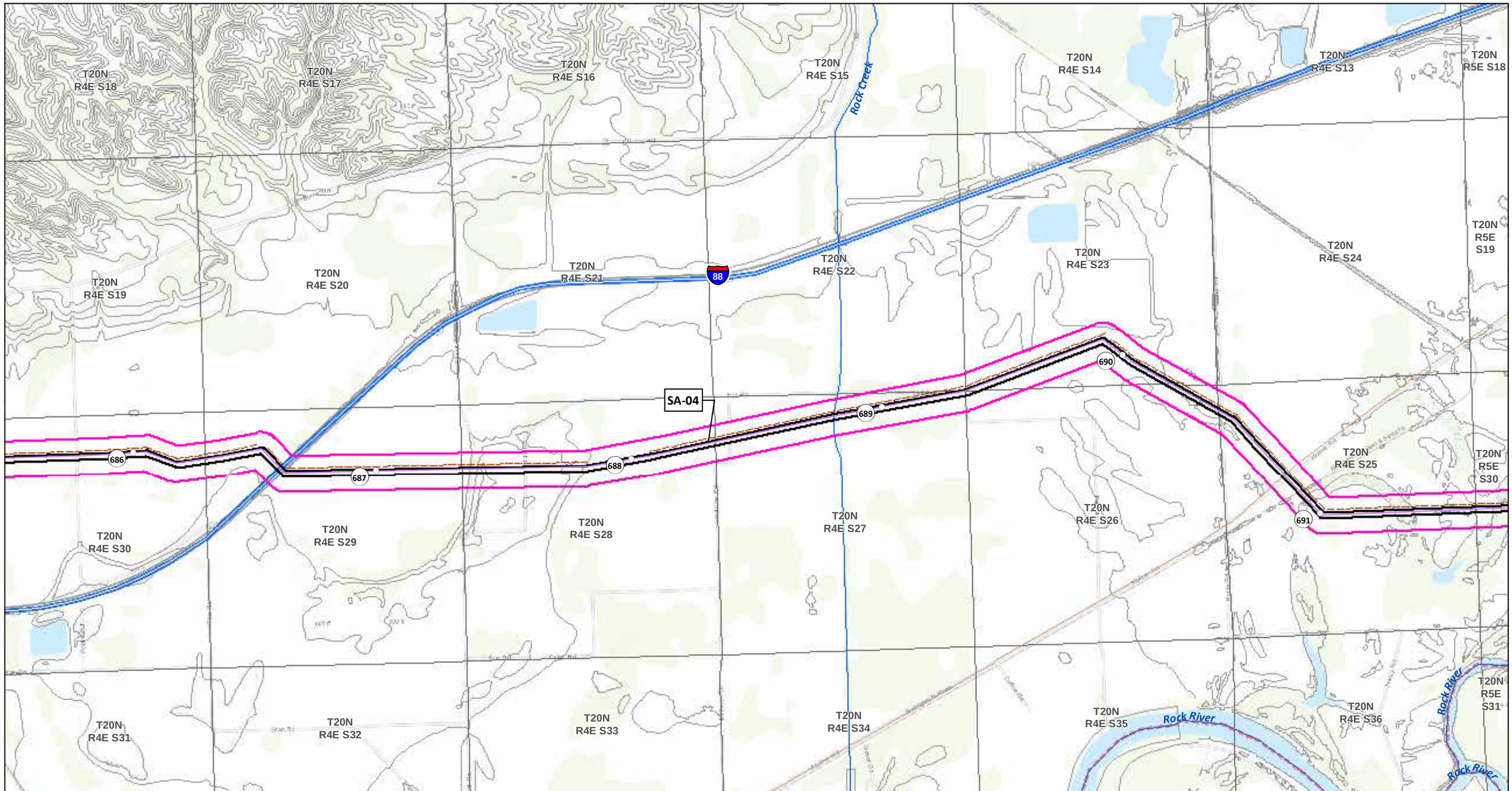

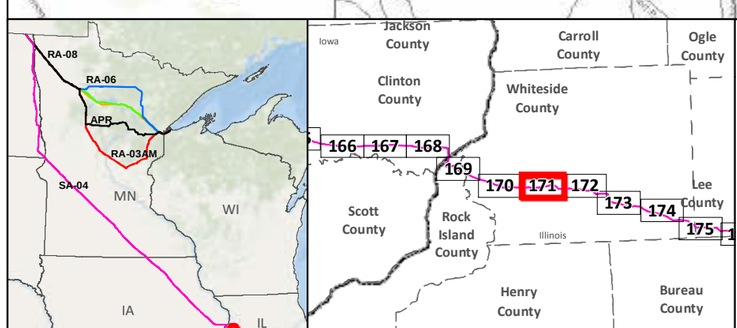

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 171B of 188

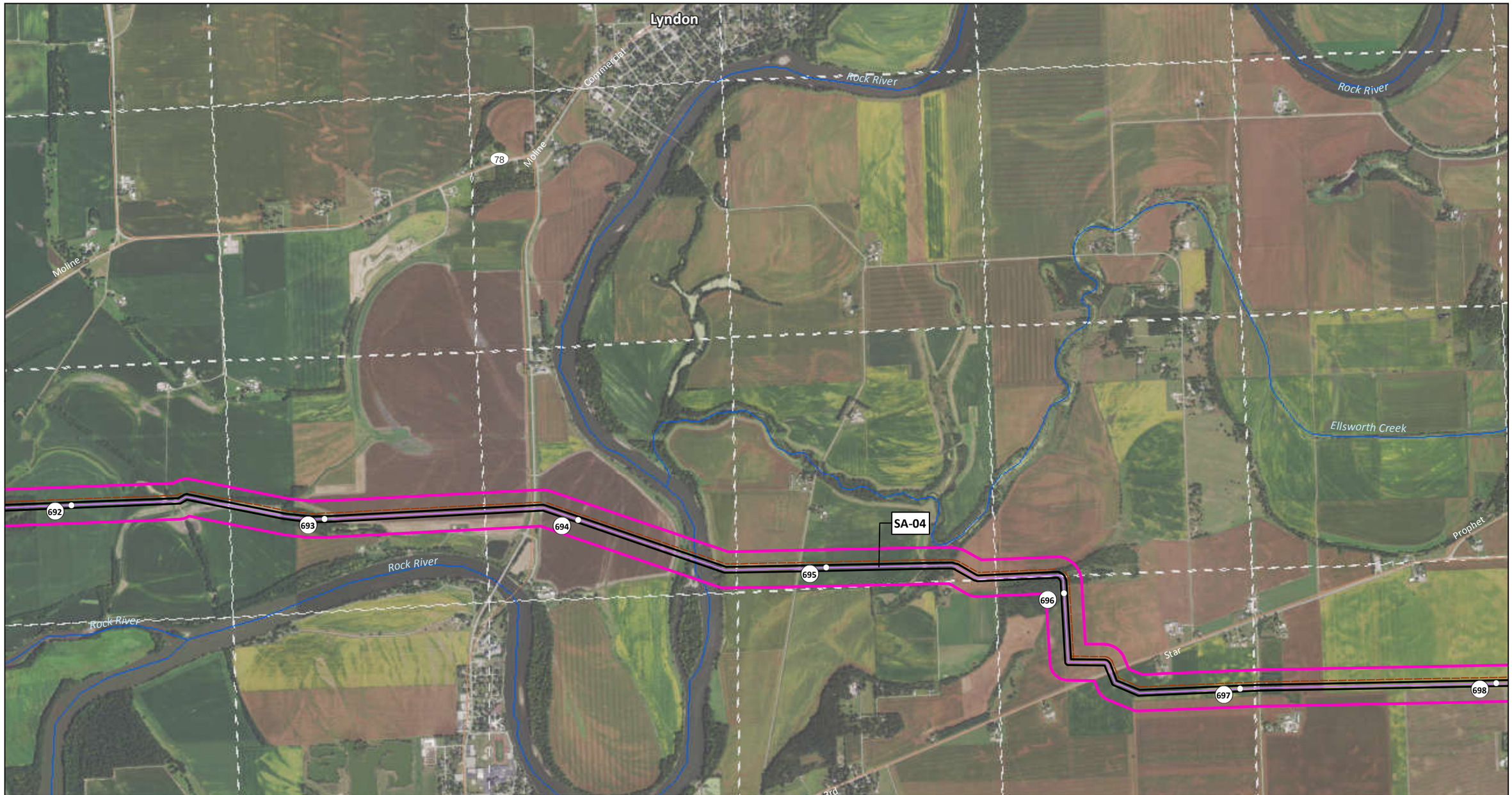

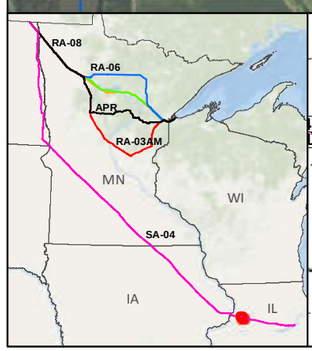

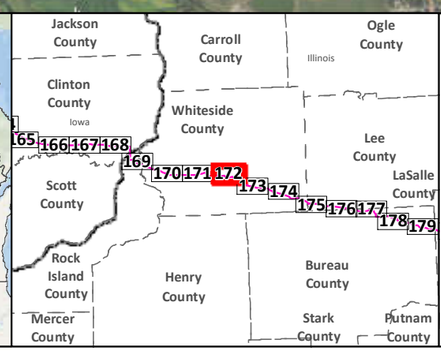

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 172A of 188

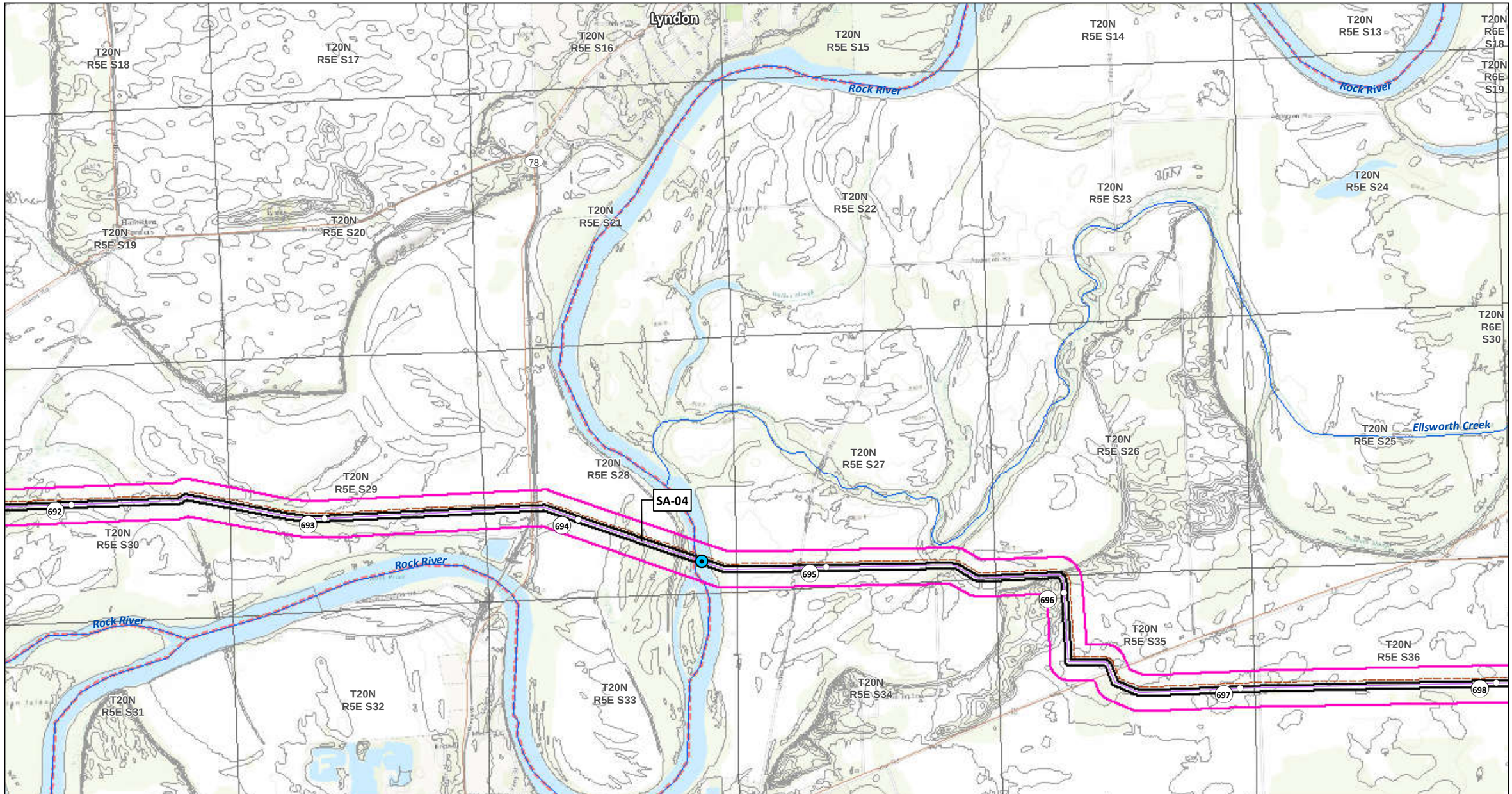

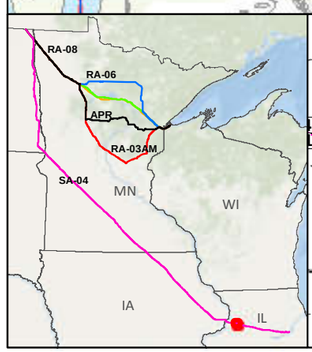

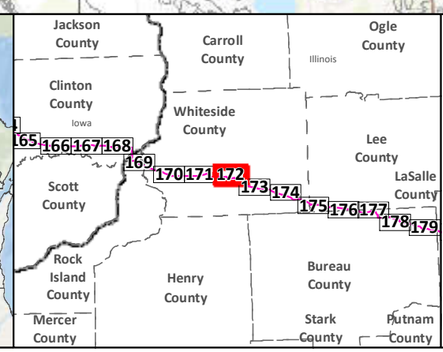

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 172B of 188

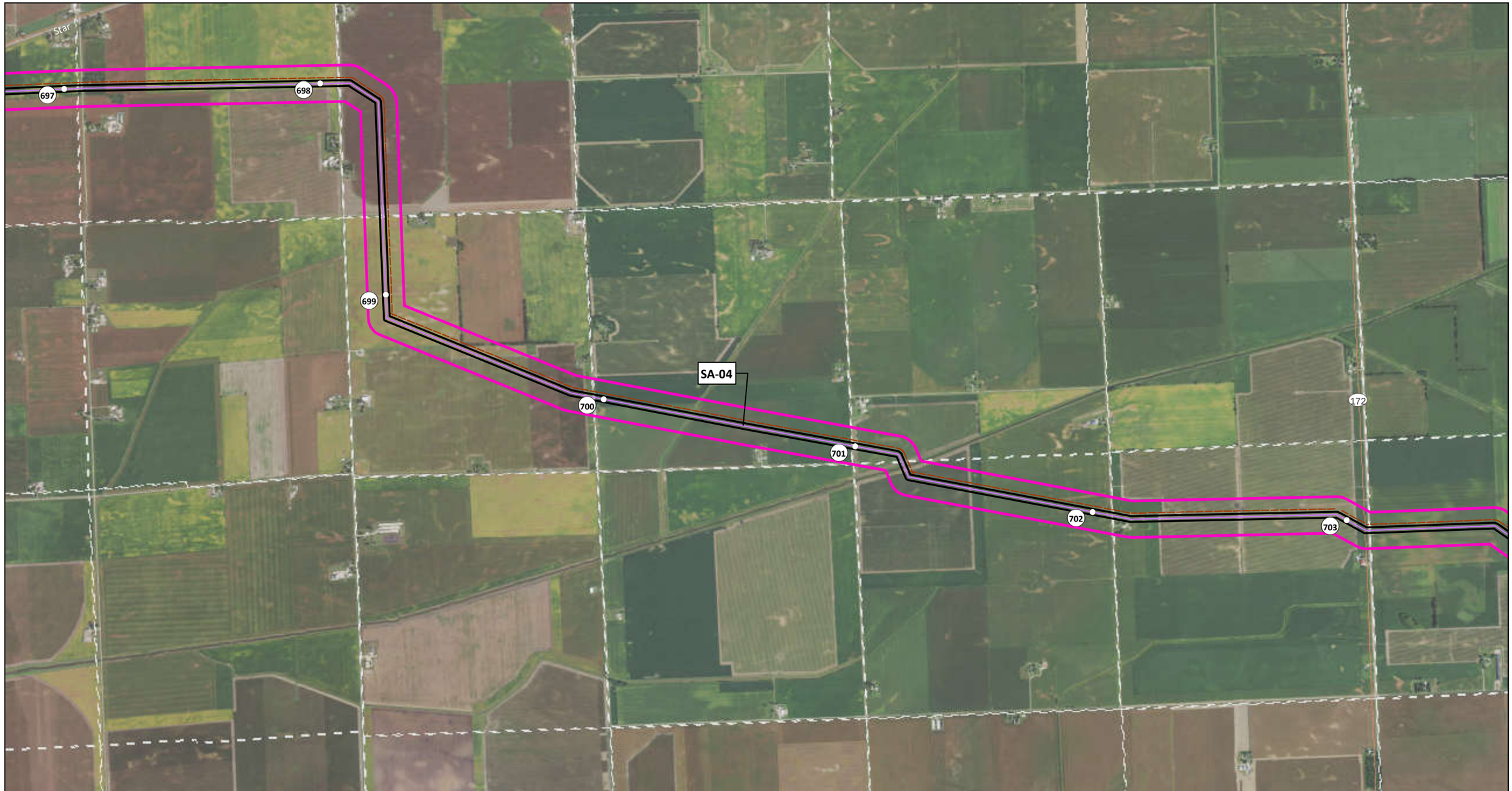

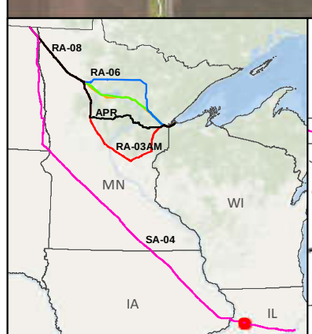

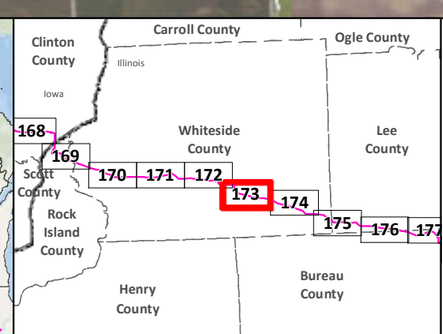

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 173A of 188

697
698
699
700
701
702
703
SA-04
172
T20N R5E S35
T20N R5E S36
T20N R6E S31
T20N R6E S32
T20N R6E S33
T20N R6E S34
T20N R6E S35
T19N R5E S2
T19N R5E S1
T19N R6E S6
T19N R6E S5
T19N R6E S4
T19N R6E S3
T19N R6E S2
T19N R5E S11
T19N R5E S12
T19N R6E S7
T19N R6E S8
T19N R6E S9
T19N R6E S10
T19N R6E S11
T19N R5E S14
T19N R5E S13
T19N R6E S18
T19N R6E S17
T19N R6E S16
T19N R6E S15
T19N R6E S14

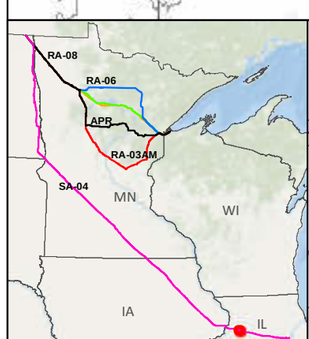

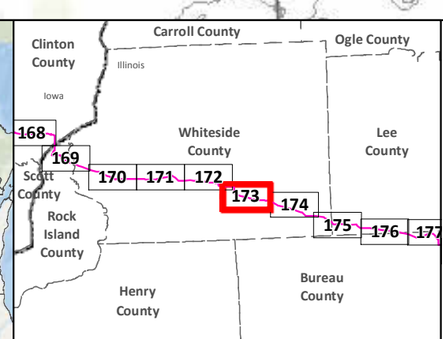

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
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Water Resources
- Navigable Waterway Crossings
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Public Waters Watercourse
303d Imparied Waters
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Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 173B of 188

Hennepin
Canal Parkway
State Park

704

705

706

707

708

709

710

SA-04

88

Hennepin
Canal Parkway
State Park

Hahnaman

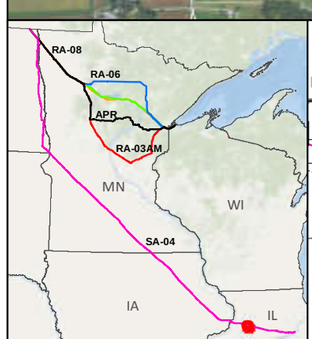

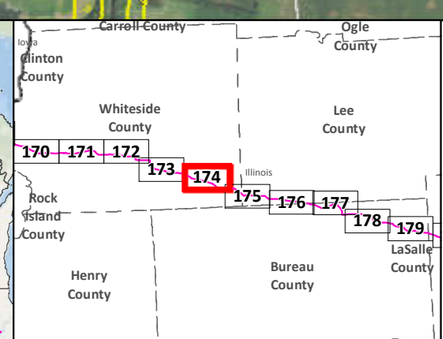

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
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Highway
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State Forest
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Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
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Data Sources:
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 174A of 188

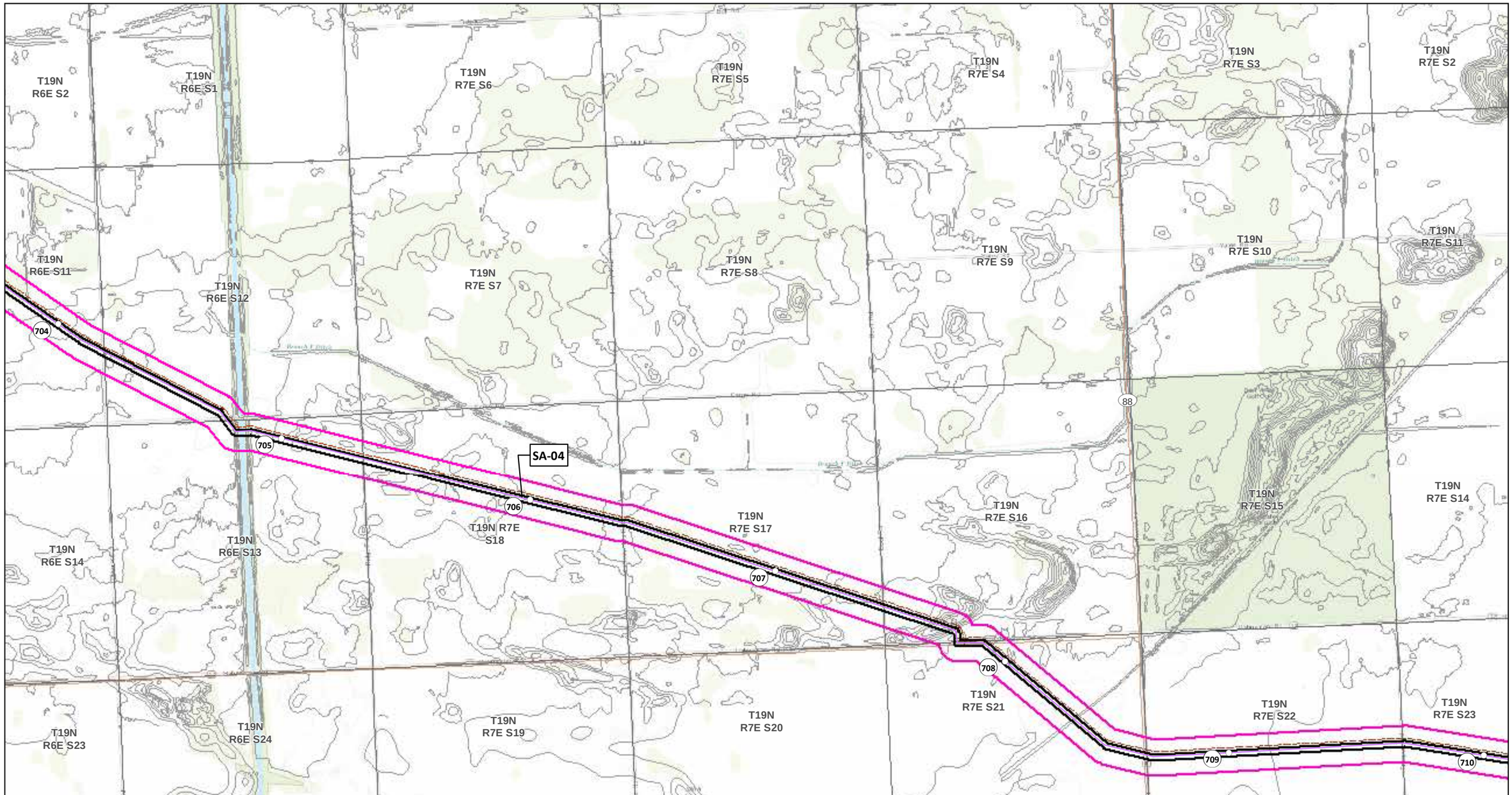

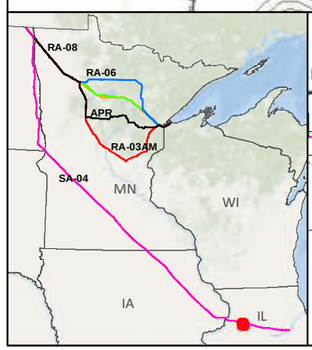

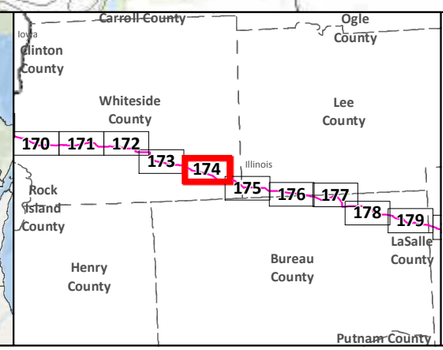

SA-04

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 174B of 188

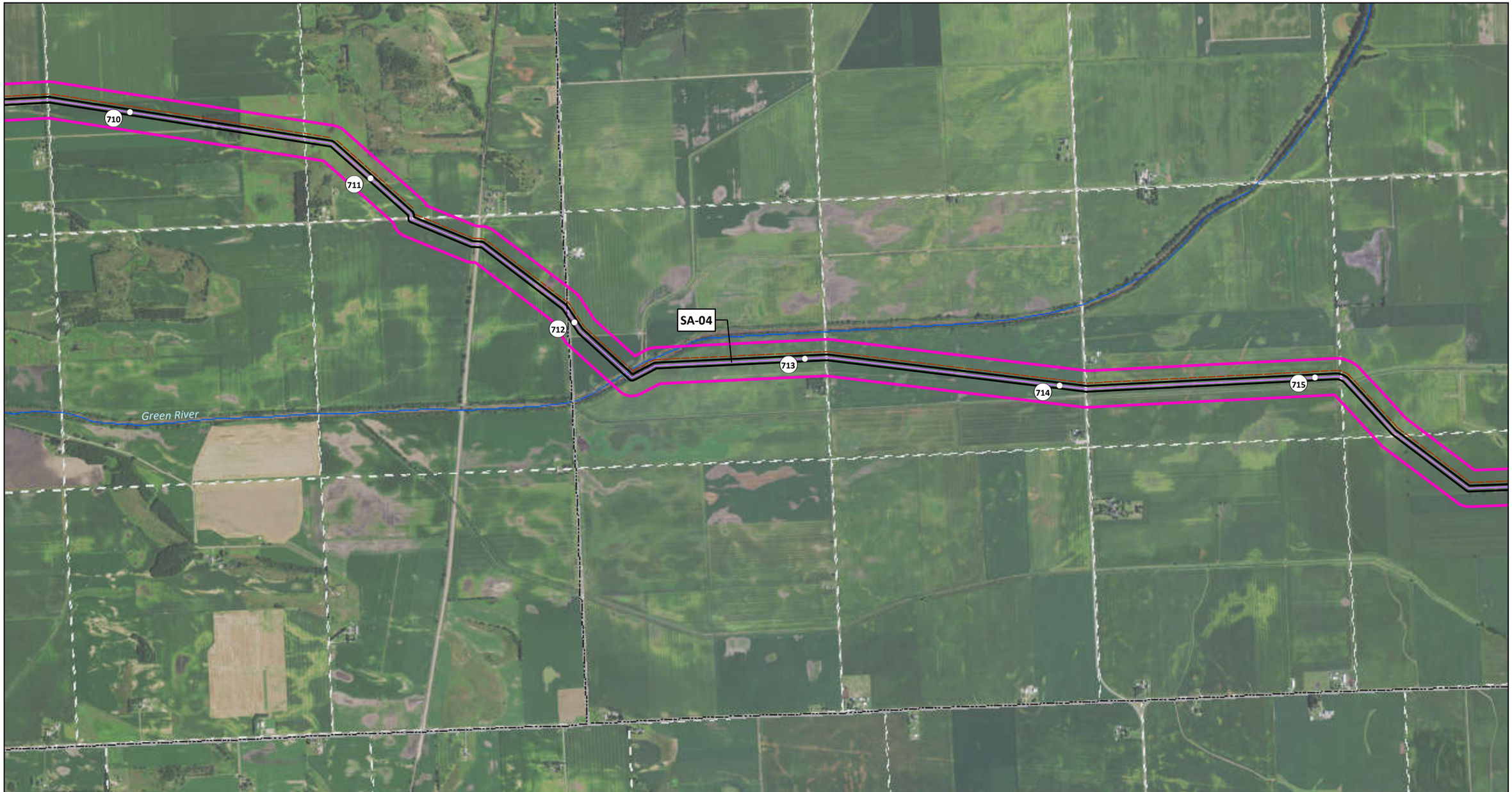

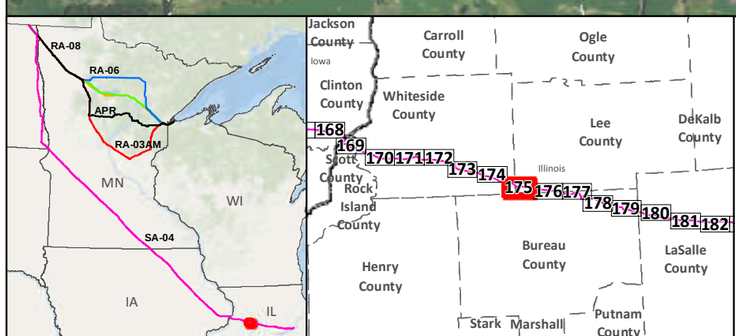

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

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National Forest

Tribal Reservation

Water Resources

Lake

River

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0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 175A of 188

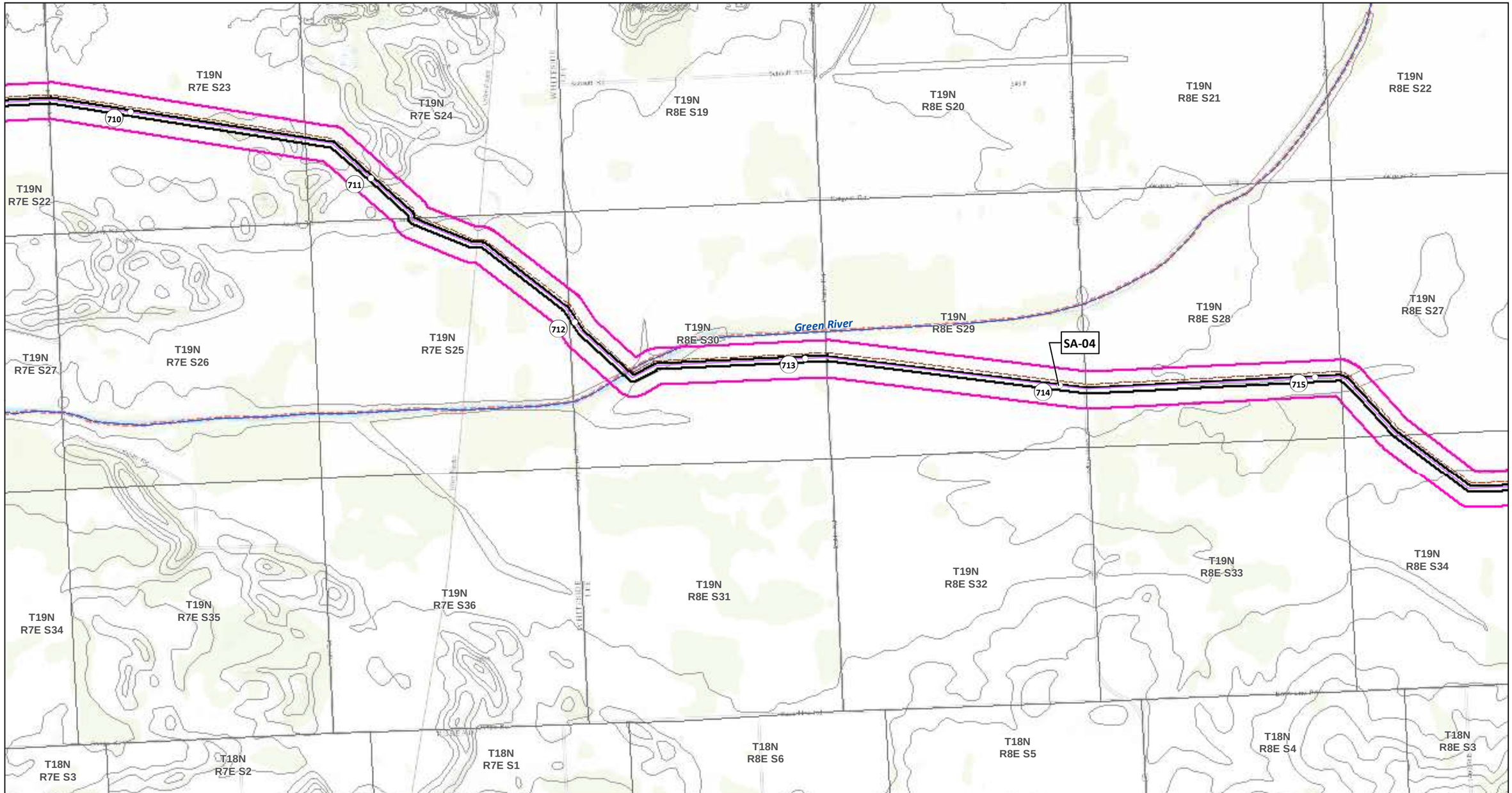

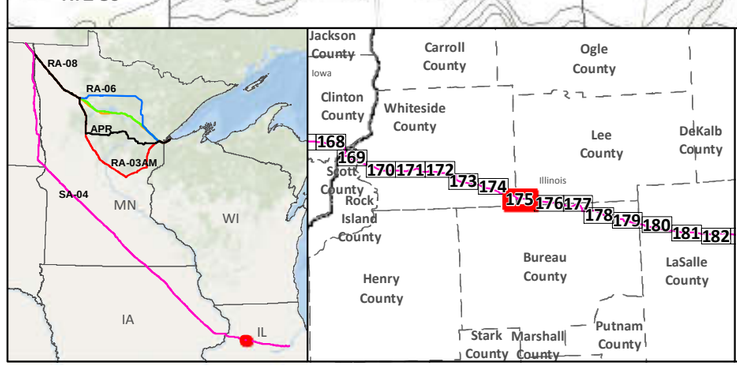

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
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- RA-06
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 175B of 188

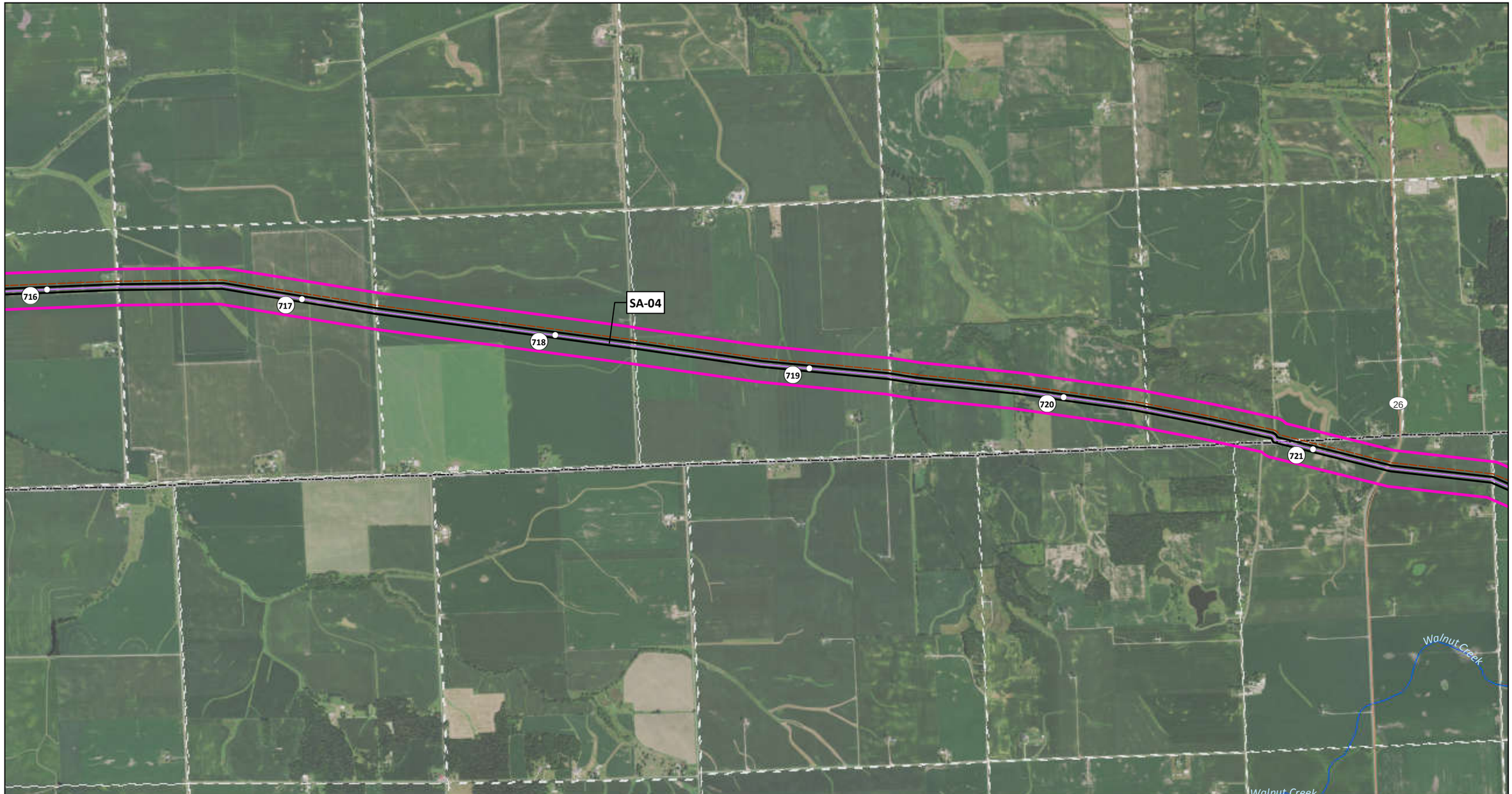

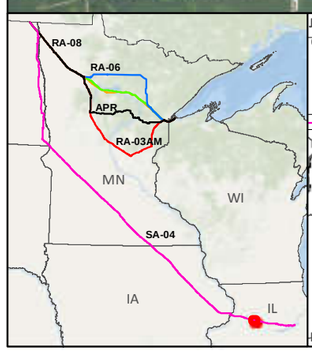

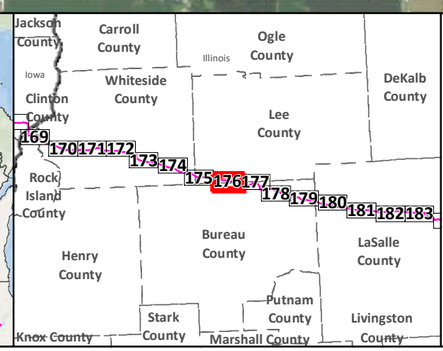

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 176A of 188

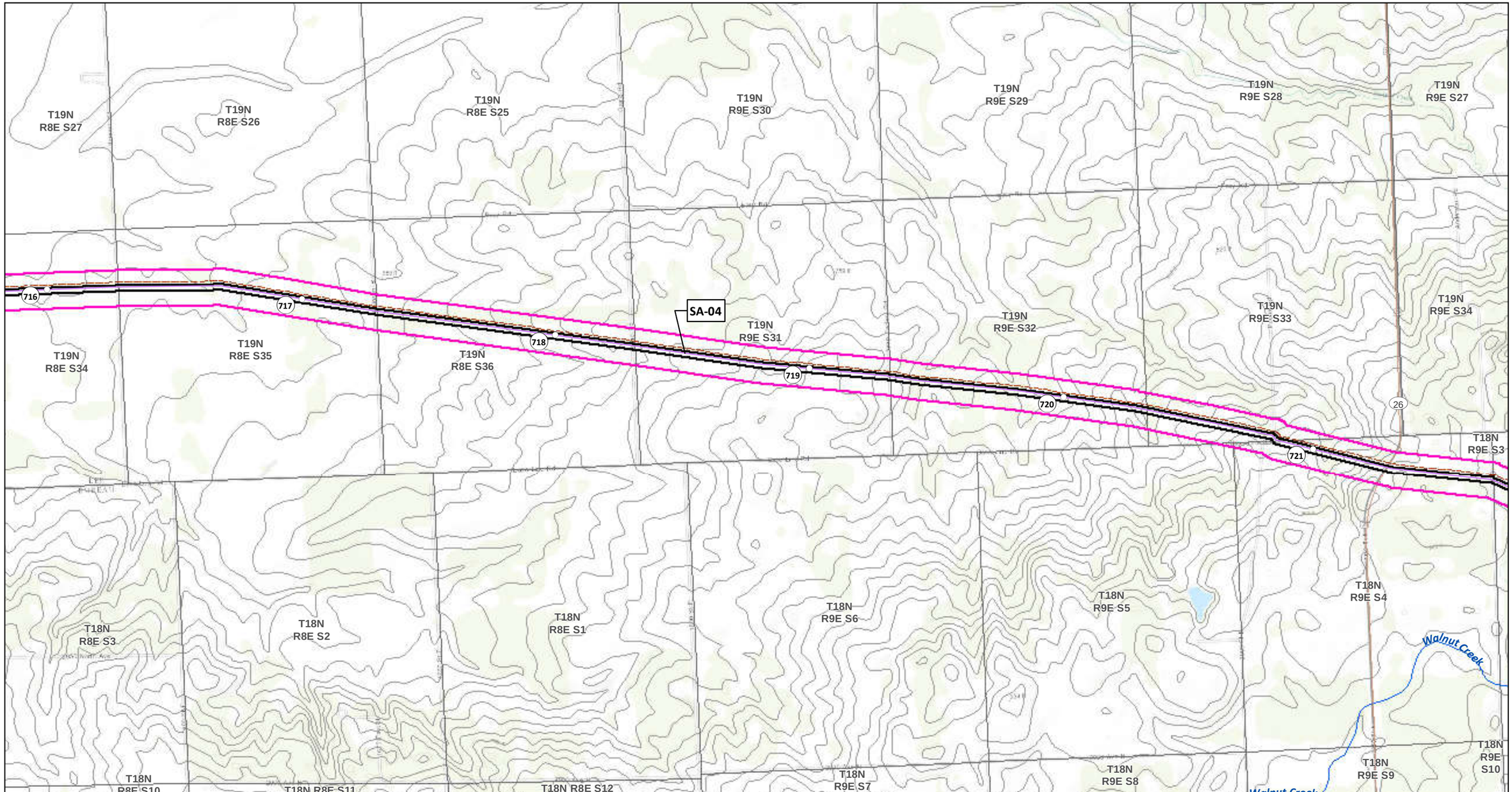

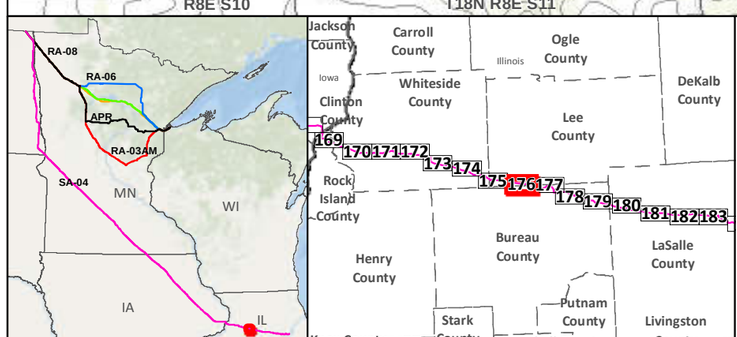

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 176B of 188

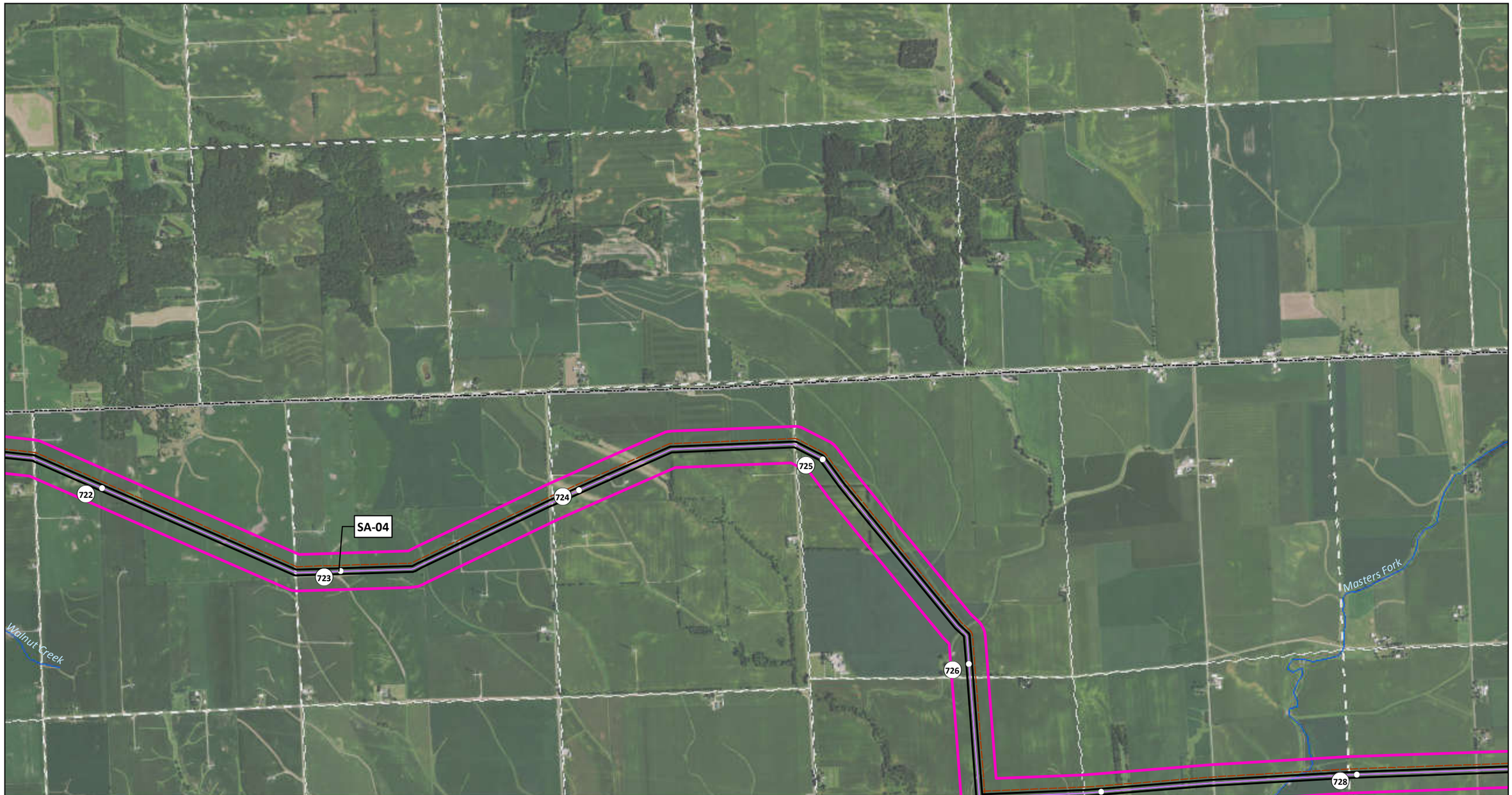

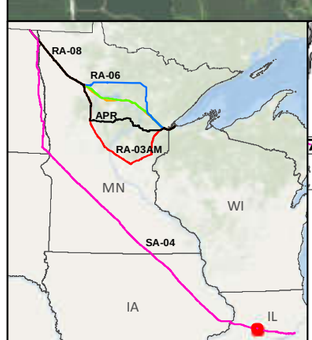

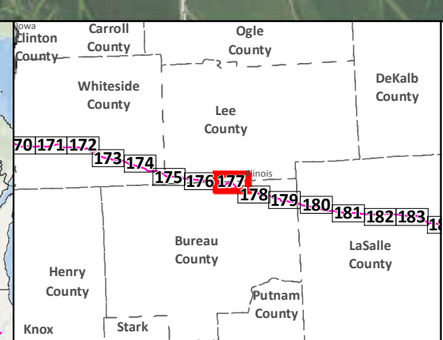

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

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Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 177A of 188

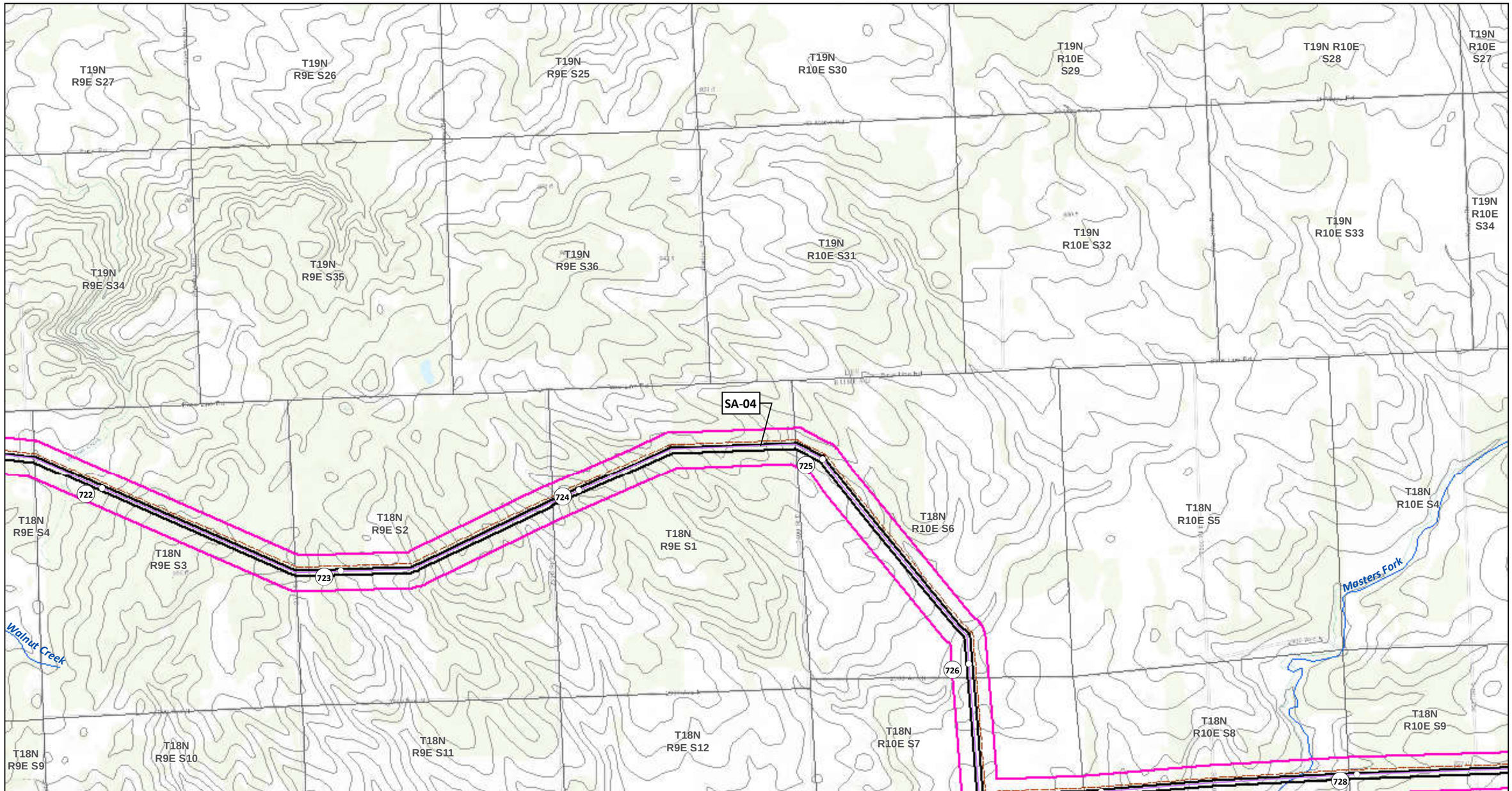

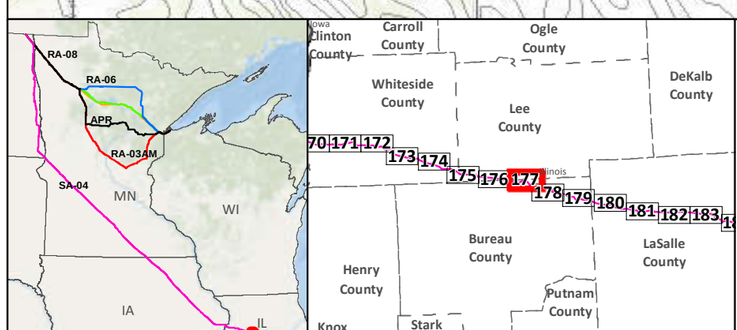

SA-04

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 177B of 188

SA-04

727 728 729 730 731 732 733

92

Big Bureau Creek

34

La Moille

Pike Creek

Masters Fork

89

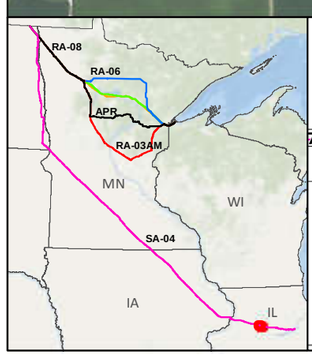

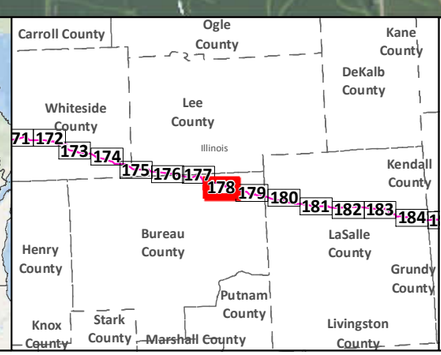

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

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Interstate

Highway

Major Road

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Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 178A of 188

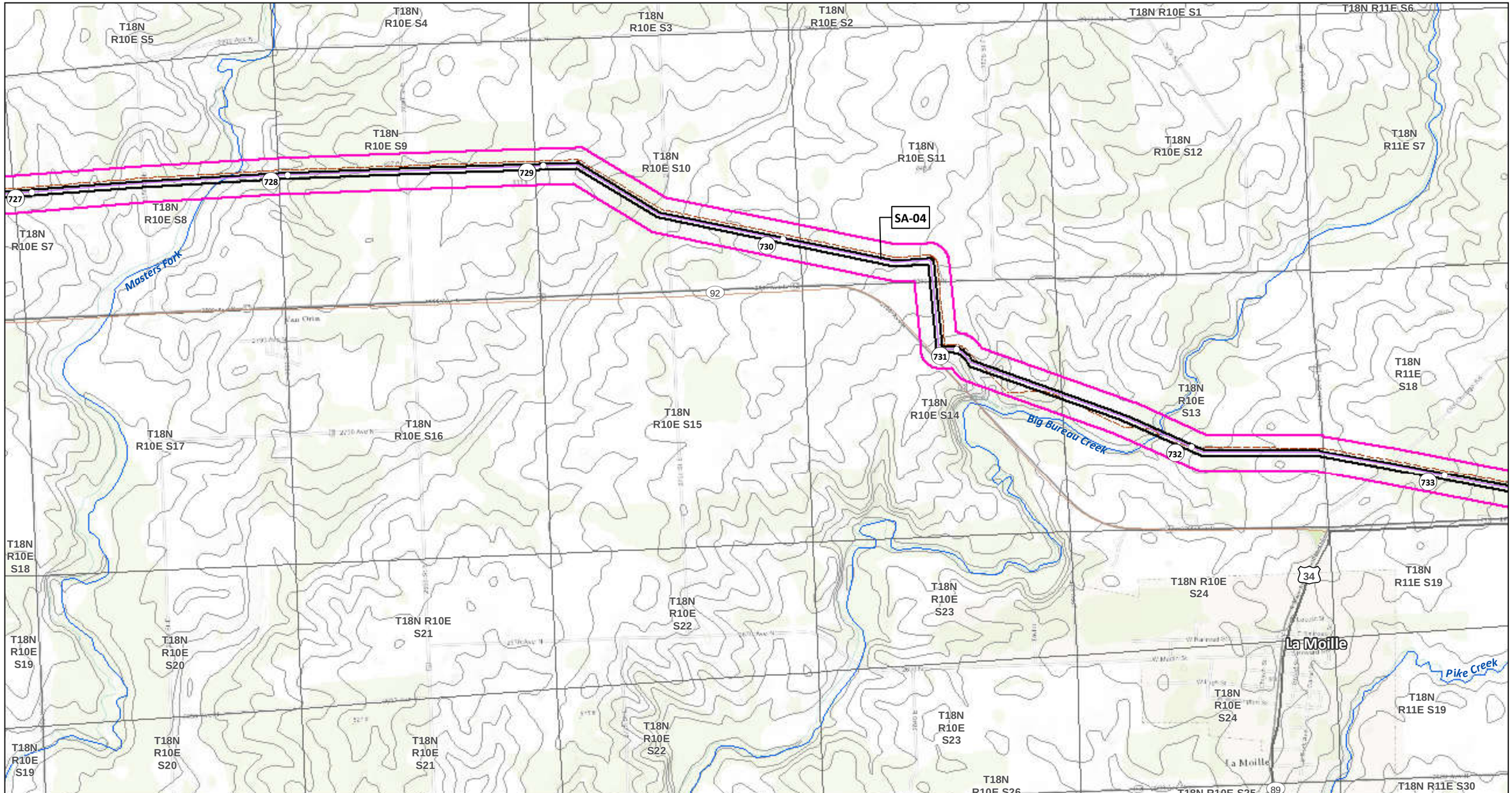

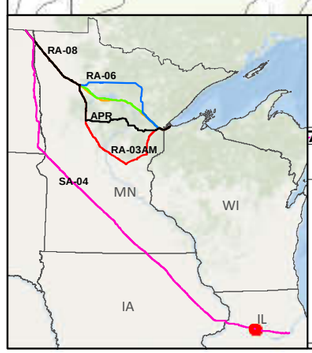

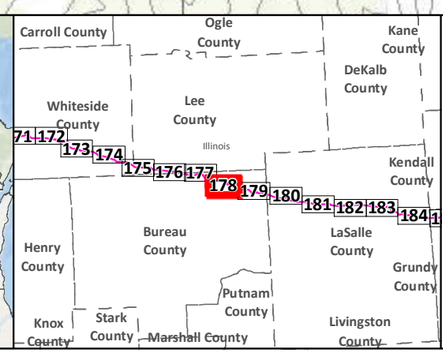

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

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- SNA - Scientific and Natural Area

Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

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Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 178B of 188

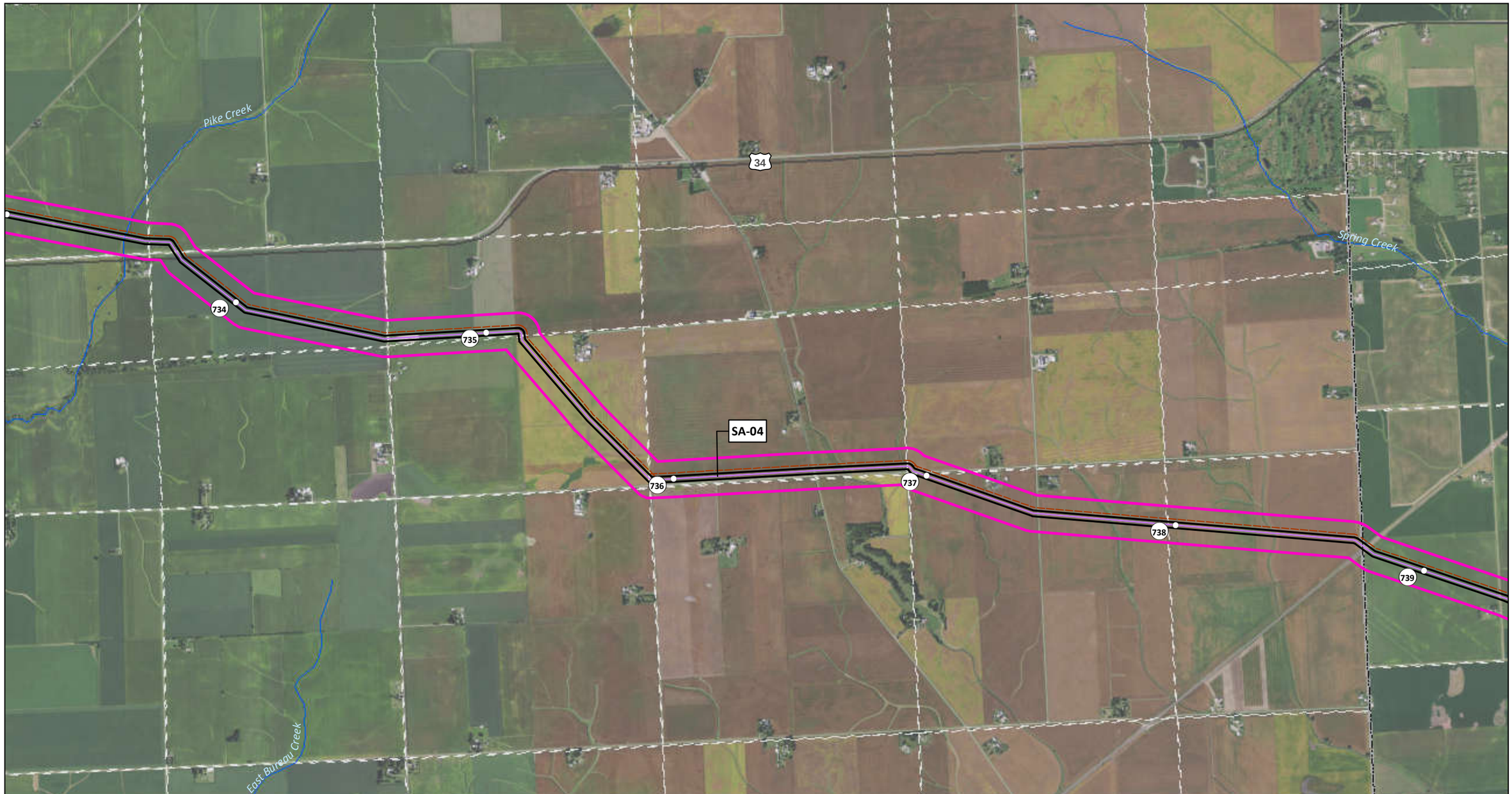

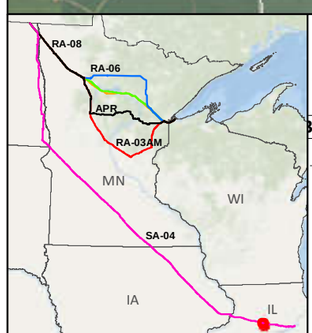

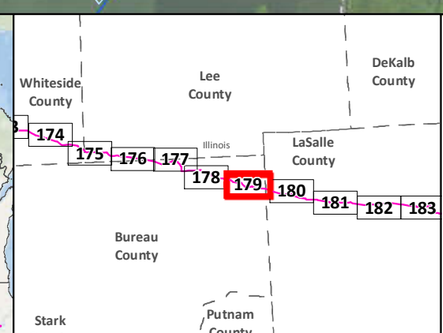

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 179A of 188

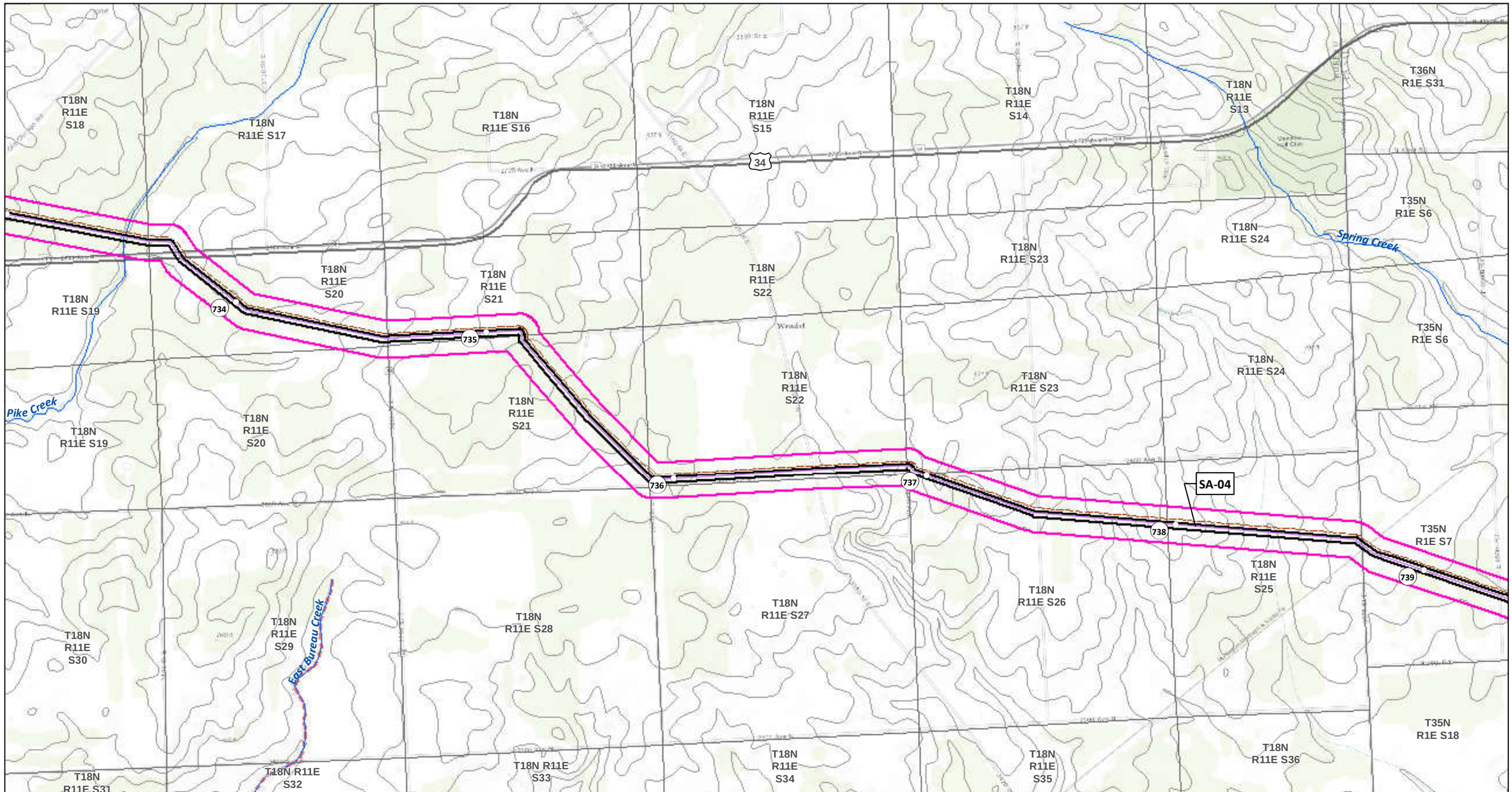

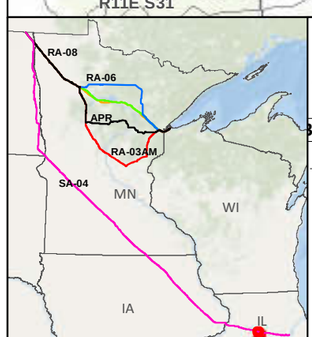

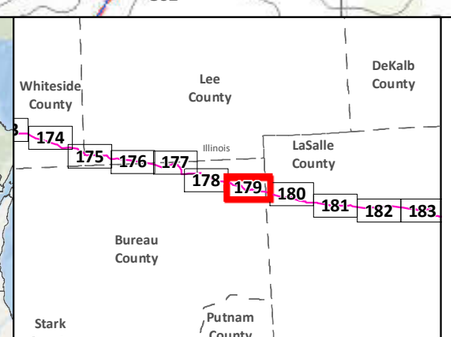

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
- Wild Rice Lakes (DNR)
- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 179B of 188

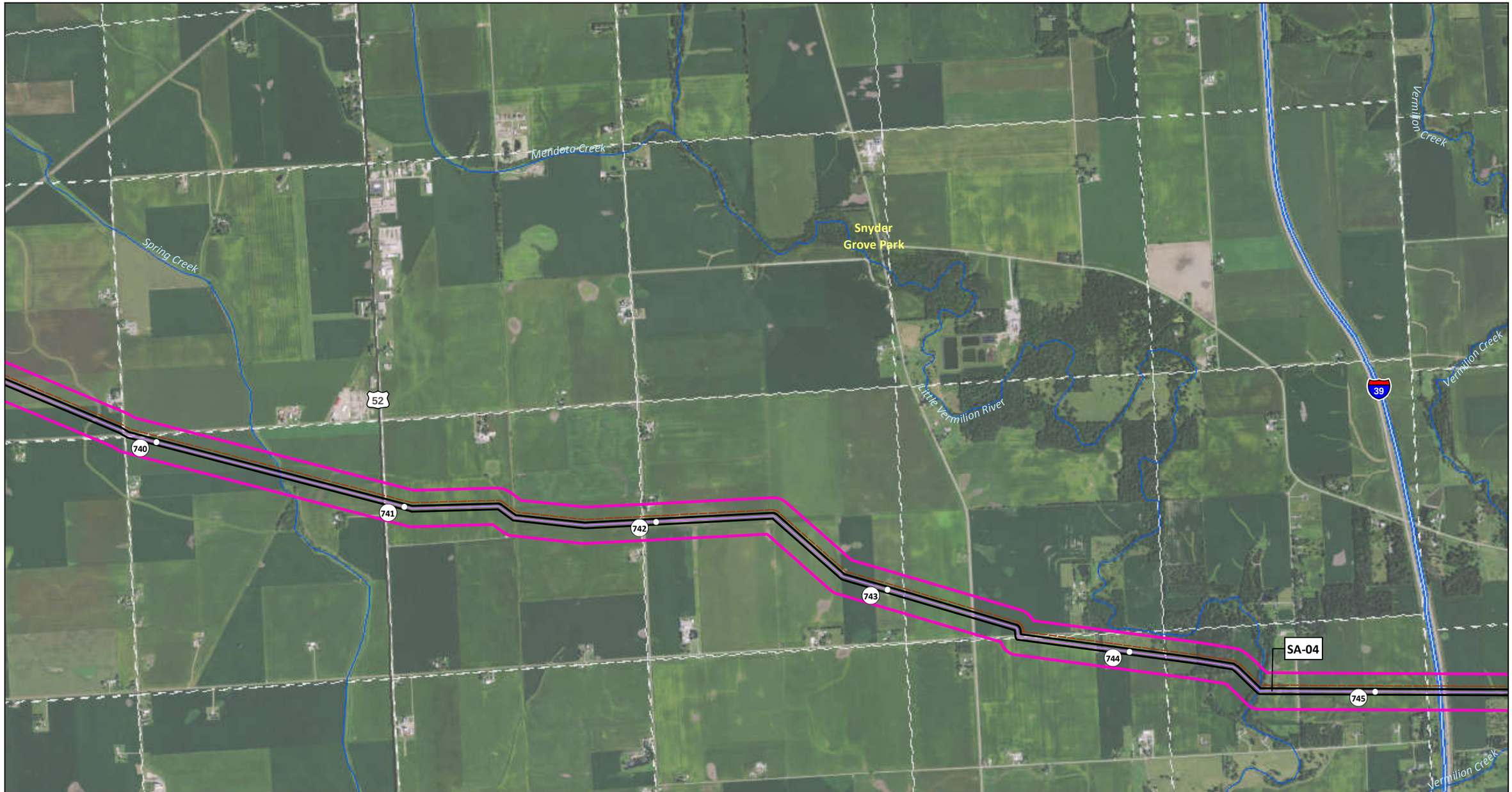

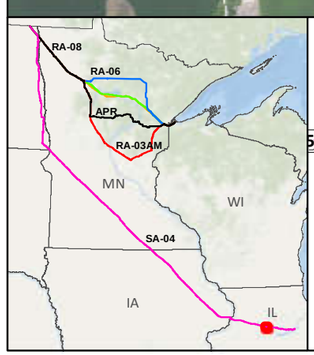

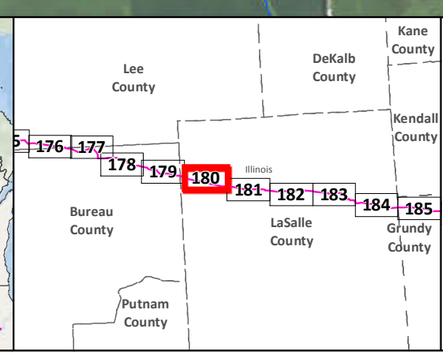

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 180A of 188

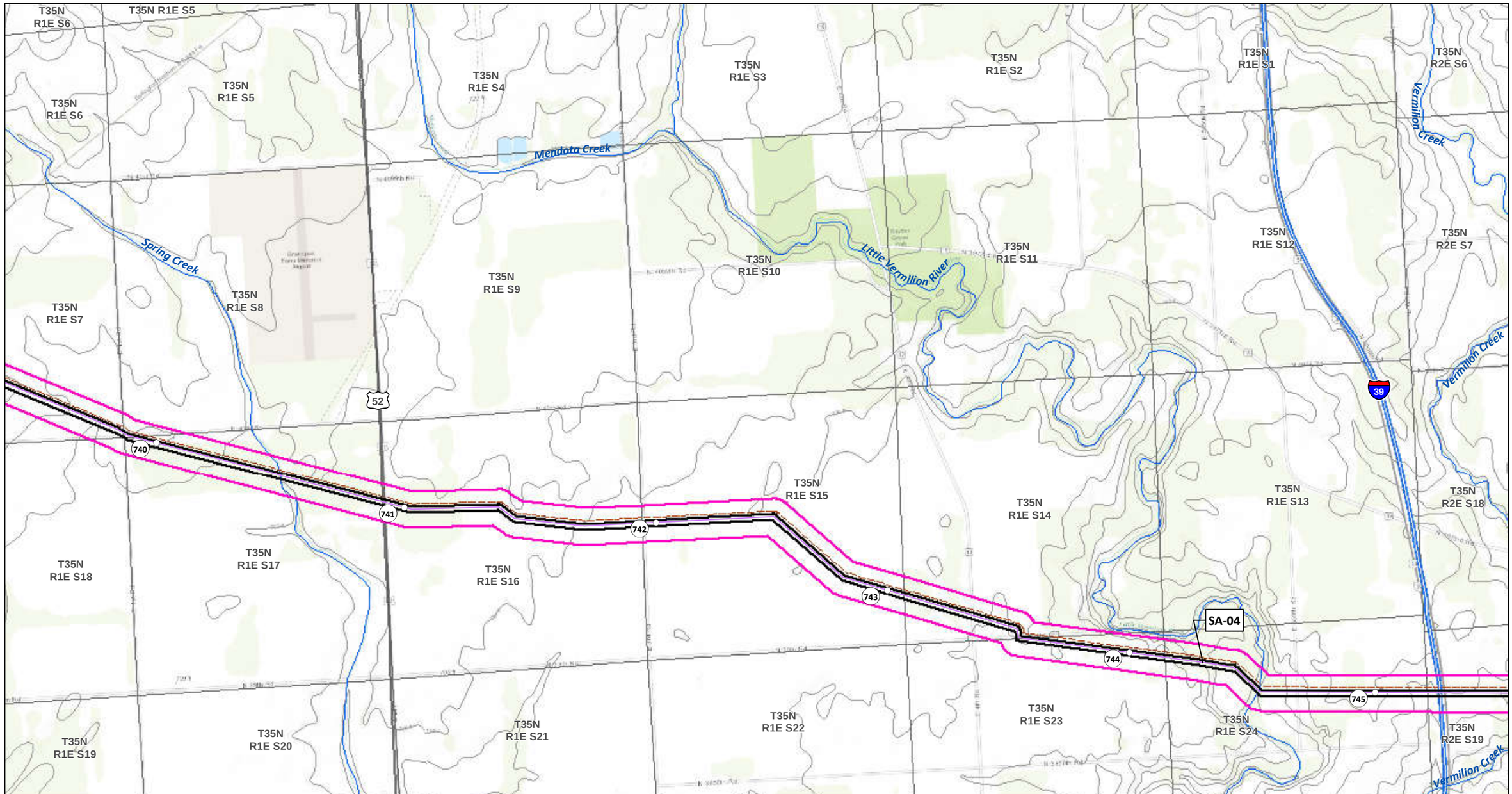

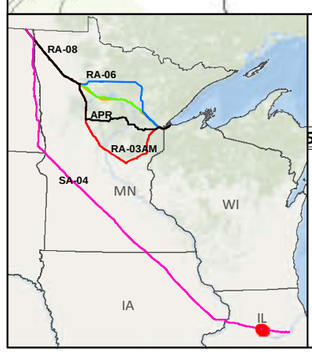

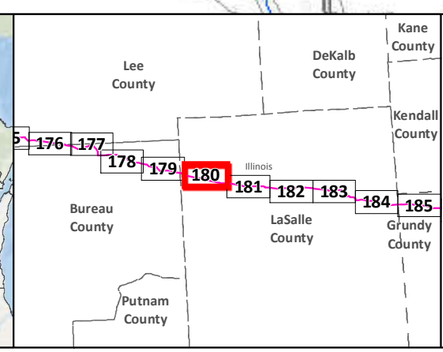

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
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- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

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- WMA - Wildlife Management Areas
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Public Waters Watercourse
303d Imparied Waters
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Lakes of Biological Significance
- Outstanding
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Native Plant Communities with Biodiversity Significance
- Outstanding
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 180B of 188

Tomahawk Creek

Triumph

Vermilion Creek

746

747

748

749

750

751

SA-04

52

8th

Buck Creek

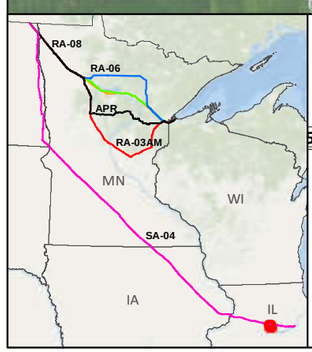

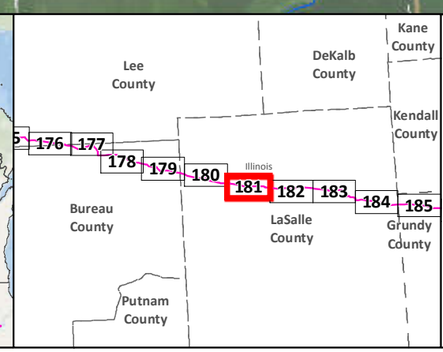

SA-04

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Anticipated 120' Construction ROW

Route Width (750')

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0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 181A of 188

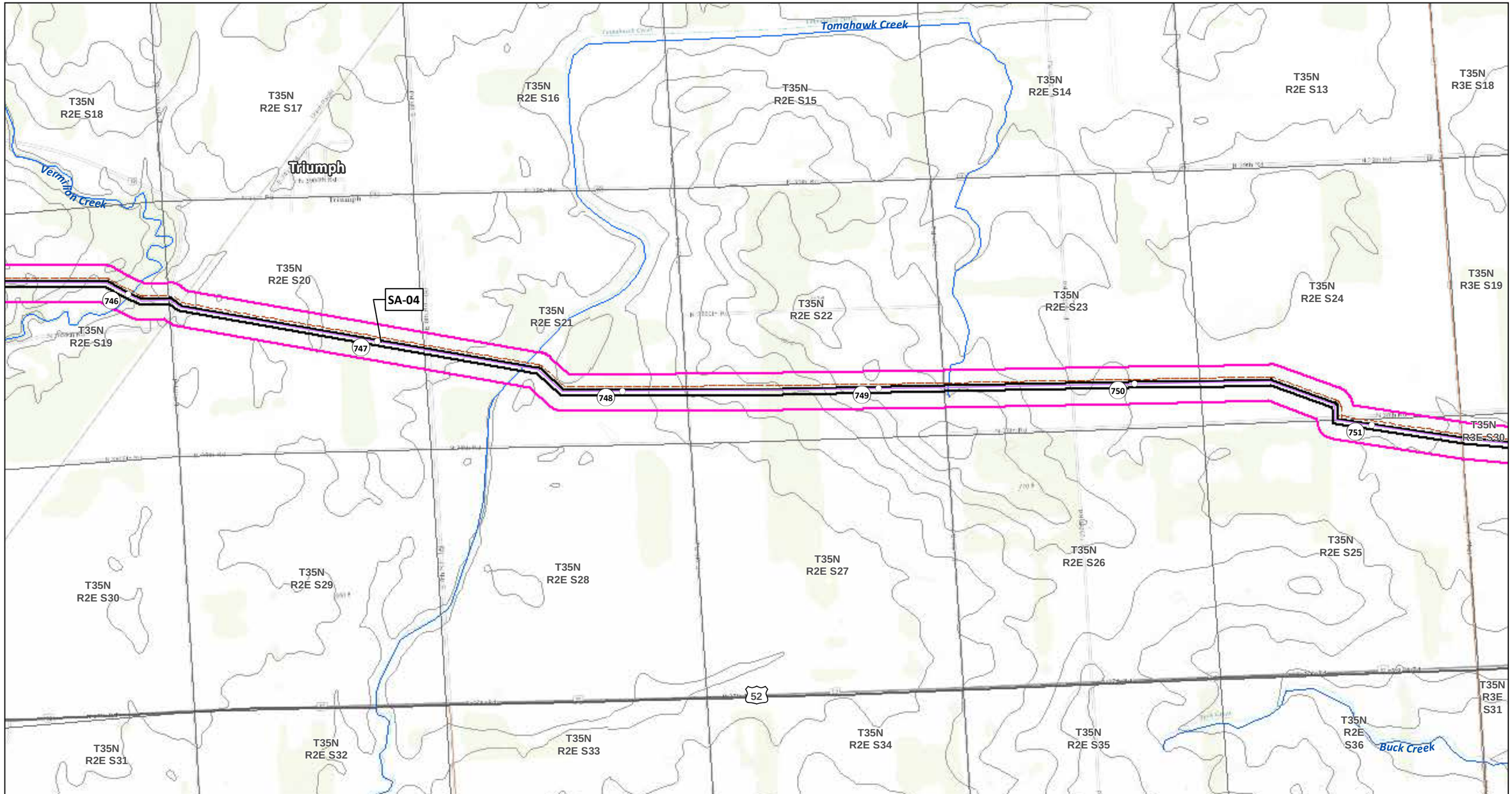

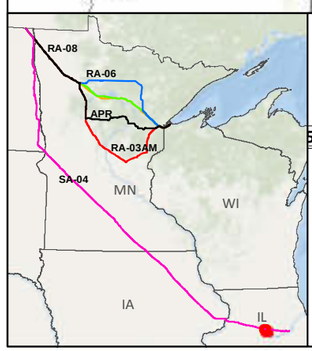

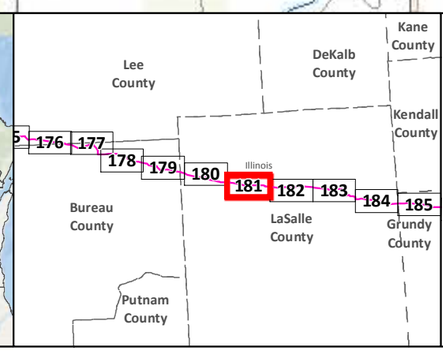

SA-04
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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 181B of 188

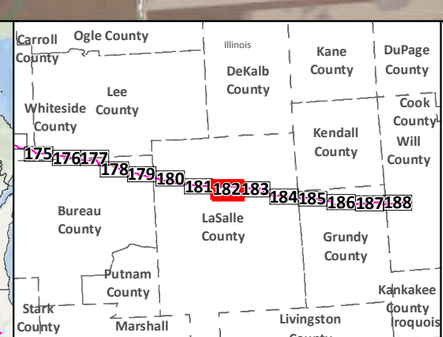

SA-04

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River

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1:24,000

0 125 250 500 Meters

Data Sources:
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LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 182A of 188

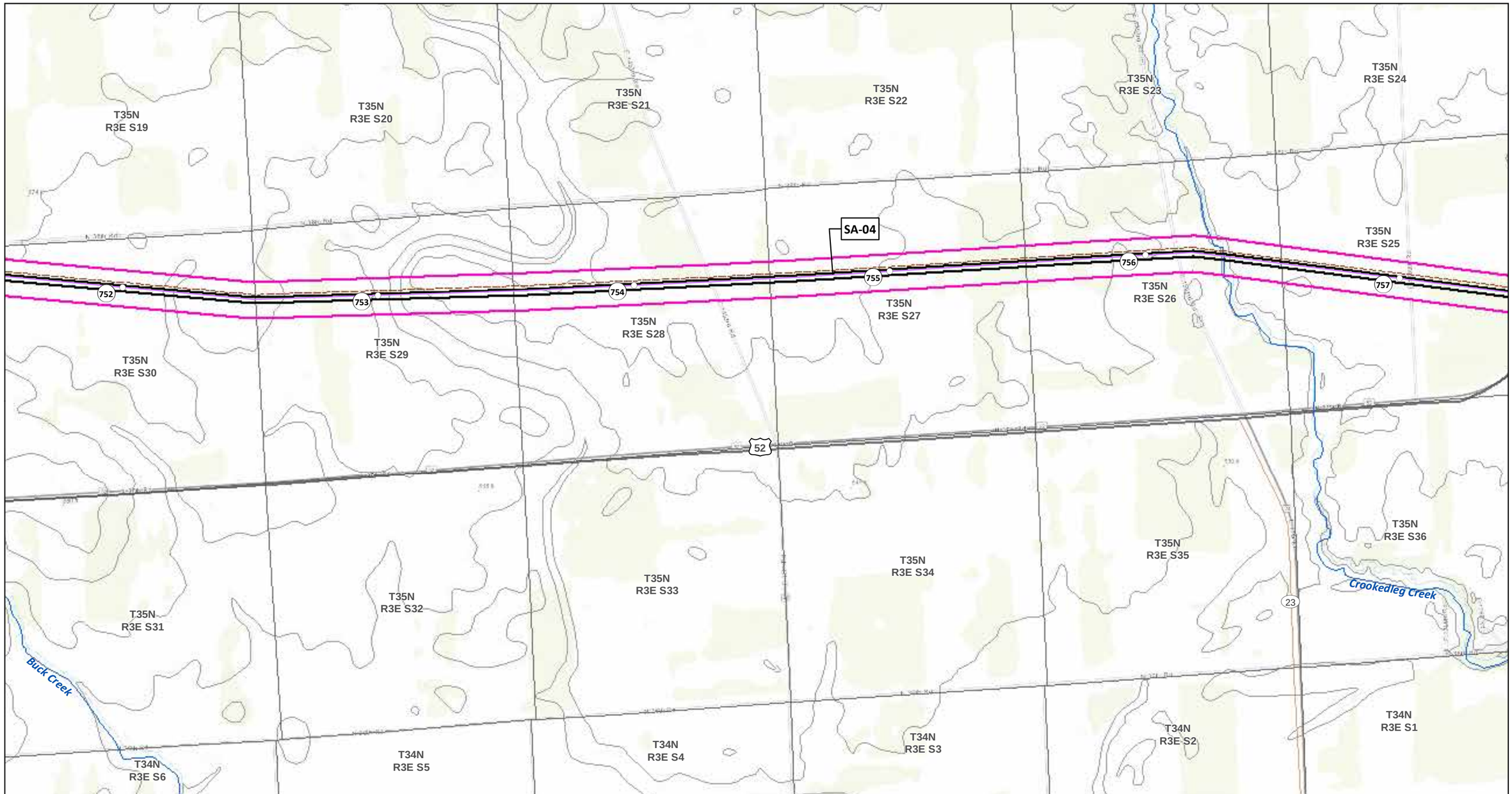

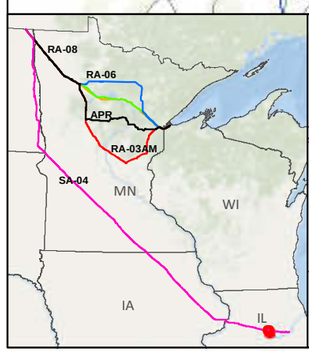

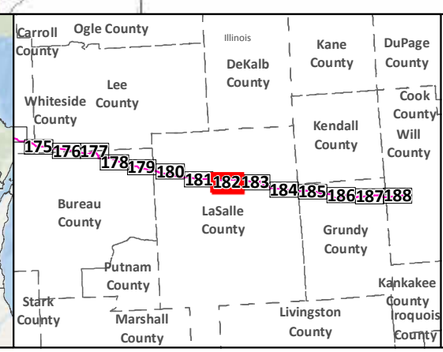

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post
Anticipated 120' Construction ROW
Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse
303d Imparied Waters
Designated Trout Stream
Calcareous Fens
Wild Rice Lakes (DNR)
Public Waters Wetlands
Public Water Basin
Public Drinking Water Supply
Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

Map 182B of 188

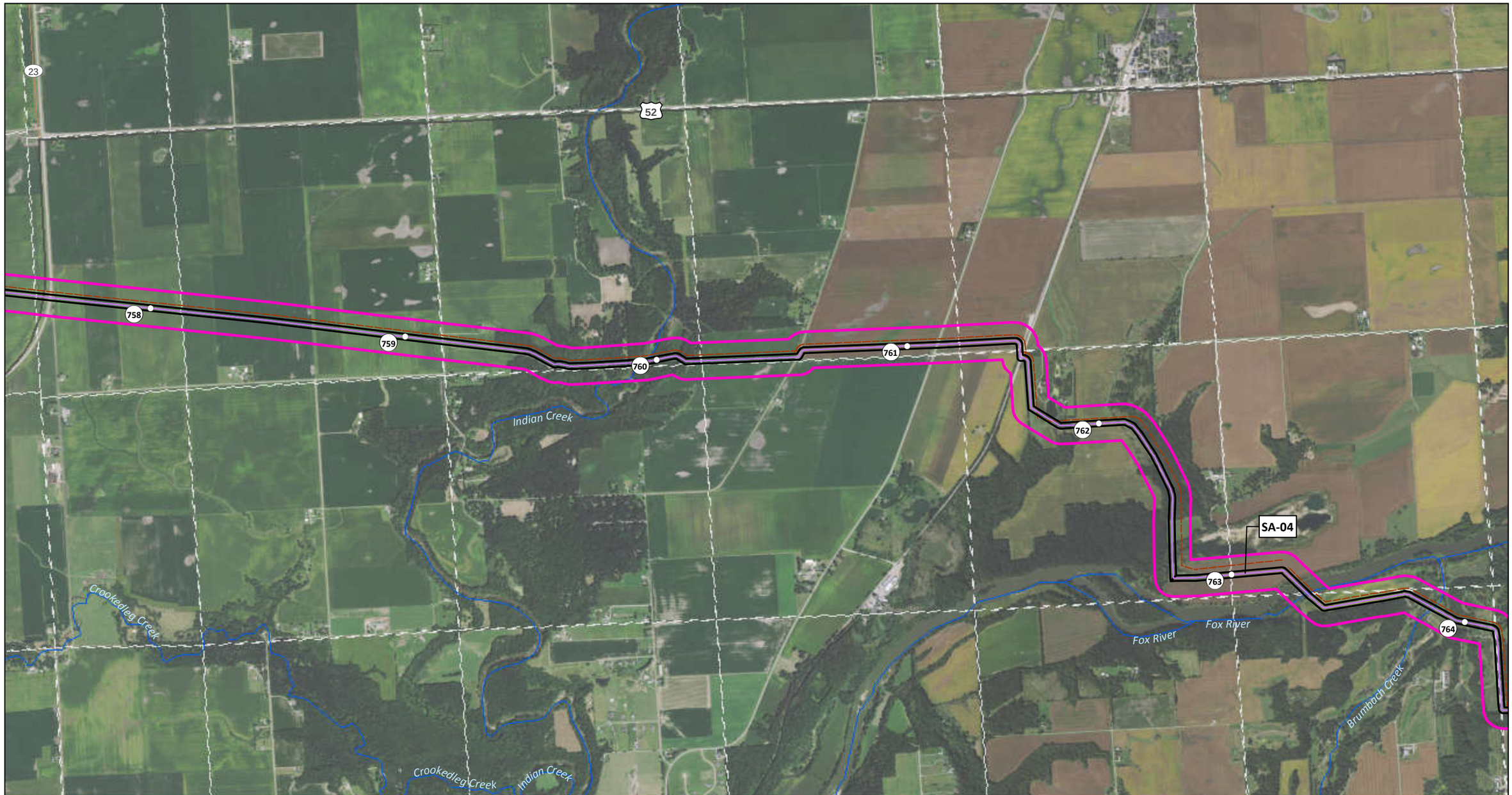

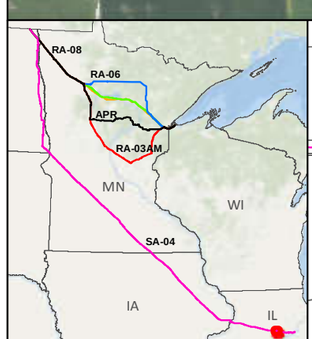

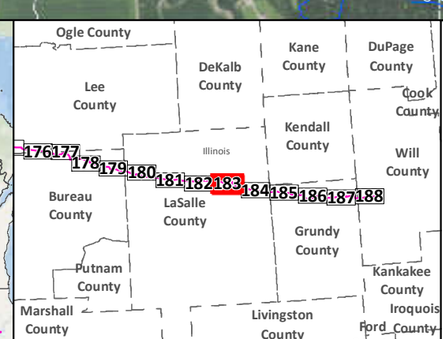

SA-04

Applicant's Preferred Route (APR)

Anticipated 120' Construction ROW

Route Width (750')

County Boundary

Mile Post

Existing Pipeline

Interstate

Highway

Major Road

Township Boundary

Land Ownership

State Forest

National Forest

Tribal Reservation

Water Resources

Lake

River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles

1:24,000

0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 183A of 188

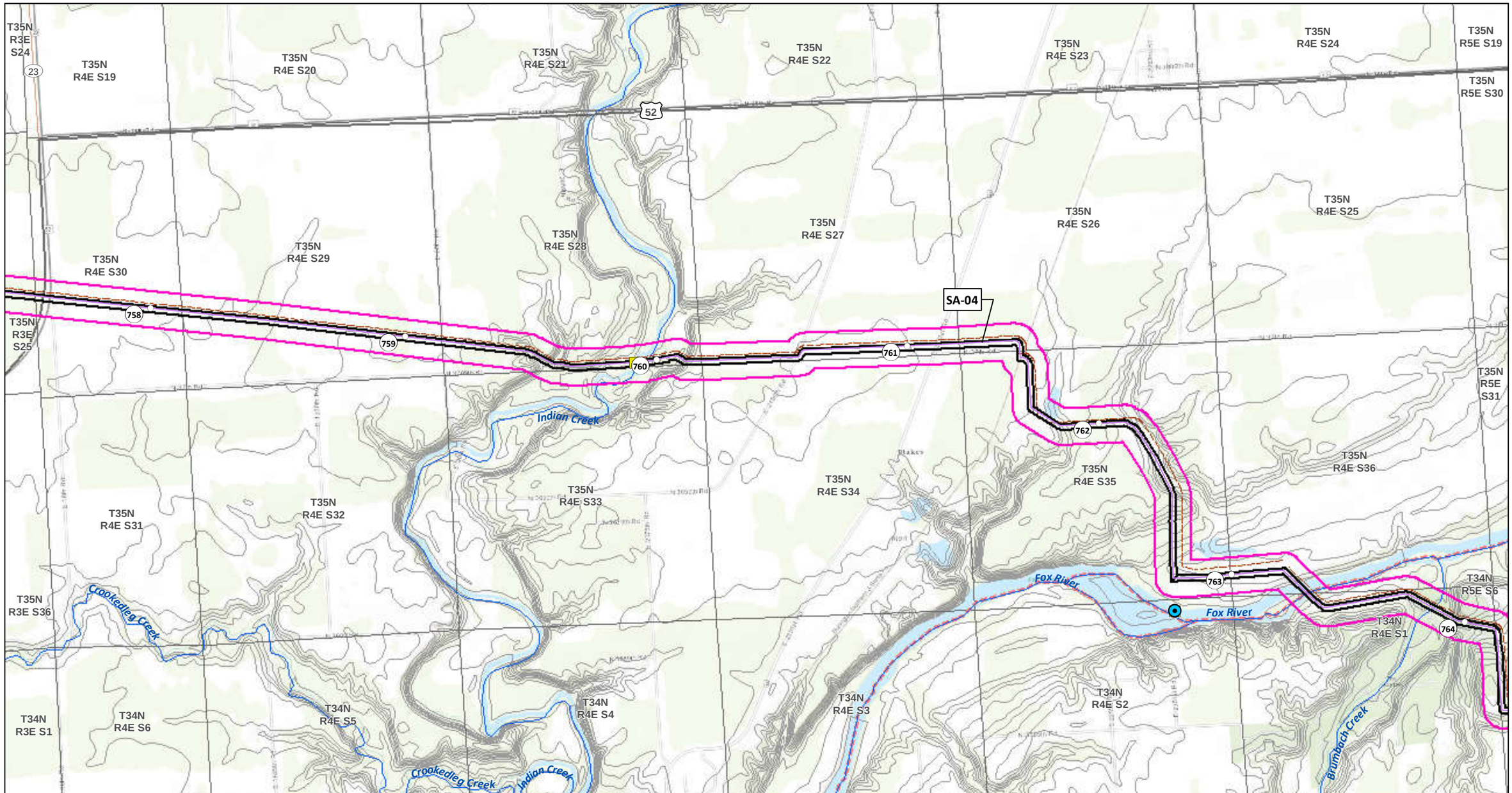

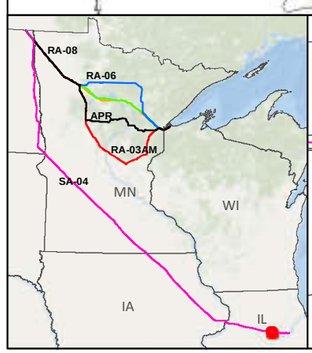

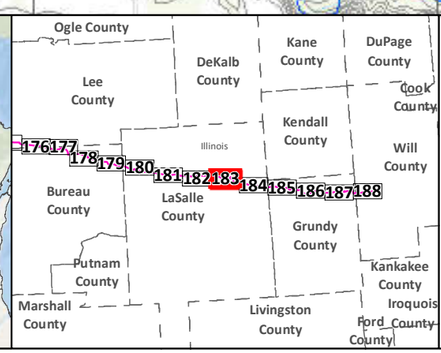

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
- RA-06
- RA-07
- RA-08

Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

Township Boundary

State Managed Lands

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- SNA - Scientific and Natural Area

Water Resources

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- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 183B of 188

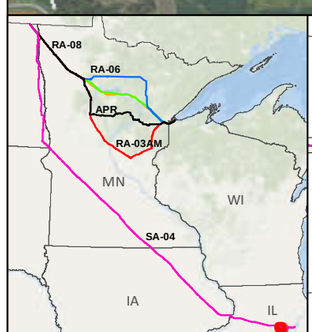

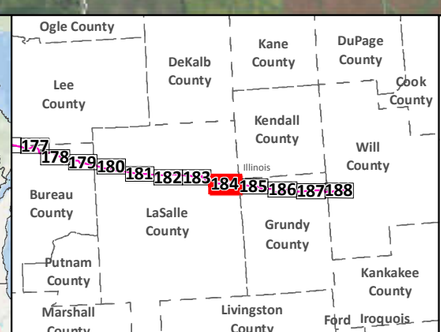

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 184A of 188

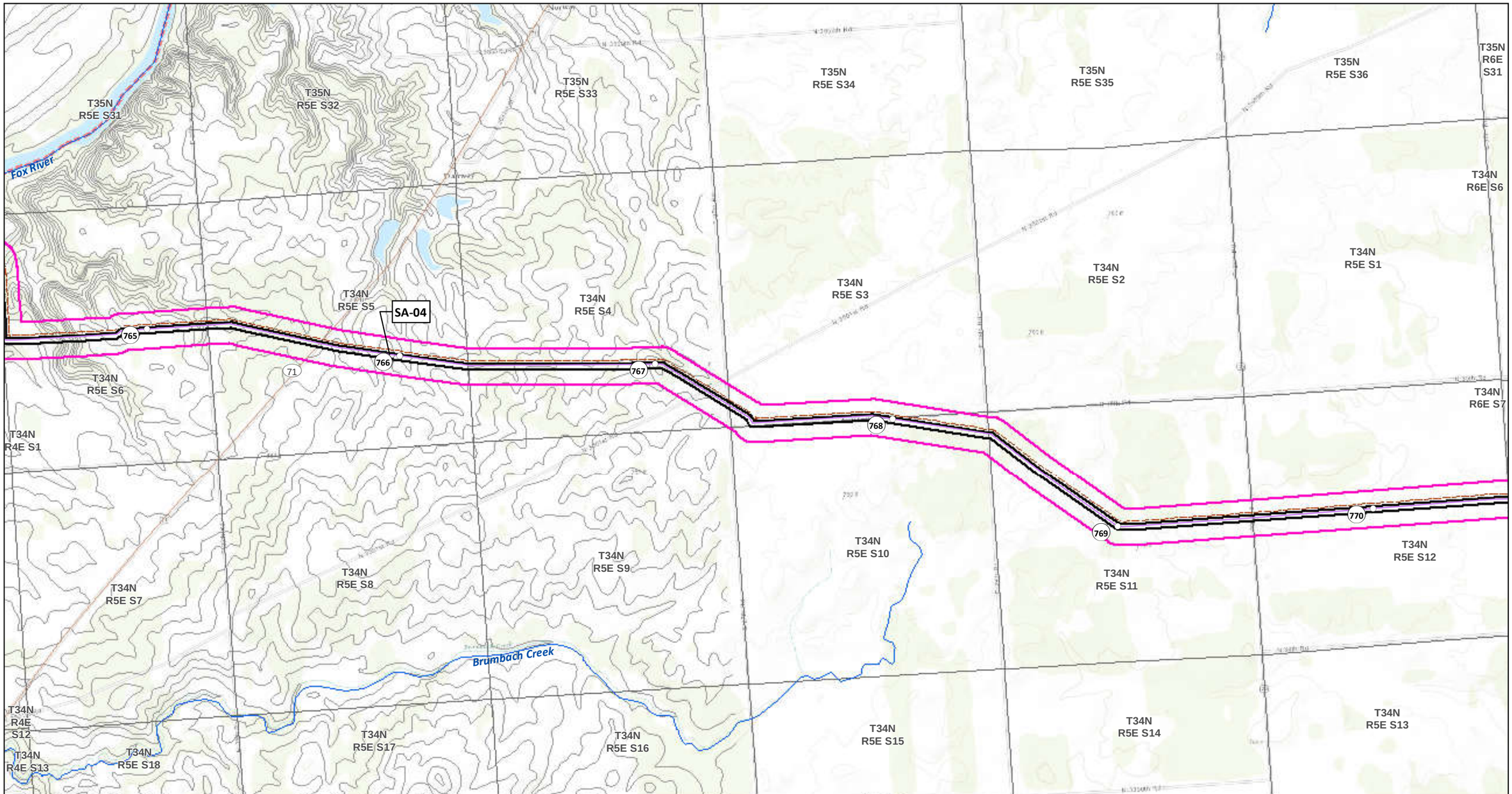

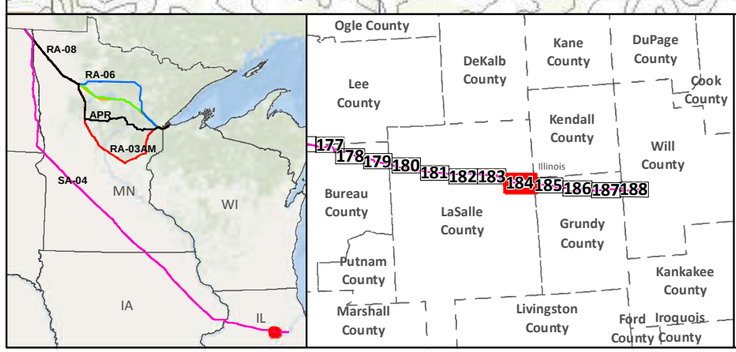

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

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Mile Post

Anticipated 120' Construction ROW

Route Width (750')

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303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

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Public Water Basin

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- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 184B of 188

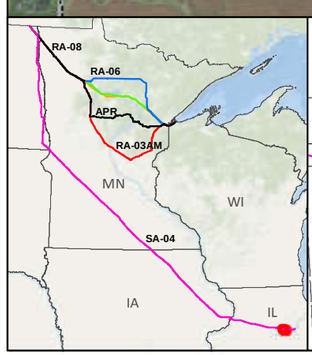

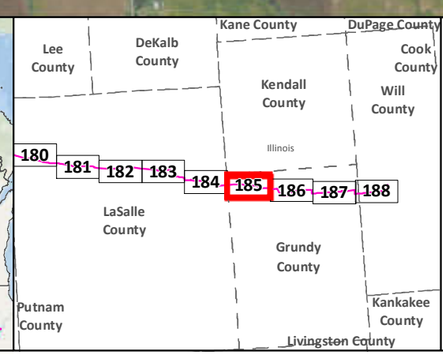

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

Data Sources:
MNDNR, NHD,USGS, Enbridge

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 185A of 188

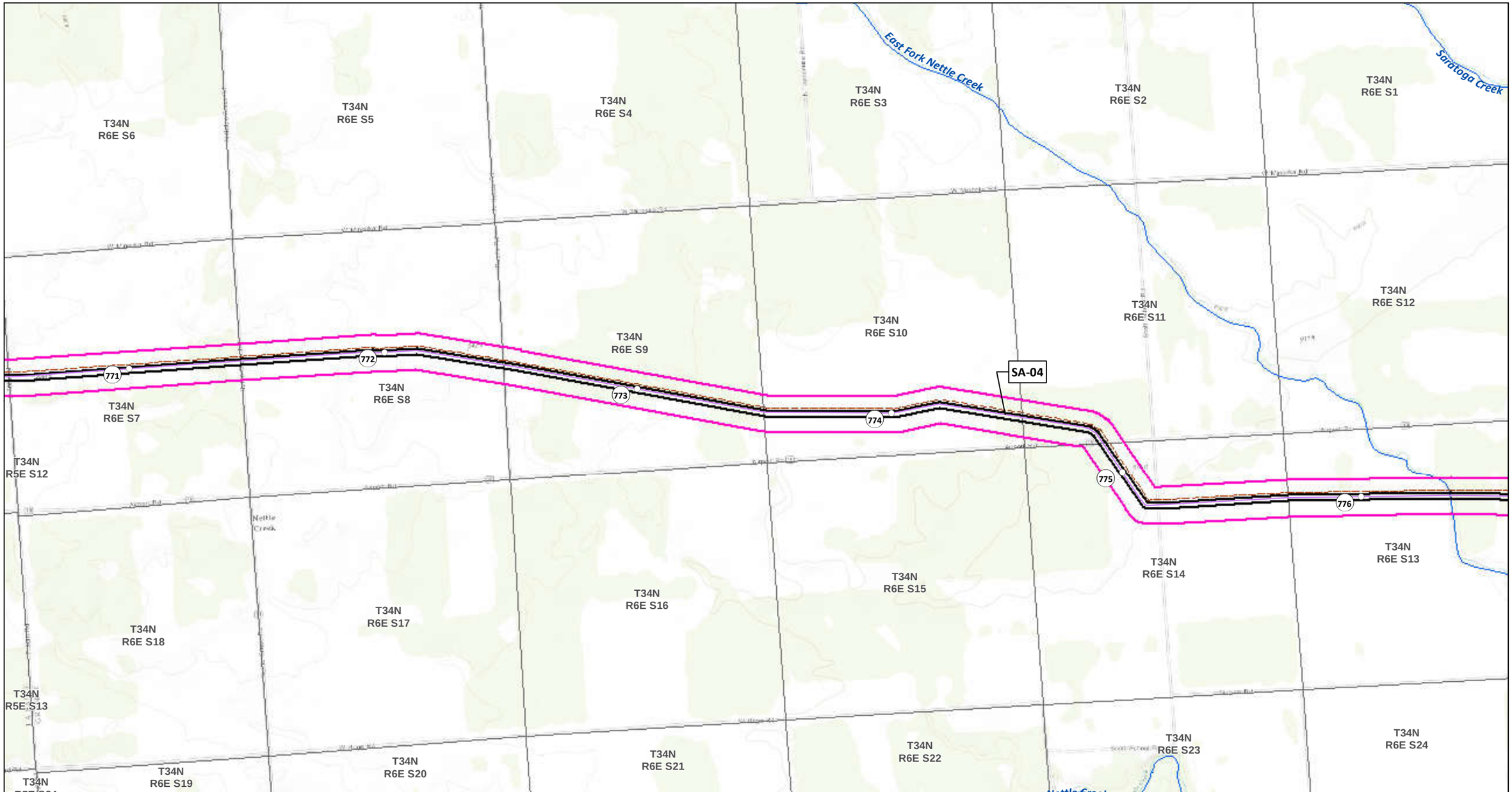

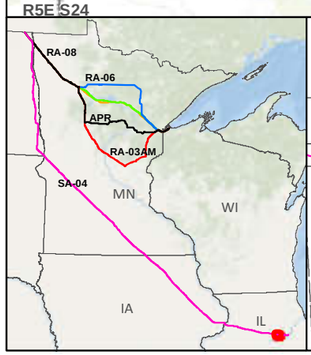

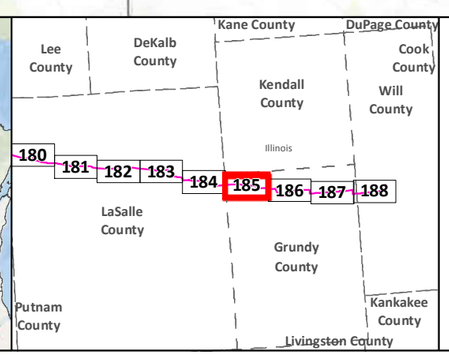

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
0 125 250 500 Meters
1:24,000
10ft Contours

N

Map 185B of 188

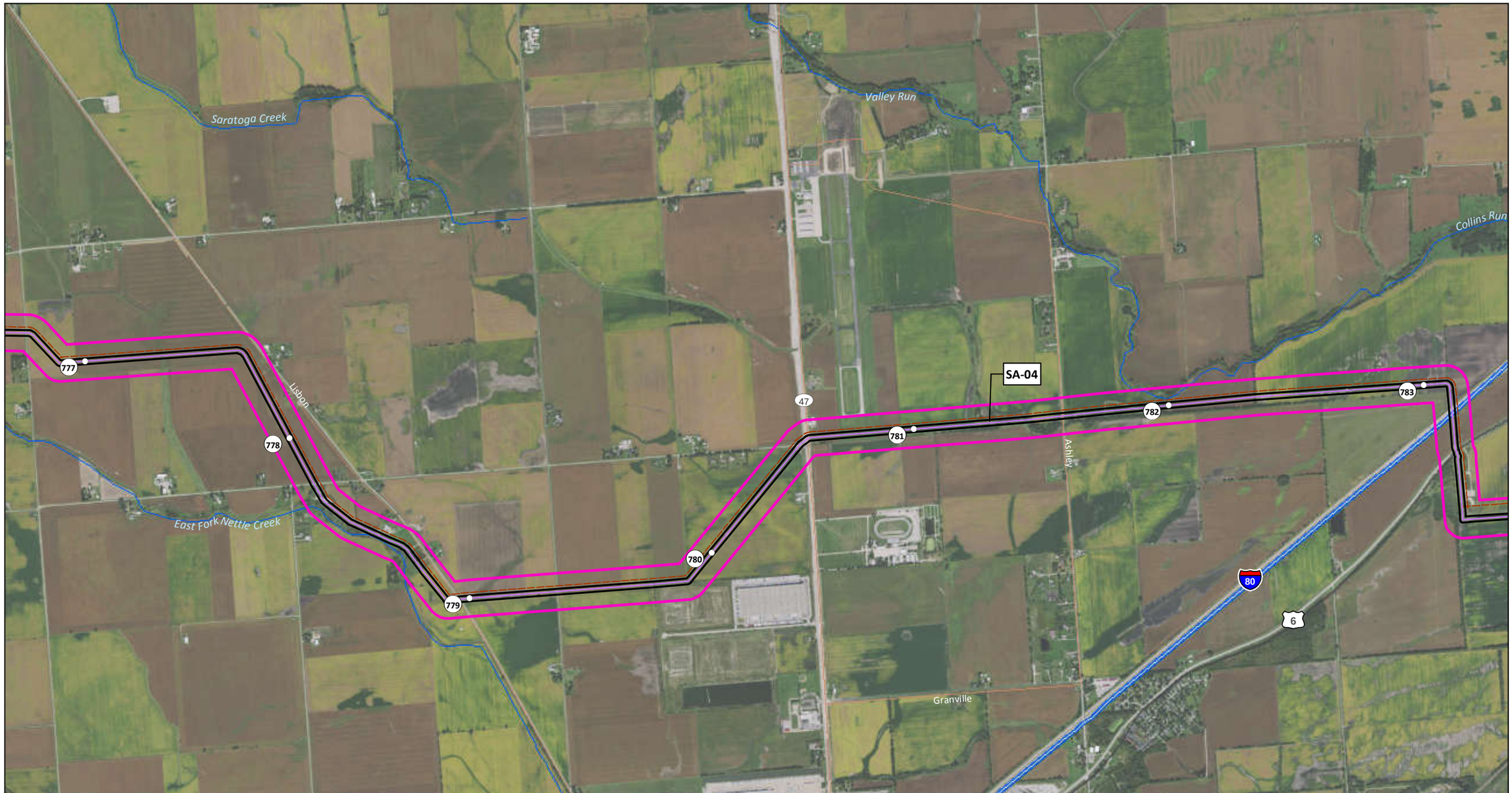

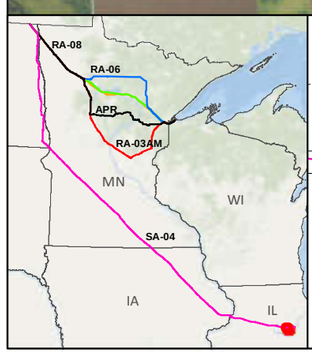

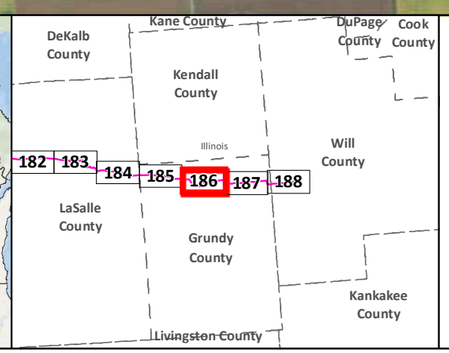

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
Interstate
Highway
Major Road
Township Boundary

Land Ownership
State Forest
National Forest
Tribal Reservation

Water Resources
Lake
River

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

Data Sources:
MNDNR, NHD,USGS, Enbridge

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 186A of 188

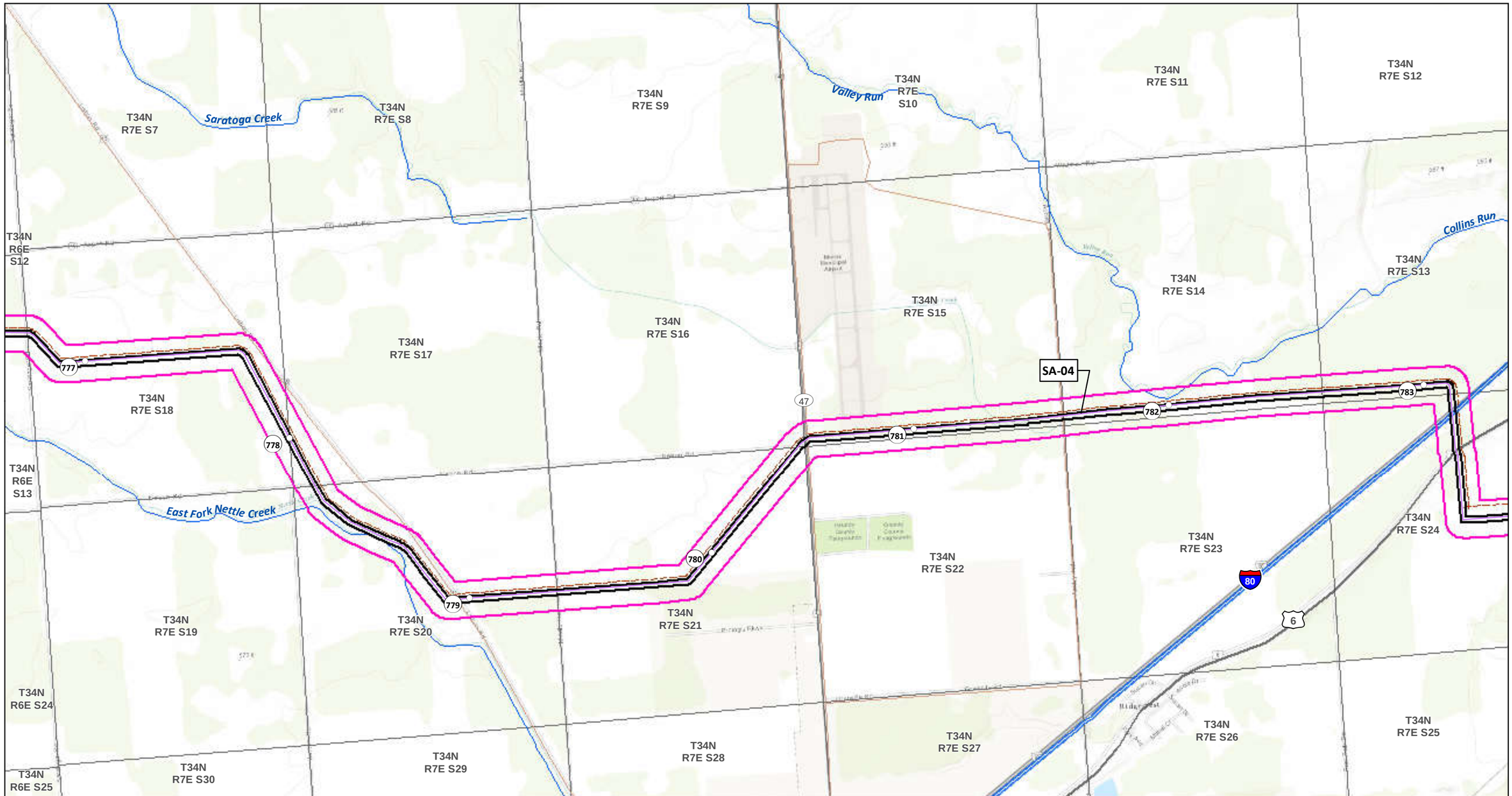

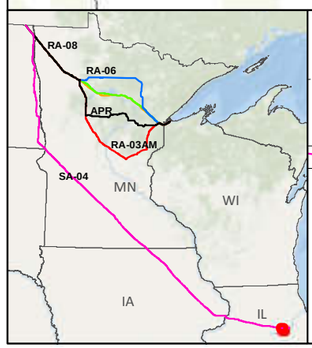

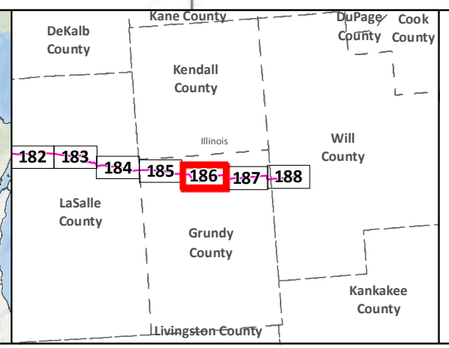

SA-04
Applicant's Preferred Route (APR)

Route Alternatives
- RA-03AM
- RA-06
- RA-07
- RA-08
- Mile Post
- Anticipated 120' Construction ROW
- Route Width (750')

Existing Pipelines
Township Boundary

State Managed Lands
- WMA - Wildlife Management Areas
- Wildlife Refuge Inventory
- SNA - Scientific and Natural Area

Water Resources
- Navigable Waterway Crossings
- National River Inventory Crossing
- Public Waters Watercourse
- 303d Imparied Waters
- Designated Trout Stream
- Calcareous Fens
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- Public Waters Wetlands
- Public Water Basin
- Public Drinking Water Supply
- Wellhead Protection Area (WHPA)

Lakes of Biological Significance
- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance
- Outstanding
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Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters
10ft Contours

Map 186B of 188

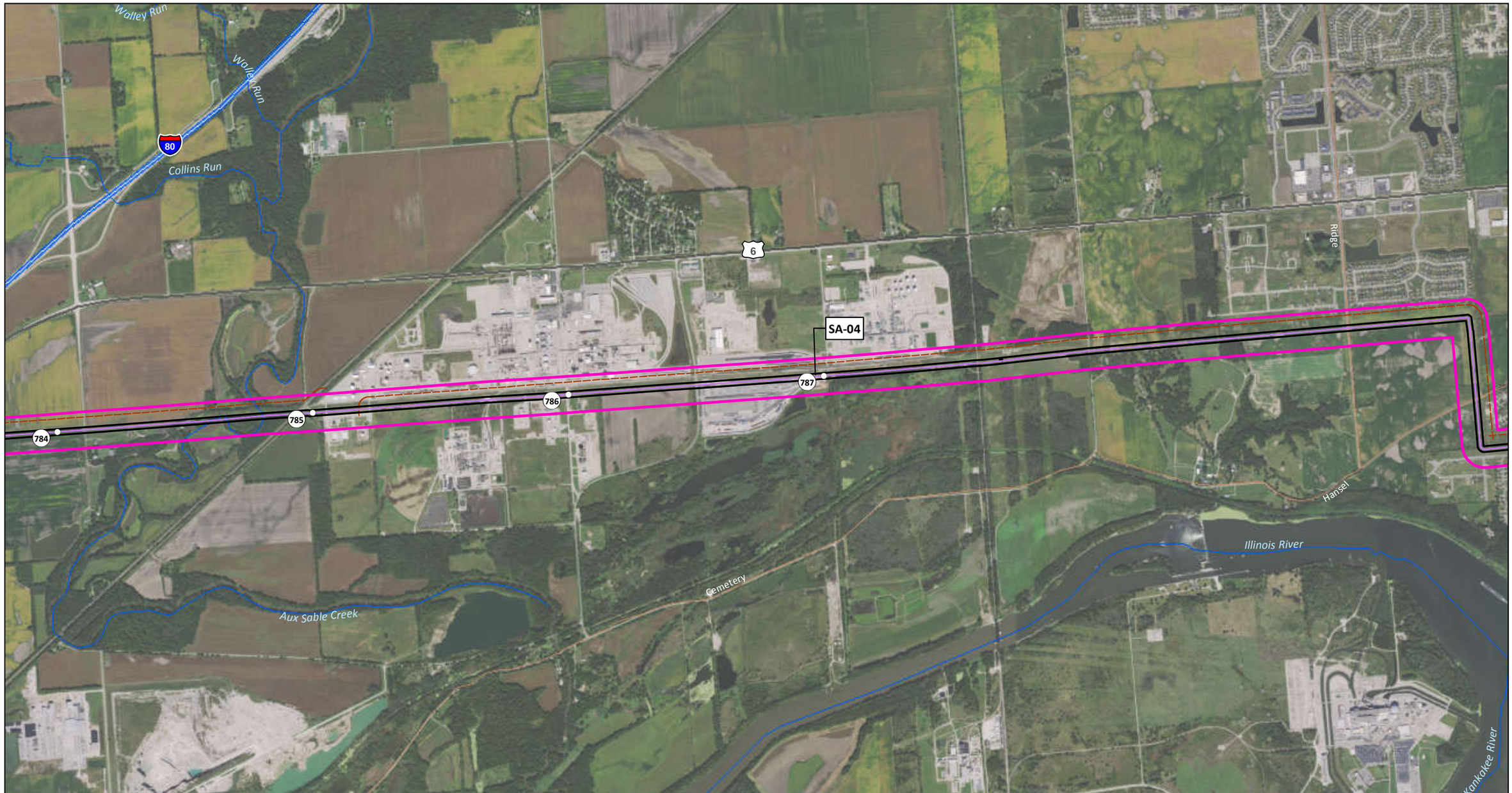

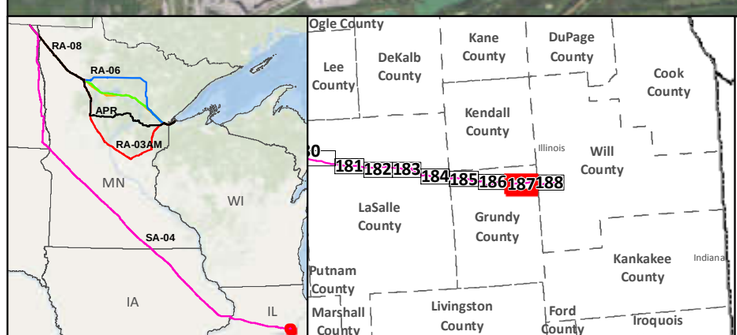

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
Existing Pipeline
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Highway
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River

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0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 187A of 188

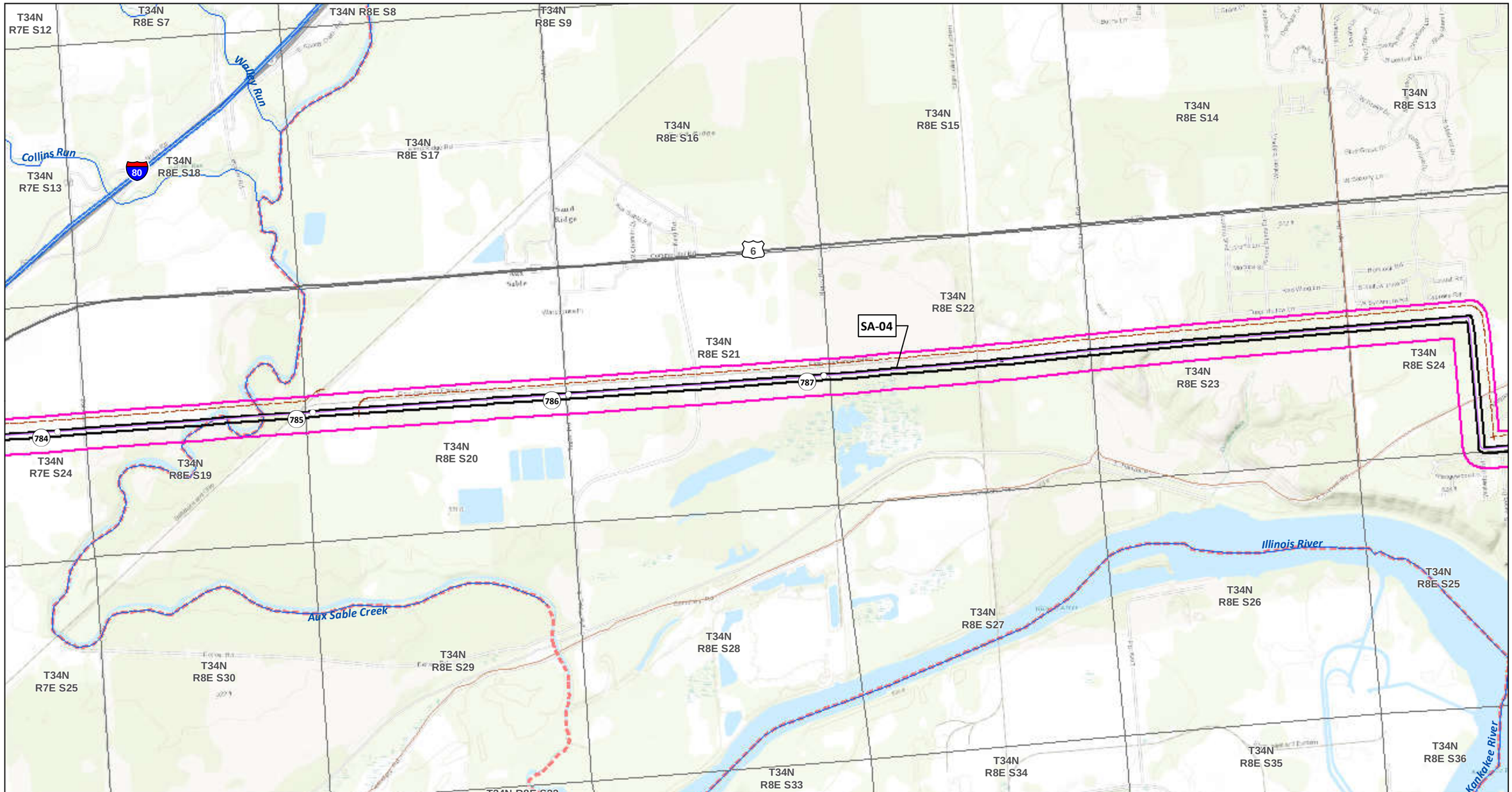

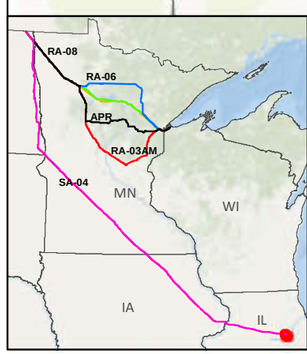

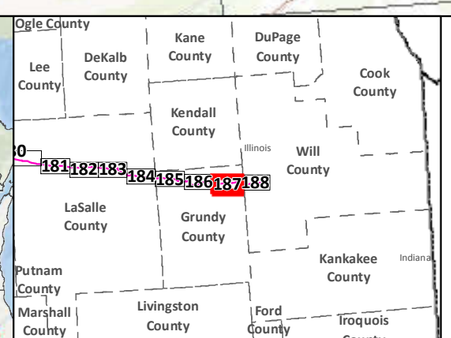

SA-04

Applicant's Preferred Route (APR)

Route Alternatives

- RA-03AM
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Mile Post

Anticipated 120' Construction ROW

Route Width (750')

Existing Pipelines

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LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 187B of 188

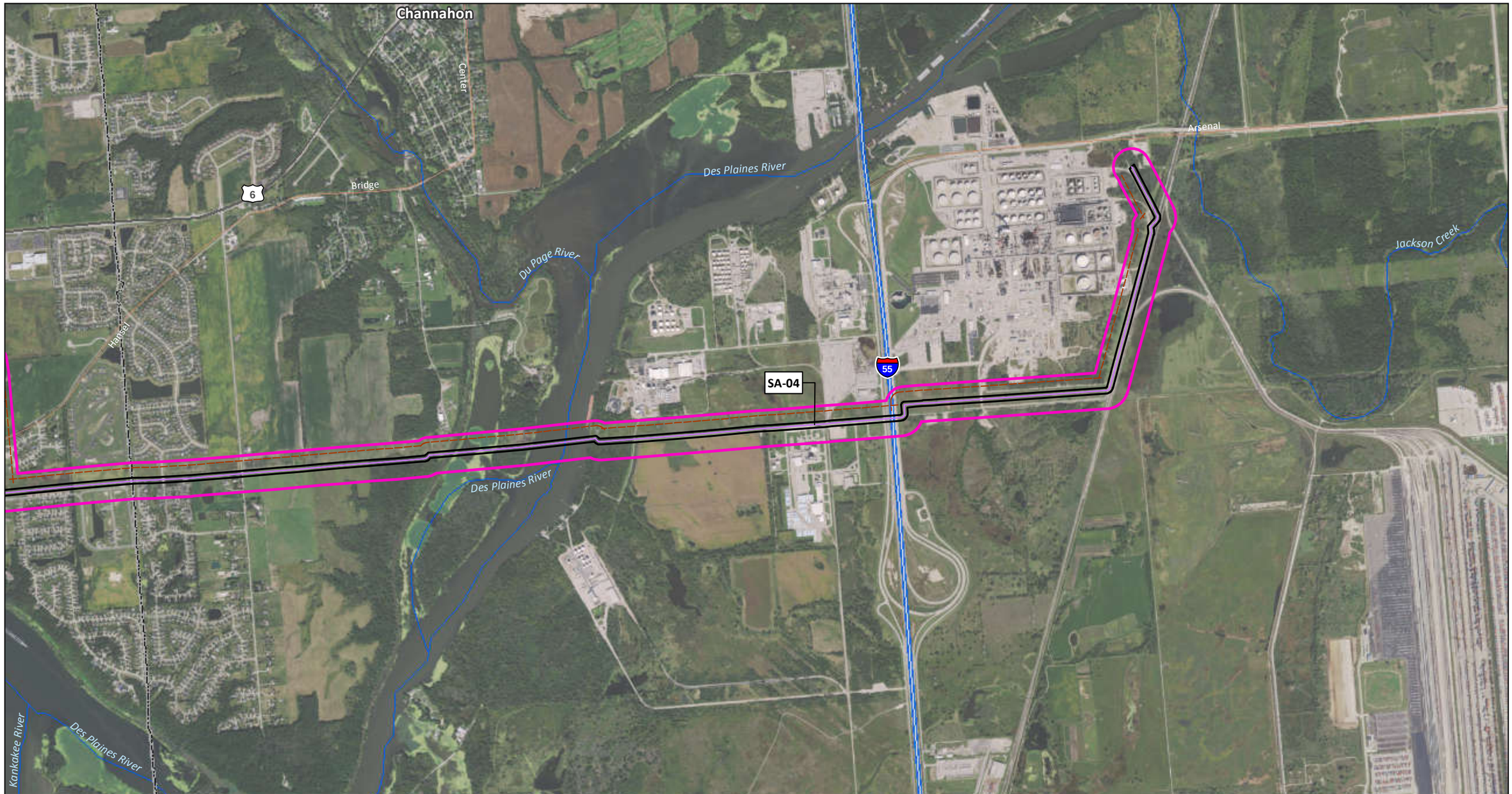

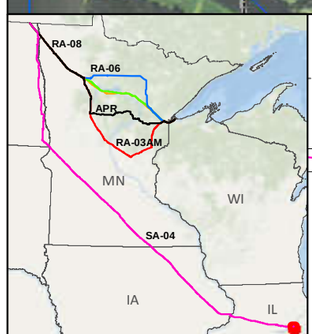

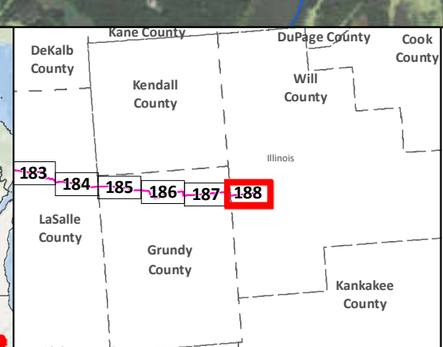

SA-04
Applicant's Preferred Route (APR)
Anticipated 120' Construction ROW
Route Width (750')
County Boundary

Mile Post
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Interstate
Highway
Major Road
Township Boundary

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Water Resources
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River

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0 0.125 0.25 0.5 Miles
1:24,000
0 125 250 500 Meters

LINE 3 PROJECT DETAILED MAP SET AERIAL

SA-04

Map 188A of 188

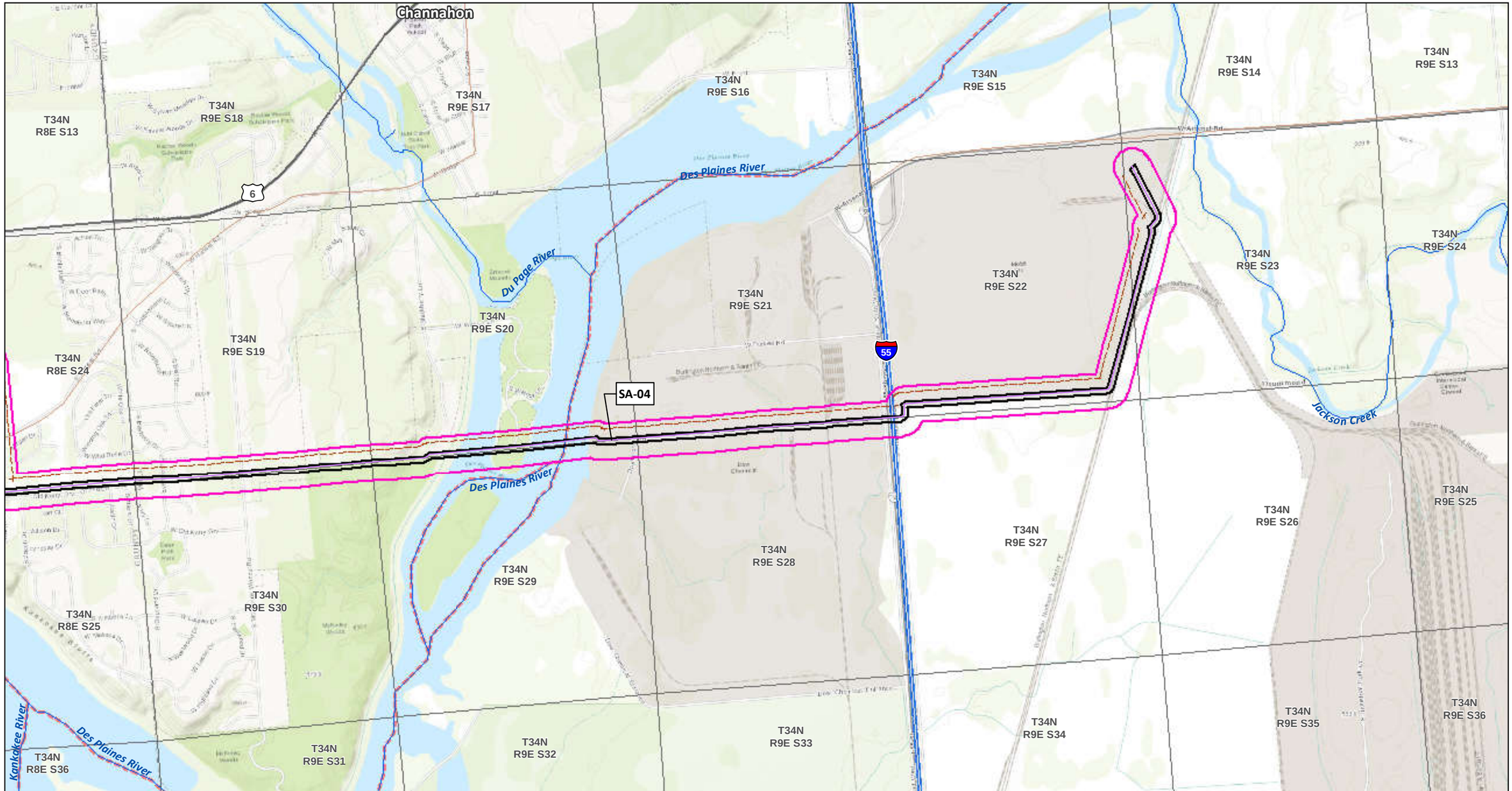

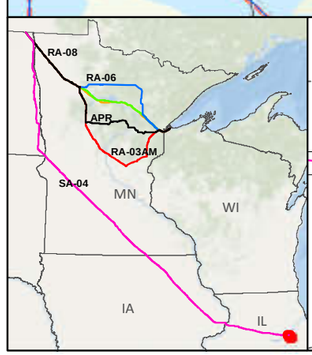

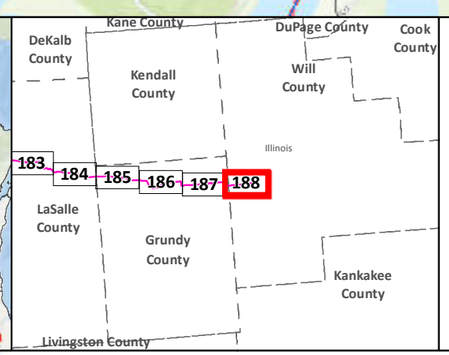

SA-04

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- RA-06
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Anticipated 120' Construction ROW

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Water Resources

- Navigable Waterway Crossings
- National River Inventory Crossing

Public Waters Watercourse

303d Imparied Waters

Designated Trout Stream

Calcareous Fens

Wild Rice Lakes (DNR)

Public Waters Wetlands

Public Water Basin

Public Drinking Water Supply

Wellhead Protection Area (WHPA)

Lakes of Biological Significance

- Outstanding
- High
- Moderate

Native Plant Communities with Biodiversity Significance

- Outstanding
- High
- Moderate

Data Sources: MNDNR, USGS, NHD, Enbridge

LINE 3 PROJECT DETAILED MAP SET TOPOGRAPHIC

SA-04

0 0.125 0.25 0.5 Miles

0 125 250 500 Meters

1:24,000

10ft Contours

N

Map 188B of 188

Appendix B

Line 3 Permanent Deactivation Plan

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Enbridge Energy, Limited Partnership

Line 3 Permanent Deactivation Plan (U.S.)

MPUC Docket Nos. PL-9/CN-14-916 and PPL-15-137
OAH Docket Nos. 65-2500-32764 and 65-2500-33377

January 2017

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DEFINITIONS AND ACRONYMS

Abandoned Pipeline: A pipeline permanently removed from service that has been physically separated from its source of gas or hazardous liquid and is no longer maintained under regulation 49 CFR Parts 192 or 195, as applicable. Source: PHMSA Operations & Maintenance Enforcement Guidance, Part 195 Subpart F.

ASME: American Society of Mechanical Engineers.

CEPA: Canadian Energy Pipeline Association – CEPA is an organization whose mission is to enable companies to advance operations and develop safety and environmental innovations for the transmission pipeline industry through leadership and credible engagement between member companies, governments, the public and stakeholders. CEPA works together with companies to define and implement leading practices to continuously improve industry performance in three key areas: pipeline safety, environmental protection and socio-economics.

CFR: Code of Federal Regulations.

Cathodic Protection (CP): A technique used to control the corrosion of a metal surface, in this case a pipeline, by making it the cathode of an electrochemical cell. Most often this involves the application of a low level electrical current to the pipeline. Source: National Association of Corrosion Engineers (NACE) standard SP0169.

DNV GL: An international certification body and classification society whose main expertise is in technical assessment, advisory, and risk management. It is the world's largest technical consultancy to onshore and offshore wind, wave, tidal, and solar industries, as well as the global oil & gas industry - 65% of the world's offshore pipelines are designed and installed to DNV GL's technical standards.

Grouting: The use of an injectable mortar mix to fill in voids in soils, pipes or other cavities.

Hydraulic Vacuum Excavation (Hydrovac): Using pressurized water and a vacuum system to quickly and safely expose underground infrastructure. Pressurized water is injected into the ground through a handheld wand and as soil is liquefied, the resulting slurry is removed by powerful truck-mounted vacuum systems.

ISD: In-service date.

Line 3 Replacement Project: The Line 3 Replacement Project is the Minnesota portion of Enbridge's Line 3 maintenance driven replacement program and includes the replacement of approximately 282 miles of the existing 34-inch diameter Line 3 pipeline with approximately 340 miles of 36-inch diameter pipeline and associated facilities between the North Dakota/Minnesota border and the Minnesota/Wisconsin border.

Mainline Valves (MLVs): Mainline valves are designed and installed to isolate sections of the pipeline for maintenance purposes or in the event of a release. Valves are also required to be installed per federal pipeline safety regulations (49 CFR Part 195). The valves are remotely controlled by the Control Center to limit the extent of a release.

MP: Mile Post.

NORM: Naturally Occurring Radioactive Materials.

NPMS: National Pipeline Mapping System.

PCB: Polychlorinated biphenyl; any of a class of toxic aromatic compounds, often formed as waste in industrial processes.

Permanent Deactivation: Permanent deactivation as used by Enbridge herein means a pipeline permanently removed from service that has been physically separated from its source of gas or hazardous liquid.

PHMSA: Pipeline Hazardous Materials Safety Administration

Pipeline Inspection Gauge (PIG): Pigs are used for hydrostatic testing and pipeline drying, internal cleaning, internal coating, liquid management, batching, and inspection.

Pipeline Isolation: The separation of a pipeline from existing stations, terminals, and crossover connections to prevent the reintroduction of product.

Pipeline Segmentation: Employing methods such as: installation of a plug, cutting, and capping of the pipeline or closing of valves to effectively take the pipeline and turn it into smaller, hydraulically-independent sections.

O&MMs: Operations and Maintenance Manuals.

ROW: Right-of-way.

Water Conduit: Any physical pathway which fosters the conveyance of water.

1 EXECUTIVE SUMMARY

Enbridge's Line 3 pipeline was put into service in 1968. Line 3 is a 34-inch diameter, 1,097 mile long pipeline, which extends from Alberta, Canada to Superior, Wisconsin. The Minnesota portion of Line 3 includes approximately 282 miles of 34-inch pipeline, associated mainline valve sites, piping, pumps and manifold connections at the seven pump stations, and two terminals which facilitate the operation of the existing Line 3. As part of Enbridge's maintenance driven Line 3 Replacement Project, a new 36-inch diameter pipeline will replace Line 3. Once the Line 3 Replacement Project is permitted, constructed and placed into service, the existing Line 3 pipeline will be Permanently Deactivated.

Enbridge's Line 3 Permanent Deactivation Plan is based upon engineering assessments which considers risks to the environment, public safety, industrial entities (e.g., railway companies and utilities), and current land use. These assessments included detailed literature review, internal stakeholder consultation, the application of mitigation strategies to those identified risks, and the validation of the Permanent Deactivation Plan by assessing current pipeline conditions and modeling expected future pipeline conditions.

Enbridge conducted a risk assessment to determine the technical risks associated with the Permanently Deactivated pipeline. As part of this assessment, Enbridge assessed the relative risks of removing the pipeline and Permanently Deactivating it in place. Removing the 282 miles of existing Line 3 would create a significant risk to other operating pipelines and additional impacts to the environment, land use, and public safety similar to and exceeding those related to constructing a new pipeline project. Based on the results of the risk assessment, Enbridge believes that deactivating a pipeline in place minimizes and/or eliminates unnecessary impacts to the environment, landowners, and the state of Minnesota..

This document describes the way in which Enbridge plans to Permanently Deactivate the existing Line 3 pipeline in the United States. This plan was designed to Permanently Deactivate the pipeline in a way that minimizes risks to public safety, the environment, and current land use. A brief summary of the Permanent Deactivation scope is as follows:

1. Purging the oil;
2. Cleaning of the pipeline;
3. Isolating the pipeline from specific infrastructure which is actively transporting oil;
4. Further segmentation of the pipeline, as needed, including completing all required remediation at roads, railroads, waterbodies, or any other permitted crossing in consultation and coordination with that crossing's authority; and
5. Continue to monitor the existing right-of-way (ROW) to identify, assess, and appropriately mitigate apparent or emerging risk to public safety, the environment, or current land use caused by the Permanently Deactivated pipeline. As part of the ongoing maintenance and monitoring, continue to apply cathodic protection (CP) until such time that it is ineffective or otherwise detrimental.

As discussed in this Plan, Enbridge's assessments identified the following risks are related to pipelines Permanently Deactivated in place:

- soil and water contamination;
- water conduits; and
- subsidence.

Enbridge analyzed these risks and developed mitigation plans, as necessary. Table 1-1 summarizes how Enbridge plans to minimize each of these risks on Line 3. Further details of these activities are presented in the body of this report.

Table 1-1: Summary of Risks and Mitigation

Hazard	Enbridge Analysis/Mitigation
Soil and Water Contamination	To prevent soil and water contamination, Enbridge will purge (i.e., remove) all crude oil from the pipeline and clean the pipe of remaining hydrocarbons. Based on the results of third party testing and validation, it is expected that the amount of hydrocarbons left in the pipe after cleaning would be de minimis. As a result, there will be no material risks to soil or water contamination from oil remaining in Line 3 after the line is purged and cleaned.
Water Conduits	Enbridge will segment the Permanently Deactivated pipeline to protect the water resources from the risk that the pipeline would act as a water conduit. The pipeline will be isolated at its 7 pump stations/terminals and further segmented at the 40 MLV locations which are located along Line 3 in Minnesota. Additional segmentation and/or grouting may be completed in consultation with the crossing authorities at roads, railroads, and other locations where public and environmental safety is a concern. Assessment of topography and existing water resources demonstrates that Enbridge's segmentation plan will prevent water from moving a material distance within the Permanently Deactivated pipeline.
Ground Subsidence	Enbridge conducted a series of assessments to predict the risk of ground subsidence over an extended time frame. Enbridge plans to continue applying cathodic protection (CP) to the Permanently Deactivated pipeline to address the risk of ground subsidence due to eventual pipeline collapse. With the application of CP, the first single points of through wall corrosion are not expected to occur for 25 to 50 years. Note that a single point of through wall corrosion would not cause the pipe to collapse. The structural integrity of the pipe is expected to remain intact for hundreds of years. Given these estimates, it is anticipated that the pipe will likely be filled with soil by the time it has corroded to a point of collapse, which will minimize subsidence. Further, Enbridge plans to continue to monitor the Permanently Deactivated Line 3 ROW, which is in the middle of a corridor of other operating pipelines. Additional grouting may be completed at roads and railroads after consultation with crossing authorities, in order to remove the risk of any subsidence at these locations. This ROW monitoring program will inspect for any signs of subsidence on the ROW and develop plans to address the issue if it arises.

2 GUIDING INDUSTRY REGULATIONS AND LITERATURE

While Enbridge has used the term "Permanently Deactivated" to refer to taking the existing Line 3 out of service permanently, industry terminology generally refers to pipeline "abandonment" rather than "Permanent Deactivation," and the references and citations that follow use the terminology accordingly. Enbridge has relied on this literature because, from a physical perspective, the activities associated with abandonment and deactivation are the same.

2.1 FEDERAL

Line 3 is an interstate pipeline. As such, its operations are regulated by PHMSA under Title 49 of the CFR. Enbridge will comply with all applicable federal requirements within Title 49 of the CFR or those requirements included by reference. Additionally, Enbridge will follow the code guidance published by the ASME.

- **49 CFR § 195.59** – "For each abandoned offshore pipeline facility or each abandoned onshore pipeline facility that crosses over, under or through a commercially navigable waterway, the last operator of that facility must file a report upon abandonment of that facility."

- **PHMSA's NPMS Submission Guide** – "6I. Newly Abandoned Pipelines. Pipelines that were newly abandoned during the last calendar year should be included in your new NPMS data submission."

- **PHMSA – 195.64** – "§ 195.64 National Registry of Pipeline and LNG Operators. (a) OPID Request. Effective January 1, 2012, each operator of a hazardous liquid pipeline or pipeline facility must obtain from PHMSA an Operator Identification Number (OPID). An OPID is assigned to an operator for the pipeline or pipeline system for which the operator has primary responsibility. To obtain an OPID or a change to an OPID, an operator must complete an OPID Assignment Request DOT Form PHMSA F 1000.1 through the National Registry of Pipeline and LNG Operators in accordance with §195.58….(c) Changes. Each operator must notify PHMSA electronically through the National Registry of Pipeline and LNG Operators at http://opsweb.phmsa.dot.gov, of certain events. (1) An operator must notify PHMSA of any of the following events not later than 60 days before the event occurs: (i) Construction or any planned rehabilitation, replacement, modification, upgrade, uprate, or update of a facility, other than a section of line pipe, that costs $10 million or more. If 60 day notice is not feasible because of an emergency, an operator must notify PHMSA as soon as practicable."

- **49 CFR § 195.402** – "(a) General. Each operator shall prepare and follow for each pipeline system a manual of written procedures for conducting normal operations and maintenance activities and handling abnormal operations and emergencies. (c) Maintenance and normal operations. This manual shall be reviewed at intervals not exceeding 15 months, but at least once each calendar year, and appropriate changes

made as necessary to insure that the manual is effective. This manual shall be prepared before initial operations of a pipeline system commence, and appropriate parts shall be kept at locations where operations and maintenance activities are conducted. The manual required by paragraph (a) of this section must include procedures for the following to provide safety during maintenance and normal operations: "(10) Abandoning pipeline facilities, including safe disconnection from an operating pipeline system, purging of combustibles, and sealing abandoned facilities left in place to minimize safety and environmental hazards. For each abandoned offshore pipeline facility or each abandoned onshore pipeline facility that crosses over, under or through commercially navigable waterways the last operator of that facility must file a report upon abandonment of that facility in accordance with § 195.59 of this part."(13) Periodically reviewing the work done by operator personnel to determine the effectiveness of the procedures used in normal operation and maintenance and taking corrective action where deficiencies are found."

- **PHMSA – 645.211** - "The FHWA [U.S. Department of Transportation's Federal Highway Administration]> should use the current editions of the AASHTO [American Association of State Highway and Transportation Officials] publications, "A Guide for Accommodating Utilities Within Highway Right-of-Way" and "Roadside Design Guide" to assist in the evaluation of adequacy of STD utility accommodation policies….(a) Utilities must be accommodated and maintained in a manner which will not impair the highway or adversely affect highway or traffic safety. Uniform procedures controlling the manner, nature and extent of such utility use shall be established."

- **PHMSA's Operations & Maintenance Enforcement Guidance, Part 195 Subpart F** – "Only abandoned (permanently removed from service) pipelines are exempt from Part 195 regulations with exception of abandonment inventory reporting requirements….. Inactive pipeline, which may or may not contain liquids, must meet all applicable requirements of Part 195. Operators sometimes do not completely abandon a pipeline and may sometimes use terms such as "idle", "inactive", or "out of service" to describe this situation. The regulations do not define "idle" or "inactive" pipe. Pipe is either considered active or abandoned. If a pipeline has not been abandoned according to the guidance, then it is active and the operator must ensure that the pipeline complies with all requirements of Part 195."

- **The American Association of State Highway and Transportation Officials** (AASHTO) – A Guide on the Accommodation of Utilities Within Freeway Right-of-Way, – "Untrenched Construction - Methods may include directional drilling, micro tunneling, driving, coring, or boring….Grout backfill should be considered for carriers or casings more than 300 mm (12 in.) in diameter and for overbreaks, unused holes, or abandoned carriers or casings. Untrenched excavations 100 mm (4 in.) or less in diameter may be exempt from void filling requirements in accordance with the transportation agency's utility accommodation policy."

- **American Society of Mechanical Engineers (ASME) B31.4-2012** – 457 ABANDONING A PIPING SYSTEM – "In the event of abandoning a piping system, it is required that (a) facilities to be abandoned in place shall be disconnected from all sources of the transported liquid, such as other pipelines, meter stations, control lines, and other appurtenances; (b) facilities to be abandoned in place shall be purged of the transported liquid and vapor with an inert material and the ends sealed."

- **PHMSA Advisory Bulletin – Pipeline Safety: Clarification of Terms Relating to Pipeline Operational Status –** "SUMMARY: PHMSA is issuing this advisory bulletin to all owners and operators (operators) of hazardous liquid, carbon dioxide, and gas pipelines, as defined in 49 Code of Federal Regulations Parts 192 and 195, to clarify the regulatory requirements that may vary depending on the operational status of a pipeline. Further, this advisory bulletin identifies regulatory requirements operators must follow for the abandonment of pipelines. Pipeline owners and operators should verify their operations and procedures align with the regulatory intent of defined terms as described under this bulletin. Congress recognized the need for this clarification in its Protecting our Infrastructure of Pipelines and Enhancing Safety Act of 2016."

2.2 ENBRIDGE STANDARDS

Enbridge has developed an internal standard titled "D06-201 – Pipeline and Facility Change in Operational Status" to ensure compliance with the applicable standards. This internal standard recommends the completion of several analyses, including:

- project-specific risk assessment;
- land use assessment;
- crossing assessment;
- depth of cover assessment;
- erosion and slope stability assessment;
- long-term monitoring and mitigation assessment;
- ground subsidence and soil mechanics/pipeline collapse assessment;
- environmental contaminant considerations assessments;
- coatings contamination assessment; and
- NORM and PCB review.

In addition to the aforementioned analyses, the standard provides guidance on:

- criteria for draining product from existing mainline and facilities;
- methods of purging product from the system;
- methods of cleaning pipeline and facilities; and
- methods to isolate the pipeline from operating infrastructure.

Enbridge has adhered to this internal standard in order to ensure the safest and most efficient practice when deactivating Line 3.

2.3 PIPELINE ABANDONMENT MATRIX

The Canadian Energy Pipeline Association (CEPA) developed a Pipeline Abandonment Matrix to provide general guidance for a company who has to decide whether to abandon a pipeline by removing it or abandoning it in place. The Pipeline Abandonment Matrix looks at both the diameter of the pipeline and existing and potential future land use considerations which are then broken down into usage categories. A summary of the Pipeline Abandonment Matrix for pipe diameters greater than 26 inches is provided in Table 2-1 below.

Table 2-1: CEPA Pipeline Abandonment Matrix

Land Use		Primary Option For Abandonment (Pipe Diameter > 26")
Agricultural	Cultivated	Abandon In Place
	Cultivated with special features* (depth of cover considerations)	Remove
	Non Cultivated (Native Prairie, Rangeland, Pasture)	Abandon In Place
Non-Agricultural	Existing Developed Lands (Commercial, Industrial, Residential)	Abandon In Place
	Prospective future development (Commercial, Industrial, Residential)	Remove
	No future development anticipated (e.g., Forest Areas)	Abandon In Place
Other Areas	Environmentally Sensitive Areas (including Wetlands)	Abandon In Place
	Roads & Railways	Abandon In Place (with special treatment to prevent potential ground subsidence)
	Water Crossings	Abandon In Place
	Other Crossings (Utilities)	Abandon In Place (with special treatment to prevent potential ground subsidence)

In the CEPA Pipeline Abandonment Matrix, there are only two land use situations in which removal is the recommended method to abandon a pipeline: (1) where the land is cultivated but has special features such as depth of cover considerations; or (2) when it is non-agricultural land and there is prospective future development contemplated. Neither of these two land use situations applies to Line 3 because it exists in a multi-pipeline corridor that contains active pipelines. In all other categories of land use, abandon in place is the recommended method to abandon a pipeline. Enbridge is proposing to Permanently Deactivate the existing Line 3 in place, and Enbridge's decision to deactivate in place is consistent with CEPA's recommendations.

3 RISK ASSESSMENT

Enbridge conducted a risk assessment to determine the technical risks associated with both removing the Line 3 from the ground and Permanently Deactivating Line 3 in place. As part of the assessment, Enbridge consulted with internal stakeholders, worked with external consultants to perform studies, and performed a literature review of industry studies. The risk assessment consisted of:

- collecting risk data during a risk identification workshop attended by representatives from Enbridge's various functional groups and subject matter experts;
- developing risk reduction and mitigation strategies for high risk scenarios; and
- committing to re-assessing the high risks (post-action) to assess the value of the reduction and mitigation strategies.

3.1 RISKS ASSOCIATED WITH PIPE REMOVAL

Pipeline removal would create impacts to the environment, land use, and public safety similar to a new pipeline project. Environmental hazards associated with pipe removal are related to the disturbance of the soil, potential impacts to the groundwater, and potential impacts to human activities, natural wildlife and vegetation. Reduced soil stability during and after excavation can also be a concern, as it can lead to increased localized erosion and destabilized slopes. These hazards may cause considerable disruption to ongoing and future land management activities. These risks increase significantly during a large scale removal project.

Excavation of the Permanently Deactivated Line 3 will cause significant disruption to landowners and the general public. Construction activities would restrict access to the ROW and adjacent works areas. Removal operations at crossings would not only cause traffic interruptions and restrictions, but soil stability issues caused by pipe removal could damage the roads, bridges and crossings. These issues introduce risk to existing infrastructure such as roadways, railways, and other utilities.

One of the greatest risks of removing a Permanently Deactivated pipeline is the risk of damaging adjacent pipelines or infrastructure, which can lead to significant public, environment, and operational impacts. The existing Line 3 currently shares a congested ROW with either five or six additional pipelines. Line 3 is located in the third position in roughly 75% of the mainline ROW corridor in Minnesota. In the U.S., the majority of Line 3 is within 7 to 18 feet edge-to-edge from the nearest adjacent, active pipeline. Given the proximity of Line 3 to other operating pipelines, removal increases the chance of a release from adjacent operational lines caused by either a line strike or by their fatigue due to the use of heavy equipment during removal activities.

In light of the significant construction-related risks, execution in the congested corridor would also be a significant challenge, especially as it relates to excavation. Unlike the installation of a new pipeline (i.e., a pipeline installed as the outside pipe in a multi-pipe corridor), where crews can work over areas where there aren't active pipes underneath, the removal of a pipeline within a multi-pipe corridor necessitates the placement of timber mats over the active pipelines. The placement of these mats creates a working and travelling surface for large equipment to use when excavating and pulling out the abandoned pipe. Enbridge estimates approximately 600,000 – 900,000 mats would be required to safely remove Line 3 from the ground. Securing this volume of mats at one time may not be feasible.

Additionally, in areas where pipelines are relatively close to each other or where there exists slope stability concerns due to either changes of ground elevation across the ROW or wet soil conditions, the installation of sheet piling may be required. Sheet piling will likely be required in all saturated wetlands. Removal of Line 3 would require over 235,000 tons of steel to sheet pile both sides of the pipe located in saturated wetlands along the ROW. Similar to mats, securing this volume of sheet piling at one time may not be feasible.

Due to restrictions on utilization machines to excavate within close proximity of active pipelines (minimum of 1 foot of clearance), Enbridge would likely use either hand dig or hydraulic vacuums to excavate the Permanently Deactivated Line 3 in order to meet Enbridge's Ground Disturbance Guideline (MP-HSMS-009) to reduce the likelihood of construction damage to existing infrastructure. Hydraulic vacuum excavation could present a challenge due to the large amount of water and associated slurry waste needed due to the size of the removal project. Enbridge estimates approximately 1.7 million gallons of slurry waste would be produced if the pipe were to be removed from the trench. This will also create disposal and erosion challenges. Notwithstanding Enbridge's robust construction specifications, proper planning and execution, the likelihood of a mechanical incident will be elevated due to the size of the removal project, irrespective of the party conducting the excavation.

In areas where the abandoned pipe is both (a) on the interior of a multi-pipeline corridor and (b) within a saturated wetland, mats and sheet piling will not provide the protections they would normally offer in a dry area based upon the lack of bearing capacity of the saturated wetland's soil. This lack of bearing capacity introduces the potential for the placed matting to *sink* when it is driven over by heavy equipment. This sinking could progress all the way unit the mats are resting upon those very same pipes they were once trying to protect. Again, because of the lack of bearing pressure, even when considering relatively long sheet piling, there exists risk that driven sheet pile will not "reach bottom" and, as such, will not serve as adequate soil stability or as the "foundation" for a temporary matting road and would prevent access to those areas. Due to the access issues identified in saturated wetlands, Enbridge anticipates there will be areas where pipe removal cannot be safely performed. Please see Figure 3-1 which shows the stages of pipeline removal.

Figure 3-1: Stages of Pipeline Removal

Line 3 is located within a multi-pipeline corridor.

To remove Line 3 would require additional temporary work space for equipment and topsoil storage.

Temporary mats would be placed over operating lines.

The mats protect the operating pipelines from heavy equipment.

Soil would be removed to expose the pipeline.

Heavy equipment would be brought in to remove the pipeline from its trench.

The pipeline would be cut into sections. Valves and buoyancy weights would be detached and removed.

The pipeline is further sectioned to fit onto trucks.

The pipeline sections would be hauled away by truck.

Additional trucks would bring in soil to fill the void from the removed pipeline.

The right-of-way would be restored.

3.2 Risks Associated with Deactivating a Pipe in Place

Permanently Deactivating Line 3 in place avoids the potential risks and impacts related to ground disturbance and active pipelines discussed for removal. Nonetheless, there are other risks related to abandoning a pipeline in place that need to be addressed. To further assess these risks, Enbridge reviewed industry literature related to the deactivation or abandonment of pipelines, including: CSA Z662[4], the 2007 CEPA Report[1], and the 2010 DNV GL Study[6]. The literature review identified that the following areas are the most critical to address for Permanently Deactivated pipelines:

- Soil and water contamination;
- Water conduits; and
- Subsidence.

As summarized in Table 1-1, Enbridge has studied each of these risks and determined a mitigation strategy to minimize each one. Each identified risk, Enbridge's engineering analyses, and mitigation strategies, is described in detail in the following sections of this Plan.

3.3 RECOMMENDED APPROACH

Based on the results of the risk assessment, Enbridge believes that deactivating a pipeline in place minimizes and/or eliminates unnecessary impacts to the environment, landowners, and the state of Minnesota. Removing the 282 miles of existing Line 3 would create a significant risk to other operating pipelines and additional impacts to the environment, land use, and public safety similar to and exceeding those related to constructing a new pipeline project. Permanently Deactivating Line 3 in place poses some risk of water and soil contamination, water conduit, and ground subsidence. However, based on Enbridge's engineering assessments, these risks can be adequately avoided, minimized, or mitigated through the cleaning program, isolation and segmentation, and ongoing monitoring and maintenance activities as described in this Plan.

It is unnecessary, therefore, to subject the environment, landowners, and the state of Minnesota to the additional removal impacts and risks when deactivating a pipeline in place can be done in a manner that minimizes known risks. Accordingly, deactivation in place is recommended for the following land uses because the disturbance caused by pipe removal would likely adversely affect landowners, sensitive areas or existing infrastructure:

- environmentally sensitive areas (parks, wetlands, natural areas, species at risk habitat);
- water crossings (streams, rivers, lakes, canals);
- non-agricultural lands;
- forested lands;
- existing developed lands (commercial, industrial, residential);
- non-cultivated lands (native prairie, range land);
- roads and railways;
- other crossings (utilities, other pipelines); and
- cultivated (including those that are irrigated).

The remainder of this Permanent Deactivation Plan discusses minimize risks and impacts related to the pipeline remaining in the ground.

4 SCOPE OF WORK FOR DEACTIVATING IN PLACE

The Line 3 Permanent Deactivation Plan will comply with applicable regulations for abandoned pipelines and include execution of measures designed to minimize the risk of soil and water contamination, water conduits, and ground subsidence. The Permanent Deactivation Plan will follow the five main steps which are summarized in Figure 4-1 below.

Figure 4-1: Deactivation Process

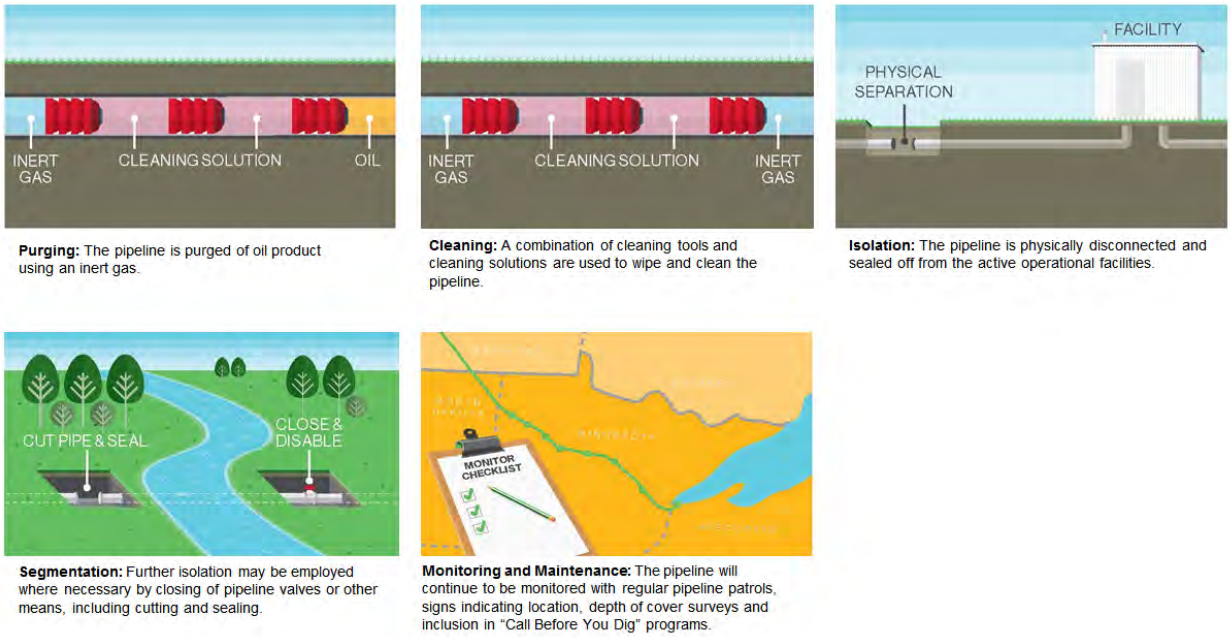

4.1 MINIMIZING THE RISK OF SOIL AND WATER CONTAMINATION

4.1.1 Soil and Water Contamination Risk

One identified risk is that soil and water contamination could occur from hydrocarbons remaining in the pipeline after it is removed from service. In order to minimize this risk, Enbridge will purge the pipeline of crude oil and implement a cleaning program to remove remaining hydrocarbons from the pipeline.

4.1.2 Mitigation

4.1.2.1 Purging

Existing product within the pipe will be purged, or pushed through the pipeline, using pigs propelled with nitrogen gas. Enbridge will deactivate the existing Line 3 between MP 789 near Joliette, ND and MP 1098 near Superior, WI. Deactivation will proceed in two sections:

Section one will consist of a pipeline purge between the Gretna Station (MP 772) and the Clearbrook Terminal (MP 909) followed by pipeline cleaning and disconnecting the pipeline from the facilities along the Gretna to Clearbrook segment and at Clearbrook Terminal. See Figure 4-2.

Section two will consist of a pipeline purge, pipeline cleaning, and disconnecting the pipeline from the facilities at Clearbrook Terminal (MP 909) and along the pipeline to the Superior Terminal (MP 1097). See Figure 4-3.

Figure 4-2: Purge Diagram (Gretna to Clearbrook)

Figure 4-3: Purge Diagram (Clearbrook to Superior)

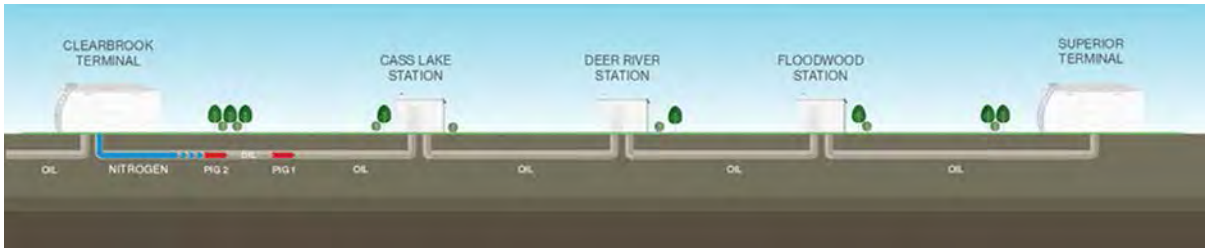

For each section, a batch of two (2) 34” pigs will be loaded and launched. The first pig will be a purge pig followed by a batch of oil and a tailing purge pig. Nitrogen injected at the beginning of the section is used to propel the pigs to the downstream side of the nearest intermediate station. This will “push” the oil along the pipeline. The purge operation will continue by injecting nitrogen at each of the intermediate stations until the pigs reach the end of the section; the Clearbrook Terminal (MP 909) or Superior Terminal (MP 1097), respectively. The oil that has been pushed to the terminus of the pipeline (i.e., purged oil) will be delivered to tankage at either the Clearbrook Terminal for section 1 or the Superior Terminal for section 2. All purging activities will be undertaken subject to any federal, state or local permitting requirements.

Once the purging operation is complete, the section of Line 3 will be prepared for cleaning.

4.1.2.2 Cleaning

In order to minimize soil and water contamination risks, the existing Line 3 pipeline will be cleaned with the appropriate solvents to remove hydrocarbons from the pipe walls. The appropriate solvent is typically an engineered cleaning solution comprised of water and/or water and biodegradable cleaning agents. After purging is complete, cleaning runs will be completed in a sequence similar to that shown in Figure 4-4.

The cleaning program will be verified when Enbridge completes cleaning the first section and re-verified during cleaning of each subsequent section. Each cleaning stage will be sampled to confirm cleanliness.

All cleaning activities will be undertaken subject to any applicable federal, state or local permit requirements. All solid waste materials generated as a result of cleaning activities will be handled and disposed of in accordance with applicable federal and/or state requirements. All of the cleaning solution used during this process will be appropriated and disposed of in accordance with permit requirements.

Figure 4-4: Example Cleaning Sequence

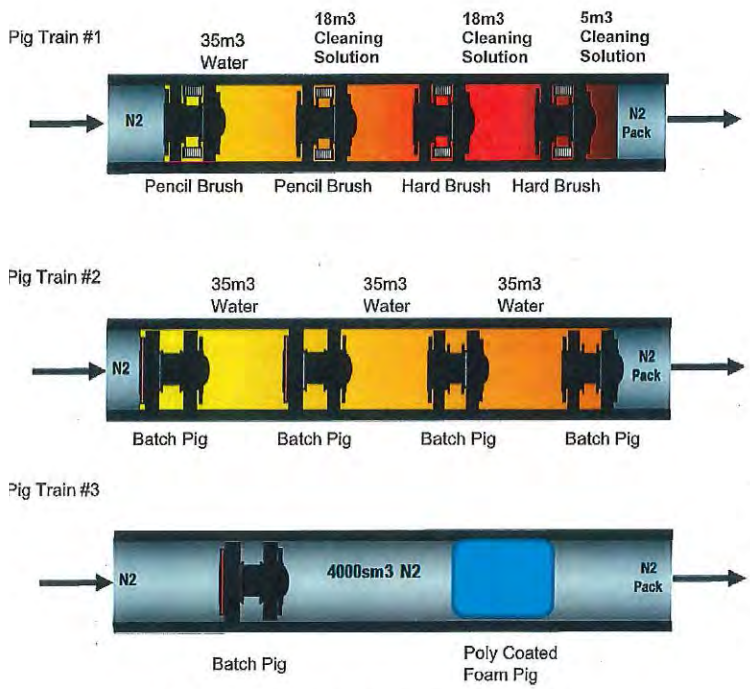

Enbridge completed a two-phase verification to validate its proposed cleaning program (Appendix 7.1). The first phase consisted of laboratory testing of representative pipeline material, which determined the appropriate chemical selection for the cleaning material, as well as hydraulic modeling and cleaning train design. In the second phase, this cleaning program was then applied to a 12-mile deactivated section of Line 3 pipe after it was taken out of service

in 2014. All fluid samples collected during the cleaning process were submitted to an accredited laboratory for unbiased and independent chemical analysis of the samples taken. The laboratory analysis concluded that PCB and NORM concentrations were below detectable limits and, therefore, the Permanently Deactivated pipe did not pose a risk of contamination. Scientific analysis of the rinse water concluded that 99.9999987% of the product was removed from the pipeline after the cleaning regime was completed. If the results of this 12-mile section were extrapolated to the results expected from cleaning the entire 282 miles of Line 3 in Minnesota, this is equivalent to less than one gallon of hydrocarbons that would be left inside the pipeline. Therefore, the cleaned pipe would not pose a risk of contamination.

As mandated by the Department of Justice Consent Decree, cleaning and purging of the existing Line 3 must begin within three months of the in-service date (ISD) for the Line 3 Replacement Project.

4.2 Minimizing the Risk of Water Conduit Effect

4.2.1 Water Conduit Risk

A Permanently Deactivated pipeline may function as a conduit to transport water or soil in a downslope direction if the pipeline has significantly degraded after being Permanently Deactivated. Pipeline corrosion and/or third party damage (e.g., a line strike which may affect coating quality and, in turn, accelerate localized corrosion) are the most likely events that cause the pipe to degrade over time. If the structural integrity of the pipeline is compromised, water and surrounding materials may infiltrate the pipe and have the potential of travelling downslope and exiting the pipe at another location. Water conduits may cause water migration to or from sensitive environmental features such as wetlands, watercourses, water supply areas such as aquifers, areas with sodic/saline or sandy soils, agricultural lands, and areas with a high water table.

Each of the following conditions is necessary for the formation of water conduits:

- Through-wall corrosion to allow water to enter the pipeline;
- The Permanently Deactivated pipeline must be in contact with water (that is, the pipeline is located at or below the water table);
- The portion of the pipeline that forms the conduit must be intact;
- There must be a preferential exit corrosion point that allows water to exit following movement within the pipeline;
- There must be sufficient elevation changes between the entry and exit points to allow for the movement of water; and
- The influx of soil must be of such type and occur in such a fashion that it does not effectively block the conduit.

The creation of water conduits along the outside of pipelines has not been identified as a risk. It is industry standard during pipeline construction and restoration that trench breakers are placed to prevent this occurrence, and it is assumed that given the vintage of Line 3, the likelihood of an external conduit occurring is minimal as the pipeline has been through numerous freeze/thaw cycles over its lifetime. In addition, the Permanently Deactivated pipeline will be monitored as part of the Enbridge Operations and Maintenance Manual, and if evidence of water conduit formation along the outside of the Permanently Deactivated pipeline is observed, similar mitigation measures to those used for operating pipelines will be implemented.

The key mitigation measures identified to reduce the potential effects of the formation of water conduits are:

- pipeline cleanliness (to address potential contamination from within the pipeline);
- isolation and pipeline segmentation;
- responding to one call requests for the Permanently Deactivated line;
- monitoring of the ROW; and
- maintaining CP.

Enbridge's planned cleaning program is described in Section 4.1.2.2. Enbridge's planned continued monitoring and maintenance, including One-call participation, are discussed in Section 4.3.2. The following section focuses on Enbridge's assessment and plans to isolate and segment existing Line 3.

4.2.2 Segmentation Assessments

Segmentation is conducted to avoid the potential for the Permanently Deactivated pipeline to act as a water conduit. To ensure protection of resources such as wetlands, streams and rivers, a detailed analysis has been completed to show the effectiveness of segmentation of the Permanently Deactivated pipeline at predetermined locations, including pump station and MLV locations. In addition to these existing segmentation locations, topography, hydrology and depth of cover have been reviewed in detail and taken into consideration in order to identify additional segmentation locations.

Enbridge conducted several segmentation assessments to identify segmentation locations for the Permanently Deactivated Line 3 pipeline and to mitigate the risk of water conduit via the pipeline. The following analyses were completed:

1. Desktop review of Enbridge data collected through years of operational history, including, but not limited to: wetland and waterbody delineations, cultural surveys, pipe depth of cover, ground profile information, and valve and station locations;
2. Desktop review of publicly available data including: water table elevation, soil types and ground profile information;
3. Computer-assisted iterative model to verify and confirm the results of the in-depth desktop analysis;

4. Using the results of the desktop analysis and computer model, provide a detailed listing of segmentation locations; and
5. Provide implementation strategy for in-field segmentation locations to ensure protection of all identified features, on a site-specific basis.

4.2.2.1 Topographical High Concept

The Topographical High Concept is an approach used to identify where the existing topography of the land acts as a physical barrier to the movement of water through a Permanently Deactivated pipeline. To accommodate local accumulation of seepage water at sag, or low points, a topographical high must be greater than one pipeline diameter above any adjacent lows. The Topographical High Concept was used to identify areas along the Line 3 pipeline that will act to hydraulically disconnect the pipeline and mitigate the water conduit effect. See Figure 4-5 for a representation of the Topographical High Concept.

Figure 4-5: Topographical High Concept

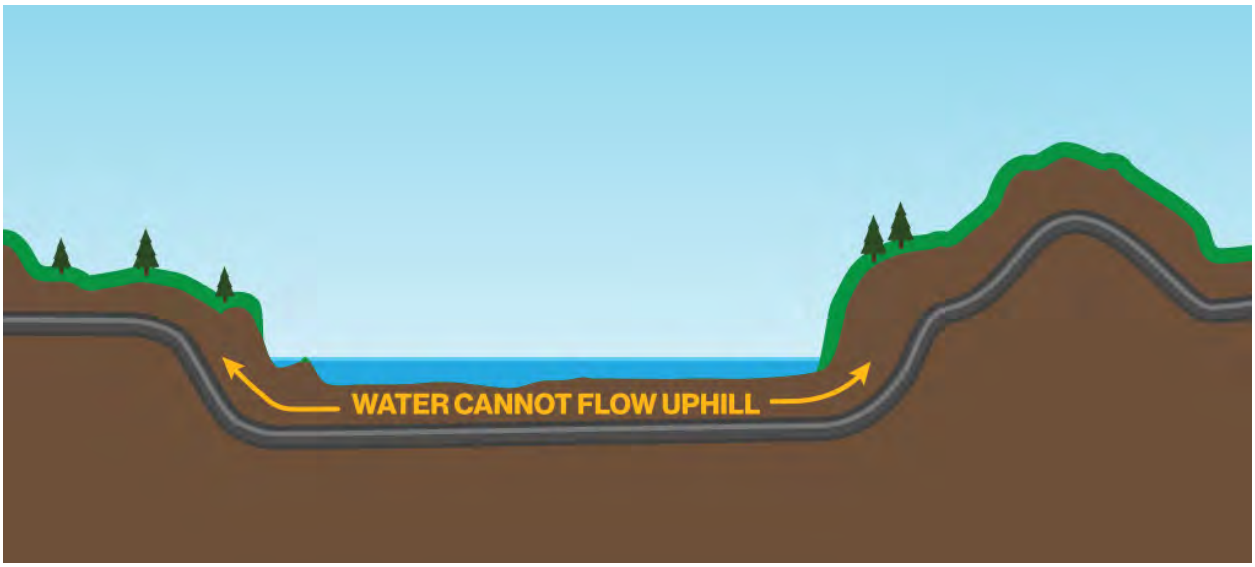

For the purpose of the Topographical High Concept used in the segmentation modeling, a topographical high is defined by:

A location along a pipeline that has an elevation sufficiently above:

- The predicted groundwater elevation, based on known ground surface elevations and regional characteristics, and
- The water level on both sides of a surface water or delineated wetland/waterbody feature that provides sufficient topographical relief to hydraulically isolate adjacent features or other upstream and downstream features outside a natural hydraulic connection. In addition to hydraulic disconnection, and in order to accommodate local

accumulation of fluid at sag points, a topographic high must also be a distance greater than one pipeline diameter (here, 34 inches) above any adjacent lows.

This definition will be used to identify areas along the existing Line 3 pipeline where the surface topography acts to hydraulically disconnect the pipeline and effectively mitigate the water conduit effect. To be effective, the topographic high must ensure that hydraulic disconnection is maintained in one or both directions from the topographic high to the next adjoining segmentation point in perpetuity. To prevent the pipeline from acting as a conduit, the elevation of the topographic high must be greater than the estimated highest annual surface/groundwater level.

The distance over which a topographical high will be applicable as an alternative to other segmentation methods will depend on factors such as hydrological and hydrostatic conditions, pipeline elevation, topography, local water accumulation, outflow zones, and both the distance to, and the elevation of, the next adjoining segmentation point specific to the lateral section of the pipeline being considered.

4.2.2.2 SEGMENTATION MODELING METHODS

4.2.2.2.1 Desktop Analysis

Using publicly available and additional Enbridge captured ground and pipeline profile data, a desktop analysis was performed to holistically review potential flow paths caused by elevation differences between known and delineated wetlands/waterbodies and ground water levels using the Topographical High Concept.

In many cases the wetlands and water bodies were found to be at naturally occurring local low points in the topography. In such cases, the pipe elevation coming into and exiting such features is greater than the elevation of the feature itself. This effectively eliminates the susceptibility for water to migrate out of the identified feature to any other feature. In addition to this naturally occurring segmentation, each delineated wetland was reviewed to determine if it is part of a larger wetland complex and/or combined wetland and stream/river crossing in order to identify locations of hydraulic connectivity and limit any potential exposure outside of the confines of the same complex.

Similar to the analysis performed for each individual wetland and waterbody feature, publicly available data in combination with field data obtained during the construction of Line 67 (Alberta Clipper) in 2009/2010 was used to analyze the possibility of a flow path within the water table that could create a water conduit risk.

4.2.2.2.2 Computer Assisted Model

To support the detailed desktop analysis, a segmentation model was developed using an iterative process to assess the potential effects of the water conduit effect. The model considers the topography of the land, the depth of cover of the pipeline, the location of

wetlands/waterbodies, and current proposed isolation/segmentation locations (that is, manual and automatic valves and facilities), and the groundwater elevation. The model uses an iterative process to determine and verify the results of the desktop analysis by doing a query that looks both upstream and downstream of known features to find the topographical high, and reports such areas that need to be investigated for potential segmentation points, if other factors do not mitigate such risk.

Data for topography, and the groundwater elevation was obtained from publically available sources. Isolation and segmentation locations (MLVs, stations and terminals) and pipeline depth-of-cover were obtained from Enbridge. In order to determine where additional segmentation of the pipeline is recommended, the segmentation model uses water table evaluation data, surface elevation data, pipeline elevation data, the location of existing isolation and segmentation points, and an iterative computer analysis. The segmentation model considers the regional movement of water when determining the placement of segmentation locations.

4.2.2.3 Refinement of the Segmentation Model Results

The model results were reviewed to determine whether or not the segmentation locations were optimally placed to mitigate the water conduit effect while reducing the amount of environmental disturbance associated with segmentation activities to the greatest extent practicable. As part of the desktop and iterative computer model reviews, all known features were given the same consideration for protection from a water conduit path.

4.2.2.4 Results and Recommended Segmentation Assessments

Based on the engineering assessment completed, 47 locations have been identified in the state of Minnesota for isolation (see Table 4-1). These 47 locations consist of the 40 mainline valves, 6 pump stations, and one co-located pump station/terminal within MN. There are three additional locations that have been identified as potential segmentation locations (items 8, 10 and 12 in Table 4-1) due to elevation changes and waterbody characteristics; these locations are currently being analyzed based on site specific factors (e.g., soil characteristics, topography, and hydraulic connectivity) and will be used as segmentation locations if determined that the water conduit effect poses a risk. Additionally, final isolation locations are subject to further refinement based upon the completion of the field assessment and detailed engineering and constructability review.

Table 4-1: Segmentation and Isolation Locations

Existing Line 3 Segmentation/Isolation Locations				
Number	ROW MP	Elevation (ft.)	Location	Action
1	803.25	792	MLV 803.25-3-V	Segment
2	805.55	795	MLV 805.55-3-MOV	Segment
3	814.01	820	MLV 814.01-3-V (Donaldson)	Station Isolation
	814.02	820	CHK 814.02-3-V (Donaldson)	
	814.11	820	MLV 814.11-3-MOV (Donaldson)	
4	829.16	877	MLV 829.16-3-V	Segment
5	834.51	929	MLV 834.51-3-V	Segment
6	838.36	964	MLV 838.36-3-V	Segment
7	840.77	984	MLV 840.77-3-V	Segment
8	844-848			Site Specific Analysis Underway
9	848.15	1049	MLV 848.15-3-MOV (Viking)	Station Isolation
10	850-854			Site Specific Analysis Underway
11	857.14	1133	MLV 857.14-3-V	Segment
12	860-864			Site Specific Analysis Underway
13	864.02	1100	MLV 864.02-3-MOV	Segment
14	865.06	1102	MLV 865.06-3-MOV	Segment
15	867.40	1101	MLV 867.40-3-V	Segment
16	873.43	1116	MLV 873.43-3-V	Segment
17	876.99	1142	MLV 876.99-3-MOV (Plummer)	Station Isolation
	877.05	1142	CHK 877.05-3-V (Plummer)	
18	885.65	1141	MLV 885.65-3-V	Segment
19	895.96	1240	MLV 895.96-3-V	Segment
20	899.31	1335	MLV 899.31-3-V	Segment
21	904.56	1292	MLV 904.56-3-V	Segment
22	909.15	1351	MLV 909.15-3-MOV (Clearbrook)	Terminal/Station Isolation
	909.17	1351	MLV 909.17-3-MOV (Clearbrook)	
	909.39	1351	MLV 909.39-3-MOV (Clearbrook)	
	909.43	1351	MLV 909.43-3-MOV (Clearbrook)	
23	916.52	1440	MLV 916.52-3-V	Segment

24	933.43	1383	MLV 933.43-3-V	Segment
25	939.45	1365	MLV 939.45-3-MOV	Segment
27	940.02	1362	MLV 940.02-3-MOV	Segment
27	943.69	1365	MLV 943.69-3-V	Segment
28	949.90	1358	MLV 949.90-3-V	Segment
29	953.02	1337	MLV 953.02-3-MOV (Cass Lake)	Station Isolation
	953.02	1337	CHK 953.02-3-V (Cass Lake)	
30	955.05	1312	MLV 955.05-3-V	Segment
31	957.91	1320	MLV 957.91-3-MOV	Segment
32	972.74	1314	MLV 972.74-3-V	Segment
33	973.70	1320	MLV 973.70-3-MOV	Segment
34	985.66	1307	MLV 985.66-3-MOV	Segment
35	986.40	1304	MLV 986.40-3-MOV	Segment
36	987.75	1293	MLV 987.75-3-V	Segment
37	989.71	1291	MLV 989.71-3-V	Segment
38	995.92	1292	MLV 995.92-3-V (Deer River)	Station Isolation
	996.03	1292	MLV 996.03-3-MOV (Deer River)	
39	1007.32	1327	MLV 1007.32-3-V	Segment
40	1010.57	1288	MLV 1010.57-3-MOV	Segment
41	1011.66	1292	MLV 1011.66-3-MOV	Segment
42	1017.99	1307	MLV 1017.99-3-MOV	Segment
43	1019.87	1302	MLV 1019.87-3-V	Segment
44	1025.85	1315	MLV 1025.85-3-V	Segment
45	1044.36	1253	MLV 1044.36-3-MOV (Floodwood)	Station Isolation
	1044.36	1253	CHK 1044.36-3-V (Floodwood)	
46	1046.94	1270	MLV 1046.94-3-V	Segment
47	1060.10	1320	MLV 1060.10-3-V	Segment
48	1062.51	1347	MLV 1062.51-3-V	Segment
49	1073.41	1212	MLV 1073.41-3-MOV	Segment
50	1079.91	1051	MLV 1079.91-3-MOV	Segment

4.2.3 Mitigation

To minimize the potential risk for existing Line 3 to act as a water conduit, Enbridge will isolate and segment the pipeline as described in this Plan.

4.2.3.1 Pipeline Isolation

In accordance with CFR Part 195, the Permanently Deactivated pipeline will be physically separated (or isolated) from in-service piping to prevent the reintroduction of oil into the pipeline. Additionally, equipment and instrumentation on the pipeline, with the exception of CP, will be disconnected from electrical sources. All applicable federal, state and local permitting approvals will be obtained prior to undertaking any pipeline isolation activities.

The following sections provide additional details regarding the activities undertaken to isolate Line 3 from other pipelines, pump stations, terminal, MLVs and other facilities.

4.2.3.1.1 Pump Stations and Terminals

The pipeline will be physically disconnected and isolated from pump stations and terminals by safely excavating down to the isolation location, mechanically cutting the pipeline, removing a small section of pipe, and welding a plate or weld cap to the pipe on each side of pipeline and facility left in the ground. This activity will occur both upstream of the station suction valve and downstream of the station discharge valve. It is anticipated that this activity will occur near the fenced boundaries of the stations and terminals to ensure all auxiliary piping is isolated within the pump station or terminal. The precise locations where these activities will occur will be evaluated on a site-specific basis to minimize disruption to any nearby infrastructure due to construction activities. The Superior Terminal will only be isolated on the upstream side of the facility, as it is the terminating facility for the existing Line 3. The pump station and facilities buildings will remain in place and be used for maintenance and storage.

4.2.3.1.2 Mainline Valves (MLVs)

All MLVs will be electrically disconnected as to discontinue operability of the electrical actuators and be closed as a method of segmentation.

4.2.3.1.3 Electrical and Instrumentation

Electrical connections will be de-energized and rendered safe as determined during detailed engineering. Any electrical or instrumentation infrastructure required for the ongoing application of the CP system will be maintained.

4.2.3.1.4 Facilities

The following facilities on the existing Line 3 are locations at which isolation will occur:

- the northern endpoint of the Project located in North Dakota (MLV-789.43-3-B);
- Donaldson Pump Station (MP 814.00);
- Viking Pump Station (MP 847.91);
- Plummer Pump Station (MP 876.97);
- Clearbrook Terminal/Pump Station (MP 909.10);
- Cass Lake Pump Station (MP 952.98);
- Deer River Pump Station (MP 995.83);
- Floodwood Pump Station (MP 1044.33); and
- Superior Terminal (MP 1096.95).

The deactivation process involving the removal of mechanical piping will start with a safety briefing with the staff working on this project to discuss any onsite hazards and mitigation activities. Upon completion, the purging process will begin at each of the stations identified above. All removed piping and equipment will be cleaned and disposed of per applicable regulations. Pipe, piping components, valves, pumps and pipe fittings that are no longer fit for service or reuse within the Enbridge system would be cleaned and disposed of through regional salvage or disposal companies. The removal of the suction and discharge valves and associated piping will isolate the pump stations from the Line 3 mainline, once sealed. Any pipe within each facility that cannot be removed safely will be cleaned and plated so that there is a barrier between the facility and the pipe. The Line 3 pumps will be permanently removed to allow for a safe working area. The sump tank and its associated piping will be cleaned and removed.

The process to disconnect the facilities' electrical systems will start with a safety briefing to discuss any onsite hazards and mitigation measures. A review of the electrical equipment to be disconnected will be performed and equipment identified as non-essential will be removed and salvaged. Items essential for the operations of the adjacent operating lines will be identified and kept in place. A Lock Out/Tag Out tally will be performed on all of the electrical equipment associated with Line 3. If required, a 480 volt pad mounted transformer would be installed to provide power to maintain the yard, building lights and any power needed for CP. All equipment that is no longer fit for service or reuse within the Enbridge system would be cleaned and disposed of through regional salvage or disposal companies in accordance with applicable codes, regulations, and ordinances.

4.2.3.2 Pipeline Segmentation

The Line 3 pipeline will be segmented via the permanent closure of existing mainline valves. In addition, and as required by CFR Part 195, the stations will be isolated from the pipeline and

serve as additional segmentation points. When Line 3 was constructed, the valves were strategically placed to prevent volumes of oil from entering sensitive areas in the event of an emergency release during operation and, as such, they will also prevent movement of water within the empty pipe from reaching these same resources.

At locations other than existing MLVs, which will be permanently closed, additional mainline segmentation will be achieved by mechanically cutting the pipeline, removing a short piece of pipe, and welding a plate or weld cap to the pipe on each side of the pipeline left in the ground similar to facility isolation (see Section 4.2.3.1), or by installing a plug of grout. Pipeline segmentation activities will be undertaken in accordance with all applicable federal, state, and local permits.

4.3 MINIMIZING THE RISK OF SUBSIDENCE

The risk of ground subsidence has been identified by CEPA, the Petroleum Technology Alliance of Canada ("PTAC"), and the NEB as a possible concern for permanent deactivation of a pipeline in-place.[1,3,13] The literature recognizes that the long-term degradation of a Permanently Deactivated pipeline may eventually lead to a measureable amount of ground subsidence; however, the extent of that subsidence is not well defined and must be assessed. In order to responsibly deactivate a pipeline, an operator must consider the risks of ground subsidence and develop a plan to address it. The decision to Permanently Deactivate in-place requires that potential ground subsidence levels are within tolerable limits for site-specific land use.[1,3] While guidance for establishing tolerable limits is not presently available in the industry, the information available instead defers to a risk-based decision-making process to support appropriate actions for a specific pipeline.[1]

4.3.1 Structural Integrity and Subsidence Risk Assessments

This section provides details of the assessments of subsidence and structural integrity performed as part of developing the Line 3 Deactivation Plan to predict the short and long-term risks of ground subsidence. It should be noted that subsidence as a general term is used in relation to both natural and artificial hazards, such as growth faults, flood or groundwater withdrawal, and mining operations. However, reference to ground subsidence within this Plan is used solely with respect to possible subsidence concerns related to pipeline deactivation.

Enbridge performed a thorough review of the possible risks associated with ground subsidence with respect to pipeline deactivation, considering industry guidance from the 2007 CEPA Report,[1] the NEB Background and Discussion Papers,[3,5] the PTAC Report,[13] the 2010 DNV GL Report,[6] and additional Enbridge work summarized in this plan. The review identified the following potential consequences related to ground subsidence with respect to pipeline deactivation.

- Public Safety:
  - hazards to agricultural equipment;
  - road subsidence at primary highways;
  - track bed subsidence at railway crossings; and
  - hazards to people, machinery, or livestock.
- Environmental Impact and Land Use:
  - water channeling and subsequent erosion;
  - loss of topsoil; and
    long-term impact on land use.

4.3.1.1 Subsidence Failure Modes

Ground subsidence can occur where a void is created within the ground, generally at the pipe depth, allowing the soil above to collapse into the void, and creating a disturbance at the surface. This may occur due to a combination of corrosion degradation and loss of structural integrity of the pipe wall. Subsidence due to corrosion can be either partial, considering soil infill into large localized perforations in a Permanently Deactivated pipe, or total, considering significant overall general wall loss and total infill of soil.

Structural integrity, in the case of a Permanently Deactivated pipeline, is defined by the ability of the pipeline to resist collapse due to external loading, rather than internal product and pressure containment. DNV GL recognized that an abandoned pipeline sufficiently degraded by corrosion such that structural integrity is compromised could, in theory, collapse due to the weight of the soil and any potential surface loads present.[6,13] The possibility for total subsidence of a large diameter pipeline, (defined by CEPA[1] as having an outer diameter of 24 to 48 inches) is of specific concern for the 34-inch Line 3 because of potential environmental and safety concerns, as mentioned above. While the magnitude of subsidence due to partial infill is generally considered minor,[3] it has nonetheless been assessed in the following sections for comparative purposes.

In 2013, the Petroleum Technology Alliance of Canada (PTAC) commissioned DNV GL to prepare a study entitled “Understanding the Mechanisms of Corrosion and their Effects on Abandoned Pipeline”. The PTAC report presents a conservative methodology proposed by DNV GL for estimating time to loss of structural support for an abandoned pipeline. This assessment considers a worst case condition, assuming no coating (or 100% loss of coating) and no CP applied. However, these assumptions are not applicable to Line 3 since CP will continue to be applied to the pipeline; thus, the corrosion progression is predicted to be localized perforations due to external corrosion and not general wall thinning. Similarly, the conditions for internal corrosion on Line 3 are not consistent with the conditions used in the corrosion aspect of the PTAC model.

4.3.1.2 Corrosion Degradation

The structural integrity of a pipeline in a load bearing capacity is subject to decrease with corrosion degradation. The specific rate of corrosion due to exposure to the environment depends on a number of factors, including the condition of the pipeline coating, soil aeration, types and homogeneity of soils, soil moisture, internal atmosphere, and electrical factors which create the potential differences for a corrosion cell to be established.

Line 3 has been in service since 1968. The types of environmental degradation normally affecting onshore pipelines of similar vintage are:

- localized corrosion;
- uniform corrosion;
- stress corrosion cracking (SCC);
- corrosion fatigue; and
- selective seam weld corrosion.

Localized pitting and uniform corrosion, both external and internal, are the only two forms of corrosion that are relevant with respect to pipeline deactivation and contribution to subsidence. SCC, corrosion fatigue, and selective seam weld corrosion are unlikely to affect the structural integrity of the pipeline because they have a crack-like morphology that can grow to failure under an applied high hoop stress from internal pressure. The Permanently Deactivated Line 3 will not be under hoop stress due to internal pressure. In the absence of internal pressure, the primary stresses in the circumferential (hoop) direction will be minimized. As such, the driving stresses for continued SCC or corrosion fatigue crack growth are expected to be negligible. Therefore, SCC, corrosion fatigue, and selective seam weld corrosion are not considered as contributing factors to the risk of pipe collapse and subsidence caused by Line 3.

4.3.1.3 Effects of Coating and Cathodic Protection on Corrosion

External corrosion control is generally achieved on underground pipelines by a combination of corrosion resistant coatings and CP systems. Corrosion resistant coatings are designed to provide high dielectric strength, and low moisture permeability. The coating, where intact, provides a barrier to moisture, which is necessary to support the corrosion reactions. However, coatings contain defects, or ‘holidays’ where corrosion can occur. Furthermore, coatings can degrade with time which increases the extent of bare pipe surface susceptible to corrosion.

Generally, pipeline corrosion on an externally coated pipeline will primarily progress as localized pitting with general corrosion occurring at coating holidays, or where coating is disbonded.[13, 37] Per historical industry experience and guidance from CEPA and the NEB, it is considered highly unlikely for corrosion to cover the entire circumference of a pipeline over a significant length.[1,3] Thus, it is correspondingly unlikely that a long segment of the pipeline will be potentially susceptible to sudden collapse and subsidence. It should be noted that the 2011GE UltraScan®

WM in-line inspection data collected on the most severely corroded section of Line 3 revealed that approximately 99% of the inspected pipe joints contained corrosion that was <10% of the pipe's total surface area. This data substantiates the guidance provided by CEPA and the NEB that it is considered highly unlikely for corrosion to cover the entire circumference of a pipeline over a significant length.[1,3]

Line 3 is externally coated with polyethylene tape. A Gas Research Institute (GRI) report published in 1992 provides information that the most common problems reported by pipeline operators who had used tape coating on their pipeline systems were: poor field application, failure of adhesive, poor resistance to soil stress, and high susceptibility to shielding the current of the CP system.

Data collected from the 1996 direct examinations conducted on Line 3 was reviewed to provide a baseline for historical metal loss on this line. There were 49 locations excavated between 1978 and 1982 based on the findings of the in-line inspection (ILI) tool. External metal loss was found at 15 of these locations, all under wrinkled and disbonded tape. Excavations conducted on Line 3 have provided confirmation that the polyethylene tape is experiencing disbonding due to soil stress promoting the formation of wrinkles (on the coating) at the point of maximum stress, typically at the 3 o'clock and 9 o'clock circumferential positions of the pipe. (For reference, circumferential positions are indicated in terms of clock divisions looking downstream, with 12 o'clock representing the top centerline of the pipe.) Once the wrinkles form, water is able to seep under the disbonded coating and is carried along the pipeline's steel surface by capillary action. Permeation of the CP current is limited due to high dielectric strength of the polyethylene tape shielding the current.

4.3.1.4 Estimate of Corrosion Rates

A review of historical and conservative theoretical external and internal corrosion rates was undertaken to help establish a predicted time to failure for possible pipeline collapse, and related ground subsidence.

4.3.1.5 External Corrosion Rates

The U.S. National Bureau of Standards (NBS) initiated an extensive series of tests in 1922 to measure corrosion rates of various metals and alloys in a number of soil environments.[14] The soils studied were the native soils in over 150 test sites from around the United States. The soils were analyzed for pH, total acidity and the concentrations of sodium, potassium, calcium, magnesium, carbonate, bicarbonate, chloride and sulfate ions. The soil resistivity values were measured and the local climatic conditions were recorded.[14]

The numerical analysis provided in the PTAC report was used to calculate the localized corrosion rate and the uniform corrosion rate, as a function of soil drainage, assuming it was limited by ionic diffusion of oxygen through a surface oxide. The soil drainage was the only parameter that showed a weak but usable correlation between the mass loss (uniform corrosion) and the localized corrosion, with soils drainage. The wall thickness of the pipe was

calculated with respect to time for the two extreme soil drainage conditions: very poor and good. The results are presented in Figure 4-6.

A 0.4 mm/year (16 mils/year [mpy]) default corrosion rate for pipelines when other data are not available, is presented by ANSI/NACE SP0502-2010, "Pipeline External Corrosion Direct Assessment Methodology" (SP0502).[15] This corrosion growth rate was developed using an 80% probability bound (X80) value, established by the NBS study discussed above. SP0502 also provides a default pitting rate of 0.3 mm/year (12 mpy) for pipelines when other data was not available, provided that the piping has had at least 40 millivolts (mV) of polarization for a significant period of time since installation. This 0.4 mm/year growth rate was calculated from long-term underground corrosion tests of bare steel pipe coupons in a variety of soils, including native and non-native backfill, and is considered conservative for most transmission pipelines.[15] NACE guidance allows for a 24% reduction of this default rate, yielding the 0.3mm/year rate cited.[15]

Figure 4-6: Upper and Lower Bound Wall loss progression due to corrosion as a function of soil drainage (PTAC). Applicable NACE SP0502 corrosion rates have been included for comparison.

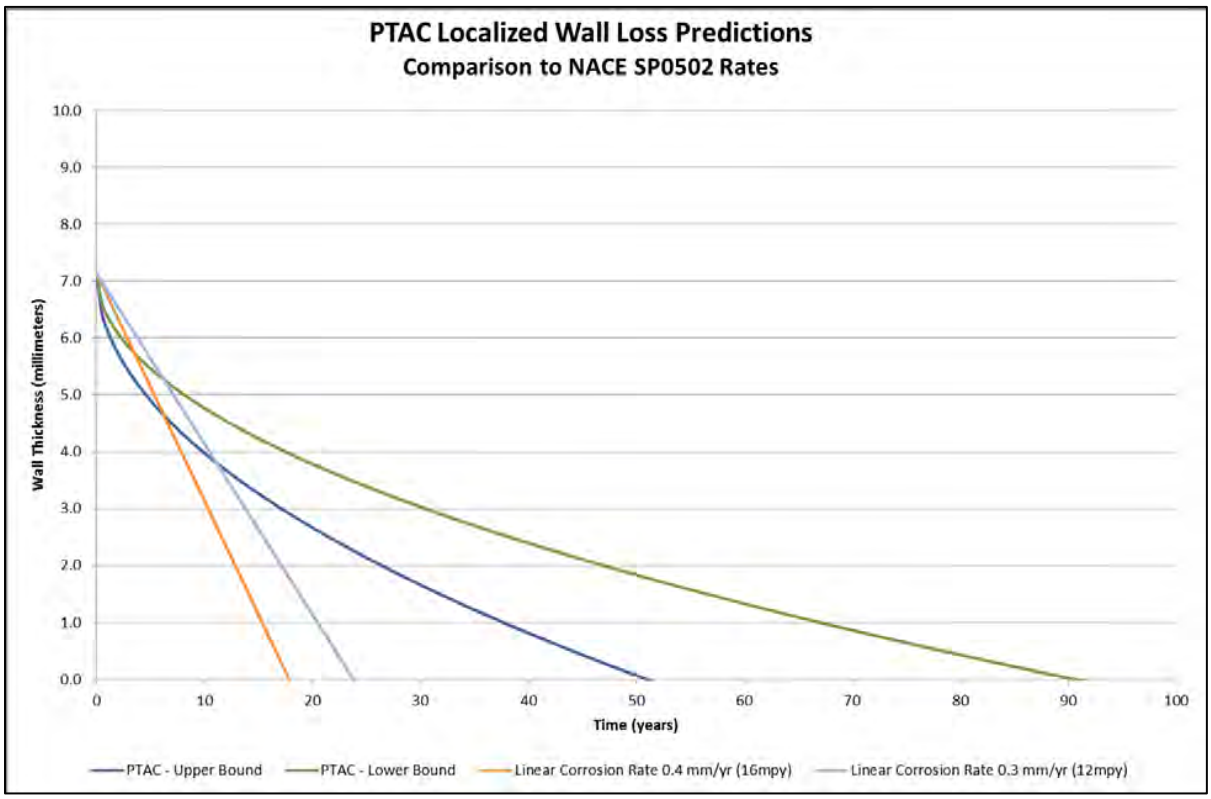

These corrosion rates are generally considered conservative as presented below in Section 4.3.6, but are presented for comparison.

Both general and pitting corrosion rates have been shown to decline with age, as shown in Figure 4-7.[17] Velazquez presented a statistical analysis of over 250 excavations to predict the long term rates of pitting corrosion over a 40 year period.[17] For comparison, the worst case pitting growth rate (based on the X80 value) for the various soil types considered in this study was presented as 0.119 mm/year (4.7 mpy), or roughly a third of the 0.4 mm/year growth rate proposed by NACE.[15]

Figure 4-7: Average Corrosion Pitting Growth Rates as a Function of Time and Soil Classifications **(Reproduced from Oil and Gas Journal – Corrosion)[17]**

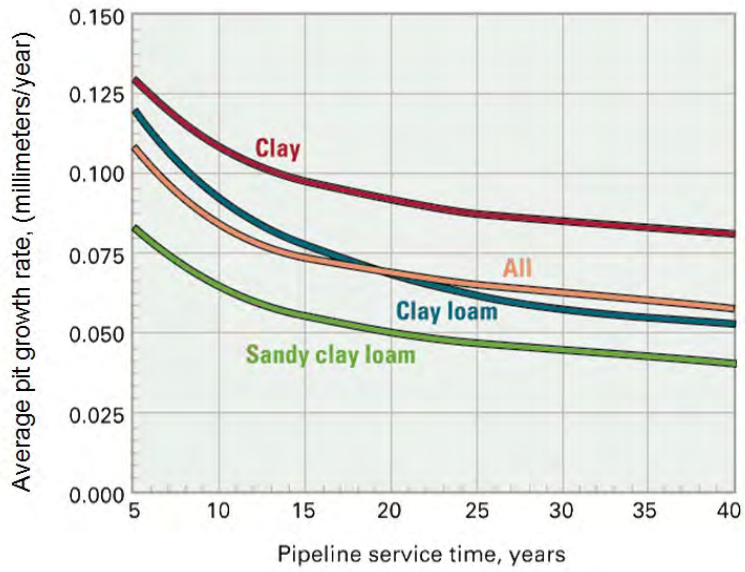

4.3.1.6 Historical Corrosion – Leaks and Ruptures

In an effort to better understand historical external corrosion performance for Line 3, the historical incidents along the entire length of Line 3 and the most recent integrity data for a representative section was reviewed. There have been five in-service incidents, the last of which was in 1997, in which external corrosion was either the cause or played a significant role in the cause of the incident; one was due to extensive general and pitting corrosion, three were due to cracks at the bottom of a deep pit, and the other was classified as narrow axial external corrosion. These incidents were caused by localized defects in the pipe wall and not general wall loss. From examination of the integrity data, there is no indication of significant areas of general wall loss and therefore the structural integrity of the pipe as a load bearing structure will not be significantly affected.

Data from the 2011 GE UltraScan® WM in-line inspection conducted on the most severely corroded section of Line 3 was reviewed to provide an assessment on the prevalence and severity of the metal loss on line. Table 4-2 summarizes the percentage of anomalies identified during inspection along this 255 km long section of Line 3. After approximately 60 years in service, over 50% of the anomalies identified were reported with an external metal loss less than 20% of the nominal wall thickness. Based on this 2011 data, less than 0.5% of the

anomalies were reported with an external metal loss greater than 50% of the nominal wall thickness.

Table 4-2: Depth Distribution of External Metal Loss Anomalies Reported by 2011 WM Inspection for Line 3

Wall Loss as Percentage of Nominal Wall Thickness	Percentage of Total Anomalies (%)
≤ 20%	51.2
20 - 30%	36.4
30 - 40%	10.4
40 - 50%	1.6
≥ 50%	0.45

When comparing the 2011 ILI results to the localized corrosion data presented in the PTAC Report, a time to perforate the Permanently Deactivated Line 3 due to external corrosion may be estimated.[13] Figure 4-8 shows the wall thickness reduction with time due to localized external corrosion under two types of soils, one considering good drainage resulting in a lower bound corrosion rate (PTAC Lower Bound), and one with very poor drainage resulting in an upper bound corrosion rate (PTAC Upper Bound). The 1982 ILI data is also included in the plot for comparison. Reviewing the depth and time related to the worst case 56% deep through wall anomaly, identified in 1982, shows good comparison with the predicted curve for the worst case soil conditions. Based on the information presented in Figure 4-8, the worst case time to failure, from the original installation is estimated at 51 years. Based on this, it would be assumed that the pipeline is already penetrated or is likely to be within the next five years considering an in-service date of 1968. This demonstrates the over-conservative nature of the corrosion rates presented in the PTAC Model when compared to the corrosion rates experienced on Line 3. The time to penetration is linked to the time when internal metal loss due to corrosion could begin as a result of the ingress of ground water and soil to the internal surface of the pipe.

Reviewing the data from the 2011 ILI run, however, and assuming that the largest anomalies with external metal loss greater than 66% of the nominal wall thickness were repaired, it can be shown that the worst case anomaly is approximately 60% through wall as of 2011. Taking the degradation curve based on the PTAC Upper and Lower Bound corrosion rates and shifting those curves accordingly to represent a 60% through wall pit at 2011, as shown with the dashed curves in Figure 4-8, yields estimates of time to through wall penetration based on the PTAC model between 25 to 50 years from 2011. This only represents through-wall corrosion and not failure or collapse.

Figure 4-8: Upper and Lower Bound Wall loss progression due to corrosion as a function of soil drainage (PTAC). Historical metal loss inspection data collected on Line 3 has been included for comparative purposes.

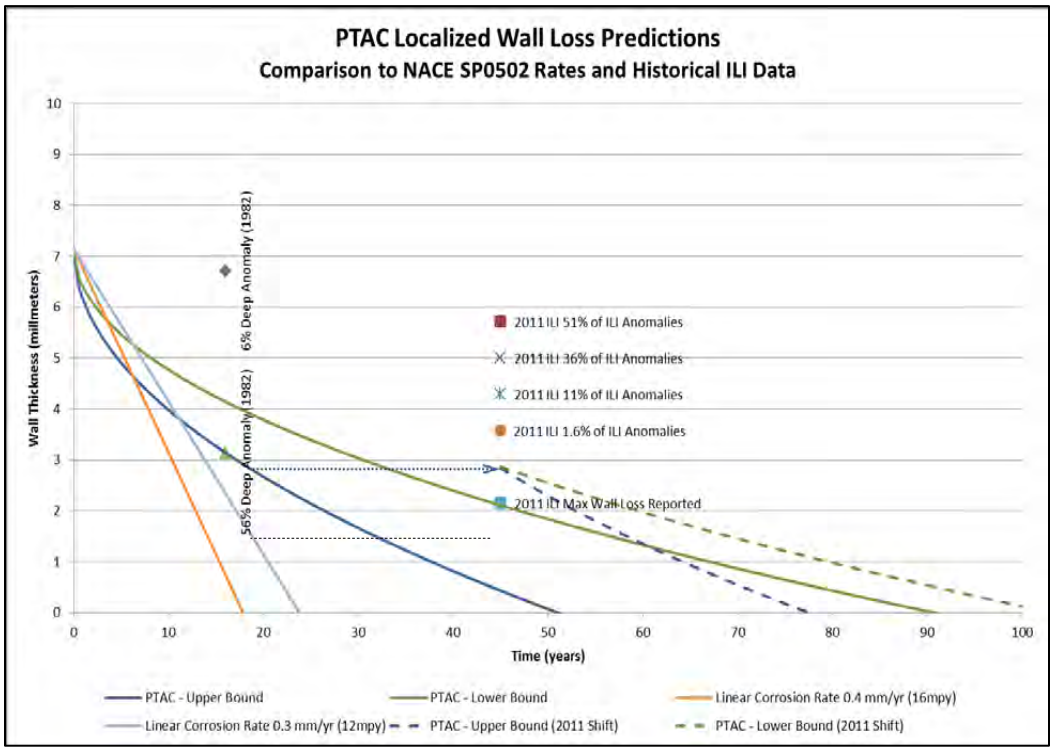

An analysis was conducted to evaluate the time it would take for the entire pipe wall thickness to corrode to zero due to uniform corrosion. Figure 4-9 shows the wall thickness reduction with time due to uniform external corrosion under types of soils, one considering good drainage resulting in a generally moderate corrosion rate (green curve), and one with very poor drainage resulting in a more aggressive corrosion rate (blue curve). The worst case estimates for time to total pipe degradation due to generalized corrosion, based on the PTAC model are greater than 1,250 years.

Figure 4-9: Pipe Wall Thickness Affected by Uniform Corrosion as a Function of Time and Drainage of the Soil (PTAC). Comparison to 2011 ILI Results.

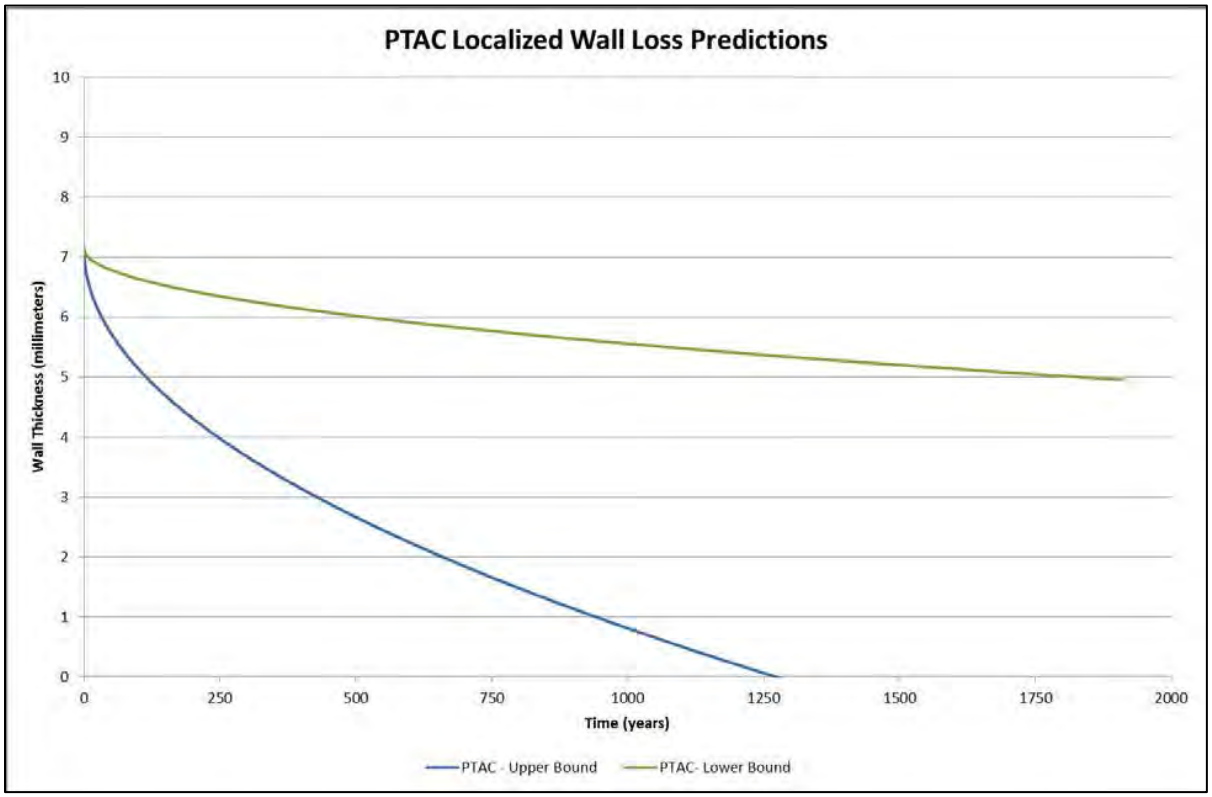

The distribution of the external metal loss around the circumference of the pipe reported by the 2011 ILI run is presented in Figure 4-10. The sides of the pipe (2:40 to 3:40 o'clock and 8:40 to 9:40 o'clock) generally contained the highest percentage of external metal loss. This finding is most likely attributable to the fact that polyethylene tape coatings, such as that used on Line 3, are susceptible to soil stresses that result in wrinkling and disbondment along the sides of the pipe.[39] Due to the shielding characteristics of the coating, the CP system would not be able to adequately protect the pipe surface under the areas of disbondment.[18] The data presented in this figure does not suggest that the entire circumference of Line 3 is being corroded at a uniform rate and thus, there is no evidence to currently suggest that there are segments of Line 3 potentially susceptible to sudden collapse and abrupt subsidence.

Figure 4-10: Orientation of Metal Loss Features Reported by the 2011 GE UltraScan® WM In-Line Inspection of a Representative Section of Line 3

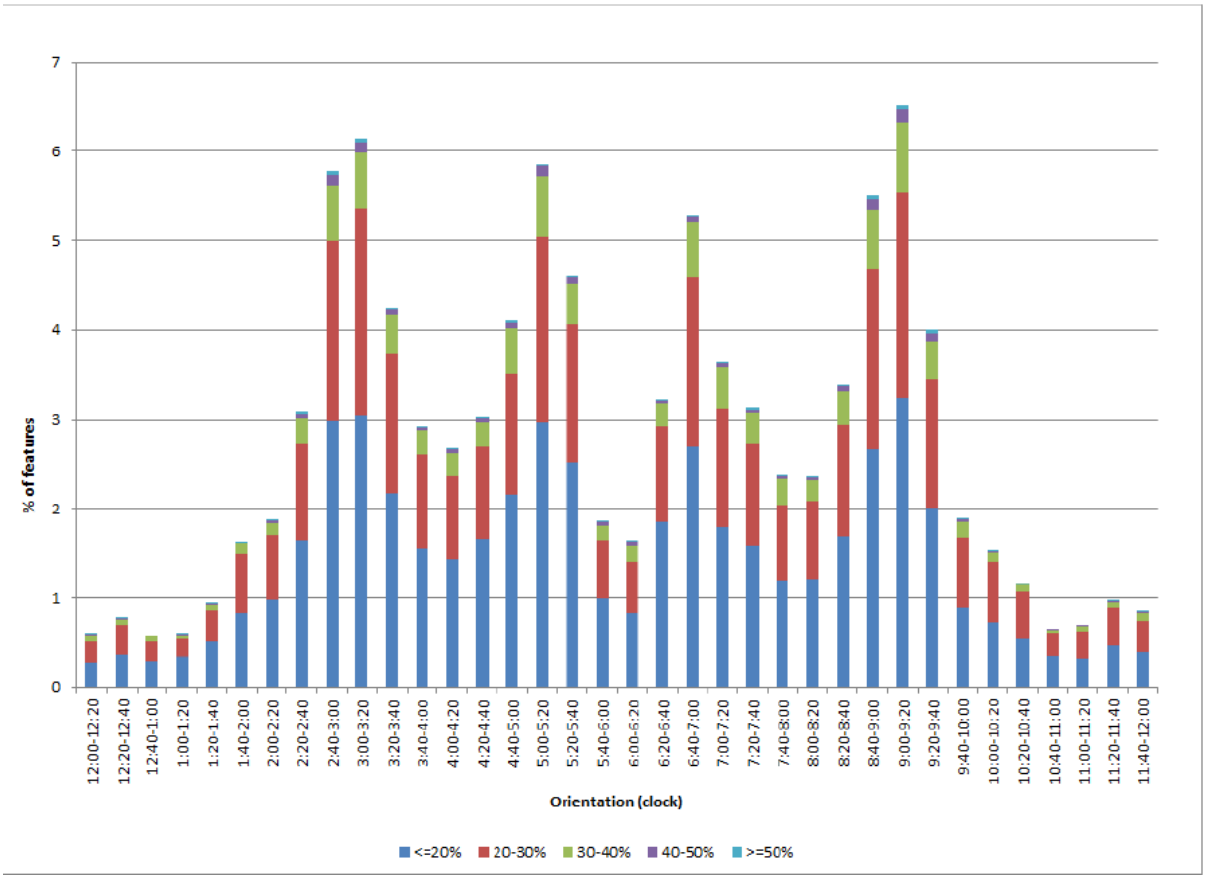

4.3.1.7 Predicted External Corrosion Progression

In its 1996 Report, the NEB presents a mechanism of corrosion leading to ultimate structural failure of a pipeline. Based on a review of the literature presented, industry guidance, and historical industry experience, a predicted external corrosion progression is proposed below to establish a relative understanding of the long term corrosion mechanisms.[1,3,6,13,14,17,19] The predicted external corrosion progression assumes Enbridge will continue the application of CP as part of its ongoing Operations and Maintenance programs as described in Section 4.3.2.1.

- After Permanently Deactivating Line 3, external corrosion is expected to progress in a similar manner with what has been historically observed.[1,3,6,13 12]
    - External corrosion is expected to grow at the locations of coating holidays, or disbonded coating, similar to the locations presented in Section 4.3.1.6.[3,13 14]
    - Pitting corrosion is expected to be the primary form of corrosion on Line 3 as opposed to large scale general corrosion; this assumption is consistent with the findings from the 2011 GE UltraScan® WM in-line inspection conducted in the most severely corroded section of Line 3 in which approximately 99% of the pipe

joints inspected contained corrosion that was <10% of the pipe's total surface area.

- The external corrosion is expected to continue being localized on the sides of the pipe, where the highest percentage of external metal loss has been measured, as discussed in Section 4.3.1.6.
- External corrosion is expected to be the dominate degradation rate until pits penetrate through wall, allowing moisture ingress into the pipeline.[3,13]

- Once external perforations have developed, water or soil may accumulate within the pipeline, and internal corrosion may progress as presented in Section 4.3.1.8.[13] This accumulation is expected to occur over hundreds of years.

- As the coating degrades and disbonds, more of the pipeline surface will be exposed. Areas where coating fails completely (i.e. exposing the external surface of the pipe to the surrounding soil), will be accessible to the CP system and thus, subsequent corrosion growth would be minimized. By contrast, locations where the coating is disbonded but remains intact will be shielded from the CP system and subject to continued corrosion as discussed in Section 4.3.1.3.[3,13]

The corrosion analyses presented in the NEB study indicated that due to the slow rates of pitting corrosion, and their localized nature, complete structural failure is not expected to occur for decades, or even centuries.[3] The findings from the NEB study are consistent with the type of corrosion present on Line 3 and the time estimates presented in Section 4.3.1.6, based on the PTAC Model. Furthermore, based on the random nature of pitting corrosion, it is considered unlikely that localized pits would coalesce to the point of significant pipe collapse.[3,13]

4.3.1.8 Predicted Internal Corrosion Progression

The predicted internal corrosion progression assumes the pipe has been cleaned, and residual moisture levels are as proposed in the cleaning program (Appendix 7.1). It is also assumed that corrosion due to microbially induced corrosion ("MIC") is negligible. Based on minimal amount of water, MIC results in insignificant degree of corrosion.

1. Internal corrosion is expected to be minimal until large enough external perforations occur to allow moisture or soil to enter.

   The findings from the 2011 GE UltraScan® WM in-line inspection conducted in the most severely corroded section of Line 3 revealed that only 0.4% of the pipe joints within the inspected section of line contained internal metal loss features. In total, only 122 internal metal loss features were detected in this section, and half of those had a reported length of ≤50 mm which would typically be indicative of pitting corrosion. With no product in the line and assuming the line is sufficiently cleaned and dried, the research performed by DNV GL and NGA/NYSEARCH related to casing corrosion is applicable for reference. In this study, 39 bench, small-scale, and field tests were performed for a variety of casing

environments. Field testing of a bare, cathodically-protected carrier pipe with a dry, vented environment showed no pitting on corrosion coupons and very low corrosion rates with a maximum of 0.002 mm/year (0.08 mpy) at all pipe positions except for the bottom of the line (6 o'clock). At the 6 o'clock position, an average corrosion rate of 0.05 mm/year (2.01 mpy) was observed. Although the annular environment was reportedly dry, the vent may have allowed for ingress of moisture and oxygen. Similarly, it is expected based on the cleaning program that any residual moisture will not have sufficient volume to pool, and the pipeline will have low oxygen content as nitrogen will be used to drive the cleaning pigs. However, it is considered that there may be a possibility of residual moisture in areas of existing internal pits, undercuts, or other defects that are not sufficiently dried during cleaning. Therefore, given lack of other specific data, it may be considered that an internal corrosion rate of 0.05 mm/year be used to provide a conservative estimate of the internal corrosion rates prior to perforation of the pipe wall.

Based on estimates above in Section 4.3.1.6, time to through-wall penetration is estimated to be between 25 to 50 years from 2011.

2. After the first perforations form, the rate of internal corrosion is expected to accelerate.

   Two scenarios were addressed, comparable to the scenarios presented in the DNV GL Scoping Study;[6] namely, considering complete fill of the pipeline where the water table is above the pipeline, and partial filling of the pipe due to moisture ingress where the water table is below.

   For the first case, a proposed progression is presented in the DNV GL Scoping Study, as follows.

   For Case 1, it was assumed that the pipe fills with aerated groundwater. Since the solubility of oxygen in water is low (< 8 ppm), the oxygen in a pipeline will be consumed rapidly for typical corrosion rates. For example, the oxygen in a 24-inch diameter pipeline will be consumed in around one week at a corrosion rate of about 0.1 mm/yr. After the oxygen is consumed, the corrosion rate will drop to negligibly low values. Anaerobic bacteria may accelerate the corrosion rate somewhat, but significant damage would not be expected based on measured corrosion rates for deep steel pilings (Beavers 1998), or buried subsea artifacts (J. A. Beavers, G. H. Koch, and W. E. Berry, "Corrosion of Metals in Marine Environments," Metals and Ceramics Information Center, MCIC Report 86-50, 1986). Furthermore, resupply of oxygen in the pipeline would be very limited unless there were a large number of large holes present in the pipeline.[6]

   For Case 2, considering a partial fill scenario, when the pipe has perforated, the internal surface will be exposed to moisture and possibly soil. In the DNV GL and NGA/NYSEARCH study, small-scale testing of bare carrier pipe exposed to air and a static level of brackish water (1/2-filled annular space) showed an average corrosion rate

of 0.22 mm/year (8.61 39 mpy) and an average pitting rate of 0.45 mm/year (18.1 mpy).[19] It should be noted that these rates were observed primarily at the water/air interface, which was located at the 3 o'clock and 9 o'clock positions in this experiment. Other locations around the pipe showed relatively low corrosion rates, with a maximum rate of 0.06 mm/year (2.20 mpy) and no appreciable pitting.

If soil enters the Permanently Deactivated pipeline, there is the possibility of these deposits causing localized areas of corrosion, which would be expected to occur along the bottom of the pipe at or near the 6 o'clock position where the soil is likely to settle. For this scenario, the internal surface would essentially act analogous to a bare external surface. ANSI/NACE SP0502-2010 provides a default pitting rate of 0.3 mm/year (12 mpy) for pipelines when other data are not available, provided CP level of the piping has had at least 40 mV of polarization for a significant fraction of time since installation.[16] This 12 mpy was calculated from long-term underground corrosion tests of bare steel pipe coupons in a variety of soils, including native and non-native backfill, and is considered conservative for most transmission pipelines.[16]

4.3.1.9 Effects of CP

It is expected that given sufficient time, a pipeline that is not maintained, has poor or no coating, and without CP, will eventually collapse due to corrosion. Estimates of this timeframe have been provided in Section 4.3.1.6, as well as from industry references to be decades at the low end, and thousands of years on the high end.[1,3,6,13] The NEB recognizes that maintaining abandoned pipelines while continuing CP cannot completely eliminate the risk of pipeline degradation or collapse. However, it can be expected to significantly slow the corrosion process, and thereby delay any potential subsidence.[5]

It is recognized, however, that polyethylene tape coatings are subject to disbondment, and locations where coating has disbonded will be dielectrically shielded from CP.[39] Enbridge will continue to monitor the Permanently Deactivated pipeline as part of its ongoing Operations and Maintenance programs as described in Section 4.3.2.1 and will continue the application of CP until which time it can be determined that it is ineffective or otherwise detrimental. Continuing the application and monitoring of CP will help to minimize the corrosion at coating holidays. However, corrosion may continue at locations of disbonded coating where water may come in contact with the pipe surface, and the coating dielectrically shields CP.

4.3.1.10 Structural Integrity and Subsidence Estimates

The PTAC model[13] for pipe collapse presents a conservative methodology for estimating time to collapse, defined as time to loss of structural integrity, of an abandoned pipeline. This assessment considers uniform wall loss scenarios, considering no coating (or 100% loss of coating) and no CP.

The primary loads that may contribute to structural collapse are loads imposed by soil cover, and any surface loads transferred to the pipe from forces acting at the ground surface. Surface

loads may refer to any loads acting at the ground surface, such as vehicular or equipment loads. The load acting directly at the pipe, or the "effective live load", is generally much less than the loads at the surface, as the loads are dissipated through the soil as they are transferred to the pipe. The degree of this dissipation is dependent on the depth of soil cover. The PTAC report[13] provides calculations methods and summary tables of typical effective live loads for various American Society of Civil Engineers ("ASCE") load and impact factors, which is reproduced in Appendix 7.2 (document titled Appendix 7-9.4 Structural Integrity and Subsidence, Section C-ASCE Loading Conditions). The effects of surface live loads on a Permanently Deactivated pipeline are considered more significant than the loads associated with depth of cover alone.[3,13] If sufficient enough to exceed the structural capacity of a Permanently Deactivated pipeline, the pressures transferred to the pipe will lead to ovalization, as depicted in Figure 4-11. If the loads are sufficient to progress, the pipe may fail through either plastic collapse or elastic buckling, as depicted in Figure 4-12 and as per the PTAC Report[13] and the American Life Alliance Guidelines for the Design of Buried Steel Pipe.[20]

Plastic collapse occurs when bending stress on the pipe walls exceeds the yield strength of the pipe steel. The wall plastically yields, and collapses under the loads on the pipe. Elastic collapse, or buckling, occurs when the elastic energy in the pipe wall exceeds the critical buckling limit. Both failure modes need to be considered in development of collapse assessments.[13] The critical load acting on the pipe to cause this collapse is considered the load bearing capacity of the pipeline.

Figure 4-11: Surface Load and Transmitted Pressured and Corresponding Ovality of Pipe Cross-Section (Reproduced from American Lifelines Alliance)[20]

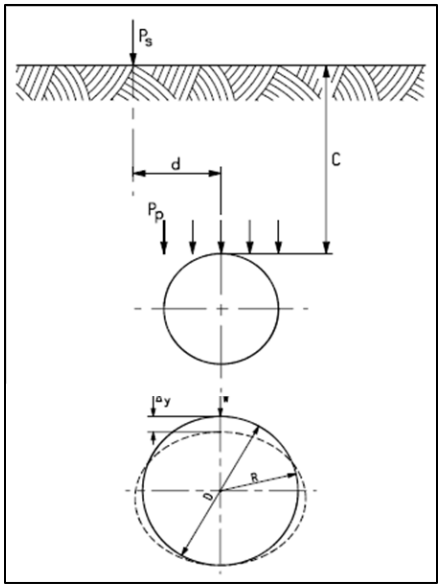

Figure 4-12: Through-Wall Bending Stress, Crushing of the Side-Wall, Elastic Buckling of Pipe Cross-Section **(Reproduced from American Lifelines Alliance)[20]**

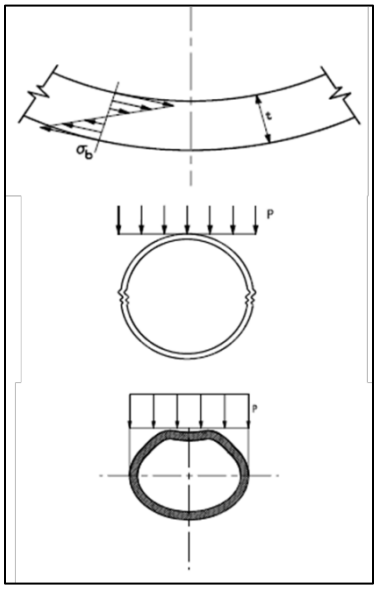

The PTAC model presents a methodology to assess the load bearing capacity of a pipeline as a function of wall thickness, considering both plastic and elastic collapse. An example plot is presented in Figure 4-13, where the blue curve represents the load bearing capacity as limited by plastic collapse, and the red curve represents the load bearing capacity as limited by elastic collapse. It should be noted that the load bearing capacity is not directly decreasing with the decrease in wall thickness. As the pipe wall becomes thinner, the stiffness of the pipe wall decreases. The decreased stiffness increases resistance to plastic collapse, until the point where elastic buckling is the controlling failure mode as described within the PTAC report.

As represented in Figure 4-13, the pipe can fail in two ways (elastic and plastic). As the pipe wall thins, the wall becomes more flexible being able to support greater loads following the blue curve. At the intersection of the curves, the pipe becomes weaker; following the red curve as the wall thickness decreases until failure results from a given load.

Figure 4-13: Example Plot of Load Bearing Capacity as a Function of Pipe Wall Thickness 2

(Reproduced from PTAC)[13]

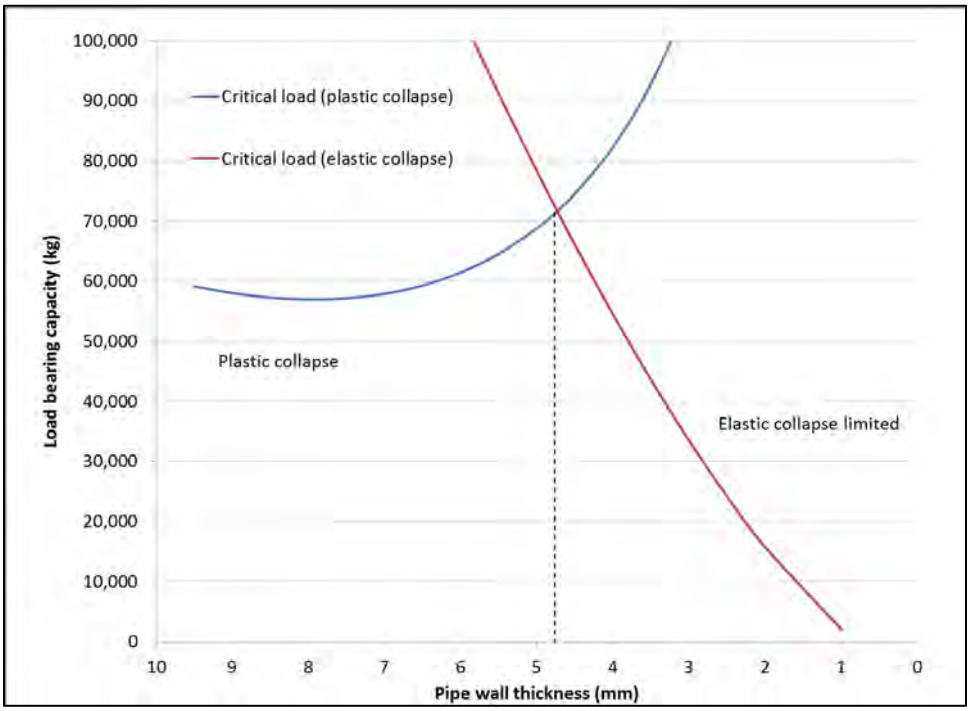

4.3.1.11 Lapse Due to Generalized Corrosion

Structural integrity models presented by PTAC ("PTAC Model") were analyzed to assess the load bearing capacity of the Permanently Deactivated Line 3 as a function of corrosion damage. As the Permanently Deactivated pipeline corrodes, the load bearing capacity will be reduced. Analyses were performed to estimate the critical surface load necessary to cause pipe collapse, the corresponding soil subsidence geometry, and the pipe stresses associated with various surface loading scenarios.

The load bearing capacity of a 34-inch pipeline comparable to the Permanently Deactivated Line 3 was analyzed using the combined PTAC model for plastic and elastic collapse. It should be noted that the PTAC model is considered a conservative estimate, as it assume generalized corrosion, no coating, and no CP, which are not representative of conditions on the Permanently Deactivated Line 3. However, it may be used to establish a conservative lower bound estimate. Input assumptions were used, as required, based on known or approximated conditions along Line 3. They are summarized below, and detailed in Appendix 7.2, Section B – PTAC Model Setup:

- Max Soil Density = 2000 kg/m3
- X52 Pipe (52,000 psi = 359 MPa)
- 34" Diameter (863.6mm)

- Young's Modulus (E = 205 GPa)
- Soil Modulus (E') = 6.9 MPa
- Bedding factor = 0.1
- Lag factor = 1.5
- Stress Intensity Factor = 3
- Impact factor = 1.75

Figure 4-14 presents the estimated surface load bearing capacity as calculated by the PTAC model for a 34-inch pipeline as a function of remaining or effective wall thickness. The surface load bearing capacity curve considers both plastic collapse and elastic buckling, as indicated on Figure 4-14. The surface loads represented in Figure 4-14 consider a point load acting at the ground surface in kilograms, and is generally conservative as surface loading will be distributed over a given area. The data is presented, however, to demonstrate the effect of depth of cover with respect to the surface load bearing capacity of a Permanently Deactivated pipeline.

Figure 4-14: Uncased Load Bearing Capacity Versus Wall Thickness as a Function of Depth of Cover

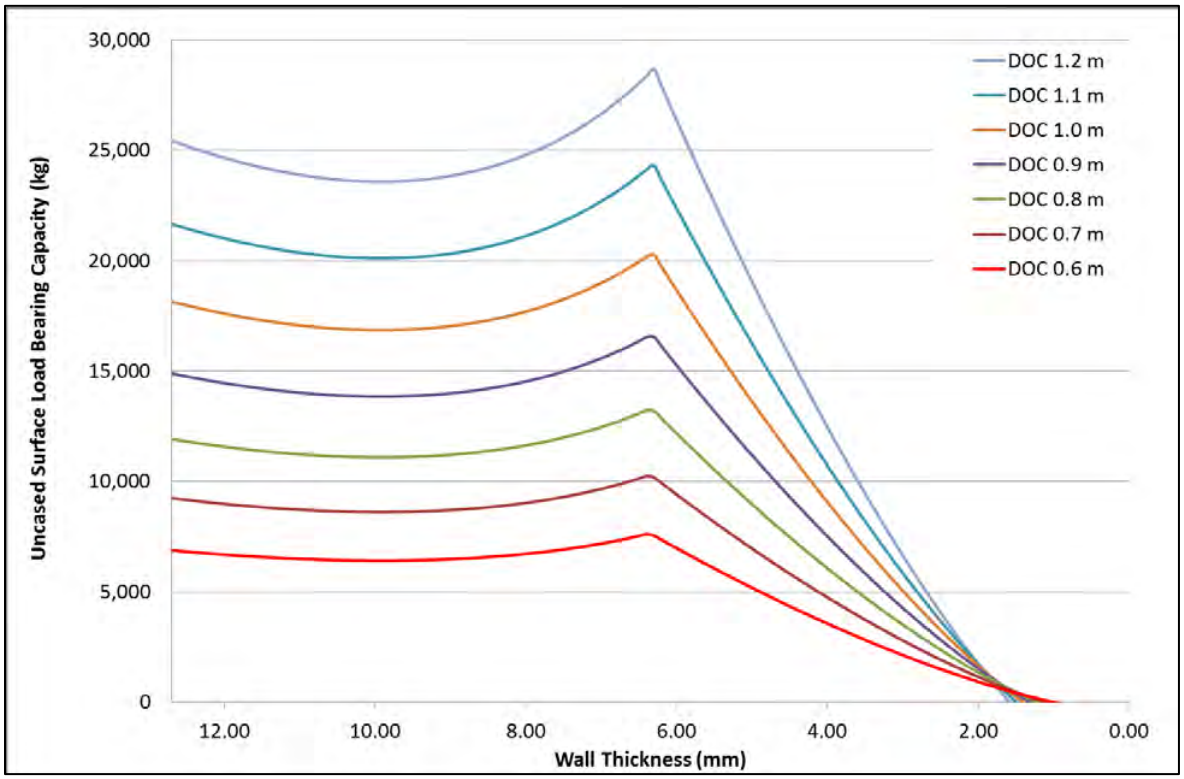

In order to allow for direct comparison with typical loading scenarios ASCE loads for known conditions, Enbridge considered the effective live load bearing capacity, or the load acting at the pipe as described in Section 4.3.1.10.

Figure 4-15 presents the effective live load capacity, for an uncased pipe, calculated as above. The effective live loads due to various surface load conditions are presented for comparison. An E80 load simulates an 80,000 lbs/ft. railway load, with impact loading considerations as defined by ASCE. An HS20 load simulates a 20-ton truck traffic load as defined by ASCE.[20] The personal truck load simulates a 5-ton vehicle traffic load. The minimum wall thickness necessary to resist collapse for a given load is found where the horizontal load lines intersect the corresponding DOC curve, as represented by the vertical dashed lines. For example, considering an HS20 load scenario at 0.6 m (2 ft.) DOC, the minimal wall thickness to resist collapse is found where the red curve representing the 0.6 m (2 ft.) DOC intersects the horizontal live load line for an HS20 load 0.6 m (2 ft.), at 2.6 mm for this example.

It should be noted that the effective live loads presented in Figure 4-15 represent the live load acting directly at the pipe, considering allowable contribution from surface loading. The live load capacity decreases slightly with depth of cover, as the contribution from soil loads will be greater at depth. The data presented in Figure 4-15 indicates that the added load from soil is minor in comparison to the benefits of depth of cover, however. For comparison, considering an HS20 load at the ground surface, the effective live load at the pipe for a relatively shallow depth of cover of 0.6 m (2 ft.) is two times greater than the effective live load considering a 1.2 m (3.9 ft) depth of cover, while the load capacity is only reduced approximately 6% due to soil loading.

Figure 4-15: Uncased Effective Load Bearing Capacity Versus Wall Thickness

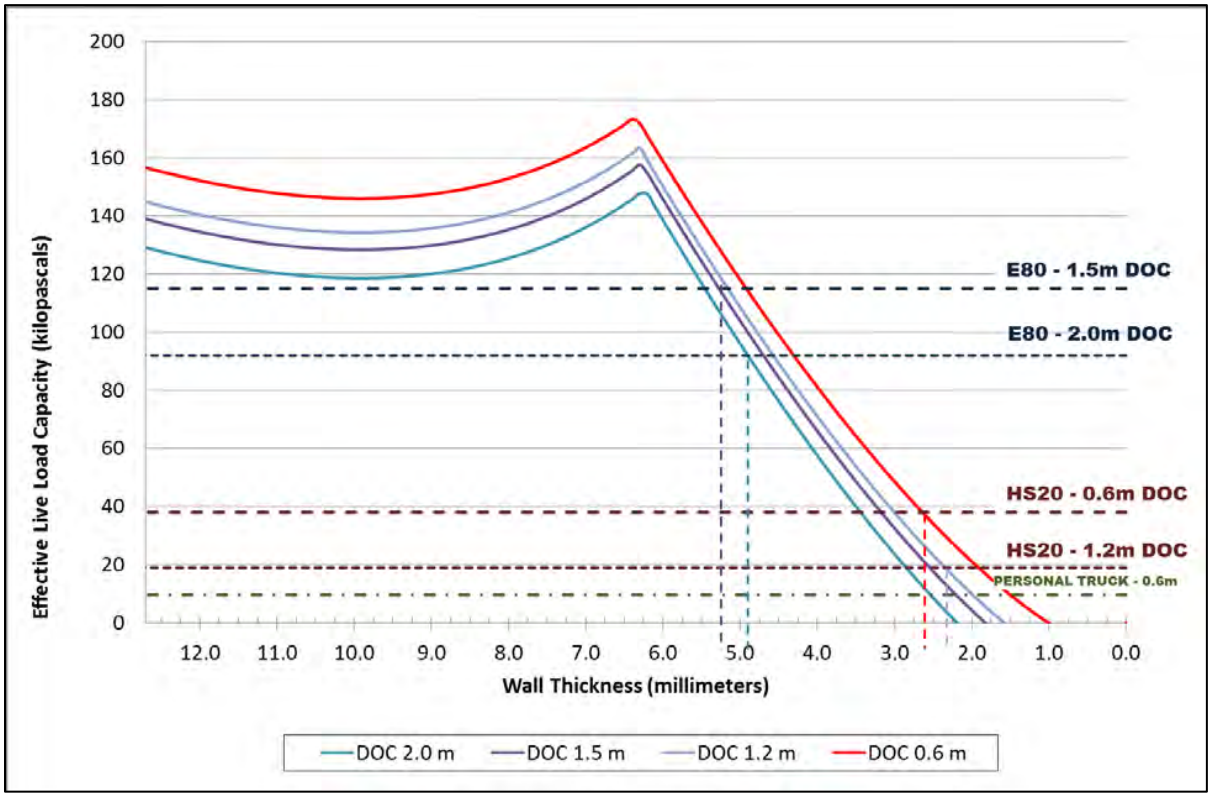

Table 4-3 summarizes the minimum effective wall thickness necessary for the Permanently Deactivated Line 3 to resist collapse considering the three loading scenarios (i.e., personal truck load, 20-ton truck load and 80,000 lbs/ft. railway load). The depths of cover in Table 4-3 are based on the following and are taken from the depth of cover measurements for Line 3 in Canada:

- 0.6 m (2 ft.) is the approximate minimum measured depth of cover in the 2008 depth of cover survey completed on Line 3;
- 1.2 m (3.9 ft.) is the typical depth of cover as measured in the 2008 depth of cover survey completed on Line 3;
- 2.0 m (6.6 ft.) is the minimum expected depth of cover for railway crossings (note: the depth of cover associated with each active railway crossing will be confirmed during detailed engineering); and
- 1.5 m (4.9 ft.) is a conservative estimated depth of cover for railway crossings.

Table 4-3: Minimum Effective Uncased Wall Thickness Capable of Withstanding Highway or Rail Loads

DOC		Minimum Allowable Wall Thickness (mm, in)		
(m)	(ft.)	Personal Truck	HS20	E80
0.6	2.0	1.5, 0.06	2.6. 0.10	N/A
1.2	3.9	1.8, 0.07	2.4, 0.09	N/A
1.5	4.9	1.9, 0.07	2.3, 0.09	5.3, 0.21
2.0	6.6	2.3, 0.09	2.5, 0.10	4.9, 0.19

The key findings from Table 4-3 are summarized below:

- At the minimum measured depth of cover of 0.6 m (2 ft.), the Permanently Deactivated Line 3 is capable of resisting collapse due to equivalent highway loads until sufficient corrosion degradation occurs such that the effective wall thickness is reduced to 1.5 mm, or approximately 78% uniform reduction of the nominal pipe wall thickness for Line 3.
- At a depth of cover of 1.5 m (4.9 ft.),. (expected depth of cover for a railway crossing) the Permanently Deactivated Line 3 is capable of resisting collapse due to equivalent railway loads until sufficient corrosion degradation occurs such that the effective wall thickness is reduced to 0.19 in., or approximately 30% uniform reduction of the nominal pipe wall thickness for Line 3.
- At a depth of cover of 2.0 m (6.6 ft.), (conservative depth of cover for a railway crossing) the Permanently Deactivated Line 3 is capable of resisting collapse due to equivalent railway loads until sufficient corrosion degradation occurs such that the effective wall thickness is reduced to 0.21 in., or approximately 25% uniform reduction of the nominal pipe wall thickness for Line 3.

The 2008 depth of cover survey completed on Line 3 indicates that less than 1% of the line has a depth of cover less than or equal to 0.9 m (3.0 ft,), and over 50% of the line has a depth of cover greater than 1.2 m (3.9 ft.).

It should be noted that these analyses were performed considering only the strength of the carrier pipe. All primary highway and railway crossings are expected to be cased as per original design recommendations. The nominal wall thickness of a casing for a 34-inch carrier varies, but is typically reported to be greater than 12 mm (0.5 in.).[21]

The estimated time required for Line 3 to undergo such environmental degradation that it would collapse was calculated with the assumption that no coating or CP is acting on the line. With active CP and intact coating, the general corrosion rate is expected to decrease, and subsequently the time to failure would be expected to increase.[5] As mentioned above, the nominal wall thickness of a casing for a 34-inch carrier pipe is typically 13-17 mm (0.5-0.7 in.) wall thickness. The 2011 GE MF ILI inspection conducted on Line 3 indicated that all active railway crossings on this line are cased.

Table 4-4 and Table 4-5 illustrate that the predicted time to failure under typical highway loads assuming uniform wall loss (i.e. the pipe wall has thinned to the extent that it can no longer support the live load under a highway or railway) varies from approximately 87 years to over 1000+ years depending upon the assumed wall thickness, soil classification and drainage.

Table 4-4: Time to Failure due to Critical Wall Loss - Highway

Time to Critical Uniform Wall Loss (Highway Load HS20) (years)				
	Soil Internal Drainage and Wall Thickness			
	PTAC Upper Bound Degradation Rates		PTAC Lower Bound Degradation Rates	
Depth of Cover	7.14 mm	12.1 mm	7.14 mm	12.1 mm
0.6 m	508	2237	8100	35797
0.9 m	536	2299	8575	36787
1.2 m	574	2377	9178	38025

Soil Type A: E'= 6.9 MPa, γs= 2000 kg/m3
kml PTAC upper bound degradation rate = 0.2
kml PTAC lower bound degradation rate = 0.05

Table 4-5: Time to Failure due to Critical Wall Loss - Railway

Time to Critical Uniform Wall Loss (Railway Load) (years)				
	Soil Internal Drainage and Wall Thickness			
	PTAC Upper Bound Degradation Rates		PTAC Lower Bound Degradation Rates	
Depth of Cover	7.14mm	12.1 mm	7.14 mm	12.1 mm
1.5 m	97	1166	1399	18660
2.0 m	125	1296	2007	20736

Soil Type A: E'= 6.9 MPa, γs= 2000 kg/m3
kml PTAC upper bound degradation rate = 0.2
kml PTAC lower bound degradation rate = 0.05

4.3.1.12 Pipe Collapse Due to Pitting Corrosion

In addition to the previously discussed model involving a uniform reduction in wall thickness, the PTAC "perforation" model was used to identify the percent of coating disbondment needed to create a pipe collapse scenario due to extensive perforations. The perforation calculations are built upon the plastic collapse model and the assumption that as the corrosion progresses, randomized pitting will be the predominant mechanism, and that there would still exist some amount of metal between the through-wall perforations.

To calculate the loss in load bearing capacity from a plastic collapse perspective, due to these randomized perforations, the PTAC model assumes that a 1% reduction in the wall thickness corresponds to a 1% loss in load bearing capacity, and a 10% reduction in wall thickness corresponds to a 10% loss in load bearing capacity.

Two perforation scenarios were investigated, one with the depth of cover of 2.0 ft. depth of cover, and another with 3.9 ft. depth of cover (this is the average depth of cover for Line 3 including topsoil cover) as illustrated in Figure 4-16 and Figure 4-17. In each of these scenarios the live loading capacity of pipe with a 7.1 mm and a 12.1 mm wall thickness, based on the range of nominal wall thicknesses for the Permanently Deactivated Line 3, was plotted. Additionally, the live loads transferred to the pipe from both a 5-ton personal truck and a 20-ton truck traffic highway are shown alongside the loading limits of the pipe.

Figure 4-16 and Figure 4-17 show the load bearing capacity of all graphed pipe is higher than the loads imposed by both the 5-ton personal truck and 20-ton truck traffic highway in all valid graphed areas. It is acknowledged within the PTAC report that as the perforation area increases from 20% to 50% or greater, the simple relationship breaks down, and it is not recommended this model be considered. As such, the plots are cutoff at 30% degradation, but demonstrate that the pipe wall will likely maintain a majority of its load bearing capacity until greater than 30% of the pipe's circumference is lost due to coalescing of perforations. The corrosion detected, to date, on Line 3 fits within the applicable portion of these figures based on the 2011 GE UltraScan® WM in-line inspection data, collected on the most severely corroded section of Line

3, that approximately 99% of the inspected pipe joints contained corrosion that was <10% of the pipe's total surface area. A time to collapse analysis could not be completed under this model, as the analysis does not extrapolate accurately past the 30% degradation, and the pipe was not predicted to collapse before that point.

Figure 4-16: Allowable surface loading per Pitting Corrosion Model, at 0.6m (2.0 ft.) DOC

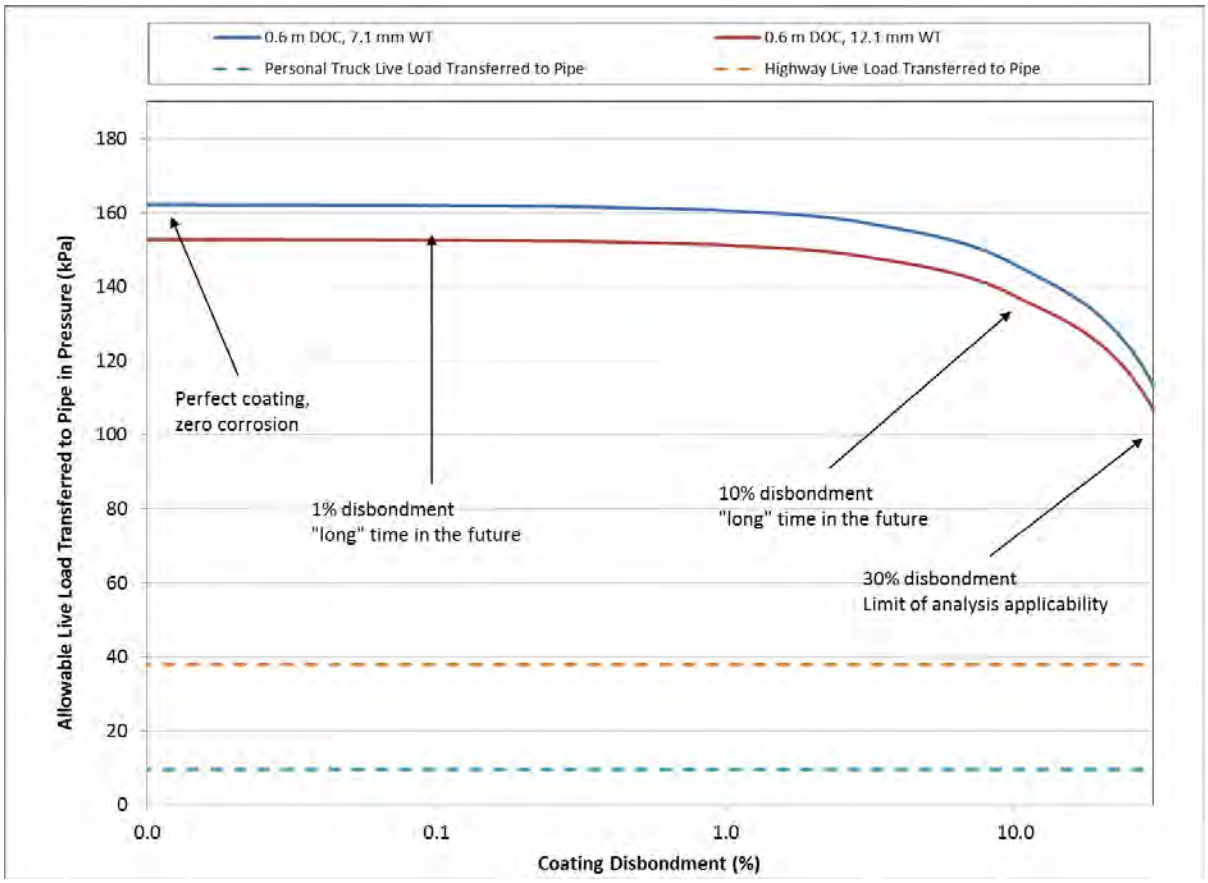

Figure 4-17: Allowable surface loading per Pitting Corrosion Model, at 1.2 m (3.9 ft.) DOC

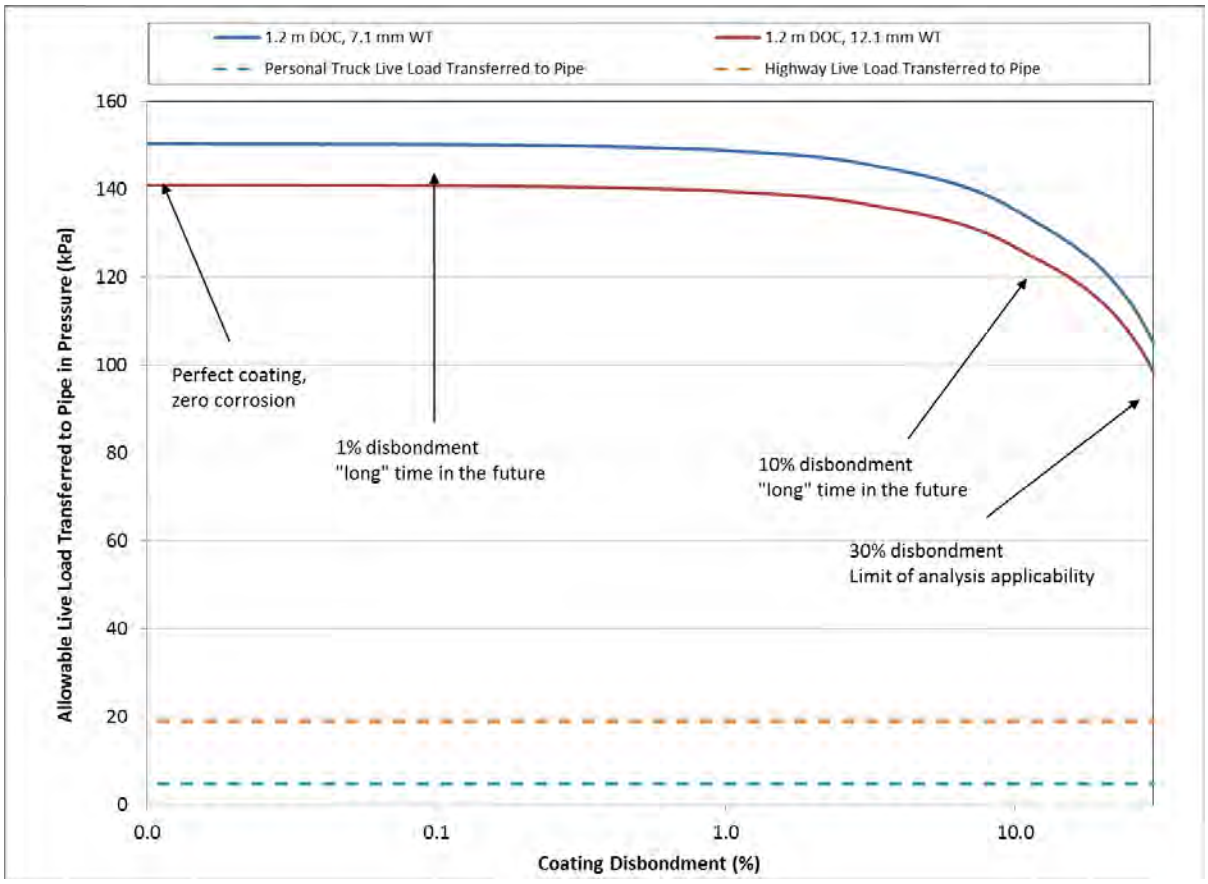

4.3.1.13 Historical Ground Subsidence

In 1996, the NEB commissioned a study on corrosion and soil mechanics in an attempt to better understand the connection between pipeline corrosion, structural integrity, and the possible ground subsidence that might be observed. The results of this study indicated that there had been no documented incidents of ground subsidence related to pipeline structural failure and this included the approximate 10,500 miles of abandoned or discontinued pipe, as of 1994, in Alberta.[3] The study further stated that ground subsidence associated with the collapse of pipelines is negligible for pipeline diameters up to 12 inches in diameter, at typical depths of cover. Additionally, while there is expected to be some measurable degree of subsidence associated with larger diameter pipelines, it may be small enough to be considered in the tolerable range.[3] The 1996 Discussion Paper concluded after significant study that even under the worst conditions of total structural collapse, ground subsidence would be negligible for pipelines with diameters of 12-inches and smaller. It went on to conclude that for pipelines with greater diameters, the degree of subsidence may be within tolerable ranges.[1] CEPA guidance recommends an assessment to determine the magnitude of subsidence possible for the Permanently Deactivated Line 3, which Enbridge undertook and provided below.

4.3.1.14 Predicted Subsidence Profiles

The rate and magnitude of ground subsidence are generally difficult to predict. Subsidence depends on a complex combination of site-specific parameters, pipe degradation, and soil mechanics properties near the pipeline. In 2014, as part of developing the Engineering Basis for the Line 3 Deactivation Program, Enbridge commissioned DNV GL to provide a geotechnical analysis to determine the possible subsidence levels, and corresponding trough profiles that could occur assuming various levels of pipe infill, up to and including full loss of pipe volume.

Ideally, ground subsidence estimations should consider both total subsidence from pipe collapse at shallow burial depth, and partial subsidence due to excessive ovalization and/or finite soil ingress. Prediction of ground subsidence in the absence of significant external loading can be predicted through analogy with tunneling construction. Extensive field measurements[40,41,42] have shown that the subsidence profile, or settlement trough, during open-face tunneling construction can be well characterized by the Gaussian distribution curve method. Figure 4-18 shows the generic settlement trough, where *i* describes the characteristic half-width of the trough and is a dependent on the depth of cover and soil type. For the scenarios presented for the Permanently Deactivated Line 3, the exact shape of the Gaussian distribution curve can be estimated based on the particular scenario: total pipeline collapse (Vl = 18 1), or partial collapse (i.e., excessive ovalization, or corrosion ingress, 0 < Vl < 1).

Figure 4-18: Generic Ground Settlement Trough Considering Gaussian Distribution Curve Method

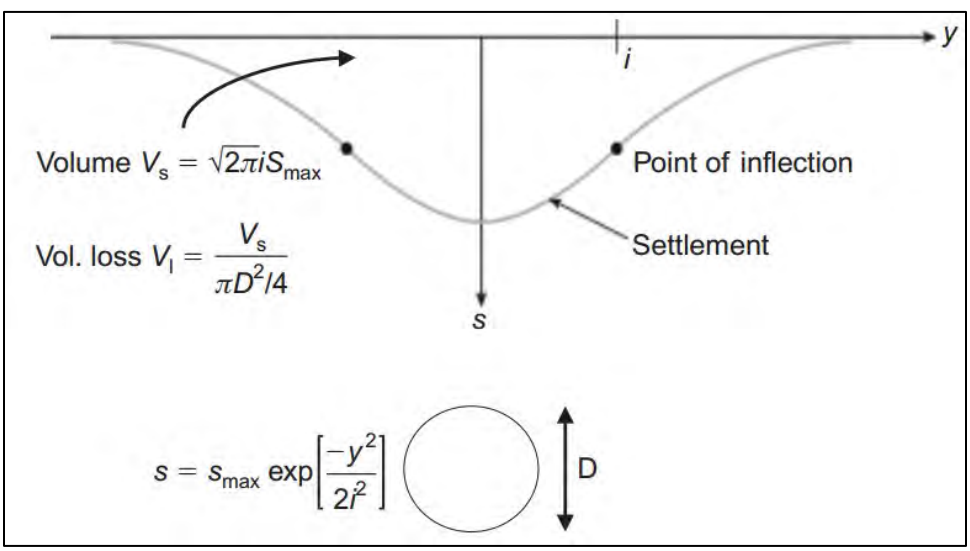

A series of assessments were conducted to predict ground subsidence profiles considering 25%, 50% and 100% volume loss at various depths of cover. Note: 100% volume loss represents complete infill of the pipeline (i.e., at the time of collapse, the pipe is completely empty), while the 25% and 50% volume loss estimates represent a partial infill of the pipeline

(i.e., at the time of collapse, 75% and 50% of the pipe is filled with soil, respectively), see figure 4-19.

Figure 4-19: Pictorial Representation of Volume Loss for the 100%, 50%, and 25% Scenarios

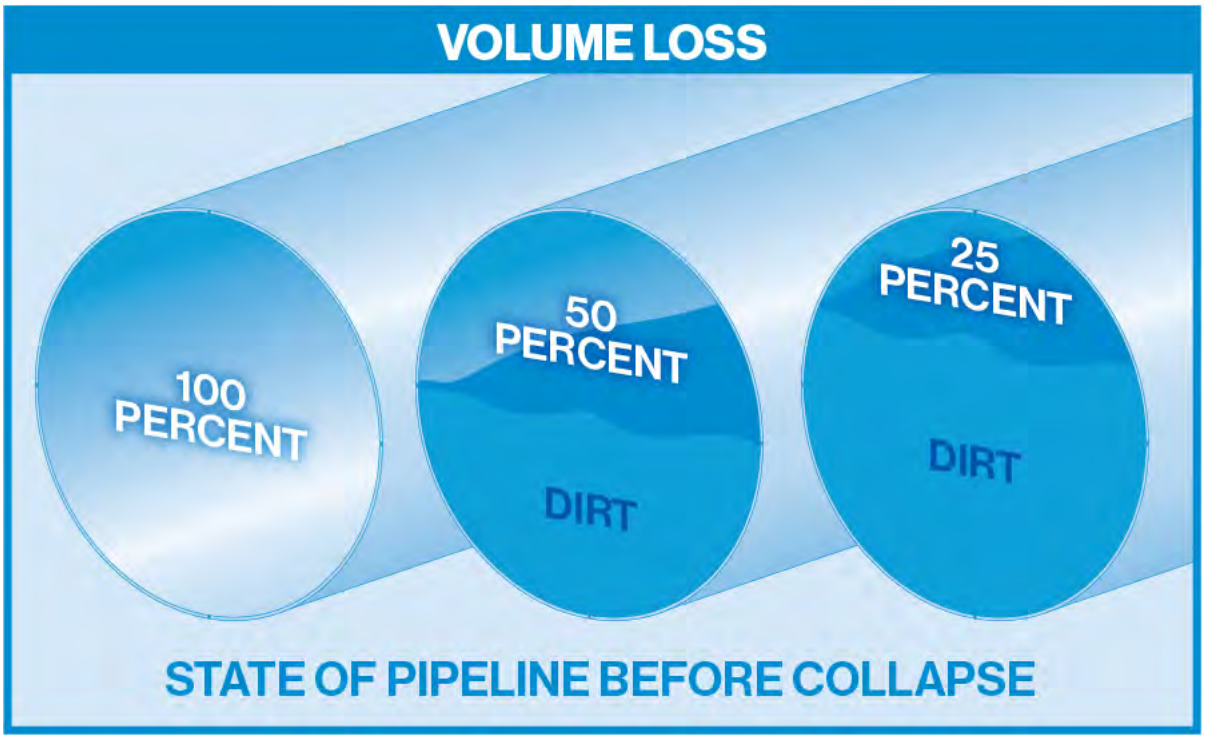

Table 4-6 through Table 4-8 summarize the maximum depth of the ground subsidence expected above the center line of the pipe and the half-width of the settlement trough (*i*) on both side of the pipe's center line at different volume loss values (100%, 50% and 25%) and depths of cover (assumed at 0.6m (2 ft.), 1.2m (3.9 ft.), 1.6m (5.2 ft.), 2.0m (6.6 ft.) and 4.0m (13.1 ft.)).

Figure 7A-2 through Figure 7A-4 found in Appendix 7.2, present the ground settlement profiles for the considered depths of cover and volume losses. Each figure consists of two graphs - one that shows the horizontal and vertical settlement in equal scales and a second which magnifies the vertical settlement by a factor of ten (10) for clarity.

The predicted trough profile presents a gradual non-linear profile that can be expected in the event of total subsidence of a Permanently Deactivated pipeline. The width of the subsidence trough is predicted to be significantly greater than the depth, as seen in the settlement profiles in the aforementioned Appendix 7.2. For example, considering the worst case subsidence profile for total subsidence of a 34-inch pipe, at 0.6 m (2.0 ft.) depth of cover, the peak depth is predicted to be 6.8 inches, whereas the full width of the profile spans nearly 27 feet. This would indicate that for a crossing where the Permanently Deactivated pipeline is perpendicular to a road crossing, for example, the trough width would be parallel to the direction of the road, and

the maximum predicted settlement of 6.8 inches would be distributed over approximately 27 feet of the road length in a gradual profile similar to that shown in Appendix 7.2.

The largest magnitude of subsidence predicted for a 34-inch pipeline at a depth of cover 0.6 m (2 ft.) was approximately 6.8 inches, decreasing to 4.7 inches of subsidence at 2 m (6.6 ft.) of cover, as shown in Tables 4-6 through 4-8. This analysis assumes a scenario where there is complete 100% soil infill of the pipe through either complete collapse of the pipe wall or total degradation of the pipe steel. Reviewing the Depth of Cover Survey from 2008, it can be seen that less than 1% of the line has a depth of cover equal to or less than 0.9 m (3.0 ft.), and over 50% of the line has a depth of cover greater than 1.2 m (3.9 ft.). This would indicate that the magnitude of subsidence considering complete loss of pipe volume and 100% infill is expected to be approximately 6 inches or less for the majority of the Permanently Deactivated Line 3.

In agricultural areas, the effect of subsidence due to the eventual decomposition of the pipeline will likely be minimized as a result of regular farming activity. Any cumulative low spots will be identified by Enbridge depth of cover surveys and mitigated.

Table 4-6: Settlement at 100% Volume Loss

Prediction with Assumed Volume Loss of 100%					
Depth of Cover		Peak Subsidence		Half width of significant settlement trough	
(m)	(ft.)	(m)	(in.)	(m)	(ft.)
0.6	2.0	0.1725	6.8	1.36	4.5
1.2	3.9	0.1450	5.7	1.62	5.3
1.6	5.2	0.1310	5.2	1.79	5.9
2	6.6	0.1195	4.7	1.96	6.4
4	13.1	0.0831	3.3	2.82	9.3

Table 4-7: Settlement at 50% Volume Loss

Prediction with Assumed Volume Loss of 50%					
Depth of Cover		Peak Subsidence		Half width of significant settlement trough	
(m)	(ft.)	(m)	(in.)	(m)	(ft.)
0.6	2.0	0.0863	3.4	1.36	4.5
1.2	3.9	0.0725	2.8	1.62	5.3
1.6	5.2	0.0655	2.9	1.79	5.9
2	6.6	0.0598	2.4	1.96	6.4
4	13.1	0.0415	1.6	2.82	9.3

Table 4-8: Settlement at 25% Volume Loss

Prediction with Assumed Volume Loss of 25%					
Depth of Cover		Peak Subsidence		Half width of significant settlement trough	
(m)	(ft.)	(m)	(in.)	(m)	(ft.)
0.6	2.0	0.0431	1.7	1.36	4.5
1.2	3.9	0.0362	1.4	1.62	5.3
1.6	5.2	0.0328	1.3	1.79	5.9
2	6.6	0.0299	1.2	1.96	6.4
4	13.1	0.0208	0.8	2.82	9.3

4.3.1.15 Crossings

The issue of subsidence at crossings is considered when identifying areas of potential risk. Subsidence and structural integrity are not easily predicted on a universal scale; rather, they are a function of site specific corrosion properties, soil mechanics and classification, loading impacts, pipeline depth and other factors. Of particular importance are the terms contained in agreements relating to the crossings of railways, primary and secondary highways, roads, other pipelines, power lines, and communication lines, and the conditions they may place on the deactivation process.

Predicted subsidence profiles have been introduced in section 4.3.1.14 based on assumed depths of cover (Table 4-6 through 4-8). However, with respect to crossings, it should be noted that the depth of cover will be generally greater than those presented in the subsidence profiles due to current installation practices and design criteria. It can therefore be presumed that the extent of subsidence will be less than that shown in Table 4-6 through 4-8.

While not applicable at the time of construction for Line 3, as a reference CFR Part 195.248 dictates depth of cover based on installation location, as seen in Table 4-9 below.

Table 4-9: Cover Over Buried Lines

Location	Cover (in)	
	Normal Excavation	Rock Excavation
Industrial, commercial, and residential areas	36	30
Crossing of inland bodies of water with a width of at least 100 feet (30 millimeters) from high water mark to high water mark	48	18
Drainage ditches at public roads and railroads	36	36
Deepwater port safety zones	48	24

Gulf of Mexico and its inlets in waters less than 15 feet (4.6 meters) deep as measured from mean low water	36	18
Other offshore areas under water less than 12 ft (3.7 meters) deep as measured from mean low water	36	18
Any other area	30	18

Unfortunately, guidance is not presently available in the industry for establishing tolerable subsidence limits; the information available instead defers to a risk=-based decision process to support appropriate actions for a specific pipeline.[1]

Table 4-10 is a preliminary summary of the Line 3 crossings identified, and details will be verified during detailed engineering.

Table 4-10: Preliminary Summary of Line 3 Crossings

Crossing Type	Number of crossing type
Roads	**297**
Highway	22
County, City, Township	275
Other (Trail)	**1**
Railroad	**17**
Active	15
Inactive	2

Ground-truthing will occur early during detailed engineering to identify and confirm the number and location of highway and railway crossings. Environmental impacts of treatment of specific crossing locations will be permitted with any applicable federal, state, and local permit requirements.

The crossing methods described below may be further refined upon completion of consultations and final agreements with third parties.

4.3.1.16 Railway

Though both corrosion degradation and structural integrity are believed to not be of concern for decades due to the higher loading produced by rail cars, the grouting of railroad crossings is being evaluated. Enbridge will consult with all railroad authorities in order to determine course of action for all active and inactive railroad crossings.

Ground subsidence due to corrosion and pipe collapse has been shown to be a time dependent failure mode. Specifically, this means that possible subsidence due to pipe or casing degradation would likely occur gradually with time, and therefore monitoring with appropriate intervals is considered an effective response to mitigating the risk. Detailed calculations and estimates of the proposed time to failure will be used as guidance for establishing the inspection intervals.

Based on current information, there are 15 active railway crossings, the majority of which are cased. Given the predicted corrosion rates on Line 3, the corrosion and the structural integrity model results shown in Figure 4-14 predict that the Permanently Deactivated Line 3 will maintain its load bearing capacity until significant general corrosion (approximately 37% equivalent general wall loss, for the full circumference of the pipe) has occurred for a depth of cover of approximately 3.9 feet. Based on the 2008 depth of cover survey, it is expected that all railway crossings will have depth of cover greater than 3.9 feet, but this will be verified during detailed engineering. As large scale general corrosion has not been identified, as addressed in Section 4.3.1.12, total subsidence is not expected to occur.

4.3.1.17 Roads

Due to lower loading considerations and continued third-party maintenance programs, grouting will not take place at road crossings. In an effort to minimize environmental impacts, Enbridge will monitor these crossings to ensure integrity is maintained and will consult with the appropriate road authorities as required.

4.3.1.17.1 Primary Highways

The pipe collapse model presented in Section 4.3.1.11 predicts that all depth of cover analyzed would have sufficient structural integrity to prevent collapse due to HS20 Highway loads, simulating a 20-ton truck traffic load, until significant general corrosion (at least 45% equivalent general wall loss, for the full circumference of the pipe) has occurred. As large scale general corrosion has not been identified, as addressed in Section 4.3.1.12, total subsidence is not expected to occur.

4.3.1.17.2 Secondary Highways, Rural Municipality, and Other Roads

The reduced traffic frequency for secondary highways and roadways further diminishes the likelihood of subsidence at road level caused by pipe collapse. The continued application of CP and standard monitoring practices are appropriate to manage these crossings.

4.3.1.18 Utility Crossings

The CEPA Abandonment Matrix recommends abandonment in-place with special treatment for utility crossings when the pipe diameter is greater than 26 inches. The risks to utilities from pipe removal include the possible loss of support and/or interference with the operation of the utility (i.e., due to third party damage, restricted access, etc.).

Enbridge's proposal is to Permanently Deactivate these crossings in-place subject to a technical risk assessment of utility crossings. Depending upon the result of that assessment, Enbridge may apply special treatment on a case-by-case basis. The primary risk for utility crossings associated with a Permanently Deactivated in-place pipeline is the potential for void formation, which could lead to an unsupported length of pipeline or cable, or displacement due to ground subsidence, as illustrated in Figure 4-20.

Figure 4-20: Representation of Tunneling Possible for Crossing Utility

(Reproduced from *Boundary element model for analysis of the mechanical behavior of existing pipelines subjected to tunneling-induced deformations*)[22]

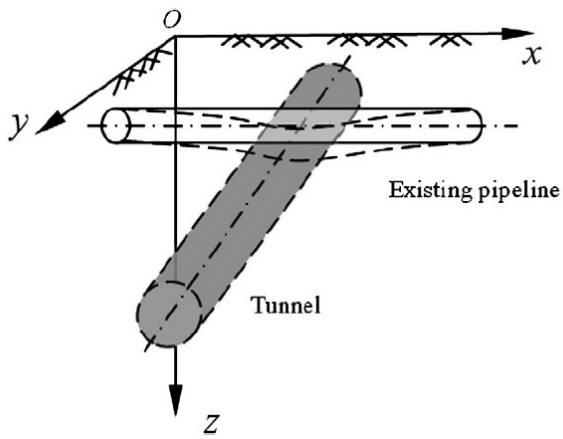

4.3.1.19 Casings

The benefits of casings with respect to structural integrity of the pipeline and any cased crossing locations should be noted. Presently, the structural integrity models presented were based solely on the capacity of the carrier pipe, and conservatively ignored any benefits of the casings.

The primary benefit of casings, with respect to structural integrity and loading capacity are that casing pipes, while intact, will provide additional structural support to the Permanently Deactivated carrier pipe. Secondly, from a risk perspective, casings will provide a secondary barrier to failure, either by corrosion or structural collapse, meaning that both the casing pipe and the Permanently Deactivated carrier pipe would have to fail prior to any substantial ground subsidence at a cased crossing. The nominal wall thicknesses for casings vary but are typically reported to be greater than ~.5 inches.[19]

It has been shown that subsidence due to pipe or casing corrosion and possible pipe collapse is a long-term time-dependent risk. Specifically, this means that possible subsidence due to pipe or casing degradation would occur gradually with time, and can be monitored or observed so that appropriate corrective action can be taken prior to significant subsidence.

Of primary concern for casings is that they are generally not coated, and therefore subject to general corrosion. Additionally, there is potential for shielding of CP from the carrier pipe if not properly maintained.

4.3.1.20 Summary and Conclusions – Structural Integrity and Subsidence

The primary conclusions of the analyses provided are as follows:

- Based on the PTAC corrosion rate curves presented, and comparison with historical ILI data for Line 3, the estimated time to through wall penetration was calculated to be between 25 to 50 years from 2011.
- The results of the PTAC model considering generalized wall loss for the Permanently Deactivated Line 3 indicate predicted minimum time to collapse as 87 years, with estimates well above 1,000 years based on the variety of soil conditions as described in Section 4.3.1.7.
- The results of the PTAC model considering pitting corrosion indicate the Permanently Deactivated Line 3 will maintain the majority of its structural strength until greater than 30% of the pipe's circumference is lost due to coalescing of perforations.
- The maximum subsidence predicted considering 100% volume loss of the pipe, complete infill, and 2.0 feet depth of cover was 6.8 inches.
- The maximum subsidence predicted considering 50% volume loss of the pipe, complete infill, and 2.0 feet depth of cover was 3.4 inches.
- Predicted subsidence profiles indicate a gradual sloping surface profile, which would create minimal disturbance to surface profile for the depths predicted.

4.3.2 Mitigation

As stated above, subsidence due to pipe or casing corrosion and possible pipe collapse is a long-term time-dependent failure mode. Numerous calculations are referenced estimating the time to collapse as being many decades, or more likely centuries.[1,3,6,13] Conservative calculations based on the PTAC collapse model for a 34-inch pipeline, similar to Line 3, predict the minimum time to collapse as 87 years at railway crossings, and with estimates significantly greater than 1,000 years based on the variety of soil conditions as described in Section 4.3.1.7.

To address the risks associated with long-term corrosion and possible ground subsidence, Enbridge will:

- continue to monitor the Permanently Deactivated pipeline as part of its ongoing Operations and Maintenance programs;

- survey, assess, and mitigate the depth of cover over the Permanently Deactivated pipeline in accordance with O&MM and Enbridge's PDMP;
- monitor and apply the CP in accordance with Enbridge O&MMs and CCG; and
- perform ground-truthing to identify and confirm the number and location of crossings.

4.3.2.1 Monitoring & Maintenance

Enbridge will continue to monitor the Permanently Deactivated pipeline as part of its ongoing Operations and Maintenance programs. Certain applicable monitoring procedures currently practiced on active pipelines will be extended to the Permanently Deactivated pipeline, in order to address the risks identified in Section 3. Operations and Maintenance activities include:

- completing pipeline inspections during patrols;
- assessing areas of potential geotechnical threats;
- maintaining pipeline signage;
- performing depth of cover surveys; and
- monitoring the CP system.

The Permanently Deactivated pipeline will also remain a part of Enbridge's programs for damage prevention and safe work practices, which include:

- continuing Enbridge's public awareness program; and
- ensuring ground disturbance activities by the Company or third parties in the vicinity of the pipeline in accordance with Enbridge construction specifications and O&MMs. Typical requirements are:
    - specifying safe work distances during excavation;
    - surface locating and identifying the pipeline;
    - ensuring pipeline is crossed in a safe manner and applying temporary ramps or matting when required; and
    - verifying that construction activities do not negatively impact the integrity of the pipeline or its CP system.

Enbridge periodically reviews and revises its standards and procedures to incorporate regulatory and legislative changes, updated safe work practices and industrial knowledge, and new technology. As such, the on-going monitoring of the Permanently Deactivated pipeline will progress in the same manner as Enbridge's active pipelines.

4.3.2.2 Right-Of-Way Patrols, Geotechnical Threat Assessments and Signage

To protect the public in proximity of the pipeline, the environment, and the integrity of the pipeline, the ROW is monitored by:

- patrolling the entire ROW plus the adjacent land;
- documenting and assessing abnormal conditions or activities on or adjacent to the ROW;
- assessing areas of potential geotechnical instability; and
- inspecting and maintaining ROW signs and markers.

ROW monitoring is completed in accordance with Enbridge O&MM.

ROW patrols are completed by qualified individuals to identify abnormal surface conditions or activities on or adjacent to the ROW using methods of walking, driving, flying or other appropriate means, periodically. Any abnormal condition or activity will be recorded. Enbridge will complete additional investigations when warranted. These investigations include documenting the location and condition of exposed pipe, and assessing the effects of unsupported spans, atmospheric corrosion, and third party damage on the pipeline. Remediation activities are planned based on the risk associated with the abnormality. Remediation options include, but are not limited to:

- on-going monitoring;
- improving community awareness; or
- providing additional depth of cover, buoyancy control, pipeline protection, cladding, matting, or drainage control.

The Enbridge mainline is assessed for geotechnical threats such as areas of potential slope stability or erosion concerns. These areas, when identified, undergo a site-specific assessment which may recommend more frequent or detailed on-site monitoring. Enbridge's plan to leave the Permanently Deactivated pipeline in-place will minimize the risk of erosion caused by construction activities because the vast majority of the ROW will remain undisturbed. With no disturbance, the permanently deactivated Line 3 ROW will have the same risk for erosion as the surrounding ROW for the active pipelines. In areas where excavation may occur, site-specific erosion plans will be developed, and all work will be performed in accordance with the Project's Environmental Protection Plan.

Warning signs and line markers are located in key areas to promote awareness in the vicinity of the pipeline. These signs will be visually inspected during regular patrols and, when required, the key information on the signs will be updated. Signage is also checked annually to ensure signs are not missing, vandalized, or damaged, and are visible from appropriate roadways and railways.

4.3.2.3 Pipeline Depth Monitoring Program

Depth-of-cover surveys utilize electromagnetic line locating equipment or equivalent technology to accurately locate and record the depths for each pipeline in the ROW. The depth of cover over the Permanently Deactivated pipeline will be surveyed, assessed, and mitigated in

accordance with the O&MM. The depth of cover survey program for the Permanently Deactivated pipeline will be completed at least once every ten years. The frequency for the depth of cover survey program may be reduced for portions of the pipeline based on internal risk assessments.

The depth of the pipe will be measured and recorded at predefined intervals down the ROW. Additional measurements will be taken on either side of a location with insufficient depth of cover. Physically probing for pipeline depth is used to validate non-intrusive depth measurements.

If the measured depth of cover of the Permanently Deactivated pipeline poses a risk to public safety or the environment, a risk analysis will be conducted to assess whether mitigative action is required. This risk analysis will consider land use, underground structures in close proximity, and/or adverse conditions that may prevent the maintenance of such cover. The risk assessment will determine if further action is required, such as:

- adding soil over the pipeline;
- lowering the pipeline;
- developing new agreements to restrict land use with the appropriate stakeholders; or
- installing mechanical protection over the pipeline.

4.3.2.3.1 Exposed Pipe

Currently, locations where pipe is exposed are identified through aerial patrol as well as by performing field depth of cover surveys. The areas of exposed pipe are reviewed by various internal stakeholders through a risk assessment, to identify priority and necessary remedial actions.

A review of the exposed pipe, depth of cover data and pipeline crossing features has been completed to identify areas that may be subject to loss of cover once the pipeline is purged.

Enbridge continues to monitor high risk areas and prescribes the appropriate course of action in the event additional pipe becomes exposed.

Following completion of deactivation activities on Line 3, if newly exposed pipe is discovered, each site will be reviewed by the following stakeholder representation: ROW/permitting agent(s), environmental lead and relevant agency, operations representative, and Enbridge Pipeline Integrity representative. Each will have a specific responsibility when considering the completion of site-specific mitigation efforts:

- The ROW agent will work with landowners or pertinent jurisdictional authorities impacted;

- The Environment Lead will need to complete a review with those agencies having jurisdiction;
- The Operations representatives will need to be engaged to review the workspace and any potential impacts to the operation of adjacent lines; and
- The Enbridge Pipeline Integrity representative should review and address risks brought from an Enbridge systems perspective.

The aforementioned stakeholder review will be used to identify inputs to a risk assessment matrix. Mitigation methods will be chosen upon completion of the risk review with the following potential actions:

- Pipe Removal: Removal of pipe will be dependent on site-specific conditions and will likely produce the highest environmental impacts, risk to adjacent lines and complications with regards to constructability.
- Grouting: grouting as a mitigation technique will have permanent results if the pipe re-settles and will have a lower environmental impact and lower risk to adjacent lines as compared to full pipe removal. Grouting lengths may be limited and therefore pose effective installation risk during construction. Grouting for buoyancy mitigation is meant to re-settle the pipeline, with the intent of eliminating positive buoyancy.
- Continued monitoring: with continued monitoring, there is no present impact to either Line 3 or the adjacent lines. The company will continue to monitor the high risk areas and mitigate as necessary.

4.3.2.4 Cathodic Protection

There are currently 82 Impressed Current CP (ICCP) Systems along the US portion of the route that actively function to mitigate threats of external corrosion on the entire mainline system. Additionally, there exists upwards of 90 bonds connecting Line 3 and adjacent pipelines, as well as an unknown number of below grade bonds, the locations of which may not be known.

In evaluating how to manage the existing cathodic protection (CP) system, the following were assessed: regulatory requirements and commitments, Enbridge's Operating and Maintenance Procedures, economic impact, and external corrosion risks associated with potential changes to the CP system. Based on this analysis, it was determined that the CP system will remain in place.

4.3.2.4.1 Maintaining the Active CP System

In keeping the existing CP system in place, there are effectively no changes from current CP work practices within the EEP corridor due to the operational status of Line 3. In any areas where Line 3 is segmented, new bonding cables will be installed to ensure electrical continuity remains across the pipeline, to maintain cathodic protection along the existing Line 3.

Environmental impacts of CP system maintenance will be permitted in accordance with any applicable federal, state, and local permit requirements.

In a multiple pipeline ROW, it is common to install bonds to maintain electrical continuity of the pipelines for CP operation. Bonds help to distribute CP current evenly through the pipeline ROW as well as mitigate stray current interference amongst neighboring pipelines. To ensure electrical continuity, bonds will be installed at locations where Line 3 is non-contiguous. The installation of bond cables will be completed in accordance with Enbridge D04-101 (2015), "Cathodic Protection – Mainline." Bond cable sizing will be determined based upon the current carrying capacity but will be no smaller than #4 AWG stranded copper cable. In addition to the bond cables installed, it is recommended that Test Lead cables are installed for future monitoring. The intention is to install bond cables on each Enbridge pipeline at segmentation locations. All cables will be terminated in an above grade junction box at a location that minimizes impacts to land use.

In some cases, it may be required to relocate a bond box to a suitable location for the above grade appurtenance. When able, these locations will remain within the existing Enbridge ROW, however they may be situated at the nearest tree line, fence line, or edge of a roadway ditch. As the project develops, site specific drawings may be required for cases where bond boxes cannot be placed at the segmentation location and will be addressed on a case-by-case basis.

4.3.2.4.2 Monitoring of CP System

In the short-term, Operations would continue to monitor and maintain the CP system to meet requirements for all pipelines along the EEP corridor. In the long-term, as CP systems become depleted and protective coatings deteriorate or change, new design and monitoring efforts will need to be implemented to maintain system integrity. As the coating quality on Line 3 degrades, an increased current requirement will be needed to mitigate external corrosion, ultimately increasing the costs associated with operating the CP system, both electrically and through the installation of new CP groundbeds.

The following programs or monitoring methods are currently undertaken by Enbridge to ensure the integrity of the CP systems:

- AC-DC Structure to Soil Potential Monitoring Program: Regularly scheduled monitoring to verify adequate cathodic protection levels on all pipelines and facilities through field surveys or remote monitoring;
- Bonding Inspection Program: Regularly scheduled monitoring of critical and non-critical bonds through field surveys or remote monitoring;
- Rectifier Operation Monitoring: Regularly scheduled monitoring of cathodic protection system rectifiers and related equipment to ensure correct operation of the cathodic protection system through field surveys or remote monitoring equipment;
- Close Interval Survey Program: Regular scheduled close interval surveys to provide a cathodic protection (CP) profile of the pipeline. An initial survey is completed when the

pipeline is put into operation and additional surveys are completed if operating conditions change;

- CP Coupon Monitoring Program: Regular inspection of CP coupons to obtain field or remote measurements to monitor current densities and induced resistance free reading; and
- Atmospheric Pipe Inspection Program: Regularly scheduled visual inspection of all above grade piping, including exposed piping, for atmospheric corrosion.

While the proposed Permanent Deactivation Plan involves maintaining CP as practical to extend the life as a load bearing structure, it is recognized that, "…in the long term, any pipeline left in-place would eventually degrade to the point that a void exists in the ground".[2] The terms, "long-term" and "eventually", cited here were intentionally vague, as they refer to site specific conditions. The analyses presented have shown that this "long-term" may be in the order of centuries or more. Specifically, this means that possible subsidence due to pipe or casing degradation or collapse would occur gradually with time, and therefore on-going monitoring with appropriate intervals is considered an effective response to mitigating the risk. Detailed calculations and estimates of the proposed time to failure will be used as guidance for establishing the inspection intervals during detailed engineering.

5 CONCLUSION

Enbridge's Line 3 Permanent Deactivation Plan is based upon engineering and risk assessments which identified the technical risks and mitigation measures associated with the Permanently Deactivated pipeline. As part of this assessment, Enbridge assessed the relative risks of removing the pipeline and Permanently Deactivating it in place. Removing the 282 miles of existing Line 3 would create a significant risk to other operating pipelines and additional impacts to the environment, land use, and public safety similar to and exceeding those related to constructing a new pipeline project. Based on the results of the risk assessment, Enbridge believes that deactivating a pipeline in place minimizes and/or eliminates unnecessary impacts to the environment, landowners, and the state of Minnesota.

Enbridge's Permanent Deactivation Plan was designed to Permanently Deactivate the pipeline in a way that minimizes risks to public safety, the environment, and current land use. In summary, the scope of the Plan includes:

1. Purging the oil;
2. Cleaning of the pipeline;
3. Isolating the pipeline from specific infrastructure which is actively transporting oil;
4. Further segmentation of the pipeline, as needed, including completing all required remediation at roads, railroads, waterbodies, or any other permitted crossing in consultation and coordination with that crossing's authority; and

5. Continue to monitor the existing right-of-way (ROW) to identify, assess, and appropriately mitigate apparent or emerging risk to public safety, the environment, or current land use caused by the Permanently Deactivated pipeline. As part of the ongoing maintenance and monitoring, continue to apply cathodic protection (CP) until such time that it is ineffective or otherwise detrimental.

These measures will protect the environment and human activity by minimizing risks related to soil and water contamination, water conduits, and subsidence. This Permanent Deactivation Plan will also avoid the unnecessary risks and impacts related to pipeline removal.

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7 APPENDICES

7.1 ENBRIDGE LINE 3 DECOMMISSIONING CLEANING VALIDATION PROGRAM REPORT

Appendix 7.1

Line 3 Decommissioning
Cleaning Validation Program Report

Enbridge Pipelines Inc.
September 4, 2015

Enbridge Pipelines Inc. (Enbridge) conducted a cleaning validation program on a 19.8 km section of the NPS 34 Line 3 that was recently deactivated near Cromer, Manitoba by Enbridge as part of National Energy Board (NEB) filing A50617. This validation program was completed in accordance with NEB filing A64166 as part of Enbridge's application to the NEB for the Line 3 Replacement Program (L3RP).

The cleaning validation program successfully accomplished the following objectives:

1. Develop and execute an economical, reliable, and repeatable cleaning program that could be implemented when decommissioning Line 3,

2. Demonstrate the effectiveness of the program by completing third party testing for residual hydrocarbons in fluid samples of the cleaning solution and water used to clean the pipeline, and

3. Validate that polychlorinated biphenyls (PCB) and naturally occurring radioactive materials (NORMs) are not a risk that requires modification to the decommissioning plan for Line 3 currently filed with the NEB.

The cleaning program consisted of one chemical train (comprised of two 18 m^3 batches of cleaning solution and one 35 m^3 water batch), one rinse train (comprised of three 35 m^3 water batches), and a third train (comprised of a foam pig and scraper pig) to remove residual bulk fluid remaining in the pipeline. Approximately 5 m^3 of cleaning solution was injected in front of the chemical train to lubricate the first pig in the train. A combination of hard brushes, pencil brushes, and scraper pigs were used to scrape the pipe walls and maximize cleaning effectiveness. The objectives each pig and train are outlined in table 1 below.

Table 2: PIG sequence and objectives for chemical train

Pig Train #	Pig Sequence #	Pig Type	Objective
1 - Chemical	1	Spring Loaded Hard Brush Pig	Initial brush pigs were used to scrape the pipe walls to maximum cleaning effectiveness. Aggressive brushes were installed on a spring to provide mechanical cleaning without damaging the pipe wall.
	2	Spring Loaded Hard Brush Pig	
	3	Spring Loaded Pencil Brush Pig	Slightly less aggressive brushes removed residual deposits remaining after the hard wired brushes. The pencil brushes were also spring loaded to avoid excessive scraping of the pipe wall.
	4	Spring Loaded Pencil Brush Pig	
2 - Rinse	5	Scraper Batch Pig	Scraper pigs were used for final scraping of the pipe walls with the polyurethane discs. These pigs removed any debris/contaminants dislodged by the brush pigs in pig train #1, and transported the material in the water batches. The combination of cups and discs provided effective isolation of the rinse batches to prevent bypass of material and, removed most of the fluid from the pipeline.
	6	Scraper Batch Pig	
	7	Scraper Batch Pig	
	8	Scraper Batch Pig	
3 - Foam	9	Foam Pig	Foam pig and Scraper pig used to remove residual free bulk fluid remaining in the pipeline after pig train #2.
	10	Scraper Batch Pig	

Engineering of the cleaning validation program was completed in two phases: laboratory testing of representative pipeline material to determine appropriate chemical selection for the cleaning solution, and hydraulic modeling and design of the cleaning train. Laboratory testing of potential cleaning chemistries was completed using hydrocarbon covered test coupons representative of the worst case scenario for potential pipe wall contamination based on the previous products transported on Line 3. These tests determined that a water-based cleaning formulation in combination with water rinses was most appropriate for cleaning the Line 3 pipeline. The volume of cleaning solution and water were sized based on specific parameters of the Line 3 pipeline segment (i.e. length and diameter). Engineering of the Line 3 cleaning program will consist of the same two phase approach, during which the batch sizes and cleaning chemistry may be subject to change. Figure 1 illustrates the three pig trains employed in the cleaning validation program.

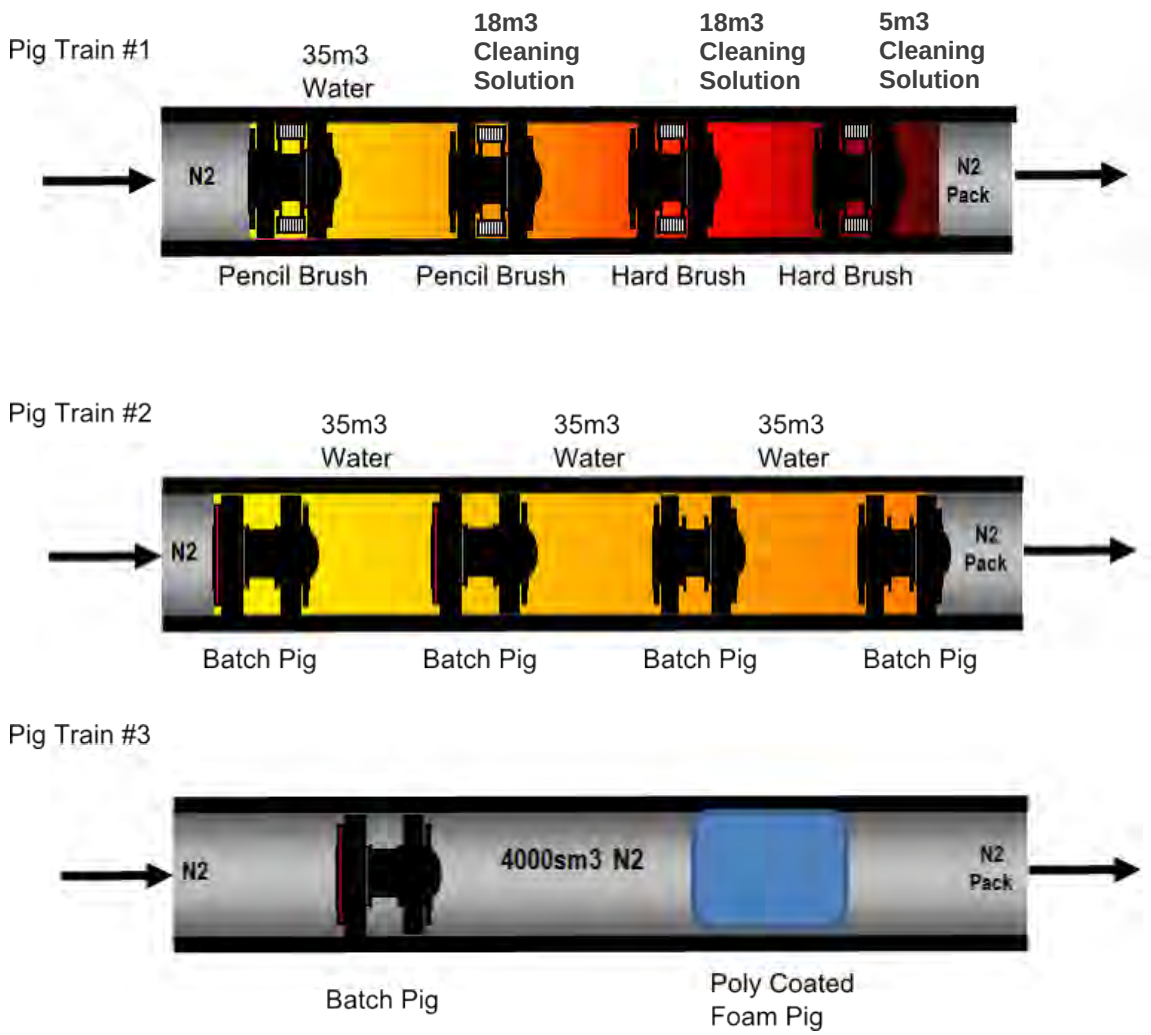

Figure 1: Cleaning validation program pig trains

The execution of the cleaning operation was split into three separate trains due to the size of receiving traps available for the cleaning validation program. The Contractor agreed that the resulting cleanliness for either a combined or split pig train was unchanged provided the fluid volumes, cleaning fluids, and fluid residence times are not altered. Enbridge intends to clean Line 3 in a single operation (one pig train) when decommissioning the remainder of the Line 3 pipeline.

Nitrogen (N_2) was used to propel all pig trains. Nitrogen was chosen as the propellant for this application as its inert properties allow for the safe propulsion of the cleaning train regardless of the residual vapours. Sampling of the lower explosive limit (LEL) completed during the cleaning operation confirmed that compressed air could be utilized safely as an alternative propellent when cleaning the remainder of Line 3 as part of L3RP. The propellant selection for the Line 3 cleaning program will be further evaluated as part of detailed engineering.

All samples collected during the cleaning validation program were submitted to a Canadian Association for Laboratory Accreditation Inc. (CALA) accredited laboratory to provide an unbiased and independent chemical analysis of the effectiveness of the cleaning validation program. The laboratory analysis of the samples collected confirmed that PCB and NORM concentrations were below detectable limits and therefore are not a risk to the decommissioning of the remainder of the Line 3 pipeline..

Samples taken at the discharge of the pipeline demonstrated that the cleaning program developed was effective in removing residual hydrocarbons from the deactivated pipeline. The cleaning and rinse trains were designed to identify possible limitations in cleaning technologies when decommissioning Line 3. Sampling of the water rinse batches indicated a strong downward trend in the concentration of hydrocarbon constituents between rinse batches as shown by Figure 2. The remaining water flush sample concentrations ranged from 108.2 mg/L for the initial sample to 15.54 mg/L for last samples of the final rinse. As the total petroleum hydrocarbon (TPH) concentrations in the water samples produced a statistically significant exponential decay curve with a high degree of confidence, the measured decrease in the TPHs are expected to be repeatable when using similar cleaning methodology, cleaning equipment/materials, and initial conditions on Line 3.

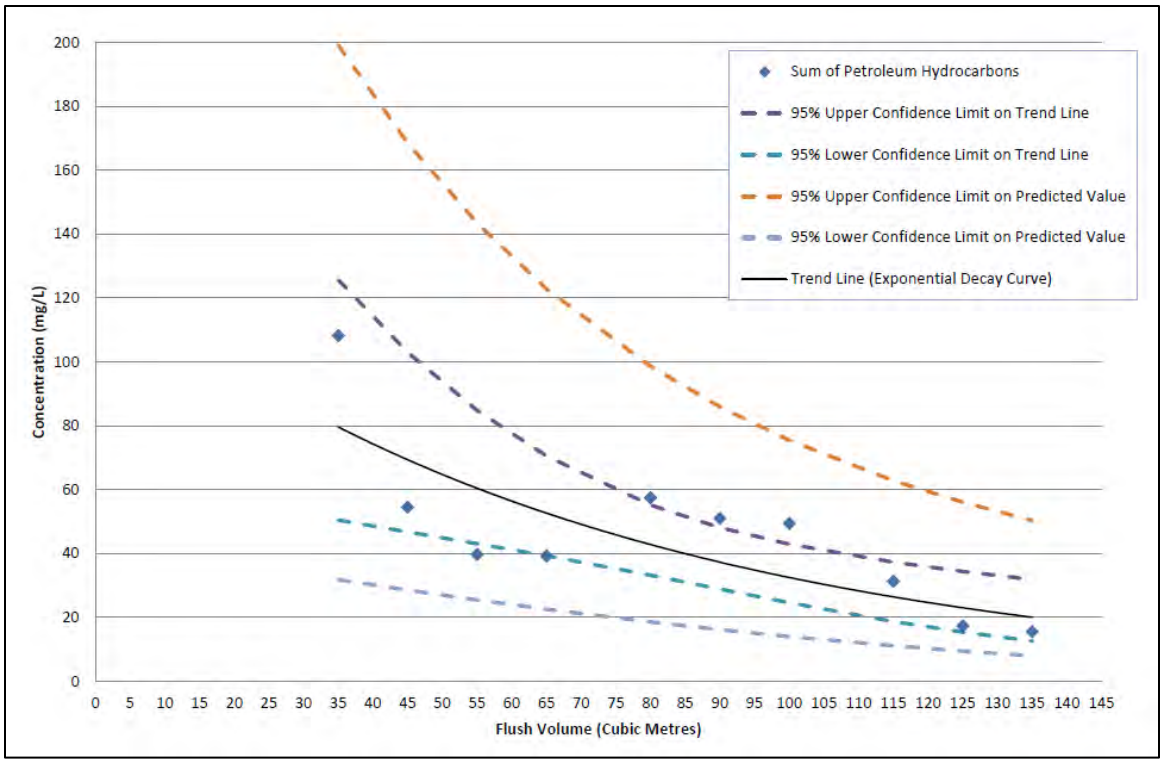

Figure 2: Rinse train sample TPH analysis based on flush volume

Based on the successful execution of the cleaning validation program, the same engineering approach utilized for the cleaning validation program will be implemented to develop the cleaning program to decommission the remainder of Line 3 as per Enbridge's current filing with the NEB for L3RP.

7.2 STRUCTURAL INTEGRITY AND SUBSIDENCE

APPENDIX 7.2
Structural Integrity and Subsidence

SECTION A – SOIL TROUGH SUBSIDENCE PROFILES

This section provides the results and discussions from studies conducted for a series of generalized soil subsidence scenarios. These generalized cases have been assumed to be imposed on the 34-inch OD pipeline. The scenarios considered predictions of settlement profiles (ground subsidence) under 25, 50 & 100% volume loss at various depths of cover (between ground level and crown of the pipe), in which 100% volume loss is the total collapse of the pipeline, with complete soil infill and 25% volume loss represents a partial infill scenario.

Ground subsidence estimations should take into account two different scenarios: following complete infill considering pipe collapse at shallow burial depth, and partial infill due to excessive ovalization and/or finite soil ingression.

Prediction of total ground subsidence, considering complete infill of the pipe volume can be predicted through analogy with tunneling construction. Extensive field measurements (Peck, 1969; Schmidt, 1969; Rankin, 1988; Mair, 2008) have shown that the settlement trough during open-face tunneling construction can be well characterized by the Gaussian distribution curve:

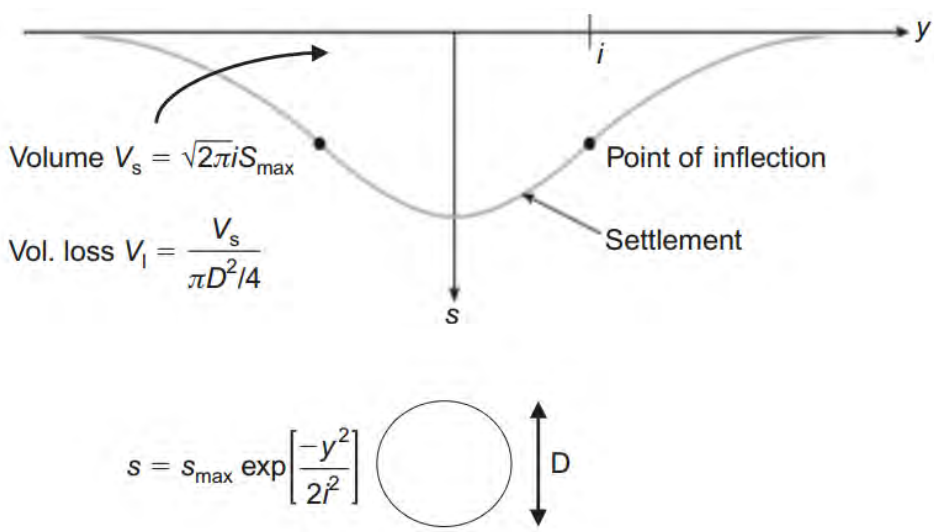

Figure 7A - 1: Generic ground settlement trough considering Gaussian Distribution Curve Method

Where *i* describes the characteristic half-width of the settlement trough and is a dependent on the soil cover height and soil type. For this particular case, the exact shape of the Gaussian distribution curve can be estimated based on the particular scenario: total pipeline collapse (V_l = 1), or partial collapse (i.e. excessive ovalization, $0 < V_l < 1$).

Figure 7A - 1 through Figure 7A - 3 shows results from a number of preliminary settlement at different volume loss values (100%, 50% and 25%) and depths of cover to the pipe's crown (assumed at 0.6m, 1.2m, 1.6m, 2.0m and 4.0m). Each figure consists of two graphs - one that shows the horizontal and vertical settlement in equal scales and a second which magnifies the vertical settlement by a factor of ten (10) for clarity.

As expected, the peak subsidence increases with higher volume loss value and shallower depth of cover. The half-width of settlement trough is only dependent on the depth of cover though it is not as linearly increasing with depth of cover as assumed in geometric models presented in PTAC report. The reason is that for pipe embedded at shallower depths, the two models are similar in their predictions but at deeper covers the Gaussian distribution curve introduced in this analysis has been shown to offer a better match to the observed ground settlement data, particularly for tunnels.

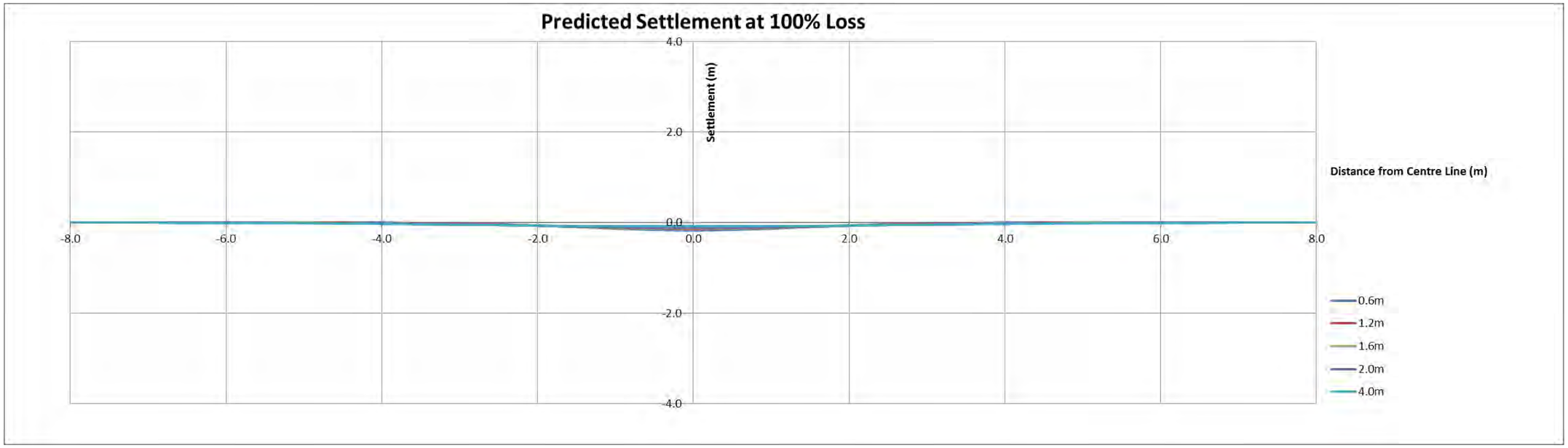

(a)

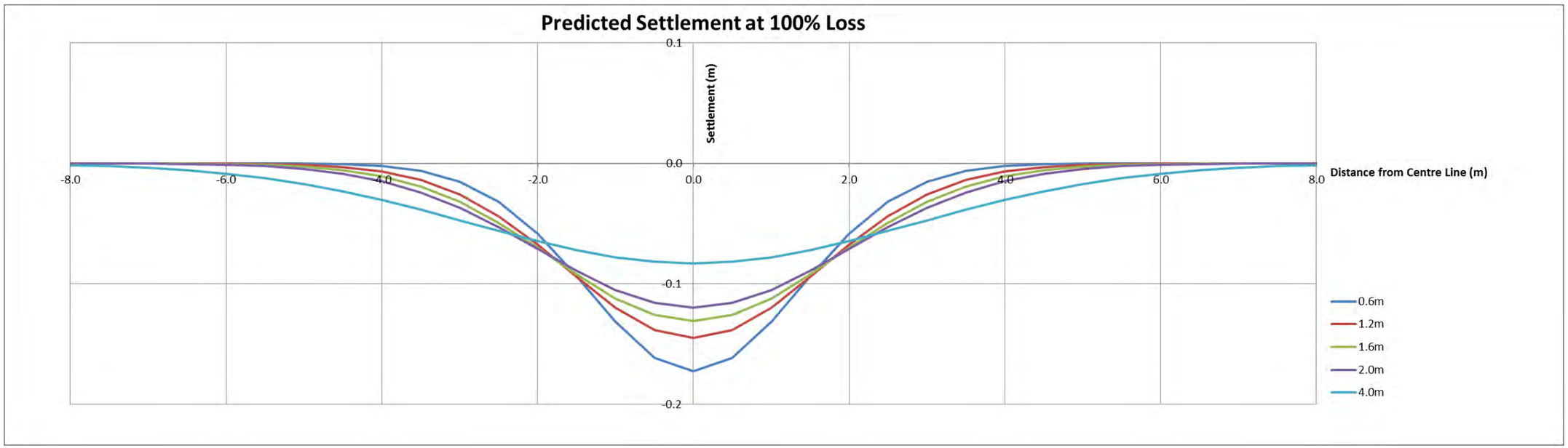

(b)

Figure 7A - 2: Predicted settlement profile at ground level for different depths of cover assuming 100% volume loss (a) equivalent horizontal and vertical scales (b) vertical scale magnified to ten times the horizontal scale

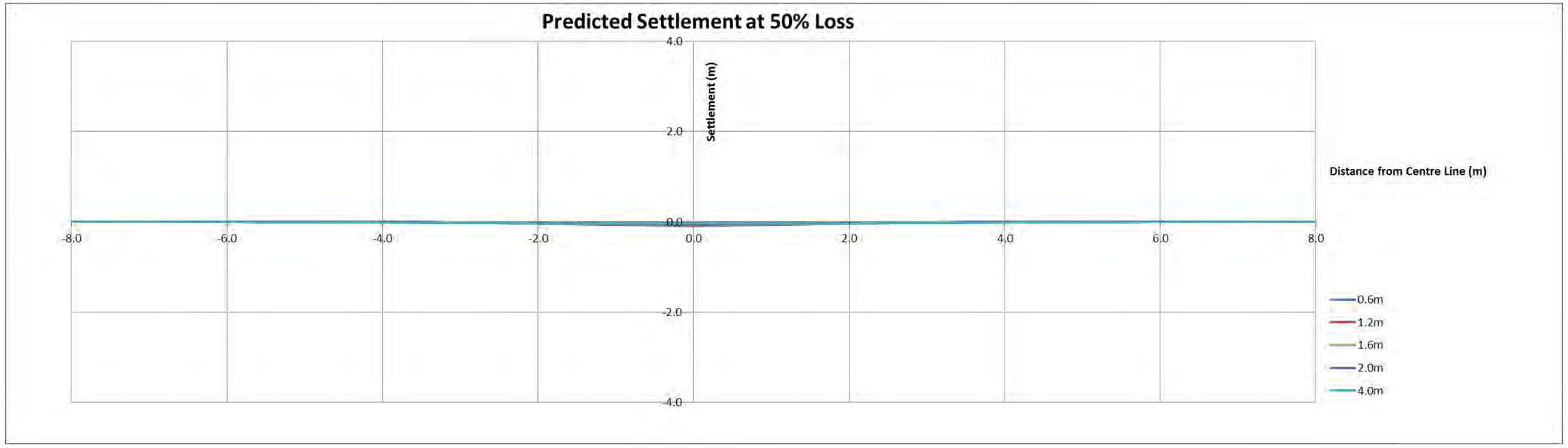

(a)

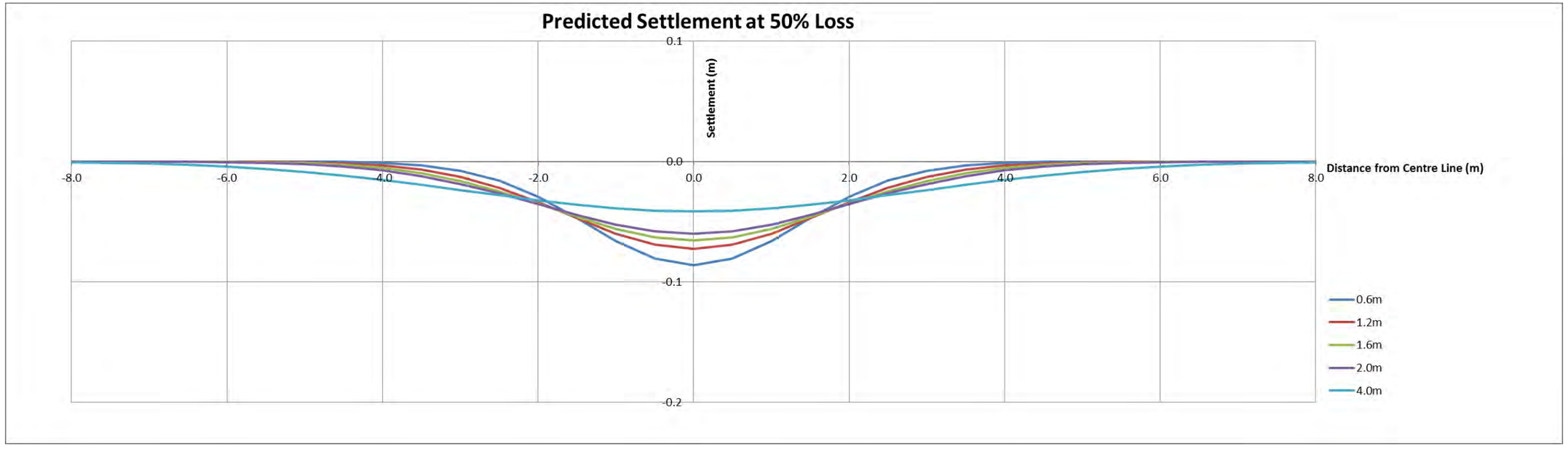

(b)

Figure 7A - 3: Predicted settlement profile at ground level for different depths of cover assuming 50% volume loss (a) equivalent horizontal and vertical scales (b) vertical scale magnified to ten times the horizontal scale

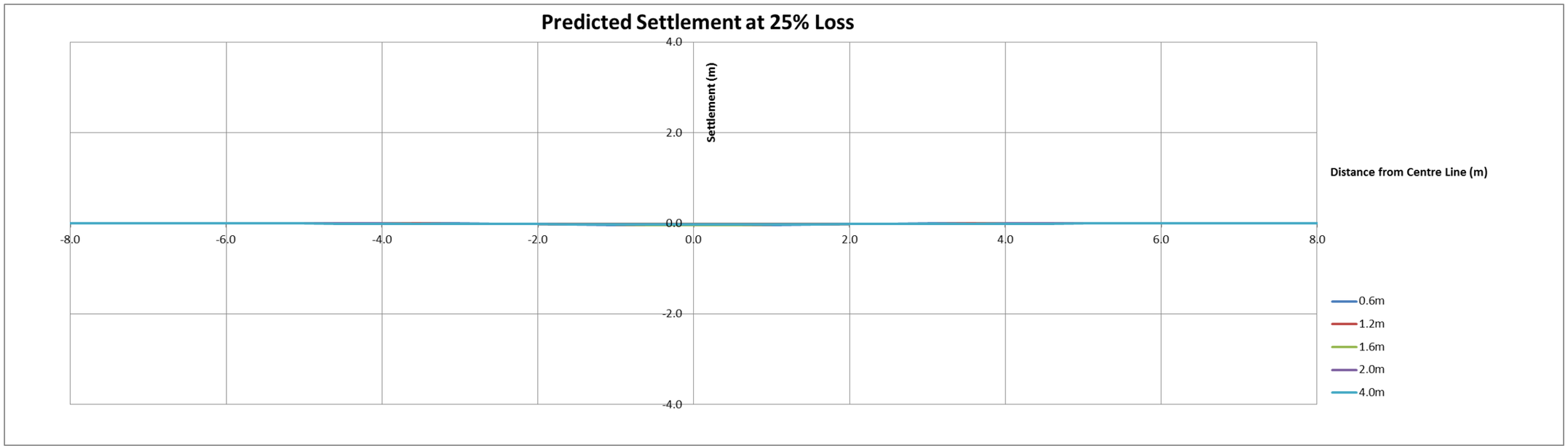

(a)

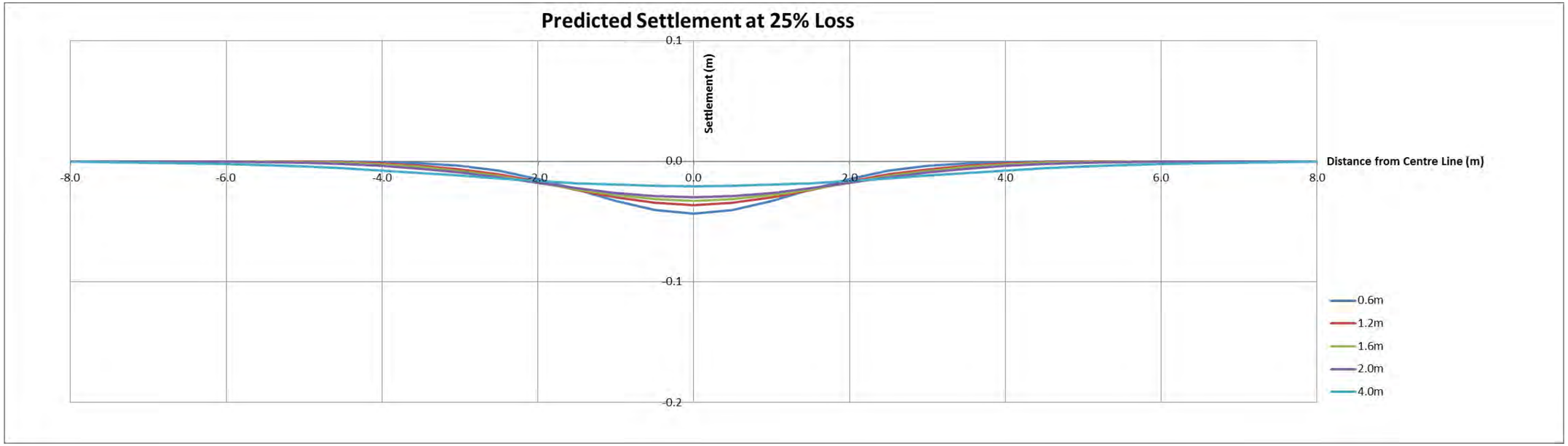

(b)

Figure 7A - 4: Predicted settlement profile at ground level for different depths of cover assuming 25% volume loss (a) equivalent horizontal and vertical scales (b) vertical scale magnified to ten times the horizontal scale

1 **SECTION B – PTAC MODEL SETUP**

Parameter	Symbol	Value	Comments
Max soil density	$\rho_{soil,max}$	2000 kg/m^3	The max soil density results in the lowest predicted load bearing capacity for the pipe, range indicated along pipeline from 990 kg/m^3 to 2000 kg/m^3
Yield strength of X52 pipe	$\sigma_{y,X52}$	359 MPa (52,000 psi)	
Pipe diameter	D	0.8636 m	
Young's Modulus	E	205 GPa	
Soil Modulus	E'	6.9 MPa	E' increases with increasing depth of cover and increased compaction [Hartley & Duncan]; the use of 6.9 MPa is recommended for coarse-grained soils with fines at 90% compaction and also for fine-grained soils with less than 25% sand content at 95% compaction at less than 1.5 m depth of cover, therefore this is conservative due to the compaction level assumed and especially with respect to the majority of crossings at deeper depths of cover
Bedding factor	K	0.1	Conservative for buried pipe that is in intimate contact with soils at the side wall, such as soil compacted over 60 years or constructed to CPCS-SPEC-PIPELINE-001: Specification for Pipeline Construction, 19.3.2: which states compaction to 98% of Standard Proctor Density
Lag factor	L	1.5	Values of 1.0 to 1.5 acceptable, 1.5 is most conservative and accounts for Spangler's observation that culvert ovality can increase over long periods of time, values closer to 1.3 have been suggested for pipe by Warman et al
Safety factor	FS	3	Applied to elastic collapse to account for stress concentrations due to perforations, see Section 7.4.6.3.2 for details
Impact factor	F'	1.75	Recommended for Railway by Warman et al, the impact factor also decreases with depth to a value of 1.0 at a depth of only 0.9m (3.0 ft) for traffic live loads, therefore this is conservative
Pipe diameter	D	0.864 m	
Pipe modulus of elasticity	E	2.05 x 10^{11} Pa	
Height of soil above pipe (DOC)	C	variable	
Modulus of soil reaction	E'	6.9 MPa	
Gravitational constant	g	9.81 m/s^2	
Yield strength of pipe	σ_{yield}	3.59 x 10^{8}Pa	
Dry density of soil	γ_S	2000 kg/m^3	
Bedding factor (for pipeline constructed by trenching)	K	0.1	
Density of water	γ_W	1000 kg/m^3	
Height of water table above pipe	h_W	0 (for pipe above water table)	
Lag factor (empirical)	L	1.5	
Effective load from traffic (from "Guidelines for the Design of Buried Steel Pipe," ASCE, July 2001)	P_{pipe}	variable (function of DOC, "C")	
Impact factor	F'	1.75 or 1.0 as stated	
Factor of safety	FS	3.0	

2

Assumptions and data inputs

Conservative assumptions were used in the model as necessary, and summarized below:

- The pipe is above the water table and there is no jacking of the pipe.
- The coating provides no significant stiffness.
- A conservative impact factor is used for all depths of cover.
- Soil behaves in the following way:
    - Soil will collapse along 45° planes as the shear stresses are highest along these planes.
    - When the pipeline collapses, soil flows efficiently and fills the empty void of the pipeline.
    - The volume of soil filling the pipeline can be calculated and used to estimate the depth of subsidence at the ground surface.
    - The prism of soil above the pipeline subsides by a depth of “S” after pipeline collapse.

SECTION C – ASCE LOADING CONDITIONS

TABLE 7A - 1: LIVE LOADS TRANSFERRED TO PIPE (KPA)

LIVE LOADS TRANSFERRED TO PIPE (kPa)				ADDENDUM	
Height of Cover (m)	Highway H20*	Railway E80**	Airport***	Personal Truck****	Person*****
0.3	86	–	–	21.6	5.0
0.6	38	182	91	9.6	1.3
0.9	29	163	85	7.2	0.6
1.2	19	127	78	4.8	0.3
1.5	12	115	70	3.0	0.2
1.8	10	108	61	2.4	0.1
2.1	8	84	54	2.1	0.1
2.4	5	77	48	1.2	0.1
3.0	–	53	42	–	–
3.7	–	38	33	–	–
4.3	–	29	21	–	–
4.9	–	24	16	–	–
5.5	–	19	13	–	–
6.1	–	14	11	–	–
6.7	–	13	8	–	–
7.3	–	12	7	–	–
7.9	–	10	–	–	–
8.5	–	7	–	–	–
9.1	–	5	–	–	–
10.7	–	–	–	–	–
12.2	–	–	–	–	–

* Simulates a 20-tonne truck traffic load, with impact.

** Simulates an 11 tonne / m railway load, with impact.

*** Simulates 82 tonne dual tandem gear assembly, 0.66 m spacing between tires and 1.68 m centre-to-centre spacing between fore and aft tires under a rigid pavement 30 cm inches thick, with impact.

**** Simulates a 5 tonne personal truck load, with impact

***** Assumes 100 kg person, no impact

SECTION D – HIGHWAY CLASSIFICATION

Alberta

In Alberta, "Primary Highways are divided into two series, the "1-216 Series" makes up Alberta's core highway network, has the highest traffic volume, and are mostly paved. The "500-986 Series", formerly known as the "Secondary Highways", provide more local access, and include a large number of gravel highways."[1]

Saskatchewan

Saskatchewan highways can also be divided into seven classes.

Class 1 - serve major inter-provincial and international travel as well as regional service centres with 3,000 or more. These highways also link between regional and base hospitals.

Class 2 – serves population centres of 1,000 or more and provide a link between hospitals.

Class 3 – serve communities of 500 or greater and link health centres or special care homes to hospitals.

Class 4 – considered as primary inter-municipal roads that provide access to communities of more than 100 and large industrial sites.

Class 5 - considered as secondary inter-municipal roads that provide access to communities of less than 100 and medium industrial sites.

Class 6 – serves residences, school bus routes and small industrial sites.

Class 7 – provide access to land only.[2]

Manitoba

Manitoba's highway classification system defines highways under control of MIT as

1. RTAC routes
2. Class "A1" highways – Provincial Truck Highways numbered from 1 to 110 that are not RTAC routes
3. Class "B1" highways – highways with a numeric designation above 110. Note that some B1 highways have been upgraded to RTAC or A1 loadings.[3]

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[1] http://en.wikipedia.org/wiki/List_of_Alberta_provincial_highways
[2] Saskatchewan Highways and Infrastructure, "Design Manual", Government of Saskatchewan,1992
[3] Manitoba Highway Classification System, Government of Manitoba website, http://www.gov.mb.ca/mit/mcd/mcpd/mhcs.html

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Appendix C

Plot Plans for Expanded Clearbrook Terminal and Pump Stations

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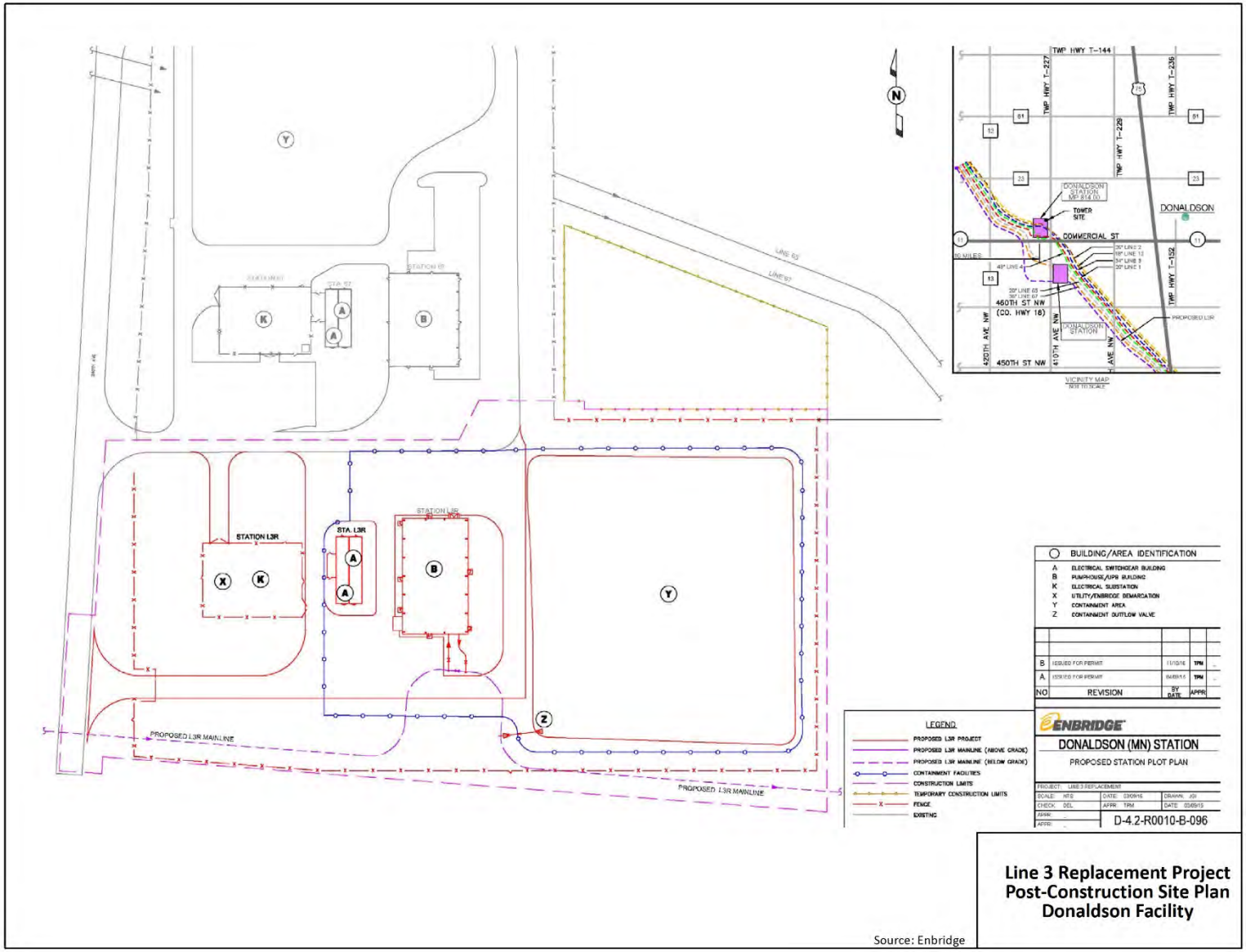

Line 3 Replacement Project Post-Construction Site Plan Donaldson Facility

Source: Enbridge

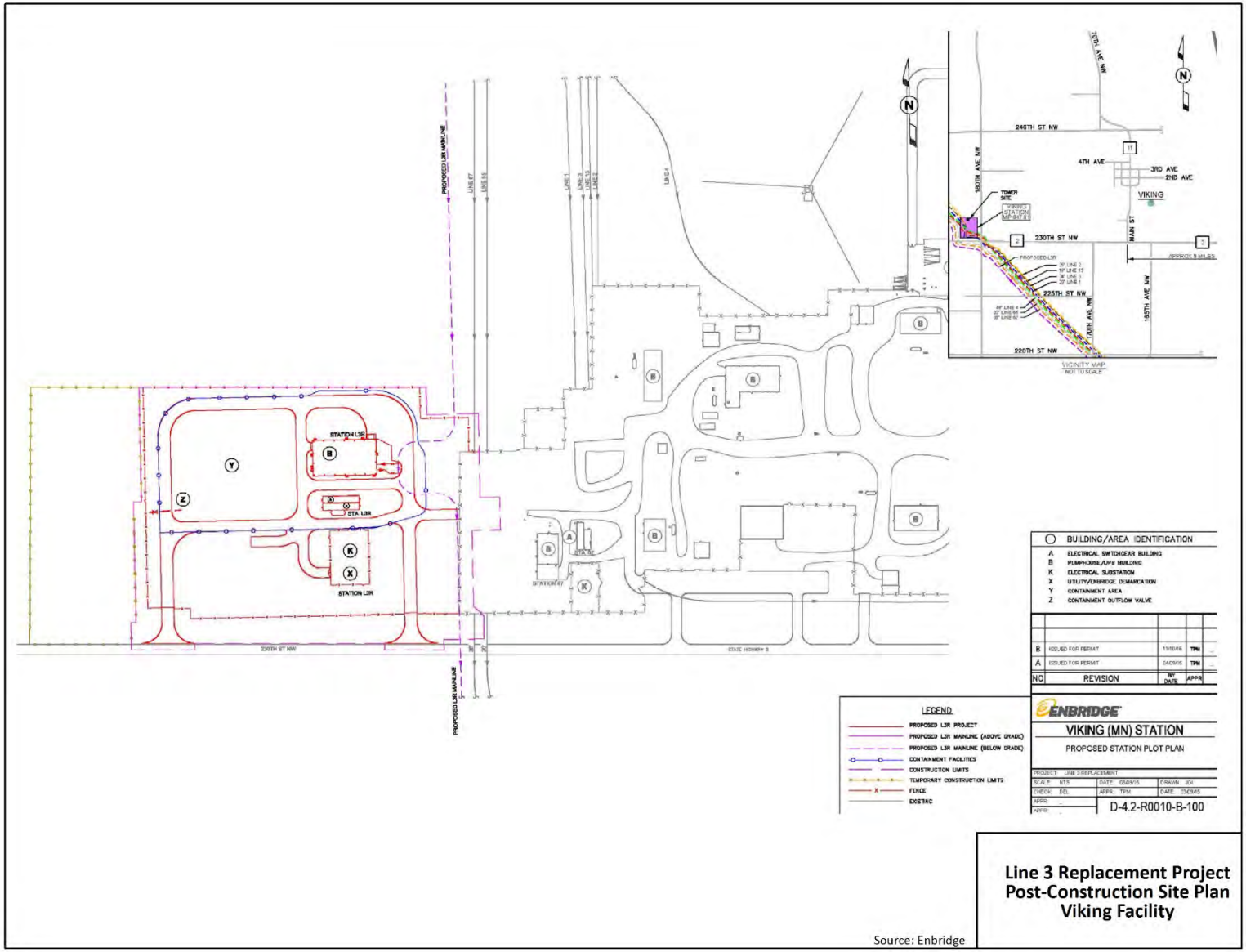

Line 3 Replacement Project Post-Construction Site Plan Viking Facility

Source: Enbridge

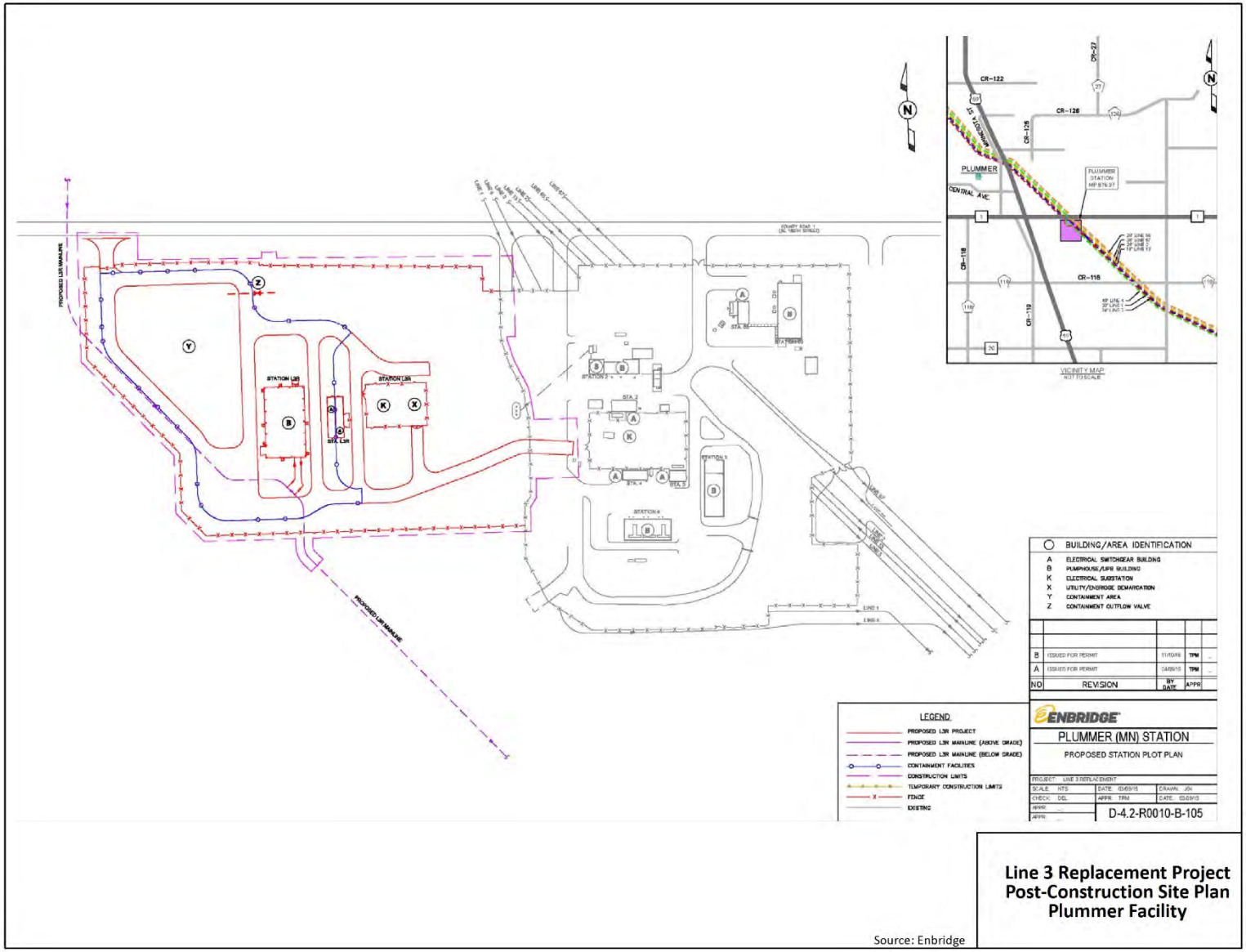

Source: Enbridge

Line 3 Replacement Project Post-Construction Site Plan Plummer Facility

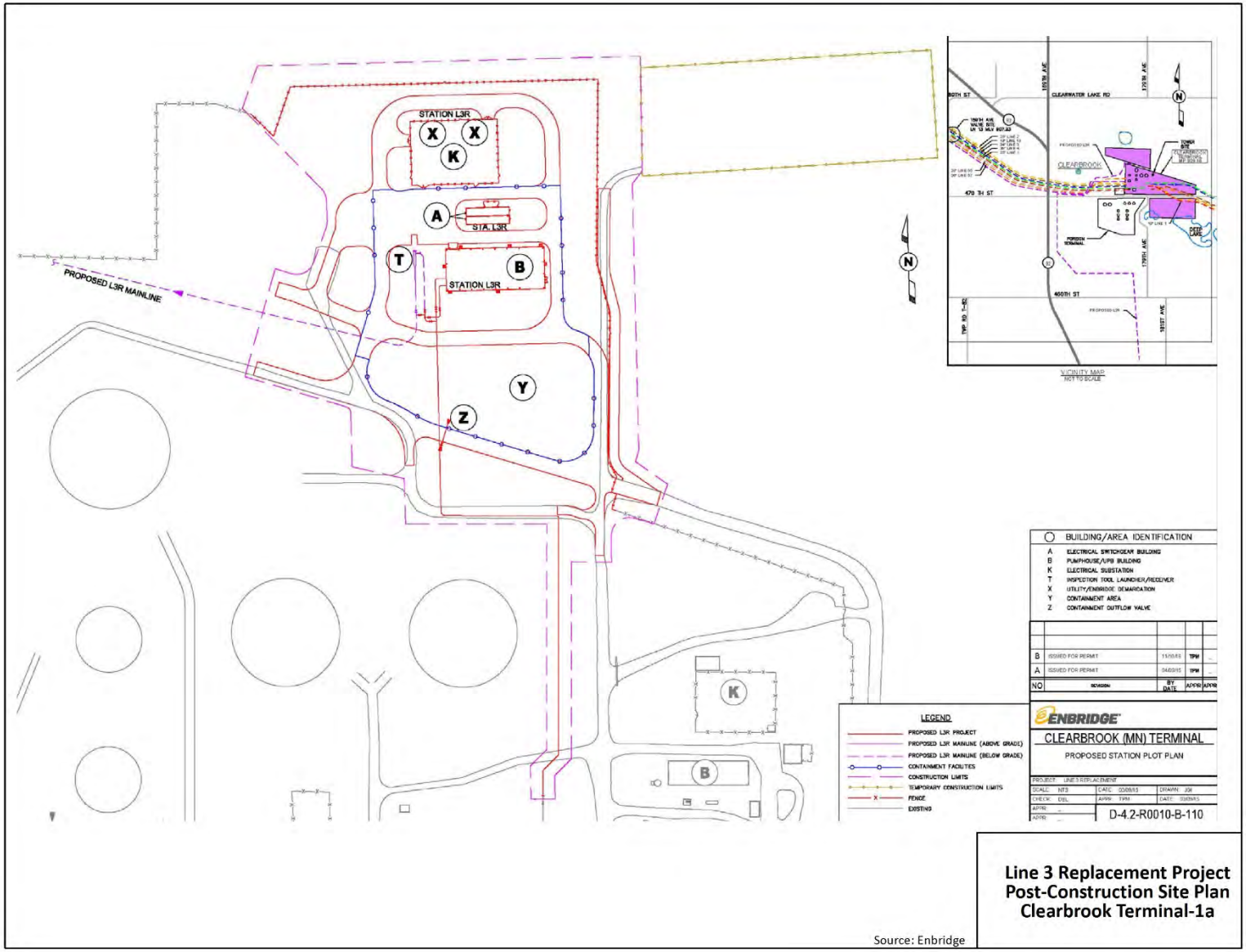

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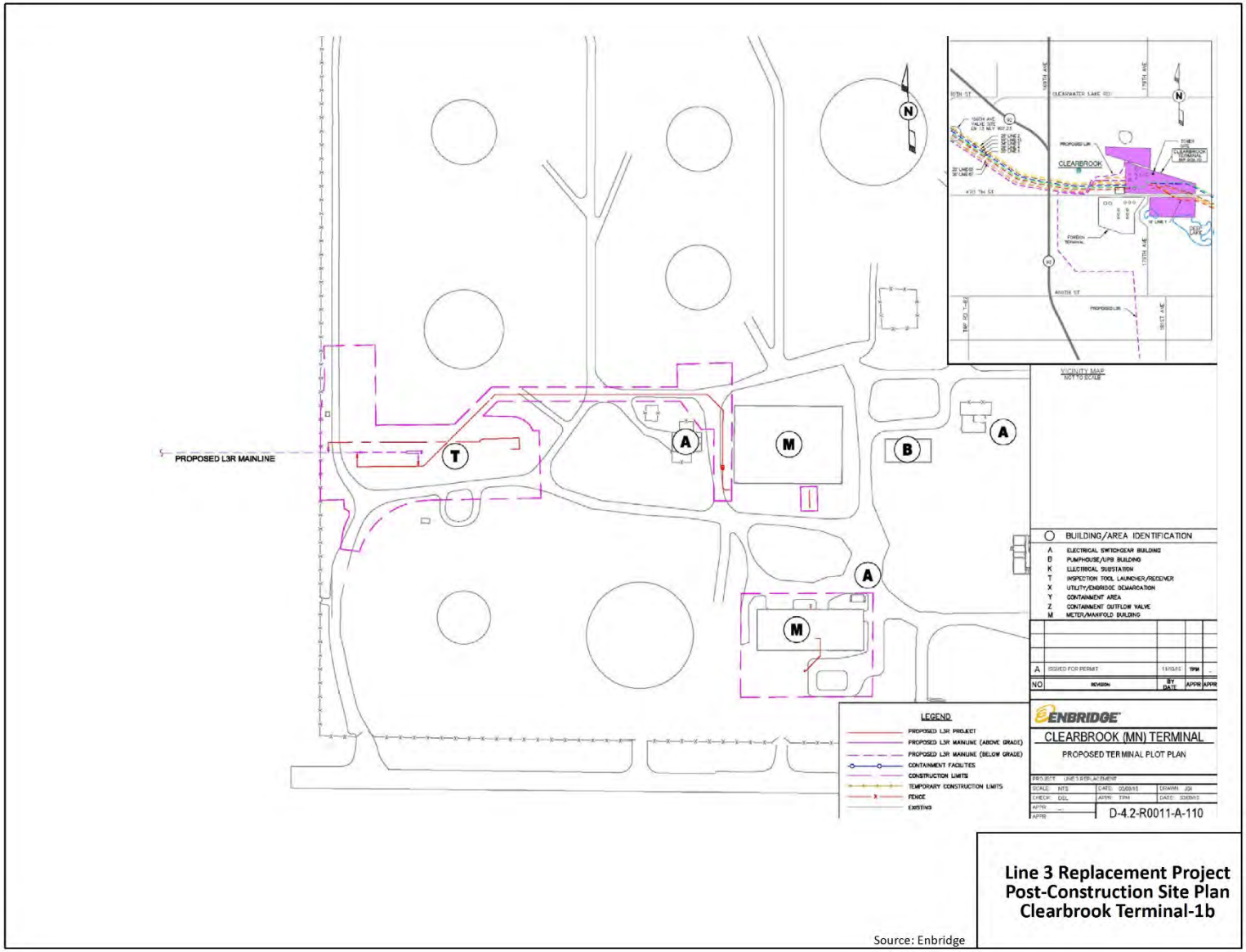

Source: Enbridge

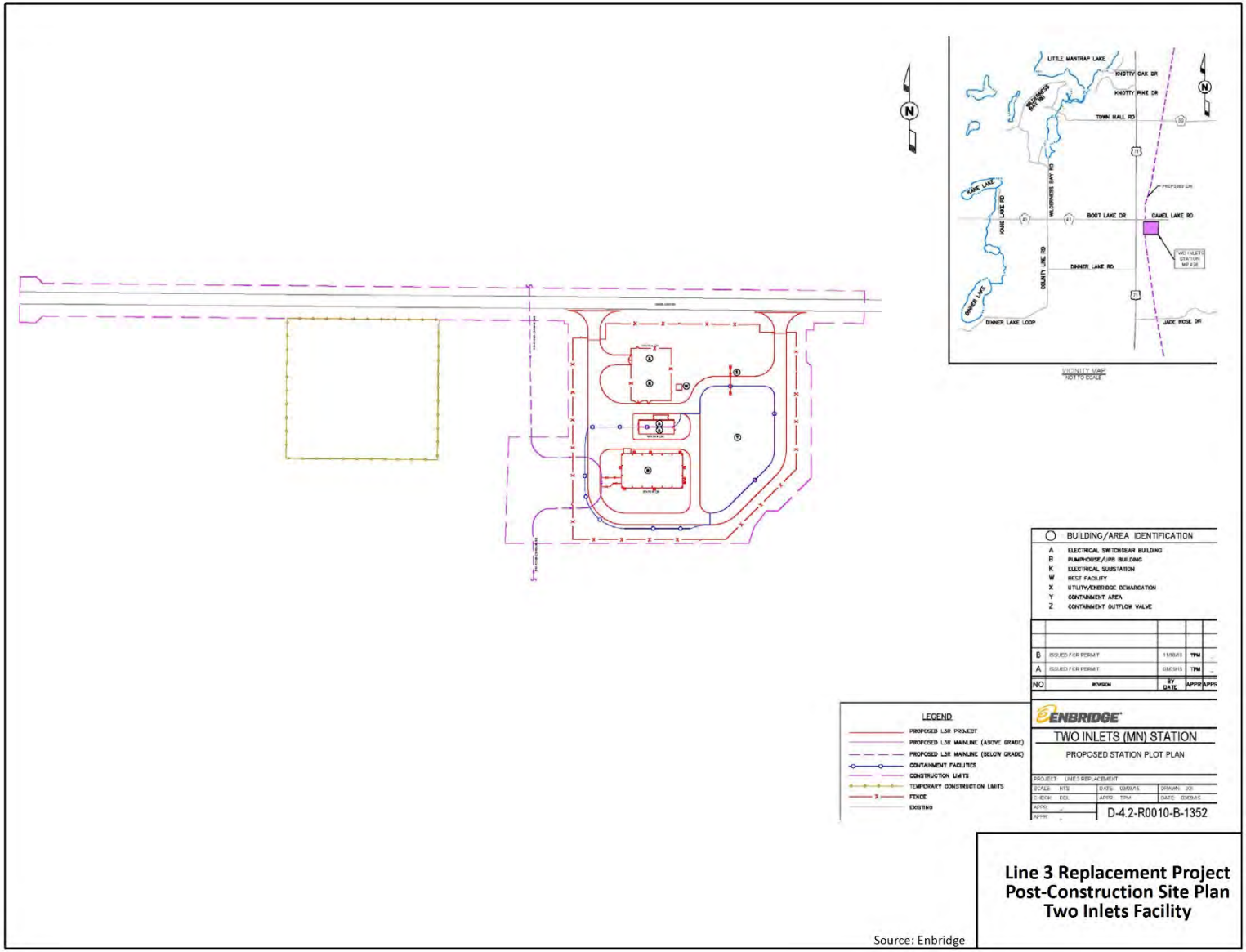

Line 3 Replacement Project Post-Construction Site Plan Two Inlets Facility

Source: Enbridge

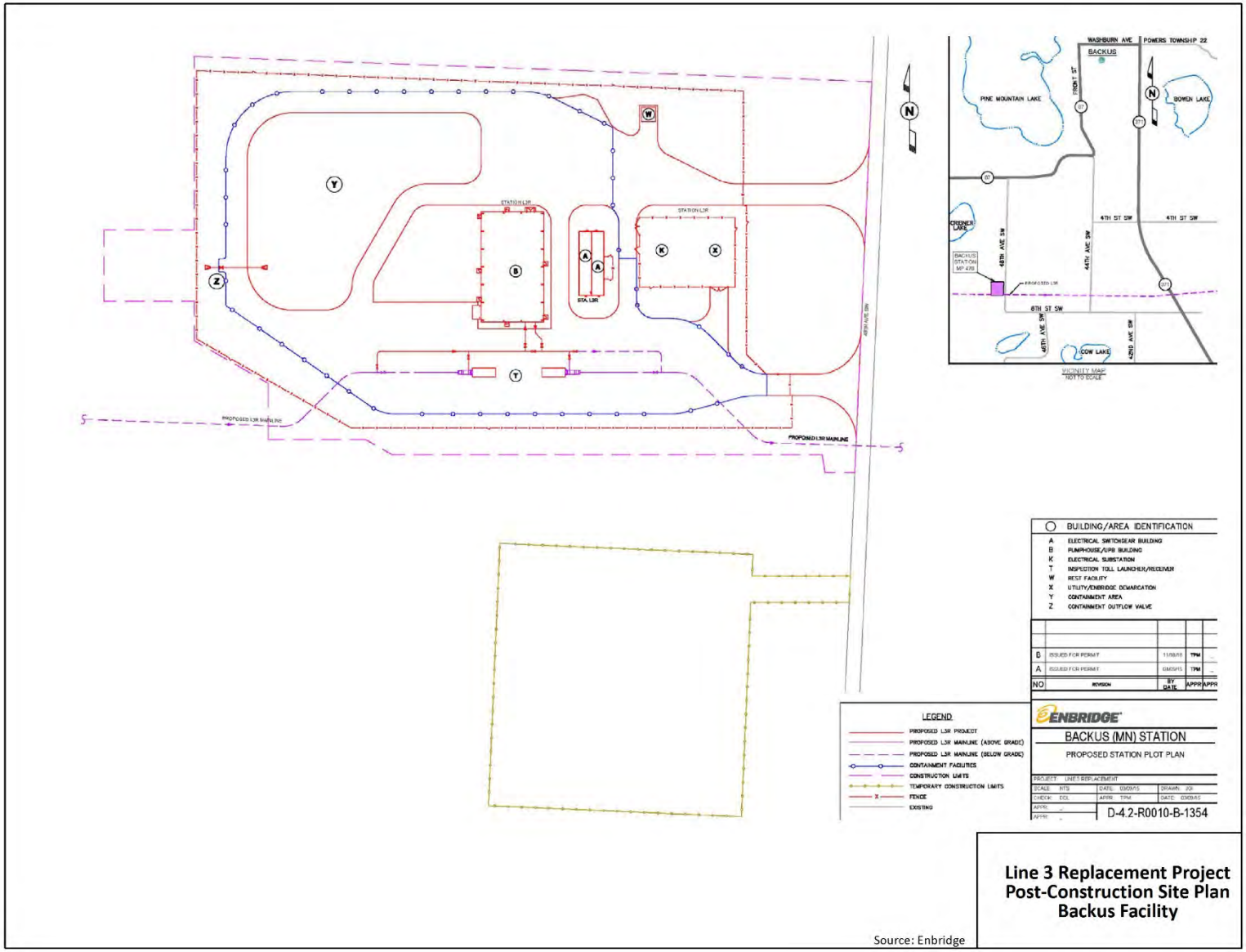

Source: Enbridge

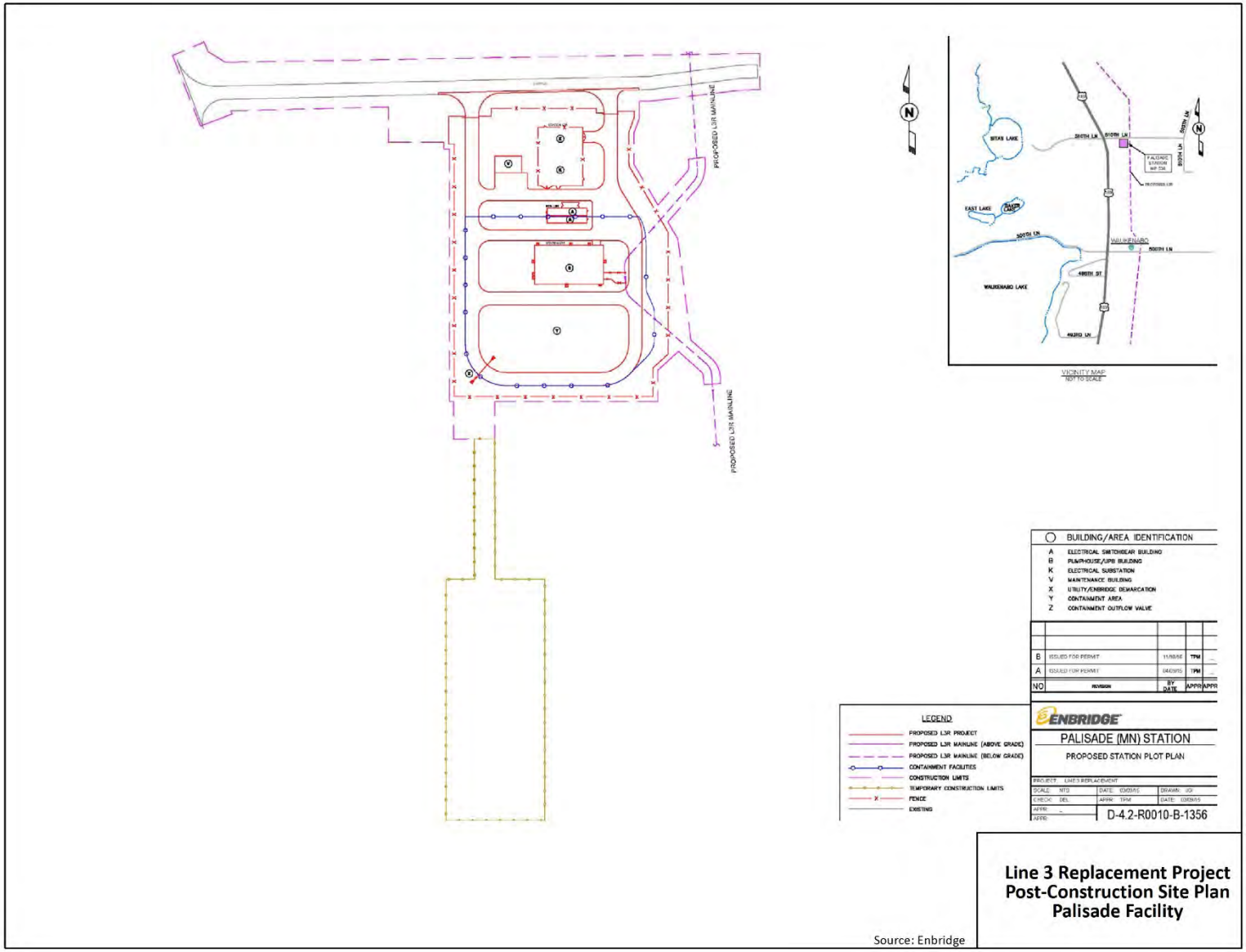

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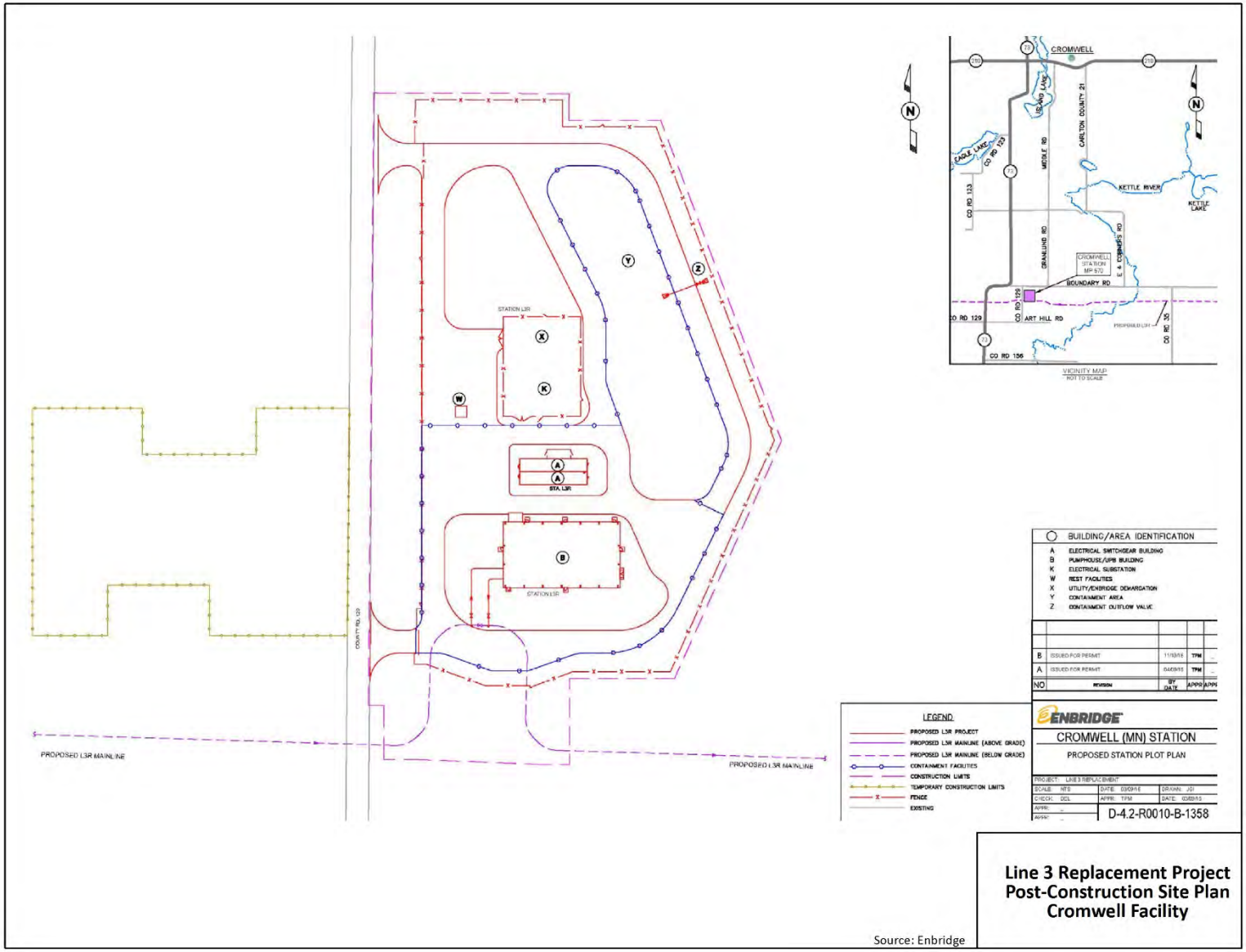

Source: Enbridge

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Appendix D

Access Roads Table

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Access Roads Table

This information was not previously submitted as part of the Enbridge Energy, Limited Partnership Application for a Pipeline Routing Permit on April 24, 2015. The Access Roads Table was provided in April 2016 and was published as part of the Environmental Assessment Worksheet.

Line 3 Project
Access Roads Table

County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Kittson	AR1005	802.0	field	new	no	TBD	Primary	TBD	MN-KI-23.0030220	0.0	0.0
Kittson	AR1005	802.0	field	new	no	TBD	Primary	Private	T-1028	1611.6	1.2
Kittson	AR1005	802.0	field	new	no	TBD	Primary	Private	T-1029	13.5	0.2
Kittson	AR1005	802.0	field	new	no	TBD	Primary	TBD	230100400	1.2	0.0
Kittson	AR1008	815.6	field	new	no	TBD	Primary	Private	T-993	0.0	0.0
Kittson	AR1008	815.6	field	new	no	TBD	Primary	County	T-993A	0.0	0.0
Kittson	AR1008	815.6	field	new	no	TBD	Primary	Private	T-994	264.7	0.1
Marshall	AR1009	817.8	gravel	existing	yes	TBD	Primary	Private	T-983	2496.5	1.7
Marshall	AR1011	828.1	gravel	existing	yes	TBD	Primary	Private	T-955	3457.3	2.4
Marshall	AR1012	828.3	field	new	no	TBD	Shoofly	Private	T-955	318.1	0.2
Marshall	AR1013	828.7	gravel/field	new/existing	partial	TBD	Primary	TBD	MN-MH-44-0094-000	326.9	0.2
Marshall	AR1013	828.7	gravel/field	new/existing	partial	TBD	Primary	TBD	MN-MH-44-0095-000	845.7	0.8
Marshall	AR1013	828.7	gravel/field	new/existing	partial	TBD	Primary	TBD	MN-MH-44-0102-000	1795.6	1.0
Marshall	AR1013	828.7	gravel/field	new/existing	partial	TBD	Primary	Private	T-952-1	2892.6	2.0
Marshall	AR1013	828.7	gravel/field	new/existing	partial	TBD	Primary	Private	T-954	0.0	0.0
Marshall	AR1014	828.8	field	new	no	TBD	Primary	Private	T-952-1	1033.9	0.7
Marshall	AR1015.7	835.8	Field	New	No	TBD	Primary	Private	T-932	425.4	0.3
Marshall	AR1016	835.8	gravel	existing	yes	TBD	Primary	Private	T-932	428.4	0.3
Marshall	AR1017	837.1	gravel/field	new/existing	no	TBD	Primary	Private	T-927	178.1	0.1
Marshall	AR1017	837.1	gravel/field	new/existing	no	TBD	Primary	Private	T-928	1361.9	0.9
Marshall	AR1017	837.1	gravel/field	new/existing	no	TBD	Primary	Private	T-929	1296.3	0.7
Marshall	AR1017	837.1	gravel/field	new/existing	no	TBD	Primary	TBD	MN-MH-17-0098-000	56.6	0.2
Marshall	AR1018	838.3	field	new	no	TBD	Primary	Private	T-925	307.1	0.2
Marshall	AR1019	838.5	field	new	no	TBD	Primary	Private	T-925	83.5	0.1
Marshall	AR1020	843.2	field	new	no	TBD	Primary	Private	T-909	1189.6	1.1
Marshall	AR1021	846.4	gravel/field	new/existing	partial	TBD	Primary	RR	T-0899-A	1052.5	0.7
Marshall	AR1021	846.4	gravel/field	new/existing	partial	TBD	Primary	Private	T-899	0.0	0.0
Marshall	AR1022	846.9	field	new	no	TBD	Primary	Private	T-896	84.8	0.1
Pennington	AR1023	853.9	field	new	no	TBD	Primary	Private	T-877	116.4	0.2
Pennington	AR1024	856.6	gravel	existing	yes	TBD	Primary	Private	T-864	464.4	0.3
Pennington	AR1024	856.6	gravel	existing	yes	TBD	Primary	Right of Way	ROW8055	63.3	0.1
Pennington	AR1025	856.8	gravel	existing	yes	TBD	Primary	Private	T-863A	348.0	0.2
Pennington	AR1025	856.8	gravel	existing	yes	TBD	Primary	Right of Way	ROW8055	56.3	0.0
Pennington	AR1026	858.7	field	new	no	TBD	Primary	Private	T-855	138.4	0.1
Pennington	AR1026	858.7	field	new	no	TBD	Primary	Private	T-856	0.0	0.0
Pennington	AR1027	859.3	gravel	existing	yes	TBD	Primary	Private	T-854	399.1	0.3
Pennington	AR1027.2	859.6	Gravel	Existing	No	TBD	Primary	Enbridge	T-852A	477.1	0.3
Pennington	AR1028	861.7	gravel	existing	yes	TBD	Primary	Private	T-846	0.0	0.0
Pennington	AR1028	861.7	gravel	existing	yes	TBD	Primary	Private	T-846A	335.8	0.2

Line 3 Project
Access Roads Table

County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Pennington	AR1029	861.9	gravel	existing	yes	TBD	Primary	Private	T-845B	390.0	0.3
Pennington	AR1031	862.8	gravel	existing	yes	TBD	Primary	Private	T-844	0.0	0.0
Pennington	AR1031	862.8	gravel	existing	yes	TBD	Primary	Private	T-844A	1841.8	1.3
Pennington	AR1032	863.8	field	new	no	TBD	Primary	Private	T-840A	966.5	0.5
Pennington	AR1032	863.8	field	new	no	TBD	Primary	Private	T-841	0.0	0.2
Pennington	AR1033	864.1	gravel	existing	yes	TBD	Primary	Private	T-840	14.4	0.0
Pennington	AR1033	864.1	gravel	existing	yes	TBD	Primary	Right of Way	ROW8077	172.9	0.1
Pennington	AR1035	864.9	field	new	no	TBD	Primary	Private	T-838	8.2	0.0
Pennington	AR1035	864.9	field	new	no	TBD	Primary	Private	T-838A	1604.7	1.1
Red Lake	AR1035.4	872.1	Gravel	Existing	No	TBD	Primary	Private	T-818	349.7	0.2
Red Lake	AR1036	875.3	field	new	no	TBD	Primary	Private	T-810	1517.5	1.0
Red Lake	AR1037	877.2	field	new	no	TBD	Primary	Private	T-805	581.8	0.4
Red Lake	AR1037	877.2	field	new	no	TBD	Primary	TBD	TBD	536.7	0.4
Red Lake	AR1037	877.2	field	new	no	TBD	Primary	Enbridge	T-805B	0.0	0.0
Red Lake	AR1038	885.7	field	new	no	TBD	Primary	Private	T-780	215.1	0.2
Red Lake	AR1038.1	885.8	field	new	no	TBD	Primary	City	T-778	195.2	0.1
Red Lake	AR1038.1	885.8	field	new	no	TBD	Primary	Right of Way	ROW8061	14.6	0.0
Red Lake	AR1039	886.0	gravel/field	new/existing	partial	TBD	Primary	Private	T-776	945.0	0.7
Red Lake	AR1040	886.6	gravel	existing	yes	TBD	Primary	Private	T-774	245.7	0.2
Red Lake	AR1040	886.6	gravel	existing	yes	TBD	Primary	Private	T-774D	108.8	0.1
Polk	AR1041	886.8	gravel	existing	yes	TBD	Primary	Private	T-773	323.7	0.2
Polk	AR1042	889.7	gravel	existing	yes	TBD	Primary	Private	T-766	54.2	0.0
Polk	AR1043	891.3	gravel	existing	yes	TBD	Primary	Private	T-761	0.0	0.0
Polk	AR1043	891.3	gravel	existing	yes	TBD	Primary	Private	T-761A	1214.0	0.9
Polk	AR1044	892.5	field	new	no	TBD	Primary	Private	T-758-1	886.5	0.6
Polk	AR1045	894.7	gravel	existing	yes	TBD	Primary	Private	T-752	1013.9	0.7
Polk	AR1045	894.7	gravel	existing	yes	TBD	Primary	Private	T-753	343.1	0.2
Polk	AR1045	894.7	gravel	existing	yes	TBD	Primary	Private	T-753A	114.9	0.1
Polk	AR1045.8	895.9	Gravel and Field	Existing	No	TBD	Shoofly	Private	T-747A	40.9	0.1
Polk	AR1045.8	895.9	Gravel and Field	Existing	No	TBD	Shoofly	Private	T-748	181.4	0.1
Polk	AR1045.8	895.9	Gravel and Field	Existing	No	TBD	Shoofly	Right of Way	ROW8058	100.0	0.1
Polk	AR1046	896.1	gravel	existing	yes	TBD	Primary	Private	T-747	181.8	0.1
Polk	AR1047	896.9	gravel	existing	yes	TBD	Primary	Private	T-745	22.9	0.0
Polk	AR1047	896.9	gravel	existing	yes	TBD	Primary	Private	T-745-A	559.6	0.4
Polk	AR1047	896.9	gravel	existing	yes	TBD	Primary	Right of Way	ROW8060	81.1	0.1
Polk	AR1048	897.0	field	new	no	TBD	Primary	Private	T-744	25.6	0.1
Polk	AR1048	897.0	field	new	no	TBD	Primary	Private	T-745-A	383.8	0.2
Polk	AR1048	897.0	field	new	no	TBD	Primary	Right of Way	ROW8060	255.8	0.2
Polk	AR1049	897.2	field	new	no	TBD	Primary	Private	T-744	453.2	0.3

Line 3 Project
Access Roads Table

County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Polk	AR1049	897.2	field	new	no	TBD	Primary	Right of Way	ROW8060	78.1	0.1
Polk	AR1050	898.5	field	new	no	TBD	Primary	Private	T-738	861.3	0.6
Clearwater	AR1051	900.6	field	new	no	TBD	Primary	Private	T-732	194.0	0.1
Clearwater	AR1051.2	900.9	Field	Existing	No	TBD	Primary	Private	T-731	863.1	0.6
Clearwater	AR1051.2	900.9	Field	Existing	No	TBD	Primary	Private	T-732	0.0	0.0
Clearwater	AR1052	902.8	field	new	no	TBD	Primary	Private	T-725	71.2	0.1
Clearwater	AR1053	903.0	field	new	no	TBD	Primary	Private	T-725	933.8	0.6
Clearwater	AR1054	903.9	field	new	no	TBD	Primary	Private	T-721	191.9	0.1
Clearwater	AR1055	903.9	gravel	existing	yes	TBD	Primary	Private	T-721	1161.0	0.8
Clearwater	AR292	906.1	Field	New	No	TBD	Primary	Private	MN-CL-015.300	1896.3	1.3
Clearwater	AR292	906.1	Field	New	No	TBD	Primary	Private	MN-CL-017.300	0.0	0.0
Clearwater	AR292	906.1	Field	New	No	TBD	Primary	Private	T-714A	118.9	0.1
Clearwater	AR292	906.1	Field	New	No	TBD	Primary	Private	T-716	527.4	0.4
Clearwater	AR292	906.1	Field	New	No	TBD	Primary	Private	T-716A	1829.0	1.3
Clearwater	AR292	906.1	Field	New	No	TBD	Primary	Private	T-717	0.0	0.0
Clearwater	AR293	906.8	Field	New	No	TBD	Primary	Private	T-712	2058.7	1.4
Clearwater	AR1058	908.1	field	new	no	TBD	Primary	Private	T-709	817.3	0.6
Clearwater	AR1060	910.1	field	new	no	TBD	Primary	Other Utility	T-708B	322.8	0.2
Clearwater	AR1059	910.3	field	new	no	TBD	Primary	Other Utility	T-708B	184.2	0.1
Clearwater	AR295	912.7	Gravel	Existing	Yes	TBD	Primary	Private	MN-CL-C5-005.000	389.6	0.3
Clearwater	AR296	913.0	Gravel	Existing	Yes	TBD	Primary	Private	MN-CL-C5-006.000	414.0	0.3
Clearwater	AR296.1	914.4	Gravel	Existing	Yes	TBD	Primary	Private	MN-CL-C5-011.000	908.1	0.4
Clearwater	AR296.1	914.4	Gravel	Existing	Yes	TBD	Primary	Private	MN-CL-C5-012.000	0.0	0.2
Clearwater	AR297	914.9	Field	New	No	TBD	Primary	Private	MN-CL-C5-013.000	1405.8	1.0
Clearwater	AR297.1	915.0	Field	New	No	TBD	Shoofly	Private	MN-CL-C5-013.000	178.4	0.1
Clearwater	AR298.1	916.0	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CL-C5-015.000	2494.7	1.7
Clearwater	AR299.1	916.8	Field	New and Existing	No	TBD	Shoofly	Private	MN-CL-C5-018.000	1697.5	1.2
Clearwater	AR300	917.0	Field	New	No	TBD	Primary	Private	MN-CL-C5-018.000	63.0	0.0
Clearwater	AR300	917.0	Field	New	No	TBD	Primary	Private	MN-CL-C5-018.210	2642.8	1.8
Clearwater	AR301	919.2	Field	New	No	TBD	Primary	Private	MN-CL-C5-026.200	83.2	0.1
Clearwater	AR301	919.2	Field	New	No	TBD	Primary	Private	MN-CL-C5-024.200	914.2	0.6
Clearwater	AR301	919.2	Field	New	No	TBD	Primary	Private	MN-CL-C5-025.000	742.7	0.5
Clearwater	AR301	919.2	Field	New	No	TBD	Primary	Private	MN-CL-C5-026.300	314.0	0.2
Clearwater	AR302	920.4	Field	New	No	TBD	Primary	Private	MN-CL-C5-030.000	706.8	0.5
Clearwater	AR303	921.1	Field	New	No	TBD	Primary	Private	MN-CL-C5-031.000	2273.6	1.6
Clearwater	AR303.1	922.0	Field	New	No	TBD	Primary	Private	MN-CL-C5-036.000	118.8	0.1
Clearwater	AR303.2	922.1	Field	New	No	TBD	Primary	Private	MN-CL-C5-036.000	544.5	0.4
Clearwater	AR304	922.1	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CL-C5-036.000	767.3	0.5
Clearwater	AR304	922.1	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CL-C5-037.000	0.0	0.0

Line 3 Project
Access Roads Table

County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Clearwater	AR305	925.3	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CL-C5-051.000	2619.4	1.8
Clearwater	AR305	925.3	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CL-C5-051.000	0.0	0.0
Clearwater	AR306	925.4	Field	New	No	TBD	Primary	Private	MN-CL-C5-051.000	2013.3	1.4
Clearwater	AR306	925.4	Field	New	No	TBD	Primary	Private	MN-CL-C5-051.000	0.0	0.0
Clearwater	AR306.1	927.3	Gravel	Existing	Yes	TBD	Primary	Private	MN-CL-C5-059.000	88.9	0.1
Clearwater	AR306.2	927.5	Gravel	Existing	Yes	TBD	Shoofly	Private	MN-CL-C5-059.000	86.8	0.1
Clearwater	AR306.2	927.5	Gravel	Existing	Yes	TBD	Shoofly	Enbridge	MN-CL-C5-060.000	586.7	0.3
Clearwater	AR306.3	927.8	Field	New	No	TBD	Shoofly	Private	MN-CL-C5-061.000	393.1	0.3
Clearwater	AR306.4	927.9	Field	New	No	TBD	Shoofly	Private	MN-CL-C5-062.000	380.4	0.3
Clearwater	AR307	928.1	Field	New	No	TBD	Primary	Private	MN-CL-C5-062.000	3167.0	2.2
Clearwater	AR308	928.9	Gravel	Existing	Yes	TBD	Primary	Private	MN-CL-C5-065.000	0.0	0.0
Clearwater	AR308	928.9	Gravel	Existing	Yes	TBD	Primary	Private	MN-CL-C5-066.000	770.6	0.5
Clearwater	AR308	928.9	Gravel	Existing	Yes	TBD	Primary	Private	MN-CL-C5-066.300	36.9	0.0
Clearwater	AR308.1	929.7	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CL-C5-069.000	2154.1	1.5
Clearwater	AR309	929.8	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CL-C5-071.000	990.6	0.7
Clearwater	AR309	929.8	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CL-C5-069.000	1364.4	0.5
Clearwater	AR309	929.8	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CL-R14.029.0400	0.0	0.4
Clearwater	AR309.2	930.8	Gravel and Field	New and Existing	No	TBD	Primary	County	MN-CL-C5-074.000	1764.2	1.2
Clearwater	AR309.2	930.8	Gravel and Field	New and Existing	No	TBD	Primary	Private	MN-CL-C5-074.100	1948.7	1.4
Clearwater	AR309.2	930.8	Gravel and Field	New and Existing	No	TBD	Primary	State	MN-CL-C5-074.200	201.4	0.1
Clearwater	AR309.2	930.8	Gravel and Field	New and Existing	No	TBD	Primary	State	MN-CL-C5-074.300	16.0	0.0
Clearwater	AR309.2	930.8	Gravel and Field	New and Existing	No	TBD	Primary	County	MN-CL-C5-074.000	0.0	0.0
Clearwater	AR309.1	930.8	Field	New	No	TBD	Primary	County	MN-CL-C5-074.000	92.9	0.1
Clearwater	AR309.3	930.9	Gravel	New	No	TBD	Primary	County	MN-CL-C5-074.000	732.2	0.5
Clearwater	AR309.3	930.9	Gravel	New	No	TBD	Primary	County	MN-CL-C5-074.000	0.0	0.0
Clearwater	AR310	931.8	Gravel and Field	Existing	No	TBD	Primary	Private	MN-CL-C5-075.000	852.7	0.6
Clearwater	AR310.05	932.7	Gravel	Existing	No	TBD	Primary	Private	MN-CL-C5-077.000	217.3	0.1
Clearwater	AR310.1	933.1	Field	New	No	TBD	Primary	Private	MN-CL-C5-078.000	578.8	0.4
Clearwater	AR311	934.7	Gravel	Existing	No	TBD	Primary	Private	MN-CL-C5-085.000	1364.9	0.9
Clearwater	AR311.1	937.6	Field	New	No	TBD	Primary	Private	MN-CL-C5-097.000	108.4	0.1
Clearwater	AR311.2	937.7	Gravel	Existing	No	TBD	Primary	Private	MN-CL-C5-097.000	76.1	0.1
Clearwater	AR312	938.2	Field	Existing	No	TBD	Primary	State	MN-CL-C5-100.000	3238.8	2.1
Clearwater	AR312	938.2	Field	Existing	No	TBD	Primary	County	MN-CL-C5-099.000	0.0	0.1
Clearwater	AR313	938.4	Field	Existing	No	TBD	Primary	State	MN-CL-C5-100.000	3120.4	2.1
Clearwater	AR313	938.4	Field	Existing	No	TBD	Primary	State	MN-CL-C5-100.000	0.0	0.0
Clearwater	AR314	938.7	Field	New and Existing	No	TBD	Primary	State	MN-CL-C5-100.000	1233.1	0.9
Clearwater	AR314	938.7	Field	New and Existing	No	TBD	Primary	State	MN-CL-C5-100.000	0.0	0.0
Clearwater	AR314.1	939.0	Field	New	No	TBD	Shoofly	Private	MN-CL-C5-102.000	233.2	0.2
Clearwater	AR315	940.2	Field	New and Existing	No	TBD	Primary	Private	MN-CL-C5-106.000	1666.2	1.1

Line 3 Project
Access Roads Table

County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Clearwater	AR315	940.2	Field	New and Existing	No	TBD	Primary	Private	MN-CL-C5-107.000	148.4	0.1
Clearwater	AR316	940.5	Gravel	Existing	No	TBD	Primary	Private	MN-CL-C5-111.000	0.0	0.0
Clearwater	AR316	940.5	Gravel	Existing	No	TBD	Primary	Private	MN-CL-C5-108.300	25.4	0.0
Clearwater	AR316	940.5	Gravel	Existing	No	TBD	Primary	Other Utility	MN-CL-C5-109.000	478.6	0.3
Clearwater	AR317	942.1	Gravel	Existing	No	TBD	Primary	Private	MN-CL-C5-119.300	0.0	0.3
Clearwater	AR317	942.1	Gravel	Existing	No	TBD	Primary	Private	MN-CL-C5-119.301	675.2	0.5
Clearwater	AR317	942.1	Gravel	Existing	No	TBD	Primary	Private	MN-CL-C5-122.300	1824.4	0.9
Hubbard	AR319	944.0	Field	Existing	No	TBD	Primary	County	MN-HU-C5-006.000	1279.6	0.9
Hubbard	AR320	944.6	Gravel and Field	Existing	No	TBD	Primary	County	MN-HU-C5-009.000	328.5	0.2
Hubbard	AR321	945.0	Field	Existing	No	TBD	Primary	Private	MN-HU-C5-011.000	1344.5	0.9
Hubbard	AR321	945.0	Field	Existing	No	TBD	Primary	Private	MN-HU-C5-012.000	163.3	0.1
Hubbard	AR322	946.4	Field	New and Existing	No	TBD	Primary	Private	MN-HU-C5-016.000	24.1	0.0
Hubbard	AR322	946.4	Field	New and Existing	No	TBD	Primary	Private	MN-HU-C5-017.000	362.4	0.2
Hubbard	AR322	946.4	Field	New and Existing	No	TBD	Primary	Private	MN-HU-C5-017.200	564.9	0.4
Hubbard	AR323	947.4	Field	Existing	No	TBD	Primary	County	MN-HU-C5-023.000	833.3	0.6
Hubbard	AR324.1	950.3	Field	New	No	TBD	Shoofly	County	MN-HU-C5-037.000	443.1	0.3
Hubbard	AR324.11	950.4	Field	New	No	TBD	Primary	County	MN-HU-C5-037.000	316.4	0.2
Hubbard	AR324.2	950.4	Field	New	No	TBD	Shoofly	County	MN-HU-C5-037.000	445.9	0.3
Hubbard	AR324.2	950.4	Field	New	No	TBD	Shoofly	County	MN-HU-C5-037.000	94.5	0.1
Hubbard	AR324.3	950.5	Field	New	No	TBD	Shoofly	County	MN-HU-C5-037.000	287.6	0.2
Hubbard	AR324.3	950.5	Field	New	No	TBD	Shoofly	County	MN-HU-C5-037.000	94.6	0.1
Hubbard	AR324.31	950.6	Field	New	No	TBD	Primary	County	MN-HU-C5-038.000	577.8	0.4
Hubbard	AR324.4	950.8	Field	New	No	TBD	Shoofly	County	MN-HU-C5-038.000	480.6	0.3
Hubbard	AR325	950.9	Gravel and Field	New and Existing	No	TBD	Primary	County	MN-HU-C5-038.000	655.9	0.5
Hubbard	AR325.01	951.0	Field	New	No	TBD	Shoofly	County	MN-HU-C5-039.000	153.0	0.1
Hubbard	AR325.01	951.0	Field	New	No	TBD	Shoofly	County	MN-HU-C5-038.000	345.2	0.2
Hubbard	AR325.020	951.2	Gravel	New	No	TBD	Primary	County	MN-HU-C5-039.000	1411.2	1.0
Hubbard	AR325.020	951.2	Gravel	New	No	TBD	Primary	TBD	15.38.03300	511.3	0.4
Hubbard	AR325.020	951.2	Gravel	New	No	TBD	Primary	County	MN-HU-C5-039.000	30.9	0.0
Hubbard	AR325.02	951.3	Field	New	No	TBD	Shoofly	County	MN-HU-C5-039.000	383.6	0.3
Hubbard	AR325.0211	951.4	Field	New	No	TBD	Shoofly	County	MN-HU-C5-039.000	118.4	0.1
Hubbard	AR325.0211	951.4	Field	New	No	TBD	Shoofly	County	MN-HU-C5-039.000	0.0	0.0
Hubbard	AR325.03	951.5	Field	New	No	TBD	Shoofly	County	MN-HU-C5-039.000	502.3	0.3
Hubbard	AR325.03	951.5	Field	New	No	TBD	Shoofly	County	MN-HU-C5-039.000	9.0	0.0
Hubbard	AR325.021	951.5	Field	New	No	TBD	Primary	County	MN-HU-C5-039.000	1133.1	0.8
Hubbard	AR325.021	951.5	Field	New	No	TBD	Primary	County	MN-HU-C5-040.000	48.4	0.0
Hubbard	AR325.021	951.5	Field	New	No	TBD	Primary	County	MN-HU-C5-039.000	0.0	0.0
Hubbard	AR325.012	951.5	Gravel	New and Existing	Partial	TBD	Shoofly	County	MN-HU-C5-039.000	2226.4	1.5
Hubbard	AR325.012	951.5	Gravel	New and Existing	Partial	TBD	Shoofly	County	MN-HU-C5-040.000	139.4	0.1

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County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Hubbard	AR325.012	951.5	Gravel	New and Existing	Partial	TBD	Shoofly	County	MN-HU-C5-041.200	1098.8	0.8
Hubbard	AR325.012	951.5	Gravel	New and Existing	Partial	TBD	Shoofly	State	MN-HU-C5-040.200	2061.8	1.4
Hubbard	AR325.012	951.5	Gravel	New and Existing	Partial	TBD	Shoofly	State	MN-HU-C5-041.300	307.6	0.2
Hubbard	AR325.012	951.5	Gravel	New and Existing	Partial	TBD	Shoofly	County	MN-HU-C5-039.000	30.9	0.0
Hubbard	AR325.04	951.5	Field	New	No	TBD	Shoofly	County	MN-HU-C5-039.000	245.0	0.2
Hubbard	AR325.04	951.5	Field	New	No	TBD	Shoofly	County	MN-HU-C5-040.000	92.5	0.1
Hubbard	AR325.04	951.5	Field	New	No	TBD	Shoofly	County	MN-HU-C5-039.000	7.7	0.0
Hubbard	AR325.1	952.0	Gravel	Existing	No	TBD	Shoofly	State	MN-HU-C5-041.000	5.9	0.0
Hubbard	AR325.1	952.0	Gravel	Existing	No	TBD	Shoofly	County	MN-HU-C5-041.200	1344.5	0.9
Hubbard	AR325.1	952.0	Gravel	Existing	No	TBD	Shoofly	County	MN-HU-C5-042.000	304.3	0.2
Hubbard	AR325.1	952.0	Gravel	Existing	No	TBD	Shoofly	County	MN-HU-C5-042.200	776.9	0.5
Hubbard	AR325.2	952.0	Field	New	No	TBD	Shoofly	State	MN-HU-C5-041.000	308.7	0.2
Hubbard	AR325.2	952.0	Field	New	No	TBD	Shoofly	State	MN-HU-C5-041.000	0.0	0.0
Hubbard	AR325.3	952.1	Field	New	No	TBD	Shoofly	State	MN-HU-C5-041.000	161.0	0.1
Hubbard	AR325.3	952.1	Field	New	No	TBD	Shoofly	County	MN-HU-C5-042.000	342.0	0.2
Hubbard	AR325.3	952.1	Field	New	No	TBD	Shoofly	State	MN-HU-C5-041.000	3.1	0.0
Hubbard	AR326.1	952.3	Field	New	No	TBD	Shoofly	County	MN-HU-C5-043.000	354.5	0.2
Hubbard	AR326.10	952.3	Field	New	No	TBD	Shoofly	County	MN-HU-C5-043.000	650.8	0.4
Hubbard	AR328	955.7	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-HU-C5-058.000	1116.9	0.8
Hubbard	AR329	956.6	Field	New	No	TBD	Primary	Private	MN-HU-C5-062.000	1314.1	0.9
Hubbard	AR330	957.6	Gravel and Field	Existing	No	TBD	Primary	Private	MN-HU-C5-067.320	102.2	0.1
Hubbard	AR330	957.6	Gravel and Field	Existing	No	TBD	Primary	Private	MN-HU-C5-068.000	614.8	0.4
Hubbard	AR330	957.6	Gravel and Field	Existing	No	TBD	Primary	Private	MN-HU-C5-068.300	315.5	0.2
Hubbard	AR330	957.6	Gravel and Field	Existing	No	TBD	Primary	Private	MN-HU-C5-067.310	1269.7	0.9
Hubbard	AR330.1	959.0	Field	New	No	TBD	Shoofly	Private	MN-HU-C5-073.000	816.0	0.6
Hubbard	AR330.1	959.0	Field	New	No	TBD	Shoofly	Private	MN-HU-C5-074.000	87.6	0.1
Hubbard	AR330.1	959.0	Field	New	No	TBD	Shoofly	Private	MN-HU-C5-074.000	0.0	0.0
Hubbard	AR330.4	959.1	Gravel and Field	New and Existing	No	TBD	Primary	Private	MN-HU-C5-073.310	194.1	0.1
Hubbard	AR330.4	959.1	Gravel and Field	New and Existing	No	TBD	Primary	Private	MN-HU-C5-073.000	34.4	0.0
Hubbard	AR330.4	959.1	Gravel and Field	New and Existing	No	TBD	Primary	Private	MN-HU-C5-074.000	336.9	0.2
Hubbard	AR330.4	959.1	Gravel and Field	New and Existing	No	TBD	Primary	Private	MN-HU-C5-074.300	20.4	0.0
Hubbard	AR330.4	959.1	Gravel and Field	New and Existing	No	TBD	Primary	Private	MN-HU-C5-074.000	0.0	0.0
Hubbard	AR331	959.2	Field	New	No	TBD	Primary	Private	MN-HU-C5-074.000	26.8	0.0
Hubbard	AR331	959.2	Field	New	No	TBD	Primary	Private	MN-HU-C5-074.300	0.1	0.0
Hubbard	AR332	959.4	Field	New	No	TBD	Primary	Private	MN-HU-C5-076.000	109.5	0.1
Hubbard	AR332.1	959.5	Field	Existing	No	TBD	Primary	Enbridge	MN-HU-C5-077.000	140.7	0.1
Hubbard	AR335	961.8	Gravel	Existing	No	TBD	Primary	Private	MN-HU-C5-086.000	934.6	0.6
Hubbard	AR335.1	962.6	Field	New	No	TBD	Shoofly	Private	MN-HU-C5-089.000	300.3	0.2
Hubbard	AR335.4	964.2	Field	New	No	TBD	Shoofly	County	MN-HU-C5-095.210	604.5	0.4

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County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Hubbard	AR335.4	964.2	Field	New	No	TBD	Shoofly	Private	MN-HU-C5-098.000	156.4	0.1
Hubbard	AR335.3	964.2	Field	New	No	TBD	Shoofly	County	MN-HU-C5-095.000	346.8	0.2
Hubbard	AR335.3	964.2	Field	New	No	TBD	Shoofly	County	MN-HU-C5-096.000	13.7	0.0
Hubbard	AR336	964.4	Gravel and Field	Existing	No	TBD	Primary	Private	MN-HU-C5-098.000	1259.9	0.9
Hubbard	AR337	966.7	Field	New and Existing	No	TBD	Primary	Private	MN-HU-C5-106.000	420.2	0.3
Hubbard	AR338.2	968.0	Field	Existing	No	TBD	Primary	Private	MN-HU-C5-112.000	0.0	0.1
Hubbard	AR338.2	968.0	Field	Existing	No	TBD	Primary	Private	MN-HU-C5-110.000	1325.3	0.8
Hubbard	AR338.2	968.0	Field	Existing	No	TBD	Primary	Private	MN-HU-C5-111.000	0.0	0.1
Hubbard	AR338.3	969.2	Field	Existing	No	TBD	Primary	Private	MN-HU-C5-117.000	553.3	0.4
Hubbard	AR339	969.9	Field	New	No	TBD	Primary	Private	MN-HU-C5-118.000	386.9	0.2
Hubbard	AR339	969.9	Field	New	No	TBD	Primary	Private	MN-HU-C5-119.000	0.0	0.1
Hubbard	AR339.01	972.2	Field	New	No	TBD	Shoofly	Private	MN-HU-C5-126.000	374.6	0.3
Hubbard	AR341	974.2	Field	New	No	TBD	Primary	Commercial	MN-HU-C5-135.000	214.7	0.2
Hubbard	AR341	974.2	Field	New	No	TBD	Primary	Commercial	MN-HU-C5-136.000	628.2	0.4
Hubbard	AR342	974.7	Field	New	No	TBD	Primary	Private	MN-HU-C5-140.000	0.0	0.0
Hubbard	AR342	974.7	Field	New	No	TBD	Primary	Private	MN-HU-C5-139.000	921.1	0.5
Hubbard	AR342	974.7	Field	New	No	TBD	Primary	Private	MN-HU-C5-140.300	0.0	0.1
Hubbard	AR343	976.4	Field	New	No	TBD	Shoofly	Commercial	MN-HU-C5-151.000	1000.2	0.7
Hubbard	AR343.1	976.5	Field	New	No	TBD	Primary	Commercial	MN-HU-C5-150.000	157.9	0.1
Hubbard	AR344	977.1	Gravel	Existing	Yes	TBD	Primary	Private	MN-HU-C5-157.000	1199.4	0.8
Hubbard	AR345	977.9	Field	New	No	TBD	Primary	Private	MN-HU-C5-160.300	982.5	0.8
Hubbard	AR345	977.9	Field	New	No	TBD	Primary	Commercial	MN-HU-C5-160.000	299.8	0.2
Hubbard	AR345	977.9	Field	New	No	TBD	Primary	Private	MN-HU-C5-160.310	337.9	0.2
Hubbard	AR345.1	978.2	Field	New	No	TBD	Shoofly	Private	MN-HU-C5-161.000	398.4	0.3
Hubbard	AR345.2	978.7	Field	New	No	TBD	Primary	State	MN-HU-C5-165.000	22.4	0.0
Hubbard	AR345.2	978.7	Field	New	No	TBD	Primary	RR	MN-HU-C5-167.000	337.7	0.2
Hubbard	AR345.2	978.7	Field	New	No	TBD	Primary	County	MN-HU-C5-165.300	32.2	0.0
Hubbard	AR345.2	978.7	Field	New	No	TBD	Primary	Private	MN-HU-C5-166.000	0.0	0.0
Hubbard	AR345.2	978.7	Field	New	No	TBD	Primary	Private	MN-HU-C5-168.000	108.0	0.1
Hubbard	AR346	979.6	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-HU-C5-172.000	807.3	0.6
Hubbard	AR346	979.6	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-HU-C5-172.210	0.0	0.0
Hubbard	AR346	979.6	Gravel and Field	New and Existing	Partial	TBD	Primary	County	MN-HU-C5-173.000	1832.4	1.3
Hubbard	AR347	980.3	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-HU-C5-174.000	521.8	0.4
Hubbard	AR347	980.3	Gravel and Field	New and Existing	Partial	TBD	Primary	State	MN-HU-C5-175.100	1422.5	1.0
Hubbard	AR347	980.3	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-HU-C5-175.300	46.1	0.0
Hubbard	AR348.1	981.6	Gravel and Field	New and Existing	Partial	TBD	Primary	State	MN-HU-C5-178.000	427.5	0.2
Hubbard	AR348.1	981.6	Gravel and Field	New and Existing	Partial	TBD	Primary	County	MN-HU-C5-178.200	45.3	0.1
Hubbard	AR348.1	981.6	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-HU-C5-179.000	165.6	0.1
Hubbard	AR348.1	981.6	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-HU-C5-179.200	0.0	0.0

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County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Hubbard	AR348.12	981.8	Gravel	Existing	No	TBD	Primary	Private	MN-HU-C5-179.000	96.3	0.1
Hubbard	AR348.12	981.8	Gravel	Existing	No	TBD	Primary	Private	MN-HU-C5-179.220	31.3	0.0
Hubbard	AR348.2	984.0	Field	New	No	TBD	Shoofly	Private	MN-HU-C5-184.000	901.0	0.6
Hubbard	AR349	984.3	Field	New	No	TBD	Primary	Private	MN-HU-C5-185.000	21.7	0.2
Hubbard	AR349	984.3	Field	New	No	TBD	Primary	Private	MN-HU-C5-185.100	1306.5	0.8
Hubbard	AR349	984.3	Field	New	No	TBD	Primary	Private	MN-HU-C5-186.000	1140.5	0.7
Hubbard	AR350	985.3	Field	New	No	TBD	Primary	Private	MN-HU-C5-189.000	0.0	0.1
Hubbard	AR350	985.3	Field	New	No	TBD	Primary	Private	MN-HU-C5-190.000	2581.9	1.7
Hubbard	AR350.21	986.7	Field	New	No	TBD	Primary	Private	MN-HU-C5-193.200	507.9	0.4
Hubbard	AR350.21	986.7	Field	New	No	TBD	Primary	Private	MN-HU-C5-193.000	502.8	0.3
Hubbard	AR350.3	986.8	Field	New	No	TBD	Primary	Private	MN-HU-C5-193.000	513.3	0.2
Hubbard	AR350.3	986.8	Field	New	No	TBD	Primary	Private	MN-HU-C5-193.300	0.0	0.1
Wadena	AR350.5	990.4	Field	New	No	TBD	Primary	County	MN-WA-009.000	40.8	0.1
Wadena	AR350.5	990.4	Field	New	No	TBD	Primary	Commercial	MN-WA-010.000	1290.4	0.9
Wadena	AR351.1	990.9	Gravel and Field	New and Existing	Partial	TBD	Primary	Commercial	MN-WA-010.000	116.4	0.2
Wadena	AR351.1	990.9	Gravel and Field	New and Existing	Partial	TBD	Primary	Commercial	MN-WA-011.000	1073.7	0.6
Wadena	AR351.3	991.4	Gravel and Field	New and Existing	Partial	TBD	Primary	State	MN-WA-010.100	0.0	0.1
Wadena	AR351.3	991.4	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-WA-013.000	214.7	0.1
Wadena	AR351.3	991.4	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-WA-014.000	738.0	0.4
Wadena	AR351.3	991.4	Gravel and Field	New and Existing	Partial	TBD	Primary	County	MN-WA-015.000	1418.3	0.9
Wadena	AR351.3	991.4	Gravel and Field	New and Existing	Partial	TBD	Primary	County	MN-WA-015.000	0.0	0.0
Wadena	AR351.4	991.6	Gravel and Field	New and Existing	Partial	TBD	Primary	County	MN-WA-015.000	1664.4	1.1
Wadena	AR351.4	991.6	Gravel and Field	New and Existing	Partial	TBD	Primary	County	MN-WA-015.000	0.0	0.0
Wadena	AR353.3	992.5	Field	New	No	TBD	Primary	County	MN-WA-017.000	350.7	0.3
Wadena	AR353.3	992.5	Field	New	No	TBD	Primary	Private	MN-WA-017.300	429.8	0.2
Hubbard	AR353.4	993.6	Gravel and Field	New and Existing	No	TBD	Shoofly	County	MN-WA-017.000	44.3	0.0
Hubbard	AR353.4	993.6	Gravel and Field	New and Existing	No	TBD	Shoofly	County	MN-WA-019.300	3234.3	2.2
Hubbard	AR353.4	993.6	Gravel and Field	New and Existing	No	TBD	Shoofly	Private	MN-WA-020.000	157.6	0.1
Hubbard	AR353.4	993.6	Gravel and Field	New and Existing	No	TBD	Shoofly	Private	MN-WA-020.300	66.9	0.0
Hubbard	AR353.4	993.6	Gravel and Field	New and Existing	No	TBD	Shoofly	County	MN-WA-018.000	2180.7	1.5
Wadena	AR354.3	994.2	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-WA-020.000	3370.8	2.2
Wadena	AR354.3	994.2	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-WA-020.200	0.0	0.1
Cass	AR355.2	995.5	Field	New	No	TBD	Primary	Private	MN-CA-C5-001.520	846.2	0.5
Cass	AR355.2	995.5	Field	New	No	TBD	Primary	Private	MN-CA-C5-001.520.300	0.0	0.0
Cass	AR357	997.3	Gravel	Existing	Yes	TBD	Primary	State	MN-CA-C5-007.200	97.3	0.1
Cass	AR357	997.3	Gravel	Existing	Yes	TBD	Primary	State	MN-CA-C5-009.200	0.0	0.1
Cass	AR357	997.3	Gravel	Existing	Yes	TBD	Primary	State	MN-HU-C5-225.200	870.7	0.5
Cass	AR357	997.3	Gravel	Existing	Yes	TBD	Primary	County	MN-CA-C5-006.000	6562.9	4.3
Cass	AR357	997.3	Gravel	Existing	Yes	TBD	Primary	Private	MN-CA-C5-009.300	35.3	0.3

Line 3 Project
Access Roads Table

County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Cass	AR357	997.3	Gravel	Existing	Yes	TBD	Primary	County	MN-HU-C5-225.100	0.0	0.0
Cass	AR358	998.1	Field	New	No	TBD	Shoofly	Private	MN-CA-C5-010.000	719.9	0.5
Cass	AR358.1	998.3	Field	New	No	TBD	Primary	Private	MN-CA-C5-010.000	1718.0	1.2
Cass	AR358.2	998.5	Field	New	No	TBD	Primary	Private	MN-CA-C5-010.000	125.6	0.1
Cass	AR359	999.0	Field	New	No	TBD	Primary	Commercial	MN-CA-C5-011.000	1189.7	0.8
Cass	AR360	1000.0	Field	New	No	TBD	Primary	Private	MN-CA-C5-013.000	110.1	0.2
Cass	AR360	1000.0	Field	New	No	TBD	Primary	Private	MN-CA-C5-014.000	835.0	0.4
Cass	AR361	1002.2	Gravel	Existing	Yes	TBD	Primary	County	MN-CA-C5-018.000	6224.1	4.3
Cass	AR361	1002.2	Gravel	Existing	Yes	TBD	Primary	County	MN-CA-C5-019.000	1263.6	0.9
Cass	AR361	1002.2	Gravel	Existing	Yes	TBD	Primary	State	MN-CA-C5-020.000	1674.7	1.2
Cass	AR360.1	1002.2	Gravel and Field	New and Existing	No	TBD	Shoofly	County	MN-CA-C5-019.000	837.3	0.6
Cass	AR361.01	1003.5	Field	New	No	TBD	Shoofly	State	MN-CA-C5-020.000	503.1	0.3
Cass	AR361.001	1003.5	Field	New	No	TBD	Shoofly	State	MN-CA-C5-020.000	357.3	0.2
Cass	AR361.1	1004.4	Field	New	No	TBD	Shoofly	State	MN-CA-C5-021.000	3116.3	2.1
Cass	AR361.3	1007.1	Field	New	No	TBD	Primary	Private	MN-CA-C5-027.000	1225.9	0.8
Cass	AR361.4	1008.9	Field	New	No	TBD	Primary	Private	MN-CA-C5-039.000	1295.1	0.9
Cass	AR362.1	1013.6	Gravel and Field	New	No	TBD	Primary	Private	MN-CA-C5-059.310	0.0	0.0
Cass	AR362.1	1013.6	Gravel and Field	New	No	TBD	Primary	Private	MN-CA-C5-059.320	0.0	0.1
Cass	AR362.1	1013.6	Gravel and Field	New	No	TBD	Primary	County	MN-CA-C5-060.000	623.9	0.4
Cass	AR362.1	1013.6	Gravel and Field	New	No	TBD	Primary	Private	MN-CA-C5-060.100	941.4	0.5
Cass	AR362.1	1013.6	Gravel and Field	New	No	TBD	Primary	County	MN-CA-C5-060.200	150.7	0.1
Cass	AR362.1	1013.6	Gravel and Field	New	No	TBD	Primary	State	MN-CA-C5-060.300	1385.4	1.0
Cass	AR362.12	1014.8	Gravel	Existing	No	TBD	Primary	Private	MN-CA-C5-066.200	149.7	0.1
Cass	AR362.12	1014.8	Gravel	Existing	No	TBD	Primary	Private	MN-CA-C5-066.000	156.2	0.1
Crow Wing	AR364	1016.6	Field	New	No	TBD	Primary	Private	MN-CW-C5-005.000	1069.2	0.7
Crow Wing	AR364	1016.6	Field	New	No	TBD	Primary	Private	MN-CW-C5-005.000	0.0	0.0
Crow Wing	AR364.1	1016.6	Field	New	No	TBD	Primary	Private	MN-CW-C5-005.000	122.9	0.1
Crow Wing	AR364.1	1016.6	Field	New	No	TBD	Primary	Private	MN-CW-C5-005.000	0.0	0.0
Crow Wing	AR364.11	1016.7	Field	New	No	TBD	Shoofly	Private	MN-CW-C5-005.000	799.5	0.6
Crow Wing	AR364.11	1016.7	Field	New	No	TBD	Shoofly	Private	MN-CW-C5-006.000	293.5	0.2
Crow Wing	AR364.11	1016.7	Field	New	No	TBD	Shoofly	Private	MN-CW-C5-005.300	522.8	0.4
Crow Wing	AR365	1017.2	Gravel	Existing	Yes	TBD	Primary	Private	MN-CW-C5-009.000	1062.7	0.7
Crow Wing	AR366	1017.9	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CW-C5-012.000	804.8	0.6
Crow Wing	AR366	1017.9	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CW-C5-013.000	0.0	0.0
Crow Wing	AR366	1017.9	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CW-C5-011.000	44.1	0.0
Crow Wing	AR366	1017.9	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CW-C5-011.210	24.9	0.0
Crow Wing	AR366.1	1019.6	Field	New	No	TBD	Shoofly	County	MN-CW-C5-021.000	299.9	0.2
Crow Wing	AR366.1	1019.6	Field	New	No	TBD	Shoofly	County	MN-CW-C5-023.000	245.8	0.2
Crow Wing	AR366.1	1019.6	Field	New	No	TBD	Shoofly	State	MN-CW-C5-021.200	298.3	0.2

Line 3 Project
Access Roads Table

County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Cass	AR367	1020.5	Field	New	No	TBD	Primary	Private	MN-CA-C5-072.100	1397.2	1.0
Cass	AR367	1020.5	Field	New	No	TBD	Primary	Private	MN-CA-C5-072.200	1067.4	0.7
Cass	AR367	1020.5	Field	New	No	TBD	Primary	Private	MN-CA-C5-072.300	204.5	0.1
Cass	AR367	1020.5	Field	New	No	TBD	Primary	County	MN-CA-C5-073.000	94.6	0.1
Cass	AR367	1020.5	Field	New	No	TBD	Primary	County	MN-CA-C5-072.000	1435.3	1.0
Cass	AR368	1021.7	Field	New	No	TBD	Primary	County	MN-CA-C5-077.000	203.5	0.1
Cass	AR368	1021.7	Field	New	No	TBD	Primary	County	MN-CA-C5-078.000	1594.4	1.1
Cass	AR368.01	1023.0	Field	New	No	TBD	Primary	Private	MN-CA-C5-085.000	1084.8	0.7
Cass	AR368.01	1023.0	Field	New	No	TBD	Primary	Private	MN-CA-C5-085.100	371.7	0.3
Cass	AR368.01	1023.0	Field	New	No	TBD	Primary	Private	MN-CA-C5-084.504	9.9	0.0
Cass	AR372	1024.7	Field	New	No	TBD	Primary	Private	MN-CA-C5-091.000	1479.1	1.0
Cass	AR372	1024.7	Field	New	No	TBD	Primary	Private	MN-CA-C5-091.300	126.5	0.1
Cass	AR373	1024.9	Field	New	No	TBD	Primary	Private	MN-CA-C5-093.000	621.4	0.4
Cass	AR373	1024.9	Field	New	No	TBD	Primary	Private	MN-CA-C5-092.000	1005.0	0.7
Cass	AR374	1025.6	Field	New	No	TBD	Primary	County	MN-CA-C5-095.000	1056.6	0.7
Cass	AR375	1026.3	Field	New	No	TBD	Primary	County	MN-CA-C5-097.000	626.3	0.4
Cass	AR376	1026.4	Field	New	No	TBD	Primary	County	MN-CA-C5-099.000	94.5	0.1
Cass	AR376.1	1027.1	Field	New	No	TBD	Primary	County	MN-CA-C5-104.000	124.1	0.1
Cass	AR376.1	1027.1	Field	New	No	TBD	Primary	County	MN-CA-C5-101.200	216.3	0.1
Cass	AR378	1027.7	Field	New	No	TBD	Primary	County	MN-CA-C5-106.000	0.0	0.0
Cass	AR378	1027.7	Field	New	No	TBD	Primary	County	MN-CA-C5-105.000	0.0	0.0
Cass	AR378	1027.7	Field	New	No	TBD	Primary	County	MN-CA-C5-107.000	47.4	0.0
Cass	AR378	1027.7	Field	New	No	TBD	Primary	State	MN-CA-C5-107.300	2.4	0.0
Cass	AR379	1028.2	Field	New	No	TBD	Primary	County	MN-CA-C5-108.000	123.4	0.1
Cass	AR379	1028.2	Field	New	No	TBD	Primary	County	MN-CA-C5-109.000	141.7	0.1
Cass	AR380	1028.6	Field	New	No	TBD	Primary	County	MN-CA-C5-110.000	290.8	0.2
Cass	AR381	1029.4	Field	New	No	TBD	Primary	County	MN-CA-C5-113.000	540.7	0.4
Cass	AR382	1030.0	Field	New	No	TBD	Primary	County	MN-CA-C5-116.000	260.8	0.2
Cass	AR383	1030.9	Field	New	No	TBD	Primary	County	MN-CA-C5-119.200	143.5	0.1
Cass	AR384	1031.3	Field	New	No	TBD	Shoofly	County	MN-CA-C5-121.200	113.7	0.1
Cass	AR385	1032.6	Field	New	No	TBD	Primary	County	MN-CA-C5-126.000	16.2	0.0
Cass	AR385	1032.6	Field	New	No	TBD	Primary	County	MN-CA-C5-126.200	145.5	0.1
Cass	AR386	1032.9	Field	New	No	TBD	Primary	County	MN-CA-C5-127.000	372.3	0.3
Cass	AR388	1034.3	Gravel	Existing	Yes	TBD	Primary	Private	MN-CA-C5-12-446-0102	0.0	0.0
Cass	AR388	1034.3	Gravel	Existing	Yes	TBD	Primary	Private	MN-CA-C5-133.100	614.3	0.4
Cass	AR388	1034.3	Gravel	Existing	Yes	TBD	Primary	County	MN-CA-C5-133.000	29.5	0.0
Cass	AR388	1034.3	Gravel	Existing	Yes	TBD	Primary	County	MN-CA-C5-134.000	1452.2	1.0
Cass	AR388	1034.3	Gravel	Existing	Yes	TBD	Primary	County	MN-CA-C5-135.000	12.6	0.0

Line 3 Project
Access Roads Table

County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Cass	AR387.1	1034.5	Field	New	No	TBD	Primary	County	MN-CA-C5-134.000	245.0	0.2
Cass	AR387.1	1034.5	Field	New	No	TBD	Primary	County	MN-CA-C5-135.000	29.5	0.0
Cass	AR389	1035.3	Gravel and Field	New and Existing	Partial	TBD	Shoofly	County	MN-CA-C5-138.000	1043.3	0.7
Cass	AR389.2	1035.8	Gravel and Field	New and Existing	Partial	TBD	Shoofly	County	MN-CA-C5-139.000	665.2	0.5
Cass	AR389.2	1035.8	Gravel and Field	New and Existing	Partial	TBD	Shoofly	County	MN-CA-C5-140.000	1294.6	0.9
Cass	AR389.2	1035.8	Gravel and Field	New and Existing	Partial	TBD	Shoofly	Private	MN-CA-C5-141.000	51.9	0.0
Cass	AR391	1036.4	Gravel	New and Existing	Partial	TBD	Primary	County	MN-CA-C5-143.000	838.5	0.6
Cass	AR391	1036.4	Gravel	New and Existing	Partial	TBD	Primary	County	MN-CA-C5-142.000	167.0	0.1
Cass	AR391.1	1039.3	Field	New	No	TBD	Shoofly	State	MN-CA-C5-155.000	967.8	0.7
Cass	AR391.1	1039.3	Field	New	No	TBD	Shoofly	State	MN-CA-C5-153.000	134.9	0.1
Cass	AR391.2	1039.5	Field	New	No	TBD	Shoofly	State	MN-CA-C5-155.000	503.1	0.3
Cass	AR391.3	1039.7	Field	New	No	TBD	Shoofly	State	MN-CA-C5-155.000	1822.6	1.2
Cass	AR391.4	1040.1	Field	Existing	No	TBD	Shoofly	State	MN-CA-C5-155.000	1403.3	1.0
Cass	AR391.4	1040.1	Field	Existing	No	TBD	Shoofly	State	MN-CA-C5-156.000	838.2	0.6
Cass	AR392	1040.3	Gravel	Existing	Yes	TBD	Primary	State	MN-CA-C5-156.000	1519.7	1.0
Cass	AR392	1040.3	Gravel	Existing	Yes	TBD	Primary	State	MN-CA-C5-156.100	1359.1	0.9
Cass	AR392	1040.3	Gravel	Existing	Yes	TBD	Primary	State	MN-CA-C5-156.400	1408.2	1.0
Cass	AR392	1040.3	Gravel	Existing	Yes	TBD	Primary	Private	MN-CA-C5-156.500	193.5	0.1
Cass	AR392	1040.3	Gravel	Existing	Yes	TBD	Primary	State	MN-CA-C5-156.200	1454.3	1.0
Cass	AR392	1040.3	Gravel	Existing	Yes	TBD	Primary	State	MN-CA-C5-156.300	1071.1	0.7
Cass	AR392	1040.3	Gravel	Existing	Yes	TBD	Primary	Private	MN-CA-C5-156.600	67.1	0.0
Cass	AR393	1040.8	Gravel	Existing	Yes	TBD	Primary	Private	MN-CA-C5-158.300	386.9	0.2
Cass	AR393	1040.8	Gravel	Existing	Yes	TBD	Primary	Private	MN-CA-C5-158.800	1096.9	0.5
Cass	AR393	1040.8	Gravel	Existing	Yes	TBD	Primary	Private	MN-CA-C5-158.810	0.0	0.0
Cass	AR393	1040.8	Gravel	Existing	Yes	TBD	Primary	Private	MN-CA-C5-158.910	103.4	0.1
Cass	AR393	1040.8	Gravel	Existing	Yes	TBD	Primary	State	MN-CA-C5-158.100	1343.0	0.9
Cass	AR393	1040.8	Gravel	Existing	Yes	TBD	Primary	Private	MN-CA-C5-158.400	634.3	0.5
Cass	AR393	1040.8	Gravel	Existing	Yes	TBD	Primary	Private	MN-CA-C5-158.500	338.2	0.2
Cass	AR393	1040.8	Gravel	Existing	Yes	TBD	Primary	Private	MN-CA-C5-158.600	1380.3	0.9
Cass	AR393	1040.8	Gravel	Existing	Yes	TBD	Primary	Private	MN-CA-C5-158.700	0.0	0.1
Cass	AR393	1040.8	Gravel	Existing	Yes	TBD	Primary	Private	MN-CA-C5-156.600	1377.7	0.9
Cass	AR393	1040.8	Gravel	Existing	Yes	TBD	Primary	Private	MN-CA-C5-158.900	223.8	0.4
Cass	AR393.2	1040.9	Field	New	No	TBD	Primary	State	MN-CA-C5-156.000	263.9	0.2
Cass	AR393.1	1041.0	Gravel and Field	Existing	No	TBD	Shoofly	State	MN-CA-C5-156.000	2641.7	1.8
Cass	AR393.1	1041.0	Gravel and Field	Existing	No	TBD	Shoofly	State	MN-CA-C5-157.000	178.8	0.1
Cass	AR394	1041.1	Field	New	No	TBD	Primary	State	MN-CA-C5-157.000	1875.2	1.3
Cass	AR394	1041.1	Field	New	No	TBD	Primary	State	MN-CA-C5-157.100	772.1	0.5
Cass	AR394	1041.1	Field	New	No	TBD	Primary	State	MN-CA-C5-157.200	483.6	0.4
Cass	AR394	1041.1	Field	New	No	TBD	Primary	State	MN-CA-C5-157.400	1809.8	1.2

Line 3 Project
Access Roads Table

County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Cass	AR394	1041.1	Field	New	No	TBD	Primary	State	MN-CA-C5-157.500	564.5	0.4
Cass	AR394	1041.1	Field	New	No	TBD	Primary	State	MN-CA-C5-157.600	1664.6	1.1
Cass	AR394	1041.1	Field	New	No	TBD	Primary	Private	MN-CA-C5-156.600	139.4	0.1
Cass	AR394.2	1042.1	Field	New	No	TBD	Primary	State	MN-CA-C5-157.000	470.0	0.3
Cass	AR394.2	1042.1	Field	New	No	TBD	Primary	State	MN-CA-C5-157.000	0.0	0.0
Cass	AR394.1	1042.2	Gravel and Field	Existing	No	TBD	Shoofly	State	MN-CA-C5-157.000	6903.7	4.7
Cass	AR394.1	1042.2	Gravel and Field	Existing	No	TBD	Shoofly	State	MN-CA-C5-158.000	601.5	0.4
Cass	AR394.1	1042.2	Gravel and Field	Existing	No	TBD	Shoofly	State	MN-CA-C5-158.200	1468.9	1.0
Cass	AR394.1	1042.2	Gravel and Field	Existing	No	TBD	Shoofly	State	MN-CA-C5-161.000	480.0	0.3
Cass	AR394.1	1042.2	Gravel and Field	Existing	No	TBD	Shoofly	State	MN-CA-C5-157.000	0.0	0.0
Cass	AR394.6	1043.4	Field	New	No	TBD	Shoofly	State	MN-CA-C5-162.000	783.6	0.5
Cass	AR394.6	1043.4	Field	New	No	TBD	Shoofly	State	MN-CA-C5-161.000	873.2	0.6
Aitkin	AR397	1047.8	Gravel	Existing	Yes	TBD	Primary	County	MN-AI-C5-004.000	2245.4	1.5
Aitkin	AR397.1	1048.6	Field	New	No	TBD	Primary	Private	MN-AI-C5-006.000	1302.7	0.9
Aitkin	AR398	1048.8	Field	New	No	TBD	Primary	Private	MN-AI-C5-007.000	779.7	0.5
Aitkin	AR398	1048.8	Field	New	No	TBD	Primary	Private	MN-AI-C5-008.000	53.1	0.1
Aitkin	AR399	1049.1	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-AI-C5-008.000	582.1	0.4
Aitkin	AR400	1051.2	Gravel	Existing	Yes	TBD	Primary	Private	MN-AI-C5-025.200	1457.9	1.0
Aitkin	AR400	1051.2	Gravel	Existing	Yes	TBD	Primary	Private	MN-AI-C5-023.000	1235.3	0.8
Aitkin	AR401.1	1052.1	Field	New	No	TBD	Primary	Private	MN-AI-2C5-028.000	180.1	0.1
Aitkin	AR402	1052.3	Field	New	No	TBD	Primary	Private	MN-AI-2C5-029.000	626.2	0.4
Aitkin	AR403	1053.0	Field	New	No	TBD	Primary	State	MN-AI-2C5-032.000	1191.8	0.8
Aitkin	AR404	1054.4	Field	New	No	TBD	Primary	State	MN-AI-2C5-036.000	941.8	0.6
Aitkin	AR406	1055.0	Field	New	No	TBD	Primary	State	MN-AI-2C5-036.000	295.7	0.2
Aitkin	AR408	1056.6	Field	New	No	TBD	Primary	State	MN-AI-2C5-037.000	0.0	0.0
Aitkin	AR408	1056.6	Field	New	No	TBD	Primary	State	MN-AI-2C5-038.000	192.3	0.1
Aitkin	AR408	1056.6	Field	New	No	TBD	Primary	Private	MN-AI-2C5-039.000	1515.6	1.0
Aitkin	AR408	1056.6	Field	New	No	TBD	Primary	Private	MN-AI-2C5-041.300	1287.4	0.9
Aitkin	AR408	1056.6	Field	New	No	TBD	Primary	Private	MN-AI-2C5-041.400	351.8	0.2
Aitkin	AR408	1056.6	Field	New	No	TBD	Primary	State	MN-AI-2C5-041.500	33.4	0.0
Aitkin	AR408	1056.6	Field	New	No	TBD	Primary	State	MN-AI-2C5-041.600	20.6	0.0
Aitkin	AR408	1056.6	Field	New	No	TBD	Primary	Private	MN-AI-2C5-041.200	812.1	0.6
Aitkin	AR408.1	1058.3	Field	New	No	TBD	Primary	Private	MN-AI-2C5-050.000	39.3	0.0
Aitkin	AR410	1058.7	Field	New	No	TBD	Primary	Private	MN-AI-2C5-053.000	1167.2	0.8
Aitkin	AR411	1061.5	Field	New	No	TBD	Primary	Private	MN-AI-2C5-069.000	754.0	0.5
Aitkin	AR412	1062.6	Field	New	No	TBD	Primary	Private	MN-AI-2C5-075.000	164.2	0.1
Aitkin	AR412	1062.6	Field	New	No	TBD	Primary	Private	MN-AI-2C5-075.300	1059.4	0.7
Aitkin	AR412.1	1064.2	Field	New	No	TBD	Primary	Private	MN-AI-2C5-084.000	495.2	0.3
Aitkin	AR412.2	1064.2	Field	New	No	TBD	Primary	Private	MN-AI-2C5-085.000	1089.6	0.8

Line 3 Project
Access Roads Table

County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Aitkin	AR413	1064.6	Field	New	No	TBD	Primary	State	MN-AI-2C5-087.500	340.2	0.2
Aitkin	AR413	1064.6	Field	New	No	TBD	Primary	Private	MN-AI-2C5-087.000	1329.2	1.0
Aitkin	AR414	1064.7	Field	New	No	TBD	Primary	State	MN-AI-2C5-087.502	909.2	0.6
Aitkin	AR414	1064.7	Field	New	No	TBD	Primary	Private	MN-AI-2C5-087.000	263.2	0.2
Aitkin	AR414	1064.7	Field	New	No	TBD	Primary	Private	MN-AI-2C5-088.000	1784.6	1.2
Aitkin	AR414.2	1065.9	Field	New	No	TBD	Primary	Private	MN-AI-2C5-087.506	559.6	0.4
Aitkin	AR415	1067.1	Field	New	No	TBD	Primary	Private	MN-AI-2C5-102.000	1736.0	1.2
Aitkin	AR415	1067.1	Field	New	No	TBD	Primary	Private	MN-AI-2C5-102.000	0.0	0.0
Aitkin	AR415.1	1067.2	Gravel	Existing	No	TBD	Primary	Private	MN-AI-2C5-102.000	177.3	0.1
Aitkin	AR415.1	1067.2	Gravel	Existing	No	TBD	Primary	Private	MN-AI-2C5-102.000	0.0	0.0
Aitkin	AR416	1068.4	Field	New	No	TBD	Primary	Private	MN-AI-2C5-106.300	1279.2	0.9
Aitkin	AR417	1070.6	Gravel	Existing	Yes	TBD	Primary	County	MN-AI-C5-163.100	587.0	0.4
Aitkin	AR417	1070.6	Gravel	Existing	Yes	TBD	Primary	County	MN-AI-C5-163.200	621.2	0.4
Aitkin	AR417	1070.6	Gravel	Existing	Yes	TBD	Primary	County	MN-AI-C5-164.000	1259.5	0.9
Aitkin	AR417	1070.6	Gravel	Existing	Yes	TBD	Primary	County	MN-AI-C5-166.200	732.0	0.5
Aitkin	AR417	1070.6	Gravel	Existing	Yes	TBD	Primary	County	MN-AI-C5-167.200	1001.8	0.7
Aitkin	AR417	1070.6	Gravel	Existing	Yes	TBD	Primary	County	MN-AI-C5-168.200	602.4	0.4
Aitkin	AR417.01	1074.0	Field	New	No	TBD	Primary	Private	MN-AI-2C5-121.200	1373.7	0.9
Aitkin	AR417.1	1074.6	Field	New	No	TBD	Primary	Private	MN-AI-2C5-121.200.515	1284.0	0.9
Aitkin	AR418	1075.5	Field	New	No	TBD	Primary	Private	MN-AI-2C5-121.200.540	1900.5	1.4
Aitkin	AR418	1075.5	Field	New	No	TBD	Primary	Private	MN-AI-2C5-121.200.545	0.0	0.0
Aitkin	AR418	1075.5	Field	New	No	TBD	Primary	TBD	MN-AI-C5-121.200.550	1325.7	0.7
Aitkin	AR418	1075.5	Field	New	No	TBD	Primary	TBD	MN-AI-C5-121.200.555	277.2	0.4
Aitkin	AR419	1080.2	Field	New	No	TBD	Primary	Private	MN-AI-2C5-137.000	276.2	0.2
Aitkin	AR420	1082.3	Gravel	Existing	Yes	TBD	Primary	Private	MN-AI-2C5-147.000	2290.5	1.6
Aitkin	AR420	1082.3	Gravel	Existing	Yes	TBD	Primary	Private	MN-AI-2C5-146.000	804.1	0.6
Aitkin	AR421	1085.7	Gravel	Existing	Yes	TBD	Primary	Private	MN-AI-2C5-156.000	136.6	0.1
Aitkin	AR422	1086.2	Field	New	No	TBD	Primary	Private	MN-AI-2C5-159.000	0.0	0.0
Aitkin	AR422	1086.2	Field	New	No	TBD	Primary	Private	MN-AI-2C5-160.000	25.1	0.0
Aitkin	AR423	1086.6	Field	New	No	TBD	Primary	Private	MN-AI-2C5-161.000	28.4	0.0
Aitkin	AR424	1086.8	Field	New	No	TBD	Primary	Private	MN-AI-2C5-162.000	32.6	0.0
Aitkin	AR425	1087.0	Field	New	No	TBD	Primary	Private	MN-AI-2C5-162.000	20.7	0.0
Aitkin	AR425	1087.0	Field	New	No	TBD	Primary	State	MN-AI-2C5-163.000	2.2	0.0
Aitkin	AR426	1087.3	Field	New	No	TBD	Primary	State	MN-AI-2C5-163.000	24.5	0.0
Aitkin	AR427	1090.3	Gravel	Existing	Yes	TBD	Primary	County	MN-AI-C5-290.000	1127.7	0.5
Aitkin	AR427	1090.3	Gravel	Existing	Yes	TBD	Primary	Private	MN-AI-C5-290.100	1340.2	0.6

Line 3 Project
Access Roads Table

County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Aitkin	AR427	1090.3	Gravel	Existing	Yes	TBD	Primary	Private	MN-AI-C5-290.200	22.2	0.0
Aitkin	AR427	1090.3	Gravel	Existing	Yes	TBD	Primary	County	MN-AI-C5-294.000	0.0	0.3
Aitkin	AR427	1090.3	Gravel	Existing	Yes	TBD	Primary	Private	MN-AI-C5-294.100	0.0	0.3
Aitkin	AR427	1090.3	Gravel	Existing	Yes	TBD	Primary	Private	MN-AI-C5-294.200	0.0	0.0
Aitkin	AR428	1091.4	Field	New	No	TBD	Primary	Private	MN-AI-C5-300.000	0.0	0.1
Aitkin	AR428	1091.4	Field	New	No	TBD	Primary	Private	MN-AI-C5-298.300	986.7	0.6
Aitkin	AR429	1092.8	Field	New	No	TBD	Primary	Private	MN-AI-C5-306.300	735.3	0.5
Aitkin	AR429	1092.8	Field	New	No	TBD	Primary	Private	MN-AI-C5-307.300	664.2	0.5
Aitkin	AR429	1092.8	Field	New	No	TBD	Primary	Private	MN-AI-C5-306.000	4.2	0.0
Aitkin	AR431	1093.7	Gravel	Existing	Yes	TBD	Primary	Private	MN-AI-C5-310.000	335.3	0.2
Aitkin	AR431	1093.7	Gravel	Existing	Yes	TBD	Primary	Private	MN-AI-C5-310.300	277.1	0.2
Aitkin	AR431.41	1097.4	Gravel and Field	New	No	TBD	Primary	County	MN-AI-C5-321.300	3272.9	2.3
Aitkin	AR431.41	1097.4	Gravel and Field	New	No	TBD	Primary	State	MN-AI-C5-321.400	7806.6	5.4
Aitkin	AR431.41	1097.4	Gravel and Field	New	No	TBD	Primary	State	MN-AI-C5-321.600	3597.3	2.5
Aitkin	AR431.41	1097.4	Gravel and Field	New	No	TBD	Primary	State	MN-AI-C5-321.500	4234.9	2.9
Aitkin	AR431.41	1097.4	Gravel and Field	New	No	TBD	Primary	Private	MN-AI-C5-321.800	0.0	0.0
Aitkin	AR431.41	1097.4	Gravel and Field	New	No	TBD	Primary	State	MN-AI-C5-321.601	13.8	0.0
Aitkin	AR431.41	1097.4	Gravel and Field	New	No	TBD	Primary	State	MN-AI-C5-321.801	0.0	0.0
Carlton	AR431.6	1099.9	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-C6-006.700	655.5	0.5
Carlton	AR431.6	1099.9	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-C6-006.800	351.9	0.2
Carlton	AR431.6	1099.9	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-C6-006.700	488.3	0.3
Carlton	AR431.6	1099.9	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-C6-006.800	1164.9	0.8
Carlton	AR431.61	1100.0	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-C6-006.700	915.3	0.6
Carlton	AR431.61	1100.0	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-C6-006.800	124.5	0.1
Carlton	AR431.61	1100.0	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-C6-006.700	488.3	0.3
Carlton	AR431.61	1100.0	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-C6-006.800	1166.4	0.8
Carlton	AR433.1	1102.0	Gravel	Existing	Yes	TBD	Primary	Private	MN-CR-C6-011.100	109.3	0.1
Carlton	AR433.1	1102.0	Gravel	Existing	Yes	TBD	Primary	Private	MN-CR-C6-011.200	0.0	0.0
Carlton	AR433.2	1102.3	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-C5-001.510.300	863.5	0.6
Carlton	AR434	1103.0	Gravel	Existing	Yes	TBD	Primary	County	MN-CR-C5-001.514	5.7	0.0
Carlton	AR434	1103.0	Gravel	Existing	Yes	TBD	Primary	Private	MN-CR-C5-015.300	0.0	0.0
Carlton	AR434	1103.0	Gravel	Existing	Yes	TBD	Primary	Private	MN-CR-C5-016.300	1539.3	1.1
Carlton	AR434	1103.0	Gravel	Existing	Yes	TBD	Primary	Private	MN-CR-C5-001.512	1317.2	0.9
Carlton	AR434	1103.0	Gravel	Existing	Yes	TBD	Primary	Private	MN-CR-C5-014.310	1385.1	1.0
Carlton	AR434	1103.0	Gravel	Existing	Yes	TBD	Primary	Private	MN-CR-C5-017.300	1118.2	0.8
Carlton	AR434.1	1103.6	Gravel	Existing	Yes	TBD	Shoofly	State	MN-CR-C5-019.300	800.4	0.6
Carlton	AR434.1	1103.6	Gravel	Existing	Yes	TBD	Shoofly	Private	MN-CR-C5-017.300	449.0	0.3
Carlton	AR434.1	1103.6	Gravel	Existing	Yes	TBD	Shoofly	Private	MN-CR-C5-018.300	1590.4	1.1
Carlton	AR434.1	1103.6	Gravel	Existing	Yes	TBD	Shoofly	County	MN-CR-C5-019.000	80.6	0.1

Line 3 Project
Access Roads Table

County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Carlton	AR435	1105.7	Field	New	No	TBD	Primary	County	MN-CR-C5-026.000	1064.7	0.7
Carlton	AR435	1105.7	Field	New	No	TBD	Primary	Private	90-010-5650	0.9	0.0
Carlton	AR436.05	1107.1	Gravel and Field	New and Existing	Partial	TBD	Primary	State	MN-CR-C5-037.000	381.1	0.3
Carlton	AR436.05	1107.1	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-C5-038.000	666.4	0.5
Carlton	AR436.05	1107.1	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-C5-039.000	33.2	0.0
Carlton	AR436.1	1108.8	Field	New	No	TBD	Primary	Private	MN-CR-C5-047.000	268.6	0.2
Carlton	AR436.1	1108.8	Field	New	No	TBD	Primary	Private	MN-CR-C5-046.000	61.0	0.0
Carlton	AR436.1	1108.8	Field	New	No	TBD	Primary	Private	MN-CR-C5-047.200	1404.7	1.0
Carlton	AR436.2	1109.4	Field	New	No	TBD	Primary	County	MN-CR-C5-049.000	0.0	0.0
Carlton	AR436.2	1109.4	Field	New	No	TBD	Primary	Private	MN-CR-C5-049.200	1009.3	0.7
Carlton	AR436.2	1109.4	Field	New	No	TBD	Primary	Private	MN-CR-C5-049.210	917.5	0.6
Carlton	AR436.2	1109.4	Field	New	No	TBD	Primary	County	MN-CR-C5-050.000	25.7	0.0
Carlton	AR436.2	1109.4	Field	New	No	TBD	Primary	State	MN-CR-C5-050.200	28.0	0.0
Carlton	AR438	1110.5	Gravel	Existing	Yes	TBD	Primary	Private	MN-CR-C5-054.000	0.0	0.2
Carlton	AR438	1110.5	Gravel	Existing	Yes	TBD	Primary	Private	MN-CR-C5-056.000	1242.7	0.6
Carlton	AR439	1113.0	Field	New	No	TBD	Primary	Private	MN-CR-C5-068.000	973.2	0.5
Carlton	AR439	1113.0	Field	New	No	TBD	Primary	Private	MN-CR-C5-069.000	0.0	0.2
Carlton	AR440	1113.5	Field	New	No	TBD	Primary	Private	MN-CR-C5-071.000	959.2	0.7
Carlton	AR441	1114.2	Field	New	No	TBD	Primary	Private	MN-CR-C5-075.000	944.1	0.6
Carlton	AR441	1114.2	Field	New	No	TBD	Primary	Private	MN-CR-C5-075.000	0.1	0.0
Carlton	AR441.1	1114.2	Field	New	No	TBD	Primary	Private	MN-CR-C5-075.000	478.3	0.3
Carlton	AR441.1	1114.2	Field	New	No	TBD	Primary	Private	MN-CR-C5-075.000	0.1	0.0
Carlton	AR441.2	1114.7	Field	New	No	TBD	Primary	Private	MN-CR-C5-077.000	976.2	0.7
Carlton	AR443	1116.3	Gravel	Existing	Yes	TBD	Primary	Private	MN-CR-C5-088.000	938.5	0.6
Carlton	AR444	1116.8	Field	New	No	TBD	Primary	Private	MN-CR-C5-089.000	171.3	0.1
Carlton	AR444	1116.8	Field	New	No	TBD	Primary	Private	MN-CR-C5-090.000	1483.3	1.0
Carlton	AR445	1117.4	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-C5-092.000	1362.6	0.9
Carlton	AR446	1118.8	Gravel	Existing	Yes	TBD	Primary	Private	MN-CR-C5-098.200	426.3	0.3
Carlton	AR446	1118.8	Gravel	Existing	Yes	TBD	Primary	Private	MN-CR-C5-098.000	664.1	0.3
Carlton	AR446	1118.8	Gravel	Existing	Yes	TBD	Primary	Private	MN-CR-C5-099.000	16.0	0.2
Carlton	AR447	1122.6	Field	New	No	TBD	Primary	Private	MN-CR-R51-012.300	1489.7	1.0
Carlton	AR447	1122.6	Field	New	No	TBD	Primary	Private	MN-CR-R51-012.000	981.6	0.7
Carlton	AR449.2	1123.8	Gravel and Field	New and Existing	No	TBD	Primary	Private	MN-CR-R51-010.603.300	351.5	0.2
Carlton	AR449.2	1123.8	Gravel and Field	New and Existing	No	TBD	Primary	Private	MN-CR-R51-010.603.400	216.5	0.1
Carlton	AR450	1125.5	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-R51-010.615	260.9	0.2
Carlton	AR450	1125.5	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-R51-010.613.300	1063.6	0.7

Line 3 Project
Access Roads Table

County	Access Road ID	MP	Surface Type	Road Status	Permanent	Improvements	Road Class	Ownership	Tract Number	Length (feet)	Acres
Carlton	AR450	1125.5	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-R51-010.613.400	1819.2	1.3
Carlton	AR452.1	1128.4	Field	New	No	TBD	Primary	Private	MN-CR-C5-161.200	1927.2	1.3
Carlton	AR452.1	1128.4	Field	New	No	TBD	Primary	Private	MN-CR-R51-010.633	972.7	0.7
Carlton	AR453	1129.1	Field	New	No	TBD	Primary	Private	MN-CR-C5-167.000	654.8	0.4
Carlton	AR453	1129.1	Field	New	No	TBD	Primary	Private	MN-CR-C5-167.300	437.1	0.4
Carlton	AR453	1129.1	Field	New	No	TBD	Primary	Private	MN-CR-C5-168.000	1140.1	0.7
Carlton	AR453	1129.1	Field	New	No	TBD	Primary	Other Utility	MN-CR-C5-169.000	0.0	0.1
Carlton	AR453.1	1138.1	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-159.000	346.7	0.2
Carlton	AR453.1	1138.1	Gravel and Field	New and Existing	Partial	TBD	Primary	Private	MN-CR-159.200	17.3	0.0
Carlton	AR453.1	1138.1	Gravel and Field	New and Existing	Partial	TBD	Primary	Enbridge	MN-CR-158.000	628.3	0.4
Carlton	AR453.2	1138.9	Gravel	Existing	Yes	TBD	Primary	Enbridge	MN-CR-162.000	490.3	0.3
Carlton	AR454	1139.3	Gravel	Existing	Yes	TBD	Primary	RR	MN-CR-164.900RR	531.4	0.4
Cass	AR394.1	TBD	TBD	TBD	TBD	TBD	Shoofly	TBD	TBD	0.0	1.0
Hubbard	AR325.020	TBD	TBD	TBD	TBD	TBD	Primary	TBD	TBD	0.0	0.0
Aitkin	AR398	TBD	TBD	TBD	TBD	TBD	Primary	TBD	TBD	0.0	0.0
Aitkin	AR417	TBD	TBD	TBD	TBD	TBD	Primary	TBD	TBD	0.0	0.0
Polk	AR1043	TBD	TBD	TBD	TBD	TBD	Primary	TBD	TBD	0.0	0.0
Red Lake	AR1039	TBD	TBD	TBD	TBD	TBD	Primary	TBD	TBD	0.0	0.0
Pennington	AR1032	TBD	TBD	TBD	TBD	TBD	Primary	TBD	TBD	0.0	0.1
Cass	AR388	TBD	TBD	TBD	TBD	TBD	Primary	TBD	TBD	0.0	0.5

Appendix E

Enbridge Environmental Protection Plan

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Environmental Protection Plan

This EPP updates the EPP submitted as Appendix E of the Enbridge Energy, Limited Partnership's Application for a Pipeline Routing Permit on April 24, 2015.

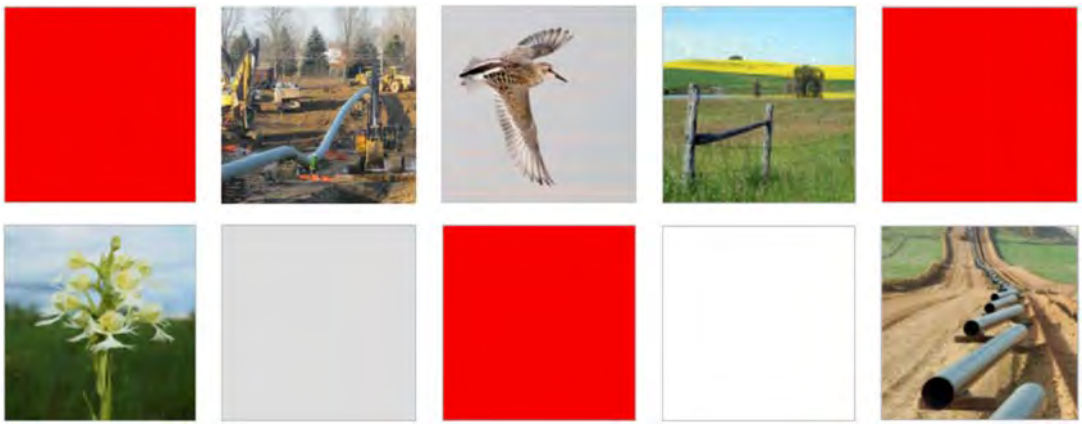

Enbridge

ENVIRONMENTAL PROTECTION PLAN

September 2015

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INTRODUCTION

This Environmental Protection Plan ("EPP") outlines construction-related environmental policies, procedures, and protection measures Enbridge developed as a baseline for construction. This EPP was developed based on Enbridge's experience implementing Best Management Practices ("BMPs") during construction as well as the Federal Energy Regulatory Commission's ("FERC's") Upland Erosion Control, Revegetation, and Maintenance Plan (May 2013 Version) and Wetland and Waterbody Construction and Mitigation Procedures (May 2013 Version). It is intended to meet or exceed federal, state, tribal, and local environmental protection and erosion control requirements, specifications and practices. The EPP is designed to address typical circumstances that may be encountered along the Project. Project-specific permit conditions and/or landowner agreements may supersede the general practices described in this document.

This document includes the following sections:

- Section 1.0 describes general mitigation measures, including soil erosion and sedimentation control procedures, to be implemented during upland construction and upland restoration;
- Section 2.0 describes stream and river construction, crossing, and restoration;
- Section 3.0 describes practices for wetland construction, crossings, and restoration;
- Section 4.0 describes highway, road, and rail crossings;
- Section 5.0 describes construction dewatering;
- Section 6.0 outlines water appropriation practices;
- Section 7.0 addresses revegetation measures;
- Section 8.0 addresses winter construction issues;
- Section 9.0 addresses waste management issues;
- Section 10.0 addresses construction equipment-related spill prevention, containment and controls; and
- Section 11.0 addresses containment, response, and notification procedures for inadvertent releases of drilling fluid.

Alternative construction procedures implemented in lieu of this EPP will provide an equal or greater level of protection to the environment, and will be approved in writing by Enbridge.

Unless otherwise specified, the construction Contractor ("Contractor") is responsible for implementing the requirements of this EPP.

Enbridge will provide appropriate construction oversight to confirm and document compliance with the measures of this EPP and requirements of applicable federal, state, tribal, and local permits. Enbridge's Environmental Inspectors ("EIs") will assist the Contractor in interpreting and implementing the requirements of the EPP, and verify compliance with these procedures for Enbridge. Enbridge will employ experienced EIs to manage unforeseen situations that are not directly addressed by project documents. Enbridge relies on the experience and judgment of the EIs, through coordination and consultations with project management staff, to address unforeseen situations should they occur in the field. The EIs will be expected to use judgment in the field to

interpret environmental conditions and requirements, but will not be authorized to make major modifications or changes without the prior written approval of Enbridge. The EI, in consultation with Enbridge Environment staff, will have the authority to stop activities and order corrective mitigation for actions that are not in compliance with the measures in this EPP, landowner agreements, or environmental permit requirements. The EI will maintain appropriate records to document compliance with these and other applicable environmental permit conditions.

Enbridge has also committed to applicable agencies to fund a comprehensive third-party monitoring program to be deployed during Project construction. Enbridge has constructed numerous projects with the oversight of third-party monitors and accepts the recommendation by state agencies regarding their use. Enbridge will work with the agencies to define the role and qualifications of proposed third-party monitors to ensure they are experienced in the type of construction they will be observing and knowledgeable regarding the resources that may be impacted.

1.0 GENERAL MITIGATION MEASURES

1.1 IDENTIFICATION OF AVOIDANCE AREAS

The EI will post signs for environmental features such as wetlands, waterbodies, drainages/drain tiles, buffer zones, rare plant or ecological community sites, invasive species and noxious weed locations, regulated wildlife habitat, cultural resources, and erosion-prone or steep slopes.

1.2 CONSTRUCTION LINE LIST AND PERMITS

Enbridge will provide the Contractor with a Construction Line List ("CLL") that describes special requirements (e.g., timber salvage, topsoil segregation, restoration measures, fencing requirements, etc.) as agreed upon with landowners provided the special requirements conform to project permits. The Contractor will comply with these special requirements and/or permit conditions.

The CLL identifies requirements and comments provided by landowners; however it is not a comprehensive list of construction requirements. The CLL will be considered in conjunction with other project documents and permits.

1.3 WET WEATHER SHUTDOWN

During construction, certain activities may be suspended in wet soil conditions, based on consideration of the following factors:

- extent of surface ponding;
- extent and depth of rutting and mixing of soil horizons;
- areal extent and location of potential rutting and compaction (i.e., can traffic be rerouted around wet area); and
- type of equipment and nature of the construction operations proposed for that day.

The Contractor will cease work in the applicable area until Enbridge determines that site conditions are such that work may continue. The EIs, in collaboration with Enbridge construction management, will ultimately decide if wet weather shutdown is necessary in a given location.

1.4 RIGHT-OF-WAY ACCESS

Access to the right-of-way ("ROW") will be from public roadways and Enbridge-approved private access roads only. Enbridge is responsible for posting signs or other methods to identify approved access roads in the field and to ensure that access is confined to only the approved roads. Vehicle tracking of soil from the construction site will be minimized by installation and implementation of best management practices ("BMPs") such as stone pads, timber mats, reducing equipment/vehicle access to the construction ROW where practicable (off-ROW parking), or equivalent. Installation of stone or timber mat access pads will be in accordance with applicable permits and state/federal specifications. If such BMPs are not adequately preventing sediment from being tracked onto public roads, street sweeping, or other equivalent means of collecting sediment, will be used. If soil is tracked onto a roadway, the contractor will remove accumulated material from the road and return it to the construction ROW within an upland area as soon as possible, but in no circumstances more than 24 hours after discovery. In addition, soil on roadways cannot be broomed, washed, and/or graded into the road ditch or onto the shoulder.

1.5 RIGHT-OF-WAY REQUIREMENTS

All construction equipment and vehicles will be confined to the approved construction ROW and additional temporary workspace. Prior to commencement of clearing operations, the outer limits of the construction ROW and additional temporary workspace areas will be marked with distinctive stakes and flagging by Enbridge. Construction activities are restricted to the approved designated areas.

The construction ROW (i.e., construction workspace) for the Project will vary and may include a portion of Enbridge's existing corridor, new permanent corridor, permitted temporary workspace, and site-specific extra workspaces as defined below and shown in Figures 1 through 3. The construction ROW width will be reduced in selected locations (e.g., wetlands, waterbodies, and forested shelterbelts), in accordance with applicable permit conditions, as indicated on the Project construction alignment sheets and in the field by the use of staking.

(a) ROW (Permanent)

Enbridge's existing permanent ROW varies in width. Additional footage may be added, depending on the location of the new pipeline(s) in relation to the existing pipelines. The permanent ROW is maintained to facilitate access and aerial inspection of the pipeline system.

(b) Temporary Workspace

In addition to the ROW/permanent corridor, construction will require Temporary Workspaces ("TWS"). The TWS will be located adjacent to and contiguous with the proposed ROW/permanent corridor and will be identified on the construction alignment sheets and by distinctive staking of construction limits prior to clearing.

(c) Additional Temporary Workspace

Site-specific additional temporary workspace ("ATWS") locations, (construction work areas beyond the permanent corridor and TWS previously described), will be required at select locations such as steep slopes, road, waterbody, railroad, some wetland crossings, and where it is necessary to cross under the existing pipelines or foreign utilities. ATWS will typically be located in uplands adjacent to the construction ROW and set at least 50-feet back from sensitive resource boundaries where site-specific field conditions allow. However, to complete work safely, Enbridge may need to locate ATWS within a wetland or within the 50-foot setback from a wetland or waterbody based on site-specific conditions. ATWS adjacent to waterbodies and/or wetlands is addressed further in Sections 2.0 and 3.0, respectively.

1.6 CONTROLLING SPREAD OF UNDESIRABLE SPECIES

It is Enbridge's intent to minimize the potential introduction and/or spread of undesirable species (i.e., invasive species, noxious weeds, or crop diseases) along the construction ROW due to pipeline construction activities. However, it is not practicable for Enbridge to eradicate undesirable species that are adjacent to the construction ROW. Enbridge will minimize the potential for the establishment of undesirable species by minimizing the time duration between final grading and permanent seeding.

In consultation with the applicable agencies, Enbridge will identify plant species that are considered noxious weeds and/or invasive plants that may occur within the counties being crossed by the pipeline corridor (refer to Appendix A).

1.6.1 Prevention and Control Measures

To prevent the introduction of identified noxious weeds and invasive species into the Project areas from other construction sites, construction equipment will be cleaned prior to arriving on site. This cleaning consists of removing visible dirt from the equipment and blowing loose material from equipment using compressed air. Equipment designated for use within waterbodies will be washed and dried prior to use. Purge and clean all pumps before proceeding from one location to the next if designated noxious weeds or invasive species (e.g. zebra mussels, Eurasian milfoil, etc.) are known to be present in the area. The Contractor(s) will keep logs documenting the cleaning history of each piece of equipment and make the logs available to the EI upon request. Contractors may use the equipment cleaning log provided in Appendix A or an equivalent form approved by Enbridge. Equipment found to be in non-compliance with the cleaning requirement will not be allowed on the Project sites until it has been adequately cleaned.

Prior to clearing and grading of the construction right-of-way and pending landowner permission, major infestation areas identified during surveys or by Enbridge's EIs may be treated with the recommended herbicides or their equivalents as identified through consultation with local authorities. All proposed herbicides will be reviewed and approved by Enbridge's Environment Department prior to use. Alternatively, full construction ROW topsoil segregation may be implemented for weed control to allow equipment to work through the area after topsoil has been stripped, as long as equipment stays on the subsoil (clearing, grading, and restoration equipment will still be cleaned). The Contractor(s) will obtain necessary permits and/or certifications for the use of the applicable herbicides, is responsible to limit off-ROW overspray, and will comply with state laws regarding the use of those herbicides. Contractor(s) will keep proper documentation of the locations where the herbicides have been used and provide such documentation to Enbridge within 3 days of completing the work. Weed control spraying will be restricted near certified organic farms and prohibited on certified organic farms.

Treatment of known infestation areas will be completed in accordance with applicable chemical contact times (as specified by the manufacturer) in advance of clearing and grading within the construction ROW. Treatment may be restricted in areas that are not readily accessible, such as areas where access is limited by topography or other site conditions such as saturated/inundated soils. In the event that an area is determined to be inaccessible, the EI will be notified and a site-specific alternative treatment method will be developed.

If additional noxious weed infestations are identified subsequent to herbicide applications, mechanical means (scrape down/blow down) may be used to remove weeds from tracked equipment prior to leaving the infested area. High pressure water wash stations may be established in select areas if the above measures do not adequately remove soil and vegetation debris from construction equipment. Enbridge will determine where this practice will be implemented. The Contractor(s) will keep logs documenting the cleaning history of each piece of equipment and make the logs available to the EI or other Enbridge Representative upon request. Any equipment found to be in noncompliance with the cleaning requirement will be removed from the Project sites until it has been adequately cleaned.

To prevent the spread of noxious weeds and invasive species during construction, mulch used on the Project will be composed of weed-free material. Certified weed-free mulch may also be

required at site-specific locations. The Contractor(s) will be responsible for identifying and acquiring sources of weed-free and certified weed-free mulch. Sources will be approved by Enbridge prior to purchase.

1.7 POTHOLING/HYDROVAC SLURRY

Hydrovac excavation is used to positively identify pipelines and other buried utilities. The Contractor will construct an unlined but bermed containment area or identify comparable containment (e.g., open top tank) to hold the hydrovac slurry in an Enbridge and landowner-approved upland area within the construction workspace or dispose of the material off-site at a licensed disposal facility. Once the slurry is drained and dry, it may be incorporated with the subsoil in an Enbridge and landowner-approved upland area within the construction workspace. Discharging hydrovac slurry on to topsoil is not permitted as the material will degrade the quality of the topsoil and potentially affect revegetation.

1.8 UPLAND CLEARING

The initial stage of construction involves the clearing of brush, trees, and tall herbaceous vegetation from the ROW. Clearing may be accomplished with chain saws, mowers, and hydraulic tree-cutting equipment.

1.8.1 Disposal of Non-Merchantable Timber

Unless otherwise directed by Enbridge, non-merchantable timber and slash will be disposed of by mowing, chipping, grinding, and/or hauling off site to an approved disposal facility or used in stabilizing erodible slopes or construction entrances. In non-agricultural, non-wetland areas, chips, mulch, or mechanically cut woody debris may be uniformly broadcast across the ROW where the material would ultimately be incorporated into the topsoil layer during grading activities, with landowner approval (coordinated through Enbridge ROW agents). Burning of non-merchantable wood may be allowed only where the Contractor has acquired all applicable permits and approvals (e.g. agency, tribal, and landowner) and in accordance with all tribal, state, and local regulations. The Contractor will provide Enbridge with copies of these permits and/or approvals prior to initiating burning.

1.8.2 Disposal of Merchantable Timber

All merchantable timber will be managed in accordance with Enbridge contract specifications.

1.8.3 Upland Grading and Stump Removal

To facilitate proper cleanup and restoration in upland areas, tree stumps outside the ditch line will be ground below normal ground surface or completely removed and hauled off to an approved disposal facility. Stumps in the ditch line will be completely removed, ground, and/or hauled off to an approved disposal facility.

1.9 TEMPORARY EROSION AND SEDIMENT CONTROLS

Temporary erosion and sediment controls (“ECDs”) include, but are not limited to, slope breakers, sediment barriers (i.e. silt fence, straw bales, bio-logs, etc.), stormwater diversions, trench breakers, mulch, and revegetation subsequent to seeding of exposed soils (refer to Figures 4 through 11). The Contractor will maintain erosion and sediment control structures as required in the Project construction documents and as required by all applicable permits. Non-functional erosion and sediment controls will be repaired, replaced, or supplemented with functional materials within 24 hours after discovery, or as otherwise specified in project permits. ECDs will

be installed after initial clearing but before grading activities, and will be replaced by permanent erosion controls as restoration is completed.

Temporary ECDs will be installed after clearing and prior to grubbing and grading activities at the base of sloped approaches to streams, wetlands, and roads. Temporary ECDs will also be installed at the edge of the construction ROW as needed, and/or in other areas determined by the EI to slow water leaving the site and prevent siltation of waterbodies and wetlands down slope or outside of the construction ROW (e.g., swales and side slopes). Temporary ECDs will be placed across the entire construction ROW at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from tile line inlets, drainage ways, wetlands, and/or waterbodies until the area is revegetated and there is no potential scouring or sediment transport to surface waters. Adequate room will be available between the base of the slope and the sediment barrier to accommodate ponding of water and sediment deposition.

If silt fence is used, when the depth of sediment reaches about one-third of the height, the sediment will be removed. Non-functional ECDs will be repaired, replaced, or supplemented with functional structures within 24 hours after discovery, or as otherwise specified in project permits.

Temporary ECDs installed across the travel lane may be removed during active daytime construction; however, ECDs will be properly reinstalled after equipment passage, or activities in the area are completed for the day. These ECDs will also be repaired and/or replaced prior to inclement weather when forecasted.

1.9.1 Temporary Stabilization

Installation of temporary seeding, mulch (straw or hydromulch), and erosion control mats may be required by Enbridge in certain locations (including topsoil piles) if there are construction delays within a spread of at least 14 days. The Contractor may be required by Enbridge to install temporary stabilization materials sooner based on site conditions, or as required in project permits.

1.9.2 Erosion Control Blanket

The appropriate class of erosion control blanket will be installed in accordance with manufacture recommendations and/or state Department of Transportation ("DOT") specifications on slopes greater than 5 percent that would be exposed over the winter and drain to surface waters (refer to Figures 8 and 9). The Contractor will attempt to install erosion control blankets on the exposed slopes prior to snowfall; however, construction progress and/or seasonal weather variations may prevent installation prior to the first snowfall. Installation of erosion control blankets and additional BMPs, as applicable based on site conditions, is required after the first snowfall to protect slopes prior to spring melt and runoff. Erosion control blankets will be installed running parallel (up and down) with the direction of the slope (not perpendicular).

1.9.3 Mulch

Mulch (weed-free straw, wood fiber hydromulch, or a functional equivalent) will be applied to disturbed areas (except for actively cultivated land and wetlands) if requested by the landowner or land managing agency, if specified by the applicable permits or licenses, or as required by Enbridge. Mulch will specifically be required on:

- Slopes greater than 5 percent; and
- Dry, sandy areas that can blow or wash away (field decision).

Mulch will be free of noxious weeds as listed in applicable state laws. Certified weed-free mulch may also be required at site-specific locations. The Contractor will be responsible for identifying and acquiring sources of weed-free and certified weed-free mulch. Sources will be approved by Enbridge prior to purchase.

Mulch will be applied at a rate of 2 tons per acre to cover at least 75 percent of the ground surface unless otherwise stipulated by permit conditions. Mulch will be uniformly distributed by a mechanical mulch blower, or by hand in areas not accessible to the mulch blower. Mulch will be anchored/crimped using a mulch-anchoring tool or disc set in the straight position to minimize loss by wind and water, as site conditions allow. In areas not accessible to a mulch-anchoring tool or too steep for safe operation, the mulch may be anchored by liquid tackifiers, with advance written approval from Enbridge. The manufacturer's recommended method and rate of application will be followed.

Hydro-mulch and liquid tackifier can be used in place of straw or weed-free hay mulch with prior approval from Enbridge. All hydromulch and liquid tackifier products used will be on the applicable state DOT product list. Application rates will be at the manufacturer's recommended rate, equal to or greater than 2 tons per acre of straw mulch.

1.9.4 Cat Tracking

Cat tracking, also known as horizontal slope grading, may be implemented based on site conditions (sandy or silt soils) to reduce erosion potential. Cat tracking is achieved by driving a bulldozer vertically up and down the slope which results in the tracks being oriented horizontally; creating small speed bumps for water (refer to Figure 11).

1.9.5 Temporary Slope Breakers

Temporary slope breakers will be installed to minimize concentrated or sheet flow runoff in disturbed areas in accordance with the following maximum allowable spacing unless otherwise specified in permit conditions.

Slope (%)	Approximate Spacing (ft)
3-5	250
5-15	200
15-25	150
>25	<100

If the length of the slope is less than the distance of the required spacing, slope breakers are not required unless a sensitive resource area (e.g., wetland or public roadway) is located immediately down slope, or as requested by the EI. Temporary slope breakers may be constructed using earthen subsoil material, silt fence, straw bales, or in non-agricultural land, rocked trenches may be used. On highly erodible slopes, slope breakers in the form of earthen berms will be used whenever possible.

Temporary slope breakers will be constructed according to the following specifications (refer to Figures 4 and 5):

- straw bales used as slope breakers will be trenched in and staked so as to not allow spacing between bales or allow flow underneath the bales;

- the outfall of temporary slope breakers will be directed off the construction ROW into a stable well-vegetated upland area or into an appropriate energy-dissipating sediment control device (e.g., silt fence, straw bales, rock aprons) to prevent the discharge of sediments (refer to Figure 4);

- proper slope breaker outfalls will be established where topsoil segregation and/or grading has created a barrier at the edge of the construction workspace; and

- gaps will be created through spoil piles where necessary to allow proper out letting of temporary berms.

1.10 UPLAND TOPSOIL SEGREGATION

Upland areas where topsoil will be stripped includes cropland, hay fields, pasture, residential areas, and other areas as requested by the landowner or as specified in the project plans, commitments, and/or permits. Topsoil will not be used to construct berms, trench breakers, temporary slope breakers, improving or maintaining roads, or to pad the pipe. Berms used for stacking pipe in pipe yards may be constructed using topsoil if landowner permission and necessary approvals are obtained. Gaps will be left and ECDs installed where stockpiled topsoil and spoil piles intersect with water conveyances (i.e., ditches, swales, and waterways) to maintain natural drainage.

Topsoil Segregation Methods

The following topsoil segregation methods may be employed during construction:

- Full Construction ROW (refer to Figure 1)

- Trench-Line-Only (refer to Figure 2)

- Modified Ditch-Plus-Spoil Side (refer to Figure 3)

The Full Construction ROW topsoil segregation technique will typically be used in active cropland, which will consist of stripping topsoil from the spoil storage area, ditch line, and the primary travel lane. The Trench-Line-Only topsoil segregation method may be used where Enbridge determines that the width of the construction ROW is insufficient for other methods to be used. Enbridge may also use the Trench-Line-Only topsoil segregation method in areas where there is a thick sod layer such as in hay fields, pastures, golf courses, and residential areas, unless otherwise requested by the landowner. Alternative topsoil segregation methods, such as Modified Ditch-Plus-Spoil Side, may be used on a site-specific basis or as requested by the landowner. Topsoil is not typically segregated in standing water wetlands unless specifically requested by the landowner and/or managing land agency in accordance with applicable permit conditions.

Depth of Upland Topsoil Stripping

In deep soils (more than 12 inches of topsoil), topsoil will be stripped to a minimum depth of 12 inches, unless otherwise specified/requested by other plans, permit conditions, or the landowner. Additional space may be needed for spoil storage if more than 12 inches of topsoil are segregated. If less than 12 inches of topsoil are present, the Contractor will attempt to segregate to the depth that is present.

1.11 UPLAND TRENCHING

Trenching in uplands is typically accomplished with a backhoe excavator or a rotary wheel ditching machine. Excavated material will be side cast (stockpiled) within the approved construction ROW separate from topsoil, and stored such that the area subject to erosion is minimized. Enbridge will coordinate with landowners to minimize disruption of access caused by the trench during construction. Where deemed appropriate by Enbridge, the Contractor will leave plugs of subsoil in the ditch or will construct temporary access bridges across the trench for the landowner to move livestock or equipment. Trenches may also be sloped where started and ended to allow ramps for wildlife to escape. Spacing of plugs and ramps will be determined in the field.

1.11.1 Timing

The length of time a trench is left open will be minimized to ensure that installation of the pipe and restoration of the construction ROW occurs in a timely fashion. Therefore, unless otherwise specified by project permits or Enbridge, the Contractor will limit the amount of excavated open trench to a maximum of 3 days of anticipated welding production per spread, per pipe. This timeframe may be decreased at the discretion of Enbridge based on site conditions. Site-specific activities such as horizontal directional drilling, guided bores, road bores, tie-in points, and valve work may be performed independent of a spread.

1.12 FOAM PILLOW INSTALLATION

Use of foam pillows for pipe protection in the trench will be approved by Enbridge in advance and installed in accordance with applicable project permits, local/state/federal regulations, and manufacturer's recommendations.

1.13 TRENCH BREAKERS

Trench breakers will be installed as deemed necessary by Enbridge in sloped areas after the pipe has been lowered into the trench. Trench breakers protect against subsurface water flow along the pipe after the trench is backfilled. Trench breakers will be constructed with bags filled with rock-free subsoil or sand. Use of foam trench breakers will be approved by Enbridge in advance and installed in accordance with applicable project permits, local/state/federal regulations, and manufacturer's recommendations. Trench breakers will be placed from the bottom of the trench to near the top of the trench, completely surrounding the pipe and will be properly keyed into the undisturbed trench walls (refer to Figures 12 and 13). The location for trench breakers will be based on field conditions including the degree and length of slope, presence of down slope sensitive resource areas such as wetland and waterbodies, and proximity to other features such as roads and/or railroads. The following conditions apply to the placement and installation of trench breakers unless otherwise directed by Enbridge:

- Trench breakers will be installed on slopes greater than 5 percent adjacent to streams, wetlands, or other waterbodies.
- Topsoil cannot be used to construct trench breakers.
- Where the pipeline exits a wetland towards areas of lower relief, trench breakers will be installed (within the upland) where there is a potential for underground drainage along the pipe in order to prevent wetland or waterbody drainage.

- At all waterbody crossings, as necessary, to prevent diversion of water into upland portions of the pipeline trench and to keep accumulated trench water out of the waterbody.

The actual location of each trench breaker will be selected through coordination between Enbridge's EIs, Enbridge's Craft Inspectors, and the Contractor's Foreman for backfilling activities.

1.14 DRAIN TILE INLET PROTECTION AND TILE REPAIRS

Enbridge will attempt to locate existing drain tile inlets that are located near the construction work area prior to construction. Drain tile inlets will be marked using flags. The Contractor will protect located drain tile inlets with the potential to receive stormwater from construction of the Project using the appropriate ECDs until sources with the potential to discharge have been stabilized. The determination of the specific ECD will be made based on the location of an inlet with respect to the project area, drainage area from the construction work area to the inlet, topography, vegetation, soils, and accessibility to the inlet. Where drain tile inlets are located off of Enbridge's construction ROW, Enbridge may not have authorization to install ECDs at the inlet site. In these cases, sediment control measures (typically silt fence) will be installed along the edge of the construction work area that drains to the inlet structure to minimize sedimentation.

If underground drainage tile is damaged by pipeline construction, it will be repaired in a manner that assures proper tile line operation at the point of repair in accordance with the Agricultural Protection Plan.

1.15 UPLAND BACKFILLING

Backfilling follows pipe installation and consists of replacing the material excavated from the trench. In areas where topsoil has been segregated, the subsoil will be replaced first, and the topsoil will be spread uniformly over the area from which it was removed. Prior to backfilling, the trench will be dewatered in accordance with the methods discussed in Section 5.0 if water obscures the trench bottom.

1.16 CLEANUP AND ROUGH/FINAL GRADING

All waste materials, including litter generated by construction crews, will be disposed of daily by the Contractor. Initial cleanup and rough grading activities may take place simultaneously. Cleanup involves removing construction debris (including litter generated by construction crews and excess rock) and large woody debris. Rough and final grading includes restoring disturbed areas as near as practicable to preconstruction conditions, returning the topsoil where topsoil has been stripped, preparing a seedbed and de-compacting subsoil (where applicable) for permanent seeding, installing or repairing temporary erosion control measures, repairing/replacing fences, and installing permanent erosion controls.

1.16.1 Timing

The Contractor will begin cleanup and rough grading (including installation of temporary erosion and sediment control measures) within 72 hours after backfilling the trench. The Contractor will attempt to complete this rough cleanup within one week. The Contractor will initiate final grading, topsoil replacement, seeding, and installation of permanent erosion control structures within 14 days after backfilling the trench. If seasonal or other weather conditions prevent compliance with these timeframes, temporary erosion controls will be maintained until conditions allow completion of cleanup.

1.17 PERMANENT EROSION AND SEDIMENT CONTROLS

During final grading, slopes in areas other than cropland will be stabilized with erosion control structures. With exception for actively cultivated areas, permanent berms (diversion dikes or slope breakers) will be installed on all slopes, according to the following maximum spacing requirements unless otherwise specified in permit conditions:

Slope (%)	Approximate Spacing (ft)
3-5	250
5-15	200
15-25	150
>25	<100

Permanent berms will be constructed according to the following specifications:

- Permanent berms will be constructed of compacted earth, stone, or functional equivalent as approved in advance by Enbridge.
- The outfall of berms will be directed toward appropriate energy-dissipating devices, and off the construction ROW if possible.
- Permanent berms will be inspected and repaired as deemed necessary by Enbridge to maintain function and prevent erosion.
- Erosion control blankets (curlex, jute, or equivalent) will be placed on slopes over 30 percent or that are a continuous slope to a sensitive resource area (e.g., wetland or waterway).

1.18 SOIL COMPACTION TREATMENT

Cultivated fields and compacted or rutted areas will be tilled prior to topsoil replacement with a deep tillage device or chisel plowed to loosen compacted subsoils. If subsequent construction and cleanup activities result in further compaction, additional measures will be undertaken to alleviate the soil compaction.

1.19 STONE REMOVAL

A diligent effort will be made to remove excess stones equal to or larger than 4 inches in diameter from the upper 8 inches of subsoil or as specified in permit conditions, contract documents, or landowner agreements. After the topsoil is replaced, stone removal efforts will cease when the size and density of stones on the construction ROW are similar to undisturbed areas adjacent to the construction ROW as determined by the EI. Excess rock will be piled in upland areas where landowner permission has been obtained, or will be hauled off-site to an Enbridge approved disposal site.

1.20 REPAIR OF DAMAGED CONSERVATION PRACTICES

The Contractor will restore all soil conservation practices (such as terraces, grassed waterways, etc.) that are damaged by the pipeline construction to preconstruction conditions to the extent practicable.

1.21 LAND LEVELING FOLLOWING CONSTRUCTION

Following the completion of the pipeline, the construction ROW will be restored to its pre-construction conditions as practical. Should uneven settling or documented surface drainage problems occur following the completion of pipeline construction and restoration, Enbridge will take appropriate steps to remedy the issue.

2.0 STREAM AND RIVER CROSSING GENERAL REQUIREMENTS

The procedures in this section apply to streams, rivers, and other waterbodies such as jurisdictional ditches, ponds, and lakes. These procedures require that judgment be applied in the field and will be implemented under the supervision of Enbridge.

Stream crossing requirements, including construction methods, timing, erosion control, and restoration are described in this section and in the stream crossing permits issued by state and federal agencies and by tribal authorities (as applicable). If the contractor considers certain parts of these procedures to be technically impractical due to site-specific engineering constraints, they may submit an on-site modification request to Enbridge for consideration of alternative measures that would provide an equal or greater level of protection to the stream and river ecosystems. Enbridge will review the contractor's alternatives and consult with appropriate regulatory agencies and tribal resource specialists (as applicable). The contractor will receive written approval from Enbridge prior to implementing the alternatives. During wet and high runoff conditions, the EI will determine whether conditions warrant additional considerations for construction activities.

2.1 TIME WINDOW FOR CONSTRUCTION

All in-stream work activities (installation of dams, sheet piling, etc.) will be minimized to the extent practicable on an area and time duration basis. In-stream trenching will be conducted during periods permitted by the appropriate regulatory agencies and applicable permits. Unless otherwise specified in applicable permits and with exception to blasting and other rock breaking measures and directional drill, in-stream construction activities (specifically trenching, pipeline installation, backfill, and restoration of the streambed contours) for wet crossing methods will occur within the following timeframes:

- Minor Waterbodies (all waterbodies less than or equal to 10 feet wide at the water's edge at the time of crossing): 24 hours

- Intermediate Waterbodies (all waterbodies greater than 10 feet wide but less than 100 feet wide at the water's edge at the time of crossing): 48 hours

- Major Waterbodies (all waterbodies greater than 100 feet wide at the time of crossing): As specified by Enbridge or in the applicable permits.

These timeframes apply regardless of the presence or absence of flow. These timeframes also apply to dry crossing methods as a guideline and can be extended based on site-specific conditions with approval from Enbridge Environment staff, Construction Management, and the EI.

Stream crossings will be designed as close to perpendicular to the axis of the stream channel as engineering and routing constraints allow, creating the shortest crossing length.

2.2 CLEARING AND GRADING

The construction ROW width will consist of a 25-foot-wide neck down beginning 20 feet from the ordinary high water mark ("OHWM") / ordinary high water level ("OHWL") on the working side of the right-of-way (refer to Figures 15 through 17).

2.2.1 Beaver Dam Removal and Prevention of Dam Rebuilding

With landowner approval and in accordance with necessary permits obtained, the Contractor may trap beavers, alter or remove beaver dams in order to attempt to lower the water level prior to construction. For alterations, the Contractor will insert a 12-inch minimum diameter, 20-foot long minimum perforated steel culvert, or an equivalent device, through the dam to allow the water to continually drain. The perforations should be a minimum of 1.5-inch diameter, encompassing the entire circumference and extend for the full length of the culvert.

2.2.2 Impaired Waters

Where discharges of stormwater may occur to waters designated under Section 303(d) of the Clean Water Act as Impaired Waters, additional BMPs will be implemented as specified in the applicable project permits.

2.3 ADDITIONAL TEMPORARY WORKSPACE

ATWS includes work areas outside the boundary of the typical construction ROW. These spaces are typically used to assemble pipe segments and for temporary spoil storage. Clearing of forested and brushy areas for ATWS will be avoided as much as possible. Woody vegetation in wetlands and riparian areas will typically not be cleared for the purpose of ATWS unless approved by appropriate regulatory agencies as stipulated in permits issued for the Project. ATWS will be constructed as follows:

- ATWS will be located at least 50 feet away from the OHWM/OHWL if topographic or other physical conditions such as stream channel meanders allow, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land (refer to Figures 15 through 17).

- If safe work practices or site conditions do not allow for a 50-foot setback, ATWS should be located no closer than 20 feet from the OHWM/OHWL, subject to site-specific approval by Enbridge.

- ATWS will be limited to the minimum size needed to construct the stream crossing.

2.4 BRIDGES

Temporary equipment bridges will be used on most waterways (upon approval by the appropriate agency), including small waterways such as ditches and intermittent streams, where there is a potential for stormwater runoff or rain events to transport sediment downstream from equipment crossing the waterway. Bridges will be constructed as described below and will be removed as soon as possible during final restoration. Bridges will not typically be installed at directionally drilled waterbodies, unless there is no reasonable alternative that provides an efficient, economical way to transport heavy construction equipment around the waterbody by truck.

With exception to clearing-related equipment, fording of waterways is prohibited (i.e. civil survey, potholing, or other equipment are not permitted to ford waterways prior to bridge placement). Clearing equipment and equipment necessary for installation of equipment bridges will be allowed a single pass across waterbodies prior to bridge installation, unless restricted by applicable permits.

2.4.1 Types of Bridges

Equipment bridges will be constructed using one of the following techniques:

- Typical Span Type Bridge (timber mats - refer to Figure 19)
- Rock Flume (refer to Figure 20)
- Railroad flat cars
- Flexi-float or other pre-fabricated portable bridges
- Other methods as approved by Enbridge and appropriate agencies

2.4.2 Bridge Design and Maintenance

Bridges will be designed as close to perpendicular to the axis of the stream channel, creating the shortest crossing length and will be built and maintained in accordance with applicable permits. Equipment bridges will be designed to withstand the maximum foreseeable flow of the stream with headers and support structures being placed above the ordinary high water mark (OHWM) of the feature. In the event that local jurisdictions require stricter guidelines associated with bridge placement, Enbridge will design the bridge to comply with these requirements. Bridges will not restrict flow or pool water while the bridge is in place, and will be constructed with clean materials. Bridges will be designed and maintained to prevent soil from entering the waterbody. Soil that accumulates on the bridge decking will be removed as needed, or as deemed necessary by the EI.

2.5 STREAM AND RIVER CROSSING CONSTRUCTION METHODS

The following stream and river crossing methods are typically used, subject to further restrictions by Enbridge and applicable permits and subject to modifications as approved by appropriate regulatory agencies and tribal resource specialists (as applicable) during construction.

2.5.1 Wet Trench Method

Installation

The wet trench method will be used to cross streams and rivers not permitted to be flumed, dam and pumped, or directionally drilled (refer to Figure 15). The following procedures will be used during wet trench crossings:

- Sediment control measures will be installed before grading from the 20-foot vegetative buffer left on each stream bank. Spoil containment structures will be installed back from the stream bank so that spoil does not migrate into the stream.

- Grading will be directed away from the waterbody to minimize the potential for sediment to enter the stream. Grading of stream banks will be restricted to the trench line and areas necessary for safe bridge installation.

- After grading, backhoes or draglines will be used to excavate the trench. Where possible, excavating equipment will operate from one or both banks, without entering the stream. If equipment must encroach into the stream, it will operate on clean construction mats. Streambed material will be segregated (e.g., upper one foot and the remaining trench spoil will be stored separately) and placed within a spoil containment structure in approved

construction work area limits. Storage of streambed spoil within the stream will only be allowed if expressly approved in the applicable permits.

- Earthen trench plugs (hard plugs) between the stream and the upland trench will be left undisturbed during excavation of the in-stream trench to prevent diversion of the stream flow into the open trench and to prevent water that may have accumulated in the adjacent upland trench from entering the waterbody. Trench plugs will be removed immediately prior to pipe placement, and then replaced when the pipe is in place. Trench water accumulated upslope of trench plugs will be dewatered appropriately prior to trench plug removal.

- Water within the trench will be managed in accordance with Section 5.0

- Backfilling will begin after the pipe is positioned in the trench at the desired depth. Backfill material will consist of the spoil material excavated from the trench and parent streambed unless otherwise specified in state or federal permits. The in-stream trench will be backfilled so that the stream bottom is as near as practicable to its pre-construction condition, with no impediments to normal water flow.

Temporary Stabilization

The Contractor will restore the stream banks as near as practicable to pre-construction conditions unless that slope is determined to be unstable. If Enbridge determines the slope is considered unstable, the Contractor will reshape the banks to prevent slumping. Once the banks have been reshaped, ECDs will be installed within 24 hours of backfilling the crossing. Temporary slope breakers will be installed on all sloped approaches to streams in accordance with the spacing requirements previously specified.

A temporary seed mix (e.g., annual rye or annual oats) and mulch and/or erosion control blankets will be installed within a 50-foot buffer on either side of the stream, with exception to actively cultivated land. Silt fence or functional equivalent as approved in advance by Enbridge will be installed upslope of the temporary seeding area.

2.5.2 Dam and Pump Method

Installation

The dam and pump method is a dry crossing technique that is suitable for low flow streams and is generally preferred for crossing meandering channels. The dam and pump method involves damming of the stream upstream and downstream of the proposed trench before excavation (refer to Figure 16) and pumping water around the construction area. The following procedures will be used for dam and pump crossings:

- Dams may be constructed of sandbags, inflatable dams, aqua-dams, sheet piling, and/or steel plates. The dams will prevent the stream from flowing into the construction area. The dams will be continuously monitored for a proper seal. Additional sandbags, plastic sheeting, steel plating, or similar materials will be used where necessary to minimize the amount of water seeping around the dams and into the construction work area. The dam will not be removed until after the pipeline has been installed, the trench has been backfilled, and the banks have been stabilized.

- Pumping of the stream across the ROW will commence simultaneously with dam construction to prevent interruption of downstream flow. Stream flow will be pumped across the construction area through a hose and will be discharged to an energy-dissipation device, such as plywood boards, to prevent scouring of the streambed.

- The pumps and fuel containers will be located on the upstream side of the crossing and will be placed in impermeable, sided structures which will act as containment units (refer to Section 10.0). The pumps used for this crossing method will not be placed directly in the stream or on the streambed. Pumps will have a capacity greater than the anticipated stream flow. The pumping operation will be staffed 24 hours a day and pumping will be monitored and adjusted as necessary to maintain an even flow of water across the work area and near-normal water levels upstream and downstream from the crossing. .

The pump intake will be suspended to prevent sediment from being sucked from the bottom of stream and will be equipped with a screen, or equivalent device, to prevent fish uptake.

- Where possible, excavating equipment will operate from one or both banks, without entering the stream. If equipment must encroach into the stream, it will operate on clean construction mats (free of soil and plant material prior to being transported onto the construction ROW). Streambed material will be segregated as stated in the wet trench method and will be placed within a spoil containment structure in approved construction work area limits. Storage of streambed spoil within the stream will only be allowed if expressly approved in the applicable permits.

- Earthen trench plugs (hard plugs) between the stream and the upland trench will be left undisturbed during excavation of the in-stream trench to prevent diversion of the stream flow into the open trench and to prevent water that may have accumulated in the adjacent upland trench from entering the waterbody. Trench plugs will be removed immediately prior to pipe placement, and then replaced when the pipe is in place. Trench water accumulated upslope of trench plugs will be dewatered appropriately prior to trench plug removal.

- Standing water that is isolated in the construction area by the dams will be managed in accordance with Section 5.0

- Backfilling will begin after the pipe is positioned in the trench to the desired depth. Backfill material will consist of the spoil material and parent streambed excavated from the trench unless otherwise specified in state or federal permits. The in-stream trench will be backfilled so that the stream bottom is similar to its pre-construction condition, with no impediments to normal water flow.

Temporary Stabilization

Restoration of the stream banks and the installation of temporary erosion controls will be similar to that described for the wet trench method above but will occur immediately following installation of the pipeline. Once the stream banks have been stabilized, the dams and pump will be removed.

2.5.3 Flume Method

Installation

The flume method is a dry crossing technique that is suitable for crossing relatively narrow streams that have straight channels and are relatively free of large rocks and bedrock at the point of crossing (refer to Figure 17). This method involves placement of flume pipe(s) in the stream bed to convey stream flow across the construction area without introducing sediment to the water. The procedures for using the flume method are described below.

- The flume(s) will be of sufficient diameter to transport the maximum flows anticipated to be generated from the watershed. The flume(s), typically 40 to 60 feet in length, will be installed before trenching and will be aligned so as not to impound water upstream of the flume(s) or cause downstream bank erosion. The flumes will not be removed until after the pipeline has been installed, trench has been backfilled, and the stream banks have been stabilized.

- The upstream and downstream ends of the flume(s) will be incorporated into dams made of sand bags and plastic sheeting (or equivalent). The upstream dam will be constructed first and will funnel stream flow into the flume(s). The downstream dam will prevent backwash of water into the trench and construction work area. The dams will be continuously monitored for a proper seal. Adjustments to the dams will be made where necessary to prevent large volumes of water from seeping around the dams and into the trench and construction work area.

- Where possible, excavating equipment will operate from one or both banks, without entering the stream. If equipment must encroach into the stream, it will operate on clean construction mats. Streambed material will be segregated and placed within a spoil containment structure in approved construction work area limits. Storage of streambed spoil within the stream will only be allowed if expressly approved in the applicable permits.

- Earthen trench plugs (hard plugs) between the stream and the upland trench will be left undisturbed during excavation of the in-stream trench to prevent diversion of the stream flow into the open trench and to prevent water that may have accumulated in the adjacent upland trench from entering the waterbody. Trench plugs will be removed immediately prior to pipe placement, and then replaced when the pipe is in place. Trench water accumulated upslope of trench plugs will be dewatered appropriately prior to trench plug removal.

- If additional trench dewatering is necessary to complete the installation of the pipe, the discharge will be managed in accordance with Section 5.0.

- Backfilling will begin after the pipe is positioned in the trench to the desired depth. Backfill material will consist of the spoil material excavated from the trench and parent streambed unless otherwise specified in state or federal permits. The in-stream trench will be backfilled so that the stream bottom is similar to its pre-construction condition, with no impediments to normal water flow.

Temporary Stabilization

Restoration of the ROW and the installation of temporary erosion controls will be similar to that described for the wet trench method above but will occur immediately following installation of the

pipeline. After the stream banks have been stabilized, the dams and flume will be removed from the stream bed allowing water to resume its flow in the channel.

2.5.4 Directional Drill and/or Guided Bore Method

Installation

Installing the pipe underneath a stream will involve placing a drill unit on one side of the stream (refer to Figure 18). A small-diameter pilot hole will be drilled under the stream along a prescribed profile. After the pilot hole has been completed, barrel reams will be used to enlarge the pilot hole to accommodate the desired pipeline diameter. Drilling mud will be necessary to remove cuttings and maintain the integrity of the hole. Water from an Enbridge-approved source will be used to prepare the slurry of drilling mud, and will be appropriated according to applicable permits. The pipe section will be pulled through the hole by the drilling rig and welded to the adjoining sections of pipe on each side of the river.

Drilling Mud

During drilling operations, drilling mud and slurry will be stored back from the waterbody in an earthen berm sediment control structure, in tanks, or by other methods so that it does not flow into the waterbody, adjacent wetlands or off the workspace (refer to Section 11.0 for additional details).

After the pipe is in place, excess drilling mud will be hauled off-site to an Enbridge-approved disposal location or licensed disposal facility.

Temporary Stabilization

The directional drilling/guided bore method normally does not result in the disturbance of the stream banks or riparian vegetation (with exception of extremely limited hand clearing of woody required to facilitate guide wire placement), which reduces the potential for erosion and sedimentation at the stream crossing. Consequently, temporary erosion control measures that are installed at open-cut crossings typically are not necessary for drilled/bored crossings.

2.6 PERMANENT RESTORATION

Stream/channel banks disturbed during installation of the pipelines will be stabilized with erosion control materials such as an erosion control blanket and seeded in accordance with Section 7.0. Permanent stabilization will be initiated within 24 hours after installation of the crossing using the wet trench method and prior to restoring flow using the dam and pump or flume method, unless site and permit conditions delay permanent installation. Where the banks have been disturbed, the Contractor will restore the slopes as near as practicable to pre-construction conditions unless that slope is determined by Enbridge to be unstable. Where the slope of the banks is determined to be unstable or has the potential to erode or fail, the banks will be reshaped to transition the disturbed areas into the natural stream bank with the intent to stabilize the bank and create a blended, natural appearance.

Berms or other sediment filter devices will be installed at the base of sloped approaches to streams greater than five percent and the outlet of the berm will be directed away from the stream into a well vegetated area. Temporary sediment control devices will remain in place until the area has stabilized and adequate revegetation has established.

2.6.1 Vegetative Bank Restoration

Typically, waterbody banks will be restored as near as practicable to preconstruction conditions after backfilling is complete and will be seeded with an appropriate seed mix as specified in Section 7.0 and covered with an erosion control blanket. Erosion controls, (e.g. straw bales, bio-logs, silt fences, etc.) will be installed as necessary based on site-specific conditions.

2.6.2 Supplemental Bank Stabilization

Unstable soils and/or site-specific factors such as stream velocity and flow direction may require additional restoration efforts, such as installation of rock rip-rap, to stabilize disturbed stream banks. Rock rip-rap will be used only where site-specific conditions require and where applicable permits or approvals have been acquired. Geotextile fabric and rock riprap will be placed according to site and permit conditions (refer to Figure 23). Disturbed soils upslope and on either side of the riprap will be prepared for seeding according to Section 7.0 and other stream bank protection requirements. Bioengineering techniques may also be implemented as determined by Enbridge (refer to Figures 26 through 28).

2.6.3 Bridge Removal

Equipment bridges will be removed during final cleanup or, if access is needed, after final cleanup and permanent seeding. Restoration of the bridge area will be completed upon bridge removal.

2.6.4 Swales

Swales will be restored as near as practicable to original conditions. Swales will be seeded and either mulched with straw or erosion control blankets will be installed to the perceivable top of bank for the width of the construction ROW.

3.0 WETLAND CROSSING GENERAL REQUIREMENTS

The procedures in this section apply to all wetlands that will be affected by the Project. These procedures require that judgment be applied in the field and will be implemented under the supervision of Enbridge and the EI. The intent of these procedures is to minimize construction-related disturbance and sedimentation of wetlands and to restore wetlands as nearly as possible to pre-existing conditions. Additionally, in wetlands that are being farmed at the time of construction, Enbridge will construct the pipeline using standard upland methods. Most seasonally saturated farmed wetlands are used for crop production and topsoil will be segregated in the same manner as topsoil in upland agricultural lands. Pipe stringing and fabrication may occur within the farmed wetland adjacent to the trench, or adjacent to the farmed wetland in a designated ATWS.

Wetland crossing requirements, including construction methods, timing, erosion control, and restoration, are described in this section and in the wetland crossing permits issued by state, federal and/or tribal agencies as applicable. If the contractor considers certain parts of these procedures to be technically impractical due to site-specific engineering constraints, they may submit an on-site modification request to Enbridge for approval of alternative measures. Enbridge will review the contractor's alternatives and consult with appropriate regulatory agencies. The contractor must receive approval from Enbridge prior to implementing the alternatives.

3.1 WETLAND ACCESS

The Contractor will use the construction ROW and only approved roads to access wetland areas.

3.2 CLEARING

Clearing the construction ROW in wetlands will be similar to clearing in uplands. For construction to proceed, obstructions (e.g., trees, brush, and logs) need to be removed. Typically, low ground pressure equipment will be used, limiting disturbance to the wetland. Vegetation and trees within wetlands will be cut off at ground level, leaving existing root systems intact; clearing debris will generally be removed from the wetland for disposal. Hydro-axe debris, or similar can be left in the wetland if spread evenly in the construction ROW to a depth which will allow for normal revegetation, as determined by the EI.

3.3 ADDITIONAL TEMPORARY WORKSPACE IN WETLANDS

In general, Enbridge attempts to locate ATWS outside of wetlands wherever practicable; however, ATWS may be sited in select wetlands where the wetland is adjacent to a waterbody, road, railroads, foreign utility crossings, and/or pipeline cross-over with prior approval from the applicable regulatory agencies. Clearing of forested wetlands for ATWS will be avoided as much as possible.

- Staging areas, additional spoil storage areas, and other ATWS will be located in upland areas at least 50 feet away from wetland boundaries (refer to Figures 24), where safe work practices or site conditions permit, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land. If site conditions do not permit a 50-foot setback, then these areas will be located as far away from the wetland as is practicable. Vegetation will not be cleared between these areas and the wetland in any event. No construction activities including vegetation clearing or earthwork will occur between the ATWS and the wetland.

- The size of the ATWS areas will be limited to the minimum needed to construct the wetland crossing.

3.4 GRADING IN A WETLAND

Grading activities will be confined to the area of the trench and will be minimized to the extent practicable. Grading outside the trench will only be allowed where required to ensure safety and restore the construction ROW after backfilling the trench with prior approval from Enbridge.

ECDs will be installed:

- across the entire construction ROW upslope of the wetland boundary, where necessary, to prevent sediment flow into the wetland;
- along the edge of the construction ROW as necessary to prevent sediment flow into off-ROW wetlands; and
- Along the edge of the construction ROW as necessary to contain spoil and sediment within the construction ROW through wetlands.

ECDs will be maintained in proper working order to prevent the flow of sediment into wetlands from spoil piles or sloped approaches that are adjacent to the wetlands. .

3.5 RIGHT-OF-WAY STABILIZATION

Tree stumps, brush riprap, imported soil, and rock fill will not be brought in to stabilize the right-of-way in wetlands. Where low ground pressure equipment is not used, construction equipment will operate from timber construction mats or equivalent means with prior approval from Enbridge (refer to Figure 24). To prevent the spread of noxious and invasive plant species, timber mats will be free of soil and plant material prior to being transported onto the construction ROW and/or moved from one area of the construction ROW to another area. Timber riprap (also known as corduroy road) will not be used without prior written approval from Enbridge and the appropriate regulatory agencies. Pre-existing corduroy roads in wetlands may be used but may not be improved, maintained, restored, or replaced without site-specific authorization from applicable agencies.

Subsoil from the pipeline trench within the immediate wetland may be placed on top of equipment mats for additional stabilization. Timber mats may be placed over the ditch line or on the working side to facilitate trench excavation. All timber mats, construction debris, and larger woody vegetative debris will be removed during cleanup of wetlands.

3.6 TRENCHING

Excavation of the pipeline trench in wetlands typically will be accomplished using backhoe excavators. The Contractor will take reasonable steps to insure that the duration of open trench in wetlands, including tie-ins, is minimized to the fullest extent possible.

3.6.1 Topsoil Segregation

When constructing in wetland areas without standing water, up to one foot of topsoil (organic layer) will be stripped from the trench line and stockpiled separate from trench spoil to preserve the native seed stock. In standing water wetlands, organic soil segregation is not typically practical; however, the Contractor will attempt to segregate as much of the organic layer as possible based on site/saturation conditions. If normally unsaturated wetlands are saturated at

the time of construction, topsoil segregation will be attempted according to Figure 2 and based on recommendations from the EI and appropriate regulatory agencies.

3.6.2 Trench Breakers

Where the EI determines that the pipeline trench has the potential to drain or partially drain a wetland, trench breakers will be installed as necessary to maintain the original wetland hydrology.

3.7 PIPELINE INSTALLATION

The following procedures are intended to minimize siltation and disturbance to wetlands during installation.

3.7.1 Push/Pull Method

Large wetlands with standing water can generally not be crossed with typical crossing methods. In these areas, the pipeline will be assembled in an upland area and positioned in the trench using the “push-pull" and/or "float" techniques.

Usually this fabrication requires use of ATWS adjacent to the construction ROW. A backhoe (or equivalent) supported on timber mats or equivalent low ground pressure equipment will be used to dig the trench. The prefabricated section of pipeline will then be pushed-pulled into position or floated across the wetland. When the pipeline is in position, floats, if used, will be removed and the pipeline will sink into position. The trench will then be backfilled and a backhoe or similar equipment working from construction mats or by low ground pressure equipment will be used restore the wetland.

3.7.2 Temporary Erosion and Sediment Controls

ECDs at approaches to wetlands will be installed as previously described and in accordance with Section 1.0.

3.7.3 Concrete Coating

Concrete will generally be mixed off-site, and concrete coated pipe will be transported to the construction ROW on trucks. If required, pre-fabricated concrete weights and/or saddlebag weights will also be used to provide negative buoyancy. Concrete weights will be manufactured off-site and transported to the ROW. Weights will be strung along the construction ROW, where necessary, until they are placed over the pipe within the excavated ditch. Limited mixing and coating activities may occur on the construction ROW for coating pipe joints and concrete weight repairs according to the concrete usage specifications in Section 10.0. Washing equipment used for mixing, pouring, casting, or coating will not be within 100 feet of any wetland and will be conducted and contained in a leak-proof containment facility or impermeable liner. The EI will determine where ECDs will be installed down slope of equipment wash areas to capture sediments and minimize erosion from runoff.

3.8 BACKFILLING

Subsequent to pipe installation, backfilling of wetland trenches will take place immediately, or as approved by EI. The Contractor will restore wetlands as near as practicable to pre-construction conditions and will make a reasonable attempt to return the subsoil to its pre-construction density. During backfilling of wetland areas, subsoil material removed from the trench during construction will be replaced so that the material is not mounded above the adjacent ground surface (undisturbed trench wall). Subsoil that exceeds the elevation of the ground adjacent to the trench

will be removed from the wetland and disposed of in an upland area or an Enbridge-approved disposal site. After the trench has been backfilled with subsoil, previously segregated topsoil will be spread over the trench area and mounded.

3.9 ROUGH GRADING, CLEANUP, AND TEMPORARY RESTORATION

Cleanup and rough grading activities may take place simultaneously. Cleanup typically involves removing construction debris and replacing fences removed during construction. Rough grading includes restoring original conditions within the disturbed areas (i.e., ditch line, spoil storage areas, and equipment travel lane) and installing or repairing temporary ECDs. Temporary slope breakers will be installed near the boundary between the wetland and adjacent sloped approaches, to prevent sediment flow into the wetland.

3.9.1 Timing

Cleanup and rough grading (including installation of temporary erosion control measures) will begin as soon as practical after the trench is backfilled, weather permitting.

3.9.2 Temporary Stabilization

Where necessary, disturbed wetland areas will be seeded with oats (40 lbs/acre) and/or a temporary seed mix, unless standing water is prevalent or unless permanent planting or seeding with native wetland vegetation is required by applicable permits. No fertilizer, lime, or mulch will be applied in wetlands.

4.0 HIGHWAY, ROAD AND RAIL CROSSINGS

4.1 ADDITIONAL WORKSPACE

Additional workspaces for bored road and railroad crossings and open-cut road crossings will be determined on a site-specific basis. These workspaces will be adjacent to the road or railroad and limited to the size needed to contain spoil from the crossing.

4.2 MAINTENANCE

Roadway crossings will be maintained in a condition that will prevent tracking of mud onto the roadway.

Rock tracking pads, constructed of stone as required by the applicable permits, will be installed adjacent to paved public roads to prevent or minimize the tracking of soil onto the roadway. If the roadside ditch is part of a jurisdictional waterway, a permit will be obtained prior to installing the tracking pad or culvert. If permitted in wetlands, tracking pads will be limited in size to reduce impacts. Tracking pads installed in wetlands will be constructed with clean rock placed on geotextile fabric, as approved by an EI and with approval from applicable regulatory agencies. All rock and fabric will be removed from the wetland during cleanup.

4.3 TEMPORARY EROSION AND SEDIMENT CONTROLS

Temporary ECDs (e.g., silt fence and/or double-staked straw bales) will be installed on sloped approaches to road crossings where vegetation has been disturbed (refer to Figure 25).

5.0 CONSTRUCTION DEWATERING

5.1 TRENCH DEWATERING

Prior to initiating dewatering activities, the EI will approve the water discharge plan to ensure that the best management practices are applied in such a way as to minimize the potential for scour and water containing sediment from reaching a wetland or waterbody. Furthermore, landowner approval is required in advance of placement of dewatering structures outside of the approved construction ROW. The Contractor will assess each water discharge situation to include:

- **Water Discharge Setting** - This includes:
    - Soil Type - The soil type the discharged water would flow over. The management of discharged water traveling over sandy soil is more likely to soak into the ground as compared to clay soils.
    - Ground Surface - The topography in the area that would influence the surface flow of the discharged water.
    - Adjustable Discharge rate - The flow rate of the discharged water (which may need to vary) can be managed based on the site conditions to minimize instances of water from reaching a sensitive resource area such as a wetland or waterbody. (Example - Water discharged at 500 gallons per minute may soak into the ground while if discharged at a higher flow rate would cause water to flow via overland runoff into a sensitive resource area)
    - Discharge Outfall - The amount of hose and number/size of pumps needed to attempt to discharge water at a location which drains away from waterbodies or wetlands.

- **Pump Intake** - Use floating suction hose or other similar measures to prevent sediment from being sucked from bottom of trench.

- **Overwhelming Existing Drainage** - If the discharge (assumed to be clean) enters a stream, the flow added to the stream will not exceed 50 percent of the peak storm event flow (to prevent adding high water volumes to a small stream channel that causes erosion due to imposing high flow conditions on the stream.

- **Filtering Mechanism –** All dewatering discharges will be directed through a filtering device as indicated below.
    - Well-Vegetated Upland Area – Water can be directed to a well-vegetated upland area through a geotextile filter bag. Geotextile bags need to be sized appropriately for the discharge flow and suspended sediment particle size.
    - Straw Bale Dewatering Structure – Where the dewatering discharge point cannot be located in an upland area due to site conditions and/or distance, the discharge should be directed into a straw bale dewatering structure. The size of the straw bale dewatering structure is dependent on the maximum water discharge rate (refer to Figure 21). A straw bale dewatering structure should be used in conjunction with a geotextile filter bag to provide additional filtration near sensitive resource areas.
    - Alternative dewatering methods - Alternative methods may be approved by Enbridge on a site-specific basis.

5.1.1 Flow Measurement and Water Sampling

The volume of water discharged from the trench will be recorded as required by the applicable permits. The volume may be determined using a flow meter, or equivalent method, as approved by Enbridge or specified by applicable permit conditions.

Samples of the water discharged will be sampled if required by tribal permits and/or state-issued discharge permits.

5.1.2 Regulatory Notification and Reporting

Enbridge will notify and submit reports to appropriate tribal, state and federal agencies as required by all permits/authorizations.

5.2 HYDROSTATIC TEST DISCHARGES

Hydrostatic testing involves filling the new pipeline segments with water acquired in accordance with applicable permits (refer to Section 6.0), raising the internal pressure level, and holding that pressure for a specific period of time per federal DOT specifications. Hydrostatic testing will be done to verify that there are no flaws in the pipe or welds. Pre-built sections may be hydrostatically tested prior to installation using horizontal directional drilling ("HDD") and/or guided bore techniques. Hydrostatic testing will be conducted in accordance with applicable appropriation and discharge permits obtained by Enbridge. Hydrostatic test waters will not be transferred from one waterbody to another. Chlorinated source water will be used and treated as specified in applicable permits. After the hydrostatic test is complete, the line will be depressurized and the water discharged.

5.2.1 Refueling

The operation and refueling of hydrostatic test equipment will be in accordance with the conditions outlined in Section 10.0.

5.2.2 Siting of Test Manifolds

Hydrostatic test manifolds will be installed where necessary to ensure proper test pressures and incorporates changes due to topography. Where feasible, Enbridge will incorporate minor adjustments to the test manifold locations to avoid placement in wetlands and riparian areas. However, completely avoiding the placement of a test manifold in a wetland may not always be possible. The Contractor will install appropriate erosion control measures where the EI determines they are necessary.

5.2.3 Water Sampling

Water discharged from hydrostatic tests will be sampled as required by state-issued appropriation or discharge permits. Water volumes and flow rates will be recorded using the form provided in Appendix D.

5.2.4 Best Management Practices

Prior to hydrostatic testing the pipeline, Enbridge will prepare the pipe by removing accumulated construction debris, mill scale, dirt, and dust using a cleaning pig. The debris will be collected in a temporary receiver and will be properly disposed off-site of by the Contractor. Upon completion of the cleaning operation, the pipeline will be sealed with the test headers.

Test headers and pigs will be arranged to allow for rinse water to be installed ahead of the fill pigs. Rinse water will be treated and disposed of in accordance with applicable permit conditions.

Following testing, the test section will be depressurized and the water will be discharged to a well-vegetated, upland area with an appropriate dewatering structure such as a geotextile filter bag and/or a hay bale structure that will be lined with geotextile fabric. Direct discharges to surface waters, if allowed by permit, will be directed into an energy dissipation device such as a splash pup.

At no time will the discharge rate exceed the applicable discharge rates specified in state-issued or other discharge permits. In the event no maximum discharge rate is identified, discharges will be monitored and adjusted as necessary to avoid scouring, erosion, or sediment transport from the discharge location.

To minimize the potential for introduction and/or spread of invasive species due to hydrostatic testing activities, Enbridge will discharge water to the same source location from which it was appropriated. If water is used to test multiple test sections, it will be relayed back to the source water through the pipeline for final discharge. Test water will not be discharged to a waterbody other than the appropriation source, unless coordinated and permitted through the applicable agencies.

5.2.5 Flow Measurement

The total volume of water discharged will be determined with a flow meter (or equivalent), or as required by the applicable state permit. The total volume of water discharged will not exceed the volume specified in the applicable permit.

6.0 WATER APPROPRIATION

6.1 GENERAL

Water may be drawn from local sources, such as lakes, streams, and private or municipal wells for construction activities such as dust control, horizontal directional drilling/guided boring, trench dewatering, and hydrostatic testing. The Project will follow applicable permit conditions for the appropriation of water.

The intake hose will be suspended off of the stream or lake bottom and equipped with a screen, or equivalent device, to prevent fish uptake. During withdrawal, adequate waterbody flow rates and volumes will be maintained to protect aquatic life and allow for downstream uses. The volume and rate of withdrawal will be monitoring to comply with applicable permit conditions.

6.2 WATER SOURCES

Water will only be withdrawn from sources approved by Enbridge and in accordance with applicable permits. No additives to the water are permitted unless written approval is received from Enbridge and applicable permits authorize such additives.

If appropriation is scheduled to occur during possible periods of low flow, including frozen conditions, a backup source will be identified.

6.3 FLOW MEASUREMENT

At no time will the withdrawal rate for the water source exceed the rate specified in the applicable permits.

The Contractor will measure the withdrawal rate and total volumes of water appropriated with a flow meter (or equivalent) and provide the data to Enbridge, as required by the applicable permits.

6.4 WATER SAMPLING

Where required by permit conditions, Enbridge will sample the water during appropriation. The Contractor will assist Enbridge in obtaining these samples.

6.5 REGULATORY NOTIFICATION AND REPORTING

Enbridge will notify appropriate agencies of the time of appropriations if required by the state appropriations permits. Enbridge will submit reports regarding the volume and quality of the water withdrawn if required by the applicable permits.

7.0 REVEGETATION & MONITORING

This section was developed in conjunction with Natural Resources Conservation Service ("NRCS") guidelines. Project-specific permit conditions and landowner requests (with exception to wetlands) for specific seed mixes (as indicated in the Project CLL) take precedence over this section.

7.1 PROJECT SEED SPECIFICATIONS

Seed used will be purchased on a "Pure Live Seed" ("PLS") basis for seeding (both temporary and permanent) revegetation areas. Seed tags will identify:

- purity;
- germination;
- date tested;
- total weight and PLS weight;
- weed seed content; and
- seed supplier's name and business information.

Seed will be used within 12 months of testing as required by applicable state rules and regulations. The seed tags on the seed sacks will also certify that the seed is "Noxious Weed Free". Seed rates used on the Project will be based on PLS rate, not actual weight basis. Therefore, to determine the correct application rate if not indicated on the seed tag, a correction calculation will be performed based the purity and germination. For example, a seed mix that has a specified 10 pounds PLS per acre, 95 percent germination rate, and is 80 percent pure needs to be applied at the following rate:

(95% germination × 80% purity)/100 = 76% PLS
10 pounds PLS per acre/.76% PLS = 13.2 pounds per acre actual seeding rate

The species components of individual mixes are subject to availability at the time of purchase. Grass species may be substituted with alternative native or non-invasive species that are included in the NRCS guidelines and subject to approval by Enbridge.

Seed tags will be collected by the contractor and provided to Enbridge during seeding activities. The tags will be reviewed by the EI prior to installation to ensure that the seed mix complies with Enbridge's specifications and that it is being applied to the correct location. If bulk delivery of seed is made, the above information will still be made available to Enbridge. Off-loading/on-loading of seed will not be performed in a designated wetland area.

Legume seed (if used) will be treated with an inoculant specific to the species and in accordance with the manufacturer's recommended rate of inoculant appropriate for the seeding method (broadcast, drill, or hydroseeding). When hydroseeding, four times the manufacturer's recommended rate of inoculant will be used.

7.2 TEMPORARY REVEGETATION

Enbridge's temporary seed mix (refer to Appendix C) was developed based on recommendations from the NRCS. Unless specifically requested by landowners or land managing agencies, Enbridge does not intend to establish temporary vegetation in actively cultivated land, standing water wetlands, and/or other standing water areas.

7.3 TIMING FOR TEMPORARY VEGETATION

Temporary revegetation will be established in construction work areas where 14 days or more will elapse between:

- the installation of the first pipeline and the second line where two pipelines will be co-constructed and active construction is ongoing;
- the completion of final grading at a site and the establishment of permanent vegetation; and/or,
- where there is a high risk of erosion due to site-specific soil conditions and topography.

Enbridge may require the Contractor(s) to conduct temporary seeding sooner than 14 days at site-specific locations near sensitive resource areas and/or areas prone to wind/water erosion.

Temporary vegetation should be established at any time between **April 1 and September 1**. Attempts at temporary revegetation after this date should be assessed on a site-specific basis and with approval from Enbridge.

7.4 MULCH

Mulch (weed-free straw, wood fiber hydromulch, or a functional equivalent) will be applied to disturbed areas (except for actively cultivated land and wetlands) if requested by the landowner or land managing agency, if specified by the applicable permits or licenses, or as required by Enbridge. Mulch will specifically be required on:

- Slopes greater than 5 percent; and
- Dry, sandy areas that can blow or wash away (field decision).

Mulch will be free of noxious weeds as listed in applicable state laws. Certified weed-free mulch may also be required at site-specific locations. The Contractor will be responsible for identifying and acquiring sources of weed-free and certified weed-free mulch. Sources will be approved by Enbridge prior to purchase.

Mulch will be applied at a rate of 2 tons per acre to cover at least 75 percent of the ground surface unless otherwise stipulated by permit conditions. Mulch will be uniformly distributed by a mechanical mulch blower, or by hand in areas not accessible to the mulch blower. Mulch will be anchored/crimped using a mulch-anchoring tool or disc set in the straight position to minimize loss by wind and water, as site conditions allow. In areas not accessible to a mulch-anchoring tool or too steep for safe operation, the mulch may be anchored by liquid tackifiers, with advance written approval from Enbridge. The manufacturer's recommended method and rate of application will be followed.

Hydro-mulch and liquid tackifier can be used in place of straw or weed-free hay mulch with prior approval from Enbridge. All hydromulch and liquid tackifier products used will be on the applicable state DOT product list. Application rates will be at the manufacturer's recommended rate, equal to or greater than 2 tons per acre of straw mulch.

7.5 PERMANENT REVEGETATION

Permanent vegetation will be established in areas disturbed within the construction work area (permanent easement, TWS, and ATWS) except in actively cultivated areas and standing water wetlands. The seed mixes for permanent seeding include native seed varieties commonly found and/or available from local seed distributors. Enbridge's seed mixes (refer to Appendix C) were

selected to augment revegetation via natural recruitment from native seed stock in the topsoil and are not intended to change the natural species composition. Rates provided are assumed for a drill application and will be adjusted as discussed in Section 7.1.

7.6 UPLAND CONSTRUCTION AREAS

In consulting with the NRCS and other agencies, Enbridge developed standard upland seed mixes for restoring disturbed areas affected by the Project (Appendix C, Tables 1-23). These mixes include species that will provide for effective erosion control and revegetation of the project area. These seed mixes will be used by Enbridge as the standard upland mixes unless an alternate seed mix is specified by a landowner or land managing agency.

7.7 PERMANENT SEEDING OF WETLAND AREAS

7.7.1 Unsaturated Wetland Areas

Non-standing water wetlands in Minnesota and Wisconsin will be seeded with the mix provided in Appendix C, Table 17 (MN Seed Mix 3) to provide temporary cover and allowed to revegetate naturally. No unsaturated wetlands will be seeded in North Dakota. The natural revegetation process will be encouraged by the seeds and rhizomes in the topsoil spread back over the right-of-way after pipe installation. No fertilizer, lime, or mulch will be applied in wetlands.

7.7.2 Saturated/Standing Water Wetlands

Enbridge does not propose to seed saturated or standing water wetland areas. It is widely accepted that the reestablishment of vegetation within standing water wetlands occurs best through natural process without supplemental seeding.

7.7.3 Forested Wetland Restoration

Enbridge proposes to allow natural reforestation of the temporary workspace area within forested wetlands via stump sprouting, root sprouting, and natural recruitment. Specific forested wetland restoration provisions will be followed as indicated in applicable permits issued for the Project.

7.8 PERMANENT SEEDING OF WATERBODY BANKS

Enbridge will reestablish stream bank vegetation in North Dakota using ND Seed Mix 2 (Table 2, Appendix C), and in Minnesota and Wisconsin using MN Seed Mix 2 (Table 16 Appendix C) unless an alternate seed mix is requested by applicable agencies. Additional vegetation requirements may also be contained within project-specific permits. Where a waterbody is located within a wetland, the Contractor will re-seed the banks with the applicable wetland seed mix.

7.9 SPECIALIZED SEED MIXES

Enbridge developed specialized seed mixes for restoring these areas:

- Native prairie in North Dakota and Minnesota;
- Openings in forested areas in Minnesota and Wisconsin;
- Mixed native prairie/tamed hayland areas and road ditches in North Dakota, Minnesota, and Wisconsin;
- Tame pasture and Conservation Reserve Program (“CRP”) lands;
- North Dakota State School land; and
- Protected waterbody banks and wetland fringes in Minnesota;

Enbridge will provide other specialized seed mixes upon landowner request on a site-specific basis for:

- Residential Areas: This seed mix will be used to reestablish residential lawns or other types of "turf-type" land cover.
- Wildlife Areas: This seed mix will be used to provide a desirable food source for wildlife, specifically deer.

7.10 CONSERVATION RESERVE PROGRAM PROPERTIES

Enbridge's Land Agents will contact landowners where the construction ROW crosses land enrolled in CRP. Enbridge will work with the respective landowners to identify the parcel-specific CRP seed mixes. CRP lands will be seeded at the direction of the landowner per the site-specific landowner CRP requirements for that parcel and no non-CRP approved seed mix will be planted on CRP lands. CRP parcels will also be seeded with Enbridge's temporary cover seed mix. Seed for CRP seeding will meet the same criteria as other seed described in Section 7.1

7.11 SEED BED PREPARATION AND SEEDING PROCEDURES

After final grading, deep tillage will be performed in actively cultivated areas and in non-agricultural areas (as directed by Enbridge) to relieve soil compaction and promote root penetration. Deep tillage will not be conducted in non-farmed wetlands. The soil will then be tilled with a disc, field cultivator, or chisel plow (or equivalent) to prepare a seedbed, breaking up large clods and firm the soil surface.

Tillage and equipment operations related to seeding and mulching will be performed parallel to ground contours as much as practicable. Fertilizer and other soil amendments will be incorporated into the soil during seedbed preparation as specified by Enbridge in the project-specific CLL requirements and permits. No soil amendments will be applied in wetlands unless directed by the appropriate agencies.

7.12 SEEDING METHODS

Seed will be applied uniformly at specified rates across the prepared construction ROW by drilling, broadcasting, hydroseeding, or air seeding. The EI will suspend seeding activities if conditions are such that equipment will cause rutting of the surface in the designated seeding areas. Enbridge will continue to monitor ROW conditions to resume seeding activities as site conditions improve and according to the general seeding timing restrictions listed in Section 7.15.

7.12.1 Drill Seeding

Seeding equipment will be capable of uniformly distributing the seed and sowing it at the required depth. Drills will be equipped with a feeding mechanism that will provide a uniform flow of seed at the desired application rate. Double-disc furrow openers equipped with depth bands and packer wheels to firm the soil over the seed will be used where practicable.

7.12.2 Broadcast Seeding

Broadcast seeding rate will be <u>double</u> the drill-seeding rate. Seed will be uniformly distributed by a mechanical or hand operated seeder. Following seeding, a cultipacker, harrow, or hand rake will be used to cover the seeds and firm the seedbed as is appropriate for the area.

7.12.3 Hydroseeding

Hydroseeding rate will be double the drill seeding rate, or the same as broadcast seeding rate. Seed will be applied alone or in a seed, fertilizer, and/or hydromulch slurry. If seeding is applied alone, the amount of hydromulch material will be adjusted to the seed slurry to show where seeding has taken place, providing a means to identify uniform cover of the construction ROW. Hydroseeders will provide continuous agitation and be capable of supplying a continuous, non-fluctuating flow of slurry. Enbridge will pre-approve all hydromulch products, which must be on the applicable state DOT product list.

7.13 COMPANION CROPS

A companion crop is an annual that can be planted with the perennial species where soil erosion is a severe hazard. A companion crop may be used for all seed mixes.

Seeding rates for companion crops are lower than normal seeding rates for those crops to reduce competition with the seeded perennial species.

Table 7.13-1
Companion Crops

Seed	Planting Rate
Barley	10 lbs/acre
Oats	10 lbs/acre
Spring wheat	15 lbs/acre
Flax	7 lbs/acre

7.14 SOIL AMENDMENTS

Enbridge will consult with NRCS representatives and review county soil survey information to assess where soil amendments, specifically the application of fertilizer or lime are needed to promote successful revegetation. No fertilizer or lime will be added with native seed mixes. When using non-native species on dry, dry-mesic and mesic sites for permanent seeding a minimum of 150 pounds of 20-10-10, and 2 tons of 80-85 lime or equivalent will be applied, unless otherwise specified or restricted by the landowner, NRCS, or land-managing agency. Soil amendments may be applied to agricultural, pasture, and/or residential lands if requested by landowners and/or land managing agencies. Enbridge will apply phosphate free fertilizers to areas within 100 feet of a waterway if soil amendments are required.

7.15 SEEDING PERIODS

Recommended seeding dates in Table 7.15-1 are based on climatic records, research, and experience; and they also represent optimum periods for the germination of grass and legumes. The dates below provide adequate development of adventurous roots prior to stressful periods.

Table 7.15-1 Recommended Seeding Dates	
Species Type and Season of Planting	**Recommended Dates**
Cool Season Species Spring Late Summer Late fall dormant seeding	Prior to May 20 August 10 to September 1 Typically November 1 and later
Warm Season Species Spring	May 10 to June 25
Warm/Cool Season Mix Spring	May 1 to June 14

Enbridge will delay seeding during frozen ground conditions until the applicable spring seeding period or will complete dormant seeding where conditions allow (i.e., no snow cover). Enbridge will install temporary erosion controls during frozen conditions.

7.16 TIMING OF FINAL SEEDING

Upon final grading of the construction ROW, and upon the restoration of wetland and waterways, seeding and restoration/stabilization will occur within 48 hours if weather and soils conditionals allow. Other methods of stabilization will be used if temporary seeding is not appropriate due to seasonal conditions (e.g., mulch, erosion control matting).

7.17 EROSION & SEDIMENT CONTROL

Erosion control blankets, such as sewn straw mats, jute mats, coconut erosion control blankets, or biodegradable synthetic erosion control blankets, as approved by Enbridge, will be used on slopes over 30 percent, on stream banks and ditch banks and as directed by Enbridge.

7.18 DORMANT SEEDING

Dormant seeding is a method used after soil temperatures have cooled to 55 degrees Fahrenheit or cooler to prevent seed germination. Dormant seeding is only practicable if the soil is not frozen and snow is not present. Procedures for applying soil amendments, seedbed preparation, seeding, and mulching are the same as outlined for permanent revegetation in this section.

Where dormant seeding is conducted, one or more of the following temporary erosion and sediment controls will be put in place over the freshly seeded area unless the local soil conservation authority, landowner, or land managing agency specifies otherwise. The temporary measures will be in place within 48 hours of seeding, and are as follows:

- noxious weed-free straw mulch, at not more than 2 tons/acre, anchored;
- hydromulch, at 2 tons/acre, anchored; and/or
- erosion control blanket.

Additional erosion control measures will be applied as requested by the EI.

7.19 MANAGEMENT AND MONITORING

Enbridge will monitor and address all areas where stabilization techniques have been implemented in accordance with conditions identified in the applicable project permits and/or licenses.

8.0 WINTER CONSTRUCTION

Frozen conditions can preclude effective topsoil segregation. When soil is frozen to a depth greater than the depth of topsoil, the soil will come off in thick slabs that contain both topsoil and subsoil, and mixing can result. If top soiling will proceed under these conditions, it should be done at the excavation only. A ripper should be used to break up the frozen topsoil over the trench line only. Care should be taken to only rip to the actual depth of topsoil or to a maximum depth of 12 inches, whichever is less. Topsoil in the spoil storage area should be graded smooth to minimize mixing during backfilling. Sufficient time is needed to allow the newly graded topsoil to freeze in place prior to trenching.

Summer construction of large diameter pipelines in saturated/standing water wetlands with unconsolidated soils can be difficult and potentially result in greater wetland disturbance including wider trench widths and extensive rutting/surface disturbance. Constructing across these types of wetlands in the winter can result in fewer impacts. Heavy construction equipment use and travel along the construction ROW, which may not be possible in summer conditions due to saturated, unstable soil conditions, can be accomplished in the winter by establishing temporary winter frost/ice roads. These frost/ice roads protect underlying vegetation and upper layers of wetland surfaces from disturbance potentially created during summer construction.

The area of open excavation will be minimized during winter construction to reduce amount of frozen backfill, and facilitate restoration to pre-construction contours. If winter conditions preclude final grading and cleanup, the Contractor will stabilize the area and temporary erosion control measures will remain in place until permanent erosion control measures are installed. Depending on site and weather conditions, Enbridge may require the Contractor to install dormant seeding, mulching, and/or installation of erosion control blanket on stream banks or other sensitive locations.

9.0 WASTE MANAGEMENT

The Contractor will properly handle, store, and dispose of all solid and hazardous materials and wastes that are used or generated by the Contractor as a result of the Project. The Contractor will determine if the materials and wastes associated with the Project classify as hazardous materials and/or wastes in accordance with applicable federal and/or state criteria. Upon request by Enbridge, the Contractor will provide documentation to Enbridge to substantiate findings of the regulatory status of materials and/or wastes used and/or generated as a result of the Project.

The Contractor will collect all waste materials, including oil or other waste liquids generated as a result of equipment maintenance, daily in suitable or approved containers (i.e., labeled and meeting any relevant regulatory requirements). On a routine basis, the Contractor will remove the containers of waste from the site and properly dispose of them. Throughout the duration of the Project, the Contractor will cleanup areas to the satisfaction of Enbridge. The Contractor is responsible for proper off-site disposal of all wastes generated during the Project. No wastes are to be left on Enbridge property, along the ROW, or buried in an excavation or otherwise disposed of on Enbridge property or ROW.

9.1 HAZARDOUS WASTES

If a Contractor generates a hazardous waste from materials they have brought on-site (e.g., paint clean-up solvents, waste paints, etc.), then the Contractor is responsible for proper waste collection, storage and disposal in accordance with all applicable regulations. The Contractor remains responsible for the proper handling, storage and disposal of the hazardous waste. Any release of the hazardous waste as a result of the improper handling, storage or disposal by the Contractor in this instance is the responsibility of the Contractor to rectify to the satisfaction of Enbridge and all applicable regulatory agencies.

9.2 ABRASIVE BLAST DEBRIS

The Contractor will contain and collect spent abrasive blast materials and place it into appropriate containers. The Contractor is responsible for covering the containers with appropriate means of rainwater and stormwater control to prevent said waters from entering or exiting the container. The Contractor is responsible for disposal of the spent abrasive in accordance with applicable federal, state and local regulatory requirements. The Contractor is responsible for determining if the spent abrasive is classified as a “hazardous” or “special” waste as defined by applicable federal and state regulations. If the spent abrasive is determined to be hazardous waste as a direct result of constituents of an Enbridge facility or equipment, Enbridge will coordinate proper disposal with the Contractor as previously discussed.

10.0 SPILL PREVENTION, CONTAINMENT, AND CONTROL MEASURES

This section describes planning, prevention and control measures to minimize impacts resulting from spills of fuels, petroleum products, or other regulated substances as a result of construction. These measures will be implemented by the Contractor, unless otherwise indicated by Enbridge.

10.1 PLANNING AND PREVENTION

Enbridge requires its Contractors to implement proper planning and preventative measures to minimize the likelihood of spills, and to quickly and successfully clean up a spill should one occur. This section sets forth minimum standards for handling and storing regulated substances and cleaning up spills. Potential sources of construction-related spills include machinery and equipment failure, fuel handling, transfer accidents and storage tank leaks. The Contractor will be responsible for implementing, at a minimum, the following planning and prevention measures.

10.2 ROLES AND RESPONSIBILITIES

10.2.1 Spill Coordinator

A Spill Coordinator will be designated by the Contractor, subject to approval by Enbridge. For all construction related spills, the Spill Coordinator will:

- report all spills to the Enbridge Representative immediately;
- report spills to appropriate federal, state and local agencies as soon as possible (subject to EI verification);
- mobilize on-site personnel, equipment, and materials for containment and/or cleanup commensurate with the extent of the spill;
- assist the Emergency Response Contractor (refer to a list of potential contractors provided in Appendix E) and monitor containment procedures to ensure that the actions are consistent with the requirements of this section;
- in consultation with Enbridge and appropriate agencies, determine when it is necessary to evacuate spill sites to safeguard human health;
- in consultation with Enbridge, coordinate with appropriate agencies the need to contact additional parties or agencies; and
- complete a Spill Report Form (refer to Appendix F) within 24-hours of the occurrence of a spill, regardless of the size of the spill.

10.2.2 Environmental Inspector

The EI will monitor the Contractor's compliance with the provisions of this section to ensure that appropriate agency notifications are made, spill resources are allocated, and clean-up is accomplished in accordance with applicable agency requirements

10.2.3 Authorized Personnel

Authorized Personnel are representatives of the Contractor who are designated to handle fuel, lubricants or other regulated substances. Authorized Personnel will be familiar with the requirements of this section and the consequences of non-compliance.

10.2.4 Construction Superintendent

The Contractor's Construction Superintendent or representative will notify the EI immediately of any spill of a petroleum product or hazardous liquid, regardless of volume.

10.2.5 Construction Personnel

Construction Personnel are representatives of the Contractor involved with the installation of the pipeline. Construction Personnel will notify the crew foreman or Spill Coordinator immediately of any spill of a petroleum product or hazardous liquid, regardless of volume.

10.3 TRAINING

The Contractor will train all employees handling fuels and other regulated substances to follow spill prevention procedures. The Contractor will train all employees who handle fuels and other regulated substances to prevent spills and to quickly and effectively contain and clean up spills that may occur in accordance with applicable regulations. .

10.4 EQUIPMENT

- Each construction crew will have adequate absorbent materials and containment booms on hand, to enable the rapid cleanup of any spill which may occur.

- The Contractor will maintain spill kits containing a sufficient quantity of absorbent and barrier materials to adequately contain and recover foreseeable spills. These kits may include, but are not limited to absorbent pads, straw bales, absorbent clay, sawdust, floor-drying agents, spill containment barriers, plastic sheeting, skimmer pumps, and holding tanks. This equipment will be located near fuel storage areas and other locations as necessary to be readily available to control foreseeable spills.

- Suitable plastic lining materials will be available for placement below and on top of temporarily-stored contaminated soils and materials.

- All fueling vehicles, and where necessary, service vehicles, will carry materials adequate to control foreseeable spills. Such material may include but not be limited to absorbent pads, commercial absorbent material, plastic bags with ties, and shovels.

- The Spill Coordinator will inform the Authorized Personnel, Construction Personnel, and the EIs of the locations of spill control equipment and materials, and have them readily accessible during construction activity. Spill kits should be clearly labeled for quick and easy identification in the field.

- All fuel nozzles will be equipped with functional automatic shut-offs.

- Fuel trucks transporting fuel to on-site construction equipment will travel only on approved access roads.

10.5 SUPERVISION AND INSPECTION

The Contractor will perform a pre-construction inspection and test of all equipment to ensure that it is in good repair. During construction, the Contractor will regularly inspect hoses, pipes, valves, and tanks to ensure equipment is free of leaks. Any equipment that found to be is leaking or in need of repair will be immediately removed from service by Contractor and repaired, prior to resuming work.

10.6 STORAGE AND HANDLING OF FUELS/HAZARDOUS LIQUIDS

10.6.1 Fuel Storage - General

The Contractor will follow proper fuel storage practices, including, but not limited to the following:

- Fuel storage will be at Contractor yards only or as approved by Enbridge.
- Proper signage at and adjacent to fuel storage areas to include “Fuel Storage Area – No smoking within 50 feet.”
- Tools and materials to stop the flow of leaking will be kept on-site. Such equipment may include, but not be limited to, plugs of various sizes, 3M tank patches, a hammer, assorted sizes of metal screws with rubber washers, a screwdriver, and plastic tape.
- Fuels, lubricants, waste oil, and any other regulated substances will be stored in aboveground tanks only.
- Storage tanks and containers will conform to all applicable industry codes (e.g., NFPA, UFC).
- A suitable secondary containment structure will be utilized at each fuel storage site. These structures will be lined with suitable plastic sheeting; provide a minimum containment volume equal to 150 percent of the volume of the largest storage vessel.
- Secondary containment areas will not have drains. Precipitation may be drawn off as necessary. If visual inspection indicates that no spillage has occurred in the secondary containment structure, accumulated water may be drawn off and discharged in accordance with Section 5.0. If spillage has occurred in the structure, accumulated waste will be drawn off and pumped into drum storage for disposal.

10.6.2 Refueling

Contractor will make all efforts to dispense fuel by Authorized Personnel during daylight hours. Fuel dispensing operations will be attended by Authorized Personnel at all times. Personnel will be stationed at both ends of the hose during fueling unless both ends are visible and are readily accessible by one person.

10.6.3 Refueling, Maintenance, and Fuel Storage Near Wetlands and Waterbodies

Enbridge requires that the storage of petroleum products, refueling, maintenance, and lubricating operations take place in upland areas that are more than 100 feet from wetlands, streams, and waterbodies (including drainage ditches), and water supply wells. In addition, the Contractor will store hazardous materials, chemicals, fuel and lubricating oils, and perform concrete coating activities outside these areas.

In certain instances, refueling or fuel storage may be unavoidable due to site-specific conditions or unique construction requirements (e.g., continuously operating pumps or equipment on barges). These locations will be approved in advance by the EI. Site-specific precautions, in addition to those practices described above, will be taken when refueling or maintenance activities are required within 100 feet of streams, wetlands or other waterbodies. These precautions include, but are not limited to:

- Adequate amounts of absorbent materials and containment booms will be kept on hand by each construction crew to enable the rapid cleanup of any spill which may occur;
- If fuel will be stored within wetlands or near streams for refueling of continuously operating pumps, secondary containment will be used;
- Secondary containment structures will be lined with suitable plastic sheeting, provide a containment volume of at least 150 percent of the storage vessel, and allow for at least one foot of freeboard; and
- Provide adequate lighting for these locations and activities.

10.6.4 Overnight parking

Overnight parking of equipment (including but not limited to light plants, generators, pumps, and machinery) is not allowed within 100 feet of a wetland or waterbody unless special containment provisions have been implemented and approved by the EI in advance.

10.6.5 Concrete Washout Handling

Concrete wash water, grindings and slurry, will not be discharged to wetlands, waterbodies, and storm sewer systems or allowed to drain onto adjacent properties. Wash water disposal will be limited to a defined area of the site or to an area designated for cement washout. The area(s) will be sufficient to contain the wash water and residual cement. Contractors hired to provide concrete products will provide equipment capable of reclaiming wash water during wash out.

10.7 INITIAL SPILL MANAGEMENT

10.7.1 Immediate Response

Immediately upon learning of any fuel, oil, hazardous material or other regulated substance spill, or upon learning of conditions that will lead to an imminent spill, the person discovering the situation will:

- Initiate actions to contain the fluid that has spilled or is about to spill, and initiate action to eliminate the source of the spill to the maximum extent that is safely possible.
- Notify the crew foreman and/or the Spill Coordinator and provide them with the following information:
    - Location and cause of the spill;
    - The type of material that has spilled; and
    - Whether the spill has reached or is likely to reach any surface water.

Upon learning of a spill or a potential spill the Spill Coordinator will:

- Assess the situation and determine the need for further action;
- Direct subsequent activities and/or further assign responsibilities to other personnel; and
- Notify the EI.

10.7.2 Mobilization

The Spill Coordinator will mobilize on-site personnel, equipment, and materials for containment and/or cleanup commensurate with the extent of the spill. If the Spill Coordinator feels that a spill is beyond the scope of on-site equipment and personnel, the Spill Coordinator will immediately notify the Construction Superintendent that an Emergency Response Contractor is needed to contain and/or clean up the spill. Appendix E contains a list of potential Emergency Response Contractors. The Spill Coordinator will assist the Emergency Response Contractor and monitor containment procedures to ensure that the actions are consistent with the requirements of this Section.

In the event of a suspected Enbridge pipeline spill (or from an adjacent pipeline), Enbridge's Emergency Pipeline Control Center will be notified at 1-800-858-5253 (24-hours/day), as well as the Enbridge EI. Actions requiring emergency response will be coordinated by Enbridge.

10.8 SPILL NOTIFICATION RESPONSIBILITIES

10.8.1 Notification Volumes

The Contractor's Construction Superintendent or representative will notify the Enbridge Representative and the EI immediately of any spill of a petroleum product or hazardous liquid, regardless of volume.

10.8.2 Spill Report Form

The Spill Coordinator will complete a Spill Report Form (Appendix F) for each release of a regulated substance, regardless of volume. The Spill Report Form will be submitted to the EI within 24 hours of the occurrence of a spill. Follow-up written reports, associated laboratory analyses, and other documentation may also be required separately on a site-specific basis as directed by the EI. Documentation is the responsibility of the Contractor.

10.8.3 Agency Notification

The Contractor will report spills to appropriate federal, state and local agencies as soon as possible. A listing of federal, state, and local agencies including reporting thresholds and timeframes is provided in Appendix G.

The Contractor, in coordination with Enbridge and the appropriate federal, state and local agencies will ensure that additional parties or agencies are properly notified. Additionally, the Contractor is responsible for ensuring that all cleanup activities required by a jurisdictional agency are satisfactorily met and provide documentation to Enbridge demonstrating this compliance.

10.9 SPILL CONTAINMENT AND CLEANUP

In the event of a spill, the Contractor will abide by all applicable federal, state and local regulations with respect to cleaning up the spill. All clean-up and other construction related spill

activities will be completed by, and costs assumed by the Contractor. Specific cleanup measures for both upland and wetland/waterbody spills are described below.

10.9.1 Spill Control - Upland Areas

- If a spill should occur during refueling operations, **STOP** the operation until the spill can be controlled and the situation corrected.
- The source of the spill will be identified and contained immediately.
- For large spills on land, the spill will be contained and pumped immediately into tank trucks. The Contractor or, if necessary, an Emergency Response Contractor, will excavate contaminated soil.
- The spilled material and the contaminated soil will be treated and/or disposed of in accordance with all applicable federal, state, and local agency requirements.
- Smaller spills on land will be cleaned up with absorbent materials. Contaminated soil or other materials associated with these releases will also be collected and disposed of in accordance with applicable regulations.
- Flowing spills will be contained and/or absorbed before reaching surface waters or wetlands.
- Absorbent material(s) will be placed over spills to minimize spreading and to reduce its penetration into the soil.
- The Spill Coordinator, in consultation with the EI and appropriate agencies, determine when spill sites will be evacuated as necessary to safeguard human health. Evacuation parameters will include consideration for the potential of fire, explosion, and hazardous gases.

10.10 SPILL CONTROL - WETLANDS AND WATERBODIES

In addition to the above measures, the following conditions apply if a spill occurs near or into a wetland or waterbody, regardless of size:

- If a spill occurs during refueling operations, **STOP** the operation until the spill can be controlled and the situation corrected.
- The Contractor will use absorbent booms and pads to contain and recover released materials in standing water.
- If necessary, for large spills in waterbodies, The Contractor will secure an Emergency Response Contractor to further contain and clean up the spill.
- The Contractor will excavate contaminated soils in wetlands and temporarily place them on plastic sheeting in a bermed area, a minimum of 100 feet away from the wetland. Contaminated soils will be covered with plastic sheeting while being stored temporarily and properly disposed of as soon as possible, in accordance with Section 10.11.

10.11 STORAGE AND DISPOSAL OF CONTAMINATED MATERIALS

- Appendix E lists potential treatment and disposal facilities for contaminated materials, petroleum products, and other construction-related wastes. The Contractor should recycle those wastes, such as motor oil, where there is an established recycling program available. Wastes such as grease or oily rags shall be disposed of in accordance with state requirements.

- The Contractor will store and dispose of all contaminated soils, absorbent materials, and other wastes in accordance with all applicable state and federal regulations.

- Only licensed carriers may be used to transport contaminated material from the site to a disposal facility.

- If it is necessary to temporarily store excavated soils on site, these materials will be placed on, and covered by, plastic sheeting, and the storage area bermed to prevent and contain runoff.

11.0 DRILLING FLUID RESPONSE, CONTAINMENT, AND NOTIFICATION PROCEDURES

Construction of a pipeline may include the use of trenchless methods known as the HDD and guided/road bore methods. Throughout this section, both methods are referred to collectively as "drilling". While the HDD method always includes the use of drilling fluid, the guided or road bore method might use drilling fluid or only use water to power and lubricate the bore. The HDD drilling fluids/mud consists primarily of water mixed with inert bentonite clay. Under certain conditions an additive may need to be mixed with the drilling fluids/mud for viscosity or lubricating reasons. Only non-hazardous additives will be used and a Material Safety Data Sheet for the drilling fluid will be maintained on-site.

This section elaborates on measures to be implemented by the Contractor if an inadvertent release of drilling fluid occurs despite prevention efforts. Prior to the commencement of drilling operations, the Contractor will inform construction personnel involved as to the responsible party(ies) for release containment and response. The Contractor will ensure that the appropriate response personnel and containment equipment are on site for each drill/bore.

11.1 ON-SITE OBSERVATION DURING CONSTRUCTION

During construction of a drilled crossing, Contractor personnel will monitor the pipeline route throughout the process, as follows:

The Contractor will inform construction observers on what to watch for and will make them aware of the importance of timely detection and response actions to any release of drilling fluid.

- Construction observers will have appropriate, operational communication equipment (e.g., radio and cell phones) available at all times during installation of the directionally drilled crossing, with the ability to communicate directly with the HDD operator.
- The HDD operator will monitor the annular drilling fluid pressures during pilot hole operations.
- If the HDD operator identifies a sustained loss in fluid pressure or loss of circulation:
  - The operator will immediately notify the construction observers of the assumed position of the drill tool; and
  - The Contractor will visually monitor the appropriate portion of the drill path where the drill tool is located to determine if an inadvertent return occurred. The Contractor may perform this monitoring by walking or by using a boat, as appropriate.
- Construction observers, EI(s), or the Enbridge HDD craft inspector have the authority to order installation of containment structures, if needed, and to require additional response measures if deemed appropriate.

11.2 CONTAINMENT, RESPONSE, AND CLEAN-UP EQUIPMENT

Containment, response and clean-up equipment will be available at both sides of an HDD crossing location and one side of a guided or road bore prior to the commencement to assure a

timely response in the event of an inadvertent release of drilling fluid. Containment and response equipment includes but is not limited to:

- straw bales and staking
- pre-filled sandbags
- turbidity curtain (not necessary for guided or road bores that do not involve a waterbody)
- silt fence
- plastic sheeting and/or geotextile fabric
- shovels, brooms, buckets, and other appropriate hand tools
- pumps and sufficient hose
- fluid storage tanks (may not be necessary for guided or road bores)
- vacuum truck on 24-hour call
- one small boat (for larger rivers and open water wetlands)
- light plant/generator (only necessary where operations are conducted outside of daylight hours)

11.3 RESPONSE

In the event an inadvertent drilling fluid release is observed, the EI and the Contractor will assess to determine the amount of fluid being released and potential for the release to reach sensitive resource areas (e.g., wetlands and waterbodies). Response measures will vary based on location of inadvertent release as discussed below.

11.3.1 Upland Locations

Response measures include:

- The EI will evaluate the release to determine if containment structures are warranted and if they will effectively contain the release.
- If the amount of the surface release is not great enough to allow the practical physical collection from the affected area, it will be diluted with clean water and/or the fluid will be allowed to dry and dissipate naturally.
- Earthen or sandbag berms, silt fence, and/or hay bales will be installed to contain small releases and prevent migration of drilling fluid.
- The Contractor will remove excess fluid at a rate sufficient to prevent an uncontrolled release.
- If the amount of the surface release exceeds that which can be completely contained with hand-placed barriers, small collection sumps (less than 5 cubic yards) may be used (with approval from Enbridge) to remove released drilling fluid by the use of portable pumps and hoses.
- The EI will inform the Contractor to initiate immediate suspension of drilling operations if the fluid release cannot be effectively contained.

11.3.2 Wetland and Waterbody Locations

This section also applies to areas immediately adjacent to wetlands and waterbodies, such as stream banks or steep slopes, where drilling fluid releases could quickly reach surface waters.

- In the event of a drilling fluid release in wetlands, waterbodies, or adjacent areas:
  - The EI will evaluate the release, and the Contractor will implement appropriate containment measures.
  - The EI and the Contractor will evaluate the recovery measures to determine the most effective collection method.
  - Enbridge Engineering and the Contractor will review and consider adjusting drill pressures, pump volume rates, and drill profile, based on best management practices, to minimize the extent of the release.
  - Enbridge will suspend drilling operations if containment measures do not effectively control the release.
- If the amount of the surface release exceeds that which can be contained with hand-placed barriers, small collection sumps (less than 5 cubic yards) may be utilized to collect released drilling fluid for removal by the use of portable pumps and hoses.
- If the amount of the surface release is not great enough to allow the practical physical collection from the affected area without causing additional impacts, with approval from both Enbridge Environmental and Construction Management, the drilling fluid may be diluted with clean water and/or the fluid will be allowed to dry and dissipate naturally.
- Excess fluid will be held within the containment area and removed using pumps or other appropriate measures at a rate sufficient to maintain secure containment.
- Recovered fluid will be stored in a temporary holding tank or other suitable structure out of the floodplain and/or wetland for reuse or eventual disposal in an approved disposal facility
- Enbridge will consult with the appropriate regulatory agencies to evaluate the circumstances of the release, discuss additional containment or cleanup requirements, and determine whether and under what conditions the HDD may proceed.

11.4 NOTIFICATION AND RESUMPTION OF SUSPENDED HDD OPERATIONS

The Contractor will immediately notify the EI of all drilling fluid releases. If the EI determines the release affects wetland or waterbody areas, he or she will immediately notify Enbridge Environment and Construction Management and the appropriate regulatory agencies.

If notifications are necessary during non-business hours they will be done according to prior arrangements made between Enbridge and the regulatory agencies. Follow-up notifications will be made as necessary and practicable.

The conditions under which drilling/boring operations can resume will be discussed with appropriate regulatory agencies and/or field representatives. If containment measures are functioning, and the circumstances and potential impacts of the release are understood, drilling/boring operations will resume.

11.5 CLEAN-UP

The following measures are to be considered as appropriate:

- Drilling fluid will be cleaned up by hand using hand shovels, buckets and soft-bristled brooms as possible without causing extensive ancillary damage to existing vegetation. Clean water washes may also be employed if deemed beneficial and feasible.
- Containment structures will be pumped out and the ground surface scraped to bare topsoil without causing undue loss of topsoil or ancillary damage to existing and adjacent vegetation.
- Material will be collected in containers for temporary storage prior to removal from the site.
- The EI will regularly evaluate the potential for secondary impact from the clean-up process and clean-up activities terminated if physical damage to the site is deemed to exceed the benefits of removal activities. This decision will be made in consultation with the appropriate regulatory agencies and/or Enbridge.

11.6 RESTORATION AND POST-CONSTRUCTION MONITORING

Following cleanup activities, restoration and revegetation of affected areas will be completed in accordance with all applicable local, state, and federal permits in addition to Enbridge's EPP. Enbridge will monitor the release site as appropriate to assure adequate restoration.

Figures

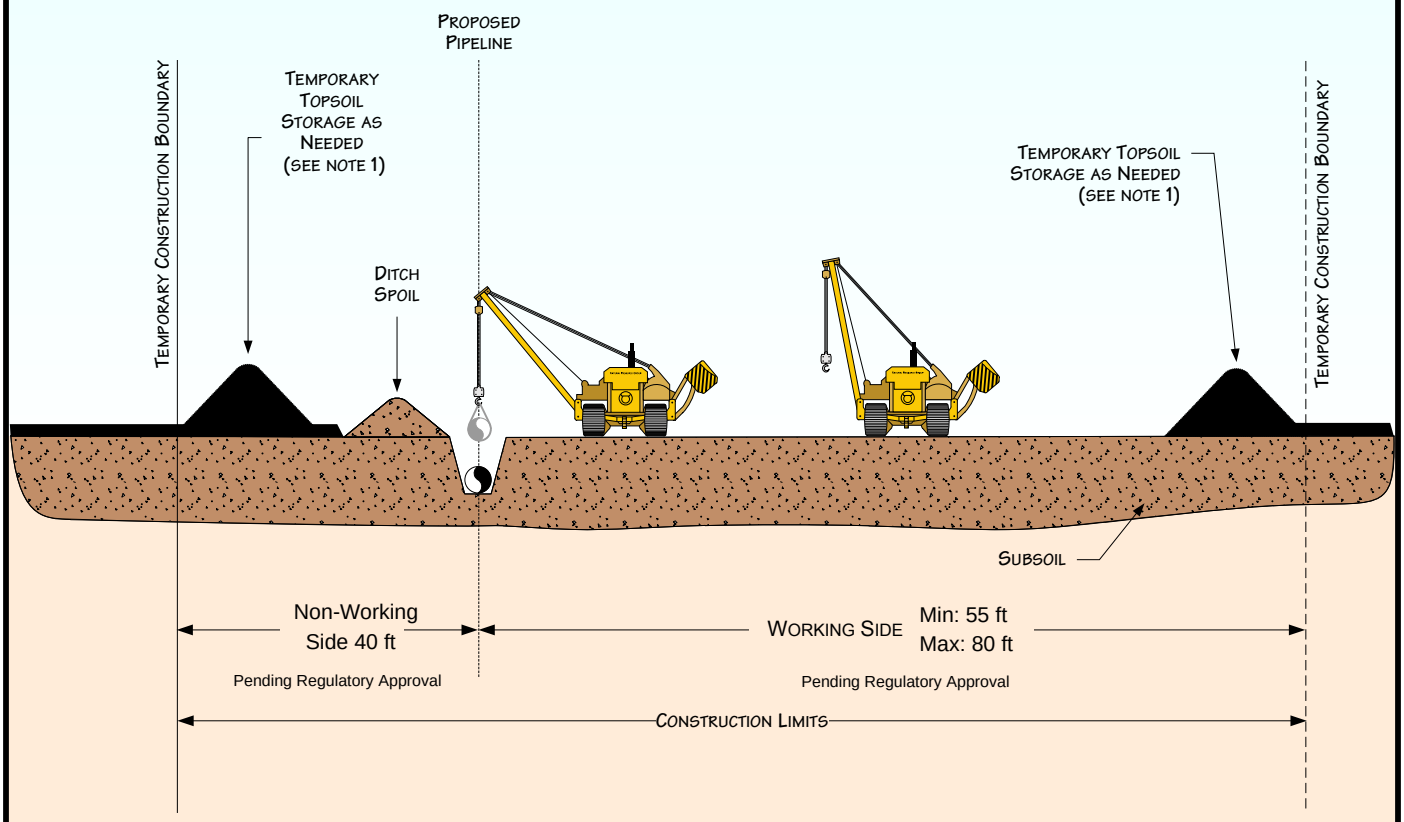

PROFILE

NOTES:

1. STOCKPILE TOPSOIL SEPARATELY FROM DITCH SPOIL AS SHOWN OR IN OTHER CONFIGURATIONS APPROVED BY THE COMPANY.

ENBRIDGE

Figure 1

Environmental Protection Plan

Typical Topsoil Segregation - Full Right-of-Way

DATE: 7/9/2001

REVISED: 3/11/2011

SCALE: NTS

DRAWN BY: JPBOENTJE

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_1-3_TYPICAL_TOPSOIL_SEGREGATION.VSD

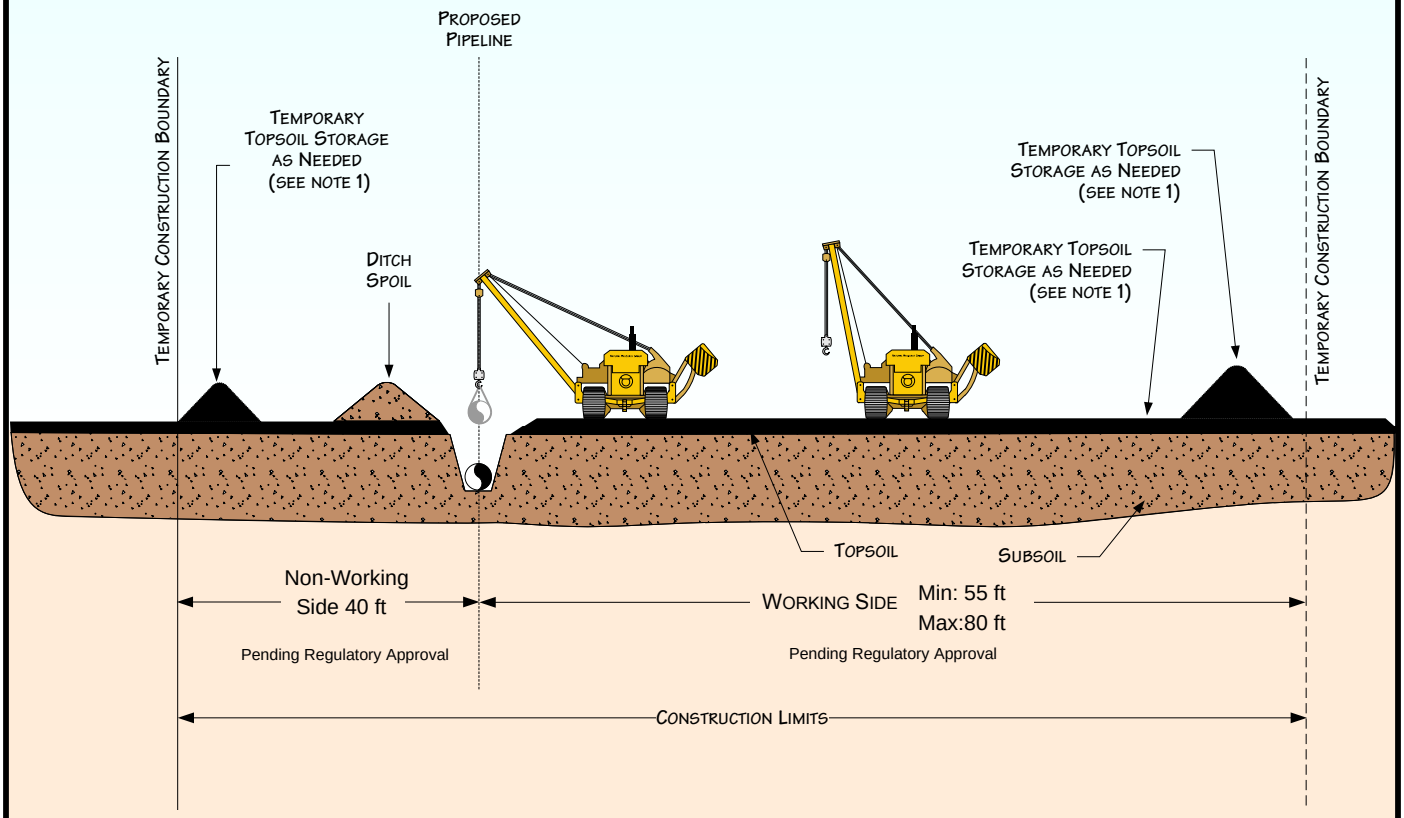

PROFILE

NOTES:

1. STOCKPILE TOPSOIL SEPARATELY FROM DITCH SPOIL AS SHOWN OR IN OTHER CONFIGURATIONS APPROVED BY THE COMPANY.

ENBRIDGE

Figure 2

Environmental Protection Plan

Typical Topsoil Segregation – Trench Line Only

DATE: 7/9/2001

REVISED: 3/11/2011

SCALE: NTS

DRAWN BY: JPBOENTJE

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_1-3_TYPICAL_TOPSOIL_SEGREGATION.VSD

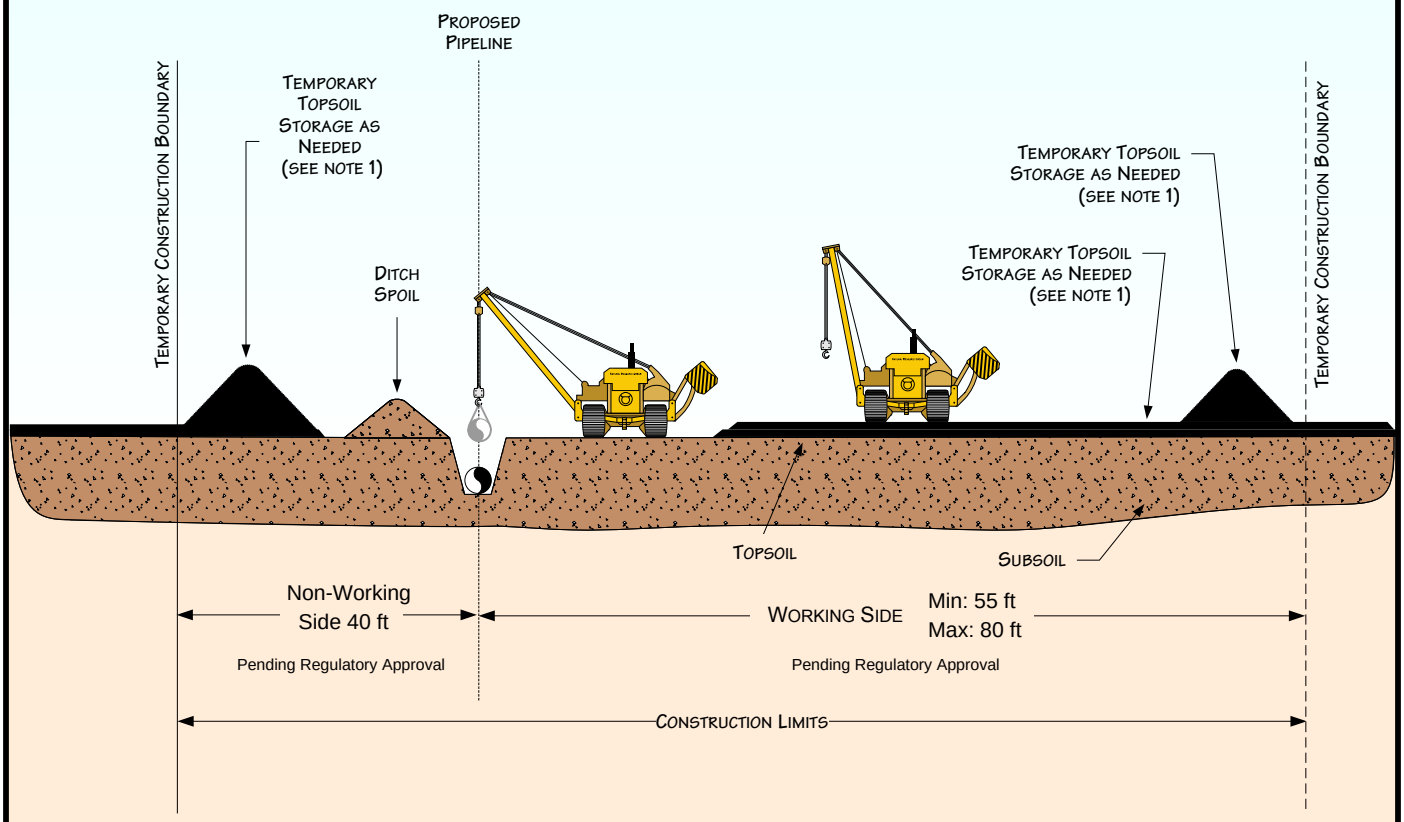

PROFILE

NOTES:

1. STOCKPILE TOPSOIL SEPARATELY FROM DITCH SPOIL AS SHOWN OR IN OTHER CONFIGURATIONS APPROVED BY THE COMPANY.

ENBRIDGE

Figure 3

Environmental Protection Plan

Typical Topsoil Segregation – Modified Ditch Plus Spoil Side

DATE: 7/9/2001

REVISED: 3/11/2011

SCALE: NTS

DRAWN BY: JPBOENTJE

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_1-3_TYPICAL_TOPSOIL_SEGREGATION.VSD

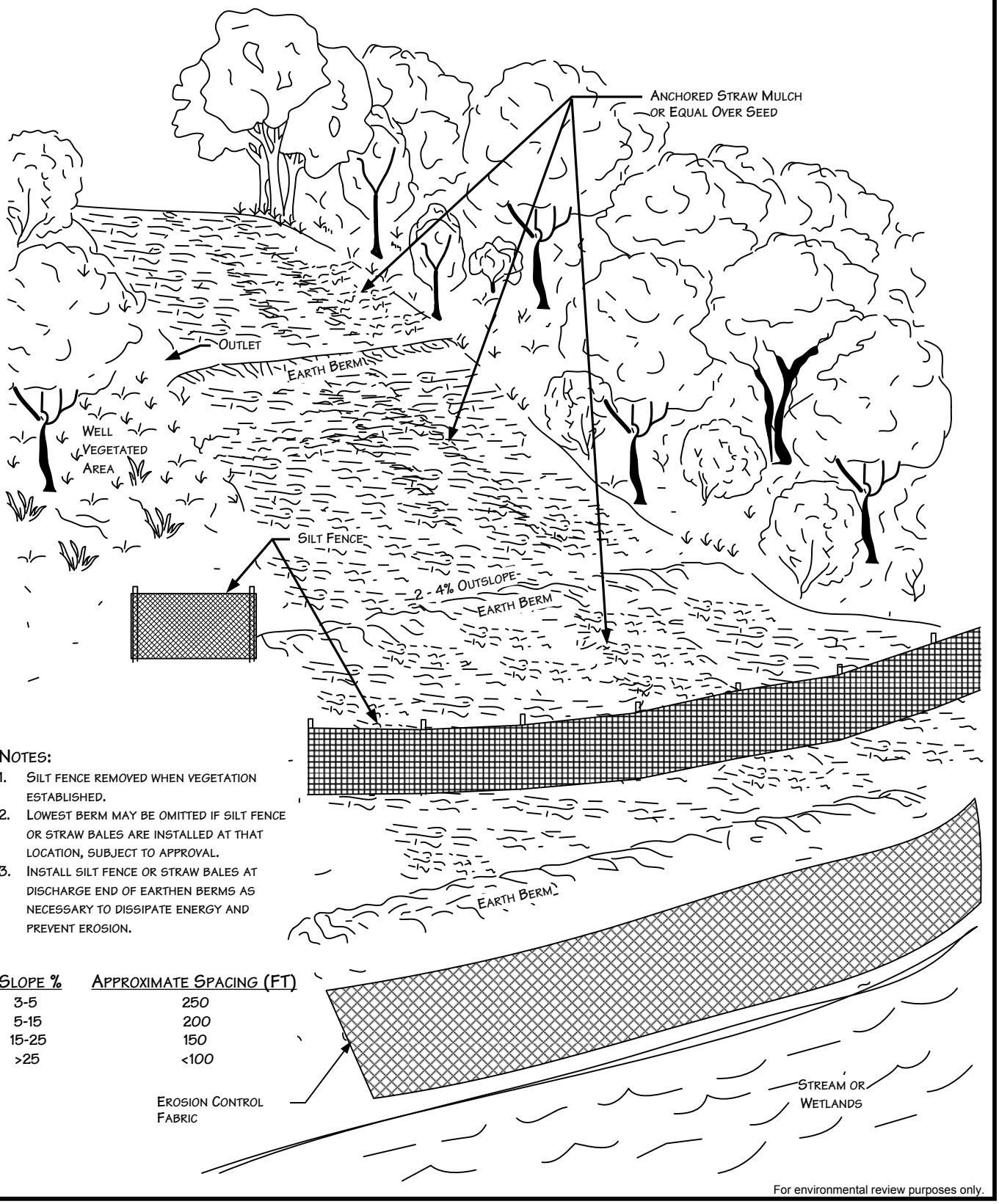

Notes:

1. Silt fence removed when vegetation established.
2. Lowest berm may be omitted if silt fence or straw bales are installed at that location, subject to approval.
3. Install silt fence or straw bales at discharge end of earthen berms as necessary to dissipate energy and prevent erosion.

Slope %	Approximate Spacing (FT)
3-5	250
5-15	200
15-25	150
>25	<100

For environmental review purposes only.

ENBRIDGE

Figure 4

Environmental Protection Plan

Typical Temporary or Permanent Berms
Perspective View

DATE: 11/14/2000
REVISED: 3/11/2011
SCALE: NTS
DRAWN BY: KMKENDALL

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_4_BERMS_PERSPECTIVE_VIEW.VSD

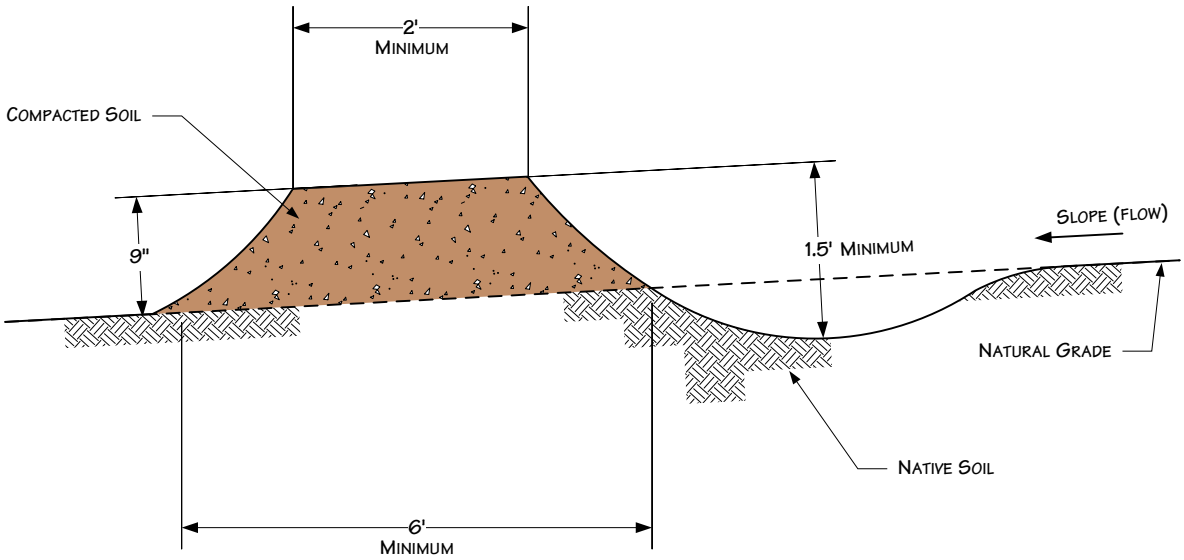

NOTES

1. Berms shall be constructed with 2 to 4 percent outslope.
2. Berms shall be outleted to well vegetated stable areas, silt fences, straw bales or rock aprons.
3. Berms shall be spaced as described in construction specifications.
4. Additional information included on other drawings.

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ENBRIDGE

Figure 5

Environmental Protection Plan

Typical Temporary or Permanent Berms
Elevation View

DATE: 5/25/2001
REVISED: 3/11/2011
SCALE: NTS
DRAWN BY: KMKENDALL
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_5_BERMS_ELEVATION_VIEW.VSD

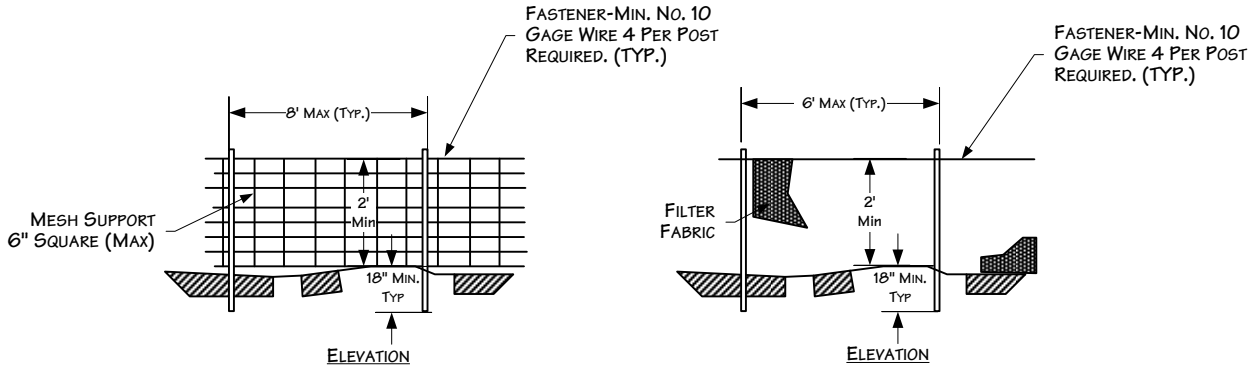

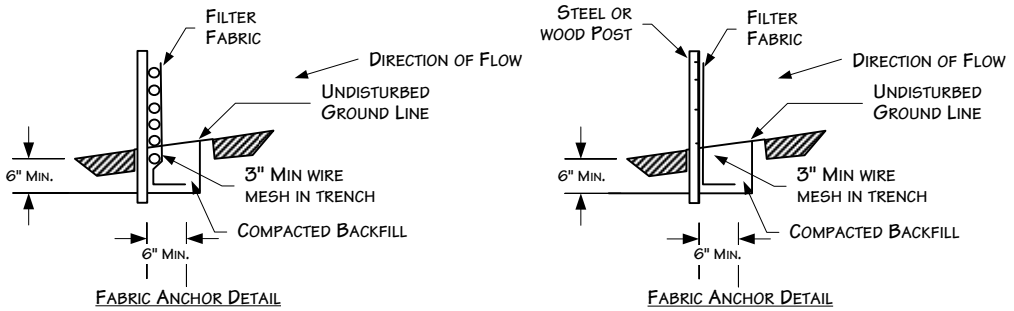

Silt Fence with wire support Plan

Silt Fence Plan

NTS

Notes:

1. Wires of mesh support shall be min. gage no. 12.
2. Filter fabric shall meet the requirements of the specification with equivalent opening size of at least 30 for nonwoven and 50 for woven. (Sieve No.)
3. The posts used to support the silt fence should be hardwood material with a minimum cross sectional area of 4 inches square and 4 feet long. Metal posts should be used in areas that pond water.

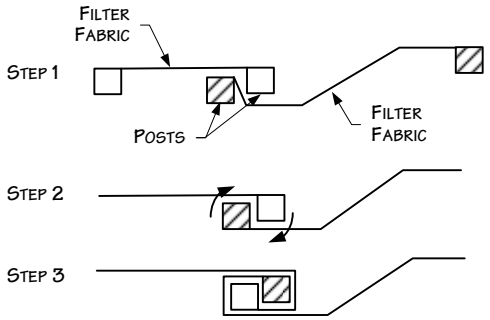

Attaching two silt fences

Notes:

1. Place the end post of the second fence inside the end post of the first fence.
2. Rotate both posts at least 180 degrees in a clockwise direction to create a tight seal with the fabric material.
3. Drive both posts a minimum of 18 inches in the ground and bury the flap.

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ENBRIDGE

Figure 6

Environmental Protection Plan

Typical Silt Fence Installation

DATE:	5/25/2001
REVISED:	3/23/2011
SCALE:	NTS
DRAWN BY:	KMKENDALL

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_6_SILT_FENCE_INSTALL.VSD

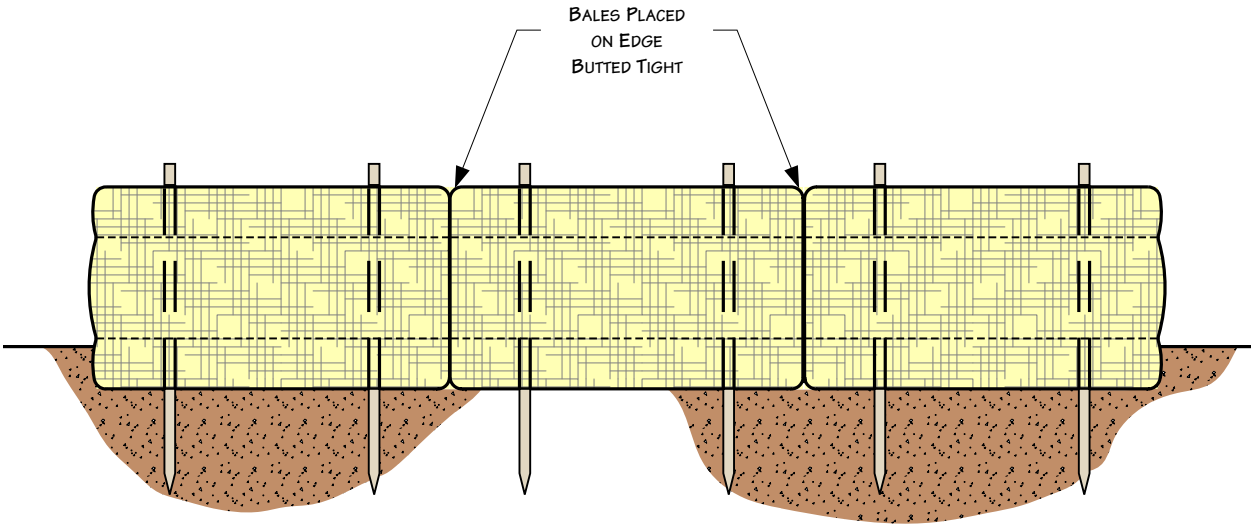

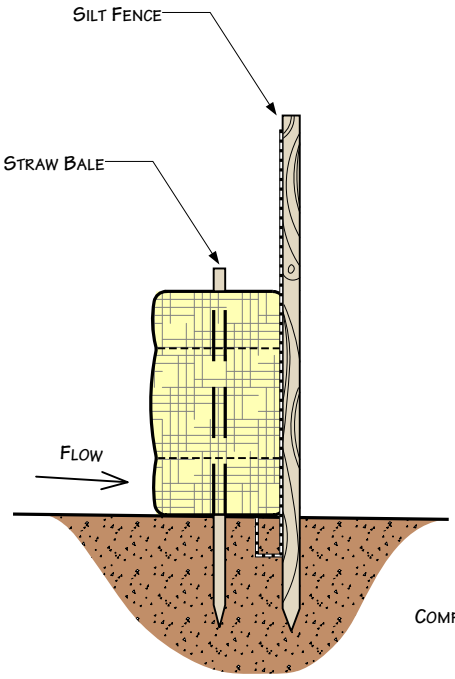

Straw Bales & Silt Fence

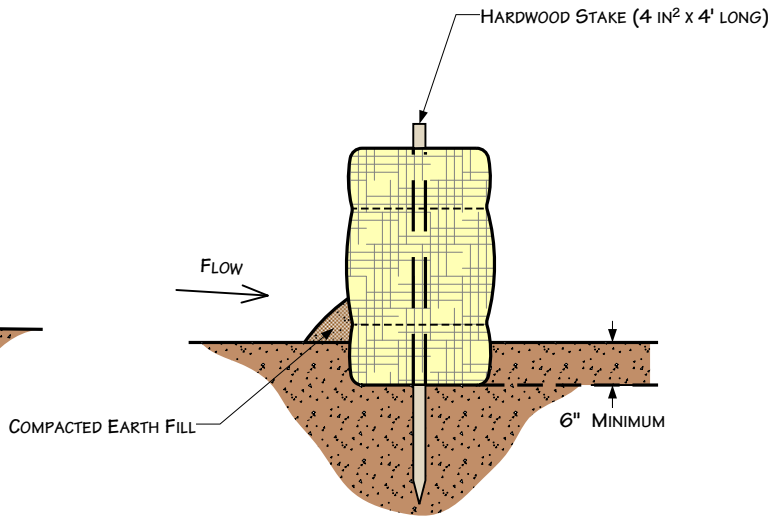

Straw Bales Only

For environmental review purposes only.

ENBRIDGE

Figure 7
Environmental Protection Plan
Typical Straw Bale Installation

DATE:	5/25/01
REVISED:	3/11/11
SCALE:	Not to Scale
DRAWN BY:	KMKENDALL

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_7_STRAW_BALE_INSTALL.VSD

Fill Slope Section

Erosion Control Blankets should be installed vertically downslope.

Note: Slope surface shall be smooth and free of rocks, lumps of dirt, grass and sticks. Mat shall be placed flat on surface to ensure proper soil contact.

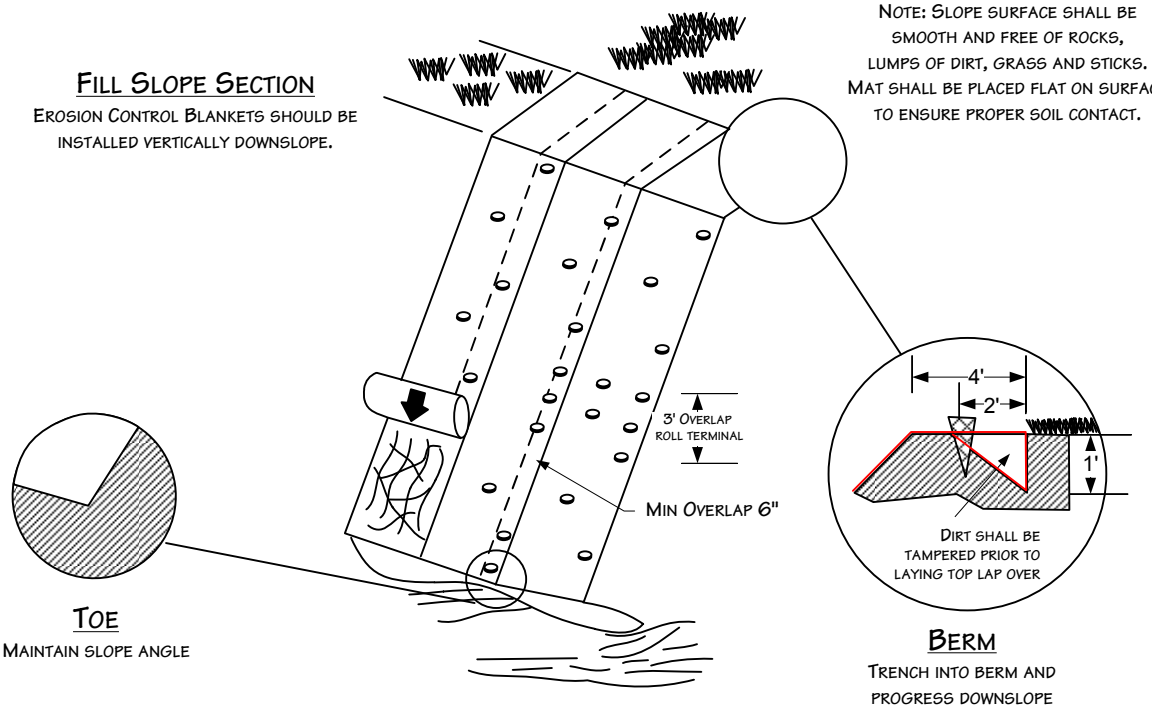

Toe

Maintain slope angle

Berm

Trench into berm and progress downslope

Stream Channel

Erosion Control Blankets should be installed Horizontally with Stream Flow.

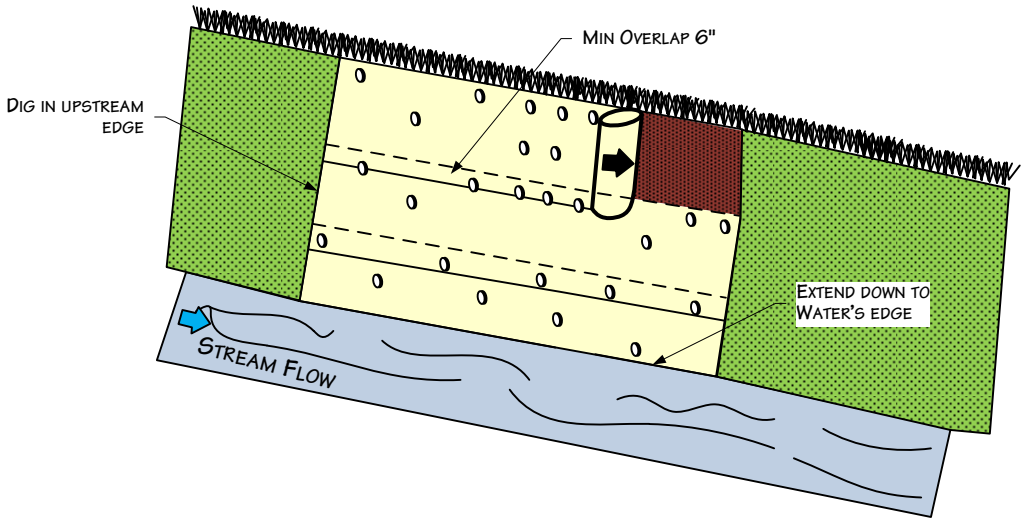

For environmental review purposes only.

ENBRIDGE

Figure 8
Environmental Protection Plan
Typical Erosion Control Blanket Installation

DATE: 5/25/2001
REVISED: 3/23/2011
SCALE: NTS
DRAWN BY: KMKENDALL
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_8_EROSION_CONTROL_BLANKET_INSTALL.VSD

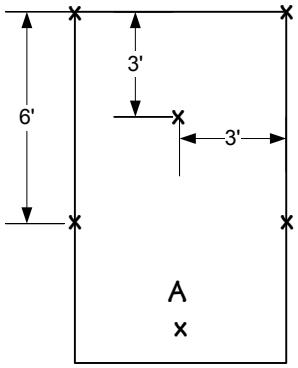

1 Staple Per Sq. Yd

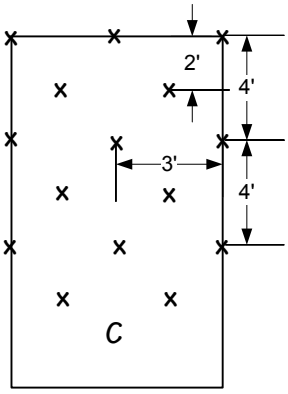

2 Staples Per Sq. Yd

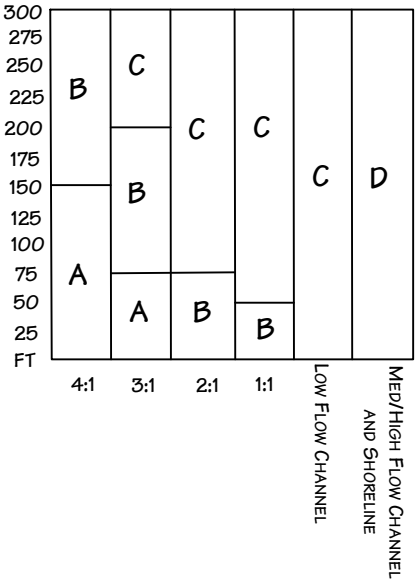

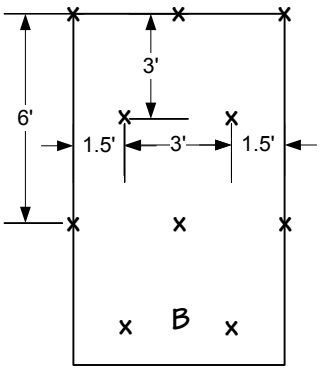

1 ½ Staples Per Sq. Yd

For optimum results, these recommended staple pattern guides must be followed. Suggested anchoring methods vary according to the manufacturer. This chart shows how to slope lengths and how gradients affect sampling patterns.

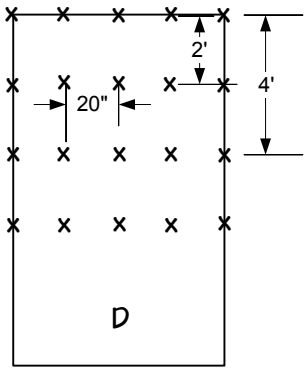

3 1/2 Staples Per Sq. Yd

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Figure 9
Environmental Protection Plan
Typical Staple Pattern for Erosion Control Fabric

DATE:	5/25/2001
REVISED:	3/24/2011
SCALE:	NTS
DRAWN BY:	KMKENDALL

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_9_STAPLE_PATTERN_EROSION_CONTROL_FABRIC.VSD

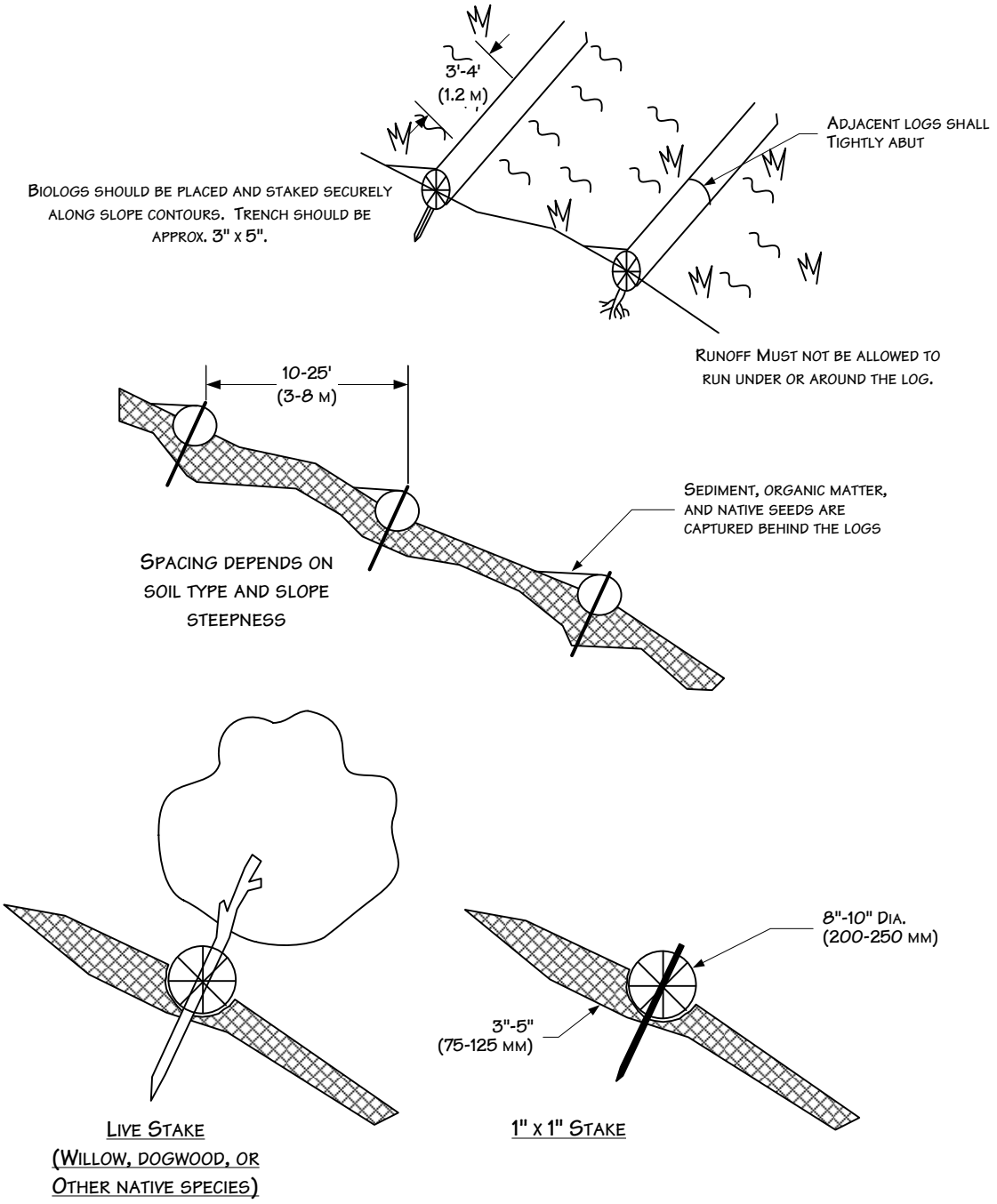

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Figure 10
Environmental Protection Plan
Typical Biolog Installation

DATE: 5/25/2001
REVISED: 3/24/2011
SCALE: NTS
DRAWN BY: KMKENDALL
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_10_BIOLOG INSTALL.VSD

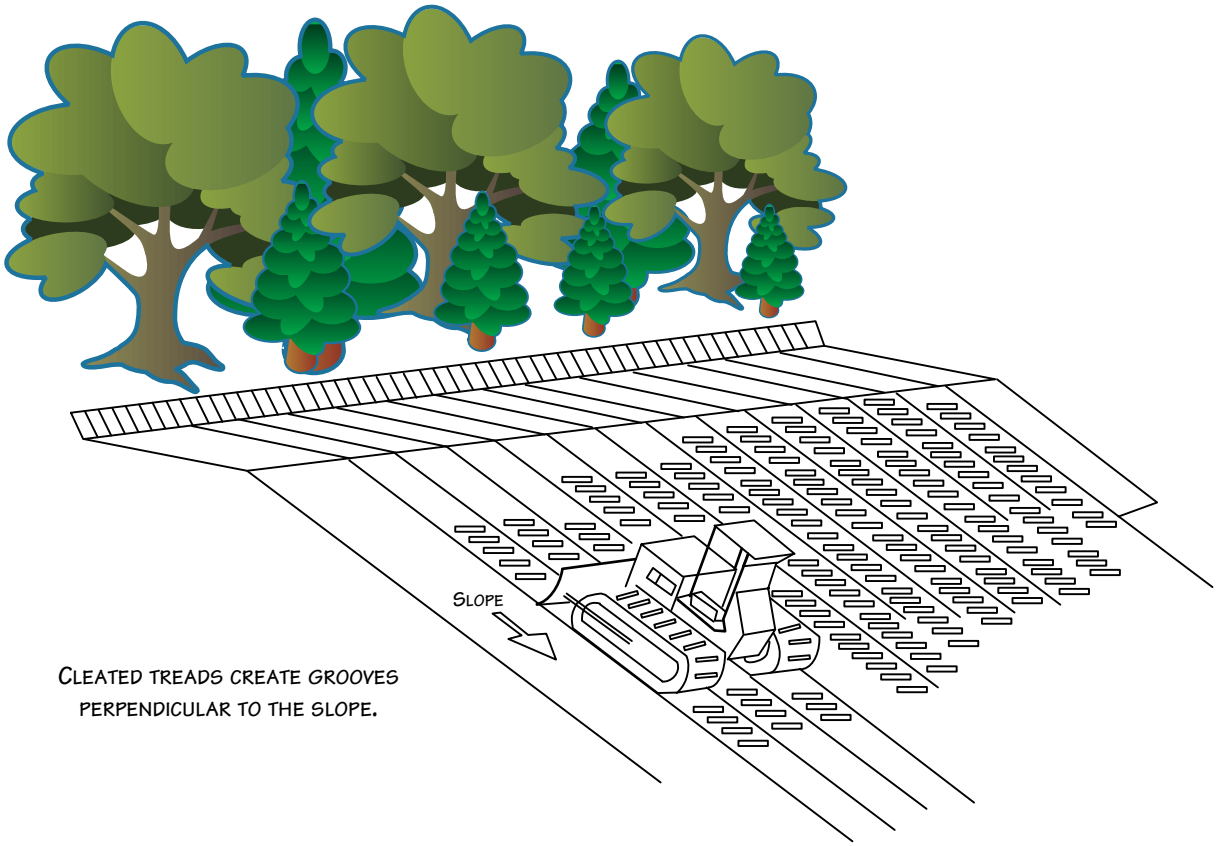

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Figure 11
Environmental Protection Plan
Typical Cat Tracking

DATE: 5/25/2001
REVISED: 3/24/2011
SCALE: NTS
DRAWN BY: KMKENDALL
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_11_CAT_TRACKING.VSD

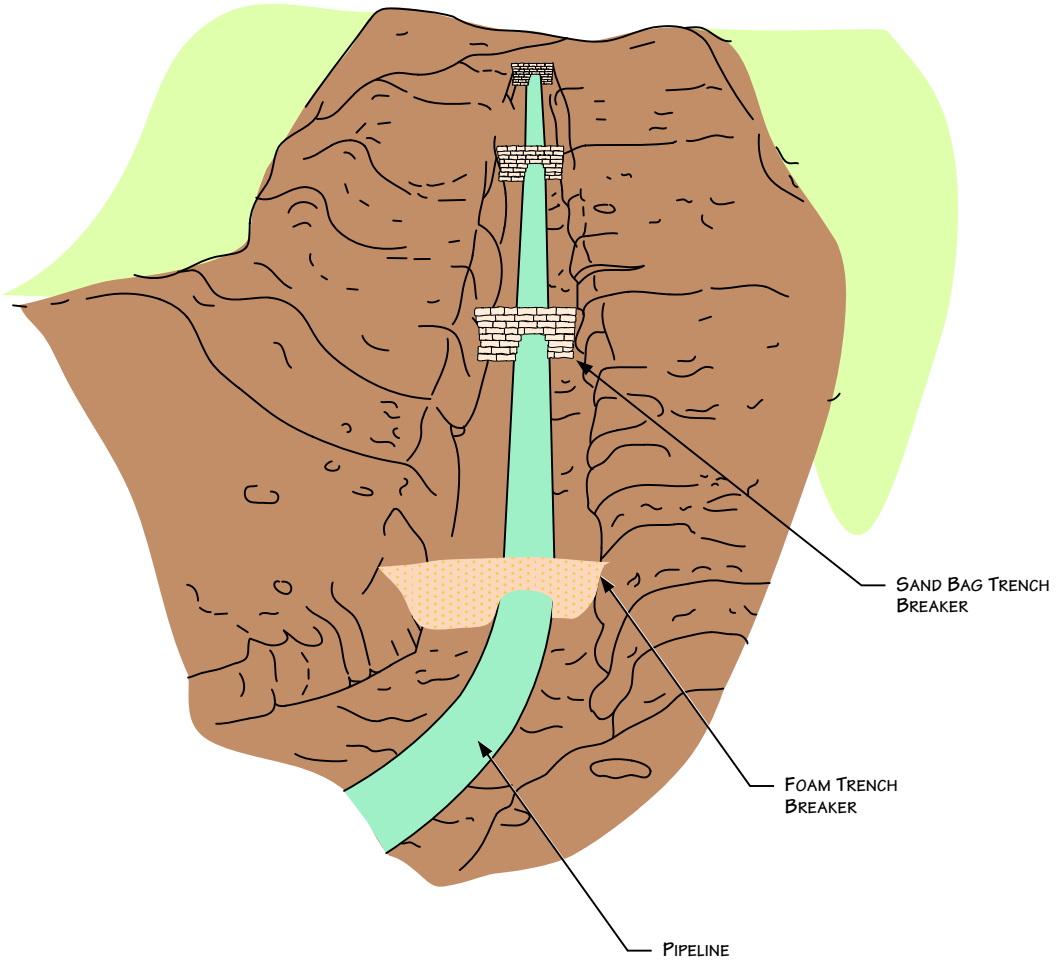

Notes

1. Bags will not be filled with topsoil.
2. Additional information included on other drawings.

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Figure 12
Environmental Protection Plan
Typical Trench Breakers - Perspective View

DATE: 5/25/2001
REVISED: 3/11/11
SCALE: NTS
DRAWN BY: KMKENDALL
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_12_TRENCH_BREAKER_PERSPECTIVE_VIEW.VSD

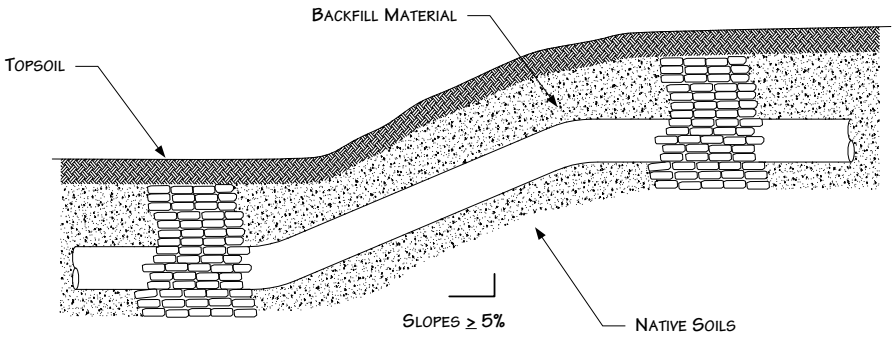

Profile View
(Not to Scale)

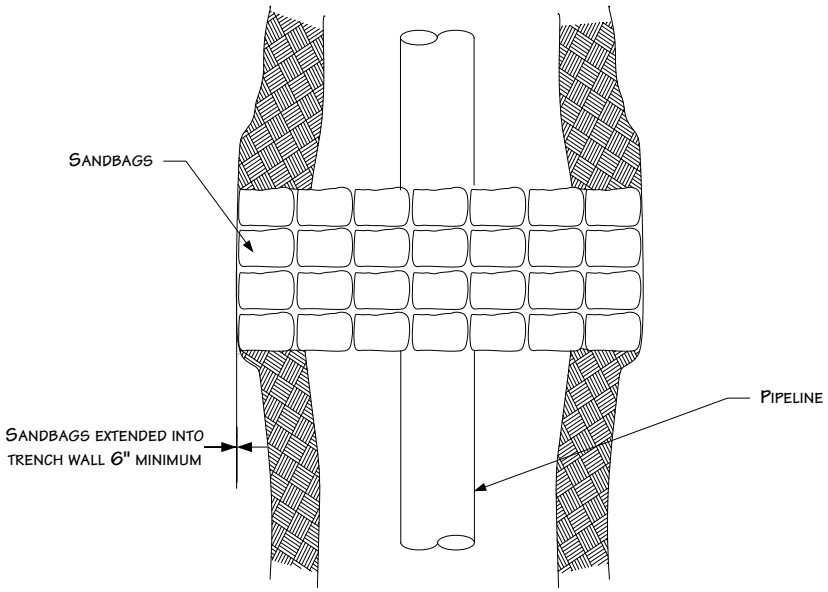

Plan View
(Not to Scale)

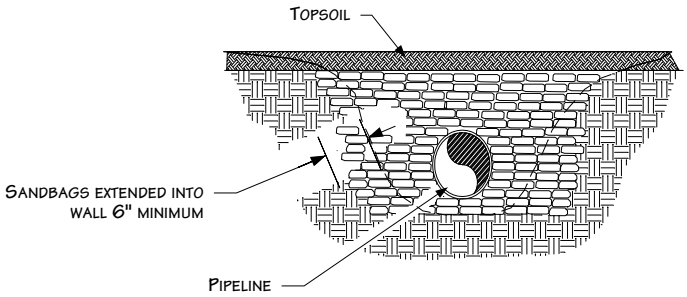

Face View
(Not to Scale)

Notes

1. Bags will not be filled with topsoil
2. Additional information included on other drawings

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ENBRIDGE

Figure 13
Environmental Protection Plan
Typical Trench Breakers – Plan & Profile View

DATE: 11/15/2000
REVISED: 3/11/11
SCALE: NTS
DRAWN BY: KMKENDALL
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_13_TRENCH_BREAKER_PLAN_PROFILE_VIEW.VSD

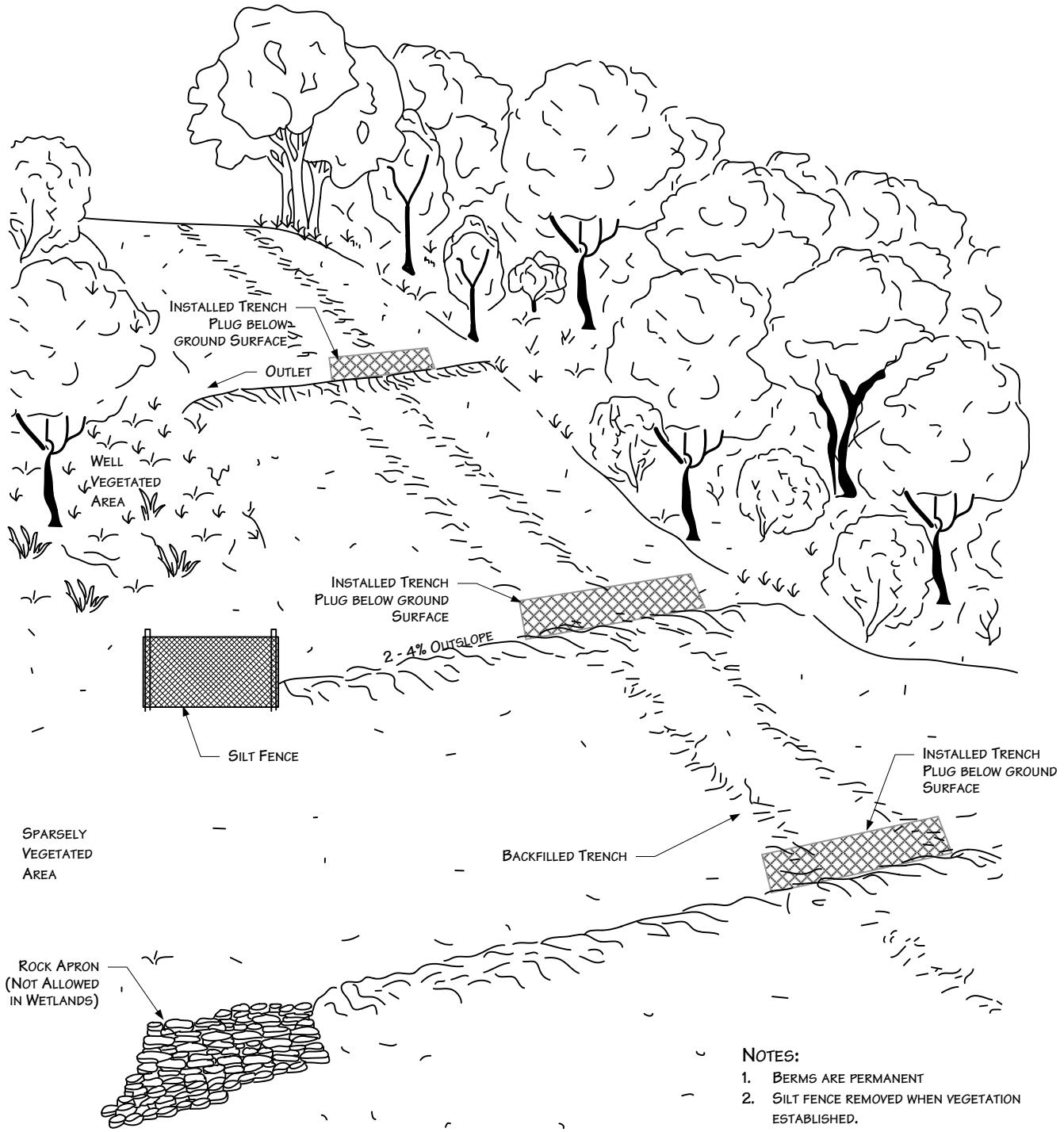

Perspective View
(not to scale)

Slope %	Approximate Spacing (FT)
3-5	250
5-15	200
15-25	150
>25	<100

Notes:

1. Berms are permanent
2. Silt fence removed when vegetation established.
3. Lowest berm may be omitted if silt fence or straw bales are installed at that location, subject to approval.
4. Install silt fence or straw bales at discharge end of earthen berms as necessary to dissipate energy and prevent erosion.

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Figure 14

Environmental Protection Plan

Permanent Slope Breakers - Perspective View

DATE: 5/25/2001
REVISED: 3/11/11
SCALE: NTS
DRAWN BY: KMKENDALL
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_14_SLOPE_BREAKERS_PERSPECTIVE_VIEW.VSD

NOTES:

1. No clearing until time of crossing. Only woody vegetation may be flush cut during initial clearing.

2. 50' ATWS setback from ordinary high water mark (OHWM) except in upland areas of cultivated or rotated cropland or other disturbed land.

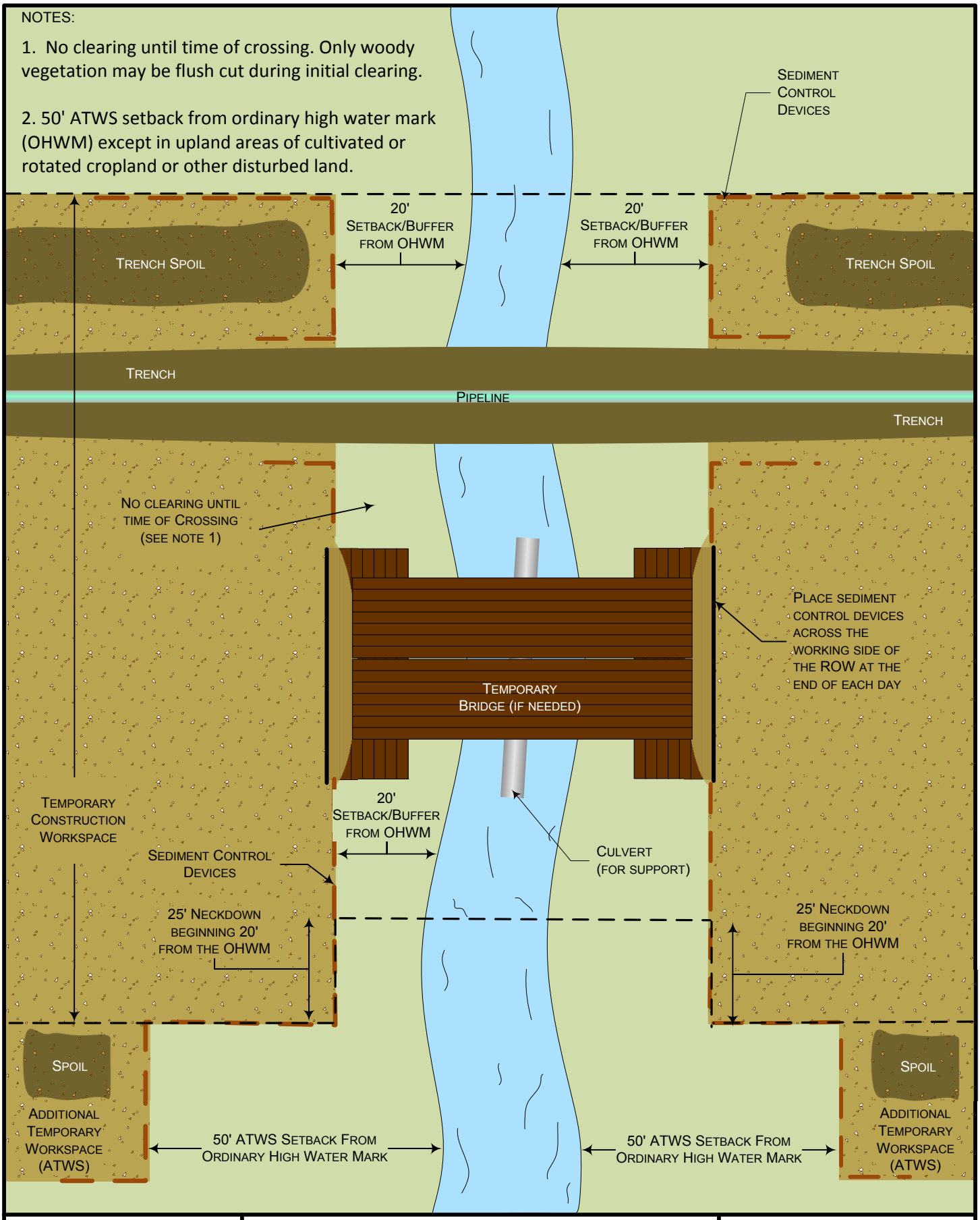

ENBRIDGE

Figure 15
Typical Waterbody Crossing
Open-Cut Wet Trench Method

Environmental Protection Plan

Drawn by: merjent 9/17/2015

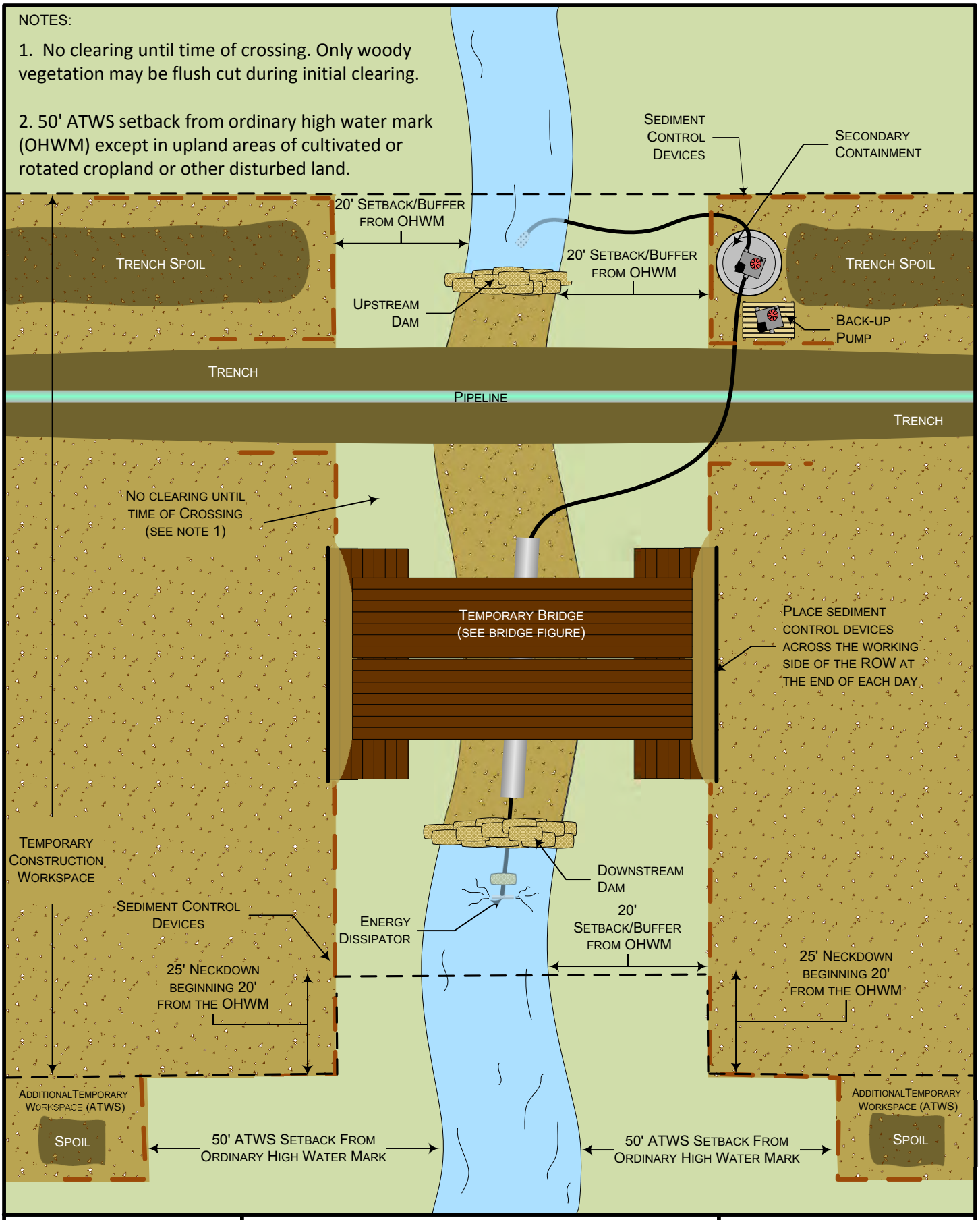

ENBRIDGE

Figure 16
Typical Waterbody Crossing
Dam and Pump Method

Environmental Protection Plan

Drawn by: merjent

9/14/2015

NOTES:

1. No clearing until time of crossing. Only woody vegetation may be flush cut during initial clearing.

2. 50' ATWS setback from ordinary high water mark (OHWM) except in upland areas of cultivated or rotated cropland or other disturbed land.

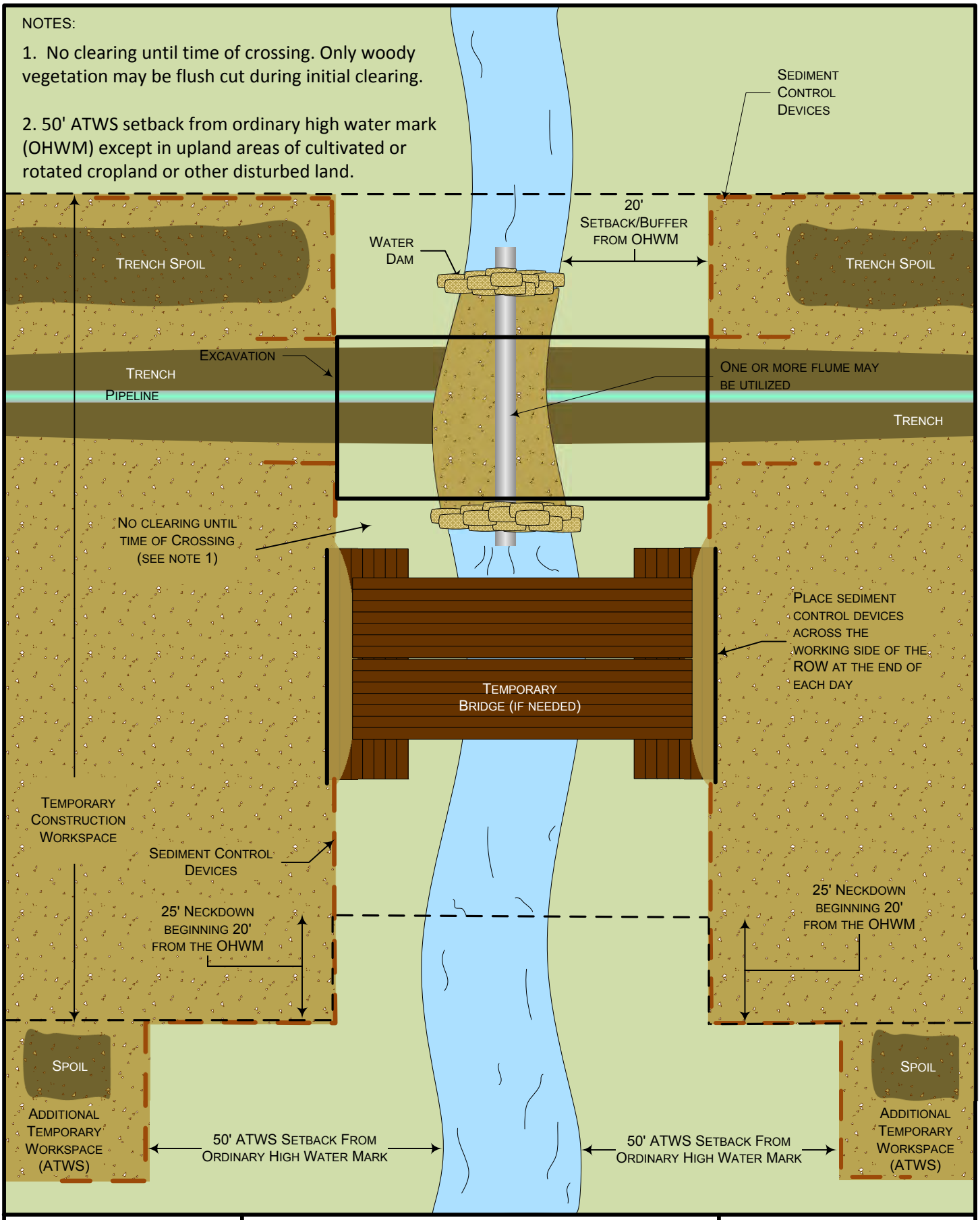

ENBRIDGE

Figure 17
Typical Waterbody Crossing
Flume Method

Environmental Protection Plan

Drawn by: Merjent 9/14/2015

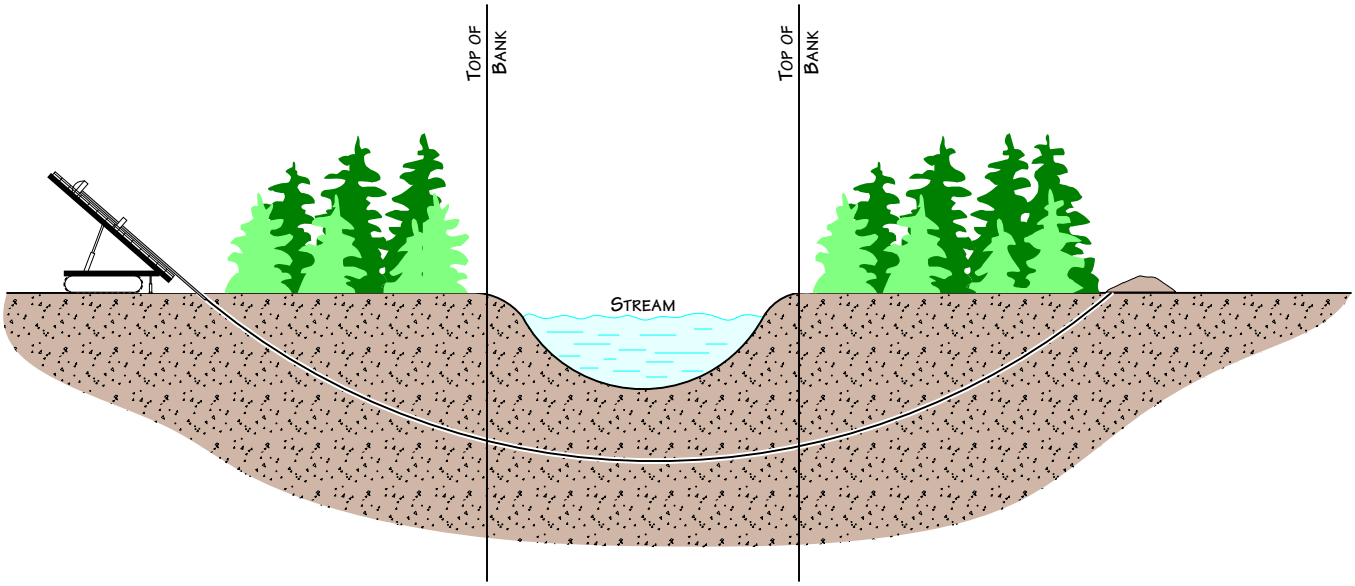

For environmental review purposes only.

ENBRIDGE

Figure 18

Environmental Protection Plan

Typical Waterbody Crossing
Directional Drill Method

DATE: 7/14/2000
REVISED: 3/11/11
SCALE: NTS
DRAWN BY: KMKENDALL
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_18_WATERBODY_DIRECTIONAL_DRILL.VSD

Plan View

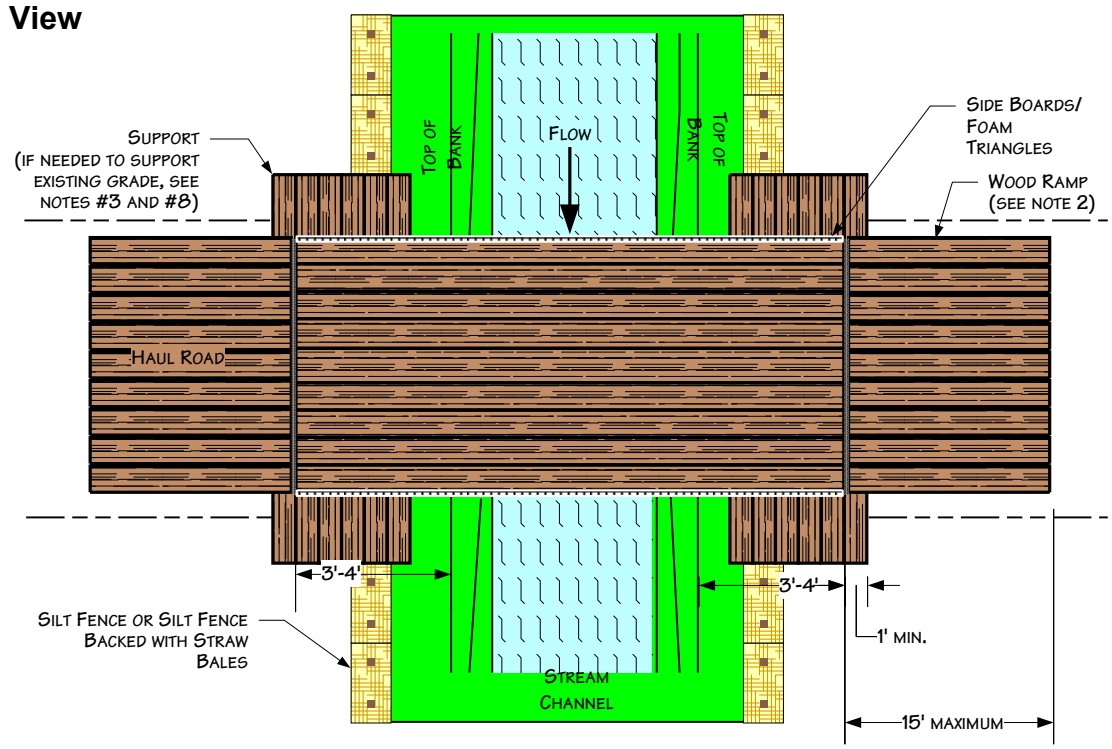

Profile View

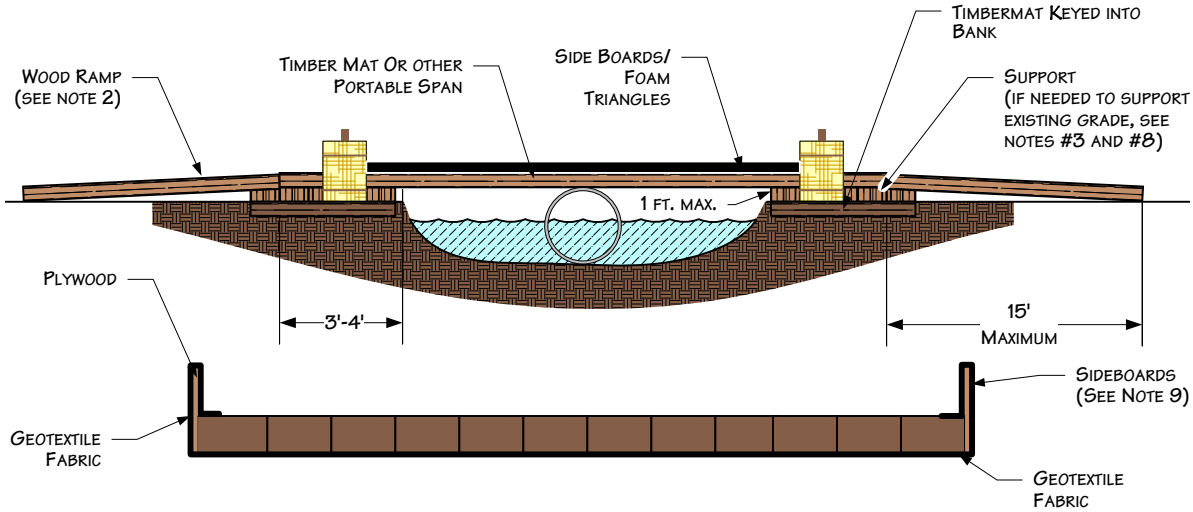

Notes:

1. Inspect bridge opening periodically and following rainfalls of over ½". Remove any debris restricting flow and deposit it at an upland site outside of floodplain.
2. If physical circumstances prohibit wood or metal ramps, earthen ramps may be used as approved.
3. Inspect bridge elevation so bridge remains supported above OHWM.
4. The culvert support must be anchored to the stream bottom and may not be supported with fill.
5. Earthen ramp cannot be taller than 1' and cannot extend for more than 15' on either side of the crossing.
6. The bridge must span ABOVE OHWM TO OHWM.
7. Additional support must be added on top of bank and under span if initial support starts to settle.
8. Erosion and sedimentation control measures shall be inspected and maintained in accordance with the company's Environmental Protection Plan
9. Sideboards will be installed on temporary bridges to minimize the potential for sediment transport. Sideboards may be constructed out of plywood, or equivalent, and affixed to the outer sides of the bridge. Geo-textile fabric, or equivalent, must also be adequately secured to the underside of the bridge to prevent material from falling through the bridge deck. The geo-textile fabric or an equivalent should be secured to the bottom of the bridge and wrapped around the sideboards in a continuous fashion.

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ENBRIDGE

Figure 19

Environmental Protection Plan

Typical Span Type Bridge
With or Without Instream Support

DATE:	3/11/2003
REVISED:	3/25/2011
SCALE:	NTS
DRAWN BY:	KMK6792

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_19_BRIDGE_SPAN.VSD

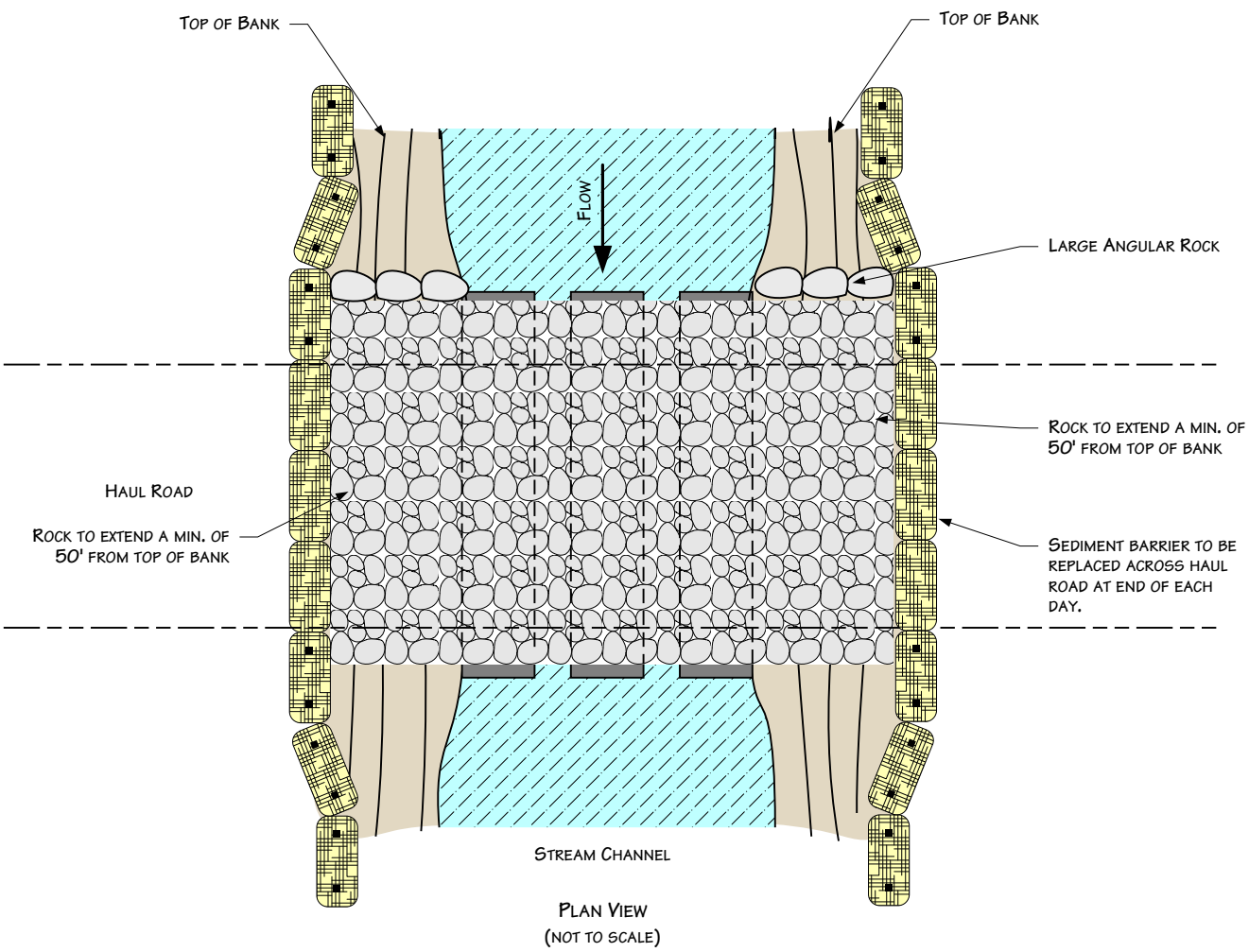

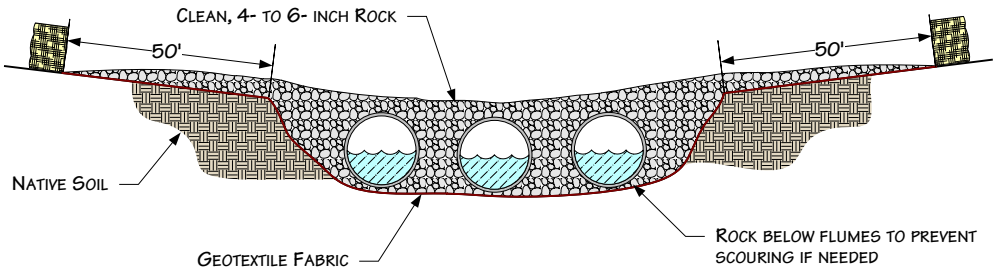

NOTES:

1. Steel flume pipe(s) sized to allow for stream flow and equipment load.
2. Straw bales shall be placed across bridge entrance every night.
3. Additional information included on other Drawings.

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Figure 20

Environmental Protection Plan

Typical Rock Flume Bridge

DATE:	5/25/2001
REVISED:	3/15/11
SCALE:	NTS
DRAWN BY:	KMKENDALL

NATURAL RESOURCE GROUP

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_20_ROCK_FLUME_BRIDGE.VSD

Dewatering Discharge in Well Vegetated Uplands

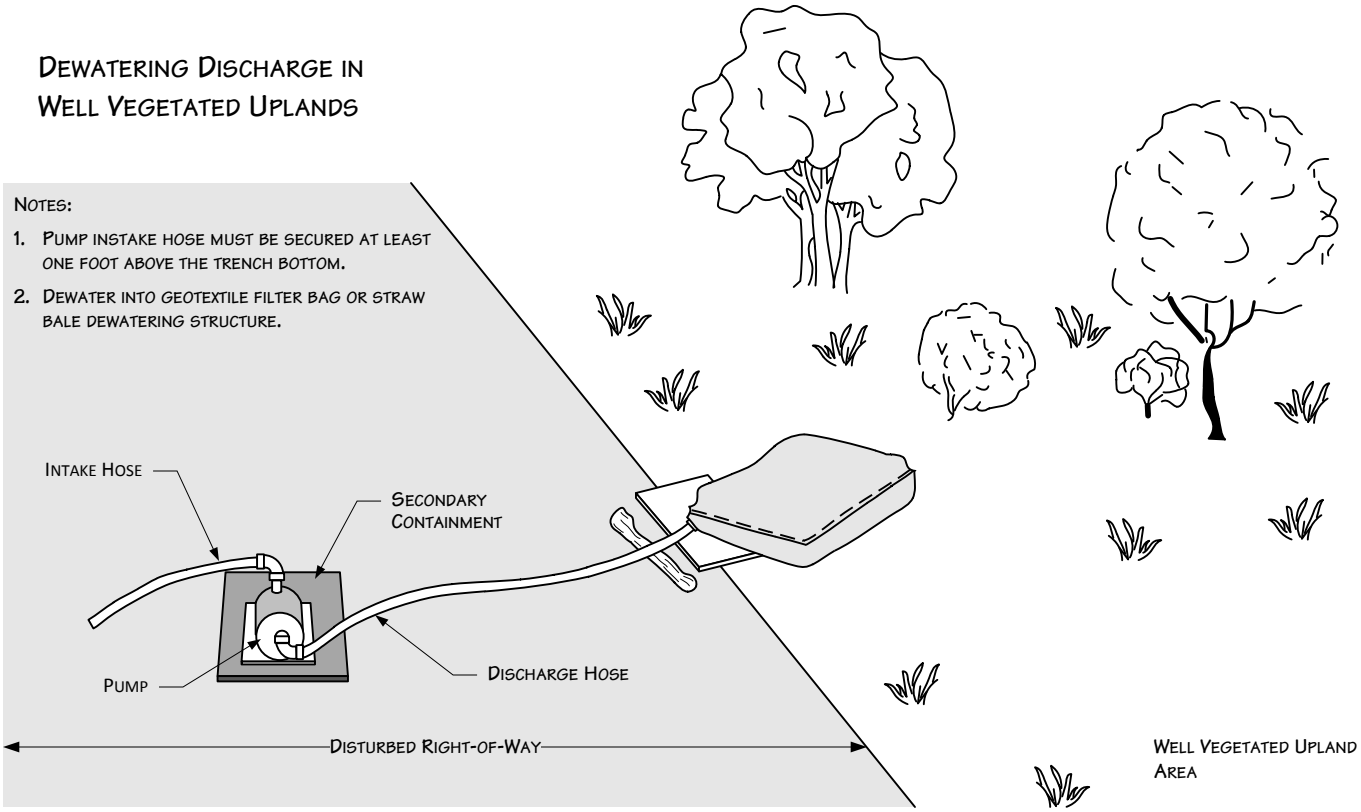

Notes:

1. Pump intake hose must be secured at least one foot above the trench bottom.
2. Dewater into geotextile filter bag or straw bale dewatering structure.

Geotextile Filter Bag

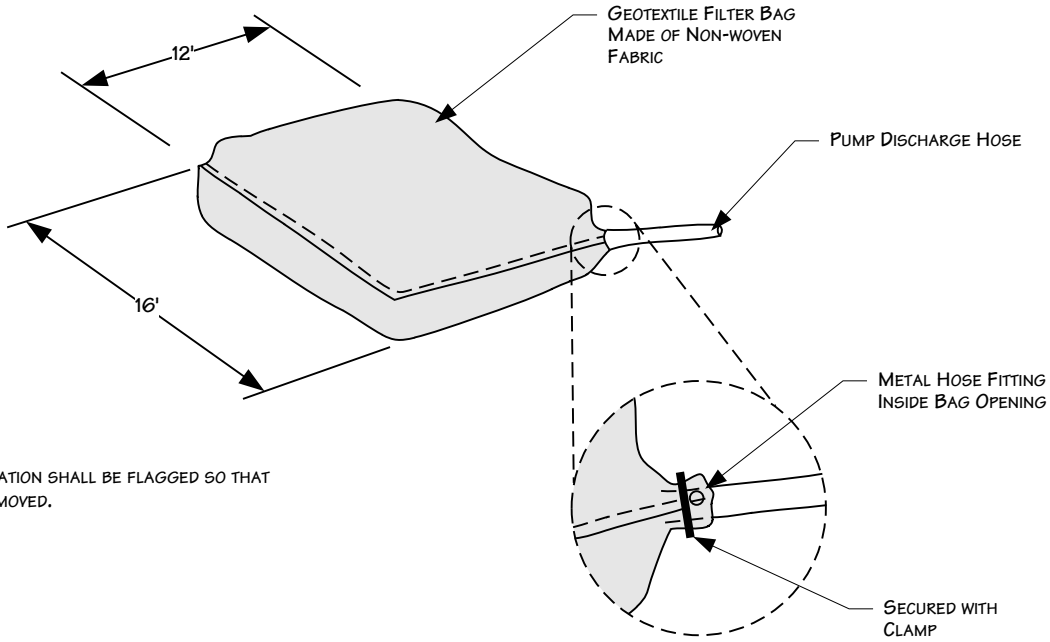

Note:

1. Filter bag location shall be flagged so that bag can be removed.

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ENBRIDGE

Figure 21
Environmental Protection Plan
Typical Dewatering Measures

DATE:	5/25/2001
REVISED:	3/15/11
SCALE:	NTS
DRAWN BY:	KMKENDALL

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_21_DEWATERING_MEASURES.VSD

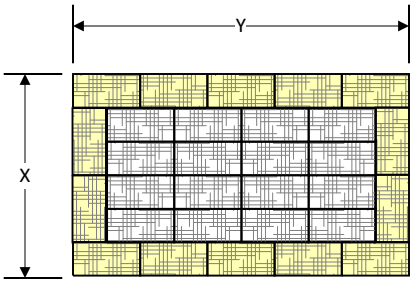

NOTES

1. ARRANGE THE STRAW BALES TO THE X AND Y DIMENSIONS AS SPECIFICIED BELOW.
2. IF BOTTOM OF STRUCTURE IS NOT LINED WITH STRAW BALES (OPTION 1), LINE ENTIRE STRUCTURE WITH GEOTEXTILE FILTER FABRIC.

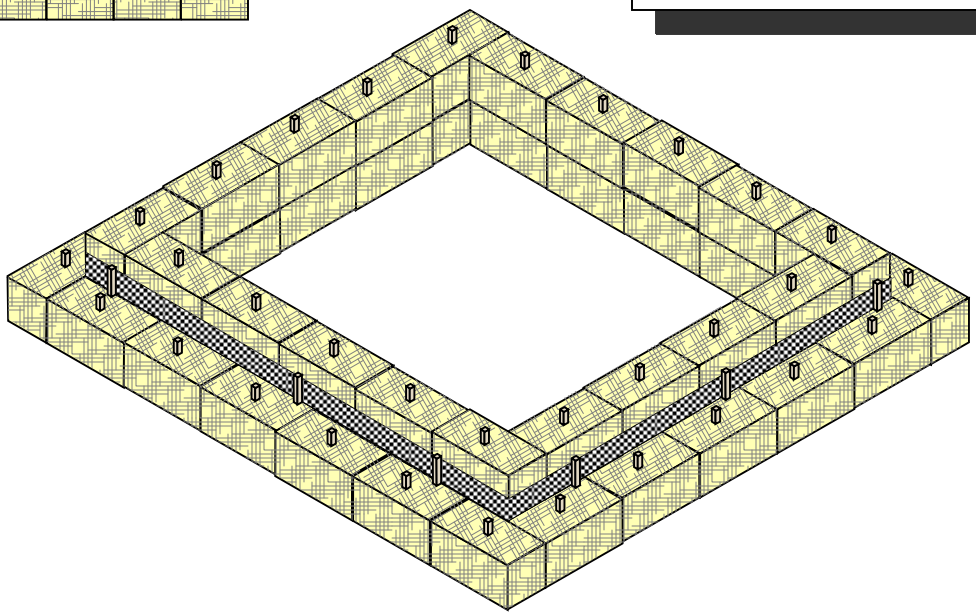

PERSPECTIVE VIEW

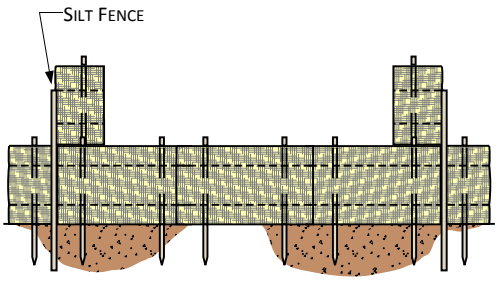

OPTION 1

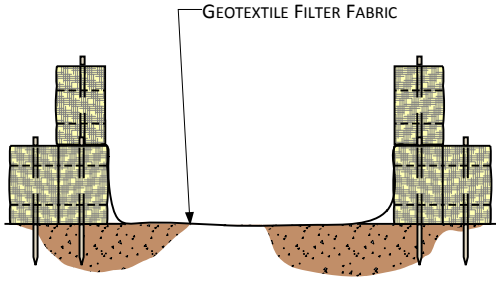

OPTION 2

TYPICAL MINIMUM SUMP DIMENSIONS (FEET)		MAXIMUM PUMPING RATE
X	Y	GALLONS PER MINUTE
10	20	300
15	20	350
20	20	400
20	25	450
25	25	500
25	30	550
30	30	660

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Figure 22A
Environmental Protection Plan
Straw Bale Dewatering Structure

NATURAL RESOURCE GROUP

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\
FIG_22_STRAW_BALE_DEWATERING_STRUCTURE_C.VSD

SCALE: NTS	DATE: 3/11/2003	REVISED: 3/25/2011	DRAWN BY: KJANDERSON

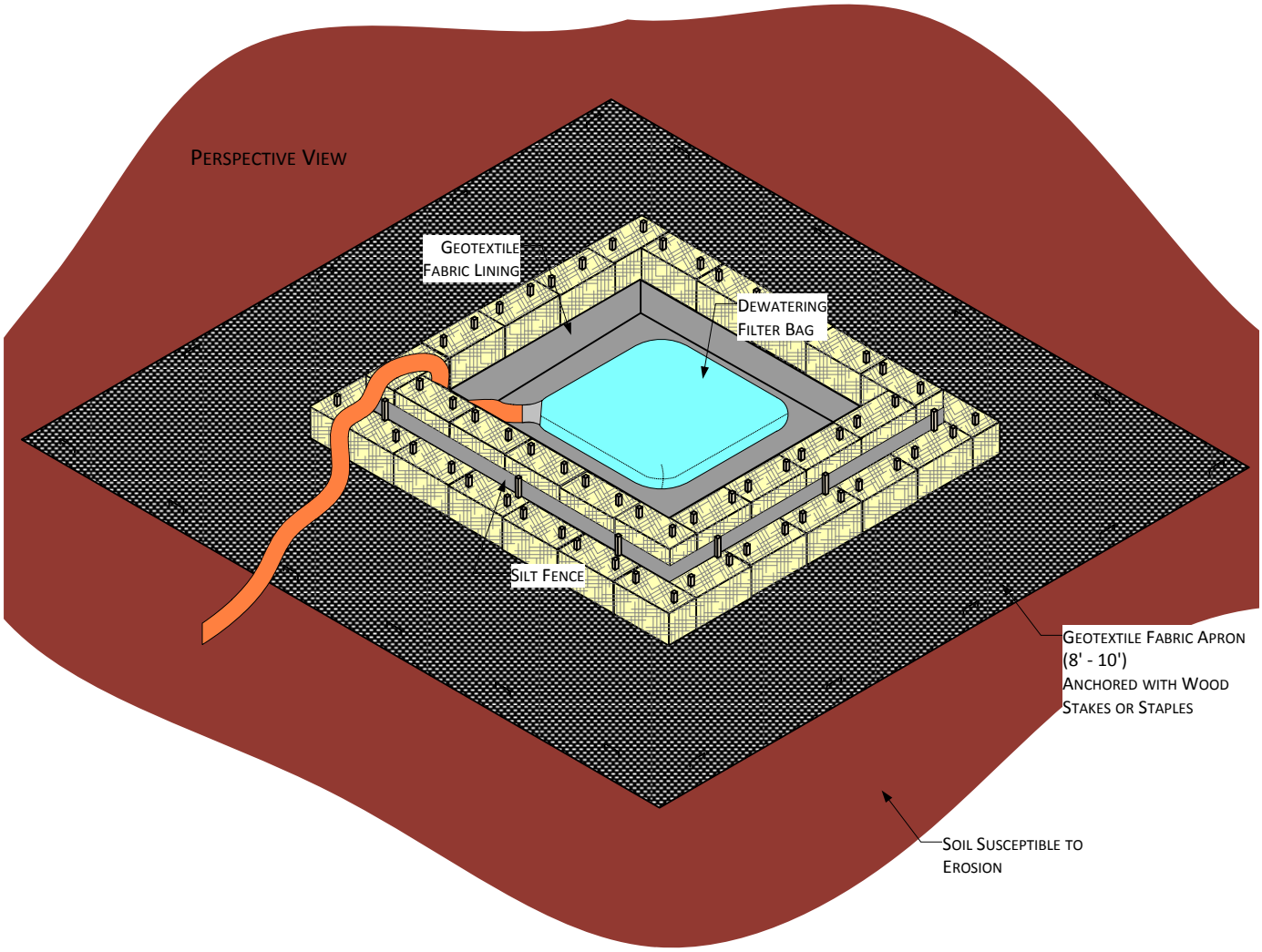

Construct Dewatering Structure to accommodate anticipated pumping rates. See example below.

Example Pumping rate = 200 g.p.m.
Storage volume (c.f.) = 16 x 200 g.p.m. = 3200 c.f.
Height of straw bale structure = 3 feet (2 bales stacked) (based on height of bales, not silt fence)
Inside dimensions of structure = 33 x 33 feet square

Notes:

1. Silt fence ends must be wrapped to join two sections.
2. Install silt fence 2 inches above top of straw bales, and anchor a minimum of 8 inches straight down.
3. Silt fence post staking must be 4 feet or less.
4. Dewatering intake hose supported at least 1 foot from bottom of trench being dewatered.
5. Erosion and sedimentation control measures shall be inspected and maintained in accordance with the company's upland erosion control, revegetation, and maintenance plan.

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Figure 22B
Environmental Protection Plan
Straw Bale Dewatering Structure

NATURAL RESOURCE GROUP

K:_CLIENT_PROJECTS\D-FEEL\2011-019\ FIG_22_STRAW_BALE_DEWATERING_STRUCTURE_C.VSD	SCALE: NTS	DATE: 3/11/2003	REVISED: 3/25/2011	DRAWN BY: KJANDERSON

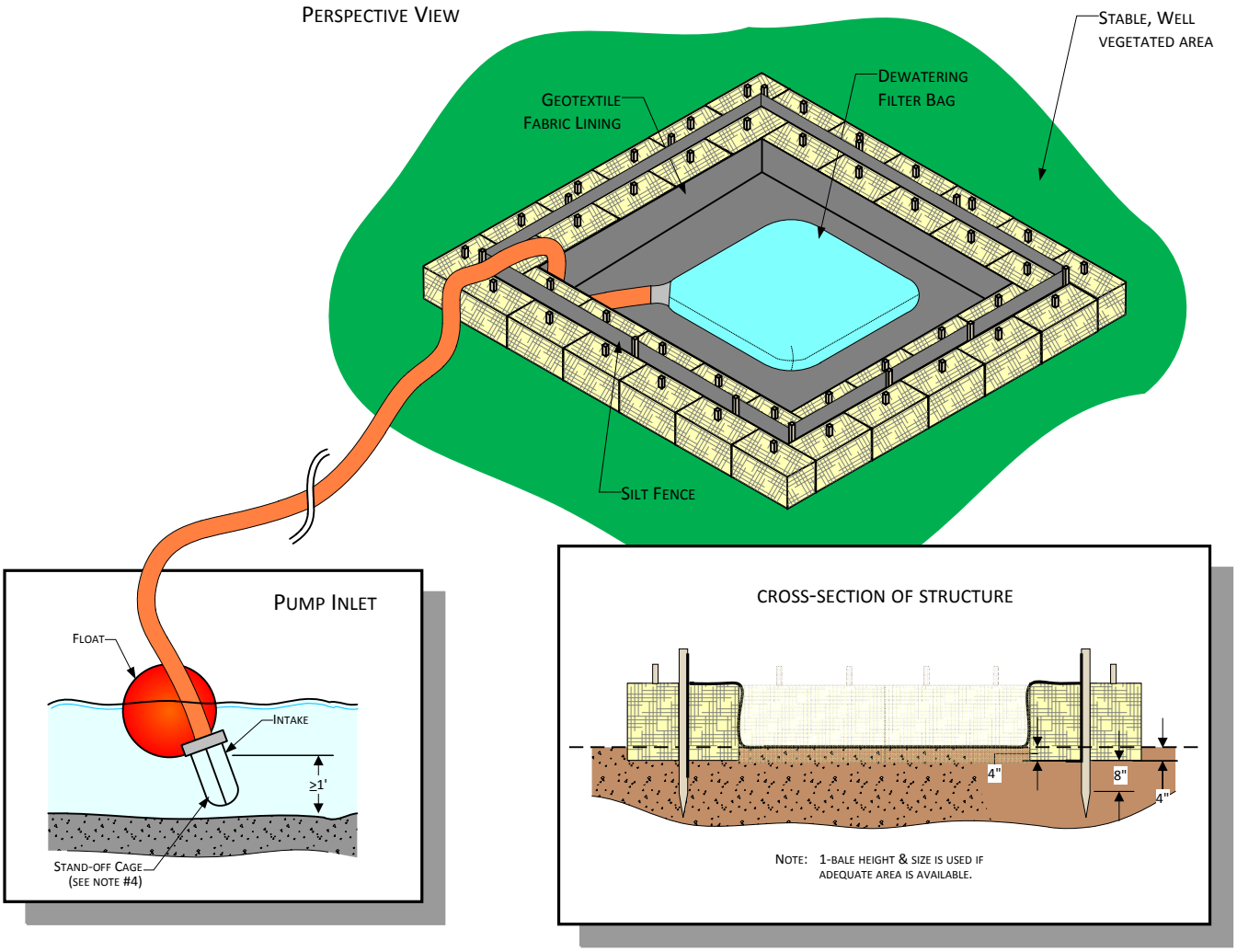

CONSTRUCT DEWATERING STRUCTURE TO ACCOMMODATE ANTICIPATED PUMPING RATES. SEE EXAMPLE BELOW.

EXAMPLE PUMPING RATE = 200 G.P.M.
STORAGE VOLUME (C.F.) = 16 X 200 G.P.M. = 3200 C.F.
HEIGHT OF STRAW BALE STRUCTURE = 1.5 FEET (1 BALE) (BASED ON HEIGHT OF BALES, NOT SILT FENCE)
INSIDE DIMENSIONS OF STRUCTURE = 46 X 46 FEET SQUARE

NOTES:

1. SILT FENCE ENDS MUST BE WRAPPED TO JOIN TWO SECTIONS.
2. INSTALL SILT FENCE 2 INCHES ABOVE TOP OF STRAW BALE, AND ANCHOR A MINIMUM OF 8 INCHES STRAIGHT DOWN.
3. SILT FENCE POST STAKING MUST BE 4 FEET OR LESS.
4. DEWATERING INTAKE HOSE SUPPORTED AT LEAST 1 FOOT FROM BOTTOM OF TRENCH BEING DEWATERED.
5. USE A FILTER BAG AT THE DISCHARGE HOSE END.
6. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED IN ACCORDANCE WITH THE COMPANY'S UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN.

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Figure 22C
Environmental Protection Plan
Straw Bale Dewatering Structure

NATURAL RESOURCE GROUP

K:_CLIENT_PROJECTS\D-FIEEL\2011-019\ FIG_22_STRAW_BALE_DEWATERING_STRUCTURE_C.VSD	SCALE: NTS	DATE: 3/11/2003	REVISED: 3/25/2011	DRAWN BY: KJANDERSON

NOTE: PLACE JUTE BLANKET A MINIMUM OF ONE (1) FOOT UNDER RIP RAP. EXTEND JUTE BLANKET FROM MEAN HIGH WATER LEVEL TO SEVERAL FEET BEHIND HIGH BANK.

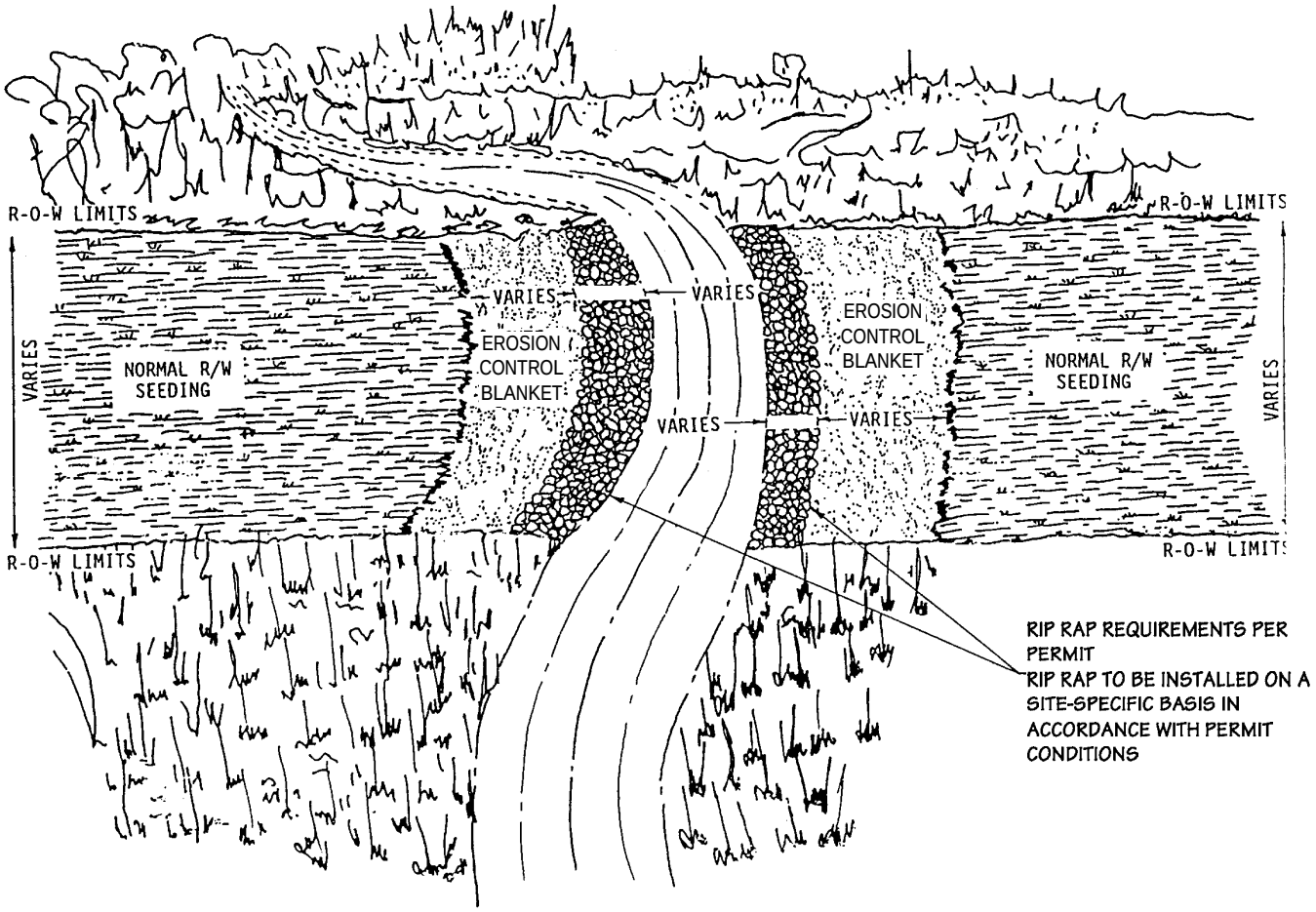

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Figure 23

Environmental Protection Plan

Typical Final Stream Bank Stabilization
Rip Rap & Erosion Control

DATE:	7/19/2000
REVISED:	3/14/11
SCALE:	NTS
DRAWN BY:	KMKENDALL

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_23_STREAM_BANK_STABILIZATION.VSD

NATURAL RESOURCE GROUP

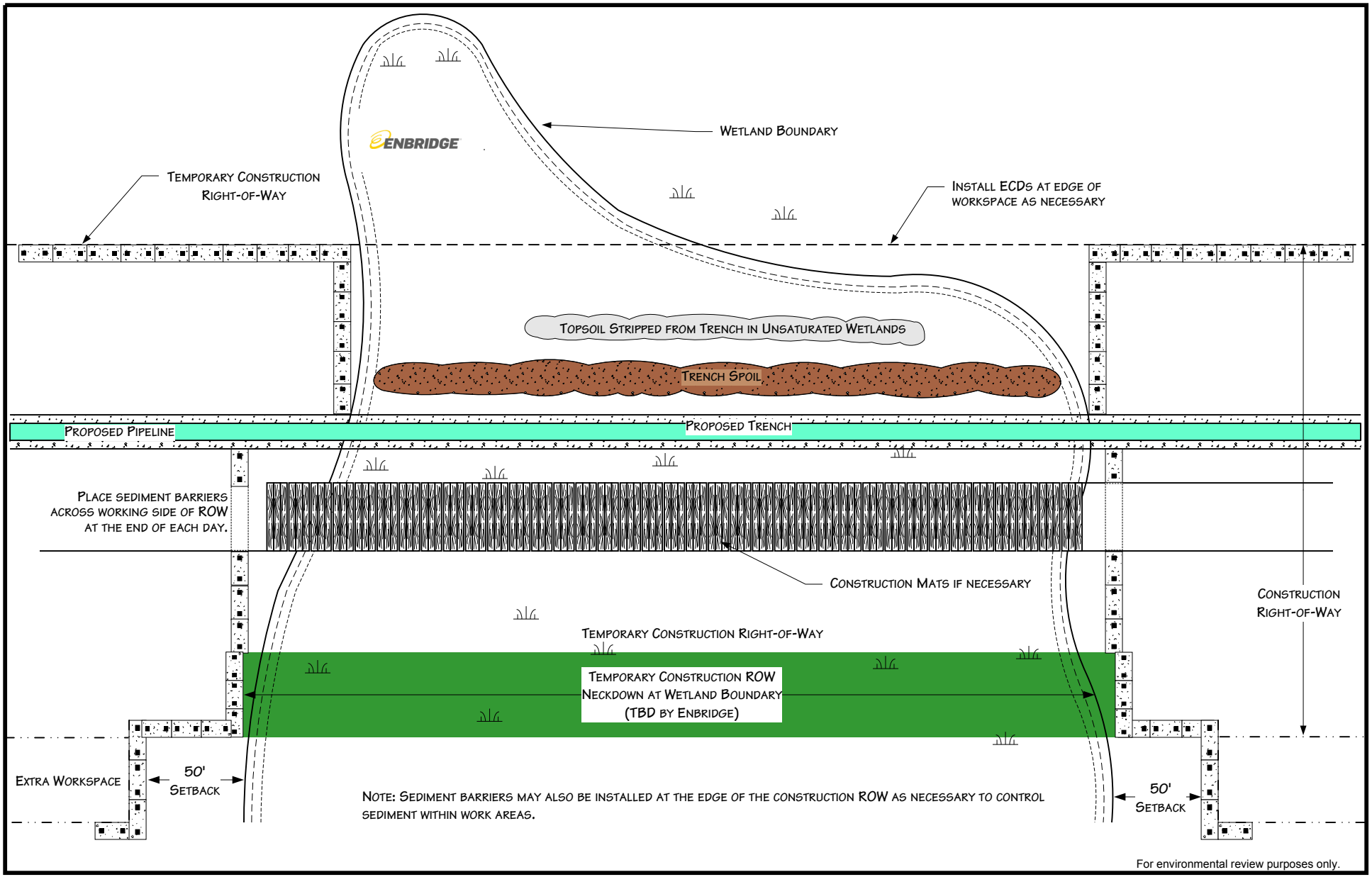

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Figure 24
Environmental Protection Plan
Typical Wetland Crossing Method

DATE: 5/25/2001
REVISED: 3/14/11
SCALE: NTS
DRAWN BY: KMKENDALL
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_24_WETLAND_CROSSING_METHOD.VSD

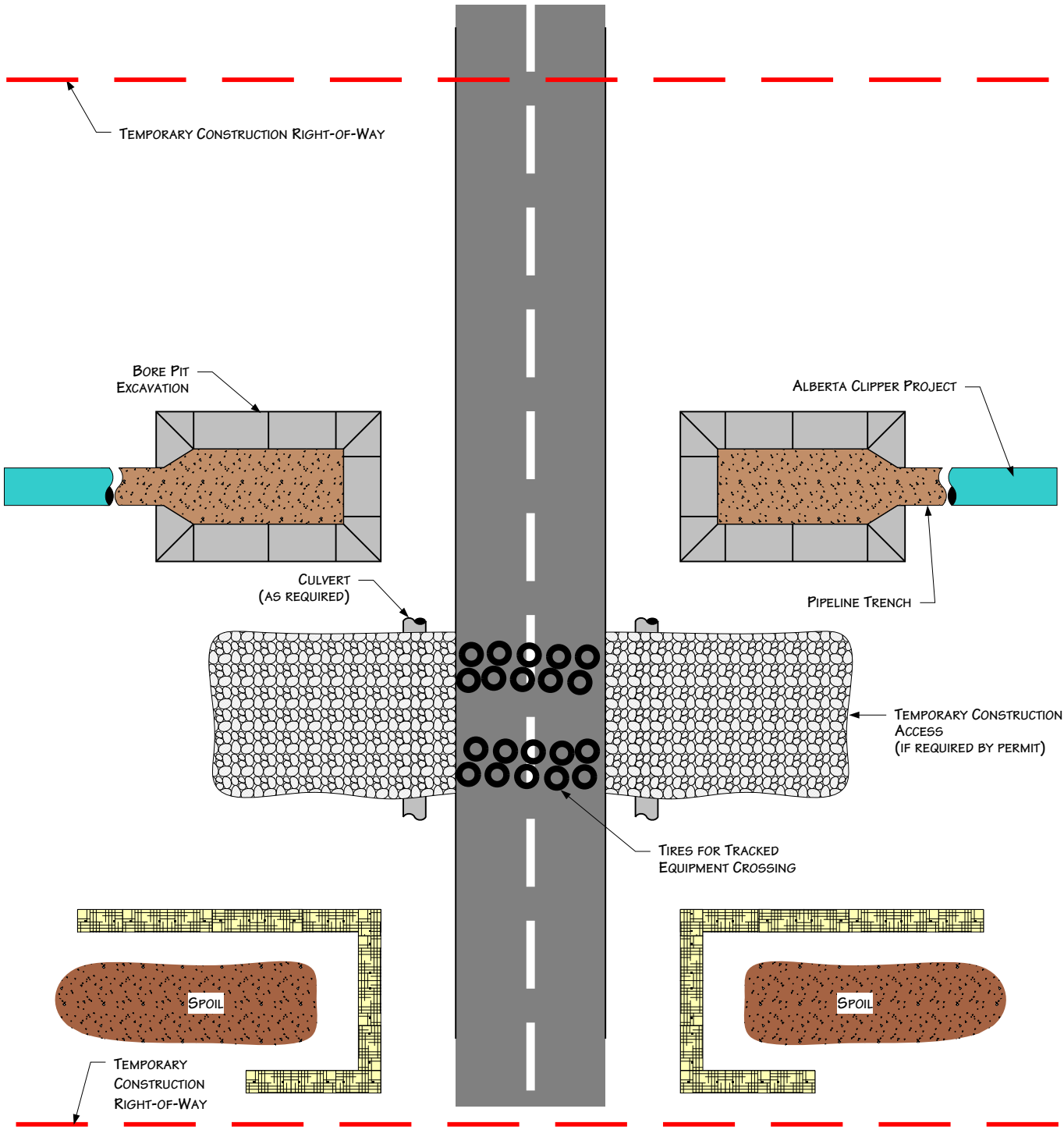

Plan View

Notes

1. Procedures shown in this drawing apply to improved roads.
2. Roads must be cleaned after equipment crosses and dirt placed in spoil containment areas.
3. Temporary access materials must be removed upon project completion.
4. Additional information included on other drawings or permits.
5. Construction areas located outside road ROW.

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Figure 25
Environmental Protection Plan
Typical Improved Road Crossing
Directional Bore Method

DATE: 7/13/1999
REVISED: 3/14/11
SCALE: NTS
DRAWN BY: KMKENDALL

NATURAL RESOURCE GROUP

K:\ CLIENT_PROJECTS\D-F\EEL\2011-019\ FIG_25_IMPROVED_ROAD_BORE_CROSSING.VSD

Typical Cross Section – Biolog

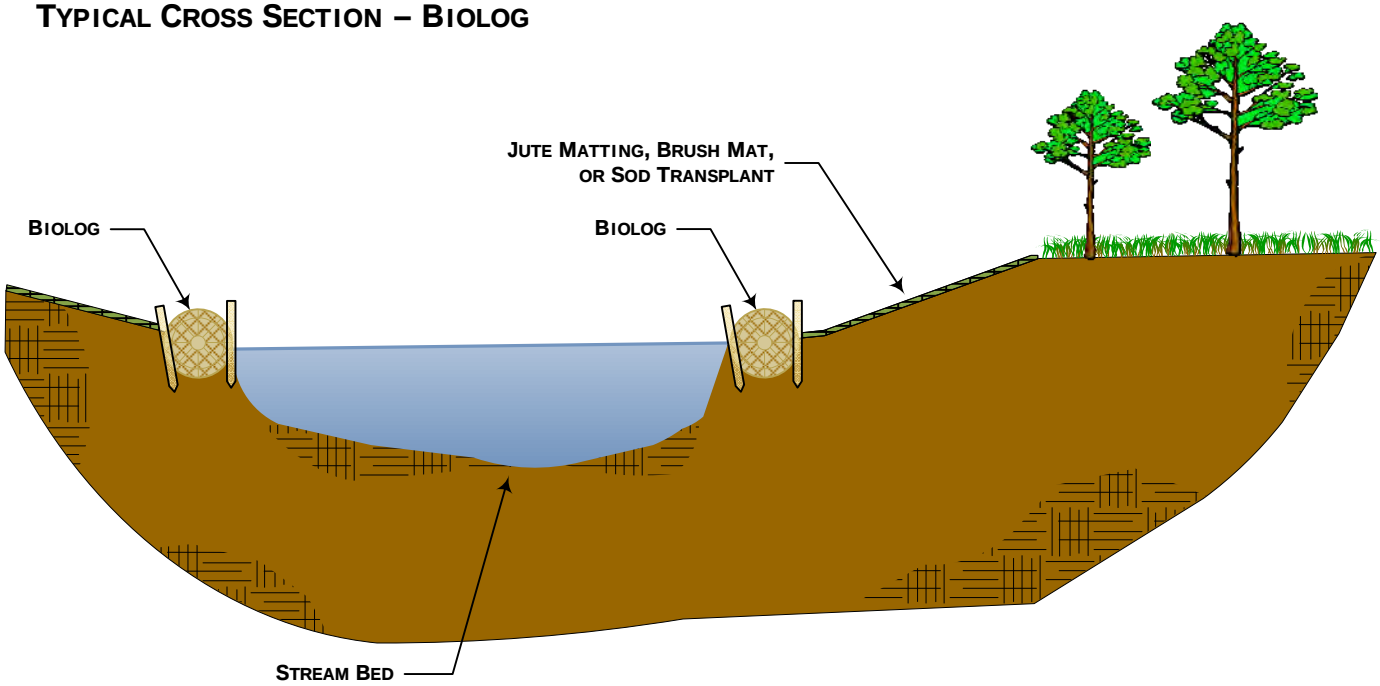

Typical Plan View – Biolog

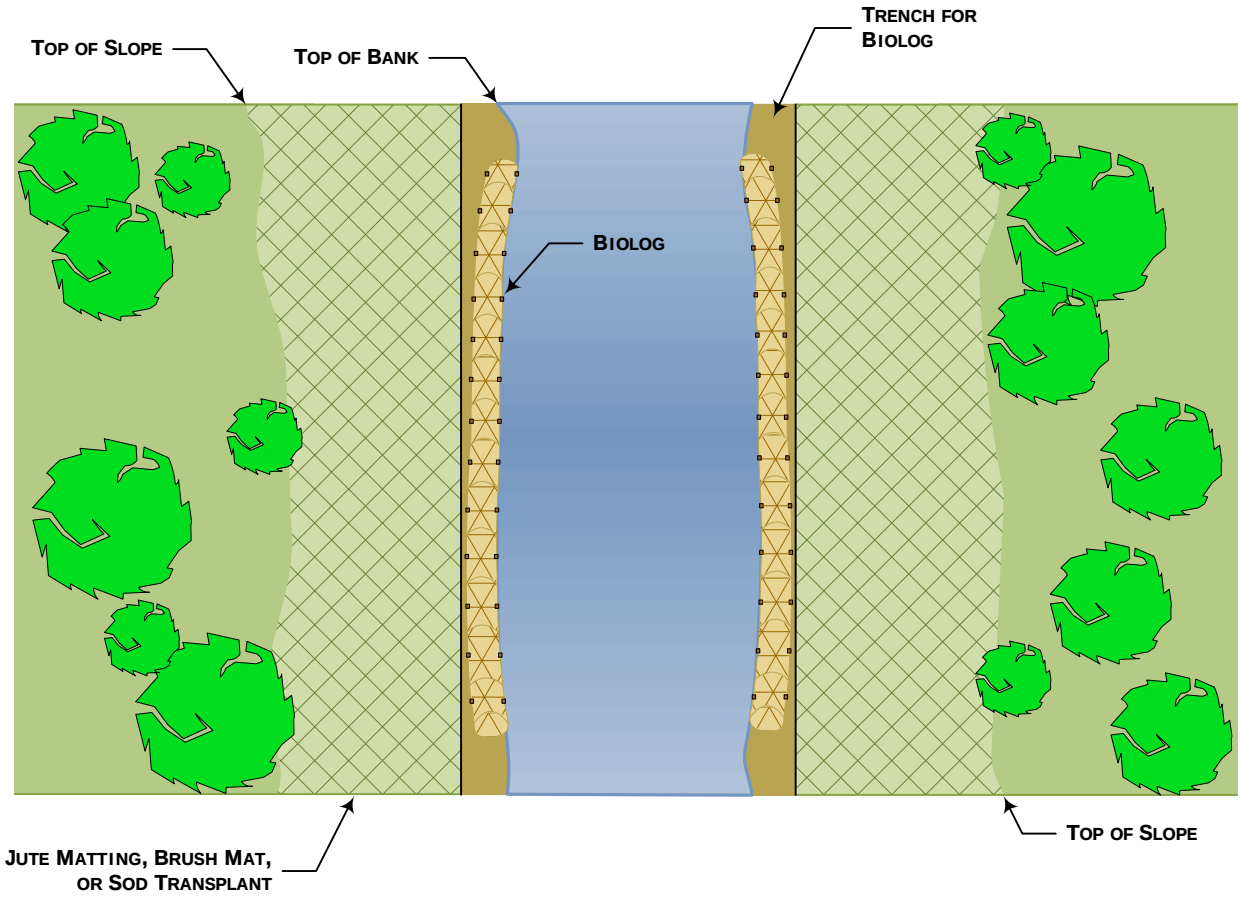

ENBRIDGE

Figure 26
Typical Stream Bank Stabilization
Biolog

04/17/2013

Typical Cross Section – Sod Transplant

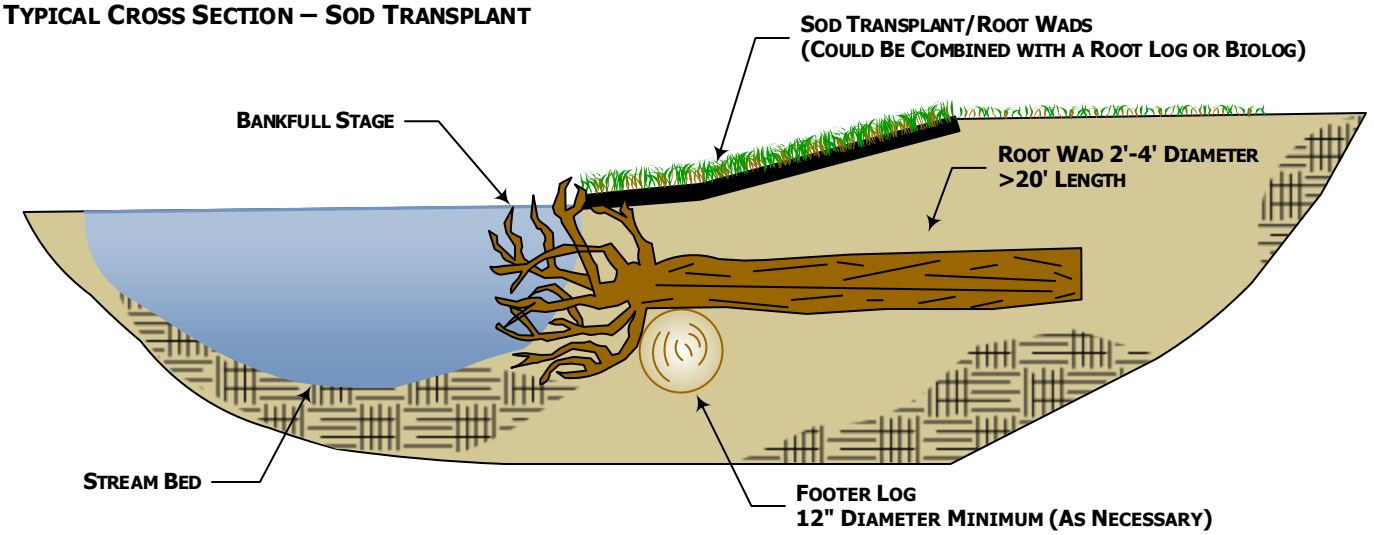

Typical Cross Section – Jute Mat

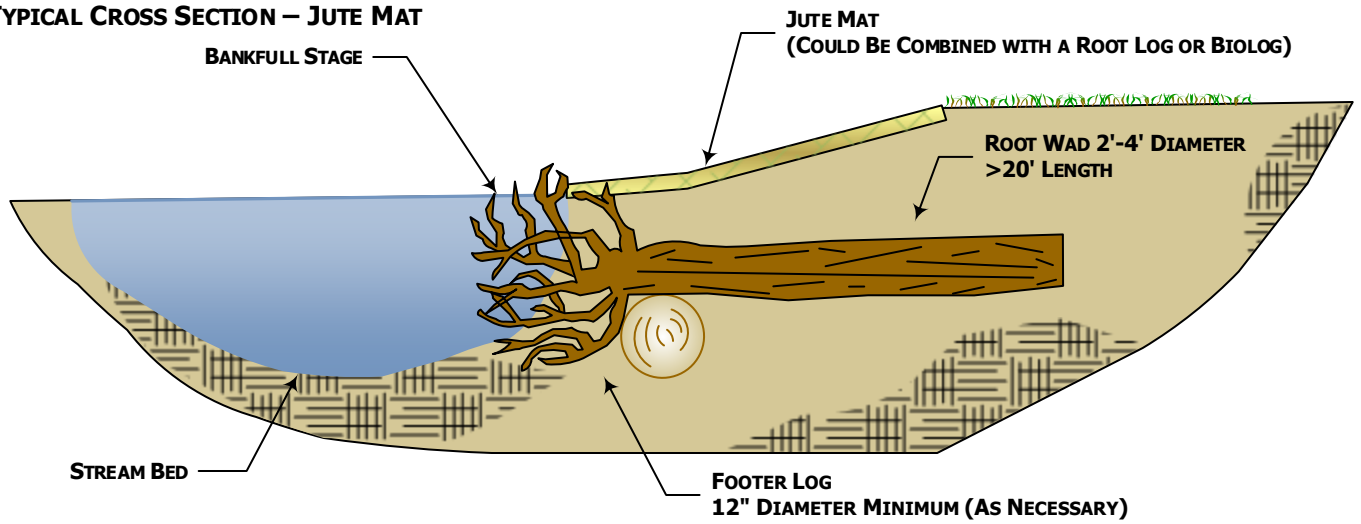

Typical Cross Section – Brush Mat

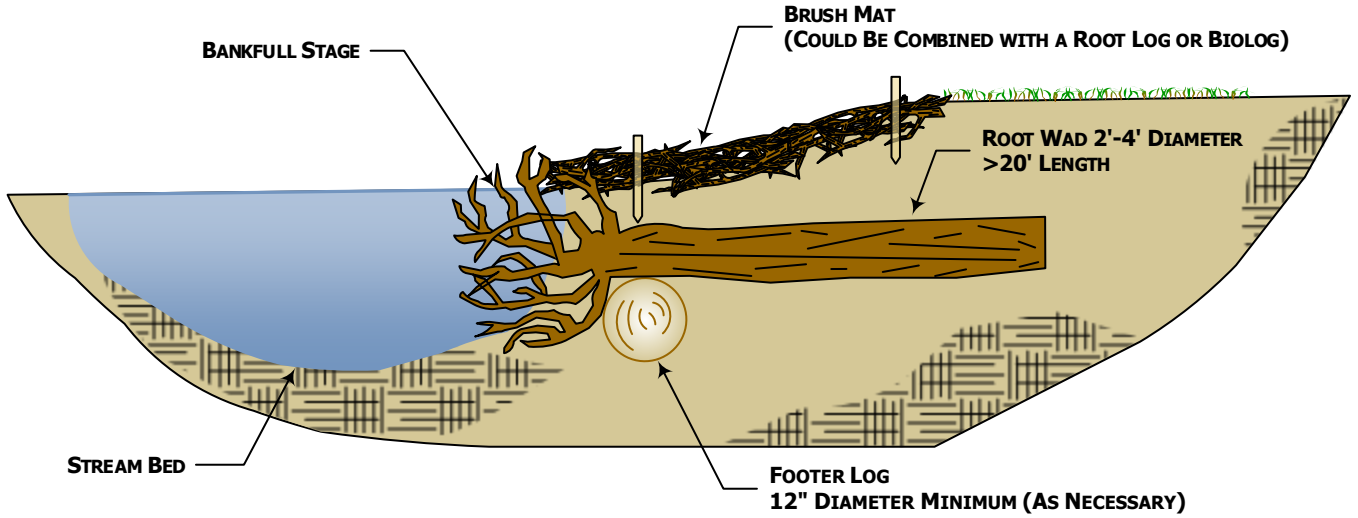

ENBRIDGE

Figure 27
Typical Root Wad

8/25/2015

Typical Plan View – Natural Material Revetment

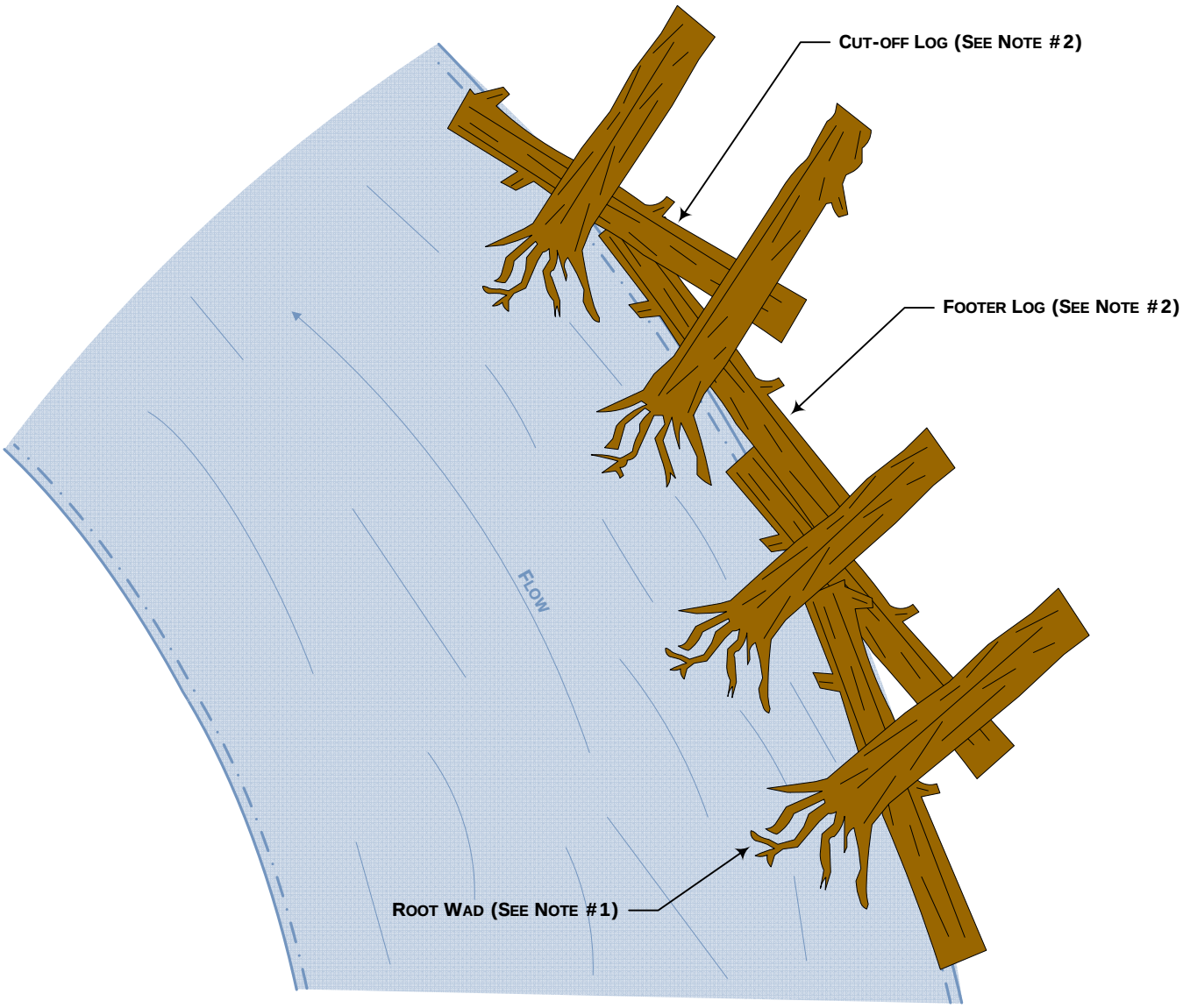

Notes:

#1 – Root wad logs to be used on steep banks or based on agency recommendations.
#2 - Root wad logs to be anchored appropriately based on site-specific conditions or agency recommendations.

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Figure 28
Typical Natural Material Revetment

04/17/2013

Appendix A
Noxious and Invasive Weed Species

Appendix A

Enbridge Noxious and Invasive Weed Species			
State/Weed Type	Common Name	Scientific Name	Regulatory Classification
NORTH DAKOTA			
Terrestrial Weeds	Russian knapweed	*Acroptilon repens*	NW [a]
	absinth wormwood	*Artemisia absinthium*	NW [a]
	musk thistle	*Carduus nutans*	NW [a]
	diffuse knapweed	*Centaurea diffusa*	NW [a]
	yellow starthistle	*Centaurea solstitialis*	NW [a]
	spotted knapweed	*Centaurea stoebe; Centaurea maculosa*	NW [a]
	Canada thistle	*Cirsium arvense*	NW [a]
	field bindweed	*Convolvulus arvensis*	NW [a]
	leafy spurge	*Euphorbia esula*	NW [a]
	Dalmatian toadflax	*Linaria dalmatica; Linaria genistifolia*	NW [a]
	purple loosestrife	*Lythrum salicaria; Lythrum virgatum*	NW [a]
	saltcedar	*Tamarix chinensis; Tamarix parviflora; Tamarix ramosissima*	NW [a]
Mountrail County	common tansy	*Tanacetum vulgare*	CONW [a]
	houndstounge	*Cynoglossum officinale*	CONW [a]
Ward County	scentless chamomile	*Anthemis arvensis*	CONW [a]
	yellow toadflax	*Linaria vulgaris*	CONW [a]
	houndstounge	*Cynoglossum officinale*	CONW [a]
Ramsey County	annual sowthistle	*Sonchus oleraceus*	CONW [a]
	scentless chamomile	*Anthemis arvensis*	CONW [a]
	common milkeed	*Asclepias syriaca*	CONW [a]
Nelson County	perennial sowthistle	*Sonchus arvensis*	CONW [a]
Grand Forks County	kochia	*Bassia scoparia*	CONW [a]
Pembina County	kochia	*Bassia scoparia*	CONW [a]
	common tansy	*Tanacetum vulgare*	CONW [a]
Aquatic Weeds	curly leaf pondweed	*Potamogeton crispus*	Regulated
	Eurasian watermilfoil	*Myriophyllum spicatum*	Regulated
	didymo or rock snot	*Didymosphenia geminata*	Prohibited
Aquatic Invertebrate Invasives (Bivalves)	Asian clam	*Corbicula fluminea*	Prohibited
	Zebra mussel	*Dreissena polymorpha*	Prohibited
	Quagga mussel	*Dreissena bugensis*	Prohibited
	New Zealand mudsnail	*Potamopyrgus antipodarum*	Prohibited
Aquatic Invertebrate Invasives	Rusty crayfish	*Orconectes rusticus*	Prohibited
	Scud	*Echinogammarus ischnus*	Prohibited
	Fishhook water flea	*Cercopagis pengoi*	Prohibited
	Spiny water flea	*Bythotrephes cederstroemi*	Prohibited
MINNESOTA			
Terrestrial Weeds	black swallow-wort	*Cynanchum louiseae*	SN [b]

Enbridge Noxious and Invasive Weed Species			
State/Weed Type	Common Name	Scientific Name	Regulatory Classification
	brown knapweed	*Centaurea jacea*	SN [b]
	Canada thistle	*Cirsium arvense*	SN, PS [c]
	common or European buckthorn	*Rhamnus cathartica*	RN [d]
	common reed – non-native subspecies	*Phragmites australis*	RN [d]
	common teasel	*Dipsacus fullonum*	SN [b]
	cut-leaved teasel	*Dipsacus laciniatus*	SN [b]
	Dalmatian toadflax	*Linaria dalmatica*	SN [b]
	garlic mustard	*Alliaria petiolata*	SN [c]
	giant hogweed	*Heracleum mantegazzianum*	FN [b]
	glossy buckthorn, including all cultivars	*Frangula alnus*	RN [d]
	Grecian foxglove	*Digitalis lanata*	PS [b]
	Japanese hops	*Humulus japnicus*	SN [b]
	leafy spurge	*Euphorbia esula*	SN, PS [c]
	meadow knapweed	*Centaurea x moncktonii*	FN [b]
	multiflora rose	*Rosa multiflora*	RN [d]
	musk thistle	*Carduus nutans*	SN, PS [c]
	narrowleaf bittercress	*Cardamine impatiens*	SN [c]
	Oriental bittersweet	*Celastrus orbiculatus*	SN [b]
	plumeless thistle	*Carduus acanthoides*	SN, PS [c]
	poison ivy	*Toxicodendron radicans*	SR; Specially Regulated
	purple loosestrife	*Lythrum salicaria, virgatum*	SN [c]
	spotted knapweed	*Centaurea stoebe*	SN [c]
	common tansy	*Tanacetum vulgare*	SN [c]
	wild parsnip	*Pastinaca sativa*	SN [c]
	yellow starthistle	*Centaurea solstitialis*	PI [b]
Aquatic Weeds	African oxygen weed	*Lagarosiphon major*	FN, PI; Prohibited Species
	ambulia	*Limnophila sessiliflora*	FN
	anchored or rooted water hyacinth	*Eichornia azurea*	FN
	aquarium watermoss, giant salvinia	*Salvinia molesta*	FN; Prohibited Species
	arrowhead	*Sagittaria sagittifolia*	FN
	arrowleaf false pickerelweed	*Monochoria hastata*	FN
	Australian stonecrop	*Crassula helmsii*	PI; Prohibited Species
	brittle naiad	*Najas minor*	PI; Prohibited Species
	broadleaf paper bark tree	*Melaleuca quenquinervia*	FN
	curly-leaf pondweed	*Potamogeton crispus*	PI; Prohibited Species
	European frog-bit	*Hydrocharis morsus-ranae*	PI; Prohibited Species

Enbridge Noxious and Invasive Weed Species			
State/Weed Type	Common Name	Scientific Name	Regulatory Classification
	Eurasian watermilfoil	*Myriophyllum spicatum*	PI; Prohibited Species
	exotic bur-reed	*Sparganium erectum*	FN
	ducklettuce	*Ottelia alismoides*	FN
	flowering rush	*Butomus umbellatus*	PE; Prohibited Species
	giant salvinia	*Salvinia auriculata*	FN
	giant salvinia	*Salvinia biloba*	FN
	giant salvinia	*Salvinia herzogii*	FN
	heart-shaped false pickerelweed	*Monochoria vaginalis*	FN
	hydrilla	*Hydrilla verticillata*	FN, PI; Prohibited Species
	Indian swampweed, Miramar weed	*Hygrophila polysperma*	FN; Prohibited Species
	Mediterranean strain (killer algae)	*Caulerpa taxifolia*	FN
	mosquito fern, water velvet	*Azolla pinnata*	FN
	purple loosestrife	*Lythrum salicaria, Lythrum virgatum*	PI, SN; Prohibited Species
	water aloe or water soldiers	*Stratioles aloides*	PI; Prohibited Species
	water chestnut	*Trapa natans*	PI; Prohibited Species
	water-spinach, swamp morning-glory	*Ipomoea aquatica*	FN
	wetland nightshade	*Solanum tampicense*	FN
	Brazilian waterweed	*Egeria densa*	Regulated Species
	Carolina fanwort or fanwort	*Cabomba caroliniana*	Regulated Species
	Chinese water spinach	*Ipomoea aquatica*	Regulated Species
	nonnative waterlilies	*Nymphaea spp.*	Regulated Species
	parrot's feather	*Myriophyllum aquaticum*	Regulated Species
	yellow iris or yellow flag	*Iris pseudacoris*	Regulated Species
Aquatic Invertibrate Invasives	faucet snail	*Bithynia tentaculata*	Prohibited Species
	New Zealand mud snail	*Potamopyrgus antipodarum*	Prohibited Species
	quagga mussel	*Dreissena bugensis*	Prohibited Species
	red swamp crayfish	*Procambarus clarkii*	Prohibited Species
	zebra mussel	*Dreissena spp.*	Prohibited Species
	Banded mystery snail	*Viviparus georgianus*	Regulated Species
	Chinese mystery snail, Japanese trap door snail	*Cipangopaludina spp.*	Regulated Species
	rusty crayfish	*Orconectes rusticus*	Regulated Species
	spiny water flea	*Bythotrephes longimanus*	Regulated Species
WISCONSIN			
Terrestrial Weeds	Amur honeysuckle	*Lonicera maackii*	Prohibited/Restricted
	Autumn olive	*Elaeagnus umbellata*	Restricted

Enbridge Noxious and Invasive Weed Species			
State/Weed Type	Common Name	Scientific Name	Regulatory Classification
	Bells honeysuckle	*Lonicera x bella*	Restricted
	Black swallow-wort	*Vincetoxicum nigrum*	Prohibited/Restricted
	Canada thistle	*Cirsium arvense*	Restricted
	Cattail hybrid	*Typha x glauca*	Restricted
	Celandine	*Chelidonium majus*	Prohibited/Restricted
	Chinese yam	*Dioscorea oppositifolia*	Prohibited
	Common buckthorn	*Rhamnus cathartica*	Restricted
	Common teasel	*Dipsacus fullonum subsp. sylvestris*	Restricted
	Creeping bellflower	*Campanula rapunculoides*	Restricted
	Cut-leaved teasel	*Dipsacus laciniatus*	Restricted
	Cypress spurge	*Euphorbia cyparissias*	Restricted
	Cypress spurge	*Euphorbia cyparissias*	Restricted
	European marsh thistle	*Cirsium palustre*	Prohibited/Restricted
	Garlic mustard	*Alliaria petiolata*	Restricted
	Giant hogweed	*Heracleum mantegazzianum*	Prohibited
	Giant knotweed	*Polygonum sachalinense*	Prohibited
	Glossy buckthorn	*Frangula alnus*	Restricted
	Hairy willow herb	*Epilobium hirsutum*	Prohibited/Restricted
	Helleborine orchid	*Epipactis helleborine*	Restricted
	Hemp nettle, brittlestem hemp nettle	*Galeopsis tetrahit*	Restricted
	Hill mustard	*Bunias orientalis*	Prohibited/Restricted
	Hound's tongue	*Cynoglossum officinale*	Restricted
	Japanese hedge-parsley	*Torilis japonica*	Prohibited/Restricted
	Japanese honeysuckle	*Lonicera japonica*	Prohibited
	Japanese hops	*Humulus japonicus*	Prohibited/Restricted
	Japanese knotweed	*Polygonum cuspidatum*	Restricted
	Japanese stilt grass	*Microstegium vimineum*	Prohibited
	Kudzu	*Pueraria lobata*	Prohibited
	Leafy spurge	*Euphorbia esula*	Restricted
	Lyme grass or sand ryegrass	*Leymus arenarius*	Prohibited/Restricted
	Mile-a-minute vine	*Polygonum perfoliatum*	Prohibited
	Morrow's honeysuckle	*Lonicera morrowii*	Restricted
	Multiflora rose	*Rosa multiflora*	Restricted
	Musk thistle	*Carduus nutans*	Restricted
	Narrow-leaf cattail	*Typha angustifolia*	Restricted
	Oriental bittersweet	*Celastrus orbiculatus*	Restricted
	Pale swallow-wort	*Vincetoxicum rossicum*	Prohibited
	Perennial pepperweed	*Lepidium latifolium*	Prohibited
	Phragmites, Common reed	*Phragmites australis*	Restricted
	Plumeless thistle	*Carduus acanthoides*	Restricted
	Poison hemlock	*Conium maculatum*	Prohibited/Restricted

Enbridge Noxious and Invasive Weed Species			
State/Weed Type	Common Name	Scientific Name	Regulatory Classification
	Porcelain berry	*Ampelopsis brevipedunculata*	Prohibited
	Princess tree	*Paulownia tomentosa*	Prohibited
	Purple loosestrife	*Lythrum salicaria*	Restricted
	Russian olive	*Elaeagnus angustifolia*	Restricted
	Sawtooth oak	*Quercus acutissima*	Prohibited
	Scotch broom	*Cytisus scoparius*	Prohibited
	Sericea lespedeza	*Lespedeza cuneata*	Prohibited
	Spotted knapweed	*Centaurea biebersteinii, c. stoebe*	Restricted
	Spreading hedge parsley	*Torilis arvensis*	Prohibited
	Tall or Reed manna grass	*Glyceria maxima*	Prohibited/Restricted
	Tansy	*Tanacetum vulgare*	Restricted
	Tartarian honeysuckle	*Lonicera tatarica*	Restricted
	Tree-of-heaven	*Ailanthus altissima*	Restricted
	Wild chervil	*Anthriscus sylvestris*	Prohibited/Restricted
	Wild parsnip	*Pastinaca sativa*	Restricted
	Wineberry	*Rubus phoenicolasius*	Prohibited
	Yellow star thistle	*Centaurea solstitialis*	Prohibited
Wetland Weeds	Dame's rocket	*Hesperis matronalis*	Restricted
	European marsh thistle	*Cirsium palustre*	Prohibited/Restricted
	Flowering rush	*Butomus umbellatus*	Restricted
Aquatic Weeds	Australian swamp crop	*Crassula helmsii*	Prohibited
	Brazilian waterweed	*Egeria densa*	Prohibited
	Brittle waternymph	*Najas minor*	Prohibited
	Curly-leaf pondweed	*Potamogeton crispus*	Restricted
	Eurasian water milfoil	*Myriophyllum spicatum*	Restricted
	European frog-bit	*Hydrocharis morsus-ranae*	Prohibited
	Fanwort, Carolina Fanwort	*Cabomba caroliniana*	Prohibited
	Flowering rush	*Butomus umbellatus*	Restricted
	Hydrilla	*Hydrilla verticillata*	Prohibited
	Oxygen-weed, African elodea	*Lagarosiphon major*	Prohibited
	Parrot feather	*Myriophyllum aquaticum*	Prohibited
	Water chestnut	*Trapa natans*	Prohibited
	Yellow floating heart	*Nymphoides peltata*	Prohibited
	N/A	*Ulva (Enteromorpha) spp.*	Prohibited
Aquatic Fish and Invertebrate Invasives	Asian clam	*Corbicula fluminea*	Prohibited
	Bloody shrimp	*Hemimysis anomala*	Prohibited
	Chinese mitten crabs	*Eriocheir sinensi*	Prohibited
	Chinese mystery snail	*Cipangopaludina chinensis*	Restricted

Enbridge Noxious and Invasive Weed Species			
State/Weed Type	Common Name	Scientific Name	Regulatory Classification
	Cylindro (cyanobacteria)	*Cylindrospermopsis raciborskii*	Prohibited
	Didymo or rock snot	*Didymoshpenia geminata*	Prohibited
	Faucet snail	*Bithynia tentaculata*	Prohibited
	Fishhook waterflea	*Cercopagis pengoi*	Prohibited
	Golden alga	*Prymneisum parvum*	Prohibited
	New Zealand mudsnail	*Potamopyrgus antipodarum*	Prohibited
	Novel cyanobacterial epiphyte of order Stigonematales	*Stigonematales spp.*	Prohibited
	Quagga mussels	*Dreissena bugensis*	Prohibited
	Red swamp crayfish	*Procambarus clarkii*	Prohibited
	Rusty crayfish	*Orconectes rusticus*	Restricted
	Spiny waterflea	*Bythotrephes cederstroemi*	Prohibited
	Starry stonewort (alga)	*Nitellopsis obtusa*	Prohibited
	Water flea	*Daphnia lumholtzi*	Prohibited
	Zebra mussel	*Dreissena polymorpha*	Restricted

North Dakota:

[a] Listed Regulated Species

Minnesota Control Status:

[b] Eradicate

[c] Control

[d] Restricted

Abbreviations:

NW = Noxious Weed

CONW = County Noxious Weed

SN = State noxious weed (Minnesota Department of Agriculture)

PS = State prohibited weed seed (Minnesota Department of Agriculture)

SR= Specially regulated (Minnesota Department of Agriculture)

RN = Restricted noxious weed (Minnesota Department of Agriculture)

FN = Federal noxious weed (USDA-Animal Plant Health Inspection Service)

PI = Prohibited exotic species (Minnesota Department of Natural Resources)

Appendix B
Equipment Cleaning Log

Equipment Cleaning Log

Form Completed By: _____

Date: _____ Time: _____

Location of Equipment (tract & milepost): _____

Equipment Type: _____

Equipment ID (e.g., company, unique ID number): _____

Cleaning Method: (check all that apply)

- ☐ Scrape Down
- ☐ Steam Wash Blow Down (compressed air)
- ☐ Power/Pressure Wash (water)
- ☐ Other (Describe): _____

Comments: _____

_____

_____

_____

_____

Appendix C
Seed Mixes

NORTH DAKOTA SEED MIXES

Upon recommendations of the North Dakota Natural Resources Conservation Service, Enbridge divided regional seeding in North Dakota into three regions based on precipitation and general soil types as follows:

- Region 1 is between the Montana state line and Highway 83;
- Region 2 is between Highway 83 and Highway 32; and
- Region 3 is between Highway 32 and the Minnesota state line.

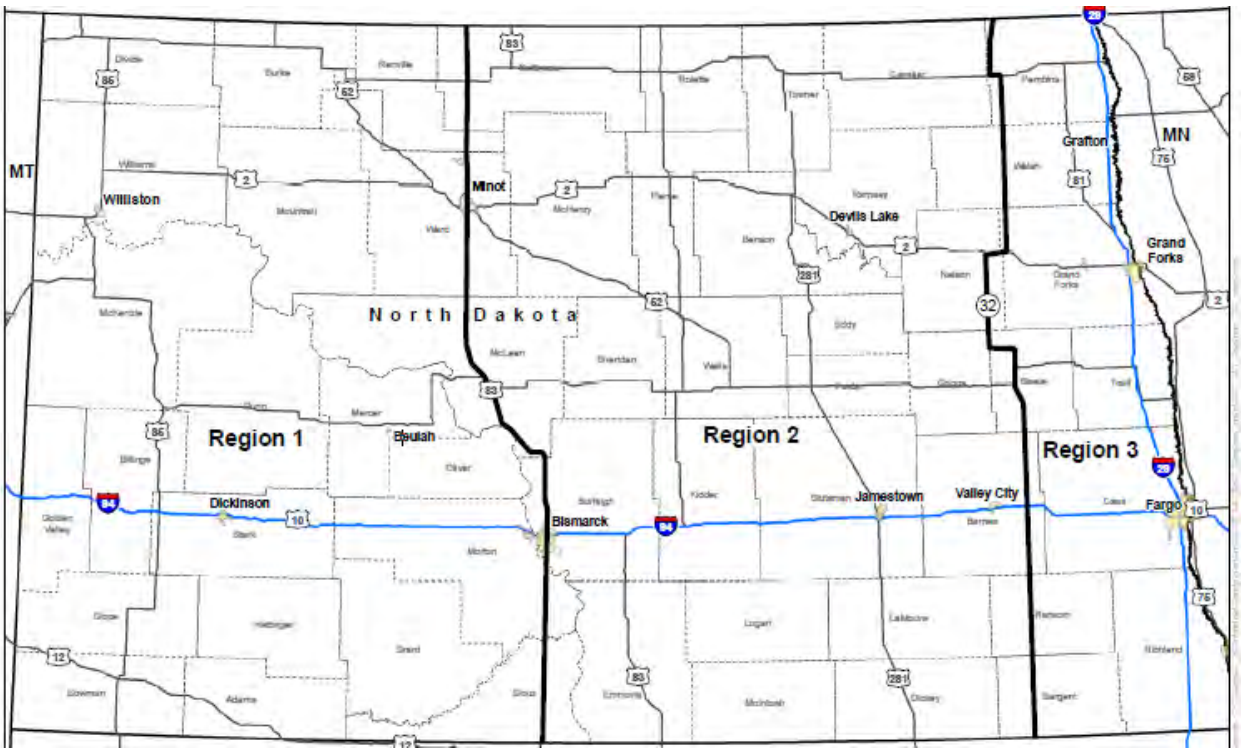

NORTH DAKOTA STATE-WIDE SEED MIXES

Table 1 **ND Seed Mix 1 – State-Wide Temporary Cover Crop** Use: Where agency, landowner, or Enbridge requests a cover crop Seeding rate: 80.0 pounds/acre Pure Live Seed ("PLS") drilled or 160.0 pounds /acre PLS broadcast Notes: *No species substitutions allowed*		
Species: Preferred Varieties (if available)	**Pounds/Acre Pure Live Seed (PLS)**	**Percent of Mix**
Oats *if spring or summer seeding,* **OR** Winter Wheat *if dormant (late fall) seeding*	40.0	50.0
Annual Ryegrass or Slender Wheat Grass	40.0	50.0
Total Seed	**80.0**	**100.0**

Table 2
ND Seed Mix 2 – North Dakota State-Wide State School Lands Seed Mix

Use: School Trust Lands and reestablishing stream bank vegetation where the waterbodies are open cut
Seeding Rate: 19.0 pounds/acre PLS drilled or 38.0 pounds/acre PLS broadcast without the companion crop. Double the rate of the companion crop when broadcast seeding
Notes: *No species substitutions allowed*

Species: Preferred Variety (if available)	Pounds/Acre PLS	Percent of Mix
Western wheatgrass: Rodan, Walsh, Flintlock, Rosana, Recovery	8.0	42.1
Slender wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	5.0	26.3
Green needlegrass: Lodorn, AC Mallard, Fowler	4.0	21.1
Side-oats grama: Killdeer, Pierre, Butte	2.0	10.5
Total	**19.0**	**100.0[1]**
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
Total Seed	**29.0**	**100.0[1]**

[1] May not equal 100 percent due to rounding

NORTH DAKOTA REGION 1 SEED MIXES

Table 3
ND Seed Mix 3 – Region 1 Native Prairie Seed Mix

Use: North Dakota Region 1 on private and state lands (non-school trust) where native and degraded prairie are currently managed as range or hay land
Seeding rate: 11.90 pounds/acre PLS drilled or 23.80 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *Enbridge Environment must approve substitutions in advance*

Species: Preferred Varieties (if available)	Pounds/Acre PLS	Percent of Mix
Western wheatgrass: Rodan, Walsh, Flintlock, Rosana, Recovery	2.50	21.0
Green needlegrass: Lodorn, AC Mallard, Fowler	2.00	16.8
Slender wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	1.50	12.6
Little bluestem: Badlands, Itasca	1.00	8.4
Prairie sandreed: Goshen, Bowman, Koch	1.00	8.4
Side oats grama: Killdeer, Pierre, Butte	2.00	16.8
Blue grama: Bad River	0.50	4.2
Prairie cordgrass: Red River	0.50	4.2
Purple prairieclover: Common	0.10	0.8
White prairieclover: Antelope	0.10	0.8
Maximilian sunflower: Medicine Creek	0.10	0.8
Blanket flower: Common	0.20	1.7
Black-eyed Susan: Common	0.05	0.4
Stiff sunflower: Common	0.10	0.8
Canada goldenrod or Missouri goldenrod: Common	0.05	0.4
Lewis flax: Appar, Maple Grove	0.10	0.8
Prairie coneflower: Stillwater	0.10	0.8
Total	**11.90**	**100.0**[1]
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.00	100.0
Total Seed	**21.90**	**100.0**[1]

[1] May not equal 100 percent due to rounding

Table 4
ND Seed Mix 4 – Mixed Hay Land (Converted Prairie) and Open-Cut Road Ditch Seed Mix

Use: North Dakota Region 1 for private land hay land planting and re-establishing road bank/ditch vegetation
Seeding Rate: 11.4 pounds/acre PLS drilled or 22.8 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *Enbridge Environment must approve* substitutions *in advance*

Species/Preferred Varieties (if available)	Pounds/ Acre PLS	Percent of Mix
Crested wheatgrass: Nordan, RoadCrest, Summit	3.0	26.3
Pubescent: Manska, Greenleaf; **OR** Intermediate wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	4.0	35.1
Alfalfa: Vernal, Ladak	4.0	35.1
Purple prairieclover: Bismarck	0.1	0.9
White prairieclover: Antelope	0.1	0.9
Narrow leaf purple coneflower: Bismarck	0.1	0.9
Stiff sunflower: Bismarck	0.1	0.9
Total	**11.4**	**100.0**[1]
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
Total Seed	**21.4**	**100.0**[1]

[1] May not equal 100 percent due to rounding

Table 5
ND Seed Mix 5 – Tame Pasture Reclamation Seed Mix

Use: North Dakota Region 1 on private tame (improved) pasture planting
Seeding Rate: 14.0 pounds/acre PLS drilled or 28.0 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *Enbridge Environment must approve* substitutions *in advance*

Species: Preferred Varieties (if available)	Pounds/Acre PLS	Percent of Mix
Crested wheatgrass: Nordan, RoadCrest, Summit	4.0	28.6
Pubescent: Manska, Greenleaf; **OR** Intermediate wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	5.0	35.7
Western wheatgrass: Rodan, Walsh, Flintlock, Rosana, Recovery	5.0	35.7
Total	**14.0**	**100.0**[1]
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
Total Seed	**24.0**	**100.0**[1]

[1] May not equal 100 percent due to rounding

Table 6
ND Seed Mix 6– North Dakota Default Conservation Reserve Program (CRP) Seed Mix

Use: North Dakota Region 1 on tracts enrolled in CRP
Seeding Rate: 8.0 pounds/acre PLS drilled or 16.0 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *No species substitutions allowed*

Species: Preferred Variety (if available)	Pounds/Acre PLS	Percent of Mix
Tall Wheatgrass: Platt, Orbit	4.4	55.0
Intermediate Wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	1.7	21.3
Slender Wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	0.5	6.3
Alfalfa: Vernal, Ladak or any with Zone 2 winter hardiness	1.1	13.8
Sweetclover: Common	0.3	3.8
Total	**8.0**	**100.0**[1]
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
Total Seed	**18.0**	**100.0**[1]

[1] May not equal 100 percent due to rounding

NORTH DAKOTA REGION 2 SEED MIXES

Table 7
ND Seed Mix 7 – Native Prairie Seed Mix

Use: North Dakota Region 2 on private and state lands (non-school trust) where native and degraded prairie are currently managed as range or hay land
Seeding Rate: 11.9 pounds/acre PLS drilled or 23.8 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *Enbridge Environment must approve* substitutions *in advance*

Species: Preferred Varieties (if available)	Pounds/Acre PLS	Percent of Mix
Western wheatgrass: Rodan, Walsh, Flintlock, Rosana, Recovery	2.50	21.0
Green needlegrass: Lodorn, AC Mallard, Fowler	1.50	12.6
Slender wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	1.50	12.6
Little bluestem: Badlands, Itasca	1.00	8.4
Big Bluestem: Sunnyview, Bison, Bonilla, Bounty	1.00	8.4
Prairie sandreed: Goshen, Bowman, Koch	1.00	8.4
Side oats grama: Killdeer, Pierre, Butte	2.00	16.8
Blue grama: Bad River	0.25	2.1
Switch grass: Dacotah, Forestburg, Sunburst, Summer	0.25	2.1
Purple prairieclover: Common	0.10	0.8
White prairieclover: Antelope	0.10	0.8
Maximilian sunflower: Medicine Creek	0.10	0.8
Blanket flower: Common	0.20	1.7
Black-eyed Susan: Common	0.05	0.4
Stiff sunflower: Common	0.10	0.8
Canada goldenrod or Missouri goldenrod: Common	0.05	0.4
Lewis flax: Appar, Maple Grove	0.10	0.8
Prairie coneflower: Stillwater	0.10	0.8
Total	**11.90**	**100.0**[1]
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.00	100.0
Total Seed	**21.90**	**100.0**[1]

[1] May not equal 100 percent due to rounding

Table 8
ND Seed Mix 8 – Mixed Hay Land (Converted Prairie) and Open-Cut Road Ditch Seed Mix

Use: North Dakota Region 2 on private land mixed hay land planting and re-establishing road bank/ditch vegetation
Seeding Rate: 13.4 pounds/acre PLS drilled or 26.8 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *Enbridge Environment must approve* substitutions *in advance*

Species: Preferred Varieties (if available)	Pounds/Acre PLS	Percent of Mix
Pubescent: Manska, Greenleaf; **OR** Intermediate wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	3.0	22.4
Meadow Bromegrass: Fleet, Paddock, Regar, Montana, MacBeth, Cache	7.0	52.2
Alfalfa: Vernal, Ladak	3.0	22.4
Purple prairieclover: Bismarck	0.1	0.7
White prairieclover: Antelope	0.1	0.7
Narrow leaf purple coneflower: Bismarck	0.1	0.7
Stiff sunflower: Bismarck	0.1	0.7
Total	**13.4**	**100.0**[1]
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
Total Seed	**23.4**	**100.0**[1]

[1] May not equal 100 percent due to rounding

Table 9 ND Seed Mix 9 – Tame Pasture Reclamation Seed Mix Use: North Dakota Region 2 on private tame (improved) pasture planting Seeding Rate: 21.0 pounds/acre PLS drilled or 42.0 pounds/acre PLS broadcast without the companion crop Double the rate of the companion crop when broadcast seeding Notes: *Enbridge Environment must approve* substitutions *in advance*		
Species: Preferred Varieties (if available)	**Pounds/Acre PLS**	**Percent of Mix**
Pubescent: Manska, Greenleaf; **OR** Intermediate wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	6.0	28.6
Meadow bromegrass: Fleet, Paddock, Regar, Montana, MacBeth, Cache	15.0	71.4
Total	**21.0**	**100.0**[1]
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
Total Seed	**31.0**	**100.0**[1]
[1] May not equal 100 percent due to rounding		

Table 10
ND Seed Mix 10– North Dakota Default Conservation Reserve Program (CRP) Seed Mix

Use: North Dakota Region 2 on tracts enrolled in CRP
Seeding Rate: 8.0 pounds/acre PLS drilled or 16.0 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *No species substitutions allowed*

Species: Preferred Variety (if available)	Pounds/Acre PLS	Percent of Mix
Tall Wheatgrass: Platt, Orbit	4.4	55.0
Intermediate Wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	1.7	21.3
Slender Wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	0.5	6.3
Alfalfa: Vernal, Ladak or any with Zone 2 winter hardiness	1.1	13.8
Sweetclover: Common	0.3	3.8
Total	**8.0**	**100.0**[1]
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
Total Seed	**18.0**	**100.0**[1]

[1] May not equal 100 percent due to rounding

NORTH DAKOTA REGION 3 SEED MIXES

Table 11
ND Seed Mix 11 – Native Prairie Seed Mix

Use: North Dakota Region 3 on private and state lands (non-school trust) where native or degraded prairie currently managed as range or hay land

Seeding Rate: 12.15 pounds/acre PLS drilled or 24.30 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding

Notes: *Enbridge Environment must approve* substitutions *in advance*

Species: Preferred Varieties	Pounds/Acre PLS	Percent of Mix
Western wheatgrass: Rodan, Walsh, Flintlock, Rosana, Recovery	2.00	16.5
Green needlegrass: Lodorn, AC Mallard, Fowler	2.00	16.5
Slender wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	1.00	8.2
Canada wildrye: Mandan	1.00	8.2
Big Bluestem: Sunnyview, Bison, Bonilla, Bounty	1.50	12.3
Side oats grama: Killdeer, Pierre, Butte	2.00	16.5
Blue grama: Bad River	0.25	2.1
Switch grass: Dacotah, Forestburg, Sunburst, Summer	0.50	4.1
Indiangrass: Tomahawk	1.00	8.2
Purple prairieclover: Common	0.10	0.8
White prairieclover: Antelope	0.10	0.8
Maximilian sunflower: Medicine Creek	0.10	0.8
Blanket flower: Common	0.20	1.6
Black-eyed Susan: Common	0.05	0.4
Stiff sunflower: Common	0.10	0.8
Canada goldenrod or Missouri goldenrod: Common	0.05	0.4
Lewis flax: Appar, Maple Grove	0.10	0.8
Prairie coneflower: Stillwater	0.10	0.8
Total	**12.15**	**100.0[1]**
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.00	100.0
Total Seed	**22.15**	**100.0[1]**

[1] May not equal 100 percent due to rounding

Table 12
ND Seed Mix 12 –Mixed Hay Land (Converted Prairie) and Open-Cut Road Ditch Seed Mix

Use: North Dakota Region 3 on private land mixed hay land planting and re-establishing road bank/ditch vegetation
Seeding Rate: 15.3 pounds/acre PLS drilled or 30.6 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *Enbridge Environment must approve* substitutions *in advance*

Species: Preferred Varieties (if available)	Pounds/Acre PLS	Percent of Mix
Meadow Bromegrass: Fleet, Paddock, Regar, Montana, MacBeth, Cache	10.0	65.4
Alfalfa: Vernal, Ladak	5.0	32.7
Purple prairieclover: Bismarck	0.1	0.7
White prairieclover: Antelope	0.1	0.7
Narrow leaf purple coneflower: Bismarck	0.1	0.7
Total	**15.3**	**100.0**[1]
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
Total Seed	**25.3**	**100.0**[1]

[1] May not equal 100 percent due to rounding

Table 13 **ND Seed Mix 13 – Tame Pasture Reclamation Seed Mix** Use: North Dakota Region 3 on private tame (improved) pasture planting Seeding Rate: 21.0 pounds/acre PLS drilled or 42.0 pounds/acre PLS broadcast without the companion crop Double the rate of the companion crop when broadcast seeding Notes: *Enbridge Environment must approve* substitutions *in advance*		
Species: Preferred Varieties (if available)	**Pounds/Acre PLS**	**Percent of Mix**
Pubescent: Manska, Greenleaf; **OR** Intermediate wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	6.0	28.6
Meadow bromegrass: Fleet, Paddock, Regar, Montana, MacBeth, Cache	15.0	71.4
Total	**21.0**	**100.0**[1]
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
Total Seed	**31.0**	**100.0**[1]
[1] May not equal 100 percent due to rounding		

Table 14
ND Seed Mix 14 – North Dakota Default CRP Seed Mix

Use: North Dakota Region 3 on tracts enrolled in CRP
Seeding Rate: 10.0 pounds/acre PLS drilled or 20.0 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *No species substitutions allowed*

Species: Preferred Variety (if available)	Pounds/Acre PLS	Percent of Mix
Western Wheatgrass: Rodan, Walsh, Flintlock, Rosana, Recovery	2.0	20.0
Intermediate Wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	5.0	50.0
Alfalfa: Any with Zone 2 winter hardiness	2.0	20.0
Sweetclover: Common	1.0	10.0
Total	**10.0**	**100.0**[1]
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
Total Seed	**20.0**	**100.0**[1]

[1] May not equal 100 percent due to rounding

MINNESOTA SEED MIXES

Based on average annual precipitation and temperatures and soil types, Enbridge divided seeding in Minnesota into two regions. These regions have different seed mixes for specific areas.

- Region 1 is between the North Dakota state line and approximately Highway 71; and
- Region 2 is between Highway 71 and the Wisconsin state line.

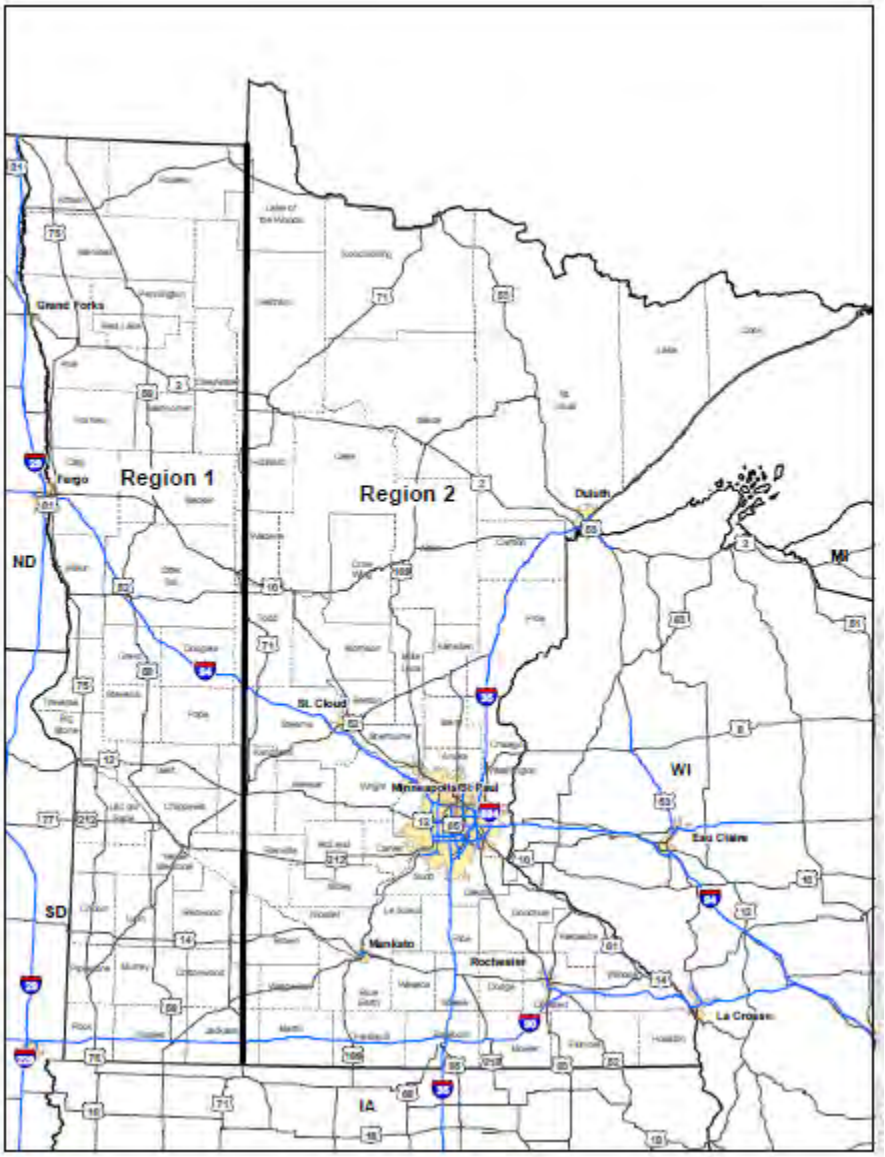

MINNESOTA STATEWIDE SEED MIXES

Table 15
MN Seed Mix 1 – Minnesota Default CRP Seed Mix

Use: Minnesota state-wide on tracts enrolled in the CRP
Seeding Rate: 12.0 pounds/acre PLS drilled or 24.0 PLS pounds/acre broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *No species substitutions allowed*

Species: Preferred Variety (if available)	Pounds/Acre PLS	Percent of Mix
Big Bluestem: Bison, Bonilla	4.0	33.3
Western Wheatgrass: Rodan	0.5	4.2
Slender Wheatgrass; Revenue	0.9	7.5
Sideoats Grama: Bad River	1.6	13.3
Switchgrass:Dacotah, Forestburg, Sunburst, Nebraska	0.2	1.7
Indiangrass: Tomahawk, Holte	0.5	4.2
Rough Dropseed: Common	0.3	2.5
Yarrow: Common	0.1	0.8
Purple Prairie Clover: Common	2.0	16.7
Ox-eye Sunflower: Common	1.0	8.3
Prairie Cinquefoil: Common	0.1	0.8
Black-eyed Susan Common	0.8	6.7
Total	**12.0**	**100.0**[1]
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
Total Seed	**22.0**	**100.0**[1]

[1] May not equal 100 percent due to rounding

Table 16
MN Seed Mix 2 – Minnesota Protected and Other Waters Seed Mix

Use: Minnesota state-wide on the outer fringe of Public Water Inventory ("PWI") waterbodies and wetlands and all other waterbody banks
Seeding Rate: 8.255 pounds/acre PLS drilled or 16.510 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *Enbridge Environment must approve* substitutions *in advance*

Species: Preferred Varieties (if available)	Pounds/Acre PLS	Percent of Mix
American slough grass: Common	1.500	18.2
Blue-joint grass: Common	0.100	1.2
Reed manna grass: Common	0.200	2.4
Fowl manna grass: Common	0.100	1.2
Fowl bluegrass: Common	1.800	21.8
Rice cut-grass: Common	0.250	3.0
Annual ryegrass: Common	0.900	10.9
Tussock sedge: Common	0.100	1.2
Fox sedge: Common	0.300	3.6
Green bulrush: Common	0.100	1.2
Wool grass: Common	0.005	0.1
River bulrush: Common	0.250	3.0
Soft-stem bulrush: Common	0.100	1.2
March milkweed: Common	0.100	1.2
Flat-topped aster: Common	0.300	3.6
Joe-pye weed: Common	0.300	3.6
Boneset: Common	0.250	3.0
Sneezeweed: Common	0.250	3.0
Spotted touch-me-not: Common	0.100	1.2
Great blue lobelia: Common	0.100	1.2
Monkey flower: Common	0.100	1.2
Mountain mint: Common	0.100	1.2
Giant goldenrod: Common	0.250	3.0
Blue vervain: Common	0.350	4.2
Ironweed: Common	0.350	4.2
Total	**8.255**	**100.0**[1]
Companion Crop		
Slender wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	3.000	100.0
Total Seed	**11.255**	**100.0**[1]

[1] May not equal 100 percent due to rounding

Table 17
MN Seed Mix 3 – Minnesota Unsaturated Wetlands Seed Mix

Use: Minnesota state-wide in unsaturated wetland areas
Seeding Rate: 17.0 pounds/acre PLS drilled or 34.0 pounds/acre PLS broadcast
Notes: *No species substitutions allowed*

Species: Preferred Variety (if available)	Pounds/Acre PLS	Percent of Mix
American slough grass: Common	6.0	35.3
Annual ryegrass: Common	8.0	47.1
Flow bluegrass: Common	3.0	17.6
Total Seed	**17.0**	**100.0**[1]

[1] May not equal 100 percent due to rounding

MINNESOTA REGION 1 SEED MIXES

Table 18
MN Seed Mix 4 – Native Prairie Seed Mix

Use: Minnesota Region 1 on private and public land where native or degraded prairie are currently managed as range or hay land
Seeding Rate: 13.0 pounds/acre PLS drilled or 26.0 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *Enbridge Environment must approve* substitutions *in advance*

Species: Preferred Varieties (if available)	Pounds/Acre PLS	Percent of Mix
Big bluestem: Sunnyview, Bison, Bonilla, Bounty	1.25	9.6
Side-oats grama: Killdeer, Pierre, Butte	1.00	7.7
Fringed bromegrass: Common	1.40	10.8
Canadian wild rye: Mandan	2.00	15.4
Slender wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	2.50	19.2
Virginia wild rye: Common	2.00	15.4
Switchgrass: Dacotah, Forestburg, Sunburst, Summer	0.75	5.8
Fowl bluegrass: Common	0.60	4.6
Indian grass: Tomahawk	1.00	7.7
Black-eyed Susan: Common	0.10	0.8
Wild bergamont: Common	0.05	0.4
Hoary vervain: Common	0.05	0.4
Partridge pea: Common	0.30	2.3
Total	**13.00**	**100.0**[1]
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.00	100.0
Total Seed	**23.00**	**100.0**[1]

[1] May not equal 100 percent due to rounding

Table 19
MN Seed Mix 5 – Mixed Hay Land (Converted Prairie) and Open-Cut Road Ditches Seed Mix

Use: Minnesota Region 1 on private mixed hay land and for re-establishing road bank/ditch vegetation
Seeding Rate: 15.0 pounds/acre PLS drilled or 30.0 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *Enbridge Environment must approve* substitutions *in advance*

Species: Preferred Varieties (if available)	Pounds/Acre PLS	Percent of Mix
Meadow bromegrass: Fleet, Paddock, Regar, Montana, MacBeth, Cache	3.75	25.0
Intermediate wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	3.75	25.0
Crested wheatgrass: Nordan, RoadCrest, Summit	3.75	25.0
Tetraploid ryegrass: Common	1.50	10.0
Alfalfa: Any with Zone 2 hardiness	2.25	15.0
Total	**15.00**	**100.0[1]**
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.00	100.0
Total Seed	**25.00**	**100.0[1]**

[1] May not equal 100 percent due to rounding

Table 20 MN Seed Mix 6 – Tame Pasture Reclamation Seed Mix Use: Minnesota Region 1 on private land tame (improved) pasture planting Seeding Rate: 20.0 pounds/acre PLS drilled or 40.0 pounds/acre PLS broadcast without the companion crop Double the rate of the companion crop when broadcast seeding Notes: *Enbridge Environment must approve* substitutions *in advance*		
Species: Preferred Varieties (if available)	**Pounds/Acre PLS**	**Percent of Mix**
Alfalfa: Any with Zone 2 hardiness	6.0	30.0
Red clover: Arlington, Astred, Cinnamon , Concord or Marathon	4.0	20.0
Timothy: Climax or Claire	2.0	10.0
Orchard grass: Orion, Hawkeye, Duke, Condor, Albert	3.0	15.0
Smooth bromegrass: Alpha, Badger, Bounty , York	5.0	25.0
Total	**20.0**	**100.0[1]**
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
Total Seed	**30.0**	**100.0[1]**
[1] May not equal 100 percent due to rounding		

MINNESOTA REGION 2 SEED MIXES

Table 21
MN Seed Mix 7 – Native Prairie Seed Mix

Use: Minnesota Region 2 on private and public land where native or degraded prairie are currently managed as range or hay land
Seeding Rate: 8.20 pounds/acre PLS drilled or 16.40 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *Enbridge Environment must approve* substitutions *in advance*

Species: Preferred Varieties (if available)	Pounds/Acre PLS	Percent of Mix
Fringed brome grass: Common	2.00	24.4
Bluejoint grass: Common	0.15	1.8
Poverty grass: Common	0.50	6.1
Canadian (Nodding) wild rye: Manda	1.25	15.2
Slender wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	2.00	24.4
Fowl Bluegrass: Common	0.85	10.4
False melic grass: Common	0.25	3.0
Stiff golden rod: Common	0.15	1.8
Smooth wild rose: Common	0.15	1.8
Black-eyed susan: Common	0.25	3.0
Smooth aster: Common	0.15	1.8
American vetch: Common	0.50	6.1
Total	**8.20**	**100.0**[1]
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.00	100.0
Total Seed	**18.20**	**100.0**[1]

[1] May not equal 100 percent due to rounding

Table 22
MN Seed Mix 8 – Mixed Hay Land and Open-Cut Road Ditches Seed Mix

Use: Minnesota Region 2 on private mixed hay land and for re-establishing road bank/ditch vegetation
Seeding Rate: 45.00 pounds/acre PLS drilled or 90.00 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *Enbridge Environment must approve* substitutions *in advance*

Species: Preferred Varieties (if available)	Pounds/Acre PLS	Percent of Mix
Fowl Bluegrass: Common	6.00	13.3
Smooth Bromegrass: Alpha, Badger, Bounty , York	7.75	17.2
Slender Wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	2.00	4.4
Perennial Rye: Citadel, Mongita, Madera, Pagent, Achiever, SR-4000, Vivid, Linn Perennial Ryegrass, Windstar, and Festulolium hybrid	13.50	30.0
Switchgrass: Kanlow, Blackwell, Shelter, Carthage	1.50	3.3
Timothy: Climax or Claire	1.75	3.9
Alfalfa: Any with Zone 2 hardiness	12.50	27.8
Total	**45.00**	**100.0**[1]
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.00	100.0
Total Seed	**55.00**	**100.0**[1]

[1] May not equal 100 percent due to rounding

Table 23 MN Seed Mix 9 – Tame Pasture Reclamation Seed Mix Use: Minnesota Region 2 on private land tame (improved) pasture planting Seeding Rate: 20.0 pounds/acre PLS drilled or 40.0 pounds/acre PLS broadcast without the companion crop Double the rate of the companion crop when broadcast seeding Notes: *Enbridge Environment must approve* substitutions *in advance*		
Species: Preferred Varieties (if available)	**Pounds/Acre PLS**	**Percent of Mix**
Alfalfa: Any with Zone 2 hardiness	6.0	30.0
Red clover: Arlington, Astred, Cinnamon , Concord or Marathon	4.0	20.0
Timothy: Climax or Claire	2.0	10.0
Orchard grass: Orion, Hawkeye, Duke, Condor, Albert	3.0	15.0
Smooth bromegrass: Alpha, Badger, Bounty , York	5.0	25.0
Total	**20.0**	**100.0[1]**
Companion Crop		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
Total Seed	**30.0**	**100.0[1]**
[1] May not equal 100 percent due to rounding		

WISCONSIN SEED MIXES

Based on precipitation and general soil types the following seed mixes will be used in Wisconsin:

Table 24
WI Seed Mix 1 – Standard Upland Seed Mix

Use: Wisconsin state-wide in upland areas
Seeding Rate: 15.0 pounds/acre PLS drilled or 30.0 pounds/acre PLS broadcast without the companion crop
Double the rate of the companion crop when broadcast seeding
Notes: *Enbridge Environment must approve* substitutions *in advance*

Species: Preferred Varieties (if available)	**Pounds/Acre PLS**	**Percent of Mix**
Perennial Ryegrass	2	17.0
Canada Wild-rye	4	33.0
Switchgrass: unimproved native variety	4	33.0
Timothy	2	17.0
Subtotal	12	100.0[1]
Associated Companion Crop Mix		
Oats for summer seeding; or Winter Wheat for seeding in late fall (dormant) or spring	16	80.0
Annual Ryegrass or Slender Wheat Grass	4	20.0
Companion/Cover Crop Subtotal	20	100.0
GRAND TOTAL (pounds)	**32**	**100.0[1]**

[1] May not equal 100 percent due to rounding

Table 25
WI Seed Mix 2 – Native Sedge/Wet Meadow Mixture (W2)

Use: Wisconsin state-wide in unsaturated Wet Meadow wetland areas
Seeding Rate: See below summary.
Notes: *Enbridge Environment must approve* substitutions *in advance*

Common Name	Botanical Name	Indicator Status	Seeds/oz.	Seeds/ft^2	% of Mix
Brome, fringed	*Bromus ciliata*	*FACW*	10,000	1.5	8.1
Blue-joint grass	*Calamagrostis canadensis*	*OBL*	280,000	8.2	1.6
Wild-rye, Virginia	*Elymus virginicus*	*FACW-*	4,200	3.2	42.3
Manna grass, reed	*Glyceria grandis*	*OBL*	80,000	4.7	3.2
Manna grass, fowl	*Glyceria striata*	*OBL*	160,000	4.7	1.6
Bluegrass, fowl	*Poa palustris*	*FACW+*	118,000	16.7	7.1
Sedge, bottlebrush	*Carex comosa*	*OBL*	30,000	2.2	4.3
Sedge, pointed- broom	*Carex scoparia*	*FACW*	84,000	1.5	1.0
Sedge, tussock	*Carex stricta*	*OBL*	53,000	0.8	0.8
Sedge, Common fox	*Carex stipata*	*OBL*	34,000	2.0	3.2
Sedge, fox	*Carex vulpinoidea*	*OBL*	100,000	5.9	3.2
Rush, slender	*Juncus tenuis*	*FAC*	1,000,000	11.0	0.2
Torry's Rush	*Juncus toryi*	*OBL*	1,600,000	5.9	0.6
Bulrush, green	*Scirpus atrovirens*	*OBL*	460,000	16.9	2.0
Wool grass	*Scirpus cyperinus*	*OBL*	1,700,000	6.2	0.2
Milkweed, marsh	*Asclepias incarnata*	*OBL*	4,800	0.4	5.0
Aster, swamp	*Aster puniceus*	*OBL*	80,000	5.9	4.0
Aster, flat-topped	*Aster umbellatus*	*FACW*	67,000	1.5	1.2
Joe-pye weed	*Eupatorium maculatum*	*OBL*	95,000	0.7	0.4
Boneset	*Eupatorium perfoliatum*	*FACW+*	160,000	1.2	0.4
Goldenrod, grass- leaved	*Euthamia graminifolia*	*FACW-*	350,000	1.0	0.2
Sneezeweed	*Helenium autumnale*	*FACW+*	130,000	0.8	0.3
Sunflower, serrated	*Helianthus grosseserratus*	*FACW-*	15,000	0.2	0.6
Lobelia, great-blue	*Lobelia siphilitica*	*FACW+*	500,000	2.9	0.3
Monkey flower	*Mimulus ringens*	*OBL*	2,300,000	6.8	0.2
Mint, mountain	*Pycnanthemum virginianum*	*FACW+*	220,000	1.3	0.3
Meadow-rue, purple	*Thalicturm dasycarpum*	*FACW*	11,000	0.1	0.4
Vervain, blue	*Verbena hastata*	*FACW+*	93,000	2.2	1.3
Alexanders, Golden	*Zizea aurea*	*FACW*	11,000	1.0	5.0

Recommended Rate: 5.0 (PLS lbs/acre)

SUMMARY

Mix Seeds Per Square Foot	Mix Seeds Per Square Yard	Mix Seeds Per Acre
121	1,093	5,290,320
% by wt. Grasses	**% by wt. Graminoids**	**% by wt. Forbs**
64.0	15.0	21.0
% by Seed Count Grasses	**% by Seed Count Graminoids**	**% by Seed Count Forbs**
32.1	43.2	24.7

Table 26
WI Seed Mix 3 –Native Wet Prairie Mixture (W3)

Use: Wisconsin state-wide in unsaturated Wet Prairie wetland areas
Seeding Rate: See below summary.
Notes: *Enbridge Environment must approve* substitutions *in advance*

Common Name	Botanical Name	Indicator Status	Seeds/oz.	Seeds/ft^2	% of Mix
Bluestem, big	*Andropogon gerardi*	*FAC-*	10,000	3.7	15.3
Brome, fringed	*Bromus ciliata*	*FACW*	10,000	1.8	7.7
Blue-joint grass	*Calamagrostis canadensis*	*OBL*	280,000	6.2	0.9
Wild-rye, Virginia	*Elymus virginicus*	*FACW-*	4,200	2.0	19.9
Manna grass, reed	*Glyceria grandis*	*OBL*	80,000	2.9	1.5
Manna grass, fowl	*Glyceria striata*	*OBL*	160,000	3.5	0.9
Switchgrass	*Panicum virgatum*	*FAC+*	14,000	3.1	9.2
Bluegrass, fowl	*Poa palustris*	*FACW+*	118,000	9.6	3.0
Indian grass	*Sorghastrum nutans*	*FACU+*	12,000	2.0	6.7
Cord grass, prairie	*Spartina pecinata*	*FACW+*	6,600	1.1	6.9
Sedge, tussock	*Carex stricta*	*OBL*	53,000	0.7	0.5
Sedge, fox	*Carex vulpinoidea*	*OBL*	100,000	3.7	1.5
Bulrush, green	*Scirpus atrovirens*	*OBL*	460,000	7.7	0.7
Wool grass	*Scirpus cyperinus*	*OBL*	1,700,000	18.7	0.5
Anemone, Canada	*Anemone canadensis*	*FACW*	8,000	0.09	0.5
Milkweed, marsh	*Asclepias incarnata*	*OBL*	4,800	0.1	1.4
Aster, swamp	*Aster puniceus*	*OBL*	80,000	2.4	1.2
Aster, flat-topped	*Aster umbellatus*	*FACW*	67,000	1.5	0.9
Tic-trefoil, showy	*Desmodium canadense*	*FAC-*	5,500	0.8	6.1
Joe-pye weed	*Eupatorium maculatum*	*OBL*	95,000	1.7	0.8
Boneset	*Eupatorium perfoliatum*	*FACW+*	160,000	2.4	0.6
Goldenrod, grass- leaved	*Euthamia graminifolia*	*FACW-*	350,000	2.0	0.3
Sneezeweed	*Helenium autumnale*	*FACW+*	130,000	2.39	0.8
Sunflower, serrated	*Helianthus grosseserratus*	*FACW-*	15,000	0.3	0.7
Blazingstar, tall	*Liatris pycnostachya*	*FAC-*	11,000	0.1	0.5
Lobelia, great-blue	*Lobelia siphilitica*	*FACW+*	500,000	1.4	0.1
Monkey flower	*Mimulus ringens*	*OBL*	2,300,000	6.4	0.1
Mint, mountain	*Pycnanthemum virginianum*	*FACW+*	220,000	1.2	0.3
Vervain, blue	*Verbena hastate*	*FACW+*	93,000	1.0	0.5
Ironweed	*Veronia fasciculate*	*FACW*	24,000	0.1	0.3
Culver's root	*Veronicastrum virginicum*	*FAC*	800,000	8.8	0.5
Alexander's, golden	*Zizea aurea*	*FAC+*	11,000	2.4	9.2

Recommended Rate: 5.0 (PLS lbs/acre)

SUMMARY

Mix Seeds Per Square Foot	Mix Seeds Per Square Yard	Mix Seeds Per Acre
102	884	4,436,283
% by wt. Grasses	**% by wt. Graminoids**	**% by wt. Forbs**
72.0	3.0	24.0
% by Seed Count Grasses	**% by Seed Count Graminoids**	**% by Seed Count Forbs**
35.0	30.0	35.0

Appendix D
Enbridge Environment Hydrotest Discharge Authorization and Documentation

Enbridge Environment Hydrotest Discharge Authorization & Documentation - ***Instructions***

The purpose of this form is to document and insure that appropriate planning occurs prior to hydrostatic test discharge activities as well as the proper recording of necessary information during the actual discharge event. If the discharge permit specifies the need for a Certified Operator, he/she is responsible for the final section of the form. Otherwise, an Environmental Inspector will be responsible for completion of this form.

Part 1: Basic Discharge Information: All information must be completed. Coordination with Enbridge Engineering is necessary to obtain the exact test section length and volume of water to be discharged. The estimated duration of the discharge must be calculated using the maximum permitted rate (or the anticipated rate, if lower than the permitted rate) and the total volume of water to be discharged. This is critical information and will ensure that any required sampling is conducted at the appropriate frequency specified in the permit.

Part 2: Pre-Discharge Planning Checklist: A pre-discharge planning meeting must be held with the Certified Operator (if required), Contractor, Craft Inspection, Environmental Inspection, and Construction Management staff to review items included in the checklist and any other pertinent information deemed necessary. A full copy of the permit and discharge plan must be provided to all participants. Upon completion of this meeting, all participants must sign the form to indicate that they understand all steps of the discharge process. ***Note: In order to proceed with discharge activities, the Enbridge Construction Manager and Environment Staff assigned to the project, or their designees, must review the information and provide their authorization by signing and dating the form.***

Part 3: Discharge Monitoring: A copy of the permit, discharge plan, and parts one and two of the form must be on-site at all times during the discharge event. In addition to the items specified on the form, the following photographs are required:

- Receiving water before, during, and after the discharge (minimum 3 photos/day)
- Discharge structure/device before and during the discharge (minimum 3 photos/day)

As noted, upon completion of the discharge event, the Certified Operator or Environmental Inspector, Craft Inspector, Contractor Foreman, and Enbridge Construction Manager must sign and date the form. ***The completed form, along with the supplemental photographs, and a copy of the chain of custody for any samples submitted for laboratory analysis must be submitted to the Enbridge Environment Project Manager/Lead within 12 hours of ending the discharge. Any permit violations will be reported to the applicable agencies by the Enbridge Environment Project Manager/Lead within the timeframes specified in the discharge permit.***

Enbridge Environment Hydrotest Discharge Authorization & Documentation

Part 1: Basic Discharge Information

Date: _____

Project Name: _____ Spread: _____ Tract #: _____

Test Section Identification: _____

Pipe Diameter (inches): _____ Test Section Length (feet): _____

Volume to be discharged (gallons): _____

Permitted Discharge Rate (gpm): _____ Est. Duration of Discharge (hours): _____

Receiving Waterbody Name/Nearest Surface Waterbody: _____

Certified Operator Name and Number (if applicable): _____

Part 2: Pre-Discharge Planning Checklist

Note: All items must be complete prior to initiating discharge activities

- ☐ Notification to agency(ies) provided (if applicable - attach copy of notification documentation)
- ☐ Flow meter installed and functional in accordance with manufacturers recommendations
- ☐ Sample collection port/tap installed or other positive means of direct sampline of discharge water (only necessary if sampling is required)
- ☐ Review of discharge permit and site-specific plan complete (attach a copy of the permit and approved site specific plan)
- ☐ Discharge structure/BMPs installed according to approved plan
- ☐ Complete the table below, including quantity of samples required in accordance with the permit based on anticipated discharge duration. Add other parameters as specified in the permit:

Parameter	Analytical Method Number	Container type	Container Volume	Preservation	Maximum Holding Times	Permit Limit	Sample Type	Frequency of Analysis Specified in Permit	Number of Samples Required
pH	NA	Polyethylene / Glass	NA	None required	Analyze immediately		Field measurement		
Dissolved Oxygen	NA	Glass bottle and top	NA	None required	Analyze immediately		Field measurement		
TSS	106.2	Polyethylene	500 ml	Cool to 4° C	7 days				
Oil & Grease	1664	Amber Glass	1 liter	Cool to 4° C, HCL or H_2SO_4 to pH <2	28 days				

- ☐ Indicate responsible party for emergency/upset/spill notifications in accordance with the permit:_____
- ☐ Indicate responsible party for to begin flow diversion when change in coloration observed: _____

All staff involved in hydrostatic test discharge activities must review the above information and print and sign their name below indicating their participation in a pre-job planning meeting and that they understand the discharge plan, permit, and procedures and are prepared to properly implement them. Attach additional sheets as necessary.

Name (print and sign):

Certified Operator or Environmental Inspector Signature: _____

Enbridge Environment and Construction Management staff reviewed the pre-planning information provided and approve the initiation of discharge activities.

Enbridge Environment Staff Signature and Date: _____

Enbridge Construction Manager Signature and Date: _____

Part 3: Discharge Monitoring - attach additional sheets as necessary
Note: Flow rate must be recorded hourly, sample frequency must be in accordance with the permit specifications

Date	Time	Recorded/Sampled By	Flow Rate (gpm)	pH	Dissolved Oxygen (mg/l)	TSS Sample Collected?	Oil & Grease Sample Collected?	Other (indicate)

Appendix E
Emergency Response Contractors/Disposal and Treatment Facilities

Emergency Response Contractors/Disposal and Treatment Facilities

The Contractor will dispose of all wastes according to applicable federal, state, and local requirements. A listing of potential Emergency Spill Response Contractors and waste disposal facilities is provided below. This list was developed from state-wide data bases. This list represents firms operating at the time the data base was produced. The Contractor is responsible for verifying if a contractor or facility is currently operating under appropriate permits or licenses. The Contractor is responsible for ensuring wastes are disposed of properly.

Spill Response Contractors		
Company	**City/State**	**Phone Number**
North Dakota		
Clean Harbors Environmental	Williston, ND	(701) 774-2201 (800) 645-8265
Garner Environmental Services	Williston, ND	(701) 577-1200 (855) 774-1200
Absorbent & Safety Solutions	Watford City, ND	(701) 838-4558
Minnesota Limited	Berthold, ND	(701) 453-3700
Bobs Oilfield Service Inc	Belfield, ND	(701) 575-4666
Keitu Engineers & Consultants, Inc.	Mandan, ND	(701) 667-1800
Minnesota		
Bay West Environmental	St. Paul, MN	(800) 279-0456 (651) 291-0456
West Central Environmental Consultants Inc.	Morris, MN	(800) 422-8356 (888) 923-2778
Minnesota Limited	Bemidji, MN	(218) 755-9595
OSI Environmental	Bemidji, MN	(800) 585-8838
OSI Environmental	Eveleth, MN	(800) 777-8542
Bay West Environmental	Duluth, MN	(800) 279-0456 (218) 740-0110
Wisconsin - *The Contractor should consult with the WDNR Northern Regional Spill Coordinator (John Sager: phone (715) 365-8959) for assistance when selecting a spill response contractor.*		

Waste Disposal/Treatment Facilities		
Facility	**City/State**	**Telephone**
North Dakota		
Gascoyne Materials Handling & Recycling LLC	Dickinson, ND	701.225.0061
Sawyer Disposal Services LLC*	Sawyer, ND	701.624.5622
Dishon Disposal Inc*	Williston, ND	701.572.3223
Prairie Disposal Inc*	Tioga, ND	800.490.2106
Minnesota		
Pope-Douglas Solid Waste	Alexandria, MN	(320) 762-2381
Northstar Reclamation	Fosston, MN	(800) 422-0817
Polk County Incinerator	Fosston, MN	(218) 435-6501
Wisconsin		
Lake Area Landfill (BFI)	Sarona, WI	(612) 457-2778
Timberline Trail (Waste Mgmt.)	Weyerhaueser, WI	(800) 504-1067 ext. 7

Please note: Some facilities may have limitations on amounts, types of materials, etc.
*May accept crude oil-impacted soils and/or wastes from oil field exploration and production activities.

Appendix F
Spill Report Form

Spill Report Form

(The Contractor Spill Coordinator must complete this for any spill, regardless of size, and submit the form to the Enbridge Representative within 24 hours of the occurrence)

Date of Spill:_____ Date of Spill Discovery:_____

Time of Spill:_____ Time of Spill Discovery:_____

Name and Title of Discoverer:_____

Type of material spilled and manufacturer's name:_____

Legal Description of spill location to the quarter section:_____

Directions from nearest community:_____

Estimated volume of spill:_____

Weather conditions:_____

Topography and surface conditions of spill site:_____

Spill medium (pavement, sandy soil, water, etc.):_____

Proximity of spill to surface waters: _____

Did the spill reach a waterbody? _____Yes _____No

If so, was a sheen present? _____Yes _____No

Describe the causes and circumstances resulting in the spill:_____

_____

_____

_____

Describe the extent of observed contamination, both horizontal and vertical (i.e., spill-stained soil in a 5-foot radius to a depth of 1 inch): _____

_____

_____

Describe immediate spill control and/or cleanup methods used and implementation schedule: _____

_____

_____

_____

Current status of cleanup actions:_____

Name and Company for the following:

Construction Superintendent:_____

Spill Coordinator:_____

Enbridge Representative:_____

Person Who Reported the Spill:_____

Environmental Inspector:_____

Form completed by:_____Date:_____

Appendix G
Spill Reporting-Agency Contacts

Spill Reporting Contacts			
Agency	**Reporting Criteria**	**When**	**Phone Number**
Federal Contacts			
National Response Center	Release of a hazardous substance in an amount equal to or greater than its reportable quantity under CERCLA Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on the water's surface, or leaves sludge or emulsion beneath the surface	Immediately	(800) 424-8802
Environmental Protection Agency (EPA) Region V (MN&WI)	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on the water's surface, or leaves sludge or emulsion beneath the surface	Immediately	1 (312) 353-2000
Environmental Protection Agency (EPA) Region VIII (ND)	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on the water's surface, or leaves sludge or emulsion beneath the surface	Immediately	1 (303) 312-6312
State Contacts			
North Dakota Industrial Commission, Oil and Gas Division	Must be a leak, spill or other release of fluid that is less than one barrel total volume and remains onsite of a facility.	Immediately	(701) 328-8020
North Dakota Department of Health	Any Amount	Immediately	(701) 328-5210 or 5166
North Dakota Department of Emergency Services (NDDES)	As Needed	Immediately	NDDES Duty Officer System (701) 328-9921 (24 hour, request the Duty Officer be paged) ND Regional Hazardous Materials Teams (800) 472-2121 (Teams requested through State Radio)

Spill Reporting Contacts			
Agency	**Reporting Criteria**	**When**	**Phone Number**
Minnesota Duty Officer Program	Minnesota has a reporting threshold of greater than five-gallons for petroleum spills. Spills of any quantity of all other chemicals or materials should be reported. If in doubt, report.	Immediately	Duty Officer (651) 649-5451 1 (800) 422-0798
Wisconsin Department of Natural Resources	>one gallon of gasoline on a pervious surface	Immediately	24-hour Toll Free Hotline for Reporting Spills 1 (800) 943-0003
County Contacts – North Dakota			
Williams County Emergency Services County Law Enforcement Center	As Needed		Mike Hallesy (701) 577-7707
Mountrail County Emergency Management Resources	As Needed		Don Longmuir (701) 628-2909
Ward County Emergency Management	As Needed	8:00 a.m.–4:30 p.m. Monday-Friday	Amanda Schooling, Director (701) 857 6560
McHenry County Emergency Management	As Needed		Marvin Sola (815) 338-6400
Pierce County Emergency Management	As Needed	7:30 a.m.-4:30 p.m. Monday-Friday	Kelsey Siegler (253) 798-6595
Benson County Emergency Management	As Needed		Scott Todahl (701) 473-5320
Ramsey County Emergency Management	As Needed		Kristen Nelsen, Local Emergency Manager (701) 662-7001
Nelson County Emergency Management	As Needed		Sharon Young, Local Emergency Manager (701) 247-2472
Grand Forks County Emergency Services	As Needed		Jim Campbell (701) 780-8213
City of Grand Forks Emergency Services	As Needed		John Bernstrom (701) 746-4636
Pembina County Emergency Management	As Needed		Andrew Kirking (701)265-4849
County Contacts – Minnesota			

Spill Reporting Contacts			
Agency	**Reporting Criteria**	**When**	**Phone Number**
Kittson County Emergency Management	Kittson, Marshall, Pennington, Polk, Clearwater, Hubbard, Wadena, Cass, Crow Wing, Aitkin, and Carlton counties		Barb O'Hara (218) 843-2113
Marshall County Emergency Services	As Needed		Josh Johnston (218) 745-5841
Pennington County Emergency Management	As Needed		Erik Beitel (218)683-7087
Wadena County Emergency Management	As Needed		Luke Manderschied (218)631-7795
Polk County Emergency Management	As Needed		Barb Erdman, Director (218) 281-0437
Red Lake County Emergency Management	As Needed		Mitch Bernstein (218) 253-2996
Clearwater County Emergency Management	As Needed	8:00 a.m.–4:30 p.m. Monday-Friday	(218) 694-6183
Hubbard County Emergency Management	As Needed		Brian Halbasch (218) 732-2588
Cass County Emergency Management	As Needed		Kerry Swenson, Dispatcher (218) 547-7437
Crow Wing County Emergency Management	As Needed		John Bowen, Director (218) 829-4749
Aitkin County Emergency Management	As Needed		Dispatch (non-emergency) (218) 927-7400
Carlton County Emergency Management	As Needed		Brian Belich, Manager (218) 384-3236
County Contacts – Wisconsin			
Douglas County Emergency Management	As Needed	8:00 a.m.-4:30 p.m. Monday-Friday	Keith Kesler, Director (715) 395-1636

Appendix F

Enbridge Agricultural Protection Plan

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Agricultural Protection Plan

This APP is the same APP that was submitted as Appendix H of the Enbridge Energy, Limited Partnership Application for a Pipeline Routing Permit on April 24, 2015.

Enbridge

AGRICULTURAL PROTECTION PLAN

April 2015

ENBRIDGE

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APPENDICES

Appendix A Mitigation Measures for Organic Agricultural Land
Appendix B Management of Change Onsite Modification Request Form

DEFINITIONS

Agricultural Inspector	On-site inspector retained by Enbridge to verify compliance with requirements of this Plan during construction.
Agricultural Land	Land that is actively managed for agricultural purposes, including: cropland, hayland, or pasture; silvicultural activities (i.e., tree farms); and land in government set-aside programs such as Conservation Reserve Program and Conservation Reserve Enhancement Program. Agricultural Land may also include land that is otherwise fallow but would likely be cultivated within 5 years of construction completion.
Agricultural Monitor	On-site third-party monitor retained and funded by Enbridge, but providing direct reports to the Minnesota Department of Agriculture and/or Wisconsin Department of Agricultural, Trade, and Consumer Protection and responsible for auditing Enbridge's compliance with provisions of this Plan.
APP	Agricultural Protection Plan.
ATWS	Additional Temporary Workspace.
BMP	Best Management Practices.
CFR	Code of Federal Regulations.
Cropland	Land actively managed for growing row crops, small grains, or hay.
Easement	The agreement(s) and/or interest in privately owned Agricultural Land held by Enbridge by virtue of which it has the right to construct and operate together with such other rights and obligations as may be set forth in such agreement.
EPP	Environmental Protection Plan
Final Cleanup	Pipeline construction activity that occurs after backfill but before restoration of fences and required reseeding. Final Cleanup activities include: replacing Topsoil, removal of construction debris, removal of excess rock, decompaction of soil as required, final grading, and installation of permanent erosion control structures.
Landowner	Person(s) holding legal title to Agricultural Land from whom Enbridge is seeking, or has obtained, a temporary or permanent Easement. The term "Landowner" shall include any person(s) authorized in writing by the actual Landowner to make decisions regarding the mitigation or restoration of agricultural impacts to such Landowner's property.
MDA	Minnesota Department of Agriculture
MOC	Management of Change procedure.
MN PUC	Minnesota Public Utilities Commission
Non-Agricultural Land	Any land that is not "Agricultural Land" as defined above.
NDA	North Dakota Department of Agriculture
ND PSC	North Dakota Public Service Commission

Person	An individual or entity, including any partnership, corporation, association, joint stock company, trust, joint venture, limited liability company, unincorporated organization, or governmental entity (or any department, agency, or political subdivision thereof).
Planned Tile	Locations where the proposed Tile installation is made known in writing to Enbridge by the Landowner either: 1) within 60 days after the signing of an Easement; or 2) before the issuance of a Routing Permit to Enbridge; whichever is sooner.
PSCW	Wisconsin Public Service Commission
Right-of-way	The land included in permanent and temporary Easements that Enbridge possess for the purpose of construction and operation.
Routing Permits	Routing permits issued by the ND PSC, MN PUC, and PSCW.
Spoil Storage Side	Non-working side of the construction Right-of-way where ditch spoil and temporary Topsoil are stored (as needed).
Tenant	Any person, other than the Landowner, lawfully residing on or in possession or control of the land that makes up the "right-of-way" as defined in this Plan.
Tile	Subsurface drainage systems and their aboveground appurtenances.
Topsoil	The uppermost horizon (layer) of the soil, typically with the darkest color and highest content of organic matter and nutrients.
Trench Crown	The placement of subsoil and Topsoil in the trench to a finished elevation somewhat above the surrounding ground surface to account for post-construction settling of soil returned to the trench.
TWS	Temporary Workspace
USC	United States Code
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
WDATCP	Wisconsin Department of Agricultural, Trade, and Consumer Protection

PURPOSE AND APPLICABILITY

This Agricultural Protection Plan (”Plan”) was developed by Enbridge in consultation with the Minnesota Department of Agriculture (“MDA”) and the Wisconsin Department of Agricultural, Trade, and Consumer Protection (“WDATCP”)[1]. Enbridge will include the Plan as part of applications for a Pipeline Routing Permit (“PRP”) from the Minnesota Public Utilities Commission (“MN PUC”) and a Public Interest Determination (“PID”) from the Wisconsin Public Service Commission (“PSCW”). Through the MN PUC and PSCW public notice and review processes associated with the applications, other agencies (including the MDA and WDATCP), local authorities, Landowners, Tenants, and other stakeholders are able to review and provide comments on the Plan. This Plan will be incorporated by reference into the Routing Permits issued by the MN PUC and the Public Interest Determination issued by the PSCW. Once finalized, this Plan may also be incorporated by reference into other federal, state, and local permits.

The objective of the Plan is to identify measures that Enbridge will implement to avoid, mitigate, or provide compensation for negative agricultural impacts that may result from pipeline construction. The construction standards described in this document apply only to construction activities occurring partially or wholly on privately owned Agricultural Land. Furthermore, Best Management Practices (“BMPs”) identified in the Enbridge’s Environmental Protection Plan (“EPP”) may be installed on Agricultural Land in conjunction with mitigation measures outlined in this Plan.

Unless the easement or other agreement, regardless of nature, between Enbridge and the Landowner specifically requires the contrary, the mitigation measures specified in this Plan will be implemented in accordance with the conditions discussed below.

Appendix A sets forth the specific additional mitigation measures that will be applied specifically to Organic Agricultural Lands, such as Certified Organic farms or farms that are in active transition to become Certified Organic. Organic Agricultural Land is defined as farms or portions thereof, as described in the National Organic Program, Title 7 Code of Federal Regulations (“CFR”) § 205.

GENERAL PROVISIONS

All mitigation measures are subject to change by Landowners, provided such changes are negotiated in advance of construction and acceptable to Enbridge. If any provision of this Plan is held to be unenforceable, no other provision will be affected by that holding, and the remainder of the Plan will be interpreted as if it did not contain the unenforceable provision.

Enbridge will consider any federal, state, and local permit, including Routing Permits, to be the controlling authority. To the extent a mitigation measure contemplated by this Plan is determined to be unenforceable in the future due to requirements of other permits issued, Enbridge will inform the regulatory authority and will develop reasonable alternative measures. Enbridge will implement the mitigation measures and BMPs described in this Plan to the extent they do not conflict with the requirements of federal and state rules and regulations, and permits and approvals obtained by Enbridge. Certain provisions of this Plan require Enbridge to consult and/or reach agreement with the Landowner of a property. Enbridge will engage in a good faith effort to

[1] Enbridge also attempted to engage the North Dakota Department of Agriculture (“NDA”) for purposes of Plan development. The NDA has not replied to-date. Nonetheless, Enbridge will apply this Plan to the entire project (including North Dakota Agricultural Lands). State-specific requirements may be referenced within this Plan.

secure the agreement. Tenants will not be consulted except where a Landowner has designated in writing that a Tenant has decision making authority on their behalf.

Enbridge will retain qualified contractors to perform mitigation measures; however, Enbridge may negotiate with Landowners to implement the mitigation measures that Landowners wish to perform themselves.

Enbridge will employ an Agricultural Inspector whose role is to verify compliance with the requirements of this Plan during construction of the pipeline. The Agricultural Inspector will be employed by and report to Enbridge, and will be a part of Enbridge's environmental inspection team.

The Agricultural Inspector will:

- Be a full-time member of Enbridge's environmental inspection team
- Provide construction personnel with training on provisions of this Plan before construction begins;
- Provide construction personnel with field training on specific topics, such as protocols for Topsoil stripping;
- Observe construction activities on Agricultural Land on a continual basis;
- Be responsible for verifying Enbridge's compliance with provisions of this Plan during construction;
- Work collaboratively with other Enbridge inspectors, right-of-way agents, and the Agricultural Monitor in achieving compliance with this Plan;
- Document instances of noncompliance and work with construction personnel to identify and implement appropriate corrective actions as needed; and
- Have the authority to stop construction activities that are determined to be out of compliance with the provisions of this Plan.

In addition to the Agricultural Inspector, an Agricultural Monitor will also inspect construction work on Agricultural Lands in Minnesota and Wisconsin. The Agricultural Monitor will be retained and funded by Enbridge, but will function as an independent third-party inspector providing direct reports to the MDA and WDATCP, and will be responsible for auditing Enbridge's compliance with the provisions of this Plan in Minnesota and Wisconsin, respectively. Enbridge will provide resumes of candidates who meet the qualifications of an Agricultural Monitor for review and final selection by the MDA and WDATCP.

The Agricultural Monitor will not be a member of Enbridge's environmental inspection team. The Agricultural Monitor will not have the authority to direct construction activities or manage Enbridge employees or contractors. The Agricultural Monitor will work through Enbridge's Agricultural Inspector and the MDA and WDATCP if compliance issues are identified. The Agricultural Monitor will have full access to Agricultural Land crossed in Minnesota and Wisconsin and will have the option to attend meetings where construction on Agricultural Land is discussed. Specific duties of the Agricultural Monitor will include:

- Participate in preconstruction training activities sponsored by Enbridge;
- Monitor construction and restoration activities on Agricultural Land for compliance with provisions of this Plan;
- Review Management of Change ("MOC") requests;
- Approve MOC Level 1 requests as appropriate;

- Report instances of noncompliance to Enbridge's Agricultural Inspector;
- Prepare regular compliance reports and submit them to the MDA and WDATCP;
- Act as a liaison between Landowners and the MDA and WDATCP when necessary and requested by the Landowner;
- Serve as a resource to investigate complaints at the direction of the MDA and WDATCP and to explain any proposed changes to this Plan during construction; and
- Maintain a written log of communications from Landowners regarding compliance with this Plan as well as report Landowner complaints to Enbridge's Agricultural Inspector or right-of-way representative.

Both the Agricultural Inspector and Monitor will have a bachelor's degree in agronomy, soil science, or equivalent work experience. In addition, the Agricultural inspectors and Agricultural Monitors will have demonstrated practical experience with pipeline construction and restoration on Agricultural Land.

Enbridge will provide each Landowner with a telephone number and address that can be used to contact Enbridge, during and following the completion of construction, regarding the agricultural mitigation work that is performed on their property or other construction-related matters. If the contact information changes following construction, Enbridge will provide the Landowner with updated contact information. Enbridge will respond to Landowner telephone calls and correspondence within a reasonable time.

Mitigation measures identified by Enbridge pursuant to this Plan, unless otherwise specified in this Plan or in an Easement or other agreement with an individual Landowner, will be initiated within forty-five (45) days following completion of Final Cleanup on an affected property, weather permitting or unless otherwise delayed at the request of the Landowner. If implementation of mitigation measures requires additional time, Enbridge will make temporary repairs, as needed, to minimize the risk of additional property damage or interference with the Landowner's access to or use of the property.

MITIGATION MEASURES

1. Right-of-Way Width

Prior to construction, Enbridge will establish the right-of-way width for construction and temporary workspace ("TWS") in Agricultural Lands based on prior project experience, engineering and construction requirements or best practices, and safety needs. The construction limits will be shown on alignment sheet drawings provided to the construction contractor, Environmental Inspector, Agricultural Inspector, Agricultural Monitor, and regulatory authorities.

A. The typical construction workspace will be governed by the Routing Permits and other permits, but may be up to 120 feet wide in uplands, of which 50 feet will typically be retained in a permanent Easement, and 70 feet, respectively, will typically be TWS. The TWS will be used during construction for soil storage and operation of equipment and vehicles along the entire length of the pipeline. At certain select areas where the pipeline crosses natural geographic or larger man-made features such as roads, railroads, streams, or wetland crossings, a defined area of additional temporary workspace ("ATWS") will be required on each side of the feature.
B. The construction boundaries of ATWS will be staked prior to the work at each location.

C. If the area of the ATWS is not sufficient to perform the work and implement BMPs, Enbridge will refrain from construction in that area until an adequate work area is available and approved. Enbridge will discuss the need for ATWS with the construction contractor, construction inspection team, Agricultural Inspector, Agricultural Monitor, and the Landowner, and will not use any additional workspace until approved by the Landowner, Agricultural Monitor, and regulatory authorities, as applicable.

2. Pipeline Depth of Cover

A. Except for aboveground facilities, such as mainline block valves, and except as otherwise stated in this Plan, the pipeline will be buried with the following depths of cover on Agricultural Land:

1) The pipeline will be constructed with a minimum depth of cover of 30 inches as required by U.S. Department of Transportation ("USDOT") regulations in 49 CFR §195.248. Section 216G.07 of the Minnesota Statutes further requires a minimum depth of cover of 54 inches unless waived by the Landowner. As a result, Enbridge will ask Landowners to waive the 54-inch-deep minimum cover requirement, as allowed by Minn. Stat. § 216G.07 and consistent with Enbridge's expansion projects in 1994, 1998, 2002, 2008, and 2009-2010.

2) Where existing or planned Tile systems are present, the pipeline will be installed at a depth that will achieve at least a 12-inch-wide separation between the pipeline and overlying Tiles as described in Section 2.C. of this Plan.

B. Enbridge will construct the pipeline under existing non-abandoned Tile and Planned Tile within six (6) feet of the surface, unless the Landowner determines otherwise in writing. Enbridge may install the pipeline over Tile that is buried deeper than six (6) feet. If, prior to construction, the Landowner plans to install a new Tile system, the Landowner must provide to Enbridge plans drawn by a qualified professional with experience in Tile design and installation. In determining the proper depth of the pipeline, Enbridge will accommodate the depth and grade needed for both existing and Planned Tile to function properly. Enbridge will not change the grade of existing Tile to accommodate the pipeline without the Landowner's advance written consent.

C. A minimum of twelve (12) inches of separation will be maintained between the pipeline and Tile unless the Landowner agrees in writing to a lesser separation. If unforeseen physical conditions are discovered during construction that prevents minimum separation, the Landowner will be informed of the situation prior to the installation of the pipeline over the Tile. If a good faith effort is made and the Landowner is unavailable, the Agricultural Monitor will be informed and construction will continue.

3. Winter Construction

Enbridge intends on avoiding construction in Agricultural Lands in the winter season. However, to protect the productivity of Agricultural Lands in the event that winter construction is unavoidable as a result of weather, permit acquisition, or any other unforeseen delays, the following mitigation measures are proposed:

A. *Minimize Topsoil Stripping in frozen conditions.* Frozen conditions can preclude effective Topsoil stripping. When soil is frozen to a depth greater than the depth of the Topsoil, Topsoil cannot be efficiently stripped from the subsoil. If Topsoil stripping must proceed under these conditions, it will only be removed from the area of the trench. A ripper will be used to break up the frozen Topsoil over the trenchline and a backhoe will remove the Topsoil layer and store the material in a separate pile. The ripper will extend to the depth of Topsoil or to a maximum depth of eighteen (18) inches in the Red River Valley (In Minnesota) and twelve (12) inches elsewhere, whichever is less.

B. *Minimize Final Clean-up activities in frozen conditions*. Frozen conditions can preclude effective Topsoil replacement, removal of construction debris, removal of excess rock, decompaction of soil as required, final grading, and installation of permanent erosion control structures. If seasonal or other weather conditions preclude Final Clean-up activities, the trench and temporary workspace areas will be backfilled, stabilized, and temporary erosion control measures will be installed until restoration can be completed. If Topsoil/spoil piles remain throughout the winter, the Topsoil/spoil piles will be stabilized by an application of mulch and a tackifier or other methods approved by the regulatory authority. To prevent subsidence, backfill operations will resume when the ground is thawed and the subsoil will be compacted (as needed) prior to Final Clean-up activities. The construction contractor must monitor these areas until final restoration is complete.

C. Topsoil Stripping and Final Clean-up activities proposed in Agricultural Lands in frozen conditions in Minnesota and Wisconsin will be discussed with the MDA and WDATCP, respectively prior to commencement of these activities.

4. Temporary Erosion and Sediment Control

Temporary erosion and sediment controls will be implemented as required and are described in the EPP.

5. Topsoil Stripping, Trenching, Soil Storage, and Replacement

A. Full and partial Topsoil stripping methods are similar except for the area where the Topsoil is removed. With full Topsoil stripping, the Topsoil is removed from the entire working side (traffic lane, trench spoil storage, Topsoil storage piles, and trench area) of the right-of-way. Under partial Topsoil stripping, the Topsoil will not be removed from under the Topsoil storage piles. Topsoil will also be removed and segregated in other areas, such as bore pits at road and railroad crossings, where the footprint may be larger and/or irregularly shaped. Topsoil is typically stored on the outer most edge of the working side of the construction right-of-way, however, Enbridge may also store Topsoil on the spoil storage side of the construction workspace where there are workspace constraints. Typical details for each Topsoil stripping method are presented in the EPP.

Enbridge will use the following Topsoil segregation methods during construction on Agricultural lands. The method selected will be dependent on specific Landowner approvals or agreements, field conditions, regulatory authority or permit requirements and/or other factors.

- Modified Ditch-Plus-Spoil-Side Method – This method involves stripping Topsoil horizon from the spoil storage area, the pipeline trench, and the primary portion of the travel lane. The modified ditch-plus-spoil-side method would typically be used in active cropland in the Red River Valley (in Minnesota).

- Full Right-of-Way Method – This method involves stripping Topsoil from the entire width of the construction right-of-way. On most Agricultural Land located outside of the Red River Valley (in Minnesota), Topsoil will be removed from the full right-of-way because this method typically results in less soil mixing between Topsoil and subsoil caused by equipment rutting over areas where Topsoil was not stripped. A larger volume of Topsoil will be generated using this method and, consequently, may warrant the need for Topsoil to also be stored on both sides of the construction right-of-way.

- Trenchline-Only Method – This method involves removing Topsoil from over the proposed trench only, and may be used where Enbridge determines that the width of the construction right-of-way is insufficient for storing Topsoil and maintaining a sufficient width to perform construction activities and allow equipment to pass.

B. The maximum depth of Topsoil stripping will be twelve (12) inches, except in the Red River Valley in Minnesota (see Figure below).

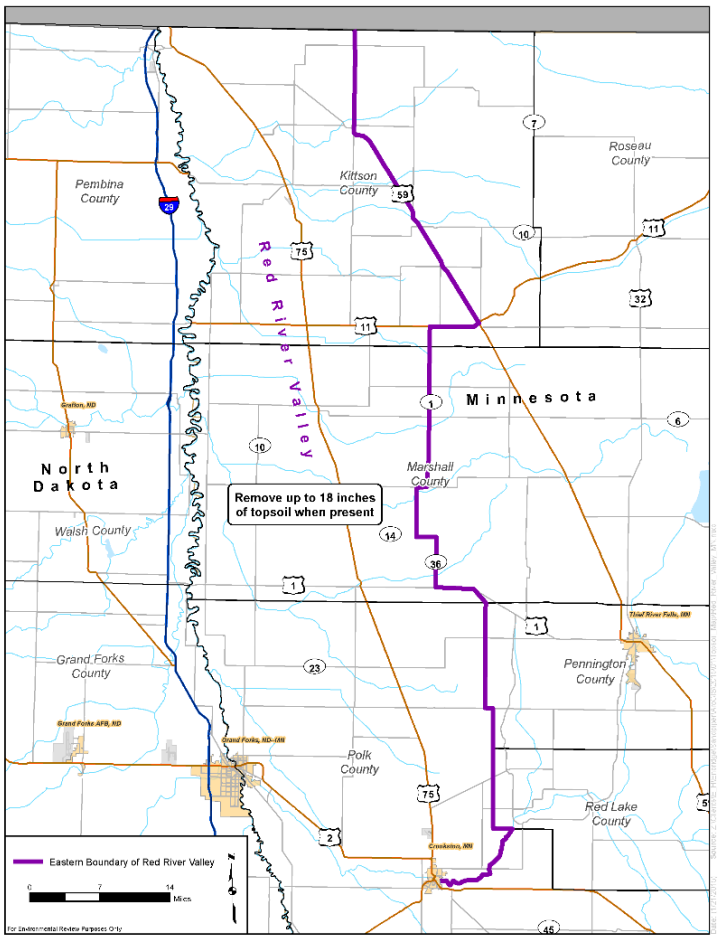

In the Red Lake Valley up to eighteen (18) inches of Topsoil may be stripped when present, unless otherwise agreed to with MDA. In this area, Enbridge will work with MDA to identify a suitable protocol for communicating the appropriate depth of Topsoil stripping to construction personnel. The Agricultural Inspector or the designated Enbridge inspector will observe Topsoil operations so that appropriate depths are removed.

C. Equipment operators will be trained to discriminate between Topsoil and subsoil based on obvious color changes. In locations where the Topsoil/subsoil color changes are not easily distinguishable or variable, the Agricultural Inspector will determine the depth.

D. Before removing Topsoil during wet soil conditions, the Agricultural Inspector will assess whether the moisture content in the surface horizon is suitable for grading. If the soil is considered too wet to segregate, stripping may be postponed. Based on the Agricultural Inspector's recommendation, Enbridge may allow Topsoil removal in areas where soils are persistently wet.

E. Enbridge may also remove Topsoil from ATWS as dictated by site-specific conditions and Landowner agreements. Topsoil will be removed in all "cut and fill" areas prior to grading.

F. In specific areas of deep Topsoil and as determined in consultation with the Agricultural Inspector and/or the Agricultural Monitor, the modified ditch-plus-spoil method will be used. However, the area requiring Topsoil stripping may be adjusted from the modified ditch-plus-spoil method where the Agricultural Inspector determines that such modification is necessary for safety or would be more protective of the soil resource. The adjusted method may include trenchline-only Topsoil segregation, such as in instances where Topsoil is removed under frozen conditions (i.e., winter construction). In all cases where modifications are proposed, approval from Enbridge, the MDA, the WDATCP, or other regulatory authority is required.

G. If the Agricultural Monitor and the Agricultural Inspector cannot agree on the proposed adjustment in the Topsoil segregation method, the Agricultural Monitor will document the objection and provide documentation to the MDA and/or WDATCP and Enbridge.

H. Trench spoil will be placed in a stockpile that is separate from Topsoil. Enbridge will maintain a minimum one (1)-foot-wide separation or place a barrier between Topsoil and subsoil piles to avoid mixing. In areas where the Topsoil has not been stripped from the subsoil storage area, subsoil can be stored on a thick layer of mulch or another physical barrier that identifies and protects the unstripped Topsoil.

J. Backfilling will follow lowering the pipe into the trench. During trench backfilling, subsoil material will be replaced first, followed by Topsoil. To prevent subsidence, subsoil will be backfilled and compacted. Compaction by operating construction equipment along the trench is acceptable.

K. Rock excavated from the trench may be included with backfill provided the rock content of the pre-construction soils is not significantly increased. In the event excess rock cannot be returned to the trench without substantially increasing pre-existing rock

content, rocks will be considered construction debris and removed (see Section 8 of this Plan).

L. Replacing Topsoil will be initiated within fourteen (14) days after backfilling the trench. If seasonal or other weather conditions prevent compliance with this timeframe, temporary erosion control measures must be implemented and maintained until conditions allow completion of cleanup. Topsoil will be replaced across the stripped area as near as practicable to its original depth. A Trench Crown over the trenchline is permissible to offset potential settling. Following placement of the subsoil crown, Topsoil would be uniformly returned across the stripped area. The height of the crown will generally be equal to, or less than, twelve (12) inches at the center. Breaks in the crown may be cut to accommodate overland water flow across the right-of-way.

6. Repair of Damaged and Adversely Affected Tile

If Tile is damaged during installation of the pipeline, the Tile will be repaired in a manner that restores operating condition. If Tile lines immediately adjacent to the construction area are adversely affected by the pipeline installation, Enbridge will restore the Tile, including the relocation, reconfiguration, or replacement of the Tile. The affected Landowner may settle with Enbridge for payment to repair, relocate, reconfigure, or replace the damaged Tile. In the event the Landowner chooses to perform the repair, relocation, reconfiguration, or replacement of the damaged Tile, Enbridge will not be responsible for correcting Tile repairs after completion of the pipeline and the Landowner's repairs. Enbridge is only responsible for correcting Tile repairs if the repairs were made by Enbridge or its agents or designees.

Prior to pipeline installation, Enbridge will contact Landowners to determine if Tile systems will be affected. Tile systems that will be damaged, cut, or removed during construction will be marked by placing a highly visible flag at the edge of the construction right-of-way directly over the Tile lines. These markers will not be removed until the Tile has been permanently repaired and approved and accepted by the Landowner, or the Agricultural Monitor.

The pipeline trench shall provide a minimum of twelve (12) inches of clearance, where practicable, between the pipe and drainage Tiles. In most situations, the pipe will be installed under the drainage Tile; however, where drain Tiles are deeper than six (6) feet Enbridge may elect to install the pipe above the Tile lines.

Enbridge will ensure that the construction contractor repairs damaged Tile in a manner consistent with industry-accepted methods. At the Landowner's request and with Enbridge's approval, local contractors may perform the repair, replacement, or reconfiguration of the Tiles damaged or cut during pipeline construction.

Where damaged Tile is repaired by Enbridge, the following procedures will apply:

A. Before completing permanent repairs, Tiles will be examined on both sides of the trench for their entire length within the work area to check for damage by construction equipment. If Tiles are found to be damaged, they will be repaired to preconstruction conditions.

B. Tiles will be repaired with material of the same or better quality as that which was damaged.

C. Filter-covered drain Tiles will be replaced with filter-covered drain Tiles.

D. If the Tile is clay, ceramic, or concrete, any connection made with new material must be made with commercially available connectors, wrapped in plastic, or sealed with Sakrete to prevent soil intrusion.

E. If water is flowing through a damaged Tile, temporary repairs will be promptly completed and maintained until permanent repairs can be made.

F. Where Tiles are damaged or severed by the pipeline trench, repairs will be made according to the following procedures:

1) Where Tiles are severed by the pipeline trench, double-walled drain Tile pipe, or its equivalent material, will be used for Tile repairs.

2) Within the trench, one and one-half (1.5) inch river gravel, four (4) inch crushed stone, sandbags, bags of Sakrete (or an equivalent), or poured concrete will be backfilled under Tiles, as needed, to provide support and prevent settling. Concrete blocks are also acceptable forms of support as are protective pads on the pipeline.

3) The support member will be of sufficient strength to support loads expected from normal farming practices (i.e., loads up to a ten (10) ton point load) on the surface directly above the repaired Tile.

4) The support member will extend a minimum of two (2) feet into the soil on both sides of the trench and will be installed in a manner that will prevent it from overturning. If the repairs involve clay Tile, the support member will extend to the first Tile joint beyond the minimum two (2) -foot-wide distance.

5) There will be a minimum clearance as required by Section 2.C. of this APP.

6) The grade of the Tile will not be changed.

G. Enbridge will initiate efforts to complete permanent Tile repairs within a reasonable timeframe after Final Cleanup, weather and soil conditions permitting.

H. Following completion of the Final Cleanup, Enbridge will be responsible for correcting repairs to Tile that fail, but only if Enbridge or its agents or designees made the initial repairs. Enbridge will not be responsible for Tile repairs that Enbridge has paid the Landowner to perform.

I. Any necessary modifications to the configuration of existing Tile systems must be consistent with the U.S. Department of Agriculture (“USDA”), Natural Resources Conservation Service, and Minnesota Wetland Conservation Act restrictions, and other regulatory authorities on wetland drainage.

7. Agricultural Drainage Ditches

Where the pipeline route crosses agricultural drainage ditches that are operated by the Landowner, the pipeline will be installed at a depth that is sufficient to allow for ongoing maintenance of the ditch. After the pipeline is installed, the ditch will be restored to its preconstruction contours with erosion controls as needed. Ditches that are operated and maintained by a public entity will be crossed in accordance with applicable permits.

8. Rock Removal

The following conditions will apply on Agricultural Land:

A. If trenching, blasting, or boring operations are required in bedrock, suitable precautions will be taken to minimize the potential for rocks to become mixed with the backfill.

B. After the construction right-of-way has been decompacted as required in Section 10 of this Plan and the Topsoil replaced, Enbridge will remove rocks from the surface of the entire construction area so that the size, density, and distribution of rock on the right-of-way is similar to that on adjacent off-right-of-way areas. Enbridge will consult with the Landowner to identify suitable rock disposal locations on the construction right-of-way, or the rocks will be removed for disposal at another approved disposal location. Written authorization from the Landowner is required for disposal on the Landowner's property. Rock disposal will comply with any federal, state, or local regulations involving fill and disposal of construction debris.

9. Removal of Construction Debris

Construction-related debris, material, and litter will be removed from the Landowner's property at Enbridge's expense. The Landowner or land-managing agency may approve leaving specific materials onsite that may provide for beneficial uses for stabilization or habitat restoration.

10. Compaction, Rutting, and Soil Restoration

A. In an effort to minimize soil compaction prior to trenching activities, Enbridge will, where practical, transport pipe joints (i.e., "stringing trucks") as closely as possible along the pipeline centerline.

B. After construction, compaction of the subsoil will be alleviated on Cropland using deep-tillage equipment, as needed. Decompaction of the topsoil, if necessary, will be performed during favorable soil conditions. If the Agricultural Inspector and/or Agricultural Monitor determine that the soil is too wet, decompaction will be delayed until the subsoil is friable/tillable in the top eighteen (18) inches.

C. Deep subsoil ripping in cropland will occur in all traffic and work areas of the pipeline right-of-way where there was full right-of-way Topsoil stripping, unless the Agricultural Inspector determines compaction has not occurred. This includes ATWS.

D. Subsoil ripping equipment may include v-rippers, chisel plows, or equivalents.

E. If the Landowner makes a written claim for damages related to soil compaction greater than that of immediately adjacent Agricultural Land owned by the Landowner but unaffected by pipeline construction, Enbridge will retain a Professional Licensed Soil Scientist, or an appropriately qualified professional engineer. The Professional Soil Scientist or engineer will perform a survey of the construction right-of-way, ATWS, and adjacent unaffected land owned by the Landowner for soil compaction using field equipment such as a soil penetrometer. In addition, where there are row crops, samples will be taken in the middle of the row, but not in rows where the drive wheels of farm equipment normally travel. Copies of the results of the survey will be provided to the Landowners making such claim within thirty (30) days of completion of the soil survey. These surveys for soil compaction will be completed at Enbridge's expense.

F. Enbridge will restore rutted land as near as practical to its preconstruction condition.

G. Enbridge will compensate Landowners, as appropriate, for damages caused by Enbridge during construction. Damages will be paid for the cost of soil restoration on the construction right-of-way and ATWS to the extent such restoration work is not performed by Enbridge.

H. In the event of a dispute between the Landowner and Enbridge regarding what areas need to be deep tilled (i.e., “ripped”) or chiseled, or the depth at which compacted areas should be ripped or chiseled, Enbridge will determine the appropriate actions based on the Agricultural Monitor’s opinion.

11. Fertilization and Liming

Fertilizers and lime will be applied based on Landowner requirements.

12. Land Leveling

Following completion of the construction, Enbridge will restore the construction work areas as practicable to the original preconstruction contours. If uneven settling occurs or surface drainage problems develop as a result of pipeline construction, Enbridge will provide additional land leveling services within forty-five (45) days of receiving a Landowner's written notice, weather and soil conditions permitting. Alternatively, Enbridge will negotiate with the Landowner for reasonable compensation in lieu of restoration.

13. Prevention of Soil Erosion

Enbridge will install permanent erosion control devices during restoration to prevent erosion as described in Enbridge’s EPP.

14. Repair of Damaged Soil Conservation Practices

Soil conservation practices (e.g., terraces, grassed waterways) that are damaged by pipeline construction will be restored to their preconstruction condition.

15. Interference with Irrigation Systems

A. If it is feasible and mutually acceptable to Enbridge and the Landowner, temporary measures will be implemented to allow an irrigation system to continue to operate across land on which the pipeline is being constructed.

B. If the pipeline right-of-way and/or ATWS interfere with an operational (or soon-to-be operational) spray irrigation system, Enbridge will inform the Landowner of the need to take the Irrigation system out of service. Enbridge and the Landowner will agree upon an acceptable amount of time the irrigation system may be out of service. If Enbridge and the Landowner are unable to agree on the amount of time within ten (10) days of Enbridge informing the Landowner of the need to take the irrigation system out of service, construction will proceed and the Landowner will be asked to take the irrigation system out of service.

C. If, as a result of pipeline construction, interruption of an irrigation system results in crop damages, either on the right-of-way or off-right-of-way, compensation of Landowners will be determined as described in Section 21 of this Plan.

16. Ingress and Egress

Prior to pipeline construction, Enbridge will identify the means of entering and exiting the right-of-way should access to the right-of-way not be practical or feasible from adjacent tracts or from public highway or railroad rights-of-way, consistent with Enbridge's Easement rights. Temporary access ramps may be constructed using locally obtained Topsoil as needed to facilitate the movement of equipment between public highways and the right-of-way.

17. Temporary Roads

A. If public roads do not provide sufficient access, Enbridge will attempt to use existing farms roads for access to and from the right-of-way, subject to approval from the Landowner or Enbridge's Easement rights. If Enbridge needs to construct a new temporary access road across Agricultural Land, the location will be made in collaboration with the Landowner. Temporary roads that are needed during construction will be located to minimize impacts on the landowner's or tenant's use of the agricultural land. If temporary roads in Agricultural Lands require gravel stabilization, geotextile construction fabric will be placed beneath the rock to add stability and to provide a distinctive barrier between the rock and soil surface. During restoration of the right-of-way, temporary access roads will be removed or restored to preconstruction conditions, except as described in Section 17C of this Plan.

B. Temporary roads will be designed so as not to impede drainage and will be constructed to minimize soil erosion.

C. Following construction, new temporary roads may be left intact through mutual agreement of the Landowner and Enbridge unless otherwise restricted by federal, state, or local regulations.

D. If the temporary roads are to be removed, the Agricultural Land on which the temporary roads are constructed will be returned to its previous use and restored to a condition

equivalent to what existed prior to construction. Restoration techniques for temporary roads will be similar to those used in restoring the construction right-of-way (e.g., decompaction).

18. Weed Control

Enbridge has identified and will implement weed control measures as described in the EPP.

Enbridge will provide weed control at its aboveground facility sites (e.g., mainline block valve sites, pump stations) to avoid the spread of weeds onto adjacent Agricultural Land during operation activities. Weed control spraying, will be conducted in accordance with applicable regulatory authorities.

19. Pumping of Water from Open Trenches

A. Enbridge will identify locations for discharging water pumped out of trenches in consultation with the Agricultural Inspector and Landowner, to the extent practicable.

B. When dewatering trenches, Enbridge will discharge the water in a manner that will minimize damaging adjacent Agricultural Land, crops, and/or pasture. Such damages may include, but are not limited to, inundation of crops for more than twenty-four (24) hours and deposition of sediment in cropland and drainage ditches. If water-related damage during discharge from trenches results in a loss of yield, compensation of Landowners will be determined as described in Section 21 of this Plan.

C. Discharge of water will be conducted in accordance with the EPP, federal and state regulations, and permit conditions.

20. Construction in Wet Conditions

A. Should the Agricultural Monitor determine that continued construction in wet conditions could result in damage to soil structure and compromise future cropland productivity, the Agricultural Monitor may request Enbridge's Agricultural Inspector to temporarily halt the activity on a Landowner's property until the Agricultural Monitor consults with Enbridge's Environmental Inspector and Construction Manager. Should Enbridge elect to continue construction activities over the objection of the Agricultural Monitor, Enbridge will retain a Professional Licensed Soil Scientist or an appropriately qualified professional engineer, at its own expense, to perform a survey of the construction right-of-way, ATWS, and adjacent unaffected land owned by the Landowner for soil compaction, prior to final restoration and using the procedures described above.

21. Procedures for Determining Construction-Related Damages

A. Enbridge will negotiate in good faith with Landowners who assert claims for construction-related damages. The procedure for resolution of these claims will be in accordance with the terms of the Easements.

B. Negotiations between Enbridge and any affected Landowner will be voluntary in nature and no party is obligated to follow a specific procedure or method for computing the amount of loss for which compensation is sought or paid, except as otherwise

specifically provided in the Easements. In the event a Landowner should decide not to accept compensation offered by Enbridge, the compensation offered is only an offer to settle, and the offer shall not be introduced in any proceeding brought by the Landowner to establish the amount of damages Enbridge must pay. In the event that Enbridge and a Landowner are unable to reach an agreement on the amount of compensation, any such Landowner may seek further recourse as provided in the Easement.

22. Advance Notice of Access to Private Property

A. Enbridge or its agents will provide the Landowner with a minimum of twenty-four (24) hours' notice before accessing his/her property for construction, in addition to any regulatory notifications.

B. Prior notice will consist of a personal or telephone contact, whereby the Landowner is informed of Enbridge's intent to access the land. If the Landowner cannot be reached in person or by telephone, Enbridge will mail or hand-deliver to the Landowner's home a dated, written notice of Enbridge's intent. The Landowner need not acknowledge receipt of the written notice before Enbridge enters the property.

23. Indemnification

Indemnification obligations relating to the pipeline installation covered by this Plan shall be determined in accordance with the terms of the Easements and applicable law.

24. Tile Repair Following Pipeline Installation

A. If, after pipeline installation, the Landowner must make repairs to the Tile system within the right-of-way, or plans to install a new Tile system, the Landowner must obtain Enbridge approval of the work plan prior to commencing any activities within the right-of-way. Enbridge may impose such requirements and limitations on the work as necessary to protect the safety and integrity of Enbridge's facilities. The Landowner will be responsible for contacting 811 or the local one call center prior to any excavation near the pipeline and complying with all necessary requirements imposed by Enbridge to protect the safety and integrity of Enbridge's facilities.

Enbridge will, at its own expense, follow the procedures below.

B. An Enbridge representative will be present while the excavation work is being performed, but will not perform the excavation work. If the pipeline is above the Tile system, Enbridge will be responsible for reasonable extra costs incurred by the Landowner to excavate and expose the pipeline in accordance with Enbridge's requirements for protection of the pipeline.

MANAGEMENT OF CHANGE PROCEDURE

As a result of variable field conditions during construction, Enbridge established a MOC procedure to allow this Plan to be modified as needed during construction. The MOC procedure allows for modifications to mitigation measures, construction alignments, plans, designs, methods, and construction work areas governed by this Plan. These modifications will involve discussions amongst representatives of Enbridge, the Agricultural Inspector, the Agricultural Monitor, and the

MDA and/or WDATCP, or other regulatory authorities. Some authority for approval/denial may be delegated to the Agricultural Monitor by the MDA and/or WDATCP, or other regulatory authorities. The MOC process can also be used to clarify discrepancies discovered in project documents and/or to distribute information to team members. Three MOC levels (Levels 1, 2, and 3) will be used to categorize and process requests. Enbridge will not conduct activities that deviate from approved activities without prior authorization by the MDA and/or WDATCP, or other regulatory authorities.

Enbridge anticipates that two types of minor route field realignments/modifications may be required after issuance of the routing permits that would not require approval of the Agricultural Monitor, the MDA and/or WDATCP, or other regulatory authorities: 1) minor realignments that are requested by the Landowner; and 2) minor realignments required due to site-specific conditions (e.g., steep slopes and other constructability concerns).

When these modifications are requested by Landowners or determined necessary for constructability and they do not affect other Landowners or sensitive environmental areas, such as wetlands, Enbridge will review all of the preconstruction surveys, documentation/collection, and mitigation, but will not request written approval of the Agricultural Monitor, MDA and/or WDATCP, or other regulatory authorities unless required by the terms of applicable permit(s). However, the Agricultural Inspector will inform the Agricultural Monitor of these minor adjustments.

Enbridge will request written approval from the Agricultural Monitor for all other modifications that would affect additional Landowners, or change construction procedures or methods, before commencing construction in or near any of these areas.

Level 1 Modification

Level 1 modifications are site-specific, minor changes to project specifications or mitigation measures that provide equal or better protection to environmental and agricultural resources. These minor modification requests can be reviewed and either approved or denied by the Agricultural Monitor in the field during normal construction operations.

Examples of Level 1 modifications include:

- Modifying the Topsoil segregation methods based on site-specific conditions;
- Using alternative soil stockpile locations (i.e., along the non-working (spoil) side of the right-of-way);
- Allowing the use of existing access roads that have not been previously approved, provided adequate cultural, wetland, and biological survey coverage is documented, if the use would be considered “like-use;” and
- Shifting extra workspace along the right-of-way a short distance where the overall disturbance remains the same, surveys have been completed, no sensitive resources would be affected, the workspace remains within the area permitted by the routing permits, and property access is available.

A Level 1 modification may also be used to document and disseminate agency-directed changes to mitigation measures. To initiate a Level 1 modification request, the Agricultural Inspector or other designated Enbridge representative will complete a modification request form (see Appendix B) and obtain the appropriate signatures (to be determined by Enbridge). Landowner approval will be obtained by Enbridge for those modifications requiring such approval. The

Agricultural Inspector will contact the Agricultural Monitor to review the proposed change. The Agricultural Inspector and the Agricultural Monitor will collaborate to evaluate the site-specific situation and determine if the modification is appropriate, feasible, and justified.

The Agricultural Monitor may approve a reasonable Level 1 modification request if, in the Agricultural Monitor's opinion, the results of implementing the change will provide equal or better protection for the resource than the original mitigation measure or if the original mitigation measure is not applicable to that specific site. If a Level 1 modification request is approved in the field, the Agricultural Monitor will sign the modification form.

The Agricultural Monitor will document the modification approval and transmit the approved form to the MDA and/or WDATCP, or other regulatory authority. If the modification exceeds the Agricultural Monitor's authority level, the Agricultural Monitor will inform the Agricultural Inspector that a Level 2 or Level 3 modification request is required.

Level 2 Modification

A Level 2 modification request exceeds the field decision authority of the Agricultural Monitor and requires review and final approval by the MDA and/or WDATCP, or other regulatory authority. Level 2 modification requests generally involve project changes that would affect an area outside of the previously approved work area, but are still within the corridor previously surveyed for cultural, wetland, and biological resources. Level 2 modification requests typically require the review of supplemental documents, correspondence, and records, and may require applicable agency approval.

Examples of Level 2 modifications include:

- Reducing the width or depth of Topsoil segregation in agricultural fields;
- Reducing the area to be decompacted or using an alternative method to decompact subsoil;
- Use of ATWS outside of the previously approved work area but within the previously surveyed corridor;
- The use of existing access roads that have not been previously approved if the use would not be considered "like-use" that could be approved as a Level 1 modification;
- Modifying a previously approved access road in ways not previously identified; and
- Increasing the width of the construction right-of-way at locations other than those allowed by Routing Permits, Enbridge Construction Alignment Sheets, and Enbridge's EPP.

To initiate a Level 2 modification request with the MDA and/or WDATCP, and other regulatory authority, the Agricultural Inspector or other designated Enbridge representative will fill out a modification request form, prepare the appropriate supporting documentation, and obtain the required signatures. The designated Enbridge representative will complete and submit the modification request form and supporting documentation by e-mail (scanned copy) or fax to the regulatory authority. The regulatory authority will review the request and supporting documentation. Landowner approval will be obtained by Enbridge for those modifications requiring approval. The regulatory authority will also discuss the request with the Agricultural Monitor.

If the Level 2 modification request is approved, the regulatory authority will sign the modification request and e-mail the approved form (scanned copy) to the designated Enbridge representatives and the Agricultural Monitor. The modification may be implemented in the field as soon as the regulatory authority and all other applicable agencies have approved the modification.

Level 3 Modification

Level 3 modification requests generally involve project changes that would affect an area outside of the previously approved work area, and that are outside corridor previously surveyed for cultural resources, wetlands, and biological resources.

Examples of Level 3 modifications include:

- Extra workspaces, access roads, or route realignments for which landowner approval has not been obtained (i.e., condemnation tracks);
- Certain changes to mitigation measures or construction/restoration procedures; and
- Extra workspaces, access roads, or route realignments outside the previously surveyed corridor that require additional surveys and agency approvals that affect resources of sufficient sensitivity to require a formal letter approval from other regulatory authorities.

To initiate a Level 3 modification request, the Agricultural Inspector or other designated Enbridge representative will fill out a modification request form, prepare the appropriate supporting documentation, ensure the required environmental surveys have been completed, and obtain the required signatures. The designated Enbridge representative will submit the modification request form and supporting documentation by e-mail (scanned copy) or fax to the all applicable regulatory authorities. The regulatory authorities will review the request and supporting documentation and consult with other agencies as necessary. The MDA and/or WDATCP may also discuss the request with the Agricultural Monitor. If sensitive biological species and/or habitat are encountered during the additional surveys, documentation of consultation with applicable agencies will be provided with the modification request. The MDA and/or WDATCP will consult with the regulatory authorities and receive appropriate agency approvals before authorizing the modification.

If the Level 3 modification request is approved, the MDA and/or WDATCP will sign the modification request and e-mail the approved form (scanned copy) to the designated Enbridge representatives and the Agricultural Monitor. The modification may be implemented in the field as soon as the approved modification is received. All agency-approved mitigation measures will adhere to the modification if it is approved by the MDA and/or WDATCP.

Appendix A
Mitigation Measures for Organic Agricultural Land

INTRODUCTION

This appendix identifies mitigation measures that apply specifically to farms that are Certified Organic or farms in Minnesota that are in active transition to become Certified Organic, and is intended to address the unique management and certification requirements of these operations. All protections provided in the Plan must also be applied to Organic Agricultural Land in addition to the provisions of this appendix.

The provisions of this appendix will apply to Organic Agricultural Land for which the Landowner has provided to Enbridge a true, correct, and current version of the Organic System Plan within sixty (60) days after the signing of the Easement for such land or sixty (60) days after the issuance of a PRP to Enbridge by the MN PUC, whichever is sooner. In the event the Easement is signed later than sixty (60) days after the issuance of the PRP, the provisions of this appendix are applicable when the Organic System Plan is provided to Enbridge at the time of the signing of the Easement. In instances where Enbridge is in possession of the Easement prior to submitting its MN PUC application, the Landowner must provide the Organic System Plan to Enbridge no later than sixty (60) days after the issuance of the PRP. Enbridge recognizes that Organic Agricultural Land is a unique feature of the landscape and will treat this land with the same level of care as other sensitive environmental features.

DEFINITIONS

Unless otherwise provided to the contrary in this appendix, capitalized terms used in this appendix shall have the meanings provided below and in the Plan. In the event of a conflict between this appendix and the Plan with respect to definitions, the definition provided in this appendix will prevail but only to the extent such conflicting terms are used in this appendix. The definition provided for the defined words used herein shall apply to all forms of the words.

Apply	To intentionally or inadvertently spread or distribute any substance onto the exposed surface of the soil.
Certifying Agent	As defined by the National Organic Program Standards, 7 CFR § 205.2.
Decertified or Decertification	Loss of Organic Certification.
Organic Agricultural Land	Farms, or portions thereof, that have been Certified Organic.
Certified Organic	"Certified" as defined in 7 CFR § 205.2.
Organic System Plan	As defined by the National Organic Program Standards, 7 CFR § 205.2.
Prohibited Substance	As defined in 7 CFR § 205.2. Prohibited Substances are further described in 7 CFR §§ 205.600-607.

ORGANIC SYSTEM PLAN

Enbridge recognizes the importance of the individualized Organic System Plan to the Organic Certification process. Enbridge will work with the Landowner, the Landowner's Certifying Agent, and/or a USDA-approved organic consultant to identify site-specific construction practices and develop an organic construction plan that will minimize the potential for Decertification as a result of construction activities. Enbridge also recognizes that Organic System Plans are proprietary in nature and confidentiality will be respected.

PROHIBITED SUBSTANCES

Enbridge will avoid the application of Prohibited Substances onto Organic Agricultural Land. No herbicides, pesticides, fertilizers, or seed will be applied unless requested and approved by the Landowner. Likewise, no refueling, fuel, or lubricant storage or routine equipment maintenance will be allowed on Organic Agricultural Land. Equipment will be checked prior to entry to make sure that fuel, hydraulic, and lubrication systems are in good working order before working on Organic Agricultural Land. If Prohibited Substances are used on land adjacent to Organic Agricultural Land, these substances will be used in such a way as to prevent them from entering Organic Agricultural Land.

SOIL HANDLING

Topsoil and subsoil layers that are removed during construction will be stored separately and replaced in the proper sequence after the pipeline is installed. Unless otherwise specified in the site-specific plan described above, Enbridge will not use this soil for other purposes, including creating access ramps at road crossings. No Topsoil or subsoil (other than incidental amounts) may be removed from Organic Agricultural Land. Likewise, Organic Agricultural Land will not be used for storage of soil from non-Organic Agricultural Land.

EROSION CONTROL

On Organic Agricultural Land, Enbridge will, to the extent feasible, implement erosion control methods consistent with the Landowner's Organic System Plan. On land adjacent to Organic Agricultural Land, Enbridge's erosion control procedures will be designed so that sediment from adjacent non-Organic Agricultural Land will not flow along the right-of-way and be deposited on Organic Agricultural Land. Treated lumber will not be used in erosion control measures on Organic Agricultural Land.

WATER IN TRENCHES

During construction, Enbridge will leave an earthen plug in the trench at the boundary of Organic Agricultural Land to prevent trench water from adjacent land from flowing into the trench on Organic Agricultural Land. Likewise, Enbridge will not allow trench water from adjacent land to be pumped onto Organic Agricultural Land.

WEED CONTROL

On Organic Agricultural Land, Enbridge will, to the extent feasible, implement weed control methods consistent with the Landowner's Organic System Plan. Prohibited Substances will not be used for weed control on Organic Agricultural Land. In addition, Enbridge will not use

Prohibited Substances for weed control on land adjacent to Organic Agricultural Land in such a way as to allow these materials to drift onto Organic Agricultural Land.

MITIGATION OF NATURAL RESOURCE IMPACTS

Enbridge will not use Organic Agricultural Land for the purpose of required compensatory mitigation of impacts on natural resources such as wetlands or woodlands unless approved by the Landowner.

MONITORING

In addition to the responsibilities of the Agricultural Monitor described in the Plan, the following will apply:

- The Agricultural Monitor or a trained Organic Inspector (trained through a USDA-approved Organic Inspection Program and retained by Enbridge) will routinely monitor construction and restoration activities on Organic Agricultural Land for compliance with the provisions of this appendix and will document activities that could result in Decertification; and

- Instances of noncompliance will be documented according to International Organic Inspectors Association protocol consistent with the Landowner's Organic System Plan, and will be made available to the MDA, the Landowner, the Landowner's Certifying Agent, and to Enbridge.

If the Agricultural Monitor is responsible for routinely monitoring activities on Organic Agricultural Land, he or she will have been trained in such activities by the International Organic Inspectors Association, at Enbridge's expense if necessary.

COMPENSATION FOR CONSTRUCTION DAMAGES

The settlement of damages will be based on crop yield and/or crop quality determination and the need for additional restoration measures, and will proceed in accordance with the terms of the Easement. Unless the Landowner of Organic Agricultural Land and Enbridge agree otherwise, at Enbridge's expense, a mutually agreed upon professional agronomist will make crop yield determinations, and the MDA Fruit and Vegetable Inspection Unit will make crop quality determinations. If the crop yield and/or crop quality determinations indicate the need for soil testing, the testing will be conducted by a commercial laboratory that is properly certified to conduct the necessary tests and is mutually agreeable to Enbridge and the Landowner. Fieldwork for soil testing will be conducted by a Professional Soil Scientist or Professional Engineer licensed by the State of Minnesota. Enbridge will be responsible for the cost of sampling, testing, and additional restoration activities, if needed. Landowners may elect to settle damages with Enbridge in advance of construction on a mutually acceptable basis or to settle after construction based on a mutually agreeable determination of actual damages.

COMPENSATION FOR DAMAGES DUE TO DECERTIFICATION

Should any portion of Organic Agricultural Land be Decertified as a result of construction activities, the settlement of damages will be based on the difference between revenue generated from the land affected before Decertification and after Decertification, for the entire period of time the land is Decertified, so long as a good faith effort is made by the Landowner to regain certification.

Appendix B
Management of Change Onsite Modification Request Form

ON-SITE MODIFICATION REQUEST FORM

Change Request No.: _____ Approval Reference No.: _____

Date Approval Required: _____ Date Submitted: _____

Spread/Location: _____ Time Submitted: _____

Land Owner: _____ Current Land Use: _____

Alignment Sheet Station No.: _____ Tract No.: _____

Change From (check one): ☐ Permit ☐ Plan/Procedure ☐ Drawing ☐ Specification ☐ Other

Specify Source (e.g., Detail Drawing 1): _____

Detailed Description of Change: Attachments? ☐ Yes ☐ No Photos? ☐ Yes ☐ No

Change Justification:

Environmental Review – Describe Potential to Affect Each of the Following (including area and agency consultation as appropriate):

Wetlands:

Endangered and Threatened Species:

Archeological Sites:

Closest Residence:

Closest Drinking Water Supply Well:

Other Conditions:

Prepared by: _____ Date: _____

Reviewed by: _____ Date: _____

Attachment

☐ Yes ☐ No

For Agency or Enbridge Environment Management Use Only

Check one:

☐ Modification Approved ☐ Modification Denied ☐ Point of Contact

Signature: _____ Date: _____

CONDITIONAL APPROVAL

☐ Yes ☐ No

(If yes, list conditions below)

Conditions:

Distribution (note all that apply):

Appendix G

Waterbody Crossings

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Appendix G Figures and Tables

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Appendix G1
Waterbody Crossing Trenching and Installation Methods

Construction at waterbodies requires clearing and grading; installing erosion control measures; possibly removing beavers and removing or altering beaver dams; and constructing temporary equipment bridges. After initial clearing and grading is completed, Enbridge would install the pipeline across the waterbody using one of the following crossing methods: wet trench, dam and pump, flume, or horizontal directional drill (HDD) or guided bore. Each of these waterbody crossing trenching and installation methods are detailed below.

Wet Trench Method

The open-cut method (also known as the "wet open-cut" method) is a waterbody crossing technique that often minimizes the total duration of instream disturbance. The wet trench method is typically used to cross waterbodies for which dam and pump, flume, and HDD are not permitted. This method is illustrated in Figure G-1.

Enbridge would excavate the trench using draglines or backhoes operating from one or both streambanks. If equipment is required to enter the stream to excavate the trench, the equipment would conduct the excavation on clean construction mats. Enbridge would place excavated material on the upland construction work area at least 20 feet from the water's edge or in an ATWS. The upper 1 foot of the trench spoil would be stored separately from the remaining spoil. The ATWS would be set back 50 feet from the water's edge, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. Sediment containment devices, such as silt fences and straw bales, would be installed to contain the excavated material and to minimize the potential for sediment to migrate into the waterbody. Enbridge would only store trench spoil within the stream if doing so is expressly approved by regulatory agencies.

During excavation of the instream trench, Enbridge would leave earthen trench plugs at each end of the excavation to prevent the waterbody from flowing into the adjacent excavated pipeline trench and to prevent water accumulated in the upland trench from running into the waterbody. When excavation of the trench is complete, the trench plugs would be removed, and a prefabricated section of pipe would be positioned and lowered into the trench.

Enbridge would backfill the trench with the excavated material, unless otherwise specified in stream crossing permits. Enbridge would attempt to return the bed of the waterbody as near as practicable to its preconstruction condition with no impediments to normal waterbody flow.

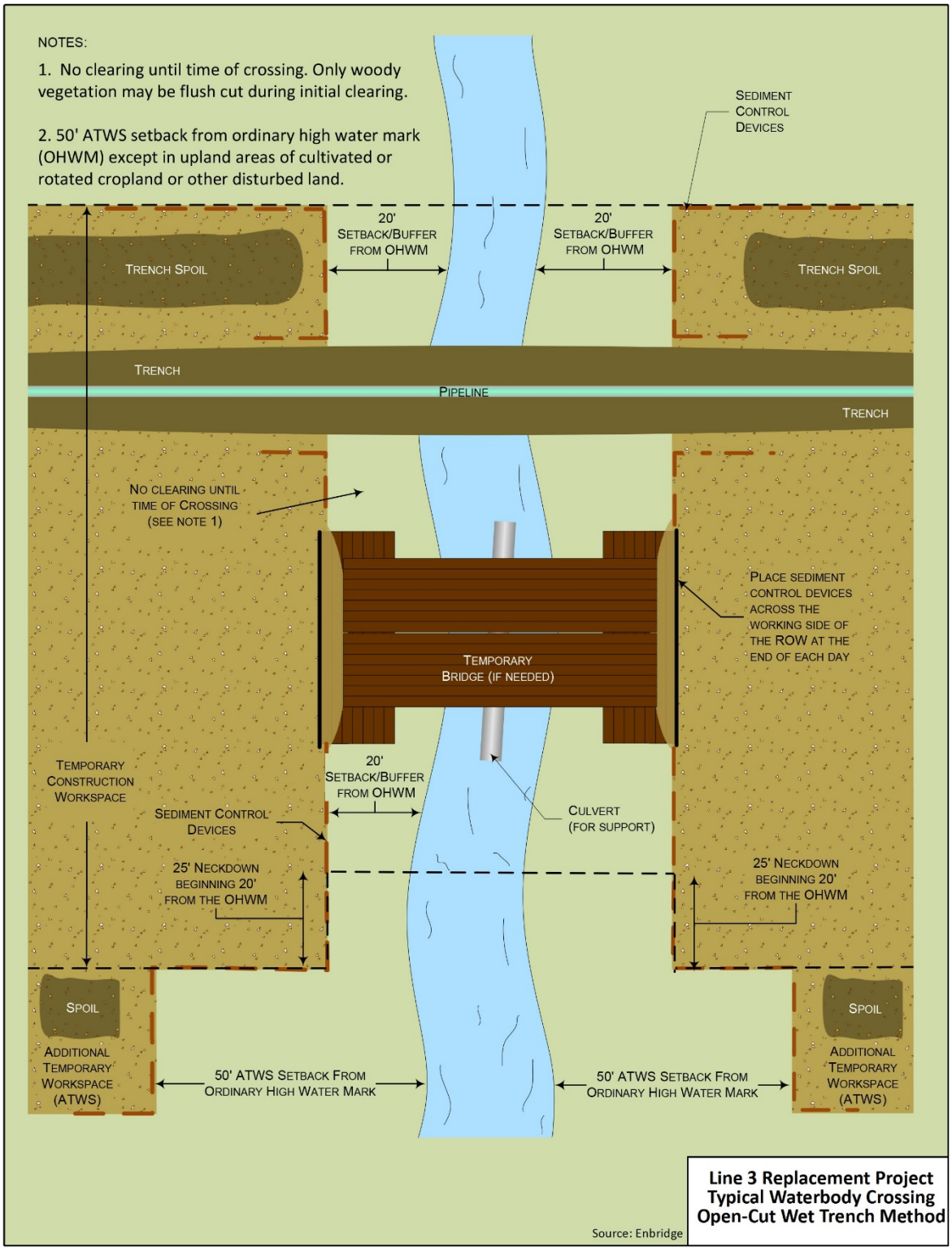

Figure G-1. Wet Open Cut Waterbody Crossing Technique

Dry Crossing Methods

Dam-and-Pump Method

The dam-and-pump method is a dry crossing method that is typically used for waterbodies with low gradients and flow or waterbodies with meandering channels. This method involves constructing temporary dams across the waterbody, both upstream and downstream of the crossing, prior to excavation. Dams generally would be installed using sandbags, plastic sheeting, sheet piling, or steel plates. Pumps and piping would be used to transport the stream flow around the construction area for the duration of the process. This method is illustrated in Figure G-2.

When using this method, Enbridge would begin pumping the upstream flow while the dams are being installed to prevent interruption of stream flows. The downstream flow would be discharged into an energy-dissipation device to prevent scouring of the waterbody bed or adjacent banks. The capacity of the pumps and piping would be greater than the anticipated flow of the waterbody being crossed but would be adjusted to maintain the flow of water downstream and prevent excessive drawdown of the waterbody upstream of the construction area. Pumps and fuel for the pumps would be installed in impermeable, sided containment structures in the upland on the upstream side of the waterbody crossings. Enbridge would cover the pump intake with a screen and suspend it above the waterbody bed to prevent sediment uptake and entrainment of aquatic organisms.

Once stream flow is routed around the construction area, water from the area between the dams would be pumped, via separate pumps, into a straw bale structure or similar dewatering discharge device. These devices would be located in well-vegetated upland areas, if present, and would be designed in a manner to prevent the flow of heavily silt-laden water into waterbodies or wetlands. Backhoes would excavate the trench from one or both banks or on clean construction mats within the isolated waterbody bed. Enbridge would place excavated material on the upland construction work area at least 20 feet from the water's edge or in an ATWS. The upper 1 foot of the trench spoil would be stored separately from the remaining spoil. The ATWS would be set back 50 feet from the water's edge, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. Sediment containment devices, such as silt fences and straw bales, would be installed to contain the excavated material and to minimize the potential for sediment to migrate into the waterbody.

During excavation of the instream trench, Enbridge would leave earthen trench plugs at each end of the excavation to prevent water accumulated in the upland trench from running into the isolated waterbody bed. After the trench is excavated to the proper depth, the trench plugs would be removed, and a prefabricated section of pipe would be positioned and lowered into it. Enbridge would then backfill the trench with the material excavated from the bed of the waterbody, unless otherwise specified in stream crossing permits. Prior to removing the dams and restoring stream flow, Enbridge would pump water that accumulated in the construction area into a straw bale structure or similar dewatering device and restore the bottom contours of the streambed and the streambanks as closely as practical to preconstruction contours with no impediment to waterbody flow.

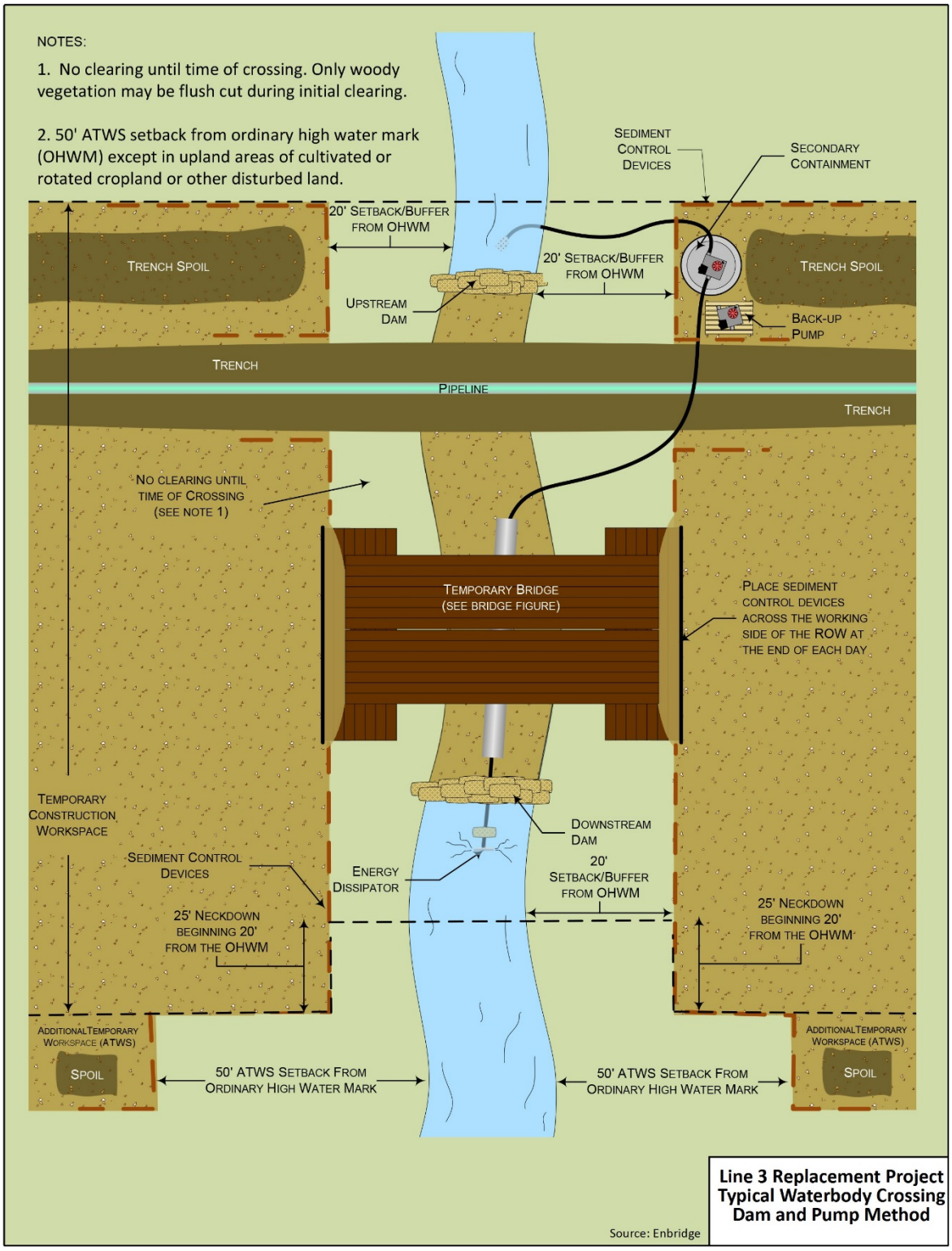

Figure G-2. Dam-and-Pump Waterbody Crossing Technique

Flume Method

The flume method is a dry crossing method used for relatively narrow waterbodies free of large rocks and bedrock at the trench line and with a relatively straight channel across the construction work area. The flume method generally is not appropriate for wide, deep, or heavily flowing waterbodies. Use of this method involves installing dams upstream and downstream of the construction area and installing one or more pipes (flumes) that would extend along the course of the waterbody and through both dams. Streamflow would be carried through the construction area by the flume pipe(s). The flume method is illustrated in Figure G-3.

Flumes would be installed with sufficient capacity to transport the maximum flows that could be generated seasonally within the waterbody. The flumes, typically 40 to 60 feet long, would be installed before trenching and aligned to prevent impounding of water upstream of the construction area or to cause back-erosion downstream.

The upstream and downstream ends of the flumes would be incorporated into dams made of sandbags and plastic sheeting (or equivalent material). Upstream dams would be installed first and would funnel stream flow into the flumes. Downstream dams then would be constructed to prevent water from flowing back into the area to be trenched. Enbridge would monitor the dams and adjust them as necessary to minimize leakage. The flumes would remain in place during pipeline installation, backfilling, and streambank restoration.

Prior to trenching, the area between the dams typically would be dewatered. Backhoes working from one or both banks, or from clean construction mats within the isolated waterbody bed, would excavate the trench across the waterbody and under the flume pipes. Excavated material would be placed on the upland construction work area at least 20 feet from the water's edge or in an ATWS. The upper 1 foot of the trench spoil would be stored separately from the remaining spoil. The ATWS would be set back 50 feet from the water's edge, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. Sediment containment devices, such as silt fences and straw bales, would be installed to contain the excavated material and to minimize the potential for sediment to migrate into the waterbody.

During excavation of the instream trench, Enbridge would leave earthen trench plugs at each end of the excavation to prevent water accumulated in the upland trench from running into the isolated waterbody bed. After the trench is excavated to the proper depth, the trench plugs would be removed, and a prefabricated section of pipe would be positioned and lowered into the trench. The trench then would be backfilled with the excavated material from the stream unless otherwise specified in stream crossing permits. Prior to removing the dams and flume pipes and restoring stream flow, Enbridge would pump water that accumulated in the construction area into a straw bale structure or similar dewatering device and restore the bottom contours of the streambed and the streambanks as closely as practical to preconstruction contours with no impediment to waterbody flow.

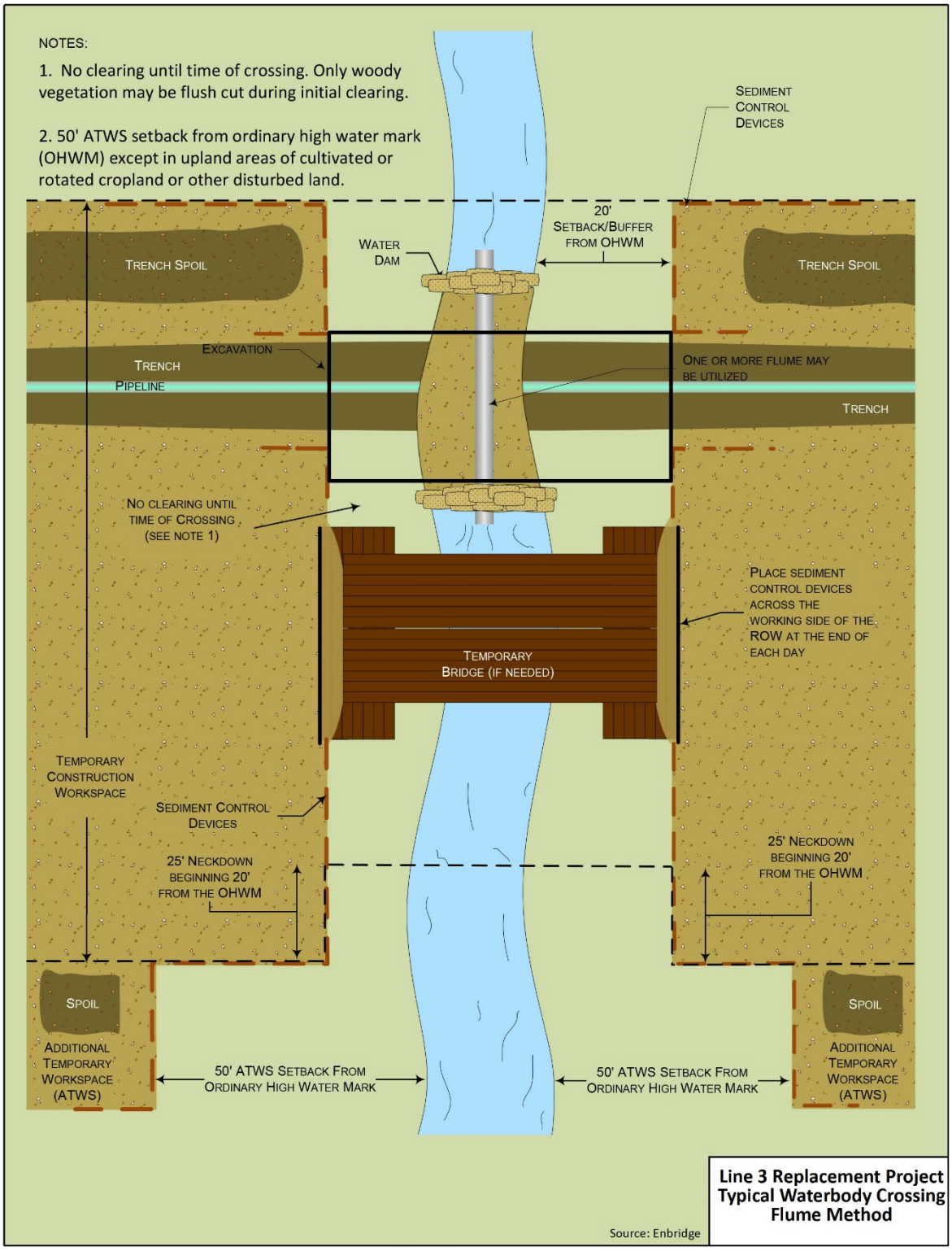

Figure G-3. Flume Waterbody Crossing Technique

Horizontal Directional Drilling and Guided Bore Method

Horizontal Directional Drilling (HDD) involves drilling under a wetland or waterbody and installing the pipeline without physical disturbance of the wetland or waterbody feature. These methods could be used to cross environmentally sensitive areas identified by permitting agencies including the Minnesota Department of Natural Resources and the Army Corps of Engineers such as riparian forested wetlands, sensitive fishery resources, and impaired waters.

The feasibility of using HDD depends on subsurface substrate conditions and the length of the drill path. Portions of the pipeline route might cross regions with soils that are not conducive to HDD technology, including soils containing cobbles, boulders, layers of gravel, or non-cohesive sands. To determine the feasibility of using HDD at a specific crossing, Enbridge would undertake preliminary geotechnical investigations.

The HDD process is accomplished in three stages:

- A small-diameter pilot hole is drilled along a predetermined path under the waterbody.
- The pilot hole is incrementally enlarged or reamed out to a diameter that would accommodate the pipeline.
- Prefabricated segments of the pipe are pulled through the enlarged hole and welded to adjoining sections at the beginning and end of the crossing.

During drilling, construction personnel would monitor the crossing to detect unanticipated releases of drilling mud to the surface (termed “frac-outs”). The Environmental Protection Plan includes planned response actions if releases of drilling mud were to occur in wetlands, waterbodies, or upland areas. The plan identifies containment, clean-up, and notification procedures, the steps to be taken to restore affected areas and the equipment to be used.

Guided Bore

The guided bore method is typiccally used at crossings of narrow wetlands and ditches adjacent to roads or railroads. It is not suitable adjacent to steep slopes, where water tables are near the surface, or where substrates consist of loose sand and gravel.

The guided bore method consists of boring an auger from an entrance hole on one side of the wetland to a corresponding hole on the other side of the wetland. The bore may or may not include a casing. An advantage of the guided bore is that there is no concern for a sediment release.

The holes on each side of the water, however, typically require large excavations and could consequently require dewatering and sheet-piling to maintain their structure. Pumps could be required to drain seepage within the holes onto adjacent land, which includes the risk of releasing sediment into the adjacent wetland. The guided bore method may also risk some subsidence along the bore alignment.

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Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	ND	Pembina	ND Section	Pembina River	Artificial Path	ND 1.4	IA	303d-Listed Impaired, NRI-listed, USACE Navigable	NA	NA
APR	ND	Pembina	ND Section	Pembina River	Artificial Path	ND 1.7	IA	303d-Listed Impaired, NRI-listed, USACE Navigable	NA	NA
APR	ND	Pembina	ND Section	Tongue River	Stream/River - Perennial	ND 12.1	II	None	NA	NA
APR	ND	Pembina	ND Section	Tongue River Cutoff	Stream/River - Intermittent	ND 9.2	II	303d-Listed Impaired	NA	NA
APR	ND	Pembina	ND Section	County Drain Number 33	Stream/River - Perennial	ND 8.5	III	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Canal Ditch	Canal Ditch	ND 21.7	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Canal Ditch	Canal Ditch	ND 24.4	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Canal Ditch	Canal Ditch	ND 23	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Canal Ditch	Canal Ditch	ND 25.8	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 23.7	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 24.4	None	None	NA	NA

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	ND	Pembina	ND Section	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 13.6	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Stream/River Perennial	Stream/River - Perennial	ND 4.8	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Stream/River Perennial	Stream/River - Perennial	ND 14.8	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Stream/River Perennial	Stream/River - Perennial	ND 16.3	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 7.5	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 7.2	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Stream/River Perennial	Stream/River - Perennial	ND 15.7	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 11.3	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 11.7	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Waterbody	Swamp/Marsh	ND 17.2	None	None	NA	NA

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	ND	Pembina	ND Section	Unnamed Waterbody	Lake/Pond - Perennial	ND 17.1	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Waterbody	Lake/Pond - Perennial	ND 18.3	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Waterbody	Lake/Pond - Perennial	ND 8.8	None	None	NA	NA
APR	ND	Pembina	ND Section	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 26.6	None	None	NA	NA
APR	MN	Marshall	ND Border to Clearbrook	Tamarac River	Stream/River - Perennial	MN 54.4	1C, 2Bd, 3C	303d-Listed Impaired	HDD	Dry Crossing
APR	MN	Pennington	ND Border to Clearbrook	Red Lake River	Artificial Path	MN 91.9	1C, 2Bd, 3C	NRI-listed, USACE Navigable	HDD	None
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 44.9	1C, 2Bd, 3C	None	NA	NA
APR	MN	Kittson	ND Border to Clearbrook	Red River of the North	Artificial Path	ND 27.6	1C, 2Bd,3C	303d-Listed Impaired, USACE Navigable	HDD	Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Silver Creek	Stream/River - Perennial	MN 135.9	2B, 3C	303d-Listed Impaired	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Lost River	Stream/River - Perennial	MN 132.2	2B, 3C	None	Dry Crossing	Wet Open Cut

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Marshall	ND Border to Clearbrook	Middle River	Stream/River - Perennial	MN 62.3	2B, 3C	303d-Listed Impaired, NRI-listed	HDD	None
APR	MN	Marshall	ND Border to Clearbrook	South Branch Snake River	Stream/River - Intermittent	MN 74.7	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Snake River	Stream/River - Perennial	MN 70.5	2B, 3C	None	HDD	Dry Crossing
APR	MN	Red Lake	ND Border to Clearbrook	Clearwater River	Artificial Path	MN 103	2B, 3C	303d-Listed Impaired	HDD	None
APR	MN	Red Lake	ND Border to Clearbrook	Lost River	Artificial Path	MN 113.5	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Silver Creek	Stream/River - Perennial	MN 135.3	2B, 3C	303d-Listed Impaired	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Silver Creek	Stream/River - Perennial	MN 135.6	2B, 3C	303d-Listed Impaired	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 137.4	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 131.1	None	None	Dry Crossing	Wet Open Cut

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 131.7	None	None	NA	NA
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Connector	Connector	MN 133.9	None	None	NA	NA
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 64.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 98.9	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 129	None	None	Dry Crossing	Wet Open Cut
APR	MN	Polk	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 121.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 75.2	None	None	Bore	Dry Crossing
APR	MN	Polk	ND Border to Clearbrook	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 122.3	None	None	Dry Crossing	Wet Open Cut
APR	MN	Polk	ND Border to Clearbrook	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 117.9	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 43	None	None	Bore	Wet Open Cut

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 69.1	None	None	Dry Crossing	Wet Open Cut
APR	MN	Kittson	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 38.7	None	None	Dry Crossing	Wet Open Cut
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 95.6	None	None	NA	NA
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 129.5	None	None	NA	NA
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 99.6	None	None	Dry Crossing	Wet Open Cut
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 93.8	None	None	NA	NA
APR	MN	Polk	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 128.4	None	None	NA	NA
APR	MN	Kittson	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 31.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 107.9	None	None	NA	NA
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 84.8	None	None	NA	NA

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Kittson	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 41.7	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 129.9	None	None	Dry Crossing	Wet Open Cut
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 114.3	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 52.1	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 60.4	None	None	Dry Crossing	Wet Open Cut
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 86.3	None	None	Bore	Dry Crossing
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 97.3	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 57.4	None	None	Dry Crossing	Wet Open Cut
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 91.1	None	None	Dry Crossing	Wet Open Cut
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 101.4	None	None	Dry Crossing	Wet Open Cut

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Kittson	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 35.8	None	None	Bore	Wet Open Cut
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 94.9	None	None	Dry Crossing	Wet Open Cut
APR	MN	Kittson	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 37.3	None	None	Bore	Dry Crossing
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 80.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 129.3	None	None	NA	NA
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 92.3	None	None	HDD	None
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 97.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 112.3	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 49.6	None	None	NA	NA
APR	MN	Kittson	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 39.9	None	None	Bore	Dry Crossing

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Polk	ND Border to Clearbrook	State Ditch Number Sixty-one	Canal Ditch	MN 117.4	None	None	Dry Crossing	Wet Open Cut
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 109	None	None	NA	NA
APR	MN	Kittson	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 35.9	None	None	Bore	Wet Open Cut
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 87.7	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 47	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 51.8	None	None	Dry Crossing	Wet Open Cut
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 82.6	None	303d-Listed Impaired	Wet open cut	Dry Crossing
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 99.8	None	None	Dry Crossing	Wet Open Cut
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 89.3	None	None	Bore	Dry Crossing
APR	MN	Polk	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 118.5	None	None	Dry Crossing	Wet Open Cut

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 130.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 57.8	None	None	NA	NA
APR	MN	Polk	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 115.7	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 59.4	None	None	Dry Crossing	Wet Open Cut
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 100	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 65.6	None	None	NA	NA
APR	MN	Polk	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 123	None	None	NA	NA
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 137	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 57.6	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 57.7	None	None	Dry Crossing	Wet Open Cut

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Polk	ND Border to Clearbrook	Unnamed Waterbody	Lake/Pond - Perennial	MN 127.4	None	None	NA	NA
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Waterbody	Lake/Pond - Perennial	MN 88.2	None	None	NA	NA
APR	MN	Cass	Clearbrook to Carlton	Spring Branch	Stream/River - Perennial	MN 265.3	1B, 2A, 3B	Trout stream	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	King Creek	Stream/River - Intermittent	MN 344.2	1B, 2A, 3B	Trout stream	Wet Open Cut	Dry Crossing
APR	MN	Hubbard	Clearbrook to Carlton	Straight River	Artificial Path	MN 198.3	1B, 2A, 3B	Trout stream	HDD	Open cut
APR	MN	Carlton	Clearbrook to Carlton	Blackhoof River	Stream/River - Perennial	MN 352.1	1B, 2A, 3B	Trout stream	Dry Crossing	Wet Open Cut
APR	MN	Cass	Clearbrook to Carlton	Moose River	Stream/River - Perennial	MN 272.1	1B, 2Bd, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Cass	Clearbrook to Carlton	Big Swamp Creek	Canal Ditch	MN 224.6	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Moose Horn River	Stream/River - Perennial	MN 347.6	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Mississippi River	Artificial Path	MN 296.7	2B, 3C	303d-Listed Impaired, USACE Navigable	HDD	Open cut
APR	MN	Carlton	Clearbrook to Carlton	West Branch Kettle River	Stream/River - Perennial	MN 328.4	2B, 3C	None	NA	NA
APR	MN	Wadena	Clearbrook to Carlton	Shell River	Artificial Path	MN 215.3	2B, 3C	NRI-listed	HDD	Open cut

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Aitkin	Clearbrook to Carlton	Sandy River	Canal Ditch	MN 312.8	2B, 3C	None	HDD	Open cut
APR	MN	Cass	Clearbrook to Carlton	Daggett Brook	Stream/River - Perennial	MN 261.4	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Kettle River	Canal Ditch	MN 338.2	2B, 3C	303d-Listed Impaired, USACE Navigable	Dry Crossing	Wet Open Cut
APR	MN	Wadena	Clearbrook to Carlton	Crow Wing River	Artificial Path	MN 217.4	2B, 3C	NRI-listed	HDD	Wet Open Cut
APR	MN	Hubbard	Clearbrook to Carlton	Shell River	Stream/River - Perennial	MN 205.5	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Sandy River	Artificial Path	MN 305.9	2B, 3C	USACE Navigable	HDD	Open Cut
APR	MN	Hubbard	Clearbrook to Carlton	Shell River	Artificial Path	MN 207.8	2B, 3C	None	HDD	Open cut
APR	MN	Carlton	Clearbrook to Carlton	West Fork Moose Horn River	Stream/River - Perennial	MN 342.7	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Cass	Clearbrook to Carlton	South Fork Pine River	Stream/River - Perennial	MN 232.6	2B, 3C	None	NA	NA
APR	MN	Cass	Clearbrook to Carlton	Pine River	Artificial Path	MN 241.4	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	Clearbrook to Carlton	Clearwater River	Artificial Path	MN 149.5	2B, 3C	303d-Listed Impaired, NRI-listed	HDD	Open cut
APR	MN	Hubbard	Clearbrook to Carlton	Shell River	Stream/River - Perennial	MN 200.7	2B, 3C	None	Dry Crossing	Wet Open Cut

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Hubbard	Clearbrook to Carlton	Hay Creek	Artificial Path	MN 187.8	2B, 3C	None	HDD	Open cut
APR	MN	Clearwater	Clearbrook to Carlton	Mississippi River	Stream/River - Perennial	MN 165.1	2B, 3C	303d-Listed Impaired	HDD	Dry Crossing
APR	MN	Aitkin	Clearbrook to Carlton	Willow River	Stream/River - Perennial	MN 292.8	2C	NRI-listed	HDD	Open cut
APR	MN	Hubbard	Clearbrook to Carlton	LaSalle Creek	Stream/River - Perennial	MN 170.1	2C	Trout stream	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 286.2	None	None	NA	NA
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 302.3	None	None	Wet Open Cut	Dry Crossing
APR	MN	Crow Wing	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 245.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 308	None	None	Wet Open Cut	Dry Crossing
APR	MN	Wadena	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 220.2	None	None	Wet Open Cut	Dry Crossing
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 303.6	None	None	Wet Open Cut	Dry Crossing
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 347.1	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 308.2	None	None	Wet Open Cut	Dry Crossing

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Aitkin	Clearbrook to Carlton	White Elk Creek	Stream/River - Intermittent	MN 291.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 309.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Cass	Clearbrook to Carlton	Unnamed Connector	Connector	MN 269.8	None	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Park Lake Creek	Stream/River - Perennial	MN 346.7	None	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Heikkila Creek	Stream/River - Perennial	MN 334.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 341.1	None	None	Wet Open Cut	Dry Crossing
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 277.4	None	None	Dry Crossing	Wet Open Cut
APR	MN	Cass	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 225.3	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 279.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 298.3	None	None	Wet Open Cut	Dry Crossing
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 301.9	None	None	Wet Open Cut	Dry Crossing
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 314.1	None	None	NA	NA

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 310.1	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 318.9	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 290.7	None	None	NA	NA
APR	MN	Cass	Clearbrook to Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 257.9	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Connector	Connector	MN 275.5	None	None	NA	NA
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 209.5	None	None	HDD	Open cut
APR	MN	Cass	Clearbrook to Carlton	Blind Lake Creek	Stream/River - Perennial	MN 250.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 138.2	None	None	NA	NA
APR	MN	Hubbard	Clearbrook to Carlton	Shell River	Artificial Path	MN 209.5	None	NRI-listed	NA	NA
APR	MN	Aitkin	Clearbrook to Carlton	White Elk Creek	Stream/River - Perennial	MN 283.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Wadena	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 220.2	None	None	Wet Open Cut	Dry Crossing

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 335.3	None	None	NA	NA
APR	MN	Cass	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 223.7	None	None	Dry Crossing	Wet Open Cut
APR	MN	Cass	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 226.9	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 138.1	None	None	NA	NA
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 299	None	None	Wet Open Cut	Dry Crossing
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 343.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 320.8	None	None	Dry Crossing	Wet Open Cut
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 185.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed artificial Path	Artificial Path	MN 209.2	None	None	NA	NA
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 337.7	None	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 333.8	None	None	NA	NA

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 295.1	None	None	Dry Crossing	Wet Open Cut
APR	MN	Cass	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 270.6	None	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 333.7	None	None	NA	NA
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 333.7	None	None	NA	NA
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 333.8	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 137.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 137.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 138.8	None	None	NA	NA
APR	MN	Cass	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 253.1	None	None	NA	NA
APR	MN	Cass	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 229.5	None	None	NA	NA

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Cass	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 230.7	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Walker Brook	Stream/River - Perennial	MN 151.4	None	303d-Listed Impaired	Wet Open Cut	None
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 169.9	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Bear Creek	Stream/River - Perennial	MN 164.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 349	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 146.9	None	None	NA	NA
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Connector	Connector	MN 354.4	None	None	NA	NA
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 352.3	None	Trout stream	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 144.3	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 146.3	None	None	NA	NA
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 189.4	None	None	NA	NA

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 152.6	None	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 353.7	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 141.2	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 154.4	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 163.5	None	None	NA	NA
APR	MN	Cass	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 227	None	None	NA	NA
APR	MN	Crow Wing	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 246.6	None	None	NA	NA
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 299.1	None	None	NA	NA
APR	MN	Cass	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 231.7	None	None	NA	NA
APR	MN	Crow Wing	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 244.3	None	None	NA	NA
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 186.4	None	None	Dry Crossing	Wet Open Cut

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 147.9	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 148.9	None	None	NA	NA
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 191.2	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 155.1	None	None	NA	NA
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 186.3	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 154.7	None	None	NA	NA
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 177.6	None	None	NA	NA
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 356.6	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 156.4	None	None	NA	NA
APR	MN	Carlton	Carlton to WI Border	Unnamed Waterbody	Lake/Pond - Perennial	MN 359.5	None	None	NA	NA
APR	MN	Carlton	Carlton to WI Border	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 365.4	None	None	Wet Open Cut	Dry Crossing
APR	MN	Carlton	Carlton to WI Border	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 364.7	None	None	Wet Open Cut	Dry Crossing

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Carlton	Carlton to WI Border	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 365.1	None	None	Wet Open Cut	Dry Crossing
APR	MN	Carlton	Carlton to WI Border	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 362.3	None	None	NA	NA
APR	MN	Carlton	Carlton to WI Border	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 363.3	None	None	Dry Crossing	Wet Open Cut
APR	WI	Douglas	WI Section	Unnamed Stream/River Perennial	Stream/River - Perennial	WI 369	None	None	NA	NA
APR	WI	Douglas	WI Section	Unnamed Stream/River Intermittent	Stream/River - Intermittent	WI 368.5	None	None	NA	NA
APR	WI	Douglas	WI Section	Unnamed Stream/River Intermittent	Stream/River - Intermittent	WI 367.6	None	None	NA	NA
APR	WI	Douglas	WI Section	Unnamed Stream/River Intermittent	Stream/River - Intermittent	WI 369.9	None	None	NA	NA
APR	WI	Douglas	WI Section	Unnamed Stream/River Intermittent	Stream/River - Intermittent	WI 375.7	None	None	NA	NA
APR	WI	Douglas	WI Section	Pokegama River	Stream/River - Perennial	WI 366.5	LFF	None	NA	NA
APR	WI	Douglas	WI Section	Pokegama River	Stream/River - Perennial	WI 376	LFF	USACE Navigable	NA	NA

Table G-1. Certificate of Need - Waterbodies crossed by the Applicant's Preferred Route.

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	WI	Douglas	WI Section	Unnamed Stream/River Intermittent	Stream/River - Intermittent		None	None	NA	NA
APR	WI	Douglas	WI Section	Unnamed Stream/River Perennial	Stream/River - Perennial		None	None	NA	NA
APR	WI	Douglas	WI Section	Unnamed Stream/River Perennial	Stream/River - Perennial		None	None	NA	NA

Notes: Waterbody crossings determined using NHD GIS layers.

State-designated Use.
North Dakota (ND) (Chapter 33-16-02.1):

- Class I: suitable for the propagation or protection, or both, of resident fish species and other aquatic biota and for swimming, boating, and other water recreation; suitable for irrigation, stock watering, and wildlife without injurious effects. After treatment consisting of coagulation, settling, filtration, and chlorination, or equivalent treatment processes, the water quality shall meet the bacteriological, physical, and chemical requirements of the department for municipal or domestic use.
- Class 1A: The quality of the waters in this class shall be the same as the quality of class I streams, except that where natural conditions exceed class I criteria for municipal and domestic use, the availability of softening or other treatment methods may be considered in determining whether ambient water quality meets the drinking water requirements of the department.
- Class II: The quality of the waters in this class shall be the same as the quality of class I streams, except that additional treatment may be required to meet the drinking water requirements of the department. Streams in this classification may be intermittent in nature which would make these waters of limited value for beneficial uses such as municipal water, fish life, irrigation, bathing, or swimming.
- Class III: suitable for agricultural and industrial uses. Streams in this class generally have low average flows with prolonged periods of no flow. During periods of no flow, they are of limited value for recreation and fish and aquatic biota. The quality of these waters must be maintained to protect secondary contact recreation uses (e.g., wading), fish and aquatic biota, and wildlife uses.

Minnesota (MN): Minnesota Rule 7050.0470 lists the classifications of major waterbodies in the state. If a waterbody is not listed under 7050.0470 and is not a wetland, it is classified as a Class 2B, 3C, 4A, 4B, 5, and 6 water per Minnesota Rule 7050.0430.

- Class 1 – domestic consumption (i.e., drinking water);
- Class 2 – aquatic life and recreation;
- Class 3 – industrial or commercial use;
- Class 4 – agricultural use, irrigation (4A) and livestock and wildlife watering (4B);
- Class 5 – aesthetics and navigation;
- Class 6 – other uses and protection of border waters; and

- Class 7 – limited resource value waters.
- Minnesota Rule 7050.0222 further defines the water quality standards for the following subclasses of Class 2 waters:
- Class 2A – Coldwater fisheries, trout waters, suitable for all aquatic recreation and protected as a source of drinking water;
- Class 2Bd – Cold and warm water fisheries, suitable for all aquatic recreation and protected as a source of drinking water;
- Class 2B – Cold and warm water fisheries, suitable for all aquatic recreation but not protected for drinking water;
- Class 2C – Indigenous fish and associated aquatic community, suitable for boating but not protected for drinking water.

Wisconsin (WI): LFF –Limited forage fish communities. (Intermediate surface waters). This subcategory includes surface waters of limited capacity and naturally poor water quality or habitat. These surface waters are capable of supporting only a limited community of forage fish and other aquatic life (Chapter NR 102.04).

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Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	ND	Pembina	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 13.6	None	None
SA-04	ND	Pembina	Tongue River	Stream/River - Perennial	ND 12.1	II	None
SA-04	ND	Pembina	Unnamed Stream/River Perennial	Stream/River - Perennial	ND 4.8	None	None
SA-04	ND	Pembina	Tongue River Cutoff	Stream/River - Intermittent	ND 9.2	II	303d-Listed Impaired
SA-04	ND	Pembina	Unnamed Stream/River Perennial	Stream/River - Perennial	ND 14.8	None	None
SA-04	ND	Pembina	Unnamed Stream/River Perennial	Stream/River - Perennial	ND 16.3	None	None
SA-04	ND	Pembina	County Drain Number 33	Stream/River - Perennial	ND 8.5	None	None
SA-04	ND	Pembina	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 7.5	None	None
SA-04	ND	Pembina	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 7.2	None	None
SA-04	ND	Pembina	Unnamed Stream/River Perennial	Stream/River - Perennial	ND 15.7	None	None
SA-04	ND	Pembina	Pembina River	Artificial Path	ND 1.4	IA	303d-Listed Impaired, NRI-listed, USACE Navigable
SA-04	ND	Pembina	Pembina River	Artificial Path	ND 1.7	IA	303d-Listed Impaired, NRI-listed, USACE Navigable
SA-04	ND	Pembina	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 11.3	None	None
SA-04	ND	Pembina	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 11.7	None	None
SA-04	ND	Pembina	Unnamed Waterbody	Swamp/Marsh	ND 17.2	None	None
SA-04	ND	Pembina	Unnamed Waterbody	Lake/Pond - Perennial	ND 17.1	None	None
SA-04	ND	Pembina	Unnamed Waterbody	Lake/Pond - Perennial	ND 18.3	None	None
SA-04	ND	Pembina	Unnamed Waterbody	Lake/Pond - Perennial	ND 8.8	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	ND	Pembina	Unnamed Canal Ditch	Canal Ditch	ND 21.4	None	None
SA-04	ND	Pembina	Unnamed Canal Ditch	Canal Ditch	ND 22.5	None	None
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 228.5	None	None
SA-04	ND	Richland	Wild Rice River	Artificial Path	ND 213	II	303d-Listed Impaired
SA-04	ND	Richland	Unnamed Waterbody	Swamp/Marsh	ND 194.4	None	None
SA-04	ND	Pembina	Unnamed Waterbody	Lake/Pond - Perennial	ND 28.1	None	None
SA-04	ND	Pembina	Unnamed Waterbody	Lake/Pond - Perennial	ND 29.2	None	None
SA-04	ND	Pembina	Unnamed Canal Ditch	Canal Ditch	ND 23.6	None	None
SA-04	ND	Pembina	Unnamed Canal Ditch	Canal Ditch	ND 23.6	None	None
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 231.6	None	None
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 227.9	None	None
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 214.4	None	None
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 232.9	None	None
SA-04	ND	Richland	Unnamed Canal Ditch	Canal Ditch	ND 223.9	None	None
SA-04	ND	Richland	Unnamed Stream/River Perennial	Stream/River - Perennial	ND 213.7	None	None
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 228.3	None	None
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 230.3	None	None
SA-04	ND	Richland	Unnamed Canal Ditch	Canal Ditch	ND 225.6	None	None
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 219.5	None	None
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 189.2	None	None
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 184.4	None	None
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 197.3	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 208	None	None
SA-04	ND	Richland	South Branch Antelope Creek	Stream/River - Intermittent	ND 205.5	III	None
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 199.2	None	None
SA-04	ND	Richland	Pitcairn Creek	Stream/River - Intermittent	ND 192.9	None	None
SA-04	ND	Richland	Antelope Creek	Stream/River - Intermittent	ND 203.9	III	303d-Listed Impaired
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 185.2	None	None
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 205.4	None	None
SA-04	ND	Richland	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 183.6	None	None
SA-04	ND	Richland	Wild Rice River	Artificial Path	ND 185.6	II	303d-Listed Impaired
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 160.9	None	None
SA-04	ND	Cass	Wild Rice River	Stream/River - Perennial	ND 173.3	II	303d-Listed Impaired
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 147.7	None	None
SA-04	ND	Cass	Unnamed Artificial Path	Artificial Path	ND 167.5	None	303d-Listed Impaired
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 169	None	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 145.2	None	None
SA-04	ND	Cass	Lower Branch Rush River	Stream/River - Intermittent	ND 151.3	III	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 163.5	None	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 143.2	None	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 147.2	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	ND	Cass	Maple River	Stream/River - Perennial	ND 154.7	II	303d-Listed Impaired
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 172.1	None	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 175	None	None
SA-04	ND	Cass	Rush River	Stream/River - Perennial	ND 149.8	III	303d-Listed Impaired
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 150.8	None	None
SA-04	ND	Cass	Unnamed Stream/River Perennial	Stream/River - Perennial	ND 155.4	None	None
SA-04	ND	Traill	North Branch Elm River	Stream/River - Perennial	ND 126.2	II	303d-Listed Impaired
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 136.9	None	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 134.8	None	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 137.9	None	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 132.6	None	None
SA-04	ND	Traill	Goose River	Artificial Path	ND 120	IA	303d-Listed Impaired
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 140.1	None	None
SA-04	ND	Traill	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 129.5	None	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 135.8	None	None
SA-04	ND	Traill	Elm River	Artificial Path	ND 132.1	II	None
SA-04	ND	Traill	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 108.2	None	None
SA-04	ND	Traill	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 107.6	None	None
SA-04	ND	Traill	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 109.4	None	None
SA-04	ND	Traill	Buffalo Coulee	Stream/River - Intermittent	ND 109.6	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	ND	Grand Forks	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 100	None	None
SA-04	ND	Grand Forks	Drain Number 4	Canal Ditch	ND 89.5	None	None
SA-04	ND	Traill	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 108.1	None	None
SA-04	ND	Grand Forks	Cole Creek	Stream/River - Intermittent	ND 96.9	None	303d-Listed Impaired
SA-04	ND	Traill	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 107.9	None	None
SA-04	ND	Grand Forks	Elm Coulee	Stream/River - Intermittent	ND 94.3	None	None
SA-04	ND	Grand Forks	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 75.1	None	None
SA-04	ND	Grand Forks	English Coulee	Stream/River - Intermittent	ND 84.5	None	None
SA-04	ND	Grand Forks	County Ditch Number 3	Canal Ditch	ND 65.9	None	None
SA-04	ND	Grand Forks	Unnamed Canal Ditch	Canal Ditch	ND 67.1	None	None
SA-04	ND	Grand Forks	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 73	None	None
SA-04	ND	Grand Forks	County Ditch Number 13	Canal Ditch	ND 64.1	None	None
SA-04	ND	Grand Forks	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 78.7	None	None
SA-04	ND	Grand Forks	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 82.5	None	None
SA-04	ND	Grand Forks	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 74.7	None	None
SA-04	ND	Grand Forks	Turtle River	Artificial Path	ND 69.1	II	303d-Listed Impaired
SA-04	ND	Walsh	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 40.4	None	None
SA-04	ND	Walsh	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 57.8	None	None
SA-04	ND	Walsh	Park River	Artificial Path	ND 43.3	II	303d-Listed Impaired
SA-04	ND	Walsh	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 39.4	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	ND	Walsh	Forest River	Stream/River - Perennial	ND 53.9	II	303d-Listed Impaired
SA-04	ND	Pembina	Unnamed Canal Ditch	Canal Ditch	ND 37.4	None	None
SA-04	ND	Pembina	Unnamed Canal Ditch	Canal Ditch	ND 24.6	None	None
SA-04	ND	Pembina	Unnamed Canal Ditch	Canal Ditch	ND 27.7	None	None
SA-04	ND	Pembina	Unnamed Canal Ditch	Canal Ditch	ND 28.7	None	None
SA-04	ND	Pembina	Unnamed Canal Ditch	Canal Ditch	ND 25.7	None	None
SA-04	ND	Pembina	Unnamed Canal Ditch	Canal Ditch	ND 26.7	None	None
SA-04	ND	Pembina	Unnamed Canal Ditch	Canal Ditch	ND 32.8	None	None
SA-04	ND	Richland	Unnamed Artificial Path	Artificial Path	ND 213.1	None	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 159.2	None	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 159.3	None	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 159.7	None	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 155.6	None	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 155.6	None	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 161.7	None	None
SA-04	ND	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 162	None	None
SA-04	ND	Traill	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 104.7	None	None
SA-04	ND	Traill	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 104.7	None	None
SA-04	ND	Traill	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 104.8	None	None
SA-04	ND	Grand Forks	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 100.3	None	None
SA-04	ND	Grand Forks	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 100.4	None	None
SA-04	ND	Grand Forks	Unnamed Stream/River Intermittent	Stream/River - Intermittent	ND 100.4	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	MN	Kandiyohi	Unnamed Canal Ditch	Canal Ditch	MN 329.8	None	None
SA-04	MN	Kandiyohi	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 334.4	None	None
SA-04	MN	Nicollet	Unnamed Canal Ditch	Canal Ditch	MN 400.1	None	None
SA-04	MN	Waseca	Bull Run Creek	Stream/River - Intermittent	MN 432.8	2C	None
SA-04	MN	Freeborn	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 457	None	None
SA-04	MN	Renville	Judicial Ditch Number Fifteen	Canal Ditch	MN 353.1	None	None
SA-04	MN	Kandiyohi	Unnamed Canal Ditch	Canal Ditch	MN 335.4	None	None
SA-04	MN	Nicollet	Unnamed Connector	Connector	MN 406.1	None	None
SA-04	MN	Stevens	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 262.9	None	None
SA-04	MN	Traverse	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 252.4	None	None
SA-04	MN	Chippewa	Shakopee Creek	Stream/River - Perennial	MN 314.5	2C	None
SA-04	MN	Sibley	Unnamed Canal Ditch	Canal Ditch	MN 377.9	None	None
SA-04	MN	Traverse	County Ditch Number Four	Canal Ditch	MN 242.8	None	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 287.5	None	None
SA-04	MN	Stevens	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 279	None	None
SA-04	MN	Freeborn	County Ditch Number Twelve	Canal Ditch	MN 468.4	None	None
SA-04	MN	Stevens	Muddy Creek	Stream/River - Intermittent	MN 268.2	7	None
SA-04	MN	Traverse	Unnamed Canal Ditch	Canal Ditch	MN 250.2	None	None
SA-04	MN	Nicollet	Judicial Ditch Number Six	Canal Ditch	MN 386.7	None	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 311.8	None	None
SA-04	MN	Le Sueur	Minnesota River	Artificial Path	MN 406.6	2B, 2C	303d-Listed Impaired, NRI-listed, USACE Navigable

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	MN	Renville	Unnamed Canal Ditch	Canal Ditch	MN 346.7	None	None
SA-04	MN	Sibley	Middle Branch Rush River	Canal Ditch	MN 378.9	7	None
SA-04	MN	Chippewa	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 314.8	None	None
SA-04	MN	Kandiyohi	Unnamed Canal Ditch	Canal Ditch	MN 325	None	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 286.8	None	None
SA-04	MN	Chippewa	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 320.8	None	None
SA-04	MN	Waseca	Boot Creek	Stream/River - Perennial	MN 443.7	2C	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 307.4	None	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 288.9	None	None
SA-04	MN	Kandiyohi	Unnamed Canal Ditch	Canal Ditch	MN 340.6	None	None
SA-04	MN	Nicollet	Unnamed Canal Ditch	Canal Ditch	MN 400.8	None	None
SA-04	MN	Mower	Cedar River	Artificial Path	MN 478.6	2C, 3C	303d-Listed Impaired
SA-04	MN	Waseca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 442.3	None	None
SA-04	MN	Stevens	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 271.1	None	None
SA-04	MN	Freeborn	Unnamed Canal Ditch	Canal Ditch	MN 467.5	None	None
SA-04	MN	Swift	Judicial Ditch Number Five	Stream/River - Intermittent	MN 299.6	None	None
SA-04	MN	Chippewa	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 318.7	None	None
SA-04	MN	Traverse	Unnamed Canal Ditch	Canal Ditch	MN 243.2	None	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 295.1	None	None
SA-04	MN	Le Sueur	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 407.3	None	None
SA-04	MN	Waseca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 440.7	None	None
SA-04	MN	Chippewa	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 315.7	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	MN	Traverse	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 247.8	None	None
SA-04	MN	Stevens	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 279.4	None	None
SA-04	MN	Sibley	Unnamed Canal Ditch	Canal Ditch	MN 380.2	None	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 310.1	None	None
SA-04	MN	Freeborn	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 461.2	None	None
SA-04	MN	Freeborn	County Ditch Number Sixtythree	Canal Ditch	MN 454.8	None	None
SA-04	MN	Blue Earth	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 410.9	None	None
SA-04	MN	Stevens	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 256.7	None	None
SA-04	MN	Renville	High Island Creek	Canal Ditch	MN 360.8	7	None
SA-04	MN	Renville	Unnamed Canal Ditch	Canal Ditch	MN 351.7	None	None
SA-04	MN	Waseca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 434.5	None	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 309.4	None	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 290.7	None	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 293.2	None	None
SA-04	MN	Stevens	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 274	None	None
SA-04	MN	Nicollet	County Ditch Number Seventyeight	Canal Ditch	MN 395.4	None	None
SA-04	MN	Sibley	Unnamed Canal Ditch	Canal Ditch	MN 366	None	None
SA-04	MN	Waseca	Le Sueur River	Stream/River - Perennial	MN 427.9	2C	None
SA-04	MN	Sibley	County Ditch Number Thirtyone	Canal Ditch	MN 368.8	None	None
SA-04	MN	Kandiyohi	Unnamed Canal Ditch	Canal Ditch	MN 341.3	None	None
SA-04	MN	Renville	Unnamed Canal Ditch	Canal Ditch	MN 349.5	None	None
SA-04	MN	Blue Earth	Unnamed Canal Ditch	Canal Ditch	MN 421.5	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	MN	Kandiyohi	County Ditch Number Eight A	Canal Ditch	MN 335.1	None	None
SA-04	MN	Sibley	Unnamed Canal Ditch	Canal Ditch	MN 372.8	None	None
SA-04	MN	Swift	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 305.7	None	None
SA-04	MN	Kandiyohi	Unnamed Canal Ditch	Canal Ditch	MN 333.7	None	None
SA-04	MN	Traverse	Unnamed Canal Ditch	Canal Ditch	MN 243.8	None	None
SA-04	MN	Stevens	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 261.7	None	None
SA-04	MN	Waseca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 443.2	None	None
SA-04	MN	Renville	Unnamed Canal Ditch	Canal Ditch	MN 357.7	None	None
SA-04	MN	Swift	Chippewa River	Artificial Path	MN 297.3	2B	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 309.1	None	None
SA-04	MN	Freeborn	Unnamed Canal Ditch	Canal Ditch	MN 468.3	None	None
SA-04	MN	Chippewa	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 315.8	None	None
SA-04	MN	Mower	Unnamed Canal Ditch	Canal Ditch	MN 482.2	None	None
SA-04	MN	Mower	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 480.1	None	None
SA-04	MN	Renville	Unnamed Canal Ditch	Canal Ditch	MN 346.3	None	None
SA-04	MN	Kandiyohi	Unnamed Canal Ditch	Canal Ditch	MN 331.2	None	None
SA-04	MN	Nicollet	Judicial Ditch Number One A	Canal Ditch	MN 390.7	None	None
SA-04	MN	Chippewa	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 319.9	None	None
SA-04	MN	Blue Earth	Unnamed Canal Ditch	Canal Ditch	MN 423.1	None	None
SA-04	MN	Sibley	Unnamed Canal Ditch	Canal Ditch	MN 376.4	None	None
SA-04	MN	Traverse	Unnamed Canal Ditch	Canal Ditch	MN 248.6	None	None
SA-04	MN	Nicollet	County Ditch Number Five	Canal Ditch	MN 396.8	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	MN	Traverse	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 248.9	None	None
SA-04	MN	Stevens	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 263.5	None	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 291.8	None	None
SA-04	MN	Traverse	Mustinka River	Artificial Path	MN 241.9	2C	None
SA-04	MN	Waseca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 435.7	None	None
SA-04	MN	Swift	County Ditch Number Twentythree	Stream/River - Intermittent	MN 291.2	None	None
SA-04	MN	Stevens	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 280.2	None	None
SA-04	MN	Stevens	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 264	None	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 308.2	None	None
SA-04	MN	Traverse	Unnamed Canal Ditch	Canal Ditch	MN 251.4	None	None
SA-04	MN	Stevens	Pomme de Terre River	Artificial Path	MN 277.5	None	303d-Listed Impaired
SA-04	MN	Mower	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 480.9	None	None
SA-04	MN	Kandiyohi	Unnamed Canal Ditch	Canal Ditch	MN 337.5	None	None
SA-04	MN	Sibley	County Ditch Number Thirtyone	Canal Ditch	MN 369.5	None	None
SA-04	MN	Nicollet	Unnamed Canal Ditch	Canal Ditch	MN 388.2	None	None
SA-04	MN	Freeborn	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 452.3	None	None
SA-04	MN	Kandiyohi	Unnamed Canal Ditch	Canal Ditch	MN 331.9	None	None
SA-04	MN	Sibley	South Branch Rush River	Canal Ditch	MN 383.4	None	303d-Listed Impaired
SA-04	MN	Blue Earth	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 424.7	None	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 311.4	None	None
SA-04	MN	Blue Earth	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 413.5	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	MN	Traverse	County Drain Number Twentyseven	Canal Ditch	MN 240.1	None	None
SA-04	MN	Freeborn	Unnamed Canal Ditch	Canal Ditch	MN 467.1	None	None
SA-04	MN	Freeborn	Woodbury Creek	Canal Ditch	MN 472.7	2C	303d-Listed Impaired
SA-04	MN	Chippewa	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 321.4	None	None
SA-04	MN	Mower	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 483.6	None	None
SA-04	MN	Stevens	Twelvemile Creek	Stream/River - Intermittent	MN 258.4	2C	None
SA-04	MN	Kandiyohi	Hawk Creek	Canal Ditch	MN 327.2	7	None
SA-04	MN	Nicollet	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 406.3	None	None
SA-04	MN	Blue Earth	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 426.4	None	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 296.9	None	None
SA-04	MN	Chippewa	Unnamed Canal Ditch	Canal Ditch	MN 321.8	None	None
SA-04	MN	Chippewa	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 319	None	None
SA-04	MN	Renville	Unnamed Canal Ditch	Canal Ditch	MN 350.1	None	None
SA-04	MN	Kandiyohi	Unnamed Canal Ditch	Canal Ditch	MN 327.8	None	None
SA-04	MN	Sibley	Unnamed Canal Ditch	Canal Ditch	MN 365.1	None	None
SA-04	MN	Mower	Judicial Ditch Number Seventyseven	Canal Ditch	MN 477.8	None	None
SA-04	MN	Sibley	Unnamed Canal Ditch	Canal Ditch	MN 373.8	None	None
SA-04	MN	Waseca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 430.8	None	None
SA-04	MN	Swift	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 302.2	None	None
SA-04	MN	Freeborn	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 457.8	None	None
SA-04	MN	Traverse	Unnamed Canal Ditch	Canal Ditch	MN 245.3	None	None
SA-04	MN	Stevens	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 260.7	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	MN	Waseca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 431.9	None	None
SA-04	MN	Renville	County Ditch Number Thirtythree	Canal Ditch	MN 359	None	None
SA-04	MN	Blue Earth	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 415.4	None	None
SA-04	MN	Kandiyohi	Unnamed Canal Ditch	Canal Ditch	MN 332.7	None	None
SA-04	MN	Sibley	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 368.3	None	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 287.1	None	None
SA-04	MN	Traverse	Unnamed Canal Ditch	Canal Ditch	MN 246.9	None	None
SA-04	MN	Mower	Otter Creek	Stream/River - Perennial	MN 484.2	2B, 3C	303d-Listed Impaired
SA-04	MN	Nicollet	Unnamed Canal Ditch	Canal Ditch	MN 399	None	None
SA-04	MN	Stevens	Unnamed Canal Ditch	Canal Ditch	MN 263.1	None	None
SA-04	MN	Traverse	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 244.4	None	None
SA-04	MN	Nicollet	Unnamed Canal Ditch	Canal Ditch	MN 389.4	None	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 287	None	None
SA-04	MN	Freeborn	Le Sueur River	Canal Ditch	MN 450.9	2C	None
SA-04	MN	Swift	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 293.6	None	None
SA-04	MN	Traverse	Unnamed Canal Ditch	Canal Ditch	MN 252.7	None	None
SA-04	MN	Traverse	Twelvemile Creek	Stream/River - Perennial	MN 247.5	2C	303d-Listed Impaired
SA-04	MN	Nicollet	County Ditch Number Thirteen A	Canal Ditch	MN 402.1	None	None
SA-04	MN	Swift	County Ditch Number Seven	Stream/River - Intermittent	MN 293.5	None	None
SA-04	MN	Sibley	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 384.8	None	None
SA-04	MN	Traverse	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 234.5	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	MN	Traverse	Bois de Sioux River	Artificial Path	MN 233.6	2C	303d-Listed Impaired, USACE Navigable
SA-04	MN	Freeborn	Unnamed Canal Ditch	Canal Ditch	MN 467.9	None	None
SA-04	MN	Freeborn	Unnamed Canal Ditch	Canal Ditch	MN 468	None	None
SA-04	MN	Freeborn	Unnamed Canal Ditch	Canal Ditch	MN 468.2	None	None
SA-04	MN	Blue Earth	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 408.9	None	None
SA-04	MN	Blue Earth	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 419	None	None
SA-04	MN	Waseca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 434.8	None	None
SA-04	MN	Waseca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 437.1	None	None
SA-04	MN	Waseca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 438.2	None	None
SA-04	MN	Traverse	Unnamed Canal Ditch	Canal Ditch	MN 254.8	None	None
SA-04	MN	Stevens	Unnamed Canal Ditch	Canal Ditch	MN 255.6	None	None
SA-04	MN	Blue Earth	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 419.7	None	None
SA-04	MN	Blue Earth	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 420.3	None	None
SA-04	MN	Stevens	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 282.2	None	None
SA-04	MN	Stevens	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 285.5	None	None
SA-04	MN	Traverse	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 249.3	None	None
SA-04	MN	Traverse	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 249.3	None	None
SA-04	MN	Traverse	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 249.5	None	None
SA-04	MN	Traverse	Unnamed Waterbody	Lake/Pond - Perennial	MN 239.7	None	None
SA-04	MN	Swift	Unnamed Waterbody	Lake/Pond - Perennial	MN 298.3	None	None
SA-04	MN	Le Sueur	Unnamed Waterbody	Lake/Pond - Perennial	MN 407.9	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IA	Howard	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 514.3	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 627.6	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 627.8	None	None
SA-04	IA	Howard	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 511.1	None	None
SA-04	IA	Howard	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 511.3	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 582.6	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 582.7	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 582.7	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 555.9	None	None
SA-04	IA	Clinton	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 646.3	None	None
SA-04	IA	Clinton	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 646.5	None	None
SA-04	IA	Clinton	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 646.6	None	None
SA-04	IA	Mitchell	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 485.5	None	None
SA-04	IA	Mitchell	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 485.8	None	None
SA-04	IA	Mitchell	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 486.8	None	None
SA-04	IA	Mitchell	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 487	None	None
SA-04	IA	Mitchell	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 487.4	None	None
SA-04	IA	Clinton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 664.3	None	None
SA-04	IA	Clinton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 664.6	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 633.2	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 633.7	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 587	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 587.3	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 515.7	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 516.1	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 615.4	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 615.8	None	None
SA-04	IA	Clinton	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 670.7	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 527	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 590.2	None	None
SA-04	IA	Buchanan	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 572	None	None
SA-04	IA	Jones	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 602.2	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 622.4	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 527.4	None	None
SA-04	IA	Chickasaw	Elk Creek	Stream/River - Perennial	IA 518.6	A1, B (WW-2)	None
SA-04	IA	Jones	West Kitty Creek	Stream/River - Intermittent	IA 617.5	A1, B (WW-2)	None
SA-04	IA	Mitchell	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 488.4	None	None
SA-04	IA	Mitchell	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 506.7	None	None
SA-04	IA	Mitchell	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 489.7	None	None
SA-04	IA	Buchanan	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 578.4	None	None
SA-04	IA	Delaware	Todds Creek	Stream/River - Intermittent	IA 591.9	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 623.4	None	None
SA-04	IA	Buchanan	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 572.9	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IA	Delaware	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 585.9	None	None
SA-04	IA	Jones	Mineral Creek	Stream/River - Perennial	IA 619.7	A3, B (WW-2)	None
SA-04	IA	Buchanan	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 576.4	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 551.5	None	None
SA-04	IA	Chickasaw	Marsh Creek	Stream/River - Perennial	IA 538.8	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 523.8	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 547.6	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 557.6	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 533.9	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 589.3	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 629.1	None	None
SA-04	IA	Jones	Bryan Creek	Stream/River - Perennial	IA 631.7	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 607.2	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 563.4	None	None
SA-04	IA	Clinton	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 643.4	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 591	None	None
SA-04	IA	Fayette	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 545.8	None	None
SA-04	IA	Mitchell	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 507.6	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 630.7	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 602.5	None	None
SA-04	IA	Clinton	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 652.1	None	None
SA-04	IA	Clinton	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 651.2	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IA	Buchanan	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 575.1	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 600.1	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 549.3	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 515.3	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 559.6	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 557.1	None	None
SA-04	IA	Clinton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 656.2	None	None
SA-04	IA	Clinton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 654.7	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 583.7	None	None
SA-04	IA	Buchanan	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 580.4	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 536.9	None	None
SA-04	IA	Mitchell	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 491.3	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 607.4	None	None
SA-04	IA	Clinton	Calamus Creek	Stream/River - Perennial	IA 647.9	A1, B (WW-2)	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 535.5	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 543.6	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 548.5	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 618	None	None
SA-04	IA	Jones	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 610.4	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 524.3	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 595	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 551.5	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IA	Clinton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 665.4	None	None
SA-04	IA	Jones	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 615	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 539.3	None	None
SA-04	IA	Bremer	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 544.8	None	None
SA-04	IA	Clinton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 655.4	None	None
SA-04	IA	Delaware	Sand Creek	Stream/River - Perennial	IA 588.6	A1, B (WW-2)	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 517.6	None	None
SA-04	IA	Mitchell	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 503.9	None	None
SA-04	IA	Clinton	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 636.3	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 613.2	None	None
SA-04	IA	Mitchell	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 504.5	None	None
SA-04	IA	Clinton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 644.2	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 523.3	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 516.9	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 612.3	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 630.1	None	None
SA-04	IA	Clinton	Brophy Creek	Stream/River - Perennial	IA 664.1	A1, B (WW-2)	303d-Listed Impaired
SA-04	IA	Jones	Deer Creek	Stream/River - Perennial	IA 608.4	A1, B (WW-2)	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 527.8	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 556.3	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 525.3	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 633.1	None	None
SA-04	IA	Clinton	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 646.6	None	None
SA-04	IA	Clinton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 660.7	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 603.4	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 530.3	None	None
SA-04	IA	Howard	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 512.2	None	None
SA-04	IA	Buchanan	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 574.1	None	None
SA-04	IA	Bremer	Little Wapsipinicon River	Stream/River - Perennial	IA 544.2	A1, B (WW-2)	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 609.5	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 547.6	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 548.7	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 541.1	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 540	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 541.9	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 596.5	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 537.2	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 564.3	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 531.8	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 533	None	None
SA-04	IA	Mitchell	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 502.3	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 626.7	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 550.8	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IA	Clinton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 663.3	None	None
SA-04	IA	Buchanan	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 570.7	None	None
SA-04	IA	Chickasaw	Plum Creek	Stream/River - Perennial	IA 531.1	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 602.2	None	None
SA-04	IA	Howard	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 514.7	None	None
SA-04	IA	Fayette	Stoe Creek	Stream/River - Perennial	IA 553.5	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 587.5	None	None
SA-04	IA	Fayette	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 559.7	None	None
SA-04	IA	Delaware	Unnamed Artificial Path	Artificial Path	IA 583.9	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 604.5	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 528.4	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 563.8	None	None
SA-04	IA	Chickasaw	Little Wapsipinicon River	Stream/River - Perennial	IA 516.3	A2, B (WW-2)	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 614.3	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 628.3	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 517.2	None	None
SA-04	IA	Buchanan	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 571.4	None	None
SA-04	IA	Fayette	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 550.3	None	None
SA-04	IA	Mitchell	Little Cedar River	Artificial Path	IA 501.9	A1, B (WW-1)	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 517.8	None	None
SA-04	IA	Clinton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 654.3	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IA	Buchanan	Prairie Creek	Stream/River - Intermittent	IA 576.6	A1, B (WW-2)	None
SA-04	IA	Buchanan	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 577.5	None	None
SA-04	IA	Howard	Wapsipinicon River	Artificial Path	IA 510.4	A1, B (WW-1)	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 616.6	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 558.6	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 534.3	None	None
SA-04	IA	Clinton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 662.7	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 622	None	None
SA-04	IA	Clinton	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 661.5	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 591.9	None	None
SA-04	IA	Delaware	Prairie Creek	Artificial Path	IA 584	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 524.5	None	None
SA-04	IA	Howard	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 512.6	None	None
SA-04	IA	Jones	Kitty Creek	Stream/River - Perennial	IA 611.6	A1, B (WW-2)	None
SA-04	IA	Clinton	Ames Creek	Stream/River - Perennial	IA 658.9	A1, B (WW-2)	None
SA-04	IA	Clinton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 640.6	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 595.3	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 565.8	None	None
SA-04	IA	Clinton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 637.4	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 526.8	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IA	Buchanan	East Branch Buffalo Creek	Stream/River - Perennial	IA 571.1	A1, B(WW-2)	303d-Listed Impaired
SA-04	IA	Jones	Bear Creek	Stream/River - Perennial	IA 625.7	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 542.7	None	None
SA-04	IA	Delaware	Grove Creek	Stream/River - Intermittent	IA 600.9	None	None
SA-04	IA	Clinton	Silver Creek	Stream/River - Perennial	IA 656.9	A2, B (WW-2)	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 629.5	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 581.7	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 619.9	None	None
SA-04	IA	Jones	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 628.8	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 581.7	None	None
SA-04	IA	Delaware	Lime Creek	Stream/River - Perennial	IA 599.1	A2, B(WW-2)	None
SA-04	IA	Mitchell	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 493	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 522.4	None	None
SA-04	IA	Chickasaw	East Fork Wapsipinicon River	Stream/River - Perennial	IA 520.7	A1, B (WW-1)	None
SA-04	IA	Chickasaw	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 526.2	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 618.8	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 624.9	None	None
SA-04	IA	Buchanan	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 573.6	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 521.8	None	None
SA-04	IA	Buchanan	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 575	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 608.1	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 603.8	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 556.1	None	None
SA-04	IA	Chickasaw	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 529.5	None	None
SA-04	IA	Howard	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 514.5	None	None
SA-04	IA	Fayette	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 551.9	None	None
SA-04	IA	Delaware	Golden Branch	Stream/River - Intermittent	IA 594.3	None	None
SA-04	IA	Fayette	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 559.9	None	None
SA-04	IA	Delaware	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 585.8	None	None
SA-04	IA	Clinton	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 639.7	None	None
SA-04	IA	Jones	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 606.3	None	None
SA-04	IA	Clinton	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 644.5	None	None
SA-04	IA	Clinton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IA 655	None	None
SA-04	IA	Mitchell	Turtle Creek	Stream/River - Intermittent	IA 490.1	A1, A2, B(CW1), HH	None
SA-04	IA	Jones	Little Bear Creek	Stream/River - Intermittent	IA 622.1	None	None
SA-04	IA	Jones	Silver Creek	Stream/River - Perennial	IA 605.1	None	None
SA-04	IA	Delaware	Buck Creek	Stream/River - Perennial	IA 596.8	A1, B (WW-2)	None
SA-04	IA	Clinton	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 649.5	None	None
SA-04	IA	Clinton	Unnamed Stream/River Perennial	Stream/River - Perennial	IA 643.4	None	None
SA-04	IA	Clinton	Rock Creek	Artificial Path	IA 670.9	None	None
SA-04	IA	Jones	Unnamed Waterbody	Lake/Pond - Intermittent	IA 631	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IA	Clinton	Unnamed Waterbody	Lake/Pond - Perennial	IA 657.4	None	None
SA-04	IA	Clinton	Unnamed Waterbody	Swamp/Marsh	IA 657.4	None	None
SA-04	IA	Clinton	Unnamed Waterbody	Swamp/Marsh	IA 657.4	None	None
SA-04	IA	Clinton	Unnamed Waterbody	Swamp/Marsh	IA 657.6	None	None
SA-04	IA	Clinton	Unnamed Waterbody	Swamp/Marsh	IA 659	None	None
SA-04	IA	Jones	Unnamed Waterbody	Lake/Pond - Intermittent	IA 605.1	None	None
SA-04	IA	Jones	Unnamed Waterbody	Lake/Pond - Perennial	IA 602.2	None	None
SA-04	IA	Clinton	Unnamed Waterbody	Lake/Pond - Intermittent	IA 647.2	None	None
SA-04	IA	Clinton	Unnamed Waterbody	Lake/Pond - Intermittent	IA 671.8	None	None
SA-04	IA	Delaware	Unnamed Waterbody	Lake/Pond - Perennial	IA 583.9	None	None
SA-04	IA	Clinton	Unnamed Waterbody	Lake/Pond - Perennial	IA 671.1	None	None
SA-04	IL	Clinton	Mississippi River	Artificial Path	IA 672.3	None	303d-listed Impaired, USACE Navigable
SA-04	IL	Rock Island	Unnamed Artificial Path	Artificial Path	IL 672.5	None	None
SA-04	IL	Rock Island	Unnamed Stream/River Perennial	Stream/River - Perennial	IL 676.6	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Perennial	Stream/River - Perennial	IL 677.3	None	None
SA-04	IL	Rock Island	Unnamed Artificial Path	Artificial Path	IL 677.3	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 677.4	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Perennial	Stream/River - Perennial	IL 677.9	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Perennial	Stream/River - Perennial	IL 678.1	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Perennial	Stream/River - Perennial	IL 678.4	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 679.5	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IL	Whiteside	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 679.9	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 680.3	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Perennial	Stream/River - Perennial	IL 681.8	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Perennial	Stream/River - Perennial	IL 682.6	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 683.8	None	None
SA-04	IL	Whiteside	Mineral Spring Creek	Stream/River - Intermittent	IL 685.1	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Perennial	Stream/River - Perennial	IL 686.5	None	None
SA-04	IL	Whiteside	Rock Creek	Artificial Path	IL 688.8	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 690.1	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 690.4	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 690.9	None	None
SA-04	IL	Whiteside	Unnamed Waterbody	Swamp/Marsh	IL 691.3	None	None
SA-04	IL	Whiteside	Unnamed Artificial Path	Artificial Path	IL 691.7	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 692.4	None	None
SA-04	IL	Whiteside	Unnamed Stream/River Perennial	Stream/River - Perennial	IL 692.6	None	None
SA-04	IL	Whiteside	Rock River	Artificial Path	IL 694.5	None	303d-listed Impaired, USACE Navigable, NRI-listed
SA-04	IL	Whiteside	Unnamed Canal Ditch	Canal Ditch	IL 700.4	None	None
SA-04	IL	Whiteside	Coon Creek	Artificial Path	IL 701.2	None	None
SA-04	IL	Whiteside	Unnamed Artificial Path	Artificial Path	IL 704.8	None	None
SA-04	IL	Whiteside	Main Ditch	Canal Ditch	IL 708.3	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IL	Lee	Green River	Artificial Path	IL 712.3	None	303d-listed Impaired, USACE Navigable
SA-04	IL	Lee	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 715.1	None	None
SA-04	IL	Lee	Unnamed Stream/River Perennial	Stream/River - Perennial	IL 715.1	None	None
SA-04	IL	Lee	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 716.6	None	None
SA-04	IL	Lee	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 717.1	None	None
SA-04	IL	Lee	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 719.4	None	None
SA-04	IL	Lee	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 719.8	None	None
SA-04	IL	Lee	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 720.3	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 721	None	None
SA-04	IL	Bureau	Walnut Creek	Stream/River - Intermittent	IL 721.8	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 723	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 723.3	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 723.7	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 724	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 724.3	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 724.4	None	None
SA-04	IL	Bureau	Unnamed Stream/River Perennial	Stream/River - Perennial	IL 725.9	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 726.9	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 727.1	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 727.4	None	None
SA-04	IL	Bureau	Masters Fork	Stream/River - Perennial	IL 727.7	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 727.9	None	None
SA-04	IL	Bureau	Unnamed Stream/River Perennial	Stream/River - Perennial	IL 729.5	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 731.2	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 731.5	None	None
SA-04	IL	Bureau	Big Bureau Creek	Stream/River - Perennial	IL 731.9	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 733.2	None	None
SA-04	IL	Bureau	Pike Creek	Stream/River - Perennial	IL 733.5	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 734.4	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 736.7	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 736.9	None	None
SA-04	IL	Bureau	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 737.8	None	None
SA-04	IL	Bureau	Brush Creek	Stream/River - Intermittent	IL 738.4	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 739.8	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 739.8	None	None
SA-04	IL	LaSalle	Spring Creek	Stream/River - Perennial	IL 740.5	None	None
SA-04	IL	LaSalle	Little Vermilion River	Stream/River - Perennial	IL 744.5	None	None
SA-04	IL	LaSalle	Unnamed Waterbody	Swamp/Marsh	IL 745.8	None	None
SA-04	IL	LaSalle	Unnamed Waterbody	Swamp/Marsh	IL 745.9	None	None
SA-04	IL	LaSalle	Vermilion Creek	Stream/River - Perennial	IL 746	None	None
SA-04	IL	LaSalle	Tomahawk Creek	Canal Ditch	IL 747.6	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 749.3	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 753.1	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IL	LaSalle	Crookedleg Creek	Stream/River - Perennial	IL 756.3	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 758.4	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 759.6	None	None
SA-04	IL	LaSalle	Indian Creek	Artificial Path	IL 759.9	None	NRI
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 761.8	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 762.4	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 762.7	None	None
SA-04	IL	LaSalle	Fox River	Artificial Path	IL 763.3	None	303d-listed Impaired, USACE Navigable
SA-04	IL	LaSalle	Brumbach Creek	Stream/River - Intermittent	IL 763.8	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Lake/Pond - Perennial	IL 763.8	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 763.9	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 764.7	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 765.2	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 765.8	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 766	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 766.4	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 766.7	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 767.4	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 767.4	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 769.1	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 769.8	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 770.2	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 770.3	None	None
SA-04	IL	LaSalle	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 770.5	None	None
SA-04	IL	Gundy	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 771.5	None	None
SA-04	IL	Gundy	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 773.3	None	None
SA-04	IL	Gundy	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 773.5	None	None
SA-04	IL	Gundy	East Fork Nettle Creek	Stream/River - Intermittent	IL 776.3	None	None
SA-04	IL	Gundy	East Fork Nettle Creek	Stream/River - Intermittent	IL 778.5	None	None
SA-04	IL	Gundy	East Fork Nettle Creek	Stream/River - Intermittent	IL 778.5	None	None
SA-04	IL	Gundy	Saratoga Creek	Stream/River - Intermittent	IL 781.3	None	None
SA-04	IL	Gundy	Saratoga Creek	Stream/River - Intermittent	IL 781.3	None	None
SA-04	IL	Gundy	Saratoga Creek	Stream/River - Intermittent	IL 781.3	None	None
SA-04	IL	Gundy	Saratoga Creek	Stream/River - Intermittent	IL 781.6	None	None
SA-04	IL	Gundy	Saratoga Creek	Stream/River - Intermittent	IL 781.7	None	None
SA-04	IL	Gundy	Saratoga Creek	Stream/River - Intermittent	IL 781.9	None	None
SA-04	IL	Gundy	Saratoga Creek	Stream/River - Intermittent	IL 782	None	None
SA-04	IL	Gundy	Saratoga Creek	Stream/River - Intermittent	IL 782	None	None
SA-04	IL	Gundy	Aux Sable Creek	Artificial Path	IL 784.6	None	303d-listed Impaired
SA-04	IL	Gundy	Aux Sable Creek	Artificial Path	IL 784.7	None	303d-listed Impaired
SA-04	IL	Gundy	Aux Sable Creek	Artificial Path	IL 784.8	None	303d-listed Impaired
SA-04	IL	Gundy	Unnamed Stream/River Intermittent	Swamp/Marsh	IL 787.4	None	None

Table G-2. Certificate of Need - Waterbodies Crossed by the SA-04 System Alternative Route

Name	State	County	Waterbody Name	Waterbody Type/Flow	State Milepost	State-Designa-ted Use	Agency Classification
SA-04	IL	Gundy	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 787.5	None	None
SA-04	IL	Gundy	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 788.3	None	None
SA-04	IL	Will	Des Plaines River	Artificial Path	IL 792.2	None	303d-listed Impaired, USACE Navigable
SA-04	IL	Will	Unnamed Stream/River Intermittent	Artificial Path	IL 792.8	None	None
SA-04	IL	Will	Unnamed Stream/River Intermittent	Stream/River - Intermittent	IL 793.1	None	None

Waterbody crossing methods for the SA-04 route have not been determined.

State Designated Use

North Dakota (ND) (Century Code 33.16.02.1):

- Class I: suitable for the propagation or protection, or both, of resident fish species and other aquatic biota and for swimming, boating, and other water recreation; suitable for irrigation, stock watering, and wildlife without injurious effects. After treatment consisting of coagulation, settling, filtration, and chlorination, or equivalent treatment processes, the water quality shall meet the bacteriological, physical, and chemical requirements of the department for municipal or domestic use.
- Class 1A: The quality of the waters in this class shall be the same as the quality of class I streams, except that where natural conditions exceed class I criteria for municipal and domestic use, the availability of softening or other treatment methods may be considered in determining whether ambient water quality meets the drinking water requirements of the department.
- Class II: The quality of the waters in this class shall be the same as the quality of class I streams, except that additional treatment may be required to meet the drinking water requirements of the department. Streams in this classification may be intermittent in nature which would make these waters of limited value for beneficial uses such as municipal water, fish life, irrigation, bathing, or swimming.
- Class III: suitable for agricultural and industrial uses. Streams in this class generally have low average flows with prolonged periods of no flow. During periods of no flow, they are of limited value for recreation and fish and aquatic biota. The quality of these waters must be maintained to protect secondary contact recreation uses (e.g., wading), fish and aquatic biota, and wildlife uses.

Minnesota (MN): Minnesota Rule 7050.0470 lists the classifications of major waterbodies in the state. If a waterbody is not listed under 7050.0470 and is not a wetland, it is classified as a Class 2B, 3C, 4A, 4B, 5, and 6 water per Minnesota Rule 7050.0430.

- Class 1 – domestic consumption (i.e., drinking water);
- Class 2 – aquatic life and recreation;
- Class 3 – industrial or commercial use;
- Class 4 – agricultural use, irrigation (4A) and livestock and wildlife watering (4B);
- Class 5 – aesthetics and navigation;
- Class 6 – other uses and protection of border waters; and
- Class 7 – limited resource value waters.

- Minnesota Rule 7050.0222 further defines the water quality standards for the following subclasses of Class 2 waters:
  - Class 2A – Coldwater fisheries, trout waters, suitable for all aquatic recreation and protected as a source of drinking water;
  - Class 2Bd – Cold and warm water fisheries, suitable for all aquatic recreation and protected as a source of drinking water;
  - Class 2B – Cold and warm water fisheries, suitable for all aquatic recreation but not protected for drinking water;
  - Class 2C – Indigenous fish and associated aquatic community, suitable for boating but not protected for drinking water.

Iowa (IA) (Administrative Code 61.3(455B):

- Primary contact recreational use (Class "A1"). Waters in which recreational or other uses may result in prolonged and direct contact with the water, involving considerable risk of ingesting water in quantities sufficient to pose a health hazard. Such activities would include, but not be limited to, swimming, diving, water skiing, and water contact recreational canoeing.
- Secondary contact recreational use (Class "A2"). Waters in which recreational or other uses may result in contact with the water that is either incidental or accidental. During the recreational use, the probability of ingesting appreciable quantities of water is minimal. Class A2 uses include fishing, commercial and recreational boating, any limited contact incidental to shoreline activities and activities in which users do not swim or float in the water body while on a boating activity.
- Children's recreational use (Class "A3"). Waters in which recreational uses by children are common. Class A3 waters are water bodies having definite banks and bed with visible evidence of the flow or occurrence of water. This type of use would primarily occur in urban or residential areas.
- Cold water aquatic life—Type 1 (Class "B(CW1)"). Waters in which the temperature and flow are suitable for the maintenance of a variety of cold water species, including reproducing and nonreproducing populations of trout (Salmonidae family) and associated aquatic communities.
- Cold water aquatic life—Type 2 (Class "B(CW2)"). Waters that include small, channeled streams, headwaters, and spring runs that possess natural cold water attributes of temperature and flow. These waters usually do not support consistent populations of trout (Salmonidae family), but may support associated vertebrate and invertebrate organisms.
- Warm water—Type 1 (Class "B(WW-1)"). Waters in which temperature, flow and other habitat characteristics are suitable to maintain warm water game fish populations along with a resident aquatic community that includes a variety of native nongame fish and invertebrate species. These waters generally include border rivers, large interior rivers, and the lower segments of medium-size tributary streams.
- Warm water—Type 2 (Class "B(WW-2)"). Waters in which flow or other physical characteristics are capable of supporting a resident aquatic community that includes a variety of native nongame fish and invertebrate species. The flow and other physical characteristics limit the maintenance of warm water game fish populations. These waters generally consist of small perennially flowing streams.
- Human health (Class "HH"). Waters in which fish are routinely harvested for human consumption or waters both designated as a drinking water supply and in which fish are routinely harvested for human consumption.

IL (IL): No waterbodies crossed by the SA-04 route are designated per IL Administrative Code Par 303.

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Kittson	ND Border to Clearbrook	Red River of the North	Artificial Path	ND 27.6	1C, 2Bd,3C	303d-Listed Impaired, USACE Navigable	HDD	None
APR	MN	Kittson	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 31.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Kittson	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 35.8	None	None	Bore	Wet Open Cut
APR	MN	Kittson	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 35.9	None	None	Bore	Wet Open Cut
APR	MN	Kittson	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 37.3	None	None	Bore	Dry Crossing
APR	MN	Kittson	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 38.7	None	None	Dry Crossing	Wet Open Cut
APR	MN	Kittson	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 39.9	None	None	Bore	Dry Crossing
APR	MN	Kittson	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 41.7	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 43	None	None	Bore	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 44.9	1C, 2Bd, 3C	None	NA	NA
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 47	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 49.6	None	None	NA	NA
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 51.8	None	None	Dry Crossing	Wet Open Cut

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 52.1	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Tamarac River	Stream/River - Perennial	MN 54.4	1C, 2Bd, 3C	303d-Listed Impaired	HDD	Dry Crossing
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 57.4	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 57.6	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 57.7	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 57.8	None	None	NA	NA
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 59.4	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 60.4	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Middle River	Stream/River - Perennial	MN 62.3	2B, 3C	303d-Listed Impaired, NRI-listed	HDD	Dry Crossing
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 64.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 65.6	None	None	NA	NA

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 69.1	None	None	Dry Crossing	Wet Open Cut
APR	MN	Marshall	ND Border to Clearbrook	Snake River	Stream/River - Perennial	MN 70.5	2B, 3C	None	HDD	Dry Crossing
APR	MN	Marshall	ND Border to Clearbrook	South Branch Snake River	Stream/River - Intermittent	MN 74.7	2B, 3C	None	Wet Open Cut	Dry Crossing
APR	MN	Marshall	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 75.2	None	None	Bore	Dry Crossing
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 80.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 82.6	None	303d-Listed Impaired	Wet open cut	Dry Crossing
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 84.8	None	None	NA	NA
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 86.3	None	None	Bore	Dry Crossing
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 87.7	None	None	Dry Crossing	Wet Open Cut
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Waterbody	Lake/Pond - Perennial	MN 88.2	None	None	NA	NA
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 89.3	None	None	Bore	Dry Crossing
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 91.1	None	None	Dry Crossing	Wet Open Cut
APR	MN	Pennington	ND Border to Clearbrook	Red Lake River	Artificial Path	MN 91.9	1C, 2Bd, 3C	NRI-listed, USACE Navigable	HDD	Dry Crossing

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 92.3	None	None	HDD	None
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 93.8	None	None	NA	NA
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 94.9	None	None	Dry Crossing	Wet Open Cut
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 95.6	None	None	NA	NA
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 97.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Pennington	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 97.3	None	None	Dry Crossing	Wet Open Cut
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 98.9	None	None	Dry Crossing	Wet Open Cut
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 99.6	None	None	Dry Crossing	Wet Open Cut
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 99.8	None	None	Dry Crossing	Wet Open Cut
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 100	None	None	Dry Crossing	Wet Open Cut
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 101.4	None	None	Dry Crossing	Wet Open Cut
APR	MN	Red Lake	ND Border to Clearbrook	Clearwater River	Artificial Path	MN 103	2B, 3C	303d-Listed Impaired	HDD	Dry Crossing
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 107.9	None	None	NA	NA

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 109	None	None	NA	NA
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 112.3	None	None	Dry Crossing	Wet Open Cut
APR	MN	Red Lake	ND Border to Clearbrook	Lost River	Artificial Path	MN 113.5	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Red Lake	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 114.3	None	None	Dry Crossing	Wet Open Cut
APR	MN	Polk	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 115.7	None	None	Dry Crossing	Wet Open Cut
APR	MN	Polk	ND Border to Clearbrook	State Ditch Number Sixtyone	Canal Ditch	MN 117.4	None	None	Wet Open Cut	Dry Crossing
APR	MN	Polk	ND Border to Clearbrook	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 117.9	None	None	Dry Crossing	Wet Open Cut
APR	MN	Polk	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 118.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Polk	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 121.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Polk	ND Border to Clearbrook	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 122.3	None	None	Dry Crossing	Wet Open Cut
APR	MN	Polk	ND Border to Clearbrook	Unnamed Canal Ditch	Canal Ditch	MN 123	None	None	NA	NA
APR	MN	Polk	ND Border to Clearbrook	Unnamed Waterbody	Lake/Pond - Perennial	MN 127.4	None	None	NA	NA
APR	MN	Polk	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 128.4	None	None	NA	NA

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 129	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 129.3	None	None	NA	NA
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 129.5	None	None	NA	NA
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 129.9	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 130.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 131.1	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 131.7	None	None	NA	NA
APR	MN	Clearwater	ND Border to Clearbrook	Lost River	Stream/River - Perennial	MN 132.2	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Connector	Connector	MN 133.9	None	None	NA	NA
APR	MN	Clearwater	ND Border to Clearbrook	Silver Creek	Stream/River - Perennial	MN 135.3	2B, 3C	303d-Listed Impaired	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Silver Creek	Stream/River - Perennial	MN 135.6	2B, 3C	303d-Listed Impaired	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Silver Creek	Stream/River - Perennial	MN 135.9	2B, 3C	303d-Listed Impaired	Dry Crossing	Wet Open Cut

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 137	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 137.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 137.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	ND Border to Clearbrook	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 137.4	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 138.1	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 138.2	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 138.8	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 141.2	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 144.3	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 146.3	None	None	NA	NA

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 146.9	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 147.9	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 148.9	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Clearwater River	Artificial Path	MN 149.5	2B, 3C	303d-Listed Impaired, NRI-listed	HDD	Open cut
APR	MN	Clearwater	Clearbrook to Carlton	Walker Brook	Stream/River - Perennial	MN 151.4	None	303d-Listed Impaired	Wet Open Cut	None
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 152.6	None	None	Dry Crossing	Wet Open Cut
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 154.4	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 154.7	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 155.1	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 156.4	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 163.5	None	None	NA	NA
APR	MN	Clearwater	Clearbrook to Carlton	Bear Creek	Stream/River - Perennial	MN 164.2	None	None	Dry Crossing	Wet Open Cut

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Clearwater	Clearbrook to Carlton	Mississippi River	Stream/River - Perennial	MN 165.1	2B, 3C	303d-Listed Impaired	HDD	Open Cut
APR	MN	Clearwater	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 169.9	None	None	NA	NA
APR	MN	Hubbard	Clearbrook to Carlton	LaSalle Creek	Stream/River - Perennial	MN 170.1	2C	Trout stream	Dry Crossing	Wet Open Cut
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 177.6	None	None	NA	NA
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 185.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 186.3	None	None	NA	NA
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 186.4	None	None	Dry Crossing	Open Cut
APR	MN	Hubbard	Clearbrook to Carlton	Hay Creek	Artificial Path	MN 187.8	2B, 3C	None	HDD	Open cut
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 189.4	None	None	NA	NA
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 191.2	None	None	NA	NA
APR	MN	Hubbard	Clearbrook to Carlton	Straight River	Artificial Path	MN 198.3	1B, 2A, 3B	Trout stream	HDD	Open cut
APR	MN	Hubbard	Clearbrook to Carlton	Shell River	Stream/River - Perennial	MN 200.7	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Hubbard	Clearbrook to Carlton	Shell River	Stream/River - Perennial	MN 205.5	2B, 3C	None	Dry Crossing	Wet Open Cut

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Hubbard	Clearbrook to Carlton	Shell River	Artificial Path	MN 207.8	2B, 3C	None	HDD	Open cut
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed artificial Path	Artificial Path	MN 209.2	None	None	NA	NA
APR	MN	Hubbard	Clearbrook to Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 209.5	None	None	HDD	Open cut
APR	MN	Hubbard	Clearbrook to Carlton	Shell River	Artificial Path	MN 209.5	None	NRI-listed	NA	NA
APR	MN	Wadena	Clearbrook to Carlton	Shell River	Artificial Path	MN 215.3	2B, 3C	NRI-listed	HDD	Open cut
APR	MN	Wadena	Clearbrook to Carlton	Crow Wing River	Artificial Path	MN 217.4	2B, 3C	NRI-listed	HDD	Wet Open Cut
APR	MN	Wadena	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 220.2	None	None	Wet Open Cut	Dry Crossing
APR	MN	Wadena	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 220.2	None	None	Wet Open Cut	Dry Crossing
APR	MN	Cass	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 223.7	None	None	Dry Crossing	Wet Open Cut
APR	MN	Cass	Clearbrook to Carlton	Big Swamp Creek	Canal Ditch	MN 224.6	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Cass	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 225.3	None	None	Dry Crossing	Wet Open Cut
APR	MN	Cass	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 226.9	None	None	NA	NA
APR	MN	Cass	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 227	None	None	NA	NA
APR	MN	Cass	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 229.5	None	None	NA	NA

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Cass	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 230.7	None	None	NA	NA
APR	MN	Cass	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 231.7	None	None	NA	NA
APR	MN	Cass	Clearbrook to Carlton	South Fork Pine River	Stream/River - Perennial	MN 232.6	2B, 3C	None	NA	NA
APR	MN	Cass	Clearbrook to Carlton	Pine River	Artificial Path	MN 241.4	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Crow Wing	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 244.3	None	None	NA	NA
APR	MN	Crow Wing	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 245.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Crow Wing	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 246.6	None	None	NA	NA
APR	MN	Cass	Clearbrook to Carlton	Blind Lake Creek	Stream/River - Perennial	MN 250.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Cass	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 253.1	None	None	NA	NA
APR	MN	Cass	Clearbrook to Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 257.9	None	None	Dry Crossing	Wet Open Cut
APR	MN	Cass	Clearbrook to Carlton	Daggett Brook	Stream/River - Perennial	MN 261.4	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Cass	Clearbrook to Carlton	Spring Branch	Stream/River - Perennial	MN 265.3	1B, 2A, 3B	Trout stream	Dry Crossing	Wet Open Cut
APR	MN	Cass	Clearbrook to Carlton	Unnamed Connector	Connector	MN 269.8	None	None	Dry Crossing	Wet Open Cut

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Cass	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 270.6	None	None	Dry Crossing	Wet Open Cut
APR	MN	Cass	Clearbrook to Carlton	Moose River	Stream/River - Perennial	MN 272.1	1B, 2Bd, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Connector	Connector	MN 275.5	None	None	NA	NA
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 277.4	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 279.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	White Elk Creek	Stream/River - Perennial	MN 283.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 286.2	None	None	NA	NA
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 290.7	None	None	NA	NA
APR	MN	Aitkin	Clearbrook to Carlton	White Elk Creek	Stream/River - Intermittent	MN 291.2	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Willow River	Stream/River - Perennial	MN 292.8	2C	NRI-listed	HDD	Open cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 295.1	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Mississippi River	Artificial Path	MN 296.7	2B, 3C	303d-Listed Impaired, USACE Navigable	HDD	Open cut

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 298.3	None	None	Wet Open Cut	Dry Crossing
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 299	None	None	Wet Open Cut	Dry Crossing
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 299.1	None	None	NA	NA
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 301.9	None	None	Wet Open Cut	Dry Crossing
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 302.3	None	None	Wet Open Cut	Dry Crossing
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 303.6	None	None	Wet Open Cut	Dry Crossing
APR	MN	Aitkin	Clearbrook to Carlton	Sandy River	Artificial Path	MN 305.9	2B, 3C	USACE Navigable	HDD	Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 308	None	None	Wet Open Cut	Dry Crossing
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 308.2	None	None	Wet Open Cut	Dry Crossing
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 309.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 310.1	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Sandy River	Canal Ditch	MN 312.8	2B, 3C	None	HDD	Open cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 314.1	None	None	NA	NA

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 318.9	None	None	Dry Crossing	Wet Open Cut
APR	MN	Aitkin	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 320.8	None	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	West Branch Kettle River	Stream/River - Perennial	MN 328.4	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 333.7	None	None	NA	NA
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 333.7	None	None	NA	NA
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 333.8	None	None	NA	NA
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 333.8	None	None	NA	NA
APR	MN	Carlton	Clearbrook to Carlton	Heikkila Creek	Stream/River - Perennial	MN 334.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 335.3	None	None	NA	NA
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Canal Ditch	Canal Ditch	MN 337.7	None	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Kettle River	Canal Ditch	MN 338.2	2B, 3C	303d-Listed Impaired, USACE Navigable	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 341.1	None	None	Wet Open Cut	Dry Crossing

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Carlton	Clearbrook to Carlton	West Fork Moose Horn River	Stream/River - Perennial	MN 342.7	2B, 3C	None	Wet Open Cut	Dry Crossing
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 343.5	None	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	King Creek	Stream/River - Intermittent	MN 344.2	1B, 2A, 3B	Trout stream	Wet Open Cut	Dry Crossing
APR	MN	Carlton	Clearbrook to Carlton	Park Lake Creek	Stream/River - Perennial	MN 346.7	None	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 347.1	None	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Moose Horn River	Stream/River - Perennial	MN 347.6	2B, 3C	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 349	None	None	NA	NA
APR	MN	Carlton	Clearbrook to Carlton	Blackhoof River	Stream/River - Perennial	MN 352.1	1B, 2A, 3B	Trout stream	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 352.3	None	Trout stream	NA	NA
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 353.7	None	None	NA	NA
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Connector	Connector	MN 354.4	None	None	NA	NA
APR	MN	Carlton	Clearbrook to Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 356.6	None	None	NA	NA
APR	MN	Carlton	Carlton to WI Border	Unnamed Waterbody	Lake/Pond - Perennial	MN 359.5	None	None	NA	NA

Table G-3. Route Permit - Waterbodies crossed by the Applicant's Preferred Route (in Minnesota)

Route	State	County	Section	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
APR	MN	Carlton	Carlton to WI Border	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 362.3	None	None	NA	NA
APR	MN	Carlton	Carlton to WI Border	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 363.3	None	None	Dry Crossing	Wet Open Cut
APR	MN	Carlton	Carlton to WI Border	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 364.7	None	None	Wet Open Cut	Dry Crossing
APR	MN	Carlton	Carlton to WI Border	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 365.1	None	None	Wet Open Cut	Dry Crossing
APR	MN	Carlton	Carlton to WI Border	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 365.4	None	None	Wet Open Cut	Dry Crossing

Notes: Waterbody crossings determined using NHD GIS layers.

State-designated Use.

Minnesota (MN): Minnesota Rule 7050.0470 lists the classifications of major waterbodies in the state. If a waterbody is not listed under 7050.0470 and is not a wetland, it is classified as a Class 2B, 3C, 4A, 4B, 5, and 6 water per Minnesota Rule 7050.0430.

- Class 1 – domestic consumption (i.e., drinking water);
- Class 2 – aquatic life and recreation;
- Class 3 – industrial or commercial use;
- Class 4 – agricultural use, irrigation (4A) and livestock and wildlife watering (4B);
- Class 5 – aesthetics and navigation;
- Class 6 – other uses and protection of border waters; and
- Class 7 – limited resource value waters.

- Minnesota Rule 7050.0222 further defines the water quality standards for the following subclasses of Class 2 waters:
  - Class 2A – Coldwater fisheries, trout waters, suitable for all aquatic recreation and protected as a source of drinking water;
  - Class 2Bd – Cold and warm water fisheries, suitable for all aquatic recreation and protected as a source of drinking water;
  - Class 2B – Cold and warm water fisheries, suitable for all aquatic recreation but not protected for drinking water;
  - Class 2C – Indigenous fish and associated aquatic community, suitable for boating but not protected for drinking water.

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-03AM	Clearwater	Unnamed Waterbody	Lake/Pond - Perennial	MN 139.6	None	None	NA	NA
RA-06	Clearwater	Ruffy Brook	Stream/River - Perennial	MN 140.5	2B, 3C (assessed NW of the crossing location	303d-Listed Impaired	NA	NA
RA-03AM	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 141.2	None	None	NA	NA
RA-08	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 141.4	None	None	NA	NA
RA-07	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 141.5	None	None	NA	NA
RA-07	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 141.8	None	None	NA	NA
RA-08	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 141.8	None	None	NA	NA
RA-06	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 141.9	None	None	NA	NA
RA-08	Clearwater	Unnamed Waterbody	Lake/Pond - Perennial	MN 142	None	None	NA	NA
RA-07	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 142.8	None	None	NA	NA
RA-07	Clearwater	Ruffy Brook	Stream/River - Perennial	MN 143.1	2B, 3C (assessed NW of the crossing location	303d-Listed Impaired	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-06	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 143.5	None	None	NA	NA
RA-08	Clearwater	Ruffy Brook	Connector	MN 144.1	2B, 3C (assessed NW of the crossing location	303d-Listed Impaired	NA	NA
RA-03AM	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 144.3	None	None	NA	NA
RA-08	Clearwater	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 144.3	None	None	NA	NA
RA-08	Clearwater	Ruffy Brook	Stream/River - Perennial	MN 144.3	2B, 3C (assessed NW of the crossing location	303d-Listed Impaired	NA	NA
RA-06	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 144.7	None	None	NA	NA
RA-07	Clearwater	Unnamed Waterbody	Lake/Pond - Perennial	MN 145.3	None	None	NA	NA
RA-07	Clearwater	West Four Legged Lake	Lake/Pond - Perennial	MN 145.5	None	None	NA	NA
RA-06	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 145.6	None	None	NA	NA
RA-06	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 145.7	None	None	NA	NA
RA-07	Clearwater	Unnamed Connector	Connector	MN 145.7	None	None	NA	NA
RA-03AM	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 146.3	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-03AM	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 146.9	None	None	NA	NA
RA-03AM	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 147.9	None	None	NA	NA
RA-08	Clearwater	Clearwater River	Stream/River - Perennial	MN 148.8	2B, 3C (assessed NW of the crossing location	303d-Listed Impaired, NRI-listed	NA	NA
RA-03AM	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 148.9	None	None	NA	NA
RA-06	Beltrami	Clearwater River	Stream/River - Perennial	MN 149.2	1B, 2A, 3B	Trout Stream, NRI-listed	NA	NA
RA-03AM	Clearwater	Clearwater River	Artificial Path	MN 149.5	2B, 3C	303d-Listed Impaired, NRI-listed	HDD	Open cut
RA-08	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 149.9	None	None	NA	NA
RA-08	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 150.7	None	None	NA	NA
RA-07	Beltrami	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 151.1	None	Trout Stream	NA	NA
RA-08	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 151.1	None	None	NA	NA
RA-07	Beltrami	Clearwater River	Stream/River - Perennial	MN 151.2	1B, 2A, 3B	Trout Stream, NRI-listed	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-08	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 151.3	None	None	NA	NA
RA-03AM	Clearwater	Walker Brook	Stream/River - Perennial	MN 151.4	None	303d-Listed Impaired	Wet Open Cut	None
RA-08	Beltrami	Unnamed Waterbody	Lake/Pond - Perennial	MN 152.1	None	None	NA	NA
RA-03AM	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 152.6	None	None	Dry Crossing	Wet Open Cut
RA-06	Beltrami	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 152.7	None	None	NA	NA
RA-06	Beltrami	Unnamed Waterbody	Lake/Pond - Perennial	MN 153.6	None	None	NA	NA
RA-06	Beltrami	Sandy River	Stream/River - Perennial	MN 153.9	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-03AM	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 154.4	None	None	NA	NA
RA-03AM	Clearwater	Unnamed Waterbody	Lake/Pond - Perennial	MN 154.7	None	None	NA	NA
RA-03AM	Clearwater	Unnamed Waterbody	Lake/Pond - Perennial	MN 155.1	None	None	NA	NA
RA-08	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 155.1	None	None	NA	NA
RA-08	Beltrami	Unnamed Canal Ditch	Canal Ditch	MN 155.1	None	None	NA	NA
RA-08	Beltrami	Unnamed Connector	Connector	MN 155.6	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-07	Beltrami	Grant Creek	Stream/River - Perennial	MN 156.1	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-06	Beltrami	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 156.3	None	None	NA	NA
RA-03AM	Clearwater	Unnamed Waterbody	Lake/Pond - Perennial	MN 156.4	None	None	NA	NA
RA-08	Beltrami	Unnamed Waterbody	Lake/Pond - Perennial	MN 156.6	None	None	NA	NA
RA-08	Beltrami	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 157.8	None	None	NA	NA
RA-08	Beltrami	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 157.9	None	None	NA	NA
RA-07	Beltrami	Grant Creek	Stream/River - Perennial	MN 158.5	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-08	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 159.4	None	None	NA	NA
RA-08	Beltrami	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 159.5	None	None	NA	NA
RA-06	Beltrami	Rice Lake	Lake/Pond - Perennial	MN 159.6	2B	None	NA	NA
RA-06	Beltrami	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 160.3	None	None	NA	NA
RA-06	Beltrami	Unnamed Artificial Path	Artificial Path	MN 161.1	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-06	Beltrami	Pike Creek	Stream/River - Perennial	MN 161.5	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-07	Beltrami	Grant Creek	Stream/River - Perennial	MN 161.6	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-08	Beltrami	Grant Creek	Stream/River - Perennial	MN 161.9	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-07	Beltrami	Grant Creek	Stream/River - Perennial	MN 162.5	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-06	Beltrami	Mud River	Stream/River - Perennial	MN 162.7	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-06	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 162.9	None	None	NA	NA
RA-03AM	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 163.5	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-07	Beltrami	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 163.6	None	None	NA	NA
RA-03AM	Clearwater	Bear Creek	Stream/River - Perennial	MN 164.2	2C, 3C	None	Dry Crossing	Wet Open Cut
RA-08	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 164.2	None	None	NA	NA
RA-03AM	Clearwater	Mississippi River	Stream/River - Perennial	MN 165.1	2B, 3C (assessed NW of the crossing location	303d-Listed Impaired	HDD	Dry Crossing
RA-08	Beltrami	Mississippi River	Stream/River - Perennial	MN 165.8	2B, 3C (assessed NW of the crossing location	303d-Listed Impaired	NA	NA
RA-08	Beltrami	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 165.9	None	None	NA	NA
RA-06	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 166.1	None	None	NA	NA
RA-06	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 166.2	None	None	NA	NA
RA-08	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 167.2	None	None	NA	NA
RA-06	Beltrami	Hay Creek	Connector	MN 167.5	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-08	Beltrami	Schoolcraft River	Artificial Path	MN 168.3	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-07	Beltrami	Mississippi River	Artificial Path	MN 168.7	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-06	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 169.6	None	None	NA	NA
RA-03AM	Clearwater	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 169.9	None	None	NA	NA
RA-03AM	Hubbard	LaSalle Creek	Stream/River - Perennial	MN 170.1	2C	Trout Stream	Dry Crossing	Wet Open Cut
RA-06	Beltrami	Darrigans Creek	Stream/River - Perennial	MN 170.7	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-07	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 170.8	None	None	NA	NA
RA-08	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 170.9	None	None	NA	NA
RA-07	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 171.4	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-06	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 171.7	None	None	NA	NA
RA-08	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 171.7	None	None	NA	NA
RA-08	Hubbard	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 172.1	None	None	NA	NA
RA-06	Beltrami	O'Brien Creek	Stream/River - Perennial	MN 172.4	1B, 2A, 3B	Trout Stream	NA	NA
RA-07	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 172.4	None	None	NA	NA
RA-06	Beltrami	O'Brien Creek	Stream/River - Perennial	MN 172.6	1B, 2A, 3B	Trout Stream	NA	NA
RA-06	Beltrami	O'Brien Creek	Stream/River - Perennial	MN 172.7	1B, 2A, 3B	Trout Stream	NA	NA
RA-08	Hubbard	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 172.7	None	Trout Stream	NA	NA
RA-07	Hubbard	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 172.8	None	None	NA	NA
RA-07	Hubbard	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 173.3	1B, 2A, 3B	Trout Stream	NA	NA
RA-06	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 173.8	None	None	NA	NA
RA-06	Beltrami	Unnamed Waterbody	Lake/Pond - Perennial	MN 173.9	None	None	NA	NA
RA-08	Hubbard	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 173.9	None	Trout Stream	NA	NA
RA-06	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 174.4	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-07	Hubbard	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 174.5	None	Trout Stream	NA	NA
RA-06	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 174.9	None	None	NA	NA
RA-06	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 175	None	None	NA	NA
RA-06	Beltrami	Unnamed Waterbody	Lake/Pond - Perennial	MN 175.4	None	None	NA	NA
RA-07	Hubbard	Necktie River	Stream/River - Intermittent	MN 176.4	1B, 2A, 3B	Trout Stream	NA	NA
RA-06	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 177	None	None	NA	NA
RA-08	Hubbard	Necktie River	Stream/River - Perennial	MN 177	1B, 2A, 3B	Trout Stream	NA	NA
RA-08	Hubbard	Unnamed Canal Ditch	Canal Ditch	MN 177.1	None	None	NA	NA
RA-03AM	Hubbard	Unnamed Waterbody	Lake/Pond - Perennial	MN 177.6	None	None	NA	NA
RA-06	Beltrami	Blackduck River	Stream/River - Perennial	MN 177.7	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-06	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 178.5	None	None	NA	NA
RA-08	Hubbard	Unnamed Connector	Connector	MN 179.5	None	None	NA	NA
RA-08	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 180.4	None	None	NA	NA
RA-06	Beltrami	Unnamed Connector	Connector	MN 180.5	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-06	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 180.8	None	None	NA	NA
RA-06	Beltrami	Spring Creek	Artificial Path	MN 181.7	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-08	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 182.3	None	None	NA	NA
RA-06	Beltrami	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 183.7	None	None	NA	NA
RA-07	Cass	Fox Creek	Artificial Path	MN 184.7	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-08	Cass	Unnamed Artificial Path	Artificial Path	MN 185.3	None	None	NA	NA
RA-06	Beltrami	South Cormorant River	Stream/River - Intermittent	MN 185.7	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-03AM	Hubbard	Unnamed Waterbody	Lake/Pond - Perennial	MN 186.3	None	None	NA	NA
RA-03AM	Hubbard	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 186.4	None	None	Dry Crossing	Wet Open Cut
RA-08	Cass	Unnamed Artificial Path	Artificial Path	MN 186.4	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-06	Itasca	Unnamed Waterbody	Lake/Pond - Perennial	MN 186.7	None	None	NA	NA
RA-03AM	Hubbard	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 187.1	None	None	Dry Crossing	Wet Open Cut
RA-03AM	Hubbard	Hay Creek	Artificial Path	MN 187.8	2B, 3C (assessed NW of the crossing location	None	HDD	Open cut
RA-03AM	Hubbard	Unnamed Canal Ditch	Canal Ditch	MN 189.4	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 190.7	None	None	NA	NA
RA-03AM	Hubbard	Unnamed Waterbody	Lake/Pond - Perennial	MN 191.2	None	None	NA	NA
RA-08	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 191.2	None	None	NA	NA
RA-06	Itasca	Popple River	Stream/River - Perennial	MN 191.8	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-07	Cass	Unnamed Connector	Connector	MN 192.4	None	None	NA	NA
RA-08	Cass	Sucker Creek	Stream/River - Perennial	MN 192.5	2B, 3C (assessed NW of the crossing location	USACE Navigable	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-08	Cass	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 193	None	None	NA	NA
RA-07	Cass	Unnamed Artificial Path	Artificial Path	MN 193.1	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 193.5	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 194.3	None	None	NA	NA
RA-08	Cass	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 194.4	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 196.2	None	None	NA	NA
RA-07	Cass	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 196.6	None	None	NA	NA
RA-07	Cass	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 196.9	None	None	NA	NA
RA-03AM	Hubbard	Straight River	Artificial Path	MN 198.3	1B, 2A, 3B	Trout Stream	HDD	Open cut
RA-08	Cass	Portage Creek	Stream/River - Perennial	MN 198.3	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 199.6	None	None	NA	NA
RA-06	Itasca	Unnamed Waterbody	Lake/Pond - Perennial	MN 200.2	None	None	NA	NA
RA-06	Itasca	Unnamed Waterbody	Lake/Pond - Perennial	MN 200.6	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-03AM	Hubbard	Shell River	Stream/River - Perennial	MN 200.7	2B, 3C 2A	None	Dry Crossing	Wet Open Cut
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 201.7	None	None	NA	NA
RA-07	Cass	Unnamed Waterbody	Swamp/Marsh - Intermittent	MN 202.3	None	None	NA	NA
RA-06	Itasca	Moose Brook	Stream/River - Perennial	MN 203.4	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-06	Itasca	Big Fork River	Artificial Path	MN 203.9	2B, 3C (assessed NW of the crossing location	USACE Navigable	NA	NA
RA-07	Cass	Sixmile Brook	Canal Ditch	MN 203.9	2C, 3C	None	NA	NA
RA-06	Itasca	Big Fork River	Artificial Path	MN 204.2	2B, 3C (assessed NW of the crossing location	USACE Navigable	NA	NA
RA-08	Cass	Sixmile Brook	Canal Ditch	MN 204.2	2C, 3C	None	NA	NA
RA-06	Itasca	Big Fork River	Artificial Path	MN 205.6	2B, 3C (assessed NW of the crossing location	USACE Navigable waterway	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-06	Itasca	Hay Creek	Stream/River - Perennial	MN 205.8	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-06	Itasca	Unnamed Connector	Connector	MN 207.1	None	None	NA	NA
RA-03AM	Wadena	Blueberry River	Stream/River - Perennial	MN 207.5	2C, 3C	None	NA	NA
RA-08	Cass	Unnamed Canal Ditch	Canal Ditch	MN 208	None	None	NA	NA
RA-03AM	Wadena	Kettle River	Stream/River - Perennial	MN 208.2	2C	None	NA	NA
RA-07	Cass	Unnamed Canal Ditch	Canal Ditch	MN 208.2	None	None	NA	NA
RA-08	Cass	Unnamed Canal Ditch	Canal Ditch	MN 209.4	None	None	NA	NA
RA-06	Itasca	Harrison Creek	Stream/River - Perennial	MN 209.9	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-06	Itasca	Big Fork River	Artificial Path	MN 210	2B, 3C (assessed NW of the crossing location	USACE Navigable	NA	NA
RA-03AM	Wadena	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 210.2	None	None	NA	NA
RA-03AM	Wadena	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 210.5	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-08	Cass	Unnamed Canal Ditch	Canal Ditch	MN 210.6	None	None	NA	NA
RA-03AM	Wadena	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 210.9	None	None	NA	NA
RA-07	Cass	Unnamed Canal Ditch	Canal Ditch	MN 211	None	None	NA	NA
RA-06	Itasca	Unnamed Artificial Path	Artificial Path	MN 211.8	None	None	NA	NA
RA-03AM	Wadena	Cat River	Canal Ditch	MN 212	1B, 2A, 3B	Trout Stream	NA	NA
RA-06	Itasca	Unnamed Artificial Path	Artificial Path	MN 212	None	None	NA	NA
RA-06	Itasca	Big Fork River	Artificial Path	MN 212.6	2B, 3C (assessed NW of the crossing location	USACE Navigable	NA	NA
RA-08	Cass	Unnamed Waterbody	Lake/Pond - Perennial	MN 212.8	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 213	None	None	NA	NA
RA-03AM	Wadena	Cat River	Stream/River - Perennial	MN 213.2	1B, 2A, 3B	Trout Stream	NA	NA
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 213.2	None	None	NA	NA
RA-06	Itasca	Big Fork River	Artificial Path	MN 214.5	2B, 3C (assessed NW of the crossing location	USACE Navigable	NA	NA
RA-08	Cass	Unnamed Artificial Path	Artificial Path	MN 214.5	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-08	Cass	Mississippi River	Artificial Path	MN 214.6	2B, 3C (assessed NW of the crossing location	USACE Navigable	NA	NA
RA-07	Cass	Mississippi River	Artificial Path	MN 214.8	2B, 3C (assessed NW of the crossing location	USACE Navigable	NA	NA
RA-07	Itasca	Unnamed Waterbody	Lake/Pond - Perennial	MN 214.8	None	None	NA	NA
RA-03AM	Wadena	Kitten Creek	Stream/River - Perennial	MN 215	2C, 3C	None	NA	NA
RA-07	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 215	None	None	NA	NA
RA-07	Cass	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 215	None	None	NA	NA
RA-08	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 215	None	None	NA	NA
RA-08	Itasca	Unnamed Waterbody	Lake/Pond - Perennial	MN 215	None	None	NA	NA
RA-06	Itasca	Big Fork River	Artificial Path	MN 215.2	2B, 3C (assessed NW of the crossing location	USACE Navigable	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-06	Itasca	Big Fork River	Artificial Path	MN 215.9	2B, 3C (assessed NW of the crossing location	USACE Navigable	NA	NA
RA-08	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 216.4	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 216.8	None	None	NA	NA
RA-07	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 216.9	None	None	NA	NA
RA-03AM	Wadena	Unnamed Canal Ditch	Canal Ditch	MN 217.7	None	None	NA	NA
RA-08	Itasca	Ball Club River	Stream/River - Perennial	MN 218.1	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-03AM	Wadena	Redeye River	Stream/River - Perennial	MN 218.3	2B, 3C	None	NA	NA
RA-07	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 218.3	None	None	NA	NA
RA-07	Itasca	Ball Club River	Stream/River - Perennial	MN 218.4	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-08	Itasca	Unnamed Canal Ditch	Canal Ditch	MN 219.9	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-07	Itasca	Unnamed Canal Ditch	Canal Ditch	MN 220.5	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 221	None	None	NA	NA
RA-08	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 221.2	None	None	NA	NA
RA-07	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 221.8	None	None	NA	NA
RA-08	Itasca	Unnamed Canal Ditch	Canal Ditch	MN 221.9	None	None	NA	NA
RA-08	Itasca	Unnamed Canal Ditch	Canal Ditch	MN 222.2	None	None	NA	NA
RA-07	Itasca	Unnamed Canal Ditch	Canal Ditch	MN 222.8	None	None	NA	NA
RA-07	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 223	None	None	NA	NA
RA-06	Itasca	Big Fork River	Artificial Path	MN 223.4	2B, 3C (assessed NW of the crossing location	NRI-listed, USACE Navigable	NA	NA
RA-08	Itasca	Deer River	Stream/River - Perennial	MN 223.5	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-08	Itasca	Unnamed Canal Ditch	Canal Ditch	MN 223.6	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-07	Itasca	Deer River	Stream/River - Perennial	MN 224.2	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-06	Itasca	Rice Creek	Stream/River - Perennial	MN 224.4	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-03AM	Wadena	Unnamed Canal Ditch	Canal Ditch	MN 224.5	None	None	NA	NA
RA-08	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 224.5	None	None	NA	NA
RA-07	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 224.9	None	None	NA	NA
RA-03AM	Wadena	Hay Creek	Stream/River - Perennial	MN 225.8	2B, 3C	None	NA	NA
RA-08	Itasca	Unnamed Connector	Connector	MN 225.9	None	None	NA	NA
RA-06	Itasca	Coon Creek	Artificial Path	MN 226.9	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-03AM	Wadena	Unnamed Canal Ditch	Canal Ditch	MN 227.4	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-06	Itasca	Coon Creek	Stream/River - Perennial	MN 227.9	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-03AM	Wadena	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 229.2	None	None	NA	NA
RA-03AM	Wadena	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 230.1	None	None	NA	NA
RA-08	Itasca	Blackwater Creek	Stream/River - Perennial	MN 230.1	2C	None	NA	NA
RA-03AM	Wadena	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 230.2	None	None	NA	NA
RA-03AM	Wadena	Leaf River	Stream/River - Perennial	MN 230.8	2B, 3C	None	NA	NA
RA-03AM	Wadena	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 231.7	None	None	NA	NA
RA-03AM	Wadena	Unnamed Canal Ditch	Canal Ditch	MN 231.9	None	None	NA	NA
RA-06	Itasca	Coon Creek	Stream/River - Perennial	MN 232	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-08	Itasca	Bass Brook	Stream/River - Perennial	MN 232.1	None	None	NA	NA
RA-08	Itasca	Unnamed Waterbody	Lake/Pond - Perennial	MN 232.3	None	None	NA	NA
RA-08	Itasca	Forsythe Lake	Lake/Pond - Perennial	MN 232.4	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-07	Itasca	Bass Brook	Stream/River - Perennial	MN 233	None	None	NA	NA
RA-06	Itasca	Larson Lake	Lake/Pond - Perennial	MN 233.2	1B, 2A, 3B	None	NA	NA
RA-03AM	Wadena	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 235	None	Trout Stream	NA	NA
RA-03AM	Wadena	Partridge River	Stream/River - Perennial	MN 236.7	None	None	NA	NA
RA-03AM	Wadena	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 236.7	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 237.1	None	None	NA	NA
RA-03AM	Wadena	Unnamed Canal Ditch	Canal Ditch	MN 238.2	None	Trout Stream	NA	NA
RA-08	Itasca	Prairie River	Artificial Path	MN 239	None	None	NA	NA
RA-07	Itasca	Prairie River	Artificial Path	MN 239.3	None	None	NA	NA
RA-06	Itasca	Unnamed Waterbody	Lake/Pond - Perennial	MN 240.5	None	None	NA	NA
RA-03AM	Wadena	Unnamed Connector	Connector	MN 240.9	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 241.5	None	None	NA	NA
RA-03AM	Todd	Hayden Creek	Stream/River - Perennial	MN 241.6	None	None	NA	NA
RA-06	Itasca	Bear River	Stream/River - Perennial	MN 241.7	None	None	NA	NA
RA-06	Itasca	Venning Creek	Stream/River - Perennial	MN 242.7	1B, 2A, 3B	Trout Stream	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-03AM	Todd	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 242.9	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 243.6	None	Trout Stream	NA	NA
RA-08	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 244.1	None	None	NA	NA
RA-03AM	Todd	Unnamed Canal Ditch	Canal Ditch	MN 244.4	None	None	NA	NA
RA-07	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 245.7	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 246.4	None	None	NA	NA
RA-03AM	Todd	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 247	None	None	NA	NA
RA-03AM	Todd	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 247.2	None	None	NA	NA
RA-03AM	Todd	Long Prairie River	Artificial Path	MN 247.4	2B, 3C	None	NA	NA
RA-08	Itasca	Unnamed Canal Ditch	Canal Ditch	MN 247.6	None	None	NA	NA
RA-08	Itasca	Unnamed Canal Ditch	Canal Ditch	MN 247.7	None	None	NA	NA
RA-06	Itasca	Unnamed Connector	Connector	MN 248.1	None	None	NA	NA
RA-06	Itasca	Unnamed Waterbody	Lake/Pond - Perennial	MN 249.1	None	None	NA	NA
RA-03AM	Todd	Unnamed Canal Ditch	Canal Ditch	MN 249.2	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-06	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 249.2	None	None	NA	NA
RA-07	Itasca	Unnamed Canal Ditch	Canal Ditch	MN 249.2	None	None	NA	NA
RA-03AM	Todd	Unnamed Canal Ditch	Canal Ditch	MN 249.6	None	None	NA	NA
RA-07	Itasca	Unnamed Canal Ditch	Canal Ditch	MN 249.8	None	None	NA	NA
RA-07	Itasca	Unnamed Canal Ditch	Canal Ditch	MN 250.2	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 250.9	None	None	NA	NA
RA-08	Itasca	Shallow Lake	Lake/Pond - Perennial	MN 250.9	None	None	NA	NA
RA-03AM	Todd	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 252.2	None	None	NA	NA
RA-08	Itasca	Swan River	Stream/River - Perennial	MN 252.3	2B, 3C (assessed NW of the crossing location	303d-Listed Impaired	NA	NA
RA-08	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 252.4	None	None	NA	NA
RA-03AM	Todd	Fish Trap Creek	Stream/River - Perennial	MN 253.2	2B, 3C	None	NA	NA
RA-08	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 253.6	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-07	Itasca	Swan River	Stream/River - Perennial	MN 253.9	2B, 3C (assessed NW of the crossing location	303d-Listed Impaired	NA	NA
RA-06	Itasca	Prairie River	Stream/River - Intermittent	MN 254	None	None	NA	NA
RA-07	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 254.4	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 254.8	None	None	NA	NA
RA-08	Itasca	Spot Lake	Lake/Pond - Perennial	MN 254.9	None	None	NA	NA
RA-03AM	Morrison	Unnamed Waterbody	Lake/Pond - Perennial	MN 255.2	None	None	NA	NA
RA-07	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 255.8	None	None	NA	NA
RA-08	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 255.8	None	None	NA	NA
RA-06	Itasca	Day Brook	Stream/River - Perennial	MN 255.9	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-08	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 256	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-08	Itasca	Bruce Creek	Canal Ditch	MN 256.1	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-03AM	Morrison	Corner Lake	Lake/Pond - Perennial	MN 256.4	None	None	NA	NA
RA-07	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 257.3	None	None	NA	NA
RA-07	Itasca	Bruce Creek	Canal Ditch	MN 257.9	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-03AM	Morrison	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 259.2	None	None	NA	NA
RA-06	Itasca	East River	Stream/River - Perennial	MN 259.9	None	None	NA	NA
RA-03AM	Morrison	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 261.1	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 261.3	None	None	NA	NA
RA-08	Aitkin	Unnamed Canal Ditch	Canal Ditch	MN 261.7	None	None	NA	NA
RA-03AM	Morrison	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 262.2	None	None	NA	NA
RA-06	Itasca	Rock Creek	Stream/River - Perennial	MN 262.3	None	None	NA	NA
RA-08	Aitkin	Unnamed Canal Ditch	Canal Ditch	MN 262.6	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 263	None	None	NA	NA
RA-08	Aitkin	Unnamed Canal Ditch	Canal Ditch	MN 263	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 263.4	None	None	NA	NA
RA-07	Itasca	Unnamed Canal Ditch	Canal Ditch	MN 263.6	None	None	NA	NA
RA-03AM	Morrison	Hay Creek	Stream/River - Perennial	MN 264.2	None	None	NA	NA
RA-08	Aitkin	Unnamed Canal Ditch	Canal Ditch	MN 264.3	None	None	NA	NA
RA-07	Itasca	Unnamed Canal Ditch	Canal Ditch	MN 264.9	None	None	NA	NA
RA-07	Aitkin	Unnamed Canal Ditch	Canal Ditch	MN 265.2	None	None	NA	NA
RA-08	Aitkin	Unnamed Canal Ditch	Canal Ditch	MN 265.7	None	None	NA	NA
RA-07	Aitkin	Unnamed Canal Ditch	Canal Ditch	MN 265.9	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 266.8	None	None	NA	NA
RA-08	St. Louis	Unnamed Canal Ditch	Canal Ditch	MN 267.1	None	None	NA	NA
RA-03AM	Morrison	Little Elk River	Stream/River - Perennial	MN 267.4	2C, 3C	None	NA	NA
RA-06	Itasca	O'Brien Creek	Stream/River - Perennial	MN 267.8	None	None	NA	NA
RA-06	St. Louis	Unnamed Canal Ditch	Canal Ditch	MN 267.9	None	None	NA	NA
RA-07	St. Louis	Unnamed Canal Ditch	Canal Ditch	MN 267.9	None	None	NA	NA
RA-08	St. Louis	Unnamed Canal Ditch	Canal Ditch	MN 268.2	None	None	NA	NA
RA-06	Itasca	O'Brien Creek	Stream/River - Perennial	MN 268.4	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-03AM	Morrison	Little Elk River	Stream/River - Perennial	MN 268.6	2C, 3C	None	NA	NA
RA-08	St. Louis	Unnamed Canal Ditch	Canal Ditch	MN 269.5	None	None	NA	NA
RA-08	St. Louis	Unnamed Canal Ditch	Canal Ditch	MN 270.2	None	None	NA	NA
RA-06	Itasca	Welcome Creek	Artificial Path	MN 271.5	2C	None	NA	NA
RA-03AM	Morrison	Unnamed Canal Ditch	Canal Ditch	MN 271.7	None	None	NA	NA
RA-08	St. Louis	East Savanna River	Canal Ditch	MN 273.1	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-03AM	Morrison	Mississippi River	Artificial Path	MN 273.3	2B, 3C	USACE Navigable waterway	NA	NA
RA-08	St. Louis	Unnamed Canal Ditch	Canal Ditch	MN 273.3	None	None	NA	NA
RA-06	St. Louis	Unnamed Canal Ditch	Canal Ditch	MN 274	None	None	NA	NA
RA-07	St. Louis	Unnamed Canal Ditch	Canal Ditch	MN 274	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 274.4	None	None	NA	NA
RA-06	St. Louis	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 274.7	None	None	NA	NA
RA-07	St. Louis	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 274.7	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-06	Itasca	Hay Creek	Stream/River - Perennial	MN 275.6	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-06	St. Louis	East Savanna River	Canal Ditch	MN 275.7	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-07	St. Louis	East Savanna River	Canal Ditch	MN 275.7	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-03AM	Morrison	Rice Creek	Canal Ditch	MN 276	2B, 3C	None	NA	NA
RA-08	St. Louis	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 276.8	None	None	NA	NA
RA-08	St. Louis	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 276.8	None	None	NA	NA
RA-08	St. Louis	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 276.8	None	None	NA	NA
RA-06	St. Louis	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 277.3	None	None	NA	NA
RA-07	St. Louis	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 277.3	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-03AM	Morrison	Rice Creek	Canal Ditch	MN 277.9	2B, 3C	None	NA	NA
RA-06	Itasca	Coons Creek	Artificial Path	MN 278.1	None	None	NA	NA
RA-06	Itasca	Tank Creek	Connector	MN 278.8	None	None	NA	NA
RA-06	Itasca	Unnamed Artificial Path	Artificial Path	MN 279.1	None	None	NA	NA
RA-08	St. Louis	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 279.1	None	None	NA	NA
RA-08	St. Louis	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 279.2	None	None	NA	NA
RA-06	St. Louis	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 279.8	None	None	NA	NA
RA-07	St. Louis	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 279.8	None	None	NA	NA
RA-08	St. Louis	Ahmik River	Stream/River - Perennial	MN 279.9	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-03AM	Morrison	Rice Creek	Stream/River - Perennial	MN 280	2B, 3C	None	NA	NA
RA-08	St. Louis	Ahmik River	Stream/River - Perennial	MN 280	2B, 3C (assessed NW of the crossing location	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-08	St. Louis	Ahmik River	Stream/River - Perennial	MN 280	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-06	St. Louis	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 280.1	None	None	NA	NA
RA-07	St. Louis	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 280.1	None	None	NA	NA
RA-06	Itasca	Beauty Lake	Lake/Pond - Perennial	MN 280.8	None	None	NA	NA
RA-06	Itasca	Mary Lake	Lake/Pond - Perennial	MN 281.4	None	None	NA	NA
RA-06	St. Louis	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 281.8	None	None	NA	NA
RA-06	St. Louis	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 281.8	None	None	NA	NA
RA-07	St. Louis	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 281.8	None	None	NA	NA
RA-07	St. Louis	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 281.8	None	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 282.5	None	None	NA	NA
RA-06	St. Louis	Ahmik River	Stream/River - Perennial	MN 282.5	2B, 3C (assessed NW of the crossing location	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-07	St. Louis	Ahmik River	Stream/River - Perennial	MN 282.5	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-03AM	Morrison	Platte River	Stream/River - Perennial	MN 282.6	2B, 3C	None	NA	NA
RA-06	Itasca	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 283.6	None	Trout Stream	NA	NA
RA-06	Itasca	Unnamed Artificial Path	Artificial Path	MN 284.2	None	None	NA	NA
RA-06	Itasca	Unnamed Waterbody	Lake/Pond - Perennial	MN 285.5	None	None	NA	NA
RA-08	St. Louis	Unnamed Canal Ditch	Canal Ditch	MN 285.8	None	None	NA	NA
RA-03AM	Morrison	Skunk River	Stream/River - Perennial	MN 286.8	2C, 3C	303d-Listed Impaired	NA	NA
RA-03AM	Morrison	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 287.3	None	None	NA	NA
RA-03AM	Morrison	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 288.2	None	None	NA	NA
RA-06	St. Louis	Unnamed Canal Ditch	Canal Ditch	MN 288.4	None	None	NA	NA
RA-07	St. Louis	Unnamed Canal Ditch	Canal Ditch	MN 288.4	None	None	NA	NA
RA-03AM	Morrison	Unnamed Canal Ditch	Canal Ditch	MN 288.8	None	None	NA	NA
RA-03AM	Morrison	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 288.9	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-08	Carlton	Stoney Brook	Canal Ditch	MN 289.6	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-03AM	Morrison	Unnamed Canal Ditch	Canal Ditch	MN 290.3	None	None	NA	NA
RA-03AM	Morrison	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 290.8	None	None	NA	NA
RA-03AM	Morrison	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 290.9	None	None	NA	NA
RA-06	Itasca	West Branch Floodwood River	Stream/River - Perennial	MN 291.3	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-08	Carlton	Unnamed Canal Ditch	Canal Ditch	MN 291.4	None	None	NA	NA
RA-08	Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 292	None	None	NA	NA
RA-03AM	Morrison	Mischke Creek	Stream/River - Intermittent	MN 292.3	None	None	NA	NA
RA-06	Carlton	Stoney Brook	Canal Ditch	MN 292.3	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-06	Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 292.3	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-07	Carlton	Stoney Brook	Canal Ditch	MN 292.3	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-07	Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 292.3	None	None	NA	NA
RA-06	Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 292.4	None	None	NA	NA
RA-07	Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 292.4	None	None	NA	NA
RA-06	Itasca	Unnamed Canal Ditch	Canal Ditch	MN 292.5	None	None	NA	NA
RA-03AM	Morrison	Unnamed Canal Ditch	Canal Ditch	MN 292.7	None	None	NA	NA
RA-06	Itasca	Unnamed Canal Ditch	Canal Ditch	MN 293.5	None	None	NA	NA
RA-06	Carlton	Unnamed Canal Ditch	Canal Ditch	MN 294.1	None	None	NA	NA
RA-07	Carlton	Unnamed Canal Ditch	Canal Ditch	MN 294.1	None	None	NA	NA
RA-03AM	Morrison	Unnamed Canal Ditch	Canal Ditch	MN 294.5	None	None	NA	NA
RA-06	Aitkin	Unnamed Canal Ditch	Canal Ditch	MN 294.5	None	None	NA	NA
RA-06	Aitkin	Unnamed Canal Ditch	Canal Ditch	MN 294.7	None	None	NA	NA
RA-06	Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 294.7	None	None	NA	NA
RA-07	Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 294.7	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-06	Aitkin	Unnamed Canal Ditch	Canal Ditch	MN 295.1	None	None	NA	NA
RA-08	Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 295.1	None	None	NA	NA
RA-06	Aitkin	Unnamed Canal Ditch	Canal Ditch	MN 295.2	None	None	NA	NA
RA-08	Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 297.2	None	None	NA	NA
RA-03AM	Morrison	Unnamed Canal Ditch	Canal Ditch	MN 298	None	None	NA	NA
RA-08	Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 298.6	None	None	NA	NA
RA-03AM	Morrison	Unnamed Canal Ditch	Canal Ditch	MN 299	None	None	NA	NA
RA-06	Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 300	None	None	NA	NA
RA-07	Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 300	None	None	NA	NA
RA-03AM	Morrison	Unnamed Artificial Path	Artificial Path	MN 300.8	None	None	NA	NA
RA-03AM	Morrison	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 301.2	None	None	NA	NA
RA-06	Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 301.4	None	None	NA	NA
RA-07	Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 301.4	None	None	NA	NA
RA-08	Carlton	Little Otter Creek	Stream/River - Perennial	MN 301.4	1B, 2A, 3B	Trout Stream	NA	NA
RA-08	Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 302.4	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-03AM	Benton	West Branch Rum River	Stream/River - Perennial	MN 303.3	2B, 3C	None	NA	NA
RA-06	Carlton	Little Otter Creek	Stream/River - Perennial	MN 304.2	1B, 2A, 3B	Trout Stream	NA	NA
RA-07	Carlton	Little Otter Creek	Stream/River - Perennial	MN 304.2	1B, 2A, 3B	Trout Stream	NA	NA
RA-03AM	Benton	Unnamed Waterbody	Lake/Pond - Perennial	MN 305.1	None	None	NA	NA
RA-03AM	Benton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 305.5	None	None	NA	NA
RA-03AM	Benton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 306	None	None	NA	NA
RA-03AM	Benton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 306.4	None	None	NA	NA
RA-03AM	Benton	Stony Brook	Stream/River - Perennial	MN 306.8	None	None	NA	NA
RA-06	St. Louis	Unnamed Waterbody	Lake/Pond - Perennial	MN 307	None	None	NA	NA
RA-07	St. Louis	Unnamed Waterbody	Lake/Pond - Perennial	MN 307	None	None	NA	NA
RA-03AM	Mille Lacs	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 307.7	None	None	NA	NA
RA-03AM	Mille Lacs	West Branch Rum River	Stream/River - Perennial	MN 308.3	2B, 3C	None	NA	NA
RA-03AM	Mille Lacs	West Branch Rum River	Stream/River - Perennial	MN 308.5	2B, 3C	None	NA	NA
RA-03AM	Mille Lacs	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 311.6	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-03AM	Mille Lacs	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 312.2	None	None	NA	NA
RA-03AM	Mille Lacs	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 313.4	None	None	NA	NA
RA-03AM	Mille Lacs	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 314.2	None	None	NA	NA
RA-03AM	Mille Lacs	Rum River	Artificial Path	MN 314.3	2B, 3C	USACE Navigable	NA	NA
RA-03AM	Mille Lacs	Unnamed Waterbody	Lake/Pond - Perennial	MN 315.8	None	None	NA	NA
RA-03AM	Mille Lacs	Unnamed Canal Ditch	Canal Ditch	MN 316.7	None	None	NA	NA
RA-03AM	Mille Lacs	Vondell Brook	Canal Ditch	MN 317.3	2C, 3C	None	NA	NA
RA-03AM	Mille Lacs	Unnamed Canal Ditch	Canal Ditch	MN 320	None	None	NA	NA
RA-03AM	Mille Lacs	Bogus Brook	Stream/River - Perennial	MN 321	7	None	NA	NA
RA-03AM	Mille Lacs	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 322	None	None	NA	NA
RA-03AM	Kanabec	South Fork Groundhouse River	Stream/River - Perennial	MN 323.3	2B, 3C	303d-Listed Impaired	NA	NA
RA-03AM	Kanabec	Unnamed Canal Ditch	Canal Ditch	MN 325.3	None	None	NA	NA
RA-06	Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 326.9	None	None	NA	NA
RA-07	Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 326.9	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-03AM	Kanabec	Groundhouse River	Stream/River - Perennial	MN 328.5	2B, 3C	303d-Listed Impaired, USACE Navigable	NA	NA
RA-03AM	Kanabec	Unnamed Canal Ditch	Canal Ditch	MN 329.2	None	None	NA	NA
RA-03AM	Kanabec	Ann River	Artificial Path	MN 332.7	2B, 3C	303d-Listed Impaired, USACE Navigable	NA	NA
RA-06	Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 334.3	None	None	NA	NA
RA-07	Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 334.3	None	None	NA	NA
RA-03AM	Kanabec	Snake River	Artificial Path	MN 334.9	2B, 3C	303d-Listed Impaired, USACE Navigable	NA	NA
RA-03AM	Kanabec	Spring Brook	Artificial Path	MN 335.2	2B, 3C	303d-Listed Impaired	NA	NA
RA-03AM	Kanabec	Spring Brook	Stream/River - Perennial	MN 337	2B, 3C	303d-Listed Impaired	NA	NA
RA-03AM	Kanabec	Spring Brook	Stream/River - Intermittent	MN 338	2B, 3C	303d-Listed Impaired	NA	NA
RA-03AM	Kanabec	Unnamed Canal Ditch	Canal Ditch	MN 341.5	None	None	NA	NA
RA-03AM	Kanabec	Unnamed Canal Ditch	Canal Ditch	MN 342.6	None	None	NA	NA
RA-03AM	Kanabec	Mud Creek	Stream/River - Perennial	MN 343.5	None	303d-Listed Impaired	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-03AM	Pine	Unnamed Canal Ditch	Canal Ditch	MN 346.4	None	None	NA	NA
RA-03AM	Pine	Pokegama Creek	Stream/River - Perennial	MN 348.4	2B, 3C	None	NA	NA
RA-03AM	Pine	Unnamed Canal Ditch	Canal Ditch	MN 348.5	None	None	NA	NA
RA-03AM	Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 349	None	None	NA	NA
RA-03AM	Pine	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 349.6	None	None	NA	NA
RA-03AM	Pine	East Pokegama Creek	Stream/River - Perennial	MN 351.7	2B, 3C	None	NA	NA
RA-03AM	Carlton	Blackhoof River	Stream/River - Perennial	MN 352.1	1B, 2A, 3B	Trout Stream	Dry Crossing	Wet Open Cut
RA-03AM	Carlton	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 352.3	None	Trout Stream	NA	NA
RA-03AM	Pine	Unnamed Stream/River Perennial	Stream/River - Perennial	MN 352.7	None	None	NA	NA
RA-03AM	Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 353.7	2B, 3C (assessed NW of the crossing location	None	NA	NA
RA-03AM	Carlton	Unnamed Connector	Connector	MN 354.4	None	None	NA	NA
RA-03AM	Pine	Mission Creek	Stream/River - Perennial	MN 355.9	1B, 2A, 3B	Trout Stream	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-03AM	Carlton	Unnamed Waterbody	Lake/Pond - Perennial	MN 356.6	None	None	NA	NA
RA-03AM	Pine	Grindstone River	Artificial Path	MN 359.1	2B, 3C	303d-Listed Impaired, USACE Navigable	NA	NA
RA-03AM	Pine	Unnamed Canal Ditch	Canal Ditch	MN 362.6	None	None	NA	NA
RA-03AM	Pine	Friesland Ditch	Canal Ditch	MN 364.9	None	None	NA	NA
RA-03AM	Pine	Skunk Creek	Stream/River - Intermittent	MN 367.9	None	None	NA	NA
RA-03AM	Pine	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 368.7	None	None	NA	NA
RA-03AM	Pine	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 369	None	None	NA	NA
RA-03AM	Pine	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 369.3	None	None	NA	NA
RA-03AM	Pine	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 370.4	None	None	NA	NA
RA-03AM	Pine	Medicine Creek	Canal Ditch	MN 372.1	2B, 3C	None	NA	NA
RA-03AM	Pine	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 373.5	None	None	NA	NA
RA-03AM	Pine	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 373.7	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-03AM	Pine	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 374	None	None	NA	NA
RA-03AM	Pine	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 374.4	None	None	NA	NA
RA-03AM	Pine	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 375.2	None	None	NA	NA
RA-03AM	Pine	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 375.5	None	None	NA	NA
RA-03AM	Pine	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 375.6	None	None	NA	NA
RA-03AM	Pine	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 375.8	None	None	NA	NA
RA-03AM	Pine	Pine River	Artificial Path	MN 377.2	None	None	NA	NA
RA-03AM	Pine	Unnamed Connector	Connector	MN 379.1	None	None	NA	NA
RA-03AM	Pine	Unnamed Connector	Connector	MN 379.3	None	None	NA	NA
RA-03AM	Polk	Unnamed Waterbody	Lake/Pond - Perennial	MN 379.9	None	None	NA	NA
RA-03AM	Polk	Fox Lake	Lake/Pond - Perennial	MN 380	None	None	NA	NA
RA-03AM	Pine	Unnamed Connector	Connector	MN 382.6	None	None	NA	NA

Table G-4. Route Permit - Waterbodies crossed by the Route Alternatives (Clearbrook to Carlton)

Route	County	Waterbody Name	Waterbody type/flow	State Mile Post	State-Designated Use	Agency Classification	Applicant-proposed Crossing Method	Applicant-proposed Alternative Crossing Method
RA-03AM	Pine	Kettle River	Artificial Path	MN 384.6	2B, 3C	303d-Listed Impaired, USACE Navigable	NA	NA
RA-03AM	Pine	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 387.1	None	None	NA	NA
RA-03AM	Pine	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 387.9	None	None	NA	NA
RA-03AM	Carlton	West Fork Moose Horn River	Stream/River - Perennial	MN 397.8	2B, 3C	None	NA	NA
RA-03AM	Carlton	Moose Horn River	Stream/River - Perennial	MN 400.2	2B, 3C	None	NA	NA
RA-03AM	Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 401.3	None	None	NA	NA
RA-03AM	Carlton	Unnamed Stream/River Intermittent	Stream/River - Intermittent	MN 401.8	None	None	NA	NA
RA-03AM	Carlton	Unnamed Connector	Connector	MN 403	None	None	NA	NA

Notes: Waterbody crossings determined using NHD GIS layers.

State-designated Use:

Minnesota (MN): Minnesota Rule 7050.0470 lists the classifications of major waterbodies in the state. If a waterbody is not listed under 7050.0470 and is not a wetland, it is classified as a Class 2B, 3C, 4A, 4B, 5, and 6 water per Minnesota Rule 7050.0430.

- Class 1 – domestic consumption (i.e., drinking water);
- Class 2 – aquatic life and recreation;
- Class 3 – industrial or commercial use;
- Class 4 – agricultural use, irrigation (4A) and livestock and wildlife watering (4B);
- Class 5 – aesthetics and navigation;
- Class 6 – other uses and protection of border waters; and
- Class 7 – limited resource value waters.

- Minnesota Rule 7050.0222 further defines the water quality standards for the following subclasses of Class 2 waters:
- Class 2A – Coldwater fisheries, trout waters, suitable for all aquatic recreation and protected as a source of drinking water;
- Class 2Bd – Cold and warm water fisheries, suitable for all aquatic recreation and protected as a source of drinking water;
- Class 2B – Cold and warm water fisheries, suitable for all aquatic recreation but not protected for drinking water;
- Class 2C – Indigenous fish and associated aquatic community, suitable for boating but not protected for drinking water.

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Appendix H

Locations and Methods of Road and Railroad Crossings

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Road and Railroad Crossings

This table updates the information submitted as Appendix L of the Enbridge Energy, Limited Partnership Application for a Pipeline Routing Permit on April 24, 2015. The Road and Railroad Crossing Table was provided in April 2016 and was published as part of the Environmental Assessment Worksheet.

Line 3 Replacement Project
Road and Railroad Crossing Table

MP	County	Crossing Type	Name	Crossing Method
802	Kittson	Road	160th Avenue	Open-cut
803	Kittson	Road	200th Street	Open-cut
804	Kittson	Road	170th Avenue	Open-cut
805	Kittson	Road	190th Street	Open-cut
806	Kittson	Road	180th Street	Open-cut
806	Kittson	Road	180th Avenue	Open-cut
807	Kittson	Road	CSAH #7	Bore
807	Kittson	Road	CSAH #1	Bore
808	Kittson	Road	200th Avenue	Open-cut
809	Kittson	Road	160th Street	Open-cut
810	Kittson	Road	150th Street	Bore
810	Kittson	Road	210th Avenue	Open-cut
811	Kittson	Road	CSAH #23	Bore
811	Kittson	Road	CSAH #13	Open-cut
813	Kittson	Road	130th Street	Open-cut
813	Kittson	Road	CSAH #13	Open-cut
814	Kittson	Road	240th Ave	Open-cut
814	Kittson	Road	State Highway 11	Bore
816	Kittson	Road	110th Street	Open-cut
816	Kittson	Road	250th Avenue	Open-cut
817	Kittson	Railroad	Burlington Northern Santa Fe Railway	Bore
817	Kittson	Road	100th St/460th St NW	Bore
817	Kittson	Road	US Highway 75	Bore
818	Marshall	Road	450th Street NW	Open-cut
819	Marshall	Road	380th Avenue NW	Open-cut
819	Marshall	Ditch	Jurisdiction Ditch Number 8	Open-cut
820	Marshall	Road	370th Avenue NW	Open-cut
820	Marshall	Road	CSAH #24	Bore
821	Marshall	Road	430th Street NW	Open-cut
822	Marshall	Road	420th Street NW	Open-cut
822	Marshall	Road	CSAH #23	Bore
823	Marshall	Road	415th Street NW	Open-cut
824	Marshall	Road	350th Avenue NW	Bore
824	Marshall	Road	410th Street NW	Bore
824	Marshall	Ditch	County Ditch #45-BR3	Bore
825	Marshall	Road	340th Avenue NW	Open-cut
825	Marshall	Road	CSAH #5	Bore
826	Marshall	Road	CSAH #6	Bore
826	Pennington	Ditch	Jurisdiction Ditch Number 16	Open-cut
827	Marshall	Road	330th Avenue NW	Open-cut
828	Marshall	Road	380th Street NW	Open-cut
829	Marshall	Road	CSAH #34	Bore
830	Marshall	Road	CSAH #30	Open-cut
831	Marshall	Road	300th Avenue NW	Open-cut
831	Marshall	Ditch	Name Not Confirmed	Open-cut
832	Marshall	Road	290th Avenue NW	Open-cut

Line 3 Replacement Project
Road and Railroad Crossing Table

MP	County	Crossing Type	Name	Crossing Method
832	Marshall	Road	350th Street NW	Open-cut
833	Marshall	Road	County Road 110	Open-cut
833	Marshall	Ditch		Open-cut
834	Marshall	Road	280th Avenue NW	Open-cut
835	Marshall	Road	CSAH #1	Bore
835	Marshall	Road	330th Street NW	Open-cut
836	Marshall	Road	County Road 111	Open-cut
836	Marshall	Road	CSAH #4	HDD
838	Marshall	Road	CSAH #3	Bore
838	Marshall	Road	250th Avenue NW	Open-cut
839	Marshall	Road	240th Avenue NW	Open-cut
839	Marshall	Road	County Road 37	Open-cut
840	Marshall	Road	290th Street NW	Open-cut
841	Marshall	Road	230th Avenue NW	Open-cut
842	Marshall	Road	220th Avenue NW	Open-cut
842	Marshall	Road	280th Street NW	Open-cut
843	Marshall	Road	CSAH #14	Bore
844	Marshall	Road	210th Avenue NW	Open-cut
845	Marshall	Road	200th Avenue NW	Bore
846	Marshall	Railroad	Northern Plains	Bore
846	Marshall	Road	CSAH #38	Bore
846	Marshall	Road	250th Street NW	Bore
847	Marshall	Road	240th Street NW	Open-cut
848	Marshall	Road	180th Avenue NW	Bore
848	Marshall	Road	CSAH #2	Bore
849	Marshall	Road	225th Street NW	Open-cut
850	Marshall	Road	160th Avenue NW	Open-cut
850	Marshall	Road	220th Street NW	Bore
850	Marshall	Road	County Road 107	Bore
851	Marshall	Road	160th Avenue NW	Bore
851	Marshall	Road	215th Street NW	Bore
851	Marshall	Road	165th Avenue NW	Open-cut
852	Pennington	Road	200th Street NW	Open-cut
853	Pennington	Road	147th Avenue NW	Open-cut
853	Pennington	Road	150th Avenue NW	Open-cut
855	Pennington	Road	County Highway 63/180th St NW	Bore
855	Pennington	Ditch	Jurisdiction Ditch Number 25-BR-3	Bore
856	Pennington	Road	130th Avenue NW	Open-cut
857	Pennington	Road	County Highway 71	Open-cut
857	Pennington	Road	State Highway 1	Bore
858	Pennington	Road	160th Street NW	Open-cut
858	Pennington	Ditch	County Ditch #96-BR-4	Open-cut
859	Pennington	Road	County Highway 61	Open-cut
859	Pennington	Road	CSAH #15	Bore
860	Pennington	Road	County Highway 72	Open-cut
861	Pennington	Road	CSAH #7	Bore

Line 3 Replacement Project
Road and Railroad Crossing Table

MP	County	Crossing Type	Name	Crossing Method
862	Pennington	Road	County Highway 59	Open-cut
862	Pennington	Road	County Highway 73	Bore
863	Pennington	Road	120th Street NE	Open-cut
863	Pennington	Road	County Highway 74	Open-cut
864	Pennington	Railroad	Minnesota Northern Railroad	Bore
864	Pennington	Road	State Highway 32	Bore
865	Pennington	Road	County Highway 75	Open-cut
866	Pennington	Road	CSAH #17	Bore
866	Pennington	Road	CSAH #3	Bore
867	Pennington	Road	County Highway 55	Open-cut
868	Pennington	Road	150th Avenue SE	Bore
869	Pennington	Road	160th Avenue SE	Open-cut
870	Pennington	Road	County Highway 79	Open-cut
870	Pennington	Road	CSAH #2	Open-cut
871	Pennington	Road	County Highway 52	Open-cut
871	Pennington	Road	175th Avenue SE	Open-cut
873	Red Lake	Road	CSAH #26	Open-cut
874	Red Lake	Road	160th Street SE	Open-cut
874	Red Lake	Road	190th Avenue SE	Open-cut
875	Red Lake	Road	Township #107	Open-cut
876	Red Lake	Railroad	Canadian Pacific Railway	HDD
876	Red Lake	Road	U.S Highway 59	HDD
876	Red Lake	Road	County Road 126	HDD
877	Red Lake	Road	CSAH #1	Bore
877	Red Lake	Ditch	County Ditch #22	Bore
878	Red Lake	Road	190th Street SE	Open-cut
879	Red Lake	Road	230th Avenue SE	Open-cut
880	Red Lake	Road	County Road 129	Open-cut
880	Red Lake	Ditch	BR-6	Open-cut
881	Red Lake	Road	250th Avenue SE	Open-cut
881	Red Lake	Ditch	County Ditch #67	Open-cut
883	Red Lake	Road	CSAH #21	Open-cut
884	Red Lake	Road	270th Avenue SE	Open-cut
885	Red Lake	Road	220th Street SE	Open-cut
885	Red Lake	Road	280th Avenue SE	Open-cut
886	Red Lake	Road	CSAH #5	Bore
887	Polk	Road	CSAH #33	Open-cut
888	Polk	Road	310th Avenue SE	Open-cut
890	Polk	Road	240th Street SE	Open-cut
891	Polk	Road	340th Avenue SE	Open-cut
892	Polk	Road	CSAH #6	Bore
893	Polk	Road	360th Ave SE	Open-cut
894	Polk	Road	Stine Road	Bore
894	Polk	Ditch	State Ditch 61 B.1.L.1	Open-cut
895	Polk	Road	CSAH #28	Open-cut
895	Polk	Ditch	State Ditch 61 B.1.L.1	Open-cut

Line 3 Replacement Project
Road and Railroad Crossing Table

MP	County	Crossing Type	Name	Crossing Method
896	Polk	Railroad	Canadian Pacific Railway	Bore
896	Polk	Road	State Highway 92	Bore
896	Polk	Road	380th Avenue SE	Bore
898	Polk	Road	CSAH #2	Bore
899	Polk	Road	410th Avenue SE	Open-cut
900	Polk	Road	420th Avenue SE	Bore
901	Clearwater	Road	101st St SE (Pine Lake T-131)	Bore
902	Clearwater	Road	113th Avenue	Open-cut
903	Clearwater	Road	CSAH #8	Bore
904	Clearwater	Road	CSAH #7	Bore
905	Clearwater	Road	County Road 73	Bore
905	Clearwater	Road	490th Street	Open-cut
907	Clearwater	Road	159th Avenue	Open-cut
908	Clearwater	Road	State Highway 92	Bore
912	Clearwater	Road	CR-3	Bore
913	Clearwater	Road	450TH ST	Open-cut
914	Clearwater	Road	181ST Avenue	Open-cut
914	Clearwater	Road	446TH ST	Open-cut
914	Clearwater	Road	MN Highway 223/Leonard Road	Bore
916	Clearwater	Road	418TH ST	Open-cut
918	Clearwater	Road	CR-1	Bore
920	Clearwater	Road	380th ST	Bore
920	Clearwater	Road	Fairground Road/CR-24	Bore
922	Clearwater	Road	US Highway 2	HDD
922	Clearwater	Railroad	Burlington Northern Santa Fe Railway	HDD
922	Clearwater	Road	Airport Drive	HDD
924	Clearwater	Road	CR-19	Bore
925	Clearwater	Road	340TH ST/CR-26	Bore
927	Clearwater	Road	CR-30/221ST Avenue	Bore
927	Clearwater	Road	320TH ST/CR-13	Bore
930	Clearwater	Road	300TH ST/Township Road 150	Open-cut
933	Clearwater	Road	CR-84/Pioneer Road	Bore
933	Clearwater	Road	270TH ST	Open-cut
934	Clearwater	Road	CR-36/Upper Rice Lake	Bore
935	Clearwater	Road	Mallard Grade Trail	Open-cut
936	Clearwater	Road	250TH ST	Open-cut
936	Clearwater	Road	CR-2	Bore
937	Clearwater	Road	240TH ST	Open-cut
938	Clearwater	Road	230TH ST/CR-40	HDD
939	Clearwater	Road	Clearline Road/220TH ST	Open-cut
941	Clearwater	Road	200TH ST	Open-cut
942	Clearwater	Road	190TH ST	Open-cut
946	Hubbard	Road	400TH ST	Open-cut
947	Hubbard	Road	390TH ST	Open-cut
948	Hubbard	Road	CR-95	Open-cut
950	Hubbard	Road	US Highway 71	Bore

Line 3 Replacement Project
Road and Railroad Crossing Table

MP	County	Crossing Type	Name	Crossing Method
950	Hubbard	Road	Norway Drive	Open-cut
954	Hubbard	Road	320th St/Wabisish Lake Road	Open-cut
955	Hubbard	Road	CR-89	Open-cut
956	Hubbard	Road	300TH ST	Open-cut
957	Hubbard	Road	Jade Rose Drive	Open-cut
959	Hubbard	Road	Inland Drive	Open-cut
959	Hubbard	Road	US Highway 71	Bore
960	Hubbard	Road	260TH ST	Open-cut
963	Hubbard	Road	CR-32	Open-cut
965	Hubbard	Road	CR-48	Bore
966	Hubbard	Road	200TH ST/Township Road 8	Open-cut
967	Hubbard	Road	190TH ST	Bore
967	Hubbard	Road	109TH Avenue	Bore
968	Hubbard	Road	MN Highway 34	Bore
969	Hubbard	Road	170TH ST	Open-cut
970	Hubbard	Road	160TH ST	Open-cut
971	Hubbard	Road	150TH ST	Open-cut
972	Hubbard	Road	CR-14	Bore
974	Hubbard	Road	109TH Avenue/CR-111	HDD
975	Hubbard	Road	114TH ST/Township Road 15	Open-cut
976	Hubbard	Road	110TH ST/CR-111	Open-cut
977	Hubbard	Road	109TH Avenue- Section Line	Open-cut
978	Hubbard	Road	119TH Avenue	Open-cut
979	Hubbard	Road	129TH Avenue	Open-cut
979	Hubbard	Road	US Highway 71	Bore
982	Hubbard	Road	159TH Avenue/Township Road 24	Bore
983	Hubbard	Road	CR-6	Bore
984	Hubbard	Road	179TH Avenue/CR-108	Open-cut
986	Hubbard	Road	CR-11	Bore
989	Wadena	Road	CR-25	Bore
992	Wadena	Road	CR-153	Open-cut
995	Cass	Road	96th Ave. SW	Open-cut
995	Cass	Road	94th Ave SW	Open-cut
995	Cass	Road	92nd Ave SW	Open-cut
997	Cass	Road	Mckinley Road # 2	Open-cut
997	Cass	Ditch	JD-2 Main	Open-cut
998	Cass	Ditch	JD-2 Lateral #1	Open-cut
999	Cass	Road	MN Highway 64	Bore
1000	Cass	Road	76TH Avenue SW	Open-cut
1001	Cass	Road	CR 112/72ND Avenue SW	Open-cut
1002	Cass	Road	68TH Avenue SW	Open-cut
1003	Cass	Trail	Bull Moose Trail	Bore
1007	Cass	Road	CR 27/48TH Avenue SW	Bore
1008	Cass	Road	44TH Avenue SW	Open-cut
1009	Cass	Trail	Paul Bunyan State Trail	Bore
1009	Cass	Road	MN Highway 371	Bore

Line 3 Replacement Project
Road and Railroad Crossing Table

MP	County	Crossing Type	Name	Crossing Method
1011	Cass	Road	32ND Avenue SW/Mildread Chapel Road	Open-cut
1012	Cass	Road	CR 42/28TH Avenue SW	Open-cut
1013	Cass	Road	24TH Avenue SW	Open-cut
1015	Cass	Road	MN Highway 84	Bore
1016	Cass	Road	CR 43/12TH Avenue SW	Bore
1016	Crow Wing	Road	CR 56	Bore
1017	Crow Wing	Road	Bulldozed Road	Open-cut
1022	Cass	Road	4TH ST NE	Open-cut
1027	Cass	Road	County Forest Road	Open-cut
1027	Cass	Road	CR 160/12TH ST NE	Open-cut
1029	Cass	Road	CR 160/12TH ST NE	Open-cut
1030	Cass	Road	CR 160/12TH ST NE	Open-cut
1032	Cass	Road	CR-55 NE	Open-cut
1033	Cass	Road	Lake Washburn Road NE/CR 48	Open-cut
1034	Cass	Road	CR 155 NE	Bore
1037	Cass	Road	Lake Washburn Road NE/CR 48	Bore
1038	Cass	Road	MN 6	Bore
1045	Cass	Road	Pikus Forest Road NE	Open-cut
1049	Aitkin	Road	CR-19	Open-cut
1052	Aitkin	Road	Osprey Avenue - CR 29	Open-cut
1056	Aitkin	Ditch	CD-30	Open-cut
1058	Aitkin	Road	CR-68	Open-cut
1059	Aitkin	Road	525TH Lane / UT-437	Open-cut
1060	Aitkin	Road	US Highway 169	Bore
1061	Aitkin	Road	510TH Lane	Open-cut
1062	Aitkin	Road	500TH Lane	Open-cut
1064	Aitkin	Road	480th St / CR-3	Bore
1066	Aitkin	Road	340TH Place	HDD
1067	Aitkin	Road	330TH Avenue	Open-cut
1069	Aitkin	Road	CR-10/Great River Road	HDD
1070	Aitkin	Road	CR-5	Bore
1071	Aitkin	Trail	Soo Line Recreational Trail	Open-cut
1071	Aitkin	Ditch	State Ditch-66	Open-cut
1072	Aitkin	Ditch	CD-38	Open-cut
1073	Aitkin	Ditch	Fire Relief Commission Ditch	Open-cut
1073	Aitkin	Road	270th Place	Open-cut
1073	Aitkin	Ditch	Fire Relief Commission Ditch	Open-cut
1074	Aitkin	Ditch	CD-4	Bore
1074	Aitkin	Road	Township Road 552	Open-cut
1074	Aitkin	Ditch	CD-4	Open-cut
1075	Aitkin	Ditch	CD-4	Open-cut
1075	Aitkin	Road	Township Road 550	Open-cut
1077	Aitkin	Road	240th Ave / CR-62	Open-cut
1077	Aitkin	Ditch	CD-4	Open-cut
1078	Aitkin	Road	240th Ave / CR-62	Open-cut
1080	Aitkin	Road	230th Ave / CR-62	Open-cut

Line 3 Replacement Project
Road and Railroad Crossing Table

MP	County	Crossing Type	Name	Crossing Method
1080	Aitkin	Road	440th Street	Open-cut
1082	Aitkin	Road	MN Highway 65	Bore
1082	Aitkin	Road	430th LANE	Open-cut
1083	Aitkin	Ditch	CD-42	Open-cut
1084	Aitkin	Road	Simpson Road/CR 73	Open-cut
1084	Aitkin	Ditch	CD-42	Open-cut
1086	Aitkin	Ditch	CD-42	HDD
1086	Aitkin	Railroad	Burlington Northern Santa Fe Railway	HDD
1086	Aitkin	Road	185TH Place	HDD
1086	Aitkin	Road	MN Highway 210	Bore
1087	Aitkin	Ditch	CD-29/42	Bore
1092	Aitkin	Ditch	CD-29	Open-cut
1092	Aitkin	Road	CR-16	Bore
1094	Aitkin	Road	395TH LANE	Open-cut
1102	Carlton	Road	CR 22	Bore
1107	Carlton	Road	Highway 73	Bore
1108	Carlton	Road	CR 129	Open-cut
1111	Carlton	Road	Heikkila Road	Open-cut
1112	Carlton	Road	CR-135	Bore
1115	Carlton	Road	CR-157	Open-cut
1116	Carlton	Road	Aho Road	Open-cut
1119	Carlton	Road	Strandberg Road	Open-cut
1120	Carlton	Road	CR-4	Bore
1121	Carlton	Road	CR-144 / Brandt Rd	Bore
1121	Carlton	Road	CR-61	Bore
1121	Carlton	Trail	Willard Munger State Trail	Bore
1124	Carlton	Road	Interstate 35	Bore
1126	Carlton	Road	CR-5	Bore
1127	Carlton	Road	Nendick Road	Open-cut
1128	Carlton	Road	Gillogly Road	Bore
1130	Carlton	Road	West Chub Lake Road	Bore
1131	Carlton	Road	East Chub Lake Road	Bore
1132	Carlton	Road	CR-3	Bore
1133	Carlton	Road	Alcohol Road/CR-101	Bore
1134	Carlton	Road	Thell Road/ UT-356	Bore
1135	Carlton	Road	CR-1	Bore
1135	Carlton	Road	Matten Road	Open-cut
1136	Carlton	Road	MAERE RD/T-373	Bore
1136	Carlton	Road	Cemetery Road/ T-94	Bore
1137	Carlton	Road	Cemetery Road / T-94	Bore
1137	Carlton	Road	MN 23	Bore

Appendix I

Sample Route Permit

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STATE OF MINNESOTA PUBLIC UTILITIES COMMISSION

PIPELINE ROUTING PERMIT
FOR CONSTRUCTION OF A LARGE CRUDE OIL PIPELINE
AND ASSOCIATED FACILITIES

IN

[*COUNTIES*]

ISSUED TO

ENBRIDGE ENERGY, LIMITED PARTNERSHIP

PUC DOCKET NO. PL-9/PPL-15-137

In accordance with the requirements of Minnesota Statutes Chapter 216G and Minnesota Rules Chapter 7852 this route permit is hereby issued to:

ENBRIDGE ENERGY LIMITED PARTNERSHIP

Enbridge Limited Partnership is authorized by this route permit to construct approximately 340 miles of 36-inch diameter pipeline and associated facilities.

The pipeline and associated facilities shall be built within the route identified in this permit and as portrayed on the aerial photos attached to this permit and in compliance with the conditions specified in this permit.

Approved and adopted this _____ day of [*Month, Year*]

By Order of the Commission

_____

Daniel P. Wolf,
Executive Secretary

This document can be made available in alternative formats (i.e., large print or audio) by calling 651-296-0406 (voice). Persons with hearing or speech disabilities may call us through their preferred Telecommunications Relay Service.

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1.0 ROUTE PERMIT

The Minnesota Public Utilities Commission (Commission) hereby issues this pipeline routing permit to Enbridge Energy, Limited Partnership (herein after Permittee) pursuant to Minnesota Statutes Chapter 216G and Minnesota Rules Chapter 7852. This pipeline routing permit authorizes the Permittee to construct the Line 3 Project (Project), which includes construction of XXX miles of 36-inch pipeline and associated facilities between the North Dakota/Minnesota border and the Minnesota/Wisconsin border. The Project crosses portion of [*Counties*] as identified in the attached route permit maps, hereby incorporated into this document.

1.1 Pre-emption

Pursuant to Minn. Stat. § 216G.02, Subd. 4, this permit shall be the sole route approval required to be obtained by the Permittee for construction of the pipeline and associated facilities and this permit shall supersede and preempt all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government.

1.2 Definitions

"Construction," as defined in Minn. R. 7852.0100 Subp. 11 "means any clearing of land, excavation, or other action for the purpose of constructing new pipeline that would adversely affect the natural environment of a pipeline route. Construction does not include changes needed for use of a route for purposes of maintenance, or replacement of an existing pipeline and associated facilities within existing rights-of-way, or for the minor relocation of less than three-quarters of a mile of an existing pipeline or for securing survey or geological data, including necessary borings to ascertain soil conditions."

"Associated facilities," as defined in Minn. R. 7852.0100 Subp. 7" means all parts of those physical facilities through which hazardous liquids or gas moves in transportation, including but not limited to pipe, valves, and other appurtenances connected or attached to pipe, plumbing and compressor units, fabricated assemblies associated with pumping and compressor units, metering and delivery stations, regulations stations, holders, breakout tanks, fabricated assemblies, cathodic protection equipment, telemetering equipment, and communication instrumentation located on the right-of-way."

2.0 PROJECT DESCRIPTION

Overall, the Project consists of approximately XXX miles of new 36-inch pipeline through North Dakota, Minnesota, and Wisconsin. It terminates at the existing Enbridge Superior station and terminal facility near Superior, Wisconsin. The Minnesota portion of the Project consists of approximately XXX miles of new 36-inch diameter, underground crude oil pipeline. The Project follows the existing Line 3 pipeline along the Enbridge Mainline System right-of-way from the North Dakota border in Kittson County to the Clearbrook Terminal in Clearwater County. Next, [*continue general description of Project location as authorized by the Commission.*]

2.1 Associated Facilities

This Route Permit authorizes the following Associated Facilities:

Clearbrook Terminal Expansion

The Permittee will modify equipment within the existing Clearbook Terminal as well construct a new pump station located near MP 909.4 in Clearwater County, Minnesota. Improvements authorized at the existing Enbridge Clearbrook Terminal include:

- A new pump station, including four 7,000 horsepower (hp) motor and pump units, two 7,000 hp variable frequency drives, valves, sump and crude oil reinjection pump, metering, instrumentation and monitoring equipment, and associated electrical facilities including a substation with redundant utility transformers and breakers.
- A 36-inch in-line inspection tool (ILI) launcher, pump station to terminal interconnections and associated terminal piping.
- A 36-inch ILI tool receiver, valves, pressure relief system, metering, instrumentation and monitoring equipment, terminal piping, manifold interconnections, and associated electrical facilities.
- A 16-inch meter manifold run to be added to the existing meter manifold with associated valves, interconnections, piping, instrumentation, electrical facilities, and sample system.

Pump Stations

The Permittee will construct three new pump stations adjacent to existing pump stations west of Clearbrook, and a new pump station adjacent of the Clearbrook Terminal. An additional [*number*] pump stations will be constructed east of Clearbrook. Mainline valves, metering, monitoring equipment, and associated electrical facilities would also be installed at the facilities east of Clearbrook. A new ILI tool launcher and receiver traps will be constructed at the [*pump station name*] east of Clearbrook.

Project Pump Stations			
County	Facility	MP	Description
West of Clearbrook			
Kittson	Donaldson	814.5	3 new 7,000 hp motors adjacent to existing Donaldson pump stations
Marshall	Viking	848.2	3 new 7,000 hp motors adjacent to existing Viking pump stations
Red Lake	Plummer	877.0	3 new 7,000 hp motors adjacent to existing Plummer pump stations
Clearwater	Clearbrook Terminal	909.2, 909.4	Described above
East of Clearbrook			

Mainline Valves

The Permittee will install valves along the pipeline to protect populated areas, major waterbody crossings, drinking water sources, and environmentally sensitive areas. At each valve location the Permittee will install the following equipment:

- A slide gate valve that would be remotely controlled from the Enbridge Control Center (Control Center) and that can be controlled manually as well;
- Digital pressure and temperature monitoring devices that would provide real-time pressure and temperature information to the Control Center; and
- Associated electrical and communications equipment required to control the valve and communicate pressure and temperature information to the Control Center.

The Permittee will install will install remotely-controlled shutoff valves at the following locations in Minnesota:

[*Insert table of valve locations by county and milepost*.]

Cathodic Protection

The Permittee will install cathodic protection systems along buried portions of the pipeline to mitigate the threat of external corrosion on the pipeline. The approximate locations of cathodic protection systems are provided in the table below:

[*Insert table of cathodic protection system locations by county and milepost*.]

Pipeline/Material Storage Yards

The Permittee will lease temporary off-right-of-way areas for pipe and material storage and to receive rail deliveries (rail sidings). The Permittee will restore these storage yards upon the completion of the Project.

[*Insert table of storage yards by facility type, current use, and location*.]

Access Roads

The Permittee will typically use public roads to gain access to the construction workspace where public roads cross the right-of-way. In areas where public roads are limited, existing privately-owned roads may be used with landowner consent. If public or privately-owned roads are not available, the Permittee will construct new access roads. Prior to use of private access roads, modifications to existing non-private roads, and construction of new access roads, the Permittee must obtain landowner permission, conduct environmental surveys, and obtain applicable environmental permits and clearances. The Permittee must construct permanent access roads to each mainline valve.

[*Insert table of access roads, including location and length*.]

2.2 Project Location

[*Describe the location of the project including appropriate details, such as county, township, range, and section. Also include a reference to the relevant route map to be attached to the permit.*]

3.0 DESIGNATED ROUTE

The route designated by the Commission in this permit is the route described below and as shown on the route maps attached to this permit. The route is generally described as follows:

[*Provide a detailed description of the authorized route including the route widths and any other specifics relevant to each segment. Also include a reference to the relevant route map to be attached to the permit.*]

The designated route width is limited to a maximum of 750 feet unless otherwise indicated on the route maps attached to this permit. The final alignment must be located within this designated route.

The identified route widths on the attached route maps provide the Permittee with flexibility for minor adjustments of the anticipated alignment or right-of-way to accommodate landowner requests and unforeseen conditions. The final alignment (i.e., permanent and maintained rights-of-way and temporary workspace) will be located within this designated route unless otherwise authorized by this permit or the Commission.

3.1 Permanent Right-of-Way

This Permit authorizes the Permittee to obtain a new permanent right-of-way for the pipeline up to 50 feet in width. The permanent right-of-way is typically 25 feet on both sides of the pipeline, measured from its centerline.

[*Describe permanent right-of-way associated with associated facilities, i.e., pump stations*.]

3.2 Temporary Right-of-Way/Workspace

The Permittee is authorized by this permit to acquire a 120-foot-wide construction workspace in uplands and a 95-foot-wide construction workspace in wetland areas.

The Permittee shall limit temporary right-of-way to special construction access needs required outside of the authorized permanent rights-of-way. Temporary right-of-way shall be selected to limit the removal and impacts to vegetation.

3.3 Extra Temporary Right-of-Way/Workspace

The Permittee may obtain additional temporary workspace outside of the typical construction workspace to facilitate specific aspects of construction. Additional temporary workspace may include areas to stage equipment and hold spoil material and areas in which construction methods require additional workspace. The table below provides typical dimensions for temporary extra workspace used for construction.

Typical Dimensions of Additional Temporary Workspace	
Feature	Dimensions on each side of feature in addition to temporary workspace in feet
Open-cut road crossings	100 x 75
Bored Road, Foreign Pipeline, and Utility Crossings	100 x 75
Railroad Crossings	200 x 75
Pipeline Cross-Unders	100 x 75
Waterbody Crossings, including HDD	200 x 75
Wetland Crossings	200 x 75

3.4 Right-of-Way Conformance

This permit identifies an anticipated alignment within the designated route that minimizes potential impacts to the criteria identified in Minn. R. 7852.1900, and, as such, this permit anticipates that the actual right-of-way will generally conform to this anticipated alignment, except as otherwise provided by this permit.

Any alignment modification within this designated route shall be located to have the same or less impacts relative to the criteria in Minn. R. 7852.1900 as the alignment identified in this permit.

3.5 Route Width Variations

Route width variations may be allowed for the Permittee to overcome potential site specific constraints. These constraints may arise from any of the following:

1. Unforeseen circumstances encountered during the detailed engineering and design process.

2. Federal or state agency requirements.

3. Existing infrastructure within the pipeline route, including but not limited to railroads, natural gas and liquid pipelines, high voltage electric transmission lines, or sewer and water lines.

Any alignment modifications arising from these site specific constraints that would result in right-of-way placement outside of this designated route shall be located to have the same or less impacts relative to the criteria in Minn. R. 7852.1900 as the alignment identified in this permit and be specifically identified in and approved as part of the Plan and Profile submitted pursuant to this permit.

3.6 State and Federal Minimum Depth of Cover Requirements

Minn. Stat. § 216G.07, Subd. 1, requires the pipeline trench to be excavated to a depth that sufficiently allows for at least 54 inches (4.5 feet) of backfill from ground surface to the top of pipeline in all areas where the pipeline crosses the right-of-way of any public drainage facility or any county, town, or municipal street or highway and where the pipeline crosses agricultural land. Where the pipeline crosses the right-of-way of any drainage ditch the pipeline shall be

installed with a minimum level cover of not less than 54 inches (4.5 feet) below the authorized depth of the ditch, unless waived in the manner provided in Minn. Stat. § 216G.07, Subd. 2 and 3. In agricultural land, the Permittee may seek a depth requirement waiver from the affected landowners to install the pipeline at the same depth required by 49 CFR 195.248. Even if waivers are procured pursuant to Minn. Stat. § 216G.07, Subd. 2, the Permittee must bury the pipeline to a depth below cultivation and in accordance with U.S. Department of Transportation regulations (49 CFR 195.248).

4.0 ADMINISTRATIVE COMPLIANCE

The following administrative compliance procedures require submissions to the Commission. Submissions must be made by electronic filing (eFiling).

4.1 Permit Distribution to Local Governments and Residents

The Permittee shall, within 10 days of receipt of the pipeline routing permit from the Commission, send a copy of the permit to the office of each regional development commission of a development region, soil and water conservation district, watershed district, watershed management district, office of the county auditor, and the clerk of each city and township crossed by the designated route.

Within 30 days of permit issuance, the Permittee shall send a printed copy of the permit and the complaint procedures to all affected landowners. In no case shall the affected landowner receive this route permit and complaint procedures less than five days prior to the start of construction on their property. An affected landowner is any landowner or designee that is within or adjacent to the designated pipeline route authorized by this permit.

The Permittee shall provide all affected landowners with information concerning, at a minimum, the initial survey, right-of-way acquisition, right-of-way preparation, construction, and restoration.

As provided by applicable laws and regulations the Permittee shall provide educational materials about the project and any restrictions or dangers associated with the project to affected landowners within the route whose land is crossed by the pipeline and, upon request, to any interested persons.

4.2 Notification

The Permittee shall notify landowners or their designee at least 14 days in advance but not greater than 60 days in advance of entering the property.

4.3 Field Representative

At least 14 days prior to the start of construction and continuously throughout construction and completion of restoration of the areas affected by construction, the Permittee shall designate a field representative responsible for overseeing compliance with the conditions of this Permit

during construction of the project. This person (or a designee) shall be accessible by telephone or other means during normal business hours throughout site preparation, construction, cleanup, and restoration.

The Permittee shall file with the Commission the name, address, email, phone number, and emergency phone number of the field representative 14 days prior to commencing construction. The Permittee shall provide the field representative's contact information to affected landowners, residents, local government units and other interested persons 14 days prior to commencing construction. The Permittee may change the field representative at any time upon notice to the Commission by eFiling as well as posting to a project website maintained by the Permittee and by providing a telephone number to affected landowners, residents, local government units and other interested persons that provides current contact information for the field representative.

4.4 Agricultural Monitor and County Inspector Notification Requirements

The Permittee shall at least 14 days prior to the start of construction provide notice to all landowners affected by construction with the name, telephone number and email address of the Agricultural Monitor and County inspector designated by the County, if appointed.

4.5 Employee Training and Education of permit Terms and Conditions

Prior to any construction, the Permittee shall file an affirmative statement with the Commission, certified by a senior company official, that all Permittee personnel, environmental inspectors, and contractor personnel will be informed of the environmental inspector's authority and have been or will be trained on the implementation of environmental mitigation measures in this permit that are appropriate to their jobs before becoming involved with construction and restoration activities associated with the project.

5.0 GENERAL CONDITIONS

The Permittee shall comply with the following conditions during pipeline right-of-way preparation, construction, cleanup, and restoration over the life of this permit.

5.1 Environmental Protection Plan

The Permittee must develop and file with the Commission an Environmental Protection Plan (EPP). The EPP shall include all environmental control plans and special conditions imposed by permits or licenses issued by federal, state, and local agencies or units of government, and a list of permits required for the construction of the Project. Plans within the EPP shall include an Agricultural Mitigation Plan (AMP), a Vegetation Management Plan (VMP), and a Stormwater Pollution Prevention Plan (SWPPP). The EPP shall be filed with the Commission with the first Plan and Profile Submission. The EPP shall include the following:

1. Identification of and contact information for an Environmental Monitor to oversee the construction process and monitor compliance with the EPP and all plans therein.

2. A process for reporting construction status to the Commission.

3. A process for internal tracking of construction management, including required plan or permit inspection forms.

4. Appropriate mitigation [*as discussed in applicable environmental documents*].

5.2 Agricultural Mitigation Plan

The Permittee shall comply with the Agricultural Mitigation Plan (AMP) attached to this permit and incorporated herein. The obligation to comply with the AMP as a condition of this permit shall expire with the termination of Commission jurisdiction over this permit as prescribed by Minn. R. 7852.3900, unless otherwise specified in the AMP. The Minnesota Department of Agriculture must approve of any amendments to the AMP. The Permittee shall file an amended AMP with the Commission within 10 days of Minnesota Department of Agriculture approval.

5.3 Construction Practices

The Permittee shall follow those specific construction practices and material specifications described in the Permittee's Application to the Commission for a route permit for the Line 3 Project Application, as supplemented by the January 31, 2017, EAW, and the Environmental Impact Statement in this proceeding and the record of the proceedings unless this permit establishes a different requirement in which case this permit shall prevail. The Permittee shall comply with the conditions for right-of-way preparation, construction, cleanup, and restoration contained in Minn. R. 7852.3600.

5.3.1 Public Services, Public Utilities, and Existing Easements

During construction, the Permittee shall minimize any disruption to public services or public utilities. To the extent disruptions to public services or public utilities occur these would be temporary and the Permittee will restore service promptly. Where any impacts to utilities have the potential to occur the Permittee will work with both landowners and local agencies to determine the most appropriate mitigation measures if not already considered as part of this permit.

5.3.2 Access to Property for Construction

The Permittee shall obtain all necessary permits authorizing access to public rights-of-way prior to any construction. The Permittee shall obtain approval of the landowners for access to private property prior to any construction. The Permittee shall consult with property owners to identify and address any special problems the landowners may have that are associated with the pipeline prior to any construction.

The Permittee shall work with landowners to provide access to their property, to locate the pipeline on their property to minimize the loss of agricultural land, forest, and wetlands, with due regard for proximity to homes and water supplies, even if the deviations will increase the cost of

the pipeline, so long as the landowner's requested relocation does not adversely affect environmentally sensitive areas.

The Permittee shall negotiate agreements with landowners that will give the landowners access to their property; minimize the impact on planned future development of the property; and to assume any additional costs for such development that may be the result of installing roads, driveways and utilities that must cross the right-of-way. The Permittee shall not unreasonably deny a landowner's request to cross the easement to access the landowner's property.

5.3.3 Noise

The Permittee shall comply with noise standards established under Minn. R. 7030.0010 to 7030.0080. Construction and maintenance activities shall be limited to daytime working hours to the extent practicable to ensure noise level standards will not be exceeded.

5.3.4 Site Sediment and Erosion Control

The Permittee shall develop a Soil Erosion and Sediment Control Plan prior to construction and submit the Plan to the Commission at least 14 days prior to the start of construction. This Plan may be the same as the SWPP submitted to the MPCA as part of the National Pollutant Discharge Elimination System (NPDES) permit application provided it identifies the information in the following paragraph.

The EPP shall address what types of erosion control measures will be implemented during each Project phase and shall at a minimum identify: plans for grading, construction, and restoration of the areas affected by construction activities; necessary soil information; detailed design features to maintain downstream water quality; a comprehensive revegetation plan to maintain and ensure adequate erosion control and slope stability and to restore the site after temporary activities; and measures to minimize the area of surface disturbance. Other practices shall include containing excavated material, protecting exposed soil, and stabilizing restored material and removal of silt fences or barriers when the area is stabilized. The plan shall identify methods for disposal or storage of excavated material. Erosion and sedimentation control measures shall be implemented prior to construction and maintained until restoration activities are completed for each phase of the Project.

5.3.5 Topsoil Protection

The Permittee shall take precautions to minimize mixing of topsoil and subsoil during excavation of the trench for the pipe unless otherwise negotiated with the affected landowner.

5.3.6 Soil Compaction

Compaction of agricultural lands by the Permittee must be kept to a minimum and mitigated in accordance with its AMP.

5.3.7 Landscape Protection

Care shall be used to preserve the natural landscape, minimize tree removal and prevent any unnecessary destruction of the natural surroundings in the vicinity of all pipeline construction and restoration activities.

5.3.8 Sensitive Areas

The Permittee shall stabilize stream banks and other sensitive areas disturbed by pipeline construction in accordance with the requirements of applicable state or federal permits.

5.3.9 Wetlands and Water Resources

Wetlands and riparian areas shall be accessed using the least impactful manner that minimizes travel through wetland areas and prevents unnecessary impacts. No temporary workspace areas shall be placed within or adjacent to wetlands or water resources, as practicable. To minimize impacts, construction in wetland areas shall be according to permit requirements by the applicable permitting authority. Wooden or composite mats shall be used to protect wetland vegetation. Soil excavated from the wetlands and riparian areas shall be handled in compliance with the permit from the appropriate regulatory agency. Should a permit not be required, excavated soils shall be contained and not placed back into the wetland or riparian area.

Dewatering during periods of excessive precipitation or in areas where the natural groundwater table intersects the pipeline trench will be discharged in such a way as to not reach wetlands or waterbodies. Dewatering discharges will be directed toward well vegetated upland areas. Should discharge activities need to be directed off the right-of-way landowner consent will be obtained and locations will be chosen to minimize impacts. All discharge activities will comply with applicable agency permits or approvals.

Areas disturbed by construction activities shall be restored to preconstruction conditions. Restoration of the wetlands will be performed by Permittee in accordance with the requirements of applicable state and federal permits or laws and landowner agreements.

All requirements of the U.S. Army Corps of Engineers (wetlands under federal jurisdiction), Minnesota Department of Natural Resources (DNR) (Public Waters/wetlands), and County (wetlands under the jurisdiction of the Minnesota Wetland Conservation Act) shall be met.

As part of the preconstruction reports, the Permittee will include a section evaluating the potential for the occurrence of aquatic invasive species in the project area and describing, if any, the best management practices that apply.

The Permittee should identify any infested waters or otherwise indicate that aquatic invasive species are not anticipated Aquatic Invasive Species. The DNR must be provided an opportunity to review and comment on the plan. The DNR must be notified if any aquatic invasive species are identified in an area not previously identified as infested water.

5.3.10 Vegetation Removal and Protection

The Permittee shall clear the permanent right-of-way and temporary right-of-way preserving to the maximum extent practicable windbreaks, shelterbelts, living snow fences, and vegetation in areas such as trail and stream crossings where vegetative screening may minimize aesthetic impacts, to the extent that such actions do not impact the safe operation, maintenance, and inspection of the pipeline and are in compliance with all applicable laws and regulations.

Tree stumps will be removed at the landowner's request or when necessitated due to trench location. Cleared vegetation may be disposed of in a manner authorized by the responsible governmental unit or as agreed to with the landowner, provided disposal complies with local regulations.

5.3.11 Application of Pesticides

The Permittee shall restrict pesticide use to those pesticides and methods of application approved by the Minnesota Department of Agriculture, DNR, and the U.S. Environmental Protection Agency. Selective foliage or basal application shall be used when practicable. The Permittee shall contact the landowner or his designee to obtain approval for the use of pesticide prior to any application on their property. The landowner may request that there be no application of pesticides on any part of the right-of-way within the landowner's property. All pesticides shall be applied in a safe and cautious manner so as not to damage crops, orchards, tree farms, or gardens. The Permittee shall provide notice of pesticide application to affected landowners and known beekeepers operating apiaries within three miles of the project site at least 14 days prior to such application.

The Permittee shall restrict herbicide use to those herbicides and methods of application approved by the Minnesota Department of Agriculture and the U.S. Environmental Protection Agency. Selective foliage or basal application shall be used when practicable. The Permittee shall contact the landowner or his designee to obtain approval for the use of herbicide prior to any application on their property. The landowner may request that there be no application of herbicides on any part of the right-of-way within the landowner's property. All herbicides shall be applied in a safe and cautious manner so as not to damage crops, orchards, tree farms, or gardens.

5.3.12 Invasive Species

The Permittee shall develop and Invasive Species Plan to prevent the introduction of invasive species on lands disturbed by Project construction activities. This requirement may be included as an element of the Soil Erosion and Sediment Control Plan.

5.3.13 Noxious Weeds

The Permittee shall take all reasonable precautions against the spread of noxious weeds during all phases of pipeline construction and restoration of all areas affected by construction. When utilizing seed to establish temporary and permanent vegetative cover on exposed soil the

Permittee shall select site appropriate seed certified to be free of noxious weeds. To the extent possible, the Permittee shall use native seed mixes. The Permittee shall consult with landowners on the selection and use of seed for replanting.

5.3.14 Roads (Public and Private)

Prior to commencement of construction, the Permittee shall identify all state, county, city or and township roads that will be used for the project and shall notify the state, county, city or township governing body having jurisdiction over the roads to determine if the governmental body needs to inspect the roads prior to use of these roads. The Permittee is responsible for maintenance and repair of roads that will be subject to extra wear and tear due to transportation of equipment and project related materials. The Permittee shall cooperate with state, county, city and township road authorities to develop appropriate signage and traffic management during construction.

Equipment involved in pipeline construction shall be moved into the right-of-way using existing public or private roads unless a temporary access road is negotiated with the landowner and approved by the [*appropriate Monitor*].

The Permittee shall promptly repair private roads or lanes damaged when moving equipment or when accessing construction workspace, unless otherwise negotiated with the affected landowner.

5.3.15 Archaeological and Historic Resources

The Permittee shall work with the State Historic Preservation Office (SHPO) and the State Archaeologist prior to commencing construction to determine whether any additional archaeological survey work will be necessary for any part of the proposed Project. The Permittee shall contract with a qualified archaeologist to complete such surveys, and shall submit the results to SHPO, the State Archaeologist and the Commission.

The SHPO and the State Archaeologist will make recommendations for the treatment of any significant archaeological sites which are identified. Any issue in the implementation of these recommendations will be resolved by the Commission in consultation with SHPO and the State Archaeologist.

Prior to construction, workers shall be trained about the need to avoid cultural properties, how to identify cultural properties, and procedures to follow if undocumented cultural properties, including gravesites, are found during construction. If any previously unrecorded archaeological sites are found during construction, the Permittee shall mark and preserve the sites and promptly notify the SHPO, the State Archaeologist, and the Commission of such discovery. The Permittee shall not excavate at such locations until so authorized by the Commission in consultation with the SHPO and the State Archeologist.

If human remains are encountered during construction, the Permittee shall immediately halt construction at that location and promptly notify local law enforcement authorities and the State

Archaeologist. Construction at the human remains location shall not proceed until authorized by local law Enforcement authorities or the State Archaeologist.

If any federal funding, permit, or license is involved or required, the Permittee shall complete any Section 106 (36 C.F.R. part 800) review that is necessary by coordinating with the federal agency or federal authority and SHPO as deemed necessary by the federal agency or federal authority.

5.3.16 Livestock Protection

The Permittee shall take precautions to protect livestock during all phases of construction and restoration of the areas affected by construction.

5.3.17 Security

The Permittee will install temporary gates or similar barriers, as needed, to prohibit public access to the right-of-way during construction.

5.3.18 Restoration

The Permittee shall restore the right-of-way, temporary work spaces, access roads, and other public or private lands affected by construction of the pipeline to the natural conditions that existed immediately before construction of the pipeline and as required by other federal and state agency permits. Restoration must be compatible with the safe operation, maintenance, and inspection of the pipeline. Within 60 days after completion of all restoration activities the Permittee shall advise the Commission in writing of the completion of such activities.

5.3.19 Cleanup

All waste and scrap that is the product of construction shall be removed from the right-of-way and all premises on which construction activities were conducted and properly disposed of upon completion of each task. Personal litter, including bottles, cans, and paper from construction activities shall be removed on a daily basis.

5.3.20 Pollution and Hazardous Wastes

All appropriate precautions to protect against pollution of the environment must be taken by the Permittee. The Permittee shall be responsible for compliance with all laws applicable to the generation, storage, transportation, clean up and disposal of all wastes generated during pipeline construction and restoration of the right-of-way.

5.3.21 Damages

The Permittee shall fairly restore or compensate landowners for damage to crops, fences, private roads and lanes, landscaping, drain tile, or other damages sustained during construction.

5.4 Other Requirements

The Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations. A list of the permits known to be required is included in the permit application. The Permittee shall file a listing of all permits with the Commission and submit a copy of any requested permit to the Commission.

6.0 SPECIAL CONDITIONS

Special conditions shall take precedence over other conditions of this permit should there be a conflict.

[*Describe any Special Conditions; see example language below.*]

6.1 Wildlife Friendly Erosion Control Materials

The Permittee, in cooperation with the DNR, shall use wildlife-friendly erosion control materials in areas known to be inhabited by wildlife species (birds, small mammals, reptiles, and amphibians) susceptible to entanglement in plastic netting.

6.2 Rare Species Surveys

The Permittee, in consultation with the U.S. Fish and Wildlife Service and the DNR, will determine the need for rare species surveys (pre-construction) within the designated route. In the areas where these species are known to exist or where the right-of-way passes through habitats where the species are likely to exist, field surveys may be required. In the event impacts cannot be avoided, the Permittee may need to obtain a take permit from the U.S Fish and Wildlife Service and the DNR for the species of concern. The Permittee shall submit the results of these efforts to the Commission with its Plan and Profile filing.

Construction and maintenance personnel will be made aware of rare resources and plant communities during preconstruction meetings to minimize potential disturbance. The Permittee shall avoid impacts to state-listed endangered, threatened, and special concern species in all areas of the project including temporary workspaces associated with the project.

6.3 Contamination Survey

The Permittee, in consultation with the MPCA, shall identify any contaminated sites as it performs its detailed survey and acquisition work prior to the submittal of the final plan and profile to the Commission.

Vegetation Management Plan

Permittee shall submit a VMP with the Environmental Mitigation Plan. The purpose of the VMP shall be to identify measures to minimize the disturbance and removal of vegetation for the Project, prevent the introduction of noxious weeds and invasive species, and re-vegetate disturbed non-cropland area with appropriate native species in cooperation with landowner and state, federal, and local resource agencies, such that such re-vegetation does not negatively impact safe and reliable operation of the Project.

6.4 Third Party Monitors

The Permittee shall contract with independent third-party environmental monitors to oversee the construction process and to monitor compliance with (1) the Agricultural Mitigation Plan; (2) the Environmental Protection Plan; and (3) the requirements of this and all other environmental permits. The independent monitors shall be approved by the Commission.

6.5 Construction Environmental Control Plan

Prior to any construction, the Permittee shall file with the Commission a "Construction Environmental Control Plan." All amendments, modifications, or changes to the Construction Environmental Control Plan shall be filed with the Commission and any other agency or governmental unit with responsibility for implementing requirements of the Construction Environmental Control Plan.

6.6 Specific Landowner Requests

[*Describe any Special Conditions relating to a specific landowner*.]

7.0 DELAY IN CONSTRUCTION

If the Permittee has not commenced construction or improvement of the designated route within four years after the date of issuance of this permit the Commission shall suspend the permit in accordance with Minn. R. 7852.3300. If at the time of suspension, or at a later time, the Permittee decides to construct the pipeline, it shall certify to the Commission that there have been no significant changes in any material aspects of the conditions or circumstances existing when the permit was issued. If the Commission determines that there are no significant changes, it shall reinstate the permit. If the Commission determines that there is a significant change, it may order public information meetings or a new hearing and consider the matter further, or it may require the Permittee to submit a new application.

8.0 COMPLAINT PROCEDURES

Prior to the start of construction, the Permittee shall submit to the Commission the procedures that will be used to receive and respond to complaints. The procedures shall be in accordance with the requirements of Minn. R. 7852.3700, and as set forth in the complaint procedures attached to this permit.

The Permittee shall advise the Commission when such procedure has been established. The Permittee shall notify the Commission of any complaints received during the course of construction pertaining to Minn. R. 7852.3600 that are not resolved within 30 days of the complaint.

Upon request, the Permittee shall assist the Commission with the disposition of unresolved or longstanding complaints. This assistance shall include, but is not limited to, the submittal of complaint correspondence and complaint resolution efforts.

9.0 PIPELINE SAFETY

In an emergency situation, responders will take appropriate actions necessary to address the emergency. Pursuant to Minn. Stat. § 216G.02, Subd. 3(a) the pipeline routing permit may not set safety standards for the construction of pipeline. This would also apply to operation and maintenance. Therefore, this Pipeline Routing Permit does not address pipeline safety related issues.

10.0 COMPLIANCE REQUIREMENTS

Failure to timely and properly make compliance filings required by this permit is a failure to comply with the conditions of this permit. Compliance filings must be electronically filed with the Commission.

10.1 Plan and Profile

At least 30 days before right-of-way preparation for construction begins on any phase or portion of the project, the Permittee shall provide the Commission with a plan and profile of the right-of-way and the specifications and drawings for right-of-way preparation, construction, cleanup, and restoration for each phase of the project for which construction is scheduled. The documentation shall include maps depicting the plan and profile including the designated route, right-of-way, and pipeline alignment approved per this permit.

The Permittee may not commence construction until the 30 days has expired or until the Commission has advised the Permittee in writing that it has completed its review of the plan and profile documents and determined that the planned construction is consistent with this permit. If the Permittee intends to make any significant changes in its plan and profile or the specifications and drawings after submission to the Commission the Permittee shall notify the Commission at least five days before implementing the changes. No changes shall be made that would be in violation of any of the terms of this permit.

The Permittee shall also provide the Minnesota Office of Pipeline Safety with the same information provided to the Commission. The Permittee’s plan and profile and specifications and drawings, shall become a condition of this permit and shall be complied with by the Permittee in accordance with Minn. R. 7852.3500.

10.2 Status Reports

In the event the Permittee proceeds with phased construction of the Project, such weekly reports shall be filed beginning with the submittal of the plan and profile for that phase and continue until completion of restoration of that phase. If there is any period of time where no construction activity is occurring, restoration of the prior phase of the Project has been completed, and the overall Project is not yet completed, Permittee need only provide status reports monthly.

10.3 Notification to Commission

At least three days before the pipeline is to be placed into service, the Permittee shall notify the Commission of the date on which the pipeline will be placed into service and the date on which construction was complete.

10.4 As-Builts

Within 90 days after completion of each phase of construction, the Permittee shall submit copies of all final as-built plans and specifications developed for each project phase.

10.5 GPS Data

Within 90 days after completion of each phase of construction the Permittee shall submit to the Commission, in the format requested by the Commission, geospatial information (e.g., ArcGIS geodatabase or shapefiles, GPS coordinates, associated database of characteristics) for the pipeline and associated facilities.

11.0 RIGHT OF ENTRY

The Permittee shall allow Commission designated representatives to perform the following, upon reasonable notice, upon presentation of credentials and at all times in compliance with the Permittee's site safety standards:

a. To enter upon the facilities easement of the property for the purpose of obtaining information, examining records, and conducting surveys or investigations.

b. To bring such equipment upon the facilities easement of the property as is necessary to conduct such surveys and investigations.

c. To sample and monitor upon the facilities easement of the property.

d. To examine and copy any documents pertaining to compliance with the conditions of this permit.

12.0 PERMIT AMENDMENT

The Permittee may apply to the Commission for an amendment of the route designation or to conditions specified in the permit in accordance with the requirements and procedures of Minn. R. 7852.3400.

13.0 PERMIT MODIFICATION OR SUSPENSION

If the Commission determines that substantial evidence supports a finding that a violation of the terms or conditions of this pipeline routing permit has occurred or is likely to occur, it may take action to modify or suspend this permit in accordance with Minn. R. 7852.3800. The Commission may at any time re-consider modification or suspension of this permit if the Permittee has undertaken effective measures to correct the violations.

14.0 PIPELINE CONSTRUCTION COMPLETION CERTIFICATE

In accordance with Minn. R. 7852.3900, the Permittee shall file with the Commission a written certification that the construction and remediation of the permitted pipeline has been completed in compliance with all permit conditions and landowner agreements. The certification shall be considered by the Commission within 60 days of its filing. The Commission shall accept or reject the certification of completion and make a final determination regarding cost or reimbursements due. If the certification is rejected, the Commission shall inform the Permittee in writing which deficiencies, if corrected, will allow the certification to be accepted. When corrections to the deficiencies are completed, the Permittee shall notify the Commission, and the certification shall be reconsidered as soon as possible. After acceptance of the certification, the Commission's jurisdiction over the Permittee’s pipeline routing permit shall be terminated.

Appendix J

Quality of Existing Surface Water Conditions

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Watershed Health Assessment Framework

"Managing for System Health"

Watershed Report Card:

Pine River

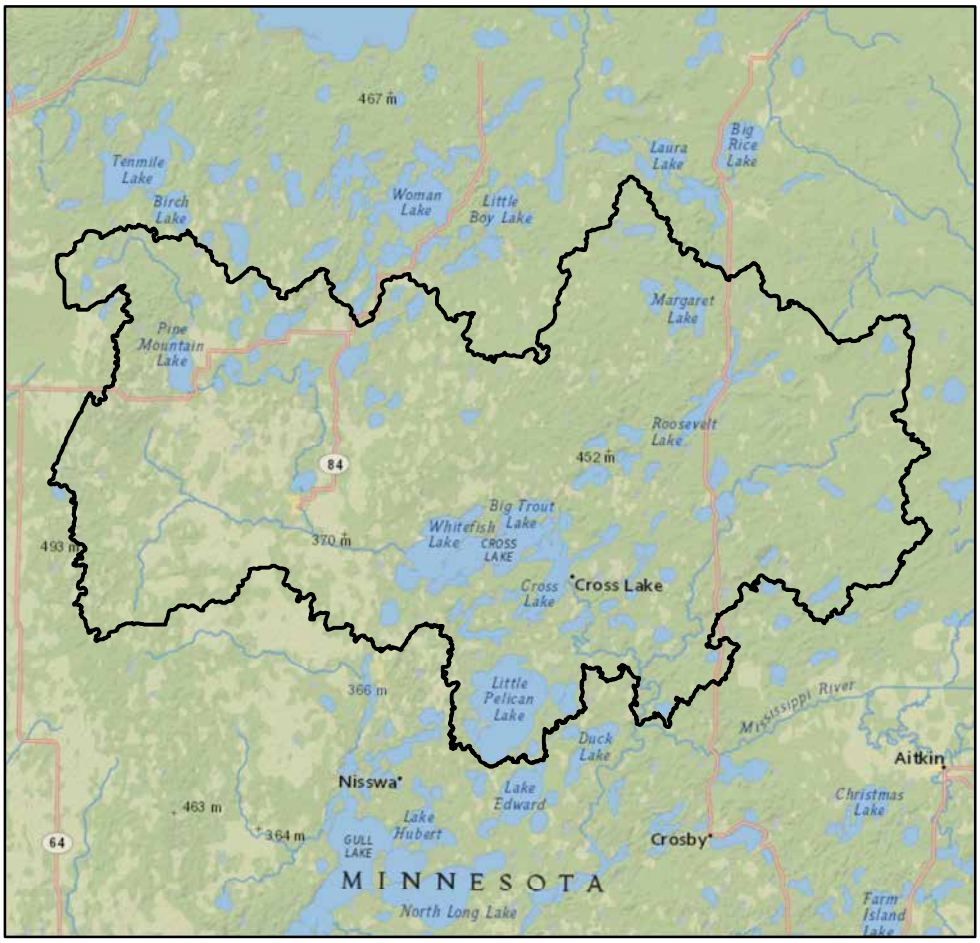

People and Places:

Watershed Population:
- 2000 census - 13,589
- 2010 census - 15,170

Largest Cities - Population:
- Breezy Point - 2,346
- Pine River - 944
- Emily - 813
- Jenkins - 430
- Fifty Lakes - 387

Counties - % of watershed:
- Cass - 50 %
- Crow Wing - 47 %
- Aitkin - 2 %
- Hubbard - 0 %

Watershed Area:

Watershed size:
- 500,887 acres
- 783 square miles

Watershed Surface Area:
- Percent Land - 88 %
- Percent Water - 12 %

HUC8 ID:
- 07010105

Basin Name:
- Mississippi Headwaters (0701)

Land Use:

Percent of watershed area by land cover type:

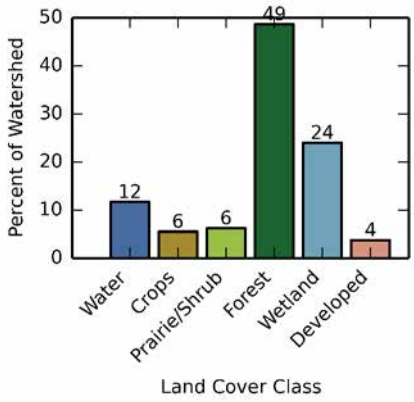

Watershed Health Report - Major Watershed

Pine River

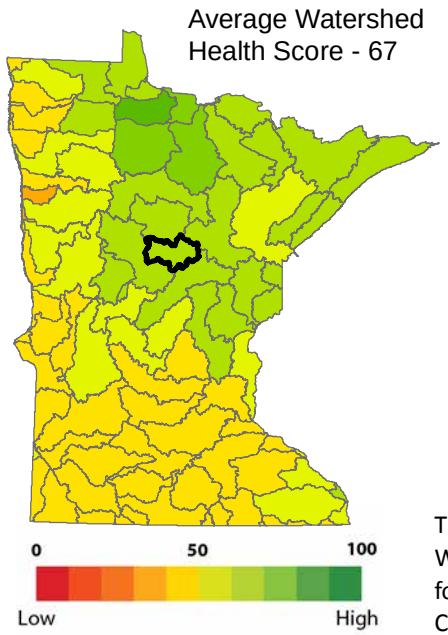

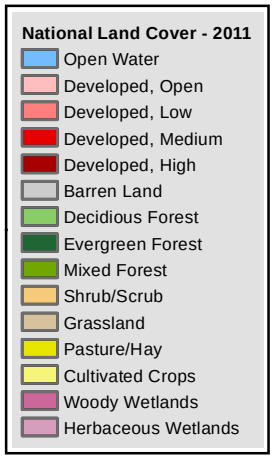

These health scores are calculated at the Major Watershed (HUC8) scale. Health score names followed by (*) are also calculated at the DNR Catchment scale (subdivided HUC12). Those results are reported on the following pages.

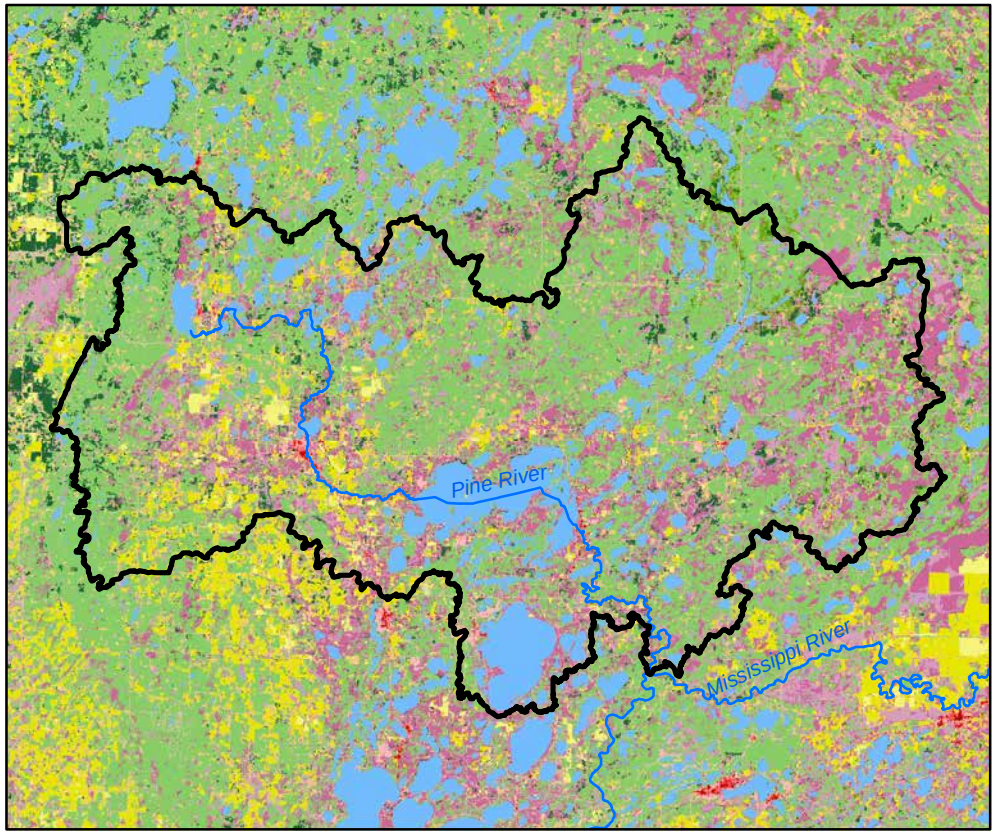

Hydrology

Component Health Score (index average) 91

Index Scores

Perennial Cover*	94
Impervious Cover*	86
Water Withdrawal*	99
Flow Variability	68
Hydrologic Storage	94
Sub-Scores	
Altered Streams*	91
Surface Storage	98

Geomorphology

Component Health Score (index average) 59

Index Scores

Soil Erosion Potential*	75
Groundwater Susceptibility	31
Climate Vulnerability	70

Biology

Component Health Score (index average) 43

Index Scores

Terrestrial Habitat Quality*	21
Stream Species Quality*	58
Species Richness	54
At-Risk Species Richness	38

Connectivity

Component Health Score (index average) 46

Index Scores

Terrestrial Habitat Connectivity	30
Aquatic Connectivity*	72
Riparian Connectivity*	97

Water Quality

Component Health Score (index average) 95

Index Scores

Non-Point Pollution Sources	90
Sub-Score	
Phosphorus Risk*	87
Localized Pollution Sources*	89
Assessments	95

Watershed Health Assessment Framework
Health score methodology - **www.dnr.state.mn.us/whaf/about/scores**

September, 2015

Perennial Cover (2011)

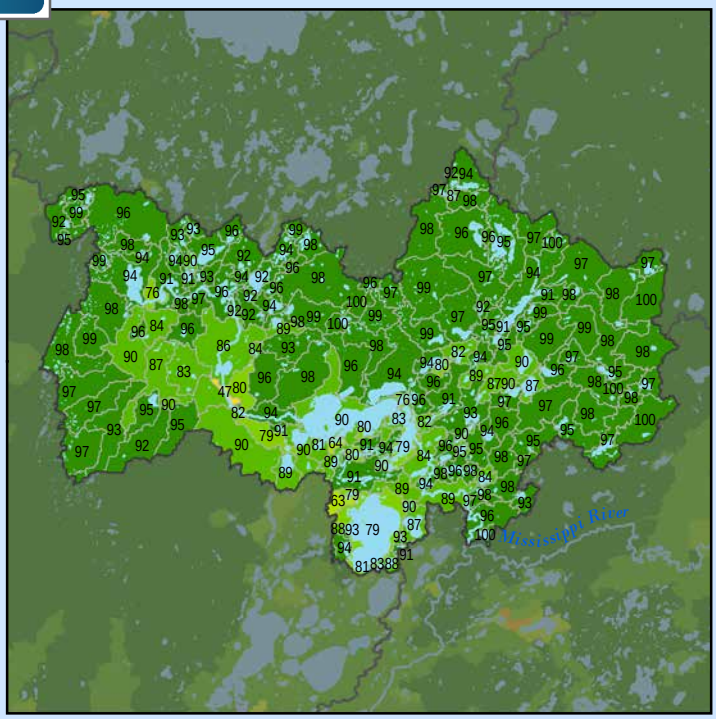

Health Score Distributions:
Pine River
- Min: 47
- Max: 100
- Median: 94.0
- Mean: 92.44
- Standard Dev: 7.11

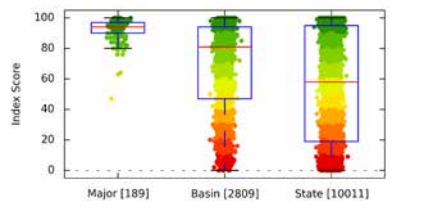

Impervious Cover (2011)

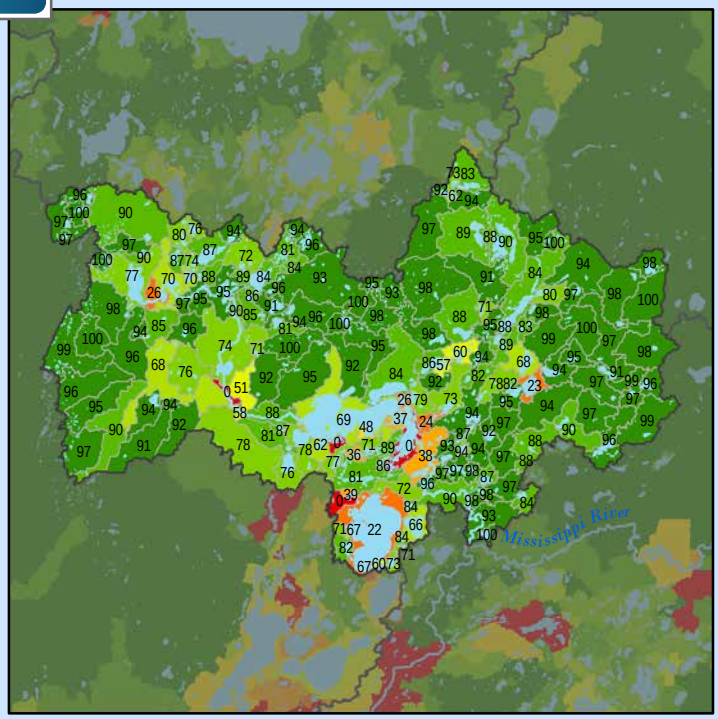

Health Score Distributions:
Pine River
- Min: 0
- Max: 100
- Median: 90.0
- Mean: 82.89
- Standard Dev: 20.41

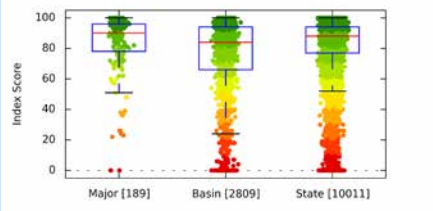

Water Withdrawal Index

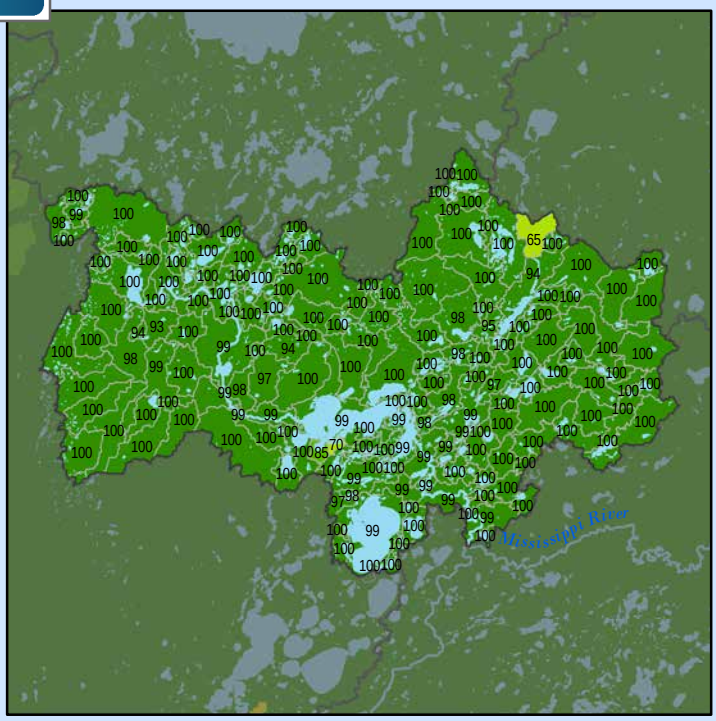

Health Score Distributions:
Pine River
- Min: 65
- Max: 100
- Median: 100.0
- Mean: 99.19
- Standard Dev: 3.63

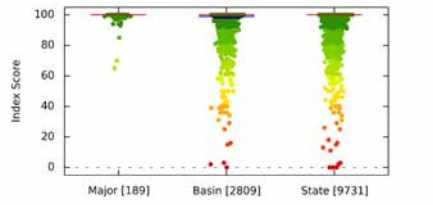

Altered Streams

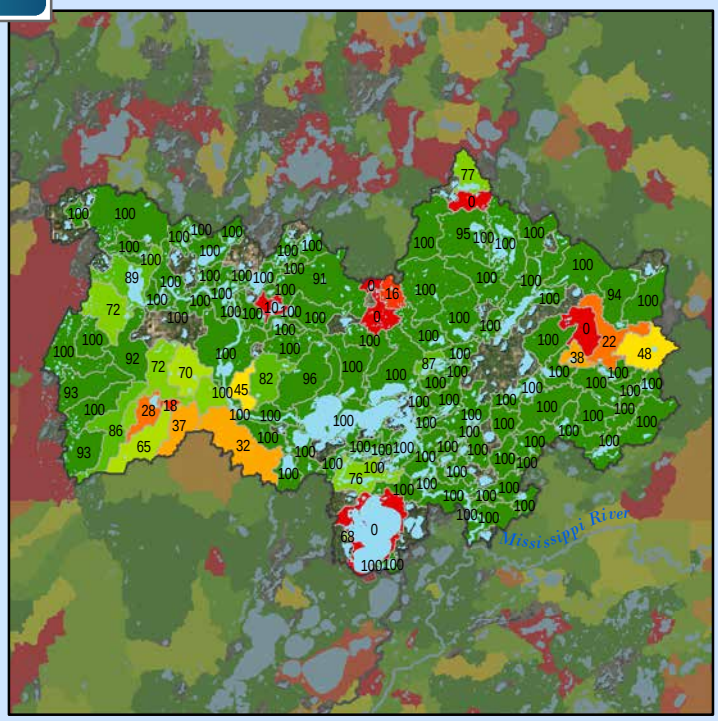

Health Score Distributions:
Pine River
- Min: 0
- Max: 100
- Median: 100.0
- Mean: 88.75
- Standard Dev: 26.1

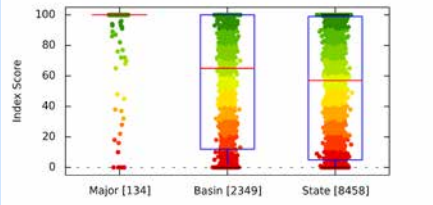

Soil Erosion Potential

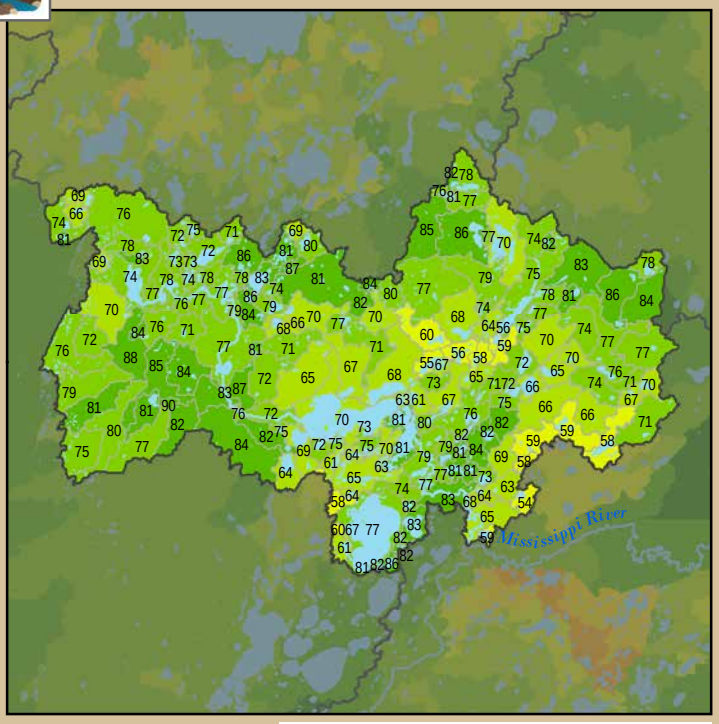

Health Score Distributions:
Pine River
- Min: 54
- Max: 90
- Median: 75.0
- Mean: 74.27
- Standard Dev: 7.95

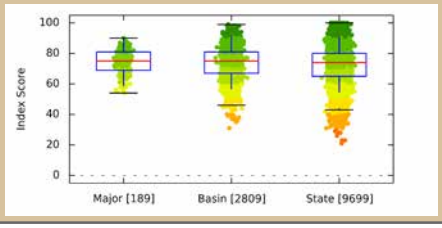

Terrestrial Habitat Quality

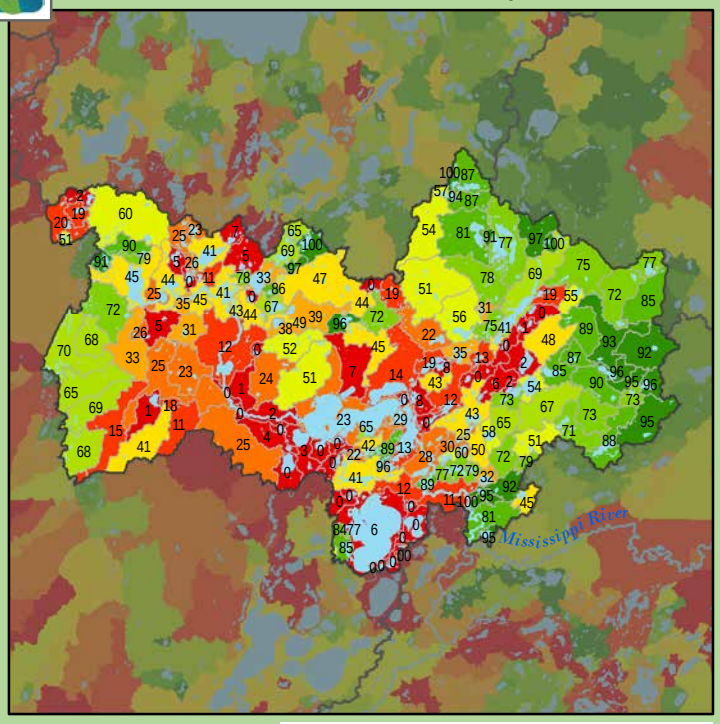

Health Score Distributions:
Pine River
- Min: 0
- Max: 100
- Median: 43.0
- Mean: 43.58
- Standard Dev: 33.64

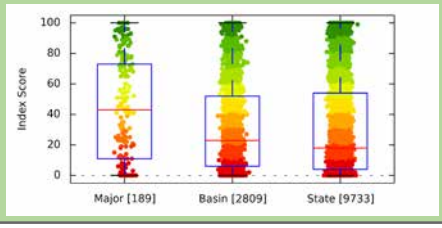

Stream Species Quality - Mussel Score

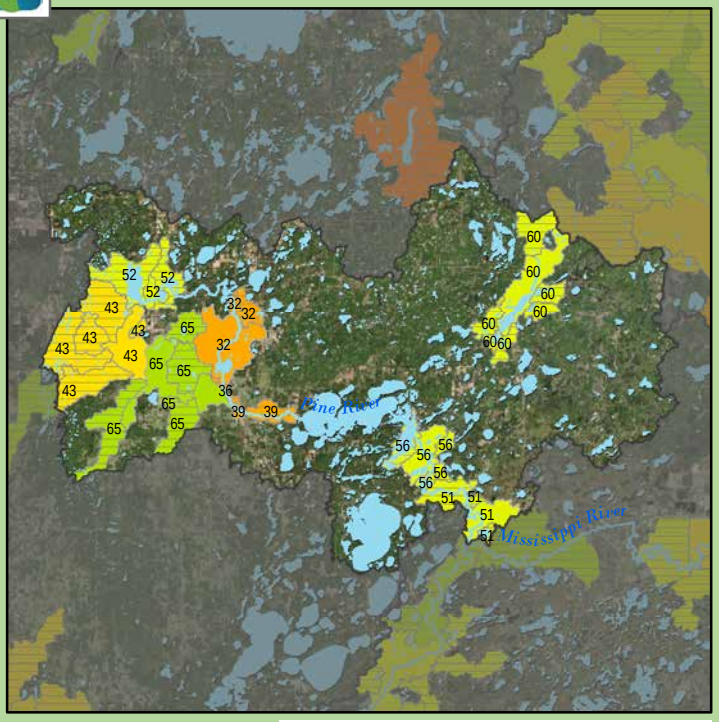

Health Score Distributions:
Pine River
- Min: 32
- Max: 65
- Median: 52.0
- Mean: 51.84
- Standard Dev: 10.17

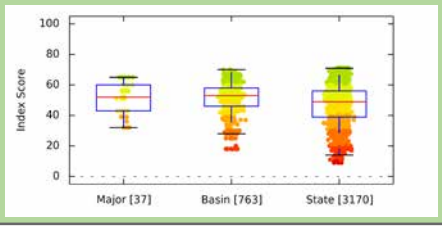

Stream Species Quality - Aquatic Invertebrate IBI

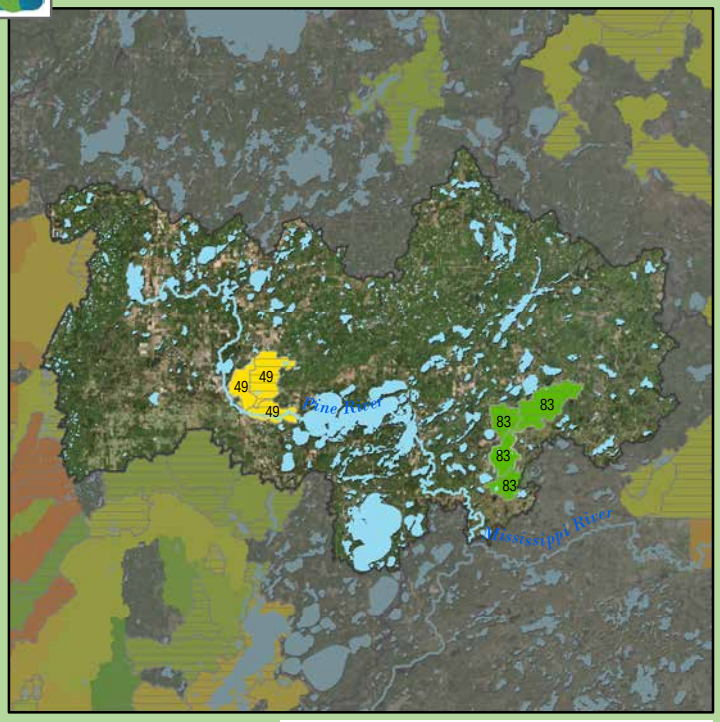

Health Score Distributions:
Pine River
- Min: 49
- Max: 83
- Median: 83.0
- Mean: 68.43
- Standard Dev: 16.83

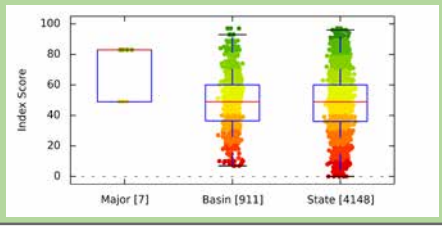

Stream Species Quality - Fish IBI

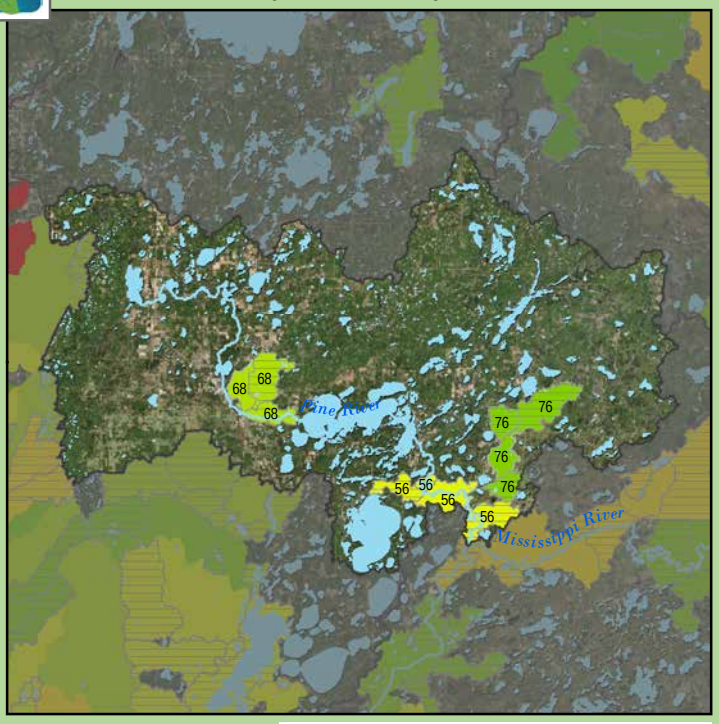

Health Score Distributions:
Pine River
- Min: 56
- Max: 76
- Median: 68.0
- Mean: 66.55
- Standard Dev: 8.57

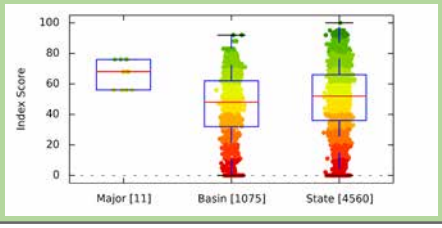

Aquatic Connectivity

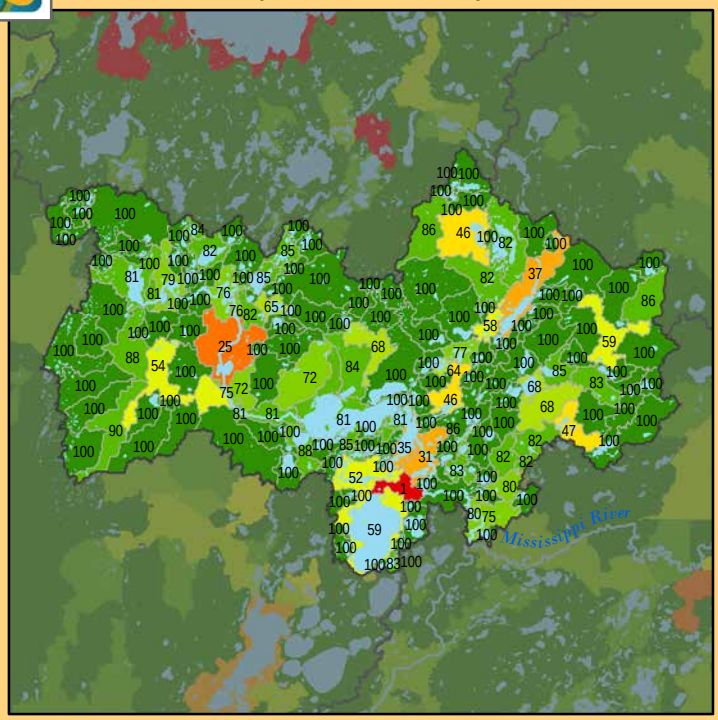

Health Score Distributions:
Pine River
- Min: 1
- Max: 100
- Median: 100.0
- Mean: 91.4
- Standard Dev: 16.55

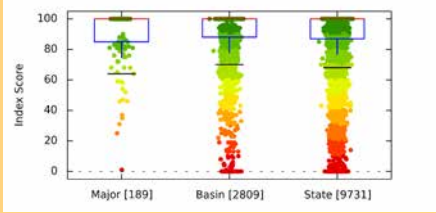

Riparian Connectivity

Health Score Distributions:
Pine River
- Min: 56
- Max: 100
- Median: 97.0
- Mean: 95.98
- Standard Dev: 5.44

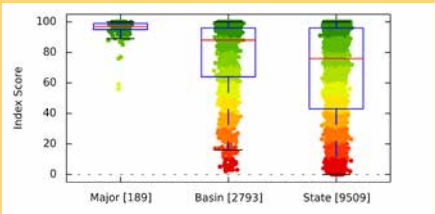

Non-Point Source - Phosphorus Risk

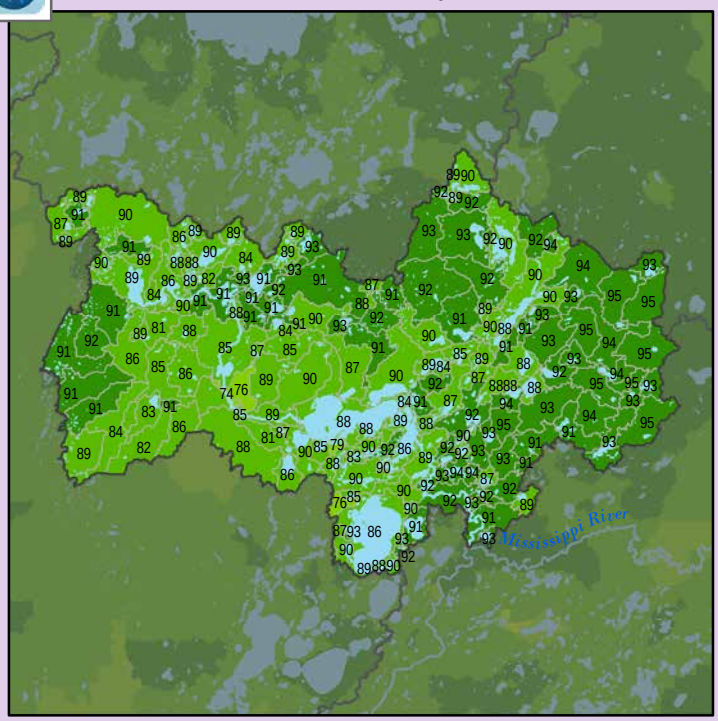

Health Score Distributions:
Pine River
- Min: 74
- Max: 95
- Median: 90.0
- Mean: 89.6
- Standard Dev: 3.61

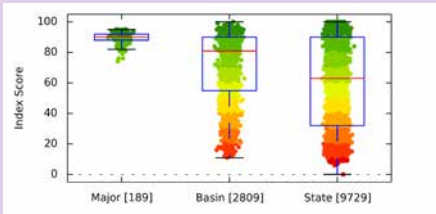

Localized Pollution Sources

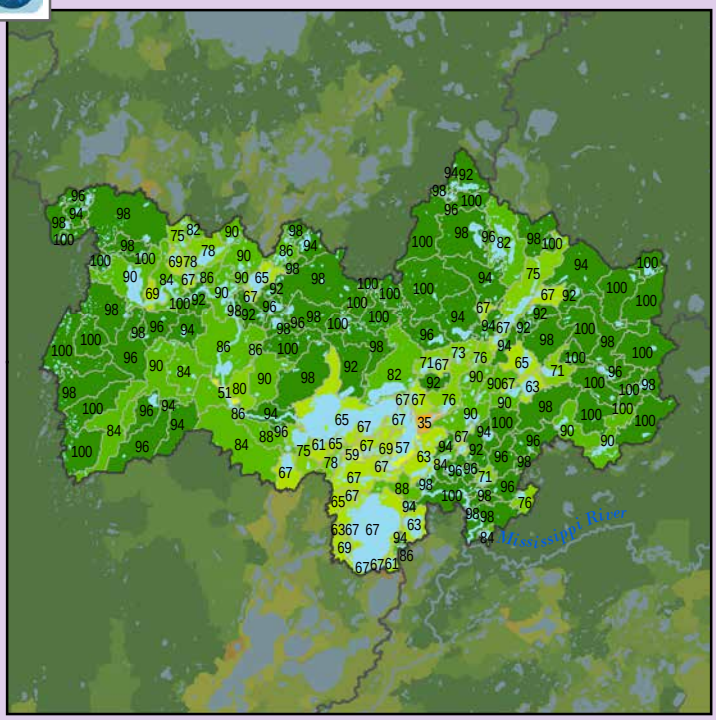

Health Score Distributions:
Pine River
- Min: 35
- Max: 100
- Median: 92.0
- Mean: 86.74
- Standard Dev: 13.68

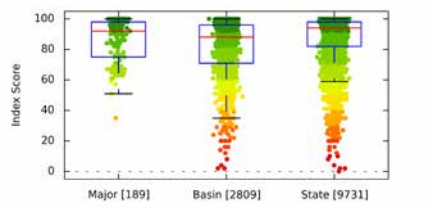

Localized Pollution Sources - Animal Units

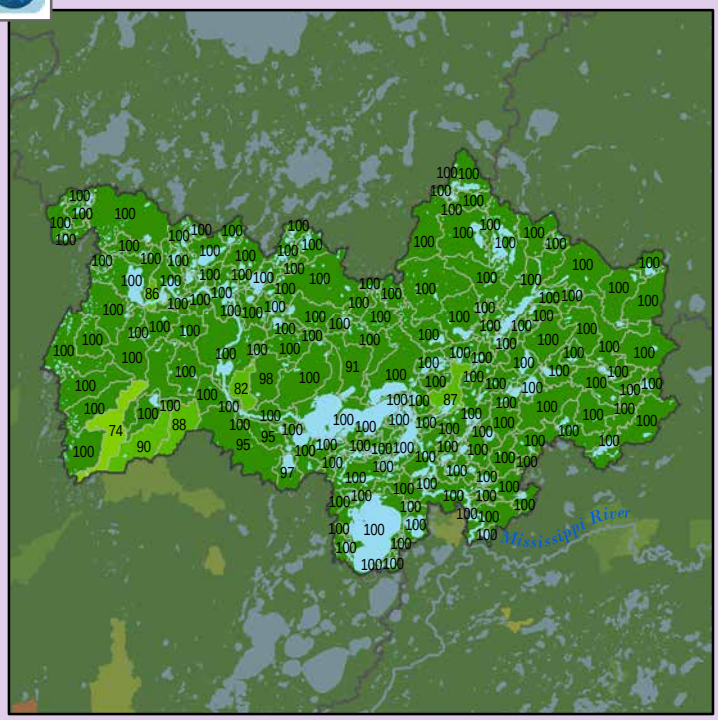

Health Score Distributions:
Pine River
- Min: 74
- Max: 100
- Median: 100.0
- Mean: 99.38
- Standard Dev: 2.98

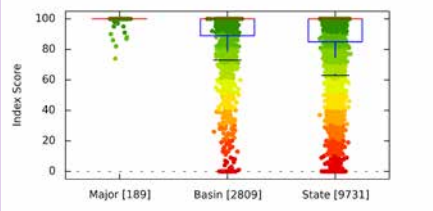

Localized Pollution Sources - Potential Contaminants

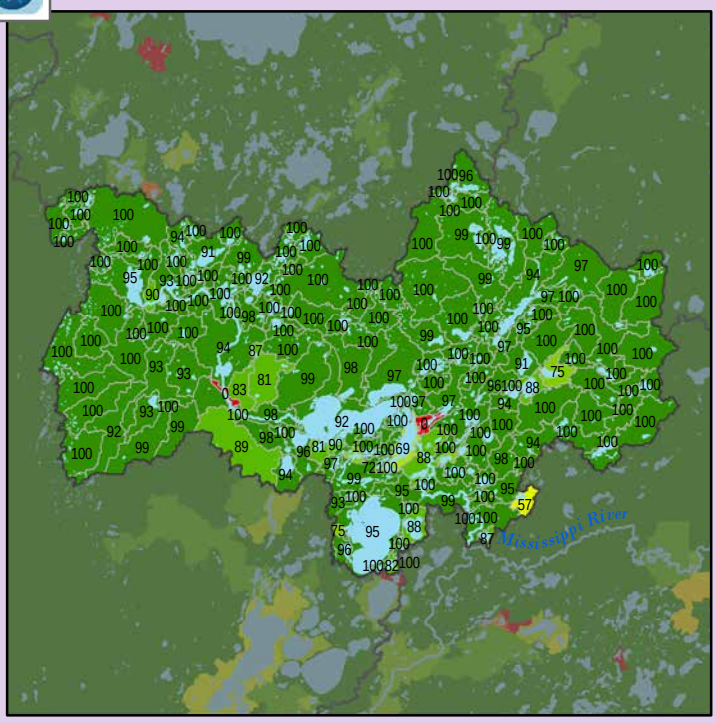

Health Score Distributions:
Pine River
- Min: 0
- Max: 100
- Median: 100.0
- Mean: 96.03
- Standard Dev: 11.75

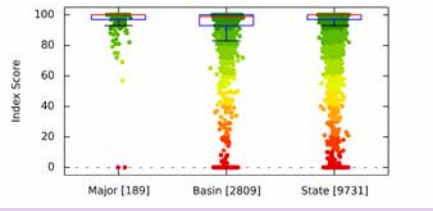

Localized Pollution Sources - Superfund Sites

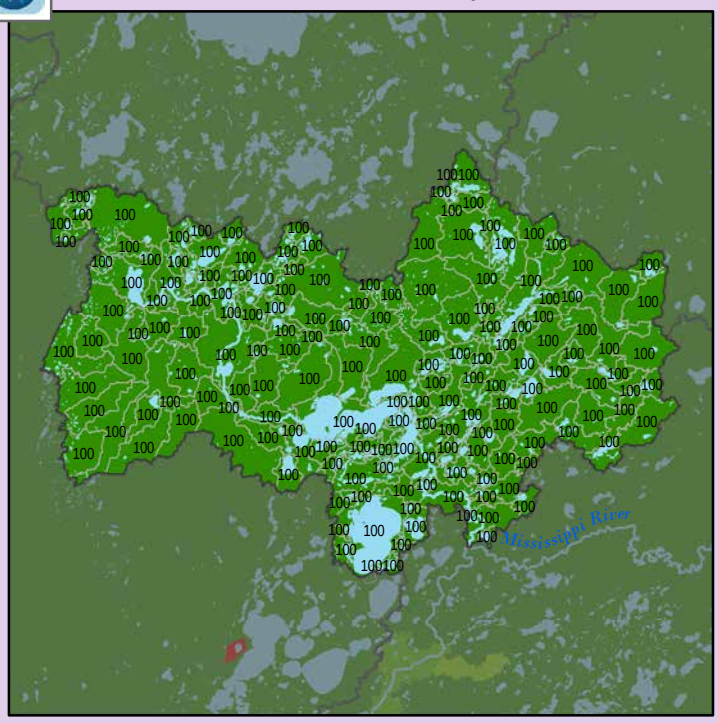

Health Score Distributions:
Pine River
- Min: 100
- Max: 100
- Median: 100.0
- Mean: 100.0
- Standard Dev: 0.0

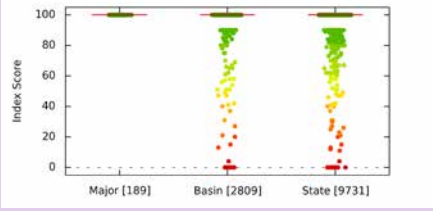

Localized Pollution Sources - Wastewater Treatment

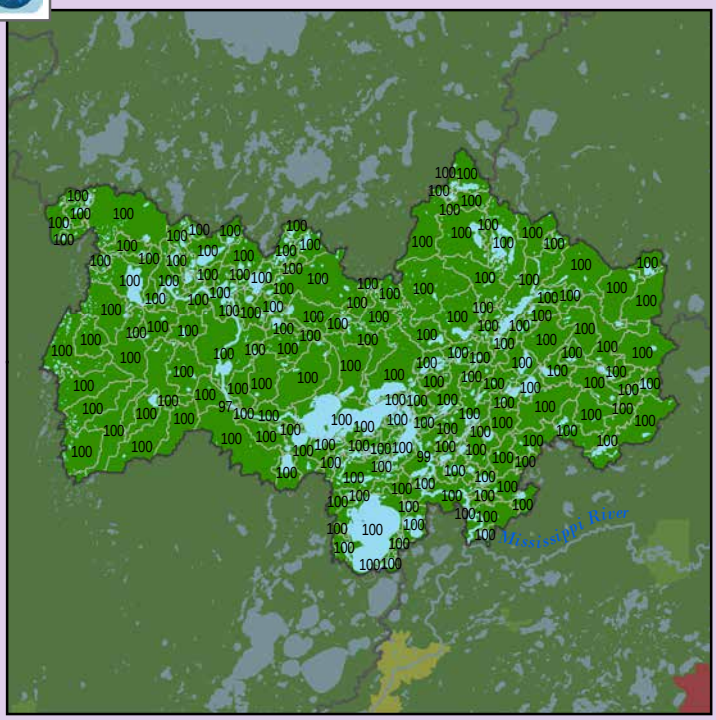

Health Score Distributions:
Pine River
- Min: 97
- Max: 100
- Median: 100.0
- Mean: 99.98
- Standard Dev: 0.23

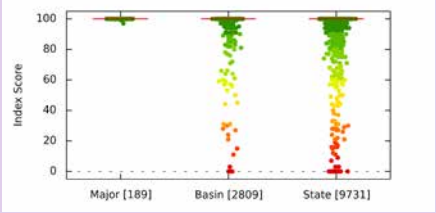

Localized Pollution Sources - Open Pit Mines

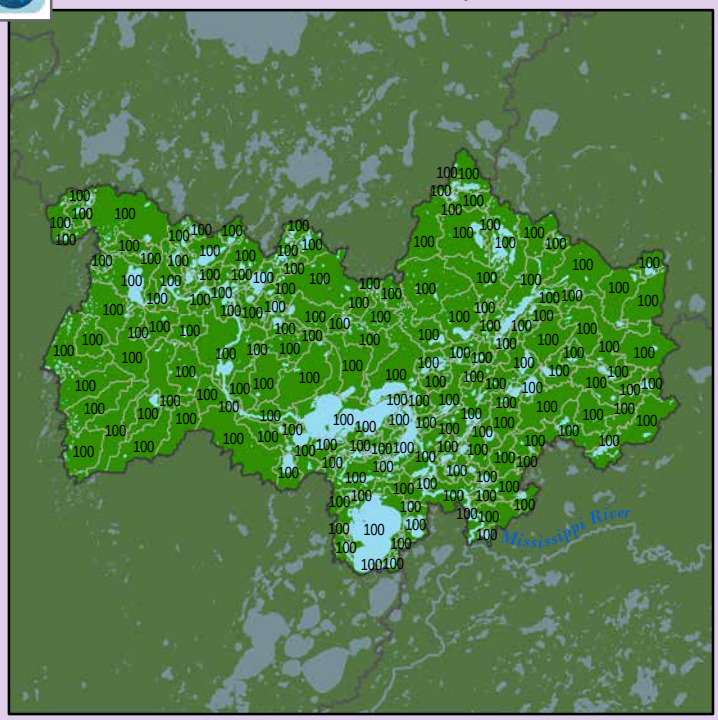

Health Score Distributions:
Pine River
- Min: 100
- Max: 100
- Median: 100.0
- Mean: 100.0
- Standard Dev: 0.0

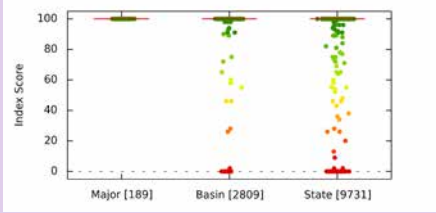

Localized Pollution Sources - Septic Systems

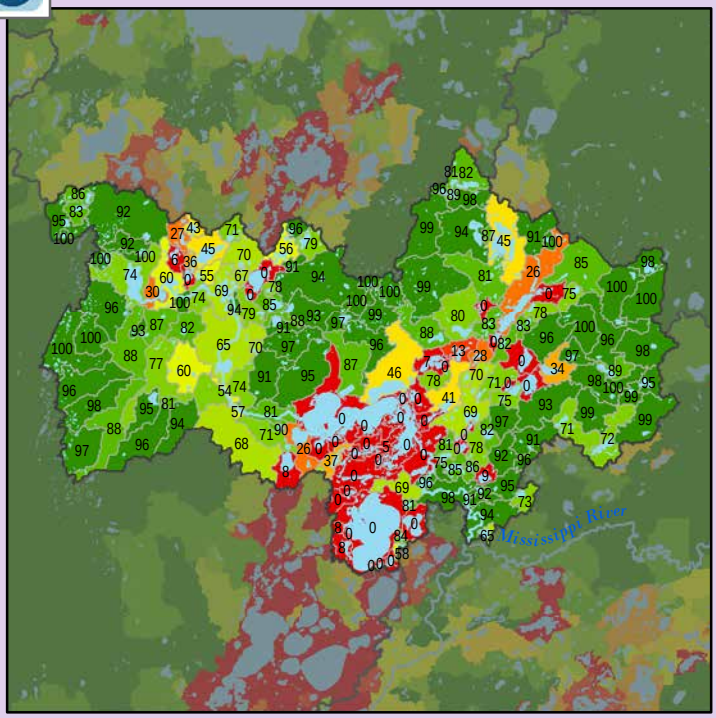

Health Score Distributions:
Pine River
- Min: 0
- Max: 100
- Median: 81.0
- Mean: 63.82
- Standard Dev: 37.13

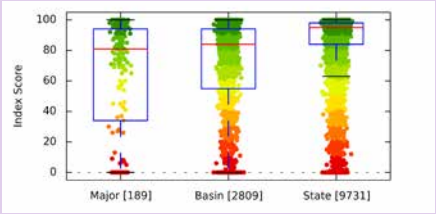

Watershed Health Assessment Framework

"Managing for System Health"

Watershed Report Card:

Chippewa River

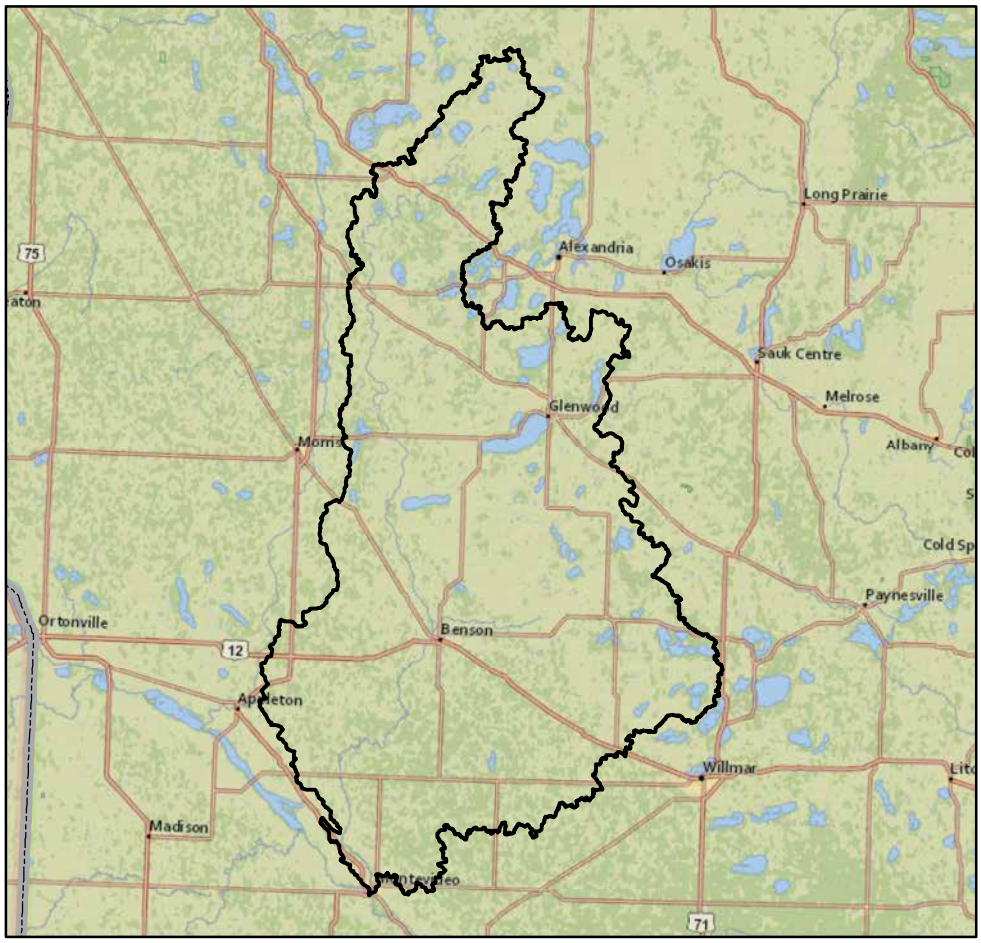

People and Places:

Watershed Population:
- 2000 census - 33,653
- 2010 census - 32,465

Largest Cities - Population:
- Montevideo - 5,383
- Benson - 3,240
- Glenwood - 2,564
- Starbuck - 1,302
- Hancock - 765

Counties - % of watershed:
- Pope - 30 %
- Swift - 28 %
- Douglas - 14 %
- Chippewa - 13 %
- Kandiyohi - 7 %
- Stevens - 4 %
- Grant - 2 %
- Otter Tail - 1 %
- Stearns - 0 %

Watershed Area:

Watershed size:
- 1,330,152 acres
- 2,078 square miles

Watershed Surface Area:
- Percent Land - 94 %
- Percent Water - 6 %

HUC8 ID:
- 07020005

Basin Name:
- Minnesota (0702)

Land Use:

Percent of watershed area by land cover type:

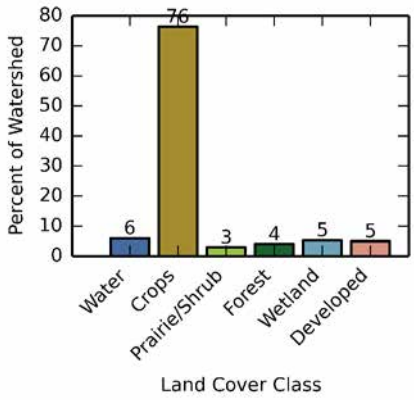

Watershed Health Report - Major Watershed

Chippewa River

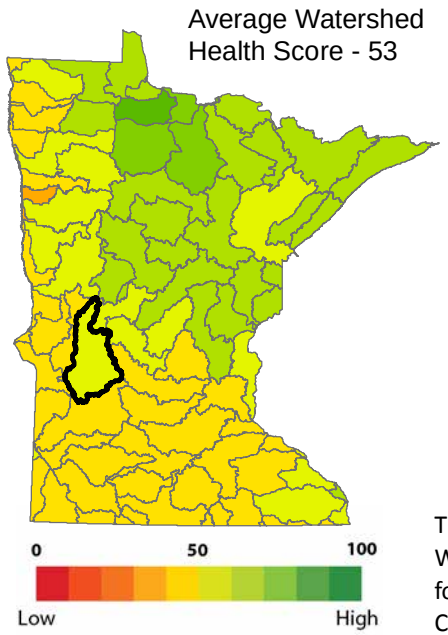

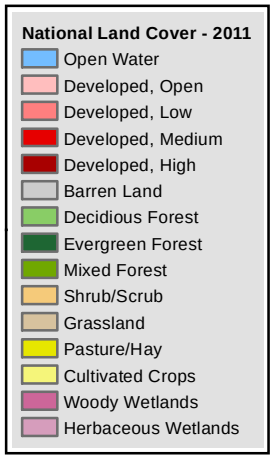

These health scores are calculated at the Major Watershed (HUC8) scale. Health score names followed by (*) are also calculated at the DNR Catchment scale (subdivided HUC12). Those results are reported on the following pages.

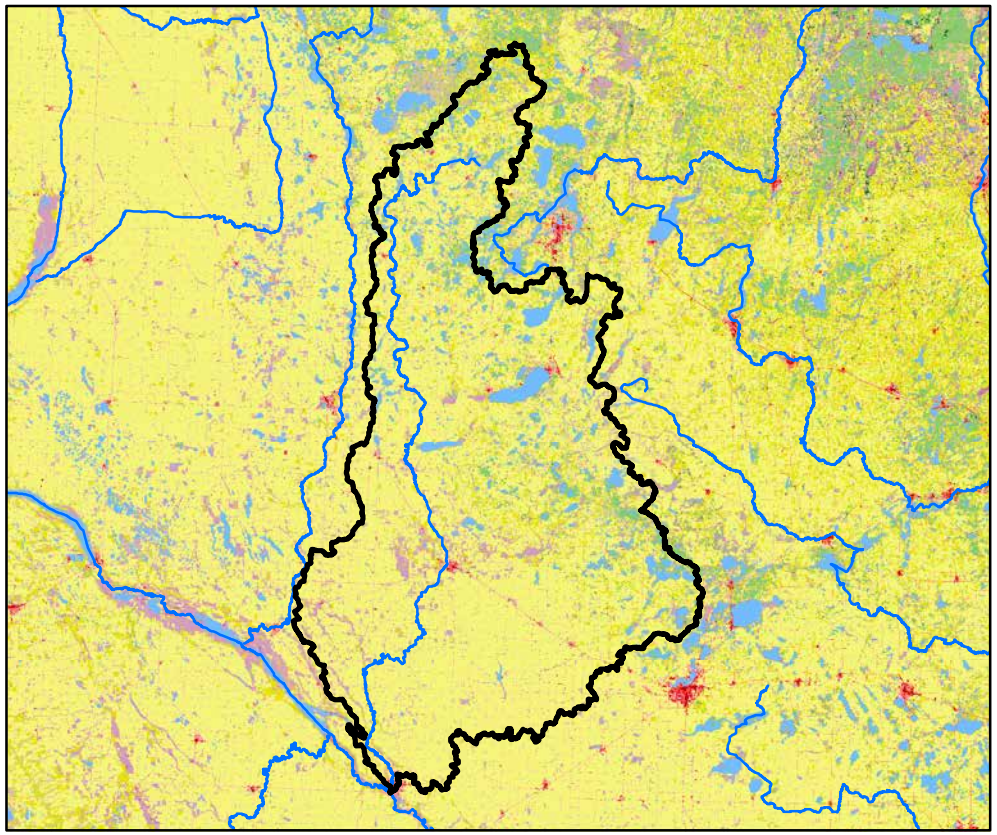

Hydrology

Component Health Score (index average) 69

Index Scores

Perennial Cover*	22
Impervious Cover*	83
Water Withdrawal*	93
Flow Variability	66
Hydrologic Storage	69
Sub-Scores	
Altered Streams*	100
Surface Storage	39

Geomorphology

Component Health Score (index average) 62

Index Scores

Soil Erosion Potential*	71
Groundwater Susceptibility	51
Climate Vulnerability	63

Biology

Component Health Score (index average) 42

Index Scores

Terrestrial Habitat Quality*	4
Stream Species Quality*	69
Species Richness	63
At-Risk Species Richness	34

Connectivity

Component Health Score (index average) 27

Index Scores

Terrestrial Habitat Connectivity	6
Aquatic Connectivity*	37
Riparian Connectivity*	61

Water Quality

Component Health Score (index average) 64

Index Scores

Non-Point Pollution Sources	45
Sub-Score	
Phosphorus Risk*	19
Localized Pollution Sources*	89
Assessments	56

Watershed Health Assessment Framework
Health score methodology - **www.dnr.state.mn.us/whaf/about/scores**

September, 2015

Perennial Cover (2011)

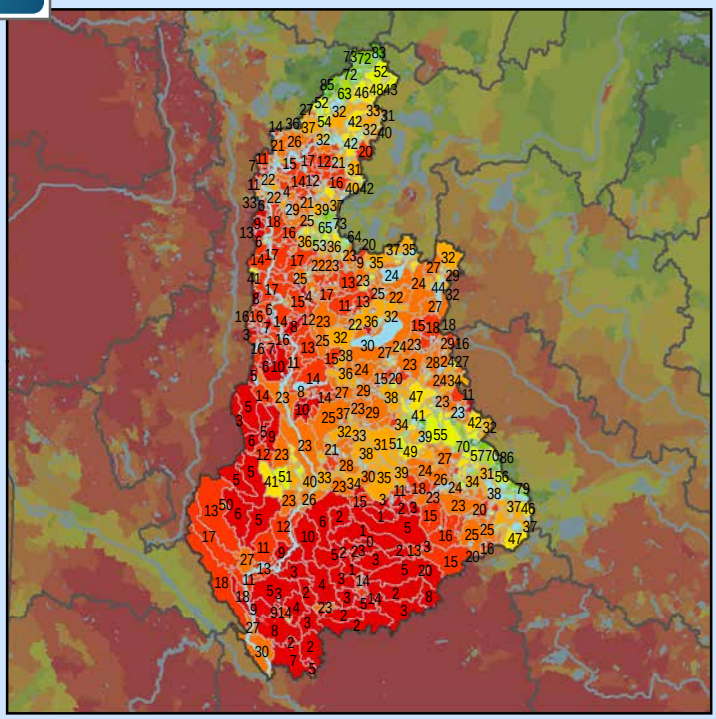

Health Score Distributions:
Chippewa River
- Min: 0
- Max: 99
- Median: 26.0
- Mean: 29.95
- Standard Dev: 20.18

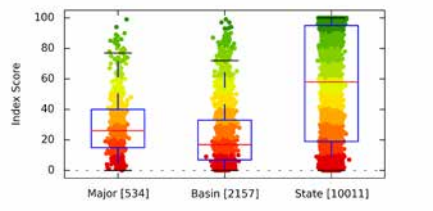

Impervious Cover (2011)

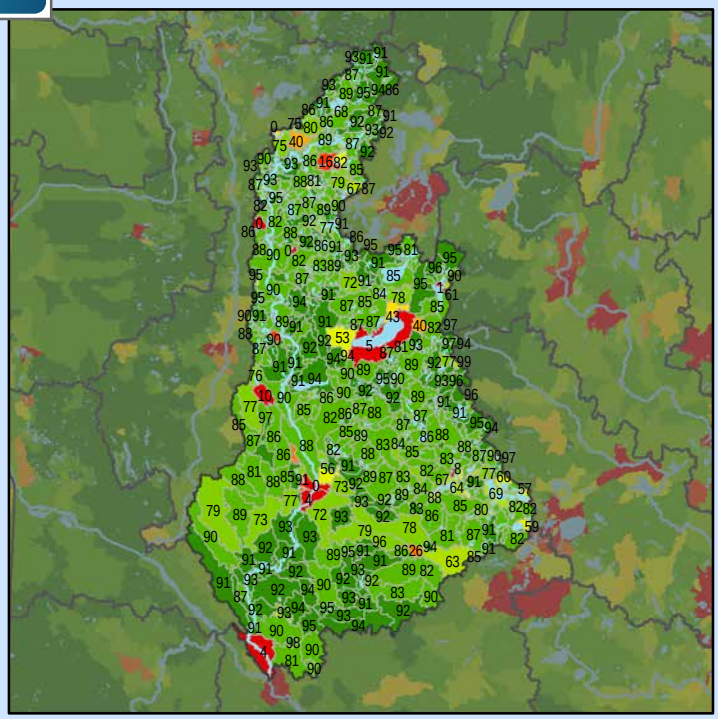

Health Score Distributions:
Chippewa River
- Min: 0
- Max: 100
- Median: 89.0
- Mean: 84.78
- Standard Dev: 15.88

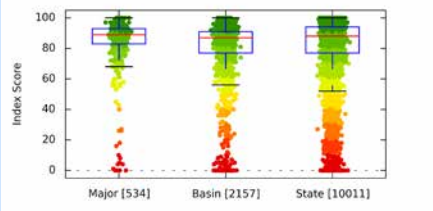

Water Withdrawal Index

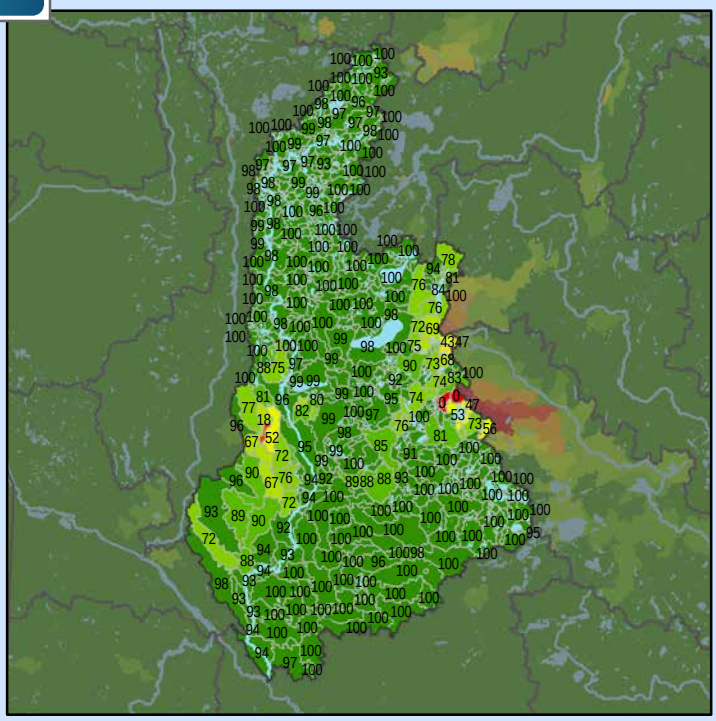

Health Score Distributions:
Chippewa River
- Min: 0
- Max: 100
- Median: 100.0
- Mean: 95.75
- Standard Dev: 11.86

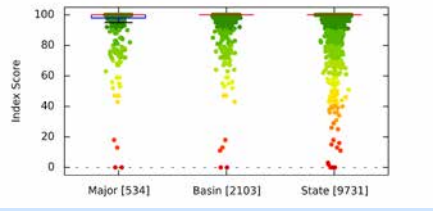

Altered Streams

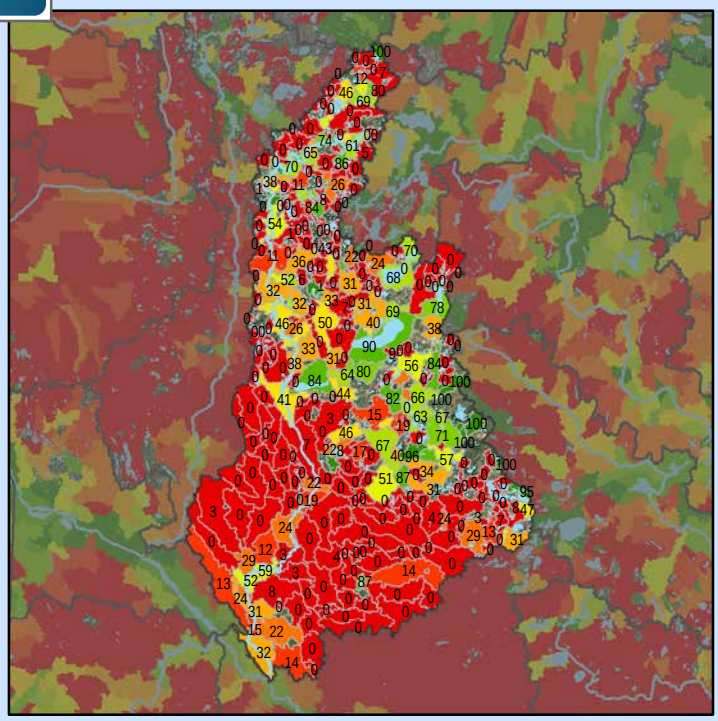

Health Score Distributions:
Chippewa River
- Min: 0
- Max: 100
- Median: 0.0
- Mean: 21.15
- Standard Dev: 32.33

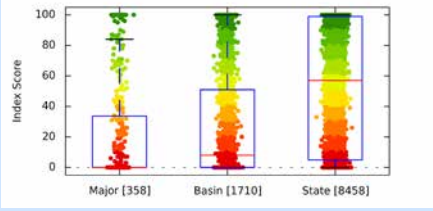

Soil Erosion Potential

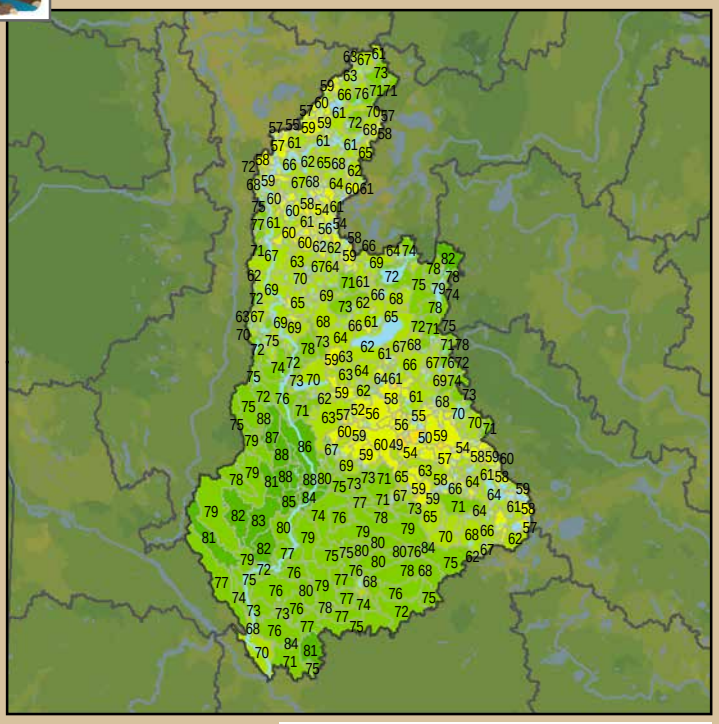

Health Score Distributions:
Chippewa River
- Min: 42
- Max: 90
- Median: 65.0
- Mean: 66.02
- Standard Dev: 8.44

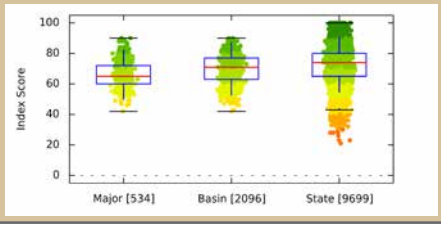

Terrestrial Habitat Quality

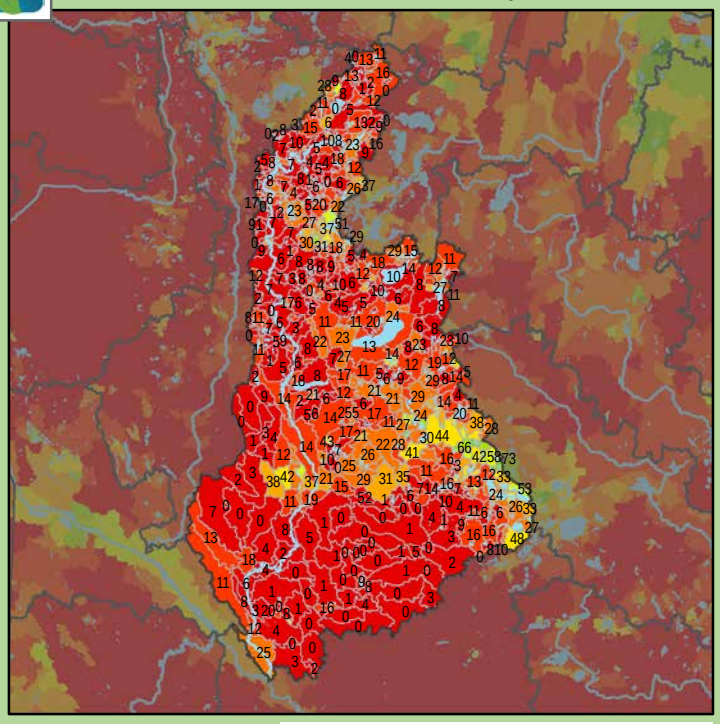

Health Score Distributions:
Chippewa River
- Min: 0
- Max: 81
- Median: 12.0
- Mean: 17.09
- Standard Dev: 16.61

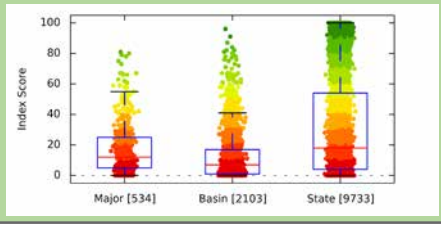

Stream Species Quality - Mussel Score

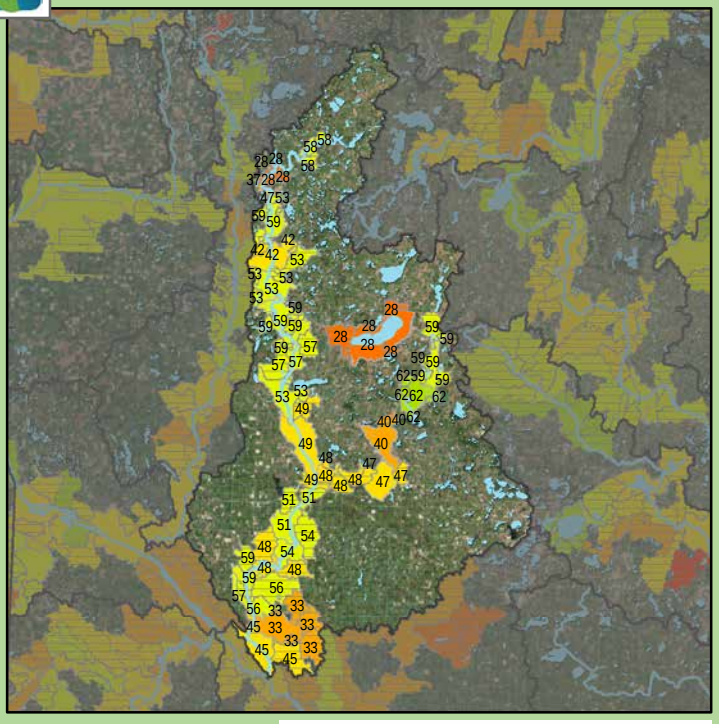

Health Score Distributions:
Chippewa River
- Min: 28
- Max: 62
- Median: 53.0
- Mean: 49.18
- Standard Dev: 10.66

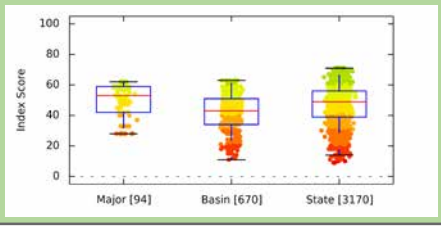

Stream Species Quality - Aquatic Invertebrate IBI

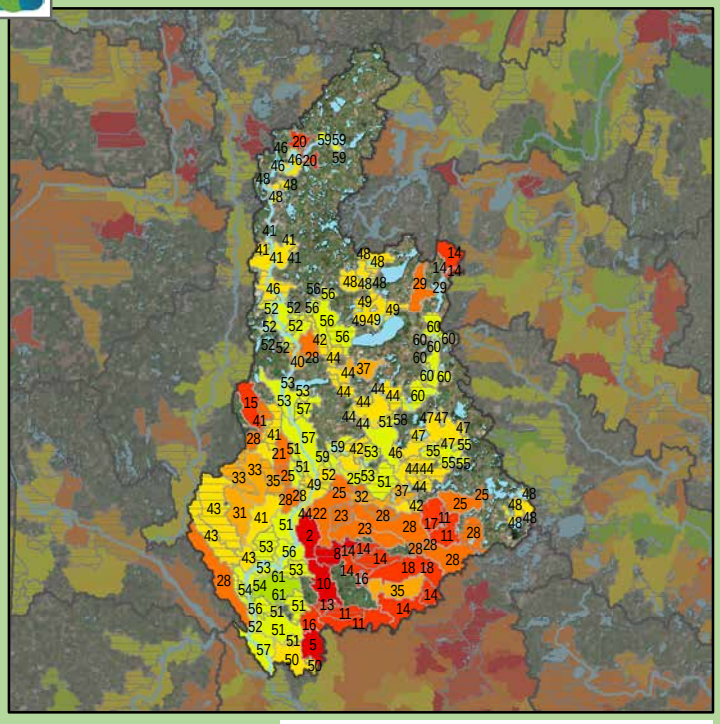

Health Score Distributions:
Chippewa River
- Min: 2
- Max: 61
- Median: 46.0
- Mean: 41.52
- Standard Dev: 14.66

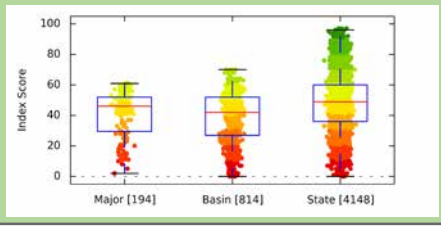

Stream Species Quality - Fish IBI

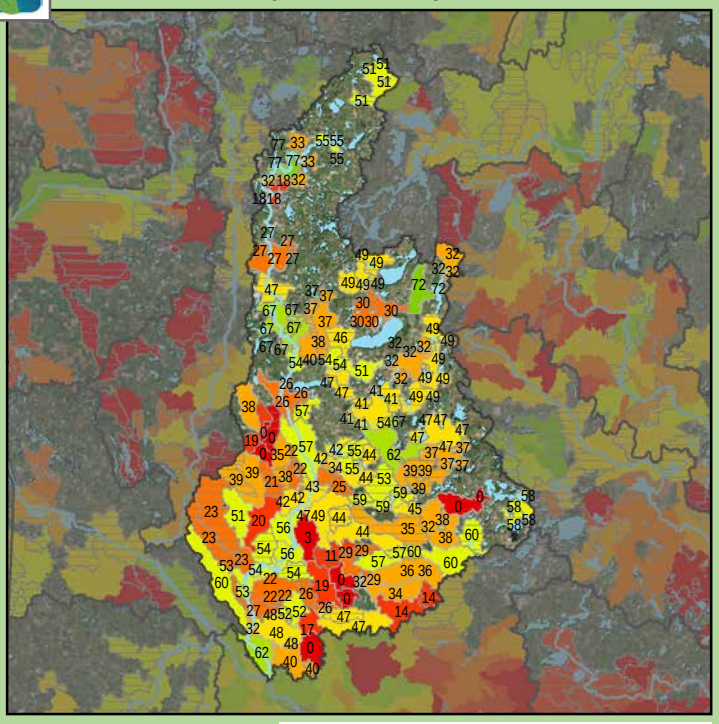

Health Score Distributions:
Chippewa River
- Min: 0
- Max: 77
- Median: 42.0
- Mean: 40.9
- Standard Dev: 16.09

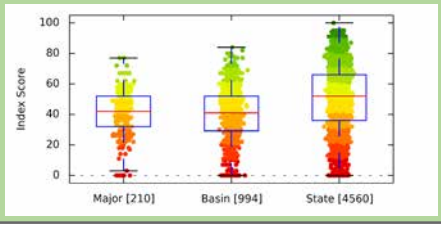

Aquatic Connectivity

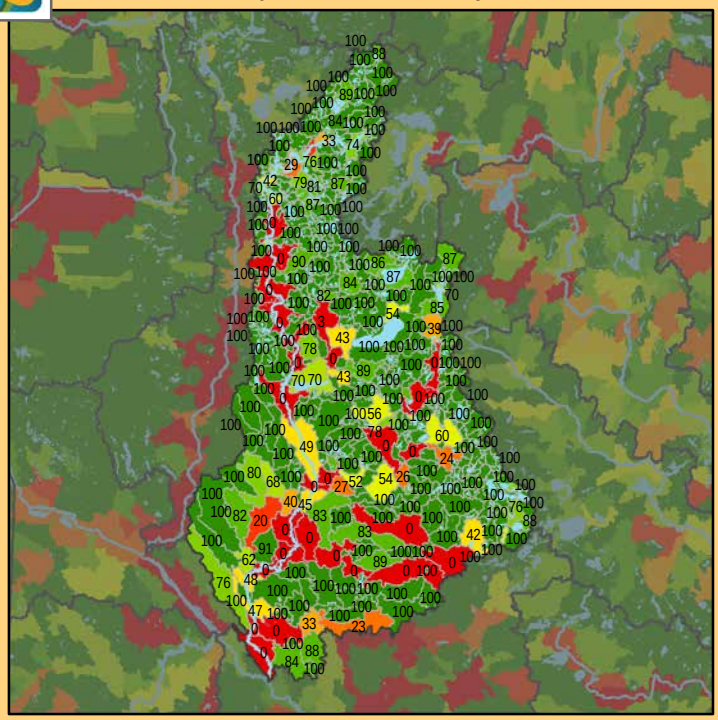

Health Score Distributions:
Chippewa River
- Min: 0
- Max: 100
- Median: 100.0
- Mean: 90.37
- Standard Dev: 24.86

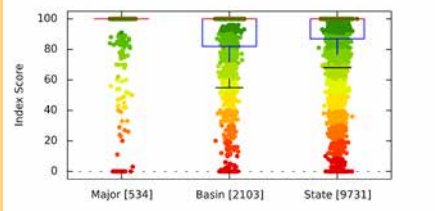

Riparian Connectivity

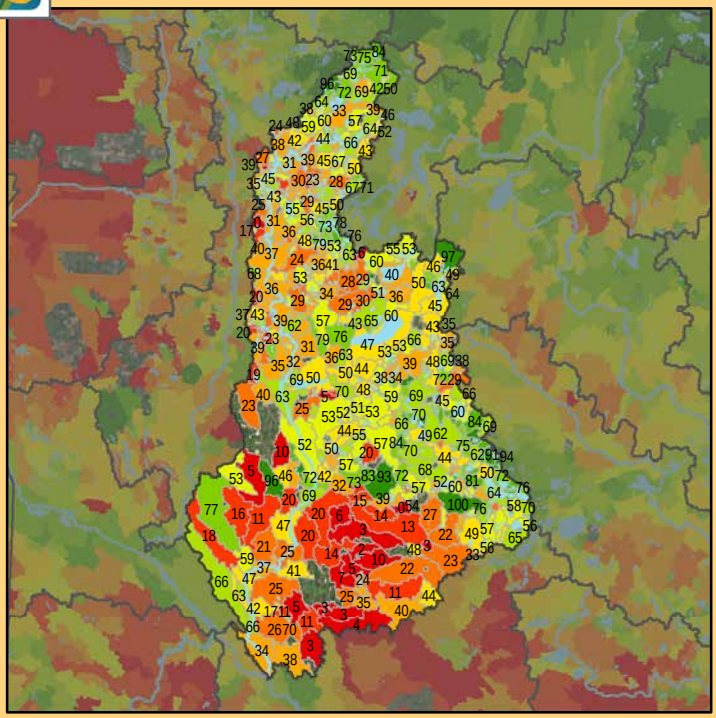

Health Score Distributions:
Chippewa River
- Min: 0
- Max: 100
- Median: 50.0
- Mean: 49.97
- Standard Dev: 22.32

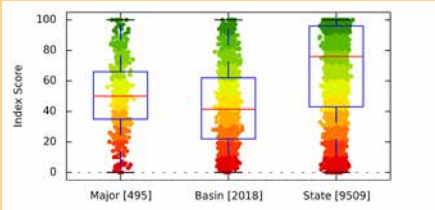

Non-Point Source - Phosphorus Risk

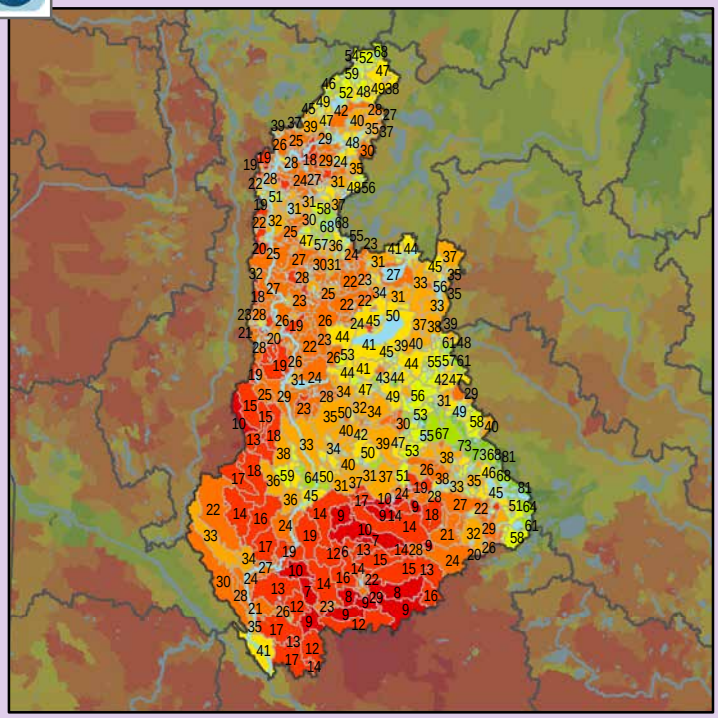

Health Score Distributions:
Chippewa River
- Min: 6
- Max: 88
- Median: 36.0
- Mean: 38.31
- Standard Dev: 17.94

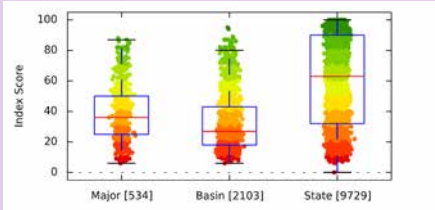

Localized Pollution Sources

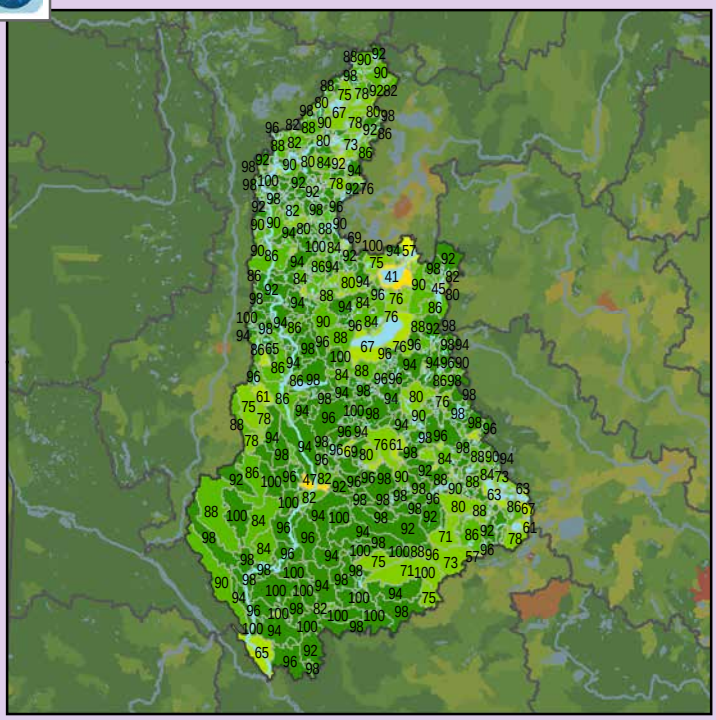

Health Score Distributions:
Chippewa River
- Min: 41
- Max: 100
- Median: 94.0
- Mean: 90.41
- Standard Dev: 10.65

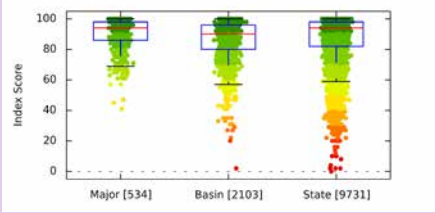

Localized Pollution Sources - Animal Units

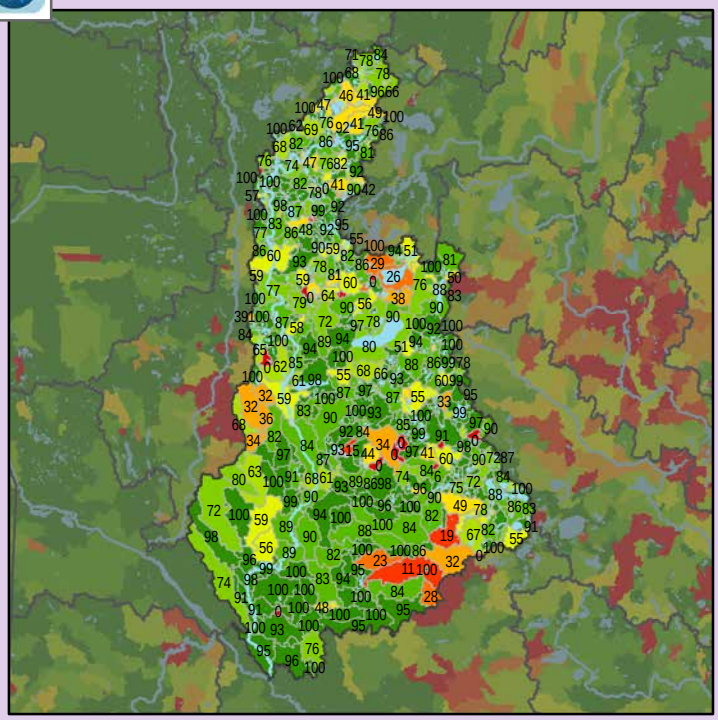

Health Score Distributions:
Chippewa River
- Min: 0
- Max: 100
- Median: 94.0
- Mean: 83.4
- Standard Dev: 23.56

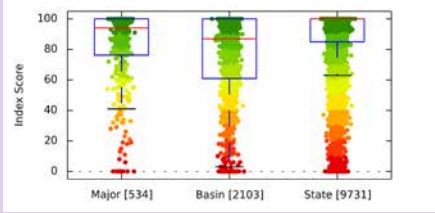

Localized Pollution Sources - Potential Contaminants

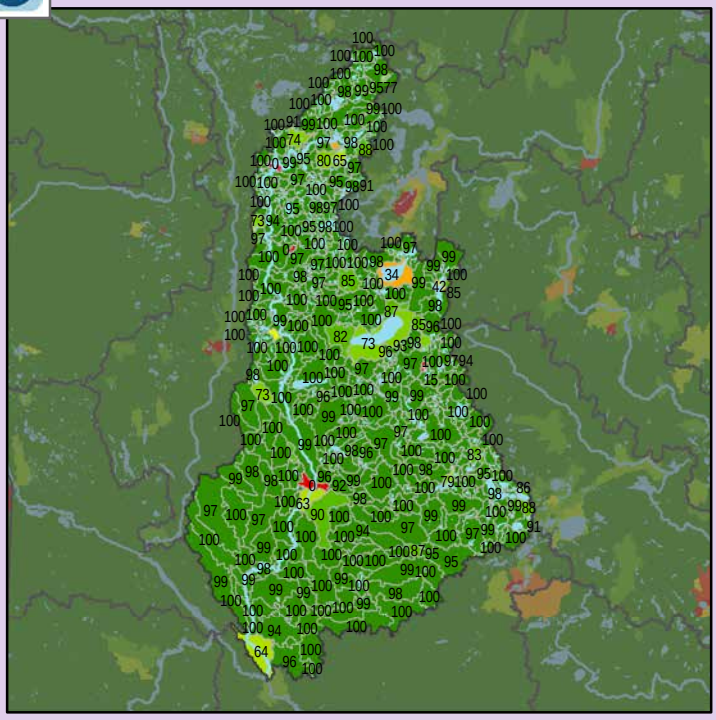

Health Score Distributions:
Chippewa River
- Min: 0
- Max: 100
- Median: 100.0
- Mean: 96.9
- Standard Dev: 11.59

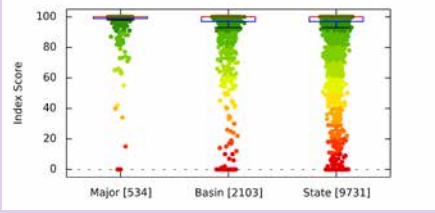

Localized Pollution Sources - Superfund Sites

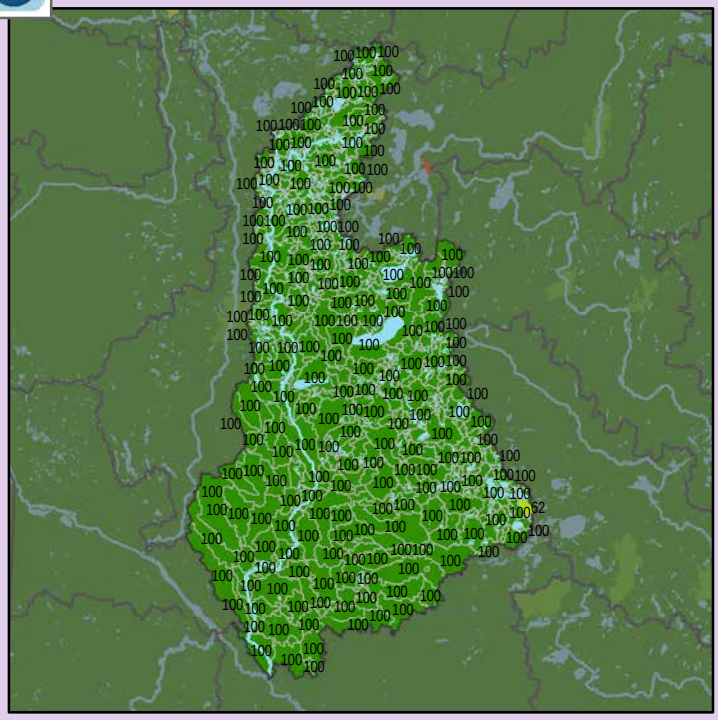

Health Score Distributions:
Chippewa River
- Min: 62
- Max: 100
- Median: 100.0
- Mean: 99.93
- Standard Dev: 1.64

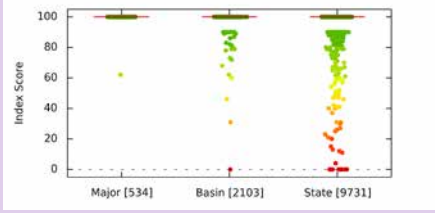

Localized Pollution Sources - Wastewater Treatment

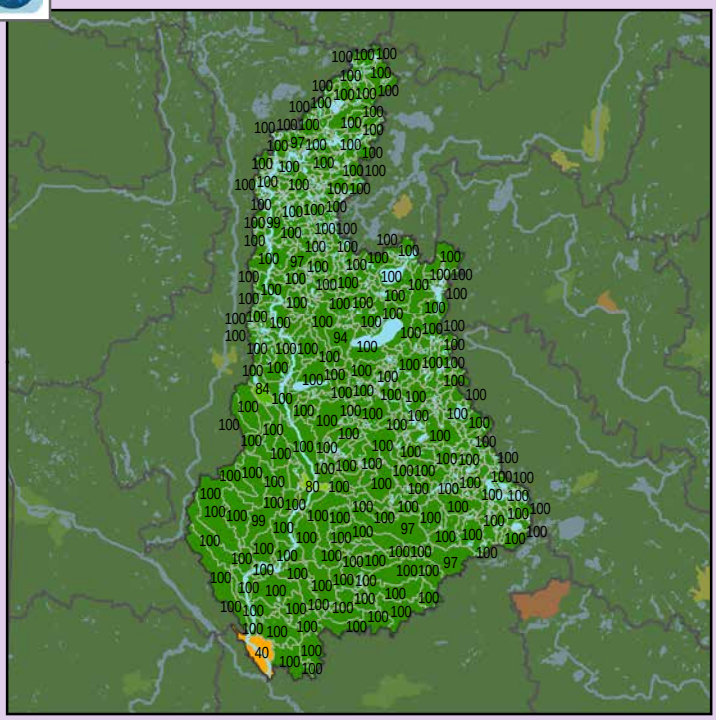

Health Score Distributions:
Chippewa River
Min: 40
Max: 100
Median: 100.0
Mean: 99.78
Standard Dev: 2.84

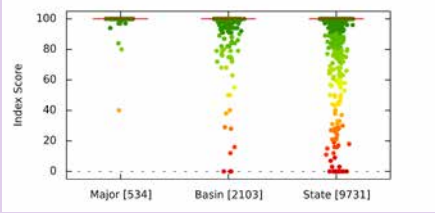

Localized Pollution Sources - Open Pit Mines

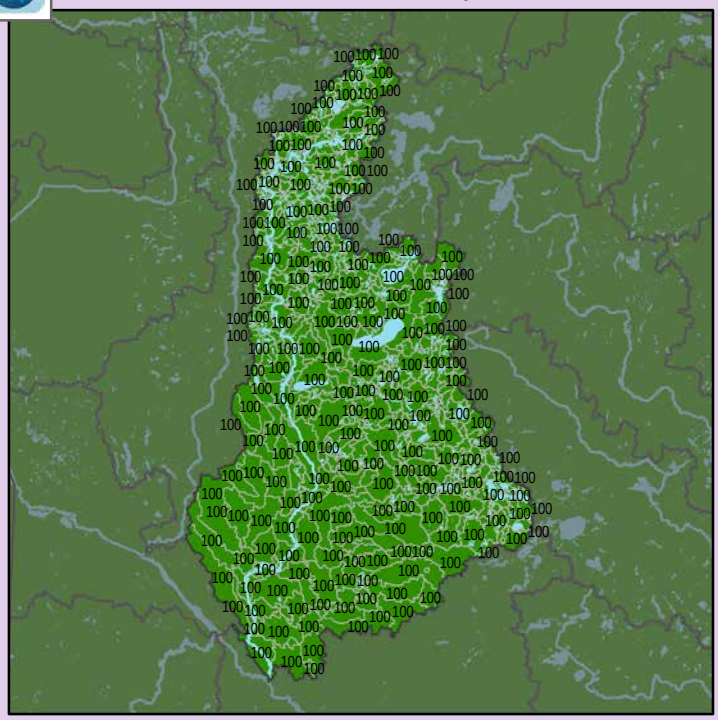

Health Score Distributions:
Chippewa River
Min: 100
Max: 100
Median: 100.0
Mean: 100.0
Standard Dev: 0.0

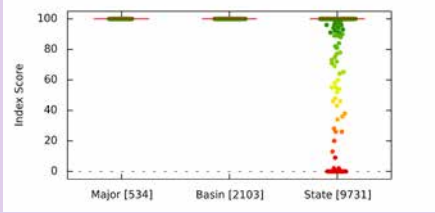

Localized Pollution Sources - Septic Systems

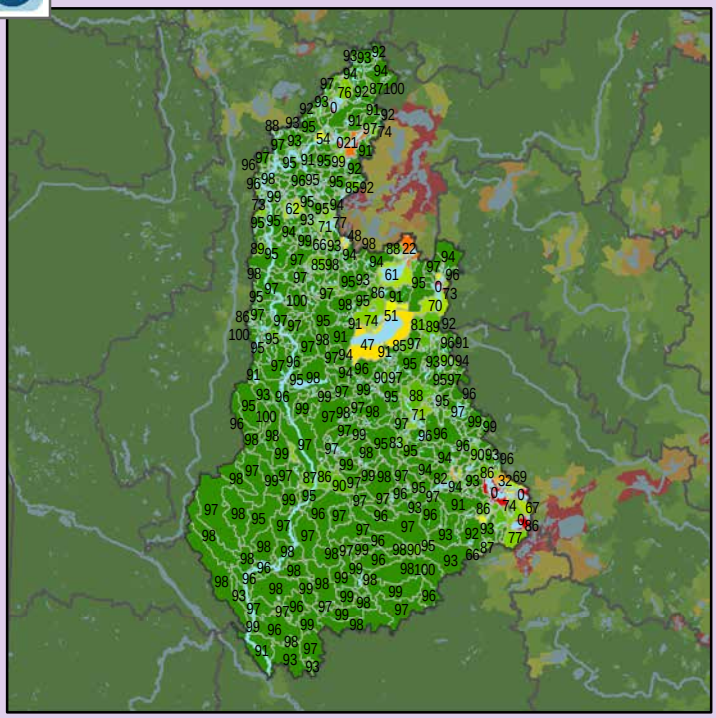

Health Score Distributions:
Chippewa River
Min: 0
Max: 100
Median: 95.0
Mean: 90.38
Standard Dev: 16.28

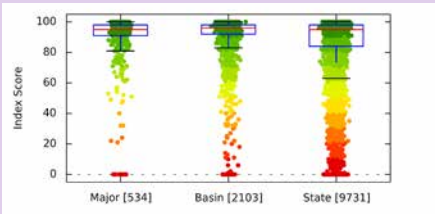

Watershed Health Assessment Framework

"Managing for System Health"

Watershed Report Card:

Le Sueur River

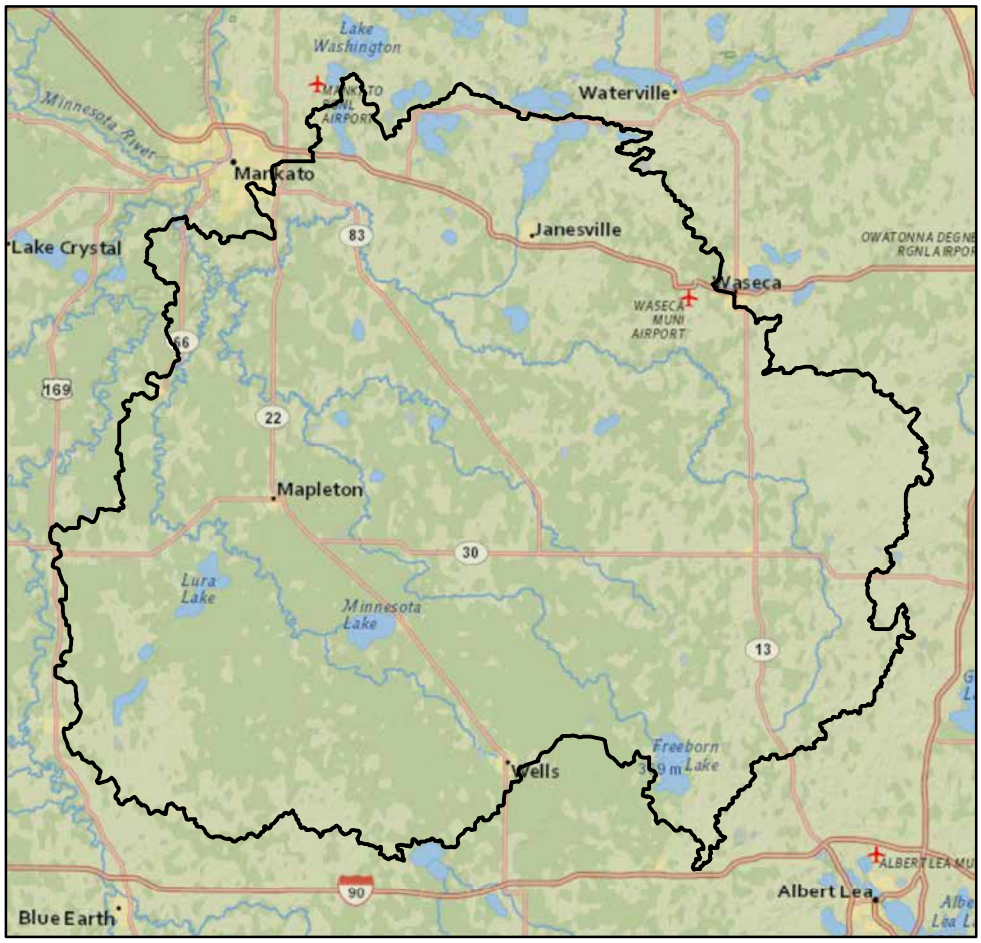

People and Places:

Watershed Population:
- 2000 census - 33,099
- 2010 census - 34,412

Largest Cities - Population:
- Eagle Lake - 2,422
- Wells - 2,343
- Janesville - 2,256
- Mapleton - 1,756
- New Richland - 1,203

Counties - % of watershed:
- Blue Earth - 33 %
- Waseca - 32 %
- Faribault - 22 %
- Freeborn - 10 %
- Steele - 3 %
- Le Sueur - 0 %

Watershed Area:

Watershed size:
- 711,115 acres
- 1,111 square miles

Watershed Surface Area:
- Percent Land - 98 %
- Percent Water - 2 %

HUC8 ID:
- 07020011

Basin Name:
- Minnesota (0702)

Land Use:

Percent of watershed area by land cover type:

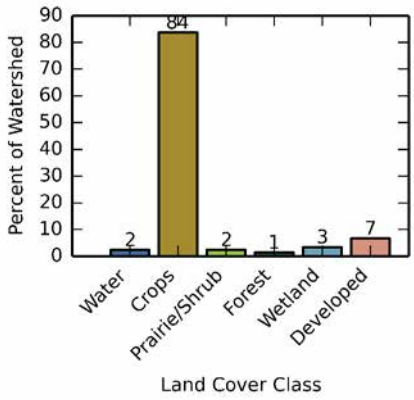

Watershed Health Report - Major Watershed

Le Sueur River

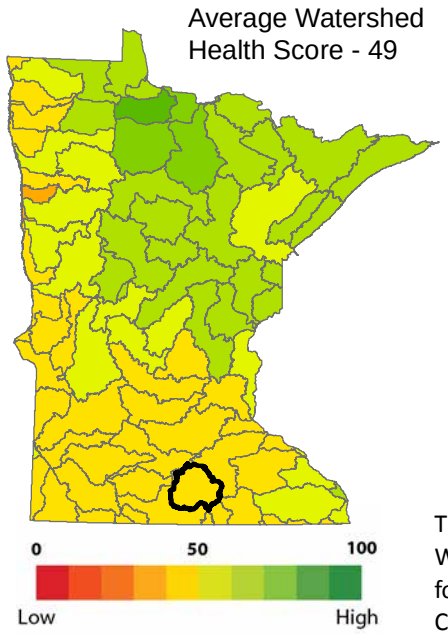

National Land Cover - 2011

- Open Water
- Developed, Open
- Developed, Low
- Developed, Medium
- Developed, High
- Barren Land
- Decidious Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Grassland
- Pasture/Hay
- Cultivated Crops
- Woody Wetlands
- Herbaceous Wetlands

These health scores are calculated at the Major Watershed (HUC8) scale. Health score names followed by (*) are also calculated at the DNR Catchment scale (subdivided HUC12). Those results are reported on the following pages.

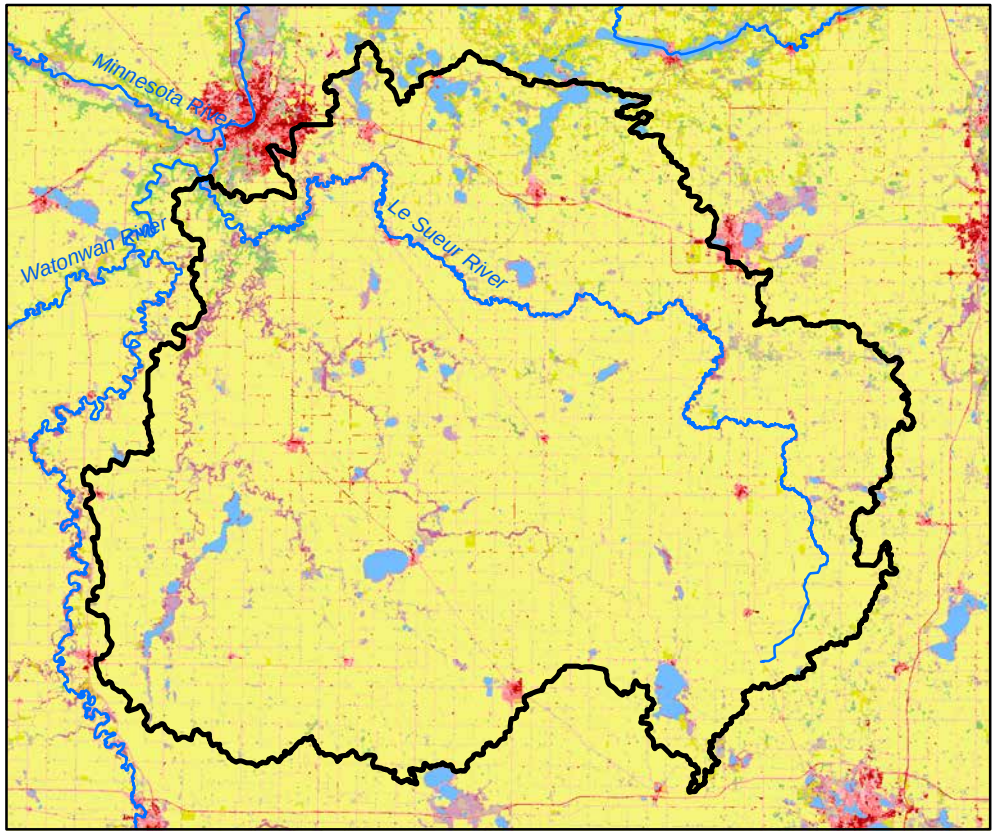

Hydrology

Component Health Score (index average) 60

Index Scores

Perennial Cover*	9
Impervious Cover*	71
Water Withdrawal*	99
Flow Variability	65
Hydrologic Storage	35
Sub-Scores	
Altered Streams*	53
Surface Storage	18

Geomorphology

Component Health Score (index average) 74

Index Scores

Soil Erosion Potential*	76
Groundwater Susceptibility	55
Climate Vulnerability	92

Biology

Component Health Score (index average) 38

Index Scores

Terrestrial Habitat Quality*	1
Stream Species Quality*	76
Species Richness	56
At-Risk Species Richness	18

Connectivity

Component Health Score (index average) 19

Index Scores

Terrestrial Habitat Connectivity	2
Aquatic Connectivity*	45
Riparian Connectivity*	44

Water Quality

Component Health Score (index average) 52

Index Scores

Non-Point Pollution Sources	31
Sub-Score	
Phosphorus Risk*	5
Localized Pollution Sources*	81
Assessments	39

Watershed Health Assessment Framework
Health score methodology - **www.dnr.state.mn.us/whaf/about/scores**

September, 2015

Perennial Cover (2011)

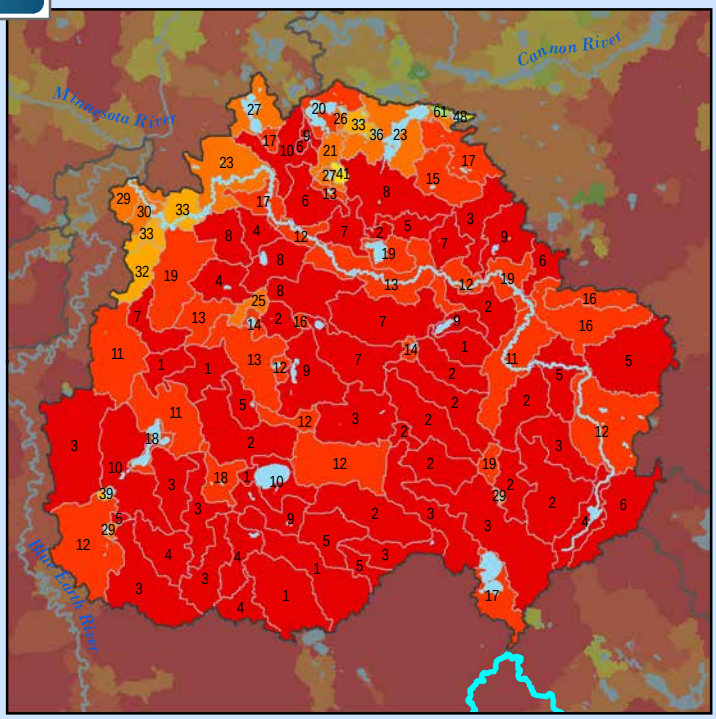

Health Score Distributions:
Le Sueur River
- Min: 1
- Max: 61
- Median: 9.0
- Mean: 12.13
- Standard Dev: 11.2

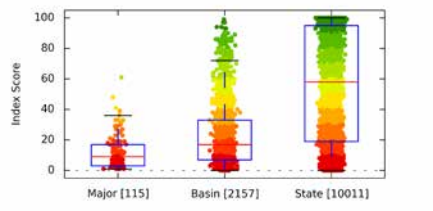

Impervious Cover (2011)

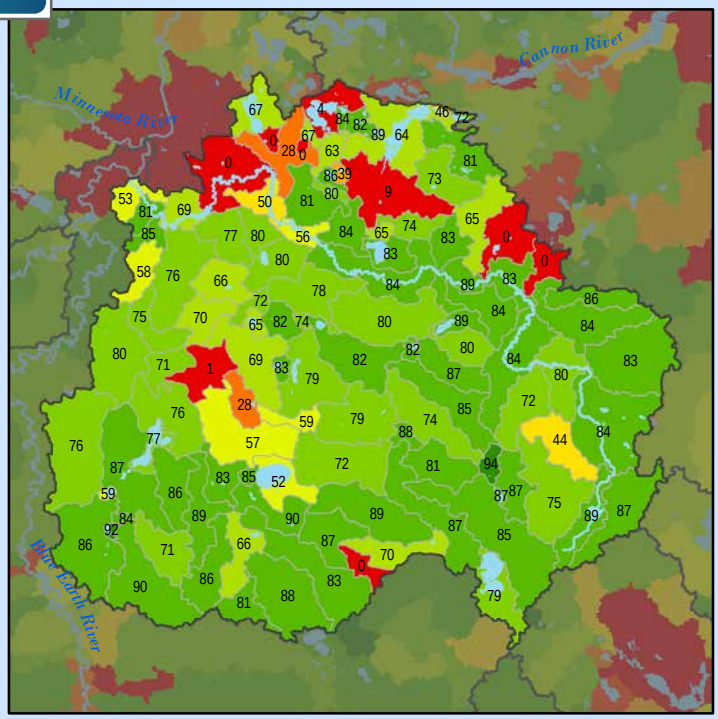

Health Score Distributions:
Le Sueur River
- Min: 0
- Max: 94
- Median: 80.0
- Mean: 70.28
- Standard Dev: 23.61

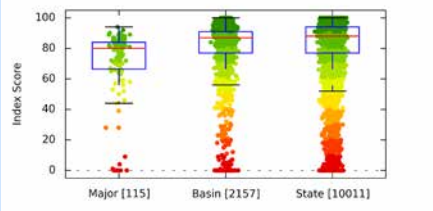

Water Withdrawal Index

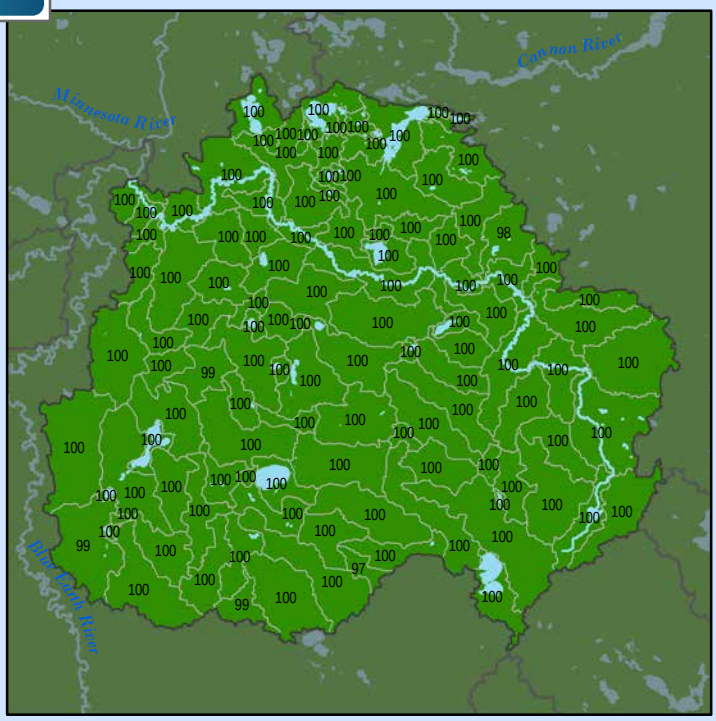

Health Score Distributions:
Le Sueur River
- Min: 97
- Max: 100
- Median: 100.0
- Mean: 99.93
- Standard Dev: 0.37

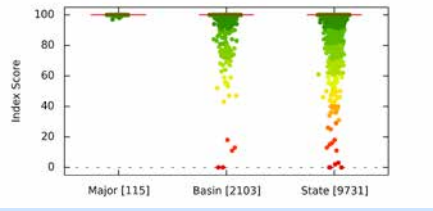

Altered Streams

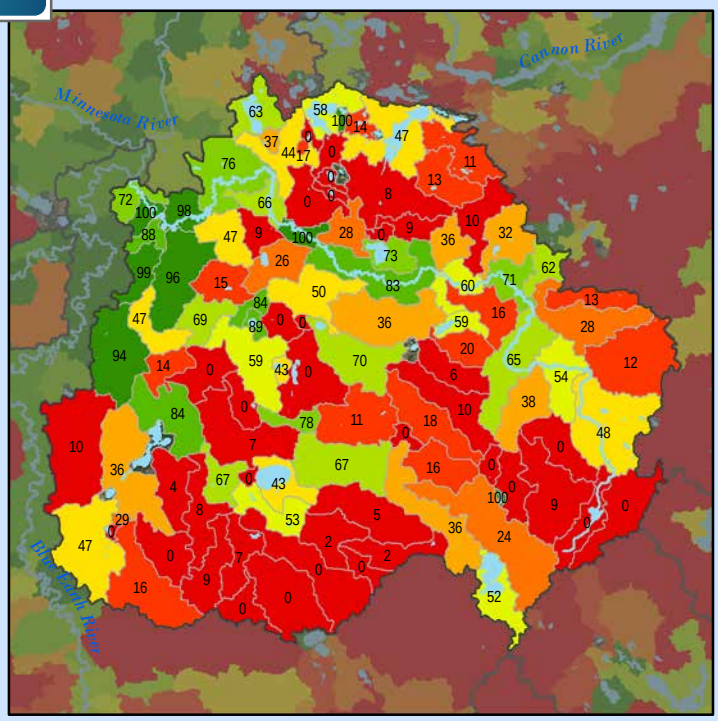

Health Score Distributions:
Le Sueur River
- Min: 0
- Max: 100
- Median: 22.0
- Mean: 33.63
- Standard Dev: 32.32

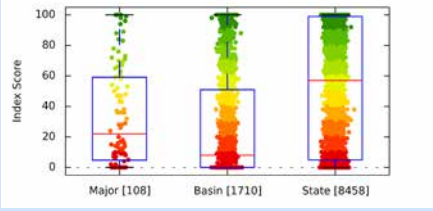

Soil Erosion Potential

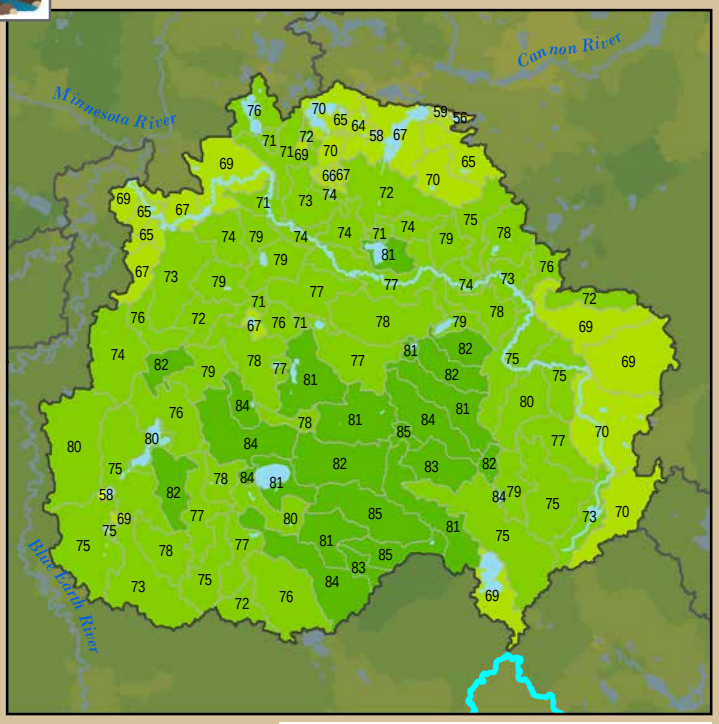

Health Score Distributions:
Le Sueur River
Min: 56
Max: 85
Median: 75.0
Mean: 74.89
Standard Dev: 6.23

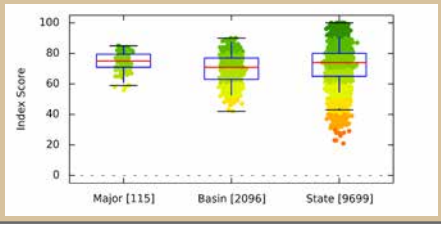

Terrestrial Habitat Quality

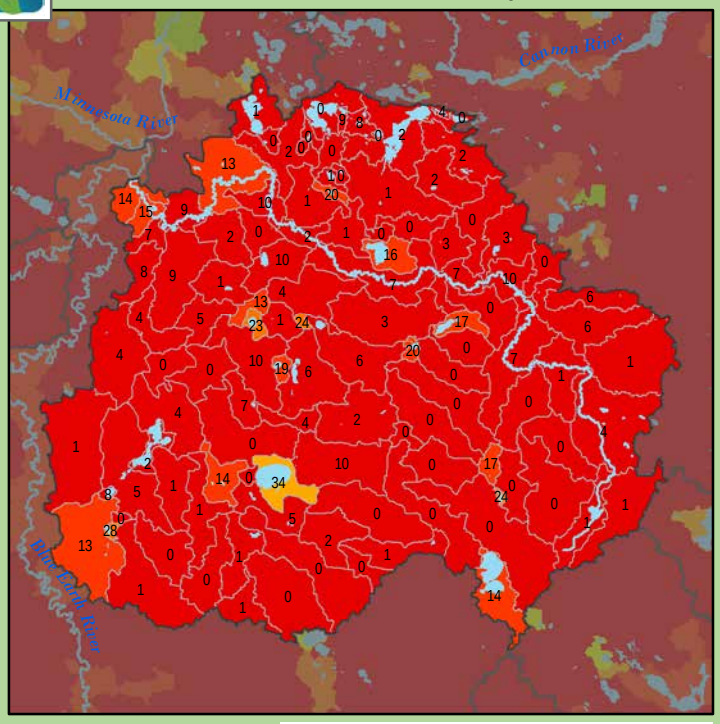

Health Score Distributions:
Le Sueur River
Min: 0
Max: 34
Median: 2.0
Mean: 5.1
Standard Dev: 6.94

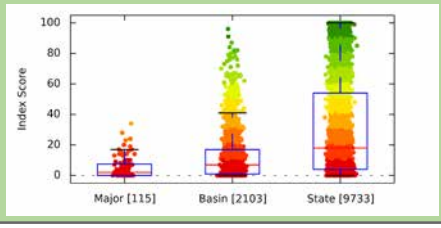

Stream Species Quality - Mussel Score

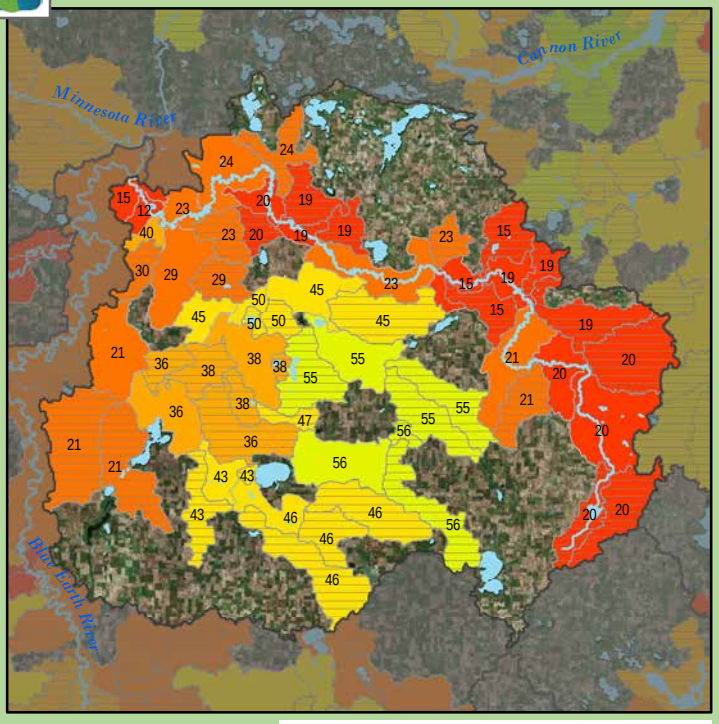

Health Score Distributions:
Le Sueur River
Min: 12
Max: 56
Median: 29.0
Mean: 32.66
Standard Dev: 13.78

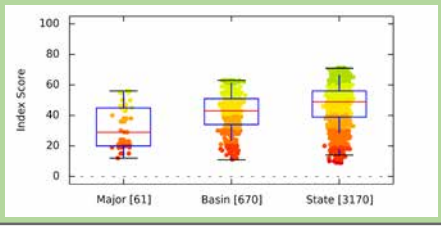

Stream Species Quality - Aquatic Invertebrate IBI

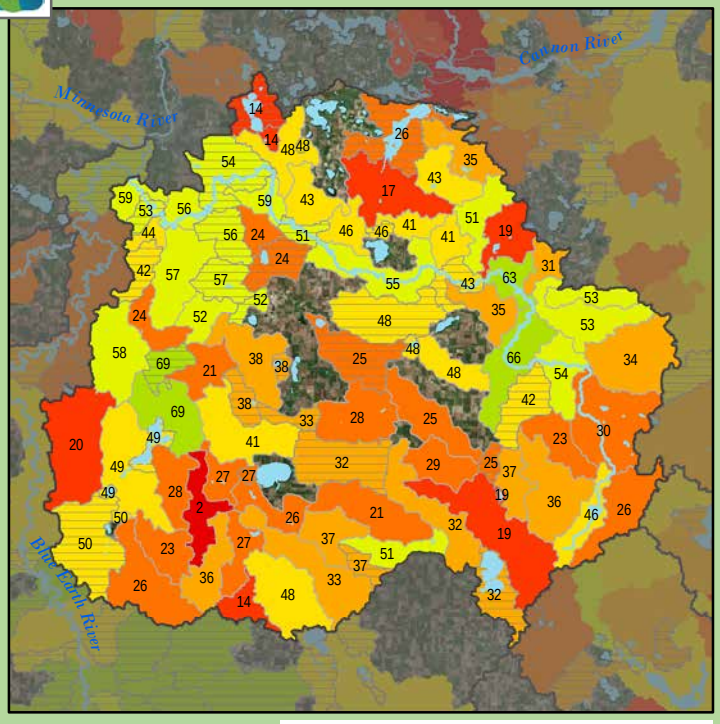

Health Score Distributions:
Le Sueur River
Min: 2
Max: 69
Median: 38.0
Mean: 38.78
Standard Dev: 14.16

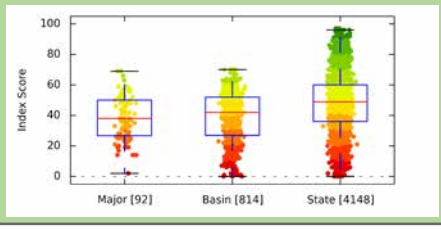

Stream Species Quality - Fish IBI

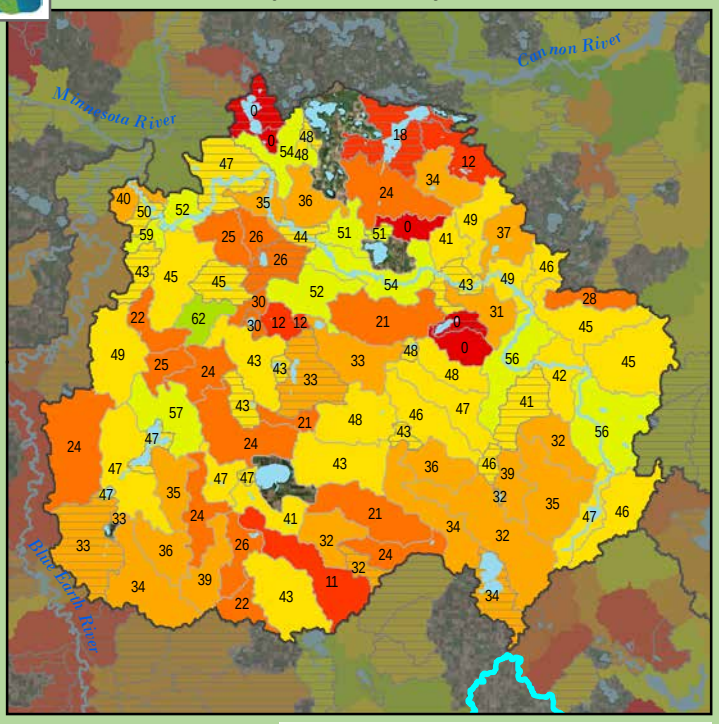

Health Score Distributions:
Le Sueur River
Min: 0
Max: 62
Median: 39.0
Mean: 36.21
Standard Dev: 13.9

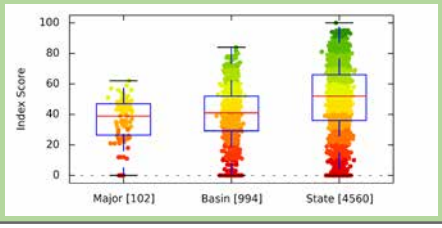

Aquatic Connectivity

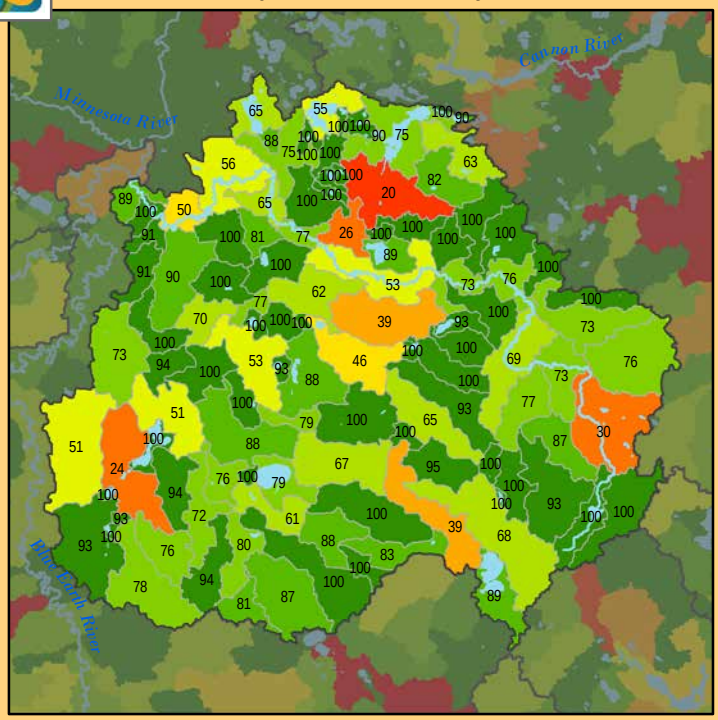

Health Score Distributions:
Le Sueur River
Min: 20
Max: 100
Median: 90.0
Mean: 83.65
Standard Dev: 19.55

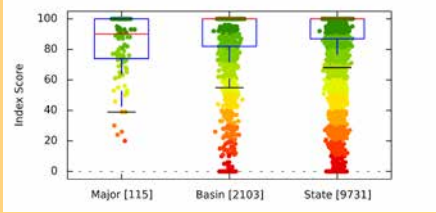

Riparian Connectivity

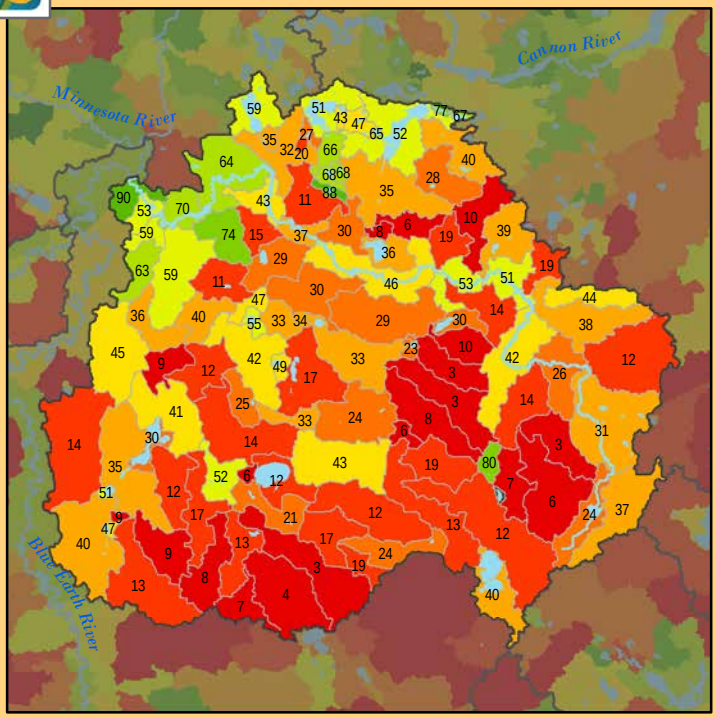

Health Score Distributions:
Le Sueur River
Min: 3
Max: 90
Median: 30.0
Mean: 32.23
Standard Dev: 21.05

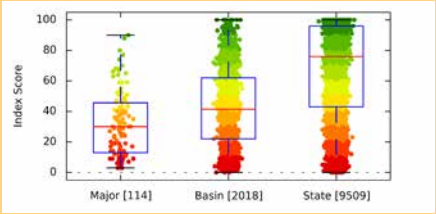

Non-Point Source - Phosphorus Risk

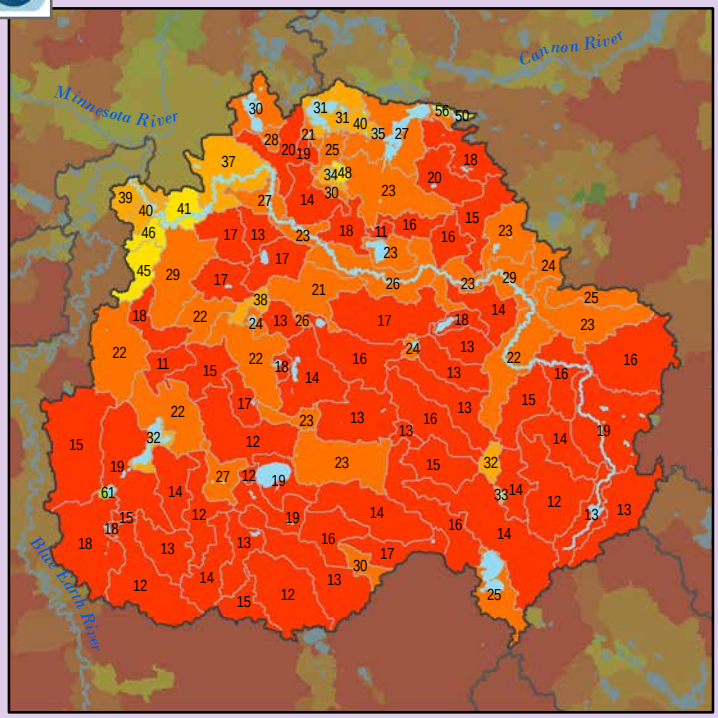

Health Score Distributions:
Le Sueur River
Min: 11
Max: 61
Median: 19.0
Mean: 22.03
Standard Dev: 10.06

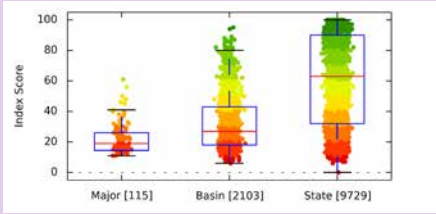

Localized Pollution Sources

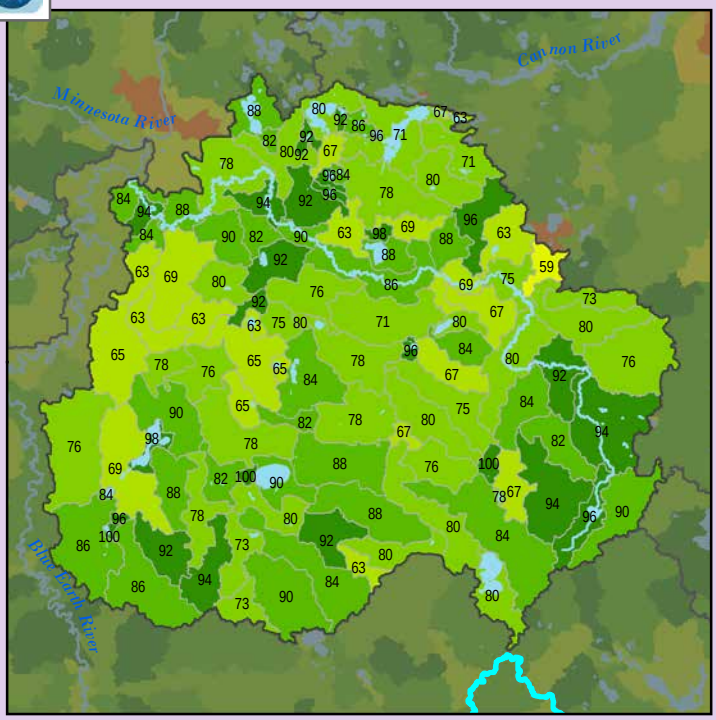

Health Score Distributions:
Le Sueur River
- Min: 59
- Max: 100
- Median: 80.0
- Mean: 81.17
- Standard Dev: 10.57

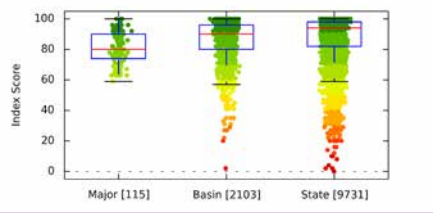

Localized Pollution Sources - Animal Units

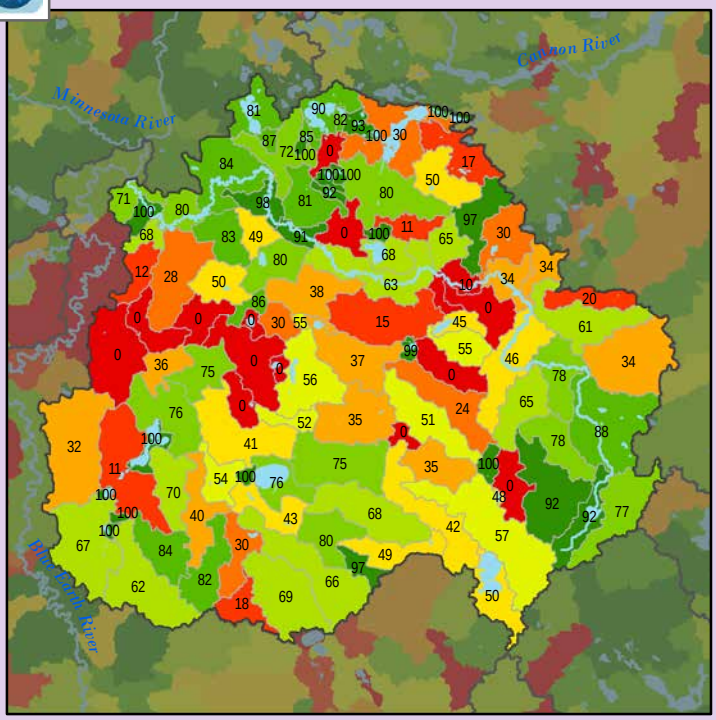

Health Score Distributions:
Le Sueur River
- Min: 0
- Max: 100
- Median: 63.0
- Mean: 57.29
- Standard Dev: 32.55

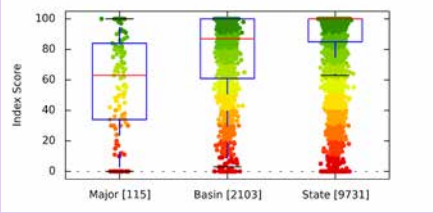

Localized Pollution Sources - Potential Contaminants

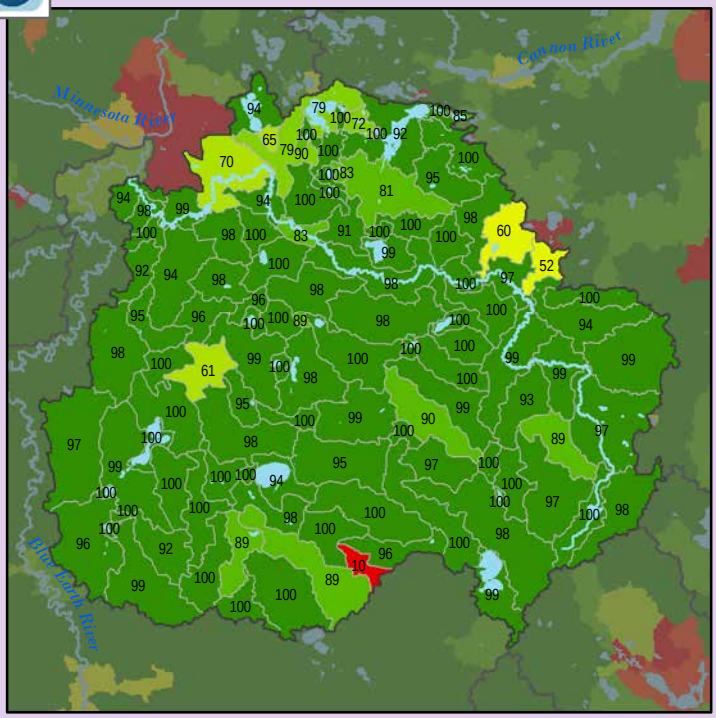

Health Score Distributions:
Le Sueur River
- Min: 10
- Max: 100
- Median: 99.0
- Mean: 94.37
- Standard Dev: 11.91

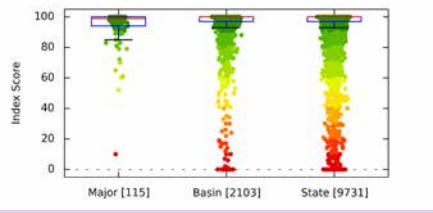

Localized Pollution Sources - Superfund Sites

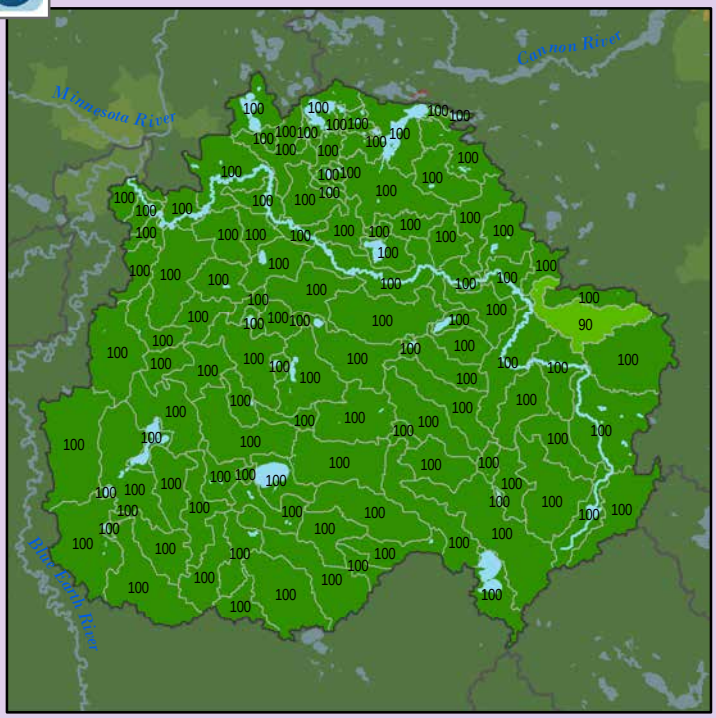

Health Score Distributions:
Le Sueur River
- Min: 90
- Max: 100
- Median: 100.0
- Mean: 99.91
- Standard Dev: 0.93

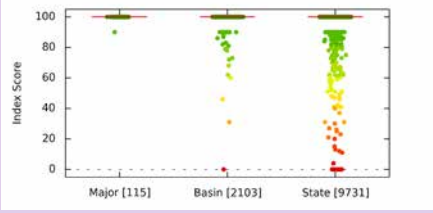

Localized Pollution Sources - Wastewater Treatment

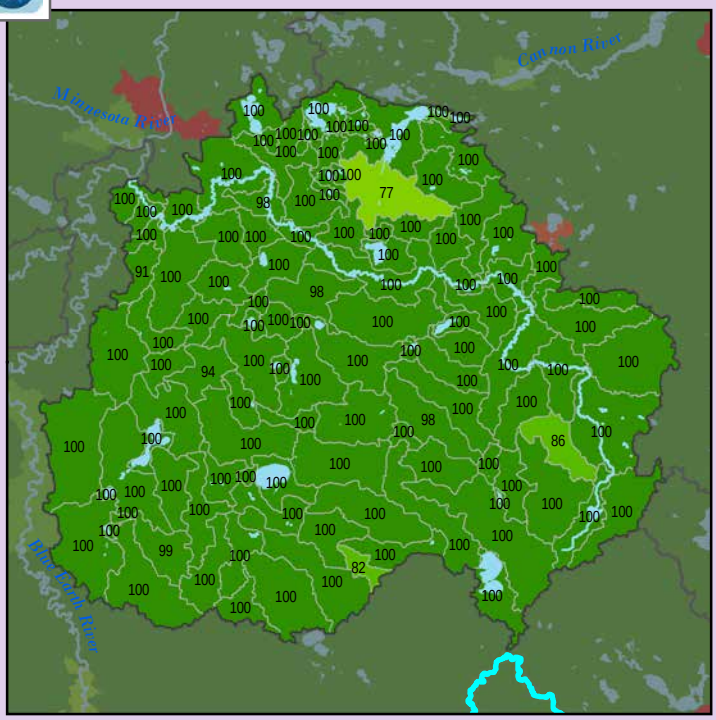

Health Score Distributions:
Le Sueur River
Min: 77
Max: 100
Median: 100.0
Mean: 99.33
Standard Dev: 3.13

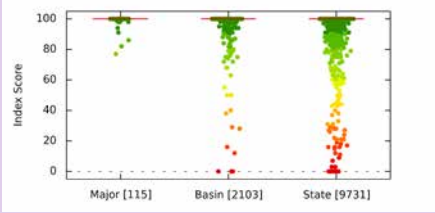

Localized Pollution Sources - Open Pit Mines

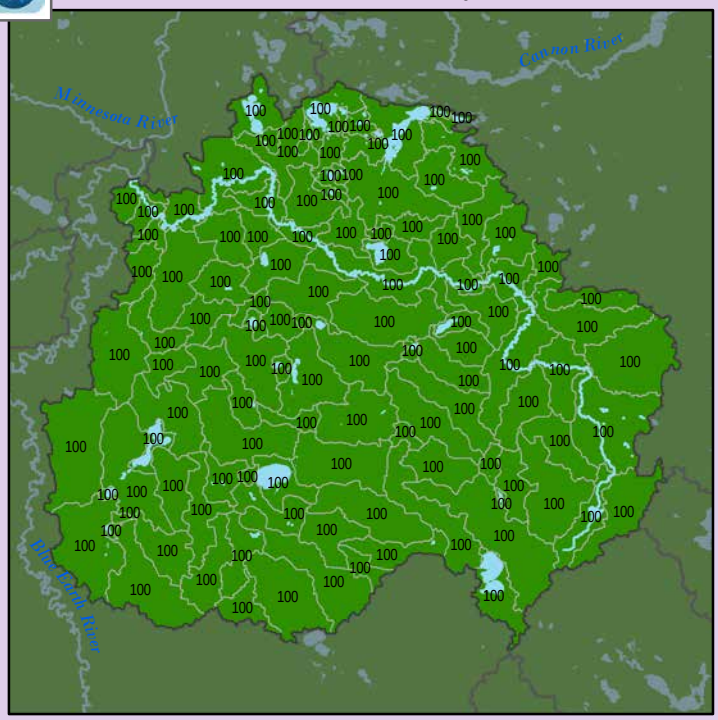

Health Score Distributions:
Le Sueur River
Min: 100
Max: 100
Median: 100.0
Mean: 100.0
Standard Dev: 0.0

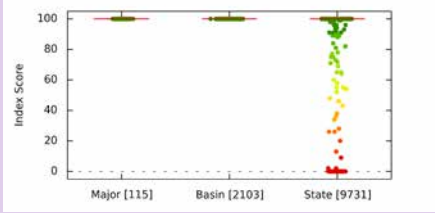

Localized Pollution Sources - Septic Systems

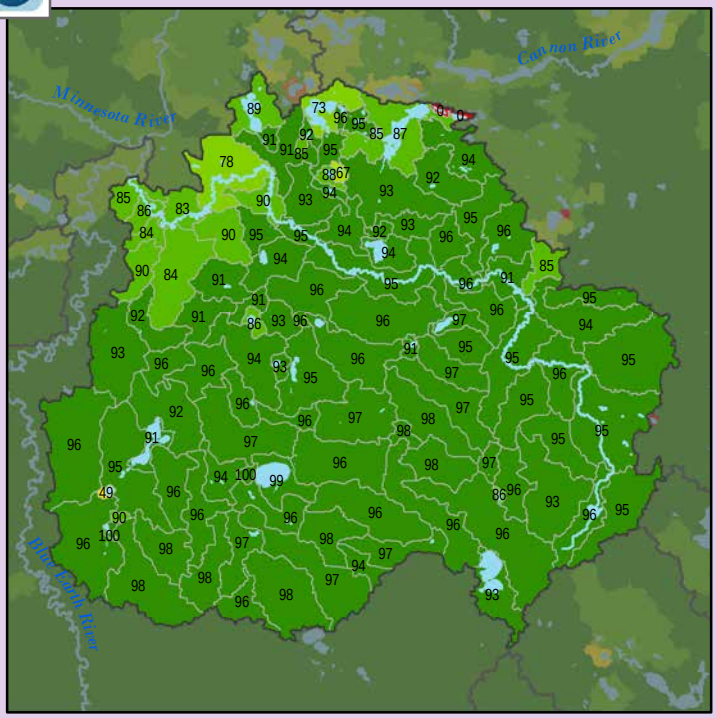

Health Score Distributions:
Le Sueur River
Min: 0
Max: 100
Median: 95.0
Mean: 91.22
Standard Dev: 13.76

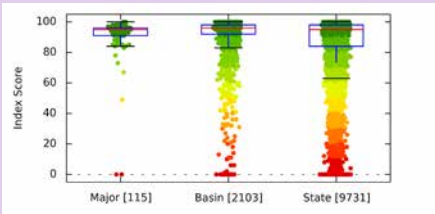

Appendix J-2

Lake Distribution Among Ecoregions-Routes

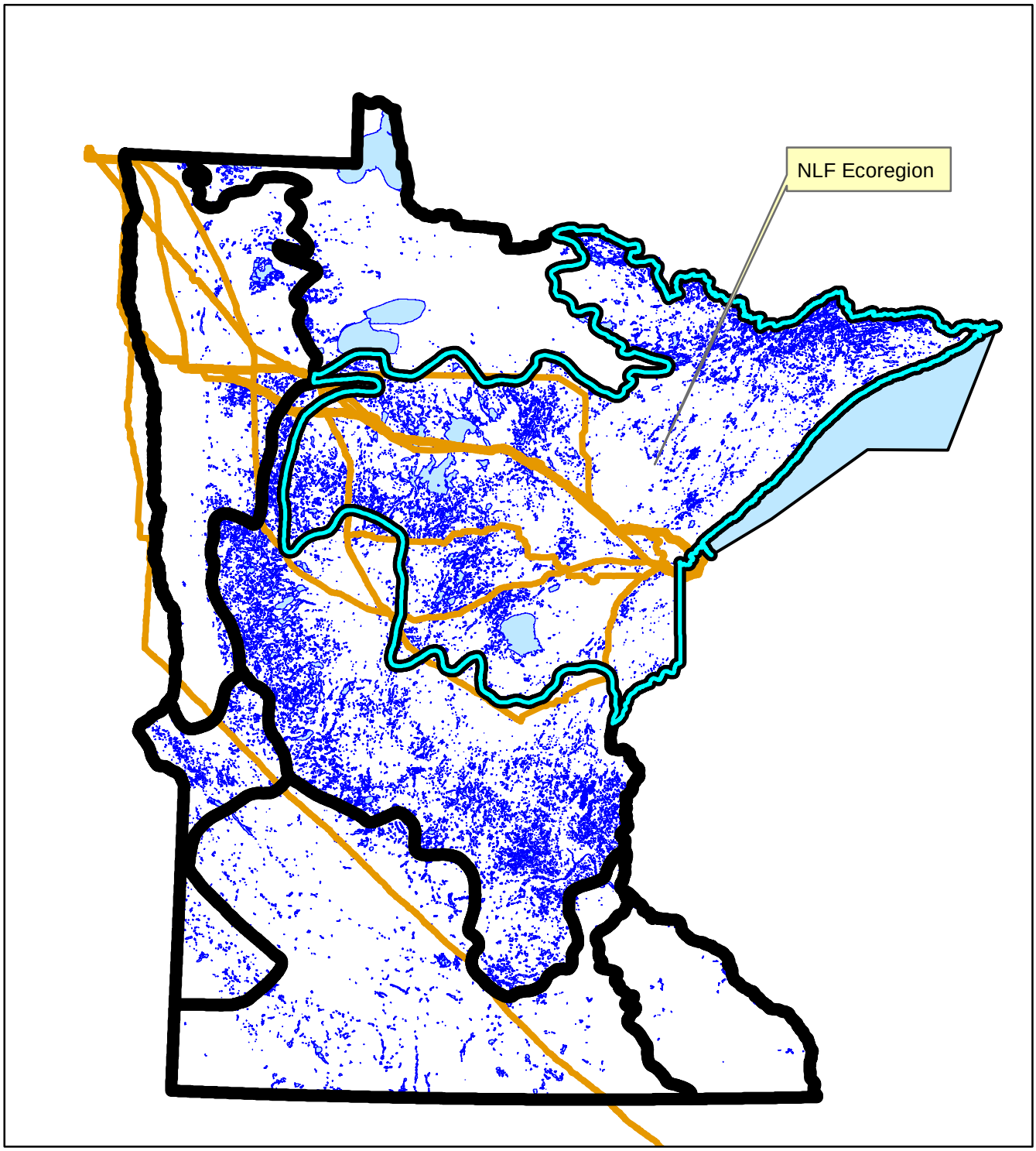

Legend

- mn_eco_l3
- Final_Rail_Routes_Buffer
- Final_Truck_Routes_Buffer
- RA
- Public Waters Basins

Appendix J-3

Stream Distribution Among Ecoregions-Routes

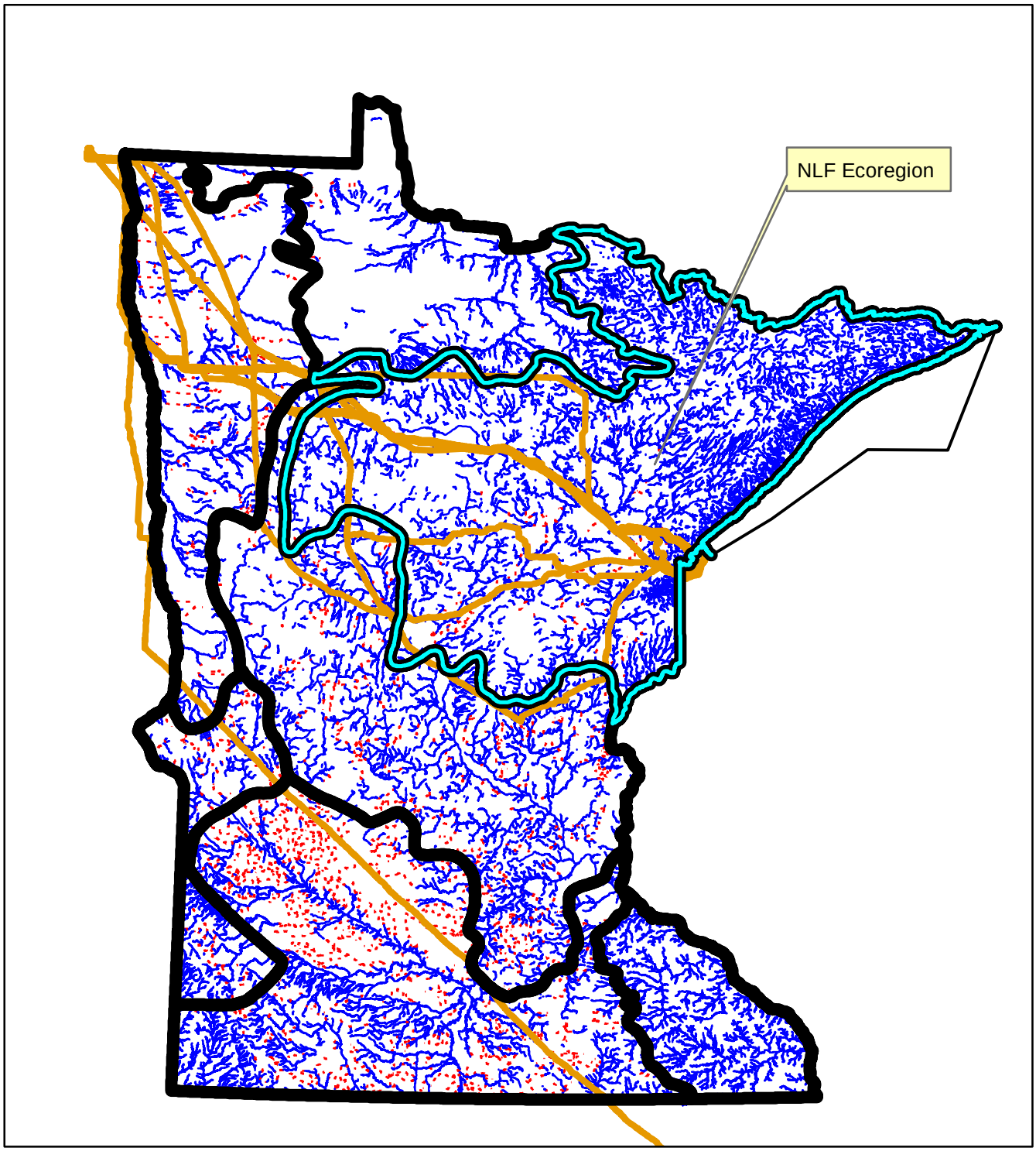

Legend

- mn_eco_l3
- Final_Rail_Routes_Buffer
- Final_Truck_Routes_Buffer
- RA
- Public Water Watercourse
- Public Ditch/Altered Natural Watercourse

Appendix J-4

Distribution of MN Ditches (Source DOT)

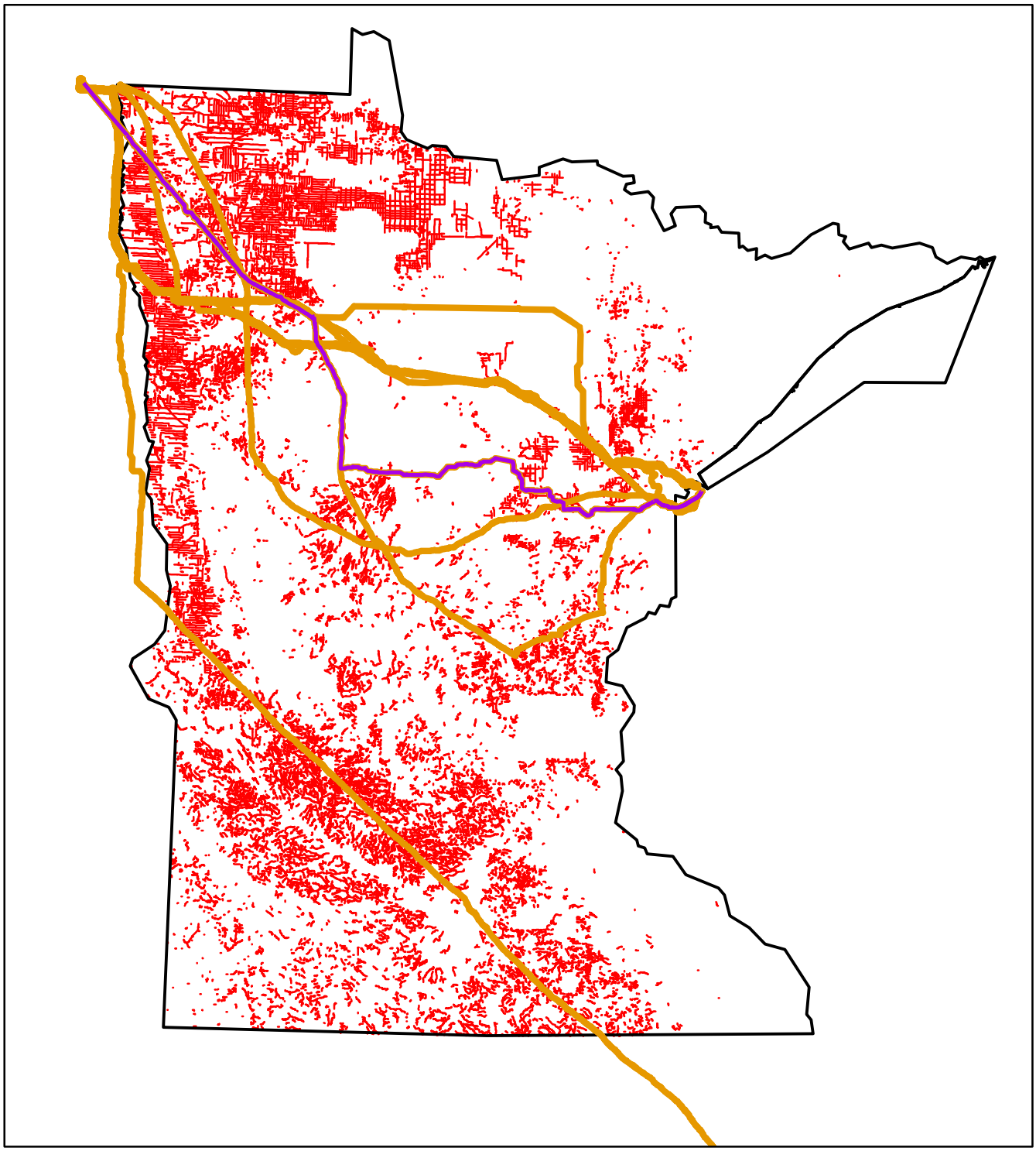

Legend

- Applicants_Preferred_Route
- Final_Rail_Routes_Buffer
- Final_Truck_Routes_Buffer
- RA
- Reduced Resolution Boundary > 1:3,000,000
- Drainage Ditches

Appendix J-5

Distribution of MN Ditches (Source DOT)

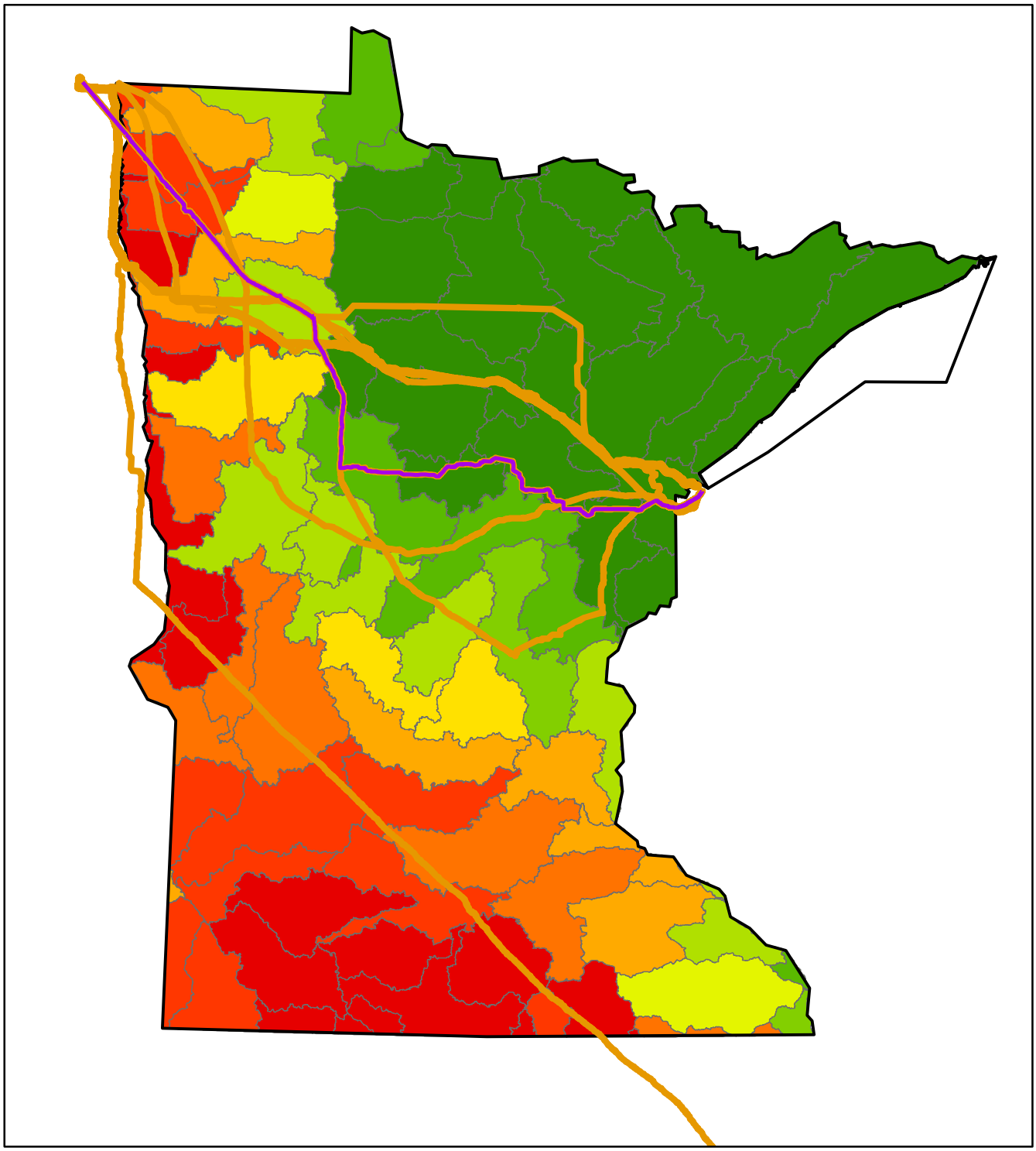

Legend

- Applicants_Preferred_Route
- Final_Rail_Routes_Buffer
- Final_Truck_Routes_Buffer
- RA
- Reduced Resolution Boundary > 1:3,000,000

Legend

Hyd Index - Perennial Cover, 2011

Major_Scores.H_I_PC

- 0 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- 61 - 70
- 71 - 80
- 81 - 90
- 91 - 100

Appendix J-6

Wetland Distribution Circular 39

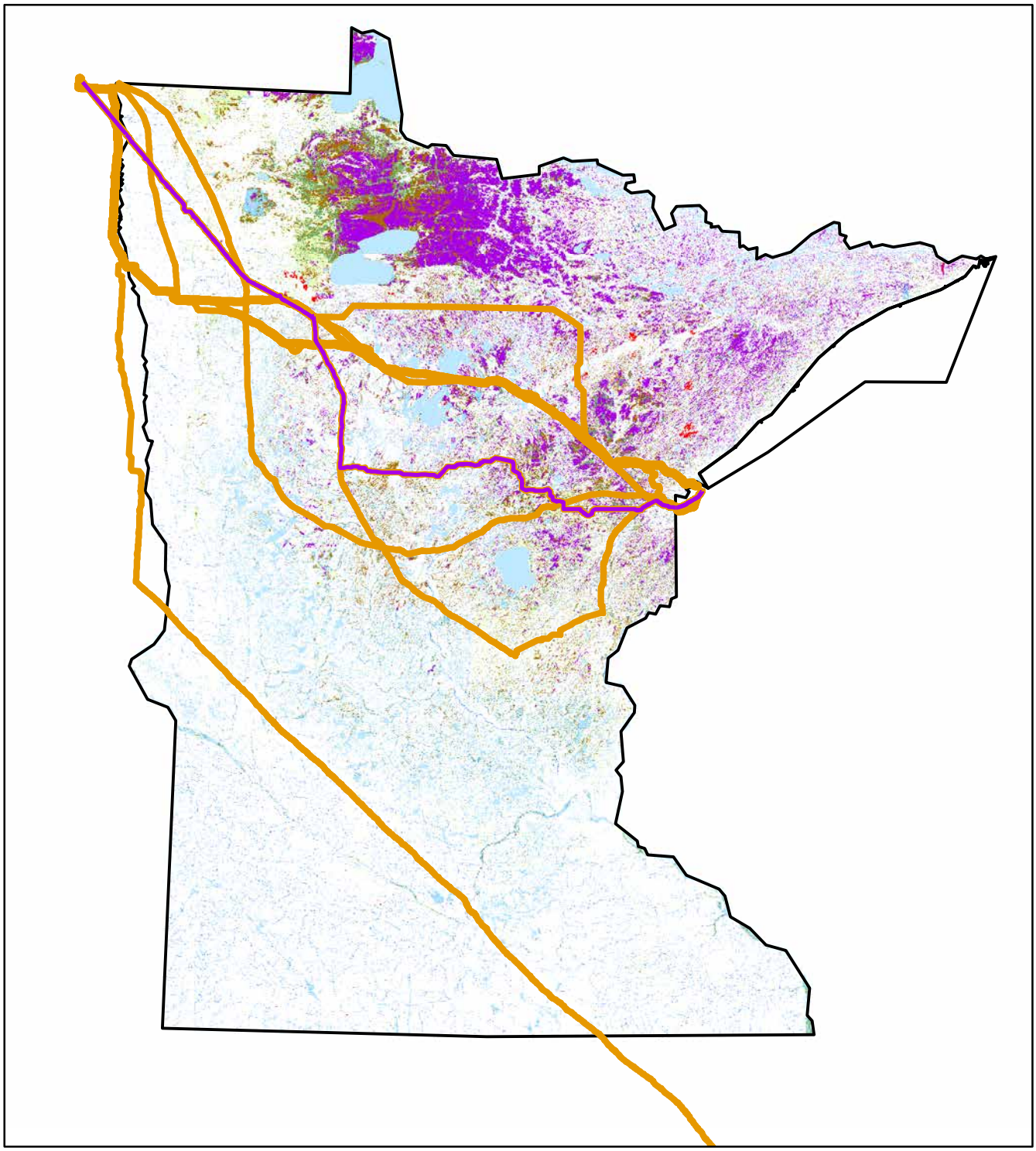

Legend

- Applicants_Preferred_Route
- Final_Rail_Routes_Buffer
- Final_Truck_Routes_Buffer
- RA
- Reduced Resolution Boundary > 1:3,000,000

Legend

National Wetlands Inventory Raster

NWI Circular 39 Classification

- Seasonally Flooded Basin or Flat
- Wet Meadow
- Shallow Marsh
- Deep Marsh
- Shallow Open Water
- Shrub Swamp
- Wooded Swamp
- Bog
- Municipal and Industrial
- Riverine System

Legend

Appendix J-7

Loss of Hydrologic Storage, Wetland Loss

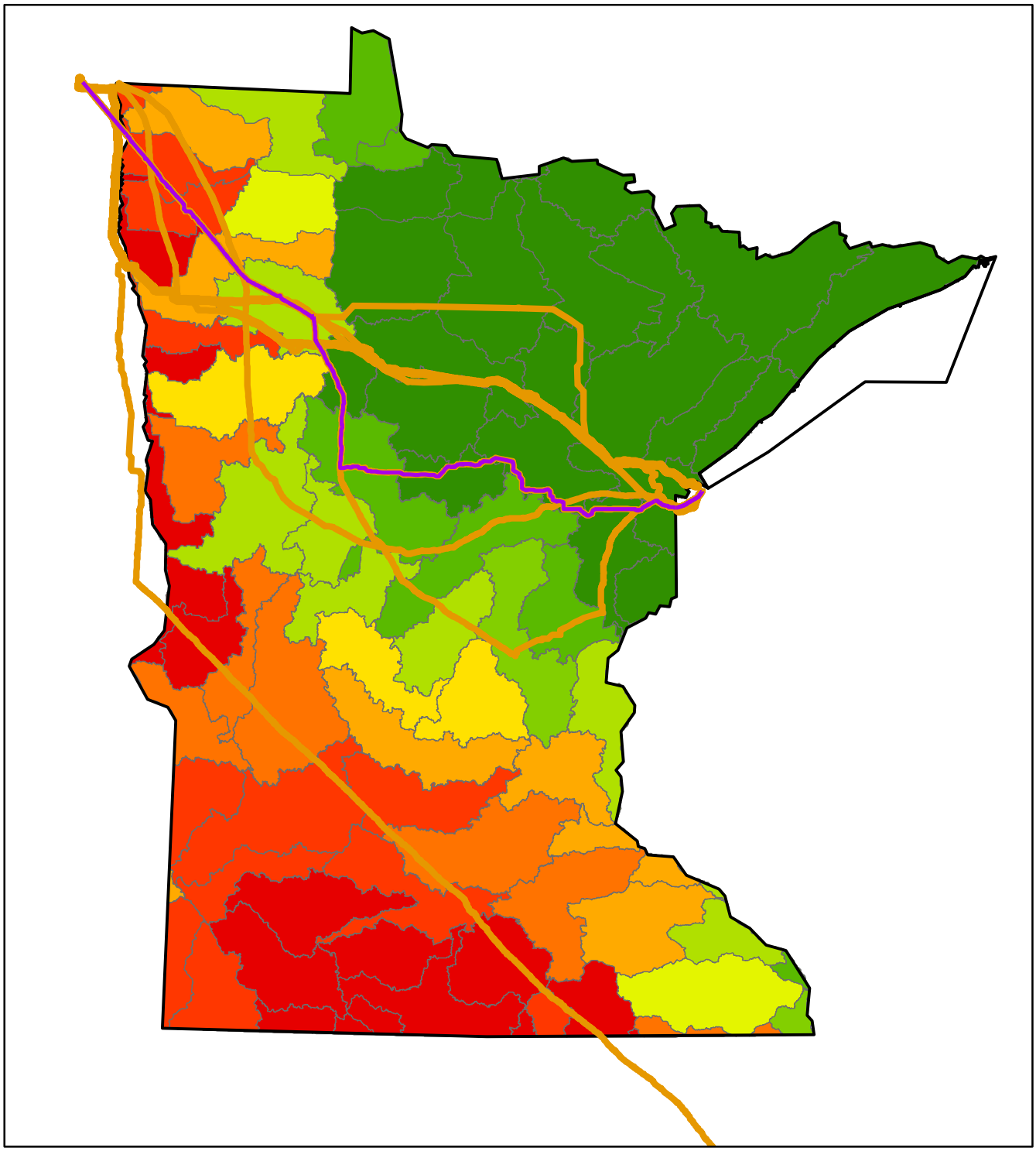

Legend

- Applicants_Preferred_Route
- Final_Rail_Routes_Buffer
- Final_Truck_Routes_Buffer
- RA
- Reduced Resolution Boundary > 1:3,000,000

Legend

Hyd Index - Perennial Cover, 2011

Major_Scores.H_I_PC

- 0 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- 61 - 70
- 71 - 80
- 81 - 90
- 91 - 100

Legend

Appendix K

Vegetation Tables

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Table K-1. Minnesota Ecological Sections Crossed by the Applicant's Preferred Route and Route Alternatives (miles)

Province	Section	Subsection	Applicant's Preferred Route		Route Alternatives[a]			
			Total within Minnesota	Between Clearbrook and Carlton	RA-03AM	RA-06	RA-07	RA-08
Prairie Parklands	Red River Valley	Red River Prairie	35.1					
Prairie Parklands subtotal								
Tallgrass Aspen Parklands	Lake Agassiz, Aspen Parklands	Aspen Parklands	61.6					
Tallgrass Aspen Parklands subtotal								
Eastern Broadleaf Forest	Minnesota & NE Iowa Morainal	Anoka Sand Plain			10.7			
		Hardwood Hills	20.9	8.5	24.0	9.6	6.2	6.4
Eastern Broadleaf Forest subtotal			***20.9***	***8.5***	***34.7***	***9.6***	***6.2***	***6.4***
Laurentian Mixed Forest	N. Minnesota & Ontario Peatlands	Littlefork-Vermillion Uplands				21.2		
	N. Minnesota Drift & Lake Plains	Chippewa Plains	31.5	31.5	31.5	54.9	87.3	87.9
		Pine Moraines & Outwash Plains	94.7	94.7	78.3			
		St. Louis Moraines	36.6	36.6		29.2	16.0	13.2
		Tamarack Lowlands	31.3	31.3		29.4	37.6	37.0
	Northern Superior Uplands	Nashwauk Uplands				30.9		
		North Shore Highlands				17.0	17.0	16.9
	Southern Superior Uplands	Glacial Lake Superior Plain	7.1					
	Western Superior Uplands	Mille Lacs Uplands	20.8	18.2	130.2	3.7	3.7	3.6
Laurentian Mixed Forest subtotal			***222.1***	***212.4***	***240.0***	***186.3***	***161.6***	***158.5***
TOTAL			**339.6**	**220.9**	**274.7**	**195.9**	**167.7**	**164.8**

Source: Minnesota DNR 2016a.

Notes: Blank = no occurrence.

[a] Route alternatives between Clearbrook and Carlton, Minnesota.

"-" = no occurrence

Table K-2. Noxious Weeds and Invasive Plants near the Applicant's Preferred Route and Route Alternatives

Common Name	Scientific Name	Minnesota Status[d]	Applicant's Preferred Route[a]		Route Alternatives[c]			
			Total within Minnesota	Between Clearbrook and Carlton[b]	RA-03AM	RA-06	RA-07	RA-08
hoary alyssum	*Berteroa incana*	NA	1	1	1			7
common buckthorn	*Rhamnus cathartica*	RNW			18			
creeping Charlie	*Glechoma hederacea*	NA			1			
oxeye daisy	*Leucanthemum vulgare*	NA	5	5	5	5	26	12
Siberian elm	*Ulmus pumila*	NA			1			4
amur silvergrass	*Miscanthus sacchariflorus*	NA					1	
reed canarygrass	*Phalaris arundinacea*	NA	66	65	14	106	316	208
smooth brome	*Bromus inermis*	NA	14	14	14	1		9
orange hawkweed	*Hieracium aurantiacum*	NA	3	3	7		1	
honeysuckle	*Lonicera* spp.	RNW	1	1	2		1	
spotted knapweed	*Centaurea stoebe*	C	48	47	53	21	110	56
giant knotweed	*Polygonum sachalinense*	SRP						1
black locust	*Robinia pseudoacacia*	RNW					4	
purple loosestrife	*Lythrum salicaria*	PNW					4	2
amur maple	*Acer ginnala*	NA			1		4	1
common mullein	*Verbascum thapsus*	NA			1			
wild parsnip	*Pastinaca sativa*	PNW				6	128	50
Siberian peashrub	*Caragana arborescens*	NA	1	1	4	2	5	4
multi-flora rose	*Rosa multiflora*	RNW					2	2
leafy spurge	*Euphorbia esula*	PNW	1				4	
white sweetclover	*Melilotus alba*	NA	7	7	9	12	43	37

Table K-2. Noxious Weeds and Invasive Plants near the Applicant's Preferred Route and Route Alternatives

Common Name	Scientific Name	Minnesota Status[d]	Applicant's Preferred Route[a]		Route Alternatives[c]			
			Total within Minnesota	Between Clearbrook and Carlton[b]	RA-03AM	RA-06	RA-07	RA-08
yellow sweetclover	*Melilotus officinalis*	NA	5	5	5	2		2
tansy	*Tanacetum vulgare*	PNW	115	107	76	108	150	152
thistle spp.e	*Cirsium* spp.	NA	92	92	34	117	117	60
bull thistle	*Cirsium vulgare*	NA	14	14	23	1	1	2
Canada thistle	*Cirsium arvense*	C	18	18	29	17	34	29
plumeless thistle	*Carduus acanthoides*	C	1	1				
sow thistle	*Sonchus arvensis*	NA	9	9	1			
birsfoot trefoil	*Lotus corniculatus*	NA	12	11	11	10	50	27
cow vetch	*Vicia cracca*	NA			1			
crown vetch	*Coronilla varia*	RNW			3		1	
Number of Taxa			18	17	23	13	20	19
Total Number of Occurrences			**413**	**401**	**314**	**408**	**1,002**	**665**

Sources: Minnesota DNR 2016d; Minnesota DA 2016.

Notes: Blank = no occurrence.

[a] Number of occurrences of infestations within 0.5 mile from the Applicant's preferred route within Minnesota.

[b] Number of occurrences of infestations within 0.5 mile from the Applicant's preferred route between Clearbrook and Carlton, Minnesota.

[c] Number of occurrences of infestations within 0.5 mile from the route alternatives between Clearbrook and Carlton, Minnesota.

[d] Status (MN): E – Eradicate List; C – Control List; RNW – Restricted Noxious Weed; SRP – Specially Regulated Plants
Note: NA = plant species with no legal status per Minnesota Noxious Weed List (Minnesota DA 2016)

[e] May include native, non-weed thistle species

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Table K-3. Estimated Impacts on Vegetation Cover for the Applicant's Preferred Route in Minnesota(acres)

Vegetation Cover Class	Con[a]	Op[a]	ATWS	Access Roads	Pump Stations	Valves	Total[b]	
							Con	Op
Minnesota								
Evergreen Forest	175.8	70.7	18.2	18.6	0.5	0.5	197.9	86.4
Deciduous Forest	1,349.2	594.0	96.8	102.6	2.4	2.1	1,477.1	670.0
Mixed Forest	18.2	7.8	1.4	2.3			19.7	10.0
Scrub/Shrub	225.8	111.5	15.2	13.1	2.1		242.5	125.3
Grassland/Herbaceous	129.8	62.1	32.4	8.7	3.5	0.2	164.1	72.5
Hay/Pasture	577.2	258.7	120.7	45.4	15.7	1.2	698.7	320.2
Cultivated Crops	1,335.5	574.6	326.9	22.3	20.1	1.8	1,664.5	616.8
Woody Wetlands	336.0	169.6	17.7	13.0	3.0	0.5	355.3	184.6
Emergent Herbaceous Wetlands	229.2	122.4	18.9	7.1	3.0	0.1	249.2	131.5
Barren Land	3.6	1.7	8.1	0.6			11.7	2.4
TOTAL	**4,380.3**	**1,973.2**	**656.2**	**233.8**	**50.2**	**6.6**	**5,080.8**	**2,219.5**

Source: Homer et al. 2015.

Notes:

Values in table may not sum to subtotals and totals due to rounding. Blank = no occurrence.

[a] Con = Enbridge-provided construction work area, which includes 50-foot-wide permanent right-of-way; Op = operations right-of-way

[b] Total: Con = sum of Enbridge-provided construction work area, ATWS (additional temporary workspace including pipe yards), and temporary access roads; Op = sum of Enbridge-provided pipeline permanent right-of-way, permanent access roads, pump stations, and valves

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Table K-4. Minnesota Native Plant Community Systems for the Applicant's Preferred Route

Native Plant Community System	MBS Site Biodiversity Significance Rank[a]	Con[b]		Op[b]		Facilities				Totals[c]				Within 0.5 Mile[d]	
						Con		Op		Con		Op			
		Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.
Acid Peatland System	High	2.4	3	1.2	3					2.4	3	1.2	3	339.5	23
Complex community	Moderate	5.8	2	3.1	2					5.8	2	3.1	2	288.4	5
	High													135.2	7
Fire-Dependent Forest/Woodland System	Moderate	28.7	9	13.7	9	3.5	19	3.5	6	32.2	28	17.2	15	1,817.4	59
	High					0.3	1			0.3	1			276.5	24
	Outstanding							1.5	2			1.5	2	267.3	32
Forested Rich Peatland System	Moderate	4.9	5	4.6	5	0.1	1			5.0	6	4.6	5	442.1	19
	High	17.6	6	9.0	6			0.7	2	17.6	6	9.7	8	650.1	32
	Outstanding	3.5	2	1.8	2					3.5	2	1.8	2	27.0	1
Marsh System	Moderate													0.0	1
	Outstanding													197.2	29
Mesic Hardwood Forest System	Moderate	42.7	7	19.0	7	12.0	37	2.1	5	54.7	44	21.1	12	1,393.5	28
	High	9.0	7	4.0	7	0.2	2			9.2	9	4.0	7	565.7	30
	Outstanding													128.9	30
Open Rich Peatland System	Moderate	5.5	7	4.3	7	0.0	3			5.5	10	4.3	7	514.5	16
	High													7.1	1
	Outstanding													49.5	3
Upland Prairie System	Moderate	1.7	1	0.7	1	0.3	1			2.0	2	0.7	1	43.9	1
	High													92.5	3
	Outstanding													37.1	6

Table K-4. Minnesota Native Plant Community Systems for the Applicant's Preferred Route

Native Plant Community System	MBS Site Biodiversity Significance Rank[a]	Con[b]		Op[b]		Facilities				Totals[c]				Within 0.5 Mile[d]	
						Con		Op		Con		Op			
		Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.
Wet Forest System	Moderate	2.8	3	1.9	3	0.1	1			2.9	4	1.9	3	207.2	8
	High	6.2	4	2.8	4	0.6	3			6.8	7	2.8	4	206.2	18
	Outstanding													51.6	11
Wet Meadow/Carr System	Moderate	4.7	16	4.1	11					4.7	16	4.1	11	765.2	106
	High	0.5	1	0.3	1	10.5	11			11.0	12	0.3	1	177.3	19
	Outstanding							0.0	1			0.0	1	35.4	35
Wetland Prairie System	High													164.5	8
Total		**135.9**	**73**	**70.5**	**68**	**27.7**	**79**	**7.9**	**16**	**163.6**	**152**	**78.4**	**84**	**8,880.9**	**555**

Sources: Minnesota DNR 2016b, Minnesota DNR 2016e.

Notes:

Values in table may not sum to subtotals and totals due to rounding. Blank = no occurrence, 0.0 = <0.1.

[a] Systems occurring within Minnesota Biological Survey (MBS) Sites of Biodiversity Significance are given these ranks:
Outstanding = Sites containing the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes.
High = Sites containing very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes.
Moderate = Sites containing occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery.
Below = Sites below minimum biodiversity threshold for statewide significance. These sites lack occurrences of rare species or natural features or do not meet Minnesota Biological Survey standards for Outstanding, High, or Moderate rank.

[b] Con = Enbridge-provided construction work area, which includes 50-foot-wide permanent right-of-way; Op = operations right-of-way

[c] Totals: Con = sum of Enbridge-provided construction work area, ATWS (additional temporary workspace including pipe yards), and temporary access roads; Op = sum of Enbridge-provided pipeline permanent right-of-way, permanent access roads, pump stations, and valves

[d] Within 0.5 mile = Minnesota native plant community systems within 0.5-mile buffer centered on the route

Table K-5. Rare Native Plant Communities for the Applicant's Preferred Route

Native Plant Community	MBS Site Biodiversity Significance Rank[a]	Conser-vation Rank[b]	Con[c]		Op[c]		Additional Impacts[d]				Total Impacts[e]				Within 0.5 Mile[f]	
							Con		Op		Con		Op			
			Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.
Alder – (Red Currant – Meadow-Rue) Swamp	Outstanding	S3													1.9	2
	(blank)	S3													0.0	1
Black Ash – (Red Maple) Seepage Swamp	High	S1S2	5.1	2	2.4	2	0.6	3			5.7	5	2.4	2	65.5	5
Calcareous Fen (Northwestern)	High	S2													7.1	1
Graminoid Poor Fen (Basin)	High	S3													11.5	3
Jack Pine – (Bush Honeysuckle) Woodland	Moderate	S1/S2/S3	10.3	5	5.4	5	1.4	5	2.3	4	11.7	10	7.7	9	714.5	22
Jack Pine – (Bush Honeysuckle) Woodland, Bracken Subtype	High	S1					0.3	1			0.3	1			68.2	2
Jack Pine – (Yarrow) Woodland	High	S1S2													30.4	1
Mesic Brush-Prairie (Northern)	High	S2													92.5	3
	Outstanding	S2													33.1	4
Mesic Prairie (Northern)	Moderate	S2	1.7	1	0.7	1	0.3	1			2.0	2	0.7	1	43.9	1
	Outstanding	S2													4.1	2
Oak – Aspen Forest	Below	S3	6.3	1	2.6	1	0.9	4	0.0	1	7.2	5	2.6	2	60.2	1
	Moderate	S3	16.4	3	7.2	3	2.1	13	1.2	2	18.0	12	8.4	5	1,024.4	34
	High	S3													87.8	2
	Outstanding	S3							0.8	1			0.8	1	128.1	15
	(blank)	S3													0.1	2
Red Pine – White Pine Forest	Moderate	S2													43.9	1
	High	S2													49.8	13
	Outstanding	S2							0.7	1			0.7	1	5.1	1
Red Pine – White Pine Woodland, Balsam Fir Subtype	High	S3													22.9	3

Table K-5. Rare Native Plant Communities for the Applicant's Preferred Route

Native Plant Community	MBS Site Biodiversity Significance Rank[a]	Conser-vation Rank[b]	Con[c]		Op[c]		Additional Impacts[d]				Total Impacts[e]				Within 0.5 Mile[f]	
							Con		Op		Con		Op			
			Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.
Red Pine – White Pine Woodland, Mountain Maple Subtype	High	S3													10.2	2
Spikerush – Bur Reed Marsh (Northern)	Moderate	S2													0.0	1
	Outstanding	S2													12.5	23
	(blank)	S2													0.4	7
Sugar Maple – Basswood – (Bluebead Lily) Forest	High	S3													97.9	2
Tamarack Seepage Swamp (Aspen Parkland)	Moderate	S3													10.1	1
	Outstanding	S3													27.0	1
Wet Brush-Prairie (Northern)	High	S3													64.5	5
Wet Prairie (Northern)	High	S3													100.0	3

Table K-5. Rare Native Plant Communities for the Applicant's Preferred Route

Native Plant Community	MBS Site Biodiversity Significance Rank[a]	Conser-vation Rank[b]	Con[c]		Op[c]		Additional Impacts[d]				Total Impacts[e]				Within 0.5 Mile[f]	
							Con		Op		Con		Op			
			Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.
White Pine – White Spruce – Paper Birch Forest	High	S2	0.6	3	0.3	3	0.0	1			0.6	4	0.3	3	59.9	9
Total			**40.4**	**15**	**18.6**	**15**	**5.6**	**28**	**5.1**	**9**	**45.5**	**39**	**23.6**	**24**	**2,877.6**	**173**

Sources: Minnesota DNR 2016b, 2016d, 2016e.

Notes:

Values in table may not sum to subtotals and totals due to rounding. Blank = no occurrence, 0.0 = <0.1.

[a] Native plant communities occurring within Minnesota Biological Survey (MBS) Sites of Biodiversity Significance are given these ranks:
Outstanding = Sites containing the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes.
High = Sites containing very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes.
Moderate = Sites containing occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery.
Below = Sites below minimum biodiversity threshold for statewide significance. These sites lack occurrences of rare species or natural features or do not meet Minnesota Biological Survey standards for Outstanding, High, or Moderate rank.

[b] S1 = critically imperiled, S2 = imperiled, S3 = vulnerable to extirpation

[c] Con = Enbridge provided construction work area, which includes 50-foot-wide permanent right-of-way; Op = operations right-of-way.

[d] Additional Impacts = footprints for additional temporary workspace (ATWS), pipe yards, access roads, valve pads and driveways, and pump stations

[e] Total Impacts = Con = sum of Enbridge-provided construction work area, ATWS (including pipe yards), and temporary access roads; Op = sum of Enbridge-provided pipeline permanent right-of-way, permanent access roads, pump stations, and valves

[f] Within 0.5 mile = rare native plant communities within 0.5-mile buffer centered on the route

Table K-6. Estimated Impacts on Vegetation Cover for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton, Minnesota

Vegetation Cover	Applicant's Preferred Route[a]		Route Alternatives							
			RA-03AM[b]		RA-06[b]		RA-07[c]		RA-08[b]	
	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op
Evergreen Forest	173.4	69.6	145.4	60.1	102.6	42.6	234.5	37.0	106.4	43.7
Deciduous Forest	1,255.5	554.0	975.1	403.1	797.7	332.9	772.6	177.1	591.8	245.5
Mixed Forest	17.5	7.4	13.5	5.7	164.2	68.3	139.4	27.9	74.6	30.5
Scrub/Shrub	210.6	104.3	190.5	80.2	251.4	104.2	276.9	83.4	123.8	51.8
Grassland/Herbaceous	93.5	45.0	142.8	60.6	115.5	49.2	404.8	107.0	81.3	34.5
Hay/Pasture	388.1	175.2	1,030.6	432.9	213.2	89.2	325.5	88.4	303.9	128.2
Cultivated Crops	173.4	76.4	565.2	237.7	43.0	18.0	76.3	23.1	31.7	13.2
Woody Wetlands	316.6	158.8	194.7	78.1	732.2	304.2	1,055.9	236.1	651.1	270.2
Emergent Herbaceous Wetlands	174.0	95.3	315.1	133.5	223.3	94.0	536.1	154.2	318.6	134.7
Barren Land	3.6	1.7	5.1	2.2	30.5	12.8	10.4	3.2	2.8	1.1
Total	**2,806.4**	**1,287.8**	**3,578.0**	**1,494.1**	**2,673.6**	**1,115.4**	**3,832.3**	**937.4**	**2,286.0**	**953.5**

Source: Homer et al. 2015

Notes:

[a] Con = Enbridge-provided footprint for construction work area; Op = Enbridge-provided footprint for permanent right-of-way

[b] Con = estimated 120-foot-wide construction work area centered on route, includes the 50-foot-wide permanent right-of-way; Op = estimated operations area based on 50-foot-wide permanent right-of-way centered on route

[c] Con = estimated 205-foot-wide construction work area with 10-feet-wide on the north side of Line 3 and 195-feet-wide on the south side of Line 3; Op = estimated operations area based on 50-foot-wide permanent right-of-way centered on route

Table K-7. Estimated Impacts on Native Plant Community Systems for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton, Minnesota

Native Plant Community System	MBS Site Biodiversity Significance Rating	Applicant's Preferred Route[a]						Route Alternative RA-03AM[b]						Route Alternative RA-06[b]						Route Alternative RA-07[c]						Route Alternative RA-08[b]					
		Con		Op		0.5 mile		Con		Op		Within 0.5 Mile		Con		Op		Within 0.5 Mile		Con		Op		Within 0.5 mile		Con		Op		Within 0.5 Mile	
		Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.
Acid Peatland System	Moderate											76.6	15																		
	High	2.4	3	1.2	3	339.5	23					1.1	1	8.6	2	3.7	2	290.1	8	27.3	2	3.4	1	493.7	14	37.2	9	15.9	8	2,580.0	42
Complex community	Moderate							0.0	1			68.5	12																		
	High					24.1	3																								
Fire-Dependent Forest/ Woodland System	Moderate	26.7	8	12.6	8	1,785.6	58	20.2	14	8.1	10	1,777.7	66							2.7	1			217.0	4					148.2	4
	High					269.3	23					255.9	22					9.5	1					9.5	1					9.5	1
	Outstanding					133.2	16					133.3	17																		
Floodplain Forest System	High											0.1	1																		
Forested Rich Peatland System	Moderate	4.9	5	4.6	5	432.0	18	2.2	8	0.6	4	531.9	36							8.4	1			264.2	4	2.3	1	0.4	1	412.9	9
	High	17.6	6	9.1	6	650.1	32	2.5	2	1.0	1	33.1	5	9.9	4	3.5	3	429.0	19	14.3	3	0.3	1	436.1	18	2.0	2	0.6	1	330.4	14
Marsh System	Moderate					0.0	1					40.7	3																		
	High											3.2	1																		
	Outstanding					12.5	23					12.5	23																		
Mesic Hardwood Forest System	Moderate	42.7	7	19.0	7	1,393.5	28	32.7	7	15.7	5	2,331.9	34																	3.5	1
	High	9.0	7	4.0	7	565.7	30	0.9	4	0.3	3	403.2	20	0.4	2	0.0	1	62.9	9	2.5	3	0.0	1	62.9	9	3.9	3	1.6	2	229.1	26
	Outstanding					128.9	30					128.9	30																		
Open Rich Peatland System	Moderate	5.5	7	4.3	7	514.5	16	8.4	10	3.3	7	648.5	27											48.4	2	2.9	2	1.2	2	168.2	4
	Outstanding					1.3	1					1.3	1																		
Upland Prairie System	High											3.7	1																		
Wet Forest System	Moderate	2.8	3	1.9	3	164.7	7	5.3	5	2.2	5	199.7	14																		
	High	6.2	4	2.8	4	190.9	17	5.6	2	2.4	2	128.4	8	0.6	2			233.0	10	9.0	3			233.0	11	1.3	1	0.6	1	301.2	10
	Outstanding					4.6	10					4.6	10																		
Wet Meadow/Carr System	Moderate	4.7	16	4.1	11	765.2	106	6.1	11	1.8	9	664.4	109							0.7	1			39.2	3					39.2	3
	High	0.5	1	0.3	1	177.3	19	2.6	2	1.1	2	247.1	21					3.3	1					3.3	1	0.4	1	0.2	1	11.7	2
	Outstanding					35.4	35					35.5	37																		
TOTAL		**122.9**	**67**	**63.8**	**62**	**7,588.4**	**496**	**86.5**	**66**	**36.4**	**48**	**7,732.1**	**514**	**19.5**	**10**	**7.3**	**6**	**1,027.7**	**48**	**64.9**	**14**	**3.8**	**3**	**1,807.2**	**67**	**50.1**	**19**	**20.6**	**16**	**4,233.9**	**116**

Sources: Minnesota DNR 2016b, 2016e

Notes:

Totals may not sum exactly due to rounding. Blank = no occurrence, 0.0 = < 0.1.

[a] Con = Enbridge-provided footprint for construction work area, Op = Enbridge-provided footprint for permanent right-of-way

[b] Con = estimated 120-foot-wide construction work area centered on route, includes the 50-foot-wide permanent right-of-way, Op = estimated operations area based on 50-foot-wide permanent right-of-way centered on route

[c] Con = estimated 205-foot-wide construction work area with 10-feet-wide on the north side of Line 3 and 195-feet-wide on the south side of Line 3, Op = estimated operations area based on 50-foot-wide permanent right-of-way centered on route

Table K-8. Estimated Impacts on Rare Native Plant Communities for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton, Minnesota

Native Plant Communities	MBS Site Biodiversity Significance Rating	Conservation Rank[x]	Applicant's Preferred Route[a]						Route Alternative RA-03AM[b]						Route Alternative RA-06						Route Alternative RA-07[c]						Route Alternative RA-08[b]					
			Con		Op		Within 0.5 Mile		Con		Op		Within 0.5 Mile		Con		Op		Within 0.5 Mile		Con		Op		Within 0.5 Mile		Con		Op		Within 0.5 Mile	
			Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.
Alder – (Red Currant – Meadow-Rue) Swamp	Outstanding	S3					1.9	2					1.9	2																		
	(blank)	S3					0.0	1					0.0	1																		
Aspen – Birch – Fir Forest	Moderate	S3																													3.5	1
Basswood – Black Ash Forest	Moderate	S3											85.2	2																		
	High	S3											41.8	1																		
Black Ash – (Red Maple) Seepage Swamp	High	S1S2	5.1	2	2.4	2	65.5	5	5.6	2	2.4	2	65.5	5																		
Black Ash – Silver Maple Terrace Forest	High	S3											0.1	1																		
Black Ash – Yellow Birch – Red Maple – Basswood Swamp (Eastcentral)	Moderate	S3							0.2	1	0.0	1	65.4	6																		
Dry Sand – Gravel Oak Savanna (Southern)	High	S1S2											3.7	1																		
Graminoid Poor Fen (Basin)	High	S3					11.5	3																								
Jack Pine – (Bush Honeysuckle) Woodland	Moderate	S1/S2/ S3	10.3	5	5.4	5	714.5	22					48.6	3																		
Jack Pine – (Bush Honeysuckle) Woodland, Bracken Subtype	High	S1					68.2	2					68.2	2																		
Jack Pine – (Yarrow) Woodland	Moderate	S1S2																			2.7	1			160.7	2					100.7	2
	High	S1S2					30.4	1					30.4	1																		
Oak – Aspen Forest	Below	S3	6.3	1	2.6	1	60.2	1																								
	Moderate	S3	16.4	3	7.2	3	1,024.4	34	13.7	3	7.2	3	1,019.6	33											56.3	2					47.5	2
	High	S3					87.8	2					70.3	1																		
	Outstanding	S3					128.1	15					128.2	16																		
	(blank)	S3					0.1	2					0.1	2																		
Pin Oak – Bur Oak Woodland	Moderate	S3											40.3	1																		
	High	S3											14.0	1																		
Red Pine – White Pine Forest	Moderate	S2					43.9	1					43.9	1																		
	High	S2					49.8	13					49.8	13								-	-	-	-	-	-	-	-	-	-	-
	Outstanding	S2					5.1	1					5.1	1								-	-	-	-	-	-	-	-	-	-	-
Red Pine – White Pine Woodland, Balsam Fir Subtype	High	S3					22.9	3					22.9	3								-	-	-	-	-	-	-	-	-	-	-
Red Pine – White Pine Woodland, Mountain Maple Subtype	High	S3					10.2	2					0.3	1								-	-	-	-	-	-	-	-	-	-	-
Spikerush – Bur Reed Marsh (Northern)	Moderate	S2					0.0	1					0.0	1								-	-	-	-	-	-	-	-	-	-	-
	Outstanding	S2					12.5	23					12.5	23								-	-	-	-	-	-	-	-	-	-	-
	(blank)	S2					0.4	7					0.4	7								-	-	-	-	-	-	-	-	-	-	-
Sugar Maple – Basswood – (Bluebead Lily) Forest	High	S3					97.9	2																								
White Pine – White Spruce – Paper Birch Forest	High	S2	0.6	3	0.3	3	59.9	9	0.7	3	0.3	3	59.9	9																		
TOTAL			**38.7**	**14**	**17.9**	**14**	**2,495.3**	**152**	**20.3**	**9**	**9.9**	**9**	**1,878.3**	**138**							**2.7**	**1**			**217.0**	**4**					**151.8**	**5**

Table K-8. Estimated Impacts on Rare Native Plant Communities for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton, Minnesota

Native Plant Communities	MBS Site Biodiversity Significance Rating	Conservation Rank[x]	Applicant's Preferred Route[a]						Route Alternative RA-03AM[b]						Route Alternative RA-06						Route Alternative RA-07[c]						Route Alternative RA-08[b]					
			Con		Op		Within 0.5 Mile		Con		Op		Within 0.5 Mile		Con		Op		Within 0.5 Mile		Con		Op		Within 0.5 Mile		Con		Op		Within 0.5 Mile	
			Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.	Acres	No.

Sources: Minnesota DNR 2016b, 2016e

Notes:

RA-06 contains no rare native plant communities. Totals may not sum exactly due to rounding. Blank = no occurrence, 0.0 = < 0.1.

[x] S1 = critically imperiled, S2 = imperiled, S3 = vulnerable to extirpation

[a] Con = Enbridge-provided footprint for construction work area, Op = Enbridge-provided footprint for permanent right-of-way

[b] Con = estimated 120-foot-wide construction work area centered on route, includes the 50-foot-wide permanent right-of-way
Op = estimated operations area based on 50-foot-wide permanent right-of-way centered on route

[c] Con = estimated 205-foot-wide construction work area with 10-feet-wide on the north side of Line 3 and 195-feet-wide on the south side of Line 3
Op = estimated operations area based on 50-foot-wide permanent right-of-way centered on route

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Table K-9. Occurrence of Old-Growth Forests along the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton, Minnesota (acres and number)

Main Cover Type	Applicant's Preferred Route[a]			Route Alternatives											
				RA-03AM[b]			RA-06[b]			RA-07[c]			RA-08[b]		
	Con	Op	Within 0.5 Mile	Con	Op	Within 0.5 Mile	Con	Op	Within 0.5 Mile	Con	Op	Within 0.5 Mile	Con	Op	Within 0.5 Mile
Ash			13.0 (2)												
Aspen									24.7 (1)			16.8 (1)			23.3 (2)
Birch									23.1 (1)						3.1 (1)
Northern Hardwoods															11.5 (2)
White Pine															22.0 (3)
Norway Pine			0.4 (1)			0.4 (1)			34.3 (2)	0.1 (1)	-	43.5 (3)			
White Cedar												28.3 (1)	2.1 (1)	0.9 (1)	28.6 (2)
TOTAL			**13.4 (3)**			**0.4 (1)**			**82.1 (4)**	**0.1 (1)**		**88.5 (5)**	**2.1 (1)**	**0.9 (1)**	**88.4 (10)**

Source: Minnesota DNR 2016c.

Notes:

Old-growth forest as identified by Timber Status = 5 (designated old growth) and 7 (potential or future old growth); area in acres is followed by the number of stands in parentheses; blank = no occurrence.

[a] Con = Enbridge-provided footprint for construction work area; Op = Enbridge-provided footprint for permanent right-of-way

[b] Con = estimated 120-foot-wide construction work area centered on route, includes the 50-foot-wide permanent right-of-way; Op = estimated operations area based on 50-foot-wide permanent right-of-way centered on route

[c] Con = estimated 205-foot-wide construction work area with 10-feet-wide on the north side of Line 3 and 195-feet-wide on the south side of Line 3; Op = estimated operations area based on 50-foot-wide permanent right-of-way centered on route

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Appendix L

Fish and Wildlife Tables

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Table L-1. Trout Streams Potentially Affected by the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton, Minnesota (number)

Trout Streams – Kittle Name (Kittle Number)	Near Milepost	Near Route	Applicant's Preferred Route			Route Alternative RA-03AM			Route Alternative RA-06			Route Alternative RA-07			Route Alternative RA-08		
			Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile
Blackhoof River (S-001-003)	MN 408.1	RA-03AM	1	1	1	1	1	1									
Cat River (M-096-028)	MN 211.9	RA-03AM				1		1									
Cat River (M-096-028)	MN 213.2	RA-03AM					1										
Clearwater River (H-026-030-019)	MN 149.2	RA-06							1	1	1						
Clearwater River (H-026-030-019)	MN 151.2	RA-07										1	1	1			
Fawn Creek (M-096-018)	MN 238.2	RA-03AM				1	1	1									
Hay Creek (M-096-020-001)	MN 235	RA-03AM				1	1	1									
King Creek (M-050-046-029-023)	MN 344.2	Applicant's preferred route	1	1	1												
King Creek (M-050-046-029-023)	MN 400.4	RA-03AM						1									
LaSalle Creek (M-163)	MN 171.4	RA-03AM			1			1									
LaSalle Creek (M-163)	MN 171.7	RA-03AM	1	1	1	1	1	1									
Little Otter Creek (S-002-009-001)	MN 301.5	RA-08															1

Table L-1. Trout Streams Potentially Affected by the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton, Minnesota (number)

Trout Streams – Kittle Name (Kittle Number)	Near Milepost	Near Route	Applicant's Preferred Route			Route Alternative RA-03AM			Route Alternative RA-06			Route Alternative RA-07			Route Alternative RA-08		
			Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile
Little Otter Creek (S-002-009-001)	MN 332.3	RA-06									1			1			
Little Otter Creek (S-002-009-001)	MN 333.3	RA-06							2	1	1	2	1	1	2	1	1
Mission Creek (M-050-044-006)	MN 355.9	RA-03AM				1	1	1									
Necktie River (M-146-017-001)	MN 173.3	RA-07												1			1
Necktie River (M-146-017-001)	MN 176.4	RA-07										1	1	1			1
Necktie River (M-146-017-001)	MN 177	RA-08													1	1	1
Necktie River (M-146-017-001-B010)	MN 173.7	RA-07												1			1
O'Brien Creek (H-026-030-069-004)	MN 172.6	RA-06							1	1	1						
Otter Creek (S-002-009)	MN 295	RA-08									1			1			1
Otter Creek (S-002-009)	MN 298.5	RA-07									1			1			
Pine River, South Fork (M-106-013)	MN 232.7	Applicant's preferred route			1												

Table L-1. Trout Streams Potentially Affected by the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton, Minnesota (number)

Trout Streams – Kittle Name (Kittle Number)	Near Milepost	Near Route	Applicant's Preferred Route			Route Alternative RA-03AM			Route Alternative RA-06			Route Alternative RA-07			Route Alternative RA-08		
			Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile
Spring Brook (M-106-004-002-001)	MN 265.3	Applicant's preferred route	1	1	2												
Spring Creek (H-026-030-069-003-004)	MN 182.1	RA-06									1						
Spring Creek (M-050-046-010-001)	MN 360.7	RA-03AM						1									
Straight River (M-096-035-002-002)	MN 198.3	Applicant's preferred route	1	1	1	1	1	1									
Unnamed Creek (H-026-030-019-024.35)	MN 150.4	RA-06									1						
Unnamed Creek (H-026-030-019-024.4)	MN 149.1	RA-06									1						
Unnamed Creek (H-026-030-019-024.45)	MN 148.5	RA-06									1						
Unnamed Creek (H-026-030-019-024.5)	MN 148.2	RA-06									1						
Unnamed Creek (H-026-030-019-025.1)	MN 151.1	RA-07										1	1	1			

Table L-1. Trout Streams Potentially Affected by the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton, Minnesota (number)

Trout Streams – Kittle Name (Kittle Number)	Near Milepost	Near Route	Applicant's Preferred Route			Route Alternative RA-03AM			Route Alternative RA-06			Route Alternative RA-07			Route Alternative RA-08		
			Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile
Unnamed Creek (H-026-030-069-004-007)	MN 173.1	RA-06									1						
Unnamed Stream (H-001-030-023-002-010-001)	MN 243.6	RA-06									1						
Unnamed Stream (H-001-030-023-002-010-001-001)	MN 243.6	RA-06							1	1	1						
Unnamed Stream (H-001-030-023-002-010-001-001-001)	MN 243.7	RA-06									1						
Unnamed Stream (H-001-030-023-002-010-002)	MN 243.2	RA-06									1						
Unnamed Stream (H-001-030-023-002-010-003)	MN 243.3	RA-06									1						
Unnamed Stream (M-050-046-029-023-002)	MN 344.8	Applicant's preferred route			1												
Unnamed Stream (M-050-046-029-029)	MN 406.3	RA-03AM			1			1									
Unnamed Stream (M-096-020-001-002)	MN 234.9	RA-03AM						1									

Table L-1. Trout Streams Potentially Affected by the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton, Minnesota (number)

Trout Streams – Kittle Name (Kittle Number)	Near Milepost	Near Route	Applicant's Preferred Route			Route Alternative RA-03AM			Route Alternative RA-06			Route Alternative RA-07			Route Alternative RA-08		
			Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile
Unnamed Stream (M-096-020-001-003)	MN 233.6	RA-03AM						1									
Unnamed Stream (M-106-013-008)	MN 232.4	Applicant's preferred route			1												
Unnamed Stream (M-146-017-001-001)	MN 173.9	RA-08										2	1	1	2	1	1
Unnamed Stream (M-146-017-001-002)	MN 172.7	RA-08													1	1	
Unnamed Stream (M-146-017-001-002)	MN 173	RA-08															1
Unnamed Stream (M-146-017-001-002)	MN 173.3	RA-07										1	1	1			1
Unnamed Stream (M-146-017-001-003)	MN 172.9	RA-07												1			1
Unnamed Stream (S-001-003-027.8)	MN 408.1	RA-03AM			1			1									
Unnamed Stream (S-001-003-028)	MN 352.1	Applicant's preferred route			1			1									

Table L-1. Trout Streams Potentially Affected by the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton, Minnesota (number)

Trout Streams – Kittle Name (Kittle Number)	Near Milepost	Near Route	Applicant's Preferred Route			Route Alternative RA-03AM			Route Alternative RA-06			Route Alternative RA-07			Route Alternative RA-08		
			Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile
Unnamed Stream (S-001-003-029)	MN 352.3	Applicant's preferred route	1	1	1	1	1	1									
Unnamed Stream (S-001-003-030)	MN 352.7	Applicant's preferred route			1			1									
Unnamed Stream (S-001-003-030-001)	MN 408.7	RA-03AM			1			1									
Unnamed Stream (S-001-003-030-001-B001)	MN 408.8	RA-03AM			1			1									
Unnamed Stream (S-002-009-001-000.4)	MN 301.3	RA-08									1			1	1		1
Unnamed Stream (S-002-009-001-000.5)	MN 333.3	RA-06									1			1			1
Unnamed Stream (S-002-009-001-001)	MN 332.3	RA-06									2			2			1
Unnamed Stream (S-002-009-001-002)	MN 330.4	RA-06									1			1			1
Unnamed Stream (S-002-009-001-002-001)	MN 298.5	RA-08									1			1			1

Table L-1. Trout Streams Potentially Affected by the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton, Minnesota (number)

Trout Streams – Kittle Name (Kittle Number)	Near Milepost	Near Route	Applicant's Preferred Route			Route Alternative RA-03AM			Route Alternative RA-06			Route Alternative RA-07			Route Alternative RA-08		
			Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile	Con	Op	0.5 mile
Unnamed Stream (S-002-009-001-003)	MN 298.3	RA-08									1			1			2
Unnamed Stream (S-002-032-011)	MN 283.6	RA-06							1	1	1						
Venning Creek (H-001-030-023-002-010)	MN 242.7	RA-06							1	1	1						
Venning Creek (H-001-030-023-002-010-B001)	MN 243.5	RA-06									1						
Venning Creek (H-001-030-023-002-010-B002)	MN 243.6	RA-06									1						
TOTAL			**6**	**6**	**17**	**8**	**8**	**19**	**7**	**6**	**28**	**8**	**6**	**19**	**7**	**4**	**18**

Source: Minnesota DNR 2015a.

Notes:

Con = construction; Op = operations; SA = study area number of occurrences (potential crossings) based on 1 mile wide corridor

Table L-2. Lakes of Biological Significance within 0.5 mile of the Applicant's Preferred Route in Minnesota and Route Alternatives between Clearbrook and Carlton, Minnesota (acres)

LBS Class	Watershed	DNR Hydrology ID	Area (acres)	Shoreline (miles)	Applicant's Preferred Route		RA-03AM	RA-06	RA-07	RA-08
					ND Border to Clearbrook	Clearbrook to Carlton				
Outstanding	Bass	12592	2,713.6	24.4					27.7	
	Carr	14494	42.4	1.1					24.8	42.4
	Cass	14870	15,958.3	45.4					363.8	
	Dora	13286	429.8	6.7				2.4		
	East Four-Legged	23949	356.6	6.4					84.2	
	Fish	7417	505.8	10.0			13.9			
	Fish Trap	3878	1,163.8	13.1			52.8			
	Grant	15401	213.7	3.7						103.5
	Irving	15390	661.3	5.3					160.0	
	Island	14798	541.2	7.1		41.1	41.1			
	Leech	21722	110,309.9	232.6						9.4
	Marquette	14919	527.6	5.5						129.3
	Mud	11386	210.8	2.5		86.0	86.0			
	Pike Bay	14487	4,751.3	10.7					615.6	64.8
	Rice	29814	77.9	1.7		69.0				
	Roosevelt	14175	1,510.6	18.6		43.5				
	Round	26991	44.4	1.0		12.0				
	Salo WMA Impoundment	8169	312.7	4.6		29.1				
	Shallow	13543	539.0	5.1					196.6	372.4
	Six Mile	14395	1,323.0	7.8						44.3
	Washburn	12488	1,590.2	19.7		5.5				

Table L-2. Lakes of Biological Significance within 0.5 mile of the Applicant's Preferred Route in Minnesota and Route Alternatives between Clearbrook and Carlton, Minnesota (acres)

LBS Class	Watershed	DNR Hydrology ID	Area (acres)	Shoreline (miles)	Applicant's Preferred Route		RA-03AM	RA-06	RA-07	RA-08
					ND Border to Clearbrook	Clearbrook to Carlton				
	Waukenabo	13413	666.1	4.9		5.9				
	West Four-Legged	21300	432.0	8.0					244.3	73.3
	White Oak	13452	942.5	8.5					144.4	368.8
	Winnibigoshish	12798	56,471.6	69.8					61.9	
Outstanding Total						292.1	193.8	2.4	1,923.4	1,208.1
High	Big	12490	529.5	8.1				26.2	26.2	30.3
	Long	12005	132.4	4.1				84.2		
	Upper Twin	14867	212.5	3.2		4.9				
	Wawina	30415	375.5	3.9					166.5	
High Total						4.9		110.4	192.7	30.3
Moderate	Ball Club	14124	4,335.3	19.5					228.3	121.4
	Clear	6913	26.3	0.9			26.3			
	Grass	11897	232.6	3.4					28.2	
	Portage	15124	429.3	5.3		44.4	44.4			
	Twin	14906	168.8	3.2						68.7
	Unnamed	1805	208.8	7.3	111.3					
Moderate Total					111.3	44.4	70.6		256.4	190.1
TOTAL					111.3	341.3	264.4	112.9	2,372.5	1,428.5

Table L-2. Lakes of Biological Significance within 0.5 mile of the Applicant's Preferred Route in Minnesota and Route Alternatives between Clearbrook and Carlton, Minnesota (acres)

LBS Class	Watershed	DNR Hydrology ID	Area (acres)	Shoreline (miles)	Applicant's Preferred Route		RA-03AM	RA-06	RA-07	RA-08
					ND Border to Clearbrook	Clearbrook to Carlton				

Source: Minnesota DNR 2016, Minnesota DNR 2015b

DNR =Minnesota Department of Natural Resources, LBS = Lake of Biological Significance

Notes:

Rank Definitions: Outstanding – Plants: high aquatic plant richness, high floristic quality, and a population of an endangered or threatened plant; important wild rice lakes. Fish: exceptional fishery for selected game fish or an outstanding nongame fish community. Birds: endangered or threatened colonial waterbird nesting area, presence of several endangered, threatened or special concern lake bird species, or six or more lake bird Species of Greatest Conservation Need.

High – Plants: high aquatic plant richness, high floristic quality, or a population of an endangered or threatened plant. Fish: populations of more than one fish of special concern and/or Species of Greatest Conservation Need. Birds: colonial waterbird nesting area, history of endangered or threatened colonial waterbird nesting, presence of endangered, threatened, or special concern lake bird species, or five lake bird Species of Greatest Conservation Need.

Moderate – Plants: high aquatic plant richness, high floristic quality, or a population of an endangered or threatened plant. Fish: populations of one fish species of special concern and/or fish Species of Greatest Conservation Need. Birds: history of colonial waterbird nesting, presence of an endangered, threatened, or several lake bird Species of Greatest Conservation Need.

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Appendix M

Unique Natural Resources Tables

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Table M-1. Number of Occurrences of Rare Invertebrate Animals for the Applicant's Preferred Route, Existing Line 3, and System Alternative SA-04

Common Name	Scientific Name	State	State Status[a]	Applicant's Preferred Route[b]					Existing Line 3		System Alternative SA-04[d]			Rail[e]	Truck[e]
				Con WA	Op ROW	Total[c]		0.5 mile	Operations	0.5 mile	Con	Op	0.5 mile		
						Con	Op								
Arthropods															
A caddisfly	*Anabolia ozburni*	MN	SPC			1		1	1	1					
A jumping spider	*Marpissa formosa*	MN	SPC					1					1		
A jumping spider	*Phidippus pius*	MN	SPC										1		
Iowa skipper	*Atrytone arogos iowa*	MN	SPC										1		
Leadplant flower moth	*Schinia lucens*	MN	SPC										1		
Red-tailed prairie leafhopper	*Aflexia rubranura*	MN	SPC										1		
Redveined prairie leafhopper	*Aflexia rubranura*	IL	THR										1		
Regal fritillary	*Speyeria idalia*	MN	SPC										2		
Regal fritillary	*Speyeria idalia*	IL	THR								1	1	1		
Mollusks															
Black sandshell	*Ligumia recta*	MN	SPC	2	2	2	2	2	2	5	2	2	7		
Black sandshell	*Ligumia recta*	IL	THR								1	1	2		
Butterfly	*Ellipsaria lineolata*	IA	THR										1		
Creek heelsplitter	*Lasmigona compressa*	MN	SPC	3	3	3	3	4	3	4			2		
Creeper	*Strophitus undulatus*	IA	THR										2		
Ellipse	*Venustaconcha ellipsiformis*	MN/IA	THR										2		
Fluted-shell	*Lasmigona costata*	MN	THR	1	1	1	1	1	1	1			1		
Higgins eye	*Lampsilis higginsii*	IL	END								1	1	1		
Monkeyface	*Quadrula metanevra*	MN	THR								1	1	1		
Mucket	*Actinonaias ligamentina*	MN	THR								2	2	4		
Pink heelsplitter	*Potamilus alatus*	ND	NA					1		1					
Pistolgrip	*Tritogonia verrucosa*	MN	END								1	1	1		
Round pigtoe	*Pleurobema sintoxia*	MN	SPC								1	1	1		
Spike	*Elliptio dilatata*	MN	THR								1	1	3		
Yellow sandshell	*Lampsilis teres*	MN/IA	END								1	1	4		
Total Number of Rare Invertebrate Species				**3**	**3**	**4**	**3**	**6**	**4**	**5**	**10**	**10**	**22**	**None**	**None**
Total Occurrences of Rare Invertebrate Animals				**6**	**6**	**7**	**6**	**10**	**7**	**12**	**12**	**12**	**41**	**None**	**None**
Total Occurrences of Endangered Invertebrate Animals				**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**3**	**6**	**None**	**None**
Total Occurrences of Threatened Invertebrate Animals				**1**	**1**	**1**	**1**	**1**	**1**	**1**	**6**	**6**	**18**	**None**	**None**
Total Occurrences of Special Concern Invertebrate Animals				**5**	**5**	**6**	**5**	**9**	**6**	**11**	**3**	**3**	**17**	**None**	**None**

Sources: Minnesota DNR 2016e; Illinois DNR 2016; Iowa DNR 2016a; North Dakota GFP 2016, Wisconsin DNR 2016.

Table M-1. Number of Occurrences of Rare Invertebrate Animals for the Applicant's Preferred Route, Existing Line 3, and System Alternative SA-04

Common Name	Scientific Name	State	State Status[a]	Applicant's Preferred Route[b]					Existing Line 3		System Alternative SA-04[d]			Rail[e]	Truck[e]
				Con WA	Op ROW	Total[c]		0.5 mile	Operations	0.5 mile	Con	Op	0.5 mile		
						Con	Op								

Notes:

Species listing may occur more than once. Blank = no occurrence.

a State Status: END = Endangered, SPC = Species of Concern, THR = Threatened, NA = not applicable counted as SPC

b Enbridge provided footprints: Con WA = construction work area; Op ROW= operations right-of-way for Minnesota (note within 120-foot-wide construction work area for North Dakota and Wisconsin)

c Minnesota Only: Con = sum of pipeline construction work area, ATWS, Temporary Access Roads; Op = sum of pipeline permanent right-of-way, Permanent Access Roads, Pump Stations, Valves

d Con = Estimated construction impacts in numbers of occurrences acres based on 120-foot-wide construction work area, Op = Estimated operations impacts in numbers of occurrences based on 50-foot-wide right-of-way

e Based on review for presence absence based on available information on general locations for infrastructure

Table M-2. Number of Occurrences of Rare Vertebrate Animals for the Applicant's Preferred Route and System Alternative SA-04

Common Name	Scientific Name	State	State Status[a]	Applicant's Preferred Route[b]					Existing Line 3		System Alternative SA-04[d]			Rail[e]	Truck[e]
				Con WA	Op ROW	Total[c] Con	Total[c] Op	0.5 mile	Operations	0.5 mile	Con	Op	0.5 mile		
Mammals															
Big brown bat	*Eptesicus fuscus*	MN	SPC	4	3	4	3	7		1					
Little brown myotis	*Myotis lucifugus*	MN	SPC	7	6	8	6	11		1					
Northern long-eared bat	*Myotis septentrionalis*	MN	SPC	13	12	16	15	27	1	3					
Northern long-eared myotis	*Myotis septentrionalis*	IL	THR								1	1	2		
Prairie vole	*Microtus ochrogaster*	MN	SPC					1							
Birds															
Acadian flycatcher	*Empidonax virescens*	MN	SPC										1		
Bald eagle	*Haliaeetus leucocephalus*	IL	RemTHR								1	1	4		
Bald eagle	*Haliaeetus leucocephalus*	IA	SPC										2		
Burrowing owl	*Athene cunicularia*	MN	END								1	1	1		
Cerulean warbler	*Setophaga cerulea*	MN	SPC										3		
Chestnut-collared longspur	*Calcarius ornatus*	MN	END										1		
Connecticut warbler	*Oporornis agilis*	WI	SPC					1		1					
Greater prairie-chicken	*Tympanuchus cupido*	MN	SPC	8	6	9	8	11					1		
King rail	*Rallus elegans*	IL	END										1		
Le Conte's sparrow	*Ammodramus leconteii*	WI	SPC					1		1					
Loggerhead shrike	*Lanius ludovicianus*	MN/IL	END										3		
Louisiana waterthrush	*Parkesia motacilla*	MN	SPC										1		
Marbled godwit	*Limosa fedoa*	MN	SPC										1		
Nelson's sparrow	*Ammodramus nelsoni*	MN	SPC	2	2	2	2	2	3	3					
Northern goshawk	*Accipiter gentilis*	MN	SPC					1							
Red-shouldered hawk	*Buteo lineatus*	MN	SPC					1							
Short-eared owl	*Asio flammeus*	MN	SPC	1	1	1+	1	1	1	1					
Trumpeter swan	*Cygnus buccinator*	MN	SPC					2	1	1					
Upland sandpiper	*Batramia longicauda*	IL	END										1		
Yellow rail	*Coturnicops noveboracensis*	MN	SPC						1	1					
Amphibians and Reptiles															
Four-toed salamander	*Hemidactylium scutatum*	MN	SPC					1							
Blanding's turtle	*Emydoidea blandingii*	MN/IA	THR										2		
Blanding's turtle	*Emydoidea blandingii*	IL	END								1	1	3		
North American racer	*Coluber constrictor*	MN	SPC								1	1	2		

Table M-2. Number of Occurrences of Rare Vertebrate Animals for the Applicant's Preferred Route and System Alternative SA-04

Common Name	Scientific Name	State	State Status[a]	Applicant's Preferred Route[b]					Existing Line 3		System Alternative SA-04[d]			Rail[e]	Truck[e]
				Con WA	Op ROW	Total[c] Con	Total[c] Op	0.5 mile	Operations	0.5 mile	Con	Op	0.5 mile		
Ornate box turtle	*Terrapene ornata*	IA/IL	THR								1	1	3		
Plains hog-nosed snake	*Heterodon nasicus*	IL	THR										1		
Smooth softshell	*Apalone mutica*	MN	SPC								1	1	1		
Wood Turtle	*Glyptemys insculpta*	WI	THR					1		1					
Fish															
American brook lamprey	*Lampetra appendix*	IA	THR										1		
Banded killifish	*Fundulus diaphanous*	IL	THR										1		
Black buffalo	*Ictiobus niger*	MN	THR								1	1	1		
Blacknose shiner	*Notropis heterolepis*	IL	END								1	1	1		
Blue sucker	*Cycleptus elongatus*	MN	SPC								1	1	1		
Greater redhorse	*Moxostoma valenciennesi*	IL	END										2		
Least darter	*Etheostoma microperca*	MN	SPC	1	1	1	1	2			1	1	1		
Ozark minnow	*Notropis nubilus*	MN	SPC								1	1	1		
Pallid shiner	*Hybopsis amnis*	IL	END										1		
Pugnose shiner	*Notropis anogenus*	MN	THR	1	1	1	1	1							
Redfin shiner	*Lythrurus umbratilis*	MN	SPC										1		
River redhorse	*Moxostoma carinatum*	IL	THR										1		
Slender madtom	*Noturus exilis*	MN	END										1		
Total Number of Rare Vertebrate Species				**8**	**8**	**8**	**8**	**16**	**5**	**10**	**12**	**12**	**31**	**None**	**None**
Total Occurrences Rare Vertebrate Animals				**37**	**32**	**42**	**37**	**71**	**7**	**14**	**12**	**12**	**47**	**None**	**None**
Total Occurrences Endangered Vertebrate Animals				**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**3**	**15**	**None**	**None**
Total Occurrences Threatened Vertebrate Animals				**1**	**1**	**1**	**1**	**2**	**0**	**1**	**3**	**3**	**12**	**None**	**None**
Total Occurrences Special Concern Vertebrate Animals				**36**	**31**	**41**	**36**	**69**	**7**	**13**	**6**	**6**	**20**	**None**	**None**

Sources: Minnesota DNR 2016e; Illinois DNR 2016; Iowa DNR 2016a; North Dakota GFP 2016; Wisconsin DNR 2016.

Notes:

Species listing may occur more than once. Blank = no occurrence.

a State Status: END = Endangered, SPC = Species of Concern, THR = Threatened, RemTHR = removed Threatened counted as SPC

b Enbridge provided footprints: Con WA = construction work area; Op ROW= operations right-of-way for Minnesota (note within 120-foot-wide construction work area for North Dakota and Wisconsin)

c Minnesota Only: Con = sum of pipeline construction work area, ATWS, Temporary Access Roads; Op = sum of pipeline permanent right-of-way, Permanent Access Roads, Pump Stations, Valves

d Con = Estimated construction impacts in numbers of occurrences acres based on 120-foot-wide construction work area, Op = Estimated operations impacts in numbers of occurrences based on 50-foot-wide right-of-way

e Based on review for presence absence based on available information on general locations for infrastructure

Table M-3. Number of Occurrences of Rare Plants for the Applicant's Preferred Route and System Alternative SA-04

Common Name	Scientific Name	State	State Status[a]	Applicant's Preferred Route[b]					Existing Line 3		System Alternative SA-04[d]			Rail[e]	Truck[e]
						Total[c]									
				Con WA	Op ROW	Con	Op	0.5 mile	Operations	0.5 mile	Con	Op	0.5 mile		
Nonvascular Plants															
A species of lichen	*Buellia nigra*	MN	SPC										1		
A species of liverwort	*Trichocolea tomentella*	MN	THR					1							
Vascular Plants															
American ginseng	*Panax quinquefolius*	MN	SPC										1		
Barren strawberry	*Waldsteinia fragarioides var. fragarioides*	MN	SPC						1	1					
Beaked spikerush	*Eleocharis rostellata*	MN	THR	1	1	1	1	2	1	2				PP	PP
Blue sage	*Salvia azurea*	IL	THR										1		
Blunt sedge	*Carex obtusata*	MN	SPC	1	1	1	1	1	1	1					
Bog bluegrass	*Poa paludigena*	MN	THR	1	1	1	1	1							
Bog birch	*Betula pumila*	IA	THR										1		
Bristle-berry	*Rubus fulleri*	MN	THR					1							
Broomrape	*Orobanche ludoviciana*	IL	THR								1		1		
Buffalo grass	*Buchloe dactyloides*	MN	SPC								1	1	1		
Butternut	*Juglans cinerea*	MN	END	1	1	1	1	1							
Cleft phlox	*Phlox bifida*	IA	SPC										2		
Clinton's bulrush	*Trichophorum clintonii*	MN	THR	-	-	-	-	1							
Clustered bur-reed	*Sparganium glomeratum*	WI	THR	1	1	1	1	4	1	4					
Cutleaf ironplant	*Xanthisma spinulosum var. spinulosum*	MN	SPC										1		
Dwarf grape fern	*Botrychium simplex*	IL	END										1		
Edible valerian	*Valeriana edulis var. ciliata*	MN	THR										2		
English sundew	*Drosera anglica*	MN	SPC							1					
False mallow	*Malvastrum hispidum*	IL	END								1	1	1		
False mountain willow	*Salix pseudomonticola*	MN	SPC	2	1	2	1	2	1	2					
Few-flowered spikerush	*Eleocharis quinqueflora*	MN	SPC	2	2	2	2	3	3	4				PP	PP
Flat top white aster	*Aster pubentior*	IA	SPC										1		
Flax-leaved aster	*Aster linariifolius*	IA	THR										2		
Goblin fern	*Botrychium mormo*	MN	THR							1					
Grassleaf rush	*Juncus marginatus*	IA	SPC										1		
Gray ragwort	*Packera cana*	MN	END					1		1					
Green dragon	*Arisaema dracontium*	MN	SPC										1		

Table M-3. Number of Occurrences of Rare Plants for the Applicant's Preferred Route and System Alternative SA-04

Common Name	Scientific Name	State	State Status[a]	Applicant's Preferred Route[b]					Existing Line 3		System Alternative SA-04[d]			Rail[e]	Truck[e]
						Total[c]									
				Con WA	Op ROW	Con	Op	0.5 mile	Operations	0.5 mile	Con	Op	0.5 mile		
Hair-like beak rush	*Rhynchospora capillacea*	MN	THR			1	1	1	1	2				PP	PP
Hair-like beak rush (Beakrush)	*Rhynchospora capillacea*	IA	THR										1		
Handsome sedge	*Carex formosa*	MN	END			1		2		2					
Hedge hyssop	*Gratiola quartermaniae*	IL	END										1		
Hidden-fruited bladderwort	*Utricularia geminiscapa*	MN	THR							1					
Kentucky coffee tree	*Gymnocladus dioica*	MN	SPC										1		
Lapland buttercup	*Ranunculus lapponicus*	MN	SPC							1					
Leafy prairie clover	*Dalea foliosa*	IL	END										1		
Least moonwort	*Botrychium simplex*	MN	SPC	3	1	3	1	4	5	12					
Mamillate spike-rush	*Eleocharis mamillata*	WI	SPC	1	1	1	1	1	1	1					
Marsh grass-of-Parnassus	*Parnassia palustris*	WI	THR					1		1					
McCalla's willow	*Salix maccalliana*	MN	SPC	1		1		3		3				PP	PP
Meadow beauty	*Rhexia virginica*	IA	THR										2		
Mingan moonwort	*Botrychium minganense*	MN	SPC						4	6					
Narrow triangle moonwort	*Botrychium lanceolatum* ssp. *angustisegmentum*	MN	THR	3	2	3	2	5		1					
Neat spike-rush	*Eleocharis nitida*	WI	END	2	2	2	2	5	2	5					
Nodding wild onion	*Allium cernuum*	MN	SPC										1		
Northern single-spike sedge	*Carex scirpoidea*	MN	SPC	2	2	2	2	5	2	5					
Northwestern sticky aster	*Canadanthus modestus*	WI	SPC					1		1					
Pale green orchid	*Platanthera flava*	IA	END										3		
Pale moonwort	*Botrychium pallidum*	MN	SPC						4	5					
Plains sedge	*Carex heliophila*	IL	END								1	1	1		
Plains wild indigo	*Baptisia bracteata* var. *glabrescens*	MN	SPC								1	1	1		
Purple-flowered bladderwort	*Utricularia purpurea*	MN	END					1							
Quillwort	*Isoetes butleri*	IL	END								2	1	3		
Ram's head orchid	*Cypripedium arietinum*	MN	THR							1					
Rattlesnake master	*Eryngium yuccifolium*	MN	SPC										5		
Red saltwort	*Salicornia rubra*	MN	THR			1		1		1					
Richardson's rush	*Juncus alpinoarticulatus*	IL	THR										1		
Sage willow	*Salix candida*	IA	SPC										3		
Seaside crowfoot	*Ranunculus cymbalaria*	WI	THR	2	2	2	2	4	2	4					

Table M-3. Number of Occurrences of Rare Plants for the Applicant's Preferred Route and System Alternative SA-04

Common Name	Scientific Name	State	State Status[a]	Applicant's Preferred Route[b]					Existing Line 3		System Alternative SA-04[d]			Rail[e]	Truck[e]
						Total[c]									
				Con WA	Op ROW	Con	Op	0.5 mile	Operations	0.5 mile	Con	Op	0.5 mile		
Slender arrow grass	*Triglochin palustris*	IA	THR										1		
Slender naiad	*Najas gracillima*	MN	SPC			1	1	2							
Slender sandwort	*Minuartia patula*	IL	THR										1		
Small fringed gentian	*Gentianopsis procera*	IA	SPC										1		
Small white lady's-slipper	*Cypripedium candidum*	MN	SPC	1	1	1	1	4	1	4	1	1	5		
Small yellow water crowfoot	*Ranunculus gmelinii*	WI	END	2	2	2	2	3	2	3					
Snow trillium	*Trillium nivale*	MN	SPC										1		
Soft rush	*Juncus effusus*	IA	SPC										1		
St. Lawrence grapefern	*Botrychium rugulosum*	MN	SPC						4	5					
Sterile sedge	*Carex sterilis*	MN	THR	2	2	2	2	6	2	6			1	PP	PP
Sullivant's milkweed	*Asclepias sullivantii*	MN	THR										1		
Swamp thistle	*Cirsium muticum*	IA	SPC										1		
Sweet Colt's Foot	*Petasites sagittatus*	WI	THR	5	5	5	5	8	5	8				PP	PP
Tea-leaved willow	*Salix planifolia* ssp. *planifolia*	WI	THR					1		1					
Torrey's mannagrass	*Torreyochloa pallida*	MN	SPC	2	2	2	2	2							
Tuberous Indian-plantain	*Arnoglossum plantagineum*	MN	THR										1		
Twig rush	*Cladium mariscoides*	MN	SPC					3		3				PP	PP
Valerian	*Valeriana edulis*	IA	SPC										1		
Vasey's rush	*Juncus vaseyi*	WI	SPC	3	3	3	3	4	3	4					
White adder's mouth	*Malaxis monophyllos* var. *brachypoda*	MN	SPC					1							
White wild indigo	*Baptisia lactea* var. *lactea*	MN	SPC										1		
Whorled nutrush	*Scleria verticillata*	MN	THR					1		1					
Whorled nutrush (Low nut rush)	*Scleria verticillata*	IA	THR										1		
Wild quinine	*Parthenium integrifolium*	MN	END										1		
Total Number of Rare Plant Species				**20**	**19**	**24**	**21**	**35**	**20**	**35**	**7**	**6**	**42**	**7**	**7**
Total Occurrences of Rare Plants				**38**	**34**	**42**	**35**	**87**	**46**	**104**	**8**	**6**	**60**	**7**	**7**
Total Occurrences of State Endangered Plants				**5**	**5**	**6**	**5**	**13**	**4**	**11**	**4**	**3**	**12**	**0**	**0**
Total Occurrences of State Threatened Plants				**15**	**14**	**117**	**15**	**35**	**12**	**34**	**1**	**0**	**17**	**4**	**4**
Total Occurrences of State Special Concern Plants				**18**	**14**	**19**	**15**	**36**	**30**	**59**	**3**	**3**	**31**	**3**	**3**

Sources: Minnesota DNR 2016e; Illinois DNR 2016; Iowa DNR 2016a; North Dakota GFP 2016; Wisconsin DNR 2016; Merjent 2016.

Table M-3. Number of Occurrences of Rare Plants for the Applicant's Preferred Route and System Alternative SA-04

Common Name	Scientific Name	State	State Status[a]	Applicant's Preferred Route[b]					Existing Line 3		System Alternative SA-04[d]			Rail[e]	Truck[e]
						Total[c]									
				Con WA	Op ROW	Con	Op	0.5 mile	Operations	0.5 mile	Con	Op	0.5 mile		

Notes:

Species listing may occur more than once. Blank = no occurrence.

a State Status: END = Endangered, SPC = Species of Concern, THR = Threatened

b Enbridge provided footprints: Con WA = construction work area; Op ROW= operations right-of-way for Minnesota (note within 120-foot-wide construction work area for North Dakota and Wisconsin)

c Minnesota Only: Con = sum of pipeline construction work area, ATWS, Temporary Access Roads; Op = sum of pipeline permanent right-of-way, Permanent Access Roads, Pump Stations, Valves

d Con = Estimated construction impacts in numbers of occurrences acres based on 120-foot-wide construction work area, Op = Estimated operations impacts in numbers of occurrences based on 50-foot-wide right-of-way

e Based on review for presence absence based on available information for general location of required infrastructure in the United States, PP = Potentially Present

Table M-4. Mammal, Amphibian, Reptile, and Bird GAP Species Models Used to Estimate Impacts on Species of Conservation Need for the Applicant's Preferred Route and System Alternative SA-04

Common Name	Scientific Name	Occurrence on State Lists							GAP Model Name
		IL	IA	MN	ND	SD	WI	Total	
MAMMALS									
Arctic Shrew	*Sorex arcticus*				1			1	mACSHx
American Badger	*Taxidea taxus*	1						1	mAMBAx
American Marten	*Martes americana*				1		1	1	mAMMAx
American Pygmy Shrew	*Sorex hoyi*	1			1			2	mAPSHx
American Water Shrew	*Sorex palustris*						1	1	mAWSHx
Canada lynx (Fed Status: T)	*Lynx canadensis*			1				1	mCALYx
Eastern Spotted Skunk	*Spilogale putorius*		1	1	1			3	mESSKx
Gray Wolf (Fed Status: E)	*Canis lupus*	1			1	1		3	mGRWOx
Little Brown Bat	*Myotis lucifugus*			1	1		1	3	mLBMYx
Long-eared Bat	*Myotis evotis*				1			1	mLEMYx
Long-legged Bat	*Myotis volans*				1			1	mLLMYx
North American River Otter	*Lontra canadensis*					1		1	mNAROx
Northern Flying Squirrel	*Glaucomys sabrinus*					1	1	2	mNFSQx
northern pocket gopher	*Thomomys talpoides*			1				1	mNPGOx
Silver-haired Bat	*Lasionycteris noctivagans*					1	1	2	mSHBAx
AMPHIBIANS AND REPTILES									
Four-toed Salamander	*Hemidactylium scutatum*	1		1			1	3	aFTSAx
Mudpuppy	*Necturus maculosus*	1	1	1				3	aMUDPx
Wood Frog	*Rana sylvatica*	1						1	aWOFRx
Blanding's Turtle	*Emydoidea blandingii*	1	1	1			1	4	rBTURx

Table M-4. Mammal, Amphibian, Reptile, and Bird GAP Species Models Used to Estimate Impacts on Species of Conservation Need for the Applicant's Preferred Route and System Alternative SA-04

Common Name	Scientific Name	Occurrence on State Lists							GAP Model Name
		IL	IA	MN	ND	SD	WI	Total	
common five-lined skink	*Plestiodon fasciatus*			1				1	rCFLSx
Eastern Massasauga	*Sistrurus catenatus catenatus*	1					1	2	rMASSx
False Map Turtle	*Graptemys pseudogeographica*				1	1		2	rFMTUx
Northern Prairie Skink	*Plestiodon septentrionalis*				1			1	rPRSKx
Ornate Box Turtle	*Terrapene ornata*	1	1			1	1	4	rOBTUx
Plains Hog-nosed Snake	*Heterodon nasicus*	1		1	1			3	rPHNSx
Prairie Rattlesnake	*Crotalus viridis*		1					1	rPRRAx
Prairie Skink	*Plestiodon septentrionalis*						1	1	rPRSKx
Six-lined Racerunner	*Aspidoscelis sexlineata*						1	1	rSLRAx
Slender Glass Lizard	*Ophisaurus attenuatus*	1	1				1	3	rSGLIx
Smooth Softshell	*Apalone mutica*	1		1	1	1	1	5	rSMSOx
Snapping Turtle	*Chelydra serpentina*				1			1	rSNTUx
Spiny Softshell	*Apalone spinifera*				1			1	rSPSOx
Spotted Turtle	*Clemmys guttata*	1						1	rSPTUx
Timber Rattlesnake	*Crotalus horridus*	1		1			1	3	rTIRAx
Western Hognose Snake	*Heterodon nasicus*		1					1	rPHNSx
Wood Turtle	*Glyptemys [Clemmys] insculpta*		1	1			1	3	rWOTUx
BIRDS									
Acadian Flycatcher	*Empidonax virescens*	1		1			1	3	bACFLx
American Bittern	*Botaurus lentiginosus*	1			1		1	3	bAMBIx
Baird's Sparrow	*Ammodramus bairdii*			1	1	1		3	bBAISx

Table M-4. Mammal, Amphibian, Reptile, and Bird GAP Species Models Used to Estimate Impacts on Species of Conservation Need for the Applicant's Preferred Route and System Alternative SA-04

Common Name	Scientific Name	Occurrence on State Lists							GAP Model Name
		IL	IA	MN	ND	SD	WI	Total	
Bald Eagle	*Haliaeetus leucocephalus*		1		1	1		3	bBAEAx
Bell's Vireo	*Vireo bellii*	1		1			1	3	bBEVIx
Black Tern	*Chlidonias niger*	1	1		1	1	1	5	bBLTEx
Black-billed Cuckoo	*Coccyzus erythropthalmus*	1			1			2	bBBCUx
Black-crowned Night-Heron	*Nycticorax nycticorax*	1					1	2	bBCNHx
Blue-winged Warbler	*Vermivora pinus*	1						1	bBWWAx
Bobolink	*Dolichonyx oryzivorus*	1			1		1	3	bBOBOx
Brown Thrasher	*Toxostoma rufum*	1						1	bBRTHx
Canada Warbler	*Wilsonia canadensis*							0	bCAWAx
Cerulean Warbler	*Dendroica cerulean*	1		1			1	3	bCERWx
Common Tern	*Sterna hirundo*	1		1			1	3	bCOTEx
Dickcissel	*Spiza americana*				1		1	2	bDICKx
Ferruginous Hawk	*Buteo regalis*				1	1		2	bFEHAx
Field Sparrow	*Spizella pusilla*							0	bFISPx
Golden Eagle	*Aquila chrysaetos*				1			1	bGOEAx
Golden-winged Warbler	*Vermivora chrysoptera*						1	1	bGWWAx
Grasshopper Sparrow	*Ammodramus savannarum*				1		1	2	bGRSPx
Henslow's sparrow	*Ammodramus henslowii*	1	1	1			1	4	bHESPx
Kentucky Warbler	*Geothlypis [Oporornis] formosa*	1					1	2	bKEWAx
Least Bittern	*Ixobrychus exilis*	1					1	2	bLEBIx
Least Tern (Interior, Fed Status: E)	*Sterna antillarum athalassos*	1	1		1	1		4	bLETEx

Table M-4. Mammal, Amphibian, Reptile, and Bird GAP Species Models Used to Estimate Impacts on Species of Conservation Need for the Applicant's Preferred Route and System Alternative SA-04

Common Name	Scientific Name	Occurrence on State Lists							GAP Model Name
		IL	IA	MN	ND	SD	WI	Total	
Loggerhead Shrike	*Lanius ludovicianus*	1		1	1		1	4	bLOSHx
Marbled Godwit	*Limosa fedoa*			1	1	1		3	bMAGOx
Marsh Wren	*Cistothorus palustris*							0	bMAWRx
Nelson's Sharp-tailed Sparrow	*Ammodramus nelsoni*			1	1		1	3	bNSTSx
Northern Flicker	*Colaptes auratus*							0	bNOFLx
Olive-sided Flycatcher	*Contopus cooperi*						1	1	bOSFLx
Peregrine Falcon	*Falco peregrinus*		1	1	1	1	1	5	bPEFAx
Pied-billed Grebe	*Podilymbus podiceps*							0	bPBGRx
Piping Plover (Fed Status: E/T)	*Charadrius melodus*	1	1	1	1	1	1	6	bPIPLx
Prairie Falcon	*Falco mexicanus*				1			1	bPRFAx
Prothonotary Warbler	*Protonotaria citrea*						1	1	bPROWx
Red-headed Woodpecker	*Melanerpes erythrocephalus*	1			1		1	3	bRHWOx
[Rufa] Red Knot (Fed Status: T)	*Calidris canutus rufa*	1			1	1	1	4	bREKNx
Rusty Blackbird	*Euphagus carolinus*						1	1	bRUBLx
Short-eared Owl	*Asio flammeus*	1	1	1	1		1	5	bSEOWx
Sprague's pipit (Fed Status: C)	*Anthus spragueii*			1	1	1		3	bSPPIx
Swainson's Hawk	*Buteo swainsoni*	1			1			2	bSWHAx
Upland Sandpiper	*Bartramia longicauda*	1			1		1	3	bUPSAx
Western Grebe	*Aechmophorus occidentalis*							0	bWEGRx
Willow Flycatcher	*Empidonax traillii*	1						1	bWIFLx
Wood Thrush	*Hylocichla mustelina*	1						1	bWOTHx

Table M-4. Mammal, Amphibian, Reptile, and Bird GAP Species Models Used to Estimate Impacts on Species of Conservation Need for the Applicant's Preferred Route and System Alternative SA-04

Common Name	Scientific Name	Occurrence on State Lists							GAP Model Name
		IL	IA	MN	ND	SD	WI	Total	
Worm-eating Warbler	*Helmitheros vermivorum*	1					1	2	bWEWAx
Yellow Rail	*Coturnicops noveboracensis*	1		1	1		1	4	bYERAx

Sources: Cardno analysis based on state threatened, endangered, and species of conservation concern lists; USGS-GAP 2016.

Notes:

IL = Illinois, IA = Iowa, ND = North Dakota, SD = South Dakota, MN = Minnesota, WI = Wisconsin, Blank = no occurrence.

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Table M-5. Birds of Conservation Concern Occurring within 1 mile of the Applicant's Preferred Route, Route Alternatives, and System Alternative SA-04

Alternative, Common Name	Scientific Name	Applicant's Preferred Route				Route Alternatives, Clearbrook to Carlton				Existing Line 3	SA-04 – North Dakota to Illinois
		North Dakota border to Clearbrook	Clearbrook to Carlton	Carlton to Wisconsin Border	North Dakota to Wisconsin (full route)	RA-03AM	RA-06-	RA-07-	RA-08		
Area (mi^2)		363.0	721.2	31.6	768.8	907.4	655.9	555.9	550.4	950.4	1,323.6
BCC Species (number)		23	24	15	27	26	22	22	22	26	35
Birds of Conservation Concern (BCC) Seasonal Occurrence											
Acadian Flycatcher	*Empidonax virescens*										B
American Bittern	*Botaurus lentiginosus*	B	B	B	B	B	B	B	B	B	B
Baird's Sparrow	*Ammodramus bairdii*										
Bald Eagle	*Haliaeetus leucocephalus*	W, B	YR	YR	YR	YR	YR	YR	YR	YR	YR
Bell's Vireo	*Vireo bellii*										B
Black Tern	*Chlidonias niger*	B	B	B	B	B	B	B	B	B	B
Black-billed Cuckoo	*Coccyzus erythropthalmus*	B	B	B	B	B	B	B	B	B	B
Black-crowned Night-heron	*Nycticorax nycticorax*										B
Blue-winged Warbler	*Vermivora pinus*										B
Bobolink	*Dolichonyx oryzivorus*	B	B		B	B	B	B	B	B	
Brown Thrasher	*Toxostoma rufum*	B	B		B	B	B	B	B	B	
Canada Warbler	*Wilsonia canadensis*		B	B	B	B	B	B	B	B	
Cerulean Warbler	*Dendroica cerulea*					B					B
Common Tern	*Sterna hirundo*		B	B	B	B	B	B	B	B	B
Dickcissel	*Spiza americana*	B	B		B	B	B	B	B	B	B

Table M-5. Birds of Conservation Concern Occurring within 1 mile of the Applicant's Preferred Route, Route Alternatives, and System Alternative SA-04

Alternative, Common Name	Scientific Name	Applicant's Preferred Route				Route Alternatives, Clearbrook to Carlton				Existing Line 3	SA-04 – North Dakota to Illinois
		North Dakota border to Clearbrook	Clearbrook to Carlton	Carlton to Wisconsin Border	North Dakota to Wisconsin (full route)	RA-03AM	RA-06-	RA-07-	RA-08		
Ferruginous Hawk	*Buteo regalis*										
Field Sparrow	*Spizella pusilla*										B
Golden Eagle	*Aquila chrysaetos*	W			W					W	W
Golden-winged Warbler	*Vermivora chrysoptera*	B	B	B	B	B	B	B	B	B	
Grasshopper Sparrow	*Ammodramus savannarum*	B			B					B	B
Henslow's Sparrow	*Ammodramus henslowii*										B
Hudsonian Godwit	*Limosa haemastica*	M			M					M	M
Kentucky Warbler	*Oporornis formosus*										B
Least Bittern	*Ixobrychus exilis*	B	B	B	B	B	B	B	B	B	B
Loggerhead Shrike	*Lanius ludovicianus*		B		B	B					B
Marbled Godwit	*Limosa fedoa*	B	B		B	B	B	B	B	B	B
Marsh Wren	*Cistothorus palustris*	B	B		B	B	B	B	B	B	
Nelson's Sparrow	*Ammodramus nelsoni*	B	B		B	B	B	B	B	B	B
Northern Flicker	*Colaptes auratus*										YR
Olive-sided Flycatcher	*Contopus cooperi*	B	B	B	B	B	B	B	B	B	
Peregrine Falcon	*Falco peregrinus*										B
Pied-billed Grebe	*Podilymbus podiceps*	B	B	B	B	B	B	B	B	B	B
Prairie Falcon	*Falco mexicanus*										

Table M-5. Birds of Conservation Concern Occurring within 1 mile of the Applicant's Preferred Route, Route Alternatives, and System Alternative SA-04

Alternative, Common Name	Scientific Name	Applicant's Preferred Route				Route Alternatives, Clearbrook to Carlton				Existing Line 3	SA-04 – North Dakota to Illinois
		North Dakota border to Clearbrook	Clearbrook to Carlton	Carlton to Wisconsin Border	North Dakota to Wisconsin (full route)	RA-03AM	RA-06-	RA-07-	RA-08		
Prothonotary Warbler	*Protonotaria citrea*										B
Red-headed Woodpecker	*Melanerpes erythrocephalus*	B	B	B	B	B	B	B	B	B	YR
Rusty Blackbird	*Euphagus carolinus*										W
Short-eared Owl	*Asio flammeus*	B	B	B	B	B	B	B	B	B	W, B
Sprague's Pipit	*Anthus spragueii*										
Swainson's Hawk	*Buteo swainsoni*	B	B		B	B	B	B	B	B	B
Upland Sandpiper	*Bartramia longicauda*	B	B	B	B	B	B	B	B	B	B
Western Grebe	*Aechmophorus occidentalis*	B	B		B	B				B	B
Willow Flycatcher	*Empidonax traillii*					B					B
Wood Thrush	*Hylocichla mustelina*		B	B	B	B	B	B	B	B	B
Worm-eating Warbler	*Helmitheros vermivorum*										B
Yellow Rail	*Coturnicops noveboracensis*	B	B	B	B	B	B	B	B	B	B

Source: USFWS 2016

Notes:

B = Breeding, M = Migration, W = wintering, YR = Year Round, blank = no occurrence.

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Appendix N

State and County Population Data

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Table N-1. State and County Population Data along the Applicant's Preferred Route and Existing Line 3

Alternative/State/County	Population Estimates (2010)[a]	Population Estimates (2015)[b]	Population Percent Change (2010 – 2015)[a,b]	Population per Square Mile (2015)[a,b]
Applicant's Preferred Route				
North Dakota	**672,591**	**756,927**	**12.5**	**11.0**
Pembina County	7,413	7,091	-4.3	6.3
Minnesota	**5,303,925**	**5,489,594**	**3.5**	**68.9**
Kittson County	4,552	4,424	-2.8	4.0
Marshall County	9,439	9,423	-0.2	5.3
Pennington County	13,930	14,219	2.1	23.1
Red Lake County	4,089	4,055	-0.8	9.4
Polk County	31,600	31,533	-0.2	16.0
Clearwater County	8,695	8,803	1.2	8.8
Hubbard County	20,428	20,655	1.1	22.3
Wadena County	13,843	13,875	0.2	25.9
Cass County	28,567	28,706	0.5	14.2
Crow Wing County	62,500	63,428	1.5	63.5
Aitkin County	16,202	15,702	-3.1	8.6
Carlton County	35,386	35,569	0.5	41.3
Wisconsin	**5,687,289**	**5,771,337**	**1.5**	**106.6**
Douglas County	44,159	43,601	-1.3	33.4
TOTAL	**300,803**	**301,084**	**-0.1**	**18.3**
Existing Line 3				
Minnesota	**5,303,925**	**5,489,594**	**3.5**	**68.9**
Beltrami County	44,442	45,672	2.8	18.2
Hubbard County	20,428	20,655	1.1	22.3
Cass County	28,567	28,706	0.5	14.2
Itasca County	45,058	45,435	0.8	17.0
Aitkin County	16,202	15,702	-3.1	8.6
St. Louis County	200,226	200,431	0.1	32.1
TOTAL	**354,923**	**356,601**	**0.5**	**22.0**

[a] U.S. Census Bureau 2010 Census.

[b] U.S. Census Bureau 2015 population estimates.

Table N-2. State and County Population Data along the System Alternative SA-04 Route

State/County	Population Estimates (2010)[a]	Population Estimates (2015)[b]	Population Percent Change (2010 – 2015)[a,b]	Population per Square Mile (2015)[a,b]
North Dakota	**672,591**	**756,927**	**12.5**	**11.0**
Pembina County	7,413	7,091	-4.3	6.3
Walsh County	11,119	10,897	-2.0	8.5
Grand Forks County	66,861	70,916	6.1	49.4
Traill County	8,121	8,014	-1.3	9.3
Cass County	149,778	171,512	14.5	97.2
Richland County	16,321	16,402	0.5	11.4
Minnesota	**5,303,925**	**5,489,594**	**3.5**	**68.9**
Traverse County	3,558	3,401	-4.4	5.9
Stevens County	9,726	9,796	0.7	17.4
Swift County	9,783	9,340	-4.5	12.6
Chippewa County	12,441	12,109	-2.7	20.8
Kandiyohi County	42,239	42,542	0.7	53.4
Renville County	15,730	14,892	-5.3	15.2
Sibley County	15,226	14,875	-2.3	25.3
Nicollet County	32,727	33,347	1.9	74.4
Le Sueur County	27,703	27,663	-0.1	61.6
Blue Earth County	64,013	65,787	2.8	88.0
Waseca County	19,136	18,989	-0.8	44.9
Freeborn County	31,255	30,613	-2.1	43.3
Mower County	39,163	39,116	-0.1	55.0
Iowa	**3,046,869**	**3,123,899**	**2.5**	**55.9**
Bremer County	24,276	24,722	1.8	56.8
Chickasaw County	12,439	12,097	-2.7	24.0
Howard County	9,566	9,410	-1.6	19.9
Mitchell County	10,772	10,832	0.6	23.1
Clinton County	49,116	47,768	-2.7	68.7
Jones County	20,638	20,466	-0.8	35.6
Delaware County	17,764	17,403	-2.0	30.1

Table N-2. State and County Population Data along the System Alternative SA-04 Route

State/County	Population Estimates (2010)[a]	Population Estimates (2015)[b]	Population Percent Change (2010 – 2015)[a,b]	Population per Square Mile (2015)[a,b]
Buchanan County	20,958	21,062	0.5	36.9
Fayette County	20,880	20,257	-3.0	27.7
Illinois	**12,831,549**	**12,859,995**	**0.2**	**231.6**
~~Livingston County~~	~~38,950~~	~~36,671~~	~~-5.9~~	~~35.1~~
LaSalle County	113,922	111,333	-2.3	98.1
Bureau County	34,978	33,587	-4.0	38.6
Lee County	36,031	34,584	-4.0	47.7
Whiteside County	58,498	57,079	-2.4	83.4
Rock Island County	147,546	146,133	-1.0	341.7
Grundy County	50,063	50.541	1.0	117.1
Will County	677,560	687,263	1.4	806.5
TOTAL	**1,887,320**	**1,864,349**	**1.0**	**73**

[a] Source: U.S. Census Bureau 2010 Census.

[b] Source: U.S. Census Bureau 2015 population estimates.

Appendix O

Cultural Resources Unanticipated Discovery Plan

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Unanticipated Discovery Plan

This Plan updates the information submitted as Appendix P of the Enbridge Energy, Limited Partnership Application for a Pipeline Routing Permit on April 24, 2015.

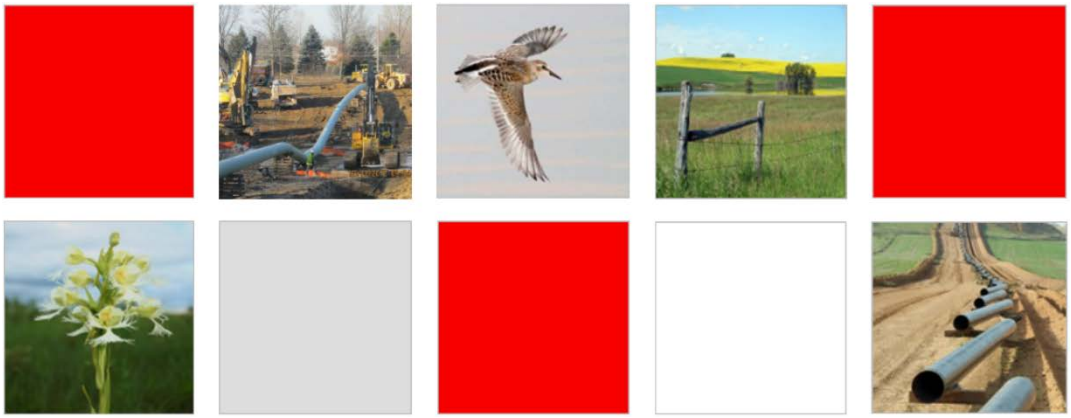

Enbridge

UNANTICIPATED DISCOVERIES PLAN

April 2015

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1.0 INTRODUCTION

This Unanticipated Discoveries Plan ("UDP") sets forth the guidelines to be used in the event archaeological resources or human skeletal remains are discovered during construction activities. These measures were developed by Enbridge in accordance with applicable state and federal guidelines. Early and frequent communications are essential in meeting both the spirit and law of those guidelines; therefore, Appendix A shows the most current list of relevant contacts in the event of an unanticipated discovery during construction.

2.0 UNANTICIPATED DISCOVERY CONDITIONS

Pipeline construction excavations have the potential to uncover previously unknown archaeological sites and human skeletal remains, as well as many other cultural and natural elements such as modern refuse and faunal remains. While extensive environmental surveys can effectively eliminate most discoveries during construction, Enbridge is aware that project planning should anticipate even the remote possibility of a discovery.

Enbridge will have the primary responsibility of distinguishing discoveries of significant archaeological sites or human skeletal remains from those that are neither. The former would require ceasing construction activities at the find location followed by a coordinated consultation effort among Enbridge, permitting agencies, landowners, and other interested parties. Identification of the latter (neither significant archaeological sites nor human skeletal remains) would not mean ceasing construction activities or initiation of the consultation process; however documentation of the event must be made.

When possible archaeological materials or suspected human skeletal remains are identified during ground disturbing activities within the construction corridor, the construction contractor ("Contractor") will immediately notify Enbridge's lead onsite Environmental Inspector ("EI") of the discovery.

1. Immediately following notification of the discovery, the lead EI shall:

   (a) Establish and delineate a 25 foot buffer around the edge of the discovery (using flagging and/or fencing), advise the on-site construction manager to halt all ground-disturbing activities within the buffered area until otherwise notified by Enbridge Environment, and implement measures to protect the discovery from looting and vandalism, including a 24-hour watch, if necessary; and

   (b) Contact a qualified Professional Archaeologist (possible archaeological materials) and/or Physical Anthropologist (suspected human skeletal remains) to conduct an assessment of the discovery. The Professional Archaeologist should meet the qualification standards outlined in 36 Code of Federal Regulations ("CFR") Part 61 in order to conduct the assessment. The Physical Anthropologist must be acknowledged as competent to positively identify human skeletal remains.

2. When contacted by the lead EI, the Professional Archaeologist shall gather additional information from the discovery area and assess the potential significance and condition

and integrity of the discovery according to the guidelines established by the National Park Service ("NPS") in Bulletin 15 and its amendments:

(a) The Professional Archaeologist will determine whether or not the discovery is an archaeological site or cultural resource over 45 years of age. If the discovery is an archaeological site or cultural resource greater than 45 years of age, the Professional Archaeologist will record as much information as possible to secure a Smithsonian Trinomial Number from the appropriate state agency. The lead EI would then notify Enbridge Environment to initiate the process outlined in *3.0 Discovery of Historic Properties* below.

(b) If the discovery is not an archaeological site or cultural resource greater than forty-five years of age, the Professional Archaeologist will document the discovery for the record and Enbridge's lead EI will advise the on-site construction manager to restart ground-disturbing activities.

3. When contacted by the lead EI, the Physical Anthropologist shall investigate the site to make an assessment of the likely nature of the remains:
   (a) If the remains are likely human then the lead EI would notify Enbridge Environment to initiate the process outlined in *4.0 Discovery of Human Skeletal Remains* below.
   (b) If the discovery does not represent human skeletal remains, the Physical Anthropologist will document the discovery for the record and Enbridge's lead EI will advise the on-site construction manager to restart ground-disturbing activities.

3.0 DISCOVERY OF HISTORIC PROPERTIES

Upon the discovery of an archaeological site or cultural resource greater than 45 years of age, the Professional Archaeologist will advise Enbridge Environment of the proper agency notification procedure and recommend a plan of action for the discovery area.

(a) If the discovery area is under the jurisdiction of a federal permit and/or approval, or otherwise subject to federally-mandated conditions, Enbridge Environment will advise the Responsible Federal Agency ("RFA") of the resource and provide information regarding its significance and condition and integrity (see *3.1 Federal Agency Jurisdiction* below).

(b) If the discovery is on state land, Enbridge Environment will first advise the land-managing agency of the resource and provide information regarding its significance, condition and integrity and, if directed by the land-managing agency, advise the appropriate State Archaeologist (see *3.2 State Lands* below).

(c) If the discovery is on private land, its disposition will still be subject to the authority of the appropriate state routing agency. Enbridge Environment will advise the state routing agency of the resource and provide information regarding its significance, condition and integrity (see *3.3 Public Lands Subject to State Routing Authority* below).

3.1 FEDERAL AGENCY JURISDICTION

(a) Enbridge Environment will notify the RFA of the resource and provide information regarding its significance and condition and integrity.

(b) Within 24 hours of notification, the RFA shall provide notice of the discovery to other parties who may wish to participate in consultation, including but not limited to the appropriate State Historic Preservation Office ("SHPO"), Native American tribal officials (as applicable), and private landowner(s).

(c) The RFA shall have 5 calendar days following notification to determine the discovery's eligibility for listing on the National Register of Historic Places ("NRHP") in consultation with the appropriate SHPO and other consulting parties. The RFA may extend the review period by an additional 7 calendar days by providing written notice to consulting parties prior to the expiration of the 5 day calendar period.

(d) For properties determined eligible for listing on the NRHP pursuant to (c) above, Enbridge Environment shall notify the RFA and other consulting parties of Enbridge's proposed treatment measures to resolve adverse effects to the discovered resource. The consulting parties shall comment on the proposed treatment measures within 48 hours. The RFA shall ensure that the recommendations of the consulting parties are considered prior to granting approval of Enbridge-proposed treatment measures. Once approval has been granted by the RFA, Enbridge Environment shall carry out the approved treatment measures and, after doing so, Enbridge may resume construction.

(e) In the event of any disagreements between the consulting parties regarding the NRHP eligibility of the newly discovered property or the treatment measures proposed to mitigate adverse effects to the property, the RFA shall seek and take into account the recommendations of the Advisory Council on Historic Preservation ("ACHP"). Within 48 hours of receipt of a request, ACHP shall provide the RFA with recommendations on how to resolve the dispute.

(f) If, after consultation, the RFA determines that the discovery does not represent an NRHP-eligible resource, the RFA will direct Enbridge Environment to resume ground-disturbing activities at the discovery location at its discretion.

3.2 STATE LANDS

(a) Enbridge Environment will notify the land-managing agency of the resource and provide information regarding its significance and integrity. If directed by the land-managing agency to do so, Enbridge Environment will advise the appropriate State Archaeologist.

(b) The land-managing agency will have 5 calendar days following notification to consult with the appropriate state archaeologist and other consulting parties, as necessary, about the assessment of the discovery. NPS criteria of eligibility for listing on the NRHP may be considered as a guideline to determine the significance of the find and SHPO may be consulted during the assessment, but the state agency is not obliged to apply NPS standards in making its decision. The land-managing agency may assume the resource is eligible for listing on the NRHP while consultation occurs and may require avoidance, impact minimization, or mitigation.

(c) For properties determined eligible for listing on the NRHP, Enbridge Environment shall notify the land-managing agency and other consulting parties of the treatment measures it proposes for resolving adverse effects to the resource. The consulting parties shall provide their views on the proposed treatment measures to Enbridge Environment, the land-managing agency and other consulting parties within 48 hours. The land-managing

agency shall ensure that the recommendations of the consulting parties are considered prior to granting approval of Enbridge's proposed treatment measures. Once approval has been granted by the land-managing agency, Enbridge Environment shall carry out the approved treatment measures and, after doing so, Enbridge may resume construction.

(d) If, after consultation, the land-managing agency determines that the discovery does not represent an NRHP-eligible or otherwise important resource, the land-managing agency will direct Enbridge Environment to resume ground-disturbing activities, at its discretion, at the discovery location.

3.3 PRIVATE LANDS SUBJECT TO STATE ROUTING AUTHORITY JURISDICTION

(a) Enbridge Environment will notify the state routing authority of the resource and provide information regarding its significance and integrity.

(b) Within 24 hours of notification, the state routing authority shall provide notice of the resource to other parties, including, but not limited to, the appropriate SHPO, the appropriate State Archaeologist, Native American tribal officials (as applicable), and private landowner(s).

(c) The state routing authority will have 5 calendar days following notification to consult with the appropriate SHPO and other consulting parties, as necessary, about assessing the discovery. Criteria for eligibility for listing on the NRHP may be considered as a guideline to determine the significance of the find and SHPO may be consulted during the assessment, but the state routing authority is not obliged to apply the standards in making its decision. The state routing authority may assume the resource is eligible for listing on the NRHP while consultation occurs and may require avoidance, impact minimization, or mitigation.

(d) For properties eligible for listing on the NRHP, Enbridge Environment shall notify the state routing authority and other consulting parties of the treatment measures it proposes to resolve impacts to the resource. The consulting parties shall provide their views on the proposed treatment measures within 48 hours. The state routing authority shall ensure that the recommendations of the consulting parties are considered prior to granting approval of Enbridge's proposed treatment measures. Once approval has been granted by the state routing authority, Enbridge Environment shall carry out the approved treatment measures and, after doing so, Enbridge may resume construction.

(e) If, after consultation, the state routing authority determines that the discovery does not represent an NRHP-eligible or otherwise important resource, the state routing authority will direct Enbridge Environment to resume ground-disturbing activities, at its discretion, at the discovery location.

4.0 DISCOVERY OF HUMAN SKELETAL REMAINS

1. When unmarked human burial or skeletal remains are encountered during construction activities, Enbridge will comply with all applicable laws, specifically:

   a) North Dakota's "Protection of human burial sites, human remains, and burial goods – Unlawful acts – Penalties – Exceptions" law (North Dakota Century Code ["NDCC"]

§23-06-27) and its accompanying administrative rules (North Dakota Administrative Code ["NDAC"] §40-02-03);

b) Minnesota's "Private Cemeteries Act" (Minnesota Statute ["Minn. Stat."] §307.08); and

c) Wisconsin Statute §157.70. In Wisconsin, in the case of accidental discoveries, state law does not distinguish between historic or prehistoric burials in the requirements for initial notifications or disinterment.

2. In the event a human burial or skeletal remains are encountered during ground-disturbing construction activity, Enbridge Environment will implement the following notification procedures:

   a) North Dakota – notify the local law enforcement agency (county sheriff) and the State Historical Society of North Dakota as required by NDCC §23-06-27. Pursuant to NDAC §40-02-03-03, upon receiving notification of the discovery of human skeletal remains, a human burial, or burial goods, the local law enforcement agency shall, as soon as practicable, report the receipt of such notification to State Historical Society of North Dakota and the North Dakota State Department of Health and Consolidated Laboratories. These two state agencies shall commence the initial examination of the discovery within 24 hours of notification.

   b) Minnesota – notify the local law enforcement agency (county sheriff). As required by Minn. Stat. §307.08 Enbridge Environment will also notify the Office of the State Archaeologist of the find.

   c) Wisconsin – notify the local law enforcement agency (county sheriff) and SHPO as stipulated by Wisconsin Statute §157.70.

3. Enbridge Environment also shall promptly notify the RFA, land-managing agency, or state routing authority of the find and consult regarding the appropriate measures to handle the discovery.

After permission to resume construction has been issued by the RFA, land-managing agency, or state routing authority, Enbridge's lead EI will advise the on-site construction manager to restart ground-disturbing activities.

Appendix A
Contact Lists – North Dakota, Minnesota, and Wisconsin

Contact Lists North Dakota, Minnesota, and Wisconsin		
State/County	Contact	Address/Telephone
NORTH DAKOTA	TBD, Lead Environmental Inspector	Cellphone: TBD E-mail: TBD
	Fern Swenson, Deputy SHPO	State Historical Society of North Dakota 612 East Boulevard Avenue Bismarck, ND 58505-0830 Telephone: (701) 328-2666 Fax: (701) 328-3710 E-mail: fswenson@nd.gov
	Edward C. Murphy, State Geologist	North Dakota Industrial Commission, Department of Mineral Resources, North Dakota Geological Survey 1016 East Calgary Ave. Bismarck, ND 58503 Telephone: (701) 328-8000
Williams County	Scott Busching, County Sheriff	223 East Broadway, Suite 301 Williston, ND 58801 Telephone: (701) 577-7700
Mountrail County	Kenneth Halvorson, County Sheriff	101 N Main St Stanley, ND 58784 Telephone: (701) 628-2975
Ward County	Steve Kukowski, County Sheriff	315 SE 3rd Street PO Box 907 Minot, ND 58702 Telephone: (701) 857-6500
McHenry County	Marvin Sola, County Sheriff	407 Main Street South, Room 303 Towner, ND 58788 Telephone: (701) 537-5633
Pierce County	Matt Lunde, County Sheriff	110 Industrial Park Road Rugby, ND 58368-0226 Telephone: (701) 776-5245 mmlunde@nd.gov
Towner County	Vaughn Klier, County Sheriff	315 2nd Street PO Box 366 Cando, ND 58324-0603 Telephone: (701) 968-4350
Ramsey County	Steve Nelson, County Sheriff	222 W Walnut Devils Lake, ND 58301-3596 Telephone: (701) 662-0708
Nelson County	Kelly Janke, County Sheriff	210 B Ave W Ste 102 Lakota, ND 58344-7410 Telephone: (701) 247-2475
Grand Forks County	Bob Rost, County Sheriff	122 South 5th Street Suite 210 PO Box 12608 Grand Forks, ND 58208-2608 Telephone: (701) 780-8280
Pembina County	Brian Erovick, County Sheriff	308 Courthouse Drive Cavalier, ND 58220 Telephone: (701) 265-4122

Contact Lists North Dakota, Minnesota, and Wisconsin		
State/County	Contact	Address/Telephone
MINNESOTA	TBD, Lead Environmental Inspector	Cellphone: TBD E-mail: TBD
	Barbara Mitchell Howard, Deputy SHPO	Minnesota State Historic Preservation Office Minnesota Historical Society 345 Kellogg Boulevard West St. Paul, MN 55102-1903 Telephone: (651) 259-3466 E-mail: barbara.howard@mnhs.org
	Scott Anfinson, Minnesota State Archaeologist	Office of the State Archaeologist Fort Snelling History Center 200 Tower Avenue St. Paul, MN 55111 Telephone: (612) 725-2411 E-mail: scott.anfinson@state.mn.us
	Jim L. Jones, Jr., Cultural Resource Director	Minnesota Indian Affairs Council 3801 Bemidji Avenue, Suite 5 Bemidji, MN 56601 Telephone: (218) 755-3825
	Harvey Thorleifson, Director	Minnesota Geological Survey 2642 University Ave. St. Paul, MN 55114-1057 Telephone: (612) 627-4780, ext. 224
Polk County	Barb Erdman, County Sheriff	600 Bruce Street P.O. Box 416 Crookston, MN 56716 Telephone: (218) 281-0431
Red Lake County	Mitch Bernstein, County Sheriff	124 Langevin Avenue, PO Box 367 Red Lake Falls, MN 56750 Telephone: (218) 253-2996
Clearwater County	Darin Halverson, Chief Deputy	213 Main Avenue North Bagley, MN 56621 Telephone: (218) 694-6226
Hubbard County	Cory Aukes, County Sheriff	301 Court Ave. Park Rapids, MN 56470 Telephone: (218) 737-3331
Becker County	Kelly Shannon, County Sheriff	925 Lake Ave. Detroit Lakes, MN 56501 Telephone: (218) 847-2661
Wadena County	Mike Carr, County Sheriff	415 So Jefferson St Wadena, MN 56482 Telephone: (218) 631-7600
Cass County	Tom Burch, County Sheriff	303 Minnesota Avenue Walker, MN 56484 Telephone: (218) 547-1424, ext. 309
Crow Wing County	Todd Dahl, County Sheriff	304 Laurel St. Brainerd, MN 56401 Telephone: (218) 829-4749
Aitkin County	Scott Turner, County Sheriff	217 2nd St. NW, Room 185 Aitkin, MN 56431 Telephone: (218) 927-7435
Carlton County	Kelly Lake, County Sheriff	317 Walnut Avenue Carlton, MN 55718 Telephone: (218) 384-3236

Contact Lists **North Dakota, Minnesota, and Wisconsin**		
State/County	Contact	Address/Telephone
Kittson	Kenny Hultgren, County Sheriff	410 5th Street South Suite 102 Hallock, MN 56728 Telephone: (218) 843-3535
Marshall	John D. Novacek, County Sheriff	208 East Colvin Avenue Suite #1 Warren, MN 56762 Telephone: 218-745-5411 Fax: (218) 745-9203
Pennington	Ray D. Kuznia, County Sheriff	102 1st Street West PO Box 484 Thief River Falls, MN 56701 Telephone: 218-681-6161 Fax: (218) 683-7006

Contact Lists **North Dakota, Minnesota, and Wisconsin**		
State/County	Contact	Address/Telephone
WISCONSIN	TBD, Lead Environmental Inspector	Cellphone: TBD E-mail: TBD
	John Broihahn, State Archaeologist, SHPO	Wisconsin Historical Society, Division of Historic Preservation 816 State Street Madison, WI 53706-1488 Telephone: (608) 264-6500
	James M. Robertson, State Geologist	Wisconsin Geological and Natural History Survey 3817 Mineral Point Road Madison, WI 53705-5100 Telephone: (608) 262-1705
Douglas County	Tom Dalbec, County Sheriff	1316 North 14th Street Superior, WI 54880 Telephone: (715) 395-1371

Appendix Q

Environmental Justice Statistics in Affected Counties in Minnesota

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Table Q-1 Minority Population

State/County/Census Tract	Percent Minority Population	If 10 Percentage Points Higher than County Level	If 10 Percent Points Higher than State Level	If 50 Percent of Total Population Minority
Minnesota	18.3			
Aitkin County	5.6			
Census Tract 7701	5.4			
Census Tract 7702	6.6			
Census Tract 7703	3.8			
Census Tract 7704	12.1			
Census Tract 7905.01	2.4			
Census Tract 7905.02	2.6			
Beltrami County	26.6			
Census Tract 4501	11.9			
Census Tract 4502	10.4			
Census Tract 4503	6.1			
Census Tract 4504	9.6			
Census Tract 4505	3.6			
Census Tract 4506	19.7			
Census Tract 4507.01	22.9			
Census Tract 4507.02	22.5			
Census Tract 9400.01	96.8	TRUE	TRUE	TRUE
Census Tract 9400.02	46.1	TRUE	TRUE	
Benton County	7.3			
Census Tract 201	4.7			
Census Tract 202.02	2.8			
Census Tract 202.03	6.6			
Census Tract 202.05	1.7			
Census Tract 202.06	6.4			
Census Tract 203	2.8			
Census Tract 211.01	7.2			
Census Tract 211.02	10.1			
Census Tract 212	15.5			
Carlton County	11.4			
Census Tract 701	13.1			
Census Tract 702	9.0			
Census Tract 703	4.2			
Census Tract 704	6.6			
Census Tract 705	10.1			
Census Tract 706	4.3			
Census Tract 9400	49.7	TRUE	TRUE	

Table Q-1 Minority Population

State/County/Census Tract	Percent Minority Population	If 10 Percentage Points Higher than County Level	If 10 Percent Points Higher than State Level	If 50 Percent of Total Population Minority
Cass County	15.8			
Census Tract 9400.01	24.7			
Census Tract 9400.02	72.9	TRUE	TRUE	TRUE
Census Tract 9601	9.3			
Census Tract 9602	20.3			
Census Tract 9603.01	1.9			
Census Tract 9603.02	2.5			
Census Tract 9606	6.8			
Census Tract 9607	2.5			
Census Tract 9608.01	1.9			
Census Tract 9608.02	5.8			
Clearwater County	14.2			
Census Tract 1	9.7			
Census Tract 2	25.3	TRUE		
Census Tract 3	8.4			
Crow Wing County	4.5			
Census Tract 9501	1.2			
Census Tract 9502.04	2.0			
Census Tract 9504	3.8			
Census Tract 9505.01	3.4			
Census Tract 9505.02	1.4			
Census Tract 9507	6.4			
Census Tract 9508	3.6			
Census Tract 9509	2.3			
Census Tract 9510	5.9			
Census Tract 9511	8.6			
Census Tract 9512	11.6			
Census Tract 9513.01	1.5			
Census Tract 9513.02	5.8			
Census Tract 9514	4.5			
Census Tract 9516	6.3			
Census Tract 9517	1.7			
Hubbard County	6.5			
Census Tract 701	9.5			
Census Tract 702	4.2			
Census Tract 703	7.5			
Census Tract 704	6.0			
Census Tract 705	4.7			
Census Tract 706	7.1			
Census Tract 707	3.4			

Table Q-1 Minority Population

State/County/Census Tract	Percent Minority Population	If 10 Percentage Points Higher than County Level	If 10 Percent Points Higher than State Level	If 50 Percent of Total Population Minority
Itasca County	7.7			
Census Tract 4801	6.0			
Census Tract 4803	11.7			
Census Tract 4804	5.4			
Census Tract 4805	6.8			
Census Tract 4806	1.4			
Census Tract 4807	6.2			
Census Tract 4808.01	5.7			
Census Tract 4808.02	4.3			
Census Tract 4809	4.6			
Census Tract 4810	7.9			
Census Tract 9400	34.7	TRUE	TRUE	
Kanabec County	4.7			
Census Tract 4801	6.6			
Census Tract 4802	4.3			
Census Tract 4803	3.7			
Census Tract 4804	4.4			
Kittson County	3.6			
Census Tract 901	3.1			
Census Tract 902	4.2			
Marshall County	6.0			
Census Tract 801	3.5			
Census Tract 802	2.8			
Census Tract 803	10.0			
Census Tract 804	7.4			
Mille Lacs County	10.1			
Census Tract 1704	3.9			
Census Tract 1705	5.9			
Census Tract 1706	5.9			
Census Tract 1707	8.1			
Census Tract 9701	10.6			
Census Tract 9702	40.4	TRUE	TRUE	
Census Tract 9703	5.1			
Morrison County	3.7			
Census Tract 7801	2.7			
Census Tract 7802	3.7			
Census Tract 7803	4.4			
Census Tract 7804	1.6			
Census Tract 7805	3.5			
Census Tract 7806	6.6			
Census Tract 7807	1.6			
Census Tract 7808	2.5			

Table Q-1 Minority Population

State/County/Census Tract	Percent Minority Population	If 10 Percentage Points Higher than County Level	If 10 Percent Points Higher than State Level	If 50 Percent of Total Population Minority
Pennington County	8.7			
Census Tract 901	9.9			
Census Tract 902	13.2			
Census Tract 903	1.8			
Census Tract 904	10.6			
Census Tract 905	6.8			
Pine County	10.1			
Census Tract 9501	4.9			
Census Tract 9502	6.4			
Census Tract 9503	5.1			
Census Tract 9504	25.9	TRUE		
Census Tract 9505	11.6			
Census Tract 9506	8.1			
Census Tract 9507	3.9			
Census Tract 9508	4.1			
Polk County	11.0			
Census Tract 201	14.8			
Census Tract 202	14.5			
Census Tract 203	9.9			
Census Tract 204	2.3			
Census Tract 205	7.3			
Census Tract 206	14.3			
Census Tract 207	25.9	TRUE		
Census Tract 208	5.8			
Census Tract 209	5.7			
Census Tract 210	7.6			
Red Lake County	6.9			
Census Tract 101	8.0			
Census Tract 102	5.9			
St. Louis County	8.3			
Census Tract 1	4.1			
Census Tract 10	6.5			
Census Tract 101	4.0			
Census Tract 102	2.5			
Census Tract 103	3.7			
Census Tract 104	3.3			
Census Tract 105	4.8			
Census Tract 106	5.7			
Census Tract 11	6.8			
Census Tract 111	4.6			
Census Tract 112	20.1	TRUE		
Census Tract 113	2.3			

Table Q-1 Minority Population

State/County/Census Tract	Percent Minority Population	If 10 Percentage Points Higher than County Level	If 10 Percent Points Higher than State Level	If 50 Percent of Total Population Minority
Census Tract 114	2.7			
Census Tract 12	22.0	TRUE		
Census Tract 121	2.5			
Census Tract 122	10.0			
Census Tract 123	8.3			
Census Tract 124	6.2			
Census Tract 125	5.6			
Census Tract 126	6.5			
Census Tract 127	9.0			
Census Tract 128	2.7			
Census Tract 13	15.3			
Census Tract 130	5.0			
Census Tract 131	19.7	TRUE		
Census Tract 132	4.9			
Census Tract 133	6.1			
Census Tract 134	5.6			
Census Tract 135	2.0			
Census Tract 136	1.8			
Census Tract 138	3.7			
Census Tract 139	2.1			
Census Tract 14	17.7			
Census Tract 140	1.5			
Census Tract 141	3.5			
Census Tract 151	3.2			
Census Tract 152	6.2			
Census Tract 153	1.9			
Census Tract 154	9.5			
Census Tract 155	23.6	TRUE		
Census Tract 156	33.2	TRUE	TRUE	
Census Tract 157	12.2			
Census Tract 158	6.1			
Census Tract 16	26.3	TRUE		
Census Tract 17	15.6			
Census Tract 18	24.7	TRUE		
Census Tract 19	27.9	TRUE		
Census Tract 2	5.7			
Census Tract 20	13.1			
Census Tract 22	6.3			
Census Tract 23	2.7			
Census Tract 24	7.9			
Census Tract 26	12.2			
Census Tract 29	5.0			
Census Tract 3	16.6			
Census Tract 30	9.4			
Census Tract 33	13.9			
Census Tract 34	5.4			
Census Tract 36	3.0			

Table Q-1 Minority Population

State/County/Census Tract	Percent Minority Population	If 10 Percentage Points Higher than County Level	If 10 Percent Points Higher than State Level	If 50 Percent of Total Population Minority
Census Tract 37	10.7			
Census Tract 38	5.2			
Census Tract 4	8.3			
Census Tract 5	12.1			
Census Tract 6	5.6			
Census Tract 7	5.4			
Census Tract 9	10.1			
Census Tract 9901	0.0			
Todd County	8.1			
Census Tract 7901	4.8			
Census Tract 7902	3.9			
Census Tract 7903	5.6			
Census Tract 7904	4.1			
Census Tract 7905	2.2			
Census Tract 7906	31.5	TRUE	TRUE	
Census Tract 7907	2.4			
Census Tract 7908	3.6			
Wadena County	5.0			
Census Tract 4801	4.5			
Census Tract 4802	5.6			
Census Tract 4803	4.6			
Total True		18	8	2

Table Q-2 Native American Population

State/County/Census Tract	Native American or in Combination with Another Race	If 10 Percentage Points Higher than County Level	If 10 Percentage Points Higher than State Level	If 50 Percent of Total Population Native American
Minnesota	1.9			
Aitkin County	3.5			
Census Tract 7701	2.8			
Census Tract 7702	4.2			
Census Tract 7703	1.6			
Census Tract 7704	9.4			
Census Tract 7905.01	1.2			
Census Tract 7905.02	1.0			
Beltrami County	23.0			
Census Tract 4501	9.4			
Census Tract 4502	6.3			
Census Tract 4503	3.7			
Census Tract 4504	6.0			
Census Tract 4505	3.3			
Census Tract 4506	11.4			
Census Tract 4507.01	20.8		TRUE	
Census Tract 4507.02	18.2		TRUE	
Census Tract 9400.01	93.8	TRUE	TRUE	TRUE
Census Tract 9400.02	44.0	TRUE	TRUE	
Benton County	0.9			
Census Tract 201	1.0			
Census Tract 202.02	0.6			
Census Tract 202.03	0.3			
Census Tract 202.05	0.5			
Census Tract 202.06	0.2			
Census Tract 203	0.3			
Census Tract 211.01	0.5			
Census Tract 211.02	1.0			
Census Tract 212	2.4			
Carlton County	7.2			
Census Tract 701	8.1			
Census Tract 702	4.3			
Census Tract 703	1.6			
Census Tract 704	2.3			
Census Tract 705	4.4			
Census Tract 706	1.7			
Census Tract 9400	46.9	TRUE	TRUE	

Table Q-2 Native American Population

State/County/Census Tract	Native American or in Combination with Another Race	If 10 Percentage Points Higher than County Level	If 10 Percentage Points Higher than State Level	If 50 Percent of Total Population Native American
Cass County	13.2			
Census Tract 9400.01	23.0		TRUE	
Census Tract 9400.02	69.2	TRUE	TRUE	TRUE
Census Tract 9601	6.5			
Census Tract 9602	18.7		TRUE	
Census Tract 9603.01	0.9			
Census Tract 9603.02	0.6			
Census Tract 9606	2.1			
Census Tract 9607	1.5			
Census Tract 9608.01	0.7			
Census Tract 9608.02	1.1			
Clearwater County	11.7			
Census Tract 1	6.8			
Census Tract 2	23.2	TRUE	TRUE	
Census Tract 3	5.9			
Crow Wing County	1.6			
Census Tract 9501	0.0			
Census Tract 9502.04	1.2			
Census Tract 9504	0.8			
Census Tract 9505.01	0.8			
Census Tract 9505.02	0.0			
Census Tract 9507	2.1			
Census Tract 9508	1.0			
Census Tract 9509	2.3			
Census Tract 9510	1.6			
Census Tract 9511	3.6			
Census Tract 9512	2.7			
Census Tract 9513.01	0.1			
Census Tract 9513.02	1.1			
Census Tract 9514	1.7			
Census Tract 9516	4.6			
Census Tract 9517	0.5			
Hubbard County	3.6			
Census Tract 701	5.9			
Census Tract 702	1.1			
Census Tract 703	5.4			
Census Tract 704	3.7			
Census Tract 705	1.4			
Census Tract 706	3.9			
Census Tract 707	2.1			
	3.6			

Table Q-2 Native American Population

State/County/Census Tract	Native American or in Combination with Another Race	If 10 Percentage Points Higher than County Level	If 10 Percentage Points Higher than State Level	If 50 Percent of Total Population Native American
Itasca County	5.0			
Census Tract 4801	3.2			
Census Tract 4803	9.1			
Census Tract 4804	3.4			
Census Tract 4805	2.3			
Census Tract 4806	0.4			
Census Tract 4807	3.3			
Census Tract 4808.01	2.3			
Census Tract 4808.02	2.2			
Census Tract 4809	2.4			
Census Tract 4810	5.0			
Census Tract 9400	29.9	TRUE	TRUE	
Kanabec County	1.5			
Census Tract 4801	2.8			
Census Tract 4802	1.6			
Census Tract 4803	1.2			
Census Tract 4804	1.0			
Kittson County	0.5			
Census Tract 901	0.6			
Census Tract 902	0.4			
Marshall County	1.0			
Census Tract 801	1.8			
Census Tract 802	1.0			
Census Tract 803	0.5			
Census Tract 804	0.6			
Mille Lacs County	6.7			
Census Tract 1704	1.3			
Census Tract 1705	1.5			
Census Tract 1706	3.0			
Census Tract 1707	4.5			
Census Tract 9701	8.2			
Census Tract 9702	35.0	TRUE	TRUE	
Census Tract 9703	3.4			
Morrison County	0.9			
Census Tract 7801	0.5			
Census Tract 7802	0.8			
Census Tract 7803	0.6			
Census Tract 7804	0.5			
Census Tract 7805	1.6			
Census Tract 7806	2.4			
Census Tract 7807	0.1			
Census Tract 7808	0.1			

Table Q-2 Native American Population

State/County/Census Tract	Native American or in Combination with Another Race	If 10 Percentage Points Higher than County Level	If 10 Percentage Points Higher than State Level	If 50 Percent of Total Population Native American
Pennington County	2.3			
Census Tract 901	1.4			
Census Tract 902	4.5			
Census Tract 903	0.3			
Census Tract 904	2.8			
Census Tract 905	1.8			
Pine County	4.0			
Census Tract 9501	1.8			
Census Tract 9502	1.7			
Census Tract 9503	2.6			
Census Tract 9504	9.1			
Census Tract 9505	6.8			
Census Tract 9506	3.3			
Census Tract 9507	0.9			
Census Tract 9508	1.1			
Polk County	2.4			
Census Tract 201	3.0			
Census Tract 202	4.7			
Census Tract 203	2.9			
Census Tract 204	0.3			
Census Tract 205	1.6			
Census Tract 206	2.3			
Census Tract 207	2.8			
Census Tract 208	0.9			
Census Tract 209	2.6			
Census Tract 210	3.1			
Red Lake County	2.5			
Census Tract 101	3.4			
Census Tract 102	1.7			
St. Louis County	3.4			
Census Tract 1	1.0			
Census Tract 10	1.2			
Census Tract 101	0.0			
Census Tract 102	2.1			
Census Tract 103	1.3			
Census Tract 104	1.1			
Census Tract 105	1.6			
Census Tract 106	1.3			
Census Tract 11	2.4			
Census Tract 111	2.3			
Census Tract 112	17.5	TRUE	TRUE	
Census Tract 113	1.5			

Table Q-2 Native American Population

State/County/Census Tract	Native American or in Combination with Another Race	If 10 Percentage Points Higher than County Level	If 10 Percentage Points Higher than State Level	If 50 Percent of Total Population Native American
Census Tract 114	1.7			
Census Tract 12	6.1			
Census Tract 121	1.0			
Census Tract 122	6.2			
Census Tract 123	1.0			
Census Tract 124	1.0			
Census Tract 125	0.5			
Census Tract 126	2.9			
Census Tract 127	3.4			
Census Tract 128	2.1			
Census Tract 13	6.9			
Census Tract 130	1.8			
Census Tract 131	16.5	TRUE	TRUE	
Census Tract 132	4.1			
Census Tract 133	3.1			
Census Tract 134	1.5			
Census Tract 135	0.1			
Census Tract 136	0.7			
Census Tract 138	0.4			
Census Tract 139	1.4			
Census Tract 14	2.8			
Census Tract 140	1.4			
Census Tract 141	3.1			
Census Tract 151	1.3			
Census Tract 152	4.6			
Census Tract 153	0.3			
Census Tract 154	9.2			
Census Tract 155	21.9	TRUE	TRUE	
Census Tract 156	10.5			
Census Tract 157	2.7			
Census Tract 158	1.0			
Census Tract 16	6.9			
Census Tract 17	4.8			
Census Tract 18	9.9			
Census Tract 19	5.5			
Census Tract 2	1.6			
Census Tract 20	5.8			
Census Tract 22	1.2			
Census Tract 23	1.4			
Census Tract 24	6.0			
Census Tract 26	7.2			
Census Tract 29	1.7			
Census Tract 3	3.3			
Census Tract 30	4.1			
Census Tract 33	5.0			
Census Tract 34	1.2			
Census Tract 36	2.5			

Table Q-2 Native American Population

State/County/Census Tract	Native American or in Combination with Another Race	If 10 Percentage Points Higher than County Level	If 10 Percentage Points Higher than State Level	If 50 Percent of Total Population Native American
Census Tract 37	3.5			
Census Tract 38	2.1			
Census Tract 4	1.7			
Census Tract 5	3.9			
Census Tract 6	3.3			
Census Tract 7	0.0			
Census Tract 9	3.0			
Census Tract 9901	0.0			
Todd County	1.0			
Census Tract 7901	1.5			
Census Tract 7902	1.7			
Census Tract 7903	1.7			
Census Tract 7904	0.7			
Census Tract 7905	1.3			
Census Tract 7906	0.0			
Census Tract 7907	0.6			
Census Tract 7908	0.8			
Wadena County	1.3			
Census Tract 4801	0.6			
Census Tract 4802	0.9			
Census Tract 4803	2.3			
Total True		10	14	2

Table Q-3 Poverty Population

EJ Census Tracts: 185 PERCENT OF POVERTY
Counties with Proposed or Alternate Route Crossing

State/County/Census Tract	Percentage Below 185 Percent of Poverty Level	If 10 Percentage Points Higher than County Level	If 10 Percentage Points Higher than State Level	If 40 Percent of Population Below 185 Percent
Minnesota	24.3			
Aitkin County	34.0			
Census Tract 7701	25.2			
Census Tract 7702	35.2		TRUE	
Census Tract 7703	42.3		TRUE	TRUE
Census Tract 7704	42.5		TRUE	TRUE
Census Tract 7905.01	33.0			
Census Tract 7905.02	22.7			
Beltrami County	38.9			
Census Tract 4501	30.2			
Census Tract 4502	23.4			
Census Tract 4503	21.5			
Census Tract 4504	35.0		TRUE	
Census Tract 4505	33.4			
Census Tract 4506	54.6	TRUE	TRUE	TRUE
Census Tract 4507.01	38.7		TRUE	
Census Tract 4507.02	42.7		TRUE	TRUE
Census Tract 9400.01	69.1	TRUE	TRUE	TRUE
Census Tract 9400.02	40.2		TRUE	TRUE
Benton County	30.5			
Census Tract 201	22.6			
Census Tract 202.02	19.1			
Census Tract 202.03	15.3			
Census Tract 202.05	16.1			
Census Tract 202.06	23.8			
Census Tract 203	13.1			
Census Tract 211.01	40.2		TRUE	TRUE
Census Tract 211.02	34.2			
Census Tract 212	51.6	TRUE	TRUE	TRUE
Carlton County	28.9			
Census Tract 701	30.2			
Census Tract 702	34.0			
Census Tract 703	14.6			
Census Tract 704	25.2			
Census Tract 705	36.8		TRUE	
Census Tract 706	30.1			
Census Tract 9400	37.0		TRUE	

Table Q-3 Poverty Population

State/County/Census Tract	Percentage Below 185 Percent of Poverty Level	If 10 Percentage Points Higher than County Level	If 10 Percentage Points Higher than State Level	If 40 Percent of Population Below 185 Percent
Cass County	34.2			
Census Tract 9400.01	37.3		TRUE	
Census Tract 9400.02	54.2	TRUE	TRUE	TRUE
Census Tract 9601	34.0			
Census Tract 9602	37.4		TRUE	
Census Tract 9603.01	16.7			
Census Tract 9603.02	22.8			
Census Tract 9606	38.8		TRUE	
Census Tract 9607	36.0		TRUE	
Census Tract 9608.01	18.6			
Census Tract 9608.02	31.3			
Clearwater County	37.6			
Census Tract 1	41.6		TRUE	TRUE
Census Tract 2	39.4		TRUE	
Census Tract 3	32.6			
Crow Wing County	29.0			
Census Tract 9501	25.5			
Census Tract 9502.04	15.0			
Census Tract 9504	27.9			
Census Tract 9505.01	17.5			
Census Tract 9505.02	23.5			
Census Tract 9507	37.2		TRUE	
Census Tract 9508	27.2			
Census Tract 9509	11.6			
Census Tract 9510	35.7		TRUE	
Census Tract 9511	47.3	TRUE	TRUE	TRUE
Census Tract 9512	44.1	TRUE	TRUE	TRUE
Census Tract 9513.01	23.6			
Census Tract 9513.02	39.7	TRUE	TRUE	
Census Tract 9514	23.3			
Census Tract 9516	27.9			
Census Tract 9517	23.5			
Hubbard County	30.7			
Census Tract 701	25.3			
Census Tract 702	24.2			
Census Tract 703	32.4			
Census Tract 704	33.6			
Census Tract 705	32.3			
Census Tract 706	41.8	TRUE	TRUE	TRUE
Census Tract 707	22.8			

Table Q-3 Poverty Population

State/County/Census Tract	Percentage Below 185 Percent of Poverty Level	If 10 Percentage Points Higher than County Level	If 10 Percentage Points Higher than State Level	If 40 Percent of Population Below 185 Percent
Itasca County	31.1			
Census Tract 4801	33.8			
Census Tract 4803	29.1			
Census Tract 4804	21.5			
Census Tract 4805	33.6			
Census Tract 4806	25.2			
Census Tract 4807	22.4			
Census Tract 4808.01	19.1			
Census Tract 4808.02	42.1	TRUE	TRUE	TRUE
Census Tract 4809	37.6		TRUE	
Census Tract 4810	31.7			
Census Tract 9400	35.2		TRUE	
Kanabec County	33.1			
Census Tract 4801	28.8			
Census Tract 4802	34.5		TRUE	
Census Tract 4803	41.7		TRUE	TRUE
Census Tract 4804	28.8			
Kittson County	27.7			
Census Tract 901	35.4		TRUE	
Census Tract 902	18.3			
Marshall County	22.2			
Census Tract 801	19.5			
Census Tract 802	23.0			
Census Tract 803	22.1			
Census Tract 804	23.9			
Mille Lacs County	30.4			
Census Tract 1704	26.8			
Census Tract 1705	29.3			
Census Tract 1706	12.5			
Census Tract 1707	34.3		TRUE	
Census Tract 9701	35.2		TRUE	
Census Tract 9702	47.8	TRUE	TRUE	TRUE
Census Tract 9703	29.8			
Morrison County	29.1			
Census Tract 7801	34.3		TRUE	
Census Tract 7802	29.7			
Census Tract 7803	19.2			
Census Tract 7804	25.3			
Census Tract 7805	26.8			
Census Tract 7806	40.8	TRUE	TRUE	TRUE
Census Tract 7807	36.3		TRUE	
Census Tract 7808	25.5			

Table Q-3 Poverty Population

State/County/Census Tract	Percentage Below 185 Percent of Poverty Level	If 10 Percentage Points Higher than County Level	If 10 Percentage Points Higher than State Level	If 40 Percent of Population Below 185 Percent
Pennington County	28.7			
Census Tract 901	25.0			
Census Tract 902	38.2		TRUE	
Census Tract 903	15.8			
Census Tract 904	34.7		TRUE	
Census Tract 905	26.4			
Pine County	34.3			
Census Tract 9501	26.7			
Census Tract 9502	31.3			
Census Tract 9503	31.8			
Census Tract 9504	39.4		TRUE	
Census Tract 9505	36.0		TRUE	
Census Tract 9506	29.3			
Census Tract 9507	45.7	TRUE	TRUE	TRUE
Census Tract 9508	30.0			
Polk County	27.3			
Census Tract 201	27.5			
Census Tract 202	43.3	TRUE	TRUE	TRUE
Census Tract 203	7.8			
Census Tract 204	12.9			
Census Tract 205	17.2			
Census Tract 206	34.3			
Census Tract 207	30.8			
Census Tract 208	29.3			
Census Tract 209	32.1			
Census Tract 210	35.5		TRUE	
Red Lake County	26.6			
Census Tract 101	30.5			
Census Tract 102	22.9			
St. Louis County	31.0			
Census Tract 1	16.6			
Census Tract 10	39.6		TRUE	
Census Tract 101	20.5			
Census Tract 102	8.2			
Census Tract 103	13.5			
Census Tract 104	17.0			
Census Tract 105	18.9			
Census Tract 106	12.1			
Census Tract 11	32.8			
Census Tract 111	14.3			
Census Tract 112	35.5		TRUE	
Census Tract 113	27.4			
Census Tract 114	23.5			

Table Q-3 Poverty Population

State/County/Census Tract	Percentage Below 185 Percent of Poverty Level	If 10 Percentage Points Higher than County Level	If 10 Percentage Points Higher than State Level	If 40 Percent of Population Below 185 Percent
Census Tract 12	71.4	TRUE	TRUE	TRUE
Census Tract 121	19.5			
Census Tract 122	60.9	TRUE	TRUE	TRUE
Census Tract 123	30.9			
Census Tract 124	50.0	TRUE	TRUE	TRUE
Census Tract 125	37.4		TRUE	
Census Tract 126	41.3	TRUE	TRUE	TRUE
Census Tract 127	25.4			
Census Tract 128	24.6			
Census Tract 13	61.8	TRUE	TRUE	TRUE
Census Tract 130	47.1	TRUE	TRUE	TRUE
Census Tract 131	55.7	TRUE	TRUE	TRUE
Census Tract 132	31.9			
Census Tract 133	45.4	TRUE	TRUE	TRUE
Census Tract 134	15.3			
Census Tract 135	35.1		TRUE	
Census Tract 136	35.1		TRUE	
Census Tract 138	35.8		TRUE	
Census Tract 139	19.9			
Census Tract 14	62.1	TRUE	TRUE	TRUE
Census Tract 140	20.5			
Census Tract 141	38.2		TRUE	
Census Tract 151	20.3			
Census Tract 152	21.9			
Census Tract 153	39.3		TRUE	
Census Tract 154	20.1			
Census Tract 155	34.0			
Census Tract 156	70.7	TRUE	TRUE	TRUE
Census Tract 157	51.3	TRUE	TRUE	TRUE
Census Tract 158	36.7		TRUE	
Census Tract 16	68.9	TRUE	TRUE	TRUE
Census Tract 17	69.1	TRUE	TRUE	TRUE
Census Tract 18	58.7	TRUE	TRUE	TRUE
Census Tract 19	80.4	TRUE	TRUE	TRUE
Census Tract 2	15.4			
Census Tract 20	53.9	TRUE	TRUE	TRUE
Census Tract 22	17.1			
Census Tract 23	15.4			
Census Tract 24	34.2			
Census Tract 26	44.7	TRUE	TRUE	TRUE
Census Tract 29	22.9			
Census Tract 3	32.8			
Census Tract 30	27.9			
Census Tract 33	40.8		TRUE	TRUE
Census Tract 34	38.3		TRUE	
Census Tract 36	30.1			
Census Tract 37	49.1	TRUE	TRUE	TRUE
Census Tract 38	30.9			

Table Q-3 Poverty Population

State/County/Census Tract	Percentage Below 185 Percent of Poverty Level	If 10 Percentage Points Higher than County Level	If 10 Percentage Points Higher than State Level	If 40 Percent of Population Below 185 Percent
Census Tract 4	32.4			
Census Tract 5	22.5			
Census Tract 6	15.9			
Census Tract 7	3.4			
Census Tract 9	36.9		TRUE	
Census Tract 9901	0.0			
Todd County	33.1			
Census Tract 7901	39.0		TRUE	
Census Tract 7902	38.6		TRUE	
Census Tract 7903	38.9		TRUE	
Census Tract 7904	32.3			
Census Tract 7905	28.8			
Census Tract 7906	37.0		TRUE	
Census Tract 7907	23.9			
Census Tract 7908	23.9			
Wadena County	38.1			
Census Tract 4801	38.4		TRUE	
Census Tract 4802	32.2			
Census Tract 4803	45.0		TRUE	TRUE
Total True		31	81	39

Appendix R

Enbridge Economic Study (IMPLAN Study)

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April 18, 2017

Research Report

Enbridge Pipeline Construction

Economic Impact Study

Prepared for

Area Partnership for Economic Expansion (APEX)

Bureau of Business and Economic Research

Labovitz School of Business and Economics

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Driven to Discover

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Enbridge provided the majority of inputs for this report. Where data was not available from Enbridge, the BBER utilized IMPLAN, industry standards, and other secondary data sources. The BBER relied upon the completeness, accuracy, and fair presentation of all data and information obtained from Enbridge and/or their agents. The report is conditional upon the completeness, accuracy, and fair presentation of that data and information. The BBER does not promise or guarantee the outcome of these results but rather is providing projections based upon inputs and outputs using IMPLAN software.

The BBER was asked to supply an economic impact analysis only. This analysis does not consider the social or environmental impacts of the project and should not be viewed as a cost benefit analysis or environmental impact assessment.

Media requests should be directed to Brian Hanson at APEX, 218-740-3667, brian@apexgetsbusiness.com

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Executive Summary

Enbridge Inc. is proposing replacement of its existing Line 3 pipeline. The pipeline, originally installed in the 1960s, extends more than 1,000 miles from Edmonton, Alberta, to Superior, Wisconsin. The proposed replacement would serve the same purpose as the existing Line 3, which is the transportation of crude oil from Canada to Enbridge's Superior Station and Terminal Facility near Superior, Wisconsin.

APEX, in cooperation with Enbridge, asked the Bureau of Business and Economic Research (BBER), an entity of the University of Minnesota Duluth's Labovitz School of Business and Economics, to assess the economic impact of the construction of the proposed replacement of Line 3 on the affected Minnesota counties, which total 15. The study includes a special focus on the economic impacts to the retail and hospitality industries in the selected region. The BBER used county data and impact models for value added, employment, and output measures.

The economic modeling data and software used was IMPLAN. The study used IMPLAN's economic multiplier analysis and input/output modeling. Data used were the most recent IMPLAN data, which is for year 2015. Results of modeling are reflected in 2017 dollars.

The Line 3 replacement project is estimated to support, directly and indirectly, approximately 8,600 jobs over the two-year period, 2,100 of which are expected to be filled by construction workers from outside the 15-county study area. In total, Enbridge expects to spend more than $1.5 billion within the study area during the Line 3 replacement project, leading to a total output impact of over $2.0 billion regionally in combined direct, indirect, and induced spending effects.

The bulk of the economic impacts will come from the company's construction expenditures, including site preparation, procurement, engineering, and environmental costs. At the peak of the construction project (Year 1), replacement of Line 3 is expected to support more than 7,000 jobs in the study region. The project is anticipated to contribute more than $1.8 billion in new spending during the two-year period.

A smaller, but still significant, portion of the impact from the project will come from spending on the part of the non-local construction workers brought in for the project. Approximately half of the workforce for the construction project will be sourced from outside of the study area, and much of their income will leave the study area. However, these workers will spend some portion of their income on lodging, restaurants, and other incidental expenses. The BBER research team estimated that non-local workers brought on for the Line 3 construction project are expected to spend upwards of $122 million ($106 with margining) within the study area over the course of the construction project, supporting roughly 1,660 jobs and leading to about $162 million in combined direct, indirect, and induced spending.

Finally, this analysis examined the impacts of the Line 3 project on the retail and hospitality sector in the study area. In total, it is expected that the Line 3 replacement project (including impacts from the construction project as well as the non-local workforce) would support nearly 2,800 jobs within that sector. The industries seeing the greatest benefits included various types of retail, accommodations, hotels and motels, and food service businesses.

★ ★ ★

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Enbridge Pipeline Construction Economic Impact Study

I. Project Description

Enbridge Inc. is proposing replacement of the existing Line 3 pipeline. The pipeline, originally installed in the 1960s, extends more than 1,000 miles from Edmonton, Alberta to Superior, Wisconsin. The proposed replacement would serve the same purpose as the existing Line 3, which is the transportation of crude oil from Canada to Enbridge's Superior Station and Terminal Facility near Superior.

The Area Partnership for Economic Expansion (APEX), in partnership with Enbridge Inc., asked the Bureau of Business and Economic Research (BBER), an entity of the University of Minnesota Duluth's Labovitz School of Business and Economics, to assess the economic impact of the replacement of Line 3 on the affected Minnesota counties. In addition, this study includes a special focus on the economic impacts to the retail and hospitality industries in the selected region as a result of increased economic activity during the project. The BBER used county data and impact models for value added, employment, and output measures.

The study used IMPLAN[1] economic modeling data and software, specifically, IMPLAN's economic multiplier analysis and input/output modeling. Data used were the most recent IMPLAN data, which is for year 2015. Results of modeling are reflected in 2017 dollars and are presented here in a digital, written report.

Study Area

The geographic scope for this economic impact analysis includes the fifteen Minnesota counties of Kittson, Marshall, Pennington, Red Lake, Polk, Clearwater, Beltrami, Hubbard, Wadena, Cass, Crow Wing, Itasca, Aitkin, Carlton, and Saint Louis, according to the map below.

Figure 1. MN Map with Project Study Area Highlighted in White

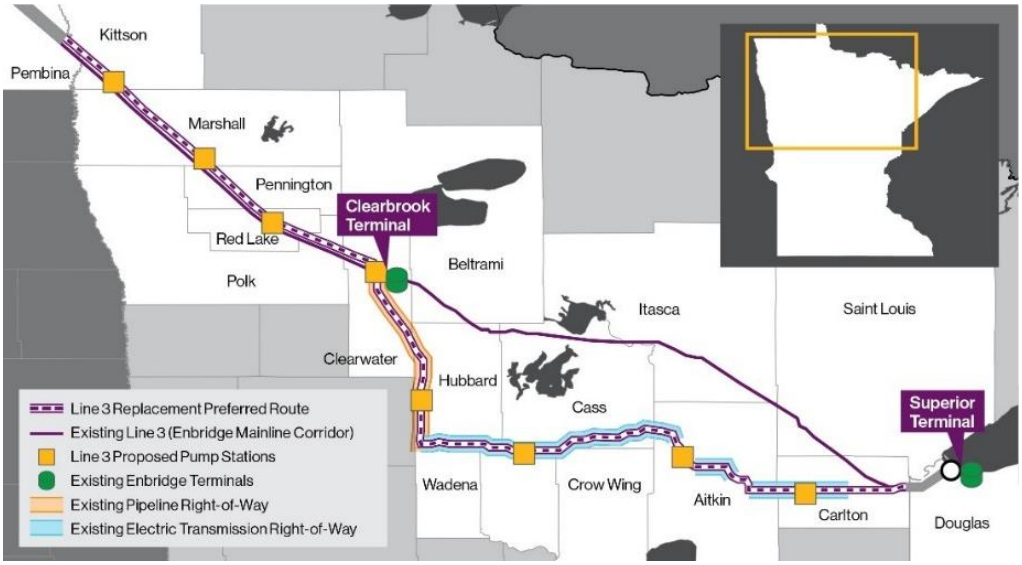

SOURCE: ENBRIDGE

[1] IMPLAN is used by more than 570 clients, including 100 state government agencies and 25 national agencies. IMPLAN Group LLC, 16740 Birkdale Commons Pkwy, Suite 212, Huntersville, NC 28078 www.implan.com

These counties represent the existing route of Line 3 along with several neighboring counties from which employees, goods, and services are expected to be sourced. Enbridge expects that approximately half of the workforce required for the Line 3 project will come from within this region. The counties included in the study are primarily rural and encompass a significant portion of the northern half of the state of Minnesota. Major cities within the region include Duluth, Hibbing, Bemidji, Brainerd, Cloquet, and Grand Rapids.

Figure 2. Employment by Sector for Study Area, 2015

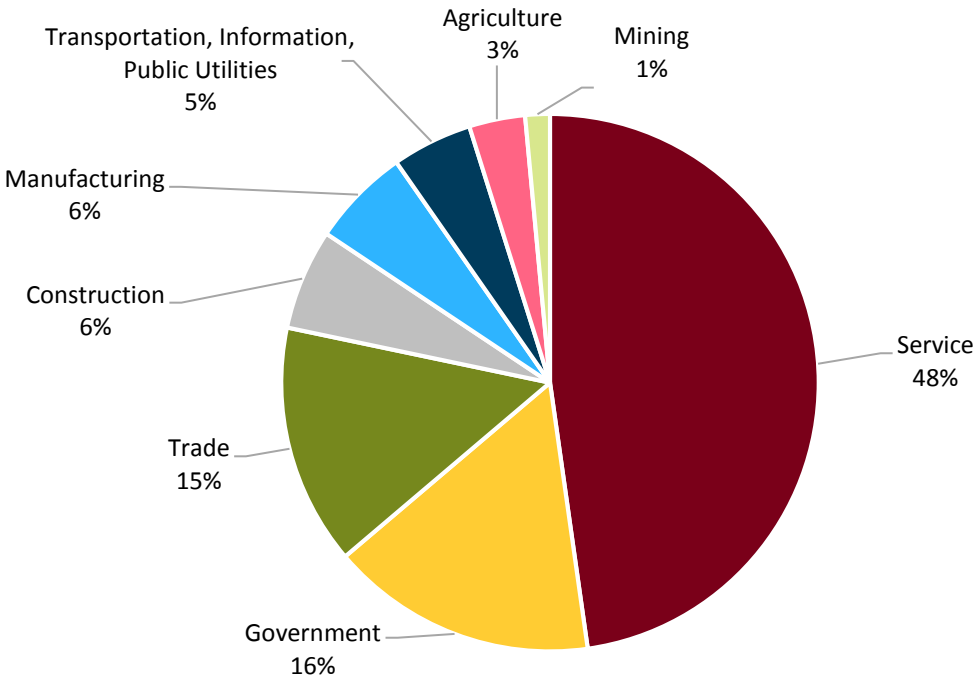

SOURCE: IMPLAN

Figures 2 and 3 provide background on the regional economy of the study area as context for the results of the report. Figure 2 shows employment by sector. In 2015, roughly half of the 312,000 jobs in the study area came from the service sector, which includes health care, education, and hospitality. The other largest sectors in the region, measured in employment, included government, trade, and manufacturing. Construction employment represented approximately 6% of the jobs in the region in 2015, with about 19,000 workers in the study area employed in that sector.

Figure 3. Top Industries by Employment for Study Area, 2015

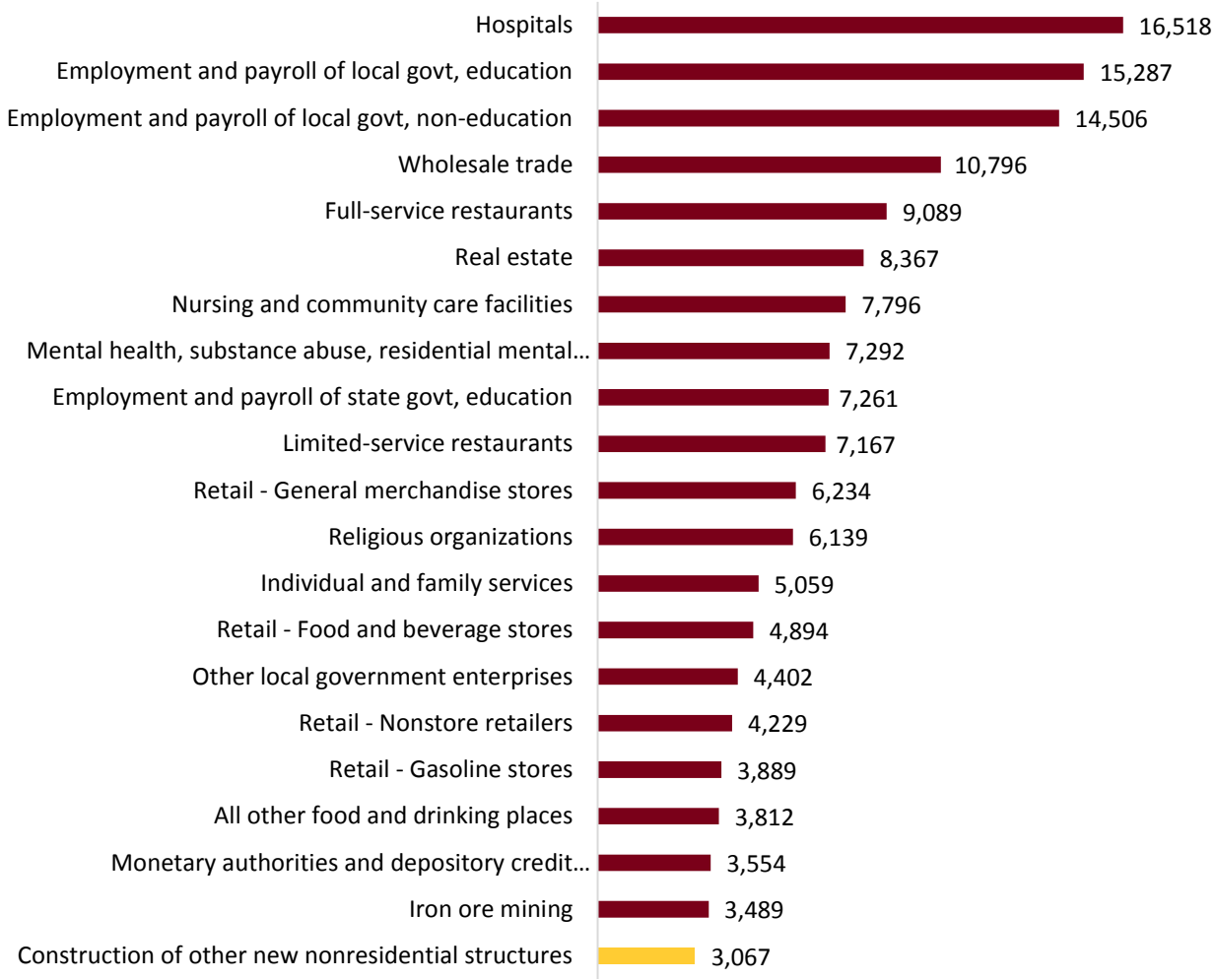

SOURCE: IMPLAN

Figure 3 shows the top industries within the study area as measured by overall employment. This figure provides more detail into the industries that employ the largest numbers. Hospitals, full-service restaurants, nursing and community care facilities, and limited-service restaurants represent a substantial portion of the jobs in the service sector in the study area. The local government industry is another significant local employer. This study will focus primarily on IMPLAN sector 58 – construction of other new nonresidential structures, shown in gold. This industry was ranked 25 in terms of overall employment in 2015, with nearly 3,100 workers. In addition, the study includes a special focus on the impacts of the Line 3 replacement project on retail and hospitality sectors in the region. The largest retail and hospitality industries (as shown in Figure 3) include full-service restaurants, limited-service restaurants, retail – general merchandise stores, retail – food and beverage stores, retail – non-store retailers, retail – gasoline stores, and all other food and drinking places. Combined, they provide roughly 60% of the jobs in retail and hospitality throughout the study area.

II. Inputs and Assumptions

The following section describes the inputs required for modeling the impacts of the construction project and non-local construction worker spending as well as the assumptions made when developing the models. Inputs used include major construction expenditures, employment estimates, employee compensation, and the percentage of local labor and equipment purchases. Data were provided by Enbridge representatives. The research team worked under the assumption that the company provided good-faith estimates for the project. In instances where data was not provided by Enbridge, the research team relied on IMPLAN estimates and secondary data sources as inputs.

Effects of Construction

Replacement of Line 3 is anticipated to begin in early 2019, with the bulk of the work happening in that year and the project completion expected in 2020. According to Enbridge representatives, roughly 80% of the replacement project will occur in Year 1 with a smaller share (primarily clean up and remediation) happening in Year 2. All modeling and results reflect that distribution.

The replacement of Line 3 will generate a temporary increase in economic activity during the course of the construction project. Throughout the project, increased demand for equipment, labor, and transportation will lead to increased economic activity in the affected counties. After the completion of the project, this additional activity will cease, and the economic impacts will no longer be felt in the region.

Table 1. Line 3 Expenditures (in Millions of Dollars)

Budget item	***Total Spending***	***Year 1 (2019)***	***Year 2 (2020)***	***% Spent in Study Area***	***Direct Spending in Study Area***
Site preparation-Construction	$998.7	$798.9	$199.7	100%	$998.7
Site preparation-Project management	$376.8	$301.4	$75.4	100%	$376.8
Procurement	$445.4	$356.3	$89.1	10%	$44.5
Engineering	$34.7	$27.8	$6.9	90%	$31.3
Environment	$47.1	$37.7	$9.4	32%	$15.1
Total Costs	$1,902.9	1,522.1	$380.5		$1,466.4

SOURCE: ENBRIDGE, IMPLAN

The budget for the Minnesota portion of the Line 3 replacement is expected to total $1.9 billion over the 2-year period.[2] Table 1 shows expenditures for the Line 3 replacement project by major purchase as well as the percentage of each budget item that is expected to be sourced within the study area.

IMPLAN requires that, for construction modeling, the full value of the structure be included in the study area.[3] The logic behind this reasoning is that while these inputs may come from outside the study area, they now make up part of the value of the structure. Therefore, 100% of site preparation costs were considered to be spent within the study area.[4] The percentage spent within the study area on the other budget items

[2] Includes all construction expenses with the exception of land acquisition costs, which are not used in economic impact modeling.
[3] IMPLAN Support Forum https://implan.com/index.php?option=com_kunena&view=category&Itemid=1841&layout=list
[4] The estimate of 100% only affects the first round of direct spending. Indirect and induced spending estimates were based on IMPLAN spending patterns.

(procurement, engineering, and environment) were modified based on the estimates provided by Enbridge or by using IMPLAN's average local purchase percentages.[5] As this project has not yet begun, Enbridge representatives used information from previous projects to estimate expenditures and purchases within the study area.

Figure 4. Line 3 Replacement - Construction Spending by Major Expenditure

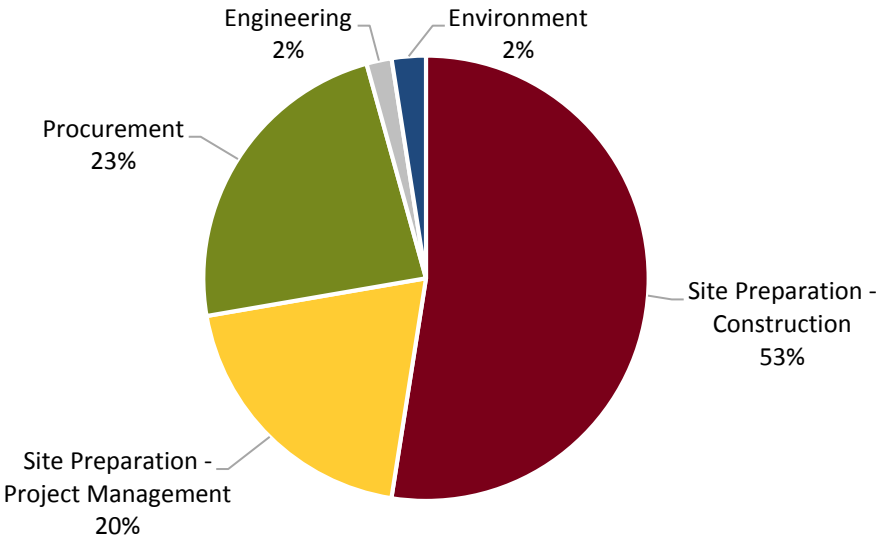

SOURCE: ENBRIDGE

More than half of the costs for the project are in site preparation – construction. Procurement costs (equipment, purchases) represent about one quarter (23%) of the total project budget. Site preparation – project management (20%), environmental consulting (2%), and engineering (2%) costs make up the remainder of the expenditures (see Figure 4).

Enbridge estimates that the replacement of the Minnesota portion of Line 3 will require 4,200 workers, with approximately half of those coming from within the study area (2,100). To account for this, employee compensation for the construction project was reduced by approximately 50% to represent the leakage from non-local workers' spending outside of the study area.[6] The economic activity generated as a result of per diem spending by non-local workers is analyzed separately.

[5] The share of environmental costs sourced locally was not provided by the company, therefore, the IMPLAN average for the study area (23%) was used instead.

[6] Local employee compensation was calculated using the following equation: Local Employee Compensation = Total Employee Compensation * [(1- expected commuting rate)/(1- typical commuting rate)]

Table 2. IMPLAN Sectors Used in Modeling

Sector	*Description*
58	Construction of other new nonresidential structures
395	Wholesale trade
449	Architectural, engineering, and related services
455	Environmental and other technical consulting services

SOURCE: IMPLAN

Table 2 shows the IMPLAN sectors used in modeling the construction impacts for the Line 3 project. The site preparation costs (including construction and project management) were modeled in sector 58 using a method called analysis by parts, which is the process of splitting or parsing an impact analysis issue into smaller and more specific parts. This technique allows the user to specify the amount of commodity inputs, the proportion of local labor income, and the proportion of local purchases. The remaining budget items (procurement, engineering, and environment) were modeled in sectors 395 (wholesale trade), 449 (architectural, engineering, and related services), and 455 (environmental and other technical consulting services), respectively.

Non-Local Worker Spending

Approximately half of the workers employed during the construction of the Line 3 pipeline are expected to come from outside the study area. During the project, these workers will spend a per diem allowance on expenses, such as lodging, meals, and incidentals. They will also be spending additionally on automotive costs and healthcare over the two-year project timeframe. To determine the economic impacts of this spending, the research team first estimated the total amount spent by non-local workers, using the number of workers, their average length of stay, and their per diem spending allowance. Figure 5 shows the non-local worker spending pattern developed for this analysis.

Figure 5. Line 3 Non-Local Worker Spending Pattern

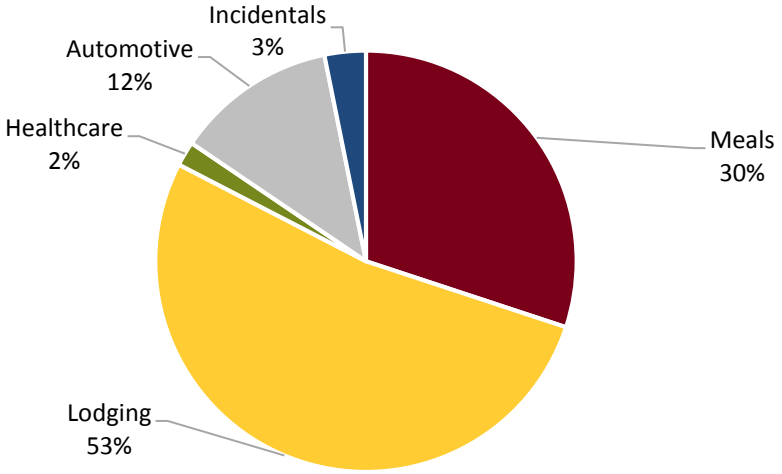

SOURCE: GSA, RELEVANT LITERATURE

Enbridge did not provide the research team with specific per diem totals, therefore, estimates for meals, lodging, and incidentals were calculated using FY2016 Per Diem Standard Rates for Minnesota, provided by

the General Service Administration (GSA).[7] The GSA rates are $91 for lodging expenses and $51 for meals and incidentals per day.[8] In total, the amount spent per non-local worker on these expenses was estimated to be $735 each week for a six-day work week. Assuming an average length of employment for each non-local worker of 1.3 years,[9] or 68 weeks, the total per diem spent on these items in the study area for each non-local worker was estimated to equal nearly $50,000. Assuming 2,100 non-local workers, this would equal roughly $105 million in spending on meals, lodging, and incidentals in the study area over the life of the project.

Another major part of non-local worker spending is on gasoline and automotive maintenance. The average spending of each worker was modeled using the GSA rates for POV (privately owned vehicle) mileage. This rate ($0.535 per mile) includes both the price for fuel, as well as typical repairs and maintenance. The spending pattern developed for this analysis assumes that each non-local worker is traveling approximately 200 miles[10] from their homes to the job site and then returning home once each week. Assuming each worker purchases half of their gasoline and automotive expenses within the study area, this would equate to roughly $15 million in local spending on those items over the life of the project.

Finally, the spending pattern was then supplemented with additional medical expenditures that may be necessary for workers, especially those on extended employment. The estimates for the medical expenditures (offices of physicians, other ambulatory health care services, and hospitals sectors) were calculated using the ratios from IMPLAN's household spending pattern and were not based on estimates from Enbridge.[11] Using these ratios, it is expected that non-local workers would spend just over $2 million in the study area on healthcare costs.

Table 3. Sectors and Direct Effects Used in Modeling Non-Local Worker Spending (in Millions of Dollars)

Spending Category	*IMPLAN Sector*	*Direct Effects, in Millions*
Meals	Retail - Food and beverage stores	$9.2
	Full-service restaurants	$9.2
	Limited-service restaurants	$9.2
	All other food and drinking places	$9.2
Lodging	Hotels and motels, including casino hotels	$32.3
	Other accommodations	$32.3
Healthcare	Offices of physicians	$0.7
	Other ambulatory health care services	$0.04
	Hospitals	$1.6
Automotive	Retail - Gasoline stores	$7.6
	Automotive repair and maintenance	$7.6
Incidentals	Retail - General merchandise stores	$2.0
	Dry-cleaning and laundry services	$2.0
Total		**$123.0**

SOURCE: GSA, IMPLAN, RELEVANT LITERATURE

[7] http://www.gsa.gov/portal/category/100120
[8] 75% of meals and incidentals are provided for the first and last day of travel.
[9] Source: Enbridge representatives
[10] This 200-mile estimate was calculated by taking equidistant averages of major cities along the Line 3 pipeline and calculating their distance to the Minneapolis-St. Paul region, where it is assumed the majority of non-local workers might reside.
[11] It is assumed that non-local workers would spend roughly 25% of their annual household medical expenses within the study area.

Table 3 on the previous page contains a complete list of the categories used for modeling the impacts of non-local worker spending and the direct effects modeled in each IMPLAN sector as a result of non-local construction worker spending. In total, the non-local worker spending pattern estimates that more than $120 million in direct spending on food, lodging, and other expenses would be added to the study area as a result of non-local workers employed on the Line 3 project. To align with the project timeline, roughly 80% of this total was modeled in 2019 and the remaining amount was modeled in 2020.

III. Findings

This section provides the direct, indirect, and induced economic impacts of construction activities for the Line 3 project, measured in employment, output, and value added. The total impacts of the Line 3 replacement project are shown first, followed by results of the construction project and non-local worker spending, modeled individually. In addition, a special section on the retail and hospitality industries affected by the project are included. All results are shown in 2017 dollars.

These findings summarize the effects of the Line 3 replacement project on the northern Minnesota study area. These results use the direct expenditures provided by Enbridge as well as per diem spending by non-local construction workers as the original input for the model. Like any construction project, the replacement of Line 3 will generate a temporary increase in economic activity during the course of the construction project. Throughout the project, increased demand for equipment, labor, and transportation will lead to increased economic activity in the affected counties. After the completion of the project, this additional activity will cease, and the economic impacts will no longer be felt in the region.

Table 4. Total Line 3 Replacement Impact Summary, by Year (in Millions of Dollars)

Total Effects	*Employment*	*Labor Income*	*Value Added*	*Output*
Year 1 (2019)	8,670	$227.2	$529.0	$1,572.2
Year 2 (2020)	5,728	$131.1	$215.9	$452.5
Project Total	8,670	$358.4	$744.9	$2,024.8

SOURCE: IMPLAN

Table 4 shows the total economic impacts of the two-year Line 3 replacement project by year. The left-most column of Table 4, labeled employment, indicates the number of jobs that the Line 3 replacement project is estimated to support directly and indirectly. Employment estimates are in terms of jobs, not in terms of full-time equivalent employees. For construction projects, these jobs are typically short-term and temporary, meaning the effects will be felt during the project and will cease upon its completion. According to the results of this analysis, it is estimated that the replacement of the Line 3 pipeline will support approximately 8,700 jobs in the region during the two-year period, 2,100 of which are expected to be filled by construction workers from outside the study area.[12] It should be noted that employment for the project, shown here and throughout the findings, represents the peak of the two years (Year 1), not the sum. Employment numbers cannot be summed because it is assumed that most of the jobs carry over from one year to the next and will be filled by the same individuals.

The second column, labor income, is an estimate of all employee compensation, including wages, benefits, and proprietor income. It is estimated that the Line 3 replacement would contribute to roughly $358 million in employee wages and benefits in the study area over the life of the project. Column three, labeled value

[12] In IMPLAN modeling, employment is defined as "at the site," so all employees hired for the project are considered part of direct employment, even though we know that some will be hired from outside the study area.

added, shows the economic impacts of the expenditures that the Line 3 replacement would put specifically towards wages, rents, interest, and profits related to its construction. Value added represents the contribution to GDP made by an individual producer, industry, or sector. The Line 3 replacement is estimated to have a total value added impact of nearly $745 million in the study area during the two-year period (2019-20). The last column, output, is the value of all local production required to sustain activities. In total, the Line 3 replacement project is estimated to add just over $2 billion in new spending regionally, through the combined direct, indirect, and induced effects.

Table 5. Total Line 3 Replacement Impact Detail (in Millions of Dollars)

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Direct Effect	5,524	$204.9	$487.6	$1,520.6
Indirect Effect	2,135	$94.1	$150.7	$307.1
Induced Effect	1,011	$59.4	$106.5	$197.1
Total Effect	8,670	$358.4	$744.9	$2,024.8

SOURCE: IMPLAN

Further details of the Line 3 replacement impacts are shown in Table 5. In this table, the total effects for the two-year project are broken out by impact type: direct, indirect, and induced effect. Direct employment and expenditures provided by Enbridge were combined with the direct effects of non-local construction workers' spending for a total direct effect in the study area of $1.5 billion in spending and roughly 5,500 supported jobs. The indirect effect shows the measurement of increased spending between commercial, government, and service industries as a result of the direct effects ($307 million in industry spending and 2,135 supported jobs). Induced effect measures the amount of increased spending by residential households as a result of the direct effects ($197 million in household spending and more than 1,000 supported jobs). Total effect is the sum of direct, indirect, and induced effects.

Table 6. Line 3 Construction Impact Detail (in Millions of Dollars)

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	4,200	$162.0	$424.2	$1,414.6
Indirect Effect	2,003	$87.3	$140.0	$283.6
Induced Effect	803	$49.4	$88.7	$164.0
Total Effect	7,006	$298.7	$652.9	$1,862.2

SOURCE: IMPLAN

Tables 6 and 7 show how construction and non-local worker spending contribute to the total impacts for the Line 3 replacement project. Table 6 includes detailed impacts for the Line 3 construction spending, and Table 7 highlights the impacts of non-local worker spending. The majority of the impacts of the project will come from the company's construction expenditures (Table 6), totaling $1.4 billion[13] in direct spending on site preparation, procurement, engineering, and environmental costs. To complete the project, Enbridge expects to directly employ 4,200 workers, half of whom are expected to be from within the study area. The construction will result in an estimated total payroll of $334 million, of which half ($162 million) will go to

[13] Enbridge's procurement spending is subject to margining and is the reason that the total direct spending shown in Table 12 is slightly smaller than what was originally seen in Table 1. For more information on margins, see the explanation on page 10 and the definition of margins in Appendix B.

local workers. As a result of local input purchases and the spending of labor income, the two-year construction project is expected to support more than 7,000 jobs in the region and will lead to more than $1.8 billion in new spending during the two-year period.

Table 7. Line 3 Non-Local Worker Spending Impact Detail (in Millions of Dollars)

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Direct Effect	1,323	$42.9	$63.4	$106.0
Indirect Effect	132	$6.8	$10.8	$23.5
Induced Effect	208	$10.0	$17.9	$33.1
Total Effect	1,664	$59.7	$92.0	$162.6

SOURCE: IMPLAN

Spending by non-local workers will also provide an injection of spending to the region, as shown in Table 7. Using the GSA's per diem estimates, the BBER research team estimated that non-local workers would spend roughly $123 million over the course of the construction project (see Table 3, page 7). However, it should be noted that the direct effects shown in Table 7 are only $106 million. This discrepancy is because the retail industries have margins on their goods, and only a portion of each sale is actually being introduced into the local economy. Regardless, this new spending would support 1,660 jobs throughout the region and add about $162 million in direct, indirect, and induced spending.

Throughout the life of the project, it is expected that the retail and hospitality sectors in the region will experience an increase in economic activity as a result of direct spending on the part of non-local workers as well as indirect and induced spending from the construction project itself. Table 8, on the next page, shows all of the retail and hospitality sectors impacted by the project and the number of jobs supported in each as a result of the Line 3 project. In total, it is expected that the workers of the project will directly support more than 1,300 jobs and in total create more than 2,800 jobs in retail and hospitality sector during the two-year period. Non-store retailers are expected to see the largest employment gains as a result of the project, followed by other accommodations (e.g. resorts, campgrounds, RV parks), hotels and motels, and full-service restaurants.

Table 8. Top Retail and Hospitality Industries Impacted by Line 3 Replacement Project, 2019-2020

	Direct	*Indirect*	*Induced*	*Total*
Retail - Nonstore retailers	487	0.1	0	487
Retail - Miscellaneous store retailers	0	303	28	330
Retail - Clothing and clothing accessories stores	250	2	1	253
Other accommodations	154	36	61	250
Full-service restaurants	195	18	26	239
Retail - General merchandise stores	0	159	17	176
Retail - Gasoline stores	13	103	12	127
Retail - Health and personal care stores	90	12	50	151
All other food and drinking places	13	103	12	127
Limited-service restaurants	6	82	38	126
Automotive repair and maintenance, except car washes	62	22	18	102
Hotels and motels, including casino hotels	0	87	11	98
Retail - Building material and garden equipment and supplies stores	32	17	36	85
Retail - Sporting goods, hobby, musical instrument and book stores	0	53	15	68
Retail - Food and beverage stores	0	49	8	58
Retail - Motor vehicle and parts dealers	0	33	16	50
Dry-cleaning and laundry services	25	2	1	29
Independent artists, writers, and performers	0	14	6	20
Retail - Furniture and home furnishings stores	0	7	4	11
Other amusement and recreation industries	0	4	7	11
Retail - Electronics and appliance stores	0	5	4	9
Commercial Sports Except Racing	0	5	2	7
Gambling industries (except casino hotels)	0	0	5	5
Promoters of performing arts and sports and agents for public figures	0	2	3	5
Fitness and recreational sports centers	0	1	2	3
Performing arts companies	0	1	2	3
Museums, historical sites, zoos and parks	0	0	2	2
Total	**1,326**	**1,119**	**388**	**2,832**

SOURCE: IMPLAN

IV. Conclusions

The Line 3 replacement project is estimated to support, directly and indirectly, approximately 8,600 jobs over the two-year period, 2,100 of which are expected to be filled by construction workers from outside the study area.[14] In total, Enbridge is expected to spend more than $1.5 billion within the study area during the Line 3 replacement project, leading to a total output impact of $2.0 billion regionally, in combined direct, indirect and induced spending effects.

The bulk of the economic impacts from the project will come from the company's construction expenditures,

[14] In IMPLAN modeling, employment is defined as "at the site," so all employees hired for the project are considered part of direct employment, even though we know that some will be hired from outside the study area.

including site preparation, procurement, engineering, and environmental costs. It is estimated that the project will directly employ 4,200 workers, half of which are expected to be from within the study area. The construction will result in an estimated total payroll of $334 million, of which half ($162 million) will go to local workers. As a result of local input purchases and the spending of labor income, the two-year construction project is expected to support more than 7,000 jobs in the region and will lead to more than $1.8 billion in new spending during the two-year period.

Spending by non-local workers will also provide an injection of new spending to the region. The BBER research team estimated that non-local workers would spend upwards of $122 ($106 with margining) million over the course of the construction project. This new spending is expected to support 1,660 jobs throughout the region and lead to about $162 million in combined direct, indirect, and induced spending.

It is expected that the retail and hospitality sector in the region will experience an increase in economic activity as a result of direct spending on the part of non-local workers as well as indirect and induced spending from the construction project itself. In total, it is expected that the project will support more than 2,800 jobs in the retail and hospitality sector during the two-year period. Other accommodations (e.g. resorts, campgrounds, RV parks) are expected to see the largest employment gains as a result of the project, followed by non-store Retailers, hotels and motels, and full-service restaurants.

NOTE - Readers are encouraged to remember the UMD Labovitz School's BBER was asked to supply an economic impact analysis only. This analysis does not consider the social or environmental impacts of the project and should not be viewed as a cost benefit analysis or environmental impact assessment. Any subsequent policy recommendations should be based on the "big picture" of total impact.

Appendix A: Model Assumptions

Construction Activity

The IMPLAN industries selected for sectoring these impact activities are:

Sector	*Description*
58	Construction of other new nonresidential structures
395	Wholesale trade
449	Architectural, engineering, and related services
455	Environmental and other technical consulting services

SOURCE: IMPLAN

1. Land acquisition costs, or easements, were not included in the analysis.

2. Construction years are assumed to be 2019 and 2020.

3. It is assumed that half of the required workforce for the project will live within the study area. This equates to 2,100 local workers for the Line 3 replacement project. Therefore, labor income was reduced by approximately half to reflect the local employee compensation, using the following equation: Local Employee Compensation = Total Employee Compensation * [(1- expected commuting rate)/(1- typical commuting rate)]

4. Line 3 construction costs are estimated to be $1.9 billion in total, distributed as follows:

Budget item	*Total Spending*	*Year 1 (2019)*	*Year 2 (2020)*	*% Spent in Study Area*	*Direct Spending in Study Area*
Site preparation-Construction	$998.7	$798.9	$199.7	100%	$998.7
Site preparation-Project management	$376.8	$301.4	$75.4	100%	$376.8
Procurement	$445.4	$356.3	$89.1	10%	$44.5
Engineering	$34.7	$27.8	$6.9	90%	$31.3
Environment	$47.1	$37.7	$9.4	32%	$15.1
Total Costs	$1,902.9	1,522.1	$380.5		$1,466.4

SOURCE: ENBRIDGE, IMPLAN

Non-Local Worker Spending

1. Non-local construction worker spending estimates were calculated using FY2016 Per Diem Standard Rates for Minnesota, provided by the General Service Administration (GSA).[15] The rates are $91 for lodging expenses and $51 for meals and incidentals, with 75% meals and incidentals on the first and last travel days (e.g. Monday and Saturday).

[15] http://www.gsa.gov/portal/category/100120

2. For each worker, we assume a 1.3 year length of employment and a six-day work week. Therefore, per-diem spending per non-local worker is estimated to be $735.50 per worker per week, or $49,720 per worker for the life of the project.
3. It is assumed that half of the required workforce for the project will come from outside the study area. This equates to 2,100 non-local workers for the Line 3 replacement project.
4. Non-local construction worker spending includes lodging, meals, incidentals and automotive costs. In addition, it is assumed that some personal expenses will go to medical costs. All other worker income will leave the region. The IMPLAN industries used for modeling these impacts and the direct effects for the project are shown below.

Spending Category	***IMPLAN Sector***	***Direct Effects, in Millions***
Meals	Retail - Food and beverage stores	$9.2
	Full-service restaurants	$9.2
	Limited-service restaurants	$9.2
	All other food and drinking places	$9.2
Lodging	Hotels and motels, including casino hotels	$32.3
	Other accommodations	$32.3
Healthcare	Offices of physicians	$0.7
	Other ambulatory health care services	$0.04
	Hospitals	$1.6
Automotive	Retail - Gasoline stores	$7.6
	Automotive repair and maintenance	$7.6
Incidentals	Retail - General merchandise stores	$2.0
	Dry-cleaning and laundry services	$2.0
Total		**$123.0**

SOURCE: GSA, IMPLAN, RELEVANT LITERATURE

Appendix B. Economic Impact Procedures and Data Sources

Input-Output Modeling

This study uses the IMPLAN Group's input-output modeling data and software (IMPLAN version 3.1). The IMPLAN database contains county, state, zip code, and federal economic statistics, which are specialized by region, not estimated from national averages. Using classic input-output analysis in combination with region-specific Social Accounting Matrices and Multiplier Models, IMPLAN provides a highly accurate and adaptable model for its users. IMPLAN data files use the following federal government data sources:

- U.S. Bureau of Economic Analysis Benchmark Input-Output Accounts of the U.S.
- U.S. Bureau of Economic Analysis Output Estimates
- U.S. Bureau of Economic Analysis Regional Economic Information Systems (REIS) Program
- U.S. Bureau of Labor Statistics Covered Employment and Wages (CEW) Program
- U.S. Bureau of Labor Statistics Consumer Expenditure Survey
- U.S. Census Bureau County Business Patterns
- U.S. Census Bureau Decennial Census and Population Surveys
- U.S. Census Bureau Economic Censuses and Surveys
- U.S. Department of Agriculture Census

IMPLAN data files consist of the following components: employment, industry output, value added, institutional demands, national structural matrices, and inter-institutional transfers. Economic impacts are made up of direct, indirect, and induced impacts. The data used was the most recent IMPLAN data available, which is for the year 2015. All results are reported in 2017 dollars.

Economic impacts are made up of direct, indirect, and induced impacts. The following are suggested assumptions for accepting the impact model: IMPLAN input/output is a production-based model, and employment numbers (from U.S. Department of Commerce secondary data) treat both full- and part-time individuals as being employed.

Regional data for the impact models for value added, employment, and output are supplied by IMPLAN for this impact. Employment assumptions were provided to the model to enable construction of the impact model. From these data, social accounts, production, absorption, and byproducts information were generated from the national level data and was incorporated into the model. All region study definitions and impact model assumptions were agreed on before work with the models began.

Modeling Issues

There are some IMPLAN modeling issues that should be considered when interpreting the results of this study.

A study area that is actually part of a larger functional economic region will likely miss some important backward linkages. For example, linkages with the labor force may be missing. Workers who live and spend outside the study area may actually hold local jobs.

Regional indirect and induced effects are driven by assumptions in the model. With some models, one problem is that the assumptions can mask the true multiplier. This is especially true of the assumption of constant returns to scale. This assumption most affects induced effects and says that, for example, if I drink

coffee, and my income increases, I will drink proportionally more coffee than before. The amount of weight placed on the induced effects (the percentage of the total induced effect you would want to use) can be further analyzed with an in-depth impact study, involving much more specific data collection and more detailed analysis, but that is beyond the scope of this analysis.

Finally, and most importantly, the relationship of output to employment has been set for the model by data provided by Enbridge to the BBER based on the best estimates of engineers and managers involved in the project. It can be noted that, for purposes of research and with more resources, the modeling methodology can be driven by data collected from surveys and post-construction values. This survey data can provide greater accuracy in regional impact assessments for the linkage between core and peripheral labor market areas and deliver better estimates of local vs. regional purchases.

Appendix C: IMPLAN Assumptions

The following are suggested assumptions for accepting the impact model:[16]

Backward-Linkages: IMPLAN is a backward-linkage model, meaning that it measures the increased demand on industries that produce intermediate inputs as a result of increases in production. However, if an industry increases production, there will also be an increased supply of output for other industries to use in their production. Models that measure this type of relationship are called forward-linkage models. To highlight this concept, consider the example of a new sawmill beginning its operations in a state. The increased production as a result of the sawmill's operations will increase the demand for lumber, creating an increase in activity in the logging industry, as well as other supporting industries, such as electric transmission and distribution. IMPLAN's results will include those impacts, but will exclude effects on any wood product manufacturers located nearby that might be impacted by the newly available supply of lumber.

Employment: IMPLAN input-output is a production-based model, and employment numbers (from U.S. Department of Commerce secondary data) treat both full- and part-time individuals as employed.

Fixed Prices and No Supply Constraints: IMPLAN is a fixed-price model. This means that the modeling software assumes no price adjustment in response to supply constraints or other factors. In other words, the model assumes that firms can increase their production as needed and are not limited by availability of labor or inputs and that firms in the local economy are not operating at full capacity.

Fixed Production Patterns: Input-output (I-O) models assume inputs are used in fixed proportion, without any substitution of inputs, across a wide range of production levels. This assumption assumes that an industry must double its inputs (including both purchases and employment) to double its output. In many instances, an industry will increase output by offering overtime, improving productivity, or improvements in technology.

Industry Homogeneity: I-O models typically assume that all firms within an industry have similar production processes. Any industries that fall outside the typical spending pattern for an industry should be adjusted using IMPLAN's analysis-by-parts technique.

Leakages: A small area can have a high level of leakage. Leakages are any payments made to imports or value added sectors, which do not in turn re-spend the dollars within the region. What's more, a study area that is actually part of a larger functional economic region will likely miss some important linkages. For example, workers who live and spend outside the study area may actually hold local jobs.

[16] Bureau of Economic Analysis https://www.bea.gov/papers/pdf/WP_IOMIA_RIMSII_020612.pdf

Definitions Used in This Report

Analysis by Parts: The process of splitting or parsing an impact analysis issue into smaller and more specific parts. This technique allows the user to specify the amount of commodity inputs, the proportion of local labor income, and the proportion of local purchases.

Backward Linkages: The interconnection of an industry to other industries from which it purchases its inputs in order to produce its output. It is measured as the proportion of intermediate consumption to the total output of the sector (direct backward linkage) or to the total output multiplier (total backward linkage). An industry has significant backward linkages when its production of output requires substantial intermediate inputs from many other industries.[17]

Deflators: Deflators are used by the IMPLAN software whenever the event year is set to a year that differs from the model data year. The output deflator converts the industry sales value to the year of the dataset, while the GDP deflator converts the value-added values to the year of the dataset. Output deflators are specific to each industry, while the GDP deflators are the same across industries.

Direct Effect: Initial new spending in the study area resulting from the project.

Employment: Estimates (from U.S. Department of Commerce secondary data) are in terms of jobs, not in terms of full-time equivalent employees. Therefore, these jobs may be temporary, part-time, or short-term.

Gross Output: The value of local production required to sustain activities.

Indirect Effect: The additional inter-industry spending from the direct impact.

Induced Effect: The impact of additional household expenditures resulting from the direct and indirect impact.

Labor Income: All forms of employment income, including employee compensation (wages and benefits) and proprietor income.

Leakages: Any payments made to imports or value added sectors that do not in turn re-spend the dollars within the region.

Margins: The value of wholesale and retail trade services provided in delivering commodities from producers' establishments to purchasers. Margin is calculated as sales receipts less the cost of the goods sold. It consists of the trade margin plus sales taxes and excise taxes that are collected by the trade establishment. (BEA)

Multipliers: Total production requirements within the study area for every unit of production sold to final demand. Total production will vary depending on whether induced effects are included and the method of inclusion. Multipliers may be constructed for output, employment, and every component of value added.

Value Added: A measure of the impacting industry's contribution to the local community; it includes wages, rents, interest, and profits.

[17] IMPLAN

Appendix S

Baseline Crude Oil Pipeline Spill Analysis

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Baseline Crude Oil Pipeline Spill Analysis

Line 3 Project Final Environmental Impact Statement

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Notes on Terminology Used in Report

Probability and Frequency

The term "probability" and "frequency" are used interchangeably in this report. The probability that something will occur is the frequency of expected events (spills or releases) in a specified time frame.

Return Periods

The results are represented in terms of expected *frequencies* and as *return periods*. (The return period is also sometimes called the "recurrence interval.") These terms express the same concepts in different ways. The expected frequency is an estimate of the likelihood or probability that an event (in this case, a pipeline spill) will occur in any given year. The inverse of this is the return period.

For example, if there is a 1% chance, or a one in 100 chance, that a large spill event will occur in one year, the "return period" for this event is 100 years. The return period is the inverse of the frequency.

$$Frequency(event) = \frac{number(events)}{year}$$

$$Return = \frac{1}{Frequency(event)} = \frac{years}{event}$$

$$Frequency(event) = \frac{0.01}{year}$$

$$Return(event) = \frac{1}{0.01} = 100$$

The return period (e.g., 100 years) is used in an attempt to simplify the definition of a specific statistically determined chance of an event occurring in any one year (1%). It does not, however, mean that it will necessarily take 100 years before this event occurs or that it will only occur once in a 100-year time frame. The return period or recurrence interval can also be viewed as the "odds" or "chances" that an event will occur in any one year.

Rounding of Numbers and Significant Digits

Calculated data from modeling and various interim analyses are shown with as many as five digits after the decimal point. This is to allow for greater accuracy in adding and other mathematical processes and to avoid rounding errors that may be confusing to the reader.

In summary tables, however, such as those providing estimates of annual frequencies of specific volumes of spills and return years, the results have been rounded to two or three significant digits, as appropriate, starting with the first non-zero digit. This is a standard methodology applied in many analyses to avoid the implication that one could be so precise in determining the frequency of spill events in the future. For example, if the calculated spill frequency is 0.00128 per year, which would bring a return period of 781.25 years, the spill frequency would be rounded to 0.0013 per year and the return period would be expressed as 780 years. Note that "significant digits" are also called "significant figures."

Baseline Crude Oil Pipeline Spill Analysis
Enbridge Line 3 Final Environmental Impact Statement

Introduction

In order to quantify the incremental risk for the Line 3 Project, the potential spills that might occur need to be compared with the baseline of spills occurring from existing pipelines in the area. This report provides an overview of pipeline spill rates and trends in the inland[1] US as a whole, as well as an analysis of historical data for existing crude oil pipelines in Minnesota.

General Analysis Inland Pipeline Spills in the US

Pipeline Spill Data

Data analyses on the crude and refined product pipeline spills were based on data available publicly from the Pipeline and Hazardous Materials Safety Administration (PHMSA).[2] A total of 10,810 spill incidents were included. Criteria for inclusion of spill incidents in the database were:

- Spillage of one gallon or more;
- Onshore/inland spill location;[3] and
- Incident occurrence during 1968 through 2015.[4]

The spill incidents were individually characterized with respect to:

- Year and date of incident;
- Location (state, county, city, latitude/longitude);
- General oil type (crude or refined);
- Detailed oil type (crude, gasoline, light oil,[5] and heavy oil[6]); and
- Amount of spillage (in barrels, bbl).

Analytical Results and Findings: Annual Spill Numbers and Volumes

Over the 48-year time period, there were a total of 6,433 crude pipeline spills and 4,377 refined product spills in inland[7] areas of the US, involving a total of over 6.7 million bbl of spillage. These figures are for spills of 1 gallon or more.[8]

The data for major pipeline spills of at least 10,000 gallons (238 bbl) were also analyzed separately. According to the National Contingency Plan,[9] a "major" oil spill is defined as one that involves a spillage of more than 100,000 gallons in coastal (marine) waters, and more than 10,000 gallons in inland waters.

---

[1] In this report, the term "inland" pipeline specifically excludes any pipelines offshore in marine waters, but does not exclude pipelines that cross inland waterways.
[2] https://www.phmsa.dot.gov/pipeline/library/data-stats/raw-data
[3] Spills from offshore pipelines were excluded.
[4] These were the data that were available at the time of the preparation of this document.
[5] Light oil included: diesel, jet fuel, kerosene.
[6] Heavy oil included: heavy fuel oil, transmix.
[7] The term "inland" is used to exclude offshore and exclusively marine pipeline spill incidents.
[8] Parts of these analyses appeared in Etkin (2014) and Etkin (2017).

Five-year averages of spillage for all pipeline spills and for major spills are shown in Table 1 and Table 2, with graphical representations in Figure 1 and Figure 2, respectively. The annual numbers and total volumes are shown in Table 3 and Table 4, and Figure 3 through Figure 5.

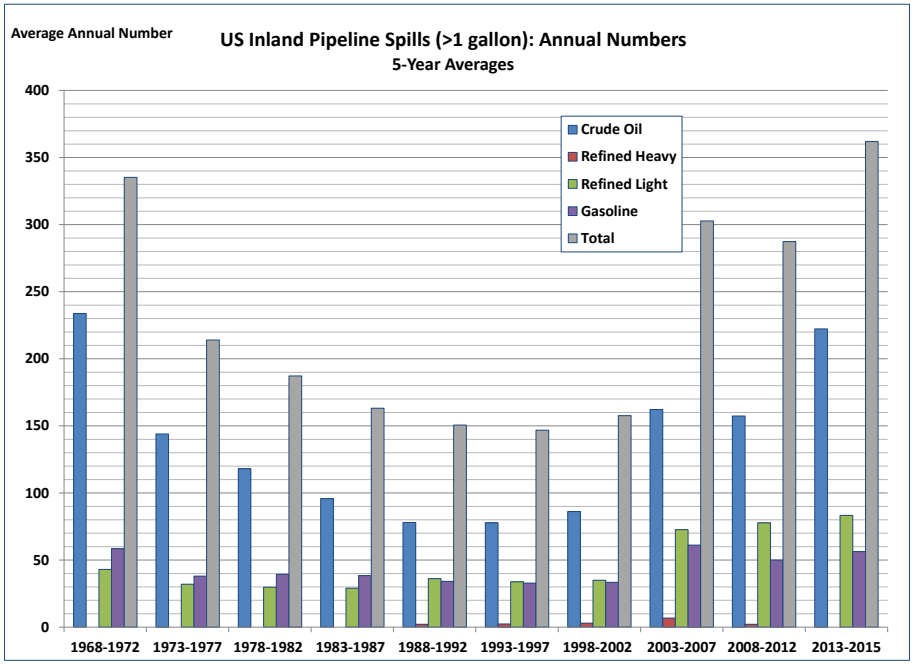

Figure 1: US Inland Pipeline Spills (>1 gallon): Five-Year Averages of Annual Spill Numbers

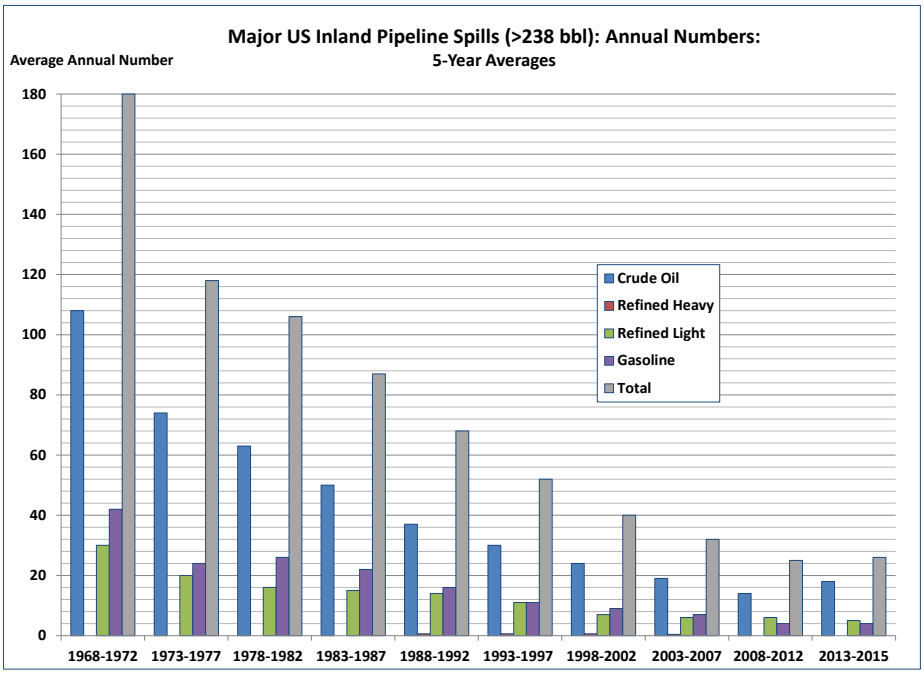

Figure 2: Major US Inland Pipeline Spills (>238 bbl): Five-Year Averages of Annual Spill Numbers

[9] 40 CFR§ 300.5

Table 1: Five-Year Average Spillage for US Inland Pipeline Spills (1968–2012)															
Years	Five-Year Averages[10]														
	Crude Oil			Refined Heavy			Refined Light			Gasoline			Total		
	#	Total Bbl	Spill Bbl	#	Total Bbl	Spill Bbl	#	Total Bbl	Spill Bbl	#	Total Bbl	Spill Bbl	#	Total Bbl	Spill Bbl
1968–1972	234	225,023	994	0	0	0	43	37,076	871	58	44,517	765	335	306,616	933
1973–1977	144	136,736	932	0	0	0	32	44,341	1,380	38	31,537	848	214	212,614	983
1978–1982	118	118,949	1,016	0	0	0	30	26,640	871	39	29,959	776	187	175,547	943
1983–1987	96	111,124	1,229	0	0	0	29	22,692	796	38	46,305	1,210	163	180,121	1,129
1988–1992	78	98,026	1,265	2	1,857	361	36	19,996	579	34	19,568	561	151	139,447	937
1993–1997	78	54,063	705	2	713	190	34	20,031	596	33	29,610	979	147	104,274	733
1998–2002	86	55,856	823	3	866	362	35	13,557	622	33	13,792	560	158	84,070	733
2003–2007	162	50,073	307	7	323	42	73	9,680	128	61	9,720	166	303	69,795	233
2008–2012	157	37,308	244	2	2	0	78	7,134	92	50	7,232	139	287	51,676	181
2013–2015	222	27,177	126	0	0	0	83	4,510	54	56	7,535	127	362	39,222	110
Grand Average	**134**	**94,111**	**791**	**2**	**385**	**100**	**46**	**21,235**	**622**	**44**	**24,662**	**633**	**225**	**140,385**	**716**

Table 2: Five-Year Average Spillage for US Major[11] Inland Pipeline Spills (1968–2012)										
Years	Five-Year Averages									
	Crude Oil		Refined Heavy		Refined Light		Gasoline		Total	
	#	Total Bbl	#	Total Bbl	#	Total Bbl	#	Total Bbl	#	Total Bbl
1968–1972	108	209,558	0.0	0	30	35,502	42	42,328	180	287,387
1973–1977	74	128,997	0.0	0	20	42,759	24	30,140	118	201,895
1978–1982	63	113,625	0.0	0	16	25,207	26	28,579	106	167,412
1983–1987	50	106,923	0.0	0	15	21,359	22	44,576	87	172,858
1988–1992	37	94,650	0.6	1,801	14	18,723	16	18,498	68	133,672
1993–1997	30	50,017	0.6	500	11	18,507	11	28,383	52	97,407
1998–2002	24	52,949	0.6	784	7	12,490	9	12,801	40	79,024
2003–2007	19	47,504	0.4	218	6	8,936	7	8,842	32	65,500
2008–2012	14	34,601	0.0	0	6	5,879	4	6,658	25	47,137
2013–2015	18	23,753	0.0	0	5	3,372	4	7,196	26	34,321
Grand Average	**44**	**86,258**	**0.2**	**330**	**13**	**19,273**	**17**	**22,800**	**73**	**128,661**

[10] The period 2013–2015 is a three-year average. "Total bbl" is average annual total spillage. "Spill bbl" refers to average spill volume for individual incidents.
[11] Major spills are defined as those involving at least 10,000 gallons (238 bbl).

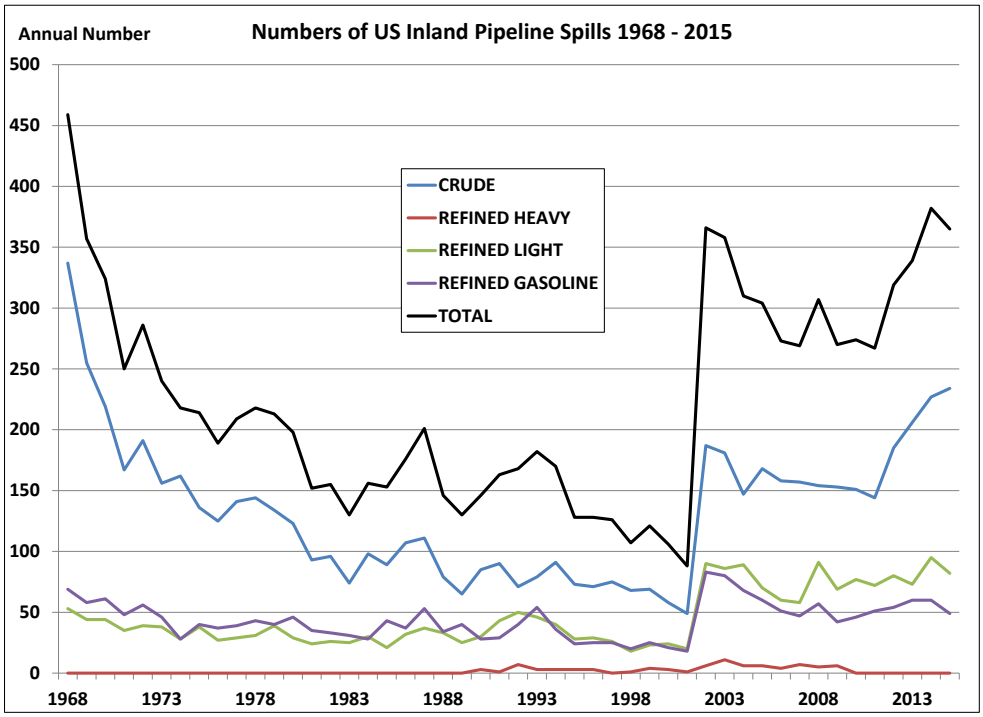

Figure 3: Annual Numbers of US Inland Pipeline Spills (>1 gallon)

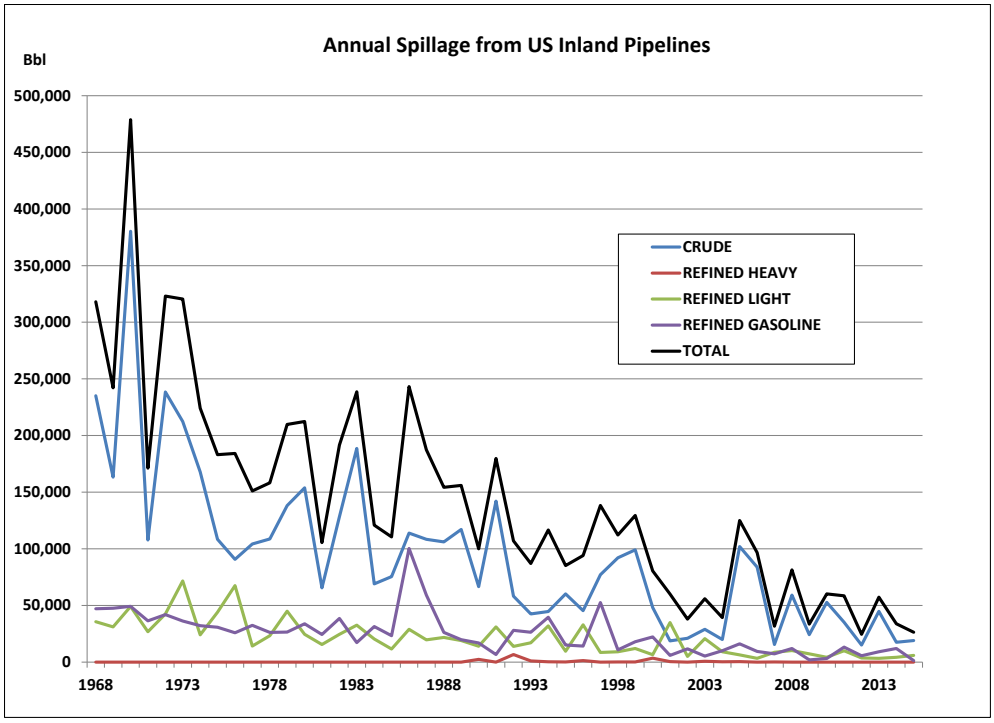

Figure 4: Annual Volume of Spillage from US Inland Pipelines

Table 3: Spill Numbers and Volumes for US Inland Pipeline Spills of One Bbl or More (1968–2015)										
Year	**Crude Oil**		**Refined Heavy**		**Refined Light**		**Gasoline**		**Total**	
	#	**bbl**	**#**	**bbl**	**#**	**bbl**	**#**	**bbl**	**#**	**bbl**
1968	337	235,196	0	0	53	35,730	69	47,075	459	318,001
1969	255	163,312	0	0	44	31,149	58	47,661	357	242,122
1970	219	380,289	0	0	44	49,096	61	49,318	324	478,703
1971	167	107,820	0	0	35	26,870	48	36,526	250	171,216
1972	191	238,500	0	0	39	42,536	56	42,004	286	323,040
1973	156	212,356	0	0	38	71,741	46	36,382	240	320,479
1974	162	167,891	0	0	28	24,187	28	32,122	218	224,200
1975	136	108,355	0	0	38	44,043	40	30,770	214	183,168
1976	125	90,709	0	0	27	67,578	37	25,870	189	184,157
1977	141	104,367	0	0	29	14,158	39	32,540	209	151,065
1978	144	108,732	0	0	31	23,338	43	26,253	218	158,323
1979	134	138,167	0	0	39	45,056	40	26,567	213	209,790
1980	123	153,901	0	0	29	24,580	46	33,913	198	212,394
1981	93	65,525	0	0	24	15,592	35	24,404	152	105,521
1982	96	128,421	0	0	26	24,632	33	38,656	155	191,709
1983	74	188,653	0	0	25	32,656	31	17,250	130	238,559
1984	98	69,025	0	0	30	20,515	28	31,457	156	120,997
1985	89	75,549	0	0	21	11,615	43	23,336	153	110,500
1986	107	113,903	0	0	32	28,958	37	100,301	176	243,162
1987	111	108,490	0	0	37	19,716	53	59,183	201	187,389
1988	79	106,130	0	0	33	21,806	34	26,318	146	154,254
1989	65	117,071	0	0	25	19,131	40	19,816	130	156,018
1990	85	66,594	3	2,507	30	14,029	28	16,987	146	100,117
1991	90	142,101	1	3	43	31,059	29	6,676	163	179,839
1992	71	58,236	7	6,775	50	13,956	40	28,041	168	107,008
1993	79	42,578	3	1,040	46	17,062	54	26,339	182	87,019
1994	91	44,715	3	302	40	32,064	36	39,642	170	116,723
1995	73	60,303	3	132	28	9,601	24	15,173	128	85,209
1996	71	45,533	3	1,378	29	32,934	25	14,206	128	94,051
1997	75	77,184	0		26	8,493	25	52,689	126	138,366
1998	68	92,134	1	149	18	9,117	20	10,814	107	112,214
1999	69	99,095	4	211	23	12,091	25	18,054	121	129,451
2000	58	48,218	3	3,484	24	6,616	21	22,252	106	80,570
2001	49	18,718	1	440	20	34,976	18	6,011	88	60,145
2002	187	21,114	6	47	90	4,983	83	11,828	366	37,972
2003	181	28,979	11	786	86	20,801	80	5,415	358	55,980
2004	147	19,943	6	258	89	9,154	68	10,072	310	39,427
2005	168	101,970	6	418	70	6,437	60	16,201	304	125,026
2006	158	83,852	4	44	60	3,311	51	9,529	273	96,737
2007	157	15,618	7	109	58	8,696	47	7,383	269	31,806
2008	154	59,253	5	6	91	10,167	57	12,033	307	81,459
2009	153	24,193	6	4	69	7,360	42	1,938	270	33,495
2010	151	52,710	0	0	77	4,362	46	3,211	274	60,283
2011	144	35,287	0	0	72	10,071	51	13,280	267	58,638
2012	185	15,099	0	0	80	3,710	54	5,697	319	24,506
2013	206	44,877	0	0	73	3,372	60	9,144	339	57,393
2014	227	17,521	0	0	95	4,254	60	12,124	382	33,899
2015	234	19,134	0	0	82	5,903	49	1,337	365	26,374
Total	**6,433**	**4,517,322**	**83**	**18,094**	**2,196**	**1,019,261**	**2,098**	**1,183,796**	**10,810**	**6,738,473**

Table 4: Spill Numbers and Volumes for Major US Inland Pipeline Spills (1968–2015)										
Year	**Crude Oil**		**Refined Heavy**		**Refined Light**		**Gasoline**		**Total**	
	#	**bbl**	**#**	**bbl**	**#**	**bbl**	**#**	**bbl**	**#**	**bbl**
1968	149	211,637	0	0	39	33,826	48	44,508	236	289,971
1969	122	146,404	0	0	28	29,162	44	45,534	194	221,100
1970	96	365,610	0	0	35	48,237	44	46,689	175	460,536
1971	74	96,363	0	0	24	25,585	34	35,004	132	156,952
1972	101	227,776	0	0	24	40,698	38	39,904	163	308,378
1973	88	204,601	0	0	27	70,264	29	34,489	144	309,354
1974	83	158,898	0	0	17	22,426	20	31,467	120	212,791
1975	63	99,623	0	0	25	42,739	23	29,223	111	171,585
1976	63	84,244	0	0	21	66,444	23	24,356	107	175,044
1977	74	97,617	0	0	10	11,921	25	31,165	109	140,703
1978	82	102,200	0	0	15	21,374	29	24,616	126	148,190
1979	65	130,623	0	0	24	43,547	22	24,860	111	199,030
1980	61	148,279	0	0	15	23,391	31	31,952	107	203,622
1981	49	61,870	0	0	12	14,517	27	23,942	88	100,329
1982	58	125,155	0	0	16	23,205	23	37,527	97	185,887
1983	45	185,962	0	0	11	30,929	20	16,025	76	232,916
1984	44	64,280	0	0	17	19,549	16	29,891	77	113,720
1985	38	70,788	0	0	10	10,550	20	21,199	68	102,537
1986	61	109,417	0	0	19	27,607	26	99,179	106	236,203
1987	61	104,168	0	0	20	18,159	26	56,585	107	178,912
1988	43	102,274	0	0	16	20,799	18	24,821	77	147,894
1989	30	113,997	0	0	9	17,908	19	18,556	58	150,461
1990	33	63,225	2	2,506	15	13,260	17	16,016	67	95,007
1991	47	138,916	0	0	14	28,867	10	6,087	71	173,870
1992	34	54,840	1	6,500	16	12,781	18	27,008	69	101,129
1993	26	38,926	1	950	9	15,056	16	24,630	52	79,562
1994	34	40,983	1	300	14	31,039	12	38,118	61	110,440
1995	30	56,843	0	0	10	7,921	9	14,422	49	79,186
1996	24	40,404	1	1,250	11	31,319	4	12,852	40	85,825
1997	34	72,930	0	0	10	7,200	13	51,891	57	132,021
1998	27	88,344	0	0	5	7,991	5	9,720	37	106,055
1999	37	96,275	0	0	10	11,144	13	17,532	60	124,951
2000	28	45,699	2	3,482	8	5,808	10	21,123	48	76,112
2001	13	16,006	1	440	7	34,187	5	5,096	26	55,729
2002	14	18,419	0	0	6	3,321	10	10,532	30	32,272
2003	22	26,149	1	725	11	19,861	7	4,349	41	51,084
2004	20	17,252	0	0	6	7,916	9	9,022	35	34,190
2005	26	99,533	1	365	6	5,501	6	15,077	39	120,476
2006	14	80,865	0	0	4	2,975	5	9,107	23	92,947
2007	14	13,720	0	0	4	8,429	6	6,655	24	28,804
2008	15	56,536	0	0	6	8,797	6	11,241	27	76,574
2009	15	22,061	0	0	6	6,123	4	1,471	25	29,655
2010	13	50,122	0	0	4	3,226	2	2,621	19	55,969
2011	16	32,679	0	0	11	9,154	5	12,761	32	54,594
2012	12	11,606	0	0	5	2,094	4	5,194	21	18,894
2013	15	41,486	0	0	4	2,393	5	8,677	24	52,556
2014	19	13,877	0	0	5	3,471	6	11,887	30	29,235
2015	19	15,897	0	0	5	4,251	1	1,025	25	21,173
Total	**2,151**	**4,265,379**	**11**	**16,518**	**646**	**956,922**	**813**	**1,125,606**	**3,621**	**6,364,425**

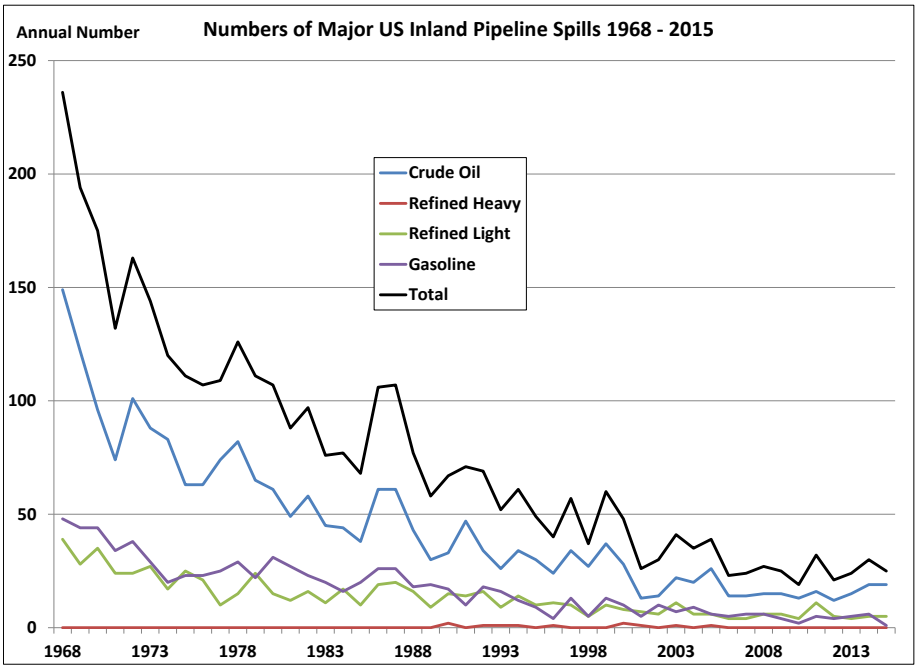

Figure 5: Annual Numbers of Major US Inland Pipeline Spills (>238 bbl)

Annual average volumes per spill incident for all spills are shown in Table 5, Table 6, Figure 6, and Figure 7. The average volume of pipeline spills has decreased significantly since the late 1960s, and particularly in the last dozen years. The average spill volume (all oil types) is now less than 50% of the average volume ten years ago, and 12% of the volume in the late 1960s.

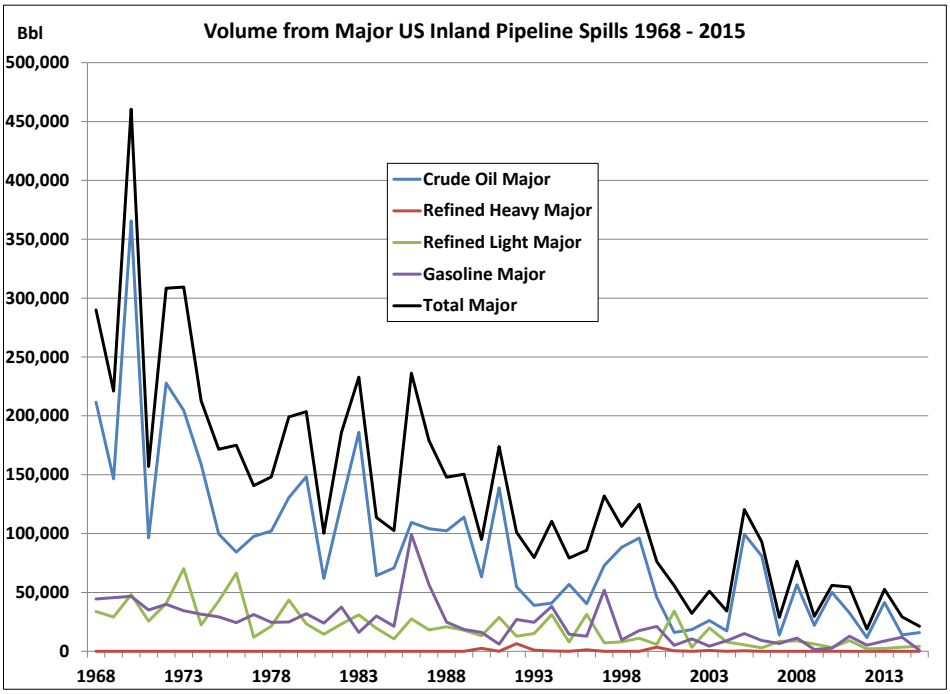

Figure 6: Volume of Spillage from Major US Pipeline Spills (>238 bbl)

Table 5: Average Volumes for US Inland Pipeline Spills of One Bbl or More (1968–2015)					
Year	**Average Volume (bbl)**				
	Crude Oil	**Refined Heavy**	**Refined Light**	**Gasoline**	**Total**
1968	698	0	674	682	693
1969	640	0	708	822	678
1970	1,736	0	1,116	808	1,477
1971	646	0	768	761	685
1972	1,249	0	1,091	750	1,130
1973	1,361	0	1,888	791	1,335
1974	1,036	0	864	1,147	1,028
1975	797	0	1,159	769	856
1976	726	0	2,503	699	974
1977	740	0	488	834	723
1978	755	0	753	611	726
1979	1,031	0	1,155	664	985
1980	1,251	0	848	737	1,073
1981	705	0	650	697	694
1982	1,338	0	947	1,171	1,237
1983	2,549	0	1,306	556	1,835
1984	704	0	684	1,123	776
1985	849	0	553	543	722
1986	1,065	0	905	2,711	1,382
1987	977	0	533	1,117	932
1988	1,343	0	661	774	1,057
1989	1,801	0	765	495	1,200
1990	783	836	468	607	686
1991	1,579	3	722	230	1,103
1992	820	968	279	701	637
1993	539	347	371	488	478
1994	491	101	802	1,101	687
1995	826	44	343	632	666
1996	641	459	1,136	568	735
1997	1,029	0	327	2,108	1,098
1998	1,355	149	507	541	1,049
1999	1,436	53	526	722	1,070
2000	831	1,161	276	1,060	760
2001	382	440	1,749	334	683
2002	113	8	55	143	104
2003	160	71	242	68	156
2004	136	43	103	148	127
2005	607	70	92	270	411
2006	531	11	55	187	354
2007	99	16	150	157	118
2008	385	1	112	211	265
2009	158	1	107	46	124
2010	349	0	57	70	220
2011	245	0	140	260	220
2012	82	0	46	105	77
2013	218	0	46	152	169
2014	77	0	45	202	89
2015	82	0	72	27	72
Total	**702**	**218**	**464**	**564**	**623**

Table 6: Average Volumes for US Inland Pipeline Spills (1968–2015): 5-Year Averages					
Year	Five-Year Average Spill Volume (bbl)[12]				
	Crude Oil	Refined Heavy	Refined Light	Gasoline	Total
1968–1972	994	0	871	765	933
1973–1977	932	0	1,380	848	983
1978–1982	1,016	0	871	776	943
1983–1987	1,229	0	796	1,210	1,129
1988–1992	1,265	361	579	561	937
1993–1997	705	190	596	979	733
1998–2002	823	362	622	560	733
2003–2007	307	42	128	166	233
2008–2012	244	0	92	139	181
2013–2015	126	0	54	127	110

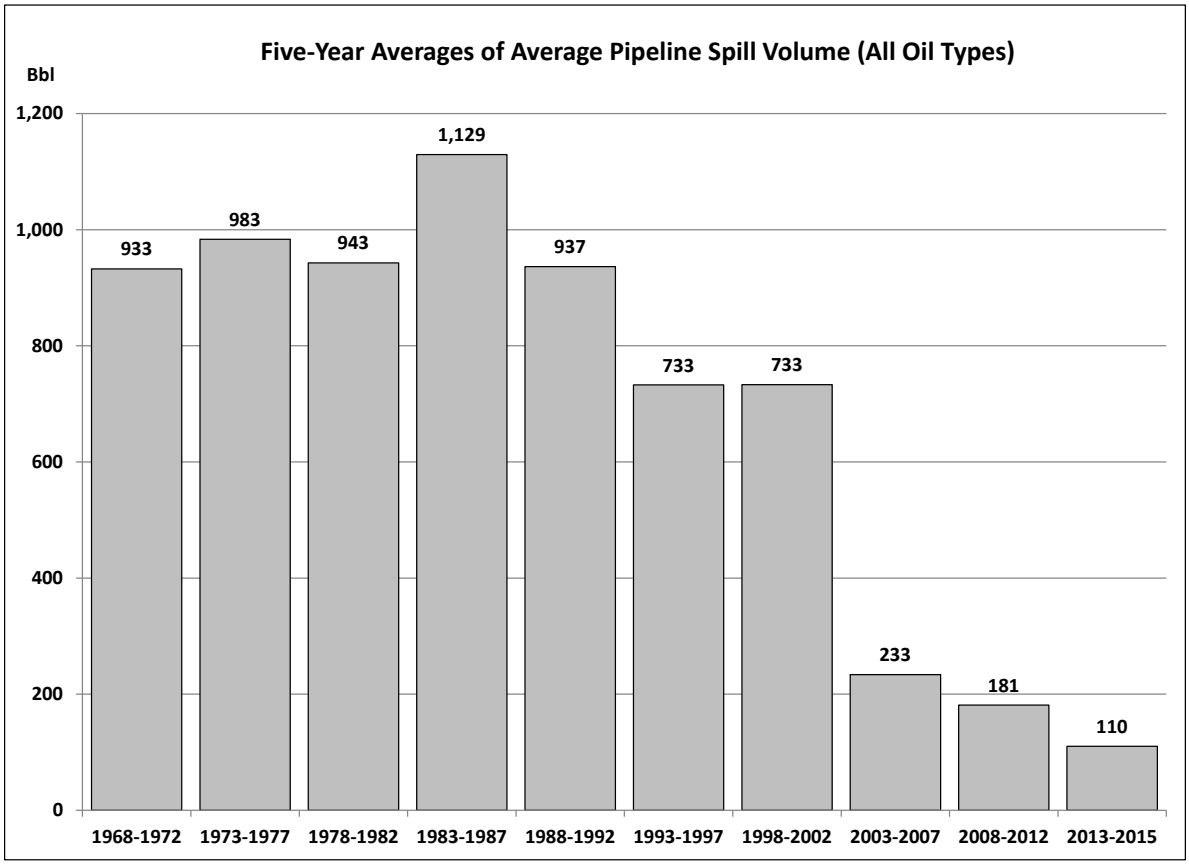

Figure 7: Average US Inland Pipeline Spill Volume (Five-Year Averages)

The vast majority of spillage is attributable to major spills (238 bbl and larger) (Figure 8 through Figure 11). Overall, 93% of the volume of spillage can be attributed to the 37% of incidents that are considered "major" by involving 10,000 gallons (238 bbl) or more.

[12] The period 2013–2015 is a three-year average.

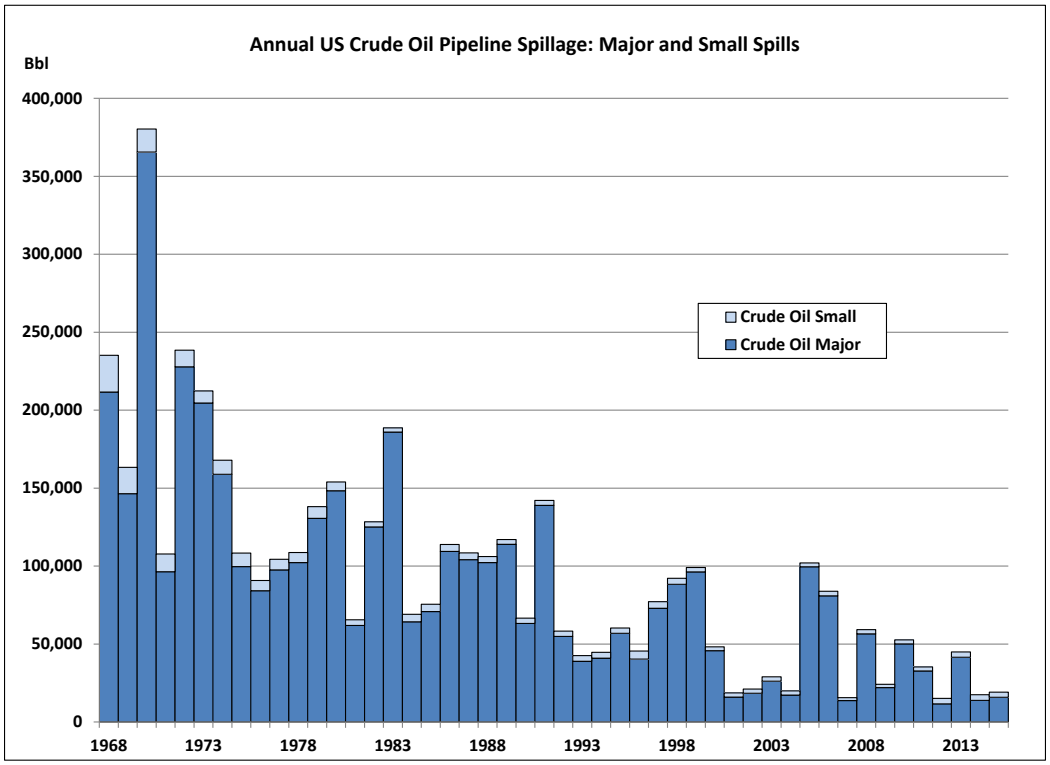

Figure 8: Annual Volume of Inland Crude Oil Pipeline Spillage (Major and Small Spills)

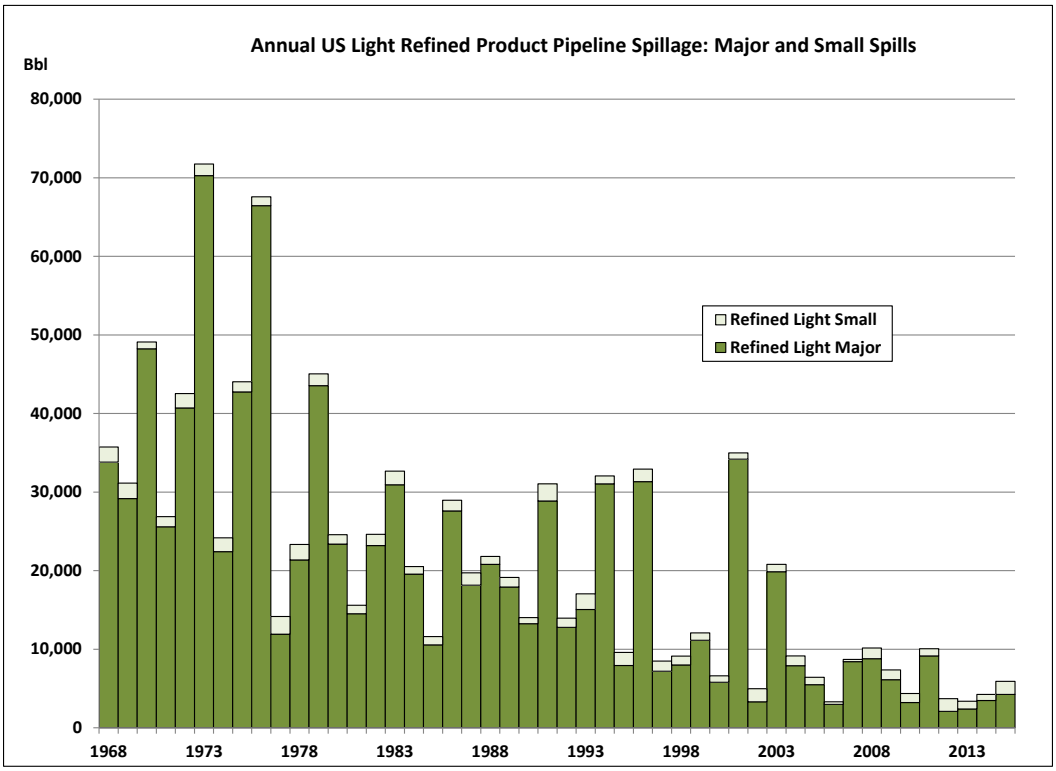

Figure 9: Annual Volume of Inland Light Refined Pipeline Spillage (Major and Small Spills)

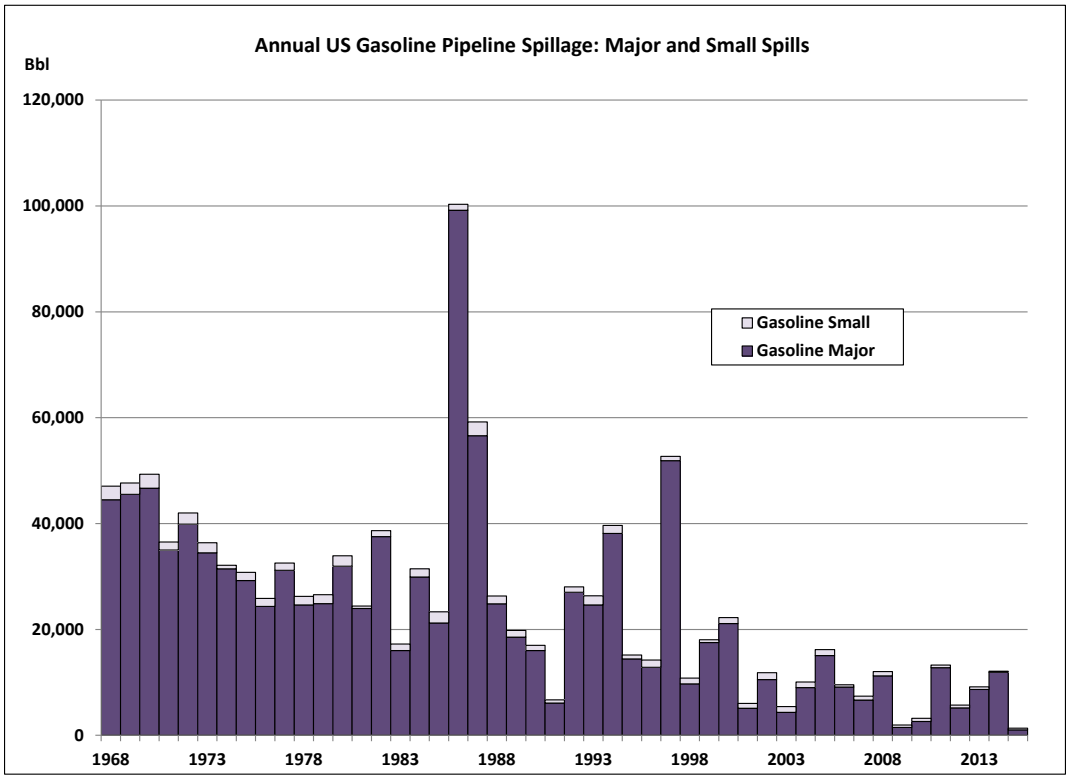

Figure 10: Annual Volume of Inland Gasoline Pipeline Spillage (Major and Small Spills)

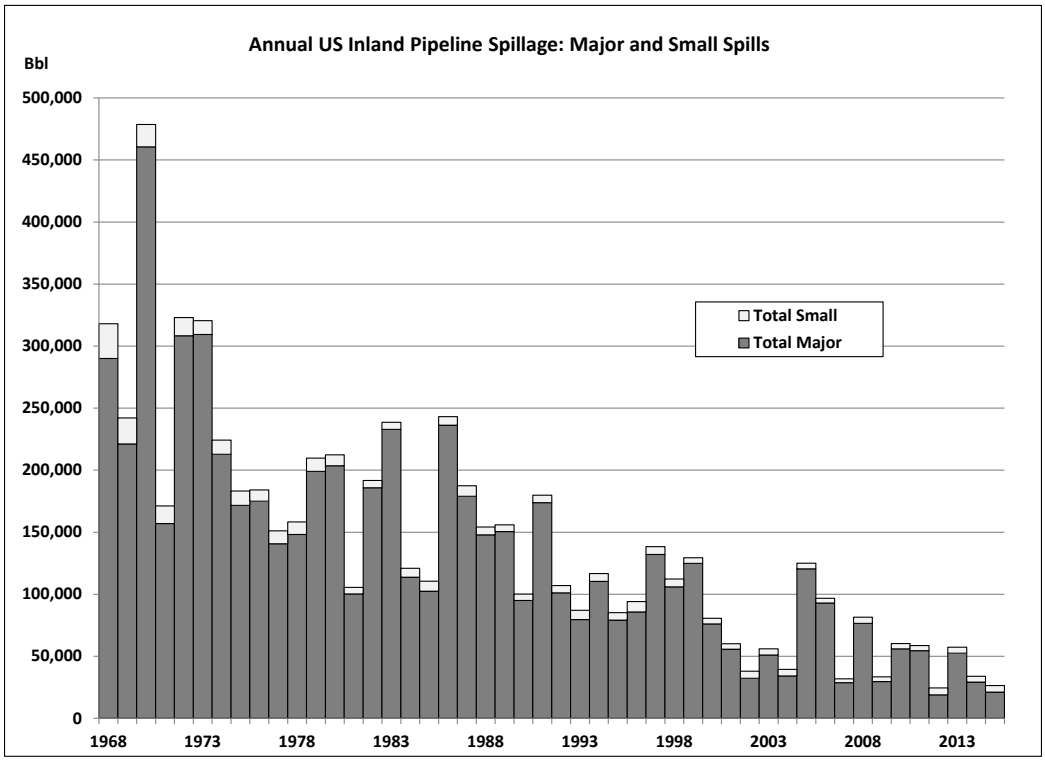

Figure 11: Annual Volume of Inland Pipeline Spillage (Major and Small Spills)–All Oil Types

Probability Distribution of Pipeline Spill Volume

The volumes of spills vary from a few drops or a small leak to a very large discharge. The distribution of volumes in the spills from inland oil pipelines over the years 1968–2015 are shown in Table 7 and Table 8. Figure 12 shows a cumulative probability density function of volume for pipeline spills.

Table 7: Probability Distribution of Spill Volumes for US Inland Pipelines (1968–2015)

Spill Volume	% Spill Incidents	Number of Incidents
<1 bbl	8.64%	934
1–9 bbl	21.99%	2,377
10–99 bbl	19.21%	2,077
100–999 bbl	37.47%	4,050
1,000–9,999 bbl	11.90%	1,286
10,000–90,000 bbl	0.78%	84
100,000+ bbl	0.02%	2

Table 8: Percentile Spill Volumes for US Inland Pipelines (1968–2015)

Percentile[13]	Volume
50th (median)	100 bbl
90th	1,100 bbl
95th	2,000 bbl
99th	6,000 bbl

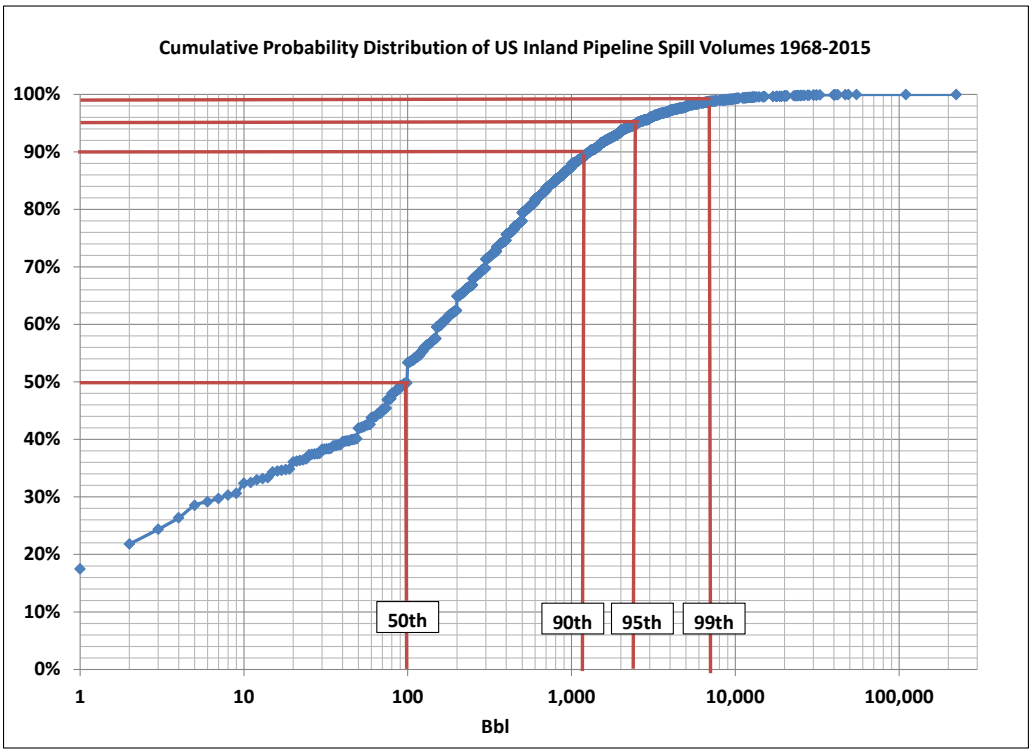

Figure 12: Cumulative Probability Distribution of US Inland Spill Volumes (1968–2015)

[13] A percentile spill volume is the percentage of spills that are that volume or less. e.g., a 90th percentile spill of 1,100 bbl means that 90% of spills are 1,100 bbl or less. Only 10% of spills are larger. The 50th percentile is the equivalent of the "median." Half of spills are smaller, half are larger.

With the trend towards smaller spills in the last decades, another cumulative probability distribution function of spill volume was developed for spills in the last decade only (2006–2015), as in Table 9, Table 10, and Figure 13. The shift towards smaller spills in the last decade can be seen in Figure 14.

Table 9: Probability Distribution of Spill Volumes for US Inland Pipelines (2006–2015)

Spill Volume	% Spill Incidents	Number of Incidents
<1 bbl	33.51%	1,027
1–9 bbl	34.78%	1,066
10–99 bbl	18.76%	575
100–999 bbl	10.15%	311
1,000–9,999 bbl	2.58%	79
10,000–90,000 bbl	0.23%	7
100,000+ bbl	0.00%	0

Table 10: Percentile Spill Volumes for US Inland Pipelines (2006–2015)

Percentile[14]	Volume
50th (median)	1 bbl
90th	100 bbl
95th	400 bbl
99th	2,500 bbl

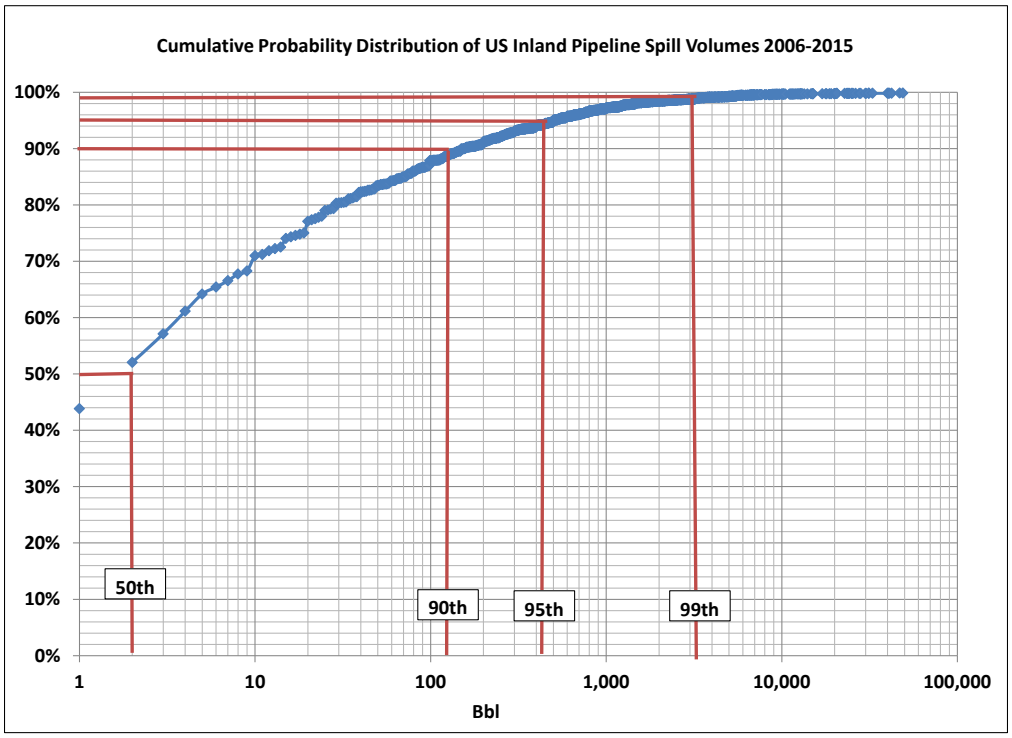

Figure 13: Cumulative Probability Distribution of US Inland Spill Volumes (2006–2015)

[14] A percentile spill volume is the percentage of spills that are that volume or less. e.g., a 90th percentile spill of 1,100 bbl means that 90% of spills are 1,100 bbl or less. Only 10% of spills are larger. The 50th percentile is the equivalent of the "median." Half of spills are smaller, half are larger.

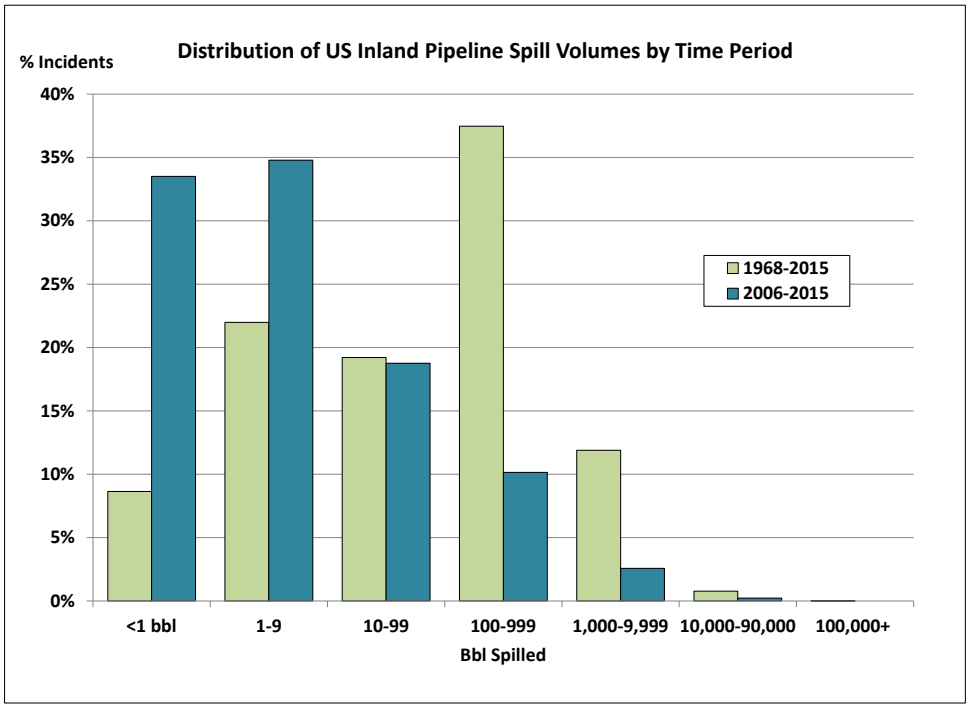

Figure 14: Distribution of US Inland Pipeline Spill Volumes by Time Period

Pipeline Spillage Rate per Volume Transmitted

Spillage should be viewed with respect to the amount of oil transported through pipelines to determine incident rates. This also allows projections for future spillage rates. Two types of incident rates analyzed—spillage rate (volume of oil spilled per unit crude or refined product transported through pipelines) and incident frequency (numbers of spills per unit crude or refined product transported through pipelines).[15] The numbers of spills (of any volume) per barrel of oil transmitted are shown in Table 11 and Figure 15. Spill numbers, particularly crude spills, have increased since 1985.

Table 11: US Inland Pipeline Spill Number per Oil Transmitted (1985–2015)

Years	Number of Spills per Bbl Transmitted Through Pipelines		
	Crude	Refined	Total
1985–1989	0.00000013	0.00000006	0.00000008
1990–1994	0.00000011	0.00000006	0.00000008
1995–1999	0.00000008	0.00000003	0.00000005
2000–2004	0.00000017	0.00000008	0.00000011
2005–2009	0.00000024	0.00000008	0.00000013
2010–2015	0.00000030	0.00000008	0.00000014
1985–2015 (All Years)	**0.00000029**	**0.00000009**	**0.00000016**

[15] Oil pipeline transmission rates are from US Energy Information Administration (EIA). In the EIA data, refined products are combined into one category. Spill incidents from the various refined product categories are combined.

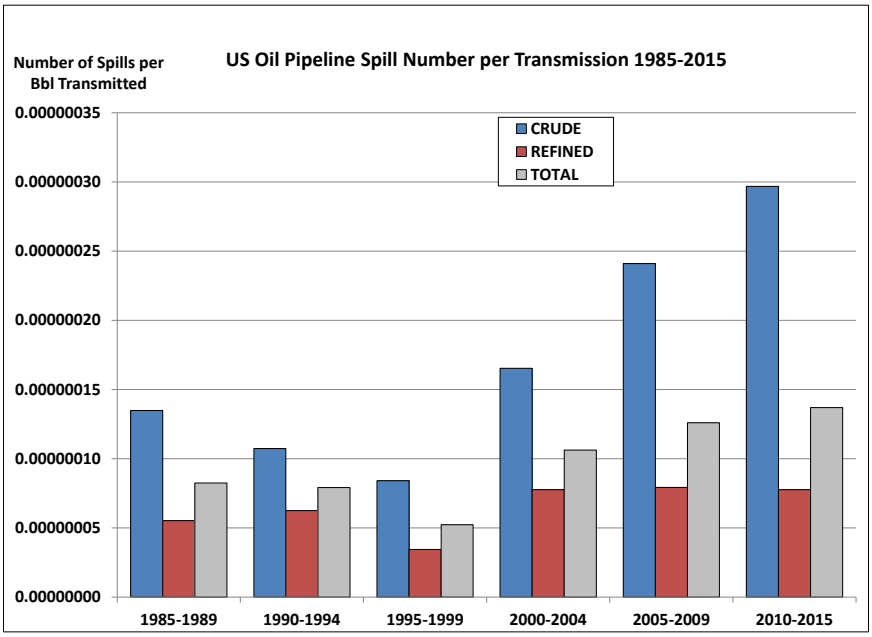

Figure 15: US Inland Oil Pipeline Spill Number per Volume Transmission (1985–2015)

Note that the values for the crude, refined, and total number of spills per bbl transmitted (the rates), as shown in Table 11 and Figure 15 are not additive. (The same holds true for Table 12 and Figure 16). The rates are derived as follows:

$$Rate_{crude} = \frac{N_{crude}}{Barrels_{crude}}$$

$$Rate_{refined} = \frac{N_{refined}}{Barrels_{refined}}$$

$$Barrels_{total} = Barrels_{crude} + Barrels_{refined}$$

$$N_{total} = N_{crude} + N_{refined}$$

$$Rate_{total} = \frac{N_{crude} + N_{refined}}{Barrels_{crude} + Barrels_{refined}}$$

$$N_{crude} = Rate_{crude} \cdot Barrels_{crude}$$

$$N_{refined} = Rate_{crude} \cdot Barrels_{crude}$$

$$Rate_{total} = \frac{(Rate_{crude} \cdot Barrels_{crude}) + (Rate_{refined} \cdot Barrels_{refined})}{(Barrels_{crude} + Barrels_{refined})}$$

$$Rate_{total} = (Barrels_{crude} + Barrels_{refined}) \cdot ((Rate_{crude} \cdot Barrels_{crude}) + (Rate_{refined} \cdot Barrels_{refined}))$$

$$Rate_{total} \neq Rate_{crude} + Rate_{refined}$$

For example, in 1985, there were 633,979,000 bbl of crude, and 1,216,670,000 bbl of refined products transmitted through pipelines, or a total 1,850,649,000 bbl. That year, there were 89 crude and 64 refined pipeline spills (of 1 bbl or more), for a total of 153 spills. The spillage rate for crude oil was

0.00000014 spills/bbl transmitted (89/633,979,000) and for refined products it was 0.00000005 spills/bbl transmitted (64/1,216,670,000). For the total spill rate (crude oil and refined products) are calculated, it would be done by dividing the total number of spills (153) by the total oil transmitted (1,850,649,000 bbl) to get a rate of 0.00000008 spills/bbl transmitted. This is not the sum of the crude spillage rate (0.0000005) and the refined product spillage rate (0.00000014), which would be 0.00000019.[16]

However, rates of major spills (238 bbl and larger) have *decreased* (Table 12 and Figure 16). This may possibly be explained by increasingly higher reporting rates for smaller spills. Crude pipelines consistently have higher spillage rates than refined product pipelines.

Table 12: Major US Inland Pipeline Spill Number per Oil Transmitted (1985–2015)

Years	Number of Spills per Bbl Transmitted Through Pipelines		
	Crude	Refined	Total
1985–1989	0.000000070	0.000000028	0.000000043
1990–1994	0.000000045	0.000000022	0.000000031
1995–1999	0.000000037	0.000000013	0.000000021
2000–2004	0.000000025	0.000000011	0.000000015
2005–2009	0.000000025	0.000000007	0.000000012
2010–2015	0.000000024	0.000000006	0.000000011
1985–2015 (All Years)	**0.000000037**	**0.000000013**	**0.000000021**

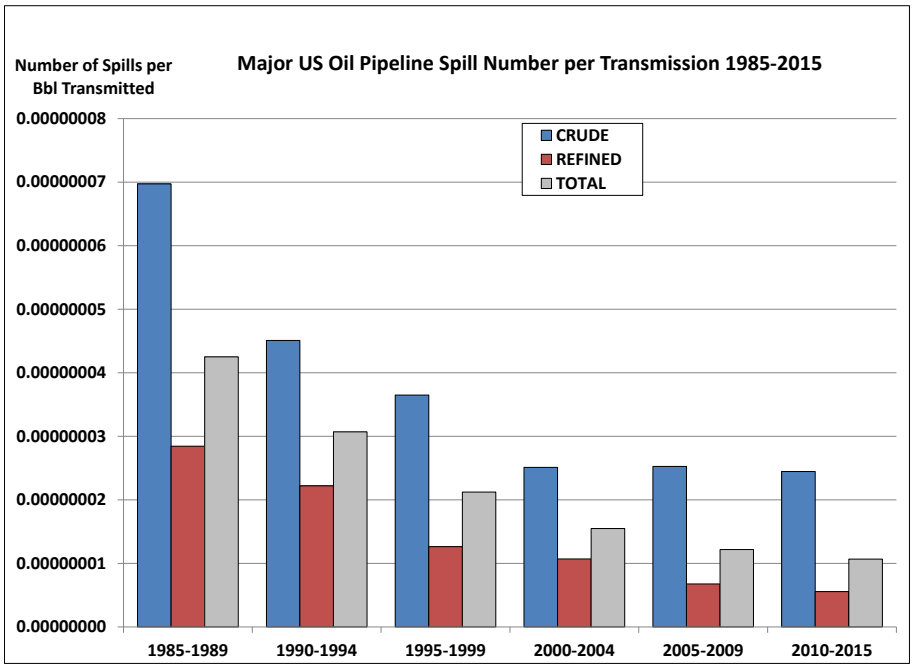

Figure 16: Major US Inland Oil Pipeline Spill Number per Volume Transmission (1985–2015)

[16] A more simple example is this: If a person eats 3 apples out of a bunch of 12 apples (1/4 or 0.25) and 4 oranges out of a group of 5 oranges (4/5 or 0.80), he can also be said to have eaten 7 pieces of fruit out of 17 (7/17 or 0.412). The rate of total *fruit* consumption is 0.412. But the rate of apple consumption is 0.25 and the rate of orange consumption is 0.80. The two rates are not added together to make 1.05.

Spillage rates per volume of pipeline transmission are shown in Table 13 and Figure 17. Again, spillage rates have generally gone down, though there was an increase in crude pipeline spillage between 2000 and 2010. Crude pipeline spillage rates are about four times the rates for refined product pipelines.

Table 13: US Inland Pipeline Volume Spilled per Oil Transmitted (19852015)

Years	Volume of Oil Spilled per Bbl Transmitted Through Pipelines		
	Crude	Refined	Total
1985–1989	0.000154	0.000051	0.000087
1990–1994	0.000092	0.000036	0.000057
1995–1999	0.000085	0.000025	0.000047
2000–2004	0.000035	0.000018	0.000024
2005–2009	0.000083	0.000010	0.000032
2010–2015	0.000051	0.000007	0.000019
1985–2015 (All Years)	**0.000083**	**0.000023**	**0.000042**

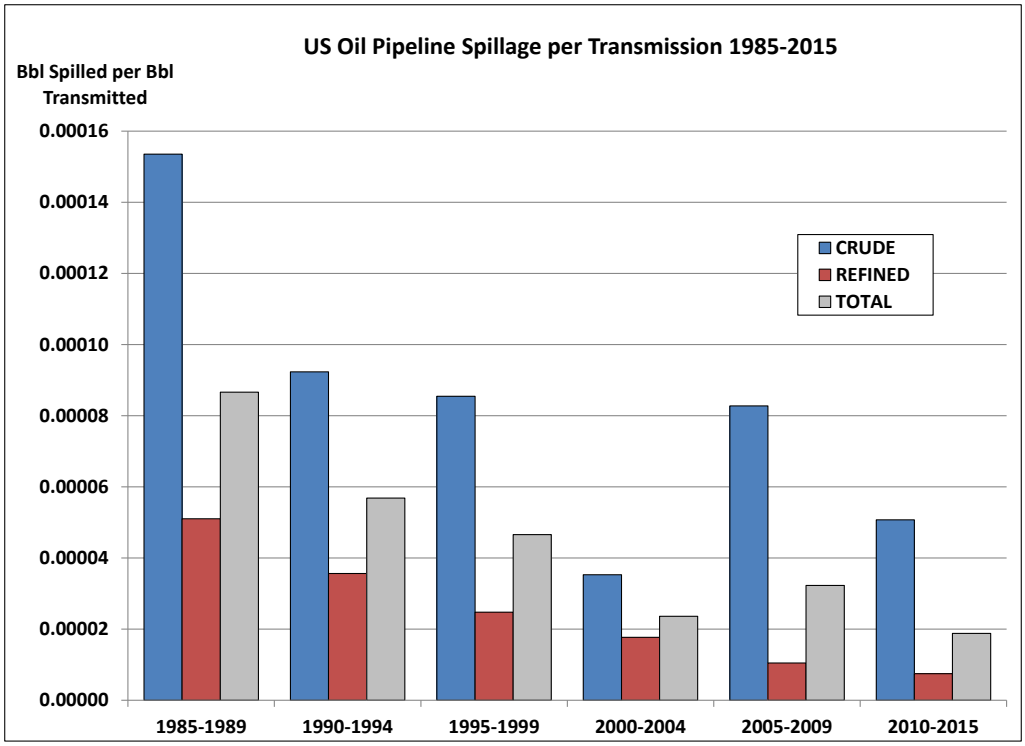

Figure 17: US Inland Oil Pipeline Spillage per Transmission (1985–2015)

Spillage per Pipeline Mile

Pipeline spillage was also analyzed by pipeline mile,[17] as in Figure 18, Figure 19, and Table 14 for spill number, and Table 15 and Figure 20 for spill volume.[18]

[17] Pipeline mileage data are from PHMSA. Transmission lines only.

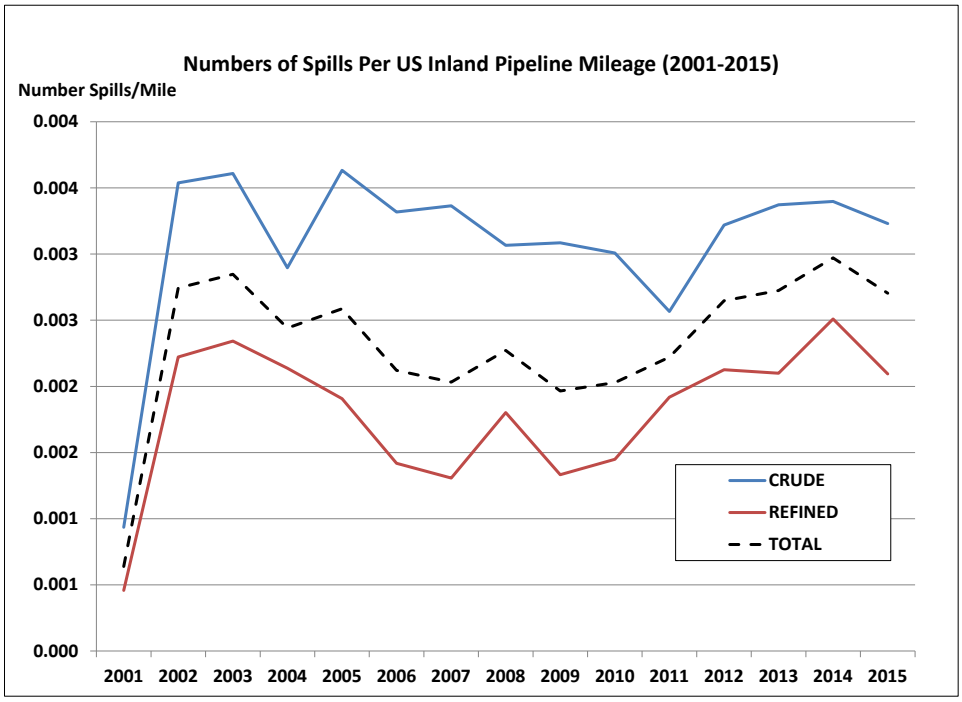

Figure 18: Number of Spills of Any Volume per US Inland Pipeline Mile

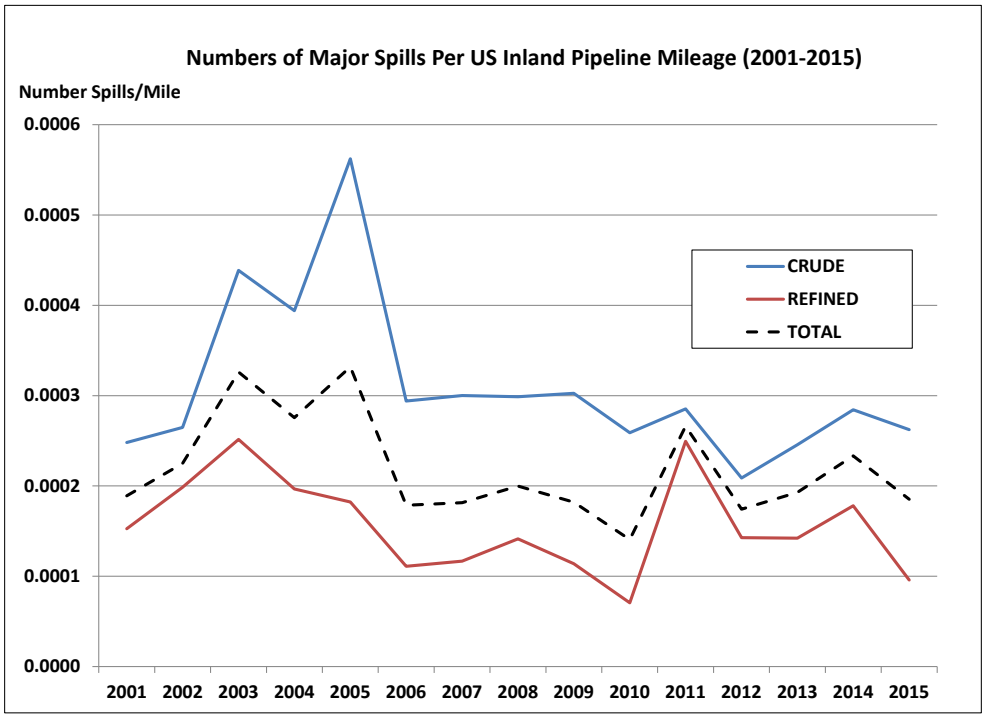

Figure 19: Number of Major Spills per US Inland Pipeline Mile

[18] As described previously, the rates are not additive. For example, the crude spillage rate for the year 2001 is 13 spills per 52,386 pipeline miles (0.00025); the refined spillage rate is 13 spills per 85,214 pipeline miles (0.00015). The total spillage rate is 26 spills for 137,600 miles or 0.00019. (0.00025 + 0.00015 ≠ 0.00019).

Table 14: US Inland Pipeline Spill Number per Pipeline Mile (2001–2015)[19]						
Year	Number of Spills per US Inland Pipeline Mile					
	Crude		Refined		Total	
	All Spills	Major Spills	All Spills	Major Spills	All Spills	Major Spills
2001	0.00094	0.00025	0.00046	0.00015	0.00064	0.00019
2002	0.00354	0.00026	0.00222	0.00020	0.00274	0.00022
2003	0.00361	0.00044	0.00234	0.00025	0.00285	0.00033
2004	0.00290	0.00039	0.00214	0.00020	0.00244	0.00028
2005	0.00363	0.00056	0.00191	0.00018	0.00259	0.00033
2006	0.00332	0.00029	0.00142	0.00011	0.00212	0.00018
2007	0.00336	0.00030	0.00131	0.00012	0.00203	0.00018
2008	0.00307	0.00030	0.00180	0.00014	0.00227	0.00020
2009	0.00309	0.00030	0.00133	0.00011	0.00197	0.00018
2010	0.00301	0.00026	0.00145	0.00007	0.00203	0.00014
2011	0.00257	0.00029	0.00192	0.00025	0.00222	0.00027
2012	0.00322	0.00021	0.00213	0.00014	0.00265	0.00017
2013	0.00337	0.00025	0.00210	0.00014	0.00272	0.00019
2014	0.00340	0.00028	0.00251	0.00018	0.00297	0.00023
2015	0.00323	0.00026	0.00209	0.00010	0.00270	0.00019
All Years	**0.00309**	**0.00030**	**0.00176**	**0.00015**	**0.00232**	**0.00022**

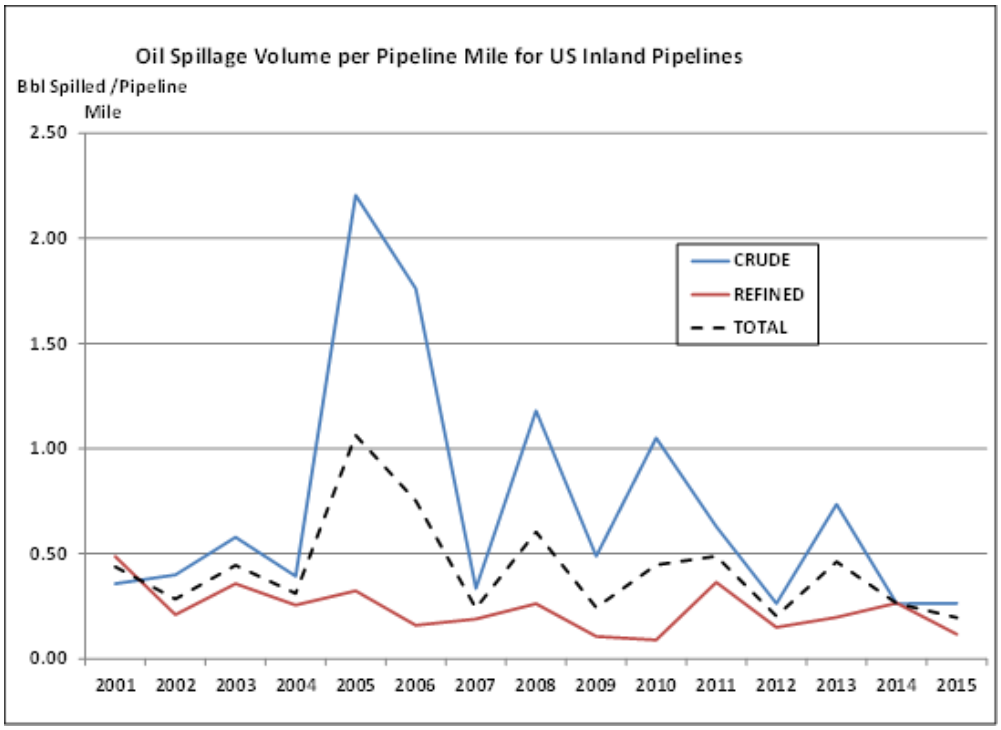

Figure 20: Volume Spilled per Pipeline Mile for US Inland Pipelines

[19] As described previously, the rates are not additive.

Table 15: US Inland Pipeline Volume Spilled per Pipeline Mile (2001–2015)			
Year	**Volume (bbl) Spilled per US Inland Pipeline Mile**		
	Crude	**Refined**	**Total**
2001	0.36	0.49	0.44
2002	0.40	0.21	0.28
2003	0.58	0.36	0.45
2004	0.39	0.26	0.31
2005	2.21	0.32	1.06
2006	1.76	0.16	0.75
2007	0.33	0.19	0.24
2008	1.18	0.26	0.60
2009	0.49	0.11	0.24
2010	1.05	0.09	0.45
2011	0.63	0.36	0.49
2012	0.26	0.15	0.20
2013	0.73	0.20	0.46
2014	0.26	0.27	0.26
2015	0.26	0.12	0.20
All Years	**0.69**	**0.23**	**0.42**

US Inland Pipeline Spillage Summary

Based on the analytical results presented above the following conclusions are reached concerning US inland pipeline spills:[20]

- Each year, it can be expected that about 360 pipeline spills (of any volume) will occur, of which:
  - About 60% (216) would be crude spills;
  - About 25% (90) would be gasoline spills; and
  - About 15% (54) would be light refined product spills.

- Heavy refined product pipeline spills are relatively rare.

- Each year, throughout the US, it can be expected that there will be about 26 major pipeline spills of at least 238 bbl (10,000 gallons), of which:
  - About 70% (18) would be crude spills;
  - About 15% (4) would be gasoline spills; and
  - About 15% (4) would be refined light product spills.

- Overall, half of the pipeline spills that do occur would be expected to involve 1 bbl or less. About 90% would involve 100 bbl or less. Only 5% would be expected to be 400 bbl or more, and only 1% would be expected to be 2,500 bbl or more.

[20] Data from analytical results have been rounded to the nearest two significant digits.

- For future projections, assuming that pipeline operations and conditions are constant, any changes in spillage could be estimated from the number of spills per oil transmission and/or volumes of spillage per oil transmission:

    - Inland crude pipeline spills occur at the rate of about one pipeline spill (of any volume) for every 3.3 million bbl transmitted;
    - A major inland crude pipeline spill of at least 238 bbl (10,000 gallons) might be expected once for every 42 million bbl of crude oil transmitted;
    - Inland refined product pipeline spills occur at the rate of about one spill (of any volume) for every 12.5 million bbl of refined product transmitted;
    - A major inland refined product pipeline spill of at least 238 bbl (10,000 gallons) might be expected once for every 28 million bbl of refined product transmitted; and
    - About half of the major refined product pipeline spills might be expected to be gasoline spills and the other half light refined product spills.

Minnesota Pipeline Spill Analysis

The data presented thus far in this report represent pipeline spills of both crude and refined products throughout the US. The following analyses specifically focus on crude pipelines that transit within and through Minnesota.

Minnesota Crude Pipeline Mileage in Comparison with Other States

According to PHMSA, the state of Minnesota currently has 2,416 miles of crude oil pipelines, making it the state with the seventh greatest crude transmission pipeline mileage (Table 16). Its pipeline mileage is exceeded only by Texas, Oklahoma, California, Wyoming, Louisiana, and Kansas. In terms of "pipeline density," i.e., the mileage of pipelines per square mile, Minnesota ranks eighth, exceeded by Oklahoma, Louisiana, Texas, Illinois, Wyoming, Kansas, and Mississippi. There is one crude pipeline mile for every 35 square miles of land in Minnesota. Oklahoma, Louisiana, and Texas—all oil-producing states—have 2.3, 2.2, and 1.8 times as many pipelines per square mile, respectively, in comparison with Minnesota.

Table 16: Crude Pipeline Spillage by Pipeline Mileage by State (as of 2015)

State	Crude Pipeline Miles[21]	Square Miles	Pipeline Density[22]
Texas	14,108	266,874	0.05286
Oklahoma	4,575	69,903	0.06545
California	3,820	158,648	0.02408
Wyoming	3,572	97,818	0.03652
Louisiana	2,951	47,720	0.06184
Kansas	2,671	82,282	0.03246
Minnesota	2,416	84,397	0.03147
Montana	2,204	147,047	0.01499
Illinois	2,089	56,343	0.03708
North Dakota	1,615	70,704	0.02284
Missouri	1,591	69,709	0.02282
Mississippi	1,416	47,695	0.02969
New Mexico	1,206	121,599	0.00992
Wisconsin	1,206	56,145	0.02148
Michigan	1,179	58,513	0.02015
Alaska	1,028	587,878	0.00175
Nebraska	672	77,359	0.00869
Utah	620	84,905	0.00730
Kentucky	538	40,411	0.01331
Ohio	530	41,328	0.01282
Arkansas	432	53,183	0.00812
Indiana	426	36,185	0.01177
Alabama	370	51,718	0.00715
Colorado	344	104,100	0.00330

[21] Data source: PHMSA. (Transmission lines only.)
[22] Pipeline miles/square mile of area in state.

Table 16: Crude Pipeline Spillage by Pipeline Mileage by State (as of 2015)			
State	**Crude Pipeline Miles[21]**	**Square Miles**	**Pipeline Density[22]**
Iowa	336	56,276	0.00597
Tennessee	275	42,146	0.00652
South Dakota	232	77,122	0.00301
Maine	148	33,128	0.00447
Vermont	117	9,615	0.01217
New York	93	49,112	0.00189
New Hampshire	68	9,283	0.00733
Washington	64	68,126	0.00094
Maryland	52	10,455	0.00497
Florida	45	58,681	0.00077
Pennsylvania	28	45,310	0.00062
West Virginia	4	24,231	0.00017
Hawaii	2	6,459	0.00031
Total	**53,043**	**3,614,743**	**0.01467**

Minnesota Crude Pipeline Spill History

During the years 1968 through 2016, there were a total of 118 crude pipeline spills (of one bbl or more) reported in Minnesota (Table 17, Figure 21, and Figure 22).[23] A total of 184,239 bbl of crude oil spilled in this time period. During this time period, there has been an average of 2.45 spills per year, though the average annual number has increased in the last 10 to 20 years (3.7 spills per year since 1997, and 3.0 spills per year since 2007). This may be an artifact of the data in that the reporting of pipeline spills was less rigorous in the earlier years. Smaller spills (of less than a few bbl) were not reported consistently.

Table 17: Crude Pipeline Spills in Minnesota (1968–2016)		
Year	**Number (1 bbl or more)**	**Bbl Spilled**
1968	1	4,000
1969	2	400
1970	0	0
1971	0	0
1972	5	11,950
1973	4	41,100
1974	3	6,975
1975	1	350
1976	0	0
1977	1	4,398
1978	1	60
1979	1	10,500
1980	2	14,247

[23] There were two spills of less than one bbl (0.21 bbl and 0.15 bbl) in 2016 and one spill of 0.76 bbl thus far in 2017 that are not included in this analysis.

Table 17: Crude Pipeline Spills in Minnesota (1968–2016)		
Year	**Number (1 bbl or more)**	**Bbl Spilled**
1981	0	0
1982	2	9,350
1983	0	0
1984	1	2,196
1985	2	6,010
1986	3	568
1987	3	626
1988	1	3
1989	3	415
1990	0	0
1991	1	40,500
1992	1	150
1993	1	2
1994	5	297
1995	1	50
1996	3	5,065
1997	1	475
1998	2	5,900
1999	2	401
2000	4	110
2001	4	57
2002	7	6,286
2003	11	286
2004	3	1,014
2005	0	0
2006	6	3,240
2007	6	340
2008	4	1,616
2009	6	5,014
2010	5	176
2011	1	10
2012	1	1
2013	2	36
2014	3	28
2015	2	30
2016	0	0
Total	**118**	**184,232**

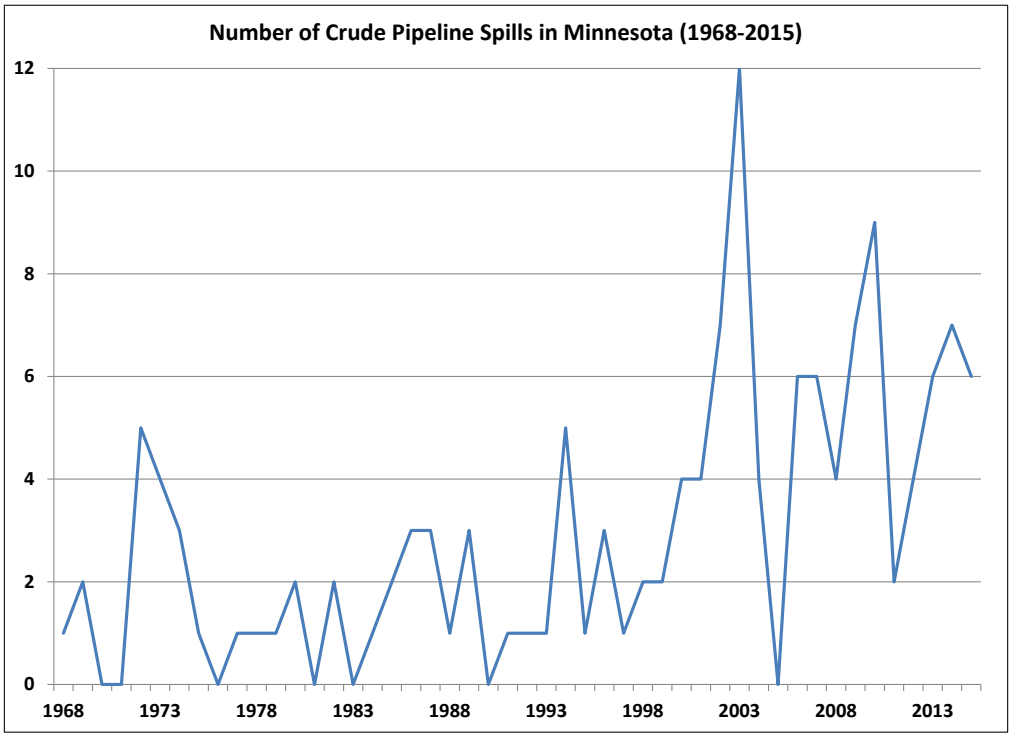

Figure 21: Annual Number of Crude Pipeline Spills in Minnesota (1968–2015)

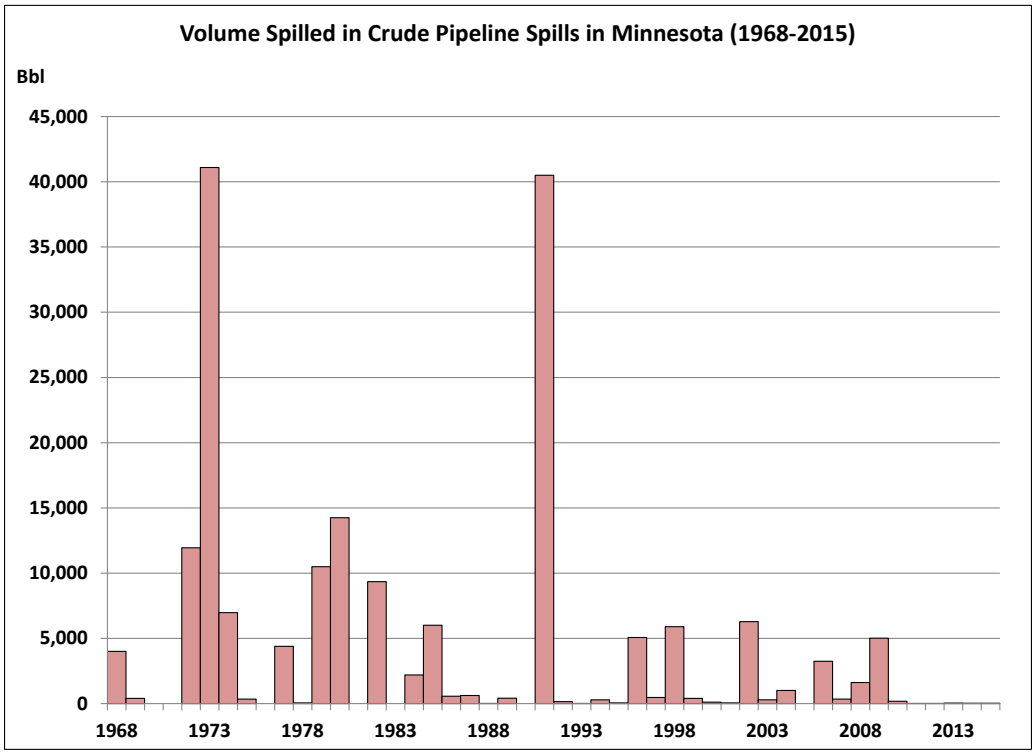

Figure 22: Volume Spilled in Crude Pipeline Spills in Minnesota (1968–2015)

The five-year average data are shown in Table 18. The average annual number of spills has increased; however, the average annual volume and the average volume per spill have both decreased.

Table 18: Five-Year Average Crude Pipeline Spill Data for Minnesota

Years[24]	Annual Number Spills (1 bbl or more)	Annual Volume Spilled	Average Volume/Spill (1 bbl or more)
1968–1972	2	3,270	1,318
1973–1977	2	10,565	3,470
1978–1982	1	6,831	4,472
1983–1987	2	1,880	1,120
1988–1992	1	8,214	8,158
1993–1997	2	1,178	455
1998–2002	4	2,551	818
2003–2007	5	976	192
2008–2012	3	1,363	257
2013–2016	2	31	14
Overall Average	**2.4**	**3,760**	**2,068**

The frequency distribution of spill volumes (volume for each individual incident) varies from 0.01 bbl (0.42 gallons, or less than two quarts) to 40,500 bbl (Table 19). Just over 69% of spill incidents involved less than 100 bbl, about 85% less than 1,000 bbl, and nearly 97% less than 10,000 bbl.

Table 19: Frequency Distribution of Spill Volumes for Minnesota Crude Pipelines (1968–2016)

Spill Volume	% Spill Incidents	Number of Incidents
<1 bbl	18.2%	26
1–9 bbl	30.1%	43
10–99 bbl	21.0%	30
100–999 bbl	15.4%	22
1,000–9,999 bbl	11.9%	17
10,000–90,000 bbl	3.5%	5
100,000+ bbl	0.0%	0

During the 49-year time frame, there were 32 major crude pipeline spills (>238 bbl), of which three occurred in the last decade and eight in the last 20 years (Table 20). These major spills account for over 98% of the total volume of spillage. There have been no major (>238 bbl) pipeline spills in Minnesota in the last six years. There have been no spills of over 10,000 bbl since 1991.

Table 20: Major Crude Pipeline Spills (>238 bbl) in Minnesota (1968–2016)

Year	Number (238 bbl or more)
1968	1
1969	0
1970	0

[24] The period 2013–2015 is a four-year average.

Table 20: Major Crude Pipeline Spills (>238 bbl) in Minnesota (1968–2016)	
Year	**Number (238 bbl or more)**
1971	0
1972	3
1973	4
1974	1
1975	1
1976	0
1977	1
1978	0
1979	1
1980	2
1981	0
1982	1
1983	0
1984	1
1985	1
1986	2
1987	1
1988	0
1989	1
1990	0
1991	1
1992	0
1993	0
1994	0
1995	0
1996	1
1997	1
1998	1
1999	1
2000	0
2001	0
2002	1
2003	0
2004	1
2005	0
2006	1
2007	1
2008	1
2009	1
2010	0

Table 20: Major Crude Pipeline Spills (>238 bbl) in Minnesota (1968–2016)	
Year	**Number (238 bbl or more)**
2011	0
2012	0
2013	0
2014	0
2015	0
2016	0
Total	**32**

Minnesota Major Crude Pipeline Spills

Data on the 32 major crude pipeline spills (>238 bbl) in Minnesota are shown in Table 21 in chronological order. A summary of the major spills by county is shown in Table 22.

Table 21: Major Crude Pipeline Spills in Minnesota (1968–2016)

Date	Operator[25]	County (City)	Bbl Spilled	Cause
12/8/1968	Enbridge	Red Lake	4,000	Defective weld
7/14/1972	Enbridge	Marshall	8,000	Equipment rupturing line
8/23/1972	Enbridge	Clearwater	3,000	Incorrect operation by carrier
9/9/1972	Enbridge	Carlton	700	Equipment rupturing line
8/13/1973	Enbridge	Marshall	17,000	Incorrect operation by carrier
9/5/1973	Enbridge	Kittson	400	Equipment rupturing line
9/11/1973	Enbridge	Polk	5,000	Incorrect operation by carrier
12/4/1973	Enbridge	Marshall	18,700	Other (No further information available)
7/12/1974	Enbridge	Clearwater	6,900	Defective pipe
4/3/1975	Enbridge	Clearwater	350	Other (No further information available)
11/4/1977	Koch	Todd (Staples)	4,398	Defective pipe
8/20/1979	Enbridge	Beltrami	10,500	Defective pipe
1/11/1980	Koch	Benton	11,847	Defective weld
6/26/1980	Enbridge	Kittson	2,400	Defective pipe
7/21/1982	Enbridge	Clearwater (Clearbrook)	9,200	Other (No further information available)
2/11/1984	Koch	Benton (Foley)	2,196	Defective pipe
11/7/1985	Koch	Anoka (Burns)	5,980	Other (No further information available)
2/10/1986	Koch	Dakota (Inner Grove Hts)	300	Failed weld
9/6/1986	Enbridge	Polk	265	Other (Contractor failed to tighten)
3/6/1987	Enbridge	Clearwater	500	Failed weld
3/26/1989	Enbridge	Pennington (Sanders Twp)	300	Failed weld
3/3/1991	Enbridge	Itasca	40,500	Other (Split in heat affect zone)
8/24/1996	Enbridge	Kittson (Donaldson Station)	5,000	Corrosion
1/3/1997	Marathon	Washington (Cottage Grove)	475	Other (Tank farm pipeline)

[25] Minnesota Pipeline and Wood River Pipeline are grouped under Koch; Lakehead is grouped under Enbridge.

Table 21: Major Crude Pipeline Spills in Minnesota (1968–2016)				
Date	**Operator[25]**	**County (City)**	**Bbl Spilled**	**Cause**
9/16/1998	Enbridge	Red Lake (Plummer)	5,700	Excavation damage
2/22/1999	Enbridge	Marshall (Radium)	400	Other (Loose bolts on flange)
7/4/2002	Enbridge	Itasca (Cohasset)	6,000	Material and/or weld failures
2/19/2004	Enbridge	Itasca (Grand Rapids)	1,003	Natural forces (earth movement)
6/27/2006	Koch	Morrison (Little Falls)	3,200	Other outside force damage
11/28/2007	Enbridge	Clearwater (Clearbrook)	325	Incorrect operation by carrier
3/23/2008	Koch	Clearwater (Clearbrook)	1,600	Natural forces (earth movement)
12/4/2009	Koch	Todd (Staples)	5,000	Incorrect operation by carrier

Table 22: Major Pipeline Spills by Minnesota County (1968–2016)							
County	**Square Mileage**	**Major Spill Number**			**Total Spill Volume[26]**		
		Number	**% Total Major**	**Number per Square Mile**	**Volume (bbl)**	**% Total Volume**	**Volume per Square Mile**
Anoka	432.61	1	3.1%	0.00231	5,980	3.3%	13.82
Beltrami	2,505.27	1	3.1%	0.00040	10,500	5.8%	4.19
Benton	408.28	2	6.3%	0.00490	14,043	7.8%	**34.40**
Carlton	860.33	1	3.1%	0.00116	700	0.4%	0.81
Clearwater	994.71	7	**21.9%**	**0.00704**	21,875	12.1%	21.99
Dakota	569.58	1	3.1%	0.00176	300	0.2%	0.53
Itasca	2,665.06	3	9.4%	0.00113	47,503	**26.2%**	17.82
Kittson	1,097.08	3	9.4%	0.00273	7,800	4.3%	7.11
Marshall	1,772.24	4	12.5%	0.00226	44,100	24.3%	24.88
Morrison	1,124.50	1	3.1%	0.00089	3,200	1.8%	2.85
Pennington	616.54	1	3.1%	0.00162	300	0.2%	0.49
Polk	1,970.37	2	6.3%	0.00102	5,265	2.9%	2.67
Red Lake	432.43	2	6.3%	0.00463	9,700	5.4%	22.43
Todd	942.02	2	6.3%	0.00212	9,398	5.2%	9.98
Washington	391.70	1	3.1%	0.00255	475	0.3%	1.21
Total	**16,782.72**	**32**	**100.0%**	**0.00191**	**181,139**	**100.0%**	**10.79**

Comparison of Minnesota and US for Major Crude Pipeline Spills

The rate of major crude pipeline spills (>238 bbl) in Minnesota was compared with the crude pipeline spillage in the US as a whole for the last 16 years (2001 through 2016), and for the last seven years (2010 through 2016). The latter time period was selected because this was the only time frame for which state-specific pipeline transmission rates were available from PHMSA. Overall, the Minnesota crude pipeline rate was considerably less than that of the nation as a whole, with respect to spillage per pipeline miles and barrels transmitted (Table 23).

[26] Includes only spillage from major spills, which encompasses 98% of the total spillage.

Table 23: Crude Pipeline Spillage: Minnesota vs. US Nationwide[27]						
Spill Rate[28]	Average 2001–2016			Average 2010–2016		
	MN	US	MN/US Ratio	MN	US	MN/US Ratio
Major Spills/Pipeline Mile-Year	0.00023	0.0003	0.767	0	0.00026	0.000
Bbl Spilled/Pipeline Mile-Year	0.43	0.69	0.623	0.015	0.53	0.028
Major Spills/Million Bbl Transmitted	0.0014	0.025	0.056	0	0.024	0.000
Bbl Spilled/Million Bbl Transmitted	4.3	56	0.077	0.16	51	0.003

All Crude Pipeline Spills (2000–2016)

Data for crude pipeline spills of *all sizes* that occurred since 2000 were analyzed. There were 91 spill incidents, one of which occurred in 2017.[29] A summary of these data is shown in Table 24.

Table 24: Minnesota Crude Pipeline Spills of All Sizes (2000–Present)				
Year	Number of Spills		Total Volume (bbl)	Average Volume (bbl)
	All Volumes	Major Spills (>238 bbl)		
2000	4	0	110.00	27.50
2001	4	0	57.00	14.25
2002	7	1	6,286.00	898.00
2003	12	0	286.24	23.85
2004	4	1	1,014.50	253.63
2005	0	0	0.00	0.00
2006	6	1	3,240.00	540.00
2007	6	1	340.02	56.67
2008	4	1	1,616.00	404.00
2009	7	1	5,015.31	716.47
2010	9	0	176.21	19.58
2011	2	0	10.48	5.24
2012	4	0	1.86	0.47
2013	6	0	38.69	6.45
2014	7	0	28.39	4.06
2015	6	0	30.27	5.05
2016	2	0	0.36	0.18
2017[30]	1	0	0.76	0.76
Total	**91**	**6**	**18,252.09**	**-**
Average All Years	**5.2**	**0.3**	**1,042.98**	**200.57**
Average 2010–2017	**4.9**	**0**	**38.27**	**5.57**

[27] US data is for all states inclusive of Minnesota.
[28] Pipeline mile-year is a mile of pipeline in operation for one year. Crude transmission bbl-miles for Koch and Enbridge based on PHMSA data for 2015 and mileage data.
[29] There was one crude pipeline spill incident of 0.76 bbl reported for 2017–on 5 June 2017 in Clearwater.
[30] Half year (through June 2017).

The frequency distribution of spill volumes is shown in Table 25 and Figure 23. For the years 2000 through the present (end of June 2017), there were 91 incidents, of which nearly 30% involved less than one bbl. The average spill volume was 201 bbl. The median (i.e., 50th percentile) was 2.0 bbl. For the years 2010 through the present, there were 37 incidents, of which over 81% involved less than one bbl. The average spill volume was 7.8 bbl. The median was 0.54 bbl. The spill volumes have been significantly smaller since 2010.

Table 25: Frequency Distribution of Spill Volumes for Minnesota Crude Pipelines (2000–2017)

Spill Volume Category	2000–2017		2010–2017	
	Number of Incidents	% Spill Incidents	Number of Incidents	% Spill Incidents
0.01–0.09 bbl	5	5.5%	23	62.2%
0.1–0.9 bbl	22	24.2%	7	18.9%
1–9 bbl	37	40.7%	6	16.2%
10–99 bbl	17	18.7%	1	2.7%
100–999 bbl	5	5.5%	0	0.0%
1,000–9,999 bbl	5	5.5%	0	0.0%
10,000–90,000 bbl	0	0.0%	0	0.0%
100,000+ bbl	0	0.0%	0	0.0%
Total	**91**	**100%**	**37**	**100%**
Median	**2.0 bbl**		**0.54 bbl**	
Mean (Average)	**200.57 bbl**		**7.76 bbl**	

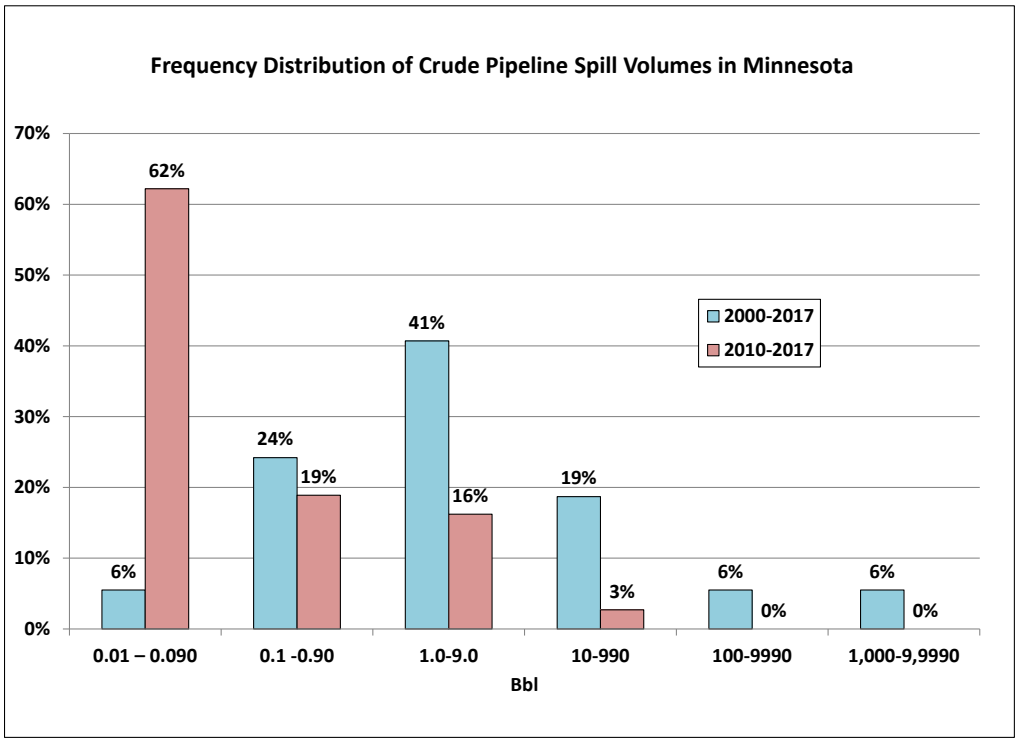

Figure 23: Frequency Distribution of Crude Spill Pipeline Volumes in Minnesota by Time Period

Benchmarking of Enbridge Line 3 Hypothetical Spill Scenarios

Hypothetical spill scenarios were modeled in the Stantec Report (Stantec et al. 2017) at seven selected sites with the spill volumes in Table 26. The volumes were benchmarked against spill volumes from past spills throughout the US and in Minnesota for different time periods. [Note that throughout this section, the hypothetical spills are referred to by their site numbers for convenience. The site itself not pertinent to the benchmarking analysis as the scenario volumes are compared to historical spills throughout the US and throughout the state of Minnesota. The sites themselves are not benchmarked in this analysis in any manner.]

Table 26: Hypothetical Pipeline Spill Scenarios Modeled

Site Number	Study Site	Volume (bbl)[1]
Site 1	Mosquito Creek to Lower Rice Lake	
Site 2	Mississippi River at Ball Club	
Site 3	Sandy River	
Site 4	Shell River to Twin Lakes	
Site 5	Red River	
Site 6	Mississippi River at Palisades	
Site 7	Mississippi River at Little Falls	

[1] The Applicant has identified this data as non-public. Classification is still under review by the Administrative Law Judge in this matter.

Benchmarking Against US National Spills

The hypothetical spills in Table 26 were benchmarked against US pipeline spills (crude and refined) based on data from 1968 through 2015 (Table 7, Table 8, and Figure 12) and on data from 2006 through 2015 (Table 9, Table 10, and Figure 13). All of the scenarios exceeded the 99th percentile of pipeline spills regardless of spilled product. In other words, less than 1% of historical pipeline spills throughout the US over 48 years were that size or larger.

Table 27 shows the percentile value for the hypothetical spill scenarios relative only to crude pipeline spills throughout the US for different time periods.

Table 27: Hypothetical Line 3 Spills Relative to US National Crude Pipeline Incidents						
Hypothetical Spill[31]	US 1968–2015		US 2000–2015		US 2006–2015	
	Percentile[32]	% Spills Larger[33]	Percentile	% Spills Larger	Percentile	% Spills Larger
Site 1	98.82	1.18%	99.53	0.47%	99.66	0.34%
Site 2	99.19	0.81%	99.69	0.31%	99.72	0.28%
Site 3	99.52	0.48%	99.80	0.20%	99.83	0.17%
Site 4	99.44	0.56%	99.77	0.23%	99.77	0.23%
Site 5	99.52	0.48%	99.84	0.16%	99.85	0.15%
Site 6	99.27	0.73%	99.73	0.27%	99.72	0.28%
Site 7	99.52	0.48%	99.80	0.20%	99.84	0.16%

Benchmarking Against Historical Minnesota Spills

The same analyses were conducted comparing the hypothetical spill scenario volumes to historical crude pipeline spills in Minnesota, as summarized in Table 28. The data involved spills that occurred from 1968 through the present (end of June 2017). There have been no spills over 6,000 bbl since 2000. For this reason, all of the hypothetical Line 3 spill scenarios would represent the largest spills in this time period.

There have been larger spills prior to 2000. The hypothetical Line 3 scenarios represent the 96th to 99th percentiles. That means that 1% to 3.5% of crude pipeline spills during 1968 through 2015 were larger. In other words, if these hypothetical incidents had occurred, they would have fallen into the designated percentiles and only the percentage shown would have been larger. If these hypothetical Line 3 spills had occurred in 2000 or later, they would have been the largest crude pipeline spills in that time period.

Table 28: Hypothetical Line 3 Spills Relative to Minnesota Crude Pipeline Incidents						
Hypothetical Spill	Minnesota 1968–2017		Minnesota 2000–2017		Minnesota 2006–2017	
	Percentile	% Spills Larger	Percentile	% Spills Larger	Percentile	% Spills Larger
Site 1	96.45	3.55%	100.00	0.00%	100.00	0.00%
Site 2	97.87	2.13%	100.00	0.00%	100.00	0.00%
Site 3	99.01	0.99%	100.00	0.00%	100.00	0.00%
Site 4	98.87	1.13%	100.00	0.00%	100.00	0.00%
Site 5	99.15	0.85%	100.00	0.00%	100.00	0.00%
Site 6	97.87	2.13%	100.00	0.00%	100.00	0.00%
Site 7	99.08	0.92%	100.00	0.00%	100.00	0.00%

Return Period Calculation for Hypothetical Line 3 Scenario Volumes

The return periods for the volumes of the hypothetical Line 3 spills *in the entire US* were calculated based on the national data for the three time periods, with the results shown in Table 29. In other words, spills of this volume would be expected *somewhere in the US* every two to four years based on the data from the

[31] The hypothetical spills are referred to by their "site numbers" for convenience. The sites themselves are not benchmarked in this analysis in any manner.

[32] A percentile spill volume is the percentage of spills that are that volume or less. e.g., a 99th percentile spill of 1,100 bbl means that 99% of spills are 1,100 bbl or less. Only 1% of spills are larger.

[33] The percent of historical crude pipeline spills that were larger than the volume of the hypothetical scenario.

last decade. *This does not indicate that these spills would occur in Minnesota on Line 3 (or any other pipeline in Minnesota).*

Table 29: Estimated Return Periods for Hypothetical Crude Pipeline Spill Volumes in the US

Hypothetical Spill Volume	US 1968–2015		US 2000–2015		US 2006–2015	
	Frequency per Year	Return Period (Years)	Frequency per Year	Return Period (Years)	Frequency per Year	Return Period (Years)
Site 1	1.58	0.6	0.75	1.3	0.60	1.7
Site 2	1.09	0.9	0.50	2.0	0.50	2.0
Site 3	0.64	1.6	0.32	3.1	0.30	3.3
Site 4	0.75	1.3	0.37	2.7	0.41	2.5
Site 5	0.64	1.6	0.26	3.9	0.27	3.8
Site 6	0.98	1.0	0.43	2.3	0.50	2.0
Site 7	0.64	1.6	0.32	3.1	0.28	3.5

Based on analyses of historical data for Minnesota, the frequency of a spill of large volume in the state is much lower (see Table 23). As shown in Table 28, there have been no spills of the magnitude of the volumes for the hypothetical Line 3 scenarios since prior to 2000. The last spill of this volume or greater in Minnesota was in March 1991 (see Table 21).

The return period calculation based solely on Minnesota data for the years 1968 through June 2017 is shown in Table 30. Note that for the 2000–2017 time period, the calculation returns a value of zero for the frequency as there are no historical incidents in this time period. This may be attributed to a very low likelihood or probability of a large spill incident and a short time frame.[34]

The estimated return periods based on the 1968–2017 data are over-estimates with regard to frequency, and, correspondingly, under-estimates for return periods. In other words, the frequencies would be expected to be lower and the return periods would be expected to be longer.

Table 30: Estimated Return Periods for Hypothetical Crude Pipeline Spill Volumes in Minnesota

Hypothetical Spill Volume	Minnesota 1968–2017	
	Frequency per Year	Return Period (Years)
Site 1	0.101	9.9
Site 2	0.061	16.5
Site 3	0.028	35.5
Site 4	0.032	31.1
Site 5	0.024	41.3
Site 6	0.061	16.5
Site 7	0.026	38.2

[34] This would be analogous to rolling dice a limited number of times and never getting a particular result. With more rolls (more time), eventually the number may come up.

An alternative approach to calculating the return period for the Minnesota spills was also taken. The return periods estimated for the US as a whole (in Table 29) were used to calculate the relative reduction in frequencies for the time periods (1968–2015, to 2000–2015, to 2006–2015), as shown in Table 31.

Table 31: Reduction in Frequencies for Hypothetical Crude Pipeline Spill Volumes in the US

Hypothetical Spill Volume	US 1968–2015 Frequency per Year	US 2000–2015		US 2006–2015	
		Frequency per Year	Reduction from 1968–2015	Frequency per Year	Reduction from 1968–2015
Site 1	1.58	0.75	52.5%	0.6	62.0%
Site 2	1.09	0.5	54.1%	0.5	54.1%
Site 3	0.64	0.32	50.0%	0.3	53.1%
Site 4	0.75	0.37	50.7%	0.41	45.3%
Site 5	0.64	0.26	59.4%	0.27	57.8%
Site 6	0.98	0.43	56.1%	0.5	49.0%
Site 7	0.64	0.32	50.0%	0.28	56.3%

The reduction factors in Table 31 were applied to the frequencies in Table 30 to derive the extrapolated frequencies and return periods in Table 32. These results indicate that the expected return period of the hypothetical spills ranges from about once every 21 to 26 years for the lowest volume (Site 1) to once every 99 to 103 years for the highest volume (Site 5). Note that these return periods do not necessarily correspond to the specific sites (Table 26) for which these volumes were calculated—only these spill volumes within the state.

It is important to bear in mind that this estimation approach is conservative. That is, it is cautionary by over-estimating the probability of these incidents.

Table 32: Extrapolated Frequencies/Return Periods for Hypothetical Large Spills in Minnesota

Hypothetical Spill Volume	Minnesota 1968–2017		Minnesota 2000–2017 Extrapolated from US 2000–2015 Reduction		Minnesota 2006–2017 Extrapolated from US 20062015 Reduction	
	Frequency per Year	Return Period (Years)	Frequency per Year	Return Period (Years)	Frequency per Year	Return Period (Years)
Site 1	0.101	9.9	0.0479	20.9	0.0384	26.1
Site 2	0.061	16.5	0.0280	35.7	0.0280	35.7
Site 3	0.028	35.5	0.0140	71.4	0.0131	76.2
Site 4	0.032	31.1	0.0158	63.3	0.0175	57.2
Site 5	0.024	41.3	0.0098	102.6	0.0101	98.8
Site 6	0.061	16.5	0.0268	37.4	0.0311	32.1
Site 7	0.026	38.2	0.0130	76.9	0.0114	87.9

Return Period Calculation for Smaller Spills

Based on the data in Table 25, the return periods for smaller spills were calculated, as shown in Table 33. Since there were no spills in the larger spill categories, the frequencies were zero. However, this is merely

indicative of a lower probability and a return period that exceeds the time period for the data—17.5 years for the 2000–2017 data set, and 7.5 years for the 2010–2017 set.

Table 33: Frequencies and Return Period by Spill Volumes for Minnesota Crude Pipelines

Spill Volume Category	Based on Minnesota 2000–2017 Data		Based on Minnesota 2010–2017 Data	
	Frequency per Year	Return Period (Years)	Frequency per Year	Return Period (Years)
0.01–0.09 bbl	0.29	3.5	3.07	0.3
0.1–0.9 bbl	1.26	0.8	0.93	1.1
1–9 bbl	2.11	0.5	0.80	1.3
10–99 bbl	0.97	1.0	0.13	7.5
100–999 bbl	0.29	3.5	0.00	0.0
1,000–9,999 bbl	0.29	3.5	0.00	0.0
10,000–90,000 bbl	0.00	0.0	0.00	0.0
Total	**5.20**	**0.2**	**4.93**	**0.2**

Summary of Findings for Minnesota Crude Pipeline Spills

In order to quantify the incremental risk for the Line 3 Project, the potential spills that might occur need to be compared with the baseline of spills occurring from existing pipelines in the area. The analyses of historical data conducted in this report provide an overview of pipeline spill rates and trends in the inland US as a whole for existing crude oil pipelines in Minnesota.

US Crude Pipeline Spills

For crude oil pipeline spillage in the US as a whole, the following conclusions were reached:

- There are about 53,045 miles of crude oil pipeline throughout the US.
- The frequency of crude pipeline spills in the US has decreased significantly over the last 48 years.
- Crude pipeline spills have become increasingly lower in volume.
- Projecting into the future, half of the pipeline spills that do occur would be expected to involve 1 bbl or less, and about 90% would involve 100 bbl or less. Only 5% would be expected to be 400 bbl or more, and only 1% would be expected to be 2,500 bbl or more.
- Inland crude pipeline spills occur at the rate of about one pipeline spill (of any volume) for every 3.3 million bbl transmitted.
- A major inland crude pipeline spill of at least 238 bbl (10,000 gallons) might be expected once for every 42 million bbl of crude oil transmitted.

Minnesota Crude Pipeline Spills

For crude oil pipeline spillage in Minnesota, the following conclusions were reached:

- Minnesota currently has about 2,416 miles of crude oil pipelines.
- Since 1968, there were a total of 118 crude oil pipeline spills of one bbl or more, with a total of 184,332 bbl spilled.

- The annual number of reported pipelines has increased; however, this can be attributed to the increase in reporting of smaller spills that previously had not been reported.
- During 1968 through 2016, there were 32 major pipeline spills (>238 bbl or 10,000 gallons).
- There have been no major crude pipeline spills in Minnesota in the last six years, and no spills over 10,000 bbl since 1991.
- The rate of spillage in Minnesota has been lower than that in the US as a whole, accounting for pipeline mileage and amount transmitted.
- The rate of major spills per pipeline mile-year in Minnesota was 77% that of the US as a whole during 2001 through 2016. There were no major spills in 2010 through the present.
- The volume spilled per pipeline mile-year in Minnesota as 62% that of the US as a whole during 2001 through 2016, and 3% that of the US during 2010 through 2016.
- The number of major spills per volume transmitted in Minnesota was 6% that of the US as a whole during 2001 through 2016. There were no major pipeline spills in Minnesota since 2010.
- The volume of spillage per amount transmitted in Minnesota was 8% that of the US as a whole in 2001 through 2016, and 0.3% that of the US as a whole since 2010.
- Since 2010, 62% of crude pipeline spills have involved less than 0.1 bbl (4.2 gallons); 81% have involved less than 1 bbl.
- A spill of less than 0.1 bbl might be expected once every four months; a spill of less than 10 bbl, once every 16 months; and a spill of less than 100 bbl, once every 7.5 years.

Using a conservative (cautionary over-estimating) approach, it was estimated that the volumes of spillage in the seven hypothetical Line 3 spill scenarios might be expected once in 26 to 99 years somewhere in the state of Minnesota. *This does not indicate that the incidents would occur at the specific sites selected for modeling.*

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Appendix P

Tribal Resources and Impacts

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Resolutions, Policies, and Memoranda of Understanding

WHEREAS, the Minnesota Chippewa Tribal Executive Committee is the duly elected governing body of the Minnesota Chippewa Tribe, comprised of six member reservations (Bois Forte, Fond du Lac, Grand Portage, Leech Lake, Mille Lacs and White Earth), each of which is separately recognized by the United States as an Indian tribe; and

WHEREAS, the Revised Constitution and Bylaws of the Minnesota Chippewa Tribe provides that the purposes of the tribal organization under the Act of June 18, 1934 (48 Stat. 984) include the conservation of tribal resources and promotion of the general welfare of members of the Tribe; and

WHEREAS, water sustains all life, and the protection of clean water is our sacred responsibility as Anishinabe people; and

WHEREAS, manomin, or wild rice, is also sacred to Anishinabe people, and because all waters are interconnected, even subtle changes in water quality or levels can profoundly harm the health of manomin, which is a trust resource with federal protections; and

WHEREAS, private companies are proposing and planning several oil and gas pipeline and other large infrastructure projects that would cross lands and waters where Tribal members gather wild rice and natural resources, and where Tribal cultural resources are located; and

WHEREAS, construction of such large infrastructure poses a threat to waters, natural resources and cultural resources from disturbance during construction and permanent destruction by project activities; and

WHEREAS, oil pipelines in particular pose a unique threat to Ojibwe in Minnesota where those pipelines cross over, under or through waters, wetlands and ecosystems on which Ojibwe depend for wild rice, fish, game, and other culturally-important natural resources; and

WHEREAS, impacts to natural and cultural resources from large-diameter pipeline construction include streambank degradation, increased sedimentation of waters, long-term wetland disruption, and destruction of fish and wildlife habitat corridors through permanent vegetation removal; and

WHEREAS, wild rice is particularly sensitive to changes in water levels, water quality, increased sedimentation, and pollutants; and

WHEREAS, pipeline proponents deliberately select new pipeline routes with the intent of avoiding all possible environmental review of pipeline projects; and

WHEREAS, as a result, routes for pipelines and other large infrastructure projects frequently avoid passing through Indian reservations and Tribal trust lands but still pass through treaty-ceded territories and tribal aboriginal lands where Tribal members hunt, fish, and gather, and where Tribal cultural resources are located; and

WHEREAS, Enbridge's proposed Line 3 Replacement Project will, if constructed, carry Canadian tar sands oil via 36-inch diameter pipeline through pristine wild rice lakes, waters, rivers and interconnected aquifers of Minnesota including the headwaters of the Mississippi and two other major North American watersheds; and

WHEREAS, many of those wild rice waters, rivers, lakes and aquifers are interconnected downstream and upstream with ecosystems which are the primary sources of natural resources important to Tribal members; and

WHEREAS, many of those interconnected waters flow through Ojibwe treaty-ceded territories and aboriginal lands where Tribal members exercise reserved hunting, fishing and gathering rights and where cultural resources are located, or through Tribal trust lands and Reservations; and

WHEREAS, the Line 3 Replacement Project proposed route fastidiously avoids actually crossing any Indian Reservations or Tribal trust lands yet will still impact important natural and cultural resources; and

WHEREAS, the significance of treaty rights and treaty resources in Minnesota has been acknowledged in judicial decisions that have addressed those rights both on and off reservations; and

WHEREAS, current federal law and state law governing permitting of oil pipelines places greater emphasis on meeting the needs of the pipeline proponent than ensuring that natural resources, cultural resources, and Tribal rights, interests and resources are considered and protected; and

WHEREAS, current Army Corps of Engineers tribal consultation policy requires consultation with tribes on activities that occur within a tribe's aboriginal lands, regardless of land status; and

WHEREAS, the Army Corps of Engineers has looked to guidelines drafted in 1997 (Attached as Exhibit A) when ascertaining its trust responsibilities to Indian tribes and since that time there have been developments in the law both generally and specifically with respect to treaties with Minnesota tribes; and

NOW THEREFORE BE IT RESOLVED that the Tribal Executive Committee hereby requests that the U.S. Army Corps of Engineers initiate early and robust tribal consultation for any infrastructure projects proposed to be located within Ojibwe aboriginal lands, regardless of land status or reservation status; and

BE IT FURTHER RESOLVED that the Tribal Executive Committee hereby requests that such tribal consultations be initiated at the earliest stages of project proposal to allow tribes to identify tribal natural and cultural resources that may be impacted; and

BE IT FURTHER RESOLVED that the Tribal Executive Committee hereby requests that the U.S. Army Corps of Engineers work with Ojibwe tribes in Minnesota and Wisconsin to develop new Clean Water Act Section 404 permitting processes for wild rice waters in recognition of the special impacts created to wild rice resources by activities covered under Section 404; and

BE IT FURTHER RESOLVED that the Tribal Executive Committee hereby requests that the U.S. Army Corps of Engineers seek all necessary authority to condition Section 404 permit approval over infrastructure projects occurring within tribal aboriginal lands with serious potential impacts to tribal cultural and natural resources on receipt of the informed consent of the impacted tribes; and

BE IT FINALLY RESOLVED that the Tribal Executive Committee hereby requests that the U.S. Army Corps of Engineers: (1) consult with the Minnesota Chippewa Tribe and its constituent Bands to update the guidelines (Exhibit A); (2) make a firm unequivocal commitment that it will follow those guidelines and fulfill its trust obligations to Indian tribes; and (3) enter into agreements with the MCT or a constituent Band to establish protocols for tribal input and consultation on proposed actions impacting tribal cultural and natural resources.

We do hereby certify that the foregoing Resolution was duly presented and acted upon by a vote of 9 For, 1 Against (Dennis Morrison), 0 Silent, at a Special Meeting of the Minnesota Chippewa Tribal Executive Committee, a quorum present, held on November 30, 2016 via electronic polling, Cass Lake, Minnesota.

Kevin R. Dupuis, President
THE MINNESOTA CHIPPEWA TRIBE

Melanie Benjamin, Secretary
THE MINNESOTA CHIPPEWA TRIBE

EXECUTIVE COMMITTEE

PRESIDENT
Brian Cladoosby
Swinomish Tribe

FIRST VICE-PRESIDENT
Randy Noka
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Jerry Isaac
Native Village of Tanacross

EASTERN OKLAHOMA
S. Joe Crittenden
Cherokee Nation

GREAT PLAINS
Leander McDonald
Spirit Lake Nation

MIDWEST
Roger Rader
Pokagon band of Potawatomi

NORTHEAST
Lance Gumbs
Shinnecock Indian Nation

NORTHWEST
Fawn Sharp
Quinault Indian Nation

PACIFIC
Rosemary Morillo
Soboba Band of Luiseno Indians

ROCKY MOUNTAIN
Ivan Posey
Shoshone Tribe

SOUTHEAST
Ron Richardson
Haliwa-Saponi Indian Tribe

SOUTHERN PLAINS
Stephen Smith
Kiowa Tribe

SOUTHWEST
Manuel Heart
Ute Mountain Ute Tribe

WESTERN
Len George
Fallon Paiute Shoshone Tribe

EXECUTIVE DIRECTOR
Jacqueline Johnson Pata
Tlingit

NCAI HEADQUARTERS
1516 P Street, N.W.
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202.466.7767
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The National Congress of American Indians
Resolution #MSP-15-040

TITLE: Calling for Environmental Justice and a Full Environmental Impact Statement on Enbridge Energy's Proposed Tar-Sands Oil Pipeline Across Treaty-Ceded Territory in Minnesota

WHEREAS, we, the members of the National Congress of American Indians of the United States, invoking the divine blessing of the Creator upon our efforts and purposes, in order to preserve for ourselves and our descendants the inherent sovereign rights of our Indian nations, rights secured under Indian treaties and agreements with the United States, and all other rights and benefits to which we are entitled under the laws and Constitution of the United States, to enlighten the public toward a better understanding of the Indian people, to preserve Indian cultural values, and otherwise promote the health, safety and welfare of the Indian people, do hereby establish and submit the following resolution; and

WHEREAS, the National Congress of American Indians (NCAI) was established in 1944 and is the oldest and largest national organization of American Indian and Alaska Native tribal governments; and

WHEREAS, Manoomin, or Wild Rice, is a sacred food to the Anishinaabe of tremendous spiritual and cultural importance, a federally-protected tribal resource, and tribal harvesters in Minnesota are the largest producers of hand-harvested wild rice in the United States; and

WHEREAS, tribal governments throughout Minnesota and Wisconsin have significant concerns that the development of, and any release from, Enbridge Corporation's Sandpiper oil pipeline along its proposed route would have devastating impacts on unique spiritual and cultural resources, as the proposed pipeline route will cross directly through the most sensitive wild-rice producing lakes and rivers within the treaty-ceded territories in Minnesota; and

WHEREAS, over tribal objections, the Minnesota Public Utilities Commission (MPUC) rescheduled its determination meeting to a date two weeks earlier than the notice provided to tribes, and no testimony from the tribes' own hearings could be entered into the MPUC record; and

WHEREAS, the MPUC issued a project determination of need approval on June 5, 2015, without any tribal consultation, consideration of testimony, investigation of impacts to tribal resources, or environmental justice issues—raising the concern that future approvals will issue in a similarly perfunctory manner; and

WHEREAS, Enbridge has begun initial consultation with the U.S. Army Corps of Engineers regarding Section 404 Permits for the project, and the U.S. Environmental Protection Agency (EPA) will perform, at least, a consulting role under Section 106 of the National Historic Preservation Act and oversight on the Army Corps' environmental impact statement, pursuant to Section 309 of the Clean Air Act.

NOW THEREFORE BE IT RESOLVED, that the NCAI calls upon EPA to engage with the Army Corps immediately to stress concerns and advocate for the most thorough environmental review possible, including respect of tribal resources and environmental justice issues; and

BE IT FURTHER RESOLVED, that EPA must assist the appropriate Bands of Chippewa/Ojibwe to become designated as "cooperating agencies" during NEPA review; and

BE IT FURTHER RESOLVED, that EPA urge that a joint Federal-State Environmental Impact Statement be undertaken to enhance coordination around novel and complex tribal resource and environmental issues; and

BE IT FURTHER RESOLVED, that NCAI requests that EPA investigate whether the pipeline requires other federal environmental permits that fall within the agency's direct jurisdiction; require a jurisdictional determination be made by Army Corps; designate a high-level EPA official as a liaison to tribal governments on all aspects of the Sandpiper project; and meet with the affected tribes and bands following issuance of the recommendations from the June 5, 2015, hearing on the Sandpiper pipeline; and

BE IT FINALLY RESOLVED, that this resolution shall be the policy of NCAI until it is withdrawn or modified by subsequent resolution.

CERTIFICATION

The foregoing resolution was adopted by the General Assembly at the 2015 Midyear Session of the National Congress of American Indians, held at the St. Paul River Centre, St. Paul, MN, June 28 to July 1, 2015, with a quorum present.

Brian Cladoosby

Brian Cladoosby, President

ATTEST:

Aaron A. Payment

Aaron Payment, Recording Secretary

RED LAKE BAND
f CHIPPEWA INDIANS
RED LAKE NATION HEADQUARTERS

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DON R. COOK, SR., Secretary
ANNETTE JOHNSON, Treasurer

DISTRICT REPRESENTATIVES:
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GLENDA J. MARTIN
JULIUS "TOADY" THUNDER
ALLEN PEMBERTON
ROMAN "DUCKER" STATELY
ROBERT "BOB" SMITH
RICHARD BARRETT, SR.
ROBERT "CHARLIE" REYNOLDS

ADVISORY COUNCIL:
7 HEREDITARY CHIEFS

RESOLUTION NO. 64-17

Upon a motion by Representative Smith and second by Secretary Cook, the following was enacted:

WHEREAS, the Tribal Council is the duly elected governing body of the Red Lake Band of Chippewa Indians pursuant to Article IV, Section 1 of the Revised Constitution and Bylaws of the Red Lake Band of Chippewa Indians; and

WHEREAS, pursuant to Article VII, Section 2 of the Revised Constitution and Bylaws, the Tribal Council is authorized to manage and otherwise deal with tribal lands, including impacts to tribal lands in the diminished Red Lake Reservation, as well as in the lands ceded to the United States through the Treaties of 1863 and 1889; and

WHEREAS, Enbridge Energy Resources, LLC (Enbridge) seeks to locate a crude oil pipeline, known as the Line 3 project, in locations that cross many sensitive land and wetland landscapes in Minnesota, including the lands ceded through the Treaties of 1863 and 1889; and

WHEREAS, Enbridge describes the Line 3 project as a "replacement", but we find the Company's reference to be a clear misnomer that downplays what the project really consists of: relocation of a pipeline to another more damaging route, enlargement of pipeline capacity by approximately 12 percent, transporting new product including tar sand oil, and the abandonment in place of the existing pipeline. Accordingly, we find that the project should more accurately be termed the "Line 3 Enlargement, Relocation and Abandonment Project"; and

WHEREAS, as an initial matter Enbridge must establish that there is a "need" for their proposed large energy project, and the Tribal Council finds that the analysis of the need for the Line 3 pipeline must consider the current capacity of the "Enbridge Mainline" which consists of the following pipelines and capacities:

-Line 1	237,000 barrels per day
-Line 2B	442,000 barrels per day
-Line 3	390,000 barrels per day (proposed increase to 760,000 barrels per day)
-Line 5	540,000 barrels per day
-Line 13	180,000 barrels per day
-Line 67	800,000 barrels per day

2,589,000 barrels per day = Existing capacity of Enbridge's Mainline

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WHEREAS, the Tribal Council finds that the company's existing capacity to transport crude oil through our homeland does not justify the increased risks to the human and natural environment posed by the additional capacity proposed Line 3 project; and the Tribal Council strongly urges the Minnesota Public Utilities Commission (PUC) to conclude that there is no need for the Line 3 project, and deny the company a certificate of need; and

WHEREAS, because the Line 3 project is proposed to be located on a new route south of Clearbrook, Minnesota; and because the new pipeline is proposed to partially follow existing corridors, it is therefore clearly time for the Minnesota PUC and other federal and state agencies to address the cumulative environmental impact of these energy corridors, including the cumulative impact of oil release risk and consequences to sensitive water, wetland and other natural resources; as well as the additional impacts of pipeline abandonment; and

WHEREAS, the proposed new pipeline is projected to carry large amounts of toxic and profoundly damaging oil products, including tar sand oil from northern Alberta, Canada, the variety of crude oil that damaged more than 35 miles of the Kalamazoo River in Michigan in 2010 when another Enbridge pipeline ruptured; and

WHEREAS, there are other possible routes that have been proposed for the Line 3 project that do not cross wetland and water landscapes, and other environmentally sensitive and pristine areas; and the Tribal Council finds that these alternative routes should be fully explored, including an analysis of the risks and consequences of a crude oil spill in each of the alternative routes in addition to the company's preferred route; and

WHEREAS, because Enbridge has previously provided testimony before the Minnesota PUC that the market for the crude oil products to be carried by the proposed Line 3 pipeline is primarily in the Chicago vicinity, and that the proposed route as a general matter follows old pipeline routes established before environmental laws were enacted, the Tribal Council therefore finds that the "preferred route" is merely for the convenience of this private Canadian pipeline company; and

WHEREAS, the Tribal Council has determined that is essential for each federal and state agency having review and permit authority over the Line 3 pipeline firmly commit to conduct a scientifically sound and thorough assessment of the risks and consequences of leaks and ruptures of the proposed pipelines (including pipeline abandonment) over the more than 50 year project life in a manner that properly compares the company's proposed route, which crosses sensitive and pristine landscapes, with those alternative routes that do not cross such landscapes; and

WHEREAS, decisions concerning the location and abandonment of pipelines, as well as the protection of waters, wetlands and other important natural resources, cannot be rationally considered without a thorough understanding of the risk of oil releases and the consequences of such releases; and

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ADVISORY COUNCIL:
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WHEREAS, generally accepted technical considerations involved in a responsible environmental analysis must be implemented with respect to Enbridge's proposed project, which entirely support our demand that the risk of oil releases and the consequences of such releases **must be** thoroughly understood; **and must be** understood in the context of route comparisons which include routes that do not cross sensitive water-rich environments; and

WHEREAS, in addition to the aforementioned environmental concerns, the Red Lake Band has also identified cultural resource concerns for Line 3 that could result in impacts to archaeological and traditional cultural properties that are eligible for listing on the National Register of Historic Places; and

WHEREAS, due to the manner in which the US Army Corps of Engineers interprets its mandate for carrying forth its agency responsibilities for compliance with the National Historic Preservation Act (NHPA) and its regulations set forth in 36 CFR 800.4, the Red Lake Band finds that the process for identification, evaluation, assessment of effects, and treatment of cultural resources cannot be seen as adequate to protect resources of importance to the Band or other Indian tribes; and

WHEREAS, this interpretation by the US Army Corps is too limited in scope, ignores vital upland areas, and ignores repeated requests by Indian tribes to broaden its scope or, if this is not possible, to relinquish its status as lead agency from purposes of NHPA oversight to another Federal agency who can provide a more comprehensive review of the entire Line 3 project that will ensure that tribal concerns are more thoroughly considered;

NOW THEREFORE BE IT RESOLVED, that the Tribal Council hereby makes clear that it strenuously opposes Enbridge's present Line 3 proposal, and also strenuously opposes any other pipeline project; and

BE IT FURTHER RESOLVED, that considering the staggering capacity that Enbridge currently has to transport crude oil through the "Enbridge Mainline", the Tribal Council strongly urges the Minnesota Department of Commerce to conclude through the agency's present Environmental Impact Statement (EIS) that there is no need for the Line 3 pipeline; and

BE IT FURTHER RESOLVED, that the Tribal Council concludes that a risk assessment and analysis of consequences of Enbridge's proposed project should be completed as a component of the EIS now in process with respect to the Line 3 proposal; and

BE IT FURTHER RESOLVED, that such EIS must be at least of the type and quality as the federal EIS that was completed with respect to the Keystone XL pipeline; and

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ADVISORY COUNCIL:
11 HEREDITARY CHIEFS

BE IT FURTHER RESOLVED, that such studies must be developed in consultation with the Red Lake Nation and other Anishinaabe of Minnesota, and must specifically develop techniques and methods to determine the potential impacts to the loss and damage to the cultural, religious and historic significance of the environment to the Anishinaabe people; and that such methods and techniques **by necessity** have the ability to specifically address extremely sensitive and important site-specific wetlands and watersheds, where oil releases at proposed water crossings could rapidly enter the wetlands with catastrophic results; and

BE IT FURTHER RESOLVED, that because pipeline failure can occur on new pipelines; can occur from failure of modern pipeline monitoring systems; and will likely occur over the more than 50 year project life of the proposed Line 3 pipeline, the Tribal Council is very concerned that the decision whether to locate this pipeline through pristine and sensitive waters and wetlands will not receive the proper degree of analysis, and the Tribal Council thus demands the most careful attention from unbiased, objective experts; and

BE IT FURTHER RESOLVED, that such studies be accomplished prior to any permits being granted for the Line 3 Relocation/Enlargement project; and that such studies be accomplished for alternative routes selected without regard to Enbridge's contracts with shippers or its present system of pipeline configurations; and

BE IT FINALLY RESOLVED, that the Tribal Council hereby requests that in addition to the Minnesota Department of Commerce, which is conducting the present EIS with respect to the Line 3 proposal, that the Bureau of Indian Affairs, other agencies of the Department of Interior, the Army Corps of Engineers, the Environmental Protection Agency, as well as the Anishinaabe tribes of Minnesota and Wisconsin also participate in such risk and consequence analyses prior to granting any permits.

FOR: 10

AGAINST: 0

We do hereby certify that the foregoing resolution was duly presented and acted upon at the Regular Meeting of the Tribal Council held on Tuesday, April 11, 2017, with a quorum present, at the Red Lake Nation Headquarters, Red Lake.

DARRELL G. SEKI, SR., CHAIRMAN ANNETTE JOHNSON, SECRETARY PROTEM

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RED LAKE NATION HEADQUARTERS

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ADVISORY COUNCIL:
7 HEREDITARY CHIEFS

RESOLUTION NO. 257-16

Upon a motion by Treasurer Johnson and second by Representative Reynolds, the following was enacted:

WHEREAS, the Red Lake Tribal Council is the governing body of the Red Lake Band of Chippewa Indians, a federally recognized Indian Tribe; and

WHEREAS, pursuant to the Constitution and Bylaws of the Red Lake Band the Red Lake Tribal Council is entrusted with the responsibility to protect the human and natural environment throughout the diminished Reservation and the ceded territories; and

WHEREAS, chief among the Tribal Council's responsibility is the protection of water, which sustains all life, and the protection of clean water is our sacred responsibility as Anishinabe people; and

WHEREAS, manoomin, or wild rice, is also sacred to Anishinabe people, and because all waters are interconnected, even subtle changes in water quality or levels can profoundly harm the health of manoomin, which is a trust resource with federal protections; and

WHEREAS, private companies, including Enbridge are proposing and planning multiple oil and gas pipeline and other large infrastructure projects that would cross lands and waters where Tribal members gather wild rice and other natural resources, and where Tribal cultural resources are located; and

WHEREAS, construction of such large infrastructure poses a threat to waters, natural resources and cultural resources from disturbance during construction and permanent destruction by project activities; and

WHEREAS, oil pipelines in particular pose a unique threat to the Red Lake Nation where those pipelines cross over, under or through waters, wetlands and ecosystems on which tribal members depend for wild rice, fish, game, and other culturally-important natural resources; and

WHEREAS, impacts to natural and cultural resources from large-diameter pipeline construction include streambank degradation, increased sedimentation of waters, long-term wetland disruption, and destruction of fish and wildlife habitat corridors through permanent vegetation removal; and

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WHEREAS, wild rice is particularly sensitive to changes in water levels, water quality, increased sedimentation, and pollutants; and

WHEREAS, pipeline proponents deliberately select new pipeline routes with the intent of avoiding all possible environmental review of pipeline projects; and

WHEREAS, as a result, routes for pipelines and other large infrastructure projects frequently avoid passing through Indian reservations and Tribal trust lands but still pass through treaty-ceded territories and tribal aboriginal lands where Tribal members hunt, fish, and gather, and where Tribal cultural resources are located; and

WHEREAS, Enbridge's proposed Line 3 Replacement Project will, if constructed, carry Canadian tar sands oil through a 36-inch diameter pipeline through pristine wild rice lakes, waters, rivers and interconnected aquifers located in the Red Lake Nation's ceded territory, as well as the headwaters of the Mississippi and two other major North American watersheds;

WHEREAS, many of those wild rice waters, rivers, lakes and aquifers are interconnected downstream and upstream with ecosystems which are the primary sources of natural resources important to Tribal members; and

WHEREAS, many of those interconnected waters flow through Red Lake treaty-ceded territories and aboriginal lands where Tribal members exercise reserved hunting, fishing and gathering rights and where cultural resources are located, or through Tribal trust lands, as well as the diminished Red Lake Reservation; and

WHEREAS, the Line 3 Replacement Project proposed route fastidiously avoids actually crossing any Indian Reservations or Tribal trust lands, yet will still impact important natural and cultural resources ; and

WHEREAS, the significance of treaty rights and treaty resources in Minnesota has been acknowledged in judicial decisions that have addressed those rights both on and off reservations; and

WHEREAS, current federal law and state law pertaining to the permitting of oil pipelines places greater emphasis on meeting the needs of the pipeline proponent than ensuring that natural resources, cultural resources, and Tribal rights, interests and resources are considered and protected; and

WHEREAS, current Army Corps of Engineers tribal consultation policy requires consultation with tribes on activities that occur within a tribe's aboriginal lands, regardless of land status; and

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WHEREAS, the Army Corps of Engineers has looked to guidelines drafted in 1997 (Attached as Exhibit A) when ascertaining its trust responsibilities to Indian tribes and since that time there have been developments in the law both generally and specifically with respect to treaties with Minnesota tribes; and

NOW THEREFORE BE IT RESOLVED that the Tribal Council hereby requests that the U.S. Army Corps of Engineers initiate early and robust tribal consultation for any infrastructure projects proposed to be located within Red Lake aboriginal lands, regardless of land status or reservation status;

BE IT FURTHER RESOLVED that the Tribal Council hereby requests that such tribal consultations be initiated at the earliest stages of project proposal to allow tribes to identify tribal natural and cultural resources that may be impacted;

BE IT FURTHER RESOLVED that the Tribal Council hereby requests that the U.S. Army Corps of Engineers work with the Red Lake Nation and other Ojibwe tribes in Minnesota and Wisconsin to develop new Clean Water Act Section 404 permitting processes for wild rice waters in recognition of the special impacts created to wild resources by activities covered under Section 404;

BE IT FURTHER RESOLVED that the Tribal Council hereby requests that the U.S. Army Corps of Engineers seek all necessary authority to condition Section 404 permit approval over infrastructure projects occurring within tribal aboriginal lands with serious potential impacts to tribal cultural and natural resources on receipt of the informed consent of the impacted tribes; and

BE IT FINALLY RESOLVED that the Tribal Council hereby requests that the U.S. Army Corps of Engineers: (1) consult with the Red Lake Nation to update the guidelines (Exhibit A); (2) make a firm, unequivocal commitment that it will follow those guidelines and fulfill its trust obligations to Indian tribes; and (3) enter into an agreement with the Red Lake Nation to establish protocols for tribal input and consultation on proposed actions impacting tribal cultural and natural resources.

FOR : 9
AGAINST: 0

We do hereby certify that the foregoing resolution was duly presented and enacted upon at a Special Meeting of the Tribal Council held on November 30, 2016, with a quorum present, at the Red Lake Nation Headquarters, Red Lake.

DARRELL G. SEKI, SR., CHAIRMAN DONALD R. COOK, SR., SECRETARY

WHITE EARTH RESERVATION TRIBAL COUNCIL
A/K/A WHITE EARTH BUSINESS COMMITTEE
WHITE EARTH BAND OF CHIPPEWA INDIANS

Resolution No. 001-14-012

WHEREAS, the White Earth Reservation Tribal Council is the duly elected governing body of the White Earth Reservation pursuant to Article IV, Section 1, of the revised constitution of the Minnesota Chippewa Tribe, as amended, and organized under Section 16, of the Act of June 18, 1934 (48 Stat. 984), and

WHEREAS, the White Earth Reservation Tribal Council, also known as the White Earth Reservation Business Committee, is the duly authorized governing body of the White Earth Band, and

WHEREAS, the White Earth Reservation Tribal Council, as the duly elected governing body of the White Earth Reservation has the power under the constitution and by-laws to promulgate resolutions governing the conduct of business on the Reservation; as well as conduct taking place within or having a direct impact upon the 1855 Treaty Ceded territory, and

WHEREAS, the White Earth Reservation Tribal Council has reviewed the application filed by North Dakota Pipeline Company LLC with the Minnesota Public Utilities Commission ("PUC") with respect to a routing permit for a petroleum pipeline between Tioga, North Dakota and Superior, Wisconsin, and

WHEREAS, the White Earth Tribal Government and staff have been active in work to protect the environment for our present Tribal members and for our future generations through the approval and implementation of a body of tribal laws and regulations, and

WHEREAS, the White Earth Reservation Tribal Council is concerned about the potential impact to lands, wetlands and waters if a leak or rupture of North Dakota Pipeline Company's pipeline were to occur near the White Earth Reservation or in the 1855 Treaty Ceded territory, and

WHEREAS, the White Earth Reservation Tribal Council is mandated to take steps to protect tribal members; and to protect habitat for animals, plants and especially wild rice from the devastating potential effects of a pipeline leak or rupture, and

WHEREAS, the White Earth Reservation Tribal Council has not been provided with any assurances by the North Dakota Pipeline Company or any other party that additional pipelines for the transportation of crude oil, tar sands and diluents will be any safer than the current pipelines which have leaked and ruptured on countless occasions, now

THEREFORE BE IT RESOLVED, that the White Earth Reservation Tribal Council hereby declares that it is opposed to the application filed by the North Dakota Pipeline Company with the Minnesota PUC with respect to a routing permit for the Sandpiper petroleum pipeline between Tioga, North Dakota and Superior, Wisconsin, and

BE IT FURTHER RESOLVED, that the White Earth Reservation Tribal Council hereby directs Tribal environmental and legal staff to formally intervene in the proceedings now pending before the Minnesota PUC involving the North Dakota Pipeline Company's application for a routing permit for the purpose of informing the PUC of the White Earth Nation's opposition to the grant of such permits, now

BE IT FINALLY RESOLVED, that the White Earth Reservation Tribal Council further directs Tribal environmental and legal staff to document the potential harmful impacts to the White Earth Nation, its people, its natural environment, its water, both within the boundaries of the White Earth Reservation and in the 1855 Treaty Ceded territory.

We do hereby certify that the foregoing resolution was adopted by a vote of 3 for, 0 against, 0 silent, a quorum being present at a special meeting of the White Earth Reservation Tribal Council held on February 13, 2014 in Mahnomen, Minnesota.

Erma J. Vizenor, Chairwoman

Robert J. Durant, Secretary/Treasurer

Field Archeology Act

138.40 COOPERATION OF STATE AGENCIES; DEVELOPMENT PLANS.

Subdivision 1.**Cooperation.**

The Department of Natural Resources, the Department of Transportation, and all other state agencies whose activities may be affected, shall cooperate with the historical society and the state archaeologist to carry out the provisions of sections 138.31 to 138.42 and the rules issued thereunder, but sections 138.31 to 138.42 are not meant to burden persons who wish to use state property for recreational and other lawful purposes or to unnecessarily restrict the use of state property.

Subd. 2.**Compliance, enforcement, preservation.**

State and other governmental agencies shall comply with and aid in the enforcement of provisions of sections 138.31 to 138.42. Conservation officers and other enforcement officers of the Department of Natural Resources shall enforce the provisions of sections 138.31 to138.42 and report violations to the director of the society. When archaeological or historic sites are known or, based on scientific investigations are predicted to exist on public lands or waters, the agency or department controlling said lands or waters shall use the professional services of archaeologists from the University of Minnesota, Minnesota Historical Society, or other qualified professional archaeologists, to preserve these sites. In the event that archaeological excavation is required to protect or preserve these sites, state and other governmental agencies may use their funds for such activities.

Subd. 3.**Review of plans.**

When significant archaeological or historic sites are known or, based on scientific investigations, are predicted to exist on public lands or waters, the agency or department controlling said lands or waters shall submit construction or development plans to the state archaeologist and the director of the society for review prior to the time bids are advertised. The state archaeologist and the society shall promptly review such plans and within 30 days of receiving the plans shall make recommendations for the preservation of archaeological or historic sites which may be endangered by construction or development activities. When archaeological or historic sites are related to Indian history or religion, the state archaeologist shall submit the plans to the Indian Affairs Council for the council's review and recommend action.

Minnesota Department of Commerce Minnesota Tribal Nations Consultation Policy

I. Introduction

A unique government-to-government relationship exists between the 11 Federally-recognized Minnesota Tribal Nations, the State of Minnesota, and the federal government. The U.S. Constitution, numerous treaties, statutes, federal case law, regulations, Executive Orders, as well as political, legal, moral, and ethical principles legally recognize the inherent self-governance and self-determination rights of Indian Tribes. On August 8, 2013, Governor Mark Dayton issued Executive Order 13-10 (EO 13-10) affirming this unique and legally established relationship between the State of Minnesota and Minnesota Tribal Nations and requiring certain Cabinet–level agencies to implement a Tribal Consultation Policy.

II. Policy Statement

2.1 The Minnesota Department of Commerce ("Commerce") recognizes Minnesota Tribal Nations ("MTNs") as sovereign entities, not political subdivisions of States or other governmental units, with the inherent authority and responsibility for self-governance.

2.2 In accordance with best practices and in support of EO 13-10, Commerce is implementing the following policy ("Policy") to create an accountable, mutual, and intentional consultation process that encourages and promotes dialogue between MTNs and Commerce when input and guidance is necessary because Commerce's proposed actions and/or policies may implicate or affect the interests of MTNs.

2.3 Commerce will encourage cooperation between tribal, federal, state, and local governments to resolve issues of mutual concern.

2.4 Commerce will intentionally and proactively identify and consider when its actions and/or decisions may affect Tribal Interests and facilitate informed decision-making with the ultimate goal of reaching consensus on any proposed actions and/or decisions.

III. Definitions

3.1 **"Commerce" –** is the agency, Agency Leadership, staff and/or designated officials including directors, managers, supervisors, and technical staff responsible for supporting and implementing this policy.

3.2 **"Consultation**" – is the process of meaningful communication and coordination between Commerce and Tribal officials prior to Commerce taking actions or implementing decisions that may directly affect Tribal Interests. Consultation emphasizes trust, respect, and shared responsibility. It is an open and free exchange of information and opinions among parties, which leads to mutual understanding and comprehension.

3.3 **"Coordination" –** is the process by which each party:

- Shares and compares, in a timely manner, its plans, programs, projects and schedules with the related plans, programs, projects, and schedules of the other parties; and
- Adjusts its plans, programs, projects, and schedules to optimize the efficient and consistent delivery of Commerce-related projects and services.

3.4 **"Effective Date"—** the effective date of this Policy is the date of execution. The Policy will remain in effect until it is amended, superseded by a Commerce Administrative Order, or revoked.

3.5 **"Minnesota Tribal Nations" (MTNs) –** Minnesota's 11 Federally-recognized Tribes: Bois Forte Band of Ojibwe; Fond Du Lac Band of Lake Superior Chippewa; Grand Portage Band of Chippewa Indians; Leech Lake Band of Ojibwe; Lower Sioux Indian Community; Mille Lacs Band of Ojibwe; Prairie Island Indian Community; Red Lake Nation; Shakopee Mdewakanton Sioux Community; Upper Sioux Indian Community; and the White Earth Nation.

3.6 **"Tribal Interests" –** shall include the health and well-being of Tribe members; Tribal sovereignty and other legal rights of Tribes and Tribe members; Tribal lands and property; and policies, issues, and events that MTNs have communicated, through the consultation process established in this Policy to Commerce as being significant to Tribes.

IV. Implementation

4.1 **Identification of Required Consultation.** The analysis, planning, and implementation of Consultation should take into account all aspects of the action under consideration, including but not limited to, the complexity, implications, and resource constraints of the activity.

4.2 **Timing.** Commerce will consult with MTNs prior to the agency taking action or implementing decisions that may directly affect Tribal Interests about whether, how, or

when to act on a matter under consideration. Consultation is required on an ongoing basis, including any additions or amendments that occur later in the process.

4.3 **Notification.** Consultation may be initiated by written notification or other method either by Commerce or any of the MTNs. Commerce's notification will be from the Commissioner, addressed to a Tribal Chairperson and the highest ranking applicable Executive Administrator, or Tribal Council officer and should include sufficient information for the MTN to make informed decisions about participation.

4.4.1 **Presence of Third-Parties.** Either the MTN or Commerce may invite third-parties to participate in consultation with the agreement of the consulting parties.

4.4.2 **Record-Keeping**. An Administrative Record shall be created by Commerce, if needed, and sent to the most senior Tribal Official involved in the consultation. The MTN will review and make changes and/or comments to be incorporated into a final administrative record created by and distributed by Commerce.

4.4.3 **Input.** Either Commerce or the MTN can provide input at meetings, through written and oral exchanges of information, phone calls, or other ways depending on the specific circumstances.

V. Roles and Responsibilities

5.1.1 **Commissioner of Commerce.** In accordance with this policy, the Commissioner will engage in Consultation with the identified Tribal Leader. The Commissioner will also appoint a person from Commerce to serve as the Department Tribal Liaison.

5.1.2 **Tribal Liaison.** The Tribal Liaison is responsible for the coordination and implementation of Consultation in accordance with this Policy and has the authority to:

i. Identify and define appropriate issues for Consultation;
ii. Evaluate the adequacy of that Consultation;
iii. Ensure that Commerce program and Consultation practices are consistent with this Policy;
iv. Ensure that a formal record of the Consultation is maintained, if needed; and
v. Identify the appropriate and essential Commerce staff necessary for Consultation.

VI. Preemption

6.1 Nothing in this policy shall require Commerce to violate or ignore any laws, rules, directives or other legal requirement or obligations imposed by state or federal law, set forth in agreements or compacts between one or more of the MTNs and the State or its agencies.

6.2 Consultations are not intended to preclude or replace the existing, ongoing, and future meetings, communications, and exchanges of information and input that occur between Commerce and MTN.

6.3 If any provision of this policy conflicts with state or federal law, administrative rules, or other legal requirements or obligations, state and federal law shall control.

Responsible Manager(s):

Contact Person(s):

Related Commerce Policies:

Agency Signature:
[Signature gif/jpg of Commissioner]

Tribal Liaison Signature:

Effective date of this policy:

307.08 DAMAGES; ILLEGAL MOLESTATION OF HUMAN REMAINS; BURIALS; CEMETERIES; PENALTY; AUTHENTICATION.

Subdivision 1. **Legislative intent; scope.** It is a declaration and statement of legislative intent that all human burials, human remains, and human burial grounds shall be accorded equal treatment and respect for human dignity without reference to their ethnic origins, cultural backgrounds, or religious affiliations. The provisions of this section shall apply to all human burials, human remains, or human burial grounds found on or in all public or private lands or waters in Minnesota.

Subd. 2. **Felony; gross misdemeanor.** (a) A person who intentionally, willfully, and knowingly does any of the following is guilty of a felony:

(1) destroys, mutilates, or injures human burials or human burial grounds; or

(2) without the consent of the appropriate authority, disturbs human burial grounds or removes human remains.

(b) A person who, without the consent of the appropriate authority and the landowner, intentionally, willfully, and knowingly does any of the following is guilty of a gross misdemeanor:

(1) removes any tombstone, monument, or structure placed in any public or private cemetery or authenticated human burial ground; or

(2) removes any fence, railing, or other work erected for protection or ornament, or any tree, shrub, or plant or grave goods and artifacts within the limits of a public or private cemetery or authenticated human burial ground; or

(3) discharges any firearms upon or over the grounds of any public or private cemetery or authenticated burial ground.

Subd. 3. **Protective posting.** Upon the agreement of the appropriate authority and the landowner, an authenticated or recorded human burial ground may be posted for protective purposes every 75 feet around its perimeter with signs listing the activities prohibited by subdivision 2 and the penalty for violation of it. Posting is at the discretion of the Indian affairs council in the case of Indian burials or at the discretion of the state archaeologist in the case of non-Indian burials. This subdivision does not require posting of a burial ground. The size, description, location, and information on the signs used for protective posting must be approved by the appropriate authority and the landowner.

Subd. 3a. **Authentication.** The state archaeologist shall authenticate all burial grounds for purposes of this section. The state archaeologist may retain the services of a qualified professional archaeologist, a qualified physical anthropologist, or other appropriate experts for the purpose of gathering information that the state archaeologist can use to authenticate or identify burial grounds. If probable Indian burial grounds are to be disturbed or probable Indian remains analyzed, the Indian Affairs Council must approve the professional archaeologist, qualified anthropologist, or other appropriate expert. Authentication is at the discretion of the state archaeologist based on the needs identified in this section or upon request by an agency, a landowner, or other appropriate authority.

Subd. 4. [Repealed by amendment, 2007 c 115 s 1]

Subd. 5. **Cost; use of data.** The cost of authentication, recording, surveying, and marking burial grounds and the cost of identification, analysis, rescue, and reburial of human remains on public lands or waters shall be the responsibility of the state or political subdivision controlling the lands or waters. On private lands or

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waters these costs shall be borne by the state, but may be borne by the landowner upon mutual agreement with the state. The state archaeologist must make the data collected for this activity available using standards adopted by the Office of MN.IT Services and geospatial technology standards and guidelines published by the Minnesota Geospatial Information Office. Costs associated with this data delivery must be borne by the state.

Subd. 6. [Repealed by amendment, 2007 c 115 s 1]

Subd. 7. **Remains found outside of recorded cemeteries.** All unidentified human remains or burials found outside of recorded cemeteries or unplatted graves or burials found within recorded cemeteries and in contexts which indicate antiquity greater than 50 years shall be dealt with according to the provisions of this section. If such burials are not Indian or their ethnic identity cannot be ascertained, as determined by the state archaeologist, they shall be dealt with in accordance with provisions established by the state archaeologist and other appropriate authority. If such burials are Indian, as determined by the state archaeologist, efforts shall be made by the state archaeologist and the Indian Affairs Council to ascertain their tribal identity. If their probable tribal identity can be determined and the remains have been removed from their original context, such remains shall be turned over to contemporary tribal leaders for disposition. If tribal identity cannot be determined, the Indian remains must be dealt with in accordance with provisions established by the state archaeologist and the Indian Affairs Council if they are from public land. If removed Indian remains are from private land they shall be dealt with in accordance with provisions established by the Indian Affairs Council. If it is deemed desirable by the state archaeologist or the Indian Affairs Council, removed remains shall be studied in a timely and respectful manner by a qualified professional archaeologist or a qualified physical anthropologist before being delivered to tribal leaders or before being reburied. Application by a landowner for permission to develop or disturb nonburial areas within authenticated or recorded burial grounds shall be made to the state archaeologist and other appropriate authority in the case of non-Indian burials and to the Indian Affairs Council and other appropriate authority in the case of Indian burials. Landowners with authenticated or suspected human burial grounds on their property are obligated to inform prospective buyers of the burial ground.

Subd. 8. **Burial ground relocation.** No non-Indian burial ground may be relocated without the consent of the appropriate authority. No Indian burial ground may be relocated unless the request to relocate is approved by the Indian Affairs Council. When a burial ground is located on public lands or waters, any burial relocations must be duly licensed under section 138.36 and the cost of removal is the responsibility of and shall be paid by the state or political subdivision controlling the lands or waters. If burial grounds are authenticated on private lands, efforts may be made by the state to purchase and protect them instead of removing them to another location.

Subd. 9. **Interagency cooperation.** The Department of Natural Resources, the Department of Transportation, and all other state agencies and local governmental units whose activities may be affected, shall cooperate with the state archaeologist and the Indian Affairs Council to carry out the provisions of this section.

Subd. 10. **Construction and development plan review.** When human burials are known or suspected to exist, on public lands or waters, the state or political subdivision controlling the lands or waters or, in the case of private lands, the landowner or developer, shall submit construction and development plans to the state archaeologist for review prior to the time bids are advertised and prior to any disturbance within the burial area. If the known or suspected burials are thought to be Indian, plans shall also be submitted to the Indian Affairs Council. The state archaeologist and the Indian Affairs Council shall review the plans within 30 days of receipt and make recommendations for the preservation in place or removal of the human burials or remains, which may be endangered by construction or development activities.

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Subd. 11. **Burial sites data.** Burial sites locational and related data maintained by the Office of the State Archaeologist and accessible through the office's "Unplatted Burial Sites and Earthworks in Minnesota" Web site are security information for purposes of section 13.37. Persons who gain access to the data maintained on the site are subject to liability under section 13.08 and the penalty established by section 13.09 if they improperly use or further disseminate the data.

Subd. 12. **Right of entry.** The state archaeologist may enter on property for the purpose of authenticating burial sites. Only after obtaining permission from the property owner or lessee, descendants of persons buried in burial grounds covered by this section may enter the burial grounds for the purpose of conducting religious or commemorative ceremonies. This right of entry must not unreasonably burden property owners or unnecessarily restrict their use of the property.

Subd. 13. **Definitions.** As used in this section, the following terms have the meanings given.

(a) "Abandoned cemetery" means a cemetery where the cemetery association has disbanded or the cemetery is neglected and contains marked graves older than 50 years.

(b) "Appropriate authority" means:

(1) the trustees when the trustees have been legally defined to administer burial grounds;

(2) the Indian Affairs Council in the case of Indian burial grounds lacking trustees;

(3) the county board in the case of abandoned cemeteries under section 306.243; and

(4) the state archaeologist in the case of non-Indian burial grounds lacking trustees or not officially defined as abandoned.

(c) "Artifacts" means natural or artificial articles, objects, implements, or other items of archaeological interest.

(d) "Authenticate" means to establish the presence of or high potential of human burials or human skeletal remains being located in a discrete area, delimit the boundaries of human burial grounds or graves, and attempt to determine the ethnic, cultural, or religious affiliation of individuals interred.

(e) "Burial" means the organic remnants of the human body that were intentionally interred as part of a mortuary process.

(f) "Burial ground" means a discrete location that is known to contain or has high potential to contain human remains based on physical evidence, historical records, or reliable informant accounts.

(g) "Cemetery" means a discrete location that is known to contain or intended to be used for the interment of human remains.

(h) "Disturb" means any activity that significantly harms the physical integrity or setting of a human burial or human burial ground.

(i) "Grave goods" means objects or artifacts directly associated with human burials or human burial grounds that were placed as part of a mortuary ritual at the time of interment.

(j) "Human remains" means the calcified portion of the human body, not including isolated teeth, or cremated remains deposited in a container or discrete feature.

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(k) "Identification" means to analyze organic materials to attempt to determine if they represent human remains and to attempt to establish the ethnic, cultural, or religious affiliations of such remains.

(l) "Marked" means a burial that has a recognizable tombstone or obvious grave marker in place or a legible sign identifying an area as a burial ground or cemetery.

(m) "Qualified physical anthropologist" means a specialist in identifying human remains who holds an advanced degree in anthropology or a closely related field.

(n) "Qualified professional archaeologist" means an archaeologist who meets the United States Secretary of the Interior's professional qualification standards in Code of Federal Regulations, title 36, part 61, appendix A, or subsequent revisions.

(o) "Recorded cemetery" means a cemetery that has a surveyed plat filed in a county recorder's office.

(p) "State" or "the state" means the state of Minnesota or an agency or official of the state acting in an official capacity.

(q) "Trustees" means the recognized representatives of the original incorporators, board of directors, or cemetery association.

History: *(7632) RL s 2964; 1976 c 48 s 1; 1980 c 457 s 1; 1983 c 282 s 1-4; 1986 c 463 s 1; 1989 c 335 art 1 s 199; 1993 c 326 art 4 s 9; 1999 c 86 art 1 s 64-67; 1Sp2003 c 8 art 2 s 17; 2007 c 115 s 1; 2010 c 392 art 1 s 14; 2013 c 134 s 30; 2013 c 142 art 3 s 36*

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STATE OF MINNESOTA

EXECUTIVE DEPARTMENT

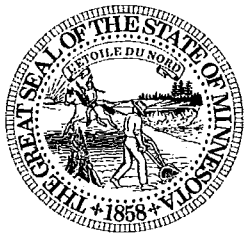

MARK DAYTON
GOVERNOR

Executive Order 13-10

Affirming the Government –to-Government Relationship between the State of Minnesota and the Minnesota Tribal Nations: Providing for Consultation, Coordination, and Cooperation; Rescinding Executive Order 03-05

I, Mark Dayton, Governor of the State of Minnesota, by virtue of the power invested in me by the Constitution and applicable statutes, do hereby issue this Executive Order:

Whereas, the United States and the State of Minnesota have a unique legal relationship with federally recognized Tribal Nations, as affirmed by the Constitution of the United States, treaties, statutes, and case law; and

Whereas, the State of Minnesota is home to 11 federally recognized Tribal Nations ("the Minnesota Tribal Nations") with elected or appointed Tribal Governments; and

Whereas, the State of Minnesota recognizes and supports the unique status of the Minnesota Tribal Nations and their right to existence, self-government, and self-determination; and

Whereas, the Minnesota Tribal Nations are comprised of a majority of the State's 61,000 American Indians and provide significant employment in the State; and

Whereas, members of the Minnesota Tribal Nations are citizens of the State of Minnesota and possess all the rights and privileges afforded by the State; and

Whereas, the State of Minnesota and the Minnesota Tribal Nations significantly benefit from working together, learning about one another, and partnering where possible; and

Whereas, meaningful and timely consultation between the State of Minnesota and the Minnesota Tribal Nations will facilitate better understanding and informed decision making by allowing for collaboration on

matters of mutual interest, and helping to establish respectful relationships between the State and the Minnesota Tribal Nations.

Now, Therefore, I hereby order that:

1. All Executive Branch agencies of the State of Minnesota shall recognize the unique legal relationship between the State of Minnesota and the Minnesota Tribal Nations, respect the fundamental principles that establish and maintain this relationship, and accord Tribal Governments the same respect accorded to other governments.

2. By March 10, 2014, the following Cabinet-level Executive Branch agencies (hereinafter "Cabinet Agency" and "Cabinet Agencies") shall, in consultation with the Minnesota Tribal Nations, develop and implement tribal consultation policies to guide their work and interaction with the Minnesota Tribal Nations: the Department of Corrections, Department of Education, Department of Health, Housing Finance Agency, Department of Human Rights, Department of Human Services, Department of Natural Resources, Pollution Control Agency, Department of Public Safety, Department of Transportation, and Department of Veterans Affairs. All other Cabinet-level Executive Branch agencies shall coordinate, as needed, with the tribal liaison in the Governor's Office to consult with the Minnesota Tribal Nations. Prior to February 1 of each year, each Cabinet Agency shall consult with each of the Minnesota Tribal Nations to identify priority issues for consultation.

3. As appropriate, and at the earliest opportunity, Cabinet Agencies shall consult with the Minnesota Tribal Nations prior to undertaking actions or policies related to the list of priority issues identified in Paragraph 2. Cabinet Agencies shall consider the input generated from tribal consultation into their decision-making processes, with the goal of achieving mutually beneficial solutions.

4. Each Cabinet Agency shall designate a staff member to assume responsibility for implementation of the tribal consultation policy and to serve as the principal point of contact for the Minnesota Tribal Nations. Each Cabinet Agency's designated staff member shall work with a representative(s) designated by the Minnesota Tribal Nations, who shall serve as the Cabinet Agency's principal point of contact.

5. All Cabinet Agencies shall provide training for designated staff who work with the Minnesota Tribal Nations in an effort to foster a collaborative relationship between the State of Minnesota and the Minnesota Tribal Nations.

Nothing in this Order shall require state agencies to violate or ignore any laws, rules, directives, or other legal requirements or obligations imposed by state or federal law, or set forth in agreements or compacts between one or more of the Minnesota Tribal Nations or any other Tribal Nation and the State or its agencies. This Order is not intended to, and does not create, any right to administrative or judicial review, or any other right or benefit or responsibility, substantive or procedural, enforceable against the State of Minnesota, its agencies or instrumentalities, its officers or employees, or its subdivisions or any other persons. Nothing in this Order prohibits or limits any state agency from asserting any rights or pursuing any administrative or judicial action under state or federal law to effectuate the interests of the State of Minnesota or any of its agencies.

If any provision in this Order conflicts with any laws, rules, or other legal requirements or obligations imposed by state or federal law, state and federal laws shall control.

Under Minnesota Statutes, section 4.035, subdivision 2, this Executive Order is effective 15 days after publication in the State Register and filing with the Secretary of State and shall remain in effect until rescinded by proper authority or it expires in accordance with Minnesota Statutes, section 4.035, subdivision 3.

In Testimony Whereof, I have set my hand on this 8th day of August, 2013.

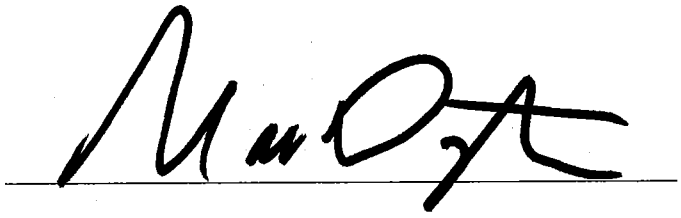

Mark Dayton
Governor

Filed According to Law:

Mark Ritchie
Secretary of State

MEMORANDUM OF UNDERSTANDING

between the

Leech Lake Reservation Tribal Council

and the

Chippewa National Forest

In a spirit of mutual respect and understanding, the Leech Lake Reservation and the Chippewa National Forest will cooperate in their roles as stewards of the lands and resources within the Leech Lake Reservation and the Chippewa National Forest.

This partnership is a new beginning for cooperative management of the natural and human resources of the Leech Lake Reservation and the Chippewa National Forest.

We recognize and acknowledge our government to government relationship and our separate authorities and responsibilities, but believe they are not a barrier to significant interaction and cooperation.

To the greatest extent possible, the Leech Lake Reservation Tribal Council and Chippewa National Forest shall seek opportunities to form partnerships in natural and human resource management and will share knowledge, discuss and resolve issues, and exchange ideas, concepts and theories about the most effective strategies for managing the natural and human resources of the Leech Lake Reservation and Chippewa National Forest for the benefit of this and future generations.

Signed on this 9th day of August, 1993.

ALFRED R. PEMBERTON
Chairman
Leech Lake Reservation Tribal Council

STEVEN T. EUBANKS
Forest Supervisor
Chippewa National Forest

Anishinabe (Ojibwe/Chippewa) Pictograph of a Bald Eagle.
The Eagle Symbolizes Courage and Vision, Attributes of Leadership.

MEMORANDUM OF UNDERSTANDING

REGARDING

TRIBAL - USDA-FOREST SERVICE RELATIONS

ON

NATIONAL FOREST LANDS

WITHIN THE TERRITORIES CEDED

IN

TREATIES OF 1836, 1837, AND 1842

PREAMBLE

The Memorandum of Understanding (MOU) deals with the relationships of sovereign and federally recognized tribes of Lake Superior Chippewa Indians and of the USDA Forest Service, an agency of the government of the United States. The MOU is based on the principle of government-to-government interactions between the United States Government and federally recognized Indian tribes. The purpose of the agreement is to establish standards by which the Forest Service and the Tribes will act consistently across national forest lands within areas ceded in the treaties of 1836, 1837, and 1842.

The policies of the Forest Service toward federally recognized tribes are intended to strengthen relationships and further tribal sovereignty through fulfilling mandated responsibilities and through support and assistance of various kinds to tribal governments. The relationships between the Tribes and Forest Service are comprised of several parts, including honoring treaty-based usufructuary rights as well as policies of the Forest Service toward Indian nations. While court decisions, laws, regulations, policies and Executive Orders from the President of the United States have all shaped the Forest Service's policy toward Indian tribes, nothing in this agreement is in any way intended to abrogate or affect in any fashion judicial decisions which have interpreted such treaty rights.

This MOU recognizes existing treaty rights of Tribes to hunt and fish and to gather wild plants on national forest lands in accord with applicable regulatory authorities of the States or other federal agencies having jurisdiction over such activities. Reference in the MOU to such

activities as hunting and fishing are designed to recognize that the Forest Service manages and provides access to ecosystems which support these activities.

I. CEDED TERRITORIES AND NATIONAL FORESTS INVOLVED (Figure 1).

A. **Ceded Territories.** This MOU specifically pertains to the territories ceded [hereafter ceded territories] by various Chippewa Tribes in the following Treaties: Treaty of 1836, 7 Stat. 491; Treaty of 1837, 7 Stat. 536; and Treaty of 1842, 7 Stat. 591.

B. **National Forests.** This MOU specifically pertains to the portions of the following National Forests [hereafter National Forests] located in the ceded territories: Chequamegon-Nicolet in Wisconsin; and Ottawa, Hiawatha and Huron-Manistee in Michigan.

II. PARTIES.

The following entities may ratify this MOU in accordance with their respective applicable laws and procedures, and, upon proper ratification, shall be deemed a party to this MOU:

A. **Tribes.** In their respective sovereign capacities, the following federally-recognized Tribes [hereafter Tribes] that are members of the Great Lakes Indian Fish and Wildlife Commission [hereafter GLIFWC]: Bad River Band of the Lake Superior Tribe of Chippewa Indians; Fond du Lac Band of Lake Superior Chippewa Indians; Lac du Flambeau Band of Lake Superior Chippewa Indians; Lac Courte Oreilles Band of Lake Superior Chippewa Indians; St. Croix Chippewa Indians of Wisconsin; Sokaogon Chippewa Community of the Mole Lake Band; Red Cliff Band of Lake Superior Chippewa Indians; Mille Lacs Band of Chippewa Indians; Bay Mills Indian Community; Keweenaw Bay Indian Community; and Lac Vieux Desert Band of Lake Superior Chippewa Indians.

B. **USDA-FS.** On behalf of the United States Department Agriculture, Forest Service [hereafter Forest Service] as an agency of the United States Government: the Forest Service's Eastern Region; the Eastern Region's Law Enforcement and Investigations; and the Forest Service's Northern Research Station.

III. GOVERNING PRINCIPLES AND FUNDAMENTAL ASSUMPTIONS.

The parties agree that the MOU is based upon the following governing principles and fundamental assumptions and that the MOU shall be interpreted in accordance with them:

A. **Existence of Ceded Territory Rights.** The parties acknowledge and recognize the Tribes' treaty-guaranteed hunting, fishing and gathering rights [hereafter ceded territory rights] that may be exercised on lands administered by the Forest

Service located within the ceded territories.

B. **Tribal Sovereignty and Self-Regulatory Capacity.** The parties acknowledge and recognize:

1. The Tribes' inherent sovereignty and retained regulatory authority regarding their ceded territory rights; and

2. The Tribes' ability to administer and implement a system of effective tribal self-regulation regarding tribal member exercise of those rights.

C. **Federal Trust Responsibility and Treaty Obligations.** The parties acknowledge and recognize that the Forest Service shares in the United States Government's trust responsibility and treaty obligations to work with the Tribes on a government-to-government basis to protect the Tribes' ceded territory rights on lands administered by the Forest Service.

D. **Forest Service's Native American Policies.** The parties acknowledge and recognize the Forest Service's American Indian and Alaska Native Relations polices as presently set forth in Forest Service Manual 1563, Forest Service Handbook 1509.13, and other directives implementing provisions of the Food, Conservation, and Energy Act of 2008, Public Law 110-246 [hereinafter the "2008 Farm Bill"], to:

1. Maintain a governmental relationship with federally-recognized tribal governments consistent with Executive Order 13175 of November 6, 2000, Consultation and Coordination with Indian Tribal Governments, the President's Memorandum of November 5, 2009, Tribal Consultation and the President's Memorandum of April 29, 1994, Government-to-Government Relations with Native American Tribal Governments;

2. Implement programs and activities in a way that honors Indian treaty rights and fulfills legally-mandated trust responsibilities to the extent they apply to National Forest System lands;

3. Administer programs and activities to address and be sensitive to traditional Native religious beliefs and practices; and

4. Provide research, transfer of technology, and technical assistance to tribal governments.

E. **Forest Service's Forest Management Responsibilities.** The parties

acknowledge and recognize that the Forest Service is the agency of the United States Government authorized and responsible for implementing law and policies related to National Forest management.

F. **Forest Service's Law Enforcement Responsibilities.** The parties acknowledge and recognize that the Forest Service's Law Enforcement and Investigations Branch is responsible for enforcement of alleged violations of federal laws and regulations occurring on lands administered by the Forest Service.

G. **General Tribal/USDA-FS Government-to-Government Relationship Unaffected.** This MOU applies to the parties' government-to-government relationship, other Tribal -Forest Service interactions, the Tribes' ceded territory rights applicable on lands administered by the Forest Service, and the parties' relationships and dealings involving those rights. It is not intended, and should not be construed, to abrogate or otherwise affect any party's authority or responsibility in other areas. Similarly, it is not intended, and should not be construed, to otherwise define or restrict the parties' obligations, relationships or dealings in other areas of their respective authorities, responsibilities, or sovereign prerogatives.

H. **Effect of MOU on Non-Ratifying Tribes.** The parties' specific intent is that this MOU shall not bind or in any way affect the rights or claims of any GLIFWC member Tribe that chooses not to become a party or of any other Tribe that is a signatory to any of the treaties identified in Section I.B., above.

I. **Reservation of Rights, Claims and Defenses.**

1. The termination of or withdrawal from this MOU shall be without resulting liability to any other party or prejudice to any claim a party may have against any other party.

2. Except as expressly provided herein, the fact that any Tribe or the Forest Service is or may have been a party to this MOU shall not be construed as a waiver of any rights, claims or defenses that, absent this MOU, any of those entities may have under any treaty between the United States and a Tribe, or under other applicable law of the United States.

3. The parties acknowledge that this MOU contains provisions that may be the result of compromise and policy choices. As such, these provisions may not reflect the full extent of the Tribes' ceded territory rights or of the Forest Service's responsibilities to manage the National Forests. Therefore, in the absence of or outside the scope of this MOU, the

provisions contained herein are not intended to alter or abridge:

a. The Tribes' underlying ceded territory rights or those rights of any other treaty signatory Tribe that is not a party to this MOU; or

b. The Forest Service's authorities to manage the National Forests in accordance with applicable law.

4. This agreement is not intended to alter usufructuary rights recognized in *Lac Courte Oreilles Band v. Voigt*, 700 F.2d 341 (7th Cir. 1983) or *Minnesota v. Mille Lacs Band*, 119 S.Ct. 1187 (1999). The MOU does not alter the authority of any government regarding the regulation of treaty rights under those decisions.

IV. **PURPOSES.** To accomplish the primary purposes of recognizing and implementing the Tribes' ceded territory rights and furthering Forest Service Native American policies, the parties intend to:

A. **Government-to-Government Relationship.** Establish a framework for a cooperative, government-to-government relationship between the Tribes and the United States Government that:

1. Ensures the meaningful exercise of the Tribes' ceded territory rights on the lands administered by the Forest Service within the ceded territories;

2. Facilitates consistent and timely communication between parties at the appropriate levels of government; and

3. Fosters effective participation by the Tribes in National Forest management, in the development, revisions and implementation of Land and Resource Management Plans [hereafter Forest Plans] and in subsequent Forest Plan implementation decisions.

B. **Exercise of Ceded Territory Rights.** Establish agreed-upon parameters under which the Tribes' ceded territory gathering rights may be exercised within the provisions of and the protections afforded by this MOU on lands administered by the Forest Service within the ceded territories.

C. **Conservation of Natural Resources.** Protect, manage and enhance ecosystems and communities that support the natural resources subject to the Tribes' ceded territory rights on lands administered by the Forest Service.

V. **RECOGNITION OF THE PARTIES' MUTUAL INTERESTS.** Underlying the purposes of and specific agreements contained in this MOU, the parties recognize a number of mutual interests that they wish to address:

A. **Tribal Self-Determination and Self-Governance.** One of the Tribes' primary goals is to achieve self-determination and self-governance through the exercise of their retained sovereign governmental authority regarding their ceded territory rights. A key Forest Service policy is to administer its programs and activities in a manner that recognizes the governments of the Tribes and the authority that they carry out on behalf of the Tribes. Therefore, the parties seek to establish a government-to-government relationship that promotes collaboration and communication in the management of the National Forests, that provides for effective tribal self-regulation of the exercise of ceded territory rights on lands administered by the Forest Service, and, as noted below, that promotes efficient and effective law enforcement.

B. **Collaborative Approach in the Management of Natural Resources.** The Tribes' ceded territory rights include the right to gather wild plants and to harvest wild animals on lands administered by the Forest Service, and the Tribes want to ensure that management of these lands protects their ability to meaningfully exercise these rights. The Forest Service is tasked with the administration of the National Forests and is the federal agency responsible for the care and management of the land and natural resources that are part of the National Forests. Therefore, the Tribes and the Forest Service seek to establish a relationship and associated processes that facilitate consistent and timely communication between them and that integrate the Tribes' needs and wishes for the desired state of the National Forests into Forest Plans and subsequent Forest Plan implementation decisions.

C. **Sustainability of Ecosystems.** Since time immemorial, the Tribes have traditionally harvested certain plants and other resources found on lands now managed as the National Forests to meet subsistence, religious, cultural, medicinal and commercial needs. The Tribes' culture and lifeway depends on this harvest activity, and they wish to protect and enhance the natural resources upon which they rely. The Tribes measure the protection of these resources in terms of ensuring their sustainability for use by the seventh generation hence. The Forest Service is the federal agency responsible for managing the National Forests for the benefit of present and future generations. In addition, the Forest Service's policy is to carry out its programs and activities in a manner that is sensitive to the Tribes' traditional practices and beliefs. Therefore, the Tribes and Forest Service seek to collaboratively promote ecosystem management that protects and restores native communities and species, furthers the diversity of species, and ensures the

sustained yield and availability of natural resources that are subject to the Tribes' ceded territory rights.

D. **Efficient and Effective Law Enforcement.** As part of their self-regulatory system, the Tribes recognize the need to provide for the enforcement and adjudication of alleged violations of tribal laws governing the exercise of the ceded territory rights. To further compliance with tribal laws and to mete out meaningful and effective penalties, they recognize that the administration of justice in this context is best accomplished within their own communities and in their own forums. The Forest Service also recognizes that justice is best served in the communities most involved and affected. Therefore, the parties seek to establish a mutually beneficial efficient and effective system for enforcing applicable laws.

E. **Consistent Ceded Territory Gathering Regulations**. The meaningful exercise of the Tribes' ceded territory rights requires a consistent, conservation-based harvest regulatory system throughout the National Forests. To avoid administrative inefficiency and the associated confusion, the Forest Service recognizes the need for a consistent gathering policy and regulatory scheme in each of the National Forests. Therefore, the parties seek to establish a ceded territory-wide policy and regulatory framework that provides for the exercise of the ceded territory rights in a consistent manner that meets conservation goals, protects the public health and safety, and promotes efficient and effective law enforcement.

F. **Implementation of the Federal Trust Responsibility.** The Tribes continually seek to have United States Government and its agencies properly discharge the federal trust responsibility to assist in the development of the Tribes' governmental capabilities and to take actions for the Tribes' benefit. The Forest Service's policy is to administer its programs and activities in a manner sensitive to the Tribes' needs, beliefs, and practices, and to provide research, transfer of technology and technical assistance to the Tribes. Therefore, the parties seek to establish a framework for collaboration, communication and information exchange that will nurture understanding and maximize mutual benefits, and that will enhance the development of the Tribes' capabilities necessary to ensure effective tribal participation in the processes and procedures established in this MOU.

VI. **SPECIFIC AGREEMENTS TO IMPLEMENT THE GOVERNMENT-TO-GOVERNMENT RELATIONSHIP**. This section sets forth the specific agreements to implement the parties' government-to-government relationship in these areas: (A) MOU administration and implementation; (B) National Forest planning and decision-

making; (C) natural resource harvest management; (D) natural resource research and monitoring; (E) law enforcement; and (F) amendment of the MOU and its Appendices.

A. MOU Administration and Implementation.

1. The parties shall strive to reach consensus in all decisions, actions and processes contemplated by the MOU.

2. Unless otherwise specifically provided in this MOU, the parties shall attempt to resolve any dispute arising under the MOU at the lowest possible level on a government-to-government basis between properly authorized representatives of the parties who have the authority to resolve the dispute in question.

3. To facilitate on-going communication and the resolution of outstanding issues, the parties:

   a. Shall meet at least annually to facilitate on-going communication, to review progress made and discuss issues arising under this MOU, to ensure that the parties are faithfully and effectively implementing this MOU and adhering to its terms, and to discuss trends, issues or other matters that may effect the MOU. The Forest Service will accept comments from interested citizens about the implementation of the MOU at any time and, prior to the annual meeting, the Forest Service will solicit public comments. The parties will consider any comments at the annual meeting and jointly approved minutes will be made available for public review.

   b. Hereby establish a Technical Working Group (hereafter TWG) whose purpose shall be to review any scientific, technical or natural resource management issue referred to it in this MOU or by subsequent agreement of the parties. The TWG is empowered to make recommendations to the parties regarding the matters referred to it, such as the development and coordination of research projects, possible harvest monitoring and regulatory responses to particular circumstances, and data/information exchange regimens. The TWG also is empowered to suggest to the parties issues that may require the parties' attention and consideration.

      The TWG will be comprised of qualified natural resource scientists, managers and researchers designated by the Forest Service and the Tribes, and should include designates from the Northern Research Station and GLIFWC. Law enforcement

personnel should participate in the TWG as necessary to address enforcement-related issues.

The Forest Service and the Tribes will each appoint a TWG co-chair to coordinate communication and planning for the group's work. The TWG may appoint one or more working subgroups to address specified issues.

c. May, in addition to matters referred to the TWG, agree to refer specific questions or issues to designated representatives or *ad hoc* working groups for discussion, development of information, formulation of recommendations, or specific action.

d. Agree to provide such data and information as another party might request pertaining to matters addressed by the MOU, such as natural resource population and harvest data, law enforcement statistics and tribal court statistics.

4. The parties shall cooperate in identifying and seeking adequate funding for the enhancement of their infrastructures necessary to improve the implementation of this agreement. However, the parties acknowledge that this MOU does not modify or restrict the budgetary authority of any party.

5. The parties shall undertake cultural sensitivity training for their personnel who will be responsible for implementing this MOU. The parties also shall engage in joint and coordinated public education efforts to inform the public about this MOU and its underlying purposes.

B. **National Forest Planning and Decision-making.** The parties recognize that Forest Service decisions vary in their effects on the abundance of, distribution of or access to the natural resources on the lands that it administers. For example, the Forest Service, at various levels, makes a number of decisions that relate to such matters as the development, revision and implementation of Forest Plans for each of the National Forests covered by this MOU. They include decisions that commit to particular land management actions, such as project level decisions (including closures of temporary and permanent roads), and decisions that establish the policies or guidelines that govern these actions. Other decisions relate to such matters as the internal administration of the Forest Service as an agency regarding personnel, property and budgets, and do not commit to particular land management actions or establish policies governing those actions.

The Tribes and Forest Service agree that they shall consult on a government-to-

government basis on all Forest Service decisions that affect the abundance, distribution or access to the natural resources on lands administered by the Forest Service. In addition, they agree that the goal of such consultation shall be that any such Forest Service decision should expressly recognize and accommodate the Tribes' ceded territory rights, protect and enhance treaty-reserved natural resources, and accommodate exercise of ceded territory rights by tribal members under tribal regulations.

To achieve this end, the Tribes and Forest Service specifically agree that:

1. As to decisions that result in particular land management actions, in policies or guidelines governing those actions, or in research projects to be conducted by the Northern Research Station:

    a. The Forest Service shall consult with and facilitate effective participation by the Tribes at all stages and levels of the decision-making process. This collaboration is recognized as a dynamic process that must include consultation on a consistent and timely basis at the appropriate levels of government and that must be flexible to deal with ever-changing circumstances and adaptive natural resource management responses.

    b. The Forest Service shall consider the effects of its decisions on treaty resources and the ability of the Tribes to exercise treaty gathering rights. In decision and analysis documents, including those required by the National Forest Management Act and the National Environmental Policy Act, decision-makers will show how tribal information and involvement was taken into account in analyzing the effects of potential management actions and in making the decision.

    c. The Tribes and the Forest Service will strive to reach consensus. Where consensus cannot be reached:

        1) They will attempt to resolve any dispute or disagreement first by good faith discussions between the affected Tribe(s) and the Forest Service deciding official. The Tribe(s) may raise any matter not resolved at this level to a higher Forest Service official, including the appropriate Forest Supervisor and the Regional Forester. The Forest Service agrees to delay a final decision on the unresolved matter until this process has had the opportunity to take place within a reasonable amount of time.

2) The Forest Service may make and implement the decision.

3) In addition to the procedures provided by the MOU, a Tribe may challenge or appeal any Forest Service decision or action in accordance with applicable law.

2. As to decisions relating to the administration of Forest Service budgets, personnel or property, the parties shall cooperate in identifying and seeking adequate resources for the Tribes' and Forest Service's capabilities necessary to implement this MOU. In particular, the Forest Service shall seek input from the Tribes in a timely manner regarding the development of its budget proposal for upcoming fiscal years.

3. During the course of their dealings, the Tribes and Forest Service shall ensure that they have identified their representatives with whom the other parties should interact regarding particular decisions or particular types of decisions.

4. Nothing in this MOU shall preclude the Tribes and Forest Service from discussing matters or advancing particular requests that are not part of a particular pending Forest Plan implementation decision.

C. **Natural Resource Harvest Management.** The Tribes and Forest Service acknowledge their mutual interests in undertaking a collaborative approach in managing the harvest of natural resources on lands administered by the Forest Service to ensure the sustainability of ecosystems and the sustained yield of natural resources, in ensuring that the Tribes' ceded territory rights are meaningfully exercised, and in providing for a consistent conservation-based system under which the Tribes will exercise their ceded territory rights on those lands. Specifically, the Tribes and Forest Service agree:

1. Within the bounds of their respective authorities, to regulate and monitor the harvest of natural resources on lands administered by the Forest Service in a manner that provides for a sustained harvest of those resources and affords the Tribes the opportunity to harvest an equal allocation of the harvestable surpluses of those resources.

2. That the Tribes will regulate tribal member gathering on lands administered by the Forest Service by adopting regulations and implementing permit systems that are no less restrictive than those set forth in the Model Off-Reservation National Forest Gathering Code

[hereafter Model Code], which is attached as Exhibit A and specifically incorporated into this MOU.

3. That any changes making the Model Code, or any Tribe's enactment based upon the Model Code, less restrictive will fall within the scope of the MOU if the Forest Service's consent is obtained in accordance with the provisions of subsection F, below.

4. To monitor harvest levels in the most effective and precise manner needed to ensure resource protection and to exchange harvest monitoring data on a regular basis.

5. To designate areas for tribal sugar bushes that will meet needs identified by the Tribes and to jointly develop specific sugar bush management plans. The parties further agree to consider complementary and conflicting resource values, location of historical sugarbushes, proximity to reservations, and other relevant factors in choosing sugarbush locations.

6. To locate species of interest to the Tribes and to provide gathering opportunities for those resources, particularly regarding gathering opportunities associated with National Forest timber sales.

7. That once the Forest Service decides that it intends to solicit bids for timber sale contracts for down or damaged trees, trees in the designated timber salvage stands having a diameter of four inches or greater, whether they are alive, dead, down or standing, will be regulated in the same manner as standing live trees for treaty harvest purposes. For the purposes of the MOU and attached Model Code, the term "Forest Service timber salvage stand" means any stand of trees where the Forest Service has notified the Tribes of its decision to solicit bids for a salvage timber sale contract, and the term "salvage timber" means any tree in that stand, whether alive, dead, down or standing, having a diameter of four inches or greater.

8. That the Tribes will not issue a permit for the harvest of timber or of salvage timber, as set forth below, without the Forest Service's consent.

    a. In seeking the Forest Service's consent, the requesting Tribe shall inform the other Tribes that are parties to the MOU of the request and shall indicate in writing to the Forest Service the types and amounts of trees sought, the use to which the trees will be put, and the anticipated time frame for the harvest. The Forest Service shall promptly consider the request, consult with the requesting Tribe as

to the specifics of the proposal, and provide in writing its decision and the underlying rationale. The Forest Service shall make every attempt to accommodate the request and, before withholding consent, shall discuss with the Tribe possible alternatives. In any event, Forest Service consent shall not be unreasonably withheld. The Tribes will conduct inter-tribal coordination on requests for timber.

b. To further the purpose of this Section, the Tribes will implement a harvest management system pertaining to requests for timber, as set forth in the Tribal Timber Harvest Framework Agreement [Management Framework Agreement], which is attached as Appendix C and specifically incorporated into this Agreement. Any changes to the Management Framework Agreement or to any Tribe's enactment based upon it, which would result in less restrictive provisions relating to treaty rights exercise within the National Forest, will fall within the scope of the MOU only if the Forest Service's consent is obtained in accordance with the provisions of subsection F.6, below.

c. The tribes may issue a permit for the harvest of timber or of salvage timber for the following purposes:

1) For domestic purposes, as this term is defined in the attached Model Code (authorized pursuant to 16 U.S.C. 477, and the treaties between the Unites States and GLIFWC's member Ojibwe Tribes, specifically Treaty of 1836, 7 Stat 491, Treaty of 1837, 7 Stat. 536, and Treaty of 1842, 7 Stat. 591).

2) For non-commercial traditional and cultural purposes, as this term is defined in the attached Model Code (authorized pursuant to 25 U.S.C. 3055, and the treaties between the Unites States and GLIFWC's member Ojibwe Tribes, specifically Treaty of 1836, 7 Stat 491, Treaty of 1837, 7 Stat. 536, and Treaty of 1842, 7 Stat. 591).

9. That any requests for timber or miscellaneous forest products, as these terms are defined in the attached Model Code, from national forests made by Tribes not party to this MOU within the ceded territories will require immediate consultation with the signatory Tribes prior to the granting of such request.

10. That the Tribes and their members use National Forest campgrounds in the exercise of their ceded territory rights and that Forest Service fees and length of stay restrictions at campground should not interfere with the exercise of the rights. The parties acknowledge that, prior to completion and ratification of the MOU, time constraints have prevented them from developing the necessary Exemption Agreement and accompanying Implementation Plan regarding campground fee and length of stay exemptions for tribal members. Upon ratification of the MOU, the parties commit to immediately developing the Agreement and Implementation Plan. Once properly approved, the Exemption Agreement and Implementation Plan shall become part of the MOU and be specifically incorporated by reference herein as if set forth in their entirety.

11. That the parties have not resolved their disagreement regarding the Tribes' request for unrestricted motorized use of Crooked Lake in the Sylvania Wilderness located in the Ottawa National Forest. While the parties agree to disagree on this matter at this time, they will continue to strive for a resolution using the procedures and processes contained in the MOU. The parties acknowledge that on all other matters regarding wildernesses, their agreement is properly reflected in the provisions of the attached Model Code, including specifically those of §3.06(1)(a) that establish Tribal National Forest Wildernesses.

12. That, in accordance with the provisions of subsection F, below, the Forest Service will notify the Tribes of and obtain the Tribes' input on proposed changes in federal laws or regulations that are intended to regulate or otherwise restrict the harvest of natural resources on lands administered by the Forest Service within the ceded territories.

13. That the Tribes have implemented harvest management regulatory systems that govern the exercise of off-reservation treaty-reserved tribal deer hunting, bear hunting, migratory bird hunting, small game hunting and trapping, and wild rice gathering. To the extent that these activities occur within National Forests, the provisions of the Tribe's Off-Reservation Conservation Code are hereby declared, and shall be construed, to govern tribal members engaged in the exercise of these treaty-reserved rights within National Forests.

D. **Monitoring and Evaluation.** To ensure the sustainability of ecosystems, the Tribes and Forest Service acknowledge the importance of inventorying and monitoring the status of species and their habitats within the National Forests, evaluating the impacts of harvest on the resources subject to the Tribes' ceded

territory rights, and evaluating the effects of other land management activities on those resources. With the input and recommendations of the TWG, the Tribes and Forest Service agree to:

1. Review their respective existing research projects and administrative studies as needed for the purpose of encouraging research coordination.

2. Establish and implement a program of research, monitoring and evaluation regarding the resources subject to the Tribes' ceded territory rights that specifically would:

   a. Inventory species status and habitat requirements.

   b. Monitor the population dynamics and habitats of species as Forest Plans are implemented.

   c. Determine the effects of land management activities, such as timber harvest, on species' populations.

   d. Determine the effects of wild plant harvest on the status of the species being harvested.

   e. Evaluate such other matters that relate to the resources subject to the Tribes' ceded territory rights.

E. **Law Enforcement.** The parties acknowledge the Tribes' capabilities to implement a self-regulatory system governing the exercise of ceded territory rights applicable on lands administered by the Forest Service. The parties specifically agree that:

1. Any regulation adopted by Tribe consistent with the MOU will govern the exercise of the Tribes' ceded territory gathering rights within the National Forests and is within the scope of the MOU. Any Tribe's regulation that is not consistent with the MOU's provisions is outside the MOU's scope.

2. The enforcement of the Tribes' regulations and of any federal statute or regulation governing the conduct within the scope of a Tribe's regulations that are consistent with the terms of the MOU shall be governed by a properly ratified agreement that is no less restrictive than the Tribal Self-Regulation Agreement [hereafter Self-Regulation Agreement], attached as Appendix B and specifically incorporated into the MOU. For the purposes of this subsection, "properly ratified" means a party's approval of

and the agreement to be bound by the Self-Regulation Agreement in accordance with that party's required governmental procedures.

3. That any changes in the Self-Regulation Agreement shall be made in accordance with the provisions of subsection F, below.

4. Primary enforcement and administration of justice responsibilities for the Tribes' regulations lies with the Tribes and their properly authorized agencies.

5. The Tribes and Forest Service will coordinate their respective law enforcement activities and establish cooperative law enforcement ventures, such as joint patrols, effective communication systems, information and potential violation referral processes, and joint training activities. These coordinated law enforcement activities shall include at least annual meetings between designated enforcement personnel.

F. **Process for MOU Amendments, Regulatory Changes and Self-Regulation Agreement Changes.** The parties recognize the dynamic nature of their government-to-government relationship. They also recognize that changes in federal and tribal regulation and management of the harvesting of the National Forests' natural resources in the ceded territories are inevitable. To facilitate open communication and minimize disputes arising from the dynamics of their relationship and from the need to change harvest regulations, the parties agree:

1. Consensus/Resolution of Disputes. As for the matters addressed by this subsection F, the affected parties shall strive to reach consensus on the matter at hand. Where consensus cannot be reached:

   a. The affected parties will attempt to resolve any dispute or disagreement first by good faith discussions at the appropriate governmental level. A party may raise any matter not resolved at this level to a higher official of another party. If it has the authority to do so, a party will delay a final decision on the unresolved matter until this process has had the opportunity to take place within a reasonable amount of time.

   b. A party claiming the requisite authority may make and implement a decision on the unresolved matter.

   c. In addition to the procedures provided by the MOU, a party may challenge or appeal another party's decision or action in

accordance with applicable law.

2. MOU Amendment. Any party may propose an amendment to the MOU in writing to the other parties. Within 60 days of receipt, the parties shall convene a meeting to consider the proposal. An amendment may be adopted by and binding upon less than all of the parties provided that the adopting parties include at least one tribal party and the Forest Service.

3. Federal Laws and Regulations. The Forest Service agrees to seek the input of the Tribes on proposed changes to the Forest Service's regulation of natural resource harvesting within the ceded territories by providing written notice, including an explanation of the underlying rationale, to the Tribes at least 60 days in advance of the desired effective date of the proposed change. The Tribes shall have 45 days, or such other time period as may be agreed upon, to provide comments.

   In addition, the Tribes may submit a written request to the Forest Service for changes in the Forest Service's regulation of natural resource harvesting, including an explanation of the request's rationale. The Forest Service agrees to respond to the request within 45 days, or such other time period as may be agreed upon.

   Unless other time frames are specifically imposed by applicable law, the Forest Service and the Tribes agree to afford as much time as is necessary and appropriate for consensus to be reached on the Forest Service proposal and on a Tribe's request.

4. Model Code or Tribal Enactments Based Upon the Model Code. The Tribes agree to notify the Forest Service in writing of any proposed change that would make the Model Code, or any Tribe's enactment based upon the Model Code, less restrictive than provided for in the MOU. In addition, the Forest Service may request the Tribes to change the Model Code, or any Tribe's enactment based upon the Model Code, to be more restrictive than provided for in the MOU.

   Except in cases of emergency, such notices and requests will be provided at least 60 days in advance of the desired effective date of the change and will include an explanation of the proposal's rationale. Within 45 days of receipt, or such other time period as may be agreed upon, the receiving party or parties shall respond expressing any objections and indicating any changes that are agreeable. The failure to object in writing to a proposed change within the 45-day period, or any extension thereof, will be deemed as agreement to the proposal.

The Forest Service and the Tribes agree to afford as much time as is necessary and appropriate for consensus to be reached on any objection to a proposed or requested change.

A properly amended Model Code shall replace the then-current Appendix A to the MOU and is specifically incorporated by reference herein as if set forth in its entirety.

5. Tribal Self-Regulation Agreement. Any party may submit a written request to the other parties for a change in the Self-Regulation Agreement. Except in cases of emergency, such request will be provided at least 60 days in advance of the desired effective date of the change and will include an explanation of the proposal's rationale. Within 45 days of receipt, or such other time period as may be agreed upon, the receiving party or parties shall respond expressing any objections and indicating any changes that are agreeable. The failure to object in writing to a proposed change within the 45-day period, or any extension thereof, will be deemed as agreement to the proposal.

   The Forest Service and the Tribes agree to afford as much time as is necessary and appropriate for consensus to be reached on any objection to a proposed change.

   A properly amended Self-Regulation Agreement shall replace the then-current Appendix B to the MOU and is specifically incorporated by reference herein as if set forth in its entirety.

6. Tribal Timber Harvest Framework Agreement. Any party may submit a written request to the other parties for a change in the Timber Harvest Framework Agreement. Except in cases of emergency, such request will be provided at least 60 days in advance of the desired effective date of the change and will include an explanation of the proposal's rationale. Within 45 days of receipt, or such other time period as may be agreed upon, the receiving party or parties shall respond expressing any objections and indicating any changes that are agreeable. The failure to object in writing to a proposed change within the 45-day period, or any extension thereof, will be deemed as agreement to the proposal.

   The Forest Service and the Tribes agree to afford as much time as is necessary and appropriate for consensus to be reached on any objection to a proposed change.

A properly amended Timber Harvest Framework Agreement shall replace the then-current Appendix C to the MOU and is specifically incorporated by reference herein as if set forth in its entirety.

G. **Special Closures.** It is agreed that the Tribes or the Voigt Intertribal Task Force may submit a written request to the Forest Service requesting the temporary closure from public access areas of the National Forest to protect the privacy of tribal activities for traditional and cultural purposes.

1. The parties agree that in the implementation of the request the parties will cooperatively determine the smallest practicable area for the minimum period necessary to accommodate the requested activity.

2. It is further agreed that Tribal officials on behalf of the Tribe making the request or Voigt Intertribal Task Force Representatives shall be prepared to help the Forest Service understand the request, if necessary, by explaining how the intended activity is identifiable by the Tribe as traditional or cultural because of the long-established significance or ceremonial nature of the activity to the Tribe.

VII. **CONGRESSIONAL INVOLVEMENT.** Pursuant to 42 U.S.C. Section 22, no Member of or Delegate to the Congress of the United States shall be admitted to any share or part of this instrument, or any benefits that may arise therefrom.

VIII. **MOU EFFECTIVE DATE/TERMINATION.** The MOU shall take effect on the date when at least one Tribe, the Forest Service's Eastern Region, the Region's Law Enforcement and Investigations Branch, and the Northern Research Station have properly ratified it in accordance with their respective governmental procedures. The MOU shall be binding as to and between those entities upon notice to the other parties of their ratification as provided in Section IX, below. Any party may withdraw from this agreement at any time following the notice of withdrawal procedures of Section IX.B., below. This MOU shall no longer be in effect if the Forest Service withdraws or if all ratifying tribes have withdrawn.

IX. **REQUIRED NOTICES/PARTIES' DESIGNATED REPRESENTATIVES.**

A. **Notice of Ratification.** Within 30 days of ratification of the MOU, an entity shall notify all other entities listed in Section II, above, of the date of ratification. Each party's Notice of Ratification is specifically incorporated into the MOU as if set forth in its entirety.

B. **Notice of Withdrawal.** A party shall provide written notice to the other parties

of its intent to withdraw from the MOU at least 60 days in advance of the proposed withdrawal date. Within 45 days of such notice, or such other time period as may be agreed upon, the parties shall convene a meeting to discuss the intent to withdraw and to attempt to reach consensus on ways to prevent the withdrawal. Should a party ultimately withdraw from the MOU, it shall provide a written Notice of Withdrawal to the other parties, and such Notice is specifically incorporated into the MOU as if set forth in its entirety.

C. **Designated Representatives.** In providing notice of its ratification, a party may designate its representative for receiving the notices from the another party that are required by the MOU. Where a party has not formally designated a representative either with its Notice of Ratification or with respect to particular matters addressed by the MOU, another party may provide a required notice ex officio to the office of the official that provided the party's Notice of Ratification.

X. **INITIAL MEETING OF THE PARTIES.** Within 90 days of the MOU's effective date, the parties shall convene an initial meeting for the purposes of: (A) identifying those matters that require immediate attention in implementing the MOU's provisions, such as the agreement and implementation plan regarding campground fees and length of stay restrictions; (B) identifying and addressing any other matter regarding the MOU that requires the parties' attention; (C) setting forth a timetable for addressing those matters; and (D) identifying their representatives that will serve as their "keepers of the process" in ensuring that the MOU is faithfully implemented. These representatives may be persons other than a party's designated representative for receiving required notices from another party provided for in Article IX, above.

APPENDIX A

MODEL

OFF-RESERVATION NATIONAL FOREST GATHERING CODE

OF THE

_____

CHAPTER 1 - INTRODUCTION

1.01 Title.

This ordinance shall be known as the _____ Off-Reservation National Forest Gathering Code.

1.02 Authority.

This ordinance is enacted pursuant to Article _____, Section _____ of the Constitution and By-Laws of the _____ _____ Tribe.

1.03 Purpose.

It is the purpose of this ordinance to:

(1) Provide an orderly and effective system for tribal control and regulation of treaty-reserved gathering activities applicable to National Forests located in the ceded territory.

(2) Supplement the Tribal Off-Reservation Conservation Code for the purposes of regulating the exercise of treaty-reserved off-reservation gathering rights applicable to National Forests located in the ceded territory.

(3) Implement the provisions of the *Memorandum of Understanding Regarding the Recognition and Implementation of Tribal Ceded Territory Rights Guaranteed by the Treaties of 1836, 1837, and 1842*, as may be amended from time to time, which has been ratified by the Tribe and which is incorporated by reference herein as if set forth in its entirety.

1.04 Effective Date.

This ordinance shall be effective on the date adopted by the Tribe's governing body.

1.05 Interpretation.

The provisions of this ordinance:

(1) Shall be interpreted and applied as minimum requirements governing the exercise of treaty-reserved gathering rights applicable to National Forests located in the ceded territory;

(2) Shall be liberally construed in favor of the tribe;

(3) Shall be construed consistent with the purposes and provisions of the *Memorandum of Understanding Regarding the Recognition and Implementation of Tribal Ceded Territory Rights Guaranteed by the Treaties of 1836, 1837, and 1842*, as may be amended from time to time, which has been ratified by the Tribe and which is incorporated by reference herein as if set forth in its entirety; and

(4) Shall not be deemed a limitation or repeal of any other tribal power or authority.

1.06 Severability and Non-Liability.

If any section, provision or portion of this ordinance is adjudged unconstitutional or invalid by a court of competent jurisdiction, the remainder of this ordinance shall not be affected thereby. The Tribe further asserts immunity on its part and that of its agencies, employees, and/or agents from any action or damages that may occur as a result of reliance upon and conformance with this ordinance.

1.07 Relationship to Tribal Off-Reservation Conservation Code and other Tribal Ordinances.

(1) All other ordinances and resolutions that solely govern treaty-reserved ceded territory gathering rights applicable to National Forests located in the ceded territory are hereby repealed.

(2) (a) This ordinance is not intended to repeal or replace any provision of the Tribe's Off-Reservation Conservation Code. It is intended to supplement that Code for the purposes of authorizing or governing the exercise of treaty-reserved wild plant gathering rights applicable to National Forests. It is not intended to apply to the exercise of any other treaty-reserved ceded territory right that is authorized or governed by the Tribe's Off-Reservation Conservation Code.

(b) Unless otherwise specifically indicated in this ordinance, it is the intent of this ordinance that the provisions of the Tribe's Off-Reservation Conservation Code that generally govern the conduct of tribal members exercising treaty rights applicable in the ceded territory shall apply to tribal members exercising treaty-reserved off-reservation gathering rights applicable to National Forests pursuant to this ordinance, including but not limited to regulations pertaining to the gathering of wild rice. Such provisions of the Tribe's Off-Reservation Conservation Code are hereby declared, and shall be construed, to govern tribal members engaged in the exercise of treaty-reserved gathering rights applicable to National Forests.

1.08 Religious or Ceremonial Use of Natural Resources.

(1) Nothing in this ordinance shall prohibit the harvest or use of natural resources in a manner otherwise prohibited by this ordinance which is harvested, taken or otherwise obtained in a National Forest within the ceded territory for religious or ceremonial purposes in accordance with the traditions and customs of the Tribe and with the consent of the Tribe's governing body, or its designee.

(2) In reviewing and taking action on any request for religious or ceremonial harvest, the Tribes' governing body, or its designee, shall take into account the biological impact of the harvest, shall ensure that the harvest takes place in a manner that does not cause biological harm, and shall consult with the local National Forest District office if the requested gathering is to take place in a National Forest Research Natural Area (see Section 3.06(1)).

(3) No member shall fail to comply with the terms and conditions of the any permit issued pursuant to this section or to otherwise comply with the requirements imposed by the Tribe's regarding religious or ceremonial harvest of wild plants in National Forests in the ceded territory.

CHAPTER 2 - DEFINITIONS

2.01 Definitions.

(1) Except for specific terms defined in subsection (2), terms in this ordinance shall have the same definition as provided in the Tribe's Off-Reservation Conservation Code.

(2) The following terms, wherever used in this ordinance, shall be construed as follows:

(a) **"Ceded Territory"** means those off-reservation lands ceded by the Tribe or another signatory tribe to the United States of America in the Treaty of 1836, 7 Stat. 491, the Treaty of 1837, 7 Stat. 536, or the Treaty of 1842, 7 Stat. 591.

(b) **"Bark"** means the tough outer covering of the woody stems and roots of trees, shrubs, and other woody plants. It includes all tissues outside the vascular cambium.

(c) **"Bough"** means any branch of a tree less than 2 inches in diameter.

(d) **"Domestic Purpose"** means the use of timber or salvage timber, harvested for the construction of any structure, building or appenditia to be used for community or residential domestic purposes.

(e) **"Firewood"** means any dead tree or part thereof, either standing or downed, which is harvested for and is to be used as fuel.

(f) **"Forest Service"** means the United States Department of Agriculture, Forest Service.

(g) **"Forest Service Salvage Timber Stand"** means any stand of trees where the Forest Service has notified the Tribe of the decision to solicit bids for a Forest Service salvage timber sale contract.

(h) **"Gather"** or **"gathering"** means to take or acquire or attempt to take or acquire possession of any wild plant, or part thereof.

(i) **"Gathering Products"** means all products of miscellaneous forest products other than non-timber forest products such as: branchlets, roots, berries, fruits, nuts, and seeds.

(j) **"Lodgepoles"** means any tree that is less than 5 inches DBH (diameter at breast height).

(k) **"Miscellaneous Forest Products"** means any wild plant including: non-timber forest products, wild plants that are not trees such as herbaceous plants and shrubs, gathering products, endangered or threatened plant species, and species of special concern, but for the purposes of this ordinance excludes timber.

(l) **"National Forest"** means those lands located within the ceded territory owned by the United States of America and part of the Chequamegon-Nicolet National Forest, the Hiawatha National Forest, the Huron-Manistee National Forest, or the Ottawa National Forest.

(m) **"Non-Commercial Traditional and Cultural Purpose"** means the use of timber harvested with respect to a definable use, area, or practice, identified by an Indian tribe as traditional or cultural because of the long established significance or ceremonial nature of the use, area, or practice to the Indian tribe; and is not for commercial purposes.

(n) **"Non-Timber Forest Products"** means any of the following miscellaneous forest products: bark, boughs, firewood, lodgepoles, and sap as further defined in this section.

(o) **"Salvage Timber"** means any tree in a Forest Service salvage timber stand, whether alive, dead, down or standing, having a diameter of four inches or greater.

(p) **"Sap"** means the watery fluid that circulates through a tree or plant, carrying food and other substances to the various tissues.

(q) **"Shrub"** means a woody perennial plant usually branched several times at or near the base giving it a bushy appearance, and is usually less than five meters tall.

(r) **"Signatory Tribe"** means an Indian Tribe which is a signatory to the Treaty of 1836, 7 Stat. 491, the Treaty of 1837, 7 Stat. 536, or the Treaty of 1842, 7 Stat. 591, or such tribe's successor in interest.

(s) **"Species of Special Concern"** means any wild plant which is contained on the tribal species of special concern list.

(t) **"Timber"** means any tree that is not a lodgepole as defined in Section 2.01(2)(i) of this ordinance, or is not firewood as defined in Section 2.01(2)(d) of this ordinance.

(u) **"Tree"** means a woody, perennial plant with a single trunk that is typically unbranched at or near the base, and is usually greater than five meters tall.

(v) **"Wild Plant"** means any undomesticated species, or part thereof, of the plant and fungi kingdoms occurring in both forested and non-forested natural ecosystem, but for the purposes of this ordinance excludes wild rice.

CHAPTER 3 - GENERAL REGULATIONS

3.01 Regulatory Authority.

(1) The Tribe asserts legal authority to regulate the exercise of the Tribe's treaty-reserved ceded territory gathering rights applicable to wild plants found in National Forests.

(2) Any person authorized to enforce this ordinance may seize forthwith wherever found:

(a) any wild plant taken or reduced to possession in violation of this ordinance; or

(b) any wild plant lawfully taken or reduced to possession under this ordinance, upon violation of any provision of this ordinance relating to the possession, use, giving, sale, barter or transportation of such wild plant.

3.02 Permits and Identification -- General.

(1) No member shall gather any wild plant off-reservation in a National Forest without possessing a valid off-reservation harvesting permit approved by the Tribe, which may be the member's tribal identification card required by Subsection (2), or such other permit as this ordinance may require validated for the particular type of activity to be engaged in for the particular season in question, as follows:

(a) Generally. Except a provided in subs. (b) [Non-Timber Forest Products and Ginseng Gathering Permits], no member shall gather any miscellaneous forest products without possessing a valid general gathering permit issued by the tribal conservation department while harvesting off-reservation in a National Forest.

(b) Non-Timber Forest Product and Ginseng Gathering Permits.

(i) No member shall harvest or gather non-timber forest products or ginseng pursuant to this ordinance without possessing a valid gathering permit issued by the tribal conservation department as follows:

1) Small Scale Harvest Activity. For small scale activity, a tribal member may harvest the following non-timber forest products while possessing a valid gathering permit up to the following limits:

a) Bark;	Twenty (20) Trees
b) Boughs;	Two (2) Tons

c) Firewood; Ten (10) Cords

d) Lodgepoles; Seventy-Five (75) Lodgepoles

2) Large Scale Harvest Activity. For large scale activity, a tribal member may harvest non-timber forest products while possessing a valid large scale harvest activity gathering permit above the limits established for small scale harvest activity as follows:

a) No member shall gather non-timber forest products on a large scale without a valid large scale harvest activity gathering permit valid for a designated area established by the tribal conservation department in consultation with the Forest Service.

b) "Designated Area" means a specific site identified and established by the tribal conservation department, in consultation with the Forest Service, for which a species harvestable surplus has been determined and for which the appropriate number of large scale harvest activity permits are available for the designated area.

c) The tribal conservation department may issue a large scale harvest activity permit to one or more members based upon the determined species harvestable surplus and may impose such terms and conditions as it deems necessary or appropriate.

d) No member shall fail to comply with the terms and conditions of a large scale harvest activity permit.

(ii) No gathering permit is required of helpers of a permittee who participate only in the collection of the resource once it has been reduced to possession of a permittee.

(iii) The tribal conservation department may impose such other terms and conditions as it deems necessary or appropriate, including biological monitoring requirements in addition to those contained in Section 3.04 of this ordinance.

(2) No member shall gather any wild plant off-reservation in a National Forest except while carrying a valid picture identification card issued by the tribe, or other form of identification approved by the tribe for such gathering activities.

(3) No member shall refuse to display his or her identification documents upon request

of any tribal, Great Lakes Indian Fish and Wildlife Commission, federal, state, or local law enforcement officer.

(4) No member shall fail to comply with the terms, conditions and location restrictions of a permit issued pursuant to this ordinance.

(5) The tribal conservation department is authorized to issue to members permits required by this ordinance and to impose such terms, conditions and location restrictions in those permits as it deems necessary or appropriate. Except as otherwise required by this ordinance, the form of such permits shall be left to the discretion of the tribal conservation department, provided such form shall require the name, address and member's tribal identification number.

(6) The tribal conservation department may issue such harvesting permits to members of a signatory Tribe, provided such other Tribe has enacted an ordinance governing gathering in National Forests that is at least as restrictive as this ordinance.

3.03 Sale of Miscellaneous Forest Products Authorized.

(1) Nothing contained in this ordinance shall be construed to prohibit members from selling any miscellaneous forest products, or any part thereof, lawfully harvested pursuant to this chapter.

(2) With respect to the sale of any miscellaneous forest products, or part thereof, lawfully harvested pursuant to this ordinance in a National Forest, any requirement for maintaining records of commercial transactions contained in the Tribe's Off-Reservation Conservation Code shall not apply.

3.04 Harvest Monitoring.

(1) Generally. No member to whom any permit has been issued under this ordinance shall fail or refuse to provide harvest information when requested by the tribal conservation department, any person authorized to enforce this ordinance, or the Great Lakes Indian Fish and Wildlife Commission.

(2) Records of Ginseng Transactions.

(a) Unless otherwise required under the provisions of GLIFWC's and the Tribes' approved CITES export program, no member shall sell any ginseng harvested pursuant to this ordinance to any person unless the member maintains a written record of all transactions on forms prescribed by the tribal conservation department indicating the amount of ginseng involved, the parties to the transaction, the date of the transaction and the National Forest in which harvest occurred.

(b) Records maintained pursuant to this section shall be forwarded annually to the tribal conservation department, or its designee.

(c) No member shall fail to comply with the reporting requirements of this section.

(d) With respect to ginseng gathered in a National Forest, this section supersedes any requirement for maintaining records of commercial transactions contained in the Tribe's Off-Reservation Conservation Code.

3.05 Emergency Closures.

(1) Notwithstanding any other provision of this ordinance, the Director of the Biological Services Division of the Great Lakes Indian Fish and Wildlife Commission or the tribal conservation department may order the closure of the harvest activity of any wild plant in a National Forest generally or with respect to a particular location, whenever the continuation of the harvest is likely to cause biological harm to the species involved.

(2) Every reasonable effort shall be made to consult with and obtain approval of the Tribe prior to ordering an emergency closure, but such closure may be ordered without consultation or approval if circumstances require.

(3) An emergency closure shall become effective immediately upon issuance or at such time or date as the closure order may direct. Such closure shall be communicated to the Tribe by the best and swiftest practical method.

(4) No member shall violate the terms, conditions or restriction of an emergency closure order issued pursuant to this section.

3.06 Harvest and Other Location Restrictions.

(1) Tribal Wilderness, Research Natural Areas, and Special Use Areas Established. The following Great Lakes Indian Fish and Wildlife Commission document, as it may be amended from time to time, is hereby adopted and incorporated in this ordinance as if fully set forth herein, and no member shall fail to comply with the closures and other restrictions established by this document:

Tribal Wildernesses, Tribal Research Natural Areas, and Tribal Vehicle Permit Areas on National Forests, Version 1: [August 1998].

(2) Forest Service Administrative Sites. No member shall gather wild plants under authority of this ordinance on a Forest Service administrative site. For the purposes of this

ordinance, a "Forest Service administrative site" means a specific site where an office, storage or other building or structure is located and maintained by the Forest Service as part of its operation and management of a National Forest. It is the member's responsibility to be certain about a Forest Service administrative site. Any uncertainty should be resolved by contacting the tribal conservation department, Great Lakes Indian Fish and Wildlife Commission or the local National Forest District office.

(3) National Forest Campgrounds.

(a) Gathering in Developed Campgrounds.

(i) Except as provided in subs (ii), no member shall gather wild plants under authority of this ordinance on any land located within a developed National Forest Campground. For the purpose of this ordinance, a "developed National Forest Campground" means a location that is clearly marked and identified as a campground by the Forest Service and on which improvements clearly have been made to develop and maintain the site as a campground. It is the member's responsibility to be certain about a developed National Forest campground. Any uncertainty should be resolved by contacting the tribal conservation department, Great Lakes Indian Fish and Wildlife Commission or the local National Forest District office.

(ii) Except where firewood is provided at no cost by the campground or where firewood will be used while camping in the campground, no member shall gather firewood in a developed National Forest campground.

(b) Camping Fees and Length of Stay Restrictions. The Tribe and the Forest Service have entered into a Memorandum of Understanding that will exempt members from certain camping fees and length of stay restrictions that the Forest Service requires of the general public in the National Forests. Once the Tribe and the Forest Service have entered into a campground fee and length of stay Exemption Agreement and accompanying Implementation Plan, and the Tribe has ratified the Agreement and Plan, no member shall fail to comply with the requirements and restrictions contained in the Agreement and Plan. Information about the Exemption Agreement and Implementation Plan can be obtained by contacting the tribal conservation department, Great Lakes Indian Fish and Wildlife Commission or local National Forest District office.

(4) Non-National Forest Lands. No member shall gather wild plants under authority of this ordinance on any land located within the boundaries of a National Forest that is not owned by the United States of America and part of a National Forest. This provision does not apply to or otherwise restrict any wild plant gathering on non-National Forest lands that is authorized by another tribal ordinance.

3.07 Harvest of Trees Subject to a Timber Sale Contract or Located Within a Forest Service Timber Sale Contract Area.

(1) No member shall gather any tree under authority of this ordinance without a permit issued pursuant to subs. (4) that is subject to the harvest rights of another in a valid Forest Service timber sale contract. Sometimes these trees are marked with orange, green or yellow paint. However, it is the member's responsibility to be certain about trees that are subject to a valid Forest Service timber sale contract. Any uncertainty should be resolved by contacting the tribal conservation department, Great Lakes Indian Fish and Wildlife Commission or the local National Forest District office.

(2) Within an open Forest Service Timber Sale Contract Area as defined in subs. (3), no member shall undertake any of the following activities under authority of this ordinance without a permit issued pursuant to subs. (4):

(a) Cut down any live tree;

(b) Remove the bark of any live tree;

(c) Trim or remove the branches from the top half of any live tree; or

(d) Trim or remove the branches or other parts, except cones, of any tree that has been cut down by another person.

(3) For the purposes of this ordinance, an "Open Forest Service Timber Sale Contract Area" means a defined location of a National Forest which has been delineated by the Forest Service for the purposes of a timber sale offering and for which a valid Forest Service timber sale contract has been executed. Typically, a Forest Service Timber Sale Contract Area is marked with orange paint on trees around the perimeter of the Area. It is the member's responsibility to be certain about an open Timber Sale Contract Area. Any uncertainty should be resolved by contacting the tribal conservation department, Great Lakes Indian Fish and Wildlife Commission or the local National Forest District office.

(4) (a) The tribal conservation department, after first consulting with the Forest Service, is authorized to issue permits under this section on such terms and conditions as it deems necessary and appropriate.

(b) No member shall fail to comply with the terms and conditions of a permit issued pursuant to this section.

3.08 Harvest of Certain "Marked" Trees.

(1) No member shall cut down any tree that has been designated with any of the following markings, and no member shall remove, alter or deface any of the following markings:

(a) Orange Paint. Orange paint designates the boundaries of a payment unit within a Forest Service Timber Contract Sale Area;

(b) Red Paint. Red paint indicates boundaries between National Forest land and other ownerships, or may designate a witness tree at a legal corner;

(c) White Paint Stripes or Other White Bands. White stripes or bands indicate a tree being used to collect cones or seeds for nursery stock; or

(d) Metal or Wood Forest Service Signs. These signs designate property or National Forest boundaries, indicate legal corners or other survey data, indicate nursery stock, or provide other similar information.

3.09 Permissible Conduct/Assistance by Non-Members.

(1) Conduct which is not expressly prohibited, restricted or otherwise regulated by this ordinance shall be deemed permissible.

(2) Except as provided in subs. (3) or as otherwise provided herein, nothing in this ordinance shall be construed to prohibit a member from gathering in a National Forest with any other person who is not a member of the Band, provided that such other person possesses a license or permit, or is otherwise not prohibited from engaging in the activity involved and complies with applicable laws.

(3) No member shall allow any person who is not a member to assist, and no such person shall assist, in the activities authorized by this ordinance except that persons of the member's immediate family, including but not limited to grandparents, parents, spouses, siblings, wenh'enh, doodem, and bami'aagin may assist the member provided the member is present when the assistance is rendered.

CHAPTER 4 - ENFORCEMENT

4.01 Enforcement by Deputized Conservation Wardens and Issuance of Citations.

(1) Any provision of this ordinance may be enforced by tribal conservation wardens or by conservation wardens of the Great Lakes Indian Fish and Wildlife Commission. Said Commission wardens are hereby deputized by the Tribe as tribal conservation wardens for the purposes of enforcing this ordinance.

(2) Such Tribal and Commission wardens may issue a citation on a form approved by the Tribe or tribal court to any person whose conduct is regulated by the provisions of this ordinance upon reasonable belief that such person has violated or breached a provision of this ordinance.

4.02 Search and Seizure; When Authorized.

Tribal and Great Lakes Indian Fish and Wildlife Commission conservation wardens, and properly identified Forest Service law enforcement officers are empowered to:

(1) Conduct a search of an object, place or person whose conduct is regulated by the provisions of this ordinance, and may seize things when the search is made:

(a) with consent;

(b) pursuant to a valid search warrant;

(c) with the authority and within the scope of a right of lawful inspection as provided in this section;

(d) incident to the issuance of a lawfully issued citation under this ordinance; or

(e) as otherwise authorized by law or by the provisions of this ordinance;

(2) Conduct routine inspections, in a manner and at such times and locations as are reasonable and appropriate in the ordinary course of routine enforcement activities, of vessels, boats, wagons, trailers, automobiles, snowmobiles, off-highway vehicles, containers, packages, and other receptacles contained therein, utilized by a person in a harvest activity authorized by this ordinance and of record of commercial transactions required under this ordinance with have not yet been forwarded to the tribal conservation department;

(3) Execute and serve warrants and other process issued by the tribal court in accordance with applicable law;

(4) Stop any automobile or other vehicle as part of a lawful inspection authorized by this section or if the person reasonably suspects there is a violation or breach of this ordinance;

(5) With or without a warrant, open, enter and examine vessels, boats, wagons, trailers, automobile, vehicles, snowmobiles, off-highway vehicles, and packages and other receptacles contained therein, in which the person has probable cause to believe that contraband wild plants, may be contained or pursuant to a lawful inspection authorized by this section; and

(6) Seize and hold subject to the order of the tribal court any alleged contraband or property which such person reasonably believes may be needed as evidence in connection with the institution of proceedings in tribal court or any property otherwise authorized to be seized by the provisions of this ordinance.

4.03 Seized Items.

Any wild plant which is seized in connection with cases referred to Tribal Court for prosecution shall be turned over to the Tribe. No seized wild plant shall be returned by the tribal court or tribal officials to a convicted violator, his or her immediate family or other member of the gathering party.

4.04 Penalties.

Any person who, for himself or herself, or by his or her agent, servant or employee, or as an agent, servant or employee of another, violates this ordinance, shall be liable as follows:

(1) For any violation, a civil remedial forfeiture of not more than $5000.00;

(2) For any violation, a revocation or suspension of off-reservation National Forest gathering privileges for a period of time within the discretion of the court;

(3) For any violation, the court may order a natural resources assessment not to exceed 75% of the amount of the civil remedial forfeiture; and

(4) For any violation, appropriate court costs within the discretion of the court.

4.05 Civil Damages.

(1) In addition to any other penalty allowed by this ordinance, the tribal court may award to the Tribe or, in addition to an action to impose penalties, the Tribe may bring a civil action for recovery of, damages against any person unlawfully gathering or having unlawfully in possession any wild plant taken from a National Forest. The sum assessed for damages for each wild plant shall not be less than the amount stated in this section:

(a) Any endangered or threatened species protected under this ordinance, $875.00.

(b) Any wild plant for which a fair market value can be established, the fair market value.

(c) Any other wild plant, $17.50.

(2) Where the Forest Service or another person or entity has sustained damages as a result of unlawful harvest, the court may, with the consent of the Tribe, award all or part of any civil damages obtained pursuant to this section to the Forest Service or to such person or entity.

4.06 Enhancement of Forfeiture and Penalties.

Upon conviction of any member for a violation of this ordinance when such person has been convicted of a previous violation of this ordinance within a period of one year, the court may enhance any civil remedial forfeiture or other penalty as the court deems appropriate.

4.07 Collection of Money Penalties.

Enforcement of the money penalties imposed pursuant to this ordinance may be had through the collection of penalties from funds of the violator held by the Tribe, through the imposition of community service work requirements in lieu of money payment, through debt collection mechanisms of the courts of other jurisdictions, or through any other method authorized by law.

4.08 Parties to a Violation.

(1) Whoever is concerned in the commission of a violation of this ordinance shall be deemed a principal and may be charged with the violation although he or she did not directly commit it and although the person who directly committed it has not been convicted of the violation.

(2) A person is concerned in the commission of the violation if the person:

(a) directly commits the violation;

(b) aids or abets the commission of it; or

(c) is a party to a conspiracy with another to commit it, or advises, hires, or counsels or otherwise procures another to commit it.

4.09 Harvesting After Revocation or Suspension.

No person whose off-reservation National Forest wild plant gathering privileges have been revoked or suspended pursuant to Section 4.04(2), shall gather any wild plant in a National Forest, the harvest of which is regulated by this ordinance, during such revocation or suspension.

4.10 Schedule of Money Penalties; No Contest.

The tribal court, in consultation with the Tribe's Governing Body, may adopt a schedule of forfeitures to be imposed by the court upon the receipt of an admission that a violation of this ordinance has occurred, or a plea of not contest, which may be done either in person or in writing. This schedule shall not bind the court as to forfeitures assessed by the court after adjudicating a violation where the defendant has entered a plea of not guilty.

4.11 Hearings in Tribal Court.

The Tribal Court shall adjudicate all matters arising under this ordinance pursuant to the provisions of the Tribal Court Code.

4.12 Members of Other Tribes, Tribal Court Adjudications.

The tribal court is authorized to adjudicate alleged violations by any member of a signatory tribe of any off-reservation National Forest gathering code of that Tribe provided:

(1) The relevant provisions of such ordinance are in essential conformance with the parallel provisions of this ordinance; and

(2) The other Tribe has authorized the adjudication.

CHAPTER 5 -- SPECIFIC HARVEST REGULATIONS

5.01 Conifer Boughs.

No member shall:

(1) Cut down a tree for the purpose of gathering conifer boughs;

(2) Remove boughs from the upper half of a tree; or

(3) Gather for subsequent sale northern white cedar or hemlock boughs.

5.02 Princess Pine.

No member shall gather any *Lycopodium* species except by cutting the vertical above ground stem.

5.03 Sheet Moss.

No member shall harvest sheet moss except by harvesting no more than fifty percent (50%) of a species in any particular harvest area, including leaving the edges of the patch.

5.04 Lodgepoles.

No member shall harvest lodgepoles except by harvesting no more than fifty percent (50%) of a species in any particular harvest area, unless the location is a designated area as defined:

(1) "Designated Area" means a specific site identified and established by the tribal conservation department, in consultation with the Forest Service, for which a species harvestable surplus has been determined and for which the appropriate number of large scale harvest activity permits are available for the designated area.

5.05 Firewood.

(1) No member shall cut any live tree or gather any salvage timber for firewood unless the tree is included within a National Forest "firewood sale," other area designated for firewood either generally or on a case-by-case basis, or as permitted pursuant to a valid sugarbush site permit issued pursuant to Section 5.05.

(2) No member shall cut any standing dead tree more than 100 feet from the cleared edge

of any road where it is legal for highway vehicles to travel.

(3) No member shall cut any standing dead tree within 200 feet of any pond, lake, stream or river.

(4) No member shall use a farm tractor, rubber tired skidder, or similar vehicle for gathering firewood without written permission from the Tribe.

5.06 Ginseng.

No member shall gather ginseng from November 1 through August 31.

5.07 Maple Sap/Sugarbushes.

(1) No member shall gather maple sap without a sugarbush site permit valid for a designated tribal sugarbush or for such other location approved by the tribal conservation department in consultation with the Forest Service.

(2) "Designated tribal sugarbush" means a specific site identified and established by the tribal conservation department, in consultation with the Forest Service, for which a site management plan has been developed and for which a sugarbush site permit has been issued.

(3) The tribal conservation department may issue a sugarbush site permit to one or more members and may impose such terms and conditions as it deems necessary or appropriate.

(4) No member shall fail to comply with the terms and conditions of a sugarbush site permit.

5.08 Unsustainable Harvest Activity.

Member compliance with tribal harvest guidelines (bmp) shall be considered sustainable harvest activity, otherwise no member shall harvest any miscellaneous forest product in such a manner so as to impair the future viability and continued success of the miscellaneous forest product on the landscape or ecosystem from which the member is harvesting, as conditioned by the type of miscellaneous forest product, and must take reasonable precautions to prevent unsustainable harvest activity.

5.09 Harvest of Timber and Salvage Timber.

(1) Harvest for Sale as "Lumber" or Similar Wood Products.

(a) No member shall under authority of this ordinance cut down any timber or gather any salvage timber for the purposes of selling all or part of it, or any product derived from its wood, as bolts, pulpwood or lumber.

(b) No member shall sell under authority of this ordinance all or part of any timber, or any product derived from its wood, as bolts, pulpwood or lumber.

(2) Harvest for Domestic and Non-Commercial Traditional and Cultural Purposes.

(a) No member or tribal entity shall cut down any timber or gather any salvage timber under authority of this ordinance for domestic purposes, such as constructing a structure or dwelling, or for non-commercial traditional and cultural purposes, as those terms are defined in subs. (b), without a valid harvest permit issued pursuant to subs. (c).

(b) (i) For the purposes of this section, the terms "structure or dwelling" mean a building or other larger structure to be used for residential, commercial, or storage purposes, and include, for example, a home, cabin, garage, storage shed, store, office building, and manufacturing facility. The terms do not include smaller structures, such as hunting blinds, fish houses or sugarbush shacks, that are used in the exercise of treaty-reserved hunting, fishing or gathering rights. It is the member's responsibility to verify that the intended construction use is not prohibited by this ordinance. Any uncertainty should be resolved by contacting the tribal conservation department or the Great Lakes Indian Fish and Wildlife Commission.

(ii) For the purposes of this section, the terms " non-commercial traditional and cultural purpose" shall be defined by the Tribe issuing the harvest permit. Tribal officials on behalf of the Tribe issuing the harvest permit shall be prepared to help the Forest Service understand the request, if necessary, by explaining how the intended use is identifiable by the Tribe as traditional or cultural because of the long-established significance or ceremonial nature of the use to the Tribe. It is the member's responsibility to verify that the intended use is not prohibited by this ordinance. Any uncertainty should be resolved by contacting the tribal conservation department or the Great Lakes Indian Fish and Wildlife Commission.

(iii) For the purposes of this section, "tribal entity" means an agency, business, partnership, corporation, committee, body or other entity, and the officers, employees and agents thereof, that is chartered, directed, controlled, or

majority owned by the Tribe.

(c) (i) The tribal conservation department is authorized to issue harvest permits for domestic and non-commercial traditional and cultural purposes on such terms and conditions as set forth in the attached Tribal Timber Harvest Framework.

(ii) Prior to issuing a harvest permit for domestic or non-commercial traditional and cultural purposes, the tribal conservation department must consult with and obtain the concurrence of the Forest Service.

APPENDIX B

TRIBAL SELF-REGULATION AGREEMENT

This Tribal Self-Regulation Agreement [hereafter Self-Regulation Agreement] is entered into as part of the parties' ratification of the *Memorandum of Understanding Regarding the Recognition and Implementation of Tribal Ceded Territory Rights Guaranteed by the Treaties of 1836, 1837, and 1842* [hereafter MOU]. Specifically, the Self-Regulation Agreement implements the MOU's provisions regarding the Administration of Justice outlined in MOU Section VI.E.

1. **Parties.** The entities that may be parties to the Self-Regulation Agreement are the same as those that may be parties to the MOU, as set forth in MOU Section II.

2. **Incorporation of MOU's Provisions.** The MOU, as may be amended from time to time, is specifically incorporated by reference into the Self-Regulation agreement as if set forth in its entirety. The Self-Regulation Agreement shall be construed consistent with the purposes and provisions of the MOU, and, except as otherwise specifically provided herein, terms in the Self-Regulation Agreement shall have the same definition as provided in the MOU.

3. **Scope and Purposes of the Self-Regulation Agreement.** The Self-Regulation Agreement pertains to the administration of justice regarding the Tribes' exercise of their treaty-reserved ceded territory rights. Its primary purposes are to:

   a. Facilitate the exercise of the Tribes' self-regulatory authority over the exercise of those rights; and

   b. Prevent dual prosecution in tribal and federal forums stemming from conduct regulated by a Tribe's Off-Reservation National Forest Gathering Code that complies with the MOU's provisions [hereafter Complying Tribal Code].

4. **Enforcement and Prosecution of Alleged Violations of Tribal Law.** The parties acknowledge that conduct governed by a Complying Tribal Code also might be governed by federal statutes or regulations which the Forest Service is authorized to enforce in federal forums. Where the underlying conduct or act would be a violation of a Complying Tribal Code and of a federal statute or regulation, the parties agree that the Tribe's court is the preferred forum for dealing the alleged violation. Specifically, the parties agree:

   a. Except as provide in subs. b, any conduct or act which is an alleged violation of a Complying Tribal Code shall be administered and prosecuted in accordance with the provisions of the Complying Tribal Code, provided:

i. The Complying Tribal Code is in force at the time of the alleged violation; and

ii. The Tribe maintains a tribal court with jurisdiction to enforce the Complying Tribal Code.

b. After consultation with the affected Tribe, the Forest Service may initiate a federal enforcement action where the underlying conduct is egregious in nature. Factors to determine egregiousness shall include: the type of conduct involved; the amount of natural resources illegally taken; the nature and extent of the natural resource damages caused by the illegal act; considerations for specific and general deterrence; and considerations for compensating those persons or entities harmed or damaged by the conduct or act.

5. **Agreement Effective Date/Termination.** The Self-Regulation Agreement shall take effect when at least one Tribe, the Forest Service's Eastern Region and the Region's Law Enforcement and Investigations have properly ratified it in accordance with their respective governmental procedures. The Self-Regulation Agreement shall be binding as to and between those entities that ratify it upon notice to the other parties of their ratification as provided in MOU Section IX.

   The Self-Regulation Agreement shall automatically terminate at such time when the requisite combination of parties to make it effective no longer exists, or when the MOU terminates.

6. **Dispute Resolution.** The parties agree that any controversies, disputes, differences or misunderstandings arising out of the Self-Regulation Agreement shall be addressed as disputes under the MOU and handled in accordance with the MOU's provisions.

7. **Amendment of Agreement.** The parties agree that amendments to the Self-Regulation Agreement shall be addressed in accordance with the provisions of MOU Section VI.F.

8. **Required Notices/Parties' Designated Representatives.** The parties agree that the provisions of MOU Section IX shall apply to Notices of Ratification of and Withdrawal from the Self-Regulation Agreement and to the parties' designation of representatives regarding the Self-Regulation Agreement.

APPENDIX C

TRIBAL TIMBER HARVEST FRAMEWORK AGREEMENT

This Tribal Timber Harvest Framework Agreement [hereafter Timber Harvest Framework] is entered into as part of the parties' ratification of the *Memorandum of Understanding Regarding the Recognition and Implementation of Tribal Ceded Territory Rights Guaranteed by the Treaties of 1836, 1837, and 1842* [hereafter MOU]. Specifically, the Timber Harvest Framework implements the MOU's provisions regarding Natural Resource Harvest Management outlined in MOU Section VI.C. It is through the implementation of the Timber Harvest Framework that the Forest Service exercises its authority pursuant to 16 U.S.C. 477; 25 U.S.C. 3055; and the treaties between the Unites States and GLIFWC's member Ojibwe Tribes, specifically the Treaty of 1836, 7 Stat 491, the Treaty of 1837, 7 Stat. 536, and the Treaty of 1842, 7 Stat. 591.

1. **Parties.** The entities that may be parties to the Timber Harvest Framework are the same as those that may be parties to the MOU, as set forth in MOU Section II.

2. **Incorporation of MOU's Provisions.** The MOU, as may be amended from time to time, is specifically incorporated by reference into the Timber Harvest Framework as if set forth in its entirety. The Timber Harvest Framework shall be construed consistent with the purposes and provisions of the MOU, and, except as otherwise specifically provided herein, terms in the Timber Harvest Framework shall have the same definition as provided in the MOU:

   a. For the purpose of this Timber Harvest Framework, timber shall be defined as any "tree" as defined in the attached Model Code, that is not a "lodgepole" or "firewood" as defined in the attached Model Code.

3. **Scope and Purposes of the Timber Harvest Framework.** The Timber Harvest Framework pertains to the Natural Resource Harvest Management principles regarding the Tribes' exercise of their treaty-reserved ceded territory rights. Its primary purposes are to:

   a. Facilitate the exercise of the Tribes' self-regulatory authority over the exercise of those rights through the implementation of a timber harvest management system; and

   b. To detail the process pertaining to the Tribes' implementation of the harvest of timber and salvage timber for domestic and non-commercial traditional and cultural purposes.

4. **Timber Harvest Conditions.** The Parties acknowledge the following conditions to the

Timber Harvest Framework:

a. Timber and salvage timber harvested pursuant to the Timber Harvest Framework may not be used for commercial purposes.

b. The harvesting of timber and salvage timber pursuant to the Timber Harvest Framework must comply with relevant land management plans, the National Environmental Policy act, and all other applicable laws and regulations.

c. The harvesting of timber and salvage timber pursuant to the Timber Harvest Framework shall be in compliance with 36 C.F.R. 223.8.

d. The harvesting of timber and salvage timber pursuant to the Timber Harvest Framework may be conditioned or denied for reasons including:

   i. Protecting public health and safety,

   ii. Preventing interference with Forest Service and/or tribal activities,

   iii. Complying with federal, tribal, and state laws and regulations,

   iv. Ensuring the sustainability of a forest product or tribal sensitive species;

   v. Otherwise protecting ceded territory land and resources.

5. **Timber Harvest Framework Principles.** The parties agree to the implementation of the following Timber Harvest Framework:

a. A tribe initiating a request for the harvest of timber or salvage timber for domestic or non-commercial traditional and cultural purposes shall inform the Voigt Intertribal Task Force [hereafter VITF] of such intent for the purpose of conducting intertribal coordination.

b. Once the VITF has conducted the proper intertribal coordination, the Commission shall send a letter to the tribe of such intent, thereby notifying it whether there is an intertribal conflict with the request.

c. If the VITF determines that there is no intertribal conflict with a request, the Commission staff shall notify the Forest Service that the VITF has conducted intertribal coordination pertaining to the tribe's initial intent to harvest timber or salvage timber for domestic or non-commercial traditional and cultural purposes and that there is no intertribal conflict pertaining to the request. Thereby, the notification shall include a request to consult on the tribe's initial desire to make a request for the harvest of timber or salvage timber for domestic or non-commercial traditional and cultural purposes.

d. The Commission, in consultation with the tribe, shall set up a meeting with the Forest Service, the Tribe and the Commission to discuss the specifics of the potential formal request, which shall include the following:

1) Potential locations where the Tribe may desire to harvest;

2) Approximate number of trees the Tribe desires to harvest;

3) The species and size of timber the Tribe desires to harvest;

4) The approximate year and season when the Tribe desires to harvest;

5) The purpose for which the timber or salvage timber will be put:

i) For domestic purposes, as this term is defined in the attached Model Code.

ii) For non-commercial traditional and cultural purposes, as this term is defined in the attached Model Code.

e. The Forest Service, the Tribe, and the Commission shall set up a site evaluation(s) to determine the feasibility of the proposed harvest location(s). Proposed harvest locations shall be agreed to by consensus of all parties.

f. The Tribe shall submit a formal "Letter of Request of the Tribe for Timber Harvest Purposes" to the District Ranger. The letter of request shall include:

1) The location of harvest;

2) The approximate number of trees to be harvested;

3) The species and size of timber to be harvest;

4) The approximate year and season the timber shall be harvested; and

5) The purpose for which the timber or salvage timber will be put:

i) For domestic purposes, as this term is defined in the attached Model Code.

ii) For non-commercial traditional and cultural purposes, as this term is defined in the attached Model Code.

The Tribe shall provide a courtesy copy (cc) of this letter of request to the Forest Supervisor, the Tribal Liaison for the Chequamegon-Nicolet, Hiawatha and Ottawa National Forests, the VITF, and Commission staff.

g. The Forest Service in consultation with the Tribe and the Commission shall develop an area of operation map.

h. The Forest Service in consultation with the Tribe and the Commission shall develop the necessary decision and analysis documents, including those required by the National Forest Management Act and the National Environmental Policy Act. If either the Tribe or the Commission has the capacity, they may exercise the option to jointly develop the necessary decision and analysis documents for the requested site location.

i. The Commission, the Tribe and the Forest Service shall develop the specific provisions of the "Operating Plan".

j. The Tribe shall issue a tribal permit to the "member" or "tribal entity" as defined in the attached Model Code.

k. The Tribe in consultation with the Commission and the Forest Service shall conduct the necessary monitoring and evaluation of the timber harvest operation.

l. The Tribe in consultation with the Commission shall provide the Forest Service with a final notification that the filed operations on the timber harvest operation are complete.

m. The Tribe in consultation with the Commission shall provide the Forest Service with a final briefing (success story) on the results of the timber harvest request.

5. **Agreement Effective Date/Termination.** The Timber Harvest Framework shall take effect when at least one Tribe, and the Forest Service's Eastern Region have properly ratified it in accordance with their respective governmental procedures. The Timber Harvest Framework shall be binding as to and between those entities that ratify it upon notice to the other parties of their ratification as provided in MOU Section IX. The Timber Harvest Framework shall automatically terminate at such time when the requisite combination of parties to make it effective no longer exists, or when the MOU terminates.

6. **Dispute Resolution.** The parties agree that any controversies, disputes, differences or misunderstandings arising out of the Timber Harvest Framework shall be addressed as disputes under the MOU and handled in accordance with the MOU's provisions.

7. **Amendment of Agreement.** The parties agree that amendments to the Timber Harvest Framework shall be addressed in accordance with the provisions of MOU Section VI.F.

8. **Required Notices/Parties' Designated Representatives.** The parties agree that the provisions of MOU Section IX shall apply to Notices of Ratification of and Withdrawal from the Timber Harvest Framework and to the parties' designation of representatives regarding the Timber Harvest Framework.

Tribal Communication - Written

Fond du Lac Band of Lake Superior Chippewa
Reservation Business Committee

1720 Big Lake Rd.
Cloquet, MN 55720
Phone (218) 879-4593
Fax (218) 879-4146

Chairman
Wally Dupuis

Secretary/Treasurer
Ferdinand Martineau, Jr.

Dist. II Representative
Bruce M. Savage

Dist. III Representative
Kevin R. Dupuis, Sr.

Executive Director,
Tribal Programs
Chuck Walt

Executive Director,
Tribal Enterprises
Michael Himango

May 25, 2016

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101

Pipeline.Comments@state.mn.us

RE: Scoping Comments Regarding the Sandpiper Pipeline and Line 3 Replacement Projects, PUC Docket Numbers for Sandpiper: PL-6668/CN-13-473 and PPL-13-474; Line 3: PL-9/CN-14-916 and PPL-15-137

Dear Ms. MacAlister:

The Fond du Lac Band of Lake Superior Chippewa is a federally-recognized Indian tribe located in Northeastern Minnesota with a reservation consisting of roughly 100,000 acres. In addition to the reservation, the Band also retains usufructuary rights in an additional 9.5 million acres surrounding the reservation. These lands were ceded to the U.S. Government in the Treaties of 1837 and 1854. The Band retains all rights in the Ceded Territories that were not specifically reserved by treaty, including hunting, fishing, and gathering.

The proposed routes for both Sandpiper and Line 3 cut through the Band's Ceded Territories. The Fond du Lac Band of Lake Superior Chippewa submits the following comments regarding Enbridge's Sandpiper Pipeline and Line 3 Replacement projects.

Climate Change

Any new oil transportation infrastructure serves to encourage the country's reliance on an energy resource that is inherently damaging to the world's climate, locking us into an uncertain future for our children, grandchildren, and all future generations. The pipeline would lead to increasing greenhouse-gas emissions, killing our chances of meeting pollution-reduction targets. Continued reliance on energy from oil is altering many resources on Earth, contributing to devastating climate change.

The effects of a changing climate impact the resources on our reservation and Ceded Territories. Several species of interest to the Band are already being adversely impacted by climate change. Wild rice, for instance, is very dependent on steady water levels during the floating leaf stage. Floods on the Reservation in 2012 destroyed the wild rice crop that year. The steep decline of the moose population in northern Minnesota that has been noted over the past twelve years is believed to have been

exacerbated by hotter summers and the increased occurrence of pests. The emerald ash borer has destroyed stands of ash around the state. The health of many Native people, many of whom suffer from asthma, is worsened by mold outbreaks caused by wetter weather and higher ozone levels caused by a hotter climate. A study completed by the National Wildlife Federation ("Facing the Storm: Indian Tribes, Climate-Induced Weather Extremes, and the Future for Indian Country", 2011) details the many ways in which tribes are disproportionately impacted by climate change and the many challenges tribes face in responding to climate-related disasters.

In evaluating the no-action alternative, the DOC must consider the fact that because of the relatively easy availability of things like the tar sands oil, companies like Enbridge continue to exploit damaging energy sources rather than exploring more sustainable alternatives. Projects like this contribute to a significant loss of carbon sequestration related to the forests and wetlands that will be converted or degraded. This continues to bring us down an unsustainable path of reliance on dirty fossil fuels and more carbon emissions, while simultaneously diminishing the natural landscape's inherent resilience and the natural resource services it provides.

Instead of investing in the Sandpiper Pipeline and re-routing Line 3, the no-action alternative allows more investment in alternative energy infrastructure and promotion. Alternative energy resources like solar, wind, and water have the potential to ultimately replace our reliance on dirty oil.

1837 and 1854 treaty rights

The proposed Sandpiper route would pump 375,000 barrels per day of fracked oil across the Band's Ceded Territories. The Treaties of 1837 and 1854 promised the Band a continuation of sustenance from Reservation and Ceded Territories' water and land. Leaks and ruptures would endanger the Mississippi headwaters, Lake Superior watershed, and the wetlands that the Band relies on for our way of life.

Enbridge has a demonstrated history of negligence in pipeline safety. For instance, in 2010 in Michigan, an Enbridge pipe spilled dilbit into the Kalamazoo River, contaminating nearly forty miles of the river. It's not clear if the river will ever go back to pre-spill quality, as it is now six years after the spill and there remain lingering chemicals and crude oil in the river. In 2012, an Enbridge pipe spilled more than 50,000 gallons of light crude oil in rural Wisconsin.

Any spill from the proposed pipelines would likely render cooking, cleaning, and drinking water unusable for hundreds of years. In addition, many of the wetlands on the reservation are peat; any oil spilled into peat will continue to contaminate our resources for eons.

System Alternative

Any route alternative proposed will impact the Great Lakes, as well as the treaty-protected resources of the Band. If Enbridge is allowed to proceed with the Sandpiper and Line 3 projects, they should be required to move the system entirely away from our forest resources, wetlands, and essential water systems. The route alternative options bring pipelines through the Duluth area and create unnecessary harms to the Band's treaty resources, and to Lake Superior.

Pipeline rights-of-way (ROW) do not allow forest cover, causing fragmentation of the forest, including forested wetlands. In turn, that fragmentation disrupts the free movement of wildlife. In addition, fragmentation provides a corridor for invasive plant species to move through the area, since

most invasive plant species in this area are dependent upon full to partial sunlight provided by pipeline ROWs.

Existing pipelines on the Reservation, both active and inactive, have already negatively impacted our wetlands and forests through fragmentation and wetland degradation. The Band needs very clear assurances that our future generations are not left with an Enbridge graveyard to remember us by.

If the Band is to support a pipeline project at all, any system alternative must completely avoid the Great Lakes, not only in Minnesota but in our Ceded Territories in Wisconsin and Michigan as well. The projects should be moved to more agricultural areas of the state, where the cleanup of the anticipated spills will be easier to access and contain.

Cathodic protection and access road and locations

At numerous locations throughout any pipeline route, Enbridge will need to install cathodic protection as well as access roads. When Enbridge completed their installation of Line 67 (Alberta Clipper) and Line 13 (Southern Lights) through the Fond du Lac Reservation, they did not include any cathodic protection or access road locations in their original wetland permit application. The Band later received a separate wetland permit application for Enbridge to install cathodic protection and access roads in wetlands adjacent to MN Highway 210, essentially "piecemealing" the pipeline project. Enbridge needs to identify all locations to be impacted in their project description so that those facilities can also be properly evaluated.

Eco-system valuation

In 2015 Earth Economics published an eco-system valuation of the St. Louis River watershed, finding that

> [t]he St. Louis River watershed provides an estimated $5 billion to $14 billion in ecosystem service benefits per year which provides each of the approximately 177 thousand people living in the watershed an annual benefit of $28,248 to $79,096.
> https://www.glifwc.org/Events/Earth%20Economics%20St%20Louis%20River%20Project%20Report.pdf.

This innovative study recognizes that quantifying the value of our eco-systems gives us better tools to understand the impact that environmental decisions have on the economy as a whole.

A similar study of the eco-systems that could be impacted by the Sandpiper and Line 3 projects should be done by an independent third party, such as the Great Lakes Indian Fish & Wildlife Commission.

Financial assurances

Enbridge must be held responsible for any oil spill that might happen from its pipelines. Before the company is allowed to take on these projects, it should be required to provide evidence of financial assurance, such as insurance or alternative financial security, which covers the full cost of recovery from any disaster which could happen as a result of the presence of its pipelines. The cost should be evaluated using an eco-system valuation study as discussed in the previous section. Enbridge must show that it has

the resources to cover the full costs of pollution damage as well as both remediation and restoration costs incurred by public and tribal agencies in preventing and cleaning up any spill that could happen.

Enbridge's purpose and need for this project is based on the assumption that the global economy will need more oil. This assumption is not well-founded, given recent international commitments to reduce carbon emissions as well as recent plunges in global oil markets. The DOC should fully analyze the no-build, no-replacement alternative, including a full quantification carbon impacts.

The Band looks forward to continued consultation on these issues.

Sincerely,

Wally Dupuis
Chairman

Fond du Lac Band of Lake Superior Chippewa
Reservation Business Committee

1720 Big Lake Rd.
Cloquet, MN 55720
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Executive Director,
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Chuck Walt

Executive Director,
Tribal Enterprises
Michael Himango

June 7, 2016

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101

RE: Scoping Comments Regarding the Sandpiper Pipeline Project and the Line 3 Replacement Pipeline Project, PUC Docket Numbers for Sandpiper: PL-6668/CN-13-473 and PPL-13-474; Line 3: PL-9/CN-14-916 and PPL-15-137

Dear Ms. MacAlister:

The Sandpiper Route Alternative-37 (RA-37), which would traverse through the southern edge of the external boundary of the Fond du Lac Reservation, has been reviewed pursuant to the responsibilities given to the Fond du Lac Tribal Historic Preservation Office (THPO) by the National Historic Preservation Act (NHPA) of 1966 and the Procedures of the Advisory Council on Historic Preservation (36CFR800).

A spatial/graphic review of Fond du Lac's Cultural Resources Inventory identified that RA–37 would traverse within Fond du Lac's Cultural Preservation Zone that includes significant cultural/natural resources that provide a water source and several wild rice waters that the Band depends upon. Wild rice is basic to the traditional diet and important both culturally and spiritually as well as a central element in feasts and ceremonies. The quality of these waters and the aquatic habitat is essentially important to Band members.

From a cultural perspective, in recognition of the ecological importance of key cultural/natural resources within the external boundary of the Reservation, our concerns in regard to RA-37 footprint from both direct and indirect damage potential are substantial.

The Fond du Lac Band of Lake Superior Chippewa strongly requests that the Route Alternative RA-37 be omitted from the EIS Scoping Decision Document and no further analysis of this alternative be conducted.

The Band looks forward to continued coordination and consultation on this issue.

Sincerely,

Wally Dupuis

Wally Dupuis
Chairman

Fond du Lac Band of Lake Superior Chippewa

TRIBAL HISTORIC PRESERVATION OFFICE

1720 Big Lake Road, Cloquet, MN 55720

Phone 218-878-7129 E-Mail jillhoppe@fdlrez.com

March 16, 2017

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500, Saint Paul, MN 55101

Dear Jamie,
Per the Fond du Lac Resource Management meeting with the Minnesota Department of Commerce held on 3/2/17, we discussed that if Fond du Lac Resource Management provided concerns in regard to Enbridge Line 3 Replacement Project by 3/17/17, the Minnesota Department of Commerce would include concerns provided in the Draft Environmental Impact Statement. As a result, Fond du Lac Resource Management has documented concerns, which are attached to this letter.

Please let me know if you have any questions or comments.

Sincerely,

Jill Hoppe
Fond du Lac Tribal Historic Preservation Officer

Summary of Fond du Lac Resource Management Concerns Regarding Enbridge Line 3 Replacement Project

1 Treaty Rights

- Any Line 3 Route Alternatives, with exception of Line 3 System Alternative Route, would cut through the Band's Ceded Territories where the Band retains usufructuary rights. These lands were ceded to the U.S. Government in the Treaty of La Pointe of September 30, 1854, 10 Stat. 1109, the Treaty with the Chippewa October 4, 1842, 7 Stat., 591, and the Treaty with the Chippewa July 29, 1837, 7 Stat. 536. Pipeline leaks and ruptures would endanger the Mississippi headwaters and Lake Superior watersheds, and the wetlands that the Band relies on for our way of life. Any spill from the proposed pipelines would likely render cooking, cleaning, and drinking water unusable for hundreds of years or more.
- Within the external boundary of the Fond du Lac Reservation alone, 47% is water resources/wetland. Many of the wetlands on the Reservation are peat; any oil spilled into peat will continue to contaminate our resources for an unknown period of time.
- As Indigenous people of North America, we have been marginalized through the extraction of resources in this hemisphere, our socio economic means have been displaced and the emphasis on extraction of the resources of our homeland has appropriated our ways of life.

2 Wild Rice

- Wild rice is central to Ojibwe culture; it is considered a special gift from Manidoo, the Great Spirit.
- Wild rice waters are recognized by the Ojibwe as Traditional Cultural Properties—wild rice is basic to the traditional diet and important culturally, spiritually, economically as well as a central element in feasts and ceremonies.
- Wild rice plants are very sensitive to pollution, invasive species, changes in water levels and land use development and practices. A history of environmental degradation has taken its toll on wild rice waters with western expansion and development.
- Deadfish Lake on the Fond du Lac Reservation is an important wild rice lake upon which Band members depend. Although this wild rice lake is located more than 1,200 feet from Line 3 Existing Route, there is a location of a ditch that Line 3 Existing Route crosses that feeds directly into Dead Fish Lake. Any spill, regardless of size will likely impact this important wild rice water. If this were to occur, it is unlikely any member of the Fond du Lac Band of Lake Superior Chippewa would willingly harvest rice from this lake, regardless of the extent of spill recovery and remediation.

3 Water

- It is important to clearly articulate the importance of water to the Ojibwe people. Nibi (water) is the lifeblood of Mother Earth, coursing through streams and rivers like blood through vessels; for earth to be strong and healthy, capable of sustaining life for generations to come, it must be kept clean. Nibi is sacred and it is our responsibility to keep it pure; it is our source of life and the lives of all plants and animals that share the earth.
- Any Line 3 Route Alternatives, with exception of the Line 3 System Alternative, will pose a threat to the Lake Superior watershed and ultimately the Great Lakes, as well as the treaty-protected resources of the Band.
- Line 3 Existing Route and other pipelines in proximity have altered hydrology in areas within Fond du Lac Reservation and Ceded Territories.

- With the exception of the Line 3 System Alternative Route, all Line 3 Routes through Minnesota have the potential to impact millions of acres of freshwater wetlands.
- **Line 3 Applicant Preferred Route** would traverse at least 14 named rivers and 13 unnamed tributaries in the 1854 Ceded Territory, and 3 named rivers and 6 tributaries in the 1842 Ceded Territory. **Line 3 Route Alternative** would traverse at least 22 named rivers and 26 unnamed tributaries in the 1837 Ceded Territory, 4 named rivers and 4 tributaries in the 1854 Ceded Territory, and 3 named rivers and 6 tributaries in the 1842 Ceded Territory, and 3 named rivers and 6 tributaries in the 1842 Ceded Territory. **Line 3 Existing Route** traverses at least 2 named rivers and 7 tributaries in the 1854 Ceded Territory and 3 named rivers and 6 tributaries in the 1842 Ceded Territory.

4 Cultural Resources

- All Line 3 Route Alternatives in Minnesota would traverse numerous wetlands, streams, lakes, and fisheries. The quality of these waters is vitally important to Band members and possible effects from contaminated water include disruption of the Bands' traditional way of life based on the harvest of fresh water fish, game, wild rice and other aquatic habitat culturally significant to the Bands.
- The pipeline right-of-way permanently removes forest cover which fragments the forest and leaves unnatural open spaces which may lead to reduction of wildlife habitat and animal pattern/migration changes.
- FDL Ordinance #03/14 – Preservation of Cultural Resources was enacted to protect and preserve FDL Cultural Resources; a subsequent Cultural Preservation Zone was established around culturally sensitive areas within the external boundary of the FDL Reservation. Line 3 Existing Route traverses near FDL's Cultural Preservation Zone where there exists Traditional Cultural Properties, archaeological and historic sites and other cultural resources, all of which are vulnerable to the potential impact of contaminants from a crude oil release reaching cultural sites.

5 Climate Change

- The increase in capacity for pumping oil and bitumen will result in impacts to the climate. These impacts need to be accounted for through quantification of climate change impacts. For example, the cost of petroleum extraction, the cost to our climate from production of the steel used to transport the oil, the cost of pumping the oil, the cost of trucking to transport the pipe and other assorted materials used in construction of the pipeline, the cost of the refining process, and the cost of using the oil once it is transported and refined.
- Any new oil transportation infrastructure serves to encourage the country's reliance on an energy resource that is inherently damaging to the world's climate, locking us into an uncertain future for our children, grandchildren, and all future generations. The pipeline would lead to increasing greenhouse-gas emissions, reducing our chances of meeting pollution-reduction targets. Continued reliance on energy from oil is altering many resources on Earth, contributing to devastating climate change.

6 Air Emissions

- Air emissions generated during the pipeline development phase may include digging, increased vehicle traffic, and continuous idling. Spill mitigation can release significant amount of air emissions. Air emissions from refining and final usage are of significant local and global concern.

7 Invasive Species

- The pipeline corridor encourages the overgrowth of invasive non-native species such as wild parsnip (*Pastinaca sativa*), which was not present on the Fond du Lac Reservation prior to Enbridge pipeline work in 2009, but has now spread outside the corridor and is found along some roads within the external boundaries of the Reservation. Although an official survey has not occurred, Fond du Lac conservatively estimates at least 80 acres has been infested with wild parsnip which forms dense stands that compete with native plant growth thereby reducing plant biodiversity and altering the natural setting. Wild parsnip contains chemicals that cause severe dermatitis making it problematic in infested areas for harvesting/gathering medicinal plants, berries, and other forest products culturally significant to the Bands. Pipeline construction and maintenance activities have also introduced purple loosestrife (*Lythrum salicaria*) to new areas along the Enbridge pipeline; the locations of which are often difficult to access for proper control efforts. Other invasive species including sweet clover, tansy, and spotted knapweed are also a concern on the Enbridge right-of-way, the Reservation and in the Ceded Territory. The presence of invasive species diminishes resources on Reservation and Ceded Territories.

8 Land Use

- Line 3 Existing Route that traverses through the FDL Reservation takes up approximately 360 acres. Line 3 Applicant Preferred Route takes up approximately 482 acres in the 1854 Ceded Territory and approximately 124 acres in the 1842 Ceded Territory. This diminishes Reservation/Treaty resources.

9 Environmental Justice

- Line 3 Existing Route traverses through Fond du Lac and Leech Lake Reservations. If significant impacts were to occur, the damage could disproportionately affect tribal and low-income populations.
- Pipeline proponents anticipate pipeline development could benefit low-income, minority, and tribal populations by creating job opportunities and stimulating local economic growth; however, noise, dust, visual impacts, wildlife and plant habitat destruction, introduction of invasive species, adverse land use changes, and increased risks to the quality of water and land which the Bands depend upon for sustenance may adversely affect traditional tribal lifeways and sites of spiritual and cultural significance. Additionally, an insignificant number of Native Americans are employed by pipeline development.
- An increase in the Line 3 pipeline flow/expansion (from 34” to 36” pipe) certainly leads to an increase in the potential for spills and for the magnitude of the affected spill area to be large. Any diminishment of natural resources or access to those resources amounts to a diminishment of Treaty-protected rights, which are also tribal property rights. Accidental spills do occur, and any expected loss of natural resources should be analyzed and quantified.

10 Soil Disturbance

- Vegetation and topsoil removal and mixing of soil horizon leads to reduction in plant diversity, potential for increased erosion and introduction/perpetuation of invasive, noxious plant species.

11 Financial Assurance

- Through time, all pipelines will need to be removed or decommissioned. What is the financial assurance for total remediation and restoration of Line 3 Existing Route pipeline corridor?

12 Eco-System Valuation

- In 2015 Earth Economics published an eco-system valuation of the St. Louis River watershed, finding that the St. Louis River watershed provides an estimated $5 billion to $14 billion in ecosystem service benefits per year which provides each of the approximately 177 thousand people living in the watershed an annual benefit of $28,248 to $79,096. This innovative study recognizes that quantifying the value of our eco-systems gives us better tools to understand the impact that environmental decisions have on the economy as a whole. The study can be found here: https://www.glifwc.org/Events/Earth%20Economics%20St%20Louis%20River%20Project%20Report.pdf. A similar study of the eco-systems that could be impacted by Line 3 projects should be done by an independent third party, such as the Great Lakes Indian Fish & Wildlife Commission.

13 Energy Alternatives

- Since 2007, Fond du Lac has reduced our carbon footprint and reduced energy usage by 40%. It is FDL Resource Management's position that although the United States is currently dependent upon crude oil, the world needs to begin a concerted effort to greatly reduce this dependence. The construction of new crude oil pipelines and the increase of capacities of existing pipelines encourage an increase in our dependence. Discussion of this reduction should be included to help illustrate what a less dependent scenario would look like.
- Extractive industries should take a percentage of their profits and contribute towards alternative energy.

LEECH LAKE BAND OF OJIBWE

***Carri Jones**, Chairwoman*
***Donald Finn**, Secretary-Treasurer*

***Robbie Howe**, District I Representative*
***Steve White**, District II Representative*
***LeRoy Staples-Fairbanks III**, District III Representative*

Friday, October 25, 2013

Tracy Smetana
Minnesota Public Utilities Commission
121 7th Place E., Suite 350
St. Paul, Minnesota 55101

Re: MN-PUC Docket No. PL6668/CN-13-473

To Tracy Smetana:

The Leech Lake Band of Ojibwe (the "Band") is in receipt of your letter dated October 4, 2013 regarding the Notice of Certificate of Need Application for the Sandpiper Pipeline Project to Chairwoman Carri Jones. I am writing this letter regarding the proposed alternate route, which runs through the Leech Lake Indian Reservation (the "Reservation").

Enbridge Pipelines (North Dakota) ("Enbridge") does not have legal or regulatory approval to expand its existing corridor through the Reservation. I understand that Minnesota State law may require the Public Utilities Commission ("PUC") to have applicants outline a preferred route and an alternate route, but the Band needs to inform the PUC and the State of Minnesota at this early stage that Enbridge **does not** have legal or regulatory approval to build an additional pipeline across the Reservation. Therefore, I respectfully request that the PUC insist on a new alternate route that does not enter the exterior boundaries of the Reservation.

Enbridge lists the route through the Reservation as an "alternate route" and not the "preferred route." However, the "alternate route" is not an alternate at all as it is an impossible route. The perplexing aspect of this situation is that Enbridge is fully aware that it has neither the legal nor regulatory capability to build another pipeline through the Reservation, and should have listed their alternate route as a route that does not enter the exterior boundaries of the Reservation.

The reason Minnesota law requires applicants to list both a preferred route and an alternate route is in the event the preferred route does not work for one reason or another. Because Enbridge's proposed alternate route is a legal impossibility at this time, I respectfully ask the PUC to insist on a new alternate route that does not enter the Reservation.

115 Sixth St NW, Cass Lake, MN 56633
Telephone: 218-335-8200 Fax: 218-335-8309

Thank you for your time and attention to this important matter. I look forward to hearing your response at your earliest convenience. If you have any questions or concerns, please contact me at (218) 335-8200.

Sincerely,

Steven Howard
Executive Director
Leech Lake Band of Ojibwe

Cc: Leech Lake Tribal Council Members
Lenny Fineday, LLBO Legal Director
Jim Crawford, Enbridge Project Director

Dkt Nos. CN-14-916
PPL-15-137

LEECH LAKE BAND OF OJIBWE
DIVISION OF RESOURCE MANAGEMENT
115 6th ST. NW Suite E, Cass Lake, MN 56633

Date 1/2/17

RECEIVED
JAN 17 2017
MINNESOTA PUBLIC
UTILITIES COMMISSION

Daniel Wolf, Executive Secretary
Minnesota Public Utilities Commission
121 7th Place E Suite 350
Saint Paul, Minnesota 55101

Re: **Final Scoping Decision**

Dear Mr. Wolf,

I'm writing to ensure decision makers are not make conflicting decisions and clarity between our two entities in regards to work that Minnesota Department of Commerce (MNDOC) is preforming on the Line 3 Replacement Proposed Final Scoping Decision Document undertaken at the order of the Minnesota Utilities Commission (MNPUC). There are several flaws with the document which have yet to be rectified by MNDOC which I have specifically outlined in the bullets;

- Scoping Document lists Tribal Coordination with the 2 sentences injected in the Environmental Review Process Section 2.0 of the Proposed Scoping Decision Document. There are two standalone Route Alternatives that are listed in your scoping document that cross the Leech Lake Indian Reservation (LLIR) this section does not accurately portray the role of Leech Lake Band of Ojibwe and other decision makers within the LLIR.

- Page 13, of the Proposed Scoping Decision Document states that RA-03 AM was eliminated because it was based on Screening Analysis of economic and regulatory feasibility, Environmental impacts and socioeconomic effects. Routes RA- 07 and RA - 08 should be dropped as well because they too overriding reasons such as regulatory feasibility (See Attached Leech Lake Resolution) that eliminates these routes from consideration.

- Section 3.3.5 of the Proposed Scoping Decision Document discusses evaluating removing line in place and replacing it with new pipe with no discussion with other governmental decision makers to discuss whether that would be regulatory feasible.

- The First Paragraph on page 19 of the Proposed Scoping Decision Document is not only inaccurate it seems to have a mischievous intend to escape the issue that the Leech Lake Band of Ojibwe and other federal agencies will be issuing permits and making decision if

RA -07 and RA-08 are selected. None of the required permits or approval decisions is listed in section 7.0 which the document is portraying. Yet all the requirements for the Applicants proposed route are listed.

- The State Environmental Impact Statement (EIS) will be analyzing the removal of existing line and construction of pipeline in same trench and yet does not list any of those permits and decisions that will have to take place within the exterior boundaries of the LLIR.

- Section 4.4.4.3 Wild Rice and Other Tribal Resources There is mention of Leech Lake Band of Ojibwe hunting and fishing agreement with the State of Minnesota which clearly states that LLBO has exclusive authority to regulate Wild rice within the exterior boundaries of the LLIR.

I understand that this scoping document is being drafted for state use but strongly urge you share these issues with alternative routes or lack of information with the decision makers to ensure that integrity of the EIS is protected. I'm also aware there was not a public meeting on the LLIR when developing this state document which has selected two alternatives to be scoped that lie within the LLIR. In closing Routes RA-07 and RA-08 cross an Indian reservation and/or the National Forest which it shares a common border and the document which state officials will be making a decision fail to address this in any shape or form. If there are questions or comments please contact myself at (218)-335-7400.

Sincerely,

Levi Brown, Director
Environmental-Land Department
Leech Lake Band of Ojibwe

Cc:
U.S. Forest Service
Bureau of Indian Affairs
Army Corp of Engineers

Attachments: LLBO Letter to MNDOC Dated April 3, 2015

CN-14-916
PPL-15-137

LEECH LAKE BAND OF OJIBWE
DIVISION OF RESOURCE MANAGEMENT
115 6th ST. NW Suite E, Cass Lake, MN 56633

Date 4/3/15

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500, Saint Paul, MN 55101

Re: Comments to Scoping Request of MN Department of Commerce

Dear Ms. MacAlister,

We appreciate the conversation that was had on February 16th, 2016 at the Leech Lake Division of Resource Management in Cass Lake on the Leech Lake Indian Reservation. To ensure clarity my letter in no way speaks for the White Earth government or any other Minnesota tribal entity, it is only meant to clarify and ensure the conversation was captured correctly. Below I have bulleted all the major discussion items from our February 16th, 2016 conversation;

- The Line 3 Project application is not only a requesting of a new corridor but reviewing whether current placement is appropriate and also the decommissioning of the existing Line 3 which a portion would take place within Indian country. Leech Lake Band of Ojibwe would be the decision maker on how any decommissioning would be implemented within our regulator boundaries.

- Scoping of the alternative route through Indian country should involve the decision makers along that route. In this case ACOE, CNF, BIA and EPA.

- If these decision makers are not included in the scoping process as decision makers it makes the NEPA process incomplete and no federal agency can use the State EIS document.

- The alternative route would have an incomplete review of a section of 46 miles through the LLR and my recommendation is that it is dropped from the alternative routes because of the lack of decision making authority.

- All appropriate regulators along a route should be listed as cooperatives agencies because the permits and activities needed will and should be scoped in any MEPA/NEPA process.

Why do Tribal and Federal trustees need to be cooperative agencies when scoping involves Indian Country?

- Because Tribes are adversely affected by climate change because of the subsistence lifestyles and cultural identification.

- Environmental Justice issues such as why would a route currently with 6 crude pipelines, 2 natural gas pipelines, railroad corridor and major powerline corridor **even be considered.**

- Historically it is easier for applicants of such permits to get approved permits through the lands of minority people who are perceived to historically have a limited voice.

- The socio-economic impacts to natural resource access and loss of resources mitigation would be required to offset these impacts.

- NEPA requires that decision making authorities be addressed up front and not as general public entities but instead as cooperating agencies.

- In this case LLBO is a decision maker along alternative route through LLR with our federal partners and we are not cooperating agencies to the NEPA document which would be a fundamental flaw in the NEPA process or document.

- The Alternative routing issue can be easily addressed by simply dropping the route through LLR from consideration.

Why is the cooperative approach to decision making important through Indian country?

- Shared information
- Accurate and defensible Studies/NEPA Documents
- Reach Common Decisions in multiple jurisdictional routes

In closing it is our hope that the Minnesota Department of Commerce recognizes that to properly scope the existing corridor for Line 3 as an alternative route that there is a whole spectrum of issues and regulators would need to be addressed outside of a Minnesota State Environmental Impact Statement. If there are questions or comments please feel free to contact my office at (218)-335-7400.

Sincerely,

Levi Brown, Director
Environmental-Land Department
Leech Lake Band of Ojibwe

Misi-zaaga'igani Anishinaabeg Cultural Resources StatementIDefinition

The Mille Lacs Band of Ojibwe (Misi-zaaga'igani Anishinaabeg), defines its cultural resources as the ceremonial areas, cemeteries, archaeological sites and artifacts, bodies of water, wild rice lakes and rivers, wildlife, and medicinal plants within the historical Ojibwe native region. Cultural resources also include the language, customs, beliefs, and significant items of the Ojibwe people. The Mille Lacs Band of Ojibwa's cultural resources were inherited from previous generations, sustaining the Ojibwe people of today, and are carefully managed for future generations.

Archaeological resources have been defined by the Mille Lacs Band of Ojibwe as, "' Archaeological Resources' means any remains of the past human life or activities which are of archaeological or historical interest. Such material remains shall include, but not limited to: pottery, basketry, bottles, weapons, weapon projectiles, tools, structures or portions of structures, pit houses, rock paintings, rock carvings, intaglios, talus slide depressions, cairns, graves, human skeletal remains, or any portions or piece of any of the foregoing items. The material may also include non-fossilized or fossilized paleontological species, or any portion or piece thereof, whether or not found in an archaeological context. No item shall be treated as an archaeological or historical resource unless such an item is at least fifty years of age."

The Mille Lacs Band of Ojibwe Department of Natural Resources adheres to the Cultural Resources Code (1072-MLB-23) for all cultural resource management activities, and specific definitions. The Cultural Resources Code was enacted prior to the formation of the Tribal Historic Preservation Office, but cultural resource management practices were always practiced by taking only what we needed from the environment and thanking the creator for what was taken.

To better understand when we talk cultural resources such as the wildlife, ceremonial areas, cemeteries, archaeological sites and artifacts, bodies of water, wild rice lakes and rivers, and medicinal plants within the historical Ojibwe native region, that these areas were named in Ojibwe and hold a cultural significance to its name. Below is a list of some Ojibwe wildrice lake names. Ojibwe place names of the wild rice lakes within the proposed pipeline route are: Waukenabo Lake - Waakonaaboo-zaaga'igan, White Elk Lake - Waabadiko-zaaga'igan, Steamboat Lake - Gaa-bakezaagidawaag-zaaga'igan, Portage Lake - Nitamaa-makandwe-zaaga'igan, Mud Lake - Gaa-baagwajiishkiwagaag-zaaga'igan, Island Lake - Gaa-minisiwaang-zaaga'igan, Rice Lake-Baagwaan-manoominikaani-zaaga'igan, Mud Lake- Gaa-baagwajiishkiwagaag-zaaga'igan, Washburn Lake - Jiiga'awe-zaaga'igan, Pine Lake - Azhiganegamaag-zhingwaakokaag-zaaga'igan. It is important to note many Ojibwe names may have been forgotten. Therefore, many of the English names listed below once had Ojibwe names associated with them.

The Ojibwe lived amongst many village sites, located along the lakes and rivers, for subsistence. Hunting the animals of the region, the fish of their choice, medicines needed, and gathering certain plants and berries. The Ojibwe did not place boundaries around their homeland; families buried the deceased near their villages, usually along the lakes and rivers. For better understanding read Mille Lacs Band of Ojibwe statue Title 11. In particular 1.(d) states:

"(d) It is the purpose of Subchapters I and II of this chapter, to perpetuate commonly held traditional beliefs, amongst American Indian people that human beings have a duty to peacefully co-exist within the natural environment. Human beings further have a natural duty to protect the environment which provides humans with life-sustaining natural resources."

Due to the preferred route crossing many rivers, streams and running next to many lakes is why inadvertent discovery of artifacts and old village sites and even human remains may happen in the corridor of this pipeline.

Submitted by:
Tribal Historic Preservation Office of the Mille Lacs Band of Ojibwe
Natalie Weyaus, Tribal Historic Preservation Officer
John Reynolds, THPO Review and Compliance Officer
Terry Kemper, THPO Assistant and Cultural Advisor

Misi-zaaga'igani Anishinaabeg EIS Fisheries Concerns

Introduction:

This document was compiled by the Misi-zaaga'igani Anishinaabeg (Mille Lacs Band of Ojibwe) Fisheries Department. It addresses the Mille Lacs Band of Ojibwe (MLBO) fisheries concerns regarding the construction of Enbridge's Line 3 Applicants Preferred Route pipeline. We give permission and encourage all government agencies and private parties drafting the Environmental Impact Statement (EIS) to utilize the information below at any step in the EIS process (especially the analysis). Please don't hesitate to contact the MLBO fisheries department for any questions or concerns relating to this document (contact information on last page).

McGregor, MN, area fisheries:

The MLBO has tribal members and lands less than 10 miles south of McGregor, MN, as well as in the Big Sandy region just north of Enbridge's Line 3 Applicant's Proposed Route (APR). Tribal members in this region subsistence fish the culturally important Ooga (walleye) as well as other fish species. Consequently, an oil spill in the watersheds in this region would contaminate aquatic resources thus posing a threat to the fish and thus our tribal members fishing rights. In particular the following waterbodies are of concern to the MLBO. Brief rational are included below:

Rice Lake, Rice River, and Wayfield Brook: If oil spilled where the Rice River HUC-10 watershed intersects the APR, Rice Lake (MN-DNR DOW #: 01006700), Rice River, and Wayfield Brook would be contaminated. Oil contamination would first occur in Wayfield Brook and eventually travel to Rice River, Rice Lake, and then into other waterbodies located in the Rice River watershed region. These three waterbodies are fished by tribal members. They contain the sacred Ooga (walleye), other fish species, crayfish, and clams all of which are great cultural importance.

Big Sandy Lake Reservoir: The APR goes almost entirely through the Big Sandy Lake HUC-10 watershed. A spill anywhere in this watershed would contaminate Big Sandy Lake (MN-DNR DOW #: 0100620) destroying or causing serious problems for fish species and other aquatic organisms. Big Sandy Lake contains one of the most valuable walleye fisheries in the region. While the walleye fishery in Big Sandy Lake remains stable, surveys conducted by the Minnesota DNR indicate that the walleye population suffers from poor recruitment. Several factors make this walleye fishery threatened and particularly sensitive to oil spills. First, Big Sandy Lake already has a pollution problem that is impacting resident fish species. The

Minnesota Pollution Control agency has listed the lake as “impaired” due to high phosphorus levels. Second, Big Sandy Lake is home to the culturally important odoonibiins (tullibee). The tullibee is not found in most Minnesota lakes as it is sensitive to warm summer water temperatures. Consequently the best walleye fisheries in Minnesota also have tullibee present as they are an important prey item. The APR poses a direct threat to tullibee (and therefore walleye). If pollutants get any greater they could destroy the tullibee population. Changes in water clarity, food web alteration, and increased water temperatures are just a few examples of how tullibee could be impacted by an oil spill. Tullibee are also modeled to become extinct in many Minnesota lakes due to climate change. Therefore, adding more stressors to the tullibee could create a population crash that would directly impact walleye abundance. All fish species, clams, crayfish, and other aquatic organisms are especially important to the Ojibwe in this region. The Ojibwe that survived in this region relied on these organisms for food and ceremonial purposes. When the oil spills, tullibee, walleye, other fish species, crayfish, and clams will become contaminated. This contamination will adversely impact our band member’s health as they still consume these organisms. Furthermore, ceremonies to celebrate aquatic life in the spring are still conducted. It would be offensive to the Ojibwe if they had to conduct these ceremonies in an oil polluted lake.

Lake Minnewawa- This lake also has tribal lands and members in the vicinity. Lake Minnewawa also contains walleye and other fish species our tribal members harvest. Unfortunately, according to Minnesota DNR data poor walleye natural reproduction occurs and the population is well below their long term management goal. Like Big Sandy Lake an oil spill would be catastrophic as the walleye population is already vulnerable due to anthropogenic environmental changes.

Sandy River: The APR directly crosses the Sandy River. If an oil spill occurred at this location Big Sandy Lake, Flowage Lake, Sandy River Lake, Rat Lake, Lake Minnewawa, and any lakes in the Big Sandy Lake watershed would be contaminated and have their fish species negatively impacted. It is also possible that even the construction of the APR could cause problems for fish populations in this watershed. Sandy River is the source of water for these lakes. Disturbances resulting from pipeline construction could increase water temperatures primarily from increased erosion, deforestation, and diverted water flow. Furthermore, construction equipment could contaminate the water as well as bring in aquatic and terrestrial invasive species from other construction locations.

Trout Streams: If oil spilled in the Rice River watershed Long Lake Creek (M-115-4-1) would be impacted. Long Lake Creek is a Minnesota DNR designated trout stream and has contained a harvestable population of Brook Trout. The creek is also home to the Central Mudminnow, Blacknose Shiner, Creek Chub, and Pearl Dace.

Scientific description of oil spills impact on fish and humans: Oil containments have many negative short and long term effects on fish populations (Rosenthal and Alderdice 1976; Teal and Howarth 1984; Eisler 1987; Bue et al. 1996). These effects include reductions in embryonic survival, disrupted spawning activities, reduced growth, and genetic abnormalities that are passed on to offspring. (Bue et al. 1996; Marty et al. 1997; Murphy et al. 1999; Heintz

2000; Dubansky 2013). Oil spill contaminates would also reduce and disrupt benthic organisms which are essential to fishes survival (Elmgren et al. 1983; Jewett et al. 1999). Furthermore, Polyaromatic Hydrocarbons (PAH's) increase in fish tissues after oil spills (Birkholz 1988; Allan et al. 2012). PAH's may increase cancer risks in people that consume contaminated fish if concentrations get to high (Eisler 1987; Cheung 2007; Zhonghuan et al. 2010). Therefore our Band member's health could be jeopardized by consuming Ooga (walleye) or other fish species when the spill occurs.

Baseline data required: Prior to completion of the APR the MLBO would like to see an extensive fisheries baseline data collection completed in Big Sandy Lake, Lake Minnewawa, Rice Lake, and other surrounding lakes that are connected to the Sandy River. Therefore, when the oil spill occurs its impact can be evaluated and fisheries management adjustments can be made. This baseline data set should include compiling a microchemical profile on otoliths extracted from fish species. These otoliths should be analyzed and an elemental profile should be complied using at least 33 concentrations of isotopes. This will enable future otolith microchemistry studies once the spill occurs and will allow for managing agencies to identify chemicals associated with oil spills in Minnesota for use in future studies. For further explanation of methodology we suggest following the procedures outlined in Nelson et al. 2015. We also suggest establishing baseline abundances, growth rates, and relative condition of walleye and other fish species before construction of the APR. We suggest that this approach be used when considering any pipeline construction in Minnesota.

Mille Lacs Band of Ojibwe greater Minnesota concerns:

Mille Lacs Band of Ojibwe members have the right to fish anywhere in Minnesota. Therefore in this section I address the MLBO's fisheries concerns along the APR's route outside of the Big Sandy/Rice Lake region. Additionally, the concerns below mainly analyze the APRs impact in the 750 foot right of way (here on referred to as the 750 ROW). We hope that the agencies tasked to compile the EIS analyze the impacts of oil spills at the watershed level as well.

Trout streams – 750 ROW: There are approximately 7 trout streams the APR crosses directly (750 ROW). When the oil spills contamination will be immediate. Trout in general are a very sensitive fish that need cold/clean water to survive. Construction of the pipeline alone would cause damage to these trout populations. These streams are within the 750 ROW (Minnesota DNR ID in parentheses):

King Creek (M-050-046-029-023)
Unnamed Stream (M-050-046-029-023-002)
Straight River (M-096-035-002-002)
Spring Brook (M-106-004-002-001)
Blackhoof River (S-001-003)
Unnamed Stream (S-001-003-029)
LaSalle Creek (M-163)

Furthermore, many of the above trout streams are located in remote areas which will make oil spill clean-up difficult.

Trout Streams – 2 mile radius: 41 streams, comprising over 221 miles of trout and coldwater fish habitat, are located within 2 miles of the APR. While some do not have direct contact, based on their HUC-10s contamination from an oil spill will be likely.

Tullibee sensitive lakes: As the plant warms due to climate change tullibee will start to go extinct in many Minnesota lakes. The Minnesota DNR along with the University of Minnesota conducted a study identifying lakes (refuge lakes) that tullibee will survive in despite climate change (Fang et al. 2010). Using data from this study we have identified two lakes along the APR 750 ROW that are considered tullibee refuge lakes. County names are listed in parentheses below.

Lakes: Roosevelt (Cass) and Washburn (Cass).

Walleye Lakes: The following walleye lakes come in direct contact with the APR or have streams/rivers that come in contact with the APR that flow into them. Therefore, these are the lakes that will be impacted if a spill occurs within the APR 750 ROW. Note that many lakes are connected. So if the first lake upstream is impacted more lakes further downstream will be impacted as well. County names are listed in parentheses below.

Lakes: Big Lasalle (Clearwater), Two Inlets (Becker), Island (Hubbard), Blueberry (Wadena), Twin Lakes (Wadena), Roosevelt (Cass), Bass (Aitkin), Park (Carlton), Washburn (Cass), Upper Twin (Hubbard), Lower Twin (Hubbard), First Crow Wing (Hubbard).

The MLBO recommends looking further than the APR 750 ROW to assess the impact of oil spills on walleye and other fish species. Many of these lakes that are further downstream have invasive species and an oil spill could magnify the negative impacts already caused by these species.

Muskie Lakes: Roosevelt Lake (Cass County) is a designated Minnesota DNR muskie lake. Muskie are very important to non-native recreational anglers. When the oil pipeline bursts it will have negative impacts on muskie spawning habitat and survival.

Sentinel Lakes: These lakes are being monitored by the Minnesota DNR, USGS, University of Minnesota, and other government entities. These lakes were chosen for long-term monitoring so the impacts of invasive species and climate change could be evaluated. Sentinel Lakes are crucial as they provide data that is used to improve and construct other lake management plans. Below are lakes that are within or have streams that cross the APR 750 ROW. If oil spilled or even construction equipment disturbed the area, the research would be impacted. This would impact other lake management plans, thus interfering with the Minnesota DNRs ability to manage lakes within the 1837 Ceded Territory. The lakes below will be impacted. County names are listed in parentheses.

Lakes: Roosevelt (Cass).

Invasive Species Concerns: Several lakes that have water sources that intersect the pipeline have invasive species in them. Most invasive species present a direct threat to walleye and other native fish populations. An oil spill, pipeline construction, or any other anthropogenic disturbance could magnify the negative impacts aquatic invasive species have on resident fish communities. Below is list of infested lakes that would be negatively impacted by the APR. County names are listed in parentheses below.

Lakes: Upper and Lower Twins (Hubbard County): Faucet Snail, Washburn (Cass): Eurasian Milfoil, First Crow Wing (Hubbard County): Faucet Snail, Crow Wing River (Hubbard): Faucet Snail.

All aquatic species concerns: In Ojibwe teachings the creator created all living things. Therefore, all aquatic organisms were made in the eyes of the creator and should be respected. Additionally, it is our ethical obligation as natural resource managers (and humans) to protect all aquatic life. Therefore, we hope that the professionals drafting this EIS analyze the impact of an oil spill on all aquatic organisms and not just gamefish species of monetary value.

Data sets to add:

After further review of the EIS impact assessment draft the MLBO fisheries department is suggesting the following data sets be added:

- https://gisdata.mn.gov/dataset/biota-muskie-lakes-in-mn
- https://gisdata.mn.gov/dataset/water-dnr-hydrography
- https://gisdata.mn.gov/dataset/env-sentinel-lakes-slice-program
- http://dnr.state.mn.us/invasives/ais/infested.html (Download the spreadsheet). The current invasive species ARC GIS file does not list the actual invasive species names that infested waterbodies contain.
- https://gisdata.mn.gov/dataset/water-fisheries-reclamations
- Tullibee Refuge Data: http://files.dnr.state.mn.us/fish_wildlife/fisheries/slice/slice-sim-cisco.pdf. The impact the oil spill will have on tullibee refuge lakes should be analyzed. The above link is to a study containing 620 of them. The Minnesota DNR should be contacted to get the shapefile so these lakes can be plotted in ARC GIS. The authors are listed in this paper. It is also recommended that the impact of the oil spill on all tullibee lakes be analyzed, not just the refuge ones.

References*

Fang, X., S. R. Alam, L. Jiang, P. Jacobson, D. Pereira, H. G. Stefan. 2010. Simulations of Cisco Fish Habitat in Minnesota Lakes under Future Climate Scenarios. St. Anthony Falls Laboratory. Retrieved from the University of Minnesota Digital Conservancy: http://hdl.handle.net/11299/115600.

Nelson, T. R., D. R. Devries, R. A. Wright, and J. E. Gagnon. 2015. Fundulus grandis Otolith Microchemistry as a Metric of Estuarine Discrimination and Oil Exposure. Estuaries and Coasts 38: 2044.

*Additional references can be provided upon request

** This document was completed by utilizing all data outlined in the current EIS impact assessment draft. Additional data was obtained from the Minnesota Geospatial Commons/Minnesota DNR. All data analyses were completed using ARC GIS 10.4.1.

Contact information:

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MILLE LACS BAND OF OJIBWE

Executive Branch of Tribal Government

Susan Klapel-Commissioner of Natural Resources
Mille Lacs Band of Ojibwe
43408 Oodena Drive
Onamia, MN 56342

Minnesota Public Utilities Commission
Dr. Burl Haar, Executive Secretary
121 7th Place East-Suite 350
St. Paul, MN 55101-2147

Re: Docket number 13-473 and 13-474

March 29, 2014

Honorable Commissioners,

As Commissioner of Natural Resources for the Mille Lacs Band of Ojibwe, I am responsible for protecting natural resources for the Band and its members. The proposed route for the Enbridge Sandpiper pipeline project borders our Minisinaakwaang (East Lake) Community and threatens the Big Sandy Lake and Rice Lake watersheds, in which the Band's members and their ancestors have gathered wild rice and harvested other natural resources for generations. Accordingly, it is with deep respect that I ask you to not grant Enbridge the corridor permit for the proposed southern route. The Band supports the existing Northern Main corridor where a thorough Federal, Tribal and State review process has occurred. This route avoids the Big Sandy Lake and Rice Lake watersheds that support culturally significant wild rice ecosystems.

Reasons for opposition of the proposed Sandpiper southern route include:

- Concern over historical spills and consequent risk to surface and ground water.
- Concern over vital Band self-sufficiency and cultural practices, such as harvesting wild rice within the Big Sandy Lake and Rice Lake watersheds, including the Rice Lake National Wildlife Refuge.
- Lack of Tribal consultation, specifically with the Mille Lacs Band's Tribal Historic Preservation Office (THPO) to identify lands of historical, archeological and cultural significance.
- Procedural Considerations, Minnesota Public Utilities Commission role versus Federal Agency Lead.

Concern over historical spills and consequent risk to surface and ground water

Enbridge was responsible for more than 800 spills in the U.S. and Canada between 1999 and 2010, totaling almost 7 million gallons of oil. In 2010, the News Tribune (see attached article) reported that over the previous 30 years nearly 1.5 million gallons of oil had spilled out of Enbridge pipelines in northern Minnesota, much of it into wetlands and some of it close to the Mississippi River. In one case, tens of thousands of spilled gallons were set on fire to avoid causing more serious environmental damage. The biggest spill was near Michigan's Kalamazoo River in July 2010, when a pipeline that connects to the Alberta Clipper burst, sending more than 1 million gallons of oil into the river. Enbridge is still working on the cleanup, and earlier this month it asked the U.S. Environmental Protection Agency for an extension to complete dredging of the Kalamazoo River, saying it would be unable to meet the Dec. 31 deadline to finish the cleanup.

Concern over vital Band self-sufficiency and cultural practices, such as harvesting wild rice, within the Big Sandy Lake and Rice Lake watersheds, including the Rice Lake National Wildlife Refuge

Harvesting wild rice has been central to the Band's culture, subsistence and economy for generations. Many Band members harvest wild rice in the Big Sandy Lake and Rice Lake watersheds, including in the Rice Lake National Wildlife Refuge.

Section 7852.2700 **B** of Enbridges Pipeline Routing Permit Application states:

Water Resources – Surface-Ground water "Ground disturbance associated with pipeline construction is primarily limited to the upper 10-feet, which is above the water table in most of the regional aquifers."

Enbridge's generalized claim depicting the water table as 10-feet deep or deeper is not accurate in the Big Sandy Lake and Rice Lake watersheds. Based on Natural Resource Conservation Service (NRCS) soil data, the depth of the water table in these watersheds is measured in inches not feet. Characterizing seasonal water tables may more accurately reflect hydrological connectivity and vulnerability of these watersheds.

Lack of Tribal consultation, specifically with Tribal Historic Preservation Office (THPO) to identify lands of historical, archeological and cultural significance

Enbridge states: "EPND prefers to avoid recorded or unrecorded sites and may resort to: minor route deviations around identified sites: installing the pipeline beneath the site using conventional bore or HDD technology; and/or fencing sites or portions of sites to ensure that they are not disturbed during construction."

It is not possible to identify, let alone to avoid, sites of historical, archeological and cultural significance without consulting early in the process with the relevant Tribal Historic Preservation Offices (THPO). Although the Enbridge EIR discusses State Historic Preservation Office input, the Mille Lacs Band's THPO has not been contacted yet (personal communication). To choose a route other than the existing (Clipper) corridor that borders our Minisinaakwaang community without THPO input raises serious concerns regarding Enbridge's ability to identify and avoid sites of historical, archeological, and cultural significance and the thoroughness of the selection process.

Procedural Considerations, Minnesota Public Utilities Commission role versus Federal Agency Lead

The Minnesota Environmental Policy Act, MINN. STAT. 116D.04(6) (2008), provides:

"No State action significantly affecting the quality of the environment shall be allowed, nor shall any permits for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the State's paramount concern for the protection of the air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct."

Procedurally, it appears that Enbridge has determined the preferred route from the alternative routes that have been identified. The Minnesota Public Utilities Commission is being asked to approve Enbridge's preferred route ***before*** the respective Federal Agencies will be asked to permit and determine appropriate mitigation measures for that route (including, within the corridor chosen, avoiding significant features if possible). This process commits the State to Enbridge's preferred route and limits the choices reasonably available to the Federal Agencies *before* there has been a full consideration of the alternatives, and is inconsistent with both State and Federal law that requires such alternatives to be considered before a commitment is made to Enbridge's preferred route. This process creates a cloud of confusion in regards to the sequence of environment assessment (EA) and a determination about the need to conduct an environmental impact statement (EIS).

In conclusion, the Mille Lacs Band supports the existing Northern Main corridor where a thorough Federal, Tribal and State review process has occurred. This route avoids the Big Sandy Lake and Rice Lake watersheds that support culturally significant wild rice ecosystems. This route also promotes co-location consistent with the strategy proposed west of Clearbrook, MN. (MNEIR November 2013, page 2-8).

Respectfully,

Susan Klapel
Commissioner of Natural Resources
Mille Lacs Band of Ojibwe

CC: Chief Executive Melanie Benjamin
Secretary/Treasurer Curt Kalk
District I Representative Sandra Blake
District II Representative Marvin Bruneau
District III Representative Diane Gibbs

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REPLY TO MINNEAPOLIS

September 30, 2015

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Energy Environmental Review and Analysis
85 7th Place East, Suite 500
Saint Paul, MN 55101-2198

Re: Comparative Environmental Analysis Draft Scoping Document for Sandpiper Pipeline and Line 3 Pipeline Replacement – PUC Dockets PPL-13474 and PPL15-137

Dear Ms. MacAlister:

Mille Lacs Band of Ojibwe ("Mille Lacs Band") submits the following comments regarding the scope of the Comparative Environment Analysis ("CEA") for the Sandpiper and Line 3 Pipeline Replacement projects. The proposed projects have the potential to cause serious and irreparable environmental impacts. The environmental review must be thorough and demonstrate that the Department has taken a hard look at the potential impacts of the proposed projects and has given careful consideration to all feasible and prudent alternatives. Moreover, to the extent that the Public Utilities Commission intends to use the CEA to satisfy the environmental review requirements for the Certificate of Need ("CON") proceedings for both projects, the CEA must include analysis of alternative routes and potential impacts necessary to make fully informed decisions regarding the CON applications consistent with the requirements of the Minnesota Environmental Policy Act.

Both projects are proposed to pass through Minnesota's lake country and have the potential to impact numerous pristine lakes, streams, and wetlands, including sensitive aquatic ecosystems where the Ojibwe people have gathered wild rice for hundreds of years. Wild rice is not merely a source of food; it is a spiritual resource and the act of harvesting wild rice remains an integral part of the Ojibwe culture. Moreover, wild rice is the product of a healthy environment and actions taken to protect wild rice will serve to protect the entire ecosystem. The CEA is the mechanism to identify and determine how to avoid or mitigate the proposed

projects' adverse impacts. As such, it must include a comprehensive analysis of potential impacts and evaluate alternative alignments which avoid these sensitive ecosystems altogether.

Mille Lacs Band provides the following specific comments regarding the scope of the CEA:

1. The CEA must evaluate all feasible and prudent alternatives for the proposed projects. Many alternative routes, such as the current SA-03 alternative, exist which would avoid the sensitive aquatic ecosystems. No decisions regarding the projects can be made without fully evaluating these alternatives. Also, as is typical in the course of environmental review, the Department should continue to consider and evaluate additional alternatives which may avoid unanticipated or particularly serious adverse impacts that are revealed through the course of the analysis.

2. The CEA must evaluate water quality impacts. This includes anticipated impacts to surface and groundwater resources resulting from construction of the projects and the potential short- and long-term impacts of a major spill along the route of either pipeline. The analysis also must include evaluation of the costs of, and likely success of, remedial actions in the event of a spill.

3. The CEA must evaluate water quantity and hydrologic impacts. Groundwater and surface waters interact in complex systems and the grading, excavation, compaction, and filling necessary to construct the pipeline likely will impact these systems. Wild rice and other aquatic species are sensitive to changes in water quality and water levels and the impacts on water quantity and flow must be understood in order to determine the scope of potential on these sensitive and interconnected aquatic ecosystems.

4. Construction of the pipelines along the proposed route likely will unearth Native American cultural items. The CEA must address this possibility and describe the process that will be used to ensure the preservation and repatriation of such items as is required under the Native American Graves Protection and Repatriation Act. The CEA also must address the potential impacts to wild rice waters not only from the ecological perspective but also from the cultural perspective. Adequately addressing the potential cultural impacts of the proposed projects will require consultation with Mille Lacs Band officials. Mille Lacs Band is willing and prepared to meet with the Department to address these issues.

5. The Draft Scoping Document indicates that a single CEA will be prepared for both the Sandpiper and Line 3 Replacement projects. The CEA must evaluate the cumulative impacts that will result from constructing and operating both projects along the same route. Moreover, because economic efficiency dictates that it is preferable to co-locate pipelines along a single route, the CEA should address how the potential impacts may change in nature or magnitude if additional pipelines are developed along the route.

6. At this time, it is unknown whether either of the proposed projects will be approved and constructed or whether, if constructed, they will follow the same route. Accordingly, the CEA should address any potential impacts which may change in nature or magnitude if only one of the pipelines is constructed along a route.

Finally, we remind the Department of its obligation, pursuant to Governor Dayton's Executive Order 13-10, to engage in government-to-government consultation with Mille Lacs Band and other Indian tribes. Allowing tribal governments to participate in proceedings in the same capacity as members of the public is not sufficient. Rather, the Department must affirmatively consult with the Band to identify and address issues relating to the projects which may affect the Band and its members. Mille Lacs Band looks forward to engaging in a substantive and productive dialogue with the Department relating to the environmental review of the proposed pipeline projects.

Thank you.

Very truly yours,

LOCKRIDGE GRINDAL NAUEN P.L.L.P.

David J. Zoll

c: Mille Lacs Band of Ojibwe
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REPLY TO MINNEAPOLIS

May 26, 2016

Ms. Jamie MacAlister
jamie.macalister@state.mn.us
Environmental Review Manager
Minnesota Department of Commerce
Energy Environmental Review and Analysis
85 7th Place East, Suite 500
Saint Paul, MN 55101-2198

Re: Draft Scoping Decision Document for Sandpiper Pipeline Project – PUC Dockets CN-13-473 and PPL-13-474; and Draft Scoping Decision Document for Line 3 Replacement Pipeline Project – PUC Dockets CN-14-916 and PPL-15-137

Dear Ms. MacAlister:

The Mille Lacs Band of Ojibwe ("Mille Lacs Band") submits the following comments regarding the scope of the Environmental Impact Statement ("EIS") for the Sandpiper Pipeline Project and the Line 3 Replacement Pipeline Project.[1] The proposed projects have the potential to cause serious and irreparable environmental impacts. The environmental review must be thorough and demonstrate that the Department has taken a hard look at the potential impacts of the proposed projects and has given careful consideration to all feasible and prudent alternatives consistent with the requirements of the Minnesota Environmental Policy Act.

Both projects are proposed to pass through Minnesota's lake country and have the potential to impact numerous pristine lakes, streams, and wetlands, including sensitive aquatic ecosystems where the Ojibwe people have gathered wild rice for hundreds of years. Wild rice is not merely a source of food; it is a spiritual resource and the act of harvesting wild rice remains an integral part of the Ojibwe culture. Moreover, wild rice is the product of a healthy environment and actions taken to protect wild rice will serve to protect the entire ecosystem. The EIS is the mechanism to evaluate potential adverse impacts and determine how to avoid or mitigate such impacts. Accordingly, the EIS must include a comprehensive analysis of potential

[1] The Mille Lacs Band is simultaneously filing these comments in each of the PUC dockets for the Sandpiper and Line 3 Replacement projects.

impacts and mitigation measures and must evaluate alternative routes which avoid these sensitive ecosystems altogether.

The Mille Lacs Band provides the following specific comments regarding the scope of the EIS:

1. **The purpose of the project must be defined broadly to encompass reasonable alternatives to the proposed project.** Narrowly defining the purpose of a project (e.g., creating a system to transport oil from Clearbrook, MN to Superior WI) allows the exclusion of alternatives which may use different endpoints to the system. By defining the purpose broadly (e.g., creating system to transport oil to market from North Dakota), the EIS can encompass more alternatives which may lessen environmental impact while also meeting the applicant's needs even though they may be significantly different from what the applicant initially contemplated. This facilitates the outside-of-the-box analysis that is particularly valuable in the context of environmental review. Moreover, adopting a broad purpose allows the EIS to test the economic and other assumptions underlying the applicant's choice of its preferred alignment.

2. **The EIS must evaluate all feasible and prudent alternatives for the proposed projects.** Many alternative routes have been suggested which would avoid the sensitive aquatic ecosystems of north central Minnesota. By fully evaluating these alternatives, the EIS will allow the public and the regulators to understand how the potential impacts of the proposed alignment and the alternatives compare to each other and identify the least environmentally harmful alternative. The draft scoping decision document contemplates that no field-level data will be collected for the alternative routes. The draft scoping decision document should not foreclose the possibility of gathering field-level data if it is necessary for a full analysis of the alternatives. Also, as is typical, the EIS should incorporate new alternatives developed through the course of the environmental review which may avoid unanticipated or particularly serious adverse impacts including detailed analysis of all potential mitigation measures.

3. **The EIS must evaluate potential impacts on water quality and include modeling of several "worst-case" scenario spills along each route included in the EIS.** This evaluation should include the anticipated impacts to surface and groundwater resources resulting from construction of the projects and the potential short- and long-term impacts of a major spill along the route of either pipeline. In order to provide a meaningful comparison of the potential impacts of the various alternatives, the EIS should include modeling of the potential impacts of spills at several locations along each route. The modeling should include "worst-case" assumptions regarding the location (in particularly sensitive areas),

duration, and magnitude of the spill. Finally, the analysis also must include evaluation of the costs of, and likely success of, remedial actions in the event of a spill and whether the applicant should be required to provide financial assurances sufficient to cover the expected response and clean-up costs.

4. **The EIS must evaluate potential impacts on water quantity and hydrology.** Groundwater and surface waters interact in complex systems and the grading, excavation, compaction, and filling necessary to construct the pipeline likely will impact these systems as will the long-term maintenance, operation, and eventual decommissioning. Wild rice and other aquatic species are sensitive to changes in water quality and water levels and the impacts on water quantity and flow must be understood in order to determine the scope of potential impacts on these sensitive and interconnected aquatic ecosystems. The environmental review also should detailed proposals for mitigation and an analysis of their effectiveness.

5. **The environmental review must evaluate long-term and short-term impacts to wild rice harvesting and identify areas of uncertainty in the analysis.** The proposed route for the Sandpiper and Line 3 Replacement projects passes through five counties which account for nearly one-half of the wild rice harvesting trips according to a 2006 survey conducted by the Minnesota Department of Natural Resources. The shallow and sediment-rich waters where the wild rice thrives are particularly vulnerable to the negative impacts from a potential oil spill. The EIS must analyze how the water quality, quantity, and hydrology impacts mentioned relate to the potential long-term and short-term impacts on the sensitive wild rice waters across the region. This analysis should rely on the best available information regarding the cultivation of wild rice and, where there is uncertainty regarding the potential impacts, explain what additional information is needed and describe the range of the potential impacts (i.e., whether they are likely to be minor, moderate, or severe).

6. **The environmental review must address the potential impact of a spill on fragile fisheries.** The proposed route for the pipeline projects poses a significant threat to the fisheries near McGregor, Minnesota including Lake Minnewawa and Big Sandy Lake. Mille Lacs Band members live near both of these lakes, which are sacred to the Ojibwe people, and utilize the lakes for subsistence fishing of the culturally important Ooga (Walleye). A oil spill along the proposed route could contaminate both lakes and result in many negative short- and long-term effects on fish populations. Rosenthal and Alderdice (1976); Teal and Howarth (1984); Eisler 1987; Bue et al. (1996). These effects include reductions in embryonic survival, disrupted spawning activities, reduced growth, and genetic abnormalities that are passed on to offspring. Bue et al. 1996; Marty et al. 1997; Murphy et al. 1999; Heintz 2000; Dubansky (2013). The petroleum contamination also would

reduce and disrupt benthic organisms which are essential to fish survival. Elmgren et al. (1983); Jewett et al. (1999). Furthermore Polyaromatic Hydrocarbons (PAH's), which include potential carcinogens, tend to increase in fish tissues after oil spills and pose a risk to populations that are dependent upon the consumption of fish as part of their diets. Birkholz (1988); Allan et al. (2012); Eisler (1987); Cheung (2007); Zhonghuan et al. (2010).

7. **The environmental review must address impacts caused by further fragmentation of Minnesota forests.** Minnesota's North Central landscape has some of the State's largest and most unique continuous forest landscape including some of the last large unfragmented forests in the Midwest. Further fragmentation of Minnesota forests caused by the construction of the proposed pipelines will leave the remaining forests smaller, more susceptible to invasive species, and could potentially result in a loss of species diversity. Forest fragmentation also reduces and divides habitat for wildlife species that specialize in forest interiors. Construction of the pipelines along the proposed routes, along with the long-term maintenance, operation, and eventual decommissioning, also would undermine the objectives of the Minnesota DNR's Forest Legacy Program that aims to protect private forests from further threats on fragmentation.

8. **The environmental review must analyze potential impacts on bird species including the regional and extra-regional impacts on migratory bird species.** Disturbances along the proposed pipeline routes may result in abandonment, decreased breeding success, and, in the event of leakage or pipeline system failure, a degraded habitat the cumulative effects of which will threaten these species. These impacts must be evaluated through the environmental review process and include impacts to migratory species which have the potential to extend well beyond the region. The Palisade area of Northern Minnesota is a unique boreal forest which is well known by ornithologists as a breeding and wintering ground for several avian boreal species. In addition, several species with direct ties to the Ojibwe cultural practices have been documented wintering in the area including Great Gray Owls, Northern Hawk Owls, Boreal Chickadees, and sharp-tailed Grouse. The sharp-tailed Grouse are also a food source for the Ojibwe. The area around McGregor, Minnesota is known among ornithologists as the "McGregor Marsh" and is the breeding location for Yellow Rail, and Nelson's Sparrow.

9. **The evaluation of impacts to cultural resources will require a unique approach.** The Ojibwe have lived for centuries in the areas where the pipelines are proposed to be constructed and have a rich and long-standing cultural connection to the land. The cultural resources in the region include burial sites, lands used for hunting, fishing, and gathering, and various plants with medicinal

uses. While some of these resources, such are burial sites, are found in discrete locations, many are spread across the entire region. Understanding the nature of these cultural resources and how they must be protected will require close coordination between the Department and the Mille Lacs Band's Tribal Historic Preservation Office. Moreover, the Department must understand and respect the desire of the Mille Lacs Band to maintain secrecy regarding the location of some of the cultural resources which may be vulnerable to destruction through vandalism or well-intentioned but harmful overuse by visitors.

The EIS also must address the possibility that construction of the pipelines along the proposed route will unearth Native American cultural items and describe the process that will be used to ensure the preservation and repatriation of such items as is required under the Native American Graves Protection and Repatriation Act.

Finally, the EIS also must evaluate the potential impacts to natural resources, in particular to wild rice waters, not only from the ecological perspective but also from the cultural perspective.

10. **The environmental review must consider the impacts on traditional Ojibwe gathering and medicine with an understanding of the breadth and variety of resources upon which the Band depends.** The Ojibwe have long collected medicines from the lands they have inhabited. The proposed pipeline projects will pass through the lands of the Mille Lacs Band's District II community. The native plant communities in the area are classified as Northern Rich Tamarack Swamp, Northern Spruce Bog, Northern Poor Conifer Swamp, Northern Open Bog (McGregor Marsh), and Northern Poor Fen. Traditional Cultural Medicines found in this area include original cultural foods, spiritual medicines, and plants used for other traditional purposes. The Ojibwe consider food as medicine for our bodies and these resources are important to the survival of the culture and the Band.

Some traditional foods threatened by the pipeline include: Wild Rice, Cattails, fish, mushrooms, game animals, a variety of berries and roots. Some spiritual Medicines are Bitterroot (WeKay), Lily pad roots (blood pressure medicine), sage, sweet grass, Labrador Tea, Cranberry, & Red-osier Dogwood (Kinnikinik), iron wood (Heart medicine), birch (aspirin and headache medicine), Cha Ga (fungus of birch trees along river areas used as a tea for the treatment of cancer), clams in water as well as the Megas Shell used in ceremonies, and red cedar (Ojibwe tobacco). Many other plants are used for traditional purposes, including reeds from wetlands (used for mats and housing), birch bark from birch trees (used our everyday utensils and containers), Tamarack (many uses in handmade structures for religious practices and crafts), Paper Birch (traditional basketry,

crafts and the inner bark is known as a traditional food), White Cedar (important tree for ceremonial purposes and medicinal values), Red Maple (sap is collected in the spring), and Balsam Fir (important tree where boughs are collected for ceremonial purposes). Many other culturally significant, even vital, species could be identified by the Band's gatherers. These are just a few of the many traditional and cultural resources that the Mille Lacs Band finds and uses in District II.

11. **The EIS must address cumulative impacts that would result from constructing both pipelines along the same corridor as well as the unique impacts that would occur if only one pipeline is constructed.** The EIS must evaluate the cumulative impacts that will result from constructing and operating both projects along the same route. Moreover, because economic efficiency dictates that it is preferable to co-locate several pipelines along a single route, the EIS should address how the potential impacts may change in nature or magnitude if additional future pipelines are developed along the routes for the Sandpiper and/or Line 3 Replacement projects. Finally, because it is unknown whether either of the proposed projects will be approved and constructed or whether, if constructed, they will follow the same route, the EIS should address any potential impacts which may change in nature or magnitude if only one of the pipelines is constructed.

12. **The EIS must include an analysis of socio-economic, mental health, and environmental justice impacts cause by the potential loss of cultural and environmental resources.** As noted above, the Ojibwe have a deep and long-standing connection to the natural environment. This connection is integral to their cultural identity and the loss of these resources has resulted in have profound impacts on mental health including increased incidence of alcoholism, depression, and suicide. The evaluation of health impacts in the EIS must include these impacts in addition to impacts to physical health resulting from potential exposure to pollutants, contaminants, and increased noise and dust during construction.

13. **The potential impacts are amplified by the fact that the proposed route for the pipelines runs through the middle of the Mille Lacs Band's District II Community.** District II's government services are located in the East Lake community south of the proposed pipelines while the Minnewawa and Sandy Lake communities are located north of the proposed pipelines. Closure of a roadway in the region as a result of a major pipeline failure would isolate the Minnewawa and Sandy Lake communities from the basic services provided through the East Lake community and would isolate family members living in different regions from each other. The effects of bisecting the community with the proposed pipelines would be particularly significant for the extremely

traditional community with strong ties to time-honored culture and the emotional toll of a spill in the area would be devastating.

14. **The environmental review must consider the consequences of abandonment of the old Line 3, as well as the long-term impact of a policy of abandoning defunct pipelines.** Enbridge currently proposes to leave the old Line 3 in the ground with only minimal remediation. The environmental review must evaluate the potential impacts of abandoning the existing Line 3 pipeline, the proposed pipelines at the end of their useful life, and the cumulative impacts of abandoning multiple pipelines in the same region.

15. **The environmental review should be informed by the unique information and expertise which the Mille Lacs Band and other tribal governments can provide.** The Mille Lacs Band's Department of Natural Resources has extensive information regarding the natural and cultural resources in the area along with a highly skilled and knowledgeable staff. Consistent with Governor Dayton's Executive Order 13-10, regarding government-to-government consultation with Indian tribes, the Mille Lacs Band is ready and willing to share its expertise with the Department in order to ensure that the best possible environmental impact statement is prepared. We appreciate the coordination that has occurred to date and look forward to engaging in a substantive and productive dialogue with the Department relating to the environmental review of the proposed pipeline projects.

Thank you.

Very truly yours,

LOCKRIDGE GRINDAL NAUEN P.L.L.P.

David J. Zoll

c: Mille Lacs Band of Ojibwe
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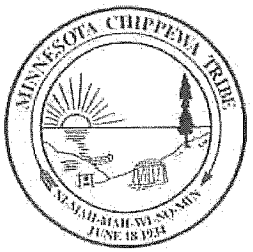

The Minnesota Chippewa Tribe

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February 7, 2014

John Linc Stine, Commissioner
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-419

Re: Definition of "waters used for the production of wild rice"; wild rice water quality standards

Dear Commissioner Stine:

The Minnesota Chippewa Tribe appreciates having the opportunity to continue discussions with your agency regarding the definition of "waters used for the production of wild rice." We commend the Minnesota Pollution Control Agency (MPCA) for the work done to clarify this definition and to strengthen protection for this critical resource. As you know, wild rice is a culturally significant resource for the tribes in Minnesota. From historical reports,[1] Band member accounts,[2] and current Minnesota Department of Natural Resources ("DNR") and tribal reports,[3] wild rice has declined significantly throughout Minnesota, and in southern Minnesota wild rice has virtually disappeared. Minnesota tribes have a unique relationship with the state regarding the protection of wild rice, as demonstrated through multiple rulemaking processes[4] and executive orders.[5]

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[1] Jenks, A.E., The Wild Rice Gatherers of the Upper Great Lakes: A Study in American Primitive Economics (Washington: GPO, 1901), available on-line at http://greatlakeswater.uwex.edu/library/articles-and-white-papers/wild-rice-gatherers-upper-lakes-study-american-primitive-economics (last visited Oct. 12, 2012).
[2] Rosemary Berens, Bois Forte Tribal Historic Preservation Officer
[3] *See, e.g.*, 1854 Treaty Authority website, "Wild Rice Survey" (including list of wild rice waters in the 1854 Ceded Territory), available at http://1854treatyauthority.org/wildrice/survey.htm (last visited Oct. 12, 2012); MN DNR website, "Wild rice management," available at http://www.dnr.state.mn.us/wildlife/shallowlakes/wildrice.html (last visited Oct. 12, 2012).
[4] *See, e.g.*, Laws of Minnesota 2007, chapter 7, article 1, section 168
[5] *See, e.g.*, Executive Order 13-10, "Affirming the Government-to-Government Relationship between the State of Minnesota and the Minnesota Tribal Nations: Providing for Consultation, Coordination, and Cooperation."

Maintain the existing sulfate criterion for protection of wild rice waters

Minnesota tribal staff have participated in and followed closely the MPCA's research program related to the existing sulfate criteria for protecting wild rice waters[6]. Our thorough review and interpretation of the research results for the state-led hydroponics studies, the field surveys, the mesocosm studies, and the sediment studies leads to our conclusion that the existing federally approved sulfate criterion is well-supported by multiple lines of evidence, and should be maintained. There is no scientific defensible basis for raising this sulfate limit, which is the clear benchmark required by the US Environmental Protection Agency for considering approval of a revised criterion[7], as was clearly communicated to the Minnesota legislative body in 2011[8].

The MPCA proposed approach for listing wild rice waters is inconsistent with the Clean Water Act

The Minnesota tribes have fundamental concerns regarding MPCA's proposed approach for meeting the intent of the 2011 state legislation that directs the agency to establish criteria considering "history of wild rice harvests, minimum acreage, and wild rice density."[9] In January of 2014, the Fond du Lac, Grand Portage, Leech Lake, White Earth and Bois Forte Bands communicated clear concerns for the agency's proposed 'watch list' approach in letters to MPCA; specifically, that this approach would violate the Clean Water Act (the Act) and Minnesota water quality standards (WQS). The agency had proposed to create a 'watch list' for those wild rice waters listed by the DNR for which the state lacked specific acreage and/or stand density measurements; only those waters with quantified stands would be formally listed as wild rice waters. The DNR list of Minnesota wild rice waters[10] was compiled as part of a legislatively directed study of the threats to wild rice in Minnesota, and represented significant contributions from Minnesota tribal resource management staff. State and tribal staff also explicitly qualified this 2008 compiled listing as 'not comprehensive', and that it would be continuously updated as new data became available.

Under the Act, the Nation's waters are to be restored and maintained for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water.[11] The goal of a water quality standards program is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.[12] States and authorized Tribes adopt water quality

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[6] http://www.pca.state.mn.us/index.php/water/water-permits-and-rules/water-rulemaking/minnesotas-sulfate-standard-to-protect-wild-rice.html#assessment

[7] *See, generally,* 40 CFR §§ 131.5, 131.11, and 131.21 (2013).

[8] Letter from USEPA to Sens. Dill, Bakk, May 13, 2011.

[9] Laws of Minnesota 2011, 1st Spec. Sess,, chapter 2, article 4, section 32 –Wild Rice Rulemaking and Research)
https://www.revisor.mn.gov/laws/?id=2&doctype=Chapter&year=2011&type=1

[10] MN DNR "Statewide Inventory of Wild Rice Waters" (2008) available at http://www.dnr.state.mn.us/wildlife/shallowlakes/wildrice.html (last visited Jan. 27, 2014).

[11] *See* 33 U.S.C.§ 1251(a)(2).

[12] *Id.*

standards to protect public health, enhance the quality of water, and serve the purposes of the Clean Water Act[13] and are free to add use classifications, as well as adopt any use classification system they see as appropriate (with the exception of waste transport and assimilation, which are not acceptable uses in any case). Among the uses listed in the Act, there is no hierarchy.

A primary objective for classifying a water body is to designate uses by evaluating and describing the ecosystem. "Designated uses" are based on the relationship and quality, i.e., the integrity, of all ecosystem components. States and authorized Tribes, through their approved WQS, specify appropriate, designated uses in order to achieve and protect existing and potential uses.[14] They can select the level of specificity they desire for identifying designated uses and subcategories of uses. Subcategories of aquatic life uses may be on the basis of attainable habitat, innate differences in community structure and function, or fundamental differences in important community components. Special uses may also be designated to protect particularly unique, sensitive, or valuable aquatic species, communities or habitats.

The current state standard for listing wild rice waters is found at Minnesota Rule 7050.0224, "Specific Water Quality Standards for Class 4 Waters of the State: Agriculture and Wildlife," which at Subpart One states:

> The numeric and narrative water quality standards in this part prescribe the qualities or properties of the waters of the state that are necessary for the agriculture and wildlife designated public uses and benefits. Wild rice is an aquatic plant resource found in certain waters within the state. The harvest and use of grains from this plant serve as a food source for wildlife and humans. In recognition of the ecological importance of this resource, and in conjunction with Minnesota Indian tribes, selected wild rice waters have been specifically identified [WR] and listed in part 7050.0470, subpart 1. The quality of these waters and the aquatic habitat necessary to support the propagation and maintenance of wild rice plant species must not be materially impaired or degraded. If the standards in this part are exceeded in waters of the state that have the Class 4 designation, it is considered indicative of a polluted condition which is actually or potentially deleterious, harmful, detrimental, or injurious with respect to the designated uses.

Natural Wild Rice Waters should be classified as a distinct aquatic life use

The fundamental use in §101(a) of the Act for 'protection and propagation of fish, shellfish and wildlife' may also include the protection of aquatic flora. However, the agricultural use class (Minnesota's Class 4 waters) is intended to define *waters that are suitable for the irrigation of crops, consumption by livestock, support of vegetation for range grazing, and other uses in support of farming and ranching and protects livestock and crops from injury due to irrigation*

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[13] *See EPA's* Water Quality Standards Handbook Chapter 2: *Designation of Uses* (40 CFR 131.10) at http://waterepa.gov/scitech/swguidance/standards/handbook/chapter02.cfm
[14] *See* 40 C.F.R. § 131.10 (2013).

and other exposures.[15] The Minnesota tribes have consistently recommended to the MPCA, during multiple consultation sessions over the past three years specifically focusing on wild rice water quality standards, that natural wild rice stands (manoomin) are more appropriately classified under a distinct aquatic life use (i.e., Minnesota's Class 2 waters). It may be appropriate to leave paddy rice, a true cultivated agricultural product, in Class 4, but it is inaccurate and inherently offensive to Minnesota tribes to classify manoomin as a 'crop', and ecologically ignorant to categorize the naturally occurring hydrology of a natural wild rice bed as "irrigation." Irrigation is defined as "...to supply (dry land) with water by means of ditches, pipes, or streams."[16] This is simply not an appropriate or accurate concept for describing a native plant species growing without cultivation in a natural water body.

Wild Rice Waters listed by the Minnesota DNR and Tribes are an 'existing use'

Tribal staff have also elevated the importance of distinguishing between a "designated use" and an "existing use" in consultation with the MPCA. An "existing use" can be demonstrated by either a) that fishing/swimming has actually occurred since November 28, 1975, or b) that the water quality is suitable to allow the use to be attained--unless there are physical problems, such as substrate or flow, that prevent the use from being attained.[17] Following, "No activity is allowable under the antidegradation policy which would partially or completely eliminate any existing use *whether or not that use is designated in a State's water quality standards*. The aquatic protection use is a broad category requiring further explanation. *Non-aberrational resident species must be protected, even if not prevalent in number or importance.* Water quality should be such that it results in no mortality and no significant growth or reproductive impairment of resident species. Any lowering of water quality below this full level of protection is not allowed. A use attainability analysis or other scientific assessment should be used to determine whether the aquatic life population is in fact an artifact or is a stable population requiring water quality protection."[18]

Designated uses may be changed only based upon findings of a use attainability analysis that has demonstrated that attaining the designated use is not possible because of naturally occurring pollutant concentrations, natural flow conditions, hydrologic modifications, substantial widespread economic impact resulting from more stringent controls, or human-caused pollution that cannot be remedied. A designated use cannot be removed if the use can be attained by implementing effluent limits and best management practices.[19] Therefore, attainable uses are, at a minimum, the uses (based on the State's system of water use classification) that can be achieved: (1) when effluent limits under sections 301 (b)(l)(A) and (B) and section 306 of the

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[15] *Id.* at Chapter 2, EPA Water Quality Standards Handbook

[16] Webster's II New College Dictionary (ISBN 0-395-70869-9) 1999. Houghton Mifflin Co.

[17] *See* Chapter 4, Water Quality Standards Handbook, *Protection of Existing Uses*

[18] *Id.*

[19] Per 40 C.F.R. Section 131.10(d), "[w]hen designating uses, States may wish to designate only the uses that are attainable. However, if the State does not designate the uses specified in section 101(a)(2) of the Act, the State must perform a use attainability analysis under section 131.10(j) of the regulation. States are encouraged to designate uses that the State believes can be attained in the future."

Act are imposed on point source dischargers; and (2) when cost-effective and reasonable best management practices are imposed on nonpoint source dischargers.

Minnesota's existing WQS require that the quality of listed and unlisted wild rice waters, and the aquatic habitat necessary to support the propagation and maintenance of wild rice plant species, not be materially impaired or degraded. In other words, Minnesota already requires the listing of *all* wild rice waters, regardless of production—the rules make no distinction based upon productivity.[20] As noted, most of the waters that now appear on MPCA, DNR, and the 1854 Treaty Authority lists *already* have an "existing use" as "waters used for the production of wild rice," whether or not they include an estimate of acres of wild rice present for any given year. These waters must remain on the wild rice waters lists for regulatory purposes. They cannot be pulled off and dropped instead onto the proposed "watch list," in effect, de-listing them as Class 4 waters of the state with the stroke of a pen. The Clean Water Act clearly states that this can only happen after significant process, including a reasoned determination has been made that production of wild rice is a designated use, not an existing use, and based upon the findings of a use attainability analysis, that the designation of "waters used for the production of wild rice" should be eliminated.

If a *designated use* is an *existing use* (as defined in 40 CFR 131.3) for a particular water body, the existing use **cannot be removed** unless a use requiring more stringent criteria is added. However, uses requiring more stringent criteria may **always be added** because doing so reflects the goal of further improvement of water quality. This is entirely consistent with the intent of not only the Clean Water Act goals, but also the intent of the DNR and Tribes in continually updating the list of wild rice waters within the state.

Productivity thresholds are not appropriate for defining wild rice waters

Even if the Act did not prohibit the watch list, it makes no sense as a conservation measure. Minnesota Chippewa Tribe Bands have consistently urged the MPCA to broadly, not narrowly, define wild rice waters, and to be as protective of this diminishing resource as possible. An unnecessarily restrictive list of "waters used for the production of wild rice" is not consistent with the principles of ecosystem management, whereby a management or regulatory agency seeks to maintain ecosystems such as wild rice waters in the appropriate condition to meet that beneficial use, while recognizing that all ecosystems have limited ability to accommodate stressors and still maintain that desired state. Using an arbitrary threshold of productivity to define "waters used for the production of wild rice" ignores the entire body of published scientific research *and* traditional ecological knowledge provided by tribal staff and tribal members that provides substantial evidence of the interannual variability in even traditionally productive waters. Given the scarcity of wild rice productivity and stand density data that the MPCA has compiled at this point in time, it is entirely premature to attempt to incorporate a representative productivity or density metric into the actual definition of a wild rice water body.

Furthermore, the Minnesota tribes with authorized water quality standards would *not* move to a less-inclusive definition or less-protective criterion even if the state adopted it. So the "watch

[20] *See* Minn. R. 7050.0224 subp. 1.

list" would also likely mean an end to an ongoing, cooperative, state-tribal conservation effort and would likely have a ripple effect on other aspects of these relationships, as wild rice is of such central importance to the Bands. As a practical matter, the result would be that the state and tribes would no longer maintain the same wild rice waters lists (at least within the 1854 Ceded Territory and on the reservations), which would undoubtedly create both administrative and permitting problems.

The "watch list" approach would have additional consequences, including delays in the environmental review process for projects with the potential to affect wild rice waters. Minnesota's wild rice waters, whether designated by the state or not, are also federally protected as tribal traditional cultural properties under Section 106 of the National Historic Preservation Act (NHPA).[21] The NHPA requires not only that a project with the potential to impact traditional cultural properties must carefully analyze potential impacts, but also stipulates that appropriate mitigation must be done or a project cannot proceed. If the same waters are not also listed at the state level, it will create a disconnect between the state and federal permitting processes and records, to the detriment of applicants, tribes, and agencies alike.

The Legislative directive can be fulfilled through MPCA's watershed-based monitoring and assessment processes

MPCA should instead continue to list all wild rice waters *regardless* of current levels of production, and should simply add productivity measurements to their assessment database as they become available over time. This is appropriately accomplished through the state's established ten-year cycle for major watershed assessments. MPCA assesses state waters through physical, chemical and biological monitoring. Biological evaluations provide a more precise statement of which species exist in a water body and therefore should be protected, determine the biological health of the water body, and determine the species that could potentially exist in the water body if the physical and chemical factors impairing a particular use were corrected. Over time, with adequate data, the MPCA should be able to make reasonably specific recommendations concerning the natural potential of a water body, levels of attainability consistent with this natural potential, confirm appropriate use designations, and identify impairments. The MPCA can most directly and appropriately address the legislative requirement for considering minimum acreage and wild rice density **through their established monitoring and assessment processes**, rather than struggling to clarify it in the definition of the wild rice designated use.

MPCA should expedite the listing of impaired wild rice waters

We also urge MPCA expedite the listing of "impaired" wild rice waters in order to ensure that water-quality-based effluent limits can be applied to discharges that exceed WQS criteria - just as Minnesota Rules already mandate. Any water body that is currently listed by the DNR, 1854 Treaty Authority, or MPCA as a wild rice water body, and is known to exceed Minnesota sulfate WQS for wild rice, should be designated as "impaired."[22] This would be consistent with the

[21] *See* 36 C.F.R. §§ 800 *et seq.* (2013)
[22] *See* Minn. R. 7050.0224 subp. 1.

MPCA's approach to designating any other type of impairment with assigned numeric or narrative criteria.

Conclusion

Natural stands of wild rice (manoomin) should be protected as a distinct Class 2 aquatic life use in Minnesota WQS, and the existing sulfate criteria (10 mg/l) should be maintained for this use class. Paddy rice may continue to be appropriately designated for protection under the Class 4 agricultural use. Narrowly defining waters used for the production of wild rice, based upon an arbitrary measure of human harvest potential, is inconsistent with Clean Water Act requirements. Creating a "watch list" to determine if waters already known as "wild rice waters," and listed by on the MN DNR, MPCA, or 1854 Treaty Authority, but that do not have estimated acreages, is also inconsistent with the Act. In order to protect and restore wild rice waters, natural variability in stand density and annual changes in location of stands in both streams and lakes must be acknowledged. The legislative mandate to consider wild rice acreage and stand density is most appropriately dealt with as an integral part of the MPCA's water body monitoring and assessment programs, not as a component of the water quality standard definition.

The goal should be continuing to build an inventory of natural wild rice waters that facilitates both conservation and monitoring, and that will dovetail with other procedures the MPCA is already implementing to require dischargers to do improved quality-assured monitoring. And properly listing impaired wild rice waters will ensure that water quality based effluent limits can be applied to dischargers that exceed Minnesota WQS criteria for the protection of these waters.

Sincerely,

Norman W. Deschampe
President

cc. Patricia Engelking, MPCA
Katrina Kessler, MPCA
Shannon Lotthammer, MPCA
Susan Hedman, US EPA
Tinka Hyde, US EPA
Linda Holst, US EPA

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1855 TREATY AUTHORITY
EAST LAKE + LEECH LAKE + MILLE LACS t SANDY LAKE + WHITE EARTH

December 30, 2016

Lawrence Roberts, Principal Deputy Assistant Secretary - Indian Affairs
lawrence robe1is@iios.doi.gov

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108 Army Pentagon
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Tracy Toulou, Director
U.S. Department of Justice Office of Tribal Justice
950 Pennsylvania Avenue, NW Washington, DC 20530-0001 Email:
tracy.toulou2@usdoj.gov

Re: Guidance on how federal agencies can better ensure
meaningful tribal input into infrastructure-related reviews
and decisions
AND
Minnesota Chippewa Tribe environmental
protection Resolutions 30-17 and 32-17

Dear Administrators:

Please accept this letter along with the two (2) Minnesota Chippewa Tribe Resolutions adopted last month as tribal input for the 2016 consultation period that just concluded. We share your understanding the tribal nations voices must be heard with regard to federal decisions that will affect our treaties, homelands, environment, cultural properties, and sacred sites. The two (2) MCT resolutions provide tribal guidance on how federal agencies can better ensure meaningful tribal input into infrastructure-related reviews and decisions, to protect tribal lands, resources, and treaty rights within the existing statutory framework.

Additionally, the MCT Resolutions request federal coordination with US Army Corps of Engineers to develop new Clean Water Act Section 404 permitting processes for wild rice waters in recognition of the special impacts created to wild rice resources, and to condition 404 permit approval over infrastructure projects occurring within tribal aboriginal lands with serious potential impacts to tribal cultural and natural resources on receipt of the informed consent of the impacted tribes, and that the US Army Corps of Engineers:

(1) consult with the Minnesota Chippewa Tribe and its constituent Bands to update the guidelines (Exhibit A);
(2) make a firm unequivocal commitment that it will follow those guidelines and fulfill its trust obligations to Indian tribes; and

(3) enter into agreements with the MCT or a constituent Band to establish protocols for tribal input and consultation on proposed actions impacting tribal cultural and natural resources.

The 1855 Treaty Authority is comprised of approximately 30,000 tribal members of the 40,000 enrolled members of the MCT. The majority of the environmental impacts from the proposed Line 3 Pipeline project will occur within the 1855 ceded territory by (1) establishing a new, east-west pipeline corridor where none previously exists, crossing new aquifers and wild rice lakes and rivers, and (2) by abandoning many miles of pipeline in the Mainline corridor of previously compromised wild rice lakes and rivers and aquifers. The Enbridge Sandpiper pipeline map has been modified to identify the 1855 and 1854 ceded territories and Minnesota Chippewa reservations and is the same preferred corridor for Enbridge's Line 3 Replacement route.

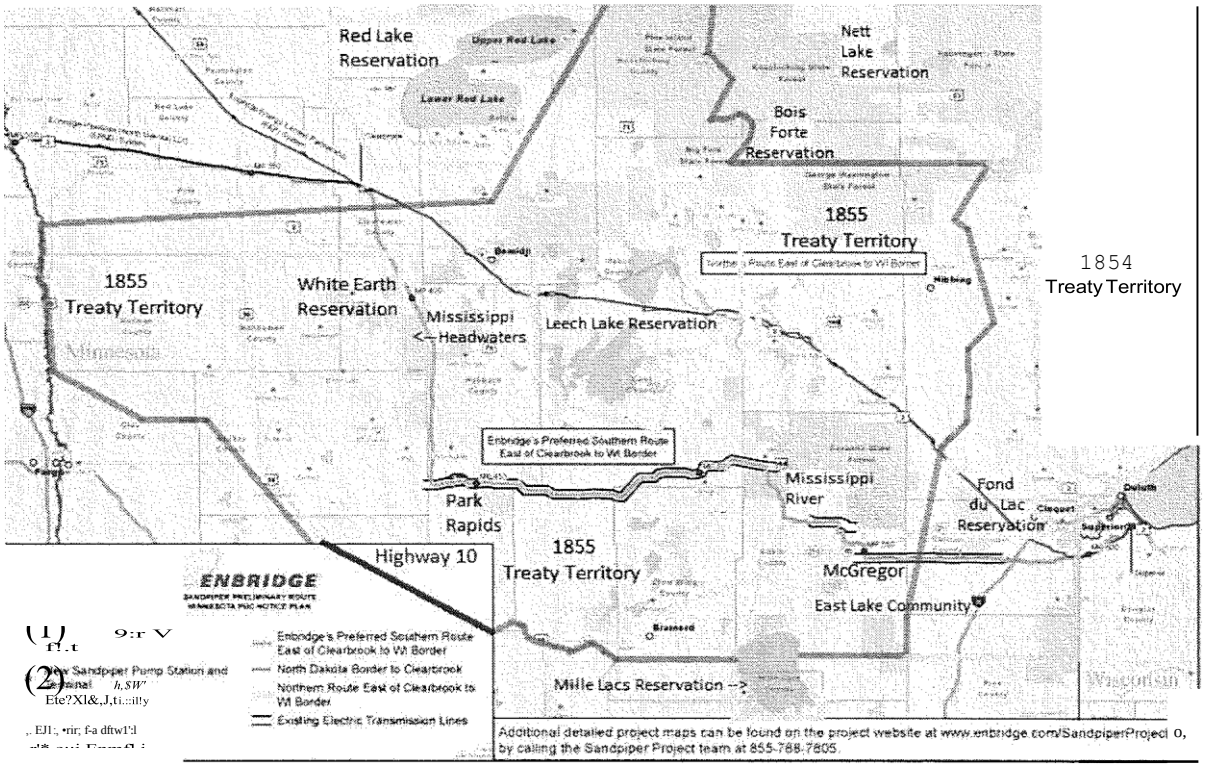

The concerns and goals represented in the two MCT Resolutions identify the same problem areas facing all of *Indian Country* and ultimately

resulting in the Dakota Access pipeline standoff; (1) States acting as though states can unilaterally risk important environmental and cultural tribal resources, and (2) the United States Army Corps of Engineers failing to fulfill trust responsibility described under the 1997 Issue Paper. (See Exhibit A attached to MCT Res. 32-17).

We believe it is important to work with the DOI, BIA, DOJ, EPA and USACE to develop a 2017 Issue Paper to provide guidance for all the federal agencies and states for tribal consultation. While the MCT EIS (Res. 30-17) process is important for self-governance and environmental protection, it will best be accomplished in a new cooperative model with the aforementioned federal agencies. A good place to start is with the EIS how to identify our necessary and important cultural resources while recognizing the number one global threat identified by the Department of Defense is climate change and will necessarily require a full cycle environmental analysis as described by the EPA. The MCTEIS Coordinator is Michael Northbird and may be reached at 218-335-8581, ext. 128 and mnorthbird@mnchippewatribe.org Meetings regarding the preparation of the MCT EIS and public notices for upcoming information sessions to take comments or other hearings are scheduled in the near future, starting with Leech Lake Reservation on January 4, 2017.

We look forward to hearing back from you in the near future about upgrading the 1997 Issue Paper with regard to Chippewa treaty rights and developing a broader tribal guidance paper of how the Corps of Engineers may better carry out its trust responsibilities.

If you have any questions, or if I may be of further assistance, please call on me at 218-760-1258 or via email at frankbibeau@gmail.com.
Miigwitch.

Best wishes,

Frank Bibeau
Executive
Director

Enclosures: (3)

cc: Kevin DuPuis, MCT President
Gary Frazer, MCT Executive Director
Michael Northbird, MCT Environmental Program
Coordinator 1855 Treaty Authority
Danny Gogal, EPA Environmental
Justice Ken Westlake, EPA Region 5
Justin Lock, DOJ

Re: Guidance for federal
agencies and MCT
environmental protection
Resolutions 30-17 and 32-
17
Dec. 30, 2016, page 4.

RED LAKE BAND
of CHIPPEWA INDIANS
RED LAKE NATION HEADQUARTERS

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ROBERT "CHARLIE" REYNOLDS

ADVISORY COUNCIL:
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December 2, 2016

Office of the Assistant Secretary-Indian Affairs
Attn.: Office of Regulatory Affairs & Collaborative Action
1849 C Street, NW, MS 3071
Washington, DC 20240

RE: Comments on Tribal Consultation for Army Corp of Engineers

Dear Assistant Secretary:

Enclosed please find comments respectfully submitted on behalf of the Red Lake Band of Chippewa Indians concerning Tribal Consultation for the Army Corp of Engineers (ACE). In a duly convened Special Meeting, the Tribal Council passed the attached Resolution stating our concerns and needs for robust consultation with ACE to protect our tribal cultural and natural resources.

Please contract Darrell G. Seki, Sr, Chairman at 218-679-3341 or myself, Charles Dolson, Executive Administrator at 218-679-1402 to discuss our comments and requests.

Very truly yours,

Charles Dolson

C: file
Attachment

TRIBAL COUNCIL Organized April 18, 1918 (Revised Constitution & By-Laws, January 6, 1959)
CHIEF COUNCIL OF 1889: May-dway-gwn-no-nind, Nah-gaun-e-gwon-abe, Mays-co-co-caw-ay, Ahnah-me-ay ge-shig, Naw-ay-tah-wowb; Nah-wah-quay-ge-shig

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ROBERT "CHARLIE" REYNOLDS

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RESOLUTION NO. 257-16

Upon a motion by Treasurer Johnson and second by Representative Reynolds, the following was enacted:

WHEREAS, the Red Lake Tribal Council is the governing body of the Red Lake Band of Chippewa Indians, a federally recognized Indian Tribe; and

WHEREAS, pursuant to the Constitution and Bylaws of the Red Lake Band the Red Lake Tribal Council is entrusted with the responsibility to protect the human and natural environment throughout the diminished Reservation and the ceded territories; and

WHEREAS, chief among the Tribal Council's responsibility is the protection of water, which sustains all life, and the protection of clean water is our sacred responsibility as Anishinabe people; and

WHEREAS, manoomin, or wild rice, is also sacred to Anishinabe people, and because all waters are interconnected, even subtle changes in water quality or levels can profoundly harm the health of manoomin, which is a trust resource with federal protections; and

WHEREAS, private companies, including Enbridge are proposing and planning multiple oil and gas pipeline and other large infrastructure projects that would cross lands and waters where Tribal members gather wild rice and other natural resources, and where Tribal cultural resources are located; and

WHEREAS, construction of such large infrastructure poses a threat to waters, natural resources and cultural resources from disturbance during construction and permanent destruction by project activities; and

WHEREAS, oil pipelines in particular pose a unique threat to the Red Lake Nation where those pipelines cross over, under or through waters, wetlands and ecosystems on which tribal members depend for wild rice, fish, game, and other culturally-important natural resources; and

WHEREAS, impacts to natural and cultural resources from large-diameter pipeline construction include streambank degradation, increased sedimentation of waters, long-term wetland disruption, and destruction of fish and wildlife habitat corridors through permanent vegetation removal; and

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WHEREAS, wild rice is particularly sensitive to changes in water levels, water quality, increased sedimentation, and pollutants; and

WHEREAS, pipeline proponents deliberately select new pipeline routes with the intent of avoiding all possible environmental review of pipeline projects; and

WHEREAS, as a result, routes for pipelines and other large infrastructure projects frequently avoid passing through Indian reservations and Tribal trust lands but still pass through treaty-ceded territories and tribal aboriginal lands where Tribal members hunt, fish, and gather, and where Tribal cultural resources are located; and

WHEREAS, Enbridge's proposed Line 3 Replacement Project will, if constructed, carry Canadian tar sands oil through a 36-inch diameter pipeline through pristine wild rice lakes, waters, rivers and interconnected aquifers located in the Red Lake Nation's ceded territory, as well as the headwaters of the Mississippi and two other major North American watersheds;

WHEREAS, many of those wild rice waters, rivers, lakes and aquifers are interconnected downstream and upstream with ecosystems which are the primary sources of natural resources important to Tribal members; and

WHEREAS, many of those interconnected waters flow through Red Lake treaty-ceded territories and aboriginal lands where Tribal members exercise reserved hunting, fishing and gathering rights and where cultural resources are located, or through Tribal trust lands, as well as the diminished Red Lake Reservation; and

WHEREAS, the Line 3 Replacement Project proposed route fastidiously avoids actually crossing any Indian Reservations or Tribal trust lands, yet will still impact important natural and cultural resources ; and

WHEREAS, the significance of treaty rights and treaty resources in Minnesota has been acknowledged in judicial decisions that have addressed those rights both on and off reservations; and

WHEREAS, current federal law and state law pertaining to the permitting of oil pipelines places greater emphasis on meeting the needs of the pipeline proponent than ensuring that natural resources, cultural resources, and Tribal rights, interests and resources are considered and protected; and

WHEREAS, current Army Corps of Engineers tribal consultation policy requires consultation with tribes on activities that occur within a tribe's aboriginal lands, regardless of land status; and

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WHEREAS, the Army Corps of Engineers has looked to guidelines drafted in 1997 (Attached as Exhibit A) when ascertaining its trust responsibilities to Indian tribes and since that time there have been developments in the law both generally and specifically with respect to treaties with Minnesota tribes; and

NOW THEREFORE BE IT RESOLVED that the Tribal Council hereby requests that the U.S. Army Corps of Engineers initiate early and robust tribal consultation for any infrastructure projects proposed to be located within Red Lake aboriginal lands, regardless of land status or reservation status;

BE IT FURTHER RESOLVED that the Tribal Council hereby requests that such tribal consultations be initiated at the earliest stages of project proposal to allow tribes to identify tribal natural and cultural resources that may be impacted;

BE IT FURTHER RESOLVED that the Tribal Council hereby requests that the U.S. Army Corps of Engineers work with the Red Lake Nation and other Ojibwe tribes in Minnesota and Wisconsin to develop new Clean Water Act Section 404 permitting processes for wild rice waters in recognition of the special impacts created to wild resources by activities covered under Section 404;

BE IT FURTHER RESOLVED that the Tribal Council hereby requests that the U.S. Army Corps of Engineers seek all necessary authority to condition Section 404 permit approval over infrastructure projects occurring within tribal aboriginal lands with serious potential impacts to tribal cultural and natural resources on receipt of the informed consent of the impacted tribes; and

BE IT FINALLY RESOLVED that the Tribal Council hereby requests that the U.S. Army Corps of Engineers: (1) consult with the Red Lake Nation to update the guidelines (Exhibit A); (2) make a firm, unequivocal commitment that it will follow those guidelines and fulfill its trust obligations to Indian tribes; and (3) enter into an agreement with the Red Lake Nation to establish protocols for tribal input and consultation on proposed actions impacting tribal cultural and natural resources.

FOR : 9
AGAINST: 0

We do hereby certify that the foregoing resolution was duly presented and enacted upon at a Special Meeting of the Tribal Council held on November 30, 2016, with a quorum present, at the Red Lake Nation Headquarters, Red Lake.

DARRELL G. SEKI, SR., CHAIRMAN DONALD R. COOK, SR., SECRETARY

SEP 29 1997

Construction-Operations
Regulatory (94-01298-IP-DLB)

Mr. James Schlender
Executive Administrator
Great Lakes Indian Fish & Wildlife Commission
P.O. Box 9
Odanah, Wisconsin 54861

Dear Mr. Schlender:

As a result of issues that have arisen during our evaluation of a permit application by Crandon Mining Company to establish a mining operation near Crandon, Wisconsin, the St. Paul District has been asked by several Native American tribes to address the nature and extent of the Corps trust responsibilities toward Indian tribes in the Corps regulatory permitting process. I have indicated at past consultation meetings that I had requested guidance from Corps Headquarters to address this question.

Enclosed is an issue paper that provides the guidelines that the District will follow to insure that it fulfills its trust obligations. This paper, while very useful for illustrative purposes, may not resolve issues that are specific to any individual treaty or pending permit action.

I propose that we hold a consultation meeting in approximately 60 days. This will provide you time to review the paper and to develop any questions or concerns that you may have regarding these guidelines, as well as to how they will be applied in our review of the Crandon Mining Company permit application. I suggest that the consultation meeting be held in early December in Eau Claire, Wisconsin. Mr. Dave Ballman, of my staff, will coordinate with your staff in scheduling the meeting.

Please contact me at (612) 290-5300 if you have any questions.

Sincerely,

/S/

J. M. Wonsik
Colonel, Corps of Engineers
District Engineer

SCANNED

Identical Letters:

Arlyn Ackley, Sokaogon Chippewa Community
Philip Shopodock, Forest County Potawatomi Community
Apesanahkwat, Menominee Indian Tribe of Wisconsin
James Schlender, Great Lakes Indian Fish & Wildlife Commission

Ballman	CO-R	DB 9/17
Ahlness	CO-R	9/18/97
Hauger	CO-R	
Wopat	CO-R	9/24/97
Haumersen	CO	
Adamski	OC	
Crump	PP-PM	
Breyfogle	DDE	9/29

18464

ISSUE PAPER
AND
DISTRICT RECOMMENDATION

THE AGENCY'S TRUST RESPONSIBILITIES TOWARD INDIAN TRIBES IN THE REGULATORY PERMITTING PROCESS

1. ISSUE. Work activities performed pursuant to permits issued under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act have the potential to impact Indian treaty rights[1] and to impact resources owned or used by Indian Tribes. Because of this, questions have arisen about the Corps' trust obligations to Indian tribes with respect to the Corps' permitting processes. This paper shall attempt to delineate trust issues related to the permitting process and will attempt to set forth guidelines with respect to those issues[2]. A question and answer format will be used to accomplish this purpose.

2. **May the Corps issue a permit that will impinge on or abrogate treaty rights?**

No, treaty rights[3], absent consent of Congress, may not be impinged or abrogated[4]. As the

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[1]The term "treaty rights", as used in this paper, includes not only rights derived from treaties, per se, but also rights derived from federal statutes, agreements executive orders and the like. The terms "Tribal resources" or "Treaty resources", as used in this paper, refers to resources that the Tribe, pursuant to a treaty, has a right to exploit and includes resources that they own and resources that they have a right to gather. The term "trust resources" refers to resources held in trust by the United States (the title is held by the United States) for the benefit of the Tribe.

[2]The paper, other than as may be useful for illustrative purposes, will not attempt to resolve issues that are specific to any individual treaty or pending permit action, but will attempt to formulate guidelines which will insure that the agency fulfils all of its trust obligations.

[3]It should be noted that the terms "treaty rights" and "treaty resources" are not synonymous. For example, a treaty that guarantees a tribe the right to hunt and fish on its reservation, the "treaty right" is the right to take the resource (game or fish), the "treaty resource"

SCANNED

Court held in *Northwest Sea Farms, Inc., v. U.S. Army Corps of Engineers*, 931 F. Supp. 1555 (W.D. Wash. 1996) 1519-1520:

> The Supreme Court has recognized "the undisputed existence of a general trust relationship between the United States and the Indian people." *United States v. Mitchell*, 463 U.S. 206, 225, 103 S.Ct. 2961, 2972, 77 L.Ed.2d 580 (1983). This obligation has been interpreted to impose a fiduciary duty owed in conducting "any Federal Government action"[5] which relates to Indian Tribes. *Nance v. Environmental Protection Agency*, 645 F.2d 701, 711 (9th Cir.), *cert. Denied*, 454 U.S. 1081, 102 S.Ct. 635, 70 L.Ed.2d 615 (1981), ... In previous cases, this Court has tacitly recognized that the duty extends to the Corps in the exercise of its permit decisions. *See e.g. Muckleshoot Indian Tribe v. Hall*, 698 F. Supp. 1504, 1523 (W.D.Wash.1988) (granting an injunction against the construction of a marina in consideration of the effect upon Indian treaty rights).
>
> In carrying out its fiduciary duty, it is the government's and subsequently the Corps', responsibility to ensure that Indian treaty rights are given full effect. *See e.g. Seminole Nation v. United States*, 316 U.S. 286, 296-297, 62 S. Ct. 1049, 1054-55, 86 L.Ed. 1480, 86 L.Ed.1777 (1942) (finding that the United States owes the highest fiduciary duty to protect Indian contract rights as embodied by treaties). Indeed, it is well established that only Congress has the authority to modify or abrogate the terms of Indian treaties. *United States v. Eberhardt*, 789 F.2d 1354, 1361 (9th Cir.1986). As such, the Court concludes that the Corps owes a fiduciary duty to ensure that the Lummi Nation's treaty rights are not abrogated or impinged upon absent an act of Congress.

3. How are treaty rights determined?

Treaty rights are determined on a case by case (treaty by treaty) basis. Each individual treaty or series of treaties must be examined to determine the specific rights provided by those treaties.

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is the game or fish. Although courts have, almost universally held that treaty rights may not be impinged, they have not held that the resource may not be negatively impacted. See also question 6.

[4]Note, however, that the same Court that decided *Northwest Sea Farms, Inc.* issued an order in *Lummi Indian Nation v. Cunningham*, case No. C92-1023C on September 1, 1992, to the effect that before a claim that treaty rights have been impinged or abrogated is cognizable "the interference with the treaty right must reach a level of legal significance".

[5]A permit is a Federal Government action"

4. How are Indian treaties to be interpreted?

There are three basic rules of treaty construction. They are: (1) Ambiguities in treaties must be resolved in favor of the Indians, (2) Indian treaties must be interpreted as the Indians would have understood them at the time they consented to the treaty, and (3) Indian treaties must be construed liberally in favor of the Indians. This does not mean, however, that the treaties are to be construed in any manner that the Indians wish them to be construed. The rules of construction do not permit the clear intent of the treaties to be disregarded.

The Court in *Menominee Indian Tribe of Wisconsin v. Thompson*, 922 F.Supp. 184, (198-199), (W.D. Wis. 1996) described the rules of construction as follows:

> It is well known that Indian treaties must be interpreted as the Indians understood them, that doubtful expressions are to be resolved in favor of the Indians and that treaties must be construed liberally in favor of the signatory tribes. ... treaties are not to be construed by "the technical meaning of [their] words to learned lawyers, but in the sense in which they would naturally be understood by the Indians." *Id.*
>
> Determining the Indians' understanding may require expert testimony to explain the historical and cultural context in which the Indians viewed the treaty provisions. *See, e.g. McClanahan v. State Tax Comm'n of Arizona*, 411 U.S. 164, 174, 93 S.Ct. 1257, 1263, 36 L.Ed.2d 129 (1973) ... ("Doubtful expressions are to be resolved in favor of the weak and defenseless people who are the wards of the nation, dependent upon its protection and good faith."); *Winters v. United States*, 207 U.S. 564, 576-77, 28 S.Ct. 207, 211, 52 L.Ed. 340 (1908) ("ambiguities occurring [in treaties] will be resolved from the standpoint of the Indians").
>
> It is true that "[t]he cannon of construction regarding the resolution of ambiguities ... does not permit reliance on ambiguities that do not exist; nor does it permit disregard of the clearly expressed intent of Congress." *South Carolina v. Catawba Indian Tribe*, 476 U.S. 498, 506, 106 S.Ct. 2039, 2044, 90 L.Ed.2d 490 (1986). See also *Amoco Production Co. V. Gambell*, 480 U.S. 531, 555, 107 S.Ct. 1396, 1409, 94 L.Ed.2d 542 (1987) (citing *Catawba Indian Tribe*); *Choctaw Nation*, 318 U.S. at 432, 63 S.Ct. At 678 ("even Indian treaties cannot be rewritten or expanded beyond their clear terms to remedy a claimed injustice or to achieve the asserted understanding of the parties").

Moreover, many of the issues of treaty construction that are likely to arise in the permitting process, have already been determined by the Courts[6]. Thus, the first step in

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[6]Even if the case law is not dispositive of the specific issue, it may provide rationale or additional information which will aid in the decision process. Additionally, it is recommend that Office of Counsel (or similar resource) be consulted before making a determination, in questionable cases, whether a treaty right exists or does not exist and whether the proposed

construing a treaty should be to review any Court decision that may be relevant.

5. How can we determine if treaty rights may be an issue with respect to a specific permit application?

The geographic extent[7] of all treaty rights and Tribal resources should be known to the regulatory staff. If the proposed activity could have any effect within that geographic area the treaties should be reviewed to determine if treaty rights may be affected. A determination should also be made as to whether the proposed activity may affect Tribal resources. Most importantly, the Indian Tribes that may be affected by the permitted activity should be apprised of the permit application and be given the opportunity to comment or consult with the Corps. If any Tribe asserts that the proposed permit activity would impinge on or abrogate its treaty rights or would negatively impact its resources, it should be requested[8] to provide all substantiating information it has available as to: (1) the existence of treaties, (2) claimed treaty rights, (3) any Court cases relevant to the Tribe's assertions, (4) an explanation of how the proposed activity would violate treaty rights, (5) identification of any Tribal resources that may be impacted, (6) an explanation of how the proposed activity would impact Tribal resources, and (7) a description of how the proposed activity would impact the Tribe[9]. BIA should also be informed of any proposed activity (needing a Corps permit) that might impact Tribal resources and should be requested to identify any treaty rights or Tribal resources that may be impacted by the proposed permit.

6. Does the Corps have a trust responsibility to protect Tribal resources from environmental degradation that may result from the proposed permit activity?

The Corps must consider the effect that the activity needing a Corps permit would have on the Tribe's resources, however, the fact that the Tribe's resource may be degraded, or reduced in value or utility, does not necessarily compel denial of the permit. This principle was explained by the Court in *Nez Perce Tribe v Idaho Power Co.*, 847 F.Supp. 791 807-813 (D.Idaho 1994) in a

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permit will or will not violate those rights.

[7]Including the area within the external boundaries of any Indian reservation and the geographic area in which usufructuary rights, if any, may be exercised.

[8]The Tribes are not required to respond.

[9]This request would be made to afford the Tribes every practicable opportunity to present their views. Neither the failure of the Tribes to respond nor a response from the Tribes relieves the Corps of its obligation to consider all impacts the proposed activity would have on any treaty rights or any impacts to Tribal resources that Corps is aware of, or reasonably should have been aware of. See also *Pueblo of Sandia v. United States*, 50 F.3d 856 (10th Cir. 1995).

case concerning permanent usufructuary rights[10], as follows:

> ... In other words, the Tribe argues that developments such as dams which damage, reduce or destroy the fish runs violate their 1855 Stevens treaty fishing rights and entitles them to an award of monetary damages.
>
> b) *Treaty Rights to Preservation of Fish Runs*
>
> The ultimate issue presented is whether the treaty provides the Tribe with an absolute right to preservation of the fish runs in the condition existing in 1855, free from environmental damage caused by a changing and developing society. Only if such a right exists is the Tribe entitled to an award of monetary damages.
>
> The parties have cited, and the Court's own independent research has disclosed only three cases which directly address this ultimate issue. *United States v. Washington* (hereinafter "*Washington 1982*"), 694 F.2d 1374 (9th Cir. 1982); *Muckleshoot Tribe v Puget Sound Power and Light*, CV No. 472-72C2V (W.D. Wash.1986); and *Nisqually Tribe v. City of Centralia*, No. C75-31 (W.D. Wash.1981). However, *Washington 1982* was vacated by the Ninth Circuit on other grounds in a subsequent en banc decision. *United States v. Washington*, 759 F.2d 1353 (9th Cir. 1985). *Muckleshoot Tribe v. Puget Sound* expressly relied on the *Washington 1982* opinion which was not vacated until after the decision in *Muckleshoot* was issued. Therefore, it appears that this Court is required to address and determine an issue of first impression without the benefit of any binding guidance and direction. ...
>
> ... State regulation cannot discriminate against the Indian fishery. *Puyallup II*, 414 U.S. [44] at 48, 94 S.Ct. [330] at 333 [38 L.Ed.2d 254 [(1973)]. This principle is broad enough to encompass discriminatory granting of permits for projects with potentially adverse environmental effects.
>
> *Id.* At 1382.
>
> In addition, the Ninth Circuit rejected the trial court's conclusion that other previous cases implied a general right to environmental protection of the fish: ...
>
> Thus, according to the Ninth Circuit's persuasive reasoning in *Washington 1982*, the states may allow or even authorize development which reduces the number of fish in the annual runs as long as such action does not discriminate against treaty fishermen in determining what development will be authorized. Although the opinion was vacated on other grounds, the Court agrees with the

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[10]The treaty at issue in the case has been interpreted as creating permanent usufructuary rights (non-exclusive) to fish in all of the Tribes usual and customary places. Not all usufructuary rights are permanent as some are subject to termination upon the occurrence of a defined event. For example, Chippewa usufructary rights with respect to territory ceded by them to the United States are terminated or extinguished whenever the land is owned by private entities rather than the public. The (trust) duty to mitigate for damage to resources that may be harvestable pursuant to permanent usufructuary rights discussed by the Court in *Nez Perce* may not be applicable to usufructuary rights that can be terminated or extinguished in their entirety.

legal analysis in *Washington 1982*. In the Court's view, the Stevens treaties do not protect the Indians from degradation of the fish runs caused by development which is not part of a pattern of discrimination against Indian treaty fish runs.

... In the Court's view, the 1855 treaty does not provide a guarantee that there will be no decline in the amount of fish available to take. The only method that would guarantee such protection would be to prevent all types of development, whether or not it is discrimatory of Indian treaty rights. The Stevens treaties simply do not provide the Tribe with such assurance or protection.

... Stevens treaties require that any development authorized by the states which injure the fish runs be non-discrimatory in nature *see Fishing vessel*, 443 U.S. 658, 99 S.Ct. 3055, 61 L.Ed.2d 823 but does not, however, guarantee that subsequent development will not diminish or eventually, and unfortunately, destroy the fish runs.

7. Does the Corps trust responsibility to Indian tribes require mitigation for impacts to off reservation resources that the Tribes have a right to harvest (usufructuary rights)?

The answer to this question depends on the nature of the usufructuary rights reserved or held by the Tribes. All usufructuary rights are not alike. For example, courts have held that a number of Tribes in the Pacific Northwest have usufructuary rights that are permanent in nature and are not subject to termination[11]. Those rights were held to have both a geographic component[12] and a component that entitled the Tribes to take a share of the available fish. Those courts have also held that while the Tribes were not entitled to be protected against off reservation activity that would result in a reduction of available fish, they were entitled to reasonable steps to mitigate adverse impacts from the activity.[13] The theoretical basis for the holding that reasonable mitigation is required was explained in *United States v. State of Washington*, 506 F.Supp. 187, 203 (1980)[14] as follows:

At the outset the Court holds that implicitly incorporated in the treaties' fishing clause is the right to have the fishery habitat protected from man-made

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[11]Other than by an Act of Congress.

[12]The right to fish forever in certain locations defined in the Treaty.

[13]"We do not find such an obligation in the treaty. Where the decision to allow development is not tinged with any discrimatory animus, the treaty fishing clause, as we read it, does not require compensation of the Indians on a make whole basis if reasonable steps, in view of the available resources and technology, are incapable of avoiding a reduction in the amount of available fish." *U.S. v. State of Washington*, 694 F.2d 1374, 1386 (1983)

[14]The Court's decision was vacated by the Ninth Circuit on other grounds in "*U.S. v. State of Washington*, 694 F.2d 1374. See also question 6.

despoilation. Virtually every case construing this fishing clause has recognized it to be the cornerstone of the treaties and has emphasized its overriding importance to the tribes. ... The Indians understood, and were led by Governor Stevens to believe, that the treaties entitled them to continue fishing in perpetuity and that the settlers would not qualify, restrict, or interfere with their right to take fish. ...

In contrast to the Pacific Northwest cases, the Chippewa in Wisconsin and Minnesota have been found to have usufructuary rights to hunt, fish and gather that are extinguished upon the land passing to private ownership[15]. Thus the underlying rationale in the Pacific Northwest cases - perpetual usufructuary rights - for requiring mitigation, as a trust responsibility, is not present with respect to the Chippewa's usufructuary rights. Moreover, a determination that the United States' trust obligations would require it to ensure that mitigation would be performed would be logically inconsistent with case law which has held that the usufructuary rights were extinguished when the land over which they originally could have been exercised passed to private ownership. Under the relevant case law no compensation would be due the Tribes, even if all of the land passed to private ownership, as it was understood that usufructuary rights "were subject to and limited by the demands of the settlers." *Lac Courte Oreilles Band v. State of Wisconsin*, 760 F.2d 177, 183 (1985)

Therefore, the specific usufructuary right in question should be examined to determine if mitigation would be required as a trust obligation. However, even if it is determined that mitigation would be required, it is not unlikely that mitigation that is or would be required in conjunction with the permit, even absent a trust responsibility,[16] would be sufficient to satisfy any Government trust obligation to mitigate.[17]

8. Does the Corps trust responsibility to Indian Tribes require mitigation for adverse impacts to Tribal resources on reservations?

Each treaty at issue must be reviewed to determine what is or is not required under that treaty. Under the rationale of the Pacific Northwest cases it would appear that mitigation, to the extent reasonable and practicable is owed. However, those cases do not indicate that there is an environmental servitude owed the Tribes such that mitigation must ensure that there is no net adverse effect resulting from the federal action. In fact, the Court in *United States v. State of*

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[15] *Lac Courte Oreilles Band, Etc. v Voigt*, 700 F.2d 341 (1983) and *Lac Courte Oreilles Band v. State of Wisconsin*, 760 F.2d 177.

[16] Mitigation that would be required of the applicant even if there were no usufructuary rights or trust obligation to mitigate.

[17] See *Pyramid Lake Paiute Tribe v. U.S. Department of Navy*, 898 F.2d 1410 (9th Cir. 1990); *Havasupai Tribe v. United States*, 752 F. Supp. 1471 (D. Ariz. 1990); and *Nance v. Environmental Protection Agency*, 645 F.2d 701 (1981)

Washington, 694 F.2d 1374 (1982) has indicated that a resource may be rendered valueless without abrogation of treaty rights or trust responsibilities[18]. As stated by that Court at page 1381 "Any right may be subject to contingencies which would render it valueless." and at page 1382:

> The spectre the district court raises of tribal fishermen unprotected by the environmental right dipping their nets into the water and bringing them out empty, 506 F.Supp. at 203, cannot alter the scope of *Fishing Vessel*. Only the extension of the servitude to ban even non-discriminatory development occurring both within and without treaty fishing areas assure against any decline in the amount of fish taken. The treaty does not grant such assurance.

It is also not unlikely that any trust obligation owed to require mitigation would be satisfied by mitigation that would be required in conjunction with the 404 permit process, absent a trust obligation.

Accordingly, mitigation, to the extent it is reasonable and practicable, for impacts to Tribal resources sited on reservations should be required.

9. May an activity whose impact to a reservation's resources be such that it would defeat the purpose for which the reservation was established be permitted?

Before one can begin to address this question, in practice, the terms of the treaty in question must be examined to determine if the Treaty specifically contemplates the activity to be permitted and if that activity, under the terms of the treaty takes precedence over or is subservient to the interests of the Tribe[19] Assuming the treaty is not dispositive, the following is applicable.

I am not aware of a line of cases directly addressing this issue; however, *Pyramid Lake Paiute Tribe of Indians v. Morton*, 354 F.Supp. 252 (1973) gives us guidance as to how one court decided the issue and may be illustrative of how such issues would be decided in the future. The case concerned the Department of Interior's regulation, which the Tribe contended delivered "more water to the District than required by applicable court decrees and statutes, and improperly diverts water that otherwise would flow into nearby Pyramid Lake located on the Tribe's

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[18]This discussion is not applicable to impacts which would defeat the purpose for which the reservation was established.

[19]See *Sokaogon Chippewa Community v. Exxon Corp.*, 805 F.Supp. 680, 706 (E.D.Wis, 1992) "If the Sokoagon were to prevent Exxon from mining on the subject territory, it would be in contravention of the very considerations prompting the two treaties. Even assuming that the Sokaogon have rights in the land, the language and intent of the 1842 and 1854 Treaties demand that mineral development should take precedence over those rights.

reservation." Although the Court could have analyzed the case under the Winters doctrine[20] It chose not to do so. The Court noted, at pages 254-255, that:

> This Lake has been the Tribe's principal source of livelihood. Members of the Tribe have always lived on its shore and have fished its waters for food. ...
>
> Recently, the United States, by original petition in the Supreme Court of the United States, filed September, 1972 claims the right to use sufficient water of the Truckee River for the benefit of the Tribe to fulfill the purposes for which the Indian Reservation was created, "including the maintenance and preservation of Pyramid Lake and the maintenance of the lower reaches of the Truckee as a natural spawning ground for fish and other purposes beneficial to and satisfying the needs of the Tribe. ...

The Court then determined (page 256) that:

> ... The Secretary's duty was not to determine a basis for allocating water between the District and the Tribe in a manner that hopefully everyone could live with for the year ahead. This suit was pending and the Tribe had asserted well-founded rights. The burden rested on the Secretary to justify any diversion of water from the Tribe with precision. It was not his function to attempt an accommodation.
>
> In order to fulfill his fiduciary duty, the Secretary must insure, to the extent of his power that, that all water not obligated by court decree or contract with the District goes to Pyramid Lake.

Accordingly, should the Corps determine that an activity needing a Corps permit would impact the reservation's resources to an extent that they would defeat the purpose for which the reservation was established the permit should be denied.[21]

10. What is the Winter's doctrine and is it applicable to permit decisions?

Felix S. Cohen's Handbook of Federal Indian Law, 1982 Edition, pages 575 to 576 offers a good explanation of the doctrine:

> The Supreme Court first articulated this doctrine in *Winters v. United States* in 1908 and reaffirmed it in 1963 in *Arizona v. California. Cappaert v.*

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[20] *Winters v. United States, 207 US 564, (1908)*

[21] It is likely that if the impacts were so great as to defeat the purpose of the reservation that, even without considering the Corps' trust obligations, the permit would be denied as not being in the public interest. (A permit whose impact would deprive any community of the ability to maintain a moderate living standard is not likely to be in the public interest.)

United States contains the Court's most succinct and lucid statement of the governing principles of reserved water rights:

> This Court has long held that when the Federal Government withdraws its land from the public domain and reserves it for a federal purpose, the Government, by implication, reserves appurtenant water then unappropriated to the extent needed to accomplish the purpose of the reservation. In so doing the United States acquires a reserved right in unappropriated water which vests on the date of reservation and is superior to the rights of future appropriators. ... The doctrine applies to Indian reservations and other Federal enclaves, encompassing water rights in navigable and nonnavigable streams.
>
> In determining whether there is a federally reserved water right implicit in a federal reservation of public land, the issue is whether the Government intended to reserve unappropriated and thus available water. Intent is inferred if the previously unappropriated waters are necessary to accomplish the purpose for which the reservation was created.

This doctrine arose and has been applied extensively in appropriative water law states (generally western states that have limited supplies of water). The doctrine has not been applied to riparian water law states and may not be applicable to them.

11. When, in the permitting process sequence, should the Corps trust obligations be considered?

Since the Tribal trust issues, alone, may be determinative[22] of the outcome of the permit decision, those issues should be considered immediately after or in conjunction with consideration of the avoidance issue.

12. If the Tribal trust issues are not dispositive of the permitting decision, do we need to consider the Tribe's concerns further?

Yes. The Tribal concerns and the impacts of the proposed activity on Tribal resources should be considered in the public interest review just as any other similarly sized community would be. Such consideration should not be evaluated based on Tribal trust responsibility considerations[23] but should take into account the relative impact the proposed activity would have

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[22]For example, if the permitted activity would violate a treaty provision, the permit application would be denied.

[23]These considerations should have been addressed previously.

on the community[24]. The same impact to natural resources may have a greater effect on individual Indians than it would on non-Indians, not only because of greater dependence on those resources, but also because the individual Indian may be more closely tied to the defined land area than his non-Indian counterpart. Additionally, any spiritual or cultural impact to the Tribe that would result from the proposed permit activity should be evaluated in the public interest review.

13. Should the Corps apply different criteria to permit applications for activities within a reservation's exterior boundaries than would be applied to a permit application for activities outside a reservation's exterior boundaries?

No. The criteria applied should be the same. However, it is very likely that an activity that is sited within the reservation's exterior boundaries would have a greater impact on Tribal resources than would an activity that is sited off reservation. Moreover, the applicant would still have to comply with all applicable local regulations, thus the Tribe may be able to impose its requirements[25] on the applicant. Such requirements would be independent of and in addition to any Corps' permit requirement or condition. Further, if the Tribe has jurisdiction over the activity and exercises its jurisdiction to prohibit the activity[26] the permit application to the Corps should be denied without prejudice.

14. Who is the Federal Trust Obligation owed to?

The Trust obligation is owed to Federally Recognized Indian Tribes.

Edwin C. Bankston
District Counsel

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[24]For example, an activity that would diminish the supply of game may affect Indian communities to a greater degree than non-Indian communities, because the Indian community may be more dependent on game than the non-Indian community. This greater importance to the Indian community should be factored into the evaluation.

[25]Including preventing the activity if the Tribe has sufficient authority to do so.

[26]Such as denying a required Tribal permit.

STATE OF MINNESOTA
PUBLIC UTILITIES COMMISSION

Beverly Jones Heydinger	Chair
Nancy Lange	Commissioner
Dan Lipschultz	Commissioner
John A. Tuma	Commissioner
Betsy Wergin	Commissioner

In the Matter of the Application of Enbridge Energy, Limited Partnership for a *Certificate of Need* and *Pipeline Routing Permit* for the Line 3 Replacement Project in Minnesota

PETITION TO INTERVENE

Docket Nos. PL-9/CN-14-916 and PL-9/PPL-15-137

To: The Minnesota Public Utilities Commission

Pursuant to Minnesota Rules 1400.6200, the White Earth Band of Ojibwe (White Earth Band) hereby respectfully petitions to intervene in the above-referenced Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need and Pipeline Routing Permit for the Line 3 Replacement Project in Minnesota.

Background and Issues

The Applicant, Enbridge Energy, Limited Partnership, applied for a Certificate of Need and Routing Permit for its proposed Line 3 Replacement Project in Minnesota, to be co-located in the corridor selected by the Applicant, Enbridge Pipelines d/b/a/ North Dakota Pipeline Company, LLC, for the proposed Sandpiper Pipeline Project. The proposed corridor for these projects traverses a significant portion of the 1855 Treaty-ceded territory, and goes through the northeast townships of the original White Earth Reservation. The White Earth Band is an intervening party to the Sandpiper Pipeline project proceedings, and has been since 2014. The interest of the White Earth Band in these proceedings is substantially similar to the interests of

White Earth in the Sandpiper Pipeline proceedings given the proposed co-location of these projects and the impact these projects could have on on-Reservation resources and usufructuary use rights resources within the 1855 Treaty-ceded territory.

Identity of Petitioner

The White Earth Band of Ojibwe (the White Earth Nation) is a federally recognized Indian Nation and a constituent member of the Minnesota Chippewa Tribe with its Reservation in west central Minnesota.[1] The members of the White Earth Band are amongst the successors in interest to a number of treaties entered into with the Ojibwe Bands between the 1830's and the 1860's.[2] The members of the White Earth Band hunt, fish, rice, and gather within the Reservation and the 1855 Treaty-ceded territory. The impact of large scale infrastructure energy projects like those proposed by Enbridge Energy, Limited Partnership and the North Dakota Pipeline Company, LLC during both construction and operation may have a significant impact on the health and availability of resources necessary to subsistence and use activities. The protection and health of wild rice within this region of the state is of particular concern to the White Earth Band given its supreme cultural significance to Ojibwe Anishinaabe people, and its importance as a source of food and income.

Argument

I. The State of Minnesota has an obligation to engage in meaningful consultation with the successors in interest to the 1855 Treaty including the White Earth Band of Ojibwe to address the impact of this Project to on-Reservation and off-Reservation usufructuary use rights resources prior to final determinations on the applications for permits.

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[1] Indian Entities Recognized & Eligible To Receive Services From the Bureau of Indian Affairs, 77 Fed. Reg. 47,868, 47,870 (Aug. 10, 2012).

[2] *See*, Treaty of 1836, 7 Stat. 491 (March 28, 1836); Treaty of 1837, 7 Stat. 536 (July 29, 1837); Treaty of 1842, 7 Stat. 591 (Oct. 4, 1842); Treaty of 1854, 10 Stats. 1109 (Sept. 30, 1854); Treaty of 1855, 10 Stat. 1165 (Feb. 22, 1855); Treaty of 1864, 13 Stat. 693 (May 7, 1864); Treaty of 1867, 16 Stats. 719 (March 19, 1867).

a. The White Earth Band of Ojibwe retains off-reservation usufructary rights in the 1855 Treaty ceded territory which have not been abrogated.

The White Earth Reservation Tribal Council is the governing body of the White Earth Reservation, and is among the successors in interest to the signatories of the 1855 Treaty with the Chippewa (hereinafter "1855 Treaty").[3] Although the 1855 Treaty was a land cession treaty, it did not dispossess the signatories of their retained usufructuary rights in the ceded territory. The Court in *Mille Lacs* noted in its conclusion that the 1855 Treaty did not abrogate previously guaranteed reserved rights. The Court stated:

> The entire 1855 Treaty, in fact, is devoid of any language expressly mentioning-much less abgrotating-usufructuary rights. Similarly, the Treaty contains no language providing money for the abrogation of previously held rights . . . The 1855 Treaty was designed primarily to transfer Chippewa land to the United States, not to terminate Chippewa usufructuary rights.[4]

In addition to the reserved rights provided for in the 1837 Treaty, the 1854 Treaty "also guarantees usufructuary property rights to the Mississippi Chippewa in the *unceded* territory west of the 1854 Treaty boundary . . ."[5] The Mississippi Band was a signatory to the 1854 Treaty, and the 1855 Treaty territory is west of the 1854 Treaty ceded territory.

The retained usufructuary rights of the White Earth Band were intact after the execution of the 1855 Treaty, and have not been subsequently divested.

b. The State of Minnesota is obligated to engage in meaningful consultation with the White Earth Band of Ojibwe regarding the impact of this Project to on and off-Reservation resources including resources within the 1855 Treaty-ceded territory.

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[3] 10 Stats. 1165 (Feb. 2, 1855). The signatory Bands to the Treaty of 1855 were the Mississippi, Pillager, and Lake Winnibigoshish Bands, whose people were among the Bands that would later organize under the Indian Reorganization Act (48 Stat. 987 (1934) as the Minnesota Chippewa Tribe, which is composed of White Earth, Leech Lake, Mille Lacs, Grand Portage, Bois Forte, and Fond Du Lac.

[4] *Minnesota v. Mille Lacs Band of Chippewa Indians*, 526 U.S. 172, 195, 196 (1999).

[5] Peter Erlinder, *Treaty-Guaranteed Usufructuary Rights:* Minnesota v. Mille Lacs Band of Chippewa Indians *Ten Years On*, 41 ELR 10921, 10930 (Oct. 2011) (emphasis added).

The White Earth Band and other successors in interest to the 1855 Treaty retain usufructuary use rights property interests in the 1855 Treaty-ceded territory.[6] The White Earth Band additionally retains original, sovereign jurisdiction over resources within the Reservation boundaries.[7] As demonstrated in the *Mille Lacs* case, tribes have the authority to regulate their membership within the treaty-ceded territories for the purposes of exercising usufructuary use rights in cooperation with the state agencies.[8] The State of Minnesota is unable to proceed with issuance of the Applicant's Certificate of Need and Routing Permit without the involvement of the White Earth Band and a detailed consideration of the impacts of the proposed project on resources both within the Reservation boundaries and within the 1855 Treaty-ceded territory.

The White Earth Band petitions for intervention in these proceedings as a necessary first step to meaningful consultation with the State of Minnesota for the preservation and protection of on and off-Reservation resources necessary to continued use by the members of the White Earth Band.

Conclusion

The State of Minnesota is required to meaningfully consult with the White Earth Band of Ojibwe regarding the impact of the Line 3 Replacement Project to on and off-Reservation resources, including resources necessary for the continued exercise of usufructuary use rights activities within the 1855 Treaty-ceded territory. The interests of the White Earth Band of

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[6] *See, e.g.*, Minnesota v. Mille Lacs Band of Chippewa Indians, 526 U.S. at 176 (finding that the Mille Lacs Band of Ojibwe retained usufructuary use rights within the 1837 Treaty-ceded territory including the right to regulate its own membership in the use of such resources).

[7] *See, e.g.*, Worchester v. Georgia, 31 U.S. 515, 557 (1832) (finding that Tribal Nations are "distinct political communities, having territorial boundaries, within which their authority is exclusive. . .").

[8] *Minnesota v. Mille Lacs Band of Chippewa Indians*, 526 U.S. 172, 205 (1999); *United States v. Dion*, 476 U.S. 734 (1986); *Washington et al. v. Washington State Commercial Passenger Fishing Vessel Ass'n, et al.*, 443 U.S. 658 (1979); *Lac Courte Oreilles Band of Lake Superior Chippewa Indians v. Voigt*, 700 F.2d 341, 365 (7th Cir. 1983); and *Lac Courte Oreilles Band of Lake Superior Chippewa Indians v. Wisconsin*, 653 F. Supp. 1420, 1430 (W.D. Wisc. 1987).

Ojibwe in these proceedings are substantially the same as the White Earth Band's interests in the Sandpiper Pipeline Project proceedings. The White Earth Band petitions for intervention in these proceedings to protect the interests of the White Earth Nation and its membership with regard to the continued health and production of on and off-Reservation resources, most important, the health of wild rice. The White Earth Band of Ojibwe does not believe that any other current or prospective party is able to represent and safeguard its interests.

Dated: 1/19/16

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Jensen	Linda	linda.s.jensen@ag.state.mn.us	Office of the Attorney General-DOC	Electronic Service	No
Kirsch	Ray	Raymond.Kirsch@state.mn.us	Department of Commerce	Electronic Service	No
LaBerge	Kathy	labergeonthelake@yahoo.com	N/A	Electronic Service	No
LaDuke	Winona	winonaladuke1@gmail.com	Honor the Earth	Electronic Service	No
Lindell	John	agorud.ecf@ag.state.mn.us	Office of the Attorney General-RUD	Electronic Service	Yes
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White Earth Reservation Tribal Council
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CHAIRWOMAN
Erma J. Vizenor

SECRETARY-TREASURER
Robert J. Durant

DISTRICT I
Irene Auginaush

DISTRICT II
Terrence Tibbetts

DISTRICT III
Kenneth Bevins

Beverly Jones Heydinger, Chair
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
Saint Paul, Minnesota 55101-2147

Dear Chair Heydinger:

As Chairwoman of the White Earth Reservation Tribal Council, I can appreciate the many issues you must face as Chair of the Minnesota Public Utilities Commission.

I am writing today to ask for the comment period with respect to the routing permit requested by the North Dakota Pipeline Company for a petroleum pipeline between Tioga, North Dakota and Superior, Wisconsin be extended beyond the current April 4, 2014 deadline.

This company has done no outreach to the White Earth Tribal Nation or any other Tribal Nation in Minnesota. These lands are sacred to us. The pipeline company proposes to locate the pipeline through lands upon which our tribal members have off-Reservation gathering rights. The issue of locating a pipeline to transport crude oil through the Mississippi Headwaters Country cannot be rushed.

The information on this issue has been repeatedly changed by the pipeline company. We are very concerned about the potential for environmental destruction similar to the dumping of over 1.5 million gallons of oil from a ruptured oil pipeline through the Kalamazoo River. We are not speculating. Disasters of this magnitude have actually occurred.

Therefore, I am requesting that no action be taken by the Minnesota Public Utilities Commission at this time. At a minimum, this company needs to do serious outreach to Tribal Nations. Given the information I have received at this time, I am certain all Tribal Nations in Minnesota would oppose the location of the route now proposed by the North Dakota Pipeline Company.

I look forward to discussing this issue with you in the future, but we are very concerned the comment period not close on April 4 for many reasons.

Sincerely,

Erma J. Vizenor
Chairwoman

WHITE EARTH RESERVATION TRIBAL COUNCIL
A/K/A WHITE EARTH BUSINESS COMMITTEE
WHITE EARTH BAND OF CHIPPEWA INDIANS

Resolution No. 001-14-012

WHEREAS, the White Earth Reservation Tribal Council is the duly elected governing body of the White Earth Reservation pursuant to Article IV, Section 1, of the revised constitution of the Minnesota Chippewa Tribe, as amended, and organized under Section 16, of the Act of June 18, 1934 (48 Stat. 984), and

WHEREAS, the White Earth Reservation Tribal Council, also known as the White Earth Reservation Business Committee, is the duly authorized governing body of the White Earth Band, and

WHEREAS, the White Earth Reservation Tribal Council, as the duly elected governing body of the White Earth Reservation has the power under the constitution and by-laws to promulgate resolutions governing the conduct of business on the Reservation; as well as conduct taking place within or having a direct impact upon the 1855 Treaty Ceded territory, and

WHEREAS, the White Earth Reservation Tribal Council has reviewed the application filed by North Dakota Pipeline Company LLC with the Minnesota Public Utilities Commission ("PUC") with respect to a routing permit for a petroleum pipeline between Tioga, North Dakota and Superior, Wisconsin, and

WHEREAS, the White Earth Tribal Government and staff have been active in work to protect the environment for our present Tribal members and for our future generations through the approval and implementation of a body of tribal laws and regulations, and

WHEREAS, the White Earth Reservation Tribal Council is concerned about the potential impact to lands, wetlands and waters if a leak or rupture of North Dakota Pipeline Company's pipeline were to occur near the White Earth Reservation or in the 1855 Treaty Ceded territory, and

WHEREAS, the White Earth Reservation Tribal Council is mandated to take steps to protect tribal members; and to protect habitat for animals, plants and especially wild rice from the devastating potential effects of a pipeline leak or rupture, and

WHEREAS, the White Earth Reservation Tribal Council has not been provided with any assurances by the North Dakota Pipeline Company or any other party that additional pipelines for the transportation of crude oil, tar sands and diluents will be any safer than the current pipelines which have leaked and ruptured on countless occasions, now

THEREFORE BE IT RESOLVED, that the White Earth Reservation Tribal Council hereby declares that it is opposed to the application filed by the North Dakota Pipeline Company with the Minnesota PUC with respect to a routing permit for the Sandpiper petroleum pipeline between Tioga, North Dakota and Superior, Wisconsin, and

BE IT FURTHER RESOLVED, that the White Earth Reservation Tribal Council hereby directs Tribal environmental and legal staff to formally intervene in the proceedings now pending before the Minnesota PUC involving the North Dakota Pipeline Company's application for a routing permit for the purpose of informing the PUC of the White Earth Nation's opposition to the grant of such permits, now

BE IT FINALLY RESOLVED, that the White Earth Reservation Tribal Council further directs Tribal environmental and legal staff to document the potential harmful impacts to the White Earth Nation, its people, its natural environment, its water, both within the boundaries of the White Earth Reservation and in the 1855 Treaty Ceded territory.

We do hereby certify that the foregoing resolution was adopted by a vote of 3 for, 0 against, 0 silent, a quorum being present at a special meeting of the White Earth Reservation Tribal Council held on February 13, 2014 in Mahnomen, Minnesota.

Erma J. Vizenor, Chairwoman

Robert J. Durant, Secretary/Treasurer

RECEIVED
APR 04 2014
MINNESOTA PUBLIC
UTILITIES COMMISSION

TO: Burl Haar URGEWT

From: **Barbara Rohde**
(202) 255-6971

Number of sheets including cover sheet 5

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SECRETARY-TREASURER
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DISTRICT I
Steven "Punky" Clark

DISTRICT II
Kathy Goodwin

DISTRICT III
Kenneth Bevins

September 30, 2015

Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

Re: Docket Nos. PPL-13-473 (Sandpiper)
PPL-15-137 (Line 3)

To the Minnesota Public Utilities Commission:

The White Earth Band of Ojibwe expects that an Environmental Impact Statement examining the cumulative effects of the Sandpiper Pipeline and the Line 3 Pipeline will be completed, considering all routes in consideration during the Sandpiper proceedings, and any additional route or project alternatives offered during the scoping period. Completion of an Environmental Impact Statement for both projects is consistent with the opinion of the Minnesota Court of Appeals,[1] and satisfies, in part, the obligations of the State of Minnesota to engage in meaningful consultation and co-management of resources with the Tribal Nations of the State.[2] Completion of an Environmental Impact

[1] *In the Matter of the Application of the North Dakota Pipeline Company, LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota*, No. A15-0016 (Sept. 14, 2015), slip op.

[2] *See, e.g.*, Minnesota v. Mille Lacs Band of Chippewa Indians, 526 U.S. 172, 205 (1999); United States v. Dion, 476 U.S. 734 (1986); Washington et al. v. Washington State Commercial Passenger Fishing Vessel Ass'n, et al., 443 U.S. 658 (1979); Lac Courte Oreilles Band of Lake Superior Chippewa Indians v. Voigt, 700 F.2d 341, 365 (7th Cir. 1983); and Lac Courte Oreilles Band of Lake Superior Chippewa Indians v. Wisconsin, 653 F. Supp. 1420, 1430 (W.D. Wisc. 1987). As illustrated by *Minnesota v. Mille Lacs Band of Chippewa Indians*, 526 U.S. 172, 204, 208 (1999) and the agreements stemming from that litigation, and the litigation and subsequent agreement reached between the State of Minnesota and the Bois Forte Band of Chippewa and the Grand Portage Band of Lake Superior Chippewa, the State of Minnesota is well aware of its obligations to engage in co-management and meaningful consultation with the successors in interest to the Treaties for the management of resources within the treaty-ceded territories.

Statement is also consistent with the trust responsibility of the Federal Government to the Tribal Nations of the State.[3]

The following observations are offered, after participation in the Sandpiper Pipeline proceedings for approximately 18 months: the Commission and the Applicant have a preference for locating major pipeline infrastructure in less populated areas at the risk of damaging unimpaired natural habitats and burdening poorer, less politically mobilized populations. This is unequivocally "environmental injustice," and has measureable disproportionate impact on remote and impoverished communities within the State. This is unacceptable, and should be at the forefront of consideration for the Public Utilities Commission.

Additionally, the Applicant appears to be advantaged in the permitting proceedings, such that participation by the public and other State agencies has no impact at all on the substance of the proceedings. The Applicant and the Commission both asserted throughout the Sandpiper proceedings that no other party had met the specificity required for consideration of any alternative that did not closely mirror the route offered by the Applicant, despite the Applicant having the burden of proof in these proceedings, despite the Applicant acknowledging that it took years and significant man-power to develop its proposed route, and despite "failure of the Applicant to propose a viable alternative for consideration in this proceeding."[4] This cannot possibly be the intent of the statutes and rules governing pipeline permitting – what would be the purpose of allowing for public participation under these circumstances?

The White Earth Band of Ojibwe urges the Commission to use common sense and consider the policy and intent of the statutes and rules that govern permitting proceedings to meaningfully consider all reasonable alternatives offered (including the so-called "SA-03 to SA-08" alternatives in consideration for the Sandpiper proceeding). The statutes and rules cannot possibly be read to mean that only engineering firms with extensive time, resources, and man-power may offer route alternatives that deviate from the Applicant's route for consideration by the Commission. Moreover, the Applicant should be held to its obligations to propose "viable alternatives" at the risk of denial of its applications. What Enbridge (in any iteration including the North Dakota Pipeline Company, LLC) has asked of the State of Minnesota is to be "pass-through" state for a massive quantity of unrefined product, to be refined and placed into commerce elsewhere. The Company should be held to exacting standards given the gravity of its request, and must participate fully and meaningfully in an Environmental Impact Statement of all of the Company's pending and proposed projects within the State. If, as the Applicant avers, it has offered a technically sound and environmentally safe option, then it should have no objection to an Environmental Impact Statement which would demonstrate its position.

In the alternative, or additionally, the State of the Minnesota reaps the immeasurable benefit from an Environmental Impact Statement of being assured that all due consideration was made of the proposed locations for any major pipeline infrastructure project within the State. Although the Commission has given little weight to the comments of the public received to date, it is clear from the Commission's own materials, that thousands of members of the public have

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[3] *See*, Petition to Intervene, White Earth Band of Ojibwe (May 1, 2014).

[4] Order Authorizing Recommencing of Route Permit Proceedings and Providing Direction for the Scope of the Comparative Environmental Analysis (August 3, 2015), at Order (2).

offered comment, many of whom expressed sincere and immediate concern that the Applicant's projects as proposed pose a significant risk to an impaired natural habitat within the State. This was evident at the public hearings regarding the scope of environmental review as well - the public testimony was replete with opposition to the proposed (co-)location of the Sandpiper and Line 3 as offered by the Applicant. Thorough environmental review now before consideration of the Applications for Certificates of Need and Routing Permits for both Sandpiper and Line 3 is required for the Commission to make informed decisions and for the public to have any meaningful participation.[5]

The environmental assessment ordered by the Commission and completed at DOC-EERA staff on the "system alternatives" SA-03 through SA-08 was invalidated by the Minnesota Court of Appeals. That environmental review was significantly insufficient to meet the requirements of the Minnesota Environmental Policy Act. The Commission recognized this in its order that qualitative as well as quantitative consideration must be made of the impact of the proposed routes, and that Sandpiper and Line 3 must be considered cumulatively.[6] The routes SA-03 through SA-08 must be considered in the Environmental Impact Statement, along with any other route alternative currently in consideration or any route or other alternative offered during the scoping period. The Commission previously held that environmental review of these six routes would "provide [the Commission] with valuable information to be weighed along with other information of record while making its need decision,"[7] and that environmental review would "ensure that the record in the certificate of need proceeding contains an adequate, albeit preliminary, environmental analysis of the system alternatives."[8] The parties now understand that "preliminary" review is inadequate, but the conclusions of the Commission are no less true – meaningful environmental review of the alternative routes in consideration by DOC-EERA in fall of 2014 is necessary to the Certificate of Need proceedings for both the Sandpiper and Line 3.

The White Earth Band of Ojibwe emphasizes again for the Commission that the State of Minnesota has an obligation to engage in meaningful consultation and co-management of resources within the 1855 Treaty-ceded territory with the Tribal Nation successors in interest to the Treaty *which cannot be abrogated* by State statute or any other internal policy of the

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[5] *See*, In the Matter of the Application of the North Dakota Pipeline Company, LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota, No. A15-0016 (Sept. 14, 2015), slip op.pgs. 10-11 ("The United States Supreme Court has explained that early-stage environmental review . . . is critical because it ensures that that[sic] important environmental effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast.") *citing* Robertson v. Methow Valley Citizens Council, 490 U.S. 349 (1989) (internal quotations and punctuation omitted).

[6] Order Authorizing Recommencing of Route Permit Proceedings and Providing Direction for the Scope of the Comparative Environmental Analysis (August 3, 2015), at Orders (9) & (10) (Although the Commission did not specifically find that the DOC-EERA environmental analysis was insufficient, its findings evidenced its acknowledgment of the criticisms made by many parties that to simple count resources in a proposed path of a pipeline is grossly inadequate and misleading because no consideration is made to the purity or impairment of the resources, a much more meaningful question for review.).

[7] Order of the Public Utilities Commission dated October 7, 2014 at VI(B), p. 11.

[8] *Id.* at p. 12.

Minnesota Department of Commerce or other Executive action of the State of Minnesota.[9] The obligations of the State of Minnesota are an extension of the Federal trust responsibility owed to Tribal Nations which cannot be met simply by participation of the White Earth Nation and Honor the Earth in the permitting proceedings. The obligation is one of nation-to-nation consultation, and must be done unequivocally and directly with the Tribal Nations. The White Earth Band of Ojibwe advises the Commission that to go any further with permitting of the Sandpiper Pipeline and the Line 3 Pipeline without meaningful consultation and co-management of usufructuary use rights resources is a violation of the trust responsibility.

The White Earth Band of Ojibwe looks forward to meaningful consultation with the State of Minnesota, and development of a co-management plan for usufructuary use rights resources within the 1855 Treaty-ceded territory. And, expects that an Environmental Impact Statement will be completed, considering all routes offered in the Sandpiper proceedings including SA-03, SA-04, SA-05, SA-06, SA-07, and SA-08, as well as all other route and alternative options offered during this scoping period, which considers both the proposal for the Sandpiper Pipeline and the proposal for the Line 3 Pipeline.

The White Earth Band of Ojibwe appreciates the consideration of the Commission in this matter.

Sincerely,

/s/ Joseph Plumer

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[9] *Cherokee Nation v. Georgia*, 30 U.S. (5 Pet.) 1 (1831). This case and its progeny establish that the United States Federal Government, and by extension the States, have an obligation to the Tribal Nations of the country, and that this obligation is enduring.

Tribal Communication - Oral

July 26, 2017

From: Wichahpi To Wiyan

Eden Prairie, MN 55346

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate Of Need for the Line 3 Replacement – Phase 3 Replacement – Phase 3 Project in Minnesota From the North Dakota Border to the Wisconsin Border

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Pipeline Project in Minnesota from the North Dakota Border to the Wisconsin Border

MPUC Docket No. PL-9/CN-14-916; OAH Docket No. 65-2500-32764 and MPUC Docket No. PL-9/PPL-15-137; OAH Docket No. 65-2500-33377

Statement From Chief Arvol Looking Horse. This statement was gathered after a meeting with the Commissioner, Michael Rothman, Anne O'Connor the Deputy Commissioner, the Tribal Liaison, Danielle Molliver, Shelia Lamb of White Earth Reservation, her husband Terry, Mysti Babineau of Red Lake Debra Topping of Fond Du Lac, and myself, Wichahpi To Wi representing the Oceti Sakowin. This statement was gathered on Saturday July 22, 2017 on the Cheyenne River Reservation, in Eagle Butte, South Dakota.

I was told directly by the Commissioner that he would accept a consultation and made an agreement that I would go to Pine Ridge and Cheyenne River to gather consultation and would transcribe it. I am following through with my part. It is my understanding that the word of the Commissioner has been withdrawn. The State of Minnesota may work with the process of MEPA, however, requires to work with NEPA as well. And while the State of Minnesota may not "be required" to consult as the Commissioner stated in our meeting, NEPA is still involved as the only way that this can enter into the State of Minnesota, is through Presidential Permits, with that, the existence of this pipeline would require a formal consultation from the Great Sioux Nation per the Treaty. We are actually called the Oceti Sakowin, which is the Seven Fires Counsel. The correct statement of who are is the Lakota, Dakota and Nakota.

We met for the transparency of the situation with the Enbridge line. The commissioners spoke with us and offered assistance and see that it was nothing more than a farce to continue to support corporations over the people. Due to the lack of honoring the Constitution, Executive Orders, which they are willing to accept the Executive orders to push the pipelines through, but will not honor the Executive Orders to honor the tribes as well as the treaties to honor the tribes as well, I am submitting to provide the consultation they never sought to gain.
This document, is being formally served.

I am Chief Arvol Looking Horse, I live on Cheyenne River Reservation. And as of today, I am the 19th Generation Keeper of the Sacred Pipe. Lakota, Nakota, Dakota Oyate. Or known as the Great Sioux Nation by treaty.

Today I would like to speak about our first medicine, the mni wiconi and a year ago, we took a stand over at Standing Rock. And, first time in 150 years, we set up our camp called Oceti. Oceti is Seven Council Fires. And, uh, in the center of that fire, sacred fire, and then right in the middle of that camp, the Horn is the place is where my position, is called Cannupa owayanka, the pipe, sacred pipe keeper position, so we went up there and I took that position, with the, Dave Archambault, the chairman of Standing Rock. He called out, in fact he called all nations to come together. But we have to set up our Oceti, our council, the headsmen. So this was the, we put it all together a year ago. And, as of today, we are still together. Our headsmen.

I want to say it is an honor today to speak on behalf of our nation. I am a fluent Lakota speaker. I have been the keeper of the sacred pipe since I was 12 years old. I was like, a keeper of the sacred pipe is a leader, a spiritual leader, the whole great Sioux nation when the white buffalo calf woman brought the sacred pipe, and then the sacred bundle keeper was in the center of our nation. My family were taking care by the warriors, tokani, tokala, the leaders. So, my position is like a (inaudible). So, I never joined the military, I never raised my hand under the United States Flag. I never joined military. I never carried a, I don't allow a gun in my house.

Because that is a position of the, a spiritual leader, we are nonviolence. My position is about peace. Wolakota. And, I never use foul language. Because in our leadership role you got to have to have a good mind. I try to eat our traditional ceremonial food, so that that it does not corrupt our mind body and spirit and we are in good health and wellbeing.

So, my role as of today, I am very honored to be in that position, that leadership role for our Great Sioux Nation. Or the Lakota, Dakota, Nakota Oyate. And, today we talk about the mni wiconi, that first medicine. As I spoke about in Standing Rock. When we called the nations together in Standing Rock, we had over 300 flags, and it was more than the United Nations. All the nations in the world came and brough their flags. So, we honor each and every flag that came in. Because we look at them as a part of a way of life. In our way as a first nations, we believe in a way of life. Not like a freedom of religion, but it is a way of life and that we stand on our sovereignty we are we been going to United Nations on Geneva and are representing ourselves because we as survivors of a holocaust, massacres, and we still have our languages and culture and traditions. And that is what United Nations basically told us that if we have that you are recognized as a nation.

So today, I am a fluent speaker, and being a keeper of sacred pipe. Now we stand our ground on protecting our sacred sites and our livelihood, which is the water. And we signed a treaty with United States Government. The pipe, the sacred pipe was used to sign this treaty. So, today it's still ongoing. We have our elders, now the youth, and our position here is pretty well known all over the world today. Since all the nations in the world came to Standing Rock. And they stood with us. But from that time on, we say Standing Rock is everywhere in the whole world.

So we have a lot of people supporting us through our way of life. Knowing that Mother Earth is a spirit, and it is (inaudible) by our prophesies today, as traditional people. As traditional people, we have our prophesies like some day mother earth will be sick and has a fever. Well that is happening today. In our prophesy it says that some day people will not get along, even

down to the families. Brothers and sisters will be fighting. Well that is happening today. In our prophesies, it says when the white animals show their sacred colors, great changes would happen upon the earth. That is happening today. We have all these white animals being born all around the world. Now we have earth changes, climate changes, and global disasters. That's happening today. Volcanos and earth quakes. All this is happening that the elders said. Its all man made. What's supposed to happen in the future is happening now. Things escalate so fast, now we are all getting sick from this environment, the foods we are eating, and our livelihood. So we have the statistics from the hospitals, its said how bad, how sick our people are. And, they are telling us, we aer lucky to live until 60 years old.

As keeper of the sacred pipe, I met a lot of world leaders. And, When Obama ran for office, he told us the prison system has better health care than the reservation, because the treaties was never honored. We are still on the reservations, uh back in the 1800s there were concentration camps. And a lot of budget cuts still happening today. Our survival on the reservation. Now there is 80% no jobs. Now the budget cuts, even probably food stamps now. But our health and wellbeing, you know? our elders signed those treaties, with good health and well being through that cannupa, the sacred pipe.

And today like the United States, from Standing Rock, we wrote a letter to former President Obama, stating that the United States should honor the constitution. Because it says we honor all treaties. But that never happened. In fact they even made new laws to hold us down. And break us apart. Like in Standing Rock. These laws that are manmade is not for the health and wellbeing of our nation. This country, America was found on freedom of religion. And yet they outlawed our ways, First Nations. 1978 the Freedom of Religion Act, now we still have problems with that, because we say we are not a religion, it is a way of life. So, I strongly suggest that they make you honor the treaties and recognize our people for who we are, because we, by treat, by law we own this territory, first nations, we all got our different places of residency. We still have our sacred sites, our ceremonies we do throughout the whole year. This is our way of life here. So, I am very honored to speak on that today.

WI: Thank you is there anything you would like the DOC to directly understand regarding the pipeline going through?

ARVOL: Um hmm. We knew that there are ceremonies that they, that the laws, manmade laws that were forced upon us. Their manmade laws through our ceremonies they say that., you know, that in we would in time see, when the decision are made. So, it took a while but they finally owned up to it (inaudible) and respect us. So, that's that the, before they even start the pipeline or anything through our reservation, they should consult us. Never did. So, you know. We believe that everything goes round in a circle. So, we, so that is that is the way, we just pray about it, and it always comes out the way it should be.

Camera off.

INTERVIEW - 14-916 15-137

MARCH 17, 2017

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916

OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Mille Lacs Band of Ojibwe's
Department of Natural Resources
45380 US Highway 169
Onamia, Minnesota 56359

MR. TERRY KEMPER: So I know it's kind of different for everybody here, but if we could take our time just to say a little prayer. A little silence for those that are struggling. Say a prayer for that ecological system that we're going to talk about today, for your culture today. That we all have open minds and we're able to get out of this meeting this time that we're sharing together what we need to get out of it.

We thank -- for what's happening today, we're thankful. We're breaking new ground in things and we're really thankful for it and hope that everything goes good.

So right now we'll just take a little moment of silence for all of the people that are in a struggle today.

Miigwech.

(Silence.)

MR. TERRY KEMPER: So if we can just take our tobacco outside and put it someplace, wherever it feels comfortable to you.

(Break.)

MS. NATALIE WEYAUS: Thanks, Terry, for the prayer. We can get started if you want to start.

MS. JAMIE MACALISTER: Okay. Good morning. Boozhoo, Natalie. I just have a few questions for you today.

The first one is can you describe the interconnectiveness of land, identity, and spirituality? Can they be separated from one another? And if not, why?

MS. NATALIE WEYAUS: I can just give you my perspective on that. And being growing up as a Native American, my parents taught me that anything you take out of the environment, we just take what we need, and we always put tobacco for anything we take from the environment. We are not alone in this world. We are not above anything else. We're just part of the environment, and not better or not worse, just here with the environment.

And as I grow older, we were -- we are stewards of the environment and we don't waste anything that's out there. Even the little trees, we don't cut them down 'cause they need a chance to grow.

With that, then, I will pass and let John or Terry speak on what they want.

MR. TERRY KEMPER: Can you rephrase that question for me?

MS. JAMIE MACALISTER: Yes. Can you describe the interconnectiveness of land, identity, and spirituality? Can they be separated from one another? And if not, why?

MR. TERRY KEMPER: No, they can't be separated from one another. The land is who we are as people. In all of our ceremonies and all of our cultural teachings that we have, the land is part of us. And when we say the land is part of us, we are made up of iron or copper, zinc, we are water, this is our bodies. And in that we are the environment. Everything that's in the environment is what we are made of.

And so to us we can't separate the two and that's why it's such an impact to us as human beings, as Anishinabe people, as Native American people, when things are disrespected, moved around, cut down, hurt, trees are cut down, plants and ground is dug up, because basically you're digging up us. Our relatives, our ceremonies, our everything is interconnected to that earth, to those trees, to those plants. So you can't separate the two of those.

MR. JOHN REYNOLDS: I'd also like to add that for the Indigenous people of this area, the way

of life that they have is something that was given. And it's not something that they just live for today, it's something that they try and maintain for future generations. And that's not something that we really see taking place with government agencies today.

MS. NATALIE WEYAUS: Which is very true when you see and read our treaties. All of the grandfathers, our ancestors that signed the treaties were not only thinking of themselves then, they were thinking of the future generations. So when we get to practice our rights, our treaty rights to gather, hunt, and fish, that was thought of way before our time. They didn't give that up. That we're always connected to the land to do what we have to do to survive.

MR. TERRY KEMPER: And there's a big significance between that hunting, fishing, and gathering. To us it's a ceremony. To us it's not just sustenance, it's not just gathering something to eat, but it's bringing a whole community together to connect with the outside world. To connect with the trees, the water, the animals. And to honor them. So we do that in ceremony before we take anything from the land. Before we hunt, before we

fish, there's a ceremony that occurs. Before we even go into the woods we do a separate ceremony, we talk to the things that we go there.

So everything is thought of today, is what we do today is going to impact seven generations, how is it going to impact seven generations down the road. And our ancestors were very good at that.

One of the reasons why we're sitting here today, you know, 'cause we're talking about our environment. We're talking about making major changes to that environment. And any major changes to the environment affects not only our ceremony, our people, our mental, physical, our spiritual health, it affects all those. That's how interconnected we are to the earth, to everything, to the plants, to the animals.

MS. JAMIE MACALISTER: Does anyone have anything else they'd like to add to that?

MS. NATALIE WEYAUS: Just that there's a lot of medicines out there. We have medicine people that pick the medicines and know what they look like and where they can be found. And what they're trying to do now is to teach the younger generations, inviting them to come to their homes

and showing them how to make their fat grease, how to make these medicines that people need. There even is medicine for cancer that they use and they share with the community that comes to them for medicine. For doctors. And that is our connection to the land. 'Cause there are medicines out there that can help almost for every illness you can think of.

MR. TERRY KEMPER: So we've experienced in our -- in our lifetime, as Indian people, a continual digression and abuse of the world, of the outside world. With cutting timbers, with plowing the fields. We've continually seen this and it's affected us, whereas -- we know already by what's happened what will happen. Like we already know when you make major changes to the ecology, to the ecosystems, that there's major changes that happen not even to us as a people, but to the world itself.

And today we are struggling because we know that every plant has a purpose. Everything out there has a purpose and meaning to it. From the little rock, to the sand, to the gravel, to the dirt, to every leaf on the plant has a purpose and it has something to give to the people to help us.

But today we, because of all the things

that have happened to us as a people, we only know certain plants now that we're really trying to hang onto, that we understand the knowledge of them because it's been passed down.

But every plant out there today, they used to say every blade of grass had a significance to the whole world. And so that's what we're trying to retain. We don't want to see that more ecology, ecological system damaged more. We would rather be helping it to make it better than to see something major happen to the earth for miles and miles, you know.

We're talking impact of trees, animals, the whole works, the whole ecological system is the air quality, the water, the everything. Because when you change the environment, when you change the ground, even when it rains the waters will go a different way. You know, things happen, they get eroded.

And the animals lose home, you know. We consider like when you go into the woods that that's their home. That's where the animals all live, the squirrels, the mouse, the mole, everything from the little things to the insects, they all live there. It's not our home anymore 'cause we live in houses.

But we used to live with them and that's all their home so we respect that. So by our cultural standards and our spirituality, we're protecting their home. We're protecting what's already been damage to them. That's it.

MS. NATALIE WEYAUS: Water, too, is very sacred to the Anishinabe and all the Native American races, Nations. We talk about that pipeline coming through and there's a big watershed that comes down north of us that affects -- that'll affect everybody, not only the people, but the plants and the animals also.

We had rice lakes north of McGregor and the Army Corps of Engineers put in a big dam there and flooded out the rice lake. Now there's no rice lake there anymore. But people still remember that. And that's -- that's a hard thing to get over. When we had a meeting there, we had an Army Corps of Engineer woman there, and they really got after her as if she was the one that did that. But when you come to a meeting with the Native American people, it's things like that that they remember. And if you're part of that group, you're probably going to get a few words of reprimand. But she took it okay, she understood.

MS. JAMIE MACALISTER: Natalie, can you tell me about the obligations that the Anishinabe have to Mother Earth and how they're met today?

MS. NATALIE WEYAUS: We still teach our children to respect the earth, to respect the water, to respect the animals, the plants, even the bugs. My grandson was -- this summer was walking and seeing a bunch of ants crawling on the sidewalk and he starts stepping on them. And I said those are mommas and daddies, and he said I'm sorry. So just teaching them stuff, little stuff like that will teach them to respect the earth and the animals and the plants and the insects.

Our schools are teaching them that stuff also. So that's nothing that -- that isn't nothing new, we grew up with that. This is what we live, to respect the earth and the trees and the animals. We don't complain about the water, the rain, the snow. Look at what happened when Katrina came. We don't complain about the rain and the water. Too much rain, not enough rain, when stuff like that happens it makes you realize that you don't complain about stuff like that, just accept it. That's Mother Earth's way of, I suppose, taking care of us also.

MS. JAMIE MACALISTER: Can you tell me

how you see this pipeline threatening the Anishinabe way of life and your relationship to place? And is that different to other types of infrastructure around you?

MS. NATALIE WEYAUS: What -- you're a mom, aren't you?

MS. JAMIE MACALISTER: Yep.

MS. NATALIE WEYAUS: And somebody put something in you that was there before, and after a while it wasn't working, so are they just going to leave that in their body or are they going to take that out and clean it up? I would say I would take it out and clean it up. Why leave something that our mother, who takes care of us.

So they're going to remove that pipeline. Don't abandon it, take it out. There's always recycling you can do with the steel or whatever. But let the land come back to its natural state.

MR. TERRY KEMPER: So the -- she referred to the earth as Mother Earth because it gives us all the sustenance we need. It gives us our food, it gives us our spirituality. But most of it, all of it gives us love. It gives a kindness to us that helps us in our world. Because it's full of medicines, it's full of all kinds of things that we

use in ceremony. And like we said in the very beginning statement, it's interconnected to us. We are part of the earth.

So I think in the last meeting that we had we said when we go out to the woods we sing love to that, we sing love and we receive love from it. You can't love a pipeline. There's no love that comes back from a pipeline. It's just a tool they use to move stuff through. So thus being now they want to move it around to another place and leave something that's not loving to the environment there. Something that can't give us any love within what we love, what we receive our love from, we receive everything that we're about from. I mean, everything that we get as a people that has sustained us to this point in time in our lives today comes from out there.

So when you leave things behind like that, it's like -- or you create new avenues of putting those things in, it's like taking the love out of someplace and then how do you put that back? You know, how do you get that back into that area? So to us it's like -- it's like the whole ecological system is just set upside down. And so that affects us. It affects us mentally, physically, and

spiritually because we use all that.

The ceremony that you just did where we just used tobacco, we used sage, all comes from out there. All the plants and things that we use, kinnikinnick, cedar, all these things.

One of the major plants that we use is cedar. And cedar was such an aromic and beautiful wood that they cut down almost all cedar forests in the state of Minnesota. Not only here, but all across this country. And so you very rarely see a cedar forest. That affected us when they did that. Because it's such a ceremonial part for us.

When a baby is born, they're put on a cedar bed. And that cedar talks for us and it tells the whole world, it tells the universe that we're here. But they came in and took most of the cedar trees. Now we have to travel, you know, hundreds of miles, 50 miles, hundreds of miles away to get cedar.

So we know the impact that things have, just like the industry of cutting the trees down, you know. That industry came in and cut so many trees that we have babies out there now and those babies are little baby trees. They're even older than us but they're baby trees. And we go out to

the woods, and if you've ever been in a cedar forest, if you've ever experienced a cedar forest, we used to watch -- in the cedar forest there's like bowls, bowls of water. And in that forest, the roots are red, they run into the water and they're red. But we watch the animals go in there, is when they were sick and hurting, they would go into a cedar forest and drink out of that. And it was a tea from that tree and it would heal them, it would help them out. And here today we hardly have that. And we use that. We watched the animals, we learned that from them and we use that in a lot of our ceremonies and now we don't have that anymore. So our whole -- every time something happens out to that ecological system, there's outcomes that happen years later down the road.

Today, because we're striving for that cedar connection again, because we're trying to make that connection back to the cedar, we have to go to man-made bushes and plants that people are planting now in order to pluck that medicine, in order to get that medicine, because there's not very much of that tree around anymore.

So where people didn't see the impact that that would have on us at that time, we feel it

today, that impact, just of losing those cedar trees. Or even the pine trees. The pine trees are very -- even the people today, if you go and see an original pine tree, and it's just magnificent, you can feel it, you'll see that tree out of all the other trees and be drawn to that tree. But our people used to talk about how those pine trees covered this land from Mille Lacs Lake all the way to White Earth. And we were connected to that. And then they came in, and that was the worse thing that happened to us, was they chopped all those trees down and used them for something. And then we had to compromise and find other avenues in order to do.

Now, when we have certain medicines that we have, we have to travel a long ways to find those trees, you know. We're so interconnected to those things out there that even our Indian names are after them. Many people are named Zhingwaak for that pine tree. People are named after rocks, Asin, Asiniikaa, Asiniinini. They're named after these things 'cause that's how interconnected we are. We're interconnected so much that plants and things we're named after. The rocks, the earth, we're named after that. The universe and all the things that are there, people have names after that.

So when they say that, you know, there wouldn't be no damage, you know, digging eight feet in the ground and putting in a pipeline, that's not true to us. To us you're taking all of our relatives and you're turning them upside down. You're taking all of our medicines, all of our spirituality when you're turning it upside down and wasting it. And so it makes -- it hurts. It hurts the whole tribe to see something.

If you've ever gone and walked down or traveled down the road and have you ever seen clear cutting, if you know what clear cutting is, you walk, you drive down the road and you're just in awe of these beautiful forests and you can open your windows up and smell them. I mean, if you stopped along the side of the road you can hear these forests. And that's what we're connected to.

Then all of a sudden you come to a place where there's nothing but stumps. Nothing but stumps on the ground and just their arms and their legs and everything is laying about here and there 'cause they took the major stem, you know. That hurts us. I mean, you can't even explain.

That's like losing your grandmother, that's like losing your father or your little baby

that was just born. That's what it feels like to us when you see something like that. And it affects a whole community because all of our community is connected to that. We're taught from a young age that these things have meaning to them, they have life. And so now you have 100 miles of trees that are cut down, or 50 or 25 miles of trees that are just -- that's all death. They just took it. And then they come in and they plant the trees and they think that they're going to make up for it by creating a farm, you know, another ecological system. And that ecological system then is -- is like us as a people trying to survive. That ecological system is us trying to remember a time when this world was just beautiful. When this world was producing everything that we needed as a people in order for us to survive.

Now, with the things that have happened in the world, we have a hard time doing that. We have a hard time finding all those things that we once used because of the things that have happened. Because of big industry coming in and not taking into consideration how it affects the people that are here.

MR. JOHN REYNOLDS: I think something

else that's very important to acknowledge is that a lot of the resources or the environment that was in place prior to a lot of the things that Terry mentioned, such as clear cutting, they've been so substantially diminished that there's only really a fraction of the resources that once were, and that's something that Anishinabe people are trying hard to preserve. And that if a pipeline of this magnitude comes through, it has the potential to basically destroy, you know, just a very small amount of what's remaining.

MS. JAMIE MACALISTER: Can you tell us a little bit about sacred places and how they are different from sacred sites?

MS. NATALIE WEYAUS: Sacred places versus sacred sites. Sacred places, that would probably be like that stone in Garrison. There's a big stone on the shoreline that people used to stop and put tobacco there. And they still do today. And what happened is the highway, Minnesota Department of Transportation came through and destroyed a lot of mounds within that area. I presume it was an area where they had Ojibwe camps or Dakota camps all around the lake, the whole lake, and it has mounds and burials and camps.

And the only part of the lake, that became a national historic monument because of the archeology, was Kathio State Park. Because of the state park status, it got recognized for all its archeology there. But just by knowing that, how the whole Lake Mille Lacs, it has a lot of archaeological areas, sites, mounds, the old Brauer maps show that. But sacred sites, we consider those our sacred sites, and we want those protected. We don't want those dug up.

We just had a water sewer plant come through and we didn't really want it, but we had to do it 'cause we own a resort along the lakeshore now, and a gas station, so they needed that sewer, a sewer line. So we let them do that and sure enough they hit an -- we had inadvertent discoveries and there was a lot of artifacts found. Those are sites that are maybe not Anishinabe, but they are Dakotas, and we need to protect those, too. Not only ours, but everybody's. And so we contact, we let them know what was found and they have representatives from the other tribes come in and talk with us and that's how we decided what to do with what we found and we collaborated and made a decision on what happened.

Does that help any?

MS. JAMIE MACALISTER: Yeah, it does help. So in that description you see the work even done by the Band for things that you need to do --

MS. NATALIE WEYAUS: Oh, yes.

MS. JAMIE MACALISTER: -- a sewer line or sewer plants, as the same as other types of infrastructure that --

MS. NATALIE WEYAUS: Yes.

MS. JAMIE MACALISTER: -- cause damage.

MS. NATALIE WEYAUS: Any agency, state or federal or our local Bands, we monitor all those projects so they don't get into our sacred areas. We even had landowners that know there are mounds on their land that we work with and they respect our culture to not destroy those sites on their land.

MR. TERRY KEMPER: I think, too, is sacred sites, sacred places, you could almost break it down into a verbal or a communicational thing because a site is a place that you can still see. A site is a place that you can go and it's still there.

Sacred places are places of inadvertent discoveries, we don't discuss that with people. There's sacred places out there that we don't

discuss with people and tell where they're at. Sacred places for us is that whole waterway. Any waterway that's out there is a sacred place because it was a highway, a place that we lived. You can still see the water, the rivers, and stuff like that. Even though they've been damaged, they're still there and you can see them. So that's considered a sacred site to us, every river, every stream, every waterbed, every swamp that you see out there is a sacred site, you can see it.

Sacred places sometimes you can't see. You can't see those sacred places. The moon, that's a site, you can see it, it's sacred to us. Something in the earth, something in the water that's a sacred place, you can't see it. Sacred places are places you take in a spiritual journey that you can't see. When we get into a ceremony, we go places in a sacred site. Sacred places, when you go to sleep at night, you wander, your spirit wanders and travels. It's a place that is a sacred place, but when you come back into this world you can't see that site. You can't remember. You remember it as a human being, but you don't remember it as the place. You bring it into this world. So there's two different things there, and it's

basically language, and all your language sometimes doesn't fit into our language. It doesn't fit into how we categorize things out there.

Sure, we have infrastructure that we have to do, but we don't know where those sacred places are, those sacred places under this earth. And that's what we try to protect the most that we can. That's what our job is here. Is that we don't know if they're going to find an inadvertent discovery. If that place is there from a long time ago, there's a dinosaur bone, there's bones of our ancestors, there's sacred sites that people used to see all the time and go to, but now they're in the ground or buried there. So it's a place that we don't even know about. But we're trying to protect it. So we know it's there.

That's why archeology, when they're looking for our kind of sites, they'll look for places that are old sites, they'll look for places along river banks, along portages, between places where they know earth, you know, and so they'll go to that. But the thing they don't know is that how we -- how we moved from by the shorelines to end of the woods during the spring times and summer times and how our villages were set back away from lakes

and streams. And so they don't know those sites.

They don't know our hunting grounds. We would travel for miles hunting deer, caribou, moose, that were all here at the time, they used to be here. Again, another ecological thing that's happened that impacted us was the animals and stuff and what we sustained our lives on and now those aren't there either. And they're managing those again, too.

And so our village sites and things like that, those were sites, those were sites at one time, now they're places because you can't see them. So archeologists are out there trying to find those places and we don't want them found and we don't want them dug up.

So whenever you put -- you take a long tract, you can't go, as long as that pipeline is going to travel, there's no way that you can travel from that area to the other area without coming across our people, our villages, our sites. Because we've lived here long before America was here. And we traveled all that land. We lived in all that land, we died in all that land, and all the people before us we consider to be part of the trees, part of the, you know, they bury people today now and

they put them in boxes, you know, concrete boxes. When they buried us a long time ago we were buried in the ground or on top of the ground and we became one with everything.

So our bodies nourished the plants, the animals, the trees, everything was nourished by our bodies going back to the Mother Earth. So every tree that was out there, every old tree, every plant, everything is our relative. And literally it is our relative. And so if you have a plant that grew on top of one of our relatives, that plant died and a baby was born because it seeds out again too. So that baby that's born and all those plants that are born are now us. If a bird comes and eats a seed off of that plant and travels 100 miles away and that plant that was our relative that was created off our relative's bodies, then that seed 100 miles from here will be put back in the earth by that bird and that relative now becomes over there, part of over there.

That's how interconnected we are to this earth. That's how interconnected we are to the birds, to the trees, to the plants, to everything out there. And that's what we're looking at, that that will affect, when a pipeline, anything major

like that, highways, roads, anything like that that comes through affects us as a people. It affects our past, it affects everything that we're about.

MS. JAMIE MACALISTER: I feel this very strong disconnect in world philosophies with that.

MR. TERRY KEMPER: It's kind of interesting because there is a very big disconnect.

MS. JAMIE MACALISTER: Yeah.

MR. TERRY KEMPER: A very big disconnect. That's why you have such a hard time putting this into your EIS.

MS. JAMIE MACALISTER: Precisely.

MR. TERRY KEMPER: Because for a long period of time now, the companies and the organizations that have been in charge of this have not listened to our point of view. Have not listened to our world view. They do not know who we are as a people because systems have been putting us how they want us to be and taking us away from that environment to disconnect us.

Well, the problem with it is, what we seen with DAPL, was that even through all atrocities that they did to Native American people, taking our land, putting us in boarding schools, even killing us, murder, death, by the army, we're still

connected. And that's -- that is so profound to say that, to be sitting here and telling you that I still remember my relatives from long ago, hundreds of years ago, because they're in them trees and they are in them plants after all of everything that's happened. That's so profound because we've been under attack for many, many years. And it came out with DAPL because we're coming to a period of time where major companies and infrastructures of cities and towns and things like that are having impact to the water, to the medicines that are out there.

You know, main society looks at aspirin as a thing they use for migraine headaches. But aspirin came from Native American people. And knowing that the birch and the poplar had that medicine in it because we chewed that when we had toothaches, when we were sick, we chewed that medicine. And then their science came along and broke it down to where now they can synthesize it, you know. But they've disconnected themselves from the tree itself.

When we have a problem we still go out to that birch tree, if we have headaches and stuff we still utilize those medicines off that tree. We still take a piece of that tree and chew it to help

us because we're still connected to that. It's been passed down from our elders to us. And that's what we're trying to protect because our elders protected that for us to keep that.

And even today we're sharing that information back to you and your people because you guys have become disconnected from that. And there's such an awakening happening in the world today, because more and more people are realizing that everything out there has a life to it. That everything out there, the medicines, the trees and everything are actually what everybody uses today. Aspirins, morphine, all the things that people use today in their medicines come from out there. And it's just been synthesized. And broken down. But people are learning that today more and more.

And so that's why we stand up and we try to do the best that we can by explaining what that really means out there, what that system really means to not just Indian people, but to all people, you know. Because all people use it. In some way, some form. But the main system now is either recreation or, you know, something I own or something to be used as a resource, you know. And we've never viewed it like that. So I can

understand what you're saying.

MS. JAMIE MACALISTER: So you were talking about land use and land ownership and that's something I want to touch on here, in terms of what do you see as the biggest differences between how Anishinabe communal, traditional use of the land, and nonnative, or Anglo-Saxon private ownership and land use, that relationship?

MS. NATALIE WEYAUS: We have boundaries now. You have -- we have boundaries after they did the treaties, we were ceded land and all that stuff. We finally -- we were wild ricing and we had to buy a Minnesota license to do that. Then some of our elders said why are we buying licenses when we have treaty rights. So the Band finally took it to court and we won and now we got our treaty rights back, we can gather, hunt, and fish within our ceded territory. But the question was, again, was something about boundaries?

MS. DANIELLE OXENDINE MOLLWER: I think it was, basically, since the Anishinabe way is communal and there really is an ownership, and how that's different or how the contrast to the Anglo-Saxon where we want to own and have private ownership.

MS. NATALIE WEYAUS: We don't believe in we own the land. It belongs to everybody. And I know there is ownership now and you have a title and this land is my land and all that stuff, but the Anishinabe way of taking it is we all own the land, we all have to take care of it. Yeah, it may be in your name, but it's not yours.

MR. TERRY KEMPER: I was in a college class and an elder I think from Michigan came in. And we were talking about this subject, about that. Because we've been dealing with this since, you know, the coming of the jakanashi (phonetic) or what you call them Anglos, I think another one, what's the one that they're going to do now, is decolonizing. The colonists. You got so many nifty words for everybody nowadays.

But he explained to me, to our class at that time, that it's a made up man-made ideology that you own the land. He said you can't own the land. The only thing that you own is a piece of paper that says you own that land. But any government system, the United States government system by eminent domain can come and take that land or tell you it's this worth and that's it and give you your price for it. So he said that you can't

own the land, but you can own a piece of paper that says you own the land and that's it. That's all you own. That's all it is is a piece of paper that says you own that land.

Can you own your mother? Can you own your father? You know. Do you love your children or do you own your children? You know. Is that your ownership? You know. And when you put it in that kind of context, no, it's not, you wouldn't say, oh, I own my son here, he's mine, I own him. You wouldn't say that. And that's how we view the world. We view the earth.

We've been through this since farmlands became, they started putting up fences. When they started putting up fences that affected us. Because we travel from the lakes and the streams back into the woods to hunt and fish. They said a long time ago that we used to be able to run down the deer when we hunted. That we were such good runners that we would tire that deer out, we would stay doggedly on his trail and we would tire that deer out till we could get close enough to him and shoot him with a bow and arrow for food. And you could imagine how far that deer would run and we could still run that deer down. They still have that in Africa where

they do that. But we haven't done that -- I don't know, Natalie might have done that when she was a kid.

But that's how we used to live. So we could run these animals down and you can imagine how far we used to go. Well, now, even the animals have to jump fences, you know. So we've experienced this ownership deal for a long period of time.

Even from like minerals. People are claiming right now today that they own the water. And that's coming. People today are selling water and owning, buying up aquifers and the land above aquifers, governments are controlling water now. And ownership, they have ownership to that water, where in some states you can't even keep the rain water because they say they own it.

Electrical companies own electricity. You can't put a solar panel in an area without paying that company because they have rights to that electricity. So ownership, we don't understand that because it's not our cultural way. It's not our spiritual way. We don't own things. We live with them. They help us, we help them. It's part of our spiritual connection to all things.

So when it comes down to ownership and

things like that, it was a foreign thing to us. But with all the things in the assimilation process that we go through, we understand it, we know what it is because we have to have a car, pay our insurance and we have to have a place to live now, you know, that's like everybody else's. So we understand what ownership is, but we don't agree with it 'cause we cannot own things.

MS. JAMIE MACALISTER: Well, here is a really great question for all of you from our perspective. And that is how do you see us, as representatives of state agencies, more effectively understanding and respecting the inherent right of self governance when coordinating with these projects that affect tribal interests?

MR. TERRY KEMPER: Okay. Want to say that again?

MS. JAMIE MACALISTER: Yeah. How can we work more effectively with you and try to represent your interests in these processes? And maybe represent isn't really -- it's not the right word. But on these projects that affect --

MS. NATALIE WEYAUS: When agencies come to you to ask for your permit or whatever?

MS. DANIELLE OXENDINE MOLLWER: Yeah.

Also -- I'm Danielle, by the way, I apologize for arriving late, I got a little turned around. And I'm with the state. I'm an enrolled member with the Lumbee Tribe, which is back east.

But I think the basic idea is, unfortunately, like you said, there's consequent elements that now we have to adopt and we have projects in all of these things that we know will continue to go on. And the state is really trying to, as much as possible, be intentional and speak with people before we take action.

MS. NATALIE WEYAUS: That's what we need, is to speak with us before you send your archeologists out there. That's what you'll hear from all the tribes, not just before you, your archeology. We have our archeologists, too. They can do that, they can go out there and look and let you know if there's anything out there.

MS. DANIELLE OXENDINE MOLLWER: And so the other piece of the question is how can we, you know, balance sort of -- you know, how can we work better so that we can honor and respect the inherent right to self governance and sovereignty? And I'm hearing Natalie saying don't do it for us, talk to us and we can do it right.

MS. NATALIE WEYAUS: Yeah. Right. Include the tribes before you do the archeology and come to us and say here's what we found, all we need is your concurrence, so your agreement that this is what is there. And sometimes there isn't, there's more there than a lot of the projects in the city area, cold water springs, for instance, and around the Fort Snelling area, a lot of sites there that they should have spoke with the Native community first.

I like your coming here today to learn. And maybe your people need cultural sensitivity before you work with tribes, have somebody come in and talk to you and so you get a better understanding of where we're coming from.

MR. TERRY KEMPER: So one of the things that I hear you saying in your words were we have to adopt to things, right. And that's kind of how, whenever we deal with systems or agencies, that's what we get, we have to adopt to these things.

Indian people know firsthand that we don't have to adopt to things. We've been assimilated from the on-start. And one of the reasons why you guys are talking to us today is because we didn't have to adopt to those things. We

still retain the cultural information, we still retain spiritual connections to the things that have been tried to be taken away from us. Through military force, through policies and procedures, through education. It's all been tried. We haven't had to adopt to it.

We've learned to utilize it. We've learned to make it a part of what we are, but still retain our cultural information, our spirituality, our ceremony. And yet when a company comes in or an organization comes in they don't do that. They adhere to the policy that they had to adopt. They adhere to that, they don't break away. And so for many years we haven't sat at a table. Or we've sat at a table listening to them tell us what we need to do.

And so today, that's why it's so significant, and if you could get it and how you put it into this is that you're listening to the people now. You're not adopting to their rules and policies, you're actually breaking out of it and trying to implement something into it that should have been there from the very beginning of EISs, from the very beginning of all these programs that affected Native American cultures and people.

So there's a lot of other places. And I think one of the things that has pushed it is the realization with DAPL and stuff what a driving force the Native American community is. And so now organizations have to begin to look at that. And they have to see and try to work around it.

Now, are they going to listen? That's the question. Are they going to listen? Are they going to hear us? Because, you know, we as a people have been hurt. We sit at the table and we continually sit at the table from treaty rights to everything and we continually are hurt. We receive little victories every now and then, but we continue to sit at tables with organizations because that's the kind of people we are, because we're connected to the love that's out there in the system, ecosystem. And it gives us enough love to sit at these tables and continually to be heard over and over and over again because people won't listen.

And so we're moving ahead and we're happy to have you sit at the table, we were glad to hear that somebody's voices are now being heard a little bit. And that they can maybe make an impact that other people will take. Because I'm the kind of person that knows, okay, I know that there's --

whenever there's a change, there's going to be people that say no, but there's going to be people that say, hey, that's awesome, that's really great. And I'm a person that says, you know what, it's up to you to make that change as an individual. If you work at an organization or a company, to put your neck on the line and say, hey, you know what, enough is enough. Let's try it, let's at least do it, let's see what happens out of the whole thing. And we don't have enough of that. There are too many people that are scared by adopting to the policy and just living by that policy.

There's a lot of places we can go and we work together. We can actually become a community again. We don't have communities anymore because of the way things are looked at. Resources, owning. So we don't have community. Me, me, me, me, me, you know. I have to have this, I have to have that, I have to support this, I got to get that, I got to pay this, I got to get that. It's all about me. And then there's no family hardly anymore because it's only about me and my kids or, you know, we have no communities anymore.

If you look at the outside world as Native Americans view it, the trees are all of the

community. They live with the birch tree, the pine tree, a poplar tree, an oak tree. They live with these little plants that are on the ground. They live with these little insects and bugs. They live with the woodpeckers. And they all live together in a community and they all fit into that community and work together. Some form, some manner.

That's how Indian people used to be. Until assimilation came along and they tore our communities up. They took the trees down. They managed the lakes. They managed the swamp areas. They manage all these things that are our life. And they took our community away from us.

And now they try to manage that community out there and they're messing it up even more. They're saying this is good for that, so we'll introduce these ladybug beetles over here because it'll help the growth of the trees or it'll stop the aphids, or whatever they're called. So they introduce this bug. Now you got this bug in everybody's house. You got this little stink beetle that bothers everybody. That's their management of the system. But it affects our ecological system and it affects that community out there. And when it affects that community out there it affects the

people.

Now, I say the people because it affects the people, not just Native American people. The reason why you're talking to us today is because we're still connected to that environment. That environment is still our ceremony, it's still who we are as a people and will continue to be. And we'll continue to fight for that environment and that community out there no matter what they did.

The water system, what have they got now, the carps, you know, they got these flying carps that just jump in your boats, and it's coming this way up the Mississippi and up the major rivers. They introduced these fish to combat something else. They manage it with -- what's the weed that's out there? They introduced a weed to stop something, the little clams and little things that are out there now.

MR. CARL KLIMAH: Zebra muscles.

MR. TERRY KEMPER: Yeah, zebra muscles. So that's our system.

I can tell you that my friend here, you're a biologist, right?

MR. CARL KLIMAH: Yeah.

MR. TERRY KEMPER: So he got an education

as a biologist and he works for fish, right? He does fish and looks at the lakes and the waters and the temperatures of the waters and things like that and raises fish, right? When I introduced myself, Awaazisii domain, that means I'm from the Fish Clan, specifically the Bullhead Clan, which is from Mille Lacs Lake. There's a lot of Bullhead Clan here, a lot of Fish Clan here.

And being that as I'm from the water, I'm the Fish Clan, that teaches me everything I need to do as a human being. It teaches me my connection to water. It teaches me my connection to everything else. As a Fish Clan, how many of you have eaten my brothers and sisters, the fish? How many other clans eat that fish? The bear, the eagle, they eat me, they eat my brothers and sisters. They sustain life. I sustain life. My clan sustains life. And I have to know the water because the water is what I live in.

So what significant impact does the water have to us as a human being? When I walk outside, every animal, every plant outside perspires. When the sun comes out, the water leaves. What we see in this room today is the room, but what's in this room is water. There's 100 million molecules of water.

There's a swamp in this room right now that we don't see, but it's here. Within that lake is a hundred million years of DNA information from the very beginning of time lives in that lake. We know that. Because it is who we are.

We retain that cultural information to that. Whereas other people don't see that. Big companies don't see that. You know, people coming through here that want to cut the trees down, they don't see the connection between the water and the tree. They don't see the connection between that tree and that fish. They can't put the two together. But yet it's there. And we see that.

But the community has been broken up by major pipelines coming through, power lines coming through, gas lines coming through. All these things have disrupted that community out there and that affects us. It has impact on us as spiritual people, as people themselves. It has impact. Our whole communities are hurting because of the things that have happened. And that's the thing that we try to capture, but how do you capture that? How do you put that into what they want to see?

Now, they don't want to hear that shit. Oop, there I go. We don't hear that stuff, you

know, but that's basically how they look at it, they see it like that and they say that, you know. How do we put that in there? And for so long a period of time people haven't been trying to. They say, oh, we can't do it, we can't introduce that into that. But they can. It's what's going to affect people. And if it affects people, you know, that's what this is all about, you know, an environment impact not just to that environment, but everything around. And we are the environment and so how does it impact us? And we've been trying to explain that to people and it's sometimes hard to get it.

MR. JOHN REYNOLDS: I think another really progressive step and specific agencies working with our tribes is on specific environmental and cultural management policies such as this one. You can ask the tribe if this specific act is sufficient, and both acknowledging and managing whatever their resources are, whether that's an archaeological investigation, or how, with an EIS, you're asking tribes and putting in an additional chapter. And if we can somehow reach the point with whatever specific agency is overseeing whatever specific practice is taking place, if they can actually ask the tribes if they think that this is

sufficient, and then begin working with tribes to make adequate additions. And if that's unclear, I can explain further.

MS. JAMIE MACALISTER: No, I think that's great. And one of the things that we will be doing is trying to capture this information as best we can and get it in our document and let you review it before we put it out.

MR. JOHN REYNOLDS: And just two really clear examples is I don't think EISs in the past have really captured how tribes are perceiving this. And then further, I don't think archaeological investigations really capture how a tribe perceives its archaeological resources. And that if we're working government to government, that dialog needs to take place and figure out how we can expand these existing practices.

MS. JAMIE MACALISTER: Yeah. I think this is really just the beginning of our efforts here. You know, this helps fill in one little piece of the puzzle. But as we keep going forward with this, there will be many more ways that we will need to get information from you and keep getting information from you. Not just on this project, but certainly everything on this project, there's still

a ways to go on this, how this ends up turning out. But on other projects in the future, this is really the beginning of our work together.

MS. NATALIE WEYAUS: That is good.

MS. JAMIE MACALISTER: I really just have -- we kind of talked about this directly and indirectly, but are there other cultural elements, and I don't mean just sites or places, but traditions that you see being threatened by the pipeline?

MS. NATALIE WEYAUS: This will be made whether we have input or not. With our leadership now at the national level, we just don't know what's going to happen. And it's people like our President that will allow things to happen and that's something that we won't be able to control. But we'll be there. If our people are opposed to it, they will be standing there and opposing it. I'm sure we'll go through a lot. But you can just sit back and watch, you know, when things don't turn out the way they're supposed to, and I suppose we'll have to say we told you so.

MR. TERRY KEMPER: Just that in itself and how Natalie talks is the emotional part of our disconnect that's going to happen from these things.

We're already disconnected, just from the way she says, and most Native people believe this now, with the apple and stuff like that, is that why are we even, it's going to happen.

But, like I said, we're sitting at a table again, you know. And even though we know that, we still have hope, you know. But we have hurt. We also have hurt in us even just knowing that for so long this is the occurrence that's been happening to us as a people. That we can speak now about it like it's an everyday thing, you know, because it's happened so much.

We're waiting for the time when people begin to see it and hear it and say wait a minute, yeah, you know what, they do have a valid point, it will affect other people, and what if it does happen. What if they do do that, what's going to be the outcome of it, you know.

And for us, we know the outcome. We've been through it. We've been through it many times over, and over and over and over again we've been through it. And there will come a time in the world where all people will begin to see it. And there will just be garbage on the earth. In the earth, on the earth, it'll be all over. And then what? Like

Natalie said, we told you so, you know. And that's not -- that's not something we look forward to or that we want to pass down to our ancestors.

Seven generations from now, I don't want my ancestors telling your ancestors, you know, our ancestors told you so. It doesn't have to be like that. And that's kind of where we're at today, though, because with the tree cutting, with the ownership, farms, and with the mining, and we told you so. We told you it was going to happen.

And we're at a point in time where does it benefit any of us, you know, does it benefit really a lot of people? No. Who does it benefit? Rich people. That's what it benefits. Majority of the people in the United States or anywhere don't get benefit from it. And if you do get a benefit from it, it's only for a short period of time and you make wages to pay your living and who benefits from that? The same people that put the company there, the company that's putting the pipeline through. They get your dollars after.

So it's a system that's really corrupt, it's a system that's not going to go anywhere. You know, it's going to implode at some point in time.

And we have our ancestors, our elders

retaining information that says take a look at it. Take a look at it and see it for what's going to happen, what can occur, you know. What are the impacts in the long run of this? Seven years from now, what are the impacts? And then seven years after that, what are the impacts going to be?

We already know that when they put the original pipeline in there and it ran through there, there's six more pipes that lay next to it and so we already know the impact of that area. We already know that it messed up that whole area that comes through. That people are living in fear of oil spilling into lakes. People that live in that area are living in fear of that. When is it going to happen? And right now they're at a time where it's now, you know. They're living in fear that any day now that pipeline can burst because they haven't up kept it, they haven't taken care of it, they haven't monitored it, and they haven't done what they said they were going to do. And so now people are living in fear.

Native American communities, and not only them communities, but other communities are living in fear every day that a pipeline is going to burst in their backyard and pollute the water or pollute

that system. So, you know, the impact of that is just in itself. So seven years from now, who is, you know, and now they want to leave it. They want to leave that pipeline in a corridor and just leave it there. That's like, to us, okay, that was seven years ago, seven years ago and maybe beyond that that they put the pipelines in and they continue to do that, so we already know the impact. That impact is that we'll just leave the garbage in the ground. We'll just leave it.

So if you're going to just leave the garbage in the ground, what makes you think I want you to put more garbage in my backyard, you know? If you put a dump in my backyard, am I going to like that? No. And then you leave it without cleaning it out? No. So that's what they're doing. And they're just leaving it in there. And now there's six more pipes in there that'll have their lifetime coming up and what are they going to do with that? Leave that garbage in the ground, too?

And so now you got a whole ecosystem, 100 miles of ecosystem that's been damaged, 100 miles of ecosystem that's been hurt. You've got new plants that came in there that are foreign, foreign plants. You got plants that don't get along with other

plants, that don't allow other plants to live. You got plants that hurt human beings. You got plants that blister your skin now that grow in them lines. You know, they grow in them lines where they dug it all up. And you can walk through that area and it will be full of Poison Ivy, Poison Oak, different things like that. I mean, just massively full of it. And you can't walk through that area without having some impact to you as a human being. You're going to have blisters, you're going to have sores on you.

There's plants in there that have needles on them now because they turned that soil up and so there's plants with thorns on them now. You go anyplace where there's been a pipeline put through, you'll find thorny plants, you'll find Poison Ivy, Poison Oak, you'll find all these plants in that area that affect the human being.

And if they affect us as a human being, what do you think they do to the animals out there? You know, the birds and the different things that are in there. And you got these other plants that are in there now that are coming, invasive species coming in that are even worse than the Poison Ivy, you know. And then not only that, but you got a

ecosystem now that's harmful to the insects. The insects now are -- their whole areas are turned up and you got different plants in there and everything, you know.

So what I'm saying is you can look at these pipelines and the corridors that are there, they're dumps now. They're dumps. That's what they're going to call it, you know. If they don't have responsibility to take them out or clean up their mess, it's a dump. So if it's going to be a dump, you look at what the dump has in it. The dump has in it thorny bushes, Poison Ivy, all these things where people can't go anyhow.

People won't want to go there to collect medicines. There used to be a nice area where you can go. You can look at the corridor now, where it goes, and it used to be just a pristine area. I mean, just beautiful forests and everything. The lumber company came in, cut it down. Then the pipelines came in and then the overhead, what do you call, the lines came in. Now you look at that whole area in there and it's just full of invasive species, full of all kinds of other things, it's hard to find any medicines that are good in there. But there are medicines that are in there that are

trying to clean up that ecological system and we have to leave them sit there in order to try and clean it up. Because the system itself tries to clean itself up, but when you have that massive amount of moving things around and putting foreign objects in there.

Just a funny joke. Just imagine if you were walking from your living room to your bedroom and all of a sudden there's a wall. Just out of nowhere there's a wall, you know. And you walk into it and you say, well, who put that wall up in here? Well, this company came in and said that wall was the best thing for us so they just said they're going to put this wall in there.

You think about those little worms that come in there, boom, oh, there's a wall. Think about those little moles and mice and stuff that live in the ground and the woodchucks and the otters and other things that dig in a hole and, bam, they run into that pipe. Well, what the heck is this here? It messes up. They don't ever think of things like that. We do. We think about that whole ecological system out there because it affects us. And so all those animals now that live in the ground, all the insects that live in the ground with

a foreign object sitting right in there.

Like I said, imagine you going from your living room and having to go to the bathroom and all of a sudden you run into the wall, you know. Because somebody said it's the best thing for you, you know.

It'll mess up your environment. You got to figure out how to get around it, how to go over it, how to do whatever to get to the place you want to get to, you know. And that's what we're dealing with.

I don't know if that explains anything to you guys, but --

MS. JAMIE MACALISTER: I just have one --

MS. LOUISE MILTICH: Can I do a follow-up on this?

MS. JAMIE MACALISTER: Yeah, go ahead.

MS. LOUISE MILTICH: I guess the question was about how the impacts of this project, you know, change cultural practices, your experience with the land. We're discussing climate change in the EIS. Can you talk a little bit about climate change and how climate change is affecting the way you interact with the land, the way you experience it?

MS. NATALIE WEYAUS: Climate change is

not created by anything but the people. The cars, the airplanes, all the automobiles. So it's happening. With all the new technology in place now, climate change is happening. And you just have to accept it. And we believe the way nature will change itself is by maybe more rain, more snow, who knows. It's never happened before, has it? Or was there a big flood once upon a time or --

MR. TERRY KEMPER: So you look at the ecological system, climate changes the trees, the wind, the rain. But the trees and the plants, they all have a significant impact to everything. We know that. We know that they're alive and living.

If you have a flower in your house and you talk to it it's going to grow nice, you know. And it's going to put oxygen, H2O in the air for you to breathe. At one time they say in the earth here, it used to be like a forest, it used to be like a jungle just full of pines and things and stuff like that. And the ozone, like the H20 level of the earth was 100 percent. Can you imagine the H20 level of the earth being 100 percent?

And there's a scholar, Vine Deloria, that talks about if it was 100 percent, that would mean that you as a human being could justify being 10

feet tall. Because if you're breathing in 100 percent oxygen, ozone level, oxygen level, your body is nourished, there's a part of you that grows. And if you're 100 percent, that makes you grow, your 100 percent oxygen would make you grow. Thus, over 100 years, over the years that have happened with deforestation, with plowing, plowing of whole fields of natural stuff, the ozone layers continue to go down.

There used to be fires and things like that, now it's big companies, corporations, pumping in cars, pollutants, spraying on the ground. So now, over the period of time, everything is getting polluted. Everything. So your ozone layer, now the people are even getting smaller. So you don't have tall people anymore. You got littler people 'cause they're not breathing the good ozone level, they're not breathing good air, oxygen, it's depleted.

So then you got the ozone layer which oversees the earth and the universe and it goes out and they say that they got big holes in that. There was a time when that ozone layer was bad at one time. Whether it was the earth, the sun, whatever it was that happened, and the whole earth had to redo itself. So whether it was flooding, whether it

was tornadoes, storms, hurricanes, different things, but the earth had to replenish itself again and it had to have time to heal. So in that time to heal we became what we are today. But now it's getting worse again.

So now we got an ozone layer that's totally, you know, have you ever been to the Cascades, or you go up above, if you go above the tree line or anywhere where you breathe, you can tell the difference in the air quality if you're in different areas where there's more vegetation, where there's more everything, you can tell the difference.

You can walk outside on the lakeshore, smell the lake. You can walk into the woods and you can smell the woods. You can go to Los Angeles, Chicago, the Twin Cities area, you will not get that smell. You will not feel that nourishment. Your whole body will actually have a different -- but the whole world is getting like that now.

So with the ozone level comes heat. Look at everything that's happened to this day right now today. The birds are flying different. The weather is different. Everything is different because of those changes to those layers in the earth, to the

air. So everything is changing. And to us that's impact to all of us. To everything out there. That impacts the trees, the water, the air. Because there's a natural cycle that I talked about earlier that everything has. Everything has that.

There's things that the government does that we don't know about. They spray little molecules up in the air, you know, the chem trails, all these other kind of things that they do. And they don't ask our permission for that, they're not asking anybody's permission. They're just doing it to control weather, to control other things. We know that as Native American people. How do we know that? Do you want me to tell you how we know that? Back when the nuclear wars were going on, when there was a nuclear like threat from Russia, do you remember as little kids going underneath your desks.

MS. DANIELLE OXENDINE MOLLWER: Yes, practicing the drills.

MR. TERRY KEMPER: Practicing the drills. There used to be a drill that we had to practice as little kids. And the siren would go off and we'd all get underneath our desks in the classroom because it was for a nuclear fallout.

Well, what they did was they came over

with big military planes over the Chippewa National Forest, over reservations and different areas and they dropped down these particles to see how far, if there was a nuclear fallout, if the bomb hit, how far that would travel. So they did all these experiments already in Native communities, in different areas. And this is all stuff you can read about, it's all stuff that they did already to check out that. So we know that they're doing things still to this day that's affecting. Because that in itself affected it, because they used some kind of chemical that they let out of the planes when they did that to see how far the air currents would carry that if there was a nuclear disaster.

And they're doing this all the time because you have a nuclear reactor down here in Monticello, so they're doing these kind of things all the time but they're not telling you. They're not doing EISs on it, they're not doing all these things down there, they're just doing these things.

So I'm the kind of person, I don't know about any of you guys, but when I hear a big military plane coming over on our reservation, I'm like, awe, shit, what are they doing.

MR. CARL KLIMAH: I was going to say, so

you asked how does the climate change directly impact the culture here?

MS. JAMIE MACALISTER: And changing --

MR. CARL KLIMAH: You do not have to look far. The bottom line, we got a warming lake up there, already we've seen the burbot go extinct practically in Mille Lacs Lake. So now we've got a situation where Band members, they can't even harvest the burbot because it's not there anymore. And now with the law declining, now our quotas are going super low. Another big one is tullibee, if the water pressures get too warm, I mean, they're already projecting to go extinct. And so now what happens in the other parts is these pipelines is going to impact and put limitations on their rights and that's just what it comes down to. You don't have to look far, you know, so I was going to add in that.

MR. CHARLES LIPPERT: And one other difference. Biogenic climate change and anthropogenic climate change. Biogenic climate change is motivated by the planet earth and it allows for the change and allows all of the living entities on earth to move and change with earth. But the anthropogenic climate change, it's human

driven and it does not allow for any other life forms to change with it. So this is basically a suicide kill for all of us. And reality is, earth sustains for life, and if anything does not promote life, earth will make sure that we will no longer exist and replace us with something that is going to promote life.

MR. TERRY KEMPER: Dun-dun-dun-dah.

MS. JAMIE MACALISTER: Terry is getting a little punchy.

Our last question really has to do with the water protectors and how -- the importance that the water protectors are in the Anishinabe culture.

MR. TERRY KEMPER: Well, what we just talked about, they're standing up for, you know. In the world that we live in we try to maneuver around to figure out how to -- because people wouldn't come to the table, you know, because people aren't listening. So when you're backed into a corner, you use the avenues that are available to you in order to say things are going wrong. And those were the avenues that were given to them and to our people now in the world. And the water protectors are some of the most -- what do you want to say, beautiful people.

Before even DAPL started there was a group of ladies that started walking with water. They were called the water walkers. And they came from each shoreline, from the south, from east-west and from the north, they bring water in copper kettles. And they walk with this water to all meet at the Great Lakes here. And I got a chance to walk with them and sing with them and do ceremony with them.

And at that point in time there was a lady, Josephine Mandamin, who had a dream that we have to protect the water. And this was years before DAPL, before the pipelines. Because there's a pipeline going through the Great Lakes up there and she seen the pollution that was happening and that companies were coming to the Great Lakes to take water out of there. And so they did this walk, so there's been many walks since then, of water walkers and stuff. But the original people that was there, we sat in ceremony with them, we had that, and it's kind of progressed now down to this point where it's at now.

So these people are considered sacred on our part. They're considered to be people that are utilizing what tools we have today in order to make

it known how important it is, the water. Thus being why you're sitting with us, because this pipeline is going to go through a watershed. This pipeline is going to go through the Land of 10,000 Lakes. And we've already seen what has happened in other places where oil has hit and how much they have not took responsibility and cleaned it up. They've covered it up.

And so those water protectors to us and to the Anishinabe, to the Lakota, to all Indians, to even people of other countries are people that are making a statement that needs to be heard. And so we look at them, you know, we honor them.

I think last week we met with Army Corps of Engineers and when we met with them there was a man that was put in jail. And he told his story and it's such a sacred thing that he went to jail protecting the water, protecting the people that were there, the old people, because they were being pushed around, they were being sprayed, dogs were being put on them. They got military out there after people that are in prayer for the water. That's how that company reacted to the people saying water is sacred, we can't have you steal water. And he went to jail for that. And the little bit I

could do is I make drums so I give to him a hand drum and told him that I appreciate, that's how important it is. And we all sat up and we healed.

With what happened out there, there's a lot of people hurt, because of when President Trump came in and did what he did and allowed it to go through, there was a lot of people that were hurt by that. A lot of Indians, a lot of other people that just see where it's all going and they were really hurt. And so, again, we all came together and we'll continue to do ceremonies to help them out, but there's a lot of hurt out there. And there's a lot of, you know, this is the next battle right here, Minnesota, 10,000 lakes. So, you know, those people are considered very, very, you know, highly respected.

But, remember, it comes from -- that whole thing came not just because of the pipeline, it came from a long time ago. These ladies, Josephine Mandamin is her name, and she is the lady that started to have a dream that we would be sitting in a time where pipelines were coming through, other things were coming through to mess that water up. So it's like Indian people, when they're connected to these things, they already send

the people. They already created this movement long before that pipeline came through. Because they knew that there was going to be that people needed to stand up at some point in time for that water. They needed to stand up for them sacred sites. They needed to stand up for those things in the past because the future relies on it.

And we've been through this road, we've been down through this road, you know. With the archeology, you know, you got a pipeline coming through and then once you do archaeological survey, okay, so you're going to dig up, do shovel tests and all of a sudden you find the bones, you find the bones of our ancestors. So then what happens? Well, they call the police force, they call these people, they come in and what happens? They dig up our people.

If we went and took all the graves from the white man's graveyard, dressed it up and said, oh, it might be an archeological dig, we went and dug up their ancestors and, oh, we found bones, call the cops, how would they feel? You know. And you got a pipeline wanting to come through and then what happens is they're going to dig them up anyhow. If they find something, make an inadvertent discovery,

it's boom, and then what happens, we get hurt again, everything.

So you talk about impact, environmentally to us the impact is immeasurable. And we've been through that because they've been digging us up under an archaeological field, permitted to dig us up like we were some kind of, you know, I don't know what you want to call it. Putting us in museums, putting us in for show, show pieces and stuff. We've been through this road for many, many years and we're just sitting at the table now with archeologists trying to get them to understand, okay, you dug this little spot here, there's a bone that came up, but maybe this whole area here is a sacred place because they put somebody there.

If you go to your cemeteries where you bury your people at, isn't that a sacred place to everybody? On the Fourth of July's, and certain times, birthdays and stuff, people come there and pray. People come there and remember them, you know. But they don't treat us like that. They dig us up. And so those are the things that -- and they don't see that impact. Oh, it's just an archaeological survey. They don't see the impact of that.

I sat on an archaeological survey as a Native American person finding artifacts of our ancestors and I said where are they going? Well, we got a property owner, we got to do this, we got to do that. It's like why am I even here? Why do I want to dig up my past, my ancestors, the things that they used and then give them to somebody else and you're not going to put them back? That's what we're dealing with. The hurt. The pain.

And so now you got major companies coming through and they're going to make inadvertent discoveries, that's just the bottom line, they're going to find stuff. That's it. More hurt. More pain for all of our communities. And I just do not understand how one group of peoples cannot see that, you know. I mean, before we even got to where we're at with the archaeological field, we literally had Native American people going to white people's graveyards saying we're going to dig them up, then, before they recognized that we were significant, that what they were doing was hurting us.

I remember some of those protestors that went to the graveyards with shovels and got arrested in order for the archaeological field to begin to understand that they were digging us up. I remember

those times. I remember them when they did that. And here we are today. You got a major pipeline wanting to go through. Is it going have impact? You're darn right it's going to have impact. They're going to find something in that corridor and they're going to dig it up and they're going to wonder where does it go. There are either going to be inadvertent discoveries of bones and things and it's going to go to the thing where reburial process is all taking over and that hurts our people, you know. So there's impact in all of that.

I just can't understand how one group of people doesn't see that, you know. How they don't see that any kind of bones or any kind of things like that of our ancestors -- if it was your ancestors, is that okay? You know, I don't think so. You know, it wouldn't be okay. Well, I'm going to put your mom and dad on display over here, you know, or I'm going to go put them in a box someplace and leave them.

You know, I went to this place down in Indiana, and it was a room twice as big as this, right, twice the size of this, and every shelf stacked to the ceiling was full of Native American bones. Or the basement of the Smithsonian. And

that's what they did.

So now I'm going to shut up because it's time to eat.

(Concluded.)

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Organizations – Tribal and Nontribal

From: Janet Hill [mailto:janet.hill@rocketmail.com]
Sent: Wednesday, March 12, 2014 1:27 PM
To: Hartman, Larry (COMM)
Subject: Public Comment for PPL-13-474 (Sandpiper Pipeline Route), Alternative Routes

To the Minnesota Public Utilities Commission:

The Big Sandy Lake Association submits the following comment in response to the request for alternative routes for the Sandpiper project.

Who we are. The Big Sandy Lake Association (BSLA) is a strong, not-for-profit lake association in Aitkin County with 540 members. The BSLA has been in existence since the 1950s. Part of our mission is to promote good lake management for Big Sandy Lake, serve as the voice for our membership in matters under consideration by federal, state, and local government bodies and agencies, and promote the welfare of the lake, its watershed, and surrounding area.

About our area: Big Sandy Lake is located in the Big Sandy Lake Watershed, the largest acreage of which is in Aitkin County, and which includes parts of Carlton and St. Louis counties. The map below shows the watershed and the proposed pipeline route passing through it.

Big Sandy Lake is at the receiving end of water flow from this watershed; our lake is the last stop before the water heads into the Mississippi River via a short stretch of the Sandy River. As such, Big Sandy Lake receives all runoff -- natural and man-made -- that finds its way into our watershed.

Big Sandy Lake is one of Minnesota's premier recreational lakes. At 6,526 acres, it is among the largest lakes in Minnesota, and is a popular fishing lake. It has between 950 and 1,000 lake homes, of which about half are homesteaded. Its islands and peninsulas enhance its beauty, and its proximity to the Twin Cities make it a popular destination for cabins and camps. Many residents have property on the lake that has been in the family for generations.

Our lake has rich historical significance, in that Big Sandy Lake (formerly called Sandy Lake) was part of what was once the main trade route between the eastern and western United States. Many generations of native Americans, and later, fur-trading voyageurs, used this route as their main "highway." Their trail -- the Savannah Portage -- includes a six-mile portage between the West and East Savanna rivers (now within Savanna State Park, which is also within the Big Sandy Lake watershed). Beginning around 1755, this trail was used for more than a century as the main route between east and west by fur traders, explorers, and missionaries. It hosted explorers such as Zebulon Pike, Lewis Cass, and Henry Rowe Schoolcraft, who all wrote about Sandy Lake in their journals. During the fur-trade era in the early 19th century, two fur trading posts were located on Big Sandy Lake, and artifacts from these posts are still being found by local residents.

Our concerns: The BSLA has two main concerns with the proposed Sandpiper Project:

- Our first concern is with the very real possibility of oil spills and leaks within the Big Sandy Watershed if the Sandpiper corridor is built. Despite claims by Enbridge, pipeline spills and leaks *do* happen, and they have caused well-documented and widespread damage to regions through which Enbridge has installed pipelines. Our mission -- as an organization established to protect our waters
  -- makes it impossible for us to approve of a pipeline and its accompanying risk of spills and leaks to be constructed through the watershed that feeds our lake.
- We also are concerned with the number of pipelines that will eventually be installed in the Sandpiper corridor. Despite claims by Enbridge that this corridor is for one pipeline only, if the Sandpiper Project is completed, Enbridge will have in place the established infrastructure, the environmental protocol, and the market connections it needs to reduce its cost of installing more pipelines in this corridor in the future. It would be a stretch to assume that Enbridge, with its

apparent "need" for more pipelines, would not add pipelines to the Sandpiper corridor in the future. Each new pipeline increases the risk of spills and leaks. We also know that tar sands are among the materials being transported by Enbridge, and that there is a possibility that future pipelines could carry tar sands.

Enbridge claims that we take issue with: In the *North Dakota Pipeline Company LLC Minnesota Environmental Information Repor*t, Section 9.1 Major Basins and Watersheds, Enbridge writes, "The [Sandpiper] project also crosses the Big Sandy Lake Watershed Management Project between MPs 540.5 and 562.4 in Aitkin and Carlton counties, which includes Big Sandy Lake and Lake Minnewawa. Both lakes are currently listed as 303(d) impaired Waters List due to excessive nutrients, specifically phosphorous loading. Neither lake is crossed by the Project."

In this statement, Enbridge appears to be saying that because Big Sandy Lake would not be crossed by the Sandpiper pipeline, and because it is on the impaired waters list, that it can be dismissed from consideration for protection. We have a few comments to make on this:

- The impaired waters status of Big Sandy Lake is due in part to phosphorus levels. These phosphorus levels are, in turn, partly due to organic phosphorus being washed down from the many wetlands in our watershed. In other words, part of our higher-than-acceptable phosphorus numbers occur *naturally*.
- The impaired waters list was not designed by the state of Minnesota to condemn lakes that need no protection. Quite the opposite: listing lakes and rivers on the impaired waters list is the first step in attempts to repair them. Once they're on the list, the state works with local governments and citizen groups to design clean-up plans, and state funds are budgeted for this purpose. Forty percent of Minnesota's waters are on the impaired waters list and are receiving state funds.
- Over the past years, Big Sandy Lake and watershed has been the recipient of grants to study and help clean up our watershed from phosphorus. We received a grant for about $250,000 and have completed a TMDL study, and are working on projects that monitor phosphorus reductions of the watershed so it can meet Minnesota's water quality standards. Thousands of hours have been spent on protecting Big Sandy Lake over the decades, by Minnesota Pollution Control staff, DNR staff, Big Sandy Area Lakes Water Management Plan (BSALWMP), Big Sandy Lake Association, and other volunteers, all working to protect our water.
- The Big Sandy Lake was awarded Star Lake status in 2010. This award is given to lake and river associations who meet eligibility requirements: the development of a lake management plan, a membership of at least 50% of private shoreland owners, and participation in a water quality monitoring program meeting Minnesota Pollution Control Agency standards. In other words, residents on Big Sandy Lake are committed to our lake and we work hard to protect it. We reject the notion that its status as an impaired waters lake makes it unworthy of protection from an oil spill.

Because of the reasons stated above, the BSLA urges that the Minnesota Public Utilities Commission consider the Northern Route Alternative, as described in the Minnesota Environmental Information Report, as the route for the Sandpiper pipeline because:

- it meets Enbridge's own stated requirements.
- it is already established.
- it will impact far fewer Minnesota residents, lands, and waters than the added Sandpiper route.
- it limits future spills and leaks to just one pipeline corridor instead of spreading the potential of spills to additional Minnesota counties.
- we feel that Enbridge is merely looking for the most convenient and cheapest way to expand their pipeline corridors, and we don't feel that Minnesotans, now and in the future, should

have to pay such a huge price for the convenience of a corporation.

- the great risk to all of the water and lands that oil pipeline corridors cross prompts us to urge that the MNPUC work on behalf of current and future Minnesotans to keep new oil and tar sands pipeline corridors to a minimum, or reject them outright, for the future health of our state. Our state's waters and lands are much more important than moving oil and tar sands from one place to another.

The Big Sandy Lake Association takes this position not to protest Enbridge, but to protect the Big Sandy Watershed, Big Sandy Lake, and our county from harm. Our legacy to future generations of Minnesotans cannot take into consideration the desires of a company who puts its own profits ahead of our land and water. When the North Dakota Pipeline Company presented its “Certificate of Need,” to the MNPUC, it sounded to us more like a “Certificate of Want.” We all need to look ahead not just twenty years, but fifty years or two hundred years, and think hard about what we’ll leave behind if we allow these pipeline corridors to proliferate, to benefit a handful of company executives.

Bruce Johnson
on behalf of the Big Sandy Lake Association Board of Directors

-----Original Message-----
From: Janet Hill [mailto:janet.hill@rocketmail.com]
Sent: Monday, March 24, 2014 11:50 AM
To: Hartman, Larry (COMM)
Subject: PUC Docket 13-474: Sandpiper

Dear MN PUC Commissioners,

The Big Sandy Lake Association submits the following comment in response to the request for alternative routes for the Sandpiper project, docket 13-474.

Who we are: The Big Sandy Lake Association (BSLA) is a strong, not-for-profit lake association with 540 members. The BSLA has been in existence since the 1950s. Part of our mission is to promote good lake management, serve as the voice for the membership in matters under consideration by federal, state, and local government bodies and agencies, and promote the welfare of the lake, its watershed, and surrounding area.

About our area: Big Sandy Lake is located in the Big Sandy Lake Watershed, the largest acreage of which is in Aitkin County, and which includes parts of Carlton and St. Louis counties. The attached map shows the watershed and the proposed pipeline route passing through it.

Big Sandy Lake is at the receiving end of water flow from this watershed; our lake is the last stop before the water heads into the Mississippi River via a short stretch of the Sandy River. As such, Big Sandy Lake receives all runoff -- natural and man-made -- that finds its way into our watershed.

Big Sandy Lake is one of Minnesota's premier recreational lakes. At 6,526 acres, it is among the largest lakes in Minnesota, and is a popular fishing lake. It has between 950 and 1,000 lake homes, of which about half are homesteaded. Its islands and peninsulas enhance its beauty, and its proximity to the Twin Cities make it a popular destination for cabins and camps. Many residents have property on the lake that has been in the family for generations. Our lake has rich historical significance, in that Big Sandy Lake (formerly called Sandy Lake) was part of what was once the main trade route between the eastern and western United States. Many generations of native Americans, and later, fur-trading voyageurs, used this route as their main "highway." Their trail -- the Savannah Portage -- includes asix-mile portage between the West and East Savanna rivers (now within Savanna State Park, which is also within the Big Sandy Lake watershed). Beginning around 1755, this trail was used for more than a century as the main route between east and west by fur traders, explorers, and missionaries. It hosted explorers such as Zebulon Pike, Lewis Cass, and Henry Rowe Schoolcraft, who all wrote about Sandy Lake in their journals. During the fur-trade era in the early 19th century, two fur trading posts were located on Big Sandy Lake, and artifacts from these posts are still being found by local residents.

Our concerns: The BSLA has two main concerns with the proposed Sandpiper Project:

* Our first concern is with the very real possibility of oil spills and leaks within the Big Sandy Watershed if the Sandpiper corridor is built. Despite claims by Enbridge, pipeline spills and leaks do happen, and they have caused well-documented and widespread damage to regions through which Enbridge has installed pipelines. Our mission -- as an organization established to protect our waters -- makes it impossible for us to approve of a pipeline and its accompanying risk of spills and leaks to be constructed through the watershed that feeds our lake.

* We also are concerned with the number of pipelines that will eventually be installed in the Sandpiper corridor. Despite claims by Enbridge that this corridor is for one pipeline only, if the Sandpiper Project is completed, Enbridge will have in place the established infrastructure, the environmental protocol, and the market connections it needs to reduce its cost of installing more pipelines in this corridor in the future. It would be a stretch to assume that Enbridge, with its apparent "need" for more pipelines, would not add pipelines to the Sandpiper corridor in the future. Each new pipeline increases the risk of spills and leaks. We also know that tar sands are among the materials being transported by Enbridge, and that there is a possibility that future pipelines could carry tar sands.

Enbridge claims that we take issue with: In the North Dakota Pipeline Company LLC Minnesota Environmental Information Report, Section 9.1 Major Basins and Watersheds, Enbridge writes, "The [Sandpiper] project also crosses the Big Sandy Lake Watershed Management Project between MPs 540.5 and 562.4 in Aitkin and Carlton

counties, which includes Big Sandy Lake and Lake Minnewawa. Both lakes are currently listed as 303(d) impaired Waters List due to excessive nutrients, specifically phosphorous loading. Neither lake is crossed by the Project."

In this statement, Enbridge appears to be saying that because Big Sandy Lake and Lake Minnewawa are not being crossed by the Sandpiper pipeline, and because they are on the impaired waters list, that they can be dismissed from consideration for protection. We have a few comments to make on this:

* The impaired waters status of Big Sandy Lake is due in part to phosphorus levels. These phosphorus levels are, in turn, partly due to organic phosphorus being washed down from the many wetlands in our watershed. In other words, part of our higher-than-acceptable phosphorus numbers occur naturally.

* The impaired waters list was not designed by the state of Minnesota to condemn lakes that need no protection. Quite the opposite: listing lakes and rivers on the impaired waters list is the first step in attempts to repair them. Once they're on the list, the state works with local governments and citizen groups to design clean-up plans, and state funds are budgeted for this purpose. Forty percent of Minnesota's waters are on the impaired waters list and are receiving state funds.

* Over the past years, Big Sandy Lake and watershed has been the recipient of grants to study and help clean up our watershed from phosphorus. We received a grant for about $250,000 and have completed a TMDL study, and are working on projects that monitor phosphorus reductions of the watershed so it can meet Minnesota's water quality standards. Thousands of hours have been spent on protecting Big Sandy Lake over the decades, by Minnesota Pollution Control staff, DNR staff, Big Sandy Area Lakes Water Management Plan (BSALWMP), Big Sandy Lake Association, and other volunteers, all working to protect our water.

* The Big Sandy Lake was awarded Star Lake status in 2010. This award is given to lake and river associations who meet eligibility requirements: the development of a lake management plan, a membership of at least 50% of private shoreland owners, and participation in a water quality monitoring program meeting Minnesota Pollution Control Agency standards. In other words, residents on Big Sandy Lake are committed to our lake and we work hard to protect it. We reject the notion that its status as an impaired waters lake makes it unworthy of protection from an oil spill.

Our proposed alternative route.

Because of the reasons stated above, the BSLA urges that the Minnesota Public Utilities Commission consider the Northern Route Alternative, as described in the Minnesota Environmental Information Report, as the route for the Sandpiper pipeline because:

* it meets Enbridge requirements.

* it is already established.

* it will impact fewer Minnesota residents, lands, waters, and counties than the additional "preferred" route.

* it limits future spills and leaks to just one pipeline corridor instead of spreading the potential of spills to additional Minnesota counties.

* we feel that Enbridge is merely looking for the most convenient and cheapest way to expand their pipeline corridors, and we don't feel that Minnesotans, now and in the future, should have to pay such a huge price for the convenience of a corporation.

* Enbridge has an available pipeline in the northern corridor -- the Alberta Clipper pipeline -- that it can use for transporting Bakken crude instead of tar sands.

The great risk to all of the water and lands that oil pipeline corridors cross prompts us to urge that the MNPUC work for current and future Minnesotans to keep new oil and tar sands pipeline corridors to a minimum, or reject them outright. The Big Sandy Lake Association takes this position not to protest Enbridge, but to protect the Big Sandy Watershed, Big Sandy Lake, and our county from environmental and economic damage.

Our legacy to future generations of Minnesotans cannot continue to support a system that puts profits ahead of our

land and water. When the North Dakota Pipeline Company presented its “Certificate of Need,” to the MNPUC, it sounded to us more like a “Certificate of Want” for all parties involved in making money off this pipeline. We all need to look ahead not just twenty years, but fifty years or two hundred years, and think hard about what we’ll leave behind if we allow these pipeline corridors to proliferate, to benefit a handful of company executives.

Bruce Johnson
on behalf of the Big Sandy Lake Association Board of Directors

Map of the Big Sandy Area Lakes Watershed Management Project

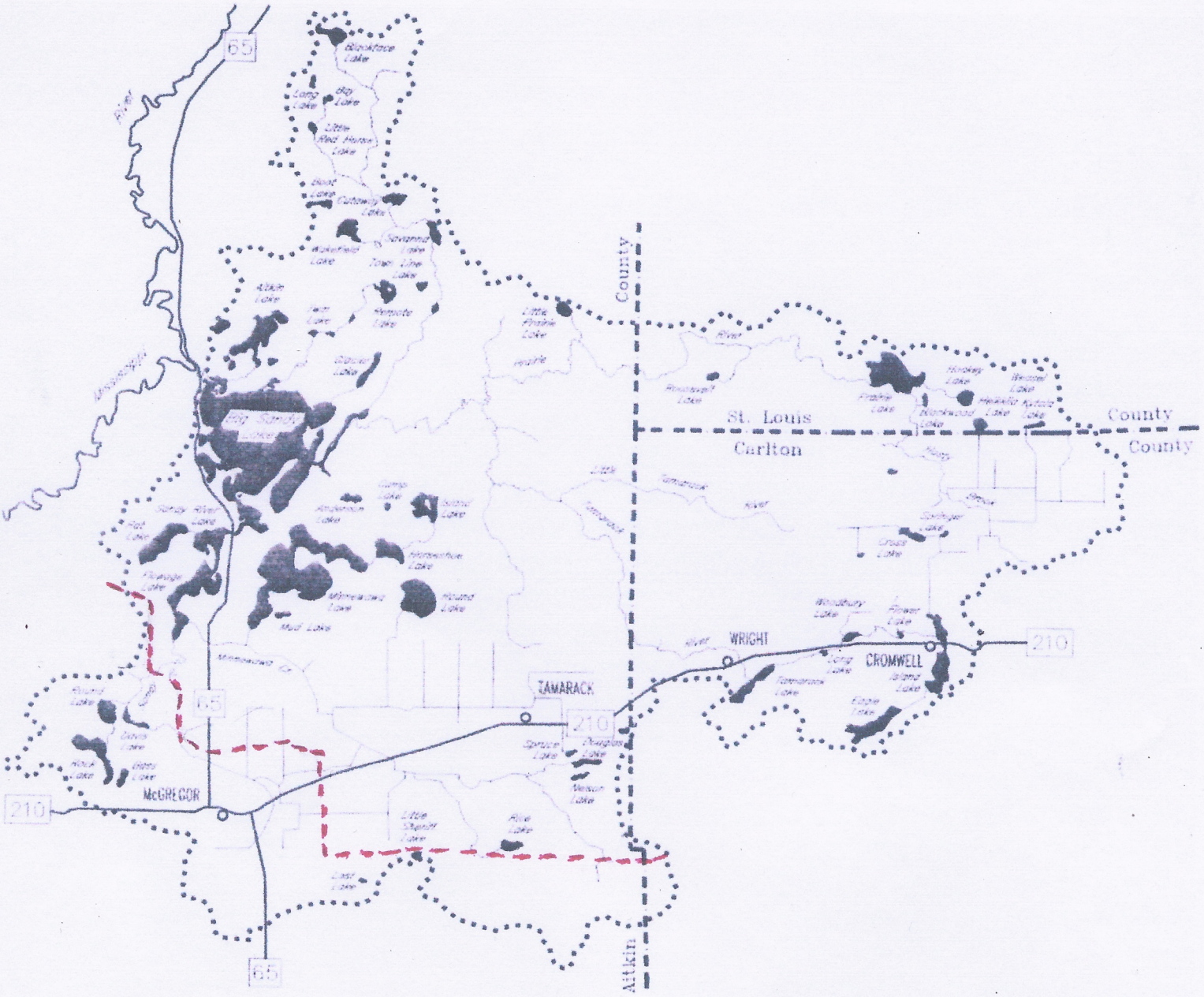

PROPOSED SANDPIPER PIPELINE ROUTE - - - -

GREAT LAKES INDIAN FISH & WILDLIFE COMMISSION
P. O. Box 9 • Odanah, WI 54861 • 715/682-6619 • FAX 715/682-9294

• MEMBER TRIBES •

MICHIGAN	WISCONSIN		MINNESOTA
Bay Mills Community	Bad River Band	Red Cliff Band	Fond du Lac Band
Keweenaw Bay Community	Lac Courte Oreilles Band	St. Croix Chippewa	Mille Lacs Band
Lac Vieux Desert Band	Lac du Flambeau Band	Sokaogon Chippewa	

May 26, 2016

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500, Saint Paul, MN 55101

Ms. MacAlister,

Great Lakes Indian Fish and Wildlife Commission (GLIFWC) is an intertribal agency exercising delegated authority from 11 federally recognized Ojibwe (or Chippewa) tribes in Wisconsin, Michigan and Minnesota.[1] Those tribes have reserved hunting, fishing and gathering rights in territories ceded in the 1836, 1837, 1842, and 1854 treaties with the United States (Map 1). GLIFWC's mission is to assist its member tribes in the conservation and management of natural resources and to protect habitats and ecosystems that support those resources.

Enclosed are GLIFWC staff comments on the Draft Scoping Decision (DSD) documents for the Line 3 Replacement Pipeline Project and the Sandpiper Pipeline Project proposed by Enbridge Energy. At this stage of the Environmental Impact Statement (EIS), GLIFWC comments are general in nature. As the process moves forward, we expect that additional comment and interaction with the Minnesota Department of Commerce will occur. GLIFWC submits these comments from an off-reservation Ceded Territory perspective and an individual tribe may choose to submit comments from its own perspective.

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[1] GLIFWC member tribes are: in Wisconsin -- the Bad River Band of the Lake Superior Tribe of Chippewa Indians, Lac du Flambeau Band of Lake Superior Chippewa Indians, Lac Courte Oreilles Band of Lake Superior Chippewa Indians, St. Croix Chippewa Indians of Wisconsin, Sokaogon Chippewa Community of the Mole Lake Band, and Red Cliff Band of Lake Superior Chippewa Indians; in Minnesota -- Fond du Lac Band of Lake Superior Chippewa, and Mille Lacs Band of Chippewa Indians; and in Michigan -- Bay Mills Indian Community, Keweenaw Bay Indian Community, and Lac Vieux Desert Band of Lake Superior Chippewa Indians.

General Scoping Comments

Analysis of Impacts to Cultural Resources

The DSD Documents indicate that impacts to cultural and natural resources will be analyzed. However, it is important to note that for tribal members, natural resources *are* cultural resources. The Ojibwe have historically used and continue to use their natural resources within the Ceded Territories for spiritual, cultural, subsistence, medicinal and economic purposes. Tribal members harvest and consume freshwater fish, wild rice, and many other natural resources as part of their bimaadiziwin, or traditional lifeway, which incorporates culture, spirituality, language and traditions, including the harvest and consumption of traditional foods. The resources that tribal members depend on have been degraded over time through a combination of loss of access and environmental degradation. Pipelines are one of many constructed features that drastically alter the landscape and can diminish the resources tribes depend on.

The EIS, in its analysis of natural resources (surface and groundwater, wetlands, habitat, etc.) should recognize the importance of a healthy environment to tribes and describe the cultural ties of tribes to the potentially impacted areas of the proposed pipeline projects.

Spatial Extent of Analysis

The Sandpiper line is intended to transport Bakken shale oil from North Dakota to Superior, Wisconsin. Line 3 transports tar sands oil from Alberta Canada to Superior Wisconsin. Therefore, these projects are regional in scope and the impacts of these projects should be described at local and regional scales. We suggest that impacts of all existing pipelines in Minnesota should be done to define existing conditions for these projects. From GLIFWC's perspective, the impacts of pipeline projects on the 1837, 1842, 1836 and 1854 ceded territories should also be conducted (Map 1) with the Ceded Territories used as distinct geographic study areas.

Additionally, on a broader scale, the EIS should also use information developed for other pipeline environmental impact assessments in Wisconsin and North Dakota, and any pertinent information developed for other multi-jurisdictional pipeline projects, such as the Keystone XL project, because these proposals present similar permitting and environmental challenges as the Sandpiper project.

History of Pipeline Safety and History of Enbridge Energy

Enbridge Inc. has a questionable environmental record. From 1999 to 2010, Enbridge pipelines spilled over 7 million gallons of crude oil in over 800 different incidents across the United States and Canada (National Wildlife Federation, 2012). The

combined environmental effect of these incidents to wetlands and surface and ground waters has not been quantified. The most notorious spill involves a ruptured pipeline that spilled over a million gallons of heavy crude oil into the Kalamazoo River in the lower peninsula of Michigan in July of 2010. Thirty-five river miles downstream of the spill were closed by the EPA. Cleanup activities at this site continued until 2014 with costs exceeding 675 million dollars. Cleanup efforts were complicated by the heavy crude oil that, when spilled, sank to the bottom of the river and into the sediment. Line 3 replacement pipeline could transport this type of oil and the proposed Sandpiper pipeline could, potentially, transport heavy crude as well. Because of this, traditional oil cleanup techniques that involve surface skimming of affected waters could be ineffective and costlier dredging of substrates must be performed.

Given this history, the EIS must provide a complete accounting of all spills from pipelines. While it is important that Enbridge's historical operations record is identified, the information should include all companies operating in the region. Spills from local feeder lines should also be detailed. With each pipeline and feeder line operating in the region, the likelihood of spills increases and any cumulative impact of successive spills impacting the region is also potentially greater. This must be acknowledged by the EIS.

Surface and Groundwater Quality

The potential for these pipelines to rupture and cause an oil spill is a major concern. The EIS should document the environmental effects of past oil spills and scientifically assess the effects of a spill in the water rich regions of the Upper Midwest and Lake Superior regions. A systematic assessment of remediation and cleanup techniques must be provided for light and heavy crude oil along with a detailed review of the effectiveness of each technique. The EIS should also quantitatively assess the possible changes to surface and groundwater that may result from a spill.

The water quality assessment should pay special attention to potential impacts to Lake Superior. This analysis should be done in the context of the Great Lakes Water Quality Agreement, the bi-national Water Quality Agreement between Canada and the United States.

A cumulative assessment of all existing impacts from pipeline construction and pipeline spills on surface and groundwater should be conducted.

Wetland Impacts and Wetland Mitigation

Construction and expansion of pipelines involve wetland fill and hydrologic alteration that will affect wetland functions and values. Mitigation for wetland impacts that cannot be avoided will be required. However, the effectiveness of wetland mitigation, both through the use of wetland banks or rehabilitation of drained wetlands, is

questionable. The EIS should describe the effectiveness of wetland mitigation measures and assess whether all functions and values of lost wetlands are likely to be replaced.

Climate Change

Increased oil transportation capacity will contribute to existing CO2 emissions into the atmosphere and exacerbate global climate change. Potential impacts of climate change have been documented for the Ceded Territories through work of the Wisconsin Initiative on Climate Change Impacts (WICCI) and GLIFWC (Attachment 1). Potential impacts on the Lake Superior Basin have been described through the work of the Lake Superior Workgroup. Furthermore, the impacts on forest ecosystems have been described by the Northern Institute of Applied Climate Science (NIACS) of the USDA. The EIS should examine the effects that this project will have on carbon emissions as well as the effect on the climate change adaptation strategies that have been suggested for Minnesota and the Lake Superior region.

The DSD documents for both projects indicate that regional economic analysis of the effects of the projects will be conducted. These economic analyses should include information on the economic effects of climate change on the region and account for the contribution of the pipeline projects to these impacts.

The economic analysis should also describe treaty guaranteed usufructury rights of Tribes in the region and assess how the proposed pipeline projects would impact the ability of tribes to continue to exercise their rights.

Financial Assurance

As previously discussed, GLIFWC staff believe that spills of oil transported through these pipelines are likely. Cleanup and remediation are costly and require long periods of time to complete. The EIS should describe, in detail, the types of financial assurance that Enbridge will be required to provide to ensure that the public is not burdened with cleanup and remediation costs. Furthermore, financial assurance is needed to cover the costs of maintaining structural integrity of the abandoned Line 3 as well as the costs of ultimately removing pipelines from the right of way whenever that becomes feasible.

No Action Alternative

The no action alternative for the proposed Sandpiper project assumes that Bakken oil will continue to be shipped by other means. The assumption that oil extraction at current levels will continue to be necessary is not supported. The United States has decided against approving the Keystone XL pipeline. There are many reasons for this, but concerns over increased carbon emissions and their contribution to global climate change as well as concerns over accidental releases of oil are two of the most important reasons.

This same rationale applies to the proposed new Sandpiper line. The analysis in the EIS should acknowledge that the need for oil transported by the Sandpiper line and Line 3 is speculative and that this oil may not be needed nor desired, given the commitments the United States has made on climate change mitigation.

Cumulative Impact Analysis

In general, the description of cumulative impact analysis is appropriate. However, there are some points that should be clarified.

Page 13 of the Line 3 Replacement DSD document states:

> "Each project will have its own EIS, and the cumulative impacts of each project will be addressed in both EISs."

Page 15 of the Sandpiper Pipeline DSD Document states:

> "The Sandpiper EIS will analyze the potential impacts of the L3R Project as part of the EIS's cumulative impacts discussion. In addition, other projects throughout the Sandpiper corridor that may cause cumulative impacts will also be discussed at a local, county and larger regional levels."

Cumulative effects analysis must not be confined to the corridor of the pipeline projects. The analysis of cumulative effects should be broad enough to account for regional impacts such as habitat fragmentation and wetland fragmentation. Additional clarity on the spatial extent of the cumulative impact assessment is needed.

The EPA, in cooperation with Region 5 tribes, has developed a protocol for assessing cumulative effects on tribal resources. This guidance should be used in the EIS for the proposed pipeline projects.

Impacts of Routine Construction and Operation

The DSD documents for Sandpiper and Line 3 projects discuss the impacts of routine construction and operation activities. However, additional detail is needed to clarify the scope of the analysis. The EIS must describe the impacts of all activities related to pipeline maintenance into the future. This includes impacts from permanent and temporary access roads and activities needed to maintain cathodic protections in pipelines abandoned in place. The EIS must anticipate, based on past experience, all permits that the applicant will need over the lifetime of the pipelines and describe them in detail.

We look forward to working with the Minnesota Department of Commerce as the EIS process moves forward. Please contact me at 608-263-2873 with any questions.

Sincerely,

Esteban Chiriboga

Esteban Chiriboga
GLIFWC Environmental Specialist

cc. Jonathan Gilbert, GLIFWC Biological Services Director (Acting)
Ann McCammon Soltis, GLIFWC Director of Intergovernmental Affairs
John Coleman, GLIFWC Environmental Section Leader
Philomena Kebec, GLIFWC Policy Analyst

Sources Cited

National Wildlife Federation, 2012, "The Anatomy of Enbridge's Once and Future Oil Spills, www.nwf.org.

Great Lakes Indian Fish & Wildlife Commission (GLIFWC)

Preliminary Climate Change Vulnerability Assessment for the Ceded Territories

Introduction

Sound conservation practices and management decisions are vital to GLIFWC's core mission of protecting and enhancing natural resources in the ceded territories. Climate data have shown that average temperature and precipitation in the ceded territories have been changing since the mid-1950's at least. These changes are due to increased greenhouse forcing in the atmosphere associated with the burning of fossil fuels. These rapid climate changes are, at best, another stressor on the ecosystems that tribes depend upon to exercise their treaty rights. At worst, these climate changes are a direct threat to the continued existence of treaty-protected natural resources that tribal members depend upon. GLIFWC has begun the process of assessing the predicted effects of climate changes on ceded territory ecosystems with the ultimate goal of developing a climate change adaptation strategy. This strategy will outline the conservation and management practices that can be implemented to protect traditional resources. It is important to note that climate change adaptation is a temporary measure that may reduce some of the impacts of climate change. The only permanent solution is to reduce the emissions of fossil fuels to the atmosphere.

This vulnerability assessment is the first step in developing an adaptation. It characterizes the potential climate changes expected within the Ceded Territory (e.g. temperature, precipitation, snow cover, etc.). It is important to note that this analysis treats the ceded territories as a distinct geographic unit and it is this ceded territory unit that is the focus of the study. The potential effects of climate change on a subset of species that GLIFWC member tribes harvest is also provided to add context to changes that the ceded territory is likely to experience. Finally, recommendations for additional, more detailed, risk assessment analyses are presented.

Predicted Climate Changes to the Ceded Territory

Temperature and precipitation are the driving variables in regional climate change research and are the basis of this vulnerability assessment. From those 2 variables, other factors that affect the ceded territory ecosystems like snow (quantity and timing), soil moisture, growing degree days, can be computed. This report relies on 2 datasets to examine the vulnerability of the ceded territory to predicted climate changes -- the National Center for Atmospheric Research (NCAR) and the Wisconsin Initiative on Climate Change Impacts (WICCI) downscaled climate change databases. Both the NCAR and WICCI datasets are computed by statistically downscaling the output of global climate change models (GCM). The underlying models used in the downscaling procedure are different for NCAR and WICCI, but at a ceded territory scale, the results are very similar. This dataset cross-check increases the confidence that the downscaling procedure is valid.

It is important to note that the downscaled climate change predictions that are the basis of this report are not without uncertainty. There are general conclusions that can be made with a great deal of scientific confidence. First, the climate of the Ceded Territories has changed and will continue to change in the future. Second, these changes are the result of enhanced greenhouse effect in the atmosphere that is caused by human emissions of carbon. Third, these climate changes, will have profound effects on plants and animals because these changes are occurring faster than ecosystems can change. What is uncertain, is the precise changes that will occur and the exact consequences that climatic changes will bring. Research in these areas is ongoing. For example, downscaled models of temperature and the associated vegetation shift have a greater degree of confidence that downscaled models of precipitation and lake levels. This report presents the best available information for the Ceded Territories in order to provide a preliminary assessment of changes and stresses to the ecosystems of the region.

This vulnerability assessment looks at predicted changes to ceded territory climate variable under two different global climate change scenarios -- A1 and A1B. These two scenarios were selected because, based on current carbon emission trends, they appear to be likely to occur in the future. The scenarios are defined by the Intergovernmental Panel on Climate Change (IPCC) as:

- A2. The IPCC A2 scenario describes a future world of intense fossil fuel use, rapid economic growth, global population that reaches 10 billion by mid-century, and the slow introduction of new and more efficient technologies. Major underlying themes are regional economic development and a lack of international cooperation. It can be considered a high emissions scenario.
- A1B. The IPCC SRES A1B scenario is marked by a balance in the use of fossil fuels and renewable energy sources. It is often thought of a mid-level scenario. It assumes very high economic growth and relatively low population growth . A convergence of global living standards results in a high per-capita demand for food, fiber, and energy. As a result, there is an increase in the human footprint on the landscape, with a decline in natural land covers such as grassland, forest, and wetland.

Changes to temperature and Precipitation are analyzed for the end of the 21st century (2099). While annual averages of temperature and precipitation are important in defining the scale of changes, considerable attention is given to the expected changes in climate during winter (monthly averages of December, January, February), Spring (monthly averages of March, April, May), Summer (monthly averages of June, July, August), and Fall (monthly averages of September, October, November). These seasonal changes are important in characterizing effects on the many seasonal activities in which tribal members engage.

Predicted Temperature Changes

Temperatures are expected to increase throughout the ceded territory. By the end of the century, average annual temperatures are predicted to increase on average across the Ceded Territories by approximately 4°F under the A1B scenario (Map 1) and 5°F to 6 ^{o}F under the A2 scenario (Map 2).

There are no significant seasonal differences in the magnitude of warming at a ceded territory scale The data indicate that greater warming is associated with the high emissions scenario.

Table 1: Predicted Seasonal Temperature Changes in the Ceded Territories by the End of the Century:

Emissions Scenario	Winter	Fall	Summer	Spring
A1B	2.7°F to 3.5°F	3.1°F to 4.1°F	2.7°F to 4.2°F	2.3°F to 3.4°F
A2	5.1°F to 6.9°F	4.8°F to 6.3°F	4.3°F to 6.8°F	3.4°F to 5.1°F

Interesting spatial patterns can be detected from the seasonal temperature data. During winter, the 1837 ceded territory is predicted to warm less than other ceded territories. This pattern is evident for both emission scenarios (Map 3 and 4). Maps for the Fall (Map 5 and 6) and Summer seasons (Map 7 and 8) indicate that the 1854 and 1837 ceded territories are predicted to warm more than the 1842 and 1836 ceded territories. This pattern is likely the result of Lakes Superior and Michigan moderating temperatures. The lakeshore areas and areas downgradient of the prevailing wind patterns are predicted to warm less than the areas upgradient of the lakes. Model predictions for the Spring season (Map 9 and 10) show different spatial patterns for the A1B and A2 scenarios. While springs are expected to be warmer, greater warming is expected in the western half of the ceded territories under the A1B scenario. The opposite prediction is evident during the A2 scenario. Spring is a notoriously difficult season to model because of the rapid changes that occur in the transition from snow and ice cover conditions to a dynamic growing season. The predictions are also complicated by the fact that there will be fewer days of snow and ice cover over the winter. Additional data are needed to provide greater clarity to spring season predictions.

Predicted Precipitation Changes

Precipitation is expected to increase throughout the ceded territories by the end of the century under both the A1B and A2 modeling scenarios (Map 11 and 12). The annual average increases are relatively small and the spatial pattern is the same for both emission scenarios. The modest increases in precipitation combined with the expected temperature increases suggest that the ceded territories are predicted to become drier as the evaporation potential created by the increased temperatures exceeds the additional precipitation.

Table 2: Predicted Seasonal Precipitation Changes in the Ceded Territories by the End of the Century

Emissions Scenario	Winter	Fall	Summer	Spring
A1B	0.3" to 0.9"	0.1" to 1.1"	0.2" to 1.8"	0.5" to 2.4"
A2	0.7" to 1.8"	0.5" to 1.5"	0.4" to 2.2"	0.5" to 1.6"

Downscaled model predictions of winter (Map 13 and 14) and fall (Map 15 and 16) precipitation indicate small increases and the predicted changes do not constitute significant deviations from existing

conditions at a ceded territory scale. At more detailed scales, topography and microclimates, including seasonal wind patterns, could have dramatic effects on precipitation patterns and their changes. Additional work in this area is needed. Summer precipitation is predicted to increase for both the A1B and A2 scenarios (Map 17 and 18). Under both scenarios, the models indicate that precipitation increases, if any, would be the smallest in the northern half of the ceded territory and increase to the south of Lake Superior. Large storm events are predicted to increase so the increased precipitation may come in the form of large storm events with drier periods in between. When combined with the temperature predictions it is reasonable to assume that conditions by the end of the century may be drier overall. Spring precipitation is also predicted to increase (Map 19 and 20) but As described in the temperature section, Spring is a difficult season to model because of the rapid changes that occur in the transition from snow and ice cover conditions to a dynamic growing season. Additional research is needed to provide greater clarity to spring season predictions.

Predicted Snowfall Changes

New research and downscaled modeling indicates that annual mean snowfall is expected to decline throughout the ceded territories. In addition, the beginning of the snow season is expected to occur later in the year and snowmelt is expected to occur earlier in the year. Thus, the duration of snow cover will decrease throughout the region. Individual snowstorms are predicted to become less common but more intense. Map 21 illustrates the predicted reduction in snow depth by comparing the average winter snow depth for the present, mid-21st century and late 21st century time periods. The location of the modeled 15 centimeter snow depth contour retreats to the north over time. By the end of the 21st century, the 15 centimeter contour is located almost entirely outside the ceded territory.

Predicted Change in the Frequency of Extreme Precipitation Events

Extreme precipitation events are expected to become more frequent. This is particularly important for the long term stability of existing infrastructure and of large-scale projects like metallic mines. Mines leave behind large tailings basins and waste rock stockpiles that become permanent features of the landscape. These facilities were designed and constructed with tolerances for climate extremes that will not exist in the future. New mines must incorporate additional safety and structural tolerances to account for increased climatic stresses. Extreme events will also likely impact natural ecosystems through increased flooding events, droughts, erosion, etc. Additional work is needed to characterize the effect these events may have on natural resources in the ceded territory.

Climate Change and Manoomin (Wild Rice)

Manoomin is highly important to the traditional lifeway and has a key role in Ojibwe history. The Sokaogon Chippewa Community established the location of their reservation because of the importance of Rice Lake to the band. The annual harvest of rice is a major event in the tribal year. Because of its unique characteristics, wild rice may be particularly vulnerable to climate change-related impacts.

Manoomin (Wild rice*)* Life Cycle (information from Peter David, GLIFWC Manoomin Biologist)

- Wild rice is an annual, cross-pollinated species.
- It generally grows in muddy shallow areas of lakes and streams.
- Wild rice requires about 2600 growing degree days (4.4° C base).
- Grows effectively in depths ranging from 6 to 36 inches (ranges are approximate) and site-specific hydrology is very important.
- Natural stands are found in water with <10 ppm of sulfate.
- Wild rice requires a certain amount of water flow,

Germination – Germination begins in late April to early May when the soil/water reach 5.6° C. During the seedling stage the leaves are submerged.

Some factors affecting plant growth:

- Turbidity/light penetration.
- Water Temperature
- Plant Competition and Shading
- Water Depth

Floating Leaf Stage – In May and early June, the next set of leaves that appear after the submerged seedling stage float on the surface of the water. All subsequent leaves are aerial.

Some factors affecting wild rice at this stage:

- Large storm/wave events can uproot the plant.
- Increased water level can drown the floating leaves.
- Herbivory by muskrat, deer, geese and swans.

Emergent Leaf Stage – In late June to early July additional aerial leaves and the main stem appear. This stage occurs earliest in shallow waters and later with increasing depth.

Some Factors affecting wild rice at this stage:

- Herbivory by muskrat, deer, geese and swans.
- Possible hail damage.

Flowering Stage – Flowering occurs in July. Pollen viability appears to be negatively correlated with temperature and positively correlated with humidity. In late July and August tillers begin to emerge and their maturity lags roughly 7 to 14 days behind the growth of the main stem. During August the grain is at an early stage of development.

Some factors affecting wild rice at this stage:

- Hot dry calm days at time of pollen release may hinder fertilization success and reduce seed set.
- Rice worm infestation (noctuid moth larva) can reduce seed yield by 10% per larva.
- Wind storms can knock the plant over or tissue can be damaged by hail.
- Drought can leave plants on exposed soil, stressing the plant in several ways.

Maturation Stage – Seeds mature and drop from the plant from late August through mid to late September. After dropping, the grains sink and are generally deposited in the sediment near the parent plant. Seeds will not germinate for at least 3 months after dropping and require a dormant period in water at or near freezing (<=35). The seed lies dormant in the sediment until the following spring when roughly 50% of the seed will germinate. Approximately 10% of the seed can remain dormant for up to 5 years, possibly longer.

Some factors affecting wild rice at this stage:

- Excessive sedimentation. Seed buried under >8 centimeters results in no emergence.
- Mild winters may contribute to poor rice season because the dormant period is too warm and because of the possibility of increased rice worm infestation.
- Over-winter drought conditions might lead to seed desiccation.

Other Concerns

- Climate change may alter wild rice's ability to compete with various species, including invasives.
- Brown spot (formerly called *Helminthosporium* brown spot) is the most serious disease affecting wild rice. This disease is caused by *Bipolaris oryzae* Luttrell (*Helminthosporium oryzae* B. de Haan) and *B. sorokiniana* Luttrell (*H. sativum* P.K. and B.). These fungi are considered to cause brown spot since both are found on infected plants and cause similar symptoms in wild rice plants. Every variety of wild rice, at each stage of development, is susceptible to brown spot. This disease is most severe when day temperatures range from 77 to 95° F and nights are 68° F or warmer. High relative humidity (greater than 89%), and the continuous presence of free water on leaf surfaces for 11 to 16 hours, can also favor infection. All parts of the plant are susceptible to infection.

Climate Change Parameters Important in Detailed Vulnerability Assessment:

GLIFWC staff developed an initial list of parameters that may be used in a detailed climate change vulnerability assessment for wild rice. The parameters are listed below.

Brown Spot Disease:

- Change in frequency of 77 to 90+ degree days.
- Change in frequency of night temp of 68 F or warmer.
- Change in frequency of relative humidity (>89%)

Risk of Uprooting:

- Change in frequency of 20 year flood events

Germination Success:

- Changes in winter temperature (more mild winters)
- Increased regional drought leading to lower water levels

Changes in Plant Competition

- Increase in number of growing degree days favor southern species

Risk of Pollination Failure -

- Increase in frequency of dry weather in July/August?

Map 22 indicates that by the end of the century summers in the western half of the ceded territory are predicted to be 5.9^{o}F to 6.8^{o}F warmer than current conditions under the A2 emissions scenario. Map 23 indicates that summers are predicted to warm between 2.7^{o}F to 4.2^{o} across the ceded territory, with the eastern half of the ceded territory predicted to warm somewhat less than the western half. All wild rice waters depicted in the map could be affected, but some areas may more severely impacted. As outlined above, brown spot disease is likely to become more common as the climate warms. The increase in extreme precipitation events will contribute to uprooting of plants during the floating leaf stage. At the same time, an overall drier climate may reduce pollination success. Additional work is needed to assess the effects on individual rice waters and the effect of the various climatic factors on the plant in increased spatial detail. The overall conclusion is that wild rice is vulnerable throughout the ceded territories with increased vulnerability on the western half of the region. It is possible that wild rice beds along the coast of Lake Superior may be sheltered from temperature-related impacts but the effects of Lake Superior level changes should be characterized.

Climate Change and Cold Water Ogaa (Walleye) Fishery

Coldwater habitats are defined by their maximum seasonal water temperatures (17 degrees Celsius during June and August). In general, rising air temperatures will be associated with rising lake and stream temperatures as well. Increasing temperatures have the potential to change coldwater habitats to cool water or even warm water habitats, subsequently affecting the ecology and species composition in lakes or rivers.

The spring walleye spearing season begins immediately after ice-out in inland lakes. Predicted spring temperature changes are likely to cause earlier ice out. Maps 24 and Map 25 indicate that the temperature of the air above many of the inland walleye lakes that are open for tribal spearing is predicted to warm between 2.3^{o}F and 5.1^{o}F during the spring season depending on the emissions scenario. Maps 26 and 27 characterize summer impacts to trout streams. Brook trout are among the most vulnerable species to water temperature increases because their habitat consists of shallow cold streams, which are highly affected by changes in air temperature. The maps indicate that some streams in the ceded territory are more vulnerable than others. Under both scenarios, the western end of the ceded territories is predicted to have greater impacts on coldwater habitats than the eastern side. However, the future water temperature in the individual walleye lake and trout stream will depend on many other factors, such as the health and quality of riparian environments and the amount of groundwater in the water budget for each individual waterbody.

Research conducted by the coldwater fisheries working group of WICCI indicated that brook trout, walleye and northern pike habitat is expected to decline throughout the ceded territory. However, at a ceded territory scale it is not possible to assess lake-specific vulnerability because lake temperatures in many cases are moderated by groundwater inflow, differences in lake morphology, and the characteristics of riparian zones. For example, deep natural lakes will warm less than shallow ones. Also, the degree of dependence of a lake on groundwater, its shape and depth, and the character of shorelines and riparian habitat will ultimately determine the water temperature increase and the viability of coldwater fish species. Trout streams with abundant shade trees will warm less than exposed stream banks. Generally, cold and cool water fish species are vulnerable to climate change, and vulnerability is greater in rivers, streams and shallow lakes. Additional work is needed to characterize vulnerability on a lake by lake basis because of the implications that climate change has on the different tribal activities that occur in the ceded territories. For example, it is known that lakes in the western side of the ceded territories are the first to thaw in the spring and therefore, tribal walleye spearing activities occur there and moves eastward as those lakes lose ice cover. If the eastern ceded territory warms at a faster rate, this pattern may change.

Climate Change and Mooz (Moose)

Moose habitat includes boreal forests and subarctic mixed forests. The southern limit of moose range coincides with the northern limit of the ceded territories for GLIFWC member tribes in Wisconsin and Michigan and have populations in northern MN and upper MI. Moose have specific temperature tolerances and prefer areas where the average summer temperature does not exceed 60°F and winter temperatures that do not exceed 41°F. Because of this, moose are easily heat stressed, and the effects of climate change upon moose are likely to be greatest in the southern limits of their range where temperatures and exposure to white-tailed deer parasites and ticks are greatest. Moose populations in Minnesota have declined substantially in recent years, and this decline has been correlated with increasing temperatures. In the Upper Peninsula of Michigan, recent population estimates suggest the growth rate of this re-introduced population may have slowed in recent years. The decline in moose populations are attributed to summer heat stress, increased mortality from parasites (more ticks survive in mild winters), and brain parasites carried by white tail deer. Maps 28 and 29 indicate that current moose ranges are in areas that are predicted to warm the most in the future for both emission scenarios. This suggests that winter stress from ticks will only increase. Maps 30 and 31 suggest summer indicating that summer heat stress will continue to be a problem throughout the ceded territories regardless of emission scenario. However, the moose range in the 1854 ceded territory is predicted to be more severely impacted than the moose ranges in the Upper Peninsula of Michigan. Regardless of the emissions scenario, the future of moose in the Ceded Territories seems uncertain.

Climate Change and Makwa (Black Bear)

Black bear habitat is found throughout North America in areas without significant urbanization. Because of their large range it is unclear how climate change may affect this species. Bears hibernate during the winter months when food is scarce; in the ceded territories, changes in temperature and shortening of the winter season are likely to change the timing of winter hibernation. Additionally, bears typically leave the den when ambient temperature is above 50°F and snow is melting; this melting condition is predicted to occur earlier in the year, which may cause bears to emerge from hibernation before food is available. Map 32 and 33 depict the location of selected hibernacula and bear management zones where GLIFWC issues permits. The map indicates that spring temperatures are predicted to increase for both emission scenarios across the range of black bears in the ceded territories. It is therefore expected that bears will emerge from hibernation earlier in the year across all management zones. Additional research is needed to determine if this change in timing of hibernation is harmful to bear health, or if climate change will affect black bears in any other ways, such as impacts on food sources, access to water, etc.

Climate Change and Waabezheshi (American Marten) and Ochig (Fisher)

American Marten and Fisher are found in suitable habitats throughout the ceded territories. In the Wisconsin and Michigan ceded territories the Marten and Fisher are at the south fringe of their ranges and both species are sensitive to warm temperatures. The southern extent of the fisher range is determined by temperature. Aside from heat stress, a changing climate may provide fishers a competitive advantage over martens, because fishers appear to use a larger variety of forest cover types than martens. However, deep fluffy snow may give pine martens a competitive edge over fishers as well as thermal protection over the winter; the small rodents on which martens feed also need fluffy snow cover. The predicted reduction in winter snow cover (map 21) may allow fishers to outcompete martens throughout the ceded territory. Additional research is needed to fully characterize the effect that warmer temperatures and reduction of snow cover may have on these two species as well as the competitive relationship between them. In addition, both species have preferences for specific types of forest cover. The effect of climate change on those ecosystems should be assessed in greater detail.

Climate Change Parameters Important in Detailed Vulnerability Assessment:

- Change in temperature for summer and winter
- Change in snow depth
- Change in snow density
- Change in seasonal duration of snowpack
- Increased variability of spring temperature and precipitation. (Creates thawing and refreezing of snow which increase density.

Climate Change and Forest Species

Climate change is expected to affect the suitable habitat of tree species impacts to northern tree species are expected to lead to a conversion to other types of forests that are more common in southern parts of the country. This conversion is detailed in work conducted by the US Forest Service Northern Research Station. Three species are listed in this vulnerability assessment because of their importance to GLIFWC member tribes. The information is taken from the USDA tree atlas at http://www.fs.fed.us/nrs/atlas/. Additional information for other tree species is available at this site.

Wiigwaas (Paper Birch)

The historic range of paper birch encompasses the entire Ceded Territories (Map 34). Recently, a decline has been noted in populations of paper birch, potentially due to changes in climate. “Higher soil temperatures, windstorms and the arrival of new forest pests such as mountain pine beetles would impact almost every tree species found in the north woods today. Paper birch and Aspen would decline from increased drought. White cedar and white pine regeneration would be impacted by deer herds that expand thanks to milder winters”.

Paper birch is expected to decline in the ceded territories by between 58 and 87 percent depending on the emissions scenario (Maps 35 and 36). Paper birch are known to be fairly drought-intolerant, sensitive to higher temperatures, and dependent on productive soils. This is one of the species most severely impacted in the models.

Aninaatig (Sugar Maple)

Sugar maple is an important species for tribal members and is found throughout the Ceded Territory (Map 37). Warmer years can mean the sugar maple -tapping season can get shorter and shorter. Warmer weather can also lead to problems with pests such as the Asian longhorn beetle. An Environmental Protection Agency Climate Action Report from 2002 notes that "climate change is likely to cause long-term shifts in forest species, such as sugar maples moving north out of the Ceded Territories." This can mean that the migration of sugar maple northwards may be unavoidable and ultimately threaten this aspect of Ojibwe sustenance living.

Sugar maple is expected to decline in the ceded territories by between 38 and 69 percent depending on the emission scenario (Maps 38 and 39). It is not expected to be completely eliminated from the CT but this species is vulnerable throughout the ceded territories.

Giizhik (Northern White Cedar)

The current range encompasses the ceded territories but ends at the southernmost boundary, leaving it susceptible to northward migration, potentially eventually out of the ceded territories. In this area the warmer climates and longer growing seasons can have a “cumulative negative impact of all drivers of change. Storms, fires, invasive insects, and unsuitable climate will remove mature forests from the landscape, increasing deer populations will prevent reproduction of several species that would otherwise be resistant to the impacts of a warmer climate, including white pine, northern red oak, yellow birch, and northern white cedar”.

Discussion on Invasive Species

Invasive species are a non-climate stressor impacting habitats and species in the ceded territory. For example, emerald ash borer will have impacts on ash trees before the mid- and late century timeframes used in this assessment. Invasive species could create a positive feedback loop in which impacts from existing invasive species are expected to continue as climates change, and native habitats that have been degraded by invasive species become more vulnerable as climate changes. Future climates may then increase the likelihood of new infestations. For example, currently, the gypsy moth and asian carp cannot easily colonize areas of the ceded territory because they are limited by air and water temperatures. As both of these air and water temperatures rise, they may be able to invade areas farther north. This vulnerability assessment does not address invasive species in detail and additional research is needed to thoroughly assess each species and determine the potential impacts it may have on ecosystems throughout the Ceded Territories as climate change progresses.

Acknowledgements

Downscaled climate change data were developed by University of Wisconsin-Madison researchers through the Wisconsin Initiative on Climate Change Impacts. Downscaled climate change data developed by the National Center for Atmospheric Research (NCAR) was also used to provide context to WICCI data. The biologic information (e.g. species range, habitat descriptions, etc) are based on the expertise of the GLIFWC wildlife section biologists.

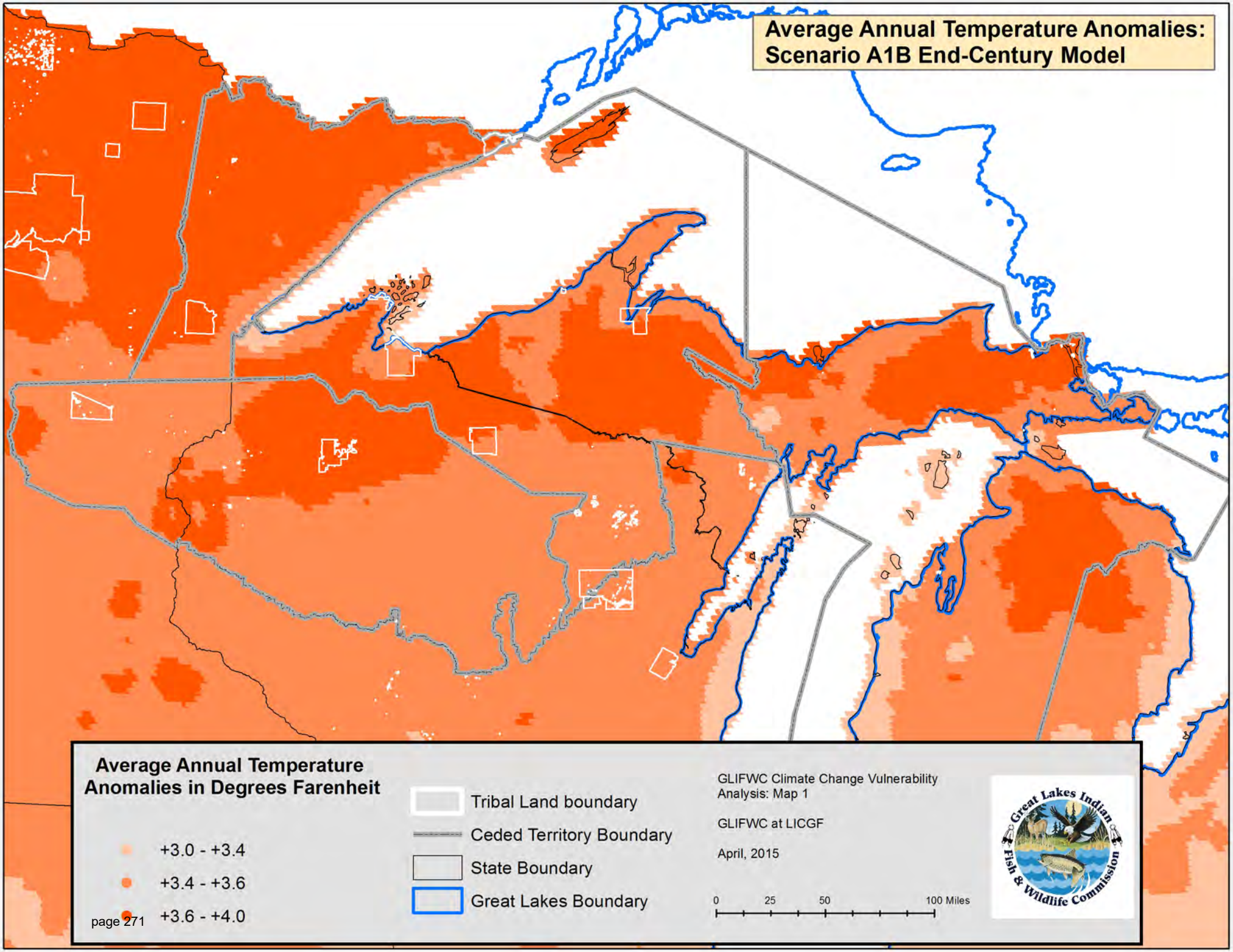
Average Annual Temperature Anomalies: Scenario A1B End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+3.0 - +3.4
+3.4 - +3.6
+3.6 - +4.0
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 1
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

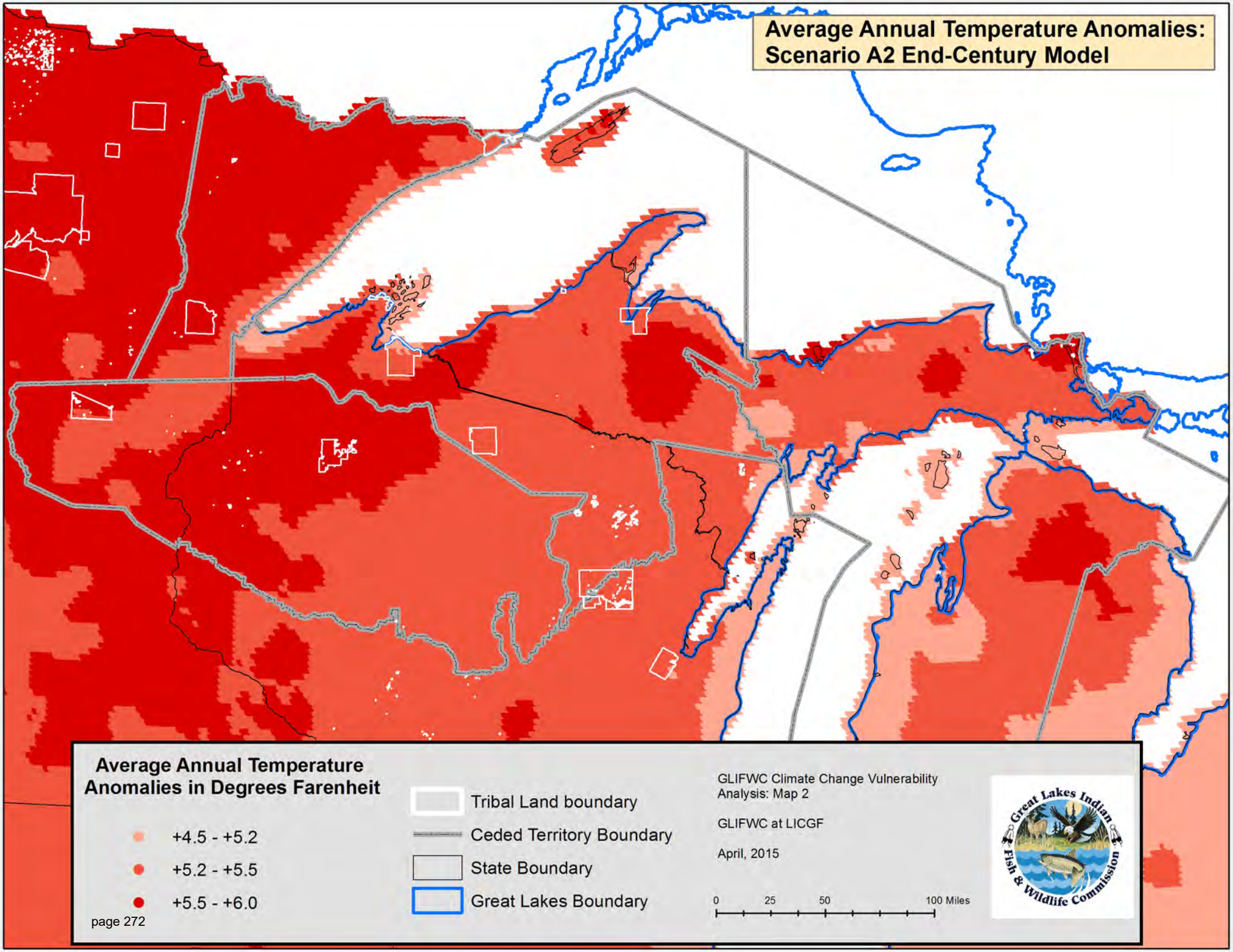
Average Annual Temperature Anomalies: Scenario A2 End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+4.5 - +5.2
+5.2 - +5.5
+5.5 - +6.0
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 2
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

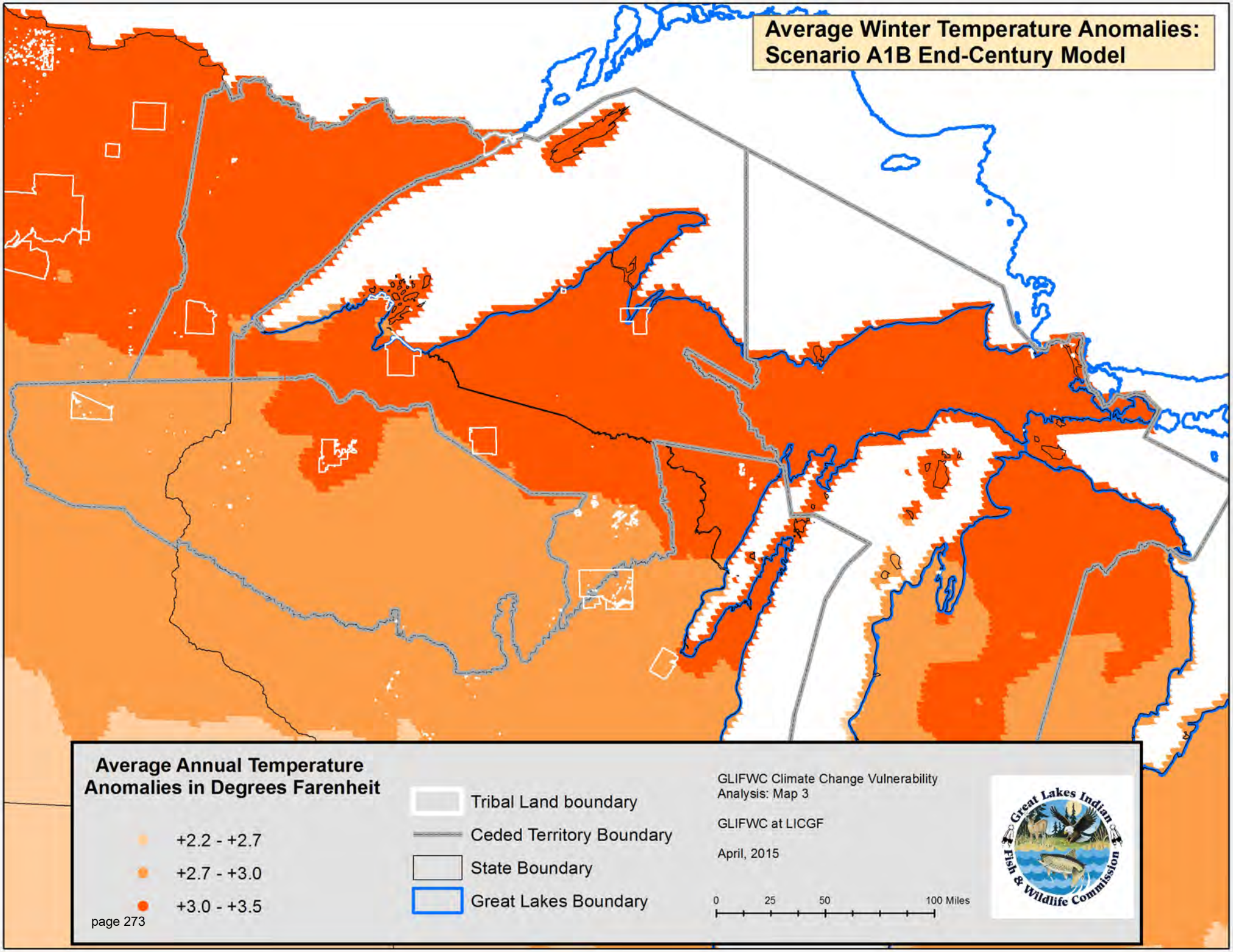
Average Winter Temperature Anomalies:
Scenario A1B End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+2.2 - +2.7
+2.7 - +3.0
+3.0 - +3.5
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 3
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

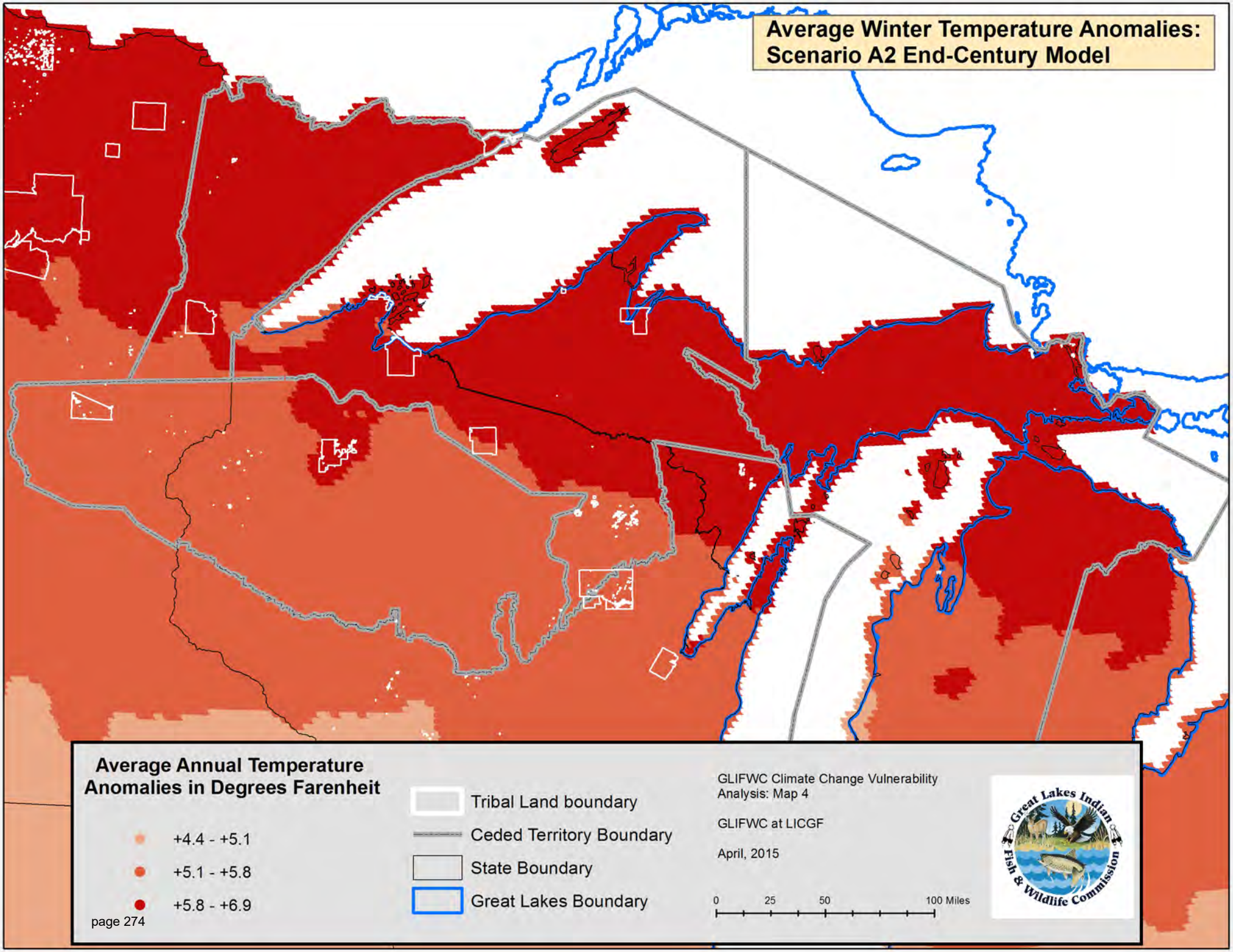
Average Winter Temperature Anomalies:
Scenario A2 End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+4.4 - +5.1
+5.1 - +5.8
+5.8 - +6.9
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 4
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

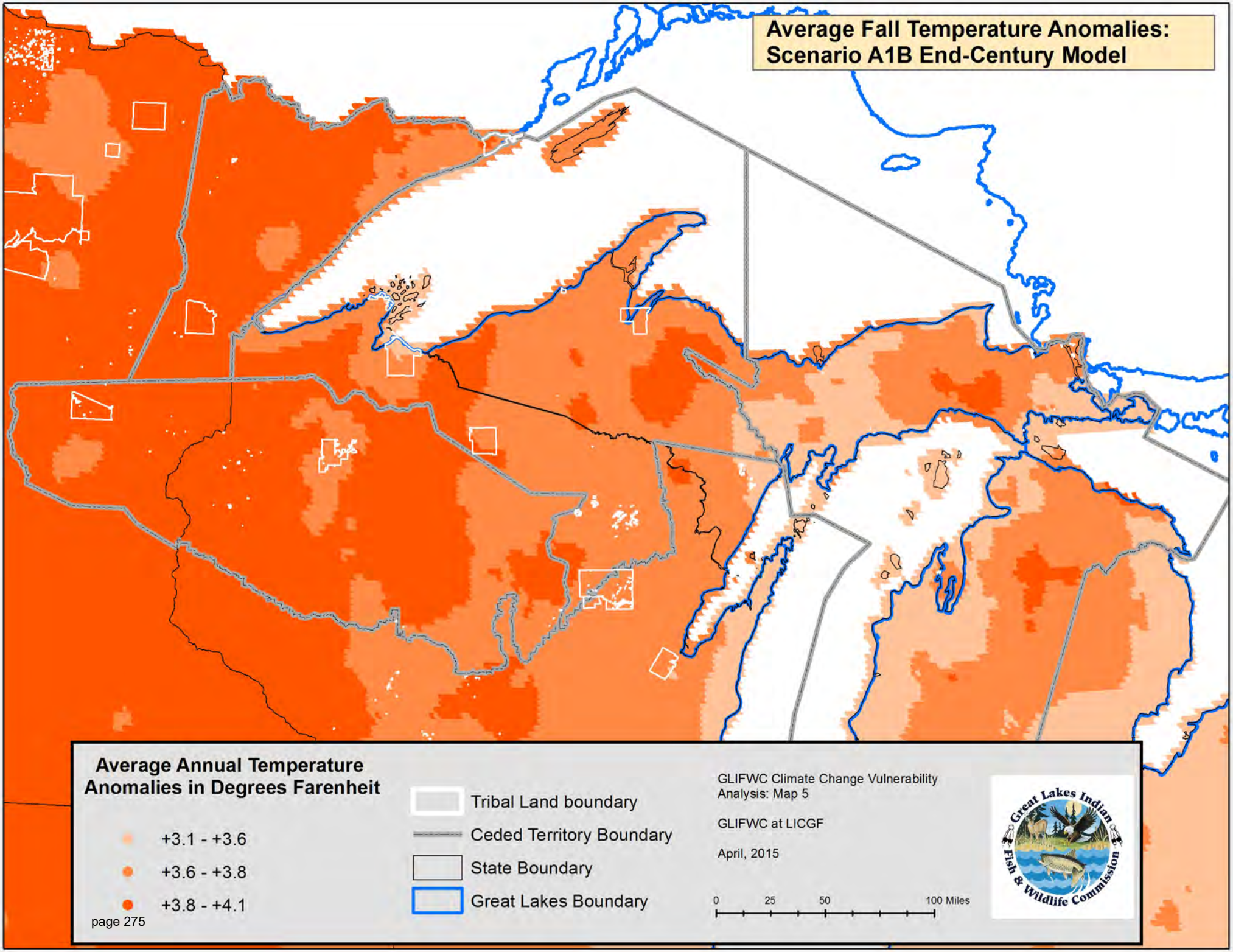
Average Fall Temperature Anomalies:
Scenario A1B End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+3.1 - +3.6
+3.6 - +3.8
+3.8 - +4.1
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 5
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

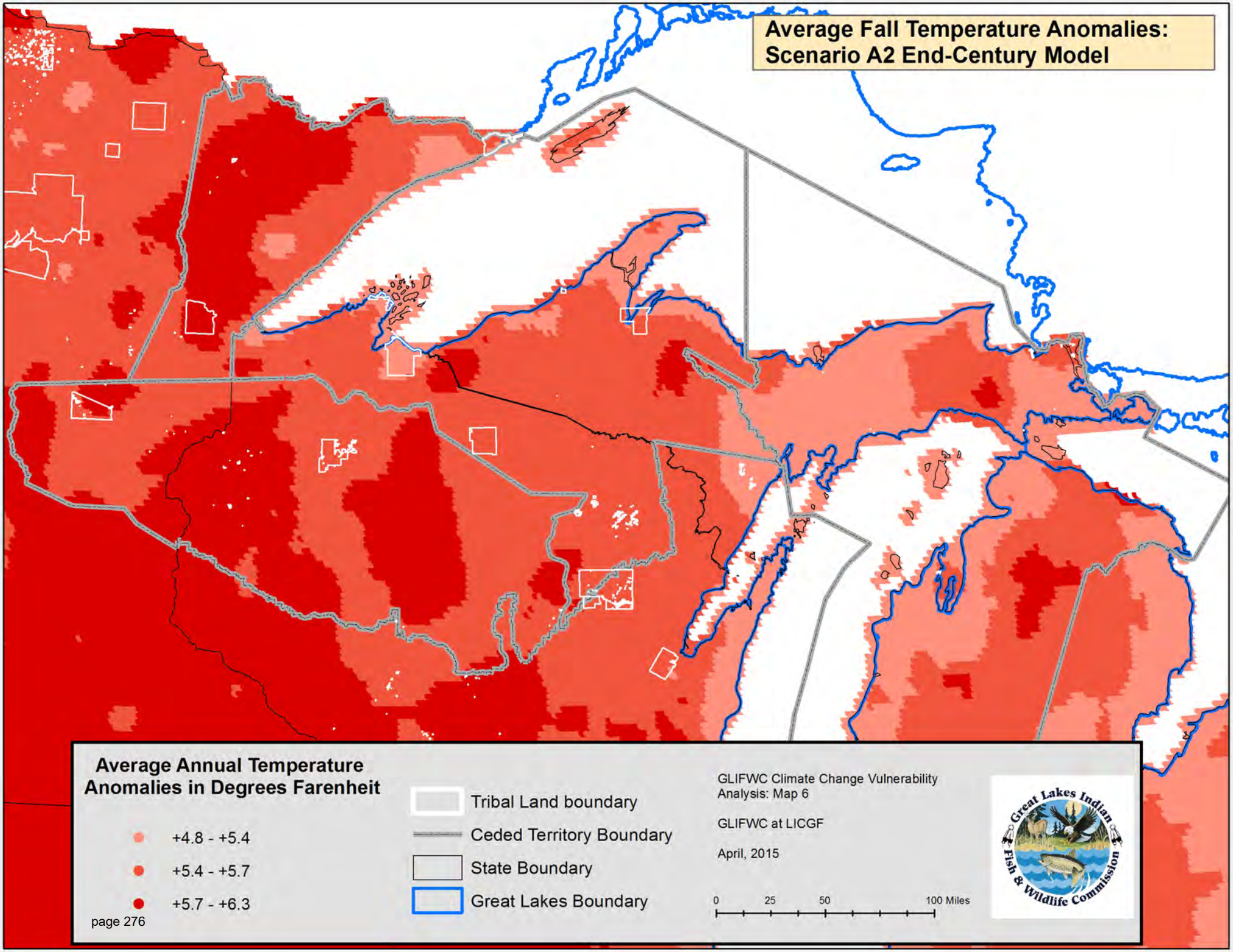
Average Fall Temperature Anomalies:
Scenario A2 End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+4.8 - +5.4
+5.4 - +5.7
+5.7 - +6.3
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 6
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

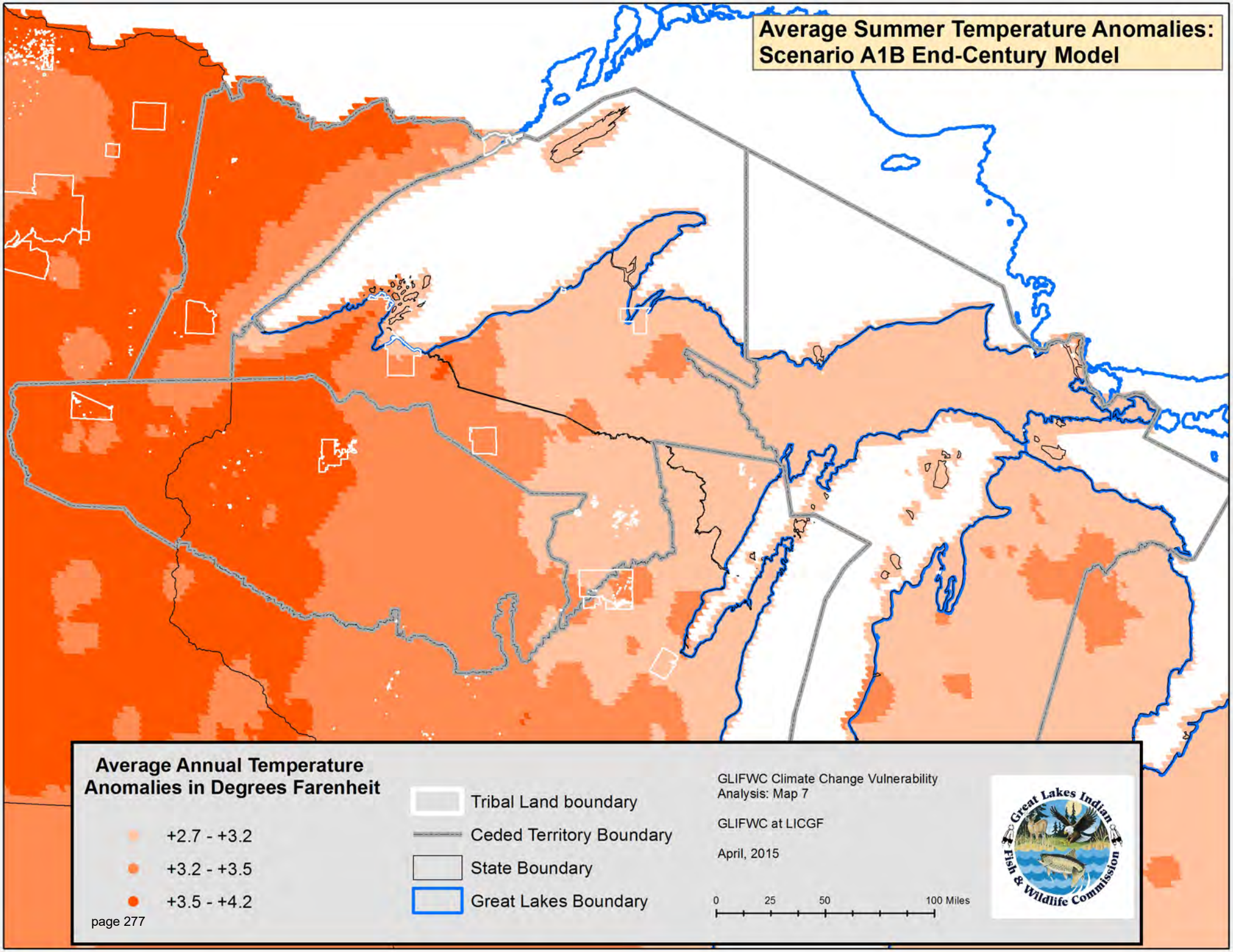
Average Summer Temperature Anomalies:
Scenario A1B End-Century Model
Average Annual Temperature
Anomalies in Degrees Farenheit
+2.7 - +3.2
+3.2 - +3.5
+3.5 - +4.2
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability
Analysis: Map 7
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian
Fish & Wildlife Commission

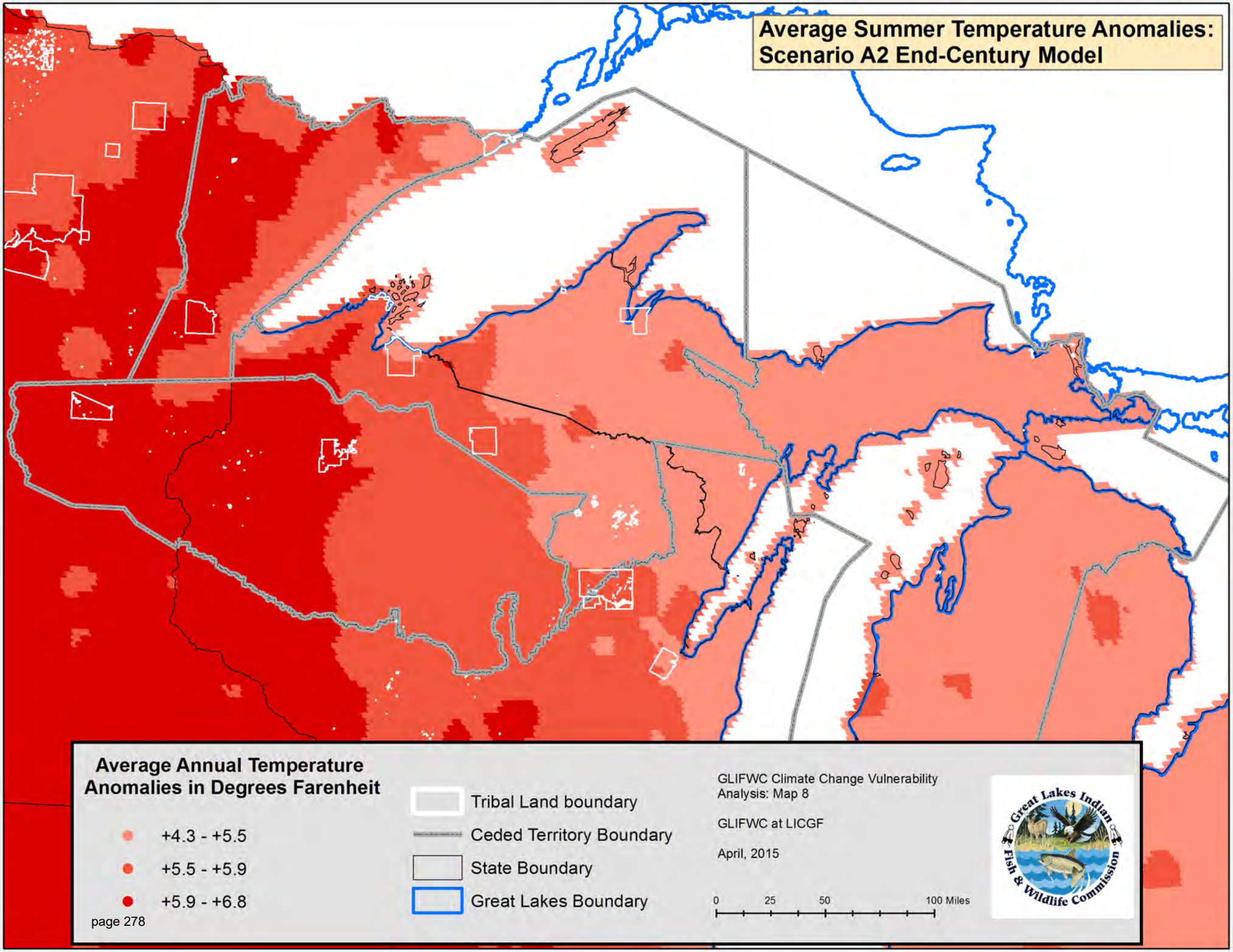
Average Summer Temperature Anomalies:
Scenario A2 End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+4.3 - +5.5
+5.5 - +5.9
+5.9 - +6.8
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 8
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

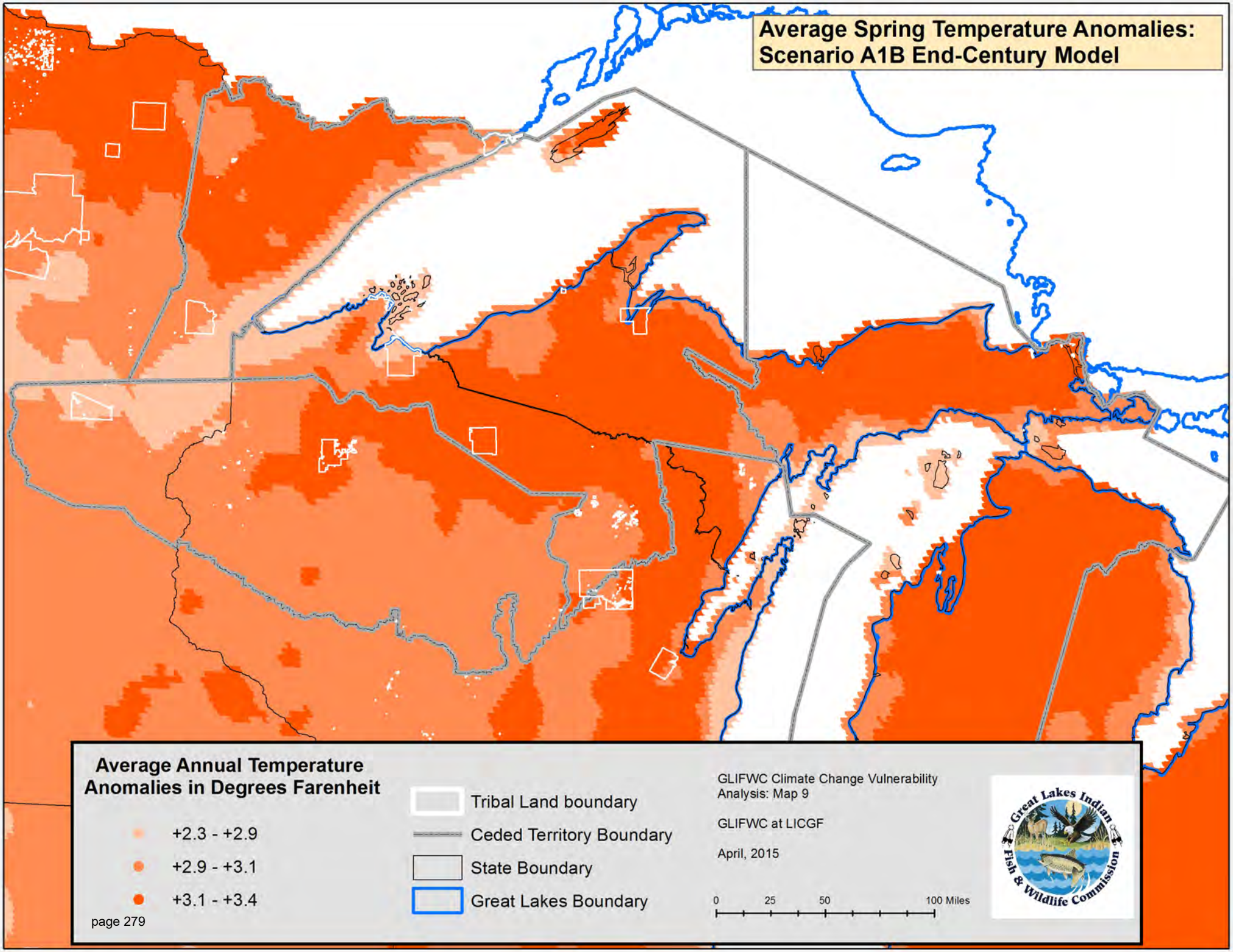
Average Spring Temperature Anomalies:
Scenario A1B End-Century Model
Average Annual Temperature
Anomalies in Degrees Farenheit
+2.3 - +2.9
+2.9 - +3.1
+3.1 - +3.4
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability
Analysis: Map 9
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian
Fish & Wildlife Commission

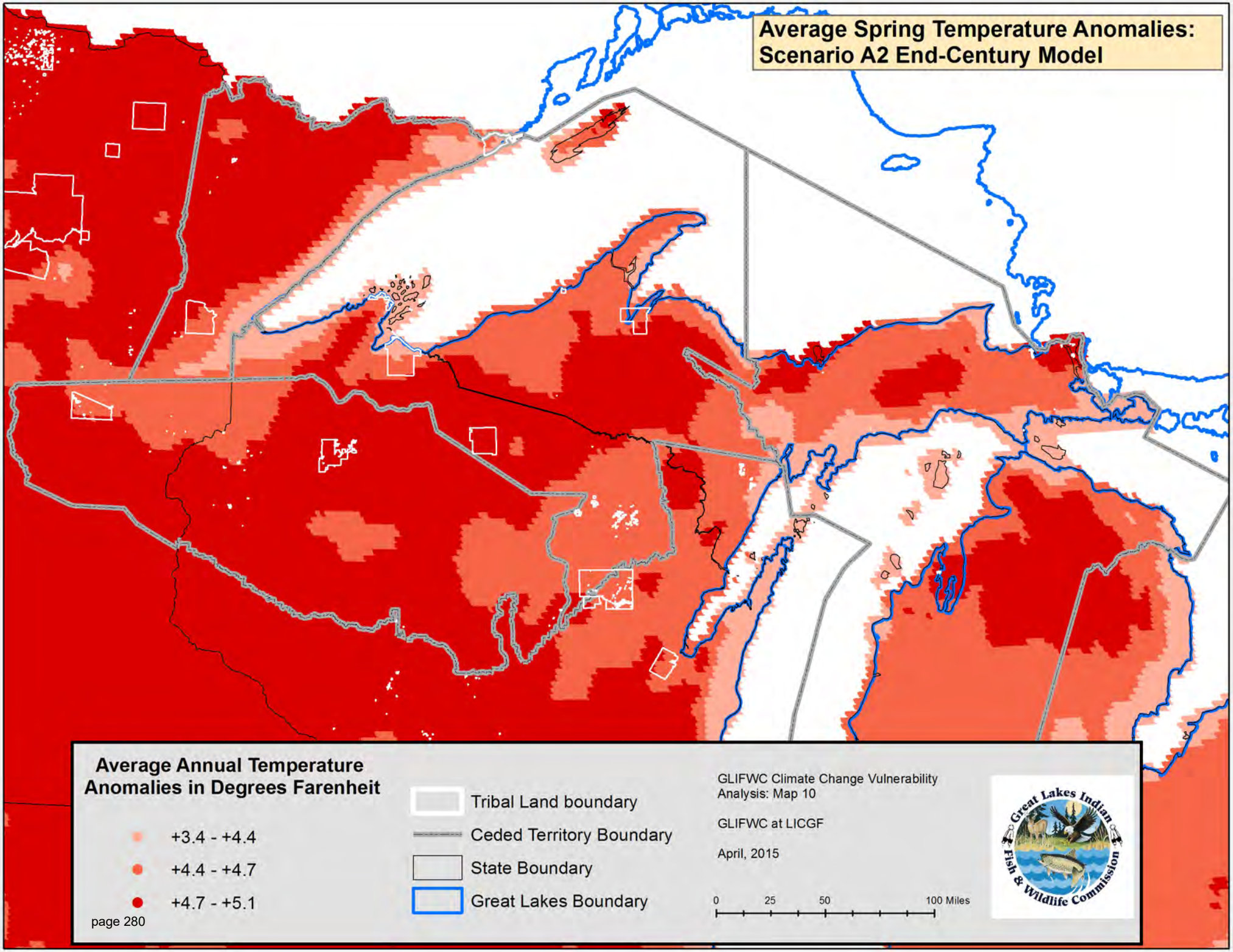
Average Spring Temperature Anomalies:
Scenario A2 End-Century Model
Average Annual Temperature
Anomalies in Degrees Farenheit
+3.4 - +4.4
+4.4 - +4.7
+4.7 - +5.1
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability
Analysis: Map 10
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian
Fish & Wildlife Commission

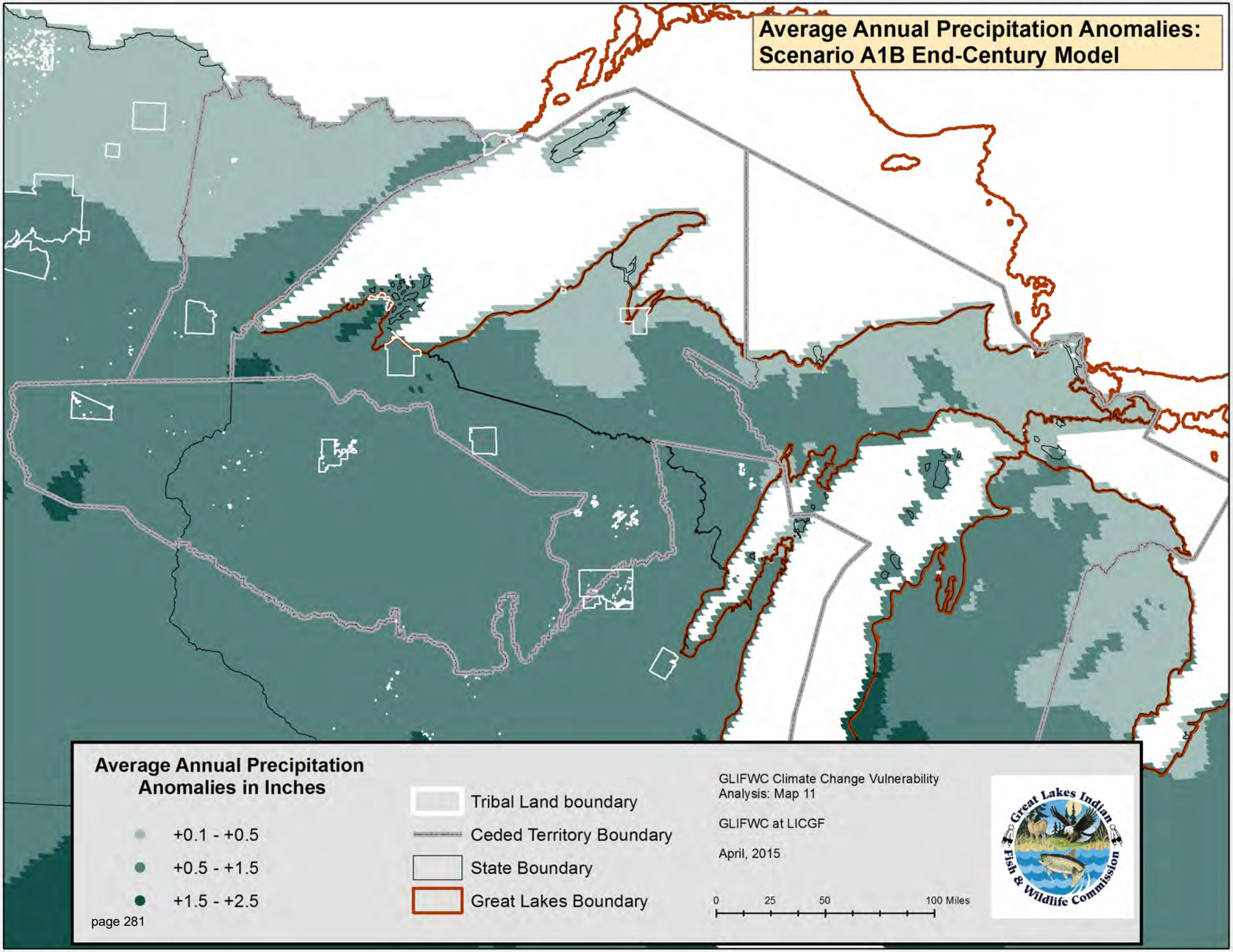
Average Annual Precipitation Anomalies: Scenario A1B End-Century Model
Average Annual Precipitation Anomalies in Inches
+0.1 - +0.5
+0.5 - +1.5
+1.5 - +2.5
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 11
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

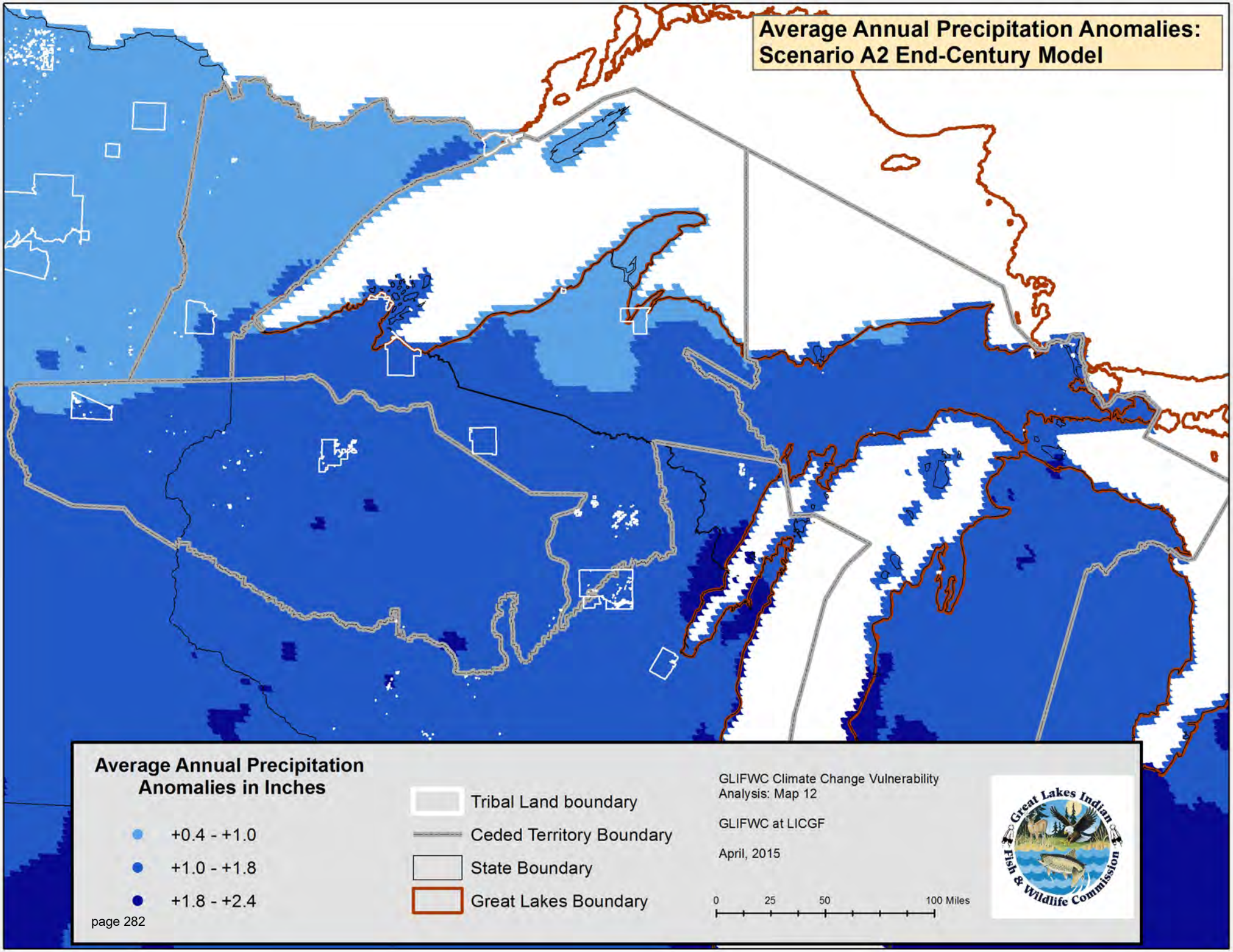
Average Annual Precipitation Anomalies: Scenario A2 End-Century Model
Average Annual Precipitation Anomalies in Inches
+0.4 - +1.0
+1.0 - +1.8
+1.8 - +2.4
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 12
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

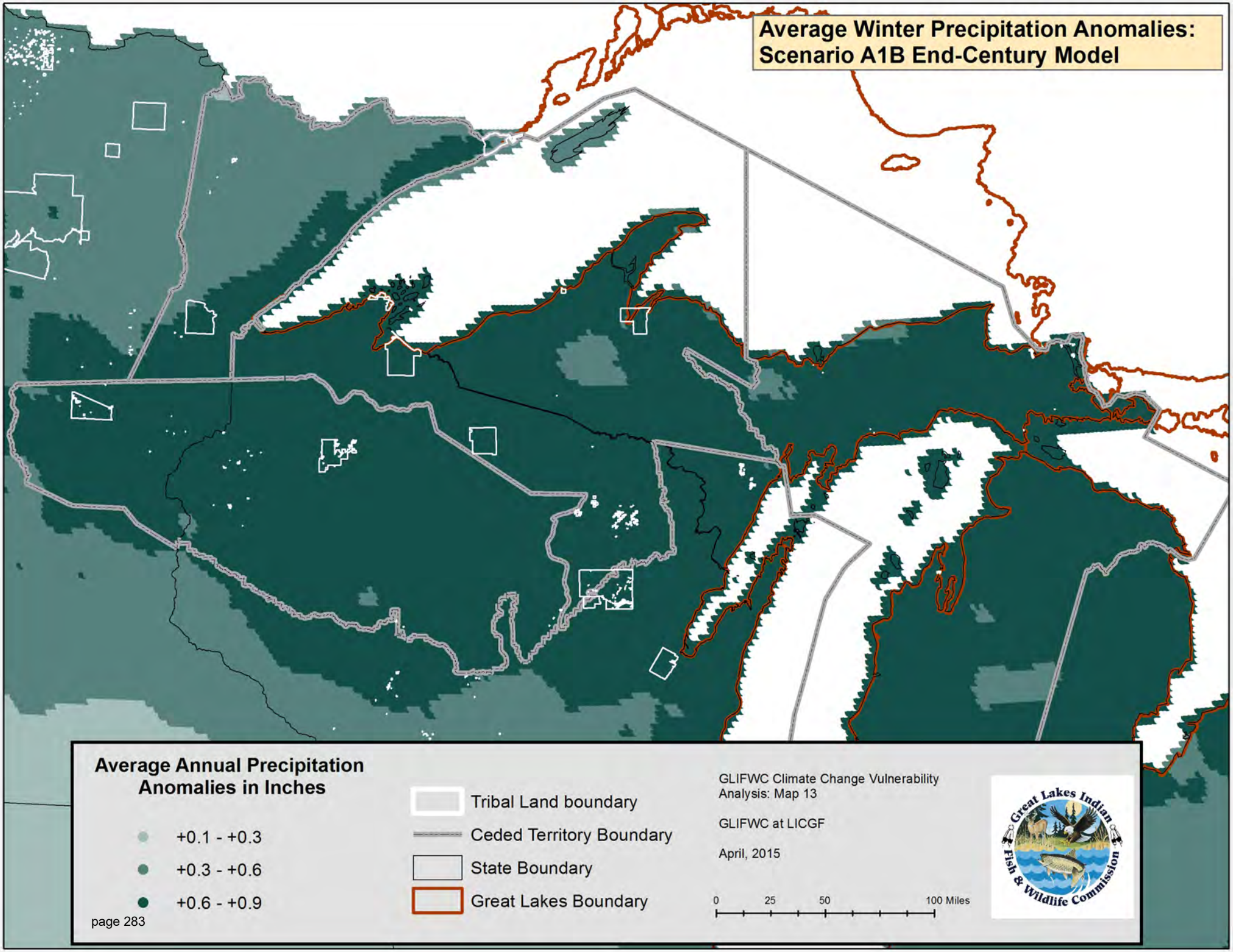
Average Winter Precipitation Anomalies:
Scenario A1B End-Century Model
Average Annual Precipitation Anomalies in Inches
+0.1 - +0.3
+0.3 - +0.6
+0.6 - +0.9
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 13
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

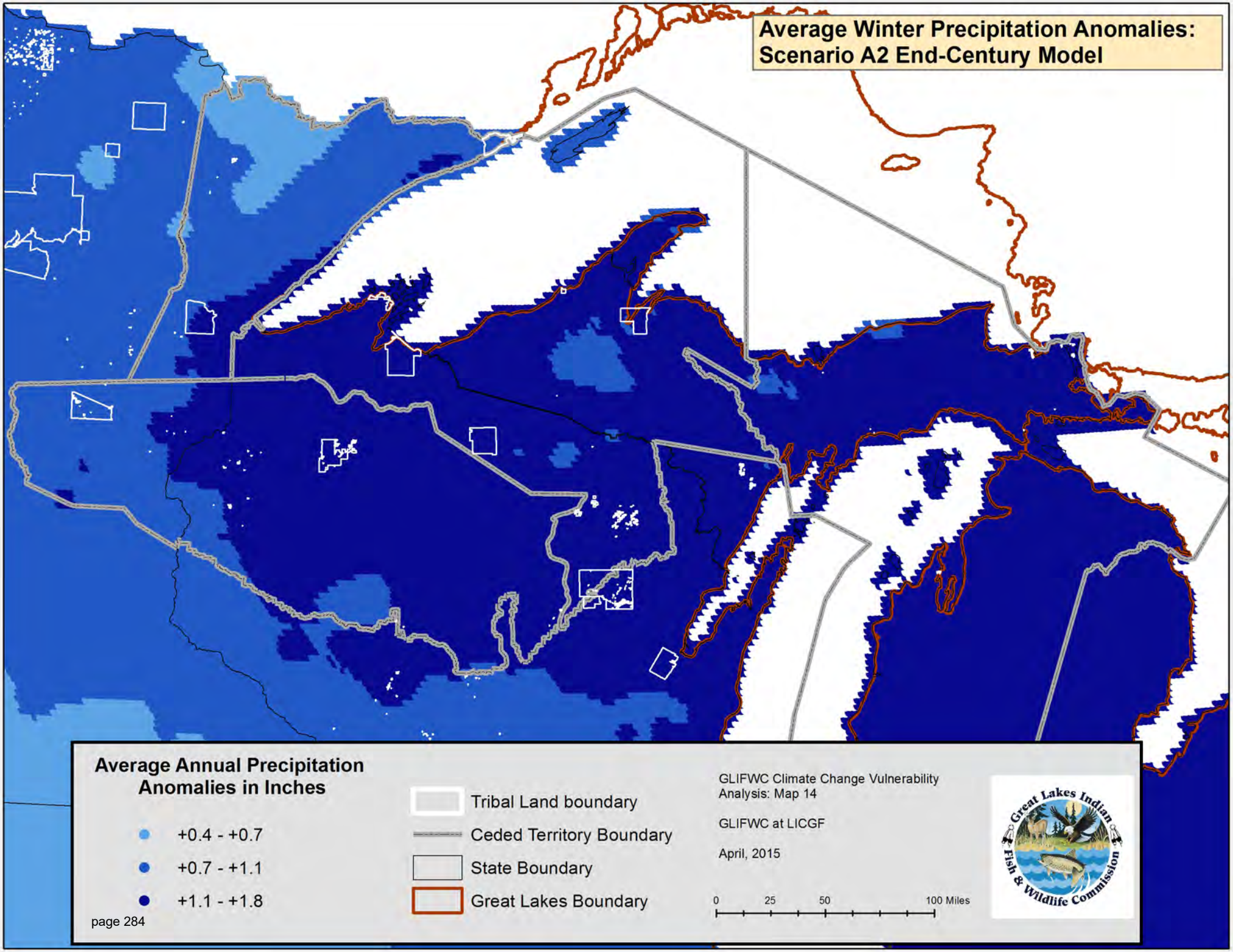
Average Winter Precipitation Anomalies:
Scenario A2 End-Century Model
Average Annual Precipitation Anomalies in Inches
+0.4 - +0.7
+0.7 - +1.1
+1.1 - +1.8
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 14
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

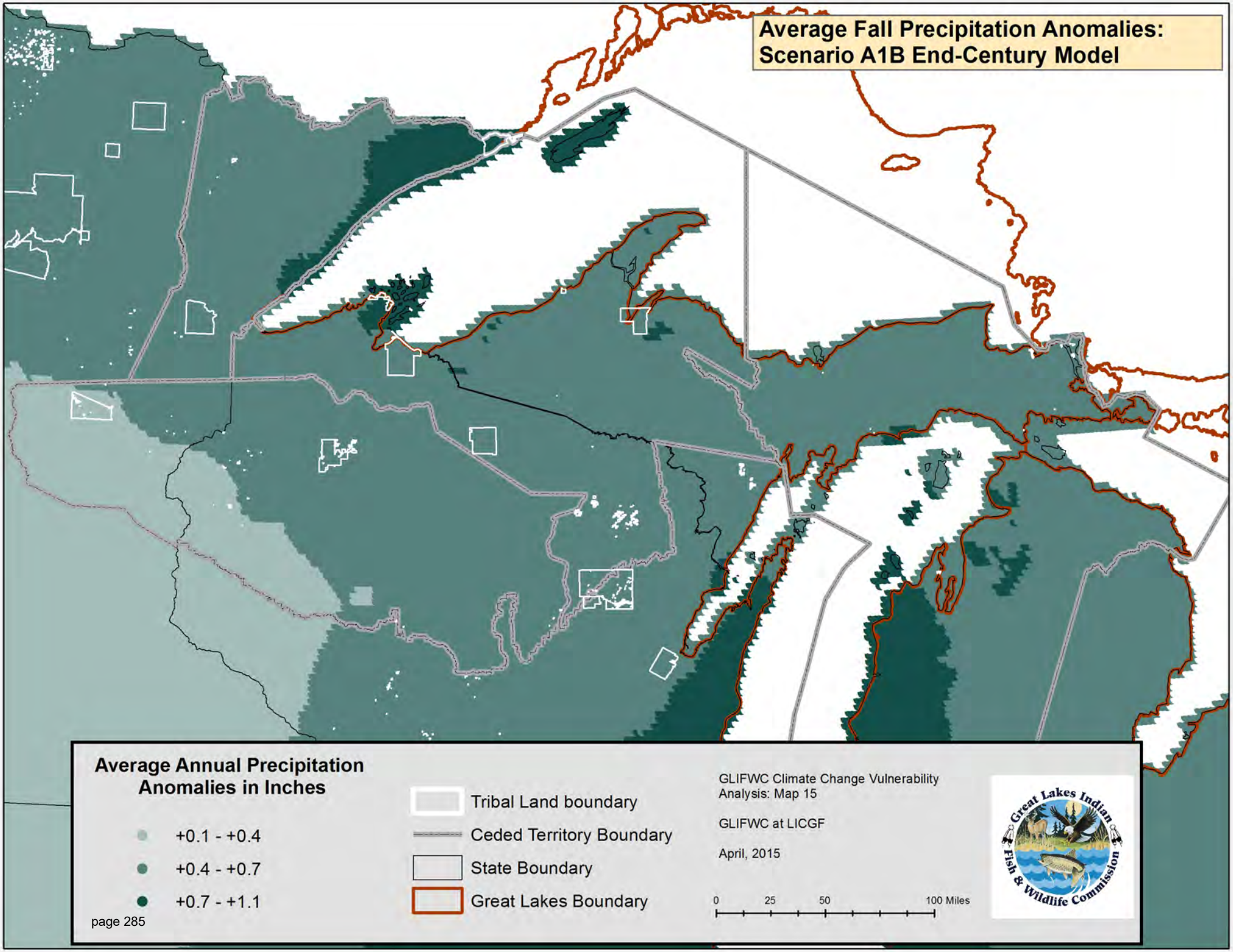
Average Fall Precipitation Anomalies:
Scenario A1B End-Century Model
Average Annual Precipitation Anomalies in Inches
+0.1 - +0.4
+0.4 - +0.7
+0.7 - +1.1
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 15
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

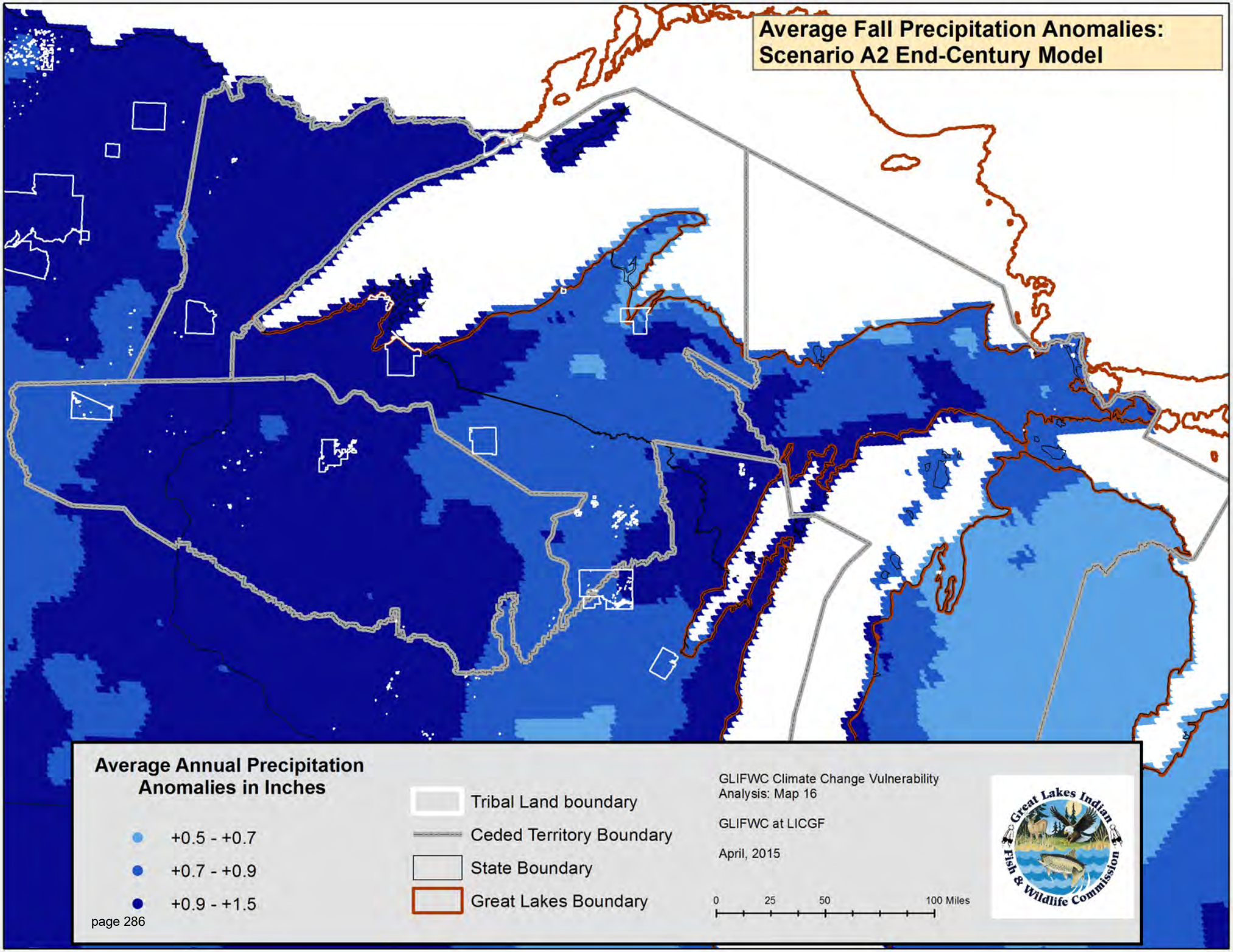
Average Fall Precipitation Anomalies:
Scenario A2 End-Century Model
Average Annual Precipitation Anomalies in Inches
+0.5 - +0.7
+0.7 - +0.9
+0.9 - +1.5
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 16
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

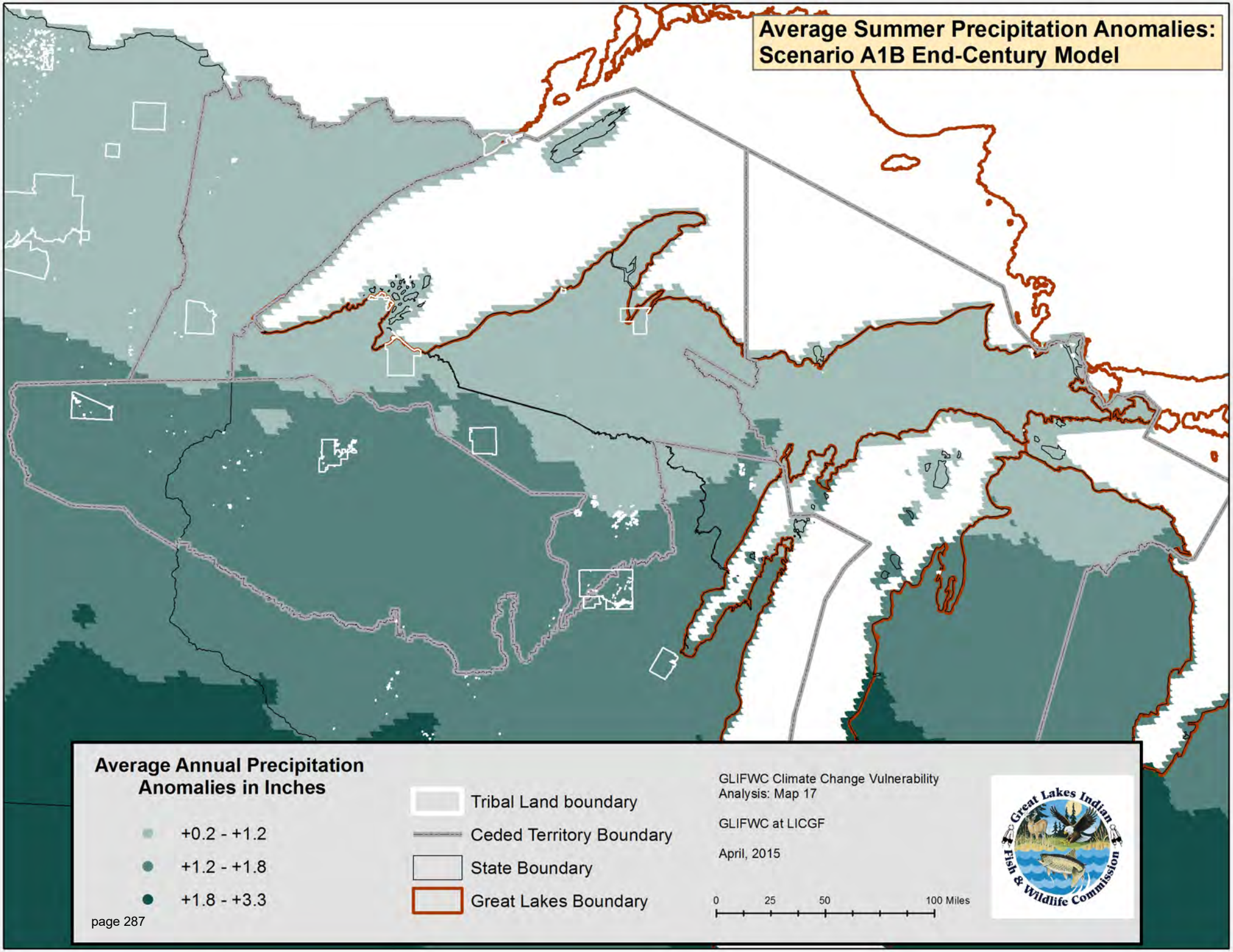
Average Summer Precipitation Anomalies:
Scenario A1B End-Century Model
Average Annual Precipitation Anomalies in Inches
+0.2 - +1.2
+1.2 - +1.8
+1.8 - +3.3
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 17
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

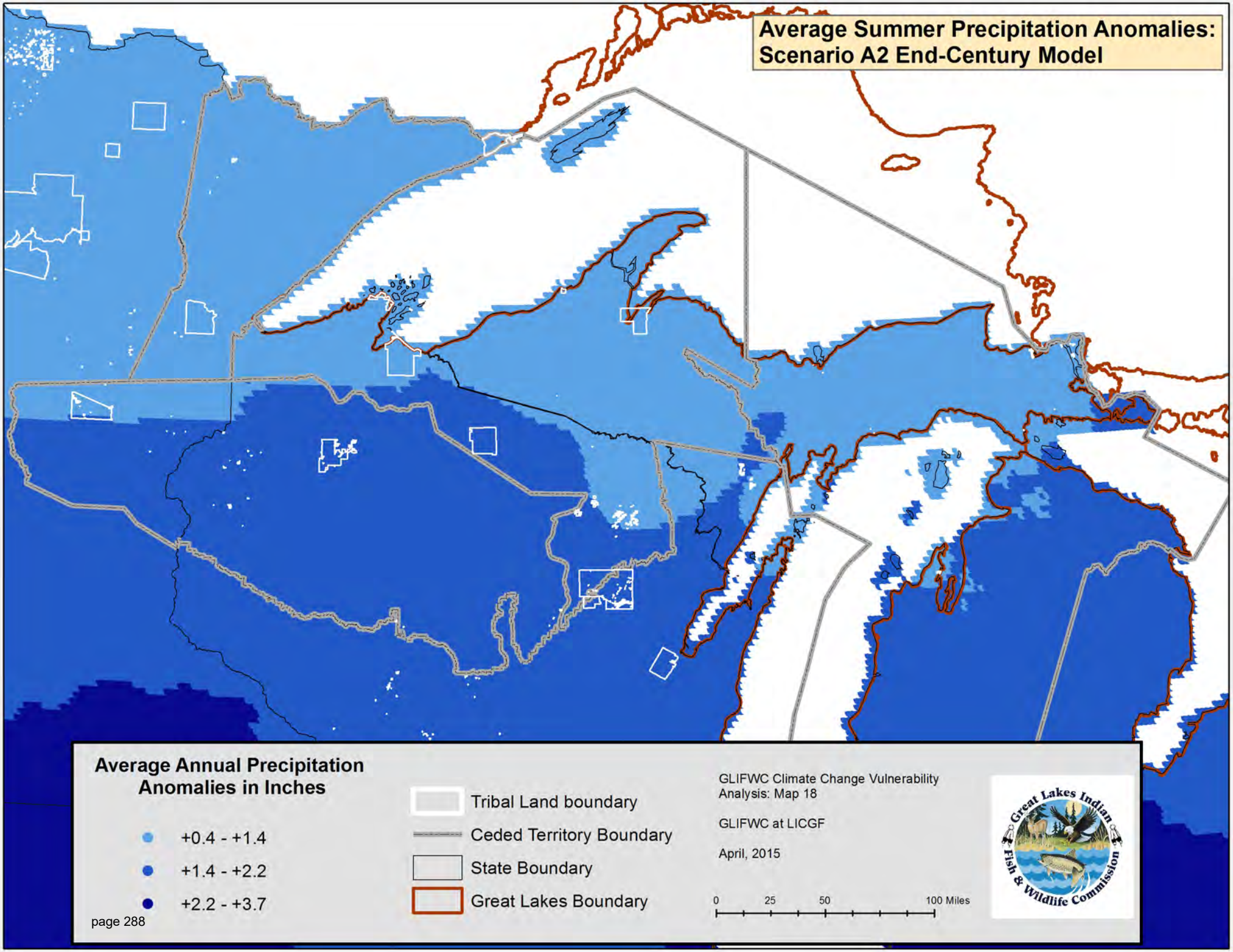
Average Summer Precipitation Anomalies:
Scenario A2 End-Century Model
Average Annual Precipitation Anomalies in Inches
+0.4 - +1.4
+1.4 - +2.2
+2.2 - +3.7
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 18
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

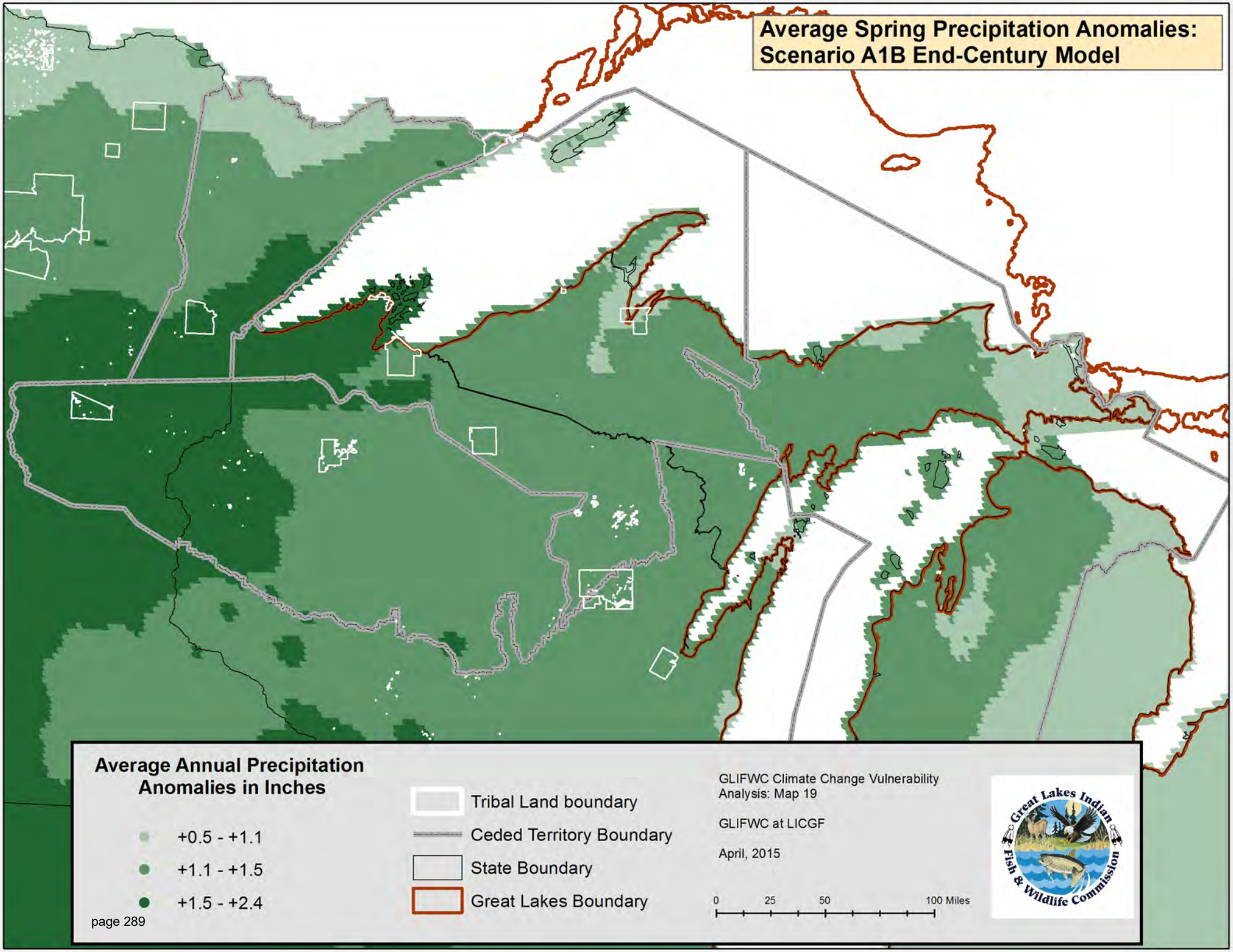
Average Spring Precipitation Anomalies:
Scenario A1B End-Century Model
Average Annual Precipitation Anomalies in Inches
+0.5 - +1.1
+1.1 - +1.5
+1.5 - +2.4
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 19
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

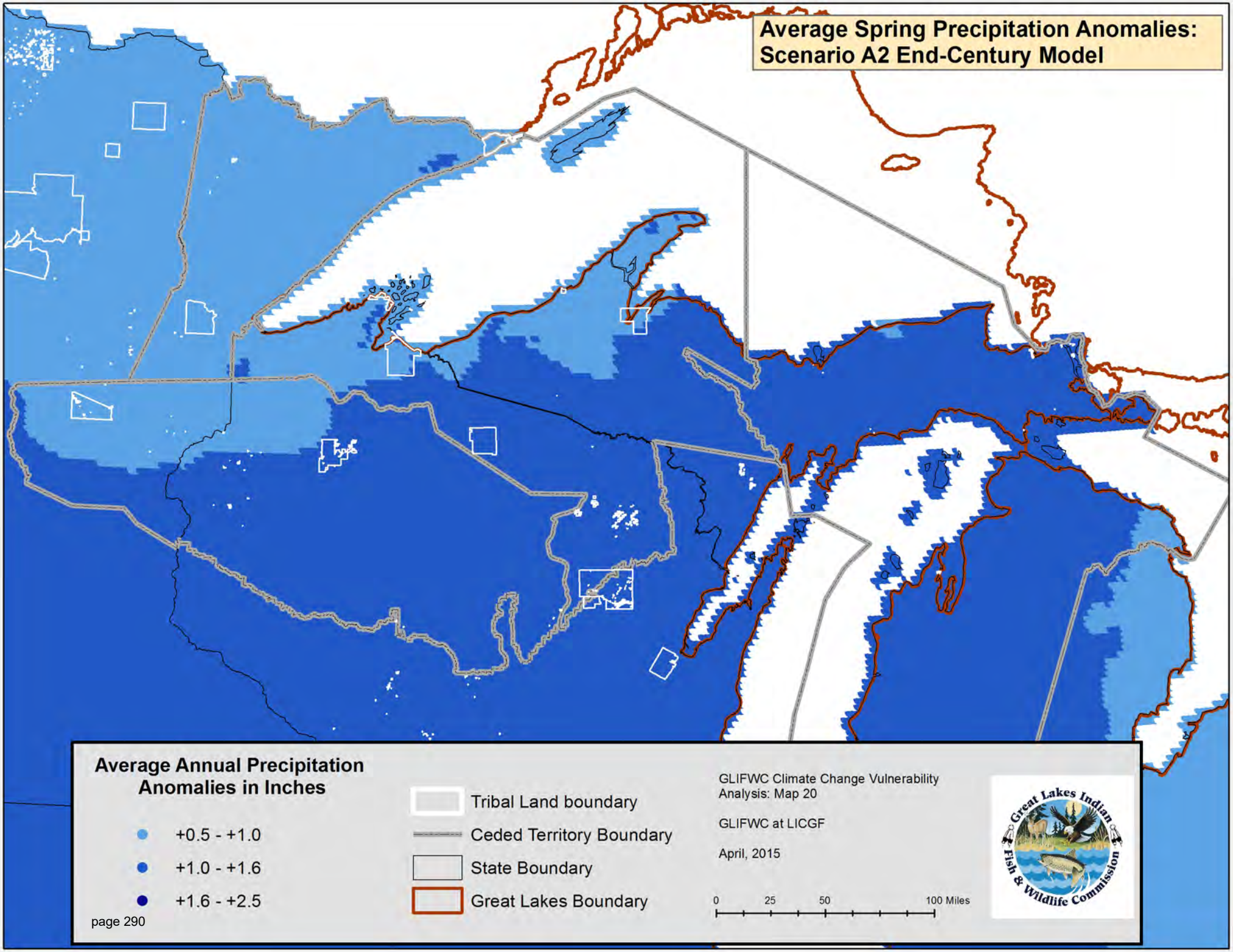
Average Spring Precipitation Anomalies:
Scenario A2 End-Century Model
Average Annual Precipitation Anomalies in Inches
+0.5 - +1.0
+1.0 - +1.6
+1.6 - +2.5
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 20
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

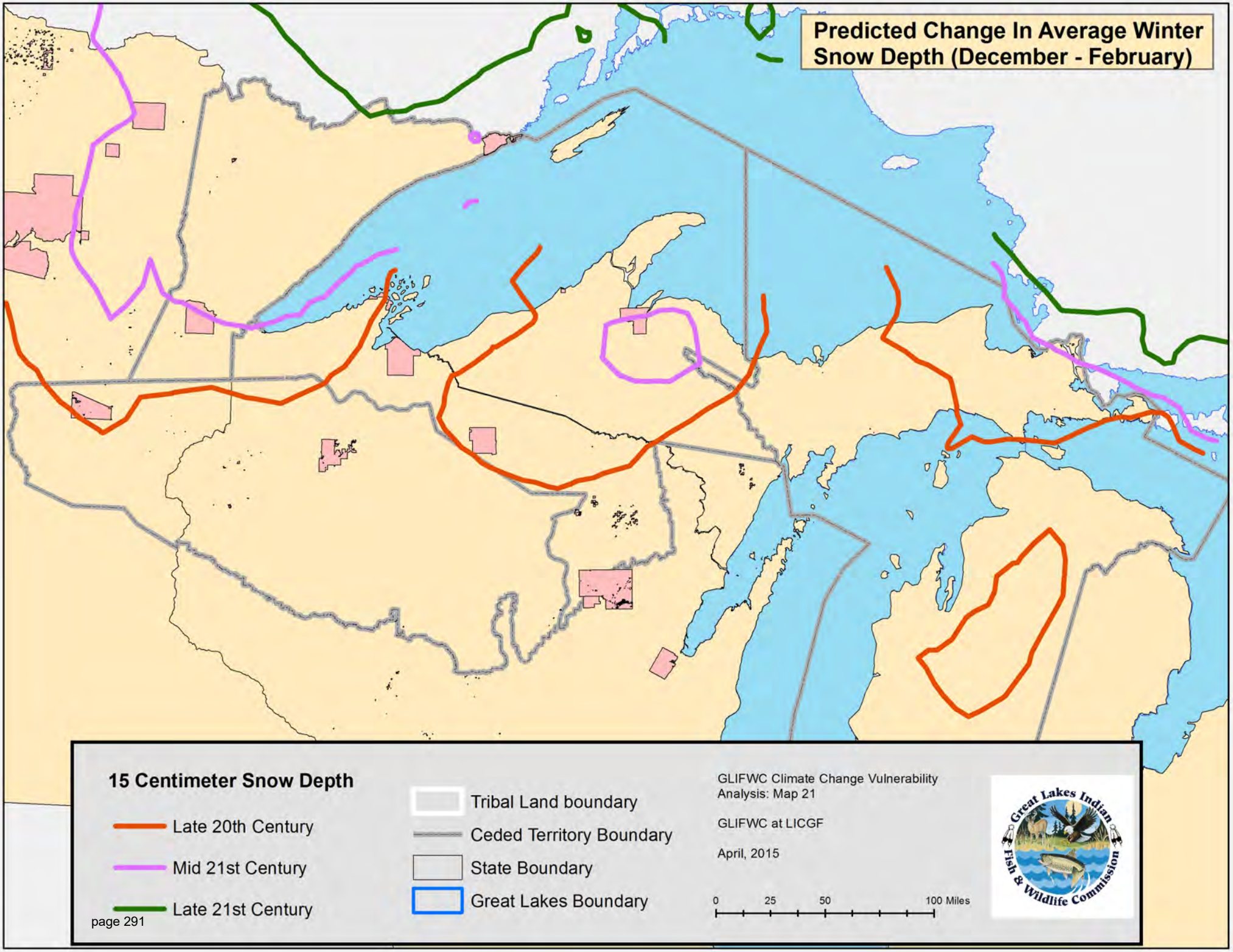
Predicted Change In Average Winter Snow Depth (December - February)
15 Centimeter Snow Depth
Late 20th Century
Mid 21st Century
Late 21st Century
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 21
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

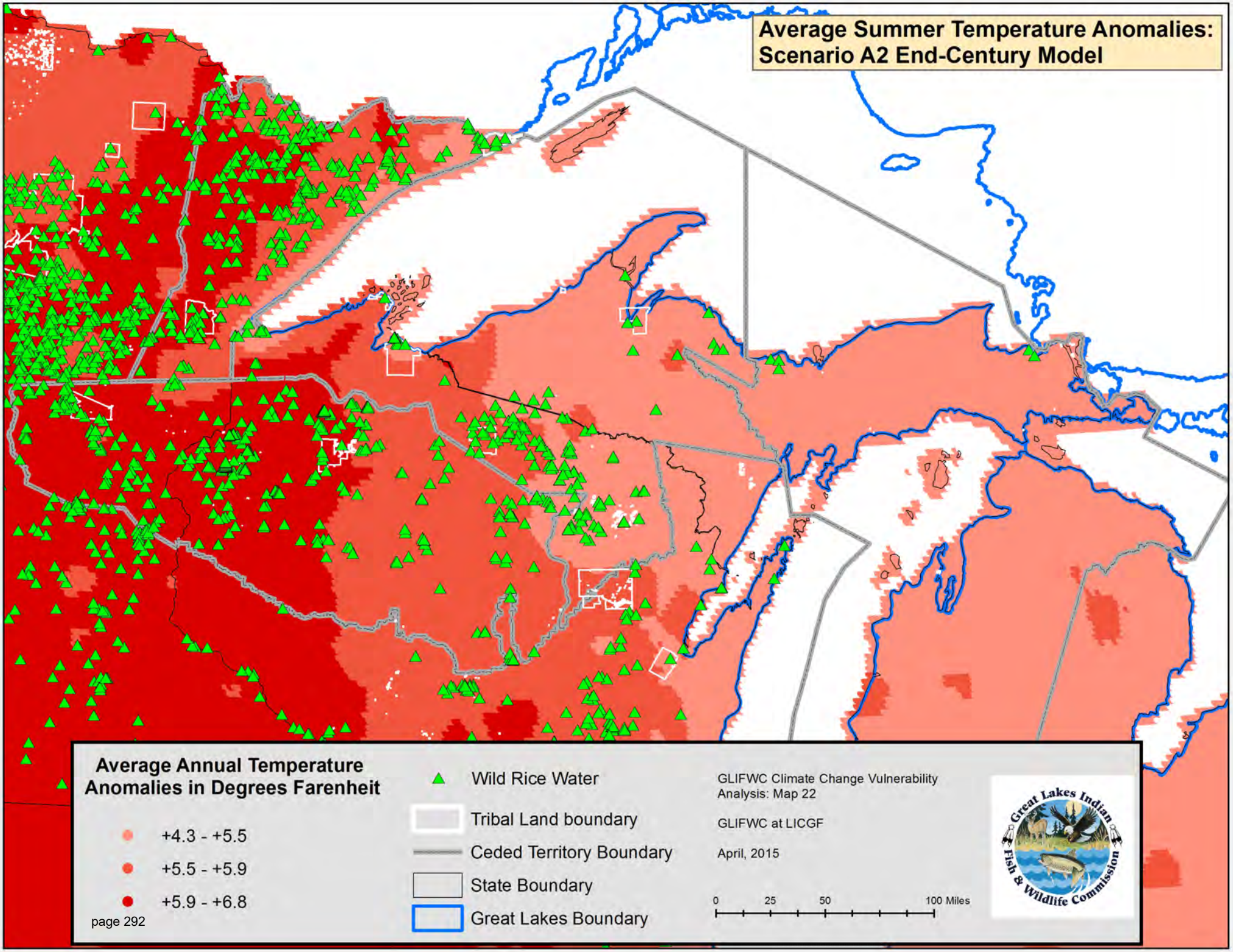
Average Summer Temperature Anomalies:
Scenario A2 End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+4.3 - +5.5
+5.5 - +5.9
+5.9 - +6.8
Wild Rice Water
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 22
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

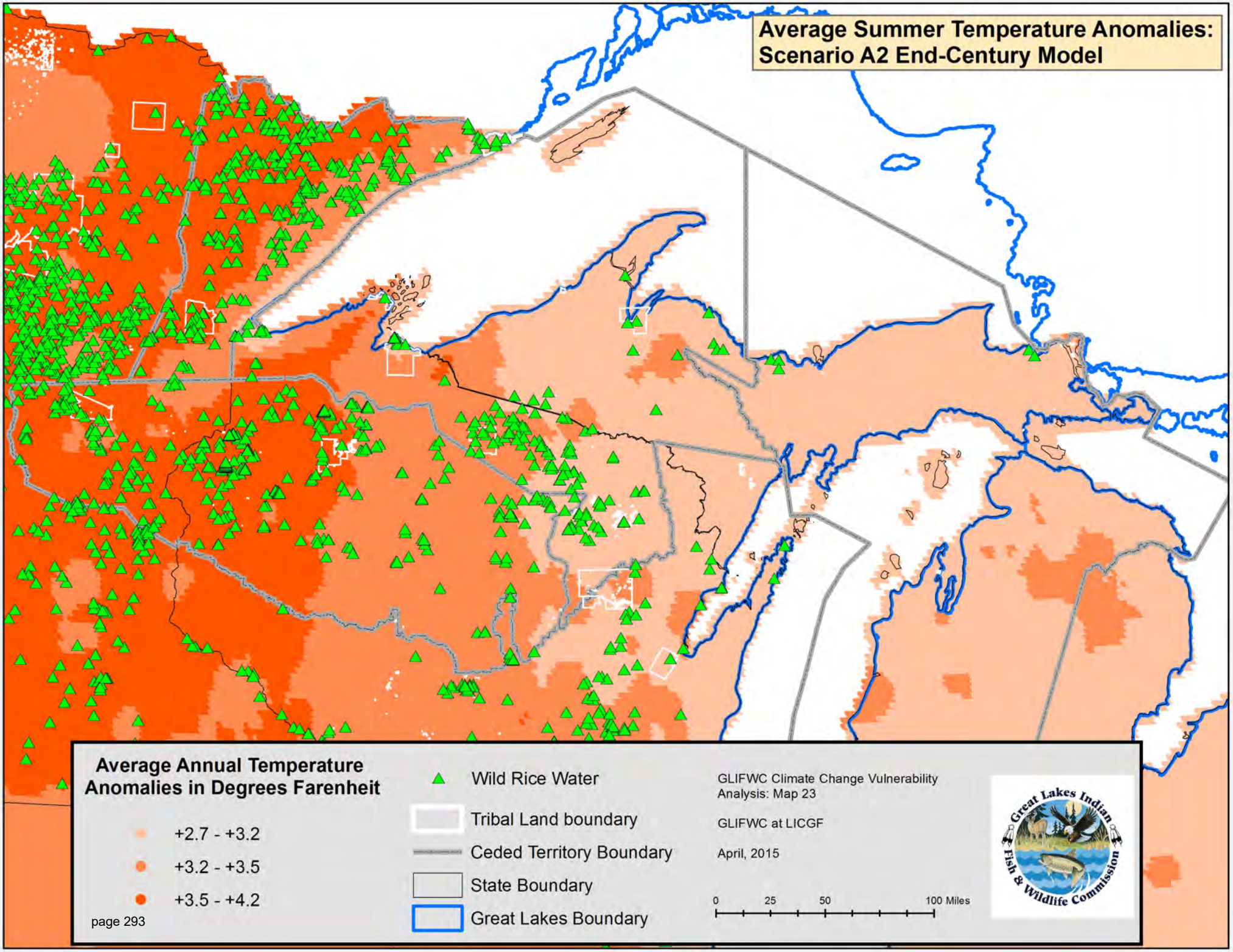
Average Summer Temperature Anomalies:
Scenario A2 End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+2.7 - +3.2
+3.2 - +3.5
+3.5 - +4.2
Wild Rice Water
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 23
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

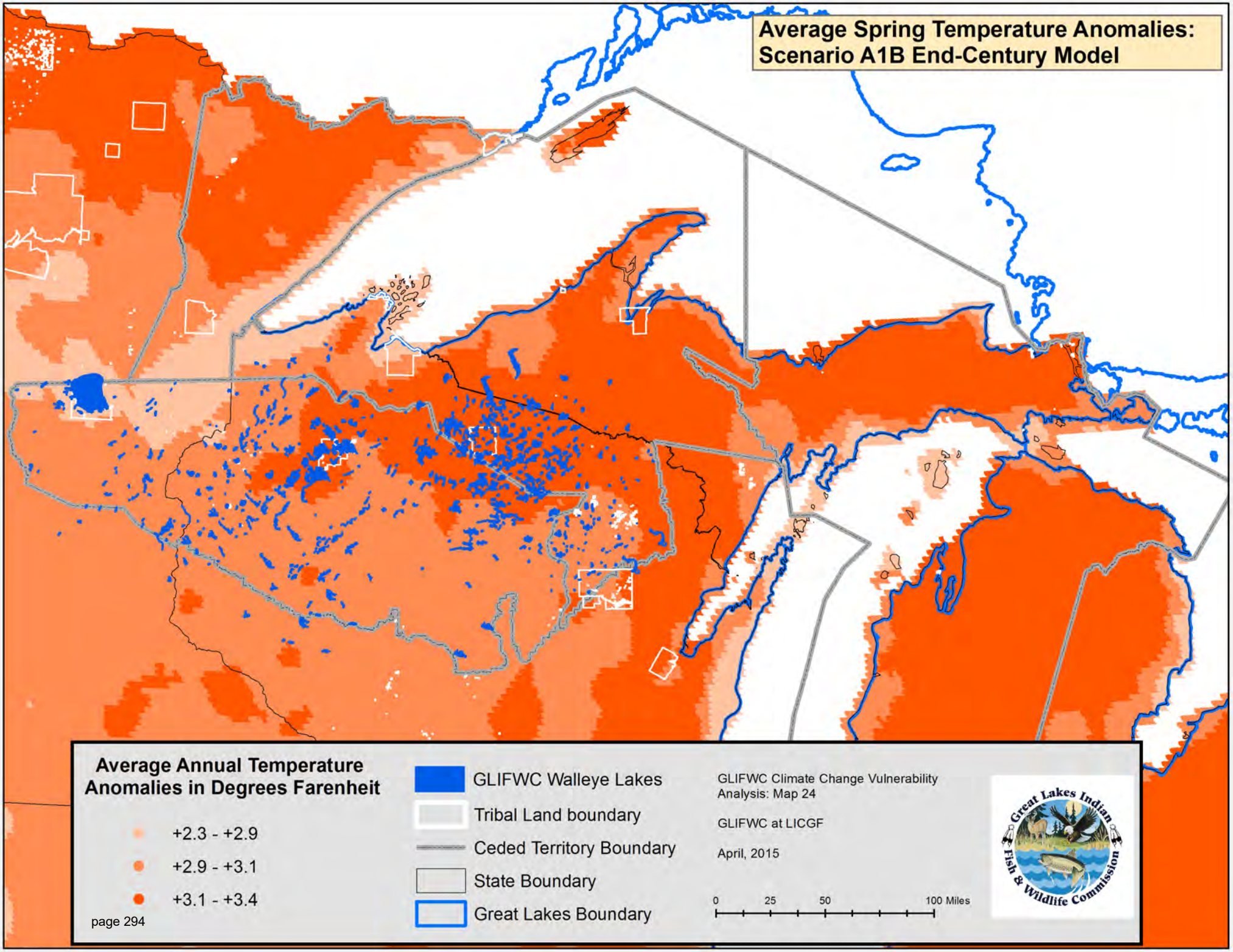
Average Spring Temperature Anomalies:
Scenario A1B End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+2.3 - +2.9
+2.9 - +3.1
+3.1 - +3.4
GLIFWC Walleye Lakes
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 24
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

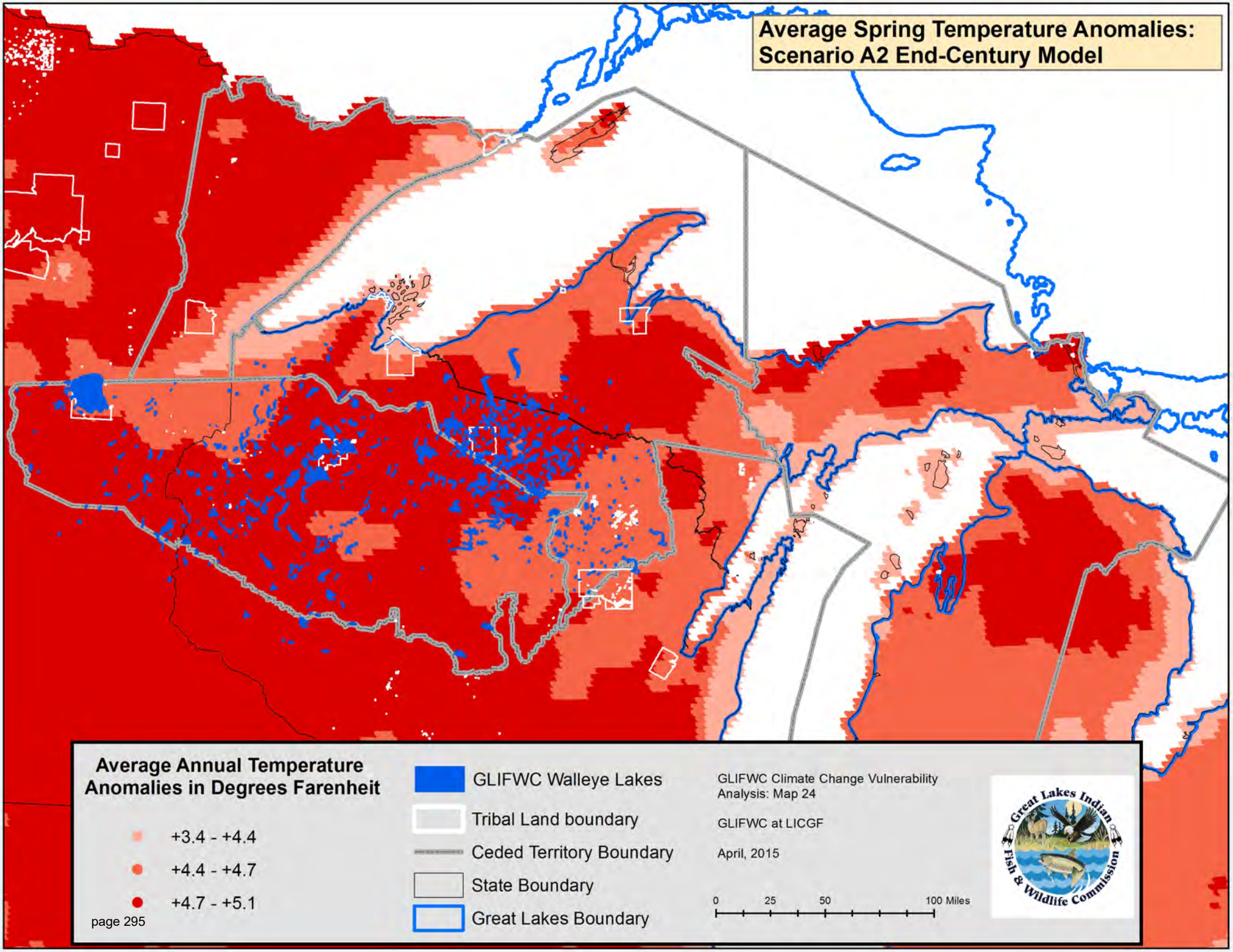
Average Spring Temperature Anomalies:
Scenario A2 End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+3.4 - +4.4
+4.4 - +4.7
+4.7 - +5.1
GLIFWC Walleye Lakes
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 24
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

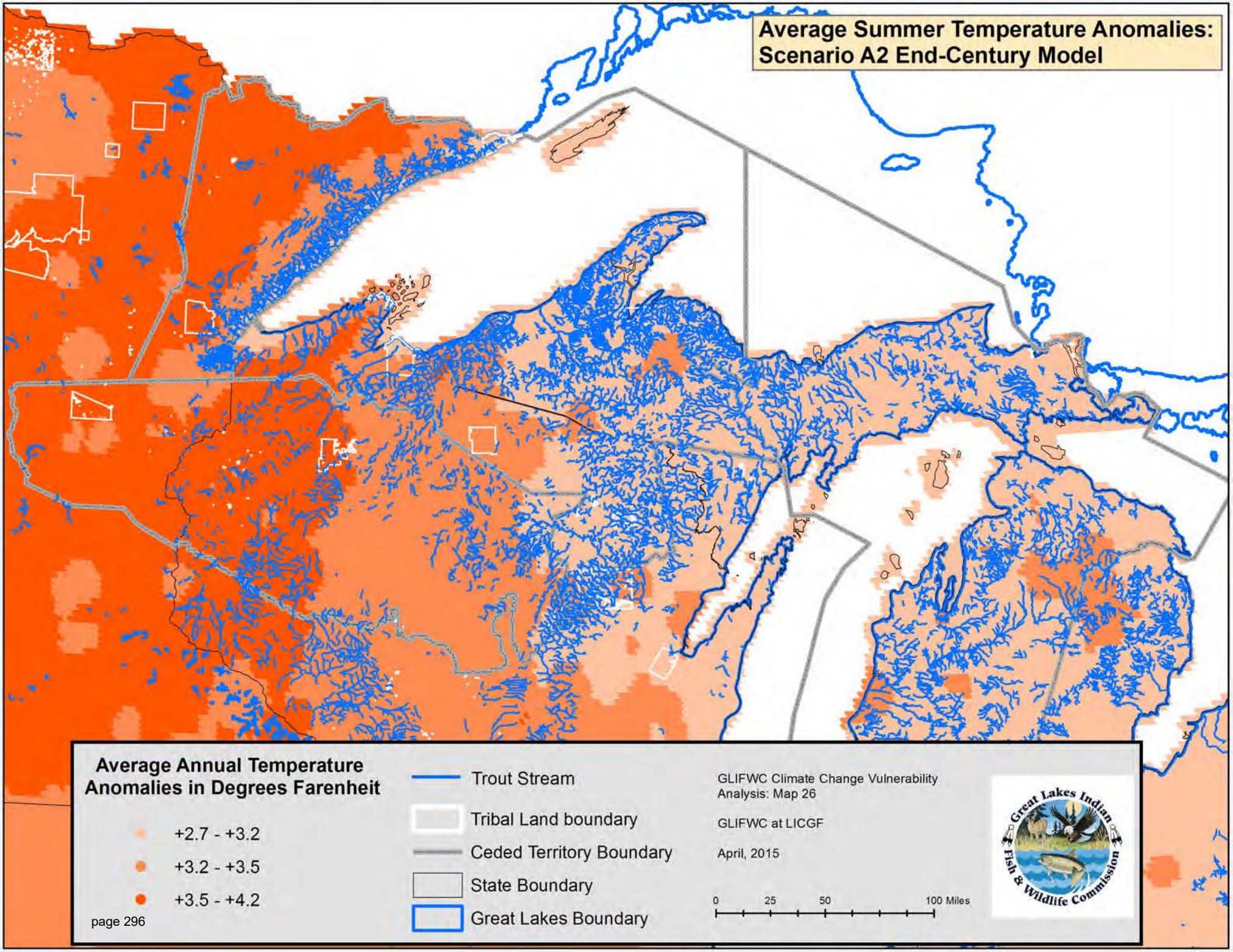
Average Summer Temperature Anomalies:
Scenario A2 End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+2.7 - +3.2
+3.2 - +3.5
+3.5 - +4.2
Trout Stream
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 26
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

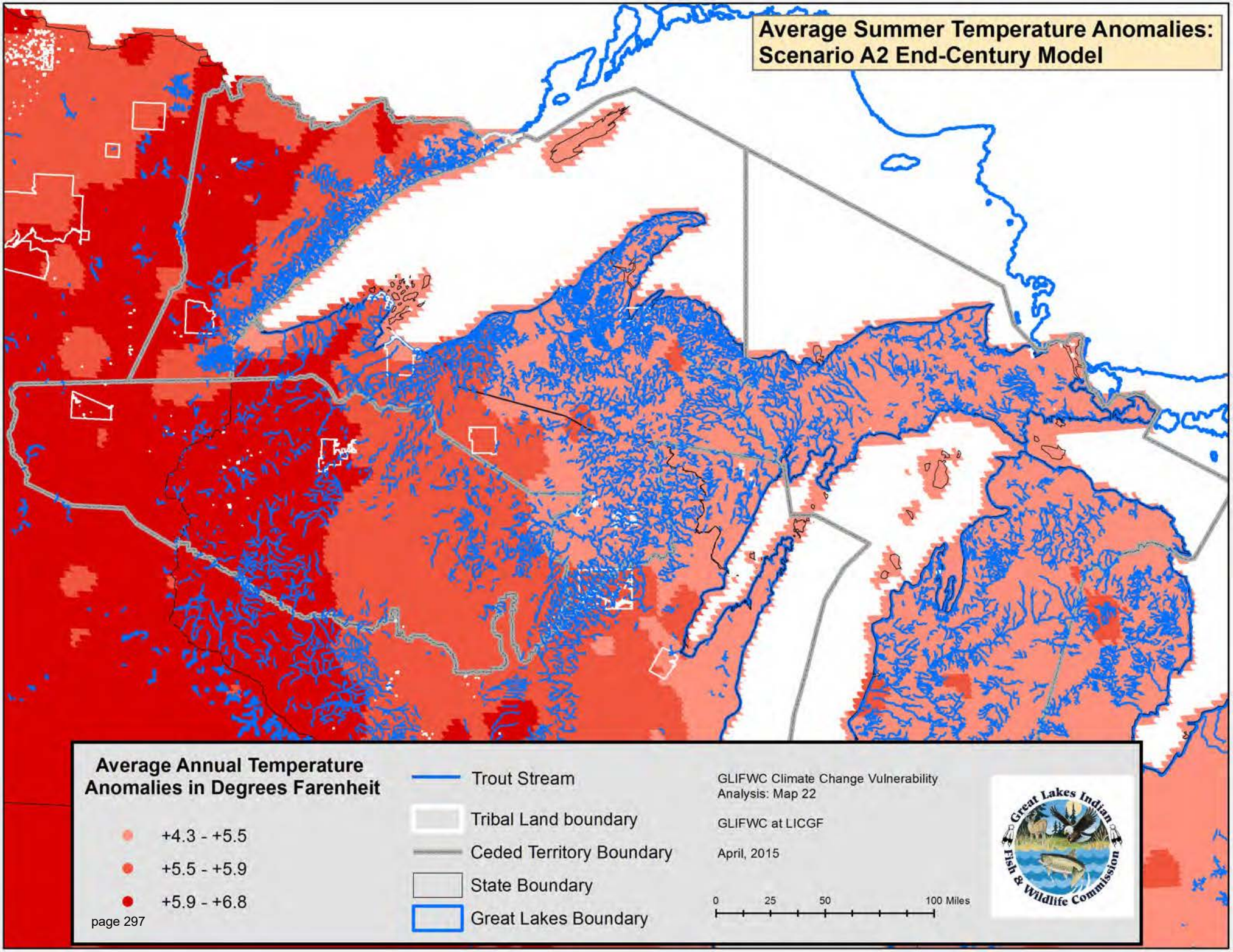
Average Summer Temperature Anomalies:
Scenario A2 End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+4.3 - +5.5
+5.5 - +5.9
+5.9 - +6.8
Trout Stream
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 22
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

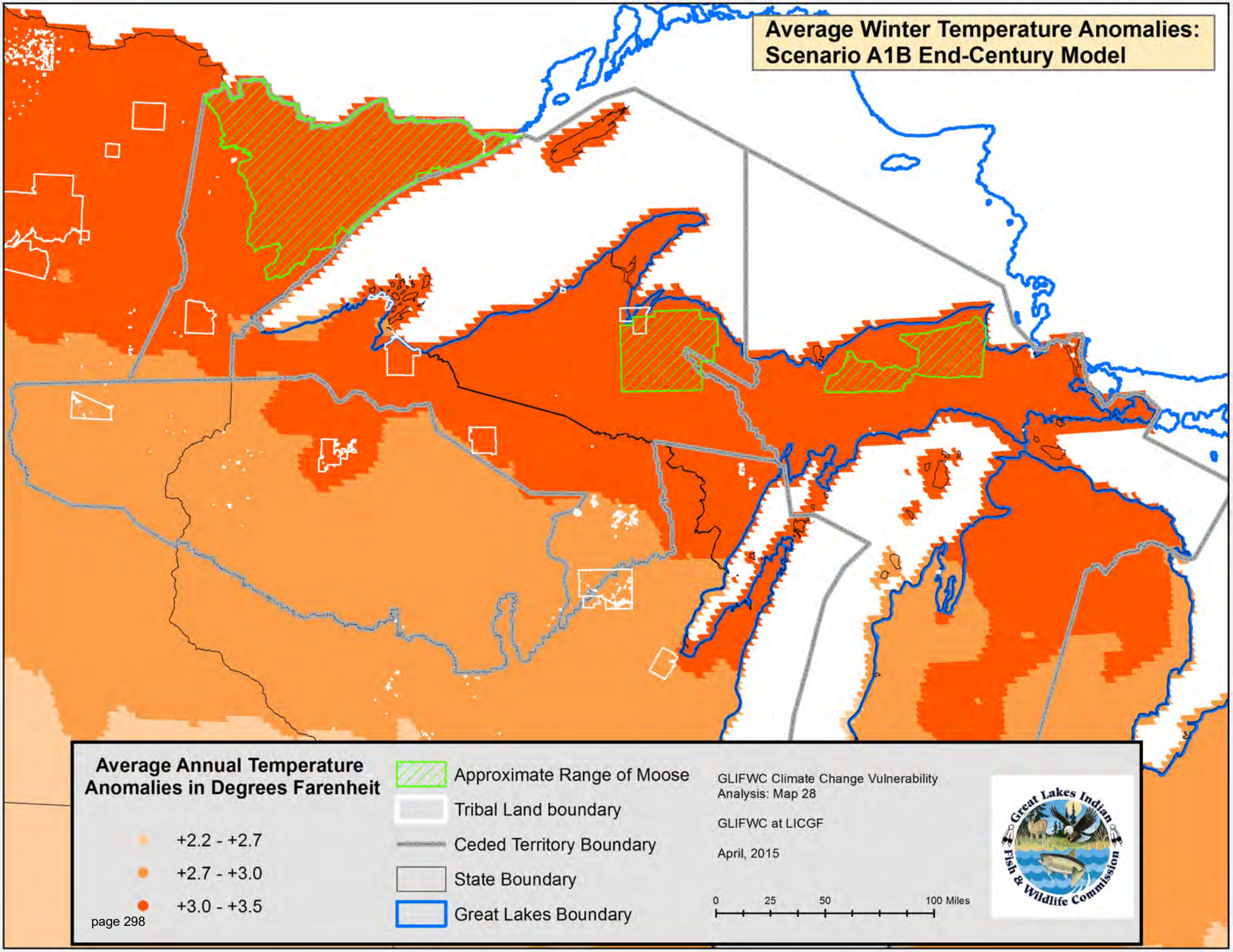
Average Winter Temperature Anomalies:
Scenario A1B End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+2.2 - +2.7
+2.7 - +3.0
+3.0 - +3.5
Approximate Range of Moose
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 28
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

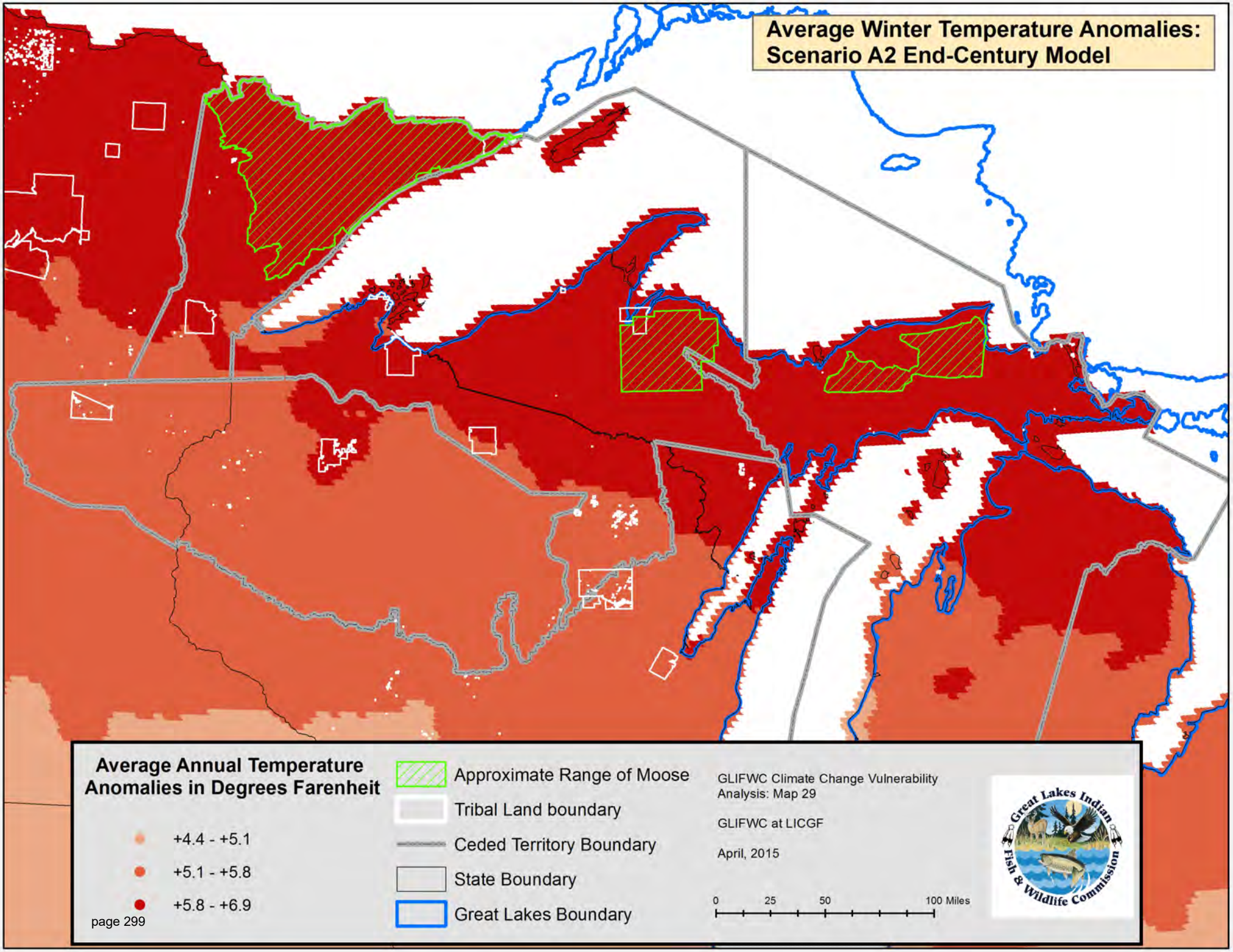
Average Winter Temperature Anomalies:
Scenario A2 End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+4.4 - +5.1
+5.1 - +5.8
+5.8 - +6.9
Approximate Range of Moose
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 29
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

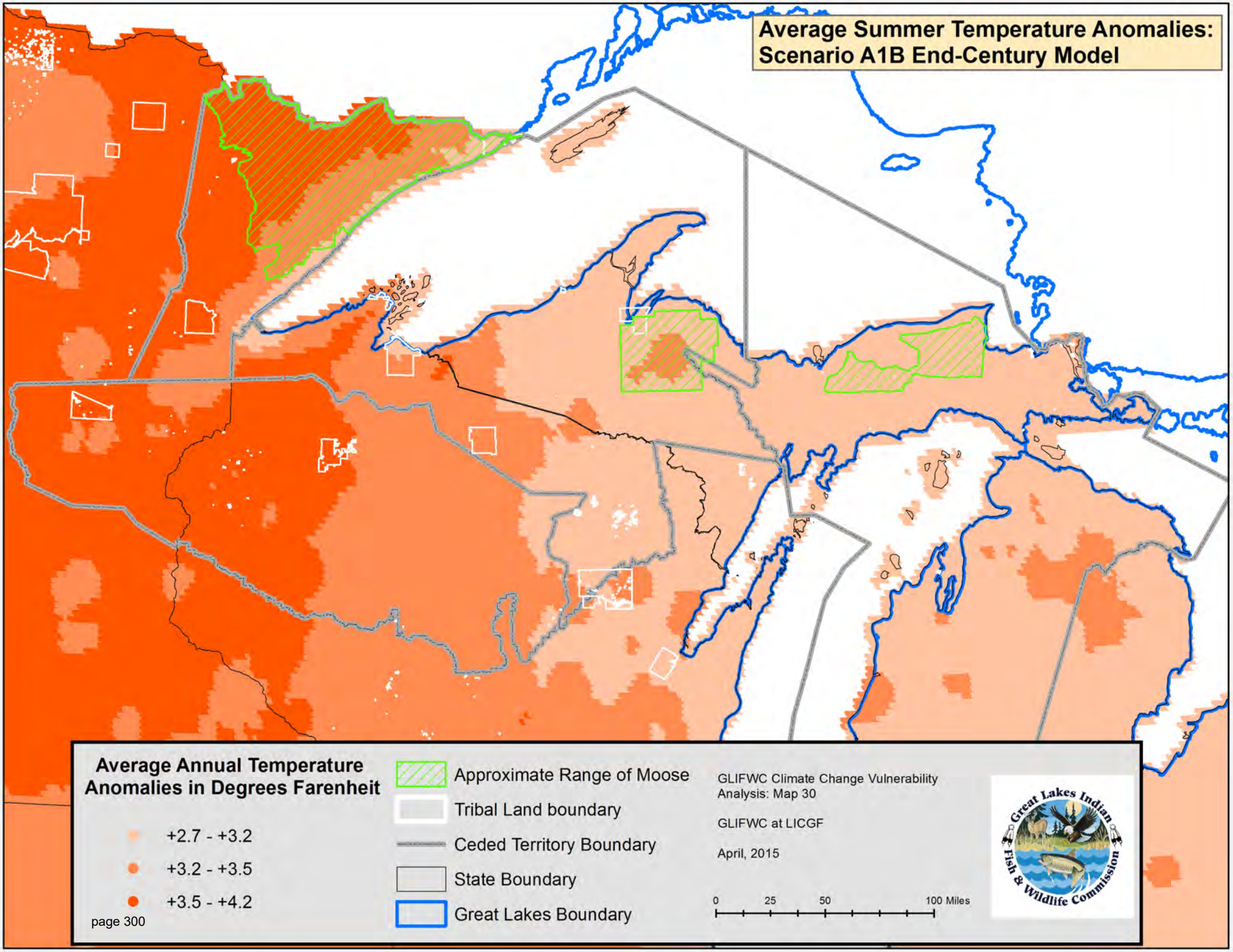
Average Summer Temperature Anomalies:
Scenario A1B End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+2.7 - +3.2
+3.2 - +3.5
+3.5 - +4.2
Approximate Range of Moose
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 30
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

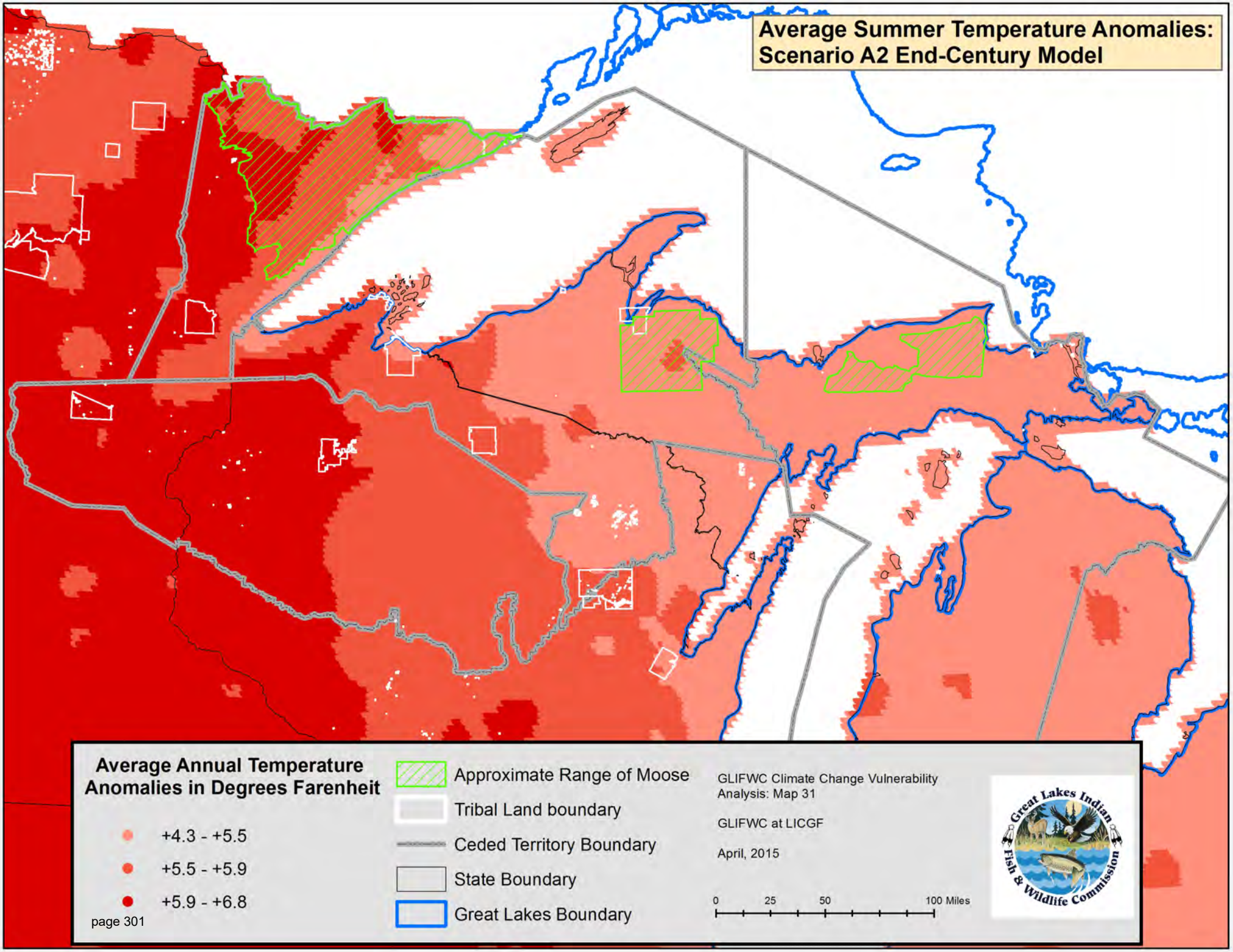
Average Summer Temperature Anomalies:
Scenario A2 End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+4.3 - +5.5
+5.5 - +5.9
+5.9 - +6.8
Approximate Range of Moose
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 31
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

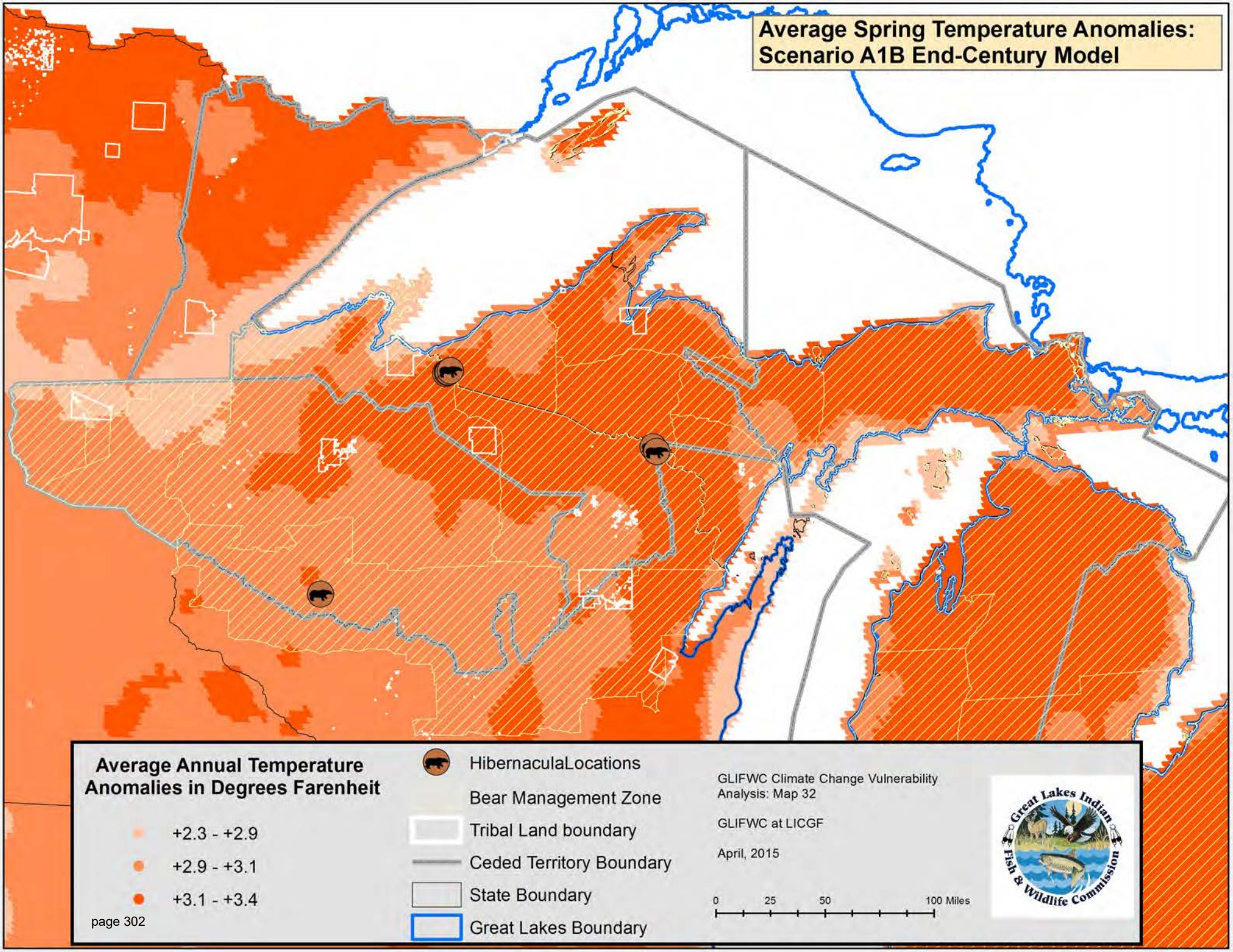
Average Spring Temperature Anomalies:
Scenario A1B End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+2.3 - +2.9
+2.9 - +3.1
+3.1 - +3.4
HibernaculaLocations
Bear Management Zone
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 32
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

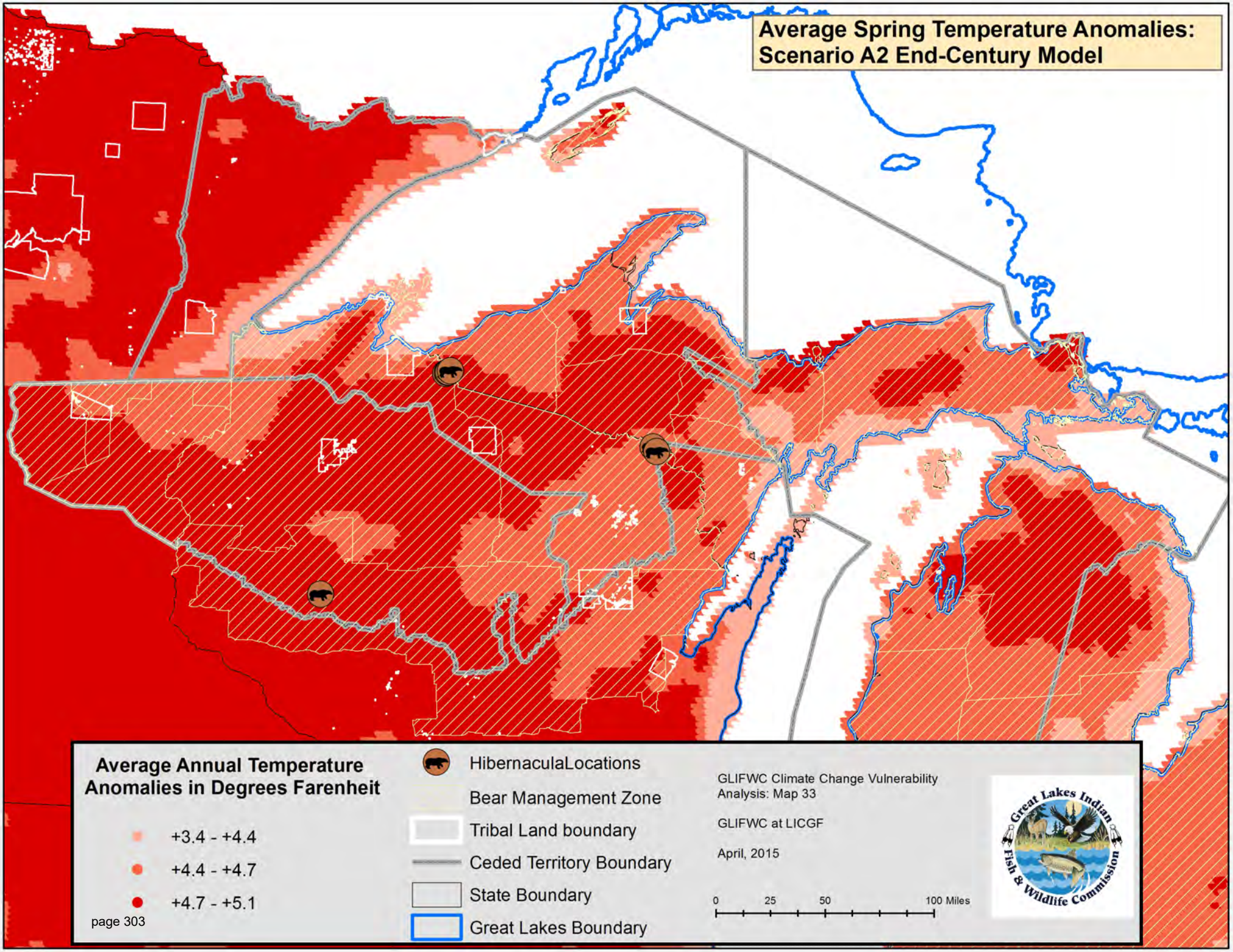
Average Spring Temperature Anomalies:
Scenario A2 End-Century Model
Average Annual Temperature Anomalies in Degrees Farenheit
+3.4 - +4.4
+4.4 - +4.7
+4.7 - +5.1
HibernaculaLocations
Bear Management Zone
Tribal Land boundary
Ceded Territory Boundary
State Boundary
Great Lakes Boundary
GLIFWC Climate Change Vulnerability Analysis: Map 33
GLIFWC at LICGF
April, 2015
0
25
50
100 Miles
Great Lakes Indian Fish & Wildlife Commission

Wiigwaasaatigoog (Paper Birch)

Current modeled distribution

Map 34

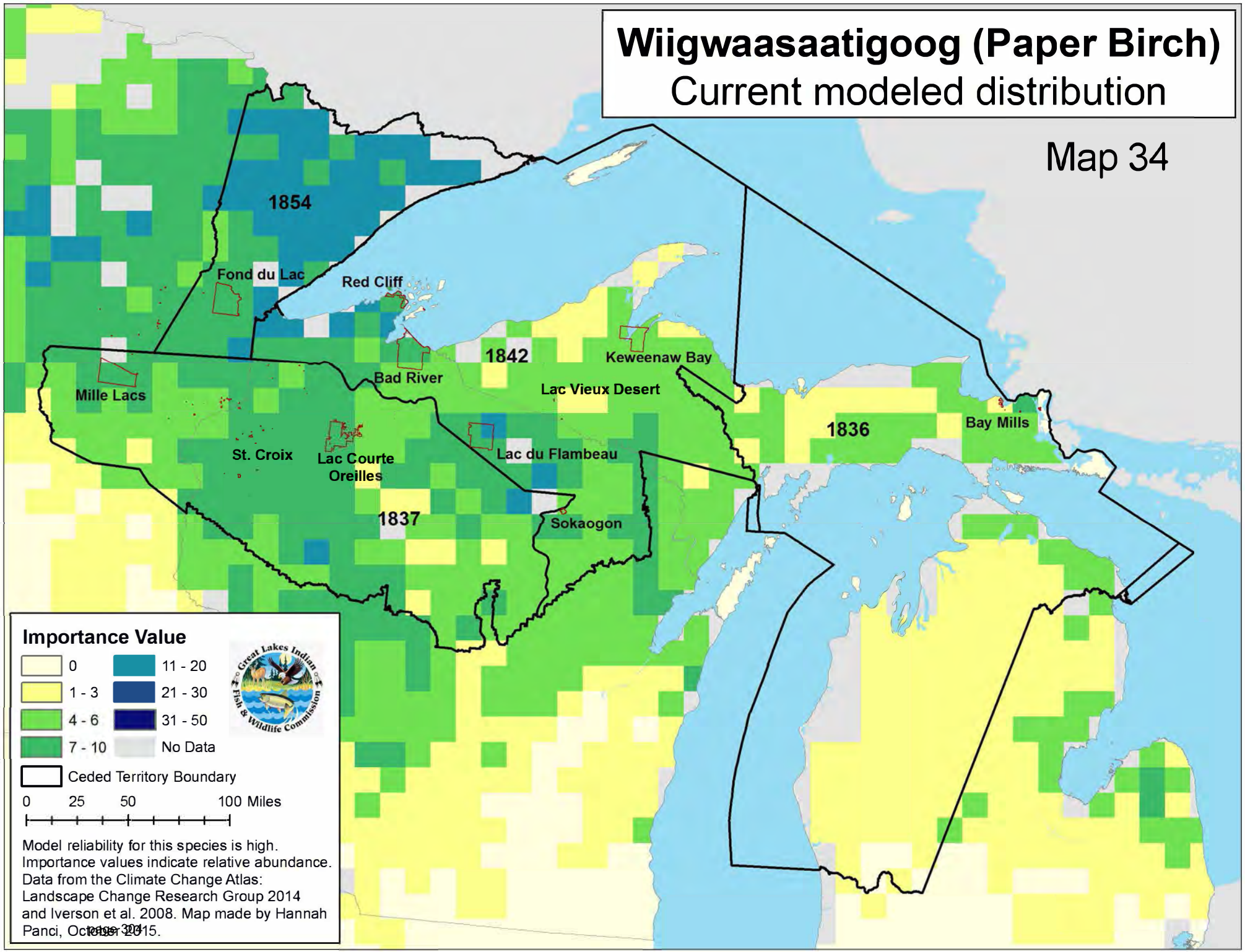

Model reliability for this species is high. Importance values indicate relative abundance. Data from the Climate Change Atlas: Landscape Change Research Group 2014 and Iverson et al. 2008. Map made by Hannah Panci, October 2015.

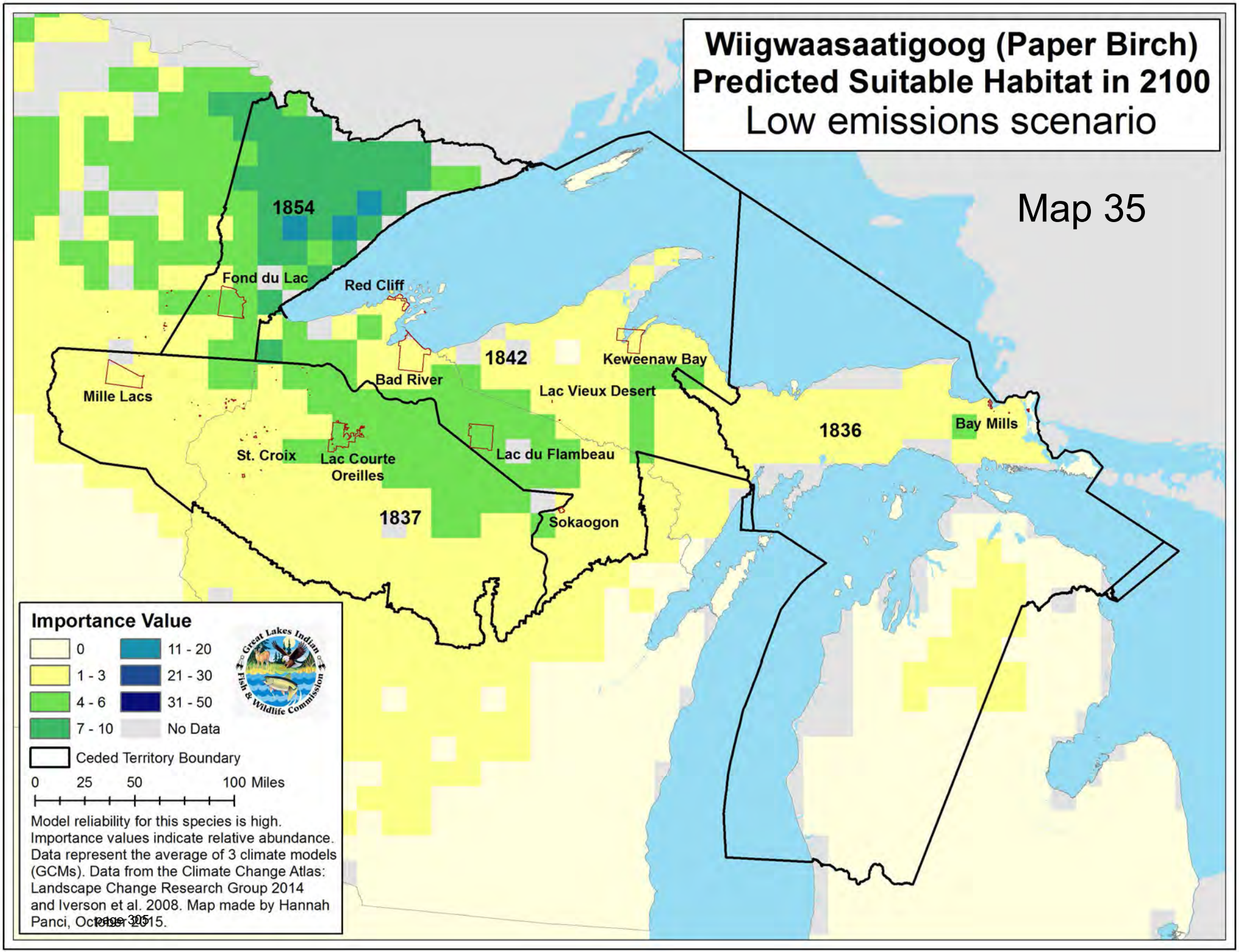
Wiigwaasaatigoog (Paper Birch)
Predicted Suitable Habitat in 2100
Low emissions scenario
Map 35
1854
Fond du Lac
Red Cliff
1842
Keweenaw Bay
Bad River
Lac Vieux Desert
Mille Lacs
1836
Bay Mills
St. Croix
Lac Courte Oreilles
Lac du Flambeau
1837
Sokaogon
Importance Value
0
1 - 3
4 - 6
7 - 10
11 - 20
21 - 30
31 - 50
No Data
Ceded Territory Boundary
0 25 50 100 Miles
Model reliability for this species is high. Importance values indicate relative abundance. Data represent the average of 3 climate models (GCMs). Data from the Climate Change Atlas: Landscape Change Research Group 2014 and Iverson et al. 2008. Map made by Hannah Panci, October 2015.
Great Lakes Indian Fish & Wildlife Commission

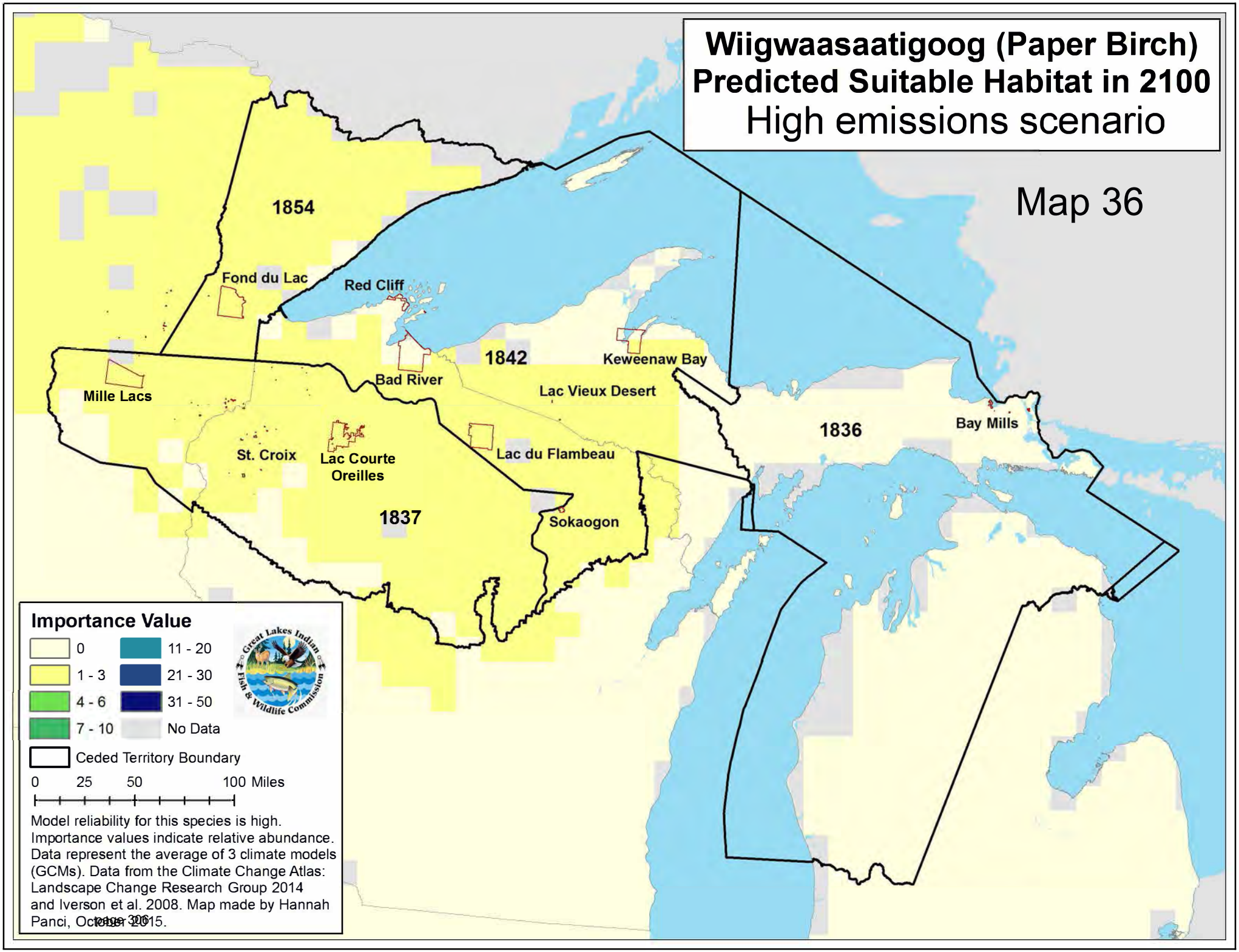
Wiigwaasaatigoog (Paper Birch)
Predicted Suitable Habitat in 2100
High emissions scenario
Map 36
1854
1842
1836
1837
Fond du Lac
Red Cliff
Bad River
Keweenaw Bay
Lac Vieux Desert
Mille Lacs
St. Croix
Lac Courte Oreilles
Lac du Flambeau
Sokaogon
Bay Mills
Importance Value
0
1 - 3
4 - 6
7 - 10
11 - 20
21 - 30
31 - 50
No Data
Ceded Territory Boundary
0 25 50 100 Miles
Model reliability for this species is high. Importance values indicate relative abundance. Data represent the average of 3 climate models (GCMs). Data from the Climate Change Atlas: Landscape Change Research Group 2014 and Iverson et al. 2008. Map made by Hannah Panci, October 2015.
Great Lakes Indian Fish & Wildlife Commission

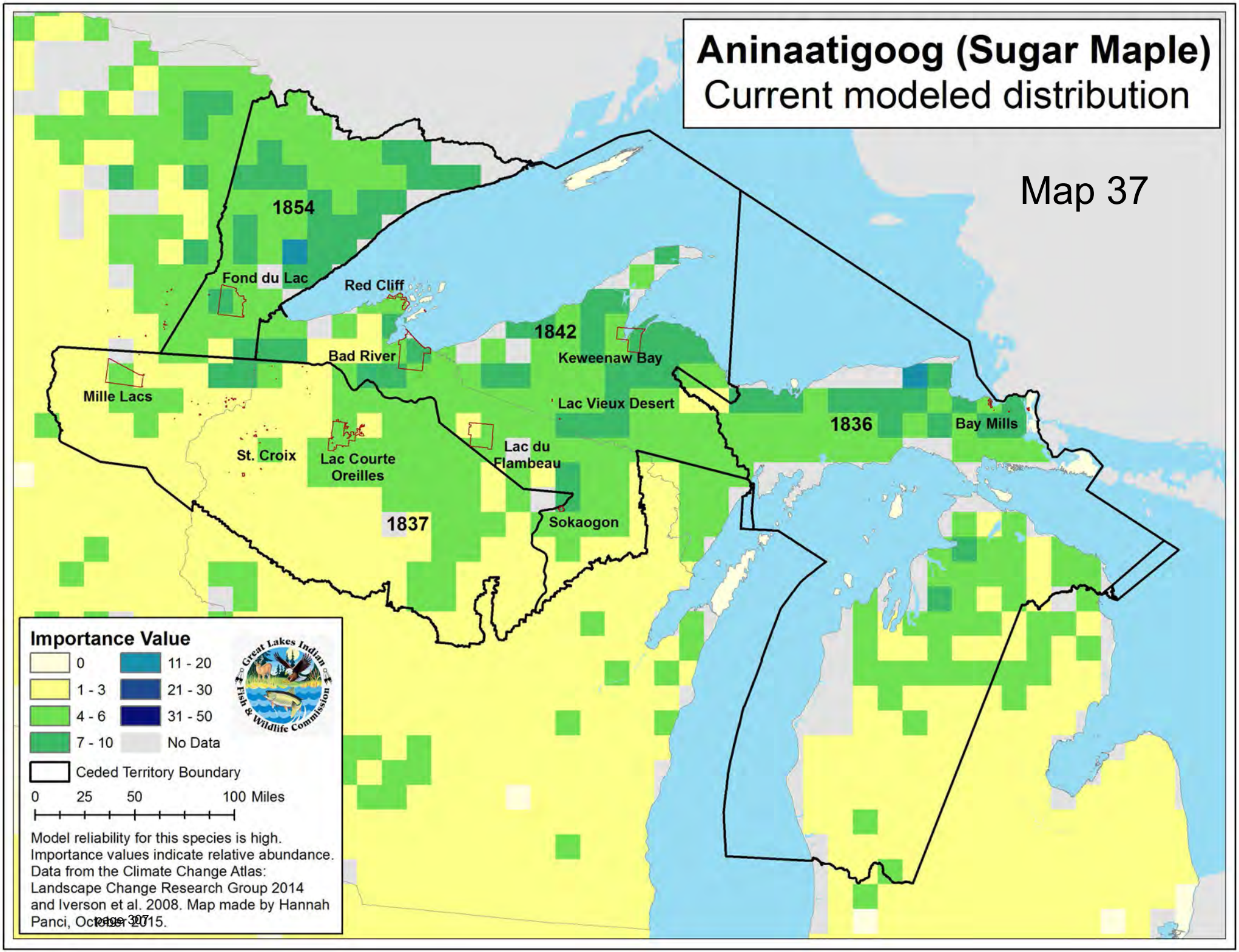
Aninaatigoog (Sugar Maple)
Current modeled distribution
Map 37
1854
1842
1836
1837
Fond du Lac
Red Cliff
Bad River
Keweenaw Bay
Mille Lacs
Lac Vieux Desert
Bay Mills
St. Croix
Lac Courte Oreilles
Lac du Flambeau
Sokaogon
Importance Value
0
1 - 3
4 - 6
7 - 10
11 - 20
21 - 30
31 - 50
No Data
Ceded Territory Boundary
0 25 50 100 Miles
Model reliability for this species is high. Importance values indicate relative abundance. Data from the Climate Change Atlas: Landscape Change Research Group 2014 and Iverson et al. 2008. Map made by Hannah Panci, October 2015.
Great Lakes Indian Fish & Wildlife Commission

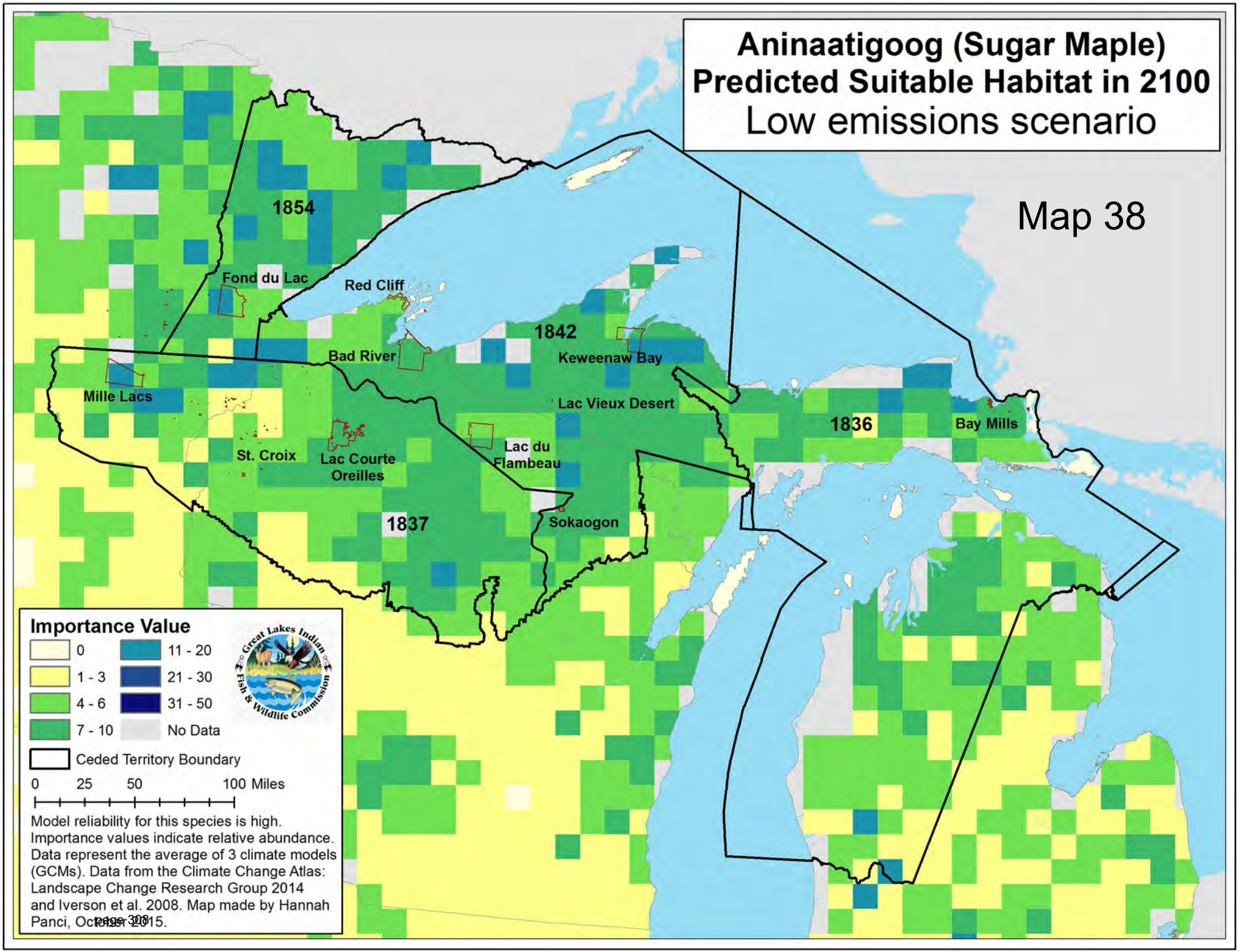
Aninaatigoog (Sugar Maple)
Predicted Suitable Habitat in 2100
Low emissions scenario
Map 38
1854
1842
1836
1837
Fond du Lac
Red Cliff
Bad River
Keweenaw Bay
Mille Lacs
Lac Vieux Desert
Bay Mills
St. Croix
Lac Courte Oreilles
Lac du Flambeau
Sokaogon
Great Lakes Indian Fish & Wildlife Commission
Importance Value
0
1 - 3
4 - 6
7 - 10
11 - 20
21 - 30
31 - 50
No Data
Ceded Territory Boundary
0 25 50 100 Miles
Model reliability for this species is high. Importance values indicate relative abundance. Data represent the average of 3 climate models (GCMs). Data from the Climate Change Atlas: Landscape Change Research Group 2014 and Iverson et al. 2008. Map made by Hannah Panci, October 2015.

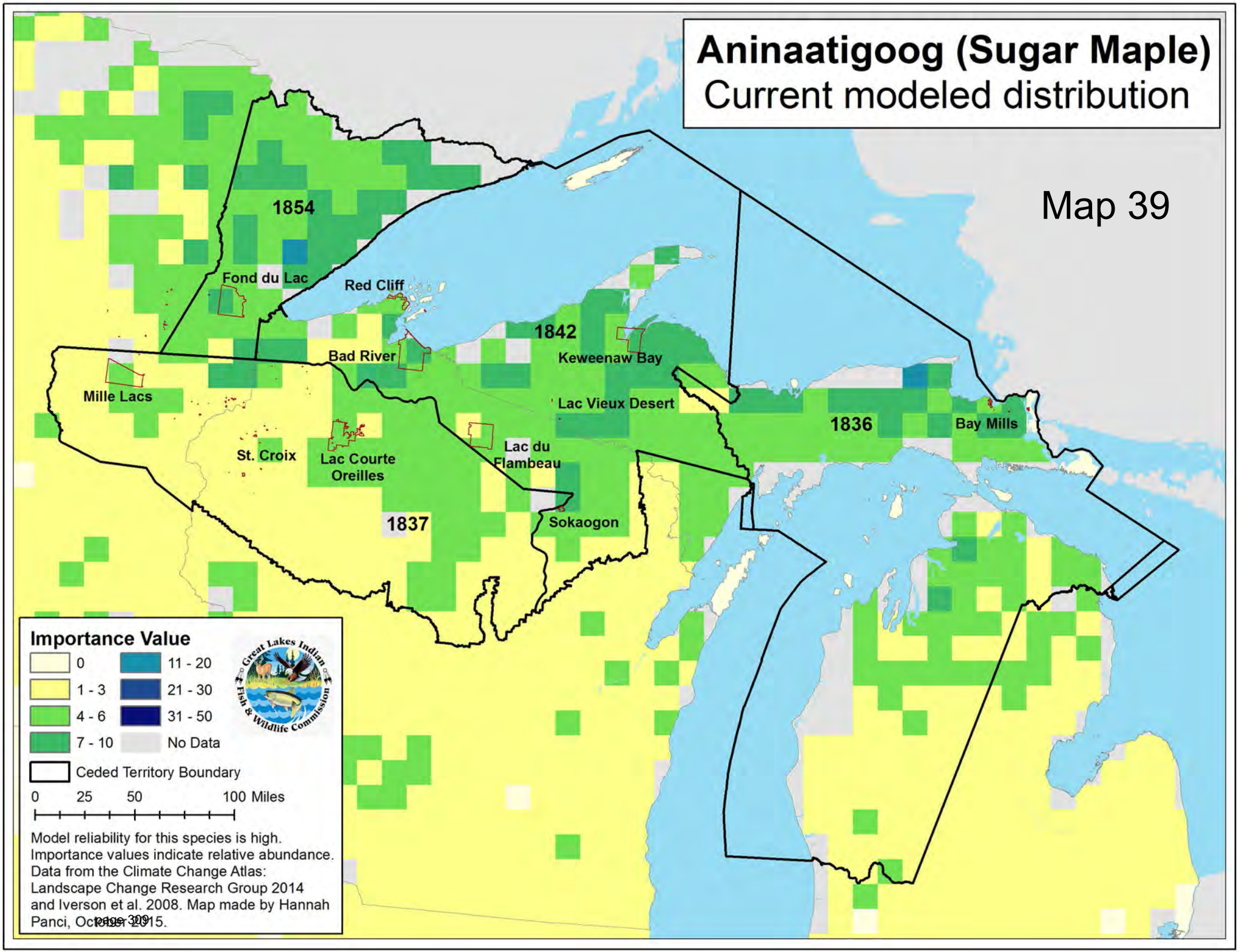
Aninaatigoog (Sugar Maple)
Current modeled distribution
Map 39
1854
Fond du Lac
Red Cliff
1842
Bad River
Keweenaw Bay
Mille Lacs
Lac Vieux Desert
1836
Bay Mills
St. Croix
Lac Courte Oreilles
Lac du Flambeau
1837
Sokaogon
Importance Value
0
1 - 3
4 - 6
7 - 10
11 - 20
21 - 30
31 - 50
No Data
Ceded Territory Boundary
0 25 50 100 Miles
Great Lakes Indian Fish & Wildlife Commission
Model reliability for this species is high.
Importance values indicate relative abundance.
Data from the Climate Change Atlas:
Landscape Change Research Group 2014
and Iverson et al. 2008. Map made by Hannah
Panci, October 2015.

Annotated Bibliography

Lake Superior Fish

Lake Whitefish: Adikameg

1. Bronte, C.R., Ebener M.P., Schreiner D.R., DeVault D.S., Petzold M.M., Jensen D.A., Richards C., and Lozano S.J. (2003). Fish Community Change in Lake Superior, 1970-2000. *Canadian Journal of Fisheries and Aquatic Sciences,* 60(12), 1552–1574. Available at http://www.fws.gov/midwest/fisheries/scientific-pubs/p-2003-2.pdf

Summary: The Fish Community Change in Lake Superior discusses the changes in Lake Superior's fish communities from 1970 – 2000. In specific it touches on habitat degradation, contaminants, effects of climate warming, phosphorus loading, intentional and unintentional species introductions, as well as other topics. Habitat protection and enhancement to prevent additional damaging effects is needed to further restoration.

Specific pages to note: Pg. 1554: Climate warming is projected to increase thermal habitat; would be for Lake Trout, Lake Whitefish, Northern Pike, where non-indigenous species would benefit. This article focuses on fish species recovery.

References Cited to Consider:

- Bronte, C.R., and Hoff, M.H. 1996. Population status and trends for Lake Superior forage fishes, 1978–95. In Minutes of the 1996 Annual Meeting of the Lake Superior Committee, Great Lakes Fishery Commission. Great Lakes Fishery Commission, Ann Arbor, Mich.
- Bronte, C.R., Schram, S.T., Selgeby, J.H., and Swanson, B.L. 1995. Density independent survival of wild lake trout in the Apostle Islands area of Lake Superior. J. Gt. Lakes Res. 21 (Suppl. 1): 246–252.
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- *Hill, D.K., and Magnuson, J.J. 1990. Potential effects of global climate warming on the growth and prey consumption of Great Lakes fishes. Trans. Am. Fish. Soc. 119: 265–275*.
- *Magnuson, J.J., Meisner J.D., and Hill, D.K. 1990. Potential changes in thermal habitat of Great Lakes fishes due to global climate warming. Trans. Am. Fish. Soc. 119: 254–264*.
- *Mandrak, N.E. 1989. Potential invasion of the Great Lakes by fish species associated with climate warming. J. Gt. Lakes Res. 15:306–316*.
- Selgeby, J.H. 1982. Decline of lake herring (Coregonus artedii) in Lake Superior: an analysis of the Wisconsin herring fishery. Can. J. Fish. Aquat. Sci. 39: 554–563.
- Sinokrot, B.A., Stefan, H.G., McCormick, J.H., and Eaton, J.G. 1995. Modeling of climate change effects on stream temperatures and fish habitats below barrier dams and near groundwater inputs. Clim. Change, 30: 181–200.

2. Great Lakes Area National Park Service U.S. Department of the Interior. 2007. Climate Change: Dying Birch trees, minimal snowpack, and ice-free lakes are just some Impacts of Midwest Warming. Available at http://www.nps.gov/apis/naturescience/upload/2007%20MWR%20Climate%20Change%20Site%20Bulletin%20-%20Great%20Lakes%20FINAL.pdf

Summary: This article, Dying Birch Trees, Minimal Snowpack, and Ice-Free Lakes Are Just Some Impacts of Midwest Warming discusses climate change effects in the Midwest Region. It touches on the science reports by the U.S. Global Change Research Program as well as others and how they show that this is due to greenhouse gases produced by human activities. In specific the article has sections on Temperature and Precipitation, The Ecological Effects, New Faces in New Places, and Recreation, Health and Safety.

Specific pages to note: * Cool tree species are projected to lose habitat in the U.S. Sugar Maple and Paper Birch are expected to shift towards Canada. For the Apostle Island Lakeshore and Michigan Upper peninsula Paper Birch may lose all habitats. *Coldwater fish such as Trout will decrease in abundance. Whitefish spawning areas will be disturbed and Native fish will be threatened.

3. Kling, G.W., K. Hayhoe, L.B. Johnson, J.J. Magnuson, S. Polasky, S.K. Robinson, B.J. Shuter, M.M. Wander, D.J. Wuebbles, and D.R. Zak. 2003. Confronting Climate Change in the Great Lakes Region. A Report of the Union of Concerned Scientists and the Ecological Society of America. Available at

http://www.ucsusa.org/assets/documents/global_warming/greatlakes_final.pdf

Summary: Confronting Climate Change in the Great Lakes Region is a report of The Union of Concerned Scientists and The Ecological Society of America. This report explains that growing evidence suggests that climate change is already affecting the Great Lakes Region: winters are shorter, average temperatures are warmer, lake ice cover is decreasing, and heavy rainstorms are more common. The potential consequences from climate change for the Great Lakes Region are confronted for the economic as well as the environmental impacts.

Specific pages to note: **Pg. 2:** Whitefish reproduction could be threatened with the loss of winter ice [Coldwater fish (Lake Trout, Whitefish, Herring) and Coolwater fish (Northern Pike, Walleye) are likely to decline in abundance]. **Pg. 54-55**: If warmwater fish species expand and increase in number in Lake Superior, this could lead to the extirpation (local extinction) of native minnows. This could have negative impacts on Lake Trout and other Native predators. "Climate warming will greatly reduce the amount of thermally suitable habitat for Lake Trout in many inland lakes." **Pg. 60:** Moose could be harmed by warming: increase in deer populations could carry disease that will stress the moose population.

References Cited to Consider:

- *Hill, D.K., and J.J. Magnuson (1990). Potential effects of global climate warming on the growth and prey consumption of Great Lakes fi sh. Transactions of the American Fisheries Society 119:265–275. American Fisheries Society 119:265–275.*
- Magnuson, J.J., et al. (1997). Potential effects of climate change on aquatic systems: Laurentian Great Lakes and Precambrian Shield Region. In Freshwater Ecosystems and Climate Change in North America: A Regional Assessment. C.E. Cushing, ed. New York: John Wiley & Sons, pp. 7–53.
- *Magnuson, J.J., J.D. Meisner, and D.K. Hill (1990). Potential changes in the thermal habitat of Great Lakes fish after global climate warming. Transactions of the American Fisheries Society 119:254–264. American Fisheries Society 119:254–264*
- Shuter, B.J., C.K. Minns, and N. Lester (2002). Climate change, freshwater fi sh and fi sheries: Case studies from Ontario and their use in assessing potential impacts. In Fisheries in a Changing Climate. N.A. McGinn, ed. Bethesda, Md.: American Fisheries Society, pp. 77–88.
- *Stefan, H.G., X. Fang, and J.G. Eaton (2001). Simulated fish habitat changes in North American lakes in response to projected climate warming. Transactions of the American Fisheries Society 130:459–477*.

4. National Wildlife Federation. 2010. Improving the Odds: Using Climate-Readiness Planning to Reduce the Impacts of Climate Change on the Great Lakes Ecosystem. Available at http://www.nwf.org/News-and-Magazines/Media-Center/News-by-Topic/Global-Warming/2010/10-29-10-Great-Lakes-Adaptation-Report.aspx.

Summary: Improving the Odds was created by the National Wildlife Federation to bring awareness to Climate Change and to reduce the impacts of Climate Change. The report describes and analyzes climate-readiness initiatives in the Great Lakes Region. There are specifically looking at restoration practices that reduce climate impacts, implementing climate ready strategies and others. This is crucial to protect our natural resources, infrastructures, public health, as well as fresh water.

Specific pages to note: **Pg. 31:** It is expected that the Pine Marten will find no suitable habitat in Wisconsin. **Pg. 40:** Increased temperature of Lake Superior would benefit Sea Lamprey. This in turn will negatively affect fish species. Sea Lamprey feed on fish and warmer waters would allow for bigger growing Sea Lamprey. This will negatively affect Lake Trout, Herring, Whitefish as well as other species.

References Cited to Consider:

- Wisconsin Initiative on Climate Change Impacts. 2010. Wildlife Working Group. http://wicci.wisc.edu/workinggroups/wildlife/index.htm
- US Environmental Protection Agency. Climate Change. http://www.epa.gov/climatechange/impacts-adaptation/
- U.S. Department of the Interior National Park Service. 2007. Climate Change and Impacts to Resources around the Great Lakes. August 2007

5. Sousounis, P.J. and J.M. Bisanz, eds. 2000. Preparing for a Changing Climate: The Potential Consequences of Climate Variability and Change. A Summary by the Great Lakes Regional
Assessment Group. U.S. Global Change Research Program. Available at http://www.geo.msu.edu/glra/PDF_files/GLRA_report.pdf.

Summary: Preparing for a Changing Climate was for the U.S. Global Change Research Program as an investment in science for the Nation's future. This report covers the potential consequences of climate variability and change. Climate change may bring negative affects to water resources, ecology, coastlines, human health, and others. They discuss the Great Lakes region and the impacts that are found in stream flow, aquatic and terrestrial ecosystems,

agriculture, and quality of life.

Specific pages to note: **Pg. 45**: Lake Trout would either potentially increase in size due to global warming (If their prey also increases in size) but would decrease in size if their prey simply stays the same size. **Pg. 92:** Less ice coverage may cause a fast decline of Whitefish; there would be a growing number of unprotected spawning areas.

References Cited to Consider:

- Chao, P.T.,1999: Great Lakes Water Resources-Climate Change Impact Analysis. Proceedings of the Speciality Conference on Potential Consequences of Climate Variability and Change to Water Resources of the United States. American Water Resources Association, Atlanta Georgia, May 10-12. pp. 307-310
- Davis, M.B., and C. Zabinski, 1992: Changes in geographical range resulting from greenhouse warming: effects on biodiversity in forests. P. 297-308 in Global Warming and Biological Diversity, R.L. Peters and T.E. Lovejoy, eds, Yale University Press, New Haven CT.
- Eaton, J.G. and R.M. Scheller, 1996: Effects of climate warming on fish thermal habitat in streams of the United States. Limnology and Oceanography 41:1109-1115
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- Jones, E.A., D.D. Reed, and P.V. Desanker, 1994: Ecological implications of projected climate change scenarios in forest ecosystems of central North America. Agricultural and Forest Meteorology,72, 2-3
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- *Magnuson, J.J., H.A. Regier, B.J. Shuter, D.K. Hill, J.A. Holmes, and J.D. Meisner, 1989: Potential responses of Great Lakes fishes and their habitat to global climate warming. University of Wisconsin and Toronto. U.S. Environmental Protection Agency, Washington, D. C. Report number EPA-230-05-89-055*.

Lake Trout: Namegos

1. Betz, C.R., Asplund T., and Hurley J. (2010). Water Resources Working Group Report. *Wisconsin Initiative on Climate Change Impacts.* Available at

http://www.wicci.wisc.edu/report/Water-Resources.pdf.

Summary: The Wisconsin Initiative on Climate Change Impacts discusses Wisconsin's changing climate and the impact this has on its water resources. Water Resources can indicate climate change at 'various temporal and spatial scales.' While climate change will affect Wisconsin differently in each geographic region, it is projected that all water resources will be affected in both quantity and quality.

Specific pages to note: **pg. VI**: Increased temperature could make coolwater and coldwater fish to no longer dominate some of Wisconsin's streams. Trout habitats will also be affected. **Pg. 33-35:** If rainfall is to increase, this will result in increased sediment and nutrient loads (from surrounding land and streams). This increase in sediment and nutrient loads could negatively impact the walleye population (who rely on sight to feed). There is the potential for warmwater fish to increase in abundances with coldwater species (such as Lake Trout) shifting farther north in search of cooler waters.

References Cited To Consider:

- Bradley et al., 1999. Phonological Changes Reflect Climate Change in Wisconsin. Proc. Natl. Acad. Sci., 96: 9701-9704
- Wisconsin Academy of Sciences, Arts and Letters (2003). *Waters of Wisconsin: The future of our aquatic ecosystems and resources.* Madison, WI: Wisconsin Academy of Sciences, Arts, & Letters.
- Wisconsin Initiative on Climate Change Impacts (2010). Cold water Fish and Fisheries Working Group Report. Wicci.wisc.edu.

2. Bronte, C.R., Ebener M.P., Schreiner D.R., DeVault D.S., Petzold M.M., Jensen D.A., Richards C., and Lozano S.J. (2003). Fish Community Change in Lake Superior, 1970-2000. *Canadian Journal of Fisheries and Aquatic Sciences,* 60(12), 1552–1574. Available at http://www.fws.gov/midwest/fisheries/scientific-pubs/p-2003-2.pdf

Summary: The Fish Community Change in Lake Superior discusses the changes in Lake Superior's fish communities from 1970 – 2000. In specific it touches on habitat degradation, contaminants, effects of climate warming, phosphorus loading, intentional and unintentional species introductions, as well as other topics. Habitat protection and enhancement to prevent additional damaging effects is needed to further restoration.

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benefit. This article focuses on fish species recovery.

References Cited to Consider:

- Bronte, C.R., and Hoff, M.H. 1996. Population status and trends for Lake Superior forage fishes, 1978–95. In Minutes of the 1996 Annual Meeting of the Lake Superior Committee, Great Lakes Fishery Commission. Great Lakes Fishery Commission, Ann Arbor, Mich.
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- Bronte, C.R., Hesselberg, R.J., Shoesmith, J.A., and Hoff, M.H. 1996. Discrimination among spawning concentrations of Lake Superior lake herring based on trace element profiles in sagittae. Trans. Am. Fish. Soc.125: 852–859.
- Ebener, M.P. 1990. Assessment and mark–recapture of lake whitefish spawning stocks around the Keweenaw Peninsula area of Lake Superior, 1987–1990. Admin. Rep. 90-10, Great Lakes Indian Fish and Wildlife Commission, Odanah, Wis.
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- *Magnuson, J.J., Meisner J.D., and Hill, D.K. 1990. Potential changes in thermal habitat of Great Lakes fishes due to global climate warming. Trans. Am. Fish. Soc. 119: 254–264*.
- *Mandrak, N.E. 1989. Potential invasion of the Great Lakes by fish species associated with climate warming. J. Gt. Lakes Res. 15:306–316*.
- Selgeby, J.H. 1982. Decline of lake herring (Coregonus artedii)in Lake Superior: an analysis of the Wisconsin herring fishery. Can. J. Fish. Aquat. Sci. 39: 554–563.
- Sinokrot, B.A., Stefan, H.G., McCormick, J.H., and Eaton, J.G. 1995. Modeling of climate change effects on stream temperatures and fish habitats below barrier dams and near groundwater inputs. Clim. Change, 30: 181–200.

3. Casselman, J.M. 2002. Effects of temperature, global extremes, and climate change on year-class production of warmwater, coolwater, and coldwater fishes in the Great Lakes basin. Am. Fish. Soc. Symp. 31: 39–60. Available at ftp://142.36.245.139/.virtual/slk6ftp/pub/outgoing/requests/!age_analysis/CD1/Selected%20Age-Growth%20Publications/Climate%20and%20year-class%20production%20of%20fish,%20AFS%20Symposium,%20C.pdf

Summary: The Effects of Temperature, Global Extremes, and Climate Change on Year-Class Production of Warmwater, Coolwater, and Coldwater fishes in the Great Lakes Basin discuss the impacts of global warming on fisheries. For this they explain the effects of temperature change on fish. Global warming will substantially increase the year-class strength of warmwater species. It will also significantly impact the year-class strength and structure of fish communities in the Great Lakes Basin. Notably decreasing amounts of coldwater and coolwater fish species and increasing warrmwater fish species.

Specific pages to note: **Pg. 51:** Increased water temperature could have affected Northern Pike negatively; decreasing their year-class strength. **Pg. 52:** For Lake Trout, temperature increase would affect their spawning success. If the water temperature increases, their successful spawning survival would drastically decrease. *Water temperature increase would alter the food web and prey base. *Increase of water temperature would positively affect warmwater fish.

References Cited to Consider:

- Christie, W. J., and H. A. Regier. 1973. Temperature as a major factor influencing reproductive success of fish—two examples. Rapports et Proces-Verbaux des Reunions Conseil International pour l'Exploration de la Mer 164:208–218
- *Hill, D. K., and J. J. Magnuson. 1990. Potential effects of global climate warming on the growth and prey consumption of Great Lakes fish. Transactions of the American Fisheries Society 119:265–275*.
- Kawasaki, T. 2001a. Global warming could have a tremendous effect on the world fisheries production. Journal of International Fisheries 4(1):17–21
- King, J. R., B. J. Shuter, and A. P. Zimmerman. 1999b. Empirical links between thermal habitat, fish growth, and climate change. Transactions of the American Fishieries Society 128:656–665.
- *Mandrak, N. E. 1989. Potential invasion of the Great Lakes by fish species associated with climatic warming. Journal of Great Lakes Research 15:306–316*.
- Meisner, J. D., J. L. Goodier, H. A. Regier, B. J. Shuter, and W. J. Christie. 1987. An assessment of the effects of climate warming on Great Lakes Basin fishes. Journal of Great Lakes Research 13:340–352.
- *Stefan, H. G., X. Fang, and J. G. Eaton. 2001. Simulated fish habitat changes in North American lakes in response to projected climate warming. Transactions of the American Fisheries Society 130:459–477*.

4. Great Lakes Area National Park Service U.S. Department of the Interior. 2007. Climate Change: Dying Birch trees, minimal snowpack, and ice-free lakes are just

some Impacts of Midwest Warming. Available at http://www.nps.gov/apis/naturescience/upload/2007%20MWR%20Climate%20Change%20Site%20Bulletin%20-%20Great%20Lakes%20FINAL.pdf

Summary: This article, Dying Birch Trees, Minimal Snowpack, and Ice-Free Lakes Are Just Some Impacts of Midwest Warming discusses climate change effects in the Midwest Region. It touches on the science reports by the U.S. Global Change Research Program as well as others and how they show that this is due to greenhouse gases produced by human activities. In specific the article has sections on Temperature and Precipitation, The Ecological Effects, New Faces in New Places, and Recreation, Health and Safety.

Specific pages to note: * Cool tree species are projected to lose habitat in the U.S. Sugar Maple and Paper Birch are expected to shift towards Canada. For the Apostle Island Lakeshore and Michigan Upper peninsula Paper Birch may lose all habitats. *Coldwater fish such as Trout will decrease in abundance. Whitefish spawning areas will be disturbed and Native fish will be threatened.

5. International Joint Commission (IJC). 2003. Climate Change and Water Quality in the Great Lakes Basin. Available at http://www.ijc.org/rel/pdf/climate_change_2003.pdf.

Summary: Climate Change and Water Quality in the Great Lakes Basin is a report of the Great Lakes Water Quality Board to the International Joint Commission. It discusses how our climate has been changing and will continue to change in the future. Investigations on climate change were undertaken. In the full report it is broken into the Water Quality Board's Advice to the International Joint Commission, Climate Change and Water Quality in the Great Lakes Region – Risks, Opportunities and Responses, Summary of the Climate Change Workshop, and Cross Boarder Tools and Strategies.

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6. Kling, G.W., K. Hayhoe, L.B. Johnson, J.J. Magnuson, S. Polasky, S.K. Robinson, B.J. Shuter, M.M. Wander, D.J. Wuebbles, and D.R. Zak. 2003. Confronting Climate Change in the Great Lakes Region. A Report of the Union of Concerned Scientists and the Ecological Society of America. Available at http://www.ucsusa.org/assets/documents/global_warming/greatlakes_final.pdf

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Specific pages to note: **Pg. 2:** Whitefish reproduction could be threatened with the loss of winter ice [Coldwater fish (Lake Trout, Whitefish, Herring) and Coolwater fish (Northern Pike, Walleye) are likely to decline in abundance]. **Pg. 54-55**: If warmwater fish species expand and increase in number in Lake Superior, this could lead to the extirpation (local extinction) of native minnows. This could have negative impacts on Lake Trout and other Native predators.

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7. National Wildlife Federation. 2010. Improving the Odds: Using Climate-Readiness Planning to Reduce the Impacts of Climate Change on the Great Lakes Ecosystem. Available at http://www.nwf.org/News-and-Magazines/Media-Center/News-by-Topic/Global-Warming/2010/10-29-10-Great-Lakes-Adaptation-Report.aspx.

Summary: Improving the Odds was created by the National Wildlife Federation to bring awareness to Climate Change and to reduce the impacts of Climate Change. The report describes and analyzes climate-readiness initiatives in the Great Lakes Region. There are specifically looking at restoration practices that reduce climate impacts, implementing climate ready strategies and others. This is crucial to protect our natural resources, infrastructures, public health, as well as fresh water.

Specific pages to note: **Pg. 31:** It is expected that the Pine Marten will find no suitable habitat in Wisconsin. **Pg. 40:** Increased temperature of Lake Superior would benefit Sea Lamprey. This in turn will negatively affect fish species. Sea Lamprey feed on fish and warmer waters would

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- Wisconsin Initiative on Climate Change Impacts. 2010. Wildlife Working Group. http://wicci.wisc.edu/workinggroups/wildlife/index.htm
- US Environmental Protection Agency. Climate Change. http://www.epa.gov/climatechange/impacts-adaptation/
- U.S. Department of the Interior National Park Service. 2007. Climate Change and Impacts to Resources around the Great Lakes. August 2007

8. Sousounis, P.J. and J.M. Bisanz, eds. 2000. Preparing for a Changing Climate: The Potential Consequences of Climate Variability and Change. A Summary by the Great Lakes Regional Assessment Group. U.S. Global Change Research Program. Available at http://www.geo.msu.edu/glra/PDF_files/GLRA_report.pdf.

Summary: Preparing for a Changing Climate was for the U.S. Global Change Research Program as an investment in science for the Nation's future. This report covers the potential consequences of climate variability and change. Climate change may bring negative affects to water resources, ecology, coastlines, human health, and others. They discuss the Great Lakes region and the impacts that are found in stream flow, aquatic and terrestrial ecosystems, agriculture, and quality of life.

Specific pages to note: **Pg. 45**: Lake Trout would either potentially increase in size due to global warming (If their prey also increases in size) but would decrease in size if their prey simply stays the same size. **Pg. 92:** Less ice coverage may cause a fast decline of Whitefish; there would be a growing number of unprotected spawning areas.

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- Chao, P.T.,1999: Great Lakes Water Resources-Climate Change Impact Analysis. Proceedings of the Speciality Conference on Potential Consequences of Climate Variability and Change to Water Resources of the United States. American Water Resources Association, Atlanta Georgia, May 10-12. pp. 307-310
- Davis, M.B., and C. Zabinski, 1992: Changes in geographical range resulting from greenhouse warming: effects on biodiversity in forests. P. 297-308 in Global Warming and Biological Diversity, R.L. Peters and T.E. Lovejoy, eds, Yale University Press, New Haven CT.
- Eaton, J.G. and R.M. Scheller, 1996: Effects of climate warming on fish thermal habitat in streams of the United States. Limnology and Oceanography 41:1109-1115

- He, H.A.S., D.J. Mladenoff, and T.R. Crow, 1999: Link- ing an ecosystem model and a landscape model to study for- est species response to climate warming. Ecological Modelling , 114, 213-233
- *Hill, D., and J.J. Magnuson, 1990: Potential effects of global climate warming on the growth and prey consumption of Great Lakes fish. Trans. Am. Fish. Soc., 119, 265-275*
- Jones, E.A., D.D. Reed, and P.V. Desanker, 1994: Ecological implications of projected climate change scenarios in forest ecosystems of central North America. Agricultural and Forest Meteorology,72, 2-3
- *Magnuson, J.J., J.D. Meisner and D.K. Hill, 1990: Potential changes in the thermal habitat of Great Lakes fish after global climate warming. Trans. Am. Fish. Soc. 119, 254-264.*
- *Magnuson, J.J., H.A. Regier, B.J. Shuter, D.K. Hill, J.A. Holmes, and J.D. Meisner, 1989: Potential responses of Great Lakes fishes and their habitat to global climate warming. University of Wisconsin and Toronto. U.S. Environmental Protection Agency, Washington, D. C. Report number EPA-230-05-89-055*.

Lake Sturgeon: Name

Lake Herring:

1. Kling, G.W., K. Hayhoe, L.B. Johnson, J.J. Magnuson, S. Polasky, S.K. Robinson, B.J. Shuter, M.M. Wander, D.J. Wuebbles, and D.R. Zak. 2003. Confronting Climate Change in the Great Lakes Region. A Report of the Union of Concerned Scientists and the Ecological Society of America. Available at http://www.ucsusa.org/assets/documents/global_warming/greatlakes_final.pdf

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- U.S. Department of the Interior National Park Service. 2007. Climate Change and Impacts to Resources around the Great Lakes. August 2007

In land Fish

Walleye: Ogaa

1. Betz, C.R., Asplund T., and Hurley J. (2010). Water Resources Working Group Report. *Wisconsin Initiative on Climate Change Impacts.* Available at http://www.wicci.wisc.edu/report/Water-Resources.pdf.

Summary: The Wisconsin Initiative on Climate Change Impacts discusses Wisconsin's changing climate and the impact this has on its water resources. Water Resources can indicate climate change at 'various temporal and spatial scales.' While climate change will affect Wisconsin differently in each geographic region, it is projected that all water resources will be affected in both quantity and quality.

Specific pages to note: **pg. VI**: Increased temperature could make coolwater and coldwater fish to no longer dominate some of Wisconsin's streams. Trout habitats will also be affected. **Pg. 33-35:** If rainfall is to increase, this will result in increased sediment and nutrient loads (from surrounding land and streams). This increase in sediment and nutrient loads could negatively impact the walleye population (who rely on sight to feed). There is the potential for warmwater fish to increase in abundances with coldwater species (such as Lake Trout) shifting farther north in search of cooler waters.

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- Bradley et al., 1999. Phonological Changes Reflect Climate Change in Wisconsin. Proc. Natl. Acad. Sci., 96: 9701-9704
- Wisconsin Academy of Sciences, Arts and Letters (2003). *Waters of Wisconsin: The future of our aquatic ecosystems and resources.* Madison, WI: Wisconsin Academy of Sciences, Arts, & Letters.
- Wisconsin Initiative on Climate Change Impacts (2010). Cold water Fish and Fisheries Working Group Report. Wicci.wisc.edu.

2. Kling, G.W., K. Hayhoe, L.B. Johnson, J.J. Magnuson, S. Polasky, S.K. Robinson, B.J. Shuter, M.M. Wander, D.J. Wuebbles, and D.R. Zak. 2003. Confronting Climate Change in the Great Lakes Region. A Report of the Union of Concerned Scientists and the Ecological Society of America. Available at http://www.ucsusa.org/assets/documents/global_warming/greatlakes_final.pdf

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Northern Pike: Ginoozhe

1. Bronte, C.R., Ebener M.P., Schreiner D.R., DeVault D.S., Petzold M.M., Jensen D.A., Richards C., and Lozano S.J. (2003). Fish Community Change in Lake Superior, 1970-2000. *Canadian Journal of Fisheries and Aquatic Sciences,* 60(12), 1552–1574. Available at http://www.fws.gov/midwest/fisheries/scientific-pubs/p-2003-2.pdf

Summary: The Fish Community Change in Lake Superior discusses the changes in Lake Superior's fish communities from 1970 – 2000. In specific it touches on habitat degradation, contaminants, effects of climate warming, phosphorus loading, intentional and unintentional species introductions, as well as other topics. Habitat protection and enhancement to prevent additional damaging effects is needed to further restoration.

Specific pages to note: **Pg. 1554:** Climate warming is projected to increase thermal habitat; would be for Lake Trout, Lake Whitefish, Northern Pike, where non-indigenous species would benefit. This article focuses on fish species recovery.

References Cited to Consider:

- Bronte, C.R., and Hoff, M.H. 1996. Population status and trends for Lake Superior forage fishes, 1978–95. In Minutes of the 1996 Annual Meeting of the Lake Superior Committee, Great Lakes Fishery Commission. Great Lakes Fishery Commission, Ann Arbor, Mich.
- Bronte, C.R., Schram, S.T., Selgeby, J.H., and Swanson, B.L. 1995. Density independent survival of wild lake trout in the Apostle Islands area of Lake Superior. J. Gt. Lakes Res. 21 (Suppl. 1): 246–252.

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- Sinokrot, B.A., Stefan, H.G., McCormick, J.H., and Eaton, J.G. 1995. Modeling of climate change effects on stream temperatures and fish habitats below barrier dams and near groundwater inputs. Clim. Change, 30: 181–200.

2. Casselman, J.M. 2002. Effects of temperature, global extremes, and climate change on year-class production of warmwater, coolwater, and coldwater fishes in the Great Lakes basin. Am. Fish. Soc. Symp. 31: 39–60. Available at ftp://142.36.245.139/.virtual/slk6ftp/pub/outgoing/requests/!age_analysis/CD1/Selected%20Age-Growth%20Publications/Climate%20and%20year-class%20production%20of%20fish,%20AFS%20Symposium,%20C.pdf

Summary: The Effects of Temperature, Global Extremes, and Climate Change on Year-Class Production of Warmwater, Coolwater, and Coldwater fishes in the Great Lakes Basin discuss the impacts of global warming on fisheries. For this they explain the effects of temperature change on fish. Global warming will substantially increase the year-class strength of warmwater species. It will also significantly impact the year-class strength and structure of fish communities in the Great Lakes Basin. Notably decreasing amounts of coldwater and coolwater fish species and increasing warrmwater fish species.

Specific pages to note: **Pg. 51:** Increased water temperature could have affected Northern Pike negatively; decreasing their year-class strength. **Pg. 52:** For Lake Trout, temperature increase would affect their spawning success. If the water temperature increases, their successful

spawning survival would drastically decrease. *Water temperature increase would alter the food web and prey base. *Increase of water temperature would positively affect warmwater fish.

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- Christie, W. J., and H. A. Regier. 1973. Temperature as a major factor influencing reproductive success of fish—two examples. Rapports et Proces-Verbaux des Reunions Conseil International pour l'Exploration de la Mer 164:208–218
- *Hill, D. K., and J. J. Magnuson. 1990. Potential effects of global climate warming on the growth and prey consumption of Great Lakes fish. Transactions of the American Fisheries Society 119:265–275*.
- Kawasaki, T. 2001a. Global warming could have a tremendous effect on the world fisheries production. Journal of International Fisheries 4(1):17–21
- King, J. R., B. J. Shuter, and A. P. Zimmerman. 1999b. Empirical links between thermal habitat, fish growth, and climate change. Transactions of the American Fishieries Society 128:656–665.
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- *Stefan, H. G., X. Fang, and J. G. Eaton. 2001. Simulated fish habitat changes in North American lakes in response to projected climate warming. Transactions of the American Fisheries Society 130:459–477*.

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Wildlife

Pine Marten (American Marten): Waabizheshi

1. National Wildlife Federation. 2010. Improving the Odds: Using Climate-Readiness Planning to Reduce the Impacts of Climate Change on the Great Lakes Ecosystem. Available at http://www.nwf.org/News-and-Magazines/Media-Center/News-by-

Topic/Global-Warming/2010/10-29-10-Great-Lakes-Adaptation-Report.aspx.

Summary: Improving the Odds was created by the National Wildlife Federation to bring awareness to Climate Change and to reduce the impacts of Climate Change. The report describes and analyzes climate-readiness initiatives in the Great Lakes Region. There are specifically looking at restoration practices that reduce climate impacts, implementing climate ready strategies and others. This is crucial to protect our natural resources, infrastructures, public health, as well as fresh water.

Specific pages to note: **Pg. 31:** It is expected that the Pine Marten will find no suitable habitat in Wisconsin. **Pg. 40:** Increased temperature of Lake Superior would benefit Sea Lamprey. This in turn will negatively affect fish species. Sea Lamprey feed on fish and warmer waters would allow for bigger growing Sea Lamprey. This will negatively affect Lake Trout, Herring, Whitefish as well as other species.

References Cited to Consider:

- Wisconsin Initiative on Climate Change Impacts. 2010. Wildlife Working Group. http://wicci.wisc.edu/workinggroups/wildlife/index.htm
- US Environmental Protection Agency. Climate Change. http://www.epa.gov/climatechange/impacts-adaptation/
- U.S. Department of the Interior National Park Service. 2007. Climate Change and Impacts to Resources around the Great Lakes. August 2007

2. Wisconsin Department of Natural Resources: Bureau of Endangered Resources. 2011. Management and Conservation Plan for American Martens in Wisconsin. Available at http://dnr.wi.gov/files/PDF/pubs/ER/ER0697.pdf

Summary: Management and Conservation Plan For American Martens In Wisconsin was created by the Wisconsin Department of Natural Resources as a plan to update the conservation status of the American Marten to ensure they remain a viable member in Wisconsin today and for generations to come. This plan provides background information on Martens including both the cultural significance and socio-economic importance of the Marten. It also provides past and current status of the Marten's life histories, habitats, and threats. It provides information on current research, management goals, and research needs.

Specific pages to note: **Pg. 20:** Climate change will decrease the amount of snowfall or snow pack. Martens need this snow to help them escape from predators. They will also lose their advantage over fishers and other competitors resulting from climate change or climate

warming.

References Cited to Consider:

- Dumyahn, J.B., P.A. Zollner, and J.H. Gilbert. 2007. Winter home-range characteristics of American marten (Martes americana) in Northern Wisconsin. American Midland Naturalist 158:382-394.
- Proulx, G., K. Aubry, J. Birks, S. Buskirk, C. Fortin, H. Frost, W. Krohn, L. Mayo, V. Monakhov, D. Payer, M. Saeki, M. Santos-Reis, R. Weir, and W. Zielinski. 2004. World distribution and status of the genus Martes in 2000. Pp. 21-76 in in D.J. Harrison, A.K. Fuller, and G. Proulx, eds. Martens and fishers (Martes) in human-altered environments: An international perspective. Springer, New York, NY.
- Woodford, J., C. Eloranta, T. Rinaldi, and B. Kohn. 2005. Inventory, status, and management needs of American Marten in northeast Wisconsin. Wisconsin Department of Natural Resources, Madison, WI. 10pp.
- Wydeven, A.P., J.E. Wiedenhoeft, and J.E. Woodford. 2007. Status of the American marten in Wisconsin. Wisconsin Endangered Resources Report No. 135. Wisconsin Department of Natural Resources, Madison, WI. 9pp.

3. Wisconsin Initiative on Climate Change Impacts. 2011. Wisconsin's Changing Climate: Impacts and Adaptation. Nelson Institute for Environmental Studies, University of Wisconsin- Madison and the Wisconsin Department of Natural Resources. Available at http://www.wicci.wisc.edu/publications.php

Summary: This report was created by the Wisconsin Initiative on Climate Change Impacts. It discusses Wisconsin's changing climate in which we now have a warmer, wetter Wisconsin climate. This change has affected precipitation, air temperatures, the quantity and quality of Wisconsin's water resources, natural habitats, agriculture, as well as others. This report is to provide information so that Wisconsin can adapt to the impacts of climate change and create strategies to adapt successfully to current and future climate change.

Specific pages to note: **Chapter 4:** The marten needs areas underneath the snow. Climate warming will lead to increasing in snow density. This will decrease the amount of thermal insulation which the Marten needs for survival. Climate warming will expose the Marten to the cold weather. Also Climate change will threaten the Marten's food source. Martens will also be threatened by more preditation; there will be fewer areas for the Marten to hide.

Fisher: Ojiig Martes pennanti

1. Olson, L. E., Sauder, J. D., Albrecht, N. M., Vinkey, R. S., Cushman, S. A., & Schwartz, M. K. (2014). Modeling the effects of dispersal and patch size on predicted fisher (Pekania [Martes] pennanti) distribution in the US Rocky Mountains. *Biological Conservation*, *169*, 89-98.

Summary: Modeling the effects of dispersal and patch size on predicted fisher distribution in the US Rocky Mountains is an article discussing the impacts climate change will have on habitats. This article specifically looks at the fisher, an already threatened species. They specifically look at fishers located across western Montana and Northern Idaho.

Specific pages to note: **Pg. 93:**The variables that contribute the most to fisher habitat suitability are 25-20 m canopy height, montane riparian vegetation, topographic positions index and mean annual precipitation. 3.2: Fisher habitat is predicted to increase. Fisher habitat is also predicted to shift north. **Pg. 95:** Fishers were more likely to occur in areas with higher mean annual precipitation, mid-range minimum winter temperatures… across both models. **Pg. 97:** Fishers are predicted to expand under climate warming but if they cannot find suitable habitat to disperse in distance greater than 4km then they will likely decline over time.

References Cited to Consider:

- Chen, I.C., Hill, J.K., Ohlemuller, R., Roy D.B., Thomas C.D., 2011. Rapid range shifts of species associated with high levels of climate warming. Science 333, 1024–1026.
- Early, R., Sax, D.F., 2011. Analysis of climate paths reveals potential limitations on species range shifts. Ecology Letters 14, 1125–1133
- Jones, J.L., Garton, E.O., 1994. Selection of successional stages by fishers in north central Idaho. In: Buskirk, S.W., Harestad, A.S., Raphael, M.G., Powell, R.A. (Eds.), Marten, Sables and Fisher: Biology and Conservation. Cornell University Press, Ithaca, NY.
- *Krohn, W.B., Elowe, K.D., Boone, R.B., 1995. Relations among fishers, snow, and martens: development and evaluation of two hypotheses. The Forestry Chronicle 71, 97–105.*
- Wasserman, T.N., Cushman, S.A., Shirk, A.S., Landguth, E.L., Littell, J.S., 2012. Simulating the effects of climate change on population connectivity of American marten (Martes americana) in the northern Rocky Mountains, USA. Landscape Ecology 27, 211–225.

2. McCamman J. (2010). Report to the California Fish and Game Commission: A Status Review of the Fisher (Martes pennanti) in California. State of California Natural Resources Agency Department of Fish and Game. Available at, https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=27900

Summary: A status Review of the Fisher in California was created to report to the California Fish and Game Commission about the current status of the fisher. This report was designed to give background history on the Fisher and their habits, what is needed for their survival, their distribution and abundance, and potential threats to the Fisher. One threat indicated for the Fisher is the current and projected future climate change.

Specific pages to note: **Pg. 57-60:** Prey and den availability for the Fisher may change. Climate Change may exacerbate wildfires which would have negative impacts on Fishers. Stress caused by unideal temperature conditions may lead Fishers to become more susceptible to disease. Lack of deep snow may allow w the Fisher to inhabit areas otherwise not available (as long as wildfires do not destroy the areas making them unsuitable first).

References Cited to Consider:

- Green, G.A., L.A. Campbell, and D.C. MacFarlane. 2008. Submitted. A conservation assessment for fishers (*Martes pennanti*) in the Sierra Nevada of California. USDA Forest Service, Pacific Southwest Region, Vallejo, California, 72pages.
- Harvell, C. D., C. E. Mitchell, J. R. Ward, S. Altizer, A. P. Dobson, R. S. Ostfeld, and M.D. Samuel. 2002. Climate warming and disease risks for terrestrial and marine biota. Science 296 No. 5576: 2158-2162.
- Heinemeyer, K. S. and J. L. Jones. 1994. Fisher biology and management in the western United States: a literature review and adaptive management strategy. Version 1.1. USDA Forest Service Northern Region and Interagency Forest Carnivore Working Group. 120 pp.
- Moritz, C, J. L. Patton, C. J. Conroy, J. L. Parra, G. C. White, S. R. Beissinger. 2008. Impact of a century of climate change on small mammal communities in Yosemite National Park, USA. Science 322:261-264.
- *Safford, H.D. 2006. Potential impacts of climate change to fisher habitat in California: a preliminary assessment. Unpublished report. U.S. Forest Service, Pacific Southwest Region, Vallejo, CA*.

3. Safford, H.D. 2006. Potential impacts of climate change to fisher habitat in California: a preliminary assessment. Unpublished report. U.S. Forest Service, Pacific Southwest Region, Vallejo, CA. Available at http://www.sierraforestlegacy.org/Resources/Conservation/SierraNevadaWildlife/PacificFisher/PF-Safford06.pdf

Summary: This unpublished article addresses the potential impacts that Climate Change could have on the Fisher. Findings indicate that fire is likely to become much more frequent which

would have negative impacts on the Fisher. Fires are likely to destroy many habitats needed by the Fisher for denning.

Specific pages to note: **Pg. 9:** Fishers will more than likely lose crucial denning habitat due to fire increases. However, Fishers may be enhanced by climate warming as long as precipitation levels stay about what they are currently.

References Cited to Consider:

- Harrison, D. J., A. K. Fuller, and G. Proulx. 2004. Martens and fishers (Martes) in human-altered environments: an international perspective. Springer, New York, New York, USA.
- *Krohn, W. B, W. J. Zielinski, and R. B. Boone. 1997. Relations among fishers, snow, and martens in California: results from small-scale spatial comparisons. Pp. 211-232, in: G. Proulx, H. N. Bryant, and P. M. Woodard (eds). Martes: taxonomy, ecology, techniques, and management. Provincial Museum of Alberta, Edmonton, Canada.*

Bobcat: Gidaagaa – Bizhiw

Moose: Mooz

1. Kling, G.W., K. Hayhoe, L.B. Johnson, J.J. Magnuson, S. Polasky, S.K. Robinson, B.J. Shuter, M.M. Wander, D.J. Wuebbles, and D.R. Zak. 2003. Confronting Climate Change in the Great Lakes Region. A Report of the Union of Concerned Scientists and the Ecological Society of America. Available at http://www.ucsusa.org/assets/documents/global_warming/greatlakes_final.pdf

Summary: Confronting Climate Change in the Great Lakes Region is a report of The Union of Concerned Scientists and The Ecological Society of America. This report explains that growing evidence suggests that climate change is already affecting the Great Lakes Region: winters are shorter, average temperatures are warmer, lake ice cover is decreasing, and heavy rainstorms are more common. The potential consequences from climate change for the Great Lakes Region are confronted for the economic as well as the environmental impacts.

Specific pages to note: **Pg. 2:** Whitefish reproduction could be threatened with the loss of winter ice [Coldwater fish (Lake Trout, Whitefish, Herring) and Coolwater fish (Northern Pike, Walleye) are likely to decline in abundance]. **Pg. 54-55**: If warmwater fish species expand and increase in number in Lake Superior, this could lead to the extirpation (local extinction) of

native minnows. This could have negative impacts on Lake Trout and other Native predators. "Climate warming will greatly reduce the amount of thermally suitable habitat for Lake Trout in many inland lakes." **Pg. 60:** Moose could be harmed by warming: increase in deer populations could carry disease that will stress the moose population.

References Cited to Consider:

- *Hill, D.K., and J.J. Magnuson (1990). Potential effects of global climate warming on the growth and prey consumption of Great Lakes fi sh. Transactions of the American Fisheries Society 119:265–275. American Fisheries Society 119:265–275.*
- Magnuson, J.J., et al. (1997). Potential effects of climate change on aquatic systems: Laurentian Great Lakes and Precambrian Shield Region. In Freshwater Ecosystems and Climate Change in North America: A Regional Assessment. C.E. Cushing, ed. New York: John Wiley & Sons, pp. 7–53.
- *Magnuson, J.J., J.D. Meisner, and D.K. Hill (1990). Potential changes in the thermal habitat of Great Lakes fish after global climate warming. Transactions of the American Fisheries Society 119:254–264. American Fisheries Society 119:254–264*
- Shuter, B.J., C.K. Minns, and N. Lester (2002). Climate change, freshwater fi sh and fi sheries: Case studies from Ontario and their use in assessing potential impacts. In Fisheries in a Changing Climate. N.A. McGinn, ed. Bethesda, Md.: American Fisheries Society, pp. 77–88.
- *Stefan, H.G., X. Fang, and J.G. Eaton (2001). Simulated fish habitat changes in North American lakes in response to projected climate warming. Transactions of the American Fisheries Society 130:459–477*.

2. Lankester, M.W. 2010. Understanding the Impact of Meningeal Worm, Parelaphostrongylus tenuis, on Moose Populations. Alces Vol. 46: 53-70.

Summary: Understanding the Impacts of Meningeal Worm on Moose Populations is an article that explores the declines in moose populations that have occurred during the past century. In general these decreases in moose population are associated with higher deer populations. This inverse relationship is caused by the Meningeal worm, a parasite that white-tailed deer carry and have shown deadly to moose population when stressed. Climate change causing warmer winters is a factor that has caused an increase in deer population in moose habitat.

Specific pages to note: **Pg. 54:** There is a seen inverse relationship between moose and deer density. Less severe winters allow for an increase of deer density that then transmits diseases to the moose populations. *With Climate warming the frequency of less-severe winters would increase. This would allow for an increase in deer density which would negatively affect moose

populations.

References Cited to Consider:

- *Lenarz, M. S., Nelson, M. E., Schrage, M. W., & Edwards, A. J. (2009). Temperature mediated moose survival in northeastern Minnesota. The Journal of Wildlife Management, 73(4), 503-510*.
- *Murray, D. L., Cox, E. W., Ballard, W. B., Whitlaw, H. A., Lenarz, M. S., Custer, T. W., ... & Fuller, T. K. (2006). Pathogens, nutritional deficiency, and climate influences on a declining moose population. Wildlife Monographs, 166(1), 1-30*.

3. Michigan Technical University. 2007. Global Warming Threatens Moose, Wolves. Michigan Tech News/Media, August 15, 2007. Available at http://www.admin.mtu.edu/urel/news/media_relations/592.

Summary: The article Global Warming Threatens Moose, Wolves discusses the fact that if moose and wolves go extinct it will because of humans that make climate change increase at a faster rate. Hot summers exacerbate moose ticks which combined with the heat are detrimental to moose populations. The hot summers and ticks make moose easy prey for wolves to kill. If moose continue to drop in population it will not only affect the moose themselves but wolf population as well.

Specific pages to note: *The heat threatens the Moose. Hot weather causes moose to forage less and rest more. If they forages less it will be less likely that they survive in the winter.

4. Minnesota Department of Natural Resources. 2011. Minnesota Moose Research and Management Plan. Available at http://www.dnr.state.mn.us/moose/index.html.

Summary: The Minnesota Moose Research and Management Plan which was created by the Minnesota Department of Natural Resources because the moose population in Minnesota is currently in decline. Their findings show that moose population decline is associated with increasing summer temperature. This report is recommendations to DNR to better understand what the moose populations need to reverse this decline.

Specific pages to note: **Pg. 30:** Research implies that climate warming is contributing to the high mortality rates of moose. Higher temperatures are contributing to stress on moose, which leave them vulnerable to disease, predators, parasites, etc. There is a link between moose populations and climate warming.

References Cited to Consider:

- *Lenarz, M. S., Nelson, M. E., Schrage, M. W., & Edwards, A. J. (2009). Temperature mediated moose survival in northeastern Minnesota. The Journal of Wildlife Management, 73(4), 503-510*.
- *Murray, D. L., Cox, E. W., Ballard, W. B., Whitlaw, H. A., Lenarz, M. S., Custer, T. W., ... & Fuller, T. K. (2006). Pathogens, nutritional deficiency, and climate influences on a declining moose population. Wildlife Monographs, 166(1), 1-30*.
- Post, E. and N. C. Stenseth. 1998. Large-Scale Climatic Fluctuation and Population Dynamics of Moose and White-Tailed Deer. Journal of Animal Ecology. 67: 537-543.

Plants

Wild Rice: Manoomin

1. Cuffe, S. 2014. Wild Rice and High Water: A Northern Harvest Under Threat. Briarpatch Magazine. Available at: http://briarpatchmagazine.com/articles/view/wild-rice-and-high-water

Summary: An article written to discuss Wild Rice and harvesters in Saskatchewan and Minnesota. Methods to try and control the wild rice while facing the effects of climate change. This article touches on the sensitivity wild rice has to environment change and that climate change can cause stress on the rice. Wild Rice is a traditionally important crop to the Anishinaabe and now there are domesticated hybrids of it, which also bring risks to the natural wild rice.

Specific Pages to Note: Wild rice is very susceptible to water change. If it gets too high at certain times of the year it will drown out the wild rice which, climate change could have an effect on. Strong winds, heavy rains, and hail can cause damage to wild rice crops. This plant also depends on a certain amount of natural water circulation, and is very particular of when, where, and how it grows.

2. Ojibwe Lifeway: Wild Rice Harvesting ("Dagwaagin" – Fall). Gikinoo'wizhiwe Onji Waaban (Guiding For Tomorrow) "G-WOW" Changing Climate, Changing Culture. Available at: http://www.g-wow.org/en-us/wildrice/default.aspx

Summary: Gikinoo'wizhiwe Onji Waaban is a website designed to look at Ojibwe lifeways and how they are affected by climate change. This specific one looks to understand wild rice, the importance of the crop to the Ojibwe people and climate related stressors that have been and

will affect these wild rice crops.

Specific Pages to Note: Climate Related issues: water level has dire consequences to wild rice; it can kill the plants with either too little or too much water. Intense rainfall can also drown wild rice plants or uproot them. Certain invasive species are out competing wild rice crops. Disease and insects that damage wild rice have been increasing noticeable with the warming climate.

3. Hoene, N. 2010. Climate Change, an Ojibwe Perspective. The Seiche. Minnesota Sea Grant, March 2010. Available at http://www.seagrant.umn.edu/newsletter/2010_03.html.

Summary: Climate Change, an Ojibwe Perspective is an article discussing different Tribal members and their observation on the effects of climate change. Wild Rice, Maple Sugar, Birch, Pine, and other elements used in the Ojibwe culture are discussed on how climate change will impact them.

Specific pages to note: **Maple Sugar:** Sap has been running sooner; with a warmer climate it could start to run, and then stop. **Wild Rice:** It cannot stand extreme water level changes. **Coldwater Fish:** They will not stay if the streams warm by even a few degrees. **Tree:** A warmer climate means the loss of Birch, and potentially Sugar Maple if there is an increase in forest fires.

4. Myers, J. 2014. Wild Rice Under the Microscope: Scientists Work Fast to Learn What Sulfate Does to Minnesota's Iconic Natural Food. Minnesota Department of Natural Resources. Available at: http://www.dnr.state.mn.us/volunteer/mayjun13/wild_rice.html

Summary: This is a study conducted by the University of Minnesota on wild rice, specifically on the impact sulfate has on wild rice. It is specifically meant to understand the relationship between sulfate and wild rice. It discusses what wild rice needs for growth and factors could affect its growth. One factor briefly mentioned is climate change.

Specific Pages to Note: If sulfate is placed in the lakes, wild rice will not immediately die; there is a whole ecosystem that has to react which happens over years. Climate warming, floods and droughts also cause problems for wild rice crops. There are seen decreases in the amount of wild rice crops that have been having rice in them.

5. Pember, Mary A. 2012. Climate Change Threatens the Ojibwe's Wild Rice Harvest. Indian Country Today Media Network. Available at: http://indiancountrytodaymedianetwork.com/2012/11/02/climate-change-threatens-ojibwes-wild-rice-harvest-143579

Summary: An article written for Indian Country Today Media Network first discussing the importance of Wild Rice to the Ojibwe stories, mentioning their migration story. It mentions how wild rice crops have seen a total loss in 2012. Finally it goes through how climate change is a factor relating to the decreased amounts of wild rice in the sloughs.

Specific Pages to Note: Wild rice, manoomin favor colder temperatures, climate warming could cause manoomin to shift farther north. It could also have caused higher rates of disease within the crops of manoomin.

6. Yeager, C. Where Food Grows on Water: Environmental and Human Threats to Wisconsin's Wild Rice. 2011. Circle of Blue. Available at: http://www.circleofblue.org/waternews/2011/world/where-food-grows-on-water-environmental-and-human-made-threats-to-wisconsins-wild-rice/

Summary: This article is written on Wisconsin's rice beds and the threats that they face from both humans and the environment. It discusses the various growing stages wild rice goes through. Examples of climate change harming wild rice being water levels in the Great Lakes, storms, and heavy rains. Lastly, the article touches on the importance of Wild Rice to the Anishinaabe with an interview from Joe Rose, Bad River Tribal Elder.

Specific Pages to Note: A warming climate could lead to lower water levels in the Great Lakes; this would have dire impacts on wild rice crops. Increased flooding or heavy rains caused from climate change could drown or uproot wild rice crops especially when it is in its floating leaf stage (a critical and fragile time in the growth cycle). There have been seen changes in wild rice beds caused by climate change in Wisconsin.

Trees

Sugar Maple: Ziinzibaakwadaatig

1. *Frumhoff, P.C.; McCarthy, J.J.; Melillo, J.M.; Moser, S.C.; Wuebbles, D.J. 2007. Confronting Climate Change in the U.S. Northeast: Science, Impacts and Solutions. Synthesis Report of the Northeast Climate Impacts Assessment (NECIA). Cambridge,*

MA: Union of Concerned Scientists. Available at: http://www.northeastclimateimpacts.org/pdf/confronting-climate-change-in-the-u-s-northeast.pdf

Summary: This report discusses the Northeast and how they experience huge climate diversity within a small area. This area has also experienced drastic climate change since 1970, with a warming rate of almost 0.5 degrees Fahrenheit per decade. With the experienced climate warming there have been seen changes in the environment. This report was created to understand past and future climate change, to understand the potential effects that climate change could bring about.

Specific pages to note: **Pg. 49 & 55:** Projections indicate that male habitat will shift northward under either climate change scenario. Southern species of trees eventually become their replacements in the Northeast. Climate change will also leave the maple tree more susceptible to disease, pests, drought, wildfire, and storm damage. **Pg. 55 & 58:** Sugar maple is expected to lose drastic amounts of suitable habitat. It could have the chance of surviving under climate warming but a warmer winter is expected disrupt the winter pattern sugar maples need for optimal syrup production. **Pg. 59:** With a projected decrease in Maples and the loss of their colorful changing leaves in the fall, tourism could suffer in the Northeast. **Pg. 74:** Maple Syrup has seen a shift in the time it usual is produced, which has caused a decline in the syrup industry. Global warming is one possibility as to why this shift has occurred, and is likely to keep occurring.

References Cited to Consider:

- Belluck, P. 2007. Warm Winters Upset Rhythms of Maple Sugar. The New York Times, March 3. Available at: http://www.nytimes.com/2007/03/03/us/03maple.html?pagewanted=1&ei=5070&en=8309fa4efa4d66b6&ex=1173589200&emc=eta1.
- Case, C.F. 2005. Climate Change Could Sour U.S. Maple Sugaring. The Christian Science Monitor. April 6. Available at: http://www.csmonitor.com/2005/0406/p11s01-sten.html.
- *Clean Air-Cool Planet. 2007. Climate Change and the Northern Forest. Available at:* http://www.cleanair-coolplanet.org/information/factsheets.php.
- *Hayhoe, K., C.P. Wake, B. Anderson, X.-Z. Liang, E. Maurer, J. Zhu, J. Bradbury, A. DeGaetano, A. Hertel, and D. Wuebbles. 2008. Regional Climate Change Projections for the Northeast U.S. Mitigation and Adaptation Strategies for Global Change. In press.*

- *Iverson, L., A. Prasad, and S. Matthews. 2008. Potential Changes in Suitable Habitat for 134 Tree Species in the Northeastern United States. Mitigation and Adaptation Strategies for Global Change. In press.*
- *Mohan, J.E., J.M. Melillo, K. Lenoir, R. Hanifin, J.H. Blanchard, T. Sipe, S. Sistla, P.A. Steudler, F. Bowles, and F.A. Bazzaz. 2007. Shifting Temperate Forest Composition with Soil Warming. Nature. In review.*
- *Ollinger, S.V., C.L. Goodale, K. Hayhoe, and J.P. Jenkins. 2008. Potential Effects of Climate Change and Rising CO_2 on Ecosystem Processes in Northeastern U.S. Forests. Mitigation and Adaptation Strategies for Global Change. In press.*
- Sheehan, J.F., and The Adirondack Council. 1998. Acid rain: A Continuing National Tragedy. Elizabethtown, NY. Available at: http://www.adirondackcouncil.org/acrapub.pdg.

2. Great Lakes Area National Park Service U.S. Department of the Interior. 2007. Climate Change: Dying Birch trees, minimal snowpack, and ice-free lakes are just some Impacts of Midwest Warming. Available at http://www.nps.gov/apis/naturescience/upload/2007%20MWR%20Climate%20Change%20Site%20Bulletin%20-%20Great%20Lakes%20FINAL.pdf

Summary: This article, Dying Birch Trees, Minimal Snowpack, and Ice-Free Lakes Are Just Some Impacts of Midwest Warming discusses climate change effects in the Midwest Region. It touches on the science reports by the U.S. Global Change Research Program as well as others and how they show that this is due to greenhouse gases produced by human activities. In specific the article has sections on Temperature and Precipitation, The Ecological Effects, New Faces in New Places, and Recreation, Health and Safety.

Specific pages to note: * Cool tree species are projected to lose habitat in the U.S. Sugar Maple and Paper Birch are expected to shift towards Canada. For the Apostle Island Lakeshore and Michigan Upper peninsula Paper Birch may lose all habitats. *Coldwater fish such as Trout will decrease in abundance. Whitefish spawning areas will be disturbed and Native fish will be threatened.

3. Hoene, N. 2010. Climate Change, an Ojibwe Perspective. The Seiche. Minnesota Sea Grant, March 2010. Available at http://www.seagrant.umn.edu/newsletter/2010_03.html.

Summary: Climate Change, an Ojibwe Perspective is an article discussing different Tribal members and their observation on the effects of climate change. Wild Rice, Maple Sugar, Birch,

Pine, and other elements used in the Ojibwe culture are discussed on how climate change will impact them.

Specific pages to note: **Maple Sugar:** Sap has been running sooner; with a warmer climate it could start to run, and then stop. **Wild Rice:** It cannot stand extreme water level changes. **Coldwater Fish:** They will not stay if the streams warm by even a few degrees. **Tree:** A warmer climate means the loss of Birch, and potentially Sugar Maple if there is an increase in forest fires.

4. Ojibwe Lifeway: Maple Sugaring and Birch Bark Harvesting ("Ziigwan" – Spring). Gikinoo'wizhiwe Onji Waaban (Guiding for Tomorrow) "G-Wow" Changing Climate, Changing Culture. Available at: http://www.g-wow.org/en-us/maple_birch/default.aspx

Summary: Gikinoo'wizhiwe Onji Waaban is a website designed to look at Ojibwe lifeways and how they are affected by climate change. This specific one looks to understand both sugar maples and birch bark trees. It covers the specific cultural importance of these trees. As well as, includes impacts they face resulting from climate change and possible climate change stressors.

Specific Pages to Note: Climate warming will cause a decrease in suitable habitat for Sugar Maple. Climate warming could also have an impact on soil moisture which will inhibit Sugar Maple's effectiveness to receive water and nutrients. Climate change may also allow for an increase in disease and pests. Lastly, shorter winters may cause stress on the Sugar Maple and allow for greater vulnerability to pests. This in turn will cause a decrease in the Maple Sap production.

5. *Rustad, L., Campbell, J., Dukes, J.S., Huntington, T., Lambert, K.F., Mohan, J., Rodenhouse, N. Changing Climate, Changing Forests: The Impacts of Climate Change on Forests of the Northeastern United States and Eastern Canada. United States Department of Agriculture. 2012. Available at*: http://www.nrs.fs.fed.us/pubs/gtr/gtr_nrs99.pdf

Summary: This was created to study climate change and the effects it poses on forest ecosystems with the goal to provide important insights for forest science, management, and policy. Climate change is predicted to have dire effects on habitat locations of tree species. A decline in suitable habitats is expected with a change in abundance and distribution of wildlife.

Specific pages to note: **Pg. 13**: Tourism would be affected with a shift from Sugar maples to Oaks. **Pg. 17 & 18:** Table 2. Shows that Sugar maple is expected to lose suitable habitat. Maple will lose habitat in either climate change scenario. **Pg. 20:** Sugar maple could decline based on prolonged thaw-freeze events.

References Cited to Consider:

- Bertrand, A.; Robitaille, G.; Nadeau, P.; Boutin, R. 1994. Effects of Soil Freezing and Drought Stress on Abscisic Acid Content of Sugar Maple Sap and Leaves. Tree Physiology. 14(4): 413-425.
- Burton, A.J.; Pregitzer, K.S; Zogg, G.P.; Zak, D.R. 1998. Drought Reduces Rot Respiration in Sugar Maple Forests. Ecological Applications. 8: 771-778.
- *Frumhoff, P.C.; McCarthy, J.J.; Melillo, J.M.; Moser, S.C.; Wuebbles, D.J. 2007. Confronting Climate Change in the U.S. Northeast: Science, Impacts and Solutions. Synthesis Report of the Northeast Climate Impacts Assessment (NECIA). Cambridge, MA: Union of Concerned Scientists. 146 p.*
- *Iverson, L.R.; Prasad, A.; Matthews, S. 2008. Modeling Potential Climate Change Impacts on the Trees of the Northeastern United States. Mitigation and Adaptation Strategies for Global Change. 13: 517-540.*
- *Ollinger, S.V.; Goodale, C.L.; Hayhoe, K.; Jenkins, J.P. 2008. Potential Effects of Climate Change and Rising CO_2 on Ecosystem Processes in Northeastern U.S. Forests. Mitigation and Adaptation Strategies for Global Change. 13: 467-485.*
- *Woodall, C.W.; Oswalt, C.M.; Westfall, J.A.; Perry, C.H.; Nelson, M.D.; Finley, A.O. 2009. An Indicator of Tree Migration in Forests of the Eastern United States. Forest Ecology and Management. 257: 1434-1444*.

6. http://www.fs.fed.us/nrs/atlas/tree/241
http://www.fs.fed.us/nrs/atlas/tree/318
http://www.fs.fed.us/nrs/atlas/tree/375
http://www.fs.fed.us/nrs/atlas/tree/543

Summary: These websites show the current distribution of the Northern White Cedar, Sugar Maple, Paper Birch, and Black Ash respectively. They are maps created by the United States Department of Agriculture Forest Service to show the current distribution, projected future habitat, and predictor maps of these tree species. They are interactive maps where you can see climate change affecting the tree species with consideration of specific factors.

Paper Birch: Wiigwaasaatig

1. *Frumhoff, P.C.; McCarthy, J.J.; Melillo, J.M.; Moser, S.C.; Wuebbles, D.J. 2007. Confronting Climate Change in the U.S. Northeast: Science, Impacts and Solutions. Synthesis Report of the Northeast Climate Impacts Assessment (NECIA). Cambridge, MA: Union of Concerned Scientists.* Available at: http://www.northeastclimateimpacts.org/pdf/confronting-climate-change-in-the-u-s-northeast.pdf

Summary: This report discusses the Northeast and how they experience huge climate diversity within a small area. This area has also experienced drastic climate change since 1970, with a warming rate of almost 0.5 degrees Fahrenheit per decade. With the experienced climate warming there have been seen changes in the environment. This report was created to understand past and future climate change, to understand the potential effects that climate change could bring about.

Specific pages to note: **Pg. x:** Birch forests are predicted t shift dramatically northward in predicted climate change scenarios. **Pg. 49:** Figure 6. Shows the predicted shift birch is expected to take under two climate change scenarios. **Pg. 55:** Birch is projected to shift northward in either climate change scenario, with oak trees taking over to replace them. Climate change may leave birch more vulnerable to disease, pests, drought, wildfire, and storm damage. **Pg. 59:** The loss of birch with their colorful leaves in the fall could cause a decrease in tourism.

References Cited to Consider:

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- *Hayhoe, K., C.P. Wake, B. Anderson, X.-Z. Liang, E. Maurer, J. Zhu, J. Bradbury, A. DeGaetano, A. Hertel, and D. Wuebbles. 2008. Regional Climate Change Projections for the Northeast U.S. Mitigation and Adaptation Strategies for Global Change. In press.*
- *Iverson, L., Prasad, and S. Matthews. 2008. Potential Changes in Suitable Habitat for 134 Tree Species in the Northeastern United States. Mitigation and Adaptation Strategies for Global Change. In press*.
- *Mohan, J.E., J.M. Melillo, K. Lenoir, R. Hanifin, J.H. Blanchard, T. Sipe, S. Sistla, P.A. Steudler, F. Bowles, and F.A. Bazzaz. 2007. Shifting Temperate Forest Composition with Soil Warming. Nature. In review.*
- *Ollinger, S.V., C.L. Goodale, K. Hayhoe, and J.P. Jenkins. 2008. Potential Effects of Climate Change and Rising CO_2 on Ecosystem Processes in Northeastern U.S. Forests. Mitigation and Adaptation Strategies for Global Change. In press.*

2. Great Lakes Area National Park Service U.S. Department of the Interior. 2007. Climate Change: Dying Birch trees, minimal snowpack, and ice-free lakes are just some Impacts of Midwest Warming. Available at http://www.nps.gov/apis/naturescience/upload/2007%20MWR%20Climate%20Change%20Site%20Bulletin%20-%20Great%20Lakes%20FINAL.pdf

Summary: This article, Dying Birch Trees, Minimal Snowpack, and Ice-Free Lakes Are Just Some Impacts of Midwest Warming discusses climate change effects in the Midwest Region. It touches on the science reports by the U.S. Global Change Research Program as well as others and how they show that this is due to greenhouse gases produced by human activities. In specific the article has sections on Temperature and Precipitation, The Ecological Effects, New Faces in New Places, and Recreation, Health and Safety.

Specific pages to note: * Cool tree species are projected to lose habitat in the U.S. Sugar Maple and Paper Birch are expected to shift towards Canada. For the Apostle Island Lakeshore and Michigan Upper peninsula Paper Birch may lose all habitats. *Coldwater fish such as Trout will decrease in abundance. Whitefish spawning areas will be disturbed and Native fish will be threatened.

3. Hoene, N. 2010. Climate Change, an Ojibwe Perspective. The Seiche. Minnesota Sea Grant, March 2010. Available at http://www.seagrant.umn.edu/newsletter/2010_03.html.

Summary: Climate Change, an Ojibwe Perspective is an article discussing different Tribal members and their observation on the effects of climate change. Wild Rice, Maple Sugar, Birch, Pine, and other elements used in the Ojibwe culture are discussed on how climate change will impact them.

Specific pages to note: **Maple Sugar:** Sap has been running sooner; with a warmer climate it could start to run, and then stop. **Wild Rice:** It cannot stand extreme water level changes. **Coldwater Fish:** They will not stay if the streams warm by even a few degrees. **Tree:** A warmer climate means the loss of Birch, and potentially Sugar Maple if there is an increase in forest fires.

4. Iverson, L., A.M. Prasad, S.N. Matthews, M. Peters. 2008. Estimating Potential Habitat for 134 Eastern US Tree Species Under Six Climate Scenarios. Forest Ecology and Management 254: 390-406.

Summary: This article is a map of 134 tree species selected from random forests to study their responses to climate change. It is to show the current as well as potential future habitats of these species according to two emission scenarios with three climate models. Generally most specie habitats move northeast, with it being more drastically in a higher emission scenario. Generally there are quite a lot of species predicted to lose suitable habitat areas.

Specific Pages to Note: **Pg. 401:** Birch can sustain some habitat under low emissions but once under high emissions, it is eliminated. **Pg. 404:** Forests are expected to lose habitat under either scenarios.

References Cited to Consider:

- Chaing, J., Iverson, L.R., Prasad, A.M., Brown, K., 2006. Interactions of Changing Climate and Shifts in Forest Composition on Stand Carbon Balance. In: Ecological Society of America, 91st Annual Meetings, Memphis, TN.
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- Schwartz, M.W., Iverson, L.R., Prasad, A.M., Matthews, S.N., O'Connor, R.J., 2006. Predicting extinctions as a result of climate change. Ecology 87 (7), 1611–1615.
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5. Ojibwe Lifeway: Maple Sugaring and Birch Bark Harvesting ("Ziigwan" – Spring). Gikinoo'wizhiwe Onji Waaban (Guiding for Tomorrow) "G-Wow" Changing Climate, Changing Culture. Available at: http://www.g-wow.org/en-us/maple_birch/default.aspx

Summary: Gikinoo'wizhiwe Onji Waaban is a website designed to look at Ojibwe lifeways and how they are affected by climate change. This specific one looks to understand both sugar maples and birch bark trees. It covers the specific cultural importance of these trees. As well as, includes impacts they face resulting from climate change and possible climate change stressors.

Specific Pages to Note: Climate warming will cause a decrease in suitable habitat for Paper Birch. Climate warming could also have an impact on soil moisture which will inhibit birch effectiveness to receive water and nutrients. Climate change may also allow for an increase in disease and pests. Lastly, shorter winters may cause stress on the paper birch and allow for greater vulnerability to pests.

6. *Rustad, L., Campbell, J., Dukes, J.S., Huntington, T., Lambert, K.F., Mohan, J., Rodenhouse, N. Changing Climate, Changing Forests: The Impacts of Climate Change on Forests of the Northeastern United States and Eastern Canada. United States Department of Agriculture. 2012. Available at*: http://www.nrs.fs.fed.us/pubs/gtr/gtr_nrs99.pdf

Summary: This was created to study climate change and the effects it poses on forest ecosystems with the goal to provide important insights for forest science, management, and policy. Climate change is predicted to have dire effects on habitat locations of tree species. A decline in suitable habitats is expected with a change in abundance and distribution of wildlife.

Specific pages to note: **Pg. 17:** Graph shows that Paper birch will experience a (87%) loss in suitable habitat under predicted climate change scenarios. **Pg. 18:** Under either climate change scenario, birch habitat experiences habitat loses out to oak and hickory habitats. **Pg. 20** Birch experiences habitat loss due to extended winter thaw cycles.

References Cited to Consider:

- Balch, R.E. 1944. The Dieback of Birch in the Maritime Region. Contribution No. 3. Fredericton, NB: Dominion of Canada, Department of Agriculture, Division of Entomology.

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- *Iverson, L.R.; Prasad, A.; Matthews, S. 2008. Modeling Potential Climate Change Impacts on the Trees of the Northeastern United States. Mitigation and Adaptation Strategies for Global Change. 13: 517-540.*
- *Ollinger, S.V.; Goodale, C.L.; Hayhoe, K.; Jenkins, J.P. 2008. Potential Effects of Climate Change and Rising CO_2 on Ecosystem Processes in Northeastern U.S. Forests. Mitigation and Adaptation Strategies for Global Change. 13: 467-485.*
- *Woodall, C.W.; Oswalt, C.M.; Westfall, J.A.; Perry, C.H.; Nelson, M.D.; Finley, A.O. 2009. An Indicator of Tree Migration in Forests of the Eastern United States. Forest Ecology and Management. 257: 1434-1444*.

7. http://www.fs.fed.us/nrs/atlas/tree/241
http://www.fs.fed.us/nrs/atlas/tree/318
http://www.fs.fed.us/nrs/atlas/tree/375
http://www.fs.fed.us/nrs/atlas/tree/543

Summary: These websites show the current distribution of the Northern White Cedar, Sugar Maple, Paper Birch, and Black Ash respectively. They are maps created by the United States Department of Agriculture Forest Service to show the current distribution, projected future habitat, and predictor maps of these tree species. They are interactive maps where you can see climate change affecting the tree species with consideration of specific factors.

Northern White Cedar: Nookomis Giizhik

1. *Rustad, L., Campbell, J., Dukes, J.S., Huntington, T., Lambert, K.F., Mohan, J., Rodenhouse, N. Changing Climate, Changing Forests: The Impacts of Climate Change on Forests of the Northeastern United States and Eastern Canada. United States Department of Agriculture. 2012. Available at*: http://www.nrs.fs.fed.us/pubs/gtr/gtr_nrs99.pdf

Summary: This was created to study climate change and the effects it poses on forest ecosystems with the goal to provide important insights for forest science, management, and policy. Climate change is predicted to have dire effects on habitat locations of tree species. A decline in suitable habitats is expected with a change in abundance and distribution of wildlife.

Specific pages to note: **Pg. 17:** Graph shows a decrease in Northern White Cedar is expected to have a (73%) decrease in suitable habitat.

References Cited to Consider:

- *Frumhoff, P.C.; McCarthy, J.J.; Melillo, J.M.; Moser, S.C.; Wuebbles, D.J. 2007. Confronting Climate Change in the U.S. Northeast: Science, Impacts and Solutions. Synthesis Report of the Northeast Climate Impacts Assessment (NECIA). Cambridge, MA: Union of Concerned Scientists. 146 p.*
- *Iverson, L.R.; Prasad, A.; Matthews, S. 2008. Modeling Potential Climate Change Impacts on the Trees of the Northeastern United States. Mitigation and Adaptation Strategies for Global Change. 13: 517-540.*
- *Ollinger, S.V.; Goodale, C.L.; Hayhoe, K.; Jenkins, J.P. 2008. Potential Effects of Climate Change and Rising CO_2 on Ecosystem Processes in Northeastern U.S. Forests. Mitigation and Adaptation Strategies for Global Change. 13: 467-485.*
- *Woodall, C.W.; Oswalt, C.M.; Westfall, J.A.; Perry, C.H.; Nelson, M.D.; Finley, A.O. 2009. An Indicator of Tree Migration in Forests of the Eastern United States. Forest Ecology and Management. 257: 1434-1444*.

2. United States Department of Agriculture. 2014. Michigan Forest Ecosystem Vulnerability Assessment and Synthesis: A Report from the Northwoods Climate Change Response Framework Project. Available at: http://www.fs.fed.us/nrs/pubs/gtr/gtr_nrs129.pdf

Summary: This report was created by the United States Department of Agriculture to explain how the forests in northern Michigan will be affected by Climate Change. It specifically discusses the forests in the eastern and northern parts of the Upper Peninsula. It identifies major forest trends and stressors that are currently threatening Michigan forests. Using climate projections they identified the potential future impacts of climate change on forests.

Specific pages to note: **Pg. 96:** Table 17. Northern White Cedar decreases in both climate change scenarios. **Pg. 101:** Northern White Cedar experienced increased climate stress in both scenarios of climate change. As the climate warms it is expected to face increasing climate

related stress. **Pg. 121 & 128 & 134:** Northern White Cedar is expected to lose suitable habitat for survival. **Pg. 134:** Deer will inhibit the regeneration ability of Northern White Cedar which will add the future climate related stress. **Pg. 157:** Native American Tribes are likely to face decreased availability of culturally important tree species such as the Northern White Cedar.

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- Chhin, J.M.; Iverson, L.R.; Prasad, A.; Brown, K.J. 2008. Effects of Climate Change and Shifts in Forest Composition on Forest Net Primary Production. Journal of Integrative Plant Biology. 50(11): 1426-1439.
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- Ollinger, S.; Goodale, C.; Hayhoe, K.; Jenkins, J. 2008. Potential effects of Climate Change and Rising CO_2 on Ecosystem Processes in Northeastern U.S. Forests. Mitigation and Adaptation Strategies for Global Change. 13(5): 467-485.
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- Scheller, R.M.; Mladenoff, D.J. 2005. A spatially interactive Simulation of Climate Change, Harvesting, Wind, and Tree Species Migration and Projected Changes to Forest Composition and Biomass in Northern Wisconsin, USA. Global Change Biology. 11(2): 307-321.

3. Whitman, A. 2013. Suggested Climate Change Adaptation Strategies for The Narrows WMA, Stands 1 and 5. Manomet Center for Conservation Sciences. Available at: https://www.manomet.org/sites/default/files/publications_and_tools/2013%20Manomet%20-%20Suggested%20Climate%20Change%20Adaptation%20Strategies%20for%20The%20Narrows%20WMA%20VT%20FINAL.pdf

Summary: This article is on Climate Change of the forests and forest habitats in Vermont. They have the projected climate change impacts that Vermont's forests in the south will experience including temperature, drought, lack of snow cover, and wildfire. The article gets over the current challenges that Vermont is facing and how they are trying to manage the impacts from climate change.

Specific Pages to Note: **Pg. 2 & 3:** Cedar seedling have a high mortality is greatest at temperatures above 90 degrees F, global warming could impact the mortality rate of cedar seedling. **Pg. 3:** Drought may have negative impacts on white cedar's regeneration abilities.

References Cited to Consider:

- Allen, C., A. Macalady, H. Chenchouni, D. Bachelet, N. McDowell, M. Vennetier, and N. Cobb. 2010. A Global Overview of Drought and Heat-Induced Tree Mortality Reveals Emerging Climate Change Risks For Forests. Forest Ecology and Management 259: 660-684.
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- *Iverson, L.R., A.M. Prasad, and M.W. Schwartz. 2005. Predicting Potential Changes in Suitable Habitat and Distribution by 2100 for Tree Species of the Eastern United States. Journal of Agricultural Meteorology 61: 29 – 37.*
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- *Ollinger, S., C. Goodale, K. Hayhoe, and J. Jenkins. 2008. Potential Effects of Climate Change and Rising CO_2 on Ecosystem Processes in Northeastern U.S. Forests. Mitigation and Adaptation Strategies for Global Change 13: 541 – 554.*
- Rustad, L., J. Campbell; J. Dukes; T. Huntington; K. Lambert, J. Mohan, and N. Rodenhouse. 2012. Changing Climate, Changing Forests: The Impacts of Climate Change on Forests of the Northeastern United States and Eastern Canada. Gen. Tech. Rep. NRS-99. Newtown Square, PA: USDA. Forest Service, Northern Research Station. 48 p.

4. http://www.fs.fed.us/nrs/atlas/tree/241
http://www.fs.fed.us/nrs/atlas/tree/318
http://www.fs.fed.us/nrs/atlas/tree/375
http://www.fs.fed.us/nrs/atlas/tree/543

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Black Ash: Baapaagimaak

1. http://www.fs.fed.us/nrs/atlas/tree/241
http://www.fs.fed.us/nrs/atlas/tree/318
http://www.fs.fed.us/nrs/atlas/tree/375
http://www.fs.fed.us/nrs/atlas/tree/543

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Ceded Territory Boundaries

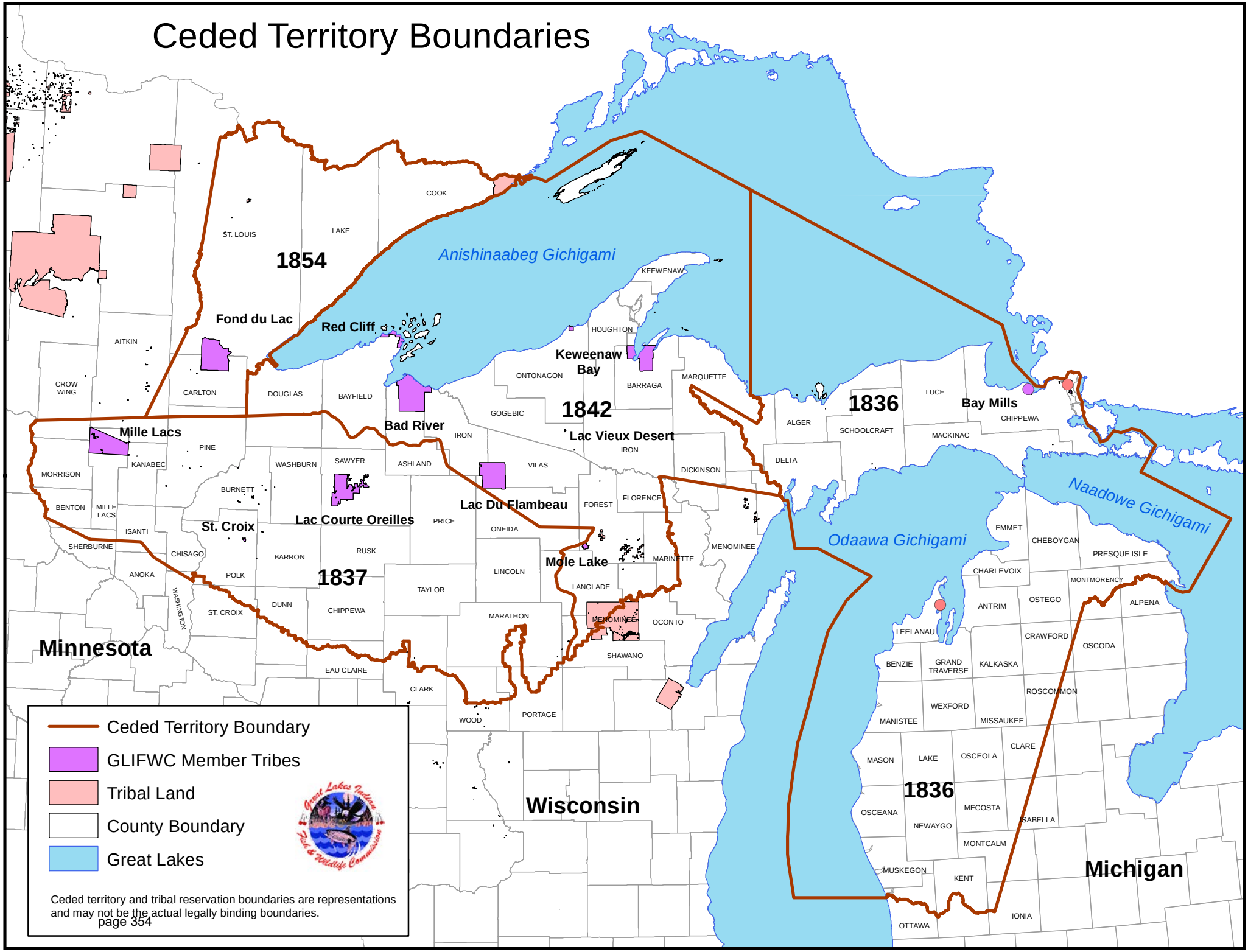

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Beverly Jones Heydinger	Chair
David C. Boyd	Commissioner
Nancy Lange	Commissioner
J. Dennis O'Brien	Commissioner
Betsy Wergin	Commissioner

In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project in Minnesota

DOCKET NO. PL-6668/PPL-13-474

HONOR THE EARTH'S
MEMORANDUM OF LAW IN SUPPORT OF LACK OF JURISDICTION FOR USUFRUCTUARY PROPERTY RIGHTS PROTECTED BY FEDERAL TREATIES

To: Administrative Law Judge Eric L. Lipman, Minnesota Department of Commerce and Applicant Enbridge

Pursuant to verbal order of Administrative Law Judge Eric L. Lipman for jurisdictional briefing, *Honor the Earth* does now serve its initial Memorandum of Law.

INTRODUCTION

Before there was a United States of America, it was understood by the new human immigrants to Turtle Island (North America) that

> We hold these truths to be self-evident, that ***all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness***. That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed.[1]

By 1787, nine of thirteen colonies (states) voted to adopt the U.S Constitution, which

[1] Declaration of Independence, July 4, 1776. *Remember also* Dr. Martin Luther King, Jr. championing civil rights nearly 200 years later.

recognized Indians as separate and apart and that "[t]he Congress shall have Power [t]o ...regulate Commerce...with the Indian Tribes[2]. . ." and that Treaties are the Supreme law of the land

> and the Laws of the United States which shall be made in pursuance thereof; *and all treaties made, or which shall be made, under the authority of the United States, shall be the supreme law of the land;* **and the judges in every state shall be bound thereby,** anything in the constitution or laws of any state to the contrary notwithstanding.[3]

(Emphasis added).

In *Minnesota v. Mille Lacs Band of Chippewa Indians*, 526 U.S. 172 (1999), the Supreme Court unanimously held that, by guaranteeing Anishinabe (Chippewa) rights to hunt, fish and gather in the 1837 Treaty in which the Chippewa ceded formal title to a small portion of Minnesota, and a larger area of Wisconsin, U.S. treaty negotiators severed the right to use the land for subsistence, usufructuary property rights, from formal title to the land in the same way a utilities easement, or mineral rights, might be severed from fee simple title. This was the choice of the United States government, which negotiated other treaties, with other native peoples, before and after 1837 that did not have these characteristics, as the *Milles Lacs* majority pointed out.

The *Mille Lacs* majority and dissent differed only as to whether these Treaty-guaranteed usufructuary property rights had been abrogated by certain subsequent events. The opinion was unanimous in the Court's analysis of Treaty acknowledged and guaranteed usufructuary property rights that are not extinguished by transfer of title to

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[2] U.S. Const., Art. 1, Sec. 8, Cl. 3
[3] Id. See Art. 6, Cl. 2.

land to the United States, since "title" was a meaningless concept to the Chippewa and "use for subsistence" was understood as continuing without interruption.[4]

TREATY HISTORY

In 1795, The Treaty of Greenville expressly reserved to "[t]he said tribes of Indians, parties to this treaty, shall be at liberty to hunt within the territory and lands which they have now ceded to the United States." This was a treaty of perpetual peace between the United States of America, and the tribes of Indians called the Wyandots, Delawares, Shawanees, Ottawas, ***Chippewas***, Pattawatimas, Miamis, Eel Rivers, Weas, Kickapoos, Piankeshaws, and Kaskaskias.

The Treaty of Prairie du Chien[5] of 1825 was the first Chippewa treaty to deal directly with land in Minnesota. The treaty created an east west boundary to separate the Chippewa and the Sioux and it was

> understood by all the tribes, parties hereto, that no tribe shall hunt within the acknowledged limits of any other without their assent . . . the Chiefs of all the tribes have expressed a determination, cheerfully to allow a reciprocal *right of hunting on the lands of one another, permission being first asked and obtained*, as before provided for.[6]

(Emphasis added).

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[4] *Minnesota v. the Mille Lacs Band of Chippewa Indians: 19th Century Treaty-Created Usufructuary Property Interests, the Foundation for 21st Century Indigenous Sovereignty*, by Peter Erlinder, Professor, William Mitchell College of Law and Director, International Humanitarian Law Institute, article currently invited for Law Review publication spring 2014. (See copy attached as Exhibit C).

[5] TREATY WITH THE SIOUX, ETC., August 19, 1825, Proclamation. Feb. 6, 1826., 7 Stat., 272. *Treaty with the Sioux and Chippewa, Sacs and Fox, Menominie, Ioway, Sioux, Winnebago, and a portion of the Ottawa, Chippewa, Potawattomie, Tribes.*

[6] Id. Article 13.

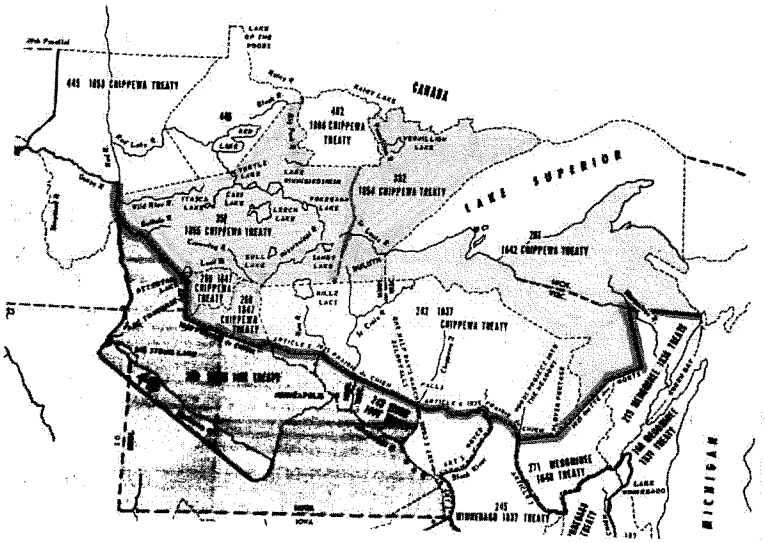

Here the red line is the Prairie du Chien boundary between the Chippewa and Sioux. Due to

> [t]he Chippewa tribe being dispersed over a great extent of country, and the Chiefs of that tribe having requested, that such portion of them as may be thought proper, by the Government of the United States, may be assembled in 1826, upon some part of Lake Superior, that the objects and advantages of this treaty may be fully explained to them, so that the stipulations thereof may be observed by the warriors. The Commissioners of the United States assent thereto, and it is therefore agreed that a council shall accordingly be held for these purposes.[7]

The 1826 Treaty, a conformation treaty for the 1825 Treaty, was conducted at Fond du Lac of the Michigan Territory, now Duluth, recognized that "this grant [from the Chippewa] ***is not to affect the title of the land, nor the existing jurisdiction over it.***[8] (Emphasis added).

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[7] Id. Art. 12.

[8] 1826 TREATY WITH THE CHIPPEWA, Aug. 5, 1826., Stat. 7,290, Proclamation, Feb. 7, 1827, Art. 3. Signed at *Fond du Lac* Michigan Territory, presently Duluth, Minnesota.

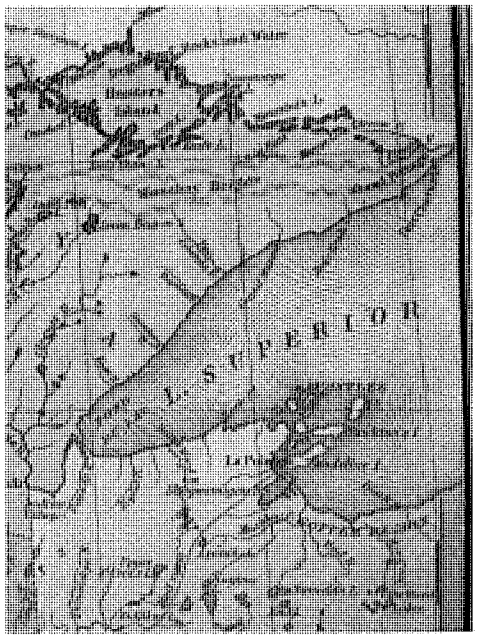

An important turn of the century U.S. Supreme Court case, Johnson v Geralds involved the consumption and sale of intoxicating liquors in the 1855 ceded territory, which the relevant treaty provided for liquor ban "and citizens of the city of Bemidji, Beltrami county, Minnesota, and at the time of the filing [. . .] were, and for a considerable time had been, engaged in business there as saloon keepers, selling at retail spirituous, vinous, and malt liquors at their respective places" in violation of federal law.[9] State citizens sued trying to argue the treaty protections only applied to Indian held lands but the Supreme Court held that

> it is unreasonable to give such a construction to the stipulation contained in the second portion of article 7 as would defeat its object, by removing the restriction from scattered parcels of land whenever it should come to pass that the Indian title therein was extinguished. The restriction would be of little force unless it covered the entire ceded area *en bloc*, so that no change in the situation of the reservations by way of extinguishing the residue of Indian title or otherwise should operate to limit its effect. And so, upon the whole, we deem it manifest that the second clause of article 7 dealt with the

[9] Johnson v Geralds, 234 U.S. 422, 424, 34 S. Ct. 794, 795 (1914).

> entire ceded country, including the reservations, as country proper to be subjected to the laws relating to the introduction, etc., of liquor into the Indian country ***until otherwise provided by Congress. It was evidently contemplated that the bands of Indians, while making their permanent homes within the reservations, would be at liberty to roam and to hunt throughout the entire country, as before.*** The purpose was to guard them from all temptation to use intoxicating liquors.[10]

(Emphasis added). This is the same, ceded, territory-wide protection the Chippewa also possess as a property interest to protect the environment against future oil spill contamination in perpetuity as we will "*be at liberty to roam and to hunt throughout the entire country, as before*."

Conceivably, this prohibition on alcohol continued until the 21t Amendment in 1933 for most citizens of the United States. However, it was not until June 11, 1934 that for the Chippewa that

> the treaty of February 22, 1855 (10 Stat. L. 1165), between the United States and the Mississippi Bands of Chippewa Indians, shall no longer be considered as "Indian country" for the purposes of article 7 of said treaties . . .[11]

which involved the health, safety and welfare rights of the Chippewa throughout the ceded territories, in Minnesota, in this case for the 1854 and 1855 Treaties.

Consequently, unless Minnesota or Applicant Enbridge can show a similar Act of Congress to abrogate the usufructruary property rights of the Chippewa to hunt, fish and gather, in similar plain language, scope and breadth as above, and show compensation for

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[10] Id. at 438.

[11] An Act To modify the effect of certain Chippewa Indian treaties on areas in Minnesota, June 11, 1934. [S. 2980.] 48 Stat., 927.

the taking of the usufructuary property rights under US. v. Dion[12] and Minnesota v. Mille Lacs, the 1854 and 1855 ceded territories are Indian Country for all other purposes. Otherwise, Minnesota would have to show a grant of authority from Congress to exercise state jurisdiction over federally protected treaty rights.

Public Law 280

In 1953, Congress adopted what became known as Public Law 280, which gave certain states *criminal*[13] jurisdiction and limited *civil*[14] jurisdiction over tribal members, in several states including Minnesota. However, Congress specifically exempted from its *criminal* grant in clearly stated and unambiguous language that

> (b) Nothing in this section shall authorize the alienation, encumbrance, or taxation of any real or personal property, including water rights, ***belonging to any Indian or any Indian tribe***, band, or community that is held in trust by the United States or is subject to a restriction against alienation imposed by the United States; ***or shall authorize regulation of the use of such property in a manner inconsistent with any Federal treaty, agreement, or statute or with any regulation made pursuant thereto; or shall deprive any Indian or any Indian tribe, band, or community of any right, privilege, or immunity afforded under Federal treaty, agreement, or statute with respect to hunting, trapping, or fishing or the control, licensing, or regulation thereof.***

The *civil* grant also provides that

> (b) Nothing in this section shall authorize the alienation, encumbrance, or taxation of any real or personal property, including water rights, ***belonging to any Indian or any Indian tribe***, band, or community that is held in trust by the United States or is subject to a restriction against alienation imposed by the United States; ***or shall authorize regulation of the use of such property in a manner inconsistent with any Federal treaty, agreement, or statute or with any regulation made pursuant thereto***; or shall confer

[12] United States v. Dion, 476 U.S. 734, 738 (1986).
[13] 18 U.S.C. § 1162.
[14] 28 U.S.C. § 1360

> jurisdiction upon the State to adjudicate, in probate proceedings or otherwise, the ownership or right to possession of such property or any interest therein.

Clearly, Congress did not grant the State of Minnesota any authority or jurisdiction to decide matters related to treaty rights, federal agreement or statutes and which includes the present Public Utilities Commission proceedings considering the Application by Enbridge for a Routing Permit across the ceded territories, which in this case is primarily across the 1855 ceded territory.

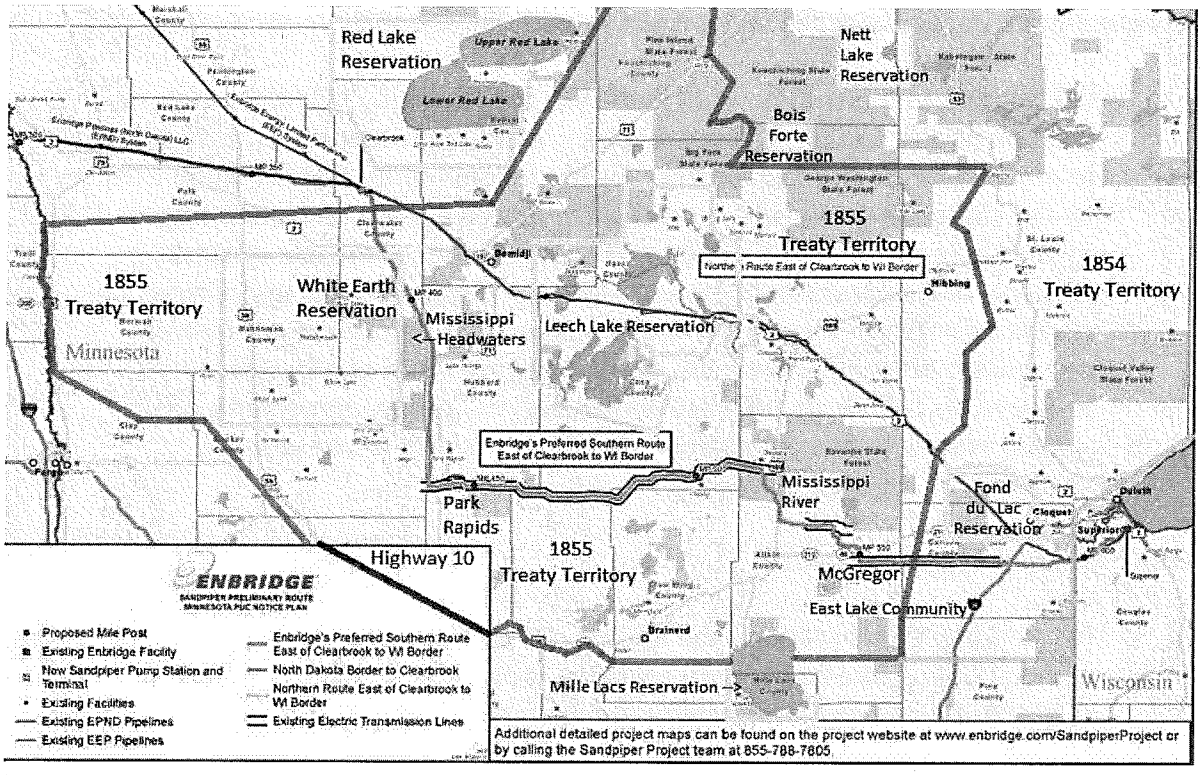

The PUC should consider the Supreme Court's analysis in Chevron where

> [t]he Court, in an opinion by Justice John Paul Stevens, upheld the EPA's interpretation. A two-part analysis was born from the *Chevron* decision (called the "*Chevron* two-step test"), where a reviewing court determines:

> (1) First, always, is the question whether Congress has spoken directly to the precise question at issue. If the intent of Congress is clear, that is the end of the matter; for the court as well as the agency must give effect to the unambiguously expressed intent of Congress.
>
> If the Court determines Congress has not directly addressed the precise question at issue, the court does not simply impose its own construction of the statute . . . Rather,
>
> (2) [I]f the statute is silent or ambiguous with respect to the specific question, the issue for the court is whether the agency's answer is based on a permissible construction of the statute.[15]

Here, the PUC is not even a *federal* agency with any delegation from Congress, and the U.S. Constitution spells out the federal relationship with Indians.

In light of the usufructuary property rights analysis unanimously adopted by Supreme Court in Minnesota v. Mille Lacs Band of Chippewa Indians, which builds upon the analysis in the earlier Lac Courte Oreilles cases in the Seventh Circuit, *Honor the Earth* provides further legal analysis for a previously unrecognized sources of Treaty-guaranteed usufructuary property rights across all of northern Minnesota, both on and off reservations.

Minnesota is without authority when it comes to federal rights in Indian country, and there is no apparent effort by Applicant Enbridge or Minnesota law to respect our unique federal protections and usufructuary property rights.

A. The *usufructuary* property rights, created by U.S. treaty negotiators in 1825, 1826, 1837, 1854, as well as in 1855, which the Supreme Court of the United States unanimously recognized in *Minnesota v. Milles Lacs Band of Chippewa Indians* in 1999, determines due process rights of the Chippewa today.

[15] Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc., 467 U.S. 837 (1984).

The modern, seminal case establishing the foundation for interpreting treaty issues in Minnesota is *Minnesota v. Milles Lacs*[16], wherein several post-1855 treaties and Executive Orders, which the majority of the *Milles Lacs* Court held did not abrogate treaties agreed to with the Chippewa in 1855 and before, with a specific focus on the 1837 Treaty. In specific, the *Mille Lacs* majority and dissenting opinions were unanimous in finding that the "bundle of rights" which the U.S. treaty negotiators could retain or bargain away included "usufructuary property" rights, *i.e.* the right to "live off the land" irrespective of "fee ownership." This is a Roman Law concept, well known to U.S. treaty negotiators, who wrote such provisions out of treaties negotiated at about the same time. *See, generally,* O'Connor, J. *Minnesota v. Milles Lacs.*

Essentially, in many ways the *Minnesota v. Mille Lacs* opinion from 1999 made all prior cases obsolete with respect to understanding the genesis of usufructuary property rights recognized in U.S. courts. This is demonstrated in the 1854 Chippewa ceded territory, where the LCO cases from the Seventh Circuit helped the State of Minnesota recognize and compensate for off-reservation Ojibwe usufructuary property rights in the Arrowhead for more than 20-years. But that $15 million bi-annual compensation is only for tribal members to not exercise treaty rights, off-reservation in the 1854 ceded territory. What is the time value of money, today, for the loss of perpetual harvest rights and loss of the environment that supports that ecosystem? Priceless?

B. Prior to 1855, rights held by the Chippewa west of the 1854 Treaty Boundary were NOT "aboriginal title", but the more highly protected Treaty-

[16] Minnesota v. Mille Lacs Band of Chippewa Indians (Mille Lacs), 526 U.S. 172, 175–76 (1999).

guaranteed usufructuary property rights that were, and are, individually exercised.

Sections of the Treaty of 1825, 1826 and 1854 plainly state that the U.S. government recognized that the Chippewa were sovereign in the territory from which the 1837 Treaty territory had been ceded, and from which the 1855 territory would eventually be ceded.[17] But this was not "aboriginal title" at all. Rather the "usufructuary property right" to hunt-fish-and gather was recognized in treaties of 1825/26 then encompassed all of Minnesota Territory north of the boundary with the Lakota (Sioux) Nation, this division was ratified by Congress and recognized as a place to which Chippewa should return if they were to be removed from the 1837 ceded territory. This right was exercised individually in the geographical area the U.S. recognized as sovereign up to 1855.

This distinction makes a significant difference because the terms of the 1825-26 and 1854 Treaties describe with specificity the agreements that pre-existed the 1855 Treaty and those that followed. The territory west of the 1854 Treaty boundary was not vacant, nor was it without treaty guarantees that preceded the 1855 Treaty.

Further, because usufructuar*y* property rights include "the right to modest living," environmental protection to maintain the long-term value of these property rights will have significant long term off-reservation land-use and wildlife

[17] The Court in U.S. v. Herbst, 334 F. Supp. 1001, 1006 (D. Minn 1971) made the same factual error. The Leech Lake Band (however defined) like all other Chippewa in Minnesota have Treaty-guaranteed usufructuary rights to hunt-fish-and gather dating to 1825-26, as sovereign people, and confirmed in the 1854 Treaty with the Chippewa of the Mississippi. This is *not inchoate and indistinct* "aboriginal title."

management implications for tribal governments and tribal members. Similarly, recent federal prosecutions of tribal members for violations of the federal Lacey Act for wildlife violations, predicated on tribal members violation of tribal game regulations are direct violations of the sovereignty explicitly guaranteed in the exercise usufructuary property rights in the heart of "Indian Country."[18] At least some of these prosecutions have been dismissed by federal district court judges who recognized the usufructuary rights established by treaties between sovereigns may be abrogated by Congress with a clear intention to do so, in language understood by both parties to accomplish that result, but cannot be set aside as merely incident to a federal statute.[19]

Another example from Supreme Court treaty analysis demonstrating that treaty-created usufructuary property rights must extend beyond the existence of any particular tribal government is Menominee v. United States in which Congress dissolved a Reservation which became Menominee County of the State of Wisconsin. The Court held that even though the entire reservation no longer existed, the usufructuary property rights created by the treaty which Congress had not specifically extinguished still

[18] For discussion of "Operation Squarehook" undercover "sting" operation, see Doug Smith and Dennis Anderson, *3-year Walleye-poaching Probe Nets More Charges in Minnesota*, STAR TRIBUNE, April 15, 2013, http://www.startribune.com/local/203006351.html

[19] United States v. Lyon, Case No. 13-68 and 13-70, Order of Judge John Tunheim, November 25, 2013, a*vailable at* http://turtletalk.files.wordpress.com/2013/11/90-dct-order-rejecting-mj-rr.pdf

remained to be exercised individually by members of the Menominee[20]. The usufructuary treaty rights were created by Congress for descendants of the signatories within the area covered by the Treaty. Individual ownership of all survival rights associated with the bundle of usufructruary rights and the right to earn a modest living[21] from and with the earth's creatures and resources, are held by the living people, reserved by prior living people in perpetuity for those Anishinabe (Chippewa) to come.

Likewise, the required *due process* for taking away individual property rights as described by US Attorney for Minnesota Renner[22] in 1971 (See Exhibit A, p. 6, item 10), would also be required for taking of a federally protected, conservation right-of-way belonging to the Chippewa. Therefore, the State's law violates all U.S. Constitutional protections and Chippewa treaty protected rights, and must be held invalid and consequently subject matter jurisdiction for the Minnesota Public Utilities Commission for the full, final and complete legal authority to grant a pipeline route permit does not independently and unilaterally exist.

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[20] The Menominee are signatories to the same 1825 Treaty with the Sioux, Menominee and Chippewa.

[21] See *Treaty-Guaranteed Usufructuary Rights: Minnesota v. Mille Lacs Band of Chippewa Indians Ten Years On* by Peter Erlinder, 41 ELR 10922, 10-2011. (See copy attached as Exhibit B).

[22] See United States v. State of Minnesota, Answers to Defendant's, State of Minnesota, Interrogatories, U.S. District Court of Minnesota, January 20, 1971, submitted by U.S. Attorney Robert G. Renner (No. 3-70 Civil 228). Attached as Exhibit A.

Respectfully submitted April 7, 2014.

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May 26, 2016

Comments on Draft Scoping Document for the Environmental Impact Statement for the proposed Sandpiper/Line 3 crude oil pipeline projects

Sandpiper PUC Docket Number PL-6668/CN-13-473 & PL-6668/PPL-13-474
Line 3 PUC Docket Number PL-9/CN-14-916 & PL-9/PPL-15-137

Honor the Earth hereby submits the following comments on the draft scoping documents for the proposed Sandpiper and Line 3 crude oil pipeline projects. We contend that the scoping document is grossly inadequate and will fail to produce an EIS that will enable the State of Minnesota to protect the environment and prevent significant human harm. We object to geographic, jurisdictional, and project boundaries set in the draft scoping document. We object to the parameters of the scoping process. We object to the proposed timeline for the EIS, which does not provide enough time for adequate field work and research to evaluate sites and potential impacts on human health, natural resources, and cultural resources. Lastly, we object to the exclusion of many significant impact considerations, especially those at the point of extraction or refinement, the climate implications of downstream emissions, the human health impacts concentrated disproportionately on our already distressed Native communities, archaeological and cultural impacts, and impacts from the proposed abandonment of the existing Line 3 pipeline.

Because of these shortcomings, the current scoping parameters undermine the goals of the National Environmental Policy Act (NEPA) and the Minnesota Environmental Policy Act (MEPA). We also assert that the Department of Commerce remains unqualified to oversee the EIS and hostile to a robust process and the unique interests of our tribal Nations. We continue to call for an integrated federal, state, and tribal EIS that acknowledges the unique knowledge and expertise that tribal governments offer in regards to the natural and cultural resources of the area, and consistent with Governor Dayton's Executive Order 13-10, which outlines a high standard of govemment-to-govemment consultation with Indian tribes. The State of Minnesota's Environmental Quality Board's denial of its citizens request to transfer control of the EIS to the state's environmental agencies, in which we have invested many billions of dollars to develop environmental stewardship capacity, was grossly negligent. This is one of the largest fossil fuel projects the State of Minnesota has ever seen; we must ensure it is evaluated properly. To date, we are getting it wrong and are on a path to further litigation.

Our response is organized into the following sections:
1) High-Level Scoping and Process Issues
2) Economic Analysis
3) Well to Wheels Impact Analysis
4) Indigenous Human Health Impacts
5) Indigenous Cultural Impacts
6) Abandonment
7) Spill Modeling and Response

1) HIGH-LEVEL SCOPING AND PROCESS ISSUES

On January 11, 2016, the PUC — the RGU for this EIS — issued an order authorizing DOC-EERA staff to prepare a combined EIS for the CN and the Route Permit. The order also requested DOC-EERA administer the EIS process in consultation with the PUC's Executive Secretary, the MDNR, and the MPCA in order to meet the requirements of the MEPA and Chapter 4410 of the Minnesota Rules.

The Minnesota Environmental Policy Act (MEPA) states: "[w]here there is potential for significant environmental effects resulting from any major governmental action, the action shall be preceded by a detailed environmental impact statement prepared by the responsible governmental unit."[1]

According to the Minnesota Rules, the purpose of the scoping process is "to reduce the scope and bulk of an EIS before the preparation of the EIS, identifying only those potentially significant issues relevant to the proposed project, define the form, level of detail, content, alternatives, timetable for preparation and preparers of the EIS, and to determine the permits for which information will be developed concurrently with the EIS."[2] "All projects requiring an EIS must have an EAW [Environmental Assessment Worksheet] filed with the RGU [Responsible Governmental Unit]. The EAW shall be the basis for the scoping process."[3]

The Minnesota Rules being used to reduce the scope of the EAW and/or EIS directly undercuts the law and policy goals of the National Environmental Policy Act (NEPA) and the Minnesota Environmental Policy Act (MEPA). These two laws are designed to ensure that new projects consider and protect human safety and the environment, and do not violate existing environmental laws. To simply grant the Department of Commerce full authority to reduce the scope of the review to "potentially significant issues relevant to the proposed project" without exploring other issues and without any process of accountability for those scoping decisions violates NEPA and MEPA requirements. Within the current parameters, the promise to the citizens of Minnesota that a complete and comprehensive EIS would be undertaken for the Sandpiper and Line 3 pipelines will not happen. We must address these problems.

First, there must be a clear definition of what constitutes an issue "significantly relevant to the proposed project." This should include the criteria of how a determination is made, who makes the determination, and what factual information is relied upon to make that determination. It must be guaranteed that the proper level of data analysis required to indicate a significant issue is used.

Second, an issue found to not be "significantly relevant to the proposed project" must be published, with a public comment period established, in order to allow the public to engage in that decision and supplement the record with additional information and materials.

The timeline and methodology for data analysis are also inadequate. Section *4.3 Data and Analysis* states that field work on the preferred route has been completed by the Applicant. The scoping document lacks a full disclosure of the practices, methods, and standards used by the Applicant to complete this field work. The scoping document should include a plan for random inspection of site work completed on the preferred route to ensure it meets the applicable standards necessary for the project. The present scoping document does not provide enough time to do this field work in order to evaluate the sites that will be adversely affected by the project. By the time the public is aware of what sites have been identified, it will be mid-winter and there will be little opportunity to review or provide information about the impact. Therefore, the time frame for the EIS must be increased in order to allow for adequate review of potential sites.

Incorrect and Non-Existent Definitions of Project Purpose

The entire draft scoping document and scoping process for the EIS are based on a false premise. The draft scoping document is drafted around a "project purpose" defined as transporting oil from the Bakken region of North Dakota to Superior, Wisconsin. For a long time, the DOC defined the project purpose as moving oil from Clearbrook to Superior, but our persistent advocacy forced a partial correction. There is still another correction to make. Transporting a product to Superior is not a viable "public purpose" for the project, especially from the point of view of Minnesota residents who stand to have their land condemned through eminent domain. That is a "private purpose," according to Enbridge's whimsical desires and bottom line. Because Minnesota Rule 4410.2300(G) states an alternative route may be excluded from analysis in the EIS if it "would not meet the underlying purpose of the project," defining the project purpose in this way precludes many alternative routes that may transport product from the Bakken to Midwest refineries and coastal ports with far less social, environmental, and economic risk. The

[1] Minnesota Statue § 116D.04, subpart 2a

[2] Minnesota Regulation 4410.2100, subpart 1

[3] Minnesota Regulation 4420.2100, subpart 2

current purpose statement is improper if not illegal in that it limits alternative routes on the basis of project cost increase alone. The scope should not assume that the criteria for route evaluation include any intermediate through-points (Clearbrook or Superior).

At the thirteen DOC scoping meetings, the public was asked to comment on a project with a purpose defined as getting oil to Superior, WI, but the giant maps on display included alternative routes that don't go to Superior. Are those routes included or not? No one knows. When it was pointed out to the Cardno Project Manager how confusing that was for the public, she stated it was likely incorrect and cited a lack of time and being rushed, and further that Governor Dayton denied their request for an extension. Several attendees pointed out the issues with the project purpose to the DOC, and received a variety of responses, depending on which day the response was provided. At one point, the DOC stated there would eventually be two Environmental Impact Statements, each with different purpose definitions, but that the documents would change in the final draft. This constitutes a reckless and negligent process. It has been stated that the Line 3 project's purpose is to address the safety and integrity concerns of the existing Line 3 pipeline. As such, replacement (in place) or complete removal from service need to be considered as alternatives. Holding public scoping meetings without disclosing these different purpose definitions clear to the public, is a violation of the duty owed to Minnesota's residents and counter to the intent of the environmental laws at issue. The public participation component of the scoping process is now complete, with most people lack clarity on whether there is one EIS or two, and without anyone being clear on what the definitions of the project or projects actually are, or what the criteria are for alternative routes to be considered or not. Despite lacking this critical information, these are projects that supposedly warrant condemnation of private land through eminent domain.

Honor the Earth also challenges the categorization of the new Line 3 pipeline as a "replacement," and objects to the faulty reasoning that as a replacement, its purpose can indeed be defined as reaching Superior, Wisconsin, even if Sandpiper pipeline cannot. The Line 3 project is not a replacement, it is a new line. It is located in a new corridor, it is larger in diameter (36 inch diameter vs. 34 inch = 12% larger by volume), and it has greater capacity (760,000 bpd vs. 880,000 bpd = 16% capacity increase). It therefore must have a new U.S. State Department approval. In the 1991 Presidential Permit for Line 3, Article 2 clearly states that one condition of the permit is "The operation and maintenance of the facilities shall be in all material respects as described in permittee's application of October 23, 1991, for a permit pursuant to Executive Order 11423."

An accurate project purpose definition for Sandpiper is transporting product from the Bakken to refineries and ports. The project purpose definition for Line 3 is transporting product from Hardisty to refineries and ports.

Enbridge's stated purpose of the Line 3 project is to "address safety and integrity concerns of the existing Line 3 pipeline." We agree that is a noble purpose, but we disagree that the way to address those safety and integrity concerns is by building a new pipeline. Realistically, building a new Line 3 will only double those concerns. Local residents are concerned about contamination along the existing corridor. Instead of building a new pipeline, we find that the best way to address safety and integrity concerns of the existing Line 3 pipeline is to dismantle it and clean up the mess underneath it. The State of Minnesota should immediately undertake a comprehensive survey of the existing corridor to identify any and all sites of contamination, and establish a regulatory code to oversee the responsible decommissioning of the line, according to scientific consultation and in accordance with the wishes of tribal nations and individual landowners that otherwise would retain the liability when the Enbridge company walks away. The section below entitled "Abandonment" outlines these concerns in detail.

Each separate EIS will have to address the other pipeline project as a "phased action" of the other. According to the Minnesota Rules, "phased actions" are defined as: "two or more projects by the same proposer that an RGU determines will have environmental effects on the same geographic area and are substantially certain to be undertaken sequentially over a limited period of time." (4410.0200, subpart 60). This definition involves three components: same proposer, same area affected, and timing. Only one and not all of a group of owners need be involved in both projects if that owner's stake is substantial. The same geographic area is affected if the effects of any potentially significant impacts overlap. The project sites do not need to be adjacent, or even nearby, if the impact zone is large.

Incorrect Geographic Boundaries for Impact Scope
The Sandpiper and Line 3 pipeline projects are perhaps the largest infrastructure proposals to be considered in recent years in the State of Minnesota. They are not just Minnesota projects, or U.S. projects, but transnational projects with global impacts. These projects require a diligent assessment that acknowledges the local, regional, and global contexts. We cannot simply assess the limited local impacts of construction. We cannot pretend that our actions in one "state" do not affect our neighbors, our descendants and the globe as a whole. The scope of the EIS should include the entirety of the project from beginning to end; from the Bakken and the Tar Sands of Alberta to the Midwest, East Coast, and Gulf Coast refineries and ports. There must be a full disclosure of where the oil is being transported in order for states, federal agencies, and tribal nations to properly coordinate and select the route that makes sense for the public and the environment across the region and across the US.

The document defines the scope of the EIS to ignore all impacts outside the state boundaries. This is ludicrous. Bureaucratic fragmentation is a primary method of regulatory agencies giving up their power in favor of industry. Each state puts on blinders and ignores everything occurring outside the imaginary lines, and assumptions are never questioned. Infrastructure impact analysis should start at the oil well and finish at the gas tank, plain and simple. In the section below entitled, "Well to Wheels Impact Analysis," we address elements in a comprehensive assessment.

Regarding geographic scope bounded by impacts, see "cumulative potential effects" in Mn Rule 4410.0200, Subp. 11a. Cumulative potential effects. "Cumulative potential effects" refers to environment impacts that result from the incremental effects of a project, in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects. According to these parameters, other major pipeline projects, mining projects and foreseeable climate impacts should be included within the scope of the EIS.

Incorrect Jurisdictional Boundaries for Project Scope
The State of Minnesota refuses to acknowledge environmental review in neighboring states (Wisconsin, Iowa, and potentially Michigan) and by federal units of government (especially USCOE and USFWS) for the same projects or projects that can be deemed "connected actions" induced by and/or dependant on these projects. Again, voluntary blindness precludes interstate coordination and any rational approach to route selection in order to meet the public purpose of transporting oil from the Bakken to refineries and ports while minimizing risk. Wisconsin is already rubber stamping their EIS for the 14-mile stretch of the route, despite requests to stand down and wait for MN.

Federal agencies, including the USGS, Fish and Wildlife, EPA, and the Corps of Engineers should be active in the development of the EIS along with the affected Chippewa Bands of Minnesota and their agencies such as the 1855 Treaty Authority.

Pipelines added or expanded by increased crude oil delivered to Wisconsin are "connected actions" and must be included in this EIS - this includes Enbridge's Line 61 expansion and Line 66 projects. These projects have cumulative impacts as "reasonably foreseeable future actions" under MEPA rules, which outline three types of relationship between projects, any one of which qualifies the projects as connected actions (part 4410.0200, subpart 9b):

- One induces the other;
- One is a prerequisite for the other and is not justified by itself (the first occurring previously or simultaneously);
- Neither is justified by itself; that is, the two projects are interdependent parts of a larger whole.

Whenever two or more projects have any of these relationships, they must be considered one project, regardless of ownership or timing (parts 4410.1000 and 4410.2000, subparts 4). See also "Cumulative Impacts" defined in 4410.0200: Subp. 11. (note the difference from "Cumulative Potential Effects above). "Cumulative Impact" refers to the impact on the environment resulting from incremental effects of the project in addition to other past, present, and reasonably foreseeable future projects regardless of what person undertakes the other projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

EQB Guidance goes on to explain that Cumulative impacts must be included. From the EQB Guide to Environmental Rules: "Directives that cumulative potential effects be analyzed in EAWs, EISs, and AUARs. Although it has long been the practice to include such impacts to some extent in review documents, the rules formerly did not explicitly include requirements to do so. The directives appear at rule parts 4410.1200, 4410.2300, item H, which states: "Environmental, economic, employment, and sociological impacts: for the proposed project and each major alternative there shall be a thorough but succinct discussion of potentially significant adverse or beneficial effects generated, be they direct, indirect, or cumulative."

Regarding Project Segmentation, the EQB's Guidance for Environmental Review states "Network projects such as highways, utility systems and pipelines may be divided for review if "logical in relation to the design of the total system or network and must not be made merely to divide up a large system into exempted segments" (parts 4410.1000 and 4410.2000, subparts 4)).."

Inadequate Public Process for EIS Scoping Comments

The DOC scheduled thirteen meetings along the Enbridge preferred new route from Clearbrook to Park Rapids to Superior, Wisconsin, with zero meetings about rebuilding Line 3 pipeline or abandoning it along the 150+ mile US Highway 2 corridor. It was an irresponsible process that thwarted public participation. In fact, the word 'abandonment' does not appear in the DOC Notice at all. Enbridge wants to create more environmental messes in Minnesota without cleaning up the old ones, and DOC is helping them. The hearing schedule was rushed, with meetings across northern Minnesota before the Governor's Fishing Opener, the customary start of the season in the affected lakes region. Children were still in school, summer residents had not returned to the lakes, Ojibwe tribal elections were being held, the State Legislature was in session, and resort owners were preparing for summer tourism. There were no meetings in the Pine River and Whitefish Chain watersheds, the areas with the most dense populations, the most resources, and the most access to the process.

The DOC Remains Unqualified to Oversee this EIS Process

The Department of Commerce conducting an Environmental Impact Statement is entirely inappropriate. That agency has no capacity or expertise and the people of Minnesota deserve better. It is baffling that Minnesota would waste its recent multi-billion dollar investments in the Pollution Control Agency by assigning such an important environmental process to a non-environmental agency. The State of Minnesota's Environmental Quality Board's denial of the citizen request to transfer control of the EIS to the state's environmental agencies, which clearly have the greater expertise, was grossly negligent if not outright illegal. A robust public record was built during the EQB's process for addressing the citizen request to change the RGU, in which hundreds of community members, organizations, elected officials, and advocates documented the case against the DOC and the clear rationale for transferring the EIS into the hands of the PCA or DNR. The largest fossil fuel infrastructure mega-project the State of Minnesota has ever seen should not be in the hands of the Department of Commerce.

Both the PUC and DOC have been consistently hostile to the concept of tribal consultation, and have resisted their duty to conduct thorough environmental review for these projects. They have ignored comments by the PCA and DNR about the extreme environmental risks associated with the proposed route and the need to consider alternative routes. The DOC does not have the structure or the capacity to uphold the state's responsibility to enter into formal government-to-government relationships with the tribes or to navigate the protection of constitutionally protected treaty resources and the complicated legal issues governing usufructuary property rights in ceded territory. The DNR and PCA have much greater expertise in analyzing the potential impacts of the project. The DOC does not have the intimate knowledge base of all of the disciplines along the entire corridor like DNR and PCA, with field offices throughout MN and relationships in place with the reservations. The DNR has field hydrologists, hydro-geologists, biologists, fisheries and wildlife managers, and ecologists who know the issues and resources intimately. DOC is a metro-based agency focused on accomplishing Enbridge's pipeline goals under Minnesota law.

Illegitimate Contract with Cardno

The contractual relationship between the DOC and the consulting firm hired to conduct the EIS, Cardno, was established prematurely and perhaps illegally. It is highly improper that the consulting firm was chosen before the

EIS had been scoped. The purpose of scoping process is to determine the special expertise necessary for the EIS. Cardno may or may not have that expertise; it was premature and negligent to select Cardno as a consultant. This selection makes clear that DOC never intended for the public participation in scoping process to meaningfully inform the scope of the EIS.

Joe Plummer, legal counsel for the White Earth Band of Ojibwe, addressed this issue in a December 2015 motion. Friends of the Headwaters also addressed it in its March 2016 motion. Both were ignored. It was handed off to the Administrative Law Judge (ALJ). By the time an ALJ can do anything about it, an inadequate EIS will already have been conducted. This is unacceptable and an example of the problems with the regulatory structure for oversight of the EIS. The DOC makes decisions arbitrarily, without consulting MPCA or MDNR, and in clear service of the pipeline company.

To properly follow MEPA procedures, the DOC should have released an official RFP (Request For Proposal) and submitted it to the docket for public review. Transparency would have allowed the public to weigh in on the necessary company qualifications, issues of company integrity, conflict of interest, etc. Instead, the DOC simply renegotiated an existing contract they already had with Cardno, which was based on Cardno's winning the RFP for the Sandpiper Route Permit Scoping CEA, ordered by the PUC on June 5, 2015 after voting 5-0 approving the Certificate of Need. The FOH/MCEA Appellate Court victory overturned that decision and ruled that the CEA was a violation of the MEPA. When the PUC was forced to order an EIS at their December 2015 hearing, the PUC threw out Deb Pile's Sandpiper Route Permit scope decision document. At that point, the DOC/Cardno contract should have been null and void. Instead, it was simply revised, which is a clear indication that the DOC intends to continue with the previous work Cardno performed on Pile's Sandpiper RP and carry that scoping decision forward into this EIS. That document should not be used because it is based on PUC CEA rules, not EIS MEPA rules.

Cardno is unqualified for the task at hand -- it is the company responsible for the first EIS on the proposed Keystone XL pipeline, a study which was thrown out for inadequacy.

Learning from Canada's National Energy Board

While various US permitting bodies are considering the Line 3 replacement project, the Canadian National Energy Board (NEB) has also been considering the project. The permitting and oversight process is much different in Canada, with the NEB serving as the national body responsible for pipelines over their entire lifecycle: from design, through construction and operation, to decommissioning and eventual abandonment. The NEB is a stronger and more robust regulatory body than those in the United States. The NEB's role does not end when a project is approved: the Board requires that people and the environment be protected throughout the entire pipeline lifecycle. The NEB imposes safety and environmental requirements on pipeline companies through a variety of means, including regulations and project-specific conditions.[4] Once the NEB makes its recommendations on a project, the final approval goes to the Canadian national government. Recently, the NEB granted conditional approval for the Line 3 replacement project. The approval document has many recommendations that the MN PUC should also consider, Including many suggestions on how to make their process more comprehensive. Since there is no similar body in the United States, the responsibility falls to the individual state permitting bodies. A thorough review of the NEB's recommendations should be included in the EIS. Documents can be found here:
https://docs.neb-one.gc.ca/ll-eng/llisapi.dll?func=ll&objId=2949686&objAction=browse

There is a significant difference between the Line 3 project in Canada and the project in Minnesota: in Canada, the project is not a greenfield project and primarily follows the existing mainline corridor. This results in very different environmental impacts in either country, which should be taken into account when reviewing the NEB recommendations.

2) ECONOMIC ANALYSIS

[4] http://bit.ly/1WJ5Pkl

Because all environmental stewardship and all environmental impacts occur within the context of specific economic conditions, the EIS should include a thorough economic analysis of the project. For example, if the project is not economically viable, or will not be in 10 years, that is an enormous liability concern for the people and tribes of Minnesota.

Local and Regional Economic Impacts

Enbridge and other proponents of these proposed pipelines often tout the anticipated property tax revenue for the poor counties proposed to receive the infrastructure. However, what is too often overlooked in Enbridge's recent and current lawsuits against several MN counties for refunds on property taxes already paid.[5] This information must be included in the EIS so that low-revenue counties have a clear understanding of the resources they stand to gain from the project compared to their financial risk.

This analysis must also include a comprehensive analysis of the economic impacts of these pipelines on the fishing, wildlife, agriculture, and tourism industries.

Enbridge Energy predicts its $2.6 billion Sandpiper construction project will create 3,000 construction jobs. However, Enbridge only hopes to give half of those jobs, about 1,500 of them, to Minnesota and North Dakota residents — there is no policy in place to guarantee a single one. More importantly, these are temporary jobs. These jobs never will trigger the additional indirect job creation that typically accompanies longer-term investments, and will disappear after one year. That is not long-lasting economic development.

Consider an alternative strategy of investment in water and sewer infrastructure, systems that actually benefit the people of Minnesota instead of the profits of a Canadian corporation. In 2007, the Environmental Protection Agency estimated Minnesota needs to invest more than $6 billion to improve drinking water systems over the next 20 years. In 2010, the Minnesota Pollution Control Agency estimated Minnesota needs to invest an additional $5.7 billion to improve wastewater systems. A steady investment in these essential services would create an estimated 11,560 jobs for Minnesota's workers every year for the next 20 years.

Economic Viability and Need

Simple math shows that the Sandpiper pipeline is not an economically viable project. The North Dakota Pipeline Authority says current pipeline export capacity from North Dakota is 739,000 bpd, and that total refinery capacity is 88,000 bpd, making total takeaway capacity 827,000 bpd. Construction is now starting on the Dakota Access pipeline, with an initial capacity of 450,000 bpd and an ultimate capacity of about 590,000 bpd. Sandpiper would have an initial capacity of 365,000 bpd. Together that means there is a proposed final total takeaway capacity of almost 1.7 million bpd, minus any inefficiencies. But total current North Dakota production peaked at around 1,160,000 bpd, plateaued, and is now at 1,000,000 and dropping, with no end in sight for these low oil prices. Plus, rail transport capacity from ND is over 2 million bpd, and rail is needed to reach East Coast refineries. This shows that there is no economic basis for the Sandpiper; the numbers do not add up. There is no public need for this project, and it is clear that the project is an investment in what will soon be a stranded asset. The EIS should include an assessment of what will become of such stranded assets, especially given the liability concerns of pipeline abandonment. Even if drilling in the Bakken continues, current estimates show they will be depleted in 20 years.

The EIS should include a full economic analysis of need for additional oil transportation through Minnesota. Minnesota's crude oil consumption is declining, despite population growth, so this additional infrastructure is not for us. And with oil prices remaining at historic lows, Bakken drillers are going bankrupt.[6] There were only 28 active rigs in May 2016, down from over 220 just a few years ago.[7] Most major players in the Alberta Tar Sands have either delayed, put on hold, and some firms, such as Stadtoil, have pulled out of the Tar Sands altogether.

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[5] http://www.grandforksherald.com/news/business/3826004-pipeline-company-seeks-reduce-their-hubbard-county-property-taxes-336892

[6] http://fuelfix.com/blog/2016/02/03/eagle-ford-bakken-shale-production-on-the-decline/

[7] https://www.dmr.nd.gov/oilgas/riglist.asp

Marathon as Anchor Shipper

The proposed Sandpiper pipeline is a joint venture between Enbridge Energy and Marathon Petroleum Corporation. Marathon is the "anchor shipper" that makes the project economically viable by committing to use the pipeline to transport oil they extract in North Dakota. Marathon plans to pay 37.5% of the Sandpiper's construction costs in exchange for a 27% ownership interest in the project. The MN PUC issued a Certificate of Need for the Sandpiper based on Marathon's interest and "need." But Marathon doesn't need this pipeline. At its peak, Marathon had 7 active rigs in the Bakken, but as of April 2016, they have ZERO. Marathon Petroleum Corporation's stock prices have dropped more than 50% from recent highs in 2015. Marathon Oil Corporation, the sister subsidiary that does all the drilling, saw their prices drop more than 75% from recent highs. Last year they posted $2.2 billion in losses, cut their capital investments in half, and laid off over 10% of their employees. This is not a sound investment for the State of Minnesota.

Ecological Costs

Another element of the economic analysis should be the carbon and ecosystem costs of the proposed projects. Enbridge likes to tout the job creation and economic need of these projects, but the costs to the environment are never addressed. The science of ecological cost accounting is rapidly developing and it's methodologies should be used to account for the full costs of these projects.

Carbon Costs:

The American Physics Society has estimated that it costs $600 per metric ton to remove carbon from the atmosphere. If we convert the volume of oil moving through the Sandpiper and Line 3 into metric tons of carbon released, we can get an estimate of the cost to remove that carbon.

Sandpiper: 355,000 barrels of Bakken oil daily[8] (Enbridge Number) x 365.25 days a year= 129,663,750 barrels annually x .43 metric tons of carbon per barrel[9] = 55,755,412 metric tons of carbon annually

Line 3: 675,000 barrels of dilbit daily[10] x 365.25 days a year = 246,643,750 barrels annually x .51 metric tons of carbon per barrel[11] = 125,737,313 metric tons of carbon annually.

Ecosystem Costs:

As the science of climate change improves, more attention is being paid to the role key ecosystems play in the maintenance of the global climate. Ecosystems can absorb and store carbon, while providing flood control and other benefits to society. These benefits can be monetized in a process known as ecosystem services valuation. The Canadian boreal forests - where tar sands are mined - is one of the best stores of carbon on the planet. Wetlands are also valuable carbon sinks, and very important for flood control. To estimate the amount of boreal forests destroyed, we used the amount of tailings (mining waste) created per barrel extracted. Tailings are stored in pits for at least 40 years while they settle and compact. The volume of these tailings, converted to area represent the annual area of boreal forest lost from tar sands extraction.[12] The only available numbers for the worth of the boreal forest is $160/hectare[13], which is a low estimate.

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[8] Enbridge number

[9] US EPA estimates

[10] Enbridge number

[11] from Extract

[12] These estimates are based of the article "Waste Streams of Mined Oil Sands: Characteristics and Remediation" by Kim L. Kasperski and Randy J. Mikula printed in *Elements*, Dec 2011 vol 7 pp 387-392. These estimates- of the amount of land impacted by the oil sands are probably extremely low and will be updated as more studies are conducted.

[13] http://www.eurekalert.org/pub_releases/2006-09/cfc-ccw091806.php

Line 3 (new proposed route): 675,000 barrels of dilbit daily[14] x 365.25 days a year = 246,643,750 barrels annually x .00026544[15] = 654,69.117 hectares annually.

To estimate the worth of the wetlands impacted by the Enbridge expansion, we used the value of wetlands from the Earth Economics report: "The Value of Nature's Benefits in the St. Louis River Watershed". The value Earth Economics came up with is $5,625/year. Honor the Earth estimated the area of wetlands impacted by approximating the amount of wetlands destroyed during the construction of the new corridor. Since Enbridge's plans do not include restoring wetlands after construction, it is fair to assume these areas will be permanently lost.

Sandpiper (proposed route): 257,129 ft of wetlands x 95 ft of construction area = 24,427,255 sq ft = 560.77 acres.

Summary:

DESCRIPTION (Annual use)	QUANTITY metric tons	UNIT PRICE	AMOUNT
Sandpiper- Carbon (metric ton)	55,755,412.00	$600.00	$33,453,247,200.00
Line 3- Carbon (metric ton)	125,737,313.00	$600.00	$75,442,387,800.00
Line 3- boreal forest (hectare)	65,469.12	$160.00	$10,475,058.72
Clipper- boreal forest (hectare)	77,508.48	$160.00	$12,401,356.80
Sandpiper- wetland (acres- US)	560.77	$5,625.00	$3,154,331.25
		Per month cost	$108,921,665,455
			12
	Annual Cost		**$307,059,988,940**

3) WELL TO WHEELS IMPACT ANALYSIS

Infrastructure impact analysis should start at the oil well and finish at the gas tank, including all social and ecological costs associated with the extraction, transportation, refining, and combustion processes. The EIS for the Keystone XL pipeline considered carbon emissions at all of these stages.[16] The Sandpiper and Line 3 projects are much larger in scope, their impacts must also be understood in a larger scope. Impacts on the communities at the extractions points, refining points and combustions points should be examined. The global impacts of the project should be examined as well, including the well to wheels increase in greenhouse gases.

Social and Ecological Costs of Extraction

Extensive testimony was presented by Honor the Earth in previous hearings on the impact of the oil extraction in the Bakken on groundwater, human health and methane emissions. In short, we do not have a full picture of the impact of fracking in the Bakken because the increase occurred rapidly without proper oversight. What we do know is since the boom in the Bakken, there has been an increase in drilling waste, water usage, and spills and leaks, many of which have gone unreported.[17] A recent study from Duke University found widespread and persistent contamination from fracking, which will affect the area for millennia to come.[18] Reports have shown that methane emissions are much

[14] Enbridge number

[15] Each barrel of tar sands creates 16.9 barrels of tailings, converting this to a hectare, we get approximately .00026544 hectares tailings per barrel of tar sands.

[16] Final Supplemental Environmental Impact Statement; Keystone XL Project; Dept. of State. Accessed online at: https://keystonepipeline-xl.state.gov/documents/organization/221190.pdf

[17] http://serc.carleton.edu/NAGTWorkshops/health/case_studies/hydrofracking_w.html

[18] "Brine Spills Associated with Unconventional Oil Development in North Dakota". Lauer, Nancy E., Harkness, Jennifer S., and Vengosh, Avner. *Environ. Sci. Technol.*

larger than previously suspected, with 275,000 tons leaked annually.[19] The third major greenhouse gas, ethane, is also on the rise (after a decades long decrease) specifically because of the oil boom Bakken, which is the third largest emitter of ethane on the planet.[20] Communities and workers in the oil patch are being exposed to known carcinogens, endocrine disruptors and other toxic chemicals.[21]

Much of the extraction in the Bakken takes place on Mandan, Hidatsa, and Arikara territory, on and near the Ft. Berthold Reservation. This is "fracked" oil, extracted by blasting millions of gallons of water and a slurry of toxic chemicals deep into the bedrock of Mother Earth. It is extreme extraction, proven to cause earthquakes and poison aquifers, and has been banned in a long list of cities, states, provinces, and countries around the world. Our relatives in the Three Affiliated Tribes are facing epidemics of health problems, drug and sex trafficking, violent crime, and traffic deaths.[22]

Social and Ecological Costs of Refinement

Marathon also operates a refinery in Detroit that is poisoning the surrounding neighborhoods. The refinery processes both light sweet crude and tar sands oil, and this is where some of the oil from the Sandpiper and Line 3 projects would end up. Its emissions are causing serious health problems in the African-American neighborhood of Boynton. The Marathon refinery in Detroit is located in zip code 48217, the most polluted in the state, where the Michigan Department of Health has documented consistently elevated rates of cancer, respiratory disease, and kidney failure. Emma Lockridge, a nearby resident, says "We don't live next to the refinery, we live IN the refinery…it is just horrific. We are a sick community." A reporter asked her what tar sands smell like, and she said "it smells like death. And that's what it is."

In 2012, Marathon Oil completed a $2.2 billion upgrade on their 81-year-old Detroit facility to process tar sands bitumen into oil. When the refinery switched from conventional oil to tar sands, Marathon bought the homes of approximately 275 people in the mostly white neighborhood of Oakwood Heights, which is not directly in the prevailing path of emissions, unlike the mostly black neighborhood of Boynton. Marathon has left the people of color in Boynton to suffer, consistently denying their requests for buyouts and emergency evacuation. Lockridge says: "There's 10 empty houses on my block...people don't even want the houses. We can't even get squatters." She says the message from Marathon and state regulators is clear: "Walk away or die…at the end of the day, they're killing us." There's an orange and black soot on her white house, from the refinery discharge. "I have had kidney failure. Neighbor died of dialysis. Neighbor next door with dialysis. Neighbor across the street has kidney failure. The chemicals in our pipelines and are in our water will be the same chemicals that come through your land and can break and contaminate. We have cancer, we have autoimmune illnesses, we have MS, we have chemicals that have come up into our homes through the sewer. Those are from the companies, they end up in the public water and sewer system... They are poisoning us. "When you step outside now, it feels as if you strike a match the air will explode. The chemicals come into our homes, come into our basements and we smell it all the time. Don't let them put that pipeline here. I mean, it has always been bad, but not this bad," says Emma Lockridge. "The air is just unbearable. It's like living inside a refinery."

Marathon recently received a controversial permit from the MI Department of Environmental Quality to increase emissions even more, in order to produce cleaner-burning vehicle fuel as required by new federal standards. In other words, this neighborhood is being further sacrificed in order to reduce pollution elsewhere. The permit was issued despite a threatened lawsuit from Detroit Mayor Mike Duggan and a statement from a coalition of state senators

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[19] http://phys.org/news/2016-05-bakken-oil-field-leaks-tons.html

[20] https://www.minnpost.com/earth-journal/2016/05/bakken-wells-drove-sudden-reversal-global-decline-ethane-emissions

[21] http://www.eesi.org/articles/view/new-research-documents-frackings-health-effects-on-workers-and-communities, Colborn T, Kwiatkowski C, Schultz K and Bachran M. 2011. Natural Gas Operations from a Public Health Perspective. Hum Eco Risk Asses: an Inter Jorn. Available at: http://www.tandfonline.com/doi/abs/10.1080/10807039.2011.605662#preview

[22] http://earthfirstjournal.org/newswire/2014/05/26/sexual-assault-in-the-bakken-shale-man-camps,
Gilbertson, Lydia. Letter: End Human Trafficking Wherever It's Happening. Bakken News, May 23, 2014.
http://bakken.com/news/id/182654/letter-end-human-trafficking-wherever-happening/,
McLaughlin, Shaymus. "Rise in Sex Trafficking on Bakken Oil Patch Poses New Challenges,: Minnesota Public Radio Interview with Bryan Lockerby, Administrator of the State's Department of Criminal Investigation. May 2014.

calling on them to reject it, comparing the situation to the poisoned water crisis in Flint. Residents filed a class-action lawsuit against Marathon in US District Court on February 23, 2016.

Climate Change Impacts

The current scoping document narrows the scope of climate change impacts considered in the EIS to only those emissions caused by pipeline construction or power plant generation of electricity to run the pumping stations. This is completely absurd. The document states: *"The air quality impacts analysis will include a review and estimate of the emission inventory of all criteria pollutant, greenhouse gas and hazardous air pollutant emissions related to construction and operation of the proposed project."* By only looking at emissions from construction equipment and pumping stations, major sources of greenhouse gasses from the projects are ignored.

The cumulative effects outlined in Section 4.7 of the draft scope should include the amount of carbon that will be released into the atmosphere if these two pipelines are built. The effects should be combined with an analysis of air quality impacts in Minnesota. The analysis should also include the overall impact of the carbon release, including the estimated cost to remove it from the atmosphere and an assessment of who gains and loses economically.

As noted before, the Environmental Impact Statement for the Keystone XL pipeline included emissions from production, refining, and combustion.. The report states:

"The total annual lifecycle emissions associated with production, refining, and combustion of 830,000 barrels per day (bpd) of oil sands crude oil transported through the proposed Project, as determined through this assessment, are approximately 147 to 168 MMTCO$_2$e. The equivalent annual lifecycle GHG emissions from 830,000 bpd of the four reference crudes (representing crude oils currently refined in Gulf Coast area refineries) examined in this section are estimated to be 124 to 159 MMTCO$_2$e. The range of incremental GHG emissions (i.e., the amount by which the emissions would be greater than the reference crudes) for crude oil that would be transported by the proposed Project is estimated to be 1.3 to 27.4 MMTCO2e annually. This is equivalent to annual GHG emissions from combusting fuels in approximately 270,833 to 5,708,333 passenger vehicles, the CO$_2$ emissions from combusting fuels used to provide the energy consumed by approximately 64,935 to 1,368,631 homes for 1 year, or the annual CO2 emissions of 0.4 to 7.8 coal fired power plants."[23]

A robust analysis is especially important for these two projects, as the Bakken fields are a major source of both methane and ethane, and the tar sands of Alberta are one of the most carbon-intensive fuels on the planet. Methane and ethane are greenhouse gases that also cause climate change.

"Pound for pound, the comparative impact of CH$_4$ (methane) on climate change is more than 25 times greater than CO$_2$ over a 100-year period…..Because gas is often found alongside petroleum, the production, refinement, transportation, and storage of crude oil is also a source of CH$_4$ emissions."[24]

Methane flaring: Fracking has exposed poor infrastructure in the state, which leads drillers to burn or "flare" much of the gas that cannot be captured or shipped. In a single month of 2014, gas wells burned 10.3 billion cubic feet of natural gas. The burning released millions of metric tons of CO$_2$ into the atmosphere, contributing to climate change. In 2012, burned gas added 4.5 million metric tons of CO$_2$ to the atmosphere, which was roughly the equivalent of adding one million cars to U.S. highways. It has also been shown that methane leaking is much greater in the Bakken than previously reported, and that drilling in the Bakken has reversed a global decline in ethane emissions.[25]

Oil sands are also one of the dirtiest fuel sources on the planet, and have caused leading scientists to call for a moratorium on further tar sands development, including infrastructure projects.[26] Over 100 scientists have signed on

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[23] Ibid, pg 4.14-4 (footnotes omitted)

[24] https://www3.epa.gov/climatechange/ghgemissions/gases/ch4.html

[25] http://phys.org/news/2016-05-bakken-oil-field-leaks-tons.html
https://www.minnpost.com/earth-journal/2016/05/bakken-wells-drove-sudden-reversal-global-decline-ethane-emissions

[26] http://www.oilsandsmoratorium.org/

the call, all of whom are leaders in climate change research, economics, geophysicists and biology. They have cited the following ten reasons as evidence for the need of a moratorium[27]:

1. Continued expansion of oil sands and similar unconventional fuels in Canada and beyond is incompatible with limiting climate warming to a level that society can handle without widespread harm.
2. Oil sands should be one of the first fuel sources we avoid using as society moves to non-polluting forms of energy, not the next carbon-intensive source we exploit. Extracting, refining, transporting, and burning oil-sands energy produces among the most greenhouse gases of any transport fuel per unit energy delivered (Brandt 2011, Gordon et al. 2015). Expansion of oil sands production will exacerbate the problem of carbon pollution and slow the transition to cleaner energy (Unruh 2000).
3. Current oil sands environmental protections and baseline data are largely lacking, and protections that exist are too seldom enforced. Too often, the development of the oil sands is presented as inevitable, while protections for human health and the environment are treated as optional.
4. Contaminants from oil sands development permeate the land, water and air of the Canadian boreal landscape, and many of these impacts are difficult to mitigate. Independent studies have demonstrated that mining and processing Albertan oil sands releases carcinogenic and toxic pollutants (e.g., heavy metals, polycyclic aromatic compounds) to the atmosphere from smoke stacks and evaporation, and to groundwater from leaching of tailings ponds. This pollution harms terrestrial and aquatic ecosystems and the species within them (Pollet and Bendell-Young 2000, Gurney et al. 2005, Nero et al. 2006, Gentes et al. 2007, Kelly et al. 2009, Kelly et al. 2010, Landis et al. 2012, Rooney et al. 2012, Kurek et al. 2013, Andrishak and Hicks 2011, Hebert et al. 2013, Galarneau et al. 2014, Parajulee and Wania 2014, Schindler 2014, Schwalb et al. 2015).
5. Less than 0.2% of the area affected by Canadian oil sands mining has been reclaimed, and none restored to its original state (Government of Alberta 2014).
6. Development and transport of oil sands is inconsistent with the title and rights of many Aboriginal Peoples of North America. Rapid expansion of the oil sands in Canada violates or puts at risk nation-to-nation agreements with Aboriginal peoples. In Alberta, oil sands mining is contributing to the degradation and erosion of treaty and constitutionally protected rights by disrupting ecological landscapes critical to the survival of Aboriginal culture, activities, livelihoods, and lifeways (Passelac-Ross and Potes 2007, Foote 2012, ACFN). In the US, proposed infrastructure projects threaten to undermine Treaty agreements between the federal government and Native American tribes (Mufson 2012, Hart 2014). In both countries, contamination of sacred lands and waters, disruption of cultural sites, lack of consultation, and long-term effects of climate change undermine sustainable social, ecological, and economic initiatives involving Aboriginal peoples across the continent and constitute violations of Native sovereignty (Passelac-Ross and Potes 2007, Foote 2012, Mufson 2012, Hart 2014, Irvine et al. 2014, McLachlan 2014, Wohlberg 2014, Athabasca Chipewyan First Nation, Tsleil-Waututh Nation).
7. What happens in North America will set a precedent for efforts to reduce carbon pollution and address climate warming elsewhere. The choices we make about the oil sands will reverberate globally, as other countries decide whether or how to develop their own large unconventional oil deposits (Balouga 2012). Strong North American leadership is needed now, because the impacts of current decisions will be felt for decades and centuries.
8. Controlling carbon pollution will not derail the economy. Most leading economists now agree that limits on carbon pollution – using mechanisms such as carbon taxes, cap-and-trade systems, or regulations – can facilitate a transition over several decades to low-emission energy without a dramatic reduction in global economic growth (Global Energy Assessment 2012, IPCC 2014, Nordhaus 2014).
9. Debates about individual pipeline proposals underestimate the full social costs of the oil sands, and existing policies ignore cumulative impacts. These are not simply business decisions. Responsible policies should address the interwoven, system-wide impacts of oil sands development, from mines and refineries, to pipelines, rail and tanker traffic, to impacts on economies and the global climate system. Current laws, regulations, and policies are not designed to assess cumulative impacts (Johnson and Miyanishi 2008, Office of the Auditor General of Canada 2011). When oil sands development is viewed as an integrated whole, the costs and benefits of individual decisions can be evaluated responsibly (Chan et al. 2014). Land use and

[27] http://www.oilsandsmoratorium.org/wp-content/uploads/2015/06/Oil-Sands-Moratorium-Message.pdf

regulatory decisions are considered lease-by-lease with no single agency responsible for oversight, accounting of cumulative impacts, or information flow. For example, decisions regarding mineral rights are made by Alberta Energy, those for timber by Alberta Sustainable Resource Development, while Alberta Environment decides on water and air impacts, and the National Energy Board decides on pipeline and rail transport of oil sands products (Johnson and Miyanishi 2008).

10. A majority of North Americans want their leaders to address climate change, and they are willing to pay more for energy to help make that happen.

Climate change is not an event in the future. Climate change was 30 years ago, we are living in climate chaos right now. We are seeing unprecedented human conflict and natural disaster. We are watching upwards of 200 species go extinct every day. A major contributor to climate change is the use of petroleum and petroleum bi-products. Many of the assumptions of need for this set of pipelines are based on a projected need for continued consumption of fossil fuels. But there is now international consensus, as illustrated in the Paris Climate Accord, that we need to rapidly shift away from fossil fuels. The U.S. energy system is extremely inefficient, wasting 61-86% of available energy.[28] The U.S. transportation system, with its heavy reliance on personal automobiles, powered by inefficient internal combustion engines is a perfect example of this. Not only are the better ways to move people (mass transit, bicycles, walking) but there are more efficient engine designs.[29] The time is now to say no to more dirty oil infrastructure.

Wildfires are an indicator very close to home. In the last two decades, North America has seen a dramatic increase in the number of wildfires and the total number of acres burning each year, as a result of climate change. In 2015, there were over 10 million acres burned by wildfire in the United States alone, approximately 67% more than the average for a given year.[30] According to the National Interagency Fire Center, 9 of the 10 worst years for acres burned in the U.S. have occurred since 2000.[31] The International Panel on Climate Change (IPCC) determined this increase will continue to accelerate. Wildfires, which already burn more than 350 million hectares globally causing an estimated 340,000 deaths, will double in number in the near future, leading forest-fire experts have warned. The early May 2016 wildfires that destroyed most of the town of Ft. McMurry, Alberta, was perhaps the most significant wildfire in North American history, in terms of human impact. It also destroyed tar sands industry infrastructure.[32] That massive fire has been raging out of control for nearly a month and is still going. It caused significant air quality concerns all across the region and resulted in a significant decline of tar sands production.[33] Experts say fires such as these will be a continuing reality in our new global climate, and will also increase in intensity.[34]

4) INDIGENOUS HUMAN HEALTH IMPACTS

The EIS must also address the unique human health concerns of the Native nations directly impacted by this project. The potential impacts of human health as a result of these projects are vastly underestimated in the scoping document. Native people are already under severe duress. Native peoples are already disproportionately impacted and suffering from structural racism due to unjust social and economic conditions. Throughout the scoping document, High Consequence Areas (HCA) are discussed. In human terms, these areas are defined by concentration of population. In general, Native communities are not considered HCAs. The EIS should factor this unique situation into the definition of an HCA, as pockets of poverty and concentrated environmental injustice should be included to consider oppressed communities equally.

Subpart 4.4.1.5 Environmental Justice is inadequate to address the issues of environmental justice associated with this project. The scope should include a detailed explanation of how the State of Minnesota will assess

[28] http://cleantechnica.com/2013/08/26/us-wastes-61-86-of-its-energy/
[29] https://www.fueleconomy.gov/feg/atv-ev.shtml
[30] https://www.nifc.gov/fireInfo/nfn.htm
[31] http://www.usatoday.com/story/weather/2016/01/06/wildfires-burned-record-10-million-acres/78362786/
[32] http://www.wsj.com/articles/canada-wildfire-prompts-new-evacuation-of-oil-sands-workers-in-northern-alberta-1463473452
[33] http://www.nytimes.com/2016/05/06/world/americas/canadian-wildfires-curtail-oil-sands-production.html?_r=0
[34] Toronto Globe and Mail February l9,2012

environmental justice concerns, how it will address the findings of environmental justice inquiry, and how it will provide additional protections and insurance for communities and people subject to disparate impacts.

In the section above titled "Well to Wheels Impact Analysis," we outline the significant human health impacts on the Indigenous people in the Bakken region.

Risk and Tribal Health Impacts in Minnesota

Tribal communities, in both the United States and Canada are already at-risk communities, as evidenced by their high-rates of suicide and persistent poverty.[35] Numerous studies and reports have linked these conditions directly to historic trauma, the history of colonization, and negative impacts of mega-projects.[36] The largest pipelines in North America, and the tar sands and fracked oil extraction they support, are undoubtedly mega-projects. Studies have also shown that impacts on Tribal communities are consistently underestimated, as the methodologies used to analyze risk are based on healthy white-males, not at-risk peoples that live off the land. Recently, suicide crises have hit First Nations communities in Canada, with a direct link being drawn between large infrastructure projects and their impacts on the communities[37].

Ojibwe socio-economic conditions place our community at high health risks. The Amherst Wilder Foundation report on health inequities in Minnesota found that American Indians suffered from structural racism with regards to health disparities, and are a high risk population. "The evidence strongly suggests that social and economic conditions and structural racism contribute significantly to the relatively poor health outcomes of the American Indian population in Minnesota. "Therefore, we feel that policy makers should take these critical factors into account in a systematic and transparent way when making decisions that potentially have wide ranging impacts..."[38] In the 2014 Advancing Health Equity report, the Minnesota Department of Health found the "years of potential life lost" as a result of heart disease and stroke is 165 percent higher for American Indians than for whites in Minnesota.[39] The report also highlighted structural racism as a key contributor to health inequities in our state:

"Structural racism — the normalization of historical, cultural, institutional and interpersonal dynamics that routinely advantage white people while producing cumulative and chronic adverse outcomes for people of color and American Indians — is rarely talked about. Revealing where structural racism is operating and where its effects are being felt is essential for figuring out where policies and programs can make the greatest improvements".[40]

International studies indicate that adding mega projects to stressed communities significantly increases negative health impacts. Without any spills, the proposed pipelines will add significant duress to tribal communities. Studies from previous oil spills have shown a marked decrease in traditional practices following a spill due to perceived contamination.[41]

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[35] http://www.mcgilldaily.com/2016/03/reactive-measures-not-a-solution-to-cross-lake-suicide-crisis/
http://www.theglobeandmail.com/news/national/attawapiskat-four-things-to-help-understand-the-suicidecrisis/article29583059/

[36] Luginaah et al (2010). Surrounded by Chemical Valley and 'living in a bubble': the case of the Aamjiwnaang First Nation, Ontario. Journal of Environmental Planning and Management, 53(3) 2010.
Tobias, J., Richmond, C., Luginaah, I. (2014) "That Land Means Everything to us". Environmental Dispossession and Resilience on the North Shore of Lake Superior. Health and Place (29), 26-33.
McDoweel, G. (2014). The socio ecological dimensions of hydrocarbon development in the disko bay region of Greenland: opportunities, risks, and trade- offs. Applied Geography, 46. 98.

[37] http://www.theglobeandmail.com/news/national/manitoba-premier-apologizes-to-first-nation-for-damage-done-by-dam/article22541829/

[38] Wilder Letter June 4, 2015

[39] Minnesota Department of Health (2014): Advancing Health Equity. Retrieved from: http://www.health.state.mn.us/divs/chs/healthequity/aheexecutivesummary.pdf

[40] Advancing Health Equity in Minnesota: Report to the Legislature, February 1, 2014: Health's Commissioner's Office.

[41] Gill DA, Picou JS, Ritchie LA. 2012. The Exxon Valdex and BP Oil Spills: A Comparison of Intial Social and Psychological Impacts. Amer Beh Sci 56: 3-23.
Miraglia R. 2002. The Cultural and Behaviour Impact of the Exxon Valdez Oil Spill on the Natives Peoples of Prince William Sound, Alaska. Spill Sci & Tech Bull 7: 75-87.

The communities of Rice Lake and East Lake, which are most directly impacted by the proposed Sandpiper, are already experiencing these statistics and are now facing the addition of the proposed pipelines. These projects are placing significant additional stress on these communities, which will only increase health inequities and cause additional harm. At both the Rice Lake and McGregor meetings, emotional verbal comments addressed the community address associated with the prospect of these projects. In the case of Rice Lake and East Lake, the larger territory would be impacted by the proposed pipeline project, and in the case of East Lake, the community has not only the prospect of a pipeline, but also the proposed Tamarac Copper mine. The cumulative impacts of these pipeline projects, and other proposed or planned projects should be considered as part of this EIS process. In the case of both White Earth and Mille Lacs reservation, suicides are already much higher than the state average, along with many other health conditions. Reservations across North America are also suffering from major drug and suicide epidemics. The health impacts of the proposed Sandpiper and Line 3 damage to Ojibwe communities will be significant, and the full, cumulative human consequences must be considered. These consequences are not limited to the populous Twin Cities, but are spread across Native communities from Alberta, North Dakota, and here in Minnesota. As we have stated before, the front line communities in Alberta and North Dakota are suffering from increased sexual violence, exposure to toxic chemicals, and a loss of community and ecology.

In the recent suicide epidemics in northern Canadian Indigenous nations- Pimicikimak (Cross Lake Manitoba) and Attawapiskat (Ontario), there has been a link made between long term duress, historic trauma, colonialism and ***most recently, mega projects***.

"...The Pimicikamak Cree Nation in Manitoba, also known as Cross Lake, declared a state of emergency on March 9, in the wake of six suicides over the past two months and over 140 attempts in the community of 8,365 in the last two weeks alone... The suicide crisis, however, cannot be resolved without considering the other hardships affecting Cross Lake, including the destruction of its land by a Manitoba Hydro station and a lack of economic security with an 80 per cent unemployment rate. In order to seriously confront Cross Lake's suicide crisis, the government must, in consultation with the Nation, address the systemic roots of this crisis…."

"Aboriginal youth in Canada have a suicide rate 50 times higher than the general population. Attawapiskat, another Cree community in the north has a suicide epidemic… In both cases, Pimicikamik Cree and Attawapiskat Cree, the background of colonialism, and injustice -whether in health access or housing access is foundational to the present suicide crisis. The crisis is worsened significantly by the destruction of the primary territory by the dam projects."

McGill Daily (Canada April 5 2016)

Climate Refugees

Climate refugees are people who must leave their homes and communities because of the effects of climate change and global warming.[42] In 2013, there were an estimated 22 million people displaced by natural disaster.[43] There is consensus that these numbers will continue to rise.[44] Domestically, we have already seen the phenomena unfold as the Isle de Jean Charles Tribal community in Southern Louisiana has been forced to relocate.[45] The northwestern Alaskan village of Kivalina is perched on a remote and narrow strip of sand next to the frigid waters of the Chukchi sea. Its 400 residents are Iñupiat. The U.S. Army Corps of Engineers predicts that Kivalina will be completely uninhabitable by 2025, a victim of melting ice, coastal erosion and rising sea levels. This village is just one of three Inuit settlements that scientists believe will be destroyed by the effects of climate change. At least eight more are at serious risk.[46] Indigenous peoples on a worldwide scale are significantly impacted as climate change refugees. This is in part due to our majority population in the Arctic and the islands in the oceans, which are the most heavily impacted by climate change. The over l80,000,000 metric tons annually of additional carbon dioxide associated with the Sandpiper and Line 3 as well as the significant metric tonnage of methane gas from the Sandpiper front end is directly related to these human health impacts. The impacts of these projects are too much for the planet to take, and will result in more drastic climate change, and disparate negative impacts on Indigenous communities.

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[42] http://nationalgeographic.org/encyclopedia/climate-refugee/

[43] http://www.internal-displacement.org/publications/2014/global-estimates-2014-people-displaced-by-disasters/

[44] http://www.unhcr.org/pages/49e4a5096.html

[45] http://www.theguardian.com/environment/2016/mar/15/louisiana-isle-de-jean-charles-island-sea-level-resettlement

[46] New York Daily News July 30, 2013 Carolyne Kuruvilla

5) INDIGENOUS CULTURAL IMPACTS

In Minnesota, the majority of these projects run through the 1855 Treaty area, lands on which tribal people continue to harvest a significant amount of the food necessary for the well-being and survival of our people. The Anishinaabeg carry out ceremonies throughout that territory, as they have since time immemorial. Through an EPA Technical Assistance for Communities contract (submitted in hard copy at the Rice Lake EIS scoping meeting in May 2016), researchers identified significant areas of traditional cultural use and sacred sites directly within the pipeline impact zone. At least 280 of these sites were identified and are subject to the archaeological assessment requirements of the State of Minnesota's Indian Affairs Council, as well as federal requirements under the National Historic Preservation Act, the Executive Order on the Protection of Sacred Sites, and the United Nations Declaration on the Rights of Indigenous Peoples.

In subpart 4.4.4 Cultural Resources, we believe that Minnesota law requires an evaluation by the Minnesota Indian Affairs archaeological staff. The MIA staff is properly trained and qualified to identify and evaluate indigenous cultural sites. Destruction of religion and tradition due to a failure to understand such concepts is unacceptable and a loss for all peoples; adequate training is a must in this situation. The structure and applicable standards of a review by this staff should be included in the scope. All Cultural Resources identification will require MIA staff and any work performed should be completed in accord to their well-researched, established standards.

In subpart 4.4.4.2 Archaeological, Historical and Cultural Resources we find the use of spatial analysis within ArcGIS inadequate to protect archaeological sites. Again, this review should be completed by Minnesota Indian Affairs archaeological staff and their developed standards to provide protection of known and unknown sites. An overseeing agency must be able to properly analyze the resources at hand to fully understand what is at stake. The scoping document should include MIA staff authority and expertise in ensuring adequate protection of archaeological sites.

In subpart 4.4.5.4 Wild Rice and other Tribal Resources. The scoping document needs to be amended to describe how it is going to protect 'other Tribal Resources' and what is encompassed within that term. The scoping document fails to identify how it will identify, evaluate and protect other Tribal Resources and deals only with wild rice.

Throughout the NEB document on the Line 3 Replacement Project cited above, there is a focus on the inclusion of Indigenous communities in the process of monitoring and analyzing this project.[47] This includes utilizing Indigenous Knowledge and Science. The MN PUC should require the same level of inclusion. As part of the conditional approval for the project in Canada, the NEB made several requirements for Indigenous involvement including:

- The development of *consultation plans for Aboriginal groups going forward... developed in consultation with Aboriginal groups and are to reflect a collaborative and coordinated consultation approach, as opposed to only information sharing. ... Enbridge must demonstrably respond to and address concerns raised where reasonable. The plans should also respect the cultural interests of Aboriginal groups regardless of the nature of the land use in the Project area (for example, unoccupied Crown land, occupied Crown land, or privately owned land). Enbridge and participating Aboriginal groups are encouraged to be innovative in order to enhance the way consultation will occur during the operation of the Line 3 Replacement Pipeline, and after the Existing Line 3 Pipeline has been decommissioned.*
- The development of *an Aboriginal Monitoring Plan for the construction phase of the Line 3 Replacement Pipeline, and specifically for the construction of pipeline facilities... The Board appreciates Enbridge's concern that it cannot hire approximately 150 Aboriginal monitors for the Project while ensuring safety and efficiency. This will be taken into account when the Board reviews the Plan. While the Board does not expect Enbridge to hire 150 monitors, there is a reasonable middle ground. The Board expects Enbridge to make efforts to accommodate active monitoring where desired by an Aboriginal group and where reasonable and safe, although observational site visits may be a component of the Plan. If an Aboriginal group wishes to participate in monitoring and Enbridge cannot reasonably accommodate the request, Enbridge will be expected to provide an explanation to the Board as to why*

[47] https://docs.neb-one.gc.ca/ll-eng/llisapi.dll?func=ll&objId=2949686&objAction=browse

Furthermore, it was recommended that *"the NEB, the pipeline industry, and Aboriginal groups work together to create a set of principles, objectives or a framework approach that can be used to assist the development of Aboriginal monitoring programs for large pipeline projects."*

At the federal level, Section 106 of the National Historic Preservation Act [NHPA] mandates tribal consultation and respect for tribal sovereignty with an undertaking that could affect tribal lands and historic properties. This legislation complements the intent and purpose of the National Environmental Policy Act. The proposed projects at hand will pass through treaty territories of the Anishinaabe people, and carry the potential for permanently destroying the ability of tribal nations to engage in their treaty-protected rights to harvest wild rice, hunt, and fish. Proper consultation with all affected tribal nations must take place, and there must be a detailed analysis of the cultural impacts of these projects at the federal and state levels. The potential for harm is high -- destruction of culture and sacred sites cannot be easily, if ever, undone.

The United States is one of numerous countries that supports the United Nations Declaration on the Rights of Indigenous Peoples. The UNDRIP is an international instrument that contains many protections for Indigenous communities, who are so often subject to abuses and unjust treatment. Among the provisions are a right to practice cultural beliefs and practices.[48] Contamination from these pipeline projects would wipe out the practice of harvesting wild rice and all associated religious ceremonies. Wild rice is an intrinsic, identity-forming aspect of Anishinaabe life -- to lose access to these wild rice beds would devastate and permanently harm our culture.

The UNDRIP also contains provisions mandating free and informed consent from an affected tribal nation by the state.[49] In this case, the state of Minnesota has failed to properly consult or even adequately consider the impacts of these projects on the indigenous peoples of the region. The damages that will result from these projects cannot be undone, nor can they be measurable in terms of losing an entire culture that has existed prior to the formation of the United States. A fossil fuel project should not be considered without fully examining cultural impacts and the potential losses that will occur if spills occur, which is a mathematical certainty.

6) ABANDONMENT

Every day, over 2.5 million barrels of crude oil flow through MN in eight oil pipelines, and 4 of those lines, Enbridge's old Lakehead system, are ancient and full of holes, likely leaking crude oil throughout their length. They were built in the 50's and 60's before the more abrasive dilbit was being extracted. As such, these pipelines were not designed to handle the crude that now flows through them. States, tribes, and the federal government were not well informed of the risks and very few environmental regulations were in place. At many points, those pipes were never buried, and are sitting above ground, corroding, with their protective coating, single wrap of Polyken 960-13 polyethylene tape with an adhesive backing, peeling off. This peeling has been shown over and over again to cause ruptures. It's what caused the Kalamazoo rupture, the largest inland spill in US history (replacing the previous record holder, the 1979 Bemidji spill).[50] It has been 6 years and $1.2 billion has been spent, and that spill is still not cleaned up. The community near the spill has been suffering negative health effects, and it has been shown that Enbridge knew about the crack, but did nothing about it. We do not want this risk in our pristine waterways and sacred rice beds. These lines are catastrophes waiting to happen. Allowing Enbridge to abandon Line 3 without a sufficient review process will set a dangerous precedent.

The following are photos were taken by our staff member, Thane Maxwell of Line 4 and Line 1, on Enbridge's Mainline Corridor where it runs across the Fond du Lac reservation near Ditchbank Road.

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[48] http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf

[49] *Id*.

[50] http://www.ntsb.gov/investigations/AccidentReports/Pages/PAR1201.aspx

The next two photos are of Line 4, taken by John Ratzloff in the same location.

Over time, soil movement causes wear and tear on this coating and it breaks down, causing pipes to corrode. In section 1.7.1, the NTSB report for the Kalamazoo incident states:

"Corrosion was observed beneath the areas where the adhesive bond between the pipe and its protective tape coating had deteriorated. In the areas of disbondment, metal loss was found around and below the longitudinal seam in the upstream and downstream sections of pipe. Because the tape had become disbonded, the pipeline's cathodic protection was prevented from reaching the pipe; it no longer prevented corrosion from occurring. External corrosion was observed along the length of the pipe in areas where the coating had disbonded."

All of this is when the pipes are buried below the frost line. It is required to bury pipelines below the frost line, so we must wonder why these pipes are sitting above ground, exposed as they are. Fond du Lac Band members and

employees raised concerns about these exposed pipes in MN Public Utilities Commission proceedings regarding Enbridge's pipeline route restoration practices in 2008, but to no avail.[51]

This polyethylene tape was also documented in the TSB of Canada's incident report as a cause of the rupture that spilled near Hardisty, Alberta in 2001.[52] It was also documented as a major cause of corrosion on Enbridge's Line 9 pipeline, during their recent application to the TSB of Canada to reverse the direction of that line.[53] Enbridge's spokesperson Lorraine Little has also cited it as the cause of the corrosion motivating Enbridge to propose abandonment of their existing Line 3 pipeline, so that they can build a new one in the Sandpiper corridor.[54]

Line 3 is the 34" line that Enbridge wants to abandon and build anew, in the new corridor, so that they don't have to deal with the 900 "structural anomalies" they've found in it. Line 4, the exposed one in the pictures is a strange one, with 28 different segments of different sizes and lengths and product types, many of which are "loops" that work in combination with Line 3 and were added on in multiple stages over the years. Many governmental reports and newspaper articles refer to Lines 3 and 4 as a single unit. Together they are responsible for Minnesota's largest spill near Grand Rapids in 1991; the spill near Cohasset, MN, in 2002; the explosion in Clearbrook in 2007 that killed two workers; a spill in Regina, Alberta in December 2014; and countless other ruptures and spills. In other words, these are Minnesota's problem child pipelines - ticking time bombs. That risk falls disproportionately on Anishinaabe people. The real opportunity to create jobs lies in maintaining, cleaning up, and dismantling these old lines.

Honor the Earth agrees that the current Line 3 needs to be removed from service. However, we do not believe that Enbridge should be allowed to walk away from existing contamination and other issues. Enbridge has indicated that the current Line 3 has over 900 "integrity anomalies", while we have not seen a classification of the level of these anomalies, we know they can developed into ruptures, spills, or leaks. Enbridge knows this as well, which is why they are proposing to abandon this structurally impaired line in place and build a brand new one. This abandonment allows Enbridge to avoid opening the ground and potentially discovering contamination their "pigs" (pipeline inspection gauge) have not disclosed (or that has not been reported). There are also reports that there are several places where the existing pipe has been exposed, and other areas where invasive species have encroached on harvesting areas as a direct result of ROW maintenance activities. If Enbridge is not required to remove the pipeline and restore the damaged ecosystems, there may never be a full accounting of the contamination surrounding the pipeline. This contamination would become the responsibility of nearby landowners. Additionally, Enbridge has stated they plan to fill the pipelines with nitrogen. This would constitute an underground storage tank according to Minnesota statute Minnesota Statute § 103I.681[55]

Article 5 of Enbridge's 1991 Presidential Permit for the operation of Line 3 clearly states that they are responsible for removal of the line:[56]

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[51] concerns about these exposed pipes in MN Public Utilities Commission proceedings regarding Enbridge's pipeline route restoration practices in 2008

[52] http://www.bst-tsb.gc.ca/eng/rapports-reports/pipeline/2001/p01h0004/p01h0004.pdf
[53] http://www.landownerassociation.ca/rsrcs/OPLAFinalArgument_May24_2012.pdf
[54] http://www.startribune.com/enbridge-files-to-replace-problem-pipeline-in-minnesota/280528652/
[55] https://www.revisor.mn.gov/statutes/?id=103I.681
[56] http://mn.gov/commerce/energyfacilities/documents/34079/Appendix%20A%20-%201991%20Presidential%20Permit.pdf

Article 5. Upon the termination, revocation, or surrender of this permit, the United States facilities in the immediate vicinity of the international boundary line shall be removed by and at the expense of the permittee within such time as the Secretary of State of the United States or his delegate may specify, and upon failure of the permittee to remove this portion of the United States facilities as ordered, the Secretary of State of the United States or his delegate may direct that possession of such facilities be taken and that they be removed at the expense of the permittee; and the permittee shall have no claim for damages by reason of such possession or removal.

Enbridge promises to maintain the pipelines in perpetuity, but no one believes this. No infrastructure from 50 years ago is still in existence now without ongoing maintenance. In the NEB report. the Canadian government found that there was a very real risk that pipeline companies would not have money available forever and would eventually stop maintenance with the result that some landowner in the future would be stuck with a decaying pipeline causing drainage, subsidence, erosion and contamination, and no way to get the oil industry to pay for its mess.[57] The State of Minnesota needs to develop a set of abandonment regulations to avoid passing on this incredible liability to our future generations.

Realizing these issues, the NEB has made several recommendations directly related to the long-term oversight of the abandoned Line 3[58]:

- ***In the Panel's view, the Board's policy and regulatory framework needs to be responsive to the evolving statutory context and the likelihood of additional large decommissioning and abandonment applications in the future.***

- *Enbridge will be required to make additional filings with the Board before commencing decommissioning activities. These include a detailed Final Decommissioning Plan and a Minimally-Invasive Procedure Evaluation Report.*

- *Due to the uncertainty regarding the long-term impacts of decommissioning the Existing Line 3 Pipeline in-place... it is important that a robust monitoring plan be in place to ensure that remedial actions and adaptive management measures will be taken if required. Board-imposed conditions include the filing by Enbridge of a Decommissioning Treatment Monitoring Program and reporting by Enbridge of the monitoring results to the Board and stakeholders. Enbridge will also be required to notify the Board or obtain Board approval in the event that certain remedial actions or adaptive management measures are required after the Existing Line 3 Pipeline has been decommissioned*

- *There is a current restriction (other operating pipelines) on Enbridge's ability to complete some of the remaining steps in the lifecycle of the Existing Line 3 Pipeline, such as removal of above-ground facilities at shared facility sites. Enbridge suggested that the Board could require it to file a proposed plan to complete these remaining activities at the time of abandonment of the last operating pipeline in the corridor. The Board agrees that it should assess and approve these remaining activities before they are carried out. However, in the Board's view, this should be accomplished by way of a future abandonment application, not merely through the approval of a plan. A future abandonment application will address any and all remaining activities*

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57 https://docs.neb-one.gc.ca/ll-eng/llisapi.dll/fetch/2000/90464/90552/92263/2404881/2545522/2955931/2949686/Volume_I_-_Our_Decisions_and_Recommendations_-_OH-001-2015_-_A4Z5U2.pdf?nodeid=2949922&vernum=-2

58 https://docs.neb-one.gc.ca/ll-eng/llisapi.dll/fetch/2000/90464/90552/92263/2404881/2545522/2955931/2949686/Volume_I_-_Our_Decisions_and_Recommendations_-_OH-001-2015_-_A4Z5U2.pdf?nodeid=2949922&vernum=-2

in the lifecycle of the Existing Line 3 Pipeline, including those that may be required due to circumstances that exist at that time. This is consistent with current Board guidance in Guide K to the Filing Manual and its amended Decommissioning Guidance Notes, which are clear that all decommissioned pipelines will require an application to the Board for abandonment.

- *The Board therefore imposes a condition requiring Enbridge to file an abandonment application once the remaining steps in the lifecycle of the Existing Line 3 Pipeline can be carried out (excluding ongoing monitoring), or if the Board directs Enbridge to do so for all or any part of the pipeline. The Board also imposes a condition requiring Enbridge, after the Existing Line 3 Pipeline has been decommissioned, to report every five years on the status of the corridor. This information will help the Board regularly assess the ongoing status of the corridor, including the continued appropriateness of the Existing Line 3 Pipeline remaining in-place.*

These conditions were designed to mitigate some of the potential long-term consequences of abandonment, including:

- Long-term financial liability of pipeline[59]
- Drainage or sinkhole issues, including the creation of water conduits
- Corrosion issues[60]
- Subsidence
- Potential soil and groundwater contamination

Additionally the NEB has ordered Enbridge to set aside nearly $1 billion to pay for future abandonment of its pipelines in Canada. In the US, the responsibility to protect landowners and the public from the risks created by abandoned pipelines is on the states.

The State of Minnesota has the power to regulate abandoned pipelines. In particular, the Public Utilities Commission (PUC) has discretion to decide what actions a pipeline company takes to minimize risks posed by old pipelines, particularly when it approves a replacement. Since Line 3 is the first major crude oil pipeline to be abandoned in the state, there is a risk that the PUC will avoid this responsibility. Enbridge should be required to do a survey of Line 3 now to identify possible spill locations and investigate them, because that should be addressed now while the costs can still be passed on to the industry. Landowners need to clarify their right to control their own land by requiring Enbridge to remove or otherwise mitigate the pipeline, otherwise, if a conflict arises their only option may be to bring Enbridge to court.

Elements of an abandonment plan should include:

1) Clarifying landowner control over what happens to abandoned pipe so they don't have to sue Enbridge;
2) Landowner education about the full range of mitigation options available to landowners, including removal, plugging, and filling abandoned pipe;
3) A survey for contamination and remediation plan
4) To the degree that landowners want to put off the decision about what to do with the pipe, the should seek the creation of a trust fund to ensure that money is always available should future problems arise.

7) SPILL MODELING AND RESPONSE

The bottom line is that for a given pipeline in any 10-year period, there is a 57% chance of a major spill, as documented by USDOT study using PHMSA data.[61] So it's not a question of *if* these pipelines will poison our sacred

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[59] From: http://www.pipelineandgasjournal.com/who-owns-abandoned-pipelines

[60] https://docs.neb-one.gc.ca/ll-eng/llisapi.dll/fetch/2000/90463/501473/501488/501198/515103/A1F2Z4_-_TNS_Tech_Guidelines_on_Abandonment_(r12)_April_10_07_JKK.pdf?_gc_lang=en&nodeid=515104&vernum=0&redirect=3

[61] http://www.phmsa.dot.gov/pv_obj_cache/pv_obj_id_4A77C7A89CAA18E285898295888E3DB9C5924400/filenam

waters and destroy our way of life, but *when*. The EIS must include a thorough analysis of spill risk and response. The current scope is insufficient.

Incorrect Spill Modeling Methodology

The EIS should include spill modeling under both average and worst case weather conditions on river crossings as well nearby lakes, streams and wetlands. It should also include all of the High Consequence Areas (HCA). The original Sandpiper RP scope prepared by Deborah Pile contained 7 locations for oil spill risk assessment and analysis. However, it is not clear in the new scoping document where these locations are. As it currently stands, DOC seems to have chosen locations that are "low consequence areas" rather than high consequence areas (HCA). Upper Rice Lake is not included despite the fact that it is one of the premier wild rice lakes. Other HCA's that should be included include Hay Creek, the Straight River aquifer, the Pine River, the Whitefish Chain, Spire Valley, the Mississippi River and Big Sandy River crossings, the Kettle River, the western tributary to the St. Croix National Scenic Riverway, and of course, Lake Superior.

The draft scoping document relies on maximum spill data from Enbridge. As Enbridge is known to under-represent their spills, independent verification of maximum potential spills should be conducted. Relying on Enbridge's data for spill modeling results thwarts public participation in the process and prevents us from commenting on the methodology being employed to protect our precious resources.

Also, if Enbridge's offical response time is anywhere from 1 hour to 3 days, then a 24 hr modeling of a spill or leak is insufficient. The duration of the model runs should be determined by emergency spill response time from moment of release to fully deployed containment. Downstream impacts must also track dissolved fractions and submerged fractions of the product that defeat containment designed to collect floating fractions. These downstream models should predict the ultimate fate of all fractions that are subject to attenuation of any kind and to the remaining components including heavy metals that do not attenuate by any other means with exception of dilution. Heavy metals like mercury would have to be modeled through natural methylation in aquatic environments and eventual uptake into the food chain including fish, predators and humans. Dilbit and other dense, nonaqueous phase liquids (DNAPLs) are exceedingly hard to clean up from groundwater and sensitive wetlands, the exact environments the prefered route runs through.

River Crossings

Crude oil pipeline river crossings pose unique and significant risks to our freshwater resources. The Yellowstone River spill in 2015 showed how unpredictable river beds can be, and how impossible it is to cross a river safely. In that case, the Poplar Pipeline had been monitored in 2011 and measured to be more than 8 feet below the river bed at its shallowest point. In 2015, it was all of a sudden entirely exposed to the river's current for more than 100 feet along its length.[62] It actually had a foot of river water flowing underneath the pipe. It ruptured, spilling more than 30,000 gallons into the river.

[62] http://insideclimatenews.org/news/06022015/yellowstone-oil-spills-expose-threat-pipelines-under-rivers-nationwide

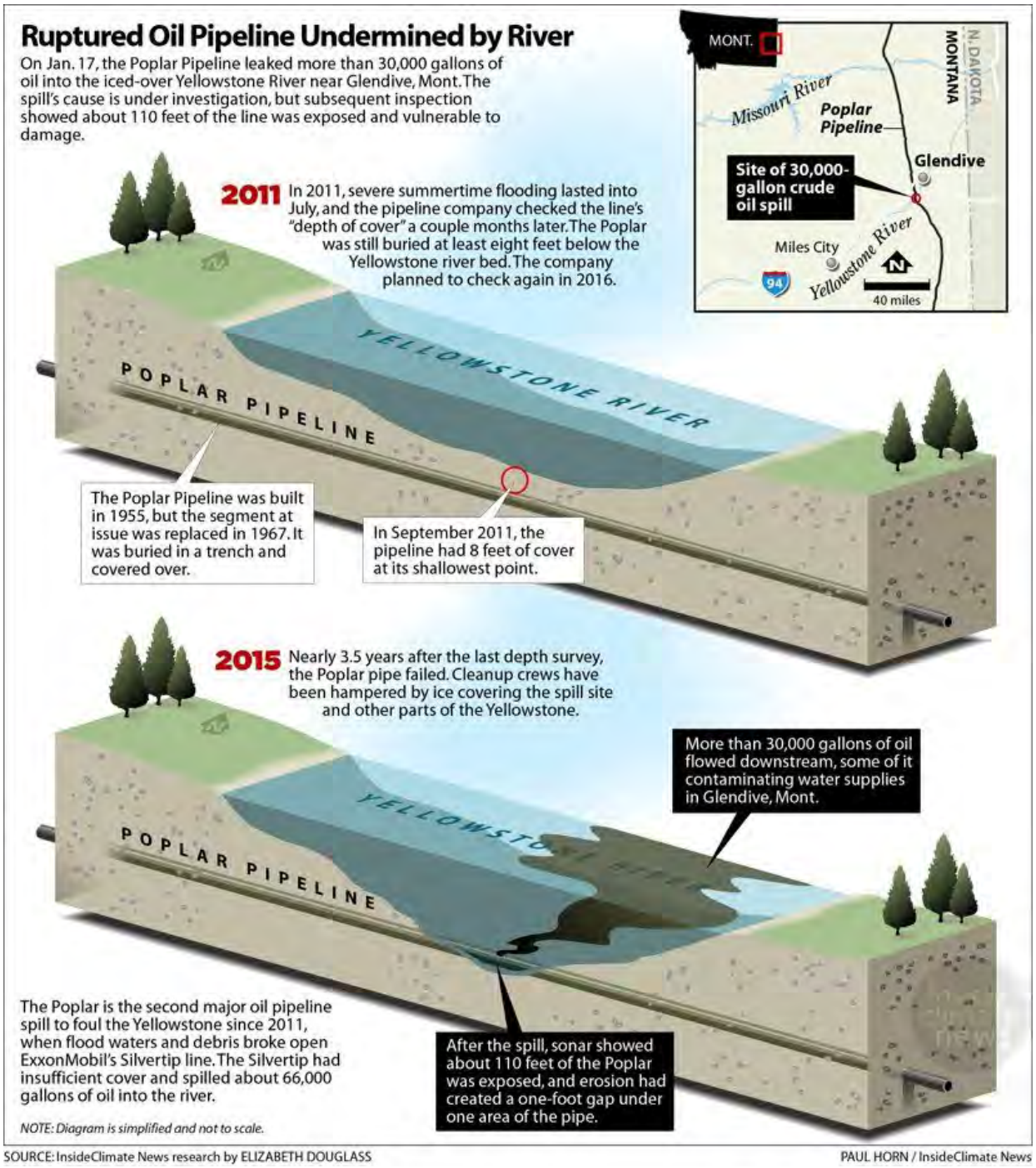

In 2014, an MPR report showed that 3 of the 6 Enbridge crude oil pipelines crossing Minnesota's Tamarac River were exposed by floodwater erosion years beforehand, but were still exposed.[63] None of the pipes had failed at that point, but one was being propped up by steel legs.

A study last year by the Pipeline and Hazardous Materials Safety Administration found "depletion of cover" was a factor in 16 significant pipeline spills at river crossings since 1991.[64]

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[63] http://www.mprnews.org/story/2014/07/29/enbridge-pipelines-exposed

[64] http://www.phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/Rep_to_Congr_on_Res_of_Haz_Liq_Incid_at_Cert_In_Wat_Cross_Stu_Final_8_27_13.pdf

Exposed Enbridge crude oil pipeline in the Tamarac River in Marshall County, MN. (Photo: Dan Gunderson/MPR News)

The exposed pipes run the risk of pipelines being damaged, but no law requires Enbridge to rebury them. Risks increase the longer a line is exposed, but determining the level of risk is up to Enbridge, not the Office of Pipeline Safety. Although federal regulations specify how deep pipelines must be buried, the rules only apply during initial construction, and there is absolutely no law to require Enbridge to rebury the pipe.[65]

River crossing issues will continue to grow as the climate continues to change. Flood events and alterations of waterway dynamics, changes in freeze/thaw cycles are all elements of climate change. The rapidly shifting climate can increase scour in river beds, and increase the likelihood of a spill at river crossings.

Spill Response

The EIS should include a thorough analysis of Enbridge's performance history in responding to spills. According to the Wall Street Journal, an estimated 80% of spills are actually detected by civilians, despite pipeline companies enormous investments in state of the art detection systems.[66]

A federal audit of Enbridge's 2010 spill in Marshall, MI, showed that Enbridge was unable to stop leaks on aging pipelines, and still does not know the best way to completely clean up after a catastrophic spill. The audit showed that Enbridge could not prove that it knew how to monitor and repair pipeline cracks forming from corrosion - the key factor that had led to two major Enbridge oil spill disasters in 2007 and 2010 in Glenavon, Saskatchewan and Marshall, Michigan.[67] As it were, Enbridge lobbied hard to demand the NEB remove the most incriminating parts of that report, and covered up two secret environmental documents.

In fact, Enbridge has lobbied aggressively against responsible spill response regulations in Minnesota. In an October 2014 letter to the Environmental Quality Board, a number of Minnesota legislators pointed out Enbridge's resistance and determination to thwart any safety regulations by the state of Minnesota. The letter, from Minnesota Senators Steve Dribble, John Marty and Representatives Frank Hornstein and Jean Wagenius, stated:

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[65] Jon Wolfgram, chief engineer for the Minnesota Office of Pipeline Safety

[66] http://thinkprogress.org/climate/2014/01/21/3186261/pipeline-spills-discovered-people/

[67] http://www.nationalobserver.com/2016/05/02/news/heres-how-enbridge-edited-federal-pipeline-audit

" Enbridge and the pipeline industry were **unwilling to agree** to: Provide a qualified company employee to advise public sector incident commander by telephone within one hour of a major pipeline oil discharge;

- Provide monitoring equipment within three hours of a discharge, or to develop an annual plan to deliver monitoring equipment to a discharge site to comply with the provision;
- Provide qualified personnel to advise incident commanders at the discharge site within three hours of a major spill;
- Provide containment booms from land across sewer outfalls, creeks, ditches and other places where oil and other hazardous substances may drain in order to contain leaked material before it reaches those resources;
- To have capability to deliver containment booms, boats, oil recovery equipment and trained staff within eight hours of a confirmed discharge to recover 10% of a worst case discharge, including protection of listed sensitive areas and potable water intakes within one mile of a discharge site
- Deliver equipment to protect sensitive environmental areas and drinking water intakes, within 60 hours of a major spill
- Provide updated disaster prevention and response plans to the Pollution Control Agency every three years ..."

National Academy of Sciences Report on Diluted Bitumen Spills

A recently released National Academy of Sciences Report[68] document shows how uniquely dangerous the transportation of tar sands oil is for water-rich regions. The report, entitled "Spills of Diluted Bitumen from Pipelines: A Comparative Study of Environmental Fate, Effects, and Response," provides unprecedented data documenting the grave environmental, economic, and public health impacts of diluted bitumen or "dilbit" spills, especially in places with abundant freshwater resources such as Wisconsin and Minnesota. The relevant conclusions of that report are too many to list here, but the overall insight is that tar sands oil spills constitute a COMPLETELY different animal than that of any other type of crude oil, with uniquely devastating ecological effects when interacting with water. The study documents in detail how, in comparison to other commonly transported crude oils, many of the chemical and physical properties of diluted bitumen, especially those relevant to environmental impacts, differ substantially from other types of crude oil. The key differences are in the exceptionally high density, viscosity, and adhesion properties of the bitumen component of the diluted bitumen that dictate environmental behavior as the crude oil is subjected to weathering (physical and chemical changes of spilled oil over time). The report also documents the utter lack of methodology for cleaning up dilbit spills. In other words, we are entirely unprepared for what's coming our way.

CONCLUSIONS

These two projects, the Sandpiper and Line 3 Replacement, represent an enormous investment in dirty oil infrastructure that the world does not need. The existing scoping document downplays the enormity of the task at hand and recklessly narrows the scope of impacts being considered, to the detriment of the public, especially the Anishinaabeg. The scoping document is grossly inadequate and will fail to produce an EIS that will enable the State of Minnesota to protect the environment and prevent significant human harm. Residents of the State of Minnesota, acting as global citizens, demand a comprehensive and transparent EIS process. Honor the Earth has outlined a number of ways to improve the scope of the EIS including: correct project purpose definitions; changes to geographic and jurisdictional scope; a new regulatory structure; appropriate research methodology; an extended timeline; a critical economic review; a well to wheels assessment of emissions and climate impacts; an analysis of human health impacts in at-risk communities; a comprehensive investigation into cultural sites impacts; and a comprehensive spill modeling/response review. These changes are necessary to uphold the National Environmental Policy Act (NEPA) and the Minnesota Environmental Policy Act (MEPA).

[68] National Academies Press, http://www.nap.edu/21834

TREATY RIGHTS AND OIL PIPELINES:
What You Need To Know

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SUMMARY:
Even on ceded territory (off-reservation), Ojibwe tribal members retain certain property rights that allow them to "make a modest living from the land." These use-rights are called usufructuary rights, and are guaranteed by the treaties between Ojibwe bands and the US government, protected by the US Constitution, and affirmed by the US Supreme Court. They include the rights to hunt, fish, gather medicinal plants, harvest and cultivate wild rice, and preserve sacred or culturally significant sites.

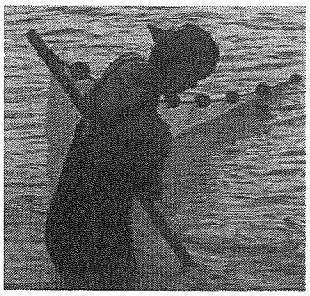

The proposed new oil pipelines in northern MN violate the treaty rights of the Anishinaabeg by endangering critical natural resources in the 1854, 1855, and 1867 treaty areas. All pipelines leak, and catastrophes like Enbridge's 1 million gallon spill in 2010 on the Kalamazoo River are not unlikely. The pipelines threaten the culture, way of life, and physical survival of the Ojibwe people. Where there is wild rice, there are Anishinaabeg, and where there are Anishinaabeg, there is wild rice. It is our sacred food. Without it we will die. It's that simple.

HISTORY:

• **1837 White Pine Treaty** (aka Treaty of St. Peters) – July 29, 1837 at Fort Snelling.
The Ojibwe nations ceded to the US a large tract of modern-day MN and WI (east of the Mississippi River and south of Lake Superior). The purpose was to exploit the region's lumber resources, especially giant white pines, for use in the construction boom across the country. The United States bought millions of acres for about $24,000. In turn, Article 5 granted the signatory Ojibwe bands usufructuary rights to hunt, fish and gather within the ceded territory. An Ojibwe chief from Leech Lake known as Eshkibagikoonzhe (Flat Mouth) demanded that his people retain the right to "get their living from the lakes and rivers" because "we cannot live, deprived of our lakes and rivers."

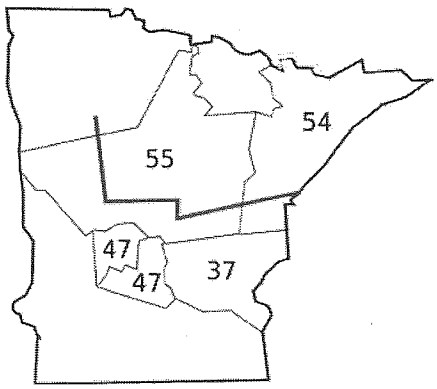

• **1855 Treaty with the Chippewa** – February 22, 1855 in Washington DC.
The Ojibwe ceded 10 million acres of northern Minnesota lake country, including the headwaters of the Mississippi River, and the US government established 9 small reservations.

• **The Voigt Decision (1983)** - In the 1970s, the Lac Court Orielles Band of Ojibwe challenged Wisconsin's efforts to regulate their hunting and fishing off-reservation. The conflict started when 2 Ojibwe men were arrested for harvesting fish with spears, and charged with poaching. In 1983, the US 7th Circuit Court of Appeals delivered the "Voigt Decision" in *LCO Band of Chippewa Indians v. Lester P. Voigt, et al*, affirming Ojibwe rights to hunt and fish anywhere on ceded territory, even on privately owned land. Over the next 8 years, which were marked by civil unrest and racial conflict as white sport fishermen protested tribal members' exercising of treaty rights, the US District Court rejected repeated appeals by the State of Wisconsin. The US Supreme Court refused to hear the case, and the Voigt decision still stands today.

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• 1999 Supreme Court Decision - Minnesota v. Mille Lacs Band of Chippewa Indians

This is the landmark decision. During the 70s and 80s, Ojibwe tribal members in Minnesota were repeatedly arrested and harassed for asserting their fishing rights. This led to a series of protracted legal battles, culminating in the 1999 U.S. Supreme Court decision *Minnesota v. Mille Lacs*. The Court ruled that the Ojibwe retained hunting, fishing, and gathering rights on the lands it had ceded to the federal government in the 1837 White Pine Treaty and that the state governments of MI, MN, and WI, had unfairly asserted authority of hunting and fishing rights without regard for treaty rights guaranteed to the Ojibwe before those states were even formed. The Court also concluded that the same protections survived in the 1855 Treaty, even though it did not explicitly outline usufructuary rights, because the Chippewa delegates that signed it clearly did not believe they were relinquishing such rights.

• 2015 Squarehook case

Operation Squarehook was a large multi-year state and federal investigation into black market walleye. On Feb. 10, 2015, the 8th Circuit U.S. Court of Appeals ruled that the federal government could not prosecute 4 Ojibwe men for netting walleye on Leech Lake Reservation and selling them. This upheld the 2013 US District Court decision to toss the cases. The men were accused of selling hundreds of thousands of dollars' worth of netted fish and charged with wildlife trafficking under the Lacey Act. The court upheld the rights guaranteed by the 1837 White Pine Treaty as the same rights the signatory Chiefs would have understood in 1855, even though the 1855 treaty did not directly apply because the Leech Lake Reservation did not exist yet. In its decision, the court repeatedly referenced the Supreme Court's landmark 1999 Mille Lacs decision. It effectively ended Operation Squarehook.

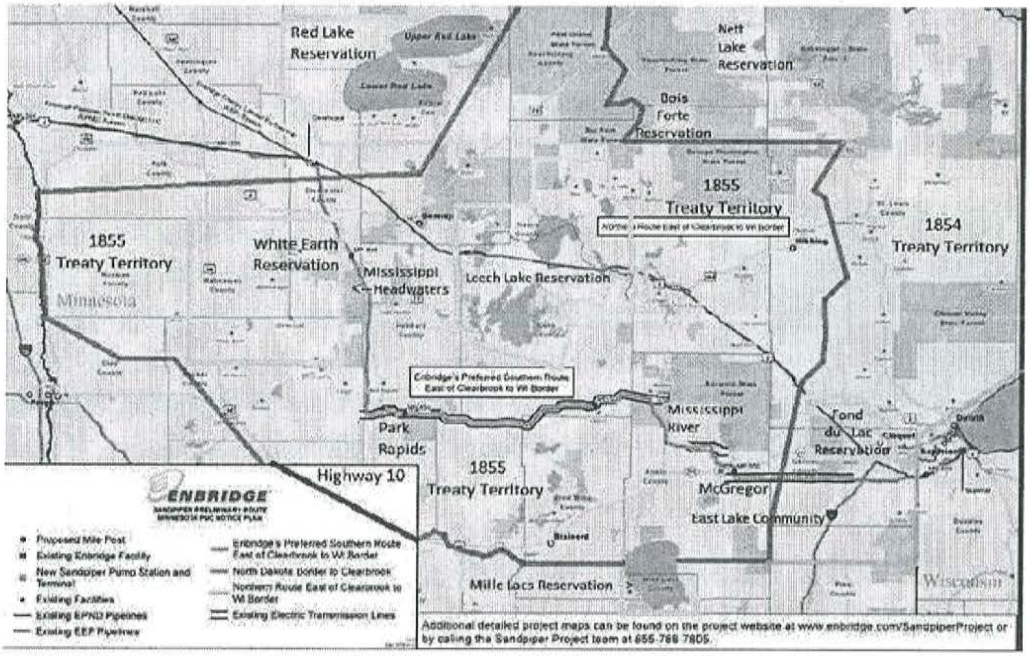

TRIBAL INTERVENTION AGAINST THE SANDPIPER/LINE 3 CORRIDOR:

Tribal nations have federally protected property rights in the treaty areas, yet have not even been consulted about the Sandpiper/Line 3 corridor. The PUC bluntly denied requests for public hearings on the reservations. So in June 2015, the White Earth and Mille Lacs Bands each held their own public hearings to document public sentiment and expert testimony on potential impacts. The bands also wrote letters to the PUC asking for a stay on the permitting process until tribes could be property consulted, and letters to Governor Mark Dayton asking him to fulfill his responsibilities for cooperation with tribal governments as outlined in Executive Order 13-10. Approval of this pipeline corridor is a declaration of war against the Anishinaabeg, a slap in the face of tribal governments, and a threat to the precious fresh water of Minnesota. Tribal governments are now exploring options for intervention at the federal level and expect a long and protracted legal and regulatory battle over the coming years.

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THE CASE AGAINST MARATHON

Withdraw from the Sandpiper Pipeline!

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BACKGROUND:

The proposed Sandpiper pipeline is a joint venture between Enbridge Energy and Marathon Petroleum Corporation. Marathon is the "anchor shipper" that makes the project economically viable by committing to use the pipeline to transport oil they extract in North Dakota. Marathon plans to pay 37.5% of the Sandpiper's construction costs in exchange for a 27% ownership interest in the project. The MN PUC issued a Certificate of Need for the Sandpiper based on Marathon's interest and "need." But Marathon doesn't need this pipeline. None of us need this pipeline. It's time for Marathon to witrhdraw from the Sandpiper because it is a losing project - financially, and for all of us.

RISKY BUSINESS FOR MARATHON:

Marathon should withdraw from the Sandpiper because it is financially disastrous for them. With oil prices remaining at historic lows, Bakken drillers are going bankrupt. There were only 29 active rigs in April 2016, down from over 220 just a few years ago. Marathon recently had 7 active rigs in the Bakken, but as of April 2016, they have ZERO. Continued delays on the Sandpiper/Line 3 corridor are increasing project costs, and Minnesota's regulatory agencies are still debating how to proceed. It is not clear that the project will move forward. And Marathon is not in a position to make mistakes. Marathon Petroleum Corporation's stock prices have dropped more than 50% from recent highs in 2015. Marathon Oil Corporation, the sister subsidiary that does all the drilling, saw their prices drop more than 75% from recent highs. Last year they posted $2.2 billion in losses, cut their capital investments in half, and laid off over 10% of their employees.

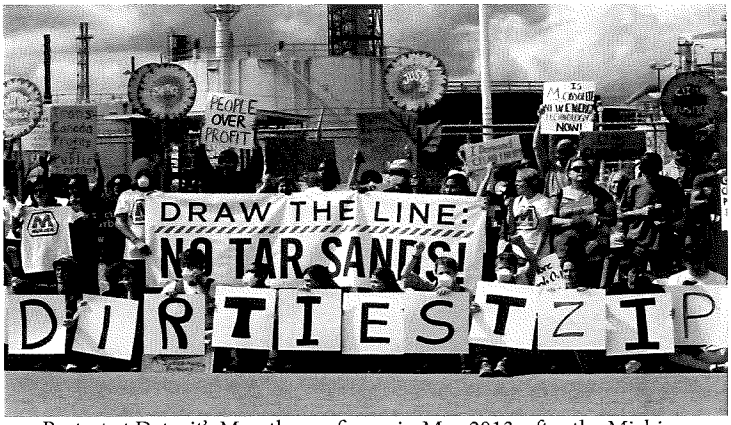

Protest at Detroit's Marathon refinery in May 2013, after the Michigan OSHA announced it was giving Marathon a safety award, one week after the refinery had an explosion. (Photo by Emma Lockridge)

A "WELLS TO WHEELS" VIEW OF IMPACT:

Infrastructure impact analysis should start at the oil well and finish at the gas tank. Marathon has been one of the major drillers in the Bakken, in Mandan, Hidatsa, and Arikara territory. Their wells are located mostly around the sacred waters of Lake Sakakawea, on and near the Ft. Berthold Reservation. This is "fracked" oil, extracted by blasting millions of gallons of water and a slurry of toxic chemicals deep into the bedrock of Mother Earth. It's "Extreme Extraction," proven to cause earthquakes and poison aquifers, and has been banned outright in a long list of cities, states, provinces, and countries around the world. Our relatives in the Three Affiliated Tribes are facing epidemics of health problems, drug and sex trafficking, violent crime, and traffic deaths. Oil companies should be responsible for the damages their extraction causes to our communiites. Marathon is responsible for the major diesel spill on the Wabash River in April 2016 - not a drop of the 50,000 gallons was recovered. Marathon also operates a refinery in Detroit that is poisoning the surrounding neighborhoods. The refinery processes tar sands oil, one of the dirtiest fuels on the planet, and its emissions are causing serious health problems in the African-American neighborhood of Boynton (see reverse for details).

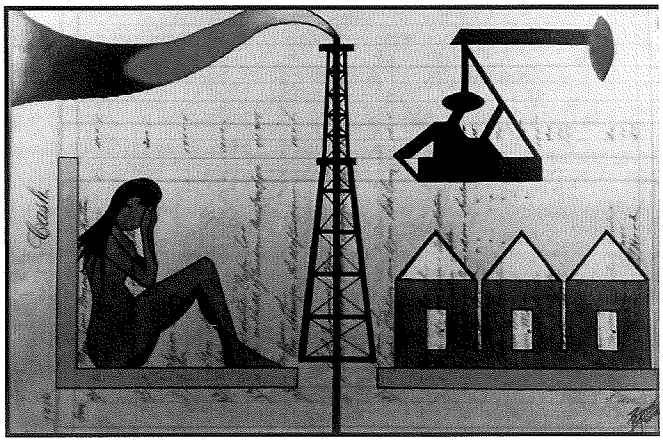

"Woman Lost in Man Camp," John Isaiah Pepion.

TAKING ACTION:

As our opposition to the Sandpiper continues to grow, we ask you to join us in calling on Marathon to withdraw from the project. The Mille Lacs Band of Ojibwe has terminated the leases at all 3 of its Marathon gas stations. And we are contacting Marathon station owners in MN and asking them to switch to a more responsible alternative that supports the local economy and avoids these blatant human rights violations.

Marathon should not poison the people of Boynton at their Detroit refinery. They should buy those people out. Marathon should not be fracking in the Bakken. And they should not push that volatile Bakken crude oil throgh our territory and through the Great Lakes. The Sandpiper would be too destructive to our water, our wild rice, our climate, and our way of life as Anishinaabe. We have enough fossil fuel infrastructure, and it is time to transition to a new economy.

WHAT YOU CAN DO:

1. Contact Marathon and ask them to withdraw from the proposed Sandpiper pipeline project:
   Gary Heminger, CEO, Marathon Petroleum Corporation, 539 South Main St., Findlay, OH 45840
2. Help us tell people the truth about Marathon's projects - share our literature and images broadly.
3. Support our work by donating thru our website, or signing up for a monthly contribution.

ENVIRONMENTAL INJUSTICE IN DETROIT

The Marathon refinery in Detroit is located in zip code 48217, the most polluted in the state, where the MI Department of Health has documented consistently elevated rates of cancer, respiratory disease, and kidney failure. Emma Lockridge, a nearby resident, says "We don't live next to the refinery, we live IN the refinery...it is just horrific. We are a sick community." When the refinery switched from conventional oil to tar sands, Marathon bought the homes of about 200 people in the mostly white neighborhood of Oakwood Heights, which is not even directly in the prevailing path of emissions, as the mostly black neighborhood of Boynton is. They've left the black folks in Boynton there to suffer, consistently denying their requests for buyouts and emergency evacuation. Lockridge, a leader in the resistance movement, says: "There's 10 empty houses on my block...people don't even want the houses. We can't even get squatters." She says the message from Marathon and state regulators is clear: "Walk away or die...at the end of the day, they're killing us." Marathon is now applying for permits to increase emissions even more, in order to produce cleaner-burning vehicle fuel as required by new federal standards. In other words, this neighborhood is being further sacrificed in order to reduce pollution elsewhere. The MI Department of Environmental Quality says it is "poised to approve the project," despite a threatened lawsuit from Detroit Mayor Mike Duggan and a a statement from a coalition of state senators calling on them to reject it, comparing the situation to the poisoned water crisis in Flint. Residents filed a class-action lawsuit against Marathon in US District Court on February 23, 2016.

Emma Lockridge, neigborhood resident and activist demanding a buyout from Marathon in order to evacuate the Detroit refinery area.

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LINE 3 PIPELINE ABANDONMENT:
What You Need To Know

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SUMMARY:
Enbridge's Line 3 Pipeline ships Tar Sands crude from Alberta to Superior, WI, spanning over 300 miles across Northern Minnesota, crossing the Red Lake, Leech Lake and Fond du Lac reservations and the 1855 and 1842 treaty areas. Line 3 was built in 1961 and now has significant structural integrity problems. Enbridge's latest public estimates indicate over 900 integrity "anomalies" in the pipeline. Instead of fixing it or removing it, they want simply to abandon the pipeline and build a new one, the Line 3 Replacement, in the Sandpiper corridor. The State of Minnesota has absolutely no regulatory guidelines for pipeline abandonment. Although Enbridge receives powers of eminent domain to build its pipelines, they are not required to assume any responsibility for them when they die. They are allowed to leave behind what is likely a superfund site. Tribal members, homeowners, local businesses, and people across the north are standing up to say no, and demand a state ordinance and regulatory process, as well as an insurance requirement.

DEATH OF A PIPELINE:
Enbridge has gathered extensive integrity data on Line 3 throughout its operation. The data shows a high number of integrity anomalies – specifically, corrosion and long seam cracking. As a result of these anomalies, Line 3 has experienced a number of failures during its 54 years of history. As a result, Line 3 requires a high level of integrity monitoring and an extensive on-going integrity dig and repair program to maintain safe operation. Approximately 4,000 integrity digs in the US alone are currently forecasted for Line 3 over the next 15 years, just to maintain its current level of operation. This would result in repeated impacts to landowners and the environment.

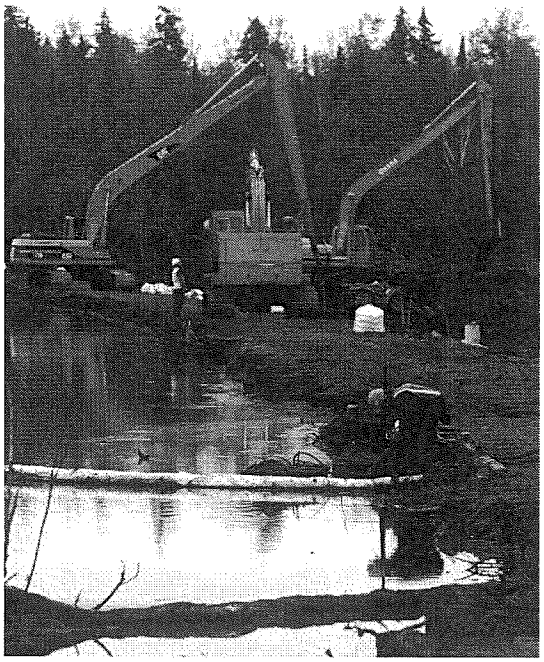

REGULATORY FAILURE (AGAIN):
At the state level, there are no abandonment guidelines or definitions for intrastate gas, liquids, or oil pipelines. Any mention of abandonment of pipeline procedures follows the federal guidelines for disconnecting from active gas service and purging of any hazardous substance. If Enbridge is not required to remove the pipeline and restore the damaged ecosystems, there may never be a full accounting of the on-going and future contamination surrounding the pipeline. All those "structural anomalies" mean there is likely a lot of oil in the soil now. This contamination would become the responsibility of nearby landowners, if discovered.

PIPELINE ABANDONMENT IN CANADA:
The US has vague and inadequate laws on pipeline abandonment, but the Canadian Energy Board has a pipeline abandonment guidance document. It includes info on pipeline corrossion and soil subsidence, reccommending any pipeline owner/operator considering the abandonment of a pipeline to conduct a professional, site-specific analysis to evaluate potential impact. Potential sources of soil and groundwater contamination include:

- substances produced in the reservoir and deposited on the walls of the pipeline;
- treatment chemicals in the pipeline;
- the line pipe and associated facilities;
- pipeline coatings and their degradation products;

- historical leaks and spills;
- possible PCB contamination, from lubricants.

The document also discusses the enormous hydrological impact of abandoning a pipeline, which can transform over time into water conduits. Eventually, corrosion allows water to enter the pipe, which leads to unnatural drainage of areas such as muskegs, sloughs, or marshes, affecting the natural balance of the ecosystem and increasing the risk of soil and water contamination, especially in wetlands. Any water that infiltrates the pipeline is likely to carry residual contaminants left in the abandoned pipeline as it flows.

MINNESOTA OIL PIPELINE PROPOSALS

As of July 2015

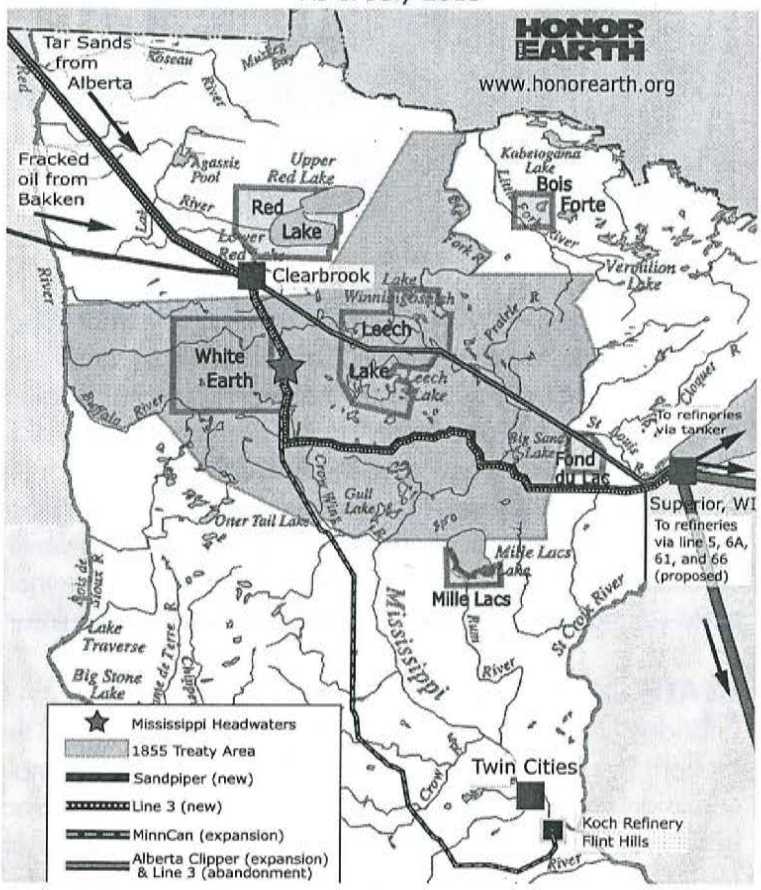

PUBLIC HEARINGS ON LINE 3:

There is no regulatory process for the proposed abandonment of Line 3, so the public should voice their concerns at the MN Public Utilities Commission's public hearings on the new Line 3 construction permit, and recorded in that docket. Public hearings will be held in August 11-26, in 11 different towns across Northern Minnesota. See our website for details (honorearth.org/events) or the PUC website (mn.gov/puc). The Certificate of Need docket is CN-14-916 and the Route Permit docket is PPL-15-137. Comments are accepted through September 30, 2015. Always Include docket numbers! There are 4 ways to submit:

1. Online: mn.gov/commerce/energyfacilities/#comment
2. Email to jamie.macalister@state.mn.us
3. Fax to 651-539-0109
4. mail to: Jamie MacAlister, Environmental Review Manager, Minnesota Department of Commerce
   85 7th Place East, Suite 500, St. Paul MN 55101

Tribal governments, environmental organizations, and citizens continue to intervene in the Sandpiper/Line 3 corridor. We expect federal intervention and a protracted legal and regulatory battle over the coming years.

OTHER WAYS TO TAKE ACTION:

1. Stay informed. Follow us on facebook + our website, come to our events this summer, contact us.
2. Speak out: Contact your tribal leaders, your City Councilmembers, County Commissioners, and especially Governor Mark Dayton (651-201-3400). Tell them they have a responsibility to protect Minnesota's precious resources, honor our treaties, and work with tribal governments.
3. Connect with your local environmental groups or faith communities.
4. Support our work by donating thru our website,, or signing up for a monthly contribution.

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STOP THE ENBRIDGE ENERGY CORRIDOR!

Join thousands of tribal members, homeowners, farmers, townships, businesses, and citizen groups opposing an oil superhighway across the northland. Love Water Not Oil!

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BACKGROUND:

The development of new fossil fuel infrastructure is accelerating in Minnesota. We are becoming a superhighway for oil that we neither produce or consume, yet we take all the risk. Enbridge, a Canadian corporation, is proposing to transport 1.4 million barrels of oil per day through a new southern route, from the North Dakota border to Superior, WI. This is a dramatic increase from the original Sandpiper proposal of 375,000 bpd. To put this in context, this is more than triple the current capacity of the Alberta Clipper pipeline (450,000 bpd) and almost double the capacity of the proposed Keystone XL pipeline (830,000 bpd).

THE PIPELINES:

- **Sandpiper:** This new pipeline would carry highly volatile Bakken Crude oil, at an initial capacity of 375,000 barrels per day, with the potential to increase to 640,000 bpd.
- **Line 3 Replacement:** Enbridge is proposing to build the replacement of Line 3 along the same corridor as the Sandpiper, and abandon the old, rusted Line 3 pipeline, with unkown consequences. The new line would move up to 760,000 bpd of dirty Alberta Tar Sands oil.

THE ROUTE:

The proposed route crosses through some of the most delicate soils, aquifers and pristine lakes in northern Minnesota, the watersheds of Rice Lake , the Mississippi Headwaters, Crow Wing, Big Sandy Lake, Rice Lake Refuge and into Superior.

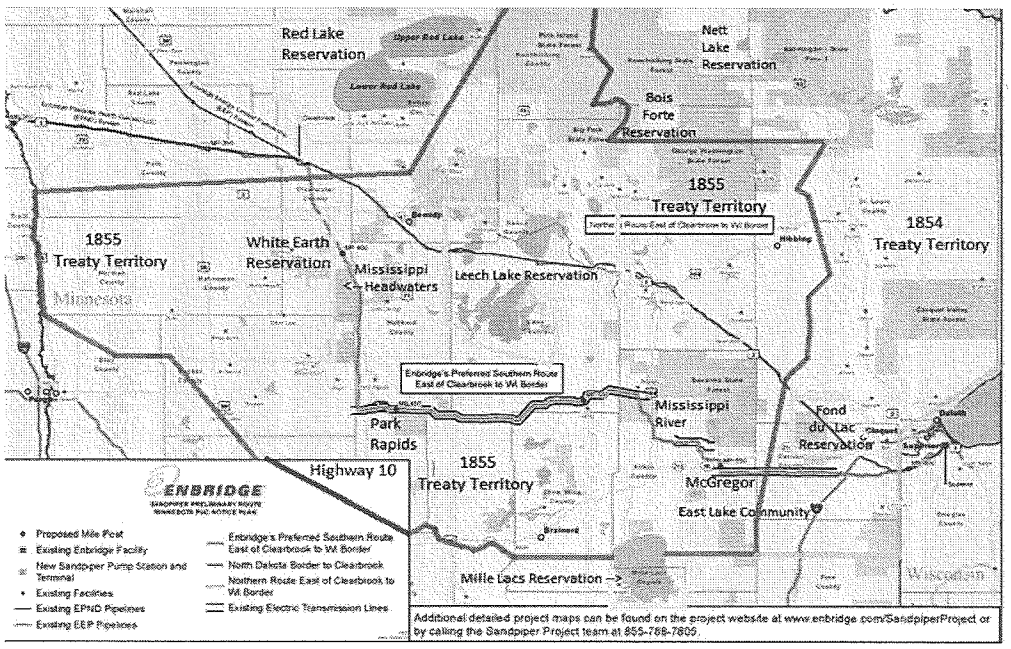

THE PROBLEMS:

- **Inevitable Spills:**

Enbridge has promised that safety will be of the upmost concern, but their history suggests otherwise. They have had over 800 spills in the last 15 years, including the largest inland oil spill in US history (1.2 million gallons) on the Kalamazoo River in 2010. In late December 2014, an Enbridge line leaked in Canada, spilling 57,000 gallons of oil in a few minutes. On Jan 2, 2015, tanks exploded at its offices

in Williston, ND. In the last 2 years, over 300 pipeline spills went unreported in North Dakota alone! A full rupture of the Sandpiper would release over 20,000 gallons of oil per minute, making million-gallon spills entirely possible. Smaller spills are harder to detect and can last for days.

• Refusal to Respond Appropriately:
In the past MN legislative session, Enbridge lobbied agressively against legislation that would improve disaster response, and refused to agree with many reasonable measures that would improve preparedness, prevention, containment, and cleanup.

• Treaty Rights Violations:
The US government has a responsibility under federal law to honor the rights guaranteed to tribal members in their treaties. The proposed pipelines would violate the treaty rights of the Anishinaabeg by endangering primary areas of hunting, fishing, wild rice harvest, medicinal plant harvest, and organically certified wild rice crops outlined in the 1867, 1855 and 1854 treaty areas. The US Supreme Court has upheld the rights of native peoples to hunt, fish, and subsist off the land. An important February 2015 decision by the US 8th Circuit Court of Appeals upheld the rights of Ojibwe people to hunt and sell fish in the 1855 treaty area. These pipelines threaten the culture, way of life, and physical survival of the Ojibwe people.

• Property Rights and Insurance:
On June 5, 2015, the MN Public Utilities Commission granted Enbridge a Certificate of Need for the Sandpiper pipeline, which gives the company eminent domain, on grounds that it is a public utility providing a public benefit. This allows them to take property without landowner consent. This is a problem: Enbridge is a private Canadian corporation that will earn billions in profit by carrying privately owned oil for privately owned oil-companies. Enbridge is now suing North Dakota family James and Krista Botsford for their land, and the case may set precedent. The Botsfords found that no insurance company would insure their farm in case of a spill, and that is after an Enbridge cleanup.

GET INVOLVED:

This battle is just getting started!! The next phase of the PUC process is the route permit, and an alliance of tribes, landowners, and citizen groups are working to at least push the route south of the lake country. Meanwhile, our resistance is building and the tribes are asserting their political power, preparing for legal and regulatory interventions at the federal level. Here's how you can get involved:

1. Stay informed. Follow us on facebook + our website, come to our events this summer, contact us.
2. Speak out: Contact your tribal leaders, your City Councilmembers, County Commissioners, and especially Governor Mark Dayton (651-201-3400). Tell them they have a responsibility to protect Minnesota's precious resources, honor our treaties, and work with tribal governments.
3. Connect with your local environmental groups or faith communities.
4. Support our work by donating thru our website,, or signing up for a monthly contribution.

LOVE WATER NOT OIL

Visit our website for articles, videos, and resources to stay informed and organize:

HONOREARTH.ORG

Follow us on facebook:
@Winona Laduke Honor the Earth

HONOR THE EARTH PO Box 63 • Callaway, MN 56521 • 218-375-3200 • info@honorearth.org

THE CLIMATE COSTS OF ENBRIDGE OIL PIPELINES

Follow us on facebook:
@Winona LaDuke Honor the Earth

WWW.HONOREARTH.ORG

Accounting for the Climate Costs of Oil

As global leaders talk carbon capping at COP21 in Paris, Honor the Earth has prepared an invoice for the climate costs of Enbridge's proposed oil pipelines in Minnesota. Enbridge is liable for the carbon emissions their pipeline system enables. We want Enbridge to establish a fund to repair the damage they would cause with new lines and expansions.

Carbon Costs

To calculate the carbon costs of these pipelines, we take the total volume of oil moving through three pipelines - the Sandpiper, Line 3, and the Alberta Clipper - and convert that to carbon equivalents. This tells us how many metric tons of carbon will be released into the atmosphere through the refining and use of the oil. We then calculate the cost to remove that carbon. The American Physics Society estimates that removing carbon from the atmosphere costs $600 per metric ton. The total cost for these 3 pipelines would be over **$198 billion, annually!**

MINNESOTA OIL PIPELINE PROPOSALS
As of July 2015

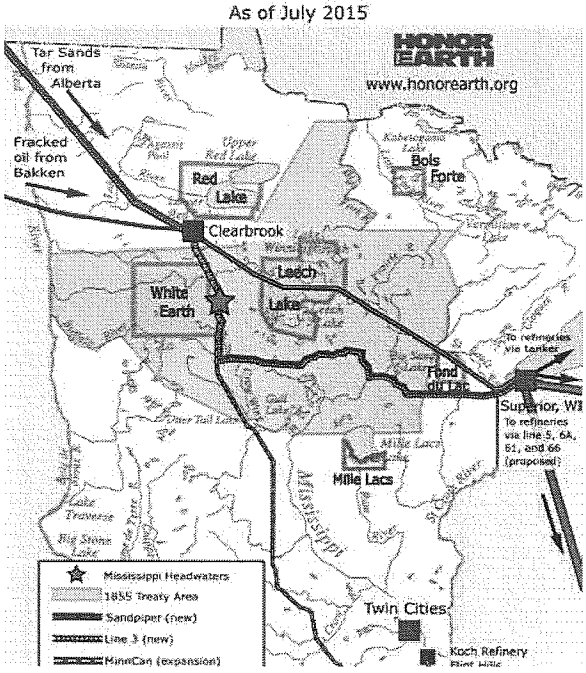

Ecosystem costs

We also calculate costs for the loss of vital ecosystems. Our boreal forests and wetlands sequester carbon, stabilize fluctuations, and provide a buffer against climate impacts. A full carbon accounting must include the loss of these ecological services. To do that, we first calculate the land area lost to tailing ponds. Each barrel of oil creates approximately 16.9 barrels of toxic tailings.[1] We multiply this by the proposed volume in the pipelines, and convert it to hectares. We also estimate the total area of wetlands destroyed during the construction of the new corridor, which Enbridge has no plan to restore. We then place values these areas of land using estiamtes from the field of Ecosystem Services Valuation.[2] The total cost of the loss of ecosystem services for the three pipelines is over **$26 billion, annually.** Our estimates for area impacted and cost per hectare are probably both extremely low.

An Incomplete Total

Adding these costs together give us a full cost of over **$224 billion annually.** Of course, there are currently no real plans to remove the carbon or restore the forests and wetlands. So these annual costs should be set aside for future generations. Even at a conservative compound interest rate of 1%, the costs for the next seven generations (140 years) total over **$68 trillion!!** Of course, we are still far from accounting for the TRUE cost of oil. We have not included the cost of climate conflicts, natural disasters caused by extreme weather events, the loss of biodiversity, or the inevitable damages to our fresh water and sacred manoomin when (not IF) these pipelines spill. Some things simply cannot be monetized.

LOVE WATER NOT OIL

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1 "Waste Streams of Mined Oil Sands: Characteristics and Remediation," Kasperski and Mikula, Elements, Dec 2011 vol 7 pp 387-392.

2 For boreal forest we use $160/hectare/yr (Canadian Forest Congress, http://bit.ly/1m3MuL0). For wetlands we use $5,625/acre/yr (Earth Economics, "The Value of Nature's Benefits in the St. Louis River Watershed")

HONOR THE EARTH PO Box 63 • Callaway, MN 56521 • 218-375-3200 • info@honorearth.org

From:	Winona Laduke
To:	MacAlister, Jamie (COMM)
Subject:	Testimony for Scoping Energy Environmental Review and Analylis
Date:	Monday, August 31, 2015 3:06:33 PM
Attachments:	Rice Lake Line Three Hearing Final.docx Who Owns Abandoned Pipelines.docx Mille Lacs hearing submission final.doc

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Jamie

I appreciate your hard work As I mentioned in my discussions with you and testimony, since the DOC has decided to run contemporaneous hearing processes and environmental review in the comparative environmental analysis process, I am submitting both my testimony from the Sandpiper and the Line 3 Hearings The Sandpiper submission is referred to as the Mille Lacs testimony . To be clear, some of the major concerns that you do not outline in your scoping request include:

Human Health Risk associated with pipelines, fossil fuels and climate change

Cumulative impact assessment or well to wheels impact. It is clear that there is nothing in your scoping outline which restricts testimony or impacts which are not along the pipeline corridor, therefore we are requesting that this is duly and comprehensively considered.

I remain deeply concerned and interested in your tribal community asssessment

Your scoping paper in Line V is absolutely unclear as to the process for completin the assessment relating to potential significant impact and as such cannot be discounted by your process, or a truncated process to expedite this critical regulatory process for the Enbridge Company or some other interest.

I believe that a full Line 3 assessment in the present location should be completed far in advance of any new projected route hearings.

I reserve the right to submit more testimony and would be happy to clarify or answer any questions

Miigwech, Winona LaDuke

Honor the Earth Comments to the PUC August I8, 2015

Submitted by Winona LaDuke

Overarching Policy Concerns:

Honor the Earth and the White Earth Band of Ojibwe are pleased that the Minnesota PUC has come to our community. It is interesting that when we requested this hearing for the initial Sandpiper Pipeline PUC process, we were denied such a hearing, but now that at a much larger corridor is proposed, you have come to our people. We appreciate this. ***To be clear, we believe a moratorium on large oil pipelines and projected pipeline abandonment projects is required until such time as a full environmental impact statement is made regarding the multitude of proposed projects, and the intersection of these projects with other mega mining projects and energy projections for the state of Minnesota and through Anishinaabe Akiing.***

In our testimony we will discuss the shortcomings and structural barriers within the present state of Minnesota's regulatory process to address these issues, and the absolute need to create a regulatory system which is secure in advance of a set of mega projects proposed by foreign companies. These regulations need to look at the issues of short term profits at the expense of the people, and ecosystem of Minnesota as well as the Anishinaabe people. We fully recognize the present economic and energy environment which has brought this crisis to the forefront, but also recognize that this is the opportunity for governance and community to lead rather than follow energy interests.

Or perhaps more clearly, it is incumbent upon a people who have lived omaa akiing, here in this Anishinaabe Akiing for over 8000 years to inform you of our observations. We have not seen either a prudent natural resource management by the state of Minnesota in the demise of fisheries, decline of water quality statewide, decline of major fauna, such as the wolf and the moose, and proposals for diminishing water quality in the state regulation of sulfide standards. We do not believe this is prudent management, and see that today the interests of a 65 year old Canadian corporation are not the interests of the Anishinaabe, or the people of Minnesota. We welcome the opportunity to build a collaborative and healthy relationship with the state of Minnesota to protect the water, land and future generations, and insure energy and food security. This is the role of governments.

In each deliberation we must consider the impact upon the seventh generation from now.

The Anishinaabeg people hold this as an essential tenet of behavior for our society, and for public policy. This intergenerational equity, responsibility, and opportunity is upon us now, and it is essential that we undertake this practice to carry on. This is responsible regulation. Anishinaabeg have tenets of sustainable governance that keep of our covenant with the Creator intact through intergenerational considerations of actions. *This was perhaps summarized in the June 4 Hearing held by the White Earth Tribal Government in Rice lake, where tribal member Michael Dahl testified, "We have treaties with creation. We have treaties with the fish, we have a treaty with the rice, [with] that lake. ... When we negotiated treaties with the United States we had to go back and renegotiate our treaties with*

creation. Creation doesn't give a second chance, we can't renegotiate again. Protect the land, live with the land, not off of it."

"Seems like folks don't want to hang around for a l000 years or so,"
Mike Wiggins, Tribal Chair of the Band River Band of Ojibwe

The fact is that the Anishinaabeg people have lived in this territory for 8000 years, and intend to be here for at least another l000 years. The short-sighted nature of US Federal oil pipeline regulations (of which there are very few) does not protect future generations from contemporary bad planning. In addition to the faulty siting, planning and oversight of the proposed Line 3 replacement, there is a drastic lack of regulatory authority over pipeline abandonment, a primary issue at stake here in the case of Line 3. This will be discussed in more details later in the testimony, but the underlying principle, that a lack of any regulatory scheme for protection of state assets remains a primary reason why such a proposal for both abandonment and a new pipe should not be forwarded.

In the broader scope, of policy making, internationally, enlightened governments are adopting new regulations which affirm the Rights of Mother Earth, (as enshrined in the Bolivian Constitution) and the Rights of Nature (as used in the Pennsylvania municipality) , and limit the rights of corporations. Prudent governments have also begun to adopt a precautionary principle in public policy. The precautionary principle has received widespread resonance in the European Economic Community, these countries, have longer term public policy and residence that the young United States and younger Minnesota. It is possible to learn from the older nation states in this way. This principle states:

"When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. In this context the proponent of an activity, rather than the public, should bear the burden of proof. The process of applying the precautionary principle must be open, informed and democratic and must include potentially affected parties. It must also involve an examination of the full range of alternatives, including no action."
Wingspread Statement on the Precautionary Principle, Jan. 1998 (http://www.sehn.org/precaution.html):

We advise the state of Minnesota to adopt this principal to protect the public interest, the commons and our collective future.

Formally, Honor the Earth and the White Earth band of Ojibwe are deeply concerned with the proposal for the Line 3 Replacement Project, in light of the lack of state and federal preparation for pipeline management, regulation, and the clear risk posed by the applicant Enbridge to the environment, public health and short and long term economic well being. Both the White Earth Band of Ojibwe and Honor the Earth submitted significant testimony in the previous hearings on the proposed Sandpiper Route. In these proceedings we will refer to that testimony, as the problems are augmented, and represent more than a cumulative impact of risk and direct impact on the health , well being and wealth of our people.

However, there are new, very significant problems which have become apparent in your regulatory process. These include: the inadequacy of the permitting process of oil pipelines

and the lack of any abandonment regulations. As well, the Minnesota Pollution Control Agency needs state primacy in assessment of the environmental impact of this project, as well as federal and tribal jurisdictions. The fact that that present regulations delegate environmental assessment to the Department of Commerce, as opposed to the 950 staffed MPCA is very problematic in terms of capacity. This scale of project would require an integrated environmental, social and economic assessment. **The regulatory problems we are facing put us all at risk.**

We are at a nexus point of opportunity in Minnesota and nationally, which provides us a chance to examine the infrastructure we invest in. Fifty to sixty years ago, when most of the country's oil and gas infrastructure was being built out, there was not much understanding of sustainable development. As a result, we now have a D in infrastructure. This is a national issue, which causes pipelines to break, bridges to collapse and the loss of millions of dollars of water and gas in aging urban infrastructure. Now, as we look towards a new generation of infrastructure development, we must decide if we want to replace our crumbling infrastructure with more of the same, or invest in the infrastructure for sustainability. This is an excellent opportunity for us all, as tribal governments and as the state of Minnesota.

We believe the state of Minnesota must recognize their inability to regulate a project of this scope and enact a moratorium until a full cost accounting and environmental impact statement can be developed for the various pipeline projects in the works. This action would acknowledge the immense, and intergenerational economic, and health impacts of this project proposal, in terms of not only opportunity forgone benefits (investments which could be made) as well as the implications of oil impacts on the immediate environment and the world climate.

Honor the Earth and the White Earth band are pleased that the Minnesota PUC has come to our community. This is an important step, we must however, recall to the PUC the problem of the general disregard the PUC has exhibited for tribal and non tribal citizens, by allowing the company to classify maps and marketing material, and, securing an unknown amount of insurance during the proposals for the Sandpiper, without a full analysis and disclosure of methodology to the tribes or the citizens of Minnesota. As it is 2015 and not l889 , it is important for the state of Minnesota , in accordance with not only Governor Dayton's executive memorandum on tribal/state cooperation, but as well, as a matter of political respect and decency to address our tribe and the Anishinaabeg with respect.

The absence of transparency by state agencies, has caused a great burden on our tribe, and on citizens of Minnesota, who are then forced to carry out extra work, while the state shields a Canadian Corporation. While we are very pleased to see that the PUC and Enbridge have scheduled a formal hearing in our community, we did not find satisfactory last year's PUC process with regards to the Sandpiper. In turn, the suggestion that this Line 3 proposal should follow the same route, with a skewed and perplexing process for determining " need" that we continue to challenge, without a route approval or any satisfactory conclusion of a Sandpiper process, causes problems for us all.

Honor the Earth had asked that these processes be combined, and a full disclosure of new pipeline projects to be put into this proposed corridor (Lines 2 and 4 are anticipated), to be considered. We requested a ***well to a pump impact*** assessment as a prudent approach to this project's evaluation.

Prudent regulatory policy would review projects in this manner, as myopic environmental, health, economic, and risk assessments do not result in prudent policy. ***As such, while the PUC seeks to review this project as the Line 3 Project, we will refer to this as the Enbridge Energy Corridor, and understand fully that there are cumulative impacts of the proposal by the Canadian Energy company, which are briefly outlined here. We are very clear that public policy should not be dictated by the needs of a foreign oil company, particularly through the lands of the 1867 and 1855 treaty areas. Indeed policy needs to be in advance of economic or environmental crisis, and the application of the precautionary principle would need to begin prior to the advent of any more permitting.***

In short, the Line 3 Abandonment and Replacement or ***Enbridge Energy Corridor*** is a bad idea that requires a sophisticated level of analysis. To date, we have not seen that level of analysis in any high-profile pipeline projects nationally, or within Minnesota. As a nation of Indigenous peoples recognized as having a right to continue our existence under our own covenant with the Creator, and as well under UN General Assembly passed UNDRIP, we will require a full consideration of the merits of this project, and it's risks, not an expedited process for the benefit of a limited liability Canadian energy corporation.

Comments on the Proposed Project:

The White Earth Band of Ojibwe and Honor the Earth object to this project, the Enbridge Energy Corridor for many reasons. Namely; the Rice Lake and East Lake communities the pipeline passes dangerously close to are communities already at risk; the preferred route would cross the highest concentration of wild rice lakes in the world, and some of the most pristine waters in North America; and finally, the proposed project represents a massive carbon impact on a climate change compromised world, and a short-sighted investment in greed rather than a long-term investment in future generations.

Over the past two years, Honor the Earth has developed several public statements on the various pipeline projects in Minnesota and have submitted several documents to docket PL-6668/CN-13-473.The White Earth band has also consistently submitted to the process. Please apply this previous testimony to this new process.

As suggested, we will address the questions the PUC has placed before the public on this docket, specifically:

1. **What human and environmental impacts should be studied in the environmental analysis?**
2. **Are there any specific methods to address these impacts that should be studied in the environmental analysis?**
3. **Are there any alternative routes or route segments that should be considered?**
4. **Are there any alternatives to the project that should be considered?**

The first half of the document will answer the first two questions, while the second will cover the second two.

1) Human and Environmental Health Impacts:

To look at the human health impact, it is essential to look at the ***well to the pump impacts*** of tar sands oil, although the primary concern, of the Minnesota PUC is the impact on Minnesota residents. To be clear there are three sets of communities directly impacted by this project: the First Nations Communities in the Athabascan Tar Sands, the communities along the proposed Enbridge Energy Corridor, as well as the communities around the refineries. Additionally, globally there are numerous communities at risk from continued climate change. Briefly, the three non Minnesota /tribal impacts will be summarized. Convenient and myopic accounting on environmental and public health issues has skewed externalizing losses and impacts. In an actual accounting full accounting, these will be deemed part of the need and consideration.

Athabascan River Tribal Community Impacts: Ft. Chipewyan

The small community of Fort Chipewyan (or Fort Chip) is on the front lines of Canadian Tar Sands expansions. This community has faced an increased rate of cancer and exposure to a variety of chemicals, far exceeding national and international standards. This impacts include direct impacts on current generations and lingering impacts that will be felt for future generations. HTE is attaching the National Resource Defense Council's fact sheet on the health impacts of tar sands, which includes more information on this community and other impacts of tar sands, including refining.

Excerpted from the NRDC report, " *In a 2009 study commissioned by the governments of Alberta and Canada, scientists studied the incidences of cancer found in the tiny community of Fort Chipewyan. Fort Chip, as it is commonly known, has 1,100 residents and is located where the Athabasca River empties into Lake Athabasca, 124 miles north (downstream) of the major tar sands developments in Fort McMurray. In the report, scientists noted a diagnosed cancer rate from 1995 to 2006 that was 30 percent higher than what would typically be expected for that period of time. Further, certain types of cancers -- biliary tract cancers, blood and lymphatic cancers, lung cancers in women, and soft tissue cancers -- all occurred at rates higher than expected, the government study showed. Scientific studies have linked elevated levels of these specific cancers to exposure to certain constituents in petroleum products and the chemicals produced in petroleum manufacturing. Fort Chip has also gained the attention of the media due in part to concerns raised by an Alberta physician, Dr. John O'Connor, who has called for further investigation of cancer incidences after noting the presence of at least three cases of cholangiocarcinoma in this small town within the past decade. Cholangiocarcinoma is a cancer that typically strikes only 1 in every 100,000 to 200,000 individuals.*

A 2009 study published by the National Academy of Sciences showed that the snow and water in an area extending outward 30 miles from upgrading facilities at Fort McMurray contained high concentrations of pollutants associated with fossil fuels, known as polycyclic aromatic hydrocarbons (PAHs). These chemicals often present serious risks to human health -- some are known to damage DNA, others are carcinogens, and many cause developmental impacts. They also typically accumulate and remain present in the environment over long periods of time, according to research

published by the U.S. Environmental Protection Agency. A follow up study in 2014, published by the National Academy of Sciences, modeled the PAH levels measured in the tar sands region and found that environmental impact studies conducted by the tar sands industry in support of further development have systematically underestimated PAH emission levels and thus did not adequately account for human health risks.

In a landmark study published in the November 2013 issue of the journal Atmospheric Environment, scientists noted the presence of elevated levels of numerous hazardous air pollutants near major upgrading facilities just north of Edmonton. Among the pollutants found at elevated levels, many are carcinogens, including benzene and styrene. The study also noted elevated rates of leukemia and other cancers of the lymph and blood-forming systems in areas surrounding upgrading and petrochemical manufacturing facilities just north of Edmonton. Further, this study also noted that experts have found similar elevated risks in other populations living downwind of industrial facilities with similar emissions, which have also been linked to increased rates of leukemia and childhood lymphohematopoietic cancers.

The impact of increased air pollutants and noxious odors from excavating tar sands has been the subject of significant attention in the remote community of Peace River. There, the Alberta Energy Regulator is finally responding to years of reports by residents that emissions and odors from tar sands drilling and processing are making them sick. According to news reports, public hearings began in early 2014 following complaints that the tar sands operations have caused nausea, headaches, skin rashes, memory loss, joint pain, exhaustion, and respiratory problems, and have forced several families to leave the area.

Pollutants in the water

The majority of tar sands oil production takes place in close proximity to the north-flowing Athabasca River, which eventually flows into the Arctic Ocean (via the Peace, Slave, and MacKenzie Rivers). According to a 2012 study published by the National Academy of Sciences, researchers confirmed through lake sediment sampling and modeling that the presence of elevated levels of toxic PAHs can be traced to the major expansion of tar sands production that began in the 1980s. In particular, certain water bodies within the Athabasca watershed now exceed current Canadian standards for pollutants in sediment for seven PAHs, including benzo(a)pyrene, a chemical that has been linked to cancer, genetic damage, reproductive impacts including birth defects, and organ damage.

In addition, scientists analyzed lake sediments and snow samples and found evidence that tar sands development is leading to increasing amounts of methylmercury in Alberta's waterways and landscape. Specifically, the researchers report an exponential increase in measured methylmercury levels within 30 miles of tar sands upgraders. Methylmercury is a potent neurotoxin that causes developmental and behavioral problems, including lower IQ in children, as well as cardiovascular effects in adults. Methylmercury is known to accumulate in the food chain and can result in unsafe exposures, particularly among populations who consume a lot of fish. This increased presence of mercury in the Canadian landscape poses a unique threat to First Nations who rely on hunting and fishing for sustenance, and whose right to hunt and fish has been guaranteed by treaty and by the Canadian Constitution.

Further health threats arise from ponds full of mining waste. These tailings ponds contain multiple toxic chemicals including arsenic, benzene, lead, mercury, naphthenic acid, and ammonia, according to a Pembina Institute analysis. A 2008 study by Environmental Defence Canada, based on industry data, found that as much as 2.9 million gallons of water leaks from tar sands tailings ponds into the environment every day. Another study, published by the National Academy of Sciences in 2014, shows that extreme concentrations of PAHs present in tailings may lead to the evaporation of those PAHs into the ambient air. Further, the releases of PAHs into the ambient air from tar sands

upgrading facilities discussed above are finding their way into the Athabasca River and its numerous tributaries. While the tailings leakages suggest the possibility of a significant future threat to waterways, emissions from upgrading and evaporating PAHs from tailings ponds appear to already be contaminating water resources with carcinogens and other chemicals linked to negative human health effects."

Source : http://www.nrdc.org/energy/tar-sands-health-effects.asp

Marathon Tar Sands Refinery

One of the communities at the end of this proposed pipeline is the Detroit community surrounded by the Marathon Tar Sands refinery. Testimony presented at the White Earth Band of Ojibwe and Mille Lacs Band of Ojibwe regulatory hearings on June 4 and 5 on the proposed Sandpiper project by Emma Lockridge (attached) shows the impact of this refinery. Notably, Marathon, the company which owns this refinery is a one third partner in the Sandpiper. This was the "need" established by Marathon which became the driving force for the PUC to issue a certificate of need. We continue to dispute this "need" in the Marathon case, and wish to offer excerpts from Ms. Lockridge's testimony to this hearing:

"...The refinery emissions are so strong it feels like we live in the refinery, not near it. News reporters have asked me to describe the odor coming from Marathon. I say it smells like death. The odors emitted from the refinery are so toxic smelling that on many nights I am forced to sleep in a mask. I awaken coughing and gagging on the emissions and I have a sore in my nose. The emissions seem particularly strong at night when people should be sleeping. In fact, it has become so unbearable I am looking for a new place to live even though my home is paid off. My home is virtually worthless due to the industrial atmosphere and its proximity to Marathon.

We are sick in my community. My sister had kidney failure and died after several years on dialysis. I have kidney failure and underwent a life-saving transplant, thanks to a kidney donation from my nephew. [It's worth noting that there are no other people in our extended family with kidney issues.] My neighbor who grew up next door to me is on dialysis and the lady across the street suffered kidney failure and died on dialysis. Our community is impacted by respiratory illnesses, kidney failure, autoimmune diseases, such as sarcoidosis and multiple sclerosis, and early deaths. We have a five-acre toxic play field in the heart of our community that is contaminated with such a high level of lead it is on an EPA brownfield list and has been cordoned off with a fence.

I am opposed to tars sands mining and refining and the installation of any new pipelines that carry toxic fuel. It is unconscionable for an oil company to place any more pipelines in Mother Earth, particularly in the sensitive life-giving lake areas where the Ojibwe people live."

The fact is, that the proposed pipeline reroute would continue to worsen the direct health impacts on this community. And, in the opinion of Honor the Earth and the White Earth Band of Ojibwe, this favoring of the rights of a foreign fossil fuel pipeline company over the health and well being of the people, in no way established the "Need" required to issue the certificate of need.

Pipeline Impact on Our Community Directly:

"…. The manoomin is our buffalo ,". It is… our covenant with the creator. It is very spiritual…We have a symbiotic relationship with the rice. We don't need to beat around ….the rice tells the way. That's what he is bred to do…. I will continue ricing as long as I can lift a pole and lift knockers." Faron Jackson, Ojibwe Wild Rice Harvester

" I don't know who in their right mind, thought it was right to make the decision for my children, my grand children , my nieces and nephews and the generations to come after this….."

Algin Goodsky at the Rice Lake Hearing, June 4

Wild rice is an essential part of the spiritual, cultural, historical , nutritional and economic foundation of Anishinaabe well being. The proposed Enbridge Energy Corridor impacts this wild rice more than any proposed mega project in Minnesota, yet in a cumulative effect assessment, the impact on the rice by the other mega-projects must be taken into account. These include the proposed Polymet, Eagle Rock and the continuing interest in the Penokee Hills for taconite . Those mining proposals , although technically outside of the scope of the very limited review this PUC has undertaken so far, also impact our wild rice. This is particularly true, in light of the state of Minnesota's apparent interest in reducing the number of wild rice lakes in the state, so that a sulfate standard would not be applied to these mining operations, and EPA regulations could be skirted. That would not be our approach. The PUC needs to be cognizant of Tribal environmental knowledge and include this knowledge into a cumulative effect assessment.

Let us be clear, this is the only place in the world where there are Anishinaabeg and this is the only place in the world where there is wild rice. We understand that, and fully intend to protect both of those, as essential to our lives as Anishinaabeg people.

Proceeding, with some historic and regional knowledge, the proposed Enbridge Energy Corridor route already caused an immense amount of duress for our community.

"… I am afraid, I am very afraid. But we are Anishinaabeg people, and it is our way that has kept us alive for all these generations and will keep us alive for the next seven, fourteen, twenty one generations to come…" Michael Dahl, White Earth

People are stressed out already, and concerned about the pipeline. National and international studies on the impact of siting proposed megaprojects in communities all show that there is increased psychological and social trauma on these communities. It is important to note, that the most impacted tribal communities in the proposed Enbridge route for Line 3, are those of Rice Lake and East Lake. Both of these communities already suffer from health disparities and duress. The White Earth Tribal Health budget already consumes a vast proportion of the tribal budget in total, and adding more health problems to our community for the benefit of a Canadian Pipeline Company is a violation of state and federal, as well as tribal rights, laws, interests, and sensibilities.

The present mental and physical health conditions of the Ojibwe, in Minnesota has been documented recently to the Minnesota Commissioner of Health, with the Wilder Foundation. The study found:

"The evidence strongly suggests that social and economic conditions and structural racism contribute significantly to the relatively poor health outcomes of the American Indian population in Minnesota. Therefore, we feel that policy makers should take these critical factors into account in a systematic and transparent way when making decisions that potentially have wide ranging impacts..."[1]

As can be seen from the following statistics, Tribal communities currently have significant health disparities, which would be exacerbated by the proposed pipeline projects.

Native American youth 15-24 suicide rate more than 3 times more than national average
Suicide leading cause of death for those 10-34
Reservations among the poorest places in the nation
Rates of depression twice national average
Alcoholism 5.5 times national rates
Heart disease twice national average[2]

In the 2014, Advancing Health Equity Report to the Legislature, the Minnesota Department of Health highlighted structural racism as a key contributor to health inequities in our state: "Structural racism — the normalization of historical, cultural, institutional and interpersonal dynamics that routinely advantage white people while producing cumulative and chronic adverse outcomes for people of color and American Indians — is rarely talked about. Revealing where structural racism is operating and where its effects are being felt is essential for figuring out where policies and programs can make the greatest improvements.

While this may not appear to be a direct interest of the Department of Commerce in these proceedings, the fact that the baseline for the communities to be impacted most heavily by the Enbridge proposed pipeline corridor, means that this additional health burden must be considered by the Department of Commerce. And, although the Minnesota PUC told the Mille Lacs band of Ojibwe that it was not required to consult with tribal governments, as had been outlined in Governor Dayton's Executive Order of 2014 on tribal and state relations, we insist that the Department of Commerce is, not in fact, exempt from that order, and in that, since the state Department of Health has already recognized the underlying structural racism in Minnesota's health disparities, in relationship to First Nations, it is clear that our community is at high risk and that it would be, in fact, reprehensible to attempt to push threat onto our tribal people.

Impact is worsened by Mega Project

The psychological and social impacts of siting a project in an at-risk community is very significant. Widespread studies and stories from Canadian and other Indigenous Nations who have faced or become victims of mega-projects indicates that there is significant social and psychological trauma,

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[1] Wilder Letter June 4, 2015
[2] McLeigh JD. 2014. What are the policy issues related to the mental health of Native Americans? PsycINFO.

resulting in additional deaths from these projects[3]. *For example, more than 43 % of victims of the Exxon Valdez oil spill, compared to 23 % of non-victims, had one or more psychological disorders (specifically depression, generalized anxiety disorder, or PTSD) one year after the oil spill (Palinkas et al. 1993). These psychological consequences persisted; six years later disaster victims had substantially higher than normative rates for depression, anxiety, and PTSD (Arata et al. 2000). Indeed, a review of studies assessing the psychological consequences of disasters invoking human culpability concluded that their psychological consequences are worse than for natural disasters (Norris et al. 2002)[4].*

The scope of oil projects, combined with large scale mining projects will cause significant additional stress on these communities which are already under duress . The pipeline corridor , if routed through the heart of the wild rice country would make the Tribal communities of Minnesota "victims of progress".

Price Tag for the Health Impact?

The State of Minnesota acknowledges that the risk of a pipeline failure would cause significant cost to the State. The State's Department of Commerce has arranged for expanded insurance under the PUC approval authority for a determination of the need for a pipeline disaster. The amount of and terms of the insurance need to be shared with the White Earth , Mille Lacs and other tribal governments and the I855 treaty authority so that we can see the estimates of potential liability and the terms and limits to this policy. From what we know of the DOC request, there is no acknowledgement that these tribal communities, and those within the I855 treaty area with their already significant health issues and numerous environmental injustices as a result of this pipeline, will be protected.

What we know is that based on the dearth of assessment by the state of Minnesota, the lack of a rigorous or robust assessment of risk and knowledge of the location of the impact of the pipeline proposal, the lack of integration of state agency cooperation, including , for instance the very accessible Department of Health report, any recommendations for insurance in the Sandpiper line and subsequently Line 3 would be grossly underestimated. The combined or actuarial risk of the Energy Corridor would need to be calculated as discussed elsewhere. We are concerned particularly that the present protection for the State of Minnesota makes no allowances for tribal communities already exposed to social, economic, and structural racism. Nor does it contemplate compensation for these communities in the event of an oil spill along the pipeline or other impacts. The present system allows for the state to protect its interests, but they have chosen not to implement a system to protect Tribal communities against potential loss of life and livelihood. In fact, they appear to be

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[3] Hoover E, et al. 2012. Indigenous Peoples of North America: Environmental Exposures and Reproductive Justice. Envir Heal Pers 120: 1645- 1649.; Tobias JK, Richmond CAM. 2014. "That land means everything to us as Anishinaabe...": Environmental dispossession and resilience on the North Shore of Lake Superior. Health & Place 29: 26-33.

[4] Cline RJW, Orom H, Chung JE, and Hernandez T. 2014. The Role of Social Toxicity in Responses to a Slowly-Evolving Environmental Disaster: The Case of Amphibole Asbestos Exposure in Libby, Montana, USA. Am J Comm Psychol 54: 12-27.

choosing to put these Tribal communities at risk and compounding environmental justice issues[5]. At a June 30th Environmental Justice meeting sponsored by Minnesota PCA, the staff identified that Minnesota had subjected its minority population to environmental justice issues and they have born a disproportion of the environmental issues[6]. The White Earth band of Ojibwe and Honor the Earth would like to know the full extent of the insurance agreement between the state of Minnesota and Enbridge, as this is a matter of concern to our people, in the management of the resources and assets of the I855 treaty area, as well as the precedent it may set. We believe that this issue should be resolved long before any permits are added.

Environmental Risk and Environmental Justice

All of the comments submitted previously by Honor the Earth, as well as related organizations such as the Friends of the Headwaters, and tribal governments, including White Earth, Fond du Lac and Mille Lacs, would apply in the case of Line 3, or the Enbridge Energy Corridor. The environmental destruction from fossil fuels is already documented. The exact figures for the increase in risk by adding mega projects to new corridor, or achieving what Enbridge calls ' pipeline fatigue" have not yet been ascertained, and would require qualified assessment. All of this, should be assessed prior to any approval for a new line, as well, full disclosure by the Enbridge Company, as to potential additional lines in the corridor they hope to secure will need to be reviewed by qualified scientific and Indigenous experts. None of this is in place at present.

Environmental Justice Concerns:

During hearing before an Administrative Law Judge at St. Paul, Minnesota in January, 2015, Enbridge project staff provide testimony and were questioned about the development of this pipeline and pipeline corridor. This is part of the public record, yet transcripts are not available. Specifically, the company considered an alternate route of the pipeline going down Interstate 94 as too dangerous because of the possibility of pipe failure and crude oil flooding the highway, causing accidents and it's routing through populated areas[7]. Enbridge's preferred route place the pipeline is very close in proximity to two tribal communities: Rice Lake Community in Clearwater County and East Lake/Sandy Lake Community in Aitkin County. These two tribal communities are being told they should shoulder the entire risk of the pipeline (which was too dangerous to place along Interstate 94 or larger, non□Indian communities). [8]. At a June 30th Environmental Justice meeting sponsored by Minnesota PCA, the staff identified that Minnesota had subjected its minority population to environmental justice issues and they have born a disproportion of the environmental issues[9]. This process must not continue that discrimination. We believe that this issue should be resolved long before any permits are added.

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[5] In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota MPUC Docket No. PL-6668/CN-13-473; OAH Docket No. 8-2500-31260 May 22,2015

[6] MPCA notes of the meeting:
June 30th 2015.

[7] Testimony of Enbridge Sandpiper Project Officer PUC hearing January 2105

[8] In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota MPUC Docket No. PL-6668/CN-13-473; OAH Docket No. 8-2500-31260 May 22,2015

[9] MPCA notes of the meeting:
June 30th 2015.

Additional Environmental Problems: Dilbit, Carbon and Abandonment

I) Dilbit Corrosion and Special Characteristics

"Dilbit" is the abbreviation for diluted bitumen, the substance Enbridge is currently pumping through the existing LIne 3 and would continue to transport in the Line 3 replacement.

Because of the more viscous makeup of dilbit, it must be pumped at higher pressure and at higher temperatures than conventional crude oil. Additional toxic chemicals are added to allow the product flow. Some sand remains in dilbit. A combination of these attributes has led some engineers to compare dilbit to ***"fast, hot, and toxic liquid sandpaper."*** *Add this to the fact that 41 percent of the pipelines were built to carry conventional crude oil in the 1950's and 1960's. The alarming speed at which tar sands are being added to this pipeline network raise legitimate questions about the likelihood of many more accidents. The environmental group Natural Resources Defense Council (NRDC) notes that pipelines in the upper Midwest that routinely carry oil from tar sands have spilled 3.6 times more oil per pipeline mile than the U.S. average[10].*

Carbon

The Enbridge Company, and its subsidiary, the North Dakota Pipeline Company, in Canadian and US regulatory proceedings has wished to only account for the carbon used to power the transportation of the oil through the pipelines it is providing for the extreme extraction process. We reject this suggestion as self serving and inaccurate.

Responsibility for the total carbon footprint of the substance would be required to be considered. It is as if we are saying that in the Nazi Gas chambers, those who operated the railroads to the gas chambers were not complicit in the Jewish holocaust, but instead, only the SS which administered it, would be liable. That is preposterous. This pipeline and the further combustion of high impact fossil fuels, constitute the gas chambers of climate change.

In short, when analyzing the carbon impact of the pipeline, more than just the operational impacts must be calculated. As the pipeline project is being developed to deliver tar sands oil to refineries and foreign markets, the carbon impact of the use of the oil must be included. HTE has done preliminary calculations of this impact and reported to the EPA:

The Sandpiper pipeline will transport 355,000 bl/day, 365.25 days a year the equivalent of 129,663,750 barrels annually. Carbon emissions per barrel per US EPA estimates: .43 metric tons per barrel[11]. Total annual carbon emissions 55,755,412 metric tons. Cost to remove carbon at

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[10] http://www.oilandwaterdontmix.org/the_bigger_picture

[11] US EPA Carbon Calculation (Note: Due to rounding, performing the calculations given in the equations below may not return the exact results shown) {.5.80 mmbtu/barrel × 20.31 kg C/mmbtu × 44 kg CO2/12 kg C × 1 metric ton/1,000 kg = 0.43 metric tons CO2/barrel}
Sources: EPA (2013). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990□2011. Annex 2 (Methodology for estimating CO2 emissions from fossil fuel combustion), P. A□68, Table A□38 and Table A□45. U.S. Environmental Protection Agency, Washington, DC. U.S. EPA #430□R□13□001 (PDF) (429 pp, 10.6MB, About PDF).

present is $600.00 per metric ton (American Physics Society). Total cost to the atmosphere annually equals $33.5 billion. The new Line 3 is also proposed to follow this corridor. Line 3 would be a 36" pipe transporting 675,000 barrels of tar sands crude oil daily (Enbridge Number), 365.25 days a year equalling 246,643,750 barrels annually. Carbon emission per barrel of tar sands oil is estimated .51 metric tons per barrel (Extract calculation from the book). Total annual carbon emission is estimated at 125,737,313 metric tons. Total cost to the atmosphere annually $75.4 billion. The combined cost to the environment is $181 billion. Compare this to the $500 million Enbridge proposes to make. These figures do not include the loss of ecosystem services and values that would result from the development of the corridor. Nor does this include project costs of spills. " This also does not include the remaining Enbridge Lines, nor does it include the MinnCan expansion also being considered by the PUC.

Abandonment Problems- Significant in all ways.

In the 1960's, when the original Enbridge Mainline was developed, there was not much public knowledge around the environmental issues of pipeline development. Decades later, after living with the pipeline infrastructure, we have a much better understanding of the impact of these projects. This impacts include the risk of spills, the impact on landscape fracture, and hydrological disturbances. Now, as we move into an era of pipeline abandonment, the potential long-term impacts of leaving this corroding infrastructure in the environment must be analyzed before permitting corporations (such as Enbridge) to walk away from this remaining liabilities. We know that the existing Line 3 has over 900 structural anomalies, which represent increased risk of spills. This is why Enbridge wants to replace the line. However, Enbridge does not want the liability of soil testing and remediating contaminated soil, or restoring historical hydrological regimes. This is why Enbridge is proposing to abandon the existing pipeline in place.

Enbridge Line 3 was placed in by the Lakehead Pipeline Company in l96l and has experienced significant structural integrity problems. Latest public estimates by the Enbridge Company indicate over 900 integrity anomalies in the pipeline, which spans over 300 miles of northern Minnesota, crossing part of the Red Lake, Leech Lake and Fond du Lac reservations and the l855 and l842 treaty areas.

Enbridge has gathered extensive integrity data on Line 3 throughout its years of operation. The integrity data shows a high number of integrity anomalies – specifically, corrosion and long seam cracking. Because of its integrity anomalies, Line 3 has experienced a number of failures during its more than 50-year history. As a result, Line 3 requires a high level of integrity monitoring and an extensive on-going integrity dig and repair program to maintain safe operation of the line. For example, approximately 4,000 integrity digs in the United States alone are currently forecasted for Line 3 over the next 15 years to maintain its current level of operation. This would result in year-after-year impacts to landowners and the environment, and may result in repeated impacts to the same landowners and environmental features. (Enbridge Reports)

If Enbridge is not required to remove the pipeline and restore the damaged ecosystems, there may never be a full accounting of the contamination surrounding the pipeline. This contamination would become the responsibility of nearby landowners , tribal governments, state and federal authorities. Additionally, Enbridge has stated they plan to fill the pipelines with nitirious oxide. This would

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IPCC (2006). 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Intergovernmental Panel on Climate Change, Geneva, Switzerland.

constitute an underground storage tank according to Minnesota statue Minnesota Statute § 103I.681[12] We believe that the state of Minnesota will need to regulate the pipeline as such.

In terms of jurisdiction. We find an article in the Oil and Gas Pipeline Journal by David Howell, Senior Right of Way Agent, International Right of Way Association (2009 article), where he notes the problem of jurisdiction is immense and a major concern...

"A dictionary definition for abandonment means to "give up entirely." Defined in terms of federal regulations, abandonment means "permanently removed from service." In federal pipeline safety jargon, an abandoned pipeline is a pipeline that is "physically separated from its source of gas and is no longer maintained," or in another federal agency glossary, "no longer connected to the system and is no longer maintained. The pipeline can be abandoned in place, by removal, or sold." In still another set of federal guidelines, abandoned property means "a property that, because of its general disrepair or lack of activity, a reasonable person could believe that there is intent on the part of the current owners to surrender their rights to the property." All of these definitions apply to gas and hazardous liquid pipelines that are interstate and fall under federal jurisdiction.

However, there are no guidelines for abandoned crude oil pipelines that fall under the jurisdiction of the Interstate Commerce Commission, and, presumably, the agencies that have succeeded to that federal agency's role since it was abolished in 1995, as common carriers. At the state level, there are no abandonment guidelines or definitions for intrastate gas, liquids, or oil pipelines, and there are no abandonment guidelines or definitions for intrastate oil or gas gathering systems. Any mention of abandonment of pipeline procedures follows federal guidelines of disconnecting from active gas service and purging of any hazardous substance."

More information on the issue of abandonment can be found in HTE supplemental Pipeline Abandonment Briefing document.

We have devoted a great deal of our comments to the first question being asked by the PUC and now look at the remaining questions. Many of these questions have been answered in the primary comments on the Sandpiper.

2. Are there any specific methods to address these impacts that should be studied in the environmental analysis?
3. Are there any alternative routes or route segments that should be considered?
4. Are there any alternatives to the project that should be considered?

Methods:

The PUC has appeared to operate in an antiquated system of analysis, which neither is able to offer full assessments, nor able to integrate assessments, whether of the environment or the economy. This is particularly true when pipelines are considered singularly, jurisdiction is siloed, and information is withheld from the review. Governments on a worldwide scale are deploying policy analysis which includes full cost accounting, carbon footprint, social impact assessment, ecological analysis and the precautionary principle. This would offer a more conservative view of choices. We can provide the PUC with methodologies which could be included here. As well, NASA scientists and many others

[12] https://www.revisor.mn.gov/statutes/?id=103I.681

have come to understand the essential knowledge of Indigenous people in relationship to the earth. This would require a full quality assessment and full partnership with Indigenous peoples, first nations and the tribes of Minnesota.

Scientifically, there are a number of methods that these potential impacts may be assessed. For ecosystem-level impacts, the Invest GIS modeling tool should be used, along with the UCONN Landscape fracture tool. This will give an estimation of ecosystems impacted. Utilizing ecosystem services valuation will give an economic impact of the loss of these ecosystems services. To look at the human health impact, it must be understood that the impact on the Tribal communities will not be the same as the non-Native communities. When estimating the impact on these communities, a seven generations perspective must be taken, or looking at the cumulative impact over the next 140 years. Past research has shown that the loss of the ability to continue traditional ways negatively impacts the physical and psychological health of Tribal communities. Given the spiritual nature of the wild rice, the loss of the ability to harvest this crop could present a potential loss of the cultural and economic basis of these communities. There is no way to quantify this potential loss. .

Alternative Routes

We do not believe this pipeline is necessary. We believe that Line 3 should be dismantled, and recognize that the economic benefits of pipeline removal, in terms of jobs and long term remediation represent at least four times as many jobs as those proposed by Enbridge for a short term , quick laying of new pipeline, without remediating any of the present pipeline toxicity. This is a significant economic issue, which we believe would benefit the state of Minnesota.

The consensus of the Tribes is that this project is not wanted or needed by these communities. As such, Enbridge must find an alternative route that does not cross Treaty protected lands. If we are required to submit a corridor option for a pipeline which we do not see the need for, then the only proposal is that which we have previously submitted: 29 94 to go down major interstates, for the benefit of those who will be able to monitor this pipeline and for the benefit, if there is some of those who will proportionally use and consume this oil.

Frankly, as the Line 3 is scheduled to follow the Sandpiper corridor, which has already been restricted to SA-applicant and SA-03-AM; HTE suggests that perhaps Enbridge shouldn't have invested so much into Clearbrook before they had permits in place for the New Mainline Corridor. Enbridge and other large oil companies have been allowed to develop a (mostly) unregulated expansive network of pipelines and refineries across the country over the last 50-60 years. This is about the life span of most of that infrastructure. That is part of the "need" for this most recent round of pipeline projects. Not that demand has gone up, but that infrastructure has decayed and markets have shifted. While domestically, urban areas are still the largest consumers of fossil fuels, there has finally been substantial movement towards investment in sustainable urban development. A major component of this is investment in public transportation. Often these vehicles do not rely on fossil fuels. Why should we invest in an infrastructure our grandchildren will not need?

Long story short, if Enbridge actually upheld the social conscience which it represents in the annual reports, we would be discussing the expansion of a regional public transportation network, the use of

the Enbridge proposed $17 billion in oil pipeline additions in Minnesota into a renewable energy infrastructure. We would be discussing the prudent transition to a renewable and efficient energy economy and the reduction of the need for a fossil fuels economy as well as the need to invest in the aging infrastructure of this country. Indeed, just dismantling Line 3 will be a major employment opportunity for the unions of Minnesota, with likely four times the employment ratio that would be needed for the laying of a new pipe. This combined, with new energy infrastructure will insure that there is long term, sustainable benefit from new energy infrastructure in this state, not long term liability.

From: paige [mailto:paigebusse@hotmail.com]
Sent: Wednesday, April 02, 2014 1:01 AM
To: Hartman, Larry (COMM)
Subject: Sandpiper routing permit public comment

To Whom it May Concern:

We are an alliance of berry pickers, we call ourselves Mawinzo Asiginigaazo, which means, berry pickers gathering. We are in opposition to the proposed Sandpiper pipeline and request that you do not grant a permit for the construction of this pipeline.

The relationship to this docket is that the pipeline would run adjacent to the largest berry patches in this region. This ecosystem lies east of the proposed route from Moose Creek Township in Clearwater County to Lake Alice Township in Hubbard County. The Mississippi River flows next to one particular area and is downstream from where the pipeline would cross beneath this said river. Due to the nature of oil with its known carcinogens, an oil spill would be detrimental to the groundwater and river habitat, therefore effecting the berries. We depend on these berries not only for nourishment but they are a key component of our cultural resources. There are seven types of berries that we harvest in this area, along with hazelnuts and many types of medicinal plants. These are all considered organic. The list of berries consist of; juneberries, pin cherry, strawberries, blueberries, huckleberries, raspberries and chokecherries.

The Anishinaabe have traveled and camped next to these berry patches for hundreds of years. We have continued to enjoy this perfect ecosystem along with our neighbors who are not Anishinaabe. We want to continue to pick these berries for our families, camp next to these berry patches as our ancestors did and we want our children, grandchildren and great-grandchildren to be able to do the same.

We do not propose an alternative route because we do not see an alternative. We do not want any additional pipelines built in the state of Minnesota. We want to see alternative fuel sources developed rather than our continued dependence upon fossil fuels which are known to increase carbon dioxide in the atmosphere. Increased carbon dioxide in the atmosphere has contributed to negative global weather changes.

We do not support the proposed project in this docket. Pipeline ruptures and oil spills are happening all over the world at increasing rates. We do not want to increase our chances of a spill by allowing this level 4 explosive oil to run through these lands via. the Sandpiper.

Thank you for your time,

The members of Mawinzo Asinigaazo

Jill Hoppe
Tribal Historic Preservation Officer
Fond du Lac Band of Lake Superior Chippewa
1720 Big Lake Road
Cloquet, MN 55720

February 1, 2017

RE: Meeting request regarding the Line 3 Replacement EIS

Dear Ms. Hoppe:

The Minnesota Department of Commerce greatly appreciates the ongoing working relationship and input from the Fond du Lac technical staff on pipeline issues. I write today with two requests. First, we would like to meet with you and other board members to continue the discussion as to how the proposed pipeline could affect the natural and cultural resources that are important to the Fond du Lac Band.

Second, we would like to hold a separate open forum to discuss the project with the members of the Fond du Lac tribal community. The intent of this forum would inform tribal members about the project and for the Department to gain additional insight into tribal members' concerns on Line 3.

As you are aware, Enbridge Energy is proposing to replace their existing Line 3 pipeline, a section of which crosses the Fond du Lac Indian Reservation. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route that does not cross the reservation. However, route alternatives (RAs) proposed by other entities as alternatives or Enbridge's preferred route are in the vicinity of the Fond du Lac Reservation. For your convenience, I have attached a map of the proposed routes.

The process for pipeline approval is that the Minnesota Public Utilities Commission (PUC) is responsible for deciding whether to issue a certificate of need and determining what route to permit for the proposed project. In this case, the PUC has ordered an environmental impact statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS. Additional information on the EIS process and the project can be found on the project web page (http://www.mn.gov//commerce/energyfacilities/line3/).

Over the last year, the department has worked with the environmental staff in the Fond du Lac Resources Department to gather information for the EIS. These discussions focused on construction impacts, land use and hydrology, as well as the potential effects on nearby natural resources, including wild rice and water resources. The Fond du Lac Band also provided comments during the EIS scoping comment period. Finally, Commerce's Commissioner and Chief of Staff consulted with the Fond du Lac Tribal Chairman and Council on January 27, 2017 regarding a variety of issues, including the proposed project.

Cultural and Natural Resources Meeting

The State of Minnesota's EIS for the proposed project does not replace any federal consultation or environmental review efforts on this project. For example, Section 106, 401 and 402 reviews required by the Army Corps of Engineers are separate from the State of Minnesota's environmental review process.

Like the federal government, however, the State of Minnesota is responsible for considering the cultural and natural resource issues that are important to the Fond du Lac Band. Therefore, at the proposed meeting we would like to discuss the following:

1. The types of effects the pipeline route and proposed alternatives could have on tribal resources.
2. The areas where the location of the pipeline could affect these resources.
3. The type and distribution of resources used by the Fond du Lac Band for hunting, gathering, economic, and cultural purposes.
4. How information that could benefit the EIS process is best obtained.

The resources the Department is currently considering include known cultural and historical resources in the area and tribal traditional and historical use areas for hunting, fishing, and gathering, which may also be properties of religious and cultural significance and sacred places. We seek input to accurately reflect the impact and understand that culturally significant data are sensitive and require careful consideration and protection. What the Department learns from the requested meetings would help us to achieve that.

Please extend this invitation to other members in your office or other band members to attend the meeting, please let us know. We would also like to extend the invitation to your Natural Resources Department (copied here).

A preliminary agenda for the meeting will follow. We would greatly appreciate suggestions for agenda items we may have missed from the consultation meeting. If possible, please provide suggested items no later than February 10, 2017.

Community Open Forum

As mentioned above, we would also request an opportunity to hold a community forum. The purpose of the forum is to help us better understand environmental justice issues in the project area, and are seeking meaningful input from members of environmental justice communities. EERA staff would attend the forum and be available to answer general questions about the proposed project, the process for preparing the EIS, and the state regulatory processes.

We would like to meet in person at your tribal headquarters office or alternate location at your suggestion. We are blocking time for the meeting during the week of February 20, 2017. If this time works for you please let us know what day (February 20 – March 3) works best for you. If possible, we would like to schedule the open forum on the same day as our meeting with you and other board members.

Please confirm your interest in, and availability for, an in-person meeting. I will follow up in a week or so to discuss your availability. My e-mail address and telephone are listed below. We look forward to meeting and consulting with the Fond du Lac.

Sincerely,

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101
Telephone: 651-539-1775
Email: Jamie.MacAlister@state.mn.us

cc: Thomas Howes, Fond du Lac Natural Resources Program Manager
Reginald DeFoe, Fond du Lac Natural Resources Director
Richard D. Gitar, Fond du Lac Water Regulatory Specialist/Tribal Inspector

Line 3 Replacement Project

Figure 1a: System Alternative Selected for Analysis in the EIS

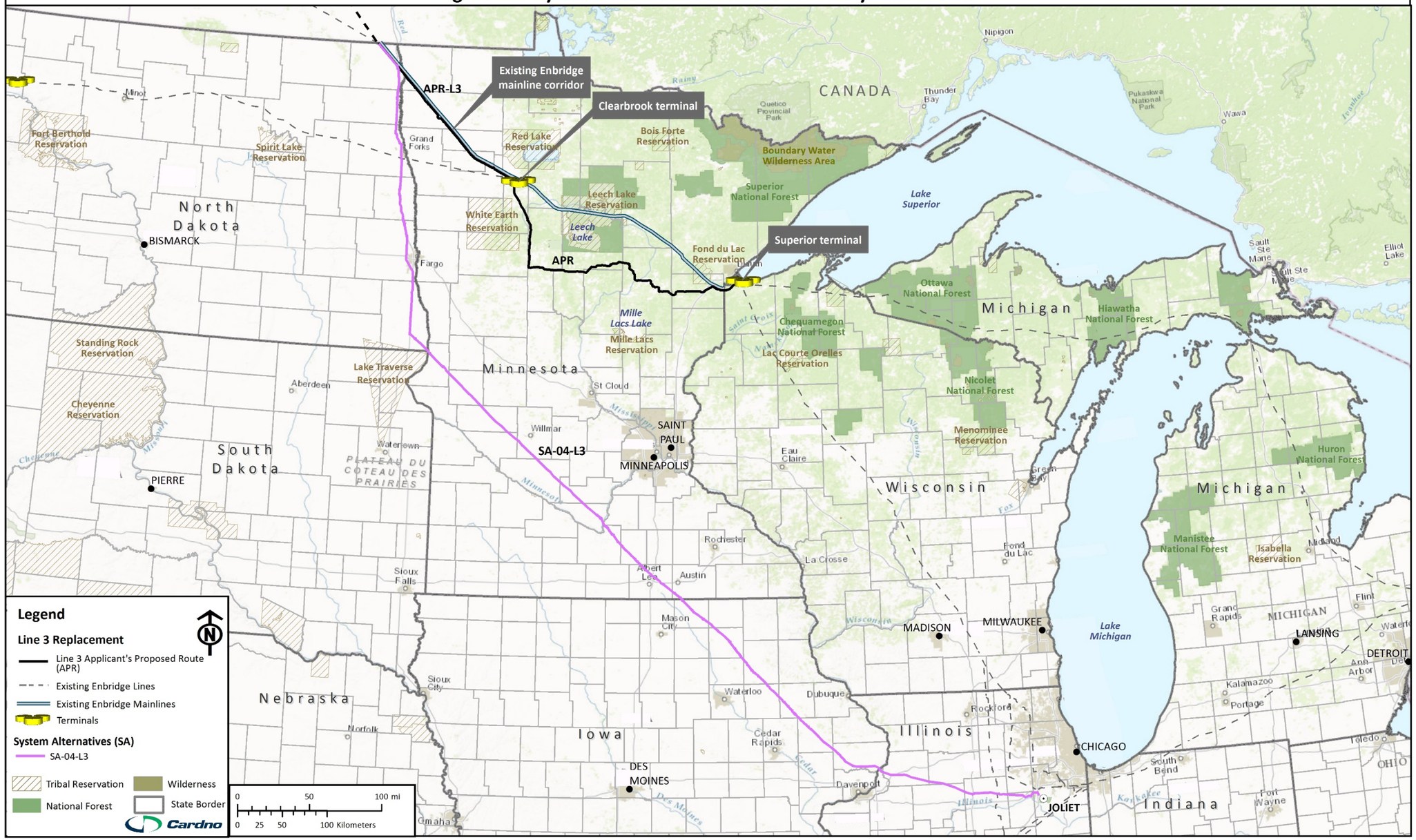

Line 3 Replacement Project

Figure 1b: Alternatives Selected for Analysis in the EIS

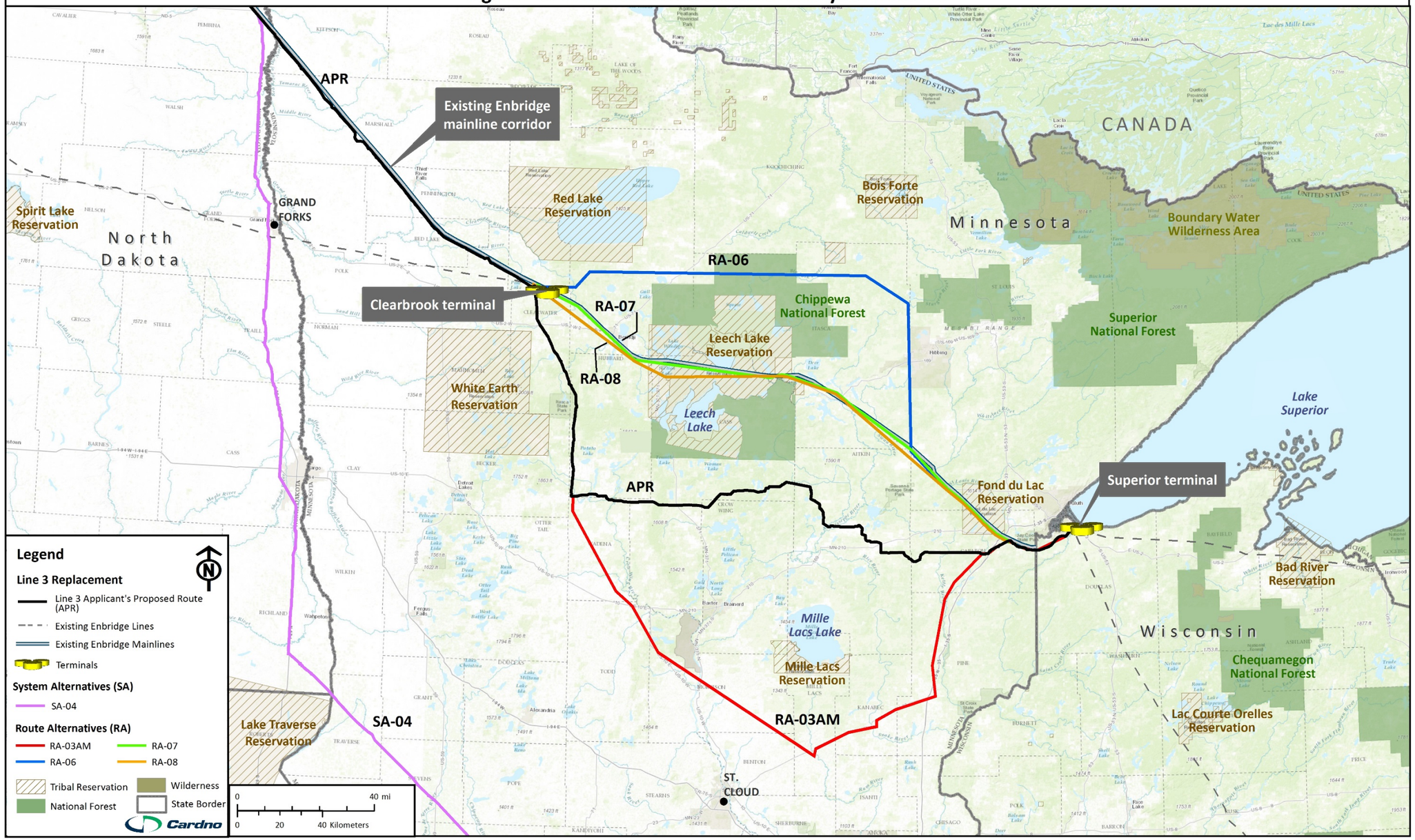

Line 3 Replacement Project
Figure 2: Route Alternatives and Route Segment Alternatives

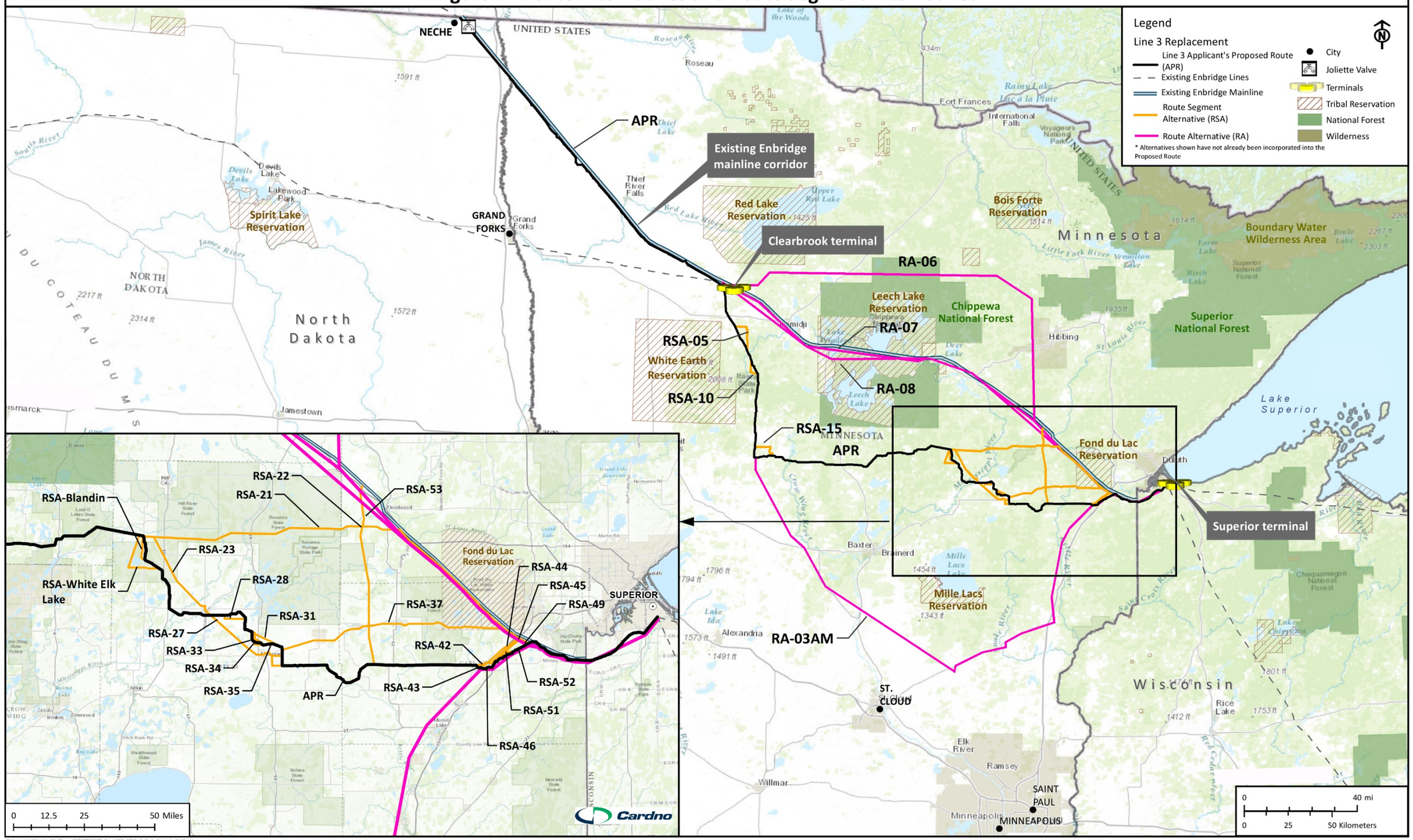

Amy Burnette
Tribal Historic Preservation Officer
Leech Lake Band of Ojibwe
115 6th Street NW, Suite E
Cass Lake, MN 56633

February 1, 2017

RE: Meeting request regarding the Line 3 Replacement EIS

Dear Ms. Burnette:

The Minnesota Department of Commerce greatly appreciates the ongoing working relationship and input from the Leech Lake technical staff on pipeline issues. I write today with two requests. First, we would like to meet with you and other board members to continue the discussion as to how the proposed pipeline could affect the natural and cultural resources that are important to the Leech Lake Band of Ojibwe.

Second, we would like to hold a separate open forum to discuss the project with the members of the Leech Lake tribal community. The intent of this forum would inform tribal members about the project and for the Department to gain additional insight into tribal members' concerns on Line 3.

As you are aware, Enbridge Energy is proposing to replace their existing Line 3 pipeline, a section of which crosses the Leech Lake Indian Reservation. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route that does not cross the reservation. However, route alternatives (RAs) proposed by other entities as alternatives or Enbridge's preferred route are in the vicinity of the Leech Lake Reservation. For your convenience, I have attached a map of the proposed routes.

The process for pipeline approval is that the Minnesota Public Utilities Commission (PUC) is responsible for deciding whether to issue a certificate of need and determining what route to permit for the proposed project. In this case, the PUC has ordered an environmental impact statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS. Additional information on the EIS process and the project can be found on the project web page (http://www.mn.gov//commerce/energyfacilities/line3/).

Over the last year, the department has worked with the environmental staff in the Leech Lake Resources Department to gather information for the EIS. These discussions focused on construction impacts, land use and hydrology, as well as the potential effects on nearby natural resources, including wild rice and water resources. The Leech Lake Band also provided comments during the EIS scoping comment period. Finally, Commerce's Commissioner and Chief of Staff consulted with the Leech Lake Tribal Chairman and Council on January 23, 2017 regarding a variety of issues, including the proposed project.

Cultural and Natural Resources Meeting

The State of Minnesota's EIS for the proposed project does not replace any federal consultation or environmental review efforts on this project. For example, Section 106, 401 and 402 reviews required by the Army Corps of Engineers are separate from the State of Minnesota's environmental review process.

Like the federal government, however, the State of Minnesota is responsible for considering the cultural and natural resource issues that are important to the Leech Lake Band. Therefore, at the proposed meeting we would like to discuss the following:

1. The types of effects the pipeline route and proposed alternatives could have on tribal resources.
2. The areas where the location of the pipeline could affect these resources.
3. The type and distribution of resources used by the Leech Lake Band for hunting, gathering, economic, and cultural purposes.
4. How information that could benefit the EIS process is best obtained.

The resources the Department is currently considering include known cultural and historical resources in the area and tribal traditional and historical use areas for hunting, fishing, and gathering, which may also be properties of religious and cultural significance and sacred places. We seek input to accurately reflect the impact and understand that culturally significant data are sensitive and require careful consideration and protection. What the Department learns from the requested meetings would help us to achieve that.

Please extend this invitation to other members in your office or other band members to attend the meeting, please let us know. We would also like to extend the invitation to your Natural Resources Department (copied here).

A preliminary agenda for the meeting will follow. We would greatly appreciate suggestions for agenda items we may have missed from the consultation meeting. If possible, please provide suggested items no later than February 10, 2017.

Community Open Forum

As mentioned above, we would also request an opportunity to hold a community forum. The purpose of the forum is to help us better understand environmental justice issues in the project area, and are seeking meaningful input from members of environmental justice communities. EERA staff would attend the forum and be available to answer general questions about the proposed project, the process for preparing the EIS, and the state regulatory processes.

We would like to meet in person at your tribal headquarters office or alternate location at your suggestion. We are blocking time for the meeting during the week of February 20, 2017. If this time works for you please let us know what day (February 20 – March 3) works best for you. If possible, we would like to schedule the open forum on the same day as our meeting with you and other board members.

Please confirm your interest in, and availability for, an in-person meeting. I will follow up in a week or so to discuss your availability. My e-mail address and telephone are listed below. We look forward to meeting and consulting with the Leech Lake Band of Ojibwe.

Sincerely,

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101
Telephone: 651-539-1775
Email: Jamie.MacAlister@state.mn.us

cc: Steve Mortensen, Fish, Wildlife & Plant Resources Program Director
James Reyes, Ojibwe Fisheries Manager
Levi Brown, Environmental Director
Brandy Toft, Environmental Deputy Director

Line 3 Replacement Project

Figure 1a: System Alternative Selected for Analysis in the EIS

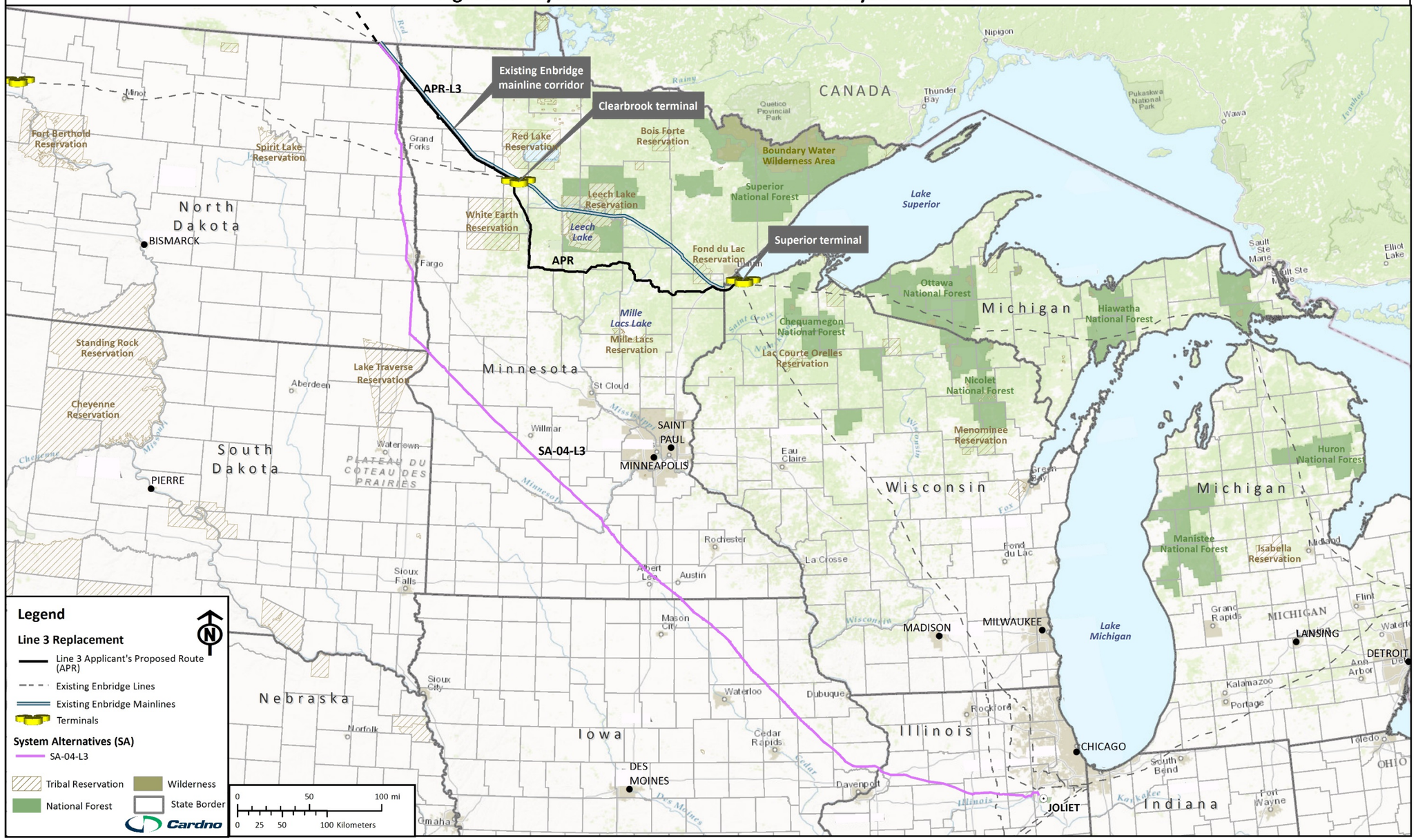

Line 3 Replacement Project

Figure 1b: Alternatives Selected for Analysis in the EIS

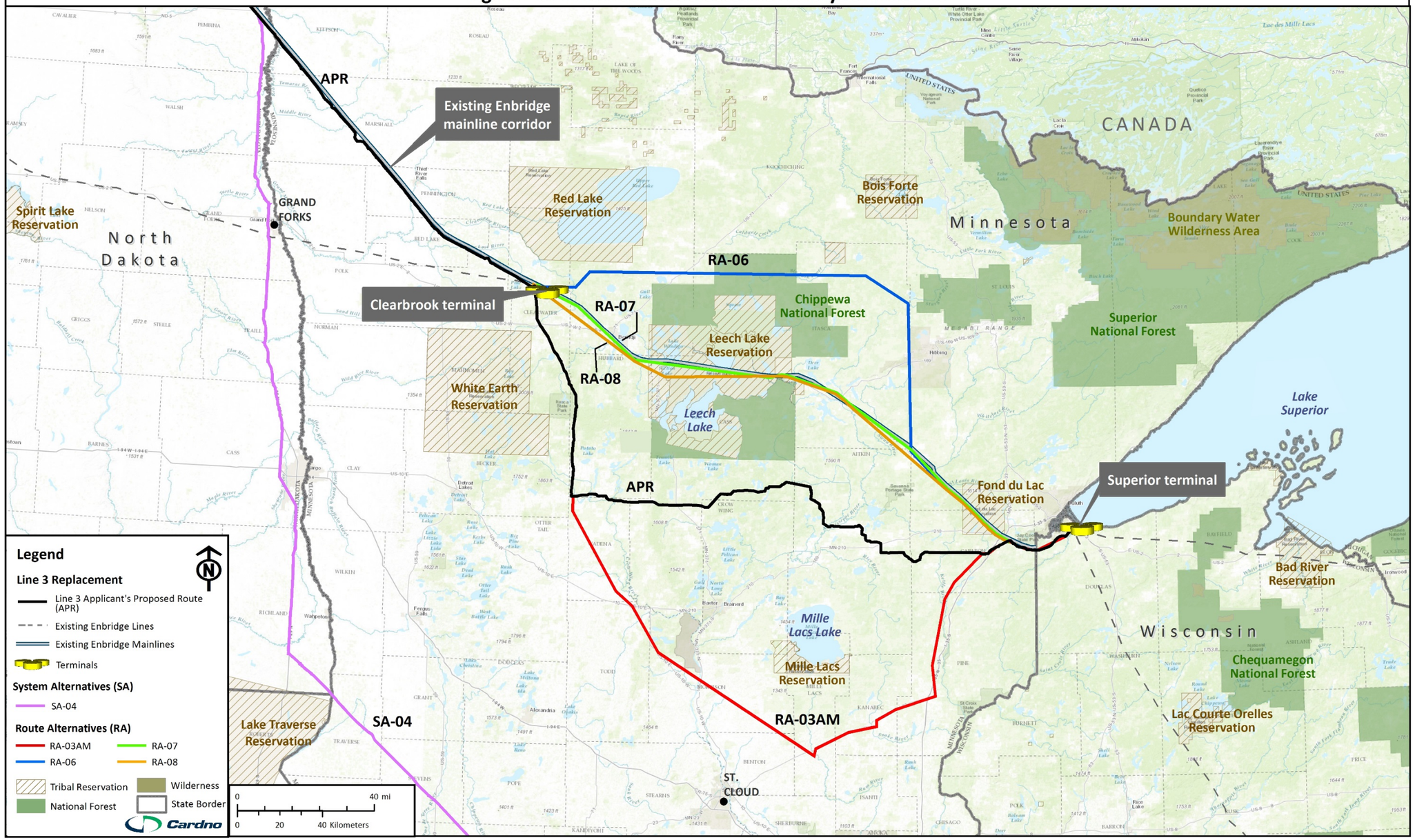

Line 3 Replacement Project
Figure 2: Route Alternatives and Route Segment Alternatives

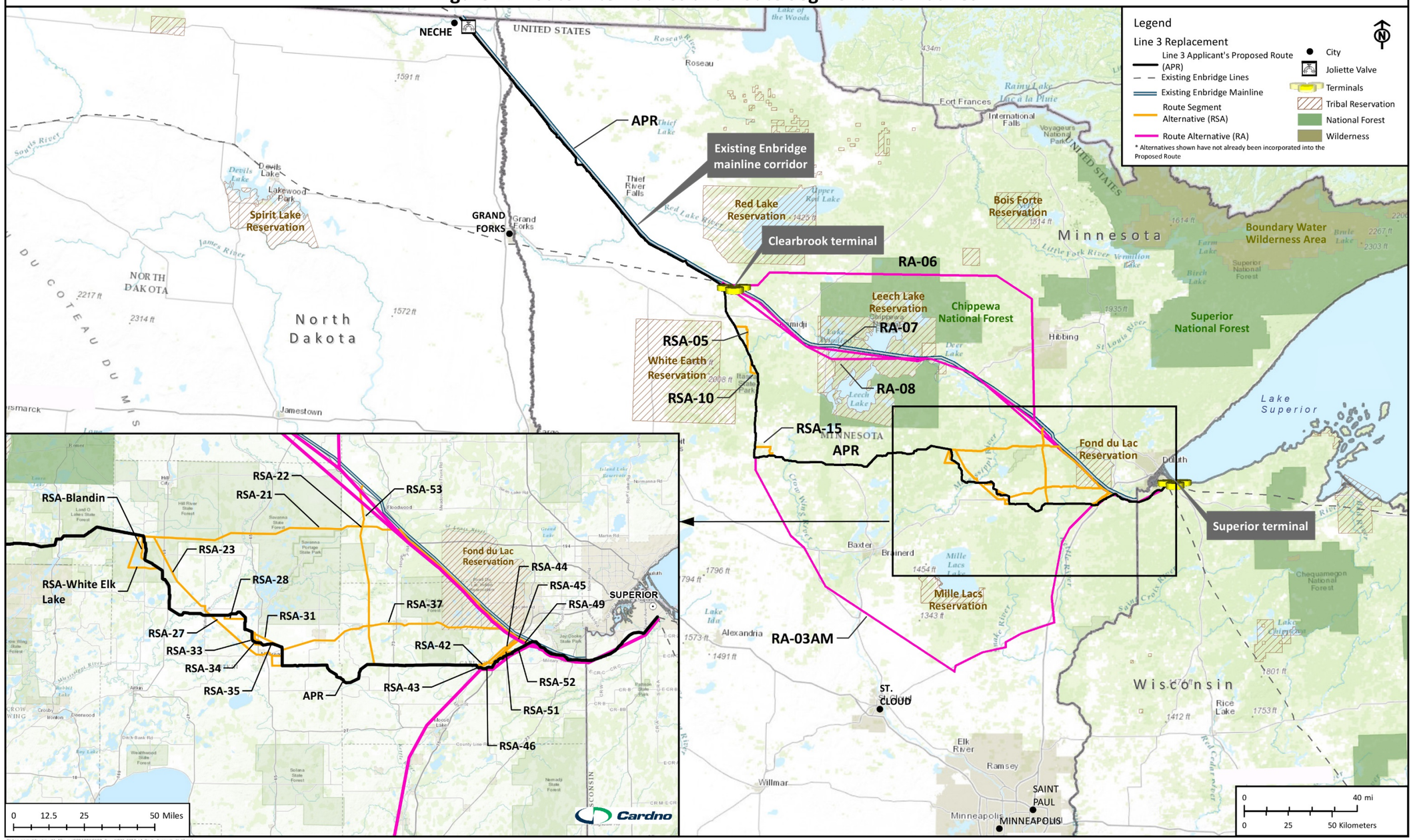

Natalie Weyaus
Tribal Historic Preservation Officer
Mille Lacs Band of Ojibwe
43408 Oodena Drive
Onamia, MN 56359

February 1, 2017

RE: Meeting request regarding the Line 3 Replacement EIS

Dear Ms. Weyaus:

The Minnesota Department of Commerce greatly appreciates the ongoing working relationship and input from the Mille Lacs Band technical staff on pipeline issues. I write today with two requests. First, we would like to meet with you and other board members to continue the discussion as to how the proposed pipeline could affect the natural and cultural resources that are important to the Mille Lacs Band.

Second, we would like to hold a separate open forum to discuss the project with the members of the Mille Lacs Band tribal community. The intent of this forum would inform tribal members about the project and for the Department to gain additional insight into tribal members' concerns on Line 3.

As you are aware, Enbridge Energy is proposing to replace their existing Line 3 pipeline, a section of which crosses the Mille Lacs Indian Reservation. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route that does not cross the reservation. However, route alternatives (RAs) proposed by other entities as alternatives or Enbridge's preferred route are in the vicinity of the Mille Lacs Reservation. For your convenience, I have attached a map of the proposed routes.

The process for pipeline approval is that the Minnesota Public Utilities Commission (PUC) is responsible for deciding whether to issue a certificate of need and determining what route to permit for the proposed project. In this case, the PUC has ordered an environmental impact statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS. Additional information on the EIS process and the project can be found on the project web page (http://www.mn.gov//commerce/energyfacilities/line3/).

Over the last year, the department has worked with the environmental staff in the Mille Lacs Resources Department to gather information for the EIS. These discussions focused on construction impacts, land use and hydrology, as well as the potential effects on nearby natural resources, including wild rice and water resources. The Mille Lacs Band also provided comments during the EIS scoping comment period. Finally, Commerce's Commissioner and Chief of Staff consulted with the Mille Lacs Tribal Chairman and Council on August 5, 2016 regarding a variety of issues, including the proposed project.

Cultural and Natural Resources Meeting

The State of Minnesota's EIS for the proposed project does not replace any federal consultation or environmental review efforts on this project. For example, Section 106, 401 and 402 reviews required by the Army Corps of Engineers are separate from the State of Minnesota's environmental review process.

Like the federal government, however, the State of Minnesota is responsible for considering the cultural and natural resource issues that are important to the Mille Lacs Band. Therefore, at the proposed meeting we would like to discuss the following:

1. The types of effects the pipeline route and proposed alternatives could have on tribal resources.
2. The areas where the location of the pipeline could affect these resources.
3. The type and distribution of resources used by the Mille Lacs Band for hunting, gathering, economic, and cultural purposes.
4. How information that could benefit the EIS process is best obtained.

The resources the Department is currently considering include known cultural and historical resources in the area and tribal traditional and historical use areas for hunting, fishing, and gathering, which may also be properties of religious and cultural significance and sacred places. We seek input to accurately reflect the impact and understand that culturally significant data are sensitive and require careful consideration and protection. What the Department learns from the requested meetings would help us to achieve that.

Please extend this invitation to other members in your office or other band members to attend the meeting, please let us know. We would also like to extend the invitation to your Natural Resources Department (copied here).

A preliminary agenda for the meeting will follow. We would greatly appreciate suggestions for agenda items we may have missed from the consultation meeting. If possible, please provide suggested items no later than February 10, 2017.

Community Open Forum

As mentioned above, we would also request an opportunity to hold a community forum. The purpose of the forum is to help us better understand environmental justice issues in the project area, and are seeking meaningful input from members of environmental justice communities. EERA staff would attend the forum and be available to answer general questions about the proposed project, the process for preparing the EIS, and the state regulatory processes.

We would like to meet in person at your tribal headquarters office or alternate location at your suggestion. We are blocking time for the meeting during the week of February 20, 2017. If this time works for you please let us know what day (February 20 – March 3) works best for you. If possible, we would like to schedule the open forum on the same day as our meeting with you and other board members.

Please confirm your interest in, and availability for, an in-person meeting. I will follow up in a week or so to discuss your availability. My e-mail address and telephone are listed below. We look forward to meeting and consulting with the Mille Lacs Band of Ojibwe.

Sincerely,

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101
Telephone: 651-539-1775
Email: Jamie.MacAlister@state.mn.us

cc: Susan Klapel, Executive Director of Natural Resources
Perry Bunting, Director of Environmental Programs
Ryan Rupp, Environmental Programs Manager

Line 3 Replacement Project

Figure 1a: System Alternative Selected for Analysis in the EIS

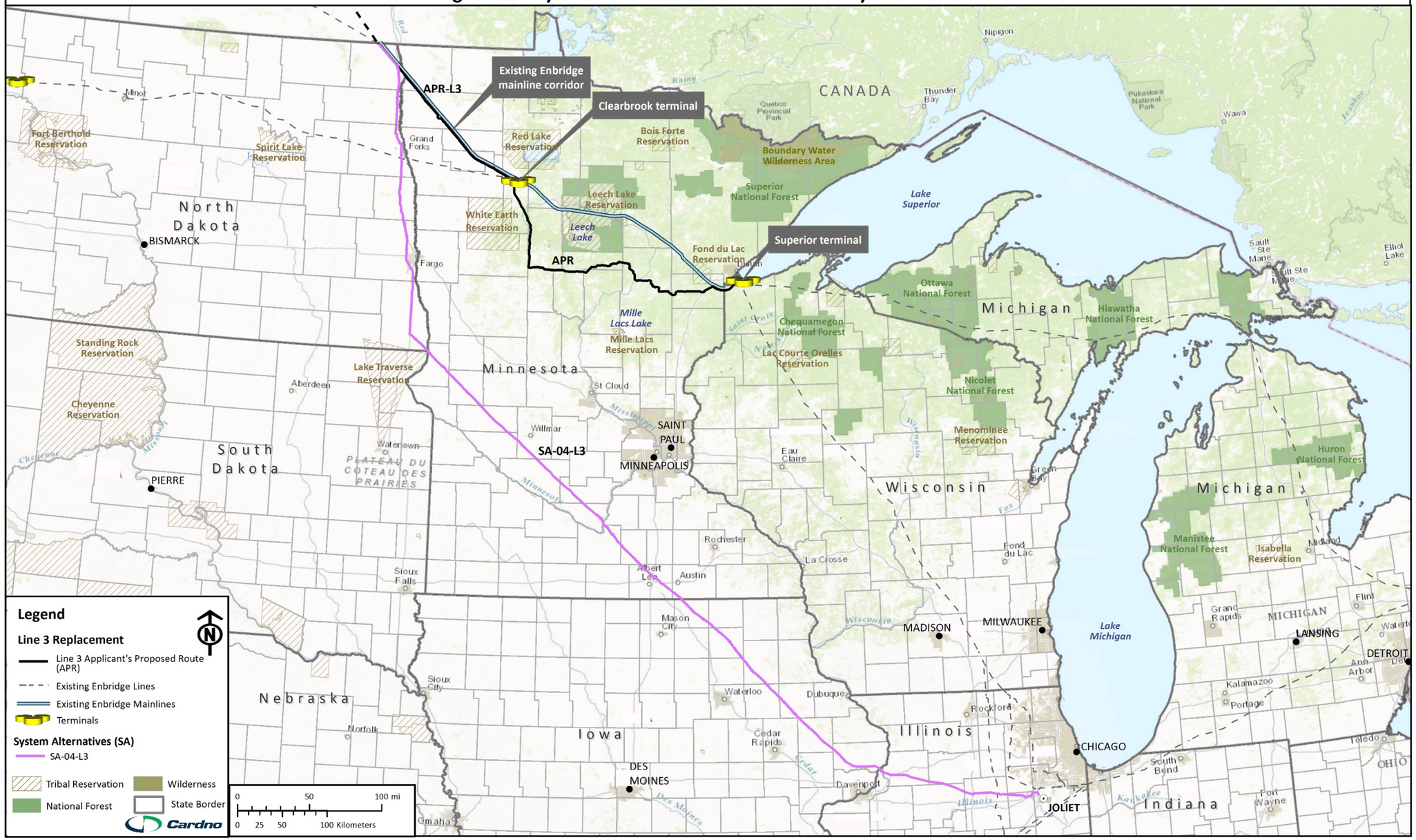

Line 3 Replacement Project

Figure 1b: Alternatives Selected for Analysis in the EIS

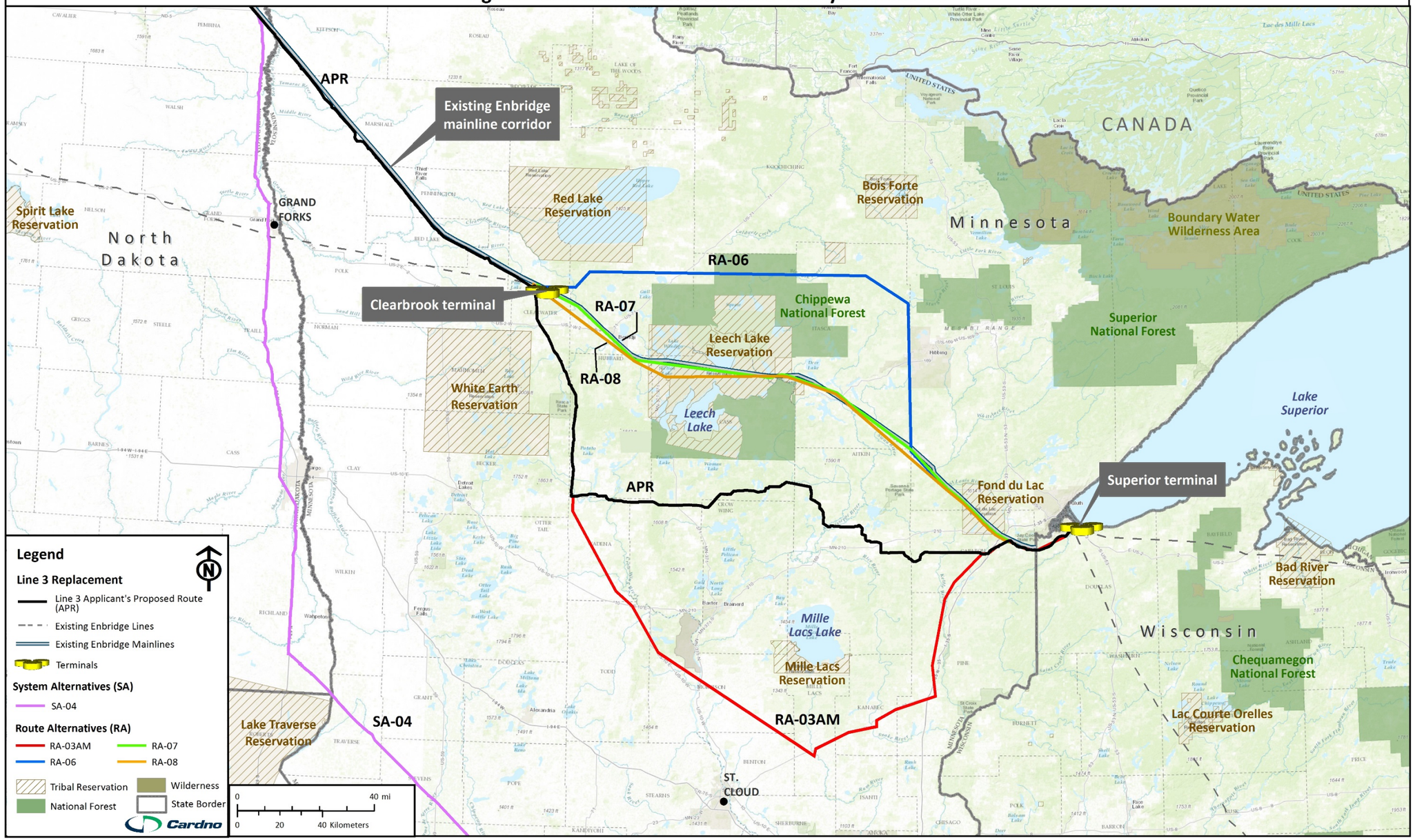

Line 3 Replacement Project
Figure 2: Route Alternatives and Route Segment Alternatives

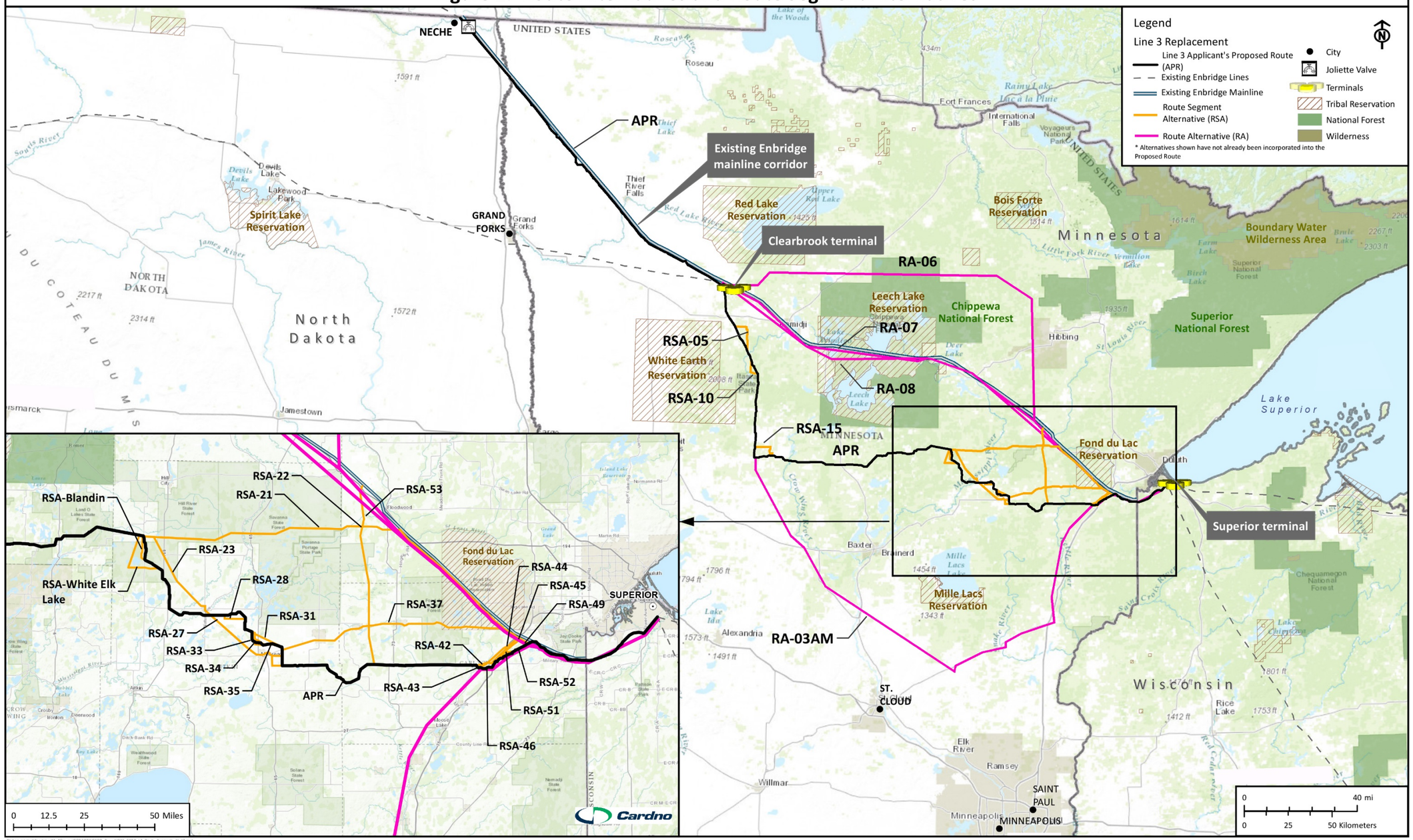

Kade Ferris
Tribal Historic Preservation Officer
Red Lake Band of Chippewa
P.O. Box 274
24200 Council Street
Red Lake, Minnesota 56671

February 9, 2017

RE: Meeting request regarding the Line 3 Replacement EIS

Dear Mr. Ferris:

The Minnesota Department of Commerce greatly appreciates the ongoing working relationship with the Red Lake Nation. On September 1, 2016 Commerce's Commissioner and Chief of Staff consulted with the Red Lake Tribal Chairman and Council regarding a variety of issues. However, those discussions were not focused on issues related to the proposed Enbridge pipeline project.

I write today with two requests. First, we would like to meet with you and other board members to discuss how the proposed Enbridge pipeline could affect the natural and cultural resources that are important to the Red Lake Band.

Second, we would like to hold a separate open forum to discuss the project with the members of the Red Lake tribal community. The intent of this forum would be to inform tribal members about the project and for the Department to gain additional insight into tribal members' concerns on Line 3.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. However, route alternatives (RAs) proposed by other entities as alternatives to the Enbridge route would be in the vicinity of the Red Lake Reservation. For your convenience, I have attached a map of the proposed routes.

The process for pipeline approval is that the Minnesota Public Utilities Commission (PUC) is responsible for deciding whether to issue a certificate of need and determining what route to permit for the proposed project. In this case, the PUC has ordered an environmental impact statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy,

Environmental Review Unit (EERA) to conduct the EIS. Additional information on the EIS process and the project can be found on the project web page (http://www.mn.gov//commerce/energyfacilities/line3/).

Cultural and Natural Resources Meeting

The State of Minnesota's EIS for the proposed project does not replace any federal consultation or environmental review efforts on this project. For example, Section 106, 401 and 402 reviews required by the Army Corps of Engineers are separate from the State of Minnesota's environmental review process.

Like the federal government, however, the State of Minnesota is responsible for considering the cultural and natural resource issues that are important to the Red Lake Band. Therefore, at the proposed meeting we would like to discuss the following:

1. The types of effects the pipeline route and proposed alternatives could have on tribal resources.
2. The areas where the location of the pipeline could affect these resources.
3. The type and distribution of resources used by the Red Lake Band for hunting, gathering, economic, and cultural purposes.
4. How information that could benefit the EIS process is best obtained.

The resources the Department is currently considering include known cultural and historical resources in the area and tribal traditional and historical use areas for hunting, fishing, and gathering, which may also be properties of religious and cultural significance and sacred places. We seek input to accurately reflect the impact and understand that culturally significant data are sensitive and require careful consideration and protection. What the Department learns from the requested meetings would help us to achieve that.

Please extend this invitation to other members in your office or other band members to attend the meeting, please let us know. We would also like to extend the invitation to your Natural Resources Department.

A preliminary agenda for the meeting will follow. We would greatly appreciate suggestions for agenda items we may have missed from the consultation meeting. If possible, please provide suggested items no later than February 15, 2017.

Community Open Forum

As mentioned above, we would also request an opportunity to hold a community forum. The purpose of the forum is to help us better understand environmental justice issues in the project area, and are seeking meaningful input from members of environmental justice communities.

EERA staff would attend the forum and be available to answer general questions about the proposed project, the process for preparing the EIS, and the state regulatory processes.

We would like to meet in person at your tribal headquarters office or alternate location at your suggestion. We are blocking time for the meeting during the week of February 20, 2017. If this time works for you please let us know what day (February 20 – March 3) is best for you. If possible, we would like to schedule the open forum on the same day as our meeting with you and other board members.

Please confirm your interest in, and availability for, an in-person meeting. I will follow up in a week or so to discuss your availability. My e-mail address and telephone are listed below. We look forward to meeting and consulting with the Red Lake Band.

Sincerely,

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101
Telephone: 651-539-1775
Email: Jamie.MacAlister@state.mn.us

Cc: Al Pemberton, Director of Natural Resources

Line 3 Replacement Project

Figure 1a: System Alternative Selected for Analysis in the EIS

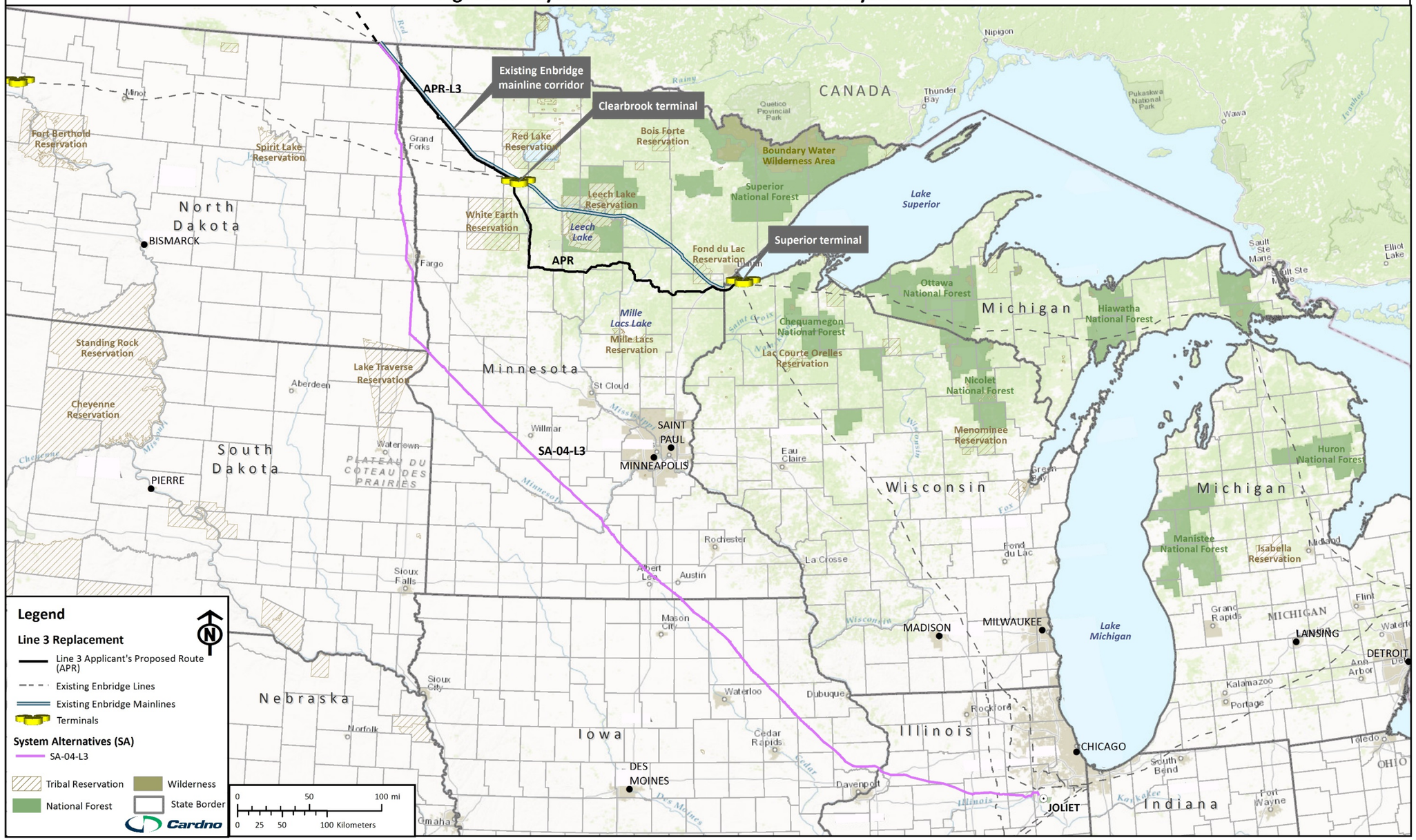

Line 3 Replacement Project

Figure 1b: Alternatives Selected for Analysis in the EIS

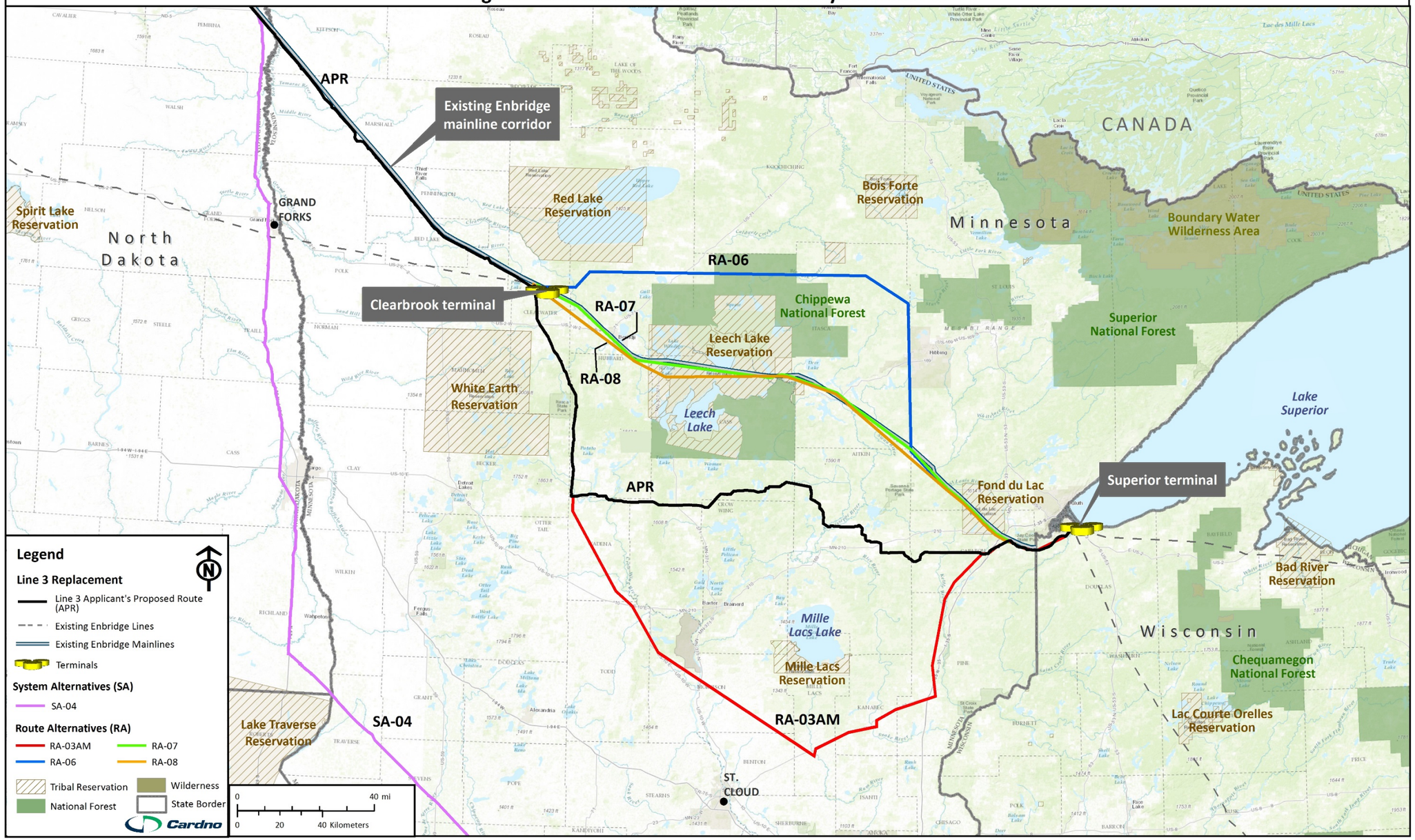

Line 3 Replacement Project
Figure 2: Route Alternatives and Route Segment Alternatives

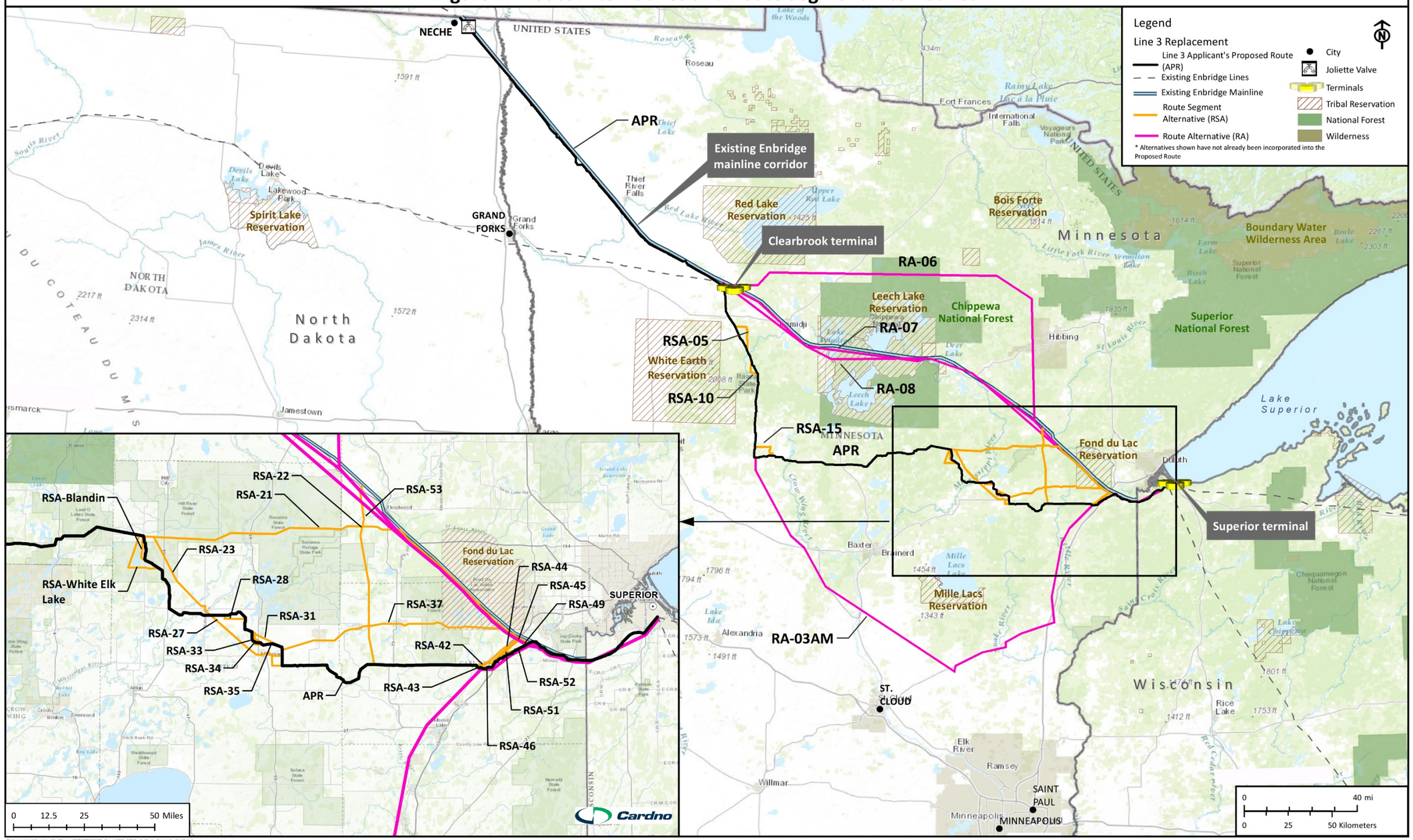

Cayla Olson
Tribal Historic Preservation Officer and NAGPRA Representative
Archives
White Earth Band of Minnesota Chippewa
PO Box 418
White Earth, MN 56591

February 1, 2017

RE: Meeting request regarding the Line 3 Replacement EIS

Dear Ms. Olson:

The Minnesota Department of Commerce greatly appreciates the ongoing working relationship and input from the White Earth technical staff on pipeline issues. I write today with two requests. First, we would like to meet with you and other board members to continue the discussion as to how the proposed pipeline could affect the natural and cultural resources that are important to the White Earth Band.

Second, we would like to hold a separate open forum to discuss the project with the members of the White Earth tribal community. The intent of this forum would inform tribal members about the project and for the Department to gain additional insight into tribal members' concerns on Line 3.

As you are aware, Enbridge Energy is proposing to replace their existing Line 3 pipeline, a section of which crosses the White Earth Indian Reservation. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route that does not cross the reservation. However, route alternatives (RAs) proposed by other entities as alternatives or Enbridge's preferred route are in the vicinity of the White Earth Reservation. For your convenience, I have attached a map of the proposed routes.

The process for pipeline approval is that the Minnesota Public Utilities Commission (PUC) is responsible for deciding whether to issue a certificate of need and determining what route to permit for the proposed project. In this case, the PUC has ordered an environmental impact statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS. Additional information on the EIS process

and the project can be found on the project web page (http://www.mn.gov//commerce/energyfacilities/line3/).

Over the last year, the department has worked with the environmental staff in the White Earth Resources Department to gather information for the EIS. These discussions focused on construction impacts, land use and hydrology, as well as the potential effects on nearby natural resources, including wild rice and water resources. The White Earth Band also provided comments during the EIS scoping comment period. Finally, Commerce's Commissioner and Chief of Staff consulted with the White Earth Tribal Chairman and Council on September 2, 2016 regarding a variety of issues, including the proposed project.

Cultural and Natural Resources Meeting

The State of Minnesota's EIS for the proposed project does not replace any federal consultation or environmental review efforts on this project. For example, Section 106, 401 and 402 reviews required by the Army Corps of Engineers are separate from the State of Minnesota's environmental review process.

Like the federal government, however, the State of Minnesota is responsible for considering the cultural and natural resource issues that are important to the White Earth Band. Therefore, at the proposed meeting we would like to discuss the following:

1. The types of effects the pipeline route and proposed alternatives could have on tribal resources.
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The resources the Department is currently considering include known cultural and historical resources in the area and tribal traditional and historical use areas for hunting, fishing, and gathering, which may also be properties of religious and cultural significance and sacred places. We seek input to accurately reflect the impact and understand that culturally significant data are sensitive and require careful consideration and protection. What the Department learns from the requested meetings would help us to achieve that.

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Please confirm your interest in, and availability for, an in-person meeting. I will follow up in a week or so to discuss your availability. My e-mail address and telephone are listed below. We look forward to meeting and consulting with the White Earth.

Sincerely,

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101
Telephone: 651-539-1775
Email: Jamie.MacAlister@state.mn.us

cc: Monica Hedstrom, Director of Natural Resources
Will Bement, White Earth Water Division Manager

Line 3 Replacement Project

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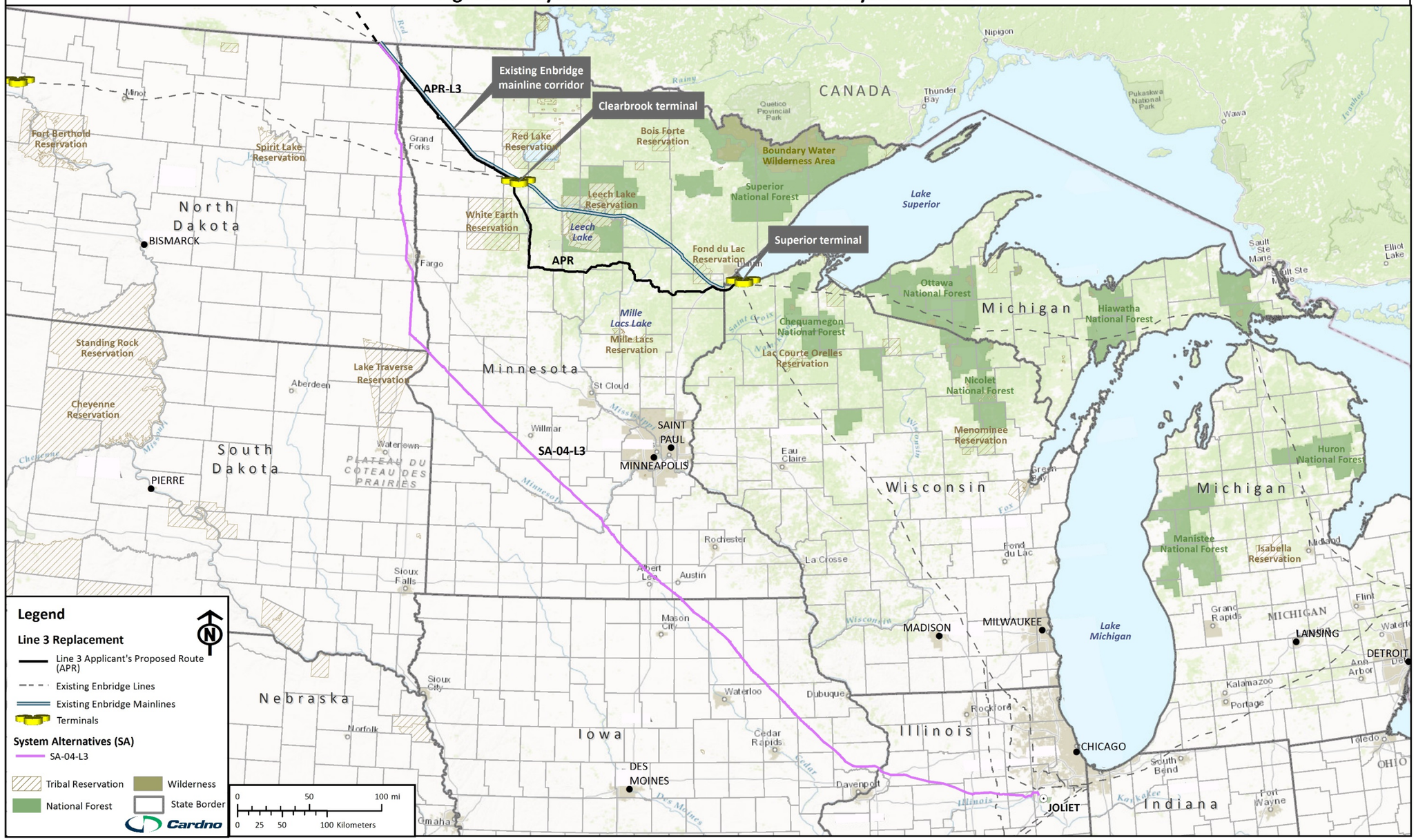

Line 3 Replacement Project

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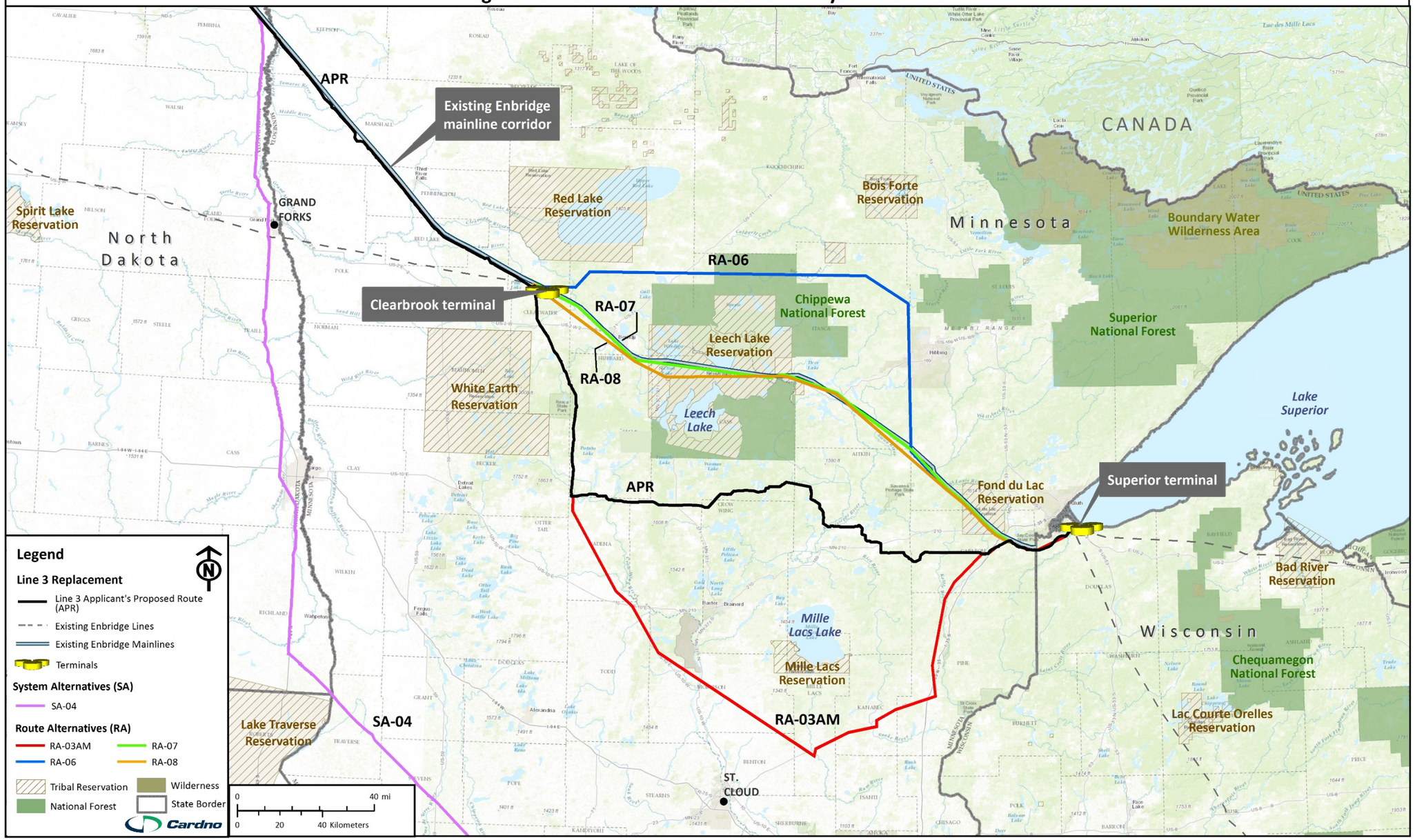

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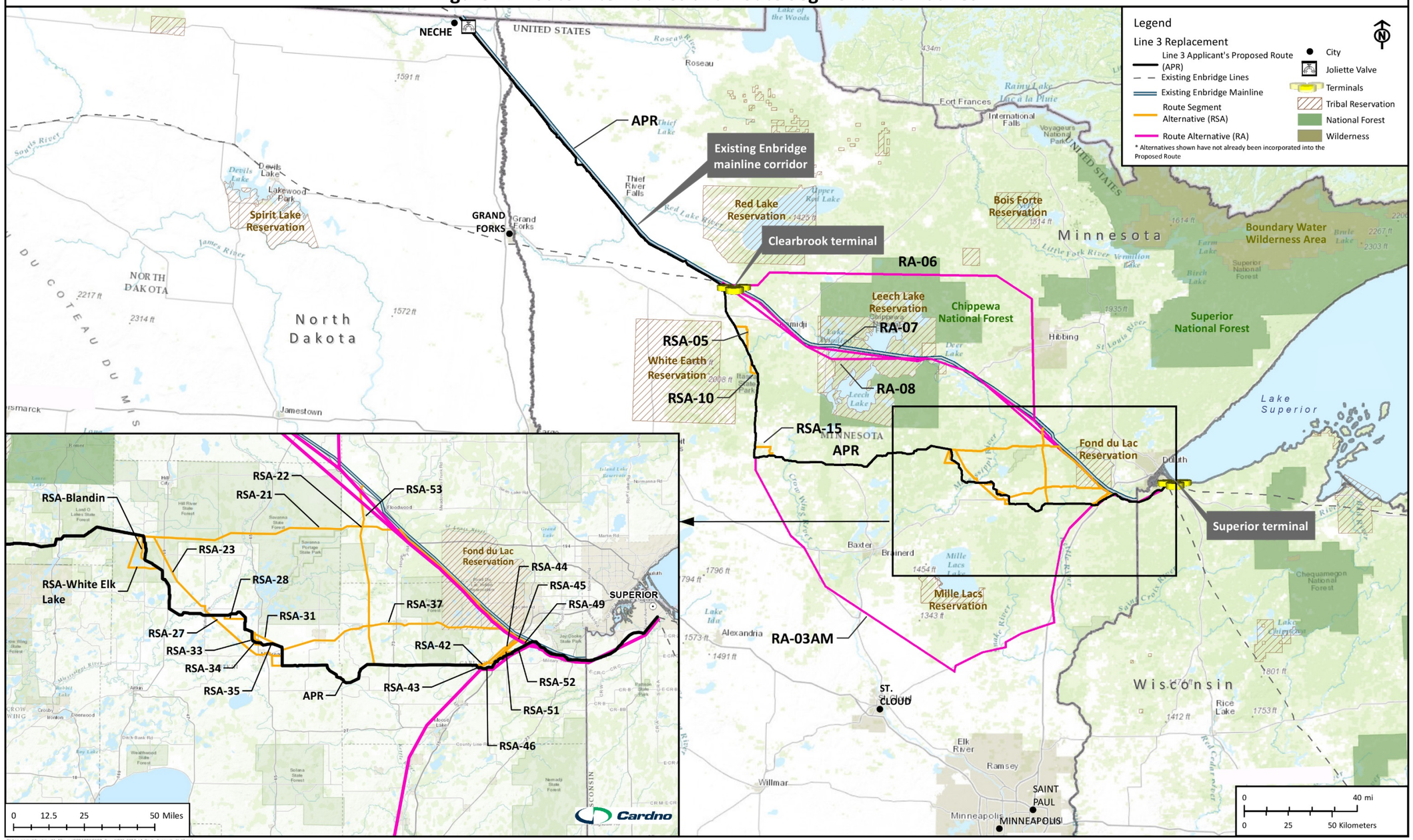

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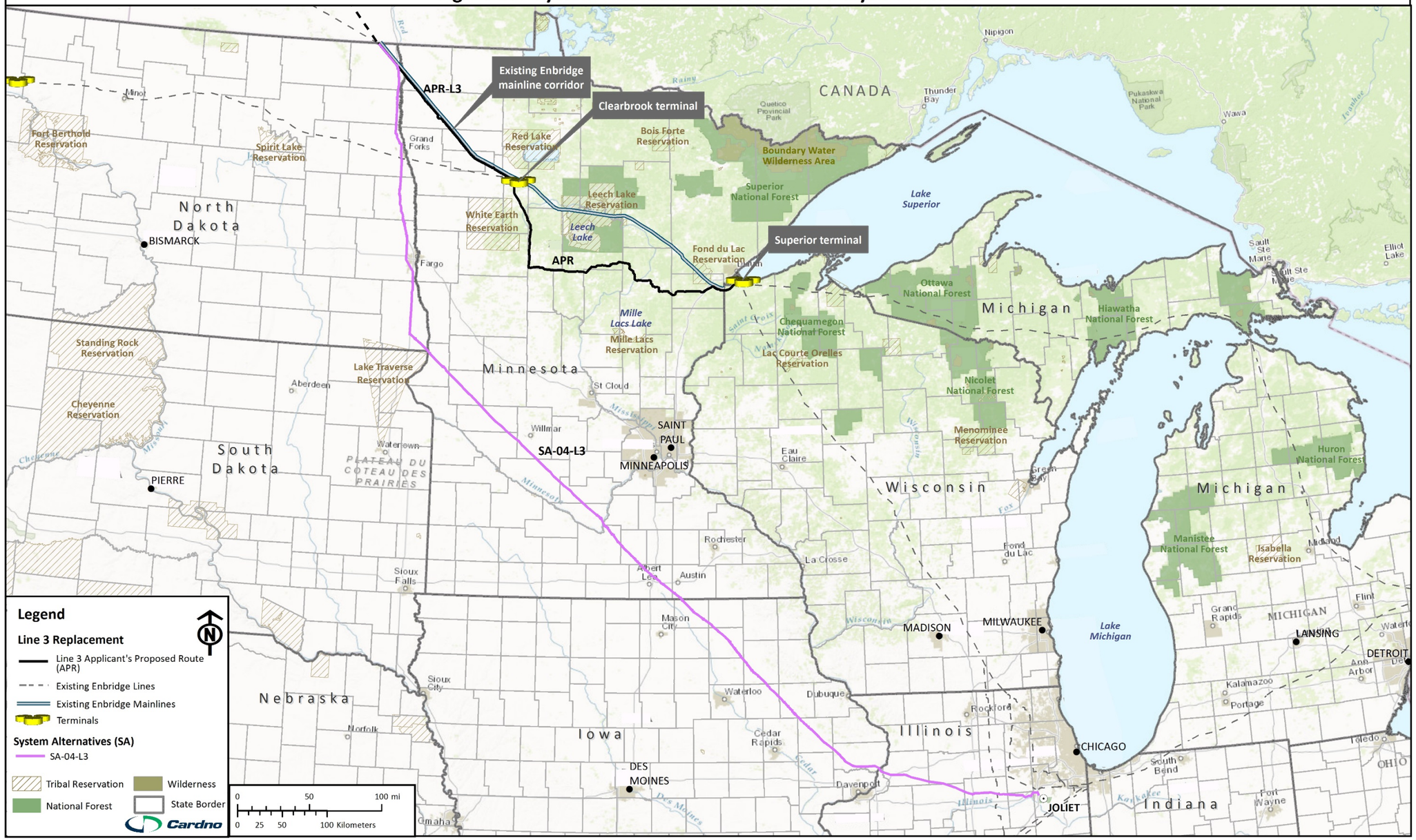

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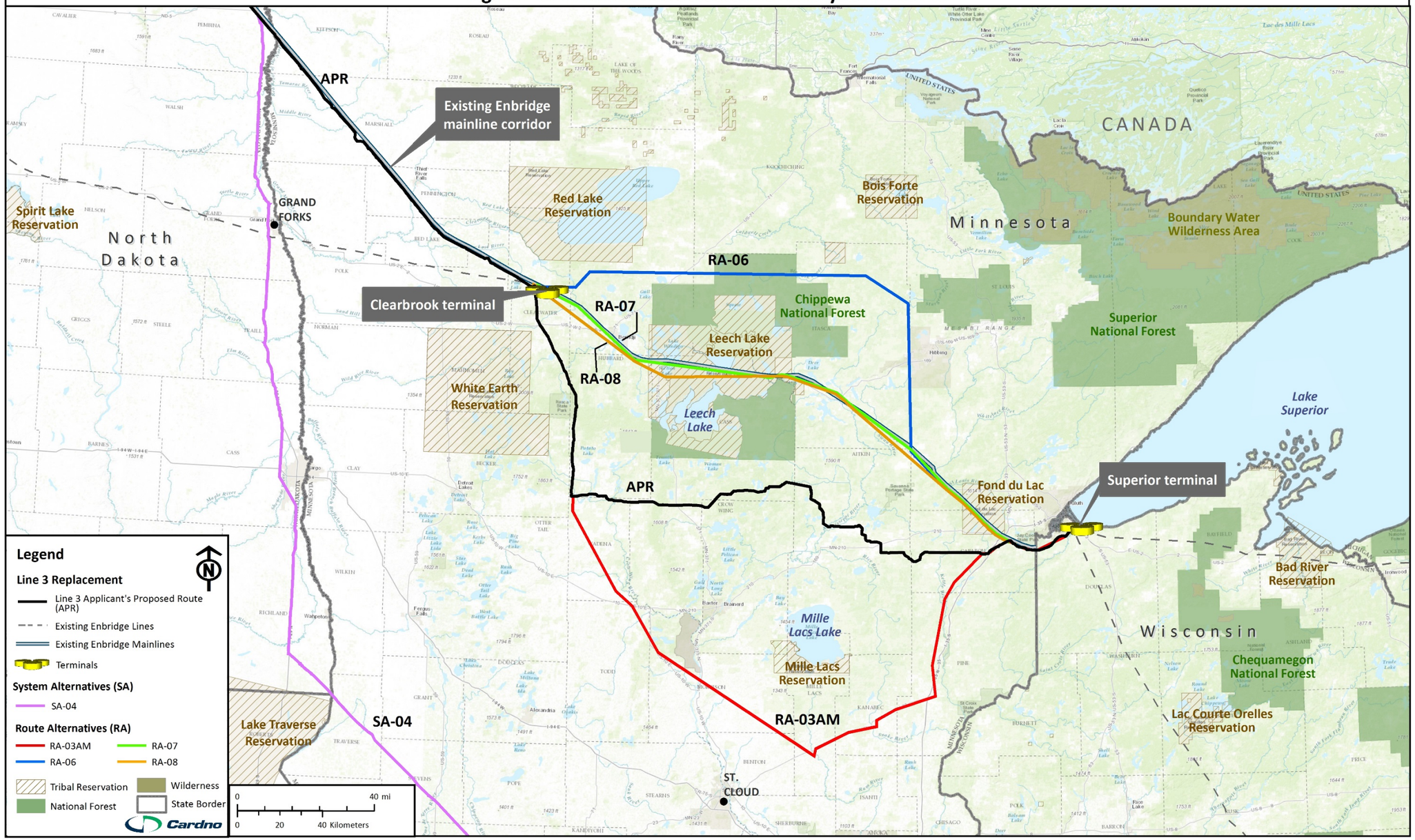

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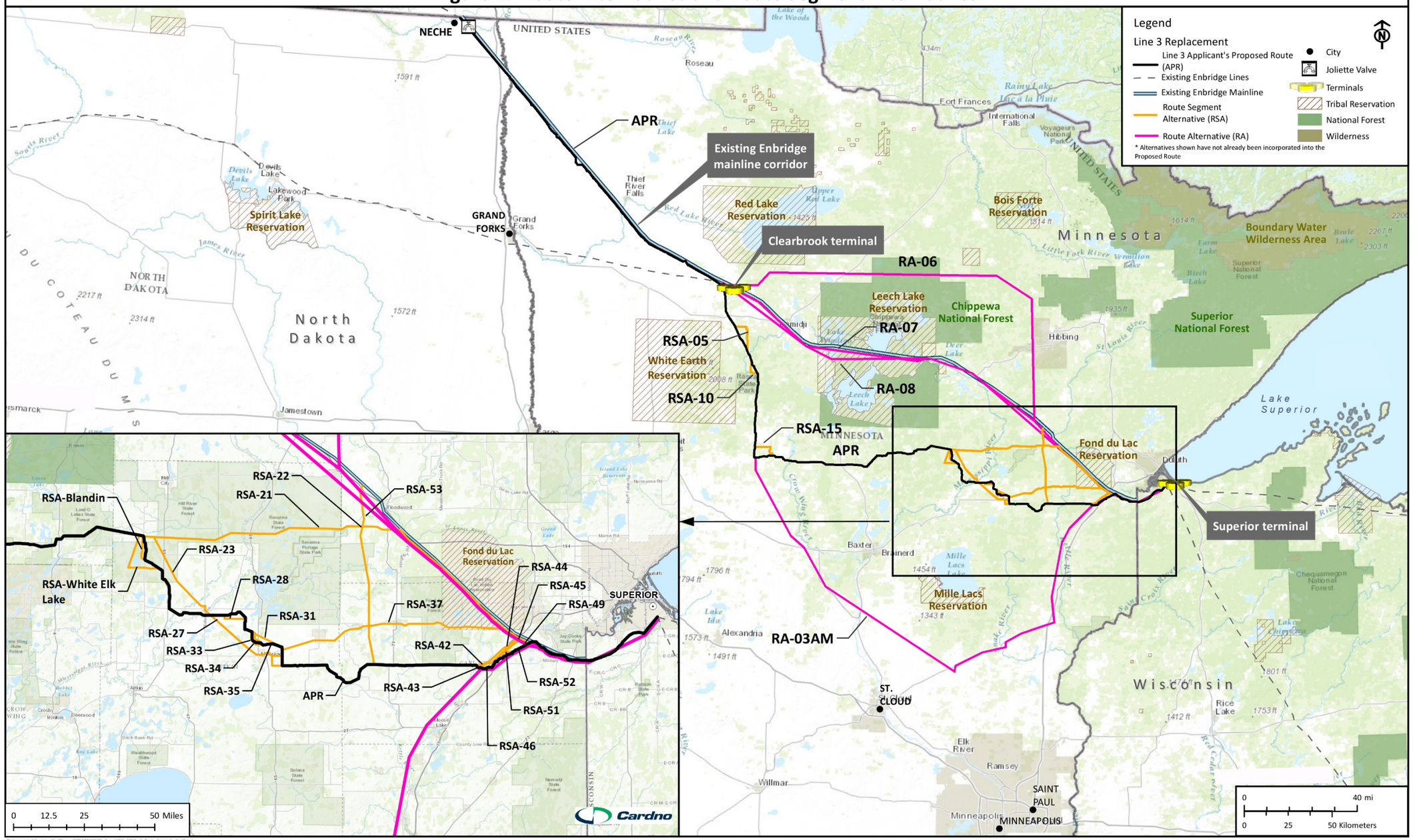

MINNESOTA DEPARTMENT OF
COMMERCE

85 7TH PLACE EAST, SUITE 500
SAINT PAUL, MN 55101-2198
MN.GOV/COMMERCE/
651.539.1500 FAX 651.539.1547
AN EQUAL OPPORTUNITY EMPLOYER

April 11, 2017

Tribal Chair Cathy Chavers
Bois Forte Band of Chippewa
5344 Lakeshore Drive
Nett Lake, MN 55772

RE: Consultation Request Regarding the Line 3 Replacement EIS

Dear Chair Chavers:

The Minnesota Department of Commerce began formal consultation in 2016 with the eleven tribal nations in Minnesota regarding the Department's Interim Tribal Consultation Policy. Although, I have not yet met with you in formal consultation on Commerce's Tribal Consultation Policy, which addresses all areas of the Department, I am reaching out to you on an important issue.

First, however, I am pleased to announce that Commerce has appointed Danielle Oxendine Molliver as Tribal Liaison to represent Commerce consistent with the Department's Interim Tribal Consultation Policy, which is enclosed for your review. With respect to identified matters that may affect tribal interests or rights, I believe it is essential to maintain ongoing working relationships between the Department and Bois Forte Band of Chippewa, whenever possible.

In addition to meeting on the Interim Tribal Consultation Policy, the Department has been in consultation and collaboration with the five sovereign tribal nations directly affected by Enbridge Energy's proposed replacement of Line 3. Although, the proposed pipeline route and alternatives are not in proximity to the Bois Forte Band of Chippewa Community, I write today to provide an update and offer to meet to discuss the process.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by other entities as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

The process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is responsible for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an

Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS.

Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, we find it vital to consult with your leadership about Commerce's role in gathering the information and creating an EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

If you deem consultation on Enbridge's proposed Line 3 replacement a priority to the Bois Forte Band of Chippewa, the Department would be happy to meet with leadership in consultation. The format of a meeting could include: a PowerPoint Overview of the proposed pipeline; Commerce's role in preparing the EIS; and the processes and proposed timeline. Most importantly, we would ask for your guidance on how to represent the interests and the impact the Proposed Project would have on your member's historical, cultural, land, and natural resources. This would include if and how leadership would like Commerce to coordinate with the Bois Forte Band of Chippewa Community, on the preparation of the draft EIS.

If there is information that would be helpful, please contact Danielle. Additionally, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

As always, I look forward to our continued partnership and collaboration.

Sincerely,

Mike Rothman

Mike Rothman
Commerce Commissioner

Enclosures: Tribal Consultation Policy
Map of Line 3 Proposed Route and Alternatives

MINNESOTA DEPARTMENT OF
COMMERCE

85 7TH PLACE EAST, SUITE 280
SAINT PAUL, MINNESOTA 55101-2198
MN.GOV/COMMERCE
651.539.1500 FAX: 651.539.1547
AN EQUAL OPPORTUNITY EMPLOYER

March 23, 2017

Chairman Kevin DuPuis
Fond du Lac Band of Lake Superior Chippewa
1720 Big Lake Road
Cloquet, MN 55720

RE: Consultation Process and Request Regarding the Line 3 Replacement EIS

Dear Chairman DuPuis:

I greatly appreciated the opportunity to meet in formal government-to-government consultation on the Minnesota Department of Commerce's Tribal Consultation Policy last month. Our meeting was an important step in strengthening our relationship with the Fond du Lac Band of Lake Superior Chippewa and providing information and help on the scope of Commerce's services and programs, from consumer protection to energy.

First, I am pleased to announce that Commerce has appointed Danielle Oxendine Molliver as tribal liaison to represent the Department consistent with the Department's Interim Tribal Consultation Policy. With respect to important topics, I believe it is essential to maintain the ongoing working relationship between the Department's and Fond du Lac's staff, whenever possible.

I would also like to follow up on one key topic in our consultation process, Enbridge pipeline's proposed replacement of Line 3. As you know, Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline, leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by others as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

Again, the process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is the responsible governmental unit for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Division of Energy, Environmental Review Unit (EERA) to conduct the EIS in collaboration with the Department of Natural Resources, and the Minnesota Pollution Control Agency.

Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, Commerce finds it vital to consult with your leadership about the Department's role in gathering the information for the draft EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

The Department requests a meeting with leadership to provide the following information: a PowerPoint Overview of the proposed pipeline; Commerce's role in preparing the EIS; and the processes and proposed timeline. Most importantly, we ask for your guidance on how to represent the interests and the impact that the Proposed Project would have on your members' historical, cultural, land, and natural resources. This would include if and how leadership would like Commerce to coordinate with Fond du Lac staff to facilitate communications on the preparation of the draft EIS.

Finally, we would ask leadership to identify the appropriate staff with whom our staff should coordinate on information gathering and scheduling forums for the draft EIS, and on subsequent public meetings for the public comment period of the draft EIS.

On behalf of the Department, we appreciate and thank your Administrative staff for suggesting and arranging an open house on March 29, 2017, and hope that we can find additional time to meet with leadership in the near future. We also thank your staff for providing great insight into tribal interests and concerns.

If there is information that would be helpful to consider prior to the meeting, please contact Danielle. Additionally, as I mentioned in our previous meeting, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

As always, I look forward to our continued partnership and collaboration.

Sincerely,

Mike Rothman
Commerce Commissioner

MINNESOTA DEPARTMENT OF
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April 11, 2017

Chairman Norman W. Deschampe
Grand Portage Reservation Tribal Council
83 Stevens Road
Grand Portage, MN 55602

RE: Consultation Request Regarding the Line 3 Replacement EIS

Dear Chairman Deschampe:

The Minnesota Department of Commerce began formal consultation in 2016 with the eleven tribal nations in Minnesota regarding the Department's Interim Tribal Consultation Policy. Although, I have not yet met with you in formal consultation on Commerce's Tribal Consultation Policy, which addresses all areas of the Department, I am reaching out to you on an important issue.

First, however, I am pleased to announce that Commerce has appointed Danielle Oxendine Molliver as Tribal Liaison to represent Commerce consistent with the Department's Interim Tribal Consultation Policy, which is enclosed for your review. With respect to identified matters that may affect tribal interests or rights, I believe it is essential to maintain ongoing working relationships between the Department and Grand Portage Reservation Tribal Council, whenever possible.

In addition to meeting on the Interim Tribal Consultation Policy, the Department has been in consultation and collaboration with the five sovereign tribal nations directly affected by Enbridge Energy's proposed replacement of Line 3. Although, the proposed pipeline route and alternatives are not in proximity to the Grand Portage Reservation Tribal Council, I write today to provide an update and offer to meet to discuss the process.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by other entities as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

The process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is responsible for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an

Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS.

Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, we find it vital to consult with your leadership about Commerce's role in gathering the information and creating an EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

If you deem consultation on Enbridge's proposed Line 3 replacement a priority to the Grand Portage Reservation Tribal Council, the Department would be happy to meet with leadership in consultation. The format of a meeting could include: a PowerPoint Overview of the proposed pipeline; Commerce's role in preparing the EIS; and the processes and proposed timeline. Most importantly, we would ask for your guidance on how to represent the interests and the impact the Proposed Project would have on your member's historical, cultural, land, and natural resources. This would include if and how leadership would like Commerce to coordinate with the Grand Portage Reservation Tribal Council on the preparation of the draft EIS.

If there is information that would be helpful, please contact Danielle. Additionally, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

As always, I look forward to our continued partnership and collaboration.

Sincerely,

Mike Rothman

Mike Rothman
Commerce Commissioner

Enclosures: Tribal Consultation Policy
Map of Line 3 Proposed Route and Alternatives

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April 11, 2017

President Wilfrid Cleveland
Ho Chunk Nation
P.O. Box 667
Black River Falls, WI 54615

RE: Consultation Request Regarding the Line 3 Replacement EIS

Dear President Cleveland,

The Minnesota Department of Commerce began formal consultation and collaboration in 2016 with the five sovereign tribal nations in Minnesota directly affected by Enbridge Energy's proposed replacement of Line 3. Through recent consultation with the Minnesota Indian Affairs Council, we have identified that the Ho Chunk Nation has land holdings in proximity to the proposed pipeline. I write today to provide an update and offer to meet to discuss the process.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by other entities as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

The process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is responsible for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS. Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, we find it vital to consult with your leadership about Commerce's role in gathering the information and creating an EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

If you deem consultation on Enbridge's proposed Line 3 replacement a priority to the Ho Chunk Nation, the Department would be happy to meet with leadership in consultation. The format of a meeting could include: a PowerPoint Overview of the proposed pipeline; Commerce's role in preparing the EIS; and the processes and proposed timeline. Most importantly, we would ask for your guidance on how to represent the interests and the

impact the Proposed Project would have on your member's historical, cultural, land, and natural resources. This would include if and how leadership would like Commerce to coordinate with the Ho Chunk Nation on the preparation of the draft EIS.

If there is information that would be helpful, please contact Commerce's tribal liaison, Danielle Molliver at (651) 539-1480 or danielle.ox.molliver@state.mn.us. Additionally, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

Sincerely,

Mike Rothman

Mike Rothman
Commerce Commissioner

Enclosures: Map of Line 3 Proposed route and alternatives

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March 23, 2017

Chairman Faron Jackson, Sr.
Leech Lake Band of Ojibwe
190 Sailstar Drive NW
Cass Lake, MN 56633

RE: Consultation Process and Request Regarding the Line 3 Replacement EIS

Dear Chairman Jackson:

I greatly appreciated the opportunity to meet in formal government-to-government consultation on the Minnesota Department of Commerce's Tribal Consultation Policy last month. Our meeting was an important step in strengthening our relationship with Leech Lake Band of Ojibwe and providing information and help on the scope of Commerce's services and programs, from consumer protection to energy.

First, I am pleased to announce that Commerce has appointed Danielle Oxendine Molliver as tribal liaison to represent the Department consistent with the Department's Interim Tribal Consultation Policy. With respect to important topics, I believe it is essential to maintain the ongoing working relationship between the Department's and Leech Lake's staff, whenever possible.

I would also like to follow up on one key topic in our consultation process, Enbridge pipeline's proposed replacement of Line 3. As you know, Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline, leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by others as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

Again, the process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is the responsible governmental unit for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Division of Energy, Environmental Review Unit (EERA) to conduct the EIS in collaboration with the Department of Natural Resources, and the Minnesota Pollution Control Agency.

Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, Commerce finds it vital to consult with your leadership about the Department's role in gathering the information for the draft EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

The Department requests a meeting with leadership to provide the following information: a PowerPoint Overview of the proposed pipeline; Commerce's role in preparing the EIS; and the processes and proposed timeline. Most importantly, we ask for your guidance on how to represent the interests and the impact that the Proposed Project would have on your members' historical, cultural, land, and natural resources. This would include if and how leadership would like Commerce to coordinate with Leech Lake staff to facilitate communications on the preparation of the draft EIS.

Finally, we would ask leadership to identify the appropriate staff with whom our staff should coordinate on information gathering and scheduling forums for the draft EIS, and subsequent public meetings for the public comment period of the draft EIS.

The Department appreciates and thanks your Administrative staff for suggesting a meeting sometime between April 3 – 7, 2017 and look forward to confirming the date. We also thank your staff for providing great insight into tribal interests and concerns.

If there is information that would be helpful to consider prior to the meeting, please contact Danielle. Additionally, as I mentioned in our previous meeting, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

As always, I look forward to our continued partnership and collaboration.

Sincerely,

Mike Rothman

Mike Rothman
Commerce Commissioner

April 11, 2017

President Phyllis Rawls Goff
Lower Sioux Agency
32469 Redwood County Hwy. 2
Morton, MN 56270

RE: Consultation Request Regarding the Line 3 Replacement EIS

Dear President Goff:

The Minnesota Department of Commerce began formal consultation in 2016 with the eleven tribal nations in Minnesota regarding the Department's Interim Tribal Consultation Policy. Although, I have not yet met with you in formal consultation on Commerce's Tribal Consultation Policy, which addresses all areas of the Department, I felt the need to reach out to you on an important issue.

First, I am pleased to announce that Commerce has appointed Danielle Oxendine Molliver as Tribal Liaison to represent Commerce consistent with the Department's Interim Tribal Consultation Policy, which is enclosed for your review. With respect to identified matters that may affect tribal interests or rights, I believe it is essential to maintain ongoing working relationships between the Department and the Lower Sioux Agency whenever possible.

In addition to meeting on the policy, the Department has been in consultation and collaboration with the five sovereign tribal nations directly affected by Enbridge Energy's proposed replacement of Line 3. Although, the proposed pipeline route and alternatives are not in proximity to the Lower Sioux Agency, I write today to provide an update and offer to meet to discuss the process.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by other entities as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

The process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is responsible for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS. Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, we find it vital to consult with your leadership about Commerce's role in gathering the information and creating an EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

If you deem consultation on Enbridge's proposed Line 3 replacement a priority to the Lower Sioux Agency, the Department would be happy to meet with leadership in consultation. The format of a meeting could include: a PowerPoint Overview of the proposed pipeline; Commerce's role in preparing the EIS; and the processes and proposed timeline. Most importantly, we would ask for your guidance on how to represent the interests and the impact the Proposed Project would have on your member's historical, cultural, land, and natural resources. This would include if and how leadership would like Commerce to coordinate with Lower Sioux Agency on the preparation of the draft EIS.

If there is information that would be helpful, please contact Danielle. Additionally, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

As always, I look forward to our continued partnership and collaboration.

Sincerely,

Mike Rothman
Commerce Commissioner

Enclosures: Tribal Consultation Policy
Map of Line 3 Proposed Route and Alternatives

MINNESOTA DEPARTMENT OF
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April 11, 2017

President Robert L. Larsen
Lower Sioux Indian Community
Chairman of MN Indian Affairs Council

RE: Consultation Request Regarding the Line 3 Replacement EIS

Dear President Larsen:

The Minnesota Department of Commerce began formal consultation in 2016 with the eleven tribal nations in Minnesota regarding the Department's Interim Tribal Consultation Policy. Although, I have not yet met with you in formal consultation on Commerce's Tribal Consultation Policy, which addresses all areas of the Department, I am reaching out to you on an important issue.

First, however, I am pleased to announce that Commerce has appointed Danielle Oxendine Molliver as Tribal Liaison to represent Commerce consistent with the Department's Interim Tribal Consultation Policy, which is enclosed for your review. With respect to identified matters that may affect tribal interests or rights, I believe it is essential to maintain ongoing working relationships between the Department and the Lower Sioux Agency, whenever possible.

In addition to meeting on the Interim Tribal Consultation Policy, the Department has been in consultation and collaboration with the five sovereign tribal nations directly affected by Enbridge Energy's proposed replacement of Line 3. Although, the proposed pipeline route and alternatives are not in proximity to the Lower Sioux Agency, I write today to provide an update and offer to meet to discuss the process.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by other entities as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

The process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is responsible for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an

Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS.

Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, we find it vital to consult with your leadership about Commerce's role in gathering the information and creating an EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

If you deem consultation on Enbridge's proposed Line 3 replacement a priority to the Lower Sioux Agency, the Department would be happy to meet with leadership in consultation. The format of a meeting could include: a PowerPoint Overview of the proposed pipeline; Commerce's role in preparing the EIS; and the processes and proposed timeline. Most importantly, we would ask for your guidance on how to represent the interests and the impact the Proposed Project would have on your member's historical, cultural, land, and natural resources. This would include if and how leadership would like Commerce to coordinate with the Lower Sioux Agency, on the preparation of the draft EIS.

If there is information that would be helpful, please contact Danielle. Additionally, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

As always, I look forward to our continued partnership and collaboration.

Sincerely,

Mike Rothman

Mike Rothman
Commerce Commissioner

Enclosures: Tribal Consultation Policy
Map of Line 3 Proposed Route and Alternatives

MINNESOTA DEPARTMENT OF
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March 23, 2017

Chief Executive Melanie Benjamin
Mille Lacs Band of Ojibwe
43408 Oodena Dr
Onamia, MN 53659

RE: Consultation Process and Request Regarding the Line 3 Replacement EIS

Dear Chief Executive Benjamin:

I greatly appreciated the opportunity to meet in formal government-to-government consultation on the Minnesota Department of Commerce's Tribal Consultation Policy and Enbridge's former Sandpiper proposal. Both meetings were an important step in strengthening our relationship with the Mille Lacs Band of Ojibwe and the Department and providing information and help on the scope of Commerce's services and programs, from consumer protection to energy.

First, I am pleased to announce that Commerce has appointed Danielle Oxendine Molliver as tribal liaison to represent the Department consistent with the Department's Interim Tribal Consultation Policy. With respect to important topics, I believe it is essential to maintain the ongoing working relationship between the Department's and Mille Lac's staff, whenever possible.

I would also like to follow up on one key topic in our consultation process, Enbridge pipeline's proposed replacement of Line 3. As you know, Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline, leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by others as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

Again, the process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is the responsible governmental unit for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Division of Energy, Environmental Review Unit (EERA) to conduct the EIS in collaboration with the Department of Natural Resources, and the Minnesota Pollution Control Agency.

Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, Commerce finds it vital to consult with your leadership about the Department's role in gathering the information for the draft EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

The Department appreciates and thanks your Administrative staff for arranging the meeting and open house on March 17 and 22. We also thank your staff for providing great insight into tribal interests and concerns.

The Department also requests an additional meeting with leadership, where we could provide the following information: a PowerPoint Overview of the proposed pipeline; Commerce's role in preparing the EIS; and the processes and proposed timeline. Most importantly, however, we ask for your guidance on how to represent the interests and the impact that the Proposed Project would have on your members' historical, cultural, land, and natural resources. This would include if and how leadership would like Commerce to continue coordinating with Mille Lacs staff to facilitate communications on the preparation of the draft EIS.

Finally, we would ask leadership to identify the appropriate staff with whom our staff should coordinate with on information gathering and scheduling forums for the draft EIS and on subsequent public meetings for the public comment period of the draft EIS.

If there is information that would be helpful to consider prior to the meeting, please contact Danielle. Additionally, as I mentioned in our previous meeting, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

As always, I look forward to our continued partnership and collaboration.

Sincerely,

Mike Rothman

Mike Rothman
Commerce Commissioner

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April 11, 2017

President Shelley Buck
Prairie Island Indian Community
5636 Sturgeon Lake Road
Welch, MN 55089

RE: Consultation Request Regarding the Line 3 Replacement EIS

Dear President Buck:

Thank you for meeting with me in formal consultation in 2016 regarding the Department's Interim Tribal Consultation Policy.

First, I am pleased to announce that Commerce has appointed Danielle Oxendine Molliver as Tribal Liaison to represent Commerce consistent with the Department's Interim Tribal Consultation Policy. With respect to identified matters that may affect tribal interests or rights, I believe it is essential to maintain ongoing working relationships between the Department and the Prairie Island Indian Community whenever possible.

In addition to meeting on the policy, the Department has also been in consultation and collaboration with the five sovereign tribal nations directly affected by Enbridge Energy's proposed replacement of Line 3. Although, the proposed pipeline route and alternatives are not in proximity to the Prairie Island Indian Community, I write today to provide an update and offer to meet to discuss the process.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by other entities as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

The process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is responsible for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS. Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, we find it vital to consult with your leadership about Commerce's role in

gathering the information and creating an EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

If you deem consultation on Enbridge's proposed Line 3 replacement a priority to the Prairie Island Indian Community, the Department would be happy to meet with leadership in consultation. The format of a meeting could include: a PowerPoint Overview of the proposed pipeline; Commerce's role in preparing the EIS; and the processes and proposed timeline. Most importantly, we would ask for your guidance on how to represent the interests and the impact the Proposed Project would have on your member's historical, cultural, land, and natural resources. This would include if and how leadership would like Commerce to coordinate with the Prairie Island Indian Community on the preparation of the draft EIS.

If there is information that would be helpful, please contact Danielle. Additionally, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

As always, I look forward to our continued partnership and collaboration.

Sincerely,

Mike Rothman

Mike Rothman
Commerce Commissioner

Enclosure: Map of Line 3 Proposed Route and Alternatives

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April 11, 2017

Chairman Darrell G. Seki, Sr.
Red Lake Nation
15484 Migizi Drive
Red Lake, MN 56671

Dear Chairman Seki,

Thank you for accommodating the Minnesota Department of Commerce during your Council meeting on April 11, 2017. We greatly appreciate the ongoing working relationship and consultation with the Red Lake Nation on all of the matters between the Minnesota Commerce Department and the Red Lake Nation.

We also appreciated the opportunity to listen to yours, the Council's and tribal members' thoughts and position on Enbridge's proposed Line 3 Replacement. Thank you also for providing the Red Lake Nation's guidance on tribal interests to the Department for the tribal resources portion for the draft Environmental Impact Statement (EIS).

Please understand again, as we discussed, the Commerce Department is committed to respect for tribal sovereignty and treaty rights. We are also working diligently to intentionally and accurately reflect the sacred knowledge and understanding that only your tribal members and leaders possess.

Following up to the consultation meeting, we asked for tribal participation. One opportunity is for leadership to identify a Tribal Historical Preservation Officer (THPO), other leader, or an elder to provide a face-to-face interview to discuss how the proposed pipeline could affect the natural and cultural resources that are important to the Red Lake Nation. If you would like us to conduct interviews on cultural resources for inclusion in the draft EIS, we would be happy to schedule a time and provide transcription services. The interview would not only inform our EIS drafting but could also be submitted into the public record for review by the judge and PUC.

The questions below will provide the context for framing tribal use of natural, spiritual, and cultural resources in the draft EIS:

- Describe the interconnectedness of Land, Identity and Spirituality. Can they be separated from one another and if not why?
- What obligations do the Anishinaabe have to Mother Earth and how can they be met today?

- There are many projects that affect tribal interests, such as energy transmission, rights of way, etc. Is there something specific about pipelines that threatens the Anishinaabe way of life and relationship to place?
- What are sacred places? How is this different from sacred sites? What are culturally significant sites or cultural sites?
- What do you see as the biggest difference between the Anishinaabe communal, traditional use of land and the Anglo-Saxon concept of private land ownership and land use?
- How could State agencies more effectively understand or respect the inherent right to self-govern and sovereignty when coordinating special projects that effect tribal interests?
- What cultural resources are most threatened by pipeline projects? Please describe.
- We have heard of the water protectors -- please explain their role within the community.

We also discussed with Council our desire to collaborate and share information, including map shape files, which are attached. Our goal is to ensure the draft EIS accurately reflects tribal concerns and identification of resources. This would include adding the resolution passed by the Council concerning Line 3.

Interviews and additions to the tribal resources map will need to be completed by April 21, 2017 for inclusion in the draft EIS to be completed by May 15, 2017. This information can also be included in the Final EIS, allowing interviews and edits to be completed by July 3, 2017.

Our tribal Liason, Danielle Oxendine Molliver, and environmental review staff, Jamie MacAlister, are always available to you and your staff with any questions, concerns, supplemental information, and to request further consultation or interviews.

Sincerely,

Mike Rothman

Mike Rothman
Commerce Commissioner

Enclosure

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April 11, 2017

Chairman Charles Vig
Shakopee Mdewakanton Sioux Community
2330 Sioux Trail NW
Prior Lake, MN 55372

RE: Consultation Request Regarding the Line 3 Replacement EIS

Dear Chairman Vig:

The Minnesota Department of Commerce began formal consultation in 2016 with the eleven tribal nations in Minnesota regarding the Department's Interim Tribal Consultation Policy. Although, I have not yet met with you in formal consultation on Commerce's Tribal Consultation Policy, which addresses all areas of the Department, I am reaching out to you on an important issue.

First, however, I am pleased to announce that Commerce has appointed Danielle Oxendine Molliver as Tribal Liaison to represent Commerce consistent with the Department's Interim Tribal Consultation Policy, which is enclosed for your review. With respect to identified matters that may affect tribal interests or rights, I believe it is essential to maintain ongoing working relationships between the Department and the Shakopee Mdewakanton Sioux Community, whenever possible.

In addition to meeting on the Interim Tribal Consultation Policy, the Department has been in consultation and collaboration with the five sovereign tribal nations directly affected by Enbridge Energy's proposed replacement of Line 3. Although, the proposed pipeline route and alternatives are not in proximity to the Shakopee Mdewakanton Sioux Community, I write today to provide an update and offer to meet to discuss the process.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by other entities as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

The process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is responsible for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an

Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS.

Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, we find it vital to consult with your leadership about Commerce's role in gathering the information and creating an EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

If you deem consultation on Enbridge's proposed Line 3 replacement a priority to the Shakopee Mdewakanton Sioux Community, the Department would be happy to meet with leadership in consultation. The format of a meeting could include: a PowerPoint Overview of the proposed pipeline; Commerce's role in preparing the EIS; and the processes and proposed timeline. Most importantly, we would ask for your guidance on how to represent the interests and the impact the Proposed Project would have on your member's historical, cultural, land, and natural resources. This would include if and how leadership would like Commerce to coordinate with the Shakopee Mdewakanton Sioux Community, on the preparation of the draft EIS.

If there is information that would be helpful, please contact Danielle. Additionally, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

As always, I look forward to our continued partnership and collaboration.

Sincerely,

Mike Rothman

Mike Rothman
Commerce Commissioner

Enclosures: Tribal Consultation Policy
Map of Line 3 Proposed Route and Alternatives

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April 11, 2017

Chairman Kevin Jensvold
Upper Sioux Community
5722 Travers Lane P.O. Box 147
Granite Falls, MN 56241

RE: Consultation Request Regarding the Line 3 Replacement EIS

Dear Chairman Jensvold:

The Minnesota Department of Commerce began formal consultation in 2016 with the eleven tribal nations in Minnesota regarding the Department's Interim Tribal Consultation Policy. Although, I have not yet met with you in formal consultation on Commerce's Tribal Consultation Policy, which addresses all areas of the Department, I am reaching out to you on an important issue.

First, however, I am pleased to announce that Commerce has appointed Danielle Oxendine Molliver as Tribal Liaison to represent Commerce consistent with the Department's Interim Tribal Consultation Policy, which is enclosed for your review. With respect to identified matters that may affect tribal interests or rights, I believe it is essential to maintain ongoing working relationships between the Department and the Upper Sioux Community, whenever possible.

In addition to meeting on the Interim Tribal Consultation Policy, the Department has been in consultation and collaboration with the five sovereign tribal nations directly affected by Enbridge Energy's proposed replacement of Line 3. Although, the proposed pipeline route and alternatives are not in proximity to the Upper Sioux Community, I write today to provide an update and offer to meet to discuss the process.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by other entities as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

The process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is responsible for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an

Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS.

Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, we find it vital to consult with your leadership about Commerce's role in gathering the information and creating an EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

If you deem consultation on Enbridge's proposed Line 3 replacement a priority to the Upper Sioux Community, the Department would be happy to meet with leadership in consultation. The format of a meeting could include: a PowerPoint Overview of the proposed pipeline; Commerce's role in preparing the EIS; and the processes and proposed timeline. Most importantly, we would ask for your guidance on how to represent the interests and the impact the Proposed Project would have on your member's historical, cultural, land, and natural resources. This would include if and how leadership would like Commerce to coordinate with the Upper Sioux Community, on the preparation of the draft EIS.

If there is information that would be helpful, please contact Danielle. Additionally, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

As always, I look forward to our continued partnership and collaboration.

Sincerely,

Mike Rothman

Mike Rothman
Commerce Commissioner

Enclosures: Tribal Consultation Policy
Map of Line 3 Proposed Route and Alternatives

MINNESOTA DEPARTMENT OF
COMMERCE

85 7TH PLACE EAST, SUITE 280
SAINT PAUL, MINNESOTA 55101-2198
MN.GOV/COMMERCE
651.539.1500 FAX: 651.539.1547
AN EQUAL OPPORTUNITY EMPLOYER

March 23, 2017

Chairman Terrence Tibbetts
White Earth Nation
P.O. Box 418
White Earth, MN 56591

RE: Consultation Process and Request Regarding the Line 3 Replacement EIS

Dear Chairman Tibbetts:

I greatly appreciated the opportunity to meet in formal government-to-government consultation on the Minnesota Department of Commerce's Tribal Consultation Policy last September. Our meeting was an important step in strengthening our relationship with White Earth Nation and providing information and help on Commerce's services and programs, from consumer protection to energy.

First, I am pleased to announce that Commerce has appointed Danielle Oxendine Molliver as tribal liaison to represent the Department consistent with the Department's Interim Tribal Consultation Policy. With respect to important topics, I believe it is essential to maintain the ongoing working relationship between the Department's and White Earth's staff, whenever possible.

I would also like to follow up on one key topic in our consultation process, Enbridge pipeline's proposed replacement of Line 3. As you know, Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline, leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by others as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

Again, the process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is the responsible governmental unit for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Division of Energy, Environmental Review Unit (EERA) to conduct the EIS in collaboration with the Department of Natural Resources, and the Minnesota Pollution Control Agency.

Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, Commerce finds it vital to consult with your leadership about the Department's role in gathering the information for the draft EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

The Department requests a meeting with leadership to provide the following information: a PowerPoint Overview of the proposed pipeline; Commerce's role in preparing the EIS; and the processes and proposed timeline. Most importantly, we ask for your guidance on how to represent the interests and the impact that the Proposed Project would have on your members' historical, cultural, land, and natural resources. This would include if and how leadership would like Commerce to coordinate with White Earth staff to facilitate communications on the preparation of the draft EIS.

Finally, we would ask leadership to identify the appropriate staff with whom our staff should coordinate on information gathering and scheduling forums for the draft EIS, and on subsequent public meetings for the public comment period of the draft EIS.

The Department appreciates and thanks your Administrative staff for suggesting a meeting sometime between March 27 – 31, 2017 and look forward to confirming the date. We also thank your staff for providing great insight into tribal interests and concerns.

If there is information that would be helpful to consider prior to the meeting, please contact Danielle. Additionally, as I mentioned in our previous meeting, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

As always, I look forward to our continued partnership and collaboration.

Sincerely,

Mike Rothman

Mike Rothman
Commerce Commissioner

May 1, 2017

Robert Blanchard, Tribal Chair
Bad River Band of the Lake Superior Tribe of Chippewa
P.O. Box 39
Odanah, WI 54861

RE: Consultation Request Regarding the Line 3 Replacement EIS

Dear Chair Blanchard,

The Minnesota Department of Commerce began formal consultation and collaboration in 2016 with the five sovereign tribal nations in Minnesota directly affected by Enbridge Energy's proposed replacement of Line 3. Through recent consultation with the Fond du Lac Band of Lake Superior Chippewa, the Department became aware that tribal nations in Wisconsin might have treaty rights for the land affected by the proposed route or alternatives. I write today to provide an update and offer to meet to discuss the process.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by other entities as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

The process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is responsible for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS. Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, we find it vital to consult with your leadership about Commerce's role in gathering the information and creating an EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

If you deem consultation on Enbridge's proposed Line 3 replacement a priority to the Bad River Band of the Lake Superior Tribe of Chippewa, the Department would be happy to meet with leadership in consultation. The format of a meeting could include a PowerPoint overview of the proposed pipeline; Commerce's role in preparing the EIS; the processes and proposed timeline; and a walk-through of the draft EIS chapters on environmental justice and cultural resources. Most importantly, we would ask for your guidance on how to represent the interests and the impact the Proposed Project would have on your member's historical, cultural, land, and natural resources. This would include if and how

leadership would like Commerce to coordinate with the Bad River Band of the Lake Superior Tribe of Chippewa for comments on the draft EIS.

If there is information that would be helpful, please contact Commerce's tribal liaison, Danielle Molliver at (651) 539-1480 or danielle.ox.molliver@state.mn.us. Additionally, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

Sincerely,

Mike Rothman
Commerce Commissioner

Enclosures: Map of Line 3 Proposed route and alternatives

MINNESOTA DEPARTMENT OF
COMMERCE

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AN EQUAL OPPORTUNITY EMPLOYER

April 11, 2017

President Wilfrid Cleveland
Ho Chunk Nation
P.O. Box 667
Black River Falls, WI 54615

RE: Consultation Request Regarding the Line 3 Replacement EIS

Dear President Cleveland,

The Minnesota Department of Commerce began formal consultation and collaboration in 2016 with the five sovereign tribal nations in Minnesota directly affected by Enbridge Energy's proposed replacement of Line 3. Through recent consultation with the Minnesota Indian Affairs Council, we have identified that the Ho Chunk Nation has land holdings in proximity to the proposed pipeline. I write today to provide an update and offer to meet to discuss the process.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by other entities as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

The process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is responsible for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS. Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, we find it vital to consult with your leadership about Commerce's role in gathering the information and creating an EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

If you deem consultation on Enbridge's proposed Line 3 replacement a priority to the Ho Chunk Nation, the Department would be happy to meet with leadership in consultation. The format of a meeting could include: a PowerPoint Overview of the proposed pipeline; Commerce's role in preparing the EIS; and the processes and proposed timeline. Most importantly, we would ask for your guidance on how to represent the interests and the

impact the Proposed Project would have on your member's historical, cultural, land, and natural resources. This would include if and how leadership would like Commerce to coordinate with the Ho Chunk Nation on the preparation of the draft EIS.

If there is information that would be helpful, please contact Commerce's tribal liaison, Danielle Molliver at (651) 539-1480 or danielle.ox.molliver@state.mn.us. Additionally, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

Sincerely,

Mike Rothman

Mike Rothman
Commerce Commissioner

Enclosures: Map of Line 3 Proposed route and alternatives

May 1, 2017

Michael Isham, Chair
Lac Courte Oreilles Band of Lake Superior Chippewa
13394 West Trepania Road
Hayward, WI 54843

RE: Consultation Request Regarding the Line 3 Replacement EIS

Dear Chair Isham,

The Minnesota Department of Commerce began formal consultation and collaboration in 2016 with the five sovereign tribal nations in Minnesota directly affected by Enbridge Energy's proposed replacement of Line 3. Through recent consultation with the Fond du Lac Band of Lake Superior Chippewa, the Department became aware that tribal nations in Wisconsin might have treaty rights for the land affected by the proposed route or alternatives. I write today to provide an update and offer to meet to discuss the process.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by other entities as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

The process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is responsible for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS. Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, we find it vital to consult with your leadership about Commerce's role in gathering the information and creating an EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

If you deem consultation on Enbridge's proposed Line 3 replacement a priority to the Lac Courte Oreilles Band of Lake Superior Chippewa, the Department would be happy to meet with leadership in consultation. The format of a meeting could include a PowerPoint overview of the proposed pipeline; Commerce's role in preparing the EIS; the processes and proposed timeline; and a walk-through of the draft EIS chapters on environmental justice and cultural resources. Most importantly, we would ask for your guidance on how to represent the interests and the impact the Proposed Project would have on your member's historical, cultural, land, and natural resources. This would include if and how

leadership would like Commerce to coordinate with the Lac Courte Oreilles Band of Lake Superior Chippewa for comments on the draft EIS.

If there is information that would be helpful, please contact Commerce's tribal liaison, Danielle Molliver at (651) 539-1480 or danielle.ox.molliver@state.mn.us. Additionally, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

Sincerely,

Mike Rothman
Commerce Commissioner

Enclosures: Map of Line 3 Proposed route and alternatives

May 1, 2017

Joseph Wildcat, Sr., President
Lac du Flambeau Band of Lake Superior Chippewa
P.O. Box 67
Lac du Flambeau, WI 54538

RE: Consultation Request Regarding the Line 3 Replacement EIS

Dear President Wildcat,

The Minnesota Department of Commerce began formal consultation and collaboration in 2016 with the five sovereign tribal nations in Minnesota directly affected by Enbridge Energy's proposed replacement of Line 3. Through recent consultation with the Fond du Lac Band of Lake Superior Chippewa, the Department became aware that tribal nations in Wisconsin might have treaty rights for the land affected by the proposed route or alternatives. I write today to provide an update and offer to meet to discuss the process.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by other entities as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

The process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is responsible for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS. Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, we find it vital to consult with your leadership about Commerce's role in gathering the information and creating an EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

If you deem consultation on Enbridge's proposed Line 3 replacement a priority to the Lac du Flambeau Band of Lake Superior Chippewa, the Department would be happy to meet with leadership in consultation. The format of a meeting could include a PowerPoint overview of the proposed pipeline; Commerce's role in preparing the EIS; the processes and proposed timeline; and a walk-through of the draft EIS chapters on environmental justice and cultural resources. Most importantly, we would ask for your guidance on how to represent the interests and the impact the Proposed Project would have on your member's historical, cultural, land, and natural resources. This would include if and how

leadership would like Commerce to coordinate with the Lac du Flambeau Band of Lake Superior Chippewa for comments on the draft EIS.

If there is information that would be helpful, please contact Commerce's tribal liaison, Danielle Molliver at (651) 539-1480 or danielle.ox.molliver@state.mn.us. Additionally, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

Sincerely,

Mike Rothman
Commerce Commissioner

Enclosures: Map of Line 3 Proposed route and alternatives

May 1, 2017

Bryan Bainbridge, Tribal Chair
Red Cliff Band of Lake Superior Chippewa
8385 Pike Road Highway 13
Bayfield, WI 54814

RE: Consultation Request Regarding the Line 3 Replacement EIS

Dear Tribal Chair Bainbridge,

The Minnesota Department of Commerce began formal consultation and collaboration in 2016 with the five sovereign tribal nations in Minnesota directly affected by Enbridge Energy's proposed replacement of Line 3. Through recent consultation with the Fond du Lac Band of Lake Superior Chippewa, the Department became aware that tribal nations in Wisconsin might have treaty rights for the land affected by the proposed route or alternatives. I write today to provide an update and offer to meet to discuss the process.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by other entities as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

The process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is responsible for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS. Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, we find it vital to consult with your leadership about Commerce's role in gathering the information and creating an EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

If you deem consultation on Enbridge's proposed Line 3 replacement a priority to the Red Cliff Band of Lake Superior Chippewa, the Department would be happy to meet with leadership in consultation. The format of a meeting could include a PowerPoint overview of the proposed pipeline; Commerce's role in preparing the EIS; the processes and proposed timeline; and a walk-through of the draft EIS chapters on environmental justice and cultural resources. Most importantly, we would ask for your guidance on how to represent the interests and the impact the Proposed Project would have on your member's historical, cultural, land, and natural resources. This would include if and how

leadership would like Commerce to coordinate with the Red Cliff Band of Lake Superior Chippewa for comments on the draft EIS.

If there is information that would be helpful, please contact Commerce's tribal liaison, Danielle Molliver at (651) 539-1480 or danielle.ox.molliver@state.mn.us. Additionally, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

Sincerely,

Mike Rothman

Mike Rothman
Commerce Commissioner

Enclosures: Map of Line 3 Proposed route and alternatives

May 1, 2017

Chris McGeshick, Chairperson
Sokaogon Chippewa Community
3051 Sand Lake Road
Crandon, WI 54520

RE: Consultation Request Regarding the Line 3 Replacement EIS

Dear Chair McGeshick,

The Minnesota Department of Commerce began formal consultation and collaboration in 2016 with the five sovereign tribal nations in Minnesota directly affected by Enbridge Energy's proposed replacement of Line 3. Through recent consultation with the Fond du Lac Band of Lake Superior Chippewa, the Department became aware that tribal nations in Wisconsin might have treaty rights for the land affected by the proposed route or alternatives. I write today to provide an update and offer to meet to discuss the process.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by other entities as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

The process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is responsible for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS. Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, we find it vital to consult with your leadership about Commerce's role in gathering the information and creating an EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

If you deem consultation on Enbridge's proposed Line 3 replacement a priority to the Sokaogon Chippewa Community, the Department would be happy to meet with leadership in consultation. The format of a meeting could include a PowerPoint overview of the proposed pipeline; Commerce's role in preparing the EIS; the processes and proposed timeline; and a walk-through of the draft EIS chapters on environmental justice and cultural resources. Most importantly, we would ask for your guidance on how to represent the interests and the impact the Proposed Project would have on your member's historical, cultural, land, and natural resources. This would include if and how leadership

would like Commerce to coordinate with the Sokaogon Chippewa Community for comments on the draft EIS.

If there is information that would be helpful, please contact Commerce's tribal liaison, Danielle Molliver at (651) 539-1480 or danielle.ox.molliver@state.mn.us. Additionally, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

Sincerely,

Mike Rothman
Commerce Commissioner

Enclosures: Map of Line 3 Proposed route and alternatives

May 1, 2017

Lewis Taylor, Chairman
St. Croix Chippewa Indians of Wisconsin
24663 Angeline Avenue
Webster, WI 54893

RE: Consultation Request Regarding the Line 3 Replacement EIS

Dear Chair Taylor,

The Minnesota Department of Commerce began formal consultation and collaboration in 2016 with the five sovereign tribal nations in Minnesota directly affected by Enbridge Energy's proposed replacement of Line 3. Through recent consultation with the Fond du Lac Band of Lake Superior Chippewa, the Department became aware that tribal nations in Wisconsin might have treaty rights for the land affected by the proposed route or alternatives. I write today to provide an update and offer to meet to discuss the process.

Enbridge Energy is proposing to replace their existing Line 3 pipeline. Enbridge's proposal is to permanently deactivate the existing Line 3 pipeline and leave it in place, and construct a replacement pipeline along a new route. This, as well as other route alternatives proposed by other entities as alternatives to the Enbridge route, may profoundly affect your historical, cultural, land, and natural resources.

The process for pipeline approval is with the Minnesota Public Utilities Commission (PUC), which is responsible for deciding whether to issue a Certificate of Need and determining what route to permit for the proposed project. In this case, the PUC has ordered an Environmental Impact Statement (EIS) for the project and has asked the Commerce Department's Divisions of Energy, Environmental Review Unit (EERA) to conduct the EIS. Consistent with our Interim Tribal Consultation Policy and in recognition of your inherit right to self-governance, we find it vital to consult with your leadership about Commerce's role in gathering the information and creating an EIS that highlights the unique sovereign status of the tribe and its protected tribal resources, interests, and concerns.

If you deem consultation on Enbridge's proposed Line 3 replacement a priority to the St. Croix Chippewa Indians of Wisconsin, the Department would be happy to meet with leadership in consultation. The format of a meeting could include a PowerPoint overview of the proposed pipeline; Commerce's role in preparing the EIS; the processes and proposed timeline; and a walk-through of the draft EIS chapters on environmental justice and cultural resources. Most importantly, we would ask for your guidance on how to represent the interests and the impact the Proposed Project would have on your member's historical, cultural, land, and natural resources. This would include if and how

leadership would like Commerce to coordinate with the St. Croix Chippewa Indians of Wisconsin for comments on the draft EIS.

If there is information that would be helpful, please contact Commerce's tribal liaison, Danielle Molliver at (651) 539-1480 or danielle.ox.molliver@state.mn.us. Additionally, my Deputy Commissioner and Chief of Staff, Anne O'Connor is also available as a contact for your staff.

Sincerely,

Mike Rothman
Commerce Commissioner

Enclosures: Map of Line 3 Proposed route and alternatives

March 31, 2017

Anne O'Connor
Deputy Commissioner and Chief of Staff
MN Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101

Re: Proposed Enbridge Line Three Replacement

Dear Deputy Commissioner O'Connor,

My name is James L. Jones, Jr, and I am the Cultural Resource Director for the Minnesota Indian Affairs Council (MIAC). I am writing to you today in regard to the proposed Enbridge Line 3 replacement that is currently being planned in the northern half of Minnesota. You have sent some questions to my Executive Director, Dennis Olson. Mr. Olson forwarded a copy of these to me. I also met with two staff members of the Department of Commerce recently in my home community of Cass Lake, MN. This meeting was held with Jamie MacAalister, Environmental Review Manager at the Department of Commerce, and with Danielle Oxendine Molliver, Commerce's Tribal Liaison. During that meeting, we discussed the questions specific to cultural resource considerations.

The intent of this letter is to inform you about concerns that I have as an enrolled member of the MN Chippewa Tribe, Leech Lake Pillager Band, and about the number of impacts a project of this nature will have to the cultural resource sites along the proposed routes. One major resource that is missing from the evaluations are the Traditional Cultural Places (TCP's). These types of sites include wild rice beds, and areas that are utilized by tribal communities both on and off reservation lands. I know that the proposed route will go through these types of areas, the McGregor, MN area being one known example. This area is rich with wild rice beds that are beneficial to a number of tribal communities.

There are also cultural corridor areas within the proposed pipeline route. These are areas that were important in the development of the tribal communities today. They are also historic routes that go back thousands of years, and are based on historic trade routes that indigenous people have had with one another for centuries. The crossing of the proposed route north of Outing, MN, and north of Roosevelt Lake, is another example of this type of corridor. There has to be a complete survey of the entire proposed route, and this survey needs to take place immediately. It will need to involve a number of the tribal communities to gather their input, and oral histories will have to be gathered to assist with the identification of these places. Consultation will have to take place with the northern Minnesota Ojibwe communities including the Red Lake Band of Chippewa Indians, as the proposed route goes through Red Lake's 1889 treaty areas. Additional consultation will have to include the Dakota Communities that are located in the southern part of the state, mainly because the U.S. Army Corps of Engineers has already started the Section 106 process with over 18 tribal nations. Consultation will have to include these tribal nations.

The proposed impacts to these places are things that a standard archaeological survey can miss, and are sometimes outside the scope of work for Environmental Impact Statements (EIS). Due to the timeline of the project, these surveys would also need to start immediately. These surveys will need people who are familiar with the type of places important to Ojibwe history and culture. Those conducting the surveys need to have working relationships with tribal communities within the state to confidently gain their trust and collaboration, while working with a number of diverse tribal nations.

There are both applicable state and federal laws which govern cultural resource management and the cultural areas of the state. Any survey work conducted will have to meet certain federal requirements, while concurrently coordinating with different tribal nations, multiple agencies, and land owners potentially impacted by this project.

Thank you for your attention to these important issues that will affect these cultural places important to the Indigenous Communities of Minnesota.

Sincerely,

James L. Jones, Jr.
Leech Lake Band Member
16139 63rd Ave. NW
Cass Lake, MN 56633

Cc: Governor Mark Dayton
Chairman Robert Larsen, Chairman, MIAC
Chairman Darrell G. Seki, Sr., Red Lake Band of Chippewa
Chairman Terrence Tibbitts, White Earth Band of Ojibwe
Chairman Faron Jackson, Leech Lake Band of Ojibwe
Chief Executive Melanie Benjamin, Mille Lacs Band of Ojibwe
Chairman Kevin Jensvold, Upper Sioux Board of Trustees
President Shelley Buck, Prairie Island Indian Community
Chairman Charlie Vig, Shakopee Mdewankton Dakota Community
Dennis Olson, Executive Director, MIAC
Commissioner Mike Rothman, MN Department of Commerce
Gary Frazer, Executive Director, MN Chippewa Tribe
David Mather, State Historic Preservation Office
Amanda Grovhold, Office of the State Archaeologist
Winona LaDuke, Executive Director, Honor the Earth
Melissa Cerda, Cultural Resource Specialist, MIAC

STATE OF MINNESOTA

INDIAN AFFAIRS COUNCIL

website: http://mn.gov/indianaffairs/

May 26, 2016

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101

Re: Sandpiper Pipeline and Line 3 Route

Dear Mr. MacAlister,

I am writing to you in regards to the Proposed Sandpiper and Line 3 routes. The Cultural Resource Program of the Minnesota Indian Affairs Council (MIAC) is concerned with the proposed routes through the northern half of Minnesota. Our concern is that the proposed preferred routes will go through the richest cultural resources areas within the State of Minnesota. As established by MN Statue 307.08, MIAC has the joint responsibility under the law to protect all American Indian Burial Sites within the State. The potential of adverse effects on identified burial and archaeology sites and important sacred sites as well as sites that have yet to be identified is too great for us not to be concerned.

Thank you for your attention to this important matter.

Jim L. Jones, Jr.

Cultural Resource Director, MIAC

Cc: Chairman Robert Larson, Lower Sioux Community
Chairman Kevin Jensvold, Upper Sioux Board of Trustee's
Chairman Charlie Vig, Shakopee Mdewakanton
President Shelly Buck, Prairie Island Indian Community
Chairman Norman Dechampe, Grand Portage Band of Lake Superior Chippewa
Chairman Wanye Depuis Fond Du Lac Band of Chippewa
Leonard Wabasha, Shakopee Mdewakanton Dakota
Amy Burnette, Leech Lake THPO
Grace Goldtooth Campos, Lower Sioux THPO
Sharon Pazi Zea, Upper Sioux Board of Trustee's

113 2nd Street NW, Suite ll0A • Bemidji, MN 56601 • phone (218)755-3739 • fax (218) 755-3739
161 St. Anthony Avenue, Suite 919 • St. Paul, MN 55103 • phone (651)296-0041 • fax (651) 296-0132

Appendix T

Comments and Responses

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Comment Response Appendix

In preparing this Final Environmental Impact Statement (EIS), the Department of Commerce reviewed all public comments submitted to the Department during the Draft EIS public comment period, which ended July 10, 2017. All timely public comments are included in this appendix to the Final EIS. The first section of the comment response appendix contains responses to substantive comments on the Draft EIS. Substantive comments were identified by evaluating whether a comment included:

1. Specific reference to the EIS, and
2. Rationale for an addition, clarification, correction, discussion of uncertainty, or application of alternative methodology.

All of the public oral and written comments determined to contain both substantive elements are provided in Section T-1 of this Appendix. Responses to substantive comments are provided in Section T-2.

Many of the remaining comments submitted during the Draft EIS comment period indicated the opinions and preferences of individuals and organizations on whether to issue a permit or high-level policy issues; provided general critiques of the draft document; or included sample studies and articles for reference without providing clear rationale for an addition, clarification, correction, discussion of uncertainty or application of alternative methodology. These comments did not provide direct or actionable feedback on the content of the Draft EIS. While all comments were read and considered, an individual response was not provided for these types of comments.

All public comments not included in Section T-1 are included in Section T-3 of this Appendix and are part of the record that is available for the Administrative Law Judge (ALJ) and the Minnesota Public Utilities Commission (Commission) to consider in the need and routing decisions. Several of the broad themes present in the comments included in Section T-3 (and often raised in submittals provided in Section T-1) are addressed generally below.

1. General support for or opposition to the project or general preference for a particular alternative

Many comments were submitted expressing support for or opposition to the project. As discussed in Chapter 3 of the EIS, an EIS does not advocate, recommend, or state a preference for a specific alternative. Instead, it analyzes and compares alternatives so that citizens, agencies, and governments can work from a common set of facts. Thus, comments expressing general opposition, support for the project, identifying a general preference for a certain alternative, or advocating for a certain course of action (renewable energy development, electric car promotion, routes that were not carried forward from scoping) did not aid the development of the Final EIS.

Additionally, a number of commenters cited the presence of the existing Line 3, which has been in operation for well over the 30-year timeframe analyzed in the EIS, as evidence that the EIS should have analyzed a 50- or 60-year operational timeline. The Applicant has stated that the expected lifetime of the proposed project is approximately 30 years. Due to the difficulty of predicting future events or

energy needs, and considering the dynamic nature of energy markets and the finite nature of oil deposits, the Department did not think it was warranted to include alternative operational timelines.

These comments, however, are included as part of the record and made available to both the ALJ and the Commission. During the public hearings for the project, citizens and organizations will have an opportunity to provide comment to the ALJ on their support for or opposition to the project or preference for a particular alternative for her consideration as she develops her findings and recommendations to the Commission.

2. Opposition to oil pipelines and continued reliance on fossil fuels

Many commenters expressed opposition to the project based on the human and environmental impacts of ongoing use of fossil fuels and the particularly intense impacts associated with tar sands oil. Many of these commenters advocated for changes in energy policy to promote alternatives to fossil fuels.

Chapter 1 of the EIS includes a discussion of broad energy policy level questions related to fossil fuels that are not comprehensively evaluated in this EIS. While pipeline projects are increasingly contributing to public debate over important, broad energy policy issues, many of these overarching issues are beyond the scope of this EIS because they extend beyond the specific decision before the Commission. Where these policy issues specifically relate to the Certificate of Need (CN) or routes, however, the EIS provides a project-level assessment that the Commission will consider in their evaluation of the need and route of the project. It should be noted that the need decision before the Commission is limited to the approval (possibly with conditions) or denial of Enbridge Energy, Limited Partnership's (Enbridge's, or the Applicant's) proposal. In its decision on the Line 3 Project CN application, the scope of the Commission's jurisdiction does not extend to other oil pipelines or statewide alternative energy policy.

3. Concerns about the fate of existing Line 3

Many commenters expressed opposition to Enbridge's proposal to abandon the existing Line 3 in place following Pipeline and Hazardous Materials Safety Administration (PHMSA) regulations. These commenters advocated for complete removal of the existing Line 3, removal or abandonment based on landowner preference, or a Commission decision denying the CN and ordering Enbridge to discontinue use of the existing Line 3 and remove it from the ground.

Chapter 8 evaluates the environmental impacts that would result from abandonment and removal of the existing Line 3. If the Commission denies the CN for the proposed project, it has no regulatory authority to determine the fate of the existing Line 3. If the Commission decides to issue a CN for the proposed project, it is possible that they may consider permit conditions prescribing abandonment, removal, or a combination of abandonment and removal for the existing Line 3. The analysis in Chapter 8 provides environmental impact information to inform such a decision, should the Commission determine that it has the necessary authority. Chapter 8, however, does not advocate for a certain outcome or recommend whether the Commission can or should take up this issue through permit conditions.

Similarly, the EIS does not take a position regarding whether or not financial assurances for removal of the existing Line 3 are appropriate or should be included as a condition of approval. The Commission will consider such concerns in its decision.

4. General concern about oil spill risk

Many commenters advocated for denial of the CN based on the risk of spills. In some cases commenters suggested that, based on spill risk, the Commission should deny the CN and order Enbridge to discontinue use of the existing Line 3 and remove it from the ground or even order Enbridge to discontinue use of other pipelines as well.

An analysis of oil spill risk is provided in Chapter 10, but comments expressing opposition, or recommending denial of the CN without additional relevance to the analysis in Chapter 10, do not aid in the development of the Final EIS. These comments are included as part of the record and made available to both the ALJ and the Commission.

5. Arguments related to project need

While the need for the proposed pipeline with the proposed throughput capacity is an issue for the Commission, this EIS does not assess the overall project need. Instead, the EIS evaluates the environmental impacts associated with the range of reasonable alternatives to aid the Commission's evaluation of the need criteria set forth in Minnesota Administrative Rules Chapter 7853. As discussed in Chapter 3, under these criteria, the Commission first considers the underlying economic demand for the proposed pipeline. This economic analysis is conducted by Minnesota Department of Commerce Division of Energy Resources Energy Planning and Advocacy and other parties to the contested case hearing. This analysis aids the Commission in evaluating the underlying economic need. If the underlying economic demand is established, the evaluation of the environmental and socioeconomic impacts of the alternatives in the EIS will help the Commission weigh the advantages and disadvantages of alternative ways to meet the economic need and whether to issue a CN for the proposed project.

6. General expressions of concern about certain resources or impacts

Many of the comments submitted during the comment period highlighted a commenter's concern about impacts of the project or alternatives to the project on a certain resource or resources, but did not provide any actionable feedback on the analysis or characterization of impacts in the EIS itself.

As noted in Chapter 1, the EIS neither prioritizes one resource over another, nor prescribes how impacts on different types of resources should be weighted. Decisions about whether and how to prioritize resources in the need and routing decisions is the Commission's charge and is not prescribed by the EIS. During the public hearings for the project, citizens and organizations will have an opportunity to provide comment to the ALJ on their resource- or impact-related concerns or suggested permit conditions to manage impacts for her consideration as she develops findings and recommendations for the Commission.

7. Concern regarding mitigation implementation and oversight

Many commenters expressed concern regarding mitigation oversight, in some cases citing the Applicant's past performance, or alleged past performance, on other projects. The EIS assumes that, if a permit is granted, the Applicant would implement the project in the manner outlined in their application. The Commission will consider all commenter concerns regarding the Applicant's record of compliance and weigh those concerns accordingly prior to issuing or denying a permit. If the Applicant fails to adhere to mitigation outlined in the EIS, such instances would be investigated by the appropriate authorities on a case-by-case basis. The Commission assumes that the Applicant will comply with all

laws, rules, and statutes governing the construction and operation of pipelines in the State of Minnesota.

8. Concern regarding landowner negotiations

A number of commenters submitted comments regarding the Applicant's negotiations with landowners. The terms of the easement(s) are a matter to be settled between the Applicant and individual landowners and would contain specifics regarding pipeline crossing mechanisms, if necessary.

9. Future decommissioning of the proposed Line 3 pipeline

Some commenters requested that the future decommissioning of the proposed Line 3 replacement be considered in the EIS. Future decommissioning would be similar to the impacts described for construction. Similar types of equipment, ground disturbance, and workforce levels would be required. Decommissioning would require adherence to similar mitigation measures and best management practices (BMPs). Alternatively, the Applicant may request to abandon the pipeline in place in a manner similar to the description in Chapter 8. Whether the proposed new pipeline is ultimately abandoned or removed, the Applicant will be required to adhere to all laws and regulations in force at the time of decommissioning. Regarding financial assurances related to decommissioning, such considerations are beyond the scope of this EIS, but will be taken into consideration by the Commission.

10. Frustration regarding the size of the EIS and the complexity of the subject matter

The Department of Commerce made every effort during preparation of the EIS to ensure that the subject matter is accessible to the general public. Due to the technical, as well as controversial nature of the project, the EIS is necessarily long and contains detailed information for stakeholder consideration. The length of the EIS and scope of the analysis is necessary in order to provide a complete disclosure of potential environmental impacts.

Levi, Andrew (COMM)

From: Loudenslager, Christopher <christopher_loudenslager@nps.gov>
Sent: Monday, July 10, 2017 8:14 AM
To: MN_COMM_Pipeline Comments
Cc: MacAlister, Jamie (COMM); Bruce Matthews; Andrea Ketchmark; Matt Davis; Mark Weaver; Christopher Loudenslager
Subject: Line 3 Pipeline Project Draft EIS: docket numbers CN-14-916 and PPL-15-137
Attachments: MN_Enbridege EIS Response_7JUL17.pdf; MN_Enbridge Pipeline_Itasca Vicinity Map_25MAY16.pdf; MN_Enbridge Pipeline_Itasca Vicinity Project Map_21MAR16.pdf

Good morning Mr. MacAlister,

Attached please find the National Park Service, North Country National Scenic Trail's comments, response, and accompanying maps for the Line 3 Pipeline Draft EIS.

Please contact me with any questions and to collaborate on developing and implementing the protection and mitigation measures discussed in the document, should a decision be made to implement the proposed project and Preferred Alternative. Please also continue to communicate project information and updates with us as the plan progresses.

Thank you very much for your cooperation and consideration of the North Country National Scenic Trail. Sincerely,

Chris Loudenslager
Trail Planner, North Country National Scenic Trail
National Park Service
PO Box 288
219 East Main Street
Lowell, MI 49331
(616) 970-7026

United States Department of the Interior

NATIONAL PARK SERVICE
North Country National Scenic Trail
P.O. Box 288
Lowell, Michigan 49331

July 7, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, suite 500
St. Paul, MN 55101

RE: Line 3 Pipeline Project, Docket Numbers CN-14-916 and PPL-15-137

Dear Mr. MacAlister:

The North Country National Scenic Trail is a 4,600-mile hiking and backpacking trail extending from Lake Sakakawea State Park in North Dakota to Crown Point State Historic Site in New York. The North Country National Scenic Trail (NCT) is administered by the National Park Service, and is one of only 11 National Scenic Trails authorized by Congress.

We have reviewed the documents and links you provided to determine if there may be an impact on the North Country National Scenic Trail (NCT) by the proposed Line 3 Replacement Projects. The Preferred Alternative, as described in the Draft EIS, will have a significant impact on the NCT and the hiking experience the Trail is intended to provide in one location:

East of Highway 71 and Itasca State Park; Hubbard County, NE ¼ of Section 5, T142N R35W. Please refer to attached Itasca Vicinity Map; and Enbridge Project Map.

The NCT crosses the existing pipeline right of way just south of the road identified as State Park Road 7 on the project survey map. This section of trail is identified as Certified Trail, which denotes the highest level of protection and permanence a section of the NCT may achieve. The NCT is a well-established and highly used foot trail in this location given its proximity and connection to Itasca State Park. It is critically important that public safety, trail access, and the scenic and aesthetic character of the trail are protected to the greatest extent possible.

As described in the Draft EIS, the Preferred Alternative will have a significant impact on the NCT in the following ways:

1. Unacceptable Encroachment and Impact on the NCT

The current project maps (see attached Enbridge Survey Map) depicts a planned Construction Workspace that appears to located directly on the NCT where the trail leaves the forest and crosses the pipeline corridor. The proposed Construction Workspace represents an unacceptable

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impact to trail access, public safety, and long-term adverse effects on the trail's fundamental scenic and aesthetic character.

1B. Proposed Mitigation Measures: Unacceptable Encroachment and Impact on the NCT

It is critical that the planned Construction Workspace be relocated- the adverse effects posed by this staging area will result in both short-term and long-term impacts to the NCT that cannot be mitigated, but easily avoided by relocation. Our recommended alternative would be to expand the planned Construction Workspace situated on the north side of State Park Road 7. 2421-1

2. Loss of Trail Access:

The current project description indicates that construction activities may close the NCT for an undetermined amount of time. While the potential window for trenching is identified as up to three days, this does not account for the additional amount of time that the trail may be blocked by equipment and staged sections of pipe waiting to be installed. A "temporary" closure of the NCT for any amount of time must be avoided because there is no alternative hiking route to avoid this crossing, and a hiker passing through the area cannot "wait out" the construction at the work site where no food, water, or overnight facilities are provided.

2B. Proposed Mitigation Measures: Loss of Trail Access

We request the following considerations to mitigate loss of trail access: 2421-2

- Communication between the Pipeline/construction site representative and the local trail stewards will be established to ensure the trail crews and public know when construction is scheduled to be start, when it has ended, and to allow dialogue between the trail stewards and construction crew should any question or issues arise.

- When staging sections of pipe prior to installation, maintain a 4' gap between the sections most proximal to the NCT to allow hikers to pass through the area. As an alternative, a structure that will allow hikers to safely cross over staged pipe shall be provided.

- Utilize the tunneling installation method where the pipeline will cross the NCT rather than trenching. If tunneling is not a possible method, then some temporary bridging of the open trench shall be provided to allow hikers to safely negotiate the crossing.

- Construction crew shall have designated representatives who alert workers of the presence of hikers passing through the area and guide hikers through the work area safely during active construction operations.

If safe passage and access across the work site cannot be provided and the NCT must be closed for any amount of time, we request the following alternative mitigation:

- The Pipeline/construction site representative shall establish a shuttle service with pick-up/drop-off sites on either side of the corridor to transport hikers around the

construction site. Signage notifying hikers of the construction, trail closure, and provision of shuttle service will be posted on both sides of the approaching trail in advance of the shuttle site. Pipeline representatives with cell phones or radios will staff the shuttle sites while this section of NCT must be closed to passage. When hikers arrive at these sites, the Pipeline representative will contact the shuttle driver for the need of transport.

3. Risk to Public Safety:

The current project description indicates that heavy equipment, staged pipe, support vehicles, and other work activities will be present immediately along and adjacent to the NCT for an unspecified amount of time. Hikers passing through the area will emerge silently from the forest at random intervals and will be difficult to notice by workers and equipment operators. Hikers may also pass through the work area at any time, including during the hours of darkness, where warning signs or other visual indicators would not be seen. An open trench, staged pipe, construction equipment, and other hazards pose an imminent risk to the public regardless of whether or not active construction is occurring.

3B. Proposed Mitigation Measures: Risk to Public Safety

We request that the same mitigations discussed under **Proposed Mitigation Measures: Loss of Trail Access** be utilized to avoid the risk to public safety impacts. 2421-3

4. Physical Impact to Trail:

The nature of the proposed construction will have an unavoidable impact to the physical attributes of the NCT regardless of the installation method. Construction activities will destroy the existing built tread and disturb surround soils and vegetation.

4B. Proposed Mitigation Measures: Physical Impact to Trail

2421-4

Physical damage to the NCT is understandably unavoidable, but can be easily mitigated. After construction activities have been completed, all evidence of construction or residual materials must be cleared from the site. The original shape and structure of the treadway should be restored to its original condition and ensure that water does not pool or otherwise collect and flow along the trail. Seeding disturbed soils with site-appropriate grasses will partially restore the site aesthetics and prevent against erosion.

5. Impact to surrounding scenic and aesthetic character of the Trail

We support siting new pipeline within an existing, previously disturbed pipeline corridor. While the NCT currently passes through such a corridor, the proposed plan would expand the width of the corridor in the vicinity of the NCT by approximately 100’. The expansion of the corridor will present both short-term and long-term visual degradation of the scenic and aesthetic values that are fundamental to the NCT.

2421-5

5B. Proposed Mitigation Measures: Impact to surrounding scenic and aesthetic character of the Trail

Before construction activities begin:

- Minimize removal of trees and vegetation to the greatest extent possible within visual distance of the established route of the NCT.

After construction activities have been completed:

- All evidence of construction or residual materials must be cleared from the site immediately along the NCT as well as what might be observable from the trail

- The original shape and structure of the treadway should be restored to its original condition and ensure that water does not pool or otherwise collect and flow along the trail. Seeding disturbed soils with site-appropriate grasses will partially restore the site aesthetics and prevent against erosion.

- Given the expanded width of the pipeline corridor after construction, consider planting or seeding the area with site-appropriate wildflowers so that the opening mimics a naturally occurring meadow or prairie landscape.

- Re-vegetate the corridor adjacent to the NCT to the greatest extent possible with site-appropriate trees, shrubs, and ground vegetation to obscure the linear appearance of the corridor and mimic a naturally occurring opening.

Our support for the Preferred Alternative described in the Draft EIS is contingent that the final plan and decision accounts for the impacts to the NCT we have identified and includes, at a minimum, the protective measures and mitigations we have discussed in this response. Our staff and North Country Trail Association partners will welcome the opportunity to work closely with you and your specialists to more fully develop and implement a comprehensive protection and mitigation plan. Please do not hesitate to contact me if you have any questions or if I may be able to assist in bringing our collective trails experts together to collaborate on this project.

Sincerely,

Chris Loudenslager
Trail Planner, North Country National Scenic Trail
National Park Service
Christopher_loudenslager@nps.gov
(616)970-7026

Cc: B. Matthews, A. Ketchmark, M.Davis, M. Weaver

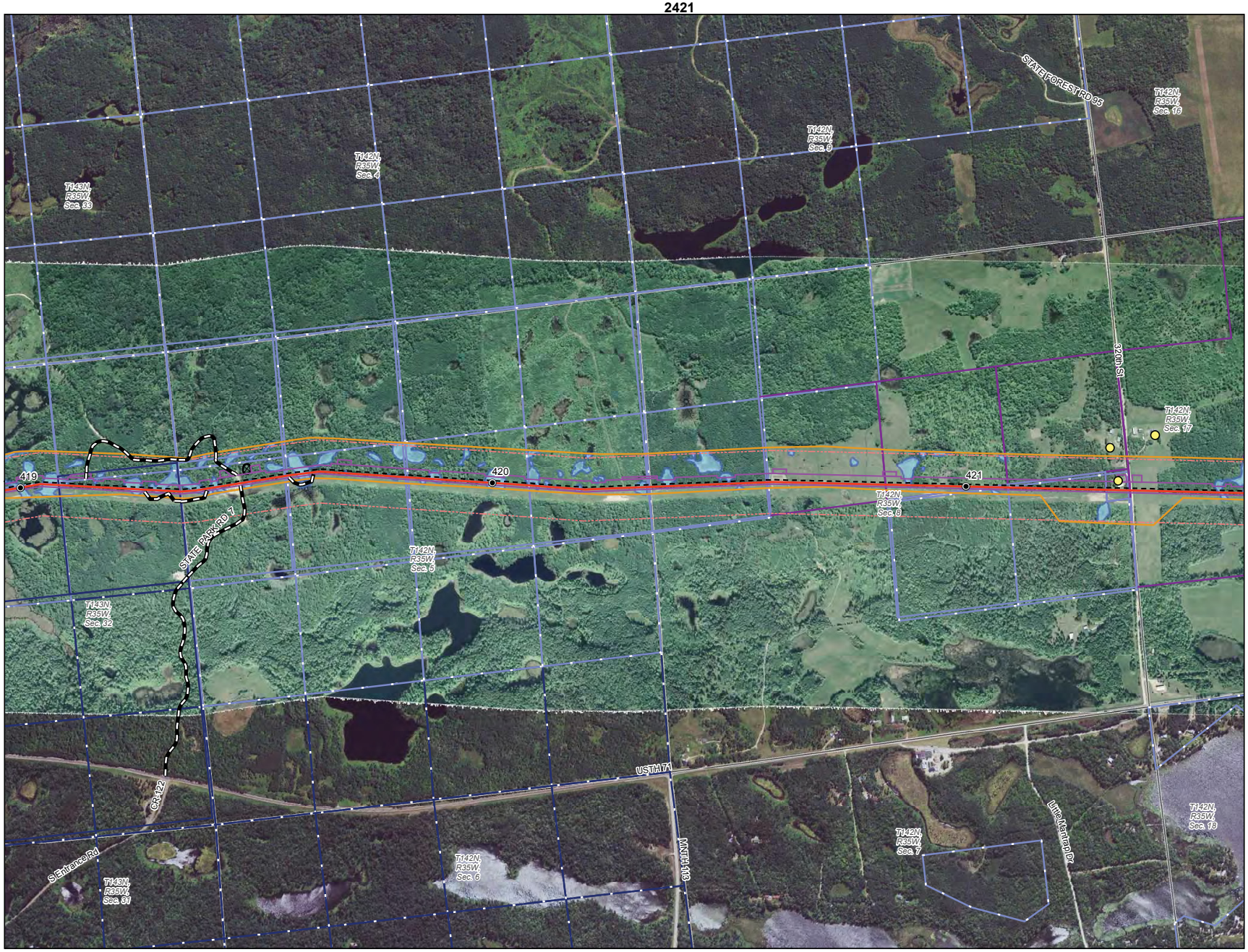

0 500 1,000 Feet

1 inch = 1,000 feet

- Milepost
- Sandpiper Centerline
- L3R Centerline
- Construction Workspace
- Environmental Survey Area
- Route Width
- Widened Route Width
- Cathodic Protection Location
- Valve Location
- Pump Station - Boundary
- Pump Station - Disturbed Area

Noise Sensitive Receptors

- Private
- Public
- Commercial/Industrial
- Other
- Temporary Access Road
- Permanent Access Road to Valve
- Delineated Waterbody
- Delineated Wetland
- Environmentally Sensitive Area
- Section Boundary
- Federal Land
- Tribal Land
- County Tax-Forfeit Land
- State Land

Parcel Ownership

- State Land
- County Land
- Private Lands/Other

North Dakota Pipeline Company LLC

Sandpiper Pipeline Project

1:12,000 Aerial Survey Maps

Hubbard County, Minnesota

ENBRIDGE

For Environmental Review Purposes Only

3/21/2016

North Country National Scenic Trail

Sandpiper Pipeline Project

2421

North Country Trail Association - 2016

northcountrytrail.org

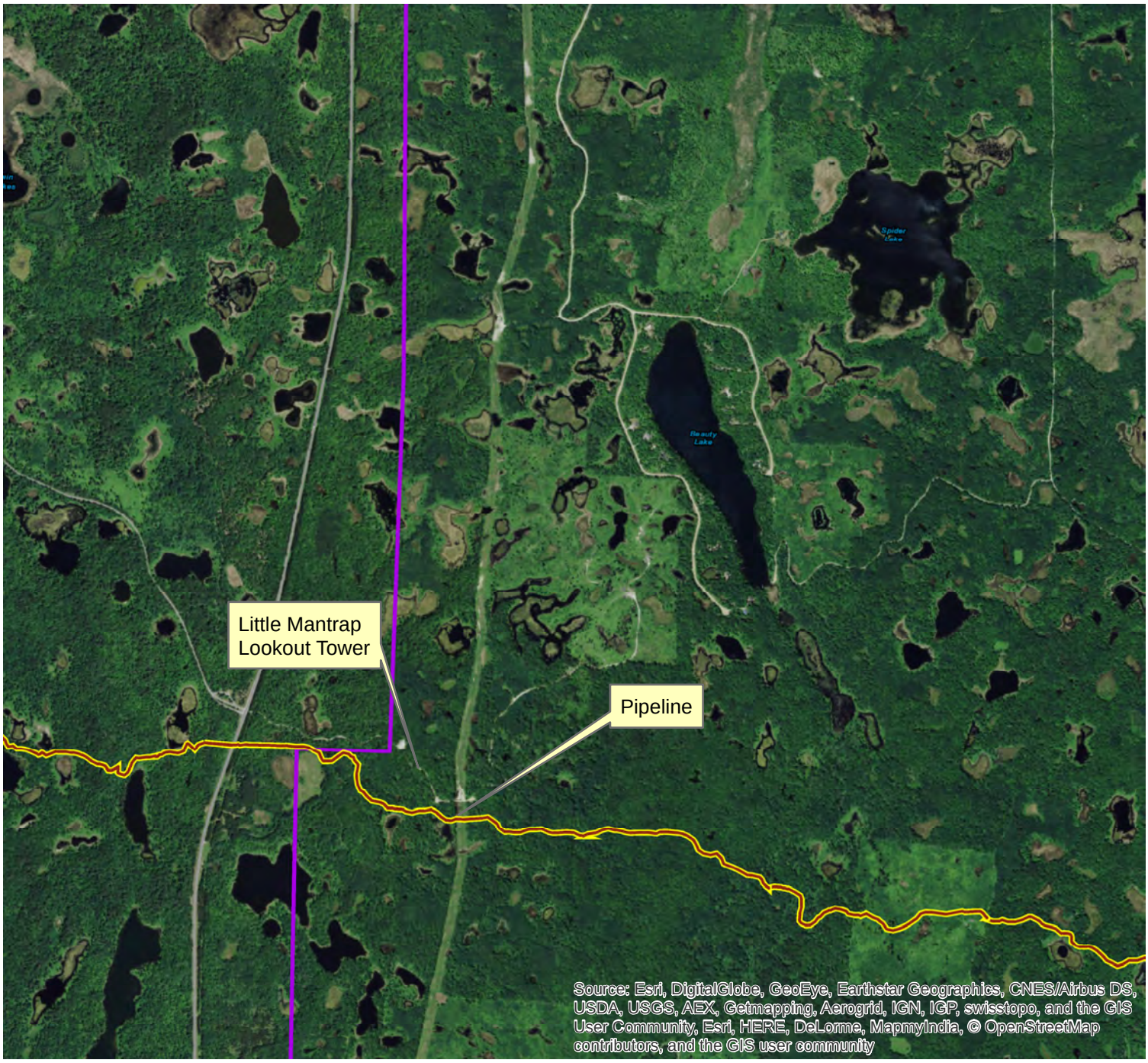

Legend

- NCT
- NCT (on-road)
- State Park Boundary

Data Sources:
National Park Service (NOCO)
North Country Trail Association
USGS
Additional: See basemap citation

N

1:25,000
1 in = 0.4 miles
UTM Zone 15 NAD83

0 0.4 0.8 Miles

Regional Overview

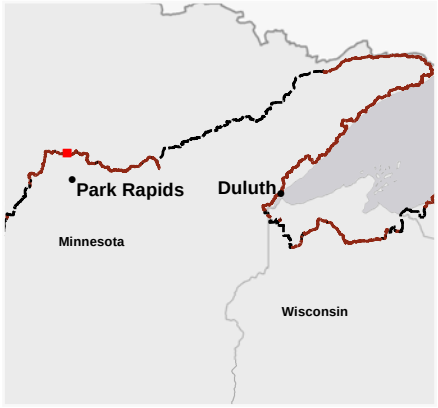

Levi, Andrew (COMM)

From: Hingsberger, Thomas J CIV USARMY CEMVP (US) <thomas.j.hingsberger@usace.army.mil>
Sent: Monday, July 10, 2017 4:15 PM
To: MN_COMM_Pipeline Comments
Cc: MacAlister, Jamie (COMM); Beaudet, Andrew D CIV USARMY CEMVP (US); Morningstar, Desiree L CIV USARMY CEHQ (US)
Subject: MPUC docket numbers CN-14-916 and PPL-15-137; Enbridge Line 3 Draft EIS Comments, USACE
Attachments: DEIS Comments 2014-01247-TJH adb.pdf

St. Paul District USACE comments on the Draft Environmental Impact Statement (DEIS) for the Enbridge Line 3 Pipeline Project are attached.

Thank you,

Tom Hingsberger
Regulatory Project Manager, NW Section
Corps of Engineers, St. Paul District
180 East Fifth Street, Suite 700
St. Paul, MN 55101-1638
Phone: 651-290-5367
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Email: thomas.j.hingsberger@usace.army.mil
http://www.mvp.usace.army.mil/Missions/Regulatory.aspx

DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
180 FIFTH STREET EAST, SUITE 700
ST. PAUL, MN 55101-1678

REPLY TO ATTENTION OF
REGULATORY BRANCH

Regulatory File No. MVP 2014-01071-TJH

July 10, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Dear Ms. MacAlister:

The St. Paul District, US Army Corps of Engineers is reviewing the Draft Environmental Impact Statement for the Enbridge Line 3 Project dated 5/15/2017 (Docket numbers CN-14-916 and PPL-15-137) prepared by the Minnesota Department of Commerce (DOC). We appreciate the opportunity to participate in the review of this document. Enclosed are comments and recommendations to consider while preparing the Environmental Impact Statement. The Corps will continue to review the DEIS and Appendices as we evaluate the project pursuant to our authorities under the National Environmental Policy Act (NEPA), Section 10 of the Rivers and Harbors Act, and Section 404 of the Clean Water Act (CWA).

In addition to the enclosed specific comments, the following general information concerning our regulatory program applies to the proposed project.

Proposals that involve activities in navigable waters of the United States may be subject to the Corps of Engineers' jurisdiction under Section 10 of the Rivers and Harbors Act of 1899 (Section 10). Section 10 prohibits the construction, excavation, or deposition of materials in, over, or under navigable waters of the United States, or any work that would affect the course, location, condition, or capacity of those waters, unless the work has been authorized by a Department of the Army permit.

Proposals that involve discharges of dredged or fill material into waters of the United States may be subject to the Corps of Engineers' jurisdiction under Section 404 of the Clean Water Act (CWA Section 404). Waters of the United States include navigable waters, their tributaries, and adjacent wetlands (33 CFR § 328.3). CWA Section 301(a) prohibits discharges of dredged or fill material into waters of the United States, unless the work has been authorized by a Department of the Army permit under Section 404. Information about the Corps permitting process can be obtained online at http://www.mvp.usace.army.mil/regulatory.

The Corps evaluation of a Section 10 and/or a Section 404 permit application involves multiple analyses, including (1) evaluating the proposal's impacts in accordance with the National Environmental Policy Act (NEPA) (33 CFR part 325), (2) determining whether the proposal is contrary to the public interest (33 CFR § 320.4), and (3) in the case of a Section 404 permit, determining whether the proposal complies with the Section 404(b)(1) Guidelines (Guidelines) (40 CFR part 230).

For proposals that require a Section 404 permit application, the Guidelines specifically require that "no discharge of dredged or fill material shall be permitted if there is a practicable

alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences" (40 CFR § 230.10(a)). Time and money spent on the proposal prior to applying for a Section 404 permit cannot be factored into the Corps' decision whether there is a less damaging practicable alternative to the proposal.

A Department of the Army (DA) permit application for the applicant's preferred route (APR) has been submitted, and we are at this time awaiting a revised permit application from Enbridge. We will continue to meet with the applicant to obtain information regarding the data, studies or other information that will be necessary for the DA permit evaluation process.

If you have any questions, please contact Tom Hingsberger in our St. Paul office at (651) 290-5367 or thomas.j.hingsberger@usace.army.mil. In any correspondence or inquiries, please refer to the Regulatory file number shown above.

Sincerely,

Andrew D. Beaudet
Chief, Northwest Section

Enclosure

Re: Docket Nos. CN-14-916 / PPL-15-137

USACE Comments, Proposed Line 3 Pipeline Project

Date: July 10, 2017

Comment Number	Page/Location/Section	Comment/Concern	Commenter: USACE	Notes	
1	ES-8, Consultation and Public Involvement	Statement: "At the federal level, for example, a U.S. Army Corps of Engineers permit must be obtained for construction activities that result in impacts to ~~across~~ wetlands and at stream and river crossings."	Revise Sentence	Throughout the document it might be more accurate to state that activities in navigable waters of the United States may be subject to Corps of Engineers' jurisdiction under Section 10 of the Rivers and Harbors Act of 1899 (Section 10). Section 10 prohibits the construction, excavation, or deposition of materials in, over, or under navigable waters of the United States, or any work that would affect the course, location, condition, or capacity of those waters, unless the work has been authorized by a Department of the Army permit. Activities that involve a discharge of dredged or fill material into waters of the United States may be subject to the Corps of Engineers' jurisdiction under Section 404 of the Clean Water Act (CWA Section 404). CWA Section 301(a) prohibits discharges of dredged or fill material into waters of the United States, unless the work has been authorized by a Department of the Army permit under Section 404. Waters of the United States include navigable waters, their tributaries, and adjacent wetlands (33 CFR § 328.3).	2280-1
2	3-1, Ch. 3, Regulatory Framework	...and potential wetland impacts **resulting from the discharge of dredged or fill material into wetlands** would require a **Department of the Army** permit from the U.S. Army Corps of Engineers (USACE).	Revise statement to include text in **bold letters**		2280-2
3	3.6.1.1, Last Sentence	Dredged or fill material, including material that moves from **adjacent** construction sites into these waters, could affect the quality of the waters, and USACE requires permits for projects that could have such effects.			2280-3
4	6 - 188, Navigable Waterways	The U.S. Army Corps of Engineers (USACE) has jurisdiction over navigable waterways in accordance with Section 10 of the Rivers and Harbors Act of 1899. Navigable waters of the United States are those that are subject to the ebb and flow of the tide or are presently used, have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Work in or affecting these waterways must be approved by USACE under ~~the~~ Section 10 of the The Rivers and Harbors Act and under ~~CWA~~ Section 404 of the CWA if the activity involves discharging dredged or fill material into waters of the US. ~~and Rivers and Harbors Act Section 10.~~ A CWA Section 401 Individual Water Quality Certification for the proposed Project in Minnesota is ~~under the jurisdiction of USACE – St. Paul District and Minnesota PCA.~~ required. The Minnesota PCA is responsible for CWA Section 401 certification in Minnesota.	Suggested revisions.	401 Cert is required for all Section 404 permits. Section 10 is for work in, under, or over navigable waters. Section 404 is for discharges of dredged or fill material in WOUS, including wetlands.	2280-4
5	ES-8, Consultations and Public Involvement	At the federal level, for example, a U.S. Army Corps of Engineers permit must be obtained for construction ~~across~~ activities that result in impacts to wetlands and at stream and river crossings.	Revise sentence		2280-5
6	5.2.1.3.1 Regulatory Context and Methodology	CWA Section 404 and Rivers and Harbors Act Section 10 Individual Permits and associated state CWA Section 401 Individual Water Quality Certification for the Project in Minnesota are under the jurisdiction of USACE – St. Paul District and Minnesota PCA. USACE requires that projects avoid impacts on wetlands to the extent practicable, potential impacts have been minimized, and may require compensation be provided for unavoidable impacts (addressed below).	General Comment	The Corps' evaluation of a Section 10 and/or a Section 404 permit application involves multiple analyses, including (1) evaluating the proposal's impacts in accordance with the National Environmental Policy Act (NEPA) (33 CFR part 325), (2) determining whether the proposal is contrary to the public interest (33 CFR § 320.4), and (3) in the case of a Section 404 permit, determining whether the proposal complies with the Section 404(b)(1) Guidelines (Guidelines) (40 CFR part 230). If the proposal requires a Section 404 permit application, the Guidelines specifically require that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences" (40 CFR § 230.10(a)).	2280-6

7	5.2.1.3.1 Regulatory Context and Methodology and 6.3.1.3.1 Regulatory Context and Methodology	For CWA Section 401 certification, Minnesota PCA is responsible for non-reservation wetlands in Minnesota, Wisconsin DNR is responsible for wetlands in Wisconsin, and North Dakota DH's Division of Water Quality is responsible for wetlands in North Dakota. Permitting for system alternative SA-04 would require obtaining a CWA Section 401 certification from Iowa DNR and Illinois DNR. Adherence to state-specific general construction and stormwater permit conditions, buffer laws, and other state and local resource protection measures also would be required, which would serve as a duplicative mechanism for oversight and protection of jurisdictional wetland resources.	General Comment	Note: USEPA is responsible for 401 certifications on reservation lands, with the exception of Grand Portage and Fond du Lac Bands in MN, and Mole Lake and Lac du Flambeau Bands in WI, which have their own 401 programs.	2280-7
8	5.2.1.3.1 Regulatory Context and Methodology, page 5-109, Minnesota Wetland Mitigation Bank Easements	Bank credit ratio is reduced if the credit area used is in a different service area than the disturbance area (Minnesota BWSR 2016).	General Comment	The compensatory mitigation ratio can be increased if a compensation site or wetland bank is located in a different Bank Service Area (BSA).	2280-8
9	5.2.1.3.3, Compensatory Mitigation, p 5-120	Compensatory wetland mitigation would be provided by the Applicant for permanent impacts on forested, scrub/shrub, and emergent wetlands as required in the federal and state-specific permits issued. The overall objective of compensatory wetland mitigation would be to compensate for aquatic resource functions lost due to construction of the Applicant's preferred route, taking into consideration what is available and feasible. Although site-specific compensatory wetland mitigation has yet to be identified, it would continue to be considered in consultation with the permitting agencies to minimize and offset wetland impacts. Compensatory wetland mitigation would be consistent with applicable policies, regulations, and rules governing compensatory wetland mitigation for purposes of Section 404 CWA (see Section 5.2.1.3.1).	It should be noted that compensatory mitigation would be required for permanent impacts to other types of wetlands as well. Permanent impacts would include conversion of forested wetlands to other wetland types. Compensatory mitigation via wetland banking is an option that should be included in this discussion.		2280-9
10	5.2.1.3.3, Compensatory Mitigation, p 5-121	For the APR, our understanding was that the total amount of permanent wetland impacts associated with pump stations and valves for the Project (in MN) was 7.24 acres. The total amount of temporary wetland impacts and wetland type conversions, including those for access road construction and cathodic protection areas (in MN) was 988.2 acres.	Understanding the disclosure in this section is for the line from Neche, ND to Superior, WI, check (confirm) impact acreage and classifications for the APR.		2280-10
11	5.2.6.2.1 Applicant's Preferred Route, Federal Land, p 5-413	There are two sites where the APR would cross Corps easement lands (at Lost River and at Sandy River). A consent to cross flowage easement is required to cross easement lands. There is also a crossing at the Red River between MN and ND that may require permission from the Corps (33 USC 408). Section 408 provides that the Secretary of the Army may, upon the recommendation of the Chief of Engineers, grant permission to other entities for the permanent or temporary alteration or use of any USACE Civil Works project.		Enbridge is aware of these sites and will request permissions and easement agreements from the Corps.	2280-11
12	6.3.1.3 Wetlands, p 6-275	General Comment	General information	The Corps defines wetlands as follows: "Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." (33 CFR 328	2280-12
13	6.3.1.3 Wetlands, p 6-275 (and elsewhere in the DEIS)	Throughout the document, "…impacts on wetlands…" is stated. "…impacts to wetlands" would be preferred.	General comment		2280-13
14	6.3.1.3.1 Regulatory Context and Methodology Regulatory Context General Wetlands, Federal and State Jurisdictional Wetlands p 6-275	"Compensatory wetland mitigation may be required in federal and state-specific permitting for permanent impacts on forested, scrub/shrub, and emergent wetlands."	The broad description of the wetlands that may require mitigation excludes bogs and other community types such as open water (PUB) wetland communities that should be included here, in the General Wetlands section of Chapter 5, and elsewhere in the document.		2280-14

15	Specially Designated Wetlands, p 6-277	"Impacts on calcareous fens are regulated by Minnesota DNR under the WCA."	Also regulated by the USACE under CWA 404. Include here and elsewhere in the document.	(Note: The Corps requires a MnDNR-approved Calcareous Fen Management Plan as well for unavoidable impacts to (or near) calcareous fens.	2280-15
16	6.3.1.3.2 Existing Conditions, Wetland Types, p 6-278	"Wetland types crossed by the route alternatives are grouped into three categories: forested wetland, scrub/shrub wetland, and emergent wetland."	See comment 14		2280-16
17	Table 6.3.1.3-3. p 6-281	Related to comments 14 and 16. The impacts to Type 3 & Type 4 shallow marsh and deep marsh wetlands are disclosed in the table but they should be discussed along with the forested, scrub/shrub, and emergent wetlands. (In the route alternatives sections, too). Consider combining Tables 6.3.1.3-1 & 6.3.1.3-3 - and the similar Tables in the route alternative sections if applicable.	General comment	Note: Our review of early plans for the APR indicated that approximately 9.21 acres of PUB (Cowardin) wetlands would be temporarily impacted. Compensatory mitigation may be required for these impacts as well in accordance with District policy and the federal mitigation rule.	2280-17
18	General Wetlands, p 6-280	"...and approximately 234of wetlands"	Typo in 1st paragraph, last sentence		2280-18
19	pp 6-291 through 6-303	The Impact Assessment sections for the APR and RAs are a bit difficult to follow and it might be beneficial to add a brief impact summary for each alternative before moving to the next one.	General comment		2280-19
20	Table 6.3.1.3-15	The comparative tables in the final summary quantifying permanent and temporary impacts associated with each alternative are helpful. Can a column or additional table be added to disclose the permanent and temporary impacts for the ND border to Clearbrook corridor?	General comment		2280-20
21	Chapter 6.3.1.3		General comment	USACE is reviewing the wetland impacts and appendices associated with the APR and Route Alternatives	2280-21
22	6.3.5.1 Regulatory Context and Methodology	The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c)	While not a federally-listed T&E species, the Bald Eagle and their nests remain protected. No known nests along the APR but the Protection Act might be mentioned in this section.	The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c) prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. (Referenced on 6-483)	2280-22
23	Table 6.8-1. Status of Required Permits and Approvals, p 6-751	Row 1: U.S. Army Corps of Engineers – St. Paul District and Minnesota Pollution Control Agency (Minnesota PCA) "Application Submitted and determined Complete (January 28, 2016). Pending Submittal of Revised Application	Add: Pending Submittal of Revised Application		2280-23
24	Table 6.8-1. Status of Required Permits and Approvals, p 6-751	Add Row under Row 1: U.S. Army Corps of Engineers – St. Paul District: Consent and Permission to Cross Flowage Easement and USACE Civil Works project, if needed. (33 USC 408)	Status would be "Not Initiated" for the APR and "Not Initiated" for the Route Alternatives.	Note: This is related to comment 11.	2280-24

Levi, Andrew (COMM)

From: Laszewski, Virginia <Laszewski.Virginia@epa.gov>
Sent: Monday, July 10, 2017 4:38 PM
To: MN_COMM_Pipeline Comments
Cc: MacAlister, Jamie (COMM); Westlake, Kenneth; Walts, Alan
Subject: Proposed Line 3 Pipeline Project DEIS (MnDOC/EERA) (Docket Nos. CN-14-196 and PPL-15-137)
Attachments: MEPA-Line3-DEIS_EPA-Ltr_07-10-2017.pdf

Please see attached file for U.S. EPA (Region 5) letter (dated 07/10/2017) regarding the above referenced Line 3 DEIS. The signed/dated original letter is in the mail. Thank you.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JUL 10 2017

REPLY TO THE ATTENTION OF:

Jamie MacAlister
Energy Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
Saint Paul, Minnesota 55101-2198

Re: Minnesota Department of Commerce, Energy Environmental Review and Analysis Draft Environmental Impact Statement (DEIS) Line 3 Project (May 15, 2017) (Docket Nos. CN-14-916/PPL-15-137)

Dear Ms. MacAlister:

The U.S. Environmental Protection Agency, Region 5 (EPA) appreciates the opportunity to comment on this DEIS, prepared to meet Minnesota's environmental review requirements for determining whether to issue or deny a certificate of need and a route permit for Enbridge Energy's proposed Line 3 replacement project. Our enclosed comments address: the U.S. Department of Justice (on behalf of EPA) / Enbridge consent decree as it pertains to Line 3; EPA and tribal jurisdiction regarding Clean Water Act (CWA) Section 402 National Pollutant Discharge Elimination System (NPDES) discharge permits and construction stormwater permits, 4) CWA Section 401 certification, and 5) Wetlands/Waters of the U.S. and U.S. Army Corps of Engineers CWA Section 404 permit requirements.

I hope these comments will be helpful as Minnesota Department of Commerce completes its environmental review. If you have any questions, please contact me at (312) 886-2910 or westlake.kennth@epa.gov; or Virginia Laszewski of my staff at (312) 886-7501 or laszewski.virginia@epa.gov.

Sincerely,

Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Enforcement and Compliance Assurance

Enclosure: 1

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Shane Bowe, Water Resources Program Director, SBowe@redlakenation.org

EPA Comments on the Minnesota Department of Commerce Energy Environmental Review and Analysis (MnDOC/EERA) Draft Environmental Impact Statement (DEIS) for Enbridge Energy's (Enbridge) Proposed Line 3 Project (May 15, 2017) Aitkin, Beltrami, Benton, Carlton, Cass, Clearwater, Crow Wing, Hubbard, Itasca, Kanabec, Kittson, Marshall, Mille Lacs, Morrison, Pennington, Pine, Polk, Red Lake, St. Louis, and Todd Counties, Minnesota

U.S. Department of Justice (on behalf of U.S. Environmental Protection Agency) / Enbridge Energy Consent Decree

Page ES-10 of the DEIS states *"The January 2017 revised Consent Decree entered between Enbridge and the U.S. Department of Justice on behalf of the U.S. Environmental Protection Agency and the U.S. Coast Guard . . . provides a framework to allow ongoing operation of the existing Line 3. While this framework would require heightened integrity work and progressive decreases in operating pressure, continued operation of existing Line 3 is not impossible."* Similarly, Page 2-4 of the DEIS states *"A consent decree between Enbridge and the U.S. Department of Justice entered by the Justice Department in September 2016 on behalf of the U.S. Environmental Protection Agency and the U.S. Coast Guard . . . requires replacement or heightened integrity work on the Existing Line 3."*

On May 23, 2017, the Western District of Michigan entered a revised Consent Decree following public comment. Paragraph 22 of this Consent Decree requires Enbridge to seek all approvals necessary for the replacement of Line 3 and replace Line 3 as expeditiously as practicable, provided that Enbridge receives those approvals. Until decommissioning Line 3, Enbridge shall limit its operating pressure, as required in Paragraph 22.c of the Consent Decree. If Enbridge has not taken Line 3 out of service by December 31, 2017, it shall comply with additional pipeline integrity requirements in Paragraph 22.d of the Consent Decree.

Recommendation: The Final EIS should clarify and update statements regarding the Consent Decree as necessary. If the Consent Decree is lodged before the Final EIS, this should be noted as well. 2279-1

National Pollutant Discharge Elimination System (NPDES) 402 permits

Page 3-13, Chapter 3 Regulatory Framework, of the DEIS states *"There are seven Anishinaabe (Ojibwe) and four Dakota (Sioux) reservations in Minnesota. Each reservation and community is an American Indian tribal nation and is a distinct, sovereign government. The Applicant's preferred route and route alternatives evaluated in this EIS run near several tribal reservations. In addition, as part of the Project, Enbridge proposes to abandon the existing Line 3, which currently traverses the Leech Lake and Fond du Lac Indian reservations. Abandonment of the line could affect tribal resources within these reservations."* The DEIS also states *"Two route alternatives analyzed in this EIS (RA-07 and RA-08) cross the Leech Lake Indian Reservation and three route alternatives (RA-06, RA-07, and RA-08) cross the Fond du Lac Indian Reservation."*

If a new Line 3 would be constructed within or along Enbridge's Mainline System right of way (r-o-w) and/or the existing Line 3 is abandoned in-place or removed from the r-o-w within the exterior boundaries of a reservation, then CWA Section 402 NPDES discharge and/or construction stormwater permits would likely be required; and EPA would be the permitting authority within the exterior boundaries of the reservations.

Recommendation: The Final EIS should identify EPA's CWA Section 402 NPDES discharge and stormwater construction permitting authority within the Leech Lake and the Fond du Lace Reservations, including in Table 3.6-1 (page 3-10). 2279-2

Wetlands/Waters of the U.S.

Section 6.3.1.2 (Surface Water, Regulatory Context, Wild Rice Waterbodies, pages 6-188 and 6-189) indicates that tribal regulations related to the harvest and protection of wild rice within reservation boundaries vary by tribe and are managed by tribe-specific wild rice committees.

Recommendation: The Final EIS should identify potentially affected tribes and include tribe-specific information to the extent it is available. 2279-3

The Draft EIS quantifies wetland impacts for each of the alternative routes; but would benefit from including more complete information on the condition and quality of impacted wetlands.

Recommendation: As practicable, the Final EIS should address the condition and quality of impacted wetlands. This information should be readily-available from the Section 404 permit application (see next Recommendation). Means for describing wetland quality include: functional assessment by using the Minnesota Rapid Assessment Methodology or Floristic Quality Assessment, or by comparing project wetlands to nearby reference wetlands using existing monitoring information in state wetland information databases. 2279-4

Chapter 5 states that comprehensive quantitative data is not available pending selection of an alternative, and that field surveys and engineering would result in route refinement and methods to avoid and minimize impacts to wetlands and waterbodies. Consequently, the alternatives analysis for the CWA Section 404 permit would likely be insufficient at this stage. Further, indirect or secondary effects wouldn't necessarily be comprehensive enough for a 404 review. However, Table 6.8-1 of the EIS indicates that a Clean Water Act Section 404 permit application was submitted to the Army Corps of Engineers and determined to be complete on January 28, 2016. The level of detail a CWA 404 permit application contains (e.g., certified wetland delineation, wetland condition and quality, project-specific minimization and avoidance measures) is typically greater than the detail found in an EIS.

Recommendation: To provide further detail about the potential environmental impacts of this project, the Final EIS should include the CWA 404 application. 2279-5

Section 6.3.1.3.1 (Wetlands Section, Page 6-276) discusses regulatory authority for CWA Section 401 water quality certification. It does not indicate that EPA is the certifying authority 2279-6

2279-6 Cont'd

for discharges within the Leech Lake Indian Reservation. In addition, Table 6.8-1 notes that the Fond du Lac Band is the certifying authority for discharges occurring within the Fond du Lac Indian Reservation; but this information is not included in the narrative in Section 6.3.1.3.1.

Recommendation: The Final EIS should reflect EPA and tribal jurisdiction as noted above.

2279-7

Each tribe may have additional details on the existing conditions of surface waters and wetlands within their boundaries. The DEIS does not discuss whether this information was collected and considered.

Recommendation: The Final EIS should identify whether such information was collected and considered. If such information is available, we suggest including it in the Final EIS.

2279-8

Wetlands Section, Page 6-281, indicates that no wetlands that are part of the Minnesota Board of Water and Soil Resources Mitigation Banking Program would be crossed by the preferred route. While most mitigation banks in Minnesota have both state and federal approval, some are only federally approved.

Recommendation: The Final EIS should also indicate whether a route crosses a federally approved U.S. Army Corps of Engineers mitigation bank.

Levi, Andrew (COMM)

From: Eldon McIlwain <Eldon.McIlwain@gov.ab.ca>
Sent: Monday, July 10, 2017 6:56 PM
To: Contact, Commissioner (COMM)
Cc: MN_COMM_Pipeline Comments; Doug Lammie; Carrie Clifford; ryan loney
Subject: Government of Alberta Technical Submission
Attachments: Technical Submission.docx; Government of Alberta - Minister Letter.pdf

Commissioner Mike Rothman,

On behalf of the Minister of Energy for the Government of Alberta, attached please find our written comments on the Draft Environmental Impact Statement in support of the Enbridge Line 3 Replacement Project.

Thank you

Eldon McIlwain Chief of Staff
Office of the Deputy Minister | Alberta Energy
T: 780.638.5654 E: eldon.mcilwain@gov.ab.ca

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ALBERTA
ENERGY

Office of the Minister
MLA, Dunvegan-Central Peace-Notley

AR28503

July 10, 2017

Mr. Mike Rothman
Commissioner
Minnesota Department of Commerce
Golden Rule Building
Suite 280, 85 7th Place East
Saint Paul MN 55101
U.S.A.

CN-14-916 and PPL-15-137

Dear Mr. Rothman:

I am writing to provide the Government of Alberta's written comments on the Draft Environmental Impact Statement in support of the Enbridge Line 3 Replacement Project. Alberta supports Line 3, as this pipeline is part of a large, integrated energy and economic system that generates jobs for millions of Americans and Albertans.

Please find Alberta's submission enclosed, which includes:

- an updated account of Alberta and Canada's recent climate action initiatives;
- an overview of Alberta's oil sands and greenhouse gas emission intensity; and
- information on the behaviour of diluted bitumen.

In addition to Alberta's unwavering support, I also want to take this opportunity to reiterate Canada's approval of the Canadian portion of the Line 3 Replacement Project. The approval occurred on November 29, 2016, following an extensive regulatory review process.

Carefully monitored, carefully regulated pipelines remain the safest, most efficient way to transport energy resources. Pipeline companies are subject to various regulations and are required to meet specific standards. Companies are also required to create a management system and protection programs that anticipate, prevent, manage and mitigate potentially dangerous conditions associated with their pipelines.

.../2

324 Legislature Building, Edmonton, Alberta T5K 2B6 Canada Telephone 780-427-3740 Fax 780-644-1222

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Not only will the Line 3 replacement make the transportation of crude safer and more reliable, this project will create an estimated 15,952 temporary full-time equivalent jobs in Minnesota. The total economic benefit of the project for Minnesota is estimated at $2.47 billion during construction. Furthermore, the project will contribute more than $19.56 million in tax benefits to the local economy through the design and construction phase.

Beyond the benefits of Enbridge Line 3, I also want to take this opportunity to remind you of Alberta's long-standing ties with the U.S. We have a long history of trade and cooperation, and we are committed to our mutually beneficial relationship to create jobs and grow the economy on both sides of the border.

Alberta is the U.S.' largest and most trusted energy partner, and the American economy greatly benefits from the contribution of our energy exports. In 2016, Alberta supplied approximately 34 per cent of U.S. oil imports, and provided 99.6 per cent of the crude imported into PADD 2, fuelling the economy of the U.S. Midwest. Between 2010 and 2014, 37,000 Americans worked in Alberta contributing to Alberta's growth while supporting families throughout the U.S. Additionally, 28 firms from Minnesota supply equipment, parts and services to Alberta's oil sands.

Alberta values its role in integrated North American energy markets and is committed to its longstanding status as a reliable supplier of energy to the U.S. By importing Alberta's oil, the U.S. gets a safe and stable supply of energy produced under one of the most ambitious climate policy frameworks in the world. We are proud to be the first jurisdiction in the world to voluntarily legislate a limit on oil sands emissions growth. With Alberta's oil sands currently emitting about 70 megatonnes per year, the 100 megatonne per year emissions cap for oil sands producers allows for continued growth while at the same time ensuring future growth is responsibly managed.

Trade generates employment for millions of workers in Alberta and in the U.S. Furthermore, Alberta's bilateral trading relationship with the U.S. accounted for more than $84 billion in 2016. Bilateral trade between Alberta and the U.S. is estimated to create more than 700,000 jobs in Alberta and nearly one million (966,827) jobs in the U.S. Alberta is also an important consumer of U.S. goods, with approximately two thirds (66 per cent) of Alberta's total international imports coming from the U.S., including in the following sectors: mining and oil and gas; machinery and electrical; transportation; and agriculture and food.

Trade between Alberta and Minnesota is also considerable—it totaled more than $3.2 billion in 2016, including $164 million worth of goods exported from Minnesota to Alberta. It is estimated that approximately 23,500 jobs in Minnesota are the result of merchandise and services exports to Alberta.

It cannot be disputed that Alberta's ties with the U.S. run strong and deep. With that said, I would like to again reiterate the Government of Alberta's support for the Enbridge Line 3 pipeline.

.../3

This pipeline is just one example of our interconnectedness, and I appreciate the opportunity to provide a submission outlining current information on Alberta's oil sands, including how they are produced in an environmentally responsible manner.

If you have any questions, please don't hesitate to contact my office.

Sincerely,

Minister McCuaig-Boyd

Enclosure

cc: Honourable Rachel Notley
Premier of Alberta

Honourable Deron Bilous
Minister of Economic Development and Trade

Honourable Margaret McCuaig-Boyd
Minister of Energy

Gitane De Silva
Alberta's Senior Representative to the United States of America

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce

Alberta Government

Minnesota Department of Commerce Draft Environmental Impact Statement for the Enbridge Line 3 Replacement Project

GOVERNMENT of ALBERTA TECHNICAL SUBMISSION

The Government of Alberta has reviewed the Draft Environmental Impact Statement (DEIS) prepared by the Minnesota Department of Commerce (Department) for Enbridge's Line 3 Replacement Project. Alberta appreciates the opportunity to provide comments on the potential impacts associated with the Minnesota Public Utilities Commission's upcoming decision on whether or not to approve the Certificate of Need and route permit application submitted by Enbridge Energy, Limited Partnership, on April 24, 2016. The submission will focus on seven areas of the DEIS: scope; abandonment; tribal monitoring program; pipeline safety; Alberta and Canada's recent climate action initiatives; Alberta's oil sands and greenhouse gas emission intensity; and the behaviour of diluted bitumen in water.

Scope

Although the Government of Alberta did not have the opportunity to provide comments on the scope of the DEIS during the 45-day comment period, ending on May 26, 2016, Alberta would like to note it is pleased to hear that the following will be considered to be outside of the scope of the DEIS for a single pipeline:

- larger energy policy issues; and
- comprehensive policy-level assessment of fossil fuels in our society and associated tribal rights.

It is concerning, however, that the following is stated on page four of Chapter 1 - Introduction:

> *"…the environmental review and permitting procedure for the Project presents an opportunity for a full evaluation of environmental and socioeconomic factors that did not necessarily enter into the original routing decisions for Enbridge's Mainline system."*

While the Government of Alberta does recognize that the original Mainline was not subject to state or federal environmental review or state procedures for Certificate of Need and route permitting, Alberta does not believe that this current review of the proposed Line 3 Replacement Project is the appropriate venue to have a *full evaluation of environmental and socioeconomic factors* on the Mainline that has been in service since the 1960s. The proposed Line 3 Replacement Project is an integrity program intended to ensure the safety and reliability of the Mainline system. The Government of Alberta believes it would be imprudent to delay the proposed integrity program to conduct a comprehensive retrospective review of the Mainline system. 2600-1

Abandonment

The Government of Alberta understands that the removal of the existing Line 3 would not be the ideal option in the case of this proposed project, mainly as a result of various other pipelines running along the same right-of-way of the existing line. Alberta is encouraged that the DEIS states on page 22 of the Executive Summary:

> *"Although removing the pipeline is potentially desirable, abandonment is easier and far less risky."*

Tribal Monitoring Program

Section 9.5.4 of the Line 3 DEIS states:

Alberta Government

> *"While non-quantifiable impacts are difficult, if not impossible, to mitigate, tribes feel they should be entrusted with the inspection, monitoring, and maintenance activities in and through their lands and territories as they are most familiar with their resources. If tribes were given a more active role in the monitoring and inspection of pipelines, they would be better prepared to address leaks or spills that could occur within reservation boundaries."*

The Government of Alberta would like to note that the above noted request from tribes is not uncommon, and has been addressed in previous regulatory hearings for oil pipeline projects. During the U.S. Department of State's review of TransCanada's Keystone XL project in 2012, a Tribal Monitoring Plan was included in Appendix E of the Final Supplemental Environmental Impact Statement (https://2012-keystonepipeline-xl.state.gov/documents/organization/221220.pdf). The Keystone XL impact statement's plan would warrant tribal monitoring during clearing and trenching for potential religious and cultural effects to tribal groups.

On the Canadian side of the border, the Line 3 Replacement Project was approved by the federal government, subject to 89 conditions that were developed by the National Energy Board (NEB). The NEB regulates the construction, operation, and abandonment of pipelines that cross international borders or provincial boundaries, as well as related pipeline tolls and tariffs. Before making a public interest decision or recommendation, the NEB factors in economic, environmental, and social considerations. One of the conditions for the Line 3 Replacement Project is an Aboriginal Monitoring Plan (page 235 of the NEB Report – Enbridge Line 3 Replacement Detailed Assessment, https://apps.neb-one.gc.ca/REGDOCS/File/Download/2949687) on the Canadian side of the border, where Enbridge is required to file a plan describing participation by Aboriginal groups in monitoring during construction. Enbridge will then be required to follow through with this plan during the construction period of the project.

Pipeline Safety

In Chapter 10 – Accidental Crude Oil Releases, section 10.2.1.1.2, the DEIS references the Alberta Energy Regulator (AER) for Alberta pipeline data in relation to safety and spill history. The DEIS notes that AER regulated pipelines are typically smaller in diameter and do not necessarily carry the same products as the proposed Line 3 Replacement Project will. Given that pipelines regulated under the AER have different physical characteristics and are regulated under different acts and regulations than NEB regulated pipelines, such as Line 3, this could result in an overestimation of Line 3 Replacement pipeline failure probabilities. The Government of Alberta would like to direct the Department to the NEB website, where more comparable pipeline safety information can be found for Canada. As mentioned above, the NEB regulates cross-border pipelines and is responsible for regulating the Line 3 Replacement Project on the Canadian side of the border. The pipeline safety portion of the NEB website can be reached here: http://www.neb-one.gc.ca/sftnvrnmnt/sft/index-eng.html. The NEB is a life-cycle regulator, continually requiring pipeline companies to evaluate and improve the effectiveness of their management systems.

Alberta and Canada's Recent Climate Action Initiatives

Alberta and Canada have taken major steps to mitigate climate change. Recent Alberta legislation and Canadian federal policy initiatives aiming to limit greenhouse gas (GHG) emissions should be considered when calculating cumulative impacts on climate change in section 5.3.7 of the DEIS.

Alberta

Alberta has stringent environmental standards and environmental assessment processes for all resource development. The province's comprehensive regulatory system for environment management is guided by key pieces of legislation including the *Environmental Protection and Enhancement Act* (EPEA), *Water Act*, *Public Lands Act*, and *Oil Sands Conservation Act*. EPEA approvals set out conditions for construction, operation, and reclamation of large industrial and mining activities in Alberta. Conditions include limits on releases to the environment (air and water), monitoring and reporting requirements, and expectations for participation in multi-stakeholder initiatives. Prior to any oil sands facility being built, the operator must obtain approvals that ensure achievement of environmental standards and management objectives set out in the regulations, policies, and plans. Projects undergo a thorough environmental assessment that ensures adequate information is provided by the proponent to make a decision on an activity.

Alberta became the first jurisdiction in North America to legislate greenhouse gas emission reductions for large industrial facilities through the Specified Gas Emitters Regulation (SGER). This regulation required facilities emitting 100,000 tonnes or more of GHGs a year to reduce their emissions intensity.

In 2018, Alberta will transition from the current SGER to an output-based allocation system. Under this new system, benchmarks will be set relative to high-performing (low emitting) industry peers or competitors who produce the same or similar products. The transition will ensure that incentives exist for continuous improvement in emissions intensity.

In 2015, the Government of Alberta released its Climate Leadership Plan (CLP). The CLP has four main policy areas:

- Implementing a carbon price across all sectors, which starts at $20 per tonne in 2017 and increases to $30 in 2018;
- Ending pollution from coal-generated electricity by 2030;
- Capping oil sands emissions to 100 mega tonnes (MT) per year; and
- Reducing methane emissions by 45% by 2025.

Alberta's legislated cap of 100 MT is a major step toward reducing emissions. Alberta is proud to be the first political jurisdiction in the world to voluntarily legislate a limit on emissions growth. The implications of this cap are important. It will help bend Alberta's overall emissions trajectory downward and allow Alberta to sell its product into global markets as one of the world's most progressive and forward-looking energy producers.

Canada

As part of the Pan-Canadian Framework on Clean Growth and Climate Change, the Government of Canada has reaffirmed its commitment to reducing methane emissions from the oil and gas sector by 40 to 45 per cent from 2012 levels by 2025. Environment and Climate Change Canada has developed proposed regulations that would reduce cumulative GHG emissions by 282 MT of carbon dioxide equivalent over an 18-year period. [1]

[1] https://www.canada.ca/en/services/environment/weather/climatechange/climate-action/technical-backgrounder-proposed-federal-methane-regulations-oil-gas-sector.html

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The Pan-Canadian Framework also includes a federal carbon pollution pricing backstop, composed of two elements[2]. The first element consists of applying a carbon levy to fossil fuels, starting at $10 per tonne in 2018 and increasing to $50 per tonne by 2022. The second element would implement an output-based pricing system for industrial facilities that emit above a 50,000 tonnes of carbon dioxide equivalent, with an opt-in capability for smaller facilities with emissions below the threshold. This output-based pricing will come into effect on January 1, 2019.

Alberta's Oil Sands and Greenhouse Gas Emission Intensity

Through its internal analysis, the Government of Alberta concludes that the approval of the Enbridge Line 3 Replacement Project is not expected to affect demand for Canadian crude oil in the U.S. or Canadian crude oil production in general. Market forces (e.g. price of crude) will determine Canadian crude oil demand in the U.S. and crude oil production in Canada. The decision on the Line 3 Replacement would only affect how crude oil is transported from Canada to U.S. refineries. Should the project not be built, more crude oil could travel to U.S. refineries by rail, increasing emissions, as rail is more emissions intensive compared to pipeline transport. This has also been confirmed in the U.S. Department of State's Final Supplemental Environmental Impact Statement (FSEIS) for TransCanada's Keystone XL project.[3]

Lifecycle Emissions

The Minnesota Department of Commerce utilized the Department of State's (DoS) 2017 Enbridge Line 67 Draft Supplemental Environmental Impact Statement (DSEIS) to develop the GHG lifecycle assessment for the Line 3 Replacement DEIS for a Certificate of Need and route permit. The Department bases the lifecycle GHG emissions for the Line 3 Replacement, and the subsequent 30-year social cost of carbon calculation, on a single point estimate, 632 kg CO_2-*e*/barrel of crude oil, for heavy Western Canadian Sedimentary Basin (WCSB) crude oil developed by the DoS using the Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) Model. Alberta believes that GHG estimates should consider the following three points: the continuum of GHG intensities rather than single point estimates, advances in oil sands technology and implementation of climate change policies, and the treatment of petroleum coke.

1. Although lifecycle GHG emissions estimates are frequently reported in various studies as single point estimates, commonly traded crude oils fall on a continuum of GHG intensities, or exhibit incremental differences. Using single point GHG estimate implies categorization of crude streams, which results in "step-change" differences with no overlap, which may not be valid.

In Table 5.2.7-10., the Department provides two values for GHG emissions intensity for heavy WCSB crude oil, both obtained from the Line 67 DSEIS. The lower value, 584 kg CO_2-*e*/barrel of crude oil, was developed from a weighted average of various studies (Table 6-7 of Line 67 DSEIS), and the higher value, 632 kg CO_2-*e*/barrel of crude oil, was developed through GREET modeling. The DoS single-point estimates for heavy WCSB crude oil do not consider the following:

- There is a wide range of different crude oils that could exist within any one pathway. For example, Suncor's synthetic crude (OSA) and Syncrude's sweet premium (SSP) crude oils have different GHG intensities, but would belong to the same pathway ("mining and upgrading" as identified in Table 6-7 of the Line 67 Expansion DSEIS).

[2] https://www.canada.ca/content/dam/eccc/documents/pdf/20170518-1-en.pdf
[3] https://2012-keystonepipeline-xl.state.gov/documents/organization/221198.pdf

- A range of GHG intensities exists for heavy WCSB crude oil, in part due to processing technologies, as seen in Figure ES-9 below.[4]

Figure ES-9.
Carbon Intensity of Producing Diesel from Heavy Alberta Crude Oils

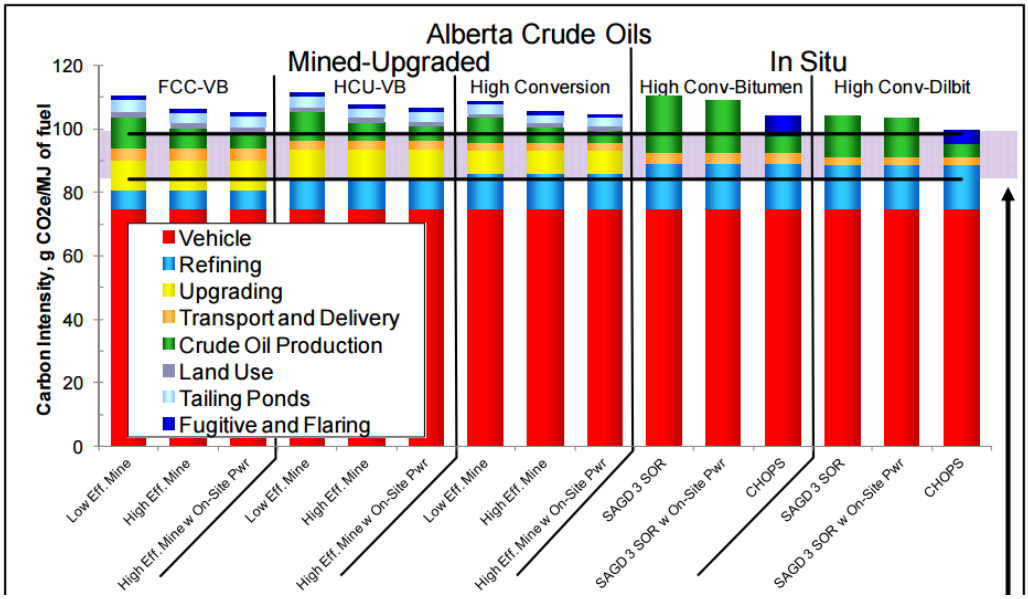

(from Jacobs Consultancy, "EU Pathway Study: Life Cycle Assessment of Crude Oils in a European Context", March 2012)

- In comparing WCSB crude oils with other crude oils, the DoS combines various studies and different assumptions in modeling well-to-wheels[5] (WTW) GHG emissions. The issue with such an approach is that it is not valid to directly compare the absolute GHG emission estimates among studies with different assumptions and methodologies. Accurate WTW GHG estimates require a consistent methodology applied to all fuel pathways and their individual WTW stages[6].
- In Table 5.2.7-10., single-point estimates for GHG intensities are provided for various crude oil types. In reality, a range of GHG intensities exists for all crudes, and these ranges may overlap such that the distinction between crude types is not statistically significant.

Data quality and availability are two of the most important factors in lifecycle emissions estimations. Presentation of single-point estimates of GHG intensity without associated errors or confidence intervals may perpetuate the impression that a single estimate adequately reflects the GHG intensity of a given crude oil.

- In particular, there is limited high-quality data available for crude oils outside of Canada and the U.S. For most other crudes, lifecycle emissions studies need to make many assumptions, leading to high uncertainty in comparing the crudes. Additionally, it should

[4] Jacobs Consultancy, "EU Pathway Study: Life Cycle Assessment of Crude Oils in a European Context", March 2012
[5] Well-to-Wheels is the assessment of the environmental impact of a given product or service throughout its entire lifespan.
[6] Jacobs Consultancy, "EU Pathway Study: Life Cycle Assessment of Crude Oils in a European Context", March 2012

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be acknowledged that Alberta crude oil production data is among the best available in the world, and third-party audited[7].

- It is important to recognize that the GHG intensity across a crude oil's lifecycle is typically estimated or modeled, but not measured. As a result, many assumptions in the estimation or modeling process can change the outcome of any GHG estimates significantly. Hence, measured data would exhibit less data uncertainty compared to modeled data.

In Table 5.2.7-10., the Department provides 584 and 632 kg CO_2-*e*/barrel of crude oil for GHG emissions intensity for heavy WCSB crude oil, both of which are higher than other commonly referenced WTW lifecycle assessment reports and studies shown in Table 6-12 of Appendix U of the DoS' FSEIS for the Keystone XL Project released in January 2014 (533-568 kg CO_2-*e*/barrel of crude oil as shown in the WCSB rows in table below).

Table 6-12 WTW GHG Emissions per Barrel for Reference Crudes, by Study and Lifecycle Stage

		GHG Emissions kgCO_2e per Barrel of Gasoline and Distillates[a]					
Study	Crude Type	Crude Oil Production	Crude Oil Transport	Refining	Finished Fuel Transport	Fuel Combustion	WTW Total
Jacobs	Middle Eastern Sour	43	15	69	2	396	526
	Mexican Maya	68	6	74	2	398	549
	Venezuelan	52	7	86	2	405	553
	WCSB	96	1	71	2	387	557
TIAX	Middle Eastern Sour	1	5	59	IE	390	456
	Mexican Maya	17	1	63	IE	390	470
	Venezuelan	55	1	67	IE	390	513
	WCSB	74	9	59	IE	390	533
NETL	U.S Average (2005)	36	7	47	5	393	488
	Middle Eastern Sour	13	15	55	5	393	480
	Mexican Maya	36	6	70	5	393	510
	Venezuelan	23	6	58	5	393	485
	WCSB	105	5	61	5	393	568

2600-2

The Government of Alberta recommends the Department review and incorporate the DoS process and/or data from the Keystone XL FSEIS (2014) in the Line 3 DEIS. The FSEIS established criteria and followed an explicit process to select studies to complete further GHG lifecycle analyses. In contrast, in the Line 67 DSEIS, the DoS (2017) did not provide criteria or the analytical process to determine GHG intensities for various crude oils.

- The DoS states in the Line 67 DSEIS that all lifecycle emissions calculations are based on the average of values for pathways by selected studies. In Table 6-1 of Appendix U of the DoS' FSEIS for the Keystone XL project (see below), the DoS provided the criteria used to develop a weighted-average GHG estimate for WCSB oil sands crude (2014). Based on the criteria shown in Table 6-1, the DoS selected the Jacobs (2009), TIAX (2009), and NETL (2008, 2009) studies in developing averages for the WCSB crude mix for Keystone XL.

[7] Jacobs Consultancy, "EU Pathway Study: Life Cycle Assessment of Crude Oils in a European Context", March 2012

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Table 6-1 Evaluation of Studies that Provided Sufficient Independent, Comprehensive Information to Develop Weighted-Average GHG Emissions Estimates for WCSB Oil Sands Crudes

Study	Type	Includes crudes likely transported by proposed Project	Evaluates full WTW GHG emissions	Does not average across same studies already included in review	Meets criteria
NETL 2008; 2009	Individual LCA	Y[a]	Y	Y	Y
IEA 2010[b]	Meta-analysis	N[c]	Y	N	N
IHS CERA, 2010	Meta-analysis	Y	Y	N	N
IHS CERA, 2011	Meta-analysis	Y	Y	N	N
IHS CERA, 2012	Meta-analysis	Y	Y	N	N
NRDC, 2010	Meta-analysis	Y	Y	N	N
ICCT, 2010	Individual LCA	N[d]	N[e]	Y	N
Jacobs, 2009	Individual LCA	Y	Y	Y	Y
Jacobs, 2012	Individual LCA	Y	Y	Y	Y[7]
TIAX, 2009	Individual LCA	Y	Y	Y	Y
Charpentier et al., 2009	Meta-analysis	N[f]	Y	N	N
Brandt, 2011	Meta-analysis	Y	Y	N	N
RAND, 2008	Individual LCA	N[g]	N[h]	N	N
Charpentier et al., 2011a	Partial LCA	Y	N[i]	Y	N
Bergerson et al., 2012a	Partial LCA	Y	N[i]	Y	N
CARB OPGEE, 2013a	Model	Y	N	Y	N
Pembina Institute, 2005	Partial LCA	N[j]	N[k]	Y	N
Pembina Institute, 2006	Partial LCA	N[l2]	N[k]	Y	N
McCann, 2001	Individual LCA	N[m]	Y[n]	Y	N
GHGenius, 2010	Model	N[o]	Y	Y	N
GREET, 2010	Model	N[p]	Y	Y	N
Rooney et al., 2012	Land use change journal article	N[q]	N[q]	Y	N
Yeh et al., 2010	Land use change journal article	N[r]	N[r]	Y	N

- The DoS provided a summary of key design factors used in studies reviewed for the Keystone XL FSEIS.

Table 4-13 Summary of Key Study Design Features that Influence GHG Results

Estimated Relative WTW Impact:[a]		High					Medium				Low
Source	Data Reference Year(s)	Petroleum coke combustion[b]	Cogeneration credit[c]	Upstream production of fuels included[d]	Flaring/ venting GHG emissions included	Capital equipment included[e]	Refinery emissions account for upgrading[f]	Local and indirect land use change included	Methane emissions from tailing ponds included	Fugitive leaks included	Methane emissions from mine face
NETL, 2008	2005	No	NS	Yes	Yes	No	No	No	NS	Yes	NS
NETL, 2009	2005	No	NS	Yes	Yes	No	No	No	NS	NS	NS
IEA, 2010	2005-2009	NS	NS	Yes	NS	NS	NA	No	Yes	NS	NS
IHS CERA, 2010, 2011, 2012	~2005-2030	V	V	No	NS	NS	NA	No	V	NS	V
NRDC, 2010	2006-2010	NS[g]	NS[g]	P	NS	NS	NA	No	NS	NS	NS
ICCT, 2010	2009	NS	No	P	Yes	No	No	No	NS	Yes	NS
Jacobs, 2009	2000s	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes	No
Jacobs, 2012	2000s	Yes	No[h]	Yes	Yes	No	Yes	Local	Yes	Yes	Yes
TIAX, 2009	2007-2009	P	P	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Charpentier, et al., 2009	1999-2008	NS[g]	NS[g]	V	NS	V	NA	No	NS	NS	NS
Brandt, 2011	V	V	V	NS[g]	V	NS[g]	V	V	V	V	V
RAND, 2008	2000s	NS	NS	NS	Yes	No	No	No	Yes	Yes	Yes
Charpentier et al. 2011a	2009	No	Yes[i]	Yes	Yes	No	NA	No	No	Yes	NS
Bergerson et al. 2012a	2009	No	Yes[i]	Yes	Yes	No	NA	No	No	Yes	NS
CARB OPGEE, 2013a	1990s, 2000s	No	NS	Yes	Yes	No	NA	Yes			
Pembina Institute, 2005	2000, 2004	NS	NS	NS	P	No	No	No	NS	P	NS
Pembina Institute, 2006	2002-2005	NS	NS	No	P	No	No	No	Yes	Yes	Yes
McCann, 2001	2007	P	NS	Yes	NS	No	NS	No	NS	NS	NS
GHGenius, 2010	Current	Yes	No	Yes	Yes	No	NS	Local	Yes	Yes	Yes
GREET, 2010	Current	NS	NS	Yes	Yes	No	NS	No	NS	Yes	NS
Rooney, et al., 2012	1990s, 2000s	NA	NA	NA	NA	NA	NA	Local	No	NA	NA
Yeh, et al., 2010	2000s	NA	NA	NA	NA	NA	NA	Local	Yes	NA	NA

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2600-2 Cont'd

- Studies completed since the DoS published the FSEIS for the Keystone XL Project were not considered by the DoS in the Line 67 DSEIS. The Government of Alberta recommends the Department review more recent studies, including IHS Energy's Special Report "Comparing GHG Intensity of the Oil Sands and the Average US Crude Oil" (2014).

2600-3

The Government of Alberta recommends the Department modifying Table 5.2.7-11 to reflect a range of possible values, recognizing that GHG intensities of heavy WCSB crude oil actually fall on a continuum. The table below provides analysis based on both 584 and 632 kg CO_2-*e*/barrel of crude oil, which the Department provided in Table 5.2.7-10, rather than being based on only the higher value of the range (632 kg CO_2-*e*/barrel of crude oil). In addition, it is recommended that a description of the input data and assumptions for the analysis completed for Table 5.2.7-11 be provided either in the table preamble text or a footnote to the table.

2600-4

The Government of Alberta also recommends the Department add another displacement scenario in Table 5.2.7-11, where 760,000 barrels per day (bpd) of WCSB heavy crude oil displaces the 390,000 bpd of WCSB light crude oil from the existing Line 3 and 370,000 bpd of Venezuelan heavy crude oil, as shown below. The 390,000 bpd of light crude oil volumes displaced on Line 3 would potentially displace heavy crude oil volumes elsewhere on the Enbridge Mainline or on the rail transport system. This displacement scenario could potentially alter the overall GHG emissions impact for the Line 3 project and can be found in the fourth row of the table below, where crude imported from Canada displaces crude imported from Venezuela[1].

Table 5.2.7-11 Average Life-Cycle Greenhouse Gas Emissions for Various Crude Oils
Adapted from original with Government of Alberta calculations (Row 2, 3 and 4)

Scenario	Annual Life-Cycle GHG Emissions (million tons CO2-e)	Incremental Annual Life-Cycle GHG Emissions (million tons CO2-e)	30-Year SCC for Incremental Life-Cycle GHG Emissions (2007 dollars)
Existing Line 3 (390,000 bpd WCSB Light)	80.5	0	0 billion
Line 3 Replacement (760,000 bpd WCSB Heavy) - No displacement	259 - 273.5	178.5 - 193	265 - 287 billion
Line 3 Replacement (760,000 bpd WCSB Heavy) - Displaces 390,000 bpd WCSB Light and 370,000 U.S. Light Tight Oil	102 - 115.5	21.5 - 35	32 - 52 billion
Line 3 Replacement (760,000 bpd WCSB Heavy) - Displaces 390,000 bpd WCSB Light and 370,000 Venezuelan Heavy	95.5 - 110.5	15 - 30	22 - 44 billion

[1] https://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_epc0_im0_mbblpd_a.htm

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2. Lifecycle emissions should account for future crude volume projections, anticipated industry trends with respect to advances in oil sands technology, and the implementation of various climate change policies.

Data from Stanford University's Oil Production Greenhouse Gas Emissions Estimator (OPGEE) and Jacobs Consultancy (2009, 2012, 2014) demonstrate reduction in carbon (GHG) intensity of production/extraction of Alberta oil sands crude since 2000. Technological development has substantially reduced the energy intensity of extracting Alberta oil sands.

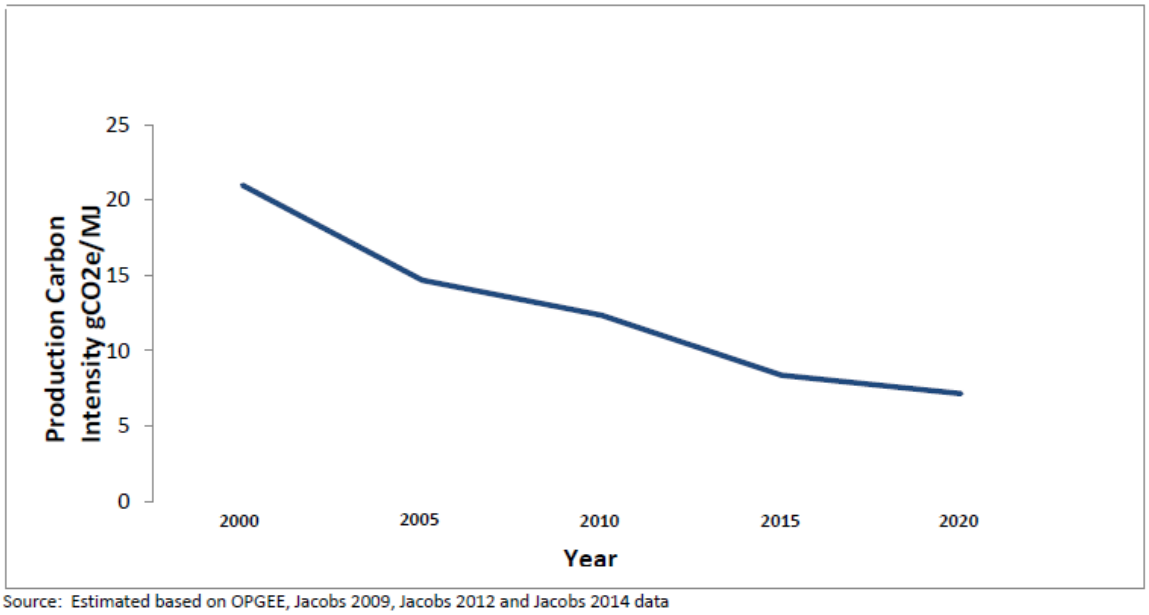

Source: Estimated based on OPGEE, Jacobs 2009, Jacobs 2012 and Jacobs 2014 data

The Line 67 DSEIS appears to calculate Line 67 crude mix volumes depicted in Figure 6-20 solely on volumes obtained from the 2013 AER ST-39[8]. It is recommended that crude mix volumes be calculated based on future projections (e.g. Canadian Association of Petroleum Producers (CAPP) or NEB forecasts).

Alberta oil sands production using primary oil production methods has averaged ~250,000 bpd from 2014-2016[9], however, a primary oil production pathway was not included in Figure 6-20 nor Table 6-7 in the Line 67 Draft SEIS.

- Primary oil production projects, primarily located in the Wabasca and Peace River oil sands regions may contribute to the Line 3 overall crude oil mix.
- WTW lifecycle emissions for Canadian crudes utilizing primary production methods such as CHOPS is ~513 $kgCO_2$(eq)/bbl of refined product[10].

With respect to future changes in crude oil production technology, the use of paraffinic froth treatment (PFT) technology is expected to grow (e.g. recent expansion of Imperial's Kearl Project, and future

[8] Alberta Energy Regulator, 2014
[9] Alberta Oil Sands Industry Quarterly Update, http://www.albertacanada.com/files/albertacanada/AOSID_QuarterlyUpdate_Winter2017.pdf
[10] IHS Energy, "Comparing GHG Intensity of the Oil Sands and the Average US Crude Oil", May 2014

anticipated start-ups of Suncor's Fort Hills and Teck's Frontier Projects). In Table 6-7 of the Line 67 DSEIS, the DoS estimates 2.2% (2185 bbl in Figure 6-20) of the Line 67 crude mix to be based on the "Mining and dilbit" pathway. Since the "Mining and dilbit" pathway in Table 6-7 presumably refers to the volumes of dilbit produced from PFT oil sands mining projects and the crude mix from this specific pathway is projected to grow over time, the 2.2% contribution of this pathway could be increased to reflect anticipated increases in future PFT volumes, rather than basing it on historical 2013 AER ST-39 data.

In the Line 67 DSEIS, the DoS includes a "cyclic steam stimulation and upgrading" pathway, but it is not clear what project(s) in Alberta use the combination of these two processing technologies. Hence, it is recommended that this specific pathway be omitted from the analysis. 2600-5

The lifecycle emissions of "Mining and dilbit" (e.g. PFT dilbit) and "Mining and upgrading" (naphthenic froth treatment (NFT) SCO) are 565 and 575 $kgCO_2$(eq)/bbl, respectively, in the Line 67 DSEIS. Based on IHS' study[11], PFT versus NFT mining lifecycle emissions exhibit greater variability (~506 $kgCO_2$(eq)/bbl of refined product and 548 $kgCO_2$(eq)/bbl of refined product, respectively). Since PFT mining processes remove the heavier fraction of the bitumen (asphaltenes) to produce a clean bitumen product of higher quality that can be processed at a refinery directly compared to bitumen produced from NFT mining processes, it is once again recommended that the IHS study results be incorporated in the Table 6-7 "Mining and dilbit" and "Mining and upgrading" lifecycle emissions results.

Various studies demonstrate that lifecycle emissions from Steam Assisted Gravity Drainage (SAGD) and Cyclic Steam Stimulation (CSS) operations are very sensitive to the steam-to-oil ratio (SOR). More specifically:

- Every 0.5 decrease in the SOR corresponds to a reduction of 10 $kgCO_2$(eq)/bbl of bitumen produced[12].
- An SOR decrease from 4 to 2 can decrease the resulting emissions by more than 50%[13][14].

From 2004-2014, the annual average industry SOR decreased from ~4.4 to 2.5. Additionally, the projects with the lowest SORs (e.g. Cenovus Christina Lake and Cenovus Foster Creek) grow faster because they become more economic and, hence, lower SOR projects eventually dominate. In providing the lifecycle emissions for all four in-situ WCSB crude oil pathways in Table 6-7, the DoS did not:

- Provide the average SOR that was assumed for each of the selected studies.
- Account for current and future anticipated industry average SOR reductions in in-situ pathway lifecycle emissions estimates.
- Consider future impacts of solvent assisted in-situ processes that would reduce lifecycle emissions from in-situ pathways even further.

[11] IHS Energy, "Comparing GHG Intensity of the Oil Sands and the Average US Crude Oil", May 2014
[12] Charpentier et al. 2009, http://iopscience.iop.org/article/10.1088/1748-9326/4/1/014005/pdf
[13] Jacobs Consultancy, "EU Pathway Study: Life Cycle Assessment of Crude Oils in a European Context", March 2012
[14] Alberta Energy – Oil Sands Production Profile

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Alberta's climate change policies were not accounted for by either the Department or DoS in assessing the GHG intensities of heavy WCSB crude oil, such as the projected future impacts of the following Alberta Climate Leadership Plan objectives:

- Alberta's commitment to reduce methane emissions from oil and gas operations by 45% by 2025[15].
- Alberta's legislated emissions limit on the oil sands of a maximum of 100MT in any year with provisions for cogeneration and new upgrading capacity[16].
- Alberta's transition to an output-based allocation system in 2018 will drive best-in-class performance and work to ensure that top performing facilities (in terms of emissions intensity) are rewarded.[17]

As an example, the Alberta Climate Change Office proposed reducing the appropriate emission factors to account for anticipated mandatory and voluntary methane reduction efforts in 2025[18].

3. Lifecycle emissions estimates should be based on appropriate petroleum coke treatment that reflects actual industry practices.

In Chapter 5 – Existing Conditions, Impacts, and Mitigation – Certificate of Need, page 441, the Department references petroleum coke used as a fuel for offsite use, resulting in GHG emissions from combustion. No further details of petroleum coke treatment are provided. In the Line 67 DSEIS, the DoS states that the industry stockpiles approximately 60% of all upgrader coke, and burns the remaining 40% as fuel. Based on our analysis of the same AER data[19], Alberta's oil sands industry burns only ~14% of all upgrader coke for fuel. The remaining upgrader coke is stockpiled (~65%), exported (~9%), and used on site (such as in tailings dykes; ~12%).

In many GHG lifecycle studies, the assumptions on petroleum coke use are not clear and thus, may not reflect actual oil sands industry practices for handling petroleum coke.

Further to the Department referring to petroleum coke used as a fuel for offsite use, resulting in GHG emissions from combustion, in the Line 67 DSEIS, the DoS did not account for petroleum coke displacing coal as a fuel. Jacobs Consultancy[20] assumes that:

- Upgrader coke is stored.
- Refinery coke is used as a substitute for coal in electricity generation. Differences in GHG emissions for using coke instead of coal were accounted for accordingly.

When conducting GHG lifecycle analyses, it is recommended that co-products like petroleum coke be accounted for in a manner that reflects actual industry practices (e.g.14% of upgrader coke is burned for fuel, and all refinery coke is substituted for coal). Finally, in considering global CO_2 emissions associated

[15] Alberta Climate Leadership Plan, https://www.alberta.ca/climate-methane-emissions.aspx
[16] Alberta Climate Leadership Plan, https://www.alberta.ca/climate-methane-emissions.aspx
[17] Output-based allocation discussion document, https://www.alberta.ca/documents/climate/Ouput-Based-Allocation-System-Discussion-Document.pdf
[18] http://www.ceaa-acee.gc.ca/050/documents-eng.cfm?evaluation=80091&type=3
[19] 2010-2014 ST-39 data, Alberta Energy Regulator
[20] Jacobs Consultancy, "Life Cycle Assessment Comparison of North American and Imported Crudes", July 2009

with burning exported upgrader and refinery coke, coke almost always replaces coal. Hence, the net contribution of coke to total GHG emissions is extremely small[21].

The Behavior of Diluted Bitumen in Water

In section 10.3.1.1.2, the Line 67 DSEIS references a 2016 National Academies of Sciences (NAS) study which concluded the following:

- Once the lighter components of diluted bitumen volatize, the remaining heavy fraction may sink, making cleanup difficult.
- Sinking of diluted bitumen in water-based environments depends less on the density of the oil in question than on its interaction with particles in the water.

To better understand this claim, the Government of Alberta and industry have studied this extensively. Based on scientific research, Alberta wishes to make several points that support an updated view of the behaviour of diluted bitumen:

- Crude oils, including diluted bitumen, float on the surface of the water-based environment when released (marine and freshwater) for a period of several days, during which time they are exposed to environmental elements such as wind and wave action, light, and temperature changes; this is called the weathering process.
- Recent research by Natural Resources Canada (NRCan) further suggests that the finding that diluted bitumen will float is accurate[22].
    - The NRCan study showed that diluted bitumen does not sink as readily as conventional oil when spilled in fresh water. Instead, it floats, unless exposed to high temperatures and weathering. NRCan's findings contradict the 2016 NAS study.
    - NRCan's findings have been presented to, and accepted by, the NAS. The scientific publication will be forthcoming.

[21] American Fuel and Petrochemical Manufacturers, http://education.afpm.org/refining/petroleum-coke/
[22] http://www.macleans.ca/society/does-spilled-pipeline-bitumen-sink-or-float/

Levi, Andrew (COMM)

From: Jamie Becker-Finn <Rep.Jamie.Becker-Finn@house.mn>
Sent: Monday, July 10, 2017 4:17 PM
To: MN_COMM_Pipeline Comments
Subject: Comments re Proposed Line 3 Pipeline Project

To Whom It May Concern:

I have numerous concerns about this proposed pipeline and the draft EIS. However, I will limit my comments and questions to long-term protection of wild rice in northern Minnesota.

Wild rice is not just a crop that can be re-planted. Wild rice is not just a grain to eat. **The importance of wild rice to Ojibwe culture, health, spirituality and history cannot be overstated.** There is no indication that these truths have been fully taken in to account by Enbridge or the authors of the DEIS.

When the Ojibwe in Minnesota signed treaties with the federal government, they explicitly retained the ability to harvest wild rice, hunt and fish on the waters and lands of the ceded territory. The DEIS, and public comments by Enbridge staff, highlight a misunderstanding regarding the difference between reservation land and ceded treaty land. While skirting reservation boundaries is a nod to the affected tribal communities, the route does not avoid the plants and wildlife Ojibwe people have a legal right to access. 2367-1

Ojibwe people's very existence in northern Minnesota is based on the existence of wild rice beds. Our spiritual teachings tell us that our ancestors traveled until they reached the place "where the food grows on the water." That food is wild rice, a unique grain that only grows wild in a few places. To thrive, wild rice requires very specific water and soil conditions. There are very few places worldwide where native wild rice can grow.

In the event of an oil leak or spill, there is no way to be certain that the affected waters and soils could be properly rehabilitated to allow wild rice to thrive again. Because of the extremely high cultural and spiritual importance of wild rice to Ojibwe people, it would be impossible for Ojibwe people to be made whole again if wild rice beds were destroyed. In addition, the spill or leak would then potentially violate federal treaties. 2367-2

The wild rice that grows in northern Minnesota differs greatly from the cultivated "wild rice" typically sold in grocery stores. Even if one chooses to ignore the consequences to Ojibwe people, there would also be economic consequences for the entire state should native wild rice beds be damaged. According to the Minnesota Department of Natural Resources, over 50% of the hand harvested rice in the entire world comes from northern Minnesota. 2367-3

Finally, Enbridge has stated that this is a "replacement" project. This is not true. The majority of the current line affecting wild rice waters would remain in the ground. To truly weigh the actual need for this pipeline, this should be considered as a new project. As such, there is no reason to route through wild rice waters. There are alternatives that would not risk the vital, unique existence of wild rice in northern Minnesota, and would not place the preferences of an international oil company above the Ojibwe people and their legal rights. 2367-4

Questions:

Were federal treaty experts consulted regarding the proposed route? 2367-5

If so, what were their recommendations on the legal consequences when a leak or spill occurs?

Do the DEIS drafters understand the treaty implications and Ojibwe cultural implications if this new pipeline was built?

What would the costs be to Ojibwe people and affected wild rice lakes?

What would the costs be to local economies?

Thank you for your time and attention to this important matter,

Jamie Becker-Finn

Rep. Jamie Becker-Finn
District 42B
307 State Office Building
St. Paul, MN 55155
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Levi, Andrew (COMM)

From: Nancy Tyra-Lukens <NTyra-Lukens@edenprairie.org>
Sent: Monday, July 10, 2017 11:25 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-016 and PPL-15-137

I have several comments about the proposed Enbridge pipeline which are not properly/thoroughly addressed in the DEIS.

Why is there no discussion of corrosion from co-location of the pipeline with high voltage transmission lines? Keystone 1, only 4 years old, suffered leaks from accelerated corrosion due to stray voltage from powerlines. 2278-1

Pipelines have a history of frequent, even daily leaks. This proposed line passes within close proximity to the watershed of major recreational lakes. What reassurance does the public have that spills/leaks will be detected quickly and mitigated promptly? Does Enbridge put aside money into a clean up fund so that if they go out of business, leaks can still be cleaned up? Or do they dump responsibility on the public, similar to the current Brownfields Clean Up programs? 2278-2

Will baseline data be collected from our many lovely lakes so that damage due to inevitable leaks is the responsibility of this company? 2278-3

Why are we continuing to risk the danger and pollution from fossil fuels rather than insisting that these companies develop renewable energy sources?

Nancy Tyra-Lukens
Mayor, City of Eden Prairie

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CITY OF
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IT'S IN MINNESOTA'S NATURE
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June 26th, 2017

Jamie Macalister
Environmental Review Manager
MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

Re: Line 3 Project Draft EIS Comment, specifically regarding Chapter 8 "Existing Line 3 Abandonment and Removal"

Dear Ms. Macalister,

We understand that Enbridge has filed a proposed abandonment plan per PHMSA regulations. We also understand, per the D-EIS, that Enbridge has filed with the Minnesota PUC a draft of the required plan that specifically show how the PHMSA abandonment regulations will be achieved. According to Enbridge, abandonment will include: removing the oil, cleaning the pipeline, disconnecting the pipeline, segmenting the pipeline, and monitoring and maintaining the pipeline, indefinitely. As Grand Rapids City Council Members, we would like you to consider how the proposed existing Line 3 abandonment will affect our City based on information provided in the Line 3 Project D-EIS. From 8.3.1 of the D-EIS, ***Potential Impacts and Mitigation Measures***: *Leaving Existing Line 3 in Place Could Have Potentially Significant Effects*:

> There are, however, some potentially significant impacts associated with abandoning the existing Line 3. These longer term impacts are caused by the continued presence of undiscovered legacy contamination that may exist surrounding the existing pipeline, as well as the potential hazards associated with the aging of the abandoned pipe. These impacts include soil and water contamination, the ability of the pipeline to serve as a water conduit, subsidence due to the failure over time of the pipeline, and loss of buoyancy control for the pipeline. (8.4)

The existing Line 3 runs through the NW part of Grand Rapids' Wellhead Protection Area (WHPA). A Wellhead Protection Area (WHPA) is the Minnesota Department of Health (MDH) approved surface and subsurface area that surrounds a public water supply well (or well field) that supplies a public water system, through which contaminants are likely to move toward and reach the well or well field. According to the D-EIS, "Soils and waters near the abandoned Line 3 could also be adversely affected where undiscovered contamination along the existing pipeline (from lubricants, process chemicals, and oil spills) are left behind.

Potential impacts on soil and water resources are highly uncertain; however, as they depend on the extent of the existing undiscovered contamination." (8.6)

We understand from the D-EIS that the current Line 3 is in grave condition and the concerns of accidental release having "the most exposure" is in keeping the existing Line 3 in place. It remains unclear as to how a deteriorated Line 3 would handle the removal of the oil, cleaning, disconnecting, and segmenting of the pipeline, as proposed. There is no specific plan within the D-EIS that states how Enbridge will manage a contaminated site other than "Enbridge has indicated that it would...." (8.12). 1235-1

The City of Grand Rapids has 11,000+ residents who rely on the WHPA to provide them with a safe public water source to supply our public water system. Our community brand is: Grand Rapids, It's in Minnesota's Nature. We pride ourselves on the precious resource that is our water. From 8.3.1 of the D-EIS, ***Potential Impacts and Mitigation Measures****: Long-Term Effects Could Be Significant and Would Require Site-Specific Mitigation Measures:*

> In sum, impacts on human and natural resources due to potential subsidence of the ground above the abandoned Line 3 are anticipated to be minimal in the near term but could be significant in the longer term, absent effective monitoring, adaptive management, and the timely introduction of mitigation measures. Because of the length of Line 3 and the variety of resources crossed, mitigation measures would be site specific and would need to be designed in collaboration with those agencies and authorities responsible for the resources in question. (8.4)

The resource in question for our community is our public water supply and we cannot support the abandonment of Line 3 knowing that the impact "could be significant in the long-term." According to the D-EIS, "The Longer the Pipe Is in the Ground, the More Likely It Is to Fail" (8-8). If Line 3 is not removed, and when it fails and/or buoyancy is lost; it is generally expected that Cities and its residents are responsible for the clean-up. Since Line 3 runs directly through our Well Head Protection Area (WHPA), which is the sole source of municipal water for two cities (Grand Rapids and LaPrairie), the City is requesting that you require the total removal of Line 3 within the WHPA. In addition, the City requests that any contaminated soils within the WHPA be removed. Lastly, we request that Line 3 be removed in any urban developed areas. Please find attached the Line 3 replacement project detailed map set (23A and 23B), aerial and topographic. 1235-2

Sincerely,

Dale Adams, Mayor

Tasha Connelly, Council Member

Dale Christy, Council Member

Rick Blake, Council Member

Bill Zeige, Council Member

CC: Tom Pagel, City Administrator, Denny Doyle, Grand Rapids Public Utilities

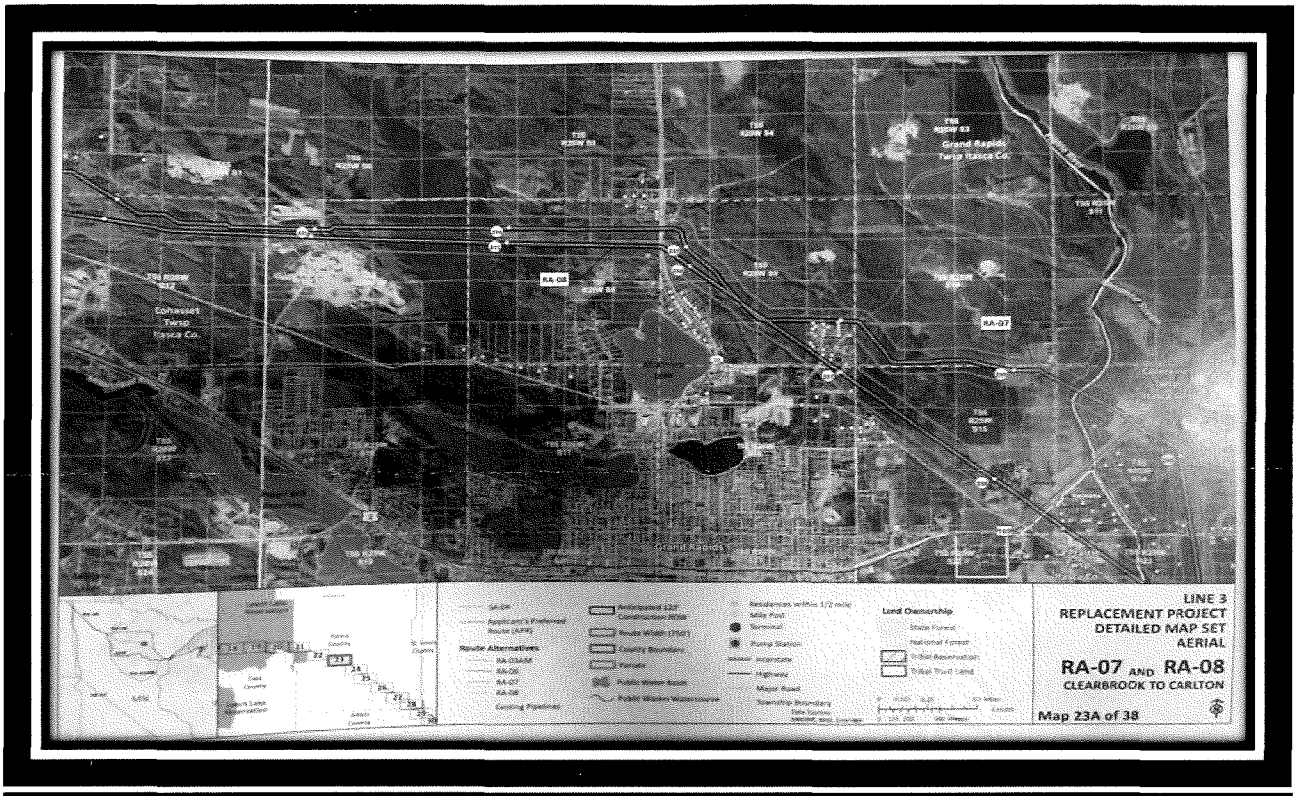
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Route Alternatives
Land Ownership
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AERIAL
RA-07 AND RA-08
CLEARBROOK TO CARLTON
Map 23A of 38

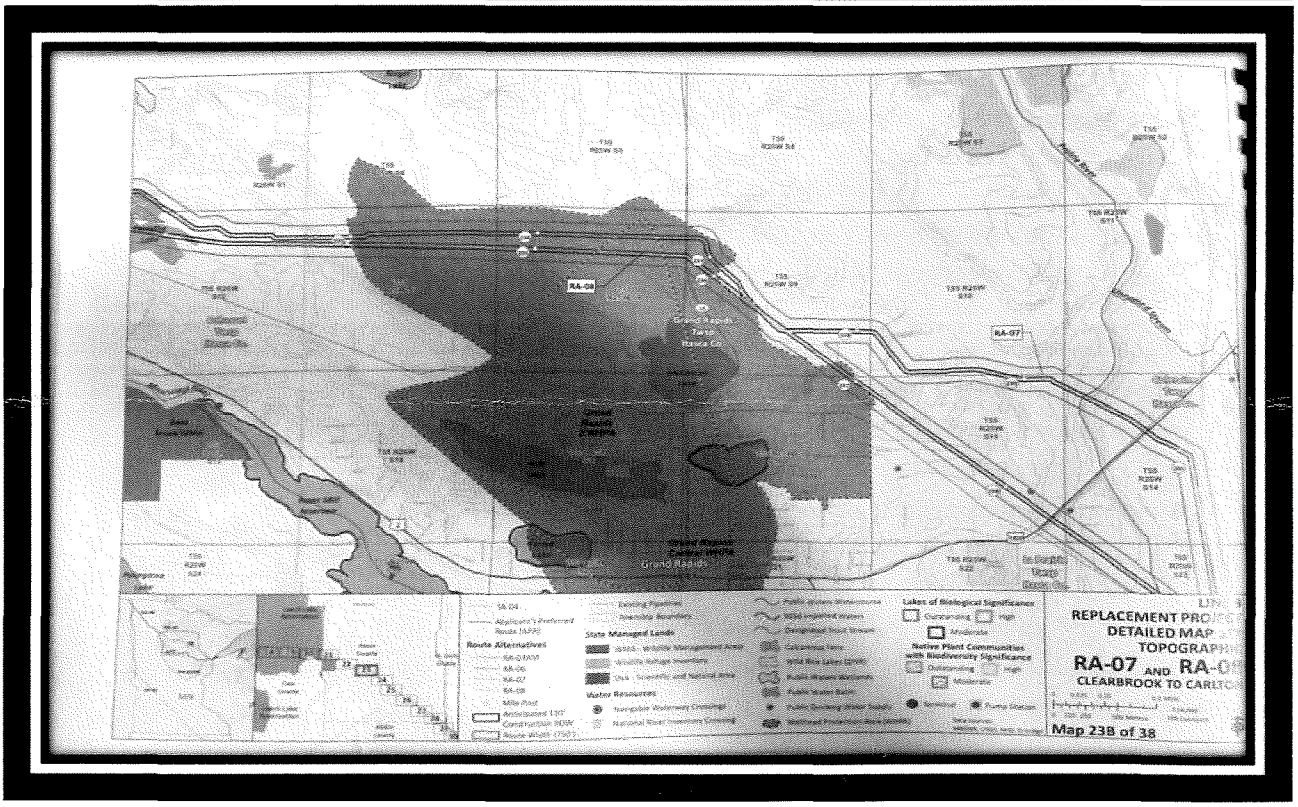
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DETAILED MAP
TOPOGRAPH
RA-07 AND RA-0
CLEARBROOK TO CARLTO
Map 23B of 38

Levi, Andrew (COMM)

From: Rick Hansen <rep.rick.hansen@house.mn>
Sent: Monday, July 10, 2017 12:07 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 DEIS Comments - PUC Docket Numbers CN-14-916 and PPL-15-137
Attachments: HANSEN LINE 3 COMMENTS FINAL 2017.07.10.pdf

Attached please find comments on the Draft Environmental Impact Statement for Enbridge's proposed Line 3 replacement project.

Thank you.

Rick Hansen
State Representative

247 State Office Building
(651) 296-6828

Feel free to sign up for my weekly updates: http://www.house.leg.state.mn.us/members/join.asp?id=12282

Rick Hansen
State Representative

District 52A
Dakota County

Minnesota House of Representatives

July 10, 2017

To: Minnesota Department of Commerce

Re: PUC Docket Numbers CN-14-916 and PPL-15-137

These comments are focused on a single issue: While chapter 8 of the Draft Environmental Impact Statement (DEIS) attempts to compare the environmental risks and benefits of removing the existing Line 3 pipeline with abandoning it in place, it does not contain enough information to enable decision makers to make a fully informed decision between those options. The absence of such information results in the failure of the DEIS to achieve one of the objectives of the environmental review process: to "provide usable information to . . . governmental decision makers and the public concerning the primary environmental effects of a proposed project."[1]

This is particularly important since, while there are environmental risks attendant to the process of removal itself – chiefly, given the location of Line 3, the risks of an accident from conducting the work adjacent to operating high-pressure pipelines – the post-removal risks appear to be minimal. In contrast, as the DEIS makes clear, the risks associated with abandonment in place, while methods exist to reduce them, remain and will have to be addressed as long as the pipe stays in the ground.

Some elements of Enbridge's proposed abandonment plan to mitigate environmental risks of abandonment in place are to be undertaken proactively; others would be implemented only when monitoring indicated that a problem needed to be addressed.

One of the proactive elements is the removal of oil and other substances from the pipe. The DEIS states: "Enbridge has developed and tested a cleaning protocol using a 12-mile abandoned section of Line 3 in Manitoba . . . [which] removes over 99.99 percent of the remaining oil and hydrocarbons from a pipeline."[2] However, the DEIS goes on to say that "It is currently unknown whether Enbridge's protocol works on a longer length of pipeline" such as the 282-mile long Line 3 pipeline within Minnesota. Although"[p]otential future impacts . . . could be minimized by ensuring that Enbridge's protocol works on the longer length of pipeline in Minnesota as well as it did in testing of the protocol,"[3] there is

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1 Minnesota Rules, chapter 4410.0300, subpart 4(A).

2 Minnesota Department of Commerce, Energy Environmental Review and Analysis, *Draft Environmental Impact Statement, Line 3 Project*, Docket Nos. PPL-15-137/CN-14-916, May 15, 2017, p. 8-6. (Hereafter, "*DEIS*.")

3 *Ibid*.

no mention of what, if any, actions Enbridge commits itself to make in order to provide that assurance and minimize those impacts, or what actions it might take if the test results on a longer line are negative. As a result, there is little guidance for decision makers weighing the risk posed to soils and groundwater by leaving an abandoned Line 3 in place that still contains some level of oil and hydrocarbons.[4] 2372-1

The DEIS discusses other potential problems with abandonment in place. "[A]s the abandoned Line 3 corrodes and loses its structural integrity, soil could enter the pipeline, causing a subsidence of the ground. This would likely occur over time. . . Subsidence could affect public safety, particularly if it occurred at highways, railroads or other utility crossings. It could also affect agricultural production and could lead to water channeling and erosion . . . ."[5]

With respect to subsidence, the DEIS tells us that "the primary mitigation strategy would be effective monitoring and adaptive management," which presumably means dealing with problems once they manifest themselves. Impacts are "anticipated to be minimal in the near term (i.e., the next 40 years) but could be significant longer term. . . [S]ubsidence can be corrected, to some extent, by fill with soil in some areas," although not where the pipeline passes beneath a waterbody.[6]

"Anticipated . . . could. . . to some extent . . . in some areas. . . ." These imprecise qualifiers do not help decision-makers trying to assess the level of risk posed by abandonment in place. In what kinds of areas does fill material **not** correct subsidence? How prevalent are these areas along the abandoned Line 3 route? Precisely to **what** extent can subsidence be corrected, and what problems remain? The DEIS is silent on these matters, leaving decision makers without the information they need to make a careful well-supported decision between abandonment in place and removal. 2372-2

The public safety risks of subsidence with respect to roads, railways and utilities would have to be evaluated on an individual basis, according to the DEIS, but one important factor it fails to address is the extent to which monitoring can accurately identify locations where risks are significant, allowing preventive action to be taken. This is both a technical issue and a question of resources as well. With Line 3 crossing over 297 roads and 17 railways, Enbridge's projected monitoring budget of $100,000 per year[7] amounts to $318 per crossing, or, alternatively, $355 for each of the 282 miles of the pipeline located in the state. The DEIS contains no discussion of the adequacy of this monitoring budget to reduce the risks of environmental harm to an acceptable level that could be compared to the risks posed by pipeline removal. 2372-3

The same objections apply to the loss of buoyancy control at watercourse crossings, as a result of which the pipeline, freed from the weight of transported oil, may become exposed at the land surface and "could adversely affect natural resources, including soil erosion and impacts on streambeds."[8] Once again, the DEIS points to monitoring and adaptive management as the primary mitigation measures, but Enbridge makes no commitment to taking proactive measures to prevent the problem. Interestingly, the document states that, in a report to the Canadian National Energy Board, "Enbridge indicated that it would conduct 2372-4

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4 The heading of one section of this discussion in the DEIS reads: "**If** Effective on Long Pipelines, Enbridge's Protocol **Could** Minimize Effects on Soils and Waters." [Emphasis added] *Ibid*.

5 DEIS, p. 8-8.

6 *Ibid*.

7 Ibid., pp. 8-9 and 8-10.

8 Ibid., p. 8-9.

a preliminary buoyancy analysis of Line 3 in Canada to determine areas where there might be pipeline buoyancy issues." No such commitment is made to Minnesota, although the document says that such an analysis "may" be required by the federal Pipeline and Hazardous Materials Safety Administration. Again, without information on the likelihood that these problems will occur if the pipeline is left in place in Minnesota, it is hard to compare abandonment in place with the removal option. 2372-4 Cont'd

Appendix B of the DEIS, *Line 3: Permanent Deactivation Plan*, concludes: "Enbridge assessed the relative risks of removing the pipeline and Permanently Deactivating it in place."[9] This statement is belied by the fact that this 86 page document devotes less than two pages to the impacts of removal. The only impact mentioned in addition to those of working adjacent to existing pipelines and the disruption to landowners and the public due to removal activities, is that "soil stability issues caused by pipe removal could damage the roads, bridges, and crossings."[10] There is no discussion of the extent to which such impacts have actually occurred as a result of previous pipeline removal projects. 2372-5

The statement that something "could" happen does not provide any guidance to help decision makers choose between options. Yet that is largely all that the DEIS offers to those seeking to compare the potential impacts of removing the pipeline with leaving it in place. This vagueness does not meet the statutory requirements of Minnesota's environmental review process. 2372-6

One thing is abundantly clear from the DEIS. The cost of pipeline removal is estimated by Enbridge to be approximately $1.28 billion, compared with $85 million for abandonment in place, with annual monitoring costs of $100,000.[11] From Enbridge's point of view, the vast difference between those amounts – even anticipating the sizeable costs of mitigation activities the company is likely to incur to respond to problems that arise from leaving the pipeline in place – makes abandonment the most cost-effective option.

Yet the Minnesota Environmental Policy Act, under which this DEIS was written, specifically prohibits Minnesota public officials from adopting such a viewpoint. It states:

> No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct.[12]

What is missing from the DEIS is an accurate estimate of the environmental risks posed by leaving the pipeline in place. To better understand the scope of these risks, Minnesota officials need to know the level and kinds of monitoring that can and cannot be done under the proposed $100,000 annual budget, and what commitments Enbridge is willing to make to take proactive measures to prevent problems 2372-7

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9 *DEIS, Appendix B, Line 3: Permanent Deactivation Plan*, p. 59.

10 *Ibid*., p. 7.

11 *DEIS*, pp. 8-13, 8-10.

12 Minnesota Statutes 2017, section 116D.04, subdivision 6

occurring where monitoring indicates the highest risks exist. There is a crucial difference between mitigating risk and mitigating damage. The DEIS often conflates the two. 2372-7 Cont'd

With the DEIS in its present form, Minnesota officials cannot make the informed decisions required of them under the Minnesota Environmental Policy Act. The omissions discussed in these comments need to be addressed in the final EIS if the state's "paramount concern" with environmental protection is to be maintained and reflected in the decisions made regarding Line 3.

State Representative Rick Hansen (District 52A)

Levi, Andrew (COMM)

From: Frank Hornstein <rep.frank.hornstein@house.mn>
Sent: Monday, July 10, 2017 5:42 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 DEIS Comments - PUC Docket Numbers CN-14-916 and PPL-15-137
Attachments: LINE 3 COMMENTS - FINAL.pdf

Attached please find comments on the Draft Environmental Impact Statement for Enbridge's proposed Line 3 replacement project.

Thank you.

Frank Hornstein
State Representative (61A)
243 State Office Building
100 Rev Dr Martin Luther King Jr Blvd
St. Paul, MN 55155
Phone: 651.296.9281
www.house.mn/61a

Lilly Melander, Legislative Assistant
651.296.5408
elizabeth.melander@house.mn

Minnesota House of Representatives

Minnesota State Senate

July 10, 2017

To: Minnesota Department of Commerce

Re: PUC Docket Numbers CN-14-916 and PPL-15-137

The following comments are submitted jointly by undersigned members of the Minnesota House of Representatives and Minnesota State Senate.

We respectfully request that the Department of Commerce make significant revisions to the Line 3 Draft Environmental Impact Statement (DEIS). We find the DEIS to be flawed in several areas.

The following deficiencies in the DEIS should be addressed prior to issuance of the final document. These include:

- Failure to appropriately quantify oil spill exposure to drinking water sources
- Tribal considerations and Line 3 abandonment
- Stronger emphasis on climate considerations and impacts
- A more comprehensive analysis of a no-build alternative

I: Failure to appropriately quantify oil spill exposure

The DEIS does not analyze the potential harm of a spill to the million plus Minnesotans who drink Mississippi River water.

2867-1

Be assured that the public interest of Minnesotans who live in St. Cloud, Minneapolis, St. Paul and the many metro communities that drink Mississippi River water is immense.

The existing corridor crosses the Mississippi River near Bemidji, again near Ball Club west of Deer River, then crosses the Prairie River just upstream of its confluence with the Mississippi east of Grand Rapids. The new proposed corridor has a crossing just north of Itasca State Park

2867-1 Cont'd

(flowing north) at the very beginning of the river and a new crossing further downstream just south of Palisade, MN. Palisade is just NW of McGregor, near the intersection of 169 and 210.

John Stansbury of the University of Nebraska conducted a study of spill scenarios for the Keystone XL pipeline.[1] In public comments (Attachment A) submitted for Enbridge's Line 67 (Alberta Clipper) pipeline expansion project's certificate of need process, engineer Stan Sattinger adapted Stansbury's study to describe a scenario involving a tar sands pipeline spill in the Upper Mississippi River and concluded that there would be elevated levels of benzene (above the Safe Drinking Water Act Max Contaminant Level (MCL)) some 280 miles downstream.[2] Because the Mississippi has many bends and loops, the 280 miles from Grand Rapids reached the St. Cloud water intake but not the intakes for Minneapolis and St. Paul. Since the new corridor at Palisade is south of the old one, the EIS must analyze the potential for benzene to reach Minneapolis and St. Paul intakes.

2867-2

However, a spill into the Mississippi creates additional problems for those who use the Mississippi as a drinking water source. Since petroleum spill data is outdated and new technology is available, the Minnesota legislature funded and the Governor signed into law an investigation that will reassess the toxicity of petroleum spills.[3] Specifically the investigation will look into "the chemical identity, quantity and toxicity of many chemicals present in petroleum-impacted groundwater and surface water, particularly the chemicals that result as the petroleum degrades over time…(because)…past toxicity assessments of petroleum-impacted surface and groundwater are: 1. Incomplete—because only a small subset of known chemicals have been assessed for toxicity, and 2. Inadequate for identification of many sublethal effects (including those on endocrine, immune and nervous systems)—which are important determinants of organism's survival and population health."[4]

The investigation is being conducted by faculty at the University of St. Thomas with the assistance of the United States Geological Survey "for use by regulatory agencies, such as the MPCA and MDH."[5]

The EIS must either incorporate the data from this investigation or complete its own investigation using the new technology that is available.

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[1] Stansbury, John. *Analysis of Frequency, Magnitude and Consequence of Worst-Case Spills From the Proposed Keystone XL Pipeline*. 2011. http://engineering.unl.edu/downloads/civil/Worst-case-Keystone-spills-report-dis.pdf.

[2] Sattinger, Stan. *Information on the risk to drinking water posed by the proposed Phase 2 of Enbridge Energy's Line 67 crude-oil pipeline*. Public Comment. Minnesota Department of Commerce. PUC Docket Pl-9/CN-13-153/OAH Docket 8-2500-30952. 2014.

[3] SF 550, 90th Legislature, 8 (2017) (enacted).

[4] Martinovic-Weigelt, Dalma. *Reassessing Toxicity of Petroleum Spills with New Technologies.* University of St. Thomas. Legislative-Citizen Commission on Minnesota Resources. May 7, 2016: 2. http://www.lccmr.leg.mn/proposals/2017/original/048-b.pdf.

[5] Ibid., 3.

The DEIS addresses the risk to Tulibee Lakes, Lakes of High and Outstanding Biological Significance, Wild Rice Lakes, and Trout Streams.[6] However, the Summary does not address risk to warmwater streams in the state across alternatives. Warmwater streams are also not addressed in the analysis of exposure to High Consequence Areas (HCAs) in Chapter 10 of the DEIS. Many of these stream systems are in very good biological condition, and are of high quality. Furthermore, the MPCA is in the process of implementing a strategy to prioritize high quality and 'exceptional' streams and rivers for preservation in their current form, as part of its Tiered Aquatic Life Use Strategy. 2867-3

The Minnesota Pollution Control Agency has collected abundant datasets documenting the biological quality of warmwater streams and rivers (i.e., not just trout streams) in the region of interest. Warmwater streams and rivers constitute the vast majority of total running waters in the northern part of the state that are crossed by the proposed project alternatives. Thus, the impact of the proposed Line 3 project to these warmwater systems, including to streams and rivers of exceptional quality, must be included in the EIS for Line 3 and all alternatives.

The threat to drinking water and the urgent need to address surface water protection is particularly important given the DEIS's contention that pipeline spill quantity is greater than with rail and truck alternatives. The DEIS states, "the average release of crude oil from a truck incident is 16 barrels (687 gallons) from a train incident, 40 barrels (1688 gallons) and from a pipeline incident, 462 barrels (19,412 gallons)."[7]

The significantly higher risk of a major spill from a pipeline compared to other alternatives is compounded by the proposer's poor response to a tar sands pipeline spill in Kalamazoo, Michigan in 2010, and the pipeline industry's strong position in opposition to 2014 Minnesota state legislation mandating faster spill response.[8] As a result of heavy pipeline industry lobbying, pipeline companies are exempted from requirements that apply to the railroad industry mandating that company officials advise first responders on clean-up protocols within an hour of first responders' confirmation major spill and to provide on-site expertise within three hours of a spill.

II: Tribal considerations and Line 3 abandonment

The DEIS states, "American Indian communities and individuals have unique health issues associated with historical trauma and structural racism. Data from the Minnesota Department of Health indicates that American Indians in Minnesota have greater health disparities and poorer health outcomes compared to other racial or ethnic groups in Minnesota. Tribal impacts are magnified because (1) impacts would be associated with abandonment or removal of the existing 2867-4

[6] Minnesota Department of Commerce. Energy Environmental Review and Analysis. *Line 3 Replacement Project Draft Environmental Impact Statement.* Executive Summary. May 15, 2017: ES-14. https://mn.gov/commerce/energyfacilities/documents/34079/1.DEIS_Line_3_Executive%20Summary.pdf. (Hereafter, "*Line 3 Replacement Project Draft Environmental Impact Statement*.")

[7] Ibid., ES-12.

[8] HF 3134/SF 2796, 88th Legislature (2014).

2867-4 Cont'd

Line 3; and (2) additional impacts would be associated with replacement of Line 3 in a new location."[9]

The concerns regarding abandonment of the existing Line 3 are particularly important to Indigenous Communities. There are no state rules addressing abandonment, and the absence of such regulations demands a very comprehensive accounting of the clean-up costs for the cumulative environmental hazards resulting from the pipeline.

Given the number of spills associated with Line 3, particularly the quantity of oil spilled and leaked since the Line started operation, the EIS must address issues of abandonment and site clean-up. The EIS must also quantify the costs and environmental liability for damages caused by the line, and identify the source of funds for hazardous materials clean-up.

2867-5

In addition to abandonment, Indigenous communities have identified impacts to wild rice, waterways, and cultural sites. The proposer's preferred route also raises issues related to treaty rights and tribal sovereignty. While the DEIS correctly refers to disparities and historical trauma suffered by indigenous communities, **the document fails to adequately address these issues**. Ignoring or avoiding the key concerns of Indigenous communities will serve to exacerbate the disparities and environmental justice issues that are raised, but not addressed in the DEIS.

III: Stronger consideration of climate impacts

2867-6

In denying the permit for the Keystone XL pipeline in 2015, President Barack Obama stated, "America is now a global leader when it comes to taking serious action to fight climate change. And frankly approving this project would have undercut that global leadership. And that is the biggest risk we face—not acting."

Similarly, among states, Minnesota has developed strong protocols in state law to address climate change. Transportation fuels account for nearly 30% of total greenhouse gas emissions,[10] and tar sands oil that is proposed for transfer in Line 3 emits 17% more greenhouse gas emissions that other forms of crude.[11] The EIS makes important points regarding tar sands oil and climate change, stating, "the project creates 760,000 barrels per day of new production and consumption of Western Canadian Sedimentary Basin heavy crude, causing GHG emissions from extraction, upgrading, transporting, refining, and consuming 760,000 barrels of WCSB crude oil each day."[12]

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[9] *Line 3 Replacement Project Draft Environmental Impact Statement,* ES-24.

[10] United States Environmental Protection Agency. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015.* Executive Summary. April 13, 2017: ES-24. https://www.epa.gov/sites/production/files/2017-02/documents/2017_executive_summary.pdf.

[11] United States Department of State. Bureau of Oceans and International Environmental and Scientific Affairs. *Final Supplemental Environmental Impact Statement for the Keystone XL Project.* Executive Summary. January 2014: ES-15. https://2012-keystonepipeline-xl.state.gov/documents/organization/221135.pdf.

[12] *Line 3 Replacement Project Draft Environmental Impact Statement,* ES-18.

2867-6
Cont'd

President Obama's actions on Keystone set an important precedent that links denial of a pipeline permit to action curbing climate change. The rationale for such a policy was laid out in the December 2015 Minnesota Environmental Quality Board (EQB) Interagency Report on Pipelines.

As a member agency of the EQB, the Department of Commerce was involved in producing the report and accepting the report's content. With regard to the relationship between climate change and development of new pipelines, the EQB concluded, "Development of infrastructure to support extraction, transportation, refinement, and combustion of oil has the potential to release additional carbon into the atmosphere and may perpetuate a carbon based economic structure that contributes to climate change. Minnesota has a state goal to reduce greenhouse gas emissions 80% below 2005 levels by 2050, building infrastructure for fossil fuels and making capital investments in this infrastructure should take this goal into account."[13]

The writing and production of the DEIS took place prior to President Trump's announcement that the United States will be pulling out of the Paris climate accords, and Governor Dayton's subsequent statement announcing Minnesota's participation in the United States Climate Alliance, a new effort by state and local governments to uphold the Paris agreement and the carbon emission reductions contained in the accord. Governor Dayton stated, "We will show the world what we can achieve by working together to conserve energy, use cleaner and renewable energy, and to leave a livable planet to our children and grandchildren."

The significant increase in global carbon emissions that accrue from the extraction, refining and combustion of tar sands oil transported via Line 3 runs counter to the U.S. Climate Alliance's intention to adhere to the Paris climate accord's greenhouse gas emissions goals.

Minnesota's record of legislation and policy directives on climate and energy are consistent with the Minnesota Environmental Policy Act which states: "In order to carry out the policy set forth in Laws 1973, chapter 412, it is the continuing responsibility of the state government to use all practicable means, consistent with other essential considerations of state policy, to improve and coordinate state plans, functions, programs and resources to the end that the state may: … (9) practice thrift in the use of energy and maximize the use of energy efficient systems for the utilization of energy, and minimize the environmental impact from energy production and use; …(12) minimize wasteful and unnecessary depletion of nonrenewable resources."[14]

A revised Line 3 EIS must directly address and refer to state goals and policies regarding climate change and mitigation.

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[13] Minnesota Environmental Quality Board. Interagency Pipeline Coordination Team. *Interagency Report on Oil Pipelines*. December 15, 2015: 49. https://www.eqb.state.mn.us/sites/default/files/documents/Interagency%20Report%20on%20Oil%20Pipelines4_0.pdf.

[14] Minnesota Statutes 2016, section 116D.02, subdivision 2.

IV: A more comprehensive analysis of a no-build alternative

2867-7

The DEIS spends considerable time discussing oil transportation alternatives to pipelines—primarily truck and rail transportation. The DEIS affirms there are considerable risks associated with all forms of tar sands oil transportation. Pipelines can leak larger amounts of oil than rail or truck options and as the Enbridge tar sands spill of 2010 and other tar sands incidents depict, clean-up of tar sands oil, particularly when spilled into surface waters, is highly problematic.

A no-build alternative section should be far more expansive than simply comparing transportation modes. There are significant socio-economic changes taking place in the oil and tar sands oil industry that must be taken into account in the DEIS. The document pays scant attention to emerging trends that indicate that there is a glut in world oil supplies and additional oil production and distribution may not be needed. CNN Money reported as recently as June 17, 2017, that "the big fear gripping the energy markets is that the world continues to have too much oil, despite the deal between OPEC and Russia to pump less."[15]

The DEIS assumes that if a new Line 3 is not built, oil by rail facilities would be constructed at the Canadian-US border, or the oil would be transported by truck across Minnesota. There is no evidence to suggest that pipeline capacity along the Line 3 route will be replaced with rail or trucking options.

This scenario is not realistic, as no such facilities appeared when Keystone XL was denied, for example. Instead, many oil sands projects were cancelled due to the plunging price of oil worldwide, and the high cost of extraction and transportation of the Canadian tar sands fields. The DEIS does not address or enumerate the cancelled projects, the bankruptcies, the sell-off of assets by foreign nationals, or potentially stranded assets if the price of oil does not increase.

The DEIS does not compare the historical movement of oil-by-rail from the Bakken fields versus the Canadian fields to verify the hypothesis that vast quantities of crude oil by rail would be shipped from Canada, nor does it discuss the relative flammability of the oils.

There is also growing evidence of a long-term slowdown in tar sands oil production. Data related to that trend should be part of the final EIS.

V: Conclusion

The DEIS as it now stands is deficient and needs considerable revision. We have outlined our serious concerns regarding the document's treatment of spill prevention and mitigation, particularly in surface and drinking water sources, concerns related to Indigenous communities, climate change, and the overall need for additional tar sands oil infrastructure. We believe all of the issues we raised can be appropriately incorporated in a vastly revised EIS consistent with state law and policy.

---

[15] Egan, Matt. "Oil prices enter bear market as supply glut fears return." CNN Money. June 17, 2017. http://money.cnn.com/2017/06/20/investing/oil-prices-bear-market/index.html.

Thank you for your consideration,

Frank Hornstein
State Representative

Mary Kunesh-Podein
State Representative

Jamie Becker-Finn
State Representative

Susan Allen
State Representative

Peggy Flanagan
State Representative

Jean Wagenius
State Representative

Karen Clark
State Representative

Rick Hansen
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Alice Hausman
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Lyndon Carlson
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Carlos Mariani
State Representative

Diane Loeffler
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Rena Moran
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Paul Rosenthal
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John Marty
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Bobby Joe Champion
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Kari Dziedzic
State Senator

The Honorable Eric L. Lipman
Office of Administrative Hearings
P.O. Box 64620
600 North Robert Street
Saint Paul, M 55164-0620

PUC Docket Pl-9/CN-13-153
OAH Docket Number (8-2500-30952)

Dear Judge Lipman,

I'm a registered mechanical engineer and resident of Minneapolis who wishes to provide information on the risk to drinking water posed by the proposed Phase 2 upgrade of Enbridge Energy's Line 67 crude-oil pipeline.

SUMMARY

- The discharge pressures for the pumping stations under Phase 2 operation with dilbit would be up to 48% larger than those under present-day operation, and the summertime pipeline temperature is likely to rise to 120°F or higher.

- The increases in pressure and temperature that would be brought on by the Phase 2 upgrade would significantly increase the risk of pipeline ruptures.

- Ruptures releasing dilbit into surface water would present risks to the safety of drinking water supplies, because one of the typical diluent ingredients is benzene, a toxic and carcinogenic, water-soluble compound.

- The benzene concentrations for a worst-case spill from the upgraded Line 67 at its crossing of the Mississippi River near Grand Rapids, MN have been calculated using methods developed by Prof. John Stansbury of the Department of Civil Engineering of the University of Nebraska.

- At the spill location the concentration would reach 32 times the Safe Drinking Water Act Maximum Contaminant Level (MCL) for benzene, and it would remain above the MCL over a distance of 280 miles as the plume travelled downstream.

- This kind of analysis is not mandated by any section of Minnesota Rules, but I believe that it should be. This increased risk to Minnesota's drinking water supplies is a risk that should not be taken. In my opinion, based on the above findings alone, the consequences to society of granting the certificate of need for Phase 2 are <u>not</u> more favorable than the consequences of denying the certificate.

DISCUSSION AND RECOMMENDATIONS

Below is outlined a calculation of the pumping station discharge pressures for dilbit transport. At the Phase 2 design-capacity flow rate of 880,000 barrels per day, the discharge pressure would be

approximately 48% higher than at the present annual-capacity flow of 450,000 barrels per day. Also, results shown in the Final Supplemental Environmental Impact Statement for the similar Keystone XL pipeline [2] indicate that we could expect a rise in pipeline temperature under the higher flow conditions to 120°F or higher in summertime. The increases in both pressure and temperature levels that would be brought on by the upgrade would increase the risk of pipeline ruptures due to corrosion or manufacturing flaws, major earth movement in landslides or floods, improper pipeline operation, or mechanical damage from excavation work.

A rupture releasing dilbit into the surface water at or near many of the 19 major rivers or tributaries crossed by Line 67 (see Table 1) would present a risk to the safety of drinking water supplies, because one of the typical diluent ingredients is benzene, a toxic and carcinogenic compound [3]. The benzene is water-soluble and would be swept downstream in a plume. The important questions are: what benzene concentrations would be reached, and how far downstream would the plume extend, in a worst-case spill?

Alberta Clipper & Waterways Rivers , Steams, Brooks & Creeks Crossed
Mississippi
Red River of the North
Red Lake River
Tamarac River
Middle River
Snake River
Branch Swale River
Clearwater River
Lost River
Swan River
Kelley Brook
Mirbat Creek
East Savana River
Stoney Brook
Cear Creek
Moose Horne River
Otter Creek
West Branch Floodwood River
Prairie River

Table 1
Rivers and tributaries crossed by Line 67

No answers to either question are included in either the Application for Certificate of Need [4] or the Final Environmental Impact Statement [5] for the initial construction of Line 67, nor are such estimates given in the application for the Phase 2 upgrade [6]. A study by Professor John Stansbury of the Department of Civil Engineering of the University of Nebraska [7] addressed worst-case spills from the proposed Keystone XL pipeline's crossings of the Missouri and Yellowstone Rivers. He predicted that benzene concentrations at either event would rise to 19 times the Safe Drinking Water Act Maximum Contaminant Level (MCL) for benzene at the spill location, and that concentrations in the plume would remain above the MCL for a distance of 450 miles downstream.

The benzene concentrations for a worst-case spill from the upgraded Line 67 at the town of Ball Club, Minnesota, crossing of the Mississippi River have been calculated using Prof. Stansbury's methods. At the spill location, the concentration would reach 32 times the MCL, and it would remain above the MCL over a distance of 280 miles as the plume travelled downstream. The drinking water intakes for the communities of Grand Rapids, Libby, Aitkin, Brainerd, Royalton, and St. Cloud would be affected. Serious health risks would be created for tens of thousands of Minnesota residents, and aquatic habitats and recreational activities would be compromised. Other constituents from the spill would pose additional risks to humans and to aquatic species in the river.

This kind of analysis is not mandated by Section 7853.0620 Subpart 1, Point discharges to water, or any other section of Minnesota Rules, but I believe that it should be. This increased risk to drinking water supplies in Minnesota is a risk that should not be taken. In my opinion, based on the above findings alone, the consequences to society of granting the certificate of need are not more favorable than the consequences of denying the certificate. The additional bitumen should remain in the ground and be supplanted by renewable energy sources.

DETAILS OF THE MISSISSIPPI RIVER CALCULATION

Worst-Case Spill:

Prof. Stansbury's report describes a calculation of spill magnitude comprised of two parts: the pumping rate volume and the drain-down volume. Because I had no access to the topographic data needed to estimate the drain-down volume, I generated only a pumping rate volume. I applied a combined detection time and shut-down time of 1.5 hours to a leak of 100 percent of the 800,000 barrel-per-day annual average flow rate, giving a spill volume of 50,000 barrels. In view of the 12-hour pump-shutoff time for the Line 6B Kalamazoo River tributary spill [8], this is a reasonable time value.

As to why the 50,000-barrel spill volume is so much larger than the estimated 20,000-barrel volume in the Kalamazoo event, I note that Line 6B was designed for the much smaller maximum flow rate of 240,000 barrels per day [9]. For the Keystone XL pipeline analysis, Prof. Stansbury had used a shut-down time of 2 hours as a reasonable time for the worst-case analysis. I assumed that there would be no cleanup of the spill during the time of peak concentration of benzene in the water.

Impacts to Surface Water:

Benzene makes up 0.1 to 1.0 percent of dilbit crude oil and is relatively soluble in water [10]. Prof. Stansbury estimates for the 1 percent case that the benzene/water concentration immediately at the oil/water interface is 75 milligram/liter, with the concentration decreasing with distance from the interface. He considers it reasonable that 5 percent of the benzene in the spill volume would reach the oil/water interface per day. Dividing this release rate by the stream flow rate produces an estimate for the benzene/water concentration after the benzene plume completely mixes across the width of the stream.

For the 50,000-barrel spill into the Mississippi River, which has a mean flow rate of 1,226 cubic feet/second at the Ball Club crossing, the peak, fully mixed concentration was calculated to be 0.16 milligram/liter, which is a factor of 32 larger than the Safe Drinking Water Act Maximum Contaminant Level (MCL) [11].

Migration of the Benzene Plume:

As the benzene plume migrates downstream, the concentration decreases due to volatilization and dilution by the increasing stream flow. A half-life of 3 days for benzene in surface water and a stream velocity of 2 feet/second are assumed. Data on the variation in Mississippi River stream flow rate with distance downstream, shown in Fig. 1, was provided by the USGS and was used in the calculations to predict concentration decrease with distance downstream of the spill. The plume length was modeled using a series of 10-mile long river reaches with first-order decay of concentration in each.

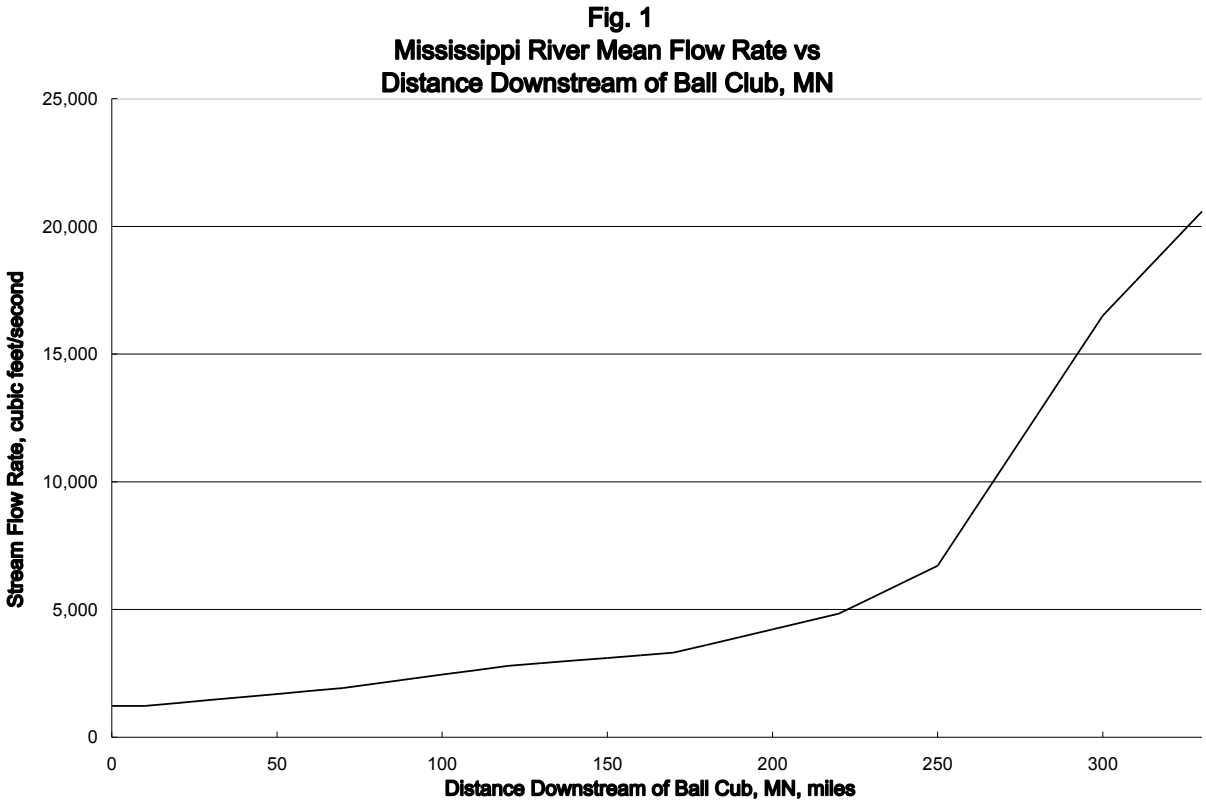

As seen in the Fig. 2 plot of concentration results, normalized to the benzene MCL, the plume would reach over 280 miles before its concentration would drop to the MCL and be safe for public water intakes.

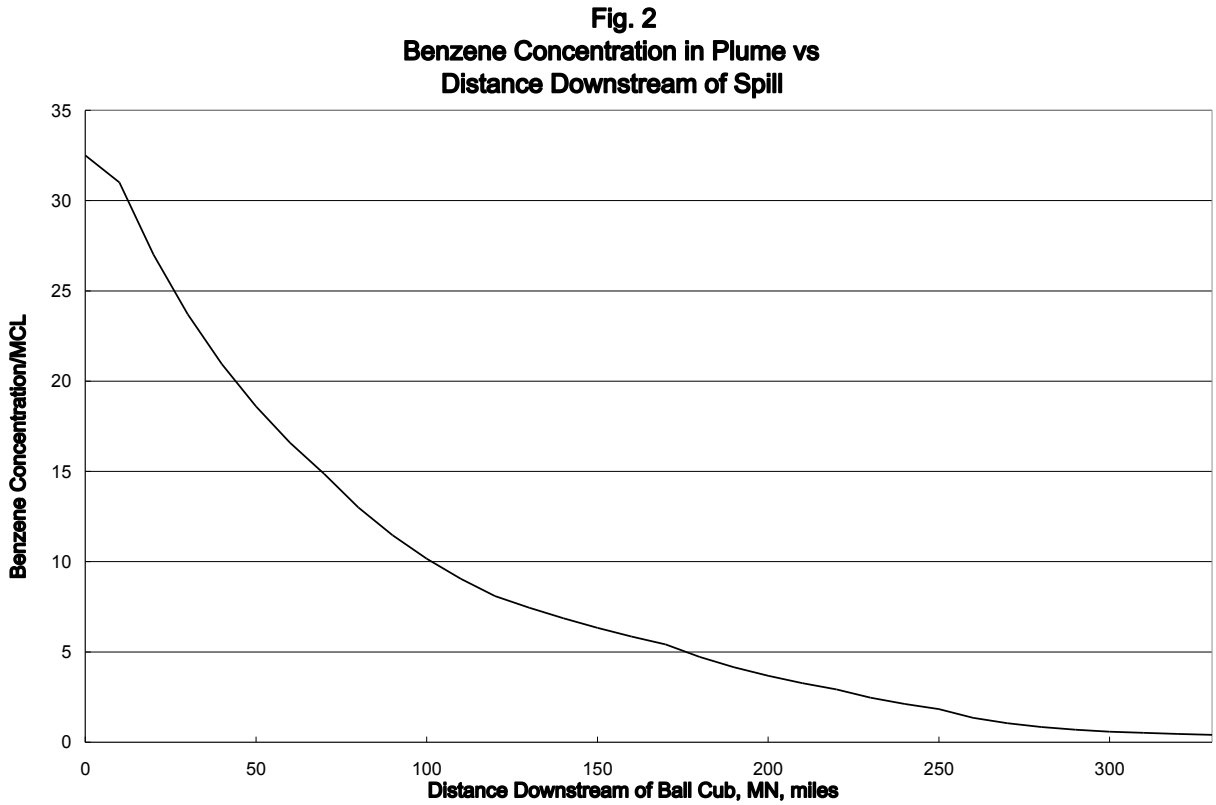

Other sets of assumptions (e.g., shorter half-life) would give somewhat different results. For example, assuming that benzene makes up only 0.3 percent of the dilbit and that 10 percent of the benzene is released per day, the calculated plume length would be reduced by about one-half. While the impacts thus cannot be calculated with precision, these results demonstrate that if a worst-case spill occurs in a major stream, the impacts would be both far-reaching and long-lasting.

DETAILS OF PUMPING STATION DISCHARGE PRESSURE INCREASES DUE TO LINE 67 UPGRADES

Crude oil flows in a pipeline segment because the upstream pumping station produces a lengthwise gradient of pressure (psi per foot of length) that overcomes flow resistance. That gradient can be calculated for a given flow rate (barrels per day), and, when multiplied by the segment length, it can give an estimate of the required discharge pressure at the upstream pumping station. This idealized estimate represents pumping-induced pressure without account of components of pressure due to variations in elevation (grade).

For the Phase 1 upgrade, instead of the gradient itself, I calculated the ratio of the gradients at the upgraded (570 kbpd) and the original (450 kbpd) annual capacities, which turned out to be 1.50. Based on that result, the peak pressure load in a given pipeline segment, which occurs at the discharge of the upstream pumping station, would have to increase by 50% to produce the higher annual-capacity flow rate of Phase 1.

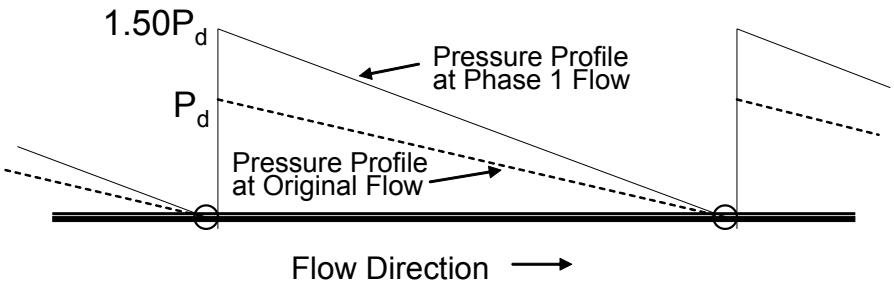

For the Phase 2 upgrade I again calculated the ratio of the pressure gradients at the upgraded and the original flow rates. But now the pipeline segment length would be half of the original length, because a new pumping station is to be inserted between each pair of the original stations. So the ratio of pumping-station discharge pressures would now be one-half the ratio of the gradients. The results are tabulated below. All calculations were performed using the well-established plot of friction factor versus Reynolds number, often identified as the Moody Diagram [1].

Case	Flow, kbpd	Ratio of Gradients, Upgrade/Original	Ratio of Pumping Station Discharge Pressures, Upgrade/Original	Increase in Discharge Pressure
Original Line 67 at Annual Capacity	450	--	--	--
Phase 1 Upgrade at Annual Capacity	570	1.50	1.50	50%
Phase 2 Upgrade at Annual Capacity	800	2.59	1.30	30%
Phase 2 Upgrade at Design Capacity	880	2.95	1.48	48%

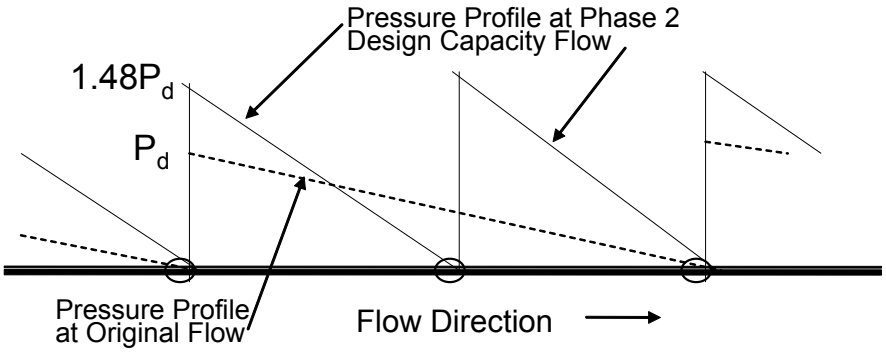

Respectfully submitted,
Stan Sattinger
Minneapolis, MN 55407
sattinss@aol.com

REFERENCES

[1] Victor L. Streeter, Fluid Mechanics, 2nd Edition, McGraw-Hiill Book Company, Inc., p.183

[2] Final Supplemental Environmental Impact Statement for the Keystone XL Pipeline, Appendix S, Pipeline Temperature Effects Study, Figure 1, http://keystonepipeline-xl.state.gov/documents/organization/221245.pdf

[3] "Tar Sands Crude Oil: Health Effects of a Dirty and Destructive Fuel," NDRC Issue Brief, February, 2014. IB:14-02-B, p.2, http://www.nrdc.org/energy/files/tar-sands-health-effects-IB.pdf

[4] Application for a Certificate of Need for a Large Energy Facility within the State of Minnesota, Minnesota Public Utilities Commission Docket No. PL9/CN-07-465, June 22, 2007, https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={AC9FF2F6-1772-4CC1-A254-61DD52C15B7E}&documentTitle=4407921

[5] Final Environmental Impact Statement for the Alberta Clipper Project, 2009, http://www.state.gov/e/enr/applicant/applicants/202466.htm

[6] Application for a Certificate of Need for a Crude Oil Pipeline, Minnesota Public Utilities Commission Docket No. PL-9/CN-13-153, August 16, 2013 revision, https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={F1B13575-3D71-4CAA-A86A-05CE1EBBCA38}&documentTitle=20138-90363-03

[7] "Analysis of Frequency, Magnitude, and Consequence of Worst-Case Spills from the Proposed Keystone XL Pipeline," by John Stansbury, PhD, P.E., http://www.boldnebraska.org/transcanada_worstcase

[8] "The Impact of Tar Sands Pipeline Spills on Employment and the Economy," L. Skinner and S. Sweeney, Cornell University, March 2012, http://www.ilr.cornell.edu/globallaborinstitute/research/upload/GLI_Impact-of-Tar-Sands-Pipeline-Spills.pdf

[9] "Line 6B Phase 2 Replacement Project," Enbridge Energy, 2013, http://www.enbridge.com/~/media/www/Site%20Documents/Delivering%20Energy/Projects/US/ENB2013-Line6BHandout-L06.pdf

[10] Shell Canada Ltd. (2008) Material Safety Data Sheet for Albian Heavy Synthetic Crude.

[11] "Drinking Water Contaminants," U.S. Environmental Protection Agency, http://water.epa.gov/drink/contaminants/index.cfm

Levi, Andrew (COMM)

From: Dale Lueck <dklueck@embarqmail.com>
Sent: Sunday, July 09, 2017 11:58 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line #3 Project DIES -- Docket# CN-14-916/PPL-15-137 Comments on DEIS
Attachments: Ltr 170709 Line 3 DEIS Comments.pdf

Please find the attached comments on the draft EIS for Enbridge Line #3.

Sincerely Yours,
Dale K Lueck, State Representative
Minnesota House of Representatives (District 10B)

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Dale Lueck
State Representative
District 10B
Aitkin and Crow Wing Counties

Minnesota House of Representatives

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East Suite 280
St. Paul, MN 55101-2198

July 9, 2017

Re: Enbridge Line #3 Project DIES -- Docket# CN-14-916/PPL-15-137

Dear Minnesota Department of Commerce,

The comments and recommendations contained herein are submitted with respect to the Draft Environmental Impact Statement (DEIS) for the Enbridge Line #3 Project (Docket# CN-13-473-PPL-13-474).

Existing Line 3 pipeline is approximately 50 years old, is operating at a restricted capacity of 390,000 barrels of crude oil per day and requires extensive maintenance. Failure to replace Line #3 in a timely manner unnecessarily increases the risk that a failure in this aging pipeline will result in environment damage. The scope of the DEIS is unnecessarily broad resulting in significant unnecessary state agency expenditures of both time and resources.

Recommendation: Reduce the scope of the DEIS to examining the actual pipeline route proposed by the applicant for replacing Line #3 and the other transport alternatives, i.e. truck, rail should there be a decision to not allow replacement of Line #3. Examination of pipeline route alternatives should be limited to minor variations along the applicant's requested preferred route. Those adjustments to the preferred route should be related directly to environmental and/or human safety features along the proposed route.

The alternatives to transporting crude oil by Line #3 which include transport by rail car or truck are orders of magnitude less safe than transporting crude oil by a new modern pipeline. Unwarranted delay on the part of the Public Utilities Commission or the Minnesota Department of Commerce in authorizing the replacement of Line #3 that would result in increased transport of crude oil by rail or truck places the general public at greater risk of an accident that could injure or kill members of the general public.

As the elected Representative of House District 10B which includes all of Aitkin County and a major portion of Crow Wing County, I am especially concerned with one of the alternatives to not replacing line #3 which would transport the oil by crude oil unit trains via the

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Superior Southern Rail Route. Certificate of Need Alternative Routes, Executive Summary Figure ES-2 in the DEIS refers. This alternative would result in as many as 10 crude oil unit trains per day moving oil on the Burlington Northern rail line the routes directly through the cities of Baxter, Brainerd, Deerwood, Aitkin, McGregor and Tamarack MN. Forcing additional crude oil on the rails for long distance transport is unacceptable and should not be done. The northern and southern suggested rail routes puts members of the general public at increased safety risk including serious injury and even death.

The DEIS contains endless pages on the threat to animals, plants, fish and wetlands with respect to a pipeline. The DEIS fails to address the threat to public safety in particular the potential of severe injury or death to members of the general public along the potential rail and truck routes that would be added if Line #3 is not replaced. Humans and especially small towns are a part of the environment and should get at least as much consideration as the animals, fish, plants and wetlands currently contained in the DEIS.

Recommendation: Include analysis of potential general public injury and fatality data for crude oil rail transport accidents with a crude oil unit train passing through or near small and large cities. The DEIS does not provide a sufficient amount of information on the horrendous potential danger of forcing more crude oil on the rails or highways to our cities. 1405-1

It is beyond the predictive capability of the Public Utilities Commission (PUC) or the Department of Commerce (DOC) to determine the future energy needs of the United States relative to our nation's economy. Accordingly, the DEIS and follow-on EIS should focus on the environmental impact of the project application. By virtue of the application and clear evidence that the applicant has the capacity to complete the project and operate the pipeline, the need is defined.

It is beyond the predictive capability of the PUC or DOC to determine the future energy needs of the United States relative to our national security. By virtue of the application and in the absence of formal notification from the federal government that the project would damage national security, the need is defined.

Recommendation: With respect to a PUC/DOC determination for granting a "Certificate of need" the scope of the DEIS and follow-on EIS should be narrowed to comment on whether the applicant (1) has the capacity to complete the project and operate the pipeline and (2) based on relevant federal agency input that the national security will not be harmed by the project.

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The suggested system alternative SA-04 which would require a completely new pipeline that would not deliver crude oil via Clearbrook to the Superior terminal, but rather would take a completely new much longer route to Joliet, Illinois imposes a huge new unwarranted cost and delay in replacing Line #3. The applicant did not request or propose that they build a new pipeline to Joliet Illinois.

Neither the PUC nor the DOC have the authority to issue a certificate of need or a route permit that encroaches upon another state's sovereign territory. Should the PUC prescribe the SA-04 alternative as a condition for replacing Line #3, this would result in a serious and unwarranted delay in replacing aging Line 3. The fact that this alternative was included with respect to the certificate of need and route permit process highlights a need to more clearly define the bounds of authority for both the PUC and DOC with respect to Minnesota's pipeline certificate of need and route permit process.

Recommendation: Consideration of route SA-04 should be dropped from the DIES, as the applicant did not request to build a pipeline to Joliet Illinois. The inclusion of alternative SA-04 in the DIES strongly suggests that current Minnesota Statutes outlining the scope of authority for the PUC and DOC when considering a certificate of need and route permits for pipelines is woefully inadequate and in need of significant legislative clarification. 1405-2

The DEIS does not clearly outline the specific impact that the completed project will have long term on local property taxes for residents along the pipeline. Significant pages of the DEIS are dedicated to assessing the tax revenue impact of constructing the project. These are one time revenues and once completed will not be repeated. It appears as if this element was intentionally hidden from the view of the local property taxpayers that would be impacted by either replacement or closing down Line #3.

The long term impact on local property tax revenues will be profound for the residents along the Line #3 route. The DEIS should clearly project the impact on the property tax payers that are subject to annual county, township and school district property tax levies. 1405-3

Recommendation: The DEIS provide the following data in at least table format for all local units of governments that will accrue property tax revenue from the completed project.

Columns: (1) County, townships, school districts (2) Current Line #3 annual property tax revenue; (3) Current annual property tax levy; (4) Line #3 % of total property tax levy; (5) Preferred Route Property annual projected tax revenue; (6) % change from existing Line #3 revenue; (detailed information in a table format as follows)

Re: Enbridge Line #3 Project DIES -- Docket# CN-14-916/PPL-15-137 (page 4 of 5) 1405-3 Cont'd

(1)	(2)	(3)	(4)	(5)	(6)
Crow Wing County	$000	$000	00%	$000	00%
Gail Lake Township	$000	$000	00%	$000	00%
Timothy Township	$000	$000	00%	$000	00%
ISD-2174 (Pine River-Backus)	$000	$000	00%	$000	00%
Aitkin County	$000	$000	00%	$000	00%
Waukenabo Township	$000	$000	00%	$000	00%
Logan Township	$000	$000	00%	$000	00%
Workman Township	$000	$000	00%	$000	00%
ISD-1 (Aitkin)	$000	$000	00%	$000	00%
ISD-4 (McGregor)	$000	$000	00%	$000	00%
ISD-2 (Hill City)	$000	$000	00%	$000	00%

1405-4

The DEIS does not adequately address the increased risk of attempting to remove a decommissioned Line #3 from amongst a tightly configured group of other operating pipelines. The increased risk of damage to and a potential spill from nearby existing pipelines should be better quantified in the DEIS. That would provide a more accurate assessment of cleaning and decommissioning versus removal of some segments of existing line #3.

1405-5

Recommendation: Present the data available on how many pipeline accidents that resulted in spills that where caused by construction activities in the vicinity of pipelines, versus the accidents involving spills that were caused by non-construction related incidents.

The preferred route from the Clearbrook Terminal to the Superior Terminal is a new route and appears to be superior to following the old existing Line #3 corridor. That portion of the existing Line #3 route is already overcrowded with pipelines, includes severe choke points that present unwarranted environmental challenges and in general continues exposure of an unnecessarily long segment of the oil pipeline in parallel and in close proximity to many miles of the main channel of the Mississippi River and its headwater's reservoirs.

The new preferred route from Clearbrook to the Superior Terminal reduces the amount of pipeline running parallel and close to the main Mississippi River channel and reservoirs. When possible it makes river crossings perpendicular to major channels, thus minimizing the overall proximity of the pipeline to major water volume channels. Fewer miles with exposure that could result in a spill quickly reaching far downriver and into existing major river reservoirs makes sense. That appears to make the preferred route from Clearbrook to the Superior Terminal superior to the current Line #3 route from an environmental protection perspective.

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Re: Enbridge Line #3 Project DIES -- Docket# CN-14-916/PPL-15-137 (page 5 of 5)

Recommendation: The DEIS include a risk analysis of the scope of anticipated damage caused by a leak near the main channel of the Mississippi River versus a similar incident near a small stream significant miles upstream from the Mississippi River's main channel.

Some of the other alternative pipeline and rail routes in the DEIS which deviate from the applicants preferred route appear to impose potential conflicts with Native American sovereignty. Those routes would require crossing Native American reservation lands which is under their sovereign control.

General Comment: The applicant does not propose to enter tribal community lands, that approach should be respected by the PUC and DOC.

The assumption that the portion of the applicant's preferred route that is located outside the existing Line 3 corridor would cause serious habitat fragmentation is not well founded. It is common knowledge that forest edges are extremely valuable and heavily used by wildlife of all types. A simple open clearing within north central Minnesota forest lands does not present any more of a disruption to the habitat than mother-nature periodically does on her own through fire, flooding and wind storms, or the disruption caused by logging operations including construction and maintaining of permanent forest roads. 1405-6

Recommendation: DEIS should address the habitat fragmentation within the context of other commonly accepted practices such as forestry roads, multiuse and single purpose recreational trails that are a normal part of northeastern Minnesota's rural landscape.

In closing the scope of the DEIS should be narrowed to address the applicant's request to replace Line #3. That would include the project's potential impact on the environment along the preferred route and include the human safety aspects of transporting the same amount of oil proposed by the Line #3 project via the alternative truck or rail routes discussed in the DEIS. Additionally, the economic impact analysis relative to the long term local property tax revenues on all local units of government along the proposed project should be provided in a concise and easily understood format. Thank you for considering this submission.

Sincerely Yours,

Dale K Lueck

Dale K. Lueck
Representative District 10B

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Levi, Andrew (COMM)

From: Sen. John Marty <jmarty@senate.mn>
Sent: Saturday, July 08, 2017 11:56 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment on Line 3 Project (CN-14-916 & PPL-15-137)
Attachments: Sen John Marty comments on Draft EIS for Line 3 Replacement - July 2017.pdf

Jamie,

Please confirm that you received the attached letter containing my comments on the Draft EIS of the Line 3 Replacement project.

Thank you.

John Marty

Senator John Marty
2401 Minnesota Senate Bldg.
St Paul, MN 55155
651/296-5645

Senator
John Marty

Senate

State of Minnesota

VIA EMAIL: Pipeline.Comments@state.mn.us
Public Comment on Line 3 Project (CN-14-916 and PPL-15-137)

July 8, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Dear Jamie,

I am writing to comment on the Line 3 "Replacement" Project Draft Environmental Impact Statement.

Rigorous and legally sufficient environmental reviews of pipeline projects are long overdue, and it is important to acknowledge that this process would never have occurred but for the persistence of affected communities. While I am glad that such a review is being conducted, I have concerns about major flaws in the Draft EIS. This is not a comprehensive list of concerns, but given the tight timeline for comment, I want to raise some points that need to be addressed in the EIS. In no particular order, here are some key flaws:

- If the "replacement" Line 3 Pipeline is built, **the Public Utilities Commission must give landowners the right to require that the existing pipeline be removed**, not simply abandoned. The landowners have hosted the Line 3 Pipeline for approximately 50 years, and have earned our appreciation and respect. Now, it would be unconscionable to grant Enbridge the sole power to decide how the land is reclaimed. Landowners should have the primary power to decide whether the pipeline will be removed or left in place with appropriate mitigation measures. These mitigation measure could include, but would not be limited to: segmentation of the pipeline to prevent water movements; filling the pipeline with grout to limit the chance that it will emerge from the ground; and a survey for contamination, which if found would be fully removed and otherwise mitigated. Leaving an aging pipeline in place is like buying a new car and leaving the old, rusting car in the backyard, slowly dripping remnants of toxic fluids into the ground. Fluids *do* continue to leak out, even if the tanks have been drained. 1404-1

  However in this case, the analogy would be even worse. It would be like leaving your rusting car in *somebody else's* backyard, without their consent, to pollute their soil and water. Providing landowners with the option of requiring removal of the existing pipeline and cleaning up contaminated soils near the pipeline must be an integral part of its replacement and needs to be addressed in the EIS.

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1404-2

- This points to another flaw in the draft: regardless of the number of years that the Line 3 replacement pipeline is used, there will be a time when it is no longer used. The draft contains no calculation of the cost and challenges of removing *this new pipeline* at that time, just as the current pipeline removal is not addressed. If the removal of the existing pipeline is so difficult, it is essential that **the removal of this new pipeline when it is no longer in use needs to be addressed in the EIS.** It is not acceptable to simply abandon it knowing that it will cause environmental harm and risks to public health and safety just because the worst of those impacts will occur many years down the road.

1404-3

- Many of the people most affected by the Line 3 replacement project are native people, whose families have lived here for hundreds of years or longer. The Draft EIS states that *"disproportionate and adverse impacts would occur to American Indian populations."* It continues, *"Any of the routes selected would negatively affect tribal resources and tribal members."* (pg 11-13) **The EIS cannot simply acknowledge this environmental injustice; it must offer a means to prevent it.**

- As unacceptable as that harm to native Minnesotans is, the acknowledged harm is based on the assumption that the pipeline construction and operation will be done according to plan. It *further* assumes a 30 or perhaps 50-year use of the pipeline and then an end to those impacts. Enbridge's failure to plan for removal of either the current line 3, or this proposed replacement shows that the extent of these negative effects on native Minnesotans is inadequately understood.

  For native people who have lived here for hundreds of years or more, the impact of the pipeline matters not only while it is under construction and while it is transporting tar sands, but also 100 years from now, decades after it is no longer in use.

  Enbridge's irresponsible plan to abandon the existing Line 3 Pipeline after it is shut down and its failure to take responsibility for fully cleaning up their mess, is sufficient in itself to show that Enbridge is not an acceptable party for building and operating this project.

- Existing Enbridge pipelines in Minnesota are well over 50 years old and the draft EIS recognizes that the proposed Line 3 replacement will last far longer than 30 years, yet the estimates of the pipeline's impact on greenhouse gases assume a 30-year operational lifespan. **The estimates of the pipeline's greenhouse gas emissions must be measured for the entire expected life of the pipeline,** not the 30 years used in the draft. The draft EIS estimates of climate-altering greenhouse gas emissions are grossly understated for this reason alone.

1404-4

- Since 2007, Minnesota has had greenhouse gas emissions reduction goals in state law. Yet, other than one brief mention of that law, there is no reference to how this project fits in with the statutory goals. The Line 3 replacement project moves Minnesota farther from those goals, yet the draft EIS never directly addresses that conflict. **The EIS must explicitly show how the project fits in with the greenhouse gas reduction goals in Minnesota law.**

- In the executive summary on the draft EIS, there is a section titled: "The Effects of Climate Change on the Project." This is obviously important because climate change *will*

intensify the environmental damage caused by the project. However, *the bigger issue is the inverse of that, namely "the effects of the project on climate change."* Minnesota and the people of Minnesota will face significant, permanent harm from climate change. This letter is not the place to spell out the devastating impacts that will occur, but the draft makes clear that a "no build" option is the only option that will not make climate change even *worse*. **The EIS needs to fully address the *profound* environmental and health impacts that would result from the project's contribution to greenhouse gas emissions.** 1404-5

- The discussion of alternatives for consideration in the Certificate of Need hearing assumes the need to transport the 760,000 barrels/day desired by Enbridge. The draft simply says: *"Enbridge states* that demand for Canadian crude oil exceeds current capacity," (pg 2-4, emphasis added) as if that is sufficient justification for putting Minnesotans at risk of significant harm. There is no independent analysis of whether that level is necessary or whether the tar sands industry needs such capacity given questions about its financial viability, let alone an analysis of whether it is in the public interest.

  Last week, the Wall Street Journal (June 29, 2017) ran a story, *"A New Problem for Keystone XL: Oil Companies Don't Want It"* that begins, "After weathering years of protests, pipeline operator TransCanada is struggling to attract customers amid low crude prices and competing oil-transportation options."

  Transporting massive amounts of tar sands through Minnesota puts our lands and waters at risk as well as worsens our climate crisis simply to address Enbridge's "need," which is far from obvious. With the climate crisis in mind and an uncertain supply of demand for the dirtiest form of oil, **the EIS must fully analyze the need for the pipeline and it must truly consider a "no build" option.** 1404-6

- As is pointed out in the draft, the EIS is required to consider the environmental consequences of "no action" alternative. In the draft, the "no action" scenarios suggest that Enbridge would continue to operate the existing line 3. However, the U.S. Department of Justice Consent Decree makes it clear that the existing pipeline cannot continue to operate in its current form absent substantial improvements in maintenance and monitoring. The draft EIS improperly and inappropriately considers continued indefinite operation of the existing Line 3 as an alternative. **The EIS must be corrected to make it clear that "no action" does not mean that the existing Line 3 can continue to operate in its current unsafe, unreliable condition.** 1404-7

- The Draft EIS creates the clear impression that the corroded, unsound existing Line 3 pipeline will continue to transport tar sands crude oil across Minnesota putting our environment at risk, *unless* Enbridge is given authority to move ahead with their proposed project. There is understandable fear that Enbridge will continue to operate with reckless disregard for the water and land in the pipeline corridor. **The EIS must go back and analyze each aspect of the proposal in a manner that recognizes that lack of trust that Enbridge will comply with requirements.**

- *Enbridge is responsible for the costliest oil pipeline spill ever recorded* (Kalamazoo River, MI, 2010, $1.21 Billion, according to Enbridge 2014 SEC filing). Enbridge told its shareholders that *the Line 3 replacement is "the largest project in our history."*

  Yet the Draft EIS of the largest project from the biggest pipeline polluter, takes much of its information directly from Enbridge's permit application, not from any independent analysis, and the methods for eliminating or mitigating the problems are all simply relying on Enbridge to responsibly handle. The Draft EIS frequently refers to the idea that "Enbridge would" take care of it, using statements such as: "Enbridge would not install equipment bridges across waterbodies..." often followed by hedge words: "unless an efficient and economical method... is not available." (pg 2-33) In literally thousands of instances, the draft EIS describes what "would" happen, i.e., what Enbridge would do, without any acknowledgement of the fact that Enbridge has often been out of compliance, and without any reason for believing that Enbridge will comply in the future.

  Furthermore, it is not sufficient or realistic to pretend that state and federal agencies have the resources to properly inspect and enforce compliance. **The EIS needs to conduct its own independent analysis to gather information, and it must be explicit that it offers no reliable means of ensuring that the proposed procedures and plans will be carried out in the manner proposed.**

- The Certificate of Need process is supposed to determine whether denial would adversely affect future adequacy, reliability, or efficiency of the energy supply. Yet each of the alternatives mentioned, from the existing Line 3 to the proposed replacement, and all the other options, are not needed for Minnesota or U.S. consumption. The U.S. already exports over 2 million barrels/day *more* than our total petroleum imports from Canada. The increased crude from the Line 3 Replacement would be used to displace more U.S. oil, which would then be exported.

  The EIS fails to adequately address the purpose of transporting this dirty oil through Minnesota's sensitive ecosystem—none of these alternatives are needed to meet the energy needs of Minnesota or our neighboring states. Instead, rapid advancements in electric vehicle and battery technology will continue to reduce our tragic dependence on crude oil-based fuels – and turn infrastructure such as Line 3 into stranded assets.

Enbridge and its shareholders would profit handsomely from the Line 3 replacement but their profits will be at the expense of the people of Minnesota and our treasured natural resources. The EIS is not acceptable unless it fully addresses each of the above concerns.

Thank you in advance for correcting these flaws in the draft.

Sincerely,

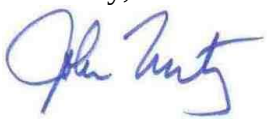

John Marty
Former chair, Senate Environment & Energy Committee

Levi, Andrew (COMM)

From: Bell, David (MDH)
Sent: Thursday, June 29, 2017 11:20 AM
To: MN_COMM_Pipeline Comments
Cc: Lundy, James (MDH); Lund, Tracy (MDH); Farnum, Trent (MDH); Kelly, James (MDH)
Subject: MDH Comment Letter - Line 3 Pipeline DEIS
Attachments: Line 3 DEIS_MDH Comment Letter_20170629.pdf

Thank you for providing the Minnesota Department of Health (MDH) the opportunity to comment on the Draft EIS for the Line 3 Pipeline Project. Attached is MDH's comment letter for the project. If you have any questions regarding the content of MDH's comments please feel free to contact myself or Jim Lundy (651-201-4649 or James.Lundy@state.mn.us).

Sincerely,

David Bell
Research Scientist - EQB Coordinator | Environmental Impact Analysis

Minnesota Department of Health
Office: 651-201-4907

DEPARTMENT OF HEALTH

Protecting, Maintaining and Improving the Health of All Minnesotans

June 29th, 2017

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

Dear Ms. MacAlister,

Thank you for providing the Minnesota Department of Health (MDH) with the opportunity to comment on Draft Environmental Impact Statement (DEIS) for the Line 3 Pipeline project. The mission of MDH is to protect, maintain, and improve the health of all Minnesotans. The careful planning and development of projects such as this one supports this mission and is an important step in ensuring health in all policies.

MDH comments to the Enbridge Line 3 DEIS represent the concerns of the Drinking Water Protection Section (MDH/DWP). MDH/DWP assists, advises, and regulates public water suppliers (PWS) in accordance with the federal Safe Drinking Water Act to achieve and maintain high quality drinking water. Our concerns focus on the protection of drinking water quality for public and private supplies during construction and operation of the line.

Beginning in November 2016, MDH/DWP provided source water protection data to this project, including:

- A shapefile existing of Drinking Water Supply Management Areas (DWSMAs) and Wellhead Protection Areas (WHPAs) along proposed route options;
- A shapefile of locations for known existing private/domestic wells along the proposed route options;
- A shapefile of estimated hydrogeologic sensitivity for the vadose zone along the proposed route options; and
- Several memoranda explaining our concerns in detail.

Our strategy in doing so was to provide the route selection process with critical information and understanding necessary to avoid unnecessary risk to drinking water quality. We understand that route selection is a complicated process that depends upon many factors, some unrelated to drinking water quality. MDH comments and the DEIS sections they pertain to are as follows:

General Comments

- ***Distinction between Wellhead Protection Area (WHPA) and Drinking Water Supply Management Area (DWSMA).*** A WHPA and a DWSMA are two distinct areas in the vicinity of public drinking water supply wells. A WHPA designates a drinking water supply well's scientifically determined capture zone, and where necessary includes an area of surface water drainage to the capture zone. A DWSMA completely encloses the associated WHPA, following easily recovered landmarks and property lines. Therefore, a DWSMA is conservatively large compared to its associated WHPA, making the DWSMA most useful to water supply protection activities. Considering only DWSMAs (not WHPAs) in the assessment of potential public water supply impacts would be adequately conservative and would make the DEIS more easily understood. 1055-1
- ***Evolving information in support of wellhead protection.*** The expected lifetime of the Line 3 pipeline is many decades and, as is stated in Chapter 10 page 10-1 of the DEIS, "…the probability of a release of some type along the entire pipeline during its lifetime is not low". Following a ten-year cycle of wellhead protection plan amendment, DWSMA boundaries constantly evolve, and information we provided earlier may soon be out of date. Several cities (e.g., Cass Lake, Clearbrook) are establishing new DWSMAs or amending existing DWSMAs in the next year. Therefore, to support effective contingency planning, we recommend that Enbridge maintain a continuously updated inventory of PWS wells, DWSMAs, and domestic wells within appropriate buffered distances around the selected route (within 2500 feet of the pipeline for DWSMAs; within 500 feet of the pipeline for domestic wells). Many of the necessary data sets are served out on the MDH web site, located here: http://www.health.state.mn.us/divs/eh/water/swp/maps/index.htm 1055-2
- ***Active role in source water protection.*** We recommend that Enbridge play an active long-term role in assisting wellhead protection efforts by maintaining proactive and routine communications with public water suppliers and private well owners within the buffered zones. 1055-3

Executive Summary

- ***Distorted map scales (page ES-2, Figure ES-1; page ES-9, Figure ES-3).*** Maps are skewed in the horizontal (E-W) direction, therefore the scale bar is inaccurate in the vertical (N-S) direction. Recreate these figures accounting for the final paper space in mind to maintain map scale accuracy. 1055-4

Chapter 2—Project Description

- ***Illegible text (page 2-11, Figure 2.3-1).*** Make text larger so that it is readable, then re-export as a TIFF or PNG (not JPG) file for proper insertion into a word document. 1055-5

- ***Material storage (page 2-12, section 2.3.4) and additional temporary workspaces (page 2-13, section 2.3.5).*** Select these areas to avoid DWSMAs, and to maximize distance from public and private (domestic) drinking water wells. 1055-6
- ***Figure format (pages 2-15, 2-16, 2-17; Figures 2.4-1 through 2.4-6).*** *For improved readability, r*esize figures on pages 2-16 and 2-17 (Figure 2.4-3, Figure 2.4-4, Figure 2.4-5, and Figure 2.4-6) to be consistent with the larger and more easily read figures on page 2-15 (Figure 2.4-1 and Figure 2.4-2). A neat line is missing from Figure 2.4-1. 1055-7
- ***Conventional pipeline construction procedures (page 2-19, section 2.7.1).*** Coordinate this step with the PWS or private well owners who may be affected. 1055-8
- ***Water conservation during testing (page 2-28).*** From where is the water for pipeline testing to be obtained? To conserve water, transfer and recycle test water between segments during hydrostatic testing.

CHAPTER 3—REGULATORY FRAMEWORK

- ***Word choice (page 3-14).*** "The MDH assists local water suppliers in preparing wellhead protection plans ~~for~~ within their drinking water supply management areas." 1055-9

CHAPTER 5—EXISTING CONDITIONS, IMPACTS AND MITIGATION-CERTIFICATE OF NEED

- ***General comment to Chapter 5***. The route comparisons were confusing. The differences between System Alternatives and Route Alternatives were not clear. It was also not clear why only the preferred route was compared to the other system alternatives. 1055-10
- ***Occurrence of karst (page 5-15).*** No karst aquifers are present along the preferred route. The paragraph about karst would be more appropriate in the discussion section about route SA-04, which does cross karst. 1055-11
- ***Verified and unverified well locations (page 5-17, page 5-18).*** The information source for well locations (verified and unverified) is County Well Index (CWI). However, universal transverse mercator (UTM) coordinates are missing or unverified for a substantial proportion of the roughly 500,000 wells that CWI contains. In addition, CWI is known to contain only a fraction of wells that exist. Therefore, within the ROI there are likely to be more than four public or domestic drinking water supply wells for which locations are missing or unverified. 1055-12
- ***Reference to sole source aquifers (page 5-26).*** There is no need to list 'Sole Source Aquifers' in the title because none are crossed by the routes described in this section. 1055-13
- ***Setback distance (page 5-26).*** A minimum setback distance of 100 feet between hazardous waste storage and drinking water wells is required (if adequate 1055-14

1055-14 Cont'd

safeguards exist). Consider siting tanks as far as possible from drinking water supply wells.

- ***Clearbrook DWSMA (page 5-26).*** The city of Clearbrook now has a preliminary DWSMA, and this DWSMA should therefore be added to the assessment. 1055-15
- ***Sensitive surface waters (page 5-43, Section 5.2.1.2.1).*** This section should mention that surface waters used as a drinking water source are regulated by MDH. 1055-16
- ***Possible incorrect city listed (Table 5.3.3-2).*** Existing line 3 does not run through Big Lake, as the table indicates. Bagley may be the PWS that was meant to be in the table. 1055-17

CHAPTER 6—EXISTING CONDITIONS, IMPACTS AND MITIGATION-ROUTE PERMIT

- ***General comment about domestic well accounting in the DEIS.*** Due to under-reporting, estimates of the number of domestic wells are very likely to be low. The database upon which estimates are based (County Well Index, CWI), primarily contains information about wells drilled after the Minnesota Water Well Construction Code went into effect. It also under-represents drive-point domestic wells, which may be very common to the areas crossed by the route alternatives. 1055-18
- ***General comment about Route alternative RA-06.*** Route Alternative RA-06 crosses the Iron Range along the edge of an active mine (U.S. Steel—Keetac) between the cities of Nashwauk and Keewatin. The DEIS as written does not discuss mineral rights or what would happen if the pipeline prevented access to minerals beneath. Enbridge may need to come up with a plan for moving the pipeline after its construction in a (someday) active mining area. This is important to drinking water because both Nashwauk and Keewatin use the iron formation as their source aquifer. 1055-19
- ***Glacial aquifers (page 6-161).*** Move the second paragraph to the "Bedrock Aquifers" section (same page). 1055-20
- ***Operations impacts (page 6-171; same comment in other sections for each route alternative).*** If French drain effects occur in "areas of groundwater upwelling", will Enbridge replace/re-engineer the "trench breakers" discussed in the text? Which regulatory agency will respond to this? 1055-21
- ***Degradation of shallow groundwater quality (page 6-172; same comment in other sections for each route alternative).*** Blasting agents may alter ground water chemistry. Take care when blasting near domestic or public water supply wells. Non-toxic food-grade blasting chemicals may be necessary. 1055-22
- ***Status of required permits and approvals commentary on DWSMA consultation (Table 6.8-1).*** This table indicates the pipeline proposal potentially affects only two DWSMAs (Wrenshall and Sundsrud Court). However, depending on the final approved route, several other DWSMAs (e.g., Plummer, Clearbrook) are likely to be affected. 1055-23

CHAPTER 7—ROUTE SEGMENT ALTERNATIVES

1055-24

- ***General comment, public water supply wells.*** The assessment of route segment alternatives (RSA) does not appear to consider route proximity to drinking water supply wells. For instance, RSA 23 approaches within 600 feet of public water supply wells for the cities of McGregor (DWSMA currently delineated) and Palisade (DWSMA to be delineated in the near future). The RSAs also closely approach numerous non-community public water supply wells and private (domestic) drinking water wells. These should all be assessed in this section of the DEIS.

CHAPTER 8—EXISTING LINE 3 ABANDONMENT AND REMOVAL

1055-25

- ***General comment about waste solvent storage.*** If waste solvents from pipeline cleanout are to be stored at Enbridge facilities at Clearbrook, it should be pointed out that a portion of the Clearbrook terminal is within the Clearbrook DWSMA (the DWSMA is still preliminary as of the date of commentary).

1055-26

- ***Location of abandoned pipeline segmentation.*** Prevent long-distance movement of water through the abandoned pipeline into DWSMAs by carefully choosing segmentation locations far from DWSMAs.

CHAPTER 10—ACCIDENTAL CRUDE OIL RELEASES

1055-27

- ***System alternative SA-04 (page 10-18, section 10.2.4.1.3).*** This is an apples to oranges comparison. All other routes have the same starting point (Neche, ND) and ending point (Superior, WI); however route SA-04 starts in Neche, ND and ends in Joliet, IL. The SA-04 risk of failure is higher because its length is so much greater than other routes.

1055-28

- ***High consequence area drinking water sources (Figure 10.4-3).*** This figure needs to be updated to ensure it presents the most up to date list of DWSMAs (Clearbrook, Cass Lake, and Warba are new additions that appear to be missing).

1055-29

- ***Number of wells.*** The number of all wells along the route options is likely higher than reported here. See earlier comment that County Well Index does not contain most wells drilled before adoption of the Minnesota Water Well Construction Code.

1055-30

- ***Correct source of DWSMA definition (page 10-71, section 10.4.3.1.2).*** The term "DWSMA" was first defined in the MDH wellhead protection rule.

APPENDIX A—DETAILED ROUTE MAPS

1055-31

- ***Do not reveal locations of public drinking water supply wells.*** Although the maps show locations of PWS wells, the scale is such that exact locations are obscured. However MDH standard practice is to prevent circulation of exact well locations (e.g., UTM coordinates) on publicly disseminated information. A copy of the MDH policy "Sensitive Geospatial Data Access, Distribution, and Use Policy" can be provided if necessary.

- ***Possible map correction.*** RA-06 on Map 26A highlights residences in the town of Keewatin that are far from the proposed ROW. 1055-32
- ***Use DWSMAs, not WHPAs.*** DWSMAs are the main polygons within which public water supplies plan activities to protect their drinking water. Therefore place DWSMAs on the maps and remove the WHPAs. See general comment at the beginning of this document. 1055-33

Health starts where we live, learn, work, and play. To create and maintain healthy Minnesota communities, we have to think in terms of health in all policies. Thank you again for the opportunity to provide comments on this DEIS for the Line 3 Pipeline project. If you have any questions regarding this letter feel free to contact Jim Lundy, Supervisor from the Source Water Protection Unit, at (651) 201-4649 or James.Lundy@state.mn.us.

Sincerely,

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Environmental Review Coordinator
Environmental Health Division
Minnesota Department of Health
PO Box 64975
Saint Paul, MN 55164-0975

CC: Jim Lundy, Hydrologist Supervisor, Source Water Protection Unit, MDH
James Kelly, Manager, Environmental Surveillance & Assessment Section, MDH
Tracy Lund, Hydrologist, Source Water Protection Unit, MDH
Trent Farnum, Hydrologist, Source Water Protection Unit, MDH

Levi, Andrew (COMM)

From: Sarah Beimers <sarah.beimers@mnhs.org>
Sent: Monday, July 10, 2017 10:09 PM
To: MN_COMM_Pipeline Comments
Subject: SHPO Comment Letter Line 3 DEIS
Attachments: 2015-0684e (1).pdf

RE: CN-14-916 and PPL-15-137

Attached is the 7/10/2017 State Historic Preservation Office (SHPO) comment letter regarding the DEIS for Line 3.

Sarah Beimers
Manager of Government Programs & Compliance | Minnesota Historic Preservation Office
Heritage Preservation Department | Minnesota Historical Society | 345 Kellogg Boulevard West | St. Paul MN 55102
tel: 651-259-3456 | e: sarah.beimers@mnhs.org

MINNESOTA HISTORICAL SOCIETY

HERITAGE PRESERVATION

July 10, 2017

Jamie MacAlister
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul MN 55101-2198

RE: Line 3 Replacement Project: CN-14-916, PPL-15-137
Multiple Counties
SHPO Number: 2015-0684

Dear Ms. MacAlister,

Thank you for the opportunity to comment on the *Draft Environmental Impact Statement* **(DEIS) for the proposed Line 3 Project (Project). The DEIS has been reviewed pursuant to the responsibilities given to the Minnesota Historical Society by the Minnesota Historic Sites Act (M.S. 138.665-666) and the Minnesota Field Archaeology Act (M.S. 138.40). The State Historic Preservation Office (SHPO) is the department within the Minnesota Historical Society which is delegated to consult with state departments and agencies and respond to requests for review pursuant to the requirements of these state laws.**

It is our understanding that the DEIS has been prepared by the Minnesota Department of Commerce's Energy Environmental Review and Analysis (DOC-EERA) for the use by the Minnesota Public Utilities Commission (PUC) as it considers issuance of a Certificate of Need (CN) and a Route Permit (RP) for the Project. The DEIS has evaluated, along with a "No Action" alternative which would result in other transportation outcomes, a System Alternative (SA-04) as well as Route Alternatives identified as RA-03AM, RA-06, RA-07, and RA-08.

Please note that this comment letter does not address the requirements of Section 106 of the National Historic Preservation Act of 1966, as amended, and 36 CFR Part 800, the procedures of the Advisory Council on Historic Preservation for the protection of historic properties, as it is the lead federal agency's responsibility to initiate and complete any required Section 106 review for a federally assisted Project.

In August 2016, the U.S. Army Corps of Engineers (USACE) initiated Section 106 consultation with our office regarding the agency's undertaking, which is the proposed issuance of a federal permit to 1) discharge fill into waters of the U.S. (WOUS) in connection with pipeline construction, and 2) provide authorization of pipeline construction under or through navigable WOUS. Following additional information submitted to our office by the USACE in April 2017, on 2 May 2017 our office provided written comments and recommendations to the USACE regarding the agency's definition of the area of potential effect for above-ground visual effects based upon the USACE's permit areas, or areas of federal agency jurisdiction.

Our office is at a very early stage in Section 106 consultation with the USACE for the proposed

federal undertaking, and it is important to clarify that the undertaking subject to Section 106 review is not construction of a replacement pipeline, but is a permit to discharge fill or construct segments of the pipeline through WOUS for the applicant's selected route only. In summary, the Section 106 review does not at this point include the entire pipeline route or any alternative routes.

Therefore, the review and consideration of potential impacts to significant historic, architectural, and archaeological resources as part of the DEIS is more comprehensive than any concurrent federal review by the USACE under Section 106 in that it takes into account the entire preferred pipeline route, a system alternative, and route alternatives, as well as consideration of potential impacts caused by the abandonment of the existing Line 3.

As mentioned in the DEIS, our office has had the benefit of consulting with Enbridge Energy (Applicant) since July 2015 as they have completed and submitted to our office for review the archaeological field surveys for areas of potential ground disturbance within their preferred pipeline route.

Comments and recommendations on the DEIS are, as follows:

Chapter 3 Regulatory Framework 2368-1

- **On Table 3.6-1 the Minnesota State Historic Preservation Office is listed as consulting (with federal agencies) under (Section 106 of) the National Historic Preservation Act which is correct. Our office does not provide "Section 106 clearance" per se. We do, however, review and provide concurrence with a federal agency's findings and determinations pursuant to 36 CFR Part 800. Also, there is no mention on this table of our role in reviewing and consulting with State agencies and departments pursuant to M.S. 138.665-666 and M.S. 138.40, which is what the SHPO does on behalf of the Minnesota Historical Society. Therefore, we recommend that this information also be included on this table.**
- **Under Section 3.6.3.4, while our office certainly consults with applicants regarding identification, evaluation, and assessment of effects to cultural resources, there is also a requirement pursuant to state law that agencies and departments should consult with our office prior to state approval of state sponsored projects or those projects undertaken on non-federal public lands for which a state agency or department has jurisdiction.** 2368-2

Chapter 5 Existing Conditions, Impacts, and Mitigation – Certificate of Need
Chapter 6 Existing Conditions, Impacts, and Mitigation - Route Permit

Section 5.4 Cultural Resources
Section 6.4 Cultural Resources 2368-3

- **For clarification, "cultural resources", as defined in this section, also include historic districts which may be archaeological or historic/architectural, or both. Historic resources also include objects and landscapes.** 2368-4
- **Regulatory Context (Minnesota) – The summaries provided in this section provides a good overview of applicable state laws. Regarding the Field Archaeology Act, it is**

2368-4 Cont'd

important to clarify that when significant archaeological sites exist, or are predicted to exist "on public lands or waters" the "agency controlling said lands or waters" are required to submit construction or development plans to the Minnesota Historical Society (SHPO) and the Office of the State Archaeologist (OSA) for review and comment. Therefore, review and consultation with our office and the OSA is dependent upon the project's location and impacts to non-federal public lands, regardless of whether it is a publicly or privately sponsored project. Also, the statement at the end of the *Minnesota Private Cemeteries Act* **incorrectly states that the SHPO reviews projects that may impact known or suspected human burials. The SHPO has no role in reviewing these projects and do not have a role in forwarding the OSA this information. The OSA is to be contacted directly pursuant to Subdivision 10 of M.S. 307.08.**

2368-5

- **Methodology – The Region of Interest (ROI) provided in the DEIS appears to be appropriate to take into account potential direct and indirect effects to cultural resources, if any, that may be caused by the Project. While it is accurate to state in the DEIS that our office has reviewed and commented on the Applicant's completed archaeological surveys for the preferred route, including two (2) additional surveys which our office reviewed in April 2017 which are not listed in the DEIS, it is critical to note that only data included in the SHPO's current inventory of recorded historic/architectural and archaeological sites was utilized for the ROIs of the other alternative routes. To further clarify and correct what is stated in the DEIS, the cultural resources identified for these ROIs included properties which fall into one of of three (3) different categories: 1) those which are listed in the National Register of Historic Places (NRHP) or State Register of Historic Places (SRHP), 2) those which have been determined eligible for listing in the NRHP through previous federal or state review (our office does not review and evaluate per the SRHP which are listings only the Minnesota Legislature has authority to pass), or 3) those which have been identified through reconnaissance survey but which have not been evaluated for NRHP eligibility. While the SHPO inventory data is considered current, it is by no means considered a comprehensive inventory of all potential archaeological and historic/architectural resources which may be present in the ROIs for alternative routes.**

2368-6

- **Impact Assessment - Further clarification needs to be made to this section which calls out the SRHP and State Historic Site Network, but makes no mention of cultural resource significance under the NRHP, which is the basis for evaluation for both federal and state reviews. Also, while we typically do recommend preparation and implementation of an Unanticipated Discoveries Plan, the intent of consultation and project review by our office pursuant to state law is that all cultural resources can be identified through field survey, evaluated for significance, all project effects to significant cultural resources assessed, and adverse effects avoided, minimized, or mitigated, prior to construction. In general, we agree with the statement made in the DEIS that only the Applicant's preferred route has been surveyed for archaeological resources. The analysis in the DEIS for alternative routes only included consideration of known cultural resources, which is a very limited data set and an incomplete representation of all significant cultural resources, and that there is a likelihood of additional cultural resources to be present within the ROI for any of the alternative**

MINNESOTA HISTORICAL SOCIETY

HERITAGE PRESERVATION

routes.

- Summary and Mitigation - For reasons outlined above, the summary provided in this section is considered incomplete as it only assesses potential impacts to known cultural resources and the majority of these known cultural resources within alternative routes, those other than the Applicant's preferred alternative, have not been evaluated for significance. As stated in this section, we look forward to ongoing consultation with the DOC-EERA and PUC regarding identification of cultural resources as well as "determinations of eligibility, Project effects, and any necessary treatment for impacts." Regarding mitigation, we agree with suggested measures to resolve - avoid, minimize or mitigate - any potential adverse effects to cultural resources. It is important to note that, if adverse effects ultimately cannot be avoided, consideration should be given to mitigation measures that have a public education benefit. We look forward to consultation with participating state agencies and departments, as well as the Applicant, to resolve any adverse effects, if any, which may be caused by the Project. 2368-6 Cont'd 2368-7

In summary, while the Cultural Resources sections for both the Certificate of Need and Route Permit actions provide a general overview of applicable laws and an initial assessment of the Project's potential impacts for the Applicant's preferred route as well as alternative routes, our office considers information and documentation presented in the DEIS as incomplete in terms of what state law requires for consultation with our office in an effort to identify and protect the state's significant historic and archaeological resources.

Therefore, we look forward to continuing consultation with the DOC-EERA, and any other state agencies which may have responsibilities for consulting with our office pursuant to state law, in an effort to comprehensively identify and evaluate all archaeological and historic/architectural resources which may be affected by the eventual state permitted Project as whole - above and beyond the scope of the federal Section 106 review - as well as assess potential effects caused by the Project and resolve adverse effects, if any.

Please contact me at 651-259-3456 or sarah.beimers@mnhs.org if you have any questions regarding this comment letter or would like to discuss next steps in the consultation process.

Sincerely,

Sarah J. Beimers

Sarah J. Beimers
Manager of Government Programs and Compliance
State Historic Preservation Office

Levi, Andrew (COMM)

From: Tyler Kaspar <Tkaspar@1854treatyauthority.org>
Sent: Monday, July 10, 2017 11:55 AM
To: MN_COMM_Pipeline Comments
Cc: Darren Vogt; Sonny Myers; Andy Edwards; Tara Geshick; Tony Swader
Subject: 1854 Treaty Authority Comments
Attachments: Enbridge Line 3 Comments-1854 Treaty Authority 7-10-2017.pdf

Please find attached comments from the 1854 Treaty Authority regarding the Draft Environmental Impact Statement for Enbridge Energy's Proposed Line 3 Pipeline Project.

Sincerely,

Tyler Kaspar
Environmental Biologist
1854 Treaty Authority
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218-722-8907

1854 Treaty Authority

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July 10, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

RE: Draft Environmental Impact Statement for Enbridge Energy's Proposed Line 3 Pipeline Project (Docket Numbers CN-14-916 and PPL-15-137).

Ms. MacAlister,

The purpose of this letter is to provide comments on the Draft Environmental Impact Statement (DEIS) for Enbridge Energy's Proposed Line 3 Pipeline Project.

The 1854 Treaty Authority is an inter-tribal natural resource management agency governed by the Bois Forte Band of Chippewa and Grand Portage Band of Lake Superior Chippewa, both federally recognized tribes. The organization is charged to preserve and protect treaty rights and related resources within the 1854 Ceded Territory. Present day northeastern Minnesota is located within the 1854 Ceded Territory including all of Lake and Cook counties, most of St. Louis and Carlton counties, and portions of Aitkin and Pine counties. Bands continue to exercise treaty rights to hunt, fish, and gather in the 1854 Ceded Territory. It is vital that resources are available and healthy for the meaningful use of treaty rights. The 1854 Treaty Authority would like to highlight a number of concerns related to the proposed project. Please note that these comments are submitted by 1854 Treaty Authority staff with the understanding that member reservations may submit comments from their own perspective.

Water Resources

Surface Water

According to the DEIS, the applicant's preferred route would require 192 surface water crossings within Minnesota, which includes streams and lakes. Some of the streams and lakes crossed by the preferred route are within the 1854 Ceded Territory and we are concerned that construction, and more importantly a potential pipeline spill, could impact these important resources and treaty rights. The streams and lakes crossed support warmwater, coolwater, and coldwater fish species, wildlife and diverse plant communities important to the bands. Alteration of flows and/or loss of riparian cover from construction and operation could alter fish communities (e.g. change from coldwater to cool or warm water species) and decrease available habitat. Erosion from

2477-1

construction activities and runoff could increase sedimentation and impact available spawning and nursery habitats for walleye as well as other fish species. Impacts to walleye may be more severe in spring/early summer when increased sediment loads can bury/suffocate eggs and fry. An oil spill would not only impact fish and their habitat but would also impact harvest and consumption. Increased contaminates in fish is a concern, especially if there is a pipeline spill in waters crossed like the Kettle River that already have an existing beneficial use impairment for aquatic consumption (mercury). Any impacts to harvest and consumption of fish is an impact to treaty rights. There is a population of lake sturgeon in the Kettle River, which is an important cultural and spiritual species to the bands. There are few populations in the 1854 Ceded Territory, others being in Lake Superior, St. Louis River and Pigeon River, so any impacts to lake sturgeon is a concern. Impacts from a pipeline spill at a stream crossing may be far reaching and evident miles downstream of the spill location, potentially beyond the 10-mile-long downstream region of interest used in the DEIS. Similarly, a lake spill will likely impact a large area of the lake and shoreline and be spread by current and wind action.

2477-2

Wild Rice Waters

An important concern we have with surface waters crossed or in close proximity to the applicants preferred route in the 1854 Ceded Territory are wild rice waters. As noted in the DEIS, wild rice is of deep cultural significance to tribes in Minnesota, including the Bois Forte and Grand Portage bands. In Chapter 5 (page 5-64) the DEIS states "*The Applicant's preferred route intersects the highest number of wild rice lakes (17) compared to the CN Alternatives*". On page 5-73, the DEIS states "*Five wild rice waterbodies would be crossed by the Applicant's preferred route, with about 5 acres of the delineated waterbody basins within the construction work area*". Wild rice waters (a lake or river with any wild rice now or historically) in and near the 1854 Ceded Territory that may be impacted by the preferred route and are of concern to us include:

-Sandy Flowage: is just outside the 1854 Ceded Territory and is an important wild rice harvesting location. The preferred route crosses Sandy River just south of the flowage.

-Kettle River: is crossed by the preferred route near and downstream of Kettle Lake. Kettle Lake and portions of the Kettle River near the lake can contain good wild rice stands utilized by harvesters.

-Moosehorn River: is crossed by the preferred route in Mahtowa, which is upstream of an area with good wild rice stands and harvest near Moose Lake.

-Venoah Lake: is a wild rice lake identified in an update from the Minnesota Department of Natural Resources in 2013 but not identified in the project map. The preferred route runs near this lake.

Some of these wild rice waters/locations were not included in the DEIS but have or previously had wild rice present and need to be considered. While our focus is the 1854 Ceded Territory, we are concerned about any impacts to wild rice across the route as a whole.

2477-3

Wild rice has been declining in areas of Minnesota and the 1854 Ceded Territory and avoidance should be used whenever possible. Tribes with treaty rights to wild rice waters that may be impacted by the proposed project should be included in discussions on how to avoid or minimize impacts (e.g. timing of construction and integrity digs will influence the degree of impact on wild rice and tribes may be the best resource for avoiding or minimizing impacts to wild rice).

2477-4

Pipeline leaks or spills, whether it be at a crossing or upstream of a wild rice water, are a major concern. Impacts would be permanent or likely lead to multiple years with little or no harvest in areas where it may occur. Given the cultural and spiritual connection tribes have with wild rice, there would not be any way to mitigate this impact.

2477-5

Groundwater

The applicant's preferred route for the Line 3 pipeline replacement will impact ground and surface waters in Minnesota and the 1854 Ceded Territory from construction, operation and any potential spills. We are concerned about groundwater contamination, especially if there is a spill, in wetlands and other shallow aquifer areas where contamination of surface water can

2477-6

readily be transported to groundwater. An additional risk of groundwater contamination exists in Carlton County within the 1854 Ceded Territory, which is the only area blasting is planned to occur. As stated in Chapter 5, (page 5-25), "*Where blasting would occur, rock would be removed to a depth of 7 feet, which could be above the elevation of the water table in the area. If the water table is exposed by blasting, the turbidity, sedimentation, or chemical contamination that could result would be localized.*" More detail should be provided in the DEIS regarding how localized the impacts would be and whether there is potential for faults to occur from blasting that could potentially transport contaminated groundwater to other areas.

Wetlands

Impacts and Mitigation

2477-7

Within Minnesota, the applicant's preferred route would impact approximately 499 acres of wetlands during construction. According to the DEIS, the preferred route will cross the St. Louis River watershed in the 1854 Ceded Territory. Any impacts (loss, conversion) of wetlands in the St. Louis River watershed is a concern due to substantial impacts, especially in headwater areas, that have already occurred. As noted in Chapter 5 (page 5-130 and Table 5.2.1.3-6) long term/permanent, major impacts are predicted for forested and shrub/scrub wetlands in the pipeline right of way, which are difficult to mitigate. On page 5-20, the DEIS states "*Although site-specific compensatory wetland mitigation has yet to be identified, it would continue to be considered in consultation with the permitting agencies to minimize and offset wetland impacts. Compensatory wetland mitigation would be consistent with applicable policies, regulations, and rules governing compensatory wetland mitigation for purposes of Section 404 CWA (see Section 5.2.1.3.1)*". Proper mitigation for all wetland impacts is important and needs to be in the St. Louis River watershed and the 1854 Ceded Territory (in-place and in-kind).

Vegetation and Forests

Impacts to Resources and Access

2477-8

Clearing and other impacts to vegetation and forest resources along the preferred route as well as access to the resources is a concern. According to the DEIS, the applicant's preferred route would

2477-8 Cont'd

result in the loss or alteration of up to 5,617 acres of existing vegetation during construction in North Dakota, Minnesota, and Wisconsin, with approximately 1,859 acres of forested land present within the construction and operation footprint of the project. In Minnesota, the preferred route would have some form of impact on about 5,081 acres of existing vegetation. Permanent impacts include up to 291 acres for facilities and roads, and 2,050 acres of forested upland and wetland vegetation from construction. In the 1854 Ceded Territory, 128 acres of Carlton County land (public land) would be crossed with 53 of those aces being in the permanent right-of-way during operation. This will not only impact treaty resources but also the exercise of treaty rights in 1854 Ceded Territory. Treaty rights are exercised on public lands, so any temporary or permanent impacts to these lands (including access) would affect tribes. 2477-9

Tribal Resources

1854 Ceded Territory 2477-10

We were pleased to see the efforts made to get and include input from tribes that would be impacted by the proposed project in Chapter 9. A good description was provided about the tribes, treaty rights on reservation and in ceded territories and their issues and concerns with the proposed project. However, there should be more information provided about how Fond du Lac, Bois Forte and Grand Portage bands of Chippewa manage and exercise off-reservation treaty rights in the 1854 Ceded Territory. The 1854 Treaty Authority (not mentioned in the DEIS) is governed by the Bois Forte and Grand Portage bands and protects and manages off-reservation treaty rights and resources for those bands in the 1854 Ceded Territory. The Fond du Lac Band manages their own off-reservation treaty rights and resources in the 1854 Ceded Territory. There also did not appear to be much detail about actual impacts to tribal resources and treaty rights from the proposed project in Chapter 9. Issues and concerns were described, but details of impacts were not and should be as they were described in other chapters. 2477-11

Cultural Resources 2477-12

We are concerned about impacts from the preferred route on cultural resources and proper consultation. According to the DEIS, surveys for archaeological resources were completed in Minnesota, with 63 sites documented in the survey area for the applicant's preferred route. Information from the Minnesota Historical Society indicated 53 previously recorded archaeological resources, with 9 located in the construction area (4 in the permanent right of way) and 3 in additional temporary workspace of the applicant's preferred route. The DEIS also notes that it is likely that currently unknown archaeological resources could be discovered during ground disturbing activities. Avoidance, minimization efforts and mitigation for impacts must be discussed with the appropriate agencies and tribes. Consultation should occur with tribes over impacts to known sites, potential traditional cultural properties, and for a process if unknown sites are discovered during construction.

Accidental Crude Oil Releases

Likelihood and Uncertainty

A primary concern with the proposed project is the impacts that will occur from any potential oil spills from a pipeline failure. As stated in Chapter 10 (page 10-1), "*Although the probability of a large or catastrophic oil release at any specific location is extremely low, the probability of a*

release of some type along the entire pipeline during its lifetime is not low" and "*However, it is impossible to predict where a spill would happen, the quantity of oil involved, how far the impacts would extend, or exactly what resources would be affected.*" This gives little reason to doubt that a spill from the pipeline, of some size, is probable and the resulting impacts to resources could be major.

Impacts and Environmental Justice 2477-13

The preferred route crosses surface waters with wild rice and other sensitive aquatic species, wetlands, forest lands and areas of high biological diversity in Minnesota and the 1854 Ceded Territory. As noted in the DEIS, there will be impacts to these resources from construction and operation, which will be cumulative with the Existing Line 3 abandonment. The additional impact from a spill is an even bigger concern given that some of the most sensitive resources and resource rich areas are remote, including tribal lands and treaty resources. On page 10-102, the DEIS notes that emergency response time is typically faster in populated areas than in more remote areas. Also, emergency response equipment is only kept in a few locations, mostly in populated areas (page 10-99). This would suggest that tribal lands and treaty resources are at a higher risk from a spill since they are typically located in more remote areas and will be disproportionately affected. The disproportionate impact to the Bois Forte and Grand Portage bands in the 1854 Ceded Territory and other tribes from a pipeline spill is a major concern for us and an environmental justice issue, as pointed out in Chapter 11. Mitigation for impacts to treaty resources, whether it be on reservation or in ceded territories, will be difficult and unlikely to be adequate. As stated on page 11-13, "*The combination of tribal identity and relationship to the land and the rights tribal members have in the ceded territories complicates the traditional notion of mitigation. The ceded territories and the rights that go with them are not mobile and cannot be transferred. Tribal impacts are magnified because there would be impacts associated with abandonment and removal of the existing Line 3 and there would be additional impacts associated with the replacement of Line 3 in a new location.*"

Abandonment of Existing Line 3

Risks 2477-14

The Existing Line 3 pipeline crosses a portion of the 1854 Ceded Territory as well as the Fond du Lac Band of Lake Superior Chippewa Reservation. We are concerned about impacts to treaty rights and resources that will occur by abandoning the Existing Line 3 pipeline. As noted in Chapter 8 (page 8-1) there is potential environmental risks and impacts of any existing contamination surrounding the pipe that may never be detected and remediated if the line was abandoned and potential environmental risks and impacts associated with ongoing deterioration of the abandoned pipeline. There is also note of potential risks associated with removing Line 3 such as removal activities could damage an active pipeline located on either side of the existing Line 3 and impacts associated with disturbances at waterbody and roadway crossings. Although removal of Line 3 is presented as an option, it seems to be precluded in the DEIS due to cost.

Permanent Impact 2477-15

On page 8-3 of the DIES, it is noted that Enbridge would maintain the Line 3 right-of-way indefinitely if abandoned, which would mean that resources lost in the right-of-way will be lost indefinitely along with any potential remediation of the right-of-way. Any fragmentation of large

blocks of forest and/or wetlands will remain indefinitely as well. We consider this a permanent loss of treaty resources and it would be cumulative with the proposed route. As noted on page 8-9, capped segments of Line 3, in wetlands and water crossings in particular, have the potential to become exposed when the water table is high and will have an increased potential of exposing contaminants in those areas. This would be an additional concern for wetland and aquatic resources, especially when in proximity to wild rice. 2477-15 Cont'd 2477-16

Cumulative Effects

Adequacy 2477-17

The cumulative effects analysis presented in the DEIS seems inadequate. It does not include past, present or future impacts from other projects along each proposed route and the added impact from the proposed project route(s) in any quantifiable way (e.g. total acres of forest and/or wetlands impacted along each potential route from other projects and the cumulative effect from the pipeline). For cumulative effects from past and present projects, there is only reference to Chapters 5 and 6 from the DEIS. Cumulative effects from future or reasonably foreseeable projects is only described generally in the DEIS (e.g. no estimates of cumulative acres, miles, waters that would be impacted in addition to the proposed project) with only reference given to environmental review documents for those projects. We suggest inclusion of more specific information so cumulative effects from past, present, and future projects and the proposed pipeline route(s) can be better understood and inform the public and permitting. 2477-18 There also appears to be a bias to downplay impacts with using the words "minimal" and "minimized" to describe cumulative effects. This could be remedied by providing actual acres, stream miles, etc. versus a general description. 2477-19 Also, as was laid out in Chapters 9 and 11 in the DEIS, any of the proposed pipeline routes will impact treaty rights and related resources for tribes and will be a cumulative, permanent impact. The proposed route would cross the 1854 Ceded Territory and would permanently impact treaty resources. The impact would be in addition to the impact of the existing Line 3 pipeline (past, present) and whether it is removed or left in place (future).

Thank you for the consideration of our comments.

Sincerely,

Tyler Kaspar

Tyler Kaspar
Environmental Biologist

Levi, Andrew (COMM)

From: Frank Bibeau <frankbibeau@gmail.com>
Sent: Monday, July 10, 2017 8:17 PM
To: MacAlister, Jamie (COMM)
Cc: MN_COMM_Pipeline Comments
Subject: 1855 Treaty Authority Comments on Line 3 DEIS
Attachments: Enbridge CEO says Canada only needs 2 more export pipelines Reuters 2-17-2017.pdf; Enbridge tax lawsuit exceed entire budget Mn counties 3-27-2017.pdf; Gov Dayton Scraps Mtg w Mille Lacs Businesses after Protest WDIO TV 7-7-17.pdf; USACE Issue Paper re Trust Responsibilities 9-29-1997 Crandon Mine EIS.pdf; 1855 Treaty Authority Comments on Line 3 DEIS 7-10-2017.pdf

Please find comments and attachments

Thank you,

Frank Bibeau

Officers

Chairman
Arthur Larose

Vice-Chair
Steve Clark

Secretary/Treasurer
Sandra Skinaway

Board Members

Steven Clark
Monica Hedstrom
Alfred Fox, Jr.
Archie Larose
Richard Robinson
Dale Greene, Jr.
Sandra Skinaway
Michaa Aubid

PO Box 418
White Earth, MN 56591

1855 TREATY AUTHORITY

East Lake ♦ Leech Lake ♦ Mille Lacs ♦ Sandy Lake ♦ White Earth

July 10, 2017

Submitted via email only
pipeline.comments@state.mn.us

Jamie MacAlister
Jamie.MacAlister@state.mn.us
Environmental Review Manager
MN Department of Commerce
85 Seventh Place East, Suite 280
Saint Paul, Minnesota 55101

Re: Draft EIS Comments for
Enbridge Line 3 Replacement

To whom it may concern;

The DEIS undercuts, understates, and fails to recognize some if not all of the Chippewa's treaties and rights to intentionally ignore and override the rights of tribal members and tribes. The Appendix has a variety of submitted documents attached[1] in an obvious effort ***to appear*** to be fair, informed or balanced. Yet, not all of the documents referenced are actually attached. Moreover, review of the important information shared in the documents is ignored to avoid the DEIS stated *guiding principles* of ***Intentionality to accurately reflect the information gathered***.

9.3.6 Guiding Principles
The preparation of this chapter is guided by the following principles:

[1] See Appendix, Chapter 9 - Tribal Resources and Impact, IV. II. *Oral and Written Testimony*, iii. Honor the Earth Filings and Impact Discussion and *Tribal Resolutions and Formal Reponses to Line 3*, xii. 1855 Treaty Authority Letter Filed (without attachments).

• Recognition of the privilege and importance of the information shared and presented;
• Respect for, and protection of, the rights, interests, and sensitivities of sovereign tribal governments in Minnesota;
• Accountability through face-to-face interviews and opportunity for review and feedback; and
• Intentionality to accurately reflect the information gathered.

2478-1

In reviewing a few named documents in the Appendix and my own submissions identified in the Appendix, it is readily apparent that some important attachments and enclosures are systematically omitted by name and/or not attached to the submitted documents referencing the attachment. As such the Guiding Principles failed on multiple levels.

Case in point is that the United States of America, as the other party to the treaties with the Chippewa, already understands in its 1997 U.S. Army Corps of Engineer's *Issue Paper and District Recommendation, The Agency's Trust Responsibilities Toward Indian Tribes in the Regulatory Permitting Process*. **This document is included by not identified, in the Appendix at Vol. 2, p. 184.** While the legal principles and concepts are 20 years old and predate the 1999 Supreme Court Mille Lacs decision, and need updating, there is no attempt to properly consider the rights of the Chippewa, and are in essence dismissed by DEIS rhetorical statements.

9.7 SUMMARY
This chapter provides an American Indian perspective on the construction and operation of a new pipeline. From this perspective, any route, route segment, or system alternative would have a long-term detrimental effect on tribal members and tribal resources. The impacts cannot be categorized by duration (short term or permanent) or by extent (region of interest, construction work area, permanent right-of way). It is also not possible to determine which alternative is better when each alternative affects tribal resources, tribal identity, and tribal health.

The *no-build* or *do nothing* alternative is not even given lip service here?

The fact of the matter is Treaties are to be construed in light most favorable to the non-drafting, Indians. Interpreting treaty rights starts with an understanding of what the Indians understood at the time of the signing of the treaties. (Mn v MLB 1999). The Chippewa have 44 treaties with the United States going back to 1795, with 12 treaties affecting lands in Minnesota.

The Treaty of Prairie du Chien[2] of 1825 was the first Chippewa treaty to deal directly with land in Minnesota. The treaty created an east west boundary to separate the Chippewa to the north and the Sioux and other tribes to the south and it was

> understood by all the tribes, parties hereto, that no tribe shall hunt within the acknowledged limits of any other without their assent . . . the Chiefs of all the tribes have expressed a determination, cheerfully to allow a reciprocal *right of hunting on the lands of one another, permission being first asked and obtained*, as before provided for.[3]

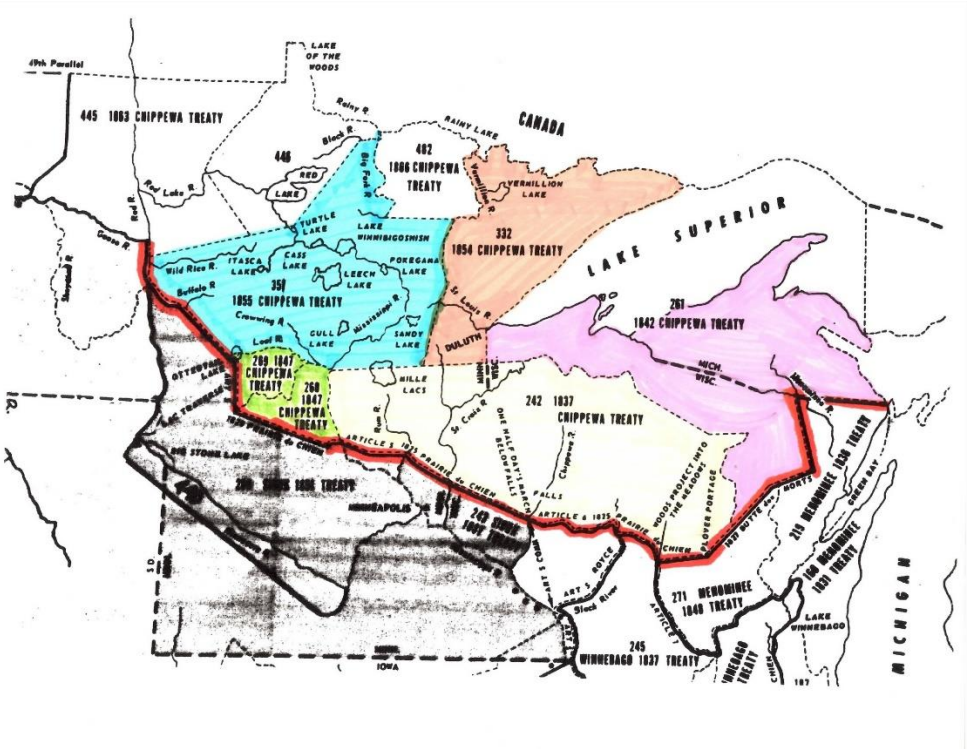

Here the red line is the 1825 *Prairie du Chien boundary* between the Chippewa and Sioux. 1855 is blue, 1854 is brown, 1842 is purple and 1837 is yellow. All before Minnesota statehood. Due to

> [t]he Chippewa tribe being dispersed over a great extent of country, and the Chiefs of that tribe having requested, that such portion of them as may be thought proper, by the Government of the United States, may be assembled in 1826, upon some part of Lake Superior, that the objects and advantages of this treaty may be fully explained to them, so that the stipulations thereof may be

[2] TREATY WITH THE SIOUX, *CHIPPEWA*, ETC., August 19, 1825, Proclamation. Feb. 6, 1826., 7 Stat., 272. *Treaty with the Sioux and Chippewa, Sacs and Fox, Menominie, Ioway, Sioux, Winnebago, and a portion of the Ottawa, Chippewa, Potawattomie, Tribes.*

[3] Id. Article 13. (Emphasis added).

observed by the warriors. The Commissioners of the United States assent thereto, and it is therefore agreed that a council shall accordingly be held for these purposes.[4]

The 1826 Treaty, a conformation treaty for the 1825 Treaty, was conducted at Fond du Lac of the Michigan Territory, now Gary New Duluth, Minnesota, explains that the 1825 "grant [from the Chippewa] ***is not to affect the title of the land, nor the existing jurisdiction over it.***[5] Contrary to the weak descriptions in DEIS Chapter 9 about *Tribal Issues*, all of the Chippewa lands in Minnesota were federally recognized and treaty protected by constitutional due process, before land cessions were made. 2478-2

Furthermore, usufructuary property rights are individual, and operate as an affirmative defense[6] to attempts by the state to regulate Treaty-protected hunting, fishing and gathering. Pursuant to the *1842 Treaty with the Chippewa* "all the unceded lands belonging to the Indians of Fond du Lac, Sandy Lake, and Mississippi bands, shall be the common property and home of all the Indians, party to this treaty."[7]

To provide further clarity, Art. 5 provides that "[w]hereas the whole country between Lake Superior and the Mississippi, has always been understood as belonging in common to the Chippewas, party to this treaty;" (referring to the 1825 treaty boundary and lands within, in what was then the Michigan Territory). As such, ***Chippewa of the Mississippi*** are parties to the 1825, 1826, 1837, 1842, 1847, 1854, 1855, 1863, 1864 and 1867 treaties.

It is intellectual dishonesty to tell a generalized story of aboriginal or Indian title and claimed rights. This DEIS tribal rights analysis is the opposite of [mis] *Guiding Principles*. There is a general failure to understand what *Indian Country* is, which is different than Indian Reservations, and, which tribal rights are individually held property rights and which are held in common, and if needed, subject to regulation by the tribe.

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[4] Id. Art. 12.

[5] 1826 TREATY WITH THE CHIPPEWA, Aug. 5, 1826., Stat. 7,290, Proclamation, Feb. 7, 1827, Art. 3. Signed at *Fond du Lac* Michigan Territory, presently Duluth, Minnesota. (Emphasis added).

[6] See U.S. v. Brown, 777 F.3d 1025 (8th Cir. 2015). (It is well settled, however, that an individual Indian may assert usufructuary rights in a criminal prosecution. For example, the Supreme Court stated in United States v. Dion that hunting and fishing "treaty rights can be asserted by Dion as an individual member of the Tribe." 476 U.S. at 738 n. 4, 106 S.Ct. 2216. Evaluating usufructuary rights in United States v. Winans, the Court explained that while "the negotiations were with the tribe," treaties "reserved rights, however, to every individual Indian, as though named therein." 198 U.S. at 381, 25 S.Ct. 662.

[7] See 1842 Treaty with the Chippewa, Art. 3.

2478-2
Cont'd

As note by the Eighth Circuit in Brown,

> both the Chippewa and the representatives of the United States understood the Treaty to reserve to the Chippewa a broad right to fish as they had been accustomed – without restriction. Notably, the Leech Lake Chief stated that the Chippewa wished to reserve the privilege of "getting their living from the lakes and rivers as they have heretofore done." *Id.* at 428. This is most reasonably understood to encompass the sale of fish, as to make a 'living' off of the lakes, Indians may have needed to sell or trade the yield. As the court held in *Bresette*, "the Chippewa were part of the national and international market economy at the time of the treaties." 761 F. Supp. at 662 (citing *Lac Courte Oreilles Band of Lake Superior Chippewa Indians v. Wisconsin*, 653 F. Supp. 1420, 1424 (W.D. Wis. 1987) (the Chippewa "harvested resources for their own immediate, personal use and for use as trade goods in commerce")). The court in *Bresette* found that the Chippewa's right to hunt and gather the feathers from birds encompassed a right to sell the feathers, finding that there was "ample evidence that the Chippewa understood that their hunting and gathering rights . . . encompassed the sale of their catch." *Id.* at 662, 664-65 (treaty right precluded prosecution for sale of feathers under the Migratory Bird Treaty Act).

Ultimately, the courts have held that the Chippewa's individual usufructuary rights to hunt, fish and gather are part of a right to earn a modest living, are protected by federal statutes and can only be modified or impinged upon by congress. These are important, constitutionally protected, long-term food, health, and economic rights meant to sustain the Chippewa in perpetuity. These right are meant to be accomplished by using natural resources on and off reservation. See Question 13 and Answer from 1997 Issue Paper below, and Appendix P for Ch. 9, Vol. 2, at page 184.

2478-2 Cont'd

Done Exhibit 4 - USACE Issue Paper re Trust Responsibilities 9-2...

13. Should the Corps apply different criteria to permit applications for activities within a reservation's exterior boundaries than would be applied to a permit application for activities outside a reservation's exterior boundaries?

No. The criteria applied should be the same. However, it is very likely that an activity that is sited within the reservation's exterior boundaries would have a greater impact on Tribal resources than would an activity that is sited off reservation. Moreover, the applicant would still have to comply with all applicable local regulations, thus the Tribe may be able to impose its requirements[25] on the applicant. Such requirements would be independent of and in addition to any Corps' permit requirement or condition. Further, if the Tribe has jurisdiction over the activity and exercises its jurisdiction to prohibit the activity[26] the permit application to the Corps should be denied without prejudice.

14. Who is the Federal Trust Obligation owed to?

The Trust obligation is owed to Federally Recognized Indian Tribes.

2478-3

The Environmental Justice, Summary and Mitigation sections begins with some candor in recognizing that

> Disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project. RA-06, RA-07, and RA-08 would have direct impacts on reservation lands (Leech Lake and Fond du Lac). Based on the discussion of tribal resources in Chapter 9, any of the routes, route segments, and system alternatives would have a long-term detrimental effect on tribal members as a result of crossing treaty lands. As summarized in Chapter 9, from a tribal perspective, the impacts cannot be categorized by duration (short term or permanent) or by extent (ROI, construction work area, permanent right-of-way). It is also not possible to determine which route alternative is better from an EJ perspective when each alternative affects tribal resources, tribal identity, and tribal health. Any of the routes selected would negatively affect tribal resources and tribal members.
>
> The combination of tribal identity and relationship to the land and the rights tribal members have in the ceded territories complicates the traditional notion of mitigation. The ceded territories and the rights that go with them are not mobile and cannot be transferred. Tribal impacts are magnified because there would be impacts associated with abandonment and removal of the existing Line 3 and there would be additional impacts associated with the replacement of Line 3 in a new location.

But,

> A finding of "disproportionate and adverse impacts" does not preclude selection

2478-3
Cont'd

> of any given alternative. This finding does, however, require detailed efforts to avoid, mitigate, minimize, rectify, reduce, or eliminate the impact associated with the construction of the Project or any alternatives.

It is apparent that the Enbridge sponsored, DOC DEIS "disproportionate and adverse impacts" does not . . . require detailed efforts to avoid, mitigate, minimize, rectify, reduce, or eliminate the impact associated with the construction of the Project or any alternatives, on tribal rights and the necessary associated Rights of Nature to clean and healthy environment in which to live, with natural resources of clear air, clean water and healthy ecosystem from which to hunt, fish and gather to earn a modest living. *Environmental Justice*[8] is a mitigated misnomer.

The Raven sayeth Nevermore after visits by Ghosts of DEIS

While there is a section explaining that *Cumulative Potential Effects*[9]

> result when impacts associated with the proposed Line 3 Replacement Project (Project) are combined with impacts associated with past, present, or reasonably foreseeable future actions within the area affected by the proposed Project. Analysis of cumulative potential effects accounts for the possibility that, added together, the minor impacts of many separate actions could be significant. This cumulative potential effects analysis considers resources that are expected to be affected by the proposed Project or its alternatives and assesses past, present, and reasonably foreseeable future actions to identify any geographic or temporal overlap in impacts on these resources.
>
> **This Section Considers Direct and Indirect Effects of Greenhouse Gases on the Environment in Minnesota**
>
> Instead, this section considers that collectively the proposed Project and other reasonably foreseeable actions across the world would contribute to global climate change. This section describes the cumulative potential climate change effects of greenhouse gas emissions on the environment in Minnesota and identifies resources that could experience cumulative impacts due to both the

[8] Chapter 11 *Environmental Justice*, 11.1 INTRODUCTION, "Environmental justice (EJ) refers to the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income. In general, EJ is intended to ensure that all people benefit from equal levels of environmental protection and have the same opportunities to participate in decisions that may affect their environment or health (Minnesota Pollution Control Agency [Minnesota PCA] 2017; U.S. Environmental Protection Agency [EPA] 2017)."

[9] Chapter 12 *Cumulative Potential Effects*, 12.1 PURPOSE AND DESCRIPTION OF CUMULATIVE POTENTIAL EFFECTS ANALYSIS,

effects of climate change as well as the direct and indirect impacts of the proposed Project and its alternatives.

2478-4

Honest environmental review must start at the beginning as *Cumulative Potential Effects* result when impacts associated with the proposed Line 3 Replacement Project (Project) are combined with impacts associated with *past, present, or reasonably foreseeable future actions* affected by the proposed Project.

In the past, when the treaties were made, there was not an understanding by the Chippewa that the environment would be put into permanent peril, jeopardy and certain consequences from greenhouse gases, climate change and water pollution from pipeline construction, extreme extraction of tar sands crude oil and Existing Line 3 pipeline abandonment and/or removal. ***In the past***, the trees had not been clear cut, the rivers had not been diverted, dredged, lock and dammed. Fish, game, waterfowl, wild rice, medicines and plants and the people enjoyed all the gifts of the Creator.

In the present, there are 1000's of impaired water bodies throughout Minnesota affecting aquatic consumption,[10] due to mercury and PCBs and other factors. ***In the present***, Governor Dayton Scraps Meeting With Mille Lacs Businesses after protest[11] because he "was with a small group fishing for bass as an alternative to walleyes on Mille Lacs Saturday when about 75 protesters in boats encircled him to protest a temporary ban on walleye fishing." These were not Tribal Water Protectors, but businesses and resort owners concerned about loss of income related to environmental problems of climate change and water quality. Canaries in the mine giving warning.

In the past, pipelines were viewed as jobs and free revenue sources for counties and businesses. Enbridge has 6 pipelines along the US Highway 2 Mainline corridor. ***In the present***, an Enbridge Tax Lawsuit Could Exceed Entire Budget of Minnesota Counties, A change in property tax evaluation may cost the state tens of millions in returns to the energy company.[12] ***Also in the present***, by letter of June 26, 2017 to Jamie McAlester of DOC, the City of Grand Rapids filed comments and concerns about Line 3 Project Draft EIS and *pipeline abandonment*, city and residents *responsibility for clean-up*, Line 3 runs directly through our Well Head

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[10] See https://www.pca.state.mn.us/water/minnesotas-impaired-waters-list

[11] See http://www.wdio.com/Outdoors/governor-dayton-cancels-meeting-businesses-protestors-mille-lacs-lake--/4536954/

[12] See *Enbridge Tax Lawsuit Could Exceed Entire Budget of Minnesota Counties, A change in property tax evaluation may cost the state tens of millions in returns to the energy company*, by Anders Koskinen, March 27, 2017, http://alphanewsmn.com/enbridge-tax-lawsuit-exceed-entire-budget-minnesota-counties/ "It's scary for us," Clearwater County Auditor Allen Paulson told the Star Tribune, "If Enbridge wins the appeal, the [tab for the county] will be $7.2 million, and our levy is $6.8 million." Red Lake County has a population of just over 4,000 people. Last year it had a total levy of $2.6 million. If Enbridge wins their case, the county could owe them $3.5 million.

2478-4
Cont'd

Protection Area (WHPA), which is the *sole source of municipal water* for two cities (Grand Rapids and LaPrairie), requiring total removal of Line 3 and *contaminated soils*.

In the future, Enbridge's other old pipelines along the US Highway 2 Mainline corridor will either need to be replaced or shutdown. Enbridge and the DEIS suggest clean-up and removal of old Line 3 would cost $1.28B or about the cost of the Kalamazoo clean-up, before a spill. Abandonment and a new pipeline corridor through lakes, rivers and wild rice is desired by Enbridge. Enbridge's four old lines might cost over $500 Billion to clean-up and remove, today. Or Enbridge could save $500 billion or more, after having made Trillions of dollars, and never clean up when Enbridge goes broke.

In the present, the Chippewa; Red Lake, White Earth, Leech Lake, Mille Lacs and Fond du Lac reservations have petitioned to intervene is the Line 3 PUC proceedings, to prevent further pipeline development on and off reservations.

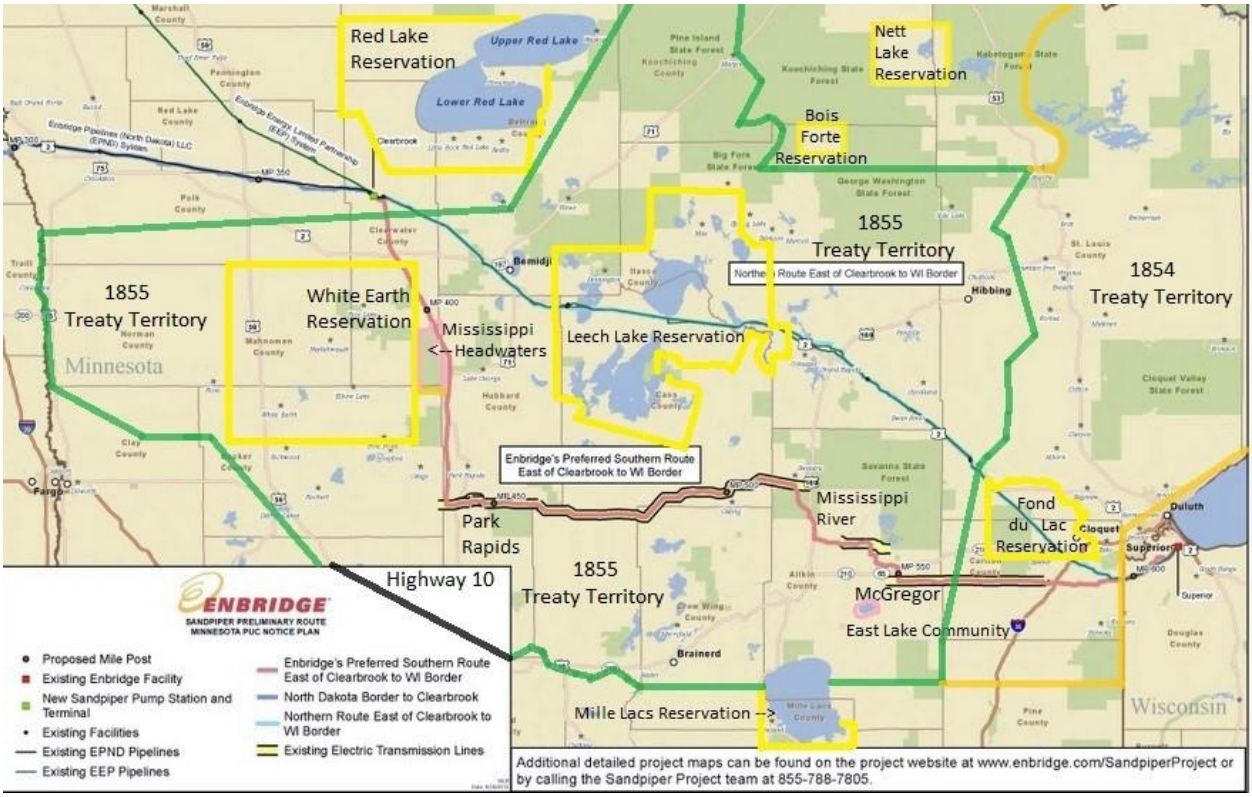

In the past, Enbridge asserted Sandpiper was an essential and necessary project and no other alternatives. Enbridge abruptly withdrew its Sandpiper pipeline application for Bakken fracked crude to join up with DAPL. ***In the past***, DAPL had developed a false *Environmental Justice* memo which resulted in Standing Rock's drinking water being targeted, with USACE acquiescence[13]. ***In the past***, after becoming a DAPL partner, violence by DAPL security at the

[13] See *Tribal Treaty and Environmental Statutory Implications of the Dakota Access Pipeline*, DOI Solicitor Hilary C. Tompkins, Opinion Memorandum M-37038, dated Dec, 04, 2016, "Nor did the Corps'

2478-4
Cont'd

Standing Rock Water Protector Camps increased. People came from all over to protect the water. Enbridge was *confident in pipeline project after Dakota Access decision.*[14]

In the past, glaciers formed the Great Lakes and topography of the lands of Minnesota. Northern Minnesota is home to the 3 of the 4 major watersheds of the North American continent. The Chippewa knew how the Red River led to Hudson Bay, the St. Louis River led to Lake Superior and the Atlantic, and the Mississippi led south to Cahokia near the confluence of the Missouri River leading to the Gulf of Mexico.

In the present, Automaker Volvo says all of its cars launched starting in 2019 will be either electric or hybrids. The decision makes Volvo, which is now owned by Chinese company Geely, the first major auto manufacturer to discontinue its production of gas-only vehicles. The company plans to release three new all-electric cars by 2021. "This announcement marks the end of the solely combustion engine-powered car," Volvo Cars CEO Hakan Samuelsson said. "Volvo Cars has stated that it plans to have sold a total of one million electrified cars by 2025. [15]

In the past, the PUC was sued for an EIS in the Sandpiper saga. ***In the future***, the PUC will likely be sued again for basic violations of the DEIS Guiding Principles, Environmental Justice and lack of jurisdiction over civil regulatory actions involving property belonging to Indians and Indian tribes as provided by Congress in 1953, in Public Law 280 section (b)

> Nothing in this section shall authorize the alienation, encumbrance, or taxation of any real or personal property, including water rights, belonging to any Indian or any Indian tribe, band, or community that is held in trust by the United States or is subject to a restriction against alienation imposed by the United States; or shall authorize regulation of the use of such property in a manner inconsistent with any Federal treaty, agreement, or statute or with any regulation made pursuant thereto; or shall confer jurisdiction upon the State to adjudicate, in probate proceedings or otherwise, the ownership or right to possession of such property or any interest therein.[16]

In the future, **present and past** *Enbridge CEO says Canada only needs two more export pipelines*[17] and that CEO Al "Monaco's comments come amid growing speculation that Canada faces pipeline overbuild after years of struggling with limited market

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conclusion take into account the Tribes' full assessment of the risks since at least two of the key analyses, the spill analysis and the Environmental Justice analysis, were considered confidential by the applicant and were never provided to the Tribes for review."

[14] See *Enbridge confident in pipeline project after Dakota Access decision* by John Hageman Fargo Forum News Service, Dec 5, 2016 at http://bismarcktribune.com/bakken/enbridge-confident-in-pipeline-project-after-dakota-access-decision/article_ed44bab3-7019-58dd-9293-31f6ee7bf0bb.html

[15] See http://www.thedailybeast.com/volvo-to-go-all-electric-with-new-models-from-2019

[16] See Public Law 83-280 (18 U.S.C. § 1162, 28 U.S.C. § 1360)

[17] See *Enbridge CEO says Canada only needs two more export pipelines* by Nia Williams, CALGARY, ALBERTA Feb. 17, 2017 at http://www.reuters.com/article/us-enbridge-inc-results-idUSKBN15W19I

access."

CONCLUSION

The 50,000 Chippewa tribal members in Minnesota individually hold constitutionally protected, usufructuary rights to hunt, fish and gather as rights to earn a modest living which includes rights to sell commercial harvests, on or off reservation unless, or as, regulated by the tribe. The Minnesota Pollution Control Agency has identified 1000s of impaired water bodies. The DNR recognizes that *Climate change affects lakes, walleye in complex ways*[18] and it affects fish in 5 different ways. Enbridge is suing to recover back taxes paid to 13 northern counties for several tax years. Enbridge has 6 pipelines along the US Highway 2 Mainline corridor, with 3 more as old as Line 3 possibly needing replacement.

In the present, Line 3 Project is a giant, greenhouse gas and climate change contributor, up wind from Minnesota, where tar sands extreme extraction exacerbates climate change, and is presently the primary reality causing Governor Dayton to suspend Walleye catch and release fishing on Mille Lacs. ***In the future*** it will likely be a Cumulative Impact Assessment[19] including real costs of pipeline abandonment ($1.28B for Line 3) and millions in paid taxes takebacks that will show the *no build alternative* is the best Social, Economic and Environmental eco-tourism future for Tribes and Minnesota, ***in the future.***

If you have any questions of need of assistance please call on me at 218-760-1258 or frankbibeau@gmail.com.

Sincerely,

/s/ Frank Bibeau

Frank Bibeau
Executive Director
1855 Treaty Authority

Attachments

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[18] See https://www.mprnews.org/story/2015/09/09/walleye-climate-change by Environment Reporter Elizabeth Dunbar, Sep 9, 2015.

[19] See Minnesota Chippewa Tribe Resolution 72-17 for Tribal Cumulative Impact Assessment at Appendix P, Vol. 2, pages 221-222.

Duluth 80° 73° | 56° (/weather/?zip=55814)
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Gov. Dayton Scraps Meeting With Mille Lacs Businesses After Protest

Gov. Dayton Scraps Meeting With Mille Lacs Businesses After Protest
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West Nile Found in Northland County
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Skate with the Pros

Associated Press
July 08, 2017 11:21 PM

ISLE, Minn. (AP) - Gov. Mark Dayton has canceled a meeting with business owners near Mille Lacs Lake after he was greeted by protesters who oppose how the state manages the lake's struggling walleye population.

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The Star Tribune reports Dayton was with a small group fishing for bass as an alternative to walleyes on Mille Lacs Saturday when about 75 protesters in boats encircled him to protest a temporary ban on walleye fishing.

Dayton's spokesman Sam Fettig said the governor was expecting the protest but decided not to go ahead with the meeting because the protesters were shouting, surrounded the boat and made it difficult to fish. The protest changed the atmosphere and Dayton elected to reschedule the meeting to a later day, Fettig said.

Protestors opposing Minnesota's handling of Walleye population

KSTP

Walleye fishing - even catch and release - is prohibited on the big lake for the next three weeks. The DNR is trying to protect the lake's walleyes from hooking mortality, the problem of fish dying after they're released.

Dayton said he respects the protesters' frustration, but he defended the ban as a way of preserving the walleye population.

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Information from: Star Tribune (http://www.startribune.com)

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Associated Press

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SEP 29 1997

Construction-Operations
Regulatory (94-01298-IP-DLB)

Mr. James Schlender
Executive Administrator
Great Lakes Indian Fish & Wildlife Commission
P.O. Box 9
Odanah, Wisconsin 54861

Dear Mr. Schlender:

As a result of issues that have arisen during our evaluation of a permit application by Crandon Mining Company to establish a mining operation near Crandon, Wisconsin, the St. Paul District has been asked by several Native American tribes to address the nature and extent of the Corps trust responsibilities toward Indian tribes in the Corps regulatory permitting process. I have indicated at past consultation meetings that I had requested guidance from Corps Headquarters to address this question.

Enclosed is an issue paper that provides the guidelines that the District will follow to insure that it fulfills its trust obligations. This paper, while very useful for illustrative purposes, may not resolve issues that are specific to any individual treaty or pending permit action.

I propose that we hold a consultation meeting in approximately 60 days. This will provide you time to review the paper and to develop any questions or concerns that you may have regarding these guidelines, as well as to how they will be applied in our review of the Crandon Mining Company permit application. I suggest that the consultation meeting be held in early December in Eau Claire, Wisconsin. Mr. Dave Ballman, of my staff, will coordinate with your staff in scheduling the meeting.

Please contact me at (612) 290-5300 if you have any questions.

Sincerely,

/S/

J. M. Wonsik
Colonel, Corps of Engineers
District Engineer

SCANNED

Identical Letters:

Arlyn Ackley, Sokaogon Chippewa Community
Philip Shopodock, Forest County Potawatomi Community
Apesanahkwat, Menominee Indian Tribe of Wisconsin
James Schlender, Great Lakes Indian Fish & Wildlife Commission

Ballman	CO-R	DB 9/17
Ahlness	CO-R	9/18/97
Hauger	CO-R	
Wopat	CO-R	24 Sep 97
Haumersen	CO	
Adamski	OC	
Crump	PP-PM	
Breyfogle	DDE	9/29

ISSUE PAPER
AND
DISTRICT RECOMMENDATION

THE AGENCY'S TRUST RESPONSIBILITIES TOWARD INDIAN TRIBES IN THE REGULATORY PERMITTING PROCESS

1. ISSUE. Work activities performed pursuant to permits issued under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act have the potential to impact Indian treaty rights[1] and to impact resources owned or used by Indian Tribes. Because of this, questions have arisen about the Corps' trust obligations to Indian tribes with respect to the Corps' permitting processes. This paper shall attempt to delineate trust issues related to the permitting process and will attempt to set forth guidelines with respect to those issues[2]. A question and answer format will be used to accomplish this purpose.

2. May the Corps issue a permit that will impinge on or abrogate treaty rights?

No, treaty rights[3], absent consent of Congress, may not be impinged or abrogated[4]. As the

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[1]The term "treaty rights", as used in this paper, includes not only rights derived from treaties, per se, but also rights derived from federal statutes, agreements executive orders and the like. The terms "Tribal resources" or "Treaty resources", as used in this paper, refers to resources that the Tribe, pursuant to a treaty, has a right to exploit and includes resources that they own and resources that they have a right to gather. The term "trust resources" refers to resources held in trust by the United States (the title is held by the United States) for the benefit of the Tribe.

[2]The paper, other than as may be useful for illustrative purposes, will not attempt to resolve issues that are specific to any individual treaty or pending permit action, but will attempt to formulate guidelines which will insure that the agency fulfils all of its trust obligations.

[3]It should be noted that the terms "treaty rights" and "treaty resources" are not synonymous. For example, a treaty that guarantees a tribe the right to hunt and fish on its reservation, the "treaty right" is the right to take the resource (game or fish), the "treaty resource"

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Court held in *Northwest Sea Farms, Inc., v. U.S. Army Corps of Engineers*, 931 F. Supp. 1555 (W.D. Wash. 1996) 1519-1520:

> The Supreme Court has recognized "the undisputed existence of a general trust relationship between the United States and the Indian people." *United States v. Mitchell*, 463 U.S. 206, 225, 103 S.Ct. 2961, 2972, 77 L.Ed.2d 580 (1983). This obligation has been interpreted to impose a fiduciary duty owed in conducting "any Federal Government action"[5] which relates to Indian Tribes. *Nance v. Environmental Protection Agency*, 645 F.2d 701, 711 (9th Cir.), *cert. Denied*, 454 U.S. 1081, 102 S.Ct. 635, 70 L.Ed.2d 615 (1981), ... In previous cases, this Court has tacitly recognized that the duty extends to the Corps in the exercise of its permit decisions. *See e.g. Muckleshoot Indian Tribe v. Hall*, 698 F. Supp. 1504, 1523 (W.D.Wash.1988) (granting an injunction against the construction of a marina in consideration of the effect upon Indian treaty rights).
>
> In carrying out its fiduciary duty, it is the government's and subsequently the Corps', responsibility to ensure that Indian treaty rights are given full effect. *See e.g. Seminole Nation v. United States*, 316 U.S. 286, 296-297, 62 S. Ct. 1049, 1054-55, 86 L.Ed. 1480, 86 L.Ed.1777 (1942) (finding that the United States owes the highest fiduciary duty to protect Indian contract rights as embodied by treaties). Indeed, it is well established that only Congress has the authority to modify or abrogate the terms of Indian treaties. *United States v. Eberhardt*, 789 F.2d 1354, 1361 (9th Cir.1986). As such, the Court concludes that the Corps owes a fiduciary duty to ensure that the Lummi Nation's treaty rights are not abrogated or impinged upon absent an act of Congress.

3. How are treaty rights determined?

Treaty rights are determined on a case by case (treaty by treaty) basis. Each individual treaty or series of treaties must be examined to determine the specific rights provided by those treaties.

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is the game or fish. Although courts have, almost universally held that treaty rights may not be impinged, they have not held that the resource may not be negatively impacted. See also question 6.

[4]Note, however, that the same Court that decided *Northwest Sea Farms, Inc.* issued an order in *Lummi Indian Nation v. Cunningham*, case No. C92-1023C on September 1, 1992, to the effect that before a claim that treaty rights have been impinged or abrogated is cognizable "the interference with the treaty right must reach a level of legal significance".

[5]A permit is a Federal Government action"

4. How are Indian treaties to be interpreted?

There are three basic rules of treaty construction. They are: (1) Ambiguities in treaties must be resolved in favor of the Indians, (2) Indian treaties must be interpreted as the Indians would have understood them at the time they consented to the treaty, and (3) Indian treaties must be construed liberally in favor of the Indians. This does not mean, however, that the treaties are to be construed in any manner that the Indians wish them to be construed. The rules of construction do not permit the clear intent of the treaties to be disregarded.

The Court in *Menominee Indian Tribe of Wisconsin v. Thompson*, 922 F.Supp. 184, (198-199), (W.D. Wis. 1996) described the rules of construction as follows:

> It is well known that Indian treaties must be interpreted as the Indians understood them, that doubtful expressions are to be resolved in favor of the Indians and that treaties must be construed liberally in favor of the signatory tribes. ... treaties are not to be construed by "the technical meaning of [their] words to learned lawyers, but in the sense in which they would naturally be understood by the Indians." *Id.*
>
> Determining the Indians' understanding may require expert testimony to explain the historical and cultural context in which the Indians viewed the treaty provisions. *See, e.g. McClanahan v. State Tax Comm'n of Arizona*, 411 U.S. 164, 174, 93 S.Ct. 1257, 1263, 36 L.Ed.2d 129 (1973) ... ("Doubtful expressions are to be resolved in favor of the weak and defenseless people who are the wards of the nation, dependent upon its protection and good faith."); *Winters v. United States*, 207 U.S. 564, 576-77, 28 S.Ct. 207, 211, 52 L.Ed. 340 (1908) ("ambiguities occurring [in treaties] will be resolved from the standpoint of the Indians").
>
> It is true that "[t]he cannon of construction regarding the resolution of ambiguities ... does not permit reliance on ambiguities that do not exist; nor does it permit disregard of the clearly expressed intent of Congress." *South Carolina v. Catawba Indian Tribe*, 476 U.S. 498, 506, 106 S.Ct. 2039, 2044, 90 L.Ed.2d 490 (1986). See also *Amoco Production Co. V. Gambell*, 480 U.S. 531, 555, 107 S.Ct. 1396, 1409, 94 L.Ed.2d 542 (1987) (citing *Catawba Indian Tribe*); *Choctaw Nation*, 318 U.S. at 432, 63 S.Ct. At 678 ("even Indian treaties cannot be rewritten or expanded beyond their clear terms to remedy a claimed injustice or to achieve the asserted understanding of the parties").

Moreover, many of the issues of treaty construction that are likely to arise in the permitting process, have already been determined by the Courts[6]. Thus, the first step in

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[6]Even if the case law is not dispositive of the specific issue, it may provide rationale or additional information which will aid in the decision process. Additionally, it is recommend that Office of Counsel (or similar resource) be consulted before making a determination, in questionable cases, whether a treaty right exists or does not exist and whether the proposed

construing a treaty should be to review any Court decision that may be relevant.

5. How can we determine if treaty rights may be an issue with respect to a specific permit application?

The geographic extent[7] of all treaty rights and Tribal resources should be known to the regulatory staff. If the proposed activity could have any effect within that geographic area the treaties should be reviewed to determine if treaty rights may be affected. A determination should also be made as to whether the proposed activity may affect Tribal resources. Most importantly, the Indian Tribes that may be affected by the permitted activity should be apprised of the permit application and be given the opportunity to comment or consult with the Corps. If any Tribe asserts that the proposed permit activity would impinge on or abrogate its treaty rights or would negatively impact its resources, it should be requested[8] to provide all substantiating information it has available as to: (1) the existence of treaties, (2) claimed treaty rights, (3) any Court cases relevant to the Tribe's assertions, (4) an explanation of how the proposed activity would violate treaty rights, (5) identification of any Tribal resources that may be impacted, (6) an explanation of how the proposed activity would impact Tribal resources, and (7) a description of how the proposed activity would impact the Tribe[9]. BIA should also be informed of any proposed activity (needing a Corps permit) that might impact Tribal resources and should be requested to identify any treaty rights or Tribal resources that may be impacted by the proposed permit.

6. Does the Corps have a trust responsibility to protect Tribal resources from environmental degradation that may result from the proposed permit activity?

The Corps must consider the effect that the activity needing a Corps permit would have on the Tribe's resources, however, the fact that the Tribe's resource may be degraded, or reduced in value or utility, does not necessarily compel denial of the permit. This principle was explained by the Court in ***Nez Perce Tribe v Idaho Power Co.***, 847 F.Supp. 791 807-813 (D.Idaho 1994) in a

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permit will or will not violate those rights.

[7]Including the area within the external boundaries of any Indian reservation and the geographic area in which usufructuary rights, if any, may be exercised.

[8]The Tribes are not required to respond.

[9]This request would be made to afford the Tribes every practicable opportunity to present their views. Neither the failure of the Tribes to respond nor a response from the Tribes relieves the Corps of its obligation to consider all impacts the proposed activity would have on any treaty rights or any impacts to Tribal resources that Corps is aware of, or reasonably should have been aware of. See also *Pueblo of Sandia v. United States*, 50 F.3d 856 (10th Cir. 1995).

case concerning permanent usufructuary rights[10], as follows:

> ... In other words, the Tribe argues that developments such as dams which damage, reduce or destroy the fish runs violate their 1855 Stevens treaty fishing rights and entitles them to an award of monetary damages.
>
> b) ***Treaty Rights to Preservation of Fish Runs***
>
> The ultimate issue presented is whether the treaty provides the Tribe with an absolute right to preservation of the fish runs in the condition existing in 1855, free from environmental damage caused by a changing and developing society. Only if such a right exists is the Tribe entitled to an award of monetary damages.
>
> The parties have cited, and the Court's own independent research has disclosed only three cases which directly address this ultimate issue. *United States v. Washington* (hereinafter *"Washington 1982"*), 694 F.2d 1374 (9th Cir. 1982); *Muckleshoot Tribe v Puget Sound Power and Light*, CV No. 472-72C2V (W.D. Wash.1986); and *Nisqually Tribe v. City of Centralia*, No. C75-31 (W.D. Wash.1981). However, *Washington 1982* was vacated by the Ninth Circuit on other grounds in a subsequent en banc decision. *United States v. Washington*, 759 F.2d 1353 (9th Cir. 1985). *Muckleshoot Tribe v. Puget Sound* expressly relied on the *Washington 1982* opinion which was not vacated until after the decision in *Muckleshoot* was issued. Therefore, it appears that this Court is required to address and determine an issue of first impression without the benefit of any binding guidance and direction. ...
>
> ... State regulation cannot discriminate against the Indian fishery. *Puyallup II*, 414 U.S. [44] at 48, 94 S.Ct. [330] at 333 [38 L.Ed.2d 254 [(1973)]. This principle is broad enough to encompass discriminatory granting of permits for projects with potentially adverse environmental effects.
>
> *Id.* At 1382.
>
> In addition, the Ninth Circuit rejected the trial court's conclusion that other previous cases implied a general right to environmental protection of the fish: ...
>
> Thus, according to the Ninth Circuit's persuasive reasoning in *Washington 1982*, the states may allow or even authorize development which reduces the number of fish in the annual runs as long as such action does not discriminate against treaty fishermen in determining what development will be authorized. Although the opinion was vacated on other grounds, the Court agrees with the

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[10]The treaty at issue in the case has been interpreted as creating permanent usufructuary rights (non-exclusive) to fish in all of the Tribes usual and customary places. Not all usufructuary rights are permanent as some are subject to termination upon the occurrence of a defined event. For example, Chippewa usufructary rights with respect to territory ceded by them to the United States are terminated or extinguished whenever the land is owned by private entities rather than the public. The (trust) duty to mitigate for damage to resources that may be harvestable pursuant to permanent usufructuary rights discussed by the Court in *Nez Perce* may not be applicable to usufructuary rights that can be terminated or extinguished in their entirety.

legal analysis in *Washington 1982*. In the Court's view, the Stevens treaties do not protect the Indians from degradation of the fish runs caused by development which is not part of a pattern of discrimination against Indian treaty fish runs.

... In the Court's view, the 1855 treaty does not provide a guarantee that there will be no decline in the amount of fish available to take. The only method that would guarantee such protection would be to prevent all types of development, whether or not it is discrimatory of Indian treaty rights. The Stevens treaties simply do not provide the Tribe with such assurance or protection.

... Stevens treaties require that any development authorized by the states which injure the fish runs be non-discrimatory in nature *see Fishing vessel*, 443 U.S. 658, 99 S.Ct. 3055, 61 L.Ed.2d 823 but does not, however, guarantee that subsequent development will not diminish or eventually, and unfortunately, destroy the fish runs.

7. Does the Corps trust responsibility to Indian tribes require mitigation for impacts to off reservation resources that the Tribes have a right to harvest (usufructuary rights)?

The answer to this question depends on the nature of the usufructuary rights reserved or held by the Tribes. All usufructuary rights are not alike. For example, courts have held that a number of Tribes in the Pacific Northwest have usufructuary rights that are permanent in nature and are not subject to termination[11]. Those rights were held to have both a geographic component[12] and a component that entitled the Tribes to take a share of the available fish. Those courts have also held that while the Tribes were not entitled to be protected against off reservation activity that would result in a reduction of available fish, they were entitled to reasonable steps to mitigate adverse impacts from the activity.[13] The theoretical basis for the holding that reasonable mitigation is required was explained in *United States v. State of Washington*, 506 F.Supp. 187, 203 (1980)[14] as follows:

At the outset the Court holds that implicitly incorporated in the treaties' fishing clause is the right to have the fishery habitat protected from man-made

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[11]Other than by an Act of Congress.

[12]The right to fish forever in certain locations defined in the Treaty.

[13]"We do not find such an obligation in the treaty. Where the decision to allow development is not tinged with any discrimatory animus, the treaty fishing clause, as we read it, does not require compensation of the Indians on a make whole basis if reasonable steps, in view of the available resources and technology, are incapable of avoiding a reduction in the amount of available fish." *U.S. v. State of Washington*, 694 F.2d 1374, 1386 (1983)

[14]The Court's decision was vacated by the Ninth Circuit on other grounds in "*U.S. v. State of Washington*, 694 F.2d 1374. See also question 6.

> despoilation. Virtually every case construing this fishing clause has recognized it to be the cornerstone of the treaties and has emphasized its overriding importance to the tribes. ... The Indians understood, and were led by Governor Stevens to believe, that the treaties entitled them to continue fishing in perpetuity and that the settlers would not qualify, restrict, or interfere with their right to take fish. ...

In contrast to the Pacific Northwest cases, the Chippewa in Wisconsin and Minnesota have been found to have usufructuary rights to hunt, fish and gather that are extinguished upon the land passing to private ownership[15]. Thus the underlying rationale in the Pacific Northwest cases - perpetual usufructuary rights - for requiring mitigation, as a trust responsibility, is not present with respect to the Chippewa's usufructuary rights. Moreover, a determination that the United States' trust obligations would require it to ensure that mitigation would be performed would be logically inconsistent with case law which has held that the usufructuary rights were extinguished when the land over which they originally could have been exercised passed to private ownership. Under the relevant case law no compensation would be due the Tribes, even if all of the land passed to private ownership, as it was understood that usufructuary rights "were subject to and limited by the demands of the settlers." ***Lac Courte Oreilles Band v. State of Wisconsin***, 760 F.2d 177, 183 (1985)

Therefore, the specific usufructuary right in question should be examined to determine if mitigation would be required as a trust obligation. However, even if it is determined that mitigation would be required, it is not unlikely that mitigation that is or would be required in conjunction with the permit, even absent a trust responsibility,[16] would be sufficient to satisfy any Government trust obligation to mitigate.[17]

8. Does the Corps trust responsibility to Indian Tribes require mitigation for adverse impacts to Tribal resources on reservations?

Each treaty at issue must be reviewed to determine what is or is not required under that treaty. Under the rationale of the Pacific Northwest cases it would appear that mitigation, to the extent reasonable and practicable is owed. However, those cases do not indicate that there is an environmental servitude owed the Tribes such that mitigation must ensure that there is no net adverse effect resulting from the federal action. In fact, the Court in ***United States v. State of***

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[15]*Lac Courte Oreilles Band, Etc. v Voigt*, 700 F.2d 341 (1983) and *Lac Courte Oreilles Band v. State of Wisconsin*, 760 F.2d 177.

[16]Mitigation that would be required of the applicant even if there were no usufructuary rights or trust obligation to mitigate.

[17]See *Pyramid Lake Paiute Tribe v. U.S. Department of Navy*, 898 F.2d 1410 (9th Cir. 1990); *Havasupai Tribe v. United States*, 752 F. Supp. 1471 (D. Ariz. 1990); and *Nance v. Environmental Protection Agency*, 645 F.2d 701 (1981)

Washington, 694 F.2d 1374 (1982) has indicated that a resource may be rendered valueless without abrogation of treaty rights or trust responsibilities[18]. As stated by that Court at page 1381 "Any right may be subject to contingencies which would render it valueless." and at page 1382:

> The spectre the district court raises of tribal fishermen unprotected by the environmental right dipping their nets into the water and bringing them out empty, 506 F.Supp. at 203, cannot alter the scope of *Fishing Vessel*. Only the extension of the servitude to ban even non-discriminatory development occurring both within and without treaty fishing areas assure against any decline in the amount of fish taken. The treaty does not grant such assurance.

It is also not unlikely that any trust obligation owed to require mitigation would be satisfied by mitigation that would be required in conjunction with the 404 permit process, absent a trust obligation.

Accordingly, mitigation, to the extent it is reasonable and practicable, for impacts to Tribal resources sited on reservations should be required.

9. May an activity whose impact to a reservation's resources be such that it would defeat the purpose for which the reservation was established be permitted?

Before one can begin to address this question, in practice, the terms of the treaty in question must be examined to determine if the Treaty specifically contemplates the activity to be permitted and if that activity, under the terms of the treaty takes precedence over or is subservient to the interests of the Tribe[19] Assuming the treaty is not dispositive, the following is applicable.

I am not aware of a line of cases directly addressing this issue; however, *Pyramid Lake Paiute Tribe of Indians v. Morton*, 354 F.Supp. 252 (1973) gives us guidance as to how one court decided the issue and may be illustrative of how such issues would be decided in the future. The case concerned the Department of Interior's regulation, which the Tribe contended delivered "more water to the District than required by applicable court decrees and statutes, and improperly diverts water that otherwise would flow into nearby Pyramid Lake located on the Tribe's

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[18]This discussion is not applicable to impacts which would defeat the purpose for which the reservation was established.

[19]See *Sokaogon Chippewa Community v. Exxon Corp.*, 805 F.Supp. 680, 706 (E.D.Wis, 1992) "If the Sokoagon were to prevent Exxon from mining on the subject territory, it would be in contravention of the very considerations prompting the two treaties. Even assuming that the Sokaogon have rights in the land, the language and intent of the 1842 and 1854 Treaties demand that mineral development should take precedence over those rights.

reservation." Although the Court could have analyzed the case under the Winters doctrine[20] It chose not to do so. The Court noted, at pages 254-255, that:

> This Lake has been the Tribe's principal source of livelihood. Members of the Tribe have always lived on its shore and have fished its waters for food. ...
>
> Recently, the United States, by original petition in the Supreme Court of the United States, filed September, 1972 claims the right to use sufficient water of the Truckee River for the benefit of the Tribe to fulfill the purposes for which the Indian Reservation was created, "including the maintenance and preservation of Pyramid Lake and the maintenance of the lower reaches of the Truckee as a natural spawning ground for fish and other purposes beneficial to and satisfying the needs of the Tribe. ...

The Court then determined (page 256) that:

> ... The Secretary's duty was not to determine a basis for allocating water between the District and the Tribe in a manner that hopefully everyone could live with for the year ahead. This suit was pending and the Tribe had asserted well-founded rights. The burden rested on the Secretary to justify any diversion of water from the Tribe with precision. It was not his function to attempt an accommodation.
>
> In order to fulfill his fiduciary duty, the Secretary must insure, to the extent of his power that, that all water not obligated by court decree or contract with the District goes to Pyramid Lake.

Accordingly, should the Corps determine that an activity needing a Corps permit would impact the reservation's resources to an extent that they would defeat the purpose for which the reservation was established the permit should be denied.[21]

10. What is the Winter's doctrine and is it applicable to permit decisions?

Felix S. Cohen's Handbook of Federal Indian Law, 1982 Edition, pages 575 to 576 offers a good explanation of the doctrine:

> The Supreme Court first articulated this doctrine in *Winters v. United States* in 1908 and reaffirmed it in 1963 in *Arizona v. California. Cappaert v.*

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[20] *Winters v. United States, 207 US 564, (1908)*

[21] It is likely that if the impacts were so great as to defeat the purpose of the reservation that, even without considering the Corps' trust obligations, the permit would be denied as not being in the public interest. (A permit whose impact would deprive any community of the ability to maintain a moderate living standard is not likely to be in the public interest.)

United States contains the Court's most succinct and lucid statement of the governing principles of reserved water rights:

> This Court has long held that when the Federal Government withdraws its land from the public domain and reserves it for a federal purpose, the Government, by implication, reserves appurtenant water then unappropriated to the extent needed to accomplish the purpose of the reservation. In so doing the United States acquires a reserved right in unappropriated water which vests on the date of reservation and is superior to the rights of future appropriators. ... The doctrine applies to Indian reservations and other Federal enclaves, encompassing water rights in navigable and nonnavigable streams.
>
> In determining whether there is a federally reserved water right implicit in a federal reservation of public land, the issue is whether the Government intended to reserve unappropriated and thus available water. Intent is inferred if the previously unappropriated waters are necessary to accomplish the purpose for which the reservation was created.

This doctrine arose and has been applied extensively in appropriative water law states (generally western states that have limited supplies of water). The doctrine has not been applied to riparian water law states and may not be applicable to them.

11. When, in the permitting process sequence, should the Corps trust obligations be considered?

Since the Tribal trust issues, alone, may be determinative[22] of the outcome of the permit decision, those issues should be considered immediately after or in conjunction with consideration of the avoidance issue.

12. If the Tribal trust issues are not dispositive of the permitting decision, do we need to consider the Tribe's concerns further?

Yes. The Tribal concerns and the impacts of the proposed activity on Tribal resources should be considered in the public interest review just as any other similarly sized community would be. Such consideration should not be evaluated based on Tribal trust responsibility considerations[23] but should take into account the relative impact the proposed activity would have

---

[22]For example, if the permitted activity would violate a treaty provision, the permit application would be denied.

[23]These considerations should have been addressed previously.

on the community[24]. The same impact to natural resources may have a greater effect on individual Indians than it would on non-Indians, not only because of greater dependence on those resources, but also because the individual Indian may be more closely tied to the defined land area than his non-Indian counterpart. Additionally, any spiritual or cultural impact to the Tribe that would result from the proposed permit activity should be evaluated in the public interest review.

13. Should the Corps apply different criteria to permit applications for activities within a reservation's exterior boundaries than would be applied to a permit application for activities outside a reservation's exterior boundaries?

No. The criteria applied should be the same. However, it is very likely that an activity that is sited within the reservation's exterior boundaries would have a greater impact on Tribal resources than would an activity that is sited off reservation. Moreover, the applicant would still have to comply with all applicable local regulations, thus the Tribe may be able to impose its requirements[25] on the applicant. Such requirements would be independent of and in addition to any Corps' permit requirement or condition. Further, if the Tribe has jurisdiction over the activity and exercises its jurisdiction to prohibit the activity[26] the permit application to the Corps should be denied without prejudice.

14. Who is the Federal Trust Obligation owed to?

The Trust obligation is owed to Federally Recognized Indian Tribes.

Edwin C. Bankston
District Counsel

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[24]For example, an activity that would diminish the supply of game may affect Indian communities to a greater degree than non-Indian communities, because the Indian community may be more dependent on game than the non-Indian community. This greater importance to the Indian community should be factored into the evaluation.

[25]Including preventing the activity if the Tribe has sufficient authority to do so.

[26]Such as denying a required Tribal permit.

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Fri Feb 17, 2017 | 5:17pm EST

Enbridge CEO says Canada only needs two more export pipelines

FILE PHOTO: A storage tank looms over a freeway at the Enbridge Edmonton terminal in Edmonton August 4, 2012. REUTERS/Dan Riedlhuber/File Photo

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Two new crude oil export pipelines will provide enough capacity to ship Canadian production to market until at least the mid 2020s, Enbridge Inc (ENB.TO) Chief Executive Al Monaco said on Friday, making clear his company's Line 3 should be one of them.

Monaco's comments come amid growing speculation that Canada faces pipeline overbuild after years of struggling with limited market access.

The Canadian government approved Enbridge's Line 3 replacement project and Kinder Morgan's (KMI.N) Trans Mountain expansion last November, while U.S. President Donald Trump invited TransCanada (TRP.TO) to reapply for a Keystone XL permit in January. TransCanada is also awaiting permits for its proposed Energy East project.

If all four pipelines get built the 2.1 billion barrel per day surge in capacity would fast outpace industry forecasts of Canadian crude production growth of 850,000 bpd by 2021.

"If you look at the supply profile and you look at our expansion replacement capacity for Line 3 and one other pipeline, that should suffice based on the current supply outlook, out to at least mid-next decade," Monaco said on a fourth quarter earnings call.

Monaco said Enbridge had another 400,000 bpd of potential capacity expansion opportunities in addition to Line 3 but the company would be guided by the amount of supply coming out of western Canada.

Wood Mackenzie analyst Mark Oberstoetter said his firm agreed with Monaco's assessment on the need for new pipelines.

"We definitely need two of these pipelines by around 2025 and after that it depends on the supply outlook," Oberstoetter said. "There's not an evident need to get three or four pipelines built."

Enbridge, Canada's largest pipeline company, also announced a C$1.7 billion ($1.3 billion) investment in a North Sea windfarm.

The 50 percent ownership in EnBW's (EBKG.DE) Hohe See strengthens Enbridge's footprint in Europe's booming offshore wind power industry.

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Monaco said there could be more to come given the push towards renewable energy in a number of European countries.

Enbridge reported fourth-quarter profit on Friday that included a C$373 million before-tax impairment charge related to its Northern Gateway pipeline, which the Canadian government blocked last year.

Earnings attributable to the company's shareholders were C$365 million ($279 million), or 39 Canadian cents per share, in the fourth quarter, hurt by charges, including for asset impairment and restructuring.

($1 = 1.3110 Canadian dollars)

(Additional reporting by Arathy S Nair in Bengaluru; Editing by Savio D'Souza, Grant McCool and Bernard Orr)

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Enbridge Tax Lawsuit Could Exceed Entire Budget of Minnesota Counties

A change in property tax evaluation may cost the state tens of millions in returns to the energy company.

By **Anders Koskinen** - March 27, 2017

DULUTH, Minn- An enormous property tax challenge by Enbridge Energy may end up costing several counties in northern Minnesota millions of dollars.

Clearwater and Red Lake counties could end of having to refund more money to Enbridge than they raise in an entire year from all property taxpayers, reports the Star Tribune. Enbridge has appealed five years of taxes claiming the Minnesota Department of Revenue unfairly valued its pipeline network in the state. This overvaluation resulted in much higher property tax payments argues the company.

"It's scary for us," Clearwater County Auditor Allen Paulson told the Star Tribune, "If Enbridge wins the appeal, the [tab for the county] will be $7.2 million, and our levy is $6.8 million."

Thirteen counties in Minnesota contain pipelines owned by Enbridge. The pipelines transport crude oil from North Dakota and Alberta, Canada to a terminal in Superior, Wisconsin.

The effect on counties would spill down to the local government and school district levels as well. These governmental bodies receive portions of tax collections form counties. The drain on county budgets by Enbridge's potential tax returns would likely preclude some payment to the lower levels.

"We have always paid our fair share, and we expect tax increases," Jennifer Smith, an Enbridge spokeswoman in Duluth told the Star Tribune, "These [appeals] are about the amount of the increase," which ended up being 24 percent in 2012 due to a change in valuation methodology by the state."

According to Smith, in 2012 the state changed how it weights certain financial inputs into the property tax assessment equation. Up until then Enbridge's property taxes in Minnesota were in line with other states where the company has pipelines, including Wisconsin, North Dakota, and Michigan. Enbridge has appealed the taxes it has paid from 2012 through 2016

Minnesota Tax Court filings show the Minnesota Department of Revenue's 2015 evaluation of the pipeline system's value was $7.13 billion. Enbridge's evaluation totalled only $4.25 billion according to the Star Tribune.

Red Lake County has a population of just over 4,000 people. Last year it had a total levy of $2.6 million. If Enbridge wins their case, the county could owe them $3.5 million.

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Anders Koskinen

Levi, Andrew (COMM)

From: Joe Plummer <Joe.Plummer@whiteearth-nsn.gov>
Sent: Monday, July 10, 2017 1:28 PM
To: MN_COMM_Pipeline Comments
Subject: Line # DEIS Comments
Attachments: Line 3 EIS 7-9-17.pdf

Jamie:

I have attached White Earth's comments to the DEIS.

Joe Plumer
Tribal Attorney
White Earth
P.O. Box 238
White Earth, MN 56591
Phone: (218) 983-3285 ext. 5753
Facsimile: (218) 983-3269
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STATE OF MINNESOTA
OFFICE OF ADMINISTRATIVE HEARINGS

FOR THE PUBLIC UTILITIES COMMISSION

In the Matter of the Application of Enbridge Energy, Limited Partnership for a *Certificate of Need* and *Pipeline Routing Permit* for the Line 3 Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

WHITE EARTH BAND OF OJIBWE'S RESPONSES TO DRAFT ENVIRONMENTAL IMPACT STATEMENT

OAH 65-2500-32764/MPUC PL-9/CN-14-916
OAH 65-2500-33377/MPUC PL-9/PPL-15-137

To: ALJ O'Reilly for MN PUC and OAH, Applicant Enbridge Energy, Limited Partnership and State of Minnesota agencies and other parties.

Introduction

Enbridge's proposed Line 3 Expansion and Abandonment project is of particular interest to the White Earth Nation. As the original people of this land, the people of White Earth strive to uphold the tenets of *Anishinaabemaadiziwin,* which dictates that we have a responsibility to look out for and protect the land, water, air, plants and animals. Enbridge's proposed project threatens our manoomin, disregards our sovereignty and places the burden of risk of any harm from the proposed project on our communities. Our responsibilities as Anishinaabeg people extend beyond our reservation boundaries, beyond the current generations, and includes a responsibility for the entire human family, similar to the fiduciary responsibility that the United States has over Native people. Our treaties with the United States, which are the supreme law of the land pursuant to the United States Constitution, recognize our responsibility to the land, water, air, plants and animals; as well as our responsibility to future generations. And in conformity with our fundamental, wide ranging responsibility we must object to the incompleteness of the Draft Environmental Impact Statement (DEIS) prepared at the direction of the Minnesota Department of Commerce (DOC).

The applicant must demonstrate that the scope of the proposed project is a good investment for future generations, because the future generations are the ones that will be dealing with the long-term impacts of this project. The benefits to the applicant are only one factor that must be considered, and the White Earth Nation submits that the benefits the proposed project would bring to Enbridge are vastly outweighed by the potential harms the project presents, directly and indirectly, for the people and the natural environment it will impact. Even if the applicant attempts to dress up the proposed project as being in the best interest of national security, the true benefits will accrue to only a handful of fossil fuel exploiters. Currently,

Enbridge would like their new energy corridor to run through the heart of the 1855 Treaty area's wild rice beds (a treaty protected resource). The development of this pipeline will directly impact the regional Ojibwe tribal access to this vital resource, and others. The manoomin is the basis of Ojibwe economy, society and religion. Ojibwe people have a responsibility to protect the manoomin and the human and natural environments, and these responsibilities are codified in the Treaties between the Ojibwe people and the United States. The federal government's responsibilities through the Treaties have filtered down to the state government and its agencies, including the Minnesota Public Utilities Commission (PUC) and the Minnesota Department of Commerce. It appears that the Minnesota DOC has recognized its responsibility to meaningfully consult with tribal nations through its outreach to tribes that will be directly impacted by the proposed project in the present EIS process. Whether or not the Minnesota PUC perceives its inclusion in Governor's Dayton's executive order requiring consultation with tribes on a government to government basis, the siting of this proposed pipeline triggers the need for government to government consultations at the federal and state levels. The White Earth Nation and other Ojibwe Tribes will continue to advocate for meaningful consultation at both the federal and state levels.

The principles of Anishinaabemaadiziwin have guided the Anishinaabe people since time immemorial, surrounded the Anishinaabe people with rich natural and cultural resources, empowered the Anishinaabe people to carry out sacred responsibilities to safeguard these natural and cultural resources and have allowed the Anishinaabe people to live in harmony with the environment. Present day Anishinaabeg continue to build upon and pass on traditional ecological knowledge for assessing use of the available air, land and water resources while treating these resources with great respect. The goal of this traditional knowledge is to leave a light footprint on the environment.

Water sustains all life, and the protection of clean water is high on our list of sacred responsibilities as Anishinaabe people. Manoomin, or wild rice, is also sacred to Anishinaabe people. Manoomin has been recognized by the federal government as a trust resource with protections to guarantee its survival. All surface waters and ground waters are inter-connected, and even subtle changes in water quality or levels can profoundly harm the health of manoomin.

Enbridge's proposed Line 3 project crosses and/or impacts lands and waters where Tribal members gather wild rice and other natural resources, and where other Tribal cultural resources are located. Additionally, construction of large infrastructure and large energy projects pose substantial threats to waters, natural resources and important cultural resources through the unavoidable disturbances during construction, as well as from the permanent environmental destruction which results through ongoing project activities.

The existing Line 3 corridor, as well as the proposed corridor cross through the heart of

the 1855 Treaty territory. When the 1837, 1854 and 1855 Treaties, and others were concluded between the United States government and the Anishinaabe Nation, usufructuary rights to hunt, fish, and gather were retained by the Ojibwe peoples in this area. Because Treaty-protected rights are the supreme law of the land pursuant to the United States Constitution, any proposed impacts on these rights must be scrutinized by permitting agencies (like the Minnesota PUC) according to the strict scrutiny analysis that is utilized by courts and other adjudicatory tribunals when fundamental rights are at stake.

Oil pipelines especially pose a unique threat to the Ojibwe in Minnesota where those pipelines cross over, under or through waters, wetlands and ecosystems on which Ojibwe depend for wild rice, fish, game, and other culturally important natural resources. Impacts to natural and cultural resources from large-diameter pipeline construction include streambank degradation, increased sedimentation of waters, long-term wetland disruption, and destruction of fish and wildlife habitat corridors through permanent vegetation removal. Enbridge's proposed Line 3 Replacement Project is planned to transport Canadian tar sands oil through a 36-inch diameter pipeline, and the preferred and alternative routes all pass through pristine wild rice lakes, surface waters, rivers and interconnected aquifers of Minnesota including the headwaters of the Mississippi and two other major North American watersheds. Clearly, the applicant's proposed project will have multiple long term impacts through a clean and sensitive water rich environment. This proposed energy corridor ends at Lake Superior, a place that is sacred to the Anishinaabeg and the source of one-fifth of the world's fresh water. Additionally, the proposed route will pass through Anishinaabeg Akiing, the land of the Anishinaabe, including the 1837, 1854 and 1855 Treaty areas. Unquestionably, this area is the mother lode of the world's wild rice.

The applicant's proposed route crosses directly through sacred landscape and historical cultural property, in which the tribal communities are already facing environmental justice and health challenges. Clearly, these challenges will be exacerbated by Enbridge's proposed new energy corridor. The present proposal represents some 302 miles of new pipeline, of which 175 miles is new and not within any existing pipeline corridor. Because of the flawed nature of the federal government's environmental and petroleum permitting regulations, there is no federal agency ultimately responsible for the oversight of projects of this nature. That means that the Minnesota Department of Commerce needs to be extra vigilant in the preparation of the present EIS to look critically at the information provided by the applicant, which is, after all, designed to assure one goal: that Enbridge gets what it wants.

Treaties and Treaty-making

Treaties are the supreme law of the land which necessarily supersede state laws, and the significance of treaty rights and treaty-protected resources in Minnesota has been acknowledged in judicial decisions that have addressed those rights both on and off reservations. Current state law which governs the permitting of oil pipelines places greater emphasis on meeting the needs

of the pipeline company than ensuring that natural resources, cultural resources, and tribal rights, interests and resources are protected in a way that demonstrates a meaningful respect for the Rights of Nature and the Anishinaabeg.

1855 Treaty with the Chippewa.[1]

On February 22, 1855 in Washington DC, the Mississippi bands of Chippewa Indians ceded 10 million acres of northern Minnesota lake country, including the headwaters of the Mississippi River, and the United States government established nine small reservations.

With the complete collapse of the fur trade, the 1855 Treaty marked a sea change in the economics of the Ojibwe.

First, the source of sustenance for Ojibwe people would become much more dependent upon annuity payments. These annual payments from the federal government were intended to be in exchange for the transfer of millions of acres, and which would be necessary to supplement hunting, fishing and other use of a land base that had been reduced to scattered reservations within the ceded territory.

Material survival would depend on the willingness of the U.S. government to honor its commitments. The annuity system, however, was vulnerable to fraud. Annuity recipients had to show up at appointed times and places to receive their funds, and any funds not distributed could be pocketed by the Indian agents in charge of annuities. In 1861, for example, Ojibwe agent Lucius Walker wrote to Dakota agent Clark W. Thompson:

"I hope that the time of payment will be kept a perfect secret. No one excepting those whom we want or need to assist ought to know anything about it. . . You nor I want anyone here but them who can render us assistance."

—Mark Diedrich
in Chief Hole-in-the-Day and the 1862 Chippewa Disturbance,
Minnesota Monthly, Spring 1987

Secondly, by allotting reservation land to individual families, the United States attempted in the Treaty of 1855 to replace the centuries-old spiritual connection of Ojibwe people to the land with a new system of private property. The federal government intended Ojibwe people to be farmers on individually-owned plots of land, and promised to plow 675 acres of land for the

[1] Treaty With the Chippewa, February 22, 1855, 10 Stat. 1165, Ratified March 3, 1855, Proclaimed April 7, 1855.

entire Ojibwe population. (It also provided 80 acres each to mixed-blood individuals, and gave missionaries the option to buy 180 acres each).

In years to come, various tracts of reservation land established in the Treaty of 1855 would be enlarged, ceded, stolen, restored, co-opted and vacated through treaties, acts of Congress, and the actions of corporations, Indian agents and other "entrepreneurs." Throughout this complicated history, the Leech Lake and Mille Lacs Bands of Chippewa held on to the land that includes their current reservations.

In the 1990s, the United States Supreme Court held that the 1837 Treaty did not cede rights to land use that the Ojibwe had retained in the 1837 land cession treaty.

1837 White Pine Treaty (aka Treaty of St. Peters)[2]

Article 5 of the 1837 Treaty granted the signatory Ojibwe bands usufructuary rights to hunt, fish and gather within the ceded territory. An Ojibwe chief from Leech Lake known as Eshkibagikoonzhe (Flat Mouth) demanded that his people retain the right to "get their living from the lakes and rivers" because "we cannot live, deprived of our lakes and rivers."

The Ojibwe received $24,000 in cash, goods and services, retaining rights to use the land for hunting, fishing and other purposes. Their mixed-blood relatives (including men who signed treaties on behalf of the United States) received $100,000; and fur traders received $70,000. Traders William Aitkin, Lyman Warren, and Hercules Dousman are mentioned by name in the 1837 Treaty as intended recipients of debt payments.

The fur trade was not the only business interest at work in these treaties. The Ojibwe treaty, called the "White Pine Treaty," transferred millions of acres of timber to the United States:

Officials in the administration of President Martin Van Buren sought the land cession not to accommodate white settlers – whites were not demanding Chippewa land – ***but to enable lumbering on a large scale.***

—Ronald N. Satz, Chippewa Treaty Rights

The cession of pine forests led to abuses of Ojibwe timber rights for a century, as treaty signers Dousman, Warren, and Sibley– as well as many other powerful political figures – suddenly widened their business interests from the fur trade to timber. Ojibwe negotiators made

[2] http://treatiesmatter.org/treaties/land/1837-ojibwe-dakota

it clear, however, that they were retaining rights to deciduous trees in the region (among other rights), going so far as to lay an oak leaf in front of United States negotiator Henry Dodge to clarify their point.

Extensive evidence indicates that our leaders and our ancestors believed they were merely leasing use of the pine forests. An important United States Supreme Court ruling in 1999 upheld those rights. (See Treaty of 1855).

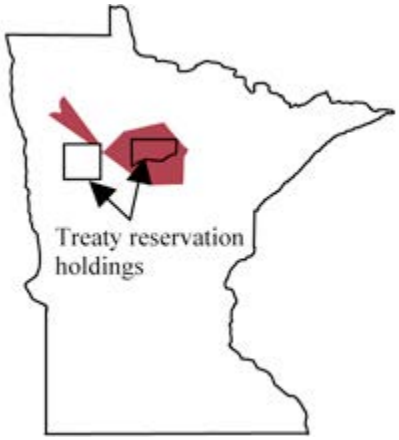

1867 Treaty[3]

The 1867 Treaty was engineered to concentrate the Ojibwe population in a single place, White Earth. Land was allotted to individuals, in direct opposition to our traditional communal living conditions. Individual band members were given scrip to be redeemed for up to 160 acres each, located within boundaries established in the treaty.

Over the following decades, the provisions of this treaty were abused and changed by legislation to transfer ownership of reservation lands from the control of Ojibwe people. Through legislation such as the Dawes Act and Nelson Act, lands were made available for sale to white settlers and timber interests. The Clapp rider in the early 1900's made it legal for mixed blood band members to sell their land scrip, which led to wide scale fraud in which no benefits were gained for the sale.

The importance of timber interests in engineering this treaty can be found in the presence of Joel B. Bassett at the treaty signing. Serving as the United States Indian agent for the Ojibwe at Crow Wing (1865-1869), Bassett had been a lumber manufacturer in Minneapolis since 1850, and this treaty expanded his business. By the late 1880's, he was convicted of fraudulently harvesting 17,000,000 feet of timber from the White Earth reservation. There have been a number of court decisions that have supported our rights to resources within the 1855 Treaty ceded territory.

The Voigt Decision (1983)

In 1983, the United States 7th Circuit Court of Appeals delivered the "Voigt Decision" in *LCO Band of Chippewa Indians v. Lester P. Voigt, et al*, 700 F.2d 341 (7th Cir. 1983) affirming Ojibwe rights to hunt and fish anywhere on ceded territory, even on privately owned land.

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[3] http://treatiesmatter.org/treaties/land/1867-ojibwe
More info: http://digital.library.okstate.edu/kappler/Vol2/treaties/chi0974.htm

1999 Supreme Court Decision - Minnesota v. Mille Lacs Band of Chippewa Indians

In *Minnesota v. Mille Lacs Band of Chippewa Indians, 562 U.S. 172 (1999*), the United States Supreme Court ruled that the Ojibwe retained hunting, fishing and gathering rights on the lands it had ceded to the federal government in the 1837 White Pine Treaty and that the state governments of Michigan, Minnesota and Wisconsin had unfairly asserted authority over hunting and fishing rights without regard for treaty rights guaranteed to the Ojibwe before those states were even formed. The Court also concluded that the same protections survived in the 1855 Treaty, even though it did not explicitly outline usufructuary rights, because the Chippewa delegates that signed it clearly did not believe they were relinquishing such rights.

2015 Squarehook case

Operation Squarehook was a large multi-year state and federal investigation into black market walleye. On February 10, 2015, the 8th Circuit United States Court of Appeals ruled that the federal government could not prosecute four Ojibwe men for netting walleye on the Leech Lake Reservation and selling them. This upheld the 2013 United States District Court decision to dismiss the cases against the Ojibwe fishermen. The men were accused of selling hundreds of thousands of dollars worth of netted fish and charged with wildlife trafficking under the federal Lacey Act. The court upheld the rights guaranteed by the 1837 White Pine Treaty as the same rights the signatory Chiefs would have understood in 1855, even though the 1855 treaty did not directly apply because the Leech Lake Reservation did not exist yet. In its decision, the court repeatedly referenced the Supreme Court's landmark 1999 Mille Lacs decision. The decision effectively ended Operation Squarehook.

Additional Consultation requirements

Beyond the consultation requirements inherent in the existence of treaties between Indian tribes and the United States government, there are additional federal statutes that trigger consultation.

Section 404 Clean Water Act

Enbridge has applied for a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (USACE) St. Paul District for construction of the pipelines including temporary bridges, grading and utility crossings. A Clean Water Act Section 404 permit is required for the discharge of dredge or fill material into waters of the United States, including wetlands. While the White Earth Nation does not yet have treatment as a state status under the Clean Water Act, this federal statute mandates that the state and its agencies must comply with federal consultation standards. Enbridge's proposed project (including its plan to abandon the existing Line 3 in place) crosses extensive wetland areas. The USACE cannot grant these permits without the full consent of the Tribal governments that have rights in the off-Reservation ceded territories.

The United States Army Corps of Engineers also has a trust responsibility to protect tribal waters and resources. The priorities for the Corps are first to provide for navigable waters. The second priority is the protection of tribal trust resources, including wild rice. Any action taken by the Corps has to first provide for navigable water but second it must protect Tribal trust resources, these resources either developed through Treaties or acts of Congress. The Sandy Lake, Mississippi River and Rice Lake Refuges in Aitkin County are directly affected by this corridor and the Corps has a unique obligation to protect this area against potential impact because of the Tribal Trust resources. This obligation is authorized under Executive Order, general laws of the United States and internal legal review by the St. Paul District of the Army Corps.

Section 106 National Historic Preservation Act Consultation

Section 106 of the National Historic Preservation Act, as amended, requires the lead state or federal agency with jurisdiction over a state or federal undertaking (i.e., a project or activity that requires a state or federal permit, license, or approval) to consider effects on historic properties before that undertaking occurs. The intent of Section 106 is for state and federal agencies to take into account the effects of a proposed undertaking on any historic properties situated within the Area of Potential Effect (APE) and to consult with the Advisory Council on Historic Preservation (ACHP), State Historic Preservation Officer (SHPO), federally recognized Indian tribes' Tribal Historic Preservation Officer (THPO), applicants for federal assistance, local governments, and any other interested parties regarding the proposed undertaking and its potential effects on historic properties.

A "historic property" is defined as any district, archeological site, building, structure, or object that is either listed, or eligible for listing, in the National Register of Historic Places (NRHP). To be considered eligible for listing in the NRHP, a property generally must be greater than 50 years of age, although there are provisions for listing cultural resources of more recent origin if they are of "exceptional" importance.

Mikwendaagoziwag - They are remembered

The proposed project (including the to-be-abandoned line) crosses exceptional and important historic lands. These lands include our historic hunting, fishing and gathering areas; our historic homelands and for many miles, follows the route of our historic removal route and the site of the Sandy Lake Tragedy. In the 1840s, traders in Minnesota realized there could be an economic boom to moving Ojibwe from Wisconsin and Upper Michigan (areas ceded in 1837 and 1842 treaties) onto unceded lands in Minnesota. This move would require the build-out of Indian agencies and schools, and the distribution of annuity goods promised under treaties. These services could be provided by Minnesota "*entrepreneurs"*. This economic potential created political pressure, and in 1850, a plan was devised.

Since the start of the annuity payment system, Lake Superior Ojibwe had traveled to La Pointe on Madeline Island in Lake Superior to receive the payments. This traditional heartland of our people was more accessible and a traditional gathering area. In 1850, the

entrepreneurs (conspirators) told our ancestors to arrive at Sandy Lake no later than October 25th to receive their annuities.

By November 10, 1850, some 4,000 Ojibwe had arrived at Sandy Lake. They were ill prepared for what they faced at Sandy Lake. The promised annuities were not waiting for them, and the last of the limited provisions that were available were not distributed until December 2, 1850 after harsh winter conditions had set in. While they waited the nearly six weeks, the Ojibwe people lacked adequate food and shelter. Over 150 Ojibwe people died from dysentery caused by spoiled government provisions and from measles. Demonstrating their steadfast desire to remain in their homelands, the Ojibwe began an arduous winter's journey home on December 3, 1850. As many as 250 others died along the way. On the same day, Aish-ke-bo-go-ko-zhe, the Ojibwe leader also known as Flat Mouth, sent word to Minnesota Territorial Governor Ramsey that he held him personally at fault for the broken promises that resulted in suffering and death. As word of the Sandy Lake disaster spread, so did opposition to the federal government's removal policy ... Ojibwe leaders traveled to Washington to secure guarantees that annuities would be distributed at La Pointe, and that the Ojibwe could remain in their homelands ..."[4]

The federal officials responsible for the scheme hoped that worn-out tribal members wouldn't make the trip home and would stay permanently in Minnesota. At Sandy Lake and on the trek home, more than 400 people died because of delayed and meager payments, tainted food, disease, inadequate housing and the cold weather. This and other events led to the 1852 journey to Washington by Chief Buffalo and Benjamin Armstrong to meet with President Fillmore. That trip resulted in the end of the removal of the Lake Superior Chippewa, returning the annuity payments to Madeline Island and eventually establishing reservations.[5]

Ojibwe Historian Elaine Fleming has researched the Sandy Lake tragedy, and explained that: "It's estimated that 1,500 of the 5,500 Ojibwe who camped out at Sandy Lake were from northern Minnesota. We don't know for certain how many of them made it back alive, having to walk 120 miles in early December back to Leech Lake, or 140 miles to Cass Lake. But we do have our stories about their experience. (Brenda) Child writes about a family who walked home to Leech Lake. There was a father, the mother, the mother's brother, a 10-year-old son, and a 2-year-old daughter. Halfway home, the mother's brother got sick and died. They stopped to bury him. Two days from Leech Lake, the children got sick. The son died and the father carried his dead son on his back. Next, the 2-year-old daughter died. The mother

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[4] http://www.chiefbuffalo.com/buffalo/Sandy_Lake_Tragedy.html
https://chequamegonhistory.wordpress.com/category/sandy-lake-tragedy-and-ojibwe-removal/
http://www.colinmustful.com/sandy-lake-tragedy/
https://www.youtube.com/watch?v=u6VaiLfy3CE
[5] http://www.chiefbuffalo.com/buffalo/Sandy_Lake_Tragedy.html

carried her dead daughter on her back, and both parents returned home to Leech Lake carrying their dead children. Sandy Lake became known as the place where their people died. Like the parents carrying their dead children on these trails of death, historical trauma is carried in the memories and bodies of the people. Those who were originally traumatized pass the trauma down to their children, and they to their children, and so on."

(Fleming, February 19, 2017)[6].

It is said that the east side of Sandy Lake was full of birchbark coffins of the hundreds who perished in this intentional act of the President. This historic trauma has not been forgotten by the Anishinaabeg, and each year is commemorated in a gathering at Sandy Lake.

Removal to White Earth

With the 1867 Treaty, great pressure was put on all bands in Minnesota to get them to relocate onto one reservation. Never the historic homeland of any Ojibwe group, it became a reservation in 1867 in a treaty with the Mississippi Band of Ojibwe. It was to become the home of all of the Ojibwe and Lakota in the state, however, not all bands wanted to move onto one reservation and give up their existing reservations. The stated purpose of the federal policy to relocate all Ojibwe people onto the White Earth Reservation was to open the existing Ojibwe Reservations to white settlement and development. The thinking of the time was that such plans could not be possible with the Ojibwe people's continued residence in their homelands. Such massive relocation was very hard on the people, and facing the prospect of leaving places where they have lived in harmony with the natural surroundings for many years, where their deceased family members were buried, and where other intimate connections with the land would be broken, was very difficult for our family members.

Mississippi Band members from Gull Lake were the first group to come and settle around White Earth Village in 1868. The 1920 census reflected those who had settled in White Earth: 4,856 were from the Mississippi Band including 1,308 from Mille Lacs, the Pillager Bands had 1,218, Pembina Band 472, and 113 had come from Fond du Lac of the Superior Band. The different bands tended to settle in different areas of the reservation. Mille Lacs Lake members moved to the northeastern part of the reservation, around Naytahwaush and Beaulieu. Pillager Band members settled around Pine Point in the southeast of the White Earth Reservation. After 1873, Pembina Band members from the Red River Valley moved into a township on the western side of the reservation. A community concentrated in the Village of White Earth where the government agency was located.[7]

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[6] Nanaboozhoo and the Wiindigo: An Ojibwe History from Colonization to the Present
Volume 28, No. 3 - Spring 2017
Bezhigobinesikwe Elaine Fleming ♦ February 19, 2017 [Tribal College, Journal of American Indian Higher Education]

[7] https://mn.gov/indianaffairs/tribes_whiteearth.html

The federal government's plan to concentrate all Ojibwe people on the White Earth Reservation was met with much resistance by the people living on the other Ojibwe Reservations in Minnesota. The ultimate part of the federal government's plan to relocate all Ojibwe people to the White Earth Reservation was to disestablish all the other Ojibwe Reservations in Minnesota, including the following: Sandy Lake, Rice Lake, Pokegama, Rabbit Lake, Grand Portage, Fond du Lac, Bois Forte, Mille Lacs, Leech Lake, Red Lake and other smaller Reservations.

The federal government's massive relocation plan never came to fruition, primarily because the Ojibwe people were fed up with the long line of broken promises and constantly changing plans. Not only were the local Indian agents not to be trusted, but the solemn promises of the federal government through the President ("Great Father") that were included in the long line of treaties between the Anishinaabeg and the United States, were disregarded by non-Indian officials as well. The Ojibwe people dug their heels in and made it clear that they were not going to abandon their existing Reservations and relocate to White Earth. Likely influenced by a moment of guilt, the federal government abandoned its plans to relocate all Ojibwe people; and the Ojibwe Reservations at Grand Portage, Fond du Lac, Mille Lacs, Bois Forte, Leech Lake and Red Lake were not disestablished. The Ojibwe from those Reservations were not forcefully relocated, and they were permitted to continue to maintain their homes where they had lived for centuries in harmony with their surroundings. Those Ojibwe people who did relocate to the White Earth Reservation followed paths that are scattered throughout the 1855 Treaty area. These paths through the 1855 Treaty ceded territories were familiar to the people, and after they relocated to White Earth they continued to follow the seasons and harvest the resources that were plentiful in these areas.

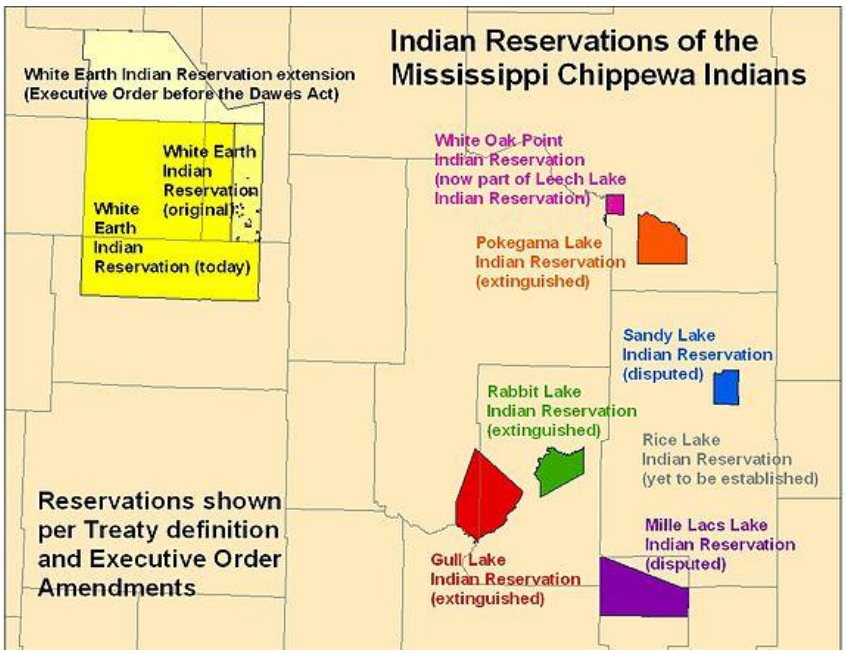

Attribution: CJLippert at English Wikipedia

The routes and trails these groups of Ojbwe people followed are undoubtedly old ox-trails (which followed buffalo routes) and the current day watertrails (rivers and streams).

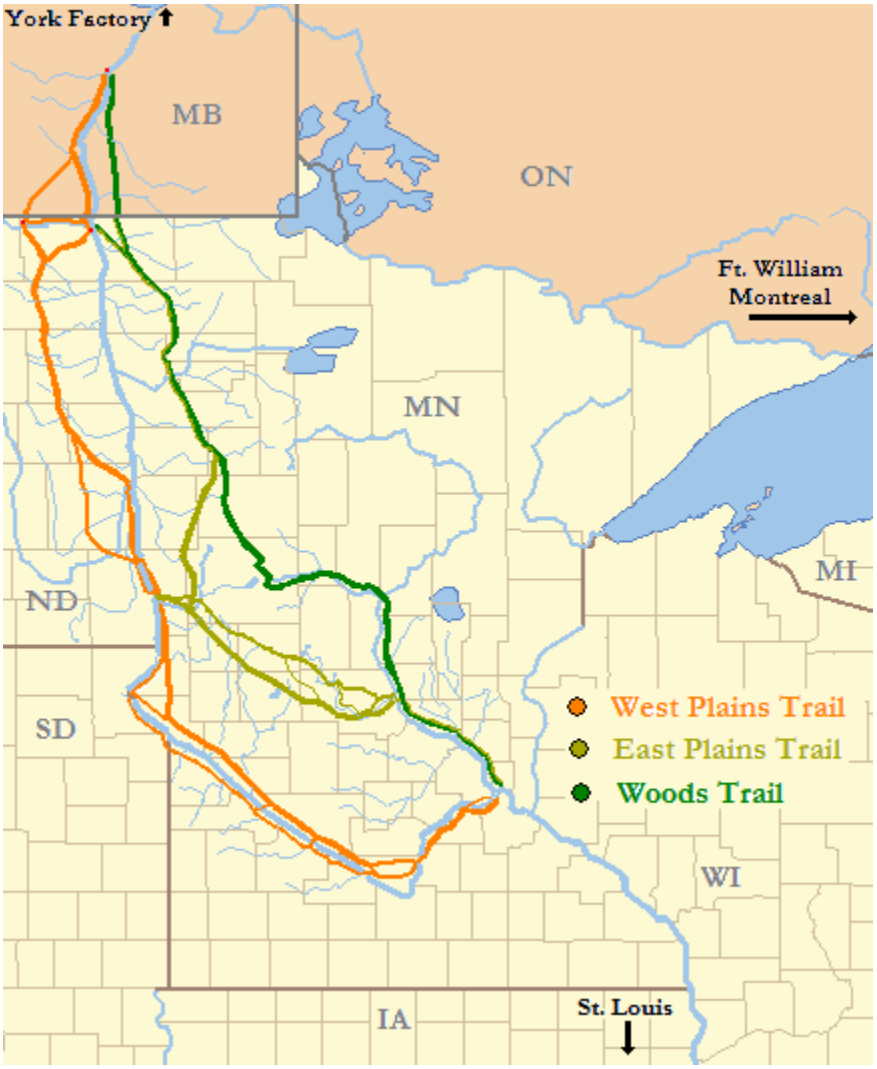

Source: US Census, Ruhrfisch, Kablammo[8]

To this day Ojibwe people follow the seasons and harvest the resources throughout each of the off-Reservation ceded territories according to the natural cycles. The most important resource is Manoomin, but other important resources include fish, deer, rabbits and other animals and plants that have been integral to Anishinaabeg existence for centuries. The customs and traditions of the Anishinaabeg illustrate how the likely impacts of Enbridge's proposed project

[8] https://commons.wikimedia.org/wiki/File:Red_River_Trails_Locator_Map_cropped.PNG#file

must be viewed broadly so that a complete appreciation of the impacts of the project upon the interconnected natural environment is considered. The following map illustrates the impact:

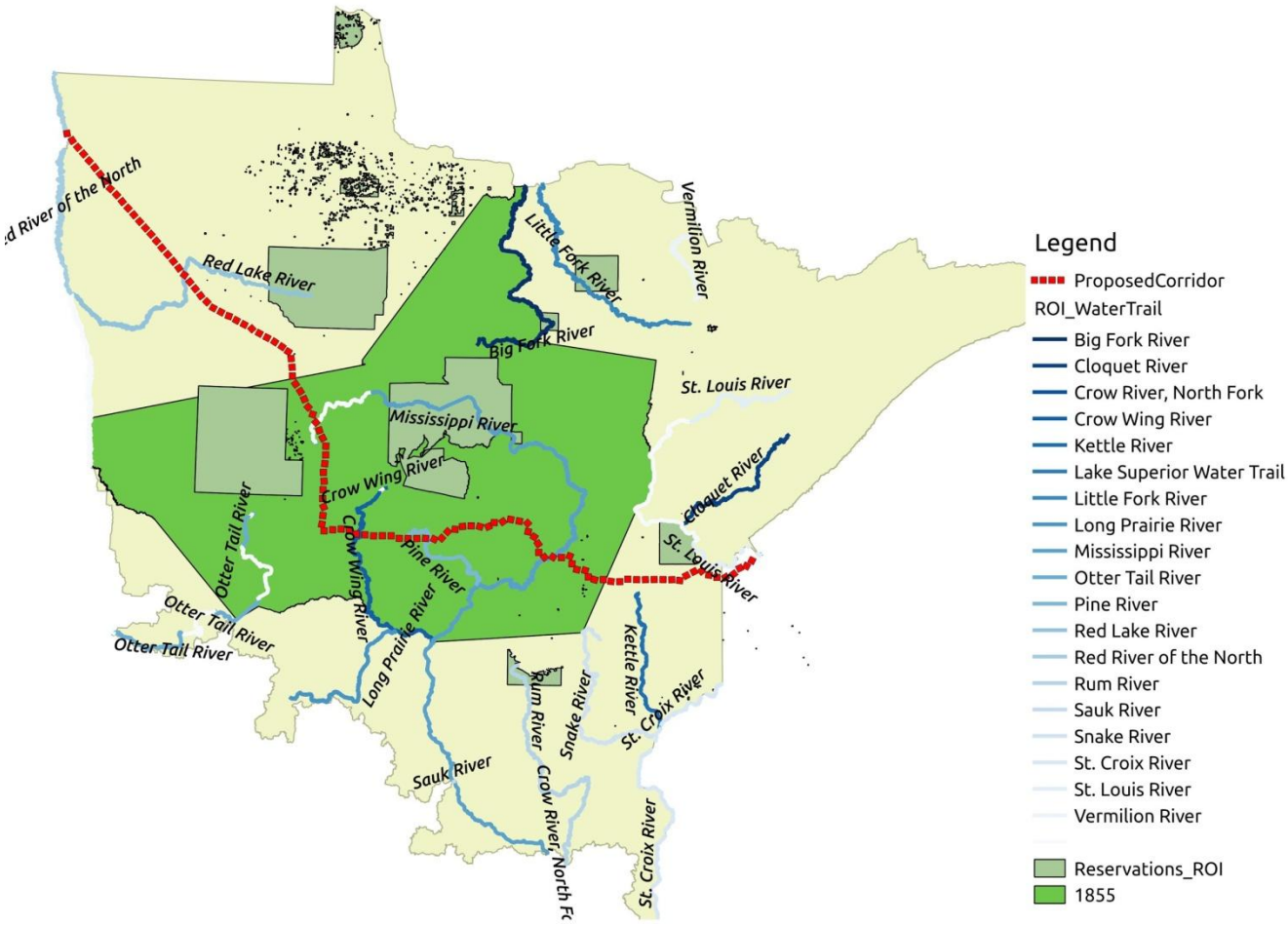

Endangered Species Act, Section 7 Consultation

The U.S. Fish and Wildlife Service (USFWS) is responsible for ensuring compliance with the Endangered Species Act (ESA), Section 7, as amended, which states that any project authorized, funded, or conducted by any federal agency should not "… jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined…to be critical….".

Endangered species in the 1855 treaty area may include[9]:

2290-1

MAMMALS	INSECTS
Canada lynx: threatened and critical habitat designated	Dakota skipper: threatened and critical habitat
Gray wolf: threatened	Karner blue butterfly: endangered
	Poweshiek skipperling: endangered and critical habitat

[9] https://www.fws.gov/midwest/endangered/lists/minnesot-cty.html

Northern long-eared bat: threatened	Rusty patched bumble bee - endangered
CLAMS (Freshwater Mussels) Higgins' eye pearlymussel - endangered Sheepnose - endangered Snuffbox - endangered Spectaclecase - endangered Winged mapleleaf mussel - endangered	PLANTS Leedy's roseroot - threatened Minnesota dwarf trout lily - endangered Prairie bush-clover threatened Western prairie fringed orchid - threatened
BIRDS Piping plover: endangered and threatened Red knot - threatened Whooping crane - nonessential experimental population	FISH Topeka shiner - endangered and critical habitat

Additionally, there are several other species of significance to the White Earth Nation, including manoomin, sturgeon, birch and maple trees.

From the Public Hearings with respect to the present draft EIS a commenter reported that:

> Other species that occupy the area, such as gray owls, northern hawk-owls, wolves, deer, bear, and beaver, are culturally significant animals for religious or traditional food purposes.[10] The area also features dancing grounds of the sharp-tailed grouse, where conditions must be ideal for the birds to perform their mating dance.[11]

To date, there has not been any comprehensive review of the status of endangered and special species in the 1855 Treaty Area. It would be irresponsible to permit Enbridge's proposed project to continue without a full assessment of the conditions and status of these species and their habitat. This assessment should be funded by Enbridge and conducted by the Bands and Nations that claim stewardship over the 1855 treaty area.

Migratory Bird Treaty Act Consultation 2290-2

The Preferred Route would pass within miles of the Rice Lake National Wildlife Refuge, one of the most important stopping points in the nation for migratory waterfowl.[12] There are also

[10] Applegate Testimony, at 76.
[11] Id.
[12] Id. at 77("Rice Lake holds the state record for the most waterfowl at a single migratory stopping point of over one million waterfowl in 1994").

2290-2
Cont'd

a number of other important bird areas in Minnesota, as identified by the Audubon Society on the following map[13]:

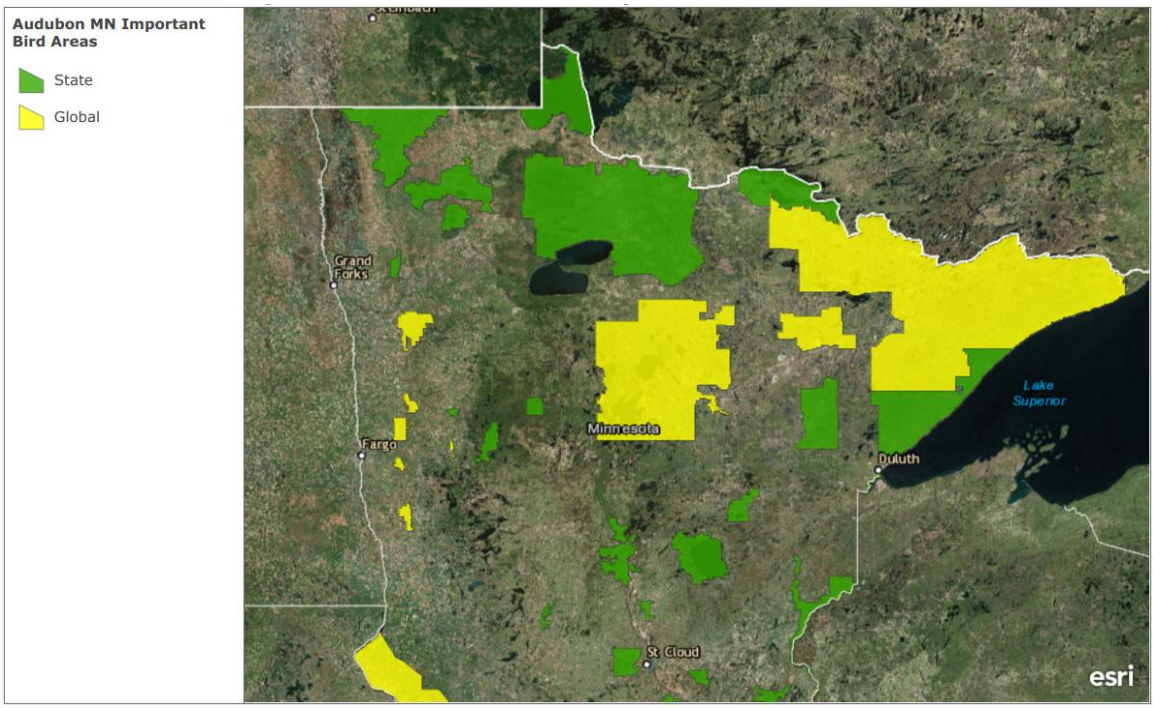

In Wisconsin, Enbridge has requested the US Fish and Wildlife Service to provide the Project planning recommendations under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). There has been no similar action in Minnesota, nor any review of the status of these important areas or the risks they face from the proposed project.

Tribal Consultation

2290-3

Since the Minnesota PUC has received Enbridge's applications for the Sandpiper and the related Line 3 projects, consultation with Tribal governments has been inadequate. The situation was so negligent during the Sandpiper process that Governor Mark Dayton signed an executive order directing state government agencies to implement new tribal consultation policies aimed at improving relationships and collaboration with Minnesota's eleven Tribal Nations.[14]

While the DOC has been making efforts to increase consultation activities, these attempts have come very late in the permitting process and do not represent true participation or consent.

[13] http://mn.audubon.org/conservation/minnesota-important-bird-areas

[14] https://mn.gov/mdhr/news-community/government-relations/tribal-consultation/tribal-consultation-policy.jsp

INTERNATIONAL STANDARDS

In addition to the various federal and state statutes and policies that outline the need for consultation with Tribal governments, there are several international standards that require a higher level of collaboration between Tribal governments and federal and state agencies.

United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)[15]

2290-4

The United States is one of numerous countries that support the United Nations Declaration on the Rights of Indigenous Peoples. The UNDRIP is an international instrument that contains many protections for Indigenous communities, which are so often subject to abuses and unjust treatment. Among the provisions are a right to practice cultural beliefs and practices.[16] Contamination from the proposed Line 3 pipeline project would wipe out the practice of harvesting wild rice and all the religious ceremonies associated with the harvest of manoomin. Wild rice is an intrinsic, identity-forming aspect of Anishinaabe life. To lose access to these wild rice beds would devastate and permanently harm our culture.

The UNDRIP also contains provisions mandating free and informed consent from an affected tribal nation by the state.[17] In this case, the state of Minnesota has failed to properly consult or fulfill the mandate for consent. The DOC has acknowledged that impacts on tribal communities "are part of a larger pattern of structural racism" that tribal people face in Minnesota. The DEIS also states that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities," but the DEIS goes on to conclude that these additional negative impacts that will be heaped upon Native people are insufficient reasons to deny the project. **The level of "consultation" reflected in this statement is definitely not a form of meaningful consultation with which the White Earth Nation consents.**

Equator Principle[18]

The Equator Principles (EPs) is a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects; which is primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. The DEIS is devoid of any Equator Principle analysis, which should be undertaken considering the magnitude of the proposed Line 3 project and the reasonably foreseeable harms that the project poses.

In the above sections, we have outlined the various statutes, principles and treaties that relate to our concern for the 1855 Treaty ceded territory and Enbridge's proposed project impacts. In the following sections, in addition to the flawed and incomplete consultation with

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[15] http://www.ohchr.org/EN/Issues/IPeoples/Pages/Declaration.aspx
[16] http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf
[17] *Id*.
[18] http://www.equator-principles.com/index.php/about-ep

Tribal Nations, we will illustrate the various deficiencies in the Department of Commerce's DEIS for the proposed Line 3 project.

2290-5

Lack of Traditional Ecological Knowledge and Indigenous Science (TEK/IS) Methodologies

Indigenous peoples have a different way of understanding the world, and humanity's role in creation. This alternative way of understanding is known as Indigenous science. Knowledge formed through this understanding is known as traditional ecological knowledge (TEK). Understanding Indigenous science and how it differs from Western science is essential to have true government to government relationships and guarantee true "prior and informed consent". The lack of understanding of Indigenous science and TEK by western regulators leads to the approval of projects that continue the legacy of colonization and genocide experienced by Indigenous Peoples (IP).

The Anishinaabeg[19] world consists of eight planes of existence, with an understanding of the deep relationship between the time of the ancestors and the time of the descendants. Because of this, Anishinaabeg are required to make decisions for the seventh generation, working to ensure that decisions made for current generations do not negatively impact the quality of life of future generations. This world view also includes an understanding that the physical world possesses animate and inanimate, intangible and tangible values, and family or relatives who are winged, rooted, with paws, fins and hooves. Anishinaabeg world view[20] and other indigenous knowledge systems employ an in-depth understanding of the inter-relation of all of creation. This world view is similar to the understanding of ecologists, but with a deep element of responsibility to each constituent part. The Western scientific process is reductionist and mostly unconcerned with the ethical implications of scientific research, which is in direct contradiction to Indigenous scientific processes. The gap between the two scientific approaches must be bridged to create a sustainable society.

The DEIS shows a complete lack of awareness or use of Indigenous Science methods or Traditional Ecological Knowledge.

In a practical sense, this lack of utilization of IS methods leads to an incomplete picture of the potential impacts of this project. To illustrate this deficiency, we will focus on *manoomin*.

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[19] Anishinaabe is the traditional name for the original people of what is now the Great Lakes area of the United States and Canada. We may be more commonly referred to as Chippewa or Ojibwe, but those terms have been imposed upon us by European and American colonizing forces, and hence many of us choose to use Anishinaabe when referring to ourselves. The plural of Anishinaabe is Anishinaabeg, and Anishinaabemowin is our language. Akiing is our name for our homeland. - Quoted from Freeland, 2015.

[20] A worldview is the cultural framework of interrelated logics which establish a relationship to land, time, the rest of life and prescription for interacting with that life. -Freeland, 2015.

Diminishment of Manoomin (Wild Rice Assets)

"Mininaajitoomin i'iw manoomin. Niinawind nindabiitaamin o' aki amaa. Niinawind niimiijimin o'o manoomin miinawaa nindamwaanaanig ongo giigoonhyag.
We have a relationship with rice. We are the ones that live here. We are the ones that eat the rice and fish."

"Iw gaye manoomen, memwinzha iw zaaga'igan gii-mooskine, gii-mooskinemagad manoomin, noongom dash agaawaa ayaamagad magizhaa eta ingodwaasing maazhaa ishwaasing endaso-ingodwaak aginjigaadeg chi-bangii jiigibiig.
About the wild rice; we went from a lake that was full of rice to one that has about three to six percent along the shore."

-Niib Aubid[21]

"[w]hen I'm out ricing, when I'm out collecting, when I'm out harvesting, I know peace and happiness."

-Elgin Goodsky

Manoomin, primarily grows wild in the Great Lakes region, and is only harvested for food in Minnesota and Canada.[22] It is essential to Tribal life because of its rich nutritional value for subsistence, support of tribal economies, and for its importance culturally and spiritually. [23] A number of federal treaties applicable in the region specifically reserved wild rice lakes for use by Tribal people, including the creation and support for wild rice camps, still in use today.[24] Wild rice lakes are considered sacred landscapes. Lower Rice Lake on White Earth is a Traditional Cultural Property, and is also the largest continuously producing wild rice bed in the world.[25]

Many lakes have been lost to habitat fragmentation from dams, recreation, mining and development. Those that remain provide important economic resources to the Tribal community, including $1 million in annual revenue from Lower Rice Lake, and $500,000 in revenues from rice lakes in the East Lake community. If an oil spill travelled downstream into wild rice lakes from the proposed pipeline, it could potentially impact the cultural and economic value of the wild rice lakes along the proposed pipeline, and beyond.

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[21] Because of the loss of Sandy Lake- from Sacred Water: Water for Life by Lea Foushee and Renee Gourneau.
[22] Wild rice is not native to California, but the plant that is cultivated in the state is not wild rice, but is instead a genetically modified plant. Genetic modification of wild rice is an additional injustice that has been promoted by the University of Minnesota and other academic institutions.
[23] Lauren Wilcox, "Going with the Grain." Smithsonian.com, September 2007. http://www.smithsonianmag.com/heritage/going-with-the-grain-161650307/?no-ist
[24] Federal Legislation, 1937. Wild Rice Campsites: Section 5 of the Indian Reorganization Act of June 18, 1934 (48 Stat. 984) funding authority Act of May 9, 1938 (52Stat. 300) and Act of August 9, 1937 (50 Stat. 573).
[25] A Traditional Cultural Property(TCP) is a property that is eligible for inclusion in the National Register of Historic Places (NRHP) based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts or social institutions of a living community.

According to the Minnesota Department of Natural Resources, "[n]o other native Minnesota plant approaches the level of cultural, ecological, and economic values embodied by natural wild rice."[26]

We have explicitly reserved the right to harvest wild rice on our traditional lands in treaties with the United States, grounding the tradition in an elevated contractual and property-based set of legal rights.[27]

As people of the manoomin, we rely on the rice for not only nutritional sustenance, but for our economic livelihoods as well.

The 1864 Bureau of Indian Affairs Annual report identified that the Chippewa of the Mississippi, population 3,966, gather 300,000 pounds of wild rice for the season. This translates to an average of 75 pounds of wild rice per person for that year. The 1866 Bureau of Indian Affairs Annual report identified that the Chippewa of the Mississippi, population 4,065, gathered 390,000 pounds of wild rice for the season. This translated to an average of 95 pounds per person for that year. The BIA's numbers most likely include the amount of wild rice sold to traders by Band members because the agency would have no way of measuring the amounts that individual Band members kept to eat.

Research at the Mille Lacs Band of Ojibwe in the l980s pursuant to the Mille Lacs treaty case identified that on an average year 37.5 pounds of finished wild rice could be harvested per acre. This would translate to a need to harvest between 8,000 and 10,400 acres of wild rice to meet the annual tribal demand. Since the above numbers are with respect to wild rice that could be sold, the Native population would also need approximately 75 pounds per person annually for personal consumption. This would translate to an annual requirement for the Chippewa of the Mississippi in the range of 16,000 to 20,800 acres of wild rice.

These figures represent the Chippewa of the Mississippi in 1866, with 4,065 tribal members. The successor tribal government to the "Chippewa of the Mississippi" is the White Earth Nation, with 20,000 tribal members. ***The demand of the White Earth Nation's present population would require almost l00,000 acres of wild rice itself to sustain a traditional diet and traditional trade economy.***

It is estimated that 70 percent of the wild rice stands in Minnesota have been destroyed.

Currently, there are 53 wild rice beds on the lakes within the boundaries of the White Earth Reservation, totaling over 3,000 acres. A majority of the acreage, some 1,400 acres, is on Lower

[26] Minnesota DNR Wild Rice Study, at 7.
[27] Treaty with the Chippewa, 7 Stat. 537, Art. 5 (1837).

Rice Lake. Lower Rice Lake alone is capable of producing nearly 300,000 pounds of green wild rice for harvest. Currently, the harvest of wild rice on the Reservation generates an estimated $600,000 annually (average of $200/acre). Tribal members have consistently supported expansion of wild rice production and harvest on the Reservation. Tribal members have the right to harvest wild rice in the 1855 Treaty ceded territory. This provides access to additional acres of manoomin. Because the preferred route of the proposed Line 3 project goes either through or very near wild rice waters, the impacts from construction and operation directly impact this important resource for White Earth tribal members.

The White Earth Integrated Resource Management Plan provided an estimate of the economic impact of the Reservation's natural resources at $2.2 million annually. Included in that estimate are the following:

- Fish/Wildlife $1,050,000
- Wild Rice $600,000
- Forests $107,000

Sensitivity of Manoomin

"We have a lot of contaminants and pollution in the water today that were not there a long time ago. On White Earth Indian Nation, for example, about half of our reservation is woodland on the East and the Western half is farm country. Whatever they put on their fields in the way of herbicides and pesticides comes to us in the winter from the prevailing westerly winds. Much of the soil from their field blows into the wooded areas and contaminates the water. Sometimes in the winter after a strong west wind, we can see a dirty film of soot on the snow. It is coming from the farmers' fields, when they plowed up and the fine dust and dirt blows into the wooded areas to the East. This has an effect on the wild rice. It affects other animals and people that are using the water, using the fish, eating things from the water, gathering roots or rice or animals that are living in the water or around the water. There are things at the bottom of that food chain that eat and accumulate more and more contaminants."

Earl Hoagland

Wild rice is considered to be a bio-sentinel for water quality due to its tendency to thrive under specific conditions.[28]

"Wild rice is dependent on the circulation of mineral-rich water and does not tolerate chemical pollutants."[29]

As Commissioner Klapel of the Mille Lacs Band of Ojibwe notes, in her letter to the Public Utilities Commission, the present proposal and analysis provided by Enbridge is entirely

[28] Kjerland, T. 2015. Wild Rice Monitoring Handbook. The University of Minnesota Sea Grant Program.

[29] Vennum, at 14.

inaccurate in the hydrological assessment provided by the company to the Public Utilities Commission, falsely representing the risk.

Enbridge states: "Ground disturbance associated with pipeline construction is primarily limited to the upper ten feet which is above the water table in most of the region's aquifers…' Enbridge's generalized claim depicting the water table as ten feet deep is not accurate in the Big Sandy or Rice Lake watersheds. Based on NRCS soil data, the depth of the water table in these watersheds is measured in inches, not feet…"

According to the Minnesota Department of Natural Resources, any factor that can affect water quality or water levels can endanger stands of wild rice.[30] In some locations, the quality of surface water is already impacted by sulfates from mining discharges.[31] For these reasons, biologists and engineers have concluded that routing Line 3 along the preferred route poses the potential for significant impacts to the waters of the Ojibwe homelands, the wild rice that depends upon it, the Band, and its members.[32] Vegetation clearing and grading during construction is likely to alter the complex ecosystem and increase sedimentation. Dredging of wetlands and waterways for bridges and equipment also has a significant potential to alter water levels, further affecting wild rice.[33] Operating and maintaining the pipeline will create further adverse impacts.[34] These impacts rise to a high level of significance, even before consideration of the risk of an oil spill from the pipeline into the natural environment and the watershed.

Manoomin typically grows in shallow to moderate water depths (1 – 3 feet) and is affected by water flow, turbidity, water quality and water level fluctuations. Wild rice is sensitive to varying water levels, and production in individual stands from year-to-year is highly variable depending on local water conditions. Wild rice beds are very attractive to migrating waterfowl, and many rice areas are traditional waterfowl staging and hunting areas.[35]

In the DEIS, 17 wild rice lakes were identified as potentially impacted by the proposed new corridor. In our independent analysis, 41 wild rice watersheds were identified as potentially impacted. This is unacceptable in our view. 2290-6

[30] Minnesota DNR Wild Rice Report, at 21.

[31] Id. at 25.

[32] Bunting Testimony at 39-45; Rupp Testimony at 45-53; Weiss Testimony at 53-58; Testimony of brownfield coordinator Todd Moilanen at 58-65; Testimony of chemical engineer and chemist Charles Lippert, Transcript at 65-71; Testimony of forester Jacob Horbacz at 71-74; Testimony of wildlife biologist Kelly Applegate, Transcript at 75-78.

[33] Weiss Testimony, at 55.

[34] Id. at 55-56.

[35] http://www.dnr.state.mn.us/wildlife/shallowlakes/wildrice.html

2290-7

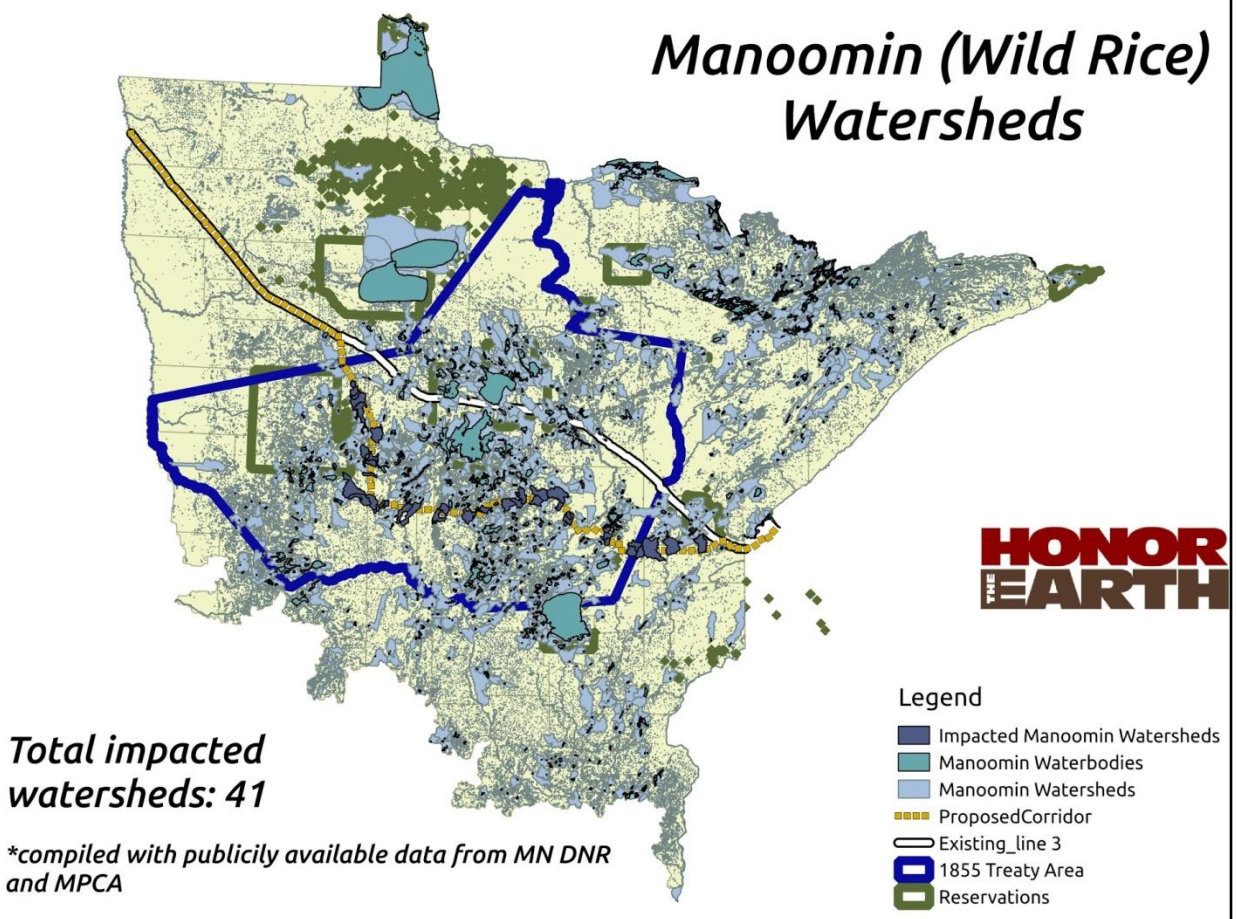

Watershed level analysis is one of many tools regional planners use to assess impacts and health. The potentially impacted watersheds were defined by intersecting the proposed route with watersheds of manoomin waterbodies, as defined by the DNR and MPCA publicly available GIS datasets. In addition to a complete disregard for the nature and importance of manoomin throughout the DEIS, Enbridge (and the DEIS preparers) demonstrate a complete lack of understanding of how ecological restoration occurs. ***Nowhere in the document is an explicit explanation of how Enbridge will protect manoomin waters, or restore a damaged rice bed. This is totally unacceptable.***

The only section in the document that details a restoration plan is with respect to wetland areas. Enbridge's process for restoring wetlands includes dumping the now compacted (and de-watered) soil back in the trench, sowing some oats and "letting nature take its course". Clearly, this is not the proper method to re-establish a wetland. Studies have consistently demonstrated that even with proper restoration practices, it can take decades for an impacted wetland to get back to the biological functioning it was at prior to the disturbance. David Moreno-Mateos, a postdoctoral fellow from the University of California, Berkeley, explains, "Once you degrade a wetland, it doesn't recover its normal assemblage of plants or its rich stores of organic soil

2290-8

2290-8
Cont'd

carbon, which both affect natural cycles of water and nutrients, for many years. "Even after one hundred years, the restored wetland is still different from what was there before, and it may never recover."[36]

Additionally, studies from Pennsylvania have shown that pipeline impacted forested areas take over 100 years to return to pre-construction states. *Wetland areas may never return to their pre-construction states if there is significant altering of the hydrology.*

Abandonment

Beyond just the impacts that a new line would have on our lands and people, there is also the very significant issue of the abandonment of the existing Enbridge Line 3 (and eventually the entire aging Enbridge Mainline corridor). Because Line 3 is the first of many pipelines likely to be abandoned in the 1855 Treaty ceded territory (and elsewhere in our traditional homelands), we must take a critical look at the regulations and procedures pertaining to pipeline abandonment. To date, there is no evidence that Enbridge takes our concerns seriously. In the first round of project applications, abandonment was given little to no attention. The current DEIS does not do much to improve on this deficiency.

2290-9

In the DEIS's 14 page abandonment section, the bulk of the information seems to have come directly from submissions prepared by Honor the Earth. While it is appreciated that this information has been included, it is imperative that the EIS include an in depth analysis of the proposed abandonment of the existing Line 3 pipeline. Particularly since it is inevitable that Enbridge will be making application for the relocation of the other aging pipelines in the existing Mainline. The information provided by Honor the Earth was gleaned from documents prepared by the Canadian National Energy Board (CA NEB). We have learned from our allies at the Canadian First Nations, and through additional research, that the Canadian National Energy Board documents also include serious flaws. It is important for the United States, Native communities and states to prepare regulations and policies on abandonment using the best science. Abandonment will become commonplace, and it is imperative that the regulators (MN DOC and MN PUC) get in front of this issue and not sit back and let the pipeline operators (Enbridge) dictate how abandonment will occur. It is disturbing that when examining the abandonment section of the DEIS appendices that most plans and estimates are based on the plans and estimates for the Canadian section of Line 3. Minnesota and the 1855 Treaty ceded territory is not Canada, and a vague abandonment plan based on another similarly contested plan is no plan at all.

Federally available spill data shows that many thousands of gallons of crude oil have been spilled by Enbridge in Minnesota and in the 1855 Treaty ceded territory. Much of that oil remains in the environment. Because of the 2010 Kalamazoo spill, Enbridge is no longer able to

[36] http://www.earthtimes.org/conservation/restored-wetlands-century-regenerate/1781/#gfixYmgJou156gyH.99

minimize the chances of a spill, nor is it able to downplay the consequences of such a massive spill. If a Kalamazoo-type spill were to occur along the water-rich environment where Enbridge seeks to relocate Line 3, the natural environment, water, wild rice, land, plants and animals would be devastated. And insurance proceeds would be little consolation for the devastation to the destruction of the Anishinaabe way of life.

The DEIS completely avoids the issue of tribal clean water and other tribal environmental standards; as well as whether Enbridge even had plans to remediate the contaminated soil and water to *Tribal defined standards*. As Enbridge has already admitted, the existing Line 3 has been leaking at many locations for some time along its 300+ mile span through Minnesota. The DEIS needs to make clear how the widespread spills and leaks along the existing Line 3 will be remediated. It is totally inadequate to allow Enbridge to abandon Line 3 and leave the gravity and number of these spills unaccounted for. The light of day definitely needs to be shined on the existing Line 3 **before** a certificate of need and a route permit are awarded to Enbridge for a new corridor to pollute. 2290-10

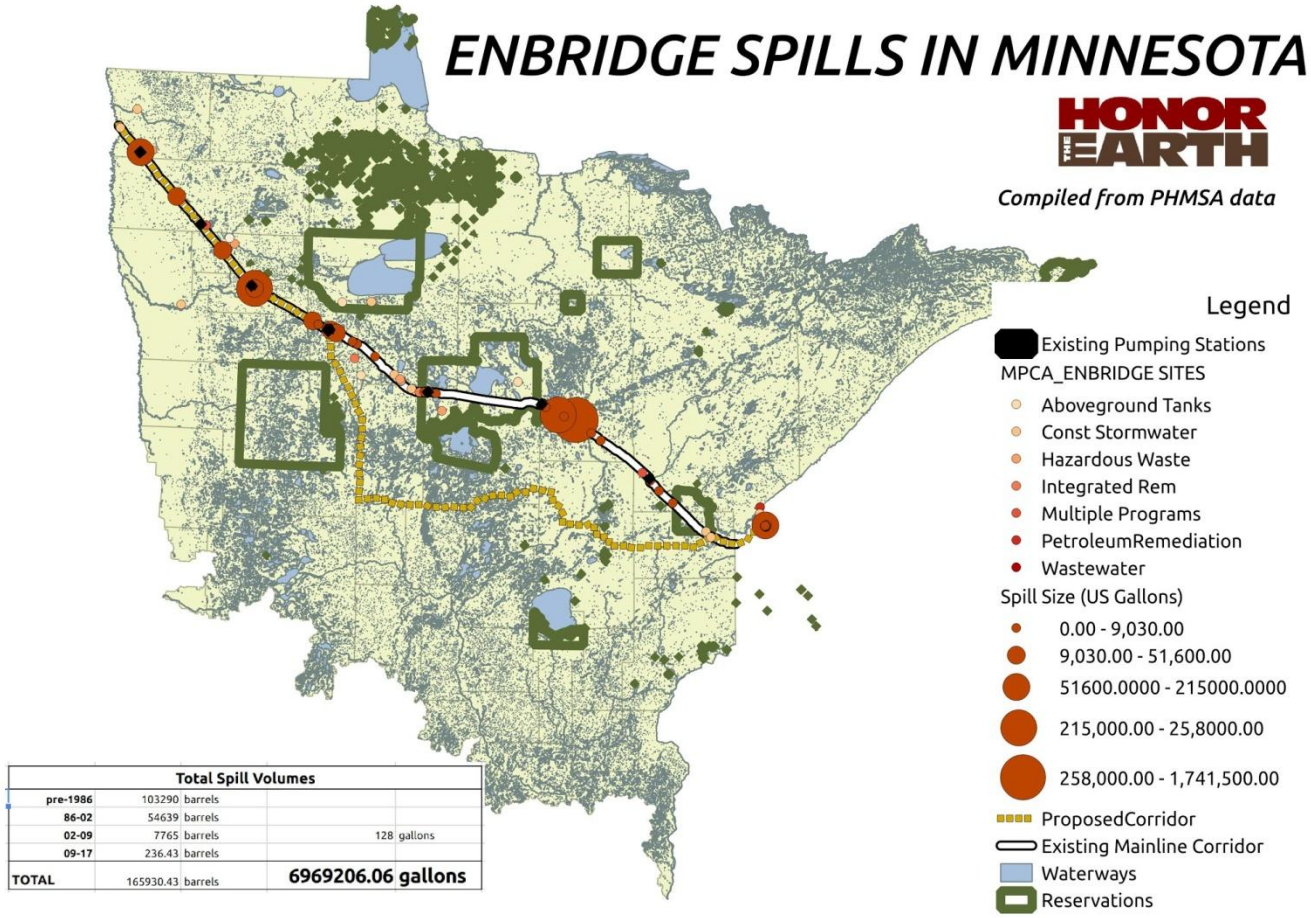

Total Spill Volumes				
pre-1986	103290	barrels		
86-02	54639	barrels		
02-09	7765	barrels	128	gallons
09-17	236.43	barrels		
TOTAL	165930.43	barrels	6969206.06	gallons

The DEIS cavalierly brushes off abandonment issues as "anticipated to be minimal in the near term". Appendix B to the DEIS (page 29) discusses the anticipated through-wall corrosion date

is either: 1) already occurring, or 2) within the next 20 - 50 years (from 2011). The DEIS provides:

> soil conditions. Based on the information presented in Figure 4-8, the worst case time to failure, from the original installation is estimated at 51 years. Based on this, it would be assumed that the pipeline is already penetrated or is likely to be within the next five years considering an in-service date of 1968. This demonstrates the over-conservative nature of the corrosion rates

Appendix B of the DEIS at page 35 provides:

> It is expected that given sufficient time, a pipeline that is not maintained, has poor or no coating, and without CP, will eventually collapse due to corrosion. Estimates of this timeframe have been provided in Section 4.3.1.6, as well as from industry references to be decades at the low end, and thousands of years on the high end.[1,3,6,13] The NEB recognizes that maintaining abandoned pipelines while continuing CP cannot completely eliminate the risk of pipeline degradation or collapse. However, it can be expected to significantly slow the corrosion process, and thereby delay any potential subsidence.[5]

However, the conclusions in Appendix B of the DEIS provide:

> The primary conclusions of the analyses provided are as follows:
>
> - Based on the PTAC corrosion rate curves presented, and comparison with historical ILI data for Line 3, the estimated time to through wall penetration was calculated to be between 25 to 50 years from 2011.
> - The results of the PTAC model considering generalized wall loss for the Permanently Deactivated Line 3 indicate predicted minimum time to collapse as 87 years, with estimates well above 1,000 years based on the variety of soil conditions as described in Section 4.3.1.7.

The 25-50 year time frame for through wall penetration is supported by Paul Vogel's article "Aging Pipelines- What are the Risks?".[37]

> *"Enbridge has acknowledged that the extensive disbonding of the Line 3 polyethylene tape pipe coating will render cathodic protection ineffective to prevent corrosion, and has estimated time to through-wall penetration at 25 to 50 years. Progressively greater agricultural surface loads increase the potential for pipeline collapse and ground subsidence. In addition to health and safety concerns and related costs and liabilities, topsoil loss upon ground subsidence would result in permanent long-term production losses.*

The article by Paul Vogel goes on to describe the terms of a recent settlement between CAEPLA/MPLA/SAPL and Enbridge with respect to landowner concerns. Part of this settlement requires that Enbridge will maintain a certain depth of cover over pipelines. From

[37] Vogel, Paul. "Aging Pipelines- What are the Risks?" in Pipeline Observer. Canadian Association of Energy and Pipeline Landowner Associations (CAEPLA). Summer 2016.

recent aerial surveys, there are many locations where Enbridge's existing pipelines are exposed. ***How will Enbridge maintain depth of cover in areas where no cover exists?***

The DEIS provides: "If t**here is a dearth of surrounding soil**, or if the cover for the pipeline is relatively shallow, the pipeline bears more of the load and, all things being equal, **is more likely to fail"**. (Emphasis added). The DEIS further provides with respect to abandonment as follows:

> When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high (DEIS, Section 8.3.1).

The DEIS further discusses *the **possibility of exposed pipe** and potential mitigation measures. Enbridge indicates in its proposed plan that it would monitor for exposed pipeline and, **if found**, would work with relevant agencies and authorities to develop site-specific mitigation measures*, which could include removing a segment of pipeline, grouting, and continued monitoring. It is easy to make such self-serving responsible-sounding intentions, but the evidence shows that Enbridge does not adequately address exposed active pipelines currently. There is no reason to believe that Enbridge would do a better job maintaining abandoned Line 3, or any of its other pipelines that will inevitably also be abandoned.

Enbridge's estimates of the costs of abandoning Line 3 fluctuate wildly. The TESTIMONY OF LAURA KENNETT, MPUC DOCKET NOS. PL9/CN-14-916, January 31, 2017, emphasizes this point in response to a question pertaining to the current estimated cost to continue a dig and repair program on Line 3, and how the dig and repair program compares to the cost of replacement of Line 3. Ms. Kennett stated:

> Conceptually, **it may be possible** to restore Line 3 to its original operating capacity if Enbridge invested nearly **$8 billion in repairs over the next 15 years** in Canada and the U.S., with **approximately $2 billion in the U.S. alone**. However, in reality, it is not feasible to conduct such an extensive dig and repair program, which would require multiple digs in concentrated areas. The resources required, and **the impact to the environment and landowners along the pipeline, would be extraordinary**. Moreover, since the total estimated cost to replace Line 3 is $7.5 billion (approximately $2.1 billion for the U.S. portion), **we are at the approximate break-even point when comparing the cost of replacement to the present value of continued repairs.**

Compliance with the requirements of the Consent Decree with respect to the federal court litigation over Enbridge's 2010 Kalamazoo spill will increase Enbridge's capital expenditure requirements for Line 3 in the range of $5 million to $40 million per year in the U.S. starting in 2018 until Line 3 is permanently deactivated. In addition, compliance with the Consent Decree

will **increase operating expenses (mainly for ILI) by approximately $8.5 million per year in the U.S.,**[38] until such time as Line 3 is permanently deactivated, which is up to three times the current amount, depending on the date Line 3 is retired. Yet, the DEIS provides:

> Enbridge estimates the short-term cost of abandoning Line 3 in place to be approximately $85 million.[39] For context, Enbridge estimates annual monitoring costs for Line 3 to be about $100,000.[40] Costs for future site-specific mitigation measures (e.g., to mitigate subsidence or loss of buoyancy control) are uncertain and would depend on the nature of the mitigation measures.

Finally, the DEIS abandonment section provides: "Enbridge estimates the cost of removing Line 3 at approximately $1.28 billion. This estimate is based on a per-foot cost for removal at about $855."[41] Because the costs of abandonment and removal of the existing Line 3 go to the core of the present dispute between the parties; and because the administrative law judge and the Public Utilities Commission will need valid and reliable information on these critical issues, it is completely unacceptable to accept Enbridge's self-serving responses for inclusion in the DEIS.

Respectfully submitted,

/s./ Joseph Plumer

Dated: July 9, 2017

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[38] ILI (In-line Inspection), or smart-pigging is merely an inspection process, not a repair process. Enbridge intends to simply "monitor" the situation.

[39] Communication with Enbridge, March 10, 2017. There needs to be objectively verifiable information on this important point.

[40] Yet in their testimony included in the Kalamazoo consent decree, Enbridge states that in-line inspection will cost $8.5 million in the US. Again, the DEIS's estimate of the annual cost of in-line inspection for the abandoned Line 3 at $100,000 is entirely unsupported.

[41] Again, this critical, and hotly contested issue must be independently verified. Reliance on a phone call to Enbridge for this critical information is unacceptable.

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July 10, 2017

The Honorable Ann O'Reilly
Minnesota Office of Administrative Hearings
600 North Robert Street
P.O. Box 64620
St. Paul, MN 55164-0620

RE:

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border — OAH 65-2500-32764, MPUC PL-9/CN-14-916

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Routing Permit for the Line 3 Replacement Project in Minnesota From the North Dakota Border to the Wisconsin Border — OAH 65-2500-33377, MPUC PL-9/PPL-15-137

Dear Judge O'Reilly:

Enclosed please find the comments on the Draft EIS of the Fond du Lac Band. An Affidavit of Service and Proof of Service are also enclosed.

If you have any questions, please contact me at 218-878-7393.

Respectfully,

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State of Minnesota
Office of Administrative Hearings
For the Public Utilities Commission

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border	**OAH 65-2500-32764** **MPUC PL-9/CN-14-916**
In the Matter of the Application of Enbridge Energy, Limited Partnership for a Routing Permit for the Line 3 Replacement Project in Minnesota From the North Dakota Border to the Wisconsin Border	**OAH 65-2500-33377** **MPUC PL-9/PPL-15-137**

Fond du Lac Band of Lake Superior Chippewa Comments on Draft Environmental Impact Statement

To: The Fond du Lac Band of Lake Superior Chippewa respectfully submits these comments to Administrative Law Judge O'Reilly and to all parties.

Introduction: The Fond du Lac Band of Lake Superior Chippewa ("Band") is no stranger to pipeline development, hosting several existing crude oil pipelines, including the existing Line 3, on its reservation in Northeastern Minnesota. The pipelines currently running through the Band's reservation and ceded territories (1854, 1842, & 1837) have been known to lead to the introduction of damaging invasive species due to extensive surface work needed to keep the pipeline corridors free of large vegetation such as trees. The Band has experienced a fragmentation of its reservation and ceded territories by pipeline and other industrial development, such as transmission lines and large mining operations. The extent of any currently undetected leaks and spills will likely remain unknown unless and until currently existing pipelines are deactivated and removed.

The Band, having carefully reviewed the draft environmental impact statement and participated in hearings conducted by the Minnesota Department of Commerce, is not convinced of the need for this project. Projects completed in recent years by the applicant have dramatically expanded the capacity to transport oil, by pipeline, across the 1854 ceded territories and the Fond du Lac Reservation. Even if the existing Line 3 were taken completely offline and not "replaced" by this expansion proposal, there is more than enough oil coming into Minnesota markets from other pipelines. Further, the need calculation must take into account the ample evidence presented that oil from the Canadian tar sands region in Alberta is among the most environmentally harmful sources of oil known to the world. Tar sands oil is unique in its 2617-1

extremely high energy tab just to get the product from the ground through strip mining and application of steam and chemicals. The market needs oil for the present time, but there are better sources of oil than the tar sands. It should also be noted that the dramatic evolution of renewable energy and electric vehicle development in recent years stands to likely reduce overall demand for oil in the near future.

In the event that the Public Utilities Commission ultimately decides that there is a need the project to go forward, the Band maintains that any pipeline should avoid the Lake Superior Watershed. It is worth noting that this proposed project threatens the headwater regions of the two largest watersheds in North America, the St. Lawrence/Great Lakes and the Mississippi. While the religious, spiritual, and cultural significance of Lake Superior to the Band cannot be overstated, it should be obvious enough to the broader population that the largest freshwater lake in the world must be protected. Introducing a new potential source of heavy crude pollution into the Great Lakes Basin would be a mistake. For these reasons, if the Commission ultimately decides that there is a need for this pipeline, the Band respectfully requests that routes such as System Alternative 04 (SA-04), get further scrutiny. Ultimately, the final route should stay away from the Lake Superior basin. There is no need to further fragment the 1854 Ceded Territories of the Band and public forests of Northeastern Minnesota with a new pipeline corridor into the Lake Superior Watershed. Other routes are available.

The Bands comments on specific sections of the DEIS are as follows.

Executive Summary (page ES-19): The production of tar sands oil (aka Western Canadian Sedimentary Basin) emits three to four times more greenhouse gas emissions than ordinary oil, according to a 2008 report by the US Department of Energy. The Executive Summary states this under its discussion of Full Displacement on page ES-19 – "The process of extracting and upgrading heavy crudes requires much greater energy input (and GHG emissions) than extracting and upgrading light crudes…" however no conclusion is drawn from this statement. The Band's conclusion is that these heavy crudes located in extremely remote locations far from markets are perhaps not the best source of energy for the economy in light of the extreme hazards brought about by climate change.

Additionally, tar sands contain a variety of toxics, including benzene and styrene and releases of these toxics into the environment near Edmonton, Canada, have led to increased rates of leukemia and childhood lymphohematopoietic cancers [1].

Chapter 2 – Project Description

Project Description: There is no mention regarding the need to weigh down the pipe in wetland and stream/river areas. In previous pipeline construction projects conducted by Enbridge (i.e., Alberta Clipper and Southern Lights), the contractor conducting the project employed two 2617-2

[1] NRDC Issue Brief, February, 2014 IB:14-02-B. Tar Sands Crude Oil: Health Effects of a Dirty and Destructive Fuel

different methods to add weight to the pipe. One was the use of a concrete coating on the pipe, while the other was to employ the use of gravel-filled saddle bags which hung over the pipe. The practice of adding weight to the pipe in certain areas should have been included in the project description, including the methods to be employed. 2617-2 Cont'd

Section 2.3.2.3 – Cathodic Protections Systems – Cathodic Protection Would be Installed Within a Year After Construction (page 2-12): Each location of cathodic protection, also requires electrical power (usually a power point on-site) and an area for a maintenance vehicle to park. Neither of these two items is stated in the "aboveground features in the second paragraph in this section. Also, it is the Band's experience that these cathodic protection system features are often located in wetlands. However, since they are not installed during the construction phase of the project, the wetland impacts are not accounted for in the applicant's wetland permit application to the U.S. Army Corps of Engineers. Enbridge then submits an application at a later date to account for these additional wetland impacts. In short, the applicant is piecemealing their impacts. This goes against the notion that the project is a single and complete project. 2617-3 2617-4

Section 2.7.1.5 – Clearing and Grading – Shrubs, Trees, and Rocks Would Be Removed and Disposed of in Accordance with the Environmental Protection Plan (second paragraph; page 2-24): The DEIS states: "Non-merchantable wood could be burned if Enbridge obtains the appropriate permits and approvals from the Minnesota Department of Natural Resources (Minnesota DNR)." If it is possible that Enbridge would burn some of the woody material cut from the work areas, then the amount of CO2 resulting from this burning should be calculated in the Climate Change section of the EIS. 2617-5

Section 2.7.1.5 – Clearing and Grading – Erosion and Sediment Control Devices Would Be Installed after Clearing but Before Grading (first paragraph; page 2-25): The DEIS states: "…installing devices…sediment barriers to prevent sedimentation from leaving the construction area (such as silt fencing and straw bales)." It has been the Band's experience from a previous Enbridge pipeline construction projects (i.e., Alberta Clipper and Southern Lights) that Enbridge "environmental crews" would always install silt fence in straight lines to save time. In many cases this did NOT prevent sediment from leaving the site because for silt fence to work properly it MUST pond water in order for the sediment to drop out of the ponded water. This type of work practice is a concern. 2617-6

Section 2.7.1.6 – Topsoil Stripping (first paragraph; page 2-25): It is stated "Enbridge proposes that topsoil would be stripped and segregated to maintain the integrity of the existing seed bed in cropland, hayfields, pastures, government set-aside program areas, and other areas as requested by the landowners…" The fact that forested and shrub areas are not mentioned is concerning. The Band has found that the segregation of topsoil from forested and shrub areas is also essential in order for the germination and survival of seed once the topsoil has been restored. This is due to the organic-rich humus layer, which contain essential microbes, fungi, and nematodes in the 2617-7

topsoil that many plants are dependent upon for survival. The Band proposes that the Applicant be required to maintain the integrity of the existing seed bed in forested and shrub areas as well. 2617-7 Cont'd

Section 2.7.1.6 – Topsoil Stripping (third paragraph; page 2-25): It is stated "If seasonal or other conditions prevent replacement within 14 days, temporary ECDs would be installed and maintained until conditions allow the replacement." It is the Band's experience that this BMP did NOT happen during the Alberta Clipper/Southern Lights project, where all stockpiled soils (topsoil and subsoil) were unprotected from erosion (in some cases for many months) causing some soil to wash into areas outside of the work zones during storm events. This type of work practice is a concern. 2617-8

Section 2.7.1.11 – Lowering-In and Backfilling – Lowering-In and Backfilling Would Be Conducted so as to Minimize Effects on Sensitive Resources (first paragraph; page 2-27): It is stated "To best protect sensitive resource areas such as wetlands or waterbodies, trench breakers would be installed…" During Enbridge's Alberta Clipper and Southern Lights projects, Enbridge employed two methods of trench breakers – sandbags and sprayed on foam. However, the Minnesota Pollution Control Agency did not certify the use of sprayed on foam in their Clean Water Act Section 401 Water Quality Certification due to the concern that by-products from this foam material could leach into adjacent waters since many slope areas where the trench breakers were utilized sloped down to wetlands or waterbodies. 2617-9

Section 2.7.1.11 - Lowering-In and Backfilling – Lowering-In and Backfilling Would Be Conducted so as to Minimize Effects on Sensitive Resources (third paragraph; page 2-28): It is stated "The backfilled trench would be compacted to minimize settlement." This is a concern since compacted soil generally does not contain adequate air space for the growing plants to thrive since it is often difficult for plant roots to penetrate compacted soil. This often leads to the eventual death of the plant, or in some cases, the plant survives only by growing roots very near the surface. In that case (root growth only near the surface), this leads to a much greater potential for soil erosion. Although in a subsequent section (Section 2.7.1.14 Cleanup, Restoration, and Revegetation) it is stated that the work area would be regarded, it appears that only compacted soils in cultivated areas would be Enbridge's concern. 2617-10

Section 2.7.2.6.3 – Cleanup and Revegetation – If Winter Weather Impedes Cleanup, Enbridge Could Install Erosion Control Devices (page 2-32): In the Band's experience from Enbridge's Alberta Clipper and Southern Lights projects, the replacement of frozen backfill material is problematic. Since the material is frozen in large chunks, it allows too much air space between the chunks. When this material thaws in the spring, it causes subsidence, which then becomes a ditch, allowing water flow in the wetland to be altered. In addition, the installation of winter "dormant seeding" and mulch is ineffective, since it tends to become a deer and bird feeding program. 2617-11

Section 2.7.2.7 – Waterbody Crossings – Proposed Crossing of 242 Waterbodies Would Require Regulatory Approvals (page 2-32): It states "The types of methods that could be used include wet trench, dam and pump, flume, and HDD or guided bore." It is the Band's experience that Enbridge has a history of changing their waterbody crossing method without notifying the appropriate regulatory agency. In the Band's case, Enbridge's wetland permit application to the Band (under the provisions of the Fond du Lac Wetlands Protection and Management Ordinance) for their Alberta Clipper and Southern Lights projects specifically stated that all waterbody crossings would utilize the wet trench (open cut) method. However, after receiving their permit from the Band, Enbridge typically employed the HDD method for Southern Lights (a 20 inch pipeline) and either wet trench (open cut) or dam and pump methods for Alberta Clipper (a 36 inch pipeline). However, the Band did not receive notification of any of these changes in construction method. The only way the Band learned that these changes had been made was by visual discovery by an inspector employed by the Band. 2617-12

Section 2.7.2.7.1 – Clearing and Grading (first paragraph; page 2-33): It is stated "In addition, grading could be necessary on the banks of some waterbodies to install temporary bridges across the waterbodies." In the Band's experience, this practice needs to be avoided. The footings for the bridge should be placed 5-10 feet away from the bank of the waterbody, otherwise grading and placement of bridge footings on the bank can cause subsidence and/or compaction of the waterbody bank. This compaction and/or subsidence often lead to water scouring of the waterbody bank, eroding the bank and sending sediment downstream. 2617-13

Section 2.7.2.7.1 – Clearing and Grading (third paragraph; page 2-33): It is stated "Enbridge may be required to trap beavers or alter or remove beaver dams to lower water elevations within the Project corridor prior to construction." And "To alter a beaver dam, a perforated steel culvert, or equivalent device, would be inserted through the dam to facilitate water drainage." Control of beavers by these methods is often (if not always) a slippery slope. In the Band's experience, removal of beavers simply "just rearranges the neighborhood." In addition, the use of a "perforated steel culvert, or equivalent device" (often call "pond levelers" or "beaver bafflers") are commonly ineffective. When they are effective, the ecology of the surrounding stream and adjacent wetlands is altered, leading to indirect wetland impacts that are not accounted for in permit applications. 2617-14

Section 2.7.2.7.3 – Trenching and Installation (fourth bullet point – HDD; page 2-34): It should be discussed in this part that "physical disturbance" of the wetland or waterbody feature is possible if there is a "frac-out" of the drilling mud into the wetland or waterbody. It cannot be stated definitively that this method does not cause a physical disturbance. 2617-15

Section 2.7.2.7.3 – Trenching and Installation (last bullet point – Guided bore; page 2-34): It is stated "It is not suitable…where water tables are near the surface…" This may not be true. During construction of the Alberta Clipper project, Enbridge used a guided bore to cross under Minnesota Highway 210 and the BNSF Railroad on the Fond du Lac Reservation. There were 2617-16

wetlands on both sides with a high water table. Enbridge installed numerous temporary wells in the wetlands to pump the water and lower the water table during the guided bore operation. 2617-16 Cont'd

Section 2.7.2.7.4 – Restoration and Revegetation – Enbridge Would Restore and Revegetate Water Crossings and Would Stabilize Streambanks (first paragraph; page 2-35): The DEIS states: "Such restoration and revegetation are generally not necessary when using the HDD method, which does not generally disturb surface features." This statement as written is incorrect. HDD generally does not disturb the water crossing surface features. However, the surface is disturbed at both the entrance point and exit point of the HDD. During the Southern Lights project, Enbridge used an excavator to dig a hole to the desired depth of the pipeline at both the entrance point for the HDD and the exit point. These excavations often remained open for a week or more until the "tie-in crew" could weld the HDD installed pipeline to the remaining pipeline installed using more conventional methods. 2617-17

Section 2.7.2.7.4 – Restoration and Revegetation – Enbridge Would Restore and Revegetate Water Crossings and Would Stabilize Streambanks (third paragraph; page 2-35): It is stated "Enbridge would stabilize a 50-foot buffer on either side of the waterbody crossings using a temporary seed mix (consisting of vegetation such as annual rye or annual oats…" The use of annual rye should be avoided due to the allelopathic nature of annual rye (its roots release a chemical that inhibits the germination and/or growth of other plants). The Band suggests that a more appropriate mix of native plants be used for the purpose of stabilization of stream banks. 2617-18

Chapter 4 – Alternatives to the Proposed Project
Section 4.2.3 – Certificate of Need Alternative 1 – Continued Use of Existing Line 3 – Maintaining the Existing Line 3 Would Require 4,000 Excavations over the Next 15 Years (first paragraph; page 4-6): It states "Enbridge has estimated that up to 4,000 integrity digs…would be required over the next 15 years of operation." Since August 2006, it has been the Band's experience that Line 3 has required the least number of maintenance digs within the external boundaries of the Fond du Lac Reservation. This is based on Exemption Certificates granted to Enbridge under the provisions of the Fond du Lac Wetlands Protection and Management Ordinance (Ordinance #03-06). The following table illustrates the number of digs for each of the pipelines operated by Enbridge through the Reservation:

Enbridge Pipeline	Number of Maintenance Digs	Span of Time
Line 1	15	2006 - present
Line 2B	10	2006 - present
Line 3	3	2006 - present
Line 4	9	2006 - present
Line 13	2	2010 - present
Line 67	3	2010 - present

It can be seen by this table that Line 3 has needed the least number of maintenance digs than the other pipelines in the ground from 2006 until the present. Only Line 13, completed in 2010, has had fewer maintenance digs. The number of maintenance digs here are only along a 14-mile span of the Reservation from the Enbridge Mainline ROW. If the maintenance numbers were projected out over the entire length of the other aging pipelines (Lines 1, 2B and 4), it would suggest Enbridge has not maintained Line 3 to the same caliber as their other pipelines.

2617-19

Table 4.3-5 – Purpose and Location of Route Segment Alternatives (RSA-37; page 4-37): Under the Location information for this table and RSA-37, it should be stated that this route segment alternative passes through the Fond du Lac Reservation, including headwaters to several Wild Rice lakes.

2617-20

Chapter 6 – Existing Conditions, Impacts, and Mitigation – Route Permit
Table 6.2.1-9 – Land Use Zoning Categories Crossed by Route Alternative RA-08 (miles) (page 6-20): Route Alternative RA-08 passes through the Fond du Lac Reservation which has its own Land Use Ordinance (Ordinance #02-07). This fact should be acknowledged in this table and the appropriate miles of each category should be included.

2617-21

Section 6.2.1.4.2 – Mitigation (first paragraph; page 6-50): As stated in Comment #5 above, segregation of topsoil and subsoil in forested areas can help the re-establishment of trees. This aspect should be included here as an additional mitigation measure in forested areas impacted by the pipeline (temporary work areas, not the permanent right-of-way).

2617-22

Section 6.3.1 – Water Resources (second sentence; page 6-151): It is stated "The analysis focuses on…public waters wetlands; …" It should be noted that there are many more wetlands in Minnesota than ones designated as public waters wetlands. The analysis of only public waters wetlands artificially reduces the number of wetlands in the analysis. Many of these "discounted wetlands" perform the same functions as public waters wetlands and are equally important on the landscape, and therefore, should also be included in the analysis.

2617-23

Section 6.3.1.2.1 – Regulatory Context and Methodology – Regulatory Context (beginning on page 6-185): This section discusses in depth Minnesota's water quality regulations, but does not discuss, nor acknowledge The Band's Water Quality Standards, which include use designations. The Band's Water Quality Standards are applicable for both RA-07 and RA-08.

2617-24

Section 6.3.1.2.3 – Regional Analysis of the Quality of Existing Surface Water Conditions – Tullibee Lakes (pages 6-216 and 6.217) **and Wild Rice Lakes** (page 6-216): It is interesting to note that stressors to the loss of Tullibee lake, as well as conservation efforts is discussed, when in the Wild Rice Lakes section, neither the stressors to the loss of wild rice, nor any conservation efforts are discussed. Both species are utilized as food sources by Band members, a discussion of the stressors and conservation efforts for Manoomin, (Wild Rice) would be appropriate here.

Section 6.3.1.2.4 – Impact Assessment - Degradation of Surface Water Quallity (third paragraph; page 6-224): Along with other potential spills, this section discusses the storage of HDD installation drilling mud and its proper disposal to prevent spills of this material. However, this paragraph neither discusses, nor acknowledges the potential for drilling mud to rapidly enter surface water during an inadvertent release or "frac-out" situation. Trout streams are particularly vulnerable to this type of spill. At a minimum, this paragraph of the Impact Assessment should indicate that drilling mud releases are discussed below in another portion of this section. 2617-25

Also in this paragraph, it should be mentioned that any spill of five gallons or greater must be reported to the State Duty Officer immediately and that a report containing a description of the incident, cause of the spill, and measures taken to prevent such spills in the future, must be submitted to the proper agency (MPCA) within 30 days of the incident.

2617-26

Section 6.3.1.2.4 – Impact Assessment – Degradation of Water Quality and Habitat from Drilling Mud Releases during HDD Crossings (pages 6-226 thru 6-227): This section fails to mention that during HDD installations the larger diameter of the pipeline, the larger the risk for an inadvertent release of drilling mud. This is because multiple pilot holes in progressively large diameters are necessary to reach the 36-inch diameter required for this project. Each drilling of a pilot hole poses a risk and therefore, multiple pilot holes in increasing diameter, increases this risk. It is the Band's experience that out of five HDD installation of Southern Lights (a 20-inch pipeline now designated as Line 13), one inadvertent release occurred on the Reservation (a trout stream and adjacent wetlands) requiring approximately 50 workers, the set up of an emergency dam and pump operation, four vacuum trucks, and over eight hours of time for clean-up operations. Additional time was required for restoration work at the site. As mentioned above, it is interesting to note that Enbridge chose to conduct HDD installation on the Fond du Lac Reservation of the 20-inch pipeline (Southern Lights – Line 13), while conducting only open cut installations at each of the same crossings for the 36-inch pipeline (Alberta Clipper – Line 67). Therefore, it can be concluded that the selection of crossing method (HDD vs Open cut) is not for protection of ecological resources, but rather cost (the larger the pipe, the more HDD costs).

The Band's experience shows the occurrence of a major frac-out of 20% with a 20-inch pipeline. The Slade (2000) reference discussed in the document shows an 18% chance of a major incident, with only a 16-inch pipeline. Drilling mud release incidents are likely to be much higher with HDD installation of a 36-inch pipeline as proposed by the applicant.

2617-27

Section 6.3.1.2.4 – Impact Assessment – Disturbance of Wild Rice Waterbodies (second paragraph; page 6-229): It is stated "Although the Applicant would restore the hydrology and soils of the affected wild rice waterbodies after construction, rice yield would be reduced in the portion of the waterbody directly affected by the repair or replacement activities for the first growing season after construction." Because of the sensitivity of wild rice to substrate disturbance, altered pH of the water, and chemicals, and other disturbances, it is unlikely that wild rice would return after only one growing season, if it returns at all.

Section 6.3.7.1.1—Regulatory Context and Methodology (page 6-590) The DEIS states that the Band is currently seeking re-designation of the Reservation from Class II to Class I. While the Band has released a draft Technical Report and held a public comment period, we have not submitted an official application to the EPA for this action. 2617-28

Section 6.3.7.3.1 –Impact Assessment (page 6-594)The DEIS states that the Applicant would minimize dust generation from construction activities by wetting soils and limiting working hours in residential areas. Please address how Enbridge will ensure that sub-contractors will carry out these requirements. Will soils be wetted with water only or will other chemicals be used? What will be the decision point for wetting to take place? Please note that dust is not the only concern when talking about construction activities - diesel emissions are also released. While Table 6.3.7-4 includes diesel emissions, the text above does not mention them. The DEIS should also acknowledge that dust and diesel emissions are a concern not only during the major construction phase, but also whenever restoration and routine maintenance activities take place. These emissions should also be quantified. 2617-29 2617-30 2617-31

Table 6.3.7-4 Estimated Construction Emissions for the Applicant's Preferred Route in Minnesota (page 6-595) estimates construction emissions for the preferred route. The Hazardous Air Pollutant (HAP) numbers seem too low and don't address diesel particulate. This section should provide more details on how these emissions were calculated. 2617-32

From **Table 6.3.7-5**, it is not clear whether the estimated emissions from operations include emissions from vehicle idling related to restoration and routine maintenance activities. It is doubtful that they do, because the emissions from "vehicle combustion" are very low. It has been the Band's experience that restoration and routine maintenance operations involve numerous heavy duty vehicles idling for extended periods of time. The following statement seems suspect – "Furthermore, operations emissions would consist primarily of VOCs, which are a precursor to the criteria pollutant ozone. VOC emissions cannot practically be modeled to show a source's ozone formation given the regional transport nature of the pollutant". Emissions from the idling of heavy duty diesel vehicles would include relatively high emissions of NOx and diesel toxics, including toxic particulates. 2617-33

Table 6.3.7-7 Estimated Operations Emissions for Route Alternative RA-03 in Minnesota (page 6-601) This table does not include emissions from vehicle combustion and unpaved roads, but the text does not explain why not. The same holds true for Tables 6.3.7-9, 6.3.7-11, and 6.3.7-13. Presumably these types of emissions would be unavoidable regardless of the route chosen and should be included. 2617-34

Section 6.3.7.4.2 Mitigation (6-612) This section discusses mitigation options. Additional options would be to use newer diesel vehicles or to retrofit older ones. These options are not mentioned and should be included. 2617-35

Chapter 7 – Route Segment Alternatives

2617-36

Section 7.3.6 – Route Segment Alternative RSA-21 (beginning on page 7-21): Although this route segment alternative attempts to avoid impacts to Sandy Lake and wild rice waters directly downstream, it does impact other wild rice waters and streams. This alternative essentially illustrates that this important resource area should be avoided entirely. The remaining wild rice strongholds should be spared further industrial developments such as major pipeline projects.

2617-37

Section 7.3.7 – Route Segment Alternative RSA-22 (beginning on page 7-25): Again, while this route segment alternative attempts to avoid impacts to Big Sandy Lake watershed, as well as several WMAs, it passes through the Fond du Lac Reservation, which is not an acceptable alternative.

2617-38

Section 7.3.15 – Route Segment Alternative RSA-37 (beginning on page 7-48): It should also be noted that this route segment alternative passes through the southern portion of the Fond du Lac Reservation, intersecting at least one stream that leads to several wild rice waters. This is another reason this route segment alternative should be rejected. It also crosses into the watershed of the Moose Horn River, which eventually flows into the Kettle River and then the St. Croix River, where it is a boundary between Minnesota and Wisconsin. The St. Croix is protected by the US Park Service as a National Scenic Riverway, but some of its tributaries such as the Moose Horn and Kettle, are not. Any route segment alternatives, such as RSA-37 and the Applicant's preferred route, that introduce threats into the St. Croix watershed in the 1854 and 1837 ceded territories should be rejected.

2617-39

Section 7.3.24 – Route Segment Alternative RSA-53 (beginning on page 7-70): While the text in the first paragraph describes this alternative to connect between RA-07 and RSA-21, Figure 7.3-24 depicts the connection from RA-07 to RSA-22, which therefore, does not avoid the Fond du Lac Reservation. Please clarify which connection (RSA-21 or RSA-22) is being proposed.

2617-40

Chapter 8 – Existing Line 3 Abandonment and Removal

Section 8.3 – Abandonment – Disconnecting the Pipeline (page 8-3): This bullet point states "The pipeline's mainline valves would be closed and electrically disconnected so that they could not be operated." However, Line 3 contains some valves that are manually operated. Discussion should acknowledge this fact and Enbridge should explain the fate of these valves as well.

2617-41

Section 8.3.1.3 – Subsidence – Long-Term Effects Could Be Significant and Would Require Site-Specific Mitigation Measures (page 8-9): The discussion here, as well as other portions of this section, gloss over the steps Enbridge will take in the event of subsidence incidents by simply stating (numerous times) "monitoring, adaptive management, and mitigation measures."

Granted, each subsidence event may be unique in where it occurs and the resource effected, but some examples of potential mitigation efforts should be discussed. 2617-41 Cont'd

2617-42

Section 8.3.1.5 – Cost (page 8-10): It is stated "Costs for future site-specific mitigation measures…are uncertain and would depend on the nature of the mitigation measures." Since Enbridge is unable to calculate the cost of these "mitigation measures" they should be required to provide adequate financial assurance to cover these costs in the event the company becomes insolvent. Northeastern Minnesota has already had enough experiences with decaying infrastructure from companies that no longer exist.

2617-43

Section 8.4.1 – Potential Impacts and Mitigation Measures – Cost (page 8-13): Only the cost of removal is factored here. Used steel has value when recycled, therefore, the recycling of Line 3 steel should be factored into the actual cost of removal.

2617-44

Chapter 9 – Tribal Resources

Section 9.4.4.1 – Tribal Lands – Fond du Lac Reservation (page 9-18): The number of rivers or streams indicated may be inaccurate. During the permitting process with Enbridge's Alberta Clipper/Southern Lights projects, Enbridge identified seven stream crossings and no water bodies. During a field inspection by the Band, only 5 stream crossings were identified. The other two had no flow at any time before and during the project (one has its source dammed up by Enbridge's Line 4 being at ground level; the other was eliminated by road construction and inadequate culverts). The "waterbody" is most likely a flooded wetland complex as a result of Line 4 damming surface and subsurface flow.

2617-45

Section 9.4.4.1.1 – Natural Resources and Traditional Uses (page 9-19): In this section, Sweet Grass - Wiingash and Cedar – Giizhig(aandag) are mentioned specifically as plants having cultural significance. However, many more plants are also very significant. The text should reflect that the two plants included in this section are for illustrative purposes and acknowledge there are many more that could be included.

2617-46

Section 9.6.1 – Climate Change (beginning on page 9-27): While this section discusses potential climate change impacts in a general sense, it should be noted here that the loss of a resource cannot be replaced. In other words, while many people affected by climate change can move to other areas to obtain the resources they need, the Ojibwe people cannot relocate since they are tied to their respective reservations and ceded territories.

2617-47

Chapter 10 – Accidental Crude Oil Releases

Section 10.2.5 (page 10-22) addresses spill probabilities. The section gives no information on the cost and after-effects of recent spills. Probabilities alone cannot convey the risk associated with pipeline operation. Also, Section 10.2.5.3 states "the frequency of a failure occurring along

the Applicant's preferred route could be interpreted as once every 5.7 to 7.2 years. Again, no information on the predicted impacts (both economic and environmental) is given. For example, the Kalamazoo spill that occurred in 2010 resulted in a $177 million dollar settlement between Enbridge, the DOJ, and the EPA. This spill also resulted in the closure of a large section of the Kalamazoo River for almost two years and the displacement of 150 families[2]. Also, from Section 10.3.1.1.2, "little research has been conducted on the toxicity of dilbit to organisms". Section 10.3.1.1.2 also states "Heavy crude oils may lose up to 10 percent of their initial volume following a spill due to evaporation in the first few days". With the predicted probability of some kind of spill occurring at a frequency of every 5.7 to 7.2 years, the DEIS must estimate the evaporative losses of VOCs and toxics to the air during any such occurrence, using best guesses as to the release amount. It is unacceptable to simply state that the toxicity of dilbit to organisms is unknown, further research needs to be done. 2617-47 Cont'd

2617-48

Chapter 11 – Environmental Justice

Section 11.4.1 mentions air emissions (dust and diesel combustion) due to construction, but again fails to mention restoration or routine maintenance activities. Band staff members have observed nearly constant idling of heavy equipment during these types of activities, therefore these emissions may not be "minor", as this section states. Section 11.4.2 states that "operations impacts related to noise or air quality impacts from pump stations are not expected to disproportionately affect minority groups or low-income populations". This statement fails to grasp the reality of the situation, which is that idling releases large quantities of emissions all along the pipeline corridor and that many Native people suffer from asthma or COPD – both of which can be exacerbated by air pollution.

2617-49

Climate change is a problem and this project will increase GHG emissions. Climate change is expected to impact Native people harder than the general population because of the higher rates of asthma and because a higher percentage of Native people live in housing that may have mold in it.

2617-50

On page 11-7, the EIS discusses impacts on air quality from pipeline construction and states that "Enbridge has identified various measures to limit these impacts, such as dust suppression, limiting idling by construction vehicles, and covering spoil piles". Please explain these measures in further detail, including how Enbridge intends to ensure that they will be implemented by sub-contractors. Also please explain whether these measures are currently taking place on Enbridge activities, including during restoration and routine maintenance work on the Fond du Lac Reservation and if not, why not. How does Enbridge define "limiting idling"? What sort of recordkeeping will be used for tracking this obligation? Are there plans for requiring the use of

[2] Inside Climate News, David Hasemyer, July 20, 2016 – Enbridge's Kalamazoo Spill Saga Ends in $177 Million Settlement

2617-50 Cont'd

clean diesel or late model equipment or for retrofitting current equipment with pollution controls?

2617-51

Accidental release of crude near the Reservation could result in air impacts. The CDC's website (www.cdc.gov/niosh/topics/montanaoilspill/response/default.html) lists symptoms of excessive exposure that are air related. These include:

- Eye, nose, and throat irritation
- Headache
- Dizziness
- Upset stomach
- Cough or shortness of breath

Additionally, respirators are listed on the CDC website as important Personal Protective Equipment for first responders to oil spills, indicating that there is an inhalation risk, if not from the crude itself then potentially from any diluent used. In addition to fumes from the product, if fires are present then protection from smoke is needed. Any people living or recreating near the pipeline could potentially be exposed to hazardous pollutants during a spill event.

2617-52

As in previous sections of the DEIS, the Air Emissions section (12.3.1.3.2) doesn't address continued emissions from restoration or routine pipeline maintenance activities, namely from idling of heavy vehicles during these activities. Likewise, air emissions from Integrity Digs (Section 12.3.2.2.1) are not quantified. It is impossible to say whether these emissions are significant if they have not been quantified.

Chapter 12 – Cumulative Potential Effects

2617-53

Section 12.3.1.3.2 – make sure to state that anticipated emissions are "per year". "Volatile Organic Compound Emissions Would Have Negligable Cumulative Potential Effect Compared to Actual Statewide Emissions" – Clean Air Act requirements depend on total predicted emissions over a period of time, not on how these numbers compare to statewide emissions.

2617-54

Section 12.3.5.3 discusses a new truck facility. Are there plans to limit idling by trucks, perhaps by eliminating bottlenecks? Are there plans to require trucks to use clean diesel or late model trucks which emit less pollution? Likewise, in Section 12.3.7, would low sulfur diesel fuel and clean vehicles be used?

2617-55

Section 12.5 discusses cumulative potential effects on climate change. While it is true that climate change is not attributable to any one action, but to many individual actions, an analysis of this project still shows that large emissions of greenhouse gases are expected.

2617-56

Section 12.5.1 briefly mentions that air quality will be impacted by a warmer, wetter climate but doesn't give a full description of the expected impacts. Ozone levels are expected to rise under a

2617-56 Cont'd

warmer climate, as the atmospheric reactions that lead to the creation of ozone take place at a greater rate at higher temperatures. Forest fires are expected to increase in the Western US and Canada, as those parts of North America are expected to experience much dryer conditions. Smoke from these fires can cause poor air quality in Minnesota. Additionally, heat stress can adversely impact those who are most vulnerable to air pollution – the elderly, children, and those who are already experiencing asthma or COPD. These health conditions are also expected to be exacerbated by allergens caused by longer growing seasons and possibly from increased populations of invasive species. Although this is alluded to, please specify that increased humidity will lead to increased mold levels in homes, which can aggravate asthma or cause allergic reactions.

2617-57

Section 12.3.2.2.1 states that integrity digs would have only minor, temporary effects on air quality. As stated above, it has been the practice of Enbridge and its contractors (as observed by Fond du Lac Environmental staff) to allow day-long idling of construction vehicles in cold weather, regardless of whether the vehicles are actually in use. This practice can release several tons of emissions per day. No quantitative analysis of these types of emissions has been performed in this chapter.

2617-58

Section 12.5 addresses cumulative greenhouse gas emissions. Again, emissions from idling are a concern. This is an area where large reductions could be made by implementing a no-idling, or reduced idling, policy.

This concludes the comments of the Band on the Draft Environmental Impact Statement.

FOND DU LAC BAND OF LAKE SUPERIOR CHIPPEWA

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AFFIDAVIT OF SERVICE

Re: In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Replacement – Phase 3 Project in Minnesota from the North Dakota Border to the Wisconsin Border
MPUC Docket No. PL-9/CN-14-916; OAH Docket No. 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Pipeline Route Permit for the Line 3 Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border
MPUC Docket No. PL-9/PPL-15-137; OAH Docket No. 65-2500-3337

STATE OF MINNESOTA)
) ss.
COUNTY OF CARLTON)

I, Seth Bichler, hereby state that on July 10, 2017, I filed by electronic eDockets the attached comments on the Draft EIS of the Fond du Lac Band and eServed on July 10, 2017, and sent by US Mail on July 11, 2017, as noted, to all parties on the attached service list.

See attached service list.

SETH BICHLER

Subscribed and sworn to before me on
this July 10, 2017.

Notary Public – Minnesota
My Commission Expires January 31, 2020.

LAURIE A OLSON
Notary Public
Minnesota
My Comm. Expires
Jan 31, 2020

Print Close

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Gratz	Emerald	emerald.gratz@state.mn.us	Office of Administrative Hearings	Electronic Service	Yes
Hingsberger	Thomas	thomas.j.hingsberger@usace.army.mil	Corps of Engineers, St. Paul District	Electronic Service	No
Howe	Kari	kari.howe@state.mn.us	DEED	Electronic Service	Yes
Javaherian	Arshia	arshia.javaherian@enbridge.com	Enbridge Energy	Electronic Service	No
Jensen	Linda	linda.s.jensen@ag.state.mn.us	Office of the Attorney General-DOC	Electronic Service	Yes
Kirsch	Ray	Raymond.Kirsch@state.mn.us	Department of Commerce	Electronic Service	Yes
Kitze Collins	Rachel	rakitzecollins@locklaw.com	Lockridge Grindeal Nauen PLLP	Electronic Service	No
Mahlberg	Patrick	pmahlberg@fredlaw.com	Fredrikson & Byron, P.A.	Electronic Service	No
Meloy	Brian	brian.meloy@stinson.com	Stinson,Leonard, Street LLP	Electronic Service	No
Moynihan	Debra	debra.moynihan@state.mn.us	MN Department of Transportation	Electronic Service	Yes
Munter	John	mumocatthefarm@yahoo.com	N/A	Electronic Service	No
Nauen	Charles	cnnauen@locklaw.com	Lockridge Grindal Nauen	Electronic Service	No
O'Reilly	Ann	ann.oreilly@state.mn.us	Office of Administrative Hearings	Electronic Service	Yes
Patton	Bob	bob.patton@state.mn.us	MN Department of Agriculture	Electronic Service	Yes
Plumer	Joseph	joep@whiteearth.com	White Earth Band of Ojibwe	Electronic Service	No
Pranis	Kevin	kpranis@liunagroc.com	Laborers' District Council of MN and ND	Electronic Service	No
Schrull	Claudia	CLAUDIA.SCHRULL@ENBRIDGE.COM	Enbridge Pipelines (North Dakota) LLC	Electronic Service	No
Shaddix Elling	Janet	jshaddix@janetshaddix.com	Shaddix And Associates	Electronic Service	Yes
Shore	Eileen	eileenshore@outlook.com	Friends of the Headwaters	Electronic Service	No
Sierks	Bill	bill.sierks@state.mn.us	State of MN - MPCA	Electronic Service	Yes
Smith	Mollie	msmith@fredlaw.com	Fredrikson Byron PA	Electronic Service	No
Smith	Richard	grizrs615@gmail.com	Friends of the Headwaters	Electronic Service	No
Starns	Byron E.	byron.starns@stinson.com	Stinson Leonard Street LLP	Electronic Service	No
Sterle	Sandy	ssterle777@gmail.com	N/A	Electronic Service	No
Watts	James	james.watts@enbridge.com	Enbridge Pipelines (North Dakota) LLC	Electronic Service	No
Winton	Cam	cwinton@mnchamber.com	Minnesota Chamber of Commerce	Electronic Service	No
Wolf	Daniel P	dan.wolf@state.mn.us	Public Utilities Commission	Electronic Service	Yes
Wolfgram	Jonathan	Jonathan.Wolfgram@state.mn.us	Office of Pipeline Safety	Electronic Service	Yes
Zoll	David	djzoll@locklaw.com	Lockridge Grindal Nauen PLLP	Electronic Service	No

Paper Service Member(s)

Last Name	First Name	Company Name	Address	Delivery Method	View Trade Secret
Miller	Jessica	White Earth Band of Ojibwe	P.O. Box 238, White Earth, MN-56591	Paper Service	No
Peterson	Alice	N/A	24153 300th St NW, Argyle, MN-56713	Paper Service	No
Von Korff	Gerald	Rinke Noonan	PO Box 1497, St. Cloud, MN-56302	Paper Service	No

Print Close

MR. LEVI BROWN: Levi Brown, L-E-V-I, B-R-O-W-N.

I wasn't going to speak tonight, but I think that we have to tell a different story than what I see walking around here.

So my comments tonight are mostly aimed at the individuals who will be sharing these as you go through the next month, different agency folks that will be representing what you see here.

And what I'd like to start off with is self determination. Tribes, you know, have been telling states that forever, and also working along federal agencies and other partners that maybe are out there, but in this case I see not really a partnership. I don't know what I see. And what I'm talking about is self determination.

Leech Lake did a Certificate of Need. We already did ours. And they said we didn't need it. I don't know if some of you have noticed our solar garden is in the back of the casino here, just finishing up a few

panels to go on there. That's our direction. That's our right to self determine where we'd like to be and what we see for our future.

As state officials, I hope you recognize that you sit on trust land, treaty land. This is ours forever. As long as the grass grows and water runs, it's here. It's ours. And I don't see that represented here.

I see this as a discussion being made by somebody who has no skin in the game.

And what I mean by that is you look at the route alternatives, with two routes going through Leech Lake, and the tribal government was up front, very clear, "Don't come through. You're not coming through here."

Yet -- told the State, "Don't do it. Don't put it on there." You still see it today, R7 -- RA-7, RA-8. How much more clear do we have to be? "You're not coming through."

And I don't know if that is just a misrepresentation or not knowing what our goals are here at Leech Lake, but our goals are probably in common and in line with most

of your citizens in the state of Minnesota.

We believe the Land of 10,000 Lakes, the clean water, that's how we're making our decisions. 0812-1

When I look at the environmental justice component of this document, I find it hard to believe that it's not mentioned on any of these billboards here.

You have two alternatives out of the four right on Leech Lake; not one mention that Leech Lake Tribal Council passed a resolution saying, "There will be no pipelines, new pipelines, running across Leech Lake."

Where's that up there? Why is it did not being told? Why is there not a self determination section saying that the tribe in Leech Lake is saying, "No"? I want to see that up there.

And so when we think of, well, what does that mean? That's true government-to-government conversations. A tribal government is telling the state agency and the state government in those states that are analyzing these routes, "It's not an

option. Respect that part," but yet there are two still.

What kind of relationship is that? One where you're just not recognizing that right here, there's no taxes. There's no state, you know. There's a tribal police officer back there. Those are ours, paid by us. What does that say? Who's the majority within the boundaries?

As you move on and you look at the tribal resource map, I was talking to an elder that was here looking at that. What does that dot represent? A dot on one of the fourth largest lakes in Minnesota, where we literally have 15 wild rice beds, 10,000 acres of wild rice are on that watershed. One dot doesn't represent that. 0812-2

And you look at social economic impacts that are back here; is it told? I don't see, really, wild rice on there. Leech Lake is the wild rice capital.

No offense to some of my cousins from other -- but we are. That's where it is.

How can I say that, because the numbers don't lie. And I have said that to

the State. We average 280,000 pounds a year, green rice. Times it up by fish, you're talking millions of dollars. Millions of dollars that go into tribal members' pockets, tax free, because guess what? Those boundaries, they don't get to tax within there.

Self determination, the tribe is telling you something. Listen, or there will be conflict, and I don't understand why people don't see that the tribe is being very respectful right now.

But as state agencies tell that story -- and I don't see it on these boards -- and I do appreciate some of the staff's willingness to update these boards as the process goes on, as we get comment.

But to go on to the tribal resources. Leech Lake has exclusive authority over wild rice. That's not a resource. That's a right to determine how that resource is impacted or how it will be impacted. That's not even up there. Tell the story for what it is, not for what you want it to be.

And the accidental true

releases, I don't see anything about how harsh it would be if those watersheds, the leach watershed, the upper Mississippi watershed, if that 49 miles where that Line 3 crosses, or the proposed Line 3, Route 7 -- and that watershed is like a heartbeat across that line -- if it were to release anywhere in there, that affects the Mississippi channel of Leach River. All those rice beds, those millions of dollars, that should be what's analyzed in there.

And there's just a lot of things that I don't like in the messaging, and I wasn't going to take a whole lot of time tonight, because we do get the big microphone working for the tribal government, but at the same time, I think, as agency folks, tonight if you get together as a team, really take a hard look at what story you're telling, because it ain't lining up when you come here.

Levi, Andrew (COMM)

From: LeviB@lldrm.org
Sent: Monday, July 10, 2017 11:41 PM
To: MN_COMM_Pipeline Comments
Cc: MacAlister, Jamie (COMM)
Subject: Line 3 Comments
Attachments: Line 3 COmments LLDRM.pdf

LEECH LAKE BAND OF OJIBWE
DIVISION OF RESOURCE MANAGEMENT
115 6th ST. NW Suite E, Cass Lake, MN 56633

July 10th, 2017

Jamie MacAlister, Director
Minnesota Department of Commerce
85 7th Place East Suite 500
St Paul, MN 55101

Re: DRAFT ENVIRONMENTAL IMPACT STATEMENT ENBRIDGE LINE 3 REPLACEMENT

Dear Ms. MacAlister:

The Leech Lake Band of Ojibwe Environmental-Land Department has compiled a list of comments that need to be addressed in the Draft Environmental Impact Statement for Enbridge Line 3 Project. Please see comments below:

PAGE	CHAPTER	TEXT	COMMENTS	
ES-1	Executive Summary	5th Paragraph "as well as ceded territory that tribal members value for wild rice, hunting, and fishing"	The sentence is bias against avoiding the reservations because it reads like the ceded territories are the highest value because of wild rice. When tribal members highest valued wild rice beds are on reservation. That's why we asked for there to be no more new pipelines through the Leech Lake Indian Reservation. So this sentences shouldn't read that value is just ceded territory but should incluce also on reservation rice beds.	2369-1
ES-6	Executive Summary	Figure ES-2	The maps coloring needs to be enhanced to better represent the large water resource within the reservations. Figure ES-3 is better representation.	2369-2
ES-7	Executive Summary	6Th Paragraph "through amicable Agreements"	The Leech Lake Band of Ojibwe has publically stated they would not allow any new pipelines and has also memorialized this decision in Leech Lake Statute. Since the title of the section is **"How do the tribal and federal approvals affect route decision?"** The opening paragraph in the section should lead off with that there is not going to be any amicable ROW given	2369-3

			or Permits through the Leech Lake Indian Reservation.	2369-3 Cont'd
ES-7	Executive Summary	6Th Paragraph "Since then, Enbridge has completed several projects"	This statement should be followed by two historical facts: First that RA-8 was scoped and reviewed in a 2009 Federal Environmental Impact Statement which found that RA-8 was not an acceptable route. The second fact that 4 of Enbridge's projects were built before NEPA was passed in law.	2369-4
ES-7	Executive Summary	6Th Paragraph "Enbridge Maintains"	Enbridge is not maintaining they are acknowledging Leech lake Band of Ojibwe right to self-determination by publically saying the reason they are going around is Leech Lake Reservation is because of the clear message they were told in 2010 that Leech Lake Band of Ojibwe would not allow further risks to pristine waters and abundant Wild Rice Beds of Leech Lake which are the cradle of our lifeways. This is the accurate language that should be portrayed in an Executive summary.	2369-5
ES-21	Executive Summary	3rd Paragraph 1st sentence	RA-07 is a heavily congested corridor and the language of comparing a new corridor and the existing mainline corridor is to unclear and needs to clearly read that having 6 or more pipelines in an area is profoundly risker then having one or two.	2369-6
ES-23	Executive Summary	2rd Paragraph "RA-07 is compatible with existing land use in the area and avoids new long term exposures to spill risk, noise, aesthetic disturbance, and maintenance related disturbance."	This statement is false and the same factors are not being applied fairly. This sentence is being betrayed as a benefit for RA-07 but when analysis RA-06 or APR on page ES-21 more pipelines are construed as higher risk for release. So you can't say having existing land use is an benefit. Also you can't justly say avoids new long term exposures to spill risk when RA-07 when using language from page ES-21adding new line to RA-07 would multiply the new long term exposures to spill risk. The noise, aesthetic disturbance, and maintenance-related disruption have impacts to the Leech Lake Band of Ojibwe's gathering rights within the Leech Lake Indian Reservation and clearing of lands directly impact the usufructory rights of Leech Lake Band of Ojibwe.	2369-7
ES-23	Executive Summary	3rd Paragraph "Despite these benefits"	Please reference above comment. The factors reviewed about can only be called benefits if there is predisposition towards RA-07.	2369-8

ES-23	Executive Summary	3rd Paragraph	#3 should include difficulties securing USFS Special Use Permit that expires December 31st, 2017. Again LLBO of Ojibwe has ownership of the natural resources within the Leech Lake Indian Reservation and new impacts to this exclusive property rights must be prevented. #4 Potential risk of governmental conflict	2369-9
ES-24	Executive Summary	3rd Paragraph	Consistency when describing analysis. When describing RA-06 words WOULD HAVE are used but when referencing other routes words like Appear and may be or may were used when words like WOULD should be used.	2369-10
ES-24	Executive Summary	7th Paragraph	Should Include a # (3) Direct impact to the political integrity, economic security, and health or welfare	2369-11
ES-26	Executive Summary	Environmental Justice Section	There should be a reference to RA-07 and RA-08 crossing the Leech Lake Indian Reservation where there is state Demographic data that could be used example being. http://www.house.leg.state.mn.us/hrd/pubs/indiangb.pdf	2369-12
ES-26	Executive Summary	Figure ES-10	Figure ES-10 Provides a comparison of high quality water resources at risk for each route. The comparison is imbalanced because when you're trying to reflect Wild Rice/Water resource impacts you have to also compare the size water body and size of harvestable wild rice beds. Lake Winniboshish 4th largest lake in Minnesota has more water volume and acres of wild rice beds then all the other individual routes. These Water Resources comparison can not reflect just number of lakes but an actual comparison would reflect acres of water resources crossed. Having a 200 acre lake have the same value as a 56,000 acre lake is not a good comparison. 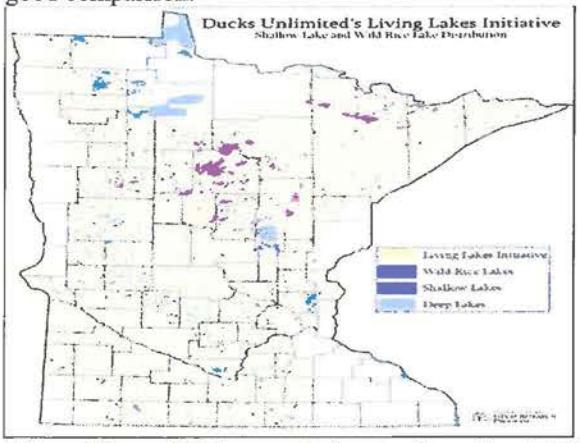 A verision of this map is located on Pg. 6-198 but it is missing servral large wild rice bodies.	2369-13

ES-26	Executive Summary	Potential Habitat Loss	The Wild Rice Harvested on the Leech Lake Indian reservation has served as the seed rice for many wild rice restoration projects through ou the region. MNDNR, Red Lake DNR, Fond Du Lac DNR, Upper Sioux Community DNR, Prairie Island DNR, Little Traverse Band DNR (MI), Keenaw Bay Band DNR (MI) and Stockbridge Munsee DNR (MI) have all used the rice that grows with the RA-07 and RA-08 potential impact areas for their own wild rice restoration projects. The potential habitat loss from and accidental release near these seat sources needs to be addressed in a potential habitat loss section in the ES.	2369-14
3-1	Chapter 3	5th Paragraph	Not possibly the U.S.EPA or the tribe would issue the 401 water certification.	
6-189	Chapter 6	1st Paragraph	Should describe the 42 miles of RA-07 and 48miles of RA-08 in which Leech Lake Band of Ojibwe has EXCLUSIVE JURISIDICTION AND OWNERSHIP OF WILD RICE WITH THE LEECH LAKE INDIAN RESERVATION. The same type of remark for state ownership was made on page 6-188 4th paragraph.	2369-15
6-189	Chapter 6	Methodology	Leech Lake Division of Resource Management Data set wasn't used to identify wild rice bodies.	2369-16
6-190	Chapter 6	Overview of Wild Rice Water Bodies "Wild Rice waterbodies are shallow bodies of water where rice, a persistent annual grass"	Line is incorrect Wild Rice water bodies come in all ranges of depths on Leech Lake Indian Reservation. Some wild rice beds have a depth of up to 10 feet.	2369-17
6-198	Chapter 6	Figure 6.3.1.2-1. Is incomplete.	Mud Lake, Pike Bay, Sucker Lakes Chain, Portage, Boy River, Leech River and Steamboat lake are all missing from map.	2369-18

6-210	Chapter 6	Wild Rice Water Bodies "One Wild Rice Waterbody is crossed"	False Statement it should say Including 3 water Wild Rice Body crossings Pike Bay, Upper Sucker Lake and White Oak Lake.	2369-19
6-208 Thru 6-220	Chapter 6	Incomplete data missing Wild Rice Water bodies all along RA-07 and RA-08	Same data sets should be done but with complete data. "See attachment A"	2369-20
9-26	Chapter 9	6th Paragraph "Overall, route alternatives RA-07 and RA-08 would have the greatest impact on tribal resources, as they cross two reservations and various ceded lands."	This statement should be in the Tribal section of the Executive summary.	2369-21
11-6	Chapter11	Figure 11-5. Census Tract 9400.02	This information about Census Tract 9400.02 should be included in the Environmental Justice Section of the Executive summary. 69.2 % is Native American that is huge number.	2369-22

If there is any questions or concerns with our comments please feel free to contact my office at (218) 335-7400.

Sincerely,

Levi Brown, Director
Environmental-Land Department
Leech Lake Division of Resource Management

Attachment: Leech Lake Band of Ojibwe Resolution #2016-26

LEECH LAKE RESERVATION BUSINESS COMMITTEE

RESOLUTION NO. 2016 - 26

RESOLUTION PETITIONING FOR PROPER INDEPENDENT ENVIRONMENTAL ANALYSIS OF THE RISK OF PIPELINE RUPTURE AND LEAKS, CONSEQUENCES OF SUCH RUPTURE AND LEAKS FOR NEW CONSTRUCTION AND PIPELINE ABANDONMENT, AND PROPER COMPARISON OF PIPELINE ROUTES THAT INCLUDE ROUTES NOT TRAVERSING LANDSCAPES CONTAINING ABUNDANT WILD RICE WATERS

WHEREAS, The Leech Lake Band of Ojibwe ("Band") is a Federally recognized Indian Tribe organized under the Indian Reorganization Act of 1934, and operating under the Revised Constitution and Bylaws of the Minnesota Chippewa Tribe; and

WHEREAS, Pursuant to its inherent sovereign authority and its By-Laws, the Band's Reservation Business Committee ("RBC"), made up of duly elected representatives, is the governing body of the Band, having all the legislative powers and responsibilities of the tribal government; and

WHEREAS, The RBC is charged with the responsibility of protecting and advocating for the health and welfare of Leech Lake Band members within the exterior boundaries of the Leech Lake Indian Reservation; and

WHEREAS, Wild rice is of cultural, religious, and historic significance to the Anishinaabe people; and is the special focus of this resolution; there are, however, other important natural resources involved that we do not address here but that would have greater assurance of protection if the course we insist on be pursued; and

WHEREAS, The Band is in support of the removal of Line 3 from the Leech Lake Reservation and reclamation of any lands impacted by Line 3; and

WHEREAS, Enbridge Energy Resources, LLC (Enbridge) seeks to locate two crude oil pipelines, known as the Sandpiper and the Line 3 projects, in locations that cross many wild rice landscapes in Minnesota, including the 1855 Treaty ceded territory; and

WHEREAS, it is therefore clearly time for the federal, tribal and state governments to address the cumulative environmental impact of these energy corridors, with particular attention to the cumulative impact of oil release risks and consequences to wild rice waters, including the impacts of pipeline abandonment; and

WHEREAS, The proposed new pipelines are projected to carry huge amounts of toxic and profoundly damaging oil products, including tar sand oil from northern Alberta, Canada, the same variety of crude oil that damaged more than 35 miles of the Kalamazoo River in Michigan in 2010 when another Enbridge pipeline ruptured; and

WHEREAS, There are other possible routes that have been proposed for the Sandpiper project, and that will be proposed for the Line 3 project that do not cross wild rice landscapes and other environmentally sensitive and pristine areas; and

WHEREAS, Enbridge has provided testimony that the market for the crude oil products to be carried by the proposed Sandpiper and Line 3 pipelines are mostly in the Chicago regional area, and that the proposed routes as a general case follow old pipeline routes established before environmental laws were enacted, and are therefore merely for the convenience of this private pipeline company; and

WHEREAS, The 1855 Treaty Authority has described the impacts to wild rice lands and waters in some detail, and has requested protection of resources in the 1855 Treaty ceded territories in letters to the Secretary of the U.S. Department of Interior and the Assistant Secretary for Indian Affairs ("Petition for Environmental Protection", dated July 15, 2015), and in a letter to Minnesota Governor Mark Dayton ("Notice of 2015 Wild Rice Harvesting Season", dated August 7, 2015); and

WHEREAS, To date, and to our continued consternation, no federal or state agency having review and permit authority over these two pipelines has committed to conducting a scientifically sound and thorough assessment of the risks and consequences of leaks and ruptures of the proposed pipelines (including pipeline abandonment) over the more than 50 year project life in a manner that properly compares proposed routes that cross wild rice landscapes with those that don't cross such

WHEREAS, To our high consternation, the Minnesota Public Utility Commission (PUC) recently decided (June 5, 2015) to proceed on a course to dismiss all route alternatives that do not cross wild rice landscapes; the result being to narrow the PUC approval process to only routes traversing wild rice landscapes, without even studying the differences in risk and consequences between routes, and in spite of extensive expert testimony to date that such studies are needed. Accordingly, we seek redress through federal law and Treaties against such indifference, fatigue, or administrative legerdemain by the state government; and

WHEREAS, Decisions concerning the location of pipelines and abandonment of pipelines, as well as the protection of wild rice and other important natural resources, as described in the 1855 Treaty Authority's "Petition for Environmental Protection", cannot be rationally considered without a thorough understanding of the risk of oil releases and the consequences of such releases; and

WHEREAS, Generally accepted technical considerations involved in a responsible environmental analysis must be considered with respect to Enbridge's two proposed projects, which entirely support our demand that the risk of oil releases and the consequences of such releases must be thoroughly understood; and must be understood in the context of route comparisons which include routes that do not cross water-rich landscapes containing wild rice.

NOW THEREFORE BE IT RESOLVED, That Leech Lake RBC, at a duly called meeting with a quorum present, does hereby conclude that a risk assessment and analysis of consequences of the two proposed Enbridge projects should be completed through a comprehensive Environmental Impact Statement (EIS); and

BE IT FURTHER RESOLVED, That such EIS must be at least of the type and quality of the federal EIS that was completed with respect to the Keystone XL pipeline; and which the Leech Lake Division of Resource Management would be a cooperating agency responsible for providing a Record of Decision; and

BE IT FURTHER RESOLVED, That such studies must be developed in consultation with the Anishinaabe of Minnesota, and must specifically develop techniques and methods to determine the potential impacts to the loss and damage to the cultural, religious and historic significance of wild rice to the Anishinaabe people; and

BE IT FURTHER RESOLVED, That the technical issues described and listed in Attachment A strongly demonstrate that pipeline failure can occur on new pipelines; can occur from failure of modern pipeline monitoring systems; and will likely occur over the more than 50 year project life of the pipelines, to the extent that decisions on locating these pipelines through wild rice lands are extremely concerning and thus demand the most careful attention from unbiased, objective experts; and

BE IT FURTHER RESOLVED, That such studies be accomplished prior to any permits being granted for the Sandpiper and/or the Line 3 Relocation/Enlargement/Abandonment projects; and that such studies be accomplished for alternative routes selected without regard to Enbridge's contracts with shippers or its present system of pipeline configurations; and

BE IT FURTHER RESOLVED, That the Tribal Council hereby requests that the Bureau of Indian Affairs, other agencies of the Department of Interior, the Army Corps of Engineers, the Environmental Protection Agency, as well as the Anishinaabe tribes of Minnesota and Wisconsin participate in such risk and consequence analyses prior to granting any federal permits.

BE IT FINALLY RESOLVED, That this Resolution is effective immediately.

CERTIFICATION

WE DO HEREBY CERTIFY that the foregoing Resolution was duly presented and acted on by a vote of __4__ for, __0__ against and __0__ silent at a Special Meeting of the Leech

Lake Reservation Business Committee, a quorum being present, held on October 22, 2015 at Cass Lake, Minnesota. Accordingly, this Resolution is duly adopted by the Reservation Business Committee for the Leech Lake Band of Ojibwe, and the Reservation Business Committee further certifies that this Resolution is in full force and has not been amended or rescinded in any way.

Carri Jones, Chairwoman
Leech Lake Band of Ojibwe

Arthur LaRose, Secretary/Treasurer
Leech Lake Band of Ojibwe

STATE OF MINNESOTA
BEFORE THE OFFICE OF ADMINISTRATIVE HEARINGS

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Routing Permit for the Line 3 Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border	MPUC Docket Nos. PL-9/CN-14-916 PL-9/PPL-15-137 OAH Docket Nos. 65-2500-32764 and 62-2500-3337

MILLE LACS BAND OF OJIBWE
COMMENTS ON DRAFT ENVIRONMENTAL IMPACT STATEMENTS

The Mille Lacs Band of Ojibwe (the "Band") submits the following comments regarding the Draft Environmental Impact Statement ("DEIS") for the Line 3 Replacement Project.

I. Structure and Organization

The usefulness of an Environmental Impact Statement, for both the public and decision makers, depends largely on its clarity and readability. The EIS needs to present a clear and concise analysis of the impacts of the Applicant's Preferred Routes ("APR") and the alternatives. The DEIS falls short of this goal. It is encyclopedic, repetitive, and illogically organized, and as a result, does not present a useful tool for the public and decision makers. First, there is a substantial amount of material within the DEIS which could be moved to the appendixes. For example, much of the data in the 614-page Chapter 5 could be moved to an appendix and the Chapter text could summarize the conclusions with the underlying data made available in an appendix. Second, discussions of existing conditions should be reorganized to allow comparisons between existing conditions across alternatives in both Chapter 5 and Chapter 6. Third, the FEIS would benefit from simple additions such as a table of contents at the beginning of each chapter, introductory paragraphs, and a summary at the end of each section. Finally, additional cross-references throughout the document would assist the reader in locating information relevant to particular topics throughout the document.

II. Evaluation of Impacts

A fundamental flaw of the DEIS is that it ignores the fact that some of the alternatives run parallel to existing pipeline corridors, and thus, the impacts to resources in those areas are perhaps incrementally greater but, unlike areas where there are no existing pipeline corridors, are not completely new. 2464-1

The Executive Summary of the DEIS identifies the percentage of each route alternative that would share or parallel existing rights-of-way. Figure ES-9 shows the percentage of existing utility corridors that each route would follow with a breakdown by the type of corridor (e.g., transmission lines, pipelines, none, etc.) and indicates that that less than 30 percent of the APR parallels existing pipeline corridors; the lowest percentage of any alternative besides RA-06. The analysis in the text of the Executive Summary and throughout the DEIS disregards the

2464-1 Cont'd

distinction between type of corridors and essentially assumes all corridor sharing is equal—that is, the impacts of constructing and operating a petroleum pipeline adjacent to an existing pipeline would be the same as constructing and operating a pipeline adjacent to an electric transmission line. This obviously is not correct and the analysis should be revised to distinguish between the different corridors. Moreover, to provide a complete basis for comparison, the analysis should include the system alternatives, particularly SA-04, in the same or a similar chart.

2464-2

More importantly, beyond the brief discussion in the Executive Summary, the remainder of the DEIS largely fails to account for existing pipelines. Each discussion of "existing conditions" in Chapters 5 and 6 should note whether those conditions include an existing pipeline or utility/transmission corridor, and each discussion of impacts should note whether the impact is new or incremental due to the presence of an existing pipeline corridor (i.e., the risk of a leak is increased due to the addition of another pipeline in the corridor or the risk of a leak is added to an area where it does not presently exist). This is a crucial fact relevant to the comparison of the various alternatives.

2464-3

Finally, in the interest of transparency, the FEIS should disclose whether the information relied upon in the analysis was obtained from the applicant or from another source.

III. Cultural Resources

2464-4

As the DEIS acknowledges in Chapter 9, Mille Lacs defines its cultural resources as the "ceremonial areas, cemeteries, archeological sites and artifacts, bodies of water, wild rice lakes and rivers, wildlife, and medicinal plants within the historical Ojibwe native region." *See* § 9.4.1. Yet, Chapters 5, 6, and 10 explicitly decline to take into account the Native American conception of cultural resources when discussing existing conditions and impacts, and instead direct the reader to Chapter 9. *See* §§ 5.4; 6.4; Table 10.4-7 and Table 10.4-16 (defining cultural resources solely as "Tribal Lands"). This omission relegates the tribal perspective to a secondary status by failing to include it in the quantitative analysis sections that are most likely to persuade the decision makers. It would be most effective to cross reference the detailed analysis in Chapter 9 and also summarize the Native American perspective in Chapters 5, 6, and 10. Also, Appendix P includes significant scientific data provided by the Great Lakes Indian Fish and Wildlife Commission ("GLIFWC") that was not incorporated into the analysis in the DEIS. The failure to utilize this information furthers the perception that the Native American concerns and expertise are mentioned, but not incorporated, in the analysis of the proposed Line 3 Replacement Project.

2464-5

2464-6

Finally, the Executive Summary states that "Department of Commerce staff and management have met with northern Minnesota tribal staff and completed formal government-to-government tribal consultations." *See* ES-8. The Band hopes that the Department of Commerce agrees that its formal consultation with the Band has begun, but is not yet complete.

IV. Specific Comments and Questions

A. Chapter 1

<u>Section 1.4</u>: While it may be beyond the scope of the FEIS to discuss overarching policy reasons for and against continued reliance on fossil fuels, the Department still has an obligation to

evaluate the actual need for the project in order for the Commission to make an informed decision regarding the viability of any of the system alternatives. This evaluation may include a discussion of Enbridge's asserted need for additional capacity and supply and demand considerations. Without this information, the Commission has no basis for determining whether a particular alternative presents a more reasonable and prudent alternative to the APR.

B. Chapter 2

2464-7

Section 2.3.3: Permanent access roads are discussed briefly in Chapters 5 and 6, but the DEIS does not include the location of each road or the number of miles that cross waterbodies. The FEIS should disclose the location and potential impacts of permanent access roads. If this data is included in the appendices, citations should be included.

2464-8

Section 2.7.1.1: In the event that a pipeline is built that crosses land that may contain cultural artifacts, the program for monitoring and inspecting construction must include inspectors from the Native American community who have the ability to identify artifacts and other culturally significant sites that may be encountered during construction, and who have the authority to order corrective mitigation actions. A plan for including tribal members in the program should be addressed in the FEIS.

2464-9

Section 2.7.2.2: With respect to the additional temporary workspaces ("ATWS"), the Band is concerned that wetlands that become ATWS may never be properly restored. The FEIS should discuss the length of time the applicant will be allowed to use ATWS, how many may be turned into permanent access sites, and the specific methods that will be used to de-commission and restore the sites. In addition, the FEIS should discuss whether any chemicals or other hazardous materials will be stored in any ATWS near wetlands and streams, and methods for preventing the release of such chemicals into the water.

2464-10

2464-11

Section 2.7.2.5: Horizontal Directional Drilling appears to be the safest method for crossing waterbodies, and should be required for each crossing. At the same time, the Band is concerned that such a method may harm cultural artifacts/resources. Does the Applicant have a plan for avoiding such harms?

2464-12

Section 2.7.2.6: The FEIS should provide a more detailed discussion of winter construction methods. The DEIS states that winter construction methods require long, cold sustained weather. How cold does it have to be and for how long? Will a minimum frost depth be required utilize winter construction methods? Can the Applicant be required to use winter construction methods for wetlands to avoid the harm that would result from compaction, grading, access roads, and the creation of ATWS?

2464-13

Section 2.8.2.1: Does the Applicant have a plan to avoid native plants and medicines when mowing the ROW? What herbicides will be used in the ROW and how will such herbicides impact humans, drinking water, plants, wildlife, and fish? What methods will the Applicant use to avoid application of herbicides to culturally significant and medicinal plants?

2464-14

Section 2.9: The first sentence of this section states: "Once the Line 3 Replacement pipeline

2464-15

is placed in service, Enbridge would abandon the existing Line 3 pipeline in accordance with federal, state, and tribal statutes, rules, and regulations." The FEIS should list the tribal statutes being referenced and not merely refer to them in the abstract. Also, when the impacts of abandonment are discussed, the FEIS should distinguish between short- and long-term impacts and should identify impacts that will be the responsibility of the applicant, landowners, or the public to address. 2464-15 Cont'd 2464-16

C. Chapter 5

General Comments: When evaluating the potential impacts on fisheries, the DIES uses the Fish IBI metric, which led the DEIS to conclude that there are only five lakes rated for Fish IBI along the APR. This metric, however, can be misleading, because many lakes and streams have not been rated by the Minnesota DNR. The FEIS should disclose how many of the lakes and streams crossed have a rating, how many have not been assessed, and for the ones that are not rated, additional data should be collected regarding the status of those waters to correctly evaluate construction and operation impacts on fisheries. 2464-17

In addition, the DEIS emphasizes the impacts to trout streams, while largely ignoring impacts to stream fish such as smallmouth bass, northern pike, and walleye; all of which provide subsistence to the Band. The FEIS should include a discussion of construction and operation impacts to these other fish species, in addition to trout. 2464-18

Wild Rice: With respect to the discussion of wild rice, the FEIS should include additional information regarding the specific tribal laws and regulations that apply to the harvesting of wild rice. In addition, in the analysis of existing conditions, the FEIS should state what percentage of productive wild rice in Minnesota could be affected by the construction and operation of the APR. In the impact assessment, the FEIS should explain in more detail the measures that would be taken by the Applicant to minimize impacts on wild rice. In addition, the FEIS needs to explain exactly how many acres of wild rice would be taken out of active production during construction, provide the percentage of active production that represents, and assess whether these stands could be returned the active production after construction. The FEIS should further elaborate on the potential number of acres that would be affected by worst-case scenario situations such as spills or leaks, frac-outs, the introduction of contaminants, invasive aquatic species, and non-native wild rice species. The FEIS should also analyze best- and worst-case scenarios for the estimated length of recovery time for wild rice stands impacted by construction, and estimate how many acres of wild rice may be taken permanently out of production due to construction of the APR in the best- and worst-case scenarios. 2464-19 2464-20 2464-21 2464-22 2464-23 2464-24

Section 5.2.1.2.4: The discussion of frac-outs in this section should include a more thorough analysis of the probability of a frac-out and methods of avoidance and remediation. Industry data on frac-outs, and particularly Enbridge's history regarding frac-outs should be included in the FEIS. 2464-25

Section 5.2.4.3.1: This section should include a more detailed discussion of stream bank stabilization methods, and the plans for long-term maintenance of erosion control structures. 2464-26

In addition, the FEIS should provide a more detailed discussion of the applicant's plan to avoid the spread of invasive species, and the plan for stopping or remediating an evasion. 2464-27

D. Chapter 6

Page 6-180: In the mitigation paragraph it says that if the pipeline negatively impacts a person's well water that the Applicant would find an alternative source of water. It then says that after a "reasonable" time period the Applicant *could* compensate the land owner or find another drinking water supply. Details regarding the thresholds for a "negative impact," the "reasonable" time for a landowner to wait for compensation and/or replacement, and assurances that the Applicant will provide the replacement water supplies should be provided. 2464-28

E. Chapter 9

2464-29

General Comments: This Chapter effectively conveys the connections between culture, the environment, and the health of tribal populations, and we appreciate the effort taken to convey the importance of these resources from the tribal perspective. At the same time, the Band believes that the Chapter is conclusory in its statements regarding which routes have the fewest adverse impacts to natural and cultural resources. While it is important to convey a qualitative perspective on the impacts of a pipeline on natural and cultural resources, the Band remains interested in how the Department quantifies such impacts across routes, and short and long-term. The Band believes the Chapter would benefit from additional cross-references to the quantitative analyses in other chapters and should summarize the conclusions from those chapters. Similarly, the quantitative chapters should cross-reference Chapter 9 when discussing wild rice, climate change, fisheries, forestry, and other resources, as well as the impacts of spills.

In addition, this Chapter, like most of the DEIS, largely ignores the fact that the APR would run in large part along a completely new pipeline route, whereas other alternatives, such as RA-03 follow existing pipelines for much of the route. Introducing pipeline-related impacts and risks to a new area, let alone an area that contains some of the most pristine waters in the state, would be perceived by tribal members as yet another taking of their land, rights, and heritage, contributing to further mistrust, feelings of powerlessness, and other social and emotional impacts. While it is true that any pipeline threatens the Band's cultural resources, because of its location, the APR poses a greater risk than others. 2464-30

2464-31

Section 9.1: Several other indigenous groups, such as the Ho-Chunk, Iowa, Assiniboine, have ancestral connection to the area now designated as Minnesota; it is not only the Anishinaabe and Dakota. This should be made clear throughout the DEIS.

2464-32

Section 9.2: The first sentence of the last paragraph in this section should state that the land now known as Minnesota is the ancestral homeland of the Dakota; it is not merely where they "fished, hunted, and gathered."

2464-33

Also, the Commission should ensure that the FEIS lists the full and correct names of each tribe.

Section 9.2.1: The concept of self-governance centers on both natural and cultural resource management, and tribes often have an ancestral and/or spiritual connection to cultural resources within their historical homelands. This idea is not clearly and fully articulated within the DEIS. 2464-34

Section 9.2.2: Tribes do not only manage fishing/hunting/gathering on their current reservation, but within their treaty area; that is, resource management does not end at the reservation boundaries. 2464-35

Section 9.2.3.3.3: This paragraph should reference the "Minnesota Chippewa Tribe" ("MCT") rather than the "Minnesota Chippewa." 2464-36

Section 9.3.4: The FEIS should include the names of the tribal elders and historians that were interviewed by the Department of Commerce. 2464-37

Section 9.4.1: This section should make clear that the destruction of ancestral cultural sites is an irreplaceable loss to each tribal nation's heritage. 2464-38

Section 9.4.2: It is unclear how the concept of Cultural Corridors was developed and defined, and the MCT was never asked to designate or identify any land as a cultural corridor. While the MCT supports MIAC's recommendation of a complete survey of cultural corridors, such a survey should occur before any route is approved, and not merely before construction. 2464-39

This section should also clarify that water is the absolute basis of each nation's vitality, and a resource that must be carefully managed for future generations. 2464-40

Section 9.4.4.1.1: The FEIS should include a thorough discussion of the resolutions passed asserting the importance of natural and cultural resources, and copies of those resolutions should be included in the Appendixes. This section should discuss how those resolutions were factored into the FEIS. This paragraph is also incorrect in that it refers to the National Congress of American Indians as one of the Chippewa Tribes. 2464-41 2464-42

With respect to impacts on fisheries, first, the FEIS should include a more thorough discussion of the impacts of climate change on fish assemblages, abundances, and distributions, and how those impacts may be exacerbated by construction of the pipeline. Second, the Band would like to see much more extensive fisheries baseline data collection on Big Sandy Lake, Lake Minnewawa, Rice Lake, and other surrounding lakes that are connected to the Sandy River (including compiling a microchemical profile on otoliths extracted from fish species). Then, in the event of an oil spill, the impacts on fish can be evaluated and the Band can adjust its management of fisheries. This will also enable future studies to track the impacts on fisheries in the event of a spill. For further explanation of methodology, see the procedures outlined in Nelson et al. 2015. The Band also suggests establishing baseline abundances, growth rates, and relative condition of walleye and other fish species before construction of the APR. 2464-43 2464-44

Finally, please note that "walleye" in Ojibwe is spelled "Ogaa," not "Ooga." 2464-45

Section 9.4.8: The last sentence of the first paragraph states that "Leech Lake has the most wild rice in North America." It is unclear whether this is referring to the lake itself, the current reservation, or the original reservation area. 2464-46

In addition, the FEIS should provide a clear analysis of what percentage of productive wild rice is at risk by the APR and each alternative, and how many productive acres could be lost in the event of a spill. 2464-47

Section 9.5.1: The losses that would be caused by construction are far greater than simply the fragmentation of forests; it is the loss of all cultural and natural resources in the construction area. In addition, this section, and numerous others throughout the DEIS, makes the conclusory assertion that impacts from construction will be "short term and negligible to minor." These conclusions are unsubstantiated. 2464-48

Section 9.5.3: This section contains a conclusory assertion that RA-03 and the APR have the fewest impacts, without distinguishing between the two. While the Band appreciates the more qualitative analysis in this Chapter, there is still an important discussion to be had about the specific short- and long-term impacts of each route and the risks posed by each. In comparison to the APR, RA-03 poses fewer risks to vital cultural and natural resources by largely avoiding the pristine waters in the Lake District. 2464-49

F. Chapter 10

General Comments: The Band has numerous concerns about the DEIS' reliance on the Stantec et al. 2017 study and the OILMAP model in terms of accurately analyzing and predicting oil release impacts and mitigation. First, Stantec et al. used an extremely limited number of samples—only 7. Particularly in the region where the APR would be located, such a low number represents a mere fraction of the waterbodies that would be at risk in the event of a spill, and it is impossible to accurately predict the full magnitude of impacts based on a mere seven streams. A second shortcoming of the Stantec et al. study is that it does not model worst-case scenarios. The FEIS should compare the conservative estimate with a worst-case scenario. Finally, and perhaps most importantly, Stantec et al. does not provide statistical data, estimates of variance, or confidence intervals, nor does it discuss how many simulations were run or provide p-values. The lack of this type of data and analysis undermines the reliability of the study and would certainly not be acceptable within the scientific community. 2464-50

With respect to the OILMAP model, the Band does not think it accurately predicts how far oil will travel. First, OILMAP assumes that the released oil will float on the water, and does not sufficiently account for other oil weathering processes such as dissolution and dispersion. Second, OILMAP assumes that shoreline saturation will occur before oil moves further downstream. This is an unrealistic assumption, and results in the model underestimating the oil dispersal distance. Third, OILMAP assumes 100% snow and ice cover when modeling winter spill scenarios. Because of climate change, this assumption is flawed, and the applicant should be required to model winter spills based on a 0-50% snow cover. Fourth, OILMAP assumes, at worst, a 24-hour response time. This assumption is concerning because the APR would be located primarily in rural areas that may be difficult to access, particularly in the winter. The FEIS should include more information regarding the basis for using 24 hours as a conservative, 2464-51

2464-51 Cont'd

worst-case scenario, as well as data on the average amount of time Enbridge historically responds to spills, and any other assumptions or analysis underlying the 24-hour period in terms of accessibility to any particular site along the APR. Finally, OILMAP makes broad generalizations about habitat type. For example, when modeling oil releases into the Mississippi River by Little Falls, Stantec et al. assumes the river bottom is silt/mud. How would different habitat types affect spill release distances?

2464-52

Ultimately, the Band believes that the FEIS should consider using independent modeling of oil spills, such as SIMAP, which is a stronger model, and could be used to analyze the impacts of the spill on a broader range of waterbodies.

2464-53

Section 10.3.3.2: It is unacceptable that Enbridge be able to hide the "predicted volume out" data as "nonpublic." This data is essential for purposes of cross-checking the estimated distance that oil would travel. This data should be made public, or, at the very least, assurances must be made that the data will be available to decision makers.

2464-54

Section 10.4: The 10-mile ROI seems to be an arbitrary cut-off. If constructed, the APR would traverse some of the most pristine and interconnected waters in Minnesota. The FEIS *must* provide at least an estimate of the maximum distance that oil could travel in these waters in the event of a catastrophic spill. In addition, the 10-mile ROI appears to only apply to rivers and streams. This analysis should be expanded to include a broader range of waterbodies. For example, the APR crosses a stream that connects to a downstream lake called Two-Inlets Lake, yet, potential impacts on that lake are not evaluated.

2464-55

The 2,500 area of interest cut-off also seems arbitrary, particularly when applied to the effects of a spill that may impact a body of water. As with the downstream analysis, the FEIS must at a minimum show the maximum distance that oil could travel in water in the event of a catastrophic spill. Again, the Band urges the Department to use an independent party to review the methodologies applied in this Chapter.

2464-56

Section 10.4.2.1.1: While this section discusses the health risks that may generally result from ingesting aquatic food sources that have been contaminated by an oil spill, a more thorough discussion is needed of these risks, particularly to tribal members who rely on fish, wild rice, and other types of aquatic resources for sustenance.

2464-57

Section 10.4.2.1.2: It is inconceivable that the APR has only 48 acres of cultural resources within 2,500 feet of the centerline, and 0 acres of cultural resources within the 10 mile downstream ROI. *See* Table 10.4-7; Table 10.4-16. The entire purpose of the tribal consultation efforts was to identify cultural resources threatened by the pipeline and to evaluate those impacts in the DEIS. The fact that data on cultural sites and historic resources was not available for *all* CN Alternatives is irrelevant. The data that exists, particularly with regard to the APR, cannot simply be ignored. The FEIS must be amended to correct this significant deficiency.

2464-58

Section 10.5.1.1.1: The FEIS should provide additional information regarding the assertion that third-party damage is the leading cause of pipeline releases, why this is the case, and detailed plans from Enbridge for addressing this issue, particularly within and among tribal communities.

2464-59

Section 10.5.2: This Section appears to suggest that local and tribal governments may be required to serve as first responders to a spill during Project operations. *See* 10-100, 10-102. The DEIS largely fails to account for the fact that the APR passes through mostly rural land, where local governments do not have the resources, financial or otherwise, to deal with a spill, and states, without any explanation, that if an "oil spill incident becomes too large or complex for local and onsite capabilities" then state or regional entities could be called in. Neither the Band nor other local or tribal communities should be required to pay for oil spill clean-ups for a pipeline they do not want. This Section needs to be considerably expanded to describe in detail the particular responsibilities that a local or tribal government would have in the event of a spill, and the cost that would have to be borne by these entities, and what exactly would trigger a state or regional response. This section contains no analysis or estimate of the potential costs of clean-up of spills of various sizes. Moreover, this section does not reassure the Band that Enbridge would bear the immediate and primary responsibility for clean-up and remediation, as well as for any and all costs borne by the Band and reparations for damage to natural and cultural resources.

G. Chapter 11

2464-60

General Comments: The use of census tract level data has the potential to mask small populations within a larger tract. For example, the analysis does not appear to include the Band's East Lake Community near McGregor, MN even though it undoubtedly qualifies as an environmental justice community. Where the Department has reason to believe that the screening has failed to capture a relevant population, it should obtain the information necessary to support the inclusion of such populations. The Band will provide whatever information the Department needs in order to include the East Lake Community in its environmental justice analysis.

H. Chapter 12

2464-61

General Comments: Section 12.4.6 contains an inadequate discussion of the impacts that would be caused by the addition of a pipeline in the corridor proposed for the APR. Less than a year ago, Enbridge proposed building two pipelines in this corridor, and it is highly likely that such a proposal would be re-introduced if a new pipeline is built. This section needs to contain a much more thorough analysis of the cumulative impacts of multiple pipelines or risk grossly underestimating the environmental impacts of this project. Given the history of the Sandpiper Project and continued aging of other pipelines in the mainline corridor, the FEIS must consider the cumulative impact of adding one or more additional pipelines along the APR including how the proximity of adjacent pipelines will be addressed in a shared corridor to avoid the issues which the applicant asserts preclude removal of the existing Line 3.

Respectfully submitted,

Dated: July 10, 2017

LOCKRIDGE GRINDAL NAUEN P.L.L.P.

s/David J. Zoll

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Levi, Andrew (COMM)

From: Esteban Chiriboga <esteban@glifwc.org>
Sent: Monday, July 10, 2017 5:37 PM
To: MN_COMM_Pipeline Comments
Cc: MacAlister, Jamie (COMM); Jon Gilbert; Ann McCammon-Soltis; jcoleman@glifwc.org; 'Philomena Kebec'
Subject: GLIFWC Comments on Line 3 DEIS
Attachments: Line3_DEIS_Comments_Attachment1.pdf; Line3_DEIS_Comments_Attachment3.pdf; Line3_DEIS_Comments_Attachment2.pdf; Line3_DEIS_Comments_Attachment4.pdf; GLIFWC_Line3_DEIS_comments .pdf

Good afternoon,

Attached are the comments of the Great Lakes Indian Fish & Wildlife Commission on the Draft Environmental Impact statement for the Line 3 Replacement Pipeline project (docket numbers CN-14-916 and PPL-15-137). Please contact me with any questions.

Thanks,
Esteban
--
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• MEMBER TRIBES •

MICHIGAN	WISCONSIN		MINNESOTA
Bay Mills Community	Bad River Band	Red Cliff Band	Fond du Lac Band
Keweenaw Bay Community	Lac Courte Oreilles Band	St. Croix Chippewa	Mille Lacs Band
Lac Vieux Desert Band	Lac du Flambeau Band	Sokaogon Chippewa	

July 10, 2017

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

Dear Ms. MacAlister,

Great Lakes Indian Fish and Wildlife Commission (GLIFWC) is an intertribal agency exercising delegated authority from 11 federally recognized Ojibwe (or Chippewa) tribes in Wisconsin, Michigan and Minnesota.[1] Those tribes have reserved hunting, fishing and gathering rights in territories ceded in the 1836, 1837, 1842, and 1854 treaties with the United States. GLIFWC's mission is to assist its member tribes in the implementation of their treaty-reserved harvesting rights and to protect habitats and ecosystems that support those resources subject to those rights.

GLIFWC's environmental and policy experts commented on the Draft Environmental Impact Statement (DEIS) documents for the Line 3 Replacement Project proposed by Enbridge Energy (docket numbers CN-14-916 and PPL-15-137) and I am transmitting those comments to you on behalf of those experts via this letter. These comments are submitted from an off-reservation Ceded Territory perspective and an individual GLIFWC member tribe may choose to submit comments from its own perspective. The general comments below will address the topics that were submitted to the Minnesota Department of Commerce (MNDOC) during the scoping period. Specific comments on the DEIS follow the general comments.

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[1] GLIFWC member tribes are: in Wisconsin -- the Bad River Band of the Lake Superior Tribe of Chippewa Indians, Lac du Flambeau Band of Lake Superior Chippewa Indians, Lac Courte Oreilles Band of Lake Superior Chippewa Indians, St. Croix Chippewa Indians of Wisconsin, Sokaogon Chippewa Community of the Mole Lake Band, and Red Cliff Band of Lake Superior Chippewa Indians; in Minnesota -- Fond du Lac Band of Lake Superior Chippewa, and Mille Lacs Band of Chippewa Indians; and in Michigan -- Bay Mills Indian Community, Keweenaw Bay Indian Community, and Lac Vieux Desert Band of Lake Superior Chippewa Indians.

GLIFWC General Comments

Analysis of Impacts to Cultural Resources

Chapter 9 of the DEIS provides a good description of treaty rights and the tribal perspective on natural resources, the traditional lifeway, and pipeline issues. The chapter also incorporates information heard during meetings with tribes. GLIFWC's policy and environmental experts agree with the overall conclusion that the existing and proposed pipeline system will have long term detrimental effect on tribal members and tribal resources.

That being said, we notice a disconnect between the conclusions in chapter 9 and the metrics used to compare different alternatives in chapter 10.4. In this section, the comparison only develops metrics for archeological sites, historic sites and tribal land. The DEIS correctly states in chapter 9 that for tribes there is no distinction between natural resources and cultural resources. Therefore, the metrics in section 10.4 that compare route alternatives for Areas of Interest (AOIs) (e.g. musky lakes, calcareous fens, wild rice waters, etc.) should not only be evaluated from a utilitarian (e.g. number of fish harvested) perspective but also be described in the context of their cultural importance to the tribes. For example: the harvest of musky does not only provide food for the table but also provides the basis for the culturally essential activity of fishing; the harvest of wild rice provides both food and economic benefits to tribal members but is also the catalyst and focus of cultural activities across Anishinaabe territory. Loss of those resources or opportunities to access those resources has both a utilitarian and a cultural impact on the tribes. Both types of impact must be accounted for in Chapter 10. Only then can the information the MNDOC carefully collected and disclosed in Chapter 9, be properly accounted for in the identification of the least environmentally damaging alternative. 2634-1

Spatial Extent of Analysis

The DEIS uses a buffer of 2500 feet around the proposed pipeline routes to identify natural features (lakes, rivers etc.) and terrestrial habitats that could be impacted. This distance is appropriate for terrestrial environments. This distance however, is not appropriate to describe potential impacts of oil spills into waterways. Section 10.4 describes the rationale for the 2500-foot buffer along with a description of a 10-mile downstream region of interest (ROI) for rivers and streams that fall within the 2500-foot buffer. The only support for the 10-mile ROI is a report by Stantec that was commissioned by the applicant. The 10-mile ROI is not supported by river impacts observed in some recent spills. It is understandable that the applicant would wish to limit the area of the ROI, but the DEIS should seek a more comprehensive geographic scope for impact analysis. 2634-2

2634-2 Cont'd

Experience from spills, in all size categories, at other sites indicates that oil can travel large distances in a river system. The Kalamazoo River oil spill extended 32 miles downstream of the pipeline failure. Last year, the oil spill into the North Saskatchewan River in Canada extended for over 190 miles from the spill location. There are many factors that affect the distance and speed at which oil moves downgradient in a river. Factors include the specific gravity of the oil, the character of the river bed and bank, the flow of the river, etc. This complexity notwithstanding, 10 miles is not a reasonable distance to use as a ROI. The appropriate distance should vary for each stream/river crossing and should extend downgradient to the nearest major flow barrier. This barrier could be a dam or a large lake where flow energy decreases to the point of creating a depositional area for the oil. An example of this type of analysis conducted by GLIFWC is provided (Attachment 1).

History of Pipeline Safety and History of Enbridge Energy

2634-3

As noted in GLIFWC's scoping letter, Enbridge Inc. has a questionable environmental record. The DEIS does describe the frequency of spills along pipelines in general when assessing the probability of future spills. However, a comprehensive review on the safety record of the applicant and the applicant's past performance in responding to spills and conducting cleanup and remediation activities is not found in the DEIS. Given that the DEIS does not dismiss the possibility of spills into the environment, an accounting of how Enbridge responds to these events is required, particularly when it comes to threats to treaty resources.

Surface and Groundwater Quality

2634-4

In GLIFWC's scooping comments, we noted that the DEIS should put any reasonably foreseeable impacts of the Line 3 replacement project in the context of the Great Lakes Water Quality Agreement, which is a bi-national water quality agreement between Canada and the United States. The DEIS does not include this information.

2634-5

2634-6

The Lake Superior Lakewide Management Plan (LAMP) identifies pipelines as potential threats to the ecological integrity of Lake Superior (Attachment 2). The FEIS should describe the threats that this project poses to Lake Superior. The alternatives analysis should also weigh different alternatives on their relative threat to Lake Superior and the Lake Superior watershed.

Wetland Impacts and Wetland Mitigation

2634-7

There are gaps in the impact assessment that should be highlighted in the text. First, the extent of wetlands impacted by maintenance activities and routine integrity digs is unknown at this time. The DEIS characterizes these impacts as temporary or minor. GLIFWC environmental and policy experts disagree with this characterization. Maintenance activities, while minor compared to the scope of the entire project, do create

2634-7 Cont'd

hydrologic and biologic alterations that may not be temporary. For example, an integrity dig in a forested wetland would require clearing of trees that may take decades to grow again. The clearing facilitates introduction of invasive exotics species and once cleared, the forested wetland may never recover its previous function. The FEIS should clearly describe the potential for wetland impacts during these as yet undefined maintenance activities and describe a mechanism for mitigating these impacts.

2634-8

The DEIS does not adequately describe how long term vegetation clearing activities would be conducted within the pipeline corridor. Use of herbicides is a common method to prevent woody vegetation from becoming established near pipelines. The FEIS should describe methods that the applicant will use to keep the pipeline corridors clear of vegetation. If herbicides are to be used, the FEIS should characterize the impacts of these herbicides on biota and waterbodies.

2634-9

Chapter 10 page 33 states that wetlands are especially sensitive to spills. Because of this sensitivity, wetlands along the alternative routes should be mapped out to the 2500-foot buffer that is used for ecological impact assessment. The acreage of wetland in this buffer should be used in an analysis of potential impacts from spills.

Financial Assurance

As discussed in GLIFWC's scoping comments, spills of oil transported through these pipelines are likely. The risk assessment in the DEIS confirms this position. Cleanup and remediation are costly and require long periods of time to complete. The Kalamazoo River oil spill has, to date, cost 1.2 billion dollars in cleanup and remediation costs. The DEIS should have described, in detail, the types of financial assurance that Enbridge will be required to provide to ensure that the public is not burdened with cleanup and remediation costs. Furthermore, financial assurance is needed to cover the costs of maintaining structural integrity of the abandoned Line 3 as well as the costs of ultimately removing pipelines from the right of way whenever that becomes feasible. Financial assurance information has been included in past EIS documents prepared by Minnesota state agencies (e.g. PolyMet FEIS) and should be included in the FEIS for the Line 3 replacement project.

2634-10

Cumulative Impact Analysis

2634-11

In GLIFWC's scoping letter we indicated that "the cumulative effects analysis must not be confined to the corridor of the pipeline projects. The analysis of cumulative effects should be broad enough to account for regional impacts such as habitat fragmentation and wetland fragmentation. Additional clarity on the spatial extent of the cumulative impact assessment is needed." Unfortunately, the DEIS does the opposite of our recommendation. It restricts the analysis to pipeline and transmission lines that cross the Line 3 route alternatives. This creates a scenario that is illogical to the extreme; the exclusion from cumulative analysis of a pipeline that runs parallel nearby, but does not

2634-11 Cont'd

intersect the Line 3 ROW. This method of analysis is not actually cumulative because it not only ignores parallel pipelines but also ignores the existing road network and other regional activities that, in combination to the new Line 3, create regional scale impacts. For example, the existing road network is already causing habitat fragmentation and impacts to stream water quality (e.g. use of salt in winter). A question that the cumulative effects analysis should have addressed is, how do the different route alternatives expand existing habitat fragmentation? And how does the pipeline affect existing water quality impairments?

2634-12

Different scales should also be used in the cumulative effect analysis to describe impacts to treaty resources. A look at industrial projects in the Ceded Territories and their existing impacts on tribal resources is needed to properly put the impacts of the proposed pipeline routes in context. A document providing information on oil transportation in the Ceded Territories is provided (Attachment 3). The document should be used to develop a cumulative effects assessment for tribal resources.

2634-13

The Environmental Protection Agency (EPA), in cooperation with Region 5 tribes, has developed a protocol for assessing cumulative effects on tribal resources. This guidance should be used in the EIS for the proposed pipeline projects. This guidance should be used to conduct an analysis that is fully cumulative in nature. An example of the types of cumulative effects analysis that the FEIS should provide is attached (Attachment 4). This cumulative effect assessment was developed by tribes and is part of the FEIS for the proposed PolyMet mine in northern Minnesota.

Section Specific Comments

2634-14

Chapter 2 – In the project description there is no discussion on the need to weigh down the pipe in wetland and stream/river areas. In previous pipeline construction projects conducted by Enbridge (i.e., Alberta Clipper and Southern Lights), the contractor conducting the project employed two different methods to add weight to the pipe. One was the use of a concrete coating on the pipe, while the other was to employ the use of gravel-filled saddle bags which hung over the pipe. The practice of adding weight to the pipe in certain areas should have been included in the project description, along with any impacts associated with adding weight to the pipeline. Given that the route alternatives are proposed in a very water rich region and that the pipeline will have hundreds of water crossings, this is an important data gap.

2634-15

Section 2.3.2.3 – This section states that cathodic protection would be installed within a year after construction. However, the DEIS does not mention that each cathodic protection site requires electrical power and other construction activities that are needed to bring electricity to the site (access/maintenance roads, generators, electrical lines, etc.).

2634-16

Furthermore, any wetland impacts associated with cathodic protection site construction and operation do not appear to be included in the acreage calculations for wetland

impacts. All impacts associated with cathodic protection requirements for the pipeline must be described in the FEIS. 2634-16 Cont'd

This section also states that coating would be added to the pipeline. The DEIS states in several locations that the coating is different from the one used in the existing Line 3 which is failing. The DEIS does not provide any information on the chemical composition of the coating and the environmental threats that may result as the coating ages. The FEIS should provide an accounting of the impacts that the coating on the existing line 3 are causing to the aquatic environment as it disintegrates. The effects of coating, both old and new, must be described in the FEIS. 2634-17 2634-18

Section 6.3.1 – The analysis in the section focuses on wetlands that are included in the public waters database. The actual acreage of affected wetlands can only be defined after wetlands have been properly delineated and this process is likely to significantly increase the acreage of impacted wetlands. Ideally, the delineation should have been done prior to the development of the DEIS under the supervision of the Army Corps of Engineers. The lack of detailed wetland information along the proposed pipeline routes is a significant data gap and conclusions on direct and indirect wetland impacts in the DEIS are thus not reliable. 2634-19

Section 6.3.1.2.1 –This section discusses Minnesota's water quality regulations, but does not discuss, nor acknowledge the Fond du Lac Band's Water Quality Standards, which include use designations different from the state and that may affect which standards apply to a particular water. Fond du Lac's Water Quality Standards are applicable for both RA-07 and RA-08. This section should also acknowledge the Great Lakes Water Quality Agreement that applies to all routes except RA-04. 2634-20 2634-21

Section 6.3.1.2.3 – The section is titled "Regional Analysis of the Quality of Existing Surface Water Conditions – Tullibee and Wild Rice" However, the section does not include any information on stressors to wild rice or any conservation efforts related to wild rice. The State of Minnesota wild rice water quality standard should also be referenced. 2634-22

Section 6.3.1.2.4 – This section describes potential degradation of surface water quality with a focus on potential spills. This section should also describe procedures that the applicant will use to manage drilling mud and its proper disposal to prevent spills of this material. Trout streams are particularly vulnerable to sedimentation from construction activities or spills of drilling mud. 2634-23

It is also unclear how impacts to surface water quality resulting from pipeline construction and operation would be measured. What surface water quality data is available to establish baseline/existing conditions in the streams and wetlands that the pipeline would cross? Baseline water quality data is critical to assessing future impacts of the project and defining mitigation and restoration activities. 2634-24

2634-25

This section also assesses potential impacts to wild rice. The applicants proposed route crosses five wild rice waters which constitutes a very significant impact. It is stated "Although the Applicant would restore the hydrology and soils of the affected wild rice waterbodies after construction, rice yield would be reduced in the portion of the waterbody directly affected by the repair or replacement activities for the first growing season after construction." It is not clear what background information is used to draw this conclusion. Yields in a healthy wild rice bed are highly variable from year to year whether the site is affected by a stressor or not. Sedimentation and changes in water levels can change the function of a rice bed for many years or change it permanently. In addition, seeding of wild rice would likely be needed to restore a site. How would this re-seeding be done? Finally, how would the success or failure of the hydrology and soil restoration efforts be measured?

2634-26

The significance of wild rice to the Ojibwe people cannot be understated. It provides sustenance, spiritual and cultural value, and provides tribal members with economic opportunity. The wild rice bodies identified in the applicant's proposed route are unique and irreplaceable. While this section identifies that major impacts to wild rice bodies could occur during construction, it fails to anticipate the likelihood that a small or large spill could result in the permanent loss of wild rice in these waterbodies. The FEIS should correct this oversight.

2634-27

Section 6.3.7 – This section describes potential air emissions from the project. One significant source of emissions is diesel engines but the DEIS does not investigate alternatives to using diesel. These alternatives should be investigated and compared to diesel emissions to define the least environmentally damaging alternative.

2634-28

Section 6.3.7.3.1 – States that the Applicant would minimize dust generation from construction activities by wetting soils and limiting working hours in residential areas. Chemical additives are commonly used in dust suppression activities. The FEIS should list any chemical additives that would be added to the water and their known effects on the surrounding environment. In addition, the FEIS should identify what the sources would be used to provide dust suppression water, the proximity of those sources to drinking water sites, and whether other water withdrawals are occurring at each site.

2634-29

2634-30

Section 8.3 – This section should clearly state that in situ abandonment of the pipeline would require inspections and maintenance in perpetuity. The FEIS should describe how this would be done, given that it is by no means obvious.

2634-31

Section 8.3.1.1 – This section discusses potential impacts of leaving old line 3 in place. However, water quality impacts of the disintegrating coating on the abandoned pipeline are not discussed.

2634-32

Section 8.3.1.2 – This section states that Enbridge would maintain cathodic protection in the abandoned pipeline. However, in earlier sections of the DEIS, it states that the coating on the existing pipeline is failing. Additional information is needed to determine if maintaining cathodic protection is enough to protect the environment in perpetuity. In addition, financial assurance is needed to maintain this cathodic protection should Enbridge become insolvent in the future.

2634-33

Section 8.3.1.3 – This section states that long-term effects from subsidence along the abandoned pipeline could be significant and would require site-specific mitigation measures. The section does not contain detailed information about what steps Enbridge would take in the event subsidence occurs on the abandoned line. Information on inspection frequency for the abandoned line is needed as well as financial assurance to ensure subsidence issues can be addressed in the future. Finally, we agree that remediation efforts will depend on site specific conditions. However, details on the types of actions that could be taken at different sites should be provided.

2634-34

2634-35

Section 8.3.1.5 – This section states that "Costs for future site-specific mitigation measures…are uncertain and would depend on the nature of the mitigation measures." Because of this uncertainty, the applicant must provide adequate financial assurance to cover these costs in the event the company becomes insolvent. This is particularly important because maintenance of a pipeline that is abandoned in place must be perpetual.

2634-36

Section 9.4.4.1.1 – This section discusses traditional uses of natural resources. In this section, only Sweet Grass - Wiingash and Cedar – Giizhig(aandag) are mentioned specifically as plants having cultural significance. However, many more plants are also very significant. The text should reflect that the two plants included in this section are for illustrative purposes and acknowledge there are many more that could be included. The text should refer to "Plants Used by the Great Lakes Ojibwa" published by GLIFWC (Meeker, 1993). This book provides information on 384 species of plants that are gathered and used by the Ojibwe.

2634-37

Section 9.6.1 – This section discusses potential climate change impacts in a general sense, it should be noted here that the loss of a resource to tribes cannot be replaced in a geographically different location. For example, loss of a wild rice bed that is destroyed by an oil spill cannot be replaced by a rice bed in a lake a few miles away because of ties to tribal members that are place based. Therefore, the section should describe the ties of tribal members to the Ceded Territories and Reservations and state that they cannot move to other areas in order to preserve the traditional lifeway.

2634-38

Chapter 10 – This chapter describes the risk assessment for pipeline leaks and failures. The section states that pipeline capacity does not change spill risk. The spill risk analysis is entirely dependent on the length of the pipeline. While this is true for the expected return time of an incident, it is not true for the volume of oil that could be released if a

2634-38
Cont'd

section of the pipeline fails. A larger diameter pipeline can contain larger volumes of oil in any single section. In fact, increasing the volume of oil transported by Line 3 is one of the objectives of this replacement project. Section 10 should describe the potential increase in the volume of oil that could be spilled by the new line as compared to the existing line 3.

We look forward to working with the Minnesota Department of Commerce as the EIS process moves forward. Please contact me at 608-263-2873 with any questions.

Sincerely,

Esteban Chiriboga

Esteban Chiriboga
GLIFWC Environmental Specialist

cc. Jonathan Gilbert Ph.D., GLIFWC Director, Biological Services
Ann McCammon Soltis, GLIFWC Director of Intergovernmental Affairs
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Sources Cited

Meeker, James E., Elias, Joan E., and Heim, John A., “Plants Used by the Great Lakes Ojibwa”, Great Lakes Indian Fish and wildlife Commission, 1993.

Rivers and Streams Intersecting Crude Oil Pipelines and Potential Downstream Extent of a Spill

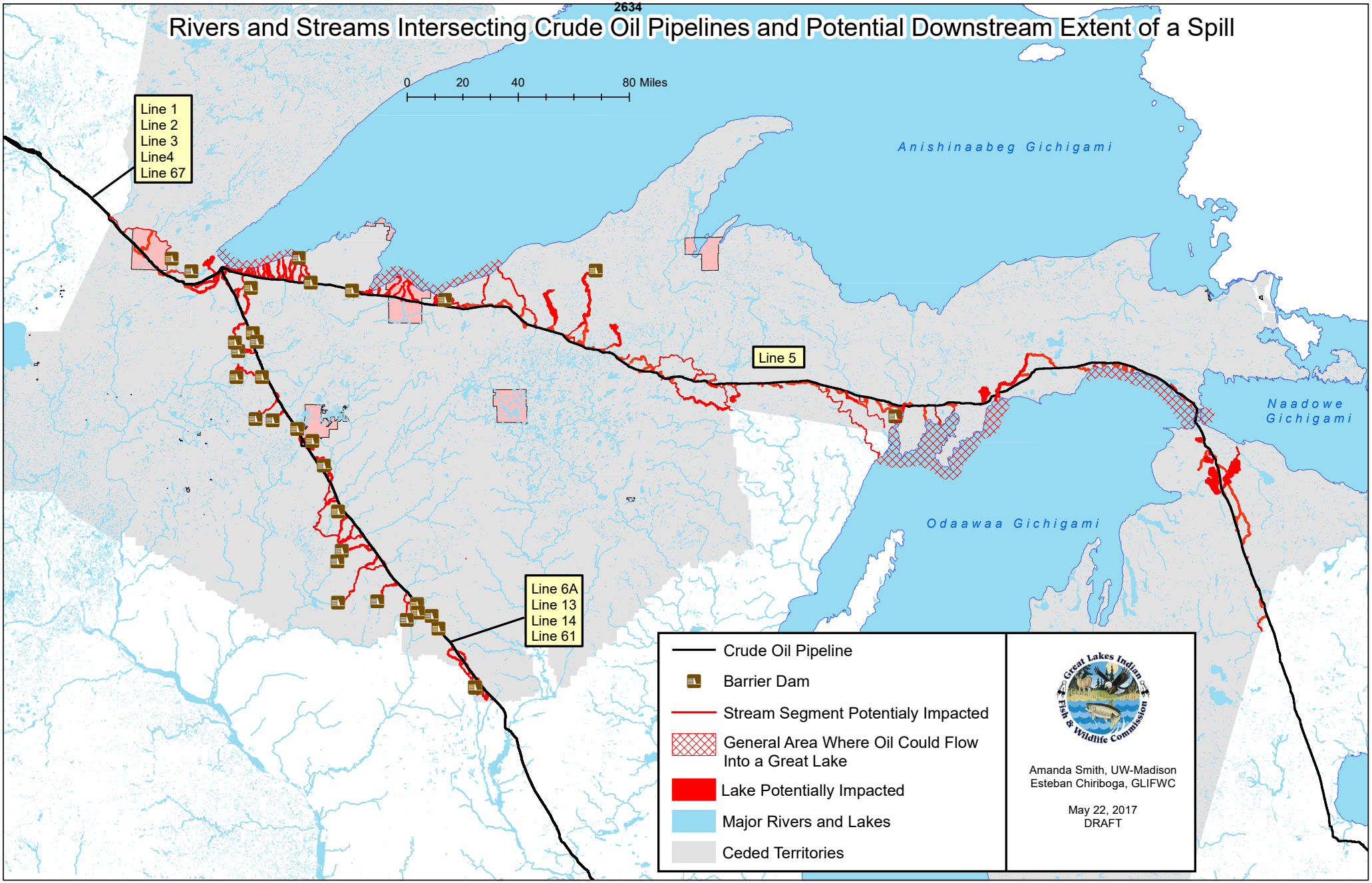

Lake Superior
Lakewide Action and Management Plan
2015 - 2019

The Lake Superior Partnership

September 2016

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This document was made possible by the many individuals and organizations working to restore and protect the Lake Superior ecosystem. The document builds upon many relevant local, tribal, state provincial, national and binational plans. Special thanks to all those involved in preparing *A Biodiversity Conservation Strategy for Lake Superior* (LSBP, 2015); to the Great Lakes Fishery Commission's Lake Superior Technical Committee; to the Great Lakes Water Quality Agreement Lakewide Management Annex (Annex 2) Subcommittee; to the numerous stakeholder groups that helped to refine the document through their review and comments at various stages of development; and to all the individuals of the Lake Superior Partnership who contributed to the LAMP's development and who will be collaborating during the implementation of this plan.

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Lake Superior Partnership Agencies, 2015

1854 Treaty Authority
Bad River Band of Lake Superior Chippewa
Bay Mills Indian Community (BMIC)
Chippewa-Ottawa Resource Authority (CORA)
Environment and Climate Change Canada (ECCC)
Fisheries and Oceans Canada (DFO)
Fond du Lac Band of Lake Superior Chippewa
Grand Portage Band of Lake Superior Chippewa
Great Lakes Indian Fish and Wildlife Commission (GLIFWC)
Keweenaw Bay Indian Community (KBIC)
Michigan Department of Environmental Quality (MDEQ)
Minnesota Department of Health (MDH)
Minnesota Department of Natural Resources (MNDNR)
Minnesota Pollution Control Agency (MPCA)
National Oceanic and Atmospheric Administration (NOAA)
Natural Resources Conservation Service
Ontario Ministry of Natural Resources and Forestry (MNRF)
Ontario Ministry of the Environment and Climate Change (MOECC)
Parks Canada
Red Cliff Band of Lake Superior Chippewa
U.S. Army Corps of Engineers (USACE)
U.S. Environmental Protection Agency (USEPA)
U.S. Fish and Wildlife Service (USFWS)
U.S. Forest Service (USFS)
U.S. Geological Survey (USGS)
U.S. National Park Service (NPS)
University of Minnesota Sea Grant Program
University of Wisconsin Sea Grant Program
Wisconsin Department of Natural Resources (WDNR)

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1.0 EXECUTIVE SUMMARY

The Lake Superior basin is one of the most beautiful and unique ecosystems in North America. Containing ten percent of the world's surface fresh water, Lake Superior is in the best ecological condition of all of the Great Lakes.

Although the Lake Superior ecosystem is in good condition, there are serious threats including: aquatic invasive species, climate change, reduced habitat connectivity between the open lake and tributaries, chemical contaminants, substances of emerging concern, and habitat destruction.

To address these challenges, the Lake Superior Lakewide Action and Management Plan (LAMP) was developed, building upon a wide variety of local, tribal, state, provincial, national and binational plans, including "A Binational Program to Restore and Protect the Lake Superior Basin." The 2015 Lake Superior LAMP is a binational action plan for restoring and protecting the ecosystem. The LAMP documents the following:

- Current environmental conditions;
- Threats to the ecosystem;
- Lakewide objectives;
- Priorities for future scientific investigations; and
- Actions and projects to address threats and to achieve lakewide objectives.

What is the LAMP?

Under the *Great Lakes Water Quality Agreement (GLWQA)*, the governments of Canada and the United States have committed to restore and maintain the physical, biological and chemical integrity of the waters of the Great Lakes.

The Lakewide Action and Management Plan (LAMP) is a binational action plan for restoring and protecting the ecosystem. The LAMP is developed by the Lake Superior Partnership, which is led by the USEPA and Environment and Climate Change Canada, and will be implemented binationally in cooperation with all Lake Superior stakeholders.

The Lake Superior LAMP was written by members of the Lake Superior Partnership, including representatives of federal, state, provincial and tribal agencies from both the U.S. and Canada. In turn, these agencies work closely with many others to manage and protect their respective portions of the Lake Superior ecosystem.

Lake Superior has some true wilderness areas. Pukaskwa National Park alone includes 219 km (136 mi) of undeveloped coastline. Credit: Parks Canada.

The Lake Superior Partnership will use this 2015 LAMP over the course of the next five years as a guide to identify, prioritize, and implement actions to restore and protect the Lake Superior ecosystem. Protection of this resource is of the highest priority and a central tenet of ecosystem management for the Lake

Superior Partnership. A new LAMP will be developed in 2020 and every five years thereafter, with the goal of protecting this incomparable resource for generations to come.

One of the key underlying principles of the Lake Superior Partnership is the importance of involving all Lake Superior stakeholders. The ultimate success of restoring and maintaining the Lake Superior ecosystem depends on the efforts of everyone.

1.1 State of Lake Superior

The Lake Superior ecosystem continues to be in good condition, as exemplified by:

- Fisheries in good condition, supported by a robust lower food web (e.g., small, shrimp-like *Diporeia* and *Mysis*);
- Self-sustaining populations of Lake Trout and increasing abundance of Lake Sturgeon;
- Good ecological status of most major habitats on a lakewide scale, including coastal wetlands; and
- Generally decreasing or stable concentrations of legacy contaminants in the environment (e.g., PCBs).

However, the ecosystem faces a number of threats, including:

- Existing aquatic invasive species (e.g., Sea Lamprey) and the risk of new invaders;
- Effects of climate change on the ecosystem (e.g., warming surface waters are stressing some cold-water species);
- Areas of impaired habitat connectivity between the tributaries and the open lake;
- Fish consumption advisories due to legacy pollutants such as mercury and PCBs;
- Substances of emerging concern, such as microplastics; and
- Other threats (e.g., mining impacts and energy sector activities).

Pictured Rocks National Lakeshore, Michigan. Credit: S. Swart.

1.2 Lakewide Ecosystem Objectives

The Great Lakes Water Quality Agreement (GLWQA) calls for the development of lake-specific ecosystem objectives, to serve as a "benchmark against which to assess status and trends in water quality and lake ecosystem health." While GLWQA Lake Ecosystem Objectives (LEOs)

have not been finalized for Lake Superior, there are nine existing lakewide objectives for water quality and habitat conditions, as found in Table 1, below.

The nine existing lakewide objectives seek to protect the physical, biological and chemical integrity of Lake Superior. Objectives for the seven major habitat types (objectives 1-7 in Table 1) were developed and assessed as part of *A Biodiversity Conservation Strategy for Lake Superior* (LSBP, 2015). These seven objectives address the physical and biological integrity of Lake Superior. The remaining two objectives (objectives 8 and 9 in Table 1) address the chemical integrity of Lake Superior. One chemical-related objective is to achieve zero release of nine specific toxic substances, which is the objective of a unique long-term pilot program in Lake Superior (see *Lake Superior Zero Discharge Demonstration Program and 1990-2010 Critical Chemical Reduction Milestones* report; LSBP, 2012). The final objective seeks to protect Lake Superior from contamination due to additional substances of concern.

Table 1. Existing Lakewide Objectives

#	Objective	Status*
1	Maintain deepwater and offshore waters in good ecological condition.	GOOD
2	Maintain nearshore zone and reefs in good ecological condition.	GOOD
3	Maintain embayments and inshore areas in good ecological condition.	GOOD
4	Maintain coastal wetlands in good ecological condition.	GOOD
5	Maintain islands in good ecological condition.	GOOD
6	Maintain coastal terrestrial habitats in good ecological condition.	GOOD
7	Maintain tributaries and watersheds in good ecological condition.	FAIR
8	Achieve zero release (from within the Lake Superior basin) of nine persistent bioaccumulative toxic substances.**	GOOD
9	Protect the Lake Superior basin from contamination resulting from additional substances of concern. ***	GOOD

* Ecological status was determined through the Conservation Action Planning (CAP) Framework, as described in *A Biodiversity Conservation Strategy for Lake Superior* (LSBP, 2015). Available Great Lakes indicators (i.e., "SOLEC indicators") were utilized through the CAP process; details of the assessment and all indicators used are available in technical documents posted on binational.net.
Ratings for Ecological Status:
Good: In a state that is within the accepted range of variation, but some management intervention may be required for some elements.
Fair: In a state that is outside the range of acceptable variation and requires management.
Poor: Allowing the goal to remain in this condition for an extended period will result in permanent ecosystem change.
**The nine persistent bioaccumulative toxic substances include: mercury, PCBs, dioxin, hexachlorobenzene, octachlorostyrene and four pesticides (dieldrin, chlordane, DDT, and toxaphene).
*** Additional substances of concern include pharmaceuticals and personal care products, microplastics, and nutrients.

1.3 Science and Monitoring Priorities

A wide range of ongoing and special intensive science and monitoring activities are undertaken to determine ecosystem conditions and trends, assess threats, and inform actions that are necessary to achieve lakewide objectives.

The primary effort to determine lakewide science and monitoring priorities is undertaken through the Lake Superior Cooperative Science and Monitoring Initiative (CSMI), an intensive, binational scientific examination which is conducted on a five-year rotational basis. The next Lake Superior CSMI field year is 2016, with data interpretation, analysis and reporting occurring in subsequent years.

Current Lake Superior science and monitoring priorities, as developed by the Lake Superior Partnership with input from hundreds of stakeholders, include but are not limited to, the following:

- Confirm lower food-web health and stability;
- Determine progress being made on reducing the nine persistent, bioaccumulative and toxic substances;
- Determine progress being made on Lake Sturgeon rehabilitation;
- Provide information needed to support implementation of fish rehabilitation plans (e.g., Walleye, Coaster Brook Trout, and Lake Sturgeon);
- Assess baseline water quality conditions in areas of critical habitat and potential significant land-use change; and
- Identify vulnerable cold-water tributaries to Lake Superior from various stressors such as climate change.

Working Together

Lake Superior's generally good ecological condition is a result of a history of strong and ongoing actions, with an emphasis on prevention. Actions are occurring at all scales – from national, state, provincial, tribal, First Nation, Métis, and municipal programs, to lakewide initiatives, to local projects by communities, businesses, and households.

1.4 Actions to Address Threats and Achieve Lakewide Objectives

The LAMP includes a list of 74 management actions to address threats to water quality and achieve lakewide objectives. These actions can be used to help identify, support or coordinate ongoing or new projects. The actions are organized under eight categories:

- Aquatic invasive species;
- Climate change;
- Dams and barriers;
- Existing chemicals of concern;
- Additional substances of concern;
- Other threats, including resource development;
- High-quality habitats; and
- Native species management.

Actions have been identified by the Lake Superior Partnership in consultation with Lake Superior stakeholders and the public. The primary sources of the actions are: *A Biodiversity Conservation Strategy for Lake Superior* (LSBP, 2015), *Lake Superior Climate Change Impacts and Adaptation Report* (Huff and Thomas, 2014), the *Lake Superior Aquatic Invasive Species Complete Prevention Plan* (LSBP, 2014), the *Zero Discharge Demonstration Program* (ongoing) and *1990-2010 Critical Chemical Reduction Milestones* report (LSBP, 2012).

The actions are fairly broad in their scope and can be used to help identify, support or coordinate ongoing or new projects for Lake Superior. For example, the actions were used to help identify Lake Superior Partnership projects over the years 2015-2019, as described below.

1.5 Lake Superior Partnership Projects for 2015-2019

To narrow down the list of 74 management actions, the Lake Superior Partnership has identified 29 projects, as listed in Table 2, below. Projects were identified by Lake Superior management experts who comprise the Lake Superior Partnership. To be identified and confirmed as a project, several factors were considered: relevancy to the broader actions needed to address a threat (referred to above), current work underway, current state of the issue, potential for a high-degree of coordinated action, contribution to achieving lakewide objectives, and achievability over the next five years.

1.6 Implementation and Accountability

Implementation of projects will remain one of the highest priorities of the individual organizations that make up the Lake Superior Partnership. Organizations identified in Section 9.1 will take action, to the extent feasible, given budget constraints and domestic policy considerations.

Internal agency work planning and reporting will help track commitment progress and provide an accountability mechanism for the results of each individual organization. Internal Lake Superior Partnership committee workplans will help track implementation at a higher level to support coordination between organizations and in the engagement of others, as well as to support lakewide reporting on LAMP implementation (e.g., annual updates to the public on the LAMP).

Table 2. Lake Superior Partnership Projects: 2015-2019

Projects 2015-2019	Agencies Involved
Aquatic Invasive Species	
1. Add additional locations to the lakewide aquatic invasive species early detection/rapid response surveillance projects.	1854 Treaty Authority, CORA, DFO, Fond du Lac, KBIC, MDEQ, MNRF, NOAA, NPS, Parks Canada, USEPA, USFS, USFWS, WDNR
2. Undertake additional aquatic invasive species prevention outreach and education, including discussions with recreational boaters, and installation of lake access site signage.	1854 Treaty Authority, Bad River, BMIC, Fond du Lac, GLIFWC, Grand Portage, KBIC, MDEQ, Minnesota Sea Grant, MNRF, NPS, Parks Canada, Red Cliff, USFS, WDNR
3. Maintain and improve effectiveness of Sea Lamprey control, prevent introduction of new species, and limit expansion of previously-established aquatic invasive species.	1854 Treaty Authority, Bad River, BMIC, CORA, DFO, GLIFWC, NPS, Parks Canada, Red Cliff, USFWS, USGS
4. Contribute to the elimination of European Common Reed (i.e., *Phragmites australis, subsp. australis*) from the Lake Superior basin by undertaking or supporting lakewide distribution mapping, early detection efforts, and control efforts.	1854 Treaty Authority, Bad River, Fond du Lac, GLIFWC, MDEQ, MNDNR, MNRF, NPS, Parks Canada, Red Cliff, USEPA, USFS, WDNR
Climate Change	
1. Undertake or support outreach and education to stakeholders on the impacts of climate change in the Lake Superior ecosystem, including potential changes to habitat ranges, stormwater management, and nutrient/chemical cycling.	1854 Treaty Authority, Bad River, BMIC, CORA, ECCC, Fond du Lac, GLIFWC, Grand Portage, KBIC, MOECC, NOAA, NPS, Red Cliff, USEPA, USFS, USGS
2. Support local climate change initiatives to help communities and/or natural resource managers develop adaptation plans.	1854 Treaty Authority, Bad River, BMIC, CORA, Fond du Lac, GLIFWC, Grand Portage, KBIC, Minnesota Sea Grant, MNDNR, MOECC, NOAA, NPS, Red Cliff, USFS, USFWS, USGS
Dams & Barriers	
1. Improve access to high-resolution stream/river barrier data and species-specific benefit analyses in support of decision-making on Lake Superior habitat connectivity decisions.	Bad River, Fond du Lac, KBIC, MNRF, Red Cliff, USFS, USFWS, WDNR
2. Establish a collaborative Lake Superior streams improvement initiative in Canada to undertake stream monitoring, assessment, and data management activities, and to help identify stream protection and restoration priorities.	MNRF

Projects 2015-2019	Agencies Involved
Dams & Barriers (continued)	
3. Prepare an environmental studies report to explore the feasibility, costs and benefits associated with the options surrounding the proposed decommissioning of Ontario's Camp 43 dam, and the construction of a corresponding multi-purpose Sea Lamprey barrier at Eskwanonwatin Lake.	MNRF
Chemical Contaminants	
1. Continue outreach and education to the public on mercury toxicity; pathways into fish, wildlife and humans; and actions that can be taken to help remove mercury from the basin.	Bad River, CORA, Fond du Lac, GLIFWC, Grand Portage, KBIC, MDEQ, MOECC, NOAA, NPS, Red Cliff, USEPA, USFS, USFWS, USGS
2. Conduct a data synthesis of available mercury monitoring data for the Lake Superior basin to improve the inter-jurisdictional understanding and communication of mercury trends in the Lake Superior ecosystem.	Bad River, ECCC, Fond du Lac, MPCA, NOAA, NPS, USGS
3. Document which agencies and local governments collect and track the types and amounts of pesticides disposed, as feasible, so as to inform existing pesticide collection programs, such as clean sweeps. Information will be used to assess the potential for expanding collections to additional geographic areas.	ECCC, MDEQ, WDNR
4. Continue to support open burning abatement programs, such as "Bernie the Burn Barrel," to achieve reductions in the release of dioxins and furans into the Lake Superior basin from the practice of residential burning of garbage.	Bad River, CORA, Fond du Lac, KBIC, MOECC, MPCA, Red Cliff, WDNR
Additional Substances of Concern	
1. Increase efforts to educate the public on new and emerging chemicals; their potential toxicity; pathways into fish, wildlife and humans; and how the public can help remove these chemicals from the basin. Put special emphasis on the topics of microplastics and safer alternatives for personal care, household cleaning products, and pesticides/herbicides.	BMIC, ECCC, Fond du Lac, Grand Portage, KBIC, MOECC, NOAA, NPS, Red Cliff, USGS, USFWS
2. Compile information on the type and status of different pharmaceutical collection efforts in the basin and other efforts to locate and properly dispose of unwanted medication. Use this information to identify opportunities for further action.	Bad River, ECCC, KBIC, MPCA, USFWS, USGS, WDNR

Projects 2015-2019	Agencies Involved
Other Existing and Emerging Threats	
1. Provide oil spill responders with better access to existing and new spatial data (as available) on ecologically-important and sensitive habitats.	Bad River, CORA, Fond du Lac, GLIFWC, MOECC, NOAA, NPS, Parks Canada, USFWS, USGS
2. Support efforts to increase the sustainable use of Lake Superior basin resources, with specific emphasis on projects on green stormwater infrastructure, incorporating traditional ecological knowledge into projects, and/or recognizing the monetary value of ecosystem services.	1854 Treaty Authority, Bad River, BMIC, CORA, Fond du Lac, GLIFWC, KBIC, MOECC, NOAA, NPS, Parks Canada, Red Cliff, USEPA, USFWS
3. Outreach and engage with communities and others at the local scale on the value of water and best water use practices and policies.	Bad River, CORA, Fond du Lac, GLIFWC, KBIC, MDEQ, Red Cliff, USFWS, USGS, WDNR
4. Map current and proposed mining activities in the Lake Superior basin to support understanding of the potential and cumulative impacts of mining on important habitat sites. Assess impacts due to other stressors, such as climate change.	1854 Treaty Authority, CORA, Fond du Lac, GLIFWC, MPCA, NPS, USGS
High-Quality Habitats	
1. Investigate, evaluate, and if feasible, implement dredging solutions or other habitat restoration efforts at Buffalo Reef, Michigan.	GLIFWC, NOAA, USACE, USEPA
2. Improve the mapping and quantification of important spawning, nursery and foraging habitat for key fish species to support protection and restoration decision-making.	1854 Treaty Authority, CORA, Fond du Lac, GLIFWC, MNRF, NPS, Parks Canada, Red Cliff, USEPA, USFWS, USGS, WDNR
3. Promote and support local and regional implementation of *A Biodiversity Conservation Strategy for Lake Superior* (LSBP, 2015) and corresponding Regional Plans.	1854 Treaty Authority, Bad River, BMIC, CORA, ECCC, Fond du Lac, GLIFWC, Grand Portage, KBIC, MDEQ, MNDNR, MNRF, NOAA, NPS, Parks Canada, Red Cliff, USFS, USFWS, WDNR
4. Formally establish the Lake Superior National Marine Conservation Area in Canada, and Federal-Provincial harmonization committee to develop and implement management priorities for the area.	MNRF, Parks Canada
5. Integrate spatial data standards, methodologies and geomatic products to help identify and prioritize sites for habitat protection and rehabilitation.	GLIFWC, MNDNR, NOAA, NPS, USEPA, USFWS, USGS
6. Protect and enhance important coastal wetland habitats on priority state and tribal lands in western Lake Superior, including Bark Bay, Frog Bay, Bad River/Kakagon Sloughs and the St. Louis River estuary.	1854 Treaty Authority, Bad River, Fond du Lac, GLIFWC, KBIC, MNDNR, NOAA, NPS, Red Cliff, USEPA, USFS, USFWS, USGS, WDNR

Projects 2015-2019	Agencies Involved
Diverse, Healthy and Self-sustaining Native Species Populations	
1. Develop and update stock assessment models to improve management of self-sustaining commercial and sport fisheries for Lake Trout, Cisco, and Lake Whitefish.	Bad River, BMIC, CORA, GLIFWC, Grand Portage, MNRF, NPS, Red Cliff, USFWS, USGS, WDNR
2. Rehabilitate populations of indigenous aquatic species (e.g., Brook Trout, Lake Sturgeon, Muskellunge, Walleye, etc.).	Bad River, CORA, DFO, Grand Portage, KBIC, MNRF, NPS, Red Cliff, USFWS, WDNR
3. Update the Ecopath with Ecosim (EwE) ecological model (www.ecopath.org) with recently acquired data and knowledge in order to explore: a) how recent changes in fish abundance could be influencing the food web; b) how the ecosystem may respond to current and potential threats; and c) how components of the ecosystem may respond to potential management actions.	CORA, GLIFWC, Grand Portage, MNRF, USEPA, USFWS, USGS
4. Develop and implement improved monitoring approaches for inshore, embayment, and tributary fish populations.	1854 Treaty Authority, BMIC, CORA, Fond du Lac, GLIFWC, Grand Portage, NPS, Red Cliff, USFWS, USGS

Projects are not ranked in priority order. Agencies are listed in alphabetical order.

2.0 INTRODUCTION

The Lake Superior Lakewide Action and Management Plan (LAMP) is a binational action plan for restoring and protecting the Lake Superior ecosystem. The LAMP also includes information on Lake Superior conditions, stressors, threats, current strategies and science priorities.

In outlining management actions, the LAMP will guide and support the work of natural resource managers, decision-makers, Lake Superior stakeholders and the general public.

Pictured Rocks National Lakeshore, Michigan. Credit: S. Swart.

2.1 Great Lakes Water Quality Agreement (GLWQA)

The 1972 *Agreement between the United States of America and Canada on Great Lakes Water Quality* (known as the Great Lakes Water Quality Agreement or GLWQA) established formal commitments to restore and maintain the water quality of this international freshwater resource. The GLWQA was amended in 1983, 1987, and most recently in 2012. The 2012 protocol amending the GLWQA reaffirms the United States' and Canada's determination "to protect, restore, and enhance water quality of the Waters of the Great Lakes and their intention to prevent further pollution and degradation of the Great Lakes Basin Ecosystem" (Canada and United States, 2012).

The GLWQA sets forth nine General Objectives which outline desired water quality conditions. As described in more detail in Section 4.0, the General Objectives direct that Great Lakes waters should: be a source of safe, high quality drinking water; allow for swimming and other recreational uses; allow for human consumption of fish and wildlife; be free from pollutants harmful to human health, aquatic organisms, and wildlife; support healthy wetlands and other habitats sustainable to native species; be free from nutrients that may cause harmful algal blooms; be free from the spread of invasive species; and be free from other substances which may affect the chemical, physical or biological integrity of the Great Lakes.

In Annex 2 of the GLWQA, "Lakewide Management," the United States and Canada jointly commit to assessing the status of each Great Lake by addressing environmental stressors that adversely affect the waters of the Great Lakes and which are best addressed on a lakewide scale through an ecosystem approach.

2.2 Lake Superior Partnership

The LAMP was written, and will be implemented and managed, by the Lake Superior Partnership, including federal, state, provincial, and tribal governments or agencies tasked with protecting and restoring the Lake Superior ecosystem. The Partnership, led by Environment and Climate Change Canada and the United States Environmental Protection Agency, seeks to contribute to the achievement of the objectives of the GLWQA with the involvement and input of others, including the Public.

The origin of the Lake Superior Partnership goes back to 1991, in response to the International Joint Commission's (IJC) recommendation that Lake Superior be designated as a demonstration area where "no point source discharge of any persistent toxic substance will be permitted." In response to that IJC recommendation, the federal governments of Canada and the U.S., the Province of Ontario, and the States of Michigan, Minnesota, and Wisconsin announced "A Binational Program to Restore and Protect the Lake Superior Basin," known as the Lake Superior Binational Program (LSBP). In addition to public outreach and broader program activities, the LSBP included the Zero Discharge Demonstration Program (ZDDP). The ZDDP has contributed to the dramatic reduction in emissions of critical legacy pollutants, such as mercury and PCBs, within the Lake Superior basin. The Broader Ecosystem program led to the establishment of lakewide ecosystem objectives which have been used to assess progress toward restoration and protection. The agencies of the Lake Superior Partnership are discussing the future status of the LSBP and its relationship to the GLWQA.

2.3 Significance of Lake Superior

Lake Superior is one of the most beautiful, unique and valuable ecosystems in the world. Containing nearly 10% of the world's surface freshwater, Lake Superior is the world's largest lake by surface area, with a volume of 3 quadrillion gallons (11.4 quadrillion liters). The lake has 2,730 miles (4,393 km) of shoreline (including islands). The lake's natural resources support many industrial and business operations, including tourism, fishing and other outdoor recreation activities. The lake's natural resources are culturally significant to local communities, tribes, First Nations and Métis.

Lake Superior Physical Facts

- Average depth: 147 m (483 ft)
- Maximum depth: 405 m (1,330 ft)
- Drainage basin: 127,686 km^2 (49,300 mi^2)
  - 85% forested,
  - 10.4% water,
  - 1.7% agriculture
  - 1.5% developed land
  - 1.0% wetland

Source: Beall, 2011

Lake Superior has unique fauna, containing species and subspecies found nowhere else on the planet, such as Siscowet, a large deep water form of Lake Trout, and Kiyi, the primary prey of Siscowet. Parts of Lake Superior's coastline provide habitat for arctic-alpine plant species that began to recolonize in the region around 15,000 years ago as the last ice sheet

retreated. The southernmost populations of Woodland Caribou still roam parts of Lake Superior's coast and islands.

Towering cliffs overlooking pebble beaches, deep, crystal-clear, frigid waters silently guarding the final resting place of more than 350 shipwrecked vessels … These are evocative images of the "greatest" of the Great Lakes – Lake Superior, or as the Ojibiwe people named it, Gichigami. Nipigon Bay, Ontario. Credit: D. Crawford.

Indigenous peoples (also known as the Anishinaabeg people, including the Ojibwe nation) of the watershed have called Lake Superior home for thousands of years, and play an important role in managing the lake. As the place where they found "the food that grows on the water" (Northern Wild Rice, *Zizania palustris*), Mooningwanekaaning (Madeline Island in Wisconsin, part of the Apostle Islands) is the center of the Ojibwe nation. In the United States, the homelands of Ojibwe tribes stretch from central Minnesota through the Upper Peninsula of Michigan, with treaty-ceded territories located throughout the Lake Superior basin. In Canada, over a dozen First Nations communities are located along the coast or within the Lake Superior basin. Figure 1 shows First Nation and tribal lands in the Lake Superior basin.

The waters, fish, plants and wildlife in the Lake Superior basin continue to provide a sense of identity and continuity with traditional ways of life. Culturally-significant wildlife include Lake Sturgeon, Bald Eagle, and Walleye, while culturally-significant plant species include Wild Rice, Labrador Tea, Paper Birch, and Cedar. Indigenous inhabitants continue to use subsistence harvesting practices throughout the basin.

Traditional Ecological Knowledge (TEK) is a term that encompasses the knowledge system of indigenous people based upon direct observations of the surrounding environment. This indigenous knowledge is passed down generation to generation and is used to explain their place in complex and interdependent relationships with all of creation. TEK enhances the understanding and appreciation of Lake Superior and is useful in local, regional, and lakewide management. TEK will be incorporated into implementation of the LAMP. According to the Ojibwe world view, Lake Superior and its connected lakes, rivers and streams are not simply the sum of their constituent parts, or the property of a state, nation, or person. Instead, they are

integral parts of the web of life that supports the continuation of Anishinaabe ways of life and provides life-giving benefits to all who now call Lake Superior home.

Nipigon Bay. Credit: D. Crawford.

Tourism is one of the economic engines of the Lake Superior region. An abundance of outdoor activities, festivals, concerts, athletic events, and unique dining and shopping opportunities draw thousands of visitors each year, particularly to vibrant metropolitan areas such as Duluth, Minnesota, and Thunder Bay, Ontario. Summer brings boaters, sightseers, campers, kayakers, anglers, and swimmers to the shore, while winter attracts skiers, snowmobilers, and snowshoers from surrounding states and provinces and beyond (Minnesota Sea Grant, 2014a).

Kayaking (left), swimming (middle), and ice fishing (right) are popular recreational activities on Lake Superior. Credit: J. Bailey (left), L. LaPlante (middle), and D. Viebeck (right).

Lake Superior contains dozens of federal, provincial, tribal, and non-governmental **parks and conservation areas** which provide a wide array of recreational experiences in the Lake Superior region. Pukaskwa National Park and Lake Superior Provincial Park on the eastern coast of Lake Superior in Ontario are the book ends of the longest undeveloped coastline in the entire Great Lakes basin. In Michigan, sandstone cliffs and white sand beaches beckon visitors to Pictured Rocks National Lakeshore. In Wisconsin, lighthouses backdrop the exploration of sea caves, ice caves, and majestic islands that comprise the Apostle Islands National Lakeshore. In Minnesota, the lighthouse in Split Rock Lighthouse State Park provides a historical starting point to experiencing Lake Superior's famous cobble beaches and rocky shores. Once formally established, Canada's Lake Superior National Marine Conservation Area (NMCA) will encompass over 10,000 km^2 (3,861 mi^2) of protected aquatic and terrestrial habitat. This protected marine area will safeguard aspects of the ecosystem and provide

benefits to local coastal communities that depend on marine industries, such as commercial fishing, sport fishing, recreational boating, and shipping (Parks Canada, 2015).

Resolute Forest Products, Thunder Bay, Ontario. Credit: D. McChristie.

Lake Superior's **natural resources** are the backbone of the regional economy. Industries such as shipping, forestry, mining, agriculture, charter and recreational fishing, and tourism, contribute greatly to the local economies of coastal communities, as well as to the economy of the Great Lakes region as a whole. While no formal, comprehensive economic assessment has been completed for the Lake Superior basin to date, the importance of these industries to the health and viability of coastal

Figure 1. First Nations and tribal lands in the Lake Superior basin. Source: The Nature Conservancy of Canada.

communities and residents cannot be overstated. For example, the Great Lakes and St. Lawrence Seaway connects the Atlantic Ocean (and the world) to Lake Superior. The port of Duluth-Superior, Lake Superior's largest port (by metric tons of cargo), averages around 40 million metric tons of cargo annually, primarily consisting of iron ore, coal, and grain. The value of this cargo is estimated to be $1.9 billion (USD), while the port supports approximately 2,000 jobs (Minnesota Sea Grant, 2014b). The shipping industry contributes greatly to many other Lake Superior communities including Marquette, Michigan; Sault St. Marie, Michigan; and Thunder Bay, Ontario (Minnesota Sea Grant, 2014b).

The annual value of cargo moving through the port of Duluth-Superior is estimated to be 1.9 billion dollars (USD). Credit: S. Swart.

3.0 EXISTING LAKEWIDE OBJECTIVES

3.1 Background

Through the GLWQA, the governments of Canada and the United States have committed to establishing Lake Ecosystem Objectives (LEOs) that will specify interim or long-term ecological conditions necessary to achieve the GLWQA General Objectives. LEOs will be used as a benchmark against which to assess status and trends in water quality and lake ecosystem health. LEOs will be determined using a systematic approach that is consistent among the Lakes, but also flexible enough to accommodate the unique characteristics and challenges faced by each Lake. LEOs for Lake Superior are scheduled to be developed by the end of 2017. The current, existing lakewide objectives for Lake Superior are presented below.

3.2 Existing Lakewide Objectives

In the short term, the Lake Superior Partnership is using previously-established conservation targets for habitats and species, and previously-established chemical objectives. These existing lakewide objectives and their current status are summarized in Table 3. For details on the status assessment for these lakewide objectives, refer to *A Biodiversity Conservation Strategy for Lake Superior* (LSBP, 2015) and the Lake Superior Zero Discharge Demonstration Program and *1990-2010 Critical Chemical Reduction Milestones* report (LSBP, 2012).

Table 3. Existing Lakewide Objectives for Lake Superior

#	Lakewide Objective	Description	Status*
1	Maintain deepwater and offshore waters in good ecological condition.	Waters that are over 80 m (262 ft) in depth. The offshore waters provide habitat for a number of native fish. Example species include Siscowet, Kiyi and other Ciscoes, Burbot, and Deepwater Sculpin.	GOOD
2	Maintain nearshore zone and reefs in good ecological condition.	Waters between 15-80 m (49-262 ft) in depth, and shallow reefs. Lake Superior's major sport and commercial fisheries are located in the nearshore zone. Example species include Lake Trout and Lake Whitefish.	GOOD
3	Maintain embayments and inshore areas in good ecological condition.	Embayments and the inshore zone at depths of 0-15 m (0-49 ft). These habitats are critical for fish abundance and diversity, since these areas provide spawning and nursery habitat for many nearshore and offshore fish species, as well as waterfowl staging and feeding zones. Example species include Lake Sturgeon, Walleye, and Yellow Perch.	GOOD
4	Maintain coastal wetlands in good ecological condition.	Wetlands within 2 km (1.2 mi) of Lake Superior's coast, with an emphasis on wetlands that have historic and current hydrologic connectivity to, and are directly influenced by the lake. Example species include Northern Pike, waterfowl, and many amphibians.	GOOD

#	Lakewide Objective	Description	Status*
5	Maintain islands in good ecological condition.	All land masses that are surrounded by water, including both natural and artificial islands. Lake Superior has many of the largest and most isolated islands on the Great Lakes. Islands support colonial nesting waterbirds such as gulls, and unique ecological communities.	GOOD
6	Maintain coastal terrestrial habitats in good ecological condition.	Habitats within 2 km (1.2 mi) from the coast or to the extent of delineation. Many rare species and habitats are found in this zone including shorebirds, bald eagles, and rare plant communities.	GOOD
7	Maintain tributaries and watersheds in good ecological condition.	All rivers, streams and inland lakes that flow into Lake Superior and their associated watersheds. Lakes, rivers and streams in the basin are influenced by land use, which affects water quality in Lake Superior. Native Lake Superior fish that migrate to and depend on tributaries as part of their natural life cycle. Examples of species that depend on tributaries and watersheds include Coaster Brook Trout, Suckers, and Northern Wild Rice.	FAIR
8	Achieve zero release (from within the Lake Superior basin) of nine persistent bioaccumulative toxic substances.**	This is called the Lake Superior Zero Discharge Demonstration Program. With 1990 as the baseline year, a staged reduction plan was developed with the year 2020 as the target for the aspirational goal of virtual elimination of these substances.	GOOD
9	Protect the Lake Superior basin from contamination resulting from additional substances of concern. ***	In addition to the nine legacy chemicals, there are a large number of substances, under an umbrella term called *substances of emerging concern*. These include substances used in flame retardants, personal care products, and pharmaceuticals.	GOOD

* Ecological status was determined through the Conservation Action Planning (CAP) Framework, as described in *A Biodiversity Conservation Strategy for Lake Superior* (LSBP, 2015). Available Great Lakes indicators (i.e., "SOLEC indicators") were utilized through the CAP process; details of the assessment and all indicators used are available in technical documents posted on binational.net.

Ratings for Ecological Status:

Good: In a state that is within the accepted range of variation, but some management intervention may be required for some elements.

Fair: In a state that is outside the range of acceptable variation and requires management.

Poor: Allowing the goal to remain in this condition for an extended period will result in permanent ecosystem change.

** The nine persistent bioaccumulative toxic substances include: mercury, PCBs, dioxin, hexachlorobenzene, octachlorostyrene and four pesticides (dieldrin, chlordane, DDT, and toxaphene).

*** Additional substances of concern include pharmaceuticals and personal care products, microplastics, and nutrients.

4.0 STATE OF LAKE SUPERIOR

Information on the state of Lake Superior is organized under the nine General Objectives of the Great Lakes Water Quality Agreement. Information is also provided on threats to Lake Superior's habitats, species and water quality.

Unless otherwise noted, the source of the information is the *State of the Great Lakes 2011 Technical Indicator Report* by Environment Canada[1] and USEPA (2013).

In the year 2020, the next Lake Superior LAMP will use newly developed Lake Ecosystem Objectives as the benchmark with which to assess ecosystem status and trends.

The Lake Superior ecosystem is in generally good condition. Fisheries are in good to excellent condition, supported by a robust lower food web (e.g., small, shrimp-like *Diporeia* and *Mysis*); there are self-sustaining populations of Lake Trout and increasing abundance of Lake Sturgeon; most major habitats are in good condition on a lakewide scale, including coastal wetlands; and concentrations of legacy contaminants in the environment (e.g., PCBs) are generally decreasing or remaining stable.

Lake Superior faces a variety of challenges. Fish consumption advisories due to legacy pollutants such as mercury and PCBs; continued damage from aquatic invasive species (e.g., Sea Lamprey) and the risk of new invaders; effects of climate change on the ecosystem (e.g., warming surface waters stressing some cold-water species); areas of impaired habitat connectivity between the tributaries and the open lake; chemical substances of emerging concern, such as microplastics; and balancing resource development with environmental protection.

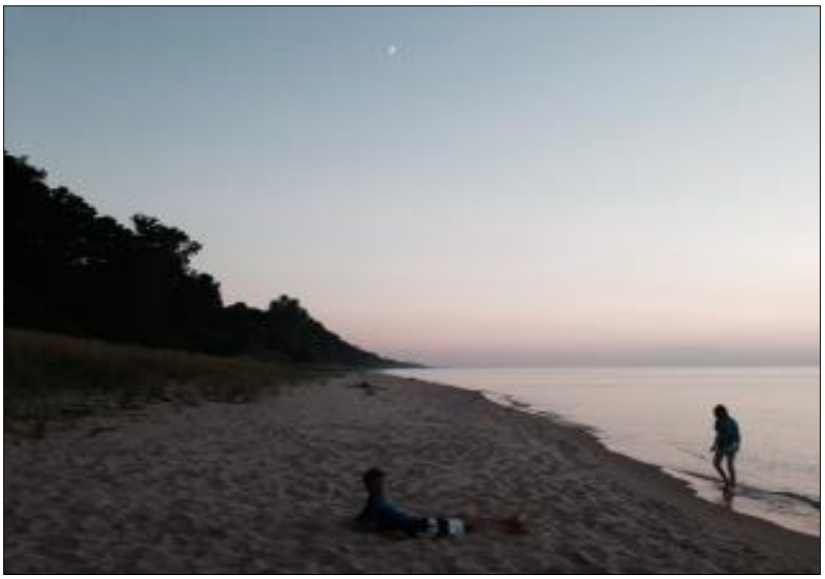

Relaxing on the beach at sunset. Credit: L. LaPlante.

[1] References authored by Environment Canada prior to the agency's name change in 2015 continue to use the former name for consistency with the references listed in Section 10.

4.1 State of Lake Superior in Relation to GLWQA General Objectives

State of Lake Superior in relation to GLWQA General Objectives

The GLWQA contains nine General Objectives for the waters of the Great Lakes.

(i) ***Be a source of safe, high-quality drinking water***;

Lake Superior is a safe, high-quality source of water for drinking water systems. In Ontario, nearly 100% of drinking water tests meet standards. In Michigan, Minnesota and Wisconsin, health-based violations from drinking water systems are rare.

(ii) ***Allow for swimming and other recreational use, unrestricted by environmental quality concerns***;

Over 90% of the time, Lake Superior beaches are open and safe for swimming.

(iii) ***Allow for human consumption of fish and wildlife unrestricted by concerns due to harmful pollutants***;

Lake Superior fish are a healthy and nutritious food source. Consumption advisories are issued to limit exposure to harmful pollutants found in some fish in some areas.

(iv) ***Be free from pollutants in quantities or concentrations that could be harmful to human health, wildlife, or aquatic organisms, through direct exposure or indirect exposure through the food chain***;

Concentrations of most contaminants are lower in Lake Superior waters than in the other Great Lakes. However, there are exceptions, including a few chemicals found at their highest concentration in Lake Superior. In whole fish, concentrations of some contaminants are above guidelines. In waterbirds and sediments, there are locations where higher concentrations of contaminants are found, but overall concentrations are generally low compared to the other Great Lakes.

(v) ***Support healthy and productive wetlands and other habitats to sustain resilient populations of native species***;

Lake Superior's coastal wetlands are in good overall health from a lakewide perspective, as are most other major habitat types. Tributaries and watersheds are the exception, being in fair condition.

(vi) ***Be free from nutrients that directly or indirectly enter the water as a result of human activity, in amounts that promote growth of algae and cyanobacteria that interfere with aquatic ecosystem health or human use of the ecosystem***;

Offshore nutrient targets continue to be met, and conditions remain acceptable. However, localized, low toxicity harmful algal blooms have been observed in some locations.

(vii) ***Be free from the introduction and spread of aquatic invasive species and free from the introduction and spread of terrestrial invasive species that adversely impact the quality of the Waters of the Great Lakes***;

Aquatic invasive species are a high threat to the Lake Superior ecosystem, due to the persistence of established invaders, expanding ranges, and the threat of new invaders.

(viii) ***Be free from the harmful impact of contaminated groundwater***;

The full extent and impact of contaminated groundwater discharges on Lake Superior is not known.

(ix) ***Be free from other substances, materials or conditions that may negatively impact the chemical, physical or biological integrity of the Waters of the Great Lakes***;

Atmospheric deposition is the top source of many contaminants found in Lake Superior. The highest threats to Lake Superior's habitats and species are aquatic invasive species, climate change, and dams and barriers.

Be a Source of Safe, High Quality Drinking Water

Lake Superior is a safe, high-quality source of water for public drinking water systems. In Ontario, nearly 100% of drinking water tests meet standards. In Michigan, Minnesota and Wisconsin, health-based violations from drinking water systems are very rare. Health-based exceedances can be caused by microbiological or chemical contaminants. Outside of public drinking water systems, the quality of water may vary on a local basis, depending on potential sources of contamination and treatment processes.

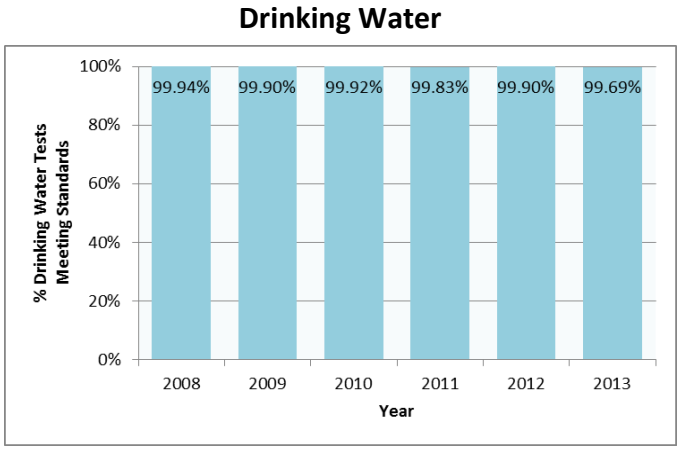

Figure 2. Percentage of Lake Superior drinking water tests meeting standards from Ontario municipal residential drinking water systems using Lake Superior water. Source: Data from Chief Drinking Water Inspector Annual Reports.

Allow for Swimming and Other Recreational Use, Unrestricted by Environmental Quality Concerns

On average, Lake Superior's beaches are open and safe for swimming and other recreational use over 95% of the time in the U.S. and over 88% of the time in Canada. Note that the U.S. and Canada use different criteria for determining when a beach is considered safe for swimming (i.e., less than 235 or 300 *E.coli* colony-forming units per 100 mL in the U.S. versus less than 100 *E.coli* colony-forming units per 100 mL in Canada). Increased beach monitoring and assessment is helping

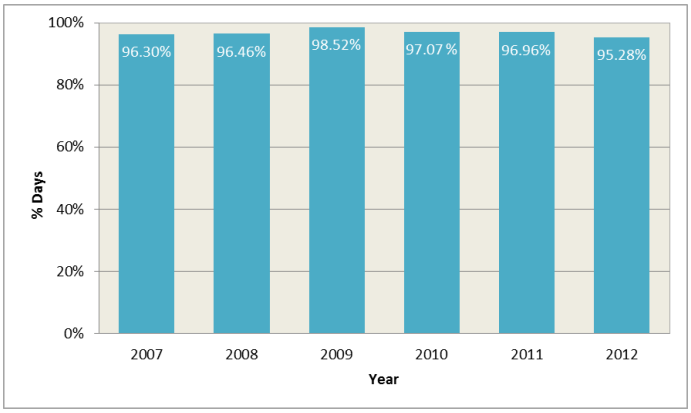

Figure 3. Percentage of days U.S. Lake Superior beaches are open and considered safe for swimming. Source: U.S. States reporting to USEPA's Beach Advisory and Closing On-Line Notification System.

to inform the public when beaches are safe for recreational use.

Major rain events and flooding can wash contaminants into the lake and overwhelm wastewater treatment plants' capability. In 2012, record flooding in the southwest part of the basin resulted in significant numbers of beach advisories. For example, beaches in Douglas County, Wisconsin, were open and safe for swimming only 70% of the time that year.

Allow for Human Consumption of Fish and Wildlife Unrestricted by Concerns Due to Harmful Pollutants

Lake Superior fish continue to be a healthy and nutritious food source. Some of the most popular species include Lake Whitefish, Lake Trout and Cisco (Lake Herring). Consumption advice is issued by states, tribes and the Province of Ontario in efforts to avoid impacts of harmful pollutants found in some fish in some areas. Developing fetuses and young children are affected by contaminants at lower levels than the general population. Therefore, it is especially important that women of child-bearing age and young children follow fish consumption recommendations (Guide to Eating Ontario Fish, 2015). Overall, there are fewer Lake Superior fish consumption advisories as compared to the other Great Lakes.

Fish consumption recommendations are provided by:

- Great Lakes Indian Fish and Wildlife Commission: glifwc.org/Mercury/mercury
- Michigan: michigan.gov/eatsafefish
- Minnesota: health.state.mn.us/fish
- Ontario: Ontario.ca/fishguide
- Wisconsin: dnr.wi.gov/topic/fishing/consumption

The two main contaminants responsible for fish advisories are polychlorinated biphenyls (PCBs) and mercury, and in a few locations, dioxins and toxaphene. Large predator fish, such as older Lake Trout, are likely to have higher contaminant levels than other species.

The eggs of Great Lakes fatty fish, especially spawning salmon species, such as Chinook and Coho Salmon, can contain elevated levels of PCBs and other organic contaminants because of their high fat content, and therefore should avoid being eaten (Ontario MOECC, 2015).

Snapping turtles may have high levels of contaminants in their fat, liver, and eggs. As a precaution, individuals are advised to trim away the fat prior to cooking turtle meat.

As part of their traditional culture, tribal, First Nation and Métis communities consume more local fish, on average, compared to others living in the basin. In 2011-2012, samples of the full range of traditional food across Ontario were collected for contaminant analyses as part of a First Nations food, nutrition and environment study. Results indicate that the ingestion of contaminants from traditional foods is not a concern, with the exception of mercury intake from fish in some locations for children and women of childbearing age (Chan et al., 2014).

These findings are consistent with Ontario Ministry of the Environment and Climate Change's *Guide to Eating Ontario Fish*, which recommends restrictions on the amount of fish consumed each month from some Lake Superior locations.

During 2013, population-based contaminant biomonitoring was conducted on individuals from the Fond du Lac Band of Lake Superior Chippewa, in Minnesota. Levels of contaminants found in their bodies were below levels of health concern. The results again suggest that fish may be safely consumed by following fish consumption guidelines (Fond du Lac and MDH, 2014).

Be Free from Pollutants in Quantities or Concentrations That Could Be Harmful To Human Health, Wildlife, or Aquatic Organisms, Through Direct Exposure or Indirect Exposure Through the Food Chain

Concentrations of most contaminants are the lowest in Lake Superior water, compared to the other Great Lakes. However, there are exceptions; a few chemicals have their highest concentration in Lake Superior. In whole fish, concentrations of some contaminants are above guidelines. In waterbirds and sediments, there are locations where higher concentrations of contaminants are found, but overall concentrations are generally low compared to the other Great Lakes.

Brook trout. Credit: H. Quinlan, U.S. Fish and Wildlife Service.

Contaminants in Whole Fish

Organochlorine pesticides and total PCBs contribute equally and together make up approximately two-thirds of the chemical body burden of Lake Trout (the total amount of chemicals in the body of an organism) in Lake Superior (McGoldrick and Murphy, 2015). Total PCBs in Lake Trout are declining in Lake Superior at an annual rate between 4 and 5 percent. In 2013, the most recent year reported, 33 of 53 measurements of PCBs were above the 1987 GLWQA criteria value of 0.1 ppm. Toxaphene is the most abundant organochlorine pesticide measured in Lake Superior, unlike the other Great Lakes. Total mercury concentrations in Lake Superior Lake Trout appear to have increased slightly since 1987 but remain below the 1987 GLWQA criteria of 0.5 ppm. Some of the remaining chemicals reported in fish from Lake Superior are PBDEs, PFCs, other flame retardants, and siloxanes.

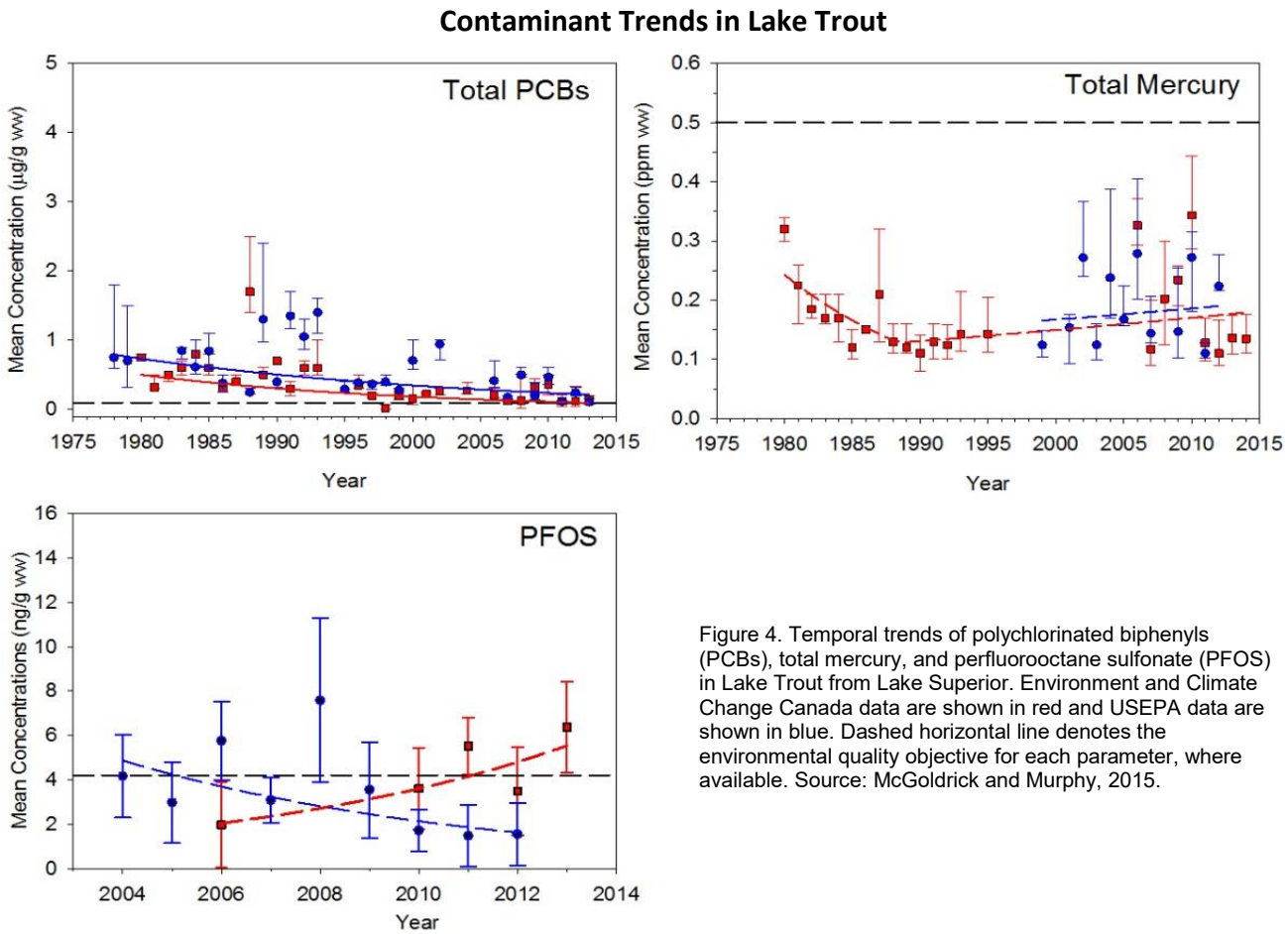

Figure 4. Temporal trends of polychlorinated biphenyls (PCBs), total mercury, and perfluorooctane sulfonate (PFOS) in Lake Trout from Lake Superior. Environment and Climate Change Canada data are shown in red and USEPA data are shown in blue. Dashed horizontal line denotes the environmental quality objective for each parameter, where available. Source: McGoldrick and Murphy, 2015.

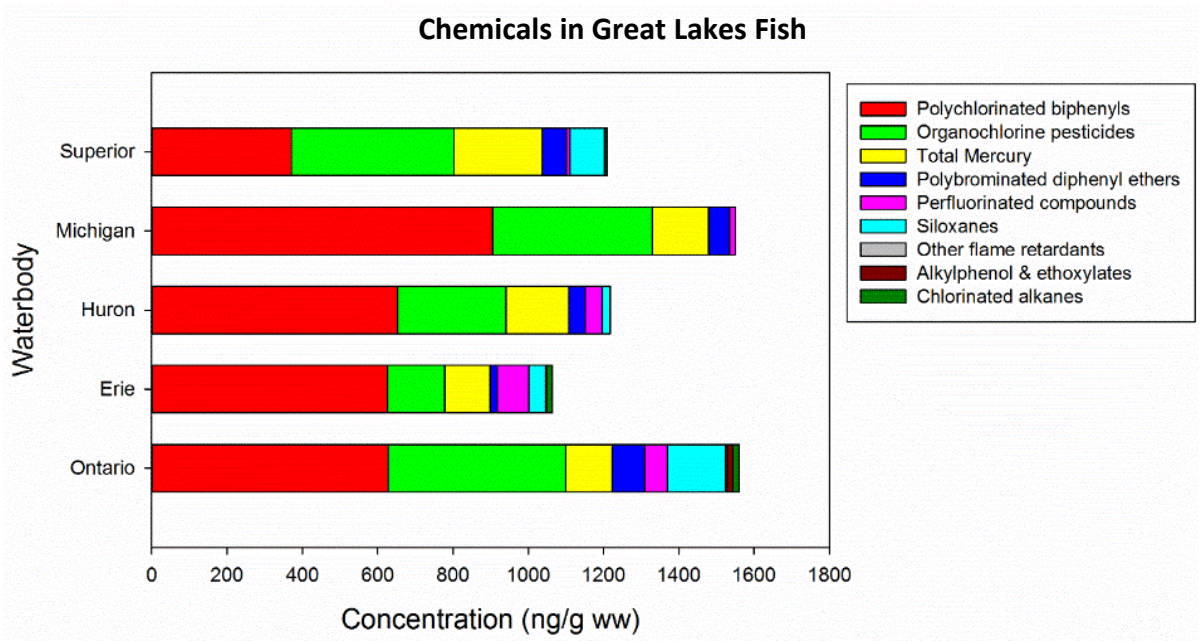

Figure 5. Contribution to Body Burden of Monitored Chemicals in Great Lakes Whole Fish (Lake Trout and Walleye in Lake Erie). Source: Environment and Climate Change Canada and USEPA.

Contaminants in Fish-Eating Birds

Contaminants, such as DDE, PCBs, and dioxins (TCDD), which interfere with the reproduction of some birds, have declined significantly in Herring Gulls and Bald Eagles compared to the 1970s and 1980s. In general, there was an exponential decline in contaminant burdens in Herring Gulls on Lake Superior from the 1970s to 2013, although concentrations appear to have stabilized in the last few years. The half-lives of contaminants in gull eggs averaged 9.9 years for pesticides, 8.2 years for dioxin, and 11.6 years for PCBs. However, DDE (associated with historical pesticide use) can still be found at levels above the threshold for healthy populations in 50% of the eagles tested.

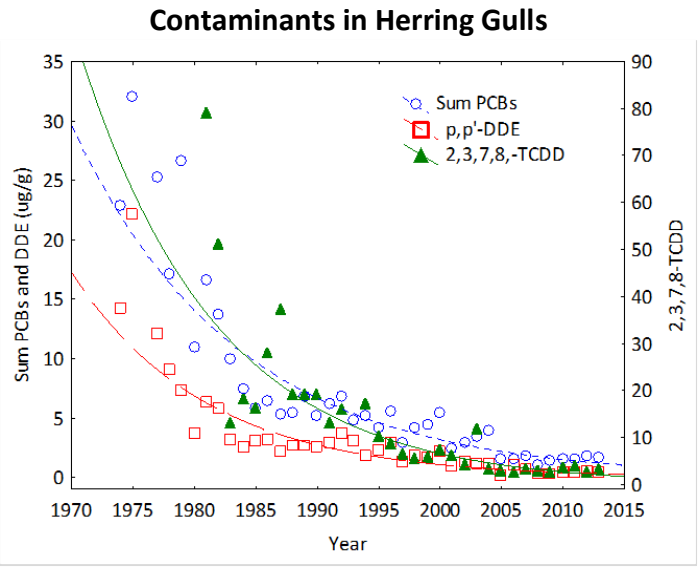

Figure 6. Changes in concentrations of sum PCBs, *p,p'*-DDE, and 2,3,7,8-TCDD (ug/g, wet weight) in Great Lakes Herring Gull eggs at Agawa Rocks, from year of first measurement to 2013. Source: deSolla et al., *in press*.

Contaminants in Offshore Waters

Contaminants are found at very low concentrations in Lake Superior's offshore waters. For example, no exceedances of Canadian federal water quality guidelines are observed for any contaminant in Lake Superior's offshore waters. Compared to the other Great Lakes, concentrations of some compounds (e.g., atrazine) are lowest in Lake Superior, but several compounds that are delivered to Lake Superior by atmospheric deposition (e.g., a-HCH and lindane) are found at higher concentrations. The lowest concentrations of mercury in the Great Lakes are observed in Lake Huron and Georgian Bay, intermediate concentrations are observed in Lake Superior and Lake Ontario, and the highest concentrations were observed in Lake Michigan and Lake Erie (EC-USEPA, 2013). Trends in Lake Superior are varied. For example, the concentration of hexachlorobenzene (HCB) is unchanging, and the concentration of dieldrin is declining.

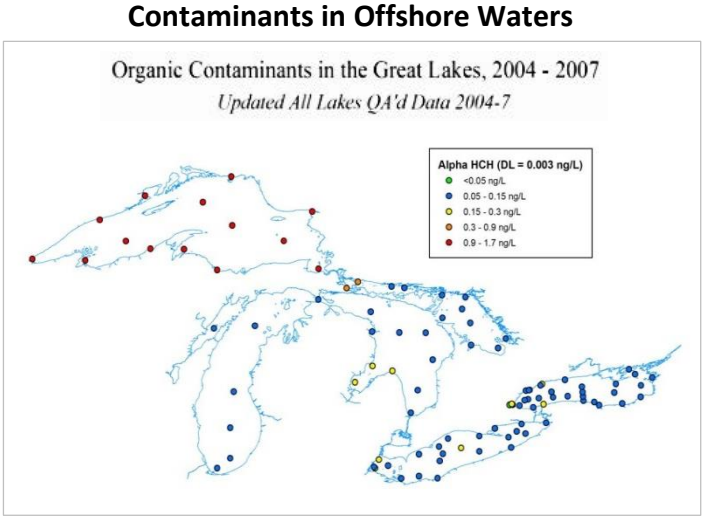

Figure 7. Spatial distribution of dissolved alpha-hexachlorocyclohexane (HCH) in Great Lakes surface waters, 2004-2007. Source: Environment and Climate Change Canada's Great Lakes Surveillance Program.

Contaminants in Air

Atmospheric PCB concentrations are decreasing relatively slowly across the Great Lakes basin. As measured by the Integrated Atmospheric Deposition Network (IADN), concentrations of PCBs are halving about every 13 years in air collected at Eagle Harbor, Michigan (Salamova et al., 2015). This declining trend is consistent with the trends seen at other IADN sites suggesting a relatively homogeneous decrease across the Great Lakes region (even with concentrations much higher at the more urbanized IADN monitoring stations).

Atmospheric concentrations of organochlorine pesticides that have been banned are also generally declining. Chlordanes and DDT-related substances have halving times of about 10 years in air collected at Eagle Harbor (Salamova et al. 2015). Concentrations of α -HCH and γ-HCH are decreasing rapidly in air, with halving times of about 4 years at all U.S. sites (Salamova et al., 2015). These are the most rapid halving times observed for any compound measured as part of IADN. The insecticides, α-endosulfan and B-endosulfan, are still on the market, but they are slated for complete elimination in 2016. Even though endosulfan is currently in use, vapor phase atmospheric concentrations around the Great Lakes are decreasing with halving times ranging from 7 to 13 years (Salamova et al., 2015).

IADN data for total polycyclic aromatic hydrocarbons (PAH) concentrations at Eagle Harbor also show some significant decreases over time, with a halving time of about 17 years. Concentrations of PAHs at Eagle Harbor are about 10 times lower than at the more urbanized IADN monitoring stations. However, the concentrations are decreasing more rapidly at urban stations (Salamova et al., 2015).

Concentrations of PBDEs were decreasing at the urban sites at Chicago and Cleveland, but were generally unchanging at the remote sites, Sleeping Bear Dunes and Eagle Harbor.

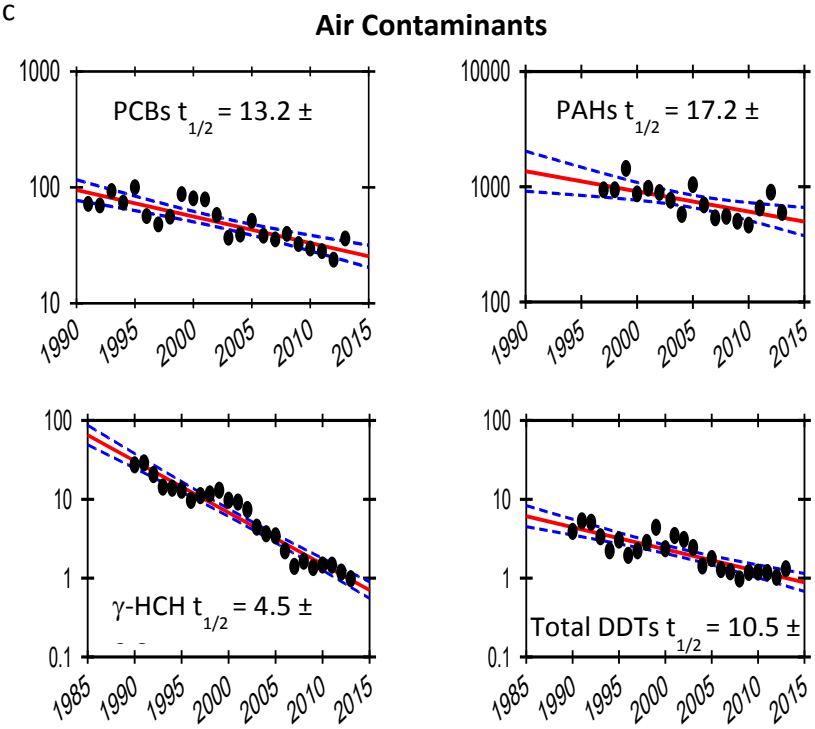

Figure 8. Concentrations of Selected Contaminants at Eagle Harbor, Michigan. Source: Integrated Atmospheric Deposition Network, at Indiana University.

Contaminants in Sediment

Sediment contaminant levels in the offshore waters consistently meet aquatic life protection guidelines. Lake Superior is the largest, coldest and deepest of the Great Lakes, resulting in slow rates of decrease in chemical concentrations in sediment. This is especially true for mercury, where no decline in concentrations is being observed, due in part to natural sources of mercury from within the watershed and mercury sources associated with past or present mining and smelting activities around Lake Superior (Environment Canada and USEPA, 2013).

Contaminants in Sediment

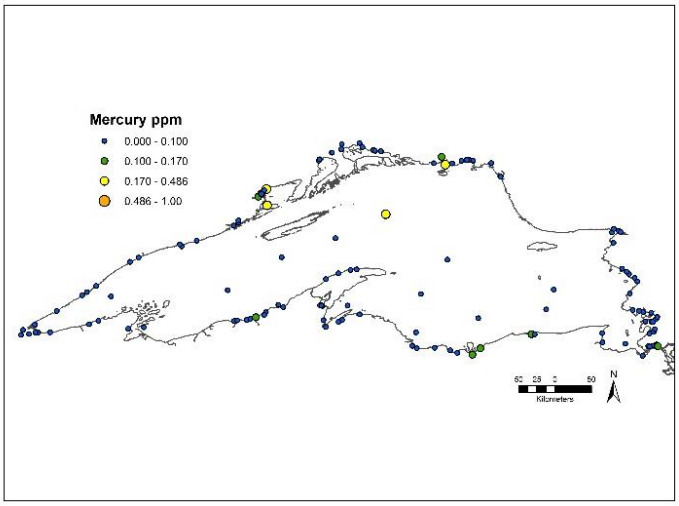

Figure 9. Spatial distribution of mercury contamination in Lake Superior's surface sediments. Sources: Environment and Climate Change Canada and USEPA.

The presence of contaminated sediment in specific nearshore locations within Lake Superior are heavily influenced by shoreline-based urban and industrial activities. For example, sediment in Peninsula Harbour, near Marathon, Ontario was contaminated with mercury and PCBs from a pulp mill that operated from 1946 to 2009. The sediment was capped with a layer of clean sand in 2012, thereby reducing the risks associated with contaminants and providing clean habitat for aquatic organisms. On the Keweenaw Peninsula, contaminated sediments or "stamp sands" are remnants of previous mining activity that continue to adversely impact the lake.

Peninsula Harbour, Ontario. Credit: Ontario MOECC.

Contaminated sediment remains in a number of locations, including: an area adjacent to a former paper mill located in the northern end of the harbor in Thunder Bay, Ontario; multiple sites in the St. Louis River, Minnesota/Wisconsin; the Ashland/Northern States Power Lakefront site in Wisconsin; and Torch Lake, Michigan. A few Areas of Concern (AOCs) are affected by contaminated sediment, as can be found in the discussion on the status of AOCs in Section 4.2.

Support Healthy and Productive Wetlands and Other Habitats to Sustain Resilient Populations of Native Species

Lake Superior's coastal wetlands are in good overall health, as are most other major habitat types. Tributaries and watersheds are the exception, being in fair condition.

Coastal Wetlands

There are 26,626 hectares (103 mi^2) of coastal wetlands documented on Lake Superior, or approximately 10% of the coast (Ingram et al., 2004). The overall condition of Lake Superior's coastal wetlands is "good," although the confidence of this ranking is low because the full suite of indicators is under development and results are not yet available. The "good" assessment is driven by the small total amounts of artificial shorelines and structures, low numbers of invasive species (including wetland species such as the common reed) and high amount of forest cover. Many coastal wetlands in Lake Superior are also subject to relatively low levels of watershed development (Trebitz et al., 2011).

Water Levels

One of the longest droughts in the Lake Superior basin started in the late 1990s and lasted into the 2000s due to a 25% drop in annual precipitation and an increase in air temperatures of about 1°C (1.8°F). The low water levels included a two-month period of record low levels in 2007. Stream flow was reduced by as much as 30% in some watersheds. These changes in water levels and stream flow affected fish migration, erosion, Wild Rice growth, and nutrient/contaminant transport and transformation. In 2014, Lake Superior water levels rose above average for the first time in 15 years. There is no evidence of a shift in water level averages over the long term, with water levels for the coming years remaining uncertain. Great Lakes water levels are primarily influenced by precipitation, evaporation, and runoff, with increased evaporation playing a larger role than changes in precipitation (Gronewold and Stow, 2014).

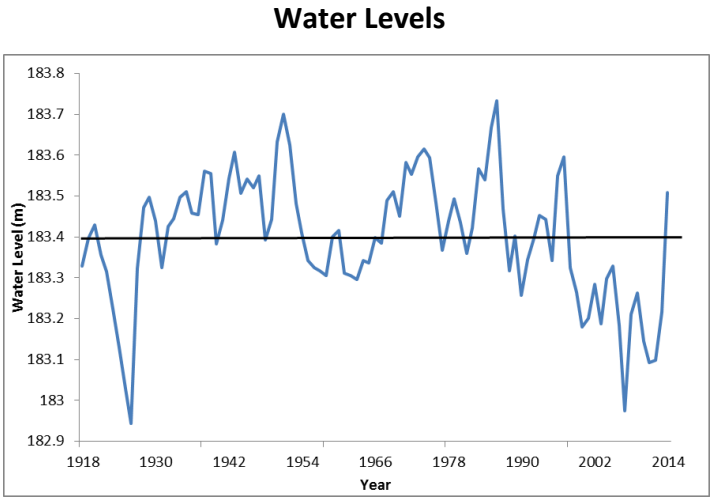

Figure 10. Annual average Lake Superior water levels 1918-2014. Long-term mean is represented by the straight black line. Source: U.S. Army Corps of Engineers, Detroit District, Great Lakes Hydraulics and Hydrology.

Land Use/Land Cover

The Lake Superior basin has high forest cover (85%) and low rates of agriculture and development (3.2%). Developed land (e.g., urban areas) and agricultural land impact coastal areas, because these land uses are concentrated near river mouths and surrounding areas. Forest cover in the Lake Superior basin continues to increase, although the composition of species is changing. Pines and maples are increasing, while species like Birch and Aspen are on the decline.

Land Use/Land Cover

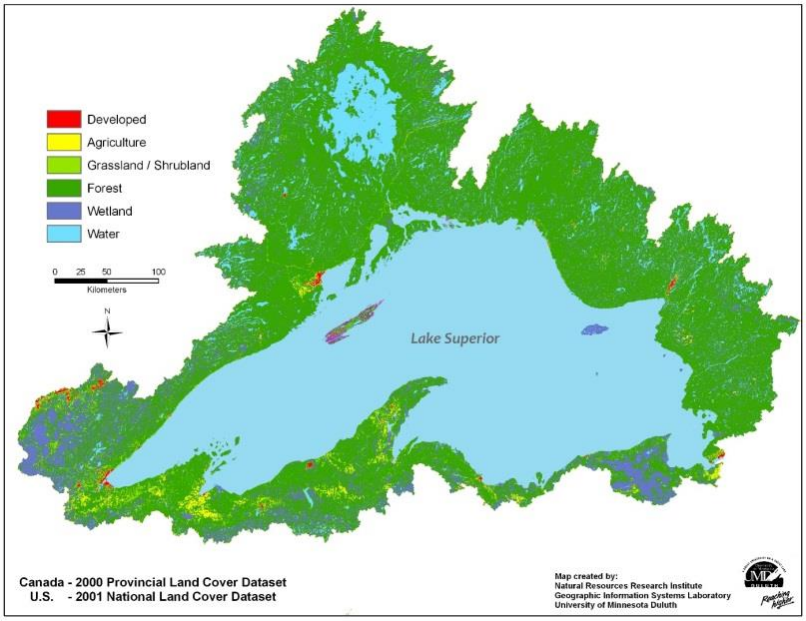

Figure 11. Distribution of land use/land cover across the Lake Superior basin in 2000 (Canada) and 2001 (U.S.) color-coded according to six land use classes. Source: Ciborowski et al., 2011.

As shown in Figure 12 below, the Chequamegon Bay area in Wisconsin provides an example of development in coastal areas that can impact wetlands and other habitats. A wide diversity of wetland and forested land cover types exists in the Chequamegon Bay area, with increasing urban development around Ashland, Wisconsin.

Land Use/Land Cover around Chequamegon Bay, Wisconsin

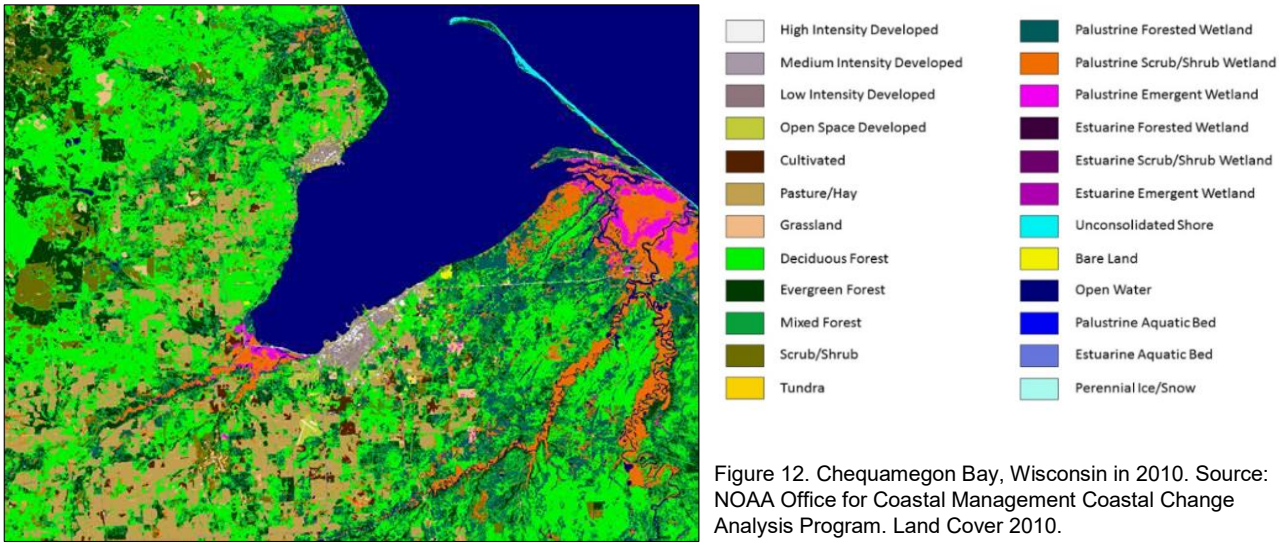

Figure 12. Chequamegon Bay, Wisconsin in 2010. Source: NOAA Office for Coastal Management Coastal Change Analysis Program. Land Cover 2010.

Species of the Lower Food Web

Mysis diluviana. Credit: USGS.

The animal portion of the lower food web is made up of numerous invertebrate species. One of the largest and most widespread species is *Mysis*, a small, shrimp-like animal that is eaten by most fish in Lake Superior. *Mysis* populations are considered to be in "good and stable" condition. Recent data suggest that populations are relatively unchanged over the past several decades. The zooplankton community, dominated by large calanoid copepods, is also considered to be in "good and stable" condition. Zooplankton are the primary prey of offshore *Coregonus* species, which include Bloater, Cisco, Kiyi, and Shortjaw Cisco. The benthic (or bottom-dwelling) invertebrate community is made up of another shrimp-like species, *Diporeia,* as well as many species of aquatic insects, worms, clams, and other species. The diversity and abundance of this community is "good and unchanging" as well. Like *Mysis*, *Diporeia* is consumed by most Lake Superior fish at some point in their lives. The lower food web components play an important role in recycling organic matter and are the energy link between primary producers, algae, and fish. As a whole, this part of the food web is considered to be in "good" condition.

Preyfish

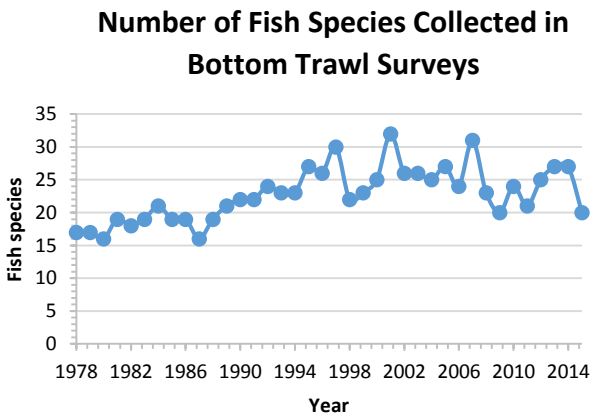

Figure 13. Number of fish species collected in annual lakewide nearshore bottom trawl surveys from 1978-2015. Source: U.S. Geological Survey - Great Lakes Science Center.

Preyfish are the intermediate player between the lower food web and predacious fish, principally Lake Trout, at the top of the food chain. The preyfish community is made up of benthic invertebrate and zooplankton-eating fish. Benthic-eating fish are dominated by native species such as Lake Whitefish. Plankton-eating fish include native *Coregonus* species such as Cisco, Kiyi, and Shortjaw Cisco. The overall biomass of Lake Superior preyfish is dominated by and reflects population trends of the many native *Coregonus* species, with Cisco being the most dominant. In recent years, recruitment of Cisco has been low, which affects the overall preyfish biomass. In general, Lake Superior's preyfish community is considered healthy due to the high number of native species, the high proportion of biomass of native versus non-native species, and the ability of the preyfish community to support a healthy sustaining predator fish population (e.g., Lake Trout).

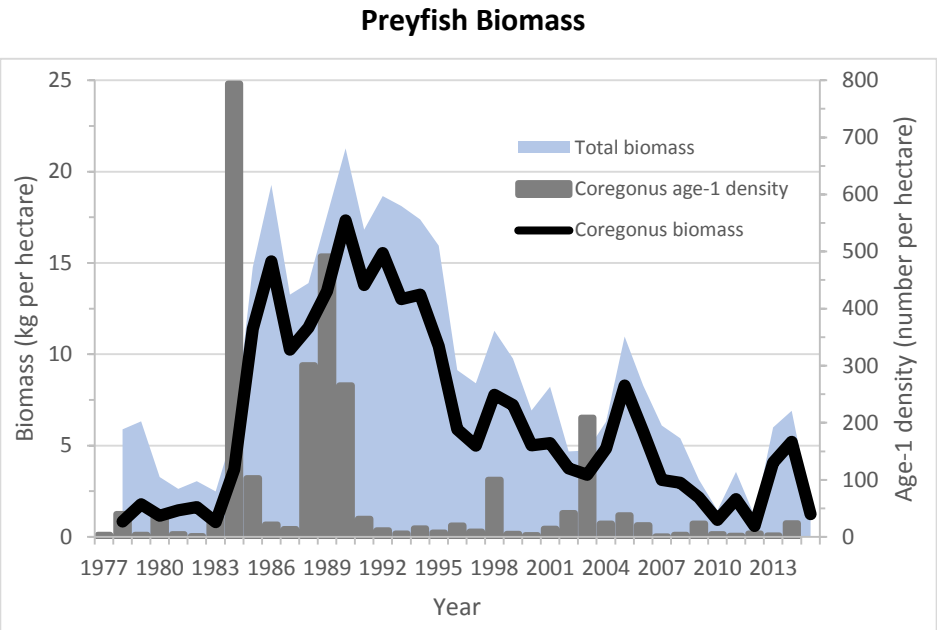

Figure 14. Mean annual total preyfish community and *Coregonus* species biomass (kg/ha) and *Coregonus* species recruitment trends (number of age-1 fish/ha) based on lakewide bottom trawl surveys from 1978-2015. *Coregonus* species include Bloater, Cisco, Kiyi, Lake Whitefish, and Shortjaw Cisco. Source: U.S. Geological Survey - Great Lakes Science Center.

Lake Trout

Lake Trout, historically the top predator fish, have self-sustaining populations throughout Lake Superior. Stocking of Lake Trout is limited to a few select management areas, such as western Wisconsin waters. Lake Trout populations are genetically diverse, with four different forms of Lake Trout (lean, siscowet, humper, and redfin).

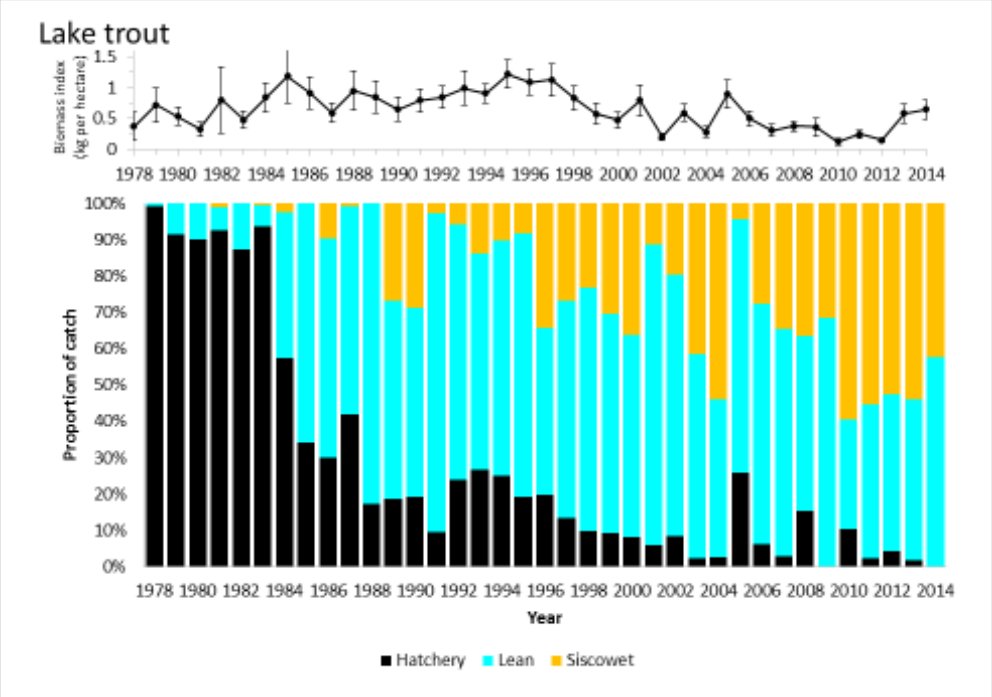

Figure 15. Lake Trout population trends, 1978-2014. Source: U.S. Geological Survey

Lake Sturgeon

Lake Sturgeon in the Great Lakes-Upper St Lawrence River and Northwestern Ontario are listed as “Threatened” by the Province of Ontario. Populations have been considered “fair” and slowly increasing over the last decade, with stocking programs and habitat restoration contributing to the increased abundance. The total population in Lake Superior is estimated to be fewer than 30,000 adults, a small fraction of the estimated historical abundance of approximately 870,000.

Lake Sturgeon

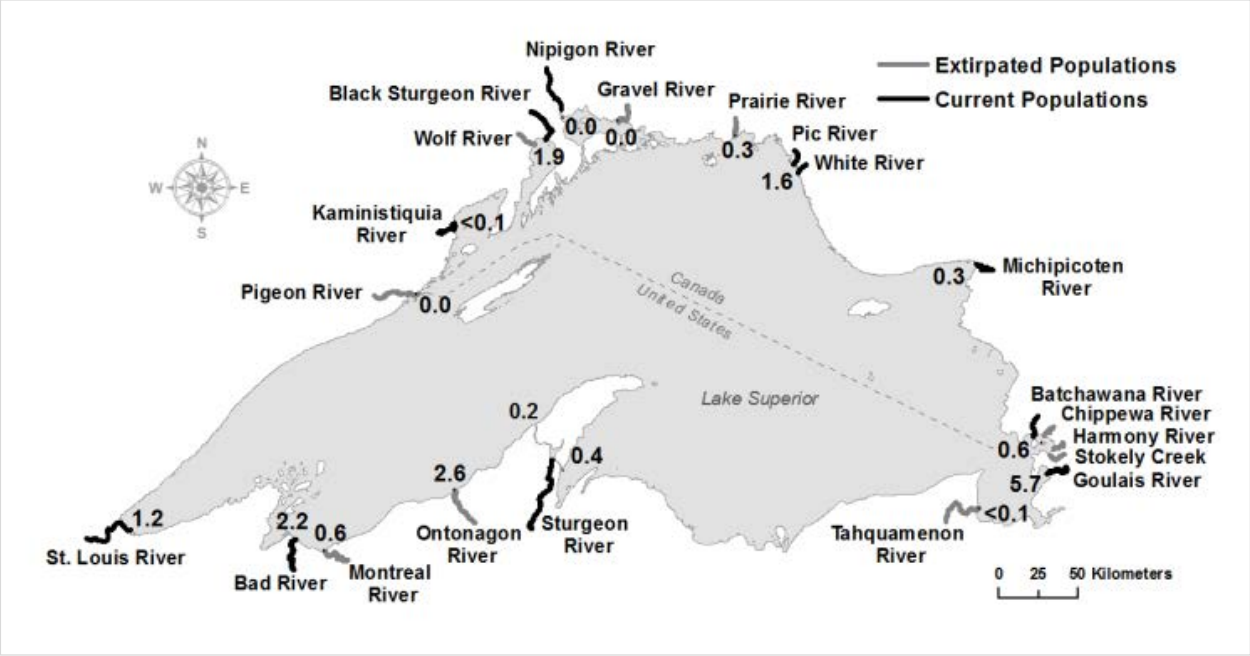

Figure 16. Catch-per-unit-effort (a relative measure of abundance) of Lake Sturgeon in inshore waters and embayments surveyed in 2011. Numbers represent the relative number of Lake Sturgeon present, meaning a river numbered 2.0 has about two times more Lake Sturgeon than a river numbered 1.0. Surveys associated with tributaries where Lake Sturgeon currently or historically spawned. Current populations indicate evidence of natural reproduction. Source: Lake Superior Lake Sturgeon Work Group, GLFC.

Walleye

Walleye populations in Lake Superior are lower than historical levels, with healthy self-sustaining populations only in the St. Louis and Kaministiquia Rivers. Many Walleye populations in Lake Superior continue to be maintained or enhanced through stocking. To date, despite stocking and fishery regulation, and presence of Walleye in locations around Lake Superior, efforts to restore the population to historic levels have had limited success. Agencies continue to address this challenge through strategies to improve and protect the quality and quantity of spawning habitat.

Fish-Eating Colonial Waterbirds

In the early 1970s, populations of many colonial waterbirds nesting in the Great Lakes suffered from high embryonic mortality, eggshell thinning and poor reproductive success, largely due to contaminants such as DDT. In Lake Superior, populations of Great Blue Herons have been stable from 1978 to 2008. Herring Gulls, however, declined from 24,900 nests in 1989 to 15,200 nests in 2008, whereas Ring-Billed Gulls declined from 18,700 nests in 1999 to 15,600 nests in 2008. Conversely, Double-Crested Cormorants increased from 35 nests in 1978 to 4,800 nests in 2008. The cause of the decline of gulls is not clear, although it may be linked to a lack of prey fish availability in the late 2000s. The increase in Cormorant nests is consistent with trends throughout the Great Lakes.

Waterbird Populations

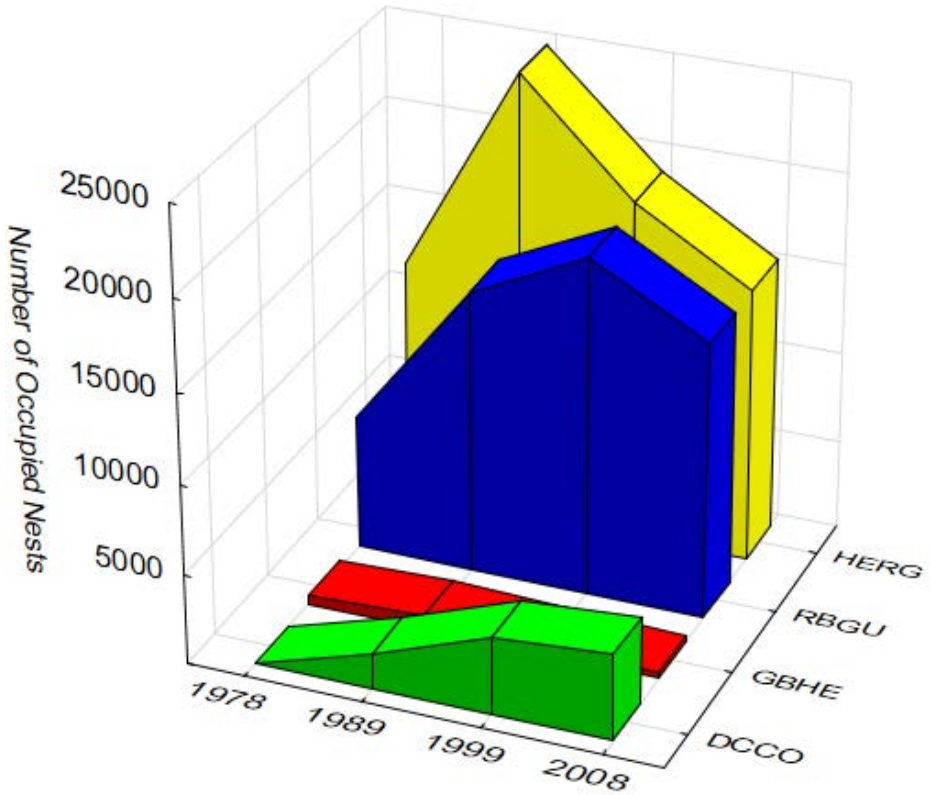

Figure 17. Number of occupied nests of four species of colonial waterbirds from Lake Superior, based upon decadal surveys from 1978 to 2008. HERG (Herring Gull); RBGU (Ring-Billed Gull); GBHE (Great Blue Heron); DCCO (Double-Crested Cormorant). Sources: Canadian Wildlife Service, Environment and Climate Change Canada, and U.S. Fish and Wildlife Service.

Be Free from Nutrients That Directly or Indirectly Enter Water as a Result of Human Activity, in Amounts That Promote Growth of Algae and Cyanobacteria That Interfere with Aquatic Ecosystem Health, or Human Use of the Ecosystem

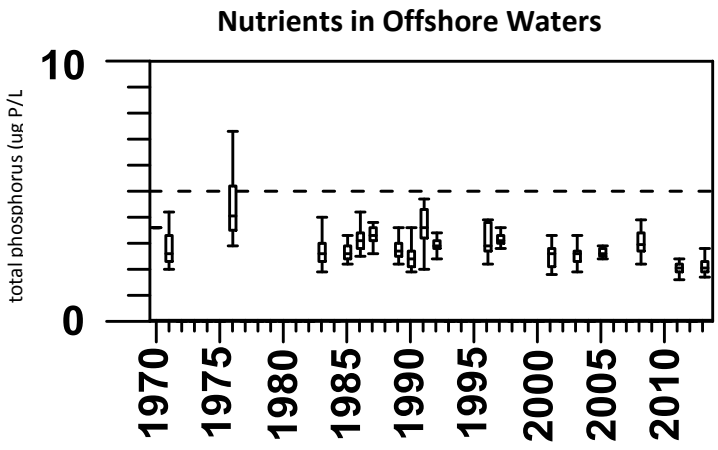

Figure 18. Long-term trend of total phosphorus (ug P/L) in Lake Superior. Dashed horizontal line denotes the environmental quality objective. Source: Dove and Chapra, 2015.

Offshore water phosphorus targets are consistently being met in Lake Superior. Unlike the lower Great Lakes such as Lake Erie, Lake Superior did not experience significant eutrophication due to anthropogenic nutrient releases. Lake Superior has very low natural levels of phosphorus. Environment and Climate Change Canada has recently documented a statistically significant, long-term decline in total phosphorus in Lake Superior, using data from 1970 to 2013 (Dove and Chapra, 2015). The concentrations of phosphorus and its rate of the decline are lower in Lake Superior than those changes noted in the other Great Lakes. The future record will bear careful scrutiny to determine if the trend is continuing. Monitoring and research scientists are working collaboratively to investigate the causes of the declines.

Occasional and site-specific algal blooms do occur in some locations in the nearshore zone. For example, in 2012, in conjunction with very warm water temperatures and an extreme rain event, a rare blue-green algal bloom was recorded in Lake Superior along a stretch of Wisconsin beach (Wisconsin Department of Natural Resources and Apostle Islands National Lakeshore, 2012). Other locations where elevated levels of algae have been observed include the connecting channels across the Keweenaw Peninsula (Michigan) and Lake Superior Provincial Park (Ontario).

Unlike the lower Great Lakes, shoreline fouling by mats of *Cladophora*, a green algae, has not historically been an issue in Lake Superior. There is no observational evidence that the occurrence of *Cladophora* has changed in recent years.

Be Free from the Introduction and Spread of Aquatic Invasive Species and Free from the Introduction and Spread of Terrestrial Invasive Species That Adversely Impact the Quality of the Waters of the Great Lakes

Due to the persistence of established invaders, expanding ranges, and threat of new invaders, aquatic invasive species present a significant threat to the Lake Superior ecosystem.

Lake Superior has 98 known non-native fishes, plants, invertebrates, and diseases (Minnesota Sea Grant, 2015). The newest non-native species, Banded Mystery Snail, was collected in 2014 in Waiska Bay, Michigan (United States Fish and Wildlife Service, 2015). According to the United States Geological Survey's Non-indigenous Aquatic Species web site, "At present there are no known impacts associated with this introduced species in the Great Lakes basin." On the other hand, impacts of many non-native species are often unknown until they cause very noticeable effects.

Some non-native species are known to be invasive, i.e., their introduction or spread threatens the environment, the economy, or society (including human health). By far, the most harmful aquatic invasive species currently established in Lake Superior, in terms of economic, societal and/or environmental cost, is the Sea Lamprey. This species has been the focus of control efforts for over 50 years at a cost of hundreds of millions of dollars. Aquatic invasive species with wide distribution and/or economic, societal, and/or environmental costs are listed in Table 4 on the following page.

Higgins eye mussel with zebra mussels. Credit: H. Quinlan, U.S. Fish and Wildlife Service.

Table 4. Most Harmful[1] Aquatic Invasive Species Established in Lake Superior

Species	Native Range	Pathway[2]	Economic/Societal/Environmental Impact
Sea Lamprey	North Atlantic	Canals and Diversions	Kill valuable sport and commercial fish species; destabilize food web and fish community
Rainbow Smelt	North Atlantic	Agency Activities	Prey on young fish reducing productivity of commercial fish species
Eurasian Ruffe	Europe and Asia	Maritime Commerce	Resulted in prohibition of bait harvest from Lake Superior; Nuisance for anglers; Competes for food with native fish
Common Carp	Europe	Multiple Pathways	Damage and uproot emergent aquatic vegetation such as wild rice
Viral Hemorrhagic Septicemia (VHS)	Northern Hemisphere	Multiple Pathways	Potential for large fish kills
Bacterial Kidney Disease	Northern Hemisphere	Agency Activities	Impact use of wild brood stock for rehabilitation stocking programs and hatchery production
Spiny Waterflea	Ponto-Caspian region	Maritime Commerce	Impacts recreational fishing by fouling fishing line; Causes declines in food resources for fish
Zebra Mussels	Ponto-Caspian region	Maritime Commerce	Establish on substrate, infrastructure and shipwrecks
Eurasian Watermilfoil	Europe and Asia	Multiple Pathways	Form mats that impede water recreation; Cause declines in shoreland property values.

Source: U.S. Fish and Wildlife Service and Minnesota Sea Grant, Personal communication.

[1] Harmful invasive species are considered those non-native species whose introduction or spread threatens the environment, the economy, or society (including human health).

[2] Pathways (vectors) identified in Lake Superior Aquatic Invasive Species Complete Prevention Plan (LSBP, 2014).

A total of 186 non-native species have already been established in the Great Lakes basin. An additional 53 more species have been identified as having a moderate-to-high probability of introduction AND establishment in the Great Lakes basin (GLANSIS, NOAA).

More information on Lake Superior's aquatic invasive species are described below in Section 4.2, Lakewide Threats.

Be Free from the Harmful Impact of Contaminated Groundwater

The full extent and impact of contaminated groundwater discharges on surface water bodies in the Great Lakes basin, including Lake Superior, is not known. It is known, however, that many sources of groundwater contamination including contaminated industrial sites, hazardous waste sites, spills, underground storage tanks, unlined landfills, abandoned mine sites, septic systems and sewer lines exist in the basin (Grannemann and Van Stempvoort, 2015).

Both directly and indirectly, groundwater is a major source of water to the Great Lakes and is expected to significantly affect both the quantity and quality of the water. Overall, 75% of the streamflow in Lake Superior's tributaries are fed by groundwater (Granneman et al., 2000). In the Lake Superior basin, large urban areas and areas with mining activities are the places which are likely to have the most significant disturbance of groundwater flow systems and contamination of groundwater quality. In turn, the water quality of streams, rivers and possibly nearshore lake environments would be most affected in these areas.

Some contaminants, such as perfluorooctane sulfonate (PFOS) and many personal care products, are susceptible to being transported in groundwater within the Lake Superior basin. This has implications for future monitoring programs, site investigations and restoration efforts, as well as for science activities related to water quality protection and management.

Be Free from Other Substances, Materials or Conditions that May Negatively Impact the Chemical, Physical or Biological Integrity of the Waters of the Great Lakes

The greatest threats to Lake Superior's habitats and species are aquatic invasive species, climate change, and dams and barriers. Atmospheric deposition is a source of many contaminants into Lake Superior. Information on these and other threats that may negatively affect Lake Superior are presented below, in the context of lakewide threats.

4.2 Lakewide Threats

Lake Superior faces a number of existing and emerging threats to the ecosystem. These threats have the potential to impede and/or derail progress toward achieving lakewide objectives. Understanding these threats help inform decisions on what actions can be taken. Threats are described below.

Aquatic Invasive Species

The invasive European Common Reed (a.k.a. *Phragmites*) is found in scattered occurrences in the Lake Superior watershed. It forms large, dense stands, and reduces wetland plant and animal species diversity. Credit: H. Quinlan, U.S. Fish and Wildlife Service.

Aquatic invasive species (AIS) have been designated as a "high threat" in Lake Superior because they have impacted, and have the potential to further impact, many of Lake Superior's habitats and species. For purposes of this section, the term "invasive species" refers to those non-native species that are causing harm to the ecosystem, not non-native species intentionally introduced by one or more government agencies. Once established, invasive species are extremely difficult to eradicate, and their impacts may be impossible to reverse. The introduction of a non-native species in Lake Superior may have a greater effect on the ecosystem than in other lakes, due to Lake Superior's relatively simple food web. In fact, while Lake Superior has a lower number of non-native fish species established than other Great Lakes, it has the highest ratio of non-native to native fish species. In total, Lake Superior has 98 known non-native fishes, plants, invertebrates, and diseases (Minnesota Sea Grant, 2015), many of which are deemed invasive because they threaten the environment, the economy, or society (through human health effects).

Ninety-three percent of introductions of non-native species were unintentional while 7% were intentional. Of the nine known pathways for entering Lake Superior, 48% of non-native species were introduced by ballast water discharge, 17% by diseases and parasites with introduced fish, 6% through stocked fish, 6% through canals and diversions, 5% by cultivation, 4% by aquarium releases, 4% through live bait release, 3% by recreational boaters, and 1% by packaging "hitchhikers" (Minnesota Sea Grant, 2015). As one end of the Great Lakes – St. Lawrence Seaway, the Duluth-Superior harbor is considered an invasion "hot spot" due to the potential for ships introducing invasive species through ballast water discharge.

As a testament to the tremendous effort in recent years to block the pathways that invasive species use to enter Lake Superior, the rate of introductions has slowed considerably. Since 2010, only two new invasive species have been identified in Lake Superior: the deadly infectious fish disease viral hemorrhagic septicemia (or VHS) discovered in 2010, and the Banded Mystery Snail in 2014. Constant vigilance is required to continue to block potential new arrivals, particularly in light of warming waters (i.e., more hospitable habitat conditions for some more southern invasive species) due to climate change.

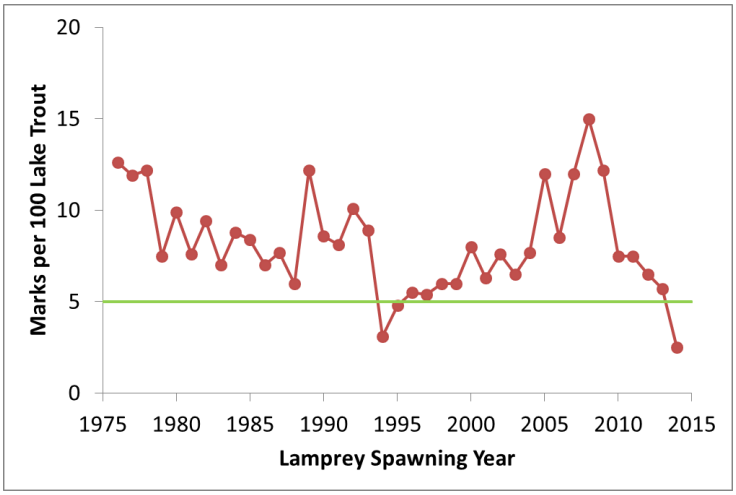

Figure 19. Yearly lakewide Sea Lamprey marking rates on Lake Trout greater than 21" (532 mm) captured in April-May assessments. The green horizontal line represents the marking rate target for Lake Superior, which is 5 marks per 100 Lake Trout. Source: Great Lakes Fishery Commission.

Sea Lamprey

The Sea Lamprey, a parasitic jawless fish that has devastated native fish populations in all the Great Lakes, contributed to the collapse of Lake Superior Lake Trout populations in the mid-twentieth century. The Sea Lamprey preys on sport and commercial fish, and is the focus of significant control efforts. The Sea Lamprey marking rate on Lake Trout in Lake Superior has been declining and is below the target for the first time since 1994. Sea Lamprey marking rates have declined in the past 10 years, while Lake Trout abundance has remained stable.

The mouth of a Sea Lamprey. Credit: Ontario Ministry of Natural Resources and Forestry.

Climate Change

Climate change is expected to alter the physical, chemical, and biological aspects of Lake Superior, as summarized in the *Lake Superior Climate Change Impacts and Adaptation* report (Huff and Thomas, 2014), include:

- Increase in air temperatures by 3 to 4.5°C (5.4 to 8.1°F) by the end of the 21st century;
- Slight increase in annual precipitation, with seasonal shifts;
- Increase in annual average water temperatures of 5 to 7°C (9 to 12.6°F) throughout the 21st century;
- Increased water temperatures of Lake Superior's streams and rivers;
- Continued decrease in the extent and duration of ice cover throughout the 21st century;
- Increased wind speeds;
- Long-term decrease in water levels (although periods of higher-than-average levels are possible); and
- Earlier onset of spring and summer and an increased growing season (Huff and Thomas, 2014).

Relative Impact of Climate Change

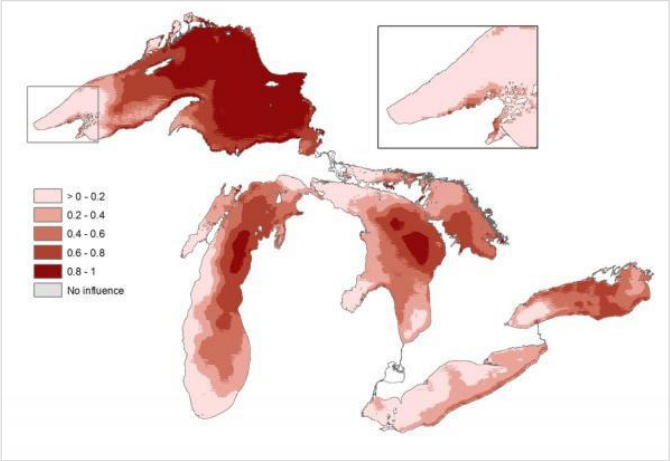

Figure 20. Weighting of the relative impact of climate change on the waters of the Great Lakes. Source: Allan et al., 2013.

Evidence suggests that some of these changes are already underway, including increases in open-water summer temperatures, changes in lake stratification, and reductions in winter ice cover (Austin and Colman, 2008).

Changes in the Lake Superior climate could have the following effects on the Lake Superior ecosystem (Huff and Thomas, 2014):

- Higher water temperatures, favoring aquatic invasive species such as Sea Lamprey;
- Increased water temperatures, which could alter the plankton communities with potential implications for the entire food web;
- Creation of ecosystem conditions unfavorable to cold-water fish communities that require cold-water rivers and streams;
- Northward shifting of deciduous forests due to warmer air temperatures and changes in precipitation;
- Spread of forest pests, such as gypsy moth, due to higher air temperatures;

- Reduction of suitable habitat for arctic-alpine and boreal species that are dependent on cooler temperatures and microclimates, due to increased air and water temperatures;
- Increased concentrations of toxic pollutants through increased intensity of precipitation, or the exposure of previously submerged toxic sediments through lower water levels;
- Lower dissolved oxygen levels due to warmer waters, increased duration of summer stratification, and increase in algal blooms;
- Lower water levels, which would be favorable to some invasive species, such as the European Common Reed (i.e., *Phragmites*); and
- Diminishing coastal wetlands, negatively affecting fish and wildlife populations.

Lake Superior Water Temperatures

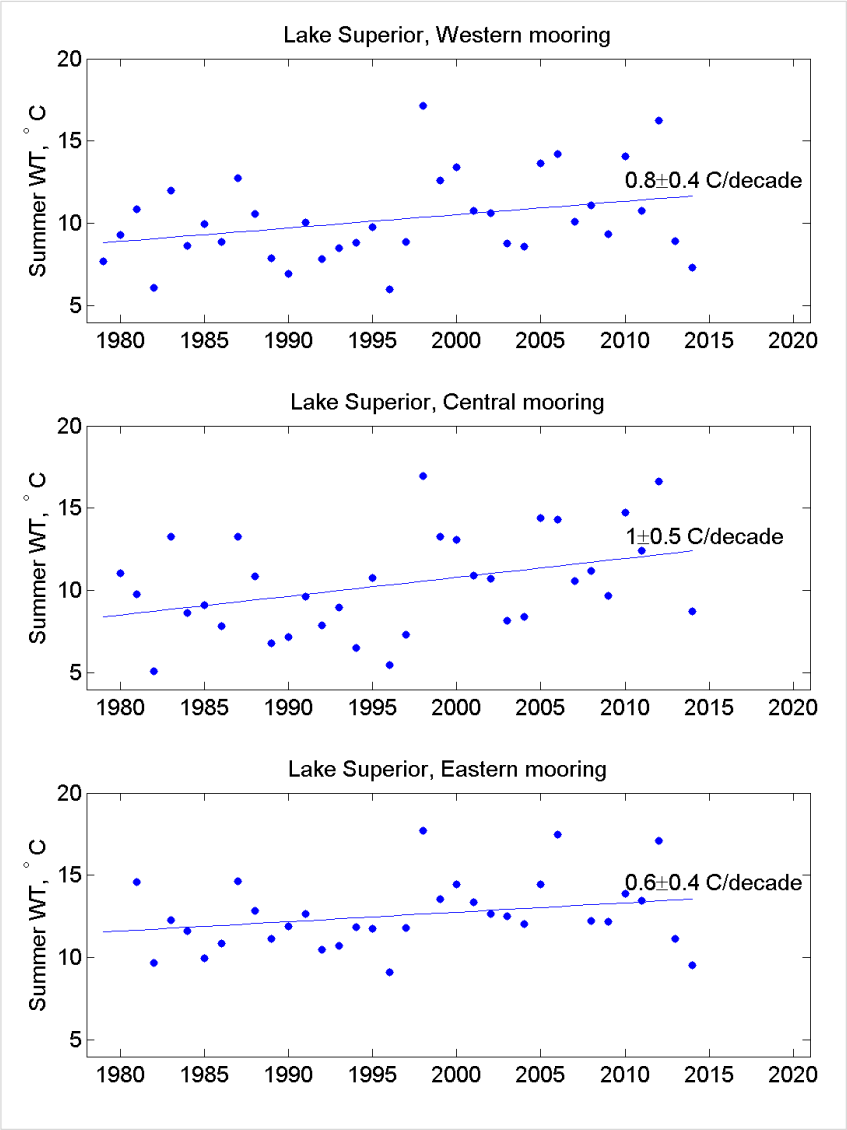

Figure 21. Lake Superior summer water temperatures, 1978-2014, collected from NOAA buoys in the western, central, and eastern basins. Source: J. Austin, UMN.

Dams and Barriers

A culvert barrier. Credit: M. Fedora, U.S. Forest Service.

Over 23,600 dams and other potential barriers, such as weirs and poorly installed road-stream crossings, have been documented within the Lake Superior watershed. Dams and other barriers disrupt habitat connectivity for aquatic organisms and can degrade water quality through the disruption of the natural movement of woody debris, sediment and nutrients. Dams are a major factor in the low population of some Lake Superior fish stocks compared to historical observations, since the fish cannot access spawning areas above the dam. Many dams in the basin are now more than 50 years old and deteriorating. The removal of dams and other barriers can be a difficult issue: While these barriers prevent native fishes from accessing their tributary habitats, they also limit the spread of invasive species and prevent the invasive Sea Lamprey from accessing additional spawning areas.

Older dams have a greater impact because newer dams were constructed with newer regulations and stronger environmental assessments. Protecting and restoring connectivity, where appropriate, requires removing dams, upgrading stream/road crossing infrastructure, or implementing other solutions, and prioritizing barrier removal considering the benefits and costs of various options.

Dams and Barriers

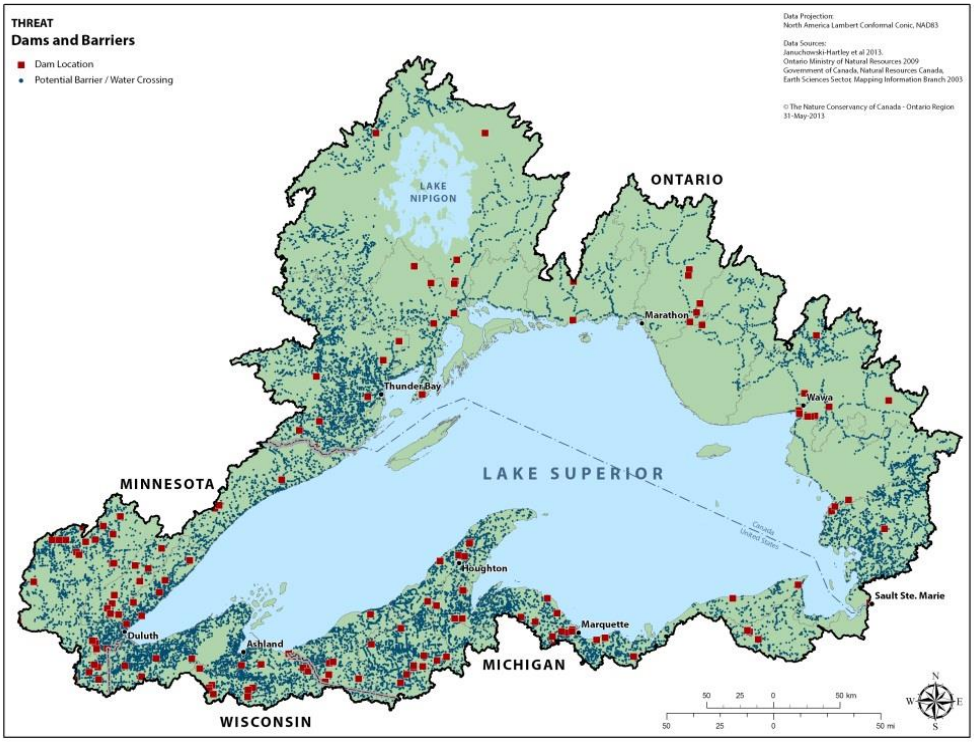

Figure 22. Dams and road stream crossings in the Lake Superior basin. Source: The Nature Conservancy of Canada.

Chemical Contaminants

Special efforts have been made to eliminate Lake Superior basin sources of many legacy chemicals through the Lake Superior Zero Discharge Demonstration Program. Local, regional and national actions targeting the nine critical pollutants have resulted in the achievement of chemical reduction targets to date. It is becoming increasingly challenging to make further reductions from the remaining sources (LSBP, 2012).

Lake Superior Zero Discharge Demonstration Program

In 1991, the Zero Discharge Demonstration Program was established in Lake Superior as a demonstration project to achieve zero discharge and zero emission of nine toxic, persistent, and bioaccumulative chemicals: mercury, total polychlorinated biphenyls (PCBs), dieldrin/aldrin, chlordane, DDT, toxaphene, 2,3,7,8-TCDD (dioxin), hexachlorobenzene (HCB), and octachlorostyrene (OCS). The target date for zero discharge is 2020, with interim reduction targets in 2000, 2005, 2010 and 2015.

In-Basin Sources of Legacy Chemicals

Compared to the baseline year of 1990, notable achievements have been made in reducing the emissions and discharges of legacy chemicals from within the Lake Superior basin:

- 80% reduction in mercury;
- 85% reduction in dioxin, HCB, and octachlorostyene;
- Significant reduction of materials containing PCBs; and
- Ongoing collection and safe disposal of the waste pesticides aldrin/dieldrin, chlordane, DDT/DDE, and toxaphene.

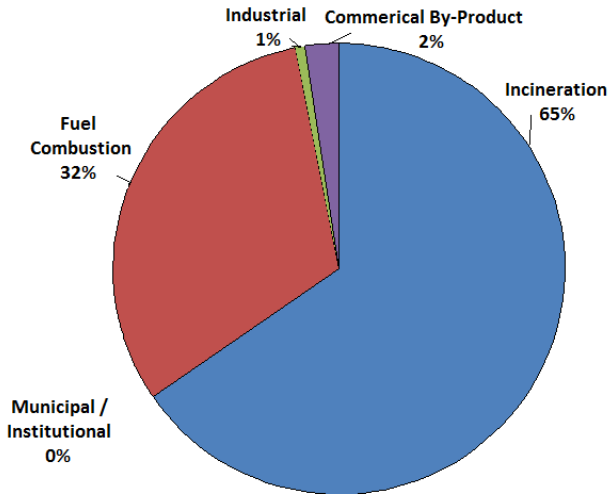

Figure 23. Percentage of dioxin releases from different sectors in the Lake Superior Basin, 2010. Source: LSBP, 2012.

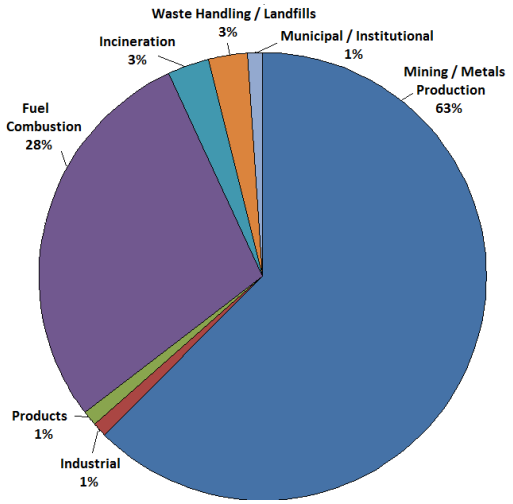

Figure 24. Percentage of mercury releases from different sectors in the Lake Superior Basin, 2010. Source: LSBP, 2012.

Chemicals of Mutual Concern

Under the 2012 GLWQA, Canada and the United States committed to designate certain chemicals found in the Great Lakes as *chemicals of mutual concern* that are potentially harmful to human health or the environment. To date, eight chemicals (or categories of chemicals) have been recommended for designation as Chemicals of Mutual Concern.

- Mercury;
- PCBs;
- Brominated flame retardants: hexabromocyclododecane (HBCD) and polybrominated diphenyl ethers (PBDEs);
- Perfluorinated chemicals: perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and long-chain perfluorinated carboxylic acids (PFCAs); and
- Short-chain chlorinated paraffins.

Mercury

Mercury is a heavy metal that can enter the environment as a result of natural processes (e.g., forest fire, volcanic activity) or as a result of anthropogenic activities (e.g., combustion of coal and refined petroleum products, extraction of metals from ore, the use and disposal of mercury-containing consumer products, and use in some manufacturing processes). A recent study found that atmospherically derived mercury is the dominant contributor of mercury to Lake Superior sediment, though watershed sources are significant near river mouths, such as the St. Louis River and Thunder Bay (Lepak et al., 2015).

Atmospheric Deposition

Lake Superior's large surface area and small human population relative to the other lakes contribute to the significance of atmospheric deposition as a source of chemical contamination relative to the other Great Lakes. Sources of air contamination come from local activities, such as cars, trucks and industry, and from activities far away such as pesticide applications in other parts of North America, and from power plants in China. Chemicals from atmospheric deposition affect the lake by contaminating offshore waters, sediments, fish and waterbirds.

Total atmospheric mercury emissions from anthropogenic sources from within the entire Great Lakes basin declined by approximately 50% between 1990 and 2005 (Evers et al., 2011). Since 2005, atmospheric mercury concentrations have decreased about 2% per year as measured in Canada's Experimental Lakes Area (west of Lake Superior). Wet deposition measurements from the North American Mercury Deposition Network follow these trends, with deposition decreasing about 1.6% per year since 1996 (Zhang et al., 2016).

PCBs

PCBs are a mixture of synthetic chemicals that do not occur naturally in the environment. They were used up through the 1970s primarily as coolants and lubricants in a wide variety of applications such as electric transformers, capacitors and switches, electrical components in

fluorescent lighting fixtures and appliances, and hydraulic and heat transfer systems. PCBs were banned in 1977 but are still being found in the environment.

PCBs are declining in the atmosphere over the Great Lakes, but at a slow rate, due to residual sources found in transformers, capacitors, and other equipment. This rate of decline is expected to continue into the future. In a 2011-2012 lake-by-lake water quality study by Venier et al. (2014), the highest concentrations of total PCBs were measured in Lake Ontario (623 ± 113 pg/L) and the lowest were measured in Lake Superior (average 117 ± 18 pg/L). For individual samples, the highest concentration measured in Lake Superior was at a station in Whitefish Bay (165 pg/L).

Brominated Flame Retardants

Flame retardants, such as polybrominated diphenyl ethers (PBDEs), are compounds added to manufactured materials and surface finishes to inhibit, suppress or delay the production of flames and to help prevent the spread of fire. In general, penta-BDE concentrations in a range of environmental media (air, sediment, landfill effluent, aquatic biota and birds) increased until approximately 2000, when levelling off or decreasing trends were observed (Backus et al., 2010). Concentrations seem to have stabilized in Lake Superior, but have not begun to decline significantly. A study by Venier et al. (2014) in which water samples were collected in the spring of 2011 and 2012 at 18 stations throughout the Great Lakes, found that total PBDE concentrations were lowest in Lake Superior, with an average of 34 ± 11 pg/L.

A passive air and water sampling study in Lake Superior in 2011 showed that atmospheric (gaseous) and dissolved PBDEs, in particular BDE-47, were greatest near urban and populated sites (Ruge et al., 2015). Net gaseous deposition of BDE-47 was observed at coastal sites, while the central open lake and at Lake Superior's IADN station of Eagle Harbor generally displayed volatilization of PBDEs into the atmosphere, mainly of BDE-47.

IADN measurements show that Great Lakes concentrations of an alternative flame retardant, pentabromoethyl benzene, or PBEB, are highest at Eagle Harbor (Liu et al., 2016). While trends of PBEB in the air are decreasing at most other IADN sites, they are not at Eagle Harbor. It is unknown why Great Lakes concentrations of PBEB are highest at Eagle Harbor.

2-ethylhexyl-2,3,4,5-tetrabromobenzoate (TBB) and bis(2-ethylhexyl)-tetrabromophthalate (TBPH) are the two main components of FireMaster 550, which is a replacement for the penta-BDE commercial mixture. The atmospheric concentrations of TBB+TBPH are significantly and rapidly increasing at all IADN sites including Eagle Harbor, with doubling times of 2–5 years.

HBCD is another category of brominated flame retardants, and in the study by Venier et al., HBCD was detected in all five Great Lakes at concentrations ranging from 0.2 to 4.36 pg/L. Of the five Lake Superior stations sampled, HBCD was detected at the Thunder Bay station and the station outside Duluth at concentrations of 1.6 pg/L and 0.8 pg/L, respectively.

Perfluorinated Chemicals PFOS, PFOA and long-chain PFCAs

Perfluorinated chemicals (PFCs), which include perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and long-chain perfluorocarboxylic acids (PFCAs) have been used for a wide number of applications which take advantage of their surfactant-like properties including aqueous film forming foams, lubricants, polishes, cosmetics and paints. PFOS concentrations in some Great Lakes fish and herring gull eggs exceed relevant guidelines derived for the protection of avian and mammalian predators and consumers of fish and wildlife. PFOS concentrations in Herring Gull eggs in the Great Lakes show that colonies in urban environments have not been consistently declining in concentrations, while in remotely-located colonies, such as Lake Superior, a decline is evident (Environment Canada, 2013). PFCs can accumulate in different ways, and trends vary in wildlife. Fish and birds, for example, represent two very different trophic levels with different food sources and ecosystems that influence their PFOS levels. Increasing concentrations of PFOS and PFOA, and to a lesser extent long-chain PFCAs, have been observed in sediment.

Short-Chain Chlorinated Paraffins

Chlorinated paraffins (CPs) are divided into groups according to their carbon chain length, namely short chain (SCCP), medium chain (MCCP) and long chain (LCCP) chlorinated paraffins. They have been used as flame retardants and plasticizers and as additives in metal working fluids, in sealants, paints and coatings. CPs can be released into the environment during production, storage, transportation, industrial and consumer usage of CP-containing products, disposal and burning of waste, and land filling of products. Short-chain chlorinated paraffins (SCCPs) are bioaccumulative in wildlife and humans, are persistent and transported globally in the environment, and are toxic to aquatic organisms at low concentrations. CPs occur in complex mixtures that are very difficult to analyze in environmental matrices, and data for Lake Superior is very limited.

Additional Substances of Concern

Commercial and consumer-use chemicals, and other substances (such as microplastics), can be detected in Lake Superior at very low levels. While the science continues to advance with respect to detecting these chemicals of concern, there is still much to be studied with respect to the potential adverse effects associated with acute and chronic exposure.

Pharmaceuticals and personal care products (PPCPs) are a diverse group of chemicals that enter waterways through wastewater treatment plant discharges after human use, and from agricultural run-off due to spreading of biosolids or use in livestock. There are concerns about the presence of pharmaceutical and personal care products chemicals in water as many are bioactive, some have the potential to bioaccumulate, some are persistent, and as the sources are often continuous (wastewater), there are constant exposures in waters where discharges occur. Pharmaceuticals include therapeutic substances for pain and inflammation (e.g., ibuprofen, naproxen), epilepsy/mood (e.g., carbamazepine), anti-biotics (e.g., sulfamethoxazole), blood pressure (valsartan), and hypertension (atenolol), to name a few. They also include recreational compounds such as caffeine, narcotics, and cotinine from cigarettes. Personal care products (PCPs) are a diverse group of compounds used in personal hygiene (e.g., shampoos, conditioners, lotions, soaps, toothpaste, deodorant) and for beautification (e.g., cosmetics, hair dye, perfumes). The primary classes of PCPs include disinfectants (e.g., triclosan), fragrances (e.g., musks), insect repellents (e.g., DEET), preservatives (e.g., parabens) and UV filters (e.g., methylenzylidene camphor).

Two recent studies have been conducted in the Lake Superior region to screen for chemicals of emerging concern in the nearshore waters impacted by urban run-off, municipal wastewater treatment plant effluent and industrial effluent discharges (Christensen et al., 2012; Ontario MOECC, unpublished). In the vicinity of the St. Louis River, St. Louis Bay, and Superior Bay, 33 of 89 (37%) chemicals were detected in the water samples (Christensen et al., 2012). Using passive samplers in water near Thunder Bay and Sault Ste. Marie, Ontario, 40 compounds were detected out of the 135 (30%) that were being screened (Ontario MOECC, unpublished). In both studies, DEET was the most commonly detected chemical of emerging concern. While estimated concentrations were very low in the Canadian samples, some of the chemicals detected most frequently included codeine, atenolol, valsartan, DEET, sulfamtheoxazole, carbamazepine, and naproxen (Ontario MOECC, unpublished). In the U.S. samples, frequently detected compounds included caffeine, benzophenone, carbamazepine, esterone, cotinine, and a fragrance hexahydrohexa-methyl cyclopentabensopyran (Christensen et al., 2012).

Microplastics are plastic particles that are generally less than 5 millimeters in size and made of non-biodegradable organic polymers such as polyethylene, polypropylene, and polystyrene. Microplastics include fibers, such as those from clothing and rope, plastic particles from the breakdown of bags, packaging and containers, and plastic beads. They are also used in a variety of products, including personal care products, certain over-the-counter drugs and sand-blasting. An open water survey investigated plastic pollution within Lakes Superior, Huron and Erie in 2012 (Eriksen et al., 2013). Results showed that the concentration of plastic particles increased as they moved from Lake Superior through to the lower Great Lakes, consistent with greater populations in the Lake Erie region and given the water flows from one lake to the next. Abundance counts at the five sites sampled in Lake Superior ranged from 1,277 to 12,645 particles per square kilometer, based on the presence of 3 to 16 plastic particles collected in 2-4 km long trawls (Eriksen et al., 2013). In comparison, the highest abundance found in Lake Erie was over 450,000 particles per square kilometer.

Microplastics Distribution

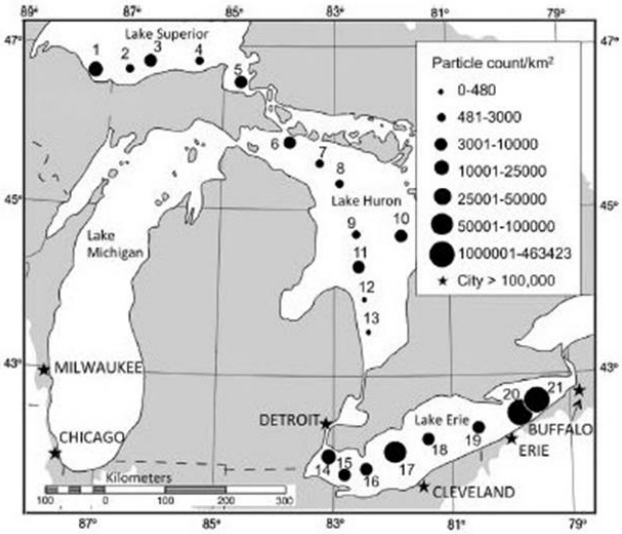

Figure 25. Distribution of plastic particles by count for 21 samples collected in three of the Great Lakes, 2012. Source: Eriksen et al., 2013.

Excessive nutrients (e.g., phosphorus) are a threat in the lower Great Lakes, but not in Lake Superior. The SPARROW model (Robertson and Saad, 2011), applied to the U.S. side of the Lake, predicted the largest source of phosphorus was from forests and wetlands, followed by point sources (e.g., regulated wastewater treatment plant discharges). Most eutrophic occurrences are generally limited to the nearshore areas with greater municipal or industrial activity. In particular, shallow bays that do not mix as readily with offshore waters are more vulnerable to the effects of increased nutrients. The SPARROW model does not attribute agricultural land uses as a major input to Lake Superior; however, in some regions around the lake agricultural land is more concentrated (primarily the southwest shore in the U.S.), and provides a greater relative contribution

Nutrient Loadings

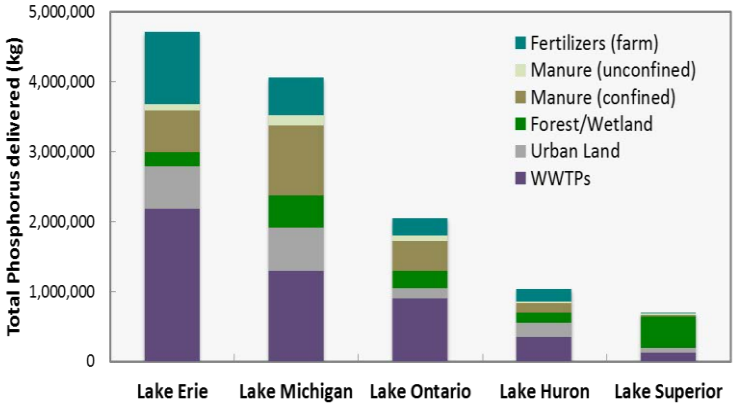

Figure 26. SPARROW model of total phosphorus delivered (kg) in the U.S. to each Great Lakes. Source: Robertson and Saad, 2011.

of nutrients in those areas. In the future, climate change is expected to increase water temperature and the frequency of extreme precipitation events (Huff and Thomas, 2014). These changes, combined with additional developments, could potentially increase the likelihood of nutrient enrichment to some specific locations in Lake Superior (LaBeau et al., 2014). Ongoing efforts are being made to better understand nutrient dynamics in Lake Superior and identify the most vulnerable locations for eutrophication.

Other Threats

Threats to the Lake Superior ecosystem are not limited to the issues identified above. At regional and local scales, the risk of a wide range of particular threats varies greatly. Other threats described below include the impacts of coastal development, oil transport, mining, and Areas of Concern. In some locations, other issues that can impact the achievement of lakewide objectives include discharges from vessels, unsustainable forestry practices, energy transport and development, and point source pollution. Through research, monitoring and other science, current and future threats are assessed regularly.

Mining Impacts

The Lake Superior basin has a long history of mining operations and related impacts. While mining operations can offer economic benefits, they also present threats to the environment. For example, two Great Lakes Areas of Concern, Deer Lake and Torch Lake, were so designated in the Lake Superior basin due to impacts from past mining operations. Fourteen mines

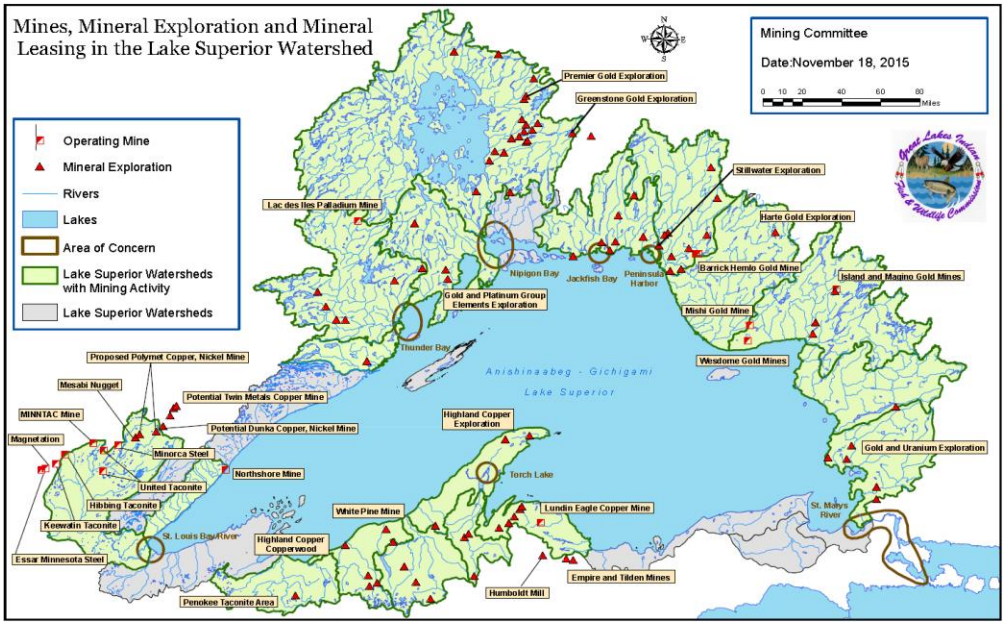

Figure 27. Mines, mineral exploration and mineral leasing in the Lake Superior watershed. Source: Great Lakes Indian Fish and Wildlife Commission, 2015.

currently operate in the Lake Superior basin, with many explorations and expansions underway. Current and/or past mines in the basin have extracted gold, silver, copper, platinum, palladium, nickel, zinc, diamond, lead, iron-ore and taconite, as well as quarried brownstone. Mining impacts cannot be easily reversed – some can cause far reaching and lasting environmental damage. Mining activity has the potential to impair water quality (e.g., mining is currently the largest source of mercury emissions from within the Lake Superior basin) and degrade habitat (e.g., through increased sediments). Mining sediments in the nearshore, embayments, and river mouths may cover or degrade fish spawning habitats, Wild Rice and other natural resources. After a mine closes, it can remain a source of contamination from chemicals and waste rock piles; tailing ponds must be monitored and maintained for centuries to avoid environmental impacts.

Coastal Development

Structures that protect shoreline properties can also alter sediment transport process along the coast and, in turn, impact the quality of beaches and wetlands. Artificial shorelines replace natural habitat, and these developments are often found in the important habitat areas of river estuaries and embayments. Overall, the Lake Superior shoreline remains in a largely natural state compared to the other Great Lakes – less than 5% of the shoreline has been developed and converted into an artificial or hardened shoreline. In some communities, former industrial lands are being reclaimed for public waterfront access, or to create green space along the shore. At the same time, however, some stretches of shoreline are becoming increasingly developed for roads and residential, commercial or industrial land uses.

Oil Transportation

The transport of crude oil from Bakken shale oil and Alberta bitumen sources presents risks to Lake Superior due to proposed increases in the amount of oil being refined and transported. In the U.S., 9,500 carloads of crude oil were carried by train in 2008, with 650,000 carloads forecasted by the end of 2014, a more than 68-fold increase (GLC, 2015). In Canada, 500 carloads were carried in 2009 with 140,000 carloads estimated to be carried by the end of 2014, a 28-fold increase. Existing pipelines are being upgraded to carry oil from west to east, and new pipelines are proposed or underway. Shipping depots and oil storage and transfer facilities are proposed in the Lake Superior basin. Transfer of oil by shipping vessels across Lake Superior to refineries located on the shores of the lower Great Lakes has been proposed in the past.

Unknown threats

New, previously unidentified threats will be addressed as they are identified, using an adaptive management approach, and appropriate actions will be initiated as needed.

Areas of Concern

The 1987 GLWQA defined Areas of Concern (AOCs) as "geographic areas that fail to meet the general or specific objectives of the GLWQA where such failure has caused or is likely to cause impairment of beneficial use of the area's ability to support aquatic life." In short, an AOC is a location that has experienced environmental degradation as a result of human activities at the local level. The status of the seven AOCs located in the Lake Superior basin is presented below.

Delisted AOCs

- In October 2014, Deer Lake AOC, located in Michigan on the southern shore of Lake Superior, was delisted from the binational list of toxic hotspots in the Great Lakes.

AOCs in Recovery

- Canada and Ontario formally recognized Jackfish Bay as an "AOC in Recovery" in 2011. Fish health and sediment quality in the area will continue to be monitored to assess progress toward environmental recovery.

Listed AOCs

- At the Torch Lake AOC, the State of Michigan is leading a multi-year project to identify the source(s) of PCBs that are causing levels in fish and sediments to remain high.
- Feasibility studies, design work, and permitting are underway for large-scale restoration and remediation projects on the Wisconsin and Minnesota sides of the St. Louis River AOC. Construction began in 2015. Eight BUIs remain.
- Most remedial actions for the Thunder Bay AOC are complete, with positive effects on the environment. Work is underway to develop the best solution for managing 22 hectares of contaminated sediment in the north harbor. The sediment cleanup is the largest and most significant project needed to address remaining environmental issues in the area.

Beneficial Use Impairments (BUIs)

Impairment of a beneficial use is a reduction in the chemical, physical, or biological integrity of the waters of the Great Lakes sufficient to cause any of 14 specific problems

1. restrictions on fish and wildlife consumption;
2. tainting of fish and wildlife flavor;
3. degradation of fish and wildlife populations;
4. fish tumors or other deformities;
5. bird or animal deformities or reproduction problems;
6. degradation of benthos;
7. restrictions on dredging activities;
8. eutrophication or undesirable algae;
9. restrictions on drinking water consumption, or taste and odor problems;
10. beach closings;
11. degradation of aesthetics;
12. added costs to agriculture or industry;
13. degradation of phytoplankton and zooplankton populations; and
14. loss of fish and wildlife habitat.

http://binational.net/annexes/a1/

- Thanks to the collaborative efforts of governments, industry, and community partners over more than two decades, the environmental goals set for the Nipigon Bay AOC have been met. The governments of Ontario and Canada are recommending the removal of Nipigon Bay from the list of Great Lakes AOCs.
- In 2012, Canada and Ontario completed sediment remediation via thin-layer capping, which was the last major action needed to address environmental problems in the Peninsula Harbour AOC. Long-term monitoring is underway to make sure the environment is recovering. To date, results show that cap materials have remained in place and some aquatic vegetation is growing in the capped area.

Vistas of Nipignon Bay (foreground) and Red Rock (background). Credit: D. Crawford.

5.0 SURVEYS, INVENTORIES AND OUTREACH

5.1 Cooperative Science and Monitoring Initiative (CSMI)

As part of a five-year cycle to assess and monitor the chemical, physical, and biological integrity of Lake Superior, the Lake Superior Partnership implements a Cooperative Science and Monitoring Initiative (CSMI). CSMI results are used to assess the state of the lake (reported in Section 4). The binational research and monitoring program involves an intensive, management-related scientific examination of each Great Lake, on a staggered five-year rotational basis. The current five-year cycle for Lake Superior CSMI consists of the following steps:

- Identify science needs (completed in 2014);
- Develop priorities (completed in 2015);
- Conduct field work (planned for 2016);
- Perform laboratory analysis and compile results (planned for 2017); and
- Report results (planned for 2018).

Monitoring on the USEPA research vessel, *Lake Guardian*. Credit: S. Swart.

Science and monitoring priorities are identified through the lakewide management process, with open discussion and input opportunities available to all stakeholders and the interested public. For Lake Superior, the last year of intensive field work and monitoring took place in 2011. A number of resulting studies were completed by various agencies and together they present a comprehensive assessment of the state of the Lake Superior ecosystem. Priority research topics ranged from emerging and legacy contaminant trends in water, fish, wildlife, and humans to ecosystem-wide assessments of fish, coastal wetlands, invasive species, and lakewide trends in tributary flows.

As part of the reporting phase of the last CSMI cycle, Environment and Climate Change Canada and the USEPA hosted a monitoring workshop on September 24-25, 2013, in Duluth, Minnesota. The workshop had a dual purpose: first, to allow researchers to present their recent Lake Superior science and monitoring results (with a focus on activities undertaken as part of the 2011 monitoring year); and second, to begin discussions of ongoing and new information needs, potential partners and potential funding mechanisms for conducting new field studies in 2016. See Section 8 for a list of Lake Superior CSMI priorities for 2016.

5.2 Ongoing Science and Research

In addition to CSMI, the agencies of the Lake Superior Partnership conduct a wide range of ongoing science and monitoring activities. This work provides a foundational understanding of

Lake Superior's conditions and threats, as well as guidance to various restoration and protection programs and initiatives. The results of the science and monitoring efforts are shared, and where applicable, coordinated among various natural resource agencies.

For example, every state and province monitors contaminant levels in fish on an ongoing basis in order to provide public advice on safe fish consumption, such as the *Guide to Eating Ontario Fish*. Similarly, the Great Lakes Indian Fish and Wildlife Commission has undertaken monitoring of and communication regarding mercury levels in fish in targeted areas of importance to tribal communities who depend on these fish for food and their traditional ways of life. Similar programs exist in each of the Lake Superior states.

Coordination of fisheries activities across Lake Superior is undertaken by the Lake Superior Technical Committee, under the auspices of the Great Lakes Fishery Commission. Fishery agencies have developed protocols to standardize collection of biological data.

These are two of many examples of the ongoing science and monitoring activities undertaken by agencies that make up the Lake Superior Partnership.

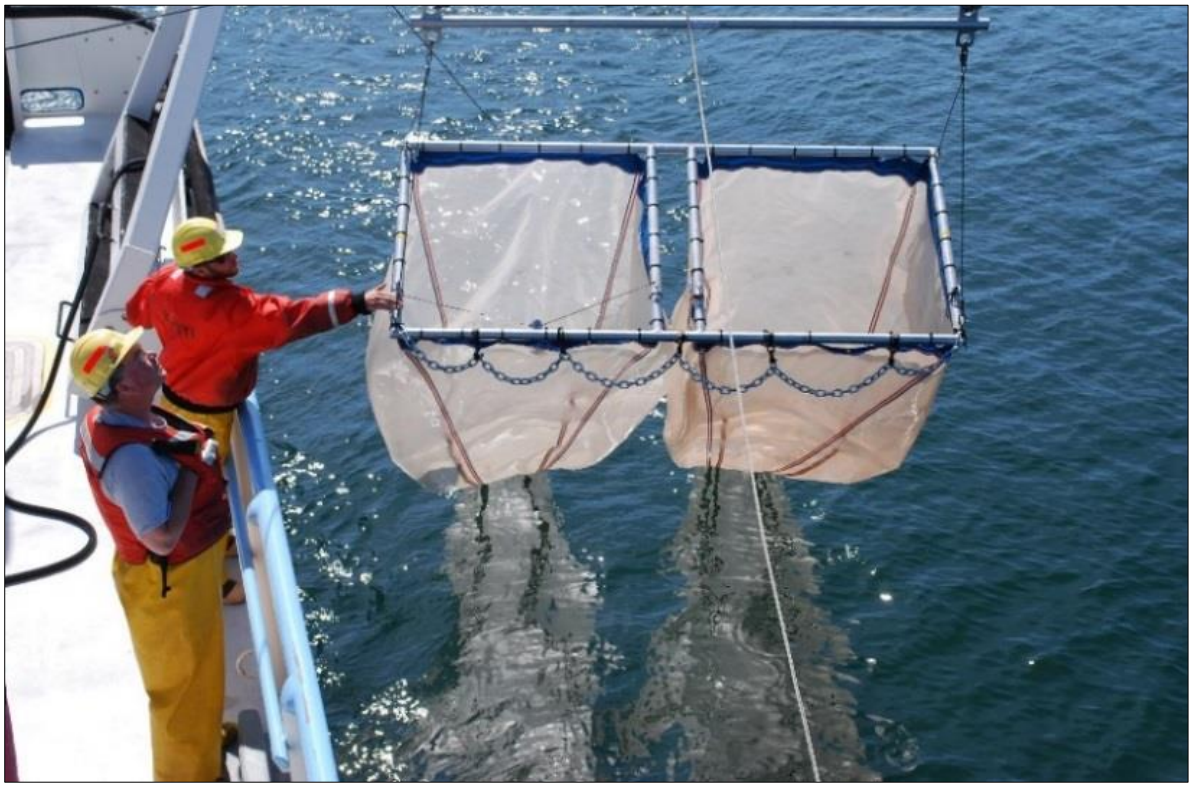

Monitoring from the U.S. Geological Survey research vessel, *Kiyi*. Credit: J. Bailey.

5.3 Outreach and Engagement

The Lake Superior Partnership has a long history – over 25 years – of extensive public engagement in the lakewide management program. Historically, outreach and engagement activities were undertaken by two entities:

1. The Lake Superior Partnership Communications Committee; and
2. The Lake Superior Binational Forum.

The Lake Superior Binational Forum, a binational group of stakeholders from a wide array of sectors, helped establish an effective multi-sector stakeholder process through public meetings, webinars, workshops, radio shows, publications, newspaper inserts, social media and websites. In particular, through social media and their website, the Forum shared important information on the Lake Superior ecosystem and helped foster an appreciation and awareness of the lake through Lake Superior Day and annual stewardship awards. Past Lake Superior Binational Forum activities included:

- Annual Lake Superior Day celebrations;
- Annual Lake Superior stewardship awards;
- Hazardous, e-waste and pesticides disposal days;
- Outreach on reduction of backyard trash burning, the largest source of dioxins to Lake Superior;
- Public meetings and webinars around the basin on mining, AIS, and other issues; and
- Contributions to establishment of chemical reduction targets and timeframes.

Purpose of Outreach and Engagement

- Provide information on GLWQA, particularly Annex 2
- Provide opportunity for stakeholder input on GLWQA Annex 2 products
- Tech transfer of information on the Lake Superior ecosystem
- Create a direct link between Lake Superior stakeholders and the Partnership
- Disseminate information on LAMP implementation, and how to be involved
- Identify opportunities for projects related to LAMP goals and priorities
- Promote LAMP to the public— help people take ownership of issues within their watershed
- Help identify emerging issues of concern about Lake Superior.

Although the Lake Superior Binational Forum is no longer operational, the Lake Superior Partnership is committed to formulating a robust, meaningful, and substantive outreach and engagement program and process. Under the 2012 GLWQA, the Lake Superior Partnership is specifically responsible for conducting outreach activities, identifying the need for further engagement by governments and the public, and providing annual updates to the public under each LAMP. The Lake Superior Partnership is committed to these activities, in accordance with the requirements of GLWQA Annex 2.

A Lake Superior Partnership Outreach and Engagement Committee will continue these types of activities and further strengthen outreach and awareness to ensure that the needs and concerns of the diverse population in the Lake Superior basin are being met.

The Lake Superior Partnership's Outreach and Engagement Committee helps plan, deliver and support communication and outreach activities and products. Examples of outreach activities which are proposed to continue into the future are presented below.

Outreach on AIS

A significant project related to public outreach is the lakewide effort to raise awareness about aquatic invasive species. In Ontario, this effort has been led by the Ontario Federation of Anglers and Hunters with funding from the Ontario Ministry of Natural Resources and Forestry (MNRF). Other organizations, including state governments, tribal organizations and non-government organizations such as Minnesota Sea Grant, are also leading AIS outreach and education programs. In 2014, the Ontario Federation of Anglers and Hunters published *The Lake Superior Aquatic Invasive Species Guide* as an informational resource for recreational lake users to be aware of potential invaders and how to report a sighting.

Burn Barrel Outreach

Open burning of household wastes continues to be a basinwide problem that contributes to air quality and human health issues by releasing particulates, specifically dioxin, and other contaminants. The "Bernie the Burn Barrel" program is based on a cartoon character who teaches children about the problems associated with open burning. Bernie has been used throughout the Lake Superior basin over the last 15 years to instill in school children the idea of reducing trash burning.

Emerging Contaminants

Outreach activities will continue on educating basin stakeholders about the environmental health issues associated with personal care products. Although the Lake Superior Partnership has focused past efforts on legacy pollutants through the Zero Discharge Demonstration Program, the Lake Superior Partnership also conducts research and outreach on emerging chemicals such as those found in cleaning products, personal care products and pharmaceuticals. Outreach efforts have ranged from establishing pharmaceutical "take back" programs and promoting medicine cabinet clean-ups to supporting hands-on workshops where participants learn how to make household cleansers or bath products. These workshops help teach stakeholders that simple, natural products are effective and safer for humans and the environment.

The beauty of Lake Superior elicits a jubilant reaction from toddler. Credit: M. Collingsworth.

Potential Public Outreach and Engagement Activities

Going forward, proposed outreach and engagement activities for the public conducted by the Lake Superior Partnership include the following:

- Publish Lake Superior annual updates;
- Develop Lake Superior ecosystem objectives;
- Develop a nearshore framework;
- Prepare Lake Superior LAMP 2020;
- Assess science priorities, i.e., workshops, publications;
- Develop binational strategies;
- Conduct Outreach and Engagement Committee activities;
- Host Lake Superior State of the Lake Conferences; and
- Organize subject matter webinars.

The lake on Manitou Island. Credit: P. Nankervis.

6.0 BINATIONAL STRATEGIES

Under the 2012 GLWQA, the Lake Superior Partnership is directed to develop and implement lake-specific binational strategies to address current and future potential threats to water quality. The first binational strategy developed under the 2012 GLWQA was *A Biodiversity Conservation Strategy for Lake Superior*, *2015* (LSBP, 2015).

A Biodiversity Conservation Strategy for Lake Superior, 2015

This Strategy provides a summary of the health of and threats to the biodiversity of Lake Superior, and presents a guide to implementing effective lakewide and regional conservation strategies. This Strategy contributes to the 2012 GLWQA commitment of developing lakewide habitat and species protection and restoration conservation strategies.

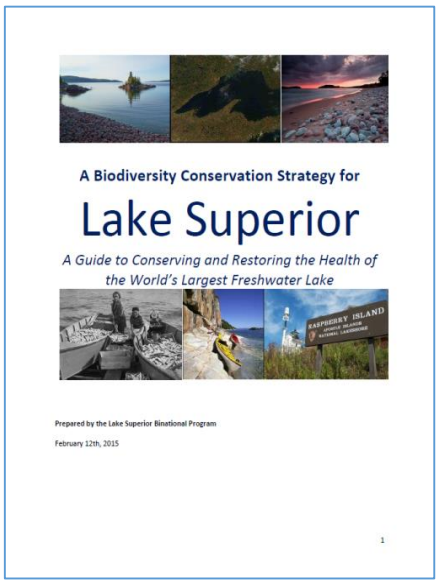

A Biodiversity Conservation Strategy for Lake Superior, 2015 is available at binational.net.

Government agencies, local stakeholders, organizations, and groups were all instrumental in developing *A Biodiversity Conservation Strategy for Lake Superior*. The information in the Strategy is intended to help all stakeholders to identify and implement necessary actions pertaining to Lake Superior`s watersheds, coasts, and waters. The Strategy has been highly influential in the development of the Lake Superior LAMP.

In conjunction and coordination with the Strategy, 20 corresponding regional plans identifying local and regional conservation opportunities were developed. The conservation actions identified in the regional plans were developed with extensive input from local stakeholders. Together, the Strategy and the Regional Plans will support and encourage actions around Lake Superior that meet the overarching goal of protecting and restoring Lake Superior's habitat and species.

Map of Regional Planning Areas, for *A Biodiversity Conservation Strategy for Lake Superior*

Figure 28. Corresponding regional plans highlight special features, issues and local conservation opportunities. Source: LSBP, 2016.

Past Lake Superior Partnership Binational Strategies

Other binational strategies developed under previous versions of the GLWQA continue to inform, or are being incorporated into efforts of, the Lake Superior Partnership. Table 5 lists these strategies.

Table 5. Past Lake Superior Partnership Strategy Documents

Title	Date	Summary
Initiated under the 1987 GLWQA		
Climate Change Impacts and Adaptation	2014	Synthesizes the current science on climate change impacts to the Lake Superior ecosystem, lists current adaptation actions undertaken by Lake Superior partners, and outlines possible actions and strategies that can be implemented in the future.
Aquatic Invasive Species Complete Prevention Plan	2014	Documents the current status of AIS in the Lake Superior basin, the vector pathways of entry, current actions and projects undertaken by LAMP partners; and outlines strategies and actions to prevent future AIS from entering the basin.
1990-2010 Critical Chemical Reduction Milestones	2012	Describes and analyzes the sources and emissions of the nine ZDDP critical pollutants and sets strategies for achieving future milestone reductions; includes actions presently being undertaken by Lake Superior partners.
1990-2005 Critical Chemical Reduction Milestones	2006	Describes and analyzes the sources and emissions of the nine ZDDP critical pollutants and lays out strategies for achieving future milestone reductions; includes actions presently being undertaken by Lake Superior partners.
Zero Discharge Demonstration Program	1991	Created as part of the Lake Superior Binational Program, the ZDDP targets nine critical legacy pollutants for zero discharge in the Lake Superior basin by 2020. So far, the reduction targets have been reached for each chemical through 2015.

7.0 NEARSHORE FRAMEWORK

The 2012 protocol amending the GLWQA contains a commitment to develop an integrated nearshore framework for the Great Lakes (hereafter referred to as the Nearshore Framework or Framework) which will provide an overall assessment of the state of the nearshore waters of the Great Lakes (Canada and the United States, 2012). The GLWQA directed that the Framework be developed within three years of entry into force of the GLWQA (i.e., by end of February 2016) and be implemented collaboratively through the lakewide management process for each Great Lake. Once the Framework is complete, it will be incorporated into the Lake Superior Partnership and reported in the next LAMP (produced in 2020).

The nearshore regions of the Great Lakes are the geographic and ecological link between our watersheds, rivers, wetlands, and groundwater to the open deep waters of the lakes. The shallow warm water at the land-water interface provides habitat critical to maintaining our native biodiversity in the Great Lakes basin. It is also the region where human use of lake resources is most intense, from reliance on clean water for recreational uses, such as swimming and fishing, to supporting our residential populations and economic pursuits and supplying our communities with clean sources of drinking water. For the purposes of the Framework, the nearshore is defined as where the water meets the land, "*the littoral area of the Great Lakes and connecting rivers where waters are subject to direct influences from shorelands and watersheds.*" Thus, the nearshore area will not be rigidly defined by depth or distance from shore, but by zone of impact where these influences are observed.

The Nearshore Framework's assessment will identify nearshore areas that are or may become subject to high stress due to individual or cumulative impacts on the chemical, physical, or biological integrity of those areas. Since the last version of the GLWQA in 1987, the focus on areas of high stress has centered on the 43 designated Great Lakes AOCs. Lessons learned from the AOC experience will provide valuable guidance for the identification of criteria that could be used to determine areas of high stress within the nearshore. The Nearshore Framework will provide a comprehensive assessment of nearshore waters; share information from the assessment; identify areas requiring protection, restoration or prevention activities; and identify stressors at a broad scale. Agencies can then factor these findings into their priority setting and engage and empower communities to create collaborative approaches to addressing the identified issues and take action.

Manitou Island off the northeastern tip of the Keweenaw Peninsula. Credit: P. Nankervis.

8.0 SCIENCE AND MONITORING PRIORITIES

As described in Section 5.1, the CSMI is an intensive, binational collaborative research and monitoring program that follows a five-year cycle. As part of that cycle, science and monitoring priorities for Lake Superior were determined through multi-stakeholder discussions, taking into account the results of previous studies and recommendations, long-term trends and emerging issues.

Lake Sturgeon. Credit: H. Quinlan, U.S. Fish and Wildlife Service.

The Lake Superior Partnership has grouped science and monitoring priorities into three themes: chemicals and nutrients, aquatic communities, and habitat and wildlife. Table 6 lists current Lake Superior science and monitoring priorities. These priorities support Lake Superior lakewide objectives, and results will inform future assessments, including the 2020 LAMP, of the state of the lake as well as threats to the ecosystem that need to be addressed. A CSMI Task Team will provide three levels of reporting that include details of completed projects (approximately 6 months after the field year), a CSMI workshop overview (2 years after the field year), and scientific journal articles published in ensuing years.

Table 6. Lake Superior Science and Monitoring Priorities, 2016

Science and Monitoring Priority	Context	Link to Action Areas and Lakewide Objectives
Aquatic Communities		
Monitoring of the lower-trophic food-web / energy transfer.	Lake Superior has a largely native and self-sustaining food-web, despite ongoing and new and cumulative stressors. Significant management actions have been taking place to restore and maintain conditions.	Action area on native species. Lakewide objective to maintain good ecological condition of the nearshore and offshore waters.
Lake Sturgeon Index Survey	Lake Sturgeon is not only a species of conservation concern, requiring intervention, but ongoing rehabilitation efforts also have positive impacts on the quality of tributary habitats, currently assessed to be "fair" condition.	Action areas on native species and dams and barriers. Lakewide objectives to maintain good ecological condition in tributaries and watersheds.
Aquatic invasive species early detection monitoring	Aquatic invasive species are a threat to biodiversity conservation and management of a self-sustaining commercial and recreational fishery.	Action areas on aquatic invasive species, and native species. Lakewide objectives to maintain good ecological condition of tributaries, inshore, nearshore and offshore waters.

Science and Monitoring Priority	Context	Link to Action Areas and Lakewide Objectives
Support to fish rehabilitation plans	Brook Trout and Walleye are species of conservation concern, and among the species with rehabilitation plans. Understanding status and trends of fish populations help prioritize management actions.	Action areas on high quality habitat and native species. Lakewide objectives to maintain good ecological condition of tributaries, coastal wetlands, inshore, nearshore and offshore waters.
Habitat and Wildlife		
Identify and rank vulnerability of cold-water tributaries to Lake Superior to various stressors, including climate change	Lake Superior has a unique network of cold-water streams. Cold-water habitats are threatened by climate change, but current and predicted distribution, extent, and risk are not known.	Action areas on climate change, high quality habitat and native species. Lakewide objective to maintain good ecological condition of tributaries and watersheds.
Baseline water quality monitoring areas of potential future land use change.	There remain gaps in knowledge regarding the impact of past and present mining activity conducted in the watershed on nearshore environments.	Action area on other existing and emerging threats. Lakewide objective to maintain good ecological condition in the tributaries and watersheds, and protect the Lake Superior basin from contamination resulting from additional substances of concern.
Identify species of conservation concern	Recent assessments in support of *A Biodiversity Conservation Strategy for Lake Superior* (LSBP, 2015) identified the need to better identify the presence of species of conservation concern, their habitats, habitat range limits, sensitivity to climate change, and other concerns such as habitat connectivity.	Action areas on climate change, native species, and high-quality habitats. Lakewide objectives to maintain good ecological condition on the islands, coastal wetlands, coastal zones and tributaries and watersheds.
Land use / Land cover	The extent and rate of land use change (e.g., forested, developed, agriculture) is not fully understood, nor is the impacts of these changes to Lake Superior. Opportunity to help better inform future land use planning with regard to lakewide objectives.	Action areas on dams and barriers, climate change and high-quality habitats. Lakewide objectives to maintain good ecological condition of tributaries and watersheds, coastal zones, coastal wetlands, embayment and nearshore waters.
Explore use of lakewide macroinvertebrate monitoring to assess state of the lake, threats, stress impacts, and success of restoration and protection investments	Various macroinvertebrate monitoring efforts are taking place to track local conditions and inform local decision-making. Assess the similarities and differences, and applicability for potential lakewide standardization for lakewide reporting and decision-making.	Action areas on dams and barriers, climate change and high-quality habitats. Lakewide objectives to maintain good ecological condition of tributaries and watersheds, coastal zones, coastal wetlands, embayment and nearshore waters.

Science and Monitoring Priority	Context	Link to Action Areas and Lakewide Objectives
Chemicals and Nutrients		
Concentrations and cycling of Zero Discharge Demonstration Program chemicals in the Lake Superior basin.	While demonstrating the extent that the emissions of these chemicals can be reduced within the basin, it is also important to understand and communicate the actual concentrations and trends of these contaminants in the environment.	Action area on chemical contaminants. Lakewide objective to achieve zero release of nine persistent bioaccumulative toxic substances.
Chemicals of emerging concern - toxicity, persistence and bioaccumulative properties. Preference to all candidate "chemicals of mutual concern" under the GLWQA that are not already captured above.	While Lake Superior is the "cleanest" of the Great Lakes, there are existing chemicals of emerging concern and new substances being detected in the waters. Even if meeting acceptable concentrations, it is important to communicate that evidence, and continue to ensure Lake Superior is benefitting from pollution prevention actions.	Action area on additional substances of concern. Lakewide objective to protect the Lake Superior basin from contamination resulting from additional substances of concern.
Mercury trends in Lake Superior fish	Lake Superior data is demonstrating a vacillation (i.e., decrease/increase/decrease) in mercury. Is this a management concern? Mercury is a cause of some fish consumption advisories.	Action area on chemical contaminants. Lakewide objective to achieve zero release of nine persistent bioaccumulative toxic substances, which includes mercury.
Identify nearshore areas most susceptible to eutrophication based on loadings, climate changes, lake currents and hydrodynamics	Occasional algal blooms do occur in some localized areas. In 2012, an extreme rain event and high temperatures was associated with a rare, small blue-green bloom in the southwest of the lake.	Lakewide objectives to maintain good ecological condition of coastal wetlands, embayments and the nearshore waters.
Follow-up studies on effects of stamp sands	Stamp sands (legacy mining waste piles) that contain elevated levels of contaminants and are eroding into Lake Superior (e.g., near Gay, Michigan) can threaten water quality, habitat and species. Is this a management concern?	Action areas on additional substances of concern, high quality habitats, and native species. Lakewide objectives to protect the Lake Superior basin from contamination resulting from additional substances of concern, and to maintain good ecological condition of embayments and the nearshore waters.

9.0 ACTIONS, PROJECTS, AND IMPLEMENTATION

The following section presents actions that may be taken to restore and protect Lake Superior. It is important to emphasize that all stakeholders play a role, i.e., federal, state and provincial governments, tribal governments, First Nations, Metis, municipal governments, watershed management agencies, other local public agencies, and the public. To successfully implement these actions, coordination, science-based management, public engagement, adaptive management and a prevention approach are all essential. These concepts are discussed below, with sections organized as follows:

Section 9.1 includes: 1) **Actions** to address threats to water quality and to achieve lakewide objectives. This information can be used to help identify, support or coordinate ongoing or new projects; 2) Lake Superior Partnership **Projects** that can help focus cooperative implementation and reporting under the Lake Superior LAMP over the next five years; and, 3) **Activities that everyone can take** to help protect Lake Superior.

Section 9.2 emphasizes the importance of restoring Lake Superior's degraded **Areas of Concern** (AOCs). AOCs are designated geographic areas that have their own specific "Remedial Action Plans" (RAPs) to guide remediation and restoration actions. Restoring AOCs will help improve conditions in the lake, thereby contributing to achievement of lakewide ecosystem objectives. RAPs can be considered a complementary effort to the LAMP.

Section 9.3 emphasizes the **commitment to implement LAMP actions and be accountable** for results.

Left: Falls River culvert on Golf Course Road, Baraga County, Michigan, before removal. *Right:* Falls River Golf Course Road after culvert removal. Credit: E. Johnston, Keweenaw Bay Indian Community.

9.1 Lakewide Management Actions and Projects

Lakewide management **actions** and **projects** are organized under the different threats identified in Section 4:

- Aquatic invasive species;
- Climate change;
- Dams and barriers;
- Chemical contaminants;
- Additional substances of concern; and
- Other threats (e.g., mining impacts and energy sector activities).

Two additional categories are included, to fully capture actions identified in *A Biodiversity Conservation Strategy for Lake Superior* (LSBP, 2015):

- High-quality habitats; and
- Native species.

Actions

Actions needed to address threats to water quality and achieve lakewide objectives have been identified by the Lake Superior Partnership in consultation with Lake Superior stakeholders and the public. The primary sources of the identified actions are: A Biodiversity Conservation Strategy for Lake Superior (LSBP, 2015), Lake Superior Climate Change Impacts and Adaptation Report (Huff and Thomas, 2014), the Lake Superior Aquatic Invasive Species Complete Prevention Plan (LSBP, 2014), the Zero Discharge Demonstration Program (ongoing) and 1990-2010 Critical Chemical Reduction Milestones report (LSBP, 2012).

The actions are fairly broad in their scope and can be used to help identify, support or coordinate ongoing or new projects for Lake Superior. For example, the actions were used to help identify Lake Superior Partnership projects over the years 2015-2019, as described below.

Lake Superior Partnership Projects

Projects were identified by Lake Superior management experts who comprise the Lake Superior Partnership. To be identified and confirmed as a project, several factors were considered: relevancy to the broader actions needed to address a threat (referred to above), current work underway, current state of the issue, potential for a high-degree of coordinated action, contribution to achieving lakewide objectives, and achievability over the next five years.

A total of 29 projects were identified. These projects can help focus cooperative implementation efforts and reporting under the Lake Superior LAMP.

Aquatic Invasive Species: Reduce the Impact of Existing Aquatic Invasive Species and Prevent the Introduction of New Ones

Context

As described in Section 4, the threat of aquatic invasive species (AIS) is ranked high, as evaluated in *A Lake Superior Biodiversity Conservation Assessment* (LSBP, 2015). This assessment examined scope, severity, and irreversibility of threats to Lake Superior. Some factors in the assessment included:

- Existing invasive species continue to impact the ecosystem (e.g., Sea Lamprey);
- Existing invasive species (found in limited areas of Lake Superior) have the potential to spread (e.g., Phragmites);
- Lake Superior waters are warming, thereby reducing the natural barrier of very cold waters that are inhospitable to many species found in the lower lakes;
- Establishment of even a single invasive species can have a greater negative consequence to Lake Superior because of the lake's relatively simple food-web, as compared to the other Great Lakes;
- Lake Superior is at one end of the Great Lakes – St. Lawrence Seaway, making it susceptible to invasive species that hitchhike via ballast water, live bait dumping, aquarium releases, water garden escapes, or as parasites or disease from introduced fish; and
- Constant vigilance is required to prevent and/or manage the risk of new invasive species becoming established in Lake Superior.

Actions

The following list of actions was developed by the Lake Superior Partnership though stakeholder comment processes and engagement (e.g., development of the *Lake Superior Aquatic Invasive Species Complete Prevention Plan* (LSBP, 2014) and *A Biodiversity Conservation Strategy for Lake Superior* (LSBP, 2015)). Results of these actions will contribute to achieving several lakewide objectives for Lake Superior (objectives 1-4 and 7, found in Section 3). These actions also support the GLWQA General Objective that calls for the Great Lakes to be free from the introduction and spread of aquatic invasive species.

- ➢ Establish first-response control protocols, where not already in place, in anticipation of newly-discovered aquatic invasive species;
- ➢ Implement control and/or eradication plans, where feasible, at appropriate geographic scales for priority aquatic invasive species;

- Undertake actions that reduce the risk of AIS being transferred between Lake Superior and the lower Great Lakes, the Mississippi River Basin, or other inland waters;
- Maintain Sea Lamprey at population levels that do not cause significant mortality for adult Lake Trout;
- Undertake best management practices to prevent AIS introductions during dredging operations, lock operations, construction, and other maintenance activities;
- Continue screening processes to classify species proposed for trade into three lists: prohibited, permitted, and conditionally prohibited/permitted;
- Identify AIS introduction issues and establish best management practices and restrictions for shore-land work;
- Implement compatible, federal regulatory regimes for ballast water discharge that are protective of the U.S. and Canadian Great Lakes;
- Use regulations, policies and best management practices to reduce the risk of introduction of AIS through all possible pathways, including boaters, guides, equipment and live bait dealers, hatchery operators, pet stores, home garden centers, sea plane pilots, scuba divers, and water recreationists;
- Protect exposed or seasonally-exposed wetland environments from off-road vehicular use that may be a vector for invasive plants (e.g., European Common Reed [*Phragmites australis subsp. australis*]);
- Undertake outreach, education, enforcement and research on preventing and managing AIS;
- Monitor AIS movement and establishment in the Lake Superior basin;
- Maintain a list of the AIS that are most likely to reach the Lake Superior basin, and monitor appropriately;
- Support development, testing and implementation of effective ballast treatment systems; and
- Identify ecosystems that may be more vulnerable to new AIS under changing environmental conditions.

Addressing the Issue

To address this issue across the Great Lakes, a number of binational efforts are being taken under the GLWQA 2012 (i.e., Annex 5 Discharges from Vessels, and Annex 6 Aquatic Invasive Species). These efforts include programs and measures to protect the Great Lakes from the discharge of aquatic invasive species from ships' ballast water and sediment; aquatic invasive species risk assessments; and an early detection and rapid response initiative.

Several organizations work collaboratively to tackle aquatic invasive species issues in the Great Lakes. For example, the Great Lakes Fishery Commission is working across borders to lead and implement a comprehensive Sea Lamprey control program. Since 1991, the Great Lakes Commission has supported the Great Lakes Panel on Aquatic Nuisance Species, a binational body comprised of representatives from government (state, provincial, federal, and tribal), business and industry, universities, citizen environmental groups and the larger community.

The Panel provides guidance on aquatic invasive species research initiatives, policy development and information/education programs. In 2009, the U.S. Saint Lawrence Seaway Development Corporation, in conjunction with the International Joint Commission, initiated the formation of the Great Lakes Ballast Water Collaborative, which shares information in an effort to facilitate communication and collaboration among key stakeholders and complement existing efforts to reduce the risk of introduction and spread of invasive species through ballast water.

In addition, domestic efforts in both Canada and the United States are underway across the Great Lakes. Many of these commitments are found in the *Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health*, and the U.S. Great Lakes Restoration Initiative Action Plan II.

Lake Superior Partnership Projects: 2015-2019

The Lake Superior Partnership identified a specific set of projects and agencies involved in implementing them (Table 7). The selection of these projects originated from Lake Superior management experts who comprise the various binational committees of the Lake Superior Partnership. The projects were selected in consideration of the list of actions identified above, accomplishments to date, work underway, current state of the issue on Lake Superior, benefits of a high-degree of coordinated action, contribution to achieving lakewide objectives, and achievability over the next five years. These projects have been vetted through the larger Lake Superior Partnership, and have undergone internal and public review.

The projects identified will help further focus coordination, tracking and reporting on specific work from a lakewide perspective. Implementation will take place, to the extent feasible, by agencies with mandates to undertake work in these areas. Not all of the agencies that make up the Lake Superior Partnership will be involved in implementing all of the projects. At the same time, contributions to these projects will not be limited to the agencies listed.

Table 7. Lake Superior Partnership Projects to Address Aquatic Invasive Species

#	Lake Superior Partnership Projects: 2015-2019	Agencies Involved
1	Add additional locations to the lakewide aquatic invasive species early detection/rapid response surveillance projects.	1854 Treaty Authority, CORA, DFO, Fond du Lac, KBIC, MDEQ, MNRF, NOAA, NPS, Parks Canada, USEPA, USFS, USFWS, WDNR
2	Undertake additional aquatic invasive species prevention outreach and education, including discussions with recreational boaters, and installation of lake access site signage.	1854 Treaty Authority, Bad River, BMIC, Fond du Lac, GLIFWC, Grand Portage, KBIC, MDEQ, Minnesota Sea Grant, MNRF, NPS, Parks Canada, Red Cliff, USFS, WDNR

#	Lake Superior Partnership Projects: 2015-2019	Agencies Involved
3	Maintain and improve effectiveness of Sea Lamprey control, prevent introduction of new species, and limit expansion of previously-established aquatic invasive species.	1854 Treaty Authority, Bad River, BMIC, CORA, DFO, GLIFWC, NPS, Parks Canada, Red Cliff, USFWS, USGS
4	Contribute to the elimination of European Common Reed (i.e., *Phragmites australis, subsp. australis*) from the Lake Superior basin by undertaking or supporting lakewide distribution mapping, early detection efforts, and control efforts.	1854 Treaty Authority, Bad River, Fond du Lac, GLIFWC, MDEQ, MNDNR, MNRF, NPS, Parks Canada, Red Cliff, USEPA, USFS, WDNR

Activities That Everyone Can Take

The general public is encouraged to help address this issue by undertaking the following actions:

- Learn to recognize invasive species and report sightings to federal, state or provincial, tribal or Sea Grant authorities;
- Never release fish or transplant invasive plants along lakes, streams, and stormwater ponds;
- Purchase and use safe alternatives for shoreland restoration, water gardens and waterscapes, instead of potentially-invasive species; and
- Clean all aquatic plants, animals, and mud from watercraft, trailers, docks, lifts, anchors, and other recreational equipment before leaving access areas.

Located at the end of the northern breakwater, the Duluth Harbor lighthouse marks the entrance to the canal in Duluth, Minnesota. Credit: S. Bayer.

Climate Change: Respond to Climate Change

Context

As detailed in Section 4, climate change is expected to alter the Lake Superior ecosystem, and exacerbate many existing stressors. Impacts include increases in air and water temperatures, decreased extent and duration of ice cover and a possible long-term decrease in water levels. Direct effects on species and habitat will include: increased stress on cold-water fish communities as streams and rivers become warmer; a northward shift in deciduous forests and the reduction of suitable habitat for boreal species; and negative effects on fish and wildlife populations due to changing ecological conditions, which may diminish coastal wetlands. The issue of climate change was identified as a high threat to habitats and species on a lakewide scale in *A Biodiversity Conservation Assessment for Lake Superior* (LSBP, 2015).

Actions

The following list of actions was developed by the Lake Superior Partnership, through stakeholder comment processes and engagement (e.g., development of the *Lake Superior Climate Change Impacts and Adaptation* report (Huff and Thomas, 2014)). The results of these actions will contribute to achievement of several lakewide objectives for Lake Superior (objectives 2-6, found in Section 3). These actions also support the GLWQA General Objective for the Great Lakes to be free from conditions that may negatively impact its chemical, physical or biological integrity.

- Review and revise conservation, restoration and management plans, guidelines and regulations as required in response to projected climate change impacts (e.g., increased water temperatures);
- Implement adaptation actions to account for changes in variability and/or frequency in air and water temperatures, water levels, storm events and droughts, among other effects;
- Implement adaptive plant and forestry management practices that respond to climate change to minimize possible disturbances to Lake Superior;
- Create coastal development setbacks or rolling easements to allow ecosystems to migrate in response to changes in water levels;
- Prevent development near potentially newly-sensitive and/or flood risk areas;
- Increase the incorporation of climate change information into the communications, management, technical assistance, science, research and development programs of parks and protected areas;

- Undertake climate change education and outreach activities, with a focus on disseminating materials and information available from domestic climate change programs;
- Monitor the effectiveness of the Lake Superior Regulation Plan (i.e., water levels) in response to changing climate conditions with regard to protecting and preserving Lake Superior coastal ecosystems;
- Modify invasive species pathway analysis and prediction models to include climate change parameters;
- Use parks or sentinel sites as long-term integrated monitoring sites for climate change (e.g., monitoring of species, especially those at-risk or extinction-prone);
- Continue to support and enhance scientific research designed to understand resilience of ecosystems to climate change and cumulative effects;
- Make climate models, scenarios, and impact information available and accessible to those making large and small scale natural resource management decisions, growth plan decisions, and socio-economic analyses; and
- Conduct climate change vulnerability assessments for forests, fisheries, priority habitats and species, and nearshore water quality.

Addressing the Issue

To address this issue across the Great Lakes, a number of binational efforts are being taken under the GLWQA 2012 (i.e., Annex 9 Climate Change Impacts). These efforts include taking into account climate change impacts during implementation of the GLWQA, using domestic programs to address climate change impacts, and communicating binationally regarding ongoing developments of domestic climate change science, strategies and actions.

The binational Great Lakes-St. Lawrence River Adaptive Management (GLAM) Committee was established in 2015 to address the issue of water level regulation, including the potential impact of climate change. The GLAM will undertake the monitoring, modeling and assessment needed to support ongoing evaluation of the regulation of Lake Superior water levels and flows. The GLAM Committee reports to the International Lake Superior Board of Control.

In addition, domestic efforts in both Canada and the United States are underway across the Great Lakes. Many of these commitments are found in the *Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health*, and the U.S. Great Lakes Restoration Initiative (GLRI) Action Plan II.

Lake Superior Partnership Projects: 2015-2019

The Lake Superior Partnership identified a specific set of projects and agencies involved in implementing them (Table 8). The selection of these projects originated from Lake Superior management experts who comprise the various binational committees of the Lake Superior Partnership. The projects were selected in consideration of the list of actions identified above, accomplishments to date, work underway, current state of the issue on Lake Superior, benefits

of a high-degree of coordinated action, contribution to achieving lakewide objectives, and achievability over the next five years. These projects have been vetted through the larger Lake Superior Partnership and have undergone internal and public review.

The projects identified will help further focus coordination, tracking and reporting on specific work from a lakewide perspective. Implementation will take place, to the extent feasible, by agencies with mandates to undertake work in these areas. Not all of the agencies that make up the Lake Superior Partnership will be involved in implementing all of the projects. At the same time, contributions to these projects will not be limited to the agencies listed.

Table 8. Lake Superior Partnership Projects to Address Climate Change

#	Lake Superior Partnership Projects: 2015-2019	Agencies Involved
1	Undertake or support outreach and education to stakeholders on the impacts of climate change in the Lake Superior ecosystem, including potential changes to habitat ranges, stormwater management, and nutrient/chemical cycling.	1854 Treaty Authority, Bad River, BMIC, CORA, ECCC, Fond du Lac, GLIFWC, Grand Portage, KBIC, MOECC, NOAA, NPS, Red Cliff, USEPA, USFS, USGS
2	Support local climate change initiatives to help communities and/or natural resource managers develop adaptation plans.	1854 Treaty Authority, Bad River, BMIC, CORA, Fond du Lac, GLIFWC, Grand Portage, KBIC, Minnesota Sea Grant, MNDNR, MOECC, NOAA, NPS, Red Cliff, USFS, USFWS, USGS

Activities That Everyone Can Take

The general public is encouraged to help address this issue by undertaking the following actions:

- Reduce unnecessary driving where possible; walk, bike, carpool or take mass transportation to reduce greenhouse gas emissions;
- Install rain gardens, green roofs, native landscaping and other green infrastructure measures as feasible; and
- Consider the use of passive solar energy and other forms of renewable energy.

Dams and Barriers: Reduce the Negative Impacts of Dams and Barriers by Increasing Connectivity and Natural Hydrology between the Lake and Tributaries

Context

As described in Section 4, the Lake Superior watershed contains thousands of dams and other barriers, many of which degrade water quality and disrupt habitat connectivity for aquatic organisms. Dams are a major factor in the low populations of some fish stocks, because the fish cannot access their traditional spawning areas above the dam. Some aging dams and other barriers are deteriorating, and some do not adhere to present day environmental regulatory standards. Dams and barriers were identified as a high threat to habitats and species on a lakewide scale in *A Biodiversity Conservation Assessment for Lake Superior* (LSBP, 2015).

While dams do disrupt habitat connectivity, they also have the benefit of preventing some aquatic invasive species from spreading. The question of what to do about aging dams and other barriers is an important topic in various jurisdictions and organizations all around Lake Superior.

Actions

The following list of actions was developed by the Lake Superior Partnership though stakeholder comment processes and engagement (e.g., development of *A Biodiversity Conservation Strategy for Lake Superior* (LSBP, 2015)). The results of these actions will contribute to lakewide objective 7, found in Section 3. These actions also support the GLWQA General Objective to support healthy and productive habitats to sustain resilient populations of native species.

- On a watershed scale, assess and prioritize habitat connectivity opportunities (e.g., culvert upgrade, road/stream crossing upgrade) with consideration of the benefits (e.g., quality or amount of habitat connected) versus the costs (e.g., community disruptions, potential spread of invasive species, financial cost);
- Protect and restore connectivity, where appropriate, by removing dams, upgrading stream/road crossing infrastructure, or by other means;
- Adopt flow standards to sustain key environmental processes, critical species habitat and ecosystem services; and
- Pursue, continue or enhance sustainable hydropower planning that adequately protects aquatic ecosystems, habitats and species.

Addressing the Issue

To address these issues across the Great Lakes, a number of binational efforts are being taken through the GLWQA (i.e., Annex 7 Habitat and Species). These efforts include assessing gaps in current binational and domestic programs to restore and maintain native species and habitat, and increasing awareness of native species and habitat and the methods to restore and maintain them.

In addition, domestic efforts in both Canada and the United States are underway across the Great Lakes. Many of these commitments are found in the *Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health* and the U.S. Great Lakes Restoration Initiative Action Plan II.

Lake Superior Partnership Projects: 2015-2019

The Lake Superior Partnership identified a specific set of projects and agencies involved in implementing them (Table 9). The selection of these projects originated from Lake Superior management experts who comprise the various binational committees of the Lake Superior Partnership. The projects were selected in consideration of the list of actions identified above, accomplishments to date, work underway, current state of the issue on Lake Superior, benefits of a high-degree of coordinated action, contribution to achieving lakewide objectives, and achievability over the next five years. These projects have been vetted through the larger Lake Superior Partnership, and have undergone internal and public review.

The projects will help further focus coordination, tracking and reporting on specific projects from a lakewide perspective. Implementation will take place, to the extent feasible, by agencies with mandates to undertake work in these areas. Not all of the agencies that make up the Lake Superior Partnership will be involved in implementing all of the projects. At the same time, contributions to these projects will not be limited to the agencies listed.

Table 9. Lake Superior Partnership Projects to Address Dams and Barriers

#	Lake Superior Partnership Projects: 2015-2019	Agencies Involved
1	Improve access to high-resolution stream/river barrier data and species-specific benefit analyses in support of decision-making on Lake Superior habitat connectivity decisions.	Bad River, Fond du Lac, KBIC, MNRF, Red Cliff, USFS, USFWS, WDNR
2	Establish a collaborative Lake Superior streams improvement initiative in Canada to undertake stream monitoring, assessment, and data management activities, and to help identify stream protection and restoration priorities.	MNRF
3	Prepare an environmental studies report to explore the feasibility, costs and benefits associated with the options surrounding the proposed decommissioning of Ontario's Camp 43 dam, and the construction of a corresponding multi-purpose Sea Lamprey barrier at Eskwanonwatin Lake.	MNRF

Activities That Everyone Can Take

The general public is encouraged to help address this issue by undertaking the following actions:

- Volunteer with your local watershed group to identify those barriers in your area which need to be removed; and
- Talk to local officials to remind them about the importance of both “fish crossing the road” and “cars crossing the creek.

Lake Superior Day volunteers. Credit: C. Clements.

Chemical Contaminants: Work to Achieve Zero Releases of the Nine Persistent Bioaccumulative Chemicals by 2020, Under the Zero Discharge Demonstration Program

Context

The table below presents 9 management actions that seek to achieve the Lake Superior lakewide objective related to persistent bioaccumulative and toxic substances (objective 8). These actions also support GLWQA General Objectives that aim to maintain a source of safe, high-quality drinking water; protect Great Lakes waters from pollutants in quantities or concentrations that could be harmful to human health, wildlife, or aquatic organisms; and allow for human consumption of fish and wildlife unrestricted by concerns due to harmful pollutants. Chemical contaminants were identified as a medium threat to habitats and species on a lakewide scale in *A Biodiversity Conservation Strategy for Lake Superior* (LSBP, 2015).

The Zero Discharge Demonstration Program (ZDDP), established in 1991, targets nine critical legacy pollutants for zero discharge in the Lake Superior basin by 2020. The nine ZDDP critical contaminants are: mercury, PCBs, dioxin, hexachlorobenzene (HCB), octachlorostyrene (OCS), chlordane, DDT and metabolites, dieldrin/aldrin, and toxaphene. The *1990-2010 Critical Chemical Reduction Milestones* report documents progress toward achieving the ZDDP reduction schedules for the nine critical chemicals (LSBP, 2012).

While the program has had many successes, including significant reductions in mercury and dioxin releases, it will be challenging to achieve the program's goal of zero release of all pollutants by 2020. Despite the success of the ZDDP, contaminants continue to be present in amounts that can be a risk to human health or cause degradation to habitat. For example, although mercury discharges and emissions in the Lake Superior basin decreased by 80% from 1990 to 2010, mercury levels in some fish in some areas continue to warrant advisories for human fish consumption.

Actions

The following list of actions was developed by the Lake Superior Partnership though stakeholder comment processes and engagement (e.g., development of the *1990-2010 Critical Chemical Reduction Milestones* report (LSBP, 2012)). The results of these actions will contribute to the Lake Superior lakewide objective 8, found in Section 3. These actions also support GLWQA General Objectives to maintain a source of safe, high-quality drinking water; protect Great Lakes waters from pollutants in quantities or concentrations that could be harmful to human health, wildlife, or aquatic organisms; and allow for human consumption of fish and wildlife unrestricted by concerns due to harmful pollutants.

- Support efforts that increase the level of public education on mercury, PCBs and dioxin toxicity and pathways into fish, wildlife, and humans. Educate the public on reduction and/or elimination actions and projects;
- Continue to build on knowledge of existing and proposed mining projects in the basin, and possible chemical emissions, for incorporation into the Lake Superior Partnership's ZDDP chemical inventory (used to assess chemical reduction milestones) and to promote, where necessary, the use of best mining practices with regard to achievement of Lake Superior lakewide objectives;
- Promote restrictions and voluntary phase-out of non-essential mercury-containing products in households, schools, municipalities, and businesses;
- Investigate any potential further opportunities to remove mercury from wastewater, including through voluntary and regulatory means (e.g., local ordinances). Recognize many completed successful innovations and toxic reduction strategies in the basin (e.g., Western Lake Superior Sanitary District, Thunder Bay, Superior, Bayfield, Marquette, Ishpeming, and others) and look for opportunities to tech transfer their success;
- Showcase agencies and local governments that collect and track the types and amounts of pesticides disposed, to support efforts to virtually eliminate from the basin, those pesticides listed in the Zero Discharge Demonstration Program;
- Support existing pesticide collection programs, such as clean sweeps, and explore the expansion of collections to additional geographic areas;
- Track and reduce atmospheric deposition of persistent, bioaccumulative, and toxic pollutants from in-basin sources through research, voluntary actions, and enforcement of controls and regulations;
- Where possible, participate in and encourage out-of-basin actions to reduce toxic chemicals from being imported into the Lake Superior basin via atmospheric deposition;
- Support various energy efficiency and energy conservation programs (e.g., Leadership in Energy and Environmental Design) and provide resources to the public, private businesses, and municipal governments; and
- Support open burning abatement programs (e.g., burning residential garbage in backyard burn-barrels), and track the extent of open burning practice from a lakewide perspective.

Addressing the Issue

To address chemical contaminants across all the Great Lakes, a number of binational efforts are being taken under the GLWQA 2012 (i.e., Annex 3 Chemicals of Mutual Concern). These efforts include identifying chemicals of mutual concern that originate from anthropogenic (human) sources, and that are agreed to by both countries as being potentially harmful to human health or the environment; reducing anthropogenic releases of chemicals of mutual concern and products containing chemicals of mutual concern throughout their entire life cycles; and promoting the use of safer chemical substances and the use of technologies that reduce or eliminate the uses and releases of chemicals of mutual concern.

In addition, domestic efforts in both Canada and the United States are underway across the Great Lakes. Many of these commitments are listed in the *Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health* and the U.S. Great Lakes Restoration Initiative Action Plan II.

Lake Superior Partnership Projects: 2015-2019

The Lake Superior Partnership identified a specific set of projects and agencies involved in implementing them (Table 10). The selection of these projects originated from Lake Superior management experts who comprise the various binational committees of the Lake Superior Partnership. The projects were selected in consideration of the list of actions identified above, accomplishments to date, related work underway, current state of the issue on Lake Superior, benefits of a high degree of coordinated action, contribution to achieving lakewide objectives, and achievability over the next five years. These projects have been vetted through the larger Lake Superior Partnership, and have undergone internal and public review.

The projects will help further focus coordination, tracking and reporting on specific work from a lakewide perspective. Implementation will take place, to the extent feasible, by agencies with mandates to undertake work in these areas. Not all of the agencies that make up the Lake Superior Partnership will be involved in implementing all of the projects. At the same time, contributions to these projects will not be limited to the agencies listed.

Table 10. Lake Superior Partnership Projects to Address Chemical Contaminants

#	Lake Superior Partnership Projects: 2015-2019	Agencies Involved
1	Continue outreach and education to the public on mercury toxicity; pathways into fish, wildlife and humans; and actions that can be taken to help remove mercury from the basin.	Bad River, CORA, Fond du Lac, GLIFWC, Grand Portage, KBIC, MDEQ, MOECC, NOAA, NPS, Red Cliff, USEPA, USFS, USFWS, USGS
2	Conduct a data synthesis of available mercury monitoring data for the Lake Superior basin to improve the inter-jurisdictional understanding and communication of mercury trends in the Lake Superior ecosystem.	Bad River, ECCC, Fond du Lac, MPCA, NOAA, NPS, USGS
3	Document which agencies and local governments collect and track the types and amounts of pesticides disposed, as feasible, so as to inform existing pesticide collection programs, such as clean sweeps. Information will be used to assess the potential for expanding collections to additional geographic areas.	ECCC, MDEQ, WDNR
4	Continue to support open burning abatement programs, such as “Bernie the Burn Barrel,” to achieve reductions in the release of dioxins and furans into the Lake Superior basin from the practice of residential burning of garbage.	Bad River, CORA, Fond du Lac, KBIC, MOECC, MPCA, Red Cliff, WDNR, MPCA

Activities That Everyone Can Take

The general public is encouraged to help address this issue by undertaking the following actions:

- Reduce, reuse, repair, and recycle;
- Take household hazardous materials to hazardous waste collection depots;
- Never burn garbage;
- Use more environmentally-friendly asphalt-based sealants as an alternative to those with coal tar, which contain toxic substances; and
- Compost your garbage, and use natural pest-control methods.

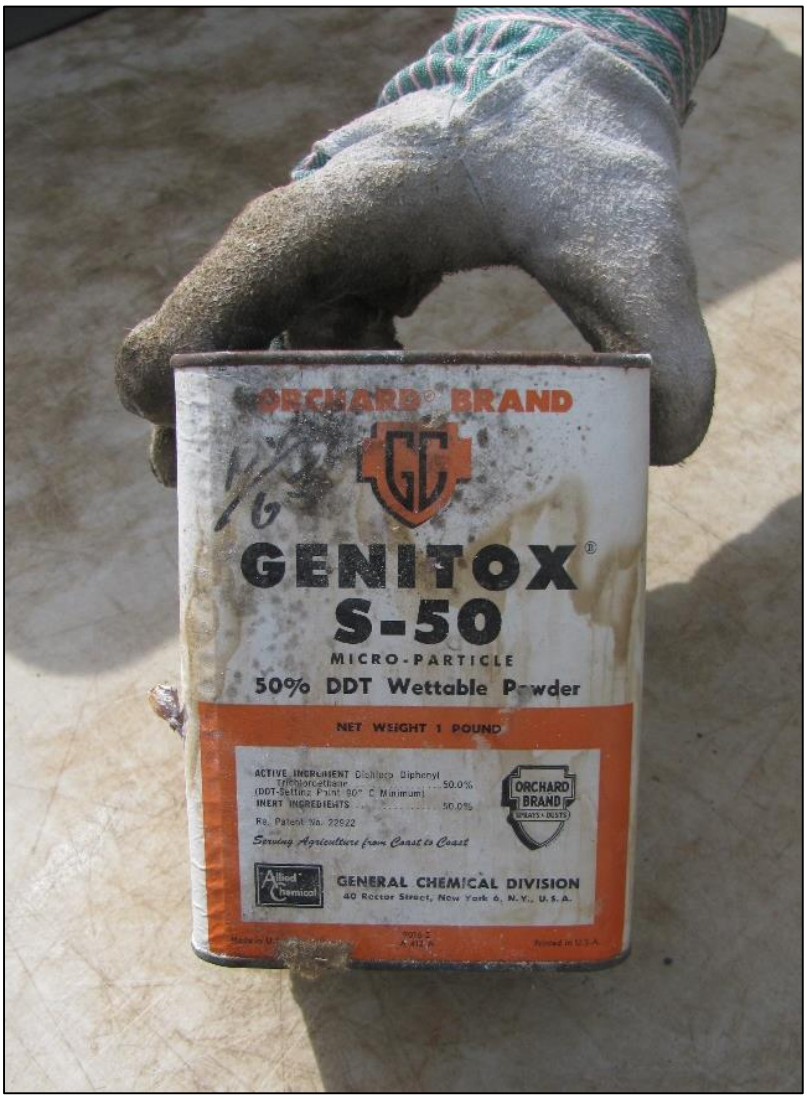

DDT collected during collection event in 2013. Credit: C. Spruce.

Additional Substances of Concern: Protect the Lake Superior Basin from Future Contamination Resulting from Additional Substances of Concern

Context

In addition to the nine critical legacy pollutants that are the focus of the Zero Discharge Demonstration Program, contaminants such as pharmaceuticals and personal care products (PPCPs), microplastics, excessive nutrients, and substances identified as GLWQA Chemicals of Mutual Concern (e.g., brominated flame retardants and perfluorinated chemicals) have the potential to adversely impact the Lake Superior basin. At the same time, there is a great opportunity to maintain good water quality in Lake Superior because in most cases the concentrations of these substances are very low.

As described in Section 4, concerns about additional substances of concern include the following:

- PPCPs have been detected in nearshore waters and in bottom sediments of Lake Superior at low concentrations;
- Atmospheric concentrations of in-use flame retardants (i.e., TBB & TBPH) are increasing;
- Personal care products and contaminants such as perfluorooctane sulfonate (PFOS) and are susceptible to being transported in groundwater within the Lake Superior basin; and
- Human activities such as agriculture, urban development and forestry can increase non-point source runoff into the lake, which can include pollutants that degrade water quality and affect biological communities.

Actions

The following list of actions was developed by the Lake Superior Partnership through such processes as stakeholder review and engagement opportunities (e.g., *1990-2010 Critical Chemical Reduction Milestones* report (LSBP, 2012)). The results of these actions will contribute to the Lake Superior lakewide objective 9, found in Section 3. These actions also support GLWQA General Objectives which aim to maintain a source of safe, high-quality drinking water; protect Great Lakes waters from pollutants in quantities or concentrations that could be harmful to human health, wildlife, or aquatic organisms; and allow for human consumption of fish and wildlife unrestricted by concerns due to harmful pollutants.

- ➢ Implement activities identified in GLWQA Binational Strategies for future GLWQA Chemicals of Mutual Concern, as appropriate;
- ➢ Seek opportunities to support, coordinate or expand the various pharmaceutical collection initiatives taking place in the Lake Superior basin;

- Develop policies or programs that assist nursing homes and other health care facilities in proper disposal of unwanted medication;
- Consider adopting policies or resolutions restricting the use of cosmetic pesticides (i.e., pesticides used for aesthetic purposes only), using as a guide the 2009 Ontario Pesticides Act: Cosmetic Pesticide Ban Regulations; and
- Protect oligotrophic conditions (i.e., high in oxygen, low in nutrients) in nearshore and offshore waters, and restore and protect water quality in embayments and tributaries.

Addressing the Issue

To address additional substances of concern across the Great Lakes, a number of binational efforts are being taken under the GLWQA 2012 (i.e., Annex 3 Chemicals of Mutual Concern). These efforts include identifying chemicals of mutual concern that originate from anthropogenic (human) sources, and that are agreed to by both countries as being potentially harmful to human health or the environment; reducing anthropogenic releases of chemicals of mutual concern and products containing chemicals of mutual concern throughout their entire life cycles; and promoting the use of safer chemical substances and the use of technologies that reduce or eliminate the use and release of chemicals of mutual concern.

In addition, domestic efforts in both Canada and the United States are underway across the Great Lakes. Many of these commitments are listed in the *Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health* and the U.S. Great Lakes Restoration Initiative Action Plan II.

Lake Superior Partnership Projects: 2015-2019

The Lake Superior Partnership identified a specific set of projects and agencies involved in implementing them (Table 11). The selection of these projects originated from Lake Superior management experts who comprise the various binational committees of the Lake Superior Partnership. The projects were selected in consideration of the list of actions identified above, accomplishments to date, related work underway, current state of the issue on Lake Superior, benefits of a high-degree of coordinated action, contribution to achieving lakewide objectives, and achievability over the next five years. These projects have been vetted through the larger Lake Superior Partnership, and have undergone internal and public review.

The projects will help further focus coordination, tracking and reporting on specific projects from a lakewide perspective. Implementation will take place, to the extent feasible, by agencies with mandates to undertake work in these areas. Not all of the agencies that make up the Lake Superior Partnership will be involved in implementing all of the projects. At the same time, contributions to these projects will not be limited to the agencies listed.

Table 11. Projects to Address Additional Substances of Concern

#	Lake Superior Partnership Projects: 2015-2019	Agencies Involved
1	Increase efforts to educate the public on new and emerging chemicals; their potential toxicity; pathways into fish, wildlife and humans; and how the public can help remove these chemicals from the basin. Put special emphasis on the topics of microplastics and safer alternatives for personal care, household cleaning products, and pesticides/herbicides.	BMIC, ECCC, Fond du Lac, Grand Portage, KBIC, MOECC, NOAA, NPS, Red Cliff, USGS, USFWS
2	Compile information on the type and status of different pharmaceutical collection efforts in the basin and other efforts to locate and properly dispose of unwanted medication. Use this information to identify opportunities for further action.	Bad River, ECCC, KBIC, MPCA, USGS, USFWS, WDNR

Activities That Everyone Can Take

The general public is encouraged to help address this issue by undertaking the following actions:

- Return unused medicines, including over-the-counter drugs, to pharmacies; never flush them down the toilet or dump them down the sink;
- Choose natural fabrics, natural cleaning products, and reusable containers; and
- Read the labels of your personal care products, and use online tools to learn which chemicals to avoid.

EcoSuperior sponsored a home cleaner trade-in project in which the public was invited to trade in a typical household cleaning product for a kit to make their own cleaning products. Credit: M. McChristie.

Other Existing and Emerging Threats: Address Other Existing and Emerging Threats That May Impact Important Habitat or Native Plant and Animal Communities

Context

As described in Section 4, other threats can impact the Lake Superior ecosystem. While high threats from a lakewide perspective are addressed individually in the LAMP, there are other threats that can impact the lake or are of high importance to a particular area. Many different threats were assessed and ranked within the process to develop *A Biodiversity Conservation Strategy for Lake Superior* (LSBP, 2015). Other existing and emerging threats include the following:

- Fourteen mines currently operate in the Lake Superior basin, with many explorations and expansions underway. Mining activity has the potential to impair water quality and degrade habitats;
- Domestic production of crude oil has increased in both the U.S. and Canada, with an increasing amount of oil being transported through the Lake Superior basin;
- Some stretches of shoreline are becoming increasingly developed for residential, commercial or industrial land uses, which can alter natural processes and degrade habitat; and
- Adverse impacts to Lake Superior can result from unsustainable forestry practices, terrestrial invasive species, and other energy sector activities.

Actions

The following list of actions was developed by the Lake Superior Partnership through stakeholder comment processes and engagement (e.g., development of *A Biodiversity Conservation Strategy for Lake Superior*). The results of these actions will contribute to the lakewide objectives for Lake Superior (found in Section 3), and the actions also support the GLWQA General Objective for the Great Lakes to be free from other substances, materials or conditions that may negatively impact the chemical, physical or biological integrity of the waters of the Great Lakes.

- ➢ Promote proactive consideration of important habitat areas and species during environmental assessment and regulatory processes for mining, supported by comprehensive binational mapping (of existing and historical mining activities and exploration) and sharing knowledge of best management practices, best available technologies and other activities, as appropriate;
- ➢ Identify and assess the risk of any newly-discovered or orphaned contaminated sites;
- ➢ Reduce non-point source pollution from urban areas, agriculture, and other sources to levels that are safe for plants, fish and wildlife;

- Integrate green infrastructure principles in coastal development projects;
- Use only sustainable forestry practices in the Lake Superior basin;
- Develop, implement, and integrate early detection and rapid response networks for terrestrial invasive species;
- Track and implement control and/or eradication plans, where feasible, for terrestrial invasive species at appropriate geographic scales; and
- Research or monitor potentially new, emerging, or cumulative threats to Lake Superior.

Addressing the Issue

Over the past several decades, there have been tremendous technological advancements, increased understanding of impacts, meaningful voluntary actions, and regulatory changes to reduce the impacts of resource extraction activities. Oversight of these activities occurs domestically by agencies with jurisdictional authority in Canada and the U.S.

To further address these threats across the Great Lakes, a number of commitments have been made in the GLWQA 2012 (i.e., Annex 2 Lakewide Management, and Article 6 Notification and Response). These commitments include identifying science priorities for the assessment of current and future threats to water quality, and for the identification of priorities to support management actions. Further, the Governments of Canada and the United States have agreed to notify each other of planned activities that could lead to a pollution incident or that could have significant cumulative impacts on the waters of the Great Lakes.

Lake Superior Partnership Projects: 2015-2019

The Lake Superior Partnership identified a specific set of projects and agencies involved in implementing them (Table 12). The selection of these projects originated from Lake Superior management experts who comprise the various binational committees of the Lake Superior Partnership. The projects were selected in consideration of the list of actions identified above, accomplishments to date, related work underway, current state of the issue on Lake Superior, benefits of a high-degree of coordinated action, contribution to achieving lakewide objectives, and achievability over the next five years. These projects have been vetted through the larger Lake Superior Partnership, and have undergone internal and public review.

The projects will help further focus coordination, tracking and reporting on specific work from a lakewide perspective. Implementation will take place, to the extent feasible, by agencies with mandates to undertake work in these areas. Not all of the agencies that make up the Lake Superior Partnership will be involved in implementing all of the projects. At the same time, contributions to these projects will not be limited to the agencies listed.

Table 12. Lake Superior Partnership Projects to Address Other Existing and Emerging Threats

#	Lake Superior Partnership Projects: 2015-2019	Agencies Involved
1	Provide oil spill responders with better access to existing and new spatial data (as available) on ecologically-important and sensitive habitats.	Bad River, CORA, Fond du Lac, GLIFWC, MOECC, NOAA, NPS, Parks Canada, USFWS, USGS
2	Support efforts to increase the sustainable use of Lake Superior basin resources, with specific emphasis on projects on green stormwater infrastructure, incorporating traditional ecological knowledge into projects, and/or recognizing the monetary value of ecosystem services.	1854 Treaty Authority, Bad River, BMIC, CORA, Fond du Lac, GLIFWC, KBIC, MOECC, NOAA, NPS, Parks Canada, Red Cliff, USEPA, USFWS
3	Outreach and engage with communities and others at the local scale on the value of water and best water use practices and policies.	Bad River, CORA, Fond du Lac, GLIFWC, KBIC, MDEQ, Red Cliff, USFWS, USGS, WDNR
4	Map current and proposed mining activities in the Lake Superior basin to support understanding of the potential and cumulative impacts of mining on important habitat sites. Assess impacts due to other stressors, such as climate change.	1854 Treaty Authority, CORA, Fond du Lac, GLIFWC, MPCA, NPS, USGS

Activities That Everyone Can Take

The general public is encouraged to help address this issue by undertaking the following actions:

- Promote corporate social responsibility and support businesses with sustainability initiatives;
- Support green infrastructure, including low-impact development to manage stormwater;
- Report possible oil spills immediately;
- Install water-saving devices; and
- Use a rain barrel for watering the garden.

High-quality Habitats: Restore and Protect a System of Representative, High-quality Habitats

Context

As described in Section 4, Lake Superior is in the best overall condition of all the Great Lakes; many of its aquatic habitats, watersheds and coastal wetlands are in good condition. For this reason, Lake Superior provides an unparalleled opportunity for sustaining high environmental quality and providing ecosystem services for the people who live near or visit Lake Superior.

In addition to actions that target specific threats such as aquatic invasive species, site-specific considerations and management actions are needed, especially in areas of high or potentially high ecological value. While Lake Superior's habitats are in relatively good condition overall, they are not uniformly "good" all around the lake. Some areas are in excellent condition and other areas are degraded. Similarly, habitat stressors vary from location to location.

Actions

The following list of actions was developed by the Lake Superior Partnership through stakeholder comment processes and engagement (e.g., development of *A Biodiversity Conservation Strategy for Lake Superior* (LSBP, 2015)). The results of these actions will contribute to several lakewide objectives for Lake Superior (objectives 1, 2-4, 6, 7, found in Section 3). These actions also support the GLWQA General Objective to support healthy and productive wetlands and other habitats to sustain resilient populations of native species.

- Restore or protect wetlands, native riparian forests, and coastal habitats such as rocky shorelines, beaches and dunes;
- Achieve an overall net gain of the productive capacity of habitat supporting fish and wildlife, including coastal wetlands;
- Restore habitats that have been degraded in their ecological capacity to better support fish and wildlife communities, where feasible;
- Develop or refine ecologically-based integrated watershed management plans in priority areas;
- Use special land and water designations to protect important habitat on public property;
- Educate and engage people about restoring or protecting important habitat and related ecosystem services;
- Develop comprehensive inventories of important fish and wildlife habitats;
- Inventory and assess impacts of degraded habitats and communities, including hardened shorelines and other artificial coastal structures;

- Develop and distribute information and/or indicators on ecosystem conditions, trends, stressors and important restoration or protection sites; and
- Maintain and share data through existing and new mechanisms, as appropriate.

Addressing the Issue

To address this issue across the Great Lakes, a number of binational efforts are being taken under the GLWQA 2012 (i.e., Annex 2 Lakewide Management, and Annex 7 Habitat and Species). These efforts include: developing a nearshore framework to identify areas that are, or may become, subject to high stress, and areas that are of high ecological value; developing a baseline survey of the existing habitat against which to establish a Great Lakes Basin Ecosystem target of net habitat gain; and developing a binational framework for prioritizing habitat conservation activities.

In addition, domestic efforts in both Canada and the United States are underway across the Great Lakes. Many of these commitments are listed in the *Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health* and the U.S. Great Lakes Restoration Initiative Action Plan II.

Lake Superior Partnership Projects: 2015-2019

The Lake Superior Partnership identified a specific set of projects and agencies involved in implementing them (Table 13, following page). The selection of these projects originated from Lake Superior management experts who comprise the various binational committees of the Lake Superior Partnership. The projects were selected in consideration of the list of actions identified above, accomplishments to date, related work underway, current state of the issue on Lake Superior, benefits of a high-degree of coordinated action, contribution to achieving lakewide objectives, and achievability over the next five years. These projects have been vetted through the larger Lake Superior Partnership, and have undergone broader internal and public reviews.

The projects will help further focus coordination, tracking and reporting on specific projects from a lakewide perspective. Implementation will take place, to the extent feasible, by agencies with mandates to undertake work in these areas. Not all of the agencies that make up the Lake Superior Partnership will be involved in implementing all of the projects. At the same time, contributions to these projects will not be limited to the agencies listed.

Table 13. Lake Superior Partnership Projects to Protect and Restore High-Quality Habitats

#	Lake Superior Partnership Projects: 2015-2019	Agencies Involved
1	Investigate, evaluate, and if feasible, implement dredging solutions or other habitat restoration efforts at Buffalo Reef, Michigan.	GLIFWC, NOAA, USACE, USEPA
2	Improve the mapping and quantification of important spawning, nursery and foraging habitat for key fish species to support protection and restoration decision-making.	1854 Treaty Authority, GLIFWC, MNRF, NPS, Parks Canada, Red Cliff, USEPA, WDNR
3	Promote and support local and regional implementation of *A Biodiversity Conservation Strategy for Lake Superior, 2015* and corresponding Regional Plans.	1854 Treaty Authority, Bad River, BMIC, CORA, ECCC, Fond du Lac, GLIFWC, Grand Portage, KBIC, MDEQ, MNDNR, MNRF, NOAA, NPS, Parks Canada, Red Cliff, USFS, USFWS, WDNR
4	Formally establish the Lake Superior National Marine Conservation Area in Canada, and Federal-Provincial harmonization committee to develop and implement management priorities for the area.	MNRF, Parks Canada
5	Integrate spatial data standards, methodologies and geomatic products to help identify and prioritize sites for habitat protection and rehabilitation.	GLIFWC, MNDNR, NOAA, NPS, USEPA, USFWS, USGS
6	Protect and enhance important coastal wetland habitats on priority state and tribal lands in western Lake Superior, including Bark Bay, Frog Bay, Bad River/Kakagon Sloughs and the St. Louis River estuary.	1854 Treaty Authority, Bad River, Fond du Lac, GLIFWC, KBIC, MNDNR, NOAA, NPS, Red Cliff, USEPA, USFS, USFWS, USGS, WDNR

Activities That Everyone Can Take

The general public is encouraged to help address this issue by undertaking the following actions:

- Reduce, reuse, repair, and recycle;
- Stay on established trails to minimize impacts on such sensitive coastal habitat as rocky shorelines, beaches, and dunes;
- Riparian property owners are encouraged to contact federal, state or provincial, tribal, or local natural resource professionals for information, advice, and permits (where applicable) when considering restoring their shoreline;
- Support stewardship events and efforts that promote how people can protect habitats; and
- Work with community groups and local authorities to develop watershed management plans.

Diverse, Healthy and Self-sustaining Native Species Populations: Manage Plants and Animals in a Manner that Ensures Diverse, Healthy and Self-sustaining Populations

Context

Lake Superior has unique fauna, containing species and subspecies found nowhere else on the planet, such as Siscowet, a large deep water form of Lake Trout, and Kiyi, the primary prey of Siscowet. Parts of Lake Superior's coastline provide habitat for arctic-alpine plant species that began to recolonize in the region around 15,000 years ago as the last ice sheet retreated. Lake Superior is the only Great Lake with a food web still dominated by native species with largely self-sustaining populations.

In addition to addressing specific lakewide threats, management of targeted species is needed to maintain diverse, healthy and self-sustaining populations, especially species which are most vulnerable to stress, are regularly harvested, or are of special importance. Often, the results of work to improve one targeted species (e.g., Lake Sturgeon) benefits the overall ecosystem and helps to achieve lakewide objectives (e.g., maintain tributaries in good ecological condition).

Actions

The following list of actions was developed by the Lake Superior Partnership through stakeholder comment processes and engagement (e.g., development of *A Biodiversity Conservation Strategy for Lake Superior* (LSBP, 2015)). The results of these actions will contribute to several lakewide objectives for Lake Superior (objectives 1-7, found in Section 3). These actions also support the GLWQA General Objective to support healthy and productive wetlands and other habitats to sustain resilient populations of native species.

- Develop and implement plans to detect and prevent disease outbreaks;
- Use local native species, to the extent possible, in restoration projects and other natural resource management initiatives, supported by the development or maintenance of lists of native species, use standards, sources, and seed zones;
- Implement native fish and wildlife species restoration, protection or rehabilitation plans, as appropriate;
- Manage the harvest of fish, wildlife and plants, as feasible, to ensure their health, long-term sustainability and balance in the ecosystem;
- Manage over-abundant populations of species where there is strong evidence of sustained detrimental effects on habitats and/or species diversity;
- Educate citizens about the importance and appropriate use of local native plants in restoration and landscaping projects;

- Undertake comprehensive biological surveys to identify species of conservation interest and remaining natural communities;
- Catalogue Lake Superior basin's genetic diversity; and
- Develop and distribute information and/or indicators on species conditions, trends, stressors and potential rehabilitation locations.

Addressing the Issue

The Great Lakes Fishery Commission facilitates cooperative fishery management among the state, provincial, tribal, and federal management agencies, and works to achieve Fish Community Objectives in Lake Superior. These efforts are an important component of lakewide management, and are reflected in the LAMP.

In addition, to address the issue across the Great Lakes, a number of binational efforts are being taken under the GLWQA 2012 (i.e., Annex 7 Habitat and Species). These efforts include assessing gaps in current binational and domestic programs and initiatives to conserve, protect, maintain, restore and enhance native species and habitat as a first step toward the development of a binational framework for prioritizing activities; facilitating binational collaborative actions to reduce the loss of native species and habitat, recover populations of native species at risk, and restore degraded habitat; renewing and strengthening binational collaborative actions to conserve, protect, maintain, restore and enhance native species and habitat by identifying protected areas, conservation easements and other conservation mechanisms to recover populations of species at risk and to achieve the target of net habitat gain; and increasing awareness of native species and the methods to conserve them.

Furthermore, domestic efforts in both Canada and the United States are underway across the Great Lakes. Many of these commitments are listed in the *Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health* and the U.S. Great Lakes Restoration Initiative Action Plan II.

Lake Superior Partnership Projects: 2015-2019

The Lake Superior Partnership identified a specific set of projects and agencies involved in implementing them (Table 14). The selection of these projects originated from Lake Superior management experts who comprise the various binational committees of the Lake Superior Partnership. The projects were selected in consideration of the list of actions identified above, accomplishments to date, related work underway, current state of the issue on Lake Superior, benefits of a high-degree of coordinated action, contribution to achieving lakewide objectives, and achievability over the next five years. These projects have been vetted through the larger Lake Superior Partnership, and have undergone internal and public review.

The projects will help further focus coordination, tracking and reporting on specific projects from a lakewide perspective. Implementation will take place, to the extent feasible, by agencies

with mandates to undertake work in these areas. Not all of the agencies that make up the Lake Superior Partnership will be involved in implementing all of the projects. At the same time, contributions to these projects will not be limited to the agencies listed.

Table 14. Lake Superior Partnership Projects to Manage Diverse, Healthy and Self-Sustaining Native Species Populations

#	Lake Superior Partnership Projects: 2015-2019	Agencies Involved
1	Develop and update stock assessment models to improve management of self-sustaining commercial and sport fisheries for Lake Trout, Cisco, and Lake Whitefish.	Bad River, BMIC, CORA, GLIFWC, Grand Portage, MNRF, NPS, Red Cliff, USFWS, USGS, WDNR
2	Rehabilitate populations of indigenous aquatic species (e.g., Brook Trout, Lake Sturgeon, Muskellunge, Walleye, etc.).	Bad River, CORA, DFO, Grand Portage, KBIC, MNRF, NPS, Red Cliff, USFWS, WDNR
3	Update the Ecopath with Ecosim (EwE) ecological model (www.ecopath.org) with recently acquired data and knowledge in order to explore: a) how recent changes in fish abundance could be influencing the food web; b) how the ecosystem may respond to current and potential threats; and c) how components of the ecosystem may respond to potential management actions.	CORA, GLIFWC, Grand Portage, MNRF, USEPA, USFWS, USGS
4	Develop and implement improved monitoring approaches for inshore, embayment, and tributary fish populations.	1854 Treaty Authority, BMIC, CORA, Fond du Lac, GLIFWC, Grand Portage, NPS, Red Cliff, USFWS, USGS

Activities That Everyone Can Take

The general public is encouraged to help address this issue by undertaking the following actions:

- Adhere to harvest limits and guidelines;
- Use proper catch and release practices for protecting species such as Brook Trout, Lake Sturgeon, and Muskellunge; and
- Report suspicious fish die-offs immediately to federal, state or provincial, tribal or Sea Grant authorities.

9.2 Areas of Concern

Remedial Action Plans (RAPs) are strategic plans designed to restore impaired "beneficial uses" in degraded areas, known as Areas of Concern (AOC). Refer to Section 4, to see the status of Lake Superior's AOCs.

Pursuant to the GLWQA, RAPs have been developed for each AOC, with a team of federal, state, provincial, tribal, First Nation and Métis partners, along with local stakeholders, cooperating to restore the AOC.

Maintaining a strong relationship between the LAMPs and the RAPs is essential to restoring and protecting Lake Superior. AOCs by definition can hinder the achievement of lakewide objectives. Conversely, actions completed in AOCs, such as those to remediate contaminated sediment or restore fish and wildlife habitat, greatly contribute to the achievement of lakewide objectives.

RAPs and LAMPs are similar in that they both use an ecosystem approach to assess and remediate environmental degradation. It is essential that the AOC partners and Lake Superior Partnership members continue to work collaboratively to achieve common goals, especially since much of the restoration expertise, as well as land use control and watershed planning, resides at the local level. Cooperation between the two efforts is essential to removing both lakewide and site-specific impairments.

Once an AOC is delisted, the area will come under the purview of the Lake Superior Partnership. Local watershed groups can continue to be engaged in lakewide management to build on the positive efforts completed as part of the RAP.

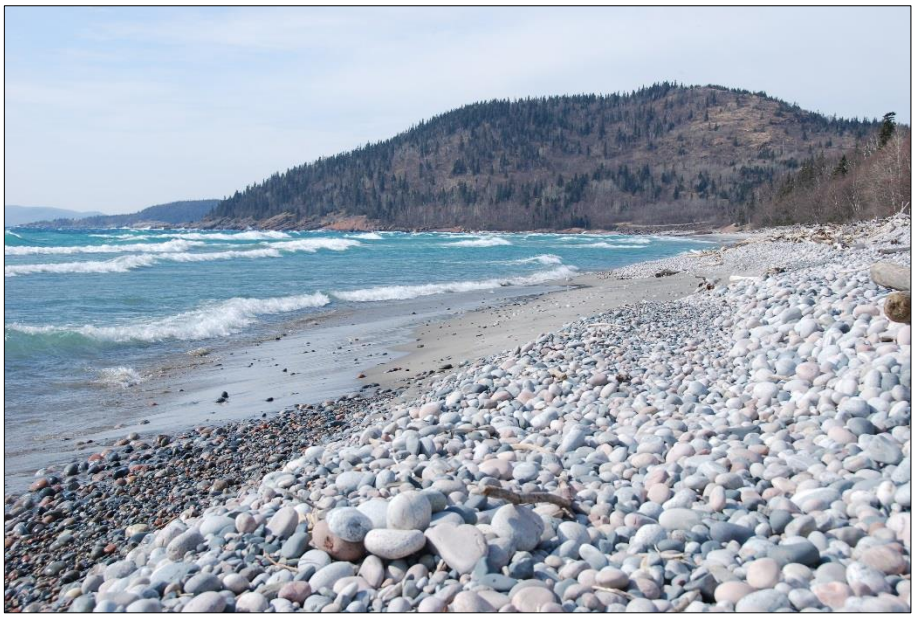

Peninsula Harbour AOC in Ontario. Credit: Environment and Climate Change Canada.

9.3 Implementation and Accountability

As demonstrated by the agency commitments in Section 9.1, Lake Superior Partnership organizations commit to incorporating, to the extent feasible, LAMP objectives and projects in their decisions on programs, funding, and staffing. In implementing the LAMP, Lake Superior Partnership organizations will be guided by the principles and approaches outlined in the GLWQA, including:

- Accountability – the effectiveness of actions will be evaluated by individual partner agencies, and progress will be reported through LAMP Annual Reports and the next 5-year LAMP report;
- Adaptive management – the effectiveness of actions will be assessed and future actions will be adjusted as outcomes and ecosystem processes become better understood and as new threats are identified;
- Coordination – actions will be coordinated across jurisdictions and stakeholder agencies, where possible;
- Prevention – anticipating and preventing pollution and other threats to the quality of the waters of the Great Lakes to reduce overall risks to the environment and human health;
- Public engagement – incorporating public opinion and advice, as appropriate, and providing information and opportunities for the public to participate in activities that contribute to the achievement of the objectives of the GLWQA; and
- Science-based management – implementing management decisions, policies, and programs that are based on best available science, research and knowledge, as well as traditional ecological knowledge, when available.

Implementation of projects will remain one of the highest priorities of the individual organizations that make up the Lake Superior Partnership. Organizations identified in Section 9.1 will take action, to the extent feasible, given budget constraints and domestic policy considerations.

Internal agency work planning and reporting will help track commitment progress and provide an accountability mechanism for the results of each individual organization. Internal Lake Superior Partnership committee workplans will help track implementation at a higher level to support coordination between organizations and in the engagement of others, as well as to support lakewide reporting on LAMP implementation (e.g., annual updates to the public on the LAMP).

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OIL TRANSPORTATION ANALYSIS

through the Chippewa Ceded Territories

Final Report

PREPARED FOR

Great Lakes Indian Fish and Wildlife Commission (GLIFWC)

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1. INTRODUCTION

In what follows, we provide historical and empirical context to the contestation of oil pipelines (known to the regulatory community as hazardous liquid pipelines, but called oil pipelines here for brevity) in order to begin to understand the risks that oil transportation poses to the human and natural systems that of the Chippewa Ceded Territories, and, in particular, to identify how these risks may affect the environments that sustain the vital, treaty-protected resources of the Territories.

We begin by situating pipelines and oil transportation generally within the current political landscape. We then reflect some of what we have learned of the values, traditions, and knowledges held by the Ojibwe tribes that govern the Great Lakes Indian Fish and Wildlife Commission (GLIFWC), as these will undoubtedly shape the policy and planning positions that member tribes pursue regarding oil transportation through their ancestral lands. From there, we describe the sources of our data and the methods by which it has been analyzed. These sources are both qualitative and quantitative, ranging from Congressional reports to news media accounts to hazardous liquid accident data collected by the U.S. federal government. Our data sources, detailed in an appended bibliography, are all publicly available. Those that were most integral to the writing of this report are briefly described in an additional, annotated bibliography and/or compiled as digital spreadsheets and map layers.

We then document the findings of our analyses. First, we describe the existing infrastructural networks of oil transportation, their capacities and their current volumes. Second, we touch on the current and planned expansion of these networks and the anticipated effects of such expansion of future capacities and volumes. Third, we provide an overview of the regulatory regime governing the safe siting, construction, and operation of these networks of oil transportation. Our focus here is on federal regulation, but we also touch on state-level frameworks in Michigan, Minnesota, and Wisconsin. Finally, we describe the initial findings of our analyses of spill data collected by the Department of Transportation's Pipeline and Hazardous Materials Safety Administration (the same body whose operations are described in the preceding section on regulation). We have not undertaken more than high-level descriptive statistical analysis of these data, but recommend more rigorous analysis in order to glean further trends.

We conclude with a more holistic discussion, exploring relationships among different types of risk and different modalities of transport and considering how different interpretations of the data may yield a diverse array of policy and planning prescriptions. Although we hope to have a sense of how the values, traditions, and knowledges of GLIFWC and its member tribes might influence the responses of both tribal and professional organizations in the Ceded Territories, we do not make any recommendations of how to proceed with the data. Instead, we leave such determinations to actors on the ground who will be much better situated to make appropriate and expert decisions of how to handle the intractable issue of oil transportation in the Ceded Territories.

2. BACKGROUND

Pipelines

In the first week of June, 2015, the members of the Minnesota Public Utilities Commission voted unanimously to grant Enbridge Energy Inc. a certificate of need for the company's Sandpiper pipeline proposal, clearing a crucial regulatory hurdle for the project. A day later, an estimated 5,000 activists led by members of the Minnesota Chippewa Tribe took to the streets of St. Paul to protest the approval and the prospect of further oil infrastructural development in the region (Swayer 2015). In September of the same year, a state Court of Appeals judge overturned the Commission's approval and instructed state environmental regulators to conduct a comprehensive Environmental Impact Statement (EIS), a process involving robust ecological and engineering analyses coupled with public engagement through meetings and comment (Kraker 2016).

The EIS was never completed; as public protest and regulatory hurdles mounted, Enbridge opted to put its $7.5 billion dollar investment in Sandpiper on hold (after having spent, by the company's own estimation, some $800 million on property acquisitions for a new easement route as well as legal fees) and instead put $1.5 billion behind Energy Transfer Partners' Dakota Access pipeline (Hughlett 2016). Dakota Access would carry light crude oil from the Bakken fields of North Dakota to a refinery in rural Illinois, bypassing resistance in Minnesota altogether, from which the refined oil would be distributed to markets across the Midwest.
Sandpiper's defeat by a diverse alliance of opponents built the momentum of resistance to a booming oil economy that had been catalyzed in 2015 by then-President Obama's decision to deny TransCanada permission for its Keystone XL pipeline to cross the northern border of the United States en route to refineries in Oklahoma. Only a few months after Enbridge abandoned the Sandpiper proposal, it appeared that the company - and the oil industry in general - would be dealt another blow as the Army Corps of Engineers announced its intent to reconsider, and ultimately deny, permits allowing the Dakota Access pipeline to cross below the Missouri River (Dennis and Mufson 2016).

But everything changed when Donald Trump took office as the 45th President in January of 2017. Barely three weeks into his term, the new President reversed course on the Dakota Access pipeline, ordering the issuance of the final permit needed to complete construction on the line (Eilperin and Dennis 2017). Then, just over a month later and on the same day that the final phase of construction recommenced on Dakota Access, Trump issued an executive order reviving the Keystone XL proposal and granting TransCanada the requisite permits to carry its pipeline over the northern border of the U.S. The President did not, though, live up fully to his campaign promise in issuing the Order, waiving a stipulation he had promoted on the campaign trail that would have required the pipeline to be constructed wholly of American-made steel (Dennis and Mufson 2017).

The particular sequence of events that has signaled the federal government's abrupt embrace of oil infrastructural development in the upper Midwest

is something of a mixed bag for Enbridge as well as its opponents. On the one hand, Enbridge can expect a relatively quick and painless permitting process among the federal agencies with which it has to deal for its remaining pipeline projects. This most prominently includes what Enbridge calls a "replacement" of its Line 3 pipeline, but which in fact entails the abandonment-in-place of the existing line and the construction of a wholly new line along a new easement route that would deliver 760,000 barrels per day of heavy crude oil from Alberta's tar sands to temporary storage and transmission in Superior, Wisconsin.

Supporters of the oil economy in the statehouses of Minnesota, Wisconsin, and Michigan are also likely to be energized by the new atmosphere of approval coming out of Washington and may transform it into pressure on environmental agencies at the state level. On the other hand, the revival of Keystone XL is a boon for Enbridge's major competitor, TransCanada and delivery of the 830,000 barrels per day of crude to be delivered by the pipeline could dampen demand for the tar sands oil that Enbridge proposes to transport through Line 3. Moreover, as widespread general opposition to the Trump administration continues apace, longstanding opponents of pipelines in the Midwest may find an expanded base of support in their resistance to Enbridge and other oil producers and pipeline operators.

Treaty Rights

The Ojibwe people, or Anishinabe, as they call themselves, have lived in the northwestern reaches of the Great Lakes for hundreds of years. Ojibwe oral history tells of the tribes' settlement on Madeline Island, just north of Chequamegon Bay, where the Ojibwe long ago discovered the bay's wild rice beds and ended their sojourn across the North American continent. The Ojibwe had once lived along the stretch of north Atlantic coast around what is now known as the Gulf of St. Lawrence. But, in a time of sickness and turmoil countless generations ago, they were instructed by their Creator, Kitiche Manito, to travel west until they found the place where the food grows upon the water. So, the Ojibwe commenced their journey, stopping for long stretches along the St. Lawrence River and then again on the shores of Lake Huron at Sault St. Marie, before finally encountering the wild rice beds of Chequamegon Bay and coming to call Madeline Island home. From their new spiritual center on the island, the Ojibwe settled all across the basin of Lake Superior, as far as the wild rice grew, and eventually still further west (GLIFWC 2017; Warren 1855).

Though the cultivation of wild rice has been central to the Ojibwe lifeway for dozens of generations and many settlements have formed around the rice beds, the Ojibwe were forever a seasonally nomadic people, supplementing their rice harvests with hunting, fishing, and gathering practices in the inland areas of what are now northern Michigan, Wisconsin, and Minnesota. But it is long since the tribes of the Great Lakes have been able to engage in their lifeways without trouble or challenge. Contentious and frequently violent encounters with European traders and, eventually, settlers began in the late 17th century and continued for almost two hundred years, until the Ojibwe made their historic treaties with the federal government of the nascent United States. In a series of four treaties – signed in 1836, 1837, 1842, and 1854, respectively – the Ojibwe tribes ceded their territories in the Great Lakes to the United States in exchange for usufructory rights to the resources and practices that they had traditionally enjoyed (Ahtone 2015; GLIFWC 2017). These practices include hunting, fishing, gathering and harvesting a diverse array of flora and fauna native to the region. Since the formation of the states of Michigan, Wisconsin, and Minnesota shortly after the signing of the treaties, though, this relation of shared sovereignty over the lands of the Great Lakes –

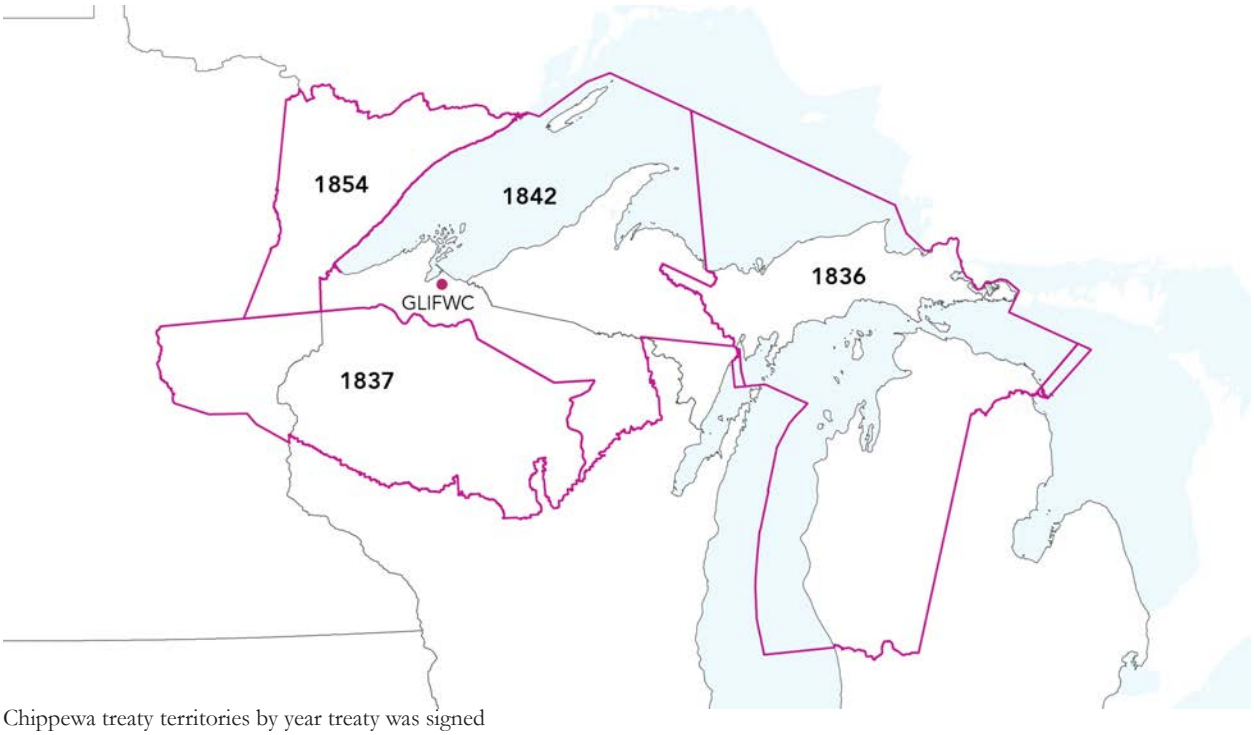

Chippewa treaty territories by year treaty was signed
Source: GLIFWC

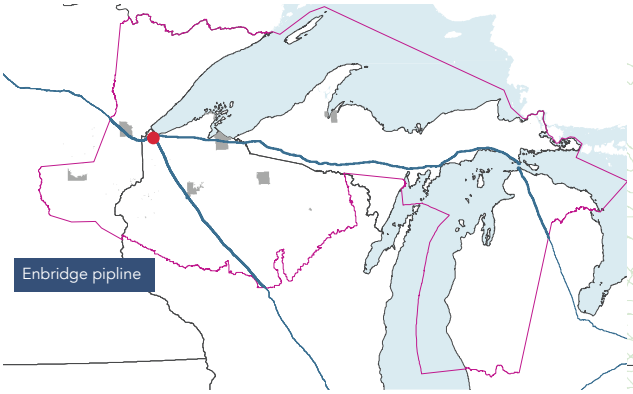

Pipeline infrastrucure through the Chippewa Ceded Territories.
Source: GLIFWC

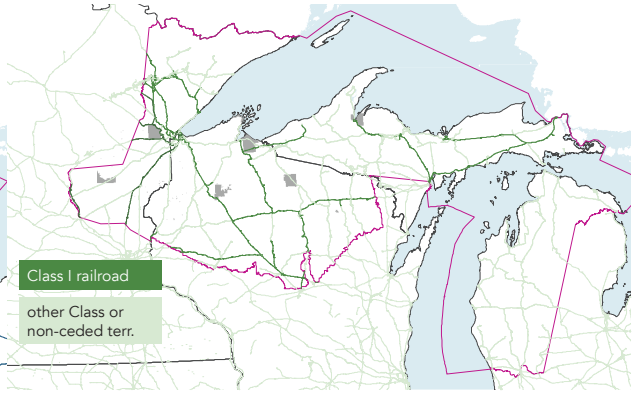

Railroads through the Chippewa Ceded Territories.
Source: Department of Transportation (DOT) & GLIFWC

referred to for historical reasons as the Chippewa ceded territories – has been constantly threatened and violated.

One crucial way in which state governments and, with their permission and encouragement, private individuals and corporations have continually violated the treaties with the Ojibwe is by, first, commodifying the land and innumerable other biophysical beings, and then, second, extracting these natural resources without restraint, jeopardizing the viability of the ecosystems to which they belong. In the 19th century, such extraction principally took the form of logging and mining. According to one historian's estimate, some 170 billion board feet of timber and 150 billion tons of iron ore have been ripped from the ceded territories (Loew and Thannum 2011). Undertaken long before any conception of sustainability would be incorporated into extractive enterprise, these activities historically have amounted to the denuding of vast swaths of hardwood forest, the tearing apart of entire mountain ranges, and the pollution of many thousands of lakes, rivers, and watersheds.

More recently, in the second half of the 20th century, state government officials interested in building a tourism economy in the northern Great Lakes region began changing the laws governing commercial and sport fishing, reorienting incentives from the former to the latter. Having done so without consulting Ojibwe tribal governments, these states either unwittingly or uncaringly violated Ojibwe treaty rights, so that when members of the Ojibwe bands in the ceded territories attempted to engage in their protected practices, they were subjected to both legal and popular reprisal, the slow violence of the police state abetted by the acute violence of white racism and even outright attacks against Ojibwe fishers (Thannum and Loew 2011).

In response to such violence, numerous Ojibwe bands joined together in a series of lawsuits against the state governments of Michigan, Minnesota, and Wisconsin. Beginning with the Wisconsin State Supreme Court's affirmation of tribal treaty rights in the 1972 case *Gunroe v. Wisconsin*, the Ojibwe of the Great Lakes region won several important confirmations of their codified rights in the ceded territories. Key among these were the 7th Circuit Appeals Court's judgement in favor of the Ojibwe in *Lac Courte Oreilles Band v. Voight* (1983) and the *U.S. Supreme Court's similar judgment in Minnesota v. Mille Lacs Band of Chippewa Indians* (1999). Though the raft of judgments upholding the Ojibwe's rights to access and enjoy the environment in which they had lived for hundreds of years did not necessarily diffuse the tensions between Native and Non-native communities in the upper Midwest, much less end the violence toward the Ojibwe, it has at least given indigenous environmental advocates a usefully flexible weapon in their arsenal of resistance to environmental degradation in the ceded territories.

In the sociopolitical landscape of the ceded territories today, the Ojibwe tribes that live in northern Minnesota, Wisconsin, and Michigan are fighting to retain sovereignty over their reservation lands and maintain autonomous access to natural resources in the ceded territories--as promised in the 1800s treaties. When the 7th Circuit Appeals Court's judged in favor of the Ojibwe in Lac Courte Oreilles Band v. Voigt (1983), the decision both affirmed the tribes access to the hunting, fishing and gathering resources they reserved in the earlier treaties, and created an intertribal task force to manage the implementation of these treaty rights. In 1984, this task force was manifest in the Great Lake Indian Fish and Wildlife Commission (GLIFWC), a quasi-governmental organization governed by the eleven Ojibwe bands with historical interest in the treaties governing the ceded territories.

GLIFWC's express purpose is to "provide natural resource management expertise, conservation

enforcement, legal and policy analysis, and public information services in support of the exercise of treaty rights during well-regulated, off-reservation seasons throughout the treaty ceded territories" (GLIFWC, 2017). The organization does not manage any resources on-reservation, but rather focuses on ensuring the sustainability of -- and tribal access to -- the wild rice beds, Lake Superior walleye populations, maple trees, and other resources that populate the millions of acres of ceded territory. GLIFWC is guided by an eleven member board, made up of each of the eleven tribes' tribal chairperson or their designee. The board sets the overarching direction and principles that guide the organization activities, and is guided two sub-committees of tribal members: the Voigt Intertribal Task Force (non-Lake treaty rights) and the Great Lakes Fisheries Committee (Lake Superior treaty rights).

As environmentally risky infrastructure that traverses government jurisdictions and has the potential to threaten the Ojibwe treaty resources, the Enbridge pipelines are of major concern to GLIFWC and its member tribes. The governance and ownership of the pipelines impedes on tribal sovereignty, and the infrastructure's environmental risk is a threat to the Ojibwe's lifeways and economies.

3. METHODS

All of the source material used to develop this report is publicly available and most was obtained through internet searches. Additionally, staff members of the Great Lakes Indian Fish and Wildlife Commission contributed generously both information regarding oil transportation in the Ceded Territories and knowledge pertaining to the values, traditions, and lifeways of the Ojibwe bands of the Great Lakes region. Both qualitatively and quantitatively organized data were examined and are described separately in the following section.

Literature Review

The qualitative component of our analysis entailed review of the relevant literatures. This includes information describing the material composition and engineering of pipeline networks; the chemistry of oil products and the physics of their transmission by pipeline, and the biology of their impact when spilled; the legal and historical development of the regulatory regime governing oil pipelines and their safety; and the political and economic dynamics of the financing, permitting, and operation of transmission pipelines. The sources of these data were numerous, and each source was scrutinized for the strengths and drawbacks of its orientation.

For example, much of the engineering and chemical literature is composed by researchers affiliated with oil-related industries and their representative organizations, such as the American Petroleum Institute (API). On the one hand, as the primary users - and, in many cases, inventors and/or manufacturers - of the technologies in question, these industries and their representative organizations necessarily possess expert knowledge of the technologies uses and limitations. On the other hand, though, because technologies ranging from inspection devices to diluents are generally proprietary and often effectively unregulated, information regarding their composition, use, and whatever standards may govern them are frequently not publicly available, or available only at prices unaffordable to lay and even academic researchers. Moreover, because public perception of the relative safety of oil and transmission products factors heavily into the profitability of such products, it is generally in the interest of oil producers and pipeline operators to produce information that is likely to be understood in a favorable light.

Other sources of qualitative data used to develop this report include Congressional reports, reports compiled by federal and state agencies (such as Environmental Impact Statements), academic reports and articles, and news media. Congressional reports and news media were useful in that both types of sources are intended for audiences likely to possess little or no specific, technical knowledge of the fields of oil extraction and transmission. Congressional reports are largely written by and for groups and individuals familiar with the structures and terms of American law and so tend to focus on legal and regulatory aspects of the issues. Both Congressional and news media sources are also useful in that they tend to be written in response to events or information (such as particularly harmful or highly visible accidents) that prompt concern about the safety of oil and its transportation. As such, they frequently offer a more critical perspective that works to balance

the concerted optimism of industry publications. Finally, academic articles and reports authored in state and federal agencies have a different set of strengths and limitations. Both types of sources are useful in that, being written for narrower, more technically expert audiences, they tend to explore issues relating to oil transportation at a much greater level of detail and specificity and often with a greater degree of conceptual rigor than other sources. Part of the effort of achieving this rigor also generally entails that researchers and authors aim to insulate themselves from politicized perspectives in order to deliver the cleanest and clearest analysis of the issue at stake. The interest of these types of sources in impartiality can be both a strength and a weakness. It is a strength to the extent that an objective perspective can be achieved, but a weakness to the extent that such an effort will always be imperfect, though researchers and authors may not always be aware of, much less able to frankly address, biases that linger as a result of their personal or institutional positions.

Although space does not permit a discussion of specific sources here, brief commentary on certain key sources can be found in the appended annotated bibliography.

Data Analysis

The quantitative component of the analysis undertaken for this report engaged publicly available data on hazardous liquid accidents, which is provided by pipeline operators to the Pipeline and Hazardous Materials Safety Administration (PHMSA) for all accidents resulting of losses of more than five liquid gallons, as required by federal regulation. PHMSA organizes its data in several ways, some of which work in concert with the aim of this report and others that presented challenges to our analysis.

For example, PHMSA's division of accident data by the liquid's mode of transportation - namely, rail and road on the one hand and pipeline on the other - reflects a distinction of interest to groups and individuals concerned with oil transportation safety, since the various modalities entail different kinds and extents of risk to the health of humans, the environment, and the economy. As such, we have preserved this division in our analysis. At the same time, PHMSA's periodization of the data, particularly relating to pipeline accidents, reflects a necessary but challenging organization. Necessary because the types of data that PHMSA collects and the categories into which those data are sorted has changed over time in response to legislative and regulatory changes, but challenging because identifying trends in the accidents reported requires comparison of data over time. Rather than attempt such comparisons at the desired level of detail by transforming the data and risking its adulteration, we have only compared fields that are clearly commensurable across periods. This has still allowed us to compile crucial elements of the data and identify trends in the number of accidents, the amount of liquids lost, as well as the causes and costs of the accidents, and the operators of the pipelines affected. Trend identification has been limited here to simple algorithmic and descriptive statistical analysis, as our aim was more to highlight areas that may be of interest for further exploration and research than to make determinations of what trends are significant and to undertake such detailed analysis.

Moreover, we have made minor changes to data fields - often limited only to changing the field name for brevity and legibility, or changing the format of the data from text to recognized numbers - in order to make recent data with specific spatial reference information compatible with Geographic Information Systems (GIS) software. This will allow further analysis of the data without compromising any of its content. Both spatialized and spreadsheet-formatted data are appended digitally to this report, along with relevant metadata.

4. FINDINGS

Infrastructure Overview

Logging, mining, and sport fishing/hunting activities have continued to the present, controversy and all, alongside the extraction and transportation of another, profoundly dangerous commodity: oil. Since the early 1950s, the excavation, transportation, refinement, and storage of crude oil and related liquids have transformed the landscape of the ceded territories in ways both subtle and stark. In the seven decades during which oil has flowed from extraction sites across the Midwest and Plains states, as well as much of western Canada, over 11,000 miles of hazardous liquid pipelines have been laid across Michigan, Minnesota, and Wisconsin to facilitate the production cycles of the modern energy economy (PHMSA 2017). Meanwhile, in the Wisconsin border city of Superior, gargantuan storage tanks pockmark the St. Louis River and the industrial community built around it. This largely "invisible" infrastructure transports crude oil in massive quantities through the Chippewa ceded territories via pipeline, rail, and truck.

Pipeline Networks, Capacities, Volumes

There are ten different Enbridge crude oil pipelines in Wisconsin, which are of particular interest to this project. Each begins or ends at the Superior oil terminal in the northwest corner of the state. According to Enbridge's internal reports, an estimated 15% of total U.S. oil imports move through the Superior Terminal, and the site has the capacity to store approximately 10.2 million barrels of oil. The company's pipelines run through private property, tribal reservation lands, national forests, and public property under state or local governance. Enbridge has negotiated eighty-foot-wide easements with each of these property owners, most of which have been granted permanently (Enbridge). In some cases the easements are up for renewal after a specific time period (Bad River Band 2017).

The ceded territories pipelines' total around 1277 miles along three different easement routes through the area - one from Alberta, CA to Superior, WI, another running down the Wisconsin's central north-south axis to Illinois, and and a third east to Canada via Michigan and the Straits of Mackinac. The pipelines vary in capacity and diameter from twenty to forty-two inches, with twenty-one pumping stations located along the respective routes (PHMSA). The estimated maximum capacity of the Enbridge Mainline system (which connects through Superior) is over five million barrel-miles per day (bpd); however, Enbridge states the system moves approximately 2.3 million bpd through Superior Terminal. This quantity is equal to approximately thirty 120-car unit trains of crude oil tank cars moving through Superior per day.

Satellite image of Superior Terminal, *Google Earth*

US and Canada crude oil pipeline network
Source: EIA

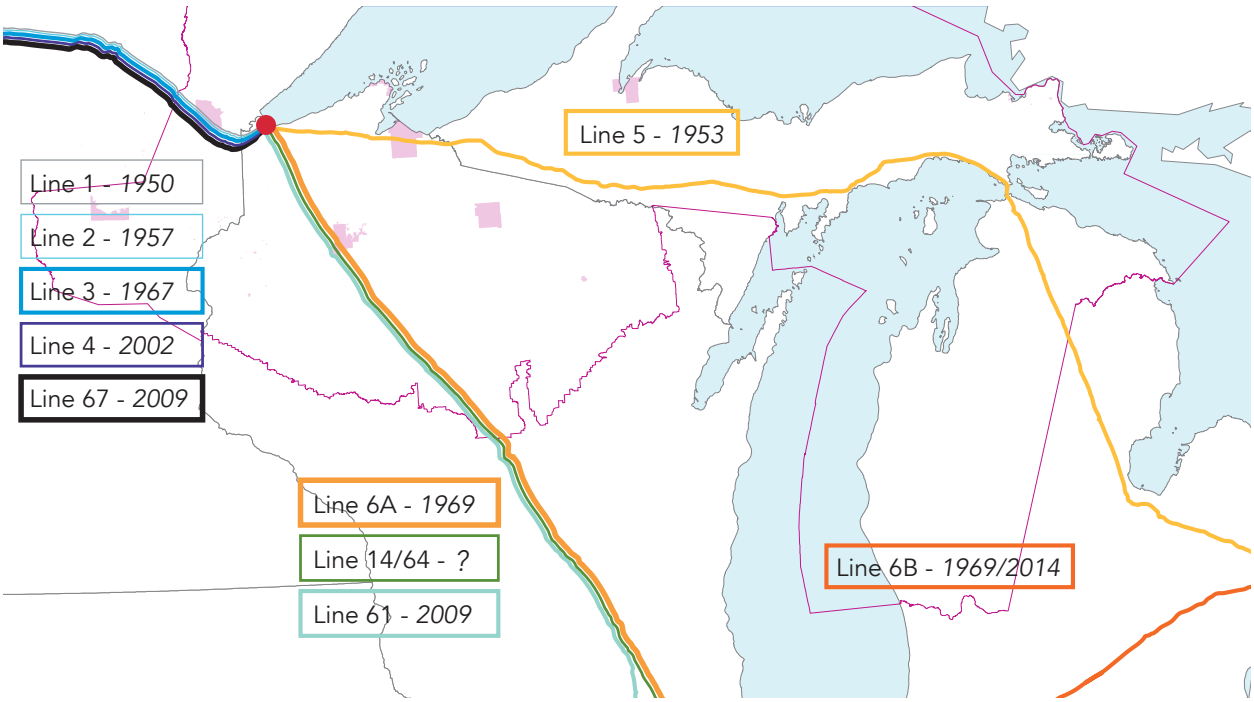

Enbridge pipeline network - line weight by relative bpd capacity
Source: Enbridge and WI DNR Environmental Impact Statement

Rail Networks, Capacities, Volumes

While pipelines carry a steady volume of crude oil through the ceded territories on a daily basis, rail networks also provide a crucial piece of the oil transportation economy. Permanent, capital intensive infrastructure such as pipelines require large upfront investments, take years to permit and construct, and require complex negotiations between governments, corporations, and individual land owners. Rail networks, on the other hand, already exist and respond more elastically to immediate changes in demand for crude oil transportation. Unlike pipeline, these networks are not fixed, and they can more easily accommodate changes in crude oil extraction depending on the source (such as increased attention to the Bakken Oil fields in North Dakota) or extraction method (increased capability to extract deeply embedded bituminous crude oil).

Publicly available information on the specific railroads used to transport crude oil is limited, and most data on rail transportation of crude is aggregated spatially at a high level. As such, assessing the amount of crude oil moving through the ceded territories via rail is nearly impossible. However, inferences based on available aggregated data can begin to be made.
By looking at Petroleum Area Defense District 2 (PADD2) which includes fifteen Midwest states, certain pattern begin to emerge. Since 2010, crude oil receipts from the Midwest via rail increased dramatically until their, peak in 2014, and then tapered off. During this same period, however, crude oil imports via any means of transportation to the Midwest have nearly doubled - from an average 1376 barrels per day in 2010 to 2486 barrels per day in 2016. Thus we can infer that new pipeline capacity has likely seen the brunt of the 2014-2017 increase in crude oil transportation. Additionally, PADD 2 has seen an increase in crude oil imports relative to the rest of the PADDs around the country, indicating that Canadian exportation of crude oil has been increasing (EIA).

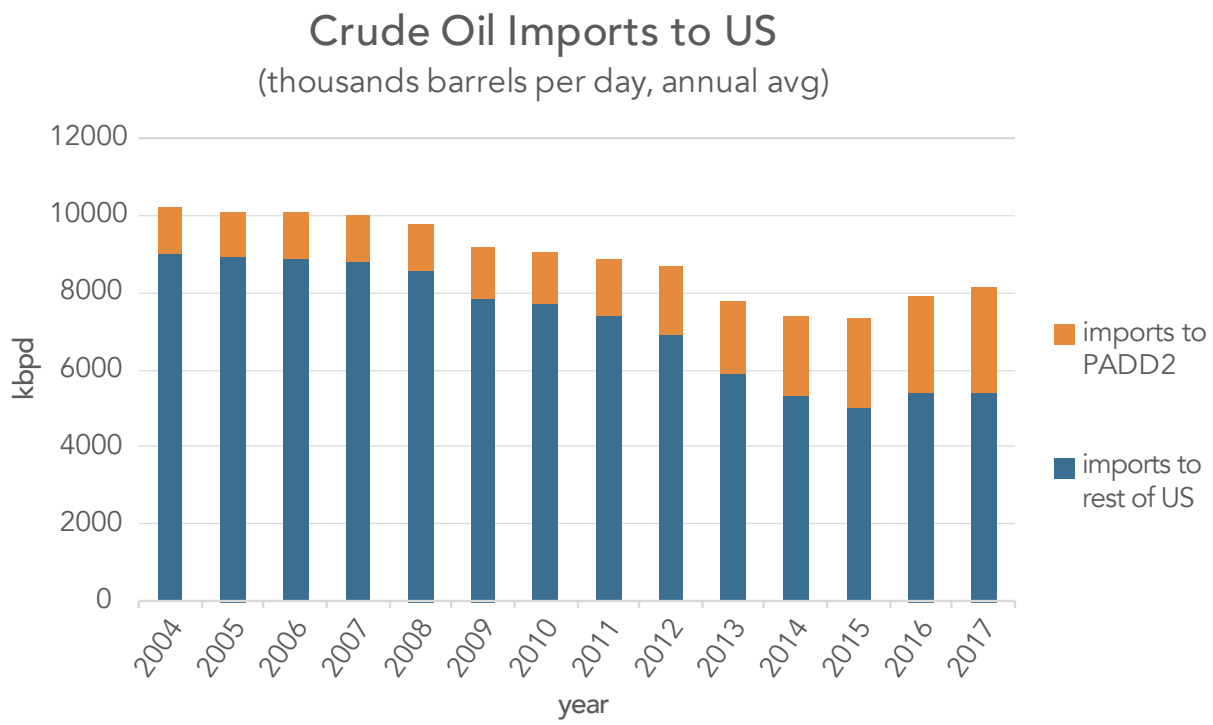

Crude oil imported to the Midwest and US by thousands of barrels.
Source: EIA

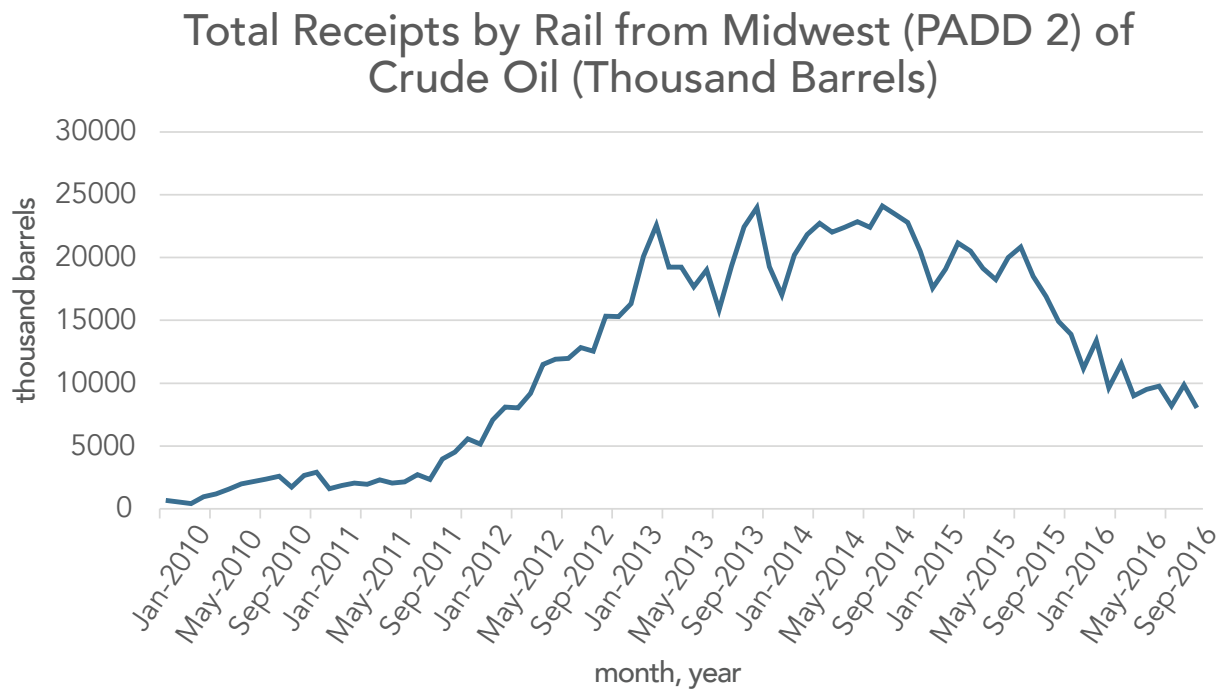

Crude oil transported by rail through the Midwest by thousands of barrels.
Source: EIA

Truck Networks, Capacities, Volumes

Most oil is carried by truck at some point in its trajectory from source to consumption. However, a truck typically only carries approximately ~200 barrels of crude oil per tank, making it a highly inefficient means of transporting large quantities of crude for long distances. It takes three trucks to carry the same amount of oil as one rail tank car (~700 barrels of crude per car), and unit trains carrying crude oil tend to be about ~120 cars long. Additionally, information on where trucks carrying crude oil are permitted was difficult to find in the ceded territories.

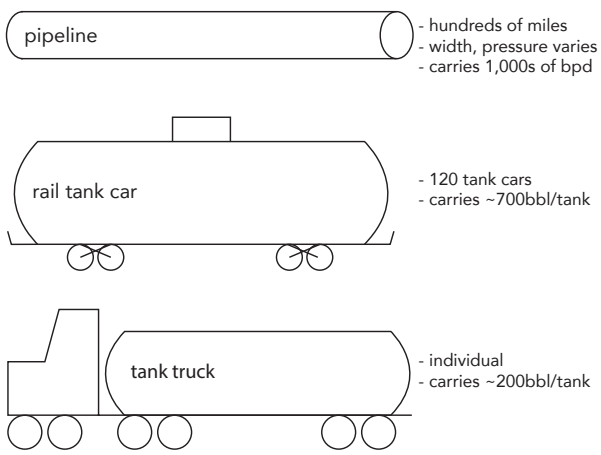

What is being transported?

Though the Enbridge pipelines have been carrying Alberta Tar Sands crude oil since since their initial installation 1950s and 1960s, the chemical nature of the crude oil being transported has changed over time. The Tar Sands is home to a heavy, clay-like bituminous oil, which requires great energy to be extracted--usually by strip-mining or steam injection. After extraction (which is part of the 'upstream' oil industry), this thick, viscous substance is usually diluted with water and various chemical solvents in order to be transported - via pipeline, rail, or truck - to refineries around North America. The transportation of crude oil after extraction and before its refinement is referred to as the 'midstream' oil industry. After it is transported, the 'downstream' industry refines the oil and distributes the product. While the upstream and downstream sectors are known for potentially large profit margins and capital-intensive equipment, the midstream industry usually only comes into the public eye when a catastrophic spill occurs.

The most heavy Alberta Tar Sands crude, which sinks in water, requires additional diluents and pressure to move through the pipeline, and it is much more difficult to clean up in the event of a spill. According to data collected by the federal government, crude oil imports to the United States have become much heavier over the last twenty-five years, making oil transportation a riskier business (EIA). The of the crude oil varies depending on the extraction method and source location. This variation is captured by a number of metrics, including sulfuric content (the more sulfuric oil is considered "sour, while less sulfuric oil is "sweet"), the API gravity (this measure of density is named for the American Petroleum Institution and indicates whether or not the oil will sink or float in water), and vapor pressure exerted by the crude oil. Additionally, the condensates and diluents, which are mixed with the oil to assist its transportation, tend to be of a proprietary nature. Further information on the chemical composition of oils and condensates, government reporting requirements, and industry testing can be found in the annotated bibliography.

Infrastructure: Expansion & Looking Ahead

Against the grain of growing environmental consciousness, climate change concern, and

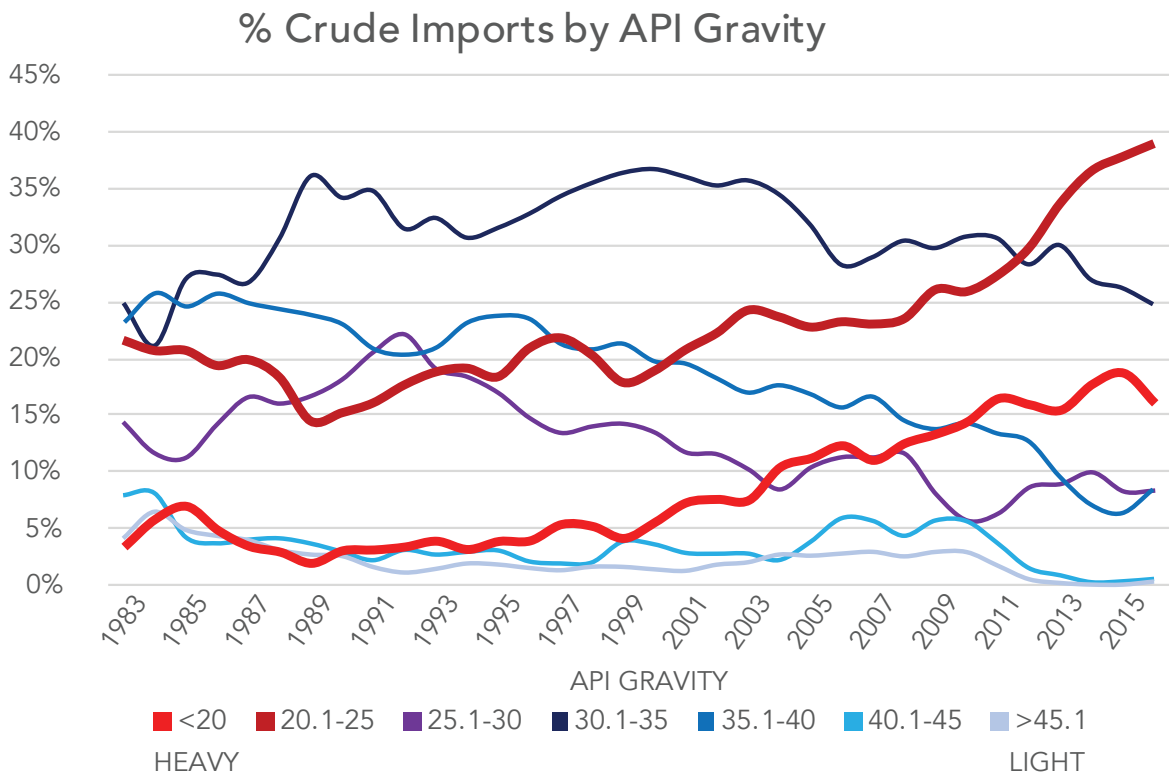

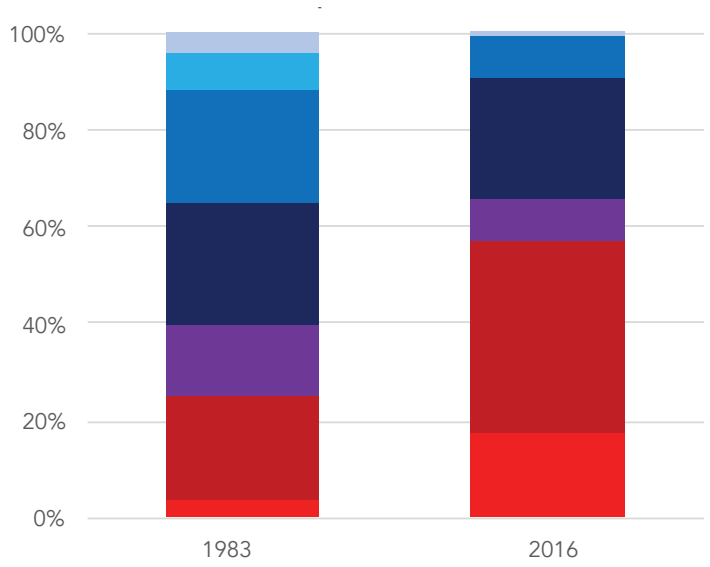

The amount of crude oil compared to other types of oil has increased in the past few decades, as measured by oil API gravity. *Source: EIA*

popular protest of the oil infrastructure development in the Midwest and Plains states, Enbridge has continued to expand its pipeline operations through the region. In 2007, the construction of the "Southern Access Expansion Pipeline" along an existing Enbridge easement through Wisconsin was approved and in 2015 the company began installing additional pumps along Line 61, which will triple the pipeline's capacity from 400,000 bpd to 1.2 million bpd -almost 30% more than the Keystone XL Pipeline proposal. The company also recently replaced its Line 6B through southern Michigan, after a 2010 weld failure caused over 834,000 barrels of heavy crude oil to spill into Michigan's Kalamazoo River through a tributary crossed by the pipeline in the town of Marshall. The Kalamazoo River spill, which remains the largest onshore oil spill in American history, officially took over four years and $1.2 billion to clean up, though some local accounts contest the claim that the Alberta Tar Sands oil has been fully removed or recovered (Bergquist 2014).

Ironically, Enbridge is now leveraging the public revelation prompted by the Kalamazoo spill - namely that, as pressures increase and existing pipeline infrastructure ages, the transportation of crude oil becomes riskier - to justify the replacement of another line. In 2014, with Kalamazoo cleanup still ongoing, Enbridge filed permits in Wisconsin and Minnesota in which the company proposed to replace its aging Line 3 (installed in 1968) by constructing a wholly new line, abandoning the original pipeline in the ground. The proposed Line 3 replacement would carry 760,000 bpd over a 1,031-mile expanse of land stretching from Edmonton, Alberta, to Superior, Wisconsin at an estimated cost of $7.5 billion (Wisconsin DNR 2016; Johnson 2017). In the US, Line 3 would cross some 330 miles of Minnesotan and fourteen miles of Wisconsinite land, including land belonging to the ceded territories, at a cost of $2.5 billion.

Simultaneously, Enbridge has faced additional scrutiny of its Line 5 span under the Straits of Mackinac: a precarious four mile-wide sunken pipeline, built in 1953, which pumps crude oil from Michigan's upper peninsula to its lower peninsula. Not only is the pipeline infrastructure aging, but at times the company is in violation of state imposed safety requirements. Strong, erratic currents make this location the "worst possible place" for a pipeline in the Great Lakes (Egan 2017). Scenario studies on potential effects of a worst-case pipeline rupture in the Straits indicate that a spill there would spread quickly and widely through Lake Huron and Lake Michigan, affecting many miles of shoreline (Schwab 2016). While the report does not focus further on the risks associated with the Line 5 crossing of the Straits of Mackinaw, its heightened precarity should be noted.

Regulation Overview

As Osland (2013) helpfully observes, pipeline hazard mitigation can be thought of as a two-part management system: first, management of the lines themselves, and second, management of the environments and land uses surrounding the pipes. In the United States, this functional division mirrors a division in the scales of regulatory authority. That is, pipeline safety itself is regulated in the first and final instances entirely by the federal government – through the Federal Energy Regulatory Commission (FERC) in the case of natural gas pipelines, and through the Pipeline and Hazardous Materials Safety Administration (PHMSA) in the case of hazardous liquid lines.

The cleanup of hazardous liquid accidents is also regulated by the Environmental Protection Agency (EPA), while the Department of Homeland Security's Transit Safety Administration (TSA) is involved in managing pipeline security. Finally, the Department of State oversees the permitting process for pipeline proposals that cross international boundaries (Pipeline Safety Trust 2015). The Bureau of Land Management (BLM) deals with the sections of pipelines crossing federal land, while the BLM's Fish and Wildlife Service is sometimes consulted on pipeline proposals that may pose risks to vital ecosystems or particular wildlife.

Because PHMSA and its antecedents are tasked with the vast majority of rulemaking and everyday enforcement regarding pipeline safety, this section focuses on the structure and operation of that administration. It does, though, also conclude with brief remarks on state and local responsibilities regarding pipeline safety and risk mitigation.

Pipeline Safety Regulatory History

Until 1968, the regulation of energy pipelines was left by the federal government to the states, of which only twenty-six had actually enacted any regulations. In that year, following a series of devastating accidents across the country, Congress passed the Natural Gas Pipeline Safety Act. The Pipeline Safety Act entrusted minimum pipeline safety regulation to the newly formed Department

FEDERAL PIPELINE REGULATORY AND PERMITTING AUTHORITIES

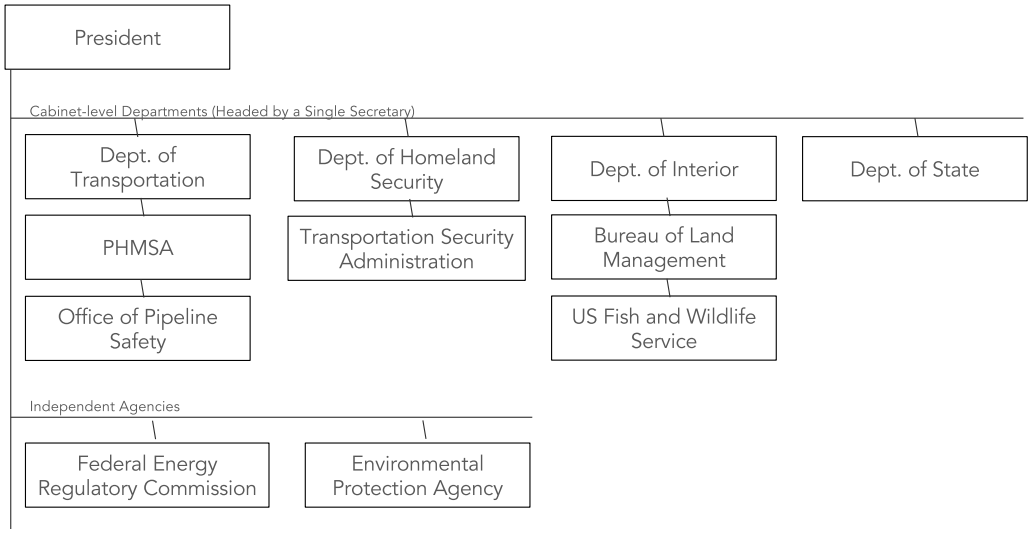

Pipeline permitting and regulation authority is divided among many federal departments.

of Transportation but provided that the states could continue to regulate intrastate pipelines, provided that they certified with the DOT their authority and capacity to enact and enforce such regulations. A decade later, as accidents continued apace, Congress evinced concern that the existing certification process was inadequate and enacted the Hazardous Liquid Pipeline Safety Act of 1979. The 1979 Act further elaborated the certification standards for state partners, as well as extending regulation to cover hazardous liquid (generally meaning oil) pipelines.

The Pipeline Safety Acts have been updated repeatedly over the decades in response to revelations of persistent regulatory shortcomings made tragically clear in the wake of ongoing accidents. Such legislation has included the Pipeline Safety Reauthorization Act of 1988, which established reporting processes of operator systems to regulators and required qualifications for operator personnel; the Pipeline Safety Act of 1992, which increased maximum allowable penalties for the violation of regulations; the Accountable Pipeline Safety and Partnership Act of 1996; the Pipeline Safety Improvement Act of 2002, which was the first iteration of the Act to require operators to prioritize the regular inspection of pipelines traversing high population areas and areas of unusual environmental sensitivity (collectively referred to as High Consequence Areas, or HCAs), while also requiring PHMSA to outline a certification process for states seeking to inspect interstate as well as intrastate pipelines in their territory; the Pipeline Inspection, Protection, Enforcement and Safety Act of 2006, which extended the foregoing rules to natural gas distribution lines and authorized civil enforcement actions against violations of the "one-call" excavation safety system; and, finally, the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011, which further increased penalty maximums as previous penalties proved an ineffective deterrent to operator negligence, and also called for a number of studies and rules regarding continually problematic aspects of pipeline safety management such as leak detection and maximum allowable operating pressures (Vanzura and Linderman 2013).

The Pipeline and Hazardous Materials Safety Administration

Throughout the years and changes to pipeline-related legislation, the basic regulation and enforcement of pipeline safety practices has remained the exclusive mandate of PHMSA, its antecedents, and its state partner agencies. PHMSA can delegate its authorities and responsibilities to state governments in a number of ways, which are discussed more below, but the most important point to make on the topic is that under no circumstances will the administration delegate its authority to enforce actions on the operators of interstate pipelines found to be in violation of federal regulation (Parfomak 2016).
In states where no delegation of authority exists, PHMSA is responsible for managing the safety of both intrastate and interstate hazardous liquid pipelines. For the most part, PHMSA's safety management strategy involves spot inspections of the management systems and records of pipeline operators. PHMSA inspectors also conduct physical inspections of pipeline transmission facilities and construction projects related to both facilities and lines. Finally, inspectors are tasked with investigating safety incidents, which, although not specifically defined in the administration's authorizing legislation, do not necessarily correspond with all hazardous liquid accidents. While PHMSA's overall annual budget is allocated by Congress, its safety program is largely funded by per-mile user fees assessed on regulated pipeline operators (Parfomak 2016).

If PHMSA inspectors encounter violations of safety regulations during their inspections and investigations, the administration may take a number of steps, depending on the nature of the violation. At a minimum, PHMSA will issue a notice of amendment to a pipeline operator,

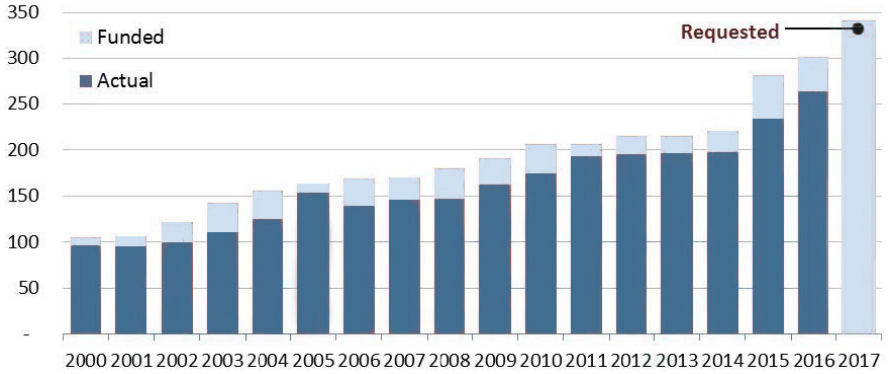

PHMSA budget has more than doubled over the last 15 years, but remains below agency needs.
Source: PHMSA

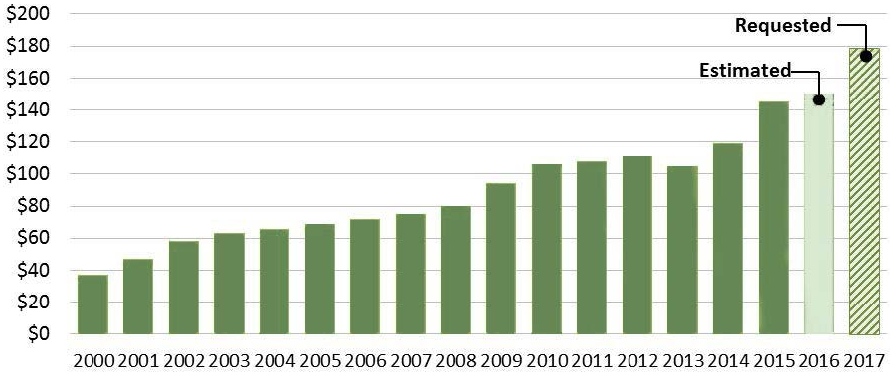

Current staff falls below budgeted level due to shortage of qualified candidates, delays in hiring, and competition from pipeline operators.
Source: PHMSA

which points out inadequacies in the operator's safety and risk mitigation systems and outlines procedures for improving the system in question, but does not allege any violation of a specific rule or regulation. If PHMSA does find a specific violation, it will issue either a warning order, a notice of probable violation, a corrective action order, or, if the violation does not present an immediate risk to public safety, a notice of proposed safety order. Notwithstanding the numerous apparent actions PHMSA may take, all of the foregoing amount in practice to an order for a pipeline operator to take steps to enter into compliance with federal safety regulations (PHMSA nd).

If the operator in question does not comply with PHMSA's order or orders, the administration is authorized to pursue administrative, civil or criminal penalty cases. In administrative and civil cases, PHMSA can issue monetary penalties of up to $200,000 per day; in the former case, these penalties have a total dollar limit of $2,000,000, while in the latter case no such limit exists. In criminal cases, PHMSA can pursue imprisonment of individual violators for up to four years (Gosman et al 2012).

Yet despite the considerable array of actions that PHMSA may take to enforce its pipeline safety program, the administration has been criticized in recent years by both concerned members of Congress and independent pipeline safety advocacy groups for lackluster inspection and enforcement practices (Parfomak 2016; Pipeline Safety Trust 2015). Despite having its annual budget more than doubled over the last decade, PHMSA has been slow to hire the full staff for which it is authorized and, subsequently, to implement several key mandates entailed in legislative updates to PHMSA's mandate during the same period.

For example, of the forty-two studies, rules, maps, and other aspects of pipeline safety regulation imposed on PHMSA by the Pipeline Safety Act of 2011, twelve remain, by PHMSA's own count, unaddressed. These include the promulgation of crucial safety rules and standards governing automatic and remote-controlled shutoff valves, excess flow valves, integrity management expansion for pipelines in so-called High Consequence Areas (HCAs, areas of high population density or unusual environmental sensitivity – e.g., bodies of drinking water supply – that pipeline operators are required to prioritize in their risk mitigation regimes), leak detection, accident notification, and maximum allowable operating pressure verification (Parfomak 2016; PHMSA 2016).

An additional concern, for independent advocates of pipelines safety, is the relationship between PHMSA and the pipeline operators that the administration exists to regulate. For one thing, advocates have pointed out, PHMSA's inspections practices rely heavily on operators' own, self-reported safety and integrity management performances. That is, PHMSA's spot inspections for the most part entail merely checking operators' practice manuals and relevant records, rather than undertaking independent investigations of these practices or keeping independent records.

For another thing, many of the too-few standards for pipeline safety that do exist and that PHMSA has incorporated into its rules and regulations, were written by organizations representing the industries involved in hazardous liquid extraction and transportation. Besides laying the groundwork for an obvious and alarming conflict of interest, this situation prevents members of the public from undertaking independent inquiries into PHMSA's rules, regulations, and practices, since most of the standards developed by industry organizations that have been incorporated into such rules and regulations are proprietary and generally too expensive for individual members of the public to obtain (Pipeline Safety Trust 2015).

Perhaps most importantly, PHMSA's staffing shortfalls center on the administration's dearth of pipeline inspectors. In 2015, inspectors comprised some 131 of the administration's 266 full-time equivalent staff. Yet the administration's own funding requests and their requested fiscal year 2017 allocation provide for seventy-four more staff, most of whom would be inspectors. This means that PHMSA is presently only employing two-thirds of the pipeline safety inspectors that its budget allows. Even given that the metrics of what an appropriate staffing level would be is unclear in both Congressional and industry literature, it is at least clear that PHMSA is currently falling well below the staff levels that administrators believe to be necessary and fundable.

State Partnerships

Of course, even if PHMSA were to onboard the several dozen additional pipeline inspectors, its staff would comprise just over a third of the national pipeline inspection workforce, the rest of whom work through state-level agencies. In mid-2016 one PHMSA administrator (Klinger 2016, cited in Parfomak 2016) put the state-level inspection workforce at around 350 people, or an average of seven inspectors per state. States, however, vary enormously in their pipeline inspection staffing levels. One frequently-cited reason is budgetary constraints imposed both by economic conditions and by austerity-minded state political regimes. Another reason is that some states conduct their own hazardous liquid pipeline inspections through authority delegated by PHMSA, and thus retain dedicated inspections staff, while other states opt to leave inspection to the federal administration and its inspectors.

When PHMSA enters into a partnership with a state to co-manage hazardous liquid pipeline safety, the state agency responsible for taking on PHMSA's responsibilities must become certified by the administration. Certification entails an agreement that the state will adopt the minimum federal regulations – with the option to enact more stringent rules – will promote one-call compliance to minimize the risk of excavation-related accidents, and will impose administrative and monetary penalties comparable to those typically ordered by PHMSA (PHMSA nd). According to a 2013 report from the National

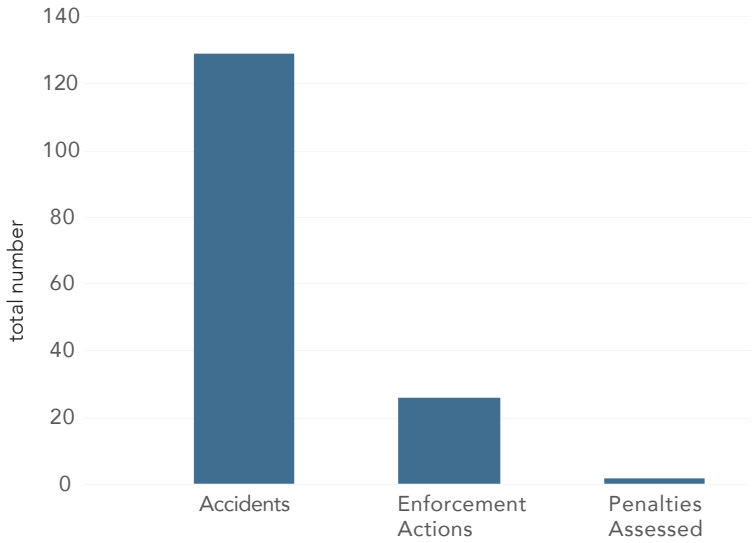

Minnesota pipeline accidents and enforcement.

Association of Pipeline Safety Representatives, no certified state had enacted more restrictive intrastate pipeline safety legislation than the federal minimum.

Certification allows state authorities to inspect intrastate pipelines and to enforce penalties for violation on intrastate lines. States can also certify with PHMSA to act as the administration's state agents, allowing state authorities additionally to inspect the segments of interstate hazardous liquid lines that traverse their state. Enforcement actions for interstate lines remain the sole province of PHMSA. According to PHMSA's website, as of late 2014, fourteen states were certified for intrastate pipeline safety authority, while just five acted as interstate agents (PHMSA nd).

Of the states in the upper Midwest, only Minnesota was included in either list, attaining both certification and interstate agent status. This means that, unlike Michigan's Department of Environmental Quality (DEQ) and Wisconsin's Department of Natural Resources (DNR), the Office of Pipeline Safety (OPS) in Minnesota's Department of Public Safety (DPS) is authorized to write rules and regulations governing intrastate hazardous liquid pipelines, to inspect and undertake enforcement actions of those pipelines, and to inspect interstate pipelines passing through the state. The OPS retains a dedicated inspections staff to manage these responsibilities, though the number and roles of these staff are not publicly available data. Data that are publicly available, however, suggest that state-level partners like Minnesota's OPS may be experiencing a capacity problem similar to PHMSA's, as the disparities between probable violations noted, enforcement actions undertaken, and penalties assessed point to a possible budgetary or staffing inability to engage in a robust inspection and violation enforcement program.

Local Regulatory Powers

The land around a given pipeline, meanwhile, is almost entirely regulated by the municipal governments through whose jurisdictions the pipeline runs (Fitzgerald 2013, Parfomak 2016). We say almost entirely because no specific federal rule or regulation grants such authority to municipal governments, and state governments may legislate restrictions on the kind or extent of municipal authority over pipelines. But several recent court cases have upheld the lawfulness of municipal ordinances that are not specifically preempted by state or federal law, that do not aim to regulate pipeline safety or security, and that are reasonable in scope.

For example, in Texas Midstream Gas Services LLC v. City of Grand Prairie, 608 F.3d 200 (5th Cir. 2010), the Court struck down the part of an amended ordinance requiring a new natural gas compressor station to erect a security fence, but upheld the same amendment's requirements for setback, building materials, roofing, and noise pollution control. And in Washington Gas Light Co. v. Prince George's County Council, 711 F3d 412 (4th Cir. 2013), the Court of Appeals upheld the county's denial of the operator's request to expand their compressor station with a LNG storage tank. Specifically, the Court found that the county's recently enacted transit-oriented development overlay and zoning plan (prohibiting new industrial uses in the station area) was not preempted by federal pipeline safety regulation (FitzGerald 2013).

Again, though, the lawful enactment of such local authority depends on the relationship between local and state governments. So, in light of the last-minute additions to Wisconsin's 2015-2017 budget - one expanding the range of corporate entities eligible to wield eminent domain authority (an amendment, subsequent reporting revealed, written largely by Enbridge-affiliated lobbyists)

and another specifically preempting county governments from requiring pipeline operators to carry pollution insurance above state-mandated minimums - municipal and county zoning authorities should consider drafting pipeline-related ordinances in cooperation with their state representatives.

Accidents: Road and Rail

There have 21, 608 combined hazardous liquid spills from railroad and highway transportation from 1989 to 2016 in Michigan, Minnesota, and Wisconsin. This is an average of 22 spills per year. Aggregating the number of spills via highway and railroad, however, obscures the fact that the majority of these have been spills that occur when oil is transported via highway. Of the combined spills, 20,442—95% of the total—have been via highway. Of the three states, Michigan has seen the most spills (8,314), followed by Minnesota (7,045) and Wisconsin (6,249).

As the table above shows, however, though a disproportionately large number of spills happen via highway, this is not necessarily represented in the total volume that is spilled. While railroad spills account for only 5% of the total number of spills, the volume of oil spilled when transported via rail is 46%. This means that while there are fewer spills via railroad, when they do happen, they tend to spill much more oil than when there are spills from a truck on a highway. That is, any one spill via truck will never have the potential to spill as much oil as a potential spill from a railroad accident.

The self-reported costs of spills, which include cleanup costs, estimates of the value of equipment damaged, estimates of damage private property, and the cost of emergency response service, is much higher for highway than for railroad spills in the aggregate. However, this is largely because there are so many highway spills in any given year and the costs to deploy all the services to ensure cleanup and safety add up. When there are railroad spills, on the other hand, these costs escalate. As the graph below shows, one single railroad spill can have the potential to increase the total cost of spills in a single year, whereas the costs of highway spills tend to be more predictable and do not vary year to year. The total amount that has been spent on cleanup costs since 1990 is $16,410,833 for highway spills and $11,120,110 for railroad spills, for a combined total of $27, 530, 943.

	Highway	Rail	Total
Number of Spills	20,395	1,163	21,558
Percent of total	*95%*	*5%*	
Spill Quantity Total (LGA)	978,526	817,382	1,795,908
Percent of total	*54%*	*46%*	

Though the number of spills by rail is only 5% of the total since 1990, it accounts for 46% of total volume spilled.

	Highway	Railroad	Total
Total Amount	$16,410,833	$11,120,110	$27,530,943
Annual Median	$539,234	$25,682	

More money has been spent on cleanup costs resulting from oil transportation via highway than rail since 1990.

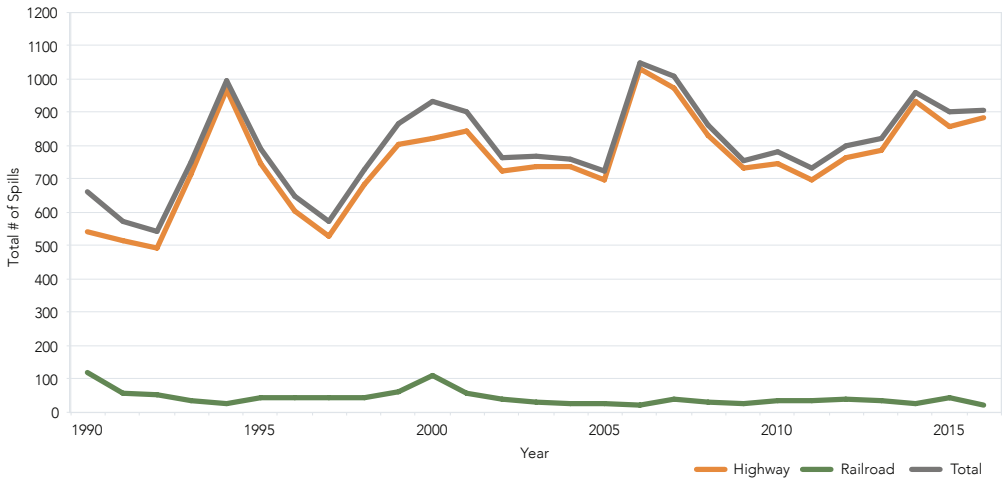

The annual total number of spills is higher via highway than railway.

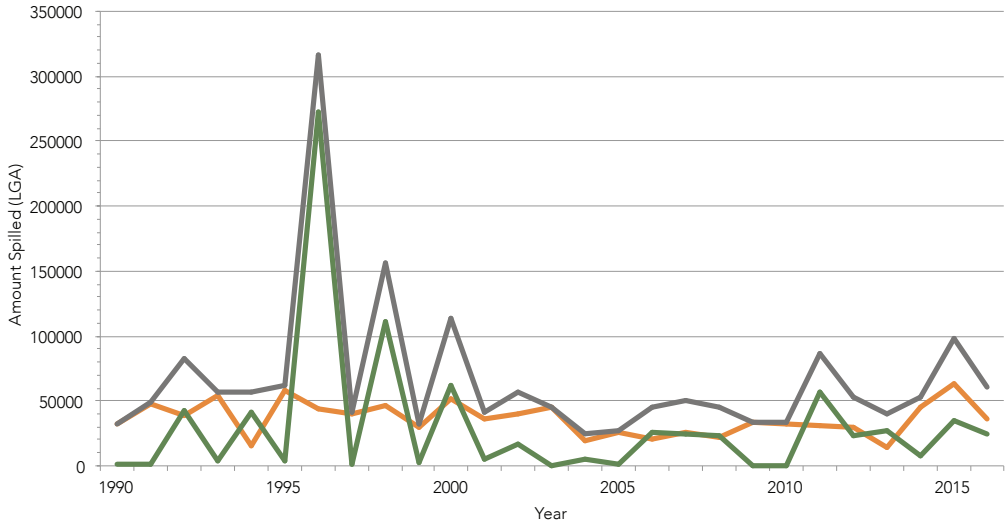

The total yearly amount of oil spilled is higher via highway than railway, though railway accidents can potentially spill large quantities as in 1996.

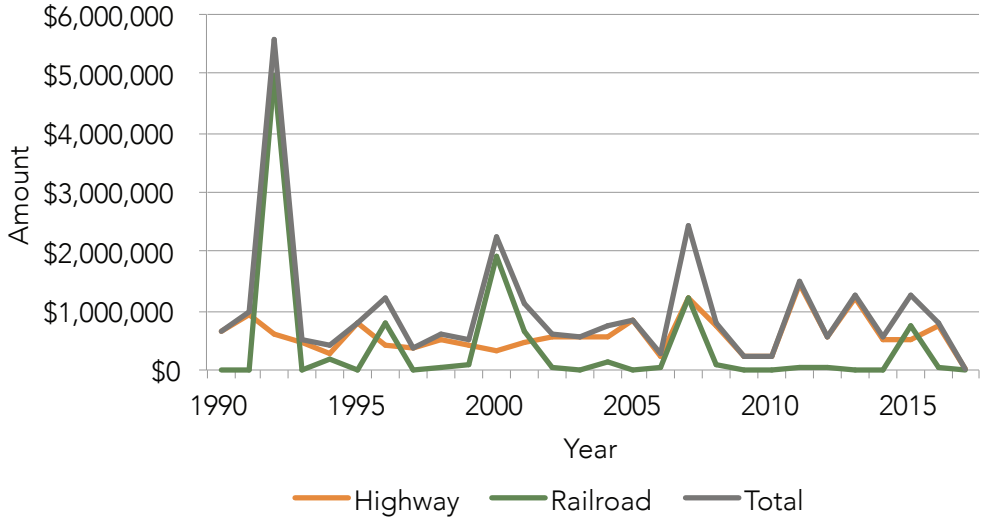

There is no identifiable trend in cleanup costs for either rail or highway spills, though the price can potentially be much higher for one large rail accident.

Source: PHMSA

Accidents: Pipeline

Michigan, Minnesota, and Wisconsin have seen a combined 395 hazardous liquid spills over the past thirty years, averaging twelve spills per year. These accidents, though, are not evenly distributed in space or in time. Of the three states, Minnesota has seen the lion's share of accidents during the past three decades, with 190 spills. Michigan and Wisconsin have been home to 103 and 102 accidents, respectively, during the period ranging from 1986 through 2016. But while these values suggest that Minnesota may be the most spill-prone location in the western reaches of the Great Lakes, it is in fact the safest in terms of the number of spills per mile of pipeline. During the last fifteen years, for which spatial data exists, almost a quarter of the 261 hazardous liquid accidents in Michigan, Minnesota, and Wisconsin, have occurred in the Ceded Territories.

Assuming that hazardous liquids are flowing at the same velocity through all pipelines (an assumption which, as the foregoing findings on pipeline volumes shows, may or may not hold on a given day or even for a given line during the course of a day), the more line there is, the greater the spill potential. Looked at this way, the recent history of hazardous liquid accidents in these states suggests a rate of one spill per forty-eight miles of pipeline in Minnesota, compared with one spill per thirty-four miles in Michigan and one per twenty-five miles in Wisconsin. One possible explanation for this disparity is differences in oversight amongst the states.

Some of these accidents are caused by endogenous factors – defects built into the lines themselves that cause rapid corrosion, for example, or imperfect welding of the seams joining two segments of a line. Even the incorrect operation of valves and inline equipment by remote operators can have disastrous consequences. Other threats to pipeline integrity are exogenous, such as pressure from erosion, jostling caused by the invasion of tree roots, or puncture by man-made equipment or natural artifact.

Of the 400-odd accidents that have occurred in Michigan, Minnesota, and Wisconsin during the last thirty years, almost one in three was caused by an equipment failure, while another one in six was caused by a failure in welding or the pipe itself. Excavation accidents, by contrast, caused only eight, or 2%, of the recorded spills. In the Ceded Territories specifically, equipment failures account for over 40% of accident causes, while around 20% were caused by weld failures. Still, with the exception of welding failures, infrequent excavation accidents have been the costliest form of failure on average, requiring more than $700,000 to rectify. This distribution of causes has important implications for the actions that communities living with pipelines should consider prioritizing when contemplating their risk mitigation strategies in policy and planning.
In addition to being the most common liquid to spill from pipelines in Michigan, Minnesota, and Wisconsin, crude oil is also the costliest to clean up. While HLA accidents have cost an average of roughly $130,000 to clean up and refined oil accidents have run to almost $800,000, the average crude oil spill has cost fully $4,100,000 to clean up. (Removing the Kalamazoo spill from this data lowers the average crude oil cleanup cost to roughly $445,000. It is arguable, though, whether doing so provides a more honest reflection of the true cost of an average spill, given that the federal regulation of risk management systems has been slow to evolve since the accident, rendering a similar disaster in the future totally possible.) Spills in the Ceded Territories have been somewhat less costly, averaging around $224,000. The cause of this difference is unclear.

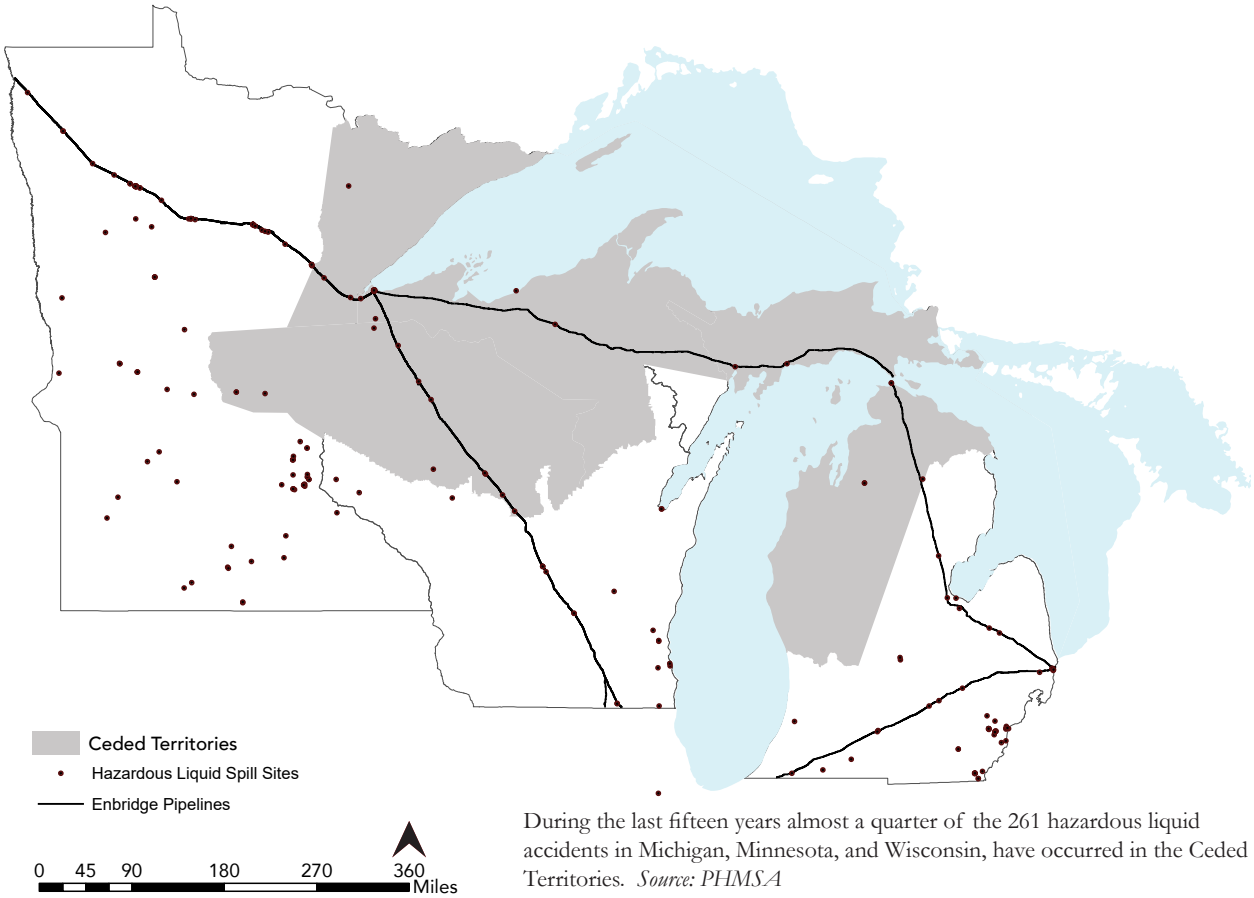

During the last fifteen years almost a quarter of the 261 hazardous liquid accidents in Michigan, Minnesota, and Wisconsin, have occurred in the Ceded Territories. *Source: PHMSA*

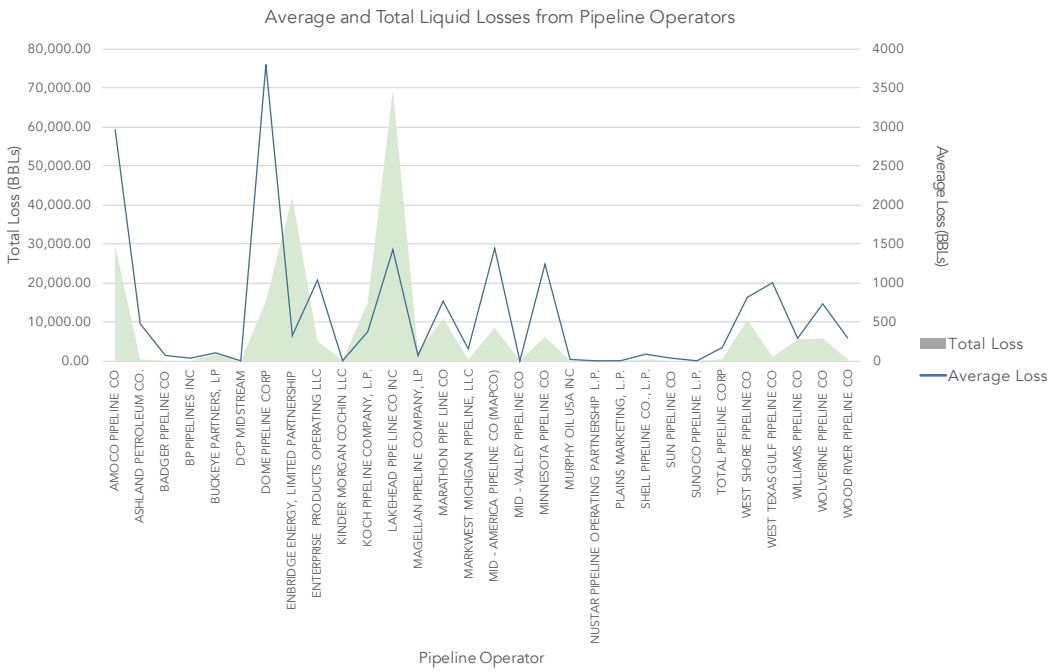

Some pipeline operators have lost up to 70,000 due to spills.
Source: PHMSA

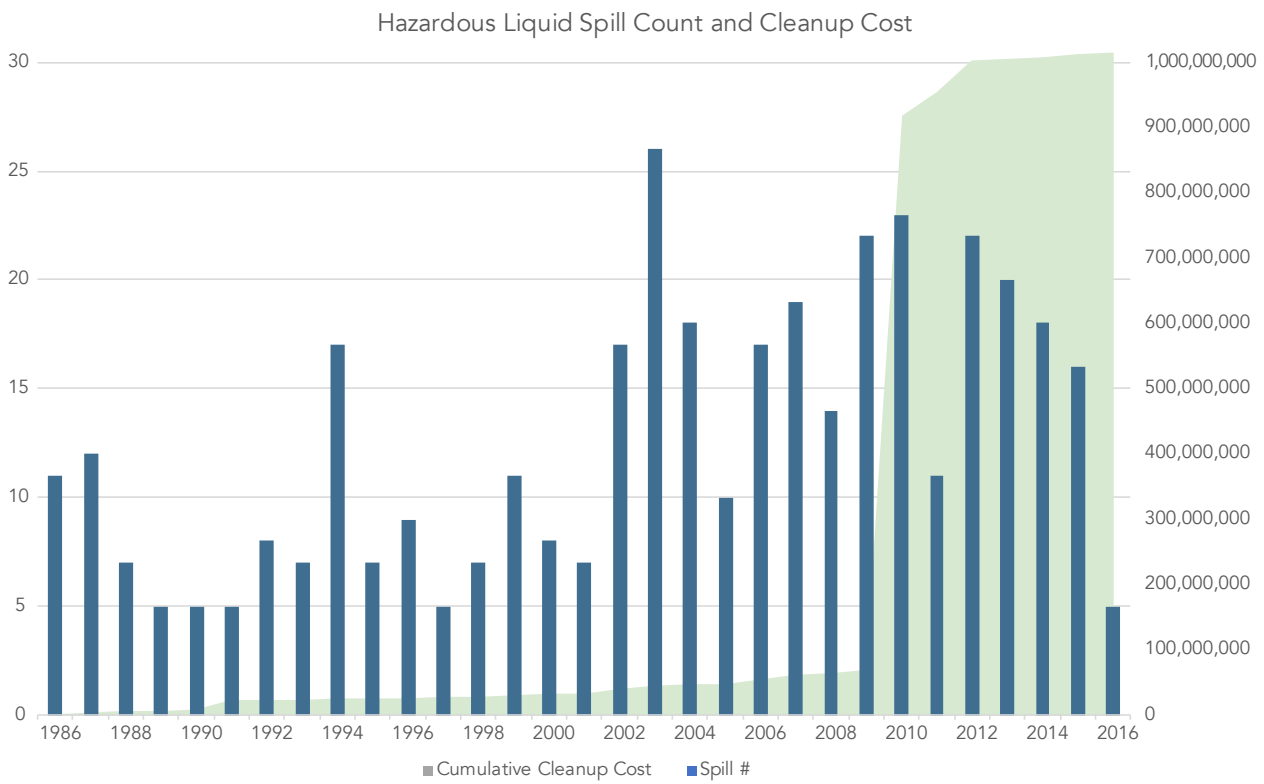

Cumulative clean up costs rose drastically with the Marsall Spill into the Kalamazoo River in 2010.
Source: PHMSA

TOTAL AND AVERAGE ACCIDENT LOSSES AND COSTS BY CAUSE

Cause	Cause Count	Total BBL Loss	Total Cleanup Cost	Total Fatality	Total Injury
CORROSION	35	8,602.62	$20,746,866.00	0	0
EQUIPMENT	111	12,398.92	$44,518,521.00	0	0
EXCAVATION DAMAGE	8	9,575.40	$5,969,388.00	0	0
FAILED PIPE	7	14,348.00	$3,645,314.00	0	0
INCORRECT OPERATION	36	11,824.01	$9,831,409.00	2	0
MATERIAL AND/OR WELD FAILURES	59	43,762.75	$892,761,087.00	2	1
NATURAL FORCES	37	3,020.66	$5,945,619.00	0	0
OTHER	65	82,139.70	$20,620,640.00	1	3
OUTSIDE FORCE DAMAGE	37	46,460.97	$11,232,227.00	1	3
(blank)					
Total	395	232,133.03	$1,015,271,071.00	6	7

Cause	Cause Count	Avg BBL Loss	Avg Cleanup Cost	Avg Fatality	Avg Injury
CORROSION	35	245.79	$592,767.60	0.00	0.00
EQUIPMENT	111	111.70	$401,067.76	0.00	0.00
EXCAVATION DAMAGE	8	1,196.92	$746,173.50	0.00	0.00
FAILED PIPE	7	2,049.71	$520,759.14	0.00	0.00
INCORRECT OPERATION	36	328.44	$273,094.69	0.06	0.00
MATERIAL AND/OR WELD FAILURES	59	741.74	$15,131,543.85	0.03	0.02
NATURAL FORCES	37	81.64	$160,692.41	0.00	0.00
OTHER	65	1,283.43	$322,197.50	0.02	0.05
OUTSIDE FORCE DAMAGE	37	1,255.70	$303,573.70	0.03	0.08
(blank)					
Total	395	589.17	$2,576,830.13	0.02	0.02

Some of these accidents are caused by endogenous factors such as defects built into the lines themselves. Other threats to pipeline integrity are exogenous, such as pressure from erosion.

5. DISCUSSION & CONCLUSIONS

It is difficult to make a determination about which method of transporting oil is better or worse. This is because each method poses different risks and different likelihoods of each type of risks. While one may be less likely to prevent death and destruction, it is more likely to release a large amount of oil in the aggregate. While one may pose a greater risk to land area, another might be more likely to contaminate water. While one is more likely to destroy habitats, it might emit higher levels of CO2.

In reality the cost figures in the previous section over- and undervalue the nature of hazardous liquid spills. On the one hand, environmental cleanup is not the only cost incurred by pipeline operators and others responding to accidents. Rather, these figures also include estimations of the value of equipment damaged, of damage or destruction to private property not held by the pipeline operator, and of the emergency response services of the various scales of government. Still, over the last fifteen years, costs associated with environmental cleanup have comprised anywhere from 35% to 75% of total accident costs. Emergency response costs typically follow, making up around 20% of average total costs.
On the other hand, both environmental cleanup costs and, by extension, total accident costs, as reported by pipeline, rail, and truck operators, likely undervalue the extent of ecological damage caused by spills of crude oil and other hazardous liquids. For beyond the acute dangers of polluting top soils, contaminating groundwater and open water sources, and posing health threats to humans and animals, these liquids can lead to long-term ecosystem disruptions by causing the death of organic matter ranging from soil bacteria to whole populations of riverine wildlife. In some cases, these threats are also cultural, as in

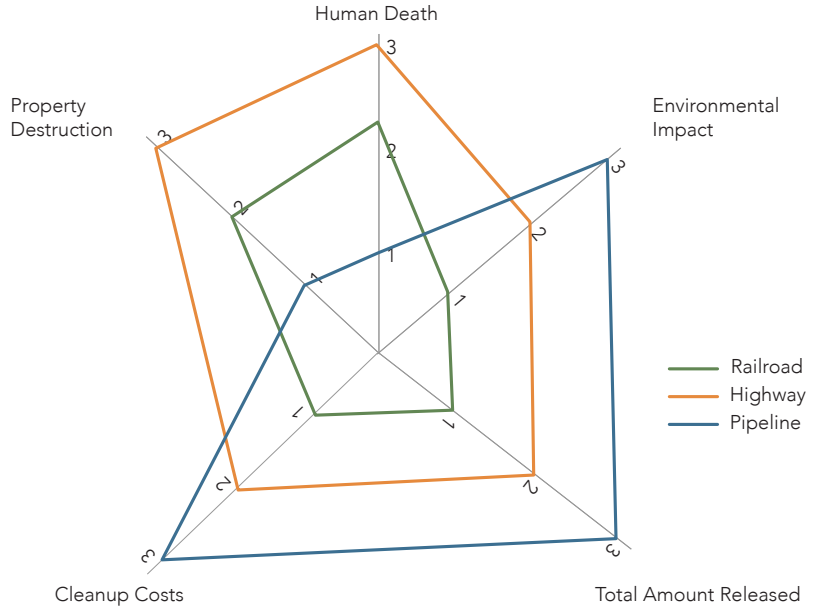

This spider diagram shows how each transportation mode ranks among the others for each risk category.

the threat posed by new and existing pipelines to the wild rice lakes of Ojibwe tribes from White Earth in Minnesota to Bad River in Wisconsin and beyond. The value of these cultural assets is virtually impossible to quantify, making it difficult for pipeline operators to internalize even if they were willing to do so.

The figure above shows how each transportation method compares to the others in terms of the risks they pose to human deaths, the environment, cleanup costs, and property destruction, based on the findings presented in this report. The numbers along each line represent the ranking of risk for each transportation method; three is the highest risk and 1 is the lowest risk when compared to the other two methods. For example, pipeline comes in at 3 in the rankings for environmental risk but 1 in terms of property destruction, etc. Visualizing the rankings in this way gives a clear picture of the difficulty of assessing which transportation method is better or worse. It also provides a means of visualizing the costs and benefits for each transportation method. The visual provides a roadmap when making decisions about which method of transportation provides the best alternative, given the values, threats, and priorities of a given community. In the end, all three transportation modes can be made safer. This would require stricter regulatory controls and modern technologies. The questions, then, would be: which regulations applied to which transportation method should be tackled first, and how can the industry be made to comply with these?

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7. APPENDICES

A. **Annotated Bibliography**

B. **Oil 101 Source Sheet**

3. **Source Materials (electionally appended)**

   1. Literature
   2. Shapefiles
   3. Spreadsheets

A. Annotated Bibliography

Egan, Dan."Oil and Water-A Journal Sentinel Special Report-Path of Least Resistance." Milwaukee Journal Sentinel. January 13, 2017.

This newspaper stories chronicles Enbridge's plans to build a new thousand-mile pipeline from Alberta to Superior, WI that would add another 370,000 barrels per day to its current flow, bringing the capacity for some 3 million barrels of oil to flow into Wisconsin each day. The story shows how Enbridge has implement increases in a piecemeal fashion, sometimes with permission but other times without.

Egan, Dan."Oil and Water-A Journal Sentinel Special Report-Dangerous Straits." Milwaukee Journal Sentinel. January 18, 2017.

This newspaper story provides thorough reporting about the Mackinac lines, focusing on the fact that they are in the "worst possible" place for an oil spill in the Great Lakes. It highlights how environmentalists, politicians and Michigan regulators are trying to figure out how to deal with them.

Dybdahl, David J. "An Insurance and Risk Management Report on the Proposed Enbridge Pumping Station," April 8, 2015.

Prepared for The Dane County Zoning and Land Regulation Committee, this report reviews Enbridge's liability insurance program, financial statements and government sponsored oil spill response programs to assist the committee in its review of a Conditional Use Permit (CUP) application to upgrade a pumping station on Enbridge's pipeline (Line 61) between Marshall and Waterloo, WI.

"Final Environmental Impact Statement: Enbridge Sandpiper and Line 3 Replacement Projects. Volumes I and II (Appendices)." Wisconsin Department of Natural Resources. August 2016.

Offers an apparently comprehensive analysis of the likely environmental impacts of the Enbridge Line 3 replacement. Notable for consideration of numerous alternatives to the proposed route. Additionally, describes permitting process and points to possible barriers that may be raised to stall overhasty development.

FitzGerald, Tom. "Planning, Zoning and Hazardous Liquid Pipelines." Pipeline Safety Trust Annual Conference. November 2013.

Provides a clear and concise summary of the distribution of regulatory powers among states, municipalities, and the federal government, with a focus on legal precedents establishing municipal authority over pipeline-adjacent land use planning.

Gosman, Sara, Lesley MacGregor, Gabe Tabak, and James Woolard. "After the Marshall Spill: Oil Pipelines in the Great Lakes Region." National Wildlife Federation. 2012.

This source provides the single best overview of the regulatory framework governing pipeline safety and is helpfully organized by key moments or phases in the process of constructing and operating a hazardous liquid pipeline. Also provides a focus on the application of regulation in the Great Lakes region and offers policy recommendations.

National Association of Pipeline Safety Representatives. "Compendium of State Pipeline Requirements & Initiatives Providing Increased Public Safety Levels compared to Code of Federal Regulations." September 2013.

This comprehensive collection of state pipeline safety regulations gives both specific information about the steps that individual states have (or have not) taken to secure regulatory authority over pipelines, organized by type of pipeline and type of action. Also provides information for comparison among states.

Parfomak, Paul W. "DOT's Federal Pipeline Safety Program: Background and Key Issues for Congress." Congressional Research Service. May 2016.

Highly readable description of the origins of the pipeline safety program and of ongoing challenges and limitations faces by PHMSA. Includes legal history, exploration of budget and staffing issues, and overview of major gaps in existing regulation.

Pipeline and Hazardous Materials Safety Administration. "Federal and State Authorities." No date.

Another take on the distribution of regulatory responsibilities and relationships. Helpful as an articulation of authorities from PHMSA itself, but neither as clear nor comprehensive as other versions of the same material, some of which are discussed above.

Pipeline and Hazardous Materials Safety Administration. "Pipeline Safety Inspections." No date.

One of the few documents that actually describes the substance of the inspections process in any detail, and here in PHMSA's own words.

Pipeline and Hazardous Materials Safety Administration. Webpage: https://primis.phmsa.dot.gov/ Last accessed 8 May 2017.

Primary source of data regarding pipeline safety program. Includes vital information on pipeline accidents by type of product (gas vs. hazardous liquids), by mode of transport (raid/road vs. pipeline) and by time period. Also includes glossary of state-level partnerships and related information (e.g. status of partnership, name and website of state partner agency, pipeline mileages and facilities under state jurisdiction). Further contains information (but seemingly no data) on operator and inspector qualifications. Finally, includes historical data on enforcement actions, although it appears that the only way to access or download the data is on a sheet-by-sheet basis, rather than in a compiled or archived format, limiting its usability. Additionally, website is poorly organized and exists in two versions (some links lead back to the previous website interface rather than to a parallel page on the more recently updated interface).

Pipelines and Informed Planning Alliance. "Hazard Mitigation Planning: Practices for Land Use Planning and Development Near Pipelines." Sponsored by the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA) and the U.S. Department of Homeland Security, Federal Emergency Management Agency (FEMA). 2015.

Provides an overview of pipelines from a systems perspective, with attention to technological elements of the energy transmission process. Also useful as one of the few documents produced with PHMSA's cooperation that proactively addresses the risks associated with gas and hazardous liquid transmission and adopts an evidence-based, hazard mitigation approach to physical planning policy around such risks.

Pipelines and Informed Planning Alliance. "Partnering to Further Enhance Pipeline Safety In Communities through Risk-Informed Land Use Planning: Final Report of Recommended Practices." November 2010.

An earlier version of "Hazard Mitigation Planning," which discusses the relationship between pipelines, the risks that they carry, and the responses that municipal actors can undertake to mitigate risk. Emphasis is on new physical development around existing pipelines, which may limit usability, and hazard mitigation approach is not yet adopted.

B. Oil 101 Source Sheet

Rather than recreate the field, see sources below for an introduction to the oil industry and specific crude oil resources.

Know Your Oil - Carnegie Foundation

http://carnegieendowment.org/2015/03/11/know-your-oil-creating-global-oil-climate-index-pub-59285

Report on changing oil types, emissions, and climate change (downloadable)

Schlumberger Oilfield Glossary - industry source

http://glossary.oilfield.slb.com/

Glossary of oil-related terminology

Crude Oil Monitor - Canadian industry source

http://www.crudemonitor.ca/home.php

Reports on chemical composition of different crude streams in CA

Pipeline Safety Glossary - PHMSA - US Govt

https://primis.phmsa.dot.gov/comm/glossary/index.htm?nocache=5217#ASTMInternational

Glossary of pipeline-related terminology

Energy Explained - EIA - US Govt

https://www.eia.gov/energyexplained/index.cfm?page=oil_home

Introduction to crude and refined oils, a little rudimentary but the rest of the EIA website has news, etc.

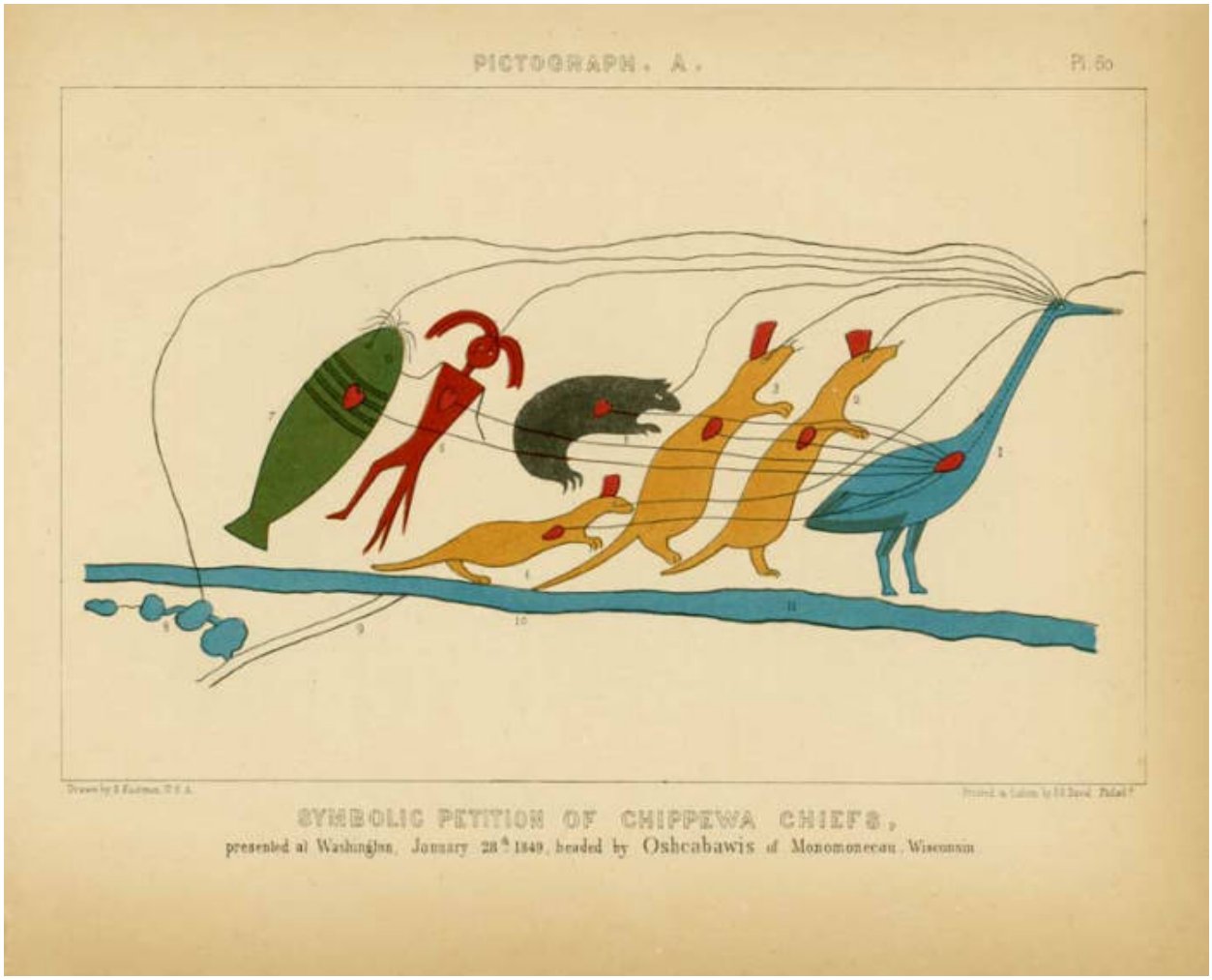

Tribal Cooperating Agencies Cumulative Effects Analysis

NorthMet Mining Project and Land Exchange

Prepared by staff from the Bois Forte Band of Chippewa, the Fond du Lac Band of Lake Superior Chippewa, the Grand Portage Band of Lake Superior Chippewa, the Great Lakes Indian Fish and Wildlife Commission, and the 1854 Treaty Authority

September 2013

Tribal Cooperating Agencies Cumulative Effects Analysis

NorthMet Mining Project and Land Exchange

In Chapter 6 of the *Preliminary Supplemental Draft Environmental Impact Statement (PSDEIS) for the NorthMet Mining Project and Land Exchange*, the co-lead agencies present a resource-specific cumulative effects analysis (CEA) for the NorthMet Project Proposed Action and Land Exchange Proposed Action that may result when combined with effects from other activities. It acknowledges that in addition to additive effects, cumulative effects may be further magnified by synergisms or cross-interactions in the environment. The analysis was developed by the co-lead agencies and their third-party contractor with consideration of the 1997 CEQ guidance *Considering Cumulative Effects under the National Environmental Policy Act* and EPA's 1999 NEPA review guidance *Consideration of Cumulative Impact in EPA Review of NEPA Documents.* However, despite specific and repeated requests from tribal cooperating agencies, the co-lead agencies did not elect to utilize a tool developed in 2011 by the EPA in cooperation with tribes, *Applying Cumulative Impact Analysis Tools to Tribes and Tribal Lands*, in order to discern potential cumulative effects to resources important to the tribes who retain usufructuary rights within the 1854 Ceded Territory. The NorthMet Project Proposed Action and Land Exchange Proposed Action are both located entirely within the boundaries of the 1854 Ceded Territory (Figure 1).

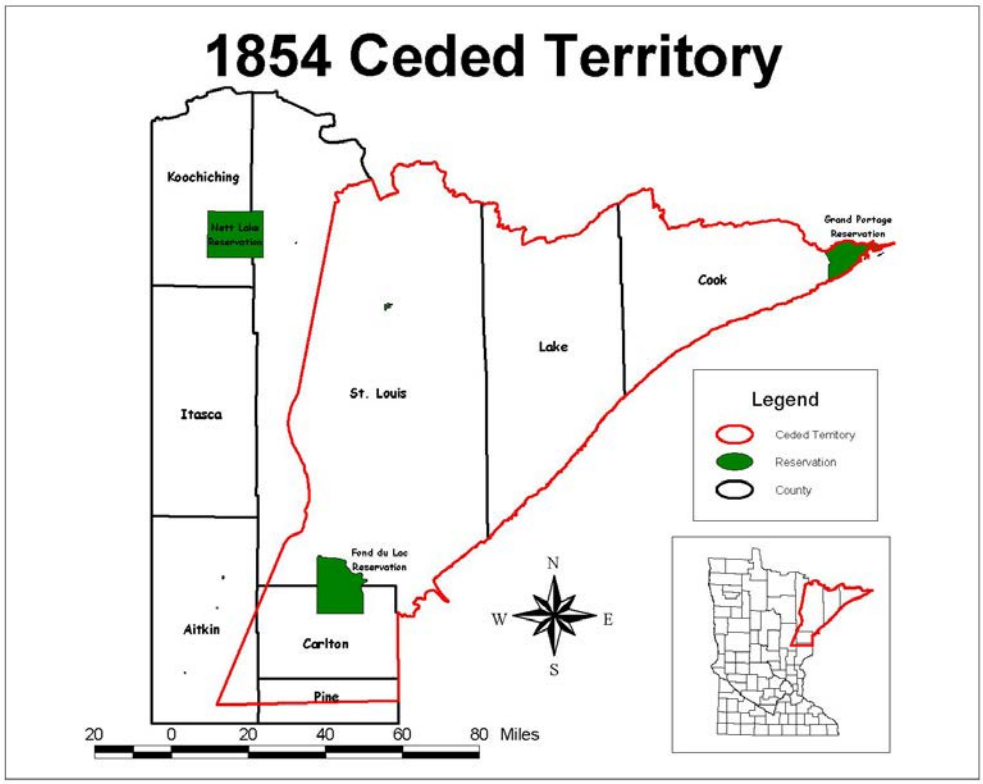

Figure 1.1854 Ceded Territory.

The Fond du Lac, Bois Forte, and Grand Portage Bands, as well as the 1854 Treaty Authority (1854) and the Great Lakes Indian Fish & Wildlife Commission (GLIFWC), have consistently advocated for a more robust, comprehensive CEA for the PolyMet NorthMet project and other mining projects. We have observed that current, historic, and 'reasonably foreseeable' mining activities have profoundly and, in many cases permanently, degraded vast areas of forests, wetlands, air and water resources, wildlife habitat, cultural sites and other critical treaty-protected resources within the 1854 Ceded Territory. As we have engaged with the lead federal and state agencies for the environmental review process under NEPA and the tribal consultation process under §106 of the National Historic Preservation Act (NHPA), we have clearly expressed our concerns for the incompleteness and inadequacy of their CEA.

In the 2008 CPDEIS section 2.2, Issues Identified During the EIS Scoping Process, it is stated that "The MnDNR and USACE determined that the following topics are not expected to present significant impacts, but would be addressed in the EIS using limited information beyond that provided in the Scoping EAW commensurate with the anticipated impacts: Cover Types; Vehicle Related Air Emissions; Air Emissions; Noise; Archeology; Visibility; Compatibility with Plans and Land Use Regulations; Infrastructure; Asbestiform Fibers; and 1854 Ceded Territory". Yet none of these resource categories or issues was fully evaluated from the standpoint of describing cumulative effects at spatial or temporal scales that the tribes find relevant, either in the earlier environmental impacts analysis or the current SDEIS process. The tribal cooperating agencies' perspectives on the resource-specific temporal and spatial boundaries for the CEA are significantly different from the co-lead agencies. Additionally, many of the tribal cooperating agencies' assumptions regarding predicted effects of the proposed actions (both the project and the land exchange) and the predicted success of proposed mitigations are significantly different from the co-lead agencies. Therefore, the tribal cooperating agencies have undertaken an alternative cumulative effects analysis, considering impacts to multiple resource categories to the extent we were able to do in the brief time within which we have been able review the draft PSDEIS, provide comments, and identify major differences of opinion.

In this CEA, we will be presenting major differences of opinion regarding cumulative effects to the 1854 Ceded Territory, Tribal Historic District (Figure 2) and the St. Louis River watershed. In addition, our analysis of the No-Action Alternative assumes current legal and regulatory requirements to remediate pollution from previous mining activities will, if implemented and enforced, lead to resource conditions that are substantially improved from their current degraded condition.

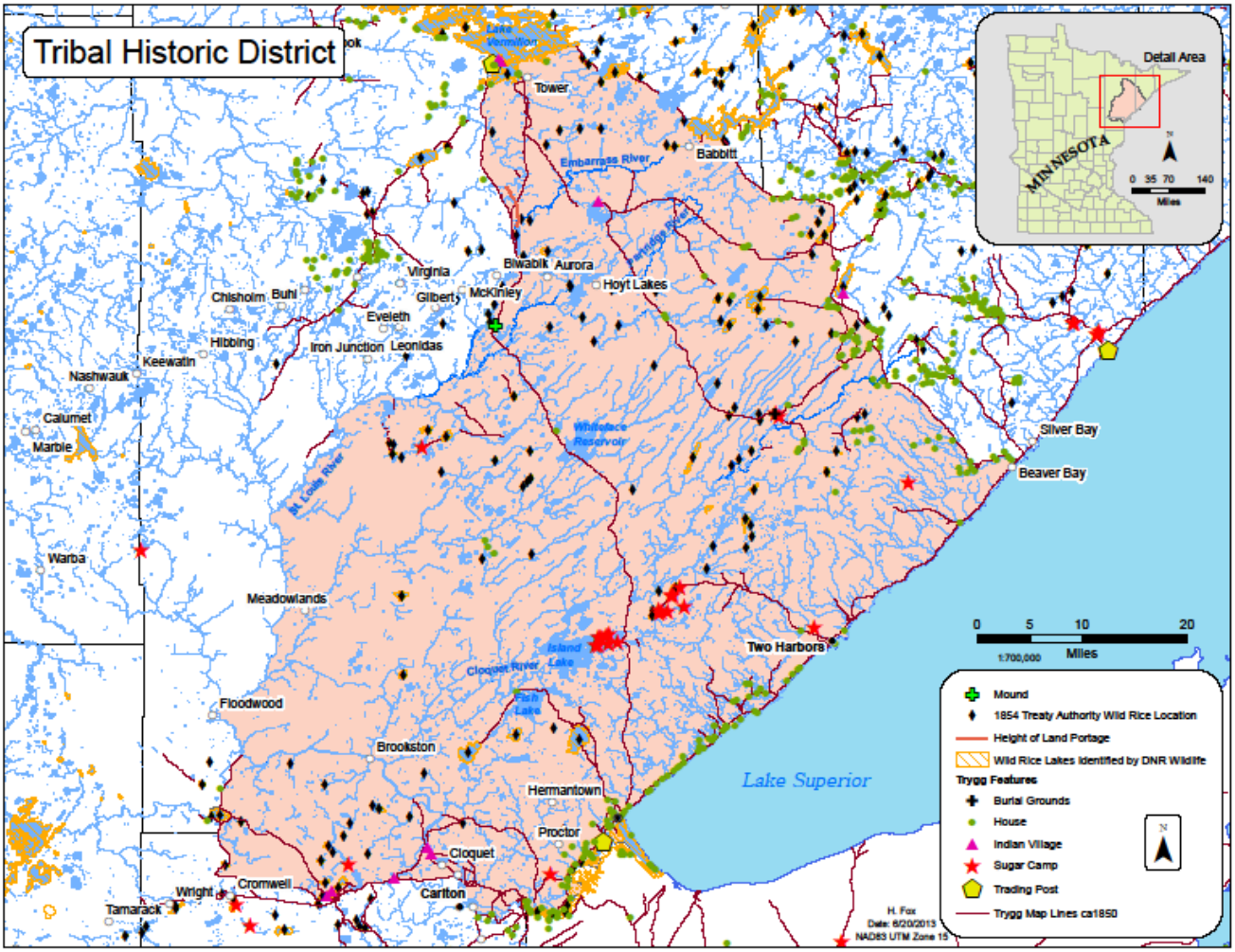

Figure 2. Tribal Historic District.

The tribal cooperating agencies use a resource-specific GIS-based approach as defined in the 2011 guidance to generate an alternative CEA that more accurately accounts for cumulative impacts to resources of tribal significance. From: *Applying Cumulative Impact Analysis Tools to Tribes and Tribal Lands:*

> The National Environmental Policy Act (NEPA) requires Federal agencies to evaluate the environmental impacts of their major projects. The scope of a federal Environmental Impact Statement (EIS) is spelled out in the NEPA legislation, in guidance documents published by the Council on Environmental Quality (CEQ) and EPA, and in various federal agencies' promulgated rules for implementing NEPA. An EIS evaluates the project's impacts to natural resources, the human environment, historical properties, and cultural properties. EIS documents are submitted for public review. Under Section 309 of the Clean Air Act, EPA is required to review and publicly comment on the environmental impacts of major federal actions including actions which are the subject of EISs.
>
> The assessment of cumulative impacts in NEPA documents is required by CEQ regulations. A cumulative impact is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (Title 40 Code of Federal Regulations (CFR) Section 1508.7, CEQ Regulations for Implementing NEPA, 1987). Only resources that are directly impacted or indirectly affected by an action are subject to a cumulative impacts analysis….
>
> In 1984, EPA issued its Indian Policy stressing two related themes: EPA will (1) pursue the principle of Indian self-government and (2) work directly with tribal governments on a government-to-government basis. Consistent with this Indian Policy and other EPA's statutory and regulatory authorities, EPA will identify and consider potential effects to reservation environments and take these potential effects into account as the Agency fulfills its regulatory duties. As a regulatory agency, EPA does not manage tribal trust resources or treaty resources in ceded territory. The U.S. Department of Interior, Bureau of Indian Affairs, does manage tribal trust resources. However, the Agency acknowledges its general trust responsibility to tribal governments which derives from the historical relationship between the Federal government and Indian tribes as expressed in certain treaties and Federal Indian laws, and understands that its regulatory activities can affect tribes.
>
> Tribal lands are fixed; that is the reservations, Indian lands, and ceded territories are specific places, defined by treaty, and tribes may hold certain rights within these areas. In addition, tribal cultural identity may be tied to specific areas, cultural properties, natural resources found within these areas or properties, and traditions and uses involving these places and resources. For this reason, tribes are not considered mobile. For these

reasons, many tribes have expressed interest and concern about cumulative impacts of actions relative to the areas they govern and/or use….

Tribal concerns about impacts to natural and cultural resources and properties and to their particular uses may include, but are not limited to the following:

- Water with naturally high quality and impacts involving -
    - Changes in concentrations of unregulated substances
    - Synergistic effects of multiple individually unregulated or regulated substances
    - Changes to water that make it unsuitable for cultural uses
- Lakes, rivers, wetlands, and other water bodies where plants of significance to tribes grow (e.g., wild rice)
- Water quality and quantity and soil quality that enable wild rice to grow
- Water quality necessary to support fish populations
- Plants and wildlife (e.g., moose, grouse, deer) of significance to tribes
- Sufficient wildlife populations and habitat to support traditional hunting, fishing, and gathering
- Fish and wildlife without contaminants that preclude their frequent consumption
- Archeological locations or areas
- Traditional or historic properties, locations or areas (e.g., traditional locations for hunting, fishing, and gathering; springs and ceremonial sites; other places where historic events occurred)
- Sacred locations or areas (e.g., gravesites, spiritual sites) without visual or noise impacts that would make them unsuitable for traditional activities
- Habitats that host culturally important resources (e.g., pipestone, sage, other culturally important plants)
- Access to areas where tribes have hunting, fishing, or gathering rights and to lands where off-reservation harvest under treaty rights occurs, including trails or passageways that link tribal use areas.
- Cultural items as defined by the Native American Graves Protection and Repatriation Act, 25 United States Code (USC) 3001, including funerary objects, sacred objects, and cultural patrimony
- Social bonds associated with traditional activities
- Tribal jurisdiction and control over reservation lands, thus improving or maintaining quality of life for residents of the reservations

An EIS that addresses cumulative impacts with respect to tribal uses and practices related to natural and cultural resources and properties should consider an analysis approach that uses:

1. A geographic area that is relevant to the tribe, for which information is collected and evaluated,

2. Information that reflects and describes tribal uses and tribal rights, and

3. A timeframe that is relevant to tribal uses.

In short, considering cumulative impacts to tribes may require a wider focus area and a discussion of direct and indirect impacts of all projects in an area, relative to tribal traditions, values, and concerns that involve using the resources affected by the project.

Regarding the geographic scope for a tribally relevant cumulative effects analysis:

- Scale is a central issue in the ecosystem approach.
- The appropriate boundary is one that ensures adequate consideration of all resources that are potentially subject to non-trivial impacts.
- For some resources, that boundary can be very large. For example, the long-range atmospheric transport of nutrients and contaminants into water bodies such as the Great Lakes and Chesapeake Bay transcends even the boundaries of their vast watersheds.
- At the other end of the spectrum, significant contributions to biodiversity protection can be made by identifying and avoiding small sensitive areas, such as rare plant communities.
- Determining relevant boundaries for assessment is guided by informed judgment, based on the resources potentially affected by an action and its predicted impacts.

The 1997 CEQ document notes that, for a project-specific analysis, it is often sufficient to analyze impacts within the immediate area of the proposed action. When analyzing the proposed action’s contribution to cumulative impacts, however, the geographic boundaries of the area should almost always be expanded. Project-specific analyses are usually conducted on the scale of forest management units, or facility footprints, or mixing zone in a waterbody pursuant to a discharge permit. Cumulative impacts analysis should be conducted in the scale of human communities, landscapes, watersheds, or airsheds.

Finally, EPA's 1999 document notes that the EPA reviewer can determine an appropriate spatial scope of the cumulative impact analysis by identifying a geographic area that includes resources potentially affected by the proposed project and extending that area, when necessary, to include the same and other resources affected by the combined impacts of the project and other actions. Furthermore:

- Geographical boundaries should not be extended to the point that the analysis becomes unwieldy and useless for decision-making.

- The analysis should use an ecological region boundary that focuses on the natural units that constitute the resources of concern.

- For non-ecological resources, other geographic areas, such as historic districts (for cultural resources) or metropolitan areas (for economics), should be used.

Cultural Resources

During the EIS scoping process for the NorthMet Project (see Section 2.1 of the Final Scoping Decision Document), no cumulative impact issues associated with cultural resources were identified. Tribes were not invited to participate in scoping. However, Tribal comments on the June 2008 PDEIS, the 2009 CPDEIS and the 2009 DEIS noted this cumulative impact and the need for analysis. The tribal cooperating agencies have repeatedly stated and commented in writing that there likely will be substantial impacts to cultural resources, and impacts to cultural resources need to be fully integrated into evaluation of potential impacts to cultural sites and cultural resources. However, there appears to be a concerted effort to diminish any and all comments on this subject and simply revert back to decisions made during the scoping phase.

The Traditional Use Survey conducted in 2011 (Latady and Isham 2011) focused on identifying and evaluating significance of places of importance to the Bands within the area to be affected by the proposed mine. Identification and evaluation is the first step before assessing adverse effects and integral to the development of a cultural resource management plan to facilitate preservation and management of cultural resources including traditional use areas. Beyond identification, the intent of the survey highlighted the potential to bridge the past and future in terms of native culture, history and natural resources.

Tribal cooperating agencies consider a 216,300 acre area bounded by the St Louis River, Lake Superior, Lake Vermilion and the Beaver Bay to Vermilion Trail to be a Tribal Historic District, and the pertinent area for consideration of cumulative effects to cultural resources. In addition to the St Louis River, the area supports three major drainage systems, the Cloquet, Embarrass and Pike Rivers. Trygg maps (1966), historic documents (Brownell 1967, Carey 1936, Chester 1902, Lancaster 2009, Trygg 1969, Van Brunt 1922, Jenks 1901, Moyle 1941) and information contained in site files located at the Bois Forte Tribal Historic Preservation Office were used to determine the extent of the district. Additional information on Historic places and properties are available at SHPO, Superior National Forest Headquarters and Duluth Archaeology Center. Included within the proposed historic district are the headwaters of the St. Louis River, the site of ongoing mineral exploration.

Ancestors of present day Band members resided in this area for centuries and many Band members followed traditional practices extensively until about a generation ago when the effects of mining devastated the rice beds in the Embarrass and St. Louis River watersheds and closed access to large tracts of public (USFS) land where traditional harvest and collection areas occur. This proposed Tribal Historic District encompasses complex trail systems, Indian villages, trading posts, encampments for fishing, hunting, wild rice harvest

and processing, sugar bush, and other traditional subsistence practices. It includes what was essentially a 'water highway' used by the Ojibwe at the time of European contact, and subsequently by Voyaguers during the era of heavy fur trading. In addition, numerous medicinal plant gathering sites, Midewewin lodges, vision quest locales and other sacred places occur.

Land Use

The co-lead agencies define the CEAA for land use to include effects associated with the NorthMet Project Proposed Action combined with other industrial (including mining) or public works projects located within the portion of the Mesabi Iron Range encompassed by St. Louis County". Tribal cooperating agencies believe the CEA for land use should encompass the 1854 Ceded Territory, as the signatory Bands have lost access to substantial portions of the 1854 CT and the resources within (Figure 3). The 1854 Ceded Territory encompasses 6,283,836 acres in North Eastern Minnesota. Of that, 4,095,146 acres are public land ranging from Federal to CRP lands. The remaining 2,188,578 is private to private industrial land[1]. Band members generally do not exercise usufructuary rights on private lands without landowner permission, although the treaty does not hold that restriction. Lands within the 1854 Ceded Territory that have experienced urban and/or industrial development are permanently 'lost' as a source of treaty resources.

[1] http://deli.dnr.state.mn.us/data_catalog.html using GAP Stewardship 2008 – all Ownership Types shape file and database

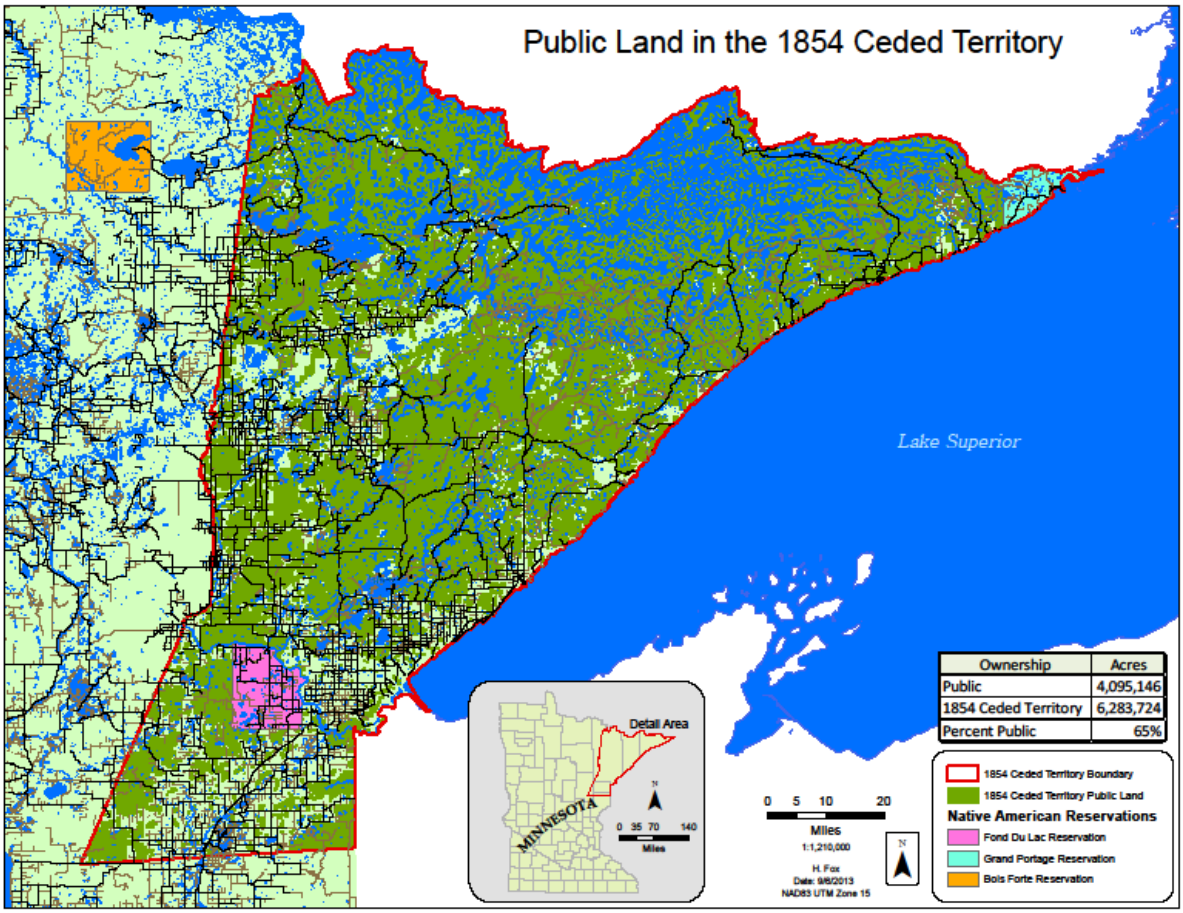

Figure 3. Public Lands within the 1854 Ceded Territory

Water Resources

The co-lead agencies evaluated cumulative impacts to surface water within the Partridge and Embarrass River watersheds only. From the preliminary SDEIS: "The St. Louis River was considered for inclusion in the cumulative effects assessment. The NorthMet Project Proposed Action is predicted to meet all water quality evaluation criteria or not make concentrations worse. Further, concentrations of sulfate and mercury, two key constituents of concern, are predicted to decrease as a result of the NorthMet Project Proposed Action. The NorthMet Project Proposed Action would also result in only minor changes in hydrology within the Partridge River and Embarrass River. Therefore, the NorthMet Project Proposed Action is not considered to have the potential for cumulative effects on hydrology and water quality in the St. Louis River. As a result, the CEAA for surface water is defined by the Partridge River and Embarrass River watersheds as shown on Figure 6.2.3-1."

The tribal cooperating agencies believe the relevant spatial scale for water quality and hydrologic cumulative effects analysis is the entire St. Louis River watershed. This watershed has experienced substantial historic, current and proposed expanded mining activities, as well as other industrial, agricultural and urban development. In addition to the direct surface water and wetland impacts (loss and/or degradation) from these activities, nearly half of the watershed has experienced hydrologic alteration from extensive ditching. It is reasonably foreseeable that an additional 3000 acres of wetlands within the watershed will be directly impacted by proposed new mining projects and expansions that are in active permitting and/or environmental review: the PolyMet NorthMet project, Mesabi Nugget Phase II, US Steel Minntac expansion, US Steel Keetac expansion, United Taconite Tailings Basin 3 construction. To date, virtually all required wetland mitigation for mining impacts has been implemented out of the basin, representing a permanent loss of high quality ecological resources and functions.

Modeling

The tribal cooperating agencies' review of the water modeling data packages for the NorthMet Project Proposed Action led to our conclusion that Goldsim did not accurately predict existing conditions, and cannot be relied upon to accurately predict future project conditions. While we feel that modeling of the existing conditions is an inadequate substitute for a realistic No-Action Alternative model and does not follow CEQ guidelines, it appears that Goldsim does not even accurately model existing conditions. As noted in spreadsheet comments submitted June 25, 2013, for many parameters at several waterbodies the No-Action P50 model of annual average value is substantially different than the observed average existing conditions. Because of the inaccuracy of the Goldsim predictions of current conditions it is not clear that use of the Goldsim estimates of project impacts are adequate to ensure protection of water resources. For example:

- PSDEIS Table 4.2.2-18 reports Colby Lake as currently having an observed mean Arsenic of 0.78 to 1.4 ug/L (depending on the data set), whereas Figure 5.2.2-35, the No-Action (continuation of current conditions) P50 model for Colby Lake Arsenic shows annual maximum values of 0.5 ug/L

- PSDEIS Table 4.2.2-34 reports PM-10 (seep at the basin north toe) as having an observed mean Mn value of 100,192 ug/L, whereas Figure F-01-18.1 (Water Modeling Data Package Vol 2-Plant Site v9 MAR2013) shows the No-Action (continuation of existing conditions) P50 as an annual maximum Mn of 390 ug/L. at the north toe.
- PSDEIS Table 4.2.2-34 reports PM-10 as having an observed mean Aluminum of 39.6 ug/L yet Figure F-01-02.1 (Water Modeling Data Package Vol 2-Plant Site v9 MAR2013) shows an annual maximum for No-Action (continuation of existing conditions) at the north toe as 11 ug/L.
- PSDEIS Table 4.2.2-14 shows that observed average SO4 at SW-005 (9.11 mg/L) is nearly identical to the Goldsim P50 predicted current annual maximum for that site (PSDEIS Fig. 5.2.2-27, 9 mg/L). This suggests that Goldsim is under-predicting SO4 at SW-005. (The authors of the text on page 5.2.2-125 of the PSDEIS seem to misinterpret the P50 of the figure as a predicted annual average. This is not the case. The P50 of that figure is the "best" estimate of the annual maximum. The Goldsim model estimate of the annual average at SW-005 is shown as the P50 in Mine Site Data Package Attachment K Figure K-06-24.2, i.e. 6 mg/L) Again, this suggests that Goldsim is underpredicting SO4 at SW-005.
- PSDEIS Table 4.2.2-29 shows that observed average Al at PM-13 is 221 ug/L. This observed average is much higher than the modeled No-Action (continuation of existing conditions) P50 annual maximum (PSDEIS Table 5.2.2-47, 159-166 ug/L). The modeled No-Action P50 annual average for Al at PM-13 of 75 ug/L (attached Fig.I-05-02.2, Water Modeling Data Package Vol 2-Plant Site v9 MAR2013) is only 1/3 of the observed average.

Tables 1-3 below compare the observed existing conditions values found in various PSDEIS tables to the P50 existing conditions predicted by Goldsim. While a very few of these model predictions are presented in the PSDEIS, many are not and therefor, the tables below refer back to the underlying data packages from which the PSDEIS was written.

Parameter (ug/L)	Average existing water quality (PSDEIS Table 4.2.2-14)	Annual average P50 existing conditions predicted by Goldsim (Mine Site Data Package Attach.K)
Mn	SW-002 = 142	SW002 = 80 (Fig.K-01-18.2)
Tl	SW-002 = 0.6	SW002 = 0.11 (Fig.K-01-25.2)
Mn	SW-003 = 147	SW003 = 85 (Fig.K-02-18.2)
B	SW-004a = 126.5	SW004a = 30 (Fig.K-04-05.2)
K	SW-004a = 2,700	SW004a = 1,600 (Fig.K-04-16.2)
SO4	SW-004a = 15,900	SW004a = 8,000 (Fig.K-04-24.2)
Pb	SW-005 = 1.3	SW005 = 0.26 (Fig.K-06-21.2)
SO4	SW-005 = 9,110	SW005 = 6,000 (Fig.K-06-24.2)
Tl	SW-005 = 0.4	SW005 = 0.05 (Fig.K-06-25.2)

Table 1. Observed existing conditions in the Partridge River vs. annual average existing conditions predicted by Goldsim.

Parameter (ug/L)	Colby Lake mean existing water quality (PSDEIS Table 4.2.2-18, Barr data)	Colby Lake Annual average P50 existing conditions predicted by Goldsim (Mine Site Data Package Attach.K)
Al	108	75 (Fig.K-08-02.2)
As	0.78	0.4 (Fig.K-08-04.2)
Cu	2.4	0.7 (Fig.K-08-13.2)
Ni	2.5	1.1 (Fig.K-08-20.2)
SO4	33,800	~10,000 (Fig.K-08-24.2)
Tl	0.1	0.025 (Fig.K-08-25.2)

Table 2. Observed mean existing conditions in Colby Lake vs. annual average existing conditions predicted by Goldsim.

Parameter (ug/L)	Mean seep measured value at Basin Toe (Table 4.2.2-34)	Annual maximum P50 existing condition predicted by Goldsim (Plant Site Data Package Attach.F)
Al	PM-8 = 25.7	West toe = 14 (Fig.F-04-02.1)
AL	PM-9 = 29.9	NW toe = 13 (Fig.F-02-02.1)
AL	PM-10 = 39.6	North toe = 11 (Fig.F-01-02.1)
Mn	PM-8 = 3,039	West toe = 1,250 (Fig.F-04-18.1)
Mn	PM-10 = 100,192	North toe = 380 (Fig.F-01-18.1)
F	PM-8 = 2,900	West toe = 1,100 (Fig.F-04-14.1)
As	PM-8 = 3	West toe = 2 (Fig.F-04-04.1)
B	PM-10 = 379	North toe = 330 (Fig.F-01-05.1)
Pb	PM-10 = 1.3	North toe = 1 (Fig.F-01-21.1)

Table 3. Observed mean existing conditions at the tailings basin toe vs. annual maximum existing conditions predicted by Goldsim. (Goldsim predicted mean concentrations are not provided in Modeling Data Package Vol 2-Plant Site v9 MAR2013).

The above examples are not an exhaustive list of discrepancies between observed existing water quality data and the Goldsim P50 prediction of the No-Action alternative (continuation of existing conditions) but highlight some of the most notable discrepancies. What the discrepancies demonstrate is that the Goldsim model is a relatively poor predictor of current conditions. If a model is unable to accurately predict current conditions it is even less likely to accurately predict future Project conditions. The Goldsim models need to be better calibrated to existing conditions (the calibration effort reported in "Calibration of the Existing Natural Watershed at the Plant Site v4 MAR2012" only compared model output to upstream site PM-12 and apparently did a poor job of preparing the models to predict either the lower reaches of the Embarrass or the Partridge River.) and model results recalculated.

Surface water quality

Evaluation Criteria that are used by the Project Proponent to evaluate the impacts of pollutants that are currently exceeding WQS do not comply with the Clean Water Act. 40 CFR § 122.44 (d) requires that all effluents be characterized to determine the need for a

Water Quality Based Effluent Limit (WQBEL). If a projected concentration of a specific pollutant exceeds the applicable numeric WQS, there is a reasonable potential that the discharge may cause or contribute to an excursion above WQS. Where existing data demonstrates an excursion from WQS, a WQBEL may be imposed without facility-specific effluent monitoring. In order to calculate a WQBEL, a Waste Load Allocation (WLA) for each permitted discharge must be established. The WLA is the portion of a Total Maximum Daily Load that is allowed for each point source to ensure compliance with WQS. However, it is very difficult to determine based on the information that has been provided by PolyMet if the additional contribution of each pollutant that currently exceeds WQS will exceed the load limit that would be required by a WLA to ensure compliance with WQS. And, the additional loading of pollutants that already exceed WQS demonstrates cumulative water quality impacts from the Project. Therefore, the Area of Potential Effect for water quality extends from the Embarrass and Partridge rivers to the mouth of the St. Louis River.

The Embarrass River, Partridge River and Colby Lake already have several constituents including sulfate, manganese, and mercury in concentrations that already exceed Minnesota Water Quality Standards ("WQS"). The existing large number of water-quality exceedances and the suite of constituents, particularly trace metals, exceeding WQS indicate the site has not been remediated from previous mining activities, and that the required reclamation was not adequate to ensure compliance with WQS. Concentrations of sulfate, specific conductance, manganese, mercury and arsenic that exceed MN WQS have been measured for NPDES permit Data Monitoring Reports and by the PolyMet project proponent demonstrate both water quality contamination issues and cumulative water quality impacts.

Specific conductance

Tribal staff have noted that elevated specific conductance is a water chemistry ‘signature’ for mining discharges. Specific conductance is the ability of a material to conduct an electric current measured in microSiemens per centimeter (µS/cm) standardized to 25°C. Specific conductance reflects concentrations of dissolved solids, including metal and other contaminants from mining, other industrial activities, and agriculture.

Tribal staff conducted analysis of specific conductance downstream of mine discharges using agency monitoring data (1990-2013). Analysis of specific conductance downstream of mine discharge sites indicated that specific conductance was highest nearest to mine discharge sites, and tended to only gradually decrease downstream of mine discharge sites. Linear regressions demonstrated that specific conductance was significantly negatively related to distance across all sample sites ($P < 0.01$, $R^2 = 0.15$; $n = 123$ sites; Fig. 4) and within the St. Louis River and Swan River systems ($P < 0.05$, $R^2 = 0.18$ and 0.52, respectively; Fig. 5). This analysis included stream and river monitoring only (not lakes). The regression suggests that specific conductance could drop to 150 µS/cm only 203 km (126 mi) downstream of the nearest upstream mine discharge site.

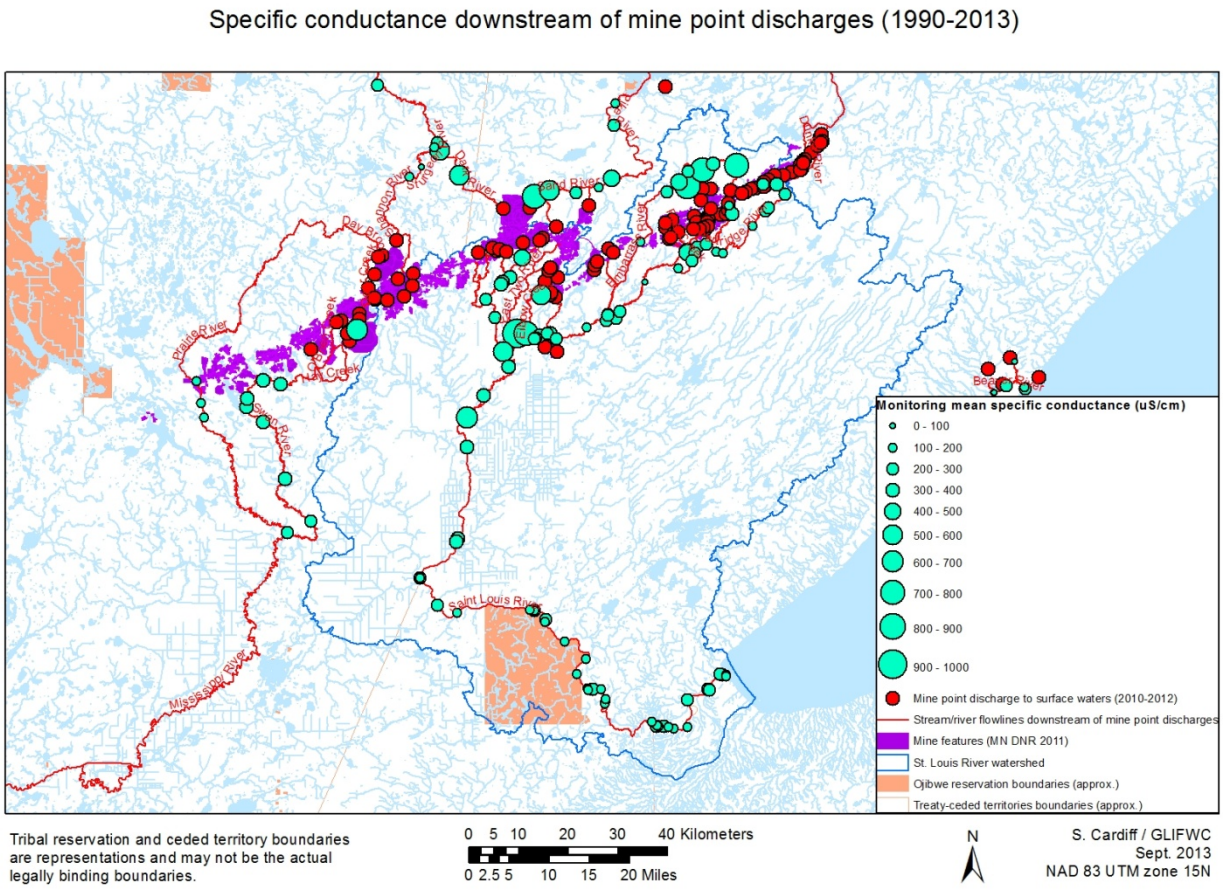

Figure 4. Mean specific conductance measurements at monitoring stations downstream of mine point discharges were inversely related to distance downstream from mine point discharge sites.

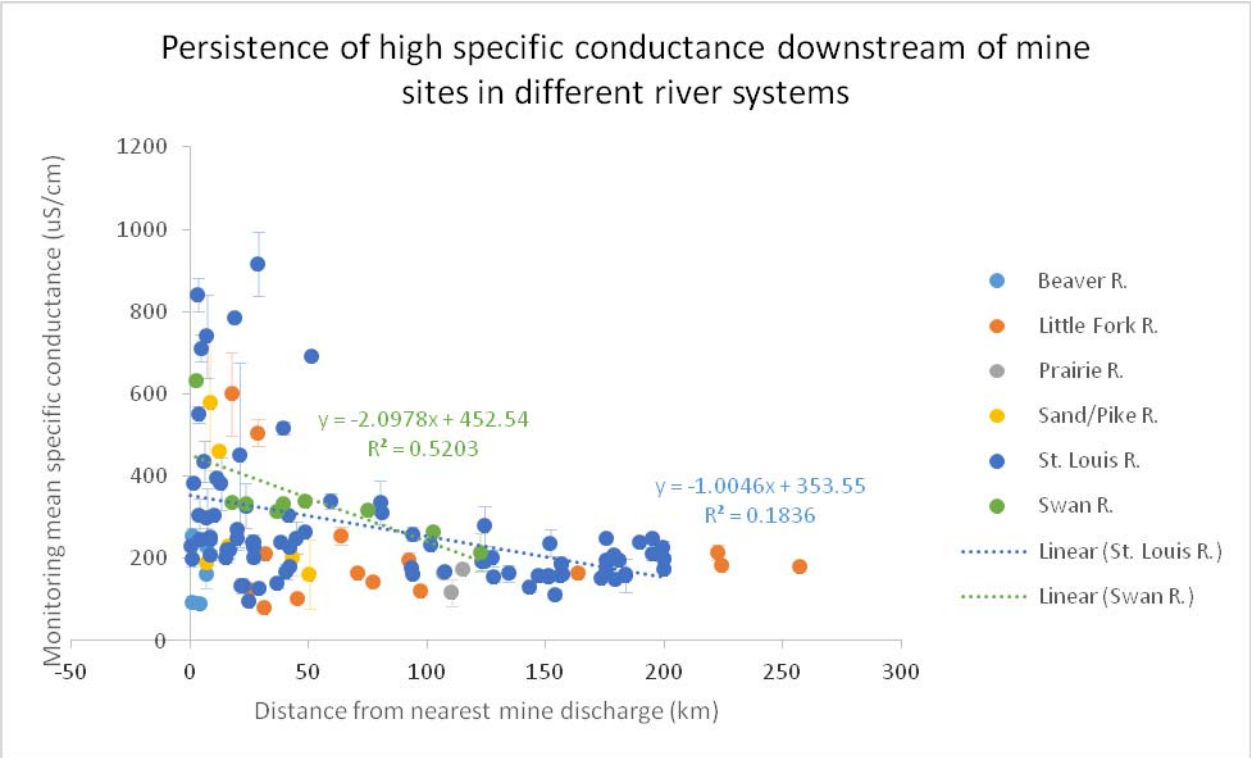

Figure 5. Linear regression indicated that mean specific conductance (±1 SE) was significantly negatively related to distance of the monitoring location downstream of the nearest mine discharge in two of the main downstream river systems, with highest specific conductance nearest to mine discharges and decreasing relatively gradually downstream (St. Louis River system $P < 0.01$, $R^2 = 0.18$, $n = 85$; and the Swan River system ($P < 0.05$, $R^2 = 0.52$, $n = 9$).

These analyses demonstrate that existing mining discharges result in elevated concentrations of pollutants that persist far downstream in the St. Louis River, which is consistent with the findings of the USEPA in their assessment report on the effects of mountaintop removal and valley fill mining[2].

Manganese

The Health Risk Limit (HRL) for manganese is 100 micrograms per liter (µg/l) because it is a potent neurotoxin known to cause brain damage when formula fed infants are exposed to high concentrations, and can cause Parkinsons-like symptoms in adults exposed to high concentrations. The average measured concentration of manganese in Wyman Creek between April 2005 and December 2012 was 1383 µg/l. Water discharging from Area Pit 5 to Spring Mine Creek, a tributary to the upper Embarrass River, between July 2010 and

[2] U.S. EPA (Environmental Protection Agency). 2011. The Effects of Mountaintop Mines and Valley Fills on Aquatic Ecosystems of the Central Appalachian Coalfields. Office of Research and Development, National Center for Environmental Assessment, Washington, DC. EPA/600/R-09/138F.

October 2011, had an average measured concentration of 804 µg/l. Test results from sixteen private drinking water wells located between the proposed project and the Embarrass River in 2008 revealed concentrations of manganese that exceeded the HRL in eight wells. The range of manganese concentrations from all of the wells was 0.66 – 4710 µg/l. The PolyMet project will contribute additional manganese to the groundwater from tailings basin water that is not captured and treated, and the water that seeps through fractures in the mine pit walls once the pit has filled with water.

In the Partridge river watershed, measured concentrations of manganese increase dramatically from the most upstream measurements to the furthest downstream measurements (Figure 6).

In the Embarrass River watershed, high concentrations of manganese are associated with mining features. SD033 is the discharge from Area Pit 5, and the former LTV tailings basin appears to be the source of pollution for monitoring locations MLC-2, PM-19, and PM-11 (Figure 7).

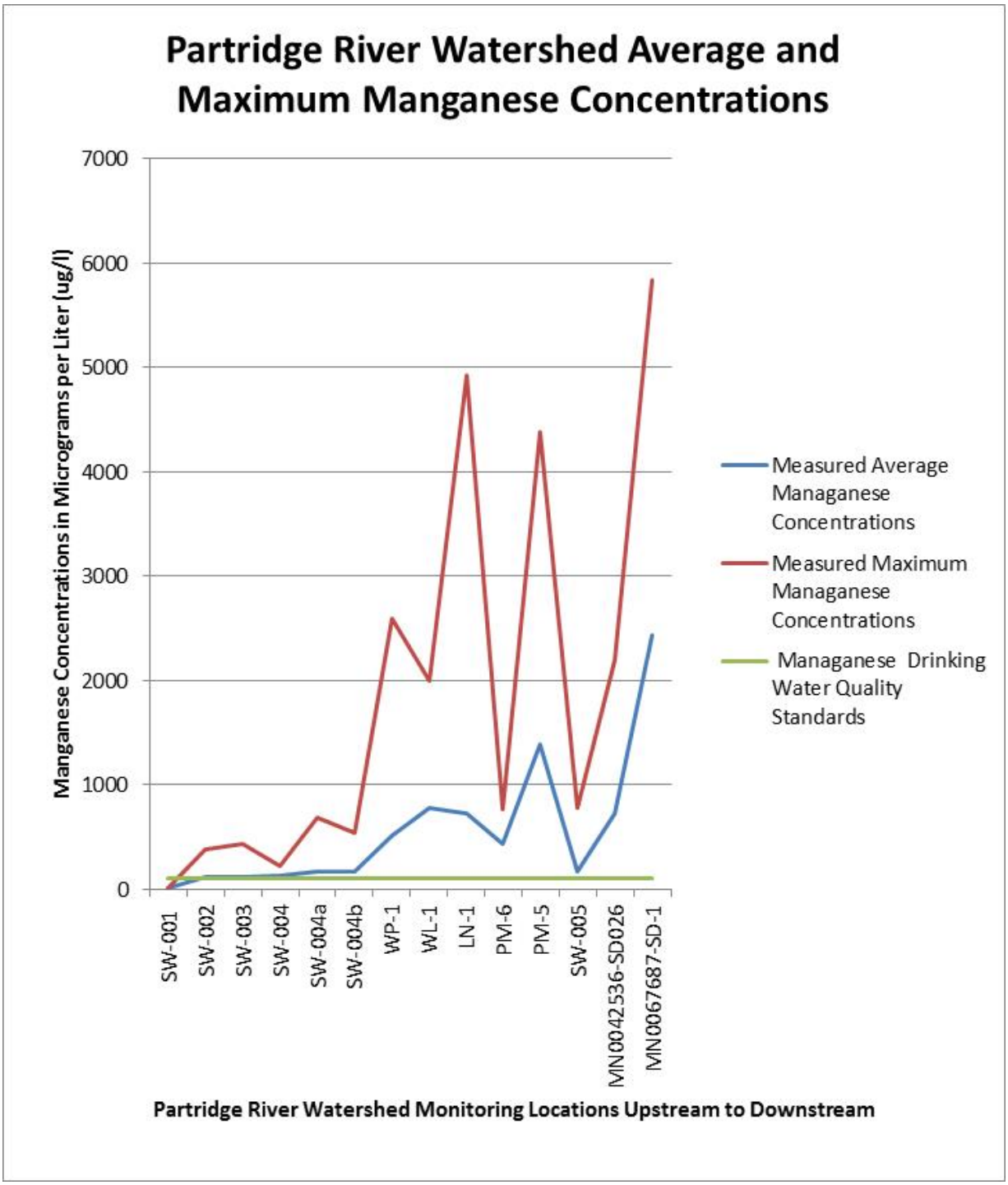

Figure 6. Partridge River Watershed Manganese Concentrations.

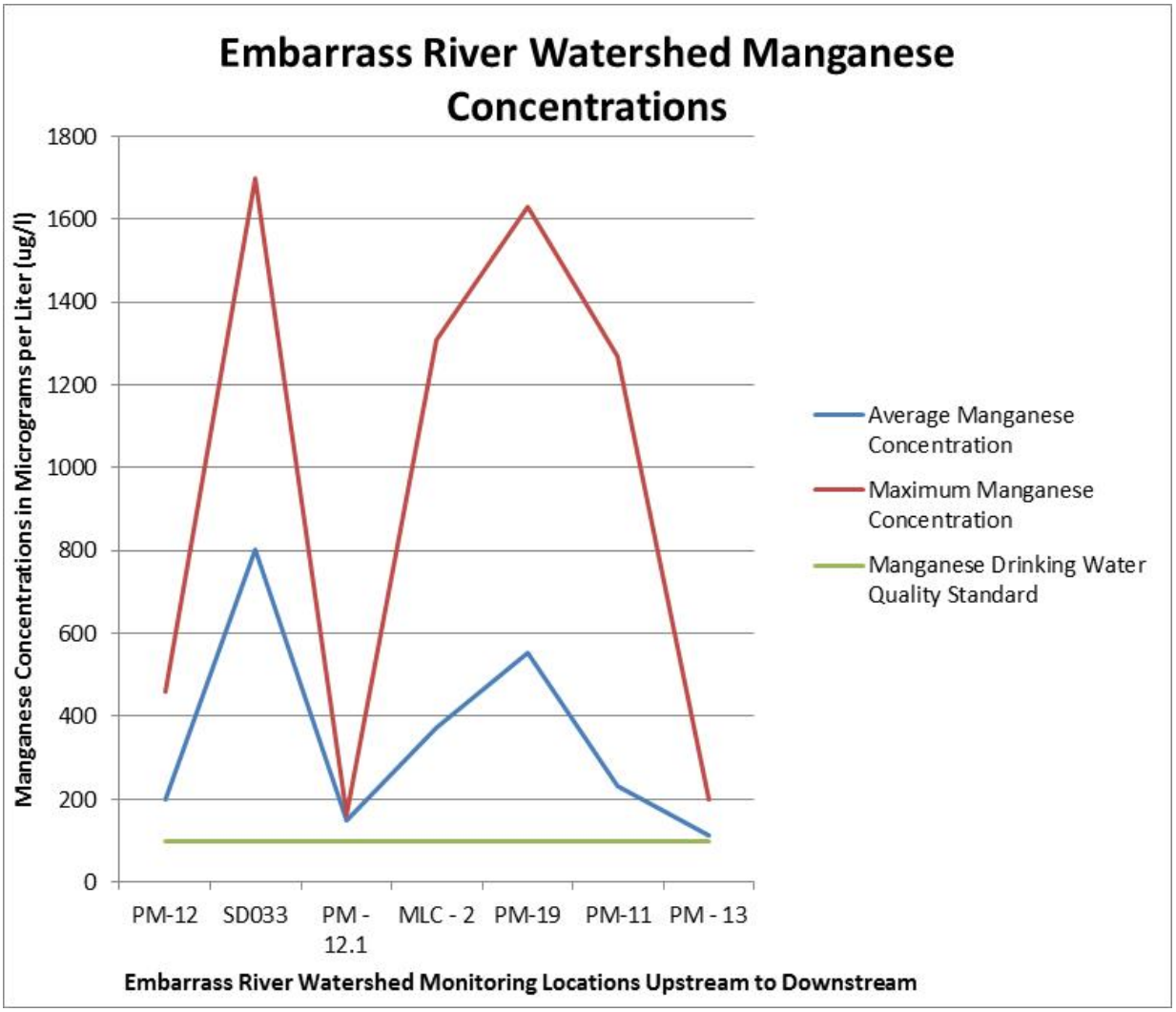

Figure 7. Embarrass River Watershed Manganese Concentrations.

Arsenic

Arsenic is a known carcinogen. The drinking water standard for arsenic is 10 µg/l, based on both human health and the economics of treating drinking water to meet the standard. Based on human health alone, the standard for arsenic is less than 2 µg/l[3]. Arsenic concentrations measured in sixteen private drinking water wells between the proposed project and the Embarrass River in 2008 ranged from less than the detection limit of 2 to 7.5 µg/l. Arsenic concentrations are projected to increase as a result of the PolyMet project[4].

In the Partridge River watershed, measured maximum arsenic concentrations exceed Class 2A and 2Bd water quality standards at all but three locations (Figure 8). The locations where the maximum measured concentration of arsenic does not exceed the Class 2A and 2Bd water quality standards are in the upper portion of the watershed.

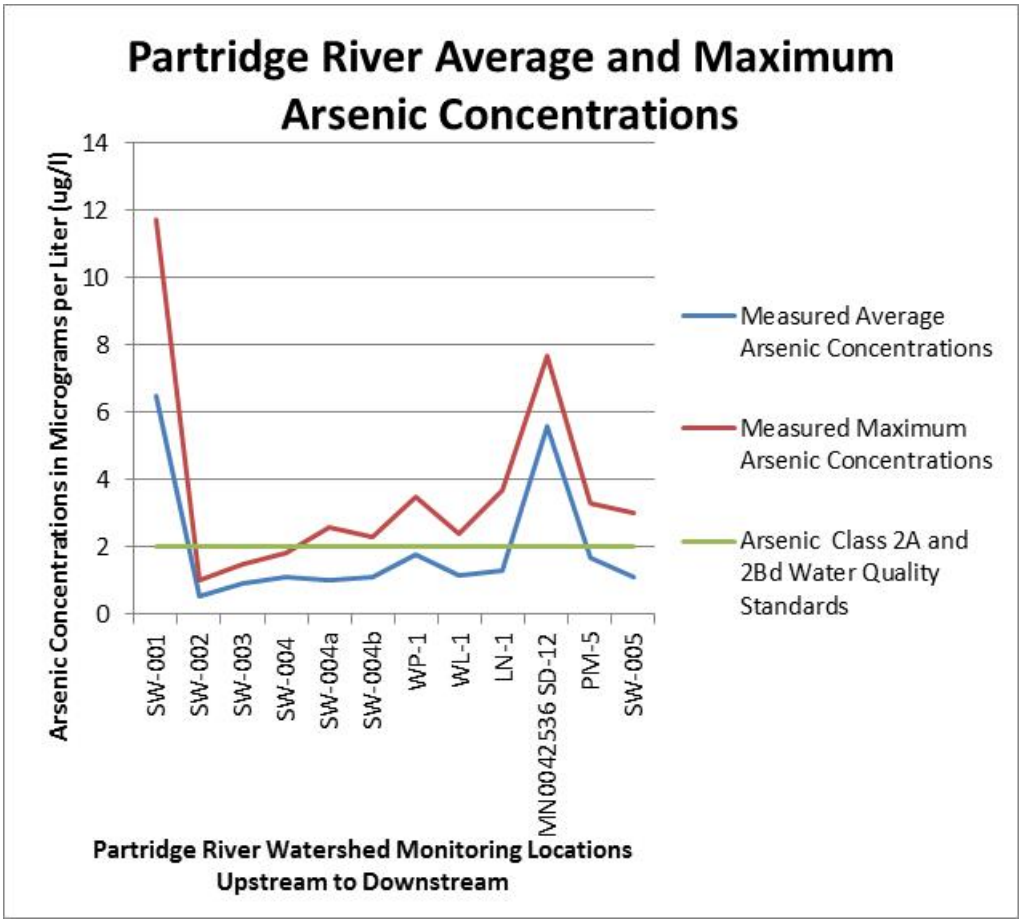

Figure 8. Partridge River Arsenic Concentrations.

[3] 40 CFR 131.36
[4] PolyMet Water Modeling Data Package

In Colby Lake, which is the City of Hoyt Lakes drinking water source, the increase in arsenic from the PolyMet project would be 38.5% (5.2.2-127 Table 5.2.2-33 Maximum Modeled Monthly P90 Surface Water Concentrations for the Colby Lake). This is significant because the US EPA's Priority Toxic Pollutants rule suggests that this level of arsenic would be more than an order of magnitude higher than what would prevent cancer in humans. The increased arsenic in the Partridge River — up to 55% at SW-004b are even more striking (p. 5.2.2-113, Table 5.2.2-29 Maximum Modeled Monthly P90 Surface Water Concentrations for the Mine Site), which may affect humans through fish consumption, even if the water isn't used for drinking.

Aluminum

The Class 2A chronic standard for total aluminum, applicable to Wyman Creek, is 87µg/l. The quality of Class 2Bd surface waters shall be such as to permit the propagation and maintenance of a healthy community of cool or warm water sport or commercial fish and associated aquatic life and their habitats. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable. The Class 2Bd standard for aluminum is 125µg/l, applicable to the Embarrass River, Partridge River and St. Louis River. As Figure 9 below demonstrates, at every site where data is available the maximum aluminum concentrations exceed WQS, except at SW-001. The average aluminum concentration exceeds WQS at one quarter of the sites where monitoring data is available for aluminum.

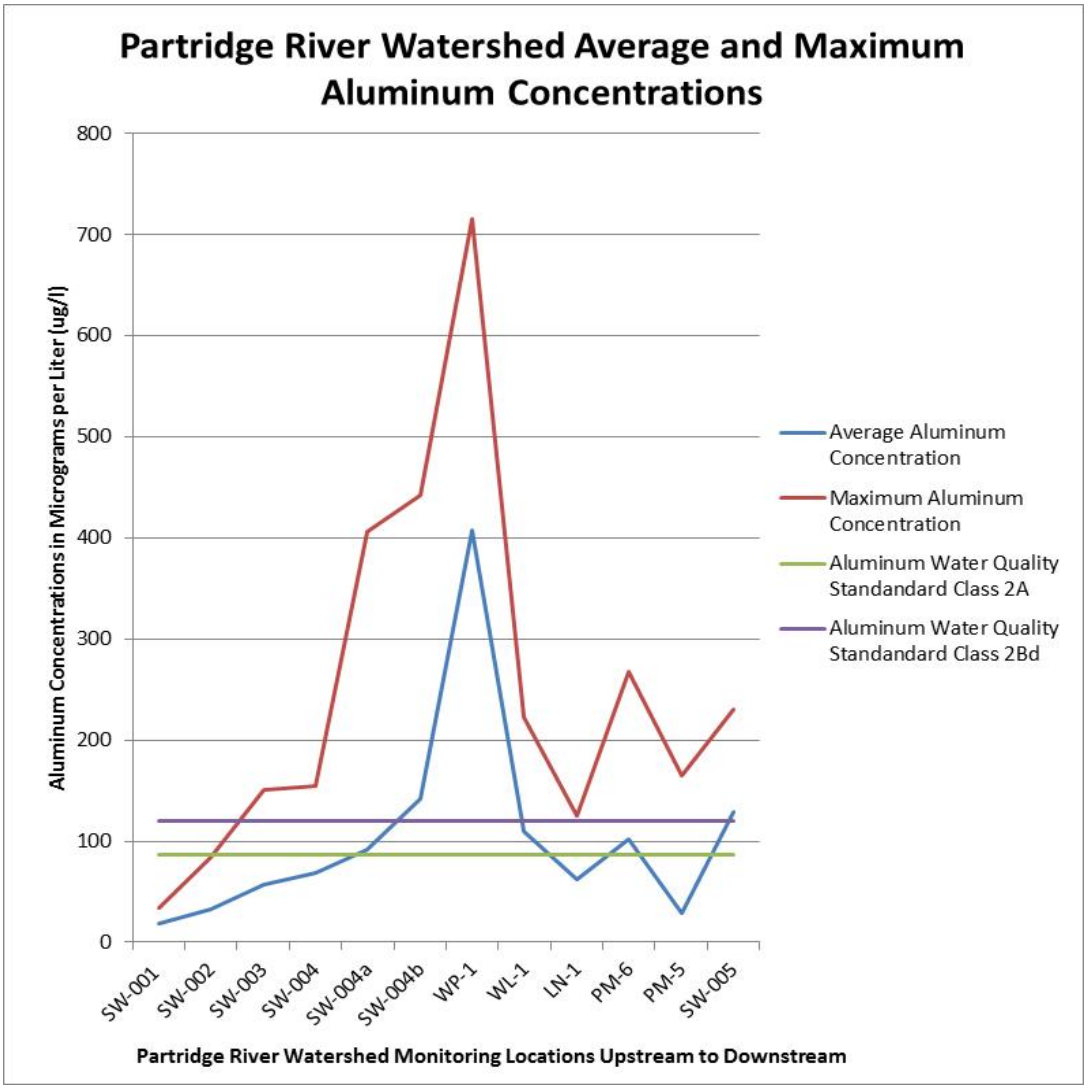

Figure 9. Partridge River Watershed Aluminum Concentrations.

Aquatic Species

Within the CEA area defined by the co-leads for impacts to aquatic species (the Partridge and Embarrass Rivers from their headwaters to a point approximately 15.5 miles downstream of the NorthMet Project Proposed Action activities, where the rivers form the St. Louis River), the MPCA has assessed and identified waterbodies that are impaired for fish and/or benthic macroinvertebrate communities, based upon recent monitoring data (since 2009). The draft 2012 §303(d) list prepared by the MPCA includes more headwaters streams and rivers in the St. Louis River watershed that are also impaired for aquatic communities (Figure 10). It is likely that the state-led stressor identification process underway will identify historic and existing mining operations as major causal factors for these impairments. The tribal cooperating agencies believe that the appropriate spatial scale for considering cumulative impacts to aquatic species is the St. Louis River watershed.

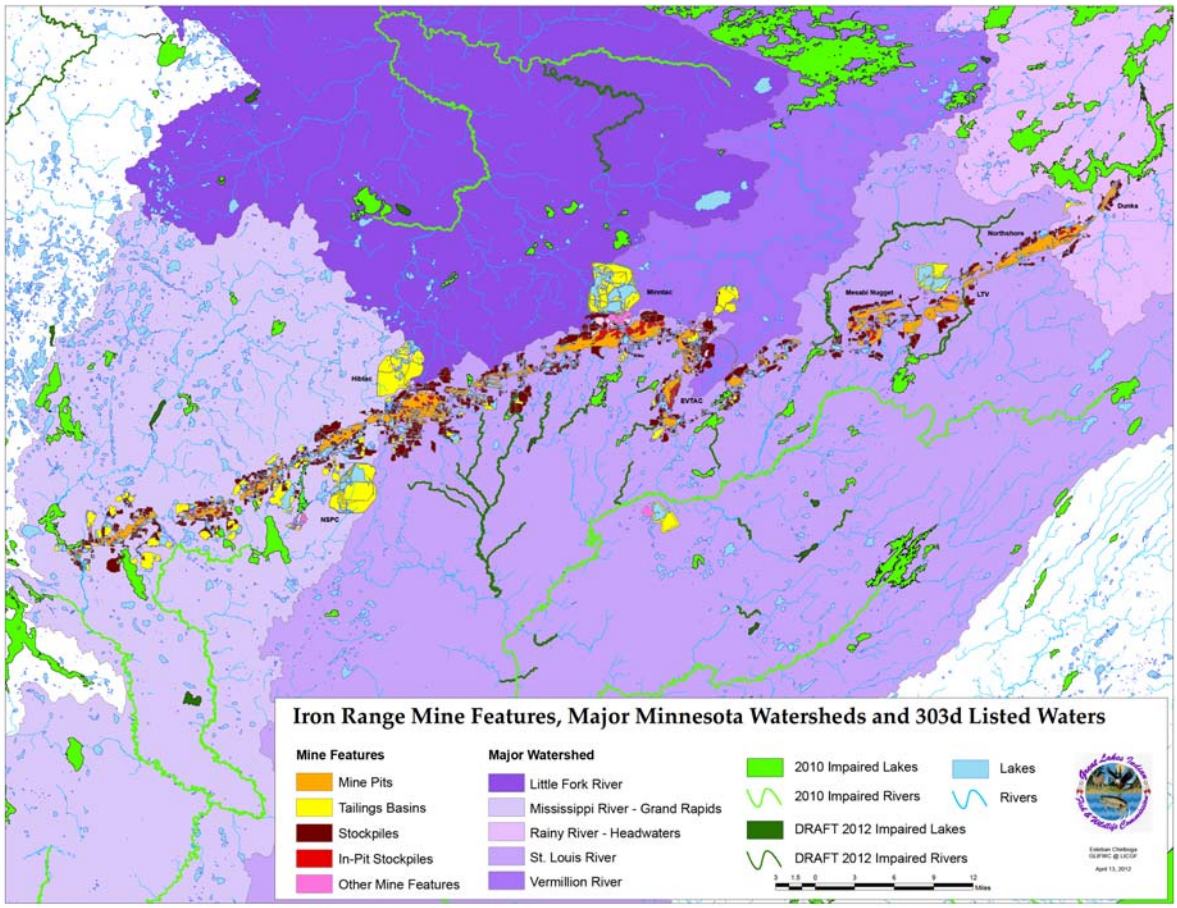

Figure 10. Impaired Waters (§303(d) Listed) within the St. Louis River and other mining-impacted watersheds.

The co-lead agencies conclude that, since the NorthMet Project Proposed Action is not predicted to result in any short- or long-term exceedances of surface water chronic standards in the Partridge River, Colby Lake, or the Embarrass River, even under extreme low-flow conditions during operations, no cumulative effects on aquatic resources are predicted within the CEAA. The co-lead agencies also conclude that there will be no effects on current baseline habitat conditions (as defined by hydrologic changes) from the NorthMet Project Proposed Action; therefore, no cumulative effects are anticipated. Both of these assumptions are major differences of opinion between the co-lead agencies and the tribal cooperating agencies. Clearly there are already adverse effects of mining operations and other development within these subwatersheds.

Mercury

From the PSDEIS: "The NorthMet Project Proposed Action is predicted to result in a net decrease in mercury loadings to the Partridge River from 24.2 grams per year to 23.0 grams per year. This would primarily be a result of a decrease in natural runoff (with a total mercury concentration of 3.6 ng/L) and a proportional increase in water discharged from the West Pit via the WWTF (with a total mercury concentration of 1.3 ng/L)."

The understanding of mercury dynamics in the St. Louis River watershed is very limited and is insufficient to lead to the conclusion reached in the PSDEIS that "the NorthMet Project Proposed Action would not exceed applicable environmental evaluation criteria." This lack of scientific information is explicitly stated throughout the PSDEIS and is what led the Minnesota Pollution Control Agency (MPCA) early this year to delay the establishment of a St. Louis River TMDL until further mercury cycling data could be collected.

The PSDEIS also states that the current fish tissue concentration in the five local lakes results in Hazard Quotients (HQs) that exceed 1 (page 6-58), but gives no further information. The *Cumulative Impacts Analysis, Local Mercury Deposition and Bioaccumulation in Fish (July 2012)* (Barr report) showed modeled contributions from both the Mesabi Nugget LDSP and PolyMet; this information should be included in the SDEIS for public review. The Barr report provides the actual HQs, rather than just saying "they exceed 1". The SDEIS should state clearly that in one case, the existing HQ equals 46.2, which is 46 times as high as the number where action is recommended.

The Barr report also states that "the existing health risk under Scenario 1 and 2 to subsistence/tribal and subsistence anglers eating three pounds or more per week of fish from these lakes would be significantly higher – up to fifteen times the EPA assumed safe risk intake level for a pregnant mother or child under the age of 15". While the incremental risk from the project may be small, the existing risk is large and has not yet been addressed through a total maximum daily load (TMDL) or other reduction program. Table 5 and Figure 9 from the Barr report should be included to give the public a clear idea of the existing condition of the local waters and why the tribes believe that no additional mercury should be added at this time. The SDEIS does not provide any rationale for more mercury to be added to a system that is already so high in mercury, but rather only suggests that the TMDL should take care of this.

Mercury is potent neurotoxin, with the primary human and wildlife route of exposure through consumption of fish. The Embarrass River, Wyman Creek, Whiteface Reservoir, Stony Creek, West Two River, numerous lakes, and the entire St. Louis River all have fish consumption advisories in place for recreational fishing. These advisories do not consider subsistence fishing. Mercury concentrations in fish from these impaired waters will require additional load reductions beyond the emissions reductions required by the statewide mercury TMDL.

Mercury levels in Lake Superior lake trout remain higher than the other Great Lakes, despite significant reductions in the amount of mercury being released from sources around the lake. The largest source of mercury from within the Lake Superior basin is the mining sector, at 63% of total emissions.[5] There has not been significant "ground-truthing" of mercury deposition rates that were used in the modeling assessment. Tribal cooperating agencies note that no studies have been conducted within this region of active mining to determine why fish tissue mercury concentrations are so high if the local sources mainly emit 'non-locally polluting' forms of mercury.

[5] Lake Superior Lakewide Management Plan Annual Report 2012, Catalogue No.: En161-9/2012E-PDF

A 2011 Minnesota Department of Health study[6] of infants in the Lake Superior basin found that 1 in 10 infants are born with unsafe mercury levels in blood. Blood spot mercury concentrations in infants from Minnesota were significantly higher than infants born in the Lake Superior basin in Wisconsin and Michigan.

Increased sulfate concentrations increase bioaccumulation of mercury. Additionally, mercury loadings to surface waters from the project is expected to increase from removing peat and storing peat in the overburden storage layout area without a cover or liner. Stormwater run-off containing concentrations of mercury that exceed MN WQS have been well documented (Aitkin AgriPeat). The Laskin Energy Center NPDES permit MN000990-SD-2 has a permit limit of 19.1 ng/l[7], even though the aquatic life WQS for the Lake Superior basin is 1.3 ng/l. Other existing permitted facilities contribute mercury loadings to the Partridge and Embarrass Rivers, in addition to the local atmospheric deposition (Figures 11, 12).

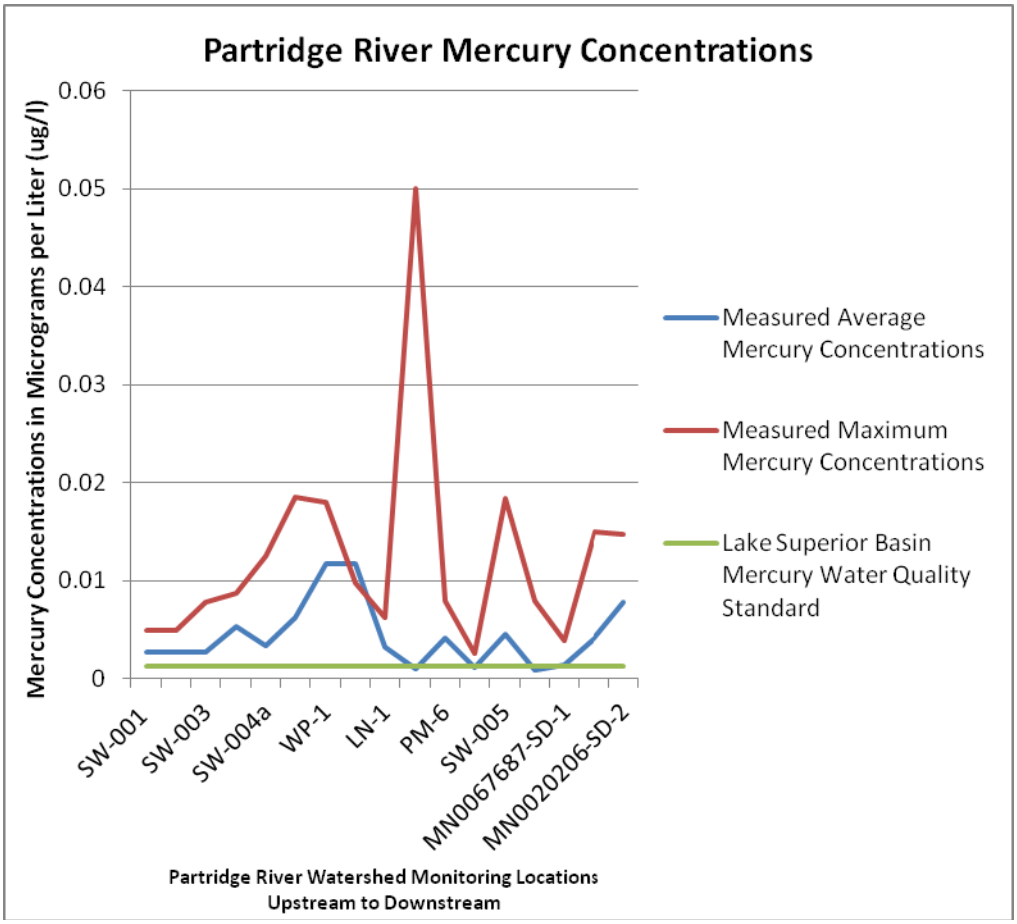

Figure 11. Partridge River Mercury Concentrations

[6] McCann, P. (2011). *Mercury Levels in Blood from Newborns in the Lake Superior Basin* (Minnesota Department of Health: Environmental Health, pp. 181)

[7] MPCA DMR data for NPDES permit MN0000990-SD-2 2000-2013.

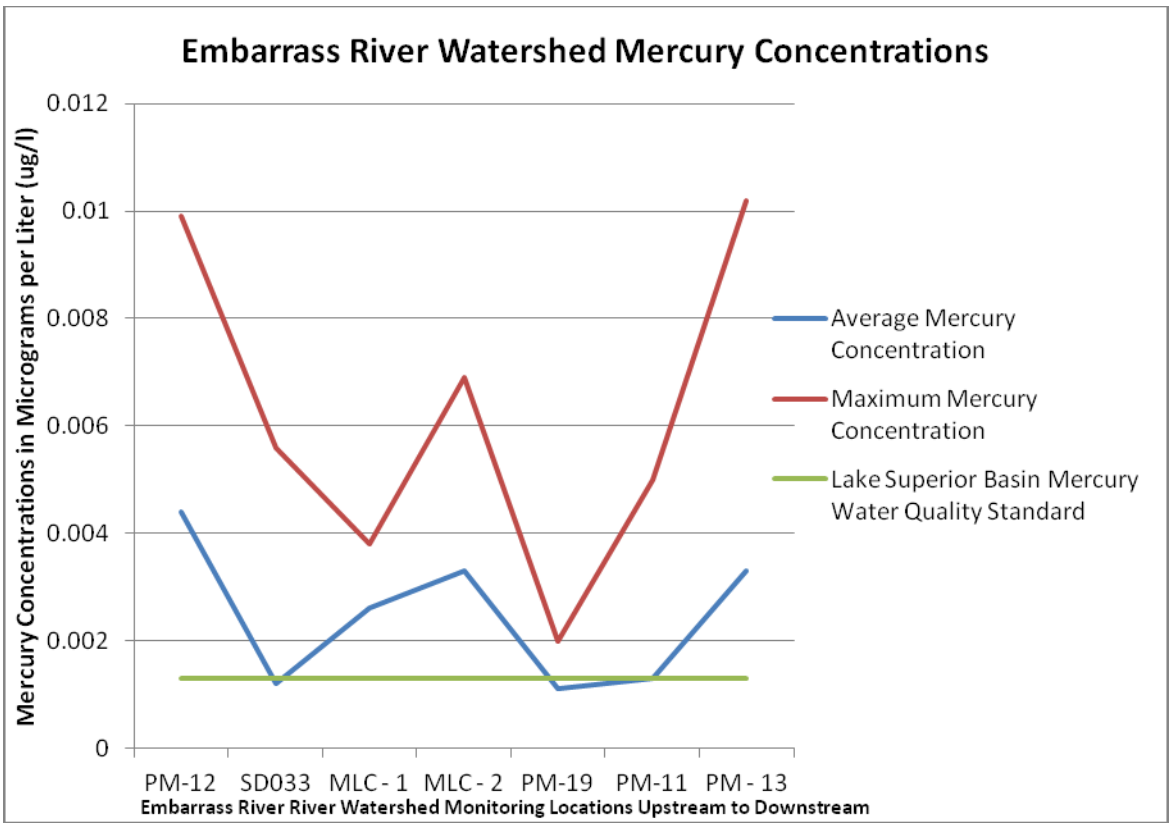

Figure 12. Embarrass River Mercury Concentrations.

Cumulative effects associated with mercury deposition and increased mercury methylation (mediated by increased sulfate loading and hydrologic alteration of peatlands) therefore extend from the plant site down the Embarrass River to the St. Louis River estuary. Additional analyses of predicted mercury impacts from the NorthMet Project Proposed Action have been provided by GLIFWC[8].

Sulfate

From the preliminary SDEIS: "Sulfate concentrations increase to an average of approximately 150 mg/L downstream of the confluence with Second Creek at the County Road 110 bridge (Mesabi Nugget monitoring location MNSW12). The wild rice surveys found sulfate concentrations as high as 289 mg/L below Second Creek during a relatively dry period. The baseline sulfate concentrations found in the Partridge River reflect the effects of discharges from existing activities within the watershed. The NorthMet sulfate load to the Partridge River would total an average of about 41 kg/d, which represents a 0.1 percent

[8] Great Lakes Indian Fish and Wildlife Commission (GLIFWC) Comments Related to Mercury on the "Northmet Mining Project and Land Exchange: Preliminary Supplemental Draft Environmental Impact Statement"

increase over existing loads. Therefore, the NorthMet Project Proposed Action should not adversely affect downstream waters that support the production of wild rice."

Sulfate concentrations in Trimble Creek, the Embarrass River, and the Partridge River currently exceed the wild rice standard of 10 mg/l. The drinking water standard and the cold water fisheries standard for sulfate is 250 mg/l. Discharge from Area Pit 5 near the proposed PolyMet tailings basin has measured sulfate concentrations that range from 170 to 2520 mg/l, averaging 1,083 mg/l between 2001 and 2013[9]. Sulfate concentrations measured in the discharge from the Peter Mitchell Pit to the upper Partridge River for NPDES permit MN0046981-SD-9 ranged from 14-37 mg/l. Sulfate concentrations measured in the discharge from the LTV Tailings basin to Second Creek for NPDES permit MN0042536-SD026 ranged from 118-360 mg/l in the period between 2008 - 2013[10]. Sulfate impaired wild rice waters, for the first time ever, will be included in the MPCA impaired waters list in 2014. The Bands believe that the Embarrass River, Second Creek, the Partridge River, Dunka River, and Bobs Bay of Birch Lake should be included on that list. In addition, the Swan River, Swan Lake, Sand River and the Twin Lakes (Sandy and Little Sandy Lakes, adjacent to the US Steel Minntac tailings basin) are all impaired wild rice waters due to concentrations of sulfate that exceed the MN wild rice sulfate standard.

The wild rice sulfate WQS is exceeded at almost every point where data is available in the Embarrass River watershed (Figure 12), and the drinking water standard is exceeded at half of the monitoring locations. In the Partridge River watershed, the wild rice sulfate WQS is exceeded at fourteen of seventeen locations (Figure 13). And, the sulfate drinking water standard is exceeded at two locations in the Partridge river watershed. The NorthMet Project Proposed Action will contribute additional sulfate to the groundwater from tailings basin water that is not captured and treated, water that seeps through fractures in the mine pit walls once the pit has filled with water, and stockpile infiltration and run-off.

[9] MPCA DMR data for NPDES permit MN0042536-SD033 2001 -2013.
[10] MPCA DMR data for NPDES permit MN0042536-SD026 2008 -2013.

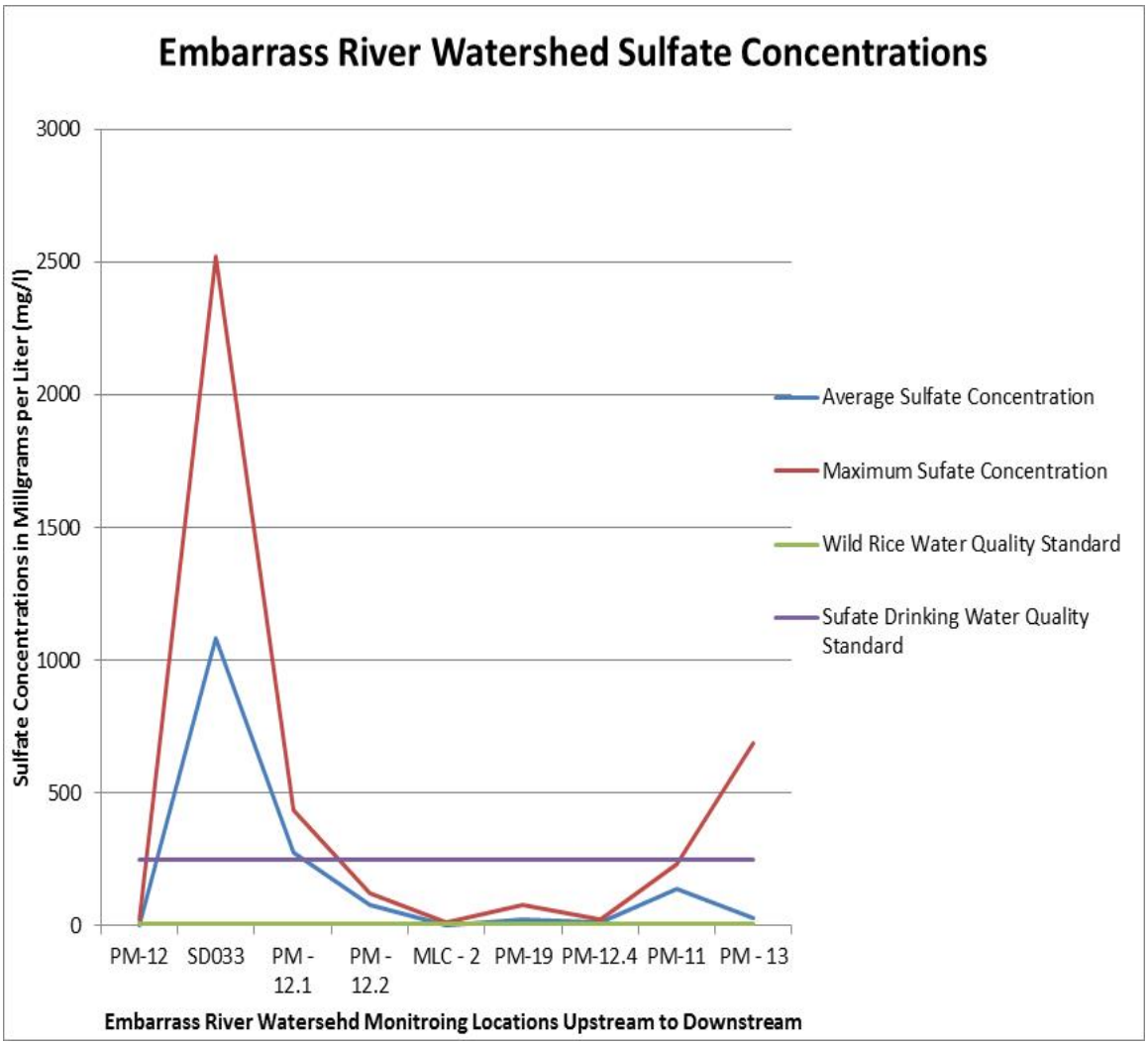

Figure 12. Embarrass River Watershed Sulfate Concentrations.

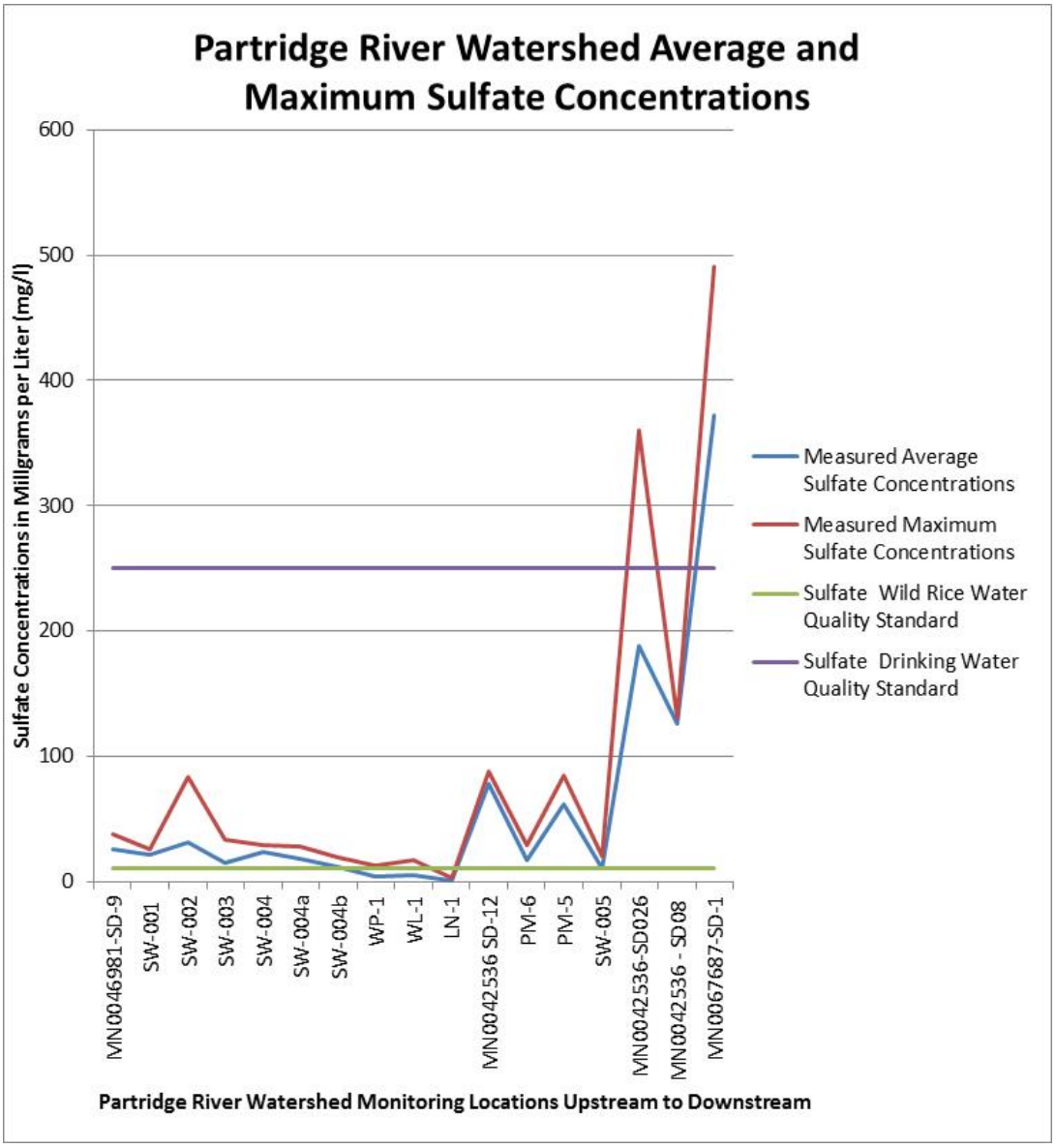

Figure 13. Partridge River Watershed Sulfate Concentrations.

Tribal staff did additional analysis of sulfate concentrations throughout the St. Louis River watershed. Analysis of sulfate concentrations downstream of mine discharge sites indicated that sulfate concentrations were highest nearest to mine discharge sites, and tended to only gradually decrease downstream of mine discharge sites. Linear regressions demonstrated that mean sulfate was significantly negatively related to distance across all sample sites ($P < 0.01$, $R^2 = 0.14$, $n = 92$) and within the Saint Louis River system ($P < 0.01$, $R^2 = 0.17$, $n = 73$; Figure 14). This analysis included stream and river monitoring only (not lakes).

The regression suggests that sulfate concentrations could drop to less than 10 mg/L only 170 km (105 mi) downstream of the nearest upstream mine discharge site (Figure 15).

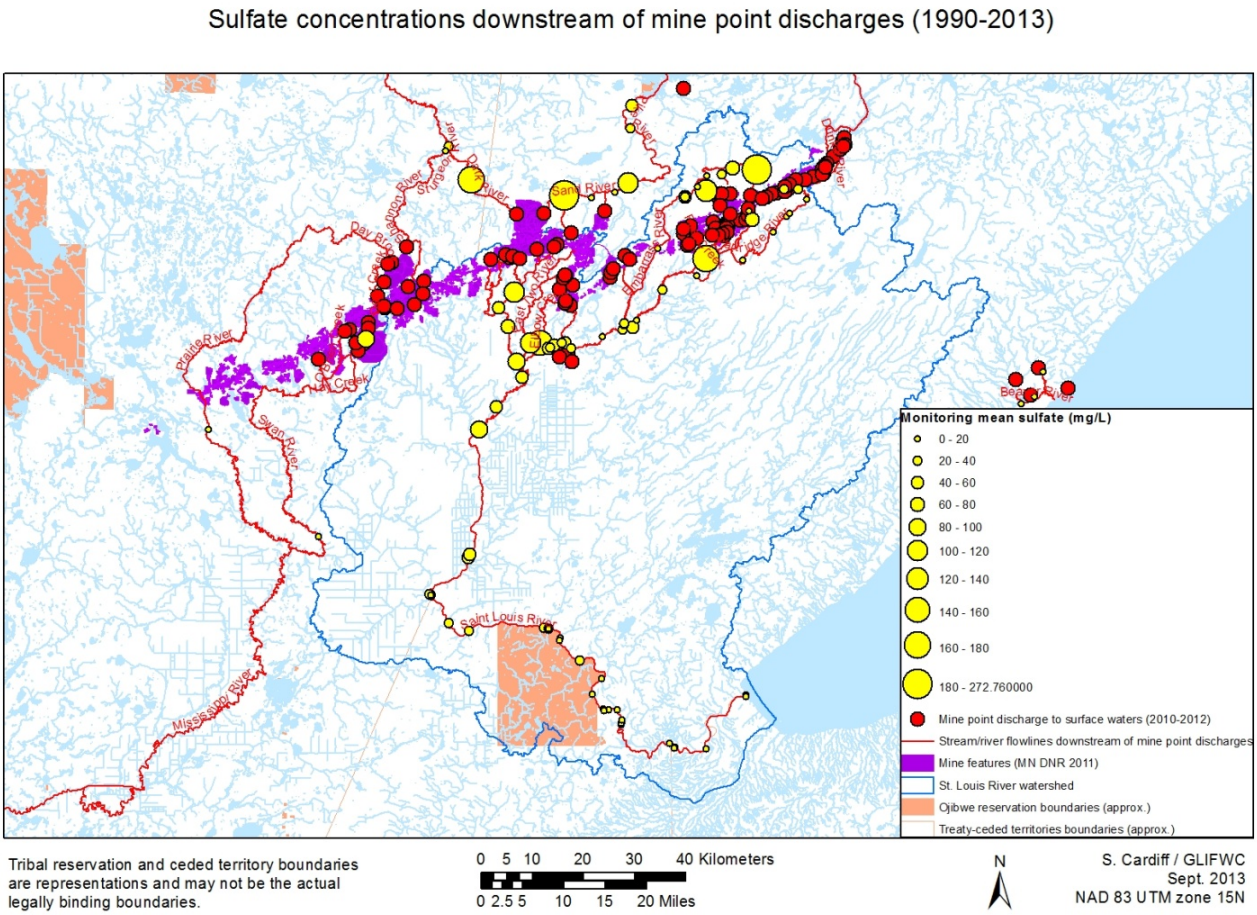

Figure 14. Mean sulfate concentrations at monitoring stations downstream of mine point discharges was inversely related to distance downstream from the discharge sites.

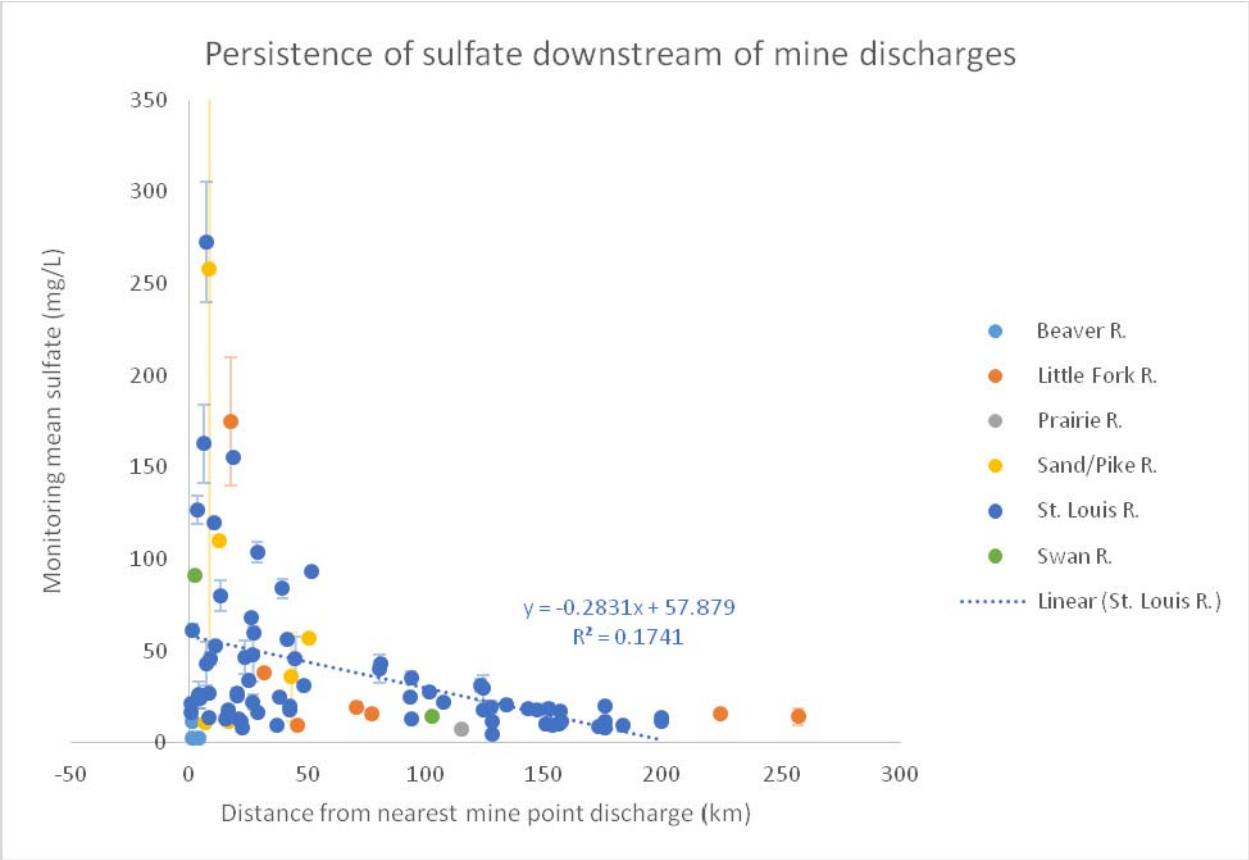

Figure 15. Linear regression indicated that mean sulfate (±1 SE) was significantly related to distance of the monitoring location downstream of the nearest mine discharge in the St. Louis River with highest sulfate concentrations nearest to mine discharges and decreasing relatively gradually downstream ($P < 0.01$, $R^2 = 0.17$, $n = 73$).

Ground water quality

From the PSDEIS: "Neither the Scoping Decision Document nor the SDEIS identified potential cumulative effects on groundwater. Although the NorthMet Project Proposed Action would affect groundwater levels, this effect would be very limited geographically and temporally (e.g., groundwater levels would be restored once pit dewatering ceases) and not subject to any off-site cumulative effects. The effects of mine dewatering are considered in terms of effects on surface water flows."

The cumulative effect of blasting ore, or vibration, has not been mentioned in the SDEIS, or even considered. It is evident that effect of blasting ore will increase fractures in the Virginia Formation and the Duluth Complex in the vicinity of the Project[11]. And, that

[11] ISEE Presentation Wesley L. Bender, Understanding Blast Vibration and Airblast, their Causes, and their Damage Potential (updated 2009), available at http://www.iseegoldenwest.org/Blast%20Effects.pdf (last visited 9/5/13)

fractures have already hydrologically connected the Biwabik Iron Formation with the Virginia Formation and Duluth Complex, as a result of blasting in the Peter Mitchell Pit. The increase in fractures from blasting has likely hydrologically connected some of the known and inferred faults in the vicinity of the Peter Mitchell Pit, too. And, there will be a cumulative impact on water quality and water quantity resulting from blasting ore in the proposed PolyMet mine pit because the fractures from blasting in the Peter Mitchell Pit will overlap fracturing resulting from blasting in the PolyMet Pit. The area where most of the new fractures are likely to be created lie within the Virginia formation between the two pits. The Virginia Formation is known to have the highest sulfur content of the three bedrock formations found within the area between the proposed PolyMet mine pit and the Peter Mitchell mine pit, and the second highest transmissivity rate.

The PolyMet SDEIS section on vibration (Chapter 5.2.8) does not discuss impacts of blasting in creation of fractures. However, fractures created by blasting and shoveling ore would extend far beyond the pit walls. Section 5.2.8-9 **Vibration** of the preliminary SDEIS states: "permanent ground displacement occurs close to the blast. For heavily confined rocks, ground vibrations of 25.4 mm/sec will occur as far away as 1,581 meters. For free face average rock, ground vibrations of 25.4 mm/sec will occur as far away as 627 meters." "Permanent ground displacement" is a discreet way to refer to the creation of new fractures without having to discuss the resulting increase in groundwater flow and connectivity to surface waters. In fact, all of the PolyMet predictions regarding discharge from the mine pits and waste rock piles, including the more reactive waste rock piles and the ore surge pile as well as the unlined permanent Category 1 waste rock pile, are made without considering the effects of fractures on discharge to groundwater and surface water.

Excerpts from three reports produced for the PolyMet project regarding groundwater/surface water interactions include the following:

"Groundwater samples were collected from three of the deep borings at the site. Two of the samples were collected from 6-in diameter exploratory boreholes. The remaining sample was collected from the water supply well (Unique Well Number 717972). This well is open to both the Duluth Complex (20-150 feet below ground surface) and the Virginia Formation (150-200 feet below ground surface)….The water sample from well MW-05-02 exceeded criteria for ammonia (240 ug/l), pH (10),aluminum (322 ug/l), and copper (11.2 ug/l). The sample from MW-05-08 exceeded criteria for aluminum (1,040 ug/l), copper (10 ug/l), and mercury (0.0053 ug/L). The sample from MW-05-09 exceeded criteria for aluminum (4,640 ug/L), chromium (28.6 ug/l), cobalt (5.4 ug/l), copper (72.2 ug/l), lead (5.6 ug/l), and mercury (0.0181 ug/l)…. The presence of ammonia in the deep boreholes may indicate that the water in the borehole came from the shallow surficial deposits. Ammonia is not typically found in deep bedrock systems but is common in wetland environments."[12]

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[12] Hydrogeologic Investigation- PolyMet NorthMet Mine Site report RS-02. Barr Engineering. 2006

"The water samples from wells P-2 and P-4 exceeded the nitrogen (ammonia as N) criteria (270 ug/L and 110 ug/L respectively). The presence of ammonia nitrogen in the samples likely indicates that there is a hydraulic connection between the bedrock aquifer and the surficial aquifer; however, the nature of this connection cannot be determined at this time."[13]

"The samples from pumping well P-2 all contained measurable tritium, indicating that at least a portion of the source water is post-1952 water."[14]

The Peter Mitchell Pit lies approximately one mile north of the proposed PolyMet mine pit. Taconite production began in 1955 at the Peter Mitchell Pit. Based on the review of the Peter Mitchell NPDES permit MN0046981 at various discharge locations, unionized ammonia nitrogen has exceeded permit limits on numerous occasions[15]. Unionized ammonia nitrogen is used to blast rock. Though PolyMet did not determine what the source unionized ammonia or tritium found in the deep boreholes was, it seems likely that because of the Peter Mitchell Pit's close proximity to the proposed PolyMet mine site, the Peter Mitchell Pit is the source of contamination. The approximate fifty- year travel time of the pollutants found in the P-2 bore hole from the Peter Mitchell Pit were not used to estimate travel time for pollutants leaving the PolyMet mine pit and reaching the Partridge River, or even to calibrate the model.

In fact, bedrock groundwater flow paths have not been determined using standard methods for hydrogeologic investigations. Instead, a model has been developed that uses extremely low baseflows in the Partridge River in order to suggest that peak concentrations of contaminants will not reach surface water features for hundreds or even thousands of years. Even though data collected for PolyMet in the three hydrologic investigations between 2006 and 2007 demonstrate a strong connection between boreholes in the bedrock aquifer and the surficial aquifer and surface water (including wetlands). This information, and the results from winter flow monitoring have not been incorporated into the PolyMet project projections for surface and groundwater quality and quantity.

Groundwater contamination from the previous mining activities is still an issue near the LTV tailings basin and mine pits more than twenty years after operations have ceased. The above evidence suggests that, whatever the degree of fractures now existing in the rock, blasting at the levels proposed by PolyMet will create damage to rock masses and rock fractures over an extensive area, including the entire mine site and extensive adjacent wetlands areas (Figure 16). This evidence requires that the impacts of fractures on propagation of pollutants from all mine sources be analyzed in detail and calls into question PolyMet's claims that discharge of sulfates and toxic metals from the mine site will not impact wetlands and exceed water quality standards. The impacts of vibrations and airblast on slope stability of waste rock piles are not discussed in the SDEIS either.

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[13] Hydrogeologic Investigation – Phase II PolyMet NorthMet Mine Site RS-10. Barr Engineering. 2006

[14] RS10A –Hydrogeological – Drill Hole Monitoring and Data Collection – Phase 3. PolyMet Mining, Inc. March 2007.

[15] MPCA DMR data for MN0046981 from website "What's in My Neighborhood" (http://www.pca.state.mn.us/index.php/data/wimn-whats-in-my-neighborhood/whats-in-my-neighborhood-text-search.html) (last visited 9/4/13)

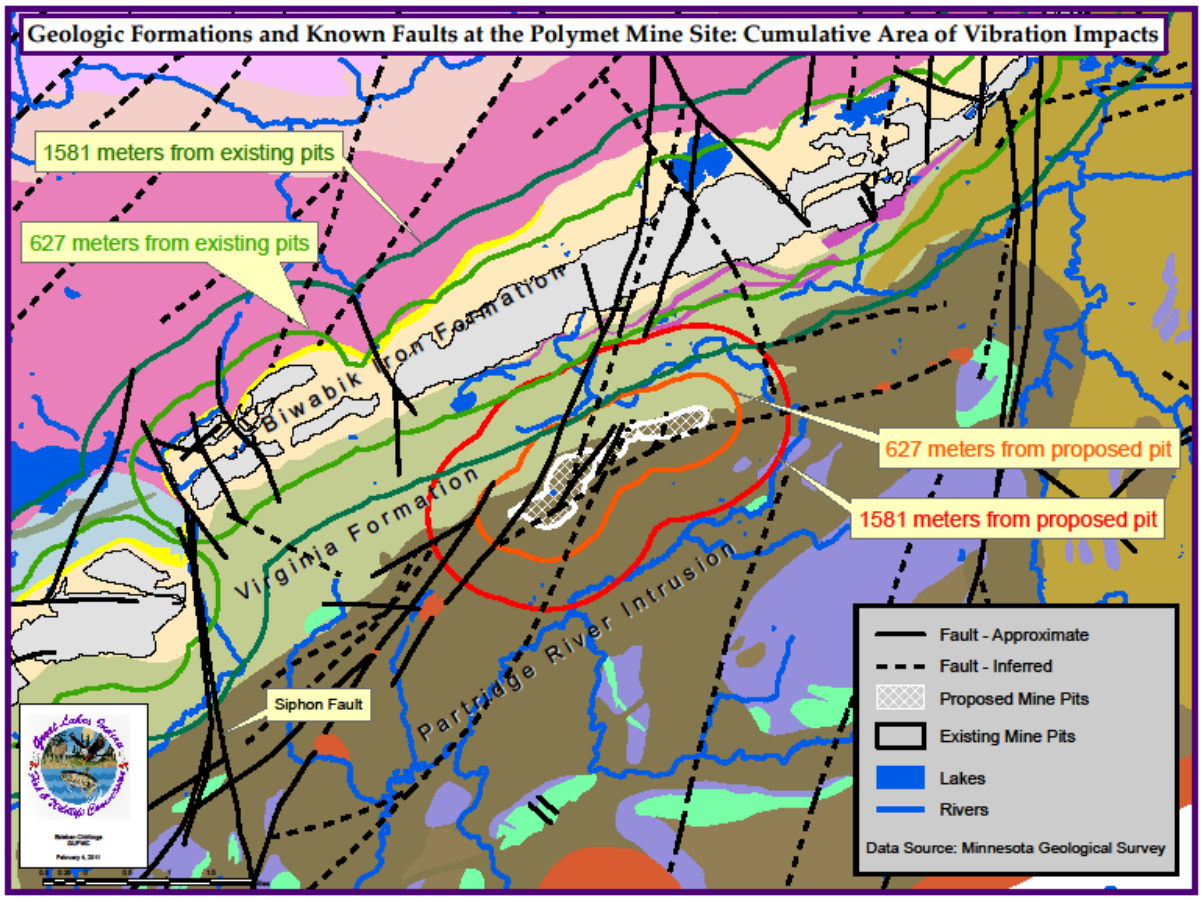

Figure 16. Cumulative Area of Vibration Impacts.

Impacts to water quality in the immediate vicinity of the project area from mining activities include:

<u>Peter Mitchell Pit:</u> Expansion of the Peter Mitchell Pit to the South towards the proposed PolyMet project and the in-pit disposal of Virginia Formation waste rock.

<u>Former LTV Site (Cliffs)</u>: Dunka Pit, Area Pit 5, Tailings Basin, Area Pit 2, Area Pit 3

<u>Mesabi Nugget:</u> Area Pit 1, Area Pit 9, Area Pit 9S, Area Pit 6, Area Pit 2WX, Stevens Pit

Considering there are domestic wells south of the property, and pit 2WX will likely overflow to surface water features when mining has ceased, contaminant transport models for surface and groundwater need to be developed if pit 2WX or pit 6 are mined due to the presence of the Virginia Formation and the Aurora Sill.

Wetlands

The co-lead agencies confined their cumulative effects analysis for wetlands to the Partridge and Embarrass River watersheds, simply quantifying the wetland acreage change from pre-settlement conditions to the present, then projecting the estimated acres in the future based upon impacts due to the NorthMet Proposed Project. The co-lead agencies, relying upon the XP-SWMM model developed for the Partridge River, conclude that "changes in annual flow (and therefore stage) in the Partridge River would be within the naturally occurring annual variation for the Partridge River. Therefore, no potential indirect cumulative wetland effects are identified for the wetlands abutting the Partridge River.

The PSDEIS states: "The St. Louis River is located downstream of the Partridge River. Effects on flows (and, by extension, water surface elevations) generated by the NorthMet Proposed Action are anticipated to be less than those estimated for the Partridge River and within the natural variation of flow within the St. Louis River. Therefore, no potential indirect cumulative wetland effects are identified for the wetlands within the St. Louis River below the ordinary high water mark from its confluence with Embarrass River to Lake Superior."

The tribal cooperating agencies take a different approach to quantifying cumulative wetland impacts for the NorthMet Proposed Action. Referencing the alternative indirect wetland impacts analysis provided by GLIFWC for the PolyMet mine site, tribal cooperating agencies believe that cumulative wetland impacts within the St. Louis River watershed should be the scale of the analysis, and that direct and indirect wetland impacts due to hydrologic modification (ditching) should be included (Figure 17). There are 1,387,630 acres of wetlands in the St. Louis River watershed, with 1732 individual wetlands impacted by ditching, totaling 198,989 acres. Ditching has occurred in 14.3% of the wetlands in the watershed. Approximately 50% of the subwatersheds have had some degree of impact from ditching, while some have experienced ditching in nearly 100% of their wetlands. Clearly, this has a profound impact to the connected surface waters, and impacts to specific stream reaches should be assessed.

There are direct impacts to wetlands that occurred when the ditches were constructed. Those impacts depend on the length and width of each ditch. The second, and larger, set of impacts is indirect. The ditches have converted some percentage of the wetlands to upland, and changed the functions and values of another percentage of wetlands.

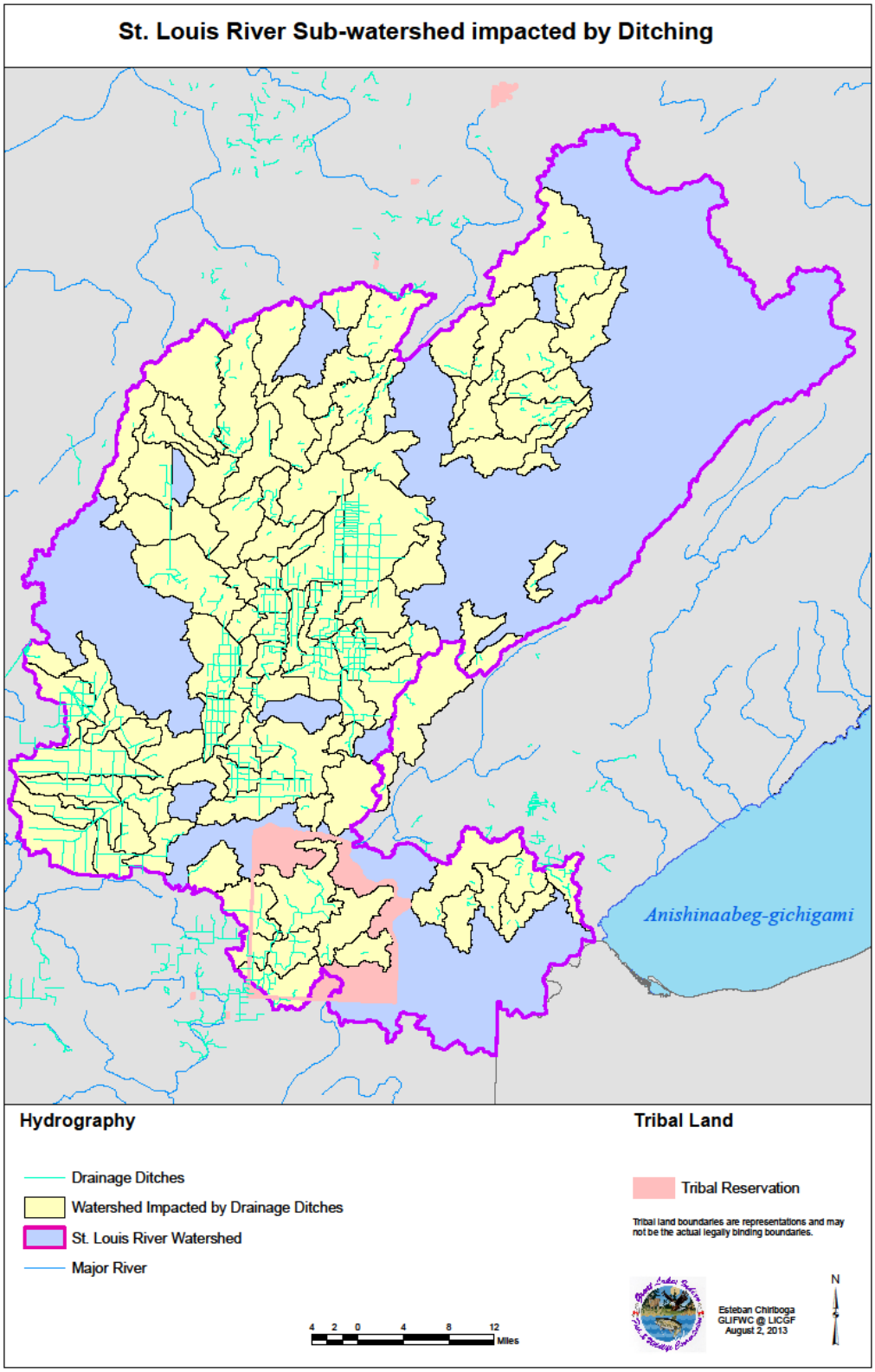
St. Louis River Sub-watershed impacted by Ditching
Anishinaabeg-gichigami
Hydrography
Drainage Ditches
Watershed Impacted by Drainage Ditches
St. Louis River Watershed
Major River
4 2 0 4 8 12
Miles
Tribal Land
Tribal Reservation
Tribal land boundaries are representations and may not be the actual legally binding boundaries.
Esteban Chiriboga
GLIFWC @ LICGF
August 2, 2013
N

Figure 17. St. Louis River Watershed Hydrologic Impacts from Ditching

Tens of thousands of acres of high quality wetlands within the St. Louis River watershed have been entirely and permanently lost to historic and current mining operations, prior to regulatory requirements for mitigation. Since the initiation of state and federal wetland mitigation requirements for permitting wetland dredge and fill activities, most mitigation has taken place outside the St. Louis River watershed and has not replaced the wetland types and functions that have been lost. Nearly 3000 additional wetland acres will be directly impacted under several reasonably foreseeable mining projects within the watershed (Figure 18).

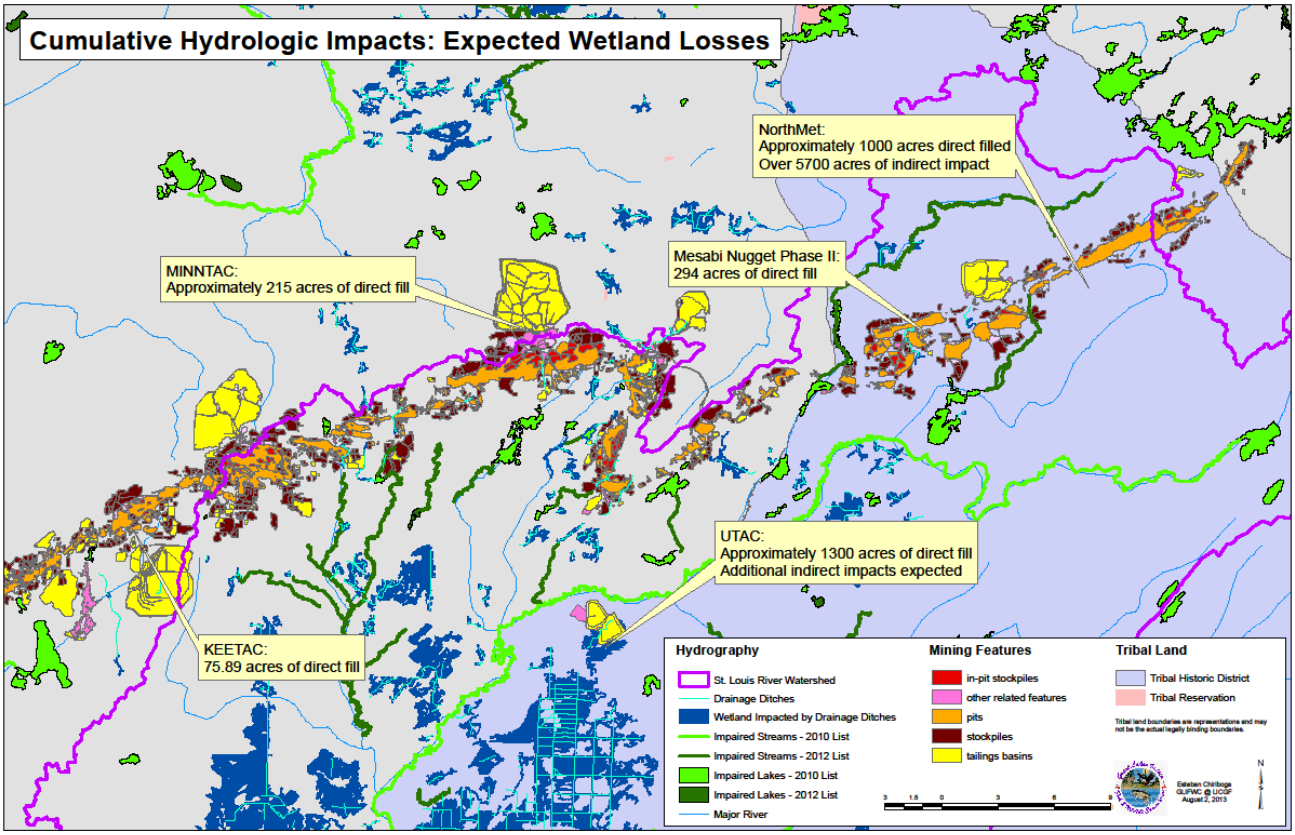

Figure 18. Cumulative Hydrologic Impacts: Expected Wetland Losses within the St. Louis River watershed

When all impacts to water quality, aquatic communities, wetlands, and hydrology are considered in a comprehensive manner, the cumulative effects on water resources are extensive (Figure 19).

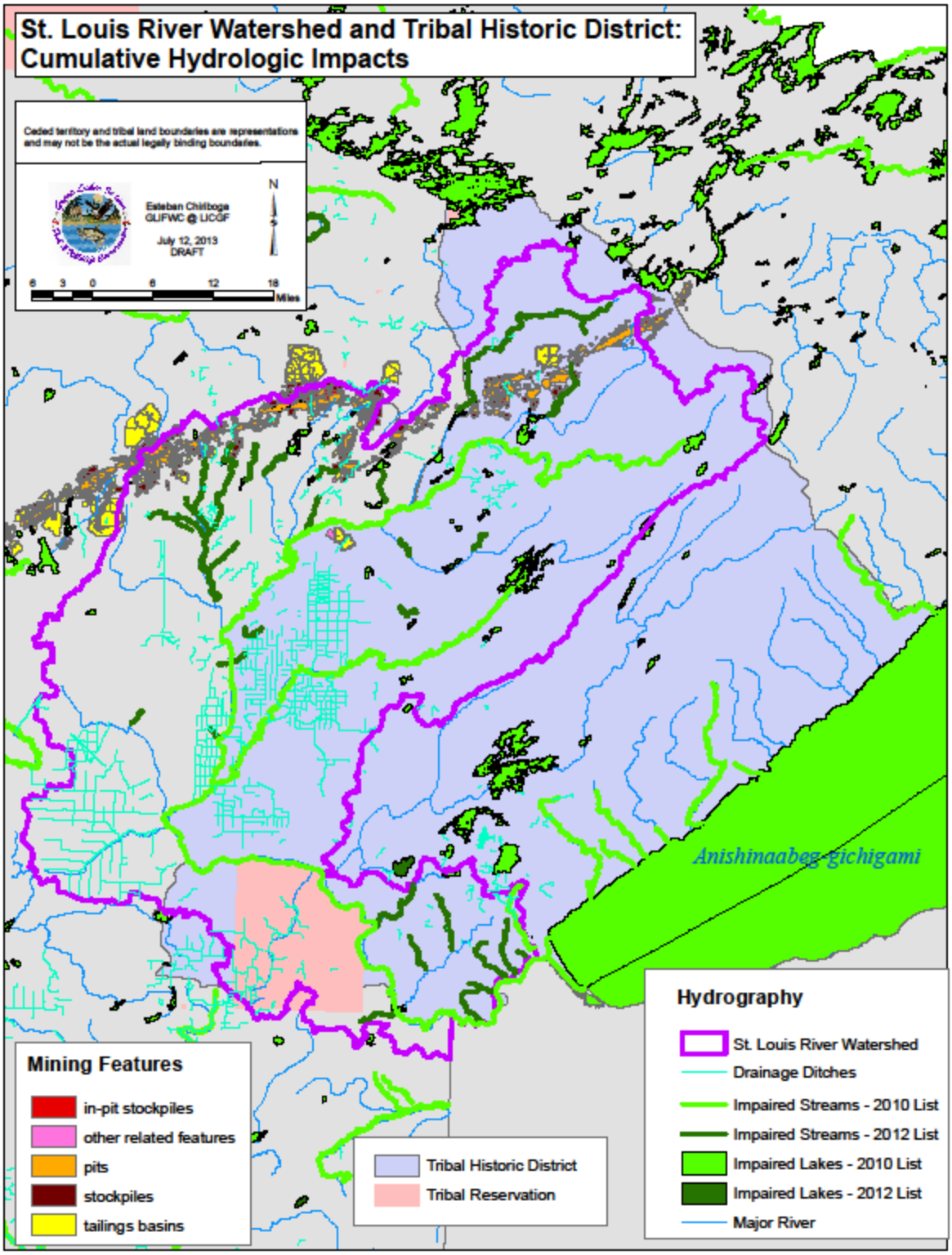

Figure 19. St. Louis River Watershed and Tribal Historic District: Cumulative Hydrologic Impacts.

Vegetation

The co-lead agencies evaluated cumulative effects on vegetation within the portion of the Mesabi Iron Range encompassed by the Nashwauk Uplands and Laurentian Uplands ecological subsections. From the preliminary SDEIS:

"Minnesota Biological Survey
The MDNR operates the MBS program, which includes spatial information from survey reports on native plant communities and rare species. Sites of Biodiversity Significance are designated and ranked by the MDNR based on the environmental conditions present, including native plant communities, rare species, and unique habitat. The MBS utilizes a four-tiered ranking system: Outstanding, High, Moderate, and Below (from highest to lowest). Sites of High Biodiversity Significance contain very good-quality occurrences of the rarest species, high-quality examples of rare native plant communities, and/or important functional landscapes (MDNR 2008a). The entire 3014.5-acre Mine Site has been characterized by the MBS as various Sites of High Biodiversity Significance due to the presence of the One Hundred Mile Swamp site, which covers 15 percent of the Mine Site, and the Upper Partridge River site, which is 85 percent of the Mine Site (MDNR 2008a)."

The tribal cooperating agencies believe a more relevant spatial reference for cumulative effects to vegetation would include the One Hundred Mile Swamp and the Headwaters Site. Additionally, the "Contributing Past, Present and Reasonably Foreseeable Actions should include the extensive mineral exploration taking place within the headwaters of the St. Louis River. The degradation and destruction of this landscape and the vegetation that provides forage and habitat for culturally important species, as well as sustenance and medicine for band members, has been a cumulative impact to cultural and natural resources since the signing of the treaty.

From Danielson and Gilbert (2002):
"The Ojibwe gather over 350 wild plant species for food, utilitarian, medicinal, ceremonial, and commercial purposes (Meeker, Elias and Heim 1993; Densmore 1928). Examples include sweet grass (*wiingashk*), white sage (*mashkiki*), basswood (*wiigob*), yellow birch (*wiinizik*), paper birch (*wiigwaas*), wintergreen (*wiinisiibag*) red-osier dogwood (*miskoobimizh*), bearberry (*miskwaabiimag*), wild sarsaparilla (*waaboozojiibik*), white water lily (*akandamoo*), bluebead lily (*odotaagaans*), Canada mayflower (*agongosimin*), swamp milkweed (*bagizowin*), wood lily (*mashkodepin*), rue anemone (*biimaakwad*), wild ginger (*namepin*), blue cohosh (*beshigojiibik*) bloodroot (*meskwiijiibikak*), black ash (*aagimaak*), yarrow (*ajidamoowaanow*), wild rose (*oginiiminagaawanzh*), Labrador tea (*waabashkikiibag*), sweet flag (*wiikenh*), wild black current (*amikomin*), wild blackberry (*odatagaagominagaawanzh*), blueberry (*miinagaawanzh*), nannyberry (*aditemin*), and highbush cranberry (*annibiminagaawashk*). Tribal members may gather wild plants, as guaranteed by their treaty rights, on all public lands within the ceded territories.

The Ojibwe have been "managing" (e.g., respecting, observing and utilizing) the land and its resources since time immemorial. However, tribal members seldom use the term "managing." Through the sharing of stories and spiritual beliefs, elders transfer a wide spectrum of skills and information to younger generations. Some scholars refer to this

information as traditional ecological knowledge and wisdom (TEKW). Berkes (1999) defines TEKW as "a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment. TEKW does not reflect a stagnant inventory of information but rather, without disregarding past wisdom, continues to transform through time.

TEKW and contemporary ecosystem management, though not identical, share common characteristics. A report published by the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management states: "Ecosystem management is management driven by explicit goals, executed by policies, protocols, and practices, and made adaptable by monitoring and research base on our best understanding of the ecological interactions and processes necessary to sustain ecosystem composition, structure, and function. In additions, "ecosystem management assumes intergenerational sustainability as a preconditions for management rather than an afterthought" (Christensen et al. 1996). Clearly, shared principles include adaptive management through observation and monitoring and an intergenerational sustainability, including the relationship and dependence of humans and all life on each other.

The tribes remind (these) land managers that, as necessitated by trust responsibility and treaty law, they must ensure the availability and sustainability of wild plant harvest. Irrevocably, the Ojibwe worldview teaches values based on an understanding that humans depend on all other earth beings (Johnston 1976)."

Further documentation of the high quality and ecological function of this landscape is found in *An Evaluation of the Ecological Significance of the Headwaters Site, Northern Superior Uplands Ecological Land Classification System Section; Laurentian Uplands Subsection Lake and St. Louis Counties, Minnesota*, March 2007):

"The Headwaters Site straddles the continental divide, with water from the Site flowing both east through the Great Lakes to the Atlantic Ocean and north to the Arctic Ocean. Paradoxically, the divide runs through a peatland. Although the peatland appears flat, water flows out of it from all sides, forming the ultimate source of rivers that eventually reach two different oceans. The Site is the headwaters of four rivers: Stony River, Dunka River, South Branch Partridge River, and the St. Louis River, which is the second largest tributary to Lake Superior…

The Headwaters Site encompasses vast peatlands on its eastern side, unfragmented upland forests in the west, and broad transition zones between them. Within the Site are two distinct areas, referred to in the document as the "Extensive Peatlands" and the "Big Lake Area," which are linked hydrologically as part of the Upper St. Louis River watershed. The Extensive Peatlands area is a mosaic of open and forested wetland communities and includes forested upland islands and peninsulas. The Big Lake Area, in the southwestern quarter of the Site, includes Big Lake and surrounding unfragmented upland forest interspersed with small wetlands.

The Headwaters Site is unique in northeastern Minnesota in several ways. The size and complexity of the peatlands in the Extensive Peatlands are unmatched in the Northern Superior Uplands Ecological Land Classification System (ECS) Section. The Sand Lake Peatland Scientific and Natural Area (SNA), established by the Wetlands Conservation Act of 1991, protects one of the 15 most significant peatlands in the state, and it is by far the largest SNA in the Section (MNDNR 1984).

The Nature Conservancy's (TNC) Superior Mixed Forest (SMF) Ecoregion Plan identifies the Sand Lake/Seven Beavers (SL7B) conservation area, including the entire Headwaters Site, as one of 51 conservation areas in the Ecoregion that best represent the ecosystems and species of the Ecoregion, and serve as a blueprint for conservation action…According to the SMF Ecoregion Plan, these conservation areas are the best opportunities for conserving the full diversity of terrestrial and aquatic ecosystems and globally rare or declining species. The SMF Ecoregion Plan identifies these areas as critical places for conserving biodiversity…and outlines the threats to conservation and conservation targets for these areas…recognizing that more detailed site planning is needed to address how to implement conservation efforts…

The Minnesota Pollution Control Agency has ranked the Upper St. Louis River watershed in the second highest category in the Lake Superior Basin for watershed integrity (Minnesota Pollution Control Agency 2003). The Headwaters Site is among the highest quality areas within the watershed. The upland forest surrounding Big Lake is among the largest, if not the largest, unfragmented, predominantly upland forest in the North Shore Highlands, Toimi Uplands, and Laurentian Uplands (NTL) ECS Subsections. The upland forest area covers 7,920 acres (including 788-acre Big Lake). This high-quality, fire-dependent forest has not been logged in recent decades, except for two stands totaling 140 acres, along the northern edge of the Site.

Covering an area roughly 11 to 12 miles (from northeast to southwest) by 7 to 8 miles (from northwest to southeast), the Headwaters Site is a mosaic of high-quality native plant communities that have functioned under relatively undisturbed conditions since the nineteenth and early twentieth century, when parts of the Site were logged and then burned by wildfires. A corridor containing a railroad grade and power line crosses this vast area, representing the only major permanent conversion of the natural landscape. Minnesota County Biological Survey (MCBS) sites bordering about two-thirds of the Site's boundary have been assigned High or Moderate statewide Biodiversity Significance (Figure 4, page 85). The lack of roads, absence of recent large-scale logging, and large size of the Site allow for natural functioning of ecological processes. These processes include disturbances such as wind, fire, and flooding, as well as plant species competition, nutrient cycling, and hydrology. Natural landscape patterns, such as patch size of the various plant communities, have not been altered, in comparison with most other parts of northeastern Minnesota (White and Host 2003). Minimal recent human disturbance also results in a landscape with very few populations of exotic or invasive species.

The predominant upland forest native plant community in the Big Lake Area is Aspen – Birch Forest [FDn43b], with inclusions of Upland White Cedar Forest [FDn43c] and White Pine – Red Pine Forest [FDn43a] (Figure 5, page 87). Isolated wetlands within the Big Lake

Area's upland forest support a variety of native plant communities, including Northern Poor Conifer Swamp [APn81], Northern Rich Spruce Swamp (Basin) [FPn62], White Cedar Swamp (FPn63a), Northern Alder Swamp [FPn73a], and Black Ash - Conifer Swamp [WFn64a]…

The Extensive Peatlands are composed of a complex of native plant communities, including Northern Cedar Swamp [FPn63]; Northern Rich Spruce Swamp (Basin) [FPn62]; Northern Alder Swamp [FPn73]; Northern Rich Tamarack Swamp (Water Track) [FPn81]; Northern Rich Fen (Water Track) [OPn91]; Northern Rich Fen (Basin) [OPn92]; Northern Shrub Shore Fen [OPn81]; Northern Spruce Bog [APn80]; Northern Poor Conifer Swamp [APn81]; Northern Open Bog [APn90]; and Northern Poor Fen [APn91]. The many upland islands in this portion of the Site provide additional native plant community diversity, supporting community types in the Northern Dry-Mesic Mixed Woodland [FDn33] and White Pine-Red Pine Forest [FDn43] classes…

The Headwaters Site supports healthy known populations of eight state-listed plant species, all of which are listed as Special Concern (SPC) in Minnesota: coastal sedge *(Carex exilis)*, Michaux's sedge *(Carex michauxiana)*, English sundew *(Drosera anglica)*, bog rush *(Juncus stygius)*, small green wood orchid *(Platanthera clavellata)*, Lapland buttercup *(Ranunculus lapponicus)*, sooty-colored beak rush *(Rhynchospora fusca)*, pedicelled woolgrass *(Scirpus cyperinus/S. pedicellatus)*, and Torrey's mannagrass *(Puccinellia pallida)*...The unfragmented complex of high-quality native plant communities within and across the Site's landforms provide excellent habitat for a wide variety of animal species distinctive of the landscape, including moose, gray wolf, sandhill cranes, American bitterns, boreal and great gray owls, and numerous amphibians, butterflies, and small mammals.

In 2005 and 2006 the Minnesota County Biological Survey of the MN DNR conducted rare plant and native plant community fieldwork, mapped the native plant communities and completed this Ecological Evaluation of the Headwaters Site. Based on the natural features and conditions revealed through this recent work and that of others since the 1980s, MCBS recommends the primary management objective for the Headwaters Site be to protect, enhance, or restore ecological processes and native plant community composition and structure. In accordance with this objective, the site or portions of the site may be identified by landowners or land management agencies for conservation activities such as special vegetation management, including ecologically based silviculture and forest development activities, or for designation as a park (city, county, state, or private), research natural area, non-motorized recreation area, scientific and natural area, or other reserve. This Ecological Evaluation has been written to characterize the ecological significance of the MCBS Site as a whole and to serve as a guide for conservation action by the various landowners.

MANAGEMENT RECOMMENDATIONS

Overview

The Headwaters Site is a large, natural area with features of widely recognized statewide ecological and biological significance. These include:

- one of the 15 most significant peatlands in the state (MN DNR 1984, Wright et al. 1992);
- the largest SNA in the Northern Superior Uplands Section;

- one of the largest, unfragmented, predominantly upland forest patches in the Laurentian Uplands,
- Toimi Uplands, and North Shore Highlands subsections;
- an ecologically functional mosaic of high quality native plant and animal communities;
- a concentration of excellent occurrences of rare species populations;
- support of species with large home ranges;
- six state-designated old-growth stands;
- remote, undeveloped lakes.

The documented condition and quality of the aquatic and vegetation resources within this headwaters region of the St. Louis River watershed meet the resource-based threshold of an Aquatic Resource of National Importance, under the Memorandum of Agreement reached by the EPA and the US Army Corps of Engineers in 1992[16].

Wildlife

The word "moose" does not appear at all in the SDEIS cumulative effects analysis, despite consistent concerns raised by tribal cooperating agency staff to co-lead agency staff during the environmental review process. As of August 19, 2013, moose are now proposed to be listed as a MNDR species of concern.

The tribal profile for the Grand Portage Band, states the unique importance of this species:

"Moose are the primary subsistence species for the Grand Portage Band and define the subsistence culture."
http://www4.nau.edu/tribalclimatechange/tribes/greatlakes_lschippewa.asp

From the Fond du Lac Wildlife Biologist: "In my experience at FDL, moose have always had a loyal core of hunters who pursue moose every year. Primarily for meat, but some for hide, bone and antler related crafts. I think also for the camaraderie, family traditions, etc – same as the rest of us for deer or duck camp. For the last couple of years at least, FDL has been supplying other bands with moose hides for drums.

Until very recently, the demand for moose hunting opportunities at FDL has always been greater than the supply. It's unique among locally hunted or trapped wildlife species that way. As the moose population has rapidly dwindled in the last couple of years, I believe more and more potential moose hunters are deciding it's not worth the effort.

Of all wildlife species, moose has required the most back and forth discussions between staff, legal counsel and the DNR regarding co-management of resources within the 1854 Ceded Territory. This again is a supply and demand issue, and reflects the relatively low density at which moose populate the landscape – even when times were good. -My program invests more effort and money in annual population surveys of moose than any other wildlife species."

[16] Clean Water Act Section 404(q) Memorandum of Agreement, Part IV (August 11, 1992)

The rationale for a comprehensive cumulative impacts analysis for moose can be found in the MDNR SONAR proposing listing of moose as a species of special concern:
(p. 21) "Between 1990 and 2000, the northwestern Minnesota Moose population underwent a substantial decline, and a 2007 Minnesota DNR aerial survey determined that as of that date, fewer than 100 Moose comprised the northwestern population. Aerial surveys currently estimate the northeastern Minnesota population at roughly 4,230 individuals. The northwestern Minnesota Moose population decline occurred in less than a decade. Recent surveys document a slow decline in the northeastern Minnesota Moose population.

"Increased temperatures are likely to increase heat stress and lead to increased mortality within the state's remaining Moose populations. Changes in land ownership and changes in forest management practices within the state's Moose range may be having a significant adverse effect on the quantity and quality of the species' habitat within the state, and particularly on thermal refuges in warmer weather. The state's northeastern Moose population has not shown as rapid a decline, but is very likely to be dramatically impacted by rising temperatures resulting from climate change. This will likely lead to a marked decline in this population within the foreseeable future."

From the *Report to the Minnesota Department of Natural Resources(DNR) by the Moose Advisory Committee (18 August 2009)*:
"In MN, moose habitat can be characterized as young forest stands, older forest stands with gaps of regenerating forest, wetlands, muskeg, marsh, riparian areas and brushlands with abundant deciduous browse within reach of moose and adequate winter and summer thermal cover. Functionally, habitat provides forage and cover. Moose forage has a primarily deciduous browse component and a seasonal aquatic component. Cover has several potential components for moose: protection from heat, protection from deep snow, moderation of cold temperatures, predator avoidance and presence of calving locations. In addition to the functional aspects of habitat, spatial distribution of habitat must also be considered at a variety of scales (from subhome range to the landscape level).

"As moose are increasingly challenged by warmer temperatures and changing precipitation patterns due to climate change, changes in land ownership and changes in forest management practices that occur within MN moose range have the potential to significantly affect the quantity, quality, and distribution of moose habitat. Examples include but are not limited to: habitat fragmentation due to expected and occurring ownership changes and shifting landowner objectives, changes in the extent of forest management due to national and state economic effects on the primary wood- using industry in Minnesota, and increased harvesting of smaller diameter trees and brush used by moose for browse as the demand for woody biomass increases. Focused management to provide high quality habitat (forage and cover) may be necessary to slow population declines and maintain or recover moose in appreciable numbers in Minnesota."

A cumulative impacts analysis must be done for this species of concern that it is of particular cultural importance to the Bands.

Air

Fugitive dust:

The tribal cooperating agencies believe that wind-blown dust particles containing sulfate compounds that are emitted from mining and beneficiation activities could contaminate wetlands, lakes, and streams near the project site and could cause harm to the Species of Special Concern that have been found in this area and to the animals that depend on these plants for food. While the PSDEIS attempts to address this issue, this is the first time details of this analysis have been available for review, and the tribes have identified some areas that require more work. The tribes do not agree with the assumption that only those areas showing model-estimated deposition rates greater than 100% of background deposition will be impacted. The choice of the "100% of background" level of deposition appears to be arbitrary and is not supported by any documentation. Further, the modeled deposition rates do not include the effects of contamination to wetlands and water bodies that may occur through other mechanisms, such as pit leaks and seepage, nor how additional sulfate will impact waters that are already experiencing elevated sulfate levels, with regard to the growth of wild rice. The work that has been done so far in this section does not meet the definition of a cumulative review.

The text describing this analysis is also unclear in places, as described below. In addition, tribal cooperating agency air staff members were not consulted regarding the impact of fugitive dust on historic properties and the definition of intra-property APE, especially with regard to mercury or acid dust (See page 4.2.9-9 of the PSDEIS).

All figures and page numbers cited below refer to the PSDEIS.

Misleading Description

- While areas of fugitive dust deposition may not exceed the ambient air quality standard beyond the property boundary, as stated in the PSDEIS, this information is irrelevant with regard to the tribes' concerns regarding sulfide dust, because there is no ambient air quality standard that is applicable to sulfide dust. Therefore, statements of this nature should be removed.

Acid and Metallic Dust

- Figure 5.2.3-23 (PSDEIS) shows that there are indeed potential indirect impacts to wetlands outside of the ambient air boundary due to deposition of dust. Figure 4.2.9-3 corroborates this claim by showing that the Fugitive Dust Area of Potential Effects extends well beyond the plant site.

- Page 5.2.3-6 lists the fugitive sources that were modeled for deposition. Rail cars and tailings basins were not included. Section 5.2.3.2.2 (page 5.2.3-58) states that the air IAP group determined that emissions from railcars would be coarse in nature and would not be dispersed to any great extent; therefore these emissions were not modeled. The section also states that "Based on this conclusion, air modeling of potential release of dust from railcars will not be performed because the potential wetlands effects would not be significant". The analysis also assumes "that all spillage of the coarse material would occur in a 2-meter-wide strip on both sides of the center line of the railway over the entire haul distance." While the dust may settle near the tracks, there is no evidence that it will not subsequently disperse and cause impacts. The dust can easily be spread through run-off.

- Tailings basin emissions were not modeled. Pages 5.2.3-50 and 5.2.3-51 and page 5.2.3-74 discuss fugitive dust somewhat, but do not make it clear whether "dust" is meant to address the acidic composition of the dust, or some other component. There are also contradictory statements on page 5.2.3-51: "All of the receptor nodes with the highest model-estimated deposition rates were located within the ambient air boundary" versus "Of the 234 acres of wetlands, 228 acres (97%) would be located within the Mine Site ambient air boundary". "97%" does not equal "all"; apparently 6 acres of wetlands with the highest model-estimated deposition rates are outside of the ambient air boundary.

- Figure 5.2.3-17 indicates that the Partridge River could be impacted by fugitive dust, however this is not stated or addressed in the text.

- From page 5.2.3-51 "The potential release of dust from railcars transporting ore from the Mine Site to the Plant Site was addressed in an Air Quality IAP Workgroup that concluded potential wetland effects would not be significant and, therefore, air modeling was not performed (PolyMet 2013b). The tribal cooperating agencies have not been provided with any report that was generated by that workgroup, nor do they have any information about how that conclusion was reached. Also, "Of the 19,914 acres of wetlands identified within the Mine Site receptor grid, deposition modeling results indicated that 234 acres of wetlands could be potentially indirectly affected (modeled metal deposition rates greater than 100% of the background". It is unclear whether modeling was performed for both metals and sulfide dust, and whether the results discussed on page 5.2.3-74 are for metals or sulfide dust. While Figures 5.2.3-16, 5.2.3-17, 5.2.3-22, and 5.2.3-23 differentiate between metals or dust modeling results, the discussion needs to be clearer.

- There are a number of unclear or incorrect statements under the heading *Fugitive Dust/Metals and Sulfide Dust Emissions* on page 5.2.3-74. Initially, the section states that "all receptors have model-estimated dust deposition of 50% or less of the effects-level background of 365 $g/m^2/yr$" but the next sentence states that "at the Plant Site, there would be two locations showing model-estimated deposition rates greater than 100% of background deposition". These two statements are contradictory.

- It is not clear which metals were modeled and whether the background concentrations mentioned (365 $g/m^2/yr$) was for metals or sulfide dust. There is no explanation for the origin of this background concentration and how the metals concentrations in dust were obtained. There is also no explanation of why 100% of background deposition was chosen as an indicator of whether potential effects could occur. To our knowledge, no discussion of this modeling or the assumptions contained within it was conducted with tribes or the co-leads before the PSDEIS was released.

- This section also indicates that the "southern and western two-thirds of the basin" shows model-estimated deposition rates greater than 100% of background deposition (exactly what constituent is being discussed is not clear). However, this same paragraph goes on to state that only 193.9 acres of wetland out of 25,846 could be potentially indirectly affected. These two statements appear to contradict one another. Without knowing what constituent is being discussed, it is hard to know which figure (5.2.3-16, 5.2.3-17, 5.2.3-22 or 5.2.3-23) corresponds to the text. Also, the yellow highlighted area on Figure 5.2.3-23, which indicates the "extent of the highest estimated deposition receptors with deposition of 100% of background", appear to cover a much larger area than 193.9 acres out of 25,846 total acres.

- The paragraph also states that "approximately 90% of the receptor nodes with the highest model estimated deposition rates are located within the ambient air boundary". It is impossible to verify this statement, because a map showing the location of the receptor nodes does not seem to have been included. If this statement is true, it overlooks that fact that 90% of the ***area*** predicted to be impacted does not lie within the ambient air boundary - only about 60% does, judging from Figure 5.2.3-23.

- The tribal cooperating agencies do not agree with the statement that "no potential indirect wetland effects from fugitive dust to Second Creek would occur" (page 5.2.3-74). A portion of Second Creek appears within the area predicted to experience deposition of 100% of background.

- Chapter 5's discussion of fugitive sulfide dust calls for future wetlands monitoring where predicted deposition will exceed 100% of the background value (first full paragraph on page 5.2.3-51). This monitoring should look at water chemistry, hydrology, soil color, texture, and composition and should take place annually for the first three years of operation and then every five years afterward. Baseline numbers should be obtained before construction starts.

- Page 5.2.4-4, *Indirect Effects* calls for water spraying areas of fugitive dust release during dry periods. Page 5.2.7-8 also calls for watering haul roads and other unpaved roads. In the case of dust that may have high acidic content, this would be a poor option, as the addition of water to the dust could simply create problems with run-off. The fugitive dust control plan also lists several monitoring options that "could" be done. These are left as vague ideas, but are not required. These options should be made more concrete.

Fibers

The tribes believe that the cumulative impacts of mineral fibers are not adequately addressed in the PSDEIS. In fact, no cumulative impact analysis of mineral fibers was performed because the PSDEIS asserts that mineral fibers will not be contacted in this project. This is a reckless assumption to make, with little evidence provided for justification, and it leaves a potentially harmful situation completely unaddressed. For example, the distance of the PolyMet project to known deposits of mineral fibers should be given in the PSDEIS. Rates of mesothelioma on the Iron Range are already alarmingly high, making it irresponsible for potential cumulative impacts to remain unaddressed. Although preliminary results from the University of Minnesota indicate that exposure to dust from today's taconite operations is "generally within safe exposure limits", it is possible that exposure to additional dust could lead to more cases of mesothelioma 30-40 years in the future, after the mine has closed. This is an issue that should unquestionably have received a cumulative impacts analysis. While the mine is expected to close in 20 years, this is not a timeframe that is relevant to either tribal concerns or to the development of mesothelioma. Tribal members live and recreate in areas close enough to the mine for this to be a source of concern. The proximity of fish, game, and culturally significant plants to the project site cause this issue to be an item of concern.

Only one year of mineral fiber monitoring in Hoyt Lakes is proposed in the PSDEIS, which the tribes believe is insufficient for detecting the potential release of fibers from portions of the formation that will be encountered during later years of operation. It is also not clear why Hoyt Lakes was chosen as a monitoring site, or if this where air dispersion modeling predicts maximum impacts. The tribes would expect to see monitoring performed for the entire life of the mine, at the site of maximum predicted impact. Since no "safe" mineral fiber concentration level has yet been specified, the tribal cooperating agencies urge the State of Minnesota to move forward to set this limit as soon as possible.

Noise

The co-lead agencies simply state that there are no other past, present, or reasonably foreseeable actions that would interact in such a way as to have a cumulative effect on the receptors identified in Sections 4 and 5 and no further evaluation of cumulative noise effects has been conducted. The tribal cooperating agencies believe it is indefensible to conclude that, amidst a "mining district" with multiple active mine facilities operating in close proximity, that there is no cumulative effect of 24 hour/day, seven days/week of heavy industrial and blasting noise on sensitive wildlife and on traditional cultural practices.

Cumulative Impacts of Noise, Vibration and Airblast Overpressure

Tribal cooperating agencies note that the noise information presented in the PSDEIS will be replaced with new data in the SDEIS. We have not been afforded the opportunity to review this information and must withhold detailed comment on the noise analysis for a later date.

With respect to cumulative impact analysis, tribal cooperating agencies do not believe that an adequate analysis has been done. Meeting ambient noise standards is a different question than assessing impacts. Impacts should be fully characterized in this document and contour maps showing overlapping noise pollution from different projects provided. Without this information, it is not possible for the public to review the cumulative impacts of noise. In addition, the cumulative impacts of mine related vibration have not been assessed. As shown in Figure 20, the cumulative effects of vibration are spatially extensive.

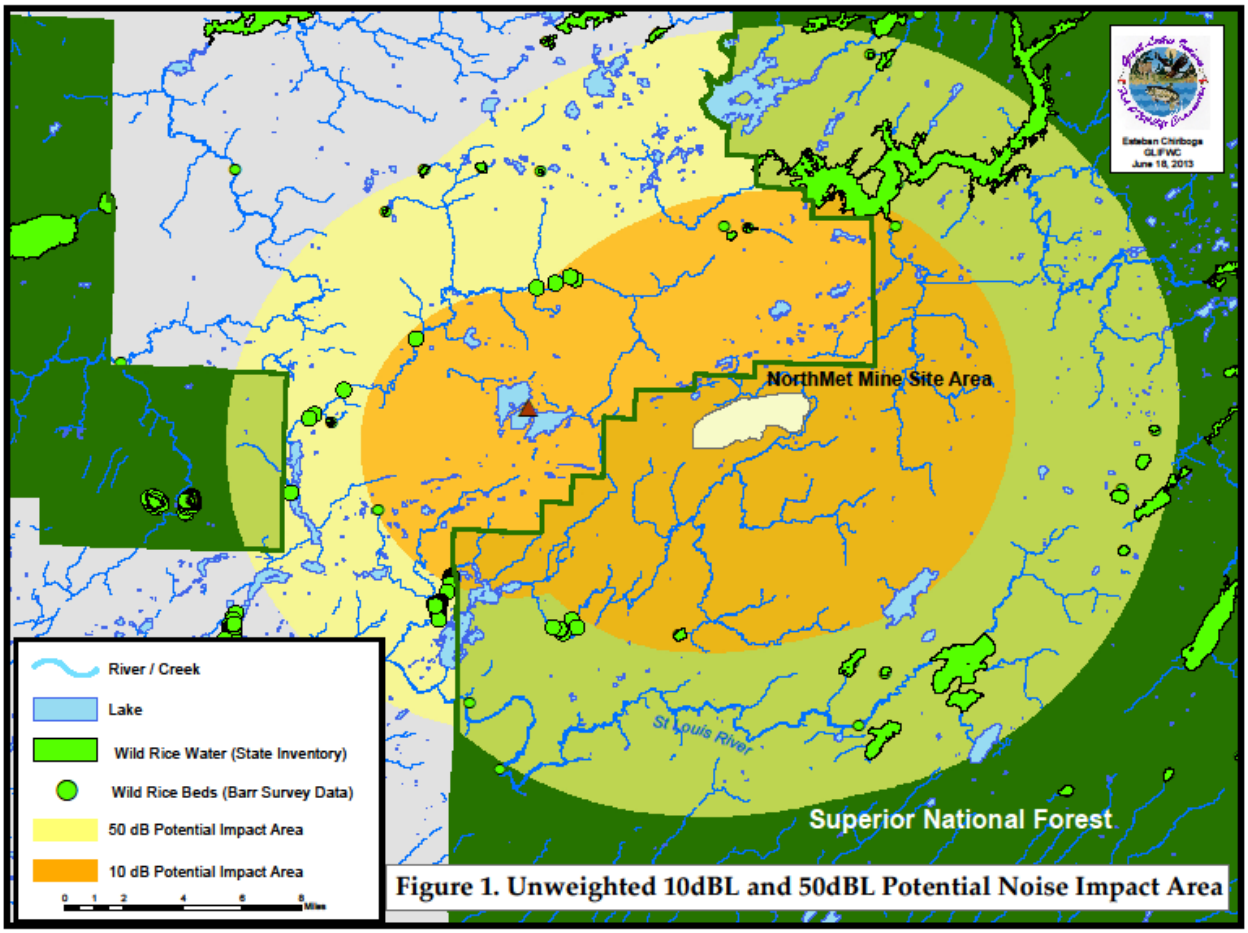

Figure 20. Unweighted 10 dBL and 50 dBL Potential Noise Impact Area

Tribal cooperating agencies also note that the noise, vibration, and airblast overpressure analysis confuses baseline noise levels with existing conditions and assumes they are the same thing. Baseline noise levels in the SDEIS should be natural noise levels that do not include existing mine operations such as Northshore. In other words, baseline is the pre-mining condition. Existing conditions are the noise levels currently recorded at the site of the proposed mine which include any contributions from the Northshore mine, the Dunka road, etc. The analysis would then use both of these pieces of information to assess the effects of the project as a single entity and in combination with other projects in the cumulative section. The lead agencies have indicated that they are using existing conditions (currently measured noise levels) as background. This is not appropriate and should be corrected.

The noise data presented in the SDEIS used A-weighted decibel data (dBA). This is appropriate when considering the effects of noise on humans because it focuses on the frequencies that the human ear can perceive. However, this weighting is not appropriate when assessing the effects on animals because they can perceive different, and often greater, ranges of frequencies than humans. The United States Department of Transportation (USDOT) has

developed a document[17] describing the effects of noise on animal populations. In general the document indicates that the sensitivities of various groups of wildlife can be summarized as:

- Mammals < 10 Hz to 150 kHz ; sensitivity to -20 dB
- Birds (more uniform than mammals) 100 Hz to 8-10 kHz; sensitivity at 0-10 dB
- Reptiles (poorer than birds) 50 Hz to 2 kHz; sensitivity at 40-50 dB
- Amphibians 100 Hz to 2 kHz; sensitivity from 10-60 dB

Figure 21 indicates the noise area of impact for wildlife. The noise contours are unweighted decibel values (dB). A more complete analysis of these impacts in the SDEIS document for the NorthMet project is needed. Known locations of wild rice are included in the map because it is an important source of food for waterfowl. We also note that the entire area of impact is important habitat for Canada Lynx.

As illustrated in Figures 21 and 22, the impacts of noise, airblast and ground vibration overlap in a large area surrounding the mine site. Figure 21 (Cumulative Impacts on Wildlife) also provides the location of the remaining wildlife corridors in the area. The wildlife corridor immediately northwest of the mine site would be cumulatively affected by noise (10dBL and 50 dBL) airblast overpressure and ground vibration. These impacts when thought of in the context of its proximity to the mine site, wetland destruction and fragmentation of the 100 mile swamp lead to a conclusion of a severe and significant impact to this corridor. Figure 22 (Cumulative Impacts on Humans) indicates areas of tribal significance that are affected.

[17] *Synthesis of Noise Effects on Wildlife Populations*, USDOT Publication No. FHWA-HEP-06-016, September 2004

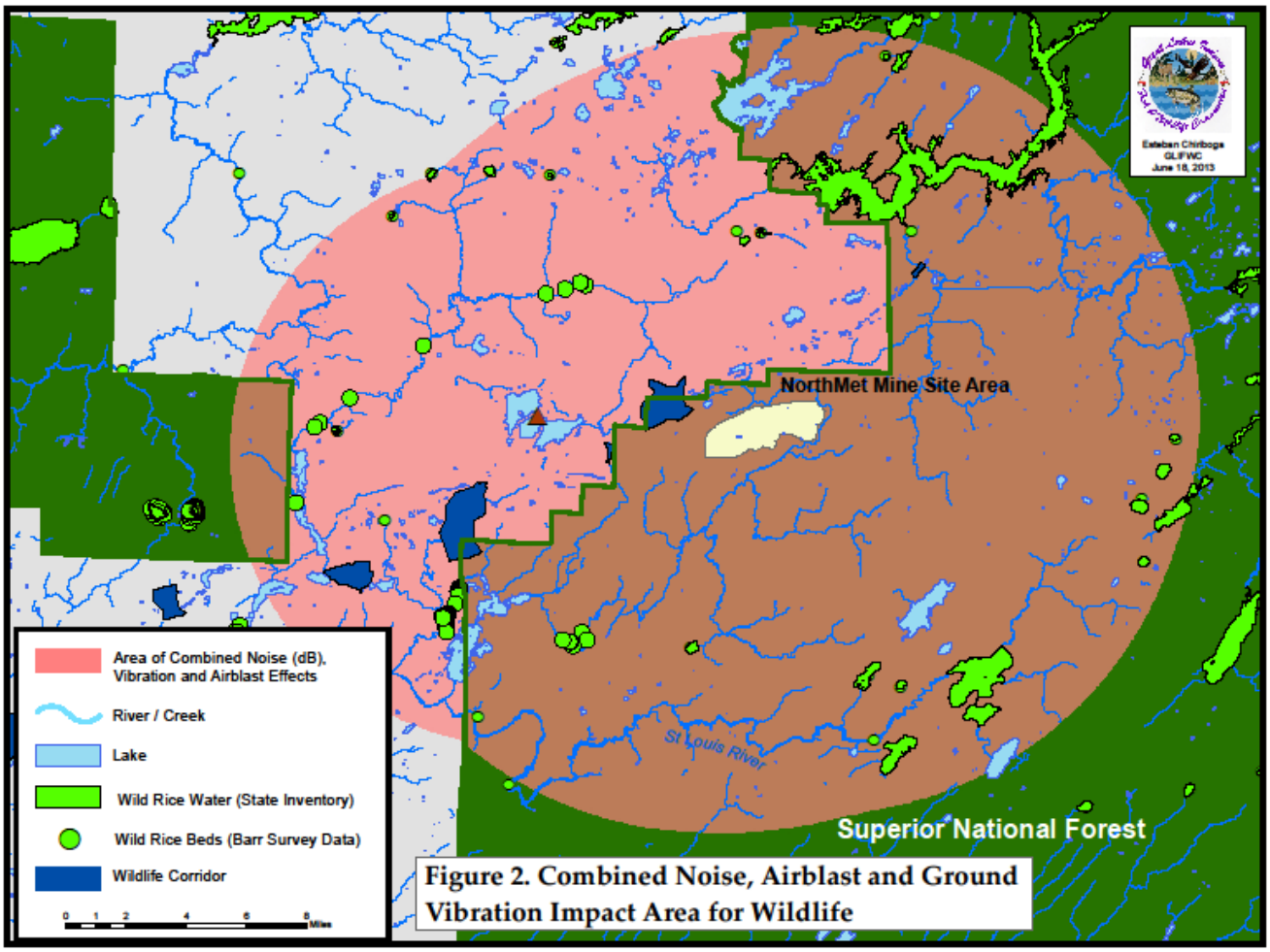

Figure 21. Combined Noise, Airblast and Ground Vibration Impact Area for Wildlife

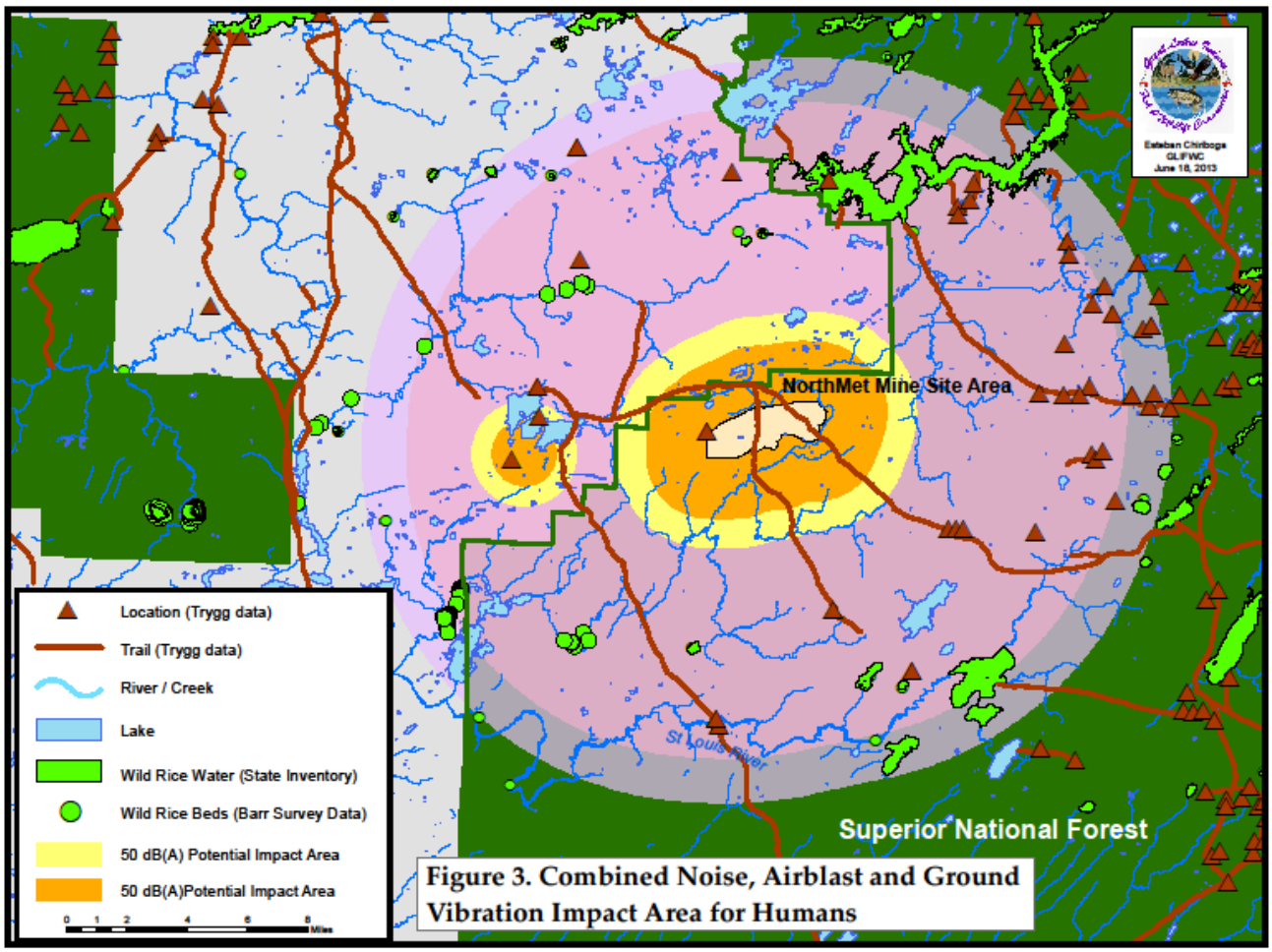

Figure 22. Combined Noise, Airblast and Ground Vibration Impact Area for Humans

No Action Alternative

A December 3, 2008 memo from NTS to the MPCA regarding the Area of Concern (AOC) Summary for the VIC Projects on the Cliffs Erie Property shows twenty-nine AOCs within the Project area. Only three AOCs have been remediated. Twenty of the remaining twenty-six sites' status is listed as "Area within property under Contract for Sale with PolyMet. No actions have been taken with regard to this site."

Some of those sites include: "Oily Waste Disposal Area, Private Landfill, Dunka WTP Sludge, Tailings Basin Reporting, Transformers, Emergency Basin, Cell 2W Salvage Area, Hornfels..." It also appears that there has not been a brownfield/superfund site investigation for the properties PolyMet intends to acquire for the Project area to assess existing contamination. Therefore, critical information to determine cumulative impacts at the site are not included in the SDEIS, and natural background water quality cannot be differentiated from existing contamination requiring remediation.

According to CEQ guidelines:

"No action" in such cases would mean the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward.

Where a choice of "no action" by the agency would result in predictable actions by others, this consequence of the "no action" alternative should be included in the analysis. For example, if denial of permission to build a railroad to a facility would lead to construction of a road and increased truck traffic, the EIS should analyze this consequence of the "no action" alternative."

Based on the above CEQ guidelines, it is clear that activities that will occur under the Cliffs Consent Decree should be included in modeling of a No Action alternative. Unfortunately not only are the consent decree activities not included, but the fact that it will be precipitating on the tailings basin for the foreseeable future has not been included in the No Action modeling. This is evident by the model results that show stable levels of chloride coming from the basin for the next 200 years (Figure 23) when there is no ongoing source for chloride. With no source for new chloride, rainwater will gradually dilute the residual chloride in the basin and levels will drop. The PSDEIS claims that the basin's water quality has stabilized and that the current conditions will not change over time. The claim of chemical stability is based on basin pond water sampling for only 4 years (2001 – 2004, PSDEIS Table 4.2.2-23).

Since there has been no water quality data collected in the basin pond for 9 years it is reasonable to assume that the past 9 years of precipitation has diluted the water chemistry in the basin pond, and that eventually the more dilute water will percolate through the basins and be discharged at the toe. If chemical stability is to be assumed, more recent data on basin pool water chemistry is needed. While the CEQ makes it clear that a blind "continuation of existing conditions" model is inappropriate as a No Action alternative, a "continuation of existing conditions" model that ignores simple environmental processes such as precipitation is even less appropriate.

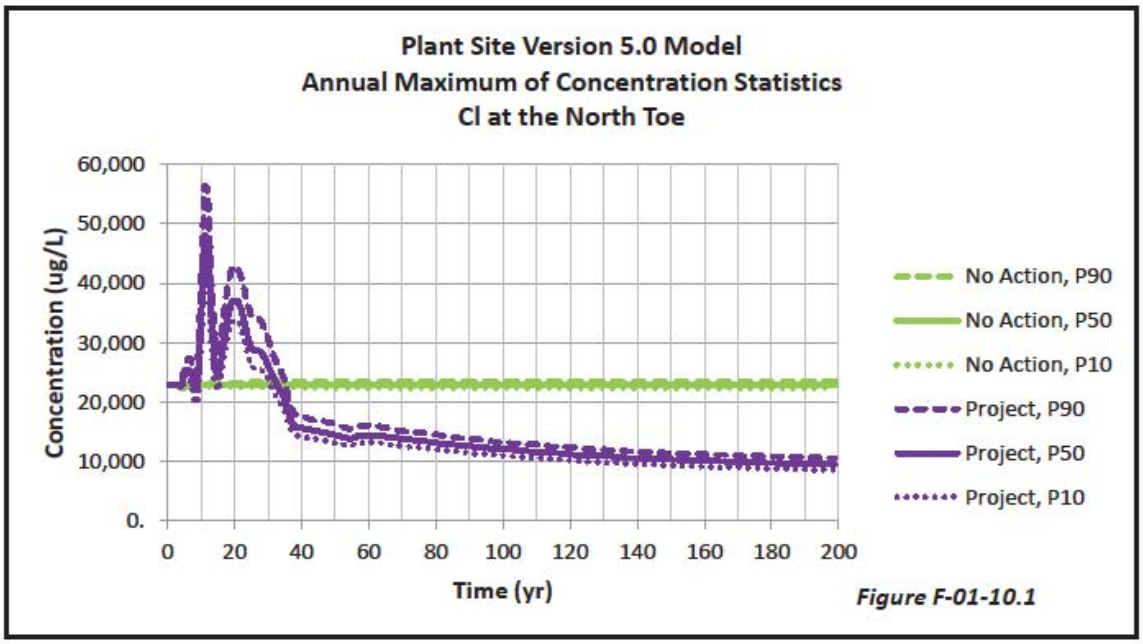

Figure 23. Annual Maximum of Concentration Statistics: Chloride at the North Toe.

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MS. MARY ACKERMAN: Mary Ackerman, A-C-K-E-R-M-A-N. Mary, M-A-R-Y. I live in Hackensack, Minnesota. Zip code, 56452. I have four points to make.

Point 1. The seven spill sites addressed in the draft are not representative of

the very sensitive and biodiverse land and waters of this route. They do not address wild rice wetlands, the St. Louis River tributaries, the Nemadji, N-E-M-A-D-J-I, river tributaries, and the Mississippi River or Lake Superior. All will be impacted by the inevitable spills, leaks, anomalies.

One thing we know for sure, pipelines spill. Not if, only when. And the product, tar sands, proposed for this Line 3 cannot currently be cleaned up. There is no technology to clean up water spills of this kind. None.

My first point. Expand the modeling for water spill sites.

Point Number 2. The Enbridge permit application cites what they would do to minimize environmental impact. Nowhere does the draft identify what outside entity will monitor these promises and/or what regulations are in place to ensure these promises are contractual. 1702-1

My point. Name the outside entities we can look to and show the contracts for this critical process.

Point Number 3. In Chapter 11, titled "Environmental Justice," the draft

acknowledges that any of the alternative routes would be detrimental in the long-term for the tribes impacted. This is Point 9.6. It says there will be "profound cultural consequences." If this route went through a town or city, would this still be an option? Would it? Disproportionate and adverse impacts is the language used in 11.5 of that chapter.

My point. Choose a route that does not have detrimental impact on the tribes of Minnesota.

My Point 4. The preferred route also impacts "more wild rice lakes and areas of rich biodiversity than any of the other routes." This is from Figure ES-10 in the draft. Why would Minnesota risk that for a Canadian company's profit? And I'm quoting again from Chapter 5, 3.4. "All workers to construct the line would be relocating to Minnesota." There will be "no measurable impact on local employment, per capita household income, median household income or unemployment." Need I say, this doesn't track.

My point. The jobs argument put forth by Enbridge does not hold for short- or long-term employment for our unions.

The line risks some of our most pristine wild rice lakes and areas of rich biodiversity.

Get serious about another route now. Thank you.

MS. MARY ADAMS: Hi. Mary,

M-A-R-Y, Adams, A-D-A-M-S.

I'm a retired school administrator. And I'll tell you, when the paper copy arrived in Park Rapids on Tuesday of 6,500 pages in our library, some of us scurried over there to read that. And I know about reading a lot of stuff, but I found it daunting, to say the least.

My comments are thus, in Volume I, what is the need for this project anyway? It had been mentioned earlier today. It had mentioned the need for the project would not be addressed in the DEIS. But you know, it's kind of like putting the cart before the horse. You put the pipeline before you have determined a need for the pipeline, and worldwide oil use is down. In Minnesota it's really down, the prices are down.

So as a retired principal, I'm going to ask you to do your homework. I have a few questions. Please describe in detail how you, meaning Enbridge, can justify further extraction of fossil fuels, when the need is not proven to be there.

Also, in Volume I, Chapter 5, I

read about the greenhouse gas emissions, the heavy western Canadian sedimentary basin, which is the tar sands coming in from Canada. We cut down a lot of trees that were mentioned in this DEIS. Trees are there for the removal of carbon sequestration.

What are the social costs of plowing through this lake country, removing the trees, bringing in this tar sands oil that is diluted with filthy chemicals and made in order to make it move through the pipes.

So I have a question for you -- continued homework. I'd like to know in detail how you intend to restrict carbon emissions. In the DEIS you mentioned that you are working on renewable and alternate energy projects. That's not good enough for me.

Volume I, Chapter 5, I noticed in the DEIS, you mention the number of acres in Aitkin County and Cass County, and where's Hubbard County in this regard? Why didn't you mention the Itasca Park, the first park ever established in our state, that tourists come and we frequent a lot during the summer, fall, winter, and spring.

Also the trout streams, I was sitting over there with a friend. He's looking through the maps of the trout streams. He said, "Well, look at this, Mary." I said, "What do you want me to look at, Tony?" He said, "It says unnamed streams." Do you know that that unnamed stream was going through this marvelous wetland, the Straight River, the primary brown trout river that's coming through Park Rapids area.

So my question is, what drilling, what drilling fluids are you using if you have to cross under the Straight River? It's harmful to wildlife. It damages the vegetation. When you're driving under those streams in the river bed, what are you putting in there? Some of us would like to know. 0800-1

Volume 3, "Accidental Crude Oil Releases." Question, to what extent would the EPA, the Army Corp of Engineers, DNR, and the PECA be involved in the permitting process?

When I read through the DEIS, it says, "Oh, we'll get a permit from DNR, and then we'll get another permit from DNR; DNR, DNR, DNR. I'd like to know the extent that

you're going to rely on all of these organizations to prove what you're doing.

I have another question -- I'm almost finished -- are the standards that are set by the Federal Pipeline and Hazardous Materials Administration for the extraction of fossil fuels and building -- for the building and maintenance of oil pipelines, is that adequate? Why; why do you think it's adequate? Why not?

We have a lot of wonderful pristine water up in this country. It's not compromised water. What research and preparedness is made to respond soundly when a tar sands spill occurs? How will our aquifers be protected? 0800-2

The MPCA said, quote, "Difficulty of responding to remote spills due to swamp land inaccessibility of the preferred route."

How crucial is that finding? Why is that so important?

And lastly, the Yellowstone River in Montana a couple of years ago, there were 40,000 gallons spilt into the

Yellowstone, but the cleanup wasn't hampered by winter weather conditions. That stuff sinks to the bottom.

So I'm asking Enbridge what's the key takeaway from the spill in Montana considering the uneven terrain and the winter conditions?

So I'm finished. I have 4,000 more pages to go through. Join me. Get a comment in to DOC by July 10th. Please, please, please help us.

Thank you so much.

Levi, Andrew (COMM)

From: Mary Adams <mmkadams65@gmail.com>
Sent: Wednesday, July 05, 2017 3:00 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137
Attachments: Jamie MacAlister III.doc

ATTN: Jamie MacAlister

Jamie MacAlister, Environmental Review Manager
MN Department of Commerce
85 7th Place East, Suite 280
St Paul, MN 55101-2198

CN-14-916
PPL-15-137

Chapters 1-5

No analysis of the NEED for this project and continued use of fossil fuels

MEPA requirement is not being meet. The decline of overall energy consumption in MN and nation has declined. Exporting tar-sands was not addressed, ie lack of transparency. Why has the pipe itself been enlarged to 36 inches? The economic evaluation is incomplete.

P5-432-443 Green house gas emission from tar sands must be addressed in detail. Removing large swaths of forests sequestering carbon contributes to global warming. The social and economic costs of CHG is lacking.. Mentioning the applicants commitment to renewable and alternative energy projects is unconvincing.

P5-304 Hubbard Co is not mentioned in the acreage noted, nor is Itasca Park and the Straight River Aquifer. MPCA "impacts from construction of additional pipelines and infrastructure, emergency response and spill prevention, water crossing body method and time frames, waste water issues, water quality, watershed and wetland issues" would be serious. The DEIS does not address this sufficiently. Permanent right of ways, construction work, temporary access roads and permanent roads will be long lasting. The negative ramifications need analysis. An independent analysis of acreage impacted is needed. Endangered and threatened species, including pollinators, was lightly treated and needs to be thoroughly studied and transparent. 1202-1

P5-254 Frac-out.. 'Drilling fluids only into waters identified as sensitive or impaired'. Is that true?

P5-257 Trout streams. {Straight River, a well known trout stream) 'construction crossing impact would be permanent to short term and minor to major, depending on the crossing'. That's not good enough, raising a red-flag for the reader of the DEIS.

Volume III Accidental Crude Oil Releases

Ch 10 All spill release data appears to be provided by ENB. What is the work history of Cardno and Barr? Are we assured there is no conflict of interest? There appears to be no independent 3rd party analysis. What does "spill frequency" mean? Benign locations-7 sites-all water- are too few. Extrapolating these to all other water bodies, regardless of terrain and topographical conditions at modeling sites lacks credibility. Transparency seems nonexistent when it comes to 'data protective order', which protects oil companies and excludes the public, does not comply with MEPA and federal law. The DEIS favors Enbridge. No winter spill analysis, no reference to The National Academy's Study on Tar Sands Oil Spills and the difficulty/impossibility of timely clean-up and long term devastating effects on lakes, streams, wetlands and low-lying forested areas. No economic analysis of the costs of oil releases and damage to natural resources based on cost. No "life of the project" risk assessment with the pipe in the ground 50 or 60 years. 1202-2

Block valves are too far apart. Averaging 12 miles. Stray voltage corrosion and pinhole leaks often are not detected in a timely fashion. Data is missing for all the lakes, rivers, wetlands and ground water recharge locations. The Stantec Report locations are not representative of the entirety of the preferred route.

1202-3

1202-4

Economics Ch 5-11
What is the data source for workforce numbers? Numbers vary from 16 permanent jobs to thousands of part time positions. No long-term assessment on tourism, property values, post construction impacts, costs and road maintenance are evident. Faulty, inflated numbers misleads the publics grasp of the project..

Route Analysis
Corridor Sharing. The DEIS indicated the proposed route would house additional pipelines in the future. We would have a "pipeline corridor" passing through pristine lakes, forests and wetlands. What does the future plan look like for increasing the number of 36 inch pipe lines within the corridor?
Minnesota Biological Survey Sites of Biodiversity Significance and MN Wildlife Action Network identify Species in Greatest Conservation Need. Enbridge preferred route most negatively affects these sensitive areas. If ever there was a case to be made for SA-04 it is now. 1) it avoids Northern Mn watersheds 2) it crosses agriculture lands, co-located with existing pipelines and access roads already in place when an emergency arises. 3) it fragments less natural habitat 4) it would mostly have a short term effect on croplands 5) spills would effect high quality agricultural soils vs high quality forested and aquatic habitats at risk 6) job creation. SA04 extends the pipeline directly to northern Illinois, positively creating more jobs for pipe fitters and additional contractors.
The DEIS appears biased to END field work on the applicant route. Thee is no field data on other routes. Truck and train = false equivalence. Quantitative and qualitative analysis needs work!

The Tribes
I shall let the tribes speak for themselves recognizing their vulnerability. Income from wild rice beds threatened with profound cultural consequences. How does one restore wild rice beds?

Acknowledging Participants
Cardno, Barr acknowledged. What roles did MPCA and DNA play in developing the DEIS? They assisted. What does that mean? 10% 20% 50% 70% 90% involved? The public expects them to analyze and protect pristine lakes, forests, wetlands, fish and wildlife habitat. Water is life!

Thank you for the opportunity to comment.

Mary Adams 24985 Great Pine Dr Nevis, MN 218 652 3519

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Levi, Andrew (COMM)

From: Mary Adams <mmkadams65@gmail.com>
Sent: Monday, July 10, 2017 10:02 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 PPL-15-137
Attachments: Jamie MacAlister Environmental Review Manager July 10.doc

Comments on DEIS

Jamie MacAlister Environmental Review Manager July 10, 2017
MN Dept. of Commerce
85 7th Place Ease, Suite 280
St. Paul, MN

Comments: CN-14-916 and PPL-15-137

DEIS

- Does this pipeline provide enough benefits for Minnesota to balance the risks? Hunting, fishing, tourism and recreational opportunities are abundant, providing a source of revenue for counties impacted. Such information is lacking. Ther must be an economical analysis for the EIS to be complete. 2479-1
- Corridor Sharing. If the preferred route is approved I would like to know what the future expansion plans are for the corridor. This must be stated in the final EIS. Accumulation of multiple pipelines increases additional spill risk, widens the corridor resulting in increased detrimental effects on water, forest, wetlands and wildlife. The public needs this information.
- Fuel demand in Minnesota is down 19%. I would like to see the need for tar sands oil addressed in the final EIS. A thorough explanation as to why this state should assume the risk when oil will be exported to ports around the world.
- Where is the "no build" option? Why is a 36 inch pipe replacing a 34 inch pipe? Address it, please.
- Drilling fluids. The DEIS is deficient in its consideration of carcinogenic properties (i.e. benzene) in its "drilling fluids. The public needs to know what toxins affecting aquatic life and our waters are used.
- Herbicides. Forest fragmentation and widened corridors will affect pollinators, who are in need of protection. What sprays will be used to keep corridors open and how often will that occur? Widening in sensitive landscapes is not covered.
- Stray voltage leaks. Negative ramifications of pipelines located under electrical lines is not addressed. Include it in the final EIS.
- Construction Impacts. 60 miles of new right of way roads will occur. It is likely END underestimates (5600 acres low) without regard to contrary evidence submitted during Sandpiper. Likely impact may be 7500 acres or more. An independent analysis of this topic needs inclusion in the FEIS. Include water- 192 surface, 6 outstanding. Wetland acreage and construction impact to groundwater 1000 vs 2500 ft for SA04.
- Pipeline Abandonment. Analysis was limited. Decommissioning was based on a 12 mile test. Pipes in the ground can over time result in groundwater movement as well as erosion. What chemicals for flushing out abandoned pipes are used? Further explanation is needed.
- Spills. No economic analysis of costs of oil releases and the damage to natural resources (based on costs) is included. Methodology was faulty. There is no justification for the method of calculation included in the DEIS. Block valves average 12 miles apart. No record of the Sandpiper Oak Ridge block valve study. No long term risk assessment. No "life of the project" risk assessment. The pipe 2479-2

will be in the ground indefinitely. 50-60 years! No winter spill analysis. Maps indicating first responder assess are lacking. All of the above must be in final EIS. 2479-2 Cont'd

- Line 3 and Route Alternatives. It appears to be based on END field-work on the applicant route. Qualitative and quantitative analysis was poor. No field date was provided for other routes. Environmental impacts focused on route comparisons rather than identifying overall impacts. System alternatives SA04 and Line 3 fit neither CN rules nor MEPS rules. It appears to be prejudiced by length without consideration of alternate routes. SA04 should be considered.

Now is the time to be on the right side of history. Climate change, dire that it is, provides a great economic opportunity. Fossil fuels are driving up climate change. The price of solar has plummeted, as citizens around the globe recognize the perils of continued extraction of fossil fuels. Fossil fuels will always be around, not totally eliminated, however, the trend moving forward towards alternate energy is gaining traction. Oil companies can get on board and successfully be a part of the future.

Thank you for the opportunity to comment on the DEIS.

Mary Adams
24985 Great Pine Dr.
Nevis, MN 56467

218-652-3519

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Don Arnosti

Street Address: 1722 Princeton Avenue

City: St. Paul State: MN Zip Code: 55105

Phone or Email: donarnosti@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Missing information: What is the intended destination of the excess capacity (beyond current Line 3?) Example: is the oil intended to be shipped via the Great Lakes? Via pipeline to Chicago or Detroit? Etc.

I think this lack of information makes it impossible to determine that there is any real need (as viewed by Minnesota for our citizens) for a new, larger pipeline.

The EIS lacks information on how, if this pipeline is built, it will be decommissioned in the future — and, how the PUC can assure that the pipeline company, not the public at large will pay for this decommissioning?

The EIS must include all the information provided by MPCA + DNR natural resource experts to their administration and the DOC. Last year, this group of experts favored the southern route through farmland as least harmful. 0644-1

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Clare A <clareauchterlonie@gmail.com>
Sent: Thursday, June 22, 2017 4:41 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

CN-14-916 and PPL-15-137 comments.

The 7 sites chosen for spill modeling are not representative of the locations and resources put at risk along the entire corridor. A more thorough analysis of different locations is needed - for example, what about Lake Superior?

I am concerned about abandonment. The risks of pipeline abandonment are not adequately assessed. For example, there is no discussion of landowner property values and the effect that an abandoned pipe could have on them, especially if there is indeed "legacy contamination" on people's land. It merely says "In the near term, impacts on socioeconomics are anticipated to be minimal" (Chapter 8). What about the long-term? 0498-1

There is also no discussion of exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied. "When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high" (8.3.1).

Regards, Clare Auchterlonie
213 Calle Miramar #6
Redondo Beach
CA 90277

Levi, Andrew (COMM)

From: Kaye <tmolin@en-tel.net>
Sent: Saturday, July 08, 2017 11:54 AM
To: MN_COMM_Pipeline Comments
Subject: Environmental Review Manager
Attachments: COLA, DEIS Bad Axe .pages

Our lake association met this morning and approved the following attachment to send to you.

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
SAINT PAUL, MN 55101-2198

1282-1

Our lake association is very concerned that the DEIS does not consider the effect of Line 3 Project on our waters, especially since there are 192 water crossings in Minnesota via the proposed route.

Among our concerns are:
-There is no disclosure of hydraulic drilling fluids used to tunnel under streams, but which are known to be TOXIC to aquatic life.
-There is no winter spill analysis - how to clean a lake or river covered by ice.
-How do first response personnel get to the site of aa spill where no roads exist?

We feel that an independent third party should be involved in the DEIS.

Kaye Molin
Bad Axe Lake Association COLA representative
20632 Jewel Drive
Park Rapids, MN 56470
tmolin@en-tel.net

Levi, Andrew (COMM)

From: Elizabeth Baker-Knuttila <2014looncall@gmail.com>
Sent: Monday, July 10, 2017 5:07 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Project Draft Environmental Impact Statement
Attachments: Commentary on DEIS for Line 3 CN.docx

Attached please find my comments on the proposed Line 3 Pipeline Project. Although it is past 4:30, the only deadline given for comments was July 10, 2017, which I take to mean midnight, July 10.

Thank you.

Sincerely,

Elizabeth Baker-Knuttila

Monday, July 10, 2017

Commentary on DEIS for Line 3
CN-14-916 and PPL-15-137

To: Jamie MacAlister,
Environmental Review Manager
Minnesota Department of Commerce

Dear Ms. MacAlister and staff:

I am writing to offer my comments regarding the draft EIS for the Line 3 Pipeline Project proposed by Enbridge Energy,LP, through N. Minnesota and Hubbard County (among many others) on route from Canada to Superior, but then ultimately on to somewhere near Joliet, Illinois. My background is NOT as a scientist or environmentalist, having retired from teaching 6 years ago. I have only recently been able to pursue interests concerning our environment and energy. I am a citizen, with children and grandchildren, and a lifelong resident of Minnesota, with a strong desire to see Minnesota's water resources preserved for future generations. With the DEIS encompassing more than 5000 pages, I have not read it in its entirety, though enough to have some concerns. I have read the entire Executive Summary. My concerns will be presented in the form of questions and reflections.

1. "The purpose of and need for this EIS is to help inform the Commission's decisions by evaluating the potential human and environmental effects of permitting the proposed project, considering reasonable alternatives, and exploring methods for reducing adverse effects." Taken from the Executive Summary, p. 7.

   My question is, who prepared the EIS? I note the answer given to this in the Executive Summary, "MN DOC EERA, in consultation with the Secretary, and with assistance from the MN DNR and MN PCA". How much input did the MPCA and MN DNR have in the writing of this DEIS? Please be specific about their inputs.
   I researched previous comments about this route written by the MPCA in regard to the Sandpiper to the ALJ and the MPUC Docket PL6668/CN 13-473 & OAH Docket No. 8-2500-31260 and dated January 23,

2105. At that time, the MPCA stated in regard to that route (the same as is proposed for Line 3), "Environmental risks are posed by all aspects of pipeline construction and operation, including post-spill recovery and restoration activities. The primary and most significant risks are associated with the long-term effects upon environmental and natural features that will be permanently altered, eliminated, or otherwise impacted by the presence of a pipeline, as well as the potential 40 years or more that the pipeline will be operational. Those risks include environmental damages such as losses of wildlife, contamination of drinking water, destruction of fisheries, loss of habitat, and alteration of ecosystems." And later on said, "With respect to protection of the highest-quality natural resources in the state, the SA-Applicant route presents significantly greater risk of potential impacts to environment and natural resources than several of the alternatives". It goes on further to state "Although all proposed routes and system alternatives have the potential to impact some natural resources, the Applicant's proposed route encroaches on higher quality resources, superior wildlife habitat, more vulnerable ground water, and more resources unique to the state of Minnesota than do many of the proposed system alternatives."

2. I have heard that Cardino, an Engineering firm, was called upon to do some of the work for the EIS. What has been Cardino's relationship to Enbridge in the past? Are we certain that the data provided can be *independently verified* as is required by the state of Minnesota for a project of this size? 2496-1

3. Where/how was data obtained for the EIS?

"The majority of the economic analysis and other technical information for the CN decision will be provided by the Applicant, other parties, and the public that are participating in the contested case hearing." Taken from the DEIS Chapter 4, p. 4-2. 2496-2

Who are the "other parties" offering economic analysis? In order for the EIS to be independent, how can economic analysis and technical information be offered by the applicant? I also noted in comments

2496-2
Cont'd

submitted by Enbridge on the docket in regards to the EIS an abundance of comments wishing to change wording, clarify or redefine topics, etc. Isn't this giving too much power to the company that is applying for the permits?

In further reading of that docket item, Enbridge often calls into question the understanding of the EIS of particular terms which makes me skeptical of the professional qualifications of the writers of the EIS.

4. **I noticed that the EIS and project proposal continually refer to the Line 3 pipeline as being built along existing pipeline corridors, such as the existing MN CAN pipeline, as if that automatically makes it a good place to site a pipeline. When was that pipeline corridor built? What were the permitting requirements at that time? How much environmental research was done at that time to assure that protection of the environment was taken into account? What was the cumulative body of knowledge and awareness of the environment at that time? Would permits be issued today for the MN CAN if there were no other pipes along that route given our present knowledge of the environment and the need for protection of our precious water resources? What is the likelihood that this will become a new pipeline corridor for other mainline pipes that "fail" or a proposed new pipe? When the application for the Sandpiper was first presented to the PUC, citizens were assured that there were no plans for any further pipeline construction. Shortly thereafter, an application was filed for Line 3. What assurances do we have that there won't soon be another application filed for this route?**
5. **In reading through the EIS on climate concerns, I am wondering if enough study has been given to the "big picture"? These climate concerns are changing the way businesses and individuals operate in our world. Within the past week there have been numerous reports of a real uptick by automakers to increase the production of electric vehicles.**

A May 26 article in the Wall Street Journal discusses the predictions being made now about the peak and then decline for oil demand. "The world's largest oil companies are girding for the biggest shift in energy consumption since the

Industrial Revolution: After decades of growth, global demand for oil is poised to peak and fall in the coming years."

Increased production of electric cars and improved EV battery design is leading an increase in the amount of Electric cars purchased worldwide. China is subsidizing electric vehicles with some cities allowing only EV's on roads when air quality is bad. Though no one knows when oil demand will peak and many variables apply, the discussion is happening in earnest now and according to the article, "Transport fuel accounts for about 50% of the demand for crude oil, with cars accounting for half of that; that means 25% of total oil demand hinges on autos."

Both quotes above taken from:

https://www.wsj.com/articles/get-ready-for-peak-oil-demand-1495419061

The EIS needs to look carefully to the future, examining current trends and projecting those of the future to determine if we should be willing to risk our precious Minnesota water resources to an industry in decline.

6. **What differences exist between cleaning up spills on agricultural land vs. spills in an aquatic environment, a river, swamp, stream or lake? Which spill is easier to remediate and why?**

7. **I live along a lake near the Applicant's proposed route of the Line 3 pipeline. The lake is one of Biological Significance. The route the pipeline will traverse is about ½ mile from the lake. Without knowing the potential for spill volumes, how do I know the potential for a spill to reach and contaminate this lake? Why are the worst case spill volumes able to be held as "protected"?**

8. **In chapter 6 of the EIS, under the heading of Table 6.2.1-4, Land Use Zoning Categories Crossed by the Applicant's Preferred Route (miles), Clearbrook to Carlton, there is no data listed for Hubbard County. It is listed as NA, or not available. I contacted our local SWCD manager who said that sort of data is available, though our county does not have county wide zoning as such. What efforts were made to obtain that** 2496-3

data from other sources? Apparently, that data is in the 2016 Local Water Plan for Hubbard County which is available on the website, www.hubbardswcd.org. 2496-3 Cont'd

Thank you for completing this first ever in the state of Minnesota DEIS for a pipeline project. I appreciate being able to comment on some concerns that I have regarding the DEIS as a citizen. At the same time, I believe that the timelines to read and understand a 5000+ page technical document by ordinary citizens of this state to be inadequate for the task, and therefore a disservice to citizens.

Sincerely,

Elizabeth Baker-Knuttila
12029 Far Portage Dr.
Park Rapids, MN 56470

Levi, Andrew (COMM)

From: Elena Bantle <elena.bantle@gmail.com>
Sent: Monday, July 10, 2017 2:50 PM
To: MN_COMM_Pipeline Comments
Subject: DEIS comment CN-14-916 and PPL-15-137

I grew up in Wisconsin, but have lived in Minnesota for the last 6 years. For much of that time, I have felt grateful to be in a state that stands up for its water and its people. I want it to stay that way!

Enbridge's DEIS is incomplete at best, and is more accurately offensive and insulting. I have worked in violence prevention and as an advocate for girls the entire time I have lived here, and Enbridge's broad response to the impacts on health and safety of women on page 10 of Chapter 11 shows that they are not taking their impacts, human or otherwise, seriously. The proposed solution is limited to “Enbridge can prepare and implement an education plan or awareness campaign around this issue with the companies and subcontractors that construct, restore, and operate the pipeline, as well as by working with local communities and tribal communities to raise awareness and provide resources to address the issue.” If they were taking this seriously, they would have called upon any of the myriad resources and information about this to have a more thorough and specific analysis.

Allowing Enbridge to move forward would be rewarding their total disregard for our land and water. Page 7 of Chapter 11 states “In addition to the individual land use categories that would be affected by the routes, various waterbodies and streams would be crossed.” However, there is no additional analysis of potential downstream environmental justice impacts. The spill analysis on pages 13-14 of Chapter 10 look at the probability of annual spills, when it would be more comprehensive and relevant to analyze the spill probability over the entire lifetime of the pipe. There is no significant analysis of the increase to spill potential as pipelines become exposed over time. 2498-1

There is too much to lose, and not nearly enough to gain. Please do not allow this pipeline to move forward.

Thank you,
Elena Bantle
Saginaw MN

MR. DAVID BARNETT: Good morning. My name is David Barnett, D-A-V-I-D, B-A-R-N-E-T-T.

I represent the United Association of Plumbers and Pipefitters, who will be the welders, pipefitters and helpers that Enbridge has committed to have build this pipeline once it does receive the needed permits.

The Energy Information Administration, which is the leading research technology arm of the federal government predicts -- well, first of all, in 2016, American people used 20 million barrels of oil per day. And that's their fact numbers. Of that 20 million barrels, there were net imports of 25 percent, meaning taking into consideration of what we exported and imported, we're still importing 25 percent of our oil as of 2016.

For me, Canada is the right

choice to get that imported oil. Ninety-two cents out of every dollar we spend in Canada comes back to the United States. Research has shown 22 cents out of every dollar we spend overseas comes back to the United States.

Canada always has been our favorite neighbor, and I think we have a relationship that speaks loud to where we should be importing our oil from.

Pipelines are the safest mode of transportation, by far. That's been proven time and time again.

I would like to call attention to the EIS and the handout on page 16 that reflects the number of incidents as well as the amount of spill of the incidents. There's something missing from that chart, and what's missing is the volumes that each one transport each year. 2116-1

Because once you put the volumes into that chart, that's where it jumps out to you that pipelines are the safest mode of transportation. So I would like to request that in the final EIS, those volumes be included in that chart description.

There's another important factor that -- the only one I have to reach to is the work and safe (indiscernible) the Keystone XL. They did research that if the pipeline were not built and the oil went on a train or truck, they would predict 43 individuals would lose their lives as a result of that. Compared to zero loss of life with a pipeline.

I think that's a big factor we need to put into this equation as well, the public safety. Public uses oil and they deserve to live safe around oil.

I'm all for wind energy, but the last study I just viewed -- I hear talk about foreign imports of oil. Don't think for a minute that wind energy is not foreign owned either. I saw a study the other day based from the state of Oklahoma, 37 percent of the power payments and the subsidy payments are going to five countries overseas.

So it's not something that if we go wind, America is going to be the big winner of it. I think it's a balance.

And as the individual before me spoke, and I think he said it perfectly, is

that I think we need all of the above. In fact, that's my organization's policy, all of the above energy so that we have a rounded portfolio.

Pipelines by far have the least DAC emissions of any transportation mode for oil. That's a fact. And that speaks loud for the environment as well, and I think it should be considered.

The pipeline trades in Minnesota have been committed to this project from Enbridge. That commitment on Enbridge's part is a large commitment. They pick the right folks to build this pipeline onces it's constructed.

The trades involved in constructing the pipeline are the best pipeline builders in the world, and as the trades, we stand ready to build a new pipeline for Minnesota that has the highest quality of any pipeline in the world.

Thank you.

Levi, Andrew (COMM)

From: Barb and John Barten <bbarten79@gmail.com>
Sent: Sunday, July 09, 2017 4:58 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge proposed Line 3 comments, Docket CN-14-916 and PPL-15-137
Attachments: Enbridge Line 3 Comments 7-09-17.docx

Please find attached my comments on the proposed Line 3 pipeline project, Docket numbers CN-14-916 and PPL-15-137.

John Barten

Docket numbers CN-14-916 and PPL-15-137

Enbridge Line 3 Comments

Thank you for the opportunity to comment on the Draft EIS for the Enbridge Line 3 proposed project. The first section of my comments pertain directly to the Draft EIS and the second section apply to the proposed project in general.

The Draft EIS did not analyze the alternative of lining the existing Line 3 pipeline. Installing a liner in existing pipelines is a proven technology that that been used by numerous municipalities in Minnesota as well as the Metropolitan Council to extend the life of sanitary sewer and other pipelines. In the Draft EIS document, Enbridge states that continued use of the existing Line 3 would require approximately 4,000 integrity digs over the next 15 years (Section 2.2). This indicates that pipeline integrity is a major rational for the proposed project. The EIS needs to assess the effectiveness of lining the existing pipe to address the integrity issues, and determine the environmental impacts of this alternative relative to the proposed alternatives. 1284-1

The Draft EIS indicates that Enbridge proposes to abandon the existing Line 3 "in-place" and monitor the line for an indefinite time period to ensure that negative impacts to Minnesota resources do not occur. The Draft EIS acknowledges that "Over time, despite cathodic protection, the abandoned Line 3 would corrode and lose structural integrity such that water could enter the pipeline." (Section 8.3.1.2). Enbridge proposes to mitigate the loss of pipeline integrity partially by segmenting the line to minimize water flow when a failure occurs. Enbridge proposes to segment Line 3 at 47 locations, with 3 locations requiring further study. On the 282-mile long line, this results in an average segment length of 6 miles. Along most of the water rich existing Line 3 corridor, water resources such as lakes, streams and wetlands are much closer together than 6 miles, significantly increasing the probability of the 6 mile segments conveying water (along with pollutants and aquatic invasive species) from one resource to another. The impact of the 6 mile segments acting as a water conveyance system needs to be addressed in the EIS. 1284-2

If allowed to abandon existing Line 3 in-place, Enbridge proposes to "continue to monitor and maintain the abandoned Line 3 right-of-way in accordance with PHMSA regulations indefinitely" (Section 8.3). However, Enbridge does not define what constitutes "monitoring" of the abandoned pipeline. The Draft EIS needs to specify the frequency of monitoring (e.g., weekly, monthly, annually) and define exactly how the line will be monitored. Since the line will be underground and therefore not visible from the ground surface, how will the integrity of the line be determined? The methodology for determining both the probability of pipeline failure under roads, streams and wetlands and buoyancy issues need to be clearly articulated. In addition, the Draft EIS needs to be revised to include the specific stabilization protocols to be used when monitoring detects potential pipeline collapse or buoyancy problems in sensitive areas. 1284-3

The Draft EIS states that removal of existing Line 3 could affect the integrity of other existing lines in the ROW corridor. However, this analysis did not assess the impact if the lines were temporarily taken out of service during the removal process. The Draft EIS needs to be revised to include this analysis. 1284-4

1284-5

The Draft EIS does not address the long-term impacts of disposal of the proposed Line 3 when this line needs to be deactivated. The Draft EIS needs to be revised to state if this Line will also be abandoned in place or removed. Costs for either option need to be included and Enbridge needs to state how the funds necessary for decades of monitoring and maintenance of the abandoned line will be secured. It is recommended that the State of Minnesota require an annual escrow account payment to ensure that necessary funds are available for the 50 to 100-year monitoring period following pipeline abandonment. The EIS needs to be revised to include the long-term management and removal of the new proposed Line 3 when it is deactivated, and indicate how the cost for that management will be secured.

1284-6

The Draft EIS did not adequately address soil compaction resulting from the soil excavation process and from travel of heavy construction equipment along the pipeline trench. Soil compaction can limit the reestablishment of many plant species, especially native species. The EIS merely indicates that disturbed areas will be tilled prior to revegetation (Section 2.7.1.14). The EIS needs to be revised to specify the degree to which compaction will be mitigated, and require the addition of compost to all disturbed areas. The University of Minnesota has found that addition of compost to disturbed, compacted soils is necessary to restore water infiltration capacity.

General comments on the projects include:

Strongly urge the PUC to deny the Certificate of Need for a new corridor and require Enbridge to remove the existing Line 3 and install the new proposed 36-inch Line 3 in the same trench. This alternative would minimize environmental impacts to water resources, forest resources and eliminate impacts from an abandoned Line 3.

The Draft EIS states that the Applicants Preferred Route (APR) has the greatest impact on terrestrial habitat of all the alternatives studied, and has a significant impact on surface water resources. The APR would result in significant forest fragmentation and tree loss by creating a new utility corridor along much of the pipeline length. Construction activities are recognized avenues for invasive species, terrestrial as well as aquatic, to encroach into new habitats. The State of Minnesota taxpayers annually expend millions of dollars to manage invasive species, and allowing access into new habitats could undo much of that work. Although Enbridge proposes to minimize invasive species invasions by cleaning equipment and chemically treating known areas of these species, aerial dispersion of seeds on soil disturbed by construction activities in inevitable. Thus, utilizing the current, already disturbed corridor would minimize invasive species issues in the relatively pristine lakes and forests of northern Minnesota.

Believe that the APR should be denied in favor of RA-7, which has the smallest natural resources impact, particularly if the proposed Line 3 is installed in the same trench when existing Line 3 is removed.

Sincerely,

John M. Barten

Levi, Andrew (COMM)

From: Kathryn Beatty <kab1946@aol.com>
Sent: Thursday, July 06, 2017 11:01 AM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)
Attachments: K Beatty Comment 1 Enbridge DEIS.pdf

Environmental Review Manager:

Please accept the attached comments regarding the Enbridge Line 3 Replacement Project (CN-14-916 and PPL-15-137) Draft EIS.

Kathryn A. Beatty
19281 530th LN
McGregor MN 55760

kab1946@aol.com

Public Comment: Line 3 Replacement Project (CN-14-916 and PPL-15-137)

Background Information

I am a resident of Big Sandy Lake in Aitkin County, Minnesota. This lake is a key part of the economy of the region as it provides recreation, tourism, and is home to approximately 1000 full-time and seasonal property owners. Enbridge's preferred route for the Line 3 Replacement Pipeline passes through the watershed of this lake.

Reference

2016 Minnesota Statutes, Environmental Protection, Chapter 115E, Section 115E.03

Risk that Should Be Addressed

In accordance with Minnesota Statute 115E.03, a person who owns or operates a facility transporting oil shall be prepared at all times to rapidly and thoroughly recover discharged oil and take all other actions necessary to minimize pollution of land, waters, and air of the state and to protect the public's safety and health. Therefore, it is incumbent upon Enbridge to address their history of responding to discharges in order for the public to assess Enbridge's ability to meet these requirements. Detailed statistics on Enbridge's history of oil releases in Minnesota should be included in the Draft Environmental Impact Statement (DEIS) for the proposed Line 3 Replacement pipeline. One would expect to find the following information for each release: 1286-1

- The dates of occurrence
- The quantity of oil released
- A description of how the release was detected
- A description of how the released material was cleaned up
- The adverse short- and long-term impacts on the environment
- The current status of the affected area.

This level of information would provide citizens with data showing patterns of rapid response and recovery, possible impacts on the land and water, and long-term effects of allowing this new pipeline to be built across the Big Sandy Lake watershed.

If the absence of this information is an oversight on the part of Enbridge, it is a serious omission. The data must be added to the Final EIS to enable the public to evaluate the relative safety of building this pipeline in our state.

If, on the other hand, this information is being withheld on purpose, the citizens of Minnesota deserve an explanation for this decision. The importance of providing the public with the information needed to assess the risks should outweigh Enbridge's desire to maintain confidentiality on such an important aspect of the proposed route for the Line 2 Replacement pipeline. Enbridge should therefore be required to provide critically-important data on all oil releases that occurred under their ownership or control within our state.

Sincerely,

Kathryn A. Beatty

Levi, Andrew (COMM)

From: Bonnie Beckel <beckelbonnie@gmail.com>
Sent: Monday, July 03, 2017 12:35 PM
To: MN_COMM_Pipeline Comments
Subject: Comments on Proposed Line 3 Pipeline
Attachments: Comment Re- Proposed Line 3.docx

Hello Jamie MacAlister,

Please see attachment for my submission.
Thank You!

Bonnie Beckel
612 722-6473

7/3/2017
Att: Jamie McAlister
Environmental Review Manager
DEIS for the proposed Line 3 Pipeline
Docket # CN-14-916 and PPL-15-137

My name is Bonnie Beckel, a lifetime MN resident. For the past four years I have been learning about tar sands and natural gas production and transport, as well as Enbridge's horrific record of spills and leaks from their pipelines. I am a volunteer working with MN350. I'm deeply committed to caring for our natural environment and addressing environmental justice as it impacts Minnesota's Native Americans, Minnesota's wildlife and the health and well being of all of us. I spend part of every summer canoeing in the BWCA and vacationing at a northern MN resort and staying at Clearwater Forest north of Mille Lacs, near the proposed Line 3 route. The pristine waters and beautiful wildlife of the region are worth protecting by rejecting the certainty of damage to the environment by the Line 3 pipeline project.

The DEIS for the pipeline project offers no analysis of the downstream effects of tar sands oil spills, a major oversight. The DEIS looks at ground water sensitivity by surface soil type but ignores doing any analysis based on ground water sensitivity maps. 0980-1

The DEIS does a wholely inadequate job of addressing the need for the pipeline, and is thus unable to fulfill the requirement of an EIS to consider reasonable alternatives. My preferred alternative is compliance with Minnesota's climate change mitigation goals and our state's recent re-commitment to the Paris Climate Accord. The DEIS blithely states that the project complies with policies and regulations of state, federal and local governments. I could name many laws and policies that put this project into question, but will just note two more – the MN 2025 Energy Action Plan and the MN Environmental Policy Act. These agreements/laws/plans all speak to the necessity of considering the impact of our actions on Minnesota's as well as the world's natural environment.

EIS documents are expected to consider a project's effects on future development. A completed EIS will reveal the obvious -- the pipeline will extend our fossil fuel dependency far into the future, when climate change dictates an efficient move in the opposite direction.

Since the purpose of the proposed project is to supply energy, then the DEIS is remiss in not evaluating renewable energy alternatives. Instead the DEIS focuses on Enbridge's corporate interests in developing Line 3 and no substantive alternatives to that.

The DEIS attempts to justify the Line 3 proposal based on economic factors alone, which is not allowed in an EIS. Instead, this DEIS, under 116D.04,subd. 6, simply

states that the need/benefit of the project will be determined by market forces (demand for oil). This is a direct violation of the requirements for an EIS.

The DEIS has significant inadequacies that include the limited way it considers the environmental impacts of spills, by excluding how toxins spread in surface and ground water. It fails to meet the requirements of an EIS to analyze the need for the project and thus, the requirement to consider alternatives to the project. It wrongly states that the project meets existing policies. These are huge errors and omissions in the era of climate change, when there are many Minnesota and International policies and laws designed to protect life on planet earth.

Bonnie Beckel
3519 23rd Ave. So.
Minneapolis, MN 55407
612 722-6473

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Austin Bellefy

Street Address: 19313 342nd St PO Box 482

City: Bagley State: MN Zip Code: 56621

Phone or Email: bellefy2012@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

The Enviromental Impact statement is false because I'm from Bagley and they say it doesn't help local jobs but it definitly does! I've worked pipeline for 4 years and my main priority is makeing the pipeline safe 0350-1

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Sheila Bennett <sheila.bennett2@comcast.net>
Sent: Sunday, July 09, 2017 8:46 PM
To: MN_COMM_Pipeline Comments
Subject: Regarding Enbridge Line 3 Replacement pipeline

As a resident of Minnesota, I am seriously concerned about the environmental consequences of the proposed new Enbridge Line 3 pipeline corridor. There are many flaws, inconsistencies, and omissions in the DEIS, which does not begin to fully or accurately describe the impact of Enbridge's plan.

Regarding climate change, the "social cost of carbon" from building this pipeline is listed as up to $287 billion over a 30-year time span, which is terrible enough; however, the DEIS should include projected costs that assume a 60-your life span or more for the pipeline. Surely that sobering statistic will put the whole proposal into context in terms of its social cost. 1290-1

Instead of describing and evaluating rail and truck alternatives to this pipeline, the DEIS should acknowledge the widely-advocated alternative of simply shutting down the current Line 3 pipeline. Such a decision would be consistent with Minnesota's climate change mitigation goals.

The cursory chapter on pipeline abandonment is completely unacceptable. What kind of financial assurance can Enbridge supply that it will monitor the pipeline, once abandoned, in perpetuity?Simple research shows that companies regularly walk away from mines and pipelines, leaving all the environmental costs and consequences (mitigation and clean-up) to be borne by states and landowners. Why would the State of Minnesota take on such a risk for its environment and its taxpayers?

In addition, the DEIS greatly underestimates the probability of oil spills over the lifetime of the pipe, particularly considering the increased pressure from higher flow rates. This pipeline will double the number of Enbridge pipeline surface water crossings, including two more Mississippi River crossings. Why would we put our precious waterways at such risk?

The potential impact on water, wildlife, and the environment is so large as to be incomprehensible. This new route would affect 5,443 acres, would require 172 new roads, would clear a 120-foot swath of land across 340 miles, and would cross hundreds of acres of wetlands.

During an era when the world's demand for oil is declining and the profitability of pipeline operations is in question, it would be extremely shortsighted to allow short-term corporate pressures to override our long-term commitment to protecting Minnesota's environmental resources and helping to reduce fossil fuel emissions worldwide.

I implore you to take the time to address the flaws of the Draft EIS so that complete and correct information will be used in making a decision about this pipeline. Thank you for considering my comment.

Reference Docket numbers: CN-14-916 and PPL-15-137

Sincerely,

Sheila Bennett
St. Paul, Minnesota

Sent from my iPhone

Levi, Andrew (COMM)

From: Bob Berdahl <rmberdahl@gmail.com>
Sent: Monday, July 10, 2017 7:40 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Preliminary EIS
Attachments: Enbridge line 3 letter.docx

Comments attached

July 10, 2017

Bob and Mary Berdahl
23193 Green Pines Rd.
Park Rapids, Mn. 56470

2505-1

Pipeline comments@state.mn.us
Attention: Jamie MacAlister
Environmental Review Manager

Re: Draft Environmental Impact Statement ("DEIS") for Application of Enbridge Energy Limited Partnership ("Enbridge") for a Certificate of Need and Route Permit for Line 3.

PUC Docket No. PL9/CN14-916

PUC Docket No. PL9/PPL15-137

My Wife and I live on Potato Lake in Park Rapids, Minnesota. The Park Rapids area has Minnesota's clearest and cleanest lakes and aquifers with high susceptibility to ground water contamination. We feel that he DEIS is inadequate in a number of ways including the following:

1. **The OIL SPILL analysis needs to be performed by a qualified, credible, third party rather than Enbridge and it's contractors. This study needs to consider all failure modes, terrain and soil conditions, access to a spill, potential spill volumes, type of oil (tar sand?), oil flow additives and cleanup. How does one handle an oil spill in winter conditions with frozen lakes/streams?? Given the length of the pipeline and the many variables described above, the study needs to include more than 7 sites.**
2. **The DNR and MPCA have not participated in the study as we would expect, given their relative expertise and major state**

responsibility for our natural resources and environment . The final study needs DNR and MPCA involvement, conclusions and recommendations. I was under the impression that the PUC required DNR/MPCA involvement. As an outsider, that the DOC has not worked to keep the DNR and MPCA involved.

3. **Given the 192 water crossings via the proposed route, the construction impact of the project needs more study as done for the Sandpiper (MN PCA comprehensive water crossings report).**

Thank you for considering our comments. Please email me or call if you have any questions.

Sincerely,

Bob and Mary Berdahl

218-255-1944

Levi, Andrew (COMM)

From: Ric Berkholtz <ricberk7@gmail.com>
Sent: Monday, June 19, 2017 10:05 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Public Comment

Hello,

In regards to the commentary for the Draft EIS for Enbridge Line 3, I would like to submit commentary to the State of Minnesota regarding impacts due to Line 3.

I believe the State has not properly addressed the level of environmental racism this pipeline project holds. Regardless of the pipeline no longer crossing the reservations of the Anishinaabe people, according to the maps provided, it still crosses their wild rice lakes north of the White Earth Reservation. The wild rice is a form of sustenance for the tribe and it holds cultural significance. Therefore, it would be a crime against humanity to allow Line 3 to cross those wild rice lakes. 0503-1

I believe that the Draft EIS does not meet water protection. The preferred route for Line 3 still crosses the headwaters of the Mississippi river. That would endanger communities living downstream from the pipeline, including the Twin Cities area.

The DEIS does not acknowledge the grievances of tribes either. Not only does the pipeline have the potential to destroy the land that it would run through and the potential to destroy the wild rice lakes, it would also have the potential to destroy their rights to gather wild rice and fish on off-reservation territory which they have a right to be in due to treaty. The DEIS also ignores Winters vs United States which protects the water rights of reservations. This pipeline puts the water those reservations depend on in grave danger.

Along with ignoring the cultural sovereignty and treaty rights of the tribes, their civil rights are threatened by this project. We saw what happened in North Dakota when the Lakota of Standing Rock peacefully stood up to resist the Dakota Access Pipeline. Aggressive, militarized police action meant to protect corporations oppress the people even further. If Line 3 is approved, the rights of the Anishinaabe and all those who stand up to stop it's construction are in jeopardy. 0503-2

The reason I ask that both the Certificate of Need and the route permit be denied is because Minnesota is one of the states that's supposed to be moving forward. Governor Dayton has agreed that Minnesota will follow the Paris Climate Agreement. We won't be following the Paris Climate Agreement if Enbridge Line 3 is allowed to be constructed thereby furthering the genocide of indigenous people and the destruction of land and fresh water in Minnesota. All of the routes hurt the water in some way and water is all life. We would not be alive if it was not for water.

Minnesota does not need a pipeline. Minnesota needs clean, renewable energy; solar and wind. I go to college in Moorhead and it's a wind ally. So I wonder why I don't see more wind turbines up there. It would lead to more employment in Minnesota. A pipeline would only offer temporary jobs just as it would only offer short term profits.

Thank you very much,
Ric Berkholtz

Levi, Andrew (COMM)

From: bwj4 <bwj4@frontier.com>
Sent: Monday, July 10, 2017 9:51 AM
To: MN_COMM_Pipeline Comments
Cc: Kathryn Beatty; Janet Hill; Bruce Johnson
Subject: Big Sandy Lake Association DEIS comment for the Line3 project (CN-14-916 and PPL-15-137)
Attachments: BSLA Comment.pdf

Dear Environmental Review Manager,

The Big Sandy Lake Association (BSLA) Board of Directors submits the attached comments for the Line 3 Draft Environmental Impact Statement.

Sincerely,
Bruce Johnson
President, Big Sandy Lake Association
P.O. Box 21
McGregor, MN 55760

Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

The Big Sandy Lake Association (BSLA) Board of Directors submits the following comments for the Line 3 Draft Environmental Impact Statement.

Background

Big Sandy Lake is a 10-square-mile fishing and recreational lake in northern Aitkin County. It is the foundation of the economy of nearby McGregor, Minnesota; full-time and seasonal property owners on Big Sandy support over 100 businesses in this part of the state.

Enbridge's preferred route for the Line 3 "replacement" pipeline passes within a few miles of an inlet to Big Sandy Lake, and passes through the width of the lake's watershed on its way eastward toward Superior, Wisconsin.

Risks for Big Sandy Lake from Pipeline Spills and Leaks

We are concerned that the DEIS does not include the results of a 2016 study by the National Academies of Science, Engineering and Medicine, titled *Spills of Diluted Bitumen from Pipelines: A Comparative Study of Environmental Fate, Effects, and Response* (referred to hereafter as the Dilbit Study). Inclusion of the findings of this study would present the following facts which should be included in the evaluation of this project. 2509-1

- *Diluted bitumen (dilbit) spills pose particular challenges in water bodies because this material will sink in freshwater environments. Once this happens it will be practically impossible to recover/remove the material from the aquatic system leading to the long term release of toxic substances to the environment.*

- During the initial days of spill response, the major component of concern to human health from the spill of dilbit and other crude oil products is release of volatile compounds such as benzene, toluene, ethylbenzene, xylenes and hydrogen sulfide (H2S) which can result in acute and sublethal/chronic effects via inhalation, absorption and ingestion exposure.

- In addressing longer term or chronic human health concerns, protection of water supplies is a major focus of spill response activities. Dilbit will sink in aquatic environments presenting a high potential for contamination of a surface water supply that can result in long-term closure of drinking water sources. Another serious long-term outcome of incomplete removal of sunken bitumen is impairment of aquifers used as sources of human water supply. The contamination of these groundwater systems is inherently more difficult to remediate than for surface water bodies.

We find it alarming that this study has been ignored, when the short- and long-term health of many Minnesotans is at stake. The Big Sandy Lake Association, with over 500 household

members, insists that the analysis and findings of the Dilbit study be included in the Line 3 Final EIS.

In addition to the impacts caused by a catastrophic release discussed above, the BSLA's apprehension regarding Enbridge's preferred route for Line 3 is based on the probability that the pipeline will develop pinhole leaks as it ages and corrodes underground (DEIS section 10.3.1.4 Pinhole Releases). The DEIS states that pinhole-sized leaks cannot currently be detected by leak-detection systems. By the time enough oil from this kind of leak came to the surface to be noticed (which would take a long time in the remote, roadless wetlands of Aitkin County), oil and water-soluble toxins would have already reached Big Sandy Lake via at least one of the four rivers in our watershed that drain into the lake. The toxins released into Big Sandy Lake in such a scenario pose a threat to the residents of this lake and residents downstream on the Mississippi River.

Adequacy of Detection Systems

Enbridge proposes to use the SCADA leak detection system to monitor Line 3 (discussed in Chapters 2 and 10 of the DEIS). We believe that the following findings presented in the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration Final Report No. 12-173: Final Report Leak Detection Study – DTPH56-11-D-000001 (https://www.phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/Press%20Release%20Files/Leak%20Detection%20Study.pdf) should be included and considered in the Final EIS.

- Detection is critical because the earlier a leak is found the less environmental damage will occur. In the 361 pipeline incidents *that went undetected* by internal systems since 2010, a total of 141,421 barrels of petroleum products spilled, totaling $1.2 billion in property damage.

- Federal data shows that leak detection systems have caught small leaks and missed some of the largest. Six out of the largest 10 pipeline spills in the U.S. since 2010 went undetected by the computer detection system. Some of the release volumes where no data on SCADA was reported by the operator were as large as 9,030 gallons.

Additional Considerations

The DEIS, Section 10.1.2.1, Threats to Crude Oil Transport by Pipeline Systems, states that "Pipeline stress or corrosion can also occur due to the natural conditions of the substrate surrounding the pipeline. For example, many types of peat (which is common in Minnesota) exhibit negative buoyancy and place upward pressure on pipelines, causing stress on the pipe." Because much of Aitkin County is peat bog, this would appear to enhance the potential for a pipeline failure to occur but isn't adequately discussed in the DEIS. In addition, there is no mention of the effect of peat acidity on pipeline corrosion. We would like to see more analysis in the Final EIS about pipeline stress in peat bogs and the effect of peat acidity on pipes. 2509-2

Alternative Analysis

There is no comparative analysis in the DEIS of the worst case scenario for emergency response to a spill along the various routes. Because the area around the alternative route SA-04 has more

established roads and a leak would be more immediately visible to the local citizens, the response time for SA-04 would likely be better than one in Aitkin County, with its remote wetlands and lack of roads. How difficult would it be to access a pipeline break along each of these potential routes? In each case, how long would it take to get oil spill equipment to the most remote areas of the route? How difficult would it be to access a large spill given immediate proximity to roads? We would like to see a comparative analysis of emergency response for all of the route alternatives, including SA-04.

Thank you for your attention to our concerns.

Bruce Johnson
President, Big Sandy Lake Association

MS. REGINA BIRCHEM: I read the Executive Summary and select parts of the DEIS for Enbridge's Line 3 proposal.

I am absolutely opposed to a new Line 3. I'm opposed to abandoning and even continuing to use the present Line 3.

The DEIS lists and sometimes provides data on many important issues, such as: Impact on wildlife, water quality, soil -- water quality, soil and air, social and environmental justice, treaty rights, climate change.

In spite of identifying these critical issues, the overall bias of the statement is to

accept another pipeline as inevitable, even though it impinges negatively, economically and socially, on the people of Minnesota and beyond.

Challenges and perils of rapidly changing climate and political situations -- never faced previously by the people of Minnesota -- are speedily coming upon us with both certainty and unpredictability.

My four points: We really don't need any more oil. Processing Canadian heavy tar sands crude oil is not currently profitable.

Number 2, based on unclear and conflicting data in Chapter 5, estimates of life-cycle greenhouse gas emissions for heavy crude transport by Line 3 over the span of 30 years is shockingly high. 1705-1

Just for greenhouse gas emissions, $287 billion.

The present Line 3 has been in place about 50 years. So if Enbridge is still viable, it is likely that a projected new line would be used longer than 30 years.

Number 3, if Enbridge cannot or chooses not to remove the old Line 3 pipeline safely, then why install a larger Line 3 carrying even more

hazardous heavy crude.

Enbridge claims it will monitor the abandoned Line 3 indefinitely. How long will Enbridge exist? The cost of removal of Line 3 is estimated at $1.28 billion. The cost of abandoning it is $85 million.

What about all the old pipelines? Who will pay for their removal and mitigation of damage.

The fourth point, the applicant's preferred route will lead to a permanent destruction and fragmentation of forested and wetland habitats in northern Minnesota, an area already challenged markedly by climate change.

This is stated clearly as permanent damage to the forest in the executive summary and is stated clearly in the EIS.

In closing, a week ago I stood, as many of you have, on the North Shore of Lake Superior in awe of the vastness and beauty of the world's largest body of fresh water.

Minnesotans share an enormous responsibility to protect water and our priceless resources. We can no longer employ destructive processes that can not be reversed for short term monetary gain by any company or individual.

University of Minnesota scientists throughout the state, including in Ely, Minnesota, are trying to assess the unexpected effects of climate change, such as, for example, high horizontal winds that can remove a whole forest in a short time. The forests do not recover.

Levi, Andrew (COMM)

From: Toni Bischoff <tonibischoff@gmail.com>
Sent: Monday, July 10, 2017 5:53 PM
To: MN_COMM_Pipeline Comments
Subject: Jamie MacAlister: Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I am from Oxford North Carolina and wanted to share my concerns with you over the Line 3 pipeline. As you can see, there are more than enough reason to deny a permit at this time. The quality of our waterways affect everyone of us across the nation. Thank you for your time and attention to this matter.

Many of the environmental impacts and "plans" for minimizing them are drawn directly from Enbridge's permit application ("Enbridge would do this" and "Enbridge would do that") without any evidence of compliance or genuine consideration that maybe, just maybe, Enbridge won't follow all the rules. History shows that they continually violate permit conditions.

The No Build alternative is not considered. It is framed as "Continued Use of Existing Line 3" (Chapters 3 and 4), but nowhere is the "Shut Line 3 Down" option considered. There is no discussion of renewable energy, conservation, or the rapid development of electric car infrastructure. There is no assessment of the decline in oil demand. The entire study assumes that society needs X amount of oil, simply because Enbridge says they can sell it. That assumption ignores the massive fossil fuel subsidies and debts that make Enbridge's profits possible, and avoids the moral question of what is good for people and the planet.

The risks of pipeline abandonment are not adequately assessed. For example, there is no discussion of landowner property values and the effect that an abandoned pipe could have on them, especially if there is indeed "**legacy contamination**" on people's land.

The DEIS contains **no spill analysis for tributaries of the St. Louis River or Nemadji River**, where spills could decimate **Lake Superior** and the harbors of the Twin Ports. 2510-1

Most of the issues specific to tribal people and tribal resources are **confined to a separate chapter** that attempts to provide "an American Indian perspective." They are excluded from the main chapters that assess potential impacts. This allows the EIS to **avoid drawing conclusions** about the impacts on tribal people. (Chapter 9)

Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "**would have a long-term detrimental effect on tribal members and tribal resources**" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). **This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members**.

Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "**are part of a larger pattern of structural racism**" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the

impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3).

Most of the analysis of archaeological resources in the path of the pipeline rely on **Enbridge's surveys**. For some reason, only 3 of their 8 surveys are available, and the 5 missing are the most recent! In those, Enbridge found 63 sites, but claims that only 3 are eligible for protection under the National Register of Historic Places. (5.4.2.6.1). 2510-2

This sums up the majority of my concerns that I wanted to address concerning Line 3. Thank you for your time.

Sincerely,
Toni Bischoff
Oxford, NC

Levi, Andrew (COMM)

From: Jessica Bleichner <jessica.bleichner@gmail.com>
Sent: Monday, July 10, 2017 11:28 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 EIS Comment

Dear Environmental Review Manager,

I am confused by a statement in the Executive Summary on Page 14 of the draft EIS. "There is no one way to measure the general region-wide differences in surface water resource quality across MN." What methodologies were used? This needs to be addressed in the Final EIS. 2517-1

I am a MPCA water quality monitor volunteer and student of Limnology. Eutrophication is a widely used water quality measurement for many reliable reasons. Is the applicant using the eutrophication model that is widely accepted as the best measure by the scientific community?

Thank You,
Jessica Bleichner
19419 Spencer Rd
Brainerd, MN 56401
MN Master Naturalist Volunteer

Levi, Andrew (COMM)

From: Dean Borgeson <dborgeson@crosslake.net>
Sent: Wednesday, July 05, 2017 1:27 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137 Public Comment: Line 3 Project (CN-14-916 and PPL-15-137

Environmental Review Manager:

- What is the target composition of the carrier diluent used in the pipeline? 1206-1
- What is the acceptable/allowable range for each of the diluent's constituent components?
- What health/environmental hazards are presented by each of the diluent's components?
- Is the diluent composition adjusted seasonally to compensate for ambient temperature variation?
- What is the effect of releasing each of the diluent's components into a flowing stream? 1206-2
- What is the effect of releasing each of the diluent's components into a flowing stream beneath a covering of ice?
- What is the effect of releasing the diluent's components into a permeable wetland?
- What is the effect of releasing the diluent's components into a permeable wetland below the frost-line?
- How many residences use sand point wells for obtaining potable water on the Whitefish chain of lakes? 1206-3
- How can 500' either side of a water body's centerline be used to determine impacted households when the reservoir is up to 20 times that width?
- What is the annual value of the Walleye eggs recovered at the DNR stripping site upstream from the reservoir? 1206-4
- What would be the cost of government providing potable water to every occupied dwelling on the reservoir? 1206-5
- What would be the cost of the DNR completely restocking the reservoir with walleyes in a year's time?
- Could Enbridge be held to account for these costs? 1206-6
- Is Enbridge bonded to cover such costs and to compensate landowners for any damages (including property value declines) in the event of a catastrophic spill?

Dean Borgeson
36030 Bonnie Lakes Road
Crosslake, MN 56442
218-692-4723

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Dan Borgeson
Street Address: 36030 Bonnie Lakes Rd
City: Crosslake State: MN Zip Code: 56442
Phone or Email: dborgeson@crosslake.net

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

In Docket "CN-14-916 the certificate of need application, Enbridge used Figure 4.A-1 to support the need for the pipeline by illustrating the five state region that includes Minnesota has a demand for petroleum products that exceeds the regional production capacity.

Why did Enbridge expand the scope of the need from the state to the region?

The U.S. Energy Information Administration Profile for Minnesota dated April 20, 2017 indicates the state's demand for petroleum products (total consumption) is 112,572,000 bbl/year. The profile also indicates the state has a production capacity of 278,900 bbl/day (or 138,298,500 bbl/yr). This capacity is not dependent on Line 3 between Clearbrook and Superior.

How does a production capacity that is 123% of the state's demand for petroleum products support the need for Minnesota to expand and reroute Line 3?

1897-1

① https://www.eia.gov/state/analysis.php?sid=MN

If including additional pages please number them and tell us how many you are providing _____ pages

July 10, 2017

To: Jamie MacAlister

From: Dawn Bourdeaux

Re: Line 3 Replacement - CN-14-916 and PPL-15-137

Hello,

Can you please put comments in all the PUC Dockets CN-14-914 & PPL-15-137 for Line 3 Replacement?

Thank you!

Total Pages: 8

Date: July 10, 2017

To: Minnesota Department of Commerce
Attn: Jamie Macalister – Environmental Review Manager

From: Dawn Bourdeaux
Trustee for Erie – Bourdeaux Family Revocable Trust
MN-CL-011.000, MN-CL-012.000, MN-CL-014.000

RE: Line 3 replacement
PUC Docket Numbers: CN-14-916 and PPL-15-137

Can you please put comments in all the PUC Dockets CN-14-914 & PPL-15-137 for Line 3 replacement?

I am writing in regards to the following properties **MN-CL-001.000, MN-CL-012.000 and MN-CL-014.000 (Erie – Bourdeaux Family Revocable Trust)** off of Taflin Lake Road in Pine Lake Township in Clearwater County. Currently going through the properties are EPP Corridor (7 lines) and NDPC Line 81, for a total of 8 lines. With the replacement line 3, our properties will have 9 lines. We are OVER fatigued with the amount of pipelines going through our properties already. For the Line 3 replacement line they want to change routes when the line leaves Clearbrook, because of fatigued, it is already fatigued before it gets to the Clearbrook Terminal. The route needs to change before you even get to Clearbrook, because of the same reasons Enbridge does not want to follow the current line 3 route to Superior, WI. The line 3 replacement line should follow the current route for line 3 exactly and the old pipes removed. The old line 3 pipes need to be removed and not left in the ground.

All the following projects are phased and connected actions and need to be in the EIS (Environmental Impact Statement): Sandpiper – docket #13-474(currently closed), Line 3 replacement – docket #15-137, Clearbrook West 115 kV Transmission line – docket #14-665 (currently closed) and Clearbrook West Terminal (New Tank Farm for Sandpiper.) All routes and alternatives must be considered in the EIS, for ALL of these phased and connected projects. If the replacement line 3 is approved, will the Sandpiper, Clearbrook West 115 kV Transmission line and Clearbrook West Terminal be resubmitted for approval? Need to look at how many new lines and replacement lines will be happening and the impact it will have on the land owners. 2307-1

Why is there any examination of corrosion from co-location pipelines with high voltage transmission lines? A 4 year old pipeline, Keystone 1, suffered leaks from accelerated corrosion due to stray voltage from powerlines. Also need to look at the current 7 lines and replacement line 3 lines will be very close together and cause corrosion or etc. The current 7 lines, some are only 10 feet apart of each other.

There are two lakes very close to the 8 pipelines, Erie Lake and Klongerbo Lake. Currently on the Erie Lake there are 12 trumpeter swans. Each year more trumpeter swans are on Erie Lake. We also have eagles between the lakes and even an eagle nest on property MN-CL-011.000. Also there are all kinds of wildlife on these properties. On Lake Erie we have springs and a hot springs. The springs stay open year round. The temperature does not matter; they are always open, even when it is 60 below 0.

Property ID # MN-CL-014.000 is a CENTURY FARM for our family this past January 2017. The **CENTURY FARM** currently has 8 pipelines (EPP Corridor – 7 lines and NDPC line 81)

going through the property. Between the Sandpiper line being very close to the homestead building site and power lines that would start to go through the homestead that Enbridge and Minnkota Power want. It has been in our family planning that we are going to be rebuilding on the old homestead in the next 5 years. Currently the old farm house is standing. The farm is so important to our family and our heritage. Our family wants to keep our farm homestead (CENTURY FARM) free of power lines and pipelines. ***The land has provided our family an agriculture living for 100 years.*** Our family should be able to preserve the **CENTURY FARM** and be able to pass the farm down to future generations. How many more replacement pipelines, new pipelines, upgrading existing lines or powerlines can a corridor (same route) handle?

On Line 3 replacement line move the workstation over to Enbridge property ID # MN-CL-013.200 and not on Erie – Bourdeaux Family Revocable Trust property ID # MN-CL-014.000.

With ALL the tanks at the Clearbrook Terminal and the new Clearbrook West Terminal and pipelines, SAFETY NEEDS TO BE ADDRESSED. When my mom passed away on April 8, 2014, there were no Fire Fighters from the Gonvick Fire Department to come out for the call. ***ALL the fire fighters are volunteers and we understand they cannot be available at all times.*** They need to make a living to support their families. Just south of Clearbrook two men lost their lives due to an explosion while repairing a line. **Need to have first responders available at ALL times to handle any kind of emergency from the pipelines, tank farms and etc.**

If the replacement line 3 is approved, then will the Sandpiper, New Tank Farm and Clearbrook West 115 kV Transmission line be back for projects to be approved? Also we have concerned with the EPP Corridor (7 lines, 8 with replacement line 3), Line 81 and Sandpiper with the amount of pipe and the 115 kV transmission line for stray voltage. Also have great concern with paralleling pipelines with transmission would lead to corrosion of the pipelines. How many new lines, replacement lines or upgrading existing pipelines will happen? How many lines does one farm need to have? Our properties already shows fatigued from pipelines and new routes need to be found. Attached is a letter from John Linc Stine – commissioner on alternative routes. 2307-2

Animal disease from property # MN-CL-015.000 to our property. Well need to work with the MN State Veterinary and make sure no animal disease get on our property. All equipment will need to be cleaned and cannot come back and far between the properties. Soil cannot be exchange or moved. Our breeding of cattle can go back just as far as our old farm (MN-CL-014.000). You cannot replace our herd of cattle or our century farm.

On Erie Lake (MN-CL-013.000 and MN-CL-014.000) and Klongerbo Lake (MN-CL-014.000) we have shoreline rules. On both Erie Lake and Klongerbo Lake we have 150 feet setback around all the lakes. Also the wetlands connected to Erie Lake. Also on properties MN-CL.011.000, MN-CL.013.000 and MN-CL-014.000 have restricted use. Lake Erie provides fresh water for wildlife (Swans, Ducks, Deer, Eagles, Beavers, etc.) and the beef cattle.

Minnesota needs to also include LANDOWNER PROTECTIONS rules/terms/conditions. Example Iowa Utilities Board placed terms & conditions, along with $25 million on their permit for the Dakota Access Pipeline. Landowners need to have protection for their property. Is Minnesota going to include LANDOWNER PROTECTIONS rules/terms/conditions?

EIS (Environmental Impact Statement):

- Protections of ALL Lakes and Wetlands.
- Fens
- Human Settlement
- Cultural Values
- Tourism
- Long term farming
- Century farm for Erie – Bourdeaux Families
- Long Standing Family Farms
- Loss of two home sites
- EIS address displacement of livestock, pasture and loss of pasture land.
- Noise 2307-3
- Public Health and Safety
- Recreation
- Socioeconomics - EIS to address loss of building sites, loss of property value, loss of value as residential and future development, loss of value for agricultural production and gravel mining.) 2307-4
- Land Base Economies (Agriculture, Forestry, Mining)
- Timing of Projects (If all projects are going at once, we will be unable to farm the land and have no crops or hay for cattle.) Puts our farm out of business.
- Air
- Geology
- Groundwater – high water tables. Showing links between groundwater, surface water and wetlands. Includes the springs and hot springs on the Erie – Bourdeaux Property.
- Rare and Unique Resources – including sensitive/protected resources.
- Vegetation – clearing impacts, potential pesticide use on RoW.
- Wildlife and Wildlife Habitat. Also address potential for USFWS recommendation of eagle take permit and bat take permit. Eagles nests on Erie – Bourdeaux property.
- EIS address that Minnesota Pollution Control Agency recommended consideration of alternative for tank farm near Crookston for the Sandpiper Terminal and Pumping Station proposed for Clearbrook West Terminal. 2307-5
- **Pipeline Route Alternatives** – ***FOH SA-04 and MPCA SA-03***

I have also attached map of the property's and letter

Thank you for your time and consideration in this matter.

Sincerely,

Dawn Bourdeaux
Trustee for Erie – Bourdeaux Family Revocable Trust

Exhibit A

- Property Map
- Letter from John Linc Stine – Commissioner for route alternatives.

4

Sandpiper proposed route

Orange - Easement already given for sandpiper line

Silver - line 81

Darkred - line 3 replacement

Red - EPP corridor

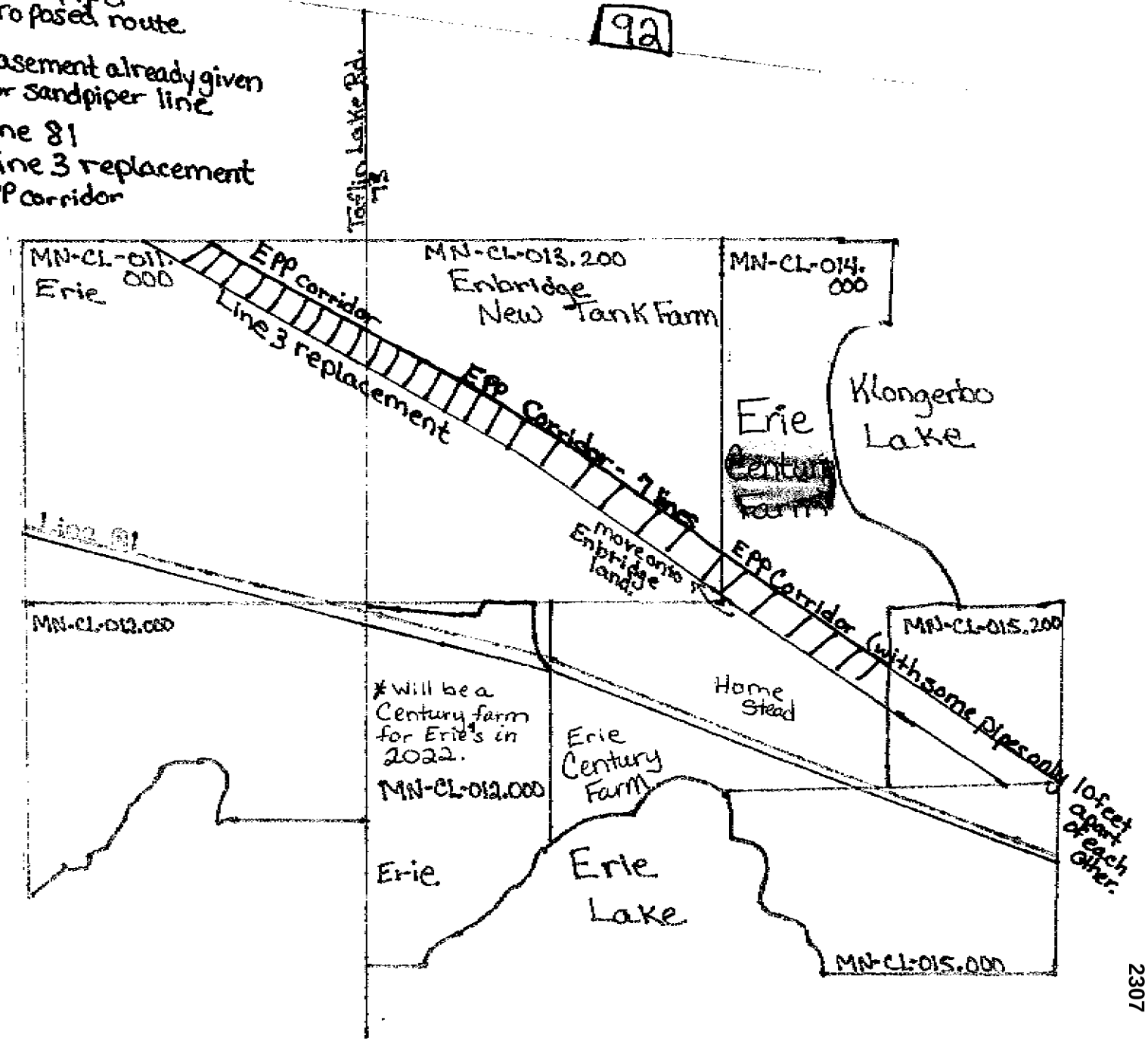

Minnesota Pollution Control Agency

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300

800-657-3864 | 651-282-5332 TTY | www.pca.state.mn.us | Equal Opportunity Employer

August 6, 2014

Mr. Burl Haar, Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

Dear Mr. Haar:

RE: Enbridge Sandpiper Pipeline Project, Docket No PL 6668/PPL-13-474

The Minnesota Pollution Control Agency (MPCA) has reviewed the comments and recommendations submitted by the Department of Commerce (DOC) on July 16, 2014, which will be considered by the Public Utilities Commission (Commission) at the August 7, 2014, hearing for the Enbridge Sandpiper Pipeline project. The MPCA offers the following comments on the project and the DOC's July 16, 2014, recommendations.

The recent boom in the production of oil and gas in North Dakota and surrounding areas has brought about an increase in the number of planned and proposed projects in Minnesota for the transportation, storage, and processing of these resources and their related products and uses. This activity has increased citizen and Agency interest in the amount and quality of information available to adequately assess the individual and cumulative environmental impacts of these projects and to fully inform decision-making processes.

Many alternatives to the proposed Sandpiper project and route have been suggested in the routing (PPL-13-474) and certificate of need (CN-13-473) proceedings, including rail transport, trucking, and numerous pipeline routes. The Commission will determine which alternatives are to be addressed in greater detail as the environmental review, certificate of need, and permitting processes move forward.

Given the high potential of additional pipelines and replacement or upgrading of existing pipelines in the near future, and within the same corridors, it is critical that the current effort consider multiple alternatives, including both route and system alternatives. For the reasons outlined below, limiting the alternatives to route options alone at this stage would unnecessarily narrow the scope of project options to reduce environmental and public health risks.

In our comments, the MPCA has suggested both route and system alternatives; these are discussed in the DOC's July 16, 2014, filing. I am concerned that the system alternative recommended for consideration by the MPCA may not be evaluated in these proceedings, since it does not include the Clearbrook terminal. The DOC evaluated the MPCA's system alternative, SA-03, and developed a connector segment to Clearbrook that would convert SA-03 into a route alternative. The MPCA supports inclusion of the SA-03 route with the connector segment developed by DOC as a less environmentally harmful route alternative than the proposer's route.

The MPCA's view is that the environmental impacts of system alternatives need to be considered as well as route alternatives. A system alternative that will transport oil to an alternative terminal with significantly less environmental harm should be evaluated in these proceedings.

My understanding is that system alternatives are considered in the Certificate of Need (CN) proceeding for this project. I also understand that DOC conducts environmental review of system alternatives in High Voltage Transmission Line certificate of need proceedings in the form of an Environmental Report (ER), but that this review is not conducted for pipeline certificate of need proceedings. The MPCA respectfully requests that the Commission request the DOC to prepare an ER-type review of alternatives to the project, including SA-03 as originally proposed by the MPCA without the connector segment to Clearbrook, for introduction into the CN proceeding. This position is based on MPCA's understanding as follows:

1. The project purpose can be met without constructing new storage capacity in Clearbrook. If the new terminal were to be built at a more westerly location, such as Crookston, a 75-mile long pipeline to Clearbrook could be constructed for the purpose of sending the oil that Enbridge is contractually obligated to send through Clearbrook (for transport to St. Paul refineries), while the remainder of the Bakken crude could be sent via a less environmentally harmful route well to the south of the sensitive water resources, and then on to the Superior, Wisconsin terminal.

2. Locating terminal facilities near Crookston, or at another site closer to the border of North Dakota, could offer other pipeline routes as viable alternatives, such as the proposed "System Alternatives" identified in the July 16, 2014, DOC recommendations. A terminal closer to the Minnesota/North Dakota border could be the point of origination for future pipelines that would travel to the south and avoid the potential threat to sensitive water resources that the MPCA has identified as being associated with the currently proposed Sandpiper route.

Thank you for consideration of our request.

Sincerely,

John Linc Stine
Commissioner

JLS:bt

MS. NATALIE BOYD: Hello. I've come to understand that people like to hear a specific section mentioned when we're talking about these things.

So I'm going to talk first about section 11.2, where they say, "Based on

recommendations from the MPCA, low income populations are individuals with income below 185 percent of the poverty level."

And I just want to say that no matter what metric you use to measure what low income is, we are all low income compared to oil companies. We will never have the resources that these companies have to push through their agenda. That's just one small thing I wanted to say.

In section 3.6.3.7, Enbridge will seek a utilities exemption from the Wetland Conservation Act in the wetlands replacement requirements. 1780-1

First of all, I wanted to know by what standards Enbridge and this pipeline are classifying themselves as a utility. And second of all, what does this say about Enbridge's commitment to the environment and clean building; that they would say that they don't have to replace wetlands that they destroy like everybody else is supposed to.

In section 3.6.3.4, "Consultation with the Minnesota State Historic Preservation Office encouraged but not required." Likewise,

the Applicant is only encouraged to consult with the Minnesota Mississippi Headwaters Board."

And I want to know why these organizations don't have the same weight as others. Why is consultation with these organizations not required?

In 9.4.2, "Cultural Corridors. The MIAC recommends a survey of the proposed route prior to start of construction to identify areas of historical or spiritual or cultural significance."

But this hasn't happened yet. It is still an afterthought rather than an actual factor in the decision-making process.

These things will happen, if they happen at all, when the process has already been approved. This illustrates the continued negligence of native communities.

While there's a lot of language in the EIS talking about native communities, there is no, virtually no meaningful action proposed.

Levi, Andrew (COMM)

From: Li Boyd <ngrace.boyd@gmail.com>
Sent: Monday, July 10, 2017 8:28 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916, PPL-15-137
Attachments: Line3 DEIS Comments.pdf

Attached, please find my comments on the Draft EIS for docket numbers CN-14-916, PPL-15-137.

Thank you.

Natalie Boyd

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9th July 2017

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Re: CN-14-916, PPL-15-137

To Whom It May Concern:

My name is Natalie Boyd. I am an enrolled member of the Mille Lacs Band of Ojibwe, a resident of the state of Minnesota, a United States citizen, and an inhabitant of Planet Earth. Herein are my public comments in opposition to the Enbridge Line 3 Expansion Project as presented in the Draft Environmental Impact Statement prepared by the Minnesota Department of Commerce Public Utilities Commission. I would like to point out that I am an average citizen with some college education but no expertise in any particular field. These comments are the best I could generate with the time I was given by the state of Minnesota to respond to the release of the draft on May 15, 2017.

This may qualify as my first objection. While I congratulate the state on engaging in the process of developing an EIS for a project of this scope, I feel that the public has been given too little time and information with which to respond. First, the EIS is a dense document and difficult to navigate. The information within it is segmented in confusing ways, and the language used is obtuse. The document, with appendices, is close to five thousand pages long. It is very difficult to address in its entirety. Furthermore, even at this length, the EIS seems to suffer from missing information. There are studies that cannot be accounted for, links that do not work, and relevant information that is simply not provided.

For example, a term used often in the DEIS is Best Management Practices or BMPs. However, the business structure employed by Enbridge and how it will manage ownership and operation of

this project are not discussed. It is standard practice with companies like Enbridge L.P. to use Limited Liability Companies to avoid liability for the consequences that would result from a catastrophic failure of the pipeline. This leads me to question who would ultimately be liable for a catastrophic failure of the pipeline in this case. I feel that this information is vital to being able to make comment on this project. If liability is shifted to an LLC, how can taxpayers be sure that they won't be stuck with the financial burden of cleaning up the mess when the pipeline fails? Enbridge's business structure related to the Line 3 Expansion needs to be made completely transparent and must be included in documents available to the public, such as this EIS.

Before I go any further, I must make clear one thing. Pipelines always fail. The only unknown factor is by how much. How severe is the damage from the failure going to be? What will the financial cost be? What will the environmental cost be? What will the human cost be?

Let us also clarify another matter. This draft EIS is not an *Environmental* Impact Statement. This is an *Economic* impact statement. This document was prepared by the Minnesota Department of Commerce, and all comments have been directed to the MNDOC. By the title of the managing agency alone, it is evident that environmental concerns are not the primary focus being discussed herein. The DOC is rightly involved in some aspects of regulation of this project, being that commerce involves "**the exchange or buying and selling of commodities on a large scale involving transportation from place to place**[1]," (as defined by Merriam-Webster.) You will note that mention of the environment appears in no part of this definition. True and actual assessment of environmental impact would better fall to the responsibility of agencies such as the Minnesota Pollution Control Agency, the Environmental Protection Agency, the Minnesota Department of Natural Resources, or any other that has anything at all to do with actual environment. The Minnesota Department of Commerce has a different set of interests it caters to, such as employment and revenue, and the environment is not the primary concern or the purview of this agency.

Additionally, this entire permitting process raises its own questions. As explained in the Executive Summary of the DEIS, the applicant (Enbridge) must first establish the underlying need for the project. Only once the need is established will the EIS be used to make determinations on the manner in which to grant or deny the certificate of need considering all the options and alternatives presented. I am unclear at what point Enbridge has ever first established the underlying need for this project, and I question the validity of a this entire document based on the uncertainty of when need was established and when analysis began. (We will come back to the issue of "need" later.)

The first issue I wish to discuss is that of compliance. The DEIS comes to many of its conclusions based on the assumption that Enbridge will comply with all the regulations laid forth in the document. It even goes so far as to make determinations based on the aforementioned

[1] "Commerce." Def 2. *Merriam Webster Online*, Merriam Webster. Web. 8 Jul 2017.

BMPs that are not in any way required. The DEIS supposes that Enbridge will always do all that it can to enact good environmental stewardship unless it explicitly claims otherwise. This is a great misplacement of faith.

Enbridge's spill response plans have not even been developed. They have offered no evidence of comprehensive policies and procedures to deal with "accidental crude release." It is unquestionable that a release of heavy crude oil, or diluted bitumen, would be devastating. According to "Spills of Diluted Bitumen from Pipelines: A Comparative Study of Environmental Fate, Effects, and Response," released by the National Academy of Science in 2016, heavy crude oil released in a marine environment poses particular challenges. Weathering of diluted bitumen progresses quickly upon release as the volatiles used to dilute it evaporate, and the remaining residue rapidly begins to submerge. Oil particles may then remain in suspension or sink to the bottom. The study goes on to say: 2524-1

> "**This situation is highly problematic for spill response because (1) there are few effective techniques for detection, containment, and recovery of oil that is submerged in the water column, and (2) available techniques for responding to oil that has sunk to the bottom have variable effectiveness depending on the spill conditions.**[2]"

The United States Geological Survey publication "Oil-Particle Interactions and Submergence from Crude Oil Spills in Marine and Freshwater Environments— Review of the Science and Future Science Needs[3]" goes so far as to say that current techniques that have been developed to deal with suspended or settled oil may be just as or more damaging than leaving the oil in place, and further study is needed.

It's no wonder then that Enbridge has failed to present spill response plans as effective mitigation tactics do not exist. This does not excuse them from their responsibility for developing these plans. It does, however, call into question whether a project or product such as this should even be considered.

Related to this, the DEIS contains no analysis of the efficacy of Enbridge's leak detection systems. According to a report from the National Transportation Safety Board on the leak of Enbridge Line 5B in Kalamazoo, Michigan, the leak detection system had no effect whatsoever 2524-2

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[2] National Academies of Sciences, Engineering, and Medicine. 2016. *Spills of Diluted Bitumen from Pipelines: A Comparative Study of Environmental Fate, Effects, and Response*. Washington, DC: The National Academies Press. Page 24. Web. 8 July 2017.

[3] Fitzpatrick, F.A., Boufadel, M.C., Johnson, Rex, Lee, Kenneth, Graan, T.P., and others, 2015, *Oil-particle interactions and submergence from crude oil spills in marine and freshwater environments—Review of the science and future science needs: U.S. Geological Survey Open-File Report 2015–1076*, 33 p., http://dx.doi.org/10.3133/ofr20151076.

on the detection of the leak[4]. It was reported by a resident of the area. The Pipeline and Hazardous Materials Safety Administration reported in a 2012 that only 17% of pipeline leaks were identified via leak detection systems[5]. This must be taken into account in the DEIS. 2524-2 Cont'd

Furthermore, the seven sites selected in the DEIS for spill modeling are not representative of the spectrum of resources put at risk along the applicant's preferred route. The corridor crosses tributaries that lead to Lake Superior, and there is no assessment of potential spill impact to this area. That is a very large body to not have taken into account. 2524-3

So, what are the consequences if Enbridge does not comply with regulations, and who will be ultimately liable? The Comprehensive Environmental Response, Compensation and Liability Act of 1980, or what we now call the federal Superfund program, deals with the cleanup of hazardous materials. It was initially funded by a tax on companies that produced chemicals, including petrochemicals. This tax was repealed, however, and superfund went bankrupt. As of 2008, Potentially Responsible Parties were not even expected to be entirely fiscally responsible for the cost of clean up anymore[6]. This means that the superfund program is taxpayer funded. We must know if the burden of Enbridge's non-compliance would fall on the people of Minnesota.

Secondly, I now address the existing Line 3. Though I understand that Enbridge only inspects Line 3 every 12-18 months, I believe it is well understood that the integrity of this line is compromised. The line pressure has been reduced from its original capacity to compensate, but by proposing a new pipeline, even Enbridge appears to agree that this line should no longer be in service.

That being said, Enbridge's current plan to abandon the pipe in place is completely unacceptable. Enbridge cannot be allowed to walk away from Line 3 with only the claim that they will continue to monitor it. There are too many unknowns when it comes to leaving this pipeline in the ground. This pipe is already exposed on the surface in multiple places, and the proposed drainage of the pipe would only contribute to buoyancy that could cause the pipe to rise in more places. What might happen to these exposed sections? If legacy contamination is discovered, what is the contingency? Enbridge has claimed they would monitor the pipe indefinitely. What does indefinitely mean, and what does monitoring entail? If there is problem in the future, will Enbridge take responsibility for it? Just because they are monitoring the pipeline, does not mean any contamination discovered is not ultimately the responsibility of the landowner on whose property the incident takes place.

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[4] National Transportation Safety Board. 2012. *Enbridge Incorporated Hazardous Liquid Pipeline Rupture and Release, Marshall, Michigan, July 25, 2010. Pipeline Accident Report NTSB/PAR-12/01*. Web. 8 Jul 2017.

[5] Pipeline and Hazardous Material Safety Administration. 2012. *Leak Detection Study – DTPH56-11-D000001*. Web. 8 Jul 2017.

[6] Schons, Mary. *Superfund*. National Geographic. 21 Jan 2011. Web. 8 Jul 2017.

If a landowner does not want pipe left on their property, they should not be forced to have it there. [Just as they should not have been forced to accept it being placed on their property in the first place.] Because of the unknown risks of abandonment and to act in fairness toward landowners, the existing Line 3 should be removed from the ground. In response to Enbridge's claims that removal of the pipeline is potentially dangerous due to proximity to other lines, I would point out that Enbridge already does integrity digs on Line 3, which illustrates that digging up the line is not unknown territory for them. If removal is somehow more dangerous than the thousands of integrity digs Enbridge claims would be necessary to continue operating Line 3, then they must explain why.

Perhaps the most dangerous aspect of allowing Enbridge to abandon Line 3 in place is that there is currently no existing policy for shutting down pipelines in Minnesota state or federal regulations. Whatever is decided here will set a precedent for future cases of pipeline decommissioning. Though it is stated in the DEIS that only this specific case can be addressed, the future impact of these decisions must be taken into account. Petrochemical and extraction companies must be shown that they are responsible for cleaning up their messes.

It has often been pointed out that many Minnesota counties have benefited from Enbridge's tax contributions. This is said to illustrate the financial benefit Enbridge provides to rural Minnesota communities. However, the Star Tribune[7] reported in March of this year that Enbridge disputes taxes levied over the last decade. The case has gone to court, and if Enbridge wins, Enbridge will receive millions of dollars in back taxes--taxes taken back from the counties it supposedly helped. This is the kind of corporate citizenship we can expect from Enbridge. This corporation cannot be trusted to keep the promises it makes.

Enbridge also cannot be counted on concerning the argument that pipeline construction would provide Minnesota an economic boost, even temporarily, by providing jobs. This financial benefit would go to a transient workforce and have very little effect on Minnesota households. This is explicitly stated in section 5.3.4.3.1. **"...hiring of local residents [...] would have a temporary and negligible impact on county-level unemployment or per capita and/or median household income levels."** It is expected that the majority of the workforce will be relocated to the areas of construction for the project, meaning employment revenue will return home with them and not stay in the Minnesota economy. Furthermore, the Line 3 expansion will create virtually zero permanent jobs. According to the same section of the DEIS, **"operation of the pipeline would have no measureable impact on local employment, per capita household income, median household income, or unemployment in the ROI."** The fallacy that this project would create jobs *that will benefit Minnesota residents on a large scale* must be corrected. 2524-4

[7] Hughlett, Mike. "Enbridge, state fail to reach settlement in pipeline tax dispute." *StarTribune*. 31 Mar 2017. *StarTribune*. Web. 8 Jul 2017.

The third major deficiency of the DEIS is the lack of analysation for a true "no build" alternative. If we pretend for a moment that this document is part of a procedure for assessing the need for and alternatives to new methods of transporting heavy crude oil across the state of Minnesota, then it has entirely forgotten to consider the alternative of renewable energy. In section 5.1.3, the applicant's preferred route is compared with the alternatives of **"continued use of existing Line 3, System alternative SA-04, Transportation by rail, Transportation by truck, Existing Line 3 supplemented by rail, Existing Line 3 supplemented by truck."** Route segment alternatives are also elsewhere discussed, but nowhere is the alternative to *not increase the amount of oil currently crossing the state* ever considered.

The United States, and the rest of the world, is currently experiencing an oil surplus. Oil companies have even agreed to lower production in order to artificially inflate the price of oil and raise their profits. According to the USA Today, the oil market is suffering from "**chronic oversupply**[8]." Yet Enbridge, a Canadian company, continues to assert that their existing pipeline systems are not able to meet the demand for oil. (Section 2.2) Enbridge needs to clarify what demand they are referring to, because all evidence seems to point to the contrary.

We also don't know the market destination of this product. Enbridge claims that much of it is bound for US use, but this may not even end up being domestic product. The public needs to know where this oil will be going, lest Minnesota simply become a dangerous conduit to serve a foreign company's profit.

The important point here is that the need for expanded oil transportation capacity, which is what this is presumably all about, simply does not exist. And even if the demand for oil were as high as Enbridge claims, renewable energy alternatives to petrochemicals exist. From transportation to power generation, the technology exists to move away from fossil fuel dependence. The only reason fossil fuels are still the dominant energy source in the world is because oil companies suppress alternative energies. In order to protect their profit, oil companies lobby against, buy out, and bully competitors developing renewable energy. No one disputes that modern civilization is dependent on energy in ways we never have been before. By assuring that access to and further development of alternate sources is limited, the petrochemical industry effectively holds the world hostage. We turn to petrochemicals because of a lack of choice, not because other options don't exist. The demand for oil is completely artificial, engineered by the greed-motivated fossil fuel industry.

The fourth major shortfall of the DEIS is that its impact assessments are insufficient. Chapter 5 is full of language such as would, may, where feasible, generally, typically, and other non-conclusive phrases. It also seems to almost always come to the conclusion that potential impacts would be "**temporary or minor**." Direct impacts are discussed "**where feasible**" while

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[8] Yu, Roger. "Oil price falls below $50 as U.S. supplies hit record." *USA Today*. 9 Mar 2017. *USA Today*. Web. 8 Jul 2017.

indirect impacts appear to be given much less weight and will only be "**described where appropriate**." (5.1.3) Though an impact may be indirect, that does not mean it will not have an equal or greater effect than a so-called direct impact. There is an entire branch of mathematics dedicated to the study of causality and behavior in dynamic systems. The Fractal Foundation, a teaching organization that explores the science known as Chaos Theory, claims that "**By understanding that our ecosystems, our social systems, and our economic systems are interconnected, we can hope to avoid actions which may end up being detrimental to our long-term well-being**[9]." By compartmentalizing impacts in the way that the DEIS does, the interconnectivity of the ecosystem (which includes humans) is ignored.

In 5.2.1.1.2 bedrock aquifers are mentioned and then summarily dismissed. The DEIS states that "**bedrock aquifers are not expected to be affected by pipeline construction and operation because they exist at depths averaging from 300 to 400 feet, which is well below pipeline construction depths. [...] Groundwater in these rocks occurs mostly in fractures that may not yield usable quantities of water**." The message here appears to be that bedrock aquifers along the applicant's preferred route are not likely to be at risk, but if they are negatively affected, their water supply is beyond feasible retrieval. It's ironic that the amount of oil found in fractures is considered a "**usable quantity**," but the amount of water is not. The oil that would be transferred through the applicant's pipeline is retrieved from fractures. It should be kept in mind that if surface water and other more conventional sources of groundwater were to be contaminated by the applicant's product, these bedrock aquifers could be the only source of water left. These sources should not be disregarded as low risk. 2524-5

Chapter 5 demonstrates that the DEIS suffers from a misunderstanding of how ecosystems operate. In the discussion of surface water impacts in 5.2.1.2.1, the Region of Interest (ROI) assessed is limited to "**the construction work area for each surface water crossed by the Applicant's preferred route in Minnesota (typically 120 feet wide) as well as the area immediately downstream from the crossing for flowing surface waters, and in the immediate vicinity for crossings of non-flowing surface waters such as lakes and wild rice waterbodies**." This statement shows either willful or fundamental ignorance of how the biosphere functions and also of the meaning of the word downstream. A stream is defined by Merriam-Webster as "**1. a body of running water (such as a river or brook) flowing on the earth, 2. a constantly renewed or steady supply, 3. an unbroken flow, and 4. a dominant influence**[10]." Streams do not stop flowing "**immediately downstream**" of anything. Neither can it be said, due to fluid dynamics, that something that may affect a non-flowing body of water can be contained to that "**immediate vicinity**." The ecosystem is vast and interconnected. It is much like a web; if you pluck one string, you distort the whole structure. To say that impacts would be localized in the manner that the DEIS claims is fallacious. The fact is that, as was chanted at

[9] "What is Chaos Theory?" Fractal Foundation. Web. 8 Jul 2017.
[10] "Stream." Def 1, 2b, 3, 5b. *Merriam Webster Online*, Merriam Webster. Web. 9 Jul 2017.

Standing Rock, we are all downstream. This means that impacts, wherever they occur, will have a trickle down effect on us all, on a broaders scale and in ways not examined in this DEIS. This is a crucial failing of this document that must be addressed.

A cathodic protection system is briefly mentioned in section 2.3.2.3 as part of the mitigation measures taken to protect the pipeline from co-located electric transmission lines that could contribute to corrosion. However, this system is not required to be in place until up to a year after the pipeline is constructed. This could result in the development of pinhole leaks, which could be considered more insidious than a large spill, as they would be more difficult to detect and remedy. Installation of cathodic protection must occur immediately following pipeline construction. 2524-6

The fifth flaw in the DEIS concerns environmental justice. I would first like to point out that the classification of low income in 11.2 is important because it illustrates the wide gulf between Enbridge as a multibillion dollar corporation and the average citizen of Minnesota. The people of Minnesota are the affected parties when it comes to this pipeline being expanded in the state. It is our well being that is at stake. Compared to the megalith that is Enbridge, we are all low income, no matter what metric is used. Average Minnesotans will never have the resources to deal with Enbridge on a level playing field. This is especially true for individuals who are against the pipeline expansion. Beside a voice, there is virtually nothing we can bring to bear against Enbridge, and there is no justice at all in those kinds of odds.

Specific to the DEIS, section 11.5 is problematic because it describes mitigation measures that can but not necessarily will be considered by the Certificate of Need or Route Permit decision. These are descriptions of possibilities, and there is nothing that guarantees follow through. Without explicit procedures outlined and required, these measures amount to lip service only. 2524-7

Enbridge also makes clear that it intends to do as little as possible in terms of remediation. Biological systems are delicate, and even with BMPs and everything going according to plan, there is no disputing that ecosystems will be impacted. Section 3.6.3.7 summarizes the Wetland Conservation Act and its requirements, but concludes with the information that "**Utilities, including pipelines, [...] can request exemption from wetland replacement requirements, and Enbridge has indicated that they will seek this exemption**." Even if full standard practices were used, it could take decades for affected wetlands to recover, yet Enbridge doesn't even intend to do that much. This is unacceptable. Enbridge must not only promise to complete all known remediation measures for environmental impacts, but they must provide detailed plans on how they intend to do so in all biomes that will be affected. 2524-8

The sixth major issue with the DEIS could be considered several issues, but all fall under Tribal Impacts, even if they were not organized that way within the DEIS. Because of the obscure way tribal impacts were addressed in the DEIS, there was a general lack of continuity concerning many issues. This amounted to large quantities of information that mask the fact that *the DEIS*

does not provide any suggestion of meaningful action to mitigate tribal impacts. In this way, the DEIS shows a continued disregard by the state of Minnesota for issues that affect indigenous communities.

One glaring problem is that the archaeological surveys used in the DEIS were provided by Enbridge and are therefore not independent. Furthermore, some can no longer be accounted for. In section 3.6.3.4 it's stated that the applicant is encouraged to consult with the Minnesota State Historic Preservation Office--encouraged by not required. The applicant's preferred route crosses multiple cultural corridors, regions culturally significant to tribes, as defined in 9.4.2. The Minnesota Indian Affairs Council "**recommends a complete survey of the entire proposed route; this survey should occur prior to the start of any construction as it will involve gaining input from a number of tribal communities and gathering their oral histories to assist with the identification of these places**." This has been recommended but, of course, has not actually occurred. It is an afterthought of this process and still not a factor in any decision making. 2524-9

Along with cultural corridors, the applicant's preferred route puts many wild rice lakes in jeopardy. In fact, it threatens the most of any of the assessed alternatives. As a food staple and spiritual source for indigenous communities, wild rice is invaluable. Any loss to wild rice habitat would have a devastating effect on tribal communities. This is the only place where this sacred food occurs naturally. Tribal communities have already suffered disproportionately from colonialism and industrialism. The DEIS acknowledges that any of the possible routes for Line 3 "**would have a long-term detrimental effect on tribal members**." As per 11.5, however, a finding of disproportionate and adverse impact "**does not preclude selection of any given alternative**." The DEIS blatantly indicates that the state of Minnesota will disregard threats to tribal communities.

Section 3.6.1.2 delineates the steps and permitting requirements mandated by the Endangered Species Act for the project's potential impact on "**federally listed threatened or endangered species, candidate species, species proposed for listing, and their designated critical habitats**." There are protections in place for threatened species of animals in the United States, but there are not for indigenous people. The United States government has done everything in its power to eradicate America's native tribes, and by a global perspective, it has nearly succeeded. America's indigenous people represent less than .07% of the world's population, based on the 2010 US Census[11]. While the US government claims to now have a fiduciary relationship with tribes and to act in their best interests, it's evident that *state and federal agencies have merely adopted an appearance of respect while continuing to enact policy that damages native communities*. The dismissiveness of this DEIS is part of that policy.

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[11] "American Indians and Alaska Natives in the United States." *United States Census Bureau*. 2010. Web. 9 Jul 2017.

The impact of temporary work forces associated with pipeline construction are of great concern to tribes. As stated in 11.4.1 "**Increases in sex trafficking, particularly among Native populations, are well documented. [...] The addition of a temporary, cash-rich workforce increases the likelihood that sex trafficking or sexual abuse will occur. Additionally, rural areas often do not have the resources necessary to detect and prevent these activities**." This phenomenon is no more evident than in the Bakken oil territory, and it is an ongoing problem in North Dakota's oil fields. Young women and girls on the Fort Berthold Reservation are afraid to walk down the street there, knowing they can be taken at any time. Violence against women is already a major concern in indian country due to the effects of abuse that began in boarding schools and were perpetuated in the trauma cycle that followed. Missing and murdered indigenous women has its own Wikipedia page, chronicling the issue.

Enbridge and the state of Minnesota, however, seem dismissive of this issue, suggesting that "**Enbridge can prepare and implement an education plan or awareness campaign around this issue with the companies and subcontractors that construct, restore, and operate the pipeline, as well as by working with local communities and tribal communities to raise awareness and provide resources to address the issue**." (11.4.1) Indeed, these measures *can* be taken, but whether or not they *will* be is undetermined. Once again, the DEIS is offering potentially empty promises, this time on an issue that could mean nothing less than life or death for individuals affected. Even if we could trust Enbridge to follow through on these suggestions, what difference could we expect them to make? The workforce in question would be subcontracted to Enbridge, and Enbridge would not be liable for them. These measures are woefully insufficient. Enbridge needs to promise that it would take steps to monitor its workforce, investigate crimes, and prosecute its employees if applicable. It needs to lend monetary resources to local law enforcement agencies to help curtail crime. It needs to create a victim support fund, in addition to making support resources available in local and tribal communities. These things all need to be requirements. Even one case of sexual violence is one too many. Whatever psychological impacts may be suffered during this construction phase will be long lasting and yet another imprint of trauma on the native community. 2524-10

And trauma is really the most obvious and unavoidable impact that construction of any new pipeline in the state of Minnesota would have on indigenous peoples. It is commonly accepted nowadays that historical trauma is a real crisis that affects chronically oppressed peoples. There is fair mention of historical trauma and the structural racism suffered by tribal communities. The DEIS even acknowledges that "**the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities**." (11.4.3.) What the DEIS doesn't seem to recognize, at least explicitly, is that the extraction industry across America is inflicting trauma on native peoples in the present tense. It cannot be dressed in alternate language like stressors or impacts. These are *traumas*, which are to the native spirit, as much like wounds as a gunshot would be.

One need only look as far as North Dakota to see how deeply affected indigenous communities are by the toxic industries that run through our land. Our land is part of us, inseparable from our sense of self and livelihood. We are the land. Native Nation's collective response to the Dakota Access Pipeline said all that needs to be said about our sentiments toward pipelines. Our shared experiences, however, also created a new generation of trauma in our communities. People from native communities all over the United States visited Standing Rock, including myself and many others from the state of Minnesota. Many of us returned to our home reservations having experienced humiliation, intimidation, vilification, and physical injury--all at the hands of government agencies acting in the interests of petrochemical companies. We have returned home bearing not only our historical trauma but a new kind of post-traumatic stress disorder. And Enbridge's Line 3 Expansion project will only add to this trauma.

Closer to home, in Minnesota, the extraction industry has already had a huge impact on our state. Our so-called Iron Range is covered with open pit mines that are like vast sores on the skin of the land. These mines leave behind dead zones, as will the pipeline in the event of failure. These are wounds in the earth and wounds in the souls of native peoples. We know this threat, and we will do all that we can to stop it. None of the impacts of any of this will be, as the DEIS often repeats, short term or temporary.

The overarching problem with the DEIS is that it entertains permitting a project which supports the tar sands industry. This document is supposed to weigh the cost of a project versus its benefit, and when you consider the origin and nature of this product, the cost becomes insurmountable. Globally speaking, climate change is the single greatest threat humanity has ever faced, and the most dangerous aspect of this battle is that many people do not recognize this threat. The petrochemical industry, as a whole, denies the threat of climate change.

As I wrote above, ecosystems are incredibly delicate. Our entire planet is one very large ecosystem that has evolved naturally over the course of billions of years to arrive at this place where it is perfectly suited to support human life. It has taken us barely more than two hundred years to bring our planet to the edge of irrevocable change. Climate change could have devastating consequences for not only humanity but for all life on the planet. With the possibility of temperature changes, oceans rising, and weather systems intensifying, it's difficult to predict the odds of anyone's survival. That is, if we do not do all that we can to prevent further impact on the climate.

Curtailing our use of fossil fuels is the number one thing we can do to avoid this disaster. The carbon emissions from fossil fuels exacerbate climate change each day that we continue to use them. Tar sands are the dirtiest fossil fuel to produce, and the end product further contributes to carbon emissions in its use.

Local to the area of production in Alberta, byproducts of this heavy-crude oil are already killing wildlife and area residents. Tar sands extraction has left a swath of devastation in its wake with toxic tailings ponds, contaminated water sources, decimated landscapes, poisoned wildlife, and beleaguered communities. It has also exacted a high cost on Canadian First Nations (indigenous) communities, where their water has been compromised and depleted, and they are experiencing rare and unusual forms of cancer associated with the toxins from tar sands extraction. The potential geological impacts of the extraction process, which involves hydraulically fracturing bedrock, are not even known. This is a lethal product.

Heavy-crude oil, or diluted bitumen, acquired from Alberta's dirty and destructive tar sands, should not ever be transported through or utilized in the United States. It's dirty, dangerous, and damaging to indigenous people.

In conclusion, I strongly suggest that this EIS explore the field of renewable energy and present it as an alternative to the expansion of the petrochemical industry. Not only is renewable energy better for the environment, but jobs in renewable energy, such as wind and solar, are growing at a rapid rate and represent a better opportunity for long-term employment. Renewable energy will also be more cost effective in the long term, as it does not require the development of new infrastructure to chase new and progressively harder to reach fuel sources. There is no limit on what technology and renewable energy can accomplish going forward. From solar roads to micro-turbine wind trees to algae powered lamps, the possibilities are endless.

Sincerely,

Natalie Boyd

RECEIVED
JUN 19 2017
MAILROOM

Docket Numbers CN-14-916 and PPL-15-137 Commentary

Submitted by: **Diana Brainard**
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The DEIS is a good start, but there are missing issues to address.

Comments on Certificate of Need:

3.1.1 A. Regarding the Underlying economic need for the proposed pipeline, I could not find any information on how this pipeline will fit into our leaders' vision. US Crude Oil supplies are at the highest level in 80 years - 199 million barrels. President Trump wants to sell off 1/2 of the oil sitting in the Strategic Reserve. MN Governor, Mark Dayton, has said that MN will proceed with its own climate change strategy including an aggressive plan to reduce greenhouse gas emissions. Gov. Dayton said the state is looking to local communities to tackle climate change— to me, that would include denial of the Line 3 replacement. Gov. Dayton is also pushing electronic transportation. The city of Minneapolis Climate Change Action Plan is to reduce greenhouse gas emissions 30% by 2023. They want to add 30 miles of bicycle facilities, double regional transit ridership and increase local, renewable energy. One of Duluth Mayor Emily Larson's 3 priorities for the coming year is to reduce the city's use of fossil fuels. She is aiming for an 80% reduction by 2050. The combination of excess oil and MN leaders' goal of reducing our dependence on oil suggest there is **not** an underlying economic need for the proposed pipeline.

B. For alternatives, I couldn't find anything about meeting energy needs through renewable resources, using less oil, or obtaining oil from somewhere other than the dirty tar sands. I believe these alternatives should be addressed in the EIS.

C. Using the SCC (social cost of carbon) estimates described in the DEIS, the 30-year cost associated with the Project lifecycle emissions could range up to $120 billion. As Jim Hansen, NASA climatologist, explains in Scientific American, "To avoid passing tipping points, such as initiation of the collapse of the West Antarctic Ice Sheet, we need to limit the climate forcing severely. It's still possible to do that, if we phase down carbon emissions rapidly, but that means moving expeditiously to clean energies of the future. Moving to tar sands, one of the dirtiest, most carbon-intensive fuels on the planet, is a step in exactly the opposite direction."
The consequences to society of granting the CN could not possibly be more favorable than the consequences of denying the certificate

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Comments on viability of Enbridge:

I couldn't find any reference in the DEIS to Enbridge's financial condition. This needs to be addressed in the EIS because DEIS mentions Appendix E (Enbridge Environmental Protection Plan) at least 155 times. It mentions Appendix F (Enbridge Agricultural Protection Plan) at least 9 times. If Enbridge starts to fail (which it is), they will have to cut resources across the company which would include its protection plans. Bloomberg says Enbridge has had to slash its distributions to shareholders nearly in half this year, and its 2017 stock prices are dropping. The energy price crash means tar sands oil is not economically viable. On top of this, they have huge catastrophic exposures from their aging pipelines, including Line 5 under the Straits of Mackinac. Why are we even considering a pipeline, with perhaps a 50 year lifetime, for a company that will likely not be around to maintain it?

Comments regarding Economic Impacts:

Chapter 5.3.4 states that Line 3 will create zero permanent jobs and have no measurable impact on local employment. Regarding taxes, the DEIS is missing information about whether Enbridge will stop paying taxes when the existing Line 3 shuts down. The DEIS is also missing information about the issue that Enbridge is now in the process of appealing years of back taxes, burdening 2 of the poorest counties in MN with over $10 million due. In any case, whatever taxes are collected, it will not pay for the SCC estimates of the Project life-cycle emissions of $120 billion. (5.2.7.3) 0620-1

Comments on Existing Line 3 Abandonment:

We absolutely cannot allow Enbridge to set a precedence of abandoning the Existing Line 3. Additionally, I could not find any plan in the DEIS for decommissioning the new replacement Line 3 they are requesting. Risks include the leeching of pollutants of the decaying line, draining our water flows and collapses under our roads. It is unacceptable to transfer the costs of these problems to landowners or MN taxpayers. If it is too costly or dangerous to remove existing Line 3 now, then set aside a fund to remove it along with the pipelines on either side of it when they need to be retired. Canada has ordered Enbridge to set aside nearly $1 billion to pay for future abandonments in Canada. Why don't we?

CN-14-916, PPL-15-137

Comments related to Tribal Resources:

I was deeply moved by comments of Tribal members in the Cloquet Line 3 meeting. Several were crying. One woman told the story of being ignored by Enbridge when she tried to report a leak. You can't help but notice that the Replacement Line 3 route avoids reservations. Enbridge must not have been a great neighbor if the tribes refuse to allow new pipelines on their lands. One native man explained to those of us worried about lack of oil or jobs, "You will adjust." He is correct. We will. We need to develop renewable energy infrastructure.

Comments related to Accidental Crude Oil Releases:

I couldn't find anything in Chapter 10 that related to the uniquely sandy soil in the Park Rapids area. In Park Rapids, where potatoes and other crops grow nearby on irrigated, sandy soil, state health officials declared violations of the nitrate limit in two separate municipal wells in 2009 and 2010. Those wells have been shut down and deeper wells had to be dug. If nitrates are a problem, I can't even imagine what an oil spill would do in those sandy soils and through the chains of Lakes. What about leaks into Lake Superior or the Twin Harbors area? It is not worth the risk to find out.

Per MN Rule 7852.1900 Subd. 3.1, we are provided a false choice for the route of this pipeline in that the company is allowed to name its start and endpoint for the project which is Clearbrook and Superior. Our natural resources should be more important than the company profit margin. The route could start at Crookston and go south (Sandpiper - SA-03) or could follow the path offered by SA- 4 which would avoid Minnesota's pristine waters.

Conclusion:

The DEIS acknowledges that Line 3 will contribute to Climate Change to the tune of <u>billions</u> of dollars. No amount of jobs or taxes can pay for that. The consensus from the scientific community is that we must leave fossil fuels in the ground. Pipelines are not the future. At the very least a new pipeline should **not** be put through the water rich environment of Northern Minnesota. We've long known that a shortage of clean drinking water is going to become a major global problem, and we need to protect this precious resource. Please protect Minnesota by denying the Certificate of Need for Replacement Line 3.

CN-14-916, PPL-15-137

Levi, Andrew (COMM)

From: DIANE BRANDT <dsbrandt@mac.com>
Sent: Sunday, July 09, 2017 1:39 PM
To: MN_COMM_Pipeline Comments
Subject: Comments re: Line 3 Replacement DEIS Doc Nos. CN-14-916 and PPL-15-137

Re: Line 3 Replacement Draft Environmental Impact Statement Doc Nos. CN-14-916 and PPL-15-137

I commend the State of Minnesota for (for the first time) seriously looking at the environmental impact of an oil pipeline running through the state. Now let's make sure the environmental review is high quality and without bias so that all stakeholders can rely on its integrity.

As it stands, the scope and methodology of the Line 3 Replacement DEIS does not fully describe the risks of an oil spill or leak to our sensitive, high quality water environment and, specifically, to our Native American tribes. 1299-1

While DEIS falls short in a number of ways, I will highlight several shortcomings that can be addressed in the final report through better-constructed analytical modeling.

First, the spill analysis is not based on the type of wetlands and waters that are across the route. The EIS should EXPAND the type and number of these sites in the forecasting model. It should also account for the fact that it is impossible to clean up the type of tar sand oil that will be carried in the pipeline. 1299-2

Second, the impact of a spill on the Native American tribes is based on poor methodology. Using census tracts in the analysis does not accurately reflect the reality of how water actually moves through a watershed and that many users travel distances to the impacted water. Also, the EIS should compare the impact of a spill on the Line 3 Replacement Route to that of a spill on an alternate route that does not run through wetlands. 1299-3

Third, the EIS must include Enbridge's "worst-case" scenario spill data (table 10.3 on page 36 of Chapter 12). The pipeline operator's spill experience is highly relevant to an assessment of risk. Why is spill data considered a trade secret and why should it have a superior legal claim to the public's right to know this information? 1299-4

Thank you.

Diane Brandt

4216 County 71 NW

Hackensack, MN 56452

Levi, Andrew (COMM)

From: Erik Brenegan <ebrenegan@gmail.com>
Sent: Monday, July 10, 2017 1:52 PM
To: MN_COMM_Pipeline Comments
Subject: Comment on Draft Environmental Impact Statement (DEIS) for Enbridge Energy's proposed Line 3 Pipeline Project

To Whom it May Concern,

After attending an information meeting and reviewing the draft EIS, I would like to submit the following brief comments.

The DEIS stated that the draft social cost of carbon could be as high as $287 billion over the *first* 30 years of the pipeline operation. That stunning cost will not be paid directly by the pipeline operators, but it will be paid by others with no connection to the project. But even that cost is not close to the full cost of the pipelines impacts, since it will likely operate for much longer that that. I would like to see the final social cost of carbon estimate the costs for a longer time frame that reflects the actual use of the pipeline, such as 60 to 80 years. Also, the climate modeling doesn't have a partial displacement scenario, where the new pipeline expands on the old pipelines oil capacity by 370,00 gallons per day. That is an oversight, since the operators would likely want that flexibility to profit from any world oil supply interruptions. A partial displacement scenario should be added to the final EIS. 2527-1

I would like to state that the National Society for Professional Engineers code of ethics states in I. Fundamental Canons: "Engineers, in the fulfillment of their professional duties, shall: 1. Hold paramount the safety, health, and welfare of the public." The DEIS shows that the impact of the pipelines product would cause great harm to the safety health and welfare of the public due to the effects of climate change. At this time in history, and given the current CO2 levels in the atmosphere, Enbridge Energy's proposed Line 3 pipeline project is not ethical. I would encourage all licensed engineers to consider their ethical responsibilities to the public before considering future work on the pipeline project.

Yours Sincerely,
Erik Brenegan

Levi, Andrew (COMM)

From: Shannon Brown <solosilvr@gmail.com>
Sent: Monday, July 10, 2017 1:19 AM
To: MN_COMM_Pipeline Comments
Subject: NO PERMIT. SHUT DOWN LINE 3 AND DEVELOP RENEWABLE ENERGY INFRASTRUCTURE.

As a citizen of the planet and the Nited States, I want to see our country move forward to renewable energy because the risks of continued use of fossile fuels are to great. I want to comment, No Line 3, because of the reasons listed below. I'm on the side of the water, the land and the sensible down to earth people who put this together. Thank you for your time.

BIG PICTURE PROBLEMS

- Many of the environmental impacts and "plans" for minimizing them are drawn directly from Enbridge's permit application ("Enbridge would do this" and "Enbridge would do that") without any evidence of compliance or genuine consideration that maybe, just maybe, Enbridge won't follow all the rules. History shows that they continually violate permit conditions - we are working on compiling an enormous record of these violations. The DEIS should analyze the likelihood of compliance.
- **The Alternatives chosen for comparison to the pipeline proposal are absurd** -- for example, the only rail alternative assumes the construction of a new rail terminal at the US border, and thousands of new railcars to transport oil to Clearbrook and Superior. Enbridge would never do that. The only reasonable rail option would begin in Alberta. The truck alternatives are similarly unreasonable.
- **The "No Build" Alternative is not genuinely considered.** It is framed as "Continued Use of Existing Line 3" (Chapters 3 and 4), but nowhere is the "Shut Line 3 Down" option considered. There is no discussion of renewable energy, conservation, or the rapid development of electric car infrastructure. There is no assessment of the decline in oil demand. The entire study assumes that society needs X amount of oil, simply because Enbridge says they can sell it. That assumption ignores the massive fossil fuel subsidies and debts that make Enbridge's profits possible, and avoids the moral question of what is good for people and the planet. We know we must stop burning fossil fuels yesterday.
- There is zero discussion of how all this extra oil will go once it leaves Superior, Wisconsin. With 370,000 bpd of additional capacity, Enbridge will need a new pipeline departing its terminal in Superior. We know that they plan to build Line 66 through Ojibwe territories in Wisconsin, but they continue to deny this. Why isn't MN asking?
- The DEIS contains **no spill analysis for tributaries of the St. Louis River or Nemadji River**, where spills could decimate **Lake Superior** and the harbors of the Twin Ports.
- For calculations of impact, the lifespan of the new Line 3 is estimated at *30 years*. But Lines 1-4 are 55-65 years old! And hasn't the technology improved? The lifespan should be at least 50 years, a shorter lifespan is a clear indication that Enbridge themselves know that the fossil fuel era is coming to an end. In Honor the Earth's analysis, we have attempted to predict the impacts of this pipeline on the next 7 generations. 2534-1

- This project is a further investment in a dying Tar Sands industry. Numerous international oil companies and financing institutions are divesting from the tar sands. Why should Minnesota invest in this industry? Why should our Nation be forced to deal with a bad idea in perpetuity.
- The DEIS assumes that the Koch pipelines to MN refineries get all their oil from Line 3, but the current Line 3 does not supply enough capacity for this (390,000 barrels per day), and we know that some of it comes from Line 81, which brings oil from the Bakken in North Dakota.

SPILL RISK

- The 7 sites chosen for spill modeling are not representative of the locations and resources put at risk along the entire corridor. A more thorough analysis of different locations is needed - for example, what about Lake Superior? 2534-2
- There is no analysis on Enbridge's leak detection system, or their inability to respond quickly to major emergencies.
- Enbridge's response plans are highly guarded, and Honor the Earth's attempts to receive and review these documents has been blocked. What we can infer is that Enbridge relies on local first responders for their emergencies. They attempt to use the money they donate to communities along their corridors as proof that they have an integrated emergency response program.

The DEIS estimates the annual probability of different kinds of spills on the proposed route in MN:

- Pinhole leak = 27%
- Catastrophic = 1.1%
- Small Spill = 107%, Medium = 7.6%, Large = 6.1%

So in 50 years, we can expect **14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic**!

- ## ABANDONMENT
  - The risks of pipeline abandonment are not adequately assessed. For example, there is no discussion of landowner property values and the effect that an abandoned pipe could have on them, especially if there is indeed "**legacy contamination**" on people's land.
  - Impacts on human and natural resources due to the abandoned Line 3 are anticipated to be minimal in the near term but could be significant in the longer term, absent effective monitoring, adaptive management, and the timely introduction of mitigation measures. There is not much information on what these mitigation and management plans are.
  - If there is a dearth of surrounding soil, or if the cover for the pipeline is relatively shallow, the pipeline bears more of the load and, all things being equal, is more likely to fail. We know from experience that there are numerous areas where the pipes are exposed and near the surface.

- There is also no discussion of **exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied**. "When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high" (8.3.1). 2534-3
- We know that the abandonment of the existing line 3 is bad. But there is also no mention of **the abandonment of the other 3 ancient pipelines in Enbridge's existing mainline corridor (Lines 1, 2, and 4)**, which we expect Enbridge will very soon attempt to abandon. Nor is there any discussion of the **abandonment of the NEW Line 3** in the future.
- The DEIS states that it will be very risky to remove and clean up the existing Line 3 because the pipelines are very close together. "The distance between pipelines within this corridor varies, but they are generally 10 to 15 feet apart" (8.3.1). This is not consistent with our extensive observations and physical measurements on the land. Also, don't they dig up pieces of pipe for maintenance purposes all the time? **Why is it suddenly risky?**
- The DEIS simply states that "Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage,and mitigate historically contaminated soils and waters" found during the abandonment or removal of the existing Line 3 (8.3.1.1.1). **We want to see that plan**. 2534-4

- # CONSTRUCTION AND RESTORATION

  - Chapter 2, "Project Description" states that Enbridge has requested a 750-foot route width (375 feet on each side of the Line 3 Replacement pipeline centerline). They claim only 50 of the 750 feet would remain a permanent right-of-way (2.1) All of this width should be included in an impact analysis because Enbridge's environmental protection plan and record is abysmal.
  - Their "restoration" plans for restoring the landscape around the corridor after installation is laughable. Enbridge's process for restoring wetlands includes dumping the now compacted (and probably de-watered) soil back in the trench, sowing some oats and "letting nature take it's course". This is not how you re-establish a wetland. Studies have shown that even with proper restoration practices, it can take decades to get back to the biological functioning it was at prior to disturbance. When Enbridge stores the soil, they will also be driving equipment over it- which compacts it, they also plan to compact the soil after refilling the trenches. This is not good for the soil. 2534-5
  - Cathodic protection, which applies electric current to the pipeline in order to protect it from corrosion caused by nearby utility lines, **will not be installed for up to 1 year after pipeline construction** (2.3.2.3). Lack of cathodic protection is what caused many pinhole leaks in the Keystone pipeline, almost immediately after construction. The proposed route for Line 3 follows a utility corridor for much of its length - this is a recipe for disaster. Even the US Army Corps's rubber-stamp approval of the Dakota Access pipeline required the cathodic protection system to be installed within 6 months! 2534-6

ECONOMIC IMPACTS

- Chapter 5, “Existing Conditions, Impacts, and Mitigation” states that Line 3 will create ZERO permanent jobs. Enbridge’s application states that “existing operations staff would be able to operate the [pipeline] and that few additional employees would be hired to assist the staff” (5.3.4).
- Also in Chapter 5, the DOC assumes “all workers would re-locate to the area” and ZERO construction jobs will go to Minnesotans. The pipeline would have “no measureable impact on local employment, per capita household income, median household income, or unemployment” (5.3.4).
- The DEIS does not acknowledge that when the existing Line 3 shuts down, Enbridge will stop paying taxes to the MN counties along the mainline corridor. For many of these poor counties in the north, revenue from Enbridge’s property tax makes up a significant portion of the county budget. There is also the issue that Enbridge is now in the process of appealing years of back taxes, burdening two of the poorest counties in Minnesota with over $10 million due. 2534-7
- CLIMATE CHANGE
  -
  - The DEIS acknowledges that Line 3 would contribute to climate change. It analyses 3 different types of emissions - direct, indirect, and lifecycle. Direct emissions are those that the pipeline infrastructure itself emits, and these are very small. Indirect emissions are those created by the power plants that provide electricity for the pipeline’s pumping stations, and these are significant. Lifecycle emissions are those caused by the refinement and eventual use of the oil, and these are massive. Line 3’s direct and indirect emissions alone would be 453,000 tons of CO2 per year. Over a 50-year lifespan, that would cost society an estimated $1.1 billion. (Executive Summary p.18).
  - The lifecycle emissions of Line 3 would be 193 million tons of CO2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3)
  - The DEIS does not discuss the unprecedented challenges of human casualty, displacement, conflict, natural disaster, biodiversity loss, etc, that climate change is causing, or the consensus from the scientific community that we must leave fossil fuels in the ground. It also fails to acknowledge that across the planet, Indigenous people are disproportionately impacted.

TRIBAL IMPACTS

- The United Nations international standard for projects that impact Indigenous Peoples is **Free, Prior and Informed consent**. Tribal consultancy after the project is already proposed and designed is not free, prior, and informed consent.
- Most of the issues specific to tribal people and tribal resources are **confined to a separate chapter** that attempts to provide "an American Indian perspective." They are excluded from the main chapters that assess potential impacts. This allows the EIS to **avoid drawing conclusions** about the impacts on tribal people. (Chapter 9)
- Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "**would have a long-term detrimental effect on tribal members and tribal resources**" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). **This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members**.
- Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "**are part of a larger pattern of structural racism**" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3).
- The DEIS concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) **But it also states that this is NOT a reason to deny the project**!
- Chapter 6 states that Enbridge's preferred route would impact **more wild rice lakes and areas rich in biodiversity** than any of the proposed alternative routes (Figure ES-10).
- Most of the analysis of archaeological resources in the path of the pipeline rely on **Enbridge's surveys**. For some reason, only 3 of their 8 surveys are available, and the 5 missing are the most recent! In those, Enbridge found 63 sites, but claims that only 3 are eligible for protection under the National Register of Historic Places. (5.4.2.6.1). Honor the Earth has had the studies we have been able to see reviewed, and there are numerous flaws in their methodology. 2534-8
- The DEIS acknowledges that "The addition of a temporary, cash-rich workforce **increases the likelihood that sex trafficking or sexual abuse will occur**," and that these challenges hit Native communities the hardest. But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). What experience does Enbridge have planning and implementing an anti-sex trafficking program? 2534-9

The DEIS affirms that the MN PUC can only grant the permit if "the consequences to society of granting are more favorable than the consequences of denying the certificate." Regardless of whether or not Enbridge can find customers, the DEIS shows that the negative impacts far outweigh the benefits.

So our position remains:

NO PERMIT. SHUT DOWN LINE 3 AND DEVELOP RENEWABLE ENERGY INFRASTRUCTURE.

I'm on the side of the water, the land and the sensible down to earth people who put this together. Thank you for your time,

Shannon Brown

MS. MAUREEN BURIC: My name is Maureen Buric, M-A-U-R-E-E-N, B-U-R-I-C.

I have property up on the North Twin that has been in my family for about four generations. My husband and I have just built our retirement home up there.

My question is this: If Hubbard County's geological survey hasn't been completed, how does an accurate EIS study get done, since you don't have all the info yet?

FACILITATOR: Thank you, Maureen. We have Mason Redwing next.

MR. MASON REDWING: My name is Mason Red Wing. I'm from the Crow Creek Sioux Tribe out in South Dakota. I'm 20 years old, and I'm not really a big fan of these pipelines. I brought my little brothers and my nephew with me today, because, you know, they don't really have a say in any of this. They don't get to say, "We don't want this pipeline." They don't have a say or a vote or nothing.

So I'm doing this for them. I'm speaking their opinion.

And they say the economic development that the pipeline brings is good and stuff, but I was up in North Dakota -- I'm sure you guys all heard of the Dakota Access pipeline up there, and they made a big deal about all the out-of-state residents that went to camp there and opposed the pipeline.

Levi, Andrew (COMM)

From: katie capistrant <kannxc@gmail.com>
Sent: Saturday, June 17, 2017 1:40 PM
To: MN_COMM_Pipeline Comments
Subject: DEIS comment

Docket # CN-K1-916 and PPL-15-137

Hello, I am a resident of Minnesota, born and raised and I want my voice to be heard about this proposed new line 3 pipeline.
My first issue is the impact it would have on wild rice lakes. In figure ES-10 of the DEIS there shows that the proposed route would go through 17 (much more than any alternative route) wild rice lakes as well as through sensitive wetland area rich in bio diversity. I personally supplement my food supply for the year with wild rice that i harvest in Minnesota as well as enjoy the process of being out on the lakes each year. While I enjoy being in the outdoors and love to eat wild rice, I asknowledge that this is more that just a hobby for indigenous folks who has been living on this land for thousands of year. It is a crucial part of their way of life culturally, as well as being a source of economic income and a source of healthy food for folks who often have health problems because of the inequity that continues to be done to them, poverty and inaccessability to healthy food. The new pipeline would be extreemely detrimental to important habitat for wild rice, medicines on the land, other wild food and fish native and non native folks rely on, not to mention the detrimental effect it could have long term .
In chapter 9 the DEIS states that line 3 "would have a long-term detrimental effect on tribal members and tribal resources." This statement clearly shows that Enbridge does not care a\bout the impact it would have on the tribal people.For one becuase Enbridge never bothered to consult them about this pipeline, secondly because in chapter 11 Enbridge states that the negative health impacts, though an act of structural racism on a group of people already under stress and inequity, are not a reason to deny the project. Because Enbridge does not care about the impacts this would have on indegenous peoples and non native residents of Minnesota it is up to us and the state of Minnesote to regulate this company and protect our land and water.
There are also many other concerns I have with this project especially concerning Enbridges hope to abandon the existing line 3 as well as many missing details in the DEIS that need to be addressed. For one the DEIS does not contain a spill analyses for tributaries of the St. Louis River and the Namadji River where spills could gravely impact Lake Superior.
Enbridge proposes abandoning the extisting line 3 without clean-up. This would caue the pipe to eventually rise up to surface level, deterioate and lower property taxes (8.3.1). Also the estimated cost to clean up is huge. If it is so sostly that it is deamed unfeasible to clean up, why should it be left to local landowners, the state of Minnesota, and future generations to foot the bill? Weather it be cost of clean up, lower property values, death to natural resources, displacement of people and animals, or the long term effects of climate change, why is it left on our shoulders to deal with the mess that this corporation is making? Are they planning to abandon the other pipelines along the corridor as well? What about the new line 3 in 60 years? Does the government of Minnesota represent an oil company or the people who reside here?
The DEIS aslo states (8.3.1.1.1) That they plan to "identify, manage and mitigate historically contaminated soils and waters found during the abandonment or removal of the existing line 3." Where is this detailed plan? I would like to see this in writing as a contract as opposed to an empty promise.
Also There are currently government subsidies going to the fossil fuel industry, though the demand is dropping. 0288-1
The impact on the environment from extracting, refining and eventually burning fossil fuels form fracking due to greenhouse gases is incredible and should be enough for the state of Mn to question whether or not its time to get on the right track and fund alternative energies. Alternative energies would also be great for creating jobs in MN, something that supporters of this project claim would happen with line 3 construction. If Minnesota wants

to comply with terms of the Paris climate agreement, then further support of the fossil fuel industry should be out of the question.

One of the main arguments for the pipeline construction is creating jobs. wouldnt clean up of the existing pipeline before new construction create even more jobs? In the DEIS (5.3.4) Enbridge states that the company will use exiting employees to operate the new line 3 cited "all workers would re-locate to the area." This means no new permanant jobs for residents of Minneasota. 0288-2

Page 18 goes on to show the estimated costs to remedy the effects this new project would have on climate change, both from emissions of refining the oil and the burning of the fuel. I ask the legislators of Minnesota who are supposed to be representing me and the other residents of Mn, to demand a more thorough EIS, to demand clean up of the existing Line 3, to respect the Indigenous Nations voices and rights, and to respect the water and future of our natural resources. I want to see these fossil fuels left in the ground and for funding and government support to go to a more viable long term source of energy.

MS. JACI CHRISTENSON: Jaci Christenson, J-A-C-I, C-H-R-I-S-T-E-N-S-O-N.

My comments first of all, to the next generation, I am going to fight until the last day I have on this earth for you.

Today I address the concerns of horizontal directional drilling, otherwise known as HDD. It's kind of a mouthful. I had no idea what this was until I started delving into the impacts on our Minnesota rivers with regards to this line.

It is used to cross pipelines under rivers.

According to the DEIS, HDD would

be the method of choice in many rivers in this preferred Line 3 route, including two of our wild rice waters, Hay Creek and Shell River. This is from Chapter 5, page 49.

So what is this HDD, which I sat shaking my head as I was reading the DEIS. Well, here's a direct quote from the DEIS: Chapter 5, page 71, "During drilling, fluid which comprises water, bentonite clay, and possible Minnesota PCA-approved additives, is circulated through the drilling pipe to lubricate the drill bit, remove drill cuttings, and stabilize the open hole.

"The potential exists for an inadvertent release or frac-out of this drilling fluid to occur when pressurization of the drill hole is beyond the containment capability of the overburdened soil material, which would allow this drilling fluid to flow to the ground or river bed surface.

"Although bentonite clay is nontoxic, drilling mud can smother aquatic wildlife and increase turbidity in affected surface waters. Additives may be mixed with the fluids, mud for viscosity for lubricating

reasons."

There is no gentle way for me to say this? For me, HDD rapes our earth, and when our earth tries to reclaim itself, it is choked with drilling mud.

Is this honestly our best? At the very least, this DEIS must disclose these additives and their effects on our ecosystem. 0816-1

HDD will be used under some of our most pristine, most sensitive waters and anywhere there's flowing moving water. That's from chapter 5, page 712.

Guess what? That description comprises pretty much all of the water in this preferred route of Line 3.

"Specifically regarding those wild rice waters of Hay Creek and Shell River," the DEIS states, "if HDD frac-out," this is a direct quote, "introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice and altered lakebed conditions occur as a result of the construction, impacts would be major."

We cannot approve a route that comes with a major risk of taking wild rice

from its people. I wasn't around when we killed the bison, but I am not going to stand back and watch us kill wild rice, too.

I was able to find an additional source cite in the DEIS footnotes regarding frac-out impacts. This comes from the Interstate Natural Gas Association of America. I have the website documented here.

"Additionally, the effects of HDD crossing construction have not been well studied. A better understanding of potential environmental impacts from HDD crossings is required for balanced evaluation crossing techniques and their application to specific water crossings."

We do not even have the information to proceed with this project.

By Enbridge's own admission, from the Enbridge Drilling Mud Containment, Response and Notification Plan, chapter 4.3, page 3, direct quote, "Containment is not feasible for in-stream releases."

HDD will be used rather extensively on Line 3, so how often can we expect a failed HDD or a frac-out under our

rivers?

Well, like much of this DEIS, the answer to these serious questions is, "It can be difficult to predict." That is the direct quote from this DEIS.

I do not accept that, and I know we can do better than this. We are brilliant. This is a cop-out. I was able to find one case study cited in the DEIS regarding the frequency of these frac-outs.

This is from Slade 2000, Stockbridge to Freedom Junction, Michigan, on the Enbridge line. Direct quote from the DEIS 5.2.1.2.4, Chapter 5, page 73, "It can be difficult to predict the probability of an occurrence. Longer crossings and HDDs passing through glacial tills, boulders, and gravels have a higher risk of failure.

"Slade 2000 studied a pipeline construction project from Stockbridge to Freedom Junction, Michigan. This was a 35-mile, 16-inch crude petroleum pipeline using 11 HDDs to cross through wetlands, streams, and state recreational areas.

"Results determined multiple

relatively minor releases regarding less cleanup and two major frac-outs, resulting in significant volume, location, and ecology issues."

35 miles, 11 crossings, multiple minor releases and two major frac-outs? Line 3 will cross flowing water, rivers, streams, creeks, brooks, more than 80 times over this 337 miles.

How many major frac-outs should we expect? If we use the case study, one major frac-out for every 5.5 river crossings.

And concluding, after spending three weeks, basically every spare moment that I had, trying to pour over this DEIS and how it will impact our rivers -- which, by the way, for the record, this process is very unfair to the public.

Really, the core component missing here is, and throughout this whole DEIS, is morality. We have a lesson to learn from our native communities. They live with morality and they know how to relate to our earth and one another.

Let's follow their lead.

MR. CURTIS COBB: I'm Curtis Cobb. My concern -- I have two concerns. One is --

FACILITATOR: Curtis, could you just spell your last name for the record.

MR. CURTIS COBB: Cobb, C-O-B-B, like corn on the cob, two Bs.

The pipeline is meeting federal standards for thickness and strength. As an engineer, I am always concerned with is that enough?

Most civil engineers, when they design structures in this country, they actually multiply the stress, and they triple it to make sure bridges and structures in this country are strong enough.

My question is, is this pipeline really going to be strong enough to withstand some of the stresses that the earth and the environment and the fluid itself puts on this pipeline? 1525-1

I understand that the pressure in this pipeline is over a thousand pounds a square inch. That's quite a bit. While that's a normal pressure, steel always has its

weaknesses.

So that's my concern, is, number one, is the pipeline strong enough?

As far as the environment goes, pipelines are the most efficient and safest way to transport most fluids. We have a huge number of pipelines in this country and they all do pretty well. That doesn't mean they don't break, but it's pretty good.

Issue number one, is the pipeline strong enough.

My other concern is the -- this pipeline aids and abets one of the biggest environmental disasters going on in this earth, and that is the processing of the oil sands in Canada.

A Canadian friend of mine did a six-month study of what was going on up there. And what happens is as they process these oil sands, there's always a toxic residual. That toxic residual just gets put into ponds.

Those ponds now cover 176 square kilometers. That's about 100 square miles of poisonous fluid ponds.

If a bird lands in the pond,

it's instant death.

These ponds are between 30 and 100 feet deep. They are designed to leak this poison into the ground, which they are doing at about 1 percent per year. It is poisoning square miles, thousands of square miles of groundwater in Canada.

We do not need this oil. It is all there to take advantage of a relatively, you might say, unusual form of oil residual.

The -- there's been a huge amount of money spent in doing this. I think there's been over $11 billion spent on building oil refineries there. It employs about 50 or 60 thousand people.

So this pipeline really aids and abets that environmental disaster.

So I have no objection to the pipeline, just what it serves.

MR. MARTY COBENAIS: Marty Cobenais, last name is C-O-B-E-N-A-I-S. I am

with the North Star chapter of the Sierra Club. I'm an executive committee member. I'm also a soil and water conservation supervisor here throughout the county.

So this is kind of to you guys. The first question, are you guys willing to have a new pipeline go through your property, have it abandoned, and left in your backyard? That's basically what you guys are asking of us to have done. So are you willing to do that yourselves?

I'll get back to that question. That will be my final one.

Oil consumption in the USA is down 18 percent level past -- since 2009. The main reasons -- fuel efficient cars, people driving less, airlines flying less. And yes, we still need oil. We all came here today in clothes. We still need oil. Thank God we still have oil, otherwise we'd all be sitting here naked.

Way back in the beginning, Harry Ford -- Henry Ford had an option between two fuels in his automobiles. First, crude oil, the second was hemp oil. Hemp oil -- yes, I

said hemp oil, a renewable. So would we really be here in 2017, if we had hemp oil as our main fuel?

We wouldn't be. We wouldn't be having this conversation about pipelines, and it would be safe to fall on railroads and everything else, and it's renewable. Once again, it's renewable. Not like this stuff. We are getting off of this stuff because we're running out of it.

And we probably wouldn't have Enbridge. Some of us would probably be happy with that.

Speaking of Enbridge, they say that they need this pipeline to bring oil to us. But remember that in 2008, they also said they need the Alberta Clipper. And nine months before they started the Alberta Clipper, the oil companies said, "We don't need that. We actually told you not to build it." They tried to get Enbridge not to build Alberta Clipper.

Last year, we just had the Sandpiper, and due to different regulations and everything else, they said, "Well, we

don't need the Sandpiper now, either. We're going to throw that away and we're going to go invest in Dakota Access over in North Dakota." So do they really need this pipeline?

Those are two questions for the DEIS. Enbridge states that they remain committed to the environment. In both the Bemidji and Duluth papers, Barry Simonson, the project director, stated that they anticipate over 6,000 integrity digs in the next 15 years for just Line 3 alone, so it's in their best interest to just replace it and abandon it in the pipeline corridor.

So if you already have over 6,000 integrity digs planned, is it really in the best interest to not have -- it's just going to make an environmental nightmare. If you already say that it has rust and cracks and everything else in it, to just leave it in the ground? That doesn't make sense.

I also got to hear Barry on the radio station the other day, and he states that the pipes would be capped, purged, and filled with nitrogen. It also says that in the draft EIS.

However, there would be no electronic monitoring like you do in current pipelines for pressure loss, but they would fly the route for leaks.

This is interesting now. Considering that they're going to fill it with nitrogen and they have to fly the routes anyways to monitor it if there's any other leaks, how do you know when nitrogen is in the air?

You guys look like farmers. Do you know nitrogen -- when you put nitrogen out on your field, do you see it? More of a gas. You don't see it, so you're not going to see if there's a nitrogen leak.

Thus, remember that all pipelines leak. Tar sand is also the fuel efficient -- the worst fuel efficiency. It takes six barrels of water to make one barrel of oil, which then they dilute to put chemicals in to make it go through the lines.

So it's probably only about four gallons to make that -- or four barrels to make that half a barrel, just to go through the lines.

One of the other things that they talked about is that they're going to use dams and stuff like that on different rivers and different spots along the route to divert the water around different areas.

And yet they say that they're environmentally friendly, but I don't know any of us that can really replace a river as is. So if you're going to divert on the river so you can dig a trench in it, you're not going to replace it as it is.

So I guess I would tell them that they need to directionally go underneath all waterways, not just the ones they feel are important like the Mississippi and stuff like that, but that they need to go underneath all, and in the depth of up to at least 15 to 20 feet, triple wall it, make it efficient.

The other part that they also talk about is that when they go through swamps, they like to bury it, the buoyancy part of it. What they did with Alberta Clipper is they put four inches of concrete around it when they went through the swamps to keep it weighted down.

And that's a lot of concrete, because we have lots of swamps up here.

The interesting part -- and I know I'm running over my time -- is that it's funny that we have the Minnesota Pollution Control Agency here, because I have one of their pages here about temporary and permanent closure of underground storage tanks.

After five years, a gas station that is closed is required to remove their tank or fill it full of inanimate objects. So concrete or fill it full of dirt, and fill it in, or they're supposed to remove all their pipes, their tanks, and everything else.

Earlier I said they're going to cap the end of these pipes. It's going to make basically a tank for them or tanks underneath there. So it doesn't make any sense not to also make them -- require them to remove these pipelines. It's going to do the same damage.

Finally, there's going to be some talk about jobs, tax money, and I'm sure today or even some of these booths are talking about jobs and stuff, and I know in the EIS it

does.

Currently Enbridge is in the Minnesota tax court system asking for money back; says the State overtaxed them. In Clearwater County alone, they're asking for over $7 million from Clearwater County -- that says Clearwater County has to repay them.

I know there's some different opinions out there and saying that -- they're trying to get the State to say they're going to pay it back, but in the end, it's going to end up hurting all of us.

So basically what I'm asking is to not allow this pipeline, that I think this pipeline should not go through anywhere, as do some of the tribes in the area. I believe Joe Palmer has already sent that to you guys, resolutions from tribes.

So what they should do is turn off Line 3, as it is a safety hazard, and remove it from the ground permanently.

So at the end, again, I ask, are you guys willing to have this pipeline go through your backyard or leave a pipeline in your backyard? Thank you.

Levi, Andrew (COMM)

From: nccwisdom@gmail.com on behalf of Nancy Cosgriff <nancy@thirdagepartners.net>
Sent: Sunday, July 02, 2017 12:51 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Pipeline

Dear MN Department of Commerce I find the Enbridge Line 3 DEIS to be unacceptable! We must not let our earth and river's be damaged for the sake of business' efficiency and profit! See below for just several reasons why we must say NO to Enbridge Line 3!

Re: dockett numbers CN-14-916 and PPL-15-137

!. DEIS Chapter 5.2.1.2.4 0996-1
Horizontal Directional Drilling (HDD) will be used to cross under our most pristine, most sensitive waters, and anywhere there is flowing water, which describes most of the route. The potential exists for contamination through release of drilling fluid to the ground and/or water, termed a “frac-out." The DEIS cites a 35 mile section of Enbridge pipeline in Michigan where there were 11 HDD crossings, multiple minor releases and 2 major frac-outs. MN will not accept the risk of a frac-out every 5.5 river crossings.

2. DEIS Chapter 10.2.4.1.1 0996-2
"The annual probability of a spill incident for the Applicant’s preferred route was estimated as 0.249 incidents per year with a recurrence interval of 4.0 years."
Every year there would be a 25% risk of an oil spill, which means a risk of one spill every four years. We should not accept this high risk probability.

Risk from Line 3 is in conflict with several of our Minnesota Statutes:

1. MN Statute 103F.305 Scenic River Protection Policy
https://www.revisor.mn.gov/statutes/?id=103F.305

2. MN Statute 116D.02 Declaration of State Environmental Policy
https://www.revisor.mn.gov/statutes/?id=116d.02

Thank you for reading and revising the DEIS!

--

Nancy Cosgriff D.Min.
Facilitator ~ Spiritual Guide ~ Life Coach

651.433.3679 *Home*
651.307.5285 *Cell*
thirdagepartners.net

"Mindfulness is loving all the details of our lives." Pema Chodron

Levi, Andrew (COMM)

From: Kyle R. Crocker <kcrocker@paulbunyan.net>
Sent: Friday, July 07, 2017 1:37 PM
To: MN_COMM_Pipeline Comments
Cc: Kyle R. Crocker
Subject: Comment of the Line 3 Project Draft EIS

Members of the Commission,

I have reviewed select portions (including appendices) of the Draft EIS for the proposed Enbridge Line 3 Project: docket numbers CN-14-916 and PPL-15-137. I would like to file this substantial comment on the document. I am very familiar with many of the issues involved, having served in leadership roles in environmental organizations (e.g. several terms as president of a local lake association, and chair of BSU's Environmental Advisory Committee) and I am closely acquainted with the corridor of the Mississippi River and its surrounding wetlands between Lake LaSalle and Pine Point. While the Draft represents a reasonable overview of the inter-related dimensions of decision-making involved, I do not think it is adequate in many of its details and conclusions. I will focus on just a few of these in my comments below.

I have lived for twenty-four years beside Grant Creek, a significant tributary of the Mississippi, about a mile downstream from the present Line 3 crossing. (Indeed I serve as a volunteer stream monitor on it for the PCA). During this time I have come by canoe and ski to know well a large, complex area of river, stream, wetland and forest of the Headwaters SF. Based on this intimate experience, I have found that the data represented in the mapping of the area is insufficient for routing decisions.

The hydrology of this region is extremely complicated, and the maps included in the document oversimplify it grossly. Channels in riverine marshes are never as simple as the maps imply. They are never easy lines on paper. Almost no attention is given to characteristics of the wetlands concerned. In Appendix G ('Watercourse Crossings') this oversimplification is also reflected. The three 'techniques' discussed and pictured in Figures G-1-2-3 are ridiculous in actual circumstances, even child-like. 1373-1

In the mapping and other sections addressing vegetation, both terrestrial and aquatic, specific information on habitat and dominant species is virtually ignored. The potential for seriously disrupted ecologies is thus very underrated in Chapter 12. Nor does Appendix D ('Access Roads Table') account for the habitats affected by the hundreds of new roads proposed, even if they are intended to be 'temporary.' In forest and wetland, any road corridor changes the ecological character of the site indefinitely. 1373-2

There are further instances of this sort that I could cite, but your time is limited. Of course I share with many others grave concerns for the effects that even a minor spill in sensitive areas would present. The risk assessment of this fairly likely event is very under-developed in the draft document. As an outdoorsman, knowing the formidable problems of access in emergencies, the very possibility gives me nightmares. As a retired university professor, I also must question 'sources

and authorship' here. A great deal is being taken on faith directly from the commercial entities making the proposal. Conflicts of interest?

And why is an EIS, especially for the heart of such a vulnerable area, been placed with the Department of Commerce, even if 'assisted' by the DNR and PCA? Should not these science-based agencies of State government take central responsibility? If the superficial nature of what I have briefly noted here characterizes the whole of this massive draft document, it will need very deep revisions by field scientists and managers. The continuing health of Minnesota waters, our diverse communities and economies depend on this.

Thank you for your attention to my comments.

Respectfully,

Kyle R. Crocker
806 Balsam Ridge Rd NW
Bemidji, MN 56601
kcrocker@paulbunyan.net
(218) 444-2589

MS. LAURA DEAN: Laura Dean, and I am a public health student at the U of M in nutrition, and I'm concerned about the impacts, the environmental impacts of this pipeline. And I believe that the statement is written biased toward Enbridge. I would like to see it geared more towards the environment. I think it directly impacts indigenous people in the land, and I think we need to look at that more seriously.

And the EIS actually gave several clauses for Enbridge in addressing potential spills but they seem to also leave an option for them to not address it all.

And I don't believe that the same considerations are given on an environmental stance in terms of the impact on the wetlands and wetland restoration, and I think that a spill is too risky.

It's one-fifth of our water, if one were to get into Lake Superior, and I think we need to protect our long-range vision of the environment and our health as a state, the people in the state, and the people on the land.

I'll guess that's all I'll say -- I also believe this means -- I'll just read this: Table 12, the spill sites' comparison, is measuring the 1716-1

1716-1 Cont'd

1 risk for trained spills, based on data from 2007 to
2 2017.
3 The EIS should more accurately measure
4 the comparative risk of these three methods of oil
5 transportation by considering improvements in rail
6 technology, safety, and regulation that will
7 inevitably proceed the lifetime of a new pipeline
8 that assumes risk of train transportation is likely
9 to change.

1716-2

10 In addition, spill data for pipelines
11 should include data specific to the applicant's
12 history.

1716-3

13 Chapter 2, section 8.33, in regards to
14 spill response training. The DEIS states that
15 Enbridge has indicated that their training programs
16 exceed the standard.
17 I recommend that the statement be
18 stricken from the EIS as it is partial to the
19 applicant, or that if that statement remains, more
20 details in reference to examples be given.
21 In addition, this section of the EIS
22 should look at previous spills in the applicant's
23 pipelines and the correlating response statistics,
24 and that includes -- that would include a spill in
25 1991, in Minnesota, which is the largest inland

spill, as well as a spill in Kalamazoo, Michigan.

Another concern was the time period in which these permits go forward. I believe it's 30 years. They look at 30 years, and many of the pipeline catastrophes that happen are just beyond 30 years.

So I believe the reference range should be a lot wider and look at more time.

I think more examples need -- more specifics should be included in the EIS about the soil restoration of the wetlands and in terms of the top soil management, and the impact of the wetlands. 1716-4

And I believe that the process should more directly involve the native communities on the lands that do not just mention them and check the box, but actually respect that this breaks the treaty on two -- at least two native reservations in northern Minnesota.

MR. CHUCK DIESSNER: Thank you. I don't know how I'm supposed to follow that.

C-H-U-C-K, D-I-E-S-S-N-E-R.

I'd like to applaud everybody that's here today. But I have a challenge for everybody. Next time we get together, get three of your friends and neighbors. We need to expand this group. If we are going to win this battle, it's not going to be done by a few. It's going to be done by everybody.

I was so naive when I got involved in this, and I've been to every PUC hearing. I thought, when I read the mission statement for the Department of Commerce, it says, "We are going to act in the best interest of the public," yay. I sat through

all the hearings. I never saw one damn thing the Department of Commerce stood up and did that was for the best interest of the public.

What they view as the best interest of us is more jobs. How many here want more jobs as opposed to a pipeline? How many want more jobs? Okay, DOC, we don't want more jobs.

Big question for all of us in this process, what is the truth? Do we even know?

MS. LORNA HANES: Right here, the Anishinaabe, the original people. We are the truth.

MR. CHUCK DIESSNER: Do we really know the truth? I'd like the EIS to address this question. What have you done to verify the statements in Enbridge's application and the statements that they have made publicly in hearings or otherwise is true?

We know, as a matter of fact, we didn't get the truth from Enbridge. They said a pipeline has to go through Clearbrook and it absolutely has to go to Superior. Guess what? That was false. Where are they now? They're

over at the Dakota Access, and their line is going to Illinois.

How many other things have we not heard -- or how many things have we heard that are not correct?

I seriously question the voracity of Enbridge. Let me read something to you. That's the basis of what we're all dealing with today.

This is the Public Utilities Commission statement in December about the EIS. "Everything possible must be done to ensure that the new process, the EIS, in considering the applications is robust, comprehensive, high quality," here's the word, "independent," here's another word, "fair and avoids further delay," et cetera.

Let's go back to what to look at whether or not we're meeting that standard. Let's talk about independence, and let's talk about conflict of interest. I've raised these and numerous comments. Never once did I get a reply.

The EIS, as I understand it, relies on reports submitted in certain areas by

Enbridge and does not contain independent study. What the hell? What would Enbridge be doing if the report had reports that was relied on by Friends of Headwaters or any of the tribes?

They'd be jumping it down and yelling and screaming. 0821-1

But yet, we let Enbridge have the DOC rely -- I told you -- on the reports. I want to be politically correct, but bullshit.

Every -- EIS should be marked, the EIS should be marked on every single part that was relied on based on only what was submitted by Enbridge, and you should get an independent study for every one of those areas.

I think, as mentioned before, we need a list of the consultants. You'd be very interested if you looked at the web of the consultants. The DOC hired the vice president of BAR Engineering to lead this study.

BAR Engineering is the environmental consultant for who? Enbridge. And then DOC hires who to run most of the report? Cardinal. Well, who's Cardinal? Somebody that has worked for Enbridge on

numerous consulting deals.

This all needs to be addressed and sorted out.

Next, the request -- the DOC was not required to have the DNR and the MPCA involved in the EIS -- only to the extent they wanted them.

I would like the EIS to address and include every area that the DNR and the MPCA were not asked to participate, and if they were asked to participate, like the DNR and MPCA, to note what they disagreed with that was in the report -- or that's in the report and why.

And one final comment. I'd like the DOC to go back and do a study of the applications and the statement made by Enbridge on the corridor that contains Line 3 as to what they said at the time they were putting multiple pipelines in that corridor.

I betcha it says they're all safe, and if there's a problem, they can go in there and solve it without disturbing anybody else.

So let's look at what they

promised in the Line 3 corridor and see how it relates to what people have said. And I support remove the old line and put in the new one.

I don't give a dam, and I don't think any of us give a dam about the profit and loss statement for Enbridge. If it costs more to do that, that's just too bad. That's the price of doing business.

I do have some specific

Levi, Andrew (COMM)

From: Janet Dixon <jfdixon@mac.com>
Sent: Sunday, July 09, 2017 11:48 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Environmental Review Manager:

I attended the public meeting in Park Rapids. My family has owned property on Big Mantrap Lake (28666 Junco Dr, Nevis, MN 56467) since the mid 1950s.

In looking at the charts and the executive summary there are several things I think could be clearer. While this is officially an Environmental Impact Statement (EIS) for one pipeline, it is in reality much bigger than that. If Enbridge gets the "new pipeline corridor" (page 11, last paragraph) they want, they will have a corridor, a new right of way, that they can add new pipelines to when their old ones need replacing. The EIS should state that in a much more prominent way. The potential environmental impact is much greater than the impact of this one, first, pipeline. It should not be buried at the bottom of a page.

System Alternative-04 is not marked on the Route Alternative map or the Proposed Project and Alternatives map. It is an alternative; it should be given the same weight as the other alternatives. 1316-1

The Certificate of Need Alternatives map shows SA-04, but it does not indicate if there is a terminal at Joliet. Is there a terminal there? And if not what happens to the oil at that point? 1316-2

Chapter 4 Accidental Crude Oil Releases - the graph isn't clear. Do I need to multiply the average number of accidental releases by the average size to get a total amount of oil spilled? Go ahead and finish the word problem. At first glance trucks don't look so good, but if I'm doing the math correctly: 1316-3
Pipeline 400 x 225 = 90,000 barrels
Rail. 625 x 25. = 15,625 barrels
Truck. 1200 x 10= 12,000 barrels

If my math is close I don't think the graph adequately shows how much bigger the risk is for pipeline spills.

Sincerely,
Janet Dixon
474 Marshall Ave
St. Paul, MN 55102
651-228-9432

Levi, Andrew (COMM)

From: Christy Dolph <dolph.christine@gmail.com>
Sent: Monday, July 10, 2017 10:32 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Comments: CN-14-916 and PPL-15-137
Attachments: Line 3_DEIS_comments_Dolph_final_CN-14-916_and_PPL-15-137.pdf

To: Minnesota Department of Commerce

Please see my public comments on the DEIS for the Line 3 pipeline (CN-14-916 and PPL-15-137), as a pdf attached.

Thank you.

Best,
Christine Dolph

Re: CN-14-916 and PPL-15-137
Line 3 DEIS comments
Prepared by: Dr. Christine Dolph, Ph.D.
July 10, 2017

In my review of the draft Environmental Impact Statement for the proposed Line 3 pipeline, I have drawn on my expertise and background in water resources science and ecology. I have Masters and PhD degrees in Water Resources Science from the University of Minnesota. I have extensive experience working with water chemistry and biological monitoring datasets collected from streams and rivers in Minnesota, and I have worked in partnership with the Minnesota Pollution Control Agency and Minnesota Department of Natural Resources to design and interpret biological indicators of water quality. My own research evaluates the impact of human land use and water quality changes on biophysical processes and aquatic communities in streams, rivers and lakes. I frequently apply statistical modelling and GIS spatial analyses in my work. As a scientist, I am also a frequent reviewer of scientific manuscripts for publication in peer reviewed journals.

My overall finding is that the document in its current form does not provide the necessary information required to adequately assess the impact of the applicant's preferred route (APR) vs the proposed alternatives. The lack of adequate assessment is due to both 1) methodological shortcomings and omissions that obscure the expected impact of the APR and alternatives, and 2) failure to include relevant available data that should be used to measure potential impact of all proposed alternatives.

Thus, as written, the DEIS fails to meet its main designated purpose, and cannot be used to effectively assess the impact of the APR vs proposed alternatives. My detailed comments as they pertain to these fundamental issues appear below.

Comment #1: Inappropriate quantification of oil spill exposure for route alternatives 2585-1

On page ES-12 of the Executive Summary, the DEIS provides annual data on the average number and size of spill incidents for 3 route alternatives (pipelines, trucks, and rail). I am assuming this is national data, although the scale of the data is not stated or described in the footnotes. On page ES-13, there is an analysis of 'exposure' (i.e., the number of acres of conservation concern that buffer the various route alternatives). These two analyses have a number of critical flaws as presented. First, providing the (presumably national) estimate for the number and amount of spills from trucks vs rail vs pipelines is relatively meaningless for the pipeline in question (Line 3), without directly stating the number of trucks or miles of pipeline implicated in this particular project. To derive a comparative risk assessment for spills from trucks vs pipelines vs rail for *this project* (not for an aggregated national scale), we need to know:

2585-1 Cont'd

-the average expected spill amount per truck
-the number of trucks expected to carry oil in the truck alternative over the lifetime of the project
-the total spill amount expected per unit length of rail per unit time
-the total length and lifetime of the rail alternative
-the average spill amount per unit length of pipeline per unit time
-the total length and lifetime of the pipeline alternative

This data, when clearly integrated together, would provide information about the *total amount of expected oil spilled for all route alternatives in this particular project*, which is the only project under consideration and therefore of relevance in this EIS. In the Executive Summary of the DEIS as it currently stands, it is impossible to interpret from this national dataset how the average number of incidents and average incident size might apply to potential spill outcomes for the proposed Line 3 project.

2585-2

Second, the information provided in Table ES-2 and categorized as 'exposure' does not account for the expected *amount* of released oil expected to contact all resources of concern in each alternative scenario. The DEIS only provides the area (in acres) that contacts each route (within a specified buffer size). But as per the previous incomplete analysis describe above, the amount of oil expected to be released from each route is not the same for all alternatives. In fact, on the national scale data provided in the DEIS, the total amount of oil released from pipelines appears to be *an order of magnitude higher* (i.e., 10 times higher) than that released from trucks. Meanwhile, in the DEIS estimate of 'exposure' in Table ES-2, the total number of areas of resources of concern that contact the 'Existing Line 3 Supplemented by Truck' route option is less than 4 times the number of acres that contact the APR. This would suggest that the total amount of expected oil spilled by the APR may be higher than the proposed alternatives, even if the APR contacts fewer total acres. However, this is just a guess, as it is actually impossible to discern what the total oil exposure risk is (in oil spilled/acre) from the analysis as it's currently provided in the Executive Summary. Essentially, the analysis of 'exposure' as provided in the DEIS is relatively meaningless in terms of analyzing actual risk to conservation areas, without knowing the total *amount of oil expected to come in contact with resources of concern for each alternative.* Because oil toxicity to aquatic environments is a matter of concentration and duration, this information is extremely relevant to determining the environmental risk of the route alternatives. **The total amount of expected oil spilled for each route alternative is one of the primary impacts of concern to reviewers of this document, and needs to be stated clearly and without obfuscation in the Executive Summary, and in the relevant chapters of the full DEIS.** Once these exposure values are adequately quantified, Table ES-2 (and the associated color coding) will need to be changed to reflect the new exposure values.

2585-3

On page ES-23 of the Executive Summary, under the section 'How do the risks of an accidental release differ among the route options?', the DEIS states that:
'Modeling, statistics, and resource mapping can help predict the probability of an accidental oil release, how crude oil would behave in the environment, and what resources could be at risk should there be an oil spill…While the EIS does not predict specific spill outcomes, it highlights:

2585-3 Cont'd

- *the general likelihood of a spill occurring, and*
- *the resources exposed'*

Again, the way these two pieces of information are described is incomplete and misleading because 1) the likelihood of a spill occurring is not provided for *this particular project* in the Executive Summary (it is only provided at a national scale); and 2) the likelihood of a spill and the size of a spill are not integrated with information about the area of resources exposed.

2585-4

The same problematic analysis occurs on p. ES-15 of the Executive Summary, with regard to impacts on Ground Water: *"Rail and truck alternatives pose the highest total potential impact on groundwater resources because they cross the largest acreage of*

- *High water table vulnerability areas…*
- *Wellhead protection areas…"*

Again, the amount of acreage crossed is not the only component of risk here – the analysis in its current form completely neglects the risk component associated with the *amount* of spilled oil expected per area from each alternative.

2585-5

Given the very unwieldy length of the DEIS, it is likely that most readers will not be able to review the entire document. Thus, clear and relevant information regarding the actual exposure risk from all proposed alternatives (i.e., the total amount of oil spilled per acre over time) needs to be stated in the Executive Summary.

2585-6

The analysis of oil spill risk is more detailed in Chapter 10, and does include analysis of spill risk for spills of varying sizes, per unit length of pipeline and per total truck mileage, and per unit time. In Table 10.2-1, annual probabilities of spill incidents for the proposed project alternatives are included. **HOWEVER, once again this information is NOT integrated in a straightforward manner with expected spill amount for each incident, such that *the estimated total amount of oil spilled is not available for comparison among route alternatives.*** The number of incidents across different route alternatives is relatively meaningless without a direct comparison of the total amount spilled per alternative over a realistic lifetime of the project (i.e., 50 years or more). The DEIS contains all of the data necessary to do this calculation, so it needs to be presented in plain terms in Chapter 10 and in the Executive Summary. Similarly, the more detailed analysis of High Consequence Areas intersecting the route alternatives (in section 10.4.2 and subsections thereof) is lacking integration with the amount of oil expected to be spilled per acre in each alternative. *It is not only the area exposed that we need to consider; rather we need to understand the total load of oil that HCA acres and other resources of concern are expected to bear.* Without this information, the potential environmental impact of the proposed alternatives (i.e., the key finding this document is designed to address) can not be readily ascertained. Thus, the document as written fails to attain its primary purpose.

2585-7

Comment #2: The DEIS fails to adequately account for impacts to the vast majority of surface waters (i.e., impacts on warmwater streams)

2585-7 Cont'd

On page ES-14 of the Executive Summary, under the section *'What are the impacts of CN Alternatives on high-quality water resources?'*, the DEIS addresses the risk to Tulibee Lakes, Lakes of High and Outstanding Biological Significance, Wild Rice Lakes, and Trout Streams. However, the DEIS does not address impacts to warmwater streams. The Minnesota Pollution Control Agency has collected abundant datasets documenting the biological quality of warmwater streams and rivers (i.e., not just trout streams) in the region of interest (e.g. MPCA 2014a, MPCA 2016, MPCA 2017). Warmwater streams and rivers constitute the vast majority of total running waters in the northern part of the state that are crossed by the proposed project alternatives (Figure 1). Many of these stream systems are in very good biological condition, and are therefore of high quality. Furthermore, the MPCA is in the process of implementing a strategy to prioritize high quality and 'exceptional' streams and rivers for preservation in their current form, as part of its Tiered Aquatic Life Use Strategy (MPCA, 2014b, 2016b). Thus, the impact of the proposed Line 3 project to these warmwater systems, including to streams and rivers of exceptional quality, must be included in the EIS for Line 3 and all alternatives.

2585-8

In Chapter 5, the DEIS lists the number of streams and rivers crossed by the proposed route alternatives. However, again it does not assess the impact to high quality streams and rivers. On p 5-223 of the DEIS, the authors list the specific geospatial data sources used to evaluate impacts on fish and aquatic habitats. Although this list includes biological data for lakes (i.e., Lakes with Fish IBI scores), it does not contain comparable biological data for warmwater streams or rivers. Warmwater streams are also not addressed in the analysis of exposure to High Consequence Areas (HCAs) in Chapter 10 of the DEIS. Index of Biological Integrity data has been collected for thousands of warmwater stream and river sites in Minnesota, and is available from the Biological Monitoring Division at the Minnesota Pollution Control Agency. The DEIS needs to be revised to include this data in its assessment of impacts related to both construction and oil spills.

2585-9

Comment #3: Table ES-2 in the Executive Summary does not account for existing vs new exposure of resources of concern

For rail lines, truck lines, and alternative pipeline routes such as S04, many of the 'exposed' acres are presumably already exposed to contaminants via existing road, rail and pipeline infrastructure, as well as via existing land use such as intensive agriculture (in the case of S04). By contrast, many of the areas that would be exposed to impacts via new pipeline construction (i.e., the APR) are relatively pristine and undeveloped (and thus may be more intact in terms of environmental quality than areas currently exposed to existing road or other infrastructure). The DEIS needs to be revised with consideration to how each route alternative would occur in the context of existing vs new impacts from route construction and oil spills. 'Existing' impacts should also include an assessment of ongoing land use (such as intensive agriculture) that already affect current water quality conditions in the region of interest for each route. Again, MPCA is in the midst of implementing a water quality management plan that prioritizes the conservation of intact environmental resources over resources that have already been disturbed by past and

2585-9
Cont'd

current land use (MPCA, 2016b). Thus, it is critical to place all project alternatives into the context of impacts to intact vs previously disturbed resources.

Comment #4: Bias towards pipeline development vs public good

In a number of instances, the DEIS reveals a consistent bias that favors pipeline development over the public good. For example, on p. 10-41 under the section 'Public Health', the DEIS states that '*Long-term impacts on water supply could occur under certain circumstances, though protective measures (i.e., using a different water supply) would reduce direct impact on human health. While the general public could be exposed to oil through contamination of aquatic food sources, fisheries are usually closed and monitored for a period after a spill to ensure food safety, reducing this mode of exposure*.' These statements ignore the enormously expensive cost of identifying and developing new private or municipal water supplies following contamination of public or private drinking water, costs that are typically borne by the taxpayer. These statements also ignore the costs to society of fisheries that are temporarily or permanently lost to commercial and recreational use. By implying that public health risk to contaminated water can be readily avoided, these statements appear designed to minimize the potential costs to the public good associated with pipeline development.

References

MPCA, 2014a. Crow Wing River Watershed Monitoring and Assessment Report. Minnesota Pollution Control Agency, St. Paul, Minnesota. https://www.pca.state.mn.us/sites/default/files/wq-ws3-07010106c.pdf

MPCA, 2014b. Development of Biological Criteria for Tiered Aquatic Life Uses: Fish and macroinvertebrate thresholds for attainment of aquatic life use goals in Minnesota streams and rivers. Minnesota Pollution Control Agency, St. Paul, Minnesota.

MPCA, 2016a. Pine River Watershed Monitoring and Assessment Report. Minnesota Pollution Control Agency, St. Paul, Minnesota. https://www.pca.state.mn.us/sites/default/files/wq-ws3-07010105.pdf

MPCA, 2016b. Draft tiered aquatic life use (TALU) designations to be proposed as part of the TALU framework rule amendment. Minnesota Pollution Control Agency, St. Paul, Minnesota. https://www.pca.state.mn.us/sites/default/files/wq-s6-38.pdf

MPCA, 2017. Mississippi River (Headwaters) Watershed Monitoring and Assessment Report. Minnesota Pollution Control Agency, St. Paul, Minnesota. https://www.pca.state.mn.us/sites/default/files/wq-ws3-07010101b.pdf

Levi, Andrew (COMM)

From: Michael Dougherty <michael.i.dougherty@gmail.com>
Sent: Monday, July 10, 2017 9:33 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPl-15-137)

July 10, 2017

Jamie Macalister

Environmental Review Manager

MN Department of Commerce

Hello,

Please accept the following comments regarding what I believe is a major weaknesses in the draft EIS for Enbridge Oil's proposed new tar pipeline.

The draft EIS does not include any studies or evidence regarding the impact on the plant, animal, and habitat identified in surveys of the Whitefish Chain of Lakes conducted by the Minnesota DNR the DNR conducted on during the summers of 2010 and 2011 and the ecological model that was developed from the compiled data (**Final Report, Sensitive Lakeshore Survey, Whitefish Chain of Lakes Crow Wing County, Minnesota -** Simon, S., K. Carlson, D. Perleberg, and K. Woizeschke. 2012. Final report on the sensitive lakeshore surveys for the Whitefish Chain of Lakes, Crow Wing County, MN. Division of Ecological and Water Resources, Minnesota Department of Natural Resources. 105 pp.). As the proposed pipeline will run through the watershed feeding the Whitefish Chain, and spills from the proposed pipeline will most certainly impact the plant, animal and habitat of the Whitefish Chain, a full explanation of the impact of the proposed pipeline and such spills on the Whitefish Chain of Lakes plant, animal and habitat as detailed in the report cited above should be included in the EIS. 2587-1

Thank you for your attention to the critical shortcoming in the draft EIS for Enbridge Oil's proposed new tar pipeline.

Sincerely,

Mike Dougherty

--
Michael I. Dougherty
9221 Father Foley Drive
Pine River, MN 56474
michael.i.dougherty@gmail.com
Cell: (612)670-4089

Levi, Andrew (COMM)

From: Mary Theresa Downing <marytheresad@gmail.com>
Sent: Sunday, July 09, 2017 1:18 AM
To: MN_COMM_Pipeline Comments
Subject: Dockets CN-14-916 and PPL 15-1

Jamie MacAlister, Environmental Review Manager

I have several questions about the information included in the Environmental Impact Statement for Enbridge's Line 3 pipeline.

What is the source of the information used in this statement? Private contractors or the state of Minnesota? If private contractors were used, had they previously worked for the Applicant? If so, a conflict of interest seems rather obvious. Who hired these contractors, Enbridge or the state?

The actual process seems liable to have multiple mishaps. Enbridge proposes to horizontally drill under certain stream and river beds. The drilling fluids used for that process contain additives. These additives are toxic to aquatic wildlife and vegetation if a frac-out occurs. The Straight River, a nationally known brown trout stream, suffered a large frac-out during construction of the MinnCan Line 4 project. What are the additives in the drilling fluids? Shouldn't the public know what they are in order to make an accurate assessment of the danger of this process? Why would we allow such a potentially dangerous operation to take place under the Mississippi River?

Line 3 would pass under the Misssissppi near the headwaters in Itasca State Park. Should a pipeline be allowed in a state park?

The Executive Summary states,*"There is no one way to measure the general region-wide or state-wide differences in surface water resource quality across Minnesota."* If that is the case, what measures or methodologies were used? Does that mean the TSI used by the MPCA in measuring eutrophication is not a reliable way to measure water quality?

Finally, one reason given for allowing this project is the number of jobs it would create and their impact in areas of the state without robust economies. But some tribes in those areas don't want the pipeline to cross their reservations. Don't they have the right to refuse since they are sovereign nations?

And would the impact be what Is claimed? A recent Enbridge direct mail promotion states 13,600 jobs will be created by the Applicant's project, but in the draft EIS the maximum number of jobs created is 4800: 600 local workers and 4200 non-local workers. Which is the correct figure? Explain the discrepancy. Who provided the information for calculating those numbers? 1317-1

I would ask that you consider whether the country and the state or only a handful of investors will benefit from this pipeline which will carry oil to be sold abroad and put at risk thousands of acres of woods and lakes that are currently a source of a strong tourist economy as well as safe drinking water for Minneapolis and other cities.

Mary Theresa Downing

1825 Dunedin Ave.
Duluth, MN 55803
June 26, 2017

Jamie MacAlister,
Environmental Review Manager
Minnesota Dept. of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Re: docket #s CN-14-916 and PPL-15-137

Dear Jamie MacAlister:

I am writing in regard to the DEIS for Enbridge Energy's proposed Line 3 Project.

My first objection to the study is that it assumes that society and that Minnesota need the oil that would be shipped. Does a dying industry need to be encouraged? Will Minnesotans benefit from this oil? Where will the oil go when it leaves Superior, Wis.?

A full analysis needs to be made of the possibility of shutting down Line 3 and removing it.

If the pipe is abandoned, what is the likelihood that Enbridge will "indefinitely" monitor it. If that does not happen, what are the risks?

A fuller analysis is needed of the impact of oil spills. There is no analysis of the potential for oil spills to impact Lake Superior,

and what that would mean to us all.

The study doesn't take a commonsense approach. ~~It~~ a new pipeline is allowed, why would a new route with associated new impacts work for Minnesotans? And why is it such a problem to remove line 3 or remove it and replace it when disturbance must occur every time there are repairs? Perhaps pipelines are a major hazard always and in all places. Perhaps Minnesota needs fewer pipelines, not more.

The study places too much faith in what Enbridge has to say. It should take a more independent, skeptical approach.

Thank you for your attention to my concerns.

Sincerely,

Janet Draper

Janet M. Draper
1825 Dunedin Ave
Duluth, MN 55811

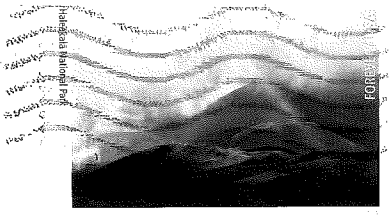

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JUN 28 2017

MAILROOM

Jamie MacAlister,
Environmental Review Manager
Minnesota Dept. of Commerce
85 7th Place East, Suite 280
St. Paul, MN

CR-14-916
PPL-15-137

Levi, Andrew (COMM)

From: Tod Drescher <tod@drescherarchitecture.com>
Sent: Wednesday, July 05, 2017 12:04 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 comment

Dear MN Department of Commerce,

I find the Enbridge Line 3 Draft Environmental Impact Statement to be unacceptable. Regarding river oil spills, the DEIS uses a 10 mile Region of Interest(ROI), when we know that an oil spill can pollute more than 35 miles downstream (Enbridge's oil spill in the Kalamazoo was 35 miles). The ROI in the EIS should include at least 35 miles of impact. Horizontal Directional Drilling (HDD) will be used to cross under our most pristine, most sensitive waters, and anywhere there is flowing water, which describes most of the route. The potential exists for contamination through release of drilling fluid to the ground and/or water, termed a “frac-out." The DEIS cites a 35 mile section of Enbridge pipeline in Michigan where there were 11 HDD crossings, multiple minor releases and 2 major frac-outs. MN will not accept the risk of a frac-out every 5.5 river crossings. 1212-1

We are very proud of our "Land of 15,000 Lakes". Let us all keep our waters clean for the future generations vs. going for some temporary quick looking profits.

Thank you for your consideration on this very important matter.

Sincerely, Tod K. Drescher
MN State Licensed Architect
Resides at 261 3rd Street
Marine on Saint Croix, MN 55047

_____

Tod Drescher
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www.drescherarchitecture.com
PO Box 272 261 3rd Street
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(651) 755 0039 cell

Levi, Andrew (COMM)

From: ANDREW <aldvorak@comcast.net>
Sent: Sunday, July 09, 2017 11:45 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 comments
Attachments: Comments - Enbridge Line 3.pdf

Comments attached.

Sincerely,

Andrew Dvorak

To: MN Department of Commerce

From: Andrew Dvorak
5708 Scenic Drive
Minnetonka, MN 55345

Re: Comments, Enbridge Energy Line 3 Pipeline

To whom it may concern,

I am a senior engineer with Dane Technologies, Inc. in Brooklyn Park, MN. We design and manufacture battery powered tuggers for medical, retail and industrial use. Our products are 99% recyclable. With this background you can see that I am interested in reusable and renewable energy, and in a clean environment where products are designed from start to finish for their low impact on the environment from production, through use and finally end of life.

As a business, we would never use a study such as the Draft Environmental Impact Statement for Line 3, hereafter called "Statement", to move ahead with a new project, unless we were the business proposing it. Everything about this "Statement" indicates that:

1) If accepted at face value, benefits only the oil industry, Enbridge Energy, and the refineries it will link to, such as the Koch Brothers.
2) It ignores and minimizes numerous tribal lands and treaties, and its effects on indigenous populations.
3) It ignores and minimizes the effect on the land and waterways it crosses.
4) It ignores the long term economic costs on the areas it crosses by ignoring the cost of health and environmental impact.

In support of my statements above I offer this:

1) ...benefits only the oil industry, Enbridge Energy…
- From the Enbridge Energy website https://www.enbridge.com/projects-and-infrastructure/projects/line-3-replacement-program-canada
"Replacing the pipeline is the most efficient way to maintain the reliability of Line 3, and it's also the most timely and reliable transportation solution for transporting Western Canadian crude oil to refinery markets in Chicago, the U.S. Gulf Coast, and the Eastern U.S. and Canada."

- From the US Energy Information website https://www.eia.gov/dnav/pet/pet_move_wkly_dc_NUS-Z00_mbblpd_w.htm
As of June 2017 the total amount of oil product imports is -2,057 thousand barrels per day, meaning that the US does not need the capacity provided by Enbridge Line 3. This oil and it's refined products are mostly for export, to the benefit of the oil industry.

From Enbridge Energy website http://www.enbridge.com/SandpiperProject.aspx
"Enbridge filed a petition to withdraw its Sandpiper Pipeline Project applications before the Minnesota Public Utilities Commission (MNPUC) on September 1, 2016. The MNPUC unanimously approved the withdrawal of those applications on October 28, 2016. Due to market changes and our customer's near-term need to access and transport Bakken crude oil, we have decided to re-evaluate Sandpiper and delay it until market conditions support the need for additional pipeline infrastructure."

2) …ignores and minimizes numerous tribal lands and treaties…
- The proposed new oil pipelines in northern MN violate the treaty rights of the Anishinaabeg by endangering critical natural resources in the 1854, 1855, and 1867 treaty areas. All pipelines leak, and catastrophes like Enbridge's 1 million gallon spill in 2010 on the Kalamazoo River are not unlikely. The pipelines threaten the culture, way of life, and physical survival of the Ojibwe people.

- Most of the issues specific to tribal people and tribal resources are confined to a separate chapter that attempts to provide "an American Indian perspective." They are excluded from the main chapters that assess potential impacts. This allows the "Statement" to avoid drawing conclusions about the impacts on tribal people (Chapter 9) 1319-1

- The "Statement" concludes that"disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) But it also states that this is NOT a reason to deny the project!

3) ...ignores and minimizes the effect on the land and waterways it crosses…

- Chapter 6 states that Enbridge's preferred route would impact more wild rice lakes and areas rich in biodiversity than any of the proposed alternative routes (Figure ES-10). Why is this not more alarming?

-The "Statement" contains no spill analysis for tributaries of the St. Louis River or Nemadji River, where spills could decimate Lake Superior and the harbors of the Twin Ports. 1319-2

-The 7 sites chosen for spill modeling are not representative of the locations and resources put at risk along the entire corridor. A more thorough analysis of different locations is needed - for example, what about Lake Superior? 1319-3

4) ...ignores the long term economic costs…

- Chapter 5, "Existing Conditions, Impacts, and Mitigation" states that Line 3 will create ZERO permanent jobs. Enbridge's application states that "existing operations staff would be able to operate the [pipeline] and that few additional employees would be hired to assist the staff" (5.3.4) 1319-4

- The "Statement" does not acknowledge that when the existing Line 3 shuts down, Enbridge will stop paying taxes to the MN counties along the mainline corridor. For many of these poor counties in the north, revenue from Enbridge's property tax makes up a significant portion of the county budget. 1319-5

- The "Statement" estimates the annual probability of different kinds of spills on the proposed route:
Pinhole leak = 27% (once every 3.7 years)
Small Spill = 107% (once every 11 months), Medium = 7.6%, Large = 6.1%
Catastrophic = 1.1% (once every 87 years)
So in 50 years, we can expect 14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic!
And though Enbridge says the operating lifetime is 30 years, the current line 3 has been operating for over 60 years, so the likely hood of a catastrophic leak is very high.

- From Auburn College website http://cla.auburn.edu/ces/energy/oil-pipelines-and-spills/

“Children surrounding the new pipeline are 56% more likely to develop leukemia versus children that live ten miles away. Even though the Keystone XL website states that it will be the "safest pipeline" in North American, shabby construction work has already had to be redone. If a leak does occur once the pipe is built, residents will be at risk of toxic exposure. In every instance of a tar sand leak in populated areas, toxic chemical exposure through respiration has occurred. Toxic chemical exposure can lead to migraines, painful rashes, breathing complications, nausea, chemical sensitivities, and exacerbated cancer activity (Tar Sands Blockade). Tar sand sinks into water, making the cleanup extraordinarily expensive. When tar sand is exposed to air, the harmful chemicals that are added as diluents evaporate into the air forming heavy toxic clouds close to ground level.

All of the above information indicate that the draft Environmental impact statement , the economic realities and the rule of law (tribal treaties) have not been given their due evaluation. This pipeline must not proceed unless all requirements are met.

Sincerely,

Andrew Dvorak

MS. ELEANOR DVORAK: My name is Eleanor, E-L-E-A-N-0-R, Dvorak, D-V-O-R-A-K.

And I strongly oppose the proposed Enbridge pipeline project.

So I am here to talk about the proposed abandonment of the existing Line 3. The problems associated with leaving Line 3 in the ground will not disappear over time and may in fact worsen. While Enbridge says they will monitor indefinitely, Enbridge might not be around in 100 more years. But, if abandoned, the pipeline and its continuing impact on our lakes, rivers, agricultural and residential lands will be there.

In Section 8.3.1.1.1, the DEIS states

that Enbridge has indicated that it would develop a contaminated sites management plan to identify and mitigate contaminated soils and waters found during the abandonment of Line 3. We want to see that plan. 2071-1 Cont'd

In Section 8.3.1.2, the risks to critical habitat as a result of the aging pipeline creating typological connections are stated. While Enbridge proposes segmentation to mitigate the risk, they also admit that the potential need for more segmentation requires further study. And the DEIS states that state, federal, and tribal agencies may require more segmentation. These studies need to be done now and be included in the EIS. 2071-2

Section 8.3.1.4 addresses a risk of buoyancy and resulting leaks into water, and admits that Enbridge's plan does not address this issue in detail. It needs to be researched and included in the EIS. 2071-3

Table 8.3-1 in Appendix B states that the abandonment of existing Line 3 could negatively affect communities with potential environmental justice impacts. Quote, Due to ongoing stress or anxiety related to the presence of the pipeline and ongoing risks related to water flow, soil and water

contamination, end quote. I see no remedies for this proposed in the DEIS.

The decision on Enbridge's request to abandon Line 3 would set a precedent. Yet there is no mention of the potential abandonment of the three other aging pipelines in Enbridge's existing mainline corridor across Minnesota. Those are lines 1, 2, and 4, which Enbridge might then next attempt to abandon. Nor is there any discussion of the abandonment of the new Line 3 in 50 to 60 years. We don't know whether Enbridge will still be around in 50, 60, or 100 years, and if they're not, we would put a costly burden on future generations, risking their health and right to clean water and land.

Line 3 abandonment alone can bring huge costs to Minnesota. But there are many other aspects of the proposed replacement pipeline that I have not addressed, including the fact that Enbridge's new Line 3 would breach the 1837 and 1855 Native American treaties that were upheld in 1999 by the Supreme Court and affirmed in 2015 and the fact that spills will occur and will likely do permanent damage to pristine lakes and lands.

Finally, I think we need to take a hard look at the fact that the demand for oil is

declining, posing the question of whether building new, increased capacity infrastructure for a declining energy source at a very high risk to our environment makes sense for Minnesota.

Please deny the certificate of need.

Levi, Andrew (COMM)

From: Li Dvorak <ecdvorak@comcast.net>
Sent: Monday, July 10, 2017 10:20 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Proposed Line 3 Comments
Attachments: Dvorak, Eleanor - Enbridge Line 3 DEIS Comments.pdf

Good evening,

Attached please find my comments regarding the Draft Environmental Impact Statement for Enbridge's requested new Line 3 pipeline. Thank you for your consideration.

Sincerely,
Eleanor Dvorak
Minnetonka MN

There is no Planet B.
Let's act NOW to save the planet for our kids.
Step 3 – Recycle your stuff – at home, work and play.
Step 2 – BYO Water Bottle – don't buy one.
Step 1 – check your emails/phone 1st – THEN start your car.

To: Jamie MacAlister, Environmental Review Manager
MN Department of Commerce

From: Eleanor Dvorak
Minnetonka, MN 55345

I am a native Minnesotan and grew up on Lake Minnetonka. My husband and I love bringing our children north to enjoy Lake Superior and other beautiful MN waters, so I am very concerned that we protect these natural resources and the way of life for those who live in northern MN. My education includes an MBA in finance from Columbia University; my work history is primarily accounting/finance for a MN-based, global software company, and includes audit, budgeting and forecasting, and contracts—so I know the need for analysis and looking at all costs and implications of proposed projects and plans – and that often the analysis shows that the project just doesn't make sense.

Repairing or living with the damage that is done to our environment, wildlife and human health, as well as the legal ramifications of violating Native American Treaties, will be the financial burden of us Minnesotans, while Enbridge takes their profits back to Canada.

I) The Draft Environmental Impact Statement (DEIS) is very long and includes a lot of facts, yet it does not provide the analyses required by Minnesota Environmental Policy Act (MEPA) 116B & D:

a) MEPA requires that the Environmental Impact Statement (EIS) is an analytical rather than an encyclopedic document which describes the proposed action in detail and analyzes its significant environmental impacts. *As drafted, the DEIS is encyclopedic – stating many facts with no analysis – and therefore is difficult to understand, particularly in terms of the cumulative environmental impacts*.

b) Per MEPA, the EIS should identify appropriate alternatives to the proposed action and their impacts, and explore methods by which adverse environmental impacts of an action could be mitigated. *Alternatives such as SA-04, truck, rail, or no new line are not given full analysis. There is no assessment of the decline in demand for fossil fuel and how that might impact Enbridge's long term viability and commitment, or its ability to maintain the pipeline and pay to clean up pollution from spills.*

c) Per MEPA (116D.04, Subd 6): "**Prohibitions.** No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state<u>, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct.</u>**"

- *The DEIS minimizes its analysis of alternatives, i.e. other routes, truck, rail, no new line, etc.*
- *The energy will not be used by Minnesotans, so it is difficult to find any reason other than Enbridge's economic needs for this project.*

II) The DEIS does not use available information:

a) Minnesota has many policies in place to protect us and guide decisions such as this pipeline. However, the DEIS includes no reference or analysis related to those relevant policies, including: 2594-1

- Minnesota's joining the US Climate Alliance to uphold the tenets of the Paris Climate Change Agreement
- State Energy Policy
- Minnesota Environmental Policy Act
- Greenhouse Gas policy
- Legislative Energy Commission: Primer on Minnesota Energy - March 11, 2016
- Minnesota's 2025 Energy Action Plan
- Global Climate Leadership Memorandum of Understanding (Under 2 MOU)
- Next Generation Energy Act
- Civic Engagement Plan (Governor's Order)

b) The DEIS also does not appear to make use of available data to rank the relative value of resources impacted by the proposed pipeline: 2594-2

- MN Pollution Control Agency's (MPCA's) Stream Use Classification System;
- MPCA and MN Department of Natural Resources (MDNR) Index of Biotic Integrity (IBI scores); and
- Maps of Streams with Highest IBI, generally headwaters vs lower reaches, especially in Ag Zone (SA-04).

III) Other Gaps

a) There is no prioritization of natural resources and which are most crucial to protect, i.e. how much would the line impact each (i) during construction or as a result of a spill; (ii) to what extent -- slightly, damage permanently; and (iii) how critical that resource is, e.g., wild rice growing lakes, Mississippi headwaters, etc. 2594-3

b) While there is a brief mention of the fact that there is no existing pipeline in Superior, WI to which the new line would connect, there is no analysis of what the repercussions would be if Wisconsin does not grant permission to build a connecting pipeline. *We would put many lakes, rivers, lands, wildlife and cultures at severe, irreversible risk for no reason.*

c) The DEIS does not discuss the unprecedented challenges of human casualty, displacement, conflict, natural disaster, biodiversity loss, etc, that climate change is causing, or the consensus from the scientific community that we must leave fossil fuels in the ground.

IV) Chapter 2, Project Description:

a) The DEIS states that Enbridge has requested a 750-foot route width--375 feet on each side of the proposed Line 3 centerline. They claim only 50 of the 750 feet would remain a permanent right-of-way (2.1). *If that is true, why do they need to affect such a broad area? This is not a small amount of land that would be damaged/destroyed by the construction, given the 340 mile length of the requested pipeline. The DOC should require, and the DEIS should include, justification for this extra land use or change the request.*

b) Also in Chapter 2, several types of land use are listed, both temporary and permanent. However, these are broken up into different uses, with tables for some but not others – so that the total requested land use is difficult to guess at. *The DEIS should include a summary with ALL land use in one chart and in the same unit of measurement to give the total picture of land use, i.e., a* 2594-4

2594-4
Cont'd

permanent access road, temporary storage yards, ATWs, temporary access road, temporary and permanent rights of way (each one causing damage to the land to varying degrees).

V) Spill and Leaks:

a) The 7 sites chosen for spill modeling are not representative of the locations and resources put at risk along the entire corridor. *A more thorough analysis of different locations is needed. Lake Superior should be included; it is part of the Great Lakes that provide 20% of the world's fresh water.*

b) The DEIS contains no spill analysis for tributaries of the St. Louis River or Nemadji River, which feed into Lake Superior. *Spills would pollute Lake Superior and kill fish, birds and mammals that make it their home. Enbridge's environmental track record is not good; it should be considered in the analysis.*

c) Enbridge's refusal to reveal spill model input (spill volume) precludes objective vetting or peer review of assumptions. *The DOC should require that Enbridge reveal its spill data to create an accurate, meaningful analysis*.

d) The DEIS estimates the annual probability of different kinds of spills on the proposed route:

- Pinhole leak = 27% (once every 3.7 years)
- Small Spill = 107% (once every 11 months), Medium = 7.6%, Large = 6.1%
- Catastrophic = 1.1% (once every 87 years)

Using the DEIS probabilities, over a 50 year pipeline lifetime, we can expect: 14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic spill. ***What would one catastrophic spill – let alone 75 smaller spills – do to our pristine MN lakes and rivers, or the unique wild rice lakes that provide food and income for the Indigenous tribes? What would the cumulative effect of all those 76 spills be to lakes, people and wildlife?*** *The DEIS should look at the cost of all these spills – and again, who will cover the cleanup costs, and who will compensate those who suffer irreparable damage? Will Enbridge still be around when these occur?*

e) The DEIS should include an assessment of Enbridge's environmental safety record, which is not great. 19 spills in the last 15 years in Minnesota alone include a 250,000 gallon spill in northern MN in 2002 and an explosion in 2007 that killed two workers in Clearbrook, MN. I invite you to look at Enbridge's corporate rap sheet posted by the Corporate Research Project at http://www.corp-research.org/enbridge, a 2013 article in the Toronto Sun at http://www.torontosun.com/2013/09/08/enbridge-has-a-history-of-spills-leaks, and the EPA summary of the 2010 spill in Michigan at https://www.epa.gov/enbridge-spill-michigan.

VI) MN will not benefit from this project.

a) Chapter 5, "Existing Conditions, Impacts, and Mitigation" states that Line 3 will create ZERO permanent jobs.

b) Also in Chapter 5, the DOC assumes "all workers would re-locate to the area" and ZERO construction jobs will go to Minnesotans. The pipeline would have "no measureable impact on local employment, per capita household income, median household income, or unemployment" (5.3.4).

c) The demand for oil is declining, posing the question of whether building new, increased capacity infrastructure for a declining energy source at a very high risk to our environment makes sense for MN. This also needs to be assessed in the DEIS.

Levi, Andrew (COMM)

From: sedna101@aol.com
Sent: Friday, June 23, 2017 12:35 AM
To: MN_COMM_Pipeline Comments
Subject: NO PERMIT. SHUT DOWN LINE 3 AND DEVELOP RENEWABLE ENERGY INFRASTRUCTURE.

The Draft Environmental Impact Statement (DEIS) for the Line 3 pipeline attempts to justify why the oil industry's need to profit is greater than the need of the Anishinaabeg people to survive.

TRIBAL IMPACTS

- The United Nations international standard for projects that impact Indigenous Peoples is **Free, Prior and Informed consent**. Tribal consultancy after the project is already proposed and designed is not free, prior, and informed consent.
- Most of the issues specific to tribal people and tribal resources are **confined to a separate chapter** that attempts to provide "an American Indian perspective." They are excluded from the main chapters that assess potential impacts. This allows the EIS to **avoid drawing conclusions** about the impacts on tribal people. (Chapter 9)
- Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "**would have a long-term detrimental effect on tribal members and tribal resources**" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). **This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members**.
- Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "**are part of a larger pattern of structural racism**" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the impacts associated with the proposed Project and its alternatives

would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3).

- The DEIS concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) **But it also states that this is NOT a reason to deny the project**!
- Chapter 6 states that Enbridge's preferred route would impact **more wild rice lakes and areas rich in biodiversity** than any of the proposed alternative routes (Figure ES-10).
- Most of the analysis of archaeological resources in the path of the pipeline rely on **Enbridge's surveys**. For some reason, only 3 of their 8 surveys are available, and the 5 missing are the most recent! In those, Enbridge found 63 sites, but claims that only 3 are eligible for protection under the National Register of Historic Places. (5.4.2.6.1). Honor the Earth has had the studies we have been able to see reviewed, and there are numerous flaws in their methodology. 0514-1
- The DEIS acknowledges that "The addition of a temporary, cash-rich workforce**increases the likelihood that sex trafficking or sexual abuse will occur**," and that these challenges hit Native communities the hardest. But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). What experience does Enbridge have planning and implementing an anti-sex trafficking program?

BIG PICTURE PROBLEMS

- Many of the environmental impacts and "plans" for minimizing them are drawn directly from Enbridge's permit application ("Enbridge would do this" and "Enbridge would do that") without any evidence of compliance or genuine consideration that maybe, just maybe, Enbridge won't follow all the rules. History shows that they continually violate permit conditions - we are working on compiling an enormous record of these violations. The DEIS should analyze the likelihood of compliance.
- **The Alternatives chosen for comparison to the pipeline proposal are absurd** -- for example, the only rail alternative assumes the construction of a new rail terminal at the US

border, and thousands of new railcars to transport oil to Clearbrook and Superior. Enbridge would never do that. The only reasonable rail option would begin in Alberta. The truck alternatives are similarly unreasonable.

- **The "No Build" Alternative is not genuinely considered.** It is framed as "Continued Use of Existing Line 3" (Chapters 3 and 4), but nowhere is the "Shut Line 3 Down" option considered. There is no discussion of renewable energy, conservation, or the rapid development of electric car infrastructure. There is no assessment of the decline in oil demand. The entire study assumes that society needs X amount of oil, simply because Enbridge says they can sell it. That assumption ignores the massive fossil fuel subsidies and debts that make Enbridge's profits possible, and avoids the moral question of what is good for people and the planet. We know we must stop burning fossil fuels yesterday.
- There is zero discussion of how all this extra oil will go once it leaves Superior, Wisconsin. With 370,000 bpd of additional capacity, Enbridge will need a new pipeline departing its terminal in Superior. We know that they plan to build Line 66 through Ojibwe territories in Wisconsin, but they continue to deny this. Why isn't MN asking?
- The DEIS contains **no spill analysis for tributaries of the St. Louis River or Nemadji River**, where spills could decimate **Lake Superior** and the harbors of the Twin Ports. 0514-2
- For calculations of impact, the lifespan of the new Line 3 is estimated at *30 years*. But Lines 1-4 are 55-65 years old! And hasn't the technology improved? The lifespan should be at least 50 years, a shorter lifespan is a clear indication that Enbridge themselves know that the fossil fuel era is coming to an end. In Honor the Earth's analysis, we have attempted to predict the impacts of this pipeline on the next 7 generations. 0514-3
- This project is a further investment in a dying Tar Sands industry. Numerous international oil companies and financing institutions are divesting from the tar sands. Why should Minnesota invest in this industry? Why should our Nation be forced to deal with a bad idea in perpetuity.
- The DEIS assumes that the Koch pipelines to MN refineries get all their oil from Line 3, but the current Line 3 does not supply enough capacity for this (390,000 barrels per day), and we know that some of it comes from Line 81, which brings oil from the Bakken in North Dakota.

SPILL RISK

- The 7 sites chosen for spill modeling are not representative of the locations and resources put at risk along the entire corridor. A more thorough analysis of different locations is needed - for example, what about Lake Superior?
- There is no analysis on Enbridge's leak detection system, or their inability to respond quickly to major emergencies.
- Enbridge's response plans are highly guarded, and Honor the Earth's attempts to receive and review these documents has been blocked. What we can infer is that Enbridge relies on local first responders for their emergencies. They attempt to use the money they donate to communities along their corridors as proof that they have an integrated emergency response program.

The DEIS estimates the annual probability of different kinds of spills on the proposed route in MN:

- Pinhole leak = 27%
- Catastrophic = 1.1%
- Small Spill = 107%, Medium = 7.6%, Large = 6.1%

So in 50 years, we can expect **14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic**!

ABANDONMENT

- The risks of pipeline abandonment are not adequately assessed. For example, there is no discussion of landowner property values and the effect that an abandoned pipe could have on them, especially if there is indeed "**legacy contamination**" on people's land.
- Impacts on human and natural resources due to the abandoned Line 3 are anticipated to be minimal in the near term but could be significant in the longer term, absent effective monitoring, adaptive management, and the timely introduction of mitigation measures. There is not much information on what these mitigation and management plans are.

- If there is a dearth of surrounding soil, or if the cover for the pipeline is relatively shallow, the pipeline bears more of the load and, all things being equal, is more likely to fail. We know from experience that there are numerous areas where the pipes are exposed and near the surface.
- There is also no discussion of **exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied**. "When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high" (8.3.1).
- We know that the abandonment of the existing line 3 is bad. But there is also no mention of **the abandonment of the other 3 ancient pipelines in Enbridge's existing mainline corridor (Lines 1, 2, and 4)**, which we expect Enbridge will very soon attempt to abandon. Nor is there any discussion of the **abandonment of the NEW Line 3** in the future.
- The DEIS states that it will be very risky to remove and clean up the existing Line 3 because the pipelines are very close together. "The distance between pipelines within this corridor varies, but they are generally 10 to 15 feet apart" (8.3.1). This is not consistent with our extensive observations and physical measurements on the land. Also, don't they dig up pieces of pipe for maintenance purposes all the time? **Why is it suddenly risky?**
- The DEIS simply states that "Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage,and mitigate historically contaminated soils and waters" found during the abandonment or removal of the existing Line 3 (8.3.1.1.1). **We want to see that plan**.

CONSTRUCTION AND RESTORATION

- Chapter 2, "Project Description" states that Enbridge has requested a 750-foot route width (375 feet on each side of the Line 3 Replacement pipeline centerline). They claim only 50 of the 750 feet would remain a permanent right-of-way (2.1) All of this width should be included in an impact analysis because Enbridge's environmental protection plan and record is abysmal.

- Their "restoration" plans for restoring the landscape around the corridor after installation is laughable. Enbridge's process for restoring wetlands includes dumping the now compacted (and probably de-watered) soil back in the trench, sowing some oats and "letting nature take it's course". This is not how you re-establish a wetland. Studies have shown that even with proper restoration practices, it can take decades to get back to the biological functioning it was at prior to disturbance. When Enbridge stores the soil, they will also be driving equipment over it- which compacts it, they also plan to compact the soil after refilling the trenches. This is not good for the soil.
- Cathodic protection, which applies electric current to the pipeline in order to protect it from corrosion caused by nearby utility lines, **will not be installed for up to 1 year after pipeline construction** (2.3.2.3). Lack of cathodic protection is what caused many pinhole leaks in the Keystone pipeline, almost immediately after construction. The proposed route for Line 3 follows a utility corridor for much of its length - this is a recipe for disaster. Even the US Army Corps's rubber-stamp approval of the Dakota Access pipeline required the cathodic protection system to be installed within 6 months!

ECONOMIC IMPACTS

- Chapter 5, "Existing Conditions, Impacts, and Mitigation" states that Line 3 will create ZERO permanent jobs. Enbridge's application states that "existing operations staff would be able to operate the [pipeline] and that few additional employees would be hired to assist the staff" (5.3.4).
- Also in Chapter 5, the DOC assumes "all workers would re-locate to the area" and ZERO construction jobs will go to Minnesotans. The pipeline would have "no measureable impact on local employment, per capita household income, median household income, or unemployment" (5.3.4).
- The DEIS does not acknowledge that when the existing Line 3 shuts down, Enbridge will stop paying taxes to the MN counties along the mainline corridor. For many of these poor counties in the north, revenue from Enbridge's property tax makes up a significant portion of the county budget. There is also the issue that Enbridge is now in the process of appealing

years of back taxes, burdening two of the poorest counties in Minnesota with over $10 million due.

CLIMATE CHANGE

- The DEIS acknowledges that Line 3 would contribute to climate change. It analyses 3 different types of emissions - direct, indirect, and lifecycle. Direct emissions are those that the pipeline infrastructure itself emits, and these are very small. Indirect emissions are those created by the power plants that provide electricity for the pipeline's pumping stations, and these are significant. Lifecycle emissions are those caused by the refinement and eventual use of the oil, and these are massive. Line 3's direct and indirect emissions alone would be 453,000 tons of CO2 per year. Over a 50-year lifespan, that would cost society an estimated $1.1 billion. (Executive Summary p.18).
- The lifecycle emissions of Line 3 would be 193 million tons of CO2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3)
- The DEIS does not discuss the unprecedented challenges of human casualty, displacement, conflict, natural disaster, biodiversity loss, etc, that climate change is causing, or the consensus from the scientific community that we must leave fossil fuels in the ground. It also fails to acknowledge that across the planet, Indigenous people are disproportionately impacted.

The DEIS affirms that the MN PUC can only grant the permit if "the consequences to society of granting are more favorable than the consequences of denying the certificate." Regardless of whether or not Enbridge can find customers, the DEIS shows that the negative impacts far outweigh the benefits. So our position remains:

NO PERMIT. SHUT DOWN LINE 3 AND DEVELOP RENEWABLE ENERGY INFRASTRUCTURE.

Jane Eagle

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Andrea Eger

Street Address: 422 SE 7th Ave

City: Minneapolis State: MN Zip Code: 55414

Phone or Email: a.eger@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am wondering how "Drinking Water Sources" & "Drinking Water Areas of Interest" are calculated in table ES-2. How were these numbers settled upon? With Line 3 replacement crossing the Mississippi & MN river & would bring crude oil closer to Lake Superior, there is no way that the proposed route can have half of the number of drinking water areas of interest than the current line 3?? 0673-1

I'm also very concerned by the table ES-4. Although truck spills might be more common there is no mention that these spills would occur in areas that have more traffic, would be seen quicker & are infinitely easier to clean (ie roadways not wetlands). In addition, this table doesn't say that the type of tar sands oil (dilbit) that will be transported through this pipeline is denser than water & will sink. Where are the statistics that show how much more likely pipeline spills are to flow into water or sink into aquifers? 0673-2

If including additional pages please number them and tell us how many you are providing:_____ pages

My name is Andrea Eger. I am a third generation Minnesotan, a organic farmer and educator. I am testifying today about the immense inadequacies I see in the Draft Environmental Impact Statement. I am concerned about many things that I have read in the DEIS but I will cover just a few of them today. Primarily I am concerned with the massive disruption to existing ecosystems along the proposed Line 3 corridor, the lack of state agency oversight in the construction process, and the compacting effect that this pipeline will cause to accelerate climate change.

One of the things that I am greatly concerned about is the effect that this pipeline will have on Minnesota's wetlands and forests. According to the MN Pollution Control Agency, the proposed route of line 3 would cross some of the areas of Minnesota that are most susceptible to groundwater contamination. This is highly permeable soil that will allow leaked oil to quickly pass to aquifers. In chapter 2 of the DEIS, Enbridge requests a 750 foot swath of land for construction purposes. This is the equivalent of it is the length of 2 football fields put together. It would run like a scar through wetlands in Northern Minnesota. Think of what a huge disturbance this will be to the Minnesota ecosystem. Critical habitat for wildlife, wildlife migration corridors, and mating grounds would all be effected. I am also very disturbed by section 2.7.2.4 which states that "Disturbed wetlands would be seeded with oats or a temporary seed mix (unless standing water is prevalent), or as otherwise directed by landowners or regulatory agencies." Enbrige has said that they "would otherwise allow the wetlands to revegetate naturally from the seeds and rhizomes present in the topsoil and natural recruitment." In whatever machine-compacted, dry, chemical-laden soil that is replaced after construction is done, "natural rejuvenation" would not be possible. Another thing that greatly disturbs me is that there is no mention of pesticides in the DEIS. Will Enbridge be allowed to spray pesticides at will into these fragile areas? Pesticides sprayed in a wetland would endanger pollinators locally as well as wash downstream. Why doesn't the DEIS ban use of toxic pesticides in clearing the land for the pipeline? To destroy this much pristine Minnesota wetlands without a plan for restoration is criminal. 0674-1

I am also incredibly concerned by 2.7.1.1 which talks about construction monitoring and inspection. It states that environmental inspectors will be supplied by Enbridge and they "would monitor and document compliance with company requirements, and the requirements of permit conditions." This is a perfect example of the fox guarding the hen house. The DEIS also says that state agents will also be on site but have diminished power Enbridge's inspectors and will not be able to haul construction on the project so Minnesota is left to blindly trusting

Fredrikson
& BYRON, P.A.

July 5, 2017

VIA EMAIL AND ELECTRONIC FILING

Jamie MacAlister, Planning Director
Minnesota Department of Commerce
85 7th Place East Suite 500
St Paul, MN 55101

Re: In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Replacement – Phase 3 Project in Minnesota from the North Dakota Border to the Wisconsin Border
MPUC Docket No. PL-9/CN-14-916; OAH Docket No. 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Pipeline Route Permit for the Line 3 Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border
MPUC Docket No. PL-9/PPL-15-137; OAH Docket No. 65-2500-33377

Dear Ms. MacAlister:

The Draft Environmental Impact Statement for the Line 3 Project ("DEIS") provides extensive evaluation and discussion of the potential benefits, impacts and mitigation measures for the Line 3 Replacement Project (the "Project") and alternatives being considered by the Minnesota Public Utilities Commission ("Commission"), following the direction provided in the Commission's February 5, 2016 Final Scoping Decision Document ("FSDD"), as well as the content requirements found in Minn. R. 4410.2300. Enbridge Energy, Limited Partnership ("Enbridge") appreciates the significant time and effort put into the DEIS by agency staff.

Enbridge is providing these initial comments identifying certain proposed discrete changes to the DEIS. To simplify the process of addressing these issues, Enbridge has organized these comments in the attached table (Attachment A). The table provides the statement or section of the DEIS being addressed, a citation to where it appears in the DEIS, and the proposed change, with a citation to the record or other source for the change, as appropriate.

Enbridge plans to file additional DEIS comments on or before the July 10, 2017 comment deadline.

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These comments have also been e-filed today through www.edockets.state.mn.us and a copy of the filing is being served upon the persons on the Official Service List of record.

Sincerely,

/s/ *Christina K. Brusven*

Christina K. Brusven
Attorney at Law
Direct Dial: 612.492.7412
Email: cbrusven@fredlaw.com

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Enbridge Energy's DEIS Comments
Attachment A

Chapter	Page	DEIS Text	Revisions and Suggestions	
ES	1	Second paragraph states that the "Minnesota portion runs from the Canadian border to a terminal in Clearbrook..."	Modify this sentence to read, "the Minnesota portion runs from the Minnesota/North Dakota border to a terminal in Clearbrook..."	1568-1
ES	1	Fifth paragraph, line eight states: "Enbridge's proposed route for the new Line 3 avoids crossing the Leech Lake and Fond du Lac reservations but does cross a disputed section of the White Earth Indian Reservation, as well as ceded territory that tribal members value for wild rice, hunting, and fishing."	A short segment of the route passes through Nora Township in Clearwater County. Nora Township is the northernmost of four townships that were ceded by the White Earth Band of Chippewa Indians to the United States in 1889, after which cession the townships were no longer part of the reservation and on which no Indian hunting and fishing rights have existed. *White Earth Band of Chippewa Indians v. Alexander* , 518 F. Supp. 527 (D. Minn. 1981) (concluding that "the language of the Nelson Act and the agreement ceding the four northeastern townships to the United States was "precisely suited" to diminished the White Earth Reservation as established by the Treaty of 1867 . . . and that the legislative history, surrounding circumstances, and subsequent history clearly indicate that the four northeastern townships of the original reservation are no longer part of the White Earth Reservation"), aff'd, 683 F.2d 1129 (8th Cir. 1982) ("If the four townships were ceded and never returned to reservation status, no Indian hunting and fishing rights exist within the four townships."), cert. den., 459 U.S. 1070 (1982); see also *State v. Butcher* , 563 N.W.2d 776, 781 (Minn. Ct. App. 1997) (stating that "[t]he four ceded townships are no longer considered part of the White Earth Reservation"). Based on this case law, there is no ongoing dispute regarding whether these parcels are within the White Earth Reservation; accordingly, recommend deleting reference to "disputed section of the White Earth Indian Reservation." Also recommend that the phrase related to "ceded territory" be removed or presented in a manner that does not leave readers with an impression that crossing ceded territories is distinct to the APR. According to Figure 9-2 of the DEIS, all alternatives under consideration cross ceded territory.	1568-2
ES	1	Fifth paragraph states that the APR follows new right-of-way after 92 miles of co-location with the transmission line.	Enbridge estimates that between Park Rapids and the Minnesota/Wisconsin border, the APR is collocated with other utility or road rights-of-way for approximately 110 miles. Over 75% of the APR between Clearbrook and the Minnesota/Wisconsin border parallels existing rights-of-way.	1568-3
ES	1	Fifth paragraph states "Then it follows new right-of-way into Superior, Wisconsin."	Modify this sentence to read: "Then it follows new right-of-way before rejoining the Enbridge Mainline corridor and then traveling into Superior, Wisconsin."	1568-4
ES	2	Figure ES-1 shows a line going into Superior labeled "SPP"	The reference to "SPP" (the Sandpiper Pipeline Project) should be removed from this figure. Applications for that project were withdrawn in August 2016.	1568-5

Enbridge Energy's DEIS Comments
Attachment A

Chapter	Page	DEIS Text	Revisions and Suggestions	
ES	4	Fourth paragraph states: "If the Commission denies the requested CN, the Applicant (or entities other than the Applicant) could reasonably be expected to meet shipper demand for the oil through other means, such as a different pipeline system, or by train or truck."	Enbridge recommends this statement be deleted. It lacks the objectivity required by Minn. R. 4410.2300 and is inconsistent with Section 4.7 of the FSDD, as it may lead a reader to assume that the purpose or need for the Project or the economic viability of other regional pipelines or alternatives were considered in the remainder of the DEIS.	1568-6
ES	7	Fifth paragraph states: "Any routing option within the existing Mainline corridor (and some other routes) would require Enbridge to obtain permanent right-of-way across a large area of federal and state public lands and two American Indian reservations."	Correct to state "Any routing option within the existing Mainline corridor east of Clearbrook..."	1568-7
ES	7	Fifth paragraph states: "Enbridge would need to acquire its permanent right-of-way in these locations through amicable agreements with tribal or federal landowners because it cannot use eminent domain to acquire a pipeline right-of-way across these lands."	The sentence should be revised to acknowledge permanent easements are not granted by the BIA on Trust lands. Instead, Enbridge would need to acquire a voluntary term easement on Tribal lands in accordance with BIA ROW regulations. Enbridge also believes it would be relevant to add a new sentence here acknowledging that the Leech Lake Band of Ojibwe has submitted letters to the Commission noting that they will not grant permission for alternatives RA-07 and RA-08 through their reservation.	1568-8
ES	7	Second paragraph: "Enbridge has asked for approval to use a 120-foot-wide area..."	Revise to state: "Enbridge has asked for approval of a route of up to 750 feet, within which an up to 120-foot-wide construction workspace area and 50-foot permanent right-of-way will be located." See Mr. Paul Eberth's Direct Testimony, Schedule 7 at 8-9.	1568-9
ES	8	Paragraph three states "Chapter 7 highlights the important variations between RSA-53 and the segment of the Applicant's preferred route it would replace."	RSA-53 is a connector segment that would allow for multiple variations of the route; however, Chapter 7 does not discuss any variations nor does it compare this RSA to the APR. Suggest removing this sentence.	1568-10
ES	9	The legend for figure ES-3 is missing symbols and misrepresents routes shown on the figure, and the title is not correct.	The fuchsia lines that show RA-06, RA-07, RA-08, and RA-03AM on the inset map do not match with the colors presented for these routes in the legend. Suggest changing the fuchsia color to the appropriate legend color for each alternative. There is no item in the legend to describe what the dotted lines are and it is unclear what their relevance is to this map. The title of this map is misleading as it is shows route alternatives and route segment alternatives instead of just "Route Segment Alternatives" as its title suggests.	1568-11
ES	11	Third paragraph states: "A significant portion of the Applicant's proposed Project would be located outside the existing Mainline corridor, causing habitat fragmentation and expanding the total acreage of land and resources exposed to the risk of a potential accidental release from a pipeline. Continued use of existing Line 3 avoids these impacts. Continued use of existing Line 3 also avoids the construction impacts associated with clearing a 120-foot-wide right-of-way and trenching hundreds of miles across Minnesota."	This is a misleading paragraph that ignores that the APR parallels existing rights-of-way, including other crude oil pipelines, for approximately 75% of its length.	1568-12

Enbridge Energy's DEIS Comments
Attachment A

Chapter	Page	DEIS Text	Revisions and Suggestions	
ES	11	Fourth paragraph, bulleted list on drawbacks of continuing to use Line 3 is incomplete.	Add "year after year disturbance to landowners along the Line 3 corridor to maintain the pipeline" to the list of drawbacks.	1568-13
ES	11	Footnote 3 directs the reader to an inactive link.	Remove this footnote and the text that it references or modify the text to include an appropriate publicly available replacement reference.	1568-14
ES	14, 26	Figures ES-5 and ES-10. High-Quality Surface Waters Crossed by Certificate of Need Alternatives/Route Options	The figures and discussion notes that the alternatives "cross" these resources when truly these are resources contained within the ROI (within 0.5 mile of the centerline). Retitle these figures to capture what the data truly represents, such as "High-Quality Surface Waters within the ROI for Certificate of Need Alternatives." For Figure ES-5, the resources considered are only in MN; all non-MN impacts are omitted. Add text to note when only Minnesota-specific data is used.	1568-15
ES	15	Third paragraph states: "A total of 38 miles of the Applicant's preferred route...would permanently fragment 21 large-block habitats. System alternative SA-04 avoids habitat fragmentation and permanent forest conversion in wooded northern Minnesota."	Comparing SA-04 to 'wooded northern Minnesota' is an oversimplification of current land cover and habitat composition patterns in the northern part of the state and the areas crossed by the APR. Many forested areas have been previously fragmented by transportation corridors and other rights-of-way, and often this fragmentation is not reflected in broad categories of land cover classes as represented in data sets such as the NLCD. Quantifying the degree to which habitats will be newly fragmented requires examination of rights-of-way that have not been incorporated into land cover classes as well as changes in land cover (e.g., intrusions of agricultural land) that have occurred since classification. Two other important considerations in assessing the potential impacts of habitat fragmentation in specific areas are: (1) the quality of existing habitats (e.g., forest stand age and measures of species diversity) and (2) the perimeter-to-area ratio of existing blocks of habitat, because where this ratio is high, the effect of fragmentation will typically be smaller than where the ratio is low. Suggest defining the methodology by which this conclusion was achieved and any limitations to the analysis.	1568-16

Enbridge Energy's DEIS Comments
Attachment A

Chapter	Page	DEIS Text	Revisions and Suggestions	
ES	15	Section titled "Will the Proposed project damage forests and wildlife habitat in northern Minnesota far more than other alternatives?"	Remove the word "far," as there is no definition in the text for what constitutes "far more." The following corrections should be made in this section: Enbridge will use a 120-foot-wide construction area in uplands and a 95-foot-wide workspace in wetlands. The discussion of SA-04 does not mention that it will also pass through the states of Iowa and Illinois, and will impact wildlife habitat in other states, some of which is in federally protected areas. Finally, the text contained under this header addresses a wide variety of resource impacts, not just forests and wildlife habitats. Suggest removing text from this section that does not address these specific resources. This section should also be updated to reflect more robust discussion of SA-04, and the habitats it impacts, as outlined in Enbridge's Comments.	1568-17
ES	18	Table ES-3, the fourth cell in header and third cell in first row: "a" and "c" aren't footnoted.	This table appears to be missing footnotes that outline the methodology and assumptions used to create this table. Add the footnotes to the table.	1568-18
ES	19	The final bullet states: "The lands and resources affected by the Project are important to preserving the traditional ways of life, including fishing, hunting, wild rice farming, maple sugar gathering, and the collection of plants for medicines, spiritual and ceremonial purposes, shelter, and other needs."	This statement over-generalizes the use of the lands affected by the Project. These subsistence activities do not occur on all of the lands and resources affected by the Project. To date, no information has been provided to identify specific areas along the APR where traditional uses would be impacted by the Project. Revision could state, "Some of the lands and resources affected by the Project..."	1568-19
ES	21	Final paragraph reads "As part of the Project, Enbridge proposes to abandon the existing Line 3, permanently removing it from service."	Modify to read, "As part of the Project, Enbridge proposes to abandon the existing Line 3, permanently removing it from service. Enbridge will continue to maintain the Line 3 once it is out of service."	1568-20
ES	26	Page ES-26, first paragraph.	When discussing Chapter 11 and environmental justice impacts, the DEIS states that RA-03AM and the APR come near the White Earth Reservation, but it doesn't mention that RA-07 and RA-08 cross the Leech Lake and Fond du Lac Reservations, and that RA-06 crosses the Fond du Lac Reservation. These facts should be added to this paragraph.	1568-21
ES	26	Under the Surface Water heading: "While the CN Alternatives differ significantly in their potential effects on water quality.."	Revise to state, "While the CN Alternatives differ significantly in their potential effects on water quality when considering only Minnesota measurements of water quality…"	1568-22
1	2	Section 1.1: "Enbridge proposes to abandon the current Line 3 in place."	This is the first use of the term abandon in Chapter 1. The meaning of the term "abandon" is not defined in this chapter. Chapter 2 (Page 2-3) presents the term along with the definition. Enbridge suggests defining "abandon" in Section 1.1 at its first mention so that the public is aware of the full regulatory meaning of the term.	1568-23

Enbridge Energy's DEIS Comments
Attachment A

Chapter	Page	DEIS Text	Revisions and Suggestions	
1	2	Discussion regarding creating a new corridor.	Use of the term "new corridor" is misleading here. Approximately 75% of the APR between Clearbrook and the Minnesota/Wisconsin border follows existing rights-of-way. This description should note that south of Clearbrook, the APR follows existing crude oil pipeline rights-of-way to Hubbard County, where it turns east and generally follows existing transmission line rights-of-way.	1568-24
1	3	Final paragraph: "As a result, the Mainline corridor was not subject to state or federal environmental review, or the Commission's procedures for CN and route permitting. Certain permits and authorizations were required prior to the construction of these early pipelines. However, some environmental review considerations that today are understood to be essential to informed decision-making (e.g., environmental justice issues, threats to rare resources, and climate change impacts) were not factored into the original establishment of the Mainline."	Enbridge's Line 67 (located in the Enbridge Mainline) underwent a full environmental review, including a U.S. Department of State Environmental Impact Statement when it was constructed. In addition, Enbridge's Line 67 Expansion project underwent a full federal environmental review (see DOS 2017 citation in Chapter 5). The EIS should recognize these prior environmental review processes as resources that document the impacts of pipelines in the Enbridge Mainline.	1568-25
2	2	Figure 2.1-1: The inset figure for the Superior Terminal includes the Sandpiper Pipeline Project.	Remove the Sandpiper Pipeline Project from the Superior Terminal inset figure in Figure 2.1-1. Applications for that project were withdrawn in August 2016.	1568-26
2	2	Figure 2-2: The pump station at Clearbrook is not shown.	Revise Figure 2-2 to include the pump station at Clearbrook.	
2	5	In a few places, the acreages provided are different from what is presented in other sections. For example, section 2.3 vs. Section 5.1.3 (5,604 total acres; 3,309 temporary and 2,134 permanent)	Verify acreages are presented consistently between sections.	1568-27 1568-28
2	9	Section 2.3.2.1.2, second paragraph, last line: "The maximum power capacity of the motors at each of the facilities would be 7,000 hp."	Revise this statement to clarify that, at each facility, the capacity of each individual motor would be 7,000 hp.	1568-29
2	10	Section 2.3.2.1.3, first paragraph, second line: "Each facility would contain three 7,000-hp motor and pump units..."	Revise this statement to clarify that the Cromwell pump station only has two 7,000-hp units.	
2	32	Section 2.7.2.7, first paragraph, first line: "All waterbody construction would require a Minnesota DNR License to Cross Public Waters and would be subject to CWA permits issued by USACE."	Revise this statement to clarify that the jurisdiction of the Minnesota DNR is limited to Minnesota Public Waters; therefore, the Minnesota DNR License to Cross Public Waters only applies to crossings of Minnesota Public Waters. Furthermore, the USACE CWA permit only applies to waterbody crossings that are under the jurisdiction of the USACE.	1568-30 1568-31
2	36	Section 2.7.3, last sentence: "Pumps would be installed on foundations and would not be housed in buildings."	Revise this statement to clarify that the pumps would housed inside buildings as shown on Figures 5-10 through 5-18 of the EAW. The Building/Area Identification Key on each drawing shows that areas identified as 'B' are Pumphouse/UPB Buildings.	1568-32
2	37	Section 2.7.5, second paragraph, first sentence: "Enbridge would restore widened and graded roads to preconstruction conditions upon completion of construction."	Revise this statement to clarify that the roads upgraded at the Two Inlets and Palisade pump stations would be retained after construction is complete to provide access to the facilities for maintenance activities during operation.	1568-33

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2	43	Section 2.9 states that abandonment of the existing Line 3 pipeline would involve disconnecting the pipeline from pump stations, terminals, and other operating facilities; purging all crude oil or other combustibles from the line; charging the pipeline with an inert gas; and sealing the pipes and facilities left in place.	Enbridge does not plan to charge the pipeline with inert gas under the abandonment scenario. Remove the following statement from this paragraph: "...charging the pipeline with an inert gas..." See DEIS Appendix B at 12-13.	1568-34
3	0	This section provides an overview of permitting requirements strictly for oil pipelines in MN, which includes the Applicant's Preferred Routes and portions of the route alternatives; however, it does not make the distinction between the permits that would be required for CN or Route Alternatives.	Enbridge recommends focusing Chapter 3 on the APR and removing the regulatory and permit requirements that are not associated with the APR from the table and the associated write-ups. Permits and authorizations associated with deactivation should also be removed from this chapter. The following permits and authorizations would not be required for the APR and should be removed: USFS Special Use Permit, BIA ROW Grant, Federal Consistency Review.	1568-35
3	1	Fourth paragraph, second sentence: "...and potential wetland impacts would require a Section 404 wetland permit from the U.S. Army Corps of Engineers (USACE)."	Revise this statement to say, "…and potential dredge and fill impacts to waters of the U.S. would require a Section 404 wetland permit..."	1568-36
3	10	Section 3.6, Table 3.6-1, second row: "Section 7 Environmental Species Act...".	Revise this to say "Section 7 Endangered Species Act...".	1568-37
3	10	Section 3.6, Table 3.6-1, third row: Bald Eagle Removal Permit	Based on recent field verification, Enbridge will no longer be seeking a Bald Eagle Removal Permit from the USFWS, and will instead apply for a Bald Eagle Nest Disturbance Permit. Update Table 3.6-1 to reflect this change.	1568-38
3	10	Section 3.6, Table 3.6-1, Minnesota DNR entries: The osprey nest removal permit required by the Minnesota DNR is not included in this table.	Enbridge will be applying for an Osprey Nest Removal Permit from the Minnesota DNR to remove an inactive osprey nest located within the construction workspace. Update Table 3.6-1 to include this permit.	1568-39
3	10	Section 3.6, Table 3.6-1, USACE: USACE Section 14 of the Rivers and Harbor Act, Section 408 Flowage Easement Permit is not included in this table.	Based on recent information provided by the USACE Realty Department, the APR will cross USACE flowage easements and will therefore require an authorization unders Section 14 of the Rivers and Harbor Act (33 U.S.C 408), also known as Section 408 Flowage Easement Permits. Update Table 3.6-1 to include this permit.	1568-40
3	12	Section 3.6.1.2, third paragraph, last sentence: "After consulting with the permitting agency, USFWS issues a Biological Opinion and Incidental Take Permit statement, if necessary"	Remove "statement" from this sentence. The USFWS would issue an "Incidental Take Permit" or an "Incidental Take Authorization".	1568-41

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3	14	Section 3.6.3.2: Missing air permit discussion.	Revise this section as follows: 3.6.3.2 Minnesota Pollution Control Agency Minnesota PCA monitors air and water quality in Minnesota and uses technical and financial assistance as well as a variety of regulations to protect and enhance environmental quality in Minnesota. An air quality permit authorizes construction and operation of the modified Clearbrook terminal. A National Pollutant Discharge Elimination System/State Disposal System construction stormwater permit from Minnesota PCA is required for stormwater discharges from construction projects. The general NPDES/State Disposal System permit requires (1) use of best management practices; (2) a Stormwater Pollution Prevention Plan; and (3) adequate stormwater treatment capacity once the project is constructed. Minnesota PCA must certify that proposed activities will not violate air and water quality standards.	1568-42
3	14	Section 3.6.3.1, second paragraph: "Minnesota's Lake Superior Coastal Program, within the Minnesota DNR, coordinates the review of federal actions to determine whether they will be consistent with the state's coastal management program. Minnesota DNR's federal consistency review includes activities requiring certain federal licenses or permits."	The APR does not cross the Lake Superior Coastal Zone; therefore, this review would not apply and reference to this review should be removed from this section. However, RA-06, RA-07 and RA-08 would cross the Minnesota Coastal Zone.	1568-43

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4	21	4.3.2: **Route Alternative RA-03AM Would Avoid Lakes, Fens, Fish Hatcheries, and Wildlife Management Areas** Route alternative RA-03AM is an alternative between Clearbrook and Carlton. The Minnesota Pollution Control Agency (Minnesota PCA) originally proposed this as a CN "system alternative" that included a new terminal in Crookston, Minnesota, in part to avoid the Mississippi River Headwaters area as well as the Minnesota's Lakes region. During scoping for the Sandpiper Project, this route option was added as a modified version of the original proposal that would provide access to the Clearbrook terminal, allowing deliveries to the Northern Tier Energy and Flint Hills Resources refineries through MPL's pipeline. (Thus, it is called RA-03AM, or "as modified.") Minnesota Department of Natural Resources (Minnesota DNR) subsequently proposed additional modifications during the 2015 Line 3 process. This route alternative parallels an existing pipeline right-of-way from Clearbrook to Park Rapids, thereby focusing pipeline construction and operations impacts in an area already affected by a crude oil pipeline. Compared to other alternatives, this option reroutes around fens, fish hatcheries, and communities, and avoids specific Wildlife Management Areas (WMAs).	The heading of this section is misleading and should reflect the following corrections: 1) RA-03AM would not avoid fens. As is stated in Chapters 4 and 6, RA-03AM, the APR, and the other RAs would share the same route between Neche, ND and Clearbrook, MN where all routes would impact the Gully 30 calcareous fen. Remove the word "fens" from the header. 2) The APR would not cross the Spire Valley Fish Hatchery, or any other fish hatchery. Remove "fish hatcheries" from the heading. RA-03AM would cross nine cities and would be installed in congested and heavily developed areas, including the Hinckley Golf Course; therefore, the final sentence that states that RA-03AM would reroute around communities is inaccurate. The impact to cities is greater along RA-03AM as compared to the APR. Remove "and communities" from the last sentence. In Table 3.6-1, MDNR noted that they would not permit the RA-03AM crossing of the Alexander Woods SNA, thus making this route alternative as proposed unpermittable ("Minnesota Department of Natural Resources has indicated that the agency would not grant license for line RA-03AM to cross Alexander Woods Scientific and Natural Area."). This information is relevant to this alternative summary and the footnote text from Table 3.6-1 should be included here.	1568-44
4	27	Section 4.3.4.3, first line: "From Neche to Clearbrook, Line 3 is one of six pipelines co-located in a single corridor."	Revise this statement to say that Line 3 is one of seven pipelines co-located in a single corridor between Neche and Clearbook.	1568-45
4	27	Section 4.3.4.3, third line: "From Clearbrook to Superior, the corridor includes seven pipelines."	Revise this statement to say that the corridor between Clearbrook and Superior includes six pipelines.	
4	31	Section 4.3.6, Table 4.3-5, RSA-05: "Minnesota PCA requested a route alternative to avoid the Eastern Wild Rice Watershed, and a possible hydrological connection to Lower Rice Lake."	Enbridge developed RSA-05. Revised text should read "Enbridge proposed RSA-05 to avoid Eastern Wild Rice Watershed, and a possible hydrological connection to Lower Rice Lake in response to comments the White Earth Band of Ojibwe filed in the Sandpiper Pipeline Project."	1568-46 1568-47
4	33	Section 4.3.6, Table 4.3-5, RSA-22: "Minnesota DNR recommended a route alternative that would avoid important habitat in the Big Sandy Lake watershed as well as Grayling Marsh WMA, McGregor WMA, Lawler WMA, and Salo Marsh WMA."	APR does not cross the Salo Marsh WMA or the McGregor WMA. Remove these WMAs from the list in this statement.	1568-48

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4	34	Section 4.3.6, Table 4.3-5, RSA 23: "The Applicant removed this route segment alternative from further analysis; however, it is being carried forward into the route alternatives analysis because it was recommended by several landowners throughout the comment period."	As noted in Enbridge's analysis of RSA-23 in Schedule 7 of Mr. Barry Simonson's January 31, 2017 testimony, Enbridge analyzed but did not select this alternative based on constructability constraints, permanent trail impacts, increased wetland and SNA impacts, and its proximity to residences. Enbridge also originally analyzed this as a possible route alternative in the Environmental Information Report (see section 2.3.3, Aitkin County Soo Line Document) submitted for the Sandpiper Pipeline Project on January 31, 2014. While Enbridge did not carry it forward as its preferred route, RSA-23 is being studied now because it was recommended by several landowners throughout the comment period."	1568-49
4	35	Table 4.3-5 RSA-28: "There was a map submitted without a written comment. It appears the segment was suggested to avoid gravel pits. It also avoids diagonal crossings of rural land."	RSA-28 would cross an active wetland mitigation site. Through landowner communication, Enbridge confirmed the presence of a wetland mitigation site, where normally the purpose is to restore wetland habitat. Typically, wetland mitigation sites have either deed restrictions or conservations easements associated with them that prevent pipeline construction. The APR would completely avoid the wetland mitigation site.	1568-50
5	0	5.2.5.2.2: Errors are present in the list of federally listed species potentially occurring along "Continued Use of Existing Line 3" alternative and potentially other alternatives as well.	The following federally listed species may occur in the counties crossed by the respective CN or Route Alternative not listed in the draft EIS: SA-04: red knot RA-06, RA-07, and RA-08: western prairie fringed orchid, piping plover, Dakota skipper, and Poweshiek skipperling RA-03AM: piping plover, red knot, spectaclecase, Dakota skipper, Poweshiek skipperling, and western prairie fringed orchid	1568-51
5	2	Section 5.1.2, third sentence: "In addition, data available as part of Enbridge's application, Enbridge's April 2016 Environmental Assessment Worksheet (EAW), and responses to data requests from the Minnesota Department of Commerce Energy, Environmental Review and Analysis (DOC-EERA) were considered."	The analyses in this chapter later use the November 2016 version of Enbridge's EAW (see page 5-39, 5-45). Please correct "April 2016" to "November 2016." Note that Enbridge also submitted an updated EAW as Schedule 2 to Mr. Paul Eberth's Direct Testimony on January 31, 2017.	1568-52
5	14	Section 5.2.1.1.2, Applicant's Preferred Route, Glacial Aquifers, Water Table Glacial Aquifers, last sentence: "The depth to the water table along with the soil types indicates the degree of vulnerability to impacts."	This statement should be augmented because depth to the water table is only part of the consideration in terms of vulnerability. There are conditions in which the water table could be shallow but the groundwater has low vulnerability.	1568-53
5	15	Section 5.2.1.1.2, page 15, third paragraph: "With the exception of shallow bedrock (either igneous/metamorphic or sedimentary, which is not common along the Applicant's preferred route) **and karst bedrock,** bedrock aquifers are not expected to be affected by pipeline construction and operation because they exist at depths averaging from 300 to 400 feet, which is well below pipeline construction depths."	APR does not cross karst bedrock. Remove "and karst bedrock," from this sentence.	1568-54

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5	17	5.2.1.1.2: "The Applicant's preferred route would not cross any wellhead protection areas in North Dakota, and it would cross 87 acres in Minnesota."	Based on the Schedule 2 to Mr. Eberth's Direct Testimony, the only WHPA crossed by the APR is Wrenshall 1 within the drinking water supply management area ("DWSMA") crossed for 390 feet. Verify this acreage and clarify that this is the acreage represented contained within the ROI; not construction impacts.	1568-55
5	25	Section 5.2.1.1.3, page 25, third full paragraph: "Applicant has identified one location at MP 354.6 where bedrock outcrops at the surface for approximately 0.3 mile, and four blasting events would be required to install the pipeline (Enbridge 2016b)."	On November 10, 2016 Enbridge provided a response to DR01-70 that indicated that blasting would occur at one location at MP D1128.4 and that blasting was estimated to be approximately one quarter mile in length. Revise text to reflect Enbridge's response to DR01-70.	1568-56
5	26	Section 5.2.1.1.3, page 26, second full paragraph, second sentence: "The Applicant's preferred route crosses the City of Plummer...Wellhead Protection areas."	The APR would not cross the City of Plummer's Wellhead Protection Area (WPA), but this WPA is within the ROI. Revise this statement to clarify that the WPA is located within the ROI, but would not be crossed by the APR.	1568-57
5	29	"If the water table is exposed by blasting, the turbidity, sedimentation, or chemical contamination that could result would be localized and likely would be diluted or attenuated before it could travel very far into the aquifer."	This conclusion does not appear to account for SA-04 crossing 70 miles of karst features, which could potentially result in a very far and fast contamination.	1568-58
5	34	Section 5.2.1.1.4 and Table 5.2.1.1-4: "Overall, impacts on groundwater for the Applicant's preferred route and the CN Alternatives would be temporary and negligible to minor, or no impact would occur. Potential construction impacts due to karst sensitivity would be the highest for SA-04. Potential construction and operation impacts due to vulnerable groundwater would be the highest for the Applicant's preferred route."	Table 5.2.1.1-3 indicates that SA-04 would cross 30,201 acres of high vulnerability aquifers, which is greater than the 25,765 acres of high vulnerability aquifers crossed by the APR referenced in section 5.2.1.1.2 pg. 5-17; therefore, the conclusion should indicate that magnitude and potentially the duration associated with the construction and operation impacts on both groundwater associated with karst terrain, which is highly vulnerable to contamination, and to highly vulnerable aquifers would be greatest on SA-04.	1568-59
5	35	Section 5.2.1.1.4, Summary, Construction Impacts, first bullet: "Potential impacts on groundwater availability from groundwater withdrawals, hydrostatic testing, trench dewatering, and other construction activities, as a result of the Applicant's preferred route and the SA-04, would be temporary and minor."	The summary should acknowledge that SA-04 would still have a greater magnitude of impacts on groundwater availability relative to the APR due to the increased length and demand for groundwater sources.	1568-60
5	42	Section 5.2.1.2.1, Regulatory Context	Revise this paragraph to include the USACE Section 404/10 permit.	
5	44	Section 5.2.1.2.1, page 44, first partial paragraph: "CWA Section 401 Individual Water Quality Certification for the Project in Minnesota is under the jurisdiction of USACE – St. Paul District and Minnesota PCA."	Remove "USACE - St. Paul District" from this sentence.	1568-61 1568-62

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5	48, 54	Section 5.2.1.2.2, Applicant's Preferred Route, Surface Waters Crossed: "Various surface waters would be crossed by the Applicant's preferred route, as shown in Table 5.2.1.2-2. The Applicant's preferred route also would cross numerous non-jurisdictional ditches/drains, for which flows are unknown and crossing permits are not required." and Section 5.2.1.2.2, System Alternative SA-04, Surface Waters Crossed: "The types of surface waters crossed by system alternative SA-04 are listed in Table 5.2.1.2-8. System alternative SA-04 also would cross many non-jurisdictional ditches/drains, for which flows are unknown and crossing permits are not required."	Revise these statements to clarify that local permits would be required for crossings of county ditches and drains. Enbridge works with County drain jurisdictions, watershed districts and water resource boards in order to permit crossings of drains and/or ditches.	1568-63
5	51	Section 5.2.1.2.2, Applicant's Preferred Route, Wild Rice Waterbodies: "Fifteen wild rice waterbodies occur within 0.5 mile of the Applicant's preferred route." However, Table 5.2.1.2-13 (page 62) indicates that there are 17 wild rice lakes within 0.5 mile of the Applicant's Preferred Route.	Verify the correct number of wild rice waters that occur within 0.5 mile of the APR and ensure the count is stated consistently between all EIS sections.	1568-64
5	64	Section 5.2.1.2.3, Existing Surface Water Conditions in the Region of Interest, Applicant's Preferred Route: "The Applicant's preferred route intersects the highest number of wild rice lakes (17) compared to the CN Alternatives. For other notable resources, this route passes 17 trout streams and 8 lakes of high and outstanding biodiversity significance as well as 4 tullibee lakes. See Table 5.2.1.2-13 for comparison of resources intersected."	Revise these statements to clarify that the features noted are within 0.5 mile of the APR; the APR does not cross this number of features. For example, the APR crosses 6 trout streams, however it is unclear what exactly is meant by "this route passes 17 trout streams."	1568-65
5	73	Section 5.2.1.2.4, Degradation of Water Quality and Habitat from Releases of Drilling Mud during HDD Crossings, Disturbance of Wild Rice Waterbodies: "Five wild rice waterbodies would be crossed by the Applicant's preferred route, with about 5 acres of the delineated waterbody basins within the construction work area."	The APR only crosses one wild rice waterbody. Acres of delineated wild rice waterbodies, within the construction work area were not calculated, as described in the DEIS. A connectivity analysis was completed to determine which wild rice waterbodies are connected to the APR, and the analysis is available in Mr. Jeff Lee's Direct Testimony.	1568-66
5	107	Section 5.2.1.3.1, first paragraph: "CWA Section 404/ and Rivers and Harbors Act Section 10 Individual Permits and associated state CWA Section 401 Individual Water Quality Certification for the Project in Minnesota are under the jurisdiction of USACE – St. Paul District and Minnesota PCA."	Remove "and Rivers Harbors Act" from this statement.	1568-67
5	108	Section 5.2.1.3.1, page 108, first full paragraph, fourth sentence: "Iowa relies solely on CWA Section 401 for wetland permitting and does not have supplemental required regulations (Illinois AC 567-61.2)."	Incorrect citation (Illinois instead of Iowa). Revise the citation to include the correct state.	1568-68

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5	125	Section 5.2.1.3.3, Applicant's preferred route, Operations Impacts, Specially Designated Wetlands, first paragraph: "Line 3 crosses three calcareous fen wetlands (Chester 24, Viking 18, and Gully 30). Potential impacts on calcareous fens during operations could occur if excavation is required at these locations; however, repeated pipeline repairs or replacement are unlikely at these locations. The resultant impacts would be similar to those for initial construction of the pipeline through the fens (i.e., the impact is expected to be short- to long-term and minor)."	Enbridge recommends providing a write-up that describes the enhancement of the Gully 30 Fen that occurred following construction and restoration of the Alberta Clipper pipeline and the ongoing hydrology and protected flora monitoring that is being conducted for Alberta Clipper and is likewise proposed for the Line 3 Replacement Project. The Minnesota DNR has already requested a Fen Management Plan for this area.	1568-69
5	124	Section 5.2.1.3.3, Continued Use of Existing Line 3, Operations Impacts, General Wetlands, second paragraph: "Because of the age of the existing Line 3, excavation and repair or replacement of the pipeline would occur at a higher rate than for new pipelines, with an estimated 267 excavations per year over the next 15 years."	In Ms. Laura Kennett's Direct Testimony filed January 31, 2017, Lines 589-591 reads: "Combined, the total digs required to maintain Line 3 at its current operating condition over the next 15 years is approximately 7,000 digs in the U.S., with approximately 6,250 of these digs in Minnesota." A total of 7,000 digs over the next 15 years equates to on average of approximately 466 digs per year, which is a higher number of digs than stated in Section 5.2.1.3.3. Correct this discrepancy.	1568-70
5	131	Section 5.2.1.3.4: Table 5.2.1.3-6 indicates 440 acres of forested and scrub-shrub wetland impacts would be associated with the Applicant's preferred route.	Table 5.2.1.3-1 in Section 5.2.1.3.2, indicates there are 423.5 acres of forested and scrub-shrub wetland impacts. Verify the correct total of impacts on forested and scrub-shrub wetlands and make consistent between these two tables.	1568-71
5	131	Section 5.2.1.3.4: Table 5.2.1.3-6 indicates 178 acres of emergent wetland impacts would be associated with the Applicant's preferred route.	Table 5.2.1.3-1 in Section 5.2.1.3.2 indicates there are 170.4 acres of emergent wetland impacts. Verify the correct total of impacts on forested and scrub-shrub wetlands and make consistent between these two tables.	1568-72
5	153	Section 5.2.2.2.1, Shallow Bedrock: DEIS states that there is one segment of surface bedrock that may require blasting along the preferred route between mileposts 354.6 to 356.6 in Carlton County, MN (2 miles).	On November 10, 2016 Enbridge provided a response to DR01-70 that indicated that blasting would occur at one location at MP D1128.4 and that blasting was estimated to be approximately one quarter mile in length. Revise the statement in the DEIS to reflect the information provided in DR01-70.	1568-73
5	156-157	Sections 5.2.2.2.4 Transportation by Rail and 5.2.2.2.5 Transportation by Truck, first line of each discussion: "Soil and geology conditions for the rail [truck] alternative are similar to those of the other alternatives."	This statement is misleading as there would likely be few additional soil impacts necessary to support the Transportation by Rail and Transportation by Truck alternatives. Revise both statements.	1568-74
5	161	Section 5.2.2.3.1, Operations Impacts: The subsection Permanent Loss of Soil Cover states "Construction of permanent access roads and associated facilities would require permanent removal of soil, to be replaced with materials such as cement and gravel. Loss of soil cover would total 278 acres for access roads and 67 acres for other permanent facilities along the Applicant's preferred route in Minnesota."	This statement is incorrect based on the data filed in Schedule 2 to Mr. Eberth's Direct Testimony. According to the EAW, the total permanent acreage of soil impacts for access roads would total 3.5 acres (though 274.2 acres would be temporarily impacted) and there would be an additional 40.9 total acres of permanent impacts at facilities, mainline valves, and cathodic beds combined. This section overstates the permanent impacts to soils.	1568-75
5	161	Section 5.2.2.3.1, Landslide Hazards: The DEIS states "It should be noted that, although the potential is low, a landslide could occur at any time throughout the life of the Project."	This is a universal conclusion that should be applied to all alternatives. It was not included in the assessment of SA-04 on page 5-164, where the same low probability of landslides was noted.	1568-76

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5	162	5.2.2.3.3: "Geology impacts that vary from the Applicant's preferred route include an increased occurrence of shallow bedrock and karst terrain on the SA-04 route. If constructed, it was assumed that measures similar to the Applicant-proposed measures would be implemented along the SA-04 route to reduce the impacts on geologic resources and soils that were identified for the Applicant's preferred route."	There are no karst features along the APR, therefore, the Applicant-proposed mitigation measures would not address potential issues with crossing karst terrain along SA-04.	1568-77
5	167	Section 5.2.2.4.1, Table 5.2.2-4: Under the Operation Impacts for permanent loss of soil cover, the DEIS states: "The extent of permanent soil conversion to an impervious surface would be up to 140 acres for the truck alternative, up to 360 acres for the rail alternative, about 345 acres for the Applicant's preferred route, and about 700 acres for SA-04."	As previously noted in comment on Section 5.2.2.3.1 (p. 5-161), these permanent impact acreages are either incorrect (compared to data presented in the EAW), or possibly overestimating permanent impacts.	1568-78
5	175	Section 5.2.3.1.2, Page 175, fifth paragraph, second sentence: "Mapping is still being conducted for portions of the northern-most counties crossed by all routes, except SA-04. MBS Sites are rated for a suite of biodiversity values and are assigned a rank from "outstanding" to "below." The biodiversity ranks help to guide conservation and management."	In general, the SOBS and biodiversity data used for the DEIS analysis is preliminary and is, therefore, subject to change before the FEIS is issued. Amend these statements to clarify the preliminary nature of SOBS and biodiversity data used as part of the DEIS analysis.	1568-79
5	181	Section 5.2.3.2, Existing Conditions, Table 5.2.3-3: Noxious Weeds and Invasive Plants within 0.5 Mile of the Applicant's Preferred Route and System Alternative SA-04	This table should distinguish between which noxious and invasive plant species that can be found within 0.5 mile of the APR vs. SA-04. Also, data for Iowa and Illinois is missing for SA-04.	1568-80
5	215	Section 5.2.3.4.2, Mitigation, Table 5.2.3-18 Loss or alteration of rare native plant communities: SA-04 Long-term to permanent/major impacts • 2 acres of rare native plant communities	Table 5.2.3-16 states there are 3.6 acres of construction impacts. Verify the information presented in these tables and revise to ensure consistent information is presented.	1568-81
5	222	Figure 5.2.4-1: Aquatic Management Areas Crossed by the Applicant's Preferred Route and CN Alternatives	Revise Figure 5.2.4-1 title to read "Aquatic Management Areas within the ROI of the APR and CN Alternatives." Not all of these AMAs are "crossed" by the APR or CN Alternatives.	1568-82
5	229	Section 5.2.4.2.1: "Coldwater fisheries support trout and salmon (Salmonidae); these are important commercial and sport fishes that require cold, clean water for survival and reproduction. Chinook (Oncorhynchus tshawytscha), coho (Oncorhynchus kisutch), and pink salmon (Oncorhynchus gorbuscha) have been introduced to Lake Superior and now spawn in its tributaries (Minnesota DNR 2016i). Lake trout (Salvelinus namaycush) are naturally reproducing in cold lakes throughout the region. The native brook trout (Salvelinus fontinalis) and the introduced brown trout (Salmo trutta) and rainbow trout (Oncorhynchus mykiss) are also present in rivers and streams in the region."	Revise this discussion to clarify that the APR does not cross salmon fisheries.	1568-83
5	231	Section 5.2.4.2.1, Page 231, Management Units: "The Applicant's preferred route crosses a variety of Minnesota DNR wildlife management and conservation areas, including WMAs, wildlife refuges, state forests, and recreation areas."	APR does not cross state wildlife refuges or recreation areas. Remove these items from the sentence.	1568-84

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5	242	5.2.4.2.1, Wildlife in the Project Region, Birds, Non-game Birds : "Raptor stick nest surveys were conducted within 0.5 mile along the Applicant's preferred route to locate and identify bald eagle and osprey nests between 2014 and 2016."	Correct this statement to reflect the following: "In Minnesota, aerial surveys were conducted for bald eagle nests within 0.25 miles of the APR and for osprey nests within the project's environmental survey corridor, which is a 250-foot- to 450-foot-wide corridor encompassing all project components. Aerial surveys for bald eagle and osprey nests were completed in 2017 and are planned through the year(s) up to construction."	1568-85
5	244	Section 5.2.4.2.2: "The route of the existing Line 3 pipeline crosses several wildlife conservation areas, including one wildlife refuge and three state forests; it also crosses the Chippewa Plains IBA."	Enbridge reviewed the APR to confirm wildlife refuge crossings and found that no wildlife refuges are crossed by the APR. Correct this statement.	1568-86
5	251	Section 5.2.4.3.1, Table 5.2.4-6 Aquatic Management Areas Crossed by the Applicant's Preferred Route in Minnesota (acres): The information in this table indicates that the Applicant's preferred route would impact the Blackhoof River, Spire Valley, and Straight River AMA.	The APR does not cross the Blackhoof River, Spire Valley or Straight River AMA. Table 5.2.4-6 should be corrected to indicate these AMAs are not crossed by the APR. Pg. 5-256, accurately states; that the APR would affect 0.4 acre of the La Salle Creek AMA. The APR would come within 0.5 mile of three other AMAs but would not directly disturb these areas.	1568-87
5	256	Section 5.2.4.3.1, Aquatic Management Areas: "LaSalle Creek would be crossed using the HDD method; this would affect 0.4 acre of the La Salle Creek AMA."	As stated in Appendix G, La Salle Creek would be crossed using a dry-crossing technique. It is also important to note that during meetings with the MDNR on this crossing, they requested that the HDD method not be used due to prior frac-outs in this area from a non-Enbridge project. Correct this statement to reflect the information in Appendix G to the DEIS.	1568-88
5	258	Section 5.2.4.3.1, Table 5.2.4-7 Number of Trout Streams Crossed by the Applicant's Preferred Route in Minnesota and Wisconsin	Revise title to Number of Trout Streams within ROI of the APR in Minnesota and Wisconsin. As illustrated in the table, the majority of these trout streams are not crossed by the APR.	1568-89
5	261	Table 5.2.4-8 indicates that the APR would impact 5.5 acres of the Pembina County Waterfowl Production Area.	Enbridge has confirmed that the APR would not cross the Pembina WPA. Correct this discrepancy throughout the document. For example (but not limited to), in Sections 5.2.6.2.1, 5.2.6.3.1, and 5.3.2.2.1.	1568-90
5	261	Section 5.2.4.3.1, Table 5.2.4-8: Indicates that the APR is impacting 1.5 operational acres the White Earth State Forest Land.	The APR does not cross the White Earth State Forest. Correct this discrepancy.	1568-91

Chapter	Page	DEIS Text	Revisions and Suggestions	
5	263	Section 5.2.4.3.1, Page 263, third paragraph: "Two colonial waterbird nesting sites (rookeries) occur within 0.5 mile of the Applicant's preferred route; both sites provide habitat for great blue heron. Waterbirds can be vulnerable to development, particularly when appropriate replacement habitat is not available and disturbance, even though a number of the species are not rare. Direct impacts may occur from the loss of nesting habitat; indirect impacts could occur from disturbance to adults, nests, young due to construction. Wildlife agencies often recommend a buffer of no impact around the colony and/or season restrictions on construction. The Shell River rookery is about 1,220 feet, from the closest construction work area. The impact on this rookery is expected to be indirect, temporary, and negligible to minor, depending on the time of year construction takes place. The Mahtowa rookery is about 340 feet from the closest construction work area. Because construction activities are expected to occur within a distance that would affect the Mahtowa colony, the Applicant should consult with Minnesota DNR and USFWS, to establish construction BMPs and timeframes to minimize impacts on the rookeries. A permit may be required. The impact of construction within this buffer zone would be temporary to long-term and could be minor to major, depending on the construction activities conducted."	The Applicant has not received conservation measures or other guidance from the USFWS or Minnesota DNR regarding rookeries. Impacts on rookeries would be limited to active rookeries, and potential disturbance would hinge on time of year of construction; existing human activities in the vicinity of the rookery; and topographic, vegetation, or other visual and auditory barriers that may be present between the rookery and APR. If the USFWS or Minnesota DNR recommends that the Applicant implement conservation measures related to the Mahtowa rookery or other rookeries, the Applicant would research these factors that would influence the potential for impact and would coordinate with the agency as appropriate.	1568-92
5	266	Section 5.2.4.3.1, Operations Impacts, Page 266, fourth paragraph: "The pipeline right-of-way could also attract migratory waterfowl during early spring if it becomes snow free before surrounding habitats, which has been demonstrated during the early spring melt, when early vegetation emergence near roadways and the buried portion of the Trans Alaska Pipeline in Northern Alaska attracts waterfowl, shorebirds, and ptarmigan (Trans Alaska Pipeline System Owners 2001)."	The DEIS does not appropriately summarize the findings of the referenced TransAlaska Pipeline System Owners, 2001. The majority of the TransAlaska Pipeline is aboveground, not below ground. The Dalton Highway was constructed to allow for maintenance of the pipeline. During spring, snowmelt starts to occur on the edges of the graveled and maintained Dalton Highway because the dust shadow created by use of the highway along the edge causes early green up; not along the edges of the aboveground pipeline right-of-way. The APR would be vegetated during operation of the pipeline. Furthermore, the area in reference occurs in the arctic tundra ecosystem where there are no trees; not within the temperate forest ecosystem of northern Minnesota. Both the ecological and climatological conditions are very different and it's unlikely the same effect would occur along the APR. Enbridge recommends that comparison to the TransAlaska Pipeline System Owners, 2001 is not applicable and should be removed from the FEIS analysis.	1568-93

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5	282	Table 5.2.4-12 Loss of habitat or reduction of wildlife habitat quality from construction activities and vegetation clearing (Applicant's preferred route): Temporary to permanent/minor to major impacts from clearing of the right-of-way • 4,917 acres of habitat, primarily forest and forested wetland	According to table 5.2.3-8, the APR would impact 2,202 acres of forest (cumulative of evergreen, deciduous, mixed, and woody wetlands) out of a total of 5,617 acres, which approximately 39% of vegetation impacted by the entire route. This same table indicates that 3,160 acres (56%) of the APR consists of herbaceous or barren communities (grassland, hay/pasture, crops, emergent herbaceous wetlands, barren land). In fact, according to table 5.2.3-8, the APR would impact 2,734 acres of hay/pasture and cultivated crops land (49%), which is more than forested land; however, table 5.2.4-12 presents the APR impacts to loss of wildlife habitat associated with vegetation clearing primarily forested vegetation when contrasted with SA-04, which would primarily impact agricultural lands. This is erroneous and should be revised throughout in this table, throughout section 5.2.4, and anywhere else it appears in this FEIS.	1568-94
5	284	Section 5.2.4.4.1, Table 5.2.4-12, first row: Aquatic habitat loss or reduction of aquatic habitat quality from maintenance activities, integrity digs, or small leaks and spills (SA-04): Short-term to long-term/ minor to major impacts • 636 stream crossings	Should state that impacts are "Long-term/major thermal effects (where streambanks are cleared of forested or woody vegetation)" similar to APR.	1568-95
5	297	Section 5.2.5.1.1, Federally Listed Species, third paragraph: "USACE is currently preparing a Biological Assessment for the Line 3 Replacement Project in response to Enbridge's application for a CWA 404 Individual Permit."	While Enbridge anticipates the ACOE will submit an applicant prepared Biological Assessment to the U.S. Fish and Wildlife Service, an BA may not be necessary if there are no adverse impacts on federally listed species except for the northern long-eared bat. With agency concurrence, Section 7 consultation for the northern long-eared bat may be managed through a streamlined consultation form associated with the species' 4d rule. Amend this discussion to clarify that a Biological Assessment may not be needed if Section 7 consultation for the northern long-eared bat may be managed through a streamlined consultation form associated with the species' 4d rule.	1568-96
5	297	Section 5.2.5.1.1, Federally Listed Species, third paragraph: "As part of the EIS preparation process, the federal lead agency must consult with USFWS under Section 7 of the ESA to examine potential effects in order to ensure that the proposed project is not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat."	The federal lead agencies must consult with the USFWS if a federally listed species or designated critical habitat may be adversely affected under ESA. The Section 7 process and requirement do not hinge on the EIS preparation process. Revise this discussion to clarify the relationship between the Section 7 process and the EIS preparation process.	1568-97
5	300-301	Section 5.2.5.1.2, Methodology, Federally Listed Species, bullet list after second paragraph: This list of surveys reports does not include the 2014 Northern Long-eared Bat Mist-net and Telemetry Survey. The Minnesota Protected Mussel Desktop Habitat Assessment should not be included as a survey report for federally listed species.	Add 2014 Northern Long-Eared Bat Mist-Net and Telemetry Survey Report to this list. Omit Minnesota Protected Mussel Desktop Habitat Assessment (Merjent 2014c) from the bulleted list.	1568-98

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5	304	Section 5.2.5.2.1: "Four federally listed threatened and endangered species may occur within the ROI for the Applicant's preferred route. The Canada lynx (Lynx canadensis) and the gray wolf (Canis lupus), and the rusty patch bumble bee (Bombus affinis) could be present within the ROI of the Applicant's preferred route, and the northern long-eared bat (Myotis septentrionalis) has been documented within the ROI of the Applicant's preferred route (Table 5.2.5-3)."	We suggest the following language to replace this paragraph: Federally listed threatened and endangered species that may occur within the North Dakota and Minnesota counties crossed by the APR and that may be affected by construction and operation include three mammals – Canada lynx (Lynx canadensis), gray wolf (Canis lupus), and northern long-eared bat (Myotis septentrionalis); one bird – whooping crane (Grus americana); three invertebrates – Dakota skipper (Hesperia dacotae), Poweshiek skipperling (Oarisma poweshiek), and rusty patched bumble bee (Bombus affinis); and one plant – western prairie fringed orchid (Platanthera praeclara).	1568-99
5	304 and 305	Section 5.2.5.2.1: Table 5.2.5-3 and associated sections do not include Cass County as part of the range of the rusty patched bumble bee along the APR.	Update the range of the rusty patched bumble bee along the APR to include Cass County in Table 5.2.5-3 and associated text sections.	1568-100
5	305	Section 5.2.5.2.1, State Listed Species, Endangered and Threatened Species: "The following state-listed endangered or threatened animals have been documented within the ROI of the Applicant's preferred route: northern long-eared bat (Myotis septentrionalis), wood turtle (Glyptemys insculpta), pugnose shiner (Notropis anogenus), and fluted shell (Lasmigona costata) (Table 5.2.5-4)."	The northern long-eared bat (Mytois septentrionalis) is listed as a special concern species in MN and should not be included in this list. Clarify why the northern long-eared bat is included in this list (e.g., because it is listed in WI) or remove this species from the list.	1568-101
5	306	Section 5.2.5.2.1, State Listed Species, Endangered and Threatened Species, Table 5.2.5-4, Known Occurrences of State-Protected Animal Species within the Region of Interest for the Applicant's Preferred Route	Remove all references to Illinois in the state/status column; this information is not relevant to the APR. Subsequently, confirm occurrence numbers are accurate with the removal of Illinois.	1568-102
5	316	Section 5.2.5.2.2, State-Listed Species, Table 5.2.5-6, Known Occurrences of State-Protected Animals within the Region of Interest and Permanent Right-of-Way for the Existing Line 3 Pipeline: Sources: Minnesota DNR 2016e; Wisconsin DNR 2016; Merjent 2016b	Merjent Minnesota Protected Flora Survey Report data would not apply to the existing Line 3 route, nor is reference shown correctly (the reference should be Merjent, 2016c).	1568-103
5	318	Section 5.2.5.2.2, State-Listed Species, Table 5.2.5-7. Known Occurrences of State-Protected Plants along the Existing Line 3 Pipeline: Sources: Minnesota DNR 2016e; Wisconsin DNR 2016; North Dakota GFP 2016; Merjent 2016b.	Merjent Minnesota Protected Flora Survey Report data would not apply to the existing Line 3 route. Remove this report from the list of data sources.	1568-104
5	336	Section 5.2.5.3.1, Federally Listed Species, Construction Impacts: "Construction of a pipeline likely would displace a few gray wolves and alter used habitats, especially if packs currently use the existing pipeline rights-of-way in the area as travel corridors. If dens are present in the vicinity of the construction work area, construction-related disturbance could reduce pup survival. In addition, wolf-vehicle collisions continue to be a major contributor to wolf mortality."	Construction activities may temporarily displace individual gray wolves and temporarily alter used habitats; however, no short-term or long-term adverse impacts are anticipated related to displacement of individuals or alteration of habitat. Wolves are adapted to a variety of habitats. Given the restricted speeds of construction vehicles on the right of way, wolf-vehicle collisions are not expected during construction.	1568-105
5	337	Section 5.2.5.3.1, Federally Listed Species, Construction Impacts: "A total of 14 roosts, including 9 maternity roost trees, were identified (2 trees in Carlton County and 7 in Cass County) (Merjent 2015d)."	As a result of survey for northern long-eared bats: A total of 39 roosts were identified (5 in Aitkin County, 14 in Cass County, 18 in Carlton County, 1 in Crow Wing County, and 1 in Hubbard County). Revise the total number of roosts presented in this statement.	1568-106

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5	338	Section 5.2.5.3.1, Federally Listed Species, Construction Impacts, Page 338, third full paragraph: "Potentially suitable Dakota skipper and Poweshiek skipperling habitat was documented at three locations along the route in Polk County, and potentially suitable habitat for Poweshiek skipperling was documented at two locations in Pennington County, Minnesota. Suitable habitats were found in small, isolated pockets that ranged in size from 0.4 to 1.8 acres. Presence/absence surveys were conducted in 2015 at a subset of USFWS selected locations identified in the 2013/2014 habitat assessment. Sites were selected based on habitat quality and size (Merjent 2015a). Surveys did not identify the presence of Dakota skipper or Poweshiek skipperling at the three suitable habitat locations in Pennington and Polk counties (Merjent 2015a). Presence/absence surveys have not been performed based on the revised 2016 habitat assessment (Merjent 2016a). While it is possible that the Dakota skipper and Poweshiek skipperling could occur within the ROI, based on the results of the habitat survey and earlier presence/absence survey, it is unlikely that these prairie-dependent insects would be affected by construction activities."	Three potentially suitable habitat areas for Poweshiek skipperling were documented along the APR during habitat assessments in 2013-2015, one in Polk County and two in Pennington County; these three sites ranged in size from 0.38 to 1.83 acres. Follow-up presence/absence surveys at these three sites in 2015 did not document Poweshiek skipperling. Presence/absence surveys were conducted at all potentially suitable habitat along the APR, not at a subset of USFWS-selected locations. The Applicant did not identify any potentially suitable habitat for the Poweshiek skipperling during 2016 desktop analysis. No adverse impacts on Poweshiek skipperling are expected along the APR. Revise this discussion to correctly state the Powershiek skipperling survey results and potential impacts.	1568-107
5	338	Section 5.2.5.3.1, Federally Listed Species, Construction Impacts, Page 338, second and fourth full paragraphs: "If present, the Dakota skipper, Poweshiek skipperling, and rusty patched bumble bee could be affected by construction activities that disturb native vegetation. These activities would disrupt egg laying and foraging during spring and summer, and could crush dormant larvae during fall and winter. These prairie-dependent insects depend on high-quality native grasslands and tallgrass prairies to provide food from flower pollen and nectar. Vegetation clearing and replacement with non-native ground covers could injure or kill these butterflies and bees, and remove forage plants." "The Applicant's preferred route would not cross any current high use areas for rusty patched bumble bee, and construction is not likely to directly or indirectly affect any individuals or current high use areas. The Applicant's preferred route crosses through current potential low use areas where rusty patched bumble bees may disperse from current high use areas or where their occurrence is uncertain. The rusty patched bumble bee may benefit from opportunities to conserve the species within the dispersal area, and USFWS may recommend surveys."	The rusty-patched bumble bee is not dependent on high quality prairie or native species and is not present in a larval form in fall and winter. The APR does not cross high potential zones for the rusty-patched bumble bee. Individual rusty-patched bumble bees may use areas outside of the high potential zones for foraging and dispersal; however, impacts on dispersing individuals are discountable due to the low probability of individuals occurring in the vicinity of project activities. No adverse impacts on rusty-patched bumble bee are expected along the APR.	1568-108

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5	339	Section 5.2.5.3.1, Federally Listed Species, Construction Impacts, Summary: "Given the limited distribution within the ROI of Kirtland's warbler, piping plover, whooping crane, Poweshiek skipperling, and rusty patched bumble bee, construction impacts likely would be temporary to short term and negligible. Dakota skippers could be affected by construction at one site, potentially resulting in short-term minor impacts on suitable habitat. However, the potential destruction of some Dakota skippers could require development of additional avoidance and conservation measures. Effects on federally listed plants are not likely because of the scarcity of appropriate habitat and/or species presence."	No impacts are expected on the Dakota skipper, Poweshiek skipperling, and western prairie fringed orchid because surveys have shown that potentially suitable habitat areas along the APR are unoccupied. The APR does not cross high potential zones of the rusty patched bumble bee; impacts on individuals outside of the high potential zone are unlikely and discountable. Revise this discussion to correct these points.	1568-109
5	340	Section 5.2.5.3.1, Federally Listed Species, Operations Impacts: "The use of all-terrain vehicles and snow machines along the permanent right-of-way also could reduce wolf habitat suitability. In addition, wolf-vehicle collisions continue to be a major contributor to wolf mortality. Based on the highly mobile nature of wolves, the transient nature of the disturbance, and wolves' use of a variety of habitats, the operations-related impacts on wolves would be temporary and minor over the life of the Project."	Wolves are adapted to a variety of habitats. Given the restricted speeds of construction vehicles on the right-of-way and the maximum speed of all terrain vehicles, wolf-vehicle collisions are not expected during the Applicant's operations or if the right-of-way is used by the public for all terrain vehicle trails. Adverse impacts on the gray wolf along the APR are not expected during operations. The potential for impacts on the gray wolf are overstated in this discussion.	1568-110
5	340	Section 5.2.5.3.1, Federally Listed Species, Operations Impacts: "Operations impacts on the northern long-eared bat could include continued habitat loss or alteration and disturbance from noise and activity at aboveground facilities during pipeline inspection overflights or ground surveillance and during right-of-way maintenance activities. Human activities during operations typically would occur during daylight hours; therefore, operations activities would not interrupt foraging activities. However, each incident would result in a temporary minor impact that would occur periodically over the life of the Project. Operation of pipeline pump stations would increase nearby noise levels over existing ambient levels. As described in Section 6.2.2, however, sound level increases would comply with Minnesota Noise Standards and would decrease over distance. Pump station footprints would be devoid of trees; while bats could forage in the vicinity, they would not roost at the pump stations. Unless a roost site is near a pump station, the effect on long-eared bats from operation of pump stations is expected to be permanent and negligible."	Continued habitat loss would not occur during operations. Trees and limbs growing in the right-of-way would be cleared every 5 years and would not reach a diameter suitable for northern long-eared bat roosting (3 inches diameter at breast height). Noise related to the operations of pipeline pump stations would be ongoing; northern long-eared bats roosting nearby would either acclimate to the noise or select roost trees farther from the pump station. Given the abundance of habitat near the pump stations where the Applicant documented northern long-eared bats and the species' use of a variety of roost tree species and sizes, alternate roost trees would not be limiting. Impacts on the northern long-eared bat due to inspection overflights, ground surveillance, and right-of-way maintenance may result in temporary displacement of individuals due to intermittent noise. Adverse impacts on the northern long-eared bat along the APR are not expected during operations.	1568-111

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5	340	Section 5.2.5.3.1, Federally Listed Species, Operations Impacts: "As described for construction, Dakota skipper and Poweshiek skipperling are unlikely to occur along the Applicant's preferred route. Operations activities, especially periodic mowing to prevent growth of trees and shrubs, could affect adults, eggs, caterpillars, or larvae directly if the species come in direct contact with equipment, personnel, or chemicals. These effects could include death, reduced reproduction, or displacement. Although these species could be present along the route, based on the results of the habitat survey and presence/absence survey, it is unlikely that these prairie-dependent insects would be affected by operations activities. Consequently, impacts would be at most negligible but permanent. One site with suitable habitat and Dakota skipper presence was identified during surveys. Impacts on this site and the Dakota skipper during operation would be permanent and minor."	The Applicant surveyed for Dakota skipper and Poweshiek skipperling based on protocols approved by the USFWS. No individuals were documented in the environmental survey corridor, which encompasses the right-of-way. The probability of the Applicant's vehicles that are conducting operations or maintenance colliding with a dispersing adult is vey low and discountable.	1568-112
5	341	Section 5.2.5.3.1, Applicant's preferred route, Federally Listed Species, Operations Impacts, Summary: "The Canada lynx could experience permanent minor impacts associated with operations and maintenance activities. The gray wolf, due to its transient nature, would experience temporary minor impacts. Impacts on northern long-eared bats would be permanent and negligible, and operations-related impacts on the Dakota skipper at the one suitable habitat site would be minor and permanent. Given the limited distribution and habitat types that could be used by Kirtland's warbler, piping plover, Poweshiek skipperling, and rusty patched bumble bee, operations impacts would be permanent and negligible. Migrant whooping cranes would not be affected by pipeline operation, nor would operations affect federally listed plants because of the scarcity of appropriate habitat and species presence."	Impacts associated with the Applicant's operations and maintenance activities on the Canada lynx, gray wolf, northern long-eared bat, and whooping crane along the APR would be limited to noise and presence of humans and equipment associated with inspection overflights, ground surveillance, and maintenance activities. Impacts on individuals of these four species would be limited to temporarily displacement or disturbance; no permanent or adverse impacts are expected. No adverse impacts are expected on Dakota skipper, Poweshiek skipperling, or western prairie fringed orchid because the Applicant did not document individuals of these species during surveys in the environmental survey corridor, which encompasses the permanent right-of-way. No adverse impacts are anticipated on the rusty-patched bumble bee because the APR does not intersect with the species' high potential zones. The probability of the Applicant's vehicles that are conducting operations or maintenance colliding with a dispersing adult Dakota skipper, Poweshiek skipperling, or rusty-attached bumble bee is very low and discountable.	1568-113
5	349	Section 5.2.5.3.1, Table 5.2.5-15: This table, and other similar tables, should be footnoted to indicate that the construction work area includes the permanent right-of-way so that the reader is aware that the "Con" and "Op" impacts are not additive and should not be summed to conclude total impacts.	Add the following footnote to Table 5.2.5-15 and other similar tables: "The construction work area includes the permanent right-of-way; as such, "Con" and "Op" impacts are not additive and should not be summed to conclude total impacts."	1568-114

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5	412	Section 5.2.6.2, Federal Land, last sentence in paragraph: "When multiple federal properties that are operated by more than one federal agency or bureau would be crossed by a project, an application would be filed with BLM."	Amend this statement to: "BLM is authorized to grant a right-of-way or permit for projects "where the surface of the Federal lands involved is administered by the Secretary or by two or more Federal agencies". 30 USC § 185(c). Under the Mineral Leasing Act, "Federal lands" means all lands owned by the United States except lands in the National Park System, lands held in trust for the Indian or Indian tribe, and lands on the Outer Continental Shelf."	1568-115
5	413	Section 5.2.6.2.1, Federal Land: "The Applicant's preferred route would cross approximately 5 acres of federal land. In North Dakota, the Applicant's preferred route would cross: • Pembina County Waterfowl Production Area..."	Enbridge has confirmed that the APR would not cross the Pembina WPA. Correct this discrepancy throughout the document. For example (but not limited to), in Sections 5.2.6.2.1, 5.2.6.3.1, and 5.3.2.2.1.	1568-116
5	413	Section 5.2.6.2.1, Federal Land, second bullet, North Country National Scenic Trail, sixth sentence: "In 2015, the House Committee on Natural Resources passed a bill granting the secretary of DOI the power to negotiate rights-of-way for gas pipelines through national park lands."	Because the Line 3 Replacement is an oil pipeline, this statement is not relevant to should be removed.	1568-117
5	414	Section 5.2.6.2.1, State Land, Page 414, second full paragraph: "Although not directly affected by pipeline construction or standard operations, the Applicant's preferred route would pass directly east of Itasca State Park, and an existing road that passes through the park would be used as an access road. This state park is one of Minnesota's flagship state parks, with over 500,000 annual visits. The park was established in 1891 to preserve remnant stands of virgin pine and to protect the basin that is the source of the Mississippi River."	The temporary construction workspace for the APR is located approximately 960 feet from the boundary of the Itasca State Park (the centerline of the APR is approximately 1,083 feet from the park boundary). The access road that would have crossed Itasca State Park has been dropped from the Project design. Revise this paragraph to reflect this change.	1568-118
5	418	Section 5.2.6.2.3, County Land: "While it is likely that SA-04 would cross county land, data had not been obtained at the time of this assessment."	Confirm that this data will be provided in the FEIS.	1568-119
5	422	Section 5.2.6.4.1, first paragraph, last sentence: "Construction of the Applicant's preferred route would have the largest impact in terms of total land area on state-owned land (i.e., forests) in Minnesota, whereas the SA-04 route would have the largest total impact on federally owned land (mostly within an NWR in North Dakota)."	Revise this statement to say, "...mostly associated with a WMA in North Dakota"	1568-120
5	427	Neither the Applicant's preferred route nor the CN Alternatives would pass through any air quality nonattainment or maintenance areas, except for a portion of the truck route from the Gretna pump station to the Superior terminal that goes through Duluth, Minnesota.	CN Alternative SA-04 would pass through Will County, IL which is designated as an ozone non-attainment area.	1568-121

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5	428	Section 5.2.7.1.1, Air Quality Permitting Requirements: "For the Applicant's preferred route, all pump stations use electric drive motors and do not emit air pollutants."	Although all pump stations use electric drive motors that do not directly emit air pollutants, the piping components (valves, connectors, pump seals, etc.), sump tanks, and pig traps at pump stations do emit volatile organic compounds ("VOCs"). Enbridge recommends revising the text in Section 5.2.7.1.1 to state: "For the Applicant's preferred route, all pump stations use electric drive motors that do not emit air pollutants, the piping components (valves, connectors, pump seals, etc.), sump tanks, and pig traps at pump stations do emit volatile organic compounds ("VOCs")."	1568-122
5	433	Section 5.2.7.3.1: Stored Carbon Releases	The acres of trees logged does not match with the totals in Table 5.3.1-3. Confirm the area of trees logged. The same references are also used in Chapter 6.	1568-123
5	435	Section 5.2.7.3.1, Operations Impacts, first paragraph, third sentence: "The external floating roof storage tanks at the existing Clearbrook terminal are subject to New Source Performance Standards (NSPS) in 40 CFR 60 Subpart Kb"	Only 4 of the 9 Clearbrook tanks are subject to NSPS Kb. The five remaining tanks were built prior to the effective date of the regulation and therefore are not subject to NSPS Kb.	1568-124
5	437	5.2.7.3.1: Indirect Greenhouse Gas Emissions	Enbridge estimated the projected pump station power consumption to be 533,199 megawatt-hours (MWh) per year. The DEIS indirect GHG emissions are calculated based on 533,249 MWh per year.	1568-125
5	439	Section 5.2.7.3.1, Operations Impacts, Table 5.2.7-9, Social Cost of Carbon (Fossil GHG Emissions) for the Applicant's Preferred Route (in 2007 dollars)	The Social Cost of Carbon (SCC) is a value meant to inform cost-benefit analyses. A cost-benefit analysis has not been completed for other environmental impacts discussed in the DEIS. For this reason, Enbridge believes that the SCC analysis is not appropriate and should be removed from FEIS analysis. For comparison - CEQ NEPA GHG guidance did not call for a SCC calculation in the impact assessment.	1568-126
5	440	Section 5.2.7.3.1, Operations Impacts, Life-Cycle Emission Estimates: "A life-cycle analysis for GHGs tracks the total production of GHGs from their extraction from the earth to the end-use combustion of refined petroleum products or byproducts."	Clarify whether or not this analysis is related to a particular agency requirement and if the analysis is appropriate here. For example, if the analysis is using a 30-year projection, and most of the GHG emissions are indirect from electricity generation, then more sophisticated projections of U.S. electricity supply over the next 30 years in these regions should be used, rather than using static eGRID values for average GHG intensity of power. Including a SCC cost of $280 billion further complicates the analysis. For comparison, the CEQ NEPA GHG guidance does not recommend a life-cycle assessment of GHGs.	1568-127

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5	445	Section 5.2.7.3.3, System Alternative SA-04: "In general, the air quality impacts associated with construction and operation of SA-04 would be similar to those described above for the Applicant's preferred route."	Emissions from SA-04 would be more that twice that of the APR. As noted in Schedule 7 to Mr. Barry Simonson's Direct Testimony, the addition of seven crude oil storage tanks would significantly increase the amount of volatile organic compounds ("VOCs"), greenhouse gases ("GHGs"), criteria pollutants, and hazardous air pollutants ("HAPs") emitted during operations. The eight additional pump stations would require more power, and their operation would generate more indirect emissions, such as GHGs, Sulfur Dioxide ("SO2") and nitrogen oxides ("NOx"), as compared to the Preferred Route. This SA would result in the consumption of 1,703 gigawatt hours per year ("GWh/yr") to power the pump stations, approximately two times greater as compared to the Preferred Route. SA-04-L3 would also increase emissions of carbon dioxide equivalent (CO2e), SO2, and NOx by 90 percent as compared to the APR.	1568-128
5	445	5.2.7.3.3: Stored Carbon Releases	The acres of trees logged does not match with the totals in Table 5.3.1-3. Confirm the area of trees logged.	1568-129
5	456	Table 5.2.7-20: Why does the table not include emissions for the no-build option - Continued use of existing Line 3?	Emissions from existing Line 3 should be included in the table.	1568-130
5	469	Section 5.3.1.2.1, Table 5.3.1-5: Active Mineral Areas Crossed by the Applicant's Preferred Route (Acres)	Revise the title of this table to, "Active Mineral Leases within ROI of APR"	1568-131
5	469	Section 5.3.1.2.1, Table 5.3.1-6: Land with Potential Sand and Gravel Resources Crossed by the Applicant's Preferred Route (Acres)	Revise the title of this table to, "Land with Potential Sand and Gravel Resources within ROI of APR"	1568-132
5	470	Section 5.3.1.2.3, Table 5.3.1-7: Agricultural Land Crossed by System Alternative SA-04 (acres)	Provide a footnote in this table that clarifies that impacts presented for SA-04 do not include ATWS, access roads, or aboveground facilities.	1568-133
5	474	Section 5.3.1.3.1, Disturbance and Loss of Land used for Mining: "The only active mining lease along the Applicant's preferred route is in Minnesota, where less than 1 acre of land with active mineral leases would be crossed by the Applicant's preferred route"	Revise this statement to say, "...where less than 1 acre of land with active mineral leases is within the ROI of the APR."	1568-134
5	477	Section 5.3.1.3.3, Disturbance and Loss of Land Used for Mining, second sentence: "Approximately 31 acres of land with known oil and gas resources occurs within the ROI for SA-04 in North Dakota and 0.4 acre of land with active coal mining is located in the ROI for SA-04 in Iowa, along with 2,393 acres of land with potential sand and gravel resources."	Section 5.3.1.2.3 indicates that there are 0.4 acre of land with active coal mining operations located in the construction work area for SA-04; however, the impacts discussion does not address how active mining activities may be disrupted and no quantification of the value of that disruption is included.	1568-135
5	485	Section 5.3.1.4.1, Table 5.3.1-11, Summary of Potential Impacts on Commodity Production for the Applicant's Preferred Route and Certificate of Need Alternatives	Provide a footnote in this table that clarifies SA-04 impacts do not include ATWS, access roads, or aboveground facilities.	1568-136

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5	490	Recreational land and waterbodies within the ROI for the Applicant's preferred route and CN Alternatives were identified using GIS datasets and layers in the following federal- and state-level data sources: • Protected Areas Database of the United States (PAD-US), • DNR water trails, • DNR snowmobile trails, • DNR state-designated trails, • DNR hunter walking trails, and • State-designated trout streams.	Non-Minnesota state data sets are missing for analysis of SA-04.	1568-137
5	502	Section 5.3.2.3.1, Construction Impacts, State-Designated Water Trails and Trout Streams, fourth paragraph, second sentence: "Crossing methods for King Creek, Spring Brook, Blackhoof River, and the unnamed stream are unknown."	This statement is incorrect; the crossing methods for these waterbodies are provided in Appendix G of the DEIS.	1568-138
5	534	Section 5.3.3.3: Impact Assessment	The impact assessment does not include a discussion of the specific estimated length of time for pipeline construction (12 months per Section 6b of the EAW). Inclusion of this detail would provide rationale for quantification of duration of impacts during construction.	1568-139
5	535	Section 5.3.3.3.1, Construction Impacts, Non-Local Workforce, fourth paragraph, last sentence: "Population increases of more than 10 percent would be considered a major impact."	Include a table, or otherwise specify which counties or areas along the route where a 10% increase in population would occur.	1568-140
5	535	Section 5.3.3.3.1, Construction Impacts, Non-Local Workforce, last paragraph: "Overall, impacts related to the non-local workforce are expected to be minor and temporary but they could be major and temporary at times under some worst-case scenarios, such as when two spreads are located within the same county or if a high number of workers are accompanied by their families."	Revise this paragraph to describe what types of impacts would constitute a "worst-case scenario" or major impact.	1568-141
5	535	5.3.3.3.1: "While it is likely that Enbridge would use some local workers, it was assumed as a conservative estimate that all workers would be non-local and would need to re-locate to the area during construction."	Population impacts assume that all workers will be non-local and that all will bring families. Given the short duration of construction, it is highly unlikely that even a small portion of the non-local workforce would relocate with their families, therefore the population impacts may be overstated.	1568-142
5	545	Section 5.3.3.4.1, Table 5.3.3-15: The table indicates that 15 populated areas would be crossed by the APR.	The information in Table 5.3.3-15 disagrees with the text on page 536 which says that 16 populated areas would be crossed. Correct this discrepancy.	1568-143
5	547	Section 5.3.3.4.1, Table 5.3.3-15: The table says operation of the APR would have permanent/negligible impacts on traffic in populated areas.	Section 5.3.3.3.1 (pg. 5-537) does not discuss impacts associated with traffic during operations for the APR. Correct this discrepancy.	1568-144

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5	551	Section 5.3.4.1.2, page 551, first partial paragraph, second sentence: "Output from a national IMPLAN model (an economic input-output model) and the number of miles of pipeline per county were used to allocate the potential change in state income taxes from the alternatives and allocated to each county in the ROI." First full paragraph, fourth sentence: "For the rail and truck transport alternatives, assumptions related to construction expenditures provided in Chapter 4 were used as inputs into IMPLAN."	The IMPLAN model and report referenced throughout this section should be included as an appendix and included in the references.	1568-145
5	551	Section 5.3.4.2.1, Applicant's Preferred Route, Employment and Income, Tax Revenues	Revise the way that impacts are identified in this section to clarify that they are "positive" impacts. It is misleading to not include "positive" with the magnitude of impacts, particularly in the summary table.	1568-146
5	561	5.3.4.3.1: Text states that APR is expected to require up to 4,800 workers across 7 spreads.	Section 5.3.3 states that it will be a maximum of 4,200 workers across 7 spreads (600 workers per spread). Information provided by Enbridge states there will be an estimated 500-600 per spread, therefore the estimate of 4,200 should be used in Section 5.3.4.3.1.	1568-147
5	561	Section 5.3.4.3.1 Applicant's Preferred Route (from Neche to Superior), Construction Impacts	This section does not refer to or use the "Report on the Economic Impacts Analysis for the Line 3 Replacement Project" by Lichty and Carey from January 2017 that was provided by the Applicant as part of direct testimony filed January 31, 2017. Recommend that this report should be included in the analysis of construction impacts in this section.	1568-148
5	577	Section 5.4, Cultural Resources	The significance and/or National Register of Historic Places (NRHP) eligibility of identified resources is not addressed in the discussion of impacts. Since 2014, Enbridge has worked with the State Historic Preservation Office and the USACE to assess site significance and NRHP eligibility, as well as determinations of effect for identified resources along the APR. Inclusion of site significance and NRHP eligibility is particularly important in Section 5.4.3.1 where the DEIS states that 16 archaeological sites could be "directly" affected without an accompanying discussion of the significance or NRHP eligibility of these resources. This gives a false sense of the impacts on these resources and does not acknowledge Enbridge's work with SHPO and the USACE. Enbridge recommends that any discussion of impacts on identified cultural resources includes a discussion of significance and NRHP eligibility. For example (but not limited to), see Sections 5.4.3.1.1 and 5.4.4.1, and Table 5.4.2-2.	1568-149
5	585	Section 5.4.1.2, Page 585, third paragraph: "Additionally, surveys for archaeological resources were completed for the Applicant's preferred route in Minnesota, the information from which is included in this analysis. Surveys were not completed for historic resources in Minnesota."	Enbridge recently completed historic structures surveys and will submit the final report to the DOC when complete. Revise this statement to clarify that historic structures surveys have been completed and the results and recommendations are forthcoming.	1568-150

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6	10	6.2 Human Settlement	Tribal lands should be included in the discussion of impacts to human settlements as a stakeholder and landowner along some of the proposed RAs.	1568-151
6	77	Section 6.2.3.1.2: The DEIS states, "Guidance by the U.S. Forest Service (USFS) and the Service's Scenic Management System (SMS) was used as a basis for understanding the quality of, location of, and potential impacts on aesthetic resources."	The SMS is a federal land management standard that should only be applied to public lands, such as National Forests. Clarify in the FEIS where and how the SMS was used to assess visual impacts on public lands. In addition, the FEIS should remove reference to use of SMS on non-public lands as these standards should not be applied to these areas.	1568-152
6	79	6.2.3.2.1: According to table 6.2.1-2, the APR would impact 1,789 acres of forested land and 2,467 acres of agricultural land, which is more than forested land; however, this section repeatedly indicates that the APR would impact primarily forested land.	Correct discrepancy.	1568-153
6	81, 88	6.2.3.2.2: Table 6.2.3-4 lists Crane Meadows National Wildlife Refuge as affected by RA-03AM.	Enbridge has confirmed that RA-03AM would not cross the Crane Meadows Wildlife Refuge. Correct this discrepancy throughout the FEIS.	1568-154
6	120	Section 6.2.5.2.1, Table 6.2.5-1: Indicates 319 road crossings; however, the EAW states that the APR would cross 281 roads.	Verify the number of road crossings and update Table 6.2.5-1 accordingly.	1568-155
6	190	Section 6.3.1.2.1, Methodology, last paragraph before Section 6.3.1.2.2: "Broader regional indicators of surface water quality were also reviewed to identify regional differences in existing conditions and extent of impacts. Due to unavailability of data from other states, this analysis was limited to Minnesota. These broad regional issues in Minnesota were evaluated by buffering GIS shapefiles the Applicant's preferred route and CN alternatives by one half mile and identifying intersections of features indicative of surface water quality, including trout streams, wild rice lakes, Lakes of Biological Significance (high and outstanding) and tullibee (cisco) lakes. Intersections of the same stream over 1 mile apart were counted as separate intersections."	It appears that this paragraph was carried over from chapter 5. Remove this paragraph as it does not apply to the RA analysis.	1568-156
6	276	Section 6.3.1.3.1, Regulatory Context, General Wetlands, second paragraph, starting at second sentence: "Permitting for route alternative RA-03AM would require obtaining a CWA Section 401 certification from Iowa DNR and Illinois DNR. Adherence to state-specific general construction and stormwater permit conditions, buffer laws, and other state and local resource protection measures also would be required, which would serve as a duplicative mechanism for oversight and protection of jurisdictional wetland resources."	These statements do not apply to RA-03AM and should be removed from this section.	1568-157
6	280	Section 6.3.1.3.2, Wetland Types, Applicant's preferred route, Table 6.3.1.3-1: Estimated Acreages of Wetlands Crossed by the Applicant's Preferred Route in Minnesota (acres)	Clarify what the differences are between the construction and operation and total construction and operation columns; footnotes a and b are identical and, therefore, do not provide the necessary clarification. Also, if this is for the entire APR then the numbers are incorrect.	1568-158

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6	296	The introduction to Section 6.3.1.3.3 states that "Wetland impacts specific to the Applicant's preferred route in Minnesota and the route alternatives between Clearbrook and Carlton are described below." However, impacts on calcareous fens are included in the impact analysis even though the calcareous fens occur between Neche and Clearbrook, which is acknowledged on pg. 6-281. Note that this analysis is only included for the APR and not mentioned under the RAs that traverse the same route between Neche and Clearbrook. In fact, page 6-294 states that: "No impacts on calcareous fens would be associated with the RA-03AM route, as none were identified during the calcareous fen data review within the construction work area or permanent right-of-way for the route."	Remove the discussion on calcareous fen impacts under Section 6.3.1.3.3 for the APR because the fens occur between Neche and Clearbrook and not Clearbrook and Carlton.	1568-159
6	324	Section 6.3.2.2.1: The fourth bullet on page 324 states, "Coarse-textured soils are common." However, Table 6.3.2-1 indicates that only 42.5 miles (or 12.5%) of the APR would cross coarse-textured soils.	Revise the language in the fourth bullet to say, "Coarse-textured soils are not common."	1568-160
6	324	Section 6.3.2.2.1, Table 6.3.2-1, Sensitive Soils along the Applicant's Preferred Route in Minnesota (miles)	Relative percentages of the soil characteristics for the APR presented in this table do not match those presented in table 10b-2 of the EAW. Specifically: 1.) Compaction-prone soils: DEIS = 24.1 miles (6%), EAW = 20% 2.) Highly water erodible soils: DEIS = 0 miles (0%), EAW = 16% 3.) Highly wind erodible soils: DEIS = 106.9 miles (31.5%), EAW = 65% 4.) Coarse-textured soils: DEIS = 42.5 miles (12.5%), EAW analyzed soils with revegetation concerns = 36% Verify the information presented in Table 6.3.2-1 and justify the reason for differences between the information presented in the DEIS and the information provided in the EAW.	1568-161
6	331	Section 6.3.2.3.1, Operations Impacts, Permanent Loss of Soil Cover: "Construction of permanent access roads and associated facilities would require permanent removal of soil, to be replaced with materials such as cement and gravel. Loss of soil cover would total 278 acres for access roads and 67 acres for other permanent facilities along the Applicant's preferred route in Minnesota."	This statement is incorrect based on the data filed in the EAW. According to the EAW, the total permanent acreage of soil impacts for access roads would total 3.5 acres (though 274.2 acres would be temporarily impacted) and there would be an additional 40.9 total acres of permanent impacts at facilities, mainline valves, and cathodic beds combined. This section overstates the permanent impacts to soils. Verify the information presented in this paragraph and justify the reason for differences between the information presented in the DEIS and the information provided in the EAW.	1568-162

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6	334	Section 6.3.2.3.2, Route Alternative RA-03AM, Page 334, first full paragraph: "One key difference in potential impacts between RA-03AM and the other routes is the potential for subsidence or sinkhole formation from the presence of karst conditions along the RA-03AM route. As previously stated, the probability and severity of the potential impact of subsidence or sinkhole formation on the integrity of the pipeline or associated facilities depend on the nature of the bedrock, the groundwater, the timing of the occurrence, and the specific engineering design of the facilities. Such a determination is beyond the scope of this analysis."	It may not be possible to predict sinkhole formation, but an analysis of the potential impacts to karst terrain associated with construction, and indirect impacts to groundwater, unique vegetation, and wildlife habitat are possible.	1568-163
6	337	Section 6.3.2.4.1, Page 337, third full paragraph, second paragraph: "The extent of permanent soil conversion to an impervious surface for all route alternatives would be expected to comparable to the Applicant's preferred route (283 acres)..." This is repeated in table 6.3.2-3 on page 6-339.	The acreage of impervious surfaces associated with the APR is incorrect; in the EAW submitted with testimony it is 28.7 acres. This number should be corrected in all instances where it appears.	1568-164
6	485	Section 6.3.5.1.2: The DEIS does not provide details regarding WAN scoring in the text on pages 485 or 491 nor is it defined in Figure 6.3.5-1.	Provide a definition of WAN scoring to support these discussions.	1568-165
6	486	Section 6.3.5.2.1, Table 6.3.5-1, Potential Occurrences of Federally Protected Species within the Region of Interest for the Applicant's Preferred Route	There are no federally listed mussels with the potential to occur along the APR. Only the Great Lakes Distance Population Segment of the Gray Wolf occurs in Minnesota. The whooping crane does not occur in Minnesota. The information presented in Table 6.3.5-1 is inconsistent with the text in this section. Correct all discrepancies.	1568-166
6	496	Section 6.3.5.2.2, Route Alternative RA-03AM, State-Listed Species, Table 6.3.5-6, Known Occurrences of State-Protected Animals and Plants within the Region of Interest for Route Alternative RA-03AM: Sources: Minnesota DNR 2016a, 2017a; Merjent 2016a.	The citation in Table 6.3.5-6, Merjent 2016a (Enbridge 2013–2016 Minnesota Protected Flora Field Survey Report), is incorrect as no field surveys were conducted for RA-03AM. See also page 501 (Table 6.3.5-10, RA-06). Correct these discrepancies.	1568-167
6	512	Section 6.3.5.3.1, Federally Listed Species: "The Canada lynx, gray wolf, northern long-eared bat, whooping crane (Grus americana), Dakota skipper, Poweshiek skipperling, rusty patched bumble bee, and western prairie fringe orchid have the potential to occur within the ROI for the Applicant's preferred route (Table 6.3.5-1). Of these species, the Canada lynx, gray wolf, northern long-eared bat, and rusty patched bumble bee potentially occur between Clearbrook and Carlton (Table 6.3.5-1)."	Omit the statement that indicates that the whooping crane occurs in Minnesota.	1568-168
6	565	Section 6.3.5.4.2, Table 6.3.5-45, Summary of Potential Impacts on Unique Natural Resources for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton: Major/permanent impacts • 6 species No Impact • 2 species	The information in Table 6.3.5-45 disagrees with information presented in Table 6.3.5-21, which states that there would be no impact on 4 plant species between Clearbrook and Carlton. Verify the number of plant species and correct this discrepancy.	1568-169

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6	616	Section 6.4, Cultural Resources	The significance and/or National Register of Historic Places (NRHP) eligibility of identified resources is not addressed in the discussion of impacts. Enbridge recommends that any discussion of impacts on identified cultural resources includes a discussion of significance and NRHP eligibility and fully describes and addresses the Applicant's efforts to coordinate with the applicable agencies. For example (but not limited to), see Sections 6.4.1, 6.4.2.1.1, and 6.4.4.1. Also, refer to comment on Section 5, Page 577, Section 5.4 in row 234.	1568-170
6	644	Section 6.5.1.2.1, Table 6.5.1-4: Total Market Value of Forested Land in the construction zone does not match corresponding number (MN subtotal) presented in table 5.3.1-4.	Verify the total market value of forested land in the construction zone and correct the discrepancy between Tables 6.5.1-4 and 5.3.1-4.	1568-171
6	706	Section 6.5.3.2.1: In the text, the DEIS states that 14 populated areas are located along the route, then in the same sentence states that 13 populated areas are located along the route. Later, in section 6.5.3.3.1 (pg. 712) the DEIS states that 13 populated areas are in proximity to the APR.	Verify the number of populated areas and update the text accordingly.	1568-172
6	711	Section 6.5.3.3: Impact Assessment	This section does not describe the specific estimated length of time for pipeline construction (12 months per Section 6b of the EAW). Inclusion of this detail would provide rationale for quantification of duration of impacts during construction.	1568-173
6	712	Section 6.5.3.3.1, Construction Impacts, Non-Local Workforce: The DEIS states, "Overall, impacts related to the influx of non-local workforce are expected to be minor and temporary, but could be major and temporary for those counties with low population density if a large number of workers bring their families and if construction spreads operate in proximity to each other."	Revise this paragraph to describe what types of impacts would constitute a "worst-case scenario" or major impact.	1568-174
6	722	Section 6.5.4: Employment, Income, and Tax Revenues	This section does not refer to or use the "Report on the Economic Impacts Analysis for the Line 3 Replacement Project" by Lichty and Carey from January 2017 that was provided by the Applicant as direct testimony. Recommend that this report should be included in the analysis of construction impacts in this section.	1568-175
6	722	Section 6.5.4 Employment, Income, and Tax Revenues	Revise the way that impacts are identified in this section to clarify that they are "positive" impacts. It is misleading to not include "positive" with the magnitude of impacts, particularly in the summary table.	1568-176
6	723	Section 6.5.4.1.2, Methodology, Page 723, fourth paragraph, second sentence: "Output from a national IMPLAN model (an economic input-output model) and the number of miles of pipeline per county were used to allocate the potential change in income taxes appropriated from the State of Minnesota to each county in the ROI for the Applicant's preferred route and route alternatives."	The IMPLAN model and report referenced through out this section should be included as an appendix and included in the references.	1568-177

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7	5	Section 7.2, Natural Resources, Wetlands: "Potential impacts on wetlands generally occur during construction; however, unlike most construction impacts, impacts on wetlands are usually long term or permanent because of the soil types associated with them."	This statement is inconsistent with the conclusions in Chapters 5 and 6; excerpt from pg. 5-121: "In general, wetland construction impacts that do not result from placement of fill in wetlands would be returned to preconstruction contours and wetland conditions. Wetland habitats containing large mature woody growth would reestablish in temporary construction work areas within 3 to 50 years, depending on the vegetation community and vegetation structure (Jacobson 2006, Wenzel et al. 2012). In areas where the disturbance to [emergent wetland] vegetation is minimal and the root structures, preconstruction wetland contours, and wetland hydrology are maintained, the impacts would be short-term and minor." Correct the inconsistency in section 7.2, Natural Resources, Wetlands.	1568-178
7	19	Section 7.3.5, RSA-White Elk Lake, Natural Environment, Wildlife: "RSA-White Elk Lake avoids documented maternity roost tree or hibernacula entrance locations for the northern long-eared bat along the Applicant's preferred route"	Based on MN NHI data, there are no northern long-eared bat hibernacula within 5 miles of the APR or the White Elk Lake alternative. Remove reference to "hibernacula entrance".	1568-179
7	24	Section 7.3.6, RSA-21, page 24, first full paragraph: "RSA-21 avoids impacts on wild rice waters along the Sandy River, specifically, Davis Lake, Steamboat Lake, Flowage Lake, Sandy River Lake, and Big Sandy Lake."	This statement is misleading because the APR would not impact Davis Lake, Steamboat Lake, Flowage Lake, Sandy River Lake, or Big Sandy Lake. Revise this statement to clarify that neither RSA-21 or the APR would impact these wild rice waterbodies.	1568-180
7	26	Section 7.3.7, RSA-22, first paragraph, fourth sentence: "The purpose of this RSA is to avoid important habitat in the Big Sandy Lake watershed as well as Grayling Marsh WMA, McGregor WMA, Lawler WMA, and Salo Marsh WMA."	This statement is misleading because the APR would not cross the McGregor WMA or the Salo Marsh WMA. Remove the McGregor and Salo WMAs from the list in this statement.	1568-181
7	33	"It passes through land previously proposed by U.S. Steel (Keetac) as a compensatory wetland mitigation site; however, geospatial data from Minnesota DNR do not identify a mitigation bank easement in this location."	Enbridge has confirmed with U.S. Steel that a recorded wetland mitigation bank easement exists at this location, making this a non-viable route.	1568-182
7	45	Section 7.3.14, RSA-35, Economics, Agriculture: "While both RSA-35 and the Applicant's preferred route cross peat lands, the RSA is located within peat lands for a greater portion of its length."	Enbridge did not provide an analysis of impacts on peat lands in the EAW and is unable to recreate the analysis. We recommend that the data source used to analyze potential impacts on peat lands be provided in the FEIS so that this analysis can be verified.	1568-183
7	70	Section 7.3.24, RSA-53, first paragraph, last sentence: "Table 7.3-24 highlights the differences between RSA-53 and the Applicant's preferred route."	This statement is inaccurate, as no comparison of the APR and RSA-53 is presented in Table 7.3-24 or in Chapter 7. Revise this statement to say that Table 7.3-24 presents the impacts associated with RSA-53.	1568-184
9	9	Section 9.2.3.3.3 includes "[m]emoranda of understanding between the tribes and the U.S. Forest Service (Chippewa National Forest) for co-management of forest lands.	This section is titled "Formal Tribal Government Acts on Line 3 Replacement Project." It should be clarified that the cited memoranda do not relate to the Project.	1568-185

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9	11	Section 9.3.4, last sentence: "Commerce Department staff collected information about significant cultural and spiritual sites across northern Minnesota to develop a map for use in this chapter, which illustrates the rich history and value the land holds for American Indians in Minnesota (see Appendix P)."	This statement should clarify to which map it is referring. Additionally, to the extent the Department has collected information in order to develop a map, such information should be included in the FEIS.	1568-186
9	13	Section 9.4.1, fourth paragraph: "Preservation of cultural resources is governed by the following laws: . . . ."	Some of these laws do govern preservation, but many govern management. Enbridge suggests revising to state: "Preservation and management of cultural resources are governed by the following laws: . . . ."	1568-187
9	20	Section 9.4.4.1.1 includes a bullet point list of potentially affected resources that includes national wildlife refuges.	Clarify that the APR will not impact any national wildlife refuges.	1568-188
9	21	Section 9.4.6, third paragraph, identifies various waterfowl habitat, including Upper Rice Lake.	Clarify that the APR does not cross many of these areas and that Enbridge has proposed RSA-05 to avoid the Eastern Rice Lake Watershed.	1568-189
9	22	Section 9.4.8, first paragraph, discusses Lower Rice Lake.	Clarify that Enbridge has proposed RSA-05 specifically to avoid the watershed that contains Lower Rice Lake.	1568-190
9	25	Section 9.5.1, seventh paragraph: "The Applicant's preferred route would result in impacts on 8 acres of wild rice lakes (Table 6.3.1.2-6)."	This statement should be revised to provide the actual acreage of crossing and clarify that the referenced table refers to wild rice lakes within a 750-foot wide corridor.	1568-191
9	26	Section 9.5.3, first paragraph, states that Enbridge proposes to fill the existing Line 3 with inert gas.	Enbridge does not plan to fill the existing Line 3 with inert gas. This statement should be removed.	1568-192
9	29	The reference, Brave Heart, M.Y.H. 2011. Welcome to Takini's historical trauma. Http://historicaltrauma.com, is not an active link.	A revised reference should be provided, or the reference should be removed.	1568-193
10		Chapter 10, when describing various trajectory, fate, and effects issues describes the analyses, including modeling, as though oil has already been released into the environment.	Where this Chapter is addressing the analyses done for hypothetical scenarios, it should describe the analyses accordingly, rather than as historical events, changing words such as "have" and "has" to "would" or "could."	1568-194
10	1, 8	Chapter 10 analyzes the behavior of spills that are labeled small, medium, large, and catastrophic.	The term "catastrophic" is not a descriptor of relative volume, but rather imports a more emotional component. A descriptor more closely tied to volume, such as "very large" should be used in place of "catastrophic." This better aligns with Minn. R. 4410.2300's directive to use "objective" language in the EIS.	1568-195

Chapter	Page	DEIS Text	Revisions and Suggestions	
10	11 n.9	The DEIS uses information from the Alberta Energy Regulator (AER) Report as a source that contributes to overall estimates of pipeline failure probabilities. At footnote 9, the DEIS explains that the AER Report caveats its use for extrapolation of incident data to larger pipelines. The DEIS then says that use of the AER data "could result in overestimation of Line 3 Replacement pipeline failure probabilities; however, this potential bias would be consistent across all pipeline route comparisons."	As set forth in the AER Report, most pipelines in Alberta are relatively small (6 inches in diameter or less). Only 2% of AER's regulated pipelines are 20 inches in diameter or more. As a result, the utility of the data is marginal on its face. If there were any question, the AER Report answers it as follows: "It is not appropriate to compare data on incidents related to small-diameter oilfield production pipelines to incidents related primarily to larger-diameter pipelines." (Report 2013-B: Pipeline Performance in Alberta, 1990-2012, p. iv.) Although the DEIS recognizes this problem, it nevertheless uses the report explaining that any potential bias showing higher failure probabilities than are appropriate would be consistent across the alternatives. The fact that the bias would be consistent for the alternatives does not solve the problem. This source should be eliminated or the DEIS should better explain why its use is appropriate.	1568-196
10	13	The DEIS notes that the AER Report observed that 5 percent of overall Alberta incidents were major ruptures. The DEIS uses this to scale the Stantec Report's AFF values "to produce higher (more conservative) AFF values that more realistically apply across a wider range of spill sizes."	As noted in the previous comment, the data sources used to justify increasing the failure probabilities expressly states that using the data is not appropriate when considering incidents related to large pipelines. Accordingly, this source should be eliminated or the DEIS should better explain why its use is appropriate. If, as the AER Report says, the AER Report data is not appropriate for use in this EIS, the major rupture AFF values from the Stantec Report, without scaling, should be used.	1568-197
10	13 n. 12	The DEIS adopts a third-party damage value from the AER Report.	See previous comments regarding AER Report's applicability to this EIS.	1568-198
10	13, n.14	The equipment failure rate is reported as 5x10-05 failures per mile year.	Clarity could be provided here by indicating whether that equipment failure rate includes failures from pump stations, meter stations, and tank farms. Additional clarity could be provided by stating whether that equipment failure rate is applied evenly along the length of all portion of pipeline segments in uplands areas or whether it was concentrated in areas where stations were located.	1568-199
10	14	Two sets of failure frequency rates are provided. The first set is broken down by landform. The second set of failure rates is broken down by spill magnitude.	Additional clarity could be provided here by: (1) explaining the basis for the derivation of the second set of failure rates, showing calculations as appropriate; (2) confirming that only the first set of failure rates were used as the basis of the analysis; and (3) if the second set of failure rates were used in the analysis, stating how they were used.	1568-200
10	17	Table 10.2-2 provides annual failure probabilities and recurrence intervals for the designated range of spill sizes for the APR and CN Alternative SA-04. The basis for the estimates is cited as DOS 2017, Table B-2.	The annual failure probability values reported in this table, particularly for large spills and for pipeline diameters that are representative of that proposed for L3R, appear to be larger than the values reported in the cited reference. It could be helpful if an explanation for that were provided.	1568-201

Chapter	Page	DEIS Text	Revisions and Suggestions	
10	18	Section 10.2.4.1.2 reports that "[t]he primary risks of an accidental release incident are corrosion, manufacturing, defects, and damages from third-party excavation or from natural forces. The amount of oil flowing in the pipeline does not affect any of these risks." Similarly, section 10.2.4.1.3 reports the following: "Because the primary risks of an accidental release incident are corrosion, manufacturing defects, and damage from third-party excavation or from natural forces, the increased flow in the Superior to Illinois segment does not increase the risk of a spill for other pipeline alternatives and therefore is not considered in the calculation of risk for the other pipeline alternatives."	These excerpts could be more accurate, if they were changed to discuss "causes" of accidental releases rather than "risks," and "probabilities" of any of those "causes" causing an event (here, a release) rather than increasing or decreasing the "risk" of a release.	1568-202
10	20	Table 10.2-4 provides estimated annual probabilities of failure for the APR and CN Alternative SA-04.	It could be helpful if the text identifies which failure frequency values were used as the basis for these estimates (e.g., the failure rates presented in Table 10.2-2; the first set of failure rates presented on page 10-14; the second set of failure rates presented on page 10-14).	1568-203
10	23-24	The DEIS reports various failure frequency probabilities, but does not consistently provide the unit of measurement.	The DEIS should include the unit of measurement in each instance.	1568-204
10	25	"The proposed Project would transport two types of crude oil: light and heavy crude oil. . . ."	The proposed Project will carry many different blends of crude oil, not simply "light crude oil" and "heavy crude oil." Light crude oil and heavy crude oil are general characterizations, or bookends, of the types of oil that the Project will carry.	1568-205
10	26	"Typical dilbit has an API gravity slightly higher than 10 degrees, which means it is less dense than water and will float (Environment Canada 2013)."	API gravities for fresh dilbits is greater than 20, which is different than "slightly higher than 10."	1568-206
10	26-27	"The components of diluents are commonly found in other crude oils; however, bitumen additionally contains several potentially toxic metals, stable and persistent resins, and asphaltenes."	These are not unique constituents of diluted bitumen; other conventional crude oils may also contain any or all of these constituents.	1568-207
10	27	"Dispersion is the entrainment of oil droplets in the water column (i.e., the spreading of oil vertically in the water)."	Dispersion is the process by which turbulence ("sub-scale" currents that mix whole oil or the dissolved fraction in three dimensions) spreads oil components throughout the water column. Entrainment is the process by which large scale turbulence (e.g surface breaking waves) can force whole oil droplets into the water column. Spreading of oil is the result of gravity on whole oil floating on the surface of the water, by which the radius of floating oil expands.	1568-208
10	27	"It is enhanced by the turbulence or mixing energy of a waterbody, which is increased by rain events, wind and tidal currents."	There are not tidal currents present in the waterbodies at issue on this project.	
10	27	"Oil can also be dispersed through adhesion to particular matter (e.g. organic matter, silt, and clay) suspended in the water column."	Adhesion is the opposite of dispersal. Adhesion will keep things in an area as they drop out of the water column, while dispersion is something that spreads things further.	1568-209 1568-210

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Chapter	Page	DEIS Text	Revisions and Suggestions	
10	32	"Because dilbit contains a higher concentration of higher-molecular-weight hydrocarbons compared to light oils, it is not as prone to evaporation and is, therefore, more persistent in terrestrial environments."	It is the higher concentrations of asphaltenes and resins, not "higher-molecular-weight hydrocarbons," which are responsible for greater persistence.	1568-211
10	33	"Dilbit has a similar density to water and, therefore, has greater potential for formation of tarballs and also has greater tendency to submerge in comparison to lighter crude oils."	Dilbit has a density less than 0.94 g/cm, which isn't any closer to that of water than any other heavy crude oil. Further, tarball formation is not density dependent. It is dependent on the residual oil and composition following weathering (e.g., asphaltenes, resins, waxes).	1568-212
10	33	"In general, lighter crude oils are more susceptible to dissolve in water, whereas heavier crude oils have a greater tendency to form tarballs."	This conclusion is too simplistic, and is neither supported nor correct.	1568-213
10	33	In describing the study site near Bemidji, the DEIS does not mention that the site was intentionally left alone following initial cleanup so that it could be studied.	Rather than conveying that the site continues to be a source of contaminants as though cleanup efforts were fully performed and the outcome was nevertheless unavoided, the DEIS should explain that cleanup efforts were halted by agreement with governmental authorities.	1568-214
10	34	The DEIS indicates that "Enbridge commissioned a modeling analysis for seven hypothetical crude oil releases from pipeline locations. . . ."	The DEIS should mention here that, although Enbridge funded the work, the scope of work was determined through substantial consultation with the authors of the DEIS.	1568-215
10	36	"The spill volumes were estimated based on a 15 minute shutdown response and backflow of oil in the line based on distance between shut off valves and topography."	The spill volumes were estimated based on a 13 minute (10 minutes for response and three minutes of pumping out during valve closure) shutdown response and gravitational draindown (not backflow) of oil in the line.	1568-216
10	36	Table 10.3-1 reports the maximum distance traveled for the seven study sites.	Certain of the numbers in the report do not appear to be accurate. Specifically, the following numbers, taken from the Stantec Report, appear to be the accurate numbers: Study Site 3 - 12.8 and 8.1 miles; Study Site 5 - 19.2 miles for Cold Lake Blend; Study Site 6 - 17.8 and 17.9 miles; Study Site 7 - 31.2 and 32.3 miles. Further, because the modeling was done to provide a range of results, it would be useful to provide the results of the other flow scenarios (average flow and low flow) in addition to the maximum flow that is presented. If the average flow and low flow data points are not presented, the reason they are excluded should be provided to the reader.	1568-217
10	37	"Two different crude oil types, a light Bakken crude oil and heavier Cold Lake Blend, were evaluated under three flow conditions. . . ."	Three, not two, different types of crude oil were modeled. The modeled crude oils were: a light Bakken crude oil, a Cold Lake Blend, and a Cold Lake Winter Blend.	1568-218
10	37 n.22	"As described in Section 10.3, dispersion is the entrainment of oil droplets in the water column (i.e., the spreading of oil vertically in water). . . ."	The process described is not "dispersion," but rather entrainment and dissolution. Dispersion is mixing with the water column. Entrainment is the process by which oil is forced into water by wave action. Dissolution is the diffusion of water-soluble components out of oil and into water.	1568-219

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Chapter	Page	DEIS Text	Revisions and Suggestions	
10	38 and Tables	There are 13 Biological AOIs listed on page 10-38. The tables reporting data on Biological AOIs (e.g., Table 10.4-8 (p. 10-55), Table 10.4-17 (pp. 10-63 and 10-64)) present information on only 10 of the 13 listed Biological AOIs. The resources that are not included in the tables are native prairies, trout streams, and fens.	The tables should be updated to be consistent with the Biological AOIs list or the FEIS should explain why the three resources were not included in the tables.	1568-220
10	38 and Tables	The Commodity Production AOIs that are listed on page 10-38 include marginal cropland, national forests, other forest land and state forests. Prime farmland, farmland of statewide importance, and mining land are not included in the list and are also not included in the tables in Chapter 10 (e.g., Table 10.4-9 (p. 10-57) and Table 10.4-18 (p. 10-65)). Chapter 5, by comparison, does use prime farmland and farmland of statewide importance.	Prime farmland, farmland of statewide importance, and mining land resources could be added when considering Commodity Production AOIs.	1568-221
10	42	"Longer-term health effects of oil spills are not well documented, but various components of crude oil are known or suspected carcinogens, and spills have been shown to have limited correlation to cancer (International Agency for Research on Cancer 1989)."	The cited report does not conclude there is a correlation between accidental crude oil releases and cancer in humans. In fact, the report concludes there is inadequate evidence for the carcinogenity in humans of crude oil. In the absence of such support, a statement linking accidentally released crude oil to cancer in humans is not appropriate.	1568-222
10	46	The DEIS describes a process of the bioaccumulation of hydrocarbons "up the food chain."	There is no substantive evidence for food-chain bioaccumulation of hydrocarbons "up the food chain." Yes, animals may absorb hydrocarbons if they ingest them, but, unlike PCBs, they do not get magnified up the food chain.	1568-223
10	54	The ROI of SA-04 does not contain any of the Minnesota recorded biological AOIs; however, the biological AOIs evaluated are Minnesota-specific and comparable data were not available from other states.	Although other states do not have Minnesota-specific data resources, they do have comparable data resources that could be used, and are in fact used elsewhere in the DEIS. See, e.g., Table 5.3.1-11.	1568-224
10	58	The DEIS describes a report by De Jong (1980) of a 1974 crude oil release in Moose Jaw, Saskatchewan. The DEIS cites this report when discussing reduced crop yields for areas directly affected by the release.	This release and the report that followed are not representative of typical conditions. Specifically, this was an atypical release in which the released oil spread in the subsoil and the soil was not amenable to conventional remediation. The report itself states that the "usual reclamation procedures of improving aeration by cultivation and ensuring an adequate nutrient supply . . . were only partly applicable." The use of only one report, which was of an atypical scenario, should be considered and additional language provided as necessary to explain the scenario relative to anticipated impacts in the event of an accidental release in the areas through which the Project pipeline may pass. Page 8.929 of the Assessment of Accidental Releases: Technical Report (Stantec 2017), identifies the De Jong study, but also several others, when discussing generalized recovery rates for terrestrial soil and vegetation.	1568-225

Enbridge Energy's DEIS Comments
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Chapter	Page	DEIS Text	Revisions and Suggestions	
10	CN and RP Alternatives Tables	The tables appear to contain entries that should be consistent, because the same route is being studied, but the entries do not appear to be entirely consistent. For example, tables appear to show differences in entries between the APR and RAs from the ND/MN border to Clearbrook, but that section of the route in the APR and RAs is the same. See, e.g., Tables 10.4-22, 10.4-25, 10-4.27, 10.4-28, 10.4-32, 10.4-35, and 10.4-36	The data in the tables should be confirmed and, where appropriate, additional explanations provided to explain any apparent discrepancies.	1568-226
10	66	The description of the area studied for analysis of Route Alternatives may be incorrect inasmuch as all RAs start at Clearbrook, MN.	The narrative should be confirmed.	1568-227
10	111	In this section, the DEIS compares failure probability estimates among the APR and CN Alternatives. It provides estimates of release frequency, but omits any discussion of the size of spills being discussed.	Providing average release frequencies, or failure probabilities, without consideration of the different return periods applicable for different size releases conveys only part of the story.	1568-228
10	Summary Tables	The tables appear to contain certain inconsistent entries. For example, Table 10.7-3 and Table 10.7-4 roll-up the CN alternatives analysis, and identify 170,027.6 acres of total AOI for the APR. Table 10.7-5 and Table 10.7-6 roll-up the RP alternatives and identify 243,607.9 acres of total AOI for the APR. It appears these numbers should be the same, but they are not. As another example, Table 10.7-4 and Table 10.7-6 present a sum total by acreages. However, certain entries in the table are not acreages, but rather other units.	The data in the tables should be confirmed and, where appropriate, additional explanations provided to explain any apparent discrepancies and/or additional tables should be used.	1568-229
11		Although this chapter references data from the American Community Survey, there is no corresponding reference that would direct a reader to the data tables within the U.S. Census Bureau that were used for the analysis	References to the data and tables should be added.	1568-230
12	6	The DEIS states in multiple areas that the project could constructed as early as spring 2018 and bases its cumulative impacts discussion on this time period.	Given the current MPUC regulatory schedule, it is unlikely that construction of the Line 3 Replacement Project will begin in Spring 2018. Enbridge plans to begin construction as soon as all applicable regulatory approvals have been obtained.	1568-231
12	11	The DEIS notes that LaSalle Creek will be crossed via HDD.	LaSalle Creek is proposed as a dry crossing. The crossing method should be updated here.	1568-232
12	12	The DEIS states that field surveys would be required to confirm the presence of rare species where the APR overlaps the environmentally relevant area of the MPL-Laporte 115-kV transmission line.	Field surveys for sensitive flora were conducted in this area between 2013 and 2016, and no threatened or endangered plant species were found.	1568-233
12	39	The DEIS states: "In addition, based on the discussion of tribal resources in Chapter 9, any of the routes, route segments, and system alternatives would have a long-term detrimental effect on tribal members."	No system alternatives are analyzed in Chapter 9. There is only the comment that, "From this perspective, any route, route segment, or system alternative would have a long-term detrimental effect on tribal members and tribal resources." This statement is also inconsistent with the mitigation measures discussed in Chapter 9.	1568-234

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Chapter	Page	DEIS Text	Revisions and Suggestions	
12	38	The lead-in heading for this section is on page 33 of the DEIS and states: "This Section Considers Direct and Indirect Effects of Greenhouse Gases on the Environment in Minnesota", however, there is a discussion of whooping cranes on 12-38 that talks about salinity levels in marsh habitat, which cites a reference that talks specifically about salinity in coastal marsh habitat in Texas (USFWS 2011).	Recommend striking the whooping crane reference on page 12-38 since whooping cranes impacts in Texas are not relevant to this discussion.	1568-235
Appendix G	0	Several of the crossing methods in Appendix G, Table G-2 are listed as Not Available (NA).	Enbridge recommends that Table G-2 be updated with the information presented in Paul Eberth's Direct Testimony, Schedule 2, Appendix H filed January 31, 2017 (Waterbody Crossing Table). This table provides crossing methods for all waterbodies crossed by the APR in Minnesota based on field-verified waterbodies and will provide clarification for waterbodies with an "NA" crossing method. Also note that there are errors in the text of the DEIS that indicate waterbody crossing methods that are different from what is presented in Appendix G. For example, Appendix G indicates that LaSalle Creek would be crossed with a dry crossing technique (which is correct); however Section 5.2.4.3.1 on page 5-256 and page 12-11 indicate that LaSalle Creek would be crossed by HDD. Review DEIS text for accuracy and consistency with Appendix G.	1568-236
Appendix M	0	Appendix M: Illinois DNR, 2016 citation.	Provide the full reference for this citation (missing from the reference section).	1568-237

Levi, Andrew (COMM)

From: Brusven, Christina <CBrusven@fredlaw.com>
Sent: Monday, July 10, 2017 3:46 PM
To: MN_COMM_Pipeline Comments
Cc: James D Watts (james.watts@enbridge.com); Tracy McAnally (Tracy.McAnally@enbridge.com)
Subject: MPUC Docket Nos. PL9/CN-14-916 and PPL-15-137 - Enbridge Energy, Limited Partnership's DEIS Comments
Attachments: Enbridge Energy, Limited Partnership DEIS Comments and Attachments B - F-c.pdf; Enbridge Energy, Limited Partnership Cover Letter, Affidavit of Service, and Service Lists-c.pdf

Ms. MacAlister,

Attached please find Enbridge Energy's DEIS Comments dated July 10, 2017 and Attachments B-F. We have also efiled the comments and attachments in MPUC Docket Nos. PL9/CN-14-916 and PPL-15-137. Please let me know if you have any questions.

Regards,

Christy Brusven
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& BYRON, P.A.

July 10, 2017

VIA EMAIL AND ELECTRONIC FILING

Jamie MacAlister, Planning Director
Minnesota Department of Commerce
85 7th Place East Suite 500
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Pipeline.Comments@state.mn.us

Re: In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Replacement – Phase 3 Project in Minnesota from the North Dakota Border to the Wisconsin Border
MPUC Docket No. PL-9/CN-14-916; OAH Docket No. 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Pipeline Route Permit for the Line 3 Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border
MPUC Docket No. PL-9/PPL-15-137; OAH Docket No. 65-2500-33377

Dear Ms. MacAlister:

Enbridge Energy, Limited Partnership ("Enbridge") provides the enclosed comments on the Draft Environmental Impact Statement for the Line 3 Replacement Project ("DEIS"). These comments supplement and incorporate Enbridge's Attachment A, filed on July 5, 2017, at eDockets Document ID 20177-133536-01.

These comments have also been e-filed today through www.edockets.state.mn.us and a copy of the filing is being served upon the persons on the Official Service List of record.

Sincerely,

/s/ *Christina K. Brusven*

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AFFIDAVIT OF SERVICE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Replacement – Phase 3 Project in Minnesota from the North Dakota Border to the Wisconsin Border

MPUC Docket No. PL-9/CN-14-916;
OAH Docket No. 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Pipeline Route Permit for the Line 3 Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

MPUC Docket No. PL-9/PPL-15-137;
OAH Docket No. 65-2500-33377

STATE OF MINNESOTA)
) SS.
COUNTY OF HENNEPIN)

Kristen A. Swenson, of the City of Minneapolis, the County of Hennepin, State of Minnesota, being duly sworn on oath, deposes and states that on the 10th day of July, 2017, she e-filed with the Minnesota Public Utilities Commission the following:

1. Letter to Minnesota Department of Commerce;
2. Enbridge Energy, Limited Partnership's DEIS Comments, including Attachments B-F; and,
3. Affidavit of Service.

A copy has also been served in accordance with the attached service list of record.

Kristen A Swenson
Kristen A. Swenson

Subscribed and sworn to before me
this 10th day of July, 2017

Roxanne M. Gangl
Notary Public

ROXANNE M. GANGL
NOTARY PUBLIC - MINNESOTA
My Commission Expires
January 31, 2020

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ENBRIDGE ENERGY, LIMITED PARTNERSHIP'S DEIS COMMENTS

1.0 INTRODUCTION

The Draft Environmental Impact Statement for the Line 3 Project (DEIS) published on May 15, 2017 provides extensive evaluation and discussion of the potential benefits, impacts, and mitigation measures for the Line 3 Replacement Project (the Project) and alternatives being considered by the Minnesota Public Utilities Commission (Commission or MPUC). The DEIS addresses the issues identified in the Commission's December 5, 2016 Final Scoping Decision Document (FSDD), as well as the content required under Minn. R. 4410.2300. Accordingly, Enbridge Energy, Limited Partnership (Enbridge) has focused these comments on corrections, clarifications, and additions that the Minnesota Department of Commerce, Energy Environmental Review and Analysis staff (DOC-EERA) may want to consider in preparing the final EIS (FEIS) to best inform the Commission, parties, public and other agencies during the permitting processes.

Enbridge has organized these DEIS comments to first suggest general or overarching clarifications to the terminologies and methodologies used in the DEIS and then to provide specific comments on the content of each chapter.

Enbridge has also created several attachments to further organize its comments and aid reviewers in addressing the comments. These attachments include:

- Attachment A – On July 5, 2017, Enbridge submitted Initial Comments, including a table marked as Attachment A, that contained suggested discrete changes to certain data and/or information provided in the DEIS. Attachment A is also incorporated by reference into these comments.[1]

- Attachment B – Table Summarizing the Regions of Interest (ROIs) by Resource and Alternative. As discussed in Section 2.1. below, Enbridge recommends this table be included in the FEIS to provide readers a comprehensive reference to the differences in the ROIs used to analyze each resource and alternative.

- Attachment C – Additional SA-04 Analysis. As discussed in Sections 3.4.2 and 3.5.1, Enbridge has provided additional analysis regarding SA-04 that could be included in the FEIS to provide additional information about potential impacts in other states.

[1] Enbridge's Initial DEIS Comments and Attachment A are available on eDockets under Document ID No. 20177-133536-02.

- Attachment D – MLP Due Diligence Process for Screening Pipeline Maintenance Locations for Possible Contamination. This document describes the process Enbridge uses to screen integrity dig sites for possible contamination.

- Attachment E – Enbridge's Contaminated Sites Management Contractor Plan – Wisconsin - Segment 18 Project. This document is an example of the type of contaminated sites management plan Enbridge will develop for the Project.

- Attachment F – Enbridge's Information Requests to White Earth Band of Ojibwe (WEBO), Mille Lacs Band of Ojibwe (MLBO), and Honor the Earth, and Honor the Earth's Responses to Enbridge's Information Requests.

2.0 OVERARCHING COMMENTS

2.1 REGIONS OF INTEREST (ROI)

The DEIS identifies "regions of interest" or "ROIs" for each alternative in an effort to gain a broader understanding of the resources present in surrounding areas (as well as areas potentially directly impacted by construction of an alternative). As explained briefly on page 5-2 of the DEIS, the ROIs varied in geographic size depending on the resources and alternatives evaluated. While it makes some sense to look at a broader geographic area for certain resources, Enbridge thinks it would improve the overall usability of the document if all of the ROIs considered across the DEIS were presented in one consolidated location, along with an explanation of the factual basis for each. ROIs could also be quantified in all cases; for example, pages 5-44 and 5-45 identify surface water ROIs as "the area immediately downstream" of flowing surface water crossings and the area "in the immediate vicinity" of non-flowing water crossings.

In addition, some ROIs vary from alternative to alternative, even for the same resource. For example, on pages 5-44 and 5-45 of the DEIS, DOC-EERA indicates that the ROI used to analyze impacts on surface waters includes the construction work area for each surface water crossed, as well as the area immediately downstream from the crossing for flowing surface waters, and in the immediate vicinity for crossings of non-flowing surface waters. However, on page 5-46, DOC-EERA buffered the Applicant's Preferred Route (APR) and Certificate of Need (CN) Alternatives by one-half mile to identify intersections of features indicative of surface water quality, including trout streams, wild rice lakes, Lakes of Biological Significance, and Tullibee (cisco) Lakes.

Attachment B contains a table summarizing the ROIs used for each resource and set of alternatives. Enbridge asks DOC-EERA to consider including a similar table in the FEIS and augmenting it with a description of how ROIs were selected and utilized. This information will better allow readers to understand the scope of the analyses throughout the document.

2.2 TERMINOLOGY RELATED TO POTENTIAL IMPACTS

A substantial portion of DEIS is dedicated to identification and quantification of features potentially impacted by construction and operation of the APR and alternatives. When presenting these data, the DEIS frequently uses terms or phrases such as:

- crossed by the pipeline;
- intersects;
- within the construction work area of the pipeline;
- within the operations area; and
- within the ROI.

DOC-EERA may want to consider clarifying its use of these statements. For example, a statement that reads, "The Applicant's preferred route intersects the highest number of wild rice lakes (17) compared to the CN Alternatives," (see page 5-64) gives the reader the impression that the centerline or workspace associated with the APR literally crosses 17 wild rice lakes. Figures ES-5 and ES-10 of the DEIS also present data indicating that there are approximately 15-17 wild rice lakes "crossed" by the APR. Closer examination of the data reveals that, in fact, the ROI (in this case 0.5 miles from the proposed centerline) *contains* 17 wild rice lakes (see discussion on page 5-51 where the DEIS more clearly states that five wild rice waterbodies would be crossed by the APR and could be affected by construction and operation, and that 15 wild rice waterbodies occur within 0.5 mile of the APR).[2] Accordingly, the statement would read as follows: "There are 17 wild rice lakes contained within the ROI of the Applicant's preferred route." For additional examples, please see Enbridge's Attachment A submitted on July 5, 2017. Enbridge suggests DOC-EERA review each of the figure titles, table titles, and statements summarizing "features crossed" or similar language and revise them where necessary to reflect whether the APR or alternative actually intersects (or crosses) the resource or if, in fact, the resources are instead within an ROI.

2.3 WISCONSIN DATA

The DEIS notes in a variety of places (e.g., Chapter 5, page 18) that data related to the "Wisconsin portion of the route was not made available." This information is publicly available. Enbridge recommends utilizing the *Final Environmental Impact Statement for Enbridge Sandpiper Pipeline and Line 3 Replacement Projects* (WI DNR, 2016), which is available at: http://dnr.wi.gov/topic/EIA/Enbridge.html.

[2] *See also,* Attachment A seeking clarification on whether 17 or 15 wild rice lakes are within the ROI for the APR.

3.0 COMMENTS BY CHAPTER

3.1 EXECUTIVE SUMMARY

Given the overall length of the document, the Executive Summary serves an important purpose, as it may be the only portion of the FEIS read by some members of the public. Accordingly, Enbridge suggests that the Executive Summary be revised to provide a more comprehensive summary of the document's contents.

The format of the DEIS Executive Summary follows a question/answer format that does not follow the applicable CN or Route Permit decision criteria and highlights only select resources and impacts. For example, the DEIS reports that two of the "major issues" asked under the CN analysis are "What are the impacts of the CN Alternatives on high quality water resources?" and "Will the proposed Project damage forests and wildlife habitat in northern Minnesota more than the alternatives?" It appears as if the focus of these "major issues" considered only specific Minnesota resources, with a particular focus on northern Minnesota. While Enbridge agrees that the impacts on water resources, forests and wildlife habitats are appropriate resources evaluated in the DEIS, there is nothing in the CN decision criteria (or the Minnesota Environmental Policy Act (MEPA) more generally) that suggests these resources and specific geographies are more important than others.

To provide a more comprehensive and balanced summary of the EIS content, Enbridge suggests that the Executive Summary in the FEIS provide a comprehensive, balanced summary of the entire document by chapter. Enbridge also suggests that the summaries focus on qualitative aspects of the EIS and that quantitative analysis be included only where it is material to an objective comparative evaluation of the Project and alternative. This format is more typical of other EIS documents prepared for the Commission and allows decision makers, as well as the public, to objectively view the data and form their own opinions as to the relative merits of the content in their decision making.[3] It is also consistent with MEPA statutes and rules that provide that an EIS should be written so that it is "analytic rather than encyclopedic"[4] and uses "plain and objective language."[5] 2603-1

Given that mitigation measures are addressed as subsections in most chapters, the Executive Summary should also reflect that potential impacts of pipeline construction and operation can be mitigated by compliance with regulatory requirements, permit conditions, and Enbridge's mitigation plans. The DEIS commonly makes this conclusion when considering impacts to 2603-2

[3] *See, e.g.,* Great Northern Transmission Line Project: FEIS, Volume 1: Impact Analysis, MPUC Docket No. E015/TL-14-21, at S-1 – S-61 (October 2015).

[4] Minn. Stat. § 116D.04, subd. 2a.

[5] Minn. R. 4410.2300.

2603-2 Cont'd

specific resources in the chapters that follow; however, these conclusions are not presented in the Executive Summary.

Finally, the Executive Summary should be revised to correct factual inaccuracies and statements that are inconsistent with the full discussion of the topic contained elsewhere within the EIS. Enbridge has provided a list of suggested corrections to the Executive Summary in Attachment A submitted on July 5, 2017.

3.2 CHAPTER 2 – PROJECT DESCRIPTION

3.2.1 STARTING POINT FOR PROJECT

2603-3

Page 2-1 of the DEIS correctly states that, in the U.S., the Line 3 Replacement Project begins at the Joliette Valve. However, multiple places throughout the remainder of the DEIS, including Chapter 5 in particular, appear to include impacts and other descriptions for the Project that begin in Neche, a town in North Dakota on the Canada/U.S. border. For example, section 5.2.1.2.1 notes that the APR would cross the Pembina River Nationwide Rivers Inventory segment; however, the Pembina River is located approximately seven miles northwest of where the Project begins. As Enbridge discussed in its CN Application, the 15.3-mile segment from the Canadian border to the Joliette Valve in Pembina County, North Dakota, has already been replaced.[6] Therefore, Enbridge recommends that, when discussing potential impacts in North Dakota, the FEIS begin its analysis at the Joliette Valve or expressly note that construction is already complete upstream of the valve site.

3.2.2 POTENTIAL CONNECTED ACTIONS – TRANSMISSION LINES

2603-4

Section 2.10 of the DEIS describes the four high voltage transmission lines that are planned to be constructed to bring power to the new proposed pump stations serving the Project. Page 2-44 states that "the environmental review documents that have already been prepared for these proposed connected actions are incorporated by reference into this EIS." Incorporation by reference is allowed under Minn. R. 4410.2400. However, the rule also requires that the content of the incorporated material must be briefly described. Enbridge believes it would be prudent to, at a minimum, include a reference to the eDocket numbers of the related permitting records and to provide a brief discussion of the status of those dockets and environmental review documents. As noted on pages 44 and 45 of Schedule 2 to Mr. Paul Eberth's Direct Testimony filed January 31, 2017, three of the transmission lines are subject to MPUC approval:

- Clover-Potato Lake Transmission Line – ET2/TL-15-689;
- Bull Moose Transmission Line – ET2/TL-15-628; and
- Palisade Transmission Line – ET2/TL-15-423.

[6] CN Application at 1-8.

2603-4 Cont'd

The fourth, Cromwell Transmission Line, is less than 1,500 feet in length and will be permitted locally.

Enbridge also notes that page 2-44 of the DEIS anticipates that additional information related to these transmission lines would be included in Chapter 12, including "additional information on these connected activities and their impacts, including a map of their locations." It does not appear that such information was included in Chapter 12 of the DEIS. The FEIS should include this additional information regarding the connected transmission lines.

3.3 CHAPTER 3 – REGULATORY FRAMEWORK

3.3.1 MINNESOTA FOCUS

2603-5

Chapter 3 opens with a statement that the chapter addresses regulations for constructing and operating oil pipelines in Minnesota.[7] Accordingly, the remainder of the chapter and related tables focus on only those permits applicable in Minnesota. While this may be an appropriate scope for this chapter, DOC-EERA may want to consider revising this chapter to note the substantial additional permitting activity that would be required in other states, including North Dakota, Iowa, Illinois, and potentially South Dakota, for SA-04. Enbridge suggests that the FEIS includes at least some high-level information, either in Chapter 3 or Chapter 5, describing the additional permitting that would be required for SA-04.

3.3.2 WETLAND PERMITTING

2603-6

Throughout the DEIS, but particularly in Chapter 3, there are several references to wetland permitting that DOC-EERA may want to consider clarifying.[8]

In accordance with the Minnesota Wetland Conservation Act (WCA) Federal Approvals Exemption for Utilities (Approvals Exemption), local government unit approval of a WCA replacement plan for the Project is not required for wetland impacts resulting from the construction, maintenance, or repair of the pipeline and associated facilities, so long as (1) all affected wetlands are either jurisdictional under the Federal Clean Water Act or the applicant agrees to proceed with the federal review using a preliminary jurisdictional determination, which assumes that all affected aquatic resources, including wetlands, are jurisdictional under the Clean Water Act; (2) the applicant receives a signed individual permit or other applicable permit instrument from the U.S. Army Corps of Engineers (COE) under Section 404 of the Clean Water Act; and (3) Approvals Exemption notification and review procedures between the COE, the Board of Water and Soil Resources (BWSR), and the Minnesota Department of Natural Resources (DNR) are followed. While WCA local government units do not approve wetland crossing methods under the Approvals Exemption, they do have

[7] DEIS at 3-1.

[8] *See, e.g.,* DEIS at Table 3.6-1 and 3-15.

2603-6
Cont'd

the opportunity to provide comments to the COE in response to the public notice on the COE permit.

The Approvals Exemption does not change the requirement to provide compensatory wetland mitigation under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act for Project impacts to waters and wetlands. Because Enbridge has asked the COE to conduct its Section 404 permit review under a preliminary jurisdictional determination, Enbridge has agreed to provide wetland mitigation for all affected aquatic resources, without formal jurisdictional determinations for each affected water or wetland.

Enbridge proposes to use COE-approved wetland mitigation banks to compensate for temporary and permanent unavoidable wetland impacts and replace the functions lost as a result of the Project. Enbridge will provide compensatory mitigation for permanent wetland losses associated with construction of pump stations and valves. Enbridge proposes to restore all temporarily affected wetlands to pre-construction elevations and contours. Enbridge will also provide compensatory mitigation for resulting permanent conversion and temporal loss of wetland function, including the conversion of forested and scrub-shrub wetlands to a herbaceous wetland in the Project's permanently maintained right-of-way and the temporary conversion of forested and scrub-shrub wetlands in the construction corridor. Enbridge will continue to work with the COE during permit review to determine the appropriate compensation ratios for Project wetland impacts.

DOC-EERA may also want to consider several clarifications that relate to wetland permitting for the APR, as currently presented in DEIS Sections 3.6.1.1, 3.6.3.7 and 3.6.4:

The COE must issue a permit to cross navigable waters of the United States under Section 10 of the Rivers and Harbors Act of 1899 and an individual permit under Section 404 of the Clean Water Act to discharge dredged and fill material into waters of the United States, including wetlands, for the Project. The Project's COE permit will require the Minnesota Pollution Control Agency (MPCA) to grant (or waive) water quality certification under Section 401 of the Clean Water Act. A Section 401 water quality certification is not a permit. Its purpose is to allow MPCA to review the proposed activity to determine if it complies with applicable water quality standards and to identify any conditions needed to ensure compliance. If MPCA finds that the Project satisfies applicable water quality standards, it will issue its Section 401 water quality certification and the certification and its conditions will then become part of the COE Section 404 permit for the Project.

The COE must also grant Enbridge permission under Section 14 of the Rivers and Harbors Act of 1899, codified 33 U.S.C. Section 408 (Section 408), to allow the Project to cross federal easements at the Sandy Lake Dam and Reservoir and at the Lost River.

3.4 CHAPTER 4 – ALTERNATIVES TO THE PROPOSED PROJECT

3.4.1 PURPOSE AND NEED

2603-7

As stated in Schedule 7 of Mr. Barry Simonson's Direct Testimony filed January 31, 2017, SA-04 does not meet the Project's stated purpose and need. It cannot serve as a replacement to the existing Line 3 because it does not connect to existing Enbridge pipelines or facilities at Clearbrook, Minnesota, or Superior, Wisconsin. Enbridge has previously indicated that it would not build SA-04, and SA-04 is not consistent with the Project's purpose and need. Minnesota Rule 4410.2300 states that, "[a]n alternative may be excluded from analysis in the EIS if it would not meet the underlying need for or purpose of the project." However, given that SA-04 was included in the FSDD, Enbridge offers additional information regarding SA-04 that could be included in the FEIS to further inform the Commission's decision on the CN alternative.

3.4.2 DESCRIPTION OF SA-04

2603-8

Section 4.2.5 of the DEIS provides a description of SA-04, including a description of additional pump stations and mainline valves that would be required.[9] The DEIS makes no mention of the additional facilities that would be required at the end point of SA-04 at Joliet, Illinois (although VOC emissions for an SA-04 terminal are included in Chapter 5). These facilities are necessary because, unlike the APR, which connects to existing facilities (including storage tanks and other crude oil pipelines) at Clearbrook, Minnesota, and Superior, Wisconsin, there are no existing crude oil facilities at Joliet with which SA-04 can interconnect.

Accordingly, Schedule 7 to Mr. Barry Simonson's Direct Testimony filed January 31, 2017, states that SA-04 would require the construction of a new crude oil storage terminal at the termination of SA-04 in Joliet, Illinois.[10] This terminal would require approximately seven new storage tanks and associated electrical and mechanical facilities, such as substations and pumping units. The new terminal would result in approximately 55 acres of permanent disturbance.

Additionally, the discussion in Chapter 4 and the data provided in Appendix M do not include analyses or mention of access roads, ATWS, aboveground facilities, terminals, blasting locations, HDDs, or water appropriation for SA-04.

Including these facilities and their related impacts in Chapters 4, 5, and 12 of the FEIS may be beneficial. See Attachment C for types of resource issues and impacts that Enbridge thinks could be included in the FEIS. To the extent DOC-EERA lacks sufficient data to fully analyze these impacts, a discussion of why the data was not discussed could be included, consistent with Minn. R. 4410.2500.

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[9] DEIS at 4-8.

[10] Schedule 7 to Simonson Direct Testimony at 9.

2603-9

3.5 CHAPTER 5 – EXISTING CONDITIONS, IMPACTS AND MITIGATION – CERTIFICATE OF NEED

3.5.1 DESCRIPTION OF SA-04

The Project description for SA-04 in Chapter 5 is similar to the description in section 4.2.5. Accordingly, the comments above regarding that description apply to the description in Chapter 5 as well. Including a fuller description of SA-04 would allow for more accurate estimation of the magnitude, extent, and potentially the duration of impacts associated with SA-04 on certain resources. In particular, the construction of the new terminal should be included in the SA-04 description and subsequent impacts analysis.

Construction of a new terminal at Joliet, Illinois, would require approximately 55 acres of disturbance. The end point for SA-04 is situated within the Illinois and Michigan Canal National Heritage Corridor and abuts the Midewin National Tallgrass Prairie. This area is very developed and congested. As a result, siting the 55-acre terminal within this area would be difficult and, if that could be accomplished, it could result in direct and/or indirect impacts to the Illinois and Michigan Canal National Heritage Corridor and/or the Midewin National Tallgrass Prairie. See Attachment C for additional discussion.

3.5.2 LIFE-CYCLE GREENHOUSE GAS EMISSIONS CALCULATIONS

2603-10

Section 5.2.7.3 of the DEIS contains a life-cycle greenhouse gas (GHG) impact analysis for the APR.[11] The framework for this analysis appears consistent with the direction provided in Section 4.4.9 of the FSDD.

Enbridge requests that DOC-EERA confirm the calculations and inputs used to present the annual life-cycle GHG emissions for the Line 3 Replacement (760,000 bpd WCSB Heavy) - No displacement scenario included in Table 5.2.7-11.[12] The table currently concludes that this scenario would result in 273.5 million tons of C02e per year. The DEIS text supporting Table 5.2.7-11 notes that "[p]ost-Project life-cycle GHG emissions were calculated assuming a worst case throughput of 760,000 bpd of WCSB heavy crude," presumably relying on the 632 kg CO2-e/barrel of crude oil for Heavy WCSB listed in Table 5.2.7-10.[13] Enbridge was unable to recreate this calculation using this methodology.

It appears that DOC-EERA calculated the annual life cycle-GHG emissions for the Line 3 Replacement (760,000 bpd WCSB Heavy) – No displacement scenario using 894.43 kg CO2-

[11] DEIS at 5-439 – 5-443.

[12] Enbridge also notes that the title to Table 5.2.7-11 may need to be revised to better reflect the data presented.

[13] DEIS at 5-442.

2603-10 Cont'd

e/barrel of crude oil, not 632 kg CO2-e/barrel for the WCSB crude type as is presented in Table 5.2.7-10. Using 632 kg CO2-e/barrel as is presented in 5.2.7-10 would result in 193.3 million tons of CO2-e per year, not 273.5 as is presented in 5.2.7-11. This change would then result in changes in the Incremental Annual Life-Cycle GHG Emissions and Social Cost of Carbon calculations for the Line 3 Replacement scenario in columns three and four of Table 5.2.7-11, respectively. The Incremental Annual Life-Cycle GHG Emissions calculation would change from 193 million tons CO2-e to 113 million tons CO2-e and the Social Cost of Carbon would change from 287 billion dollars to 169 billion dollars.

The GHG life-cycle discussion in Section 5.2.7 of the DEIS also would need to be updated accordingly.

3.6 CHAPTER 6 – EXISTING CONDITIONS, IMPACTS, AND MITIGATION – ROUTE PERMIT

2603-11

In this subsection, Enbridge provides additional information that DOC-EERA may want to include in the FEIS with respect to analyzing the Project and the alternatives. Enbridge provided this information for the Route Alternatives (RAs) in Schedule 7 of Mr. Simonson's Direct Testimony filed January 31, 2017. In Table 1, below, Enbridge provides variations and other considerations included in Enbridge's testimony but not found in the DEIS.

Table 1 - Line 3 Replacement Project
Draft Environmental Impact Statement
Variations and Other Considerations Not Included in the Route Alternatives Analysis

Route Alternative (RA)	Variations and Other Considerations
RA-06	• RA-06 would cross 12.9 miles of the Fond du Lac Reservation; the APR avoids all tribal reservations. Absent agreement from the Tribe, Enbridge is unable to secure land rights and/or other approvals necessary to construct and operate the pipeline across the Reservation. • RA-06 would pass directly through the City of Keewatin, Minnesota, which would require construction in close proximity to homes and businesses. • RA-06 would require construction through the active Keetac mine near Keewatin, which would present construction concerns due to consolidated and fractured rock, active blasting from mining, and coordination with active mining operations and heavy mine equipment traffic. Construction and operation of the Project would impact the operation of the mine, and Enbridge would need to reach an agreement with the mine operator. • RA-06 would cross an area of northern Minnesota that lacks existing electrical transmission lines and temporary housing for construction. • RA-06 would require the construction of approximately three new pump stations that would need new transmission lines; these pump stations also would result in additional permanent land disturbance.

2603-11
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Table 1 - Line 3 Replacement Project Draft Environmental Impact Statement Variations and Other Considerations Not Included in the Route Alternatives Analysis	
Route Alternative (RA)	Variations and Other Considerations

RA-07	• Safety is Enbridge's first and foremost consideration. Line 3 is positioned in the middle of the Enbridge Mainline System right-of-way, which is a multi-pipeline corridor containing seven crude oil pipelines west of Clearbrook and six crude oil pipelines east of Clearbrook. The spacing between pipelines typically ranges between 10-15 feet on the north side of Line 3 and between 15-20 feet on the south side of Line 3. Enbridge has a strong and mature safety program and strict work rules when conducting operations near its pipelines. To replace Line 3 in the same trench, Enbridge would need to excavate, expose, cut, handle, remove, and then replace the existing pipeline. Because this process would take place between multiple operating pipelines and within a very restricted workspace, there would be an increased risk of damaging an operating pipeline through accidental contact with equipment, overloads on the surface above the pipelines, cave-ins, and adjacent pipe movement due to the varying depths of cover, among other risks.
	  • Enbridge would need to operate heavy equipment and place spoil (soil removed from the trench) directly on top of operating pipelines during construction. This work would create the risk of overstressing the operating pipelines or posing the threat of accidental strikes from backfilling equipment.
	  • There are 12 locations west of Clearbrook where Enbridge's Line 67 and Line 65 pipelines cross back and forth under Line 3 to avoid special environmental features and minimize impacts to human settlements. Likewise, the same situation occurs east of Clearbrook where Line 67 and Line 13 cross back and forth 20 times under Line 3 to avoid similar environmental and human impacts. In total, the back and forth crossing of Line 3 by other pipelines occurs 32 times. Therefore, Enbridge would need to disturb these crossings to replace the existing pipeline in trench and then duplicate the crossings. This would increase the difficulty of constructing the new line in the same trench.
	• RA-07 would cross 55.4 miles of the Leech Lake and Fond du Lac Reservations; the APR avoids all reservations. Absent agreement from the Tribes, Enbridge is unable to secure land rights and/or other approvals necessary to construct and operate the pipeline across the Reservations. The Leech Lake Band of Ojibwe has previously filed comments with the Commission regarding constructing across its Reservation. See letters dated October 25, 2013, and January 2, 2017, in Schedule 6 of Mr. Eberth's Direct Testimony.
	• RA-07 would cross the southwestern boundary and either cross or be located in close proximity to the eastern boundary of the St. Regis Paper Company federal Superfund site in the town of Cass Lake, Minnesota. The administrative boundary of the Superfund site is irregular but lies generally south of an existing Burlington Northern Santa Fe railroad right-of-way and east of State Highway 371. The site is bounded to the south and east by a wooded parcel owned by the U.S. Forest Service and beyond

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Table 1 - Line 3 Replacement Project Draft Environmental Impact Statement Variations and Other Considerations Not Included in the Route Alternatives Analysis	
Route Alternative (RA)	Variations and Other Considerations
RA-07	by a lake, Pike's Bay, which would constrain workspace in this area. Both the southwestern and eastern portion of the Superfund site are where the U.S. Environmental Protection Agency has previously recommended placement of an engineered cap and groundwater extraction wells. RA-07 would impact operation and monitoring activities at the Superfund site. • RA-07 would cross 13 cities, including Leonard, Wilton, Bemidji, Cass Lake, Bena, Zemple, Cohasset, Ball Club, Warba, Grand Rapids, Coleraine, Floodwood, and Big Lake, Minnesota. In contrast, the APR would only cross Mahtowa. RA-07 contains 207 High Consequence Areas (HCAs) within the 750-foot-wide route width, whereas the APR contains 49 HCAs within the 750-foot-wide route width. • Landowners along the existing Line 3 right-of-way would be impacted by the prolonged presence of construction crews and construction activity and would have limited or no access to the construction right-of-way for the duration of construction. The length of the construction process may result in multiple years of crop loss in agricultural areas, and the presence of an open trench would impact the ability to move farming equipment and livestock across the construction right-of-way. • The extended construction operation would also result in more road use and increased traffic throughout the construction process. • Although RA-07 was proposed to be constructed in an existing, previously disturbed right-of-way, the total construction workspace area would need to be increased for several reasons. Depending on the engineering specifications and environmental factors associated with the adjacent pipelines, such as depth of cover, pipe design, operating pressure, soil types, and ground conditions, the operating pipelines would need to be protected from damage through placement of equipment bridges, additional fill, and mats. This increase in workspace would increase the overall disturbance to all environmental features. • In-trench replacement also poses greater environmental impacts at wetland and waterbody crossings. It would take an extended period of time to remove existing pipe at wetland and waterbody crossings because Enbridge would need to use specialized construction techniques within a limited workspace. In addition, installing new pipeline at these same crossings with open trench methods would further increase the duration of wetland and waterbody crossings, which would increase impacts resulting from sedimentation and aquatic life disturbance, among others. • Enbridge's Environmental Protection Plan (EPP) normally restricts having an open trench to no more than three days. In-trench replacement of Line 3 would result in the trench being open for protracted periods, and in some cases significantly longer than three days, because Enbridge would need to first remove a section of the pipe and then replace it. During that time, changing weather conditions such as frost and rain could severely weaken the trench wall and contribute to trench cave-in, and rain could fill the trench with water. Both circumstances would prevent pipe installation and could result in an even longer period of open trench. Trench cave-ins would

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Table 1 - Line 3 Replacement Project Draft Environmental Impact Statement Variations and Other Considerations Not Included in the Route Alternatives Analysis	
Route Alternative (RA)	Variations and Other Considerations
	result in more time and activity to reconstruct the trench so that pipe may be installed, and collected rainwater/groundwater would need to be discharged out of the trench before installation could occur. • In-trench replacement would result in interruption of service for shippers on the Enbridge Mainline System, as the existing Line 3 would need to be taken out of service for approximately 16 months to allow for removal and replacement.
RA-08	• RA-08 would cross 55.9 miles of the Leech Lake and Fond du Lac Reservations, while the APR would avoid all tribal reservations. Absent agreement from the Tribes, Enbridge is unable to secure land rights and/or other approvals necessary to construct and operate the pipeline across these Reservations. The Leech Lake Band of Ojibwe has previously filed comments with the Commission regarding the regulatory feasibility of constructing a pipeline across the Reservation. See letters dated October 25, 2013, and January 2, 2017, in Schedule 6 of Mr. Eberth's Direct Testimony. • RA-08 is routed along the "GLG Alternative" that was studied in the U.S. Department of State's 2009 Final Environmental Impact Statement for Enbridge's Alberta Clipper (Line 67) Project (Alberta Clipper FEIS). In the Alberta Clipper FEIS, the U.S. Department of State concluded that there were concerns with this route alignment, stating that, "[i]t should be noted that both the CNF [Chippewa National Forest] and LLBO [Leech Lake Band of Ojibwe] have expressed serious concerns about the GLG Alternative. The CNF has indicated that the GLG Alternative would result in substantially greater impact on its Experimental Forest. In addition, LLBO opposes consideration of the GLG Alternative due to increased impacts to sensitive forestland and wetland resources." (U.S. Department of State, 2009). • RA-08 would cross 10 cities, including Bemidji, Zemple, Cohasset, Ball Club, Warba, Floodwood, La Prairie, Grand Rapids, Coleraine, and Big Lake, Minnesota. By comparison, the corresponding APR segment would only cross the city of Mahtowa. RA-08 would be within 750 feet of five additional structures, one school, one church, and one additional cemetery. RA-08 contains 176 HCAs within the 750-foot-wide route width, whereas the APR contains 35 HCAs. • RA-08 would require new easements for 964 parcels.
RA-03AM	• The APR provides a shorter, more direct route from Clearbrook to Superior. Because RA-03AM is approximately 54 miles longer than the APR, it would result in an increase in total acres disturbed and total environmental and human resources impacted during construction of the Project. • RA-03AM is a substantial deviation from the APR. RA-03AM would require new easements on 1,094 parcels. There are 397 more houses within a 750-foot-wide route width over RA-03AM. Numerous homes, garages, and commercial properties would need to be removed to construct RA-03AM. • RA-03AM would cross nine cities, including Staples, Little Falls, Milaca, Mora, and Hinckley, Minnesota. Enbridge would need to install RA-03AM between public

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Table 1 - Line 3 Replacement Project Draft Environmental Impact Statement Variations and Other Considerations Not Included in the Route Alternatives Analysis	
Route Alternative (RA)	Variations and Other Considerations
	venues and businesses in congested and developed areas with constricted workspaces. Thirteen additional structures, three airports, one school, and two cemeteries are located within a 750-foot-wide route width over RA-03AM. • RA-03AM would cross Grand National Golf Course, at Grand Casino Hinckley. Much of the course would need to be closed during construction and restoration. • RA-03AM would cross U.S. Highway 169 and Minnesota State Highway 23 in the town of Milaca and the Mississippi River at Little Falls, Minnesota. These crossings would need to be completed using the HDD method; however, there would not be sufficient room on either end of the drill for the pipe pull back string assembly areas. Enbridge would need 3.7 acres of additional workspace to complete the major road crossings and 4.6 acres of additional workspace for the Mississippi River crossing.

3.7 CHAPTER 7 – ROUTE SEGMENT ALTERNATIVES

2603-12

Enbridge offers additional information concerning landowners and construction that DOC-EERA may want to consider for inclusion in the FEIS. Enbridge provided this information for the RSAs in Schedule 7 of Mr. Simonson's Direct Testimony filed January 31, 2017. Enbridge provides below, in Table 2, additional information for DOC-EERA and the resource agencies' consideration on information contained in Enbridge's testimony but not found in the DEIS. Table 2 includes only those RSAs where there was a potentially meaningful variation between the DEIS and Enbridge's prior testimony.

Table 2 - Line 3 Replacement Project Draft Environmental Impact Statement Variations and Other Considerations Not Included in the Route Segment Alternatives Analysis	
Route Segment Alternative (RSA)	Variations and Other Considerations
RSA-15	• RSA-15 would cross 0.5 mile of a U.S. Fish and Wildlife Service (USFWS) easement, while the APR would cross none. USFWS easements often require a compatible use review because some easements prohibit pipeline construction. • RSA-15 would result in a more complicated crossing of the Fishhook River. The alternative alignment would not allow for the use of an HDD (as proposed for the APR), and would therefore require additional wetland

2603-12
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Table 2 - Line 3 Replacement Project Draft Environmental Impact Statement Variations and Other Considerations Not Included in the Route Segment Alternatives Analysis	
Route Segment Alternative (RSA)	Variations and Other Considerations
	impacts to accommodate the workspace required to complete the crossing using an alternative method. • RSA-15 would increase impacts to farmers north of State Highway 87 that utilize center pivot irrigation systems by restricting these farmers from watering significant portions of their fields during construction. • Many portions of RSA-15 are placed in the middle of highways or county roads, as well as run underneath overhead power lines and next to a large substation. These are not constructible routes. Therefore, RSA-15 would need to be moved to either side of the highway, potentially placing the pipeline across driveways or possibly across homes or other structures, increasing impacts to landowners.
RSA-White Elk Lake	• RSA-White Elk Lake would cross 3.4 more miles of Hill River State Forest land than the APR. • RSA-White Elk Lake is routed adjacent to the Blind Lake Connector All-Terrain Vehicle (ATV) Trail for 2.0 miles; the APR would cross this trail once. Constructing adjacent to the trail would remove the trail from use during the construction season and would permanently remove trees from alongside the trail, effectively widening the trail and creating visual impacts on future trail users. • RSA-White Elk Lake introduces engineering constraints to the hydraulic operations of the pipeline because the western portion of the RSA traverses in the opposite direction of flow. This introduces additional stresses upon the pipeline, which would affect pipeline design and potentially operability and maintenance. • Enbridge has proposed an alternate RSA (RSA-Blandin) that is shorter, crosses less state forest land, reduces impact to the Blind Lake ATV trail, avoids hydraulic connectivity to White Elk Lake, and does not introduce pipeline operation concerns.
RSA-21	• The crossing of the Mississippi and the Willow Rivers would present significant construction challenges on RSA-21. While the APR also crosses both of these features, the length required to travel around the crossings at the locations along RSA-21 is greater than the proposed crossings on the APR. For RSA-21, the move around distance for crews at the Mississippi and Willow River crossings would be approximately 23 miles and 10 miles in length, respectively. With move around distances of this magnitude, a one-

2603-12
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Table 2 - Line 3 Replacement Project Draft Environmental Impact Statement Variations and Other Considerations Not Included in the Route Segment Alternatives Analysis	
Route Segment Alternative (RSA)	Variations and Other Considerations
	to two-day delay to each crew would occur, adding an additional two to three weeks to the overall construction schedule. Increasing the amount of time required to complete waterbody crossings would not align with best management practices outlined in Enbridge's EPP. • RSA-21 would require new easements for 182 parcels. A majority of these parcels are administered by the MDNR or are within the jurisdictional boundaries of state forests; the remainder of lands crossed is administered by Aitkin or Carlton County or are owned by private landowners.
RSA-22	• RSA-22 would cross 12.9 miles of the Fond du Lac Reservation; the APR does not cross it. Absent agreement from the Tribe, Enbridge is unable to secure land rights and/or other approvals necessary to construct and operate the pipeline across the Reservation. • RSA-22 would add two new Aquatic Management Area (AMA) crossings – the Clearwater River and Little Otter Creek AMAs. • RSA-22 would require new easements for 277 parcels. Approximately 20.1 miles of the 64.7-mile long RSA are administered by the MDNR (31.1 percent) and 30.2 miles are within the jurisdictional boundaries of state forests (46.7 percent); the remainder of lands crossed is administered by Aitkin or Carlton County, private landowners, or the Fond du Lac Reservation. • The purpose of this RSA is to avoid important habitat in the Big Sandy Lake watershed as well as Grayling Marsh Wildlife Management Area (WMA), McGregor WMA, Lawler WMA, and Salo Marsh WMA; the APR avoids two of the four WMAs noted: McGregor and Salo Marsh.
RSA-27	• The Soo Line Trail easement is approximately 100 feet wide. Installing pipelines requires space for spoil, the ditch, the pipe, and a travel lane for equipment, all adjacent to each other during the construction process. The idea of installing the pipe directly underneath the trail and not impacting the land outside of the trail easement is not realistic. To accomplish this, the trail would have to be completely cleared, graded down, and leveled off, which would not be feasible in the wetland areas that line the Soo Line Trail. Should the pipeline be placed immediately adjacent to the trail, only one side of the right-of-way would be usable and the trail in many areas would be permanently impacted via grading and/or cutting down of the trail. • As the trail was a former railroad grade, existing access from public roads is very limited. The need for access would result in several new permanent

2603-12
Cont'd

Table 2 - Line 3 Replacement Project Draft Environmental Impact Statement Variations and Other Considerations Not Included in the Route Segment Alternatives Analysis	
Route Segment Alternative (RSA)	Variations and Other Considerations
	access roads and adjacent landowner impacts. • RSA-27 would cross the town of McGregor and require new easements for 82 parcels. Additionally, RSA-27 contains 24 HCAs within the 750-foot-wide route width whereas the APR contains none. In nearly all locations along the RSA, the construction footprint would extend beyond the 100-foot-wide easement of the Soo Line Trail, creating impacts to new landowners.
RSA-28	• RSA-28 would cross the Keetac wetland mitigation site. Through landowner communication Enbridge confirmed the presence of a wetland mitigation site, where normally the purpose is to restore wetland habitat. Typically, wetland mitigation sites have either deed restrictions or conservations easements associated with them that prevent pipeline construction. The APR would completely avoid the wetland mitigation site.
RSA-33	• RSA-33 follows the edge of a property owned by a peat-farming operation. Depending on future plans of the peat farm owners, RSA-33 could impact the peat farming operation.
RSA-35	• RSA-35 would pose a more challenging crossing of State Highway 65 because a large waterbody on the east side of the highway would not accommodate a trenchless highway crossing technique. Open-cutting the highway would also be difficult to successfully complete given the water to the east of the highway and the apparent saturated conditions on the west. Safety risks would increase during construction due to working within a congested right-of-way in close proximity to a private residence.
RSA-42	• The route along RSA-42 was studied by Enbridge early in the routing process and, though portions of the route were promising, Enbridge engineers identified multiple areas of significant concern. For example, RSA-42 would be constructed adjacent to and parallel to the Moose Horn River for approximately 1.3 miles through an area of shallow bedrock and saturated wetlands, which would create difficult construction conditions because of anticipated soft soils in the river floodway. In addition, the crossings of the Moose Horn River are at a poor angle; construction would likely result in extensive disturbance to a large portion of the banks of the river and would make it difficult to achieve depth of cover. Typically, crossing of streams and rivers is held to as close to 90 degrees as possible to avoid this type of issue. • RSA-42 would cross Interstate 35 at an angle greater than 45 degrees, which can result in greater direct impacts to the roadway and a longer, more

2603-12
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Table 2 - Line 3 Replacement Project Draft Environmental Impact Statement Variations and Other Considerations Not Included in the Route Segment Alternatives Analysis	
Route Segment Alternative (RSA)	Variations and Other Considerations
	difficult crossing with higher risk of failure. Road crossings should be as close to 90 degrees as possible to minimize direct impacts to the feature being crossed. The APR allows for a preferable crossing angle at Interstate 35.
RSA-43	• RSA-43 has the same crossing of Interstate 35 as RSA-42 and, therefore, the same concerns. The crossing of Interstate 35 is at an angle greater than 45 degrees, which can result in greater direct impacts to the roadway and a longer, more difficult crossing with higher risk of failure. Road crossings should be as close to 90 degrees as possible to minimize direct impacts to the feature being crossed. The APR allows for a preferable crossing angle at Interstate 35. • There are no houses within 750 feet of the APR, but one house is directly crossed by the centerline of RSA-43.
RSA-45	• RSA-45 would require construction through an active gravel pit, presenting pipeline integrity concerns due to heavy equipment traffic and pit operation. Constructing in an active gravel pit would result in difficulties maintaining the depth of cover over the pipeline, as mandated by law, and potentially compromise the safety of the pipeline. • RSA-45 has the same crossing of Interstate 35 as RSA-42 and RSA-43, leading to the same crossing concerns. The crossing is at an angle greater than 45 degrees which can result in greater direct impacts to the roadway and a longer, more difficult crossing with higher risk of failure. Road crossings should be as close to 90 degrees as possible to minimize direct impacts to the feature being crossed. The APR allows for a preferable crossing angle at Interstate 35.
RSA-46	• Enbridge could not construct the RSA as proposed because of a radio tower with guy wires that extends through RSA-46.
RSA-51	• Enbridge has addressed the commenter's concerns that prompted this alternative. Enbridge has made route modifications to avoid the commenter's residence since the comment suggesting this RSA was submitted, and these modifications are reflected in the APR.
RSA-52	• Enbridge has addressed the commenter's concerns that prompted this alternative. Enbridge has made route modifications to avoid the commenter's residence since the comment suggesting this RSA was submitted, and these modifications are reflected in the APR.
RSA-53	• RSA-53 would only be viable in the event RA-07 or RA-08 were approved.

2603-12 Cont'd

Table 2 - Line 3 Replacement Project Draft Environmental Impact Statement Variations and Other Considerations Not Included in the Route Segment Alternatives Analysis	
Route Segment Alternative (RSA)	Variations and Other Considerations
	Absent agreement from the Leech Lake Band of Ojibwe, Enbridge is unable to secure land rights and/or other approvals necessary to construct and operate the pipeline across the Leech Lake Reservation. The Leech Lake Band of Ojibwe has previously filed comments with the Commission regarding constructing across the Reservation. See letters dated October 25, 2013, and January 2, 2017, in Schedule 6 of Mr. Eberth's Direct Testimony • RSA-53 would cross five canals/ditches, one of which is classified as a Minnesota PWI stream (the East Savanna River), which drains into the St. Louis River. • Because RSA-53 can only be accessed from RA-07 or RA-08 and would need to connect to RSA-21 or RSA-22, Enbridge notes that all the same human and environmental impacts and constructability constraints of those respective RAs and RSAs would still occur.

3.8 CHAPTER 8 – EXISTING LINE 3 ABANDONMENT AND REMOVAL

2603-13

3.8.1 PIPELINE REMOVAL IMPACTS

Mr. Barry Simonson's Direct Testimony filed on January 31, 2017, at lines 714-824, provides a detailed list of activities required to remove the pipeline. DOC-EERA may want to consider incorporating such activities into the FEIS to provide additional information on potential removal impacts.

For example, the DEIS states that soil material needed to fill the trench could be "recovered from areas directly adjacent to the pipeline right-of-way." However, Enbridge could not or would not recover fill material from areas adjacent to the pipeline right-of-way for many reasons, primarily because it would effectively reduce the depth of cover of the other active pipelines that share that right-of-way, increasing future risk of damage to those lines. Enbridge estimates that approximately 360,000 cubic yards of fill would need to be hauled in, resulting in over 55,000 one-way dump truck trips.[14] Similarly, the DEIS notes that sheet piling would be required to isolate areas of the pipeline from existing pipelines in the corridor, particularly in wetlands and wet soils; however, it may be worth noting that, due to the extensive need for

[14] Compare DEIS at 8-11 with Simonson Direct Testimony at ln. 803-806.

2603-13 Cont'd

these structures under a removal scenario, the amount of steel required for the sheet piling exceeds that used to make the replacement pipeline.[15]

In addition, where the DEIS discusses Environmental Justice impacts related to deactivation in place versus removal, it notes the potential negative effects on communities related to abandonment in place and the benefits of removal. However, it does not discuss that deactivation in place avoids the types of ground disturbing activities identified as potential impacts for construction of the replacement pipeline (despite the fact that ground related removal impacts are potentially greater); nor does the DEIS identify that removal increases the risk of strikes on adjacent lines, hence the likelihood of a release as compared to deactivation in place. Therefore, DOC-EERA may want to consider clarifying the fact that removal of pipe can have greater construction-related impacts on surrounding resources, including Environmental Justice.

3.8.2 CUMULATIVE IMPACTS OF REMOVAL PLUS CONSTRUCTION OF ALTERNATIVES OTHER THAN RA-07

2603-14

In addition to expanding the discussion regarding removal impacts, as described above, the FEIS could acknowledge the potential cumulative effects that would result if an alternative other than RA-07 were approved *and* the existing Line 3 were removed. As noted above and in Section 4.3.4.3 of the DEIS, removal of the pipeline is similar to, and results in a wider area of disturbance than, construction of a new or replacement pipeline. Thus, removal impacts would be cumulative to those for construction of the replacement pipeline, roughly doubling the overall impacts in most cases. Further discussion regarding the total area potentially disturbed by removal is included in Barry Simonson's Direct Testimony filed January 31, 2017, at lines 825-842.

3.8.3 CONTAMINATED SITES MANAGEMENT PLAN

2603-15

Section 8.3.1.1.1 of the DEIS discusses the potential for impacts from "past and present contamination outside of existing Line 3." As a threshold matter, no release, regardless of size, is acceptable to Enbridge. The primary driver for the Project is to replace the existing Line 3 pipeline with a modern pipe to improve the overall safety and reliability of the Enbridge Mainline System and to prevent issues before they occur. That said, Enbridge continues to safely operate Line 3 today, and carefully monitors the pipeline to prevent accidental releases. The term "anomaly" is not synonymous with "hole." Rather, "anomaly" is the technical term used to reference a number of pipeline characteristics, including physical objects, imperfections, and defects that must be closely evaluated, monitored, and in some cases repaired, to ensure they do not result in accidental releases from the pipeline in the future.[16] Enbridge screens for contaminated soils at integrity dig locations following its standard protocol

[15] Compare DEIS at 8-12 with Simonson Direct Testimony at ln. 765-772.

[16] *See, e.g.,* Kennett Direct at ln. 109-111.

2603-15 Cont'd

contained in the MLP Due Diligence Process for Screening Pipeline Maintenance Locations for Possible Contamination included as Attachment D.

As noted in Section 8.3.1.1.1, Enbridge will use a Contaminated Sites Management Plan to address any contaminated soils discovered during construction of the Project and deactivation of existing Line 3.[17] Attachment E provides Enbridge's Contaminated Sites Management Contractor Plan – Wisconsin – Segment 18 Project, the Wisconsin portion of the Line 3 Replacement Program currently under construction. As described in this plan, if contaminated soils are discovered, Enbridge will take the necessary steps to clean up and remediate these areas. Specific plans in Minnesota will be developed for construction and deactivation, as parts of the plans are based on site specific conditions.

3.8.4 SUBSIDENCE

2603-16

Section 8.3.1.3 of the DEIS discusses the potential for impacts from subsidence, and in several places characterizes potential impacts from subsidence as "significant."[18] As summarized on pages 53-59 of Appendix B of the DEIS, Enbridge has engaged in extensive engineering analysis to assess this risk and has developed mitigation measures to minimize risks associated with potential subsidence. Further discussion or cross reference to this material could be added to the FEIS to further describe the magnitude of potential impacts in light of the planned mitigation.

3.9 CHAPTER 9 – TRIBAL RESOURCES

3.9.1 METHODOLOGY

2603-17

Chapter 9 states that "[t]he goal of this chapter is to provide an alternative, qualitative measure of the impact of [the Project] on American Indians." Within the DEIS, a qualitative discussion is useful to provide additional context to the quantitative analysis found elsewhere in the DEIS, and Enbridge appreciates that DOC-EERA has made extensive efforts to both gather and respond to input from Indian tribes.[19] Enbridge provides these comments regarding the chapter's methodology to ensure the FEIS also reflects the applicable regulatory framework and consistently describes and integrates the resource analyses found elsewhere in the DEIS. Here, Enbridge suggests instances where the broader policy discussion in the DEIS can be paired with Project or alternative-specific analysis, as well.

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[17] *See, also*, Simonson Direct at ln. 871-877.

[18] *See., e.g.,* DEIS at 8-8 and 8-9.

[19] The terminology used in this chapter varies, and Enbridge uses this phrase for consistency with federal regulations. *See* 36 C.F.R. pt. 800.

2603-18

3.9.1.1 Certificate of Need Alternatives Analysis

Enbridge notes that Chapter 9 does not include an analysis of the alternatives considered in Chapter 5, including SA-04. SA-04 traverses a different geographic region than the APR, RAs, and RSAs, and would thus potentially result in impacts on different communities and resources. Enbridge recommends that the FEIS include an analysis of the publicly-available data regarding SA-04 and the other alternatives identified in Chapter 5 and include further explanation, consistent with Minn. R. 4410.2500, as to why additional data was not gathered.

3.9.1.2 Citation of Sources

2603-19

Chapter 9 "employs a methodology that frames the discussion to reflect American Indian perceptions of the environment and the impacts associated with constructing a pipeline through an area of traditional, cultural, spiritual, and natural resource significance."[20] Enbridge appreciates DOC-EERA's efforts to gather this information and these perspectives and proposes some clarifications to make the sources and perspectives included in this chapter more transparent to a reader.

There are many statements in this chapter that are not attributed to a source. As a result, it is not clear whether those statements represent the views or perspectives of Indian tribal governments, individual tribal members, or DOC-EERA. Enbridge understands that some of the statements in this chapter may be from the interviews conducted by DOC-EERA to obtain Indian tribes' traditional knowledge. To the extent any statements are from these interviews, they should be quoted, and a reference to the interview should be added. If a statement in this chapter is not from an interview, a citation to that source should be added, as well.

In addition, DOC-EERA may wish to consider whether the written references used for this chapter are reliable, relevant, and accurately referenced. For example:

- This chapter relies heavily upon a report prepared at the direction of Honor the Earth, a party to these proceedings opposed to the Project, titled *Geographic Information System (GIS) Mapping Analysis of Potential Community Vulnerabilities: The Proposed Sandpiper Pipeline in Northern Minnesota* (the TASC Report).[21] This is problematic for multiple reasons: (1) the TASC Report purports to study the Sandpiper Pipeline Project, not

[20] DEIS at 9-1.

[21] DEIS at 9-31. This chapter frequently speaks of "American Indian" or "Native American" perspectives, cultures, or worldview. In these instances, it is unclear whether the chapter is referring to American Indians in general or specifically to the Indian tribes in Minnesota. It would be helpful for this chapter to make this distinction.

2603-19 Cont'd

this Project;[22] (2) the methodology and sources used to prepare the TASC Report have not been provided, and it appears that at least the source data provided to its preparers is not accurate and up-to-date;[23] and (3) Honor the Earth has not provided any specific information concerning the sites or locations the TASC Report states that Honor the Earth had identified, despite requests to do so.[24] The TASC Report may be helpful in identifying resource types of concern, but given these issues, it should not be relied upon for specific legal or factual statements concerning the Project. Alternatively, if the TASC Report is the only source available to support a statement, the FEIS could so indicate.

- The chapter references the Great Lakes Indian Fish & Wildlife Commission's (GLIFWC) *Treaty Hunting Regulation Summary 1837 and 1842 Ceded Territories of Michigan, Wisconsin and Minnesota* for support for the statement that "[t]raditional terrestrial game and waterfowl hunting grounds are habitat for a variety of subsistence resources. . . ."[25] However, the chapter does not acknowledge that this GLIFWC publication contains specific information concerning the scope of treaty hunting regulations in Minnesota, nor is this specific information incorporated into the chapter.[26]

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[22] *See* Attachment F (Honor the Earth Responses to Enbridge Information Requests) at No. 1(b) ("[T]his report was developed with information relating only to Sandpiper pipeline the addition of Line 3 and the use of Line 3 in this corridor should not be assumed to be the same as that of the Sandpiper pipeline.").

[23] *See* Attachment F (Honor the Earth Responses to Enbridge Information Requests) at No. 1(c).

[24] *See* Attachment F (Honor the Earth Responses to Enbridge Information Requests) at No. 1(b) ("Please be aware that any information related to tribally important sites will not be released to you due in part to the fact that at Standing Rock Reservation when sites were identified, that the next day they were bulldozed and destroyed. Should Enbridge want access to this information the tribe would require Enbridge secure a bond of $500,000.00 to $1,000,000.00 per site to insure a similar action does not occur with these important sites."). Despite Honor the Earth's response, however, MLBO did provide information in response to similar information requests. *See* Section 3.9.2.5 herein.

[25] DEIS at 9-21.

[26] *See* GLIFWC, *Treaty Hunting Regulation Summary 1837 and 1842 Ceded Territories of Michigan, Wisconsin and Minnesota* (explaining rules for hunting on private lands in 1837 and 1842 Ceded Territories).

2603-19 Cont'd

- The DEIS does not explain how Figures 9-1 and 9-2 were developed, nor does it provide references.

3.9.1.3 Analysis of Alternatives

2603-20

This chapter's analysis of alternatives is sufficient, but Enbridge suggests that, consistent with analyses of other resources studied in the DEIS, this chapter include additional information about tribal resources along each alternative. Although this chapter states that it is "not possible to determine which alternative is better when each alternative affects tribal resources, tribal identity, and tribal health,"[27] that type of statement does not accurately reflect the rest of this chapter or the DEIS. Enbridge first notes that the quoted statement is not consistent with the following summary in this chapter:

> The Applicant's preferred route and RA-03AM would not cross reservation lands; however, they would cross ceded lands on which tribes exercise their treaty rights to access tribal resources. The other route alternatives (RA-06, RA-07, and RA-08) cross reservations, as well as ceded lands. Overall, route alternatives RA-07 and RA-08 would have the greatest impact on tribal resources, as they cross two reservations and various ceded lands. RA-06 could also have some minor to major impacts on tribal resources within the Fond du Lac reservation.
>
> The two routes that would have the fewest impacts on tribal resources would be RA-03AM and the Applicant's preferred route, as neither crosses reservation land. Direct impacts from construction could occur on tribal resources; however, most of these are considered temporary to short term and minor. Indirect impacts could occur on tribal members from temporary restrictions during construction of the Applicant's preferred route on non-reservation lands used by the tribe for hunting, fishing, or farming operations.[28]

Further, the DEIS as a whole already contains analysis of the resources discussed generally in this chapter, and this chapter should be consistent with that analysis.[29]

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[27] DEIS at 9-28. This statement seems to have been drawn primarily from unsourced statements.

[28] DEIS at 9-26 – 9-27.

[29] *See* Section 3.9.3.1 herein.

2603-21

3.9.1.4 ROI and Specific Resources

This chapter states that, "[f]or the purposes of this chapter, the concept of region of interest does not apply. To use an artificial distance from the center of a pipeline route alternative is antithetical to understanding tribal concepts of resource importance and use."[30] Enbridge understands that this assertion is consistent with the chapter's qualitative focus. However, DOC-EERA may want to consider also including the identification of an ROI in the FEIS. Also, it appears that the focus of the analysis includes only Minnesota, with a particular focus on northern Minnesota. Understanding the areas that are not included in the analysis is also important context for readers. Likewise, this chapter does not appear to identify any particular locations of traditional land uses or other specific geographic areas of concern. To the extent such information was not provided to DOC-EERA through its tribal consultations and public comment, Enbridge believes that DOC-EERA may want to clarify that for readers. In so doing, DOC-EERA should apply the criteria in Minn. R. 4410.2500 for addressing certain incomplete or unavailable information in an environmental impact statement and include the information required by applicable rules.[31]

3.9.2 AVOIDANCE

2603-22

To provide a more complete picture to the Commission and the public, additional information should be added to acknowledge the ways that the Project has been designed, routed, and modified to avoid impacts to the resources generally discussed in this chapter.

3.9.2.1 Initial Routing

This chapter could acknowledge that the APR was initially routed to avoid impacts to the Leech Lake Reservation and Fond du Lac Reservation. Enbridge notes that LLBO has informed the Commission that the Commission does not have the authority to route the Project across the Leech Lake Reservation.[32] However, this chapter does not sufficiently acknowledge LLBO's statements. Additional routing efforts to avoid impacts to natural resources are described in

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[30] DEIS at 9-11.

[31] Minn. R. 4410.2500. In addition, this chapter does not define the term "tribal resources," other than to state these are ". . . resources important to American tribes." DEIS at 9-12. However, this chapter's qualitative analysis does not use this phrase consistently. Further, the text refers to resources on reservation lands; at other times, it refers to resources on ceded lands but does not indicate whether these lands are private or public.

[32] *See* Letter from Levi Brown to Daniel Wolf (Jan. 1, 2017); Letter from Steven Howard to Tracy Smetana (Oct. 25, 2013) (noting that a route through the Leech Lake Reservation is a "legal impossibility").

2603-22 Cont'd

more detail in the Route Permit Application and in Mr. Paul Eberth's Direct Testimony filed January 31, 2017.[33]

3.9.2.2 RSA-05

2603-23

The FEIS should also clarify that Enbridge has requested that the Commission approve RSA-05. Enbridge proposed this route segment alternative to avoid crossing lands within the boundaries of the Eastern Wild Rice Watershed and remove any hydrologic connection to Lower Rice Lake. WEBO has stated that Lower Rice Lake is an important wild rice lake for tribal members and is located within that watershed.[34] Including this information would serve as a useful example that, where specific concerns are identified and shared with state regulators or Enbridge, further avoidance and mitigation measures can be employed.

3.9.2.3 Surveys

2603-24

This chapter already has some discussion of Project surveys. DOC-EERA may also consider providing additional context concerning the archaeological resource surveys conducted for the Project, as well as an explanation of the purpose and methodology of those surveys.[35] Specifically, since 2013, Enbridge has been engaged in archaeological and historic above ground resource inventories, as well as National Register of Historic Places (NRHP) eligibility evaluations, where construction activities related to the Project will occur. Inventory has taken place within the environmental survey corridor per Minnesota State Historic Preservation Office (SHPO) guidelines and, where appropriate, additional investigation was completed in locations adjacent to the environmental survey corridor so that Enbridge could modify workspace requirements to avoid impacts to eligible or not-evaluated archaeological sites or historic structures.

These studies have been conducted in a manner consistent with cultural resources best practices, while also recognizing pending state and federal regulatory actions. Enbridge submitted Project documentation for technical review to the SHPO. Enbridge further shared Project survey reports with the SHPO, DOC-EERA, and the COE. Enbridge incorporated the results of the SHPO review to help guide further investigations ahead of state and federal regulatory action, as well as to avoid potential impacts to historic properties during project planning and construction.[36]

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[33] *See* Pipeline Routing Permit Application at Chapter 6.0; Direct Testimony of Paul Eberth at ln. 675-738.

[34] Direct Testimony of Barry Simonson, Schedule 7 at 49 of 197.

[35] *See* DEIS at §§ 5.4 and 6.4.

[36] The APR avoids impacting the NRHP-eligible history properties identified by Enbridge in its surveys. Additional information concerning these surveys and their results was provided by Enbridge in the Direct Testimony of Dr. Christopher Bergman filed on January 31, 2017.

2603-25

3.9.2.4 U.S. Army Corps of Engineers Section 106 Tribal Consultation Process

To provide the Commission and the public with a more complete picture of the consultation that has occurred for the Project, the FEIS could acknowledge that the COE has a lengthy and ongoing tribal consultation process pursuant to its responsibilities under Section 106 of the National Historic Preservation Act.

2603-26

3.9.2.5 Information Requests

Finally, Enbridge understands that, as this chapter recognizes, Indian tribes have special knowledge and expertise in identifying and evaluating resources of traditional religious and cultural importance. Recognizing this, and as recommended by the TASC Report,[37] in December 2016, Enbridge reached out to WEBO, MLBO, and Honor the Earth for further information regarding specific locations of traditional land uses.[38] Because of the sensitivity of this information, Enbridge noted that the information may be subject to the governing Protective Orders. Honor the Earth refused to provide any specific information in response to the requests; WEBO has yet to respond. MLBO provided GIS data in response to the requests. Enbridge specifically requested agreements, whether oral or written, allowing tribal members to hunt, fish, rice, gather, or conduct other traditional practices on properties outside the boundaries of the applicable Reservation.[39] To date, Enbridge has not received any information or documents concerning this request.

3.9.3 IMPACTS

2603-27

3.9.3.1 Consistency with Rest of DEIS

Enbridge understands that this chapter provides a qualitative discussion and appreciates DOC-EERA's effort to provide this context. However, MEPA's goal is to provide "a thorough but succinct discussion of potentially significant adverse or beneficial effects."[40] To the extent that this chapter identifies and discusses impacts to specific resources, Enbridge suggests the following improvements to acknowledge that the DEIS already includes a consideration of the resources generally discussed in this chapter. Specifically, it may be useful for this chapter to

[37] TASC Report at 11-12.

[38] Similar requests to FDL are currently outstanding.

[39] *See* Attachment F (Enbridge Information Request to WEBO) at No. 6; *id.* (Enbridge Information Request to MLBO) at No. 7.

[40] Minn. R. 4410.2300(H).

include a table with cross-references to where resource-specific discussions are found elsewhere in the DEIS:[41] 2603-27 Cont'd

Resource/Issue	Chapter 5	Chapter 6
Water	5.2.1 – Water Resources	6.3.1 – Water Resources
Hunting	5.2.4 – Fish and Wildlife 5.3.2 – Recreation and Tourism	6.3.4 – Fish and Wildlife 6.5.2 – Recreation and Tourism
Fishing	5.2.4 – Fish and Wildlife 5.3.2 – Recreation and Tourism	6.3.4 – Fish and Wildlife 6.5.2 – Recreation and Tourism
Wild Rice	5.2.1.2 – Surface Water	6.3.1.2 – Surface Water
Spiritual Practices	Chapter 5 does not reference spiritual practices. To the extent additional information was provided to DOC-EERA, it should be included. If additional information was not provided, DOC-EERA should state so.	6.2.3.3.2 (with respect to RA-06, RA-07, and RA-08)
Medicinal & Traditional Plants & Food	5.2.3 – Vegetation	6.3.3 – Vegetation
Health	5.2.1.1 – Groundwater 5.2.7 – Air Quality	6.2.5 – Transportation and Public Services 6.3.1.1 – Groundwater 6.3.7 – Air Quality
Birds	5.2.4 – Fish and Wildlife 5.3.2 – Recreation and Tourism	6.3.4 – Fish and Wildlife 6.5.2 – Recreation and Tourism
Land Ownership	5.2.6 – Public Lands	6.3.6 – Public Lands
Invasive Species	5.2.3 – Vegetation	6.3.3 – Vegetation
Climate Change	5.2.7 – Air Quality	6.3.7 – Air Quality
Archaeological & Historic Resources	5.4 – Cultural Resources	6.4 – Cultural Resources

Further, for ease of reference for the public and the Commission, Enbridge suggests that this chapter include a reference to Chapter 7 of the Assessment of Accidental Releases: Technical 2603-28

[41] In addition, Chapter 7 of the DEIS has further resource-specific analyses with respect to the RSAs.

2603-28 Cont'd

Report[42] (AAR), which includes a discussion of the potential impacts of an oil release on the resources generally discussed in this chapter. For example, the following table contains cross-references between the resources generally discussed in this chapter and the resources discussed in Chapter 7 of the AAR:

Resource/Issue	AAR Section(s)
Water	7.1.2.2 – Groundwater 7.1.2.3 – Lakes 7.1.2.4 – Rivers 7.1.2.6 – Shoreline and Riparian Bank 7.1.2.7 – Wetlands
Hunting	7.1.3.7 – Semi-Aquatic Mammals
Fishing	7.1.3.3 – Fish
Wild Rice	7.1.2.7.1.3 – Marshes 7.1.3.4 – Aquatic Plants 7.1.4.2 – Land Resource Use
Medicinal & Traditional Plants & Food	7.1.3.1 – Terrestrial Vegetation
Health	7.1.2.1 – Air/Atmosphere 7.1.4.1 – Human Health
Birds	7.1.3.6 – Birds
Land Use	7.1.2.8 – Soils 7.1.4.2 – Land Resource Use

2603-29

Further, Chapter 7 of the AAR contains a specific and detailed analysis of the potential environmental impacts on a variety of resources (including many of those resources discussed in this chapter) from releases at seven representative locations. Summaries of the analysis are included in Tables 7-50 (Environmental Effects Summary Table for Pipeline Crude Oil Releases to Mosquito Creek), 7-56 (Environmental Effects Summary Table for Pipeline Crude Oil Releases to the Mississippi River at Ball Club), 7-62 (Environmental Effects Summary Table for Pipeline Crude Oil Releases to Sandy River), 7-68 (Environmental Effects Summary Table for Pipeline Crude Oil Releases to Shell River), 7-74 (Environmental Effects Summary Table for Pipeline Crude Oil Releases to the Red River), 7-80 (Environmental Effects Summary Table for Pipeline Crude Oil Releases to the Mississippi River at Palisade), and 7-86 (Environmental Effects Summary Table for Pipeline Crude Oil Releases to the Mississippi River at Little Falls).

2603-30

As discussed further in Section 3.3 of the AAR, these seven representative sites were selected in coordination with DOC-EERA, MDNR, MPCA, Minnesota Department of Agriculture, Cardno Entrix, the COE, Enbridge, Stantec, Dynamic Risk, and RPS to inform decision-makers about the

[42] Stantec Environmental Services, Inc., RPS/ASA, and Dynamic Risk Assessment Systems, Inc. *Assessment of Accidental Releases: Technical Report, Line 3 Replacement Project* (Jan. 13, 2017), *available at* https://mn.gov/commerce/energyfacilities/line3/.

2603-30 Cont'd

potential effects in certain environments. The cross-reference table (Table 3-3) in Section 3.3.5 of the AAR allows readers to find specific waterbody crossings of interest and determine which of the seven representative modeled locations best matches the area of interest. Accordingly, this table can be used to identify potential impacts for particular waterbodies that are of interest to tribes.

The FEIS should also identify and briefly discuss any major differences of opinion concerning the Project's significant impacts on the environment.[43] To the extent that some of the impacts discussed in this chapter are inconsistent with the discussion of impacts elsewhere in the DEIS, those discussions may qualify as major differences of opinion and could be identified as such.

3.9.3.2 Context Concerning Ceded Territories and Treaty Rights

2603-31

Section 9.2.3 contains a broad overview of "treaties and reserved rights."[44] It includes a general description of ceded lands in Minnesota and the 1837 and 1854 treaties, the 1855 treaty, and the 1863 treaty. There are selected quotations from one or more treaties that appear to be helpful in providing historic context. However, Enbridge also believes that these quotations may not be sufficiently detailed or comprehensive to understand the important differences among treaties related to potential usufructuary rights. For example, while all of these are treaties of cession, not all of the cited treaties may reserve the right to hunt, fish, or gather on the ceded lands. These differences may be significant for this chapter; to the extent the treaties do or do not provide for usufructuary rights, the tribal interests will differ.[45] For additional context, the FEIS could also include a clarification that 80% of the tracts crossed by the APR are privately-owned and that 94% of those private landowners have granted voluntary

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[43] Minn. R. 4410.2300 (H).

[44] DEIS at 9-6-9-9. As WEBO has previously noted, determinations concerning the scope of treaty rights in northern Minnesota are not within the Commission's jurisdiction. *E.g.*, White Earth Band of Ojibwe's Reply to Applicant's Response in Opposition Dated September 3, 2015, *In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota*, MPUC Docket No. PL-6668/CN-13-473 (Sept. 9, 2015) at 2 ("If an adjudication of an issue regarding the 1855 Treaty is necessary, only those entities and institutions with the jurisdictional authority to make that determination may do so – namely, the parties to the Treaty and the Federal Courts.").

[45] Enbridge also notes that the DEIS states that "[t]reaty-reserved hunting, fishing, and gathering rights on off-reservation lands are akin to easements running with the burdened lands, and include easements to access hunting, fishing, and gathering sites." DEIS at 9-6. Enbridge disagrees with this analogy. *See* GLIFWC, *Treaty Hunting Regulation Summary* quoted in footnote 46, *infra*.

2603-31 Cont'd

easements for the Project.[46] Similarly, this chapter could provide additional context concerning the scope of the Project in comparison to the cited treaty areas. For example, according to the 1854 Treaty Authority, the 1854 Treaty area encompasses approximately 5.5 million acres; the permanent right-of-way within the APR (including access roads) will consist of less than 700 of those acres.[47]

3.9.4 MITIGATION

2603-32

The mitigation discussion in Chapter 9 should be updated for consistency internally and with the rest of the DEIS. For example, the statement that "any route, route segment, or system alternative would have a long-term detrimental effect on tribal members and tribal resources"[48] is not consistent with the statement that "[d]irect impacts from construction could occur on tribal resources; however, most of these are considered temporary to short term and minor. Indirect impacts could occur on tribal members from temporary restrictions during construction. . . ."[49] Again, to the extent that this may qualify as a major difference of opinion between Indian tribes or tribal members and DOC-EERA, or is derived from comments that reflect such a difference of opinion, it could be identified as such.

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[46] *See* GLIFWC, *Treaty Hunting Regulation Summary 1837 and 1842 Ceded Territories of Michigan, Wisconsin and Minnesota* (explaining rules for hunting on private lands in 1837 and 1842 Ceded Territories):

> You may hunt only on private lands that are enrolled in Minnesota's tree growth tax program or in Wisconsin's forest cropland/managed forest tax law program. Note:
>
> 1. These are the only private lands where you may hunt under your Band's treaty regulations. Landowner consent regarding other private lands does not change this.
>
> 2. You should avoid trespassing on private lands even if you are attempting to retrieve animals that you first shot on public land or on other private land where you may hunt.
>
> 3. State authorities might prosecute you in state court if you are trespassing or if you are hunting on any other private land without a state license. State prosecution will not prevent prosecution in tribal court under your Band's regulations.

See also Direct Testimony of John McKay at ln. 113, filed on January 31, 2017.

[47] *E.g.*, 1854 Treaty Authority, *The Right to Hunt and Fish Therein: Understanding Chippewa Treaty Rights in Minnesota's 1854 Ceded Territory* (2017) at 5, *available at* http://www.1854treatyauthority.org/images/The-Right-to-Hunt-and-Fish-Therein.final.pdf.

[48] DEIS at 9-28.

[49] DEIS at 9-26 – 9-27.

2603-33

Further, the assertion that impacts "are difficult, if not impossible, to mitigate,"[50] is not consistent with this chapter's references. For example, Section 9.5.4 states that "[m]itigation of impacts due to construction and operation are detailed in Chapter 6 and represent the measures Enbridge proposes."[51] Similarly, as with its discussion of impacts, this chapter should more comprehensively acknowledge the mitigation measures identified elsewhere in the DEIS. Alternatively, DOC-EERA should indicate how it envisions identifying appropriate mitigation prior to or during construction.

2603-34

In addition, to provide additional context, it may be helpful to provide the Commission and the public with examples of other infrastructure projects in northern Minnesota. For example, this chapter includes a reference to the Bemidji-Grand Rapids 230 kV Transmission Line Project's FEIS, but does not include any context around that project or the impacts and mitigation measures identified in its FEIS related to the resources discussed in this chapter. Such context might be useful for the public and the Commission.

2603-35

Similarly, this chapter does not acknowledge that the Enbridge Mainline System currently operates in the area of RA-07 and RA-08, with the most recent pipeline in this corridor being constructed in 2009 following a federal environmental impact statement. The Project will cross many of these same environments and resources, and much of that area is previously disturbed. To the extent DOC-EERA was provided with specific information concerning impacts of that ongoing operation on the resources generally discussed in this chapter, that information should be identified; if no such information was provided, that should also be noted. Further, Enbridge notes that it successfully installed the approximately 600-mile Flanagan South Pipeline between 2012 and 2014, which in part crossed a culturally-rich area of Oklahoma; this project benefited from coordination with over 20 Indian tribes, three of which were local to the pipeline corridor, that would have potentially been affected by that project.

3.10 CHAPTER 10 – ACCIDENTAL CRUDE OIL RELEASES

3.10.1 INTRODUCTORY COMMENTS

Chapter 10 of the DEIS contains a large amount of detailed information on crude oil releases and a comparative analysis of the likelihood of releases among alternatives to the project (e.g., rail or truck transport), as well as the APR and alternative routes. It also provides a comparative analysis of environmentally sensitive areas in proximity to the APR and alternatives, as well as downstream on watercourses along the APR and alternate routes. Two supplementary reports – the AAR and the Line 3 Replacement Project: Assessment of Potential Pinhole Release, Stantec and Barr Engineering 2017 (Pinhole Report) – were also incorporated in the DEIS by reference.

[50] DEIS at 9-27.

[51] DEIS at 9-26.

Enbridge thinks that all of the FSDD's required elements of the assessment of accidental crude oil releases have been addressed by a combination of the DEIS, the AAR, and the Pinhole Report. The AAR for spills addresses:

- the approach used to assess the potential risk (considering both likelihood and consequence) of a large volume release of crude oil, including the selection of seven representative sites along the APR and RAs for detailed analyses of release likelihood and environmental effects;
- an analysis of potential hazards to pipeline integrity;
- site-specific estimates of the likelihood of a large volume release of oil at each of the seven representative sites;
- descriptions of the fate (i.e., behavior) of crude oil when released in the environment;
- predictive modeling of the trajectory (i.e., movement) and fate of a large volume release of crude oil at each representative site for a range of oil types, and over three different seasons, to provide an anticipated range of movement and behavior;
- an analysis (quantification) of the potential for a large volume release of crude oil at each representative site to affect HCAs, environmentally sensitive areas, and other areas of interest;
- a discussion on the potential environmental effects of crude oil exposure for a range of ecological and human receptors, as well as an analysis of the potential environmental effects at each of the seven representative locations; and
- a discussion on the potential for ecological and human receptors to recover from exposure to crude oil.

The Pinhole Report describes the potential for a pinhole release to occur, the characteristics of the release, and the potential consequences that may occur. Specifically, the report provides:

- an assessment of the potential characteristics of pinhole releases, including anticipated frequency, potential causes, size, rate of release, maximum release volume, and likely detection methods;
- the fate and transport of released hydrocarbons in the environment from a pinhole leak (e.g., factors affecting migration, movement in the unsaturated zone, movement in the saturated zone, and fate and transport of dissolved hydrocarbons in groundwater);
- an assessment of susceptibility of groundwater based upon the typical hydrogeologic regimes that will be traversed by the Project; and
- the ability of groundwater to recover from the effects of release, including an understanding of how emergency response, remediation, cleanup, natural processes, and restoration can promote recovery.

Enbridge offers the following additional information for DOC-EERA's consideration.

2603-36

3.10.2 THE RELATIONSHIP BETWEEN THE DEIS, THE AAR, AND PINHOLE REPORT

The body of the DEIS often summarizes and/or paraphrases information, data, or text found in the AAR document, or at least appears to do so, without attribution to a specific location within the source document. For example, the DEIS states that "[a]gency staff and the consultants selected seven sites for in-depth analysis based on (1) their distribution across the Applicant's preferred route and route alternatives, and (2) how well they represented the diversity of characteristics that were identified as significant during public scoping."[52] While this sentence is true, it does not provide readers with a complete understanding of the substantial, collaborative efforts undertaken to identify, screen, and finally select the seven representative sites from many possible locations. The AAR provides substantial details, through text, graphics, and tables, about the approach to the assessment, the types of issues that DOC-EERA and others wanted addressed via the modeling, and the framework used to screen potential modeling sites. Enbridge thus recommends incorporating citations to the appropriate and specific portion(s) of the AAR and the Pinhole Report, or by paraphrasing or summarizing portions of the AAR or Pinhole Report in Chapter 10 where they are presently used as the source document, in order to provide a more complete understanding of the work that was done, the results, and/or the conclusions. Enbridge also recommends noting that the site selection criteria used in the AAR (Chapter 3) involved both engineering and environmental and socio-economic considerations, so that the representative sites selected for study would:

- be located so that the modeled release could enter a watercourse, either directly or by traveling over land to the water;
- be located where shut-off valves would not overly restrict the volume of crude oil that could be released;
- include sites along the APR and the alternatives;
- be representative of the geographic and environmental conditions and land uses along the APR to facilitate evaluation of the range of potential human and environmental impacts;
- include a range of watercourse types (e.g., size, flow, energy level) and waterbodies, including wetlands;
- support evaluation of potential effects to environmentally sensitive resources (e.g., spawning grounds for fish, wild rice lakes, or other sensitive habitats);
- represent areas of expressed concern by Native American tribes, the general public, and/or state and federal agencies; and
- support evaluation of potential effects to traditional use, other human use, or infrastructure (e.g., potable water intakes or treatment facilities).

[52] DEIS at 10-9.

2603-36 Cont'd

Furthermore, it should be noted that the site selection process:

- purposely focused on the possibility of large volume releases of crude oil into water, as opposed to releases on land, as a conservative choice with respect to the trajectory, fate, and potential effects of released oil. Specifically, crude oil releases on land often result in only small areas of land (i.e., a few acres) becoming affected by released oil, whereas releases to water can travel longer distances and potentially affect a broader range of environmental and human receptors;
- looked at every water crossing along the APR or the RAs (nearly 1,000 locations) as potential study locations;
- considered input and comments from regulatory agencies and public comments;
- initially identified a total of 27 candidate sites for modeling;
- then involved further analysis of the candidate sites based on their attributes, including location, geomorphology, ecological land classification, location of sensitive resources or habitats, watercourse characteristics, and potential human uses; and
- resulted in a well-reasoned, well-studied conclusion that the seven representative locations for detailed modeling were appropriate to capture the range of geographic and environmental conditions that may be present along the APR and alternatives throughout the State of Minnesota.

3.10.3 THE POTENTIAL TRAJECTORY, FATE, AND EFFECTS OF AN ACCIDENTAL RELEASE OF OIL

No two releases of oil are the same with respect to crude oil trajectories, fates, and environmental effects, which is why modeling is an important and valuable tool for guiding regulatory and public consideration. With respect to the modeling that was done pursuant to the FSDD, there are two points that could be clarified in the body of the FEIS to promote a common understanding of the work that was done:

> (1) modeling the variety of scenarios that were conducted in the AAR (multiple release locations, volumes of oil, oil types, and seasonal conditions), as well as additional analyses done for the DEIS, provides insight as to the range of potential trajectory, behavior, ultimate fate, and potential environmental effects that could follow a release; and
>
> (2) the fates processes must be correctly defined and discussed throughout the FEIS to foster a sound understanding of these matters by all parties.

The AAR provides information that could be used to make the clarifications.

2603-37

First, Section 3.0 of the AAR, entitled *Framing the Site Selection Process and Modeling*, provides information on why modeling was done, and the questions that modeling was intended to address. It also describes why certain modeling tools were chosen; how representative modeling sites were selected for modeling (e.g., consideration of many potential locations for

2603-37 Cont'd

modeling and use of a set of criteria to select the final representative sites); and how the findings from each of these modeling sites can be applied to other similar locales (based on consideration of topography, land use, and watercourse types). The section also discusses the many parties (including agencies and the public) and interests that were involved in making the decisions that were then carried forward in the modeling and effects assessment.

2603-38

Second, Section 5.0 of the AAR, titled *Modeling of Oil Releases*, provides an overview of the crude oil release modeling done pursuant to the FSDD. Section 5.1 describes the modeling tools and how they were used. Additional information on releases, specifically, the processes at work in the event of a release, is set forth in Sections 5.1.2.1 and 5.1.2.2. These processes are scientifically well understood and provide a common basis for considering the trajectory, fate, and potential effects of an accidental release in light of the variability that may be present in any given release scenario.

3.10.4 SPECIFIC POINTS OF CLARIFICATION

2603-39

3.10.4.1 Trajectory and Fate Processes

In the event that crude oil is released into the environment, it is physically and chemically altered over time through various processes, including, but not limited to dissolution, emulsification, evaporation and volatilization, photo-degradation, microbial-degradation, and other fates processes, which include "degradation and weathering." These processes are described beginning at page 5.139 of the AAR.

In addition, DOC-EERA may want to consider clarifying the trajectory and fate processes discussed in the DEIS consistent with the following:[53]

- ***Dispersion*** - Dispersion is the process by which turbulence ("sub-scale" currents that mix oil in three dimensions) spreads oil components on the surface and within the water column. Entrainment is the process by which waves break over surface oil and carry oil droplets within the water column. Adhesion, which the text describes as a method of dispersion, is actually the opposite of dispersion. Dispersion spreads things out further, whereas adhesion will keep things in an area as they bind to surfaces and/or drop out of the water column.

- ***Dissolution*** - Dissolution occurs not only when water-soluble components dissolve from a surface slick, but also as a result of entrainment.

- ***Emulsification*** - The description of emulsification accurately says that "[e]mulsions are not prone to other types of weathering. . . ." It would be helpful to add that at the time

[53] AAR, at 5.140.

2603-39 Cont'd

of the mousse formation, they have already weathered to a point that they are in their more persistent state.

- ***Photodegradation*** - The description of photodegradation indicates that the process only affects lighter hydrocarbons and lighter crude oils. However, all hydrocarbons in floating oil are degraded by photodegradation. During this process, they become more soluble.

These changes should be incorporated in the FEIS where these fate process terms are used or described (e.g., DEIS at 10-37, n. 22-23).

3.10.4.2 The Range of Crude Oil Proposed to be Transported in the Pipeline

2603-40

The physical and chemical properties of the crude oil are the primary influences in determining how a release spreads, how long it lasts in the environment, and what the potential effects may be.

The FEIS should accurately identify that Project will carry many different blends of crude oil, not simply "light crude oil" and "heavy crude oil." While those classifications are helpful in understanding the bookends of what may travel through the pipeline, only identifying those classifications may lead to misunderstanding of the fate processes discussed in Section 10 and more fully discussed in the AAR. The FEIS should also accurately and fully convey, at least at a general level, that not only do the physiochemical properties of light crude oil and heavy crude oil differ, but also that the properties are different among different light crude oils and different heavy crude oils.

Moreover, because the Project will carry diluted bitumen, or dilbit, it is also important to understand what dilbit is and what it is not. In the second paragraph of section 10.3.1.1.2 on page 10-26, the DEIS explains that, after diluent is added to bitumen, the resulting dilbit is "similar in appearance to other heavy crude oils." However, it should be noted in the FEIS that the similarities are not just in appearance, but in physicochemical properties (e.g., viscosity, surface tension) as well.

3.10.4.3 The Potential for Sinking Oil

2603-41

Section 10.3.1.1.2 of the DEIS contains a discussion of how heavy crude oils and dilbit may behave in water. It states, with respect to dilbit, that "[o]nce the lighter components of dilbit volatilize, the remaining heavy fraction may sink, making cleanup difficult. This is particularly true in turbulent water conditions." Then, the release of dilbit in Marshall, Michigan, is used as an example in the DEIS. Most studies have demonstrated that dilbit does not reach a point where it sinks in water on its own. Instead, what is required is interaction with total suspended

2603-41 Cont'd

solids (TSS) in the water column to make the droplets of dilbit more dense than water. For example, the National Academies of Sciences, Engineering and Medicine (NAS 2016) report on spills of diluted bitumen from pipelines notes that no sinking or submergence of diluted bitumen was observed following a release to Burrard Inlet, in Burnaby, British Columbia in 2007, or following a release at Mayflower, Arkansas, in 2013.[54] Work done by Elliot Taylor of Polaris Applied Sciences, Randy Belore of SL Ross, Bruce Hollebone of Environment Canada, and several others demonstrates this as well. Further, the DEIS itself recognizes that neither crude oil nor dilbit, on its own, simply sinks. At Section 10.3.2.2, the DEIS says that evidence from previous releases "has shown that dilbit floats on water until its density is altered by weathering or the entrainment of sediment." Accordingly, this section should not simply convey in such a broad fashion that heavy crude oil simply sinks on its own in water. In addition, it is important to note that all oils (e.g. light, medium, heavy, dilbit) have the potential to sink out of the water column following interaction with TSS.

Elsewhere, in Section 10.3.2.2, the DEIS describes that "[a]s the time after a release increases, multiple processes act to entrain oil and its constituents into the water column. . . ." This statement is not entirely accurate. Just as oil does not simply sink on its own, so does it not simply entrain into the water column over the passage of time. Rather, entrainment is a function of turbulent processes, such as waves, rapids, riffles, and waterfalls. This statement would be more accurate if it read as follows: "As the time after a release increases, so does the opportunity for multiple turbulent processes (e.g., wind-induced waves, rapids, riffles, and waterfalls) to act to entrain oil and its constituents into the water column. . . ." By making that more accurate statement in the FEIS, the reader will also have a more accurate and complete framework for understanding oil's fate in water.

3.10.4.4 Heavy Crude Oil Release on Land

2603-42

Section 10.3.1.1.2 of the DEIS, on page 10-27, describes the fate of heavy crude oil accidentally released on land. DOC-EERA may want to consider including the following clarifications in the FEIS (clarifications in underlines):

> In the event of a land surface release, the dispersion of dilbit through soils would be slower than for other crude oils, including heavy crude oils with similar viscosities; light and medium crude

[54] *Spills of Diluted Bitumen from Pipelines: A Comparative Study of Environmental Fate, Effects, and Response*. Committee on the Effects of Diluted Bitumen on the Environment; Board on Chemical Sciences and Technology; Division on Earth and Life Studies; National Academies of Sciences, Engineering, and Medicine. at 145, National Academies of Sciences, Engineering and Medicine (NAS). 2016.

2603-42 Cont'd

oils would penetrate soils the fastest (Tsaprailis 2014). Immediately upon release, dilbit behaves much like heavy crude oil; however, weathering, temperature, and dispersion alter its properties, causing it to behave more like the original bitumen. In fact, all oils behave like a heavier version of themselves as they weather. As the diluent components volatilize, the heavier components of dilbit remain and the viscosity, which is a measure of a fluid's resistance to shear forces, increases. Although viscosity is not a measure of an oil's stickiness, higher viscosity does result in the potential for thicker oil on the water surface and upon adhesion to other surfaces (e.g., shorelines, land cover, etc.), and increasing viscosity results in slower spreading and greater adherence to soil particles. Heavy crude oils may lose up to 10 percent of their initial volume following a spill due to evaporation in the first few days (National Research Council 2003). In contrast, light crude oils may lose up to 50-90 percent of their initial volume in the first few days due to evaporation. Dilbit has been shown to lose between 11.7 and 15.9 percent of its mass within the first 6 hours of a release (Environment Canada 2013).

3.10.4.5 Primary Drivers of Trajectory of Oil on Land

2603-43

At times, the DEIS suggests that wind or water erosion (section 10.3.1.3.2) or soil type, oil viscosity, and depth to the water table (section 10.3.2.1) may be meaningful for oil trajectory on land. While those suggestions are correct, Enbridge thinks that DOC-EERA may want to consider clearly indicating that, on land, slope and land cover type are the major drivers of oil trajectory.[55]

3.10.5 DESCRIPTION OF MODELING WORK AND CONCLUSIONS

2603-44

The FSDD required that a substantial amount and range modeling be performed in order to inform the DEIS. DOC-EERA and other agencies played a substantial part in providing the framework for leading professionals to perform sophisticated analyses, ostensibly for the purpose of bolstering the utility of the EIS process. DOC-EERA may want to consider more thoroughly referencing the release modeling work presented in the AAR.

[55] *See* Ch. 5 AAR.

2603-45

Sections 5.1.1 and 5.1.2 of the AAR explain what the OILMAPLand and SIMAP models are, how they work, and what they do and do not do. For example, the definition of SIMAP in the DEIS suggests that the only difference between it and OILMAPLand is the addition of the third dimension. In fact, there are a number of differences, including that SIMAP includes a large number of additional fate processes and employs a pseudocomponent approach rather than a whole oil approach.

Further, Enbridge offers the following language that DOC-EERA may want to consider including in the final paragraph of section 10.3.3.1:

> Several release scenarios were modeled for each of the seven sites. Unmitigated large volume releases of crude oil, characterized by no emergency response, were simulated to provide a conservative, "worst-case" scenario at the hypothetical release locations (Stantec et al. 2017). Three different crude oil types were modeled: a light Bakken crude oil and heavier Cold Lake Blend, and a heavier Cold Lake Winter Blend (during wintertime conditions). The models included three river flow conditions (spring high flow, summer and fall average/moderate flow, and winter low flow) at the seven sites at one-minute time steps over the 24-hour model duration. Outputs from the modeling were provided for different time intervals (6, 12, 18, and 24 hours). The spill volumes were estimated based on a 13 minute shutdown response (10 minutes for response and three minutes of pumping out during valve closure) and gravitational draindown based on the distance between shut off valves, as well as topography.

It may also be helpful if the body of the FEIS more fully described the purpose of the study work that was done and present additional modeling results. The purpose of the study was to bound extent (i.e., multiple oil types, representative locations, seasonal variations, etc.). By understanding the purpose of the study, the reader may better understand that, while maximum distance traveled under high flow is relevant, results in other flow conditions and environmental conditions are relevant as well.

Enbridge also recommends that DOC-EERA consider the following clarifications to language contained in Section 10.3.3.2:

2603-45 Cont'd

- Dissolved hydrocarbon concentrations tended to be greater in more turbulent, high-energy systems due to ~~dispersion~~ entrainment and dissolution. (Explanation: entrainment and dissolution are the causal fate processes, not dispersion.)

- During low-flow conditions (winter), downstream extents were primarily dependent on river flow ~~and oil density~~. (Explanation: Oil density did not define the extent for low-flow conditions, the reduced flow did. The further downstream transport of the heavier Cold Lake Winter Blend occurs because it took longer to rise to the surface.)

In addition, DOC-EERA may want to consider revising Table 10.3-1 to present information for average flow or low flow scenarios. Discussing the flow rate may also be helpful in understanding the context for the maximum distance traveled outputs. Summaries of the OILMAPLand and SIMAP modeling results that were called for in the FSDD are presented at pages 6.243-.245 and 6.348-.349 of the AAR. In addition, DOC-EERA may want to consider clarifying the fact that the 24-hour unmitigated release scenario is conservative and unlikely to occur in light of Enbridge's emergency response preparedness.

3.10.6 POTENTIAL IMPACTS ASSOCIATED WITH AN ACCIDENTAL RELEASE

2603-46

The FSDD requires that the potential impacts associated with an accidental release be assessed. The AAR addresses these issues in detail (Chapter 7, "Assessment of Environmental Effects of Oil Releases"). The DEIS includes a general description of the potential environmental effects of exposure to crude oil on the biophysical environment (pages 10-43 through 10-48), as well as the human environment (pages 10-41 to 10-42 for socio-economic effects, including public health; and pages 10-48 to 10-49).

3.10.6.1 Potential Impacts

In the AAR, effects of exposure to oil on the biophysical and human environment were assessed in several ways. First, the observed and expected effects of crude oil on certain ecological and human receptors, including how crude oil behaves (i.e., its fate) in terrestrial, atmospheric, and freshwater environments and associated biological resources were discussed in detail (Section 7.1). Summaries of potential effects were also provided in sections 9.5.1 through 9.5.5.

This discussion of potential environmental effects in Section 7.1 of the AAR was followed by a detailed assessment of expected environmental effects for each of seven modeling sites that are representative of most of the predominant ecological units, major hydrological features, watercourse widths, and watercourse features along the preferred and alternative routes in Minnesota (Sections 7.2 to 7.8). A summary table of potential environmental effects for each of the seven representative sites was provided, including a comparison of the effects of

2603-46 Cont'd

exposure to crude oil versus exposure to diluted bitumen. Furthermore, a summary of potential environmental effects, based on the modeling for the seven representative sites, was provided in Section 7.9.

Readers of the FEIS may benefit if the body of the FEIS were to provide a summary of major conclusions of the environmental effects assessment in the AAR, or the body of the FEIS could include references to the above-noted AAR sections.

2603-47

3.10.6.2 Recovery of Biophysical and Human Receptors

Section 8.0 of the AAR addressed how the recovery of abiotic and biotic ecosystem components occurs after a crude oil release using case studies and a literature review. Timeframes for recovery by different receptors are discussed, as are factors that can affect these timeframes (i.e., environmental conditions within the affected area, the types of environmental media and receptors affected, the severity and areal extent of the release, and the speed and efficacy of emergency response and cleanup). Enbridge recommends that the body of the FEIS provide a summary of the major findings on recovery, as described in Section 8.0 of the AAR, or that the FEIS reference this section of the AAR.

3.11 CHAPTER 11 – ENVIRONMENTAL JUSTICE

2603-48

3.11.1 OVERALL

Because of the similarities between this chapter and Chapter 9, many of the comments Enbridge made with respect to Chapter 9 are also relevant here. Additional information specific to this chapter is provided below for DOC-EERA's consideration in preparing the FEIS.

3.11.2 METHODOLOGY CLARIFICATIONS

The ROI for the Environmental Justice analysis of the APR and each route alternative includes the census tracts intersected by each route, and these tracts were then compared to the remaining census tracts in each county crossed by a route. To the extent this is not an accurate characterization of the ROI and DOC-EERA's analysis, Enbridge suggests that DOC-EERA provide additional clarification concerning the ROI in the FEIS.

Second, the DEIS states:

> While Minnesota PCA generally uses a metric of 40 percent of population below 185 percent of poverty to establish EJ status, this analysis uses a difference of 10 percentage points or more to establish the "meaningfully greater" measure consistent with the comparison of minority populations.

2603-48 Cont'd

DOC-EERA may want to provide an explanation of why it chose to use a different metric than that generally used by MPCA, why that choice was justified, and to what extent the choice of this different metric renders this analysis incomparable to Environmental Justice analyses performed for other projects in Minnesota.

2603-49

In addition, DOC-EERA may want to consider adding the following table to provide a reader with concise information on the conclusions of this chapter as it relates to the APR and alternatives:[56]

System Alternative/Route	Census Tracts Crossed with a Meaningfully Higher Minority Population	Census Tracts Crossed with a Meaningfully Greater Proportion of the Population with Income Less than 185 Percent of the Poverty Level	Acres of Reservation Lands Crossed
APR	1	0	0
RA-03AM	1	[*DEIS does not specify. Enbridge suggests adding this information.*]	0
RA-06	2	[*DEIS does not specify. Enbridge suggests adding this information.*]	78.7 (Fond du Lac)
RA-07	4	1	258.8 (Leech Lake) 78.7 (Fond du Lac)
RA-08	4	1	260.8 (Leech Lake) 78.1 (Fond du Lac)
SA-04	TBD	TBD	TBD

2603-50

Enbridge further suggests that this chapter be revised to add additional detail where available. For instance, this chapter states that the APR and "RA-03AM do not cross any reservation lands, but would cross *within miles of* the White Earth Reservation and Fond du Lac Reservation."[57] This data is available (*e.g.*, the APR travels within 3.1 miles of the boundaries of the White Earth Reservation and 1.9 miles of the Fond du Lac Reservation) and should be specifically included instead of the general statement.

2603-51

Moreover, this chapter should more consistently cite sources for its statements, and those sources should be relevant. As Enbridge noted with respect to Chapter 9, if a statement is from an interview conducted by DOC-EERA, that statement should be set off with quotations, and a

[56] To the extent similar information is available for the rail and truck alternatives identified in Chapter 5, Enbridge suggests including this information and/or providing an explanation consistent with Minn. R. 4410.2500.

[57] DEIS at 11-7 (emphasis added).

2603-51 Cont'd

citation to the transcript should be provided. If a statement is from a source listed in Section 11.6, that source should be indicated.

2603-52

Further, as noted above in Section 3.9.2.1, above, some of the sources used for this chapter may not be relevant. For example, DOC-EERA cites *Human & Sex Trafficking: Trends and Responses Across Indian County* for the statement that "[i]ncreases in sex trafficking, particularly among Native populations, are well documented."[58] DOC-EERA should be aware that this publication does not include any analysis specific to the Project, pipeline construction, or energy infrastructure. It likewise contains no analysis that would lead any reasonable decision-maker to conclude that the highly-skilled workforce that will construct the Project would engage in these types of activities. In addition, as Enbridge noted with respect to Chapter 9, the TASC Report is not a reliable resource for assessing what specific resources could be impacted by the Project.[59]

3.11.3 DISCUSSION OF PROJECT IMPACTS

2603-53

Enbridge suggests that the economic benefits of the Project also be noted in this chapter.[60]

Also, as with Chapter 9, DOC-EERA may want to consider making this chapter's discussion of impacts (both from construction and operation) and mitigation consistent with and refer to the resource-specific discussions in other parts of the DEIS.[61] For example, to the extent this chapter mentions resources or issues not considered in the rest of the DEIS, DOC-EERA may want to consider the following: (1) include additional analysis in the FEIS; or (2) provide an explanation pursuant to Minn. R. 4410.2500. For example, this chapter specifically mentions walleye and trout fisheries, deer, elk, ducks, and geese.[62] To the extent construction and operations impacts on these resources are discussed elsewhere in the DEIS, those discussions could be referenced or incorporated here. If those resources are not discussed elsewhere, DOC-EERA could include additional analysis in Chapter 11 or explain the absence of such analysis.

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[58] DEIS at 11-10.

[59] *See* Section 3.9.1.2 herein.

[60] *See* Dr. Lichty Direct Testimony, filed January 31, 2017.

[61] *See* Section 3.9.3.1 herein.

[62] DEIS at 11-9.

2603-54

3.12 CHAPTER 12 – CUMULATIVE POTENTIAL EFFECTS

3.12.1 PAST, PRESENT AND REASONABLE FORESEEABLE ACTIONS

3.12.1.1 Transmission Lines

As noted in Section 3.2.2 above, the FEIS should include additional information regarding the four high voltage transmission lines that will be constructed to bring power to the new pump stations. Page 2-44 of the DEIS anticipates that this information would include "additional information on these connected activities and their impacts, including a map of their locations."

2603-55

3.12.1.2 SA-04 - Projects in Other States

Chapter 12 of the DEIS discusses potential impacts from three reasonably foreseeable projects located within several miles of SA-04, including the Line 67 Expansion Project, Valley Expansion Pipeline Project and Fargo-Moorhead Area Flood Risk Management Project. Each of these projects is within or closely borders Minnesota. Although SA-04 is 795 miles in length and crosses two additional states, reasonably foreseeable projects in Iowa or Illinois were not included. To the extent that no additional projects are identified in the FEIS, DOC-EERA may want to include a statement in the FEIS as to why such information was not included.

3.12.1.3 Deactivation

2603-56

Chapter 8 of the DEIS discusses deactivation of Enbridge's existing Line 3, including the possibility of permanently deactivating the pipeline in place, removing the line, or removing the line and replacing it in the same trench. Enbridge's proposal is to deactivate the pipeline in place. As described more fully in the Applications and Schedule 6 of Mr. Barry Simonson's Direct Testimony filed January 2017, deactivation in place results in minimal ground disturbing activities, including purging, cleaning, and segmenting the line, potentially removing small sections of the line in specific locations. Because these activities are reasonably foreseeable projects in the vicinity of the proposal, DOC-EERA may want to consider referencing the Chapter 8 discussion in Chapter 12.

4.0 CONCLUSION

Enbridge appreciates the extensive time and effort put into the DEIS by agency staff. The Line 3 Replacement Project is an important project for ensuring the future safety, adequacy and reliability of Minnesota's energy infrastructure. Enbridge respectfully requests that these comments be considered for inclusion in the FEIS so that the Commission has the accurate and complete information available as it considers Enbridge's Certificate of Need and Route Permit Applications.

Line 3 Replacement Project
Draft Environmental Impact Statement
Summary of Regions of Interest for Human and Environmental Analysis in Chapter 5

Resource	APR	SA-04	Existing Line 3	Rail	Truck	Existing Line 3 with Truck	Existing Line 3 with Rail
Natural Environment							
Groundwater	**Construction Region of Interest ("ROI")**						
	The ROI for the analysis of potential impacts on groundwater during construction generally consists of the pipeline corridor and a 1,000 foot buffer on either side of the centerline.	The ROI for the analysis of potential impacts on groundwater during construction generally consists of the pipeline corridor and a 1,000 foot buffer on either side of the centerline.	The ROI for the analysis of potential impacts on groundwater during construction generally consists of the pipeline corridor and a 1,000 foot buffer on either side of the centerline.	The ROI for the analysis of potential impacts on groundwater during construction generally consists of the rail corridor and a 1,000 foot buffer on either side of the corridor.	The ROI for the analysis of potential impacts on groundwater during construction generally consists of the road corridor and a 1,000 foot buffer on either side of the corridor.	The ROI for the analysis of potential impacts on groundwater during construction generally consists of the pipeline, rail or truck corridor and a 1,000 foot buffer on either side of the centerline.	The ROI for the analysis of potential impacts on groundwater during construction generally consists of the pipeline, rail or truck corridor and a 1,000 foot buffer on either side of the centerline.
	Operations ROI						
	Operations impacts for APR were based on the permanent right-of-way ("ROW").	Operations impacts for SA-04 were based on overlaying a standard 50 foot permanent ROW.	Operations impacts for existing Line 3 were based on the permanent ROW.	Potential impacts on groundwater associated with transportation by rail operations were assessed qualitatively.	Potential impacts on groundwater associated with transportation by truck operations were assessed qualitatively.	Operations impacts for existing Line 3 were based on the permanent ROW; potential impacts on groundwater associated with transportation by truck operations were assessed qualitatively.	Operations impacts for existing Line 3 were based on the permanent ROW; potential impacts on groundwater associated with transportation by rail operations were assessed qualitatively.
Surface Water	**Construction ROI**						
	The ROI for the assessment of construction impacts on surface waters includes the construction work area for each surface water crossed by the APR in MN (typically 120' wide), as well as the area immediately downstream from the crossing for flowing surface waters, and in the immediate vicinity for crossings of non-flowing surface waters such as lakes.	The ROI for the assessment of construction impacts on surface waters includes the construction work area for each surface water crossed by SA-04 in MN (typically 120' wide), as well as the area immediately downstream from the crossing for flowing surface waters, and in the immediate vicinity for crossings of non-flowing surface waters such as lakes.	The ROI includes surface waters crossed by the existing Line 3 and wild-rice waterbodies within 0.5 mile of existing Line 3.	The ROI for the assessment of construction impacts on surface waters were evaluated based on locations of surface waters at or near the rail route described in Chapter 4.	The ROI for the assessment of construction impacts on surface waters were evaluated based on locations of surface waters at or near the truck route described in Chapter 4.	The ROI includes surface waters crossed by the existing Line 3 and wild-rice waterbodies within 0.5 mile of existing Line 3 and locations of surface waters at or near the truck route described in Chapter 4.	The ROI includes surface waters crossed by the existing Line 3 and wild-rice waterbodies within 0.5 mile of existing Line 3 and locations of surface waters at or near the rail route described in Chapter 4.
	Operations ROI						
	The ROI was based on the location of the 50 foot permanent ROW centered on the pipeline for APR, as well as areas immediately downstream of flowing surface waters and in the immediate vicinity of non-flowing surface waters.	The ROI was based on the location of the 50 foot permanent ROW centered on the pipeline for SA-04, as well as areas immediately downstream of flowing surface waters and in the immediate vicinity of non-flowing surface waters.	The ROI was based on the location of the permanent ROW for that pipeline and assumes integrity digs typically would be limited to that permanent ROW.	Potential impacts on groundwater associated with transportation by rail operations were assessed qualitatively.	Potential impacts on groundwater associated with transportation by truck operations were assessed qualitatively.	Operations impacts for existing Line 3 were based on the permanent ROW; potential impacts on groundwater associated with transportation by truck operations were assessed qualitatively.	Operations impacts for existing Line 3 were based on the permanent ROW; potential impacts on groundwater associated with transportation by rail operations were assessed qualitatively.

Line 3 Replacement Project
Draft Environmental Impact Statement
Summary of Regions of Interest for Human and Environmental Analysis in Chapter 5

Resource	APR	SA-04	Existing Line 3	Rail	Truck	Existing Line 3 with Truck	Existing Line 3 with Rail
Wetland	**Construction ROI**						
	Potential wetland impacts were evaluated by overlaying the footprints of the construction work area, additional temporary workspace ("ATWS"), access roads, pipe yards, permanent ROW, mainline valve ("MLV") pads and driveways, and pump stations on identified wetland maps.	Potential wetland impacts were evaluated by overlaying the 120 foot construction right-of-way ("CROW") centered on centerline.	The potential wetland impacts of continued use of existing Line 3 were qualitatively assessed based on publicly available wetland information, potential locations for new facilities and potential transportation routes.	The potential wetland impacts of the rail corridor were qualitatively assessed based on publicly available wetland information, potential locations for new facilities and potential transportation routes.	The potential wetland impacts of the truck corridor were qualitatively assessed based on publicly available wetland information, potential locations for new facilities and potential transportation routes.	The potential wetland impacts of continued use of the existing Line 3 with truck alternative were qualitatively assessed based on publicly available wetland information, potential locations for new facilities and potential transportation routes.	The potential wetland impacts of continued use of the existing Line 3 with truck alternative were qualitatively assessed based on publicly available wetland information, potential locations for new facilities and potential transportation routes.
	Operations ROI						
	Comparisons of operations impacts were based on the Enbridge provided footprint for APR permanent ROW.	Comparisons of operations impacts were based on a 50 foot permanent ROW for SA-04.	The potential wetland impacts of continued use of existing Line 3 were qualitatively assessed based on publicly available wetland information, potential locations for new facilities and potential transportation routes.	The potential wetland impacts of rail were qualitatively assessed based on publicly available wetland information, potential locations for new facilities and potential transportation routes.	The potential wetland impacts of truck were qualitatively assessed based on publicly available wetland information, potential locations for new facilities and potential transportation routes.	The potential wetland impacts of continued use of existing Line 3 supplemented by truck were qualitatively assessed based on publicly available wetland information, potential locations for new facilities and potential transportation routes.	The potential wetland impacts of continued use of existing Line 3 supplemented by rail were qualitatively assessed based on publicly available wetland information, potential locations for new facilities and potential transportation routes.
Floodplains	**The same ROI was used for both construction and operations impacts analysis on floodplains**						
	The ROI was the footprint of the APR that included the ROW, construction work area, facilities, and access roads (where available) overlain in GIS with Federal Emergency Management Administration ("FEMA") flood maps.	The ROI was the footprint of SA-04 that included the ROW, construction work area, facilities, and access roads (where available) overlain in GIS with FEMA flood maps.	Impacts for the continued use of Existing Line 3 include miles of special flood hazard areas crossed by the existing Line 3.	The ROI was the footprint of the rail route that included ROW, construction work area, facilities, and access roads (where available) overlain in GIS with FEMA flood maps.	The ROI was the footprint of the truck route that included ROW, construction work area, facilities, and access roads (where available) overlain in GIS with FEMA flood maps.	Impacts for the continued use of Existing Line 3 include miles of special flood hazard areas crossed by the existing Line 3 and footprint of the truck route that included ROW, construction work area, facilities, and access roads (where available) overlain in GIS with FEMA flood maps.	Impacts for the continued use of Existing Line 3 include miles of special flood hazard areas crossed by the existing Line 3 footprint of the rail route that included ROW, construction work area, facilities, and access roads (where available) overlain in GIS with FEMA flood maps.

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Resource	APR	SA-04	Existing Line 3	Rail	Truck	Existing Line 3 with Truck	Existing Line 3 with Rail
	The same ROI was used for both construction and operations impacts analysis on geology/soils						
Geology/Soils	The ROI included the temporary construction work areas, permanent ROW, temporary and permanent access roads, and locations of facilities outside the permanent ROW such as pump stations.	The ROI included a 120 foot CROW and 50 foot permanent ROW centered over the centerline.	The ROI included impacts within the permanent ROW for the mainline corridor.	The ROI included potential locations of offloading facilities and new or expanded roads.	The ROI included potential locations of offloading facilities and new or expanded rail lines.	The ROI included impacts within the permanent ROW for the mainline corridor and potential locations of offloading facilities and new or expanded roads.	The ROI included impacts within the permanent ROW for the mainline corridor and potential locations of offloading facilities and new or expanded rail lines.
	Construction ROI						
Vegetation	The ROI for the assessment of construction impacts on vegetation includes the APR construction work area, ATWS, access roads, pipe yards, pipeline permanent right-of-way, valve pads and driveways, and pump stations.	Construction impacts for SA-04 were estimated by overlaying a standardized 120-foot-wide construction work area centered on the SA-04 route.	Construction impacts for continued use of the existing Line 3 pipeline are qualitatively addressed for integrity digs and subsequent pipeline repair and address the potential for these actions to occur in various vegetation cover classes, rare plant communities and noxious weed infestations.	Construction-related impacts were qualitatively reviewed based on the descriptions of potential locations for new facilities, the descriptions of potential transportation routes, and available vegetation information for these areas.	Construction-related impacts were qualitatively reviewed based on the descriptions of potential locations for new facilities, the descriptions of potential transportation routes, and available vegetation information for these areas.	Construction impacts are qualitatively addressed for integrity digs and subsequent pipeline repair and address the potential for these actions to occur in various vegetation cover classes, rare plant communities and noxious weed infestations. Construction-related truck impacts were qualitatively reviewed based on the descriptions of potential locations for new facilities, the descriptions of potential transportation routes, and available vegetation information for these areas.	Construction impacts are qualitatively addressed for integrity digs and subsequent pipeline repair and address the potential for these actions to occur in various vegetation cover classes, rare plant communities and noxious weed infestations. Construction-related rail impacts were qualitatively reviewed based on the descriptions of potential locations for new facilities, the descriptions of potential transportation routes, and available vegetation information for these areas.
	Operations ROI						
	The ROI was based on the location of the 50 foot permanent ROW centered on the pipeline for APR.	Operations impacts for SA-04 were estimated by overlaying a standardized 50-foot-wide permanent ROW centered on the SA-04 route.	Operations impacts for continued use of the existing Line 3 were evaluated based on the existing permanent ROW for that pipeline.	Operations impacts for these alternatives were qualitatively evaluated using broad-scale spatial analysis and assumptions about the potential routes for train transport.	Operations impacts for these alternatives were qualitatively evaluated using broad-scale spatial analysis and assumptions about the potential routes for truck transport.	Operations impacts for continued use of the existing Line 3 were evaluated based on the existing permanent right-of-way for that pipeline and qualitatively evaluated using broad-scale spatial analysis and assumptions about the potential routes for truck transport.	Operations impacts for continued use of the existing Line 3 were evaluated based on the existing permanent right-of-way for that pipeline and qualitatively evaluated using broad-scale spatial analysis and assumptions about the potential routes for train transport.

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Resource	APR	SA-04	Existing Line 3	Rail	Truck	Existing Line 3 with Truck	Existing Line 3 with Rail
	The same ROI was used for both construction and operations impacts analysis on fish and wildlife						
Fish and Wildlife	**Direct impacts:** The assessment of potential direct impacts focused on the areas directly affected by construction and operation activities. **Indirect impacts:** The ROI for this evaluation encompassed the area that could be affected, including indirectly, by construction and operation within 0.5 mile from the centerline of the APR. **Invasive species:** Locations were identified within 1 mile of the APR.	**Direct impacts:** The assessment of potential direct impacts focused on the areas directly affected by construction and operation activities. **Indirect impacts:** The ROI for this evaluation encompassed the area that could be affected, including indirectly, by construction and operation within 0.5 mile from the centerline of SA-04. **Invasive species:** Locations were identified within 1 mile of SA-04.	**Direct impacts:** The assessment of potential direct impacts focused on the areas directly affected by construction and operation activities. **Indirect impacts:** The ROI for this evaluation encompassed the area that could be affected, including indirectly, by construction and operation within 0.5 mile from the centerline of existing Line 3. **Invasive species:** Locations were identified within 1 mile of existing Line 3.	The ROI evaluated areas where the new structures and railways likely would be constructed and in areas adjacent to those sites.	The ROI evaluated areas where the new structures and roadways likely would be constructed and in areas adjacent to those sites.	**Direct impacts**: The assessment of potential direct impacts focused on the areas directly affected by construction and operation activities. **Indirect impacts:** The ROI for this evaluation encompassed the area that could be affected, including indirectly, by construction and operation within 0.5 mile from the centerline of existing Line 3. **Invasive species:** Locations were identified within 1 mile of existing Line 3. **Truck:** The ROI evaluated areas where the new structures and truck routes likely would be constructed and in areas adjacent to those sites.	**Direct impacts:** The assessment of potential direct impacts focused on the areas directly affected by construction and operation activities. **Indirect impacts**: The ROI for this evaluation encompassed the area that could be affected, including indirectly, by construction and operation within 0.5 mile from the centerline of existing Line 3. **Invasive species:** Locations were identified within 1 mile of existing Line 3. **Rail:** The ROI evaluated areas where the new structures and rail routes likely would be constructed and in areas adjacent to those sites.

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Resource	APR	SA-04	Existing Line 3	Rail	Truck	Existing Line 3 with Truck	Existing Line 3 with Rail
Unique Natural Resources	**The same ROI was used for both construction and operations impacts analysis on unique natural resources**						
	The ROI for APR in MN was the 50 foot permanent ROW, 120 foot CROW and to a distance of one mile on both sides of the permanent ROW. **For State-listed species**: The pipeline alternatives evaluated an area within a distance of 0.5 mile from the centerline, which is the area that could be directly or indirectly impacted by construction and operation.	The ROI for SA-04 in MN was a 50 foot permanent ROW, 120 foot CROW and to a distance of one mile on both sides of the permanent ROW. The ROI for SA-04 in ND, SD, IA, IL and WI was maintained at the county level. The ROI is reduced in MN to provide a more detailed and specific review, which is possible due to National Heritage Information Systems ("NHIS") data within the state. **For State-listed species:** The pipeline alternatives evaluated an area within a distance of 0.5 mile from centerline, which is the area that could be directly or indirectly impacted by construction and operation.	The ROI was the construction and operations footprint for existing Line 3. **For State-listed species:** The ROI evaluated an area within a distance of 0.5 mile from the centerline, which is the area that could be directly or indirectly impacted by construction and operation.	The ROI was 1 mile distance on either side of the centerline of the rail routes.	The ROI was 1 mile distance on either side of the centerline of the truck routes.	The ROI was the construction and operations footprint for existing Line 3. **For State-listed species:** The ROI evaluated an area within a distance of 0.5 mile from the centerline, which is the area that could be directly or indirectly impacted by construction and operation. **Truck:** The ROI was 1 mile distance on either side of the centerline of the truck routes.	The ROI was the construction and operations footprint for existing Line 3. **For State-listed species:** The ROI evaluated an area within a distance of 0.5 mile from the centerline, which is the area that could be directly or indirectly impacted by construction and operation. **Rail:** The ROI was 1 mile distance on either side of the centerline of the truck routes.
Public Lands	**The same ROI was used for both construction and operations impacts analysis on public lands**						
	The ROI was the construction and operations footprint for the APR.	The ROI was the construction and operations footprint for SA-04.	The ROI was the construction and operations footprint for existing Line 3.	The ROI was the construction and operations footprint for the rail route.	The ROI was the construction and operations footprint for the truck route.	The ROI was the construction and operations footprint for existing Line 3 supplemented by the truck route.	The ROI was the construction and operations footprint for existing Line 3 supplemented by the rail route.
Air Quality	**The same ROI was used for both construction and operations impacts analysis on air quality**						
	The ROI consisted of the airsheds through which the APR route passes.	The ROI consisted of the airsheds through which the SA-04 route passes.	The ROI consisted of the airsheds through which the existing Line 3 route passes.	The ROI consisted of the airsheds through which the rail route passes.	The ROI consisted of the airsheds through which the truck route passes.	The ROI consisted of the airsheds through which the existing Line 3 with truck route passes.	The ROI consisted of the airsheds through which the existing Line 3 with rail route passes.

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Resource	APR	SA-04	Existing Line 3	Rail	Truck	Existing Line 3 with Truck	Existing Line 3 with Rail
Socioeconomics							
Commodity Production	**The same ROI was used for both construction and operations impacts analysis on commodity production**						
	The ROI consists of all land currently used in the production of agricultural, timber or mineral products - or land with the potential to be used for these purposes - that could be disturbed or removed from production by the APR. This includes the permanent ROW and "broader construction work area".	The ROI consists of all land currently used in the production of agricultural, timber or mineral products - or land with the potential to be used for these purposes - that could be disturbed or removed from production by SA-04. This includes the permanent ROW and "broader construction work area".	The ROI consists of all land currently used in the production of agricultural, timber or mineral products - or land with the potential to be used for these purposes - that could be disturbed or removed from production by existing Line 3. This includes the permanent ROW and "broader construction work area".	The ROI consists of all land currently used in the production of agricultural, timber or mineral products - or land with the potential to be used for these purposes - that could be disturbed or removed from production by rail. This includes the permanent ROW and "broader construction work area".	The ROI consists of all land currently used in the production of agricultural, timber or mineral products - or land with the potential to be used for these purposes - that could be disturbed or removed from production by truck. This includes the permanent ROW and "broader construction work area".	The ROI consists of all land currently used in the production of agricultural, timber or mineral products - or land with the potential to be used for these purposes - that could be disturbed or removed from production by existing Line 3 with truck. This includes the permanent ROW and "broader construction work area".	The ROI consists of all land currently used in the production of agricultural, timber or mineral products - or land with the potential to be used for these purposes - that could be disturbed or removed from production by existing Line 3 with rail. This includes the permanent ROW and "broader construction work area".
Recreation and Tourism	**The same ROI was used for both construction and operations impacts analysis on recreation and tourism**						
	The ROI is twofold: 1. It narrowly focuses on the public recreational lands and recreational waterbodies directly crossed by construction and operation areas. 2. It broadly includes the counties through which the APR passes to assess whether the Project-related changes would affect county-level recreational visitation and subsequently the local recreation-based economy.	The ROI is twofold: 1. It narrowly focuses on the public recreational lands and recreational waterbodies directly crossed by construction and operation areas. 2. It broadly includes the counties through which SA-04 passes to assess whether the Project-related changes would affect county-level recreational visitation and subsequently the local recreation-based economy.	The ROI is twofold: 1. It narrowly focuses on the public recreational lands and recreational waterbodies directly crossed by construction and operation areas. 2. It broadly includes the counties through which existing Line 3 passes to assess whether the Project-related changes would affect county-level recreational visitation and subsequently the local recreation-based economy.	The ROI is twofold: 1. It narrowly focuses on the public recreational lands and recreational waterbodies directly crossed by construction and operation areas. 2. It broadly includes the counties through which the rail route passes to assess whether the Project-related changes would affect county-level recreational visitation and subsequently the local recreation-based economy.	The ROI is twofold: 1. It narrowly focuses on the public recreational lands and recreational waterbodies directly crossed by construction and operation areas. 2. It broadly includes the counties through which the truck route passes to assess whether the Project-related changes would affect county-level recreational visitation and subsequently the local recreation-based economy.	The ROI is twofold: 1. It narrowly focuses on the public recreational lands and recreational waterbodies directly crossed by construction and operation areas. 2. It broadly includes the counties through which the existing Line 3 with truck route passes to assess whether the Project-related changes would affect county-level recreational visitation and subsequently the local recreation-based economy.	The ROI is twofold: 1. It narrowly focuses on the public recreational lands and recreational waterbodies directly crossed by construction and operation areas. 2. It broadly includes the counties through which the existing Line 3 with rail route passes to assess whether the Project-related changes would affect county-level recreational visitation and subsequently the local recreation-based economy.
Population	**The same ROI was used for both construction and operations impacts analysis on population**						
	The ROI has two components: 1. Impacts associated with the non-local workforce re-locating to communities near the Project. 2. Impacts associated with construction and operation of the pipeline near densely populated areas.	The ROI has two components: 1. Impacts associated with the non-local workforce re-locating to communities near the Project. 2. Impacts associated with construction and operation of the pipeline near densely populated areas.	The ROI has two components: 1. Impacts associated with the non-local workforce re-locating to communities near the Project. 2. Impacts associated with construction and operation of the Existing Line 3 near densely populated areas.	The ROI has two components: 1. Impacts associated with the non-local workforce re-locating to communities near the Project. 2. Impacts associated with construction and operation of the rail route near densely populated areas.	The ROI has two components: 1. Impacts associated with the non-local workforce re-locating to communities near the Project. 2. Impacts associated with construction and operation of the truck route near densely populated areas.	The ROI has two components: 1. Impacts associated with the non-local workforce re-locating to communities near the Project. 2. Impacts associated with construction and operation of the existing Line 3 with truck route near densely populated areas.	The ROI has two components: 1. Impacts associated with the non-local workforce re-locating to communities near the Project. 2. Impacts associated with construction and operation of the existing Line 3 with rail route near densely populated areas.

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Resource	APR	SA-04	Existing Line 3	Rail	Truck	Existing Line 3 with Truck	Existing Line 3 with Rail
Employment, Income and Tax Revenue	**The same ROI was used for both construction and operations impacts analysis on employment, income and tax revenue**						
	The ROI consists of the counties crossed by the APR.	The ROI consists of the counties crossed by SA-04.	The ROI consists of the counties crossed by Existing Line 3.	The ROI consists of the counties crossed by the rail route.	The ROI consists of the counties crossed by the truck route.	The ROI consists of the counties crossed by the Existing Line 3 and truck route.	The ROI consists of the counties crossed by the Existing Line 3 and rail route.
Cultural Resources							
Cultural Resources	**The same ROI was used for both construction and operations impacts analysis on cultural resources**						
	The ROI includes the construction work area, permanent ROW, ATWS, access roads, and above-ground facilities, including 0.5 mile on either side of the pipeline for archaeological resources and 1 mile on either side for historic resources.	The ROI includes the construction work area and permanent ROW, including 0.5 mile on either side of the pipeline for archaeological resources and 1 mile on either side for historic resources.	The ROI includes the construction work area and permanent ROW, including 0.5 mile on either side of the pipeline for archaeological resources and 1 mile on either side for historic resources.	The ROI for rail included archaeological resources and historic resources that are within 0.5 mile of the offloading facility locations at Clearbrook and Superior.	The ROI for truck included archaeological resources and historic resources that are within 0.5 mile of the offloading facility locations at Clearbrook and Superior.	The ROI includes the construction work area and permanent ROW, including 0.5 mile on either side of the pipeline for archaeological resources and 1 mile on either side for historic resources and archaeological resources and historic resources that are within 0.5 mile of the offloading facility locations at Clearbrook and Superior.	The ROI includes the construction work area and permanent ROW, including 0.5 mile on either side of the pipeline for archaeological resources and 1 mile on either side for historic resources and archaeological resources and historic resources that are within 0.5 mile of the offloading facility locations at Clearbrook and Superior.

Resource	APR	RA-06	RA-07	RA-08	RA-03AM
Human Settlement					
Planning and Zoning	**The same ROI was used for both construction and operations impacts analysis on planning and zoning**				
	Region of Interest ("ROI") consists of counties and watershed districts crossed by the APR in MN. The assessment of compatibility with current land use plans is focused on the land disturbed for construction and the land within the permanent ROW.	ROI consists of counties and watershed districts crossed by RA-06. The assessment of compatibility with current land use plans is focused on the land disturbed for construction and the land within the permanent ROW.	ROI consists of counties and watershed districts crossed by RA-07. The assessment of compatibility with current land use plans is focused on the land disturbed for construction and the land within the permanent ROW.	ROI consists of counties and watershed districts crossed by RA-08. The assessment of compatibility with current land use plans is focused on the land disturbed for construction and the land within the permanent ROW.	ROI consists of counties and watershed districts crossed by RA-03AM. The assessment of compatibility with current land use plans is focused on the land disturbed for construction and the land within the permanent ROW.
Noise and Vibration	**Construction ROI**				
	The ROI for the APR includes the sensitive receptors located near the proposed construction work areas that may be affected by construction-related activities and equipment.	The ROI for RA-06 includes the sensitive receptors located near the proposed construction work areas that may be affected by construction-related activities and equipment.	The ROI for RA-07 includes the sensitive receptors located near the proposed construction work areas that may be affected by construction-related activities and equipment.	The ROI for RA-08 includes the sensitive receptors located near the proposed construction work areas that may be affected by construction-related activities and equipment.	The ROI for RA-03AM includes the sensitive receptors located near the proposed construction work areas that may be affected by construction-related activities and equipment.
	Operations ROI				
	The ROI for the APR includes the sensitive receptors located near the proposed pump stations that may be affected by noise from pump station operations.	The ROI for RA-06 includes the sensitive receptors located near the proposed pump stations that may be affected by noise from pump station operations.	The ROI for RA-07 includes the sensitive receptors located near the proposed pump stations that may be affected by noise from pump station operations.	The ROI for RA-08 includes the sensitive receptors located near the proposed pump stations that may be affected by noise from pump station operations.	The ROI for RA-03AM includes the sensitive receptors located near the proposed pump stations that may be affected by noise from pump station operations.

Resource	APR	RA-06	RA-07	RA-08	RA-03AM
Aesthetics/ Visual	**The same ROI was used for both construction and operations impacts analysis on aesthetics/visual**				
	The ROI for the APR includes all areas of high use and high user concern within the viewshed of a route or aboveground facility. The viewshed was considered to be the immediate foreground (or 300 feet) from the end of the construction work area and within 0.25 miles of aboveground facilities.	The ROI for RA-06 includes all areas of high use and high user concern within the viewshed of a route or aboveground facility. The viewshed was considered to be the immediate foreground (or 300 feet) from the end of the construction work area and within 0.25 miles of aboveground facilities.	The ROI for RA-07 includes all areas of high use and high user concern within the viewshed of a route or aboveground facility. The viewshed was considered to be the immediate foreground (or 300 feet) from the end of the construction work area and within 0.25 miles of aboveground facilities.	The ROI for RA-08 includes all areas of high use and high user concern within the viewshed of a route or aboveground facility. The viewshed was considered to be the immediate foreground (or 300 feet) from the end of the construction work area and within 0.25 miles of aboveground facilities.	The ROI for RA-03AM includes all areas of high use and high user concern within the viewshed of a route or aboveground facility. The viewshed was considered to be the immediate foreground (or 300 feet) from the end of the construction work area and within 0.25 miles of aboveground facilities.
Housing	**The same ROI was used for both construction and operations impacts analysis on housing**				
	The ROI for the APR extends 50 feet beyond the construction work area. The ROI for existing home value consisted of the counties crossed by the APR in MN. Studies considered in the literature included a range of properties up to 1 mile away from a permanent ROW.	The ROI for the RA-06 extends 50 feet beyond the construction work area. The ROI for existing home value consisted of the counties crossed by RA-06. Studies considered in the literature included a range of properties up to 1 mile away from a permanent ROW.	The ROI for the RA-07 extends 50 feet beyond the construction work area. The ROI for existing home value consisted of the counties crossed by RA-07. Studies considered in the literature included a range of properties up to 1 mile away from a permanent ROW.	The ROI for the RA-08 extends 50 feet beyond the construction work area. The ROI for existing home value consisted of the counties crossed by RA-08. Studies considered in the literature included a range of properties up to 1 mile away from a permanent ROW.	The ROI for the RA-03AM extends 50 feet beyond the construction work area. The ROI for existing home value consisted of the counties crossed by RA-03AM. Studies considered in the literature included a range of properties up to 1 mile away from a permanent ROW.

Resource	APR	RA-06	RA-07	RA-08	RA-03AM
Transportation and Public Services	**The same ROI was used for both construction and operations impacts analysis on transportation and public services**				
	Roads, Railroads and Utilities: The ROI for impact assessment on roads, railroads and utilities consists of the actual crossing locations of the infrastructure crossed the APR in MN. **Airports:** The ROI for the APR in MN for regional airports consists of airports within 20,000 feet of the construction work area and aboveground facilities. **Local Traffic:** The ROI for impacts of construction traffic on local traffic is all major roads crossed by the APR in MN. **Emergency Services:** ROI for addressing Impacts on emergency services was the counties crossed by the APR in MN. **Public Services:** The ROI for public services included all counties crossed by the APR in MN except Clearwater County.	**Roads, Railroads and Utilities**: The ROI for impact assessment on roads, railroads and utilities consists of the actual crossing locations of the infrastructure crossed RA-06. **Airports:** The ROI for RA-06 for regional airports consists of airports within 20,000 feet of the construction work area and aboveground facilities. **Local Traffic:** The ROI for impacts of construction traffic on local traffic is all major roads crossed by RA-06. **Emergency Services:** ROI for addressing Impacts on emergency services was the counties crossed by RA-06. **Public Services:** The ROI for public services included all counties crossed by RA-06 except Clearwater County.	**Roads, Railroads and Utilities**: The ROI for impact assessment on roads, railroads and utilities consists of the actual crossing locations of the infrastructure crossed RA-07. **Airports:** The ROI for RA-07 for regional airports consists of airports within 20,000 feet of the construction work area and aboveground facilities. **Local Traffic:** The ROI for impacts of construction traffic on local traffic is all major roads crossed by RA-07. **Emergency Services:** ROI for addressing Impacts on emergency services was the counties crossed by RA-07. **Public Services:** The ROI for public services included all counties crossed by RA-07 except Clearwater County.	**Roads, Railroads and Utilities**: The ROI for impact assessment on roads, railroads and utilities consists of the actual crossing locations of the infrastructure crossed RA-08. **Airports:** The ROI for RA-08 for regional airports consists of airports within 20,000 feet of the construction work area and aboveground facilities. **Local Traffic:** The ROI for impacts of construction traffic on local traffic is all major roads crossed by RA-08. **Emergency Services:** ROI for addressing Impacts on emergency services was the counties crossed by RA-08. **Public Services:** The ROI for public services included all counties crossed by RA-08 except Clearwater County.	**Roads, Railroads and Utilities**: The ROI for impact assessment on roads, railroads and utilities consists of the actual crossing locations of the infrastructure crossed RA-03AM. **Airports:** The ROI for RA-03AM for regional airports consists of airports within 20,000 feet of the construction work area and aboveground facilities. **Local Traffic:** The ROI for impacts of construction traffic on local traffic is all major roads crossed by RA-03AM. **Emergency Services:** ROI for addressing Impacts on emergency services was the counties crossed by RA-03AM. **Public Services:** The ROI for public services included all counties crossed by RA-03AM except Clearwater County.

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DEIS Table Summarizing ROIs by Resource and Alternative in Chapter 6

Resource	APR	RA-06	RA-07	RA-08	RA-03AM
Natural Resources					
Water Resources	**Construction ROI**				
	The ROI consisted of the pipeline corridor and a 1,000 buffer on either side of the APR in MN.	The ROI consisted of the pipeline corridor and a 1,000 buffer on either side of RA-06.	The ROI consisted of the pipeline corridor and a 1,000 buffer on either side of RA-07.	The ROI consisted of the pipeline corridor and a 1,000 buffer on either side of RA-08.	The ROI consisted of the pipeline corridor and a 1,000 buffer on either side of RA-03AM.
	Operations ROI				
	The ROI for the APR in MN is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-06 is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-07 is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-08 is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-03AM is a 50-ft permanent ROW centered on the pipeline centerline.
Geology and Soils	**Construction ROI**				
	The ROI for the APR in MN is the CROW, ATWS, access roads, pipe yards, permanent ROW, valve pads and driveways and pump stations.	The ROI for RA-06 is an 120-ft CROW centered on the pipeline centerline.	The ROI for RA-07 is a 205-ft CROW centered on the pipeline centerline.	The ROI for RA-08 is an 120-ft CROW centered on the pipeline centerline.	The ROI for RA-03AM is an 120-ft CROW centered on the pipeline centerline.
	Operations ROI				
	The ROI for the APR in MN is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-06 is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-07 is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-08 is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-03AM is a 50-ft permanent ROW centered on the pipeline centerline.
Vegetation	**Construction ROI**				
	The ROI for the APR in MN is the CROW, ATWS, access roads, pipe yards, permanent ROW, valve pads and driveways and pump stations.	The ROI for RA-06 is an 120-ft CROW centered on the pipeline centerline.	The ROI for RA-07 is an 205-ft CROW centered on the pipeline centerline.	The ROI for RA-08 is an 120-ft CROW centered on the pipeline centerline.	The ROI for RA-03AM is an 120-ft CROW centered on the pipeline centerline.
	Operations ROI				
	The ROI for the APR in MN is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-06 is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-07 is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-08 is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-03AM is a 50-ft permanent ROW centered on the pipeline centerline.

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Resource	APR	RA-06	RA-07	RA-08	RA-03AM
	The same ROI was used for both construction and operations impacts analysis on fish and wildlife				
Fish and Wildlife	**Direct impacts:** The assessment of potential direct impacts focused on the areas directly affected by construction and operation activities. **Indirect impacts:** The ROI for this evaluation encompassed the area that could be affected, including indirectly, by construction and operation within 0.5 mile from the centerline of the APR in MN. **Invasive species:** Locations were identified within 1 mile of the APR in MN.	**Direct impacts:** The assessment of potential direct impacts focused on the areas directly affected by construction and operation activities. **Indirect impacts:** The ROI for this evaluation encompassed the area that could be affected, including indirectly, by construction and operation within 0.5 mile from the centerline of RA-06. **Invasive species:** Locations were identified within 1 mile of RA-06.	**Direct impacts:** The assessment of potential direct impacts focused on the areas directly affected by construction and operation activities. **Indirect impacts:** The ROI for this evaluation encompassed the area that could be affected, including indirectly, by construction and operation within 0.5 mile from the centerline of RA-07. **Invasive species:** Locations were identified within 1 mile of RA-07.	**Direct impacts:** The assessment of potential direct impacts focused on the areas directly affected by construction and operation activities. **Indirect impacts:** The ROI for this evaluation encompassed the area that could be affected, including indirectly, by construction and operation within 0.5 mile from the centerline of RA-08. **Invasive species:** Locations were identified within 1 mile of RA-08.	**Direct impacts:** The assessment of potential direct impacts focused on the areas directly affected by construction and operation activities. **Indirect impacts:** The ROI for this evaluation encompassed the area that could be affected, including indirectly, by construction and operation within 0.5 mile from the centerline of RA-03AM. **Invasive species:** Locations were identified within 1 mile of RA-03AM.

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DEIS Table Summarizing ROIs by Resource and Alternative in Chapter 6

Resource	APR	RA-06	RA-07	RA-08	RA-03AM
Unique Natural Resources	**Construction ROI**				
	Federally Listed Species: The evaluation encompassed the area within a distance of 1 mile from the APR centerline in MN. **State Listed Species:** Included an area within a distance of 0.5 mile from the APR centerline in MN. Comparisons of construction impacts were based on the Applicant-provided construction work area for the APR in MN.	**Federally Listed Species:** The evaluation encompassed the area within a distance of 1 mile from the RA-06 centerline. **State Listed Species:** Included an area within a distance of 0.5 mile from the RA-06 centerline. Comparisons of construction impacts were based on an 120-ft CROW centered of the RA-06 pipeline centerline.	**Federally Listed Species:** The evaluation encompassed the area within a distance of 1 mile from the RA-07 centerline. **State Listed Species:** Included an area within a distance of 0.5 mile from the RA-07 centerline. Comparisons of construction impacts were based on an 205-ft CROW centered of the RA-07 pipeline centerline.	**Federally Listed Species:** The evaluation encompassed the area within a distance of 1 mile from the RA-08 centerline. **State Listed Species:** Included an area within a distance of 0.5 mile from the RA-08 centerline. Comparisons of construction impacts were based on an 120-ft CROW centered of the RA-08 pipeline centerline.	**Federally Listed Species:** The evaluation encompassed the area within a distance of 1 mile from the RA-03AM centerline. **State Listed Species:** Included an area within a distance of 0.5 mile from the RA-03AM centerline. Comparisons of construction impacts were based on an 120-ft CROW centered of the RA-03AM pipeline centerline.
	Operations ROI				
	The ROI for the APR in MN is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-06 is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-07 is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-08 is a 50-ft permanent ROW centered on the pipeline centerline.	The ROI for RA-03AM is a 50-ft permanent ROW centered on the pipeline centerline.
Public Lands	**The same ROI was used for both construction and operations impacts analysis on public lands**				
	The ROI included the construction and operations footprints for the APR in MN.	The ROI included the construction and operations footprints for RA-06.	The ROI included the construction and operations footprints for RA-07.	The ROI included the construction and operations footprints for RA-07.	The ROI included the construction and operations footprints for RA-03AM.
Air Quality	**The same ROI was used for both construction and operations impacts analysis on air quality**				
	The ROI consisted of the airsheds through which the APR passes.	The ROI consisted of the airsheds through which the RA-06 passes.	The ROI consisted of the airsheds through which the RA-07 passes.	The ROI consisted of the airsheds through which the RA-08 passes.	The ROI consisted of the airsheds through which the RA-03AM passes.

Resource	APR	RA-06	RA-07	RA-08	RA-03AM
Socioeconomics					
Commodity Production	**The same ROI was used for both construction and operations impacts analysis on commodity production**				
	The ROI consists of all land currently used in the production of agricultural, timber or mineral products - or land with the potential to be used for these purposes - that could be disturbed or removed from production by the APR in MN. This includes the permanent ROW and "broader construction work area".	The ROI consists of all land currently used in the production of agricultural, timber or mineral products - or land with the potential to be used for these purposes - that could be disturbed or removed from production by RA-06. This includes the permanent ROW and "broader construction work area".	The ROI consists of all land currently used in the production of agricultural, timber or mineral products - or land with the potential to be used for these purposes - that could be disturbed or removed from production by RA-07. This includes the permanent ROW and "broader construction work area".	The ROI consists of all land currently used in the production of agricultural, timber or mineral products - or land with the potential to be used for these purposes - that could be disturbed or removed from production by RA-08. This includes the permanent ROW and "broader construction work area".	The ROI consists of all land currently used in the production of agricultural, timber or mineral products - or land with the potential to be used for these purposes - that could be disturbed or removed from production by RA-03AM. This includes the permanent ROW and "broader construction work area".
Recreation and Tourism	**The same ROI was used for both construction and operations impacts analysis on recreation and tourism**				
	The ROI is twofold: 1. It narrowly focuses on the public recreational lands and recreational waterbodies directly crossed by construction and operation areas. 2. It broadly includes the counties through which the APR passes in MN to assess whether the Project-related changes would affect county-level recreational visitation and subsequently the local recreation-based economy.	The ROI is twofold: 1. It narrowly focuses on the public recreational lands and recreational waterbodies directly crossed by construction and operation areas. 2. It broadly includes the counties through which RA-06 passes to assess whether the Project-related changes would affect county-level recreational visitation and subsequently the local recreation-based economy.	The ROI is twofold: 1. It narrowly focuses on the public recreational lands and recreational waterbodies directly crossed by construction and operation areas. 2. It broadly includes the counties through which RA-07 passes to assess whether the Project-related changes would affect county-level recreational visitation and subsequently the local recreation-based economy.	The ROI is twofold: 1. It narrowly focuses on the public recreational lands and recreational waterbodies directly crossed by construction and operation areas. 2. It broadly includes the counties through which RA-08 passes to assess whether the Project-related changes would affect county-level recreational visitation and subsequently the local recreation-based economy.	The ROI is twofold: 1. It narrowly focuses on the public recreational lands and recreational waterbodies directly crossed by construction and operation areas. 2. It broadly includes the counties through which RA-03AM passes to assess whether the Project-related changes would affect county-level recreational visitation and subsequently the local recreation-based economy.

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Resource	APR	RA-06	RA-07	RA-08	RA-03AM
Population	**The same ROI was used for both construction and operations impacts analysis on population**				
	The ROI has two components: 1. Impacts associated with the non-local workforce re-locating to communities near the APR in MN. 2. Impacts associated with construction and operation of the pipeline near densely populated areas.	The ROI has two components: 1. Impacts associated with the non-local workforce re-locating to communities near RA-06. 2. Impacts associated with construction and operation of the pipeline near densely populated areas.	The ROI has two components: 1. Impacts associated with the non-local workforce re-locating to communities near RA-07. 2. Impacts associated with construction and operation of the pipeline near densely populated areas.	The ROI has two components: 1. Impacts associated with the non-local workforce re-locating to communities near RA-08. 2. Impacts associated with construction and operation of the pipeline near densely populated areas.	The ROI has two components: 1. Impacts associated with the non-local workforce re-locating to communities near RA-03AM. 2. Impacts associated with construction and operation of the pipeline near densely populated areas.
Employment, Income and Tax Revenue	**The same ROI was used for both construction and operations impacts analysis on employment, income and tax revenue**				
	The ROI consists of the counties crossed by the APR in MN.	The ROI consists of the counties crossed by RA-06.	The ROI consists of the counties crossed by RA-07.	The ROI consists of the counties crossed by RA-08.	The ROI consists of the counties crossed by RA-03AM.
Cultural Resources					
Cultural Resources	**The same ROI was used for both construction and operations impacts analysis on cultural resources**				
	The ROI includes the construction work area, permanent ROW, ATWS, access roads, and above-ground facilities, including 0.5 mile on either side of the APR pipeline in MN for archaeological resources and 1 mile on either side for historic resources.	The ROI includes the construction work area and permanent ROW, including 0.5 mile on either side of the RA-06 pipeline for archaeological resources and 1 mile on either side for historic resources.	The ROI includes the construction work area and permanent ROW, including 0.5 mile on either side of the RA-07 pipeline for archaeological resources and 1 mile on either side for historic resources.	The ROI includes the construction work area and permanent ROW, including 0.5 mile on either side of the RA-08 pipeline for archaeological resources and 1 mile on either side for historic resources.	The ROI includes the construction work area and permanent ROW, including 0.5 mile on either side of the RA-03AM pipeline for archaeological resources and 1 mile on either side for historic resources.
Cost Comparison					
Cost Comparison	**Construction ROI (Operations ROI: N/A)**				
	Information supplied by Enbridge for the cost of the APR was used to determine a per-mile cost for the pipeline.	The APR per-mile cost was applied to the length of RA-06 to derive comparative costs.	The APR per-mile cost was applied to the length of RA-07 to derive comparative costs.	The APR per-mile cost was applied to the length of RA-08 to derive comparative costs.	The APR per-mile cost was applied to the length of RA-03AM to derive comparative costs.

Resource	APR	RA-06	RA-07	RA-08	RA-03AM
ROW Sharing/Paralleling					
ROW Sharing/ Paralleling	**Construction ROI (Operations ROI: N/A)**				
	The permanent ROW for the APR was overlain on maps of existing infrastructure corridors using GIS to determine the portions of the route that would share, parallel, or be located independently of existing oil and gas pipelines, electric transmission lines, railroads, and highways.	The permanent ROW for RA-06 was overlain on maps of existing infrastructure corridors using GIS to determine the portions of the route that would share, parallel, or be located independently of existing oil and gas pipelines, electric transmission lines, railroads, and highways.	The permanent ROW for RA-07 was overlain on maps of existing infrastructure corridors using GIS to determine the portions of the route that would share, parallel, or be located independently of existing oil and gas pipelines, electric transmission lines, railroads, and highways.	The permanent ROW for RA-08 was overlain on maps of existing infrastructure corridors using GIS to determine the portions of the route that would share, parallel, or be located independently of existing oil and gas pipelines, electric transmission lines, railroads, and highways.	The permanent ROW for RA-03AM was overlain on maps of existing infrastructure corridors using GIS to determine the portions of the route that would share, parallel, or be located independently of existing oil and gas pipelines, electric transmission lines, railroads, and highways.

SA-04 IMPACT ANALYSIS

The presentation of SA-04 impacts in the DEIS focuses on Minnesota-based resources, utilizing a number of Minnesota agency-specific databases to analyze impacts on unique and sensitive resources with some discussion of potentially impacted resources outside of Minnesota. In this Attachment C, Enbridge has provided additional information regarding the magnitude, extent, and duration of impacts associated with SA-04 in other states. Schedule 7 of Mr. Simonson's Direct Testimony, filed January 30, 2017, which presents additional information on potential impacts and considerations associated with SA-04, may also be useful in this analysis.

Geology and Soils

Blasting locations are not currently included in the Chapter 5 analysis for SA-04, and could be approximated based on SSURGO shallow bedrock data. It is likely that blasting or other form of rock removal would be required wherever SSURGO data indicate shallow bedrock (less than five feet of soil surface). Rocky soils with a high prevalence of rock fragments of large diameter may also require blasting or other form of rock removal. Section 5.2.2.2.3 of the DEIS indicates that SA-04 would encounter shallow bedrock.

The DEIS identified karst conditions along alternatives SA-04 and RA-03AM. Karst conditions do not exist along the APR and the type of bedrock along the APR is not prone to formation of karst conditions. Groundwater pollution, differential settling, and formation of sinkholes are issues associated with constructing infrastructure in karst conditions.

Specifications for constructing in areas with karst are not as readily available as recommendations are to identify the areas and avoid building in these areas. Indicators of karst conditions are often the presence of sinkholes, blind valleys, karst windows and springs on the land surface above underground karst (MDNR, 2017). Karst conditions can also develop in areas with few or none of these land surface features; therefore, the absence of these features does not imply the absence of karst. Geophysical surveys, subsurface investigation, and remote sensing methods can also be used to better determine locations of subsurface cavities where karst is present and where sinkholes may develop (Missouri Department of Conservation, 2017). Building individual structures in karst areas may be accomplished by grouting karst features below proposed structures, however, grouting karst features will likely alter hydrologic regimes, which can cause formation of additional karst features (Maryland Geological Survey, 2017). Sinkhole formation in karst areas can also be caused by construction-related activities such as altered drainage, water impoundments, dewatering, blasting, and ground disturbance and vibration. Sinkhole formation is not readily predictable. Sinkholes may form in areas of Minnesota that are susceptible to karst with no prior indications or warning, as exemplified by the development of a sinkhole in Woodbury on October 5, 2005, that quickly drained a stormwater retention basin (Barr and Alexander, 2007).

The primary geologic impact that could affect a proposed pipeline and aboveground facilities in karst sensitive areas is the sudden development of a sinkhole that damages the facilities and

poses a safety risk. Other subsidence features could develop gradually over time, but would not pose an immediate risk to the proposed facilities.

The Iowa Geological Survey and Iowa Department of Natural Resources host a Natural Resources Geographic Information Systems Library (https://programs.iowadnr.gov/nrgislibx/) with a few publicly-available environmental data sets that could be reviewed to identify potential SA-04 related impacts. Datasets include:

Geologic:

1. Potential Karst Geology of Iowa (GRID format)
2. Current and Historic Sinkhole and Depression locations in Iowa
3. Current Sinkhole Boundaries in Iowa

Based on Enbridge's review of these data, SA-04 would be routed within one mile of 260 sinkhole depressions, of which at least five are located within the 120-foot construction workspace.

The DEIS also states that impacts to karst features and associated groundwater (see below) would be mitigated by applying Enbridge's mitigation measures and best management practices (BMPs) designed for the APR. However, because the APR does not cross karst terrain, Enbridge's current mitigation measures do not contemplate crossing karst terrain. Because mitigation measures in karst terrain must be specific, Enbridge's mitigation measures and BMPs designed for the APR would not be sufficient to protect karst resources on SA-04.

To illustrate the complicated construction issues contemplated by SA-04 crossing karst terrain, Enbridge suggests that DOC-EERA consider the Mountain Valley Pipeline (MVP), and the Atlantic Coast Pipeline Project (ACP) – two proposed natural gas pipelines crossing karst terrain in West Virginia and Virginia. Project planning for these projects included rerouting and avoidance of the karst features due to potential issues that can arise during construction. For those features that could not be avoided, the MVP and ACP applicants prepared Karst Mitigation Plans to address karst features encountered during construction and to further reduce the potential to initiate sinkhole development during construction and operation of the facilities. Mitigation measures potentially include, but are not necessarily limited to, the following:

- conducting a preconstruction geophysical survey to obtain more information on subsurface conditions;
- deploying a karst specialist during construction activities to confirm, monitor, and assist in limiting potential negative impacts on existing karst features;
- conducting a preconstruction inspection of the right-of-way to confirm, identify, and assess surface karst features;

- monitoring features identified during the preconstruction inspection, features that are intercepted during construction, and features that form during construction;
- characterizing and documenting the following features intercepted during construction: soil subsidence, rock collapse, sediment filling, sinking or losing streams, springs, seeps, flooding, and caves or void space;
- depending on site-specific conditions, implementing a reroute of the pipeline or installing thicker-walled pipe;
- karst point features, as well as a 300-foot buffer around each, would be clearly marked in the field with signs and/or highly visible flagging in all work areas (within and off the right-of-way, including discharge areas) until construction related ground disturbing activities are completed;
- in the event that a subsurface void opens or is intersected, or a new sinkhole forms within the construction work area, work in that area would stop and the void would be isolated from the rest of the work area;
- if karst features are encountered during construction that require stabilization or mitigation, the pipeline company and its contractors would consult with and incorporate recommendations from the appropriate federal and state agencies to ensure pipeline integrity and protection of the aquatic resource and subterranean habitat – these procedures would generally involve backfilling of the feature with sand, gravel, rock, or grout, or combinations thereof, with the overarching goal of preventing further collapse and raveling of surface material while maintaining infiltration of recharge waters to the aquifer);
- implementing surface water and erosion control measures, including diversion, detention, or collection and transportation, to prevent construction-influenced surface water from free flowing into karst features;
- preventing the disposal of materials into karst features that could harm water quality;
- placing excavated spoil on the up-slope side of the excavation in the vicinity of karst features;
- implementing a Spill Control, Control, and Countermeasures Plan, including flagged buffers for re-fueling and parking in the vicinity of karst features;
- avoiding blasting in karst terrain; and
- avoiding the discharge of hydrostatic test water or other project related water in karst areas.

FERC released the final EIS for MVP on June 23, 2017 (available here: https://www.ferc.gov/industries/gas/enviro/eis/2017/06-23-17-FEIS.asp), and the draft EIS for ACP was published on December 30, 2016 (available here: https://www.ferc.gov/industries/gas/enviro/eis/2016/12-30-16-DEIS.asp). The final EIS for ACP is scheduled for release on July 21, 2017.

Groundwater

Groundwater in karst aquifers is vulnerable to impacts from spills due to the following characteristics of water flow (Kentucky Geological Survey https://www.uky.edu/KGS/water/general/karst/gwvulnerability.htm):

- recharge to karst aquifers bypasses the filtering capability of soil through macropores and swallow holes;
- groundwater flows through conduits so that there is little opportunity for filtration or sorption of contaminants onto aquifer material;
- the movement of pollutants cannot be directly observed as in a surface-flowing stream;
- flow paths may take routes that are not apparent from the topography or slope of the land;
- flow velocities in karst aquifers are extremely fast compared to velocities in granular aquifers, allowing little time to warn downstream users following a reported spill; and
- flow is in converging conduits; therefore, pollutants are not diluted through dispersal.

Soil overlying a karst aquifer provides some filtration of contaminants from in-flowing water and the filtering capacity is dependent on soil type, depth to bedrock, and piping features that develop in soil due to the presence of karst features in underlying bedrock.

In addition, as stated in section 5.2.1.1.2 of the DEIS, on page 5-19, karst landforms are "highly vulnerable to contamination and structural changes with ground disturbance; including sinkhole formation and alteration of groundwater flow"; therefore, the impacts associated with SA-04 on groundwater quality from construction-related impacts are likely to be more substantial than the APR.

Vegetation

Section 5.2.3.3.3 of the DEIS describes that the SA-04 construction footprint would impact approximately 265 acres of grassland/herbaceous and emergent herbaceous wetland vegetation cover based on the 2011 National Land Cover Database data (Homer et al., 2015).

Table 5.2.3-17 indicates approximately 1.5 acres of mesic prairie rare native plant communities would be impacted in Minnesota, but that SA-04 would not impact native prairie communities in North Dakota, Iowa, or Illinois. However, table M-3 identifies several native prairie and grassland species with NHI occurrences within the SA-04 construction workspace, including blue sage, buffalo grass, false mallow, plains sedge, and plains wild indigo in Illinois, indicating that there are likely additional rare plant communities impacted by SA-04.

Because SA-04 would cross the Dakota Tallgrass Prairie Wildlife Management Area in Richland, North Dakota (see figure 1), it is probable that there would be impacts to rare grassland / prairie communities and species in North Dakota. The DOC-EERA could confirm that the data from the North Dakota NHI review (cited as NDGFP, 2016) have been incorporated into tables M-1 through M-3, as there are no species from North Dakota indicated within the construction workspace, operations right-of-way, or within 0.5 mile of the either the APR or any CN Alternatives. The DEIS indicates that SA-04 would impact 794 acres of the Dakota Tallgrass Prairie Wildlife Management Area (WMA) in table 5.2.4-11 of section 5.2.4.3.3. The Dakota Tallgrass Prairie WMA is a unit of the U.S. Fish and Wildlife Refuge System and was established in 2000 specifically to preserve quality tallgrass prairie habitat in southeastern North Dakota and eastern South Dakota to help maintain biodiversity and to slow habitat fragmentation (FWS, 2013).

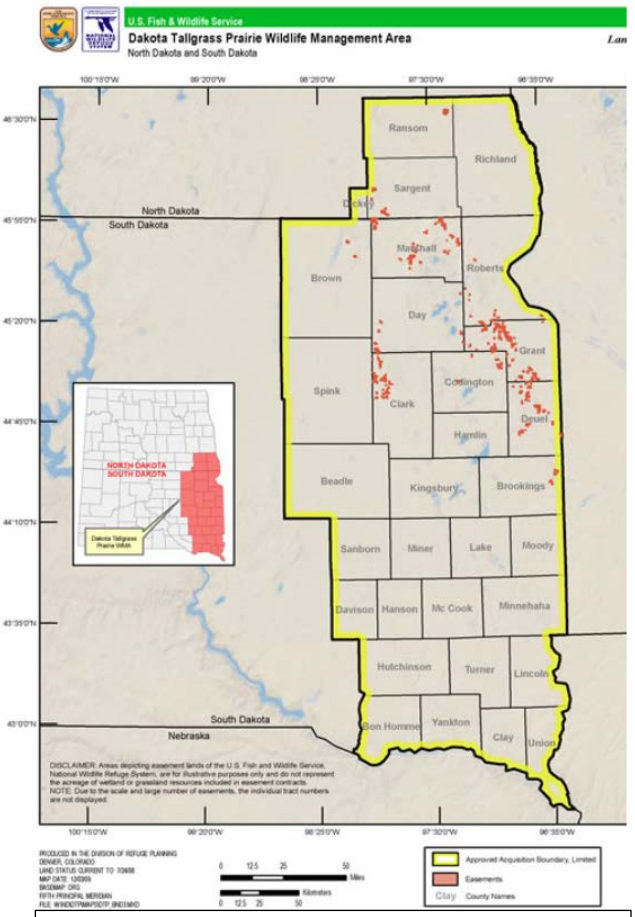

Figure 1. Dakota Tallgrass Prairie Wildlife Management Area (Source: FWS, 2013)

Tallgrass, mixed, and shortgrass prairies are among the most endangered ecosystems in the U.S., and tallgrass prairies are considered a globally endangered resource. Historically, prairies covered approximately one-third of the land surface in the contiguous U.S.; native prairies now cover less than three percent of their original acreage (Martin and Peloquin, 2005). In North

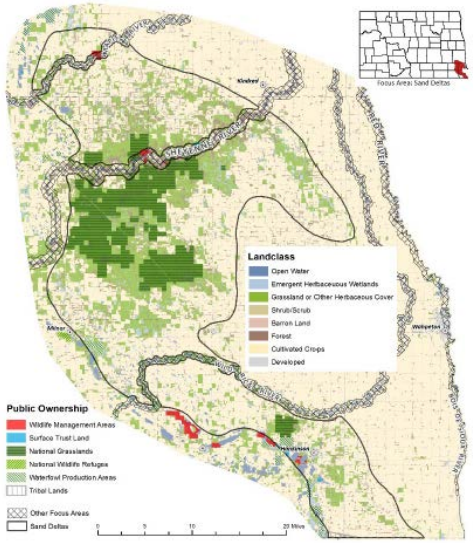

Figure 2. North Dakota State Wildlife Action Plan - Sand Deltas and Beach Ridges Focus Area (Source: Dyke et al., 2015)

Dakota, it is estimated that only three percent of the remaining native prairie is unplowed (Dyke et al., 2015). The remaining prairie patches are considered small, fragmented, and isolated, and prairie remnants are considered limited and in danger of further degradation (Martin and Peloquin, 2005).

Tallgrass prairie was historically found primarily in the eastern quarter of North Dakota along the Red River Valley, and has been largely converted to agricultural lands. The area crossed by SA-04 is also identified as the Sand Deltas and Beach Ridges focus area for native tallgrass prairie preservation and conservation of associated wildlife in the North Dakota Wildlife Action Plan (WAP) (Dyke et al., 2015) (see figure 2).

This section also does not acknowledge potential impacts to rare and unique vegetation communities within the Midewin National Tallgrass Prairie in Joliet, Illinois, where SA-04 would terminate. Administered by the U.S. Forest Service, the Midewin National Tallgrass Prairie is the largest island in the archipelago of protected areas that collectively comprise the Chicago Wilderness. Although seriously degraded in many places, "it represents by far the best chance in the region to reassemble the full array of species and natural processes typical of the tallgrass prairies, including the reintroduction of bison." The Nature Conservancy ranks Illinois' prairies as "globally imperiled," because most have been eliminated through conversion to other land uses. Midewin is a particularly critical piece of the state's remnant prairie because of its size, its biodiversity, and the concentrated efforts at restoration (National Forest Foundation, undated).

Acknowledging and including additional information and discussion of the impacts associated with SA-04 on the vegetation and wildlife communities found within the Dakota Tallgrass Prairie WMA, Midewin National Tallgrass Prairie, the North Dakota WAP Sand Deltas and Beach Ridges focus area, and other rare prairie / grassland communities in the vegetation, fish and wildlife, unique natural resources, and land use sections of the SA-04 impact analysis could increase the regulators' and public's ability to critically analyze SA-04.

Fish and Wildlife

Further discussion of SA-04 impacts on the federal and state conservation areas could be provided. SA-04 would cross the Upper Mississippi National Wildlife Refuge (NWR), which was established in 1924 as a refuge for fish, wildlife, and plants, and a breeding place for migratory birds. The refuge is designated as a Wetland of International Importance (Ramsar) and a Globally Important Bird Area.

As noted in the discussion above, SA-04 would cross the Dakota Tallgrass Prairie WMA, which was established to protect rich diversity of plant and animal species supported by tallgrass prairie habitat: at least 300 species of plants, 113 species of butterflies, 35 species of reptiles and amphibians, 60 species of mammals, and 260 species of birds. Two hundred and thirty-seven species of rare plants and animals are documented in the area. Thirteen species are under consideration or listed as threatened and endangered, such as the western prairie fringed-orchid, piping plover, and Topeka shiner (FWS, 2013b).

Although the DEIS provides the results of habitat fragmentation analysis in northern Minnesota forested landscapes, an equivalent analysis is not provided for prairie habitat crossed by SA-04. Grassland dependent-species are sensitive to the quality of the habitat, including its structural characteristics and floristic richness (Environment Canada, 2013). Many invertebrate species (e.g., skippers, skipperlings) have particular larval host and foraging plant requirements. Some species are also sensitive to soil conditions, including soil moisture, humidity, pH, surface temperature, and compaction (e.g., Dakota skipper) (Cochrane and Delphey, 2002). To encourage restoration of native grasslands, additional BMPs, such as managing growth of woody vegetation, and seeding with native grass and forb species to enhance restoration would likely be required. The timing of clearing and regular right-of-way maintenance would also need to be considered to avoid the nesting season for ground-nesting birds. Use of pesticides and insecticides to control invasive and noxious weeds would also need to be limited to avoid adverse impacts to invertebrate species and their host plants (WDNR, 1999). As is acknowledged in on page 5-364 of the DEIS, "impacts on prairie soils from construction would be long term and could require a substantial amount of recovery time, which could affect any prairie-dependent plants [and wildlife species] present."

Unique Natural Resources

Federally Listed Species

Dakota skipper and Poweshiek Skipperling are identified as having the potential to occur along SA-04 per table 5.2.5-8, and have been documented within the Dakota Tallgrass Prairie WMA (FWS, 2013). As noted previously, SA-04 would impact 794 acres of this WMA, which is likely to provide suitable habitat for both these Endangered Species Act-listed species. Based on this information, impacts associated with the construction of SA-04 to these species are likely to be much more substantial in magnitude, extent, and duration than temporary to short-term and minor as described in this section of the DEIS. In addition, the western prairie fringed-orchid may also occur in this WMA (FWS, 2013b).

Species of Greatest Conservation Need (SGCN)

<u>Methodology – GAP Analysis Program Species Models</u>

Based on section 5.2.5.1.2, DOC-EERA implemented the following process to identify SGCN species and habitat quality occurring within APR's and CN Alternatives' construction workspaces:

1. Used IPaC to select Birds of Conservation Concern within 1 mile of APR and CN Alternatives (Table M-5);
2. Compiled state-protected or rare species lists crossed by APR and CN;
3. Compared compiled state species list with GAP ranges available on U.S. Geological Survey (USGS) GAP (2016) to identify species with the potential to occur within the regions crossed by the APR and CN Alternatives; and

4. Combined the selected GAP species distribution models to identify habitat used by one or more of the identified species within the ROI (0.5 mile) to characterize habitat use and species richness within the ROI.

The DOC-EERA could consider clarifying which data were used to compile state protected or rare species lists: 1) NHI occurrences within the ROI (0.5 mile), construction workspaces, or other buffer distance; 2) county level state lists; and/or 3) SGCN by crossed habitat types provided in state WAPs. Enbridge also notes that South Dakota is included in table M-4; however, based on the SA-04 project description provided in Chapter 4, SA-04 would not cross South Dakota. Enbridge understands that, to the extent SA-04 is intended to parallel the existing Alliance natural gas pipeline, it would cross a small portion of South Dakota. Enbridge suggests DOC-EERA clarify whether SA-04 crosses South Dakota.

The USGS GAP Species Viewer (USGS GAP, 2016) cited by DOC-EERA was used to identify species with range and distribution crossing APR and SA-04. This tool only includes a small percentage of all species. As stated on the USGS GAP Species Viewer (2016) website, this program is a work in progress that currently includes over 2,000 species within the U.S. Section 5.2.5.1.2 states that GAP Analysis Program Species Models were only available for 47 bird species, 15 mammal species, and 21 reptiles for the APR and CN Alternatives; for comparison, there are 423 SGCN identified in the Illinois WAP (2016) alone, and there are over 2,000 wildlife species in the state of Minnesota (as stated on page 5-298 of the DEIS). Also, the GAP Analysis Program Species Models were not analyzed for aquatic or invertebrate SGCN.

There are a few species identified in table M-5 as Illinois SGCN, but that are not identified as SGCN in appendix 1 of the Illinois WAP (IDNR, 2016) (e.g., American pygmy shrew). In contrast, there are several Illinois SGCN that have the potential to occur in the campaigns (e.g., farmland and prairie, green cities) crossed by SA-04 (see Illinois specific discussion below) that are not included in table M-5 (e.g., marsh rice rat, Franklin's ground squirrel, Blanchard's cricket frog, spotted salamander). Upon review of the USGS GAP Species Viewer, it appears these species were not included because range / distribution information for these species is not currently available.

Because the majority of SGCN with the potential to occur on SA-04 are not available on the USGS GAP Species Viewer, DOC-EERA could remove the SGCN GAP Analysis Program Species Models completely from the FEIS, and instead provide a qualitative and, where available, quantitative, discussion of the sensitive wildlife habitats crossed by SA-04 in North Dakota, Illinois, and Iowa based on readily available state agency resources, such as the state WAPs. These discussions could be similar in nature to the Minnesota's Wildlife Action Network and Minnesota Biological Survey Sites of Biodiversity Significance discussions that are provided for the APR and CN Alternatives; as such, these discussions could consider habitat quality, species richness, and focal species and areas as defined by each state's WAP.

In the following sections, Enbridge provides highlights from the North Dakota, Iowa, and Illinois state WAPs and/or other state-agency data that Enbridge would recommend reviewing for

inclusion in the FEIS. Some of the information provided below could also be appropriate in the Vegetation and Fish and Wildlife sections of the SA-04 Impact Analysis.

North Dakota

The North Dakota WAP (Dyke et al., 2015) identifies several focus areas that are the priority for conservation actions that would be crossed by SA-04, including the Sand Deltas (see Vegetation discussion above), and the Red River and tributaries (see figures 3 and 4). As discussed in Schedule 7 of Mr. Simonson's Direct Testimony, SA-04 is routed within five miles of the Red River for approximately 102 miles and would cross approximately 119 tributaries to the Red River, including the Pembina River (MPs ND 1.4 and ND 1.7), Tongue River (MP ND 12.1), Park River (MP ND 43.3), Forest River (MP ND 53.9), Turtle River (MP ND 69.1), Goose River, (MP ND 120), Elm River (MP ND 132.1), Rush River (MN ND 149.8), Maple River (MP ND 154.7), and Wild Rice River (MPs ND 185.6 and ND 213) (see appendix G of DEIS). Key species of conservation priority within the Red River Basin include the bald eagle, red-headed woodpecker, black-billed cuckoo, river otter, northern long-eared bat, big brown bat, gray fox, and several species of fish and mussels (Dyke et al., 2015). Mussel surveys conducted in 2011 found healthy mussel populations in eastern North Dakota, including in the Maple River and Goose River, which are both crossed by SA-04. The Maple River had nine mussel species across 11 sites sampled, and the Goose River had eight mussel species in its various branches (NGFD, 2011).

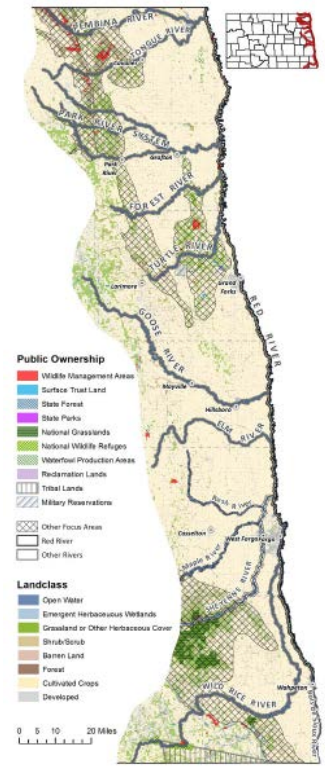

Figure 3. North Dakota State Wildlife Action Plan – Red River and Tributaries Focus Area (Source: Dyke et al., 2015)

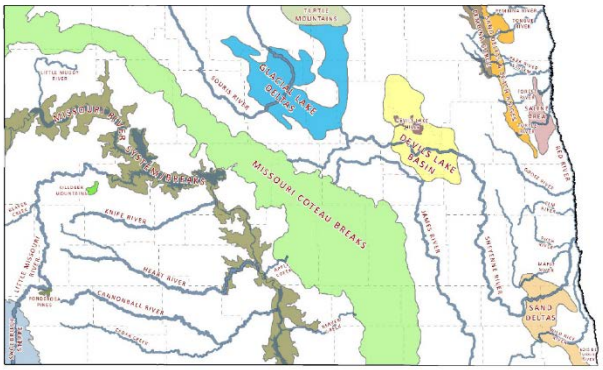

Figure 4. North Dakota State Wildlife Management Plan Focus Areas (Source: Dyke et al., 2015)

Iowa

The Iowa Geological Survey and Iowa Department of Natural Resources hosts a Natural Resources Geographic Information Systems Library (https://programs.iowadnr.gov/nrgislibx/) with a few publicly available environmental data sets that could be reviewed to identify potential SA-04 related impacts. Datasets include:

1. GAP Predicted Distributions for hundreds of amphibians, reptiles, birds, fish, and mammal species within the state of Iowa; and
2. Coldwater Streams Supporting Trout Habitat in Iowa.

Based on Enbridge's review of these data, SA-04 would cross Beaver Creek in Mitchell County, which is a coldwater stream supporting trout habitat; however, Beaver Creek is not identified in Appendix G of the DEIS. DOC-EERA may want to review these data and update the analysis of trout streams impacts accordingly.

Illinois

The 2015 Illinois WAP (IDNR, 2016) identifies campaigns and establishes conservation actions and strategies for each campaign to address the "most widespread and the most urgent issues affecting wildlife, which live in similar habitats or are responding to similar threats, in an efficient, effective, and comprehensive manner." Focal species, including SGCN, stresses and threats to wildlife and habitat, conservation actions, and management resources are established for each campaign. The Illinois WAP also establishes focal areas by campaign to target conservation actions. SA-04 would cross the following campaigns and focal areas:

Farmland and Prairie: This campaign focuses on the conservation, restoration, and management of grassland and shrubland habitats to benefit SGCN and other associated wildlife. The vast majority of native prairie has been lost in Illinois. The Illinois Department of Natural Resources (IDNR) indicates that protecting these remnant areas and the species found there is important to preserve the legacy of Illinois native prairies as well as the value of these sites to researchers to better understand the interactions and diversity of native flora and fauna found in native prairie (IDNR, 2016). The highest priority site, which is a key area to meet the conservation goals of the Farmland and Prairie Campaign, is the Midewin Tallgrass National Prairie. Depending on the location of the SA-04 terminal in Joliet, Illinois, SA-04 could directly impact or abut and possibly indirectly impact the Midewin Tallgrass National Prairie. SA-04 would also be located within less than 0.5 mile of Goose Lake Prairie State Natural Area and Des Plaines State Fish and Wildlife Area. The Kankakee River Sands Area is a high priority area that would also be crossed by SA-04.

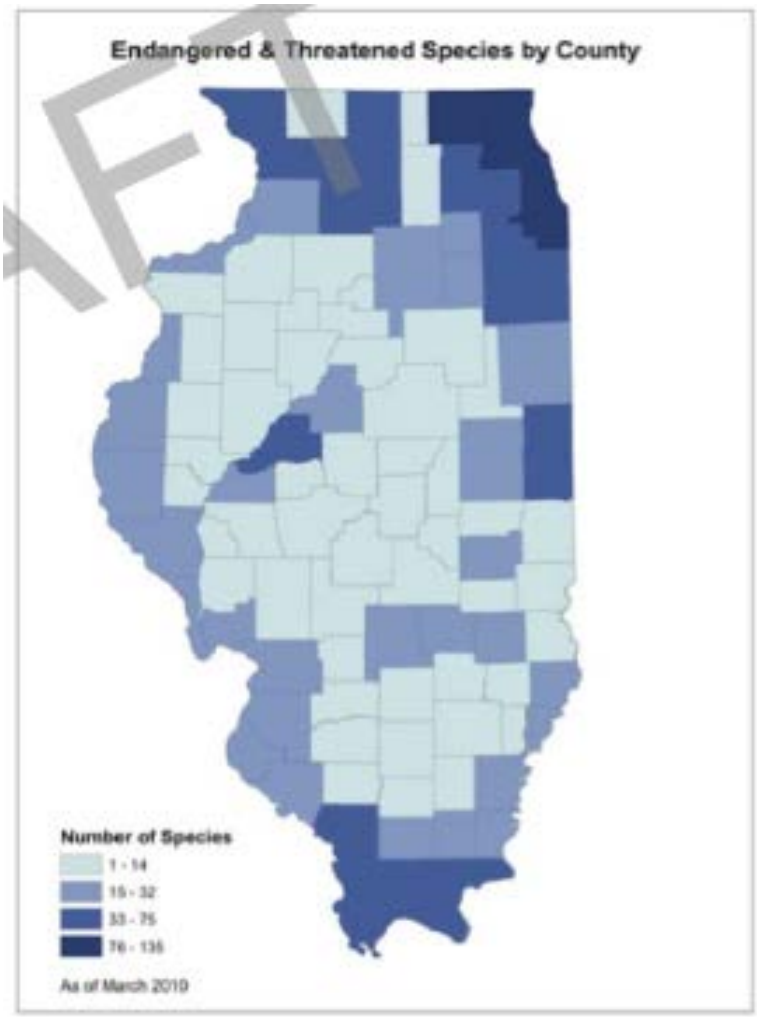

Figure 5. Illinois Endangered and Threatened Species by County (Source: IDNR, 2016)

Green Cities: The Green Cities Campaign of the Illinois WAP advances habitat conservation and

restoration in support of wildlife species within the state's developed metropolitan areas. Beyond benefits to wildlife, the IDNR notes that it has been repeatedly documented over the last decade that the integration of nature and wildlife habitat into, or back into, the cities and communities has multiple benefits to the social, economic, and human health of the urban citizen. Illinois' Metropolitan Areas support significant populations of SGCN, which include species identified by the Illinois Endangered Species Protection Board as Threatened or Endangered Species (see figure 5). These Illinois Metropolitan Areas also include a significant number of Illinois Nature Preserves and Illinois Natural Area Inventory sites, fall within designated IWAP Conservation Opportunity Areas, and Important Bird Areas. The goals and actions identified within the Green Cities/Metropolitan Areas Campaign are critically important to supporting SGCN and the habitats upon which they depend. Collectively, these Metropolitan Areas provide valuable statewide linkages for migratory species that are listed as SGCN (IDNR, 2016). SA-04 would cross both the Quad Cities Metropolitan Area and Chicago Metropolitan Area (see figure 6), which include the following priority areas:

1. The Midewin National Tallgrass Prairie is within the Chicago Metropolitan Area in Will County. Midewin is the first tallgrass prairie to be established under federal control. Encompassing over 19,000 acres, it is the largest tallgrass prairie complex in the state, and is second only to Prairie Ridge State Natural Area in the number of nesting area-sensitive grassland bird species (IDNR, 2016).
2. IDNR is working to maintain and restore mesic oak woodland communities along the Des Plaines River and Fox River to benefit the blue spotted salamander, red-headed woodpecker, and other species that inhabit this community type. SA-04 crosses both the Fox River and Des Plaines River. Portions of both the Fox River and Des Plaines rivers also provide suitable habitat for the Iowa darter. The mottled sculpin can also be found in tributaries to the Fox River (IDNR, 2016).

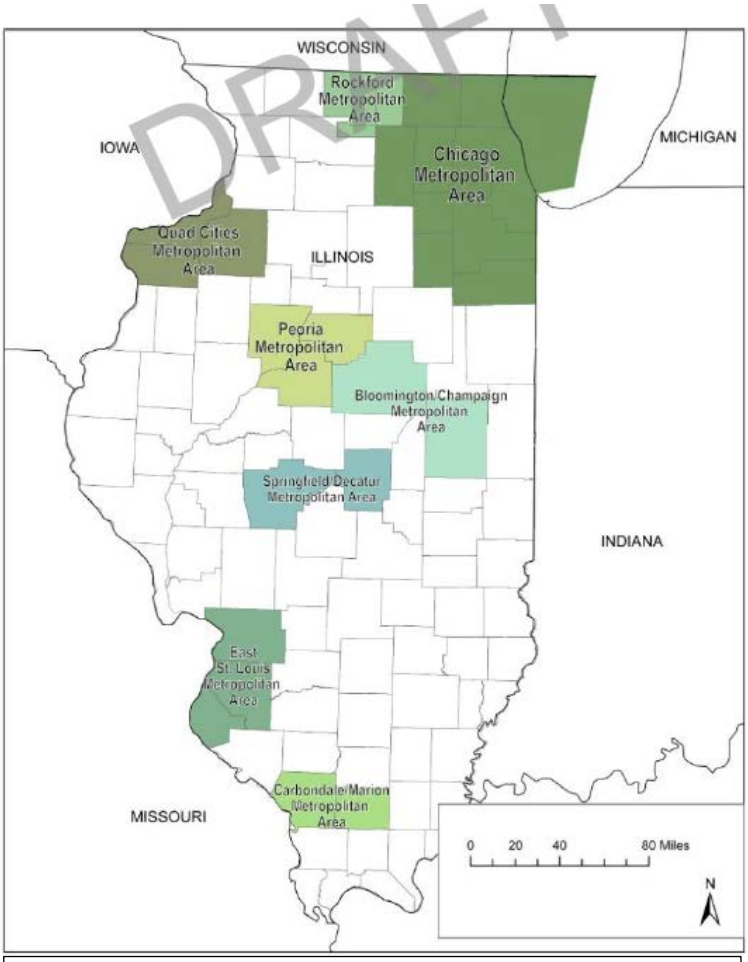

Figure 6. Illinois WAP Metropolitan / Urban Focus Area (Source: IDNR, 2016)

<u>Streams</u>: The Streams Campaign focuses on maintaining robust communities of native wildlife and improving the capacity of lands and waterbodies to support populations of aquatic SGCN through restoration, enhancement, and protection (see Figure 7). Over 200

species of fish, 80 species of mussels, and 70 species of freshwater snails are known to have resided in Illinois waters along with numerous crayfish, frogs, salamanders, snakes, turtles, waterfowl, and hundreds of species of aquatic insects. Based on 2011 monitoring data, aquatic life use was fully supported in 60.8% of stream miles and 92.2% of standing waters that were assessed in Illinois (IDNR, 2016). Bol et al. (2007) developed a multi-taxa rating system to categorize the integrity and diversity of aquatic biota and identify stream reaches with biological significance in Illinois. Over 1,000 stream segments were rated in Bol et al. (2007) with 13% characterized as Class A for diversity and nine percent as Class A for biotic integrity. One hundred twenty-two stream segments (nine percent of all stream segments rated) were identified as biologically significant (see Figure 8) (IDNR, 2016) (data available at: http://www.dnr.illinois.gov/conservation/BiologicalStreamratings/Pages/default.aspx).

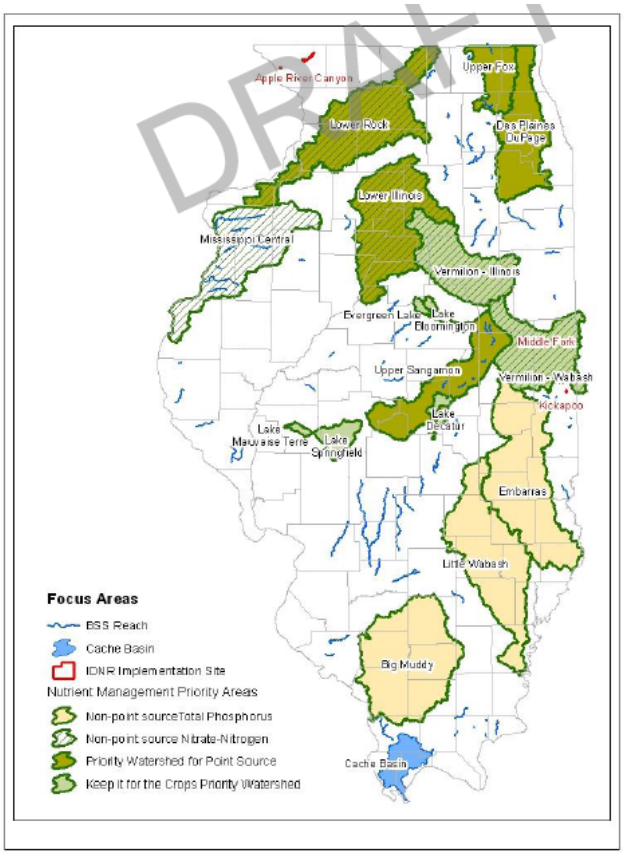

Figure 7. Illinois State Wildlife Management Plan Streams Campaign Focus Areas (Source: IDNR, 2016)

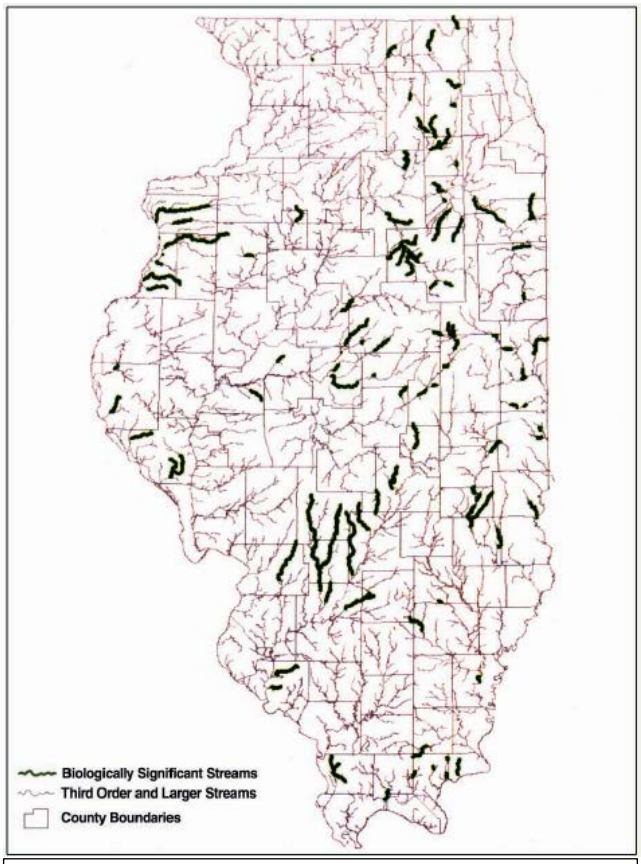

Figure 8. Illinois Biologically Significant Streams (Source: IDNR, 2008)

Wetlands: The Wetlands Campaign focuses on the conservation of wetlands throughout Illinois, but with specific emphasis on priority natural divisions with the greatest wetland resources or potential (Schulthies and Eichholz 2014). Illinois has lost over 90% of its original wetlands (Dahl 2006), with most remaining wetlands clustered in relatively small spatial areas within six natural divisions (IDNR, 2016). SA-04 would cross three of the six natural divisions, which are the focus areas of the Wetland Campaign: Upper Mississippi River and Illinois River

Bottomlands, Illinois River and Mississippi River Sand Areas, and Northeastern Morainal (see figure 9). Focal species found in these focus wetland areas include Blanding's turtle, black-crowned night heron, black tern, Illinois chorus frog, lesser scaup, odonates, short-billed dowitcher, Wilson's snipe, and wood duck.

Appendices 1, 6, 8, and 9 of the Illinois WAP (2016) identify the SGCN species that have the potential to occur in the Farmland and Prairie, Green Cities, Streams, and Wetlands campaigns, respectively.

Conservation Opportunity Areas (COAs): are known locations with significant existing or potential wildlife and habitat resources, where partners are willing to plan, implement, and evaluate conservation actions, where financial and human resources are available, and where conservation is motivated by an agreed-upon conservation purpose and set of objectives are also delineated and described in the Illinois WAP (2016). SA-04 would cross the following COAs (see figure 10):

1. *Upper Mississippi River*: the IDNR and others are working toward reestablishing wetland communities in the Upper Mississippi River to provide habitat to shorebirds, waterbirds, waterfowl, and herptiles; and to improve surface water storage capacity.
2. *Rock River*: the Rock River is a major corridor for migratory waterfowl and neotropical birds. Walleye are native to the upper Rock River, and its tributaries support the mottled sculpin.
3. *Green River*
4. *Lower Fox River*
5. *Midewin Grasslands*
6. *Kanakakee Sands*

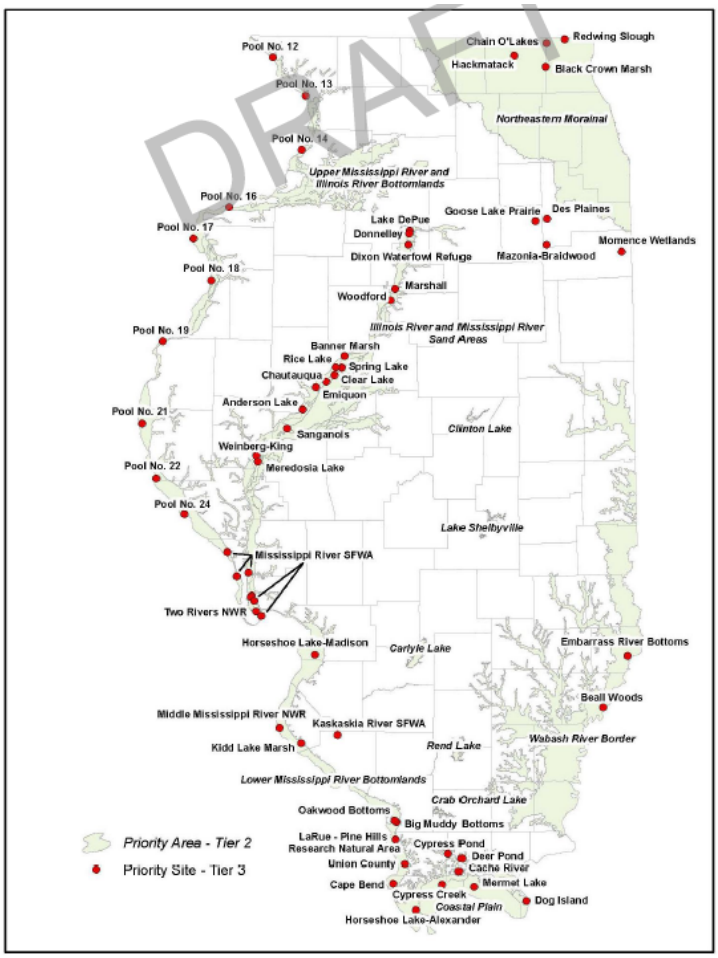

Figure 9. Illinois State Wildlife Management Plan Wetlands Campaign Focus Areas (Source: IDNR, 2016)

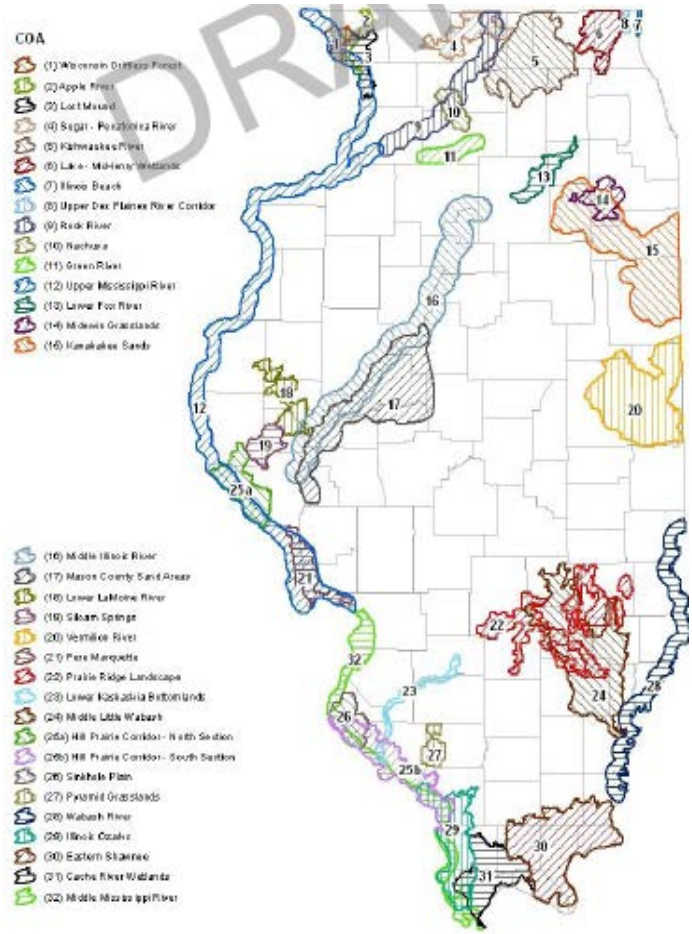

Figure 10. Illinois State Wildlife Management Plan Conservation Opportunity Areas (Source: IDNR, 2016)

Land Use

<u>Iowa</u>

The Iowa Geological Survey and Iowa Department of Natural Resources hosts a Natural Resources Geographic Information Systems Library (https://programs.iowadnr.gov/nrgislibx/) with a few publicly available environmental data sets that should be reviewed to identify potential SA-04 related impacts. Datasets include:

Recreation:

1. Canoe Routes for Major Rivers in the State of Iowa
2. Iowa's State and Federal Scenic Byways
3. Recreational Trails in Iowa

Based on review of these data, the SA-04 centerline and construction workspace would cross the following canoe routes: Little Cedar River (MP IA 501.9), Wapsipinicon River (MP IA 510.4), Little Wapsipinicon River (MPs IA 516.3 and IA 544.2), and Mississippi River (MP IA 672.3).

The SA-04 centerline and construction workspace would also cross the Grant Wood Scenic Byway (Highway 64), Great River Road Scenic Byway (U.S. 67), and Lincoln Highway Scenic Byway in Iowa, and two bike recreational trails maintained by the U.S. DOT.

Illinois

SA-04 would cross the Rock River (MP IL 694.5) in Whiteside County, Illinois. The Rock River Trail is a 320-mile water trail traversing Wisconsin and Illinois designated by the U.S. DOI. Rock River Trail Scenic and Historic Route was established by state legislation, paralleled by the Rock River Trail Bike Route (on- and off-trail with hiking opportunities).

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MLP Due Diligence Process for Screening Pipeline Maintenance Locations for Possible Contamination

Version 2 Dated June 2014

Background: Pipeline maintenance sites can be located in rural, residential, or industrial areas that may contain surface and subsurface contaminants that could pose a risk to site workers, the public, and the environment. Past practices to screen sites for the presence of potential contamination have varied and development of a Standard Operating Procedure (SOP) is necessary. The goal of this SOP is to reduce the potential for pipeline maintenance activities to inadvertently expose workers, the public, or the environment to contaminants present at pipeline maintenance sites.

This SOP is based on the assumption that the ROW is a previously disturbed area that has low potential for the presence of surface or subsurface contaminants that pose a threat to maintenance site workers or the public. In general, due diligence screening of maintenance sites should take into consideration the following potential contaminants that could have been disposed, spread, or spilled on the ROW, including but not limited to:

- Crude oil from past Enbridge spills and releases;
- Petroleum products associated with underground storage tanks;
- Industrial chemicals and products (metals, organic compounds, and pesticides);
- Agricultural chemicals and pesticides; and
- Other contamination.

Standard Operating Procedure:

This SOP is Enbridge Environment's process for addressing potential soil or groundwater contamination at maintenance digs and does not cover the actions of Enbridge Safety or Enbridge Lands. This SOP does not address the contractor's requirements; the contractor must follow the EMP and applicable permits and stop work if any environmental or safety concerns are present or suspected.

Step 1 - Complete Initial Site Screening-

Conduct record search of Enbridge Historic Leaks Database and readily available web- and map-based federal and state databases of potentially contaminated sites (see Appendix A). Identify all sites (both Enbridge historical releases and non-Enbridge sites) within 1,200 feet of the dig site.

Deliverable: Indicate on PERW that database search was completed; indicate which database(s) were searched; and indicate either No Further Action or Further Investigation Warranted. If further action is warranted, summarize for the findings and source(s) for the Enbridge Environment MLP Lead. Provide recommendations for further action that may include the following:

- Additional research
- Contacts with federal, state, local, and/or tribal agencies
- Estimate depth to groundwater and flow direction
- Contacts with land owners (Step 2)
- Site visit (Step 2)
- Screening, Sampling, and/or Analysis (Step 3)

The Enbridge Environment MLP Lead will notify other Enbridge staff as appropriate. The environmental consultant will provide notice to EI prior to site visit.

Step 2 - Conduct Phase 1 Site Visit

A) If no concerns are identified in Step 1, EI will indicate in Phase I report if anything identified during Phase I constitutes environmental concern. See Appendix B for Phase I form containing questions pertaining to potential contamination.

B) If concerns were identified in Step 1, the Phase I team will visually assess the dig site and surrounding area as warranted.

C) If concerns were identified in Step 1 but there is no scheduled Phase I, Enbridge Environment may direct the environmental consultant to conduct a reconnaissance site visit.

D) Results of the visual assessment at the time of the Phase I are documented in the portion of the Phase I inspection report which pertains to potential environmental concerns. The Phase I inspection report is provided to the environmental consultant.

E) The environmental consultant adds results of visual assessment at time of Phase I to field screening memo. Environmental consultant, in consultation with Enbridge Environment MLP Lead, recommends additional investigative work, as appropriate. If no further action is required, the site is cleared for execution with similar language to the following in the clearing email notice. In general, the language for the clearing email referencing the suspected and/or historical contamination should be provided to the Enbridge Environment MLP Lead for review if the suspected origin of the contamination was not the result of an Enbridge release. The language for the clearing email should be provided to the Enbridge Environment MLP Lead for review if the suspected origin of the contamination was the result of an Enbridge release, if warranted.

For example:

If suspected landfill debris, unusual odors, or other visual indications of impacts are encountered during excavation activities, the crew will stop work immediately and contact Construction Management and Enbridge Environment. In the event impacted soil or waste

material is excavated, soil and/or slurry will need to be segregated from clean material at the designated stockpile location. Impacted material should be placed in an area with a lined berm, or within a roll-off container (or equivalent). Enbridge Environment will collect the necessary soil sample(s) for laboratory analyses for waste disposal.

The depth to groundwater is estimated to be 9 to 11 feet below ground surface and is assumed to be contaminated (based on available information from nearby groundwater monitoring wells associated with the adjacent landfill and readily available public information). If dewatering is necessary during excavation activities, the water will need to be containerized. Enbridge Environment will collect the necessary waste water sample(s) for laboratory analyses for waste disposal.

OR

This dig is located approximately 880 feet west of an historical pipeline release location. The leak report indicates the release occurred on May 23, 1988. Approximately 40 barrels were released and 35 were recovered; the contaminated area was 100'x250'. Environment recommends that the CM discuss the presence of the historical release sites in close proximity to the planned dig sites with the local PLM supervisor for this region to obtain any additional information about the sites and notify PLM that historical contamination may be encountered during the digs. If contaminated soils are encountered, stop work immediately and contact Construction Management. Please notify Environment after the immediate notifications.

F) If additional investigation is warranted, the follow up actions should include contacts with the land owner. Enbridge Environment MLP Lead will assist Enbridge Lands in contacting the landowner to request information about past land use on and adjacent to the dig site.

G) If warranted and in consultation with Enbridge Environment MLP Lead, additional record review or agency contact may be conducted.

Step 3 - Develop Site Sampling and Analysis Plan

If warranted, Enbridge Environment will retain a qualified environmental consultant to assist in preparation of a work plan that will be used to guide sampling and analysis, which will be used to determine the degree and extent of contamination at the work area.

The consultant will provide the draft work plan to Enbridge Environment for review and approval. The consultant will proceed with work plan implementation only after receiving written approval from Enbridge Environment.

Step 4 - Conduct Field Sampling and Reporting

Enbridge Environment will implement the work plan. Following the receipt of analytical results, the consultant will prepare a draft report summarizing results and providing recommendations

for further investigation. The draft report will be submitted to Enbridge Environment for review and approval.

Based on the findings of the report, Enbridge Safety will be notified, who will follow their internal procedures for notifications and safety planning.

If no contaminants are found in investigation, the dig site will be cleared for execution with no conditions.

Step 5 - Issue Environmental Clearance

Conditionally clear dig with environmental conditions that are necessary using a site specific explanation similar to that in Step 2. A kick-off meeting will be conducted to review site conditions and precautions prior to Contractor mobilization. Safety and engineering requirements will be communicated by Enbridge Safety and the Project Engineer, respectively.

MLP Due Diligence Process for Screening Pipeline Maintenance Locations for Possible Contamination

Appendix A – Federal and State Contaminated Site Inventories and Databases

Federal

EPA Cleanups in My Community (includes Superfund National Priority List (NPL) sites, RCRA Corrective Actions (CA), Brownfields properties, federal facilities under EPA's cleanup programs, and removals from EPA's epaosc.net site):

http://ofmpub.epa.gov/apex/cimc/f?p=cimc:63:0

Illinois

IEPA Bureau of Land searchable databases:

http://www.epa.state.il.us/land/database.html

Indiana

IDEM Institutional Controls Registry Remediation Sites Report [PDF]:

http://www.in.gov/idem/files/institutional_controls_registry_report.pdf

IDEM Institutional Controls Registry Solid Waste Sites Report [PDF]:

http://www.in.gov/idem/files/institutional_controls_registry_report_sw.pdf

IDEM Voluntary Remediation Program (VRP) Project Site List:

http://www.in.gov/idem/4472.htm

Kansas

KDHE Bureau of Environmental Remediation Identified Sites List Information:

http://kensas.kdhe.state.ks.us/pls/certop/ISL_Public_Search

Michigan

MDEQ Environmental Mapper:

http://www.mcgi.state.mi.us/environmentalmapper/#SetZoomOut

MDEQ Brownfields - USTfields Site Directory:

http://www.deq.state.mi.us/ustfields/

Minnesota

MPCA What's in My Neighborhood? (can be downloaded and used in GIS or Google Earth):

http://www.pca.state.mn.us/index.php/data/wimn-whats-in-my-neighborhood/whats-in-my-neighborhood.html

MDA What's In My Neighborhood? Agricultural Interactive Mapping:

http://www.mda.state.mn.us/chemicals/spills/incidentresponse/disclaimer.aspx

MDA County Spill Report:

http://www.mda.state.mn.us/chemicals/spills/incidentresponse/countyspills.aspx

Missouri

MoDNR Hazardous Waste Program - Brownfields Voluntary Cleanup Program Interactive Mapping System:

http://www.dnr.mo.gov/simplemap/construct.do?config=longtermstewardship

MoDNR Hazardous Waste Program - Hazardous Waste Generators Map:

http://www.dnr.mo.gov/internetmapviewer/makemap.map?lyrs=ws12_tr6_tr5_tr3_tr2_tr1_bo2_wt2_wt18_wt1_aq1_wt17_bo1_na4_&iext=213366+860229+3974406+4509389&activecat=

New York

New York State Department of Environmental Conservation Environmental Remediation Databases:

http://www.dec.ny.gov/cfmx/extapps/derexternal/index.cfm?pageid=1

New York State Department of Environmental Conservation Region 9 - Environmental Remediation Project Information:

http://www.dec.ny.gov/chemical/37554.html

North Dakota

North Dakota Department of Health Underground Storage Tank Registry:
http://www.ndhealth.gov/ehs/foia/UST-LUST-DataExport/ust-data.aspx

North Dakota Department of Health Leaking Underground Storage Tank Registry:

http://www.ndhealth.gov/ehs/foia/UST-LUST-DataExport/lust-data.aspx

Ohio

Ohio EPA Brownfield Inventory Database:

http://epa.ohio.gov/derr/SABR/brown_dtb/brownfieldinventory.aspx

Oklahoma

Oklahoma DEQ Institutional Controls Web Viewer for Brownfields, VCP, SCAP, and Superfund:

http://www.deq.state.ok.us/lpdnew/ICviewer.html

Wisconsin

WDNR RR Sites Map (Barr has a Google Earth kml of this):

http://dnrmaps.wi.gov/sl/?Viewer=RR Sites

WDNR Bureau for Remediation and Redevelopment Tracking System (BRRTS) on the Web (searchable database):

http://dnr.wi.gov/botw/BasicSearchAction.do

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Enbridge Integrity Digs
Preliminary Dig Site Evaluation Form

Pipeline/Milepost: Click here to enter text.

Evaluation date: Click here to enter a date.

Environmental inspector: Click here to enter text.

Girthweld: Click here to enter text.

Site inspector name: Click here to enter text.

State/County: Click here to enter text.

Others present: Click here to enter text.

Evaluation type: Preliminary

Site type: ☐Wetland ☐Pasture ☐Cropland ☐Residential ☐Wooded ☐Roadway ☐Other (specify): Click here to enter text.

Detailed description of access route: Click here to enter text.

Has the access route been confirmed by R.O.W.? ☐Yes ☐No ☐Unknown

Are alternate access routes available? ☐Yes ☐No

If yes, would the alternate route decrease environmental impacts/permitting and/or matting? ☐Yes ☐No ☐Unknown

Will access to work area require cutting trees/brush/branches? ☐Yes ☐No ☐Unknown

If yes, number and size of trees/brush to be removed, dimensions of area to be cleared: Click here to enter text.

If yes, were any nests observed in the trees/brush/branches to be removed? ☐Yes ☐No ☐Unknown

Will the estimated work area exceed one acre? ☐Yes ☐No ☐Unknown

Will additional temporary workspace be needed outside of the permanent easement? ☐Yes ☐No ☐Unknown

If yes, provide details (note if in wetland or upland): Click here to enter text.

Apparent surface water features <500 feet from work area (i.e., lake, river, stream, drain, pond, wetland)? ☐Yes ☐No

If yes, description of surface water features and distance from work site: Click here to enter text.

Will a wetland be impacted? ☐Yes ☐No

If yes, total linear distance of wetlands impacted, in feet: Click here to enter text.

Will a waterway be crossed? ☐Yes ☐No

If yes, stream dimension: Click here to enter text., bank height: Click here to enter text., water depth: Click here to enter text., bankfull width: Click here to enter text.

Will a waterway impacted by excavation? ☐Yes ☐No

If yes, description: Click here to enter text.

**Provide additional details and photos if work will require crossing or working within a waterbody in Michigan or Wisconsin.

Where and what type of erosion and sediment controls appear to be needed? ☐NA Click here to enter text.

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Enbridge Integrity Digs
Preliminary Dig Site Evaluation Form

Pipeline/Milepost: Click here to enter text.

Evaluation date: Click here to enter a date.

Special construction methods required (Check all that apply):	
☐None	☐Drain tile
☐Aquadam	☐Site inundated with water
☐Permanent fill	☐Temporary well points
☐In-stream work	☐Other: Click here to enter text.

Is dewatering anticipated? ☐Yes ☐No

Is dewatering likely to discharge to surface water? ☐Yes ☐No

Description of probable dewatering plan: Click here to enter text.

Note any plants, animals or nests observed: Click here to enter text.

Were any of the following environmental concerns observed on the ROW or adjoining lands? ☐Yes ☐No If yes, provide photos and details: Click here to enter text.

- Waste piles or evidence of dumping or other waste disposal
- Man-made hills or depressions
- Stressed or dead vegetation, discolored soil or discolored water
- Evidence of any unknown material on ground surface
- Evidence of present or past chemical storage or use
- Evidence of aboveground or underground storage tanks
- Active or closed buildings that suggest current or past industrial activity
- Land use associated with potential contamination (landfills, waste treatment plants, agricultural pesticide storage facilities, storage ponds, septic fields, drains, culverts, etc.)

Access route:

Site plan, as described during Phase I, if requested:

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Enbridge Integrity Digs
Preliminary Dig Site Evaluation Form

Pipeline/Milepost: Click here to enter text.

Evaluation date: Click here to enter a date.

Enbridge Integrity Digs
Preliminary Dig Site Evaluation Form

Pipeline/Milepost: Click here to enter text.

Evaluation date: Click here to enter a date.

Include captions for all photos; include direction.

Photo 1: Click here to enter text.	Photo 2: Click here to enter text.
Photo 3: Click here to enter text.	Photo 4: Click here to enter text.
Photo 5: Click here to enter text.	Photo 6: Click here to enter text.

Mainline Projects (MLP) Procedures to Address Discovery of Contamination at an Active Dig Site April 2014

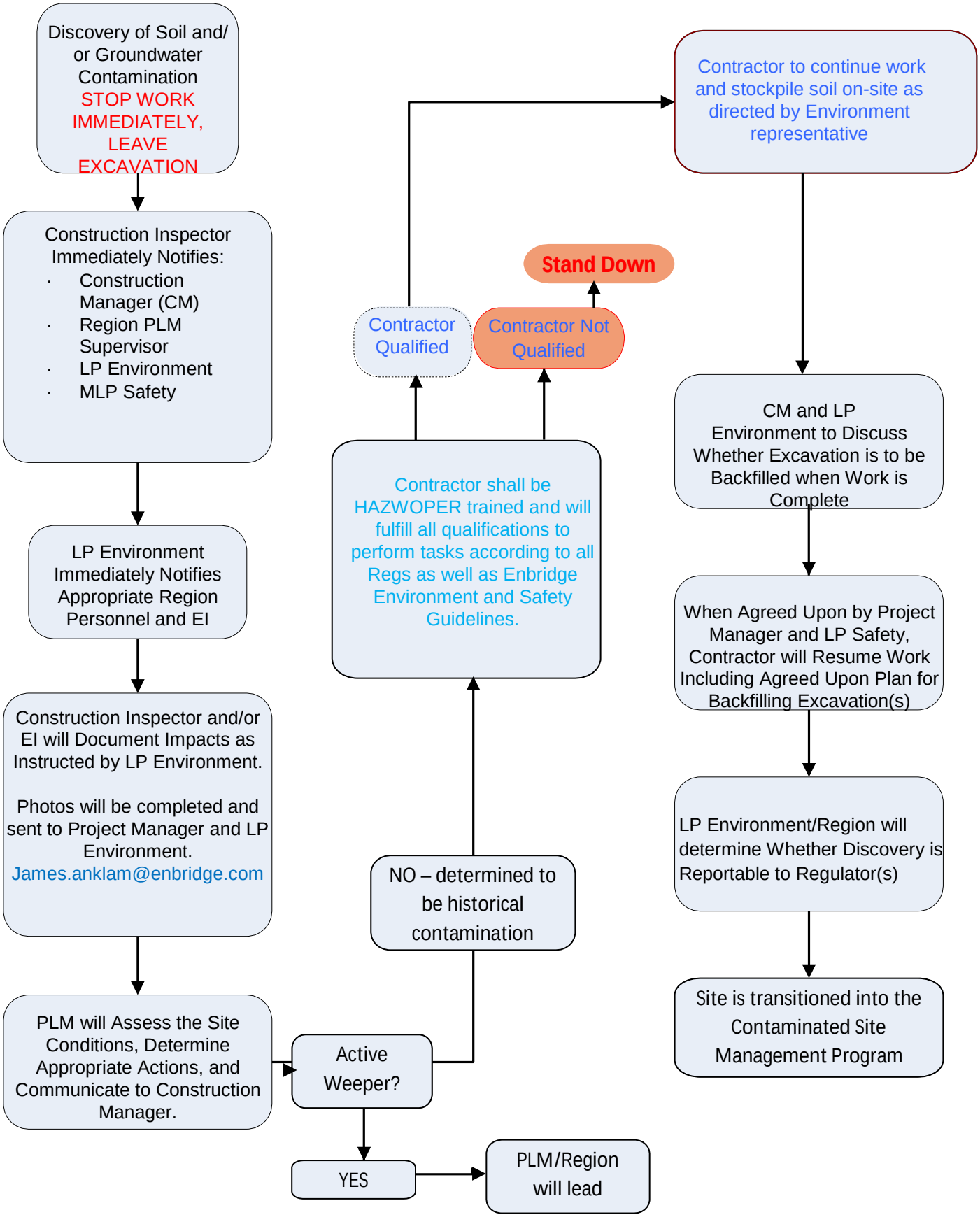

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BARR

Contaminated Sites Management Contractor Plan

Wisconsin

Segment 18 Project

Prepared for
Enbridge Energy

June 2017

ENBRIDGE

325 South Lake Avenue, Suite 700
Duluth, MN 55802
218.529.8200
www.barr.com

Contaminated Sites Management Plan

Segment 18 Project Contractor Plan

June 2017

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3.0 Contractor Response Actions 5

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Figure 2 Typical Pipeline Construction Sequence
Figure 3 Known Potential Contaminated Sites

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Appendix B Site Investigation Field Sampling and Screening Log
Appendix C Environmental Inspector Contaminated Site Response Form
Appendix D Contamination Management Flowchart

1.0 Introduction

This Contaminated Sites Management Contractor Plan (CSMP or Contractor Plan) has been prepared by Enbridge Energy, Limited Partnership (Enbridge) in preparation for the Segment 18 Project (Project) work that will take place in Wisconsin. The purpose of this Contractor Plan is to present guidance to Contractors for managing historically contaminated soil, water, debris or other materials that may be encountered during Project construction in Wisconsin.

The Project will involve replacing the existing Line 3 pipeline with a 34-inch pipe from the Minnesota-Wisconsin border to Enbridge's Superior Terminal facility (Figure 1). The Project pipeline will be constructed with modern construction methods and materials, as depicted in Figure 2. The topsoil in the right-of-way (ROW) will be stripped to a depth of 12 inches and temporarily stockpiled in the work space adjacent and parallel to the proposed pipeline trench. Trenching will be completed to a depth of approximately 6 to 8 feet below grade. Trench soil will be stockpiled separately in the work space to allow the topsoil to be replaced on top after trench backfilling. Dewatering is anticipated to take place extensively along the Project corridor. Both horizontal directional drill (HDD) and hydrovac activities are anticipated to produce slurry mud material which will be managed separately from trench soil.

1.1 Contaminated Material

1.1.1 Construction Related Spills

New spills generated during Project construction will be managed in accordance with the project-specific Spill Prevention, Containment, and Control Plan and Enbridge's Environmental Protection Plan that have been developed as documents separate from this Contractor Plan.

1.1.2 Known Potential Contaminated Sites

Contamination may be caused by petroleum products, agricultural chemicals, asbestos, or other industrial by-products that are present as a result of historical releases whether accidental, unknown or otherwise. Locations where contamination fitting this definition is encountered during the Project will be considered a contaminated site.

Enbridge conducted a review of environmental data to identify sites with potential contamination and/or historical environmental issues along the proposed Project route. The review included a search area corridor constituting 1,200 feet on either side of the route. Sites with known potential to encounter contamination are listed in Table 1 and are displayed in Figure 3.

1.1.3 Identifying Contamination

Contaminated soil, water, or debris will initially be identified by the Construction Contractor. Contamination will be identified by one or more of the following characteristics:

- Petroleum odors in soil or water
- Visual petroleum staining in soil or on vegetation

- Petroleum free product or sheen (e.g., rainbow or bluish colors) on water, soil, or debris surfaces
- Evidence of improper waste disposal such as industrial garbage, scrap materials, used containers, or other by-product type wastes
- Presence of man-made hills, depressions, or waste piles or evidence of dumping or other waste disposal
- Stressed or dead vegetation
- Soil that is discolored compared to adjacent or nearby soils
- Evidence of present or past chemical storage or use, including tanks, drums or containers
- Active or closed buildings and structures that suggest current or past industrial activity
- Evidence of land use associated with potential contamination (landfills, waste treatment plants, agricultural pesticide storage facilities, storage ponds, septic fields, drains, culverts, etc.)

If contamination is identified, an onsite Environmental Consultant may field-screen soil as it is being excavated for organic vapors using a photoionization detector (PID). Soil with a headspace reading greater than 10 parts per million (ppm) or with other evidence of contamination (e.g. chemical odor, discoloration, sheen, free-product) will be considered contaminated.

1.2 Uncontaminated Material

Non-contaminated debris (e.g. common household waste, construction debris, old appliances, etc.) with no apparent signs of contamination may be encountered during construction of the Project. If manmade debris is identified by the construction contractors, it will not be suitable for reuse on the Project as backfill.

The Construction Contractor may encounter natural organic (i.e., biogenic) sheens where the Project crosses wetlands, ditches, or other water-saturated surfaces. A biogenic sheen can often be identified by breaking up the sheen with a stick and observing the sheen behavior. If the sheen remains broken into platelets and fails to re-coalesce quickly, it may be considered natural and not a source of hydrocarbon contamination. If the sheen quickly reforms or exhibits a typical rainbow petroleum-type sheen on the surface of the water, then the material will be considered contaminated.

If there is any doubt as to whether material encountered is contaminated, Enbridge Environment will be contacted to complete additional assessments and to determine appropriate management actions.

2.0 Roles and Responsibilities

The following section provides a summary of roles and responsibilities as they pertain to contaminated site management during the Project.

2.1 General Project Perspective

Enbridge is committed to achieving a high standard of environmental protection and is committed to the proper management of unanticipated environmental conditions, including contamination, encountered during pipeline construction.

Enbridge's expectations for work during the Project include the following:

- conduct all work activities safely and effectively;
- work with all stakeholders together in a constructive fashion to accomplish Project objectives while protecting the interests of all parties; and
- comply with regulatory rules and guidelines.

Multiple parties will be working together to ensure proper installation of the pipelines while maintaining environmental compliance. The parties expected to have a major role in maintaining environmental compliance and proper management of contaminated materials are Enbridge, its Consultants and Contractors, Government Agencies, and other stakeholders.

2.2 Enbridge Major Projects Environmental Staff

Enbridge Major Projects Environmental Staff are included in the attached Contact List (Appendix A). The responsibilities of Enbridge Major Projects Environmental Staff associated with this project include:

- manage environmental permit compliance during Project construction (does not include in-depth management of contaminated sites);
- serve as the interface between the Project Engineering staff, contractors, and the Liquid Pipelines Environmental Staff;
- oversee site-specific management and disposal of debris that may be encountered during construction; and
- track construction progress and advise Enbridge's Liquid Pipelines Environmental Staff if contamination is encountered at any given location.

2.3 Enbridge Liquid Pipelines Environmental Staff

Enbridge Liquid Pipelines Environmental Staff are included in the attached Contact List (Appendix A). The responsibilities of Enbridge Liquid Pipelines Environmental Staff associated with this project include:

- direct activities specifically associated with the CSMP for the entire Project;
- serve as the primary point of contact with regulators when dealing with contaminated sites;
- provide site-specific oversight for CSMP activities conducted where the line is collocated along Enbridge's existing pipeline corridor(s) and facilities;
- work directly with the Environmental Consultant (defined below) to implement the CSMP;
- oversee site-specific management and disposal of contaminated soil or groundwater that may be encountered during construction;
- maintain and update this CSMP, as necessary; and
- provide advance notice to applicable regulatory agencies when Project construction excavation is within one day of a location of a potentially contaminated site.

2.4 Environmental Consultant

Environmental consultant responsibilities associated with this project include:

- conduct a desktop review of databases with information pertaining to known or potentially contaminated sites prior to construction;
- respond to reports of contamination at the direction of the Liquid Pipelines Environmental Staff;
- oversee and coordinate site-specific management and disposal of contaminated materials encountered during construction (with Enbridge Liquid Pipelines Environmental Staff approval);
- document site conditions at contaminated sites prior to construction backfilling using appropriate field screening and analytical sampling methods (including completing Appendix B, Site Investigation Field Sampling and Screening Log);
- maintain a database of contaminated sites encountered during the Project;
- manage records associated with contaminated material management and disposal; and
- prepare site-specific memorandums and a final Project report of findings for sites addressed under the CSMP during Project construction.

2.5 Contractors

2.5.1 Chief Inspector

Chief Inspector responsibilities associated with this project include:

- notify the Enbridge Major Projects Environmental Staff when construction activities involving ground disturbance are two days out from work commencing at known or potentially contaminated site; and

- provide initial notification to Enbridge Environmental Inspector upon discovery of any type of contamination at a site regardless of whether it is previously known or newly discovered.

2.5.2 Environmental Inspector

Environmental inspector responsibilities associated with this project include:

- maintain overall environmental permit compliance during construction activities (does not include comprehensive management of contaminated materials);
- serve as an onsite point of contact in the field during construction and restoration;
- provide an initial assessment and onsite guidance regarding contamination prior to mobilization of the Environmental Consultant; and
- notify Enbridge Major Projects Environmental Staff and complete the attached Contaminated Site Response Form (Appendix B) when contamination or suspected contamination is encountered during construction.

2.5.3 Construction Contractor

Construction Contractor responsibilities associated with this project include:

- continually evaluate the pipeline excavation for unanticipated conditions including potential contamination;
- provide the initial report to the Chief Inspector if contamination is encountered at a site; and
- work with Enbridge Liquid Pipelines Environmental Staff and the Environmental Consultant to arrange for proper removal, temporary storage/containment, and transport of contaminated materials offsite.

2.6 State Regulatory Agency

Enbridge Environmental Staff will work with the Wisconsin Department of Natural Resources (WDNR) as the government agency with jurisdiction over contaminated sites encountered during Project construction. Only representatives from Enbridge will provide notifications and contact with the WDNR unless explicit instructions are given by Enbridge indicating otherwise. The contact information for the WDNR office is provided below:

Wisconsin Department of Natural Resources
Remediation and Redevelopment Program
1701 N. 4th St.
Superior, WI 54880
Phone: (715) 392-7822

3.0 Contractor Response Actions

In the event that contaminated soil, water, or debris is encountered, the Construction Contractor will take the following response actions which are depicted in the Contamination Management Flowchart (Appendix D).

1. **Cease Work**
   - The Construction Contractor will cease work activity in the vicinity of the contamination.

2. **Address Safety**
   - The Construction Contractor will refer to the Project Safety Plan and consult with Enbridge's Project Safety representatives to determine proper health and safety actions.

3. **Notify Enbridge**
   - The Construction Contractor will notify the Chief Inspector who will notify the Environmental Inspector as soon as possible after taking initial safety precautions.
   - The Environmental Inspector will notify Enbridge Liquid Pipeline Environmental Staff and will complete the Environmental Inspector Contaminated Site Response Form (Appendix C) documenting response actions and estimated impacts.
   - Enbridge Liquids Pipeline Environmental Staff will make a determination as to whether the contamination is due to an active/ongoing release or a historical release of contamination.

4. **Prevent Contaminant Migration**
   - Build earthen dams to isolate the contamination
   - Deploy sorbent pads and booms to remove and isolate petroleum contamination

5. **Containerize Contaminated Material**

   The Construction Contractor will segregate contaminated material from clean material to the extent possible. The contaminated material will be clearly labeled with the milepost and date it was removed from the trench. The material will be stored at the job site until disposal at an offsite facility is approved.

   - **Contaminated dry soil** and debris will be placed on plastic sheeting or within a rolloff dumpster and covered with plastic sheeting.
   - **Contaminated water** that needs to be dewatered from the excavation will be pumped into a frac tank or similar container. The Construction Contractor will make reasonable efforts to prevent crude oil from being mixed with containerized water.
   - **Contaminated hydrovac slurry and drilling mud** will be placed into a rolloff dumpster or bermed area lined with plastic and covered with plastic.

- Mud and slurry will be solidified with dry wood pellets, Portland cement, bentonite, or other appropriate absorbent material only at the direction of Enbridge Liquid Pipeline Environment Staff or the Environmental Consultant.

6. Resume Project Construction

7. Manage the Waste

- The Environmental Consultant may need to collect samples from the contaminated material for waste characterization disposal purposes. The typical process for obtaining **approval for contaminated waste disposal takes approximately 1 week** from the date of sample collection.
- The Environmental Consultant will identify proper disposal facility for the contaminated material and provide the Construction Contractor with shipping papers for transportation to the disposal facility.
- The Construction Contractor will arrange for transportation of contaminated material to the proper disposal facility.
- The Construction Contractor will maintain records of shipping and waste disposal and provide copies them to the Environmental Consultant.

Table 2 Contaminated Material Disposal Facilities

Type of Waste	Soil, Debris, and Solidified Mud	Water
Facility	Vonco V Landfill	Western Lake Superior Sanitary District
Address	1100 W Gary St Duluth, MN 55808	2626 Courtland Street Duluth, MN 55806
Phone	218.626.3830	218.722.3336

8. Assist with Environmental Documentation

- Depending on the characteristics of the contamination encountered, the Environmental Consultant may need to collect additional samples from the construction trench bottom and sidewalls **BEFORE backfilling occurs**.
- The Construction Contractor will assist the Environmental Consultant in this effort.

9. Backfill the trench with clean borrow material

- Never backfill with contaminated material.
- Document the source of the backfill material.

Table 1

Known Potential Contaminated Sites

Table 1
Known Potential Contaminated Sites
Segment 18 Project, Wisconsin

Site Number	Approximate Milepost	Site Name	Site Type	Agency Status	Distance and Direction to Release (feet)	Latitude	Longitude
1	1092.81	Pokegama Rail Yard	LUST, ERP, SPILLs	LUST - open ERP site - closed Spills - closed	800, NW	46.647287	-92.144596
2	1094.37	Lakehead Kimmes Inc. Landfill	Landfill	Closed	1214, NW	46.655475	-92.112699
3	1094.78	Sweeney Residence	LUST	Closed	950, NW	46.657692	-92.104365
4	1095.37	Kimmes Oil Bulk Plant	LUST, ERP	Closed	1108, NW	46.662181	-92.099909
5	1096.33	Spiering Residence	ERP	Closed	1320, SE	46.669632	-92.081512
6	1096.45	Nemadji Golf Course	LUST	Closed	2059, SE	46.669900	-92.076994
7	1097.34	CP Rail Sinson Yard Former Round House	LUST, ERP	LUST - closed ERP site - open	1056, W	46.684984	-92.076861
8	1097.72	Calumet/Murphy Refinery	ERP, SPILLs	Closed and open	686, NW	46.690196	-92.068495
9	1097.77	Enbridge Tank Farm	Historical Releases, ERP	Closed and open	--	46.687344	-92.066574

Environmental Repair Site (ERP); Leaking Underground Storage Tank (LUST)

Figures

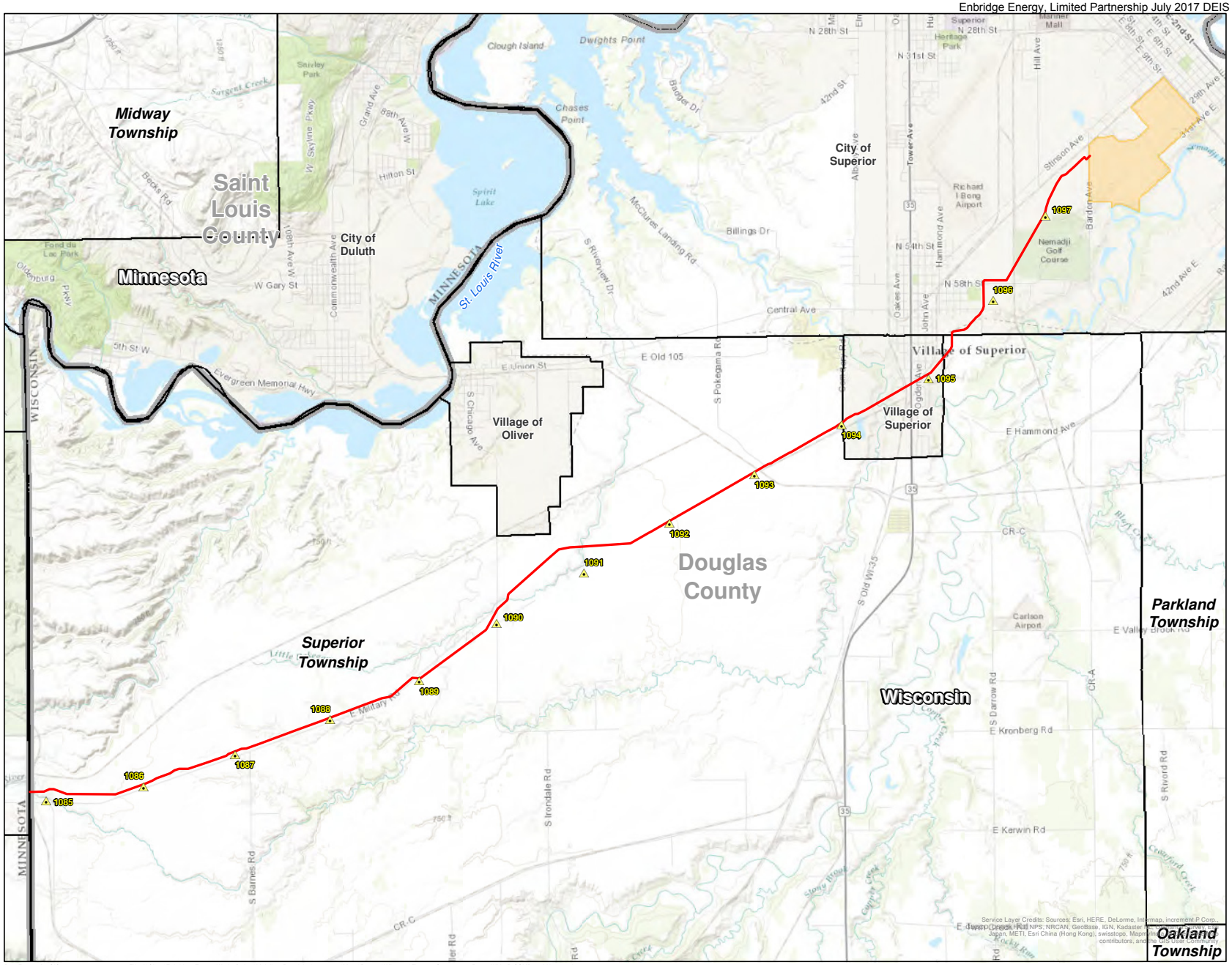

Approximate Line 3 Replacement (Corridor) Milepost

Known Contaminated Sites

Segment 18

Enbridge Superior Terminal

State Boundary

0 0.5 1 2

Miles

1 Inch = 1 miles

FIGURE 1

Segment 18 Route- Wisconsin

SEGMENT 18

CSMP

Douglas County, Wisconsin

ENBRIDGE

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Barr Footer: ArcGIS 10.4, 2017-05-02 12:31 File: I:\Client\Enbridge_Energy\Work_Orders\Mainline_Permitting\49161310\Maps\Reports\WI_2017\Figure 1 Segment 18 Route WI L3R CSMP.mxd User: mak3

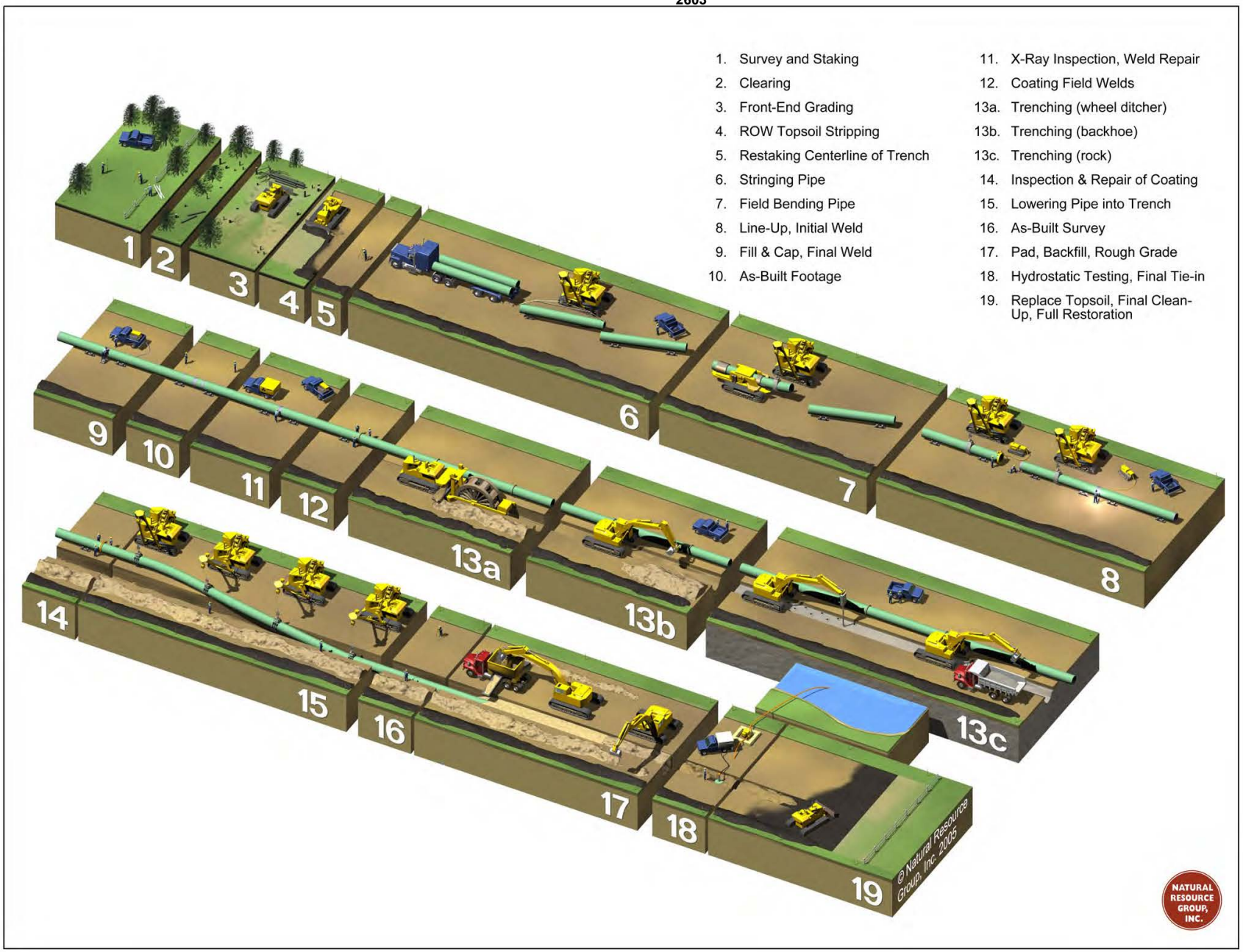

Figure 2

TYPICAL PIPELINE CONSTRUCTION SEQUENCE
SEGMENT 18
CSMP
Douglas County, Wisconsin

ENBRIDGE

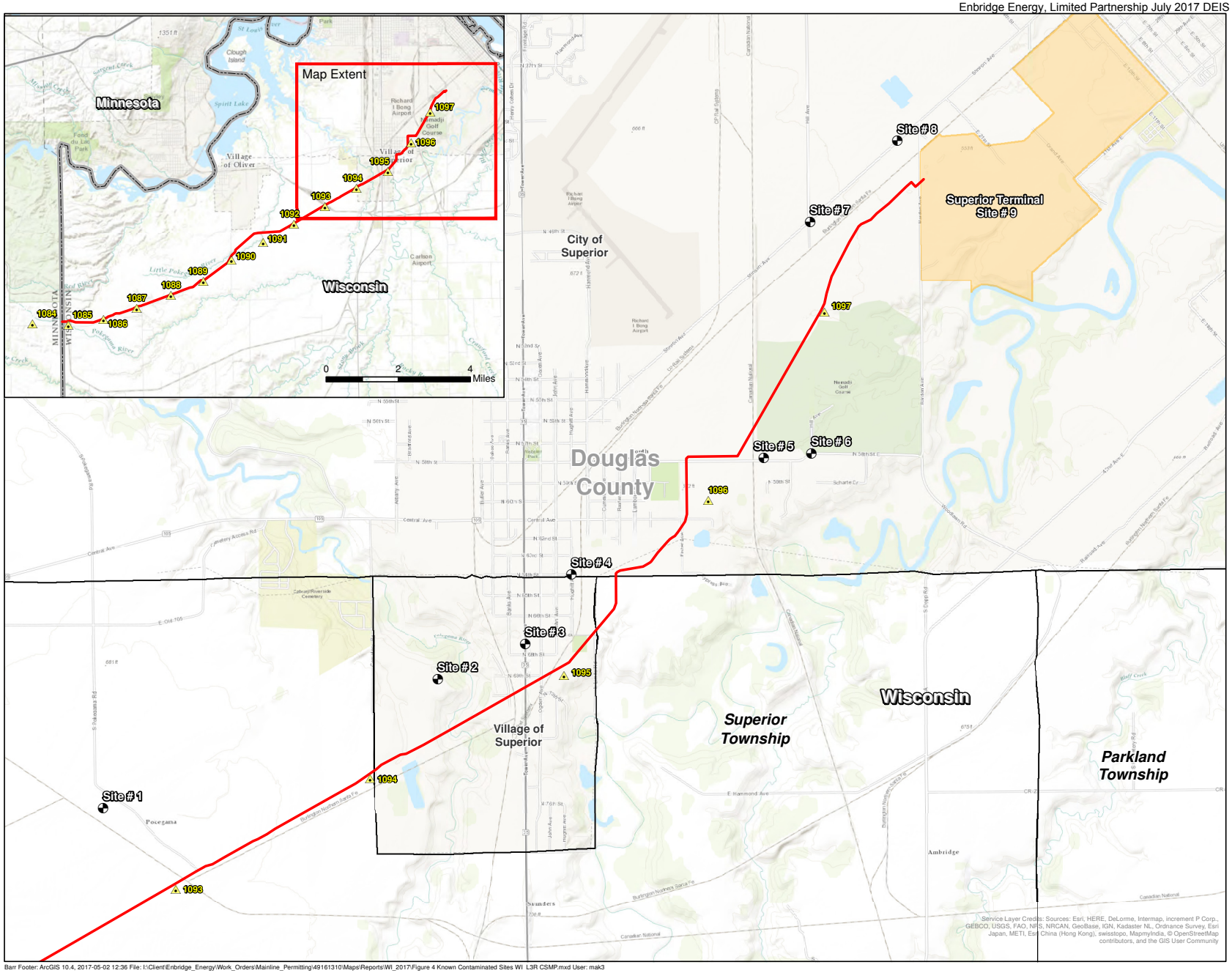

Approximate Line 3 Replacement (Corridor) Milepost

Known Potential Contaminated Sites

Segment 18

Enbridge Superior Terminal - Site # 9

State Boundary

0 1,250 2,500 5,000
Feet

FIGURE 3

Known Potential Contaminated Sites
SEGMENT 18
CSMP
Douglas County, Wisconsin

ENBRIDGE

2603

Barr Footer: ArcGIS 10.4, 2017-05-02 12:36 File: I:\Client\Enbridge_Energy\Work_Orders\Mainline_Permitting\49161310\Maps\Reports\WI_2017\Figure 4 Known Contaminated Sites WI L3R CSMP.mxd User: mak3

Appendix A

Contact List

Appendix A
Contact List
Segment 18 Project, Wisconsin

Contact	Company	Role	Phone (office)	Phone (cell)	Email
Andrew Orthober	Enbridge	Major Projects Environmental Staff, Environmental Analyst, Environmental Projects (U.S.)	218-522-4759	715-817-8723	Andrew.Orthober@enbridge.com
Karl Beaster	Enbridge	Liquid Pipelines Environmental Staff, Sr. Environmental Analyst, LP US Environment Operations	218-464-5623	715-718-1040	Karl.Beaster@enbridge.com
Hans Wronka	Barr Engineering Co.	Environmental Consultant, Senior Environmental Consultant	218-529-8208	218-343-6453	HWronka@barr.com
Emily Jurgens	Barr Engineering Co.	Environmental Consultant, Senior Environmental Consultant	952-832-2894	218-343-6773	EJurgens@barr.com
		Environmental Inspector TBD			
		Environmental Inspector TBD			

Appendix B

Site Investigation Field Sampling and Screening Log

SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Enbridge Energy, Segment 18 Date: _____

Milepost:_____ Sampler:_____

Sample Nomenclature *(Location - sample type - #):*

R = Removed **S** = Sidewall **B** = Bottom **Stockpile** = Stockpile

Sample ID	Depth *(FT)*	Time *(military)*	Soil Type *(USCS)*	Color/ Discolor	Odor/ Sheen	Headspace Reading *(ppm)*
Example: Stockpile-1	*4*	*16:30*	*CL*	*Reddish brown*	*Petroleum/ Rainbow*	*275*

Field Investigation Instrument Record: Photoionization detector with 10.6 eV bulb

	Calibration	Bump Test 1	Bump Test 2
Time			
Zero reading (ppm)			
Span reading (ppm)			
Background (ppm)			

SITE SKETCH : *north arrow, scale, excavation extents & depths, impacted areas, sample locations ,borings, wells, structures, utilities, natural features…*

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Appendix C

Environmental Inspector Contaminated Site Response Form

Environmental Inspector Contaminated Site Response Form

Name: _____

Date: _____ **Time:** _____

Milepost: _____ **Stationing:** _____

Potential Contamination Observed (check all that apply):

- ☐ Petroleum odors in soil or water
- ☐ Visual petroleum staining in soil or on vegetation
- ☐ Petroleum free product or sheen (e.g., rainbow or bluish colors) on water, soil, or debris surfaces
- ☐ Evidence of improper waste disposal such as industrial garbage, scrap materials, used containers, or other by-product type wastes
- ☐ Presence of man-made hills, depressions, or waste piles or evidence of dumping or other waste disposal
- ☐ Stressed or dead vegetation
- ☐ Soil that is discolored compared to adjacent or nearby soils
- ☐ Evidence of present or past chemical storage or use, including tanks, drums or containers
- ☐ Active or closed buildings and structures that suggest current or past industrial activity
- ☐ Evidence of land use associated with potential contamination (landfills, waste treatment plants, agricultural pesticide storage facilities, storage ponds, septic fields, drains, culverts, etc.)
- ☐ Other (describe)

_____

_____

_____

_____

Response Actions

Has containment cell been constructed and lined with plastic? Yes / No
Containment Cell Dimensions (feet):
Quantity of Contaminated Soil Excavated and Stockpiled (cubic yards):

Estimated Impacts

Estimated Extent of Contaminated Soil (horizontal and vertical, in feet):
Has groundwater or surface water been impacted? Yes/No
Describe water impacts (sheen, free oil, etc.):
Nearest surface waterbody (name and distance):
Are any impacts observed in the nearest surface water body? Describe:

Describe response action activities on reverse.

Environmental Inspector Contaminated Site Response Form

Construction Contractor Contaminated Site Response Actions:

Appendix D

Contamination Management Flowchart

BARR

Appendix D
Contamination Management Flowchart

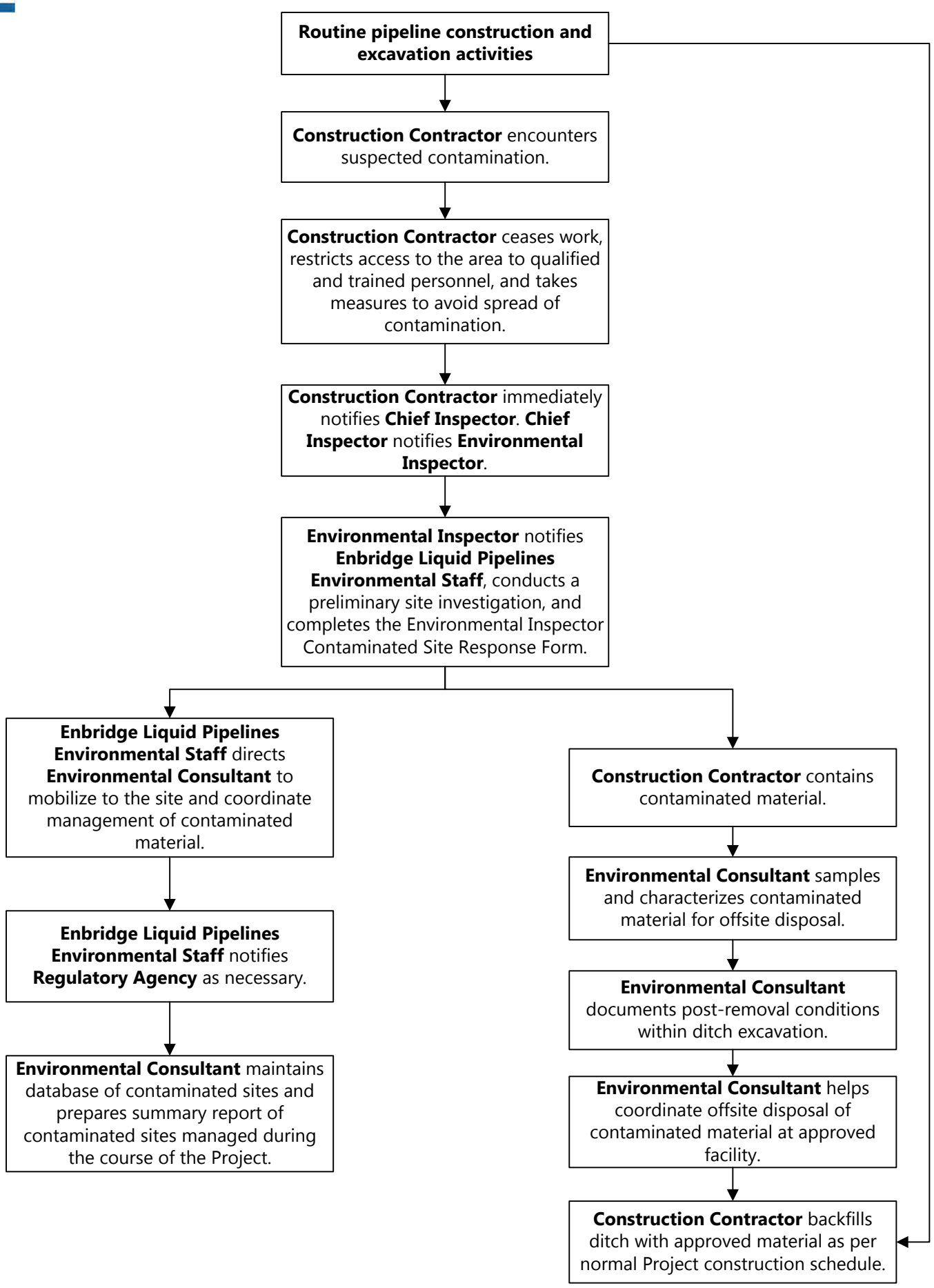

Fredrikson & BYRON, P.A.

December 19, 2016

VIA EMAIL

Joseph Plumer
White Earth Band of Ojibwe
P.O. Box 238
White Earth, MN 56591

Re: In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Replacement – Phase 3 Project in Minnesota from the North Dakota Border to the Wisconsin Border
MPUC Docket No. PL-9/CN-14-916; OAH Docket No. 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Pipeline Route Permit for the Line 3 Replacement in Minnesota from the North Dakota Border to the Wisconsin Border
MPUC Docket No. PL-9/PPL-15-137; OAH Docket No. 65-2500-33377

Dear Mr. Plumer:

Attached please find Enbridge Energy, Limited Partnership's Information Requests 1-6 to White Earth Band of Ojibwe, in connection with the above-referenced dockets. We recognize that some of the Information Requests may seek sensitive and/or confidential information subject to the current Protective Order. To the extent required, please contact me at your earliest convenience to coordinate. Please note that your responses will be due on Friday, December 30.

Please let me know if you have any questions regarding the attached.

Sincerely,

/s/ *Christina K. Brusven*

Christina K. Brusven
Attorney at Law
Direct Dial: 612.492.7412
Email: cbrusven@fredlaw.com

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Enbridge Energy. Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 1

Requested From: White Earth Band of Ojibwe

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
1.	Reference: *Geographic Information System (GIS) Mapping Analysis of Potential Community Vulnerabilities: The Proposed Sandpiper Pipeline in Northern Minnesota* (hereinafter, the "Mapping Analysis"), eDockets ID 20166-122153-02. Reference: "Honor the Earth selected 180 sites that serve as important cultural and archeological resources through this process. These resources include locations of burial mounds, cemeteries, sacred sites, medicinal plant and berry harvesting areas, drinking water well/springs and areas that are part of a spiritual or sacred landscape. Additional information regarding the specific importance and details of each site is available through a more in-depth assessment by the White Earth Tribal government which holds the documentation on each site." Mapping Analysis, Maps 5 and 6, pages 11-12. a. Please identify each of the 180 sites referenced on Maps 5-6 and the narrative summary on page 11-12 of the Mapping Analysis. b. For each site identified in response to 1.a., include: i. a description of the site, including whether it is a burial mound, cemetery, sacred site, medicinal plant and berry harvesting area, drinking water well/spring or area that is part of a spiritual or sacred landscape; ii. location of the site, based on current GIS data; and iii. the "documentation on each site" referenced on page 11 of the Mapping Analysis.

Enbridge Energy. Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 2

Requested From: White Earth Band of Ojibwe

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
2.	Reference: White Earth Nation's webpage https://whiteearth.com/programs/index.html@page_id=259&program_id=8.html defines "Cultural Resources" as "prehistoric and historic archaeological or anthropological sites, objects, historic standing structures, sacred and burial locations, and areas where traditional practices resources or cultural properties are used, located or collected. All of these resources are important to the White Earth Band of Minnesota Chippewa." Reference: Environmental Assessment Worksheet ("EAW") Exhibit A (Detailed Route Maps): a. To the extent not already provided in response to Enbridge IR No. 1, please identify any Cultural Resources that intersect or are located within 375 feet on either side of the centerline of the Line 3 Replacement Project Preferred Route west of Clearbrook shown on the detailed route maps attached as Exhibit A to the EAW. b. For each site identified in response to 2.a. include: i. a description of the site, including whether it is a burial mound, cemetery, sacred site, medicinal plant and berry harvesting area, drinking water well/spring or area that is part of a spiritual or sacred landscape; ii. location of the site, based on current GIS data; and iii. any supporting documentation related to the site.

Enbridge Energy. Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 3

Requested From: White Earth Band of Ojibwe

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
3.	Reference: White Earth Nation's webpage https://whiteearth.com/programs/index.html@page_id=259&program_id=8.html defines "Cultural Resources" as "prehistoric and historic archaeological or anthropological sites, objects, historic standing structures, sacred and burial locations, and areas where traditional practices resources or cultural properties are used, located or collected. All of these resources are important to the White Earth Band of Minnesota Chippewa." Reference: Final Scoping Decision Document (eDockets ID 201612-127062-04), Figures 1a, 1b, and 2. a. Please identify any Cultural Resources that intersect or are located within 375 feet on either side of the centerline of the System Alternative, Route Alternatives and Route Segment Alternatives shown on the detailed route maps attached as Appendix A to the EAW. b. For each site identified in response to 3.a. include: i. a description of the site, including whether it is a burial mound, cemetery, sacred site, medicinal plant and berry harvesting area, drinking water well/spring or area that is part of a spiritual or sacred landscape; ii. location of the site, based on current GIS data; and iii. any supporting documentation related to the site.

Enbridge Energy. Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 4

Requested From: White Earth Band of Ojibwe

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
4.	Reference: White Earth Nation's webpage https://whiteearth.com/programs/index.html@page_id=259&program_id=8.html defines "Cultural Resources" as "prehistoric and historic archaeological or anthropological sites, objects, historic standing structures, sacred and burial locations, and areas where traditional practices resources or cultural properties are used, located or collected. All of these resources are important to the White Earth Band of Minnesota Chippewa." Reference: Mapping Analysis, footnote 16, page 6 "Traditional Cultural Property (TCP) is a property that is eligible for inclusion in the National Register of Historic Places (NRHP) based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crats or social institutions of a living community." a. Provide the criteria used by the White Earth Band of Ojibwe to seek designation of a Cultural Resource as a TCP. b. Identify if any Cultural Resource or site provided in response to Enbridge IR Nos. 1, 2, or 3 is designated as a TCP. c. For any TCPs identified in response to 4.b., provide supporting documentation of the TCP designation.

Enbridge Energy. Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 5

Requested From: White Earth Band of Ojibwe

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
5.	Identify the legal boundaries of the White Earth Reservation. Please include a shapefile, official reference maps, or other documentation.

Enbridge Energy. Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 6

Requested From: White Earth Band of Ojibwe

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
6.	Identify any agreements, whether oral or written, which allow the Tribe or its members to hunt, fish, rice, gather, or conduct other traditional practices on properties located outside the boundaries of the White Earth Reservation. Where available, provide a copy or supporting documentation of the agreement and the location of the property where access has been granted.

Fredrikson & BYRON, P.A.

December 19, 2016

VIA EMAIL

Charles N. Nauen, Esq.
David J. Zoll, Esq.
Lockridge Grindal Nauen P.L.L.P.
100 Washington Avenue South, Suite 2200
Minneapolis, MN 55401

Re: In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Replacement in Minnesota from the North Dakota Border to the Wisconsin Border
MPUC Docket No. PL-9/CN-14-916; OAH Docket No. 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Pipeline Route Permit for the Line 3 Replacement in Minnesota from the North Dakota Border to the Wisconsin Border
MPUC Docket No. PL-9/PPL-15-137; OAH Docket No. 65-2500-33377

Dear Messrs. Nauen and Zoll:

Attached please find Enbridge Energy, Limited Partnership's Information Requests 1-7 to Mille Lacs Band of Ojibwe, in connection with the above-referenced dockets. We recognize that some of the Information Requests may seek sensitive and/or confidential information subject to the current Protective Order. To the extent required, please contact me at your earliest convenience to coordinate. Please note that your responses will be due on Friday, December 30.

Please let me know if you have any questions regarding the attached.

Sincerely,

/s/ *Christina K. Brusven*

Christina K. Brusven
Attorney at Law
Direct Dial: 612.492.7412
Email: cbrusven@fredlaw.com

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Enbridge Energy. Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 1

Requested From: Mille Lacs Band of Ojibwe

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
1.	Reference: *Geographic Information System (GIS) Mapping Analysis of Potential Community Vulnerabilities: The Proposed Sandpiper Pipeline in Northern Minnesota* (hereinafter, the "Mapping Analysis"), eDockets ID 20166-122153-02. Reference: "Honor the Earth selected 180 sites that serve as important cultural and archeological resources through this process. These resources include locations of burial mounds, cemeteries, sacred sites, medicinal plant and berry harvesting areas, drinking water well/springs and areas that are part of a spiritual or sacred landscape. Additional information regarding the specific importance and details of each site is available through a more in-depth assessment by the With Earth Tribal government which holds the documentation on each site." Mapping Analysis, Maps 5 and 6, pages 11-12. a. To the extent Mille Lacs Band of Ojibwe has supporting documentation on any of the sites identified on Maps 5 and 6 and/or pages 11-12 of the Mapping Analysis, provide such documentation. b. For each site identified in response to 1.a., include: i. a description of the site, including whether it is a burial mound, cemetery, sacred site, medicinal plant and berry harvesting area, drinking water well/spring or area that is part of a spiritual or sacred landscape; ii. location of the site, based on current GIS data; and iii. the "documentation on each site" referenced on page 11 of the Mapping Analysis.

Enbridge Energy. Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 2

Requested From: Mille Lacs Band of Ojibwe

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
2.	Reference: Final Scoping Decision Document (eDockets ID 201612-127062-04). Provide any definitions and/or criteria used by the Mille Lacs Band of Ojibwe to identify and/or define "Cultural Resources" as that term is used in the Final Scoping Decision Document.

Enbridge Energy. Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 3

Requested From: Mille Lacs Band of Ojibwe

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
3.	Reference: Final Scoping Decision Document (eDockets ID 201612-127062-04), Figures 1a, 1b, and 2. a. Please identify any Cultural Resources that intersect or are located within 375 feet on either side of the centerline of the System Alternative, Route Alternatives and Route Segment Alternatives shown on the detailed route maps attached as Appendix A to the EAW. b. For each site identified in response to 3.a. include: i. a description of the site, including whether it is a burial mound, cemetery, sacred site, medicinal plant and berry harvesting area, drinking water well/spring or area that is part of a spiritual or sacred landscape; ii. location of the site, based on current GIS data; and iii. any supporting documentation related to the site.

Enbridge Energy. Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 4

Requested From: Mille Lacs Band of Ojibwe

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
4.	Reference: Mapping Analysis, footnote 16, page 6 "Traditional Cultural Property (TCP) is a property that is eligible for inclusion in the National Register of Historic Places (NRHP) based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crats or social institutions of a living community." a. Provide the criteria used by the Mille Lacs Band of Ojibwe to seek designation of a Cultural Resources as a TCP. b. Identify if any Cultural Resource or site provided in response to Enbridge IR Nos. 1, 2, 3, or 5 is designated as a TCP. c. For any TCPs identified in response to 4.b., provide supporting documentation of the TCP designation.

Enbridge Energy. Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 5

Requested From: Mille Lacs Band of Ojibwe

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
5.	Reference: Environmental Assessment Worksheet ("EAW") Exhibit A (Detailed Route Maps): a. To the extent not already provided in response to Enbridge IR No. 1, please identify any Cultural Resources that intersect or are located within 375 feet on either side of the centerline of the Line 3 Replacement Project Preferred Route west of Clearbrook shown on the detailed route maps attached as Exhibit A to the EAW. b. For each site identified in response to 5.a. include: i. a description of the site, including whether it is a burial mound, cemetery, sacred site, medicinal plant and berry harvesting area, drinking water well/spring or area that is part of a spiritual or sacred landscape; ii. location of the site, based on current GIS data; and iii. any supporting documentation related to the site.

Enbridge Energy. Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 6

Requested From: Mille Lacs Band of Ojibwe

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
6.	Identify the legal boundaries of the Mille Lacs Reservation. Please include a shapefile, official reference maps, or other documentation.

Enbridge Energy. Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 7

Requested From: Mille Lacs Band of Ojibwe

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
7.	Identify any agreements, whether oral or written, which allow the Tribe or its members to hunt, fish, rice, gather, or conduct other traditional practices on properties located outside the boundaries of the Mille Lacs Reservation. Where available, provide a copy or supporting documentation of the agreement and the location of the property where access has been granted.

Fredrikson & BYRON, P.A.

December 19, 2016

VIA EMAIL

Frank Bibeau, Esq.
Honor the Earth
51124 County Road 118
Deer River, Minnesota 56636

Re: In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Replacement in Minnesota from the North Dakota Border to the Wisconsin Border
MPUC Docket No. PL-9/CN-14-916; OAH Docket No. 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Pipeline Route Permit for the Line 3 Replacement in Minnesota from the North Dakota Border to the Wisconsin Border
MPUC Docket No. PL-9/PPL-15-137; OAH Docket No. 65-2500-33377

Dear Mr. Bibeau:

Attached please find Enbridge Energy, Limited Partnership's Information Requests 1-3 to Honor the Earth, in connection with the above-referenced dockets. Please note that your responses will be due on Friday, December 30.

Please let me know if you have any questions regarding the attached.

Sincerely,

/s/ *Christina K. Brusven*

Christina K. Brusven
Attorney at Law
Direct Dial: 612.492.7412
Email: cbrusven@fredlaw.com

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Enbridge Energy, Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 1

Requested From: Honor the Earth

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
1.	Reference: *Geographic Information System (GIS) Mapping Analysis of Potential Community Vulnerabilities: The Proposed Sandpiper Pipeline in Northern Minnesota* (hereinafter, the "Mapping Analysis"), eDockets ID 20166-122153-02. a. Identify the person(s) responsible for preparation of the Mapping Analysis, and describe each person's role in such preparation. b. Provide the shapefiles used to conduct the Mapping Analysis. c. Provide the project centerline used to conduct the Mapping Analysis and a reference to the source for the centerline. d. Provide any and all data, materials, and/or documents used to conduct the Mapping Analysis. e. Identify and describe the methodology used to conduct the Mapping Analysis. f. Identify and describe the criteria used to determine what sites are "of specific tribal interest" on Maps 5 and 6 of the Mapping Analysis, and provide any supporting documentation available. g. Identify and describe the methodology used to create Map 5 of the Mapping Analysis, and identify and provide all supporting documentation, including shapefiles. h. Identify and describe the methodology used to create Map 6 of the Mapping Analysis, and identify and provide all supporting documentation, including shapefiles. i. Identify and provide all data supporting the statement that the "proposed pipeline route would bisect 180 sites of specific tribal interest as identified by Honor the Earth," including but not limited to the location and a description of each site. *See* Mapping Analysis page 23.

Enbridge Energy, Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 2

Requested From: Honor the Earth

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
2.	Has Honor the Earth conducted an analysis similar to the Mapping Analysis for the Line 3 Replacement Project? If so, please provide such analysis, as well as: a. Identify the person(s) responsible for preparation of the analysis, and describe each person's role in such preparation. b. Provide the shapefiles used to conduct the analysis. c. Provide the project centerline used to conduct the analysis and a reference to the source for the centerline. d. Provide any and all data, materials, and/or documents used to conduct the analysis. e. Identify and describe the methodology used to conduct the analysis.

Enbridge Energy, Limited Partnership Information Request

Docket No.: PL-9/CN-14-916 and PPL-15-137

Requested By: Enbridge Energy, Limited Partnership Information Request No. 3

Requested From: Honor the Earth

Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request No.	
3.	Reference: "Those [lakes] that remain provide important economic resources to the Tribal community, including $1 million in annual revenue from Lower Rice Lake and $500,000 from rice lakes in the East Lake community." Mapping Analysis, page 6. a. Provide the source and all documentation supporting the statement above. b. Identify the specific geographic location of the "East Lake community." c. Identify the rice lakes located in the East Lake community. d. For each of the rice lakes in the East Lake community identified in the statement above, provide a break-down of revenue by lake and include all supporting documentation.

Enbridge Energy, Limited Partnership Information Request
Docket No.: PL-9/CN-14-916 and PPL-15-137
Requested By: Enbridge Energy, Limited Partnership Information

Request No. 1
Requested From: Honor the Earth
Date of Request: December 19, 2016 Response Due Date: December 30, 2016

1. Reference: Geographic Information System (GIS) Mapping Analysis of Potential Community Vulnerabilities: The Proposed Sandpiper Pipeline in Northern Minnesota (hereinafter, the "Mapping Analysis"), eDockets ID 20166-122153-02.

a. Identify the person(s) responsible for preparation of the Mapping Analysis, and describe each person's role in such preparation.

i. Marcus Griswold- produced the mapping using GIS software.
ii. Data used in the mapping analysis was gathered from a wide range of information and compiled in the mapping summary. See summary on pages 23 and 24 plus footnotes.
iii. The mapping analysis was prepared through an entity called Technical Assistance Services for Communities.

b. Provide the shapefiles used to conduct the Mapping Analysis.

Please be aware that any information related to tribally important sites will not be released to you due in part to the fact that at Standing Rock Reservation when sites were identified, that the next day they were bulldozer and destroyed. Should Enbridge want access to this information the tribe would require Enbridge secure a bond of $500,000.00 to $1,000,000.00 per site to insure a similar action does not occur with these important sites. In addition this report was developed with information relating only to the Sandpiper pipeline the addition of Line 3 and the use of Line 3 in this corridor should not be assumed to be the same as that of the Sandpiper pipeline.

c. Provide the project centerline used to conduct the Mapping Analysis and a reference to the source for the centerline.

The centerline was obtained from North Dakota Pipeline Company preferred route as identified to the tribal governments.

d. Provide any and all data, materials, and/or documents used to conduct the Mapping Analysis.

(These files would require an agreed upon bond to be in place before any files would be release.)

e. Identify and describe the methodology used to conduct the Mapping Analysis.

The methodology used to conduct the Mapping Analysis were produced by ArcGIS and copyrighted © Ersi. Additional information used in the analysis was gathered from the public domain, published papers, or state of Minnesota reports.

f. Identify and describe the criteria used to determine what sites are "of specific tribal interest" on Maps 5 and 6 of the Mapping Analysis, and provide any supporting documentation available.

The criteria used to determine what sites are "of specific tribal interest" included: a review of archaeological information for Minnesota, consultation with experts working on archaeological sites in Minnesota, review geological information, consultation with tribal historical records, tribal oral history of important sites, and cultural review.

g. Identify and describe the methodology used to create Map 5 of the Mapping Analysis, and identify and provide all supporting documentation, including shapefiles.

The methodology used to create was to Map 5 was a review of archaeological information for Minnesota, consultation with experts working on archaeological sites in Minnesota, review geological

information, consultation with tribal historical records, tribal oral history of important sites, and cultural review. This information was then summarized and using ArcGIS software by Ersi ArcGIS and ArcMap. This software then produced the maps.

h. Identify and describe the methodology used to create Map 6 of the Mapping Analysis, and identify and provide all supporting documentation, including shapefiles.

See responds to "C" and "G".

i. Identify and provide all data supporting the statement that the "proposed pipeline route would bisect 180 sites of specific tribal interest as identified by Honor the Earth," including but not limited to the location and a description of each site. See Mapping Analysis page 23.

See response to "C"

Enbridge Energy, Limited Partnership Information Request
Docket No.: PL-9/CN-14-916 and PPL-15-137
Requested By: Enbridge Energy, Limited Partnership Information

Request No. 2
Requested From: Honor the Earth
Date of Request: December 19, 2016 Response Due Date: December 30, 2016

If you feel your responses are trade secret or privileged, please indicate this on your response.

Request 2. Has Honor the Earth conducted an analysis similar to the Mapping Analysis for the Line 3 Replacement Project? *No*

If so, please provide such analysis, as well as:

a. Identify the person(s) responsible for preparation of the analysis, and describe each person's role in such preparation. N/A

b. Provide the shapefiles used to conduct the analysis. N/A
c. Provide the project centerline used to conduct the analysis and a reference to the source for the centerline. N/A
d. Provide any and all data, materials, and/or documents used to conduct the analysis. N/A
e. Identify and describe the methodology used to conduct the analysis. N/A

Enbridge Energy, Limited Partnership Information Request
Docket No.: PL-9/CN-14-916 and PPL-15-137
Requested By: Enbridge Energy, Limited Partnership Information

Request No. 3
Requested From: Honor the Earth
Date of Request: December 19, 2016 Response Due Date: December 30, 2016

a. The annual wild rice income figures were present as part of oral testimony at public hearings.
b. Ease Lake is approximately 5 miles south of McGregor on Minnesota Hwy 65 (east of Rice Lake refuge).
c. Any and all lakes in the East Lake area likely have wild rice for many miles round.
d. Not aware of a lake by lake breakdown of revenue.

MS. JEANNE FAHLSTROM: Hi. It's Jeanne, J-E-A-N-N-E, F-A-H-L-S-T-R-O-M, F-A-H-L-S-T-R-O-M.

I have a cabin along the northern alternative route of the pipeline, and it has been causing me a lot of stress, and I would just like to say that I think of my parents who have passed, and they bought the land, they built the cabin for their children and grandchildren.

And now I'm a grandmother, and I'd like it to be -- to have the water and the forest clean. And hopefully, they will be able to have grandchildren some day and come there.

I think a lot of people in Minnesota can understand keeping the water clean, and keeping our forests and the animals, the people safe.

I think of Enbridge company as a guest here in Minnesota. We invite them. We keep inviting them back. This time, they want to cut down, as far as I can tell from the EIS -- it's a little unclear -- 750 feet swath

all along the pipeline corridor.

The part that's unclear, it's in Chapter 2, page 1, the difference between the construction right of way, the construction work space, additional temporary work space, and construction work area.

It's real unclear which is which, and are they going to just cut down and deforest or come across everyone's land for the whole 750 feet? And I think it would be great if that were clarified and specified in the EIS.

Also, we invite them -- they have their pipeline coming through Line 3, and in Chapter 2.2, Enbridge says that there's a high amount of corrosion and long seam cracking. This is the same thing that caused the spill in Kalamazoo.

And so we are allowing our guest to run this pipeline, and they're running dirty -- well, right now it's not, but they're running the tar sands pipeline through. Their new pipeline wants to be dirty tar sands that can't be cleaned up like in Kalamazoo.

I think that as guests they

should shut down Line 3 and fix it so that we don't have a huge spill here.

Let's see, also as guests, they should clean up their mess. The Line 3, as they say, is corroded and cracking and has over 900 anomalies, so it is likely leaking, yes, and Enbridge says in the Draft EIS that they have tested a 12-foot section in Canada. 0825-1

I believe that it would be appropriate to have a test -- any company knows this -- where the pipeline is, where they plan on cleaning it and abandoning it here in Minnesota, preferably larger than a 12-foot section, preferably a section that has the cracks and corrosion so we can see if their cleaning process leaks into the soil, and they can test that.

It's also a bit unclear, the cathodic protection. They say there's going to be a lining. I'm not sure if they're adding a lining, which sometimes happens, and what that lining will be, or if they're counting on the old lining that's already on the pipeline that is cracked already.

So if -- it would be good for

that to be specified so we know if that would even work and have it tested here in Minnesota.

So the other things, they've already talked about buoyancy control. The thing I worry about is there's so many areas already. There's no specification of when they will clean up or take out the mitigation for the buoyancy when the pipeline rises. There already is buoyancy here in Minnesota, and Enbridge knows that and they have not fixed that. 0825-2

So there needs to be a time limit set. Maybe they can tell us how soon they will clean up and take out those sections or fix them.

Otherwise, the EIS, what I've noticed, there's a total lacking -- of course I couldn't read it all because it's really long, but of the mention of the positive impact of removing Line 3 instead of abandoning it. I would like to see in it the amount of jobs and money it will generate and have that evaluated.

And other than that, I would like to just say that for the public utility commissioners and the people working on this,

Department of Commerce, you have this job to regulate things, and it's a short time that you are hired to do these things.

When people, including our legislators, are trying to take away your power -- you have the power to regulate. You need to step up and regulate. We need to step up and stand up, listen to the indigenous people, and for once, do what they say. Honor them. 0825-3

Could -- including these people who will regulate in the pipe workers, who I totally understand, you want jobs. This pipeline is not a for-sure thing. If Enbridge is telling you it is and you're going to get jobs, it's not a for-sure thing. Keep that in your mind.

One thing that would be for sure is to take out the old pipeline and insist that you get the jobs.

Could any of you live with it if the source of the Mississippi River gets polluted? This is dirty tar sands oil that can't be cleaned. It would catastrophic to Minnesota.

1 That's all. Thank you.
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Levi, Andrew (COMM)

From: Margaret Ferber <ferbermargaret@gmail.com>
Sent: Monday, July 10, 2017 8:10 PM
To: MN_COMM_Pipeline Comments
Subject: Comments regarding the EIS for the Proposed Enbridge Pipeline

TO: Jamie MacAlister, Environmental Review Manager Minnesota Department of Commerce
85 7th Place East, Suite 280 St. Paul, MN 55101-2198
Fax: 651-539-0109
FROM: Margaret Christensen Ferber, RN, MPH
7180 RIverview Terrace Fridley, MN 55432
email: ferbermargaret@gmail.com

RE: EIS for the Proposed Enbridge Pipeline

Docket numbers CN-14-916 and PPL-15-137

Dear Ms MacAllister,

I am a retired registered nurse with a Master's Degree in Public Health specializing in Occupational and Environmental Health & Safety. I spent 27 years out of my 40 year career in health care working in the field of Occupational and Environmental Health and Safety in Minnesota. I have great concerns about the health and safety impact of potential oil spills, especially as it relates to the quality of ground water.

I am also part owner of a family owned cabin on Big Whitefish Lake near Pine River, MN. This family cabin has been a part of my family history for over 70 years. We have enjoyed the beauty of the area and the recreational water activities such as swimming, fishing, boating, etc. Our cabin is on a 35 foot bank and has been experiencing erosion problems for many years. In 2011, I led our family in an effort to obtain a grant from WAPOA working with Crow Wing County, MN DNR and the University of MN. With the grant money we received we made many changes to our property to decrease erosion in an effort to help decrease problems with the water quality in Whitefish Lake. My husband and I also own a home on the Mississippi River in Fridley, MN. I mention these as examples of how concerned I am about the environment in which we live.

Some of my specific questions and concerns related to the EIS are:

1. I believe there is missing data in the Line 3 DEIS. There is apparently no information from a dilbit study done by the National Academy of Sciences, which you can find here: https://www.nap.edu/catalog/21834/spills-of-diluted-bitumen-from-pipelines-a-comparative-study-of. I would like this to be included in the final EIS. Thank you.

2. There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete. 2610-1

3. In Chapter 5 the methodology used for analyzing construction impacts to groundwater is inconsistent and biased to the Applicant's preferred route. The ROI (region of interest) for the Appllicant's route was a 1000 foot buffer on either side of the centerline of the route. For system alternative SA04, a 2500 foot buffer was considered on either side of the centerline. Potentail impacts to groundwater are biased towards Engridges's proposed route. 2610-2

Thank you,

Margaret Ferber, RN MPH in Occupational & Environmental Health & Safety

Levi, Andrew (COMM)

From: Rich Ferber <richmuggsyferber@gmail.com>
Sent: Monday, July 10, 2017 7:52 PM
To: MN_COMM_Pipeline Comments
Subject: Comment on Environmental Impact Statement Enbridge Pipeline

Docket #CN-14-916 and PPL-15-137.
In reading through through the executive summary I became concerned about what a leak would do to our water supply.
In table ES-2, it appears that the possible acreage that would be affected by a spill would be smaller with the APR. However, in table ES-4 it appears that the effect of a spill would be **much** greater to those sensitive areas with the APR than with the proposed RA-6 or with RA-3 routes. 2611-1
Considering that the water quality of the lakes and rivers in Minnesota, especially northern, Minnesota, is important to the entire state as a source of drinking water, via the aquifers, and as an economic resource for the state and the communities surrounding those lakes and rivers, I would like to know the following:
1- How quickly would our aquifers be effected by a spill.
2- Depending on the spill size, how much of the spill would eventually reach the aquifers.
3- What would be the economic impact on the state and the surrounding communities be if a spill did occurred.

Richard Ferber
Pharmacologist, 37 years at 3M in their Biosciences and Drug Delivery Laboratories.
Property owner on Whitefish chain.

Levi, Andrew (COMM)

From: Catherine FERGUSON <penelope2413@msn.com>
Sent: Monday, July 10, 2017 4:48 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment Re: Docket CN-14-916 and PPL-15-137

Dear Sirs and/or Madames:

Please note the important following questions re: the proposed Enbridge Pipeline : These questions need to be **asked** and **answered and seriously considered:**

1. Let's make sure this info about Cardno and Barr connections with Enbridge gets asked:

Who are the private contractors used to compile the EIS?
Do they have previous work histories with the Applicant?
If so, was "conflict of interest" considered in their employment?
Who hired them? The state or Enbridge?

2. Please explain this statement in the Executive Summary, Page 14 2612-1
"There is no one way to measure the general region-wide or state-wide differences in surface water resource quality across Minnesota."
So what measures/methodologies were used?

(Does this mean the TSI used by the MPCA in measuring eutrophication is not a reliable way to measure water quality????)

3. The Applicant's Preferred Route has numerous minor route alternatives to avoid significant features in the environment. Why were "minor route alternatives" not considered in the overall SA-04 route analysis?

4. In the Geology and Soils analysis why aren't the specific, not the generic, types of soils used in consideration of impacts whether construction or oil spills? 2612-2

5. Why no oil release sites along SA-04?

6. *"Minnesota's declared environmental policy is "to create and maintain conditions under which human beings and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of the state's people."*

The Minnesota Environmental Policy Act also requires that "Where there is potential for significant environmental effects resulting from a major governmental action, the action shall be preceded by a detailed environmental impact statement."

In this case, the "governmental action" are two separate but related decisions by the Minnesota Public Utilities Commission (Commission):

1. Whether to issue a certificate of need.
2. Whether to issue a route permit for the project, and if so, with what conditions."

"Enbridge submitted a CN application to the Commission on April 24, 2015. After accepting the application as complete, the Commission ordered the Department of Commerce, Energy Environmental Review and Analysis (DOC-EERA) to prepare a combined EIS that addressed both the CN and routing permit dockets in accordance with Minnesota Administrative Rule Chapter 4410."

"This EIS Evaluates Impacts and Alternatives for the CN Decision Using Applicable Criteria"

"Under these criteria, the Commission would first consider the underlying economic drivers for the proposed pipeline."

So WHY is the NEED for this pipeline project NOT being considered in this EIS?

7. Why is there no examination of corrosion from co-location of pipelines with high voltage transmission lines? A 4 yr old pipeline, Keystone 1, suffered leaks from accelerated corrosion due to stray voltage from powerlines.

8. Original Line 3 is 34 inches in diameter. New Line 3 proposed at 36 inches diameter. Why is larger diameter pipe necessary to achieve same barrels per day volume flow as the original Line 3? Will Applicant be re-applying to increase BPD flow to 990,000 as proposed in original Line 3 application?

9. Route alternative RA-08 is between Clearbrook and Superior. In the EIS Enbridge has stated RA08 could require 2 new pump stations west of Clearbrook. Why? Isn't that an error in the EIS? Can the public be confident they are receiving accurate information in the EIS?

10. Isn't the inclusion of rail and truck transport of oil to Superior a false equivalence in the preparation of this EIS? With the exception of a small refinery in Superior, 45,000BPD, everyone knows this oil is destined for markets further south in the United States.

In that case rail and truck traffic to Superior does not make sense. Shippers would use rail routes currently in operation.
What is purpose of "false equivalence" of rail and truck transportation to Superior especially when we know nearly all rail oil transport went south to Illinois and elsewhere, not Superior?

11. In Chapter 5 the methodology used for analyzing construction impacts to groundwater is inconsistent and biased to the Applicant's preferred route. The ROI, Region Of Interest, for the Applicant's route was a 1000 ft buffer on either side of the centerline of the route. For system alternative, SA04, a 2500 ft buffer was considered on either side of centerline. Potential impacts to groundwater are biased towards Enbridge's proposed route. 2612-3

12. Please provide contractor firms and names responsible for the groundwater hydrogeology assessments. Do these firms have a previous working relationship with Enbridge? 2612-4

13.System Alternative SA-04 is proposed to be in an existing pipeline corridor in Minnesota. This corridor was built in 2000. Did the EIS utilize any existing environmental review and/or assessments prepared for that project?

14. Enbridge is proposed to horizontally drill under certain stream and river beds. The drilling fluids used for that process contain additives. These additives are toxic to aquatic wildlife and vegetation if a frac-out occurs.

The Straight River, a nationally known brown trout stream, suffered a large frac-out during construction of the MinnCan Line 4 project. 2612-4 Cont'd

A drilling materials list should be provided to the public. The public cannot adequately comment without knowledge of these materials. What are those additives?

15. Construction of SA-04 would not affect any wild rice waterbodies. Construction of the Applicant's preferred route would result in impacts on approximately 5 acres of wild rice waterbodies. On the table provided the Applicant's route reads as impacting 3 acres. Which number is accurate? Please justify how this number was determined. 2612-5

16. A recent Enbridge direct mail promotion states 13,600 jobs will be created by the Applicant's project, but in the draft EIS the maximum number of jobs created is 4800, 600 local workers and 4200 non-local workers. Which is the correct figure? Explain the discrepancy. Who provided the information for calculating those numbers? 2612-6

17. On this subject there are discrepancies within the EIS in the numbers for construction "spreads" and workers per route alternatives. Please describe how these numbers were produced. In earlier Sandpiper testimony the company stated a much lower number of construction workers for that project and that these workers would be moving from one spread to another as construction was completed in one spread. Language in the EIS implies construction will be conducted across the proposed route all at once.

18. "The data obtained to describe the existing economic conditions in the ROI counties included county- level employment, income, and tax revenues *(where available)*. Potential direct and indirect impacts on the economic baselines in the ROI were determined using employment numbers and construction- related expenditures provided by the Applicant and estimates from other sources for other CN applications. This information was used to develop a qualitative analysis of the relative magnitude and expected changes to county-level employment and income levels, and to estimate the potential increase in income tax revenue by county." How can the public trust the qualitative analysis noted above if some information was NOT available?

19. Why isn't Itasca State Park considered a Minnesota historic resource?

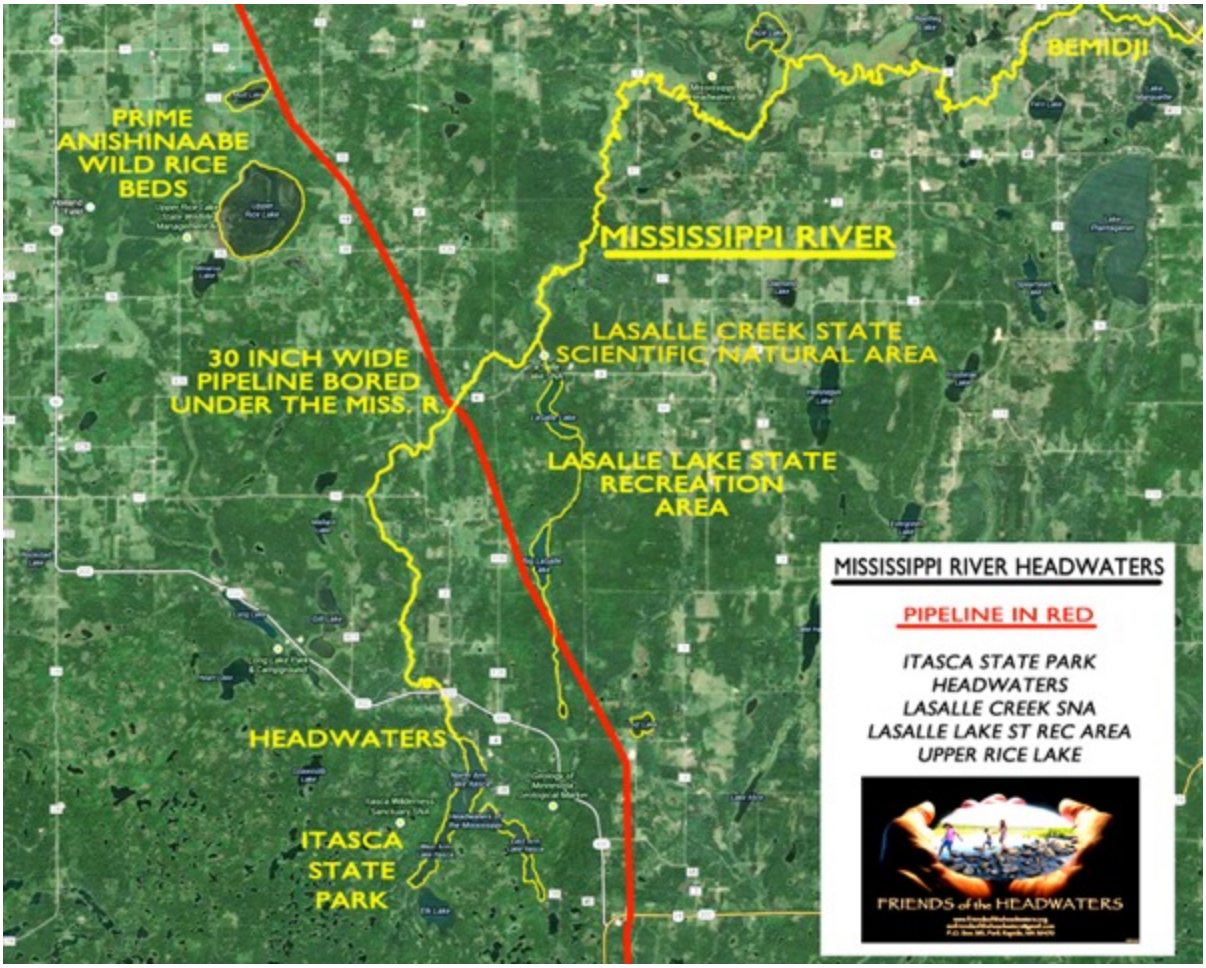

Thank you.

Sincerely,

Catherine Ferguson

Levi, Andrew (COMM)

From: Liz Fountain <lizfountain64@gmail.com>
Sent: Friday, June 23, 2017 9:42 AM
To: MN_COMM_Pipeline Comments
Subject: Comment on DEIS for Enbridge Line 3 (docket numbers CN-14-916 and PPL-15-137)

Dear Minnesota Public Utilities Committee:

Thank you for accepting public comments on the DEIS for Enbridge Line 3 (docket numbers CN-14-916 and PPL-15-137). My comments regard Section 11.4.1 Construction Impacts, specifically "other concerns" such as "sex trafficking and sexual abuse in local communities." Although the DEIS specifically notes evidence that sex trafficking increases in the so-called "man camps" and that Native populations are especially vulnerable, it's proposed mitigation relies on "education and awareness campaigns" put on by Enbridge. 0519-1

This is a shockingly weak recommendation for mitigation considering the human costs of sexual abuse and sex trafficking, and an almost cavalier dismissal of this issue as it affects the Native peoples in the vicinity of the pipeline. Education and awareness, while essential, does not stop sex trafficking and sexual abuse. Accountability and law enforcement do. Where is the requirement for Enbridge to police its camps? Where is the consideration of additional law enforcement needed to protect Native people?

With jurisdictional complexities on Native reservations, this becomes an even more vital issue to consider in whether to grant this permit. If you grant the permit, you know there will be an increase in sexual violence against the primarily indigenous peoples around the pipeline. What will you do to protect them?

It would be unconscionable to grant this permit without a plan in place to protect Native and other community members who will be put at risk. This is also a social justice issue. It should be covered in that section of the DEIS as well.

Hold the company accountable for the human damage it might cause as part of its construction, as much as you would hold it accountable for environmental damage.

There are many reasons to deny this permit. This is one of them.

I write as a concerned citizen, educator, and ex-counselor who worked with many sexual abuse survivors in an earlier part of my career.

Thank you for your serious consideration of the safety of the community.

Dr. Elizabeth Fountain

Levi, Andrew (COMM)

From: Allen <frech001@iphouse.com>
Sent: Saturday, June 17, 2017 7:22 PM
To: MN_COMM_Pipeline Comments
Subject: Comments on DEIS for Proposed Enbridge Line 3 Pipeline - docket numbers CN,-14-916 and PPL,-15-137
Attachments: Comments for Enbridge Line 3.pdf

Please find attached my submitted comments.

Thank you

Allen Frechette

1511 6th Ave. W.
Shakopee, MN 55379
June 17, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Dear Ms. MacAlister RE: docket numbers CN-14-916 and PPL-15-137

Please accept the following comments on the Draft Environmental Impact Statement (DEIS) for the proposed Enbridge Line 3 Pipeline.

Having read and commented on several environmental reviews for crude oil pipelines, I acknowledge that this DEIS appears relatively comprehensive, however, I find it still lacking in some critical aspects. My comments regard the Certificate of Need for the proposed Enbridge Line 3 Pipeline, which I believe is not only not needed for Minnesota, but presents an incremental threat to the entire planet. I will also comment on the decision for a Routing Permit, which affords the power of eminent domain and involves decisions regarding ultimate removal of the existing Line 3, which is proposed to be simply abandoned in place as well as the need to address ultimate removal of any new alternative pipeline.

This DEIS must consider the commitments that Minnesota and our nation have made to reduce our collective dependence on fossil fuels in a desperate effort to reduce greenhouse gases threatening life on our planet. The economic benefit (hidden subsidy) of a cheaper option for transporting crude oil is clearly contrary to the limitations afforded for the use of eminent domain. A helpful analysis of Minnesota laws in this regard was provided by the Minnesota House Research. (1)

The proposed replacement Line 3 obviously benefits Enbridge, a foreign corporation economically, but, in my opinion does not qualify as a public use or a public benefit in Minnesota The oil from this line will be refined outside of Minnesota for markets not benefiting Minnesota. Enbridge is an foreign corporation that would be granted the power of eminent domain to seize private property from Minnesota landowners if a Routing Permit and Certificate of Need were granted, contrary to the purposes that the power of eminent domain was intended for. Article XIII Section 4 of Minnesota's Constitution established the taking of private land for public use and though Minnesota Statutes Chapter 117.025 Subd. 10 (2) include crude oil pipelines as a public service corporation, that inclusion was established prior to legislative changes enacted in 2006, which are explained in the House Research report noted above. Further, Minnesota Statutes Chapter 117.48 (3) authorizes crude oil pipeline companies to use the power of eminent domain based on the assumption that crude oil pipelines are in the public benefit. Back in 1971, when crude oil pipelines were added to this statute, the connection between global warming and use of fossil fuels was not considered, nor even understood well, and it is, therefore, understandable that crude oil pipelines were believed to be of public benefit in 1971. However, in 2017, in light of the knowledge we have today of the implications to humanity for our continued use of fossil fuels, now well established in public law and policy, the concept that an interstate crude oil pipeline serves a public benefit must be questioned. Obviously, changes in the laws cited above are a matter for the Minnesota Legislature and not the Public Utilities Commission. The decision to determine need, however, is. The interstate and even international transport of crude oil to refineries that can process and sell the products internationally is not a public utility nor arguably even of public benefit,(4) but rather a hidden subsidy to the oil industry. As noted in the DEIS, alternatives exist for the conveyance of this particular crude oil, which, however are more expensive, or which might (continued use of the existing Line 3) require more maintenance and possibly temporary cessation of use for repairs and environmental contamination remediation. However, they do not require a permit from the PUC.

The DEIS also failed to consider that there are alternatives for the specific crude oil to be transported and assumed it as a given that this particular crude oil was necessary. It is not necessary to Minnesota, nor to our nation. It is only a means for profit to Enbridge. There are not only other sources of oil for our interim needs but there are as will be further discussed, competing cleaner energy sources. Therefore, there exists a higher threshold for demonstration of public benefit. The proposed Line 3 must be of significantly higher benefit to Minnesota than all alternatives. I contend that because of the cost benefits to be realized by Enbridge, which results in a competitive advantage favoring use of this particularly dirty oil rather than available competing non-fossil fuel alternatives or even less polluting oil, that it is actually contrary to public benefit. Eminent domain, therefore, must be included as a cumulative impact because it reduces the cost of constructing this pipeline.

0297-1

The DEIS failed to address the long term implications to affected land use including future development impediments. Once a crude oil pipeline is in place, it presents an impediment to future land use development, construction of roads or anything that might need to obtain an easement to cross the pipeline corridor. This results in increased costs for public entities needing to construct public infrastructure within a pipeline easement and development of land in the vicinity of a pipeline. These costs were not analyzed in the DEIS. Continued use of the current Line 3 or use of alternative modes of transporting the crude oil do not include these new cost implications.

Reducing the cost for acquiring easements with the use of state enforced eminent domain is a direct economic benefit to Enbridge that adversely affects the transition to clean energy, resulting in exacerbation of climate change. The National Council on Environmental Quality issued guidance [(5)]on considering greenhouse gas (GHG) emissions and climate change in National Environmental Policy Act (NEPA) reviews in 2016. Though links to this document have been removed by the current administration and the guidance was withdrawn without stated justification, the science that the guidance was based on has not been refuted. Therefore the scientifically justified guidance should be considered in addressing the issue of climate change in this DEIS. This should be presented in the EIS and it should help drive changes in state laws accordingly, because the provision of eminent domain for crude oil pipelines, as it has evolved, is arguably contrary to established law and public policy. [(6)]

The current market conditions related to oil involve numerous international competing public and private entities each trying to profit from their control of this historic resource before the world shifts to safer long term energy sources. Enbridge and interests connected to this project are competing with other oil related interests as well as the shift to alternative energy. The crude oil coming from Canada is not the only source of oil available to Minnesota, and in fact very little would likely benefit Minnesota. Thus, there is no need for Line 3 except to benefit the profits of the applicants. The project actually is competing with the transition to alternative energy, which would benefit all life on this planet.

Benefiting from hidden subsidies like the power of eminent domain, avoidance of financial obligation to remove the proposed 50-60 year old existing Line 3 along with associated undisclosed or unidentified existing contamination and avoidance of financial obligation for the eventual removal of the proposed new pipeline obstructs the transition to clean energy. Thus, approval of this pipeline benefits the profits of those who are collectively obstructing transition to cleaner energy at the expense of the environment and harm to future generations.

0297-2

The discussions in the DEIS related to removal of the existing Line 3, or the eventual need to remove a new alternate Line 3 being proposed were incomplete. The DEIS noted that: "*Enbridge estimates the cost of removing Line 3 at approximately $1.28 billion. This estimate is based on a per-foot cost for removal at about $855.*" However, the DEIS failed to note a way to ensure that the existing line 3 would ultimately be removed, such as reliable financial security. This must be addressed in the DEIS. There are thousands of miles of abandoned petroleum pipelines [(7)] in the United States that are reducing property values, obstructing land development and hiding contamination that was not disclosed by the pipeline owners. The EIS should consider the need to ultimately remove the entire pipeline and all associated infrastructure that would not be needed with

0297-2 Cont'd

the removal of the pipeline, and provide an analysis of the costs for removal and remediation of potential contamination that had not been identified during operation. This is a clear associated environmental impact that requires proposed mitigation. Enbridge's estimate for removal must also be evaluated for accuracy. This analysis should present research on the costs for removal of other abandoned pipelines in similar environmental settings as well as the historical documentation of pipeline companies actually properly removing their pipelines on their own. Financial assurance for ultimate removal of the proposed to be abandoned Line 3 as well as its replacement Line 3 should be addressed in any permit issued by permitting authorities in recognition of the demonstrated fact that LLCs have a poor record in this regard.

0297-3

The DEIS states: "*Some potentially significant effects are associated with abandoning the existing Line 3. These longer-term impacts would be caused by the continued presence of undiscovered legacy contamination that could exist around the existing pipeline, as well as the potential hazards associated with the aging of the abandoned pipe. These impacts include soil and water contamination, the ability of the pipeline to serve as a water conduit, subsidence due to the failure over time of the pipeline, and loss of buoyancy control for the pipeline. Although removing the pipeline is potentially desirable, abandonment is easier and far less risky*." I've underlined the word "risky" which is misleading and should be replaced with: "less costly to Enbridge". Another misleading statement is: "*Federal safety regulations outline the process and requirements for abandoning oil pipelines*." A more accurate statement would be: "Federal safety regulations outline the process and requirements for abandoning oil pipelines but lack requirements for ultimate removal, vacating associated easements or cleanup of associated contamination." This lack of responsible law is an impact that this EIS must acknowledge and address as an additional environmental impact.

0297-4

The draft EIS prepared by the PUC fails the requirements addressed in controlling Federal Regulations and Minnesota Rules for connected actions and cumulative impacts. Connected actions and Cumulative actions are defined in 40 CFR 1508.25: Scope (a) [8]

0297-5

"(a) Actions (other than unconnected single actions) which may be:

1 Connected actions, which means that they are closely related and therefore should be discussed in the same impact statement. Actions are connected if they:

(i) Automatically trigger other actions which may require environmental impact statements.
(ii) Cannot or will not proceed unless other actions are taken previously or simultaneously.
(iii) Are interdependent parts of a larger action and depend on the larger action for their justification.

1 Cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement."

Connected actions and cumulative impacts are also defined in Minnesota Laws: (See Guidelines) [9]

- Three types of relationships between projects qualify as connected actions (part 4410.0200, subpart 9b):
- One induces the other;
- One is a prerequisite for the other and is not justified by itself (the first occurring previously or simultaneously);
- or Neither is justified by itself; that is, the two projects are interdependent parts of a larger whole.
- Whenever two or more projects are related in any of these ways, they must be considered as one project, regardless of ownership or timing (parts 4410.1000 and 4410.2000, subparts 4)
-

Thus, the impacts to the environment associated with extraction of the crude oil and refining must be considered including the associated impacts to global warming and environmental pollution, which has the potential to

impact not only the immediate environments but the global environment. The extent of the connected actions need not consider the attached infrastructure that is currently in place and would continue to be used in the absence of the proposed Line 3, but the extended life of this infrastructure in the absence of the proposed new Line 3 should be questioned. Increased costs for transporting the crude oil from Alberta to refineries in the absence of the proposed new Line 3 could conceivably result in a quicker transition to renewable energy thereby benefiting the planet.

Tar sands crude has been identified as the dirtiest source of oil [10] resulting in greater impacts than competing sources of oil. If the PUC grants a Certificate of Need it facilitates the economics of this more environmentally damaging source of oil by avoiding the associated costs that should be identified and realized by society today as an obligation rather than ignored for future generations to deal with. One of these subsidies includes the unaddressed cost for ultimately removing the abandoned pipelines. The other is the power of eminent domain.

The alternatives presented in the DEIS fail to include alternative sources of oil from competing sources that result in less greenhouse gas emissions in comparison to the Canadian tar sands crude. The DEIS also fails to consider alternatives to oil for the primary market for the crude to be transported via Line 3, that is energy for transportation needs. The transition to alternatives such as electric or hydrogen based fuel for transportation are struggling to compete against continued dependence on oil. Permitting of Line 3 provides through the hidden subsidies presented here, an unfair and irresponsible market advantage to continued use of fossil fuel.

Considering the absence of financial security from Enbridge and consistent with the scope of the definitions of connected actions and cumulative impacts, there must be the inclusion of the costs associated with the ultimate need to demolish and remediate refineries and other infrastructure related to the extraction, transportation and refining of the crude oil that would be transported by the proposed pipeline. A search on abandoned oil refineries suggests that the industries' failure to remove and remediate contamination associated with their related infrastructure is (like abandoned pipelines) an historical problem that must be considered in any associated EIS as a connected action and cumulative impact.

The DEIS presented an analysis of the potential increases of green house gas emissions related to the proposed Line 3 relative to two alternative modes of conveying the crude oil from Clearbrook to the refineries. The analysis is based on future costs associated with dealing with increased impacts from global warming on future society. Lacking in this assessment however, is the additional cost for dealing with other aspects of this particular crude oil pipeline such as future societal costs for removal of the eventual abandoned Line 3 (both the old one and the proposed replacement pipeline) and the societal cost posed by the land development conflicts caused by both pipeline easements that will exist until the pipelines are ultimately removed and the easements vacated. Also lacking in the cost analysis is the lost market competition advantages for cleaner energy that would result from increased transportation costs associated with rail or truck. These adverse market impacts to an emerging market for clean energy alternatives are hidden subsidies for oil, should this pipeline be permitted.

The world has committed to a rapid transition away from fossil fuel toward clean energy. Any hidden subsidy associated with a governmental permit that benefits continued dependence on fossil fuel rather than clean energy obstructs this desperately urgent transition. The temporal costs associated with the retardation of the transition should be added to the cumulative societal cost impacts.

The DEIS presented a thorough analysis related to the relative safety (spills) between the preferred route, alternative routes, continued use of the existing Line 3, truck and rail transport. The underlying assumption, however, was that the same amount of crude oil would be transported one way or another. This lacked the obvious impacts of market conditions. If the cost for transporting this crude oil is not competitive with alternative options, (either fuel from other sources or increased replacement of oil as a source of energy by cleaner energy options) then the assumed volume of crude oil would not be transported. Transporting crude by truck or rail is more costly, thus favoring alternative sources of petroleum based fuels or more rapid transition to

cleaner alternative forms of energy. Since the globally desired outcome is a rapid transition to cleaner energy, then the most prudent decision would be to deny a Certificate of Need for the new Line 3. First, the pipeline does not benefit Minnesota, but presents numerous threats and problems. Secondly, it favors the economics of continued dependence on oil, resulting in more greenhouse gas emissions contrary to established laws and policies in Minnesota. And thirdly, it would facilitate the use of some of the dirtiest crude oil on earth resulting in greater releases of greenhouse gases than alternative sources of crude oil for the interim, albeit at a higher cost that would actually expedite the ultimate transition to cleaner energy options.

Respectfully

Allen Frechette

References:

(1)http://www.house.leg.state.mn.us/hrd/pubs/ss/clssemntdom.pdf

(2)https://www.revisor.mn.gov/statutes?id=117.025&year=2016&keyword_type=all&keyword=117.025+Subd.+10

(3)https://www.revisor.mn.gov/statutes/?id=117.48

(4)http://constitution.findlaw.com/amendment5/annotation14.html#1

(5)https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf

(6)http://www.presidency.ucsb.edu/ws/?pid=229

(7)https://pgjonline.com/2009/06/10/who-owns-abandoned-pipelines/

(8)https://www.gpo.gov/fdsys/pkg/CFR-2010-title40-vol32/pdf/CFR-2010-title40-vol32-sec1508-25.pdf

(9)https://www.eqb.state.mn.us/sites/default/files/documents/Guide%20to%20MN%20ER%20Rules-May%202010.pdf

(10) https://content.sierraclub.org/creative-archive/sites/content.sierraclub.org.creative-archive/files/pdfs/100_125_TarSandsDomestic_FactSht_01_low_0.pdf

Levi, Andrew (COMM)

From: rh smith <grizrs615@gmail.com>
Sent: Monday, July 10, 2017 2:42 PM
To: MN_COMM_Pipeline Comments
Subject: FOH DEIS Comments
Attachments: FOH DEIS COMMENTS.pdf

Attached please find Line 3 Comments
Thank you for your attention to these items.

--
Richard Smith
President, Friends of the Headwaters (FOH)
218-699-3737 O
612-708-0908 C

https://www.friendsoftheheadwaters.org
https://www.facebook.com/savemississippiheadwaters

2621

FRIENDS OF THE HEADWATERS

RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

Ms. Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Dear Ms. MacAlister,

Please find attached Friends of the Headwaters Response to the Line 3 DEIS.

FOH prepared a number of supporting documents (182MB) for this Response.
A package has been shipped to your office. Contents include the Response, Accufacts Report and supporting documents.

Thank you for your attention and consideration,

Sincerely,

Richard Smith
President, FOH

Note: Attachments for Letter 2621 included as F2 through F13

Friends of the Headwaters
P.O.Box 583
Park Rapids, MN 56470
www.friendsoftheheadwaters.org
www.facebook.com/savemississippiheadwaters

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

SECTION I. INTRODUCTION

In reviewing the DEIS, Friends of the Headwaters ("FOH") has concluded that our main concerns are with serious deficiencies in the methods of analysis of impacts and alternatives. If there are serious problems with methods, outcomes will be very different.

It is our conclusion that these faults are so serious and pervasive that the Draft Environmental Impact Study ("DEIS") needs to be redone. It should then undergo another public review of a new DEIS. We note that this was done on the Polymet DEIS—a project that the Minnesota Department of Commerce ("DOC") told the Minnesota Public Utilities Commission ("PUC") was the most similar to the Line 3 review. *(See Attachment: N-1 DOC Letter PUC re FEIS Adequacy.)*

In our comments, we have focused on key problems with methods and used examples to portray these problems. We do not provide a litany of all the problems found in the methods; nor examine all the proposed route or alternatives; the examples we have chosen illustrate the other problems. We also suggest alternative methods when possible.

Since the inception of our organization in 2014, it has been our purpose to not only support a rigorous and scientifically based EIS but also a rigorous examination of alternatives that includes a route carrying the intended oil product to its destination instead of a much longer route through Minnesota and Wisconsin lake country. This is especially important because:

a) The proposed location for the Enbridge Line 3 Expansion and Relocation pipeline is in especially sensitive areas,

b) Minnesota's policy of following existing corridors with future pipelines,

c) Enbridge's aging private infrastructure and possible replacement of other old lines,

d) Because this pipeline and any future pipelines, such as the potential revival of both the Sandpiper and Wisconsin Line 66 pipelines, will be in these sensitive locations for 50 plus years if this route is approved.

e) Such an EIS is absolutely necessary to inform the criteria in the Certificate of Need ("CN") decisions of the PUC.

FOH is submitting other documents that are an essential part of our comments. Our long involvement in the process that preceded the DEIS preparation generated important supporting information to apply to our critique of the DEIS. Some are referenced herein. These date back to the spring of 2014, involve both the Sandpiper and Line 3 projects and must be entered into the DEIS record. *(See attached Index of Attachments.). Digital copies of these documents are attached on a thumb drive in a FedEx submission to the DOC today. Three attachments referenced in our report are included with this document, however. (See Attachments: S-1 Accufacts Report, S-2 Accufacts Kuprewicz CV, U-1 Paul Stolen CV.)*

There is some redundancy in this material for a number of reasons. We attempt to make specific reference to the attached documents in the current comments, but may not always

succeed in doing so. Under Minnesota Environmental Quality Board ("MEQB") rules, however, we believe this is not necessary. Those responding to our comments need to fully examine all the attached in the same manner as these new comments dated today. 2621-1

Finally, we are aware that some readers of these comments might consider our concerns about oil releases as being overblown. To these we point to the largest *"on land"* oil spill in US history. It occurred in Minnesota near Grand Rapids in 1991. Sheer luck resulted in 40,000 barrels of oil not reaching the nearby Mississippi River. This was twice as big as the oil release in Michigan that has cost over $1.2 billion in clean-up costs.

SECTION II. SUMMARY OF POSITION OF FOH REGARDING DEIS DEFICIENCIES.

The following summarizes FOH reasoning for the finding of DEIS deficiencies. A parallel structure follows providing the details for each item. Below we describe eight sections, starting with *Section III*, of significant information supporting our position that the DEIS is seriously deficient as summarized in this section.

II. A. DEIS content regarding oil releases risks and impacts is deeply flawed.

It is obvious that oil releases into these surface and groundwater-rich locations must be central issues for complying with MEQB rules and the necessary application of DEIS content as it is applied to the CN decision criteria. *(See Section III.)*

II. B. The alternatives analysis is not adequate.

Both federal and state environmental review rules and guidance documents strongly state that the alternatives analysis is "at the heart of the EIS." There are many faults with this part of the DEIS, including ones that are related to our other main positions described in this section of our comments. One thing that stands out is that SA04, an alternative of the DEIS, was not given the same treatment as the other alternatives. *(See Section IV.)*

II. C. The cumulative impact assessment inadequate.

The DEIS is woefully inadequate with respect to this Minnesota Environmental Policy Act ("MEPA") and MEQB rule requirements for addressing cumulative impacts. Minnesota has seen a cumulative growth of pipeline corridors without ever examining the impacts. We also provide reasoning that the Sandpiper pipeline must be examined in the Cumulative Impact section of the DEIS, as well as a possible new large pipeline in Wisconsin for which some planning has already been accomplished. This part of the DEIS is also highly important with respect to the alternatives analysis and CN decision criteria. *(See Section V.)*

II. D. Physical and other construction impacts seriously underestimated.

The DEIS accepted at face value Enbridge's description of the Line 3 project's "footprint" during and after construction. MEQB rules and especially guidance documents make clear that an accurate description of this "footprint" is crucial to understanding the project's impacts. FOH estimates that the acreage figure alone underestimates this impact by at least 40 percent. *(See Section VI.)*

II. E. Near absence of site-specific impact assessment.

Neither the DEIS text itself, nor the two Enbridge funded reports incorporated by reference contain much actual site-specific impact assessment. The Stantec et al report uses detailed models to forecast the fate of released oil for seven selected sites but there is *no assessment of impacts of such pollution to the water bodies affected*. And the route comparisons rely on *data inventories* of environmental features along the various alternatives, but use no *specific impact analysis* to compare alternatives of them. *(See Section VII.)*

II. F. An independent review of multiple factors is necessary.

The DEIS relies on a large degree on Enbridge's analysis of impacts and on Enbridge's description of pipeline installation and operation features without any independent review of these topics. A modern pipeline is a complex and highly engineered system. Complex technological systems are subject to unforeseen failures. The recent May 2017 Federal Final Consent Decree *(Attachment P-1 Enbridge 5.23.17 Federal Consent Decree)* that resulted from the 2010 release of 20,000 barrels of oil from a pipeline rupture in Michigan describes an ongoing independent review of Enbridge's Mainline Corridor pipelines that resulted from Enbridge failures. We provide evidence that Minnesota must also conduct an independent review on multiple aspects of the pipeline.
(See Section VIII.)

II. G. The DEIS does not take a "life of project' approach in the DEIS.

The DEIS did not take a "life of project" approach to the DEIS analysis. Such an approach is essential considering the CN decision criteria on alternatives and the human and natural environment. *(See Section IX.)*

II. H. FOH believes the PUC should be assertive of Minnesota's rights.

The proposed Enbridge pipelines are interstate and cross the international border. They have major federal components such as pipeline safety and federal water permits. FOH is of the opinion that this fact influences the choices about DEIS content. This is the first time Minnesota has done an EIS on a large oil pipeline of this nature. Furthermore, it has engendered a high degree of controversy and diametrically opposed attitudes. We suggest that asserting Minnesota's authority by describing it in the DEIS could possibly help put the Enbridge projects in context and help reduce public controversy, one of the objectives pointed out in MEQB guidance documents. *(See Section X.)*

SECTION III. FOH REVIEW ON DEIS CONTENT REGARDING OIL RELEASES

Oil releases are covered in Chapter 10 of the DEIS and in two reports incorporated by reference into the DEIS, Stantec et al and Stantec/Barr Engineering.

III. A. Developing useful DEIS content on oil releases is extremely important.

This puts a high burden for accuracy and completeness. For five reasons it is important for overall pipeline permitting for the CN decision:

1. The pipelines are proposed to go through landscapes highly sensitive to oil releases and areas where clean-up will be very difficult or unlikely to completely occur.

2. A new pipeline corridor is to be partially created through the same kind of area.

3. Any new pipelines in the future receive an immediate presumption they would be added to this corridor because of Minnesota's policy of following existing utility corridors.

4. Good information on this topic is highly important to the comparison of alternatives. The alternative comparison is central to both federal and state environmental review, regulations and guidance documents. The magnitude of damages from oil releases will greatly differ among alternatives. There are differences because of natural resources and population, and differences in oil spill response times. Therefore, there will be large differences in impact magnitude between at least one alternative and the others that go through lake country.

5. The PUC CN decision will be based in a large part on understanding potential impacts of oil releases and for comparing the key part of the CN decision criteria concerning the viability of alternatives as compared to environmental and social impacts.

<u>III. B. The FOH approach to examining the DEIS content on oil releases.</u>

Besides looking at compliance with MEQB rules and the CN decision criteria, FOH imagined a future oil release of the magnitude of the 2010 Enbridge release in Michigan. We imagined it occurring next to the Straight River or the Mississippi River a couple of years after it was built. The Michigan release resulted in many studies of the actual impacts of such a release and has even been used as a case study to understand the monetary value of impacts to people and the environment. *(See Attachments: D-1 ORNL 2012 - Oak Ridge Block Valve Study, A-1 Stolen 4.4.14 Sandpiper Comments, A-2 Stolen 5.28.14 Sandpiper comments.)*

We then asked ourselves whether the information and analyses in the Line DEIS would have shed light on one of these possible future events if one looked back at it. The answer is a resounding "NO" in our view.

It is helpful to contrast what the DEIS *does not contain and what it does contain* while "Monday morning quarterbacking" from this imagined future event.

<u>III.B.1. What key information is *lacking from the DEIS* concerning oil release?</u>

Here are just a few examples:

a) Probably the most egregious missing data from the DEIS is that no actual amounts of oil releases are included at the sites that are examined. This is missing because Enbridge maintains it can be kept secret from the public document. FOH has a simple suggestion for the new DEIS to get around this demand. DOC should select its own figures and follow the recommendations in previous FOH documents on Sandpiper. *(See Attachments: D-1 ORNL 2012 - Oak Ridge Block Valve Study, A-1 Stolen 4.4.14 Sandpiper Comments, A-2 Stolen 5.28.14 Sandpiper comments, B-1 Stolen 11.19.14 Direct Testimony Sandpiper.)* 2621-2

b) The DEIS provides little actual analysis of the specific impacts of large oil releases. There is not a single location in the entire EIS where specific impacts to people and the environment are described if an oil release were to occur at that site. This is in spite of high quality information and methodology already available from other studies and in fact previously recommended by FOH. *(See Attachment: D-1 ORNL - Oak Ridge Block Valve Study.)* 2621-3

c) The DEIS contains study of the potential impacts to wild rice waters even though there has been much prior discussion of the need for it.

d) The DEIS contains no discussion of access difficulties for clean-up operations in order to compare routes or to contribute to the impact analysis. Longer access times lead to higher distances of oil travel in watercourses—a crucial landscape dependent factor in the analysis. For example, an oil release at the Mississippi crossing just north Itasca State Park will likely continue miles downstream because of rapid stream flow. There is difficult access downstream from this location. Another example is described in *Section III.E.2*, which describes a very inaccessible area in the upper reaches of the Wild Rice River and another in the La Salle lakes area in *Section III.D.3.* 2621-4

e) Almost no discussion of long-term impacts of oil in the environment and too often reliance on industry studies and data. 2621-5

f) No route comparison using site-specific impact analysis on the different routes. Instead *data* about environmental features that might be affected by pipeline construction is collected for the various routes and is used as a surrogate for analysis. *(See Section III.B.2.c below.)* 2621-6

<u>III.B.2. Here are examples of what the DEIS *does* contain and why this information is deficient.</u>

a) Many hundreds of pages of modeling what happens to oil after it is released*, but not followed up with an analysis of impacts of such releases.* For example, the Red River site analysis indicated oil pollution from Bakken oil a distance of 40 miles downstream. Canada is less than 40 miles from this location. An oil release would likely trigger a review under the International Joint Commission because such pollution is covered under the Boundary Waters Treaty.

b) The methodology of selecting seven analysis sites to serve as proxies for all other locations is described in Chapter 10 and in the Stantec et al report. It is profoundly flawed. *(See Section III.C.)*

c) The DEIS supplies a fair amount of *data* about the environment along the proposed routes, but again, little analysis of what specific impacts might occur from an oil release. This is essentially an inventory of data about possibly sensitive areas. Data is collected about natural resources, HCAs, and so forth—but *data* is not *impact analysis*. Data is apparently regarded as a surrogate for impacts. This results in a shallow comparison among routes. We do not suggest that site-specific impact assessments be done on all sites along the routes—but we do suggest that route comparison methods be developed that are more meaningfully based on impacts rather than data. *Sections IV.E and VI* explain how some of this data analysis could be developed.

d) The DEIS contains a small amount of generic information about impacts to ecological resources. An EIS of this nature should spend a significant amount of time analyzing potential impacts to this topic including generic, long term and site-specific analysis of impacts of oil releases. Yet only four pages of the DEIS discuss this topic and they are confined to generic impacts to terrestrial plants and wildlife, terrestrial and aquatic habitats, and wetlands. *(See pages 10.45 through 48 of the DEIS.)* There is only a sentence or two concerning remediation difficulties in wetlands and no discussion of impacts from the remediation itself.

e) The DEIS heavily relies on Enbridge data and Enbridge consultants in spite of the obvious conflict of interest. *(See Section VIII.)*

III. C. Problems with the seven site methodology. 2621-7

The DEIS and accompanying Stantec et al report say that seven sites were selected for in-depth analyses so they could serve as a proxy for other sites. Page 10-9 of the DEIS indicates that "Agency staff and consultants selected seven sites for in-depth analysis based on (1) their distribution across the Applicant's preferred route and route alternatives, and (2) how well they represented the diversity of characteristics that were identified as significant during public scoping…." It is noted in a footnote that Stantec did not look at SA04—with no explanation as to why this was done.

III.C.1. This method has several problems based on the following:

a) Page 1.10 of the Stantec et al report has two paragraphs describing the reasoning behind this selection. Later portions of Section 3 of this report describe the selection process and its use in substantially more detail. However, it still has little or no reasoning showing why the seven sites can be proxies.

b) Page 1.10 of the Stantec et al report reads "Should an interested party have concerns over a specific watercourse that was not modeled; this table can be used to find an equivalent representative release location. From there, the interested party can consider the range of seasons to found and/or determine the range of potential consequences for their specific location… each site serves as a proxy for other similar sites… because *oil behaves similarly in water bodies and locations with similar geographic and environmental locations,* there is not a need to model multiple watercourses that have similar features…"

III.C.2 FOH asks, "So why doesn't the DEIS provides tests of this proxy theory?"

FOH believes that this method is profoundly in error, simplistic and unsupported by ecological knowledge about the environment. Here are some of the reasons:

a) Claims are made that the factors used in the site selection and in the resulting modeling are "conservative" and therefore will result in "bracketing" the possible outcomes. There is nothing in the report that allows this claim to be validated. *(See Attachment: G-1 RRVWNA Drake Letter.)*

b) The claim is made that the seven sites can be used as proxies for all other water bodies crossed by the proposed pipeline and any alternative routes. This a profoundly important claim which must be supported by strong evidence, justification and reasoning—evidence which is completely lacking from the Stantec et al report and the DEIS.

c) A claim, highlighted above, that water bodies "have similar geographic and environmental locations." This is the type of view one might take from looking down from an airline flying at 20,000 feet. In other words, it very much "high grades" similarities. If the 20,000 barrels of oil released by Enbridge in 2010 had reached a different Michigan river, it would have had different impacts, different oil remediation and different impacts from remediation.

d) Water quality is different in different rivers. Would oil behave the same in the silt-laden Red River as it would in the cold, spring-fed, low sediment Straight River, a nationally recognized trout stream?

e) Perhaps no measure of ecological differences among rivers is starker than the boundaries of rivers and the rest of the landscape. Rivers with abrupt and short transitions to uplands are much different than rivers that flow through large areas of wetlands. Aquatic and semi-aquatic species are much different between these two situations. An oil release when

these wetlands are flooded means that oil clean-up cannot occur in these wetlands without removing the wetland soils—impossible. It means that the wetlands will continue to bleed at least some pollutants every time they are flooded. Subsequent damage to aquatic life will depend on persistence of these pollutants and many other factors.

III.C.3 Lack of impact assessment on the seven sites.

2621-8

The Stantec et al report and the DEIS do not actually do any impact assessment on the seven sites based on the information developed from the model. The report focused on modeling the behavior of oil releases and ignored any site-specific impact assessment of those releases. Even if one accepts the results of the modeling, it isn't used to assist with an important impact assessment. Other parts of the DEIS and Stantec et al have limited information on generic impacts as noted in *Section III.B.2.c.* But this is clearly not a generic EIS. In Dec 2015 PUC Commission Chair Heydinger ordered a "robust, competent, comprehensive and independent" EIS. All impacts are supposed to be assessed in it. The lack of this assessment can only be regarded as *strange*.

III.C.4 Downstream oil pollution forecast for 40 miles yet DEIS used only 10 miles in other site analysis.

2621-9

Even though oil releases were modeled to occur 40 miles downstream at the Red River site, the DEIS confines its affected area to only 10 miles at the other six sites, a profound error. And, as noted before, it only modeled the behavior of oil and did not assess impacts to people and the environment downstream. The federal draft supplemental EIS on the Line 67 Expansion project used a 20 miles river distance. The DEIS contains no discussion of these discrepancies.

III.C.5 Poor selection of hydrologic parameters ignoring high flow summer events.

2621-10

The Stantec et al report also "high grades" hydrology considerations on the seven sites. It uses summer *average* flows in the streams and assumes this represents all summer conditions. This is a major error. Minnesota has seen increasingly high summer rain events in recent years, some of which are as high as or perhaps even higher than spring runoff events. These must be taken in consideration in the DEIS and impact assessment.

III. D. Mosquito Creek site, one of the seven. An Exception.

2621-11

FOH has chosen not to examine or critique all seven sites because of the lack of time and aforementioned critical lack of Enbridge withheld data. However, the Mosquito Creek site is so egregiously inappropriate that we provide a specific critique of its selection. The problems with this site are as follows:

a) Potential effects on wild rice from an oil release are an extremely important topic for this DEIS. An impact assessment on wild rice waters must be carefully accomplished in it and must be based on actual locations where oil releases can reach wild rice waters. In fact, there are a number of better locations along the proposed route where this can occur such as the upper reaches of the Wild Rice River *(See III.E.2)* as noted below.

b) The selection of Mosquito Creek purports to represent a site where wild rice waters might be affected and also a site that can represent an on land oil release. It is an extremely poor choice with respect to wild rice waters to the point of being almost ludicrous. Lower Rice Lake is about 14 miles away. The first two miles toward the creek from a theoretical oil release site are largely open farmland with a low gradient. This is the very top of the creek's watershed, so there is no area above it carrying water to enhance oil movement away from the

spill site. In other words, this is a site very conducive to oil containment after a release, including a large release. 2621-11 cont.

c) The first two miles down-gradient toward Mosquito Creek drop only about 16-17 feet. The creek channel is barely visible except when examining topography maps.

d) As noted, Lower Rice Lake is on the order of 14 miles downstream. The elevation change over these 14 miles is only 122 feet. Such a gentle landscape change is not representative of many locations along the proposed route. For example, in the La Salle Creek area only a few miles south of the Mosquito Creek location there are elevational changes of about 100 feet in one mile.

e) Mosquito Creek is a small channel providing many opportunities to control oil releases in most of its length. The FOH consultant, Paul Stolen, is familiar with the lower Mosquito Creek area having regularly hunted there for more than 50 years. Mr. Stolen is also familiar with Lower Rice Lake. He has not only done research on it, but also worked on a river restoration project on the Wild Rice river above Lower Rice Lake. It simply is a completely poor choice to be a proxy for anything but an on-land oil spill.

III. E. The DEIS must contain an analysis of impacts to wild rice from oil releases. 2621-12

Wild rice is extremely important to Minnesota with respect to waterfowl, other wildlife, and economically and culturally to Native Americans. The DEIS contains no analysis of impacts to wild rice from oil releases. There is a clear potential for significant impacts from oil releases to Lower Rice Lake should a pipeline rupture occur at the location of the proposed route that crosses the upper watershed of the Wild Rice River.

Therefore, FOH recommends Lower Rice Lake be a location for a site-specific analysis of potential impacts to wild rice.

III.E.1. This lake is important for the following reasons:

a) Lower Rice Lake often supports about 2,000 acres of wild rice and therefore is culturally and historically important to Native Americans.

b) Oral histories of Native Americans in the area say that it was the site of peaceful meetings between the Anishinaabe and Nakota to trade since it is not far from the prairies to the West.

c) Lower Rice Lake is also the site of a major river restoration along State Highway 200 where several square miles and 62 river meanders were restored by closing a bypass ditch along the highway that had diverted flow to bypass the river south of the highway. The White Earth Tribal Biology Office maintains that this has improved wild rice stands in the lake.

d) One of the ricing landings on the lake is named after Ted Bonga, a prominent person in the fur trade era of early Minnesota.

e) Finally, Lower Rice Lake has seen enormous concentrations of waterfowl in the fall. Tens of thousands of waterfowl feeding on wild rice have been documented by the DNR from overflights.

III.E.2. Pipeline crosses upper reach of Wild Rice River.

The crossing of the Mud Lake wetland must be the location of a site specific analysis of impacts from a large oil release. These features need to be examined in this analysis:

a) The proposed route crosses wetlands located close to Mud Lake, a small wild rice lake next to the existing MinnCan pipelines. There are actually 4 pipelines in this wetland, as noted below.

b) During the construction of the MinnCan pipeline, DNR prepared a PowerPoint presentation indicating impacts to wetlands from pipeline construction. This contains photos of the Mud Lake wetland. *(See Attachment: E-1 Stolen, author, Pipeline Impacts to Wetlands & River Floodplains PowerPoint.)* During the construction of that line, MinnCan had a problem such that a new pipeline section through this wetland needed to be replaced. Instead of removing it, the decision was made to abandon it in place, clean it and plug it. DNR has records of why this occurred, as well as MinnCan. This means there are already four pipeline sections within this wetland with some likelihood of construction problems in the wetland. The DEIS needs to explore and address the reasons for the past failure of the MinnCan pipeline section.

c) There is an outlet ditch from Mud Lake that is open to the confluence of the Wild Rice River outlet of Upper Rice Lake. It is a bit less than three miles from Mud Lake to this confluence. This ditch and the Upper Rice Lake outlet result in a fairly large watershed at this point. In another location to the south, the proposed route is also just a bit more than one half mile from Upper Rice lake itself with wetlands in between. In other words this is a second exposure location of an oil release.

d) There is a large expanse of wetlands along the ditched outlet of Mud Lake, which continues downstream after the confluence of the ditch and Wild Rice River. There are about 4.5 miles along the river where there are no roads with one small trail near Mud Lake. An oil spill during high flows would expand into these wetlands. Essentially the area is roadless between these points. Response to an oil spill here would have severely limited access.

e) The potential impacts of an oil spill in this area and a preliminary description of the importance of the natural resource, cultural, and social values of the area is contained in A*ttachment H-1 Montana IPTF, pages 13-15*.

<u>III. F. “Pinhole” leak issues</u>

Simplifying, there are two types of pipeline oil releases discussed in this section.

1. Oil release amounts that result in a pressure drop that can be immediately detected by pressure monitoring systems.

2. Oil releases small enough so as to not be detected by pressure drops.

These issues are addressed in the DEIS by the report entitled “Line 3 Replacement Project: Assessment of Potential Pinhole Release,” by consulting companies Stantec and Barr Engineering. Dated January 13, 2017, the report was funded by Enbridge. Barr Engineering was Enbridge’s paid consultant during the Sandpiper administrative hearings that occurred in late 2014 and early 2015. Barr has a component of its business in oil spill remediation.
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<u>III.F.1. Key findings of this report with respect to the “pinhole leak” concept, as defined in the report, are as follows.</u>

a) A pinhole leak, defined as being 1/32 inches in diameter, can amount to 28 barrels per day. (Page 11 of Stantec/Barr Report.)

b) The report claims that oil cannot percolate through buried material very fast even though sand is used in the model to make this claim. In fact, it states that of the 28 barrels per day (1176 gallons/day) from a pinhole leak only 1.5 gallons/day will percolate into the parent material around the trench. In other words, the report from the model says that sand is so impermeable that the leaked oil will essentially have nowhere to go, but *it must have to go somewhere*.

c) The claim is made that because of very slow infiltration, oil will likely reach the surface and therefore oil from a 1/32 inch diameter leak will be detected within 28 days. This number is said to be "conservative." With no detection until at least 28 days, this means 784 barrels or 32928 gallons of oil will be released. Of this, the model—using the assumption that infiltration will be greatly impeded—predicts only 64 barrels of oil will be infiltrated into the ground. A claim that 97 percent of the oil will reach the surface is a claim of such magnitude it needs independent confirmation. Besides, that level of resistance against infiltration would seem to mean oil would reach the surface much sooner than 28 days. In other words, what was it doing during the 28 days after it began to leak from the pipe?

<u>II.F.2. Findings with respect to oil releases between pressure detection threshold and pinhole leak concept. These findings of the report were:</u>

a) The report states that the detection level for pressure drops is one percent or more of flow amounts, which can amount to 7,600 bpd.

b) The report claims that oil release amounts of between 0.5 and one percent would be detected within 120 minutes.

c) Oil releases of 0.5% (1,750 bpd) would be detected within 2 days.

d) Oil releases of 0.1% (760 bpd) would be detected within 14 days.

e) All of these oil amount numbers would be greatly reduced by the report's claim of very low infiltration rates and quick detection of oil as it reaches the surface.

<u>III.F.3. FOH finds problems with modeling this approach, as follows:</u>

2621-13

a) Modeling is an attempt to measure the "real world." Therefore, it is not the "real world." This universal problem with models is reduced by several other techniques, none of which are contained in this report nor the DEIS. These are described in *Section VIII.D* such as using "sensitivity analysis" to show how outcomes vary if one uses different assumptions.

b) The report refers to the Exponent report done for the Keystone XL pipeline. Results in the Exponent Report differ very significantly from this report. Also distances of potential groundwater affected are much higher—1,000 feet. This report insufficiently discusses these differences.

c) The models are treated as if landscape differences do not matter. In other words, the modeled results are claimed to apply equally on all segments of all route alternatives with landscape and soil differences being immaterial. Furthermore, the Exponent Report on Keystone XL was completed before the final centerline had been established. It cautioned that further studies needed to be done to more accurately forecast impacts because such forecasts depended on site-specific conditions.

2621-13 cont

III.F.4. Chances of oil reaching the surface quickly is overblown.

There are numerous references in the report stating that nearly all small leaks will "quickly reach the surface" and be detected. This is a bald, self-serving statement unsupported by real world conditions. The report does accurately state that leaks can be detected if seen during aerial surveys being done every two weeks as well as by passersby and neighbors seeing or smelling oil that has reached the surface. Aerial surveys look out for oil on the surface and watch for dead vegetation. Here are some factors that delay "quick detection" of small leaks and that vary across the landscape:

a) Deep burial of pipe by HDD under rivers where pipe can be 20-40 feet under the riverbed and deep under much of the floodplain. In hilly terrain, groundwater movement is toward the river, and if the pipe is within an area of such terrain, oil can be carried by piping action downward or by downward groundwater flow in general. This is not always toward the surface as compared to pipe buried in flat terrain with the pipe bottom being about eight feet below the surface and possibly in or near the water table.

b) Deeper burial at crests of hills due to curve flattening to reduce the degree of pipe bends. In hilly moraine terrain, the bottom of the pipe can easily be 15 feet below the surface. *(See Attachment C-1 Montana IPTF.)*

c) Leaks in snow covered areas are not visible unless they become large enough to melt snow.

d) One of the best methods of detecting leaks where no oil is visible on the surface is dead vegetation, but vegetation in Minnesota (except conifers) looks dead for about six months of the year.

III.F.5. Water table aquifer importance downplayed.

On page 45 of the Stantec/Barr Report, it is noted that along 62% of the proposed route and its alternatives, there is very low or low susceptibility "water table aquifers." So, what about the 38% where there is medium or high susceptibility? This is not addressed in the DEIS, whatsoever, which brings us to our next point.

The above 62% figure is followed by the next sentence which makes the claim that "where high-susceptibility areas are located along the proposed route, potential impacts to water supplies are limited" because they are polluted by fertilizers and pesticides from farms. This same statement was submitted by Enbridge's consultant, Barr Engineering, during the Sandpiper hearing and was just as fallacious. Basically this statement is saying that oil pollution of such aquifers doesn't matter and ignores such things as successful attempts to reduce such farm pollution. Of course, it also ignores related issues such as effects on fish and wildlife populations in groundwater emergent zones from oil contaminants.

III.F.6. Case studies and remediation of small leaks.

These case studies are misleading and deficient. The report describes 10 case studies in Minnesota of oil releases categorized as being from small and slow leaks. Seven of the 10 are in Enbridge's Mainline Corridor. Clean-up efforts are described. The case studies are presented as if, when the Minnesota PCA determined site clean-up was completed, that there was no residual environmental impacts from the oil left at the site. This is entirely incorrect—PCA's efforts were not to study long term environmental impacts of the polluted sites caused by oil contaminants. It was rather to determine if "enough" efforts had been made to recover as much oil as reasonably possible under clean-up regulations. For most of the 10 cases, not all

of the oil was removed during clean-up operations. Besides, scientific studies of impacts of oil contaminants in the environment continue to advance and develop new information. 2621-13 cont

a) Section 5.3 attempts to explain impacts and susceptibility to wildlife found in wetlands. It confines the discussion to the immediate effects of oil and the remediation of such affects, such as de-oiling birds. This completely ignores the long term effects on such wetland life and ignores the fact that oil cannot completely be removed without destroying major wetland ecological values.

b) Page 39 of the report discusses the Enbridge oil release site west of Bemidji that has received extensive and long term study of the potential for groundwater pollution from oil releases. It is a certainty, as the report says, that these studies have developed valuable information. But the report again makes the same claim made by Barr Engineering during the Sandpiper hearings: that these findings can be extrapolated to many other locations that are in fact dissimilar. The Bemidji site is quite flat with slow lateral groundwater movement away from the oil release site. In fact, in the seventeen years since the spill, groundwater has moved only an average of 96 feet per year. There are areas along the proposed Line 3 route where lateral groundwater movement is much faster and even moves 100 feet in one day. Also there are many moraine areas with high relief with many landlocked depressions and gravel lenses. It is not uncommon for drilling and excavation to cause a sudden high pressure release of groundwater in some of these areas.

III.F.7. Pinhole leak report's erroneous conclusion

The report concludes with statements that oil cleanup will essentially eliminate any problems created by such releases, ignoring the fact that there are many locations along the proposed route where clean-up operations did not remove oil. This means it is a polluted site and has been entered into the records as such. The report confuses termination of oil clean-up with a finding of no continuing impact."

SECTION IV. ALTERNATIVES

Our comments in this section are related to and depend on other sections of our comments because of the overlapping issues in the necessary DEIS analyses. We point that out where necessary. Comments are as follows:

IV. A. SA04 is a viable alternative because of PUC decisions, MEQB rules, and because it meets Enbridge's ultimate purpose.

As noted in *Section V*, we believe SA04 must be treated the same as other alternatives in a new DEIS for these reasons.

1. The PUC decided to include it and they asked for a rigorous examination of all alternatives.

2. The PUC set aside the MEQB rule that alternatives that do not meet the applicant's stated purpose may be eliminated from study at the discretion of the RGU. This rule in almost all EIS cases in the past eliminated many possible alternatives and was a significant change from past practice, even though the rule used the term "may."

3. The applicant Enbridge confines its *stated purpose* as being to build a pipeline and to use various existing Enbridge facilities. This is only true in a superficial sense. The *actual*

purpose is to move oil to Chicago area refineries and locations beyond. SA04 is the only route that goes directly to that area.

4. While it may be true that if a CN for Line 3 is denied, Enbridge may suffer additional costs; however, Subd. 6 of MEPA says that "*so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct*." (emphasis added.)

Furthermore, Enbridge may achieve long term financial benefits from building a larger pipeline in the SA04 corridor—because it may eliminate the need for the planned Line 66 in Wisconsin. Line 3 and any new line in Wisconsin will likely cost much more than going directly to Chicago along SA04.

5. Enbridge's existing corridors are aging and are in problematic locations.

6. The CN decision criteria mandates a full exploration of alternatives that have distinct differences. Otherwise the analysis will be futile. The DOC itself recognized this in its screening report when it said that SA04 has distinct environmental benefits compared to other alternatives.

IV. B. SA04 is treated much differently than other alternatives in the DEIS. 2621-14

This serious DEIS error is most obvious when comparing the methods of examining the Line 3 proposed route compared to the method of examining SA04.

1. The proposed route has been studied in detail. Many adjustments have been made to it to reduce impacts. Enbridge has already agreed to these modifications during the Sandpiper review process. None of this has been accomplished for SA04. For example, SA04 as proposed now crosses in vicinity of some karst areas in Mower and Freeborn Counties in southern Minnesota and possibly in Iowa. This is a landscape feature to be avoided for oil pipelines because of high risk of groundwater pollution from an oil release. We have examined these karst areas and it appears that a re-route could avoid this areas. *The DEIS needs to examine re-routes of SA04 to achieve impact reduction in the same manner as it does with the proposed route and its routing alternatives.*

2. The selection of the various alternatives and sub-alternatives in northern Minnesota selected for DEIS study was a much smaller subset of other routes that were rejected for various reasons. (See the Alternatives Screening Report.) There were no SA04 variations that were examined.

3. The Alternatives Screening Report indicates that a screen of 15 percent slope was used for screening alternatives. This is an extremely inappropriate number to use with respect to pipelines. This is demonstrated in *Section VI*. The justification for its use is not explained.

IV. C. Failure to take paint a "big picture" of the Enbridge system.

The FOH comments on the Cumulative Impact section *(See Section V)* of the DEIS describe other pipelines and other events that could result in increasing the viability of SA04. The implications of this were not covered in the DEIS.

IV. D. Failure of the DEIS to accurately describe the project's environmental footprint. 2621-15

This topic is more fully explored in *Section VI* of these comments. That discussion clearly indicates that the project's footprint gets exponentially larger on hilly terrain. Therefore, the comparison of alternatives of terrain with differing amounts of flat terrain vs hilly terrain will fail if this issue is not properly captured in the analysis. The obvious problem in the DEIS *is that it assumes the project's footprint is the same on all routes*.

FOH makes suggestions as to rectifying this serious DEIS defect in the next section. These measures will also pertain to the needed cumulative impact section of the revised DEIS.

IV. E. FOH suggestions for metrics that will better capture differences among alternatives based on the project's environmental footprint.

As described in this section, the pipeline construction's environmental footprint grows exponentially in hilly terrain. Therefore, the comparison among alternatives needs to compare flat terrain vs non-flat terrain by developing metrics that carefully capture this construction characteristic. Each of these metrics can then be combined with the site-specific impact assessment we also recommend as much as possible. This should shift the route comparison more toward actual real impacts than merely data compilation. These metrics will also be dependent on the independent assessment FOH recommends in *Section VI*. We recommend the following metrics be used:

1. Several categories of slope measurements should be used such as
    a) Near-zero percent,
    b) 2-3 percent)
    c) 4-5 percent,
    d) 7-8 percent,
    e) 10 percent, and
    f) slopes over 10 percent.

These can be obtained by GIS methods and should be expressed in about five mile increments on each of the proposed routes. This is the most important metric we are recommending. These metrics should then also be used in the oil release impact assessment.

2. Vegetation cover categories should be described in the same five mile increments.

3. Major environmental densities should be expressed in the same five mile increments. The list need not be exhaustive, but should include wetlands and natural watercourses.

4. Land use should be characterized in the same 5 mile increments. Great detail is not necessary. Farmland, forest, and urban categories (if possible, houses within one tenth of a mile, for example) are the main ones.

5. Road density data should be obtained in the same five mile increments. This is especially important because it is an indicator of speed of reaction time to oil spills.

It is possible that some of this information or related information was developed for the DEIS. We are confident, however, that the slope measures we recommend above were not used in the DEIS. These are the most important with respect to the environmental footprint of the project.

It will be evident that these metrics will be useful for both the cumulative impact section of the DEIS and the assessment of potential impacts in general.

With respect to the use of these measures in comparing routes, it would be possible to portray them on a per mile basis. If the next version of the DEIS were to continue to portray oil release chances on a per mile basis, using other environmental metrics could be somewhat useful in route comparisons. However, as we note elsewhere, any oil release information needs to be portrayed as a "life of project" issue rather than as a "per year" issue.

IV. F. DEIS fails to accomplish a useful comparison of routes based on route length among alternatives. 2621-16

The DEIS did not solve the issue of correcting for different route lengths among alternatives. This made it confusing and misleading, especially for the SA04 alternative. FOH strongly maintains that the next DEIS address the ultimate purpose of Line 3: carrying oil to the Chicago area and south. The route comparison should use a metric that compares the length of the ultimate purpose of the project—carrying oil to the Chicago area. That means that SA04 has significant advantages because it is much shorter than routing oil to Superior then south to the Chicago area. We do not have any other specific suggestions at this time because the current DEIS errors are so large.

SECTION V. CUMULATIVE POTENTIAL EFFECTS

This section of the DEIS is woefully inadequate.

Because this section is extremely important to the EIS "adequacy" decision and CN decision criteria, it must be readdressed. It fails to provide the proper analysis required by MEQB rules, especially regarding the description of the impacts of the existing pipeline corridors and future additions of pipelines in these corridors. Minnesota has a policy of adding additional pipelines to existing pipeline corridors yet has never done an "analysis" including a full risk assessment of both short and long term impacts of doing so.

This DEIS chapter continues to follow this error which now must be rectified in order to comply with MEQB rules for this EIS. The document essentially has no actual analyses of impacts; rather it is replete with assertions of little or no impact or, when it does recognize impacts, merely says they will "increase" or be mitigated. We believe that to be compliant with MEQB rules, this DEIS needs to be revised to fully account for the current corridors and future expansions.

Supported reasoning is provided below as well as suggestions as to how to rectify the error. We recommend 15 types of data that need to be obtained in order to do the proper cumulative impact assessment according to MEQB rule requirements. *(Section V.E.)* This should be included in the revised DEIS.

V. A. Importance of this section of the DEIS.

FOH regards this section of the DEIS exceedingly important because of the following five physical and historic facts.

1. The Pipeline corridors under study in the DEIS—Enbridge's Mainline Corridor and the proposed corridor to the Park Rapids area—were built through environmentally sensitive areas and therefore established many years before effective environmental laws.

2. Minnesota has pursued a policy—but not written into required rules—of adding linear facilities to other linear facilities without ever examining the actual impacts of doing so. It appears that this assumes overall fewer impacts, even when the existing corridor is a poor location environmentally, and even though Minnesota rules that require such an analysis. FOH challenges this unsupported assumption that must be rectified in the new DEIS.

3. Enbridge has clearly practiced a corporate policy of incrementally adding other pipelines or looping projects to its original corridor. This has resulted in about 7 pipelines in the corridors west of Clearbrook and six east on to Superior. However, because of looping projects, there may be additional pipes in certain locations.

4. Enbridge states its Mainline Corridor can no longer contain any new pipelines. It then proposes to follow the next shortest pipeline corridor to its desired destination in Superior, WI. The result is that a new corridor through an equally problematic region becomes a foregone conclusion if the project is approved as proposed—thus perpetuating past practices.

5. Most of the oil to be carried by the proposed Line 3 is destined to go via Superior to the Chicago area and beyond. Therefore, the oil itself will be transported on a much longer route through Minnesota and Wisconsin lake and river country than if it were to go directly to Chicago from Canada via SA04 in the DEIS.

6. Enbridge's pipeline system is "aging private infrastructure" with respect to the cumulative impact assessment. It is not only Line 3 that is aging. The time is now to do a thorough analysis of whether these pipelines should go through a more appropriate landscape. As noted, the Consent Decree on the Michigan 2010 oil release requires Enbridge to do new and rigorous testing of all its pipelines in Minnesota. *(See Attachment P-1.)*

V. B. The following characteristics of cumulative impacts of pipelines are necessary parts of the analysis under existing Minnesota law, rules, and policy regarding pipelines.

1. Given Minnesota's policy of following existing pipelines with new pipelines, there is a good chance another oil or gas pipeline might be proposed for the same corridor should Enbridge's proposal be approved. There is no basis for concluding otherwise. This raises a new set of possible impacts that should at least be discussed in this EIS section. 2621-17

2. This DEIS cannot be narrowly focused on this project in the present moment. Rather, the analysis must look at the past when the first pipelines were established and assess the likelihood of new pipelines in a "life of project" manner—at least 50 years into the future. 2621-18

3. Full understanding of the cumulative potential effects of cumulatively adding more and more pipelines to an existing corridor in a poor location is completely necessary in order to do an adequate analysis of alternatives.

V. C. What do the MEQB rules and guidance documents require for a cumulative potential effects analysis?

Chapter 12 is so deficient it is hard to know where to begin our critique. FOH therefore starts with a review of what the rules require and what the MEQB Guide to the Rules provides as further guidance.

In *Section V.C.1* we quote the rule which defines "cumulative potential effects" and in *Section V.C.2* we quote relevant sections of the MEQB "Guide to the Rules" which, while not a rule, provide a practical interpretation for the RGU to follow. In that section, we provide our interpretations of why, if one is to follow the rules and guidance, it would lead to a conclusion

that the Sandpiper project must be included in the analysis and other future pipelines as well. In other words, the DEIS must study the addition of 2 or more large diameter pipelines in the proposed Line 3 corridor.

V.C.1. Rule guidance MEQB 4410.0200, Subp. 11a, the definition of "Cumulative Potential Effects."

The MEQB rules and guidance regarding cumulative potential effect have received additional prominence because, as is explained in the quote from the MEQB guidance document in *Section V.C.2* below, the concept as used in EISs has been problematic for years. This has recently changed due to a Minnesota Supreme Court decision and rule revisions. The definition in the rule of this phrase is very important regarding the Line 3 DEIS for reaching an adequacy determination later. Therefore, we quote this definition in its entirety, with our added emphasis on key language.

"*Cumulative Potential Effects" (CPE) means the effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid,… Significant cumulative potential effects can result from individually minor projects taking place over a period of time. In analyzing the contributions of past projects to cumulative potential effects, it is sufficient to consider the current aggregate effects of past actions. It is not required to list or analyze the impacts of individual past actions, unless such information is necessary to describe the cumulative potential effects. In determining if a basis of expectation has been laid for a project, an RGU must determine whether a project is reasonably likely to occur and, if so, whether sufficiently detailed information is available about the project to contribute to the understanding of cumulative potential effects. In making these determinations, the RGU must consider: whether any applications for permits have been filed with any units of government; whether detailed plans and specifications have been prepared for the project; whether future development is indicated by adopted comprehensive plans or zoning or other ordinances; whether future development is indicated by historic or forecasted trends; and on other factors determined to be relevant by the RGU."* (Emphasis added.)

V.C.2. Guidance from the EQB for interpreting MEQB rules taken from "Guide to the Rules" regarding defining Cumulative Potential Effects.

The following section describes the manner in which the RGU needs to decide on future projects and also on how to assess past cumulative impacts. The sections of the Guide to the Rules are in quotes with particularly important language emphasized. These sections support the justification for why Sandpiper (for example) needs to be included in the DEIS analysis. They are noted in underline. The FOH conclusions listed below provide the specific reasons for a more detailed discussion as to why the Sandpiper pipeline must be included in the DEIS analysis.

"*The concept of cumulative potential effects was a troublesome aspect of environmental review for many years. The rules provided little – and in some ways puzzling – guidance and RGUs usually gave the concept fairly superficial treatment. However, …in the 2006 case Citizens Advocating Responsible Development (CARD) vs. Kandiyohi County Board of Commissioners and Duininck Brothers, Inc., the Minnesota Supreme Court provided new insight into how to handle the concept (which the court termed "cumulative potential effects," rather than "cumulative impacts")." This new clarity elevated the obligation of RGUs to address the concept if their environmental review decisions were to be defensible against legal challenges*." (page 16, emphasis added)

"*Definition of cumulative potential effects. The concept of cumulative potential effects means, as the Supreme Court stated, putting the project in context. It has to do with the question of to what extent, when conducting Environmental Review of a given project, do you need to consider impacts from other projects. How do you decide what other projects need to be considered? How far does the RGU need to look in terms of geography and timing, especially with respect to the future*?"

…"*The new definition indicates that CPE means the (total) effect on the environment resulting from the incremental effects of the project under review plus similar effects from certain other projects. The crux of the matter usually lies in deciding which are the relevant "other projects" that need to be considered*." (Emphasis added.)

"*The definition provides the following specific guidance regarding which other projects must be considered*:

"*1. They must be located within the "environmentally-relevant area" and be reasonably expected to affect the same environmental resources as the project under review. One way to think about this that may be helpful is to consider the "environmental footprints" of projects; those other projects whose environmental footprints would likely overlap the footprint of the project under review are those that meet this test…*" (Emphasis added.)

FOH conclusion: The Sandpiper project is/was proposed to be located within a few feet of the Line 3 project. There is strong evidence this project is merely suspended rather than stopped. In fact, the federal SEIS on the Line 67 project indicated Sandpiper was "on hold." This also fits with verbal statements made by Enbridge officials after they withdrew their Sandpiper application. Furthermore, Minnesota's policy of following existing corridors means that it is reasonable to conclude other pipelines will follow.

Furthermore, Enbridge indicates that the ultimate capacity of the proposed Line 3 will likely be expanded in the future to carry 915,000 barrels/day. Enbridge says the pipe is designed to carry this much and only needs the additional pumping stations and other facilities. Clearly, this must be addressed in the new DEIS, including increased oil release consequences. 2621-19

"*2. To account for past projects (which includes projects constructed in the past but still in existence), the definition provides that the "current aggregate effects" of past projects can be used as a surrogate for an inventory of the effects from individual past projects (in most cases)."* (Emphasis added.) 2621-20

FOH conclusion: This is the key phrase that commands the PUC to fully explore the current corridors. The "current aggregate effects" of past projects refers to impacts in and along the Enbridge's Mainline Corridor and along the MinnCan corridor from Clearbrook to Park Rapids. Recommendations for the content of this analysis are in *Section V.E* below.

"*3. In looking to the future, only other projects actually planned or for which a basis of expectation has been laid need be considered. This restriction was specifically stated by the Supreme Court in the CARD decision. However, the court did not define what is meant by a basis of expectation being laid. In its 2009 rule amendments the EQB provided guidance about that topic. This guidance consists of a two-part test and five sources of pertinent information."* (Emphasis added.)

FOH conclusion: Clearly, a "basis of expectation has been laid" for the Sandpiper project as well as the Enbridge Line 66 in Wisconsin. The basis for this expectation for the Wisconsin line 2621-21

may have been strengthened by the recent call by the Michigan Attorney General to close Line 5 across the Mackinac Straits. *(See Attachments: R-1 Enbridge Wisconsin Landowner News, R-2 PressPub.com "Enbridge Announces Plan to "twin" Line 61, M-1 Michigan official calls for shutting down oil pipeline - ABC News.)* 2621-21 cont

It is also our contention that Minnesota's policy of following existing pipeline corridors whenever a new pipeline is proposed provides an additional "basis of expectation" for studying any additional pipelines besides Sandpiper for the proposed corridor. The manner of studying them needs to be creative so as to inform the CN decision criteria.

"*The first half of the test is whether the other project is "reasonably likely to occur." The definition lists the following as sources of information that should be scrutinized relative to that question:"*

"1. Whether any applications for permits have been filed with any units of government; (note that this includes units of government other than the RGU and that "permit" is a defined term (4410.0200, subp. 58) that includes virtually any form of permission or assistance from any unit of government)." (Emphasis added.)

FOH conclusion: This test is met. Enbridge filed an application for Sandpiper.

"2. Whether detailed plans and specifications have been prepared."

FOH conclusion: This test is met. Enbridge made detailed plans and specifications for Sandpiper and Line 3 together (Note: FOH fully believes these plans underestimated environmental impacts, however, see *Section IV and Attachments A-1, A-2, and B-1*. Such plans could reasonably be used to estimate additional impacts from a second pipeline besides Sandpiper. In addition, Enbridge has surveyed a route for its proposed new Line 66 in Wisconsin. *(See Attachments: R-1 and R-2.)*

"*3. Future development indicated by adopted comprehensive plans, and zoning or other ordinances.*"

FOH conclusion: This test is met to some extent. Enbridge obtained and paid for easements and had detailed discussions with road authorities and counties regarding Sandpiper and Line 3. Enbridge also funded some projects it said was mitigation for the project and actually surveyed for a new line from Superior to the Chicago area.

"*4. Historic or forecasted development trends, and…* "

FOH Conclusion: This test is met by several factors including past actions by Enbridge of incremental growth, by Minnesota's policy of following existing linear corridors which is still in existence, and by oil analysts who seem to agree that a big jump in oil demand will re-invigorate the Bakken fields and Alberta oil sands. Essentially this means under current practices any pipelines proposed in the next 50 or more years to cross Northern Minnesota from east to west will follow the new Enbridge corridor if it is approved, whether they are oil or natural gas. This means that another additional large diameter pipeline in addition to Sandpiper—were it be oil or natural gas—needs to be studied in the cumulative potential effects DEIS chapter.

"*5. Any other factors found to be relevant by the RGU; (one possible example might be the status of funding for the project). The EQB staff believes that each of these sources of information is not intended to be a "hard-and-fast rule" that by itself necessarily means that a*

project is or is not "reasonably likely to occur" (although in some cases a single piece of information may be found definitive)… In general, the RGU is advised to synthesize available information from all the sources and come to an overall conclusion about the likelihood that the project in question will in fact occur." (Emphasis added.) 2621-21 cont

FOH conclusion: First, we believe that Enbridge has demonstrated an ability to rapidly change its funding—witness its swift change to buy into the Dakota Access pipeline. Furthermore, the sources of funding (shipper's contracts) have in the past been kept secret prior to being announced publicly. Second, this guidance as well as the content of the rule indicates that an RGU should do a fully independent look at all market factors as well as looking into the 50 year operational life of the project. If this guidance and rule support were to be actually followed by the PUC, it must conclude that at least one other pipeline should receive analysis in the corridor besides Sandpiper.

Finally, this guidance makes it clear that the DOC cannot equate the Enbridge withdrawal of the Sandpiper application with permanent or even near-future termination of the project. It must take into account other evidence which clearly shows the project can come back full bore at any moment.

V. D. MEQB 4410.2300,, Subp. H. This is a rule regarding content of the EIS with respect to, among other things, cumulative potential effects:

"H*. Environmental, economic, employment, and sociological impacts: for the proposed project and each major alternative there shall be a thorough but succinct discussion of potentially significant adverse or beneficial effects generated, be they direct, indirect, or cumulative. Data and analyses shall be commensurate with the importance of the impact and the relevance of the information to a reasoned choice among alternatives …*" (Emphasis added.)

This rule says that cumulative impacts need just as must attention as any other potential impact. EIS preparation requires best efforts be made to enumerate impacts. Other parts of the DEIS make some attempts to enumerate impacts—but Chapter 12 does not. Its focus on potential cumulative impacts of SA04 and all the route alternatives is limited and suffers from deep lack of knowledge of the "current aggregate effects" of past projects. It made no attempt to use the recommendations to address cumulative impacts that were submitted during the Sandpiper hearing where much information was presented on impacts. (*See Attachments A-1, A-2, B-1, I-1, J-1, J-2.)* And, in its description of potential impacts from oil releases, it merely says it would increase, but impacts would still be minor. 2621-22

FOH presented detailed information regarding pipeline impacts and recommended forms of analysis on the Sandpiper project for adding additional pipelines to the proposed route as well as detailed suggestions as to how to analyze cumulative impacts. FOH is resubmitting this entire set of material as comment on the DEIS. *(See Index of Attachments List.)*

We conclude that Chapter 12 of the DEIS does not begin to comply with the MEQB rules cited here regarding content of the EIS with respect to cumulative potential effects. In the next section, we list some of the impacts that should be addressed in order to portray the "current aggregate effects" of past projects.

V. E. Suggested means of compliance with the MEQB rule to portray the "current aggregate effect" of past pipeline projects.

FOH suggests that the following 15 data and analysis needs to be included in a revised DEIS in order to achieve a proper cumulative impact analysis of Line 3 and future pipelines. This data 2621-23

needs to use the Sandpiper information that was becoming available prior to Enbridge's dropping of the project as well as the volume of concerns from the public and parties about locating the two projects together. These data and associated impact assessments for a new DEIS are as follows: 2621-23 cont

1. Acreage of the existing Enbridge Mainline Corridor and acreage of the existing corridor from Clearbrook to Park Rapids. This should be portrayed in 4-5 mile segments in order to learn its variability. Such data can be easily obtained from GIS methods. This would develop a picture of terrain-related pipeline construction and also give the amount of clearing of forest areas in hilly areas vs flat terrain.

2. Analysis of historic aerial photography to assess the acreage expansion of these same corridors as pipelines were added to them, and the growth in proximity to human habitation as the expansion proceeded. For example, how many houses were within 200 feet (just an example) when the first line was place, and then continue this effort as each was added. Such data can be obtained from aerial photography in earlier years; GIS in later years. This important data will provide a good measure of adverse impacts of Minnesota's policy of adding new linear facilities to old ones.

3. Special attention to the "before/after" aerial photography (and/or GIS) of the MinnCan Line 4 project from Clearbrook to Park Rapids since the existing pipelines in that corridor were small and old. This would demonstrate the effects of adding large diameter pipelines. This information will be useful in assessing and confirming the Montana IPTF report, *(see Attachment: C-1 Montana IPTF)* of the exponential increase in ROW width on hilly terrain.

4. A determination of the actual number of pipelines in these corridors since there are looping projects. This is relevant to whether pipe removal or replacement is an option.

5. Information from DNR, Enbridge, and MinnCan regarding frac-out frequency on MinnCan Line 4, Alberta Clipper and Southern Lights. Data should include the area affected and estimated amounts of drilling mud release, recovery and non-recovery. Include analysis of types of locations where this occurred (such as rivers, next to rivers, groundwater discharge area, etc.) Include description of constituents of drilling mud as much as it was available including additives to the bentonite.

6. Aerial photography taken close after construction of these projects to determine whether forecasted Extra Work Space was accurate. (If such aerial photography is available.) Also, this will determine where there was extra wide ROW because of hilly terrain—this information will also be useful for calculating impacts on alternative routes, etc. This should be compared to Enbridge's Alberta Clipper/Southern Lights applications.

7. Inventory of all oil spills on Enbridge past facilities since original construction with acreage affected. Also include oil spill data on pipelines south of Clearbrook.

8. Data on post construction digs on corridors including reasons for such digs. MinnCan Line 4, even though completed by 2008, seems to have a history of digs.

9. Using GIS, measure shoreline or river bank clearing distances at river crossing locations. Enbridge insisted during construction of Alberta Clipper/Southern Lights that it needed a cleared area. This is an important riparian zone for wildlife travel. Shorelines denuded of brush are a serious adverse impact to wildlife due to exposure to aerial predators and other risks.

10. Detailed discussion of why Enbridge says the Mainline Corridor can't take any more pipelines. Include contact with the USFS, Leech Lake, and Fond du Lac tribes. Describe these reasons and conflicts. 2621-23 cont

11. Obtain information on complaints submitted to DOC during construction of Alberta Clipper, Southern Lights and MinnCan Line 4. Include a review of social issues during construction of those projects. DOC should have this information since Larry Hartman of the Minnesota DOC was the contact person.

12. Locations of cross-overs. Lengths of crossovers. Reasons for cross-overs. This information is relevant to determine the difficulty of pipeline replacement or abandonment. This is also important to determine whether the corridor is "maxed out" for additional pipelines.

13. Locations and lengths of pipeline separations from adjacent pipelines beyond what is normal. In its applications Enbridge gives a typical separation from existing lines. However, as pipelines are added alongside existing pipelines, obstacles are found. This results in smaller or larger centerline deviations from the stated normal separation. Sometimes there are larger deviations, which are then called "minor route changes". Both of these figures are very important to fully understand the cumulative potential effects of pipeline corridor growth. Such information also contributes to the Alternatives analyses and the CN decision criteria. Therefore, locations, length and separation figures should be collected.

14. Use of the group of metrics described in *Section IV.E* including list of the different slope categories.

15. Characterization of added risk of oil releases because of the concentration of pipelines in the same corridor, including the chances of damage from a pipeline rupture accompanied by fire causing cascading damage to other pipelines as few feet away. (See *Attachments A-1, A-2, and D-1.*)

V. F. New Wisconsin proposed pipeline, Line 66, from Superior to the Chicago area and possible close of Line 5 in Michigan.

FOH believes this project and the Michigan scenario must be included in the DEIS analysis in some manner. It is appropriate to reference these projects in both the cumulative impact section and the alternatives section. According to A*ttachments R-1 and R-2* Enbridge developed plans for a new Line 66, a 42 inch pipeline from Superior to the Chicago area. They accomplished survey work, then later suspended the planning. There is no evidence they have made a decision to irrevocably terminate these plans.

In addition, the actions in Michigan that might result in closing Line 5 across the Mackinac Straits could possibly make the Line 66 project more likely. According to news reports, "*Michigan's attorney general on Thursday called for shutting down twin oil pipelines beneath the waterway where Lakes Huron and Michigan meet, as the state released a consultant's report outlining alternative scenarios for the future of oil transport in the ecologically sensitive tourist destination.*

Republican Bill Schuette said a "specific and definite timetable" should be established for decommissioning the nearly 5-mile-long (8-kilometer-long) section of Enbridge Inc.'s Line 5 in the Straits of Mackinac, which environmental groups want removed but the Canadian pipeline company insists is in good shape." *(See Attachment: M-1 Michigan official calls for shutting down oil pipeline - ABC News.)*

The relationship of these two projects is with two significant impact analysis topics--cumulative impact issues and the alternatives analysis—and with the CN decisions in Minnesota because:

1. It might result in an additional pipeline in Minnesota.

2. If the Wisconsin line is built, it would be a continuation of Enbridge's investment in aging pipeline corridors through Minnesota and Wisconsin lake and river country, rather than using a shorter and more direct route to Chicago area and beyond refiners through a landscape less susceptible to oil releases and where response time and remediation is far more favorable. If the Michigan line is shut down, it could have cascading effects throughout Enbridges's system, including the parts in Minnesota

FOH makes no specific recommendation as to how these projects should be addressed, but they must be addressed in the new DEIS. They certainly pertain to the CN decision criteria regarding alternatives and impacts to the human and natural environment. 2621-24

SECTION VI. LACK OF ANALYSIS IN THE DEIS OF THE PHYSICAL FOOTPRINT OF THE PROJECT DURING CONSTRUCTION

It is helpful to simplify the concept of the potential economic, socioeconomic, and environmental impacts of an oil pipeline before getting into the details that become necessary in an EIS on a very large pipeline costing billions of dollars. Setting aside the first two of these, the environmental impacts fall into two categories: oil release potential over the life of the project and the various physical impacts during construction—often known as the environmental "footprint." Oil release issues are described in *Section III*.

It is a factual statement as described in this section that a pipeline's physical footprint is much smaller on flat farmland terrain vs hilly terrain. It is also true that pipeline construction encounters more problems in hilly terrain because of the landscape characteristics of Minnesota's water rich moraine country.

This FOH section will demonstrate these statements and will demonstrate that the DEIS does a poor job of addressing these issues.

VI. A. Enbridge estimates of project's footprint is significantly lower that it's likely footprint.

The Enbridge descriptions of the project's footprint is contained in its application. The DEIS analysis was in turn based on acceptance by DOC and its consultants that Enbridge's estimates were accurate. FOH estimates that Enbridge's acreage estimates are off by at least 40% and likely somewhat more. If so, this changes many of the estimates of environmental impacts in the DEIS. Enbridge acreage estimates taken from the DEIS are as follows:

1. About 5,780 acres total footprint, including the ROW, access roads, and extra work space at rivers, road crossing, pump stations, and so forth.

2. The ROW proposed will be 120 feet in uplands and the same when co-located, but with a somewhat different configuration.

3. ROW width in wetlands is 85 feet.

4. Estimates are given that about 270 acres of access roads will be needed, which are included in the overall figures.

VI. B. An accurate project description is crucial to understanding impacts in order to comply with MEQB rules.

MEQB guidance documents describe the crucial importance of having accurate descriptions of a project. Note the following from MEQB's "EAW Guidelines (for) Preparing Environmental Assessment Worksheets."

"*The project description is the most important item in the EAW. It must be completed thoroughly and accurately… Clear, complete and detailed project descriptions are essential to understanding the potential for environmental effects… The detailed description should be focused on aspects of the project that may directly or indirectly manipulate, alter or impact the physical or natural environment. This can include: construction methods, especially in regard to site preparation; operational features (ongoing operations), especially in regard to waste production and management… project closure actions. The description should distinguish between construction and operational activities… Any infrastructure constructed to serve the project and not independent of project must be treated in the EAW as part of the project. For example, a road built to serve a specific project must be treated…" (Emphasis added.)*

Of course, since the Scoping EAW merely referred to Enbridge's application for the project description, that error has continued to ramify to now cause serious DEIS deficiencies.

VI. C. Basic principles involved in impact reduction from pipeline construction.

There are general principles common to all areas except but we provide more detail for the special case of farm land because the issues are so important regarding perceived effects on the farming community and the livelihood of people. These are:

1. *Long-term vs short term impacts*. The overall concept of pipeline construction is to open up the earth, place a pipeline in it and restore the land as much as possible to the original condition and productivity, no matter what the ownership and surface use. Here are important considerations for reducing long-term impacts:

a) There are few direct obstacles to accomplishing restoration—the main one being that woody vegetation must be kept off the permanent ROW area some distance in order to observe for oil releases, provide access, and so forth.

b) An overall principle is to avoid permanent impacts by using careful restoration, effective revegetation and use of appropriate erosion control methods.

c) Proper topsoil separation and replacement after pipe emplacement goes a long way toward restoring productivity.

d) In comments that follow, FOH shows that deep excavation on areas other than the trench can occur in many locations in hilly terrain. This will be certain to cause topsoil loss from mixing with parent material. This will in turn cause long-term impacts from invasive species, loss of productivity and soil erosion on slopes above water courses and sedimentation into them. *Loss of topsoil by burying it in parent material is a serious potential long term impact from pipeline construction that is only prevented by proper topsoil separation*.

2. *Farmland issues*. Pipeline construction in farmland is a special case because farmers depend on high soil quality for producing crops. Proper pipeline installation can prevent loss of

topsoil quality. Here are possible impacts and mitigation of such impacts; keeping in mind that some measures result in a wider ROW:

a) Trench excavation and any other excavation areas on farmland (such as non-flat terrain) potentially can result in topsoil loss from mixing. Enbridge is committing to separation over the trench and also says it will separate topsoil in other areas as desired by the landowner. However, they do not describe the ROW expansion that will follow from this.

b) Repeated heavy equipment travel during pipeline construction—which occurs on the work pad—results in serious long-term compaction in certain soils. This will reduce crop productivity. Measures to reduce such compaction are deep ripping during restoration after pipe installation. An even more effective technique in these kinds of soils is topsoil separation over the trench and the entire work pad, following by deep ripping of the subsoil and parent material.

c) Minnesota rules require pipeline companies to provide deeper cover over pipelines if the landowner desires this.

d) Proper compensation for seasonal crop losses and for possible loss of access can be accomplished quite easily for most landowners.

e) If these measures are followed, and if environmental inspectors ensure their use during construction, productivity loss on farmland is low or not present for the long term.

f) Organic farms must be avoided because the presence of a pipeline is incompatible with organic farming.

3. *Pipeline siting issues with respect to the physical location in the landscape*. With respect to the theoretical best physical place to put a pipeline, it is on flat farmland where the best management approach described above is sincerely used by the pipeline company to prevent productivity loses and where there are numerous roads. Roads are important to provide quick access if there is an oil release and a flat landscape means oil will not travel far and be relatively easy to recover.

Note: *"Enbridge's Mark Curwin, Senior Director for Strategic Coordination of Major Project Executions in the U.S. stated their construction preference is to build pipelines across farmland. He made these remarks at a public meeting in Park Rapids on Jan. 29, 2014. In attendance were two Minnesota legislators, Roger Erickson and Rod Skoe, as well as Hubbard County government, agency and business officials. Mr. Curwin gave the reasons of better soils, easier construction, easier access, less natural habitat destruction, cheaper and quicker. After construction the farmland can be put back into crop production. Access to leaks and spills is much easier. Winter wetland construction would be at a minimum." (See Attachment I-1 FOH 4.4.14 Sandpiper Public Comments Part1.)*

This point is made without regard to social acceptance of pipelines by the farm community which, of course, is an important issue. However, in many cases, when farmers are appropriately assured that productivity loss will not occur, they often accept a pipeline. This acceptance has fallen lately, however, and social acceptance of pipelines is a general issue wherever they are proposed.

VI. D. FOH evidence for Enbridge's underestimate of impacts.

VI.D.1. Evidence from construction of the Northern Border Pipeline in Montana.

This Interagency Pipeline Task Force report on pipeline construction is *Attachment C-1*. It concerned a 42 inch gas pipeline. The report was prepared in response to the Northern Border Pipeline Company seriously underestimating the size of the construction zone. This led to a high degree of concern from landowners and caused more permanent impacts from topsoil loss than otherwise would have occurred. It is referred to in this section as the IPTF Report.

The main construction techniques described in the IPTF Report are similar to many current practices even though that pipeline was built some time ago.

The findings of the IPTF Report are highly relevant to the Line 3 project and the DEIS analysis. The proposed route crosses terrain similar to some of the terrain documented in the IPTF Report. The relevant findings of the IPTF Report are as follows :

a) *Flat terrain*. On flat farmland terrain similar to many locations west of Clearbrook, eastern North Dakota and Iowa, even a 42 inch pipeline can be constructed on an 85-foot right of way (ROW) if topsoil is separated only over the trench. *(See C-1 Montana IPTF, Page 34.)*

b) *Pipeline construction work pad widths*. Equipment operations during construction are primarily confined to a work pad of 50-60 feet depending on company preferences. Initial clearing and restoration activities occur out to the edge of the project's "footprlnt." According to the application, Enbridge intends to use a 55 foot work pad. This work pad must be flat in order to ensure worker safety with respect to equipment passage and operation of side-boom tractors carrying pipe. Such tractors cannot carry pipe safely on a side-hill. Enbridge says it will use a 120 foot ROW in upland terrain and a 95 foot ROW in wetland terrain according to the project description in the DEIS.

c) *Side-hill cutting to construct the 50 foot work pad*. Any deviation from flat terrain in almost all landscapes results in a wider ROW for these reasons:

1) Side-hill cutting to construct the work pad requires a wider ROW to store excavated material from the work pad construction.

2) Additional extra space to separate topsoil from the excavated side-hill cut is needed. Failure to do this practice will result in long term topsoil loss when it becomes mixed with non-soil parent material in these side-hill locations. This additional space increases the ROW width and results in wider clearing in forested areas. This means it becomes a trade-off between temporary impacts (forest loss) and long-term impacts (topsoil loss and accompanying impacts.)

3) Side-hill cuts can easily be more than 6-8 feet deep on slopes of only 6 or 7%, resulting in large amounts of spoil and risk of topsoil mixing if not carefully separated. The ROW width increases exponentially as the degree of slope increases. Even a 2% slope will result in a noticeably wider ROW if topsoil is to be saved.

4) These findings are documented on pages 32-55 of the report. There was also a finding that slopes did not exceed 6-7 percent on almost all locations except for ravines. Page 46 indicates a ROW width of 230 feet.

d) *Deep cuts at the crest of hills.* Generically, the amount of cover for the proposed Line 3 is 3 to 4 feet. However, pipeline burial depth is deeper in some locations in hilly terrain or

such locations as rivers. This can greatly increase ROW width because of spoil and topsoil storage. One of the main reasons for deeper burial is the standard engineering practice used to reduce the degree of bend to increase hydraulic efficiency and reduce internal corrosion. This essentially means that a pipeline does not follow the exact landscape contour that would result if the same burial depth was always used.

The result is that quite deep cuts occur at certain locations because the work pad elevation must be consistent with the bottom of the trench.

This means exponential increases in ROW width at these locations. An example is seen on pages 43-46. ROW width was up to 230 feet in this area even though topsoil was not properly separated. Doing so would have widened the ROW even more, unless different construction techniques were used.

e) *Very wide construction ROWs in terrain steeper than 6-7 degree slopes*. On steeper slopes such as the ravine shown on pages 27-29, ROW widths were 350-400+ feet wide.

f) FOH submitted much of this information during the Sandpiper review process. *(See Attachments A-1, B-1.)*

<u>VI.D.2. Evidence from construction of the MinnCan pipeline from Clearbrook south to St. Paul of a wider ROW wider than that proposed by Enbridge for Line 3 in non-flat terrain</u>.

FOH consultant Paul Stolen was one of the DNR's main environmental contacts during permit review and construction of both the MinnCan Line 4 and Enbridge projects in 2007-2008 before retirement. He was also the author of the IPTF Report when working for the State of Montana. He was involved in reviewing pipeline plans, analyzing impacts, developing permit conditions, coordinating with other DNR staff and other agency staff, and monitoring construction with the company's environmental inspector. These are his findings with respect to knowledge of this route:

a) The MinnCan pipeline route has many locations with slopes of 6-7 degrees with some locations of steeper slopes. There are also sharp crests of hills that will result in deep cuts and wider ROWs.

b) MinnCan construction on flat farmland was similar to some of the same landscapes in the IPTF Report with respect to ROW widths.

c) The pipeline segment from Clearbrook to Park Rapids and across hilly terrain to the south along the route resulted in extra wide ROWs similar to those described in the IPTF Report.

d) There were substantial numbers of extra-work space areas on the MinnCan route and some were not anticipated by prior plans or became larger during construction.

e) There were locations where the ROW was hundreds of feet wide because of very large amounts of spoil storage in the hilly terrain.

f) The existing pipeline corridor along the MinnCan route through forested areas was about 60 feet prior to construction. After MinnCan construction, the corridor expanded in some locations to 230 feet and in hilly areas such as the La Salle Creek area, the MinnCan environmental "footprint" was nearly 400 feet wide.

f) "Cross-overs" are locations where obstacles (or other engineering reasons) require that a new pipeline must cross to the other side of existing pipelines. It is done with a bore that

requires extra work space and flat areas widening the ROW. Such cross-overs become more frequent in difficult terrain. Such cross-overs were common on MinnCan.

VI.D.3. Special case of the La Salle Creek crossing location.

The proposed route crosses another extremely problematic area after continuing south from the Upper Rice Lake area and crossing the Continental Divide. This is an exceptionally deep glacial tunnel valley not far north of Itasca State Park. This valley contains a small trout stream and three downstream lakes before drainage from the valley's watershed empties into the Mississippi River downstream. The lakes are in downstream order Big La Salle Lake , Middle La Salle Lake (a small lake about two miles from the pipeline crossing), and La Salle Lake about 3.5 miles from the crossing. La Salle Lake is within the La Salle Lake State Recreation Area. Just north of this is the La Salle Lake Scientific and Natural Area (SNA) bounded on the west by the Mississippi River and the east by La Salle Creek. The proposed pipeline crosses both waterways upstream of the SNA. *(See Attachment T-1 La Salle Creek and Lakes Area Line 3 Map.)* Therefore, the SNA is between the State Recreation Area and the Mississippi River. La Salle Lake is an extremely high value Minnesota resource, based on the following information from the DNR about the La Salle Lake State Recreation Area (SRA):

"*At 221 acres and 213 feet deep, with over 18,600 feet of shoreline, La Salle Lake is one of Minnesota's most pristine and deepest lakes. The lake supports walleye, northern pike, largemouth bass, black crappie, and bluegill sunfish populations… In the early 1990s, an early Native American Elk Lake Culture prehistoric site was discovered adjacent to La Salle Creek near the outlet of La Salle Lake. The site was identified during planning for an upgrade of the county highway and was partially excavated in 1995 before the road was rebuilt."*

The Institute for Minnesota Archaeology states: "...artifacts recovered from the La Salle Creek site have provided archaeologists with a clearer picture of how the producers of Brainerd Ware ceramics lived, what they ate, and what tools they made. In addition, the date of 3,180 years ago obtained from charred residue on the inside of a ceramic shard at the La Salle Creek Site is one of the earliest known dates for an Elk Lake Culture occupation in Minnesota."
(See DNR website for the quoted description, and see *Attachment H-1* for further information about the multiple values of the area and about potential consequences of an oil release)

La Salle Lake, the second deepest lake in Minnesota, is surrounded by the 1,000 acre La Salle Lake State Recreation Area. It was acquired by funds from the Legacy Amendment for about $8.5 million not long after the construction of the MinnCan 4 pipeline. Therefore, about 35 percent of the stream reach (and steep tunnel valley) between the pipeline crossing and the Mississippi River has been given, by Minnesota law, special high level protection.

FOH notes that even though the DEIS says that rivers within 10 miles of the proposed route are of concern, it contains no assessment of potential impacts to this area.

With respect to the DEIS analysis this location is so problematic for pipeline construction that it needs a site-specific analysis in the DEIS. This is not only a bad location with respect to possible oil releases during the project life, but construction impacts will likely be very severe. Enbridge is proposing what they term as a "dry crossing." This is a complete misnomer because of the site conditions. It merely means a trenched crossing. The problems are as follows:

a) This is a textbook case of the problems with old pipeline corridors being built without regard to environmental impacts. The pipeline crosses this steep valley at such an oblique angle that the pipeline route is over a mile long in the valley.

b) Paul Stolen estimates that, based on his previous experience with this site and with pipeline construction, Enbridge's current plans for crossing La Salle creek with a trenched crossing plus the valley crossing as proposed will result in an environmental "footprint" alone of 40 plus acres.

c) There are hillside wetlands formed because of groundwater discharge in this steep valley. Enbridge's plan is to put staging areas at these very problematic locations. Enbridge proposes to expand the existing corridor by co-locating on the west side of the Koch MinnCan pipelines as its pipeline enters the valley. This will involve cutting into the side-slope of this steep valley crossed at an oblique angle. A large staging area is needed in order to accomplish the sharp turn east to cross the valley and the creek. This staging area will be hemmed in by the steep valley on the west and the "hot" lines of the Minncan pipelines. Any cutting into the spring-fed slope base will be problematic risking slope de-stabilization and could also lead to slope slumping during heavy rain events. The same problem may occur on the east side of the valley because of the hillside and the sharp turn back south to return to the existing corridor. Enbridge's centerline route from there is actually proposed to be on the hillside, possibly causing other stability problems.

Analysis of Enbridge's specific plans for this crossing should address the possibilities of slope de-stabilization in the valley and should consider heavy rain events that could exacerbate the problem. The study should include an analysis of whether the terrain and construction in it will increase the likelihood of pipeline integrity being damaged by slope destabilization and slumping.

d) The valley itself is filled with a water-rich deep combination of gyttja and peat accompanied by upwelling groundwater. This material is very soft and because of the large expanse of water saturated soft organic matter in the valley, normal matting to support backhoes will not be effective. The characteristics of this wetland that receives large amounts of groundwater discharge will likely necessitate using sheet pile across the entire valley to prevent trench slumping as the pipeline trench is excavated for weighted pipe installation. This wider matting will increase wetland impacts.

Note: *Gyttja* is a mud formed from the partial decay of peat. It is black and has a gel-like consistency. Aerobic digestion of the peat by bacteria forms humic acid and reduces the peat in the first oxygenated meter (generally 0.5 meter) of the peat column. As the peat is buried under new peat or soil the oxygen is reduced, often by water logging, and further degradation by anaerobic microbes, anaerobic digestion can produce gyttja. (This definition is most appropriate to the La Salle Valley peat formation in the opinion of FOH consultant Paul Stolen.)

e) Mr. Stolen indicates this is the worst location for a pipeline installation he has seen in Minnesota and Montana in his years of pipeline experience. This experience did include locations with groundwater discharge into peat wetlands and where sheet pile was needed.

f) Hills on both sides of this steep glacial valley are about 100 feet higher than the valley floor.

g) This was the site of a very large drilling release of drilling mud during the construction of MinnCan. An HDD was accomplished during winter construction instead of a trenched crossing because MinnCan recognized the severe obstacles faced by a trenched crossing. The HDD was done to avoid this, but it then led to the drilling mud frac-out. The HDD bore was about 25 feet below La Salle Creek, but the drilling mud broke out into the creek and other places in the wetland. The wetland surface does not freeze in winter at this location because of groundwater upwelling. The lack of frost and the soft wetlands soils limited the use of motorized equipment during the drilling mud recovery operation. Some recovery operations had to be accomplished by hand work that normally would have been done with such

equipment. *(See Attachments E-1 Stolen Pipeline Impacts to Wetlands & River Floodplains PowerPoint, F-1 La Salle Creek MinnCan Response Activities report bentonite frac-out, F-2 La Salle Creek Barr Response Activities Work Plan Bentonite clean-up plan.)*

h) The DEIS provides a rudimentary discussion of a possible re-route around this area that does not consider any impacts to the La Salle Creek valley, its lakes, and so forth. It even included the issue of temporary noise impacts from construction-- to the few people living in the area-- with other superficial long-term environmental impacts and concluded a re-route was not advisable. Such noise impacts are the type that occurs from road construction that occurs every summer in Minnesota, and is regarded as an acceptable, temporary impact.

i) A trenched crossing in this area might even mean shutting down the MinnCan lines because even with mats over them, the very soft spring fed organic soils may not support equipment over the live lines.

j) Impacts from constructing in this area will likely be long term and last for many years. FOH strongly recommends that an independent engineering analyst be done for this location that closely examines Enbridge plans as well as making a determination of difficulties and environmental impacts of any type of crossing.

VI.D.4. Simplifying issues pertaining to ROW width and acreage forecasts.

There is a useful rule of thumb regarding ROW width and a pipeline's environmental "footprint." A 100 foot ROW means 12.1 acres/mile. Enbridge's proposed route in Minnesota is about 337 miles long. If it had a 100 foot ROW, this means a bit over 4,000 acres. Enbridge's proposal is for a 120 foot ROW. Adding Enbridge's estimate for access roads, extra work space and other figures, one can then translate this into an equivalent ROW width. If one does this for the 337 mile pipeline length in Minnesota, this amounts to the equivalent footprint of an average ROW width of 140 feet across the proposed route.

VI. E. Problems with Enbridge's acreage forecast of the project's footprint.

These are:

1. There has been no independent review of Enbridge's description of its land requirements or its ROW estimates. In fact, it is clear from the DEIS and Enbridge's application that Enbridge's diagrams of its pipeline ROW are flat *terrain diagrams—the ideal situation for a narrow ROW*. They are not diagrams of construction In hilly terrain. The application contains no descriptions of ROW in hilly terrain .

2. The IPTF Report documented exponential ROW width increases in hilly terrain. Some of the terrain in that report is similar to substantial areas along the proposed route. Thus there are locations along the proposed route where the project "footprint" will be substantially greater than 140 feet wide. This leads to a conclusion—though not proof—that Enbridge's figures are likely too low. Taken in their entirety, *Sections VI.D.1 through 3*, and Paul Stolen's estimates that based on his experience with this route and other pipelines, FOH has concluded that the ROW equivalent width for the pipeline and associated facilities across Minnesota is at least 200 feet. This means a "footprint" of 8,155 acres instead of 5,780 acres.

3. There are methods that can be used to develop an independent review of Enbridge's figures. An obvious one is the use of aerial photos of the proposed route to see how much the corridor expanded when MinnCan was built.

4. If Enbridge's figures are wrong, the DEIS calculations of impacts to various natural resources will also be wrong. If so, this will be a serious deficiency in the DEIS.

5. Again, if wrong, this will in turn lead to deficiencies in the cumulative impact analysis and comparison of alternatives. This topic is explored further in *Section V* with suggestions for rectifying the problem in the next DEIS.

6. FOH concludes that there is sufficient evidence that this topic should receive an independent review by an outside party. Such a review is necessary in order for the DEIS to be in compliance with MEQB rules, since the MEQB has emphasized that the environmental footprint of any project is key to analyzing impacts. The review should focus on three items: 2621-25

a) ROW requirements in non-flat terrain, estimates of ROW widths and depth of excavation in order to prepare a flat work pad. Estimates should be according to the metrics listed in *Section IV.E*. The estimates should assume topsoil separation to prevent long-term impacts.

b) A review of Enbridge's specific plans on these topics.

c) La Salle Creek.

VI. F. Drilling mud release can cause both short and long term impacts to wetlands and water bodies.

As noted in FOH's comments on Sandpiper, there were numerous locations where drilling mud '"frac-outs" occurred during HDDs on the MinnCan route. *(See Attachments E-1, F-1, F-2.)* Although the reasons for this were not determined, many of the events seemed to be associated with spring areas along certain rivers and wetlands. Most drilling mud from a frac-out remains in the environment. The DEIS did not address this potential impact. A revised DEIS needs to address the issue of drilling mud not being recovered as well as the potential toxicity of its additives.

Most of the MinnCan releases were not recovered and some were very large. The La Salle Creek winter event involved collection of 24,500 gallons of slurry containing drilling mud. This was water plus drilling mud. Since the HDD was 25 feet below the wetland surface, it is likely that much was not recovered. Some of the other frac-out locations along the route south of Clearbrook included:

Wetlands adjacent to the Clearwater River near Bagley
Mississippi Riverbed north of Itasca State Park
Straight River riverbed south of Park Rapids
Hay Creek, a site of a very large drilling mud release
Others farther south

Drilling mud is mostly bentonite clay, which would be considered wetland fill. However, it contains additives to increase the likelihood of a successful bore. Pipeline companies often declare that such additives are trade secrets. This occurred on the MinnCan project. MinnCan refused to release the information to the PCA and DNR after frac-outs. Therefore, there may still be contaminants remaining at the frac-out locations along the proposed route that are toxic to aquatic organisms.

Drilling mud releases are part of the environmental footprint of the proposed project. This topic needs to be carefully evaluated in the DEIS because of the numerous occurrences on the MinnCan project. The independent review of Enbridge's construction plans needs to consider these plans and ways to reduce releases. One of the main problems in the past is the HDD operators keep putting mud into the hole until it reaches the surface, even though they know 2621-26

that so much is being used that it is not staying in the bore hole. This happened on the MinnCan project in several locations. *(See Attachments E-1, F-1, F-2.)*

VI. G. Accurate information about the project's footprint in different landscapes is significant to the crucial alternatives analysis and the cumulative impact analysis.

The alternative routes studied in the DEIS cross variable landscapes. As described above, the pipelines environmental footprint increases exponentially in hilly terrain. This means routes that pass through generally flat or flatter terrain will have a substantially smaller physical impact on the environment.

Minnesota's glacial moraine country has an abundance of isolated basins that are often at different elevations on the landscape. All precipitation that doesn't evaporate or get used by vegetation enters the groundwater instead of flowing into creeks and rivers. One of the results is groundwater movement down-gradient including lateral movement and such phenomenon as upwelling into lakes and streams or emergence at the base of hills. This is likely the cause of at least some drilling mud releases.

This topic is addressed more fully in *Section V, Alternatives*. FOH suggestions are made there which will help to understand the project's footprint as it relates to that analysis as well as the cumulative impact analysis.

SECTION VII. LACK OF SITE SPECIFIC ANALYSIS OF IMPACTS, ESPECIALLY ABOUT EFFECTS OF OIL RELEASES

VII. A. Oil releases.

As noted elsewhere in the FOH comments, the DEIS includes *data* about potentially affected areas along the route, but has little or no *analysis of impacts* to such areas. It does have some flawed generic information which can be used if corrected to supply this information.

FOH suggests the following techniques to help resolve this serious lack:

VII.A.1. Types of site-specific analyst needed.

A revised DEIS should select actual locations of the type of area potentially affected by an oil release and do a site specific analysis of a large oil release that affects that particular type. It is our opinion that the analysis we are suggesting need not be an exhaustive analysis, but it should distinguish between ease of response time, distance traveled away from the release location, ease of clean-up, type of impacts, and long-term impacts. It should also include discussion of seasonal differences as to when the oil release occurred. 2621-27

Such a method is open to the same criticism FOH has levied against the seven river and creek locations we criticize in *Section III.C.* Therefore, thought must be put into avoiding the methodological problems of doing this. We feel that selecting more sites and developing criteria for examining them could likely avoid these problems.

Some of the types of areas would include *actual* sites of the following:

a) A population center, or more than one.

b) An actual flat or nearly flat farmland area crossed by the pipeline that is within a larger farmland area such as in the Red River Valley, or in Minnesota or Iowa along SA04.

c) A farmland area characterized by at least some steeper terrain.

d) One or more important wild rice areas, such as Lower Rice Lake discussed in *Section III.E* or in consultation with Minnesota's Native American tribes.

e) An appropriate selection of the several types of HCAs including water supply areas such as the Straight River aquifer.

f) Locations where oil releases can easily spread beyond the immediate oil release area. These are rivers. They need the most attention in site specific analysis. Substantially more than one river site needs to be selected than the seven sites in the DEIS. Furthermore, instead of putting so much detailed focus on modeling attempts to determine the fate of oil releases, more focus should be on forecasting impacts based on assumptions about fate based work done in the DEIS, for example, past events such as the Kalamazoo River oil release and the two relatively recent Yellowstone River spills. Rivers selected should include the most important ones, such as the Red River, both crossings of the Applicant's proposed routes on Mississippi River, the Straight River, La Salle Creek and selected rivers on the other routes.

g) Rivers selected should have a variety of floodplain types, such as farmed floodplains, and those that have extensive floodplain wetlands along a river.

h) Rare wetland types, such as calcareous fens. The wetland northwest of Trail, Minnesota would be a good choice.

i) Forested areas.

j) Other highly sensitive locations of multiple difficult terrain and significant natural resources. The La Salle Creek area north of Itasca State Park must receive special attention because of steep terrain with its groundwater fed wetlands on hillsides. It is a designated trout stream from the pipeline crossing and upstream. Downstream it enters a pristine lake. The La Salle valley has difficult access issues, and so forth. It is discussed in more detail in *Section VI.D.3.*

k) Other locations representing examples of the data collected in the DEIS.

<u>VI.A. 2. Types of site specific oil release information</u>.

How might this information be used in the EIS? When information is obtained from site specific analysis of these sites, the information can be extrapolated at least to some extent to other similar types along the various proposed routes. We are confident this can be accomplished in a more useful manner than the current DEIS which contains no such effort. Information about these site-specific locations need to include at least:

a) Descriptions of the responses to the oil release because they will differ in most areas, and include seasonal differences.

b) Difficulty in response time and clean-up efforts. For example, oil releases into wetland adjacent to rivers if releases occur during flood stage will be difficult to clean up and will continue to pollute. Plus, the Minnesota Pollution Control Agency during the Sandpiper proceedings identified 28 stream crossings where access for first responders would be extremely difficult 2000 ft downstream of the crossing.

c) Long term effects on natural areas.

d) Short term and long term economic effects, including on people and natural resources, using methods described in ORNL 2012. *(See Attachment D-1.)*

e) And so forth.

VII. B. Lack of analysis of site specific impacts from pipeline construction and operation other than oil releases.

There is no independent analysis of Enbridge's construction plans or environmental plans in the DEIS. For example, topsoil loss causes long term impacts. Enbridge is planning on leaving topsoil separation up to the landowner except over the trench. The DEIS contains no discussion of the impacts of drilling mud releases, something that was very common along Enbridge's proposed route south of Clearbrook during the construction of the MinnCan Line 4 pipeline several years ago. This topic is discussed in more detail in *Section VI*. 2621-28

It is generally known that complex technological systems become prone to unforeseen failures, especially as they age. As Enbridge's engineers understand, a modern pipeline is much more than a steel pipe in the ground. It is not just a pipe. It is a highly engineered system. In fact, there is some evidence that these increasingly sophisticated pipeline features have become more prone to failure because of this sophistication.

For example, the damage to the Keystone 1 pipeline from stray electrical currents occurred only four years after it was built in spite of complex cathodic protection systems. This occurred in spite of it being built to the same industry and PHSMA standards as the proposed Line 3. *(See Attachments: H-1 Stolen Risk & Consequences, H-2 DHS Solar Magnetic Storm Impact on Control Systems, H-3 AC Corrosion HV Power Line Cathodic Protected Pipeline, J-2 FOH 9.30.15 Line 3 Public Comments, O-1 TransCanada - Keystone Corrosion.)*

SECTION VIII. NEED FOR AN INDEPENDENT REVIEW AND IMPROVED METHODOLOGY

FOH's position is the DEIS suffers from the lack of an independent review of Enbridge's engineering plans and Enbridge's description of the project's environmental footprint. It also is deficient for not only the lack of an independent third party review of its accident oil release chapter and supporting documents, but also is in need of an improved and comprehensive methodology for analyzing oil release risks and consequences both short and long term. Other topics are covered here as well.

VIII. A. Features of a modern pipeline that are subject to failure are based on engineering models or require high intensity management during construction and operating.

1. An oil pipeline has a sophisticated cathodic protection system that involves factory coating and then field applied coatings during installation at tie-ins and field-welded joints. Pipelines, as well as HVTL lines, develop electrical currents caused by the Earth's magnetic field, known as Geomagnetically Induced Currents (GIC). This phenomenon is stronger in northern latitudes and increases during the various types of solar storms that reach Earth. GIC can lead to increased corrosion in pipelines and can also vary by soil types. Computerized models are used to develop the pipeline's engineered features before it is buried. Models are

used afterwards to determine responses (for example) to solar events. (*See Attachments H-1, H-2, H-3, J-2, O-1.)*

2. Electrical currents in pipelines can be increased if they parallel or are crossed by HVTL lines. HVTL lines are even more susceptible than pipelines to high electrical spikes during severe thunderstorms and in solar storm events that increase GIC. These spikes in turn can affect adjacent pipelines. Enbridge is proposing to co-locate its pipeline along an existing HVTL. *(See Attachments: H-1, H-2, H-3, J-2, O-1.)* Note the following:

"*Collocated pipelines, sharing, paralleling, or crossing high voltage power line rights-of-way (ROW), may be subject to electrical interference from electrostatic coupling, electromagnetic inductive, and conductive effects. If the interference effects are high enough, they may pose a safety hazard to personnel or the public, or may compromise the integrity of the pipeline."*

"Because of increased opposition to pipeline and power line siting, many future projects propose collocating high voltage alternating current (HVAC) and high voltage direct current (HVDC) power lines and pipelines in shared corridors, worsening the threat."

"Predicting HVAC interference on pipelines is a complex problem, with multiple interacting variables affecting the influence and consequences. In some cases, detailed modeling and field monitoring is used to estimate a collocated pipeline's susceptibility to HVAC interference, identify locations of possible AC current discharge, and design appropriate mitigation systems to reduce the effects of AC interference."

"This detailed computer modeling generally requires extensive data collection, field work, and subject-matter expertise." (emphasis added, "Criteria for pipelines co-located with electric power lines," INGAA Foundation Final Report 2015-04, 2015.)

3. Enbridge monitors its entire pipeline system from a control center in Alberta. This center became infamous in 2010 when it failed to shut down a large pipeline in Michigan for 17 hours. In fact, personnel restarted pumping oil several times. The result was a release of over 20,000 barrels of oil that fouled over 35 miles of the Kalamazoo River. Just a few days before this accident, Enbridge testified in Washington before a U.S. House of Representatives Committee hearing that its pipelines were safe. Clearly, they have revamped their management system, but also clearly, they are now asserting exactly the same thing and there is no independent confirmation by an outside reviewer.

4. As a pipeline is put together along a right of way and placed in its trench, there are numerous inspectors monitoring all aspects, including when it is placed in the trench. (As an example, it should be bedded in soft material without rocks against the pipe since pipes move as oil flows through them with temperature changes. These temperature changes can cause rocks to rub through cathodic protection.) This essential feature is because once buried it can't be examined. Thus this management system must be a crucial feature of pipelines. Failures of the management of this inspection system have been shown to be the source of pipe failures on the new Keystone 1 pipeline built in 2010.

Pipeline construction has unique features that environmental regulators need to fully understand in order to first properly understand the project's environmental "footprint" and then analyze environmental impacts. Construction proceeds rapidly with complex operations. There is extensive grading in non-flat terrain to create the necessary flat work pad and the separation of topsoil to allow restoration widens the affected area. Access roads and extra workspace for road and river crossings increase this footprint. As *Section VI* of these comments indicate, the DEIS uncritically used Enbridge's estimate of the project's footprint and 2621-29

other operations that occur during construction. This estimate seriously underestimates the project's impacts. 2621-29 cont

By not taking a critical look at these issues, the alternatives analysis and analyses of impacts in the DEIS is seriously flawed.

VIII. C. FOH recommends the following *independent* studies.

The current DEIS contains no content on these subjects. FOH describes some of the principles driving risk studies and the need for an independent study of the potential for oil releases in *Section VIII.D*. FOH also strongly supports the recommendations for studying oil release potential in the report of Accufacts. *(See Attachment S-1.)*

1. Assessment of Enbridge's engineering design of cathodic protection system to address stray voltage, solar storm affects, grounding system and protection from HVTL lines that cross or are adjacent to the proposed route. Such an assessment should attempt to understand the failures of such a system that occurred with the recently built Keystone 1 pipeline where rapid corrosion from stray currents nearly ate through the pipeline wall in about 3 years. *(See Attachments: H-1, H-2, H-3, J-2, O-1.)*

2. Assessment of effects on Enbridge's Alberta control center and its remotely operated valves and pressure reading system from solar storms including effects that reach the Earth within minutes. *(See Attachment H-2.)*

3. Assessment of whether Enbridge's setback from co-locating along an HVTL line is adequate to protect the pipeline integrity including during solar storms. Studies indicate that such effects are likely increased in Northern Minnesota. This also is necessary for determining corridor width where Enbridge is co-locating to determine whether there are environmental advantages of doing so under Minnesota's policy of following existing utility corridors, and as Enbridge's contends. *(See Attachment H-2.)*

4. Assessment of Enbridge's control center operations. Enbridge has supplied repeated and abundant assurances that it has changed its operations center since the 2010 Michigan oil release where the pipeline was not shut down from the center for 17 hours. Just a few days before that event, Enbridge assured a Congressional Committee that its pipeline was safe from such events. No independent assessment of this center has been referenced in the DEIS. Therefore, Minnesota is in the same position as that Congressional committee. *(See Attachment H-2.)*

5. Assessment of the environmental "footprint" of the project based on knowledge of the landscape on the proposed routes and alternatives as well as on Enbridge's plans and likely events during construction, as described in *Section VI*.

6. Assessment of site-specific impacts of oil releases at the various specific locations to the human and natural environment recommended in FOH comments as well as others.

7. The selected contractors should affirm that they have done no prior work for Enbridge. This would be the same requirement imposed on Enbridge by the Consent Decree on the 2010 Michigan oil release. *(See Attachment P-1)*

VIII. D. Principal features of methods of estimating rare events with very high consequences.

Forecasting the chances of oil releases and the consequences if large releases could occur is a crucial part of the DEIS and is crucial for the PUC's CN decision. It is important for any oil pipeline in any location, but is of heightened importance here because of the proposed location and because future pipelines are likely to follow along the proposed new corridor. Even though ruptures are rare, consequences can be very large and must be properly examined. This is documented in previous FOH material that is enclosed. *(See Attachments: A-1 Stolen 4.4.14 Sandpiper Comments, B-1 Stolen 11.19.14 Direct Testimony Sandpiper.)*

The approach that was used in this DEIS to forecast the likelihood of oil releases during the 50 or more year life of this project did not use a risk assessment approach. It merely looked at federal data on pipeline ruptures for various sizes of oil releases. It also used oil release amounts and other information that have been kept out of the DEIS, which is a fatal flaw in the DEIS. *(See Attachment S-1.)* It then characterized this on a per mile per year basis. 2621-30

Forecasting methods for rare but highly consequential events all have similar methodological problems since all of them are intended to inform decision makers. Even though the DEIS did not do a risk assessment, FOH believes that the principles of accomplishing risk assessments are completely applicable to the problem of decision-making regarding any method of forecasting the chances of oil releases.

A useful case study that can provide some guidance for this DEIS pipeline review was a project in which the Minnesota Department of Natural Resources ("DNR") was deeply involved in 2006. This was a large risk assessment that was sponsored by the U.S. Bureau of Reclamation concerning a large bulk water transfer from the Missouri River Basin across the continental divide to the Hudson Bay Drainage. It attempted to place numerical numbers on the risk of various invasive species crossing the divide because of the water transfer. The DNR solicited a review of the risk assessment from a risk assessment expert. The review that resulted provides useful guidance for the current effort to study oil risk release and consequences. It is enclosed as *Attachment G-1 RRVWNA Drake Letter.*

We believe the principles laid out in the attached document are relevant to the needed revision of the DEIS to more objectively describe the risk of future oil releases for the public as well as for the PUC when making its CN decision. The following language in the attached document provides such necessary and useful guidance:

1. "*Before risk assessment will be complete, risk characterization must also occur, including risk estimation, risk description, <u>development of alternative scenarios, and evaluation of evidence and uncertainty.</u> In order to be viable, such a process <u>should be well documented, transparent, and available for public comment</u> as this is the stage where the relationship between <u>the probabilities of hazards are being realized and society's aversion to risk is determined</u>.*" (Page 1, emphasis added.).

2. "*Certainly, it is acceptable to treat any possible component of failure as a "black box" or in some qualitative way. However <u>this judgement must be made transparent and open to criticism</u>… there would be an independent comprehensive effectiveness analysis of proposed systems*." (First paragraph of page 2, emphasis added.)

3. "*An alternative is to perform risk analysis <u>along a range of possible failure rates…</u>*"

4. "*Risk analysis must make very clear the potential sources of error in projected scenarios. Sometimes the focus of risk analysis on inherently unpredictable events… obscures other sources of errors that must be assessed… Additionally, supporting sensitivity analysis should be conducted for all analysis and reported in order to allow to decision makers to weight the importance of all modeled assumptions*." (First paragraph of answer to Q 3, emphasis added.) 2621-30 cont

5. FOH Conclusion and summary: Being able to portray EACH of these statements is relevant to the attempts to characterize oil release risk from the proposed project, as well as cumulative impacts of corridor expansion in these sensitive areas. We do not believe the methods of characterizing oil releases in the DEIS meets the criteria noted above. Our FOH emphasis strongly asserts that certain statements in the Drake letter apply directly to the need to properly analyze oil release risk. These statements are underlined, and concern transparency, potential sources of error, openness to criticism, and sensitivity analysis. Our emphasis here is on the assumptions being evident and open to all parts of the analysis, sensitivity analysis, and an independent review.

SECTION IX. "LIFE OF PROJECT" ANALYSIS NEEDED

FOH has separated out this topic because the DEIS so pervasively did not address this crucial approach. Pipelines are linear facilities—"highways"—to carry oil. In this way they are very similar to automotive highways. The new DEIS needs to look ahead just as highway agencies look at population growth and inter-connecting highways. Our point is that these pipelines will be in the ground for 50 or more years. It is equally important to look back into the past to be aware of the consequences of past decisions compounding current problems. This is important to keep paramount for DEIS content as well as the CN decision criteria regarding alternatives and impacts to the human and natural environment.

Doing so involves developing an acute awareness that the economic, socioeconomic, and environmental values represented by the Minnesota and Wisconsin river country will continue to grow in value and need long-term protection from industries that can degrade these values. This is merely normal good government practice and good common sense that regular citizens use whenever they think of their own future.

Here are some of the most major deficiencies in the DEIS demonstrating that this was not accomplished:

A. As noted elsewhere, the cumulative impact section of the DEIS did not address the ever widening utility corridors in inappropriate locations even though Minnesota's practice of following existing utility corridors has never been examined in an EIS and MEQB guidance documents have stated this requirement in rules is more important than ever based on a recent Minnesota Supreme Court case. 2621-31

B. The DEIS failed to look ahead at the high likelihood of additional pipelines following the same route as that proposed for Line 3. 2621-32

C. The chance of oil releases were calculated on a per year basis rather than a per "life of project" basis. It is true that a "recurrence interval" was calculated, but this seems an afterthought. As the attached Accufacts report, *Attachment S-1*, shows, this method is extremely flawed at any rate. 2621-33

D. The Enbridge project description was accepted at face value, even though MEQB rules and especially guidance documents stress that is crucially important to obtain an accurate description of the project's environmental "footprint. This guidance points out without such accuracy the impact assessment becomes inaccurate. FOH estimates the Enbridge estimate of project acreage affected during construction is off by 40 percent.

E. Whatever location is selected by permitting authorities, it will be in that place for 50 or more years. By not providing a scientifically and "best practices" approach to the above four items and by not treating the SA04 alternative the same as the other routes, the entire alternatives analysis is deeply flawed. Therefore, the PUC cannot make a proper "life of project" decision which, in our opinion, is required by Minnesota law.

SECTION X. FAILURES BY THE FEDERAL GOVERNMENT INCREASE THE NEED FOR FULL AND INDEPENDENT STATE REVIEW AND ANALYSIS

FOH believes Minnesota must exert its full and independent authority as it reviews the potential environmental impacts of this pipeline. This need is heightened by the federal government's failure to provide a complementary information gathering and review process which is anticipated by laws, regulations and past practices, but has been woefully lacking here.

A. Federal Consent Decree filed in May 2017.

This Consent Decree, *Attachment P-1,* is a result of the Enbridge very large oil release in Michigan in 2010 and indicates that Line 3 should be replaced as soon as possible. Enbridge, in 2013, was still saying that repairing the pipeline was fine—now they are using the Consent Decree to urge haste and have adopted a "sky is falling" public relations approach to putting a new and enlarged Line 3 in a new problematic corridor. This inappropriate pressure makes it all the more important that the PUC fully support the objective study of SA04 as a viable and common sense alternative to Enbridge's private desire to expand its existing decaying private infrastructure through Minnesota and Wisconsin. It is important to note that the Consent *Decree contains requirements to test all of Enbridge's pipelines in Minnesota, including ones older than Line 3.* This testing may well reveal information relevant to Minnesota's DEIS analyses of alternatives and cumulative impacts—that another old pipeline needs replacement.

B. Failures and inadequacies of federal pipeline oversight.

The federal agency that oversees pipelines, PHSMA, has been found to be at fault in a number of pipeline oil releases and gas pipeline ruptures. The NTSB found this to be the case with the 2010 Michigan spill as well as the San Bruno gas pipeline explosion that killed 9 people and destroyed over 40 houses. *(See Attachment: B-1 Stolen 11.19.14 Direct Testimony Sandpiper.)* There also have been failures of PHSMA on the Keystone 1 pipeline, which was just built in 2010. Yet the DEIS supporting documents for oil releases—done by Enbridge consultants—are highly dependent on PHSMA regulations and studies. Nothing in these federal regulations prevents Minnesota from obtaining independent information. We therefore urge the PUC to not rely on Enbridge's attempt to hide behind federal regulations and oversight that is either inadequate or nonexistent.

C. Inaction by federal agencies.

The federal agency with substantial jurisdiction over rivers and wetlands in Minnesota, the U.S. Army Corp of Engineers, has not said a word publicly on either the Sandpiper or Line 3 pipelines with respect to oil releases into wetlands and rivers, nor as it weighed in on others'

studies of them. Furthermore, their actions on the DAPL pipeline were found by the courts and Obama Administration to be severely problematic. In addition, the U.S. Environmental Protection Agency, which has oversight over the quality of federal environmental review, as well as the Clean Water Act has also been nearly silent, as far as we know. *(See Attachment H-1).*

D. Failure of interstate pipeline siting.

It is obvious that a pipeline is a "line" from product origin all the way to the product's destination, which involves passing through a number of states. Yet because of the federal agencies' failure to look at the environmental impacts of the entire proposed pipeline, each state has had to take actions on segments of this line without any reference to the impacts of the entire project. This is obviously a problem and federal agencies have done nothing to solve it. Of course we recognize that there is no federal law requiring such a study—but it is eminent common sense that federal agencies could have set up interstate coordination or encouraged a joint federal/state EIS. The federal environmental review law (NEPA) encourages such coordination, although not requiring it. *(See Attachment H-1).*

E. All Enbridge pipelines are interstate and international.

Even though this is the case, Minnesota is put in the disadvantageous situation of "going it alone." Most of the product Enbridge transports does not stay in Minnesota. And the destination of the product from both Sandpiper and Line 3 is largely in the Chicago area and regions south. Essentially Enbridge is proposing *to follow a much longer route than if it were to follow SA04.* Yet the federal government has done nothing to assist the involved states to do a coordinated and rational interstate review which we believe would normally be done under federal environmental review. Therefore, we urge the PUC to not treat SA04 as a lesser route simply because using it would involve other states. To do so would deprive Minnesota of the opportunity to take a hard look at reasonable alternatives. To do so would also encourage pipeline companies to unfairly benefit from a fractured regulatory structure and from the federal government's failure to provide critical information about an entire pipeline from product origin to its final destination.

FRIENDS OF THE HEADWATERS

RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

Ms. Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Dear Ms. MacAlister,

Please find enclosed a thumb drive containing Friends of the Headwaters response to the Line 3 DEIS. Paper copy of FOH Comments and Accufacts also enclosed.

Contents include:

Comments from FOH,
Report from Accufacts, an independent consulting firm,
And supporting attachments.

Regarding the attachments: some are referenced in the FOH Response, others are materials from FOH's involvement with the Sandpiper proceedings. FOH believes these need to be entered into the Line 3 DEIS record.

Thank you for your attention to these materials. Thanks for permitting FedEx delivery of all materials. FOH Comments and Accufact Report will be posted to the docket today.

Have fun reading. ;-)

All the best,

Richard Smith
President, FOH
612-708-0908
grizrs615@gmail.com

Friends of the Headwaters
P.O.Box 583
Park Rapids, MN 56470

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

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A-1 Stolen 4.4.14 Sandpiper Comments
A-2 Stolen 5.28.14 Sandpiper comments

Record of Paul Stolen's comments and documents submitted to the Minnesota Department of Commerce for the respective Public Comment periods for the proposed Sandpiper Pipeline project

B-1 Stolen 11.19.14 Direct Testimony SP
B-2 Stolen 11.19.14 Direct Testimony SP-App 5
B-3 Stolen 11.19.14 Direct Testimony SP-App 6
B-4 Stolen 1.15.15 Surrebuttal Testimony SP

Record of Paul Stolen's Direct Testimony and Surrebuttal Testimony for Sandpiper Pipeline Contested Case and Evidentiary Hearings

C-1 Montana IPTF

"Construction of the Northern Border Pipeline in Montana", Paul Stolen, Assistant Director, Interagency Pipeline Task Force, Montana Department of Natural Resources and Conservation

D-1 ORNL 2012 - Oak Ridge Block Valve Study

Oak Ridge National Laboratories (ORNL) Study
"Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety"

E-1 Stolen Pipeline Impacts to Wetlands & River Floodplains PowerPoint

PowerPoint Presentation
"Potential Impacts of Large Diameter Pipelines to Wetlands," Minnesota Department of Natural Resources, Paul Stolen, Author

F-1 La Salle Creek-MinnCan Response Activities report bentonite frac-out

MinnCan Pipeline Company letter to Minnesota Department of Natural Resources regarding a bentonite "frac-out" in the La Salle Creek Valley in 2008

F-2 La Salle Creek-Barr Response Activities Work Plan Bentonite clean-up plan

Barr Engineering Technical Memorandum to MinnCan Pipeline Company regarding a clean-up work plan for the bentonite "frac-out" in the La Salle Creek Valley

G-1 RRVWNA Drake Letter

John Drake, PHD, National Center for Ecological Analysis and Synthesis, Santa Barbara, CA, letter to Paul Stolen regarding the proposed Surface Water Diversion Project between the Missouri River Basin and the Red River of the North in North Dakota

H-1 Stolen - Risk & Consequences

Paul Stolen Letter to:
Commissioner Mike Rothman, Minnesota Department of Commerce
Ken Westlake, Regional NEPA Contact, USEPA
Tamara Cameron, Chief, Regulatory Branch, USACE

Re: Proposed Enbridge Sandpiper and Line 3 Enlargement/Relocation/Abandonment projects in Minnesota: "Policy and technical reasons for independent, scientifically sound analysis of the risk and environmental, cultural, and human consequences of oil releases for the 50+ years of the project."

H-2 DHS Solar Magnetic Storm Impact on Control Systems

Department of Homeland Security Report "Solar Magnetic Storm Impact on Control Systems" Revised Jan 2014

H-3 AC Corrosion HV Power LIne Cathodic Protected Pipeline

CEIT'14 Report "AC Corrosion Induced by High Voltage Power Line on Cathodically Protected Pipeline

I-1 FOH 4.4.14 Sandpiper Public Comments Part1
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All Friends of the Headwaters documents and maps submitted to the Minnesota Department of Commerce for the respective Public Comment periods for the proposed Sandpiper Pipeline project

J-1 FOH 5.12.15 Line 3 Comments L3 Application
J-2 FOH 9.30.15 Line 3 Public Comments

All Friends of the Headwaters documents and maps submitted to the Minnesota Department of Commerce for the respective Public Comment periods for the proposed Line 3 Enlargement and Relocation Pipeline project

K-1 Smith 11.19.14 Direct Testimony SP
K-2 Smith 1.15.15 Surrebuttal Testimony SP

Record of Richard Smith's Direct Testimony and Surrebuttal Testimony for Sandpiper Pipeline Contested Case and Evidentiary Hearings

L-1 FOH MCEA 4.22.15 Appellate Court Brief

Friends of the Headwaters and the Minnesota Center for Environmental Advocacy Brief to the Minnesota Appellate Court resulting in unanimous decision later upheld by the Minnesota Supreme Court for a full EIS on Enbridge's proposed new pipelines in Minnesota.

L-2 FOH MCEA 5.21.15 Gunton Evaluation of SP-L3 DSDD

Report: "Evaluation of Minnesota Draft Scoping Decision Document for Sandpiper Pipeline Project" by Dr. Thomas Gunton, Director, Resource and Environmental Planning Program, Simon Fraser University

L-3 FOH MCEA 5.26.16 Comments SP-L3 DSDD

Friends of the Headwaters and the Minnesota Center for Environmental Advocacy Comments on the Minnesota Department of Commerce's Sandpiper and Line 3 Draft Scoping Decision Document

M-1 Michigan official calls for shutting down oil pipeline - ABC News

ABC News Report on Enbridge Line 5 pipeline issue in Michigan and Mackinac Straits

N-1 DOC Letter PUC re FEIS

Minnesota Department of Commerce's Response to the Minnesota Public Utilities Commission regarding the Line 3 Final EIS and Determination of "Adequacy"

O-1 TransCanada - Keystone Corrosion

Study of Root Cause and Contributing Factors, Keystone Pipeline, Corrosion Anomaly Investigation

P-1 Enbridge 5.23.17 Federal Consent Decree

Federal Settlement Consent Decree: US Department of Justice, US EPA and Enbridge on the Marshall, Michigan (Kalamazoo River) pipeline rupture 2010

Q-1 How Complex Systems Fail

"Being a Short Treatise on the Nature of Failure"
Paper by the Cognitive Technologies Laboratory, University of Chicago

R-1 Enbridge Wisconsin Landowner News

Enbridge PR Newsletter to Wisconsin Landowners indicating early survey work for Line 61 "Twin", also referred as Line 66, proposed from Superior, WI to Chicago area

R-2 PressPub.com "Enbridge Announces Plan to "twin" Line 61

Online news story published by PressPub.com/News

S-1 Accufacts Report on Line 3 DEIS.

Review of the DEIS for the Line 3 Pipeline Project Prepared for the Minnesota Department of Commerce.

S-2 Accufacts Kuprewicz CV

Accufacts Richard Kuprewicz Curriculum Vitae

T-1 La Salle Creek and Lakes Area Line 3 Map

Map of La Salle Valley, La Salle State Recreation and Scientific Natural Areas and Mississippi River region marked with proposed pipeline route

U-1 Paul Stolen Curriculum Vitae

Summary of Experience, Friends of the Headwaters Consultant, Paul Stolen

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENTS "A"

A-1 Stolen 4.4.14 Sandpiper Comments
A-2 Stolen 5.28.14 Sandpiper comments

Record of Paul Stolen's comments and documents submitted to the Minnesota Department of Commerce for the respective Public Comment periods for the proposed Sandpiper Pipeline project

April 4, 2014

Paul Stolen
37603 370th Av SE,
Fosston, MN 56542,
218-435-1138

Mr. Larry Hartman
Environmental Review Manager
Minnesota Department of Commerce
85 67th Place East, Suite 500
St. Paul, MN 55101

Re: Comments on proposed Enbridge Sandpiper Pipeline, PUC Docket #13-474

Dear Mr. Hartman:

Enclosed are my comments on this proposed project. They concern the main topics solicited in the January 31, 2014 public notice. I suggest alternative routes and route segments, and provide answers to public notice questions "What human and environmental impacts should be studied in the comparative environmental analysis?" and "Are there any specific methods to address these impacts that should be studied in the comparative environmental analysis?"

My comments address human and environmental impacts. They identify appropriate methods of studying such impacts, based on PUC rules and standard methods used in Minnesota and elsewhere to review pipelines.

The most important point in these comments concerns the enormous quantity of oil and other hazardous product that is already flowing through multiple pipelines in one or two narrow corridors This project, and the new Line 3 Enbridge replacement and enlargement will add even larger amounts of oil and product to these corridors. These corridors cross highly valued natural resource areas that have many lakes and clean rivers,. They are often at or near the headwaters of drainages and in hilly areas, as well as being close to people and concentrations of residences.

It is time for Minnesota and federal regulatory agencies to address the problem of multiple large diameter pipelines in close proximity to each other. This concentration makes the consequences of a single site event—whether such an event is natural, accidental, or intentional—potentially catastrophic. Furthermore, my comments will show that the flow of oil and other product will be so large as to be larger than—or a significant portion of—the flow of well-known rivers crossed by the corridors.

I am submitting these comments as a citizen but also as an expert. These are my personal comments written without review or reimbursement of any party. I will be willing to provide testimony as such in legal and legislative forums, should this be necessary, depending on personal availability.

In lieu of providing a c.v. at this time, I summarize here my credentials for asserting that I have expertise regarding the Sandpiper review.

I have regulatory experience with large natural gas, carbon dioxide, water, and oil and product pipelines in Montana and Minnesota. This has involved on the order of 10-12 pipeline projects while employed at the Montana Department of Natural Resources and Conservation and the Minnesota Department of Natural Resources. In Montana, the DNRC had environmental review, locational approval, and Certificate of Need Authority for energy facilities combined in one agency. I have also supervised , and /or participated in the preparation of EISs or EAs of such pipelines. This included conducting training sessions for other regulatory personnel on how to review pipelines for impacts and on pipeline construction methods.

I have written or coordinated the writing of major environmental review regulations for fixed linear energy facilities, including pipelines and HVTL lines. This experience included reviewing specific proposed linear and fixed large energy facilities (power plants and HVTL lines), and high-level nuclear waste repositories. I have been an environmental inspector on a number of large pipeline projects, including presenting agency views at pre-construction conferences with pipeline builders and sub-contractors.

I have policy-level experience with both federal and state laws and regulations regarding environmental review, pipelines, and solid and hazardous waste topics. This includes legislative staff work, legal depositions, testimony in court, and presentations to other agencies. Finally, this experience also includes years of doing environmental reviews of many other types of projects, including experience with formal risk assessment, and supervising and/or writing scopes of work for the preparation of highly technical studies conducted by outside consultants.

Review and permitting of significant projects such as the Sandpiper project, and the 36-inch Enbridge upgrade of its old Line 3, means that there are overlapping jurisdiction with other federal and state agencies. Some of these are broader than the narrow PUC review requirements. My comments also pertain to those other agency responsibilities. It is necessary to exchange information among such government authorities as a matter of good government. Many of my comments attempt to accomplish such a goal. Therefore, I am providing copies of my comments to these other agencies.

My comments are enclosed. Thank you for consideration of them.

Sincerely,

Paul D. Stolen

C: Tom Landwehr, Commissioner, Minnesota DNR
John Stine, Commissioner, Minnesota PCA
Tamara Cameron, Regulatory Chief, Corps of Engineers
Bob Eleff, Minnesota Legislature, House Research
Ken Westlake, USEPA, Chicago Office
US State Department, Washington DC

Comments on proposed Enbridge Sandpiper Pipeline, PUC Docket #13-474
Expert Testimony of Paul Stolen, Fosston Minnesota
April 4, 2014

I. Potential oil leaks and pipeline ruptures must be addressed in the route permit, by Minnesota state agencies, and by the US Corps of Engineers and EPA.

Summary: In this section I make the case for using accepted methods of risk assessment to address the consequences of pipeline ruptures to the Minnesota environment and people from this project. A foundation principle of risk assessment is that the greater the consequences of an event, the greater the need to examine rare or unlikely events. There are five reasons why unlikely events need to be considered in this risk assessment for this project:

1) Risk assessment scenarios in Attachment 4 are roughly applicable to one of the existing and proposed pipeline corridors in Minnesota. For example, a 36-inch pipeline rupture of the "worst case" type used in the assessment, may still release on the order of 40,000 barrels of oil, even assuming the quickest reaction time of pipeline operators to close block valves(13 minutes.) If valve closure time is delayed for 30 minutes, this rises to about 70,000 barrels, and if delay is 60 minutes, the amount is 100,000 barrels.

Such releases could have extremely high consequences to the Minnesota environment, and higher releases are possible under some risk assessment scenarios.

2) The portion of the Sandpiper route between Clearbrook and Park Rapids already contains three pipelines. Enbridge is apparently planning one more 36-in line in the same corridor as the 30 inch Sandpiper route. I raise the question as to what "worst-case" scenario should be used when there are 5 pipelines in close proximity in remote areas and at least somewhat susceptible to natural or intentional damage, perhaps to all of them at one time?

3) The corridor Enbridge proposes to use traverses a landscape rich in aquatic and other natural resources, highly valued by Minnesotans, and that includes major groundwater resources.

4) The portion of the Sandpiper route between Clearbrook and Park Rapids was fraught with problems during construction of the MinnCan pipeline, which were at least partially due to the corridor being created for a small pipeline long before modern environmental laws were passed.

5) The other route likely to be considered in the Sandpiper comparative review—the Enbridge mainline corridor—suffers from very similar problems as do at least the first three listed above. There are already as much as 7 pipelines present in this corridor.

The Sandpiper project, as well as other new projects in the planning stages, will add significantly to the enormous quantity of oil and other hazardous product that is already flowing through two narrow pipeline corridors.

It is time for Minnesota and federal regulatory agencies to address this problem of multiple large diameter pipelines in close proximity to each other. This concentration makes them vulnerable to natural events, accident or intentional act—such as the Oklahoma City federal building bombing. In fact, in Comment II.A. I discuss a specific case on the Alberta Clipper route where very high flows caused by the large rainfall events

that seemed to be caused by global warming could threaten the integrity of more than one of the large pipelines in this narrow corridor.

My comments on this topic are based on my experience with pipelines in Minnesota and Montana, as well as with exposure to risk assessment concepts and methods. Enbridge may object to the use of the ORNL study in Attachment 4, and say it is not appropriate to apply to these projects. I disagree: of course it isn't directly applicable, but its methods are modifiable so that it is. Extrapolating the findings of Attachment 4 to the two corridors could be pushing things a little—but I have found no information that anyone else is considering these issues and the deadline for PUC comment is now due. It is therefore entirely appropriate to use it, and I hope to trigger a helpful debate. And, I know for certain my view this topic is important will be shared by the public.

The jurisdiction of the PUC and other Minnesota agencies regarding the scope of review as it pertains to pipeline design and location lacks clarity and confusion among regulators as well as the pipeline company personnel. This is related to the issue of pipeline "safety standards", and is discussed in detail in Comment II below. This lack of clarity and confusion should not be allowed to continue, since in my view, Minnesota's natural resources and citizens are threatened by rare but reasonably foreseeable events.

As noted in Comment II, I believe the evidence is firm that the Minnesota state agencies can effectively develop measures regarding mandatory design features related to pipeline ruptures and leaks in order to that protect people and the environment without encroaching on federal "safety standards." Such involvement is extremely important, given the magnitude of oil and product potentially moving through these corridors.

<u>I. A. Estimates of existing and proposed pipeline oil and product flows in Minnesota as compared to selected river flows</u>.

After burial, pipelines, when functioning correctly, are largely invisible to the public and most policy makers—such as those currently concerned with oil transport by rail. In order to make considered judgment on policy and permits—as well as allowing proper public involvement—this needs to change. It is no longer acceptable to have an "out of sight, out of mind" attitude on the magnitude of current and potential oil transport through Minnesota in restricted corridors with multiple pipelines.

It is not possible to begin to analyze potential impacts from pipeline leaks and ruptures without knowing amounts of oil and product being transported. Attachment A provides details about oil flow into and through Minnesota in the corridors relevant to the Sandpiper analysis. It thus provides a basis for analyzing socio-economic, public safety, and environmental impacts from leaks and ruptures. Pipe size and amounts of oil and product pumped are given, as is ownership and origin (for most of the lines.) Attachment 2 provides a description of most of the Enbridge pipelines.

Also included on page 3 of Attachment A is a comparison of pipeline oil and product flow and selected river flows near where corridors cross the named rivers. These data, while in cubic feet per second (cfs), are useful for both public understanding of local residents as well as resource managers. The public in these locations can at least visualize the rivers even though most do not directly understand cfs figures.

The river flow data shown are long-term median flows for April 2, not current flows. Therefore, they are indicative of long-term spring runoff conditions, and are likely substantially higher than low-flow conditions.

In addition, the percentages listed comparing oil/product flow to river flow use the highest amounts based on the proposed pipeline projects in the permitting and planning stages.

There are some caveats with respect to the numbers in Attachment 1. First, I used reliable sources for the numbers. When I used news reports, I only used those where pipeline companies were directly quoted, and checked multiple news sources. However, the amounts indicated for the Minnesota Pipeline Company older lines rely on indirect conclusions based on Citation #2 figures and subtracting known amounts from specific projects. The Enbridge figures for existing pipelines in its Mainline corridor are taken directly from them. (Attachment 2) Finally, the source of oil/product was somewhat difficult to determine in some cases.

Attachment 1 indicates the following with respect to comparison of April 2 long-term median river flows with oil flow amounts in pipelines, both expressed in cubic feet per second:

--Four of the listed rivers, Snake River above Warren, Clearwater river at Plummer, Straight River at Park Rapids, and Prairie River at Taconite, have oil/product flows substantially higher than current spring flows in the rivers. In two cases oil flow is 200 percent of water flow.

--In all cases, especially if one considers large releases during higher flow conditions resulting in rapid dispersion downstream, these rivers are important and sensitive natural resources. For instance, the Straight River south of Park Rapids is a nationally recognized brown trout fishery.

<u>I.B. Methods of determining socio-economic and environmental impacts of pipeline ruptures</u> The PUC public notice on Sandpiper requested advice on methods of addressing potential impacts. There are indeed methods already in place, such as:

I.B.1. *Identification of "High Consequence Areas."* Comment II.B.1. addresses this topic in detail and provides recommendations for how to use this category in the project review. These areas are also roughly described in the federal agency prepared Attachment 3, which includes somewhat useful guidance as to their possible use in the Sandpiper project.

I.B.2. *Risk Assessment with respect to potential amounts of oil/product released by ruptures.* A foundation principle of risk assessment is that the greater the consequences of an event, the greater the need to examine rare or unlikely events in the risk assessment. Attachment 4 is a clear illustration of this principle. For example, it indicates that a "worst-case" pipeline rupture needs to be used, and justifies why it is needed. Such a rupture is called a "guillotine" rupture : "Guillotine-type breaks are less common than other pipeline breaks such as fish-mouth type openings, but they can occur as a result of different causes including landslides, earthquakes, soil subsidence, soil erosion (e.g. scour in a river) and third-party damage. The guillotine-type break is the largest possible break and is therefore considered in this study as the worst case scenario. " (page 5.)

The study goes on to use this scenario in its analysis of the cost-effectiveness of installing block valves, as well as assessing (some) environmental and socio-economic damages from ruptures. It calculates hypothetical releases in different scenarios in its appendix, including those figures listed in the above summary. More detail is provided in the verbatim (except for underlining) excerpts in Attachment 4.

As noted in the above summary, the estimates of amounts spilled from "guillotine" type ruptures of just one pipeline are large—perhaps a minimum of 40,000 barrels from a 36-inch line. Magnify this by the scenario of

intentional serious efforts to damage several pipelines at one time—and this amount becomes potentially massive.

*I.B.3. Actual damages from recent spills associated with rivers.*_Attachment 4 also describes two case studies of actual spills. (pp. 10-11.) These two case studies were used to develop a factor to increase the estimated costs according to the Attachment 4 methods by a factor of two, since both found the risk assessment method underestimated actual costs by about 50%.

a. Enbridge spill into Talmadge Creek and the Kalamazoo River in Michigan. Approximately 20,000 barrels of oil were released. The cost of that spill from a 30-inch diameter pipeline was of 2012 was $767 million.

b. ExxonMobil Pipeline company rupture under the bed of the Yellowstone River 20 miles upstream of Billings, Montana. This was caused by scour from flooding that exposed and fractured the pipeline that was trenched under the river bed. An estimated 1,509 barrels of oil were released before the pipeline was closed. Clean-up and recovery costs were $135 million. (Recent news reports indicate final costs and fines are not yet resolved.)

I.B.4. *Comparison of pipeline flow rates compared to river flows.* Attachment 1 indicates total amounts of oil/product flows in the numerous pipelines that cross these rivers. They portray possible amounts subject to the most catastrophic possible pipeline rupture event—that of an event that caused damage severe enough to rupture more than one pipeline. Some of these lines have been trenched under these rivers, in other cases they have been bored so that burial is deep and not subject to certain kinds of rupture events. Damage could conceivably occur due to river scour from unusually large flood events, or from an outside party successfully and deliberately accomplishing such a rupture.

My intent in comparing river flows to oil flows is not to imply that the worst-possible event be used in an analysis. Rather, it is to portray the magnitude of the oil/product flows in terms that the public and reviewers can understand it. Again, I am responding to normal methods of conducting risk assessments: Very high consequences deserve be paired with looking at rare events. The possible use of this information in any kind of corridor analysis or spill magnitude is subject to a number of questions being answered first. This is discussed next.

I.C. <u>Recommendations regarding pipeline rupture for analysis of impacts, corridor/route comparison, and estimates of spill magnitude based on risk assessment.</u>

I.C.1. The Sandpiper project should be analyzed with respect to potential impacts from pipeline rupture using risk assessment methods modified from those used in Attachment 1. This would:

a. Entail determining Enbridge's methods for locating such valves on the Sandpiper pipeline, and making this available for critical review, and

b. Include both estimates of spill magnitude based on ideal block valve locations and rupture scenarios, such as the "guillotine" scenario, and differential valve response times.

c. Estimate the spill magnitude (in a range of minimum spill to somewhat longer response time spills) that then should then be used to assess socio-economic and environmental impact along the existing corridor.

d. The risk assessment should take into account the larger rainfall events in recent years possibly caused by global warming, including an assessment of the possibility of increased scouring in rivers crossed by these corridors.

I.C.2. *What is the "worst case" when multiple pipelines are in close proximity to use in the risk assessment*? "A review should be undertaken with respect what should be the proper "worst-case" rupture scenario when multiple pipelines are packed close together in a corridor. This should include:

a. An assessment of whether a "worst-case" rupture on one line threatens rupture of another line, such as a large fire.

b. An assessment of whether the response to a "worst case" event on one line is slowed by the presence of other lines either on one or both sides of the ruptured line because equipment can't cross the shallowly buried other lines. This should also include a description of circumstances where all or some lines still operating need to be shut-down during the response and the practicality of doing so. (It needs to be recognized that in some locations there are "cross-overs" where one line is constructed underneath other lines because of existing facilities on one side—such as railroad tracks—prevent construction on the preferred side.)

c. Consultation with state and federal pipeline authorities as well as the authors of the Attachment 4 study as to what constitutes "worst-case" ruptures when there are multiple lines in close proximity.

d. Consultation with the ORNL authors and others regarding the vulnerability of a corridor with multiple large pipelines in close proximity to deliberate actions and how this should be addressed in socio-economic and environmental impact reviews.

I.C.3. *A process is needed whereby problems found during review of additional pipelines in any given corridor that might threaten pipeline integrity are thoroughly reviewed by government personnel*. While perhaps outside the scope of the PUC Sandpiper review, procedures should be developed whereby state agency field staff who find potential problems at significant pipeline locations could be assured that the problems are adequately responded to by government agencies rather than pipeline owners. I have personal knowledge of three such locations along these corridors, as discussed in Comment II.A below.

II. The PUC and Minnesota agencies indeed have significant jurisdiction over pipeline design issues related to oil spills and leaks and site-specific measures to prevent them.

<u>II.A. Overview and significance of the problem</u>. This is an important issue because a properly *designed and located* pipeline can result in the least amount of impact and be a safe way to transport petroleum products.

The central issue is that there is both federal and state jurisdiction and authority, and that it overlaps to some extent. In these comments I maintain that the PUC has clear authority to influence both pipeline *design* and location with respect to analyzing and mitigating impacts to people and the environment.

MDNR and MPCA field staff often have intimate knowledge of site specific conditions along pipeline corridors, and are trained to have such knowledge. Yet some pipeline companies, their consultants, and even some people in Minnesota government try to claim that pipeline *design* is solely the bailiwick of federal agencies and federal standards because such design pertains only to "safety standards."

On several occasions during my employment with the MDNR, and while working with other field staff, we suggested site-specific changes in design that would add more resource protection or mitigation, "pipeline safety standards" were invoked. This was strongly prevalent when DNR was trying to determine how block valve locations were selected, and why specific block valve recommendations weren't followed.

Other issues involved lack of clarity as to Minnesota Office of Pipeline Safety responsibilities regarding possible environmental damage at locations where pipe integrity was threatened. For example, during one review of the MinnCan pipeline, DNR staff (Fisheries and Ecological Resources) found a location at a proposed river crossing where a large tree had fallen into the river. This resulted in bottom scour exposing one of the older pipelines. Company officials were not interested, and indicated it was not in MDNR jurisdiction to solve this problem. A call to the State Office of Pipeline Safety only elicited a question as to whether it was brought to the attention of the pipeline company.

On another occasion during the Alberta Clipper review, an older pipeline was found to be hanging a foot or two over the surface of a designated trout stream east of Bemidji. A call to the Minnesota Office of Pipeline Safety elicited a statement that it was up to the pipeline company to correct the problem. This was likely Enbridge Line 1 because of its small size. (See attachment 2 for a description.)

The most serious problem occurred on the Alberta Clipper route on a Grant Creek crossing just west of Bemidji. I was directly involved in this site, and provided several written documentations as to what occurred. At this site, Grant Creek flows south through a narrow gap in an old railroad grade. Upstream of this gap Grant Creek flows through s a large expanse of wetland. The creek is also subject to numerous beaver dams upstream. The railroad bridge at this site had collapsed into the gap, which was also filled with segments of a five foot concrete culvert.

Immediately below the gap are 5 or 6 large pipelines, with the first being within just a few feet of the steep railroad grade. Grant Creek takes sharp turn to the east, actually following the pipeline in a parallel manner, until again turning south where it flows over the trenched pipes. I observed that bank erosion had removed 6 or 7 feet of the bank, and that this had all occurred since the previous summer. Therefore, this large pipeline was now only protected by about 5 feet of riverbank.

A large and rare rainfall event in the drainage above this site would have taken out beaver dams, and added to the flow through this narrow gap. It is likely that the first pipeline would have easily been exposed. In addition, the heavy concrete sections could have been eroded into the pipelines, threatening ruptures. Since Enbridge wanted to do something off the right of way in this location to "clean up" the site. They asked for my advice regarding permitting and repair. Since there were concrete sections available, and it looked as if there was a pipeline integrity issue present, I supplied the advice on armoring the eroding bank next to the pipeline, and moving the bank farther from the pipe. This was done by driving the 5 foot concrete sections into the stream bank, a technique I had essentially learned while employed at the DNR. I documented that this was a temporary solution

This site should be thoroughly assess at to susceptibility to scour—since it is an ideal site for down cutting caused by human activity restricting the floodplain of this river. On several other occasions, when DNR staff found exposed pipe on older—and large—pipelines in sensitive areas next to rivers, the same thing happened—staff were told it was up the pipeline company to fix the problem.

II.B. Specific PUC rules on "safety standards." The PUC rules for the route permit, in 7852.0200, Subp. 2 "Scope," has two sentences containing language pertaining to pipeline safety standards. In fact, the language is so similar as to be almost redundant:

--Second sentence: "This chapter does not set safety standards for pipelines."

--Last sentence: "The (permit) must not contravene applicable state or federal jurisdiction, rules, or regulations that govern safety standards for pipelines nor shall the permit set safety standards for the design or construction of pipelines."

I submit that the State of Minnesota has a number of clear ways it can influence Sandpiper (and any other liquid pipeline) without "setting safety standards." These are as follows:

II.B.1. Location of High Consequence Areas (HCA) is not necessarily only a "safety standard." These areas are referred to in federal safety standards for pipelines. They are areas where ". . .a release could have the most significant and adverse impact." Attachment 3 provides lots of detail concerning both human and ecologically important areas, such as "land area in which spilled liquids could affect the water supply……critically imperiled species…..areas where migratory birds congregate…..(pipelines) that pass near enough that a release could reach the area by flow over land or within a river, stream, lake, or other means, are assumed to affect (the HCA.)"

Strangely, this document doesn't mention an HCA identified by state authorities, but actually refers pipeline operators to Nature Conservancy personnel to be consulted on important areas. (A personal comment here: Might this not imply a rather over-reaching and likely unconstitutional claim of federal legal authority?)

In addition, while I was employed by the Minnesota DNR, we had a meeting with the Minnesota Office of Pipeline Safety regarding issues along the MinnCan route. The people we met with never mentioned the concept of HCAs. They were not familiar with or interested in site-specific environmental issues, in fact, and only referred to specific generic safety standards.

II.B.2. Recommendations top reduce confusion and lack of clarity among agencies with overlapping responsibilities.

a. PUC, DNR, BWSR and PCA staff consult the Minnesota Attorney General's Office to investigate the specific federal rules pertaining to HCA's to determine the ability of state authority to identify and influence the identification of both project-specific HSAs and more permanent HSAs. Examples of state-identified areas should include groundwater recharge zones, designated trout streams, canoe routes, rivers with significant fisheries or rivers leading to significant fisheries or drinking water supplies, and a number of others.

b. PUC, DNR, BWSR, and PCA should notify the federal Office of Pipeline Safety that Minnesota intends to actively propose additions to the National Pipeline Mapping System referred to in Attachment 3, based on the review of the Sandpiper proposal as well as the other Enbridge and Minnesota Pipeline company expansion plans. This should include the corridors identified in Attachment 1 as well as any other corridors and new pipelines.

c. The environmental analysis of the Sandpiper and alternatives identify HCAs along all alternative routes, including already-identified HCAs and ones identified by the public, Minnesota DNR, PCA, BWSR, federal COE during this pipeline review. The outside consultant hired by the PUC to do the analysis of impacts and the

route comparison should be charged with consulting and coordinating with Minnesota state agencies to identify these areas. The route comparisons should then include these locations in the analysis.

d. Extra care should be taken in the identification of HCAs along any corridor with multiple pipelines because of the increased magnitude of possible ruptures affecting a wider area that normal for one pipeline.

II.C. Pipeline design features that protect people and the environment are site-specific and thus need site-specific design features. It should not be necessary to have to make this point because we are many years past such knowledge based on normal and standard techniques for assessing impacts and mitigating them. Almost every environmental permit given has site-specific measure.

Large-impact projects always should have site-specific design. In fact, well-designed pipeline projects when they are finally ready to be constructed uses something often called a "line list" which identifies down to the foot what environmental mitigation measures are to be used in sensitive locations.

II. D. Support for my contention that pipeline design features such as some block valve locations are not always a "safety standards" issue. The following information clearly supports this contention:

II.D.1. Citation 8 (Attachment 4). Block valves and other related design features work to rapidly shut down and isolate pipeline segments when a sudden pressure drop indicates a pipeline rupture of enough magnitude to trigger the designated pressure drop. They can either be manual valves or remotely-operated valves.

Attachment 4 is a recent (late 2012) major study regarding improving block valve usage to reduce releases of large amounts of hazardous liquids. This was done under the auspices of an internationally known energy research institution, the Oak Ridge National Laboratory. The instigation for this study was primarily driven by the natural gas pipeline explosion in California that killed 8 people, but also seems likely that it was influenced by the large Enbridge rupture in Michigan, since it uses both as case studies. This document illustrates why features such as block valves are clearly not always a "safety standard." Here are quotes relevant to site specific pipeline design that are not "safety standards."

".. . ..site-specific parameters that influence risk analyses and feasibility evaluations often vary significantly from one pipeline segment to another and may not be consistent with those considered in this study. Consequently, the technical, operational, and economic feasibility and potential cost benefits . . . . . .need to be evaluated on a case-by-case basis." (p. 1 of Attachment 4.)

"Section 4 of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 calls for the Secretary of the U.S. Department of Transportation (DOT) to require by regulation the use of automatic or remotely controlled shutoff valves, or equivalent technology, where it is economically, technically, and operationally feasible on hazardous liquid and natural gas transmission pipeline facilities constructed or entirely replaced after the final rule was issued. . . . .The Act also requires a study to discuss the ability of transmission pipeline facility operators to respond to a hazardous liquid or natural gas release from a pipeline segment located in a high consequence area (HCA)." (p. 1 of attachment 4)

"In addition, operators are required to consider installing emergency flow restricting devices such as check valves and RCVs on pipeline segments to protect a HCA in the event of a hazardous liquid pipeline release. In making this determination, an operator must, at least, consider the swiftness of leak detection and pipeline shut down capabilities and benefits expected by reducing the spill size." (p. 2 attachment 4)

II.D.2. Citation 9. This engineering study, entitled "Method determines valve automation for remote pipelines," describes methods of determining where automated block valves are to be located. The method is clearly based on site-specific design features. In addition, the following quote summarizes how block valve location is not directly based on "safety standards":

"Most pipeline codes do not stipulate requirements for block valve spacing or remote pipeline valve operations along transmission pipelines carrying low-vapor-pressure petroleum products. This requirement is generally industry driven to control hazards and reduce environmental effects of pipeline ruptures or failures causing hydrocarbon spills. . . . . This article summarizes pipeline codes for valve spacing and spill limitations in high consequence areas (HCAs). It also provides a criterion for an acceptable oil spill volume caused by pipeline leak or full rupture. The criterion is based on industry's best practice." (Introduction to the study.)

Note: This study noted at the end that the acceptable spill volume used to determine the valve spacing was about 20,000 barrels of oil. The study was done for several large pipelines in Brazil. I did not attempt to decipher the meaning of that large amount being acceptable for design of block valve location.

II.D.3. Recommendations for Sandpiper review and analysis regarding block valve locations.

a. Enbridge be required to clearly describe their method of determining block valve determinations, including identifying what HCAs they used, as well as any other factors for determining such locations, including cost factors and "minimum acceptable leaks." This information should be submitted to the MPCA, MDNR, and COE in time for them to respond appropriately, and in time for incorporation into the analysis of impacts and Comparative Route Assessment.

b. MDNR, MPCA, and/or PUC (and COE) should request information from the Office of Pipeline Safety as to whether they have provided any advice to Enbridge as to method of determining block valve locations and acceptable minimum amounts of oil at HCA locations, potential HCA locations, and other-than HCA locations, including cost-factors.

c. Minnesota state agencies and the Corps of Engineers develop a cooperative and partnership relationship regarding the potential socio-economic and environmental risks of having multiple large pipelines in close proximity to each other.

III. The PUC, other Minnesota agencies, and the US Corps of Engineers and EPA must address "corridor fatigue."

PUC pipeline rules favor following existing corridors—even when the pipelines are squeezed into environmentally and socially sensitive areas. The current rules also allow pipeline companies to use the rules to their benefit and to reduce the scope of the analysis. Clearly, this needs a legislative solution. However, there are methods that can be used in the Sandpiper review that are within the current rules that can attempt to get at the "corridor fatigue" problem. I provide some detail in these comments because of the importance of this issue. My recommendations as to how to handle this in the Sandpiper review are in III.C. below.

III.A. Background. "Corridor fatigue" is a term that has been used to talk about what happens when multiple linear facilities such as pipelines and High Voltage Power Lines reach a point where cumulative impacts,

objections from people nearby, and crowding of various sensitive areas along the edge of corridors began to be more and more apparent.

In fact, this term is inappropriate with respect to the pipeline corridors described in Attachment 1. Much more proper terms are "corridor sickness" or "corridor exhaustion."

Any resource manager with experience in environmental review of linear facilities in Minnesota (or elsewhere) knows the reasons that lead to overuse of corridors. Some of these are generic, and others are specifically relevant to the Sandpiper proposal. These are:

III.A. 1. *Original linear facility routes pre-date almost all environmental laws*. This meant the route went through high-impact locations that wouldn't otherwise be crossed under current laws and regulations. Essentially, these routes were the shortest distance between endpoints unless there were prohibitive obstacles in effect at the time of building. these original facilities were usually small pipelines. This is true of both the Enbridge Mainline corridor and the Minnesota Pipeline Corridor.

III.A.2. *Each additional facility was assessed independent of others.* Methodology to fairly assess cumulative impact of additional facilities after the second facility was usually not used. (It is often the third facility that starts to show the strain.)

III.A.3. *Large linear facilities are almost always controversial.* There was strong pressure to follow existing corridors. This then became embedded more and more strongly in either informal or formal policy, and finally made it into regulations. Unfortunately, when this was done, there was no concurrent regulation requiring an objective assessment of the pros and cons.

III.A.4. *Lack of appropriate regulations.* Policy-makers formalizing existing corridor locations as the most likely place to put new facilities didn't write corresponding policies that required a look at impacts of ever-larger corridors. Likely the best example of this I know of is the LaSalle Creek valley north of Itasca Park on the Minnesota Pipeline Corridor. This site is covered in detail below.

5. Citizens living next to corridors have little recourse to challenge expanding corridors, since the energy companies and PUC are essentially in agreement for all practical purposes. The PUC has not developed objective methodology to address this major problem. The result is that adjacent landowners are subject to the highest impact.

<u>III. B. Known potential impacts of enlarging Minnesota Pipeline and Enbridge mainline corridors because of previous recent reviews.</u> There are recent reviews of both of these corridors (except for the Sandpiper Green field route.) Therefore, these reviews, including comments of agencies with responsibilities for environmental protection during those reviews, are relevant to the current reviews.

II.B.1. PUC, MDNR,PCA, and COE review of the MinnCan pipeline. During the review process for the MinnCan pipeline, there were many issues raised by agencies with natural resource, wetland, and permitting authority. There was an important ALJ report prepared for this project. All of this is available in the PUC records for this project. There were also major problems identified during construction. The review of that project is recent enough so that environmental concerns raised are still relevant.

<u>I</u>II.B.2. PUC, MDNR,PCA, and COE review of the Alberta Clipper/Southern Lights/LSr projects. Even more recently, the Enbridge proposals follow its mainline corridor to Clearbrook. An alternative route to Sandpiper

follows the Mainline corridor on to Superior. Now, just 5 years later, Enbridge proposes to follow this same problematic route.

III.C. Route width for new reviews too restricted so that it exacerbates corridor fatigue. The PUC rules allow Enbridge to select the route width for their application. The rules state a route can be as narrow as the right of way required to construct the pipeline, and as wide as 1.25 miles. An examination of the Enbridge proposal indicates in many locations that Enbridge has selected a very narrow route width. It is obvious that the narrower the route width for this review along the existing Minnesota Pipeline Corridor, the more advantageous to Enbridge—because it becomes too late to adjust the right of way to avoid impacts found after finalization of the route width by the PUC.

Generally speaking, the PUC waits for others to object to this restrictive situation and propose enlargements, or other route segments or routes.

A good example concerns river and flood plain crossings. Normally, the clear standard for crossing of such environmentally sensitive features with linear facilities is perpendicular to the floodplain, and perpendicular to the river meander. In addition, as mentioned in Comment V, the MDNR does not have permit jurisdiction beyond the Ordinary High Water of the river or stream (this is the top of the bank in most cases.) The DNR has two options for influencing this—proposing a route segment change or widening, or relying on the PUC authority to require moving the centerline. Furthermore, DNR often indicates to applicants to begin preparing detailed applications for its license to cross before the environmental analysis of routes is completed.

In other areas, the 1.25 mile width is still too narrow to address the problems of pipeline corridors expanding more and more in high-impact areas.

III. D. LaSalle Creek problem area. More than any other location, this area epitomizes the landscape and regulatory issues of "corridor fatigue" and problems of following old straight-line routes. The crossing and surrounding landscape has the following characteristics:

--This location is not far north of Itasca park in a heavily forested area with steep and convoluted glacial moraine. LaSalle Creek itself is a small designated trout stream flowing in a glacial tunnel valley toward LaSalle Lake. The stream channel is deeply incised in the wetland with many meanders. Right at the crossing point, the stream and valley narrow upstream and widens out substantially downstream toward the lake. The ridges on either side of the tunnel valley are likely more than 100 feet higher than the stream.

--The existing Minnesota Pipeline Company pipelines transverse the valley at the almost the worst possible manner: a sharp oblique angle side-hilling down portions of the west hillside from the north, then side-hilling out of the valley on the east side after crossing the creek.

III.D.1. *Severe problems with the MinnCan crossing*. There were severe and numerous problems with this area. I am supplying some detail on these problems because I am proposing a re-route around this area several miles in length. The problems are as follows.

a. MDNR sent an "early-coordination" letter to the MinnCan consultant warning that this crossing was the worst site of all the locations in the Bemidji Region portion of the project. There was no response from MinnCan, and near-failure months later for MinnCan to even acknowledge such a letter. By then the PUC

process had proceeded past the point for the MDNR to effectively examine another route in this high-resource area.

b. The two old and small pipelines were closely followed with the 24-inch MinnCan line with close separation, on the order of 40 feet if I recall. The old cleared right of way was fairly narrow. This greatly expanded during construction. MDNR measured a cleared right of way over 350 feet wide on the north end of the valley. (This was necessitated by the large amount of earth moving required to construct a 50-foot wide level construction word pad.) Topsoil was generally not separated here either, so impacts are long-term.

c. MinnCan did a directionally bore deep under LaSalle Creek. It was somewhat over 3,000 feet in length and done in the winter. As they bored under the creek itself, there was a large frac-out into the creek. Drilling mud escaped from several other locations besides the creek bed, all characterized by obvious groundwater upwelling. (In spite of the very cold temperatures the ground and wetland surface was not frozen.)

Construction stopped and clean-up was complicated and protracted. Because of the lack of frost from groundwater upwelling, it was impossible to get equipment to the site so that most work need to be done by hand.

However, it was necessary to get some equipment to the site, which was a very delicate operation because of the deep, soft, water saturated organic muck at the site. There were two existing pipelines floating in this water saturated muck near the surface. These could have been threatened by heavy equipment tipping into this area. Oil/ product flow was *not* shut off during these operations taking place a few feet from the pipes.

d. A large beaver dam downstream of the crossing had backed up water right to the crossing point, and covered parts of the creek receiving drilling mud. In other words, there was thin ice over the flooded creek channel. This obscured drilling mud material and caused safety problems in minus 15 degree weather.

III.D.2. Current Enbridge plans at this site. According to maps I examined during the public meeting at Clearbrook, Enbridge is now planning a warm weather crossing of the creek itself downstream from the existing crossing out in the broader wetland that leads to LaSalle Lake. The proposed crossing location is at a more perpendicular angle to the creek itself but not perpendicular to the valley, since the centerline of the pipe makes a sharp bend after coming down into the valley from the north. After the creek crossing, the Enbridge plan is to open up a new cleared right-of-way on the east side-hill of the valley. This plan was confirmed to me by MDNR staff. Enbridge had indicated to them they would accomplish the trenched crossing in a very short time to reduce impacts. I believe this is a very bad idea for the following reasons:

a. There is wetland along very much of this centerline proposal, including as the centerline comes down the hill from the north. There are wetlands on the slopes of the west hill side caused by abundant groundwater emergence. There is deep muck in this area, as well as out in the flat valley. Trenching through this soft area will require very large amounts of construction maps which usually require firmer wetland soils than are present. Furthermore, the trying to trench in such an area will result in slumping and the necessity of removing large amounts of material.

b. I have been involved in several wetland situations with some similarities to this site—but not such as large problem area as this. None of them approach the red flags of this area. The nature of the muck soil and substrate in the other areas meant that sheet pile had to be driven in on both sides of the trench in order to remove enough material to sink a weighted pipeline. I estimate that more than 1/4 mile of wetland is

involved. Furthermore, both ends of this wetland traverse are on inclined wetland at the bottom of slopes. Attempting to excavate a temporary trench through such a location trenching could also easily open a channel so that unpredictable amounts of silt laden water—both groundwater and surface water—flows down the channel into LaSalle Creek.

c. The new right of way on the east side of the valley will also traverse groundwater emergent areas some distance before it rises far enough out of the valley to rejoin the corridor south some distance. This is also an additional impact of such a crossing.

d. I recommend that a route around LaSalle Creek and its valley be considered (see below.)

Recommendation: The route width should be expanded to the maximum 1.25 miles at every floodplain crossing that is oblique (not perpendicular to the floodplain.)

<u>III.C. Recommendations to begin to address "corridor fatigue" concerns relative to existing corridors followed by Sandpiper</u>.

II.C.1. *Federal EIS on Sandpiper.* The US Corps of Engineers should prepare a federal environmental impact statement for the Sandpiper project. The COE should do this for additional reasons beyond this topic, which will be contained in a separate recommendation to them.

It is clear that the PUC environmental analysis falls far short of what can be explored in an EIS. Nevertheless, Minnesota law says that the environmental analysis done by the PUC fulfils state environmental review requirements.

However, the MPCA and MDNR who are more familiar with the merits of EIS review than is the PUC, should certainly recommend to the COE that an EIS be done on this project.

III.C.2. *Incorporation by reference of the previous environmental analysis in these corridors*. I hereby incorporate by reference the PUC record of Alberta Clipper, LSr, Southern Lights and MinnCan projects into this Sandpiper review by the PUC. This should jump-start the review of "corridor fatigue" problems.

Examples of relevant documents for these four projects include: These issues and comments include:

--The ALJ report son MinnCann and the Enbridge projects
--All PCA and MDNR comments on the projects. There should be special focus on the MDNR objections to detailed and extensive comments that were ignored in ALJ findings.
--All key determinations of the US COE on all projects, and all comments on the 404 notices for the projects

III.C.3. *Any records of specific unforeseen problems and impacts that developed post-permitting on these projects.* If the records cannot be found, these topics should be addressed in the environmental analysis:

a. "Frac-outs" on the MinnCan project. Frac-out is the common term for when drilling mud escapes from the bore from directionally drilled crossings, whether they be short or deep bores. Generally, this becomes evident by mud appearing on the surface or in water bodies. There were a large number of such events on the MinnCan project. Some of which were very large. These occurred in or next to the following rivers north of the point where the Sandpiper route turns east: Clearwater River floodplain east of Bagley, Mississippi

River at the crossing north of Itasca park, LaSalle Creek floodplain and creek bottom north of Itasca Park, and the Straight river just south of Park rapids. There were other frac-outs south of Park Rapids beyond the point where Sandpiper turns east on a Greenfield route.

Frac-outs occurred during winter bores, which greatly increased the difficulty with addressing them for several reasons. Determining amount and location of material was obstructed by ice. Recovery of material was difficult due to ice. Finally, ice conditions on flowing water was a hazard to workers attempting to recover material.

All records of frac-outs that occurred on MinnCan should be carefully examined as to amounts and locations. This may help to determine if there is a pattern as to when they occur. In each of the four rivers mentioned above, landscape conditions were such that groundwater upwelling zones were either present or suspected at the site of the frac-out. If this is correct, such landscape conditions that are present in other locations are a red flag for bores in the future.

Drilling mud is primarily bentonite clay but contains additives at the discretion of the pipeline company. Additives are a two edged sword: they can increase the success of the bore and reduce frac-outs, but some additives can be toxic to aquatic life. Furthermore, MinnCan initially claimed trade secret status on the first frac-out at the Clearwater river, which became a big obstacle to resolution. Therefore, PUC should require specific listing of any constituents of drilling mud before. Some of the frac-outs were in locations subject to direct DNR permit authority, but others were outside of the OHW so were not. PUC should make it a condition of the Route permit that frac-outs be handled in essentially the same manner wherever they occur, after recommendations from the DNR and MPCA.

b. *Winter construction successes and problems on MinnCan and Alberta Clipper.* Topsoil separation is important in all areas of deep excavation, including over the trench as well as side-cuts done to prepare the 50-foot level work pad. Poor separation leads to more successful invasive species invasion, and lost productivity. Frozen ground made topsoil separation problematic. In addition, winter construction made it erosion control more difficult and led to substantially higher erosion problems during spring runoff in certain locations.

IV. PUC and Hearing Officer must address concerns of the MDNR regarding natural resources not directly subject to MDNR and MPCA permits.

Environmental impact assessment includes—by law as well as best practice—consideration of impacts not necessarily covered by permits. As noted in a letter to the ALJ on the Alberta Clipper and Southern Lights project, the MDNR said it only had direct jurisdiction on less than 0.5 percent of the route. (April 21, 2008 letter to AlJ Judge Eric Lippman, from Matt Langan, MDNR). This jurisdiction involved public land crossings and river crossings restricted to the OHW (generally the top of the riverbank.)

Subsequently, the MDNR made extensive factually supported comments regarding natural resources in their areas of expertise. Serious problems with Enbridge's data, lack of supporting information, and assessment of impacts were noted. Some of these were glaring errors, such as obvious underestimation of area of impact. The ALJ report finalized its report without discussing the merits of the DNR comments, and did not address any of them in numerous findings on the route permit conditions. At the same time, it praised Enbridge's approach. A "reasonable person" perhaps would find it troubling that an ALJ, who lacks natural resource expertise, would replace the expertise of an important state agency charged by Minnesota law with protecting its natural resources, with that of an energy company with obvious motivations for downplaying

impacts to such resources. The lack of attention to the MDNR comments is documented in three subsequent letters to the PUC staff after the ALJ report was finalized (April 25, 2008 letter to Larry Hartman from Matt Langan, MDNR; August 1, 2008 letter to Bill Haar, PUC Executive Director from Matt Langan, and November 13, 2008 letter to Larry Hartman from Matt Langan, MNDR.

Recommendation. The PUC should ensure that this does not happen again, and ensure that the ALJ for this project is charged with specifically making findings regarding potential environmental impacts found to be of concern by state agencies such as the PCA and MDNR.

V. PUC and ALJ must use accepted impact analysis methods and its own rules to proactively address the Sandpiper project and future even though its environmental report substitutes for an EIS or EA according to law and stature.

V.A. Pipeline rules available to the PUC to improve its responsibility, process ,and results. Many of the pipeline route permit rules appear on their face to restrict and narrow the environmental analysis as compared to that done under EIS rules and ;procedures for other large facilities. However, a reading of the rules indicates that the PUC has lots more authority than it used on the Alberta Clipper projects. All of the following rules allow the PUC to address **all** of the topics I have raised in these comments:

V.A.1. Rule "7852.3200, Subpart1: "When the commission issues a pipeline routing permit for the construction of a pipeline and associated facilities, the commission shall designate a route…..conditions for right of way preparation, construction, cleanup, and restoration. . . . **and any other conditions relevant to minimizing environmental and human impact.**" (emphasis added.)

Note: The PUC could have chosen to fully address the MDNR comments that were not addressed on Alberta Clipper using the highlighted language. It now needs to respond to comments by other state agencies on the Sandpiper project and use this clause.

V.A. 2. Rule "7852.0200 Authority, scope, purpose, and objectives

"Subp. 3. Purpose. Minnesota Statutes, section 216G.02, recognizes that pipeline location and restoration of the affected area after construction is important to citizens and their welfare **and that the presence or location of a pipeline may have a significant impact on humans and the environment**. To properly assess and determine the location of a pipeline**, it is necessary to understand the impact that a proposed pipeline project will have on the environment**. .. .. The purpose of this chapter is to aid in the selection of a pipeline route and **to aid in the understanding of its impacts and how those impacts may be reduced or mitigated through the preparation and review of information contained in pipeline routing permit applications and environmental review documents**.

Note: The PUC can use this clause to address pipeline rupture risk, corridor fatigue, and so forth.

"Subp. 4. Objectives. The process created by this chapter is designed to:
A. locate proposed pipelines in an orderly manner that minimizes adverse human and environmental impact;
B. provide information **to the project proposer, governmental decision makers, and the public** concerning the primary human and environmental effects of a proposed pipeline project**;**

*Note: Note that this clause contains the phrase "**to** the project proposer. . . .decision makers, and the public" concerning the human and environmental effects of the project. On the Alberta Clipper project, the PUC, and ALJ passively turned this phrase entirely on its head and accepted the Enbridge analysis of many issues rather than accept expert analysis from responsible state agencies. This must not happen on the Sandpiper project. The PUC should insist on its role of providing objective information **to** other parties. It should do so on the main topics of these comments.*

V.A. 3. "7852.1400 Route proposal acceptance.

> Subp. 2. Sources of route proposals. **The Public Utilities Commission staff and the citizen advisory committee may propose routes or route segments directly to the commission**.

Note: The PUC can use this clause to address corridor fatigue and to attempt to obtain objective comparisons of alter=natives to problem locations.

V.A. 4. "7852.1900 Criteria for pipeline route selection.

> "I. cumulative potential effects of related or anticipated future pipeline construction; . . ."

Note: The PUC can clearly address the issues of "corridor fatigue" by using this clause.

<u>V.B. PUC can use standard impact assessment methods</u> The statute governing pipelines indicates that the PUC Environmental report meets the requirements of an EIS or EA. However, this does not mean that methods of analysis of impacts do not need to reflect standard methods used in EISs.

The request to the public to propose methods of analysis in the PUC public notice actually is strange. There are effective methods for analyzing impacts to humans and the environment and methods for comparing routes for linear facilities. These methods have been in effective use for many years. All one needs to do is find an EIS that has done so effectively.

<u>V.C. PUC staff needs to acknowledge the limitations of the pipeline environmental analysis .</u> I was present at the Sandpiper public meeting Clearbrook some weeks ago. A citizen asked how the PUC environmental analysis compared to an EIS. The PUC lead person said it was essentially the same. I was taken aback, as were some others that were present. I was later informed that this same statement was made at the Park Rapids meeting. This is highly concerning since the citizen was misled. It also is concerning because it implies PUC staff is unaware of important and routine methods of analyzing impacts and alternatives in EISs on linear facilities. Such methods are an answer to the question in the Sandpiper public notice of "topics open to public discussion. . . .Are there specific methods to address these impacts. . . .?".

Here are some reasons how the PUC environmental report very much differs from an EIS:

--PUC rules on pipelines allow the project proposer to so narrowly define the project that there is a large burden to overcome to define alternatives and even to analyze impacts. Pipeline rules favor existing corridors without a specific requirement to objectively analyze impacts of concentrating facilities in environmentally inappropriate areas. This would be impossible under an EIS.

--The PUC environmental report is finalized in-house. There is no opportunity to comment on a public review draft report. On draft EISs, the preparer is bound by law and rule to address reasonable comments

supported by sound data. No such process exists for pipelines under PUC rules. With the case of Alberta Clipper, the ALJ report would have been found deeply flawed if it had been subject to the standards for responding to comments that are found in the EIS process.

--Finally, compare the PUC process for siting HVTL lines: it uses routine methods of comparing routes and alternatives that are answers to the question posed as to how

VI. Proposed alternative routes and route enlargements

The PUC public notice solicits suggestions for alternative routes or route segments. In addition, Larry Hartman, the PUC person leading the Clearbrook public meeting, received a number of questions as to the burdensome format that appeared to be required for such proposals to be successful. He indicated alternatives would be considered that left out factors apparently required by the rules, and that a simple hand-drawn line on a map would be sufficient.

Therefore, the following recommendations for analyzing additional routes are provided:

VI. A. Widen Sandpiper route width wherever it is less than 1.25 miles in width. Enbridge has in many locations along its route narrowed the route nearly its minimum required by the PUC rule. This greatly reduces the scope of analysis of impacts very early in the siting process. This very much reduces the flexibility of moving the centerline to reduce impacts as problems are discovered during site reviews. This problem was severe during the Alberta Clipper review. Therefore, the route width should be expanded to the maximum allowable along the entire proposed route, as well as any new routes or route segments accepted for study. This is 1.25 miles in width. This will more appropriately meet the PUC requirements to adequately study environmental impacts. This is especially important at all crossings of rivers and other sensitive locations.

V.B. Route segment following Enbridge's North Dakota Pipeline corridor to Clearbrook. Enbridge's web site indicates that the existing pipeline has the capacity carry 475,000 bpd, yet Citation #2 says it is carrying 210,000 bpd at this time. If this is correct, there is excess capacity in the North Dakota line so as to allow it to carry the 225,000 bpd of the Sandpiper line. Therefore, there is a question as to whether another line is needed at this time for this route segment.

This route is clearly indicated on Enbridge's application.

V.C. Enbridge Mainline Corridor, Clearbrook to Superior. This route should be studied as an alternative to Enbridge's preferred route. The study corridor should be widened to the maximum 1.25 miles. This route is clearly indicated on the Alberta Clipper PUC files, which are incorporated into this PUC record by reference.

V.D. Any route alternatives studied for the Alberta Clipper project. There were a number of alternatives studied for the Alberta Clipper project. These routes are clearly identified on maps in the PUC record of that project. These include HVTL corridors and gas pipeline corridors. They should be re-studied for the Sandpiper project.

V.E. LaSalle Creek alternative. An alternative which avoids the major problems of crossing LaSalle Creek and its valley at an angle needs to be studied. Adding two large diameter pipelines to this area—Sandpiper and the Line 3 replacement/upgrade—is extremely likely to have large off-right-of-way impacts to groundwater, Big LaSalle Lake, and LaSalle Creek. In addition, given the sub-surface conditions, it will be very hard to

predict site-specific technical engineering plans for how to construct and maintain pipelines in this area. This could lead to massive problems and impact area growth during construction. This area could well become a case study of where not to build large pipelines.

A route avoiding this feature also crosses other areas with natural resource value, other private and public lands, and opens a new corridor. However, such an alternative for study must be accomplished because of escalating consequences of adding two more pipelines. I do not have an ability to submit a map today of my proposal, since I have to submit comments electronically in order to meet today's comment deadline. I can submit this by mail later. However, based on PUC statements made at the Clearbrook public meeting, this is sufficient as long as I describe the alternative in enough detail to identify it.

Here is a verbal description of the route: It is a 1.25 mile wide route deviating from the existing corridor in section 11 of Itasca Township in Clearwater County, then goes southwest to turn south along the east side of Clearwater County 2. It then turns SE to follow the north side of state highway 92, roughly paralleling it with the south edge of the route along this highway. It then turns east to rejoin the corridor in Section 32 of Lake Hattie township in Hubbard County.

On a final note, I believe it is within the PUCs ability to widen the "route" to more than 1.25 miles in this area.

V.D. Enbridge Line #3 enlargement/replacement. PUC needs to formally include the potential routes for this project that is clearly now in the planning stage. In addition, PUC should begin entering into studies for this project to analyze the alternative of following the corridors for the Great Northern Transmission line, now under review, since this line comes from Canada, and is potentially a route to Superior.

V. Significant impacts not otherwise indicated in these comments.

Here is a list of potential important impacts that need be addressed in the review of all route proposals, initially in a generic manner, and then as the focus is on site specific areas:

1. Analyze the advantages of topsoil separation in all areas where excavation into subsoil and parent material would otherwise result in mixing of parent material with top soil. It has been clearly demonstrated that creation of such disturbed areas leads to greater success for invasive species such as spotted knapweed and other noxious weeds. This also results in lowered productivity on not only farmland, but forest land, and reduced habitat value. In addition, it is becoming standard practice for responsible pipeline companies to accomplish this.

2. Requiring accurate depiction of any areas where excavation into parent material and subsoil occurs. Such excavation is routine in non-flat terrain in order to obtain the necessary 50-foot wide work pad for construction.

3. Detailed analysis of the product shipped in order to explore the environmental and human impacts of pipeline rupture.

4. Detailed analysis of the content of drilling muds to be used, and requirements for immediate notice to appropriate agencies when frac-outs occur during bores. Route permits should require agency review of any new additives considered during construction.

5. Careful analysis of the pros and cons of winter construction vs warm season construction. Such an analysis should be entirely independent of Enbridge desires to construct on their timetable, or for solely cost reduction reasons.

6. Careful analysis of the need for deep ripping of the work pad in areas of high clay soils. Operation of very heavy equipment along the work pad—which is essentially a road during construction—can create compaction layers in clayey soils that persist for as long as a projected 200 years.

7. Careful analysis and critique of proposed extra work space areas in sensitive locations such as stream crossings. Such areas sometimes are based solely on engineering requirements rather than given a careful review to reduce environmental impacts.

8. Careful review of the project's off-right of way affected area, and a PUC requirement that Enbridge submit all such areas to agencies for review.

9. An analysis of the damages caused by encroachment on the right of way from ATVs and other off-road highway vehicles. This has been observed to be intense in some areas, according to DNR comment letters. The MDNR has no jurisdiction to respond to this use which can cause stream bank erosion, siltation, and so forth.

V. Cumulative Impacts.

As noted in the above comments, the PUC rules require that the Commission **shall** consider "cumulative potential impacts of related or anticipated future pipeline construction. . . ."

Enbridge recently announced it is planning to "replace" in the near future its Line 3 pipeline that is in now within the mainline corridor from Canada to Superior. The announcements also note that operation of the old Line 3 will continue until the new line—upgraded to 36 inches—is completed. Therefore the new line will not be in the same location as the old line. Enbridge has indicated in the announcements that it is considering both the Mainline Corridor to Superior and its preferred Sandpiper route. Therefore, the PUC needs to conduct the following analysis:

--Cumulative impacts of adding two large pipelines in these routes, including the existing corridors and the new Greenfield route east of Park Rapids, and on any alternatives to the Sandpiper project accepted for study.

--PUC needs to inform state agencies that are currently in the early stages of reviewing applications for Sandpiper, (such as the DNR and PCA) that PUC is conducting a cumulative effects analysis on these two pipelines that may result in changes in locations. This should be done under the PUC rule cited above concerning responsibilities of the PUC to provide information **to** other stakeholders and the public.

List of attachments

1. Attachment 1. Estimates of oil/product flows in proposed and alternative corridors
2. Attachment 2. Enbridge schematic of its pipeline systems
3. Attachment 3. Web page from the US Department of transportation describing HCA areas
4. Attachment 4. Verbatim excerpts from an ORNL risk assessment appropriate for the Sandpiper project

CITATIONS

#1. Enbridge. 2013. "Enbridge Pipeline System Configuration." Quarter 1, 2013. Color chart showing entire Enbridge system in the United States and Canada, including data on individual lines, pipeline size, product type, and pipeline capacities (based on annual capacities). Available from one of the Enbridge web sites, and downloaded March 2014.

#2. Minnesota House of Representatives, House research. June 2013. Bob Eleff, Legislative Analyst. "Minnesota's Petroleum Infrastructure: :Pipelines, Refineries, Terminals.

#3. Thompson/Reuters News Service. March 31, 2014. "Enbridge to expand Southern Lights Pipeline as demand rises." Reuters Business and Financial News.

#4. Reuters News Services. March 4, 2014. "Update 2—Enbridge to spend C$7 billion (Canadian) to replace pipeline to US." Reuters Business and Financial News. (Concerns Line #3) Also, at the same time, Enbridge web sites indicate this 34 inch line will be upgraded to 36 inches from 34, and the old line won't be decommissioned until the new line is in service.

#5. Forum News Services. March 5, 2014. John Myers. "Another Enbridge proposal would replace line from Canada to Wisconsin." Concerns Enbridge Line 3 upgrade as in #4, but this article quotes an Enbridge spokesperson that both the Sandpiper Route/Corridor and the Enbridge Mainline Corridor along US 2 are being looked at as possible locations.

$6. Federal Reserve Bank of Minneapolis. May 1, 2007. Kathy Cobb. "This nation's rapacious appetite for oil products and Canada's vast supply spur district pipeline projects." Newsletter. This article notes that MinnCan can be increased by 185,000 bpd to increase the Mn Pipeline Corridor to 640,000 bpd.

$7. Minnesota Public Utility Commission (PUC) public notice on Sandpiper, January 31, 2014.

#8. Oak Ridge National Laboratory 2012. "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety" Date Published: October 2012. Revised: December 2012. For U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration Pipeline Safety Program | East Building 2nd Floor 1200 New Jersey Avenue, S.E. Washington, DC 20590

#9. Online Oil and Gas Journal. January 17 2005. (Printed from site 3/29/2014.) "Method determines valve automation for remote pipelines."

Attachment 1

ESTIMATES OF EXISTING AND PROPOSED PIPELINE FLOWS RELATED TO PROPOSED SANDPIPER CORRIDORS AND TRANSLATED TO SELECTED RIVER FLOWS

Note: Pipeline capacities are given in barrels per day (bpd). Product flow rates are converted to cubic feet per second (cfs) in order to compare to typical river flows along the routes. Rates are calculated based on 42 gallons/barrel. A useful rule of thumb is that 100,000 bpd converts to 6.5 cfs. Product type is variable, and some information about types is given in Attachment 2.

A. Enbridge Pipelines from Minnesota border east to Clearbrook

Note: All lines are in one corridor except for North Dakota Pipeline which joins the "Mainline Corridor" at Clearbrook which then goes on to Superior roughly along US Highway #2.; Enbridge refers to the main corridor as "Enbridge Mainline Corridor.

A. 1. Existing Enbridge Pipelines

Note: All product flow is to the East-southeast except for the diluent line, which takes product from Illinois refineries back to Alberta for "thinning" heavy crude so it can be pumped in pipelines. Product types are listed by Enbridge in Attachment 2.

Pipeline name	Barrels per Day Amount	Flow rate cfs	Source	Pipe diameter	Citation
Line 1	236,500	15.4	Alberta	18/20 inches	#1
Line 2b	442,200	28.7	Alberta	24/26 inches	#1
Line 3	390,000	25.4	Alberta	34 inches	#1
Line 4	795,700	51.7	Alberta	36/48 inches	#1
Line 67 (Alberta Clipper)	450,000	29.2	Alberta	36 inches	#1
Line 65 (LSr)	186,000	12.1	North Dakota	20 inches	#1,#2
North Dakota Pipeline	210,000	13.6	North Dakota	?	#1, #2
Southern Lights Diluent	180,000	11.7	US refineries	20 inches	#2, #3
Totals	2,890,400 bpd	188 cfs			

A.2. Expansion proposals by Enbridge, Minnesota border east to Clearbrook

Expansions:	bpd amount	cfs		Pipe Diameter	Citation
Line 3 increase:	370,000	24.0	(total 760,000)	34 inches to 36	#4
Line 67 increase:	350,000	22.8	(total 800,000)	Pumps added	#2
Southern Lights increase:	95,000	6.2	(total 275,000)	Pumps added	#3
New line					
Sandpiper	225,000	14.6		24 inches	#7
Subtotal (new + expand)	1,040,000	67.6			
Grand total, existing and expanded	3,930,400	255 cfs			

B. Enbridge Pipelines from Clearbrook east to Superior

Note: There is a major facility at Clearbrook whereby some product is routed south to the Twin Cities on 3 pipelines owned by the Minnesota Pipeline Company—a different company from Enbridge. One of these, the MinnCan line, was recently constructed. (There are "loops" at a few locations, so that there may be 4 lines in place in the corridor at those locations.) According to Citation #2, currently this amount is 455,000 bpd. It is difficult to determine exact amounts in the two older lines, but it is not necessary for this level of analysis.

B.1. Existing Enbridge pipelines from Clearbrook to Superior

Note: For purposes of this analysis, it is sufficient to calculate a total of existing product flows from Clearbrook to Superior by subtracting the amount diverted south at Clearbrook from the total amount entering the Clearbrook terminal:

Total entering Clearbrook terminal: 2,890,400 bpd
Amount routed south: - 455,000 bpd
Total existing flows to Superior: 2,435,400 bpd or 158 cfs

B.2. **Expansion proposals by Enbridge, Clearbrook to Superior**
Note: An alternative route for the new proposed Sandpiper project is along this Enbridge mainline corridor. It is not listed here, but if it did follow this corridor, it would increase flows by 225,000 bpd, or 14.6 cfs. Also, the Line 3 replacement/expansion could follow the southern route, but is included here. If Line 3 would instead go south of Clearbrook, the amounts listed here should be decreased by 760,000 bpd or 49.4 cfs.

Pipeline name	bpd Amount	cfs		Pipe diameter	Citation
Line 3 increase:	370,000	24.0	(total 760,000)	34 inches to 36	#4
Line 67 increase:	350,000	22.8	(total 800,000)	Pumps added	#2
Southern Lights increase:	95,000	6.2	(total 275,000)	Pumps added	#3

Total increase: 815,000 53.0 cfs
Grand total, existing + increases 3,250,400 bpd 211.2 cfs

C. Pipelines routed south from Clearbrook
Note: New Enbridge proposals are to follow the existing Minnesota Pipeline Company corridor to near Park Rapids, and then create a new corridor east to Superior, Wisconsin,

C. 1. Existing Pipelines to Twin Cities, Minnesota Pipeline Company (owned by Koch Industries)

Pipeline name	Amount	cfs	Source	Pipe diameter	Citation
MinnCan	165,000	10.7	Canada	24	#2
Two older pipelines	290,000	16.9	ND, Canada?	?	#2

Total, Minnesota Pipeline: 455,000 29.6

C.2 Expanded capacity of Minnesota Pipeline Company

Total	640,000	41.6		Adding pumps?	#2

D. New Enbridge Pipelines potentially routed to existing corridor south from Clearbrook, then east from Park Rapids to Superior on new corridor

Note: Enbridge recently announced it is planning to "replace" and expand its older Line #3 in its mainline corridor across northern Minnesota to Superior, WI. It says it is also looking at instead going south from Clearbrook, then east from Park Rapids to follow the proposed Sandpiper route. Therefore, Line #3 is listed here in order to portray amounts of product potentially flowing in these corridors.

Pipeline name	bpd Amount	cfs	Source	Pipe diameter	Citation
Sandpiper	375,000	24.4	Alberta	30	#7
Line 3 expansion	760,000	49.4	Alberta	36	#4, #5

Total expansion: 1,135,000bpd 73.8cfs

E. Total potential Enbridge and Minnesota Pipeline company from Clearbrook to Park Rapids

Pipeline Company	bpd Amount	cfs	Source	Citation
Minnesota Pipeline Co.	640,000	41.6	North Dakota, Canada	#2
Enbridge	1,135,000	73.8	Canada	#2, #5

Total in corridor: 1,775,000 115.4

F. SUMMARY OF EXISTING AND PROPOSED OIL/PRODUCT FLOWS IN EXISTING PIPELINE CORRIDORS AS COMPARED TO SELECTED RIVER FLOWS

Company	Existing	cfs	Existing+Proposed	cfs
1. Enbridge N.D. Pipeline to Clearbrook	210,000	13.6	no increase	13.6
2. Enbridge mainline to Clearbrook	2,680,400	174.2	3,720,400	242 cfs
3. Enbridge Clearbrook to Superior	2,435,400	158.0	3,930,400	255 cfs
(Existing and proposed column includes Sandpiper and #3 expansion)				
4. Enbridge and MinnPipe Co. Clearbrook To south of Park Rapids	455,000	29.6	1,775,000	115.4
5. Enbridge, Park Rapids to Superior	No corridor	000	1,135,000	73.8

River name and location	Long-term median river flows (cfs) on this date from USGS Gauges, April 2, 2014	Approximate % of maximum oil flow to river flow
Snake river above Warren	124	195 percent
Clearwater river at Plummer	172	141 percent
Mississippi river at Bemidji	334	76 percent
Straight River south of Park Rapids	69	167 percent
Mississippi River at Grand Rapids	716	36 percent
Mississippi River at Aitkin	2,859	2.6 percent*
Prairie River at Taconite	125	204 percent
St. Louis River at Scanlon	1,850	14 percent

*New Enbridge corridor from Park Rapids to Superior crosses in this vicinity; all else are Enbridge mainline

Pipeline System Configuration

Quarter 1, 2013

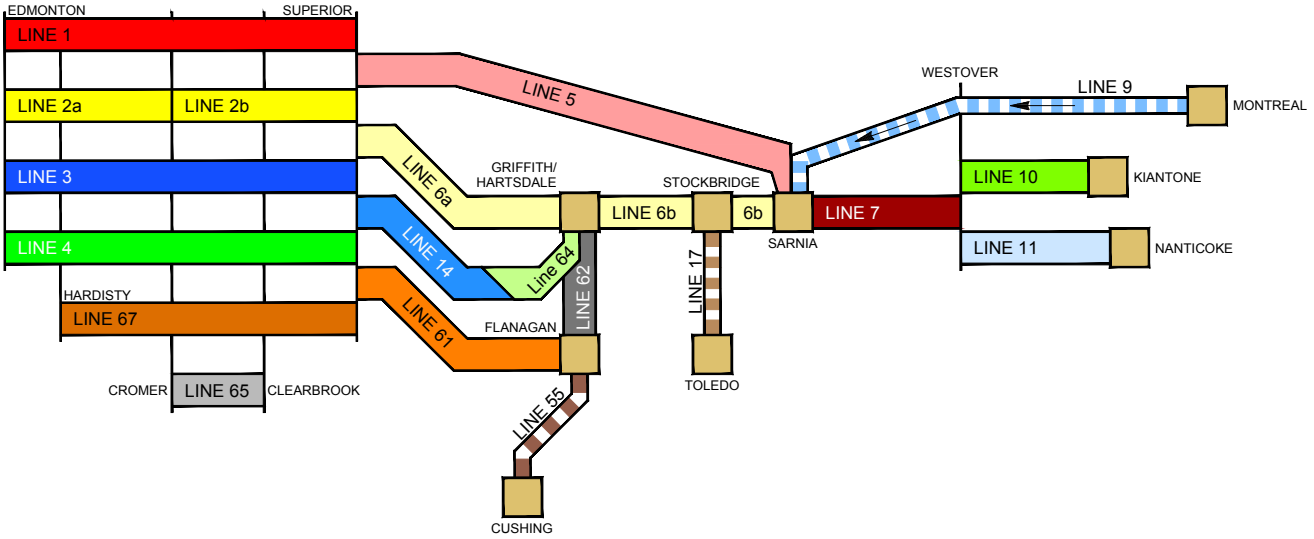

Line 1

37,600 m^3/d (236.5 kbpd)
18"/20" - 1098 miles
NGL
Refined Products
Light Synthetics

Line 2

Line 2a
70,300 m^3/d (442.2 kbpd)
24" - 596 miles
Line 2b
70,300 m^3/d (442.2 kbpd)
24"/26" - 502 miles
Condensates
Light Synthetics
Sweet
Light & High Sour

Line 3

62,000 m^3/d (390.0 kbpd)
34" - 1098 miles
Condensates (Edmonton to Hardisty)
Light Synthetics
Sweet
Light & High Sour

Line 4

126,500 m^3/d (795.7 kbpd)
36"/48" - 1098 miles
Heavy
Medium (Ex-Clearbrook)
Light Sour (Ex-Clearbrook)

Line 5

78,100 m^3/d (491.2 kbpd)
30" - 645 miles
NGL
Light Synthetics
Sweet
Light & High Sour

Line 6

Line 6a
106,000 m^3/d (666.7 kbpd)
34" - 467 miles
Line 6b
45,000 m^3/d (283.0 kbpd)
30" - 293 miles
Light Synthetics (Superior to Lockport)
Sweet (Superior to Lockport)
Light & High Sour
Medium
Heavy

Line 7

23,900 m^3/d (150.3 kbpd)
20" - 120 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 65

29,500 m^3/d (185.6 kbpd)
20" - 313 miles
Light Sour
Medium

Line 10

11,800 m^3/d (74.2 kbpd)
12"/20" - 91 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 11

18,600 m^3/d (117.0 kbpd)
16"/20" - 47 miles
Condensates
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 62

20,700 m^3/d (130.2 kbpd)
22" - 75 miles
Heavy

L 14 / L 64

50,500 m^3/d (317.6 kbpd)
24" - 467 miles
Light Synthetics
Sweet
Light & High Sour
Medium

Line 61

63,600 m^3/d (400.0 kbpd)
42" - 454 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 67

71,500 m^3/d (449.7 kbpd)
36" - 999 miles
Heavy

Not Part of the Enbridge Mainline System

Line 9

38,200 m^3/d (240.3 kbpd)
30" - 524 miles
Condensates
Sweet
Medium
Light & High Sour

Line 17

16,000 m^3/d (100.6 kbpd)
16" - 88 miles
Heavy

Line 55

30,700 m^3/d (193.3 kbpd)
22"/24" - 575 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

NOTES:

Capacities provided are Annual Capacities and do not include current restrictions.

• Updated: January 2013
File: 2013_Q1 System Config.dwg

Revised by: YZ
Drawn by: DRD

Choose One...

contained within each circle.

- Potential impact circles that contain 20 or more structures intended for human occupancy;, buildings housing populations of limited mobility; buildings that would be hard to evacuate (e.g., nursing homes, schools); or buildings and outside areas occupied by more than 20 persons on a specified minimum number of days each year, are defined as HCA's.

How do operators of pipelines know where HCA's are located?

- High population areas and other populated areas are identified using maps and data from the U.S. Census bureau.
- Critical drinking water sources and unusually sensitive ecological areas are identified using information from National Heritage Programs and Conservation Data Centers in each state, in conjunction with The Nature Conservancy.
- Because of the complexity of HCAs for Hazardous Liquid Pipelines, the Office of Pipeline Safety identifies and maps HCAs for Hazardous Liquids on its National Pipeline Mapping System (NPMS). These maps are revised periodically by OPS based on new and updated information.
- Operators of natural gas transmission pipelines must use a specified equation to calculate the radius of "potential impact circles" along their pipeline and compare the structures in those circles to the HCA criteria in the rule.

How do operators determine what pipeline segments require extra integrity protection due to the presence of HCAs?

- Pipeline operators must determine which segments of their pipeline could affect HCAs in the event of a release. This determination must be made assuming that a release can occur at any point, even though the likelihood of a release at any given point is very small.
- Hazardous liquid pipelines that pass through an HCA, or that pass near enough that a release could reach the area by flow over land or within a river, stream, lake, or other means, are assumed to have the potential to affect that area.
- Gas transmission pipelines that pass within any of the HCA potential impact circles are assumed to have the potential to affect that area. (Or, alternatively, operators may choose to treat all of their pipeline segments in Class 3 and 4 areas as HCAs.)

Date of Revision: 12012011

ATTACHMENT 4

VERBATIM EXCERPTS FROM THE FOLLOWING PIPELINE RISK ASSESSMENT OF SHUTOFF VALVES, INCLUDING ESTIMATES OF AMOUNTS OF RELEASES OF OIL AND OTHER PRODUCT FROM RUPTURES

Oak Ridge National Laboratory 2012. "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety" Date Published: October 2012. Revised: December 2012. For U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration Pipeline Safety Program | East Building 2nd Floor 1200 New Jersey Avenue, S.E. Washington, DC 20590

ABSTRACT

Author's note: This 340 page study primarily concerns worst-case pipeline ruptures in populated areas, and was stimulated by a large California rupture of a gas pipeline in a urban area in California that killed 8 people. However, it also considers oil pipelines that do not catch fire, and those in High Consequence Areas (HCAs) that are also in or near ecologically significant areas. Therefore, it is highly relevant to certain the necessary route evaluation and environmental impact evaluation of the Sandpiper proposal. The underlined portions are indicate relevancy to Sandpiper, and in each case are the author's emphasis when they appear in the text.Page numbers at the bottom of the pages are excerpt page numbers rather than as in the original text.

This study assesses the effectiveness of block valve closure swiftness in mitigating the consequences of natural gas and hazardous liquid pipeline releases on public and environmental safety. It also evaluates the technical, operational, and economic feasibility and potential cost benefits of installing automatic shutoff valves (ASVs) and remote control valves (RCVs) in newly constructed and fully replaced transmission lines. Risk analyses of hypothetical pipeline release scenarios are used as the basis for assessing: . . . . and <u>(3) socioeconomic and environmental damage in HCAs caused by hazardous liquid pipeline releases of crude oil</u>. . . . . .However, these results may not apply to all newly constructed and fully replaced pipelines because <u>site-specific parameters that influence risk analyses and feasibility evaluations often vary significantly from one pipeline segment to another and may not be consistent with those considered in this study. Consequently, the technical, operational, and economic feasibility and potential cost benefits . . . . . .need to be evaluated on a case-by-case basis</u>. In theory, installing ASVs and RCVs in pipelines can be an effective strategy for mitigating potential consequences of unintended releases because decreasing the total volume of the release reduces overall impacts on the public and to the environment. <u>However, block valve closure has no effect on preventing pipeline failure or stopping the product that remains inside the isolated pipeline segments from escaping into the environment</u>. The benefits in terms of cost avoidance attributed to block valve closure swiftness increase as the time required to isolate the damaged transmission pipeline segment decreases. Block valve closure swiftness is most effective in mitigating damage resulting from a pipeline release. . . . .. Similarly, the avoided cost of socioeconomic and environmental damage for hazardous liquid pipeline releases without ignition increase as time required to isolate the damaged pipeline segment decreases.. . . .

The scope of the study is further limited by considering <u>only worst case pipeline release scenarios in HCAs involving guillotine-type breaks rather than other more common breaks, such as punctures and through-wall cracks.</u> Although ignition of the released product following a rupture is not ensured, this study only models release scenarios that result in immediate ignition of the released product at the break location. <u>The study also assesses potential socioeconomic and environmental effects of unintended crude oil releases without ignition from hazardous liquid pipelines in HCAs.</u>

EXECUTIVE SUMMARY

The U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) is the Federal safety authority responsible for ensuring safety in the design, construction, operation and maintenance, and spill response planning for the 2.3 million (M) miles of natural gas and hazardous liquid transportation pipelines in the United States. Its mission is to protect people and the environment from the risks inherent in transportation of hazardous materials by pipeline and other modes of transportation. . . . Section 4 of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 calls for the Secretary of the U.S. Department of Transportation (DOT) to require by regulation the use of automatic or remotely controlled shutoff valves, or equivalent technology, where it is economically, technically, and operationally feasible on hazardous liquid and natural gas transmission pipeline facilities constructed or entirely replaced after the final rule was issued.. . . .The Act also requires a study to discuss the ability of transmission pipeline facility operators to respond to a hazardous liquid or natural gas release from a pipeline segment located in a high consequence area (HCA). . . . . .

(This) study assesses the effectiveness of block valve closure swiftness in mitigating the consequences of natural gas and hazardous liquid pipeline releases on public and environmental safety. . . . . .It also evaluates the technical, operational, and economic feasibility and potential cost benefits of installing ASVs and RCVs in newly constructed and fully replaced pipelines. The results of this study apply to natural gas and hazardous liquid transmission lines. . . . .
Potential effects of unintended releases from natural gas and hazardous liquid pipelines on public and environmental safety are categorized as personal injuries and fatalities, property damage, and environmental impacts.
.
Hazardous liquid pipeline operators are required to install block valves at prescribed locations to facilitate isolation of pump stations, breakout storage tanks, and lateral takeoffs and other points along the pipeline near designated bodies of water and populated areas to minimize damage and pollution from an accidental hazardous liquid discharge. In addition, operators are required to consider installing emergency flow restricting devices such as check valves and RCVs on pipeline segments to protect a HCA in the event of a hazardous liquid pipeline release. In making this determination, an operator must, at least, consider the swiftness of leak detection and pipeline shut down capabilities and benefits expected by reducing the spill size.

E.1 CONSEQUENCE MODELS

Risk analyses of hypothetical pipeline release scenarios are used as the basis for assessing: . . . . . .(3) socioeconomic and environmental damage in HCAs caused by hazardous liquid pipeline releases of crude oil.

E.4 ASSESSMENT METHODOLOGY AND RESULTS FOR HAZARDOUS LIQUID PIPELINE RELEASES WITHOUT IGNITION

Potential consequences on the human and natural environments resulting from a hazardous liquid release without ignition generally involve socioeconomic and environmental impacts. These impacts are influenced by the total quantity of hazardous liquid released and the habitats, resources, and land uses that are affected by the release. The methodology used in this study to quantify socioeconomic and environmental impacts resulting from a hazardous liquid release involves computing the quantity xxvii

of hazardous liquid released as a function of block valve closure time and then using this quantity to establish the total damage cost based on the EPA's BOSCEM. The total damage cost is determined as follows:

☐ Add the unit response cost, the unit socioeconomic damage cost, and the unit environmental damage cost;

☐ Multiply the sum of these costs by the number of barrels spilled; and

☐ Apply a damage cost adjustment factor which aligns the total damage cost with the actual cleanup costs reported for recent crude oil spills in environmentally sensitive areas. The damage cost for crude oil released in the Enbridge Line 6B pipeline rupture in Marshall, Michigan in 2010 was approximately $38,000 per barrel.

The BOSCEM accounts for effects of spill size on the total damage cost by reducing the unit cost of damage as the number of barrels spilled increases.

The swiftness of block valve closure has a significant effect on mitigating potential socioeconomic and environmental damage to the human and natural environments resulting from hazardous liquid pipeline releases because damage costs increase as the spill size increases. The benefit in terms of cost avoidance for damage to the human and natural environments attributed to block valve closure swiftness increases as the duration of the block valve shutdown phase decreases.

1.3.2 Hazardous Liquid Pipeline Release Events

After a hazardous liquid pipeline ruptures, liquid begins flowing from the break and continues until draining is complete. The amount of material released following the break is influenced by a variety of factors. These factors include the type of liquid, the operating pressure of the pipeline, the size and position of the hole through which the liquid is released, the rate at which the liquid is being pumped through the pipeline, the response of the operator in terms of shutting off pumps and closing valves, the pipeline route and elevation profile, and the location of the break relative to the pumps and block valves. Block valves are installed in hazardous liquid pipelines to facilitate maintenance, operations, or construction and to limit the amount of liquid spilled following a pipeline rupture. For worst case, guillotine-type breaks, the effective hole size is equal to the line pipe diameter.

The behavior of the released liquid depends on its physical properties and the terrain in the vicinity of the break. For example, the liquid could flash on release of pressure to form a vapor cloud containing a fine mist of residual liquid droplets, accumulate in a pool on the ground surface near the pipeline break, create a stream that flows away from the release point, or soak into the surrounding soil (Acton, 2001).

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If the released liquid ignites following the break, it could result in a pool fire, a flash fire, or, under certain conditions, a vapor cloud explosion. Pool fires can spread out in all directions or flow in a particular path depending on the terrain. Figure 1.3 shows fire damage along a creek caused by a hazardous liquid pipeline release in Bellingham, Washington (NTSB, 2002). If ignition is delayed, the resulting evolution of vapor from the release could influence the magnitude and extent of a subsequent flash fire or explosion.

Fig. 1.3. Fire damage resulting from hazardous liquid pipeline release in Bellingham, Washington (NTSB, 2002).

Impacts resulting from time-dependent radiant thermal intensities at various separation distances from the break are based on the following hazardous liquid pipeline release scenario. The release occurs following a guillotine-type break where the escaping liquid accumulates in a pool on an impermeable level ground surface and ignites immediately upon release. Pool size is affected by the type of liquid

released, the line pipe diameter, the pipeline operating pressure, the time required to detect the leak and initiate corrective actions to mitigate the consequences of the release, the spacing of block valves, the time required to close block valves and isolate the break, and the terrain features. Any potential environmental impacts to air and water quality caused by the released liquids and their products of combustions are beyond the scope of this study.

As discussed in Section 1.3.1, thermal radiation hazard zones with increasing impact severity are described by concentric circles centered on the pipeline rupture. The thermal radiation intensities at the perimeters of these concentric circles increase as the radii decrease. Effects of progressively higher heat fluxes on buildings and humans are described in Table 1.1. Because thermal radiation effects on buildings and humans are a function of radiant heat flux and exposure duration, quantifying the time-

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dependent variations in radiant heat fluxes for specific radii is key to assessing the benefits of installing RCVs and ASVs in hazardous liquid pipelines.

Given the wide range of actual pipeline sizes and operating pressures, leak detection periods, and block valve spacing and closure times, ORNL developed methodologies for quantifying the impacts of these parameters on areas affected by combustion of the escaping liquid hydrocarbon. The methodologies, which are described in Section 3.2, also characterize time-dependent radiant thermal intensities at various separation distances from the break.

Without ignition, the escaping liquid could adversely affect waterway navigation, surface and ground water quality, and other aspects of the human and natural environments. In addition, the cost to remediate the affected areas could be substantial. Consequence mitigation for a hazardous liquid pipeline release without ignition requires rapid detection, pump shutdown, and block valve closure. However, even if these actions are taken quickly, some amount of liquid in the pipeline will drain out of the broken pipeline segments. Methodologies for quantifying spill volumes for hazardous liquid pipelines releases and for estimating socioeconomic and environmental damage caused by the spill are described in Section 3.3.

1.3.2.1 Phases of a Hazardous Liquid Pipeline Release

A pipeline break can range in size and shape from a short, through-wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Although the volume of the discharge depends on many factors, the event is subdivided into four sequential phases – Phase 1 Detection, Phase 2 Continued Pumping, Phase 3 Block Valve Closure, and Phase 4 Pipeline Drain Down (Borener, 1994 and California State Fire Marshal, 1993). The total discharge volume equals the sum of the volumes released during each phase. Events associated with each phase are described below.

Phase – 1 Detection: The detection phase begins immediately after the pipeline ruptures, t0, and continues until the leak is detected by any means and the Operator initiates corrective actions to mitigate the consequences of the release, td. The volume of liquid discharged during the detection phase, Vd, depends on the duration of this phase and is influenced by factors such as the size, shape, and location of the rupture; the pumping rate; the pipeline pressure; and the effectiveness of the leak detection system.

The volume of liquid discharged during the detection phase is determined using the following equation.

$Vd = Qd(td – t0)$ (1.1)

where

Vd is the volume of liquid discharged during the detection phase, barrels (m3)

Qd is the discharge rate through the break that de

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Phase 2 – Continued Pumping: The continued pumping phase starts after corrective actions are initiated to mitigate the consequences of the release, td, and ends when the pumps stop operating, tp.

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During this time, additional hazardous liquid spills from the break. The duration of this phase can vary from a few minutes for systems with remotely operated pumps to hours for manually operated equipment located in remote areas. The volume of liquid discharged during the continued pumping phase, Vp, depends on the duration of this phase and is influenced by factors such as the type of equipment controls (automatically, remotely, or manually operated); personnel travel time to shutdown manually operated equipment; and the flow rates of the pumps.

…..Phase 3 – Block Valve Closure: The block valve closure phase starts when the pumps stop operating, tp, and ends when the upstream and downstream block valves close, ts. During this time, an additional amount of liquid in the pipeline spills from the break. The volume of liquid discharged during the block valve closure phase, Vs, depends on the duration of this phase and is influenced by factors such as the speed at which block valves located upstream and downstream from the break close. The duration of this phase can vary from a few minutes for systems with automatic or remotely controlled valves to hours for systems with manually operated valves located in remote areas.

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Phase 4 – Pipeline Drain Down: The pipeline drain down phase starts when the upstream and downstream block valves close isolating the portion of the pipeline that includes the break, ts. This phase

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ends when the remaining contents of the isolated portion of the damaged pipeline segment drain from the break, tf. The volume of liquid discharged during the drain down phase, Vf, is affected by the pipeline elevation profile including siphon action and the location of the break. A break that occurs at the highest elevation in the isolated portion of the pipeline results in no drain down volume, whereas a break that occurs at the lowest elevation could result in significant or complete drain down of the isolated portion of the pipeline.

The rate at which liquid drains from a break in the isolated portion of the damaged pipeline segment depends primarily on the size of the break and the pipeline elevation profile. It is also affected by the flow rate of air that must enter the break to replace the liquid and allow the draining to continue. In hilly or mountainous terrain, determining the length of pipeline, L, available to drain from a break must consider site-specific design and construction details. The volume of liquid discharged from the contributory length of pipeline, L, during the drain down phase, Vf, and the transient discharge rate, Qf, cannot be accurately determined without knowing the actual pipeline elevation profile as illustrated in Fig. 1.4.

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1.3.2.2 Block Valve Effects on a Hazardous Liquid Pipeline Release

The effectiveness of block valve closure swiftness on limiting the spill volume of a hazardous liquid pipeline release is influenced by the location of the block valves relative to the location of the break, the pipeline elevation profile between adjacent block valves, and the time required to close the block valves after the break is detected and the pumps are shut down.

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Block valves do not reduce the volume of liquid spilled during the detection and continued pumping phases because they are open. However, the total spill volume can be reduced by rapidly detecting the leak and taking immediate corrective actions including shutting down the pumps and closing the block valves to mitigate the consequences of the release. The effectiveness of block valve closure in mitigating the consequences of a hazardous liquid pipeline release decreases as the time required to close the block valve increases.

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1.3.5 Socioeconomic and Environmental Effects of a Hazardous Pipeline Release

Potential consequences and effects on the human and natural environments resulting from a hazardous liquid pipeline release without ignition generally involve socioeconomic and environmental impacts. These impacts are influenced by the total quantity of hazardous liquid released and the habitats, resources, and land uses that are affected by the release. The methodology used to quantifying socioeconomic and environmental impacts resulting from a hazardous liquid release involves computing the quantity of hazardous liquid released and then using this quantity to establish the total damage cost. The total damage cost is determined by adding the response cost, the socioeconomic damage cost, and the environmental damage cost as described in Section 3.3.3.

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3.2 HAZARDOUS LIQUID PIPELINES WITH IGNITION

Following a guillotine-type break in a hazardous liquid pipeline and ignition of the released hydrocarbon, a pool fire begins to form and continues to increase in diameter as liquid flows from the break. Eventually, the pool reaches an equilibrium diameter when the mass flow rate from the break equals the fuel mass burning rate. The fire will continue to burn until the liquid that remains in the isolated pipeline segments stops flowing from the pipeline.

A pipeline break can range in size and shape from a short, through-wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Guillotine-type breaks are less common than other pipeline breaks such as fish-mouth type openings, but they can occur as a result of different causes including landslides, earthquakes, soil subsidence, soil erosion (e.g. scour in a river) and third-party damage. The guillotine-type break is the largest possible break and is therefore considered in this study as the worst case scenario. Although the volume of the discharge depends on many factors, to enable analysis, the event is divided into four sequential phases with the total discharge volume equal to the sum of the volumes released during each phase. The four phases (detection, continued pumping, block valve closure and pipeline drain down) are explained in Section 1.3.2.1.

The thermal radiation hazards from a hydrocarbon release and resulting pool fire depend on a variety of factors including the composition of the hydrocarbon, the size and shape of the fire, the duration of the fire, its proximity to the objects at risk, and the thermal characteristics of the object exposed to the fire.

3.3 HAZARDOUS LIQUID PIPELINES WITHOUT IGNITION

The socioeconomic and environmental effects of an oil spill are strongly influenced by the circumstances surrounding the spill including the type of product spilled, the location and timing of the spill, sensitive areas affected or threatened, liability limits in place, local and national laws, and cleanup

strategy. The most important factors determining a per-unit cost are location and oil type, and possibly total spill amount.

The amount of oil spilled can have a profound effect on the cleanup costs. Obviously, the more oil spilled, the more oil there is to remove or disperse, and the more expensive the cleanup operation. However, cleanup costs on a per-unit basis decrease significantly with increasing amounts of oil spilled. Smaller spills are often more expensive on a per-unit basis than larger spills because of the costs associated with setting up the cleanup response, bringing in the equipment and labor, as well as bringing in the experts to evaluate the situation (Etkin, 1999).

The following methodology was used to determine: (1) the time-dependent discharge from a hazardous liquid transmission pipeline resulting from a guillotine-type break, and (2) the quantity of hazardous liquid released during the detection, continued pumping, block valve closure, and drain down phases

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needed to estimate cleanup costs. The total volume of a hazardous liquid pipeline release is primarily influenced by the flow rate at the time of the break; the combined durations of the detection, continued pumping, block valve closure phases; and the size and shape of the break. For worst case, guillotine-type breaks, where the effective hole size is equal to the line pipe diameter, the governing parameters are the line pipe diameter and the pipeline length between plateaus and peaks in the vicinity of the break.

Appendix A: Spill Volume Released Due to Valve Closure Times in Liquid Propane Pipelines, contains a family of curves for various hazardous liquid pipeline release scenarios that quantify the volume of liquid released following a guillotine-type break.

3.3.1 Analysis Scope, Parameters, and Assumptions

The methodology is based on fundamental fluid mechanics principles for computing the time-dependent response of hazardous liquid pipelines following a guillotine-type break. It is also suitable for determining the effects that detection, continued pumping, block valve closure duration have on a worst case discharge release determined in accordance with federal pipeline safety regulations in 49 CFR 194 for estimating worst case discharges from hazardous liquid pipelines (DOT, 2011e).

The configuration of the hypothetical hazardous liquid pipeline used to evaluate the effectiveness of RCVs and ASVs in mitigating the consequences of a release has the following design features and operating characteristics:

- The pump stations are located at 100 mile intervals along the pipeline.
- Each pressure pump station has a remote control device that can be activated by the pipeline operator to shut down the compressors after a rupture occurs.
- The rupture is a guillotine-type break that initiates the release event.
- The break is located at a low point in the pipeline elevation profile.
- The following times are study variables.
- The time when the operator detects the leak.
- The time when the operator stops the pumps.
- The time when the upstream and downstream block valves are closed and the line section with the break is isolated.
- The total volume of the hazardous liquid release equals the volume of liquid released during the detection, continued pumping, block valve closure, and drain down phases.
- The time-dependent flow rate is a study variable.

Study variables used to characterize hazardous liquid pipeline releases are listed in Table 3.24.

3.3.2 Analytical Approach and Computational Models

After a hazardous liquid pipeline ruptures without ignition, liquid begins flowing from the break and continues until draining is complete. A pipeline break can range in size and shape from a short, through-

wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Although the volume of the discharge depends on many factors, the event is subdivided into the four sequential phases with the total discharge volume equal to the sum of the volumes released during each phase. The phases of a hazardous liquid pipeline release are outlined in Section 1.3.2.1.

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block valve closure phase, minutes

The flow rate through the break remains constant through both the detection and continued pumping phases. In the block valve closure phase, the maximum flow rate through the break is based on the elevation difference of liquid in the pipeline. During the pipeline drain down phase, the maximum flow rate through the break is based on the difference between the operating pressure of the pipeline and atmospheric pressure. Requirements in 49 CFR 194.105(b)(1) state the worst case discharge is the largest volume of fluid released based on the pipeline's maximum release time, plus the maximum shutdown response time, multiplied by the maximum flow rate, which is based on the maximum daily capacity of the pipeline, plus the largest line drainage volume after shutdown of the line sections. In this methodology, the maximum flow rate can be estimated by multiplying the fluid speed at the pump by the cross sectional area of the line pipe. Although operators can use this rule to determine a worst case discharge, the actual flow rate during the block valve closure phase may be greater (less conservative) due to factors such as fluid density, pressure changes, pump performance characteristics, and the elevation profile of the pipeline which are not reflected in the methodology. These factors are important in a risk analysis because their effects influence time-dependent damage resulting from a release.

The influence of fluid density, pressure changes, and the elevation profile of the pipeline is taken into consideration in this study by using Bernoulli's equation to calculate the flow rate during the block valve closure and drain down phases. However, there are recognized limitations in using Bernoulli's equation to determine drain down time because it does not model the effects of air flow through the pipeline break which occurs as the fluid escapes following block valve closure. Although Bernoulli's equation does not produce an exact solution to this fluid dynamics problem, comparison of the results provides a consistent approach for evaluating the effectiveness of block valve closure swiftness on mitigating release consequences.

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3.3.3 Socioeconomic and Environmental Effects

The methodology for quantifying potential environmental effects resulting from a hazardous liquid release involves computing the quantity of hazardous liquid released and then using this quantity to establish the total damage cost. The total damage cost, Cd, is determined by adding the response cost, Cr, the socioeconomic damage cost, Cs, and the environmental damage cost, Ce. This methodology applies to crude oil and light fuel (gasoline) releases that affect the following areas.

☐ Commercially navigable waterways which means a waterway where a substantial likelihood of commercial navigation exists.

☐ High population areas and another populated areas which mean an urbanized area as defined and delineated by the Census Bureau that contains 50,000 or more people and has a population density of at least 1,000 people per square mile and a place as defined and delineated by the Census Bureau that contains a concentrated population, such as an incorporated or unincorporated city, town, village, or other designated residential or commercial area, respectively.

☐ Unusually Sensitive Areas (USAs) which is defined in 49 CFR 195.6 to mean a drinking water or ecological resource area that is unusually sensitive to environmental damage from a hazardous liquid pipeline release.

The response cost, Cr, is determined by multiplying the applicable unit response cost shown in Table 3.25 by the applicable medium modifier shown in Table 3.26.

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The response cost, C_r, is determined by multiplying the applicable unit response cost shown in Table 3.25 by the applicable medium modifier shown in Table 3.26.

Table 3.25. Unit response costs for crude oil and light fuel releases Release Quantity, barrels	**Crude Oil, $ per barrel**	**Light Fuels, $ per barrel**
<12	9,240	4,200
12-24	9,156	4,116
24-240	9,030	4,074
240-2,400	8,190	3,654
2,400-240,000	5,166	3,108
> 240,000	3,864	1,302

Table 3.26. Modifier for location medium categories for crude oil and light fuel releases Medium Category	**Medium Modifier**
Open Water/Shore	1.0
Soil/Sand	0.6
Pavement/Rock	0.5
Wetland	1.6
Mudflat	1.4
Grassland	0.7
Forest	0.8
Taiga (boreal forest)	0.9
Tundra	1.3

The socioeconomic damage cost, C_s, is determined by multiplying the applicable unit socioeconomic cost shown in Table 3.27 by applicable the socioeconomic cost modifier shown in Table 3.28.

Table 3.27. Unit socioeconomic and environmental costs for crude oil and light fuel releases Release Quantity, barrels	**Crude Oil, $ per barrel**		**Light Fuels, $ per barrel**	
Socioeconomic	**Environmental**		**Socioeconomic**	**Environmental**
<12	2,100	3,780	3,360	3,570
12-24	8,400	3,654	13,860	3,360
24-240	12,600	3,360	21,000	2,940
240-2,400	5,880	3,066	8,400	2,730
2,400-240,000	2,940	1,470	4,200	1,260
> 240,000	2,520	1,260	3,780	1,050

Table 3.28. Socioeconomic and cultural value ranking for crude oil and light fuel releases Value Rank	**Release Impact Site Description**	**Examples**	**Cost Modifier Value**

Extreme	Predominated by areas with high socioeconomic value that may potentially experience a large degree of long-term impact if oiled.	Subsistence/commercial fishing, aquaculture areas	2.0
Very High	Predominated by areas with high socioeconomic value that may potentially experience some long-term impact if oiled.	National park/reserves for ecotourism/nature viewing; historic areas	1.7
High	Predominated by areas with medium socioeconomic value that may potentially experience some long-term impact if oiled.	Recreational areas, sport fishing, farm/ranchland	1.0
Moderate	Predominated by areas with medium socioeconomic value that may potentially experience short-term impact if oiling occurs.	Residential areas; urban/suburban parks; roadsides	0.7
Minimal	Predominated by areas with a small amount of socioeconomic value that may potentially experience short-term impact if oiled.	Light industrial areas; commercial zones; urban areas	0.3
None	Predominated by areas already moderately to highly polluted or contaminated or of little socioeconomic or cultural import that would experience little short- or long-term impact if oiled.	Heavy industrial areas; designated dump sites	0.1

Note: Long-term impacts are those impacts that are expected to last months to years after the spill or be relatively irreversible. Short-term impacts are those impacts that are expected to last days to weeks after the spill occurs and are generally considered to be reasonably reversible.

Table 3.29. Freshwater vulnerability categories for crude oil and light fuel releases Freshwater Vulnerability Category	**Freshwater Vulnerability Modifier**
Wildlife Use	1.7
Drinking	1.6
Recreation	1.0
Industrial	0.4
Tributaries to Drinking/Recreation	1.2
Non-Specific	0.9

Table 3.30. Habitat and wildlife sensitivity categories for crude oil and light fuel releases	**Habitat and Wildlife Sensitivity Modifier**
Habitat and Wildlife Sensitivity Category	
Urban/Industrial	0.4
Roadside/Suburb	0.7
River/Stream	1.5
Wetland	4.0
Agricultural	2.2
Dry Grassland	0.5
Lake/Pond	3.8
Estuary	1.2
Forest	2.9
Taiga	3.0
Tundra	2.5
Other Sensitive	3.2

This methodology is consistent with the U.S. Environmental Protection Agency (EPA) Basic Oil Spill Cost Estimation Model (BOSCEM) that was developed to provide the US EPA Oil Program with a methodology for estimating oil spill costs, including response costs and environmental and socioeconomic damages, for actual and hypothetical spills (Etkin, 2004).

Total Damage Cost Validation

The following case studies compare the actual damage costs for two hazardous liquid pipeline releases to the corresponding total damage costs determined using BOSCEM.

Case Study 1 – Enbridge 2010

The Enbridge Line 6B pipeline ruptured in Marshall, Michigan on July 25, 2010, and released approximately 20,000 barrels of crude oil. This release from the 30-in. nominal diameter pipeline caused environmental impacts along Talmadge Creek and the Kalamazoo River (Nicholson, 2012). Cleanup and recovery costs for this release totaled $767,000,000.

Using the EPA BOSCEM, the estimated total damage cost for this release is approximately $307,900,000. This total damage cost, C_d, includes the response cost, C_r, the socioeconomic damage cost, C_s, and the environmental damage cost, C_e, determined as follows.

Response cost, C_r = unit response cost ☐ medium modifier

Socioeconomic damage cost, C_s = unit socioeconomic cost ☐ socioeconomic cost modifier (High) = $2,940 ☐ 1.0 = $2,940/barrel

Environmental damage cost, C_e = unit environmental cost ☐ 0.5 ☐[freshw wildlife modifier (Wetland)] = $1,470 ☐ 0.5 ☐(1.7 + 4.0) = $4,190/barrel

Total damage cost (2004 basis), C_d = 20,000 barrels ☐ ($8,265 + $2

After adjusting for inflation, the total damage cost (2012 basis), C_d = $307,900,000 ☐ 1.25 (inflation factor) = $384,875,000 which is approximately 50% of the actual cost.

Case Study 2 – Yellowstone 2011

A 12-in. hazardous liquid pipeline owned by ExxonMobil Pipeline Company ruptured on July 1, 2011 under the Yellowstone River 20 miles upstream from Billings, Montana. The Yellowstone River is navigable water in the United States (EPA, 2011). The ruptured pipeline released an estimated 1,509 barrels of oil that entered the river before the pipeline was closed. Cleanup and recovery costs for this release totaled $135,000,000.

The estimated total damage cost for this release is $48,044,000 based on 2004 cost data. This total damage cost, C_d, includes the response cost, C_r, the socioeconomic damage cost, C_s, and the environmental damage cost, C_e, determined as follows.

Response cost, C_r = unit response cost ☐ modifier (Wetland) = $8,190 ☐ 1.6 = $13,104/b

Socioeconomic damage cost, C_s = unit socioeconomic cost ☐ socioeconom
$5,880 ☐ 1.7 = $9,996/barrel.
Environmental damage cost, C_e = unit environmental cost ☐ 0.5 ☐ fish (Wildlife Use) + wildlife modifier (Wetland)] = $3,066 ☐ 0.5 ☐ (1.7 + 4.0) = $8,738/barrel.
Total damage cost (2004 basis), C_d = 1,509 barrels ☐ ($13,104 + $9,9

After adjusting for inflation, the total damage cost (2012 basis), Cd = $48,044,000 ☐ 1.25 (inflation factor) = $60,054,000 which is approximately 44% of the actual cost.

Damage Cost Adjustment Factor
For this study, total damage costs of hazardous liquid pipeline releases are determined using the EPA BOSCEM and then increased by a damage cost adjustment factor of 2.1. This factor aligns the model with cleanup and recovery costs for two recent hazardous liquid pipeline releases of crude oil into sensitive socioeconomic and environmental areas.

3.3.4 Risk Analysis Results for Hazardous Liquid Pipeline Releases
The methodology for assessing socioeconomic and environmental damage to HCAs is based on computed release volumes corresponding to the detection, continued pumping, block valve closure, and drain down phases of a hazardous liquid pipeline release of crude oil without ignition. The method used in this analysis for defining maximum flow rate through the break is as defined in 49 CFR 195.105(b)(1) for the detection, pump shut down, block valve closure, and drain down phases. The damage is quantified using the EPA BOSCEM and the damage cost adjustment factor described in Section 3.3.3.
Eight case studies involving hypothetical hazardous liquid pipeline releases in HCAs are considered to assess effects of block valve closure time on socioeconomic and environmental damage resulting from a guillotine-type break. The duration of the detection and continued pumping phases for the hypothetical hazardous liquid pipelines are 5 minutes and 5 minutes, respectively. The duration of the block valve closure phases is 3 minutes.

….

Characteristics for Case Study 8A, 8B, 8C, and 8D that involve 36-in. nominal diameter hazardous liquid pipelines are tabulated in Table 3.32. These case studies compare the following effects on avoided damage costs.
☐ Case studies 8A and 8B compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to either 400 psig or 1,480 psig, an elevation change of 100 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

☐ Case studies 8C and 8D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to either 400 psig or 1,480 psig, an elevation change of 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

☐ Case studies 8A and 8C compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to 400 psig, an elevation change equal to either 100 ft or 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

☐ Case studies 8B and 8D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to 1,480 psig, an elevation change equal to either 100 ft or 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

Figures 3.82 to 3.85 list the discharge volumes in barrels for Case Study 8A, 8B, 8C, and 8D. Discharge volumes listed in Table 3.32 for each case study are determined by adding the discharge volumes for the detection (5 minutes), continued pumping (5 minutes), block valve closure (3, 30, 60, and 90 minutes), and drain down (3 miles) phases. Avoided damage costs, which are also listed in Table 3.32, represent the differences between the discharge volumes for the various block valve closure durations and the 3 minute block valve closure duration multiplied by the avoided damage unit cost. The total damage unit cost for these case studies is estimated at $29,520 per barrel. This total damage cost is the sum of the response cost plus the socioeconomic damage cost plus the environmental damage cost. Note that the avoided damage costs are not sensitive to pressure and elevation changes because the model is based on the methodology in 49 CFR §194.105 (b) (1) for a worst case discharge which has a constant flow rate.

Benefits of Block Valve Closure Swiftness for a Hypothetical Hazardous Liquid Pipeline Releases without Ignition

The swiftness of block valve closure has a significant effect on mitigating potential socioeconomic and environmental damage to the human and natural environments resulting from hazardous liquid pipeline releases. The benefit in terms of cost avoidance for damage to the human and natural environments attributed to block valve closure swiftness increases as the duration of the block valve shutdown phase decreases.

Table 3.32. Effects of hypothetical 36-in. hazardous liquid pipeline releases without ignition	**Case Study 8A**	**Case Study 8B**	**Case Study 8C**	**Case Study 8D**
Characteristic				
Type Hazardous Liquid	Crude Oil	Crude Oil	Crude Oil	Crude Oil
Flow Velocity, ft/s	15	15	15	15
Nominal Line Pipe Diameter, in.	36	36	36	36
Drain Down Length, mi.	3	3	3	3
MAOP, psig	400	1,480	400	1,480
Elevation Change, ft	100	100	1,000	1,000
Detection Phase Duration, minutes	5	5	5	5
Continued Pumping Phase Duration, minutes	5	5	5	5
Unit Response Cost, $/barrel	3,864	3,864	3,864	3,864
Medium Modifier (Wetland)	1.6	1.6	1.6	1.6
Response Cost, Cr	6,182	6,182	6,182	6,182
Unit Socioeconomic Cost, $/barrel	2,520	2,520	2,520	2,520
Socioeconomic Cost Modifier (Very High)	1.7	1.7	1.7	1.7
Socioeconomic	4,284	4,284	4,284	4,284

Damage Cost, C_s				
Unit Environmental Cost, $/barrel	1,260	1,260	1,260	1,260
One half Freshwater Modifier (Wildlife Use = 1.7) and Wildlife Modifier (Wetland = 4.0)	2.85	2.85	2.85	2.85
Environmental Damage Cost, C_e	3,591	3,591	3,591	3,591
Total Damage Unit Cost, C_d, $/barrel	14,057	14,057	14,057	14,057
Damage Cost Adjustment Factor for Hazardous Liquid Pipeline Releases	2.1	2.1	2.1	2.1
Total Damage Unit Cost on 2012 Basis, $/barrel	**29,520**	**29,520**	**29,520**	**29,520**
Detection Phase Release, barrels	5,665	5,665	5,665	5,665
Continued Pumping Phase Release, barrels	5,665	5,665	5,665	5,665
Drain Down Phase Release, barrels	19,942	19,942	19,942	19,942
Block Valve Closure Phase for Valve Closure in 3 minutes, barrels	3,399	3,399	3,399	3,399
Block Valve Closure Phase for Valve Closure in 30 minutes, barrels	33,992	33,992	33,992	33,992

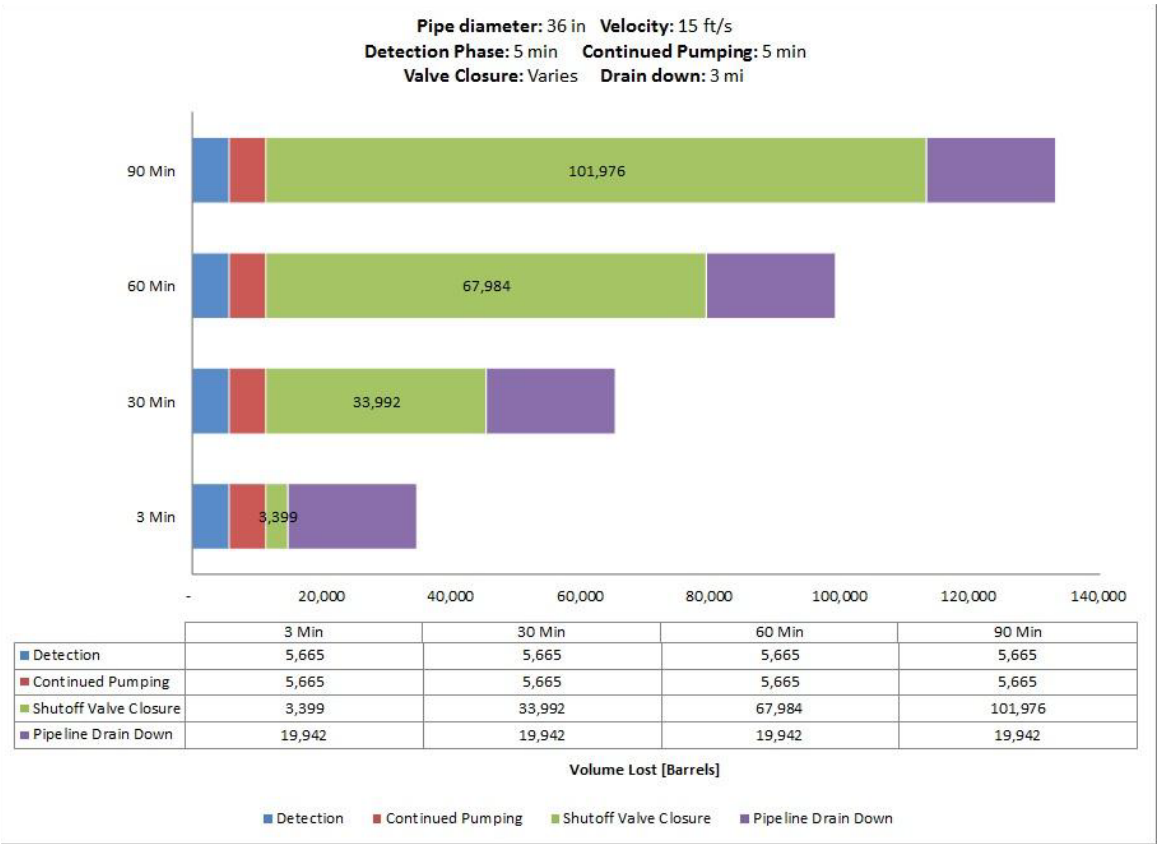

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. 3.82. Case Study 8A – Discharge volumes for a 36-in. hazardous liquid pipeline with a 400 psig MAOP and an elevation change of 100 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

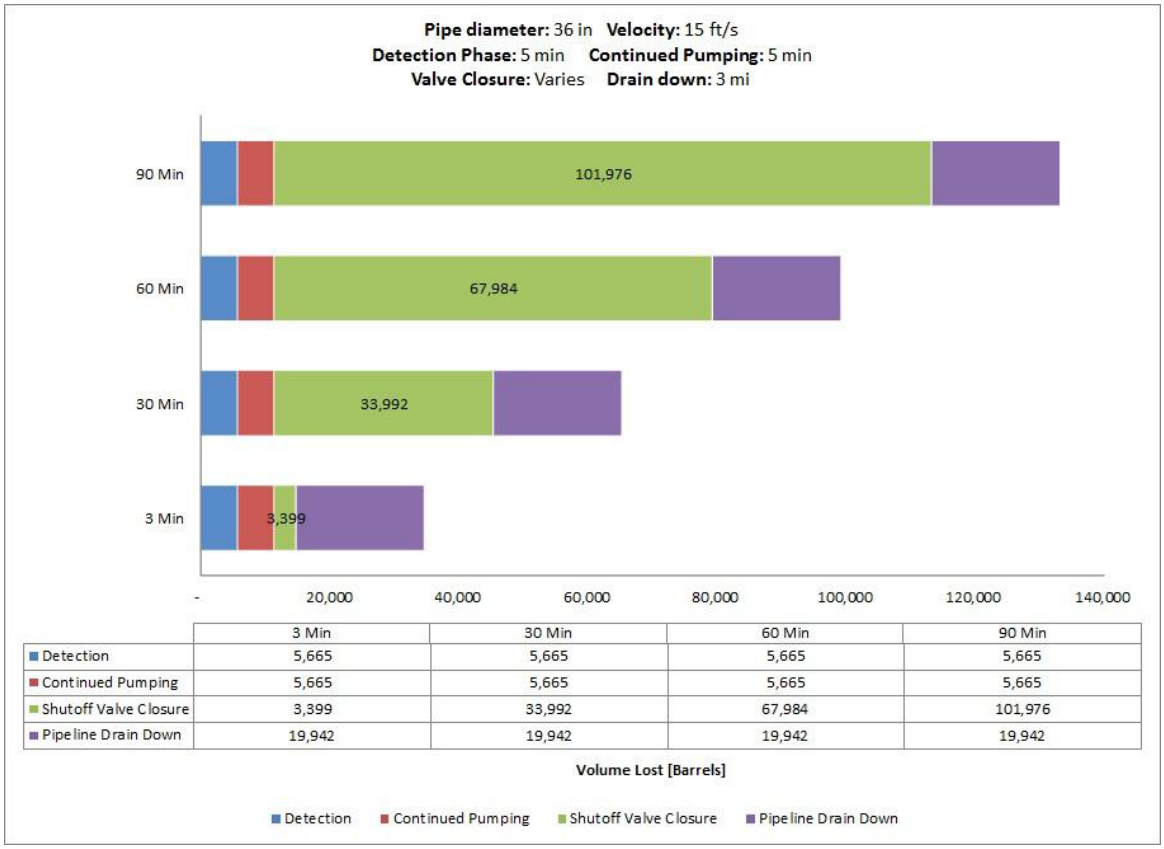

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. 3.83. Case Study 8B – Discharge volumes for a 36-in. hazardous liquid pipeline with a 1,480 psig MAOP and an elevation change of 100 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

Hartman, Larry (COMM)

From: Paul Stolen <stolami@gvtel.com>
Sent: Monday, April 07, 2014 7:30 AM
To: Ek, Scott (PUC); Hartman, Larry (COMM)
Subject: Re: Sandpiper Pipeline Comments - P. Stolen

Good morning Scott and Larry. Thanks for your cooperation on responding. As you can see from my comment, I intend to send them to various other parties. I had an unfortunate computer problem on April 4th that delayed me and then prevented me from doing the final editing of my comments. So, in order to meet the deadline, I sent the comments in anyway. When I did the final edit this weekend, I found typos, name and cross reference problems, extra words left in, and other problems like that. (Not substantive.) However, there was an error on page 3 of Attachment 1—I had mistakenly put the Sandpiper amounts in the wrong column.

Therefore, I am sending the corrected version to the other parties rather than the one I officially submitted to you. I realize the one sent to you is the "legal" version under the rules, and I can live with that since none of the specific recommendations change in any way. I would, of course, prefer that you use the corrected "clean" version in the official record. I can send it to you if you wish. I am trying to get it scanned today into one digital version, so hopefully it will be available tomorrow morning.

Thanks again. Paul Stolen

From: Ek, Scott (PUC)
Sent: Friday, April 04, 2014 3:42 PM
To: mailto:stolami@gvtel.com
Subject: FW: Sandpiper Pipeline Comments - P. Stolen

Scott E. Ek
Minnesota Public Utilities Commission
121 7th Place East, Suite 350 | St. Paul, MN 55101
(651) 201-2255 | scott.ek@state.mn.us | www.puc.state.mn.us

From: Ek, Scott (PUC)
Sent: Friday, April 04, 2014 3:32 PM
To: Hartman, Larry (COMM)
Cc: 'stolami@gvtel.com'; Nelson, Casey (COMM)
Subject: Sandpiper Pipeline Comments - P. Stolen

Hello Larry,

I received the attached comments from Paul Stolen concerning the Sandpiper project. The comments were received today (4/4/14) at ~ 3:30 p.m. Please let me know if you receive these and if you would like me upload to eDockets. I am also copying Paul on this as he wanted confirmation they were received.

Thank you,

Scott E. Ek

Minnesota Public Utilities Commission
121 7th Place East, Suite 350 | St. Paul, MN 55101
(651) 201-2255 | scott.ek@state.mn.us | www.puc.state.mn.us

From: Paul Stolen [mailto:stolami@gvtel.com]
Sent: Friday, April 04, 2014 3:14 PM
To: Ek, Scott (PUC)
Subject: Re: from paul stolen

Hello Scott. Here are my comments plus one attachment. Two more attachments to follow. thanks Paul

From: Ek, Scott (PUC)
Sent: Thursday, April 03, 2014 11:47 AM
To: Paul Stolen
Subject: RE: from paul stolen

Hi Paul,

Yes, that is fine. As you know we will read any and all comments received. Please feel free to forward to me and copy Larry. I will send you an email confirming receipt.

Thank you,

Scott E. Ek
Minnesota Public Utilities Commission
121 7th Place East, Suite 350 | St. Paul, MN 55101
(651) 201-2255 | scott.ek@state.mn.us | www.puc.state.mn.us

From: Paul Stolen [mailto:stolami@gvtel.com]
Sent: Thursday, April 03, 2014 11:38 AM
To: Ek, Scott (PUC)
Subject: from paul stolen

Hello Scott. Long time, huh? I've been retired for 5 years. I'm submitting comments on the Sandpiper project, and running a little late. I was planning on getting them in today in the overnight guaranteed delivery for tomorrow receipt, since that's the project deadline. so will need to submit via electronic mail. If Larry's inbox is swamped, can I get to you, and also get a response that you have received them? Thanks much. Paul Stolen

May 28 , 2014

RECEIVED
MAY 29 2014
MAILROOM

Paul Stolen
37603 370th Av SE,
Fosston, MN 56542
218-435-1138

Mr. Larry Hartman
Environmental Review Manager
Minnesota Department of Commerce
85 67th Place East, Suite 500
St. Paul, MN 55101

Re: Comments on proposed Enbridge Sandpiper Pipeline, Minnesota Public Utilities Commission (PUC) Docket #13-474

Dear Mr. Hartman:

Enclosed are my additional comments on this proposed project based on the time extension previously granted. The attached material covers the following topics:

I. A copy of my updated April 4 2014 comments to correct minor editing problems and a request that you replace it with the enclosed comments.

II. The Scope of Work for the consultant to the PUC that will be doing the environmental analysis and route comparison.

III. The environmental "footprint" of the proposed pipeline. Enbridge continues to maintain that the project will require a 100 foot right of way (ROW). A report entitled "Construction of the Northern Border Pipeline in Montana" is enclosed that refutes Enbridge's position on ROW requirements, and shows that it only applies to flat terrain.

IV. Additional comments regarding the consequences of pipeline ruptures and leaks. This comment expands on my April 4 comments that these consequences need to be consider in assessment of impacts, location decisions, and need for the project.

V. Additional comments on the "corridor fatigue" issue.

If you have any questions, please give me a call.

Sincerely, Paul Stolen

Paul Stolen

C: Tom Landwehr, Commissioner, Minnesota DNR
John Linc Stine, Commissioner, Minnesota PCA
Tamara Cameron, Regulatory Chief, Corps of Engineers

Additional comments on proposed Enbridge Sandpiper Pipeline, Minnesota Public Utilities Commission
Docket #13-474
Paul Stolen
May 28 2014

I. **Corrected April 4 comments**. My previous comments, submitted on April 4, 2014, were sent in a rush. I had a computer hang-up at the last minute and therefore didn't have time for a final proofing on the paper copy. Therefore, I did a corrected copy, which is enclosed. I'd appreciate it if you would replace the April 4 copy with the enclosed. There were some typos and a few confusing sentences that I clarified. The most substantive correction was a small correction of numbers in Table 1. The cover letter of the enclosed corrected copy has a note about this below the signature line. I apologize for any confusion this may cause.

II. Scope of work for PUC consultant doing the environmental analysis and comparison of routes. My understanding is that the PUC will be hiring a private party to develop the environmental analysis and comparison of routes for Sandpiper. The product of this contracted work will thus be key to government decisions on this project. How will the Scope of Work be developed? Is such a scope of work shown to Enbridge prior to its completion? My comments and those of others need to be incorporated into the Scope of Work. This Scope of Work should include specific questions focused on the key public policy decisions that need to be made about the Sandpiper project, rather than allowing the contractor to determine such questions. In addition, a draft of this Scope of Work should be available for review prior to letting the contract, since the product is so crucial to the decisions.

The rules regarding a Certificate of Need for this project clearly indicate that environmental and socioeconomic factors must be taken into account in the decision as to whether to grant a need certificate. (Section 7853.0130, Criteria.) Therefore, the Scope of Work is a key document for determining whether to grant a Certificate of Need.

III. **Pipeline construction environmental "footprint."**

A. Enbridge estimate the environmental "footprint" of the Sandpiper project is inaccurate. Enbridge's statement that they use a 100 foot ROW to construct the project seriously underestimates the project's effects and potential for long term damage. In fact, such a ROW only applies to flat or nearly flat areas, and are often farmland.

The environmental study and route comparison must use accurate figures on land requirements for building the pipeline. The estimate must include the topics of land clearing, earth moving and excavation, soil compaction, and potential for topsoil mixing. This is called the project's "environmental footprint." During a public meeting on Sandpiper at Clearbrook, a recent visit to the DNR, and the Enbridge documents on the PUC web site, I examined Enbridge's plan sheets and some applications for crossing streams. These plans are simply not accurate with respect to land clearing and extent of excavation.

Note: My comments here do not apply to the topic of "extra work space" at roads, river crossings, and a few other locations of specialized construction. Enbridge generally does include these locations on its plan sheets. Such locations are a small fraction of the ROW impacts beyond the 100-foot ROW in hilly terrain.

In spite of abundant evidence to the contrary, Enbridge continues to maintain to the public that it only needs a 100 foot right-of-way (ROW.) Enbridge also used this figure on the Alberta Clipper and Southern Lights Projects, even though during construction a much wider ROW was evident at some locations. Finally, the 100 foot ROW was also used for the MinnCan project as a guide to estimating the environmental footprint of the project. (I worked on all three projects while employed at the DNR, including conducting training for other DNR staff in pipeline construction.)

Both Enbridge and MinnCan did not provide accurate figures for excavation into parent material outside of the pipeline trench. Such excavation is abundant in hilly terrain. A key mitigation measure, topsoil separation in such areas, was ignored in many locations except for agricultural land.

The 100 foot ROW width does not apply to hilly terrain. It is time to put it to rest when large diameter pipelines are proposed in Minnesota. In fact, the construction ROW in hilly terrain can become 200 to 300 feet wide in some areas. In many cases on the three large, above-mentioned projects I was involved while at the DNR, these wider locations were never included in plains submitted for public review by the PUC, DNR, or PCA, and not included in calculations of the project's environmental footprint.

The terrain crossed by the proposed Sandpiper route crosses hilly glacial moraine in many locations Understanding pipeline construction in non-flat terrain is crucial because it directly relates to important environmental impacts such as the extent of land clearing, deep excavation outside of the pipe trench and accompanying potential serious loss of topsoil, susceptibility to invasion of non-native species and noxious weeds, and chronic erosion problems because re-vegetation is slower when topsoil is lost and replaced by parent material.

B. Detailed explanation of ROW requirements for construction of a large-diameter pipeline.

The enclosed report entitled "Construction of the Northern Border Pipeline in Montana" (referred hereafter as the IPTF Report) describes in detail why construction in non-flat terrain can lead to ROWs much wider than 100 feet. It also demonstrates why there can be extensive excavation outside of the pipeline trench. I wrote it (with review by supervisors) some years ago while Assistant Coordinator of the Montana Interagency Pipeline Task Force. One of the main reasons why it was written is because ROW was an important public issue for two proposed large pipelines in Montana. One of them, the Northern Tier Pipeline, was proposed to cross the entire state, a distance of approximately 600 miles. A detailed review of it was done, but it was never built.

The Northern Border project—a 42 inch gas pipeline—crossed 180 miles of NE Montana, and was built after an EIS was prepared. ROW of way width was generally limited to 100 feet on state lands during the permitting stage, with the consent of the pipeline company. However, during construction, it became abundantly clear that it was impossible to construct the pipeline in such a narrow area in hilly terrain.

1. Purpose of IPTF Report. This report is applicable to the Sandpiper project with respect to determining the project's environmental footprint. It had four main purposes:

a. To document the ROW width in hilly terrain compared to flat terrain, and to determine the minimum ROW for a large diameter pipeline,

b. To document the locations of, and reasons for, excavation into topsoil and parent material outside the pipeline trench, since during the review period prior to construction the pipeline company had indicated excavation only for the pipe trench.

c. To identify problems encountered during construction and reclamation after pipe burial.

d. To serve as a training manual for reviewers of proposals to construct large diameter pipelines.

2. Caveats as to use of the IPTF report for the Sandpiper project. Before pointing out key findings of the report that relate to the Sandpiper proposal, there a few caveats as to its use:

a. Northern Border was constructed on a new ROW, with no existing pipelines in place.

b. A level work pad generally 50 feet wide is needed for construction of large diameter pipelines, with the pipeline trench to the left of the forward movement of construction. This work pad is essentially a road during construction, with nearly all traffic confined to it. Width is needed for passage of traffic past active work areas, and also for worker safety. A *level* work pad is necessary for worker safety and equipment needs. This construction necessity is directly related to the environmental footprint of the project as discussed below.

c. There have been some changes in pipeline construction techniques since Northern Border, but essentially none that affect ROW width except at special areas such as rivers. (Examples include: welding methods are done somewhat differently, and machine welding is often done on-site; cathodic protection pipe coating is no longer done on site, as depicted in the report, except at field welding locations; and directional drill bores (HDD) are much more common.) The fact that Northern Border was a 42 inch pipeline made little difference in ROW width as compared to the 24 inch MinnCan pipeline. The ROW for the latter was perhaps 8-10 feet narrower on flat terrain than the Northern Border line, but there was little difference on hilly terrain. In addition, there have been changes in river crossing techniques with greater use of HDDs, and dam and pump methods are often used rather than open cut trenches.

d. When another large pipeline is added to an existing corridor, it is offset from the existing line by a project-specific distance. I've found it to be 35-40 as a minimum separation. Therefore, the construction ROW can be somewhat narrower than the standard 100 foot because spoil from the trench can be placed in the separation zone. However, there are site specific issues on hilly terrain so that generalizations don't work in such areas. Also, heavy equipment travel is restricted over the new and old lines.

e. Pipe is bent to *generally* follow the terrain, but not *exactly* follow the terrain. A straight pipe transfers gas or liquid most efficiently. Therefore, in hilly terrain with abrupt slopes, pipe curvature strikes a balance between the desire for a straight pipe and the constraints of excavation. In other words, in some locations, such as the crest of a hill, or under a small but steep hill, the pipe is buried much more deeply in order to lessen the curves. The report illustrates the result of this in expanded ROW width in some locations for the extra spoil and topsoil storage.

f. Topsoil separation in excavated areas is a crucial environmental issue because it relates to whether there are long-term impacts to land productivity in all areas, increased invasive species and

noxious weeds, and increased erosion because re-vegetation is slow or non-existent. Topsoil separation can increase the ROW width because of separate piles; however, the expansion can be reduced by creative soil storage. Lack of topsoil separation causes long-term impacts whereas a somewhat wider ROW in some places causes temporary impacts. Furthermore, in recognition of this, topsoil separation has become a standard good practice in stormwater permits and all sorts of construction.

g. When done correctly based on known best practices for pipeline construction, environmental impacts of pipeline placement (not including future oil spill impacts) can be significantly reduced. The attached report suggests some of the good practices.

3.Key points from IPTF report. The IPTF report in its entirety is part of my comments, but the following are key points especially related to Sandpiper:

a. ROW requirements and topsoil stripping. Pages 31-32 provide a summary of the significance of ROW requirements as an environmental issue. It also references the details that support my findings that the IPTF Report is completely relevant to the Sandpiper project.

b. ROW requirements on flat terrain are discussed on page 33, and shown in pictures 51 and 52. On entirely flat terrain, it was possible to construct on an 85 foot ROW, although this increased somewhat as work progressed through clean-up.

c. Separation of topsoil from parent material on side-hill cuts is shown on page 37, and pictures 58 and 60. Page 39, picture 62, depicts lack of topsoil separation where it should have been done.

d. Page 40, and pictures 64 and 67 show deep side hill cuts, topsoil separation, and parent material storage.

e. Page 43 and photos 69-73 show extra-deep pipe burial in hilly areas and resulting large amounts of spoil.

f. Page 47-55 describe in detail why ROWs are wider than 100 feet in hilly terrain, and include diagrams explaining why this happens with respect to how pipelines must be constructed. The following significant conclusions are reached:

"1) Any deviation from flat terrain (0 degree slope) causes a geometric increase in width requirements, primarily for soil and spoil storage.

"2) There is often a progressive increase in r-o-w width after initial r-o-w clearing as different stages of construction proceed.

"3) there were numerous areas of extra r-o-w width needed beyond the 100 foot requested by DNRC.

"4) There was a high potential for topsoil mixing in the numerous side-hill cuts.

"6) Construction crews demonstrated an exceptional ability to re-contour the disturbed surface to the original configuration and replace topsoil when it had been correctly stripped.

IV. Consequences of pipeline leaks and ruptures must enter into route comparison, assessment of impacts, and need for the project.

My April 4 comments (pages 3 through 11) indicated in detail why impacts of pipeline leaks and ruptures need to be addressed in PUC decisions. I reiterate those recommendations, and have additional points regarding federal rules, and analysis of existing corridors, as follows:

A. Problems with federal rules. There are federal rules regarding hazardous liquid pipelines effects on the environment and people. These pipeline integrity rules pertain to environmental and socioeconomic impacts . They are administered by the Pipeline and Hazardous Materials Safety Administration (PHMSA) in the U.S. Department of Transportation. These rules refer to High Consequence Areas (HCA) and Unusually Sensitive Areas (USAs). (Title 49: Transportation PART 195—TRANSPORTATION OF HAZARDOUS LIQUIDS BY PIPELINE.) Both of these categories refer to populated areas, some aquifers, and some ecologically sensitive areas. I referred to HCAs in my April 4, 2014 comments.

The problem is that the federal rules regarding USAs and HCAs very much "high-grade" sensitive environmental features, and only include the rarest and most unusual ecological or natural resource features. This is not just my opinion. Describing sensitive area—and making lists of them—has been standard regulatory practice for many years. Such areas are subsequently avoided, or if they cannot be avoided, various mitigation measures are incorporated into government permits to reduce impacts. For example, these lists include public lands dedicated to a public use such as parks and wildlife management areas, and critical habitat features for certain species, such as deer wintering areas.

One would expect that such normalized lists would have been incorporated into the PHMSA rules. *PHMSA did not even begin to do so.* The notice of the adoption of final rules noted that government agencies with much more expertise than PHMSA regarding pollution and natural resources, such as the EPA and US Department of Interior, strongly objected to the restricted list of USAs and HCAs. (See Federal Register / Vol. 65, No. 232 / Friday, December 1, 2000 / Rules and Regulations.) Many other commenters, including the US Department of Justice also objected to this limited list.

In spite of these objections, the Office of Pipeline Safety didn't budge and kept the limited list with little justification.

However, in 2011, Congress passed the Pipeline Safety Act, and it was signed into law in early 2012. This was in response to the Michigan Enbridge pipeline rupture, the explosion of a gas pipeline in California that killed 8 people, and other pipeline accidents. Now, PHMSA Administrator Cynthia Quarterman noted in a hearing last week in the US House of Representatives that new rules will be out for review shortly regarding USAs and HCAs and other rules regarding pipeline integrity and potential environmental impact.

B. PUC route comparison with respect to USAs and HCAs . The PUC route comparison needs to identify and compare:

1. Any USAs and HCAs as defined in *current* federal pipeline integrity rules on any of the routes that have been identified or are being studied.

2. Any USAs and HCAs—or other categories related to the environment—*as defined in proposed new rules* on any of the routes being studied and identified, assuming the new proposed rules come out in time.

3. Determine the effects on any USAs or HCAs should there be a pipeline rupture, based on the "worst case" as defined in the Oak Ridge National Laboratory 2012. "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety" December 2012. This should also incorporate a "worst case" regarding collateral damage to existing pipelines in the two corridors that already have multiple pipelines.

C. Collective facility plan. Enbridge is the owner of all of the lines in its mainline corridor to Superior. In other words, it collectively owns all the pipelines in most of this corridor. Enbridge should be required to submit a Facility Plan for the Mainline Corridor, and any other corridor that contains more than one Enbridge line. This should be in addition to the plans on each individual line. Such plans can provide indications of responses to spills constrained by existing lines, as well as be indicative of "corridor fatigue."

V. Additional comments on the analysis of "corridor fatigue" issues. My April 4 comments addressed "corridor fatigue" on pages 11-16, with recommendations on pages 15-16. I have the following additional comments.

The route comparison simply must address the growing problem of adding more and more pipelines to existing corridors that were established prior to environmental laws. Therefore, the key place to begin is in the contractor hired by the PUC. Information about the existing pipelines and corridors will aid in understanding the extent of "corridor fatigue" and the increased risk of accidents on one line cascading to others. Therefore, the Scope of Work for the PUC contractor should specifically require the contractor include at least the following with respect to existing corridors:

A. Information about existing lines. On each existing line this should include: locations, identification of any looped areas, locations of cross-overs, types of river crossings such as whether they are trenched or bored, and extent of cover in the riverbed if trenched. There are also a number of locations along the Enbridge Mainline where pipelines actually are not next to each other, which results in multiple corridors somewhat close together rather than one corridor.

B. Facility plans on existing lines. Federal rules require that a "facilities plan" be submitted by a pipeline company prior to its being built. According to a call to the state office of pipeline safety, these are sent to PHMSA, and are not filed with the Minnesota agency. These plans are to include such items as the company's risk assessment, identification of HCAs and USAs, and other content highly relevant to an assessment of impacts and a comparison of routes.

C. Locations of problems areas identified during construction of existing lines. Enbridge and MinnCan should provide information on problem areas identified during construction of the existing lines.

D. Identify "choke points." There are locations along existing corridors where it is simply not physically possible to add more pipelines. These are sometimes referred to as "choke points." Such areas are indicative of "corridor fatigue," and are also the reason for the divergence noted in #2 above.

E. Locations where existing pipelines are exposed or more vulnerable to damage. Pipelines constructed in the past were built to lesser standards than current pipelines. For instance, Enbridge Line 3 was placed on the surface of the ground in certain wetland locations and cover piled on top of it. Over time, this has resulted in pipe exposure. Federal rules do not require that older pipelines meet current standards; therefore, Enbridge has been re-covering such locations on a voluntary basis. These locations should be identified. Also, I am aware of at least one, and possibly two locations along the Enbridge corridor where pipe is exposed as it crosses a river. One of these is a trout stream in Beltrami County.

Such locations are more vulnerable to vandalism and environmental events such as large and unusual rainfall events. Therefore, these locations along the existing corridors increase the risk of ruptures and accidents which may cause increased risk to new lines. The contractor needs to obtain from Enbridge and MinnCan records that identify such areas, and include this factor in assessing "corridor fatigue" and the route comparison.

F. Rivers and floodplains crossed at an oblique angle. Such important natural resource areas should be crossed by pipelines in a perpendicular manner in order to minimize the length of crossing this feature. This would be done when a new corridor is established. Therefore, data on oblique crossings is a measure of existing corridor problems. The LaSalle Creek crossing north of Itasca Park is a good example of this problem. A good measure of each crossing is the distance crossed obliquely compared to the perpendicular distance of the same crossing.

G. Avoidance areas under current pipeline construction practices. The existing corridors should be assessed to determine locations that would have been avoided if the existing pipelines were not present. Admittedly, this assessment would be somewhat objective. However, there are such features as lakes crossed by pipelines on the existing corridor. It is highly unlikely such features would be crossed by a new pipeline corridor. Also, a new pipeline corridor could well be routed around at least some wetlands rather than the numerous wetland crossing now found on the old corridors proposed to be followed by Enbridge's new lines.

H. Areas of restricted access. The existence of buried lines actively interfering with response to pipeline ruptures can reduce response time because heavy equipment can't drive over lines in some locations. In addition, pipeline ruptures in areas with few roads likely would exacerbate spills. The existing corridors should be examined to find such areas.

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENTS "A"

A-1 Stolen 4.4.14 Sandpiper Comments
A-2 Stolen 5.28.14 Sandpiper comments

Record of Paul Stolen's comments and documents submitted to the Minnesota Department of Commerce for the respective Public Comment periods for the proposed Sandpiper Pipeline project

April 4, 2014

Paul Stolen
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218-435-1138

Mr. Larry Hartman
Environmental Review Manager
Minnesota Department of Commerce
85 67th Place East, Suite 500
St. Paul, MN 55101

Re: Comments on proposed Enbridge Sandpiper Pipeline, PUC Docket #13-474

Dear Mr. Hartman:

Enclosed are my comments on this proposed project. They concern the main topics solicited in the January 31, 2014 public notice. I suggest alternative routes and route segments, and provide answers to public notice questions "What human and environmental impacts should be studied in the comparative environmental analysis?" and "Are there any specific methods to address these impacts that should be studied in the comparative environmental analysis?"

My comments address human and environmental impacts. They identify appropriate methods of studying such impacts, based on PUC rules and standard methods used in Minnesota and elsewhere to review pipelines.

The most important point in these comments concerns the enormous quantity of oil and other hazardous product that is already flowing through multiple pipelines in one or two narrow corridors This project, and the new Line 3 Enbridge replacement and enlargement will add even larger amounts of oil and product to these corridors. These corridors cross highly valued natural resource areas that have many lakes and clean rivers,. They are often at or near the headwaters of drainages and in hilly areas, as well as being close to people and concentrations of residences.

It is time for Minnesota and federal regulatory agencies to address the problem of multiple large diameter pipelines in close proximity to each other. This concentration makes the consequences of a single site event—whether such an event is natural, accidental, or intentional—potentially catastrophic. Furthermore, my comments will show that the flow of oil and other product will be so large as to be larger than—or a significant portion of—the flow of well-known rivers crossed by the corridors.

I am submitting these comments as a citizen but also as an expert. These are my personal comments written without review or reimbursement of any party. I will be willing to provide testimony as such in legal and legislative forums, should this be necessary, depending on personal availability.

In lieu of providing a c.v. at this time, I summarize here my credentials for asserting that I have expertise regarding the Sandpiper review.

I have regulatory experience with large natural gas, carbon dioxide, water, and oil and product pipelines in Montana and Minnesota. This has involved on the order of 10-12 pipeline projects while employed at the Montana Department of Natural Resources and Conservation and the Minnesota Department of Natural Resources. In Montana, the DNRC had environmental review, locational approval, and Certificate of Need Authority for energy facilities combined in one agency. I have also supervised , and /or participated in the preparation of EISs or EAs of such pipelines. This included conducting training sessions for other regulatory personnel on how to review pipelines for impacts and on pipeline construction methods.

I have written or coordinated the writing of major environmental review regulations for fixed linear energy facilities, including pipelines and HVTL lines. This experience included reviewing specific proposed linear and fixed large energy facilities (power plants and HVTL lines), and high-level nuclear waste repositories. I have been an environmental inspector on a number of large pipeline projects, including presenting agency views at pre-construction conferences with pipeline builders and sub-contractors.

I have policy-level experience with both federal and state laws and regulations regarding environmental review, pipelines, and solid and hazardous waste topics. This includes legislative staff work, legal depositions, testimony in court, and presentations to other agencies. Finally, this experience also includes years of doing environmental reviews of many other types of projects, including experience with formal risk assessment, and supervising and/or writing scopes of work for the preparation of highly technical studies conducted by outside consultants.

Review and permitting of significant projects such as the Sandpiper project, and the 36-inch Enbridge upgrade of its old Line 3, means that there are overlapping jurisdiction with other federal and state agencies. Some of these are broader than the narrow PUC review requirements. My comments also pertain to those other agency responsibilities. It is necessary to exchange information among such government authorities as a matter of good government. Many of my comments attempt to accomplish such a goal. Therefore, I am providing copies of my comments to these other agencies.

My comments are enclosed. Thank you for consideration of them.

Sincerely,

Paul D. Stolen

C: Tom Landwehr, Commissioner, Minnesota DNR
John Stine, Commissioner, Minnesota PCA
Tamara Cameron, Regulatory Chief, Corps of Engineers
Bob Eleff, Minnesota Legislature, House Research
Ken Westlake, USEPA, Chicago Office
US State Department, Washington DC

Comments on proposed Enbridge Sandpiper Pipeline, PUC Docket #13-474
Expert Testimony of Paul Stolen, Fosston Minnesota
April 4, 2014

I. Potential oil leaks and pipeline ruptures must be addressed in the route permit, by Minnesota state agencies, and by the US Corps of Engineers and EPA.

Summary: In this section I make the case for using accepted methods of risk assessment to address the consequences of pipeline ruptures to the Minnesota environment and people from this project. A foundation principle of risk assessment is that the greater the consequences of an event, the greater the need to examine rare or unlikely events. There are five reasons why unlikely events need to be considered in this risk assessment for this project:

1) Risk assessment scenarios in Attachment 4 are roughly applicable to one of the existing and proposed pipeline corridors in Minnesota. For example, a 36-inch pipeline rupture of the "worst case" type used in the assessment, may still release on the order of 40,000 barrels of oil, even assuming the quickest reaction time of pipeline operators to close block valves(13 minutes.) If valve closure time is delayed for 30 minutes, this rises to about 70,000 barrels, and if delay is 60 minutes, the amount is 100,000 barrels.

Such releases could have extremely high consequences to the Minnesota environment, and higher releases are possible under some risk assessment scenarios.

2) The portion of the Sandpiper route between Clearbrook and Park Rapids already contains three pipelines. Enbridge is apparently planning one more 36-in line in the same corridor as the 30 inch Sandpiper route. I raise the question as to what "worst-case" scenario should be used when there are 5 pipelines in close proximity in remote areas and at least somewhat susceptible to natural or intentional damage, perhaps to all of them at one time?

3) The corridor Enbridge proposes to use traverses a landscape rich in aquatic and other natural resources, highly valued by Minnesotans, and that includes major groundwater resources.

4) The portion of the Sandpiper route between Clearbrook and Park Rapids was fraught with problems during construction of the MinnCan pipeline, which were at least partially due to the corridor being created for a small pipeline long before modern environmental laws were passed.

5) The other route likely to be considered in the Sandpiper comparative review—the Enbridge mainline corridor—suffers from very similar problems as do at least the first three listed above. There are already as much as 7 pipelines present in this corridor.

The Sandpiper project, as well as other new projects in the planning stages, will add significantly to the enormous quantity of oil and other hazardous product that is already flowing through two narrow pipeline corridors.

It is time for Minnesota and federal regulatory agencies to address this problem of multiple large diameter pipelines in close proximity to each other. This concentration makes them vulnerable to natural events, accident or intentional act—such as the Oklahoma City federal building bombing. In fact, in Comment II.A. I discuss a specific case on the Alberta Clipper route where very high flows caused by the large rainfall events

that seemed to be caused by global warming could threaten the integrity of more than one of the large pipelines in this narrow corridor.

My comments on this topic are based on my experience with pipelines in Minnesota and Montana, as well as with exposure to risk assessment concepts and methods. Enbridge may object to the use of the ORNL study in Attachment 4, and say it is not appropriate to apply to these projects. I disagree: of course it isn't directly applicable, but its methods are modifiable so that it is. Extrapolating the findings of Attachment 4 to the two corridors could be pushing things a little—but I have found no information that anyone else is considering these issues and the deadline for PUC comment is now due. It is therefore entirely appropriate to use it, and I hope to trigger a helpful debate. And, I know for certain my view this topic is important will be shared by the public.

The jurisdiction of the PUC and other Minnesota agencies regarding the scope of review as it pertains to pipeline design and location lacks clarity and confusion among regulators as well as the pipeline company personnel. This is related to the issue of pipeline "safety standards", and is discussed in detail in Comment II below. This lack of clarity and confusion should not be allowed to continue, since in my view, Minnesota's natural resources and citizens are threatened by rare but reasonably foreseeable events.

As noted in Comment II, I believe the evidence is firm that the Minnesota state agencies can effectively develop measures regarding mandatory design features related to pipeline ruptures and leaks in order to that protect people and the environment without encroaching on federal "safety standards." Such involvement is extremely important, given the magnitude of oil and product potentially moving through these corridors.

<u>I. A. Estimates of existing and proposed pipeline oil and product flows in Minnesota as compared to selected river flows</u>.

After burial, pipelines, when functioning correctly, are largely invisible to the public and most policy makers—such as those currently concerned with oil transport by rail. In order to make considered judgment on policy and permits—as well as allowing proper public involvement—this needs to change. It is no longer acceptable to have an "out of sight, out of mind" attitude on the magnitude of current and potential oil transport through Minnesota in restricted corridors with multiple pipelines.

It is not possible to begin to analyze potential impacts from pipeline leaks and ruptures without knowing amounts of oil and product being transported. Attachment A provides details about oil flow into and through Minnesota in the corridors relevant to the Sandpiper analysis. It thus provides a basis for analyzing socio-economic, public safety, and environmental impacts from leaks and ruptures. Pipe size and amounts of oil and product pumped are given, as is ownership and origin (for most of the lines.) Attachment 2 provides a description of most of the Enbridge pipelines.

Also included on page 3 of Attachment A is a comparison of pipeline oil and product flow and selected river flows near where corridors cross the named rivers. These data, while in cubic feet per second (cfs), are useful for both public understanding of local residents as well as resource managers. The public in these locations can at least visualize the rivers even though most do not directly understand cfs figures.

The river flow data shown are long-term median flows for April 2, not current flows. Therefore, they are indicative of long-term spring runoff conditions, and are likely substantially higher than low-flow conditions.

In addition, the percentages listed comparing oil/product flow to river flow use the highest amounts based on the proposed pipeline projects in the permitting and planning stages.

There are some caveats with respect to the numbers in Attachment 1. First, I used reliable sources for the numbers. When I used news reports, I only used those where pipeline companies were directly quoted, and checked multiple news sources. However, the amounts indicated for the Minnesota Pipeline Company older lines rely on indirect conclusions based on Citation #2 figures and subtracting known amounts from specific projects. The Enbridge figures for existing pipelines in its Mainline corridor are taken directly from them. (Attachment 2) Finally, the source of oil/product was somewhat difficult to determine in some cases.

Attachment 1 indicates the following with respect to comparison of April 2 long-term median river flows with oil flow amounts in pipelines, both expressed in cubic feet per second:

--Four of the listed rivers, Snake River above Warren, Clearwater river at Plummer, Straight River at Park Rapids, and Prairie River at Taconite, have oil/product flows substantially higher than current spring flows in the rivers. In two cases oil flow is 200 percent of water flow.

--In all cases, especially if one considers large releases during higher flow conditions resulting in rapid dispersion downstream, these rivers are important and sensitive natural resources. For instance, the Straight River south of Park Rapids is a nationally recognized brown trout fishery.

<u>I.B. Methods of determining socio-economic and environmental impacts of pipeline ruptures</u> The PUC public notice on Sandpiper requested advice on methods of addressing potential impacts. There are indeed methods already in place, such as:

I.B.1. *Identification of "High Consequence Areas."* Comment II.B.1. addresses this topic in detail and provides recommendations for how to use this category in the project review. These areas are also roughly described in the federal agency prepared Attachment 3, which includes somewhat useful guidance as to their possible use in the Sandpiper project.

I.B.2. *Risk Assessment with respect to potential amounts of oil/product released by ruptures.* A foundation principle of risk assessment is that the greater the consequences of an event, the greater the need to examine rare or unlikely events in the risk assessment. Attachment 4 is a clear illustration of this principle. For example, it indicates that a "worst-case" pipeline rupture needs to be used, and justifies why it is needed. Such a rupture is called a "guillotine" rupture : "Guillotine-type breaks are less common than other pipeline breaks such as fish-mouth type openings, but they can occur as a result of different causes including landslides, earthquakes, soil subsidence, soil erosion (e.g. scour in a river) and third-party damage. The guillotine-type break is the largest possible break and is therefore considered in this study as the worst case scenario. " (page 5.)

The study goes on to use this scenario in its analysis of the cost-effectiveness of installing block valves, as well as assessing (some) environmental and socio-economic damages from ruptures. It calculates hypothetical releases in different scenarios in its appendix, including those figures listed in the above summary. More detail is provided in the verbatim (except for underlining) excerpts in Attachment 4.

As noted in the above summary, the estimates of amounts spilled from "guillotine" type ruptures of just one pipeline are large—perhaps a minimum of 40,000 barrels from a 36-inch line. Magnify this by the scenario of

intentional serious efforts to damage several pipelines at one time—and this amount becomes potentially massive.

*I.B.3. Actual damages from recent spills associated with rivers.*_Attachment 4 also describes two case studies of actual spills. (pp. 10-11.) These two case studies were used to develop a factor to increase the estimated costs according to the Attachment 4 methods by a factor of two, since both found the risk assessment method underestimated actual costs by about 50%.

a. Enbridge spill into Talmadge Creek and the Kalamazoo River in Michigan. Approximately 20,000 barrels of oil were released. The cost of that spill from a 30-inch diameter pipeline was of 2012 was $767 million.

b. ExxonMobil Pipeline company rupture under the bed of the Yellowstone River 20 miles upstream of Billings, Montana. This was caused by scour from flooding that exposed and fractured the pipeline that was trenched under the river bed. An estimated 1,509 barrels of oil were released before the pipeline was closed. Clean-up and recovery costs were $135 million. (Recent news reports indicate final costs and fines are not yet resolved.)

I.B.4. *Comparison of pipeline flow rates compared to river flows.* Attachment 1 indicates total amounts of oil/product flows in the numerous pipelines that cross these rivers. They portray possible amounts subject to the most catastrophic possible pipeline rupture event—that of an event that caused damage severe enough to rupture more than one pipeline. Some of these lines have been trenched under these rivers, in other cases they have been bored so that burial is deep and not subject to certain kinds of rupture events. Damage could conceivably occur due to river scour from unusually large flood events, or from an outside party successfully and deliberately accomplishing such a rupture.

My intent in comparing river flows to oil flows is not to imply that the worst-possible event be used in an analysis. Rather, it is to portray the magnitude of the oil/product flows in terms that the public and reviewers can understand it. Again, I am responding to normal methods of conducting risk assessments: Very high consequences deserve be paired with looking at rare events. The possible use of this information in any kind of corridor analysis or spill magnitude is subject to a number of questions being answered first. This is discussed next.

I.C. <u>Recommendations regarding pipeline rupture for analysis of impacts, corridor/route comparison, and estimates of spill magnitude based on risk assessment.</u>

I.C.1. The Sandpiper project should be analyzed with respect to potential impacts from pipeline rupture using risk assessment methods modified from those used in Attachment 1. This would:

a. Entail determining Enbridge's methods for locating such valves on the Sandpiper pipeline, and making this available for critical review, and

b. Include both estimates of spill magnitude based on ideal block valve locations and rupture scenarios, such as the "guillotine" scenario, and differential valve response times.

c. Estimate the spill magnitude (in a range of minimum spill to somewhat longer response time spills) that then should then be used to assess socio-economic and environmental impact along the existing corridor.

d. The risk assessment should take into account the larger rainfall events in recent years possibly caused by global warming, including an assessment of the possibility of increased scouring in rivers crossed by these corridors.

I.C.2. *What is the "worst case" when multiple pipelines are in close proximity to use in the risk assessment*? "A review should be undertaken with respect what should be the proper "worst-case" rupture scenario when multiple pipelines are packed close together in a corridor. This should include:

a. An assessment of whether a "worst-case" rupture on one line threatens rupture of another line, such as a large fire.

b. An assessment of whether the response to a "worst case" event on one line is slowed by the presence of other lines either on one or both sides of the ruptured line because equipment can't cross the shallowly buried other lines. This should also include a description of circumstances where all or some lines still operating need to be shut-down during the response and the practicality of doing so. (It needs to be recognized that in some locations there are "cross-overs" where one line is constructed underneath other lines because of existing facilities on one side—such as railroad tracks—prevent construction on the preferred side.)

c. Consultation with state and federal pipeline authorities as well as the authors of the Attachment 4 study as to what constitutes "worst-case" ruptures when there are multiple lines in close proximity.

d. Consultation with the ORNL authors and others regarding the vulnerability of a corridor with multiple large pipelines in close proximity to deliberate actions and how this should be addressed in socio-economic and environmental impact reviews.

I.C.3. *A process is needed whereby problems found during review of additional pipelines in any given corridor that might threaten pipeline integrity are thoroughly reviewed by government personnel*. While perhaps outside the scope of the PUC Sandpiper review, procedures should be developed whereby state agency field staff who find potential problems at significant pipeline locations could be assured that the problems are adequately responded to by government agencies rather than pipeline owners. I have personal knowledge of three such locations along these corridors, as discussed in Comment II.A below.

II. The PUC and Minnesota agencies indeed have significant jurisdiction over pipeline design issues related to oil spills and leaks and site-specific measures to prevent them.

<u>II.A. Overview and significance of the problem</u>. This is an important issue because a properly *designed and located* pipeline can result in the least amount of impact and be a safe way to transport petroleum products.

The central issue is that there is both federal and state jurisdiction and authority, and that it overlaps to some extent. In these comments I maintain that the PUC has clear authority to influence both pipeline *design* and location with respect to analyzing and mitigating impacts to people and the environment.

MDNR and MPCA field staff often have intimate knowledge of site specific conditions along pipeline corridors, and are trained to have such knowledge. Yet some pipeline companies, their consultants, and even some people in Minnesota government try to claim that pipeline *design* is solely the bailiwick of federal agencies and federal standards because such design pertains only to "safety standards."

On several occasions during my employment with the MDNR, and while working with other field staff, we suggested site-specific changes in design that would add more resource protection or mitigation, "pipeline safety standards" were invoked. This was strongly prevalent when DNR was trying to determine how block valve locations were selected, and why specific block valve recommendations weren't followed.

Other issues involved lack of clarity as to Minnesota Office of Pipeline Safety responsibilities regarding possible environmental damage at locations where pipe integrity was threatened. For example, during one review of the MinnCan pipeline, DNR staff (Fisheries and Ecological Resources) found a location at a proposed river crossing where a large tree had fallen into the river. This resulted in bottom scour exposing one of the older pipelines. Company officials were not interested, and indicated it was not in MDNR jurisdiction to solve this problem. A call to the State Office of Pipeline Safety only elicited a question as to whether it was brought to the attention of the pipeline company.

On another occasion during the Alberta Clipper review, an older pipeline was found to be hanging a foot or two over the surface of a designated trout stream east of Bemidji. A call to the Minnesota Office of Pipeline Safety elicited a statement that it was up to the pipeline company to correct the problem. This was likely Enbridge Line 1 because of its small size. (See attachment 2 for a description.)

The most serious problem occurred on the Alberta Clipper route on a Grant Creek crossing just west of Bemidji. I was directly involved in this site, and provided several written documentations as to what occurred. At this site, Grant Creek flows south through a narrow gap in an old railroad grade. Upstream of this gap Grant Creek flows through s a large expanse of wetland. The creek is also subject to numerous beaver dams upstream. The railroad bridge at this site had collapsed into the gap, which was also filled with segments of a five foot concrete culvert.

Immediately below the gap are 5 or 6 large pipelines, with the first being within just a few feet of the steep railroad grade. Grant Creek takes sharp turn to the east, actually following the pipeline in a parallel manner, until again turning south where it flows over the trenched pipes. I observed that bank erosion had removed 6 or 7 feet of the bank, and that this had all occurred since the previous summer. Therefore, this large pipeline was now only protected by about 5 feet of riverbank.

A large and rare rainfall event in the drainage above this site would have taken out beaver dams, and added to the flow through this narrow gap. It is likely that the first pipeline would have easily been exposed. In addition, the heavy concrete sections could have been eroded into the pipelines, threatening ruptures. Since Enbridge wanted to do something off the right of way in this location to "clean up" the site. They asked for my advice regarding permitting and repair. Since there were concrete sections available, and it looked as if there was a pipeline integrity issue present, I supplied the advice on armoring the eroding bank next to the pipeline, and moving the bank farther from the pipe. This was done by driving the 5 foot concrete sections into the stream bank, a technique I had essentially learned while employed at the DNR. I documented that this was a temporary solution

This site should be thoroughly assess at to susceptibility to scour—since it is an ideal site for down cutting caused by human activity restricting the floodplain of this river. On several other occasions, when DNR staff found exposed pipe on older—and large—pipelines in sensitive areas next to rivers, the same thing happened—staff were told it was up the pipeline company to fix the problem.

II.B. Specific PUC rules on "safety standards." The PUC rules for the route permit, in 7852.0200, Subp. 2 "Scope," has two sentences containing language pertaining to pipeline safety standards. In fact, the language is so similar as to be almost redundant:

--Second sentence: "This chapter does not set safety standards for pipelines."

--Last sentence: "The (permit) must not contravene applicable state or federal jurisdiction, rules, or regulations that govern safety standards for pipelines nor shall the permit set safety standards for the design or construction of pipelines."

I submit that the State of Minnesota has a number of clear ways it can influence Sandpiper (and any other liquid pipeline) without "setting safety standards." These are as follows:

II.B.1. Location of High Consequence Areas (HCA) is not necessarily only a "safety standard." These areas are referred to in federal safety standards for pipelines. They are areas where ". . .a release could have the most significant and adverse impact." Attachment 3 provides lots of detail concerning both human and ecologically important areas, such as "land area in which spilled liquids could affect the water supply……critically imperiled species…..areas where migratory birds congregate…..(pipelines) that pass near enough that a release could reach the area by flow over land or within a river, stream, lake, or other means, are assumed to affect (the HCA.)"

Strangely, this document doesn't mention an HCA identified by state authorities, but actually refers pipeline operators to Nature Conservancy personnel to be consulted on important areas. (A personal comment here: Might this not imply a rather over-reaching and likely unconstitutional claim of federal legal authority?)

In addition, while I was employed by the Minnesota DNR, we had a meeting with the Minnesota Office of Pipeline Safety regarding issues along the MinnCan route. The people we met with never mentioned the concept of HCAs. They were not familiar with or interested in site-specific environmental issues, in fact, and only referred to specific generic safety standards.

II.B.2. Recommendations top reduce confusion and lack of clarity among agencies with overlapping responsibilities.

a. PUC, DNR, BWSR and PCA staff consult the Minnesota Attorney General's Office to investigate the specific federal rules pertaining to HCA's to determine the ability of state authority to identify and influence the identification of both project-specific HSAs and more permanent HSAs. Examples of state-identified areas should include groundwater recharge zones, designated trout streams, canoe routes, rivers with significant fisheries or rivers leading to significant fisheries or drinking water supplies, and a number of others.

b. PUC, DNR, BWSR, and PCA should notify the federal Office of Pipeline Safety that Minnesota intends to actively propose additions to the National Pipeline Mapping System referred to in Attachment 3, based on the review of the Sandpiper proposal as well as the other Enbridge and Minnesota Pipeline company expansion plans. This should include the corridors identified in Attachment 1 as well as any other corridors and new pipelines.

c. The environmental analysis of the Sandpiper and alternatives identify HCAs along all alternative routes, including already-identified HCAs and ones identified by the public, Minnesota DNR, PCA, BWSR, federal COE during this pipeline review. The outside consultant hired by the PUC to do the analysis of impacts and the

route comparison should be charged with consulting and coordinating with Minnesota state agencies to identify these areas. The route comparisons should then include these locations in the analysis.

d. Extra care should be taken in the identification of HCAs along any corridor with multiple pipelines because of the increased magnitude of possible ruptures affecting a wider area that normal for one pipeline.

II.C. Pipeline design features that protect people and the environment are site-specific and thus need site-specific design features. It should not be necessary to have to make this point because we are many years past such knowledge based on normal and standard techniques for assessing impacts and mitigating them. Almost every environmental permit given has site-specific measure.

Large-impact projects always should have site-specific design. In fact, well-designed pipeline projects when they are finally ready to be constructed uses something often called a "line list" which identifies down to the foot what environmental mitigation measures are to be used in sensitive locations.

II. D. Support for my contention that pipeline design features such as some block valve locations are not always a "safety standards" issue. The following information clearly supports this contention:

II.D.1. Citation 8 (Attachment 4). Block valves and other related design features work to rapidly shut down and isolate pipeline segments when a sudden pressure drop indicates a pipeline rupture of enough magnitude to trigger the designated pressure drop. They can either be manual valves or remotely-operated valves.

Attachment 4 is a recent (late 2012) major study regarding improving block valve usage to reduce releases of large amounts of hazardous liquids. This was done under the auspices of an internationally known energy research institution, the Oak Ridge National Laboratory. The instigation for this study was primarily driven by the natural gas pipeline explosion in California that killed 8 people, but also seems likely that it was influenced by the large Enbridge rupture in Michigan, since it uses both as case studies. This document illustrates why features such as block valves are clearly not always a "safety standard." Here are quotes relevant to site specific pipeline design that are not "safety standards."

".. . ..site-specific parameters that influence risk analyses and feasibility evaluations often vary significantly from one pipeline segment to another and may not be consistent with those considered in this study. Consequently, the technical, operational, and economic feasibility and potential cost benefits . . . . . .need to be evaluated on a case-by-case basis." (p. 1 of Attachment 4.)

"Section 4 of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 calls for the Secretary of the U.S. Department of Transportation (DOT) to require by regulation the use of automatic or remotely controlled shutoff valves, or equivalent technology, where it is economically, technically, and operationally feasible on hazardous liquid and natural gas transmission pipeline facilities constructed or entirely replaced after the final rule was issued. . . . .The Act also requires a study to discuss the ability of transmission pipeline facility operators to respond to a hazardous liquid or natural gas release from a pipeline segment located in a high consequence area (HCA)." (p. 1 of attachment 4)

"In addition, operators are required to consider installing emergency flow restricting devices such as check valves and RCVs on pipeline segments to protect a HCA in the event of a hazardous liquid pipeline release. In making this determination, an operator must, at least, consider the swiftness of leak detection and pipeline shut down capabilities and benefits expected by reducing the spill size." (p. 2 attachment 4)

II.D.2. Citation 9. This engineering study, entitled "Method determines valve automation for remote pipelines," describes methods of determining where automated block valves are to be located. The method is clearly based on site-specific design features. In addition, the following quote summarizes how block valve location is not directly based on "safety standards":

"Most pipeline codes do not stipulate requirements for block valve spacing or remote pipeline valve operations along transmission pipelines carrying low-vapor-pressure petroleum products. This requirement is generally industry driven to control hazards and reduce environmental effects of pipeline ruptures or failures causing hydrocarbon spills. . . . . This article summarizes pipeline codes for valve spacing and spill limitations in high consequence areas (HCAs). It also provides a criterion for an acceptable oil spill volume caused by pipeline leak or full rupture. The criterion is based on industry's best practice." (Introduction to the study.)

Note: This study noted at the end that the acceptable spill volume used to determine the valve spacing was about 20,000 barrels of oil. The study was done for several large pipelines in Brazil. I did not attempt to decipher the meaning of that large amount being acceptable for design of block valve location.

II.D.3. Recommendations for Sandpiper review and analysis regarding block valve locations.

a. Enbridge be required to clearly describe their method of determining block valve determinations, including identifying what HCAs they used, as well as any other factors for determining such locations, including cost factors and "minimum acceptable leaks." This information should be submitted to the MPCA, MDNR, and COE in time for them to respond appropriately, and in time for incorporation into the analysis of impacts and Comparative Route Assessment.

b. MDNR, MPCA, and/or PUC (and COE) should request information from the Office of Pipeline Safety as to whether they have provided any advice to Enbridge as to method of determining block valve locations and acceptable minimum amounts of oil at HCA locations, potential HCA locations, and other-than HCA locations, including cost-factors.

c. Minnesota state agencies and the Corps of Engineers develop a cooperative and partnership relationship regarding the potential socio-economic and environmental risks of having multiple large pipelines in close proximity to each other.

III. The PUC, other Minnesota agencies, and the US Corps of Engineers and EPA must address "corridor fatigue."

PUC pipeline rules favor following existing corridors—even when the pipelines are squeezed into environmentally and socially sensitive areas. The current rules also allow pipeline companies to use the rules to their benefit and to reduce the scope of the analysis. Clearly, this needs a legislative solution. However, there are methods that can be used in the Sandpiper review that are within the current rules that can attempt to get at the "corridor fatigue" problem. I provide some detail in these comments because of the importance of this issue. My recommendations as to how to handle this in the Sandpiper review are in III.C. below.

III.A. Background. "Corridor fatigue" is a term that has been used to talk about what happens when multiple linear facilities such as pipelines and High Voltage Power Lines reach a point where cumulative impacts,

objections from people nearby, and crowding of various sensitive areas along the edge of corridors began to be more and more apparent.

In fact, this term is inappropriate with respect to the pipeline corridors described in Attachment 1. Much more proper terms are "corridor sickness" or "corridor exhaustion."

Any resource manager with experience in environmental review of linear facilities in Minnesota (or elsewhere) knows the reasons that lead to overuse of corridors. Some of these are generic, and others are specifically relevant to the Sandpiper proposal. These are:

III.A. 1. *Original linear facility routes pre-date almost all environmental laws*. This meant the route went through high-impact locations that wouldn't otherwise be crossed under current laws and regulations. Essentially, these routes were the shortest distance between endpoints unless there were prohibitive obstacles in effect at the time of building. these original facilities were usually small pipelines. This is true of both the Enbridge Mainline corridor and the Minnesota Pipeline Corridor.

III.A.2. *Each additional facility was assessed independent of others.* Methodology to fairly assess cumulative impact of additional facilities after the second facility was usually not used. (It is often the third facility that starts to show the strain.)

III.A.3. *Large linear facilities are almost always controversial.* There was strong pressure to follow existing corridors. This then became embedded more and more strongly in either informal or formal policy, and finally made it into regulations. Unfortunately, when this was done, there was no concurrent regulation requiring an objective assessment of the pros and cons.

III.A.4. *Lack of appropriate regulations.* Policy-makers formalizing existing corridor locations as the most likely place to put new facilities didn't write corresponding policies that required a look at impacts of ever-larger corridors. Likely the best example of this I know of is the LaSalle Creek valley north of Itasca Park on the Minnesota Pipeline Corridor. This site is covered in detail below.

5. Citizens living next to corridors have little recourse to challenge expanding corridors, since the energy companies and PUC are essentially in agreement for all practical purposes. The PUC has not developed objective methodology to address this major problem. The result is that adjacent landowners are subject to the highest impact.

<u>III. B. Known potential impacts of enlarging Minnesota Pipeline and Enbridge mainline corridors because of previous recent reviews.</u> There are recent reviews of both of these corridors (except for the Sandpiper Green field route.) Therefore, these reviews, including comments of agencies with responsibilities for environmental protection during those reviews, are relevant to the current reviews.

II.B.1. PUC, MDNR,PCA, and COE review of the MinnCan pipeline. During the review process for the MinnCan pipeline, there were many issues raised by agencies with natural resource, wetland, and permitting authority. There was an important ALJ report prepared for this project. All of this is available in the PUC records for this project. There were also major problems identified during construction. The review of that project is recent enough so that environmental concerns raised are still relevant.

<u>I</u>II.B.2. PUC, MDNR,PCA, and COE review of the Alberta Clipper/Southern Lights/LSr projects. Even more recently, the Enbridge proposals follow its mainline corridor to Clearbrook. An alternative route to Sandpiper

follows the Mainline corridor on to Superior. Now, just 5 years later, Enbridge proposes to follow this same problematic route.

III.C. Route width for new reviews too restricted so that it exacerbates corridor fatigue. The PUC rules allow Enbridge to select the route width for their application. The rules state a route can be as narrow as the right of way required to construct the pipeline, and as wide as 1.25 miles. An examination of the Enbridge proposal indicates in many locations that Enbridge has selected a very narrow route width. It is obvious that the narrower the route width for this review along the existing Minnesota Pipeline Corridor, the more advantageous to Enbridge—because it becomes too late to adjust the right of way to avoid impacts found after finalization of the route width by the PUC.

Generally speaking, the PUC waits for others to object to this restrictive situation and propose enlargements, or other route segments or routes.

A good example concerns river and flood plain crossings. Normally, the clear standard for crossing of such environmentally sensitive features with linear facilities is perpendicular to the floodplain, and perpendicular to the river meander. In addition, as mentioned in Comment V, the MDNR does not have permit jurisdiction beyond the Ordinary High Water of the river or stream (this is the top of the bank in most cases.) The DNR has two options for influencing this—proposing a route segment change or widening, or relying on the PUC authority to require moving the centerline. Furthermore, DNR often indicates to applicants to begin preparing detailed applications for its license to cross before the environmental analysis of routes is completed.

In other areas, the 1.25 mile width is still too narrow to address the problems of pipeline corridors expanding more and more in high-impact areas.

III. D. LaSalle Creek problem area. More than any other location, this area epitomizes the landscape and regulatory issues of "corridor fatigue" and problems of following old straight-line routes. The crossing and surrounding landscape has the following characteristics:

--This location is not far north of Itasca park in a heavily forested area with steep and convoluted glacial moraine. LaSalle Creek itself is a small designated trout stream flowing in a glacial tunnel valley toward LaSalle Lake. The stream channel is deeply incised in the wetland with many meanders. Right at the crossing point, the stream and valley narrow upstream and widens out substantially downstream toward the lake. The ridges on either side of the tunnel valley are likely more than 100 feet higher than the stream.

--The existing Minnesota Pipeline Company pipelines transverse the valley at the almost the worst possible manner: a sharp oblique angle side-hilling down portions of the west hillside from the north, then side-hilling out of the valley on the east side after crossing the creek.

III.D.1. *Severe problems with the MinnCan crossing*. There were severe and numerous problems with this area. I am supplying some detail on these problems because I am proposing a re-route around this area several miles in length. The problems are as follows.

a. MDNR sent an "early-coordination" letter to the MinnCan consultant warning that this crossing was the worst site of all the locations in the Bemidji Region portion of the project. There was no response from MinnCan, and near-failure months later for MinnCan to even acknowledge such a letter. By then the PUC

process had proceeded past the point for the MDNR to effectively examine another route in this high-resource area.

b. The two old and small pipelines were closely followed with the 24-inch MinnCan line with close separation, on the order of 40 feet if I recall. The old cleared right of way was fairly narrow. This greatly expanded during construction. MDNR measured a cleared right of way over 350 feet wide on the north end of the valley. (This was necessitated by the large amount of earth moving required to construct a 50-foot wide level construction word pad.) Topsoil was generally not separated here either, so impacts are long-term.

c. MinnCan did a directionally bore deep under LaSalle Creek. It was somewhat over 3,000 feet in length and done in the winter. As they bored under the creek itself, there was a large frac-out into the creek. Drilling mud escaped from several other locations besides the creek bed, all characterized by obvious groundwater upwelling. (In spite of the very cold temperatures the ground and wetland surface was not frozen.)

Construction stopped and clean-up was complicated and protracted. Because of the lack of frost from groundwater upwelling, it was impossible to get equipment to the site so that most work need to be done by hand.

However, it was necessary to get some equipment to the site, which was a very delicate operation because of the deep, soft, water saturated organic muck at the site. There were two existing pipelines floating in this water saturated muck near the surface. These could have been threatened by heavy equipment tipping into this area. Oil/ product flow was *not* shut off during these operations taking place a few feet from the pipes.

d. A large beaver dam downstream of the crossing had backed up water right to the crossing point, and covered parts of the creek receiving drilling mud. In other words, there was thin ice over the flooded creek channel. This obscured drilling mud material and caused safety problems in minus 15 degree weather.

III.D.2. Current Enbridge plans at this site. According to maps I examined during the public meeting at Clearbrook, Enbridge is now planning a warm weather crossing of the creek itself downstream from the existing crossing out in the broader wetland that leads to LaSalle Lake. The proposed crossing location is at a more perpendicular angle to the creek itself but not perpendicular to the valley, since the centerline of the pipe makes a sharp bend after coming down into the valley from the north. After the creek crossing, the Enbridge plan is to open up a new cleared right-of-way on the east side-hill of the valley. This plan was confirmed to me by MDNR staff. Enbridge had indicated to them they would accomplish the trenched crossing in a very short time to reduce impacts. I believe this is a very bad idea for the following reasons:

a. There is wetland along very much of this centerline proposal, including as the centerline comes down the hill from the north. There are wetlands on the slopes of the west hill side caused by abundant groundwater emergence. There is deep muck in this area, as well as out in the flat valley. Trenching through this soft area will require very large amounts of construction maps which usually require firmer wetland soils than are present. Furthermore, the trying to trench in such an area will result in slumping and the necessity of removing large amounts of material.

b. I have been involved in several wetland situations with some similarities to this site—but not such as large problem area as this. None of them approach the red flags of this area. The nature of the muck soil and substrate in the other areas meant that sheet pile had to be driven in on both sides of the trench in order to remove enough material to sink a weighted pipeline. I estimate that more than 1/4 mile of wetland is

involved. Furthermore, both ends of this wetland traverse are on inclined wetland at the bottom of slopes. Attempting to excavate a temporary trench through such a location trenching could also easily open a channel so that unpredictable amounts of silt laden water—both groundwater and surface water—flows down the channel into LaSalle Creek.

c. The new right of way on the east side of the valley will also traverse groundwater emergent areas some distance before it rises far enough out of the valley to rejoin the corridor south some distance. This is also an additional impact of such a crossing.

d. I recommend that a route around LaSalle Creek and its valley be considered (see below.)

Recommendation: The route width should be expanded to the maximum 1.25 miles at every floodplain crossing that is oblique (not perpendicular to the floodplain.)

<u>III.C. Recommendations to begin to address "corridor fatigue" concerns relative to existing corridors followed by Sandpiper</u>.

II.C.1. *Federal EIS on Sandpiper.* The US Corps of Engineers should prepare a federal environmental impact statement for the Sandpiper project. The COE should do this for additional reasons beyond this topic, which will be contained in a separate recommendation to them.

It is clear that the PUC environmental analysis falls far short of what can be explored in an EIS. Nevertheless, Minnesota law says that the environmental analysis done by the PUC fulfils state environmental review requirements.

However, the MPCA and MDNR who are more familiar with the merits of EIS review than is the PUC, should certainly recommend to the COE that an EIS be done on this project.

III.C.2. *Incorporation by reference of the previous environmental analysis in these corridors*. I hereby incorporate by reference the PUC record of Alberta Clipper, LSr, Southern Lights and MinnCan projects into this Sandpiper review by the PUC. This should jump-start the review of "corridor fatigue" problems.

Examples of relevant documents for these four projects include: These issues and comments include:

--The ALJ report son MinnCann and the Enbridge projects
--All PCA and MDNR comments on the projects. There should be special focus on the MDNR objections to detailed and extensive comments that were ignored in ALJ findings.
--All key determinations of the US COE on all projects, and all comments on the 404 notices for the projects

III.C.3. *Any records of specific unforeseen problems and impacts that developed post-permitting on these projects.* If the records cannot be found, these topics should be addressed in the environmental analysis:

a. "Frac-outs" on the MinnCan project. Frac-out is the common term for when drilling mud escapes from the bore from directionally drilled crossings, whether they be short or deep bores. Generally, this becomes evident by mud appearing on the surface or in water bodies. There were a large number of such events on the MinnCan project. Some of which were very large. These occurred in or next to the following rivers north of the point where the Sandpiper route turns east: Clearwater River floodplain east of Bagley, Mississippi

River at the crossing north of Itasca park, LaSalle Creek floodplain and creek bottom north of Itasca Park, and the Straight river just south of Park rapids. There were other frac-outs south of Park Rapids beyond the point where Sandpiper turns east on a Greenfield route.

Frac-outs occurred during winter bores, which greatly increased the difficulty with addressing them for several reasons. Determining amount and location of material was obstructed by ice. Recovery of material was difficult due to ice. Finally, ice conditions on flowing water was a hazard to workers attempting to recover material.

All records of frac-outs that occurred on MinnCan should be carefully examined as to amounts and locations. This may help to determine if there is a pattern as to when they occur. In each of the four rivers mentioned above, landscape conditions were such that groundwater upwelling zones were either present or suspected at the site of the frac-out. If this is correct, such landscape conditions that are present in other locations are a red flag for bores in the future.

Drilling mud is primarily bentonite clay but contains additives at the discretion of the pipeline company. Additives are a two edged sword: they can increase the success of the bore and reduce frac-outs, but some additives can be toxic to aquatic life. Furthermore, MinnCan initially claimed trade secret status on the first frac-out at the Clearwater river, which became a big obstacle to resolution. Therefore, PUC should require specific listing of any constituents of drilling mud before. Some of the frac-outs were in locations subject to direct DNR permit authority, but others were outside of the OHW so were not. PUC should make it a condition of the Route permit that frac-outs be handled in essentially the same manner wherever they occur, after recommendations from the DNR and MPCA.

b. *Winter construction successes and problems on MinnCan and Alberta Clipper.* Topsoil separation is important in all areas of deep excavation, including over the trench as well as side-cuts done to prepare the 50-foot level work pad. Poor separation leads to more successful invasive species invasion, and lost productivity. Frozen ground made topsoil separation problematic. In addition, winter construction made it erosion control more difficult and led to substantially higher erosion problems during spring runoff in certain locations.

IV. PUC and Hearing Officer must address concerns of the MDNR regarding natural resources not directly subject to MDNR and MPCA permits.

Environmental impact assessment includes—by law as well as best practice—consideration of impacts not necessarily covered by permits. As noted in a letter to the ALJ on the Alberta Clipper and Southern Lights project, the MDNR said it only had direct jurisdiction on less than 0.5 percent of the route. (April 21, 2008 letter to AlJ Judge Eric Lippman, from Matt Langan, MDNR). This jurisdiction involved public land crossings and river crossings restricted to the OHW (generally the top of the riverbank.)

Subsequently, the MDNR made extensive factually supported comments regarding natural resources in their areas of expertise. Serious problems with Enbridge's data, lack of supporting information, and assessment of impacts were noted. Some of these were glaring errors, such as obvious underestimation of area of impact. The ALJ report finalized its report without discussing the merits of the DNR comments, and did not address any of them in numerous findings on the route permit conditions. At the same time, it praised Enbridge's approach. A "reasonable person" perhaps would find it troubling that an ALJ, who lacks natural resource expertise, would replace the expertise of an important state agency charged by Minnesota law with protecting its natural resources, with that of an energy company with obvious motivations for downplaying

impacts to such resources. The lack of attention to the MDNR comments is documented in three subsequent letters to the PUC staff after the ALJ report was finalized (April 25, 2008 letter to Larry Hartman from Matt Langan, MDNR; August 1, 2008 letter to Bill Haar, PUC Executive Director from Matt Langan, and November 13, 2008 letter to Larry Hartman from Matt Langan, MNDR.

Recommendation. The PUC should ensure that this does not happen again, and ensure that the ALJ for this project is charged with specifically making findings regarding potential environmental impacts found to be of concern by state agencies such as the PCA and MDNR.

V. PUC and ALJ must use accepted impact analysis methods and its own rules to proactively address the Sandpiper project and future even though its environmental report substitutes for an EIS or EA according to law and stature.

V.A. Pipeline rules available to the PUC to improve its responsibility, process ,and results. Many of the pipeline route permit rules appear on their face to restrict and narrow the environmental analysis as compared to that done under EIS rules and ;procedures for other large facilities. However, a reading of the rules indicates that the PUC has lots more authority than it used on the Alberta Clipper projects. All of the following rules allow the PUC to address **all** of the topics I have raised in these comments:

V.A.1. Rule "7852.3200, Subpart1: "When the commission issues a pipeline routing permit for the construction of a pipeline and associated facilities, the commission shall designate a route…..conditions for right of way preparation, construction, cleanup, and restoration. . . . **and any other conditions relevant to minimizing environmental and human impact.**" (emphasis added.)

Note: The PUC could have chosen to fully address the MDNR comments that were not addressed on Alberta Clipper using the highlighted language. It now needs to respond to comments by other state agencies on the Sandpiper project and use this clause.

V.A. 2. Rule "7852.0200 Authority, scope, purpose, and objectives

"Subp. 3. Purpose. Minnesota Statutes, section 216G.02, recognizes that pipeline location and restoration of the affected area after construction is important to citizens and their welfare **and that the presence or location of a pipeline may have a significant impact on humans and the environment**. To properly assess and determine the location of a pipeline**, it is necessary to understand the impact that a proposed pipeline project will have on the environment**. .. .. The purpose of this chapter is to aid in the selection of a pipeline route and **to aid in the understanding of its impacts and how those impacts may be reduced or mitigated through the preparation and review of information contained in pipeline routing permit applications and environmental review documents**.

Note: The PUC can use this clause to address pipeline rupture risk, corridor fatigue, and so forth.

"Subp. 4. Objectives. The process created by this chapter is designed to:
A. locate proposed pipelines in an orderly manner that minimizes adverse human and environmental impact;
B. provide information **to the project proposer, governmental decision makers, and the public** concerning the primary human and environmental effects of a proposed pipeline project**;**

*Note: Note that this clause contains the phrase "**to** the project proposer. . . .decision makers, and the public" concerning the human and environmental effects of the project. On the Alberta Clipper project, the PUC, and ALJ passively turned this phrase entirely on its head and accepted the Enbridge analysis of many issues rather than accept expert analysis from responsible state agencies. This must not happen on the Sandpiper project. The PUC should insist on its role of providing objective information **to** other parties. It should do so on the main topics of these comments.*

V.A. 3. "7852.1400 Route proposal acceptance.

> Subp. 2. Sources of route proposals. **The Public Utilities Commission staff and the citizen advisory committee may propose routes or route segments directly to the commission**.

Note: The PUC can use this clause to address corridor fatigue and to attempt to obtain objective comparisons of alter=natives to problem locations.

V.A. 4. "7852.1900 Criteria for pipeline route selection.

> "I. cumulative potential effects of related or anticipated future pipeline construction; . . ."

Note: The PUC can clearly address the issues of "corridor fatigue" by using this clause.

<u>V.B. PUC can use standard impact assessment methods</u> The statute governing pipelines indicates that the PUC Environmental report meets the requirements of an EIS or EA. However, this does not mean that methods of analysis of impacts do not need to reflect standard methods used in EISs.

The request to the public to propose methods of analysis in the PUC public notice actually is strange. There are effective methods for analyzing impacts to humans and the environment and methods for comparing routes for linear facilities. These methods have been in effective use for many years. All one needs to do is find an EIS that has done so effectively.

<u>V.C. PUC staff needs to acknowledge the limitations of the pipeline environmental analysis .</u> I was present at the Sandpiper public meeting Clearbrook some weeks ago. A citizen asked how the PUC environmental analysis compared to an EIS. The PUC lead person said it was essentially the same. I was taken aback, as were some others that were present. I was later informed that this same statement was made at the Park Rapids meeting. This is highly concerning since the citizen was misled. It also is concerning because it implies PUC staff is unaware of important and routine methods of analyzing impacts and alternatives in EISs on linear facilities. Such methods are an answer to the question in the Sandpiper public notice of "topics open to public discussion. . . .Are there specific methods to address these impacts. . . .?".

Here are some reasons how the PUC environmental report very much differs from an EIS:

--PUC rules on pipelines allow the project proposer to so narrowly define the project that there is a large burden to overcome to define alternatives and even to analyze impacts. Pipeline rules favor existing corridors without a specific requirement to objectively analyze impacts of concentrating facilities in environmentally inappropriate areas. This would be impossible under an EIS.

--The PUC environmental report is finalized in-house. There is no opportunity to comment on a public review draft report. On draft EISs, the preparer is bound by law and rule to address reasonable comments

supported by sound data. No such process exists for pipelines under PUC rules. With the case of Alberta Clipper, the ALJ report would have been found deeply flawed if it had been subject to the standards for responding to comments that are found in the EIS process.

--Finally, compare the PUC process for siting HVTL lines: it uses routine methods of comparing routes and alternatives that are answers to the question posed as to how

VI. Proposed alternative routes and route enlargements

The PUC public notice solicits suggestions for alternative routes or route segments. In addition, Larry Hartman, the PUC person leading the Clearbrook public meeting, received a number of questions as to the burdensome format that appeared to be required for such proposals to be successful. He indicated alternatives would be considered that left out factors apparently required by the rules, and that a simple hand-drawn line on a map would be sufficient.

Therefore, the following recommendations for analyzing additional routes are provided:

VI. A. Widen Sandpiper route width wherever it is less than 1.25 miles in width. Enbridge has in many locations along its route narrowed the route nearly its minimum required by the PUC rule. This greatly reduces the scope of analysis of impacts very early in the siting process. This very much reduces the flexibility of moving the centerline to reduce impacts as problems are discovered during site reviews. This problem was severe during the Alberta Clipper review. Therefore, the route width should be expanded to the maximum allowable along the entire proposed route, as well as any new routes or route segments accepted for study. This is 1.25 miles in width. This will more appropriately meet the PUC requirements to adequately study environmental impacts. This is especially important at all crossings of rivers and other sensitive locations.

V.B. Route segment following Enbridge's North Dakota Pipeline corridor to Clearbrook. Enbridge's web site indicates that the existing pipeline has the capacity carry 475,000 bpd, yet Citation #2 says it is carrying 210,000 bpd at this time. If this is correct, there is excess capacity in the North Dakota line so as to allow it to carry the 225,000 bpd of the Sandpiper line. Therefore, there is a question as to whether another line is needed at this time for this route segment.

This route is clearly indicated on Enbridge's application.

V.C. Enbridge Mainline Corridor, Clearbrook to Superior. This route should be studied as an alternative to Enbridge's preferred route. The study corridor should be widened to the maximum 1.25 miles. This route is clearly indicated on the Alberta Clipper PUC files, which are incorporated into this PUC record by reference.

V.D. Any route alternatives studied for the Alberta Clipper project. There were a number of alternatives studied for the Alberta Clipper project. These routes are clearly identified on maps in the PUC record of that project. These include HVTL corridors and gas pipeline corridors. They should be re-studied for the Sandpiper project.

V.E. LaSalle Creek alternative. An alternative which avoids the major problems of crossing LaSalle Creek and its valley at an angle needs to be studied. Adding two large diameter pipelines to this area—Sandpiper and the Line 3 replacement/upgrade—is extremely likely to have large off-right-of-way impacts to groundwater, Big LaSalle Lake, and LaSalle Creek. In addition, given the sub-surface conditions, it will be very hard to

predict site-specific technical engineering plans for how to construct and maintain pipelines in this area. This could lead to massive problems and impact area growth during construction. This area could well become a case study of where not to build large pipelines.

A route avoiding this feature also crosses other areas with natural resource value, other private and public lands, and opens a new corridor. However, such an alternative for study must be accomplished because of escalating consequences of adding two more pipelines. I do not have an ability to submit a map today of my proposal, since I have to submit comments electronically in order to meet today's comment deadline. I can submit this by mail later. However, based on PUC statements made at the Clearbrook public meeting, this is sufficient as long as I describe the alternative in enough detail to identify it.

Here is a verbal description of the route: It is a 1.25 mile wide route deviating from the existing corridor in section 11 of Itasca Township in Clearwater County, then goes southwest to turn south along the east side of Clearwater County 2. It then turns SE to follow the north side of state highway 92, roughly paralleling it with the south edge of the route along this highway. It then turns east to rejoin the corridor in Section 32 of Lake Hattie township in Hubbard County.

On a final note, I believe it is within the PUCs ability to widen the "route" to more than 1.25 miles in this area.

V.D. Enbridge Line #3 enlargement/replacement. PUC needs to formally include the potential routes for this project that is clearly now in the planning stage. In addition, PUC should begin entering into studies for this project to analyze the alternative of following the corridors for the Great Northern Transmission line, now under review, since this line comes from Canada, and is potentially a route to Superior.

V. Significant impacts not otherwise indicated in these comments.

Here is a list of potential important impacts that need be addressed in the review of all route proposals, initially in a generic manner, and then as the focus is on site specific areas:

1. Analyze the advantages of topsoil separation in all areas where excavation into subsoil and parent material would otherwise result in mixing of parent material with top soil. It has been clearly demonstrated that creation of such disturbed areas leads to greater success for invasive species such as spotted knapweed and other noxious weeds. This also results in lowered productivity on not only farmland, but forest land, and reduced habitat value. In addition, it is becoming standard practice for responsible pipeline companies to accomplish this.

2. Requiring accurate depiction of any areas where excavation into parent material and subsoil occurs. Such excavation is routine in non-flat terrain in order to obtain the necessary 50-foot wide work pad for construction.

3. Detailed analysis of the product shipped in order to explore the environmental and human impacts of pipeline rupture.

4. Detailed analysis of the content of drilling muds to be used, and requirements for immediate notice to appropriate agencies when frac-outs occur during bores. Route permits should require agency review of any new additives considered during construction.

5. Careful analysis of the pros and cons of winter construction vs warm season construction. Such an analysis should be entirely independent of Enbridge desires to construct on their timetable, or for solely cost reduction reasons.

6. Careful analysis of the need for deep ripping of the work pad in areas of high clay soils. Operation of very heavy equipment along the work pad—which is essentially a road during construction—can create compaction layers in clayey soils that persist for as long as a projected 200 years.

7. Careful analysis and critique of proposed extra work space areas in sensitive locations such as stream crossings. Such areas sometimes are based solely on engineering requirements rather than given a careful review to reduce environmental impacts.

8. Careful review of the project's off-right of way affected area, and a PUC requirement that Enbridge submit all such areas to agencies for review.

9. An analysis of the damages caused by encroachment on the right of way from ATVs and other off-road highway vehicles. This has been observed to be intense in some areas, according to DNR comment letters. The MDNR has no jurisdiction to respond to this use which can cause stream bank erosion, siltation, and so forth.

V. Cumulative Impacts.

As noted in the above comments, the PUC rules require that the Commission **shall** consider "cumulative potential impacts of related or anticipated future pipeline construction. . . ."

Enbridge recently announced it is planning to "replace" in the near future its Line 3 pipeline that is in now within the mainline corridor from Canada to Superior. The announcements also note that operation of the old Line 3 will continue until the new line—upgraded to 36 inches—is completed. Therefore the new line will not be in the same location as the old line. Enbridge has indicated in the announcements that it is considering both the Mainline Corridor to Superior and its preferred Sandpiper route. Therefore, the PUC needs to conduct the following analysis:

--Cumulative impacts of adding two large pipelines in these routes, including the existing corridors and the new Greenfield route east of Park Rapids, and on any alternatives to the Sandpiper project accepted for study.

--PUC needs to inform state agencies that are currently in the early stages of reviewing applications for Sandpiper, (such as the DNR and PCA) that PUC is conducting a cumulative effects analysis on these two pipelines that may result in changes in locations. This should be done under the PUC rule cited above concerning responsibilities of the PUC to provide information **to** other stakeholders and the public.

List of attachments

1. Attachment 1. Estimates of oil/product flows in proposed and alternative corridors
2. Attachment 2. Enbridge schematic of its pipeline systems
3. Attachment 3. Web page from the US Department of transportation describing HCA areas
4. Attachment 4. Verbatim excerpts from an ORNL risk assessment appropriate for the Sandpiper project

CITATIONS

#1. Enbridge. 2013. "Enbridge Pipeline System Configuration." Quarter 1, 2013. Color chart showing entire Enbridge system in the United States and Canada, including data on individual lines, pipeline size, product type, and pipeline capacities (based on annual capacities). Available from one of the Enbridge web sites, and downloaded March 2014.

#2. Minnesota House of Representatives, House research. June 2013. Bob Eleff, Legislative Analyst. "Minnesota's Petroleum Infrastructure: :Pipelines, Refineries, Terminals.

#3. Thompson/Reuters News Service. March 31, 2014. "Enbridge to expand Southern Lights Pipeline as demand rises." Reuters Business and Financial News.

#4. Reuters News Services. March 4, 2014. "Update 2—Enbridge to spend C$7 billion (Canadian) to replace pipeline to US." Reuters Business and Financial News. (Concerns Line #3) Also, at the same time, Enbridge web sites indicate this 34 inch line will be upgraded to 36 inches from 34, and the old line won't be decommissioned until the new line is in service.

#5. Forum News Services. March 5, 2014. John Myers. "Another Enbridge proposal would replace line from Canada to Wisconsin." Concerns Enbridge Line 3 upgrade as in #4, but this article quotes an Enbridge spokesperson that both the Sandpiper Route/Corridor and the Enbridge Mainline Corridor along US 2 are being looked at as possible locations.

$6. Federal Reserve Bank of Minneapolis. May 1, 2007. Kathy Cobb. "This nation's rapacious appetite for oil products and Canada's vast supply spur district pipeline projects." Newsletter. This article notes that MinnCan can be increased by 185,000 bpd to increase the Mn Pipeline Corridor to 640,000 bpd.

$7. Minnesota Public Utility Commission (PUC) public notice on Sandpiper, January 31, 2014.

#8. Oak Ridge National Laboratory 2012. "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety" Date Published: October 2012. Revised: December 2012. For U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration Pipeline Safety Program | East Building 2nd Floor 1200 New Jersey Avenue, S.E. Washington, DC 20590

#9. Online Oil and Gas Journal. January 17 2005. (Printed from site 3/29/2014.) "Method determines valve automation for remote pipelines."

Attachment 1

ESTIMATES OF EXISTING AND PROPOSED PIPELINE FLOWS RELATED TO PROPOSED SANDPIPER CORRIDORS AND TRANSLATED TO SELECTED RIVER FLOWS

Note: Pipeline capacities are given in barrels per day (bpd). Product flow rates are converted to cubic feet per second (cfs) in order to compare to typical river flows along the routes. Rates are calculated based on 42 gallons/barrel. A useful rule of thumb is that 100,000 bpd converts to 6.5 cfs. Product type is variable, and some information about types is given in Attachment 2.

A. Enbridge Pipelines from Minnesota border east to Clearbrook

Note: All lines are in one corridor except for North Dakota Pipeline which joins the "Mainline Corridor" at Clearbrook which then goes on to Superior roughly along US Highway #2.; Enbridge refers to the main corridor as "Enbridge Mainline Corridor.

A. 1. Existing Enbridge Pipelines

Note: All product flow is to the East-southeast except for the diluent line, which takes product from Illinois refineries back to Alberta for "thinning" heavy crude so it can be pumped in pipelines. Product types are listed by Enbridge in Attachment 2.

Pipeline name	Barrels per Day Amount	Flow rate cfs	Source	Pipe diameter	Citation
Line 1	236,500	15.4	Alberta	18/20 inches	#1
Line 2b	442,200	28.7	Alberta	24/26 inches	#1
Line 3	390,000	25.4	Alberta	34 inches	#1
Line 4	795,700	51.7	Alberta	36/48 inches	#1
Line 67 (Alberta Clipper)	450,000	29.2	Alberta	36 inches	#1
Line 65 (LSr)	186,000	12.1	North Dakota	20 inches	#1,#2
North Dakota Pipeline	210,000	13.6	North Dakota	?	#1, #2
Southern Lights Diluent	180,000	11.7	US refineries	20 inches	#2, #3
Totals	2,890,400 bpd	188 cfs			

A.2. Expansion proposals by Enbridge, Minnesota border east to Clearbrook

Expansions:	bpd amount	cfs		Pipe Diameter	Citation
Line 3 increase:	370,000	24.0	(total 760,000)	34 inches to 36	#4
Line 67 increase:	350,000	22.8	(total 800,000)	Pumps added	#2
Southern Lights increase:	95,000	6.2	(total 275,000)	Pumps added	#3
New line					
Sandpiper	225,000	14.6		24 inches	#7
Subtotal (new + expand)	1,040,000	67.6			
Grand total, existing and expanded	3,930,400	255 cfs			

B. Enbridge Pipelines from Clearbrook east to Superior

Note: There is a major facility at Clearbrook whereby some product is routed south to the Twin Cities on 3 pipelines owned by the Minnesota Pipeline Company—a different company from Enbridge. One of these, the MinnCan line, was recently constructed. (There are "loops" at a few locations, so that there may be 4 lines in place in the corridor at those locations.) According to Citation #2, currently this amount is 455,000 bpd. It is difficult to determine exact amounts in the two older lines, but it is not necessary for this level of analysis.

B.1. Existing Enbridge pipelines from Clearbrook to Superior

Note: For purposes of this analysis, it is sufficient to calculate a total of existing product flows from Clearbrook to Superior by subtracting the amount diverted south at Clearbrook from the total amount entering the Clearbrook terminal:

Total entering Clearbrook terminal: 2,890,400 bpd
Amount routed south: - 455,000 bpd
Total existing flows to Superior: 2,435,400 bpd or 158 cfs

B.2. **Expansion proposals by Enbridge, Clearbrook to Superior**
Note: An alternative route for the new proposed Sandpiper project is along this Enbridge mainline corridor. It is not listed here, but if it did follow this corridor, it would increase flows by 225,000 bpd, or 14.6 cfs. Also, the Line 3 replacement/expansion could follow the southern route, but is included here. If Line 3 would instead go south of Clearbrook, the amounts listed here should be decreased by 760,000 bpd or 49.4 cfs.

Pipeline name	bpd Amount	cfs		Pipe diameter	Citation
Line 3 increase:	370,000	24.0	(total 760,000)	34 inches to 36	#4
Line 67 increase:	350,000	22.8	(total 800,000)	Pumps added	#2
Southern Lights increase:	95,000	6.2	(total 275,000)	Pumps added	#3

Total increase: 815,000 53.0 cfs
Grand total, existing + increases 3,250,400 bpd 211.2 cfs

C. Pipelines routed south from Clearbrook
Note: New Enbridge proposals are to follow the existing Minnesota Pipeline Company corridor to near Park Rapids, and then create a new corridor east to Superior, Wisconsin,

C. 1. Existing Pipelines to Twin Cities, Minnesota Pipeline Company (owned by Koch Industries)

Pipeline name	Amount	cfs	Source	Pipe diameter	Citation
MinnCan	165,000	10.7	Canada	24	#2
Two older pipelines	290,000	16.9	ND, Canada?	?	#2

Total, Minnesota Pipeline: 455,000 29.6

C.2 Expanded capacity of Minnesota Pipeline Company

Total	640,000	41.6		Adding pumps?	#2

D. New Enbridge Pipelines potentially routed to existing corridor south from Clearbrook, then east from Park Rapids to Superior on new corridor

Note: Enbridge recently announced it is planning to "replace" and expand its older Line #3 in its mainline corridor across northern Minnesota to Superior, WI. It says it is also looking at instead going south from Clearbrook, then east from Park Rapids to follow the proposed Sandpiper route. Therefore, Line #3 is listed here in order to portray amounts of product potentially flowing in these corridors.

Pipeline name	bpd Amount	cfs	Source	Pipe diameter	Citation
Sandpiper	375,000	24.4	Alberta	30	#7
Line 3 expansion	760,000	49.4	Alberta	36	#4, #5

Total expansion: 1,135,000bpd 73.8cfs

E. Total potential Enbridge and Minnesota Pipeline company from Clearbrook to Park Rapids

Pipeline Company	bpd Amount	cfs	Source	Citation
Minnesota Pipeline Co.	640,000	41.6	North Dakota, Canada	#2
Enbridge	1,135,000	73.8	Canada	#2, #5

Total in corridor: 1,775,000 115.4

F. SUMMARY OF EXISTING AND PROPOSED OIL/PRODUCT FLOWS IN EXISTING PIPELINE CORRIDORS AS COMPARED TO SELECTED RIVER FLOWS

Company	Existing	cfs	Existing+Proposed	cfs
1. Enbridge N.D. Pipeline to Clearbrook	210,000	13.6	no increase	13.6
2. Enbridge mainline to Clearbrook	2,680,400	174.2	3,720,400	242 cfs
3. Enbridge Clearbrook to Superior	2,435,400	158.0	3,930,400	255 cfs
(Existing and proposed column includes Sandpiper and #3 expansion)				
4. Enbridge and MinnPipe Co. Clearbrook To south of Park Rapids	455,000	29.6	1,775,000	115.4
5. Enbridge, Park Rapids to Superior	No corridor	000	1,135,000	73.8

River name and location	Long-term median river flows (cfs) on this date from USGS Gauges, April 2, 2014	Approximate % of maximum oil flow to river flow
Snake river above Warren	124	195 percent
Clearwater river at Plummer	172	141 percent
Mississippi river at Bemidji	334	76 percent
Straight River south of Park Rapids	69	167 percent
Mississippi River at Grand Rapids	716	36 percent
Mississippi River at Aitkin	2,859	2.6 percent*
Prairie River at Taconite	125	204 percent
St. Louis River at Scanlon	1,850	14 percent

*New Enbridge corridor from Park Rapids to Superior crosses in this vicinity; all else are Enbridge mainline

Pipeline System Configuration

Quarter 1, 2013

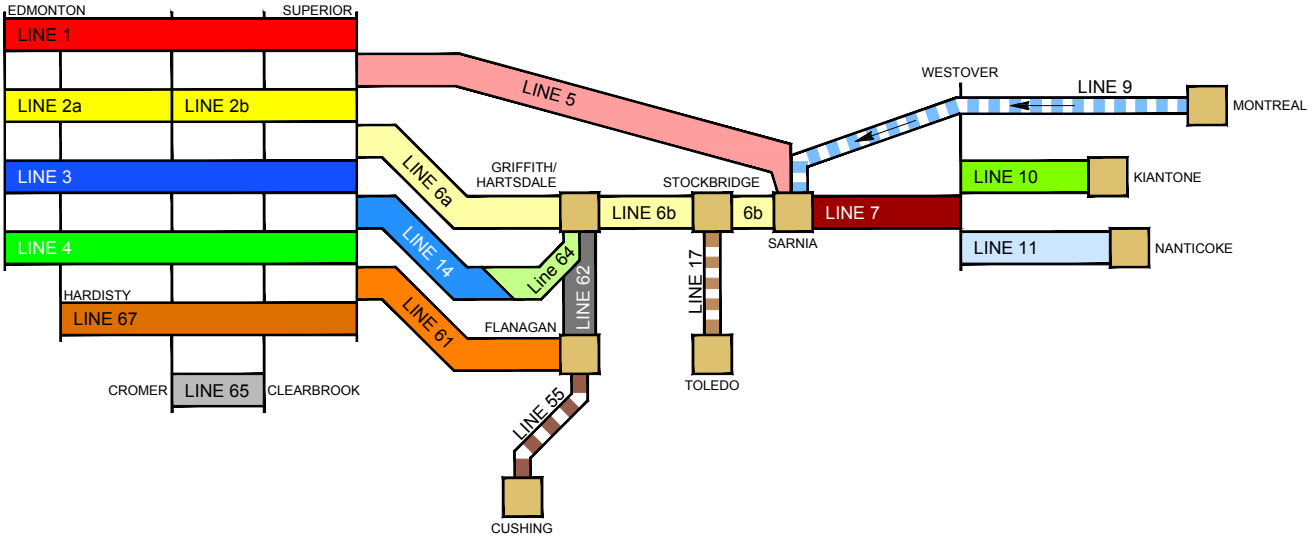

Line 1

37,600 m^3/d (236.5 kbpd)
18"/20" - 1098 miles
NGL
Refined Products
Light Synthetics

Line 2

Line 2a
70,300 m^3/d (442.2 kbpd)
24" - 596 miles
Line 2b
70,300 m^3/d (442.2 kbpd)
24"/26" - 502 miles
Condensates
Light Synthetics
Sweet
Light & High Sour

Line 3

62,000 m^3/d (390.0 kbpd)
34" - 1098 miles
Condensates (Edmonton to Hardisty)
Light Synthetics
Sweet
Light & High Sour

Line 4

126,500 m^3/d (795.7 kbpd)
36"/48" - 1098 miles
Heavy
Medium (Ex-Clearbrook)
Light Sour (Ex-Clearbrook)

Line 5

78,100 m^3/d (491.2 kbpd)
30" - 645 miles
NGL
Light Synthetics
Sweet
Light & High Sour

Line 6

Line 6a
106,000 m^3/d (666.7 kbpd)
34" - 467 miles
Line 6b
45,000 m^3/d (283.0 kbpd)
30" - 293 miles
Light Synthetics (Superior to Lockport)
Sweet (Superior to Lockport)
Light & High Sour
Medium
Heavy

Line 7

23,900 m^3/d (150.3 kbpd)
20" - 120 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 65

29,500 m^3/d (185.6 kbpd)
20" - 313 miles
Light Sour
Medium

Line 10

11,800 m^3/d (74.2 kbpd)
12"/20" - 91 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 11

18,600 m^3/d (117.0 kbpd)
16"/20" - 47 miles
Condensates
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 62

20,700 m^3/d (130.2 kbpd)
22" - 75 miles
Heavy

L 14 / L 64

50,500 m^3/d (317.6 kbpd)
24" - 467 miles
Light Synthetics
Sweet
Light & High Sour
Medium

Line 61

63,600 m^3/d (400.0 kbpd)
42" - 454 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 67

71,500 m^3/d (449.7 kbpd)
36" - 999 miles
Heavy

Not Part of the Enbridge Mainline System

Line 9

38,200 m^3/d (240.3 kbpd)
30" - 524 miles
Condensates
Sweet
Medium
Light & High Sour

Line 17

16,000 m^3/d (100.6 kbpd)
16" - 88 miles
Heavy

Line 55

30,700 m^3/d (193.3 kbpd)
22"/24" - 575 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

NOTES:

Capacities provided are Annual Capacities and do not include current restrictions.

• Updated: January 2013
File: 2013_Q1 System Config.dwg

Revised by: YZ
Drawn by: DRD

Choose One...

contained within each circle.

- Potential impact circles that contain 20 or more structures intended for human occupancy;, buildings housing populations of limited mobility; buildings that would be hard to evacuate (e.g., nursing homes, schools); or buildings and outside areas occupied by more than 20 persons on a specified minimum number of days each year, are defined as HCA's.

How do operators of pipelines know where HCA's are located?

- High population areas and other populated areas are identified using maps and data from the U.S. Census bureau.
- Critical drinking water sources and unusually sensitive ecological areas are identified using information from National Heritage Programs and Conservation Data Centers in each state, in conjunction with The Nature Conservancy.
- Because of the complexity of HCAs for Hazardous Liquid Pipelines, the Office of Pipeline Safety identifies and maps HCAs for Hazardous Liquids on its National Pipeline Mapping System (NPMS). These maps are revised periodically by OPS based on new and updated information.
- Operators of natural gas transmission pipelines must use a specified equation to calculate the radius of "potential impact circles" along their pipeline and compare the structures in those circles to the HCA criteria in the rule.

How do operators determine what pipeline segments require extra integrity protection due to the presence of HCAs?

- Pipeline operators must determine which segments of their pipeline could affect HCAs in the event of a release. This determination must be made assuming that a release can occur at any point, even though the likelihood of a release at any given point is very small.
- Hazardous liquid pipelines that pass through an HCA, or that pass near enough that a release could reach the area by flow over land or within a river, stream, lake, or other means, are assumed to have the potential to affect that area.
- Gas transmission pipelines that pass within any of the HCA potential impact circles are assumed to have the potential to affect that area. (Or, alternatively, operators may choose to treat all of their pipeline segments in Class 3 and 4 areas as HCAs.)

Date of Revision: 12012011

ATTACHMENT 4

VERBATIM EXCERPTS FROM THE FOLLOWING PIPELINE RISK ASSESSMENT OF SHUTOFF VALVES, INCLUDING ESTIMATES OF AMOUNTS OF RELEASES OF OIL AND OTHER PRODUCT FROM RUPTURES

Oak Ridge National Laboratory 2012. "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety" Date Published: October 2012. Revised: December 2012. For U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration Pipeline Safety Program | East Building 2nd Floor 1200 New Jersey Avenue, S.E. Washington, DC 20590

ABSTRACT

Author's note: This 340 page study primarily concerns worst-case pipeline ruptures in populated areas, and was stimulated by a large California rupture of a gas pipeline in a urban area in California that killed 8 people. However, it also considers oil pipelines that do not catch fire, and those in High Consequence Areas (HCAs) that are also in or near ecologically significant areas. Therefore, it is highly relevant to certain the necessary route evaluation and environmental impact evaluation of the Sandpiper proposal. The underlined portions are indicate relevancy to Sandpiper, and in each case are the author's emphasis when they appear in the text.Page numbers at the bottom of the pages are excerpt page numbers rather than as in the original text.

This study assesses the effectiveness of block valve closure swiftness in mitigating the consequences of natural gas and hazardous liquid pipeline releases on public and environmental safety. It also evaluates the technical, operational, and economic feasibility and potential cost benefits of installing automatic shutoff valves (ASVs) and remote control valves (RCVs) in newly constructed and fully replaced transmission lines. Risk analyses of hypothetical pipeline release scenarios are used as the basis for assessing: . . . . and <u>(3) socioeconomic and environmental damage in HCAs caused by hazardous liquid pipeline releases of crude oil</u>. . . . . .However, these results may not apply to all newly constructed and fully replaced pipelines because <u>site-specific parameters that influence risk analyses and feasibility evaluations often vary significantly from one pipeline segment to another and may not be consistent with those considered in this study. Consequently, the technical, operational, and economic feasibility and potential cost benefits . . . . . .need to be evaluated on a case-by-case basis</u>. In theory, installing ASVs and RCVs in pipelines can be an effective strategy for mitigating potential consequences of unintended releases because decreasing the total volume of the release reduces overall impacts on the public and to the environment. <u>However, block valve closure has no effect on preventing pipeline failure or stopping the product that remains inside the isolated pipeline segments from escaping into the environment</u>. The benefits in terms of cost avoidance attributed to block valve closure swiftness increase as the time required to isolate the damaged transmission pipeline segment decreases. Block valve closure swiftness is most effective in mitigating damage resulting from a pipeline release. . . . .. Similarly, the avoided cost of socioeconomic and environmental damage for hazardous liquid pipeline releases without ignition increase as time required to isolate the damaged pipeline segment decreases.. . . .

The scope of the study is further limited by considering <u>only worst case pipeline release scenarios in HCAs involving guillotine-type breaks rather than other more common breaks, such as punctures and through-wall cracks.</u> Although ignition of the released product following a rupture is not ensured, this study only models release scenarios that result in immediate ignition of the released product at the break location. <u>The study also assesses potential socioeconomic and environmental effects of unintended crude oil releases without ignition from hazardous liquid pipelines in HCAs.</u>

EXECUTIVE SUMMARY

The U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) is the Federal safety authority responsible for ensuring safety in the design, construction, operation and maintenance, and spill response planning for the 2.3 million (M) miles of natural gas and hazardous liquid transportation pipelines in the United States. Its mission is to protect people and the environment from the risks inherent in transportation of hazardous materials by pipeline and other modes of transportation. . . . Section 4 of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 calls for the Secretary of the U.S. Department of Transportation (DOT) to require by regulation the use of automatic or remotely controlled shutoff valves, or equivalent technology, where it is economically, technically, and operationally feasible on hazardous liquid and natural gas transmission pipeline facilities constructed or entirely replaced after the final rule was issued.. . . .The Act also requires a study to discuss the ability of transmission pipeline facility operators to respond to a hazardous liquid or natural gas release from a pipeline segment located in a high consequence area (HCA). . . . . .

(This) study assesses the effectiveness of block valve closure swiftness in mitigating the consequences of natural gas and hazardous liquid pipeline releases on public and environmental safety. . . . . .It also evaluates the technical, operational, and economic feasibility and potential cost benefits of installing ASVs and RCVs in newly constructed and fully replaced pipelines. The results of this study apply to natural gas and hazardous liquid transmission lines. . . . .
Potential effects of unintended releases from natural gas and hazardous liquid pipelines on public and environmental safety are categorized as personal injuries and fatalities, property damage, and environmental impacts.
.
Hazardous liquid pipeline operators are required to install block valves at prescribed locations to facilitate isolation of pump stations, breakout storage tanks, and lateral takeoffs and other points along the pipeline near designated bodies of water and populated areas to minimize damage and pollution from an accidental hazardous liquid discharge. In addition, operators are required to consider installing emergency flow restricting devices such as check valves and RCVs on pipeline segments to protect a HCA in the event of a hazardous liquid pipeline release. In making this determination, an operator must, at least, consider the swiftness of leak detection and pipeline shut down capabilities and benefits expected by reducing the spill size.

E.1 CONSEQUENCE MODELS

Risk analyses of hypothetical pipeline release scenarios are used as the basis for assessing: . . . . . .(3) socioeconomic and environmental damage in HCAs caused by hazardous liquid pipeline releases of crude oil.

E.4 ASSESSMENT METHODOLOGY AND RESULTS FOR HAZARDOUS LIQUID PIPELINE RELEASES WITHOUT IGNITION

Potential consequences on the human and natural environments resulting from a hazardous liquid release without ignition generally involve socioeconomic and environmental impacts. These impacts are influenced by the total quantity of hazardous liquid released and the habitats, resources, and land uses that are affected by the release. The methodology used in this study to quantify socioeconomic and environmental impacts resulting from a hazardous liquid release involves computing the quantity xxvii

of hazardous liquid released as a function of block valve closure time and then using this quantity to establish the total damage cost based on the EPA's BOSCEM. The total damage cost is determined as follows:

☐ Add the unit response cost, the unit socioeconomic damage cost, and the unit environmental damage cost;

☐ Multiply the sum of these costs by the number of barrels spilled; and

☐ Apply a damage cost adjustment factor which aligns the total damage cost with the actual cleanup costs reported for recent crude oil spills in environmentally sensitive areas. The damage cost for crude oil released in the Enbridge Line 6B pipeline rupture in Marshall, Michigan in 2010 was approximately $38,000 per barrel.

The BOSCEM accounts for effects of spill size on the total damage cost by reducing the unit cost of damage as the number of barrels spilled increases.

The swiftness of block valve closure has a significant effect on mitigating potential socioeconomic and environmental damage to the human and natural environments resulting from hazardous liquid pipeline releases because damage costs increase as the spill size increases. The benefit in terms of cost avoidance for damage to the human and natural environments attributed to block valve closure swiftness increases as the duration of the block valve shutdown phase decreases.

1.3.2 Hazardous Liquid Pipeline Release Events

After a hazardous liquid pipeline ruptures, liquid begins flowing from the break and continues until draining is complete. The amount of material released following the break is influenced by a variety of factors. These factors include the type of liquid, the operating pressure of the pipeline, the size and position of the hole through which the liquid is released, the rate at which the liquid is being pumped through the pipeline, the response of the operator in terms of shutting off pumps and closing valves, the pipeline route and elevation profile, and the location of the break relative to the pumps and block valves. Block valves are installed in hazardous liquid pipelines to facilitate maintenance, operations, or construction and to limit the amount of liquid spilled following a pipeline rupture. For worst case, guillotine-type breaks, the effective hole size is equal to the line pipe diameter.

The behavior of the released liquid depends on its physical properties and the terrain in the vicinity of the break. For example, the liquid could flash on release of pressure to form a vapor cloud containing a fine mist of residual liquid droplets, accumulate in a pool on the ground surface near the pipeline break, create a stream that flows away from the release point, or soak into the surrounding soil (Acton, 2001).

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If the released liquid ignites following the break, it could result in a pool fire, a flash fire, or, under certain conditions, a vapor cloud explosion. Pool fires can spread out in all directions or flow in a particular path depending on the terrain. Figure 1.3 shows fire damage along a creek caused by a hazardous liquid pipeline release in Bellingham, Washington (NTSB, 2002). If ignition is delayed, the resulting evolution of vapor from the release could influence the magnitude and extent of a subsequent flash fire or explosion.

Fig. 1.3. Fire damage resulting from hazardous liquid pipeline release in Bellingham, Washington (NTSB, 2002).

Impacts resulting from time-dependent radiant thermal intensities at various separation distances from the break are based on the following hazardous liquid pipeline release scenario. The release occurs following a guillotine-type break where the escaping liquid accumulates in a pool on an impermeable level ground surface and ignites immediately upon release. Pool size is affected by the type of liquid

released, the line pipe diameter, the pipeline operating pressure, the time required to detect the leak and initiate corrective actions to mitigate the consequences of the release, the spacing of block valves, the time required to close block valves and isolate the break, and the terrain features. Any potential environmental impacts to air and water quality caused by the released liquids and their products of combustions are beyond the scope of this study.

As discussed in Section 1.3.1, thermal radiation hazard zones with increasing impact severity are described by concentric circles centered on the pipeline rupture. The thermal radiation intensities at the perimeters of these concentric circles increase as the radii decrease. Effects of progressively higher heat fluxes on buildings and humans are described in Table 1.1. Because thermal radiation effects on buildings and humans are a function of radiant heat flux and exposure duration, quantifying the time-

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dependent variations in radiant heat fluxes for specific radii is key to assessing the benefits of installing RCVs and ASVs in hazardous liquid pipelines.

Given the wide range of actual pipeline sizes and operating pressures, leak detection periods, and block valve spacing and closure times, ORNL developed methodologies for quantifying the impacts of these parameters on areas affected by combustion of the escaping liquid hydrocarbon. The methodologies, which are described in Section 3.2, also characterize time-dependent radiant thermal intensities at various separation distances from the break.

Without ignition, the escaping liquid could adversely affect waterway navigation, surface and ground water quality, and other aspects of the human and natural environments. In addition, the cost to remediate the affected areas could be substantial. Consequence mitigation for a hazardous liquid pipeline release without ignition requires rapid detection, pump shutdown, and block valve closure. However, even if these actions are taken quickly, some amount of liquid in the pipeline will drain out of the broken pipeline segments. Methodologies for quantifying spill volumes for hazardous liquid pipelines releases and for estimating socioeconomic and environmental damage caused by the spill are described in Section 3.3.

1.3.2.1 Phases of a Hazardous Liquid Pipeline Release

A pipeline break can range in size and shape from a short, through-wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Although the volume of the discharge depends on many factors, the event is subdivided into four sequential phases – Phase 1 Detection, Phase 2 Continued Pumping, Phase 3 Block Valve Closure, and Phase 4 Pipeline Drain Down (Borener, 1994 and California State Fire Marshal, 1993). The total discharge volume equals the sum of the volumes released during each phase. Events associated with each phase are described below.

Phase – 1 Detection: The detection phase begins immediately after the pipeline ruptures, t0, and continues until the leak is detected by any means and the Operator initiates corrective actions to mitigate the consequences of the release, td. The volume of liquid discharged during the detection phase, Vd, depends on the duration of this phase and is influenced by factors such as the size, shape, and location of the rupture; the pumping rate; the pipeline pressure; and the effectiveness of the leak detection system.

The volume of liquid discharged during the detection phase is determined using the following equation.

$Vd = Qd(td – t0)$ (1.1)

where

Vd is the volume of liquid discharged during the detection phase, barrels (m3)

Qd is the discharge rate through the break that de

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Phase 2 – Continued Pumping: The continued pumping phase starts after corrective actions are initiated to mitigate the consequences of the release, td, and ends when the pumps stop operating, tp.

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During this time, additional hazardous liquid spills from the break. The duration of this phase can vary from a few minutes for systems with remotely operated pumps to hours for manually operated equipment located in remote areas. The volume of liquid discharged during the continued pumping phase, Vp, depends on the duration of this phase and is influenced by factors such as the type of equipment controls (automatically, remotely, or manually operated); personnel travel time to shutdown manually operated equipment; and the flow rates of the pumps.

…..Phase 3 – Block Valve Closure: The block valve closure phase starts when the pumps stop operating, tp, and ends when the upstream and downstream block valves close, ts. During this time, an additional amount of liquid in the pipeline spills from the break. The volume of liquid discharged during the block valve closure phase, Vs, depends on the duration of this phase and is influenced by factors such as the speed at which block valves located upstream and downstream from the break close. The duration of this phase can vary from a few minutes for systems with automatic or remotely controlled valves to hours for systems with manually operated valves located in remote areas.

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Phase 4 – Pipeline Drain Down: The pipeline drain down phase starts when the upstream and downstream block valves close isolating the portion of the pipeline that includes the break, ts. This phase

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ends when the remaining contents of the isolated portion of the damaged pipeline segment drain from the break, tf. The volume of liquid discharged during the drain down phase, Vf, is affected by the pipeline elevation profile including siphon action and the location of the break. A break that occurs at the highest elevation in the isolated portion of the pipeline results in no drain down volume, whereas a break that occurs at the lowest elevation could result in significant or complete drain down of the isolated portion of the pipeline.

The rate at which liquid drains from a break in the isolated portion of the damaged pipeline segment depends primarily on the size of the break and the pipeline elevation profile. It is also affected by the flow rate of air that must enter the break to replace the liquid and allow the draining to continue. In hilly or mountainous terrain, determining the length of pipeline, L, available to drain from a break must consider site-specific design and construction details. The volume of liquid discharged from the contributory length of pipeline, L, during the drain down phase, Vf, and the transient discharge rate, Qf, cannot be accurately determined without knowing the actual pipeline elevation profile as illustrated in Fig. 1.4.

…..

1.3.2.2 Block Valve Effects on a Hazardous Liquid Pipeline Release

The effectiveness of block valve closure swiftness on limiting the spill volume of a hazardous liquid pipeline release is influenced by the location of the block valves relative to the location of the break, the pipeline elevation profile between adjacent block valves, and the time required to close the block valves after the break is detected and the pumps are shut down.

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Block valves do not reduce the volume of liquid spilled during the detection and continued pumping phases because they are open. However, the total spill volume can be reduced by rapidly detecting the leak and taking immediate corrective actions including shutting down the pumps and closing the block valves to mitigate the consequences of the release. The effectiveness of block valve closure in mitigating the consequences of a hazardous liquid pipeline release decreases as the time required to close the block valve increases.

…..

1.3.5 Socioeconomic and Environmental Effects of a Hazardous Pipeline Release

Potential consequences and effects on the human and natural environments resulting from a hazardous liquid pipeline release without ignition generally involve socioeconomic and environmental impacts. These impacts are influenced by the total quantity of hazardous liquid released and the habitats, resources, and land uses that are affected by the release. The methodology used to quantifying socioeconomic and environmental impacts resulting from a hazardous liquid release involves computing the quantity of hazardous liquid released and then using this quantity to establish the total damage cost. The total damage cost is determined by adding the response cost, the socioeconomic damage cost, and the environmental damage cost as described in Section 3.3.3.

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3.2 HAZARDOUS LIQUID PIPELINES WITH IGNITION

Following a guillotine-type break in a hazardous liquid pipeline and ignition of the released hydrocarbon, a pool fire begins to form and continues to increase in diameter as liquid flows from the break. Eventually, the pool reaches an equilibrium diameter when the mass flow rate from the break equals the fuel mass burning rate. The fire will continue to burn until the liquid that remains in the isolated pipeline segments stops flowing from the pipeline.

A pipeline break can range in size and shape from a short, through-wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Guillotine-type breaks are less common than other pipeline breaks such as fish-mouth type openings, but they can occur as a result of different causes including landslides, earthquakes, soil subsidence, soil erosion (e.g. scour in a river) and third-party damage. The guillotine-type break is the largest possible break and is therefore considered in this study as the worst case scenario. Although the volume of the discharge depends on many factors, to enable analysis, the event is divided into four sequential phases with the total discharge volume equal to the sum of the volumes released during each phase. The four phases (detection, continued pumping, block valve closure and pipeline drain down) are explained in Section 1.3.2.1.

The thermal radiation hazards from a hydrocarbon release and resulting pool fire depend on a variety of factors including the composition of the hydrocarbon, the size and shape of the fire, the duration of the fire, its proximity to the objects at risk, and the thermal characteristics of the object exposed to the fire.

3.3 HAZARDOUS LIQUID PIPELINES WITHOUT IGNITION

The socioeconomic and environmental effects of an oil spill are strongly influenced by the circumstances surrounding the spill including the type of product spilled, the location and timing of the spill, sensitive areas affected or threatened, liability limits in place, local and national laws, and cleanup

strategy. The most important factors determining a per-unit cost are location and oil type, and possibly total spill amount.

The amount of oil spilled can have a profound effect on the cleanup costs. Obviously, the more oil spilled, the more oil there is to remove or disperse, and the more expensive the cleanup operation. However, cleanup costs on a per-unit basis decrease significantly with increasing amounts of oil spilled. Smaller spills are often more expensive on a per-unit basis than larger spills because of the costs associated with setting up the cleanup response, bringing in the equipment and labor, as well as bringing in the experts to evaluate the situation (Etkin, 1999).

The following methodology was used to determine: (1) the time-dependent discharge from a hazardous liquid transmission pipeline resulting from a guillotine-type break, and (2) the quantity of hazardous liquid released during the detection, continued pumping, block valve closure, and drain down phases

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needed to estimate cleanup costs. The total volume of a hazardous liquid pipeline release is primarily influenced by the flow rate at the time of the break; the combined durations of the detection, continued pumping, block valve closure phases; and the size and shape of the break. For worst case, guillotine-type breaks, where the effective hole size is equal to the line pipe diameter, the governing parameters are the line pipe diameter and the pipeline length between plateaus and peaks in the vicinity of the break.

Appendix A: Spill Volume Released Due to Valve Closure Times in Liquid Propane Pipelines, contains a family of curves for various hazardous liquid pipeline release scenarios that quantify the volume of liquid released following a guillotine-type break.

3.3.1 Analysis Scope, Parameters, and Assumptions

The methodology is based on fundamental fluid mechanics principles for computing the time-dependent response of hazardous liquid pipelines following a guillotine-type break. It is also suitable for determining the effects that detection, continued pumping, block valve closure duration have on a worst case discharge release determined in accordance with federal pipeline safety regulations in 49 CFR 194 for estimating worst case discharges from hazardous liquid pipelines (DOT, 2011e).

The configuration of the hypothetical hazardous liquid pipeline used to evaluate the effectiveness of RCVs and ASVs in mitigating the consequences of a release has the following design features and operating characteristics:

- The pump stations are located at 100 mile intervals along the pipeline.
- Each pressure pump station has a remote control device that can be activated by the pipeline operator to shut down the compressors after a rupture occurs.
- The rupture is a guillotine-type break that initiates the release event.
- The break is located at a low point in the pipeline elevation profile.
- The following times are study variables.
- The time when the operator detects the leak.
- The time when the operator stops the pumps.
- The time when the upstream and downstream block valves are closed and the line section with the break is isolated.
- The total volume of the hazardous liquid release equals the volume of liquid released during the detection, continued pumping, block valve closure, and drain down phases.
- The time-dependent flow rate is a study variable.

Study variables used to characterize hazardous liquid pipeline releases are listed in Table 3.24.

3.3.2 Analytical Approach and Computational Models

After a hazardous liquid pipeline ruptures without ignition, liquid begins flowing from the break and continues until draining is complete. A pipeline break can range in size and shape from a short, through-

wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Although the volume of the discharge depends on many factors, the event is subdivided into the four sequential phases with the total discharge volume equal to the sum of the volumes released during each phase. The phases of a hazardous liquid pipeline release are outlined in Section 1.3.2.1.

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block valve closure phase, minutes

The flow rate through the break remains constant through both the detection and continued pumping phases. In the block valve closure phase, the maximum flow rate through the break is based on the elevation difference of liquid in the pipeline. During the pipeline drain down phase, the maximum flow rate through the break is based on the difference between the operating pressure of the pipeline and atmospheric pressure. Requirements in 49 CFR 194.105(b)(1) state the worst case discharge is the largest volume of fluid released based on the pipeline's maximum release time, plus the maximum shutdown response time, multiplied by the maximum flow rate, which is based on the maximum daily capacity of the pipeline, plus the largest line drainage volume after shutdown of the line sections. In this methodology, the maximum flow rate can be estimated by multiplying the fluid speed at the pump by the cross sectional area of the line pipe. Although operators can use this rule to determine a worst case discharge, the actual flow rate during the block valve closure phase may be greater (less conservative) due to factors such as fluid density, pressure changes, pump performance characteristics, and the elevation profile of the pipeline which are not reflected in the methodology. These factors are important in a risk analysis because their effects influence time-dependent damage resulting from a release.

The influence of fluid density, pressure changes, and the elevation profile of the pipeline is taken into consideration in this study by using Bernoulli's equation to calculate the flow rate during the block valve closure and drain down phases. However, there are recognized limitations in using Bernoulli's equation to determine drain down time because it does not model the effects of air flow through the pipeline break which occurs as the fluid escapes following block valve closure. Although Bernoulli's equation does not produce an exact solution to this fluid dynamics problem, comparison of the results provides a consistent approach for evaluating the effectiveness of block valve closure swiftness on mitigating release consequences.

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3.3.3 Socioeconomic and Environmental Effects

The methodology for quantifying potential environmental effects resulting from a hazardous liquid release involves computing the quantity of hazardous liquid released and then using this quantity to establish the total damage cost. The total damage cost, Cd, is determined by adding the response cost, Cr, the socioeconomic damage cost, Cs, and the environmental damage cost, Ce. This methodology applies to crude oil and light fuel (gasoline) releases that affect the following areas.

☐ Commercially navigable waterways which means a waterway where a substantial likelihood of commercial navigation exists.

☐ High population areas and another populated areas which mean an urbanized area as defined and delineated by the Census Bureau that contains 50,000 or more people and has a population density of at least 1,000 people per square mile and a place as defined and delineated by the Census Bureau that contains a concentrated population, such as an incorporated or unincorporated city, town, village, or other designated residential or commercial area, respectively.

☐ Unusually Sensitive Areas (USAs) which is defined in 49 CFR 195.6 to mean a drinking water or ecological resource area that is unusually sensitive to environmental damage from a hazardous liquid pipeline release.

The response cost, Cr, is determined by multiplying the applicable unit response cost shown in Table 3.25 by the applicable medium modifier shown in Table 3.26.

…

The response cost, C_r, is determined by multiplying the applicable unit response cost shown in Table 3.25 by the applicable medium modifier shown in Table 3.26.

Table 3.25. Unit response costs for crude oil and light fuel releases Release Quantity, barrels	**Crude Oil, $ per barrel**	**Light Fuels, $ per barrel**
<12	9,240	4,200
12-24	9,156	4,116
24-240	9,030	4,074
240-2,400	8,190	3,654
2,400-240,000	5,166	3,108
> 240,000	3,864	1,302

Table 3.26. Modifier for location medium categories for crude oil and light fuel releases Medium Category	**Medium Modifier**
Open Water/Shore	1.0
Soil/Sand	0.6
Pavement/Rock	0.5
Wetland	1.6
Mudflat	1.4
Grassland	0.7
Forest	0.8
Taiga (boreal forest)	0.9
Tundra	1.3

The socioeconomic damage cost, C_s, is determined by multiplying the applicable unit socioeconomic cost shown in Table 3.27 by applicable the socioeconomic cost modifier shown in Table 3.28.

Table 3.27. Unit socioeconomic and environmental costs for crude oil and light fuel releases Release Quantity, barrels	**Crude Oil, $ per barrel**		**Light Fuels, $ per barrel**	
Socioeconomic	**Environmental**		**Socioeconomic**	**Environmental**
<12	2,100	3,780	3,360	3,570
12-24	8,400	3,654	13,860	3,360
24-240	12,600	3,360	21,000	2,940
240-2,400	5,880	3,066	8,400	2,730
2,400-240,000	2,940	1,470	4,200	1,260
> 240,000	2,520	1,260	3,780	1,050

Table 3.28. Socioeconomic and cultural value ranking for crude oil and light fuel releases Value Rank	**Release Impact Site Description**	**Examples**	**Cost Modifier Value**

Extreme	Predominated by areas with high socioeconomic value that may potentially experience a large degree of long-term impact if oiled.	Subsistence/commercial fishing, aquaculture areas	2.0
Very High	Predominated by areas with high socioeconomic value that may potentially experience some long-term impact if oiled.	National park/reserves for ecotourism/nature viewing; historic areas	1.7
High	Predominated by areas with medium socioeconomic value that may potentially experience some long-term impact if oiled.	Recreational areas, sport fishing, farm/ranchland	1.0
Moderate	Predominated by areas with medium socioeconomic value that may potentially experience short-term impact if oiling occurs.	Residential areas; urban/suburban parks; roadsides	0.7
Minimal	Predominated by areas with a small amount of socioeconomic value that may potentially experience short-term impact if oiled.	Light industrial areas; commercial zones; urban areas	0.3
None	Predominated by areas already moderately to highly polluted or contaminated or of little socioeconomic or cultural import that would experience little short- or long-term impact if oiled.	Heavy industrial areas; designated dump sites	0.1

Note: Long-term impacts are those impacts that are expected to last months to years after the spill or be relatively irreversible. Short-term impacts are those impacts that are expected to last days to weeks after the spill occurs and are generally considered to be reasonably reversible.

Table 3.29. Freshwater vulnerability categories for crude oil and light fuel releases Freshwater Vulnerability Category	**Freshwater Vulnerability Modifier**
Wildlife Use	1.7
Drinking	1.6
Recreation	1.0
Industrial	0.4
Tributaries to Drinking/Recreation	1.2
Non-Specific	0.9

Table 3.30. Habitat and wildlife sensitivity categories for crude oil and light fuel releases	**Habitat and Wildlife Sensitivity Modifier**
Habitat and Wildlife Sensitivity Category	
Urban/Industrial	0.4
Roadside/Suburb	0.7
River/Stream	1.5
Wetland	4.0
Agricultural	2.2
Dry Grassland	0.5
Lake/Pond	3.8
Estuary	1.2
Forest	2.9
Taiga	3.0
Tundra	2.5
Other Sensitive	3.2

This methodology is consistent with the U.S. Environmental Protection Agency (EPA) Basic Oil Spill Cost Estimation Model (BOSCEM) that was developed to provide the US EPA Oil Program with a methodology for estimating oil spill costs, including response costs and environmental and socioeconomic damages, for actual and hypothetical spills (Etkin, 2004).

Total Damage Cost Validation

The following case studies compare the actual damage costs for two hazardous liquid pipeline releases to the corresponding total damage costs determined using BOSCEM.

Case Study 1 – Enbridge 2010

The Enbridge Line 6B pipeline ruptured in Marshall, Michigan on July 25, 2010, and released approximately 20,000 barrels of crude oil. This release from the 30-in. nominal diameter pipeline caused environmental impacts along Talmadge Creek and the Kalamazoo River (Nicholson, 2012). Cleanup and recovery costs for this release totaled $767,000,000.

Using the EPA BOSCEM, the estimated total damage cost for this release is approximately $307,900,000. This total damage cost, C_d, includes the response cost, C_r, the socioeconomic damage cost, C_s, and the environmental damage cost, C_e, determined as follows.

Response cost, C_r = unit response cost ☐ medium modifier

Socioeconomic damage cost, C_s = unit socioeconomic cost ☐ socioeconomic cost modifier (High) = $2,940 ☐ 1.0 = $2,940/barrel

Environmental damage cost, C_e = unit environmental cost ☐ 0.5 ☐[freshw wildlife modifier (Wetland)] = $1,470 ☐ 0.5 ☐(1.7 + 4.0) = $4,190/barrel

Total damage cost (2004 basis), C_d = 20,000 barrels ☐ ($8,265 + $2

After adjusting for inflation, the total damage cost (2012 basis), C_d = $307,900,000 ☐ 1.25 (inflation factor) = $384,875,000 which is approximately 50% of the actual cost.

Case Study 2 – Yellowstone 2011

A 12-in. hazardous liquid pipeline owned by ExxonMobil Pipeline Company ruptured on July 1, 2011 under the Yellowstone River 20 miles upstream from Billings, Montana. The Yellowstone River is navigable water in the United States (EPA, 2011). The ruptured pipeline released an estimated 1,509 barrels of oil that entered the river before the pipeline was closed. Cleanup and recovery costs for this release totaled $135,000,000.

The estimated total damage cost for this release is $48,044,000 based on 2004 cost data. This total damage cost, C_d, includes the response cost, C_r, the socioeconomic damage cost, C_s, and the environmental damage cost, C_e, determined as follows.

Response cost, C_r = unit response cost ☐ modifier (Wetland) = $8,190 ☐ 1.6 = $13,104/b

Socioeconomic damage cost, C_s = unit socioeconomic cost ☐ socioeconom
$5,880 ☐ 1.7 = $9,996/barrel.
Environmental damage cost, C_e = unit environmental cost ☐ 0.5 ☐ fish (Wildlife Use) + wildlife modifier (Wetland)] = $3,066 ☐ 0.5 ☐ (1.7 + 4.0) = $8,738/barrel.
Total damage cost (2004 basis), C_d = 1,509 barrels ☐ ($13,104 + $9,9

After adjusting for inflation, the total damage cost (2012 basis), Cd = $48,044,000 ☐ 1.25 (inflation factor) = $60,054,000 which is approximately 44% of the actual cost.

Damage Cost Adjustment Factor
For this study, total damage costs of hazardous liquid pipeline releases are determined using the EPA BOSCEM and then increased by a damage cost adjustment factor of 2.1. This factor aligns the model with cleanup and recovery costs for two recent hazardous liquid pipeline releases of crude oil into sensitive socioeconomic and environmental areas.

3.3.4 Risk Analysis Results for Hazardous Liquid Pipeline Releases
The methodology for assessing socioeconomic and environmental damage to HCAs is based on computed release volumes corresponding to the detection, continued pumping, block valve closure, and drain down phases of a hazardous liquid pipeline release of crude oil without ignition. The method used in this analysis for defining maximum flow rate through the break is as defined in 49 CFR 195.105(b)(1) for the detection, pump shut down, block valve closure, and drain down phases. The damage is quantified using the EPA BOSCEM and the damage cost adjustment factor described in Section 3.3.3.
Eight case studies involving hypothetical hazardous liquid pipeline releases in HCAs are considered to assess effects of block valve closure time on socioeconomic and environmental damage resulting from a guillotine-type break. The duration of the detection and continued pumping phases for the hypothetical hazardous liquid pipelines are 5 minutes and 5 minutes, respectively. The duration of the block valve closure phases is 3 minutes.

….

Characteristics for Case Study 8A, 8B, 8C, and 8D that involve 36-in. nominal diameter hazardous liquid pipelines are tabulated in Table 3.32. These case studies compare the following effects on avoided damage costs.
☐ Case studies 8A and 8B compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to either 400 psig or 1,480 psig, an elevation change of 100 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

☐ Case studies 8C and 8D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to either 400 psig or 1,480 psig, an elevation change of 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

☐ Case studies 8A and 8C compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to 400 psig, an elevation change equal to either 100 ft or 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

☐ Case studies 8B and 8D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to 1,480 psig, an elevation change equal to either 100 ft or 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

Figures 3.82 to 3.85 list the discharge volumes in barrels for Case Study 8A, 8B, 8C, and 8D. Discharge volumes listed in Table 3.32 for each case study are determined by adding the discharge volumes for the detection (5 minutes), continued pumping (5 minutes), block valve closure (3, 30, 60, and 90 minutes), and drain down (3 miles) phases. Avoided damage costs, which are also listed in Table 3.32, represent the differences between the discharge volumes for the various block valve closure durations and the 3 minute block valve closure duration multiplied by the avoided damage unit cost. The total damage unit cost for these case studies is estimated at $29,520 per barrel. This total damage cost is the sum of the response cost plus the socioeconomic damage cost plus the environmental damage cost. Note that the avoided damage costs are not sensitive to pressure and elevation changes because the model is based on the methodology in 49 CFR §194.105 (b) (1) for a worst case discharge which has a constant flow rate.

Benefits of Block Valve Closure Swiftness for a Hypothetical Hazardous Liquid Pipeline Releases without Ignition

The swiftness of block valve closure has a significant effect on mitigating potential socioeconomic and environmental damage to the human and natural environments resulting from hazardous liquid pipeline releases. The benefit in terms of cost avoidance for damage to the human and natural environments attributed to block valve closure swiftness increases as the duration of the block valve shutdown phase decreases.

Table 3.32. Effects of hypothetical 36-in. hazardous liquid pipeline releases without ignition	**Case Study 8A**	**Case Study 8B**	**Case Study 8C**	**Case Study 8D**
Characteristic				
Type Hazardous Liquid	Crude Oil	Crude Oil	Crude Oil	Crude Oil
Flow Velocity, ft/s	15	15	15	15
Nominal Line Pipe Diameter, in.	36	36	36	36
Drain Down Length, mi.	3	3	3	3
MAOP, psig	400	1,480	400	1,480
Elevation Change, ft	100	100	1,000	1,000
Detection Phase Duration, minutes	5	5	5	5
Continued Pumping Phase Duration, minutes	5	5	5	5
Unit Response Cost, $/barrel	3,864	3,864	3,864	3,864
Medium Modifier (Wetland)	1.6	1.6	1.6	1.6
Response Cost, Cr	6,182	6,182	6,182	6,182
Unit Socioeconomic Cost, $/barrel	2,520	2,520	2,520	2,520
Socioeconomic Cost Modifier (Very High)	1.7	1.7	1.7	1.7
Socioeconomic	4,284	4,284	4,284	4,284

Damage Cost, C_s				
Unit Environmental Cost, $/barrel	1,260	1,260	1,260	1,260
One half Freshwater Modifier (Wildlife Use = 1.7) and Wildlife Modifier (Wetland = 4.0)	2.85	2.85	2.85	2.85
Environmental Damage Cost, C_e	3,591	3,591	3,591	3,591
Total Damage Unit Cost, C_d, $/barrel	14,057	14,057	14,057	14,057
Damage Cost Adjustment Factor for Hazardous Liquid Pipeline Releases	2.1	2.1	2.1	2.1
Total Damage Unit Cost on 2012 Basis, $/barrel	**29,520**	**29,520**	**29,520**	**29,520**
Detection Phase Release, barrels	5,665	5,665	5,665	5,665
Continued Pumping Phase Release, barrels	5,665	5,665	5,665	5,665
Drain Down Phase Release, barrels	19,942	19,942	19,942	19,942
Block Valve Closure Phase for Valve Closure in 3 minutes, barrels	3,399	3,399	3,399	3,399
Block Valve Closure Phase for Valve Closure in 30 minutes, barrels	33,992	33,992	33,992	33,992

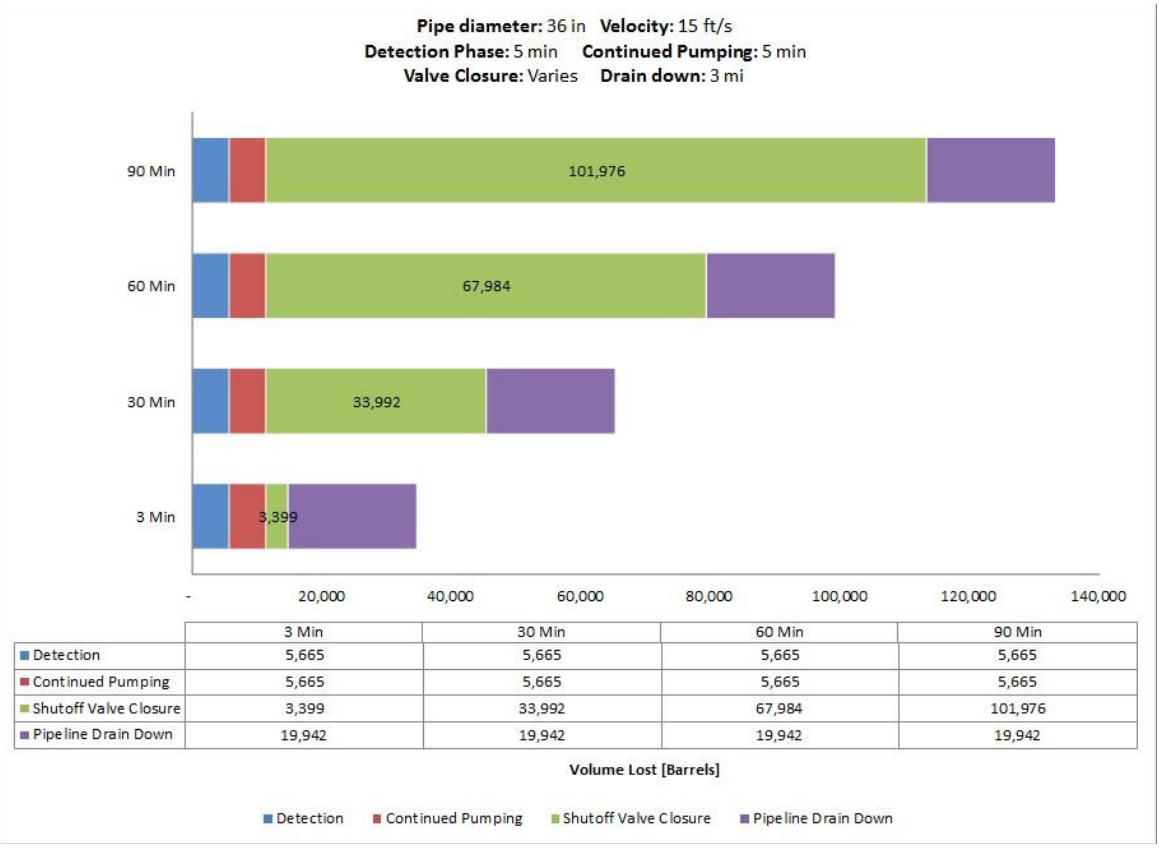

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. 3.82. Case Study 8A – Discharge volumes for a 36-in. hazardous liquid pipeline with a 400 psig MAOP and an elevation change of 100 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

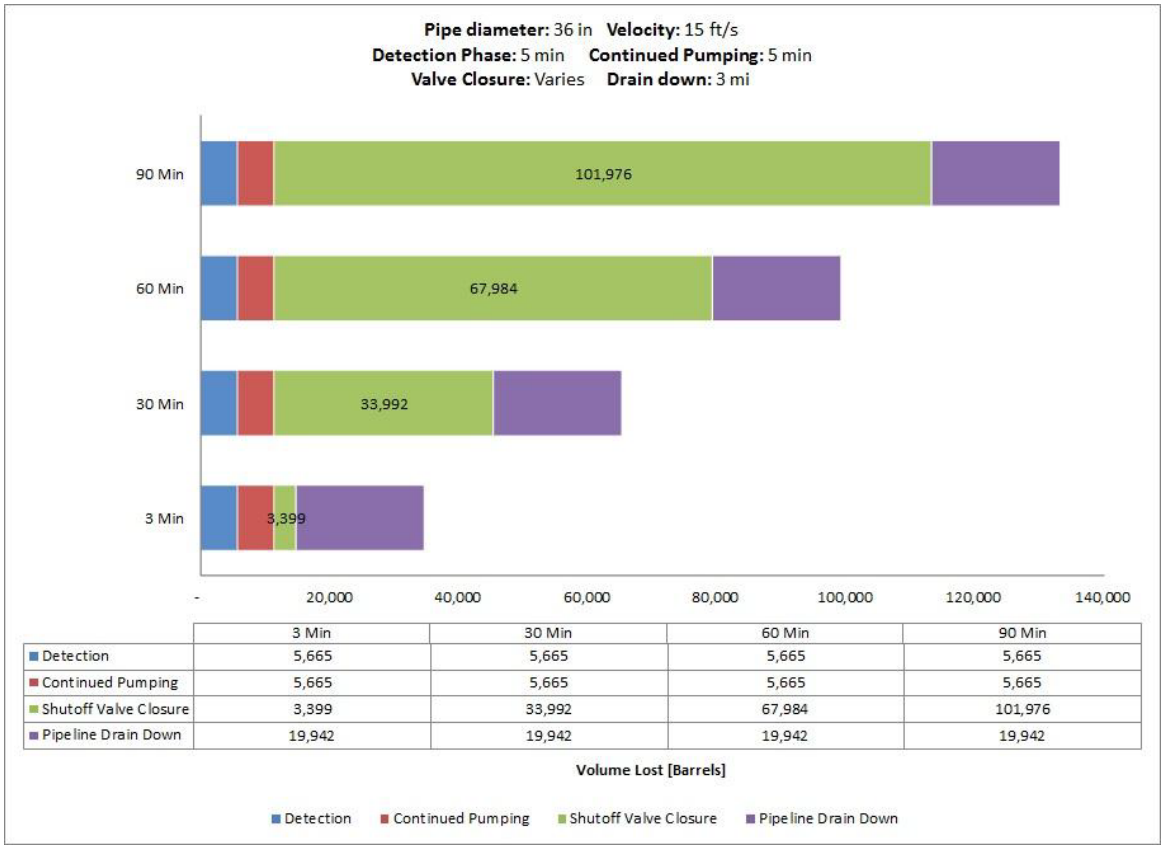

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. 3.83. Case Study 8B – Discharge volumes for a 36-in. hazardous liquid pipeline with a 1,480 psig MAOP and an elevation change of 100 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

Hartman, Larry (COMM)

From: Paul Stolen <stolami@gvtel.com>
Sent: Monday, April 07, 2014 7:30 AM
To: Ek, Scott (PUC); Hartman, Larry (COMM)
Subject: Re: Sandpiper Pipeline Comments - P. Stolen

Good morning Scott and Larry. Thanks for your cooperation on responding. As you can see from my comment, I intend to send them to various other parties. I had an unfortunate computer problem on April 4th that delayed me and then prevented me from doing the final editing of my comments. So, in order to meet the deadline, I sent the comments in anyway. When I did the final edit this weekend, I found typos, name and cross reference problems, extra words left in, and other problems like that. (Not substantive.) However, there was an error on page 3 of Attachment 1—I had mistakenly put the Sandpiper amounts in the wrong column.

Therefore, I am sending the corrected version to the other parties rather than the one I officially submitted to you. I realize the one sent to you is the "legal" version under the rules, and I can live with that since none of the specific recommendations change in any way. I would, of course, prefer that you use the corrected "clean" version in the official record. I can send it to you if you wish. I am trying to get it scanned today into one digital version, so hopefully it will be available tomorrow morning.

Thanks again. Paul Stolen

From: Ek, Scott (PUC)
Sent: Friday, April 04, 2014 3:42 PM
To: mailto:stolami@gvtel.com
Subject: FW: Sandpiper Pipeline Comments - P. Stolen

Scott E. Ek
Minnesota Public Utilities Commission
121 7th Place East, Suite 350 | St. Paul, MN 55101
(651) 201-2255 | scott.ek@state.mn.us | www.puc.state.mn.us

From: Ek, Scott (PUC)
Sent: Friday, April 04, 2014 3:32 PM
To: Hartman, Larry (COMM)
Cc: 'stolami@gvtel.com'; Nelson, Casey (COMM)
Subject: Sandpiper Pipeline Comments - P. Stolen

Hello Larry,

I received the attached comments from Paul Stolen concerning the Sandpiper project. The comments were received today (4/4/14) at ~ 3:30 p.m. Please let me know if you receive these and if you would like me upload to eDockets. I am also copying Paul on this as he wanted confirmation they were received.

Thank you,

Scott E. Ek

Minnesota Public Utilities Commission
121 7th Place East, Suite 350 | St. Paul, MN 55101
(651) 201-2255 | scott.ek@state.mn.us | www.puc.state.mn.us

From: Paul Stolen [mailto:stolami@gvtel.com]
Sent: Friday, April 04, 2014 3:14 PM
To: Ek, Scott (PUC)
Subject: Re: from paul stolen

Hello Scott. Here are my comments plus one attachment. Two more attachments to follow. thanks Paul

From: Ek, Scott (PUC)
Sent: Thursday, April 03, 2014 11:47 AM
To: Paul Stolen
Subject: RE: from paul stolen

Hi Paul,

Yes, that is fine. As you know we will read any and all comments received. Please feel free to forward to me and copy Larry. I will send you an email confirming receipt.

Thank you,

Scott E. Ek
Minnesota Public Utilities Commission
121 7th Place East, Suite 350 | St. Paul, MN 55101
(651) 201-2255 | scott.ek@state.mn.us | www.puc.state.mn.us

From: Paul Stolen [mailto:stolami@gvtel.com]
Sent: Thursday, April 03, 2014 11:38 AM
To: Ek, Scott (PUC)
Subject: from paul stolen

Hello Scott. Long time, huh? I've been retired for 5 years. I'm submitting comments on the Sandpiper project, and running a little late. I was planning on getting them in today in the overnight guaranteed delivery for tomorrow receipt, since that's the project deadline. so will need to submit via electronic mail. If Larry's inbox is swamped, can I get to you, and also get a response that you have received them? Thanks much. Paul Stolen

May 28 , 2014

RECEIVED
MAY 29 2014
MAILROOM

Paul Stolen
37603 370th Av SE,
Fosston, MN 56542
218-435-1138

Mr. Larry Hartman
Environmental Review Manager
Minnesota Department of Commerce
85 67th Place East, Suite 500
St. Paul, MN 55101

Re: Comments on proposed Enbridge Sandpiper Pipeline, Minnesota Public Utilities Commission (PUC) Docket #13-474

Dear Mr. Hartman:

Enclosed are my additional comments on this proposed project based on the time extension previously granted. The attached material covers the following topics:

I. A copy of my updated April 4 2014 comments to correct minor editing problems and a request that you replace it with the enclosed comments.

II. The Scope of Work for the consultant to the PUC that will be doing the environmental analysis and route comparison.

III. The environmental "footprint" of the proposed pipeline. Enbridge continues to maintain that the project will require a 100 foot right of way (ROW). A report entitled "Construction of the Northern Border Pipeline in Montana" is enclosed that refutes Enbridge's position on ROW requirements, and shows that it only applies to flat terrain.

IV. Additional comments regarding the consequences of pipeline ruptures and leaks. This comment expands on my April 4 comments that these consequences need to be consider in assessment of impacts, location decisions, and need for the project.

V. Additional comments on the "corridor fatigue" issue.

If you have any questions, please give me a call.

Sincerely, Paul Stolen

Paul Stolen

C: Tom Landwehr, Commissioner, Minnesota DNR
John Linc Stine, Commissioner, Minnesota PCA
Tamara Cameron, Regulatory Chief, Corps of Engineers

Additional comments on proposed Enbridge Sandpiper Pipeline, Minnesota Public Utilities Commission
Docket #13-474
Paul Stolen
May 28 2014

I. **Corrected April 4 comments**. My previous comments, submitted on April 4, 2014, were sent in a rush. I had a computer hang-up at the last minute and therefore didn't have time for a final proofing on the paper copy. Therefore, I did a corrected copy, which is enclosed. I'd appreciate it if you would replace the April 4 copy with the enclosed. There were some typos and a few confusing sentences that I clarified. The most substantive correction was a small correction of numbers in Table 1. The cover letter of the enclosed corrected copy has a note about this below the signature line. I apologize for any confusion this may cause.

II. Scope of work for PUC consultant doing the environmental analysis and comparison of routes. My understanding is that the PUC will be hiring a private party to develop the environmental analysis and comparison of routes for Sandpiper. The product of this contracted work will thus be key to government decisions on this project. How will the Scope of Work be developed? Is such a scope of work shown to Enbridge prior to its completion? My comments and those of others need to be incorporated into the Scope of Work. This Scope of Work should include specific questions focused on the key public policy decisions that need to be made about the Sandpiper project, rather than allowing the contractor to determine such questions. In addition, a draft of this Scope of Work should be available for review prior to letting the contract, since the product is so crucial to the decisions.

The rules regarding a Certificate of Need for this project clearly indicate that environmental and socioeconomic factors must be taken into account in the decision as to whether to grant a need certificate. (Section 7853.0130, Criteria.) Therefore, the Scope of Work is a key document for determining whether to grant a Certificate of Need.

III. **Pipeline construction environmental "footprint."**

A. Enbridge estimate the environmental "footprint" of the Sandpiper project is inaccurate. Enbridge's statement that they use a 100 foot ROW to construct the project seriously underestimates the project's effects and potential for long term damage. In fact, such a ROW only applies to flat or nearly flat areas, and are often farmland.

The environmental study and route comparison must use accurate figures on land requirements for building the pipeline. The estimate must include the topics of land clearing, earth moving and excavation, soil compaction, and potential for topsoil mixing. This is called the project's "environmental footprint." During a public meeting on Sandpiper at Clearbrook, a recent visit to the DNR, and the Enbridge documents on the PUC web site, I examined Enbridge's plan sheets and some applications for crossing streams. These plans are simply not accurate with respect to land clearing and extent of excavation.

Note: My comments here do not apply to the topic of "extra work space" at roads, river crossings, and a few other locations of specialized construction. Enbridge generally does include these locations on its plan sheets. Such locations are a small fraction of the ROW impacts beyond the 100-foot ROW in hilly terrain.

In spite of abundant evidence to the contrary, Enbridge continues to maintain to the public that it only needs a 100 foot right-of-way (ROW.) Enbridge also used this figure on the Alberta Clipper and Southern Lights Projects, even though during construction a much wider ROW was evident at some locations. Finally, the 100 foot ROW was also used for the MinnCan project as a guide to estimating the environmental footprint of the project. (I worked on all three projects while employed at the DNR, including conducting training for other DNR staff in pipeline construction.)

Both Enbridge and MinnCan did not provide accurate figures for excavation into parent material outside of the pipeline trench. Such excavation is abundant in hilly terrain. A key mitigation measure, topsoil separation in such areas, was ignored in many locations except for agricultural land.

The 100 foot ROW width does not apply to hilly terrain. It is time to put it to rest when large diameter pipelines are proposed in Minnesota. In fact, the construction ROW in hilly terrain can become 200 to 300 feet wide in some areas. In many cases on the three large, above-mentioned projects I was involved while at the DNR, these wider locations were never included in plains submitted for public review by the PUC, DNR, or PCA, and not included in calculations of the project's environmental footprint.

The terrain crossed by the proposed Sandpiper route crosses hilly glacial moraine in many locations Understanding pipeline construction in non-flat terrain is crucial because it directly relates to important environmental impacts such as the extent of land clearing, deep excavation outside of the pipe trench and accompanying potential serious loss of topsoil, susceptibility to invasion of non-native species and noxious weeds, and chronic erosion problems because re-vegetation is slower when topsoil is lost and replaced by parent material.

B. Detailed explanation of ROW requirements for construction of a large-diameter pipeline.

The enclosed report entitled "Construction of the Northern Border Pipeline in Montana" (referred hereafter as the IPTF Report) describes in detail why construction in non-flat terrain can lead to ROWs much wider than 100 feet. It also demonstrates why there can be extensive excavation outside of the pipeline trench. I wrote it (with review by supervisors) some years ago while Assistant Coordinator of the Montana Interagency Pipeline Task Force. One of the main reasons why it was written is because ROW was an important public issue for two proposed large pipelines in Montana. One of them, the Northern Tier Pipeline, was proposed to cross the entire state, a distance of approximately 600 miles. A detailed review of it was done, but it was never built.

The Northern Border project—a 42 inch gas pipeline—crossed 180 miles of NE Montana, and was built after an EIS was prepared. ROW of way width was generally limited to 100 feet on state lands during the permitting stage, with the consent of the pipeline company. However, during construction, it became abundantly clear that it was impossible to construct the pipeline in such a narrow area in hilly terrain.

1. Purpose of IPTF Report. This report is applicable to the Sandpiper project with respect to determining the project's environmental footprint. It had four main purposes:

a. To document the ROW width in hilly terrain compared to flat terrain, and to determine the minimum ROW for a large diameter pipeline,

b. To document the locations of, and reasons for, excavation into topsoil and parent material outside the pipeline trench, since during the review period prior to construction the pipeline company had indicated excavation only for the pipe trench.

c. To identify problems encountered during construction and reclamation after pipe burial.

d. To serve as a training manual for reviewers of proposals to construct large diameter pipelines.

2. Caveats as to use of the IPTF report for the Sandpiper project. Before pointing out key findings of the report that relate to the Sandpiper proposal, there a few caveats as to its use:

a. Northern Border was constructed on a new ROW, with no existing pipelines in place.

b. A level work pad generally 50 feet wide is needed for construction of large diameter pipelines, with the pipeline trench to the left of the forward movement of construction. This work pad is essentially a road during construction, with nearly all traffic confined to it. Width is needed for passage of traffic past active work areas, and also for worker safety. A *level* work pad is necessary for worker safety and equipment needs. This construction necessity is directly related to the environmental footprint of the project as discussed below.

c. There have been some changes in pipeline construction techniques since Northern Border, but essentially none that affect ROW width except at special areas such as rivers. (Examples include: welding methods are done somewhat differently, and machine welding is often done on-site; cathodic protection pipe coating is no longer done on site, as depicted in the report, except at field welding locations; and directional drill bores (HDD) are much more common.) The fact that Northern Border was a 42 inch pipeline made little difference in ROW width as compared to the 24 inch MinnCan pipeline. The ROW for the latter was perhaps 8-10 feet narrower on flat terrain than the Northern Border line, but there was little difference on hilly terrain. In addition, there have been changes in river crossing techniques with greater use of HDDs, and dam and pump methods are often used rather than open cut trenches.

d. When another large pipeline is added to an existing corridor, it is offset from the existing line by a project-specific distance. I've found it to be 35-40 as a minimum separation. Therefore, the construction ROW can be somewhat narrower than the standard 100 foot because spoil from the trench can be placed in the separation zone. However, there are site specific issues on hilly terrain so that generalizations don't work in such areas. Also, heavy equipment travel is restricted over the new and old lines.

e. Pipe is bent to *generally* follow the terrain, but not *exactly* follow the terrain. A straight pipe transfers gas or liquid most efficiently. Therefore, in hilly terrain with abrupt slopes, pipe curvature strikes a balance between the desire for a straight pipe and the constraints of excavation. In other words, in some locations, such as the crest of a hill, or under a small but steep hill, the pipe is buried much more deeply in order to lessen the curves. The report illustrates the result of this in expanded ROW width in some locations for the extra spoil and topsoil storage.

f. Topsoil separation in excavated areas is a crucial environmental issue because it relates to whether there are long-term impacts to land productivity in all areas, increased invasive species and

noxious weeds, and increased erosion because re-vegetation is slow or non-existent. Topsoil separation can increase the ROW width because of separate piles; however, the expansion can be reduced by creative soil storage. Lack of topsoil separation causes long-term impacts whereas a somewhat wider ROW in some places causes temporary impacts. Furthermore, in recognition of this, topsoil separation has become a standard good practice in stormwater permits and all sorts of construction.

g. When done correctly based on known best practices for pipeline construction, environmental impacts of pipeline placement (not including future oil spill impacts) can be significantly reduced. The attached report suggests some of the good practices.

3.Key points from IPTF report. The IPTF report in its entirety is part of my comments, but the following are key points especially related to Sandpiper:

a. ROW requirements and topsoil stripping. Pages 31-32 provide a summary of the significance of ROW requirements as an environmental issue. It also references the details that support my findings that the IPTF Report is completely relevant to the Sandpiper project.

b. ROW requirements on flat terrain are discussed on page 33, and shown in pictures 51 and 52. On entirely flat terrain, it was possible to construct on an 85 foot ROW, although this increased somewhat as work progressed through clean-up.

c. Separation of topsoil from parent material on side-hill cuts is shown on page 37, and pictures 58 and 60. Page 39, picture 62, depicts lack of topsoil separation where it should have been done.

d. Page 40, and pictures 64 and 67 show deep side hill cuts, topsoil separation, and parent material storage.

e. Page 43 and photos 69-73 show extra-deep pipe burial in hilly areas and resulting large amounts of spoil.

f. Page 47-55 describe in detail why ROWs are wider than 100 feet in hilly terrain, and include diagrams explaining why this happens with respect to how pipelines must be constructed. The following significant conclusions are reached:

"1) Any deviation from flat terrain (0 degree slope) causes a geometric increase in width requirements, primarily for soil and spoil storage.

"2) There is often a progressive increase in r-o-w width after initial r-o-w clearing as different stages of construction proceed.

"3) there were numerous areas of extra r-o-w width needed beyond the 100 foot requested by DNRC.

"4) There was a high potential for topsoil mixing in the numerous side-hill cuts.

"6) Construction crews demonstrated an exceptional ability to re-contour the disturbed surface to the original configuration and replace topsoil when it had been correctly stripped.

IV. Consequences of pipeline leaks and ruptures must enter into route comparison, assessment of impacts, and need for the project.

My April 4 comments (pages 3 through 11) indicated in detail why impacts of pipeline leaks and ruptures need to be addressed in PUC decisions. I reiterate those recommendations, and have additional points regarding federal rules, and analysis of existing corridors, as follows:

A. Problems with federal rules. There are federal rules regarding hazardous liquid pipelines effects on the environment and people. These pipeline integrity rules pertain to environmental and socioeconomic impacts . They are administered by the Pipeline and Hazardous Materials Safety Administration (PHMSA) in the U.S. Department of Transportation. These rules refer to High Consequence Areas (HCA) and Unusually Sensitive Areas (USAs). (Title 49: Transportation PART 195—TRANSPORTATION OF HAZARDOUS LIQUIDS BY PIPELINE.) Both of these categories refer to populated areas, some aquifers, and some ecologically sensitive areas. I referred to HCAs in my April 4, 2014 comments.

The problem is that the federal rules regarding USAs and HCAs very much "high-grade" sensitive environmental features, and only include the rarest and most unusual ecological or natural resource features. This is not just my opinion. Describing sensitive area—and making lists of them—has been standard regulatory practice for many years. Such areas are subsequently avoided, or if they cannot be avoided, various mitigation measures are incorporated into government permits to reduce impacts. For example, these lists include public lands dedicated to a public use such as parks and wildlife management areas, and critical habitat features for certain species, such as deer wintering areas.

One would expect that such normalized lists would have been incorporated into the PHMSA rules. *PHMSA did not even begin to do so.* The notice of the adoption of final rules noted that government agencies with much more expertise than PHMSA regarding pollution and natural resources, such as the EPA and US Department of Interior, strongly objected to the restricted list of USAs and HCAs. (See Federal Register / Vol. 65, No. 232 / Friday, December 1, 2000 / Rules and Regulations.) Many other commenters, including the US Department of Justice also objected to this limited list.

In spite of these objections, the Office of Pipeline Safety didn't budge and kept the limited list with little justification.

However, in 2011, Congress passed the Pipeline Safety Act, and it was signed into law in early 2012. This was in response to the Michigan Enbridge pipeline rupture, the explosion of a gas pipeline in California that killed 8 people, and other pipeline accidents. Now, PHMSA Administrator Cynthia Quarterman noted in a hearing last week in the US House of Representatives that new rules will be out for review shortly regarding USAs and HCAs and other rules regarding pipeline integrity and potential environmental impact.

B. PUC route comparison with respect to USAs and HCAs . The PUC route comparison needs to identify and compare:

1. Any USAs and HCAs as defined in *current* federal pipeline integrity rules on any of the routes that have been identified or are being studied.

2. Any USAs and HCAs—or other categories related to the environment—*as defined in proposed new rules* on any of the routes being studied and identified, assuming the new proposed rules come out in time.

3. Determine the effects on any USAs or HCAs should there be a pipeline rupture, based on the "worst case" as defined in the Oak Ridge National Laboratory 2012. "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety" December 2012. This should also incorporate a "worst case" regarding collateral damage to existing pipelines in the two corridors that already have multiple pipelines.

C. Collective facility plan. Enbridge is the owner of all of the lines in its mainline corridor to Superior. In other words, it collectively owns all the pipelines in most of this corridor. Enbridge should be required to submit a Facility Plan for the Mainline Corridor, and any other corridor that contains more than one Enbridge line. This should be in addition to the plans on each individual line. Such plans can provide indications of responses to spills constrained by existing lines, as well as be indicative of "corridor fatigue."

V. Additional comments on the analysis of "corridor fatigue" issues. My April 4 comments addressed "corridor fatigue" on pages 11-16, with recommendations on pages 15-16. I have the following additional comments.

The route comparison simply must address the growing problem of adding more and more pipelines to existing corridors that were established prior to environmental laws. Therefore, the key place to begin is in the contractor hired by the PUC. Information about the existing pipelines and corridors will aid in understanding the extent of "corridor fatigue" and the increased risk of accidents on one line cascading to others. Therefore, the Scope of Work for the PUC contractor should specifically require the contractor include at least the following with respect to existing corridors:

A. Information about existing lines. On each existing line this should include: locations, identification of any looped areas, locations of cross-overs, types of river crossings such as whether they are trenched or bored, and extent of cover in the riverbed if trenched. There are also a number of locations along the Enbridge Mainline where pipelines actually are not next to each other, which results in multiple corridors somewhat close together rather than one corridor.

B. Facility plans on existing lines. Federal rules require that a "facilities plan" be submitted by a pipeline company prior to its being built. According to a call to the state office of pipeline safety, these are sent to PHMSA, and are not filed with the Minnesota agency. These plans are to include such items as the company's risk assessment, identification of HCAs and USAs, and other content highly relevant to an assessment of impacts and a comparison of routes.

C. Locations of problems areas identified during construction of existing lines. Enbridge and MinnCan should provide information on problem areas identified during construction of the existing lines.

D. Identify "choke points." There are locations along existing corridors where it is simply not physically possible to add more pipelines. These are sometimes referred to as "choke points." Such areas are indicative of "corridor fatigue," and are also the reason for the divergence noted in #2 above.

E. Locations where existing pipelines are exposed or more vulnerable to damage. Pipelines constructed in the past were built to lesser standards than current pipelines. For instance, Enbridge Line 3 was placed on the surface of the ground in certain wetland locations and cover piled on top of it. Over time, this has resulted in pipe exposure. Federal rules do not require that older pipelines meet current standards; therefore, Enbridge has been re-covering such locations on a voluntary basis. These locations should be identified. Also, I am aware of at least one, and possibly two locations along the Enbridge corridor where pipe is exposed as it crosses a river. One of these is a trout stream in Beltrami County.

Such locations are more vulnerable to vandalism and environmental events such as large and unusual rainfall events. Therefore, these locations along the existing corridors increase the risk of ruptures and accidents which may cause increased risk to new lines. The contractor needs to obtain from Enbridge and MinnCan records that identify such areas, and include this factor in assessing "corridor fatigue" and the route comparison.

F. Rivers and floodplains crossed at an oblique angle. Such important natural resource areas should be crossed by pipelines in a perpendicular manner in order to minimize the length of crossing this feature. This would be done when a new corridor is established. Therefore, data on oblique crossings is a measure of existing corridor problems. The LaSalle Creek crossing north of Itasca Park is a good example of this problem. A good measure of each crossing is the distance crossed obliquely compared to the perpendicular distance of the same crossing.

G. Avoidance areas under current pipeline construction practices. The existing corridors should be assessed to determine locations that would have been avoided if the existing pipelines were not present. Admittedly, this assessment would be somewhat objective. However, there are such features as lakes crossed by pipelines on the existing corridor. It is highly unlikely such features would be crossed by a new pipeline corridor. Also, a new pipeline corridor could well be routed around at least some wetlands rather than the numerous wetland crossing now found on the old corridors proposed to be followed by Enbridge's new lines.

H. Areas of restricted access. The existence of buried lines actively interfering with response to pipeline ruptures can reduce response time because heavy equipment can't drive over lines in some locations. In addition, pipeline ruptures in areas with few roads likely would exacerbate spills. The existing corridors should be examined to find such areas.

FRIENDS OF THE HEADWATERS

RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENTS "B"

B-1 Stolen 11.19.14 Direct Testimony SP
B-2 Stolen 11.19.14 Direct Testimony SP-App 5
B-3 Stolen 11.19.14 Direct Testimony SP-App 6
B-4 Stolen 1.15.15 Surrebuttal Testimony SP

Record of Paul Stolen's Direct Testimony and Surrebuttal Testimony for Sandpiper Pipeline Contested Case and Evidentiary Hearings

FRIENDS OF THE HEADWATERS

MINNESOTA PUBLIC UTILITIES COMMISSION

MPUC DOCKET NO. PL-6668/CN-13-473
OAH DOCKET NO. OAH-8-2500-31260

DIRECT TESTIMONY OF PAUL STOLEN

NOVEMBER 19, 2014

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I. INTRODUCTION REGARDING QUALIFICATIONS – PURPOSE OF TESTIMONY.

Q: State your name and employment status.

A: My name is Paul Stolen, and I am retired from a number of different state government agencies in Minnesota and Montana, which also included one period of working for a consulting company.

Q: For whom are you testifying?

A: I am testifying on behalf of Friends of the Headwaters ("FOH").

Q: Have you testified in proceedings in front of the Public Utilities Commission before?

A: No. I have prepared policy papers, testified in court, and given depositions, but I have not testified in front of the Minnesota Public Utilities Commission ("PUC").

Q: What is your educational experience?

A: I have a both a Bachelors and Masters of Science in Wildlife Management from the University of Minnesota. Right after the MS degree, I studied animal behavior and have published several articles about waterfowl behavior in refereed journals. Shortly after that I entered the Master of Art program in the University of Minnesota in School of Journalism with a minor in the Hubert Humphrey School of Public Affairs. At the Humphrey School I studied environmental policy and the scientific research leading to Genetically Modified Organisms, which was controversial research at the time. I wrote a paper on this topic that was later used in support of a law passed by the Minnesota Legislature requiring that GMO releases in some instances be subject to environmental review.

Q: What is your work experience?

A. After school, I had an internship with the Minnesota Environmental Quality Board ("EQB") staffing the Power Plant Siting Advisory Citizens Committee, which conducted a review of the state regulations regarding large energy facilities. I also worked for the Minnesota Legislature, conducting a program review of the Legislature's Science and Technology Project, as well as staffing an environmental committee. This program was created by a National Science Foundation grant to establish better science and engineering understanding in the Legislature. I also worked as staff for the Joint Committee on Solid and Hazardous Waste.

From 1979 to 1985, I worked as a Project Manager and Special Projects Coordinator in the Montana Department of Natural Resources and Conservation, Energy Division. My duties primarily consisted of conducting environmental review and managing the drafting of

Environmental Impact Statements ("EIS"). This position also involved conducting joint federal-state EISs. Projects included water diversions, large coal-fired energy facilities, large transmission lines, hydroelectric dams, pipelines, and wind projects. I also assisted in re-writing the environmental review regulations. A special project was supervising the preparation of two major reports on the biological effects of electromagnetic fields associated with high voltage transmission lines.

I continued environmental review work in 1986 and 1987 at a private consulting firm now owned by URS Corporation. That position involved preparing environmental assessment worksheets ("EAWs") and environmental permits. From this position I transitioned to the DNR where I worked until I retired in 2009. I began my career at DNR as an Operational Planner in the Fish and Wildlife Division. I worked on strategic, operational, and long-range planning on a team, with the main focus often being implementing a new budget management system in this Division. I also assisted with the creation of the regional environmental review staff (of which I was one of the first hired in Bemidji) by writing the justification for the Legislative appropriation.

In 1990, I began my position at DNR as Regional Environmental Assessment Ecologist for the Northwest quarter of Minnesota. I was responsible for reviewing, among smaller projects, complex—often politically sensitive—projects affecting the environment, and coordinating with state, federal, and local agencies to try to reduce regulatory complexity. This included reviews of large flood control projects and hundreds of reviews of many other types of projects. The two most significant projects I worked on were, first, several controversial water diversion projects proposed by North Dakota that affect Minnesota, and second a Generic Joint Federal/State EIS on flood control projects in Minnesota.

Q: What is your experience with developing or reviewing government policy regarding facilities that potentially have large consequences to the environment?

A: During my Montana employment I coordinated the re-writing of the environmental review portion of regulations for Montana's Major Facility Siting Act, and wrote portions of them. At the time, this law incorporated need, location, and environmental review requirements and decisions all in one law. I prepared for the rule creation by doing a review of all state environmental review programs in the USA, as well as US federal and Canadian environmental review law and regulations, including the NEPA Deskbook. Also, the Scope of Work that I

created for the contract to study electromagnetic fields effects of high voltage power lines led to adoption of a Montana state standard for proximity of large power lines to residences, the first in the nation. I was an advisor to the Montana Board of Natural Resources during their debate about adopting this standard. After returning to Minnesota, I was hired as a facility siting specialist by BRW, Inc. (which had a contract with the White Earth Indian Reservation) primarily to review a proposal to locate high level nuclear waste sites that would affect Native American land and resources. I wrote a 76 page report that allowed White Earth to set policy based on sound technical information about this proposal. While later working for the Minnesota DNR, I was the main state representative working with state and federal agencies, and the Canadian provincial and federal governments, on the two proposed interbasin water transfers potentially negatively affecting Minnesota and Canadian ecosystems. This included working with the US State Department, and Canadian Foreign Affairs agency in Ottawa and at the Canadian Consulate in Minneapolis.

Q: What is your experience with risk assessments?

A: While I was representing the Minnesota DNR regarding the two interbasin water transfer proposals, I developed a critique of a large USGS risk assessment done for the US Bureau of Reclamation concerning the transfer of biota not found in the Hudson Bay drainage from the Missouri River basin. This involved obtaining expert assistance from a scientist knowledgeable about the details of risk assessment methods. I also reviewed the Oak Ridge National Laboratory risk assessment discussed in Appendix 1 regarding block valves on pipelines. During my work history, I also reviewed methods of forecasting impacts that would be viewed as preliminary to creation of numerical risk assessments.

Q: What is your experience with pipelines?

A: My experience with pipelines began in college when I was a laborer on the bending crew during the construction of a large diameter pipeline in the vicinity of Bemidji Minnesota. Over the course of my government career, I have been involved in approximately 12 pipeline projects in various roles, including managing an EIS on one project. I was the state environmental inspector for a Montana project and part time inspector on several other pipeline projects in Minnesota. I have given training sessions on pipeline construction as it relates to techniques of identifying impacts and mitigation and on the ins and outs of pipeline construction. I have prepared a report on the right of way requirements of large diameter pipelines that has seen

extensive use for training and determining right of way requirements. Pipeline projects have included natural gas, crude oil, carbon dioxide, and water lines. I have testified in court as an expert witness on one pipeline project.

I.B. What is the purpose of your testimony? Please outline its major components along with short statements as to implications and findings.

I.B.1. Intended audience for this testimony. This testimony is specifically submitted to the Public Utility Commission (PUC) for use in the fact-finding process for the necessary regulatory decisions concerning the Sandpiper proposal. In my regulatory career, I have been involved in a number of difficult and large projects that have generated a large amount of public interest and intensive study by government agencies. The purpose of this testimony is to join together all the various pieces that will—or should—enter into government decisions on such projects. Often, on such projects, these pieces don't become clear until it is too late to develop a more orderly and democratic decision process. I have received a number of questions from citizens who know my experience with pipelines and other large projects. It is also evident that the Enbridge projects and oil transportation in general are receiving wide attention, and questions, from large numbers of public officials.

The format and content of this testimony is intended to provide information on the key elements of the technical and public policy issues and implications of these proposals, both to the PUC and to the public that I have tried to serve throughout my career. My understanding is that the PUC members and its staff are broadly receptive to participation by interested parties. While this testimony is submitted under the name of Friends of the Headwaters (FOH), I have developed it as an unpaid interested citizen who happens to have in depth experience with pipelines, natural resources and environmental review of large and complex projects. The content is certainly based on suggestions from FOH, but it also based on my understanding of what citizens and public officials need and expect from someone with my background. I have tried to make the testimony readable to the interested public. I hope I have succeeded.

The testimony is also intended to be useful in scoping issues to be included in an EIS.

I.B.2. What pipeline projects are the subject of my testimony? My testimony focuses on two proposed Enbridge projects, and three recently approved and constructed large pipeline projects in Minnesota. The inclusion of the latter three will become evident in my testimony. These projects are:

I.B.1. New Enbridge projects. Minnesota public officials are faced with decisions on the need for and location of two large Enbridge pipeline proposals. As proposed by Enbridge, the first of these is the Sandpiper project intended to carry oil in a 24-inch pipe from North Dakota's Bakken field east to Clearbrook, then south with a 30-inch pipe to Park Rapids, then east on to Superior, Wisconsin. The second is a 36-inch Enbridge pipeline, that is to replace and enlarge (by about 12% in volume) Enbridge's older Line 3, (a 34-inch pipe), and will carry Canadian tar sand oil. According to Enbridge, it is proposed to follow Enbridge's Mainline Corridor from Canada to then join Sandpiper near Clearbrook, then follow the Sandpiper proposed route to Superior.

I.B.2. Three large recent pipeline projects. These included the 36-inch Alberta Clipper and 20-inch Southern Lights projects which were finished in 2010 in Minnesota. They followed the existing Enbridge Mainline Corridor to Superior Wisconsin, and carry tar sand oil from Alberta, and diluent back to Alberta from refineries. This mainline corridor already had multiple other pipelines in it. The third project was the 24-inch MinnCan project from Clearbrook to refineries in the Twin Cities. It followed a corridor created years ago by two smaller and older pipelines for most of its route. It was completed in 2008 and 2009. The two new Enbridge projects are proposed to follow that corridor from Clearbrook to Park Rapids, then turn east to follow a new pipeline route to Superior.

I.C. Is a Minnesota Environmental Impact Statement (EIS) required and necessary for the Enbridge Projects?

One of the purposes of my testimony is to indicate that an EIS on these projects must be accomplished because testimony so far in the PUC proceedings indicate that the Certificate of Need decision by the PUC is a state action subject to the Minnesota Environmental Policy Act—separate from the Route Permit decision. Legal briefs previously filed in this docket have described how the responsibility to prepare environmental studies for the Route Permit was given in 1989 to the Department of Commerce and PUC as an alternative review process. However, according to those same briefs, the MEQB did not transfer the Certificate of Need responsibility to these agencies, and therefore, it appears that the Comparative Environmental Assessment for the Route Permit does not apply to the Certificate of Need decisions.

Furthermore, the rules for the CN need decision clearly list separate environmental criteria than those found in the Route Permit rules. These CN criteria also cover review of alternatives—

including establishing the foundation that a CN could be denied on the basis of environmental impacts and a poor choice of routes.

Of course, I am not a lawyer and am not supplying a legal analysis. However, I do believe my career as a civil servant, regulator with responsibilities for applying law and regulations to particular situations, and my work preparing, coordinating and commenting on environmental review documents make me competent to interpret how policy—as listed in rules—applies to methods of assessing impacts and comparing alternatives. Therefore, this testimony provides information that informs—based on the criteria in the CN rules—the decision on whether to grant or not grant a Certificate of Need. I believe it is both good law and good policy to prepare an EIS based on my experience.

To my knowledge, and in my personal experience, a Minnesota EIS has never been done on any of the large pipelines that are currently located in Minnesota. Under Minnesota policy, an EIS is required if there is the "potential for significant environmental effects." My testimony will review what is involved concerning this potential as it applies to the two Enbridge proposals. I believe it provides clear and convincing evidence that the answer is yes, there is such potential and that an EIS is appropriate. Furthermore, given the very rapid—and historically relatively surprising—rapid expansion of North American oil and natural gas supplies, and Minnesota's location between supplies and markets, my testimony indicates this is time to objectively study the implications to natural resources and people as well as alternative locations and transport methods.

I.D. Physical and operational magnitude of the Enbridge proposals. Project magnitude is directly relevant to whether "there is the potential for significant environmental effects." The purpose of this part of the testimony is to describe the large magnitude of these projects. In making a finding that there is the potential for significant effects, there are three main elements to be considered in this case: a) the physical magnitude—sometimes called the "environmental footprint"—of the projects, b) whether the location of the projects increases the potential effects, and c) whether events during the operation of the project can heighten the magnitude of potential effects. Obviously, pipeline leaks, ruptures, potential explosions, and so forth are all potential operational effects. For the sake of my testimony, I have selected a project life time frame of 50 years, which is often used in the case of large projects that are built to last.

I believe my testimony will show that each of the above factors—even individually—provides justification for a finding that an EIS is the proper approach. Furthermore, the testimony will explain that standard risk assessment approaches have a foundation principal: that for any complex technological system, if the potential damage or consequences of failure is very high, it is imperative that rare events—even very rare events—be examined to determine, first the

potential magnitude and consequences of the failure, and second, whether the facility should be located in a location that will suffer less damage if the system fails.

The magnitude of the Enbridge projects is very large in every way. For example, my testimony indicates that the flow of oil under the Straight River just south of Park Rapids, if both projects are built, will be 175 percent of the entire early April flow of water under the river. (See Appendix 1.) The Straight River contains a nationally recognized brown trout fishery. Essentially, adding these two projects to this landscape enlarges and creates an industrial corridor through highly important natural resources and recreational areas.

I.E. Potential impacts during the 50 year project life with respect to pipeline leaks and ruptures, route comparison issues, Enbridge's historical record, and federal oversight.

The purpose of this part of the testimony is to describe why it is extremely important to consider pipeline leaks and ruptures in an EIS and in respect to route comparison and project location. It will also discuss Enbridge's record. This testimony reviews recent large and damaging pipeline events, including Enbridge's pipeline ruptures in 2010 and 2012, respectively in Michigan and Wisconsin. My testimony indicates that based on these recent events it appears that risk assessments of pipelines done since then have either concluded or implied that risks of large oil spill events are higher than previously thought. Such assessments are more cautious and express concern that human error—rather than engineering sophistication—is a major factor in ruptures and leaks. My testimony quotes from a finding of the National Transportation Board (NTSB) that Enbridge’s management failures and the federal government’s oversight failures contributed to the Michigan rupture of 20,000 barrels of oil into the Kalamazoo River. It includes studies directly relevant to the two Enbridge proposals and to comparing routes in Minnesota. This includes a study for the US Department of State that the potential impact zone that should be assessed for oil releases into waterways is at least 10 miles on either side of a proposed route. The testimony raises serious doubts that the Enbridge proposed route for both projects should be given a Certificate of Need under the conditions proposed by the Applicant. The testimony references and include extensive reports I submitted to the Department of Commerce in April during its Route Permit proceedings (Appendix 1 and 2).

I.F. Nature of pipeline construction that can cause impacts.

The purpose of this portion of the testimony is to describe the details of pipeline construction in order to relate it to impact assessment, permitting, route comparisons, and to understand Enbridge's environmental documentation and its limitations. Pipeline construction involves operations that have the potential for long term impacts. There are landscape differences that can significantly increase such impacts. My testimony describes pipeline construction techniques with a focus on the kinds of impacts that occur, including mitigation measures, and whether Minnesota agencies, if any, can make them mandatory requirements. It also provides a basis for developing methods of comparing routes based on this knowledge of impacts and whether one route is more problematic than another. The testimony includes as an Appendix a report I previously prepared on right of way requirements for large pipelines with a focus on potential impacts. (Appendix 3.)

I.G. Critique of Enbridge environmental documentation and impact assessment.

The purpose of this portion of the testimony is to determine the adequacy of Enbridge's environmental documentation of the most important and widespread potential impacts. This testimony demonstrates why the Enbridge documentation lacks an impact assessment on major topics related to the nature of pipeline construction, as identified in the previous section (I.E.). It points out that there is no discussion of operational impacts with respect to pipeline leaks and ruptures. The testimony indicates that often the Enbridge documentation describes possible mitigation measures, but, since there is little or no impact assessment preceding the description of the measures, one cannot determine sufficiency of those measures.

I.H. Description of the key elements of environmental review and of problems with the existing Minnesota decision making process for large diameter liquid pipelines.

The purpose of this portion of my testimony is to answer questions about the apparent procedural difficulties and problems with Enbridge's environmental documentation. Some citizens are certainly aware of these problems, as are agency staff who I have talked to. My testimony includes a description of how environmental review is conducted, since the administrative hearings on the Sandpiper proposal is not an environmental review process. I attempt to answer some questions as to why these problems exist. I discuss the difficulties of integrating the Minnesota Environmental Policy Act (MEPA) and its regulations into the PUC and Commerce procedures. This testimony reviews some of the problems with the three previous large pipelines constructed in Minnesota. It will compare these procedures with the normal environmental review procedures used on other types of large projects with respect to impact significance, and methods of analyzing impacts and comparing locations.

NOTE: Because of my desire to make my testimony easily accessible to readers who are not familiar with the PUC's traditional Q & A format, I have chosen to present the balance of my testimony in the narrative form of a report. For ease of identification for citation and examination purposes, I have retained the lined page format, and have put the report in outline form for easy reference to particular sections.

II. WHY ARE PIPELINE PROPOSALS IN MINNESOTA CONTROVERSIAL NOW COMPARED TO THE PAST?

Minnesota has more pipelines crossing it than many other states. This is partly because it lies between large Canadian production areas and Eastern and Central US industrial and population areas. Yet, until now, there has been little apparent public controversy when three large pipelines were recently constructed. These were the 24 inch Koch Industries MinnCan pipeline, the Enbridge 36 inch Alberta Clipper pipeline, and the 24 inch Enbridge Southern Lights pipeline. To the outside, public observer, there doesn't appear to have been much apparent concern from state agencies such as DNR and PCA on previous pipeline projects. The key word is "apparent" because, in fact construction of the three pipelines exposed problems with Minnesota's policy of studying and approving large pipelines.

The reasons for this large change also include other factors besides these three pipelines, and are highly relevant to the decisions of the PUC, as follows:

II.A. Recent large and damaging pipeline ruptures and leaks and role of human error. There have been large, disturbing and damaging recent pipeline accidents that have had human error and mismanagement as a cause or major contributing factor. Five such accidents are described in Section V below. Three of these were on Enbridge pipelines. These accidents have raised a high degree of concern in the public, in Congress, and in state legislatures.

II.B. "Corridor fatigue." This term is being commonly used among regulatory insiders. It describes how the addition of more and more pipelines (or other linear projects) in an existing utility corridor creates more and more conflicts. This is greatly exacerbated by the fact that the original corridors pre-date environmental laws. Therefore, they were established with little or no regard for environmental impacts. This topic is explored in Section V.I.D.2 below and in more detail in Appendix 1 and 2. In fact, this is one of the major factors explaining why the Sandpiper route along Enbridge's mainline corridor has been dropped from consideration.

II.C. Construction of three recent large pipelines in Minnesota exposed problems. The construction of Alberta Clipper, Southern Lights, and MinCann exposed major environmental impacts that were not addressed in permitting. For example, a number of comment letters from the DNR documenting impacts that were at least somewhat avoidable were not addressed by the ALJ or PUC and Commerce staff DNR, PCA, and Corps of Engineers staff familiar with these projects was well aware of these problems. (See also Appendix 1.)

One of the main problems was that DOC staff allowed the defective Enbridge-prepared CEA to be used without having an independent contractor prepare the studies. It also became clear in the DNR and PCA--during the review of these three pipelines—that it has been a fallacy to conclude that impacts from large-diameter pipelines are temporary and construction related. This is discussed in more detail in Sections VI- VIII below.

II.D. Public observations of the three large recent projects. The public was paying little attention to the recent three projects while they were in the permitting stage. However, during construction and especially in hilly areas outside of farm country, many members of the public observed the large size of the projects and became concerned. (For example, I retired from the DNR in 2009, but received calls from concerned citizens both before and after retirement.) In my opinion, at least some concerned members of the public have concluded that the Enbridge Mainline Corridor, and the proposed Sandpiper/Line 3 corridor, have become major linear industrial facilities through sensitive landscapes by lack of awareness by permitting authorites of what they have become.

III. PRACTICAL GUIDE TO ENVIRONMENTAL REVIEW (ER) AND PREPARATION OF REVIEWS OF LARGE PIPELINE PROJECTS.

III. A. Introduction: Why must decision makers understand ER?

In this section, I intend to explain the key elements that make up environmental review, as practiced under MEQB regulations, and that of other states and the federal government. My purpose is not to interpret ER law, or its regulations, but rather to explain how Minnesota

regulations are used to develop a proper impact assessment in general, and apply them to the Sandpiper/Line 3 projects in particular.

Key users of ER are not usually technical people. In my view, decision makers should understand environmental review in plainer English that the regulations provide. Over time, ER practices have become cumbersome, bureaucratic, and confusing. And many people think that ER is a only hoop to jump through of little substance. This is unfortunate, because the lawmakers who passed the laws that are the foundation of ER did not have this intent.

Basically, the intent of ER is simple: it is a founded in a "sunshine law" whose purpose is to shed light on the consequences of our societal activities that affect the environment—before we take these actions, and in time to change them should the consequences be serious and avoidable. It is also the intent of this law and its regulations to allow and encourage the public to be part of such decisions.

It is especially important to understand how conclusions about potential project impacts are defined. This is because a possible outcome of the necessary ER studies could be that the PUC would deny a Certificate of Need (CN) for this proposed route because it demonstrates unacceptable risk and unacceptable impacts to Minnesota resources, while at the same time indicating to Enbridge they should seek a less impactful corridor for these two additional lines.

There is also a large difference in how ER relates to linear projects as compared to projects proposed for one site. By their nature of being linear, moving the route to avoid a problem in one area can result in affecting another problem area. This complicates individual permitting and the analysis of impacts. It is also a big mistake to conclude that linear *pipeline* projects should be handled with the same policies as linear high voltage transmission line projects.

In point of fact, decisions on large and long linear *pipeline* projects, when proposed in environmentally sensitive areas, and coupled with a large degree of public concern, *should* always be difficult for government agencies as well as for the project proposer. This is because deciding to approve them in such locations should require a high bar of proving they will not cause disastrous impacts should they fail, and that they meet a high bar for quality of studies. And such pipeline projects are only very superficially like the regulated utility High voltage Power Line projects the PUC is familiar with. They cross many jurisdictions and potentially affect many people just as do power lines. But pipeline projects carry a much higher potential for long term damage to natural resources and people. They also attract legitimate concern from outside residents who recreate in these areas, or hold them dear for their intrinsic value. .

III.B. What is "environmental review?"

III.B.1. What is the purpose of ER? "Environmental review", at its simplest, is the concept of attempting to *objectively* understand the consequences of building something *before* it is built. If done correctly, the understanding of consequences should occur in time to change *what* is planned, or, at least as importantly, to *change the location* of what is planned in order to *reduce* the social, economic, and environmental consequences when such actions are found to

potentially cause *significant adverse effects*. My testimony primarily focuses on the highlighted words in these sentences.

III.B.2 When did ER begin, and why? The federal environmental review law was passed in 1969, and Minnesota's own law was passed in 1973. It was modelled on the federal law. This was part of the flurry of environmental laws passed in the 1960's and 1970s. There was bipartisan support for the laws; for example, the Clean Air Act was signed by Richard Nixon. What led up to passage was increased understanding of the environment coupled with understanding of how we were affecting the environment. The sustained period of economic expansion and building that had occurred after WWII also led to people noticing some of the negative impacts of uncontrolled growth.

But this was also coupled with something very important: A realization that adjustments could be made in *how* we built projects or *where* we built them so that damage to the environment could be reduced, sometimes at very little cost, or even less cost. This was the foundation for the passage of the federal and state ER laws.

III.B.3. Why is this history relevant to Sandpiper and the Line #3 replacement? The Enbridge mainline corridor, and the Sandpiper route south of Clearbrook to the Park Rapids area, was established *before most Minnesota or federal environmental laws were passed*. In many cases the first pipelines were built in nearly a straight line without regard to environmental features. In other words, these first pipelines created corridors where none would have been placed under current understanding of impacts and under current law and policy.

III.C. How does ER relate to environmental permits? ER documents are crucially important to permits, and ER law and regulation connect these closely. Here are some major points:

1. The ER analysis applies to the whole project, while most environmental permits apply to specific impacts and aspects of a project, such as waste discharges.

2. The ER analysis is to identify all significant impacts, whether there are permits for them or not. For example, analysis of the Sandpiper/Line 3 projects may identify large acreages of topsoil loss due to mixing with parent material, but there is no permit for this, nor are there specific permits regarding general wildlife habitat losses, even though hundreds of acres are involved. (Note: ER documents also often name many impacts but note they are not significant.)

3. ER documents themselves don't mandate actions—except as noted in Section III.E.9 and III.E.13 below—but may reveal information that results in mandatory changes in a project.

4. ER documents must identify all project permits, and do develop information relevant to permits. This helps provide permit information to other agencies, and also helps ER document preparers focus on relevant information for permits. Mitigation measures developed during ER document preparation can be incorporated into permits.

5. No Minnesota government entity can issue environmental permits before completion of environmental review. However, agencies can begin processing permits during the review.

6. Federal permits trigger federal ER. Some overlap between federal and state information requirements is common. The Clean Water Act, triggered by some state and federal permits, have requirements for demonstration that there is not a reasonable alternative available with fewer impacts.

III.D. What are the key elements of environmental review?

The following are key elements of both federal and state ER laws and regulations. Also, I have tried to focus on elements that are especially appropriate for these two pipeline projects. One may use them as guidance to judge whether ER on the two Enbridge projects is successful or deficient.

III.D. 1. Types of documents and studies. The "depth" of studies for ER documents is based on the project's physical magnitude and possible magnitude of impacts. In Minnesota, there are two kinds of studies: An Environmental Assessment Worksheet (EAW) and an Environmental Impact Statement (EIS.) The EIS is an-in-depth study. Generally, the main purpose of an EAW is to determine whether an EIS should be done. As a practical matter, many EAWs are done and fewer EISs are done. The EAW without an EIS often functions as an information document for the public and agencies, and, importantly, as a tool for identifying mitigation to reduce impacts. (Note for clarity: In *federal* law, the first stage of ER is the preparation of an Environmental Assessment (EA) which is normally more comprehensive than Minnesota's EAW.)

Both kinds of Minnesota reviews are specifically defined and explained in regulations and by rule. The MEQB also publishes in-depth guidance documents for use by the public and project proposers.

III.D.2. Who prepares ER documents and what are their qualifications? In Minnesota, government agencies are always responsible for the ultimate content of ER documents. Here, they are called the "Responsible Governmental Unit, "or RGU. Sometimes government employees prepare the document—especially when their own projects trigger ER. But most often, document preparers are government officials who have relied on applicant's environmental reports. But it is uncommon for an RGU to rely on the applicant's environmental reports on big projects.

Document preparers vary from those with technical training to those with little or no technical training. The latter have usually have received on-the-job training in "apprentice" positions with consulting firms or state agencies. They obtain their ability to prepare such documents by examining previously prepared ER documents or by working under technical people. The most common technical background of individuals who prepare or supervise the preparation of ER documents in Minnesota is engineering, in my opinion.

It is common for project developers to hire a consultant to prepare their own initial ER documents, and also quite common for the government agencies to rely on such documents.

III.D.3. Quality control of ER documents. There has been an inherent and chronic conflict of interest when project proposers preparing their own ER documents conclude it is best to

downplay or ignore serious impacts that raise costs. As a result, over time, there has been more and more guidance from the MEQB on this topic. MEQB has stressed that it is the responsibility of the government agency (RGU in Minnesota) to detect such problems. And they have stressed that applicants should supply data in their ER documents, rather than conclusions and analysis. The potential for conflict of interest is also why outside reviews of draft ER documents are so important.

Unfortunately, quality of content unrelated to conflicts of interest is still a problem for many ER documents, even EISs. For example, even after many years of ER, one commonly finds statements that wildlife species will move from a project area to another area and thus such an impact is a temporary impact. This is scientifically erroneous: wildlife populations are a function of habitat size; habitat acreage loss means permanent population reduction.

III.D.4. <u>Timelines and due process for project developers</u>. All ER regulations have concrete and mostly mandatory timelines covering when documents are due, and include deadlines for public comments. With justification, persons proposing and building projects are concerned with lack of clarity in how reviews are conducted by government, public involvement, and potential delays. In my opinion, this was a trade-off that occurred when the laws were passed. Those wanting thorough reviews got some assurance it would occur, while project proposers got assurance of due process via such deadlines.

There are deadlines for commenting on EAWs, draft EISs, and Final EISs. The final step is the Record of Decision prepared by the RGU.

III.E.5. <u>Scientifically based objective analysis</u>. Environmental review is intended to be based on sound scientific data and analysis. The intent of the process is to identify relevant studies suitable for defining impacts as much as possible. This includes using environmental reviews of other similar projects that have already been completed as a source of technical information. However, in another sense, ER documents are not fully scientific documents either, since they extrapolate data to conclusions that otherwise might not be reached in a scientific forum: *because government agencies must make decisions even when information is not complete*. It is particularly important in such situations for government agencies other than the RGU, the public, the applicant, and other affected parties to review ER documents in these subjective situations.

ER documents can look thorough and complete to non-technical people simply because the content is technical. This doesn't mean it's a quality ER document. Also, when the ER document is an EIS, conclusions about different topics of analysis in the EIS need to be judged by the standards of the topic rather than one standard. For example, the standards of "proof" for engineering topics are different than the standards for drawing ecological conclusions. This is because ecological systems are not understood as completely as engineering topics but government permitting agencies—and those preparing ER documents—must still draw conclusions.

III.D.6. <u>Public review of an EAW and draft EIS documents</u>. Both federal and state ER laws have, as a foundation principle, the clear requirement for the public (and any other entity) to

review and comment on the EAW (or federal EA), and then the draft and final EIS. Furthermore, the responsible government agency *must* respond to substantive comments on these documents.

III.D.7. <u>Ease of public participation</u>. Both federal and state ER laws and regulations make it easy for the public to understand and participate in the review process. A major purpose is to provide a democratic process understandable to engaged members of the public. Even those who have difficulty with bureaucratic procedures can usually participate. In Minnesota, the MEQB provides helpful and detailed guidance manuals describing the process and the role of citizens.

ER documents are also intended to invite public participation in agency decisions, and function to provide both technical and public opinions on the more subjective parts of decisions on issuance of controversial permits. Furthermore, in my experience, the public comes up with technical issues missed by document preparers because they often know more about local landscapes.

III.D.8. <u>Defining a project, its operations, and its operation life</u>. This is a crucial first step that must be taken prior to proceeding with an analysis of impacts and comparison of alternatives. It is also a frequent defect in project documentation. It is crucial because if a project's "environmental footprint "is not clearly defined or known, one can't properly determine impacts or mitigation measures. This is a major problem with Enbridge's environmental documentation, as described in Section VII. (See also the discussion about "related actions" in Section IV.B and C.)

For projects such as both of Enbridge's proposals, analyzing possible impacts during the *operation* of the pipelines is very important, as discussed in Section V. A project life of 50 years is often used for projects that have a long operational time frame. I have used it in this testimony for the sake of discussion, but none of my conclusions require a specific future number.

III.D.9. <u>Scoping of issues</u>. This concept is used to select the most important issues for further analysis, such as in an EIS, in order to avoid including extraneous material. Again, this is a participatory process. Therefore, an agency intending to prepare an EIS first publishes a Scoping EAW, which lays out intensions for the detailed analysis so the public can weigh in with its views. The scoping concept was developed to counter problem of voluminous ER documents containing information that wasn't used.

III.D.10. <u>Analysis of alternatives</u> EIS document preparers are required to do a careful analysis of alternatives to a project. Furthermore, the state policy from the Minnesota Environmental Policy Act (MEPA) says that no state permits shall be issued for a project that has serious impacts if there is an alternative with fewer impacts, and that economic considerations alone can't be the determining factor. This is based on an important provision of MEPA: "*Subd. 6.Prohibitions. <u>No state action significantly affecting the quality of the environment shall be allowed</u>, nor shall any permit for natural resources management and development be granted, <u>where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state</u>, <u>so long as there is a feasible and prudent alternative</u> consistent with the reasonable requirements of the*

public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct." (Emphasis added.)

This clause in Minnesota ER law is well known to government agencies that are familiar with EIS preparation.

III.D.11. Permanent vs temporary impacts. Generally speaking, in environmental review there is an important and somewhat subjective distinction between temporary and permanent impacts. Temporary impacts are considered of much lower importance than permanent impacts. The problem is that project developers often claim temporary impacts when, upon careful examination, there are in fact long-term important impacts.

III.D.12. Role of government agencies other than the agency preparing the ER review. In many instances, other agencies have more significant environmental permits than the RGU that has been designated in the rules. Other agencies often also have more expertise concerning the potential impacts to the environment than does the RGU. This is the case with the PUC and Department of Commerce with respect to pipelines, since they have small staffs primarily functioning as coordinators. Therefore, state agency roles in commenting on ER documents are very important. This also lets applicants know of concerns as early as possible regarding permits.

In Minnesota, it is rare for a single agency to have an overall project permit for a complex project with many individual government permits. The pipeline routing permit administered by the Department of Commerce and PUC is therefore unusual.

In fact, the MEPA law specifically sets out a number of roles of Minnesota agencies having environmental permits and general responsibilities for environmental issues. These include coordinating with other agencies, representation on the MEQB, and staff assignments to the MEQB.

III.D.13. Analyzing related actions and projects in the same or adjacent location. In order to accomplish an adequate impact analysis, the EIS must address other planned projects in certain circumstances. As described in Section IV, Enbridge's plans to build the Line 3 replacement in the same corridor as Sandpiper apparently meet this requirement. In addition, the cumulative impacts of past projects in the existing corridors also need to be addressed.

III.D. 14. Mandatory mitigation measures. In ER preparation, identification of mitigation measures may become an important part of the project, and, in practice, sometimes become mandatory. They can be identified and made a requirement of various permits, or they can become incorporated into the project during the ER study phase. This is essentially a change in the project. An example of the latter mitigation is if Enbridge were to commit to moving the pipeline location to avoid a sensitive area, or to cross a river at a more appropriate location because of ER findings.

IV. WHY WOULD AN EIS BE NORMAL GOOD PRACTICE FOR THE CERTIFICATE OF NEED FOR SANDPIPER/LINE 3?

As a person tasked with making recommendations as to whether an EIS is needed—a role I have been in during my career—I would recommend an EIS for the Enbridge projects based especially on information in this Section of my testimony. When considering decisions as to whether an EIS is needed, the staff of government agencies assigned to address ER is well aware of the overall policy standard for determining an EIS is needed: it is needed "when there is a potential for significant environmental effects." (See IV.C for a summary about this policy.)

No one has determined that pipelines, especially the CN decision, do not need to fulfill the requirements of the Minnesota Environmental Policy Act. There is no specific statements in CN rules that describe the type of ER document that should be prepared in order to address the CN criteria pertaining to the environment and alternatives decision that must be made in the CN decision. However, there is helpful guidance in the MEQB rules and law that can be used to support findings that an EIS is needed on the Certificate of Need. Furthermore, the clearest foundation are the undisputed facts that Sandpiper/Line 3 constitutes projects of very large physical magnitude, and potentially very damaging operational impacts should the pipelines rupture during a 50 year project lifetime, if built on the proposed route. Conducting an EIS by Minnesota agencies is the proper response to these circumstances.

There are three other facts about Sandpiper/Line 3—aside from the above quoted state policy about significant environmental effects—that are essentially guidance for concluding that an EIS on the two Enbridge projects would be normal practice:

1) That of the project's physical and operational magnitude when compared to the magnitude of other projects for which an EIS is required and that contain specific physical project size with the Sandpiper/Line 3 physical size.

2) Rules pertaining to related projects in essentially the same location (See IV.B.), and

3) The fact that Wisconsin is preparing an EIS on both projects together for its portion of the projects, and Enbridge has in fact indicated it wants to build both projects at the same time. It could well be that Enbridge will respond to a question as to why they haven't proposed this in Minnesota by saying that such joint construction is not in their plan for various reasons, and is therefore a different project. This is in effect saying that unknown factors trump environmental protection, since joint construction can result in reduced impacts. To me, such a statement would not be supported in normal ER decision making for projects, since there are clear environmental benefits of constructing together, if attainable precautions are taken.

MEQB rules provide guidance on these topics that could or must be applied to decisions about Sandpiper and the Line 3 replacement projects, as follows:

IV.A. Project magnitude. There are mandatory EIS categories—projects for which an EIS must be prepared—for projects based on the physical magnitude of the project. These can be

compared to the size of the Enbridge projects. According to Enbridge, permanent forest loss is 619 acres, and temporary forest lost will be 1,524 acres for Sandpiper alone.

Now compare the size of other types of projects that require an EIS in order to gain perspective on the magnitude of the Enbridge projects. MEQB rules say the following, with the underlining being my emphasis on what to compare with permanent impacts of the Enbridge projects:

"*Mandatory EIS categories:*

Subpart 1. Threshold test. An EIS must be prepared for projects that meet or exceed the threshold of any of subparts 2 to 25. Multiple projects and multiple stages of a single project that are connected actions or phased actions <u>*must be considered in total when comparing the project or projects to the thresholds*</u> *of this part. (*Author's note: Of course, there are as yet no figures for Line 3 impacts.*)*

"Subp. 9. Nonmetallic mineral mining. . . .

"A. For development of a facility for the extraction or mining of peat which will utilize <u>*320 acres of land*</u> *or more during its existence. . . .*

"B. For development of a facility for the extraction or mining of sand, gravel, stone, or other nonmetallic minerals, other than peat, which will excavate <u>*160 acres of land or more to a mean depth of ten feet*</u> *or more during its existence, ...*

"C. For development of a facility for the extraction or mining of sand, gravel, stone, or other nonmetallic minerals, other than peat, which <u>*will excavate 40 or more acres of forested*</u> *or other naturally vegetated land in a sensitive shoreland area or* <u>*80 or more acres of forested*</u> *or other naturally vegetated land in a nonsensitive shoreland area, . . .*

"*Subp. 16. Highway projects. For construction of a road on a new location which is four or more lanes in width and* <u>*two or more miles*</u> *in length, ...*

"Subp. 27. Land conversion in shorelands. For a project that permanently converts <u>*40 or more acres of forested*</u> *or other naturally vegetated land in a sensitive shoreland area or* <u>*80 or more acres of forested*</u> *or other naturally vegetated land in a nonsensitive shoreland area, ...*

"Subp. 20. Wetlands and public waters. For projects that will eliminate <u>*a public water*</u> *or public waters wetland, ...*

"Subp. 15. Airport runway projects. For construction of a paved and lighted airport runway of <u>*5,000 feet of length*</u> *or greater, . . ."*

<u>IV.B. Related actions, connected actions, phased actions, and cumulative impacts of projects</u>. MEQB rules and guidance documents directly consider in multiple ways the situation posed by Enbridge's plans to put the replacement Line 3 mostly in the same corridor as

Sandpiper and within a few feet of it. Consider the following rules, with my emphasis and notes added into the quoted text:

"Subp. 11a. Cumulative potential effects. "Cumulative potential effects" means the effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects. Significant cumulative potential effects can result from individually minor projects taking place over a period of time. In analyzing the contributions of past projects to cumulative potential effects, it is sufficient to consider the current aggregate effects of past actions. (Author's note: This means that "corridor fatigue" issues need to be fully examined in the environmental analysis and in the comparison of routes.)

"Subp. 9c. Connected actions. Two projects are "connected actions" if a responsible governmental unit determines they are related in any of the following ways:
*A. one project would directly induce the other;" (*Authors note: Enbridge has explicitly said it will put the 36 inch Line 3 replacement in the Sandpiper corridor to take advantage of its presence; essentially this is quite explicitly saying Sandpiper induces Line 3.)

"Subp. 60. Phased action. "Phased action" means two or more projects to be undertaken by the same proposer that a RGU determines:
A. will have environmental effects on the same geographic area; and
B. are substantially certain to be undertaken sequentially over a limited period of time."
(Author's note: Line 3 will be placed alongside Sandpiper, and Enbridge has indicated in public announcements that it expects permitting will take "about a year.")

"*Subp. 4. Connected actions and phased actions. Multiple projects and multiple stages of a single project that are connected actions or phased actions must be considered in total when determining the need for an EIS and in preparing the EIS. " (*Author's note: No matter what the extent of the analysis of the impacts of Line 3, the future presence of Line 3 certainly increases the magnitude of impact. Impact magnitude is what triggers the necessity of an EIS.)

*"Subp. 5. Related actions EIS. An RGU may prepare a single EIS for independent projects with potential cumulative environmental impacts on the same geographic area if the RGU determines that review can be accomplished in a more effective or efficient manner through a related actions EIS. A project must not be included in a related actions EIS if its inclusion would unreasonably delay review of the project compared to review of the project through an independent EIS." (*Author's note: This rule provides some limited flexibility for the PUC to manage the actual impact assessment of Line 3; however, given the overwhelming evidence that an EIS is needed for Sandpiper, it is doubtful there will be an unreasonable delay caused by including Line 3 in the analysis.)

IV. C. Conclusions regarding Sandpiper/Line 3 regarding the standard for preparing an EIS. As noted above, government officials tasked with making determinations as to whether an

EIS is needed, must use, by law, a determination as to whether a project "has the potential for significant environmental effects." If the answer is yes, an EIS is indicated.

The above quoted rules and guidance, and other parts of my testimony, support the following four conclusions:

1) Enbridge's Sandpiper/Line 3 project's geographic scope—its "environmental footprint"—is far larger than all other mandatory EIS categories that are based on acreage or length impacts, and

2) Sandpiper/Line 3 replacement must be addressed together with respect to cumulative impacts and the decision as to whether an EIS must be done, even though they are separate projects in other ways. The projects are likely to be proposed to be constructed only about 50 feet apart, based on plans in Wisconsin.

3) Enbridge's environmental documentation in its applications doesn't cover important construction and land requirement impacts adequately and is silent of operation impacts; therefore, is also silent on mitigation of impacts because the impacts are unknown but potentially significant.

4) Operation during an approximately 50 year project life has the potential for exceptionally significant environmental effects. This is discussed in more detail in the next section and in Appendix 1 and 2.

V. POTENTIAL OPERATION IMPACTS OVER APPROXIMATELY 50 YEAR OPERATION WITH FOCUS ON PIPELINE ACCIDENTS, LEAKS AND RUPTURES AND POTENTIAL ENSUING CONSEQUENCES

V.A. Introduction. As noted earlier in this report, the two Enbridge proposals are very large projects proposed to carry very large volumes of oil. For example, if they are constructed as proposed, the petroleum product flow under the Straight River just south of Park Rapids — including volatile Bakken oil and heavy crude Tar Sand oil—will be about 175 percent of the Straight River early April water flow. (See Appendix 1.)

These pipelines, if constructed, will be in place for at least 50 years in highly sensitive environments. Even with the best possible management oversight and training, operators get complacent as time goes by and there are no accidents. There are other high-tech situations that are comparable. Take, for example, the troubling scandal involving US Air Force crews manning nuclear missiles. According to news reports, it was found that all sorts of rules were being broken and covered up—the apparent cause being boredom and no real actions except training exercises.

Pipeline systems are technologically complex in order to transport the large quantities of liquid petroleum product they carry. They are much more than a pipe in the ground. There are complex control and monitoring systems to detect pressure changes and ruptures, and systems to shut down operation of the lines should there be a rupture. There are also detailed records of

pipe manufacture, and installation—such as for welds during construction. Also, there are highly technical methods of monitoring the pipeline after installation to find such things as corrosion or damage.

And, just like many other high technology systems, if there is failure, the consequences are environmental damage and risks to people. There are clear tools available for decision makers to assess the likelihood of failure and environmental consequences of failure. These tools aid in decisions regarding locations for the pipeline, and aid in engineering decisions to add extra technological features. For example for pipelines, additional site specific risk assessment can result in additional automatic shutdown values.

The decision and assessment tool of most interest in the EIS review of Sandpiper/Line 3 is risk assessment coupled with specific requirements to yield findings relevant to impacts to natural resources and comparison of routes. There are a number of such risk assessments already accomplished that are applicable to these projects as discussed in this testimony. A central point of risk assessments—a *foundation principle of assessing risk—is that when there are large adverse consequences, the rare and even unlikely events need to be incorporated into the analysis.* In fact, if such rare events are not included, at least in formal risk assessment, it is not considered a valid exercise. This is a general principle applicable to risk assessments done for many technologies besides pipelines.

In the following sections, I will:

V.B Describe some of the recent pipeline incidents that have brought a large amount of attention to the whole issue of failure of pipelines and human error contributing to such failures,

V.C. Describe recent concerns from the NTSB and others about the capability of the federal government to adequately supervise pipeline safety.

V.D. Describe other studies and risk assessments relevant to showing that the Sandpiper/Line 3 proposed route is a very poor location for these projects, and that point to highly important topics to be addressed in an EIS, and

V.E. Draw conclusions as to the significance of these issues to studying alternatives and the potential damage to Minnesota's resources.

V. B. Recent large and damaging pipeline ruptures and leaks and role of human error.
One of the reasons for the high public attention given to pipelines lately is that large and damaging pipeline accidents have recently occurred. This has happened in spite of continued advances in pipeline technology and oversight by the federal Office of Pipeline Safety.

Investigation of the recent large pipeline events have found human error and mismanagement as a cause or major factor contributing to much higher damage. Human error is more difficult to prevent and to forecast in risk assessments as compared to clear-cut engineering solutions that reduce risk. This is especially true when considering that pipeline engineering, including heightened ability to detect corrosion and other problems, continues to improve. Pipeline safety

regulations also supposedly have been steadily improving. And yet evidence suggests that human error and mismanagement of pipeline information may not be improving. This should definitely be a topic of analysis in an EIS.

In addition, these accidents have resulted in major questioning of the adequacy of the Pipeline and Hazardous Materials Safety Administration (PHMSA) regulations. This is a federal oversight agency located within the US Department Transportation.

The recent pipeline accident events include five recent events that are described herein. Three of them involve Enbridge pipelines. The natural gas pipeline explosion is included because the gross mismanagement of a failing pipeline in a residential area occurred in spite of major safety requirements. It has contributed to public attention on *any* pipeline, including those in Minnesota, because it was such an egregious violation of rules supervision of safe pipeline operation. (Note: There have been other recent events not included here.)

Collectively, these events have led to a number of recent and important risk assessments, PHSMA activities, and Congressional attention highly relevant to the EIS on Sandpiper/Line 3, including reasons to additionally question the proposed route, and comparison of alternatives. These events also have indicated that Minnesota should take a much more active role in analyzing risk, mitigation of risk, and state oversight of pipelines.

V.B.1. Enbridge pipeline rupture into Talmadge Creek and the Kalamazoo River in Michigan. Approximately 20,000 barrels of oil were released in 2010 from a 30-inch diameter pipeline. The ongoing cost for clean-up recently reached $1.21 billion, according to recent Enbridge securities filings as reported by the press (See Appendix 7). This is substantially higher than previously estimated, and Enbridge expects cost to continue to rise. Pipeline operators failed to shut down the pipeline for 17 hours after the rupture occurred, and in fact tried to twice re-start the pipeline pumping. This is tar sand oil. The lighter elements vaporized, and the heavy oil portions are in river sediments. Impacts occurred at least 35 miles downstream from the release. (See also V.C. below and also Appendix 1.)

V.B.2. Two Enbridge pipeline failures of Line 14 in Wisconsin. The following information about these failures can be found in two corrective action orders of the federal PHMSA Office of Pipeline Safety, dated July 30 and August 1, 2012. (See Appendix 5 and 6.) This 24-inch pipeline, running from Superior Wisconsin to Mokena, Illinois failed by seam rupture in two locations, first in 2007, then again in July 2012. Amounts of oil released were, respectively, 1,500 barrels and 1,200 barrels of product in the two locations. Enbridge rapidly responded to the 2012 release, and shut down the pipeline in about 17 minutes after the leak was detected. However, this pipeline, installed in 1998, had a significant history of seam failure and that during construction, ". . . radiography of girth welds revealed lack-of-fusion defects in the ERW seams at multiple locations along the Affected Pipeline." (emphasis added.)

The 2012 failure happened two years after the very large Kalamazoo River Michigan event. PHMSA found that, ".. . . .additional failures throughout all parts of the Lakehead System indicate that Respondent's (Enbridge) integrity management program may be inadequate." (emphasis added.) The additional 2012 failure in Line 14—coming two years after the very large

Michigan event and after Enbridge assurances of management changes—appears to have been a last straw. PHMSA ordered a detailed review of the entire Lakehead System, including the hiring of an independent outside reviewer, and a commitment by Enbridge to these details, before it allowed a re-start of Line 14 (emphasis added. See August 1, 2012 Amendment to the July 30 Order, Appendix 6.)

V.B.3. ExxonMobil Pipeline company rupture under the bed of the Yellowstone River. This accident was about 20 miles upstream of Billings, Montana. It was caused by scour from flooding that exposed and fractured the 12-inch pipeline that was trenched under the river bed. An estimated 1,509 barrels of oil were released before the pipeline was closed in 2011. The slowness of the shut-down significantly contributed to the amount released. Clean-up and recovery costs were $135 million. (Recent news reports indicate final costs and fines are not yet resolved.)

V.B.4. 2010 San Bruno natural gas pipeline explosion. While this event happened with a natural gas pipeline, the massive management failures of the Pacific Gas and Electric Company were a foundation cause of this event. It also revealed failures of government agencies, such as the Federal Department of Transportation and PHSMA, to provide adequate oversight. That is clearly why this event is relevant to the Sandpiper/Line 3 project—*since it implies that Minnesota cannot necessarily rely on the federal government to adequately provide oversight on these projects or determine the scope of studies of potential damages*.
This event occurred on Sept 9, 2010 in this suburb of San Francisco. A 30-inch (76 cm) diameter steel pipeline exploded in a residential neighborhood. It took crews nearly an hour to determine it was a gas pipeline explosion. As of September 29, 2010, the death toll was eight people. Eyewitnesses reported the initial blast caused a wall of fire more than 1,000 feet high.

This event is also discussed in Appendix 1.

The fallout from this accident continues to this day. There is much information available online about the accident and the fallout, including technical information. The Wikipedia entry provides a succinct statement of recent developments: "*On April 1, 2014, PG&E was indicted by a federal grand jury in U.S. District Court, San Francisco, for multiple violations of the Natural Gas Pipeline Safety Act of 1968 relating to its record keeping and pipeline "integrity management" practices.. . . An additional indictment was issued by the grand jury on July 29, 2014, charging the company with obstruction of justice for lying to the NTSB regarding its pipeline testing policy, bringing the total number of counts in the indictment to 28.. . .Under the new indictment, the company could be fined as much as $1.3 billion, based on profit associated with the alleged misconduct, in addition to $2.5 billion for state regulatory violations*."

V.C. Concerns about the capability of the federal government to adequately supervise pipeline safety.

The National Transportation Safety Board investigated the Enbridge Michigan spill described above. It made a finding in 2012 concerning inadequacies of Enbridge and at the Pipeline and Hazardous Materials Safety Administration. The following is a direct quote about their findings:

"*Executive Summary*

"On Sunday, July 25, 2010, at 5:58 p.m., eastern daylight time, a segment of a 30-inch-diameter pipeline (Line 6B), owned and operated by Enbridge Incorporated (Enbridge) ruptured in a wetland in Marshall, Michigan. The rupture occurred during the last stages of a planned shutdown and was not discovered or addressed for over 17 hours. During the time lapse, Enbridge twice pumped additional oil (81 percent of the total release) into Line 6B during two startups; the total release was estimated to be 843,444 gallons of crude oil. The oil saturated the surrounding wetlands and flowed into the Talmadge Creek and the Kalamazoo River. Local residents self-evacuated from their houses, and the environment was negatively affected.

"Probable Cause

"The National Transportation Safety Board (NTSB) determines that the probable cause of the pipeline rupture was corrosion fatigue cracks that grew and coalesced from crack and corrosion defects under disbonded polyethylene tape coating, producing a substantial crude oil release that went undetected by the control center for over 17 hours. The rupture and prolonged release were made possible by pervasive organizational failures at Enbridge Incorporated (Enbridge) that included the following:

"--Deficient integrity management procedures, which allowed well-documented crack defects in corroded areas to propagate until the pipeline failed.

"--Inadequate training of control center personnel, which allowed the rupture to remain undetected for 17 hours and through two startups of the pipeline.

"--Insufficient public awareness and education, which allowed the release to continue for nearly 14 hours after the first notification of an odor to local emergency response agencies.

"--Contributing to the accident was the Pipeline and Hazardous Materials Safety Administration's (PHMSA) weak regulation for assessing and repairing crack indications, as well as PHMSA's ineffective oversight of pipeline integrity management programs, control center procedures, and public awareness. (Emphasis added.)

"--Contributing to the severity of the environmental consequences were (1) Enbridge's failure to identify and ensure the availability of well-trained emergency responders with sufficient response resources, (2) PHMSA's <u>lack of regulatory guidance</u> for pipeline facility response planning, and (3) <u>PHMSA's</u> limited oversight of pipeline emergency preparedness that led to the <u>approval of a deficient facility response plan</u>." (Emphasis added. July 10, 2012. Executive Summary of National Transportation Safety Board. NTSB Number: PAR-12-01 NTIS Number: PB2012-916501)

V.D. <u>Other studies and risk assessments relevant to showing that the Sandpiper/Line 3 proposed route is a very poor location for these projects</u>.

Other recent EIS studies on other projects, as well as risk assessments (and related studies) that appear to be relevant to the Sandpiper/Line 3 projects are approptiately looked at when conducting accepted practices of scoping an EIS topic. I have located several of these documents that are highly appropriate to the proposed projects.

As noted above, there has been a flurry of government activity regarding pipeline failures and the large environmental and economic consequences of these failures. I summarized five of the events and the investigations of them in the above section. (There have been other recent serious pipeline accidents as well.) There have been a number of recent major risk assessments that also are very relevant to an EIS on Sandpiper/Line 3, its route, and route comparisons, including the system alternatives now being studied by the DOC.

In this section, I include recent risk assessment-related documentation relevant to the proposed route and its projects. All of these studies came after the large pipeline rupture events included in my testimony, and after findings that human error was a major factor in the events.

V.D. 1. ORNL shutoff valve risk assessment This detailed study covered both gas and liquid pipeline ruptures, and used modelling to predict damages and releases. It compared modelling results to the Enbridge Michigan event, among others. It was reviewed in some detail in my comments to the DOC, which is Appendix 1 in my testimony. I am incorporating this material into my testimony. It has direct relevance to the Sandpiper/Line 3 project and proposed route in a number of ways, including, but not limited to the following two points:

a. It can be used in an EIS to look at consequences on proposed and different routes. It addresses the consequences of large events like the Michigan Enbridge event, including estimates of costs, extent of damage, etc. It also discusses scenarios of ruptures without ignition accompanying the rupture, and then with ignition and fire after the rupture. In fact, the Enbridge Michigan event is used in the ORNL report as a case study. As I point out in Appendix 1, however, the scenarios addressed do not include whether fires will damage adjacent pipelines that are a few feet away, such found in the corridor proposed by Enbridge.

b. Recommendations for additional automatic valve locations. The recommendations in the ORNL study indicate additional automatic valves should be included based on such things as landscape conditions. The question is, has this been specifically done for the Enbridge projects, and exactly where are they located? In addition, there will be route differences as to the need for such additional features, which can be used as an indicator of the sensitivity of the route.

V.D.2. "Third-Party Consultant Environmental Review of the TransCanada Keystone XL Pipeline Risk Assessment." Prepared by the Exponent Consulting Company.

This April 2013 study was prepared for the US Department of State and TransCanada Keystone Pipeline. (The US Department of State is responsible for the federal EIS on Keystone.) The analysis is not a risk assessment per se, but rather an environmental review critique of the previous risk assessment done in 2009 for the Keystone EIS. (Note: That risk assessment was finished before the large Enbridge Michigan event and other relevant serious events.) The report

notes that the above-cited ORNL study engineering study on automatic block valve placement was the other report prepared to update the 2009 risk assessment.

This study contains findings of major significance to conducting an adequate analysis of impact from the Sandpiper/Line 3 projects, and on the route comparison. I will not go into all of the relevant points; however, I am including some directly pertinent to the projects in Minnesota. In fact, they are likely more pertinent than along the Keystone Route because of the higher levels of surface and groundwater, and complicated moraine landscape found along the proposed route in Minnesota.

The purpose of the report is worth quoting because of its relevance to the purpose of the review of the Enbridge proposals in Minnesota. The following language is in the Report summary and the introduction:

" *This final report summarizes the results of work performed by Exponent representing the "Environmental Review" of the Keystone XL Project Risk Assessment (Appendix P of FEIS) and related sections in the Final Environmental Impact Statement (FEIS). This work represents a limited and directed scope of review focused specifically on the Risk Assessment (Appendix P of FEIS) and on specific questions addressed to Exponent. . . . .The agencies thought it advisable to have an additional environmental review of the Risk Assessment because of the highly technical nature of the issues involved, and the desire to ensure that the Project-specific Special Conditions are properly implemented in the event that a Presidential Permit is issued. To address the issues identified by the agencies, we relied on information in the Risk Assessment and FEIS as well as information we obtained that related to the issues identified by the agencies. . . . . .Exponent was tasked by the agencies to provide the environmental review, part of which was to consider the presence of other sensitive environmental resources along the Project that may warrant additional environmental protection. These potentially sensitive environmental resources were in addition to those that had been the focus of the Risk Assessment."*

Given some of the wording of this report, its content is influenced by the recent damaging pipeline events that occurred after the original 2009 EIS study for Keystone XL. The study notes that a number of impact issues have not yet been addressed in the Keystone EIS, but are rather waiting on final centerline selection. These issues are also relevant to the Enbridge impact assessment and route comparison. Here are some Exponent findings directly relevant to the Sandpiper/Line 3 projects, the proposed route, and comparison of system alternatives:

V.D.2. a. <u>Analysis of risks related to small stream crossings.</u> Small streams were defined in this study as less than 100 feet wide. Here are just three of the relevant recommendations:

a.1. " A distance of at least 10 miles downstream from the proposed centerline of the pipeline should be used for the identification of sensitive areas and for identifying CPSs during the final design phase of the Project. " (p. xiv of Executive summary. CPS is "contributory pipeline segments" used by PHMSA associated with High Consequence Areas.) This distance was arrived at using "ecologically relevant criteria," according to the report.

Relevance to the proposed Sandpiper/Line 3 route and to the evaluation of system alternatives. There are very many small streams crossed on the Enbridge proposed route. Furthermore, the 10 mile distance is highly relevant to the width of the corridors used in the system alternative comparison being conducted now by DOC. It indicates that using a narrow corridor, such as two miles in width, would not fully capture the possible impact zone. Nor would it allow findings that a wide corridor with less concentration of small streams would be more favorable to moving a centerline than a corridor saturated with small streams. I note that Itasca State Park is easily within 10 miles of the proposed route.

V.D.2. a.2. <u>Exponent recommendation regarding burial depth in stream crossings</u>. "Keystone should rely upon stream-specific scour analyses for small stream crossings to identify where the pipeline should be buried deeper than 5 ft. or where horizontal directional drilling may be warranted." (p. xv.)

Relevance to the proposed route and to the evaluation of system alternatives. Depth of scour in general is an important issue, given the more intense precipitation events of the last few years. Deeper burial with more cover in trenched crossings may be a proper response to such events. Furthermore, Enbridge did not address this topic in its Environmental report, even though the Exxon pipeline rupture in the Yellowstone River was caused by scour and debris breaking the exposed pipeline during an exceptionally high runoff event in 2010. The may be a factor in route comparisons because the proposed Enbridge route has many small streams associated with groundwater discharge, which is likely to increase drilling mud releases. It is clearly a permitting issue for the DNR as well.

Not only that, but the EIS should address whether the existing pipelines in the corridor have adequate cover, since they are part of the industrial facility proposed to be enlarged by two more large pipelines.

V.D. 2. b. <u>Exponent recommendation regarding risk associated with downstream transport via waterways in general</u> . The study notes that the Keystone Final EIS indicates more analysis would be required after selection of the centerline. Included in that category was that further analysis of downstream transport distances in waterways was needed. It cites the Enbridge Michigan rupture into the Kalamazoo River in support of the recommendation.

Relevance to the proposed route and to the evaluation of system alternatives. As noted elsewhere, the large Enbridge spill cleanup involves a 35 mile stretch of the Kalamazoo River. There are locations in Minnesota crossed by the proposed route where the gradient is steeper than it is on rivers within the other system alternative locations. This can mean very rapid downstream travel of an oil spill. The fact is, the Enbridge Michigan event is now clearly entering into the calculation of risks. Furthermore, it appears to have *changed* actual calculation of risk. Essentially, this means that sometimes the real world enters into the modelling profession. Coupled with high consequences and unpredictability of human error, it means great care needs to be taken in choosing the methods of comparing alternatives, and deciding on whether to issue a Certificate of Need for the proposed route for these pipelines.

V.D.2. c. <u>Exponent discussions of groundwater impacts from "small" leaks.</u> The topic of groundwater contamination is very pertinent to the proposed and alternate routes for these proposed projects. The Exponent Report contains a large amount of information on assessing this potential impact, including methods and analysis of the product carried by the pipeline. However, there is one interesting issue that stands out, the topic of "pin-hole leaks." During the review of Alberta Clipper, Southern Lights, and MinnCan, agency staff was unable to obtain predictive knowledge of amounts and manner of detection. The Exponent Report sheds important light on this information, as follows:

"*Because small leaks may go undetected for longer periods of time, there is a potential for transport of oil spilled from the pipeline (i.e., diluted bitumen or synthetic crude oil) and the development of a dissolved constituent (i.e., benzene) plume that could ultimately result in impacts to groundwater resources down gradient from the pipeline. The potential extent of down gradient impacts is not quantitatively evaluated in the FEIS and discussed here. . . . ."For buried pipe in sloping terrain, lateral migration of oil could be greater, but also may result in surface expression sooner, when a barrier to oil flow (e.g., trench blocker) is encountered*." (p. 32. Note: FEIS means the Final EIS on Keystone.)

"*According to the report prepared by Battelle (2011), a <u>leak rate of 28 bbl./day is expected from a "pin-hole" leak defined as a leak through a 1/32-in. diameter hole</u>. The duration or time to surfacing would be dependent on the area over which oil infiltration occurs. If the oil spreads to a larger footprint, surfacing and potential detection will take longer than if the oil spreads to a smaller footprint. The size of the spill footprint will depend on several site-specific factors including but not limited to the permeability of trench backfill, and the permeability of soil surrounding the pipe trench. However, it is likely that a spill of 28 bbl/day <u>would result in oil surfacing and being detected on the time scale of a few months</u>."* (Exponent Report, p. 35. Emphasis added. Note: bbl/day means "barrels per day" and a barrel is 42 gallons.)

Relevance to the proposed route and to the evaluation of system alternatives. This information is obviously highly relevant to the necessary analysis of potential impacts, since it provides concrete information on the amounts of oil that can potentially leak that can only be detected when it reaches the surface. It also provides highly relevant information regarding route comparisons. Lateral movement of groundwater—a very important factor once crude oil enters the groundwater—is dependent on landscape types. And inferences can be made about lateral movement rates depending on the terrain of the different system alternatives.

<u>V.E. Environmental Protection Agency reviewal letter on Keystone draft Supplemental EIS on Keystone.</u>

This letter is dated April 22, 2013, and was sent to the US Department of State, the preparer of the federal EIS needed before a Presidential Permit can be given. It originates in the fact that the federal law regarding environmental review designates the EPA as, in effect, a quality control agency for federal EISs. This letter provides recommendations based on a high level of expertise and authority regarding compliance with Clean Water Act regulations with respect to oil spills and avoidance of oil spills by consideration of alternatives.

This letter contains multiple recommendations and findings relevant to the proposed Sandpiper/Line 3 project. Rather than quoting the lengthy relevant findings, here is a summary of main points:

1. The 2010 Enbridge Michigan spill of oil sands crude may require different response plans, and different impacts than spills of conventional oil.

2. It notes that on Keystone, the detection limits for early detection of a leak was 1.5- 2 % of pipeline flow, indicating substantial amounts of leakage before detection on the surface. (This figure was also mentioned in the Exponent Report.) (Note: Given the very large flows in the Enbridge pipelines, such leaks could be large before being detected, and could travel significant distances from the pipeline in hilly terrain and in areas with rapid lateral groundwater flow.)

3. The special constituents of tar sand oil could cause long-term toxicological impacts to organisms in the aquatic environment, and impact not as prominent in conventional oils. The letter supports findings that impact assessment studies need to examine the characteristics of the product with respect to environmental impacts of spills, because impacts differ among products.

4. The letter notes that significant improvements in reducing impacts have resulted from moving routes to avoid special groundwater areas. But then, very significantly, the letter goes on *to object to the eliminating of longer routes primarily because they were longer than the applicant's proposed route*. The letter indicates that the longer routes would reduce potential impacts to groundwater. It recommends that further justification be provided for eliminated the routes, or studying them further.

V.F. Conclusions about "significance of environmental effects" over the life of the project. There are a number of conclusions regarding analyzing operation impact for the probable life of the project. I draw these conclusions based on my experience with formulating plans for major EISs based on studying technical documents, and on commenting on major EISs prepared by others. The potential impact I have focused on in this section is the need for careful assessment of pipeline leaks, accidents, and ruptures. Here are some important conclusions that can be drawn based on proper use of environmental review policies:

V.F.1. The environmental consequences of oil loss to the environment, including large amounts of oil releases due to pipeline ruptures, needs to be thoroughly examined in spite of evidence that many miles of pipeline don't leak or rupture. In other words, this information is needed in spite of such events being rare and of low likelihood—even *very low likelihood*. Furthermore, such an analysis is standard procedure in methods of studying this topic, and, if not done would not be considered a proper risk analysis. Should a pipeline rupture of the magnitude of the Michigan event happen along certain areas of the proposed Enbridge route, environmental damage could be enormous.

V.F.2. The environmental consequences of rare events that could occur during the project life (50 years for the sake of this discussion) needs to be a major factor in comparing routes, since the consequences, and response time, will differ on the routes. An EIS on both Enbridge projects

must examine the consequences of pipeline failure in any proposed locations and on alternative routes, rather than just assume it won't happen or to not think about it.

V.F.3. Enbridge has firmly stated they *must* use the Clearbrook terminal, and *must* have the project endpoint as being Superior, Wisconsin. Enbridge also insists that longer alternative routes are not feasible because of increased costs. But the potential consequences of large events along the proposed route are so significant and damaging so as to strongly indicate—based on even a preliminary look at relevant information provided in other risks assessments, related studies, and actual events—that issuance of a Certificate of Need for the proposed route may be questionable. At a minimum, such issuance would have to meet a very high bar of detailed analysis subject to public review.

According to Enbridge's own filings, costs of a pipeline rupture in an actual sensitive area in Michigan have reached $1.21 billion. To me, this questions their argument that a longer route is more costly over the project life. Furthermore, Enbridge has supplied no information on consequences of pipeline ruptures on its routes, even though the information exists and has been given to the federal government. Given these various factors, an EIS must take a hard look at the Enbridge system and examine other alternate endpoints. A possible useful exercise would be to make a finding by the PUC that Enbridge needed to supply—as information to be used in the EIS—alternative plans for pipelines that do not need a Superior endpoint.

V.F.4. Given the potential consequences of natural resource impacts along the proposed route, added length of a safer route should not be a determinate for eliminating it from presentation as a viable alternative. This is a similar conclusion to that reached by the EPA on Keystone.

V.F.5. It is evident that the role of human error in pipeline accidents (a misnomer perhaps because "accident" implies something that couldn't be avoided) has been a major factor. It also is more difficult to control for and more difficult to predict. This needs to be taken into consideration in any kind of risk assessment.

V.F.6. Enbridge demonstrably does not have a good track record of responding to serious events. In spite of the huge spill in Michigan, another spill occurred two years later that was found to have the same sort of mismanagement and lack of appropriate response. It is likely that, on the day before the very large Michigan accident, Enbridge management officials, as well as PHMSA officials, would have provided strong assurances that this pipeline was safe to operate if they had been asked. This must be a factor in decisions regarding these proposed projects, albeit a subjective factor. A thorough inquiry into all records on the topic of management response to evidence of pipeline anomalies needs to be investigated in the EIS.

V.F.7. There are serious questions as to the adequacy of federal oversight of pipelines, based on material I have provided in this testimony. The United States Constitution provides its individual states certain rights not to be abrogated by the federal government. Given the serious charges laid on the federal government by the NTSB report, and the fact that there has been no strengthening of federal laws since this report, Minnesota citizens, in my opinion, expect the PUC to assert this State's right to delve deeply into these subjects via a thorough EIS.

V.F.8. Risk assessment methods should be applied to the risk of pipeline product entering streams, and traveling for some distance, given the topography along the proposed route. Further, this risk assessment needs to address the condition of the existing pipelines and the likelihood that a rupture accompanied by a fire would damage adjacent pipelines (See Appendix 1.)

V.F.9. The MEQB should be designated as the RGU for the EIS on the Certificate of Need, given the complexity of the needed review, its ability to coordinate among agencies, and its familiarity with effective public participation methods.

VI. OVERVIEW OF INSTALLATION OF LARGE DIAMETER PIPELINES AND RESULTING ENVIRONMENTAL IMPACTS.

VI.A. Introduction. This section attempts to answer the questions: What are the special features of installation of large diameter pipelines that cause impacts—especially long term impacts? Each of the 10 features identified in this section also includes commentary on the main impacts associated with the construction feature, and how it is related to comparison of routes. The intent here is to help in scoping for the EIS on these projects.

Section VII follows this discussion by critiquing Enbridge's environmental documentation, and noting whether there are specific permits to address impacts.
Enbridge has submitted a lengthy environmental information report, including some descriptions of environmental impacts and plans to minimize impacts. In order to understand the adequacy of this information, it is important to understand how large pipelines are installed. Pipeline construction is unique when compared to most other large construction projects. Most other projects involve a permanent change to the landscape. When done correctly, pipeline construction involves lots of earth moving, but is followed by effective replacement of the original landscape, soil reclamation, and revegetation, with the exception that grasses replace woody vegetation over the pipeline.

The following discussion, and that in Section VII, focuses on those aspects of construction that cause the most important impacts, are generic to the whole project in Minnesota, and that therefore cover the most acreage of affected area. My review of the adequacy Enbridge's documentation is based on these factors.

My review is also based on a report I prepared some years ago while working for the State of Montana. (Appendix 3.)This report describes ROW requirements in flat terrain vs hilly terrain. It has been requested by a number of pipeline companies I have worked with as a regulator. It also has been viewed as a primer on pipeline construction for persons unacquainted with such projects. None of these companies challenged any of its findings. I have previously submitted this document to the Commerce Department (See Appendix 1 and 2, and especially Appendix 2 for an explanation of this report.)

The portions of the Montana report concerning ROW construction requirements are essentially applicable today, except perhaps as regards to possible additional widening because of worker safety protection. (Also, pipeline companies have somewhat differing views on how to

construct properly.) The report covered the right of way requirements for constructing the 180 mile long Northern Border 42-inch natural gas pipeline in Montana on flat terrain as compared to hilly terrain. The company had underestimated the ROW requirements in hilly terrain, causing construction delays and problems with landowners. The company originally asked for a 100-foot construction ROW but this proved wildly inadequate in hilly terrain, some of which is similar to that along the proposed Sandpiper route. I documented why the need to construct a level work pad in hilly terrain was the primary factor in right of way expansion beyond that requested. In some cases, the ROW became several hundred feet wide in hilly terrain. It is hereby incorporated into the record as part of my testimony.

VI.B. <u>Multiple choreographed operations moving along at rapid pace, including multiple inspection activities</u>. An rule of thumb that is sometimes used is that in open flat land, a mile of large diameter pipeline can be installed per day. Generally, this is more difficult to achieve in hilly terrain. There are multiple operations needed to accomplish installation, usually involving separate specialized crews. This starts with land clearing, then proceeds with construction of a level "work pad" involving excavation into hillsides, installation of temporary bridges over waterways, installation of temporary erosion control measures, pipe stringing, trench ditching, pipe bending, welding, pipe burial, re-contouring of hillsides, installation of permanent erosion control measures, topsoil replacement, and re-seeding.

Separate crews are often used for each of these operations, depending on site conditions and contractor preference. Worker safety is an important element because of the intensity of activities, and ROW construction width is influenced by these needs. River crossings are usually done with specialized crews. Pipe segments are then tied into the completed overland sections separately, coated with cathodic protection, x-rayed, inspected, and buried.

Multiple inspectors are on site at all times during construction to ensure proper installation. These include environmental inspectors working for the company, and can include independent inspectors reporting to state agencies (This occurred on the Alberta Clipper and Southern Lights projects.). Many other inspectors deal with pipe installation and engineering issues. Also, constant daily communication among construction supervisors and environmental inspectors is an important element in this fast moving construction operation. This also allows rapid communication with government regulatory personnel *if properly set up as a requirement of permits*. One of the most important reasons for this management system is that rain events and unexpected conditions can occur that need quick attention so as to not shut down the whole operation. This also reduces potential impacts during such events because it facilitates communication among environmental inspectors.

V.B.1. *Main environmental impact issues*: a) Interruption of any of these operations can cascade to other operations, some of which can result in increased adverse impacts, such as increased erosion into waterways. b) Environmental inspection by independent inspectors during construction is extremely important because of the rapidity of change in operations, speed of movement, and changing environmental conditions such as high rainfall events. Independent environmental inspectors reporting to state agencies are necessary. On every project where I was a state inspector, I have been told by company environmental inspectors that

my role was crucial to them. If I wasn't present, they said, their ability to obtain compliance and rectification of on-site problems was lessened.

V.B.2. ***Relevance to route comparisons, including system alternatives***. There are essentially two ways whereby the complexity of pipeline installation choreography needs to be factored into comparing routes and corridors:

a) On hilly terrain, managing the various parts of pipeline construction is more complex and more risky. Therefore, efficient management can reduce adverse environmental impacts;

b) When following an existing pipeline corridor, as part of the Enbridge proposal does, equipment operation and management is more constrained, especially in certain locations because there is existing pipe on one side of the trench and therefore heavy equipment can't operate on top of these lines; and

c) At other areas, there may be "choke points" on the other, working side of the pipeline. For example, for the sake of making the point, assume there is a cemetery or rare plant community close to the existing pipeline. The choice then becomes whether to squeeze the new pipeline into this narrow area, or construct two "cross-overs" to drill under the existing pipelines, and then back again after the "choke point" is passed. In other words, engineering and construction become lots more complicated.
Therefore, the comparison of routes needs to add a negative factor for following an existing corridor with respect to complexity and difficulty of construction.

VI.C. Construction on hilly terrain vs flat terrain. These two landscape conditions have profoundly different effects for the installation of large diameter pipelines. Construction companies can routinely handle both kinds of landscapes; however, there are large potential impact differences as well as environmental risk issues. Appendix 3 provides further documentation.

VI.C. 1. *Relevance to impacts:*

a) On flat terrain, the construction ROW can be substantially narrower than hilly terrain because there is less area needed for spoil storage except for the trench spoil and topsoil that is separated. In my experience with all the large diameter pipelines I have worked on, pipeline companies readily agreed to an 85-foot right of way as being adequate in flat terrain.

b) On flat terrain there is much less potential for water erosion during and afgter large rainfall events.

c) On flat terrain coordinating the various construction crews is more straightforward and predictable, and environmental inspection needs are substantially less.

d) There would be a large difference between flat terrain and hilly terrain if there is a pipeline accident, since pipeline product would spread much faster on hilly terrain as compared to flat terrain.

These large differences with respect to environmental impacts are explained in more detail in the following sections.

VI.C.2. *Relevance to route comparisons*: Some of the following sections point out how hilly terrain increases impacts. Fuidance as to how to compare routes on the basis of flat terrain vs hilly terrain is provided. For example, an 85-foot construction ROW could be used to calculate land requirements on flat terrain, as compared to 175-200 foot wide construction ROW in areas of side-hill cutting accompanied by topsoil separation in all excavated areas. (See Appendix 2 and 3.)

VI.D. Installing large diameter pipelines adjacent to existing pipelines. It is often considered by the public and others that following existing pipeline corridors is an advantage. It is clear that following existing corridors in some locations is an advantage. However, there are important factors that can greatly increase installation complexity and environmental impacts in other locations. The problems with some existing corridors—including some non-pipeline corridors—include:

VI.D.1 Corridors were established prior to almost all federal and state environmental laws, and therefore are often located in highly environmentally sensitive areas. Adding more lines accelerates the cumulative impacts to these areas.
VI.D.2 Enbridge's stated purpose is to install its pipeline about 50 feet offset from the existing lines, and Line 3 offset (apparently) by another 50 feet. However, there are many locations where this is not possible, or at least very undesirable. Examples include home sites close to the existing corridor (resulting in uprooting and buy-outs of people), and highly important natural resources right next to the existing pipeline. Such features would have been avoided when locating a new pipeline. This results in centerline changes to avoid such issues, or complicated cross-overs. All of this results in a sprawling corridor over a wide area. Among other adverse results, this results in habitat fragmentation in wildlife areas.

Essentially, the basic problem is that following existing pipelines greatly increases the likelihood of that otherwise avoidable impacts can't be avoided because of the "rule" that an existing line needs to be closely followed.

VI.D.3 There are many locations on existing corridors that cross rivers and floodplains at an oblique angle, thus increasing the potential for damage. A new line would cross such features at a perpendicular angle.

VI.D.4 Adding pipelines closely adjacent to an existing pipeline concentrates such facilities. While some view this as an advantage, there are also clear disadvantages. For example if there was a leak or rupture, clean-up becomes more complicated. Also, concentrations increase the attractiveness to a party deliberately seeking to cause damage. If accompanied by an explosion, the other adjacent pipelines could be threatened.

VI.D.5. There are also clear adverse impacts to wildlife in that a corridor becomes very wide as pipelines are added to the corridor. This is an adverse impact to species that follow cover along river banks—since a wide gap is created that exposes wildlife to predation. (I have personally

observed avian predators sitting on a tree next to such a wide pipeline area, apparently waiting for a mink or other animal to cross the exposed stream bank.)

VI.D.6. *Main impact issues*: There are serious and varied adverse impacts associated with following an existing pipeline, since the guiding principle—following an existing line established many years ago—greatly reduces the ability to avoid sensitive natural resources. In addition, there is at least an incremental increased risk of catastrophic oil releases.

VI.D.7. *Relevance to route comparisons*: When comparing routes, including system alternatives, the disadvantages of following pre-environmental law and regulation corridors must be considered a strong negative. The first step in so doing is carefully assessing the overall problems with the existing corridor.

VI.E. The construction right-of-way functions as a temporary road. Installing large pipelines require the use of heavy equipment that cannot drive on roads without damaging them. Large machines are needed to excavate large areas in hilly terrain and to move heavy pipe. In addition, enough work space is needed to allow equipment passage around other equipment—since multiple crews are present—and to ensure worker safety. (See Appendix 2 and 3.) Therefore, the ROW essentially becomes a temporary road until installation is completed. The distance of ROW cleared ahead of the other operations is a subjective factor that varies with projects, and whether or not permit requirements address this issue.

VI.E. 1. *Main impact issues*: All of the following are approptiate topics for assessment of impacts of the projects as proposed, and mitigation measures identified.

a) Long-term soil, subsoil, or parent material compaction can result, especially on certain soils and if there is lots of traffic under wet conditions.

b) Damage to topsoil from repeated passage of heavy equipment if topsoil is not stripped from the construction lane,

c) Length of time ROW functions as a road, and the length of the opened ROW is important. For example, it may be financially beneficial for the contractor to clear and grade 5 miles of ROW, but such a practice is not actually necessary for pipeline construction, and

d) wind and water erosion risk substantially increases when clearing crews get far ahead of the installation crews.

VI.E.2 *Relevance to route comparisons:* All routes will of course have construction proceeding in the manner I have described, such as using the ROW as a temporary road. However, there will be differences in construction costs and construction complexity as a function of how much flat land and special features (such as river crossings) there are on different routes.

VI.F. Pipe trenching. Excavation of a trench for pipe burial is at variable depths. On farmland, Minnesota regulations say that landowners can ask for and receive 54 inches of cover over the pipe. However, Enbridge says it will seek to have landowners waive this requirement.

VI.F.1. *Main impact issues*: Topsoil can be lost because of mixing with parent material spoil, unless it is separated prior to trenching. If not separated, re-vegetation suffers, areas are subject to invasive species establishment, and, on hillsides, erosion potential is higher. If pipe is buried at a shallower depth, heat from the oil will result in earlier growth in the spring, and possible drying out of soil above the pipe during the growing season. This effect is heightened downstream of pump stations because of higher oil temperatures. These will both be a long term impacts.

VI.F.2. *Relevance to route comparisons:* Likely no difference in route comparisons, other than that associated with differences in amounts of farmland, and possibly soil susceptibility to compaction.

VI.G. Topsoil separation in general. Enbridge has portrayed several possibilities regarding topsoil separation; therefore I have separated out this construction technique. They indicate in diagrams that several scenarios for topsoil separation on the construction ROW. However, they don't estimate acreages that will receive these different treatments.

VI.G.1. *Main impact issues*: It is entirely established that degrading topsoil by being mixed with parent material from three or more feet below the surface is a long-term adverse impact. As noted elsewhere, and in Appendix 2 and 3, the potential area where this can occur on large diameter pipelines constructed in hilly terrain can be large. Enbridge has not calculated this area under the conditions of their proposal. Careful topsoil separation in any excavated or high traffic areas has environmental benefits, such as rapidity of reclamation, less invasion of exotic species, and return of crop and forest productivity, etc. Without having estimates of the different Enbridge practices, this impact can't be accurately estimated.

VI.G. 2. *Relevance to route comparisons*. Enbridge's specific plans regarding topsoil separation should be used to compare routes, prior to any assumption as to whether permitting agencies will require additional stripping. At this point, Enbridge plans only to separate topsoil on farmland and at the request of landowners. Since not separating topsoil causes long-term impacts, there will be higher long-term impacts on routes with less farmland.

VI.H. Construction of a level work pad, especially on hillsides. During clearing operations when the sites are readied for other crews to do their work, the equipment operation area next to the trench—the "working side" where all the equipment operations and traffic occurs—is often called the "work pad." In my experience, a rough standard width is approximately 50 feet on most of the projects I have worked on. (Note: it is possible this has been enlarged due new to safety procedures.)Heavy pipeline equipment cannot safely operate on side-hills. Therefore, in preparing the work pad, a level area is excavated when crossing the side of a hill. The fact that it needs to be level is very important with respect to accurately determining impacts. Creating a 50-foot wide level work pad on steeper hillsides can mean excavation into soil parent material can be 8 or 9 feet deep. (See Appendix 2 and 3.)

The proposed route crosses extensive areas of hilly terrain. Therefore there will be substantial acreage of excavation into side-hills, but the Enbridge documents don't recognize this as an impact and don't mention it. The area needed for spoil storage can be high, and the temporary

ROW needed to construct can be 200-300 feet wide. (Note: This was the case on the North Side of LaSalle Creek where Enbridge is proposing to install its pipelines. It was even wider than 300 feet in one location.) When topsoil is separated, a wider area is usually needed. These impacts will be a long-term, and can be easily observed on Enbridge's mainline corridor.

VI.H. 1. *Main impact issues*: Topsoil will be lost or degraded because of mixing with parent material spoil, unless it is separated prior to trenching. If not separated, re-vegetation suffers, areas are subject to invasive species establishment, and, on hillsides, erosion potential is higher. If not separated, such impacts will be long- term on hilly land. The construction ROW can become very wide because of spoil storage and topsoil separation.

VI.H.2. *Relevance to route comparisons*: Modern GIS systems should be able to calculate slopes on the various alternate routes. Routes should be compared based on Enbridge's plans for where they will definitely separate topsoil and where they will leave it up to the landowner should be used as comparison factors. Based on my experience with past Enbridge projects, there was little or none topsoil separation in forested areas and other non-farmland areas.

VI.I. Deep pipeline burial on certain locations on hilly land. On hilly land, the pipeline is not buried to follow the exact ground contour. Rather, the engineering design attempts to reduce the extent of bends by "smoothing out" the bends. This can be accomplished by deeper burial, for example, at the crests of sharp but small hills. Other locations are at river terraces, or river banks for trenched river crossings. (See Appendices 1-3 for more detail.)

Main impact issues. Same issues as discussed for construction of a work pad on hilly terrain.

Relevance to route comparisons: Similar to that above on construction of a level work pad.

VI.J. Damage to rivers and waterways during construction. There are a number of ways of crossing floodplains and rivers. Most of these are covered by permits and are conducive to mandatory mitigation by permitting authorities. Therefore, I will not go into this in detail except for pointing out areas where there is unclear permitting authority. Here are important issues not clearly covered by permitting authority, or are outside of DNR jurisdiction (the top of the riverbank in most locations):

VI.J. 1. Adjusting pipeline route/centerline to cross rivers and floodplains properly. The least impact crossing of floodplains, waterways, and river valleys is to cross the large feature perpendicularly, and the waterway itself between meanders at a perpendicular angle. Crossing at less than a 90% angle unnecessarily increases impacts because the crossing length increases. Therefore, best practices in large pipeline installation is to cross at the perpendicular angle when siting a pipeline, unless there are clearly other features that would more severely be impacted.

It is unclear as to who has the jurisdiction and/or willingness to require this of Enbridge. DNR's jurisdiction for its License to Cross stops at the high-water mark of the waterway, which is usually the top of the riverbank.

VI.J.2. Crossing waterways and wetlands by deep directional drilling. This method can potentially greatly reduce impacts if it works as planned, and is used more and more as equipment improves. The technique involves deep drilling under waterways and sometimes adjacent wetlands. Such a technique uses specialized (and large for a 36 inch line) equipment, and is usually called an "HDD." Depth can be 25-30 or more feet under the river bed, and length of drills is variable, but can be 3,000 or more feet long in order to avoid sharp bends. The entire pipe is welded for the length of the drill, and pushed/pulled through a bore that is created prior to the bore.

Unfortunately, this technique can sometimes cause big environmental and construction problems when things go wrong. This happened on a number of locations on Enbridge's proposed Sandpiper/Line 3 route during the construction of the 24-inch MinnCan project. Drilling mud escaped during the HDDs at a number of the rivers and wetlands, including at LaSalle Creek, Mississippi river and Straight River as well as others. Mud is primarily bentonite, which is non-toxic. However, additives are used. In the case of MinnCan, the construction company and consultants tried to claim that the additives were a trade secret. DNR and PCA had a difficult time obtaining the information on the additives, if at all. According to available information, some additives are toxic to fish.

VI.J.3. Main impact issues: There are four main impact issues:

a) The portion of the Enbridge proposal that follows the existing corridors means that river floodplains and the rivers themselves will be crossed at less than desirable locations if the offset from the existing lines is as proposed by Enbridge. This is likely especially true at floodplain crossings. Furthermore, adjustment of the centerline to try to cross the river itself at a perpendicular could well result in impacts to other riverine features.

b) There is strong evidence that areas with upwelling groundwater increase the likelihood of drilling mud reaching the surface or reaching the river via the riverbed or flowing from adjacent areas. Crossing the floodplain at an oblique angle means the HDD length is longer, and likely increases the likelihood of drilling mud releases.

c) The portion of the Enbridge route between Clearbrook and Park Rapids had many locations where drilling mud reached the surface in wetlands, riverbeds, and locations immediately adjacent to rivers. In my experience with pipeline projects, this incidence was by far the highest of any projects I have worked on as a regulator.

d) Drilling mud entering wetlands would be considered fill. On MinnCan, in some locations many cubic yards of drilling mud entered wetlands. Drilling mud entering streams coats the bottom, since bentonite is heavier than water.

VI.J.5. *Relevance to route comparisons*: 1) The portion of the Sandpiper/Line #3 projects that follow the existing corridor can be examined to determine where floodplains and waterways are crossed at less than desirable (best practice) locations. This can be also done on Enbridge's proposed Greenfield route. This date can then be compared to other system alternative routes with the assumption that most if not all will be crossed in a proper manner. 2) Routes with hilly

terrain and isolated wetlands will likely have more drilling mud releases because of more groundwater areas reaching the surface.

VI.K. Wetland crossings. Pipeline companies sometimes will say that impacts to wetlands are temporary. Enbridge did this on its Alberta Clipper and Southern Lights projects. Examination of existing pipeline corridors indicates that impacts can be long-term. The most obvious change can be seen in older pipelines where there is a strip of woody vegetation marking the place where the pipe is buried in the wetland. The cause of this is likely two-fold: Wetland soil compaction, and the fact that the pipeline itself is essentially fill, and thus the wetland surface is raised and becomes drier when the spoil is returned to the trench.

VI.K.1. *Main impact issues*: Soil compaction in wetlands and whether an amount of wetland soils is removed that approximately equals the volume of the pipe through the wetland. If not removed, changes in wetlands will occur. For example, a 200 foot crossing of a wetland by the 36 inch Sandpiper pipe results in 36 cubic yards of fill into the wetland, or about 4 loads of a 9 yard dump truck. This will result in vegetation changes in many locations and is, or should be, considered fill under wetland regulations.

VI.K.2. *Comparison of routes*: Distance of wetland crossed can be used to compare routes. Since some of the routes don't have a specific centerline, a surrogate needs to be developed that determines the ease at which a wetland can be avoided in a route/corridor.

VII. WHAT ARE THE MAIN ENVIRONMENTAL IMPACTS OF PIPELINES, SUMMARIZED, AND HAVE THEY BEEN ADEQUATELY IDENTIFIED AND ANALYZED FOR THE TWO ENBRIDGE PROJECTS, AND WHAT, IF ANY, PERMIT AUTHORITY IN MINNESOTA OR FEDERAL LAW EXISTS TO REQUIRE MITIGATION OF SUCH IMPACTS?

The intent of this section is to focus on the potential impacts caused by the construction operations discussed in Section VI. The focus is also on the impacts that affect the largest area, that extend into the future, and to see whether Enbridge has addressed them in its report. As such, there is some redundancy with Section VI.

Authors note: Operational impacts over the 50 year project life—pipeline ruptures and leaks—are discussed in Section V.

VII.A. Introduction. Construction and Installation of large diameter pipelines is not like other construction projects. *If done correctly*, the earth is opened up, the pipe is buried, and the landscape is returned to its previous condition. Soil productivity is not reduced on all lands, topsoil is not lost or damaged, soil compaction is addressed properly, and re-vegetation occurs. Water and wind erosion are not worse that before installation. The only permanent change is that woody vegetation over and adjacent to the pipeline is not allowed to return.

This description of what occurs when *correct* best management practices are followed is a fundamentally important guide to judge Enbridge's proposal against. I have reviewed Enbridge's Minnesota Environmental Report (January 31 2014 revision) and pertinent parts of other

Enbridge documents with this guide in mind. The following discussion focuses primarily on topics where Enbridge's proposal is seriously deficient. I also point out what I believe is the permitting authority for addressing these deficiencies.

VII. B. <u>General comments on Enbridge's environmental report and documentation</u>. A central question as to an EIS determination is: Have potential significant impacts of construction and operation of Sandpiper/Line 3 on the proposed route been identified, and have mitigation measures for such impacts been identified? The answer is clearly no. Enbridge's documentation is deficient for at least the following reasons:

VII.B.1 Enbridge's report is not a sufficient assessment of impacts. It includes limited generic comments about adverse impacts, and some statements of amounts of resources impacted. These statements appear to be based on generic assumptions of ROW width rather than actual site conditions. It also includes many statements saying mitigation practices "could" occur, with no commitment or analysis of wehre practices are needed.

VII.B.2. It follows that if there is insufficient impact identification and assessment, there is insufficient mitigation—since the latter depends on the former.
VII.B.3. A major defect is that it doesn't have any analysis of the adverse impacts of following existing pipeline corridors—in spite of an awareness of the phenomenon of "corridor fatigue" and Minnesota's regulations regarding cumulative impacts. Clearly, in some places, following an existing corridor established long before environmental laws and regulations were passed, means rivers and floodplains are crossed at improper locations. It means avoidance of impacts is overruled by the necessity of staying close to existing pipelines, even when they crowd up against sensitive natural resources.

VII.B.4. The report is silent on the impacts of drilling mud releases, even though these were common on the route south of Clearbrook. Response plans for such releases are included, but they don't substitute for impact assessment. Furthermore, they may be insufficient to match the impacts that could occur.

VII.B.5. Enbridge does not adequately describe why it needs certain ROW widths, nor the width of the work pad.

VII.B.6. There is no discussion of the potential impacts from the (likely) at least 50 year operation of the pipelines. This analysis should include, according to federal regulations for pipeline operators of existing pipelines(of a certain size) to submit to the federal Office of Pipeline Safety ". . .response plans, ...statements of significant and substantial harm, . . . worst case discharges. . . .(and) general response plan requirements. . ." (DOT PHMSA regulations 194.101, 194.103, 194.105, and 194.107, respectively.)

In would appear that Enbridge has information on file about its existing lines, since these are PHMSA mandatory requirements. The information could be used to apply to the assessment of Sandpiper/Alberta Clipper. Enbridge hasn't revealed this highly relevant information.

VII.C. Enbridge's "Environmental Protection Plan (EPP)." Such plans are an important element in pipeline construction, and Enbridge has one in its documentation. (Appendix A of Vol. 1 of its Minnesota Environment Information Report for Sandpiper.) Such plans are typically used by pipeline companies as their main guidance for environmental mitigation, and are reviewed by permitting agencies.

Many of the items in the Enbridge's Erosion Control and Revegetation plans are sufficient as generic concepts, and it could be assumed they will be appropriately applied. But this is also a function of having state involvement in environmental inspection, and Enbridge does not propose this as they agreed to on the two recent pipelines. As noted elsewhere, however, since Enbridge has not supplied an adequate assessment of impact, one can't determine adequacy of how it plans to apply this plan.

However, the plan for topsoil separation is seriously deficient because the area where it will definitely occur is only on agricultural land. Enbridge notes that it is following the May 2013 Federal Energy Regulatory Commission's (FERC) Upland Erosion Control, Revegetation, and Maintenance Plan as guidance for Best Management Practices. However, the FERC plan is deficient in that it also does not adequately address topsoil loss, since it makes topsoil separation on non-farmland an optional practice. Also, the FERC plan doesn't address the issue of excavation in areas outside of the trench such as in hilly areas. Finally, the FERC has jurisdiction over gas pipelines, and there is federal preemption on such facilities. There is no such federal preemption on oil pipelines.

Clearly, loss of topsoil causes long term problems. This cannot be factually challenged. I believe that if the FERC—and Enbridge—BMP's are followed, the criteria I described in the first paragraph of this section will not be met.

VII.D. Summary of impacts caused by installation of large diameter pipelines and Enbridge's response.

All of the impacts listed in this section *involve significant habitats or large acreages* on the Enbridge projects. Therefore, they are major impact and mitigation topics that must be given proper attention in an EIS.

VII.D.1. Topsoil loss or damage from trenching for the pipeline ditch and on side hill cuts. Long-term adverse impacts occur when topsoil is lost by mixing with parent material. Such impacts occur in a*ny* area where there is excavation into the parent material without separating topsoil first. Impacts include loss of soil productivity, sparse and limited re-vegetation, invasion of non-native exotic species and weeds, increased soil erosion on slopes, and sedimentation into wetlands and water bodies. All these impacts are significant no matter if farmland, wildlife land, forest land, or any other land use—except in already degraded areas.

Enbridge's plans. Enbridge's environmental report insufficiently assesses this impact. Enbridge only proposes to separate topsoil on excavation areas on farmland. Enbridge also is silent regarding the many other areas where excavation into parent material will occur other than over the ditch for pipe installation. The plan does say that topsoil will be separated in other areas according to landowner preferences. If the landowner is not properly informed, he/she will not

be able to make an informed decision. A proper impact assessment would estimate the acreage where productivity is lost because of topsoil loss, and also where there is increased invasion of exotic species and increased erosion due to reduced vegetative cover.

Permit authority to rectify. With respect to public lands, the DNR, counties, and other land managers can require separation as part of their permits to cross the lands. PCA may be able to require topsoil separation in their stormwater permit. Alternatively, the PUC can require it as a condition of its Route Permit.

VII.D. 2. Soil compaction. Soil compaction occurs when there is repeated heavy equipment traffic on the travel lane. Such compaction can last beyond the life of the project (greater than 50 years) in certain soils that are susceptible to compaction, especially when wet. There has been growing awareness of the seriousness of this issue. For example, compaction layers can prevent roots and moisture from reaching normal depths, and thus decrease productivity. If one assumes that the heavy equipment travel zone during construction is 50 feet wide, the area of this zone on the proposed 299 mile long pipeline is 1,800 acres subject to soil compaction from the Sandpiper project itself.

Enbridge's plans. Enbridge's report does not include estimates of the extent of this problem, and does not adequately address mitigation because it is silent on non-agricultural area compaction. The discussion in the draft Agricultural Mitigation Plan is revealing, in that it demonstrates what can occur in areas other than cropland—since it describes the benefits of topsoil separation.

Permit authority to rectify. With respect to public lands, the DNR, counties, and other land managers can require compaction alleviation as part of their permits to cross the lands. Alternatively, the PUC can require it as a condition of its Route Permit.

VII.D.3. Wind and water erosion from exposed soil. The greater the area of cleared land ahead of installation crews, the greater the risk that large rainfall events will cause erosion, topsoil loss, and sedimentation into waterbodies. According to Enbridge's calculation, about 5,140 acres will be temporarily impacted by the Sandpiper project. (Note: Enbridge does not supply enough information to determine if this is a correct figure.) This is the area that will be potentially subject to wind and water erosion during construction.

Enbridge's report and plans. One aspect of pipeline construction that can be controlled to reduce potential erosion impacts is how much ROW clearing will occur ahead of pipe installation crews. The Enbridge report is silent on this topic. On some pipeline projects I have been involved in, when this topic was not addressed in permitting, contractors cleared unnecessary miles ahead of installation, resulting in risk of severe erosion and sedimentation.

Permit authority to rectify. PCA may be able to require this via its stormwater permit; otherwise, the PUC could add the topic to its Route Permit.

VII.D.4. Permanent loss of forest habitat and fragmentation of habitat. Loss of habitat causes population losses in forest species. Fragmentation further degrades habitat.

Enbridge's report and plans. Enbridge does have an acreage figure for permanent loss of forest habitat—619 acres. However, its description of ROW requirements is generic, and somewhat wider than what is normally stated, such as for the Alberta Clipper project. The report is also completely unclear regarding the locations of additional ROW needs in hilly areas; therefore, one can't determine the accuracy of this figure. It may be lower if Enbridge can get by with a narrower ROW in certain areas.

A related topic has to do with removal of forests in temporary work spaces. Enbridge estimates that 1,524 acres of forest will be cleared temporarily. There is no explanation to indicate where this figure came from, such as whether it includes spoil storage areas in hilly terrain. Furthermore, Enbridge proposes to let natural re-growth or stump sprouting to allow return of forests. If topsoil has been lost in such areas, return of forests could well be very slow, since seedlings will have a hard time competing with invasive species for moisture.

Permit authority to rectify. The PUC would be the main authority able to require minimization of loss of forest habitat in general, and reforestation of temporary work areas. The DNR could require it on their lands.

VII.D.5. Permanent loss of woody riparian vegetation. Woody riparian vegetation is a very important ecological feature. Riparian areas are some of the richest and most productive habitats in ecosystems. Woody vegetation protects stream banks from erosion during high water events. These areas also provide cover for various animals following shorelines and river banks. Construction of a large pipeline means clearing of woody vegetation from a wide ROW, and when an existing corridor is used, the distance becomes significant to wildlife species. A wide gap results. Clearing extra work space needed to install the pipeline in the stream results in more clearing.

Enbridge's report and plans. Enbridge's reports do not discuss this important habitat. It also does not discuss the agreement that was reached to retain some of this habitat when the Alberta Clipper and Southern Lights projects were built. This agreement was instigated by the DNR.

Permit authority to rectify. Since the DNR's authority under its "License to Cross" Protected Waters ends at the top of the bank (or shoreline) in most cases. Therefore, DNR ability to require retention of at least some woody vegetation is difficult or not possible if Enbridge is adamant about its plans. The PCA might have some authority in its stormwater permit, but this might also be difficult. Therefore, the PUC route permit would be the main vehicle for requiring this in a permit.

VII.D.6. Impacts of drilling mud releases to the surface or into water bodies. As noted in Section V.J., there were frequent drilling mud releases into water bodies and wetlands during the construction of the MinnCan pipeline. Rivers included the Clearwater River floodplain, and the Mississippi and Straight Rivers. There was also some suspicion that these releases ("frac-outs" is a term sometimes used in the pipeline industry) were associated with groundwater upwelling. Therefore, this is a significant and important issue associated with attempts to accomplish HDDs. Enbridge proposed route is this same corridor.

Enbridge's report and plans. Enbridge's EPP does not analyze impacts of these releases. However, it does have a response plan to address such issues. Absent an assessment of potential impacts, it is hard to visualize having an adequate plan, since a plan must be based on an accurate knowledge of potential impacts. This needs to include firm knowledge of additives to the main constituent of drilling mud, which is bentonite.

Permit authority to rectify. A proper permit regarding drilling mud releases needs to require that all additives need to be known and approved beforehand by the DNR and PCA. It is unclear whether the DNR or PCA has this authority. Therefore, the PUC needs to require this in its Route Permit.

VII.D.7. Independent environmental inspector reporting to state agencies. During the construction of both MinnCan and the two recent Enbridge projects, an independent inspector reported to the DNR and PCA. This proved to be an indispensable position, given the problems with drilling mud releases and other factors. In those cases, this was funded by MinnCan and Enbridge.

Enbridge's report and plans. Enbridge is silent on funding an independent environmental inspector on the Sandpiper project, and says it will retain its own agricultural and environmental inspectors.

Permit authority to rectify. The PUC would be the authority to require these inspectors be retained and funded by Enbridge.

VII.D.8. Ideal location for large diameter pipelines. Aside from the issue of preference by some landowners, and social issues, the best *physical* location for a large pipeline is on land already cleared of natural vegetation, and that is also flat. This is often farmland. If true BMPs are followed, such as topsoil separated from the entire working area, and over the trench, and if the cover is 54 inches, and if deep ripping is thoroughly used to reduce soil compaction, there will be little or no productivity lost on farmland. In addition, roads are always present in farmland providing easy access should there be any kind of leak in the future.

VIII. Overview of problems with Minnesota policy regarding review of new large diameter pipelines.

VIII.A. Introduction. In my opinion, it is highly important to be aware of deficiencies with Minnesota's pipeline laws, regulations, and permitting regarding large-diameter pipelines. I hasten to add that I do know the Sandpiper project needs to proceed under existing law and regulations. However, acknowledging deficiencies at least allows some guidance as to proceeding under existing agency rules and policies.

Note that in various parts of this testimony, I have cited or developed information showing that the Enbridge Sandpiper project affects thousands of acres, and can potentially cause permanent changes of a magnitude far larger than other projects where MEQB rules require a mandatory EIS. *This means that the separate CN and Route Permit decisions by Commerce and the PUC are, in effect, major Minnesota environmental review processes*. Throughout my testimony, I

have described accepted practices for determining when an EIS is needed, for preparing EIS content including acceptable analysis of impacts when there is a high potential for adverse impacts. I have also noted applicable MEQB rule definitions and guidance for preparing and using ER documents. Therefore, I am judging these deficiencies in Minnesota policy based on answers to four questions:

1) It is not in contention that Minnesota's Environmental Policy Act applies to large pipelines; however, how does the approach to impact analyses of the Department of Commerce and PUC compare to other types of facilities of comparable size and impact magnitude reviewed under MEQB rules?

2) Are the rules and policies regarding how large pipelines are reviewed and decisions made on them as clearly defined as other facilities affecting comparable amounts of natural resources and landscapes?

3) Are the potential construction and operation impacts of large pipelines adequately covered by clear permit authority, in specific rule and by agency practice? Does the process used to address potential large environmental damages from pipeline leaks, ruptures and accidents fully inform the PUC Commissioners prior to their decisions?

4) Are PUC and Commerce agency staff, and the ALJ, fully capable of making decisions on a major state environmental permit when they do not have technical staff; and do they properly rely on agencies such as the MPCA and DNR as indicated by the MEPA law?

VIII.B. Type of environmental reviews for pipelines undefined in PUC rules. Neither the CN rules nor Route Permit rules actually define the type of environmental review documents needed for pipelines as do the MEQB rules and guidance documents. Therefore they provide poor guidance to applicants and the public, especially considering the magnitude of the decisions on large oil facilities such as a pipeline.

1. *Certificate of Need (CN.)* The CN rules clearly indicate that environmental criteria are an important part of the decision as to whether a CN should be issued, and also include rules requiring the applicant for a pipeline CN to provide environmental information. As indicated in my testimony, previous testimony indicated the CN is subject to MEQB regulations separate from the Route Permit. But the CON rules don't provide guidance as to how the necessary information is to be developed and used, nor is there guidance regarding fulfilling MEPA requirements.

2. *Pipeline Route Permit*. The rules refer to a "comparative environmental analysis" being done for the alternate routes. But this term is undefined. It has become known as the CEA. Compare this to the MEQB ER rules: the EAW and EIS documents are exhaustively defined, and the MEQB prepares helpful guides that further explain what is expected. The law establishing this Permit indicates that the environmental studies done for the permit substitute for an EIS or EAW, and the MEQB did approve the rules as substituting for environmental review (in 1989.) However, there is no evidence that the intent was to reduce the responsibility for the PUC and Commerce to comply with MEPA principles and purposes

3. *Overreliance on applicant's environmental documentation*. In the past, for example, DOC relied on Enbridge's deficient environmental documentation for its very large Alberta Clipper and Southern Lights projects. Additionally, PUC and DOC staff have been reluctant to comply with DNR requests to place permit conditions on the Route Permit based on their detailed analysis of environmental impacts. Instead, DOC staff have relied on negotiating changes in the pipeline company's environmental mitigation plans, and have issued Route Permits that closely resembles such plans. This is not in compliance with MEPA directives for interagency coordination, and in recognition of agency expertise regarding natural resources. Such past practices have thus had a strong tendency to reduce the scope of the impact discussion to only those topics covered by the company plan.

VIII.C. Complex CN and Route Permit procedures interferes with necessary public participation. Both the CN and Pipeline Route Permit proceedings are conducted under an administrative hearing process. Such a process is legalistic, difficult to understand, and almost hostile to ease of participation by the public when compared with the public participation process used by the MEQB regarding reviews of EAWs and EISs. All one has to do is examine the Commerce and PUC eDocket web site. There are two such eDockets for the Sandpiper project, with very many items listed—*without plain English identifiers as to content in most cases*. One has to open each one to see its relevance, and many are simply legal notices of service, etc.

VIII.D. No ability to review draft ER documents prepared by Commerce except via a complex administrative hearing process. The MEQB has helpful guidance documents that clearly lay out procedures whereby documents are placed before the public for review. Note that in Section III, I have described how, in practice, it has become a given that such review is a major part of the ER process. The CEA (and note it is not defined in the rule) in the Route Permit process is not placed before the public in draft form, as are normal ER documents. In the CN rules, there is no guidance for the public to be able to determine what is being prepared, much less having an opportunity to easily respond to content, other than information placed before the ALJ. There are public hearings where the public can comment, and such comments are placed on the eDocket sites. But there is no clear information on how the comments are used, and whether they are even seen by the ALJ and PUC members.

VIII.E. Staffing for Commerce, PUC, and ALJ severely limited. The staff that handles the CN and Route permit in Commerce and the PUC is small, considering the magnitude of this major Minnesota environmental review. Staff are project coordinators and don't have technical staff to consult within their agency. The ALJ is not a technical person, and has no technical staff, even though the ALJ plays a very prominent role in weighing the evidence prior to making findings which are given to the PUC commissioners. All of these personnel are based in the Twin Cities.

This staffing situation is not similar to staffing for agencies processing other major state environmental permits, such as air quality permits by the PCA or mining permits for the DNR. Commissioners of these agencies have a much larger staff to call upon when major environmental permitting decisions are made, including field staff from all over Minnesota in the geographic areas where projects are proposed.

VIII.F. <u>ALJ not addressing major DNR comments on recent large pipelines</u>. The ALJ on the Alberta Clipper and Southern Lights Enbridge projects did not address multiple DNR comments expressing a high degree of concern for impacts to natural resources in his Findings on these projects. All he said was that the DNR commented. For example, in spite of definitive documentation of a wide ROW in hilly terrain by the DNR, the DOC accepted Enbridge's statement that no additional work space was needed in such terrain. (see PUC Final Route Permit for Alberta Clipper Southern Lights projects Dec 2008, and Appendix 1.)

VIII.G. <u>DNR has very limited direct jurisdiction over natural resources affected by the projects</u>. According to DNR comment letters submitted to the ALJ and Department of Commerce on the Alberta Clipper/Southern Lights projects, the DNR had direct authority over only 0.5% of the project that crossed the entire state of Minnesota. This included all Protected Waters, and all state lands. With respect to Protected Waters, under DNR's License to Cross Procedures recognize DNR jurisdiction only to the top of the bank of rivers, which is the Ordinary High Water mark. For example, at LaSalle Creek, a designated trout stream in Clearwater County, this only constituted about nine feet of jurisdiction on the MinnCan project. Such limited jurisdiction meant that the only avenue for moving the crossing point to a better location was via the Route Permit. The Department of Commerce staff, and ALJ, have declined to insist that this occur, and have deferred to the applicants, especially on the Enbridge projects.

I believe the DNR's Utility Crossing License was originally foreseen to rapidly process the multitude of small utility projects that crossed many Protected Waters. The license appears to be more appropriate for much smaller utility projects and for utility crossings of state lands. Procedures are modelled on the state lands approval process, which is highly legalistic (requiring a detailed permit application before the permit is processed) rather than procedures used for Protected Waters permits, which encourage early coordination with applicants prior to submission of applications.

<u>VIII.H. "Corridor fatigue" not addressed by DOC or PUC in the past</u>. Clearly, MEPA requires a close look at cumulative impacts caused by projects accumulating in one area. The clear purpose of this is to prevent locations to become "sacrifice areas" from projects for which completely independent government decisions occurred, as if the other projects didn't exist. These two Enbridge projects has exposed this past inattention to this part of the law.

<u>VIII.I. PUC and DOC have not addressed operation impacts of oil pipelines.</u> On other projects requiring environmental review, potential impacts during project operations are addressed in the review. This has not happened with oil pipelines, even though operational impacts of other projects in Minnesota subject to MEPA are closely examined during the ER process. The pipeline rules at least imply that such a look is needed.

<u>VIII.J. Recommendation for determining who should be the RGU for the necessary EIS.</u> In my past employment, I have made recommendations comparable to this policy recommendation. Given the complexity of the issues and the certain complexity of the EIS on the CON proceeding, the MEQB would be a suitable RGU for an EIS. The PUC and DOH are familiar with contested case hearings, especially on energy projects. Such procedures would not be well suited for this EIS. Furthermore, it is likely there will be multiple contracts let for the

necessary work for this EIS. The MEQB can coordinate more easily among its member agencies regarding many of the details that would result in a proper EIS.

APPENDIX 1. APRIL 4, 2014 TESTIMONY OF PAUL STOLEN SUBMITTED TO THE DEPARTMENT OF COMMERCE DURING THE HEARINGS ON THE ROUTE PERMIT.

(Note comment at the end of the cover letter regarding minor corrections.)

April 4, 2014

Paul Stolen
37603 370th Av SE,
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218-435-1138

Mr. Larry Hartman
Environmental Review Manager
Minnesota Department of Commerce
85 67th Place East, Suite 500
St. Paul, MN 55101

Re: Comments on proposed Enbridge Sandpiper Pipeline, Minnesota Public Utilities Commission (PUC) Docket #13-474

Dear Mr. Hartman:

Enclosed are my comments on this proposed project. They concern the main topics solicited in the January 31, 2014 public notice. I suggest alternative routes and route segments, and provide answers to public notice questions "What human and environmental impacts should be studied in the comparative environmental analysis?" and "Are there any specific methods to address these impacts that should be studied in the comparative environmental analysis?"

My comments address human and environmental impacts. They identify appropriate methods of studying such impacts, based on PUC rules and standard methods used in Minnesota and elsewhere to review pipelines.

The most important point in these comments concerns the enormous quantity of oil and other hazardous product that is already flowing through multiple pipelines in one or two narrow corridors This project, and the new Line 3 Enbridge replacement and enlargement, will add even larger amounts of oil and product to these corridors. These corridors cross highly valued natural resource areas that have many lakes and clean rivers. They are often at or near the headwaters of drainages and in hilly areas, as well as being close to people and concentrations of residences.

It is time for Minnesota and federal regulatory agencies to address the problem of multiple large diameter pipelines in close proximity to each other. This concentration makes the consequences of a single site event—whether such an event is natural, accidental, or intentional—potentially catastrophic. Furthermore, my comments will show that the flow of oil and other product will be so large as to be larger than—or a significant portion of—the flow of well-known rivers crossed by the corridors.

I am submitting these comments as a citizen but also as an expert. These are my personal comments written without review or reimbursement of any party. I will be willing to provide testimony as such in legal and legislative forums, should this be necessary, depending on personal availability.

In lieu of providing a c.v. at this time, I summarize here my credentials for asserting that I have expertise regarding the Sandpiper review.

I have regulatory experience with large natural gas, carbon dioxide, water, and oil and product pipelines in Montana and Minnesota. This has involved on the order of 10-12 pipeline projects while employed at the Montana Department of Natural Resources and Conservation (DNRC)and the Minnesota Department of Natural Resources(MDNR). In Montana, the DNRC had environmental review, locational approval, and Certificate of Need Authority for energy facilities combined in one agency. I have also supervised, and /or participated in the preparation of EISs or EAs of such pipelines. This included conducting training sessions for other regulatory personnel on how to review pipelines for impacts and on pipeline construction methods.

I have written or coordinated the writing of major environmental review regulations for fixed linear energy facilities, including pipelines and HVTL lines. This experience included reviewing specific proposed linear and fixed large energy facilities (power plants and HVTL lines), and high-level nuclear waste repositories. I have been an environmental inspector on a number of large pipeline projects, including presenting agency views at pre-construction conferences with pipeline builders and sub-contractors.

I have policy-level experience with both federal and state laws and regulations regarding environmental review, pipelines, and solid and hazardous waste topics. This includes legislative staff work, legal depositions, testimony in court, and presentations to other agencies. Finally, this experience also includes years of doing environmental reviews of many other types of projects, including experience with formal risk assessment, and supervising and/or writing scopes of work for the preparation of highly technical studies conducted by outside consultants.

Review and permitting of significant projects such as the Sandpiper project, and the 36-inch Enbridge upgrade of its old Line 3, means that there are overlapping jurisdiction with other federal and state agencies. Some of these are broader than the narrow PUC review requirements. My comments also pertain to those other agency responsibilities. It is necessary to exchange information among such government authorities as a matter of good government. Many of my comments attempt to accomplish such a goal. Therefore, I am providing copies of my comments to these other agencies.

My comments are enclosed. Thank you for consideration of them.

Sincerely,

Paul D. Stolen

C: Tom Landwehr, Commissioner, Minnesota DNR
John Linc Stine, Commissioner, Minnesota PCA
Tamara Cameron, Regulatory Chief, Corps of Engineers
Bob Eleff, Minnesota Legislature, House Research
Ken Westlake, USEPA, Chicago Office
US State Department, Washington DC

NOTE: For the record, this document is not an exact duplicate of that submitted to the Minnesota PUC, since it contains corrections of typographical errors, corrections of acronyms and names, and a couple of minor number corrections of oil flows. It also contains corrections in the numbering of points that were discovered upon further review on October 8 2014.

Comments on proposed Enbridge Sandpiper Pipeline, Minnesota PUC Docket #13-474
Expert Testimony of Paul Stolen, Fosston Minnesota
April 4, 2014

I. Potential oil leaks and pipeline ruptures must be addressed in the route permit, by Minnesota state agencies, and by the US Corps of Engineers and EPA.

Summary: In this section I make the case for using accepted methods of risk assessment to address the consequences of pipeline ruptures to the Minnesota environment and people from this project. A foundation principle of risk assessment is that the greater the consequences of an event, the greater the need to examine rare or unlikely events. There are five reasons why unlikely events need to be considered in this risk assessment for this project:

1) Risk assessment scenarios in Attachment 4 are roughly applicable to one of the existing and proposed pipeline corridors in Minnesota. For example, a 36-inch pipeline rupture of the "worst case" type used in the assessment, may still release on the order of 40,000 barrels of oil, even assuming the quickest reaction time of pipeline operators to close block valves(13 minutes.) If valve closure time is delayed for 30 minutes, this rises to about 70,000 barrels, and if delay is 60 minutes, the amount is 100,000 barrels.

Such releases could have extremely high consequences to the Minnesota environment, and higher releases are possible under some risk assessment scenarios.

2) The portion of the Sandpiper route between Clearbrook and Park Rapids already contains three pipelines. Enbridge is apparently planning one more 36-in line in the same corridor as the 30 inch Sandpiper route. I raise the question as to what "worst-case" scenario should be used when there are 5 pipelines in close proximity in remote areas and at least somewhat susceptible to natural or intentional damage, perhaps to all of them at one time?

3) The corridor Enbridge proposes to use traverses a landscape rich in aquatic and other natural resources, highly valued by Minnesotans, and that includes major groundwater resources.

4) The portion of the Sandpiper route between Clearbrook and Park Rapids was fraught with problems during construction of the MinnCan pipeline, which were at least partially due to the corridor being created for a small pipeline long before modern environmental laws were passed.

5) The other route likely to be considered in the Sandpiper comparative review—the Enbridge mainline corridor—suffers from very similar problems as do at least the first three listed above. There are already as much as 7 pipelines present in this corridor.

The Sandpiper project, as well as other new projects in the planning stages, will add significantly to the enormous quantity of oil and other hazardous product that is already flowing through two narrow pipeline corridors.

It is time for Minnesota and federal regulatory agencies to address this problem of multiple large diameter pipelines in close proximity to each other. This concentration makes them vulnerable to natural events, accident or intentional act—such as the Oklahoma City federal building bombing. In fact, in Comment II.A. I discuss a specific case on the Alberta Clipper route where very high flows caused by the large rainfall events that seem to be caused by global warming could threaten the integrity of more than one of the large pipelines in this narrow corridor.

My comments on this topic are based on my experience with pipelines in Minnesota and Montana, as well as with exposure to risk assessment concepts and methods. Enbridge may object to the use of the ORNL study in Attachment 4, and say it is not appropriate to apply to these projects. I disagree: of course it isn't directly applicable, but its methods are modifiable so that it is. Extrapolating the findings of Attachment 4 to the two corridors could be pushing things a little—but I have found no information that anyone else is considering these issues and the deadline for PUC comment is now due. It is therefore entirely appropriate to use it, and I hope to trigger a helpful debate. And, I know for certain that this topic is important and should be shared with the public.

The jurisdiction of the PUC and other Minnesota agencies regarding the scope of review as it pertains to pipeline design and location lacks clarity that contributes to confusion among regulators as well as the pipeline company personnel. This is related to the issue of pipeline "safety standards", and is discussed in detail in Comment II below. This lack of clarity and confusion should not be allowed to continue, since in my view, Minnesota's natural resources and citizens are threatened by rare but reasonably foreseeable events.

As noted in Comment II, I believe the evidence is firm that Minnesota state agencies can effectively develop measures regarding mandatory design features related to pipeline ruptures and leaks in order to that protect people and the environment without encroaching on federal "safety standards." Such involvement is extremely important, given the magnitude of oil and product potentially moving through these corridors.

<u>I. A. Estimates of existing and proposed pipeline oil and product flows in Minnesota as compared to selected river flows</u>.

After burial, pipelines, when functioning correctly, are largely invisible to the public and most policy makers—such as those currently concerned with oil transport by rail. In order to make considered judgment on policy and permits—as well as allowing proper public involvement—this needs to change. It is no longer acceptable to have an "out of sight, out of mind" attitude on the magnitude of current and potential oil transport through Minnesota in restricted corridors with multiple pipelines.

It is not possible to begin to analyze potential impacts from pipeline leaks and ruptures without knowing amounts of oil and product being transported. Attachment 1Aprovides details about oil flow into and through Minnesota in the corridors relevant to the Sandpiper analysis. It thus provides a basis for analyzing socio-economic, public safety, and environmental impacts from leaks and ruptures. Pipe size and amounts of oil and product pumped are given, as is ownership and origin (for most of the lines.) Attachment 2 provides a description of most of the Enbridge pipelines.

Also included on page 3 of Attachment 1 is a comparison of pipeline oil and product flow and selected river flows near where corridors cross the named rivers. These data, while in cubic feet per second (cfs), are useful for both public understanding of local residents as well as resource managers. The public in these locations can at least visualize the rivers even though most do not directly understand cfs figures.

The river flow data shown are long-term median flows for April 2, not current flows. Therefore, they are indicative of long-term spring runoff conditions, and are likely substantially higher than low-flow conditions. In addition, the percentages comparing oil/product flow to river flow use the highest amounts based on the proposed pipeline projects in the permitting and planning stages.
There are some caveats with respect to the numbers in Attachment 1. First, I used reliable sources for the numbers. When I used news reports, I only used those where pipeline companies were directly quoted, and checked multiple news sources. However, the amounts indicated for the Minnesota Pipeline Company older lines rely on indirect conclusions based on Citation #2 figures and subtracting known amounts from specific projects. The Enbridge figures for existing pipelines in its Mainline corridor are taken directly from them. (Attachment 2) Finally, the source of oil/product was somewhat difficult to determine in some cases.

Attachment 1 indicates the following with respect to comparison of April 2 long-term median river flows with oil flow amounts in pipelines, both expressed in cubic feet per second:

--Four of the listed rivers, Snake River above Warren, Clearwater river at Plummer, Straight River at Park Rapids, and Prairie River at Taconite, have oil/product flows substantially higher than current spring flows in the rivers. In one case oil flow is 200 percent of water flow.

--In all cases, especially if one considers large releases during higher flow conditions resulting in rapid dispersion downstream, these rivers are important and sensitive natural resources. For instance, the Straight River south of Park Rapids is a nationally recognized brown trout fishery.

I.B. Methods of determining socio-economic and environmental impacts of pipeline ruptures
The PUC public notice on Sandpiper requested advice on methods of addressing potential impacts. There are indeed methods already in place, such as:

I.B.1. *Identification of "High Consequence Areas.(HCA)"* Comment II.B.1. addresses this topic in detail and provides recommendations for how to use this category in the project review. These areas are also roughly described in the federal agency-prepared Attachment 3, which includes somewhat useful guidance as to their possible use in the Sandpiper project.

I.B.2. *Risk Assessment with respect to potential amounts of oil/product released by ruptures.* A foundation principle of risk assessment is that the greater the consequences of an event, the greater the need to examine rare or unlikely events in the risk assessment. Attachment 4 is a clear illustration of this principle. For example, it indicates that a "worst-case" pipeline rupture needs to be used, and justifies why it is needed. Such a rupture is called a "guillotine" rupture : "Guillotine-type breaks are less common than other pipeline breaks such as fish-mouth type openings, but they can occur as a result of different causes including landslides, earthquakes, soil subsidence, soil erosion (e.g. scour in a river) and third-party damage. The guillotine-type break is the largest possible break and is therefore considered in this study as the worst case scenario. " (page 6 .)

The study goes on to use this scenario in its analysis of the cost-effectiveness of installing block valves, as well as assessing (some) environmental and socio-economic damages from ruptures. It calculates hypothetical releases in different scenarios in its appendix, including those figures listed in the above summary. More detail is provided in the verbatim (except for underlining) excerpts in Attachment 4.

As noted in the above summary, the estimates of amounts spilled from "guillotine" type ruptures of just one pipeline are large—perhaps a minimum of 40,000 barrels from a 36-inch line. Magnify this by the scenario of intentional serious efforts to damage several pipelines at one time—and this amount becomes potentially massive.

I.B.3. Actual damages from recent spills associated with rivers. Attachment 4 also describes two case studies of actual spills. (p. -11.) These two case studies were used to develop a factor to increase the estimated costs according to the Attachment 4 methods by a factor of two, since both found the risk assessment method underestimated actual costs by about 50%.

a. *Enbridge spill into Talmadge Creek and the Kalamazoo River in Michigan*. Approximately 20,000 barrels of oil were released in 2010. The cost of that spill from a 30-inch diameter pipeline was $767 million.

b. *ExxonMobil Pipeline company rupture under the bed of the Yellowstone River 20 miles upstream of Billings, Montana*. This was caused by scour from flooding that exposed and fractured the pipeline that was trenched under the river bed. An estimated 1,509 barrels of oil were released before the pipeline was closed in 2011. Clean-up and recovery costs were $135 million. (Recent news reports indicate final costs and fines are not yet resolved.)

I.B.4. *Comparison of pipeline flow rates compared to river flows.* Attachment 1 indicates total amounts of oil/product flows in the numerous pipelines that cross these rivers. They portray possible amounts subject to the most catastrophic possible pipeline rupture event—that of an event that caused damage severe enough to rupture more than one pipeline. Some of these lines have been trenched under these rivers, in other cases they have been bored so that burial is deep and not subject to certain kinds of rupture events. Damage could conceivably occur due to river scour from unusually large flood events, or from an outside party successfully and deliberately accomplishing such a rupture.

My intent in comparing river flows to oil flows is not to imply that the worst-possible event be used in an analysis. Rather, it is to portray the magnitude of the oil/product flows in terms the public and reviewers can understand. Again, I am responding to normal methods of conducting risk assessments: Very high consequences deserve be paired with rare events. The possible use of this information in any kind of corridor analysis or spill magnitude is subject to a number of questions being answered first. This is discussed next.

I.C. <u>Recommendations regarding pipeline rupture for analysis of impacts, corridor/route comparison, and estimates of spill magnitude based on risk assessment.</u>

I.C.1. *The Sandpiper project should be analyzed with respect to potential impacts from pipeline rupture using risk assessment methods modified from those used in Attachment 4.* This would:

a. Entail determining Enbridge's methods for locating such valves on the Sandpiper pipeline, and making this available for critical review, and

b. Include both estimates of spill magnitude based on ideal block valve locations and rupture scenarios, such as the "guillotine" scenario, and differential valve response times.

c. Estimate the spill magnitude (in a range of minimum spill to somewhat longer response time spills) that then should then be used to assess socio-economic and environmental impact along the existing corridor.

d. The risk assessment should take into account the larger rainfall events in recent years possibly caused by global warming, including an assessment of the possibility of increased scouring in rivers crossed by these corridors.

I.C.2. *What is the "worst case" when multiple pipelines are in close proximity to use in the risk assessment*? "A review should be undertaken to determine the proper "worst-case" rupture scenario when multiple pipelines are packed close together in a corridor. This should include:

a. An assessment of whether a "worst-case" rupture on one line threatens rupture of another line, such as a large fire.

b. An assessment of whether the response to a "worst case" event on one line is slowed by the presence of other lines either on one or both sides of the ruptured line because equipment can't cross the shallowly buried other lines. This should also include a description of circumstances where all or some lines still operating need to be shut-down during the response and the

practicality of doing so. (It needs to be recognized that in some locations there are "cross-overs" where one line is constructed underneath other lines because of existing facilities on one side—such as railroad tracks—prevent construction on the preferred side.)

c. Consultation with state and federal pipeline authorities as well as the authors of the Attachment 4 study as to what constitutes "worst-case" ruptures when there are multiple lines in close proximity.

d. Consultation with the Attachment 4 authors and others regarding the vulnerability of a corridor with multiple large pipelines in close proximity to deliberate actions and how this should be addressed in socio-economic and environmental impact reviews.

I.C.3. *A process is needed whereby problems found during review of additional pipelines in any given corridor that might threaten pipeline integrity are thoroughly reviewed by government personnel*. While perhaps outside the scope of the PUC Sandpiper review, procedures should be developed whereby state agency field staff who find potential problems at significant pipeline locations could be assured that the problems are adequately responded to by government agencies rather than pipeline owners. I have personal knowledge of three such locations along these corridors, as discussed in Comment II.A below.

II. The PUC and Minnesota agencies indeed have significant jurisdiction over pipeline design issues related to oil spills and leaks and site-specific measures to prevent them.

<u>II.A. Overview and significance of the problem</u>. This is an important issue because a properly *designed and located* pipeline can result in the least amount of impact and be a safe way to transport petroleum products.

The central issue is that there is both federal and state jurisdiction and authority, and that it overlaps to some extent. In these comments I maintain that the PUC has clear authority to influence both pipeline *design* and location with respect to analyzing and mitigating impacts to people and the environment.

Minnesota Department of Natural Resources (MDNR) and Minnesota Pollution Control Agency (MPCA) field staff often have intimate knowledge of site specific conditions along pipeline corridors, and are trained to have such knowledge. Yet some pipeline companies, their consultants, and even some people in Minnesota government try to claim that pipeline *design* is solely the bailiwick of federal agencies and federal standards because such design pertains only to "safety standards."

On several occasions during my employment with the MDNR, and while working with other field staff, when we suggested site-specific changes in design that would add more resource protection or mitigation, "pipeline safety standards" were invoked. This was strongly prevalent when MDNR was trying to determine how block valve locations were selected, and why specific block valve recommendations weren't followed.

Other issues involved lack of clarity as to Minnesota Office of Pipeline Safety responsibilities regarding possible environmental damage at locations where pipe integrity was threatened. For example, during one review of the MinnCan pipeline, MDNR staff (Fisheries and Ecological Resources) found a location at a proposed river crossing where a large tree had fallen into the river. This resulted in bottom scour exposing one of the older pipelines. Company officials were not interested, and indicated it was not in MDNR jurisdiction to solve this problem. A call to the State Office of Pipeline Safety only elicited a question as to whether it was brought to the attention of the pipeline company.

On another occasion during the Alberta Clipper review, an older pipeline was found to be hanging a foot or two over the surface of a designated trout stream east of Bemidji. A call to the Minnesota Office of Pipeline Safety elicited a statement that it was up to the pipeline company to correct the problem. This was likely Enbridge Line 1 because of its small size. (See Attachment 2 for a description.)

The most serious problem occurred on the Alberta Clipper route on a Grant Creek crossing just west of Bemidji. I was directly involved in this site, and provided several written documentations as to what occurred. At this site, Grant Creek flows south through a narrow gap in an old railroad grade. Upstream of this gap Grant Creek flows through a large expanse of wetland. The creek is also subject to numerous beaver dams upstream. The railroad bridge at this site had collapsed into the gap, which was also filled with segments of a five foot concrete culvert.

Immediately below the gap are 5 or 6 large pipelines, with the first being within just a few feet of the steep railroad grade. Grant Creek then takes sharp turn to the east, actually following the pipeline in a parallel manner, until again turning south where it flows over the trenched pipes. I observed that bank erosion had removed 6 or 7 feet of the bank, and that this had all occurred since the previous summer. Therefore, this large pipeline was now only protected by about 5 feet of riverbank.

A large and rare rainfall event in the drainage above this site would have taken out beaver dams, and added to the flow through this narrow gap. It is likely that the first pipeline would have easily been exposed. In addition, the heavy concrete sections could have been eroded into the pipelines, threatening ruptures. Enbridge wanted to do something off the right of way in this location to "clean up" the site. They asked for my advice regarding permitting and repair. Since there were concrete sections available, and it looked as if there was a pipeline integrity issue present, I supplied the advice on armoring the eroding bank next to the pipeline, and moving the bank farther from the pipe. This was done by driving the 5 foot concrete sections into the stream bank, a technique I had learned while employed at the DNR. I documented that this was a temporary solution

This site should be thoroughly assessed for susceptibility to scour—since it is an ideal site for down- cutting caused by human activity restricting the floodplain of this river. On several other occasions, when MDNR staff found exposed pipe on older—and large—pipelines in sensitive areas next to rivers, the same thing happened—staff were told it was up the pipeline company to fix the problem.

II.B. Specific PUC rules on "safety standards." The PUC rules for the route permit, in 7852.0200, Subp. 2 "Scope," has two sentences containing language pertaining to pipeline safety standards. In fact, the language is so similar as to be almost redundant:

--Second sentence: "This chapter does not set safety standards for pipelines."

--Last sentence: "The (permit) must not contravene applicable state or federal jurisdiction, rules, or regulations that govern safety standards for pipelines nor shall the permit set safety standards for the design or construction of pipelines."

I submit that the State of Minnesota has a number of clear ways it can influence Sandpiper (and any other liquid pipeline) without "setting safety standards." These are as follows:

II.B.1. Location of High Consequence Areas (HCA) is not necessarily only a "safety standard." These areas are referred to in federal safety standards for pipelines. They are areas where ". . .a release could have the most significant and adverse impact." Attachment 3 provides lots of detail concerning both human and ecologically important areas, such as "land area in which spilled liquids could affect the water supply……critically imperiled species…..areas where migratory birds congregate…..(pipelines) that pass near enough that a release could reach the area by flow over land or within a river, stream, lake, or other means, are assumed to affect (the HCA.)"

Strangely, this document doesn't mention an HCA identified by state authorities, but actually refers pipeline operators to Nature Conservancy personnel to be consulted on important areas. (A personal comment here: Might this not imply a rather over-reaching and likely unconstitutional claim of federal legal authority?)

In addition, while I was employed by the Minnesota MDNR, we had a meeting with the Minnesota Office of Pipeline Safety regarding issues along the MinnCan route. The people we met with never mentioned the concept of HCAs. They were not familiar with or interested in site-specific environmental issues, in fact, and only referred to specific generic safety standards.

II.B.2. Recommendations to reduce confusion and lack of clarity among agencies with overlapping responsibilities.

a. PUC, MDNR, BWSR and MPCA staff consult the Minnesota Attorney General's Office to investigate the specific federal rules pertaining to HCA's to determine the ability of state authority to identify and influence the identification of both project-specific HCAs and more permanent HCAs. Examples of state-identified areas should include groundwater recharge zones, designated trout streams, canoe routes, rivers with significant fisheries or rivers leading to significant fisheries or drinking water supplies, and a number of others.

b. PUC, MDNR, BWSR, and MPCA should notify the federal Office of Pipeline Safety that Minnesota intends to actively propose additions to the National Pipeline Mapping System referred to in Attachment 3, based on the review of the Sandpiper proposal as well as the other

Enbridge and Minnesota Pipeline company expansion plans. This should include the corridors identified in Attachment 1 as well as any other corridors and new pipelines.

c. The environmental analysis of the Sandpiper and alternatives identify HCAs along all alternative routes, including already-identified HCAs and ones identified by the public, Minnesota MDNR, MPCA, BWSR, and federal COE during this pipeline review. The outside consultant hired by the PUC to do the analysis of impacts and the route comparison should be charged with consulting and coordinating with Minnesota state agencies to identify these areas. The route comparisons should then include these locations in the analysis.

d. Extra care should be taken in the identification of HCAs along any corridor with multiple pipelines because of the increased magnitude of possible ruptures affecting a wider area than normal for one pipeline.

II.C. Pipeline design features that protect people and the environment are site-specific and thus need site-specific design features. It should not be necessary to have to make this point because we are many years past such knowledge-based standard techniques for assessing impacts and mitigating them. Almost every environmental permit given has site-specific measures.

Large-impact projects always should have site-specific design. In fact, well-designed pipeline projects when they are finally ready to be constructed uses something often called a "line list" which identifies down to the foot what environmental mitigation measures are to be used in sensitive locations.

II. D. Support for my contention that pipeline design features such as some block valve locations are not always a "safety standards" issue. The following information clearly supports this contention:

II.D.1. Citation 8 (Attachment 4). Block valves and other related design features work to rapidly shut down and isolate pipeline segments when a sudden pressure drop indicates a pipeline rupture of enough magnitude to trigger the designated pressure drop. They can either be manual valves or remotely-operated valves.

Attachment 4 is a recent (late 2012) major study regarding improving block valve usage to reduce releases of large amounts of hazardous liquids. This was done under the auspices of an internationally known energy research institution, the Oak Ridge National Laboratory. The instigation for this study was primarily driven by the natural gas pipeline explosion in California that killed 8 people, but also seems likely that it was influenced by the large Enbridge rupture in Michigan, since it uses both as case studies. This document illustrates why features such as block valves are clearly not always a "safety standard." Here are quotes relevant to site specific pipeline design that are not "safety standards."

".. . ..site-specific parameters that influence risk analyses and feasibility evaluations often vary significantly from one pipeline segment to another and may not be consistent with those considered in this study. Consequently, the technical, operational, and economic feasibility and

potential cost benefits . . . . . .need to be evaluated on a case-by-case basis." (p. 1 of Attachment 4.)(emphasis added)

"Section 4 of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 calls for the Secretary of the U.S. Department of Transportation (DOT) to require by regulation the use of automatic or remotely controlled shutoff valves, or equivalent technology, where it is economically, technically, and operationally feasible on hazardous liquid and natural gas transmission pipeline facilities constructed or entirely replaced after the final rule was issued. . . . .The Act also requires a study to discuss the ability of transmission pipeline facility operators to respond to a hazardous liquid or natural gas release from a pipeline segment located in a high consequence area (HCA)." (p. 1 of attachment 4)

"In addition, operators are required to consider installing emergency flow restricting devices such as check valves and RCVs on pipeline segments to protect a HCA in the event of a hazardous liquid pipeline release. In making this determination, an operator must, at least, consider the swiftness of leak detection and pipeline shut down capabilities and benefits expected by reducing the spill size." (p. 2 attachment 4)

II.D.2. Citation 9. This engineering study, entitled "Method determines valve automation for remote pipelines," describes methods of determining where automated block valves are to be located. The method is clearly based on site-specific design features. In addition, the following quote summarizes how block valve location is not directly based on "safety standards":

"Most pipeline codes do not stipulate requirements for block valve spacing or remote pipeline valve operations along transmission pipelines carrying low-vapor-pressure petroleum products. This requirement is generally industry driven to control hazards and reduce environmental effects of pipeline ruptures or failures causing hydrocarbon spills. . . . . This article summarizes pipeline codes for valve spacing and spill limitations in high consequence areas (HCAs). It also provides a criterion for an acceptable oil spill volume caused by pipeline leak or full rupture. The criterion is based on industry's best practice." (Introduction to the study.)

Note: This study noted at the end that the acceptable spill volume used to determine the valve spacing was about 20,000 barrels of oil. The study was done for several large pipelines in Brazil. I did not attempt to decipher the meaning of that large amount being acceptable for design of block valve location.

II.D.3. Recommendations for Sandpiper review and analysis regarding block valve locations.

a. Enbridge be required to clearly describe their method of determining block valve determinations, including identifying what HCAs they used, as well as any other factors for determining such locations, including cost factors and "minimum acceptable leaks." This information should be submitted to the MPCA, MDNR, and COE in time for them to respond appropriately, and in time for incorporation into the analysis of impacts and Comparative Route Assessment.

b. MDNR, MPCA, and/or PUC (and COE) should request information from the Office of Pipeline Safety as to whether they have provided any advice to Enbridge for determining block valve locations and acceptable minimum amounts of oil at HCA locations, potential HCA locations, and other-than HCA locations, including cost-factors.

c. Minnesota state agencies and the Corps of Engineers develop a cooperative and partnership relationship regarding the potential socio-economic and environmental risks of having multiple large pipelines in close proximity to each other.

III. The PUC, other Minnesota agencies, and the US Corps of Engineers and EPA must address "corridor fatigue."

PUC pipeline rules favor following existing corridors—even when the pipelines are squeezed into environmentally and socially sensitive areas. The current rules also allow pipeline companies to use the rules to their benefit and to reduce the scope of the analysis. Clearly, this needs a legislative solution. However, there are methods that can be used in the Sandpiper review that are within the current rules that can attempt to get at the "corridor fatigue" problem. I provide some detail in these comments because of the importance of this issue. My recommendations as to how to handle this in the Sandpiper review are in III.C. below.

<u>III.A. Background</u>. "Corridor fatigue" is a term that has been used to talk about what happens when multiple linear facilities such as pipelines and High Voltage Power Lines reach a point where cumulative impacts, objections from people nearby, and crowding of various sensitive areas along the edge of corridors began to be more and more apparent.

In fact, this term is inappropriate with respect to the pipeline corridors described in Attachment 1. Much more proper terms are "corridor sickness" or "corridor exhaustion."

Any resource manager with experience in environmental review of linear facilities in Minnesota (or elsewhere) knows the reasons that lead to overuse of corridors. Some of these are generic, and others are specifically relevant to the Sandpiper proposal. These are:

III.A. 1. *Original linear facility routes pre-date almost all environmental laws*. This meant the route went through high-impact locations that wouldn't otherwise be crossed under current laws and regulations. Essentially, these routes were the shortest distance between endpoints unless there were prohibitive obstacles in effect at the time of building. These original facilities were usually small pipelines. This is true of both the Enbridge Mainline corridor and the Minnesota Pipeline Corridor.

III.A.2. *Each additional facility was assessed independent of others.* Methodology to fairly assess cumulative impact of additional facilities after the second facility was usually not used. (It is often the third facility that starts to show the strain.)

III.A.3. *Large linear facilities are almost always controversial.* There was strong pressure to follow existing corridors. This then became embedded more and more strongly in either

informal or formal policy, and finally made it into regulations. Unfortunately, when this was done, there was no concurrent regulation requiring an objective assessment of the pros and cons.

III.A.4. *Lack of appropriate regulations.* Policy-makers formalizing existing corridor locations as the most likely place to put new facilities didn't write corresponding policies that required a look at impacts of ever-larger corridors. Likely the best example of this I know of is the LaSalle Creek valley north of Itasca Park on the Minnesota Pipeline Corridor. This site is covered in detail below.

III.A.5. *Citizens living next to corridors have little recourse to challenge expanding corridors, since the energy companies and PUC are essentially in agreement for all practical purposes*. The PUC has not developed objective methodology to address this major problem. The result is that adjacent landowners are subject to the highest impact.

<u>III. B. Known potential impacts of enlarging Minnesota Pipeline and Enbridge mainline corridors because of previous recent reviews.</u> There are recent reviews of both of these corridors (except for the Sandpiper Greenfield route.) Therefore, these reviews, including comments of agencies with responsibilities for environmental protection, are relevant to the current reviews.

II.B.1. PUC, MDNR,MPCA, and COE review of the MinnCan pipeline. During the review process for the MinnCan pipeline, there were many issues raised by agencies with natural resource, wetland, and permitting authority. There was an important ALJ report prepared for this project. All of this is available in the PUC records for this project. There were also major problems identified during construction. The review of that project is recent enough so that environmental concerns raised are still relevant.

<u>I</u>II.B.2. PUC, MDNR,PCA, and COE review of the Alberta Clipper/Southern Lights/LSr projects. Even more recently, the Enbridge Line 3 expansion proposal follows its mainline corridor to Clearbrook and on to Superior or the problematic corridor south of Clearbrook. An alternative route to Sandpiper follows the Mainline corridor on to Superior. The current reviews involve the same corridors recently reviewed.

<u>III.C</u>. <u>Route width for new reviews too restricted so that it exacerbates corridor fatigue</u>. The PUC rules allow Enbridge to select the route width for their application. The rules state a route can be as narrow as the right- of-way required to construct the pipeline, and as wide as 1.25 miles. An examination of the Enbridge proposal indicates in many locations that Enbridge has selected a very narrow route width. It is obvious that the narrower the route width for this review along the existing Minnesota Pipeline Corridor, the more advantageous to Enbridge—because it becomes too late to adjust the right of way to avoid impacts found after finalization of the route width by the PUC.

Generally speaking, the PUC waits for others to object to this restrictive situation and propose enlargements, or other route segments or routes.

A good example concerns river and flood plain crossings. Normally, the clear standard for crossing of such environmentally sensitive features with linear facilities is perpendicular to the

floodplain, and perpendicular to the river meander. In addition, as mentioned in Comment V, the MDNR does not have permit jurisdiction beyond the Ordinary High Water of the river or stream (this is the top of the bank in most cases.) The DNR has two options for influencing this—proposing a route segment change or widening, or relying on the PUC authority to require moving the centerline. Furthermore, DNR often indicates to applicants to begin preparing detailed applications for its license to cross before the environmental analysis of routes is completed.

In other areas, the 1.25 mile width is still too narrow to address the problems of pipeline corridors expanding more and more in high-impact areas.

<u>III. D. LaSalle Creek problem area.</u> More than any other location, this area epitomizes the landscape and regulatory issues of "corridor fatigue" and problems of following old straight-line routes. The crossing and surrounding landscape has the following characteristics:

--This location is not far north of Itasca park in a heavily forested area with steep and convoluted glacial moraine. LaSalle Creek itself is a small designated trout stream flowing in a glacial tunnel valley toward LaSalle Lake. The stream channel is deeply incised in the wetland with many meanders. Right at the crossing point, the stream and valley narrow upstream but widens out substantially downstream toward the lake. The ridges on either side of the tunnel valley are likely more than 100 feet higher than the stream.

--The existing Minnesota Pipeline Company pipelines traverse the valley at the almost the worst possible manner: a sharp oblique angle side-hilling down portions of the west hillside from the north, then side-hilling out of the valley on the east side after crossing the creek.

III.D.1. *Severe problems with the MinnCan crossing*. There were severe and numerous problems with this area. I am supplying some detail on these problems because I am proposing a re-route around this area several miles in length. The problems are as follows.

a. MDNR sent an "early-coordination" letter to the MinnCan consultant warning that this crossing was the worst site of all the locations in the Bemidji Region portion of the project. There was no response from MinnCan, and near-failure months later for MinnCan to even acknowledge such a letter. By then the PUC process had proceeded past the point for the MDNR to effectively examine another route in this high-resource area.

b. The two old and small pipelines were closely followed with the 24-inch MinnCan line with close separation, on the order of 40 feet if I recall. The old cleared right-of- way was fairly narrow. This greatly expanded during construction. MDNR measured a cleared right of way over 350 feet wide on the north end of the valley. (This was necessitated by the large amount of earth moving required to construct a 50-foot wide level construction word pad.) Topsoil was generally not separated here either, so impacts are long-term.

c. MinnCan did a directionally bore deep under LaSalle Creek. It was somewhat over 3,000 feet in length and done in the winter. As they bored under the creek itself, there was a large frac-out into the creek. (See III.C.3.a) Drilling mud escaped from several other locations besides the

creek bed, all characterized by obvious groundwater upwelling. (In spite of the very cold temperatures the ground and wetland surface was not frozen.)

Construction stopped and clean-up was complicated and protracted. Because of the lack of frost from groundwater upwelling, it was impossible to get equipment to the frac-out sites so that most work was done by hand.

However, it was necessary to get some equipment to the site, which was a very delicate operation because of the deep, soft, water saturated organic muck at the site. There were two existing pipelines floating in this water saturated muck near the surface. These could have been threatened by heavy equipment tipping into this area. Oil/ product flow was *not* shut off during these operations taking place a few feet from the pipes.

d. A large beaver dam downstream of the crossing had backed up water right to the crossing point, and covered parts of the creek receiving drilling mud. In other words, there was thin ice over the flooded creek channel. This obscured drilling mud material and caused safety problems in minus 15 degree weather.

III.D.2. Current Enbridge plans at this site. According to maps I examined during the public meeting at Clearbrook, Enbridge is now planning a warm weather crossing of the creek itself downstream from the existing crossing out in the broader wetland that leads to LaSalle Lake. The proposed crossing location is at a more perpendicular angle to the creek itself but not perpendicular to the valley, since the centerline of the pipe makes a sharp bend after coming down into the valley from the north. After the creek crossing, the Enbridge plan is to open up a new cleared right-of-way on the east side-hill of the valley. This plan was confirmed to me by MDNR staff. Enbridge had indicated to them they would accomplish the trenched crossing in a very short time to reduce impacts. I believe this is a very bad idea for the following reasons:

a. There is wetland along much of this centerline proposal, including as the centerline comes down the hill from the north. There are wetlands on the slopes of the west hill side caused by abundant groundwater emergence. There is deep muck in this area, as well as out in the flat valley. Trenching through this soft area will require very large amounts of construction mats which usually require firmer wetland soils than are present. Furthermore, trying to trench in such an area will result in slumping and the necessity of removing large amounts of material.

b. I have been involved in several wetland situations with some similarities to this site—but not such a large, problematic area as this. None of them approach the red flags of this area. The nature of the muck soil and substrate in the other areas meant that sheet pile had to be driven in on both sides of the trench in order to remove enough material to sink a weighted pipeline. I estimate that more than 1/4 mile of wetland is involved. Furthermore, both ends of this wetland traverse are on inclined wetland at the bottom of slopes. Attempting to excavate a temporary trench through such a location could also easily open a channel so that unpredictable amounts of silt laden water—both groundwater and surface water—flows down the channel into LaSalle Creek.

c. The new right of way on the east side of the valley will also traverse groundwater emergent areas some distance before it rises far enough out of the valley to rejoin the corridor south some distance. This is also an additional impact of such a crossing.

d. I recommend that a route around LaSalle Creek and its valley be considered (see below.)

<u>III.E. Recommendations to begin to address "corridor fatigue" concerns relative to existing corridors followed by Sandpiper</u>.

II.E.1. *Federal EIS on Sandpiper.* The US Corps of Engineers should prepare a federal environmental impact statement for the Sandpiper project. The COE should do this for additional reasons beyond this topic, which will be contained in a separate recommendation to them.

It is clear that the PUC environmental analysis falls far short of what can be explored in an EIS. Nevertheless, Minnesota law says that the environmental analysis done by the PUC fulfils state environmental review requirements.

However, the MPCA and MDNR, who are more familiar with the merits of EIS review than is the PUC, should certainly recommend to the COE that an EIS be done on this project.

III.E.2. *Incorporation by reference of the previous environmental analysis in these corridors*. I hereby incorporate by reference the PUC record of Alberta Clipper, LSr, Southern Lights and MinnCan projects into this Sandpiper review by the PUC. This should jump-start the review of "corridor fatigue" problems.

Examples of relevant documents for these four projects include:

--The ALJ report son MinnCan and the Enbridge projects
--All MPCA and MDNR comments on the projects. There should be special focus on the MDNR objections to detailed and extensive comments that were ignored in ALJ findings.
--All key determinations of the US COE on all projects, and all comments on the 404 notices for the projects

III.E.3. *Any records of specific unforeseen problems and impacts that developed post-permitting on these projects.* If the records cannot be found, these topics should be addressed in the environmental analysis:

a. "Frac-outs" on the MinnCan project. Frac-out is the common term for when drilling mud escapes from the bore from directionally drilled crossings, whether they be short or deep bores. Generally, this becomes evident by mud appearing on the surface or in water bodies. There were a large number of such events on the MinnCan project, and some amounts were very large. These occurred in or next to the following rivers north of the point where the Sandpiper route turns east: Clearwater River floodplain east of Bagley, Mississippi River at the crossing north of Itasca park, LaSalle Creek floodplain and creek bottom north of Itasca Park, and the Straight

river just south of Park rapids. There were other frac-outs south of Park Rapids beyond the point where Sandpiper turns east on a Greenfield route.

Some Frac-outs occurred during winter bores, which greatly increased the difficulty with addressing them for several reasons. Determining amount and location of material was obstructed by ice. Recovery of material was difficult due to ice. Finally, ice conditions on flowing water were a hazard to workers attempting to recover material.

All records of frac-outs that occurred on MinnCan should be carefully examined as to amounts and locations. This may help to determine if there is a pattern as to when they occur. In each of the four rivers mentioned above, landscape conditions were such that groundwater upwelling zones were either present or suspected at the site of the frac-out. If this is correct, such landscape conditions that are present in other locations are a red flag for bores in the future.

Drilling mud is primarily bentonite clay but contains additives at the discretion of the pipeline company. Additives are a two edged sword: they can increase the success of the bore and reduce frac-outs, but some additives can be toxic to aquatic life. Furthermore, MinnCan initially claimed trade secret status on the first frac-out at the Clearwater river, which became a big obstacle to resolution. Therefore, PUC should require specific listing of any constituents of drilling mud before. Some of the frac-outs were in locations subject to direct DNR permit authority, but others were outside of the OHW so were not. PUC should make it a condition of the Route permit that frac-outs be handled in essentially the same manner wherever they occur, after recommendations from the MDNR and MPCA.

b. *Winter construction successes and problems on MinnCan and Alberta Clipper*. Topsoil separation is important in all areas of deep excavation, including over the trench as well as side-cuts done to prepare the 50-foot level work pad. Poor separation leads to more successful invasive species invasion, and lost productivity. Frozen ground made topsoil separation problematic. In addition, winter construction made it erosion control more difficult and led to substantially higher erosion problems during spring runoff in certain locations.

IV. PUC and Hearing Officer must address concerns of the MDNR regarding natural resources not directly subject to MDNR and MPCA permits.

Environmental impact assessment includes—by law as well as best practice—consideration of impacts not necessarily covered by permits. As noted in a letter to the ALJ on the Alberta Clipper and Southern Lights project, the MDNR said it only had direct jurisdiction on less than 0.5 percent of the route. (April 21, 2008 letter to ALJ Judge Eric Lippman, from Matt Langan, MDNR). This jurisdiction involved public land crossings and river crossings restricted to the OHW (generally the top of the riverbank.)

Subsequently, the MDNR made extensive factually supported comments regarding natural resources in their areas of expertise. Serious problems with Enbridge's data, lack of supporting information, and assessment of impacts were noted. Some of these were glaring errors, such as obvious underestimation of area of impact. The ALJ report finalized its report without discussing the merits of the MDNR comments, and did not address any of them in numerous

findings on the route permit conditions. At the same time, it praised Enbridge's approach. A "reasonable person" perhaps would find it troubling that an ALJ, who lacks natural resource expertise, would replace the expertise of an important state agency, charged by Minnesota law with protecting its natural resources, with that of an energy company with obvious motivations for downplaying impacts to such resources. The lack of attention to the MDNR comments is documented in three subsequent letters to the PUC staff after the ALJ report was finalized (April 25, 2008 letter to Larry Hartman from Matt Langan, MDNR; August 1, 2008 letter to Bill Haar, PUC Executive Director from Matt Langan (MDNR): and November 13, 2008 letter to Larry Hartman from Matt Langan, MNDR.)

Recommendation. The PUC should ensure that this does not happen again, and ensure that the ALJ for this project is charged with specifically making findings regarding potential environmental impacts found to be of concern by state agencies such as the MPCA and MDNR.

V. PUC and ALJ must use accepted impact analysis methods and its own rules to proactively address the Sandpiper project and future even though its environmental report substitutes for an EIS or EA according to law and statute.

V.A. Pipeline rules available to the PUC to improve its responsibility, process ,and results.
Many of the pipeline route permit rules appear on their face to restrict and narrow the environmental analysis as compared to that done under EIS rules and procedures for other large facilities. However, a reading of the rules indicates that the PUC has lots more authority than it used on the Alberta Clipper projects. All of the following rules allow the PUC to address **all** of the topics I have raised in these comments:

V.A.1. Rule "7852.3200, Subpart1: "When the commission issues a pipeline routing permit for the construction of a pipeline and associated facilities, the commission shall designate a route…..conditions for right of way preparation, construction, cleanup, and restoration. . . . **and any other conditions relevant to minimizing environmental and human impact.**" (emphasis added.)

Note: The PUC could have chosen to fully address the MDNR comments that were not addressed on Alberta Clipper using the highlighted language. It now needs to respond to comments by other state agencies on the Sandpiper project and use this clause.

V.A. 2. Rule "7852.0200 Authority, scope, purpose, and objectives

"Subp. 3. Purpose. Minnesota Statutes, section 216G.02, recognizes that pipeline location and
restoration of the affected area after construction is important to citizens and their welfare **and that the**
presence or location of a pipeline may have a significant impact on humans and the environment.
To properly assess and determine the location of a pipeline**, it is necessary to understand the impact**
that a proposed pipeline project will have on the environment. .. .. The purpose of this

chapter is to aid in the selection of a pipeline route and **to aid in the understanding of its impacts and how those impacts may be reduced or mitigated through the preparation and review of information contained in pipeline routing permit applications and environmental review documents**.

Note: The PUC can use this clause to address pipeline rupture risk, corridor fatigue, and so forth.

"Subp. 4. Objectives. The process created by this chapter is designed to:
A. locate proposed pipelines in an orderly manner that minimizes adverse human and environmental impact;
B. provide information **to the project proposer, governmental decision makers, and the public** concerning the primary human and environmental effects of a proposed pipeline project**;**

*Note: Note that this clause contains the phrase "**to** the project proposer. . . .decision makers, and the public" concerning the human and environmental effects of the project. On the Alberta Clipper project, the PUC and ALJ passively turned this phrase entirely on its head and accepted the Enbridge analysis of many issues rather than accept expert analysis from responsible state agencies. This must not happen on the Sandpiper project. The PUC should insist on its role of providing objective information **to** other parties. It should do so on the main topics of these comments.*

V.A. 3. "7852.1400 Route proposal acceptance.

Subp. 2. Sources of route proposals. **The Public Utilities Commission staff and the citizen advisory committee may propose routes or route segments directly to the commission**.

Note: The PUC can use this clause to address corridor fatigue and to attempt to obtain objective comparisons of alternatives to problem locations.

V.A. 4. "7852.1900 Criteria for pipeline route selection.

"I. cumulative potential effects of related or anticipated future pipeline construction; . . ."

Note: The PUC can clearly address the issues of "corridor fatigue" by using this clause.

<u>V.B. PUC can use standard impact assessment methods</u> The statute governing pipelines indicates that the PUC Environmental report meets the requirements of an EIS or EA. However, this does not mean that methods of analysis of impacts do not need to reflect standard methods used in EISs.

The request to the public to propose methods of analysis in the PUC public notice actually is strange. There are effective methods for analyzing impacts to humans and the environment and

methods for comparing routes for linear facilities. These methods have been in effective use for many years. All one needs to do is find an EIS that has done so effectively.

V.C. PUC staff needs to acknowledge the limitations of the pipeline environmental analysis . I was present at the Sandpiper public meeting Clearbrook some weeks ago. A citizen asked how the PUC environmental analysis compared to an EIS. The PUC lead person said it was essentially the same. I was taken aback, as were some others that were present. I was later informed that this same statement was made at the Park Rapids meeting. This is highly concerning since the citizen was misled. It also is concerning because it implies PUC staff is unaware of important and routine methods of analyzing impacts and alternatives in EISs on linear facilities. Such methods are an answer to the question in the Sandpiper public notice of "topics open to public discussion. . . .Are there specific methods to address these impacts. . . .?".

Here are some reasons how the PUC environmental report very much differs from an EIS:

--PUC rules on pipelines allow the project proposer to so narrowly define the project that there is a large burden to overcome to define alternatives and even to analyze impacts. Pipeline rules favor existing corridors without a specific requirement to objectively analyze impacts of concentrating facilities in environmentally inappropriate areas. This would be impossible under an EIS.

--The PUC environmental report is finalized in-house. There is no opportunity to comment on a public review draft report. On draft EISs, the preparer is bound by law and rule to address reasonable comments supported by sound data. No such process exists for pipelines under PUC rules. With the case of Alberta Clipper, the ALJ report would have been found deeply flawed if it had been subject to the standards for responding to comments that are found in the EIS process.

--Finally, compare the PUC process for siting HVTL lines: it uses routine methods of comparing routes and alternatives that are answers to the question posed in the public notice.

VI. Proposed alternative routes and route enlargements

The PUC public notice solicits suggestions for alternative routes or route segments. In addition, Larry Hartman, the PUC person leading the Clearbrook public meeting, received a number of questions as to the burdensome format that appeared to be required for such proposals to be successful. He indicated alternatives would be considered that left out factors apparently required by the rules, and that a simple hand-drawn line on a map would be sufficient.

Therefore, the following recommendations for analyzing additional routes are provided:

VI. A. Widen Sandpiper route width wherever it is less than 1.25 miles in width. Enbridge has in many locations along its route narrowed the route nearly to the minimum required by the PUC rule. This greatly reduces the scope of analysis of impacts very early in the siting process. This very much reduces the flexibility of moving the centerline to reduce impacts as problems are discovered during site reviews. This problem was severe during the Alberta Clipper review. Therefore, the route width should be expanded to the maximum allowable along the entire

proposed route, as well as any new routes or route segments accepted for study. This is 1.25 miles in width. This will more appropriately meet the PUC requirements to adequately study environmental impacts. This is especially important at all crossings of rivers and other sensitive locations.

VI.B. Route segment following Enbridge's North Dakota Pipeline corridor to Clearbrook. Enbridge's web site indicates that the existing pipeline has the capacity to carry 475,000 bpd, yet Citation #2 says it is carrying 210,000 bpd at this time. If this is correct, there is excess capacity in the North Dakota line so as to allow it to carry the 225,000 bpd of the Sandpiper line. Therefore, there is a question as to whether another line is needed at this time for this route segment.

This route is clearly indicated on Enbridge's application.

VI.C. Enbridge Mainline Corridor, Clearbrook to Superior. This route should be studied as an alternative to Enbridge's preferred route. The study corridor should be widened to the maximum 1.25 miles. This route is clearly indicated on the Alberta Clipper PUC files, which are incorporated into this PUC record by reference.

VI.D. Any route alternatives studied for the Alberta Clipper project. There were a number of alternatives studied for the Alberta Clipper project. These routes are clearly identified on maps in the PUC record of that project. These include HVTL corridors and gas pipeline corridors. They should be re-studied for the Sandpiper project.

VI.E. LaSalle Creek alternative. An alternative which avoids the major problems of crossing LaSalle Creek and its valley at an angle needs to be studied. Adding two large diameter pipelines to this area—Sandpiper and the Line 3 replacement/upgrade—is extremely likely to have large off-right-of-way impacts to groundwater, Big LaSalle Lake, and LaSalle Creek. In addition, given the sub-surface conditions, it will be very hard to predict site-specific technical engineering plans for how to construct and maintain pipelines in this area. This could lead to massive problems and impact area growth during construction. This area could well become a case study of where not to build large pipelines.

A route avoiding this feature also crosses other areas with natural resource value, other private and public lands, and opens a new corridor. However, such an alternative for study must be accomplished because of escalating consequences of adding two more pipelines. I do not have an ability to submit a map today of my proposal, since I have to submit comments electronically in order to meet today's comment deadline. I can submit this by mail later. However, based on PUC statements made at the Clearbrook public meeting, this is sufficient as long as I describe the alternative in enough detail to identify it.

Here is a verbal description of the route: It is a 1.25 mile wide route deviating from the existing corridor in section 11 of Itasca Township in Clearwater County, then goes southwest to turn south along the east side of Clearwater County 2. It then turns SE to follow the north side of state highway 92, roughly paralleling it with the south edge of the route along this highway. It then turns east to rejoin the corridor in Section 32 of Lake Hattie township in Hubbard County.

On a final note, I believe it is within the PUCs ability to widen the "route" to more than 1.25 miles in this area.

VI.D. Enbridge Line #3 enlargement/replacement. PUC needs to formally include the potential routes for this project that is clearly now in the planning stage. In addition, PUC should begin entering into studies for this project to analyze the alternative of following the corridors for the Great Northern Transmission line, now under review, since this line comes from Canada, and is potentially a route to Superior.

VII. Significant impacts not otherwise indicated in these comments.

Here is a list of potential important impacts that need be addressed in the review of all route proposals, initially in a generic manner, and then as the focus is on site specific areas:

1. Analyze the advantages of topsoil separation in all areas where excavation into subsoil and parent material would otherwise result in mixing of parent material with top soil. It has been clearly demonstrated that creation of such disturbed areas leads to greater success for invasive species such as spotted knapweed and other noxious weeds. This also results in lowered productivity on not only farmland, but forest land, and reduced habitat value. In addition, it is becoming standard practice for responsible pipeline companies to accomplish this.

2. Requiring accurate depiction of any areas where excavation into parent material and subsoil occurs. Such excavation is routine in non-flat terrain in order to obtain the necessary 50-foot wide work pad for construction.

3. Detailed analysis of the product shipped in order to explore the environmental and human impacts of pipeline rupture.

4. Detailed analysis of the content of drilling muds to be used, and requirements for immediate notice to appropriate agencies when frac-outs occur during bores. Route permits should require agency review of any new additives considered during construction.

5. Careful analysis of the pros and cons of winter construction vs warm season construction. Such an analysis should be entirely independent of Enbridge desires to construct on their timetable, or for solely cost reduction reasons.

6. Careful analysis of the need for deep ripping of the work pad in areas of high clay soils. Operation of very heavy equipment along the work pad—which is essentially a road during construction—can create compaction layers in clayey soils that persist for as long as a projected 200 years.

7. Careful analysis and critique of proposed extra work space areas in sensitive locations such as stream crossings. Such areas sometimes are based solely on engineering requirements rather than given a careful review to reduce environmental impacts.

8. Careful review of the project's off-right- of- way affected area, and a PUC requirement that Enbridge submit all such areas to agencies for review.

9. An analysis of the damages caused by encroachment on the right of way from ATVs and other off-road highway vehicles. This has been observed to be intense in some areas, according to MDNR comment letters. The MDNR has no jurisdiction to respond to this use which can cause stream bank erosion, siltation, and so forth.

VIII. Cumulative Impacts.

As noted in the above comments, the PUC rules require that the Commission **shall** consider "cumulative potential impacts of related or anticipated future pipeline construction. . . ."

Enbridge recently announced it is planning to "replace" in the near future its Line 3 pipeline that is in now within the mainline corridor from Canada to Superior. The announcements also note that operation of the old Line 3 will continue until the new line—upgraded to 36 inches—is completed. Therefore the new line will not be in the same location as the old line. Enbridge has indicated in the announcements that it is considering both the Mainline Corridor to Superior and its preferred Sandpiper route. Therefore, the PUC needs to conduct the following analysis:

--Cumulative impacts of adding two large pipelines in these routes, including the existing corridors and the new Greenfield route east of Park Rapids, and on any alternatives to the Sandpiper project accepted for study.

--PUC needs to inform state agencies that are currently in the early stages of reviewing applications for Sandpiper (such as the MDNR and MPCA) that PUC is conducting a cumulative effects analysis on these two pipelines that may result in changes in locations. This should be done under the PUC rule cited above concerning responsibilities of the PUC to provide information **to** other stakeholders and the public.

List of attachments

1. Attachment 1. Estimates of oil/product flows in proposed and alternative corridors
2. Attachment 2. Enbridge schematic of its pipeline systems
3. Attachment 3. Web page from the US Department of transportation describing HCA areas
4. Attachment 4. Verbatim excerpts from an ORNL risk assessment appropriate for the Sandpiper project

CITATIONS

#1. Enbridge. 2013. "Enbridge Pipeline System Configuration." Quarter 1, 2013. Color chart showing entire Enbridge system in the United States and Canada, including data on individual lines, pipeline size, product type, and pipeline capacities (based on annual capacities). Available from one of the Enbridge web sites, and downloaded March 2014.

#2. Minnesota House of Representatives, House research. June 2013. Bob Eleff, Legislative Analyst. "Minnesota's Petroleum Infrastructure: Pipelines, Refineries, Terminals.

#3. Thompson/Reuters News Service. March 31, 2014. "Enbridge to expand Southern Lights Pipeline as demand rises." Reuters Business and Financial News.

#4. Reuters News Services. March 4, 2014. "Update 2—Enbridge to spend C$7 billion (Canadian) to replace pipeline to US." Reuters Business and Financial News. (Concerns Line #3) Also, at the same time, Enbridge web sites indicate this 34 inch line will be upgraded to 36 inches from 34, and the old line won't be decommissioned until the new line is in service.

#5. Forum News Services. March 5, 2014. John Myers. "Another Enbridge proposal would replace line from Canada to Wisconsin." Concerns Enbridge Line 3 upgrade as in #4, but this article quotes an Enbridge spokesperson that both the Sandpiper Route/Corridor and the Enbridge Mainline Corridor along US 2 are being looked at as possible locations.

#6. Federal Reserve Bank of Minneapolis. May 1, 2007. Kathy Cobb. "This nation's rapacious appetite for oil products and Canada's vast supply spur district pipeline projects." Newsletter. This article notes that MinnCan can be increased by 185,000 bpd to increase the Mn Pipeline Corridor to 640,000 bpd.

#7. Minnesota Public Utility Commission (PUC) public notice on Sandpiper, January 31, 2014.

#8. Oak Ridge National Laboratory 2012. "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety" Date Published: October 2012. Revised: December 2012. For U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration Pipeline Safety Program | East Building 2nd Floor 1200 New Jersey Avenue, S.E. Washington, DC 20590

#9. Online Oil and Gas Journal. January 17 2005. (Printed from site 3/29/2014.) "Method determines valve automation for remote pipelines."

Appendix 1, Attachment 1

ESTIMATES OF EXISTING AND PROPOSED PIPELINE FLOWS RELATED TO PROPOSED SANDPIPER CORRIDORS AND TRANSLATED TO SELECTED RIVER FLOWS

Note: Pipeline capacities are given in barrels per day (bpd). Product flow rates are converted to cubic feet per second (cfs) in order to compare to typical river flows along the routes. Rates are calculated based on 42 gallons/barrel. A useful rule of thumb is that 100,000 bpd converts to 6.5 cfs. Product type is variable, and some information about types is given in Attachment 2.

A. Enbridge Pipelines from Minnesota border east to Clearbrook

Note: All lines are in one corridor except for North Dakota Pipeline which joins the "Mainline Corridor" at Clearbrook which then goes on to Superior roughly along US Highway #2.; Enbridge refers to the main corridor as "Enbridge Mainline Corridor.

A1. Existing Enbridge Pipelines

Note: All product flow is to the East-southeast except for the diluent line, which takes product from Illinois refineries back to Alberta for "thinning" heavy crude so it can be pumped in pipelines. Product types are listed by Enbridge in Attachment 2.

Pipeline name	Barrels per Day Amount	Flow rate cfs	Source	Pipe diameter	Citation
Line 1	236,500	15.4	Alberta	18/20 inches	#1
Line 2b	442,200	28.7	Alberta	24/26 inches	#1
Line 3	390,000	25.4	Alberta	34 inches	#1
Line 4	795,700	51.7	Alberta	36/48 inches	#1
Line 67 (Alberta Clipper)	450,000	29.2	Alberta	36 inches	#1
Line 65 (LSr)	186,000	12.1	North Dakota	20 inches	#1,#2
North Dakota Pipeline	210,000	13.6	North Dakota	?	#1, #2
Southern Lights Diluent	180,000	11.7	US refineries	20 inches	#2, #3
Totals	2,890,400 bpd	188 cfs			

A2. Expansion proposals by Enbridge, Minnesota border east to Clearbrook

Expansions:	bpd amount	cfs		Pipe Diameter	Citation
Line 3 increase:	370,000	24.0	(total 760,000)	34 inches to 36	#4
Line 67 increase:	350,000	22.8	(total 800,000)	Pumps added	#2
Southern Lights increase:	95,000	6.2	(total 275,000)	Pumps added	#3
New line					
Sandpiper	225,000	14.6		24 inches	#7
Subtotal (new + expand)	1,040,000	67.6			
Grand total, existing and expanded	3,930,400	255 cfs			

B. Enbridge Pipelines from Clearbrook east to Superior

Note: There is a major facility at Clearbrook whereby some product is routed south to the Twin Cities on 3 pipelines owned by the Minnesota Pipeline Company—a different company from Enbridge. One of these, the MinnCan line, was recently constructed. (There are evidently "loops" at a few locations, so that there may be 4 lines in place in the corridor at those locations.) According to Citation #2, currently this amount is 455,000 bpd. It is difficult to determine exact amounts in the two older lines, but it is not necessary for this level of analysis.

B.1. Existing Enbridge pipelines from Clearbrook to Superior

Note: For purposes of this analysis, it is sufficient to calculate a total of existing product flows from Clearbrook to Superior by subtracting the amount diverted south at Clearbrook from the total amount entering the Clearbrook terminal:

Total entering Clearbrook terminal: 2,890,400 bpd
Amount routed south: - 455,000 bpd
Total existing flows to Superior: 2,435,400 bpd or 158 cfs

B.2. Expansion proposals by Enbridge, Clearbrook to Superior

Note: An alternative route for the new proposed Sandpiper project is along this Enbridge mainline corridor. It is not listed here, but if it did follow this corridor, it would increase flows by 225,000 bpd, or 14.6 cfs. Also, the Line 3 replacement/expansion could follow the southern route, but is included here. If Line 3 would instead go south of Clearbrook, the amounts listed here should be decreased by 760,000 bpd or 49.4 cfs.

Pipeline name	bpd Amount	cfs		Pipe diameter	Citation
Line 3 increase:	370,000	24.0	(total 760,000)	34 inches to 36	#4
Line 67 increase:	350,000	22.8	(total 800,000)	Pumps added	#2
Southern Lights increase:	95,000	6.2	(total 275,000)	Pumps added	#3

Total increase: 815,000 53.0 cfs
Grand total, existing +increases 3,250,400 bpd 211.2 cfs

C. Pipelines routed south from Clearbrook

Note: New Enbridge proposals are to follow the existing Minnesota Pipeline Company corridor to near Park Rapids, and then create a new corridor east to Superior, Wisconsin,

C.1. Existing Pipelines to Twin Cities, Minnesota Pipeline Company (owned by Koch Industries)

Pipeline name	Amount	cfs	Source	Pipe diameter	Citation
MinnCan	165,000	10.7	Canada	24	#2
Two older pipelines	290,000	16.9	ND, Canada?	?	#2

Total, Minnesota Pipeline: 455,000 29.6

C.2. Expanded capacity of Minnesota Pipeline Company

Total	640,000	41.6	Adding pumps?	#2

D. New Enbridge Pipelines potentially routed to existing corridor south from Clearbrook, then east from Park Rapids to Superior on new corridor

Note: Enbridge recently announced it is planning to "replace" and expand its older Line #3 in its mainline corridor across northern Minnesota to Superior, WI. It says it is also looking at instead going south from Clearbrook, then east from Park Rapids to follow the proposed Sandpiper route. Therefore, Line #3 is listed here in order to portray amounts of product potentially flowing in these corridors.

Pipeline name	bpd Amount	cfs	Source	Pipe diameter	Citation
Sandpiper	375,000	24.4	Alberta	30	#7
Line 3 expansion	760,000	49.4	Alberta	36	#4, #5
Total expansion:	1,135,000bpd	73.8cfs			

E. Total potential Enbridge and Minnesota Pipeline company from Clearbrook to Park Rapids

Pipeline Company	bpd Amount	cfs	Source	Citation
Minnesota Pipeline Co.	640,000	41.6	North Dakota, Canada	#2
Enbridge	1,135,000	73.8	Canada	#2, #5
Total in corridor:	1,775,000	115.4		

F. SUMMARY OF EXISTING AND PROPOSED OIL/PRODUCT FLOWS IN EXISTING PIPELINE CORRIDORS AS COMPARED TO SELECTED RIVER FLOWS

	Company	Existing	cfs	Existing+Proposed	cfs
1	Enbridge N.D. Pipeline to Clearbrook	210,000	13.6	435,000	28.3
2	Enbridge mainline to Clearbrook	2,680,400	174.2	3,495,400	227cfs
3	Enbridge Clearbrook to Superior	2,435,400	158.0	3, 930,400	255 cfs
	(Existing and proposed column includes Sandpiper and #3 expansion)				
4	Enbridge and MinnPipe Co. Clearbrook To south of Park Rapids	455,000	29.6	1,775,000	115.4
5	Enbridge, Park Rapids to Superior	No corridor	000	1,135,000	73.8

River name and location	Long-term median river flows (cfs) on this date from USGS Gauges, April 2, 2014	Approximate % of maximum oil flow to river flow
Snake river above Warren	124	183 percent
Clearwater river at Plummer	172	132percent
Mississippi river at Bemidji	334	76 percent
Straight River south of Park Rapids	69	167 percent
Mississippi River at Grand Rapids	716	36 percent
Mississippi River at Aitkin	2,859	2.6 percent*
Prairie River at Taconite	125	204 percent

St. Louis River at Scanlon 1,850 14 percent

*New Enbridge corridor from Park Rapids to Superior crosses in this vicinity; all else are Enbridge mainline

APPENDIX 1, ATTACHMENT 2

Pipeline System Configuration

Quarter 1, 2013

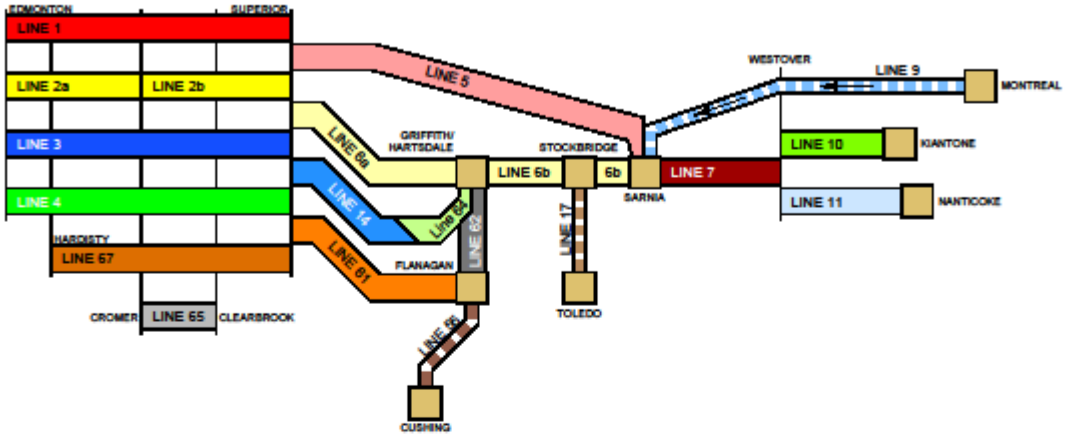

Line 1

37,600 m^3/d (236.5 kbpd)
18"/20" - 1098 miles
NGL
Refined Products
Light Synthetics

Line 2

Line 2a
70,300 m^3/d (442.2 kbpd)
24" - 596 miles
Line 2b
70,300 m^3/d (442.2 kbpd)
24"/26" - 502 miles
Condensates
Light Synthetics
Sweet
Light & High Sour

Line 3

62,000 m^3/d (390.0 kbpd)
34" - 1098 miles
Condensates (Edmonton to Hardisty)
Light Synthetics
Sweet
Light & High Sour

Line 4

126,500 m^3/d (795.7 kbpd)
36"/48" - 1098 miles
Heavy
Medium (Ex-Clearbrook)
Light Sour (Ex-Clearbrook)

Line 5

78,100 m^3/d (491.2 kbpd)
30" - 645 miles
NGL
Light Synthetics
Sweet
Light & High Sour

Line 6

Line 6a
106,000 m^3/d (666.7 kbpd)
34" - 467 miles
Line 6b
45,000 m^3/d (283.0 kbpd)
30" - 293 miles
Light Synthetics (Superior to Lookport)
Sweet (Superior to Lookport)
Light & High Sour
Medium
Heavy

Line 7

23,900 m^3/d (150.3 kbpd)
20" - 120 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 65

29,500 m^3/d (185.6 kbpd)
20" - 313 miles
Light Sour
Medium

Line 10

11,800 m^3/d (74.2 kbpd)
12"/20" - 91 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 11

18,600 m^3/d (117.0 kbpd)
16"/20" - 47 miles
Condensates
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 62

20,700 m^3/d (130.2 kbpd)
22" - 75 miles
Heavy

L 14 / L 64

50,500 m^3/d (317.6 kbpd)
24" - 467 miles
Light Synthetics
Sweet
Light & High Sour
Medium

Line 61

63,600 m^3/d (400.0 kbpd)
42" - 454 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 67

71,500 m^3/d (449.7 kbpd)
36" - 999 miles
Heavy

Not Part of the Enbridge Mainline System

Line 9

38,200 m^3/d (240.3 kbpd)
30" - 524 miles
Condensates
Sweet
Medium
Light & High Sour

Line 17

16,000 m^3/d (100.6 kbpd)
16" - 88 miles
Heavy

Line 55

30,700 m^3/d (193.3 kbpd)
22"/24" - 575 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

NOTES:

Capacities provided are Annual Capacities and do not include current restrictions.

- Updated: January 2013

File: 2013_Q1 System Config.dwg

Revised by: YZ
Drawn by: DRD

APPENDIX 1, ATTACHMENT 3

Fact Sheet: High Consequence Areas (HCA)

Quick Facts:

- *Consequences of inadvertent releases from pipelines can vary greatly, depending on where the release occurs, and the commodity involved in the release.*
- *Releases from pipelines can adversely affect human health and safety, cause environmental degradation, and damage personal or commercial property.*
- *Pipeline safety regulations use the concept of "High Consequence Areas" (HCAs), to identify specific locales and areas where a release could have the most significant adverse consequences. Once identified, operators are required to devote additional focus, efforts, and analysis in HCAs to ensure the integrity of pipelines.*

What criteria define HCA's for pipelines?

Because potential consequences of natural gas and hazardous liquid pipeline releases differ, criteria for HCAs also differ. HCAs for natural gas transmission pipelines focus solely on *populated areas*. (Environmental and ecological consequences are usually minimal for releases involving natural gas.) Identification of HCAs for hazardous liquid pipelines focus on *populated areas, drinking water sources,* and *unusually sensitive ecological resources*.

- *Populated areas* include both high population areas (called "urbanized areas" by the U.S. Census Bureau) and other populated areas (areas referred to by the Census Bureau as a "designated place").
- *Drinking water sources* include those supplied by surface water or wells and where a secondary source of water supply is not available. The land area in which spilled hazardous liquid could affect the water supply is also treated as an HCA.
- *Unusually sensitive ecological areas* include locations where critically imperiled species can be found, areas where multiple examples of federally listed threatened and endangered species are found, and areas where migratory waterbirds concentrate.

HCAs for natural gas transmission pipelines:

- An equation has been developed based on research and experience that estimates the distance from a potential explosion at which death, injury or significant property damage could occur. This distance is known as the "potential impact radius" (or PIR), and is used to depict potential impact circles.
- Operators must calculate the potential impact radius for all points along their pipelines and evaluate corresponding impact circles to identify what population is contained within each circle.
- Potential impact circles that contain 20 or more structures intended for human occupancy;, buildings housing populations of limited mobility; buildings that would be hard to evacuate (e.g., nursing homes, schools); or buildings and outside areas occupied by more than 20 persons on a specified minimum number of days each year, are defined as HCA's.

How do operators of pipelines know where HCA's are located?

- High population areas and other populated areas are identified using maps and data from the U.S. Census bureau.
- Critical drinking water sources and unusually sensitive ecological areas are identified using information from National Heritage Programs and Conservation Data Centers in each state, in conjunction with The Nature Conservancy.

- Because of the complexity of HCAs for Hazardous Liquid Pipelines, the Office of Pipeline Safety identifies and maps HCAs for Hazardous Liquids on its National Pipeline Mapping System (NPMS). These maps are revised periodically by OPS based on new and updated information.
- Operators of natural gas transmission pipelines must use a specified equation to calculate the radius of "potential impact circles" along their pipeline and compare the structures in those circles to the HCA criteria in the rule.

How do operators determine what pipeline segments require extra integrity protection due to the presence of HCAs?

- Pipeline operators must determine which segments of their pipeline could affect HCAs in the event of a release. This determination must be made assuming that a release can occur at any point, even though the likelihood of a release at any given point is very small.
- Hazardous liquid pipelines that pass through an HCA, or that pass near enough that a release could reach the area by flow over land or within a river, stream, lake, or other means, are assumed to have the potential to affect that area.
- Gas transmission pipelines that pass within any of the HCA potential impact circles are assumed to have the potential to affect that area. (Or, alternatively, operators may choose to treat all of their pipeline segments in Class 3 and 4 areas as HCAs.)

Date of Revision: 12012011

APPENDIX 1, ATTACHMENT 4

VERBATIM EXCERPTS FROM THE FOLLOWING PIPELINE RISK ASSESSMENT OF SHUTOFF VALVES, INCLUDING ESTIMATES OF AMOUNTS OF RELEASES OF OIL AND OTHER PRODUCT FROM RUPTURES

Oak Ridge National Laboratory 2012. "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety" Date Published: October 2012. Revised: December 2012. For U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration Pipeline Safety Program | East Building 2nd Floor 1200 New Jersey Avenue, S.E. Washington, DC 20590

ABSTRACT

Author's note: This 340 page study primarily concerns worst-case pipeline ruptures in populated areas, and was stimulated by a large California rupture of a gas pipeline in a urban area in California that killed 8 people. However, it also considers oil pipelines that do not catch fire, and those in High Consequence Areas (HCAs) that are also in or near ecologically significant areas. Therefore, it is highly relevant to the necessary route evaluation and environmental impact evaluation of the Sandpiper proposal. The underlined portions indicate relevancy to Sandpiper, and in each case are the author's emphasis when they appear in the text. Page numbers at the bottom of the pages are excerpt page numbers rather than as in the original text. Some of the text concerns propane lines, so it is best to access the whole report in order to follow its reasoning. It is included here because it illustrates methods of analyzing ruptures. ". . . . . ." indicates breaks in quoted text.

Two actual rather than theoretical oil spills are described on page in this study in order to compare actual vs modelled spill costs. (See page 11 below.) The 30-inch Enbridge Pipeline spill of 20,000 barrels of crude oil into Talmadge Creek and the Kalamazoo River in Michigan. It occurred in 2010. Actual clean-up costs to date are $767,000,000. A 12-inch ExxonMobil pipeline ruptured in the bed of the Yellowstone River in Montana in 2011. About 1,509 barrels of oil were released. Clean-up costs to-date are $135,000,000.

This study assesses the effectiveness of block valve closure swiftness in mitigating the consequences of natural gas and hazardous liquid pipeline releases on public and environmental safety. It also evaluates the technical, operational, and economic feasibility and potential cost benefits of installing automatic shutoff valves (ASVs) and remote control valves (RCVs) in newly constructed and fully replaced transmission lines. Risk analyses of hypothetical pipeline release scenarios are used as the basis for assessing: . . . . and <u>(3) socioeconomic and environmental damage in HCAs caused by hazardous liquid pipeline releases of crude oil</u>. . . . . .However, these results may not apply to all newly constructed and fully replaced pipelines because <u>site-specific parameters that influence risk analyses and feasibility evaluations often vary significantly from one pipeline segment to another and may not be consistent with those considered in this study. Consequently, the technical, operational, and economic feasibility and potential cost benefits . . . . . .need to be evaluated on a case-by-case basis</u>. In theory, installing

ASVs and RCVs in pipelines can be an effective strategy for mitigating potential consequences of unintended releases because decreasing the total volume of the release reduces overall impacts on the public and to the environment. However, block valve closure has no effect on preventing pipeline failure or stopping the product that remains inside the isolated pipeline segments from escaping into the environment. The benefits in terms of cost avoidance attributed to block valve closure swiftness increase as the time required to isolate the damaged transmission pipeline segment decreases. Block valve closure swiftness is most effective in mitigating damage resulting from a pipeline release. . . . .. Similarly, the avoided cost of socioeconomic and environmental damage for hazardous liquid pipeline releases without ignition increase as time required to isolate the damaged pipeline segment decreases.. . . .

The scope of the study is further limited by considering only worst case pipeline release scenarios in HCAs involving guillotine-type breaks rather than other more common breaks, such as punctures and through-wall cracks. Although ignition of the released product following a rupture is not ensured, this study only models release scenarios that result in immediate ignition of the released product at the break location. The study also assesses potential socioeconomic and environmental effects of unintended crude oil releases without ignition from hazardous liquid pipelines in HCAs.

EXECUTIVE SUMMARY

The U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) is the Federal safety authority responsible for ensuring safety in the design, construction, operation and maintenance, and spill response planning for the 2.3 million (M) miles of natural gas and hazardous liquid transportation pipelines in the United States. Its mission is to protect people and the environment from the risks inherent in transportation of hazardous materials by pipeline and other modes of transportation. . . . Section 4 of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 calls for the Secretary of the U.S. Department of Transportation (DOT) to require by regulation the use of automatic or remotely controlled shutoff valves, or equivalent technology, where it is economically, technically, and operationally feasible on hazardous liquid and natural gas transmission pipeline facilities constructed or entirely replaced after the final rule was issued.. . . .The Act also requires a study to discuss the ability of transmission pipeline facility operators to respond to a hazardous liquid or natural gas release from a pipeline segment located in a high consequence area (HCA). . . . . .

(This) study assesses the effectiveness of block valve closure swiftness in mitigating the consequences of natural gas and hazardous liquid pipeline releases on public and environmental safety. . . . . .It also evaluates the technical, operational, and economic feasibility and potential cost benefits of installing ASVs and RCVs in newly constructed and fully replaced pipelines. The results of this study apply to natural gas and hazardous liquid transmission lines. . . . .Potential effects of unintended releases from natural gas and hazardous liquid pipelines on public and environmental safety are categorized as personal injuries and fatalities, property damage, and environmental impacts.

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Hazardous liquid pipeline operators are required to install block valves at prescribed locations to facilitate isolation of pump stations, breakout storage tanks, and lateral takeoffs and other points along the pipeline near designated bodies of water and populated areas to minimize damage and

pollution from an accidental hazardous liquid discharge. In addition, operators are required to consider installing emergency flow restricting devices such as check valves and RCVs on pipeline segments to protect a HCA in the event of a hazardous liquid pipeline release. In making this determination, an operator must, at least, consider the swiftness of leak detection and pipeline shut down capabilities and benefits expected by reducing the spill size.

E.1 CONSEQUENCE MODELS

Risk analyses of hypothetical pipeline release scenarios are used as the basis for assessing: . . . . . .(3) socioeconomic and environmental damage in HCAs caused by hazardous liquid pipeline releases of crude oil.

E.4 ASSESSMENT METHODOLOGY AND RESULTS FOR HAZARDOUS LIQUID PIPELINE RELEASES WITHOUT IGNITION

Potential consequences on the human and natural environments resulting from a hazardous liquid release without ignition generally involve socioeconomic and environmental impacts. These impacts are influenced by the total quantity of hazardous liquid released and the habitats, resources, and land uses that are affected by the release. The methodology used in this study to quantify socioeconomic and environmental impacts resulting from a hazardous liquid release involves computing the quantity

of hazardous liquid released as a function of block valve closure time and then using this quantity to establish the total damage cost based on the EPA's BOSCEM. The total damage cost is determined as follows:

- Add the unit response cost, the unit socioeconomic damage cost, and the unit environmental damage cost;
- Multiply the sum of these costs by the number of barrels spilled; and
- Apply a damage cost adjustment factor which aligns the total damage cost with the actual cleanup costs reported for recent crude oil spills in environmentally sensitive areas. The damage cost for crude oil released in the Enbridge Line 6B pipeline rupture in Marshall, Michigan in 2010 was approximately $38,000 per barrel.

The BOSCEM accounts for effects of spill size on the total damage cost by reducing the unit cost of damage as the number of barrels spilled increases.

The swiftness of block valve closure has a significant effect on mitigating potential socioeconomic and environmental damage to the human and natural environments resulting from hazardous liquid pipeline releases because damage costs increase as the spill size increases. The benefit in terms of cost avoidance for damage to the human and natural environments attributed to block valve closure swiftness increases as the duration of the block valve shutdown phase decreases.

1.3.2 Hazardous Liquid Pipeline Release Events

After a hazardous liquid pipeline ruptures, liquid begins flowing from the break and continues until draining is complete. The amount of material released following the break is influenced by a variety of factors. These factors include the type of liquid, the operating pressure of the pipeline, the size and position of the hole through which the liquid is released, the rate at which the liquid is being pumped through the pipeline, the response of the operator in terms of shutting off pumps and closing valves, the pipeline route and elevation profile, and the location of the break relative to the pumps and block valves. Block valves are installed in hazardous liquid pipelines to facilitate maintenance, operations, or construction and to limit the amount of liquid spilled following a pipeline rupture. For worst case, guillotine-type breaks, the effective hole size is equal to the line pipe diameter.

The behavior of the released liquid depends on its physical properties and the terrain in the vicinity of the break. For example, the liquid could flash on release of pressure to form a vapor cloud containing a fine mist of residual liquid droplets, accumulate in a pool on the ground surface near the pipeline break, create a stream that flows away from the release point, or soak into the surrounding soil (Acton, 2001).

If the released liquid ignites following the break, it could result in a pool fire, a flash fire, or, under certain conditions, a vapor cloud explosion. Pool fires can spread out in all directions or flow in a particular path depending on the terrain. Figure 1.3 shows fire damage along a creek caused by a hazardous liquid pipeline release in Bellingham, Washington (NTSB, 2002). If ignition is delayed, the resulting evolution of vapor from the release could influence the magnitude and extent of a subsequent flash fire or explosion.

Fig. 1.3. Fire damage resulting from hazardous liquid pipeline release in Bellingham, Washington (NTSB, 2002).

Impacts resulting from time-dependent radiant thermal intensities at various separation distances from the break are based on the following hazardous liquid pipeline release scenario. The release occurs following a guillotine-type break where the escaping liquid accumulates in a pool on an impermeable level ground surface and ignites immediately upon release. Pool size is affected by the type of liquid released, the line pipe diameter, the pipeline operating pressure, the time required to detect the leak and initiate corrective actions to mitigate the consequences of the release, the spacing of block valves, the time required to close block valves and isolate the break, and the terrain features. Any potential environmental impacts to air and water quality caused by the released liquids and their products of combustions are beyond the scope of this study.

As discussed in Section 1.3.1, thermal radiation hazard zones with increasing impact severity are described by concentric circles centered on the pipeline rupture. The thermal radiation intensities at the perimeters of these concentric circles increase as the radii decrease. Effects of progressively higher heat fluxes on buildings and humans are described in Table 1.1. Because thermal radiation effects on buildings and humans are a function of radiant heat flux and exposure duration, quantifying the time dependent variations in radiant heat fluxes for specific radii is key to assessing the benefits of installing RCVs and ASVs in hazardous liquid pipelines.

Given the wide range of actual pipeline sizes and operating pressures, leak detection periods, and block valve spacing and closure times, ORNL developed methodologies for quantifying the impacts of these parameters on areas affected by combustion of the escaping liquid hydrocarbon. The methodologies, which are described in Section 3.2, also characterize time-dependent radiant thermal intensities at various separation distances from the break.

Without ignition, the escaping liquid could adversely affect waterway navigation, surface and ground water quality, and other aspects of the human and natural environments. In addition, the cost to remediate the affected areas could be substantial. Consequence mitigation for a hazardous liquid pipeline release without ignition requires rapid detection, pump shutdown, and block valve closure. However, even if these actions are taken quickly, some amount of liquid in the pipeline will drain out of the broken pipeline segments. Methodologies for quantifying spill volumes for hazardous liquid pipelines releases and for estimating socioeconomic and environmental damage caused by the spill are described in Section 3.3.

1.3.2.1 Phases of a Hazardous Liquid Pipeline Release

A pipeline break can range in size and shape from a short, through-wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Although the volume of the discharge depends on many factors, the event is subdivided into four sequential phases – Phase 1 Detection, Phase 2 Continued Pumping, Phase 3 Block Valve Closure, and Phase 4 Pipeline Drain Down (Borener, 1994 and California State Fire Marshal, 1993). The total discharge volume equals the sum of the volumes released during each phase. Events associated with each phase are described below.

Phase – 1 Detection: The detection phase begins immediately after the pipeline ruptures, t0, and continues until the leak is detected by any means and the Operator initiates corrective actions to mitigate the consequences of the release, td. The volume of liquid discharged during the detection phase, Vd, depends on the duration of this phase and is influenced by factors such as the size, shape, and location of the rupture; the pumping rate; the pipeline pressure; and the effectiveness of the leak detection system.

The volume of liquid discharged during the detection phase is determined using the following equation. . . . . .

Phase 2 – Continued Pumping: The continued pumping phase starts after corrective actions are initiated to mitigate the consequences of the release, td, and ends when the pumps stop operating, tp.

During this time, additional hazardous liquid spills from the break. The duration of this phase can vary from a few minutes for systems with remotely operated pumps to hours for manually operated equipment located in remote areas. The volume of liquid discharged during the continued pumping phase, Vp, depends on the duration of this phase and is influenced by factors such as the type of equipment controls (automatically, remotely, or manually operated); personnel travel time to shutdown manually operated equipment; and the flow rates of the pumps. . . . . .

Phase 3 – Block Valve Closure: The block valve closure phase starts when the pumps stop operating, tp, and ends when the upstream and downstream block valves close, ts. During this time, an additional amount of liquid in the pipeline spills from the break. The volume of liquid discharged during the block valve closure phase, Vs, depends on the duration of this phase and is influenced by factors such as the speed at which block valves located upstream and downstream from the break close. The duration of this phase can vary from a few minutes for systems with automatic or remotely controlled valves to hours for systems with manually operated valves located in remote areas. . . . . .

Phase 4 – Pipeline Drain Down: The pipeline drain down phase starts when the upstream and downstream block valves close isolating the portion of the pipeline that includes the break, ts. This phase ends when the remaining contents of the isolated portion of the damaged pipeline segment drain from the break, tf. The volume of liquid discharged during the drain down phase, Vf, is affected by the pipeline elevation profile including siphon action and the location of the break. A break that occurs at the highest elevation in the isolated portion of the pipeline results in no drain down volume, whereas a break that occurs at the lowest elevation could result in significant or complete drain down of the isolated portion of the pipeline.

The rate at which liquid drains from a break in the isolated portion of the damaged pipeline segment depends primarily on the size of the break and the pipeline elevation profile. It is also affected by the flow rate of air that must enter the break to replace the liquid and allow the draining to continue. In hilly or mountainous terrain, determining the length of pipeline, L, available to drain from a break must consider site-specific design and construction details. The volume of liquid discharged from the contributory length of pipeline, L, during the drain down phase, Vf, and the transient discharge rate, Qf, cannot be accurately determined without knowing the actual pipeline elevation profile as illustrated in Fig. 1.4. . . . . .

1.3.2.2 Block Valve Effects on a Hazardous Liquid Pipeline Release

The effectiveness of block valve closure swiftness on limiting the spill volume of a hazardous liquid pipeline release is influenced by the location of the block valves relative to the location of the break, the pipeline elevation profile between adjacent block valves, and the time required to close the block valves after the break is detected and the pumps are shut down.

Block valves do not reduce the volume of liquid spilled during the detection and continued pumping phases because they are open. However, the total spill volume can be reduced by rapidly detecting the leak and taking immediate corrective actions including shutting down the

pumps and closing the block valves to mitigate the consequences of the release. The effectiveness of block valve closure in mitigating the consequences of a hazardous liquid pipeline release decreases as the time required to close the block valve increases.. . . . . .

1.3.5 Socioeconomic and Environmental Effects of a Hazardous Pipeline Release

Potential consequences and effects on the human and natural environments resulting from a hazardous liquid pipeline release without ignition generally involve socioeconomic and environmental impacts. These impacts are influenced by the total quantity of hazardous liquid released and the habitats, resources, and land uses that are affected by the release. The methodology used to quantifying socioeconomic and environmental impacts resulting from a hazardous liquid release involves computing the quantity of hazardous liquid released and then using this quantity to establish the total damage cost. The total damage cost is determined by adding the response cost, the socioeconomic damage cost, and the environmental damage cost as described in Section 3.3.3. . . . . .

3.2 HAZARDOUS LIQUID PIPELINES WITH IGNITION

Following a guillotine-type break in a hazardous liquid pipeline and ignition of the released hydrocarbon, a pool fire begins to form and continues to increase in diameter as liquid flows from the break. Eventually, the pool reaches an equilibrium diameter when the mass flow rate from the break equals the fuel mass burning rate. The fire will continue to burn until the liquid that remains in the isolated pipeline segments stops flowing from the pipeline.

A pipeline break can range in size and shape from a short, through-wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Guillotine-type breaks are less common than other pipeline breaks such as fish-mouth type openings, but they can occur as a result of different causes including landslides, earthquakes, soil subsidence, soil erosion (e.g. scour in a river) and third-party damage. The guillotine-type break is the largest possible break and is therefore considered in this study as the worst case scenario. Although the volume of the discharge depends on many factors, to enable analysis, the event is divided into four sequential phases with the total discharge volume equal to the sum of the volumes released during each phase. The four phases (detection, continued pumping, block valve closure and pipeline drain down) are explained in Section 1.3.2.1.

The thermal radiation hazards from a hydrocarbon release and resulting pool fire depend on a variety of factors including the composition of the hydrocarbon, the size and shape of the fire, the duration of the fire, its proximity to the objects at risk, and the thermal characteristics of the object exposed to the fire.

3.3 HAZARDOUS LIQUID PIPELINES WITHOUT IGNITION

The socioeconomic and environmental effects of an oil spill are strongly influenced by the circumstances surrounding the spill including the type of product spilled, the location and timing of the spill, sensitive areas affected or threatened, liability limits in place, local and national laws, and cleanup strategy. The most important factors determining a per-unit cost are location and oil type, and possibly total spill amount.

The amount of oil spilled can have a profound effect on the cleanup costs. Obviously, the more oil spilled, the more oil there is to remove or disperse, and the more expensive the cleanup operation. However, cleanup costs on a per-unit basis decrease significantly with increasing amounts of oil spilled. Smaller spills are often more expensive on a per-unit basis than larger

spills because of the costs associated with setting up the cleanup response, bringing in the equipment and labor, as well as bringing in the experts to evaluate the situation (Etkin, 1999).

The following methodology was used to determine: (1) the time-dependent discharge from a hazardous liquid transmission pipeline resulting from a guillotine-type break, and (2) the quantity of hazardous liquid released during the detection, continued pumping, block valve closure, and drain down phases needed to estimate cleanup costs. The total volume of a hazardous liquid pipeline release is primarily influenced by the flow rate at the time of the break; the combined durations of the detection, continued pumping, block valve closure phases; and the size and shape of the break. For worst case, guillotine-type breaks, where the effective hole size is equal to the line pipe diameter, the governing parameters are the line pipe diameter and the pipeline length between plateaus and peaks in the vicinity of the break.

Appendix A: Spill Volume Released Due to Valve Closure Times in Liquid Propane Pipelines, contains a family of curves for various hazardous liquid pipeline release scenarios that quantify the volume of liquid released following a guillotine-type break.

3.3.1 Analysis Scope, Parameters, and Assumptions

The methodology is based on fundamental fluid mechanics principles for computing the time-dependent response of hazardous liquid pipelines following a guillotine-type break. It is also suitable for determining the effects that detection, continued pumping, block valve closure duration have on a worst case discharge release determined in accordance with federal pipeline safety regulations in 49 CFR 194 for estimating worst case discharges from hazardous liquid pipelines (DOT, 2011e).

The configuration of the hypothetical hazardous liquid pipeline used to evaluate the effectiveness of RCVs and ASVs in mitigating the consequences of a release has the following design features and operating characteristics:

- The pump stations are located at 100 mile intervals along the pipeline.
- Each pressure pump station has a remote control device that can be activated by the pipeline operator to shut down the compressors after a rupture occurs.
- The rupture is a guillotine-type break that initiates the release event.
- The break is located at a low point in the pipeline elevation profile.
- The following times are study variables.
- The time when the operator detects the leak.
- The time when the operator stops the pumps.
- The time when the upstream and downstream block valves are closed and the line section with the break is isolated.
- The total volume of the hazardous liquid release equals the volume of liquid released during the detection, continued pumping, block valve closure, and drain down phases.
- The time-dependent flow rate is a study variable.

Study variables used to characterize hazardous liquid pipeline releases are listed in Table 3.24.

3.3.2 Analytical Approach and Computational Models

After a hazardous liquid pipeline ruptures without ignition, liquid begins flowing from the break and continues until draining is complete. A pipeline break can range in size and shape from a short, through-wall crack to a guillotine fracture that completely separates the line pipe

along a circumferential path. Although the volume of the discharge depends on many factors, the event is subdivided into the four sequential phases with the total discharge volume equal to the sum of the volumes released during each phase. The phases of a hazardous liquid pipeline release are outlined in Section 1.3.2.1. . . . .

The flow rate through the break remains constant through both the detection and continued pumping phases. In the block valve closure phase, the maximum flow rate through the break is based on the elevation difference of liquid in the pipeline. During the pipeline drain down phase, the maximum flow rate through the break is based on the difference between the operating pressure of the pipeline and atmospheric pressure. Requirements in 49 CFR 194.105(b)(1) state the worst case discharge is the largest volume of fluid released based on the pipeline's maximum release time, plus the maximum shutdown response time, multiplied by the maximum flow rate, which is based on the maximum daily capacity of the pipeline, plus the largest line drainage volume after shutdown of the line sections. In this methodology, the maximum flow rate can be estimated by multiplying the fluid speed at the pump by the cross sectional area of the line pipe. Although operators can use this rule to determine a worst case discharge, the actual flow rate during the block valve closure phase may be greater (less conservative) due to factors such as fluid density, pressure changes, pump performance characteristics, and the elevation profile of the pipeline which are not reflected in the methodology. These factors are important in a risk analysis because their effects influence time-dependent damage resulting from a release.

The influence of fluid density, pressure changes, and the elevation profile of the pipeline is taken into consideration in this study by using Bernoulli's equation to calculate the flow rate during the block valve closure and drain down phases. However, there are recognized limitations in using Bernoulli's equation to determine drain down time because it does not model the effects of air flow through the pipeline break which occurs as the fluid escapes following block valve closure. Although Bernoulli's equation does not produce an exact solution to this fluid dynamics problem, comparison of the results provides a consistent approach for evaluating the effectiveness of block valve closure swiftness on mitigating release consequences.

3.3.3 Socioeconomic and Environmental Effects

The methodology for quantifying potential environmental effects resulting from a hazardous liquid release involves computing the quantity of hazardous liquid released and then using this quantity to establish the total damage cost. The total damage cost, Cd, is determined by adding the response cost, Cr, the socioeconomic damage cost, Cs, and the environmental damage cost, Ce. This methodology applies to crude oil and light fuel (gasoline) releases that affect the following areas.

 Commercially navigable waterways which means a waterway where a substantial likelihood of commercial navigation exists.

 High population areas and another populated areas which mean an urbanized area as defined and delineated by the Census Bureau that contains 50,000 or more people and has a population density of at least 1,000 people per square mile and a place as defined and delineated by the Census Bureau that contains a concentrated population, such as an incorporated or unincorporated city, town, village, or other designated residential or commercial area, respectively.

 Unusually Sensitive Areas (USAs) which is defined in 49 CFR 195.6 to mean a drinking water or ecological resource area that is unusually sensitive to environmental damage from a hazardous liquid pipeline release.

The response cost, Cr, is determined by multiplying the applicable unit response cost shown in Table 3.25 by the applicable medium modifier shown in Table 3.26. . . . . .

The response cost, *Cr*, is determined by multiplying the applicable unit response cost shown in Table 3.25 by the applicable medium modifier shown in Table 3.26.

Table 3.25. Unit response costs for crude oil and light fuel releases Release Quantity, barrels	**Crude Oil, $ per barrel**	**Light Fuels, $ per barrel**
<12	9,240	4,200
12-24	9,156	4,116
24-240	9,030	4,074
240-2,400	8,190	3,654
2,400-240,000	5,166	3,108
> 240,000	3,864	1,302

Table 3.26. Modifier for location medium categories for crude oil and light fuel releases Medium Category	**Medium Modifier**
Open Water/Shore	1.0
Soil/Sand	0.6
Pavement/Rock	0.5
Wetland	1.6
Mudflat	1.4
Grassland	0.7
Forest	0.8
Taiga (boreal forest)	0.9
Tundra	1.3

The socioeconomic damage cost, *Cs*, is determined by multiplying the applicable unit socioeconomic cost shown in Table 3.27 by applicable the socioeconomic cost modifier shown in Table 3.28.

Table 3.27. Unit socioeconomic and environmental costs for crude oil and light fuel releases Release Quantity, barrels	**Crude Oil, $ per barrel**		**Light Fuels, $ per barrel**	
	Socioeconomic	**Environmental**	**Socioeconomic**	**Environmental**

<12	2,100	3,780	3,360	3,570
12-24	8,400	3,654	13,860	3,360
24-240	12,600	3,360	21,000	2,940
240-2,400	5,880	3,066	8,400	2,730
2,400-240,000	2,940	1,470	4,200	1,260
> 240,000	2,520	1,260	3,780	1,050

Table 3.28. Socioeconomic and cultural value ranking for crude oil and light fuel releases Value Rank	**Release Impact Site Description**	**Examples**	**Cost Modifier Value**
Extreme	Predominated by areas with high socioeconomic value that may potentially experience a large degree of long-term impact if oiled.	Subsistence/commercial fishing, aquaculture areas	2.0
Very High	Predominated by areas with high socioeconomic value that may potentially experience some long-term impact if oiled.	National park/reserves for ecotourism/nature viewing; historic areas	1.7
High	Predominated by areas with medium socioeconomic value that may potentially experience some long-term impact if oiled.	Recreational areas, sport fishing, farm/ranchland	1.0
Moderate	Predominated by areas with medium socioeconomic value that may potentially experience short-term impact if oiling occurs.	Residential areas; urban/suburban parks; roadsides	0.7
Minimal	Predominated by areas with a small amount of	Light industrial areas; commercial zones; urban areas	0.3

	socioeconomic value that may potentially experience short-term impact if oiled.		
None	Predominated by areas already moderately to highly polluted or contaminated or of little socioeconomic or cultural import that would experience little short- or long-term impact if oiled.	Heavy industrial areas; designated dump sites	0.1

Note: Long-term impacts are those impacts that are expected to last months to years after the spill or be relatively irreversible. Short-term impacts are those impacts that are expected to last days to weeks after the spill occurs and are generally considered to be reasonably reversible.

Table 3.29. Freshwater vulnerability categories for crude oil and light fuel releases Freshwater Vulnerability Category	**Freshwater Vulnerability Modifier**
Wildlife Use	1.7
Drinking	1.6
Recreation	1.0
Industrial	0.4
Tributaries to Drinking/Recreation	1.2
Non-Specific	0.9

Table 3.30. Habitat and wildlife sensitivity categories for crude oil and light fuel releases Habitat and Wildlife Sensitivity Category	**Habitat and Wildlife Sensitivity Modifier**
Urban/Industrial	0.4
Roadside/Suburb	0.7
River/Stream	1.5
Wetland	4.0
Agricultural	2.2
Dry Grassland	0.5
Lake/Pond	3.8
Estuary	1.2
Forest	2.9

Taiga	3.0
Tundra	2.5
Other Sensitive	3.2

This methodology is consistent with the U.S. Environmental Protection Agency (EPA) Basic Oil Spill Cost Estimation Model (BOSCEM) that was developed to provide the US EPA Oil Program with a methodology for estimating oil spill costs, including response costs and environmental and socioeconomic damages, for actual and hypothetical spills (Etkin, 2004).

Total Damage Cost Validation

The following case studies compare the actual damage costs for two hazardous liquid pipeline releases to the corresponding total damage costs determined using BOSCEM.

Case Study 1 – Enbridge 2010

The Enbridge Line 6B pipeline ruptured in Marshall, Michigan on July 25, 2010, and released approximately 20,000 barrels of crude oil. This release from the 30-in. nominal diameter pipeline caused environmental impacts along Talmadge Creek and the Kalamazoo River (Nicholson, 2012). Cleanup and recovery costs for this release totaled $767,000,000.

Using the EPA BOSCEM, the estimated total damage cost for this release is approximately $307,900,000. This total damage cost, *Cd*, includes the response cost, *Cr*, the socioeconomic damage cost, *Cs*, and the environmental damage cost, *Ce*, determined as follows.

Response cost, *Cr* = unit response cost □ medium modifier (Wetland) = $5,166 □ 1.6 = $8,265/barrel

Socioeconomic damage cost, *Cs* = unit socioeconomic cost □ socioeconomic cost modifier (High) = $2,940 □ 1.0 = $2,940/barrel

Environmental damage cost, *Ce* = unit environmental cost □ 0.5 □ [freshwater modifier (Wildlife Use) + wildlife modifier (Wetland)] = $1,470 □ 0.5 □ (1.7 + 4.0) = $4,190/barrel

Total damage cost (2004 basis), *Cd* = 20,000 barrels □ ($8,265 + $2,940 + $4,190)/barrel = $307,900,000.

After adjusting for inflation, the total damage cost (2012 basis), *Cd* = $307,900,000 □ 1.25 (inflation factor) = $384,875,000 which is approximately 50% of the actual cost.

Case Study 2 – Yellowstone 2011

A 12-in. hazardous liquid pipeline owned by ExxonMobil Pipeline Company ruptured on July 1, 2011 under the Yellowstone River 20 miles upstream from Billings, Montana. The Yellowstone River is navigable water in the United States (EPA, 2011). The ruptured pipeline released an estimated 1,509 barrels of oil that entered the river before the pipeline was closed. Cleanup and recovery costs for this release totaled $135,000,000.

The estimated total damage cost for this release is $48,044,000 based on 2004 cost data. This total damage cost, *Cd*, includes the response cost, *Cr*, the socioeconomic damage cost, *Cs*, and the environmental damage cost, *Ce*, determined as follows.

Response cost, *Cr* = unit response cost □ medium modifier (Wetland) = $8,190 □ 1.6 = $13,104/barrel.

Socioeconomic damage cost, *Cs* = unit socioeconomic cost □ socioeconomic cost modifier (Very High) = $5,880 □ 1.7 = $9,996/barrel.

Environmental damage cost, *Ce* = unit environmental cost □ 0.5 □ [freshwater modifier (Wildlife Use) + wildlife modifier (Wetland)] = $3,066 □ 0.5 □ (1.7 + 4.0) = $8,738/barrel. Total damage cost (2004 basis), *Cd* = 1,509 barrels □ ($13,104 + $9,996 + $8,738)/barrel = $48,044,000

After adjusting for inflation, the total damage cost (2012 basis), Cd = $48,044,000 □ 1.25 (inflation factor) = $60,054,000 which is approximately 44% of the actual cost.

Damage Cost Adjustment Factor

For this study, total damage costs of hazardous liquid pipeline releases are determined using the EPA BOSCEM and then increased by a damage cost adjustment factor of 2.1. This factor aligns the model with cleanup and recovery costs for two recent hazardous liquid pipeline releases of crude oil into sensitive socioeconomic and environmental areas.

3.3.4 Risk Analysis Results for Hazardous Liquid Pipeline Releases

The methodology for assessing socioeconomic and environmental damage to HCAs is based on computed release volumes corresponding to the detection, continued pumping, block valve closure, and drain down phases of a hazardous liquid pipeline release of crude oil without ignition. The method used in this analysis for defining maximum flow rate through the break is as defined in 49 CFR 195.105(b)(1) for the detection, pump shut down, block valve closure, and drain down phases. The damage is quantified using the EPA BOSCEM and the damage cost adjustment factor described in Section 3.3.3.

Eight case studies involving hypothetical hazardous liquid pipeline releases in HCAs are considered to assess effects of block valve closure time on socioeconomic and environmental damage resulting from a guillotine-type break. The duration of the detection and continued pumping phases for the hypothetical hazardous liquid pipelines are 5 minutes and 5 minutes, respectively. The duration of the block valve closure phases is 3 minutes. . . . . .

Characteristics for Case Study 8A, 8B, 8C, and 8D that involve 36-in. nominal diameter hazardous liquid pipelines are tabulated in Table 3.32. These case studies compare the following effects on avoided damage costs.

□ Case studies 8A and 8B compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to either 400 psig or 1,480 psig, an elevation change of 100 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

□ Case studies 8C and 8D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to either 400 psig or 1,480 psig, an elevation change of 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

□ Case studies 8A and 8C compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to 400 psig, an elevation change equal to either 100 ft or 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

□ Case studies 8B and 8D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs

equal to 1,480 psig, an elevation change equal to either 100 ft or 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

Figures 3.82 to 3.85 list the discharge volumes in barrels for Case Study 8A, 8B, 8C, and 8D. Discharge volumes listed in Table 3.32 for each case study are determined by adding the discharge volumes for the detection (5 minutes), continued pumping (5 minutes), block valve closure (3, 30, 60, and 90 minutes), and drain down (3 miles) phases. Avoided damage costs, which are also listed in Table 3.32, represent the differences between the discharge volumes for the various block valve closure durations and the 3 minute block valve closure duration multiplied by the avoided damage unit cost. The total damage unit cost for these case studies is estimated at $29,520 per barrel. This total damage cost is the sum of the response cost plus the socioeconomic damage cost plus the environmental damage cost. Note that the avoided damage costs are not sensitive to pressure and elevation changes because the model is based on the methodology in 49 CFR §194.105 (b) (1) for a worst case discharge which has a constant flow rate.

Benefits of Block Valve Closure Swiftness for a Hypothetical Hazardous Liquid Pipeline Releases without Ignition

The swiftness of block valve closure has a significant effect on mitigating potential socioeconomic and environmental damage to the human and natural environments resulting from hazardous liquid pipeline releases. The benefit in terms of cost avoidance for damage to the human and natural environments attributed to block valve closure swiftness increases as the duration of the block valve shutdown phase decreases.

Table 3.32. Effects of hypothetical 36-in. hazardous liquid pipeline releases without ignition Characteristic	**Case Study 8A**	**Case Study 8B**	**Case Study 8C**	**Case Study 8D**
Type Hazardous Liquid	Crude Oil	Crude Oil	Crude Oil	Crude Oil
Flow Velocity, ft/s	15	15	15	15
Nominal Line Pipe Diameter, in.	36	36	36	36
Drain Down Length, mi.	3	3	3	3
MAOP, psig	400	1,480	400	1,480
Elevation Change, ft	100	100	1,000	1,000
Detection Phase	5	5	5	5

Duration, minutes				
Continued Pumping Phase Duration, minutes	5	5	5	5
Unit Response Cost, $/barrel	3,864	3,864	3,864	3,864
Medium Modifier (Wetland)	1.6	1.6	1.6	1.6
Response Cost, Cr	6,182	6,182	6,182	6,182
Unit Socioeconomic Cost, $/barrel	2,520	2,520	2,520	2,520
Socioeconomic Cost Modifier (Very High)	1.7	1.7	1.7	1.7
Socioeconomic Damage Cost, *Cs*	4,284	4,284	4,284	4,284
Unit Environmental Cost, $/barrel	1,260	1,260	1,260	1,260
One half Freshwater Modifier (Wildlife Use = 1.7) and Wildlife Modifier (Wetland = 4.0)	2.85	2.85	2.85	2.85
Environmental Damage Cost, *Ce*	3,591	3,591	3,591	3,591
Total Damage Unit Cost, *Cd*, $/barrel	14,057	14,057	14,057	14,057
Damage Cost Adjustment Factor for Hazardous Liquid Pipeline Releases	2.1	2.1	2.1	2.1
Total Damage	**29,520**	**29,520**	**29,520**	**29,520**

Unit Cost on 2012 Basis, $/barrel				
Detection Phase Release, barrels	5,665	5,665	5,665	5,665
Continued Pumping Phase Release, barrels	5,665	5,665	5,665	5,665
Drain Down Phase Release, barrels	19,942	19,942	19,942	19,942
Block Valve Closure Phase for Valve Closure in 3 minutes, barrels	3,399	3,399	3,399	3,399
Block Valve Closure Phase for Valve Closure in 30 minutes, barrels	33,992	33,992	33,992	33,992

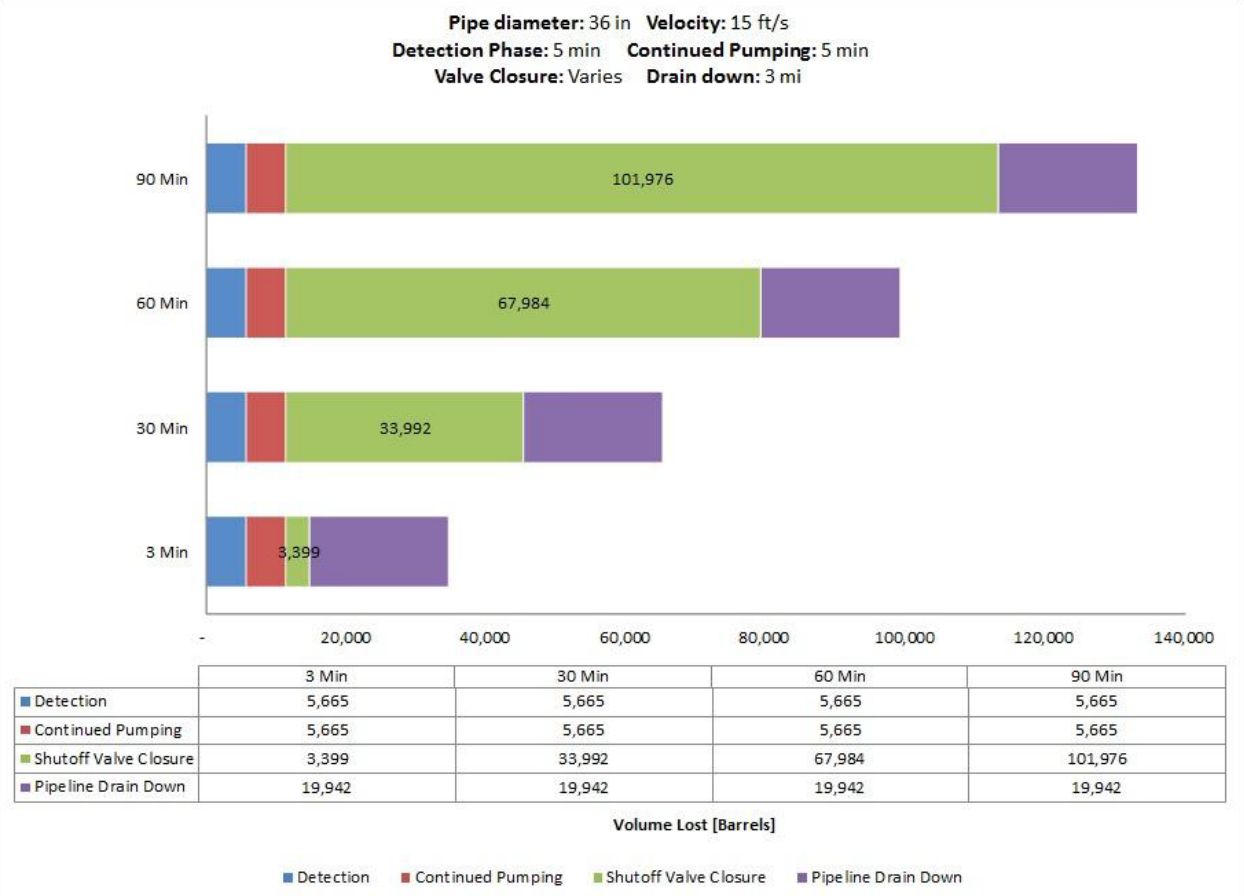

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. 3.82. Case Study 8A – Discharge volumes for a 36-in. hazardous liquid pipeline with a 400 psig MAOP and an elevation change of 100 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

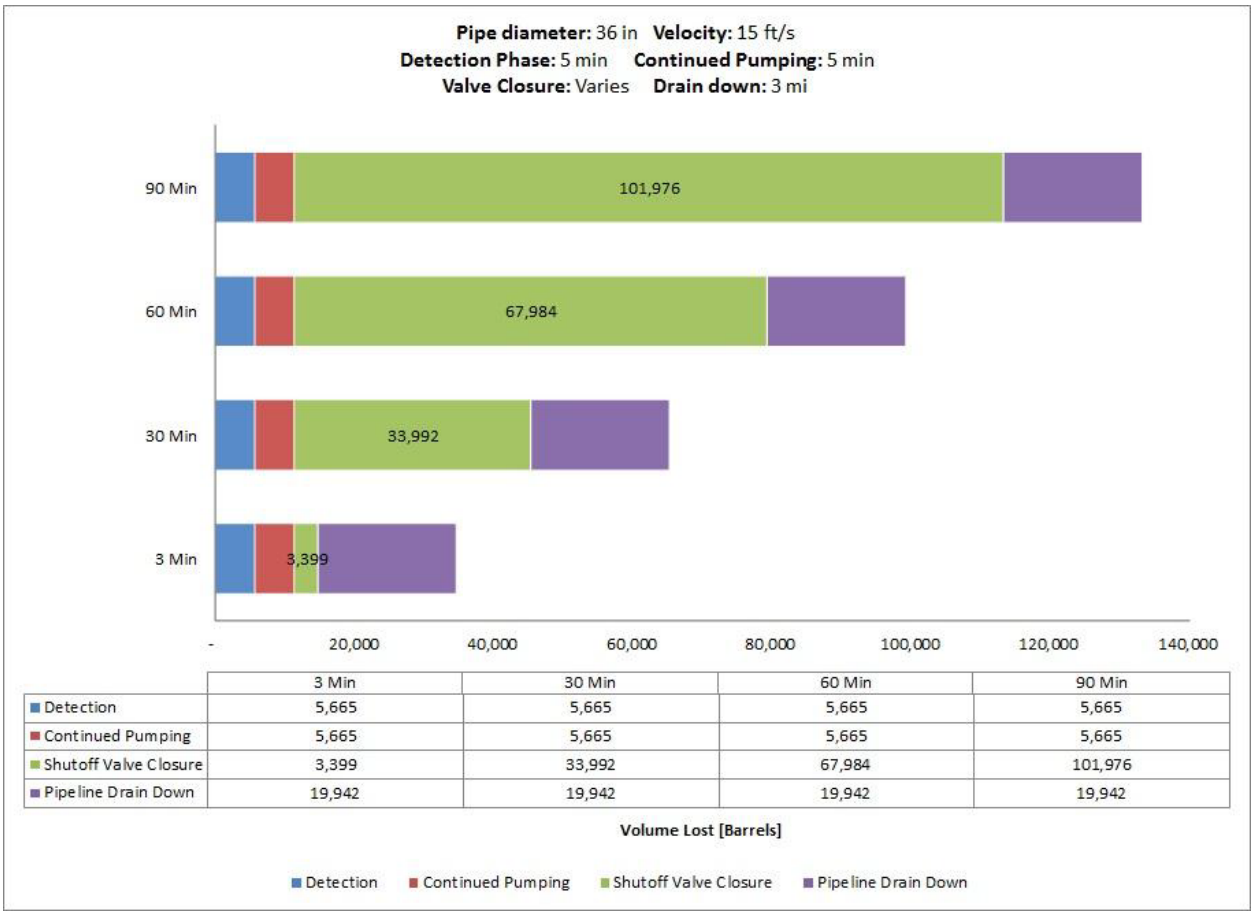

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. 3.83. Case Study 8B – Discharge volumes for a 36-in. hazardous liquid pipeline with a 1,480 psig MAOP and an elevation change of 100 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

APPENDIX 2. ADDITIONAL MAY 28 2014 COMMENTS TO THE MINNESOTA DEPARTMENT OF COMMENTS DURING THE ROUTE PERMIT HEARINGS FROM PAUL STOLEN

May 28 , 2014

Paul Stolen
37603 370th Av SE,
Fosston, MN 56542
218-435-1138

Mr. Larry Hartman
Environmental Review Manager
Minnesota Department of Commerce
85 67th Place East, Suite 500
St. Paul, MN 55101

Re: Comments on proposed Enbridge Sandpiper Pipeline, Minnesota Public Utilities Commission (PUC) Docket #13-474

Dear Mr. Hartman:

Enclosed are my additional comments on this proposed project based on the time extension previously granted. The attached material covers the following topics:

I. A copy of my updated April 4 2014 comments to correct minor editing problems and a request that you replace it with the enclosed comments.

II. The Scope of Work for the consultant to the PUC that will be doing the environmental analysis and route comparison.

III. The environmental "footprint" of the proposed pipeline. Enbridge continues to maintain that the project will require a 100 foot right of way (ROW). A report entitled "Construction of the Northern Border Pipeline in Montana" is enclosed that refutes Enbridge's position on ROW requirements, and shows that it only applies to flat terrain.

IV. Additional comments regarding the consequences of pipeline ruptures and leaks. This comment expands on my April 4 comments that these consequences need to be consider in assessment of impacts, location decisions, and need for the project.

V. Additional comments on the "corridor fatigue" issue.

If you have any questions, please give me a call.

Sincerely,

Paul Stolen

C: Tom Landwehr, Commissioner, Minnesota DNR
John Linc Stine, Commissioner, Minnesota PCA
Tamara Cameron, Regulatory Chief, Corps of Engineers

Additional comments on proposed Enbridge Sandpiper Pipeline, Minnesota Public Utilities Commission Docket #13-474
Paul Stolen
May 28 2014

I**. Corrected April 4 comments**. My previous comments, submitted on April 4, 2014, were sent in a rush. I had a computer hang-up at the last minute and therefore didn't have time for a final proofing on the paper copy. Therefore, I did a corrected copy, which is enclosed. I'd appreciate it if you would replace the April 4 copy with the enclosed. There were some typos and a few confusing sentences that I clarified. The most substantive correction was a small correction of numbers in Table 1. The cover letter of the enclosed corrected copy has a note about this below the signature line. I apologize for any confusion this may cause.

II. Scope of work for PUC consultant doing the environmental analysis and comparison of routes. My understanding is that the PUC will be hiring a private party to develop the environmental analysis and comparison of routes for Sandpiper. The product of this contracted work will thus be key to government decisions on this project. How will the Scope of Work be developed? Is such a scope of work shown to Enbridge prior to its completion? My comments and those of others need to be incorporated into the Scope of Work. This Scope of Work should include specific questions focused on the key public policy decisions that need to be made about the Sandpiper project, rather than allowing the contractor to determine such questions. In addition, a draft of this Scope of Work should be available for review prior to letting the contract, since the product is so crucial to the decisions.

The rules regarding a Certificate of Need for this project clearly indicate that environmental and socioeconomic factors must be taken into account in the decision as to whether to grant a need certificate. (Section 7853.0130, Criteria.) Therefore, the Scope of Work is a key document for determining whether to grant a Certificate of Need.

III**. Pipeline construction environmental "footprint**."

A. <u>Enbridge estimate the environmental "footprint" of the Sandpiper project is inaccurate</u>. Enbridge's statement that they use a 100 foot ROW to construct the project seriously underestimates the project's effects and potential for long term damage. In fact, such a ROW only applies to flat or nearly flat areas, and are often farmland.

The environmental study and route comparison must use accurate figures on land requirements for building the pipeline. The estimate must include the topics of land clearing, earth moving and excavation, soil compaction, and potential for topsoil mixing. This is called the project's "environmental footprint." During a public meeting on Sandpiper at Clearbrook, a recent visit

to the DNR, and the Enbridge documents on the PUC web site, I examined Enbridge's plan sheets and some applications for crossing streams. These plans are simply not accurate with respect to land clearing and extent of excavation.

Note: My comments here do not apply to the topic of "extra work space" at roads, river crossings, and a few other locations of specialized construction. Enbridge generally does include these locations on its plan sheets. Such locations are a small fraction of the ROW impacts beyond the 100-foot ROW in hilly terrain.

In spite of abundant evidence to the contrary, Enbridge continues to maintain to the public that it only needs a 100 foot right-of-way (ROW.) Enbridge also used this figure on the Alberta Clipper and Southern Lights Projects, even though during construction a much wider ROW was evident at some locations. Finally, the 100 foot ROW was also used for the MinnCan project as a guide to estimating the environmental footprint of the project. (I worked on all three projects while employed at the DNR, including conducting training for other DNR staff in pipeline construction.)

Both Enbridge and MinnCan did not provide accurate figures for excavation into parent material outside of the pipeline trench. Such excavation is abundant in hilly terrain. A key mitigation measure, topsoil separation in such areas, was ignored in many locations except for agricultural land.

The 100 foot ROW width does not apply to hilly terrain. It is time to put it to rest when large diameter pipelines are proposed in Minnesota. In fact, the construction ROW in hilly terrain can become 200 to 300 feet wide in some areas. In many cases on the three large, above-mentioned projects I was involved while at the DNR, these wider locations were never included in plains submitted for public review by the PUC, DNR, or PCA, and not included in calculations of the project's environmental footprint.

The terrain crossed by the proposed Sandpiper route crosses hilly glacial moraine in many locations Understanding pipeline construction in non-flat terrain is crucial because it directly relates to important environmental impacts such as the extent of land clearing, deep excavation outside of the pipe trench and accompanying potential serious loss of topsoil, susceptibility to invasion of non-native species and noxious weeds, and chronic erosion problems because re-vegetation is slower when topsoil is lost and replaced by parent material.

<u>B. Detailed explanation of ROW requirements for construction of a large-diameter pipeline.</u>

The enclosed report entitled "Construction of the Northern Border Pipeline in Montana" (referred hereafter as the IPTF Report) describes in detail why construction in non-flat terrain can lead to ROWs much wider than 100 feet. It also demonstrates why there can be extensive excavation outside of the pipeline trench. I wrote it (with review by supervisors) some years ago while Assistant Coordinator of the Montana Interagency Pipeline Task Force. One of the main reasons why it was written is because ROW was an important public issue for two proposed large pipelines in Montana. One of them, the Northern Tier Pipeline, was proposed to

cross the entire state, a distance of approximately 600 miles. A detailed review of it was done, but it was never built.

The Northern Border project—a 42 inch gas pipeline—crossed 180 miles of NE Montana, and was built after an EIS was prepared. ROW of way width was generally limited to 100 feet on state lands during the permitting stage, with the consent of the pipeline company. However, during construction, it became abundantly clear that it was impossible to construct the pipeline in such a narrow area in hilly terrain.

1. Purpose of IPTF Report. This report is applicable to the Sandpiper project with respect to determining the project's environmental footprint. It had four main purposes:

a. To document the ROW width in hilly terrain compared to flat terrain, and to determine the minimum ROW for a large diameter pipeline,

b. To document the locations of, and reasons for, excavation into topsoil and parent material outside the pipeline trench, since during the review period prior to construction the pipeline company had indicated excavation only for the pipe trench.

c. To identify problems encountered during construction and reclamation after pipe burial.

d. To serve as a training manual for reviewers of proposals to construct large diameter pipelines.

<u>2. Caveats as to use of the IPTF report for the Sandpiper project</u>. Before pointing out key findings of the report that relate to the Sandpiper proposal, there a few caveats as to its use:

a. Northern Border was constructed on a new ROW, with no existing pipelines in place.

b. A level work pad generally 50 feet wide is needed for construction of large diameter pipelines, with the pipeline trench to the left of the forward movement of construction. This work pad is essentially a road during construction, with nearly all traffic confined to it. Width is needed for passage of traffic past active work areas, and also for worker safety. A *level* work pad is necessary for worker safety and equipment needs. This construction necessity is directly related to the environmental footprint of the project as discussed below.

c. There have been some changes in pipeline construction techniques since Northern Border, but essentially none that affect ROW width except at special areas such as rivers. (Examples include: welding methods are done somewhat differently, and machine welding is often done on-site; cathodic protection pipe coating is no longer done on site, as depicted in the report, except at field welding locations; and directional drill bores (HDD) are much more common.) The fact that Northern Border was a 42 inch pipeline made little difference in ROW width as compared to the 24 inch MinnCan pipeline. The ROW for the latter was perhaps 8-10 feet narrower on flat terrain than the Northern Border line, but there was little difference on hilly

terrain. In addition, there have been changes in river crossing techniques with greater use of HDDs, and dam and pump methods are often used rather than open cut trenches.

d. When another large pipeline is added to an existing corridor, it is offset from the existing line by a project-specific distance. I've found it to be 35-40 as a minimum separation. Therefore, the construction ROW can be somewhat narrower than the standard 100 foot because spoil from the trench can be placed in the separation zone. However, there are site specific issues on hilly terrain so that generalizations don't work in such areas. Also, heavy equipment travel is restricted over the new and old lines.

e. Pipe is bent to *generally* follow the terrain, but not *exactly* follow the terrain. A straight pipe transfers gas or liquid most efficiently. Therefore, in hilly terrain with abrupt slopes, pipe curvature strikes a balance between the desire for a straight pipe and the constraints of excavation. In other words, in some locations, such as the crest of a hill, or under a small but steep hill, the pipe is buried much more deeply in order to lessen the curves. The report illustrates the result of this in expanded ROW width in some locations for the extra spoil and topsoil storage.

f. Topsoil separation in excavated areas is a crucial environmental issue because it relates to whether there are long-term impacts to land productivity in all areas, increased invasive species and noxious weeds, and increased erosion because re-vegetation is slow or non-existent. Topsoil separation can increase the ROW width because of separate piles; however, the expansion can be reduced by creative soil storage. Lack of topsoil separation causes long-term impacts whereas a somewhat wider ROW in some places causes temporary impacts. Furthermore, in recognition of this, topsoil separation has become a standard good practice in stormwater permits and all sorts of construction.

g. When done correctly based on known best practices for pipeline construction, environmental impacts of pipeline placement (not including future oil spill impacts) can be significantly reduced. The attached report suggests some of the good practices.

<u>3.Key points from IPTF report</u>. The IPTF report in its entirety is part of my comments, but the following are key points especially related to Sandpiper:

a. ROW requirements and topsoil stripping. Pages 31-32 provide a summary of the significance of ROW requirements as an environmental issue. It also references the details that support my findings that the IPTF Report is completely relevant to the Sandpiper project.

b. ROW requirements on flat terrain are discussed on page 33, and shown in pictures 51 and 52. On entirely flat terrain, it was possible to construct on an 85 foot ROW, although this increased somewhat as work progressed through clean-up.

c. Separation of topsoil from parent material on side-hill cuts is shown on page 37, and pictures 58 and 60. Page 39, picture 62, depicts lack of topsoil separation where it should have been done.

d. Page 40, and pictures 64 and 67 show deep side hill cuts, topsoil separation, and parent material storage.

e. Page 43 and photos 69-73 show extra-deep pipe burial in hilly areas and resulting large amounts of spoil.

f. Page 47-55 describe in detail why ROWs are wider than 100 feet in hilly terrain, and include diagrams explaining why this happens with respect to how pipelines must be constructed. The following significant conclusions are reached:

"1) Any deviation from flat terrain (0 degree slope) causes a geometric increase in width requirements, primarily for soil and spoil storage.

"2) There is often a progressive increase in r-o-w width after initial r-o-w clearing as different stages of construction proceed.

"3) there were numerous areas of extra r-o-w width needed beyond the 100 foot requested by DNRC.

"4) There was a high potential for topsoil mixing in the numerous side-hill cuts.

"6) Construction crews demonstrated an exceptional ability to re-contour the disturbed surface to the original configuration and replace topsoil when it had been correctly stripped.

IV. Consequences of pipeline leaks and ruptures must enter into route comparison, assessment of impacts, and need for the project.

My April 4 comments (pages 3 through 11) indicated in detail why impacts of pipeline leaks and ruptures need to be addressed in PUC decisions. I reiterate those recommendations, and have additional points regarding federal rules, and analysis of existing corridors, as follows:

<u>A. Problems with federal rules</u>. There are federal rules regarding hazardous liquid pipelines effects on the environment and people. These pipeline integrity rules pertain to environmental and socioeconomic impacts . They are administered by the Pipeline and Hazardous Materials Safety Administration (PHMSA) in the U.S. Department of Transportation. These rules refer to High Consequence Areas (HCA) and Unusually Sensitive Areas (USAs). (Title 49: Transportation PART 195—TRANSPORTATION OF HAZARDOUS LIQUIDS BY PIPELINE.) Both of these categories refer to populated areas, some aquifers, and some ecologically sensitive areas. I referred to HCAs in my April 4, 2014 comments.

The problem is that the federal rules regarding USAs and HCAs very much "high-grade" sensitive environmental features, and only include the rarest and most unusual ecological or natural resource features. This is not just my opinion. Describing sensitive area—and making lists of them—has been standard regulatory practice for many years. Such areas are subsequently avoided, or if they cannot be avoided, various mitigation measures are incorporated into government permits to reduce impacts. For example, these lists include public

lands dedicated to a public use such as parks and wildlife management areas, and critical habitat features for certain species, such as deer wintering areas.

One would expect that such normalized lists would have been incorporated into the PHMSA rules. *PHMSA did not even begin to do so.* The notice of the adoption of final rules noted that government agencies with much more expertise than PHMSA regarding pollution and natural resources, such as the EPA and US Department of Interior, strongly objected to the restricted list of USAs and HCAs. (See Federal Register / Vol. 65, No. 232 / Friday, December 1, 2000 / Rules and Regulations.) Many other commenters, including the US Department of Justice also objected to this limited list.

In spite of these objections, the Office of Pipeline Safety didn't budge and kept the limited list with little justification.

However, in 2011, Congress passed the Pipeline Safety Act, and it was signed into law in early 2012. This was in response to the Michigan Enbridge pipeline rupture, the explosion of a gas pipeline in California that killed 8 people, and other pipeline accidents. Now, PHMSA Administrator Cynthia Quarterman noted in a hearing last week in the US House of Representatives that new rules will be out for review shortly regarding USAs and HCAs and other rules regarding pipeline integrity and potential environmental impact.

<u>B. PUC route comparison with respect to USAs and HCAs</u> . The PUC route comparison needs to identify and compare:

1. Any USAs and HCAs as defined in *current* federal pipeline integrity rules on any of the routes that have been identified or are being studied.

2. Any USAs and HCAs—or other categories related to the environment—*as defined in proposed new rules* on any of the routes being studied and identified, assuming the new proposed rules come out in time.

3. Determine the effects on any USAs or HCAs should there be a pipeline rupture, based on the "worst case" as defined in the Oak Ridge National Laboratory 2012. "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety" December 2012. This should also incorporate a "worst case" regarding collateral damage to existing pipelines in the two corridors that already have multiple pipelines.

<u>C. Collective facility plan</u>. Enbridge is the owner of all of the lines in its mainline corridor to Superior. In other words, it collectively owns all the pipelines in most of this corridor. Enbridge should be required to submit a Facility Plan for the Mainline Corridor, and any other corridor that contains more than one Enbridge line. This should be in addition to the plans on each individual line. Such plans can provide indications of responses to spills constrained by existing lines, as well as be indicative of "corridor fatigue."

V. Additional comments on the analysis of "corridor fatigue" issues. My April 4 comments addressed "corridor fatigue" on pages 11-16, with recommendations on pages 15-16. I have the following additional comments.

The route comparison simply must address the growing problem of adding more and more pipelines to existing corridors that were established prior to environmental laws. Therefore, the key place to begin is in the contractor hired by the PUC. Information about the existing pipelines and corridors will aid in understanding the extent of "corridor fatigue" and the increased risk of accidents on one line cascading to others. Therefore, the Scope of Work for the PUC contractor should specifically require the contractor include at least the following with respect to existing corridors:

A. Information about existing lines. On each existing line this should include: locations, identification of any looped areas, locations of cross-overs, types of river crossings such as whether they are trenched or bored, and extent of cover in the riverbed if trenched. There are also a number of locations along the Enbridge Mainline where pipelines actually are not next to each other, which results in multiple corridors somewhat close together rather than one corridor.

B. Facility plans on existing lines. Federal rules require that a "facilities plan" be submitted by a pipeline company prior to its being built. According to a call to the state office of pipeline safety, these are sent to PHMSA, and are not filed with the Minnesota agency. These plans are to include such items as the company's risk assessment, identification of HCAs and USAs, and other content highly relevant to an assessment of impacts and a comparison of routes.

C. Locations of problems areas identified during construction of existing lines. Enbridge and MinnCan should provide information on problem areas identified during construction of the existing lines.

D. Identify "choke points." There are locations along existing corridors where it is simply not physically possible to add more pipelines. These are sometimes referred to as "choke points." Such areas are indicative of "corridor fatigue," and are also the reason for the divergence noted in #2 above.

E. Locations where existing pipelines are exposed or more vulnerable to damage. Pipelines constructed in the past were built to lesser standards than current pipelines. For instance, Enbridge Line 3 was placed on the surface of the ground in certain wetland locations and cover piled on top of it. Over time, this has resulted in pipe exposure. Federal rules do not require that older pipelines meet current standards; therefore, Enbridge has been re-covering such locations on a voluntary basis. These locations should be identified. Also, I am aware of at least one, and possibly two locations along the Enbridge corridor where pipe is exposed as it crosses a river. One of these is a trout stream in Beltrami County.

Such locations are more vulnerable to vandalism and environmental events such as large and unusual rainfall events. Therefore, these locations along the existing corridors increase the risk of ruptures and accidents which may cause increased risk to new lines. The contractor needs to

obtain from Enbridge and MinnCan records that identify such areas, and include this factor in assessing "corridor fatigue" and the route comparison.

F. Rivers and floodplains crossed at an oblique angle. Such important natural resource areas should be crossed by pipelines in a perpendicular manner in order to minimize the length of crossing this feature. This would be done when a new corridor is established. Therefore, data on oblique crossings is a measure of existing corridor problems. The LaSalle Creek crossing north of Itasca Park is a good example of this problem. A good measure of each crossing is the distance crossed obliquely compared to the perpendicular distance of the same crossing.

G. Avoidance areas under current pipeline construction practices. The existing corridors should be assessed to determine locations that would have been avoided if the existing pipelines were not present. Admittedly, this assessment would be somewhat objective. However, there are such features as lakes crossed by pipelines on the existing corridor. It is highly unlikely such features would be crossed by a new pipeline corridor. Also, a new pipeline corridor could well be routed around at least some wetlands rather than the numerous wetland crossing now found on the old corridors proposed to be followed by Enbridge's new lines.

H. Areas of restricted access. The existence of buried lines actively interfering with response to pipeline ruptures can reduce response time because heavy equipment can't drive over lines in some locations. In addition, pipeline ruptures in areas with few roads likely would exacerbate spills. The existing corridors should be examined to find such areas.

APPENDIX 3. CONSTRUCTION OF THE NORTHERN BORDER PIPELINE IN MONTANA
REPORT OF INTERAGENCY PIPELINE TASK FORCE

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
JANUARY 1982
BY PAUL STOLEN

This report is too big to include here. However, it has been submitted to the Department of Commerce in a timely fashion during the Route Permit proceedings. It was entered in eDocket 13-474 on July 18, 2014 in 4 pieces

APPENDIX 4, NEWS STORY REGARDING ENBRIDGE FILING OF NEW FIGURES ON COST OF PIPELINE RUPTURE

New price tag for Kalamazoo River oil spill cleanup: Enbridge says $1.21 billion
By Garret Ellison | gellison@mlive.com
on November 05, 2014 at 1:45 PM, updated November 05, 2014 at 1:48 PM

MARSHALL, MI — The largest inland oil spill in U.S. history has cost Canadian energy giant Enbridge $1.21 billion to clean up — a substantially higher figure than previously estimated.

In a securities filing this week, Enbridge Energy Partners reported the total cleanup cost of the 2010 Kalamazoo River oil spill to be $85.9 million higher than figures released last year. According to the Securities and Exchange Commission filing, the $1.21 billion figure included $551.6 million spent on response personnel and equipment, $227 million on environmental consultants and $429.4 million on professional, regulatory, and other costs. The company estimates it has $219 million in spill costs yet-to-be-paid.

The new numbers follow substantial cleanup activities and restoration of the Kalamazoo River, which was fouled by 843,000 gallons of diluted bitumen, or dilbit, a viscus type of heavy crude oil from the tar sands region of Canada. The spill occurred when a six-foot break in Enbridge's Line 6B, which runs from Griffith, Ind., to Sarnia, Ontario, sent oil into the river's Tallmadge Creek tributary near Marshall on July 25, 2010.

Portions of the river were dredged and riverbank was restored with native plantings along the entire 35-mile stretch of waterway in Calhoun and Kalamazoo counties. Dredging near Ceresco and Morrow Lake is being completed. On Oct. 9, the Michigan Department of Natural Resources reported that all sections of the river had reopened for public use.

The U.S. Dept. of Transportation fined Enbridge $3.7 million dollars after the spill. The U.S. Environmental Protection Agency is expected to levy additional fines for violations of the Clean Water Act. In the filing, Enbridge estimates those to be around $40 million. The Michigan Department of Environmental Quality is taking over responsibility for monitoring and remediation of remaining submerged oil from the EPA.

On Oct. 21, U.S. District Judge Gordon Quist approved an undisclosed settlement between Enbridge and developers who planned to convert 420 acres of undeveloped land in Marshall into a $14 million community vineyard. In a Nov. 3 earnings call, Enbridge president Mark Maki said the company increased its insurance liability coverage to $700 million following the 2010 spill.

"If you go back over our history, the Marshall incident was without question really a confluence of a number of very, very difficult and bad events in terms of what it cost ultimately," Maki said. "So we just don't see a lot of value in ensuring for another Marshall.."

Garret Ellison covers business, government and breaking news for MLive/The Grand Rapids Press. Email him at gellison@mlive.com or follow on Twitter & Instagram

APPENDIX 5.

JULY 30 2012 LETTER FROM PHMSA TO ENBRIDGE INC REGARDING CORRECTIVE ACTION ORDER ON 24-INCH LINE 14 IN WISCONSIN BECAUSE OF RUPTURE THAT OCCURRED JULY 2012.

APPENDIX 6

AUGUST 1, 2012
LETTER FROM PHMSA TO ENBRIDGE INC REGARDING AMENDED CORRECTIVE ACTIONS ORDER ISSUED FOR THE 24-INCH LINE 14 IN WISCONSIN.

Note: These two documents cannot be pasted into this testimony document; therefore, they are appended as separate documents to the testimony

U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

JULY 30 2012

1200 New Jersey Avenue, SE
Washington, D.C. 20590

VIA CERTIFIED MAIL AND FAX TO: 832-325-5473

Mr. Richard Adams
Vice President, US Operations
Enbridge Energy, LP
City Center Office
1409 Hammond Avenue
Superior, WI 54880-5247

Re: CPF No. 3-2012-5017H

Dear Mr. Adams:

Enclosed is a Corrective Action Order issued in the above-referenced case. It finds that operation of the 24-inch diameter Line 14 would be hazardous to life, property, and the environment without immediate corrective action. The Corrective Action Order requires you to take certain corrective actions to protect the public, property, and the environment in connection with the failure of Line 14 that occurred on July 27, 2012, near Grand Marsh, Wisconsin. Service is being made by certified mail and facsimile. Your receipt of this Corrective Action Order constitutes service of that document under 49 C.F.R. § 190.5. The terms and conditions of this Order are effective upon receipt.

We look forward to the successful resolution of the concerns arising out of this failure in a manner that will ensure the safe operation of the pipeline. Please direct any questions on this matter to David Barrett, Director, Central Region, OPS, at (816) 329-3800.

Sincerely,

Jeffrey D. Wiese
Associate Administrator
for Pipeline Safety

Enclosure: Corrective Action Order and Copy of 49 C.F.R. §190.233

cc: Mr. Alan Mayberry, Deputy Associate Administrator for Field Operations, OPS
Mr. David Barrett, Director, Central Region, OPS
Mr. Mark Maki, President, Enbridge Energy Management, LLC
Mr. Steve Wuori, President, Liquids Pipelines, Enbridge Pipelines Inc.

U.S. DEPARTMENT OF TRANSPORTATION
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION
OFFICE OF PIPELINE SAFETY
WASHINGTON, D.C. 20590

In the Matter of	)	
	)	
Enbridge Energy, LP,	)	**CPF No. 3-2012-5017H**
	)	
Respondent.	)	
	)	

CORRECTIVE ACTION ORDER

Purpose and Background

This Corrective Action Order (Order) is being issued, under authority of 49 U.S.C. § 60112, to Enbridge Energy, LP (Enbridge or Respondent), the operator of the 24-inch diameter hazardous liquid pipeline designated as Line 14 that runs from Respondent's Superior Terminal and pump station in Superior, Wisconsin, to its Mokena delivery facility in Mokena, Illinois (Affected Pipeline). This Order finds that continued operation of the pipeline without corrective action would be hazardous to life, property, or the environment and requires Respondent to take immediate corrective action to ensure the safe operation of the pipeline.

On July 27, 2012, Respondent experienced a failure on the Affected Pipeline near Grand Marsh, WI (Failure), in Adams County. Respondent estimates the volume of product spilled to be approximately 1,200 barrels of crude oil.

Pursuant to 49 U.S.C. § 60117, the Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS), initiated an investigation of the Failure. OPS has determined that the release originated from the Affected Pipeline but the cause of the Failure has not yet been determined. The preliminary findings of the investigation are as follows:

Preliminary Findings

- The Affected Pipeline originates at the Superior Terminal in Wisconsin, proceeds southeast for approximately 467 miles, and terminates at the Mokena delivery facility near Chicago, Illinois.

- At approximately 2:41 pm CDT on July 27, 2012, Respondent's control center staff noted indications of a release on the Affected Pipeline. Respondent initiated shut down of the pipeline and notified field personnel in Wisconsin at 3:00 pm CDT.

- At approximately 2:45 pm CDT on July 27, 2012, Respondent received a call from a landowner who reported that crude oil was spraying on the pipeline right-of-way. The local sheriff's office also called the control center at 2:50 pm CDT.

- At approximately 2:55 pm CDT on July 27, 2012, Respondent isolated the failed pipe section by closing remotely controlled valves located upstream and downstream of the Failure site.

- At 3:27 pm CDT on July 27, 2012, Respondent's field personnel confirmed the location of the Failure as being approximately 5.7 miles east of Grand Marsh, Wisconsin, at 2487 County Road G in Adams County. The Failure site was located at milepost (M.P.) 232 on the Affected Pipeline.

- At 5:16 pm CDT on July 27, 2012, Respondent notified the National Response Center of the discharge of crude oil (NRC Report No. 1019189). Respondent reported 1,200 barrels of crude oil were released.

- Two households were evacuated due to their proximity to the Failure site. Several cattle and horses required veterinary attention. No further injuries cahave been reported.

- The Affected Pipeline crosses multiple rivers, including a navigable waterway, i.e., the Illinois River in the Chicago area, and intersects multiple High Consequence Areas (HCAs), including drinking water sources, "Other Populated Areas," "High Population Areas," and ecological resources. The Affected Pipeline also crosses numerous state highways in Wisconsin and Illinois, and multiple interstate highways before terminating at Mokena, Illinois.

- The Failure site is 2.5 miles away from a drinking water source, which so far shows no signs of contamination.

- The Affected Pipeline was constructed in 1998 of 24-inch, API 5L grade X70, high frequency electric resistance welded (ERW) pipe manufactured by the Stupp Pipe Corporation, with wall thicknesses ranging from 0.328-inch to 0.500-inch. The pipe at the Failure site has a 0.328-inch nominal wall thickness. The Affected Pipeline has a fusion bonded epoxy coating and an impressed-current cathodic protection system.

- Just prior to the time of the Failure, the discharge pressure at the Adams pump station (M.P. 227.4), located approximately 4.6 miles upstream of the Failure site, was 1,329 psig. The established maximum operating pressure (MOP) of the pipeline is 1,378 psig.

- Respondent performed a hydrostatic test of the pipeline in 1998 from M.P. 227.49 to M.P. 253.15 to a test pressure of 1,875 psig, which included the Failure site.

- The cause of the Failure is unknown but PHMSA has is continuing an onsite investigation. PHMSA investigators observed a 4.18-foot-long split in the high

frequency ERW seam of the pipe with a maximum opening of 6.25 inches. The pipeline currently remains out of service.

- During construction of the Affected Pipeline in 1998, radiography of girth welds revealed lack-of-fusion defects in the ERW seams at multiple locations along the Affected Pipeline.

- On January 1, 2007, a rupture of the Affected Pipeline occurred in Atwood, Wisconsin, releasing 1,500 barrels of crude oil. The rupture was located at M.P. 149.4, approximately one mile downstream of Respondent's Owen pump station in Clark County, Wisconsin. The OPS investigation of the 2007 failure found that a pre-existing lack-of-fusion defect in the ERW seam had grown to failure by a fatigue mechanism due to cyclic loads and that the chemical and mechanical properties of the pipe joint fracture surface also had indications of low toughness of the ERW seam.

- Following the January 1, 2007 failure, Respondent utilized ultrasonic crack detection technology to assess the Affected Pipeline. Multiple crack anomalies associated with the ERW seam were reported by the inline inspection (ILI) vendor. Based on the ILI results, Respondent made repairs to the Affected Pipeline for a 1.25 x MOP factor of safety. Calculations performed by Respondent in 2008 predicted that Line 14 would not fail for a minimum of 10 years based on a crack growth analysis that considered the operating pressure spectrum.

- Respondent performed an ILI of the Affected Pipeline in the area of the Failure in 2011 utilizing high-resolution geometry and magnetic flux leakage (MFL) tools. An ultrasonic crack detection technology ILI inspection was scheduled to be performed in the area of the failure in August 2012.

- The history of failures on Respondent's Lakehead Pipeline system, of which the Affected Pipeline is a part, the defects originally discovered during construction, and the 2007 failure indicate that Respondent's integrity management program may be inadequate.

Determination of Necessity for Corrective Action Order and Right to Hearing

Under 49 U.S.C. § 60112 and 49 C.F.R. § 190.233, the Associate Administrator for Pipeline Safety (Associate Administrator) may issue a corrective action order after providing reasonable notice and the opportunity for a hearing if he finds that a particular pipeline facility is or would be hazardous to life, property, or the environment. The terms of such an order may include the suspended or restricted use of a pipeline facility, physical inspection, testing, repair, replacement, or any other action as appropriate. The Associate Administrator may also issue a corrective action order without providing any notice or the opportunity for a hearing if he finds that a failure to do so expeditiously will result in likely serious harm to life, property or the environment. The opportunity for a hearing will be provided as soon as practicable after the issuance of the CAO in such cases.

After evaluating the foregoing preliminary findings of fact, I find that the continued operation of the pipeline without corrective measures would be hazardous to life, property and the environment. Additionally, after considering the age and failure history of the pipe, the circumstances surrounding the Failure, the proximity of the pipeline to populated areas, water bodies, drinking water resources, public roadways, and High Consequence Areas, the hazardous nature of the product being transported, the uncertainties as to the cause of the Failure, and the ongoing investigation to determine the cause of the Failure, I find that a failure to issue this Order expeditiously to require immediate corrective action would likely result in serious harm to life, property, and the environment. Accordingly, this Corrective Action Order is issued without prior notice and opportunity for a hearing. The terms and conditions of this Order are effective upon receipt.

Within 10 days of receipt of this Order, Respondent may request a hearing, to be held as soon as practicable, by notifying the Associate Administrator for Pipeline Safety in writing, delivered personally, by mail or by fax at (202) 366-4566. The hearing will be held in Kansas City, Missouri, or Washington, DC, on a date that is mutually convenient to PHMSA and Respondent.

After receiving and analyzing additional data in the course of this investigation, PHMSA may identify other corrective measures that need to be taken. Respondent will be notified of any additional measures required and amendment of this Order will be considered. To the extent consistent with safety, Respondent will be afforded notice and an opportunity for a hearing prior to the imposition of any additional corrective measures.

Required Corrective Action

Pursuant to 49 U.S.C. § 60112, Enbridge Energy, LP, is ordered to immediately take the following corrective actions to ensure the safe operation of the Affected Pipeline:

1. Develop and submit a written re-start plan for prior approval of the Director, Central Region, OPS (Director). Obtain written approval from the Director prior to resuming operation of the Affected Pipeline. Submit the written plan to the Director at the Pipeline and Hazardous Materials Safety Administration, 901 Locust Street, Suite 462, Kansas City, MO 64106-2641. The plan must provide for adequate patrolling of the Affected Pipeline during the restart process to ensure the prompt detection of leaks, include a daylight restart, and detail advance communications with local emergency response officials.

2. After receiving approval from the Director to restart, maintain a minimum twenty percent (20%) pressure reduction in the operating pressure of the Affected Pipeline. Submit the operating pressures for each pump station on the Affected Pipeline at the time of failure and the reduced discharge pressure limits for approval by the Director in the restart plan referenced in Item 1. The reduced discharge pressure limits must also consider any ILI features and anomalies that are present in the Affected Pipeline to provide for continued safe operation while further corrective actions are completed. The approved pressure restrictions will remain in effect until written approval to increase the pressure or return the pipeline to its pre-failure operating pressure is obtained from the Director pursuant to

Item 12. Respondent must maintain documentation to show that these requirements have been met.

Review the pressure restrictions monthly, taking into account any ILI features present in the pipeline and analysis of operating pressure cycle data. Based on the monthly review, Enbridge must immediately reduce operating pressure accordingly to maintain safe operations. Submit results of the monthly review, the current discharge set points, including any additional reductions, and any exceedance of discharge set points, in the reports pursuant to Item 10.

3. Within 45 days of receipt of this Order, complete mechanical and metallurgical testing and failure analysis of the failed pipe and other pipe removed, including analysis of soil samples and any foreign materials. Complete the testing and analysis as follows:

   A. Document the chain-of-custody when handling and transporting the failed pipe section and other evidence from the failure site;

   B. Submit the testing protocols and the selection of the testing laboratory to the Director for prior approval.

   C. Prior to commencing the mechanical and metallurgical testing, provide the Director with the scheduled date, time, and location of the testing to allow a PHMSA representative to witness the testing; and

   D. Ensure that the testing laboratory distributes all resulting reports in their entirety (including all media), whether draft or final, to the Director at the same time as they are made available to Respondent.

4. Within 30 days of receipt of this Order, conduct an evaluation of the previous inline inspection (ILI) results, including a review and reporting by the ILI vendors' analysts (including raw data) of the Affected Pipeline as follows:

   A. Submit any and all reports from the 2007 ILI runs as received from the vendors;

   B. Re-evaluate the 2007 inline inspection results to determine whether any features were present in the failed pipe joint and other pipe removed. Determine if any features with similar characteristics are present elsewhere on the Affected Pipeline. Submit to the Director the scheduled dates, times, and locations of meetings with the ILI vendors to allow PHMSA representatives to attend;

   C. Submit a report describing the ILI features present in the failed joint and other pipe removed, the process used to re-evaluate ILI results, and the results of the re-evaluation including characterization of the size and location of similar features on the Affected Pipeline.

5. As recommended in PHMSA Advisory Bulletin 2012–06, verify the records for the Affected Pipeline relating to operating specifications for maximum operating pressure

(MOP). Within 45 days of receipt of this Order, submit a report on this record verification and copies of these records to the Director.

6. Within 90 days following receipt of this Order, complete an evaluation utilizing multiple root cause failure analysis techniques, including a Management Oversight and Risk Tree (MORT) analysis, to determine the underlying causes and contributing factors to the Failure, including preventive measures employed by Enbridge. Within 10 days of receipt of this Order, submit a list of proposed independent third-party contractors for prior approval by the Director, along with contractor qualifications and scope of work. The scope of the evaluation must include, but not be limited to: Enbridge's procedures; failure, operating and maintenance history; use of safety factors; review of ILI results; application of assessment methods, analysis and monitoring of pressure cycles in determining assessment intervals and operating pressures; decision processes regarding repair methods, including pipe replacement; a detailed review of the adequacy of the operator's spill prevention plans; and a detailed review of all emergency response activities, including initial controller response. All reports in their entirety (including all media), whether draft or final, shall be submitted to the Director at the same time they are made available to Respondent. Submit the final report for the Director's approval.

7. Within 90 days following receipt of this Order, submit an integrity verification and remedial work plan (Work Plan) for implementing continuing long-term periodic testing to the Director for approval. The Work Plan must provide for the verification of the integrity of the pipeline and must address all factors known or suspected in the July 27, 2012 failure, including, but not limited to the following:

   A. The integration of the results of the failure analyses and other actions required by this Order, with all relevant operating data, including all historical repair information, construction, operating, maintenance, testing, metallurgical analysis or other third-party consultation information, and assessment data for the Affected Pipeline. Data gathering activities must include a review of the failure history of the pipeline (including in-service and pressure test failures) and development of a written report to be approved by the Director containing all available information regarding locations, dates, and causes of leaks and failures;

   B. The performance of additional field testing, inspections, and evaluations to determine whether and to what extent the conditions associated with the failures, or any other integrity-threatening conditions are present elsewhere on the Affected Pipeline. At a minimum, the inspections and evaluations must consider use of in-line inspection that can reliably detect and identify anomalies. Include a detailed description of the criteria to be used for the evaluation and prioritization of any integrity threats and anomalies that are identified (accounting for uncertainties in anomaly and defect sizing by the ILI vendor and field non-destructive examination), establishing a minimum 1.39 x MOP factor of safety upon completion of testing, inspections, evaluations, replacements and repairs as described in this Order;

C. The performance of repairs or other corrective measures that fully remediate the conditions associated with the pipeline failures and any other integrity-threatening condition everywhere along the Affected Pipeline. The plans must be based on the known history and condition of the pipeline, and must be scheduled to be completed as follows: (1) repairs must be completed within 6 months of receipt of the ILI vendor's final report; (2) confirmatory hydrostatic pressure testing of the Affected Pipeline by December 31, 2013; and (3) replacement of the Affected Pipeline or portions thereof by July 31, 2015. Include a detailed description of the criteria and methods to be used in undertaking any repairs, replacements, or other remedial actions to establish a minimum 1.39 x MOP factor of safety.

8. The approved Work Plan will be incorporated into this Order. Respondent must revise the Work Plan as necessary to incorporate the results of actions undertaken pursuant to this Order and whenever necessary to incorporate new information obtained during the failure investigation and remedial activities. Submit any such plan revisions to the Director for prior approval. The Director may approve plan elements incrementally.

9. Implement the Work Plan as it is approved by the Director, including any revisions to the plan.

10. Submit monthly reports to the Director that: (1) include all available data and results of the testing and evaluations required by this Order; and (2) describe the progress of the repairs or other remedial actions being undertaken. The first monthly report for the period from August 1 through August 31, 2012 shall be due by September 7, 2012.

11. It is requested that Respondent maintain documentation of the costs associated with implementation of this Corrective Action Order. Include in each monthly report submitted, the to-date total costs associated with: (1) preparation and revision of procedures, studies and analyses; (2) physical changes to pipeline infrastructure, including repairs, replacements and other modifications; and (3) environmental remediation, if applicable.

12. The Director may allow the removal or modification of the pressure restriction set forth in Item 2 upon a written request from Respondent demonstrating that the hazard has been abated and that restoring the pipeline to its pre-failure operating pressure is justified based on a reliable engineering analysis showing that the pressure increase is safe considering all known defects, anomalies and operating parameters of the pipeline.

The Director may grant an extension of time for compliance with any of the terms of this Order upon a written request timely submitted demonstrating good cause for an extension.

With respect to each submission that under this Order requires the approval of the Director, the Director may: (a) approve, in whole or part, the submission; (b) approve the submission on specified conditions; (c) modify the submission to cure any deficiencies; (d) disapprove in whole or in part, the submission, directing that Respondent modify the submission, or (e) any combination of the above. In the event of approval, approval upon conditions, or modification by the Director, Respondent must take all actions required by the submission as approved or

modified by the Director. If the Director disapproves all or any portion of the submission, Respondent must correct all deficiencies within the time specified by the Director, and resubmit it for approval. If a resubmitted item is disapproved in whole or in part, the Director may again require Respondent to correct the deficiencies in accordance with the foregoing procedure, and the Director may otherwise proceed to enforce the terms of this Order.

Be advised that all material you submit in response to this enforcement action is subject to being made publicly available. If you believe that any portion of your responsive material qualifies for confidential treatment under 5 U.S.C. 552(b), you must provide, along with the complete original document, a second copy of the document with those portions you believe qualify for confidential treatment redacted, along with an explanation of why you believe the redacted information qualifies for confidential treatment under 5 U.S.C. 552(b).

In your correspondence on this matter, please refer to "CPF No. 3-2012-5017H" and for each document you submit, please provide a copy in electronic format whenever possible. The actions required by this Corrective Action Order are in addition to and do not waive any requirements that apply to Respondent's pipeline system under 49 C.F.R. Part 195, under any other order issued to Respondent under authority of 49 U.S.C. § 60101 et seq., or under any other provision of Federal or State law.

Respondent may appeal any decision of the Director to the Associate Administrator for Pipeline Safety. Decisions of the Associate Administrator shall be final.

Failure to comply with this Order may result in the assessment of civil penalties and in referral to the Attorney General for appropriate relief in United States District Court pursuant to 49 U.S.C. § 60120.

The terms and conditions of this Corrective Action Order are effective upon receipt.

Jeffrey D. Wiese
Associate Administrator
for Pipeline Safety

7/30/2012
Date Issued

U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

AUG 1, 2012

1200 New Jersey Avenue, SE
Washington, D.C. 20590

VIA CERTIFIED MAIL AND FAX TO: 832-325-5473

Mr. Richard Adams
Vice President, US Operations
Enbridge Energy, LP
City Center Office
1409 Hammond Avenue
Superior, WI 54880-5247

**Re: CPF No. 3-2012-5017H
Amendment to the July 30, 2012 Corrective Action Order**

Dear Mr. Adams:

Enclosed is an Amendment to the Corrective Action Order that was issued in the above-referenced case on July 30, 2012. Your receipt of this Amendment constitutes service of that document under 49 C.F.R. § 190.5.

Please direct any questions on this matter to David Barrett, Director, Central Region, Office of Pipeline Safety, PHMSA, at (816) 329-3800.

Sincerely,

Jeffery Wiese
Associate Administrator
For Pipeline Safety

Enclosures: Amendment to the Corrective Action Order
Copy of 49 C.F.R. § 190.233

cc: Mr. Alan Mayberry, Deputy Associate Administrator for Field Operations, OPS
Mr. David Barrett, Director, Central Region, OPS
Mr. Mark Maki, President, Enbridge Energy Management, LLC
Mr. Steve Wuori, President, Liquids Pipelines, Enbridge Pipelines Inc.

U. S. DEPARTMENT OF TRANSPORTATION
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION
OFFICE OF PIPELINE SAFETY
WASHINGTON, DC 20590

In the Matter of	)	
Enbridge Energy, LP,	)	**CPF No. 3-2012-5017H**
Respondent.	)	

AMENDMENT
TO THE CORRECTIVE ACTION ORDER

Background and Purpose

On July 30, 2012, under authority of 49 U.S.C. § 60112, the Associate Administrator for Pipeline Safety, Pipeline and Hazardous Materials Safety Administration (PHMSA), issued a Corrective Action Order (CAO) to Enbridge Energy Partners, LP (Enbridge or Respondent), finding that continued operation of Respondent's Line 14 that runs from Superior, Wisconsin, to Mokena, Illinois, without corrective action would be hazardous to life, property, or the environment and requiring Respondent to take immediate corrective action to ensure the safe operation of the pipeline. PHMSA issued the July 30, 2012 CAO (Original CAO) [1] in response to a failure on Line 14 near Grand Marsh, Wisconsin, that was reported by Enbridge on July 27, 2012 (Failure). The Failure resulted in an estimated release of 1,200 barrels of crude oil. PHMSA initiated an investigation of the Failure which is ongoing.

Line 14 is a part of Respondent's 1,900 mile-long Lakehead Pipeline system, which transports hazardous liquid from Neche, North Dakota, to Chicago, Illinois, with an extension to Buffalo, New York.[2]

Additional Preliminary Findings

The preliminary findings in the Original CAO noted that the history of failures on Respondent's Lakehead Pipeline system, the defects originally discovered during construction of Line 14, a 2007 failure on Line 14, and the July 2010 failure on Line 6B in Marshall, Michigan, and additional failures throughout all parts of the Lakehead System indicate that Respondent's integrity management program may be inadequate. PHMSA has communicated its longstanding

[1] *In the Matter of Enbridge Energy Partners, L.P.*, Corrective Action Order (CPF No. 3-2012-5017H) dated July 30, 2012.

[2] *See* http://www.enbridgeus.com/Delivering-Energy/Pipeline-Systems/Liquids-Pipelines/ (last accessed August 1, 2012). The Lakehead System includes Lines 1, 2, 3, 4, 5, 6A, 6B, 10, 14, and 64, and associated facilities.

concerns about this pattern of failures with Respondent over the past several years. Given the nature, circumstances, and gravity of this pattern of accidents, additional corrective measures are warranted.

Finding of Hazardous Condition

Section 60112 of Title 49, United States Code, provides for the issuance of a Corrective Action Order, including amendments, after reasonable notice and the opportunity for a hearing, requiring the operator of a pipeline determined to pose a hazard to take corrective actions to protect the public and the environment. These may include the suspended or restricted use of a pipeline facility, physical inspection, testing, repair, replacement, or other action, as appropriate. The basis for making a determination that a pipeline facility is or would be hazardous, requiring corrective action, is set forth both in the above-referenced statute and 49 C.F.R. § 190.233, a copy of which is enclosed.

After evaluating all available information regarding the safety of the Lakehead System, including the foregoing additional preliminary findings, and considering the nature and circumstances surrounding the Failure, the hazardous nature of the product transported, the pressure required for transporting such product, and the ongoing investigation to determine the root cause of the Failure, I find that the continued operation of the Line 14 without additional corrective measures would be hazardous to life, property, and the environment.

Accordingly, PHMSA hereby issues this Amendment to the CAO requiring the additional actions specified herein be taken to protect life, property, and the environment. The additional actions set forth in this Amendment to the CAO are in addition to the actions set forth in the Original CAO and do not suspend or eliminate the requirements of the Original CAO, unless otherwise specifically provided herein.

Amendments to Required Corrective Action

Pursuant to 49 U.S.C. § 60112 and 49 C.F.R. § 190.233, Enbridge Energy Partners, L.P. is ordered to comply with this Amendment to the CAO and take the following additional corrective actions with respect to the Lakehead System. The following item is added to the Corrective Action Order:

13. Before the Director, Central Region, OPS, approves the restart of Line 14, Enbridge must (1) submit, for review and approval, a comprehensive written plan, including timelines for specific actions to improve the safety record of Respondent's Lakehead pipeline system and (2) hire an independent third party pipeline expert to review and assess the written plan, which the third party will submit to PHMSA and to Respondent concurrently. Further, the third party expert must oversee the creation, execution and implementation of the actions identified in the plan, and must provide monitoring summaries to PHMSA and Respondent concurrently. Respondent must commit to address any deficiencies or risks identified in the third party's assessment, including repair and replacement of high-risk infrastructure.

    The plan must be sufficiently detailed with specific tasks, milestones and completion dates. At a minimum, the plan must address:

a. Organizational issues, including the promotion of a safety culture and creation of a safety management system;
b. Facilities response plan;
c. Control room management;
d. Priorities for pipe replacement;
e. Training;
f. In-line inspection result interpretation;
g. Current engineering and probability of failure modeling;
h. Leak detection systems;
i. Sensor and flow measuring and valve replacement;
j. Integrity verification;
k. Quality management system; and
l. Any other risk, task, issue or item that is necessary to promote and sustain the safety of its pipeline system.

The actions required by this Amendment to the CAO are in addition to and do not waive any requirements that apply to Line 14 under the Original CAO or to Respondent's pipeline system under 49 C.F.R. Parts 190 through 199, as applicable, or any other Order issued to Respondent under authority of 49 U.S.C. § 60101 et seq., or under any other provision of federal or state law.

After receiving and analyzing additional data in the course of this investigation, PHMSA may identify other corrective actions that need to be taken. In that event, Respondent will be notified of any additional measures required and further amendment of the CAO will be considered. To the extent consistent with safety, Respondent will be afforded notice and an opportunity for a hearing prior to the imposition of any additional corrective measures.

Jeffrey D. Wiese
Associate Administrator
for Pipeline Safety

AUG 01 2012
Date Issued

U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, D.C. 20590

JULY 30 2012

VIA CERTIFIED MAIL AND FAX TO: 832-325-5473

Mr. Richard Adams
Vice President, US Operations
Enbridge Energy, LP
City Center Office
1409 Hammond Avenue
Superior, WI 54880-5247

Re: CPF No. 3-2012-5017H

Dear Mr. Adams:

Enclosed is a Corrective Action Order issued in the above-referenced case. It finds that operation of the 24-inch diameter Line 14 would be hazardous to life, property, and the environment without immediate corrective action. The Corrective Action Order requires you to take certain corrective actions to protect the public, property, and the environment in connection with the failure of Line 14 that occurred on July 27, 2012, near Grand Marsh, Wisconsin. Service is being made by certified mail and facsimile. Your receipt of this Corrective Action Order constitutes service of that document under 49 C.F.R. § 190.5. The terms and conditions of this Order are effective upon receipt.

We look forward to the successful resolution of the concerns arising out of this failure in a manner that will ensure the safe operation of the pipeline. Please direct any questions on this matter to David Barrett, Director, Central Region, OPS, at (816) 329-3800.

Sincerely,

Jeffrey D. Wiese
Associate Administrator
for Pipeline Safety

Enclosure: Corrective Action Order and Copy of 49 C.F.R. §190.233

cc: Mr. Alan Mayberry, Deputy Associate Administrator for Field Operations, OPS
Mr. David Barrett, Director, Central Region, OPS
Mr. Mark Maki, President, Enbridge Energy Management, LLC
Mr. Steve Wuori, President, Liquids Pipelines, Enbridge Pipelines Inc.

U.S. DEPARTMENT OF TRANSPORTATION
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION
OFFICE OF PIPELINE SAFETY
WASHINGTON, D.C. 20590

In the Matter of	)	
	)	
Enbridge Energy, LP,	)	**CPF No. 3-2012-5017H**
	)	
Respondent.	)	
	)	

CORRECTIVE ACTION ORDER

Purpose and Background

This Corrective Action Order (Order) is being issued, under authority of 49 U.S.C. § 60112, to Enbridge Energy, LP (Enbridge or Respondent), the operator of the 24-inch diameter hazardous liquid pipeline designated as Line 14 that runs from Respondent's Superior Terminal and pump station in Superior, Wisconsin, to its Mokena delivery facility in Mokena, Illinois (Affected Pipeline). This Order finds that continued operation of the pipeline without corrective action would be hazardous to life, property, or the environment and requires Respondent to take immediate corrective action to ensure the safe operation of the pipeline.

On July 27, 2012, Respondent experienced a failure on the Affected Pipeline near Grand Marsh, WI (Failure), in Adams County. Respondent estimates the volume of product spilled to be approximately 1,200 barrels of crude oil.

Pursuant to 49 U.S.C. § 60117, the Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS), initiated an investigation of the Failure. OPS has determined that the release originated from the Affected Pipeline but the cause of the Failure has not yet been determined. The preliminary findings of the investigation are as follows:

Preliminary Findings

- The Affected Pipeline originates at the Superior Terminal in Wisconsin, proceeds southeast for approximately 467 miles, and terminates at the Mokena delivery facility near Chicago, Illinois.

- At approximately 2:41 pm CDT on July 27, 2012, Respondent's control center staff noted indications of a release on the Affected Pipeline. Respondent initiated shut down of the pipeline and notified field personnel in Wisconsin at 3:00 pm CDT.

- At approximately 2:45 pm CDT on July 27, 2012, Respondent received a call from a landowner who reported that crude oil was spraying on the pipeline right-of-way. The local sheriff's office also called the control center at 2:50 pm CDT.

- At approximately 2:55 pm CDT on July 27, 2012, Respondent isolated the failed pipe section by closing remotely controlled valves located upstream and downstream of the Failure site.

- At 3:27 pm CDT on July 27, 2012, Respondent's field personnel confirmed the location of the Failure as being approximately 5.7 miles east of Grand Marsh, Wisconsin, at 2487 County Road G in Adams County. The Failure site was located at milepost (M.P.) 232 on the Affected Pipeline.

- At 5:16 pm CDT on July 27, 2012, Respondent notified the National Response Center of the discharge of crude oil (NRC Report No. 1019189). Respondent reported 1,200 barrels of crude oil were released.

- Two households were evacuated due to their proximity to the Failure site. Several cattle and horses required veterinary attention. No further injuries cahave been reported.

- The Affected Pipeline crosses multiple rivers, including a navigable waterway, i.e., the Illinois River in the Chicago area, and intersects multiple High Consequence Areas (HCAs), including drinking water sources, "Other Populated Areas," "High Population Areas," and ecological resources. The Affected Pipeline also crosses numerous state highways in Wisconsin and Illinois, and multiple interstate highways before terminating at Mokena, Illinois.

- The Failure site is 2.5 miles away from a drinking water source, which so far shows no signs of contamination.

- The Affected Pipeline was constructed in 1998 of 24-inch, API 5L grade X70, high frequency electric resistance welded (ERW) pipe manufactured by the Stupp Pipe Corporation, with wall thicknesses ranging from 0.328-inch to 0.500-inch. The pipe at the Failure site has a 0.328-inch nominal wall thickness. The Affected Pipeline has a fusion bonded epoxy coating and an impressed-current cathodic protection system.

- Just prior to the time of the Failure, the discharge pressure at the Adams pump station (M.P. 227.4), located approximately 4.6 miles upstream of the Failure site, was 1,329 psig. The established maximum operating pressure (MOP) of the pipeline is 1,378 psig.

- Respondent performed a hydrostatic test of the pipeline in 1998 from M.P. 227.49 to M.P. 253.15 to a test pressure of 1,875 psig, which included the Failure site.

- The cause of the Failure is unknown but PHMSA has is continuing an onsite investigation. PHMSA investigators observed a 4.18-foot-long split in the high

frequency ERW seam of the pipe with a maximum opening of 6.25 inches. The pipeline currently remains out of service.

- During construction of the Affected Pipeline in 1998, radiography of girth welds revealed lack-of-fusion defects in the ERW seams at multiple locations along the Affected Pipeline.

- On January 1, 2007, a rupture of the Affected Pipeline occurred in Atwood, Wisconsin, releasing 1,500 barrels of crude oil. The rupture was located at M.P. 149.4, approximately one mile downstream of Respondent's Owen pump station in Clark County, Wisconsin. The OPS investigation of the 2007 failure found that a pre-existing lack-of-fusion defect in the ERW seam had grown to failure by a fatigue mechanism due to cyclic loads and that the chemical and mechanical properties of the pipe joint fracture surface also had indications of low toughness of the ERW seam.

- Following the January 1, 2007 failure, Respondent utilized ultrasonic crack detection technology to assess the Affected Pipeline. Multiple crack anomalies associated with the ERW seam were reported by the inline inspection (ILI) vendor. Based on the ILI results, Respondent made repairs to the Affected Pipeline for a 1.25 x MOP factor of safety. Calculations performed by Respondent in 2008 predicted that Line 14 would not fail for a minimum of 10 years based on a crack growth analysis that considered the operating pressure spectrum.

- Respondent performed an ILI of the Affected Pipeline in the area of the Failure in 2011 utilizing high-resolution geometry and magnetic flux leakage (MFL) tools. An ultrasonic crack detection technology ILI inspection was scheduled to be performed in the area of the failure in August 2012.

- The history of failures on Respondent's Lakehead Pipeline system, of which the Affected Pipeline is a part, the defects originally discovered during construction, and the 2007 failure indicate that Respondent's integrity management program may be inadequate.

Determination of Necessity for Corrective Action Order and Right to Hearing

Under 49 U.S.C. § 60112 and 49 C.F.R. § 190.233, the Associate Administrator for Pipeline Safety (Associate Administrator) may issue a corrective action order after providing reasonable notice and the opportunity for a hearing if he finds that a particular pipeline facility is or would be hazardous to life, property, or the environment. The terms of such an order may include the suspended or restricted use of a pipeline facility, physical inspection, testing, repair, replacement, or any other action as appropriate. The Associate Administrator may also issue a corrective action order without providing any notice or the opportunity for a hearing if he finds that a failure to do so expeditiously will result in likely serious harm to life, property or the environment. The opportunity for a hearing will be provided as soon as practicable after the issuance of the CAO in such cases.

After evaluating the foregoing preliminary findings of fact, I find that the continued operation of the pipeline without corrective measures would be hazardous to life, property and the environment. Additionally, after considering the age and failure history of the pipe, the circumstances surrounding the Failure, the proximity of the pipeline to populated areas, water bodies, drinking water resources, public roadways, and High Consequence Areas, the hazardous nature of the product being transported, the uncertainties as to the cause of the Failure, and the ongoing investigation to determine the cause of the Failure, I find that a failure to issue this Order expeditiously to require immediate corrective action would likely result in serious harm to life, property, and the environment. Accordingly, this Corrective Action Order is issued without prior notice and opportunity for a hearing. The terms and conditions of this Order are effective upon receipt.

Within 10 days of receipt of this Order, Respondent may request a hearing, to be held as soon as practicable, by notifying the Associate Administrator for Pipeline Safety in writing, delivered personally, by mail or by fax at (202) 366-4566. The hearing will be held in Kansas City, Missouri, or Washington, DC, on a date that is mutually convenient to PHMSA and Respondent.

After receiving and analyzing additional data in the course of this investigation, PHMSA may identify other corrective measures that need to be taken. Respondent will be notified of any additional measures required and amendment of this Order will be considered. To the extent consistent with safety, Respondent will be afforded notice and an opportunity for a hearing prior to the imposition of any additional corrective measures.

Required Corrective Action

Pursuant to 49 U.S.C. § 60112, Enbridge Energy, LP, is ordered to immediately take the following corrective actions to ensure the safe operation of the Affected Pipeline:

1. Develop and submit a written re-start plan for prior approval of the Director, Central Region, OPS (Director). Obtain written approval from the Director prior to resuming operation of the Affected Pipeline. Submit the written plan to the Director at the Pipeline and Hazardous Materials Safety Administration, 901 Locust Street, Suite 462, Kansas City, MO 64106-2641. The plan must provide for adequate patrolling of the Affected Pipeline during the restart process to ensure the prompt detection of leaks, include a daylight restart, and detail advance communications with local emergency response officials.

2. After receiving approval from the Director to restart, maintain a minimum twenty percent (20%) pressure reduction in the operating pressure of the Affected Pipeline. Submit the operating pressures for each pump station on the Affected Pipeline at the time of failure and the reduced discharge pressure limits for approval by the Director in the restart plan referenced in Item 1. The reduced discharge pressure limits must also consider any ILI features and anomalies that are present in the Affected Pipeline to provide for continued safe operation while further corrective actions are completed. The approved pressure restrictions will remain in effect until written approval to increase the pressure or return the pipeline to its pre-failure operating pressure is obtained from the Director pursuant to

Item 12. Respondent must maintain documentation to show that these requirements have been met.

Review the pressure restrictions monthly, taking into account any ILI features present in the pipeline and analysis of operating pressure cycle data. Based on the monthly review, Enbridge must immediately reduce operating pressure accordingly to maintain safe operations. Submit results of the monthly review, the current discharge set points, including any additional reductions, and any exceedance of discharge set points, in the reports pursuant to Item 10.

3. Within 45 days of receipt of this Order, complete mechanical and metallurgical testing and failure analysis of the failed pipe and other pipe removed, including analysis of soil samples and any foreign materials. Complete the testing and analysis as follows:

   A. Document the chain-of-custody when handling and transporting the failed pipe section and other evidence from the failure site;

   B. Submit the testing protocols and the selection of the testing laboratory to the Director for prior approval.

   C. Prior to commencing the mechanical and metallurgical testing, provide the Director with the scheduled date, time, and location of the testing to allow a PHMSA representative to witness the testing; and

   D. Ensure that the testing laboratory distributes all resulting reports in their entirety (including all media), whether draft or final, to the Director at the same time as they are made available to Respondent.

4. Within 30 days of receipt of this Order, conduct an evaluation of the previous inline inspection (ILI) results, including a review and reporting by the ILI vendors' analysts (including raw data) of the Affected Pipeline as follows:

   A. Submit any and all reports from the 2007 ILI runs as received from the vendors;

   B. Re-evaluate the 2007 inline inspection results to determine whether any features were present in the failed pipe joint and other pipe removed. Determine if any features with similar characteristics are present elsewhere on the Affected Pipeline. Submit to the Director the scheduled dates, times, and locations of meetings with the ILI vendors to allow PHMSA representatives to attend;

   C. Submit a report describing the ILI features present in the failed joint and other pipe removed, the process used to re-evaluate ILI results, and the results of the re-evaluation including characterization of the size and location of similar features on the Affected Pipeline.

5. As recommended in PHMSA Advisory Bulletin 2012–06, verify the records for the Affected Pipeline relating to operating specifications for maximum operating pressure

(MOP). Within 45 days of receipt of this Order, submit a report on this record verification and copies of these records to the Director.

6. Within 90 days following receipt of this Order, complete an evaluation utilizing multiple root cause failure analysis techniques, including a Management Oversight and Risk Tree (MORT) analysis, to determine the underlying causes and contributing factors to the Failure, including preventive measures employed by Enbridge. Within 10 days of receipt of this Order, submit a list of proposed independent third-party contractors for prior approval by the Director, along with contractor qualifications and scope of work. The scope of the evaluation must include, but not be limited to: Enbridge's procedures; failure, operating and maintenance history; use of safety factors; review of ILI results; application of assessment methods, analysis and monitoring of pressure cycles in determining assessment intervals and operating pressures; decision processes regarding repair methods, including pipe replacement; a detailed review of the adequacy of the operator's spill prevention plans; and a detailed review of all emergency response activities, including initial controller response. All reports in their entirety (including all media), whether draft or final, shall be submitted to the Director at the same time they are made available to Respondent. Submit the final report for the Director's approval.

7. Within 90 days following receipt of this Order, submit an integrity verification and remedial work plan (Work Plan) for implementing continuing long-term periodic testing to the Director for approval. The Work Plan must provide for the verification of the integrity of the pipeline and must address all factors known or suspected in the July 27, 2012 failure, including, but not limited to the following:

   A. The integration of the results of the failure analyses and other actions required by this Order, with all relevant operating data, including all historical repair information, construction, operating, maintenance, testing, metallurgical analysis or other third-party consultation information, and assessment data for the Affected Pipeline. Data gathering activities must include a review of the failure history of the pipeline (including in-service and pressure test failures) and development of a written report to be approved by the Director containing all available information regarding locations, dates, and causes of leaks and failures;

   B. The performance of additional field testing, inspections, and evaluations to determine whether and to what extent the conditions associated with the failures, or any other integrity-threatening conditions are present elsewhere on the Affected Pipeline. At a minimum, the inspections and evaluations must consider use of in-line inspection that can reliably detect and identify anomalies. Include a detailed description of the criteria to be used for the evaluation and prioritization of any integrity threats and anomalies that are identified (accounting for uncertainties in anomaly and defect sizing by the ILI vendor and field non-destructive examination), establishing a minimum 1.39 x MOP factor of safety upon completion of testing, inspections, evaluations, replacements and repairs as described in this Order;

C. The performance of repairs or other corrective measures that fully remediate the conditions associated with the pipeline failures and any other integrity-threatening condition everywhere along the Affected Pipeline. The plans must be based on the known history and condition of the pipeline, and must be scheduled to be completed as follows: (1) repairs must be completed within 6 months of receipt of the ILI vendor's final report; (2) confirmatory hydrostatic pressure testing of the Affected Pipeline by December 31, 2013; and (3) replacement of the Affected Pipeline or portions thereof by July 31, 2015. Include a detailed description of the criteria and methods to be used in undertaking any repairs, replacements, or other remedial actions to establish a minimum 1.39 x MOP factor of safety.

8. The approved Work Plan will be incorporated into this Order. Respondent must revise the Work Plan as necessary to incorporate the results of actions undertaken pursuant to this Order and whenever necessary to incorporate new information obtained during the failure investigation and remedial activities. Submit any such plan revisions to the Director for prior approval. The Director may approve plan elements incrementally.

9. Implement the Work Plan as it is approved by the Director, including any revisions to the plan.

10. Submit monthly reports to the Director that: (1) include all available data and results of the testing and evaluations required by this Order; and (2) describe the progress of the repairs or other remedial actions being undertaken. The first monthly report for the period from August 1 through August 31, 2012 shall be due by September 7, 2012.

11. It is requested that Respondent maintain documentation of the costs associated with implementation of this Corrective Action Order. Include in each monthly report submitted, the to-date total costs associated with: (1) preparation and revision of procedures, studies and analyses; (2) physical changes to pipeline infrastructure, including repairs, replacements and other modifications; and (3) environmental remediation, if applicable.

12. The Director may allow the removal or modification of the pressure restriction set forth in Item 2 upon a written request from Respondent demonstrating that the hazard has been abated and that restoring the pipeline to its pre-failure operating pressure is justified based on a reliable engineering analysis showing that the pressure increase is safe considering all known defects, anomalies and operating parameters of the pipeline.

The Director may grant an extension of time for compliance with any of the terms of this Order upon a written request timely submitted demonstrating good cause for an extension.

With respect to each submission that under this Order requires the approval of the Director, the Director may: (a) approve, in whole or part, the submission; (b) approve the submission on specified conditions; (c) modify the submission to cure any deficiencies; (d) disapprove in whole or in part, the submission, directing that Respondent modify the submission, or (e) any combination of the above. In the event of approval, approval upon conditions, or modification by the Director, Respondent must take all actions required by the submission as approved or

modified by the Director. If the Director disapproves all or any portion of the submission, Respondent must correct all deficiencies within the time specified by the Director, and resubmit it for approval. If a resubmitted item is disapproved in whole or in part, the Director may again require Respondent to correct the deficiencies in accordance with the foregoing procedure, and the Director may otherwise proceed to enforce the terms of this Order.

Be advised that all material you submit in response to this enforcement action is subject to being made publicly available. If you believe that any portion of your responsive material qualifies for confidential treatment under 5 U.S.C. 552(b), you must provide, along with the complete original document, a second copy of the document with those portions you believe qualify for confidential treatment redacted, along with an explanation of why you believe the redacted information qualifies for confidential treatment under 5 U.S.C. 552(b).

In your correspondence on this matter, please refer to "CPF No. 3-2012-5017H" and for each document you submit, please provide a copy in electronic format whenever possible. The actions required by this Corrective Action Order are in addition to and do not waive any requirements that apply to Respondent's pipeline system under 49 C.F.R. Part 195, under any other order issued to Respondent under authority of 49 U.S.C. § 60101 et seq., or under any other provision of Federal or State law.

Respondent may appeal any decision of the Director to the Associate Administrator for Pipeline Safety. Decisions of the Associate Administrator shall be final.

Failure to comply with this Order may result in the assessment of civil penalties and in referral to the Attorney General for appropriate relief in United States District Court pursuant to 49 U.S.C. § 60120.

The terms and conditions of this Corrective Action Order are effective upon receipt.

Jeffrey D. Wiese
Associate Administrator
for Pipeline Safety

7/30/2012
Date Issued

U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

AUG 1, 2012

1200 New Jersey Avenue, SE
Washington, D.C. 20590

VIA CERTIFIED MAIL AND FAX TO: 832-325-5473

Mr. Richard Adams
Vice President, US Operations
Enbridge Energy, LP
City Center Office
1409 Hammond Avenue
Superior, WI 54880-5247

**Re: CPF No. 3-2012-5017H
Amendment to the July 30, 2012 Corrective Action Order**

Dear Mr. Adams:

Enclosed is an Amendment to the Corrective Action Order that was issued in the above-referenced case on July 30, 2012. Your receipt of this Amendment constitutes service of that document under 49 C.F.R. § 190.5.

Please direct any questions on this matter to David Barrett, Director, Central Region, Office of Pipeline Safety, PHMSA, at (816) 329-3800.

Sincerely,

Jeffery Wiese
Associate Administrator
For Pipeline Safety

Enclosures: Amendment to the Corrective Action Order
Copy of 49 C.F.R. § 190.233

cc: Mr. Alan Mayberry, Deputy Associate Administrator for Field Operations, OPS
Mr. David Barrett, Director, Central Region, OPS
Mr. Mark Maki, President, Enbridge Energy Management, LLC
Mr. Steve Wuori, President, Liquids Pipelines, Enbridge Pipelines Inc.

U. S. DEPARTMENT OF TRANSPORTATION
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION
OFFICE OF PIPELINE SAFETY
WASHINGTON, DC 20590

In the Matter of	)	
Enbridge Energy, LP,	)	**CPF No. 3-2012-5017H**
Respondent.	)	

AMENDMENT
TO THE CORRECTIVE ACTION ORDER

Background and Purpose

On July 30, 2012, under authority of 49 U.S.C. § 60112, the Associate Administrator for Pipeline Safety, Pipeline and Hazardous Materials Safety Administration (PHMSA), issued a Corrective Action Order (CAO) to Enbridge Energy Partners, LP (Enbridge or Respondent), finding that continued operation of Respondent's Line 14 that runs from Superior, Wisconsin, to Mokena, Illinois, without corrective action would be hazardous to life, property, or the environment and requiring Respondent to take immediate corrective action to ensure the safe operation of the pipeline. PHMSA issued the July 30, 2012 CAO (Original CAO) [1] in response to a failure on Line 14 near Grand Marsh, Wisconsin, that was reported by Enbridge on July 27, 2012 (Failure). The Failure resulted in an estimated release of 1,200 barrels of crude oil. PHMSA initiated an investigation of the Failure which is ongoing.

Line 14 is a part of Respondent's 1,900 mile-long Lakehead Pipeline system, which transports hazardous liquid from Neche, North Dakota, to Chicago, Illinois, with an extension to Buffalo, New York.[2]

Additional Preliminary Findings

The preliminary findings in the Original CAO noted that the history of failures on Respondent's Lakehead Pipeline system, the defects originally discovered during construction of Line 14, a 2007 failure on Line 14, and the July 2010 failure on Line 6B in Marshall, Michigan, and additional failures throughout all parts of the Lakehead System indicate that Respondent's integrity management program may be inadequate. PHMSA has communicated its longstanding

[1] *In the Matter of Enbridge Energy Partners, L.P.*, Corrective Action Order (CPF No. 3-2012-5017H) dated July 30, 2012.

[2] *See* http://www.enbridgeus.com/Delivering-Energy/Pipeline-Systems/Liquids-Pipelines/ (last accessed August 1, 2012). The Lakehead System includes Lines 1, 2, 3, 4, 5, 6A, 6B, 10, 14, and 64, and associated facilities.

concerns about this pattern of failures with Respondent over the past several years. Given the nature, circumstances, and gravity of this pattern of accidents, additional corrective measures are warranted.

Finding of Hazardous Condition

Section 60112 of Title 49, United States Code, provides for the issuance of a Corrective Action Order, including amendments, after reasonable notice and the opportunity for a hearing, requiring the operator of a pipeline determined to pose a hazard to take corrective actions to protect the public and the environment. These may include the suspended or restricted use of a pipeline facility, physical inspection, testing, repair, replacement, or other action, as appropriate. The basis for making a determination that a pipeline facility is or would be hazardous, requiring corrective action, is set forth both in the above-referenced statute and 49 C.F.R. § 190.233, a copy of which is enclosed.

After evaluating all available information regarding the safety of the Lakehead System, including the foregoing additional preliminary findings, and considering the nature and circumstances surrounding the Failure, the hazardous nature of the product transported, the pressure required for transporting such product, and the ongoing investigation to determine the root cause of the Failure, I find that the continued operation of the Line 14 without additional corrective measures would be hazardous to life, property, and the environment.

Accordingly, PHMSA hereby issues this Amendment to the CAO requiring the additional actions specified herein be taken to protect life, property, and the environment. The additional actions set forth in this Amendment to the CAO are in addition to the actions set forth in the Original CAO and do not suspend or eliminate the requirements of the Original CAO, unless otherwise specifically provided herein.

Amendments to Required Corrective Action

Pursuant to 49 U.S.C. § 60112 and 49 C.F.R. § 190.233, Enbridge Energy Partners, L.P. is ordered to comply with this Amendment to the CAO and take the following additional corrective actions with respect to the Lakehead System. The following item is added to the Corrective Action Order:

13. Before the Director, Central Region, OPS, approves the restart of Line 14, Enbridge must (1) submit, for review and approval, a comprehensive written plan, including timelines for specific actions to improve the safety record of Respondent's Lakehead pipeline system and (2) hire an independent third party pipeline expert to review and assess the written plan, which the third party will submit to PHMSA and to Respondent concurrently. Further, the third party expert must oversee the creation, execution and implementation of the actions identified in the plan, and must provide monitoring summaries to PHMSA and Respondent concurrently. Respondent must commit to address any deficiencies or risks identified in the third party's assessment, including repair and replacement of high-risk infrastructure.

    The plan must be sufficiently detailed with specific tasks, milestones and completion dates. At a minimum, the plan must address:

a. Organizational issues, including the promotion of a safety culture and creation of a safety management system;
b. Facilities response plan;
c. Control room management;
d. Priorities for pipe replacement;
e. Training;
f. In-line inspection result interpretation;
g. Current engineering and probability of failure modeling;
h. Leak detection systems;
i. Sensor and flow measuring and valve replacement;
j. Integrity verification;
k. Quality management system; and
l. Any other risk, task, issue or item that is necessary to promote and sustain the safety of its pipeline system.

The actions required by this Amendment to the CAO are in addition to and do not waive any requirements that apply to Line 14 under the Original CAO or to Respondent's pipeline system under 49 C.F.R. Parts 190 through 199, as applicable, or any other Order issued to Respondent under authority of 49 U.S.C. § 60101 et seq., or under any other provision of federal or state law.

After receiving and analyzing additional data in the course of this investigation, PHMSA may identify other corrective actions that need to be taken. In that event, Respondent will be notified of any additional measures required and further amendment of the CAO will be considered. To the extent consistent with safety, Respondent will be afforded notice and an opportunity for a hearing prior to the imposition of any additional corrective measures.

Jeffrey D. Wiese
Associate Administrator
for Pipeline Safety

AUG 01 2012
Date Issued

STATE OF MINNESOTA
OFFICE OF ADMINISTRATIVE HEARINGS
FOR THE MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota	**PUC Docket No. PL-6668/CN-13-473** **OAH Docket No. 8-2500-31260**

SURREBUTTAL TESTIMONY

OF

PAUL STOLEN

SUBMITTED ON BEHALF OF:

FRIENDS OF THE HEADWATERS

January 21, 2015

I. INTRODUCTION

Q: Please state your name.

A: My name is Paul Stolen.

Q: For whom are you testifying?

A: I am testifying on behalf of Friends of the Headwaters ("FOH").

Q: Are you the same Paul Stolen who has previously had testimony filed in this case?

A: Yes, I filed direct testimony on November 19, 2014.

Q: What is the purpose of your surrebuttal testimony?

A: I am responding to documents prepared since my direct testimony. These include the *Sandpiper Pipeline: Comparison of Environmental Effects of Reasonable Alternatives*, (prepared by the Department of Commerce ("DOC") and released December 18, 2014 referred to as the "DOC-EERA Report") as well as the rebuttal testimony of Barry Simonson, Sara Ploetz, Ray Wuolo, Allan Baumgartner, and Adam Heinen. I explain my role with intervener FOH, including the impetus for direct testimony as well as this testimony. My direct testimony was lengthy, and was done when there was even more uncertainty regarding procedural and substantive issues than is now present. My current testimony now focuses on the most significant topics with respect to the CN decision. My testimony herein discusses the depth of analysis needed for a project of this size—costing many billions of dollars—including the necessary overall PUC project permit, and the significance of some important state agency permits. The content of my testimony is based on normal environmental review practices regarding study depth that are accomplished when projects are subject to the Minnesota Environmental Policy Act ("MEPA) and Minnesota Environmental Quality Board ("MEQB") rules, as are both the Enbridge projects. In this testimony, I continue to refer to both the Sandpiper and Line 3 projects together, since Minnesota's environmental review practices and regulations require such attention. I also use NDPC and Enbridge interchangeably based on the corporate relationship between the two entities.

Q: Do you have any other general comments pertaining to your surrebuttal testimony?

A: Yes. Enbridge has submitted a massive amount of new information in its rebuttal testimony. Such information is highly relevant to the Certificate of Need ("CN") decision criteria with respect to analysis of impacts to the natural and socioeconomic environment, as well as analysis of alternatives. In fact, this amount of material itself clearly indicates the massive size of this proposal and its potential implications to Minnesota's environment. Yet little of this information responds effectively to my direct testimony and, I believe, to comments of the Minnesota Pollution Control Agency ("PCA") and Department of Natural Resources ("DNR") as I am familiar with them. In addition, the three DOC documents—the DOC-EERA Alternatives Analysis and the Direct and Rebuttal Testimony of Mr. Heinen—relies on Enbridge information. A central question therefore is the extent to which independent review of the Enbridge information has occurred or should occur.

II. COMMENTS ON THE DOC-EERA REPORT

Q: Do you have general comments on your approach to reviewing this report?

A: Yes. First, I am not commenting on the merits of the different routes nor drawing conclusions as to whether one is shown in the report to be better than another. Rather, I am commenting on three major topics: methods used to compare routes, whether the report's data is sufficiently geared to actual likely important pipeline impacts, and whether the report is compliant with standard and accepted methods of environmental analysis and comparison of alternatives as routinely practiced. These topics concern approaches used in Minnesota and elsewhere for projects as large as the Sandpiper project, and that also induce another even larger pipeline in the same corridor if approved as proposed. My comments are based on my professional experience with analyzing impacts and comparing alternatives for many projects, including large, complex projects under both state and federal regulations.

I would also note that federal case law regarding the National Environmental Policy Act ("NEPA") is routinely used in interpreting state environmental review practices, and that the NEPA Deskbook is used by state agencies for guidance on

environmental review practices. The Enbridge projects are subject to significant federal permits that Minnesota agencies are deeply involved in, including federal agency requirements to consult with the state fish and wildlife agency under the Fish and Wildlife Coordination Act and permits administered by the PCA. All of these procedures and regulations provide guidance on comparing alternatives and analyzing impacts. None of this guidance appears to have been followed in the DOC-EERA Report.

Q: On page 12, the report's purpose is described, including that its intent is to support the Commission, by "seeking to ensure that the record of the CN proceeding contains an adequate, albeit preliminary, environmental analysis of the system alternatives." There are several references to this "environmental analysis" in this introduction, and it is only defined as being a "high-level examination" and appropriate for the "type of decision being made," and that is not equivalent to the detailed review needed for the route permit proceeding. Do you have concerns about these characterizations?

A: I have very serious reservations about the report's purpose. After a specific route is selected via the CN approval process, alternative locations that potentially can yield fewer impacts are precluded. Furthermore, specific state and federal environmental permits, such as those under the Clean Water Act and Corp of Engineers, and state Wetland Conservation Act and Protected Waters regulations require careful analysis of alternatives. I am deeply familiar with these laws and regulations, and have reviewed many environmental reviews and permits for such. Such comparison of alternatives would *never*, in my professional experience, be based on "high-level examination" of impacts or alternatives and yet still be in compliance with the law and regulations.

Q: Does the report's method of comparing alternatives comply with methods used in federal and state environmental permits and in environmental reviews that support and feed into such permits?

A: No, in my professional opinion it does not. One of the stated purposes in federal and state environmental review guidance documents is for this express purpose.

Q: Will this administrative hearing be hampered by lack of testimony from the Minnesota DNR and PCA concerning this report?

A: Yes. These personnel would normally have directly provided advice to DOC for preparation of this report and have knowledge of its compliance with permitting

responsibilities to compare alternatives and analyze impacts. This advice is crucial to make a fully informed decision.

Q: Does the report comply with accepted and best practices for conducting either state or federal environmental analysis of impacts and comparison of alternatives on very large projects, such as the two Enbridge pipelines?

A: No. The report does not define in any way what it means by its simple statements about "high-level analysis." The history of federal NEPA, starting in 1969, and Minnesota MEPA, starting in 1971, is replete with lessons that the methods of conducting environmental analysis need to be clearly defined. If this is not done, project delays and conflicts between agencies occur, and there is confusion for the public and, often, litigation. Guidance on exactly what kind of analysis is to occur very much includes careful definitions of the depth of analysis for the different types of environmental reviews. Specifically, MEQB guidance documents carefully describe this analysis depth. Court decisions at both the state and federal level also provide guidance to environmental managers in, for example, the DNR and PCA.

Q: The report gathers environmental information in a two-mile-wide corridor centered on each route. In your opinion is this a proper method for determining the least environmentally damaging location for a pipeline?

A. No, for several crucial reasons. First, the proper and rational method of looking at potential alternative locations for linear facilities has been well-established in siting practices for such facilities for years. The method is to focus on a wider area initially, and then narrow the focus at each succeeding stage of analysis—eventually analyzing in detail a corridor that is narrower than two miles. Starting with an initial narrow corridor undercuts the whole method. For example, Xcel Energy Great River Energy CapX2020 application to the PUC for a route permit (Docket #ET2, E002/TL-09-1056) for the 345kV line from Fargo to St. Cloud has a nice graphic illustrating this procedure. (Section 4, including figure 4-1 of this application is attached as Schedule 1 to this testimony.) The initial study corridors in that application started with a width of 12 miles. Note that my direct testimony indicated a 10-mile study area for a route.

Additionally, Enbridge's own submissions for the proposed Sandpiper route illustrate in some cases the defects of using a two-mile corridor. For example, three of its post-application route-permit modifications of its January 2014 application to the DOC for a route permit pushed the one-mile limit from the proposed route. (*See* May 30, 2014 letter to Larry Hartmann from Barry Simonson attached as Schedule 2 to this testimony. This letter also provided initial reactions to other proposed routes, and included information on adding Line #3 to the proposal.) These three modifications are pages 16, 23, and 34; Figures 5, 7, and 11, respectively. The first and third of these proposed a new route change almost a mile from the existing route, the second proposed such a change of about 4,000 feet. These and bigger adjustments are routine when doing an initial "high level" comparison of alternatives. Furthermore, since HVTL proposals are processed by the DOC, it's curious they didn't use their own methods for such a high-level comparison.

Q: What are other limitations of using a 2-mile wide study corridor for comparing routes, especially as it relates to the types of impacts of pipelines?

A: Many construction-related pipeline impacts can be mitigated by proper reclamation and proper initial siting. The best location for a large diameter pipeline is on flat land that is already in a disturbed land use, and that has a high level of road access. This is often farmland. Construction on flat land can involve an impact zone as little as 90 feet wide for a new pipeline of the size of Sandpiper or Line #3, according to my direct testimony. Construction on hilly terrain widens the construction right-of-way exponentially, and can substantially increase topsoil loss. The Sandpiper project as currently proposed—such as no topsoil removal on deep side-hill cuts to create the level work pad that must be used for worker safety and other reasons—does not involve topsoil separation in such locations.

This means long-term impacts will occur. Therefore, as proposed, routing choices limited by a 2-mile wide study corridor will restrict choices that otherwise could result in avoiding hilly terrain areas and thus indirectly increase long term impacts. The most significant potential long-term impacts from pipelines are oil event releases, especially

when the proper 50-year project life is appropriately considered. Starting out with only a two-mile wide corridor results in less flexible in finding locations that are the best for pipelines. For example, data such as that collected for the DOC report if done on a 10- or 12-mile-wide corridor would logically more likely reveal either dense locations of natural resources since these tend to be associated with each other, or spots of open, less hilly land, since these also tend to be associated with each on the landscape. In other words, a wider corridor is more likely to reveal ways to find more ideal pipeline locations.

A further very important point is that the analysis of Enbridge's proposed location and its 2-mile wide corridor has received much more study as compared to the other alternatives. Enbridge, according to its many statements, has given it careful attention and study by specialists over a period of years. Enbridge states this route avoids many natural resources, people, groundwater resources, High Consequence Areas ("HCAs"), and so forth. Clearly, the other alternatives have not received nearly as much attention and avoidance. Therefore, there is a high level of bias in favor of Enbridge's proposed route and new corridor, and prejudice against alternatives.

Q: Does the DOC-EERA Report adequately address landscape features such as significant topographic relief that tend to increase the likelihood of oil release events spreading more rapidly from the pipeline?

A: No. The report does include rivers which certainly could transfer oil away from the pipeline. However, it is inadequate in that it doesn't directly address the contribution of topographic relief to such events. Soils data does have labels regarding slope characteristics, but such data is *too* detailed to be useful for the purpose of a broad scale route comparison. Furthermore, soils data only goes down six feet. Topographic relief is also a rough indicator of whether groundwater is moving lateral to the surface. In addition, an important factor for many of the route alternatives is that they traverse glacial moraine that can have lenses of sand or gravel that have rapid groundwater movement.

Q: There are certain advantages in following existing linear corridors when constructing new linear facilities. Pipeline and HVTL rules and policies also indicate that such corridors should be considered. However, there is no such requirement that they be followed, and your direct testimony raises the issue of "corridor fatigue." How does the report handle this issue?

A: The report does not adequately address the downside of following existing corridors, and assumes it is advantageous to follow them. My direct testimony calls for analysis of this because it is a cumulative impact that needs to be addressed according to MEQB regulations. Furthermore, I make recommendations regarding specific corridor-fatigue topics that need to be analyzed at various places in my testimony, especially starting on page 109 and including all of page 110. The report does not include analysis of any of these issues, nor does Enbridge's analysis of the system alternatives. Therefore, it falls short of comparing system alternatives on this factor.

Q: Does the DOC report adequately address the potential for impacts from oil release events during its likely 50-year project life?

A: No. Data for determining this major potential impact is not adequately collected or described in order to make even rudimentary inferences about whether one route has a higher risk of damages over a 50-year project life as compared to another. HCAs are discussed in the DOC-EERA Report, but as noted elsewhere in my surrebuttal, HCAs and USAs (*see* Pipeline and Hazardous Materials Safety Administration regulation attached as Schedule 3 to this testimony) fall woefully short of addressing natural resources normally addressed in Minnesota and federal environmental analysis and in environmental permitting. Furthermore, in April of 2014, I made preliminary but specific recommendations as to what topics regarding oil release events need to be addressed in route comparisons. (*See* Stolen Direct at App. 2 p. 107:25-108:44.) These recommendations were supported with reasoning based on opinions of others besides my own experiences and analysis. I also said that the Scope of Work for the route comparison should be open to public and agency review and because the topics were so important. (*Id*. at 103: 20-34.)

Q: Does the DOC-EERA Report accurately depict potential impacts to agricultural land?

A: No. Research and field experience has shown that construction of large diameter pipelines on agricultural land can essentially be fully mitigated if done correctly. The DOC-EERA Report implies that there are long-term adverse impacts to crop production from construction that cannot be mitigated. A summary statement of the important mitigation procedures are: 1) Topsoil separation from substrate material over the trench, on the construction travel lane, and on any area necessarily excavated for the 50-foot wide (approximately) level construction work pad; 2) Crop land landowners can require 54-inch pipe coverage in Minnesota. Such burial reduces the likelihood of drying of topsoil from the heat in the product as it goes through the line or early growth in the spring in pastureland (which can result vegetation loss and soil damage because cattle are attracted to such new early growth); 3) After completion of construction, the first step of reclamation is deep ripping of the construction work pad on susceptible soils to begin the process of reducing soil compaction; 4) Careful replacement of topsoil from the temporary storage piles; and 5) Proper re-seeding of non-cropped farmland, and, in some cases, temporary fencing to keep cattle out while revegetation occurs.

Q: Is the DOC report actually an analysis of impacts and comparison of impacts of alternative routes for pipelines as it purports to be?

A: The answer is no. This conclusion is my professional opinion based on personally conducting siting studies of linear facilities, and writing rules and data requirements for both pipelines and HVTL facilities. Rather, the report is largely an exercise in gathering data on land use, soils, geologic structures, water bodies and so forth and then using this information to compare the data among the system alternatives. While this information is somewhat useful in comparing routes, it is not a comparative analysis *of impacts* of the routes. There are some very rough interpretations of the data that can be made; however, the information is entirely inadequate for the requirements of both environmental permits and proper impact analysis of pipeline impacts. Its utility is also greatly hampered by the too-narrow corridors and other large defects.

Q: Does Mr. Heinen's rebuttal testimony concerning the DOC-EERA Report accurately characterize the information and analysis it contains, and how does this characterization affect his final conclusions about the environmental suitability of the proposed Sandpiper corridor?

A: No, at key points Mr. Heinen's rebuttal testimony mischaracterizes the DOC-EERA "high-level" comparison of system alternatives as an *analysis* of impacts. This is profoundly incorrect. That study collects *data* on two-mile corridors centered around the proposed routes in order to compare data sets on the different corridors. It is true that attempts were made to identify data that could be used to determine some of the potential impacts of the project, and certain rudimentary inferences can be and were drawn about potential impacts. However, data does not substitute for the kind of actual analysis of impacts necessary according to standard practices for conducting environmental reviews of complex large projects. For example, the study contains no analysis of potential impacts during project operation, such as the consequences of oil release events. Furthermore, there are serious defects with the DOC-EERA Report, as discussed elsewhere. Finally, Mr. Heinen's conclusions in his rebuttal testimony do not actually address the <u>effects of the proposed</u> project on natural and socioeconomic environment, rather, on page 6 of his rebuttal testimony he merely says: "Q*: Based on the information in the Environmental Review, do you make any modifications to your recommendations in Direct Testimony? A. No, I do not. Based on my review of the Environmental Review, I did not identify impacts to the natural or socioeconomic environment that would render the Applicant's preferred route or SA-03 unreasonable. As such, based on the information presented in the record to this point, the Applicant's preferred route and SA-03 appear to be reasonable to meet the need for this Project as discussed in my Direct Testimony*." This is *not* a conclusion about the actual impacts of the proposed project on the natural or socioeconomic environment. Furthermore, his conclusions, especially as concerning the natural environment, have the appearance of importance because they, in fact, *are* conclusions reached by an employee of the DOC who, is in fact, reviewing a major document with lots of data on the natural environment and that purports to be an environmental assessment. But Mr. Heinen is an economist and does not have expertise

about the environment or natural resources. For this reason alone his conclusions about the natural environment of the proposed route and system alternatives do not deserve much, if any, weight.

III. RESPONSE TO BARRY SIMONSON

Q: Did you review Mr. Simonson's rebuttal testimony submitted January 5, 2015?

A: Yes.

Q: Mr. Simonson's rebuttal testimony and various other documents submitted in Enbridge's voluminous rebuttal filing, contained many references and information on the topic of oil releases from ruptures, pinhole leaks, and so forth. Your direct testimony also contained extensive material on these topics. Have you reached any general conclusions after reviewing Enbridge's rebuttal material and reflecting on your own direct testimony?

A: Yes. I have three conclusions based on my experience with government regulatory responsibility and knowledge of pipelines. First, any document that purports to be a suitable environmental analysis of a pipeline proposal *must* adequately analyze and inform the public and decision makers of the risk and environmental consequences of oil releases—both big and small—on the environment adjacent to the pipeline *during the operational life of the project without assuming that automatic shut off valves, careful engineering and so forth will protect the environment*. Second, any document that purports to be an adequate comparison of alternative routes or locations of the pipeline *must* use the information regarding risk and consequences of oil releases in its comparison of these alternatives. My first conclusion is not a criticism of Enbridge's sincerely held commitment to following good engineering practices and the federal pipeline regulations. Rather, it is simply based on the record of pipeline release events and the consequences that follow. The second conclusion is a straightforward awareness that different landscapes have different natural resources and different susceptibilities to the consequences of oil releases.

Third, the engineering decisions pipeline operators make have subjective elements in them, and different pipeline companies make different choices about such things as remotely controlled shut-off valves. This is demonstrated by a recent GAO report to

Congress (attached as Schedule 4 to this Testimony). It provides helpful guidance to Minnesota decision makers for understanding current problems with federal pipeline safety oversight. It gives special attention to block valves issues. For example, the summary states: "The primary advantage of installing automated valves is that operators can respond quickly to isolate the affected pipeline segment and reduce the amount of product released; however, *automated valves can have disadvantages, including the potential for accidental closures—which can lead to loss of service to customers or even cause a rupture—and monetary costs.*" It may well be that Enbridge is using the "performance based" approach that is recommended in this report; however, that is not my main point: which is that proper environmental review analysis needs to be done for these two projects.

Q: On page 3, lines 90-97 of his Rebuttal Testimony, Mr. Simonson comments on your direct testimony, indicating that you said "HCAs are areas where a release could have the most significant and adverse impact." Does this correctly portray your discussion of HCAs in your direct testimony?

A: No, not at all. First, the quote is not my language but rather language in PHSMA regulations describing HSAs. More seriously, his wrong attribution distorts my position on HCAs as being nearly the opposite of my actual position. My direct and surrebttal testimony on HCAs and other federal pipeline safety categories indicate that these designations do not adequately capture the environmental and natural resource concerns that are normally addressed in Minnesota environmental reviews. I also discussed HCAs and other federal designations in my testimony at pages 107, beginning at line 25, and through all of page 108. This is the section recommending content and approach to route comparison content regarding oil releases. He does not address these comments.

Q: On page 6, line 154 of his Rebuttal Testimony, Mr. Simonson cites your testimony 27:32-37 and states that you question whether NDPC plans to install automatic valves and to ask where they will be located along the preferred route? Is this an accurate portrayal of your testimony and your requests about automatic valves?

A: No, not at all. On those pages, I did not ask about *whether* there were plans to install automatic valves. I have long known that such installation is common practice on new pipelines. Rather, my testimony refers to the ORNL study and asks whether there were

plans to install *additional* remotely operated valves. Mr. Simonson should acknowledge that the answer to my question is yes, since only a few lines later in his testimony he says two additional valves will be installed. (*See* Simonson Rebuttal at 6: 167.) In my professional opinion, it is crucially important to conduct an independent analysis of the complex topic of number and location of both remotely controlled and manual valves.

A public interest determination made by Minnesota's agencies, with appropriate participation of the public, is the only way to obtain adequate protection of Minnesota's natural and other resources and its environment. Enbridge's private interest choices and determinations cannot substitute for such a public interest determination. Choices of valve locations are subject to complex engineering calculations, and are subject to federal pipeline safety regulations. Parts of the calculations are non-public information. Mr. Simonson's testimony is not an analysis of whether Enbridge's decisions on locations will result in more protection for Minnesota waters; therefore, it seems of little relevance to the necessary finding of the CN criteria. Furthermore, I provided extensive comments in my direct testimony on block valves and he did not choose to address these comments in his testimony.

Q: On page 7, Line 198 of his Rebuttal Testimony, Mr. Simonson notes that the method used to determine valve locations is "to reduce potential release volumes in major water bodies." He notes that such crossings are identified as being only those with a 100-foot-wide channel. Do you agree that the use of such a channel width accurately characterizes the ecological and resource value of water bodies under Minnesota environmental review practices and MEQB rules?

A: No. There are many rivers in Minnesota of high environmental significance with channels less than 100-feet wide. In fact, to actually use such a metric to identify significant and/or major water bodies is demonstrably wrong from an ecological and recreational value point of view. It simply doesn't identify "major water bodies" since there are other much more scientifically sound methods of determining the ecological and public resource value of rivers. Therefore, its use in methodology for locating potential valve locations in order to reduce oil releases in major water bodies is wrong, without even doing an investigation of the complex methodology in the valve location determinations. A good example is the Straight River crossed by the proposed route, which is a nationally

recognized brown trout stream. Its width is on the order of 30 feet or so. Use of such a poor representation of ecological and socioeconomic value illustrates how the federal pipeline safety rules undercut sound analysis of potential impacts.

Q: On page 9 of his Rebuttal Testimony, beginning on Line 247, Mr. Simonson discusses his response to the ORNL risk assessment cited in your direct testimony, without citing any specific points you made. He provides information about NDPC's proposed valve location and type of valves. Does this information address the recommendations you made in direct testimony based on your review of the ORNL study?

A: No. I will first reiterate the purpose and basis of my recommendations regarding the ORNL study beginning at 57:17 through 58:10 of my direct testimony. The essential purpose is to use its methods in the necessary environmental analysis and route comparison. The ORNL study, among other things, describes methods of determining economic and natural resource costs of spills based on modelling. I recognize that determining the location of remotely controlled or manual valves, as well as the kind of modelling used in the ORNL study, requires special expertise. I therefore recommended a risk assessment by an independent review entity, much as was done for the Keystone pipeline. I am fully confident that methods of parsing differences between proposed routes with respect the economic and natural resource damages *must* be developed. The ORNL study explicitly describes such methods. It also used Enbridge's 2010 Michigan oil release event as a case study. It recommends close attention being paid rapid pipeline shut down when oil releases occur next to sensitive areas. Instead of responding to these recommendations, Mr. Simonson merely reiterates the Enbridge position on its normal method of determining valve locations and doesn't provide any new information. He states on Line 260 and 261 of his rebuttal testimony that the method uses models to determine the potential oil release. In fact, this model uses the same type of "worst case" analysis method as done in the ORNL study to calculate this volume he references in his rebuttal testimony, according to Section 1.10 of its 2013 "Enbridge Integrated Contingency Plan, Superior Region (#866) Response Plan." This section of the Enbridge Plan describes the worst case conditions in Enbridge calculations: a "guillotine rupture," and an earliest time frame of 13 minutes to identify and close a remotely controlled valve.

Mr. Simonson does not answer my recommendation for an investigation of whether such a "worst-case" applies to pipelines in close proximity to each other, since a rupture plus fire could lead to damage to adjacent pipelines. (Excerpts from the ORNL study itself are found on pages 82 through 101 of my direct testimony, and some excerpts discuss the scenario of a rupture plus ignition.)

Q: Mr. Simonson provides a list of valve locations with respect to distance to rivers and other locations along the route at 6:165 of his Rebuttal Testimony. He doesn't say specifically whether the list only includes remotely controlled valves or if there are additional manual valves next to rivers. Is this helpful in understanding the reasons Enbridge has determined valve location and in providing assurance that impacts to the waterways will be minimized when there is a significant pipeline rupture next to the waterway?

A: No. In fact, this list adds to the confusion. Some of the listed rivers definitely are less than 100 feet wide, and there are many other rivers crossed by the proposed route. Valves are far from many of the rivers. It is not clear that the method of determining valve locations had anything to do with any of the rivers. In my direct testimony I described the ORNL study, which uses such terms as "drain down times" to describe amounts of oil released after shut down. For rivers, it is obvious that if a severe rupture occurs close to the river, and the shut off valve is miles away, there is a lot of product that will continue to flow after shutdown.

Q: Mr. Simonson discusses in some detail the methods of determining placement of valves in response to both your own and Mr. Heinen's requests for additional information, such as in relation to High Consequence Areas ("HCAs") and locations in general. In your opinion, do his responses provide assurances that such methods provide adequate protection to important natural resources?

A: No. First, it is clear that there are complex methods used to determine "worst case" spill amounts. Second, key information regarding natural resource judgments used in these calculations are non-public information, as is the summary of results of the Intelligent Valve Placement ("IVP") analyses conducted by NDPC, as noted on 8:213 of Mr. Simonson's testimony. My comments are not a challenge to Enbridge's engineering and modelling methods or ability. Rather, it is a fact that Enbridge has made choices as to the importance of public resources when doing its calculations, and it is a fact that these

choices have not been placed before the public for critical review. The public-interest magnitude of the issue of oil releases from pipelines is very high. Therefore, the need to know and the need for an independent review of these methods and choices are also very high.

In fact, only rivers wider than 100 feet (top of bank to top of bank, referred to in Minnesota regulations as the "Ordinary High Water") are considered to be an the HCAs, according to federal regulations. Furthermore, maps of HCAs and the calculation of the amounts of the oil released are non-public information. Clearly, this is crucially important information necessary for the CN criteria findings. Similarly, as demonstrated by the definition of an unusually sensitive area found in the Federal Pipeline Regulations attached as Schedule 3 to this Testimony and at pages 81 and 82 of my direct testimony, most wetlands along the proposed Sandpiper route are not given any status in federal pipeline safety regulations. Therefore, notwithstanding the sensitive nature of wetlands and the abundance of wetlands along the proposed route, it is clear that federal pipeline regulations do not require Enbridge to do anything special to reduce operation impacts (oil release events) to wetlands. Again, this illustrates the need for a full independent review of the Enbridge proposals.

Q: On page 14 of Mr. Simonson's testimony responding to your "lengthy" direct testimony on the topic of differences of pipeline construction, in reference to hilly terrain vs. flat terrain. Mr. Simonson suggests that considering the terrain of a proposed pipeline location is mainly a routing concern. He also says that Enbridge has accounted for additional work space needs in its environmental documentation. Do you agree?

A: No. Under normal environmental review "best management practices" it is absolutely crucial to develop a clear picture of the project's physical extent on the landscape. Enbridge demonstrably has underestimated the physical extent of construction on past projects, in its environmental January 2014 Environmental Report on Sandpiper, in its estimation of additional impacts from Line #3, and now in Mr. Simonson's rebuttal testimony. All of this in spite of concrete evidence presented in my Direct Testimony at 103:38 through 107:23 and despite acceptance by other pipeline companies of the report

cited therein as definitive of the growth of the construction right-of-way in hilly terrain and the potential impacts associate with it.

My direct testimony on this topic is lengthy simply because of Enbridge's intransigence on this major potential impact topic. My testimony addresses this in more places than the pages he cites (*see*, e.g., pages 35-46.) I document similar intransigence on the part of Enbridge projects on its last two projects beginning on 68:42 through 69:9 of my direct testimony. In that section, I refer to repeated letters from the DNR to the DOC and PUC that point out the importance of this topic and the refusal of Enbridge to address it. It is clearly to Enbridge's benefit to refuse to acknowledge these impacts because it makes its route comparison simpler and its challenges in hilly terrain simpler. But the fact is that not recognizing it distorts both the estimate of adverse impacts and the comparison of routes. Enbridge needs to be directly challenged, again.

If there are differences between proposed locations in the physical landscape—hillier terrain metrics vs flatter land metrics—this becomes a comparison issue. Excavation into soil substrate materials increases exponentially, resulting in certainty that topsoil will be mixed with substrate unless careful topsoil separation occurs. The construction right-of-way in such terrain therefore can be hundreds of feet wide, requiring forest removal. Separating topsoil in these locations adds to the width. But if it is not separated, clear long-term environmental damages occur from loss of productivity, difficulty in re-established vegetation, and invasion of noxious and non-native vegetation. Enbridge is not proposing such topsoil separation for the Sandpiper project, and has not assessed impacts on this topic. On the other hand, my testimony demonstrates that on nearly flat terrain, the right-of-way for a pipeline of the size of Sandpiper and Line #3 can be consistently <u>on the order of 100 feet in width,</u> and there is no excavation into substrate materials except for the pipeline trench itself. In addition, contrary to Simonson's Rebuttal testimony, the sections of my direct testimony he refers to demonstrate that Enbridge <u>has not</u> accounted for the extra work space needs in hilly terrain. Rather, the term "extra work space" is used for extra space needs at roads, rivers, and so forth. The fact that my testimony was lengthy on this topic because Enbridge has continued its

refusal to recognize this potentially significant impact, just as it did for the Alberta Clipper and Southern Lights projects, as discussed in my Direct Testimony.

Q: Did Mr. Simonson address your concerns regarding corridor fatigue?

A: No. First, he did not cite specific points in my direct testimony even though I addressed it in multiple places. His answer mentioned some of the advantages of following existing corridors. I do not disagree with his list of advantages, except that this would only apply if you were comparing apples to apples. In this case we have an apples-to-oranges comparison: pipelines potentially cause very high environmental damages during their operation, and also involve much greater earth moving than electrical utility lines. Pages 109 and 110 of my direct testimony describe specific corridor fatigue issues relevant to the disadvantages of following existing pipeline corridors. Mr. Simonson simply failed to acknowledge serious disadvantages, such as for oil and/or gas pipelines, ruptures of one could conceivably damage another. This topic is of special importance because of the addition of Line #3. I called for a careful analysis of this topic which has not as yet occurred. In addition, Mr. Simonson states that "Minnesota has a strong preference for co-location." (Simonson Rebuttal at 15:417.) This is not a correct statement with respect to Minnesota rules—if it did, the rules would so state. Instead, the rules merely state that the use of existing corridors must be considered during the siting and approval process. The original easement for Lakehead Pipeline Company's first pipeline in the mainline Enbridge corridor to Superior stated that the company could add additional pipelines without revision of the easement; but rather with mere payment. This outdated method was dropped years ago, and is an indication of Minnesota's ambivalence for following existing corridors.

Q: On page 15 of his testimony, Mr. Simonson says that NDPC filed a statement "detailing the cumulative impacts of routing the Line 3 Replacement Project 25 feet from the Project's proposed centerline south of Clearbrook." Did you review that report and, in your opinion, is it sufficient to wait until the routing proceeding begins to consider cumulative impacts?

A: Yes, I did review that report, and no, it is not sufficient to wait until the routing proceeding to consider cumulative impacts. First, the environmental footprint and

adequate analysis of potential operational impacts of Enbridge's projects are either under contention, or not resolved. Enbridge's assessment of its project "footprint" has been challenged in the route proceeding and is simply unresolved. My review of the NDPC description of Line 3 replacement project indicates that Enbridge continues to underestimate project's footprint. Furthermore, it appears to assume at least to some extent that the 25-foot separation works generically. In fact, as is *always* the case—in my pipeline regulatory experience—once it gets down to deciding on the specific centerline location, this offset changes, and in many cases a new "greenfield" location some distance from the other pipelines becomes necessary. My conclusions on this topic are supported by the same report Mr. Simonson cites—which show a number of local route/centerline changes being proposed. Finally, lists of acreages and affected water bodies *do not* in itself constitute a cumulative impact analysis.

Q: Mr. Simonson, along with other Enbridge witnesses and Mr. Heinen, refers to a number of topics that are covered by federal pipeline safety regulations. Does this material provide adequate assessment of pipeline impacts and protection of Minnesota's resources, based on your knowledge of natural resource, environmental management, and environmental review analysis? What is your professional opinion with respect to whether these federal pipeline safety regulations adequately address environmental impacts that are considered significant during environmental reviews done under state policy?

A: The answer to the first question is no. NDPC's emergency response plan, the number of control centers, protection from cyber security, pipeline thickness, shutoff valves, access to critical equipment, and potential spills in high consequence areas are topics and requirements addressed in federal pipeline safety rules and indeed do address some potential impacts. However, they do not nearly address the scope of the potential impacts to the social and natural environment of Minnesota. Furthermore, discussion of these seven topics alone does not live up to the type of impacts analysis that is normal practice for other projects of the magnitude of the Enbridge projects.

The answer to the second question is related to constitutional issues regarding federal vs. state authority over fish and wildlife species, which I have had on and off experience with in my career. Minnesota clearly has authority to manage its fish and

wildlife species and related habitats, which are not pre-empted by federal authority except in specific instances such as migratory bird species and federally listed endangered or threatened species. The Federal pipeline regulations are called "safety regulations" for a reason. When examined closely, it is clear that there are many important environmental issues covered in these regulations. However, also clearly, the focus of the regulations is on the safety of people, protection of natural resources most important to people, and protection of only the most unusual and rare natural resources. I addressed this topic in more detail in various sections of my direct testimony, such as 56:5-8, 60:14-21, and 81-82. The federal regulations regarding HCAs indicate that their main focus is on direct and indirect impacts to people. In my professional opinion, the necessary and normal analysis required by Minnesota's environmental review programs, when looking at the "potential for significant impact" (a phrase that is important in state policy) requires assessment of significantly more natural resource and environmental topics than are covered by federal pipeline "safety" regulations. The real question with respect to the PUC public interest decisions is the extent to which such analysis has yet occurred, whether it is available in this administrative hearing, and how it will become available for the PUC.

Q: Mr. Simonson responds to Mr. Heinen's request for additional information about pipe wall thickness. Will thicker pipe walls result in better protection for Minnesota's environment, and would you recommend it to the Commission?

A: I am acquainted with reasons why pipeline companies use thicker wall pipe in certain conditions, based on my reviews of many pipelines. Roads and railroads subject pipelines to vibration and pressure, and pulling pipe for Horizontal Directional Drill bores subject pipe to much higher than normal stresses. However, I am not competent to make recommendations as to the use of heavy wall pipe on the whole route. In my professional opinion, it is premature to draw conclusions as to whether this will "improve safety and provide more assurance to the public." The discussion in Mr. Heinen's testimony illustrates very strongly the need for deeper and independent analysis of these proposals, since there is no technical basis for Mr. Heinen's recommendation—such as whether it will accomplish its stated purpose—other than its relatively low cost. In my professional opinion, this recommendation needs to be addressed along with a full analysis of the

benefits of putting the pipeline in a safer location, rather than jumping prematurely to a conclusion that thicker wall pipe as an answer.

IV. RESPONSE TO SARA PLOETZ

Q: Did you review Ms. Ploetz's rebuttal testimony submitted January 5, 2015?

A: Yes.

Q: At 14:329-347 of her Rebuttal Testimony, Ms. Ploetz disagrees with your suggestion that a 10-mile corridor would be appropriate to analyze at this stage in the proceedings. Do you have response?

A: Yes, I disagree. Understanding the reasons for our disagreement can contribute to also understanding the procedural, technical, and regulatory complexities that have occurred during the review of these pipeline projects. These reasons also are at the basis of differences of opinion about methods of analyzing data and solving complex technical problems that have become even more stark after the thousands of pages of new information arriving in NDPC's rebuttal filing. My view is that the source of the disagreement is revealed when one contrasts the *private interests* of Enbridge in pursuing its business interests with the *public interest responsibilities* of regulatory agencies to protect natural resources, the environment, and the public for the 50-year life of the project. My reasons are based on comparing *private interests* with *public interests*.

I point out where private and public interests differ, based on my legislative and regulatory experience with developing government policies that carefully consider these differences. 1) First, Ms. Ploetz's response relies almost entirely on the pipeline industry's—and specifically Enbridge's for Sandpiper—approaches to proposing locations for pipelines. Clearly, Enbridge is reflecting its *private interests* in its regulatory applications. That *private interest* is enhanced by using a narrow corridor, because it then puts the burden on private citizens and the government to show that another location for the route is more appropriate. However, the *private interest* of a *private company* does not coincide with the *public interest duties of government agencies* seeking to serve the *public interest* of citizens and administer the laws and regulations expressly designed to serve *the public interest*. 2) NDPC's Sandpiper proposal—at least in Minnesota and

probably in North Dakota—follows existing pipeline corridors to when, assuming NDPC's *private interests* in reducing the length of pipe—it must create a new greenfield pipeline corridor/route. It is entirely logical for NDPC to find the shortest route to Superior based on serving its private interest and that of its shareholders, and based on its view of avoidable features and early contacts with private parties and agencies. 3) If the assumption is that regulatory agencies will approve new pipelines along and next to existing pipelines, a 2-mile wide—or even narrower—corridor is logical, since most minor route/centerline changes fall within that range when local costs are weighed against benefits, and, even more significantly, to avoid new landowners who weren't previously given the legal notices that are often required. In other words, in "best management practices" concerning linear facilities, everyone, including government agencies, tries to stay within the established study corridor. 4) Minnesota's public interest requirements for HVTL proposals, reflected in filings for a route permit to the DOC, show that the public interest is better served by starting with a wider corridor and then narrowing it down further and further. My response to Mr. Simonson's rebuttal testimony reflects this reasoning in more detail. 5) NDPC's private interest logic in building its replacement for Line #3 is clearly demonstrated by proposing the *narrowest possible* choice of locations: a specific centerline 25 feet from the Sandpiper pipeline. 6) In sum, based on my experience with the siting of linear facilities that include pipelines, the NDPC private interest approach has hampered the ability of government agencies to serve the public interest. That approach has played out very thoroughly during the review of Sandpiper to, I believe, the detriment of the public interest.

Q: Ms. Ploetz comments at 15:349 on your testimony stressing the need for environmental inspectors. Do you have a comment about this?

A: Yes. While this is a topic more related to the route permit, it also is related to some degree to the CN proceeding in that it goes to the project's environmental footprint and especially the issue of long-term impacts from a pipeline project. That is because environmental inspectors can detect such things as failing to follow topsoil separation requirement when clearing a route, and many other topics. I completely agree with Ms.

Ploetz's statements of the importance of such inspectors, and that NDPC does use independent inspectors reporting to government agencies rather than a pipeline builder. But the "devil is in the details." I have been an inspector myself, and have long experience with this because of its value. The details matter, such as when the inspectors are pulled off the project. On both the MinnCan project and the two Enbridge projects, the inspectors were terminated too early. I had direct knowledge of the MinnCan project, when extensive winter construction took place. Independent inspectors were not in place when the project was finished in the spring. Inspectors were also terminated too early on the Enbridge projects, based on the discussions I had with debriefing the inspectors and the DNR staff after I retired. I would add that independent environmental inspectors were extremely valuable when there were many drilling mud releases into rivers and wetlands during construction of the projects, especially since many such releases occurred on the MinnCan route south of Clearbrook.

Q: Ms. Ploetz, at 15:349, comments on your statements about the need for addressing cumulative impacts of the Line #3 replacement project. Do you have a response?

A: Yes. Ms. Ploetz refers to the May 2014 NDPC document that was submitted during the routing process, and says the document was to be "providing the cumulative impacts of routing the Line 3 Replacement project 25 feet from" the Sandpiper project. This appears to be an assertion that this addresses the cumulative impacts, while then Ms. Ploetz later says such impacts will be addressed during the routing permit process. This is entirely an insufficient response. My direct testimony cites regulations requiring such impacts be addressed in environmental reviews prior to project construction. Constructing the Sandpiper along its new greenfield pipeline corridor prejudices and induces the location of Line #3. Given Enbridge's concrete specific proposal of locating this project 25 feet from Sandpiper, a full analysis is needed regarding potential environmental impacts, including cumulative impacts, since the project's location has been very specifically proposed. This information also needs to inform any impact assessment regarding alternatives.

V. RESPONSE TO ALLAN BAUMGARTNER

Q: Did you review Mr. Baumgartner's rebuttal testimony submitted January 5, 2015?

A: Yes.

Q: At 12:371 of his Rebuttal Testimony, Mr. Baumgartner responds to your reference to pinhole leaks and references a 2011 Battelle Report, citing your testimony at 30:19-27. He mentions a figure of 28 barrels a day could come from such a leak. Do you have a response?

A: Yes. First, these pages of my direct testimony is a citation to a Battelle Report that I did not myself review, but is a quote taken from an expert review of the Keystone pipeline proposal, entitled "*Third-Party Consultant Environmental Review of the TransCanada Keystone XL Pipeline Risk Assessment*." This report was done for the US Department of State and the proposer of the Keystone project by the Exponent consulting company.[1] I stressed its importance for the Sandpiper and Line #3 projects because it is so useful in showing what studies need to be done for them. Mr. Baumgartner has selected only this quote from my testimony, and not commented on the rest of my testimony regarding the excellent and highly relevant Exponent report. His response then goes on to only refer to Enbridge's integrity management system and does not in any way address the substance of the quote itself nor the rest of this section of my direct testimony 30:1-35. This section of my report cites experts who mention that pinhole leaks can go undetected for months. If the 28 barrels/day is correct, this means a potential underground leak of 840 barrels, or 35,280 gallons, per month. In doing a quick scan I can find no other location in Enbridge's thousands of pages of rebuttal material where this important topic is discussed. Clearly, given the project's 50-year life, deep pipeline burial under rivers due to Horizontal Directional Drills, and the prevalence of both surface and groundwater, this issue must be thoroughly assessed in environmental review documents, and when comparing alternative routes.

[1] *Available at:* http://keystonepipeline-xl.state.gov/documents/organization/221278.pdf.

VI. RESPONSE TO RAY WUOLO

Q: Did you review Mr. Wuolo's rebuttal testimony submitted January 5, 2015?

A: Yes.

Q: Mr. Wuolo indicates on page 12 of his testimony that the Oak Ridge National Laboratory risk assessment attached to your direct testimony does not address the potential environmental impacts to water caused by the release of oil. Do you agree?

A: No. Mr. Wuola is entirely wrong. The ORNL report does forecast the environmental and economic impacts of liquid releases, using, for example, the damages caused by the large Enbridge pipeline rupture in Michigan that damaged 35 miles of the Kalamazoo River. I refer him to 85:12 through 86:19 of my Direct Testimony. The report used a cost-benefit format, and used the PHSMA definitions of Unusually Sensitive Areas as an indicator of potential environmental damages (*see* ORNL Report at 152.[2]). If he is implying that this ORNL study was not a complete analysis of the potential impacts of pipeline releases, he is entirely correct. On another point, I have quickly looked through his testimony and have found no evidence he reviewed the Exponent Report which was carefully cited in my direct testimony. It has highly relevant material related to his topic of groundwater impacts, as noted in my response to Mr. Baumgartner's rebuttal testimony

Q: Does this conclude your testimony?

A: Yes.

[2] *Available at*: http://www.regulations.gov/#!documentDetail;D=PHMSA-2013-0023-0001.

4.0 ROUTE DEVELOPMENT AND SELECTION PROCESS

The route development and selection process for the overall Fargo to Monticello 345 kV Project was driven by an extensive public participation and agency coordination effort. Almost 40,000 addresses in the Fargo to Monticello area received regular mailings throughout the public participation process, discussed in detail in section 8.0, which informed landowners of the Project, described opportunities to be involved in the route development and selection process, identified where additional information could be obtained, and explained how to submit comments to Applicants that could be utilized in the route development and selection process. Applicants gathered environmental data, collected stakeholder and public comments, and applied the factors listed in Minn. R. 7850.4100 and Minn. Stat. §216E.03, Subd. 7(b) to develop the Proposed Routes. Through this process, Applicants developed proposed routes for the Monticello to St. Cloud 345 kV Transmission Line Project, which are being considered in a separate docket, and the Proposed Routes for the Fargo to St. Cloud 345 kV Project included in this Application. This process is described below. Additional supporting information is provided in Appendix D.

4.1 SUMMARY OF ROUTE DEVELOPMENT SELECTION PROCESS

Applicants began their analysis by collecting GIS data from local, state and federal agencies; data repositories; or other data sources within the entire Fargo to Monticello project area. Data collected, along with observations and information collected during field reconnaissance, was used to develop a geospatial database. Data contained and analyzed within the geospatial database pertained to the environmental routing criteria that had been identified, and underlying data such as existing transportation and utility infrastructure, administrative boundaries, and property boundaries.

In developing the Proposed Routes, Applicants began by identifying the project corridors for the Fargo to Monticello 345 kV Project. The analysis then focused on what was separated as the Fargo to St. Cloud 345 kV Project. Four milestone stages associated with route development and selection included an emphasis on Project purpose and need, the development of refined corridors, the development of preliminary potential route alternatives, and the development of refined potential route alternatives—followed by selection of the Proposed Routes included in this Application. Transitioning from the project corridors to the development of refined corridors first required a discussion of the state siting criteria to be used for comparative analysis. The state siting criteria also served as the fundamental basis for comparative analysis, but also as the vehicle for seeking specific stakeholder and public input to be incorporated into the decision making process. Stakeholders, representative of various constituencies within the general public, were asked to identify the key factors to be considered among the complete list of criteria. Comments received that were specific to the siting criteria were used to validate data and inform decisions made throughout the route development and selection process.

Feedback from stakeholder and public participants throughout the route development and selection process identified a preference to routing the proposed 345 kV transmission line along the I-94 corridor, a preference to minimizing the potential for impact to existing residences, and a preference to minimizing the potential for impact to agricultural uses.

The route development and selection process can be described as a "funneling" of information. With each step, the scope or extent of study was reduced. Conversely, however, the analysis became more detailed and comprehensive with each step. Through the integration of multiple phases of stakeholder working groups and public meetings, Applicants inventoried existing and feasible linear features to be evaluated, refined the project corridors, developed preliminary potential route alternatives, identified refined potential route alternatives, and ultimately selected the Proposed Routes subject to this Application. The total number of segments or opportunities studied well exceeds 750 different segments. Figure 4-1 below generally outlines the route development and selection process.

Figure 4-1. Overview of the Route Development and Selection Process

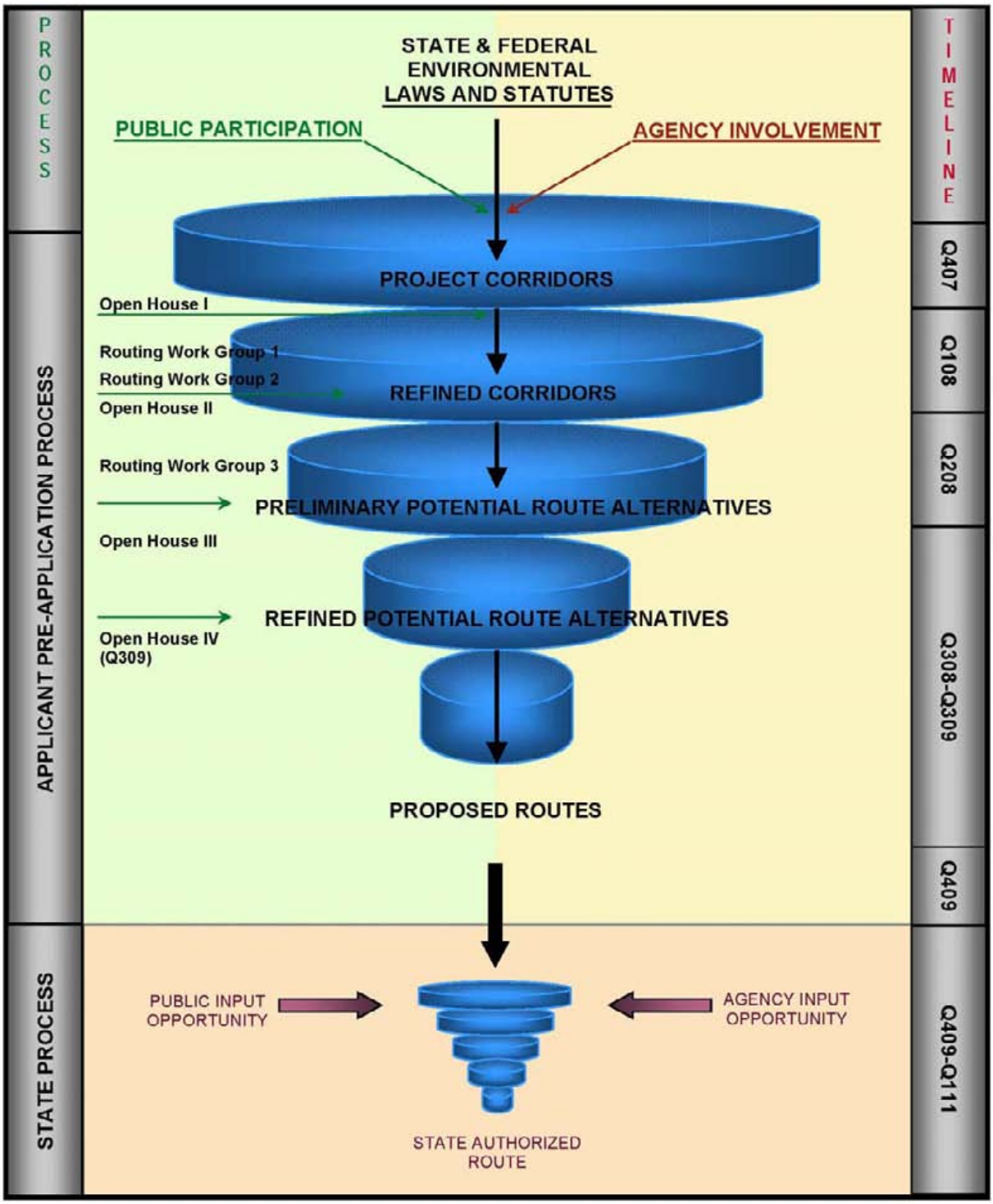

Applicants spent more than two years analyzing and evaluating potential route alternatives and gathering input from stakeholders and the general public. The Project team facilitated stakeholder working groups and open houses throughout the Project area. Applicants met with state and federal agencies, local governments and landowners within the Project study area that may be affected by the Project. The Project team also evaluated GIS data from local, state, and federal agencies; reviewed aerial photographs; and conducted preliminary field investigation throughout the Project study area to gather additional site-specific information. Through this process, Applicants developed and selected the Proposed Routes. The Proposed Routes mostly follow existing rights-of-way and property lines, to the extent feasible. For each route, Applicants have identified a route width of 1,000 feet for the majority of the route length. In some areas, a wider route width of up to 1.25 miles is requested due to site-specific considerations and substation interconnection requirements. In other areas, a narrower route width between 400 and 1,000 feet is requested due to site-specific considerations.

4.2 Regulatory Framework and Guiding Principles

The principles that guided the route development and selection process were the state criteria set forth in Minn. R. 7850.4100 and Minn. Stat. §216E.03, Subd. 7(b). The rule criteria are as follows:

A. effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services;

B. effects on public health and safety;

C. effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining;

D. effects on archaeological and historic resources;

E. effects on the natural environment, including effects on air and water quality resources and flora and fauna;

F. effects on rare and unique natural resources;

G. application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity;

H. use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries;

I. use of existing large electric power generating plant sites;

J. use of existing transportation, pipeline, and electrical transmission systems or rights-of-way;

K. electrical system reliability;

L. costs of constructing, operating, and maintaining the facility which are dependent on design and route;

M. adverse human and natural environmental effects which cannot be avoided; and

N. irreversible and irretrievable commitments of resources.

Id.

All of these factors are included in the statutory criteria listed in Minn. Stat. §216E.03, Subd. 7(b). There are also two additional factors included in Minn. Stat. §216E.03, Subd. 7(b)(7) (evaluation of route alternatives) and (12) (consideration of issues raised by other agencies and local entities).

Applicants applied these factors when making decisions about potentially removing certain route options from further evaluation or carrying forward certain route options, and ultimately in developing the routes proposed in this Application. Comparative evaluations were conducted at increasingly detailed levels following meetings with affected stakeholders and each phase of the public participation process.

4.3 Identification of Alignments Within the Proposed Routes

The refined potential route alternatives (also referred to as the Open House IV Route Alternatives) studied were 1,000 feet in width, based on geographic features, which was deemed appropriate for transmission line routing. The Open House IV Route Alternatives were presented to stakeholders and the general public at the final open houses. Prior to these public participation meetings, Applicants had met several times with other agencies, including Mn/DOT and the FHWA. Applicants described the route development and selection process, in addition to describing the integrated public participation process and our understanding of the key messages received from those that participated. Feedback from stakeholder and public participants identified a preference for routing the proposed 345 kV transmission line along the I-94 corridor, a preference for minimizing the potential for impact to existing residences, and a preference for minimizing the potential for impact to agricultural uses. Mn/DOT and FHWA representatives stated their concerns regarding constructing the proposed line near to the I-94 right-of-way and crossings.

To assist in the analysis of route impacts associated with proximity to I-94, multiple alignments were developed for the Preferred Route and Alternate Route A, both of which parallel the I-94 right-of-way at least in part. The Proposed Alignments used for analyzing impacts include: (i) at least 25 feet from the I-94 edge of right-of-way to provide data on a scenario that minimizes corridor sharing

only to intermittent aerial intrusions of the conductor during certain wind conditions (blowout); (ii) at least 75 feet from the I-94 edge of right-of-way to avoid corridor sharing entirely and to avoid the need for Mn/DOT occupancy permits; and (iii) five feet from the I-94 edge of right-of-way to provide data on a scenario that is equivalent to corridor sharing for non-interstate highways.

There are select areas along the Proposed Routes where a route width of up to 1.25 miles in width is requested. In three areas specifically, the consideration of the various alignments along I-94 influenced the requested route width. At these locations, discussed in more detail in section 2.3.2.6, Mn/DOT's preferences may require the line to be farther away from I-94. In this situation, the alignment will need to be shifted further away or divert away from the interstate, or cross the interstate, to minimize impacts at various locations along I-94. This is based on the evaluation of the varying alignments along the I-94 right-of-way. As a result, Applicants are seeking a route up to 1.25 miles in width in these areas to allow for flexibility to work with Mn/DOT and landowners having property adjacent to the interstate right-of-way that may be affected.

Through various phases of analysis, Applicants determined that the proximity of the transmission line facilities to existing transportation corridors has an effect on the overall impacts of the Project. In general, the overall impacts are minimized if the facilities are located adjacent to existing roadways or interstates and parallel or potentially share the existing right-of-way.

4.4 METHODOLOGY AND APPROACH

The methodology and approach associated with route development and selection for the Project involved the identification of project corridors, the development of refined corridors, the development of preliminary potential route alternatives, the identification of refined potential route alternatives, and the selection of Proposed Routes. There were a number of interim steps supporting each milestone stage of route development and selection.

As part of the route development and selection process, Applicants also met with local, state and federal agencies that may be affected by the Project. Agencies generally responded with requests to be updated on further Project developments and informed Applicants of potential permits that may be required for the Project, including specific applicable guidelines, rules and regulations. Applicants will continue to communicate with these agencies.

Applicants performed various levels of comparative analysis of environmental resources occurring within the Project study area using GIS and digital imagery such as recent aerial photographs and topographic maps. Data was obtained from federal, state, and local agencies that may be affected by the Project, as well other potentially affected stakeholders. For example, zoning and land use data was obtained from potentially affected local jurisdictions. The United States Department of Agriculture (USDA) was consulted for soil data and the Federal Emergency Management Agency (FEMA) for floodplain information. The MDNR provided information on native plant

communities, sites with biodiversity significance, streams and lakes, WMAs and rare natural features. The USFWS identified National Wetlands Inventory (NWI) wetlands in the Project study area. In addition, the Minnesota State Historic Preservation Office (SHPO) was consulted for the presence of cultural, archaeological or historic sites relative to the Proposed Routes.

Based on the above information, the Proposed Routes were developed in accordance with the following primary objectives:

- Maximize corridor sharing and minimize land use impacts by routing along roads and existing transmission lines to reduce the amount of new right-of-way required and by placing new facilities along natural corridors, and existing division lines (e.g., field lines, drainage ditches);
- Minimize impacts to human settlement;
- Minimize impacts to environmental and sensitive resources; and
- Minimize the length of the transmission line to reduce the impact area and costs for the Project.

Detailed maps of the Proposed Routes are included in Appendices B and C. Information pertaining to all route options that were considered during the route development and selection process is included in Appendix E.

Based on the information gathered from the participants in the stakeholder working groups and public meetings and agencies, Applicants selected the Proposed Routes as detailed in this Application. Applicants believe the Preferred Route is best suited for the Project as compared to the other Proposed Routes. A summary of the factors supporting the selection of the Preferred Route, based on the comparative evaluation of identified alignments, is as follows:

- Paralleling mostly interstate right-of-way minimizes land use impacts, particularly land uses such as existing residential use and agricultural use. Approximately 76 percent of the Preferred Route parallels the interstate right-of-way;
- Impacts to existing residences are minimized; and
- Environmental impacts are reduced to the extent feasible.

Section 6.0 further describes the rationale for selecting the Preferred Route for the Fargo to St. Cloud 345 kV Project.

4.4.1 FARGO TO MONTICELLO PROJECT CORRIDORS

The first step in the route development process was the identification of project corridors. Project corridors were developed for the Fargo to Monticello 345 kV Project. The project corridors were developed by delineating broad study boundaries around areas of obvious or predominant linear features, including existing transportation or transmission corridors, occurring between the general vicinities of the project end points. The project corridors were up to 12 miles in width and provided an adequate area of study for review between the designated endpoints. The project corridors, together with the areas occurring between the project corridors, effectively served to function as the Fargo to Monticello project area. Figure 4-2 below depicts the Fargo to Monticello project corridors.

Figure 4-2. Fargo to Monticello Project Corridors

Public information meetings were conducted throughout the Fargo to Monticello project area in September and October 2007. These meetings were conducted as open houses and provided an overview of the CapX2020 projects, including the need for the Fargo to Monticello 345 kV Project and resulting benefits. Section 8.0 describes the public participation process in greater detail.

4.4.2 FARGO TO ST. CLOUD REFINED CORRIDORS

The development of refined corridors for the Fargo to St. Cloud 345 kV Project involved the identification of the criteria to be evaluated, the collection of information and data pertaining to these criteria, database development and mapping, the preliminary assessment of existing linear features, and comparative analysis.

The environmental siting criteria to be evaluated within the overall project area were identified. The environmental siting criteria coincide with the criteria identified in Minn. R. 7850.4100 and include

"opportunities" and "sensitivities." For transmission lines, advantageous siting "opportunities" are characterized by corridors with the potential for sharing or running alongside existing facilities, infrastructure, and landscape features, and for substations, they are sites that allow a substation to be located on or adjacent to a property with existing facilities or compatible structures.

Existing linear opportunities were identified and mapped in a two-step process within the Fargo to Monticello project area. First, primary opportunities which included interstate highways, U.S. highways, state highways, county roads and existing transmission lines with voltages of at least 115 kV were identified. These existing linear features were identified as primary opportunities because they have existing associated rights-of-way that may allow for right-of-way sharing, therefore decreasing the amount of new right-of-way required. After primary opportunities were identified, secondary opportunities were then identified to add opportunities in the project area where there were otherwise few opportunities available, or where the added opportunity was of significant distance and relatively straight. Secondary opportunities included local level roads and existing transmission lines less than 115 kV.

"Sensitivities" are those environmental siting criteria, including point locations, areas, or features, which should be taken into account with regard to routing, construction, or additional licensing/permitting procedures. Identification of a feature as being sensitive does not necessitate or imply it must be avoided.

Data and information associated with the environmental siting criteria were collected and incorporated into GIS. A geospatial database was developed. The opportunities and sensitivities were then mapped. The composite mapping of the opportunities and sensitivities occurring within the Fargo to St. Cloud Project area allowed for a preliminary assessment of the strength or feasibility of the various linear features as potential routing considerations. Opportunities that conflicted with the directional orientation of the project were identified and removed from consideration. For example, since the Fargo to St. Cloud Project area was orientated northwest to southeast, any opportunity of considerable distance extending in an opposite orientation was removed from consideration. Additionally, opportunities obviously constrained by a high concentration or density of sensitivities within an area were also removed from consideration. The remaining opportunities were characterized as the study corridors to be evaluated. The study corridors were generally 1,000 feet in width.

Concurrent with the timing associated with data collection and preliminary assessment efforts, it was separately determined that due to the critical in-service need in the greater St. Cloud area, the Fargo to Monticello 345 kV Project would be divided into the Monticello to St. Cloud and Fargo to St. Cloud 345 kV projects.

An initial phase of stakeholder working group meetings was facilitated in January 2008. Attendees, including agency representatives, elected officials, community leaders and other representatives of constituencies within the general public, were provided a more in-depth overview of the overall Fargo to Monticello 345 kV Project. They were also asked to identify the key factors to be considered in the route development and selection process. As previously identified, participants of these meetings generally identified a preference for routing the proposed 345 kV transmission line along the interstate, a preference for minimizing the potential for impacts to existing residences, and a preference for minimizing the potential for impacts to agricultural uses. Although a number of consistent concepts were derived from the public participation process, these three concepts were the key common messages or themes. Figure 4-3 below illustrates the existing linear features that were further evaluated in the route development and selection process.

Figure 4-3. Refined Fargo to St. Cloud Corridors

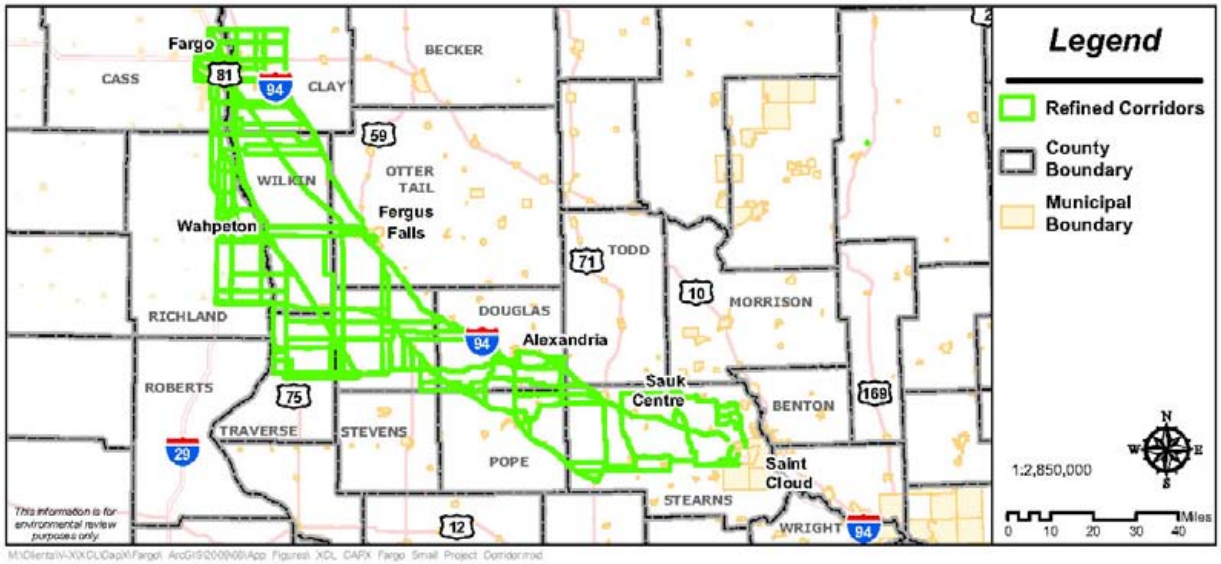

The refined corridors, and the methodology as to how they were developed, were presented to stakeholders and the general public at a second series of stakeholder working group meetings and a second series of open houses in March 2008.

4.4.3 Fargo to St. Cloud Preliminary Potential Route Alternatives

Areas among the existing linear features that had been carried forward for analysis where features were similar in function and located close to one another were then identified. Using GIS, localized comparisons were conducted in these areas to further reduce the number of opportunities or study corridors being evaluated. The comparative analysis assessed the cumulative occurrence of sensitivities associated with each opportunity and the strength of opportunity from a right-of-way sharing perspective. If two study corridors were considered comparable based on these considerations, deference was then made to the occurrence of residential use areas or the number of

estimated angle structures. Transmission angle structures typically have a greater associated impact in that they are larger transmission structures and they are more costly.

The study corridor having a greater associated occurrence of existing residential use, or will require a greater estimated number of angle structures, was removed from further consideration. The remaining study corridors were carried forward as the preliminary potential route alternatives, or Open House III Route Alternatives. Figure 4-4 below depicts the Open House III Route Alternatives.

Figure 4-4. Preliminary Fargo to St. Cloud Potential Route Alternatives (Open House III Route Alternatives)

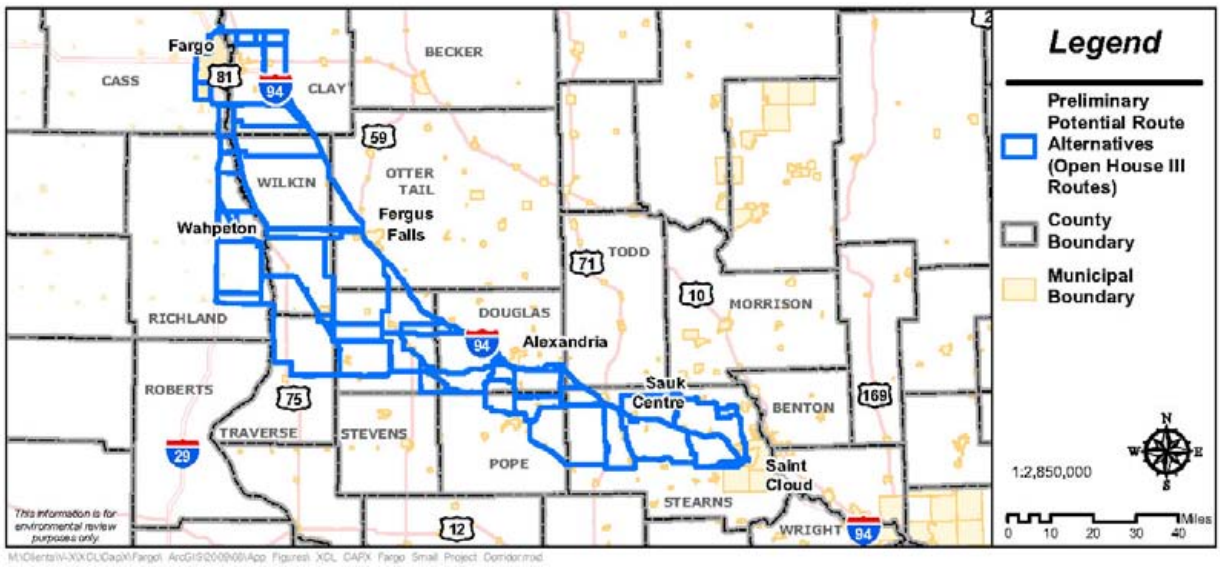

The preliminary potential route alternatives, and the methodology as to how they were developed, were presented to stakeholders and the general public at a third series of stakeholder working group meetings and a third series of open houses in June 2008.

4.4.4 Fargo to St. Cloud Refined Potential Route Alternatives

Similar to the development of the preliminary potential route alternatives, or Open House III Route Alternatives, the refined potential route alternatives (Open House IV Route Alternatives) were selected through various levels of comparative analysis although at an increasing level of detail. Localized segment or segment combination comparisons were evaluated, as well as broader comparisons associated with lengthier route options. Additionally, some of the factors being considered were further refined. For example, rather than assessing the occurrence of zoned or classified residential use areas, the number of existing residences occurring within proximity of the preliminary potential route alternatives was instead evaluated. Existing residential and non-residential buildings were identified through aerial interpretation and field reconnaissance. With this modified

sensitivity, some study corridors that were removed during the first stage of route refinement were identified as potentially needing further study and therefore were added back in as potential route alternatives. The comparative analyses assessed the cumulative occurrence of sensitivities associated with each route alternative and the strength of the route alternative from a right-of-way sharing perspective. If two route alternatives were considered comparable based on these considerations, deference was then made to the number of existing residences within proximity of the route alternatives or the number of estimated angle structures.

The preliminary potential route alternative having a greater number of existing residences within proximity, or will require a greater estimated number of angle structures, was removed from further consideration. Further, some route alternatives were identified as being infeasible in that a viable alignment could not be located within the route alternative that will avoid the displacement of existing residences. Therefore, in order to avoid displacing homes, these route alternatives were either removed from consideration or modified as appropriate to make them feasible. The remaining route alternatives were carried forward as the refined potential route alternatives, or Open House IV Route Alternatives. Figure 4-5 below depicts the Open House IV Route Alternatives.

Figure 4-5. Refined Fargo to St. Cloud Potential Route Alternatives (Open House IV Route Alternatives)

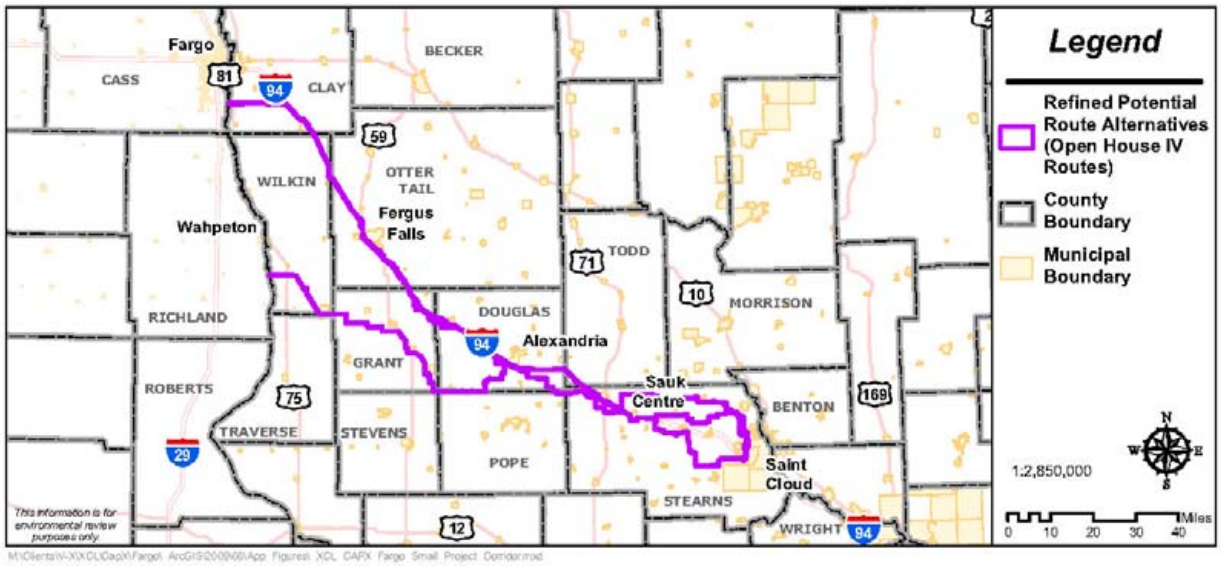

The refined potential route alternatives, and the methodology as to how they were developed, were presented to the general public at a fourth series of open houses in July 2009.

4.4.5 FARGO TO ST. CLOUD PROPOSED ROUTES

Similar to the development of the refined potential route alternatives, the Proposed Routes were selected through various levels of comparative analysis although at an increasing level of detail. Figure 4-6 depicts the Proposed Routes for the Fargo to St. Cloud 345 kV Project.

Figure 4-6. Fargo to St. Cloud Proposed Routes

4.4.6 IDENTIFIED ALIGNMENTS

Subsequent to the third phase of the public participation process, Applicants participated in various meetings with Mn/DOT and the FHWA. During these meetings, Mn/DOT and the FHWA identified concerns associated with placing the proposed 345 kV transmission line along I-94. Applicants then identified potential alignments along the I-94 right-of-way and conducted a comparative analysis of these alignments.

To assist in the analysis of the appropriate alignment along I-94, multiple alignments were developed for the Preferred Route and Alternate Route A, both of which parallel the I-94 right-of-way at least in part. The identified alignments include: (i) at least 25 feet from the I-94 edge of right-of-way; (ii) at least 75 feet from the I-94 edge of right-of-way; and (iii) five feet from the I-94 edge of right-of-way.

4.4.7 CONSIDERATION OF ROUTE ALTERNATIVES

In selecting the routes proposed in this Application, Applicants comparatively evaluated various study corridors, route alternatives, route options, and ultimately various alignments within the Proposed Routes extending between the new Quarry Substation and the Red River. More than 750

different segments were evaluated throughout the route development and selection process. In developing and selecting the Proposed Routes, many factors were evaluated including social, environmental and other factors that may contribute to potential impacts and cost – such as length, number of estimated angle structures, number of potentially affected landowners, road crossings, existing utility crossings, and right-of-way sharing. Information pertaining to all segments that were considered in the route development and selection process is provided in Appendix E.

4.4.8 Route Alternatives Removed from Consideration

In addition to the Proposed Routes described in this Application, Applicants also evaluated and rejected more than 500 segments. The route alternatives that were rejected included various segments along mostly secondary roadways, property lines, or cross-country route options where sensitivities occur more frequently or densely. Applicants removed from consideration a number of segments based on the comparative analyses performed. The removal of route alternatives from consideration was based on the following key factors:

- The Proposed Routes optimize right-of-way sharing or corridor sharing along existing linear features, such as the I-94 right-of-way.
- The Proposed Routes have a lower associated cumulative occurrence of sensitivities.
- The Proposed Routes more effectively minimize the potential for impacts to existing residences or residential use areas, as well as agricultural use areas.

Information pertaining to all segments that were considered, but removed from further consideration, is provided in Appendix E.

May 30, 2014

VIA E-FILING

Larry Hartman, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place E, Suite 500
St. Paul, MN 55101

RE: *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259)

Dear Mr. Hartman:

North Dakota Pipeline Company LLC ("NDPC") submits this letter to propose route alternatives for Sandpiper Pipeline Project ("Project"), as well as to provide comments regarding proposed route alternatives filed with the Minnesota Public Utilities Commission ("Commission") during the public comment period. In the sections that follow, NDPC discusses: (1) proposed route alternatives it has incorporated into its preferred route, which should be included in the Comparative Environmental Analysis ("CEA") prepared for the Project; (2) proposed alternatives that do not meet the Project's purpose and, therefore, should not be included in the CEA; and (3) the feasibility of certain proposed route alternatives. With respect to any proposed route alternatives not addressed in these comments, NDPC takes no position on whether the Commission and the Department of Commerce, Energy Environmental Review and Analysis ("EERA"), should include those alternatives in the CEA.

In addition, as requested by the EERA, NDPC provides updated information regarding cumulative potential effects of the proposed Project and Enbridge Energy, Limited Partnership's ("Enbridge") proposed Line 3 Replacement Program ("L3R Project").

A. Proposed Route Alternatives NDPC Incorporated Into the Preferred Route, Which Should Be Included in the CEA.

On April 4, 2014, NDPC submitted thirteen route alternatives that it had incorporated into its preferred route for the Project (*see* the attached **Exhibit A**). NDPC has identified an additional eleven route alternatives that address landowner, environmental, engineering, design, or constructability concerns, and has incorporated these additional route alternatives into its preferred route. The alternatives are consistent with the Project's purpose, are feasible from an engineering, design, and constructability standpoint, and have similar or fewer environmental impacts. The attached **Exhibit B** provides a description of each of the eleven route alternatives,

the reasons for incorporation into the preferred route, and a map depicting each alternative's location.

NDPC respectfully requests that the preferred route submitted on January 31, 2014, as modified by the route alternatives provided in its April 4, 2014, filing (*see* **Exhibit A**), and in this filing (*see* **Exhibit B**),[1] be included in the CEA, addressed at the public hearings as NDPC's preferred route, and ultimately approved as the Project route. A CD containing shapefiles of the preferred route (as modified), as well as shapefiles of each of the route alternatives, has been sent under separate cover.

B. Proposed Route Alternatives That Do Not Meet the Project's Purpose and, Therefore, Should Be Excluded From the CEA.

Certain route alternatives proposed in public comments do not meet the Project's purpose and, therefore, should not be addressed in the CEA. Each of these proposed route alternatives is discussed below.

1. North Dakota to Twin Cities Route Alternatives.

Friends of the Headwaters proposed a route alternative (referred to by Friends of the Headwaters as Alternative Route "C") that would extend from North Dakota into Minnesota along MN Hwy 9, then intersect with and follow first an existing Magellan Pipeline Company pipeline and then the existing MinnCan Pipeline, ultimately terminating at the Flint Hills and Saint Paul Park Refineries, south of the Minneapolis/St. Paul metro area.[2] Similar proposals were included in other public comments, including a route alternative that would follow I-94 from North Dakota to terminate at an unknown location in the Minneapolis/St. Paul area.[3] Such proposals do not reach the Project's designated connecting points and, thus, do not meet the Project's intended purpose.

The Project's purpose is to transport the growing supplies of oil produced in North Dakota to existing terminals at Clearbrook, Minnesota, and Superior, Wisconsin, within the

[1] Please note that the Peterson Lake Route Alternative in this filing replaces the Blind Lake Creek Route Alternative submitted on April 4, 2014.

[2] *See* Friends of the Headwaters Public Comments, dated April 4, 2014, filed by DOC EERA on April 21, 2014 (Doc. IDs 20144-98540-05, 20144-98540-06 and 20144-98540-07), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259).

[3] *See, e.g.*, Monicken Public Comments, dated April 4, 2014, and Mosner Public Comments, dated April 4, 2014, filed by the EERA on April 17, 2014 (MPUC Doc. ID 20144-98433-08), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259); *see also* Honor the Earth's Motion for Alternative Sandpiper Route 29-94, filed by Honor the Earth on April 4, 2014 (MPUC Doc. ID 20144-97984-01), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259).

Enbridge Pipeline System.[4] From these two terminals, crude oil can be shipped on other pipelines and delivered to not only refineries located in Minnesota, but also to other states in the Midwest and on the East Coast.[5] Extending the Project from North Dakota to the Clearbrook and Superior terminals enables NDPC to utilize existing facilities within the Enbridge Pipeline System, and to meet its shipper obligations. Utilizing the Clearbrook and proposed Clearbrook West terminals allows NDPC to provide back-up service to the existing Line 81 Pipeline deliveries, which in turn ensures reliable deliveries of 60,000 barrels per day ("bpd") annual capacity into the Minnesota Pipe Line Company system for delivery to Minnesota refineries.[6] However, as noted, the Project's purpose goes beyond delivery to only Minnesota refineries, and for that reason connecting to both the Clearbrook and proposed Clearbrook West terminals along with the existing Superior terminal is essential to meeting this purpose.

In essence, the proponents of a North Dakota to Twin Cities route alternatives propose a *different project*, rather than an alternative route for the proposed Project.[7] Therefore, NDPC requests that the Commission and the EERA not include route alternatives extending from North Dakota to the Twin Cities in the CEA.

2. North Dakota to Illinois Route Alternatives.

Friends of the Headwaters also suggest two route alternatives (referred to by Friends of the Headwaters as Alternative "A" and Alternative "B"), which extend from North Dakota to Illinois, passing through southwestern Minnesota.[8] Similar routes were proposed in other public comments.[9] These proposals do not reach either of the Project's designated connecting points

[4] *See* Section 7852.2100(D)(2) of NDPC's Pipeline Route Permit Application ("Application"), filed on November 8, 2013 (MPUC Doc. ID 201311-93532-03), as supplemented on January 31, 2014 (MPUC Doc. ID 20141-96101-01), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259), at pp. 4-5.

[5] *Id.*

[6] *See* Section 7852.2100(D)(5) of NDPC's Application, filed on November 8, 2013 (MPUC Doc. ID 201311-93532-03), as supplemented on January 31, 2014 (MPUC Doc. ID 20141-96101-01), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259), at p. 5.

[7] The proposals also do not contain all of the data and analysis required for route alternatives. *See* Minn. R. 7852.1400, subp. 3(B) and Minn. R. 7852.2700.

[8] *See* Friends of the Headwaters Public Comments, dated April 4, 2014, filed by DOC EERA on April 21, 2014 (Doc. IDs 20144-98540-05, 20144-98540-06 and 20144-98540-07), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259).

[9] *See, e.g.*, Mosner Public Comments, dated April 4, 2014, filed by the EERA on April 17, 2014 (MPUC Doc. ID 20144-98433-08), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259).

and, thus, do not meet the Project's intended purpose. These are proposals for *different projects*, not alternative routes, much like the North Dakota to Twin Cities route alternatives discussed above.[10] Thus, for the same reasons discussed in Section B.1, NDPC requests that the Commission and EERA not include route alternatives extending from North Dakota to Illinois in the CEA.

3. Northern Minnesota Route Alternatives.

Two route alternatives extending north of and around the Red Lake Indian Reservation were proposed in public comments. One route alternative was proposed by Sharon Natzel,[11] and the other is a conceptual route proposed by Ronald Vegemast.[12]

Neither proposed alternative connects to Enbridge's existing terminal in Clearwater, Minnesota, which, as discussed above, is a designated connecting point for the Project and essential to meeting the Project's purpose.[13] Therefore, NDPC requests that the Commission and the EERA not include these alternatives in the CEA.

C. Comments on Route Alternative Feasibility.

Two route alternatives have been proposed in areas where NDPC has no legal authority or recourse to obtain rights to construct the Project. Several public comments suggested that NDPC follow the Northern Route Alternative[14] discussed in NDPC's pipeline route permit

[10] The proposals also do not contain all of the data and analysis required for route alternatives. *See* Minn. R. 7852.1400, subp. 3(B) and Minn. R. 7852.2700.

[11] *See* Natzel Public Comments, dated April 3, 2014, filed by DOC EERA on April 17, 2014 (MPUC Doc. ID 20144-98436-02), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259).

[12] *See* Vegemast Public Comments, dated April 3, 2014, filed by DOC EERA on April 17, 2014 (MPUC Doc. ID 20144-98436-10), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259).

[13] The proposals also do not contain all of the data and analysis required for route alternatives. *See* Minn. R. 7852.1400, subp. 3(B) and Minn. R. 7852.2700.

[14] *See*, *e.g*., Sterle Public Comments, filed by DOC EERA on March 24, 2014 (MPUC Doc. ID 20143-97538-02), Carlton County Land Stewards Public Comments, dated April 3, 2014, filed by DOC EERA on April 21, 2014 (MPUC Doc. ID 20144-98540-03), Shulstrom Public Comments, dated April 3, 2014, filed by DOC EERA on April 7, 2014 (MPUC Doc. ID 20144-98036-01), Rasch Public Comments, dated March 3, 2014, filed by DOC EERA on April 17, 2014 (MPUC Doc. ID 20144-98436-04), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259).

application ("Application")[15] and accompanying Environmental Information Report ("EIR").[16] Others suggested that the Project route follow the Soo Line ATV Trail, which extends from Cass Lake, Minnesota, to Moose Lake, Minnesota.[17] NDPC understands that both route alternatives will be studied in the CEA. NDPC takes no position on their inclusion in the CEA, but notes that both alternatives cross the Leech Lake Indian Reservation, where Enbridge cannot construct the Project.[18]

D. Updated Information Regarding Cumulative Potential Effects.

On March 3, 2014, Enbridge announced that it had received shipper support for the L3R Project to replace the existing 34-inch Line 3 Pipeline along most of its route from Edmonton, Alberta, to Superior, Wisconsin, with a new 36-inch pipeline and associated facilities. Within the United States, Enbridge plans to replace three segments of the Line 3 Pipeline as three separate replacement projects: (1) the Canadian border to Joliette, North Dakota, segment; (2) the Joliette, North Dakota, to the Wisconsin border segment; and (3) the Wisconsin border to the Superior terminal segment. Enbridge proposes to route the Clearbrook, Minnesota, to Wisconsin border portion of the second segment of the Line 3 Pipeline along the preferred route for the Sandpiper Pipeline.[19] In general, Enbridge plans to locate the Line 3 Pipeline 25 feet from the Sandpiper Pipeline. Enbridge plans to file Certificate of Need and Pipeline Route Permit applications for the Minnesota portion of the LR3 Project with the Commission in 2015. Pending receipt of all necessary permits and approvals, construction of the LR3 Project is anticipated to commence in late 2016, with an in-service date in late 2017.

In light of Enbridge's recent announcement regarding the L3R Project, the EERA requested that NDPC provide updated information regarding the cumulative potential effects of the Sandpiper Pipeline Project and the LR3 Project.[20] As noted in its Application, as a general matter, NDPC has routed the Sandpiper Pipeline to facilitate construction of future projects, such

[15] NDPC's Application, filed on November 8, 2013 (MPUC Doc. ID 201311-93532-03), as supplemented on January 31, 2014 (MPUC Doc. ID 20141-96101-01), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259).

[16] Environmental Information Report ("EIR"), filed by NDPC on November 8, 2013 (MPUC Doc. ID 201311-93532-04), as supplemented on January 31, 2014 (MPUC Doc. ID 20141-96101-02), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259).

[17] *See* Sterle and Carlton County Land Stewards Public Comments, *supra*, note 14.

[18] *See* Letter from Steven Howard, Executive Director for the Leech Lake Band of Ojibwe to Tracy Smetana, MPUC, October 25, 2013, attached as **Exhibit C**.

[19] NDPC's preferred route includes the route alternatives incorporated by NDPC in its April 4, 2014 filing and this filing.

[20] *See* Minn. R. 7852.1900, subp. 3(I); *see also* Minn. R. 7852.2700.

as the L3R Project, as co-located facilities with the Sandpiper Pipeline right-of-way.[21] Cumulative environmental impacts of L3R Project construction will be reduced by utilizing the work space created for the Sandpiper Pipeline, to the extent practicable. With respect to specific data regarding cumulative potential effects of the two projects, the attached **Exhibit D** provides updates to the Tables in the EIR[22] showing the potential additive impacts of the L3R Project. Only those Tables that required updating to account for cumulative potential effects of the L3R Project and the Sandpiper Pipeline are provided in **Exhibit D**, and any Tables not included in this update remain as filed on January 31, 2014.

Since Enbridge plans to co-locate the Line 3 Pipeline along the same route as the Sandpiper Pipeline, the cumulative potential effects of the two projects should be analyzed not only for NDPC's preferred route, but also for each route alternative included in the CEA and addressed at the public hearings. Such an analysis is necessary to ensure an accurate comparison of NDPC's preferred route to any route alternatives.

Should the Commission or the EERA have questions regarding this filing, please contact Jonathan Minton at (713) 821-2000.

Sincerely,

Barry Simonson
Senior Manager
North Dakota Pipeline Company LLC

[21] *See* Section 7852.2700(I) of NDPC's Application, filed on November 8, 2013 (MPUC Doc. ID 201311-93532-03), as supplemented on January 31, 2014 (MPUC Doc. ID 20141-96101-01), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259), at pp. 12 and 11, respectively.

[22] EIR, *supra*, note 16.

North Dakota Pipeline Company LLC

Routing Permit for a Crude Oil Pipeline

Sandpiper Pipeline Project

MPUC Docket No. PL-6668/PPL-13-474

Route Alternatives

April 4, 2014

Introduction

North Dakota Pipeline Company LLC ("NDPC") presents the following Route Alternatives for the Sandpiper Pipeline Project (the "Project"). NDPC developed these alternatives in response to landowner requests and suggestions, to further reduce the impacts of construction, to improve constructability, and to address initial concerns raised by the Minnesota Department of Natural Resources during Early Coordination.

NDPC respectfully requests that the Minnesota Public Utilities Commission ("MPUC") include these Route Alternatives in those to be reviewed in the Comparative Environmental Analysis, and ultimately into any route permit issued to the Project under the above-captioned docket.

1. Milepost 407.2 to 407.9 – Big LaSalle Route Alternative

North Dakota Pipeline Company LLC ("NDPC") submits the Big LaSalle Route Alternative between mileposts[1] ("MPs") 407.2 and 407.9 in Clearwater County, Minnesota. NDPC proposes this alternative to accommodate a landowner request to reroute the pipeline to the western side of the existing Minnesota Pipe Line Company right-of-way.

1.A Description of Proposed Route Alternative

As seen in Figure 1, the Big LaSalle Route Alternative deviates from the route filed on January 31, 2014 at MP 407.2 and rejoins the route at MP 407.9. The route alternative is approximately 0.7 mile long and is located less than 0.1 mile west of the current route. No new landowners will be impacted by the alternative.

1.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be approved to accommodate a landowner request to reroute the pipeline to the western side of the existing Minnesota Pipe Line Company right-of-way. This alternative reduces the impact to lake front properties by moving the pipeline away from the side of the property adjacent to the lake.

1.C Analysis of the Potential Impacts

Table 1 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. Both the current route and the route alternative are 0.7 mile long and are co-located with existing right-of-way for the entirety of the routes. Both routes impact 0.7 mile of highly wind erodible soils and 0.2 mile of prime farmland soils. Both routes avoid wetlands, bedrock outcrops, perennial waterbodies, national forest, tribal, and state land, and roads and railroads. The route alternative is further away from Big LaSalle Lake, which is listed on the Minnesota Public Waters Inventory. NDPC proposes that the Minnesota Public Utilities Commission ("MPUC") accept the proposed route alternative, as it does not introduce any new impacts to environmental features as outlined in Table 1 and it addresses landowner route concerns related to lake front property.

[1] Mileposts have been rounded and are used for reference only; therefore, they should not be used as a source to calculate actual linear distances.

Table 1
Environmental Features Comparison – Big LaSalle Route Alternative

Environmental Features	Unit	Big LaSalle Route Alternative	January 31, 2014 Route
Length	miles	0.7	0.7
Adjacent to Existing Right-of-Way	miles	0.7	0.7
Greenfield Route [a]	miles	0.0	0.0
NWI-mapped Wetlands	miles	0.0	0.0
NWI-mapped Wetlands	number	0	0
Highly Wind Erodible Soils	miles	0.7	0.7
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.2	0.2
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	0	0
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

Milepost
Big LaSalle Route Alternative
January 31, 2014 Filed Route
0 250 500 Feet

Figure 1
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Big LaSalle Route Alternative

2. Milepost 422.4 to 422.8 – Rose Route Alternative

NDPC submits the Rose Route Alternative between MPs 422.4 and 422.8 in Hubbard County, Minnesota. NDPC proposes this alternative to remove temporary workspace from an adjacent tract.

2.A Description of Proposed Route Alternative

As seen in Figure 2, the Rose Route Alternative deviates from the route filed on January 31, 2014 at MP 422.4 and rejoins the route at MP 422.8. The route alternative is approximately 0.3 mile long and is located less than 0.1 mile east of the current route. No new landowners will be impacted by the alternative and temporary impacts are eliminated from one landowner's property.

2.B Purpose & Justification of Route Alternative

NDPC requests the alternative be approved to remove temporary workspace from an adjacent tract. The alternative reduces the number of landowners impacted and the affected landowner is agreeable to the alternative.

2.C Analysis of the Potential Impacts

Table 2 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. Both the current route and the route alternative are 0.3 mile long and are co-located with existing right-of-way for the entirety of the routes. Both routes impact 0.3 mile of highly wind erodible soils and cross one road. Both routes avoid wetlands, bedrock outcrops, prime farmland, perennial waterbodies, national forest, tribal, and state land, and railroads. The route alternative is further away from the Hjermstad Wetland, which is listed on the Minnesota Public Waters Inventory. NDPC proposes that the MPUC accept the proposed route alternative, as it does not introduce any new impacts to environmental features as outlined in Table 2 and it reduces the total number of affected landowners.

Table 2
Environmental Features Comparison – Rose Route Alternative

Environmental Features	Unit	Rose Route Alternative	January 31, 2014 Route
Length	miles	0.3	0.3
Adjacent to Existing Right-of-Way	miles	0.3	0.3
Greenfield Route [a]	miles	0.0	0.0
NWI-mapped Wetlands	miles	0.0	0.0
NWI-mapped Wetlands	number	0	0
Highly Wind Erodible Soils	miles	0.3	0.3
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.0	0.0
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	1	1
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

Milepost
Rose Route Alternative
January 31, 2014 Filed Route

0 200 400 Feet

Figure 2
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Rose Route Alternative

3. Milepost 432.5 to 434.0 – Portage Lake Route Alternative

NDPC submits the Portage Lake Route Alternative between MPs 432.5 and 434.0 in Hubbard County, Minnesota. NDPC proposes this route alternative to accommodate two landowner requests to increase the distance of the pipeline from existing structures, as well as to accommodate a third landowner request to alter the pipeline route to avoid his home and sheds.

3.A Description of Proposed Route Alternative

As seen in Figure 3, the Portage Lake Route Alternative deviates from the route filed on January 31, 2014 at MP 432.5 and rejoins the route at MP 434.0. The route alternative is approximately 1.6 miles long and is located no more than 0.2 mile east of the current route. While no new landowners will be impacted by the alternative it does move the proposed route onto an existing landowner amenable to the project.

3.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be included in the Preferred Route to accommodate two landowner requests to increase the distance of the pipeline from existing structures, as well as to accommodate a third landowner request to reroute the pipeline. The proposed route would increase the distance between an existing home and the pipeline, avoid removal of two pole barns, as well as reroute the pipeline onto land owned by an existing landowner amenable to the route, thus accommodating the third landowner's request to reroute the pipeline.

3.C Analysis of the Potential Impacts

Table 3 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. The route alternative is 0.2 miles longer than the current route; the current route is co-located with existing right-of-way and the route alternative is located for the majority of its length on greenfield. Both routes cross three roads. Both routes avoid wetlands, bedrock outcrops, prime farmland, perennial waterbodies, national forest, tribal and state land, and railroads. The route alternative crosses an additional 0.2 mile of highly wind erodible soils. NDPC proposes that the MPUC accept the proposed route alternative as it addresses landowner concerns by increasing the distance of the pipeline from existing structures and moves the proposed route onto an existing landowner amenable to the project. The proposed route alternative also does not introduce any significant new impacts to environmental features as outlined in Table 3. The proposed route's constructability is also improved by avoiding structures and construction in close-proximity to an existing residence.

Table 3
Environmental Features Comparison – Portage Lake Route Alternative

Environmental Features	Unit	Portage Lake Route Alternative	January 31, 2014 Route
Length	miles	1.6	1.4
Adjacent to Existing Right-of-Way	miles	0.1	1.4
Greenfield Route [a]	miles	1.4	0.0
NWI-mapped Wetlands	miles	0.0	0.0
NWI-mapped Wetlands	number	0	0
Highly Wind Erodible Soils	miles	1.6	1.4
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.0	0.0
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	3	3
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

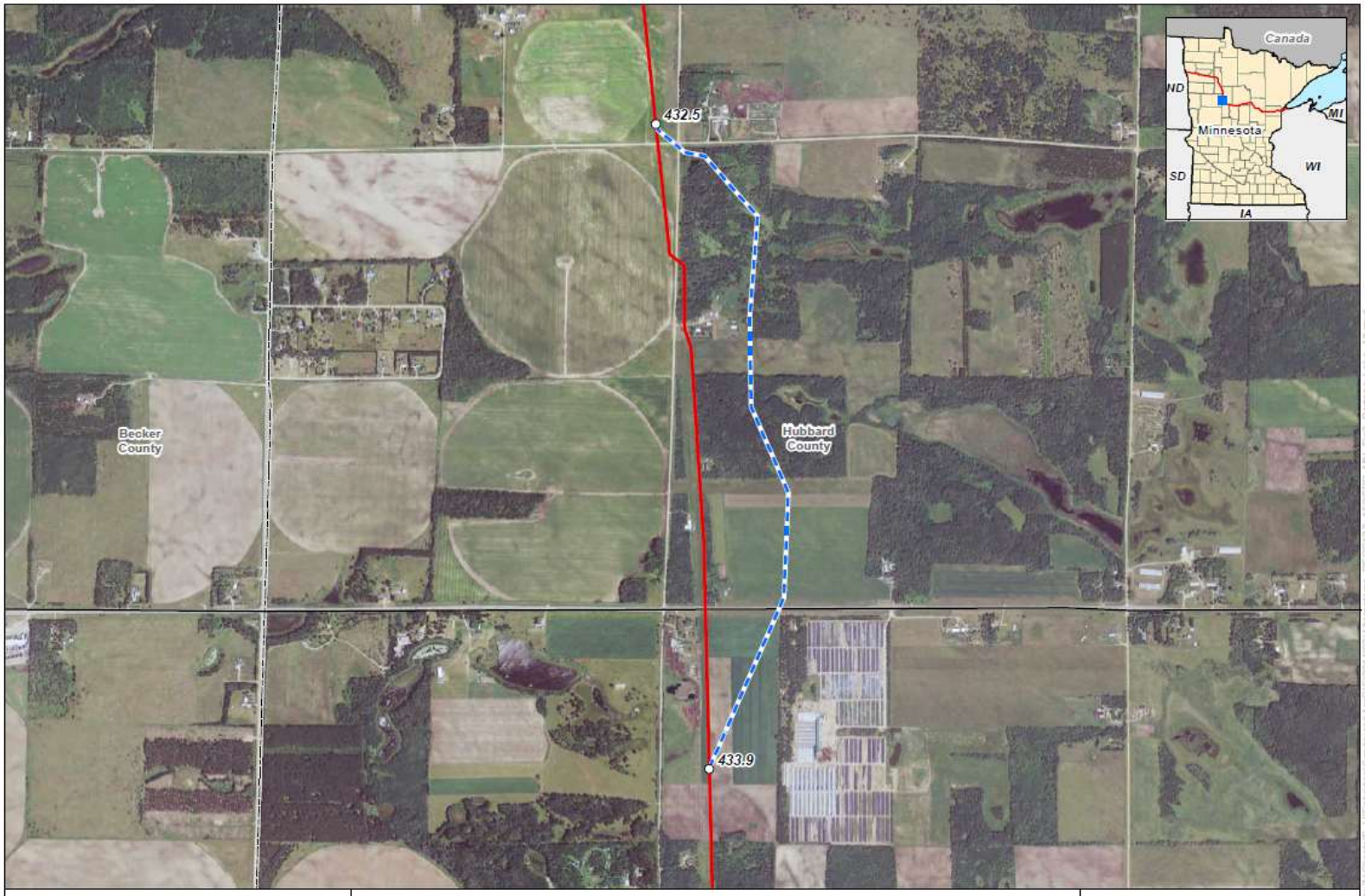

Milepost
Portage Lake Route Alternative
January 31, 2014 Filed Route

0 750 1,500 Feet

Figure 3
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Portage Lake Route Alternative

4. Milepost 469.2 to 469.6 – Foot Hills Route Alternative

NDPC submits the Foot Hills Route Alternative between MPs 469.2 and 469.6 in Cass County, Minnesota. NDPC proposes this alternative to reroute the pipeline to minimize construction through a large wetland complex within the Foot Hills State Forest.

4.A Description of Proposed Route Alternative

As seen in Figure 4, the Foot Hills Route Alternative deviates from the route filed on January 31, 2014 at MP 469.2 and rejoins the route at MP 469.6. The route alternative is approximately 0.4 mile long and is located less than 0.1 mile north of the current route. The current route and the route alternative are completely within the Foot Hills State Forest on land administered by the Minnesota Department of Natural Resources ("MNDNR"); therefore, no new landowners would be impacted by this route alternative.

4.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be approved to reroute the pipeline to minimize construction through a large wetland complex within the Foot Hills State Forest.

4.C Analysis of the Potential Impacts

Table 4 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. Both the current route and the route alternative are 0.4 mile long and are co-located with existing right-of-way for the entirety of the routes. Both routes impact 0.4 mile of state land within the Foot Hills State Forest. Both routes avoid highly wind erodible soils, bedrock outcrops, prime farmland, perennial waterbodies, national forest and tribal land, and roads and railroads. The route alternative crosses 0.2 fewer miles of National Wetlands Inventory ("NWI")-mapped wetlands and one less NWI-mapped wetland. NDPC proposes that the MPUC accept the proposed route alternative, as it does not introduce any new impacts to environmental features and reduces wetland impacts as outlined in Table 4. The proposed route's constructability is also improved by avoiding the large, open water portion of the wetland and decreasing the overall wetland crossing length.

Table 4
Environmental Features Comparison – Foot Hills Route Alternative

Environmental Features	Unit	Foot Hills Route Alternative	January 31, 2014 Route
Length	miles	0.4	0.4
Adjacent to Existing Right-of-Way	miles	0.4	0.4
Greenfield Route [a]	miles	0.0	0.0
NWI-mapped Wetlands	miles	0.0	0.2
NWI-mapped Wetlands	number	1	2
Highly Wind Erodible Soils	miles	0.0	0.0
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.0	0.0
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.4	0.4
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	0	0
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

Milepost
Foot Hills Route Alternative
January 31, 2014 Filed Route
0 200 400 Feet

Figure 4
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Foot Hills Route Alternative

5. Milepost 487.8 to 492.4 – Blind Lake Creek Route Alternative

NDPC submits the Blind Lake Creek Route Alternative between MPs 487.8 and 492.4 in Cass County, Minnesota. NDPC proposes this alternative to accommodate a localized preference among the impacted landowners.

5.A Description of Proposed Route Alternative

As seen in Figure 5, the Blind Lake Creek Route Alternative deviates from the route filed on January 31, 2014 at MP 487.8 and rejoins the route at MP 492.4. The route alternative is approximately 4.6 miles long and is located no more than 1.0 mile north of the current route. The alternative does impact two new private landowners as well as public lands. The two new landowners approve of the alternative.

5.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be approved to accommodate a localized preference among the impacted landowners.

5.C Analysis of the Potential Impacts

Table 5 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. Both the current route and the route alternative are 4.6 miles long; however, the majority of the length of the current route is co-located with existing power line right-of-way and the majority of the length of the route alternative is greenfield. Both routes cross one perennial waterbody and two roads. Both routes avoid bedrock outcrops, national forest, tribal and state land, and railroads. The route alternative crosses 0.7 fewer mile of highly wind erodible soils and 1.3 more miles of prime farmland. In addition, the route alternative crosses one additional NWI-mapped wetland; however, the total crossing length of NWI-mapped wetlands is reduced by 0.1 mile. The alternative accommodates a localized preference among the impacted landowners.

Table 5
Environmental Features Comparison – Blind Lake Creek Route Alternative

Environmental Features	Unit	Blind Lake Creek Route Alternative	January 31, 2014 Route
Length	miles	4.6	4.6
Adjacent to Existing Right-of-Way	miles	0.1	4.5
Greenfield Route [a]	miles	4.5	< 0.1
NWI-mapped Wetlands	miles	0.3	0.4
NWI-mapped Wetlands	number	15	14
Highly Wind Erodible Soils	miles	3.4	4.1
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	2.6	1.3
Perennial Waterbodies	number	1	1
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	2	2
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

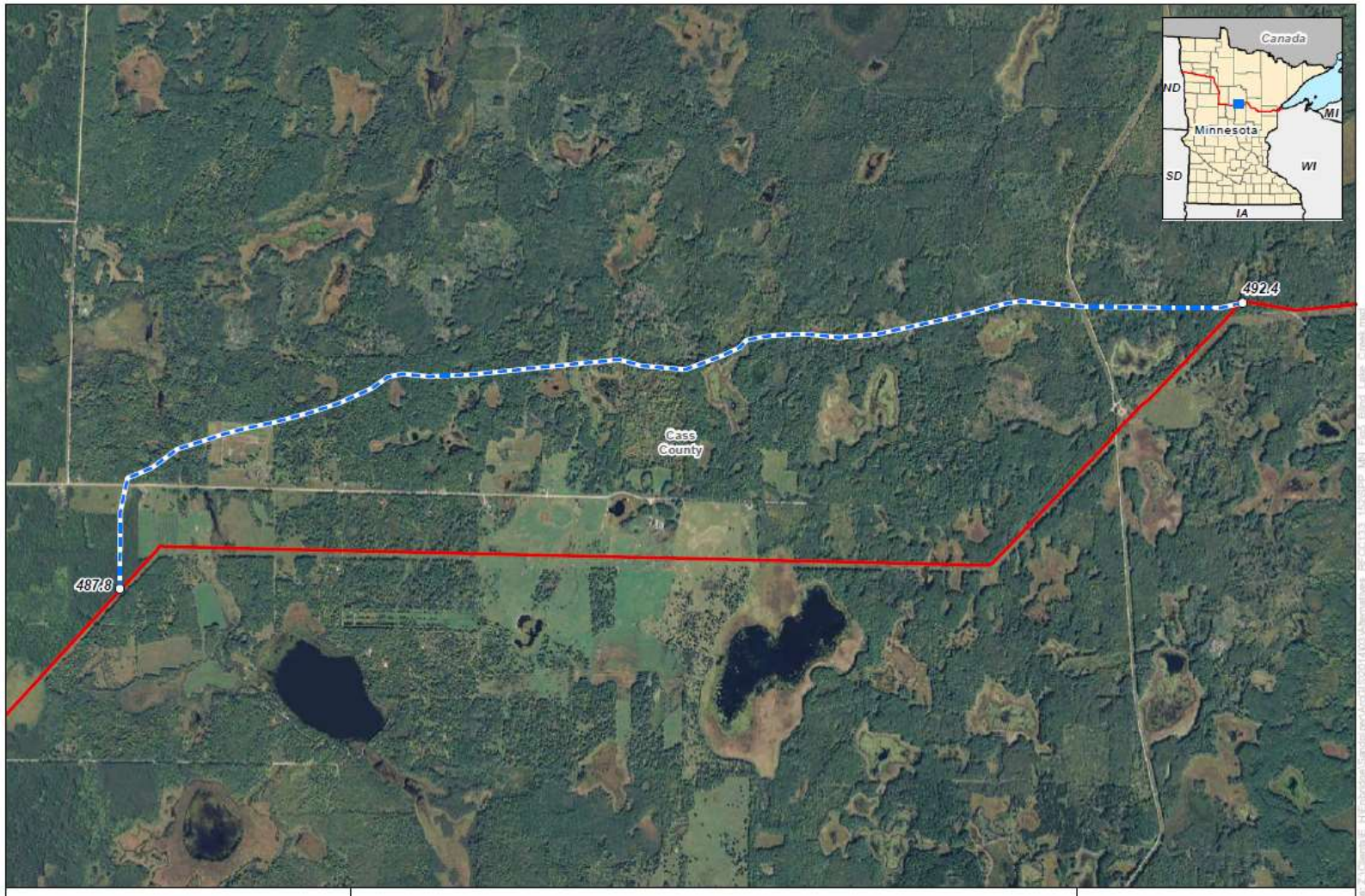

Milepost
Blind Lake Creek Route Alternative
January 31, 2014 Filed Route

0 1,000 2,000 Feet

Figure 5
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Blind Lake Creek Route Alternative

6. Milepost 519.5 to 520.7 – Hill River Route Alternative

NDPC submits the Hill River Route Alternative between MPs 519.5 and 520.7 in Aitkin County, Minnesota. NDPC proposes this alternative to minimize forest fragmentation and avoid old growth forest resources in the Hill River State Forest.

6.A Description of Proposed Route Alternative

As seen in Figure 6, the Hill River Route Alternative deviates from the route filed on January 31, 2014 at MP 519.5 and rejoins the route at MP 520.7. The route alternative is approximately 1.7 miles long and is located no more than 0.2 mile west (for a portion) and north (for a portion) of the current route. The current route and the route alternative are completely within the Hill River State Forest on land administered by the MNDNR; therefore, no new landowners would be impacted by this route alternative.

6.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be approved to minimize forest fragmentation and avoid old growth forest resources in the Hill River State Forest. NDPC coordinated with the MNDNR to identify a route alternative in this area with the least natural resource impact.

6.C Analysis of the Potential Impacts

Table 6 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. Both the current route and the route alternative are 1.7 miles long. The route alternative is co-located with an existing road right-of-way for 0.2 mile; the current route is located entirely on greenfield. Both routes impact 1.7 mile of state land within the Hill River State Forest. Both routes avoid bedrock outcrops, perennial waterbodies, national forest and tribal land, and roads and railroads. Both routes cross the same number of NWI-mapped wetlands; however, the route alternative crosses 0.2 mile less NWI-mapped wetlands. The route alternative crosses 0.8 fewer miles of highly wind erodible soils and 0.3 fewer miles of prime farmland. The route alternative is closer to White Elk Lake which is listed on the Minnesota Public Waters Inventory and is a MNDNR Designated Wildlife Lake; however, the lake and the pipeline are separated by a county road. Finally, the route alternative addresses the MNDNR's initial concerns identified in its October 3, 2013 early coordination letter. NDPC proposes that the MPUC accept the proposed route alternative, as it reduces impacts to environmental features, increases co-location with existing rights-of-way, and reduces impacts to wetlands, highly wind erodible soils, prime farmland, and MNDNR forest resources as outlined in Table 6.

Table 6
Environmental Features Comparison – Hill River Route Alternative

Environmental Features	Unit	Hill River Route Alternative	January 31, 2014 Route
Length	miles	1.7	1.7
Adjacent to Existing Right-of-Way	miles	0.2	0.0
Greenfield Route [a]	miles	1.5	1.7
NWI-mapped Wetlands	miles	0.1	0.3
NWI-mapped Wetlands	number	1	1
Highly Wind Erodible Soils	miles	0.3	1.1
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.2	0.5
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	1.7	1.7
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	0	0
Other Major Issues	number	0	1 [b]

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

[b] MNDNR concern related to Hill River State Forest.

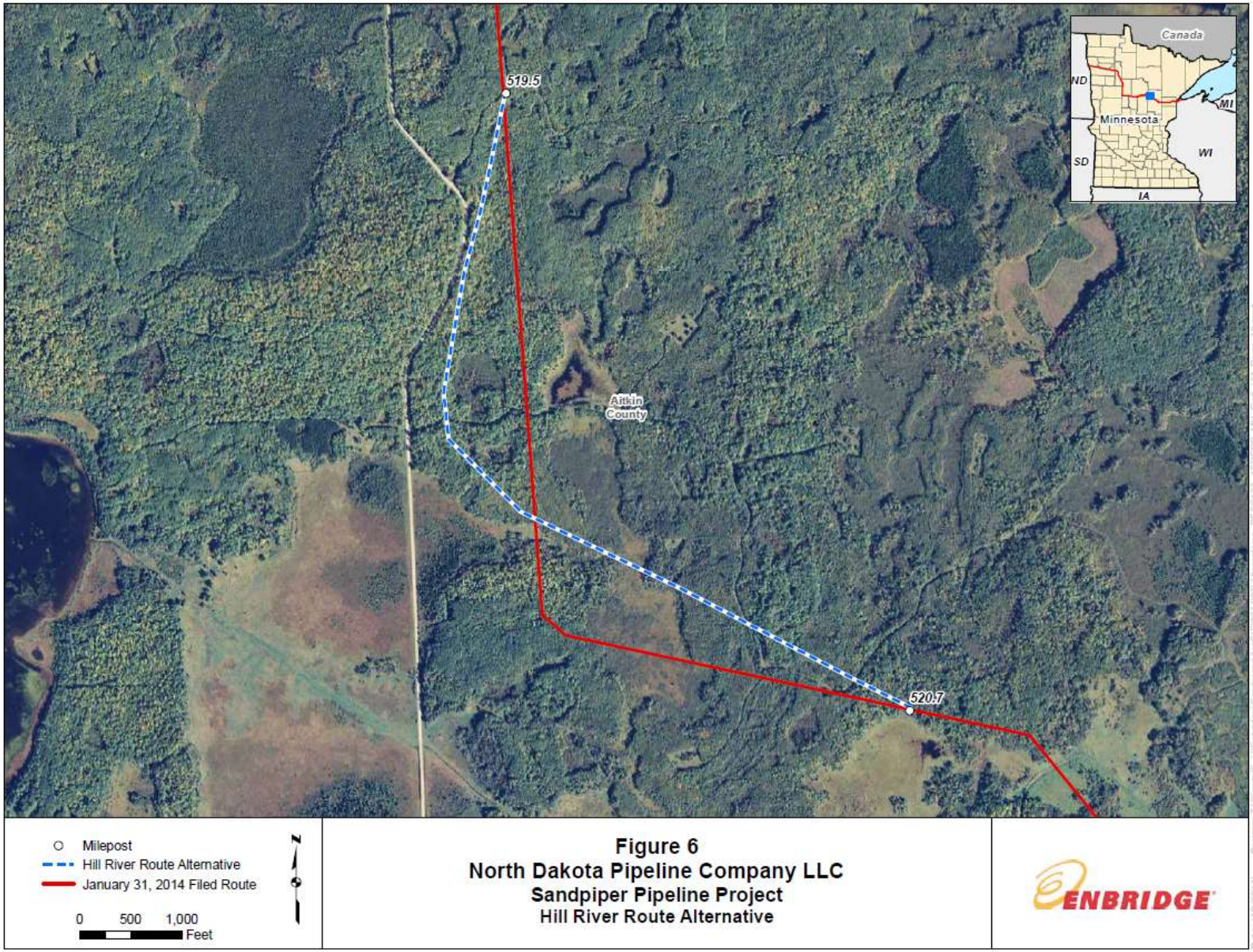

Figure 6
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Hill River Route Alternative

7. Milepost 529.0 to 532.1 – Willow River Route Alternative

NDPC submits the Willow River Route Alternative between MPs 529.0 and 532.1 in Aitkin County, Minnesota. NDPC proposes this alternative to accommodate a landowner request along the existing route.

7.A Description of Proposed Route Alternative

As seen in Figure 7, the Willow River Route Alternative deviates from the route filed on January 31, 2014 at MP 529.0 and rejoins the route at MP 532.1. The route alternative is approximately 3.4 miles long and is located less than 0.8 mile south of the current route. The route alternative then crosses the current route and is located approximately 0.1 mile north of the current route before rejoining near MP 532.1. The route alternative would impact forestry land administered by the MNDNR, including school trust forestry land and the Waukenabo State Forest. NDPC will coordinate with the MNDNR (as a potentially affected landowner) for review and comment regarding potential impacts on forestry resources. The alternative does result in impacts to new private landowners, but all impacted landowners have agreed to the alternative route.

7.B Purpose & Justification of Route Alternative

NDPC requests the alternative's approval to accommodate a landowner request along the existing route. The newly affected private landowners have agreed to the route alternative.

7.C Analysis of the Potential Impacts

Table 7 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. The route alternative is 0.3 mile longer than the corresponding segment of the current route and crosses 0.2 mile more greenfield than the current route. Both routes cross one perennial waterbody and two roads. Both routes avoid prime farmland, bedrock outcrops, national forest and tribal land, and railroads. The route alternative crosses 0.5 fewer miles of highly wind erodible soils, 0.5 fewer miles of NWI-mapped wetlands, and 2 fewer NWI-mapped wetlands. The route alternative crosses 0.9 mile of land within the Waukenabo State Forest in addition to 0.2 mile of MNDNR Forestry Division school trust land. NDPC proposes that the MPUC accept the proposed route alternative as it addresses a landowner request.

Table 7
Environmental Features Comparison – Willow River Route Alternative

Environmental Features	Unit	Willow River Route Alternative	January 31, 2014 Route
Length	miles	3.4	3.1
Adjacent to Existing Right-of-Way	miles	0.4	0.4
Greenfield Route [a]	miles	3.0	2.8
NWI-mapped Wetlands	miles	0.9	1.4
NWI-mapped Wetlands	number	10	12
Highly Wind Erodible Soils	miles	2.1	2.6
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.0	0.0
Perennial Waterbodies	number	1	1
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.9 [b]	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	2	2
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

[b] Does not include 0.2 mile of school trust land administered by the MNDNR Forestry Division.

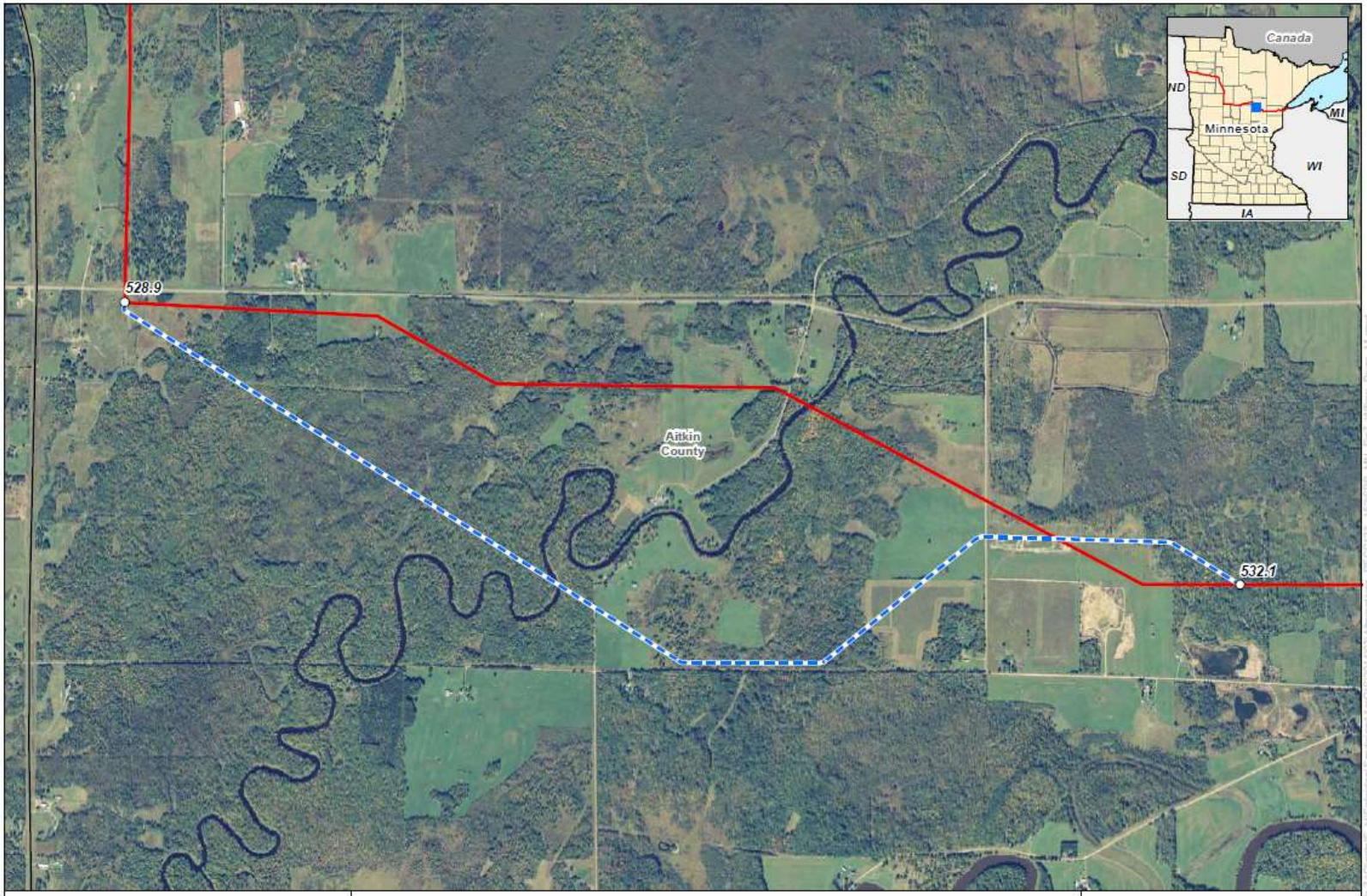

Milepost
Willow River Route Alternative
January 31, 2014 Filed Route

0 750 1,500 Feet

Figure 7
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Willow River Route Alternative

8. Milepost 541.2 to 541.8 – Sandy Route Alternative

NDPC submits the Sandy Route Alternative between MPs 541.2 and 541.8 in Aitkin County, Minnesota. NDPC proposes this alternative to accommodate a landowner request to reroute the pipeline to avoid future home sites along the road.

8.A Description of Proposed Route Alternative

As seen in Figure 8, the Sandy Route Alternative deviates from the route filed on January 31, 2014 at MP 541.2 and rejoins the route at MP 541.8. The route alternative is approximately 0.6 mile long and is located less than 0.1 mile east of the current route. No new landowners will be impacted by the alternative.

8.B Purpose & Justification of Route Alternative

NDPC requests the alternative be approved to accommodate a landowner request to reroute the pipeline to avoid future home sites along the road. The proposed route would avoid future home sites for the landowner and the alternative will address landowner concerns related to the pipeline route on their property.

8.C Analysis of the Potential Impacts

Table 8 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. Both the current route and the route alternative are 0.6 mile long. The route alternative is located on 0.5 more miles of greenfield than the current route. Both routes avoid bedrock outcrops, prime farmland, perennial waterbodies, national forest, tribal, and state land, and roads and railroads. The route alternative crosses 0.2 more miles NWI-mapped wetlands and 2 more NWI-mapped wetlands than the current route and is closer to the Flowage Public Water Basin which is listed on the Minnesota Public Waters Inventory. NDPC proposes that MPUC accept the proposed route alternative as it addresses landowner concerns relative to the pipeline route on their property.

Table 8
Environmental Features Comparison – Sandy Route Alternative

Environmental Features	Unit	Sandy Route Alternative	January 31, 2014 Route
Length	miles	0.6	0.6
Adjacent to Existing Right-of-Way	miles	0.0	0.5
Greenfield Route [a]	miles	0.6	0.1
NWI-mapped Wetlands	miles	0.2	0.0
NWI-mapped Wetlands	number	2	0
Highly Wind Erodible Soils	miles	0.6	0.6
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.0	0.0
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	0	0
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

Milepost
Sandy Route Alternative
January 31, 2014 Filed Route
0 250 500 Feet

Figure 8
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Sandy Route Alternative

9. Milepost 564.9 to 565.5 – Beaver Route Alternative

NDPC submits the Beaver Route Alternative between MPs 564.9 and 565.5 in Carlton County, Minnesota. NDPC proposes this alternative to accommodate a landowner request to reroute the pipeline to avoid a beaver pond.

9.A Description of Proposed Route Alternative

As seen in Figure 9, the Beaver Route Alternative deviates from the route filed on January 31, 2014 at MP 564.9 and rejoins the route at MP 565.5. The route alternative is approximately 0.6 mile long and is located less than 0.1 mile south of the current route. No new landowners will be impacted by the alternative.

9.B Purpose & Justification of Route Alternative

NDPC requests the alternative be approved to accommodate a landowner request to reroute the pipeline to avoid a beaver pond. No new landowners are impacted by the alternative and it addresses landowner concerns relative to pipeline routing on their property.

9.C Analysis of the Potential Impacts

Table 9 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. Both the current route and the route alternative are 0.6 mile long and are co-located with existing rights-of-way for the entirety of the route. Both routes impact 0.5 mile of highly wind erodible soils and 2 NWI-mapped wetlands. Both routes avoid bedrock outcrops, perennial waterbodies, national forest, tribal, and state land, and roads and railroads. The route alternative crosses 0.1 fewer miles of NWI-mapped wetlands and 0.1 fewer mile of prime farmland. NDPC proposes that the MPUC accept the proposed route alternative, as it does not introduce any new impacts to environmental features and reduces impacts to NWI-mapped wetlands and prime farmland as outlined in Table 9. The route alternative satisfies a landowner request that the pipeline not be installed in the beaver pond. In addition, the proposed route's constructability is also improved as wetland impacts are decreased and an open water crossing is eliminated.

Table 9
Environmental Features Comparison – Beaver Route Alternative

Environmental Features	Unit	Beaver Route Alternative	January 31, 2014 Route
Length	miles	0.6	0.6
Adjacent to Existing Right-of-Way	miles	0.6	0.6
Greenfield Route [a]	miles	0.0	0.0
NWI-mapped Wetlands	miles	0.2	0.3
NWI-mapped Wetlands	number	2	2
Highly Wind Erodible Soils	miles	0.5	0.5
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.0	0.1
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	0	0
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

Milepost
Beaver Route Alternative
January 31, 2014 Filed Route

0 200 400 Feet

Figure 9
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Beaver Route Alternative

10. Milepost 582.9 to 583.7 – Mahtowa Route Alternative

NDPC submits the Mahtowa Route Alternative between MPs 582.9 and 583.7 in Carlton County, Minnesota. NDPC proposes this alternative to address landowners concerns related to a grove of trees that would be impacted by the January 31, 2014 route.

10.A Description of Proposed Route Alternative

As seen in Figure 10, the Mahtowa Route Alternative deviates from the route filed on January 31, 2014 at MP 582.9 and rejoins the route at MP 583.7. The route alternative is approximately 0.9 mile long and is located no more than 0.1 mile south of the current route. No new landowners will be impacted by the alternative and the alternative addresses the landowners concerns.

10.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be approved to address landowners concerns related to related to a grove of trees that would be impacted by the January 31, 2014 route.

10.C Analysis of the Potential Impacts

Table 10 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. The route alternative is 0.1 mile longer than the current route and is co-located for an additional 0.2 mile. Both routes cross 0.7 mile of highly wind erodible soils. Both routes avoid perennial waterbodies, national forest, tribal and state land, and railroads and roads. The route alternative crosses 0.1 more miles of bedrock outcrops and one additional NWI-mapped wetland; however, the total crossing length of NWI-mapped wetlands is the same. The route alternative crosses 0.1 fewer mile of prime farmland. NDPC proposes that the MPUC accept the proposed route alternative, as it does not introduce any significant new impacts to environmental features and reduces impacts to prime farmland as outlined in Table 10. The route alternative satisfies a landowner request that the pipeline impact a grove of trees.

Table 10
Environmental Features Comparison – Mahtowa Route Alternative

Environmental Features	Unit	Mahtowa Route Alternative	January 31, 2014 Route
Length	miles	0.9	0.8
Adjacent to Existing Right-of-Way	miles	0.2	0.0
Greenfield Route [a]	miles	0.7	0.8
NWI-mapped Wetlands	miles	0.2	0.2
NWI-mapped Wetlands	number	4	3
Highly Wind Erodible Soils	miles	0.7	0.7
Bedrock Outcrops	miles	0.5	0.4
Prime Farmland Soils	miles	0.0	0.1
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	0	0
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

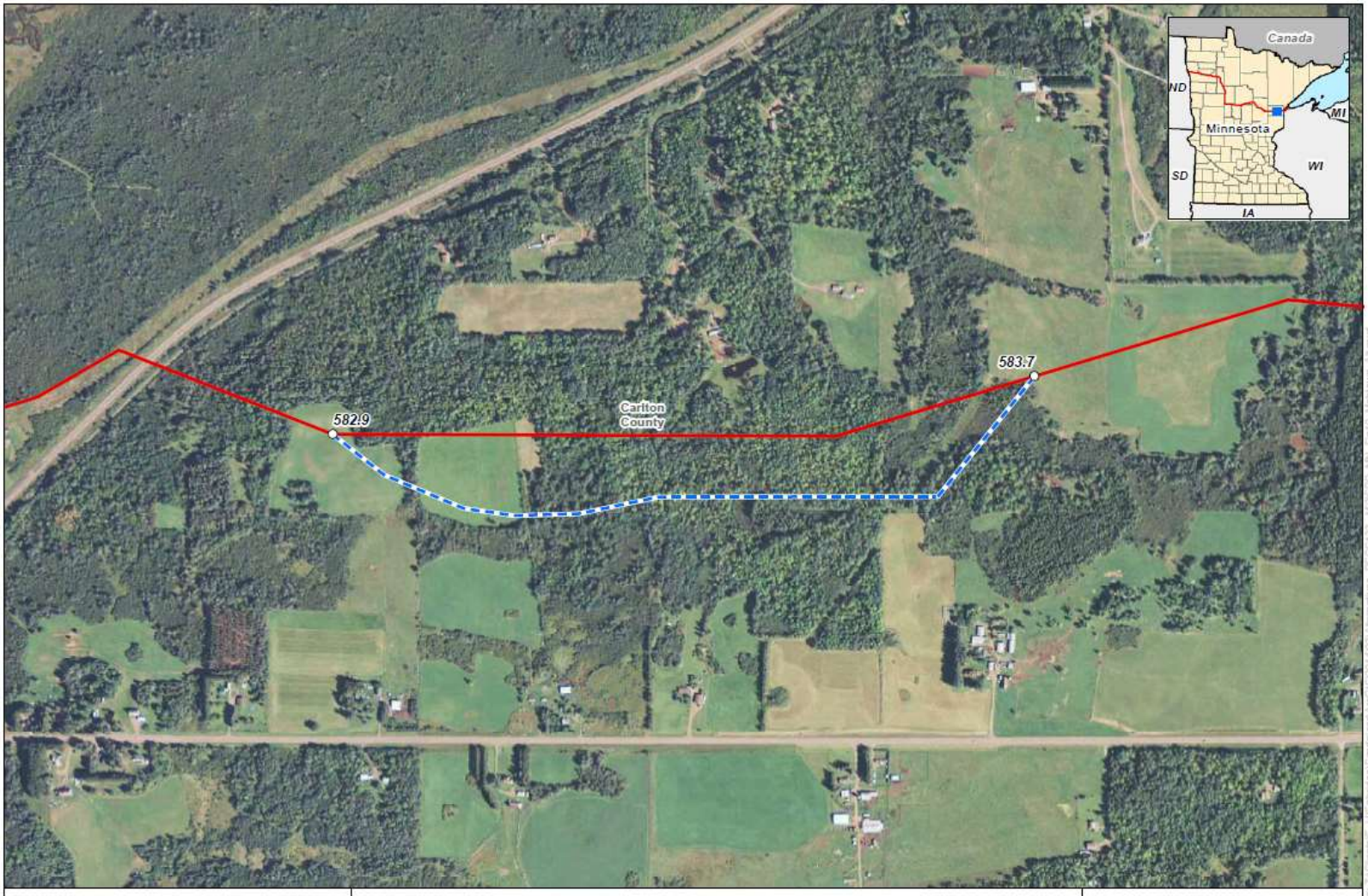

Milepost
Mahtowa Route Alternative
January 31, 2014 Filed Route

0 250 500 750 Feet

Figure 10
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Mahtowa Route Alternative

11. Milepost 586.4 to 586.9 – Blackhoof Route Alternative

NDPC submits the Blackhoof Route Alternative between MPs 586.4 and 586.9 in Carlton County, Minnesota. NDPC proposes this alternative to reduce the number of crossings of the Blackhoof River from four to one.

11.A Description of Proposed Route Alternative

As seen in Figure 11, the Blackhoof Route Alternative deviates from the route filed on January 31, 2014 at MP 586.4 and rejoins the route at MP 586.9. The route alternative is approximately 0.6 mile long and is located less than 0.1 mile southeast of the current route. No new landowners will be impacted by the alternative.

11.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be approved to avoid crossing the Blackhoof River more than once.

11.C Analysis of the Potential Impacts

Table 11 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. The route alternative is 0.1 mile longer than the current route and is located on 0.3 mile of greenfield land, while the current route is co-located with an existing transmission line right-of-way for its entire length. Both routes impact 0.3 mile of NWI-mapped wetlands, 0.4 mile of highly wind erodible soils, and cross 0.2 mile of land administered by the MNDNR as school trust fund land. Both routes avoid bedrock outcrops, prime farmland, national forest and tribal land, and roads and railroads. The route alternative crosses two additional NWI-mapped wetlands but three fewer crossings of the Blackhoof River perennial waterbody. In addition, the route alternative crosses two MNDNR trout streams/trout stream tributaries, while the current route crosses five. NDPC proposes that the MPUC accept the proposed route alternative as it will decrease the impact to trout streams and perennial waterbodies. Constructability is improved on the proposed route as only one waterbody crossing is necessary, as opposed to four crossings through strict co-location with the adjacent powerline.

Table 11
Environmental Features Comparison – Blackhoof Route Alternative

Environmental Features	Unit	Blackhoof Route Alternative	January 31, 2014 Route
Length	miles	0.6	0.5
Adjacent to Existing Right-of-Way	miles	0.3	0.5
Greenfield Route [a]	miles	0.3	0.0
NWI-mapped Wetlands	miles	0.3	0.3
NWI-mapped Wetlands	number	4	2
Highly Wind Erodible Soils	miles	0.4	0.4
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.0	0.0
Perennial Waterbodies	number	2	5
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0 [b]	0.0 [b]
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	0	0
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

[b] Does not include 0.2 mile of land administered by the MNDNR as school trust fund land.

Milepost
Blackhoof Route Alternative
January 31, 2014 Filed Route

0 200 400 Feet

Figure 11
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Blackhoof Route Alternative

12. Milepost 591.8 to 592.0 – Chub Lake Route Alternative

NDPC submits the Chub Lake Route Alternative between MPs 591.8 and 592.0 in Carlton County, Minnesota. NDPC proposes this alternative to avoid multiple crossings of an adjacent overhead powerline.

12.A Description of Proposed Route Alternative

As seen in Figure 12, the Chub Lake Route Alternative deviates from the route filed on January 31, 2014 at MP 591.8 and rejoins the route at MP 592.0. The route alternative is approximately 0.2 mile long and is located less than 0.1 mile south of the current route. The alternative will reduce the number of impacted landowners and the landowner has approved the route alternative.

12.B Purpose & Justification of Route Alternative

NDPC requests that the route alternative be approved to avoid multiple crossings of an adjacent overhead powerline.

12.C Analysis of the Potential Impacts

Table 12 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. Both the current route and the route alternative are 0.2 mile long and are co-located with existing right-of-way for the entirety of the routes. Both routes cross one NWI-mapped wetland for less than 0.1 mile. Both routes avoid highly wind erodible soils, bedrock outcrops, prime farmland, perennial waterbodies, national forest, tribal, and state land, and roads and railroads. NDPC proposes that the MPUC accept the proposed route alternative, as it does not introduce any new impacts to environmental features, as outlined in Table 12. The proposed route's constructability is improved by removing several bends in the pipeline which reduces overall construction disturbance and lessens any potential safety risks associated with overhead powerline crossings during construction.

Table 12
Environmental Features Comparison – Chub Lake Route Alternative

Environmental Features	Unit	Chub Lake Route Alternative	January 31, 2014 Route
Length	miles	0.2	0.2
Adjacent to Existing Right-of-Way	miles	0.2	0.2
Greenfield Route [a]	miles	0.0	0.0
NWI-mapped Wetlands	miles	< 0.1	< 0.1
NWI-mapped Wetlands	number	1	1
Highly Wind Erodible Soils	miles	0.0	0.0
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.0	0.0
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	0	0
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

Milepost
Chub Lake Route Alternative
January 31, 2014 Filed Route
0 200 400 Feet

Figure 12
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Chub Lake Route Alternative

13. Milepost 592.7 to 593.0 – Chub Lake 2 Route Alternative

NDPC submits the Chub Lake 2 Route Alternative between MPs 592.7 and 593.0 in Carlton County, Minnesota. NDPC proposes this alternative to accommodate a landowner request that the pipeline be more closely co-located with an adjacent natural gas pipeline.

13.A Description of Proposed Route Alternative

As seen in Figure 13, the Chub Lake 2 Route Alternative deviates from the route filed on January 31, 2014 at MP 592.7 and rejoins the route at MP 593.0. The route alternative is approximately 0.3 mile long and is located less than 0.1 mile northeast of the current route. No new landowners will be impacted by the alternative.

13.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be approved to satisfy a landowner request to more closely co-locate the pipeline with an adjacent natural gas pipeline.

13.C Analysis of the Potential Impacts

Table 13 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. Both the current route and the route alternative are 0.3 mile long; however, the route alternative is co-located for its entire length. Both routes cross one road. Both routes avoid NWI-mapped wetlands, bedrock outcrops, prime farmland, perennial waterbodies, national forest, tribal and state land, and railroads. The route alternative crosses 0.1 more mile of highly wind erodible soils. NDPC proposes that the MPUC accept the proposed route alternative, as it does not introduce any significant new impacts to environmental features and increases co-location as outlined in Table 13. The proposed route's constructability is also improved as it removes several bends in the pipeline and reduces overall construction disturbance. NDPC proposes that the proposed route alternative be accepted as it addresses landowner concerns.

Table 13
Environmental Features Comparison – Chub Lake 2 Route Alternative

Environmental Features	Unit	Chub Lake 2 Route Alternative	January 31, 2014 Route
Length	miles	0.3	0.3
Adjacent to Existing Right-of-Way	miles	0.3	0.2
Greenfield Route [a]	miles	0.0	0.1
NWI-mapped Wetlands	miles	0.0	0.0
NWI-mapped Wetlands	number	0	0
Highly Wind Erodible Soils	miles	0.1	0.0
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.0	0.0
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	1	1
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

Milepost
Chub Lake 2 Route Alternative
January 31, 2014 Filed Route
0 200 400 Feet

Figure 13
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Chub Lake 2 Route Alternative

North Dakota Pipeline Company LLC

Routing Permit for a Crude Oil Pipeline

Sandpiper Pipeline Project

MPUC Docket No. PL-6668/PPL-13-474

Route Alternatives Incorporated Into Preferred Route

May 30, 2014

1. Milepost 302.3 to 303.9 – Sather Route Alternative

North Dakota Pipeline Company LLC ("NDPC") submits the Sather Route Alternative to the route filed on January 31, 2014 between mileposts ("MPs") 302.3 and 303.9 in Polk County, Minnesota. NDPC proposes this alternative to accommodate a landowner request.[1]

1.A Description of Proposed Route Alternative

As seen in Figure 1, the Sather Route Alternative deviates from the route filed on January 31, 2014 at MP 302.3 and rejoins the route at MP 303.9. The route alternative is approximately 1.6 miles long and is located approximately 0.1 mile south of the currently proposed route. No new landowners will be affected by the alternative.

1.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be included in the preferred route to accommodate a landowner request to move the route at least 700 feet south of their house.

1.C Analysis of the Potential Impacts

Table 1 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. Both the current route and the route alternative are 1.6 miles long and cross one perennial waterbody and one road. The route alternative includes 0.2 mile of additional greenfield route. The route alternative crosses 0.1 mile less of prime farmland soils. Both routes avoid highly wind erodible soils, National Wetland Inventory (NWI)-mapped wetlands, bedrock outcrops, national forest, tribal and state land, and railroads.

NDPC proposes that the Minnesota Public Utilities Commission ("MPUC") accept the proposed route alternative and include it in NDPC's preferred route, as it does not introduce any significant impacts to environmental features as outlined in Table 1 and accommodates a landowner request.

[1] Sather Public Comments, filed by DOC EERA on April 17, 2014 (MPUC Doc. ID 20144-98436-07), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259).

Table 1
Environmental Features Comparison – Sather Route Alternative

Environmental Features	Unit	Sather Route Alternative	January 31, 2014 Route
Length	miles	1.6	1.6
Adjacent to Existing Right-of-Way	miles	0.2	0.4
Greenfield Route [a]	miles	1.4	1.2
NWI-mapped Wetlands	miles	0.0	0.0
NWI-mapped Wetlands	number	0	0
Highly Wind Erodible Soils	miles	0.0	0.0
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.3	0.4
Perennial Waterbodies	number	1	1
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	1	1
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

Milepost
Sather Route Alternative
January 31, 2014 Filed Route
0 500 1,000 Feet

Figure 1
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Sather Route Alternative

ENBRIDGE

2. Milepost 317.2 to 319.0 – University of Minnesota NWROC Route Alternative

NDPC submits the University of Minnesota Northwest Research and Outreach Center ("NWROC") Route Alternative to the route filed on January 31, 2014 between MPs 317.2 and 319.0 in Polk County, Minnesota. NDPC proposes this alternative to accommodate NWROC's request.[2]

2.A Description of Proposed Route Alternative

As seen in Figure 2, the University of Minnesota NWROC Route Alternative deviates from the route filed on January 31, 2014 at MP 317.2 and rejoins the route at MP 319.0. The route alternative is approximately 1.9 miles long and is located less than 0.1 mile north of the current route. No new landowners will be affected by the alternative.

2.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be included in the preferred route to accommodate NWROC's request that the pipeline be rerouted to minimize impacts to agricultural research sites. The January 31, 2014 filed route crossed NWROC Field 18 and the route alternative crosses NWROC property further north, in Field 17. NWROC believes that Field 18 has more potential as a future research site than Field 17 and requested that NDPC move the route to Field 17, allowing Field 18 to remain open for future research.

2.C Analysis of the Potential Impacts

Table 2 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. The current route is 1.8 miles long and is co-located with existing right-of-way for 0.4 mile. The route alternative is 1.9 miles long and is co-located with existing right-of-way for 0.1 mile. Both routes impact 1.0 mile of highly wind erodible soils and cross two roads and one railroad. The route alternative crosses 0.1 mile less of prime farmland soils. Both routes avoid NWI-mapped wetlands, bedrock outcrops, perennial waterbodies, national forest, tribal land, and state land.

NDPC proposes that the MPUC accept the proposed route alternative and include it in NDPC's preferred route, as it minimizes impacts to agricultural research sites, does not introduce any new impacts to environmental features as outlined in Table 2 and accommodates NWROC's request.

[2] University of Minnesota Northwest Research and Outreach Center Public Comments, filed by DOC EERA on April 21, 2014 (MPUC Doc. ID 20144-98540-10), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259).

Table 2
Environmental Features Comparison – University of Minnesota NWROC Route Alternative

Environmental Features	Unit	**University of** Minnesota NWROC Route Alternative	January 31, 2014 Route
Length	miles	1.9	1.8
Adjacent to Existing Right-of-Way	miles	0.1	0.4
Greenfield Route [a]	miles	1.8	1.4
NWI-mapped Wetlands	miles	0.0	0.0
NWI-mapped Wetlands	number	0	0
Highly Wind Erodible Soils	miles	1.0	1.0
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	1.2	1.3
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	1	1
Roads Crossed	number	2	2
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

Milepost
University of Minnesota NWROC Route Alternative
January 31, 2014 Filed Route
0 500 1,000 Feet

Figure 2
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
University of Minnesota NWROC Route Alternative

ENBRIDGE

3. Milepost 367.6 to 367.8 – Power Line Route Alternative

NDPC submits the Power Line Route Alternative to the route filed on January 31, 2014 between MPs 367.6 and 367.8 in Polk County, Minnesota. NDPC proposes this alternative to reroute the pipeline to avoid an overhead power line.

3.A Description of Proposed Route Alternative

As seen in Figure 3, the Power Line Route Alternative deviates from the route filed on January 31, 2014 at MP 367.6 and rejoins the route at MP 367.8. The route alternative is approximately 0.2 mile long and is located less than 0.1 mile east of the current route. No new landowners will be affected by the alternative.

3.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be included in the preferred route in order to avoid having to bend the pipeline beneath an overhead power line. By moving the pipeline bend from underneath the power line, it mitigates a potential safety hazard during construction.

3.C Analysis of the Potential Impacts

Table 3 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. Both the current route and the route alternative are 0.2 mile long and are co-located with existing right-of-way for less than 0.1 mile. Both routes impact 0.1 mile of highly wind erodible soils and prime farmland. Both routes avoid NWI-mapped wetlands, bedrock outcrops, state land, perennial waterbodies, national forest and tribal land, and roads and railroads.

NDPC proposes that the MPUC accept the proposed route alternative and include it in NDPC's preferred route, as it avoids an overhead powerline and does not introduce any new impacts to environmental features as outlined in Table 3.

Table 3
Environmental Features Comparison – Power Line Route Alternative

Environmental Features	Unit	Power Line Route Alternative	January 31, 2014 Route
Length	miles	0.2	0.2
Adjacent to Existing Right-of-Way	miles	0.1	0.1
Greenfield Route [a]	miles	0.1	0.1
NWI-mapped Wetlands	miles	0.0	0.0
NWI-mapped Wetlands	number	0	0
Highly Wind Erodible Soils	miles	0.1	0.1
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.1	0.1
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	0	0
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

Milepost
Power Line Route Alternative
January 31, 2014 Filed Route
0 200 400 Feet

Figure 3
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Power Line Route Alternative

ENBRIDGE

4. Milepost 372.7 to 373.1 – Clearbrook Route Alternative

NDPC submits the Clearbrook Route Alternative to the route filed on January 31, 2014 between MPs 372.7 and 373.1 in Clearwater County, Minnesota. NDPC proposes this alternative to accommodate facility design at the Clearbrook Terminal.

4.A Description of Proposed Route Alternative

As seen in Figure 4, the Clearbrook Route Alternative deviates from the route filed on January 31, 2014 at MP 372.7 and rejoins the route at MP 373.1. The route alternative is approximately 0.3 miles long and is located less than 0.1 mile west of the current route. No new landowners will be affected by the alternative.

4.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be included in the preferred route to accommodate refinement in the facility design at the Clearbrook Terminal. The proposed alternative also lessens impacts to the agricultural land to the south of the proposed Terminal location.

4.C Analysis of the Potential Impacts

Table 4 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. The current route is 0.4 mile long and the route alternative is 0.3 mile long. Both routes are co-located with an existing right-of-way for 0.2 mile. The route alternative crosses 0.1 mile less of prime farmland than the current route. Both routes avoid bedrock outcrops, highly wind erodible soils, perennial waterbodies, state land, national forest and tribal land, and roads and railroads. The route alternative crosses less than 0.01 mile NWI-mapped wetland.

NDPC proposes that the MPUC accept the proposed route alternative and include it in NDPC's preferred route, as it accommodates facility design at the Clearbrook Terminal and reduces impacts to prime farmland as outlined in Table 4.

Table 4
Environmental Features Comparison – Clearbrook Route Alternative

Environmental Features	Unit	Clearbrook Route Alternative	January 31, 2014 Route
Length	miles	0.3	0.4
Adjacent to Existing Right-of-Way	miles	0.2	0.2
Greenfield Route [a]	miles	0.1	0.2
NWI-mapped Wetlands	miles	0.1	0.0
NWI-mapped Wetlands	number	1	0
Highly Wind Erodible Soils	miles	0.0	0.0
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.3	0.4
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	0	0
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

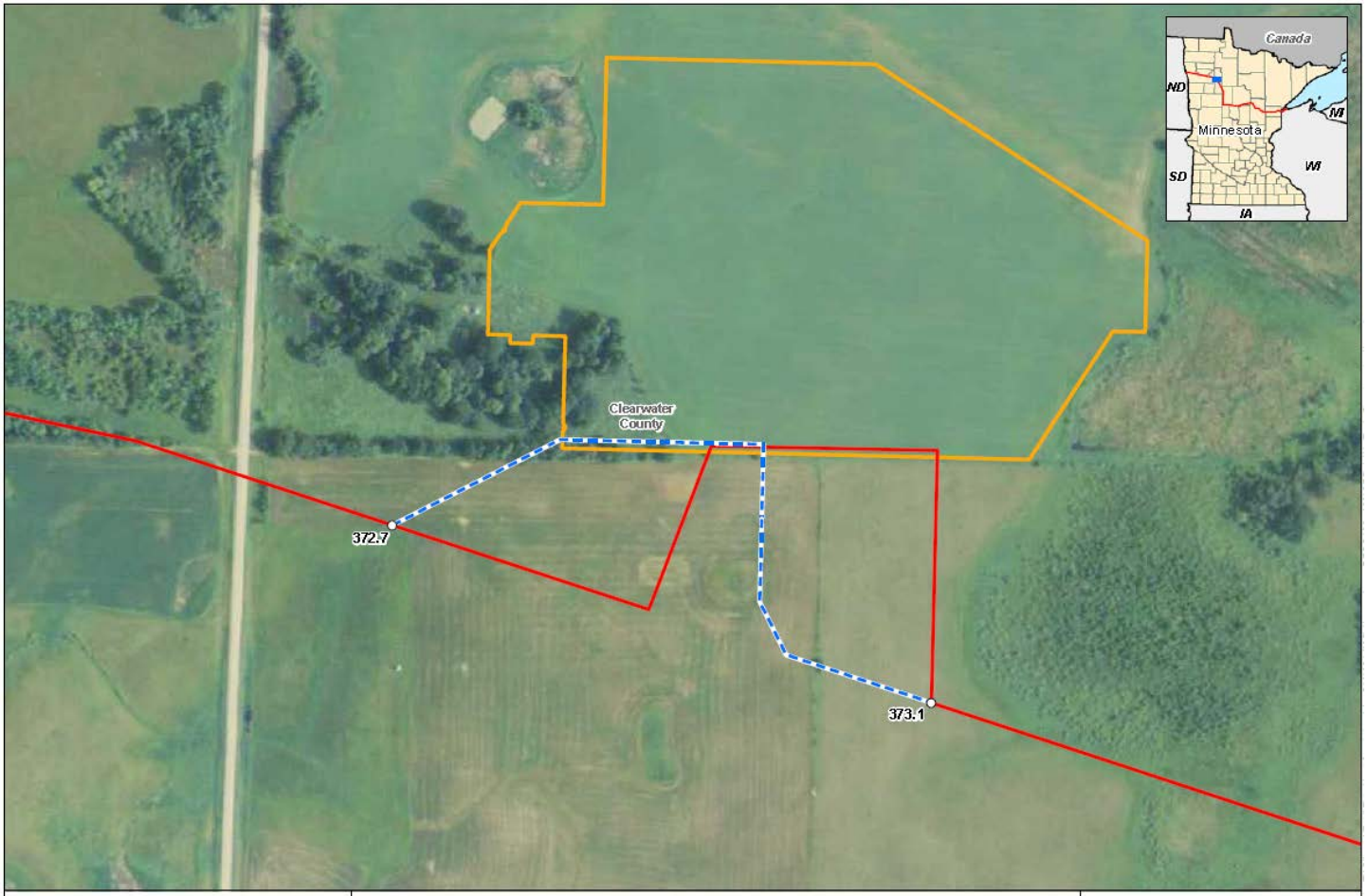

Milepost
Clearbrook Route Alternative
January 31, 2014 Filed Route
Facility Boundary
0 200 400 Feet

Figure 4
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Clearbrook Route Alternative

ENBRIDGE

5. Milepost 427.0 to 427.2 – Eagle Lake Route Alternative

NDPC submits the Eagle Lake Route Alternative to the route filed on January 31, 2014 between MPs 427.0 and 427.2 in Hubbard County, Minnesota. NDPC proposes this alternative in order to route the pipeline through a property that was recently acquired by NDPC and no longer requires avoidance.

5.A Description of Proposed Route Alternative

As seen in Figure 5, the Eagle Lake Route Alternative deviates from the route filed on January 31, 2014 at MP 427.0 and rejoins the route at MP 427.2. The route alternative is approximately 0.2 mile long and is located less than 0.1 mile west of the current route. No new landowners will be affected by the alternative.

5.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be included in the preferred route to route the pipeline through a property that was recently acquired by NDPC and no longer requires avoidance. This change also allows the pipeline to be more closely co-located with the existing pipelines on the property and improves hydraulics and operational efficiency by removing two bends in the pipeline.

5.C Analysis of the Potential Impacts

Table 5 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. Both the current route and the route alternative are 0.2 mile long and entirely co-located with an existing right-of-way. Both routes impact 0.2 mile of highly wind erodible soils. Both routes avoid bedrock outcrops, NWI wetlands, perennial waterbodies, prime farmland, state land, national forest and tribal land, and roads and railroads.

NDPC proposes that the MPUC accept the proposed route alternative and include it in NDPC's preferred route, as it does not introduce any new impacts to environmental features as outlined in Table 5.

Table 5
Environmental Features Comparison – Eagle Lake Route Alternative

Environmental Features	Unit	Eagle Lake Route Alternative	January 31, 2014 Route
Length	miles	0.2	0.2
Adjacent to Existing Right-of-Way	miles	0.2	0.2
Greenfield Route [a]	miles	0.0	0.0
NWI-mapped Wetlands	miles	0.0	0.0
NWI-mapped Wetlands	number	0	0
Highly Wind Erodible Soils	miles	0.2	0.2
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.0	0.0
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	0	0
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

Milepost
Eagle Lake Route Alternative
January 31, 2014 Filed Route
0 200 400 Feet

Figure 5
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Eagle Lake Route Alternative

ENBRIDGE

6. Milepost 480.7 to 480.8 – Pine River Route Alternative

NDPC submits the Pine River Route Alternative to the route filed on January 31, 2014 between MPs 480.7 and 480.8 in Cass County, Minnesota. NDPC proposes this alternative to accommodate engineering design at the Pine River facility.

6.A Description of Proposed Route Alternative

As seen in Figure 6, the Pine River Route Alternative deviates from the route filed on January 31, 2014 at MP 480.7 and rejoins the route at MP 480.8. The route alternative is approximately 0.2 mile long and is located less than 0.1 mile north of the current route. No new landowners will be affected by the alternative.

6.B Purpose & Justification of Route Alternative

NDPC requests the alternative be included in the preferred route to accommodate engineering design at the Pine River facility. NDPC plans to add a pipeline inspection gauge launcher and receiver trap at the site and the route change facilitates pipeline entry into the site and the traps.

6.C Analysis of the Potential Impacts

Table 6 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. The route alternative is 0.1 mile longer than the current route and crosses 0.1 mile more greenfield than the current route. The route alternative crosses 0.1 mile more of highly wind erodible soils. Both routes avoid NWI wetlands, prime farmland, bedrock outcrops, state land, national forest and tribal land, roads, and railroads.

NDPC proposes that the MPUC accept the proposed route alternative and include it in NDPC's preferred route, as it accommodates engineering design at the Pine River facility and does not introduce any significant impacts to environmental features as outlined in Table 6.

Table 6
Environmental Features Comparison – Pine River Route Alternative

Environmental Features	Unit	Pine River Route Alternative	January 31, 2014 Route
Length	miles	0.2	0.1
Adjacent to Existing Right-of-Way	miles	0.1	0.1
Greenfield Route [a]	miles	0.1	0.0
NWI-mapped Wetlands	miles	0.0	0.0
NWI-mapped Wetlands	number	0	0
Highly Wind Erodible Soils	miles	0.2	0.1
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.0	0.0
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	0	0
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

Milepost
Pine River Route Alternative
January 31, 2014 Filed Route
Facility Boundary
0 200 400 Feet

Figure 6
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Pine River Route Alternative

ENBRIDGE

7. Milepost 489.1 to 490.1 – Peterson Lake Route Alternative

NDPC submits the Peterson Lake Route Alternative to the route filed on January 31, 2014 between MPs 489.1 and 490.1 in Cass County, Minnesota NDPC proposes this alternative to accommodate a landowner request. The Peterson Lake Route Alternative replaces the Blind Lake Creek Route Alternative submitted on April 4, 2014.

7.A Description of Proposed Route Alternative

As seen in Figure 7, the Peterson Lake Route Alternative deviates from the route filed on January 31, 2014 at MP 489.1 and rejoins the route at MP 490.2. The route alternative is approximately 1.1 miles long and is located less than 0.1 mile south of the current route. No new landowners will be affected by the alternative.

7.B Purpose & Justification of Route Alternative

NDPC requests the alternative be included in the preferred route to accommodate a landowner request to reroute the pipeline near an existing fence line.

7.C Analysis of the Potential Impacts

Table 7 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. The route alternative is 0.1 mile longer than the current route. The route alternative is located on 0.9 more miles of greenfield than the current route. Both routes cross 0.9 mile of highly wind erodible soils and 0.2 mile of prime farmland. Both routes avoid bedrock outcrops, perennial waterbodies, national forest, tribal and state land, and roads and railroads. The alternative route crosses 0.1 mile less of NWI-mapped wetlands and 4 fewer NWI-mapped wetlands than the current route.

NDPC proposes that the MPUC accept the proposed route alternative and include it in NDPC's preferred route, as it accommodates a landowner request and reduces impacts to NWI-mapped wetlands as outlined in Table 7.

Table 7
Environmental Features Comparison – Peterson Lake Route Alternative

Environmental Features	Unit	Peterson Lake Route Alternative	January 31, 2014 Route
Length	miles	1.1	1.0
Adjacent to Existing Right-of-Way	miles	0.2	1.0
Greenfield Route [a]	miles	0.9	0.0
NWI-mapped Wetlands	miles	0.1	0.2
NWI-mapped Wetlands	number	2	6
Highly Wind Erodible Soils	miles	0.9	0.9
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.2	0.2
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	0	0
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

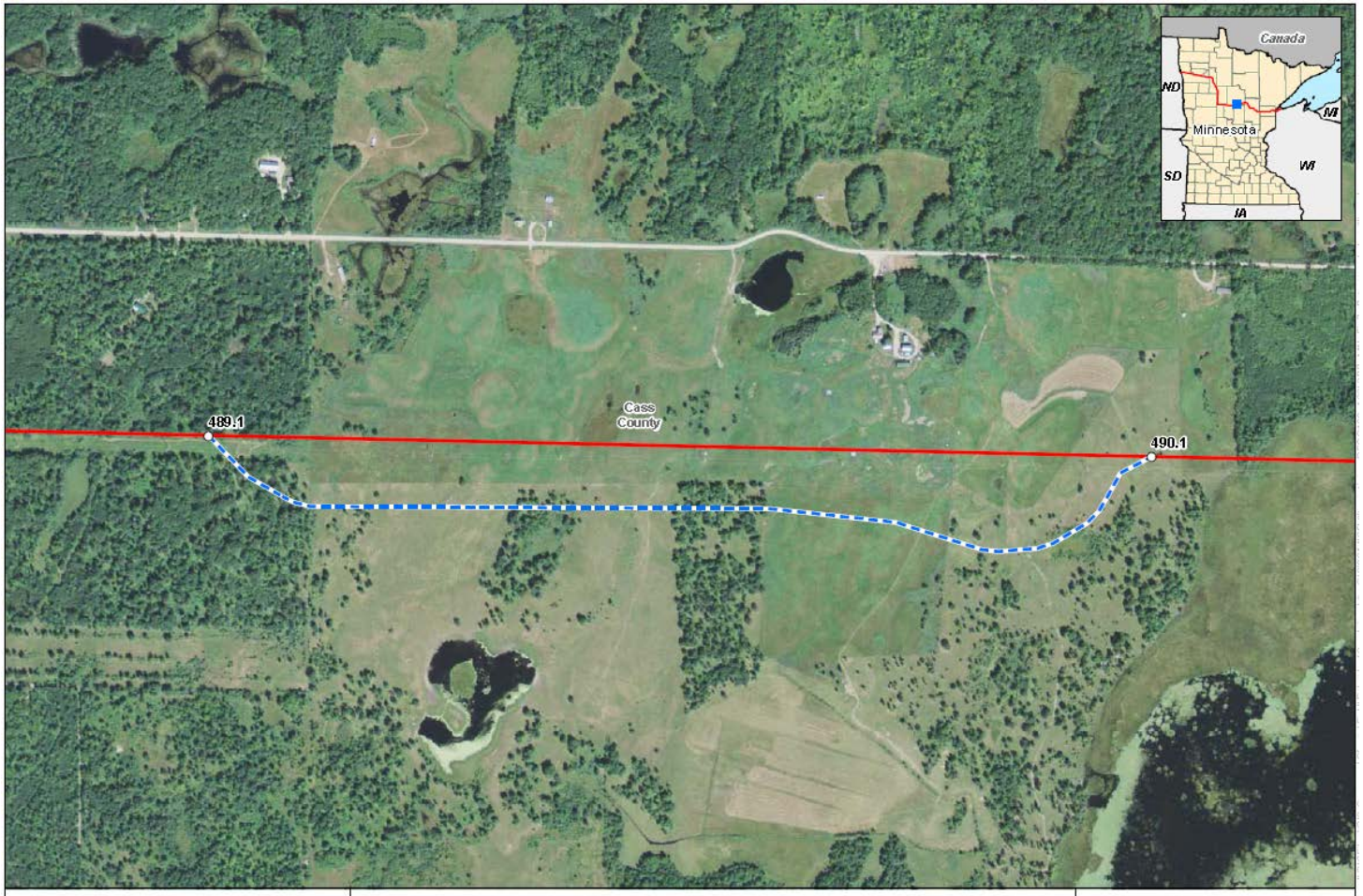

Milepost
Peterson Lake Route Alternative
January 31, 2014 Filed Route
0 500 1,000 Feet

Figure 7
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Peterson Lake Route Alternative

ENBRIDGE

8. Milepost 526.8 to 527.2 – Cuzzo Route Alternative

NDPC submits the Cuzzo Route Alternative to the route filed on January 31, 2014 between MPs 526.8 and 527.2 in Aitkin County, Minnesota. NDPC proposes this alternative to accommodate a landowner request.[3]

8.A Description of Proposed Route Alternative

As seen in Figure 8, the Cuzzo Route Alternative deviates from the route filed on January 31, 2014 at MP 526.8 and rejoins the route at MP 527.2. The route alternative is approximately 0.4 mile long and is located 0.1 mile east of the current route. No new landowners will be affected by the alternative.

8.B Purpose & Justification of Route Alternative

NDPC requests the alternative be included in the preferred route to accommodate a landowner request to avoid bisecting the property by moving the route closer to the property line and avoiding an area the landowner has designated for future building plans. The landowner has approved this route alternative.

8.C Analysis of the Potential Impacts

Table 8 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. Both routes are 0.4 miles long and are greenfield routes that cross one road. The alternative route crosses 0.1 mile less of highly wind erodible soils and 0.1 mile more of NWI-mapped wetlands and prime farmland. Both routes avoid bedrock outcrops, perennial waterbodies, national forest, tribal and state land, and railroads.

NDPC proposes that the MPUC accept the proposed route alternative and include it in NDPC's preferred route, as it accommodates a landowner request and does not introduce any new significant impacts to environmental features as outlined in Table 8.

[3] Cuzzo Public Comments, filed by DOC EERA on April 17, 2014 (MPUC Doc. ID 20144-98431-07), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259).

Table 8
Environmental Features Comparison – Cuzzo Route Alternative

Environmental Features	Unit	Cuzzo Route Alternative	January 31, 2014 Route
Length	miles	0.4	0.4
Adjacent to Existing Right-of-Way	miles	0.0	0.0
Greenfield Route [a]	miles	0.4	0.4
NWI-mapped Wetlands	miles	0.2	0.1
NWI-mapped Wetlands	number	2	2
Highly Wind Erodible Soils	miles	0.1	0.2
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.2	0.1
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	1	1
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

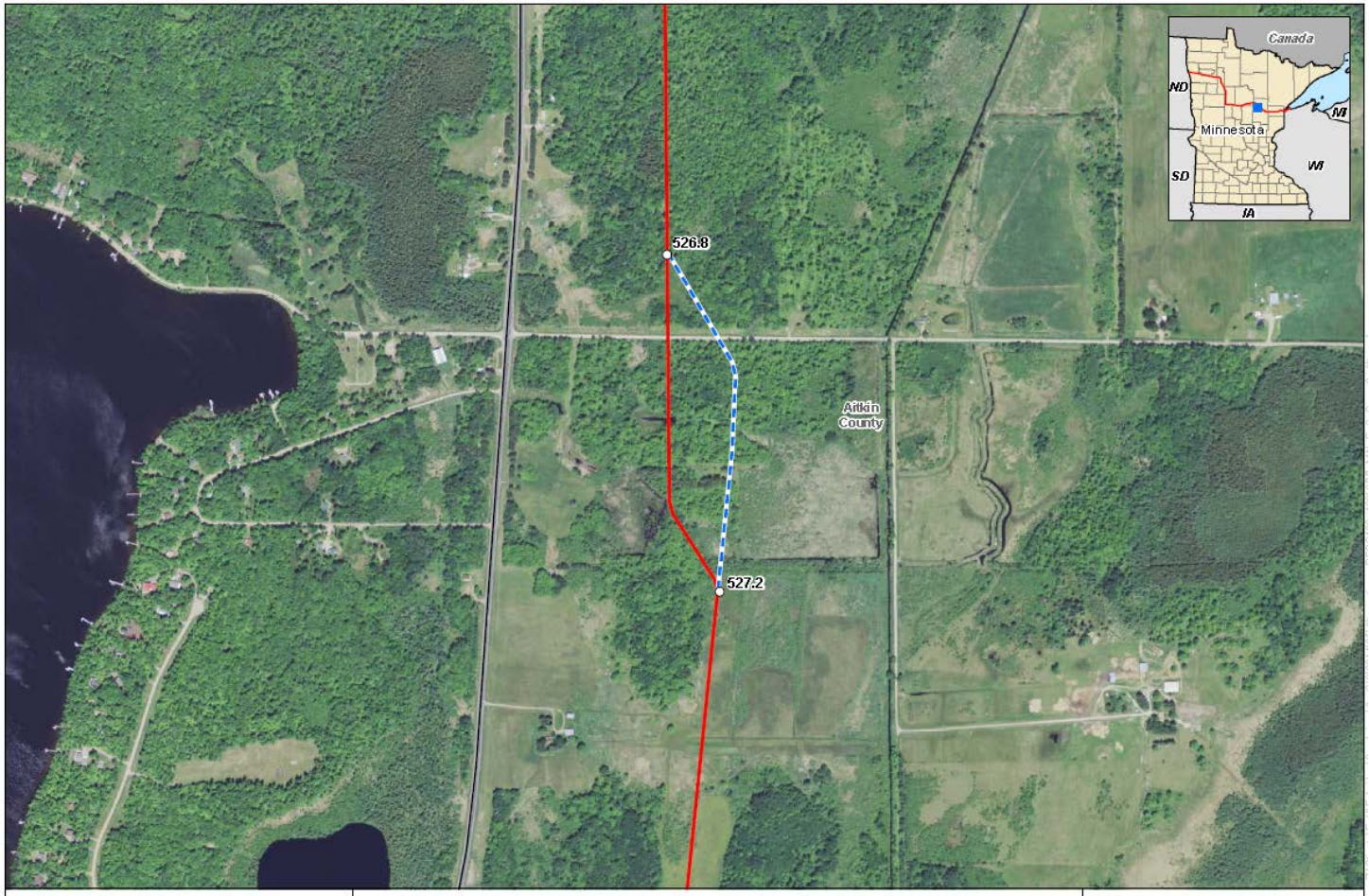

Milepost
Cuzzo Route Alternative
January 31, 2014 Filed Route
0 500 1,000 Feet

Figure 8
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Cuzzo Route Alternative

ENBRIDGE

9. Milepost 542.9 to 542.9 – Sandy River Route Alternative

NDPC submits the Sandy River Route Alternative to the route filed on January 31, 2014 between MPs 542.9 and 542.9 in Aitkin County, Minnesota. NDPC proposes this alternative to avoid having to bend the pipeline in a road ditch.

9.A Description of Proposed Route Alternative

As seen in Figure 9, the Sandy River Route Alternative deviates from the route filed on January 31, 2014 at MP 542.9 and rejoins the route at MP 542.9. The route alternative is less than 0.1 mile long and is located less than 0.1 mile southwest of the current route. No new landowners will be affected by the alternative.

9.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be included in the preferred route to avoid bending the pipeline in a road ditch, which mitigates potential risks related to modifying the gradient of the ditch and integrity of the roadway. Additionally, utilities are typically located within road ditch lines. By moving the bend, it decreases the crossing length and lessens the potential for a third-party line strike related to any small utility work.

9.C Analysis of the Potential Impacts

Table 9 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. Both the current route and the route alternative are less than 0.1 mile long and entirely co-located with an existing right-of-way. Both routes cross one road, one NWI-mapped wetland, and less than 0.1 mile of highly wind erodible soils. Both routes avoid bedrock outcrops, perennial waterbodies, prime farmland, national forest and tribal land, state land, and railroads.

NDPC proposes that the MPUC accept the proposed route alternative and include it in NDPC's preferred route, as it does not introduce any significant impacts to environmental features as outlined in Table 9 and is a better design from constructability perspective.

Table 9
Environmental Features Comparison – Sandy River Route Alternative

Environmental Features	Unit	Sandy River Route Alternative	January 31, 2014 Route
Length	miles	0.1	0.1
Adjacent to Existing Right-of-Way	miles	0.1	0.1
Greenfield Route [a]	miles	0.0	0.0
NWI-mapped Wetlands	miles	0.1	0.1
NWI-mapped Wetlands	number	1	1
Highly Wind Erodible Soils	miles	0.1	0.1
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.0	0.0
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	1	1
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

Milepost
Sandy River Route Alternative
January 31, 2014 Filed Route
0 200 400 Feet

Figure 9
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Sandy River Route Alternative

ENBRIDGE

10. Milepost 546.0 to 546.3 – Hageman Route Alternative

NDPC submits the Hageman Route Alternative to the route filed on January 31, 2014 between MPs 546.0 and 546.3 in Carlton County, Minnesota. NDPC proposes this alternative to accommodate a landowner request.[4]

10.A Description of Proposed Route Alternative

As seen in Figure 10, the Hageman Route Alternative deviates from the route filed on January 31, 2014 at MP 546.0 and rejoins the route at MP 546.3. The route alternative is less than 0.4 mile long and is located less than 0.1 mile north of the current route.

10.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be included in the preferred route to accommodate a landowner request. The newly affected landowners are agreeable to the route alternative.

10.C Analysis of the Potential Impacts

Table 10 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. Both the current route and the route alternative are less than 0.4 mile long and are co-located with existing right-of-way for 0.1 mile. Both routes cross one road. The route alternative crosses 0.1 less mile of highly wind erodible soils. The route alternative crosses one NWI-mapped wetland for less than 0.1 mile. Both routes avoid bedrock outcrops, prime farmland, perennial waterbodies, national forest, tribal and state lands, and railroads.

NDPC proposes that the MPUC accept the proposed route alternative and include it in NDPC's preferred route, as it accommodates a landowner request.

[4] Hageman Public Comments, filed by DOC EERA on April 17, 2014 (MPUC Doc. ID 20144-98431-09), *In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project*, MPUC Docket No. PL-6668/PPL-13-474 (OAH Docket No. 8-2500-31259).

Table 10
Environmental Features Comparison – Hageman Route Alternative

Environmental Features	Unit	Hageman Route Alternative	January 31, 2014 Route
Length	miles	0.4	0.4
Adjacent to Existing Right-of-Way	miles	0.1	0.1
Greenfield Route [a]	miles	0.3	0.3
NWI-mapped Wetlands	miles	0.1	0.0
NWI-mapped Wetlands	number	1	0
Highly Wind Erodible Soils	miles	0.3	0.4
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.0	0.0
Perennial Waterbodies	number	0	0
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	0.0
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	1	1
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

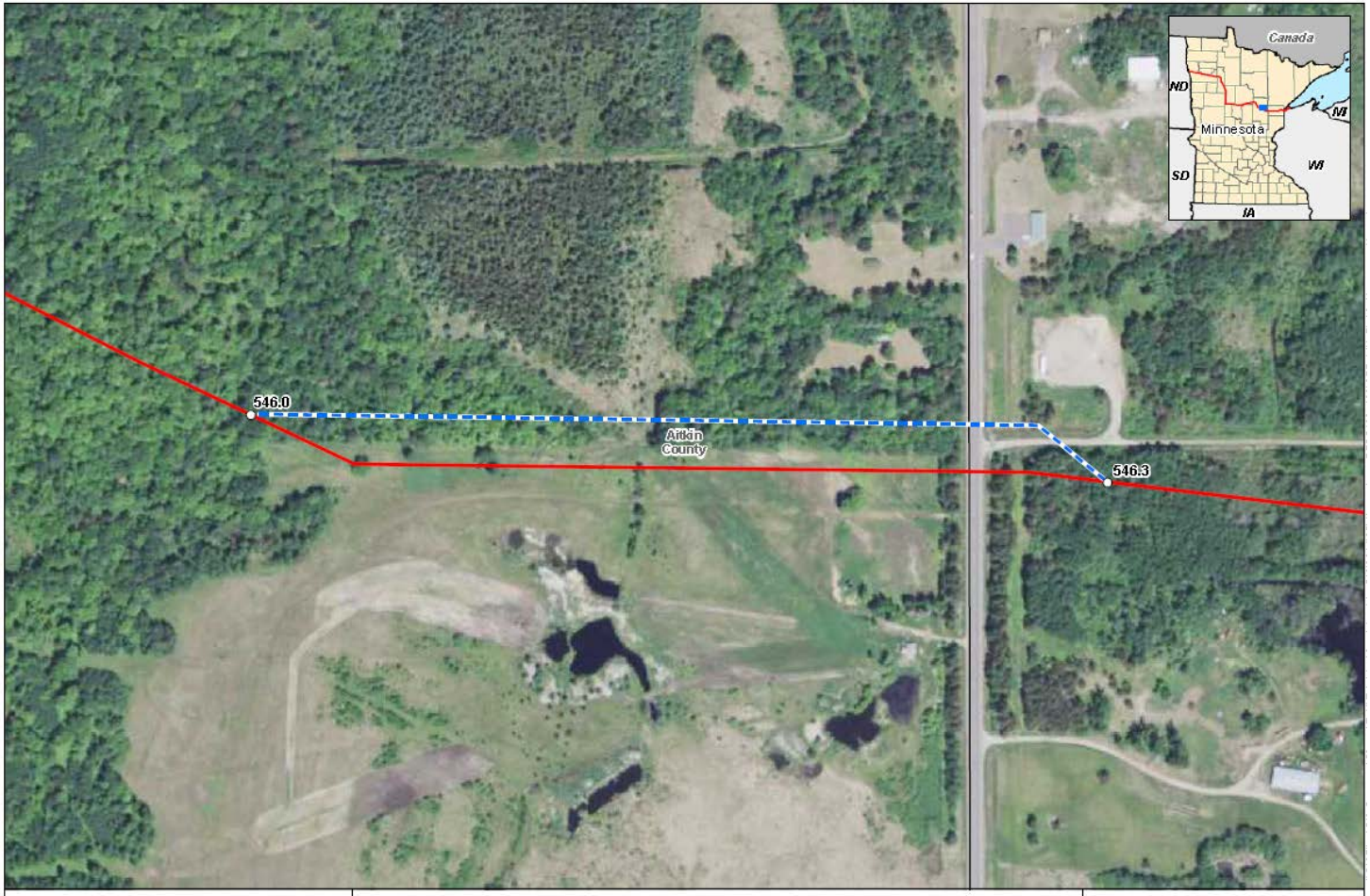

Milepost
Hageman Route Alternative
January 31, 2014 Filed Route
0 200 400 Feet

Figure 10
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Hageman Route Alternative

ENBRIDGE

11. Milepost 559.4 to 565.6 – Salo Marsh WMA Route Alternative

NDPC submits the Salo Marsh Wildlife Management Area ("WMA") Route Alternative to the route filed on January 31, 2014 between MPs 559.4 and 565.6 in Aitkin and Carlton Counties, Minnesota. NDPC proposes this alternative to avoid the Salo Marsh WMA. Additionally, NDPC and Kennecott continue to address issues associated with the pipeline crossing of potentially developable mineral resources.

11.A Description of Proposed Route Alternative

As seen in Figure 11, the Salo Marsh WMA Route Alternative deviates from the route filed on January 31, 2014 at MP 559.4 and rejoins the route at MP 565.6. The route alternative is approximately 6.7 miles long and is located approximately 0.7 mile south of the current route.

11.B Purpose & Justification of Route Alternative

NDPC requests that the alternative be included in the preferred route to avoid the WMA.

11.C Analysis of the Potential Impacts

Table 11 below lists the impacts of the requested route alternative and the January 31, 2014 filed route. The route alternative is 0.5 mile longer than the current route. The route alternative crosses one less perennial waterbody, 1.0 mile less prime farmland, 0.4 mile less NWI-mapped wetlands, and completely avoids the Salo Marsh WMA. The route alternative crosses 0.6 mile more of highly wind erodible soils and 2.5 miles of additional greenfield route. Both routes cross 2 roads and avoid bedrock outcrops, national forest, tribal and state land, and railroads.

NDPC proposes that the MPUC accept the proposed route alternative and include it in NDPC's preferred route, as it reduces impacts to 0.4 miles of NWI-mapped wetlands, 1 mile of prime farmland crossed and avoids a WMA as outlined in Table 11.

Table 11
Environmental Features Comparison – Salo Marsh WMA Route Alternative

Environmental Features	Unit	Salo Marsh WMA Route Alternative	January 31, 2014 Route
Length	miles	6.7	6.2
Adjacent to Existing Right-of-Way	miles	1.2	3.2
Greenfield Route [a]	miles	5.5	3.0
NWI-mapped Wetlands	miles	2.0	2.4
NWI-mapped Wetlands	number	20	14
Highly Wind Erodible Soils	miles	2.9	2.3
Bedrock Outcrops	miles	0.0	0.0
Prime Farmland Soils	miles	0.9	1.9
Perennial Waterbodies	number	1	2
National Forest Land	miles	0.0	0.0
Tribal Land	miles	0.0	0.0
State Forest Land	miles	0.0	0.0
State Wildlife Management Area Land	miles	0.0	1.5
State Aquatic Management Area Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	2	2
Other Major Issues	number	0	0

[a] Greenfield locations are defined for purposes of the alternatives analysis as any portion of the route that is greater than 250-feet from the centerline of a known utility or road.

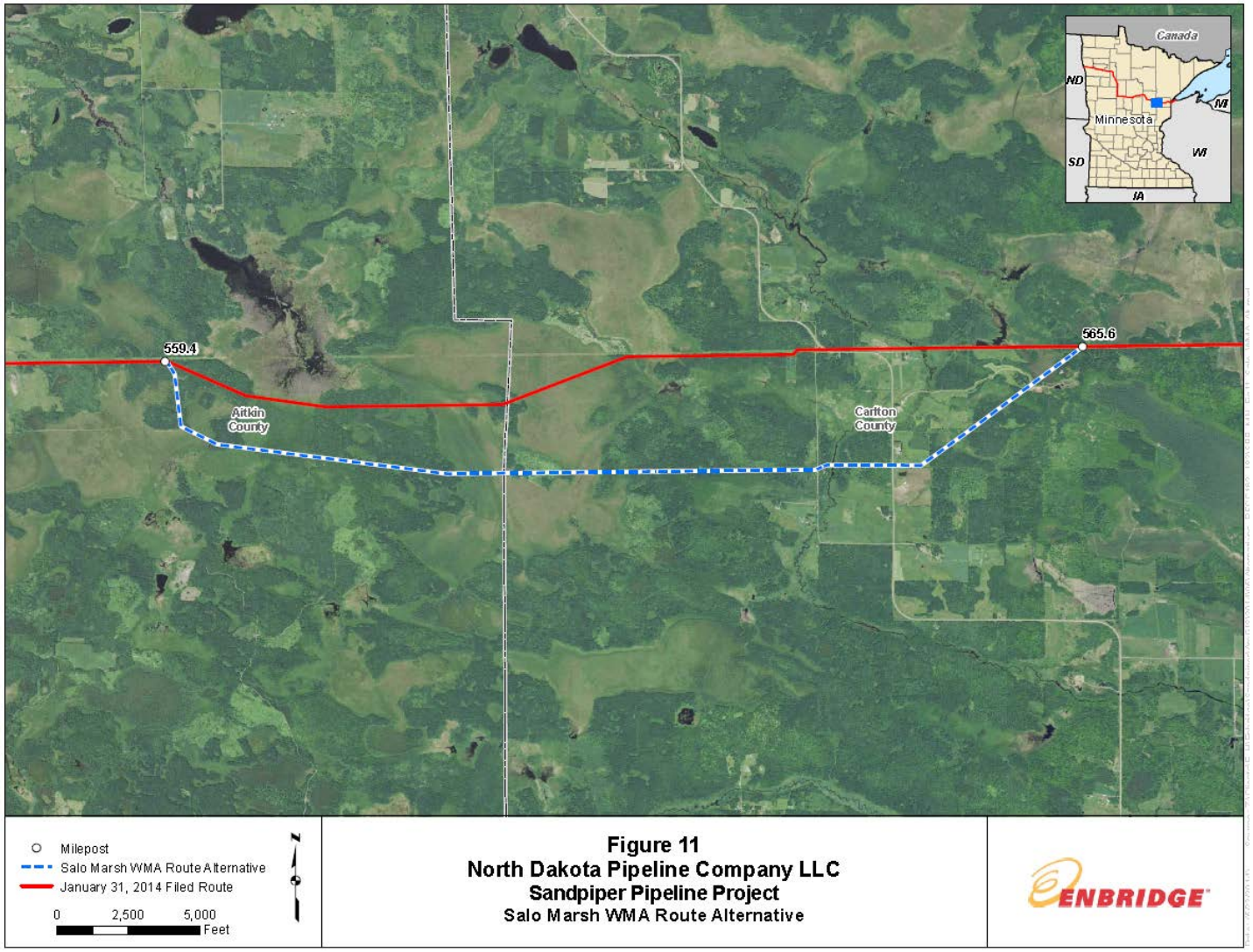

Figure 11
North Dakota Pipeline Company LLC
Sandpiper Pipeline Project
Salo Marsh WMA Route Alternative

LEECH LAKE BAND OF OJIBWE

***Carri Jones**, Chairwoman*
***Donald Finn**, Secretary-Treasurer*

***Robbie Howe**, District I Representative*
***Steve White**, District II Representative*
***LeRoy Staples-Fairbanks III**, District III Representative*

Friday, October 25, 2013

Tracy Smetana
Minnesota Public Utilities Commission
121 7th Place E., Suite 350
St. Paul, Minnesota 55101

Re: MN-PUC Docket No. PL6668/CN-13-473

To Tracy Smetana:

The Leech Lake Band of Ojibwe (the "Band") is in receipt of your letter dated October 4, 2013 regarding the Notice of Certificate of Need Application for the Sandpiper Pipeline Project to Chairwoman Carri Jones. I am writing this letter regarding the proposed alternate route, which runs through the Leech Lake Indian Reservation (the "Reservation").

Enbridge Pipelines (North Dakota) ("Enbridge") does not have legal or regulatory approval to expand its existing corridor through the Reservation. I understand that Minnesota State law may require the Public Utilities Commission ("PUC") to have applicants outline a preferred route and an alternate route, but the Band needs to inform the PUC and the State of Minnesota at this early stage that Enbridge **does not** have legal or regulatory approval to build an additional pipeline across the Reservation. Therefore, I respectfully request that the PUC insist on a new alternate route that does not enter the exterior boundaries of the Reservation.

Enbridge lists the route through the Reservation as an "alternate route" and not the "preferred route." However, the "alternate route" is not an alternate at all as it is an impossible route. The perplexing aspect of this situation is that Enbridge is fully aware that it has neither the legal nor regulatory capability to build another pipeline through the Reservation, and should have listed their alternate route as a route that does not enter the exterior boundaries of the Reservation.

The reason Minnesota law requires applicants to list both a preferred route and an alternate route is in the event the preferred route does not work for one reason or another. Because Enbridge's proposed alternate route is a legal impossibility at this time, I respectfully ask the PUC to insist on a new alternate route that does not enter the Reservation.

115 Sixth St NW, Cass Lake, MN 56633
Telephone: 218-335-8200 Fax: 218-335-8309

Thank you for your time and attention to this important matter. I look forward to hearing your response at your earliest convenience. If you have any questions or concerns, please contact me at (218) 335-8200.

Sincerely,

Steven Howard
Executive Director
Leech Lake Band of Ojibwe

Cc: Leech Lake Tribal Council Members
Lenny Fineday, LLBO Legal Director
Jim Crawford, Enbridge Project Director

EXHIBIT D

CUMULATIVE POTENTIAL EFFECTS OF LINE 3 REPLACEMENT PROGRAM

On March 3, 2014, Enbridge Energy, Limited Partnership ("Enbridge"), announced that it had received shipper support for the Line 3 Replacement Program ("L3R Project") to replace the existing 34-inch Line 3 Pipeline along most of its route from Edmonton, Alberta to Superior, Wisconsin with a new 36-inch pipeline and associated facilities. Within the United States, Enbridge plans to replace three segments of the Line 3 Pipeline as three separate replacement projects: (1) the Canadian border to Joliette, North Dakota, segment; (2) the Joliette, North Dakota, to the Wisconsin border segment; and (3) the Wisconsin border to the Superior terminal segment.

In Minnesota, Line 3 will be replaced along the existing pipeline route from the North Dakota/Minnesota border to Clearbrook, Minnesota. Enbridge is proposing to route the 224.6 mile long Clearbrook, Minnesota to Wisconsin border portion of the Line 3 Pipeline along the preferred route for the Sandpiper Pipeline Project (the "Co-located Right-of-Way"). Enbridge plans to file Certificate of Need and Pipeline Route Permit applications for the L3R Project with the Minnesota Public Utilities Commission in 2015. Pending the receipt of all necessary permits and approvals, construction is anticipated to commence in late 2016 with an in-service date in late 2017.

This Exhibit provides updates to the Tables provided in the Environmental Information Report ("EIR") filed with North Dakota Pipeline Company LLC's ("NDPC") Pipeline Route Permit Application showing the potential additive impacts of the preliminary L3R Project route. Only those Tables that required updating to account for cumulative potential effects of the L3R Project and the Sandpiper Pipeline Project are provided in this Exhibit, and any Tables not included remain as filed on January 31, 2014. Unless otherwise indicated, the section and table numbers correspond to the numbers in the EIR filed on January 31, 2014.

1.1 Project Description and Need

Table 1.1-1 summarizes the length of the Sandpiper Pipeline and Line 3 Pipeline co-location in each county.

Table 1.1-1
Location and Length of Sandpiper Pipeline Project co-located with L3R Project in Minnesota

County	Milepost Range [a]	Pipeline Length (miles)
Clearwater	377.5 – 408.6	31.1
Hubbard	408.6 – 461.2	52.6
Cass [b]	461.2 – 481.2	20.0
	486.1 – 512.3	26.2
Crow Wing	481.2 – 486.1	4.9
Aitkin	512.3 – 562.9	50.6
Carlton	562.9 – 602.1	39.2
	Total	**224.6**

[a] Mileposts are used for reference and should not be used as a source to calculate actual linear distances.

[b] For Cass County, the route exits Cass County into Crow Wing County before entering Cass County again.

1.2 Land Requirements

Table 1.2-1 presents temporary and permanent land requirements to construct both the Sandpiper Pipeline Project and the L3R Project parallel to a foreign utility and in greenfield areas in Minnesota. Typical drawings of the land requirements for the Sandpiper Pipeline Project and the L3R Project are included in Attachment A of this exhibit.

Table 1.2-1
Land Requirements for Sandpiper Pipeline Project co-located with L3R Project

Project	Permanent Right-of-Way (feet)	Temporary Workspace (feet)	Total Land Requirement (feet)
Parallel to a Foreign Utility			
Sandpiper	50	70 (upland)	120 (upland)
		45 (wetland)	95 (wetland)
Line 3	25 [a]	Additional 25 (upland) [b]	
		Additional 25 (wetland) [c]	
Combined	75	95 (upland)	145 (upland)
		70 (wetland)	120 (wetland)
Greenfield			
Sandpiper	50	70 (upland)	120 (upland)
		45 (wetland)	95 (wetland)
Line 3	25 [a]	Additional 40 (upland) [d]	
		Additional 40 (wetland) [e]	
Combined	75	110 (upland)	160 (upland)
		85 (wetland)	135 (wetland)

[a] Area of impact for Line 3 operations is based typically on a 25-foot-wide maintained right-of-way. The additional 25 feet of right-of-way required for operations will already be maintained for Sandpiper

[b] Area of impact within the Line 3 construction workspace parallel to a foreign utility is based typically on a 25-foot-wide workspace. The additional 120 feet of workspace required for construction of Sandpiper in uplands will have already been prepared.

[c] Area of impact within the Line 3 construction workspace parallel to a foreign utility is based typically on a 25-foot-wide workspace. The additional 95 feet of workspace required for construction of Sandpiper in wetlands will have already been prepared.

[d] Area of impact within the Line 3 construction workspace in greenfield is based typically on a 40-foot-wide workspace. The additional 120 feet of workspace required for construction of Sandpiper in uplands will have already been prepared.

[e] Area of impact within the Line 3 construction workspace in greenfield is based typically on a 40-foot-wide workspace. The additional 95 feet of workspace required for construction of Sandpiper in wetlands will have already been prepared.

4.2 Land Use Affected by Pipeline Construction and Operation

Land Use - Construction

Table 4.2-1 provides a summary of the land use categories within the co-located projects' construction right-of-way and additional temporary workspaces in the Co-located Right-of-Way.

Table 4.2-1
Land Uses affected by Construction of Sandpiper Pipeline Project co-located with L3R Project [a]

County	Forested (acres) [c]		Agricultural (acres) [c]		Developed (acres) [c]		Open Land (acres) [c]		Wetland/Open Water (acres) [d]		**Total (acres) [c, d]**	
	Sandpiper	Line 3	Sandpiper	Line 3	Sandpiper	Line 3	Sandpiper	Line 3	Sandpiper	Line 3	**Sandpiper**	**Line 3**
Clearwater	250.8	68.2	113.6	26.5	0.0	0.6	53.6	13.7	24.2	9.2	**442.2**	**118.2**
Hubbard	430.1	109.1	224.1	65.4	0.9	0.2	67.4	11.9	42.6	9.5	**765.0**	**196.1**
Cass	382.3	110.2	71.1	22.4	0.3	0.1	155.3	30.1	63.3	17.1	**672.3**	**179.9**
Crow Wing	39.4	9.6	11.1	2.8	0.0	0.0	18.5	3.4	2.4	0.8	**71.6**	**16.5**
Aitkin	232.2	71.3	145.3	57.2	0.0	0.0	71.5	17.5	240.9	91.4	**689.9**	**237.3**
Carlton	192.8	48.3	96.7	30.0	1.6	0.3	83.7	17.5	181.9	53.4	**556.7**	**149.5**
Total [b]	**1527.6 (78.6%)**	**416.8 (21.4%)**	**661.9 (76.4%)**	**204.3 (23.6%)**	**2.8 (71.8%)**	**1.1 (28.2%)**	**450.0 (82.7%)**	**94.1 (17.3%)**	**555.3 (75.4%)**	**181.2 (24.6%)**	**3197.7 (78.1%)**	**897.6 (21.9%)**
	1944.4		**866.2**		**3.9**		**544.1**		**736.5**		**4095.3**	

[a] Calculations are based on the construction right-of-way described in Exhibit D Table 1.2-1 and additional temporary workspaces. Calculations do not include aboveground facilities.

[b] Totals are included for the Sandpiper workspace, additional Line 3 workspace, and combined workspace defined in Exhibit D Table 1.2-1. Percent of each project within the total combined workspace is included. Due to rounding, totals may be off slightly.

[c] Area of impact within the Line 3 construction workspace is based typically on a 25-foot-wide workspace. The additional120 feet of workspace required for construction of Sandpiper in uplands will have already been prepared.

[d] Area of impact within the Line 3 construction workspace is based typically on a 25-foot-wide workspace. The additional 95 feet of workspace required for construction of Sandpiper in wetlands will have already been prepared.

The construction of Sandpiper along the 224.6-mile-long Co-located Right-of-Way will impact approximately 3,197.7 acres of land. The construction of Line 3 will impact an additional:

- 416.8 acres (21.4 percent more) of forested land;
- 204.3 acres (23.6 percent more) of agricultural land;
- 181.2 acres (24.6 percent more) of wetlands/open water; and
- 1.1 acres (28.2 percent more) of developed land.

The construction of Line 3 within the Co-located Right-of-Way will affect, in total, an additional 897.6 acres or 21.9 percent more land than construction of the Sandpiper Project.

Approximately 3.9 acres of developed land will be temporarily affected during construction of the co-located projects.

Land Use – Operation

Table 4.2-2 presents a summary of the land use categories affected by operation of the pipelines. Operation of the co-located portions of Sandpiper and Line 3 in Minnesota (excluding above ground facilities) will affect approximately 2,034.0 acres of land.

Table 4.2-2
Land Uses Affected by Operation of Sandpiper Pipeline Project co-located with L3R Project [a]

County	Forested (acres)[c]		Agricultural (acres)[c]		Developed (acres)[c]		Open Land (acres)[c]		Wetland/Water (acres)[c]		**Total (acres)[c]**	
	Sandpiper	Line 3	Sandpiper	Line 3	Sandpiper	Line 3	Sandpiper	Line 3	Sandpiper	Line 3	**Sandpiper**	**Line 3**
Clearwater	103.7	55.3	48.6	22.1	0.0	0.0	23.3	10.9	12.7	6.7	**188.3**	**95.0**
Hubbard	171.2	91.4	91.2	43.4	0.5	0.2	31.0	12.0	25.1	12.4	**319.0**	**159.4**
Cass	144.8	80.3	31.2	14.1	0.1	0.1	74.3	31.1	30.3	14.8	**280.7**	**140.4**
Crow Wing	15.0	8.0	4.6	2.0	0.0	0.0	8.6	3.9	0.9	0.6	**29.2**	**14.5**
Aitkin	100.3	49.0	60.5	30.9	0.0	0.0	32.5	13.6	113.1	59.5	**306.4**	**153.0**
Carlton	74.7	37.9	39.2	15.1	0.7	0.2	37.0	13.7	85.8	43.8	**237.4**	**110.6**
Total [b]	**609.8 (65.5%)**	**321.9 (34.5%)**	**275.2 (68.3%)**	**127.5 (31.7%)**	**1.3 (72.2%)**	**0.5 (27.8%)**	**206.8 (70.8%)**	**85.3 (29.2%)**	**267.9 (66.0%)**	**137.8 (34.0%)**	**1360.9 (66.9%)**	**673.1 (33.1%)**
	931.7		**402.7**		**1.8**		**292.1**		**405.7**		**2034.0**	

[a] Calculations are based on the operational right-of-way described in Exhibit D Table 1.2-1. In most cases, the right-of-way will be allowed to revert to the original land use during operation of the projects. These calculations do not include aboveground facilities.

[b] Totals are included for the Sandpiper easement, additional Line 3 easement, and combined easement defined in Exhibit D Table 1.2-1. Percent of each project within the total combined easement is included. Due to rounding, totals may be off slightly.

[c] Area of impact for Line 3 operations is based typically on a 25-foot-wide maintained right-of-way. The additional 25 feet of right-of-way required for operations will already be maintained for Sandpiper.

The operation of Sandpiper along the 224.6-mile-long co-located segment will affect approximately 1,360.9 acres of land. The operation of Line 3 will impact an additional:

- 321.9 acres (34.5 percent more) of forested land;
- 137.8 acres (34.0 percent more) of wetlands/waters;
- 127.5 acres (31.7 percent more) of agricultural land; and
- 0.5 acre (27.8 percent more) of developed land.

The operation of Line 3 within the Co-located Right-of-Way will affect, in total, an additional 673.1 (33.1 percent more) acres of land than the Sandpiper Project.

4.2.1 Ownership Status of Lands Crossed by the Pipeline

As presented in Table 4.2.1-1, the Co-located Right-of-Way predominantly crosses private lands located outside municipal areas (152.6 miles or approximately 67.9 percent of the route). The Co-located Right-of-Way also crosses state lands owned and managed by various state agencies (27.7 miles or 12.3 percent) and county lands (44.3 miles or 19.7 percent). County lands include lands that may be owned by the state but administered by the county (tax-forfeit lands).

Table 4.2.1-1
Ownership of Lands Crossed by Sandpiper Pipeline Project co-located with L3R Project [a]

Ownership	Crossing Length (miles)	Percentage of Route
State Lands	27.7	12.3
County Lands	44.3	19.7
Private Lands	152.6	67.9
Total [b]	**224.6**	**100**

[a] Line 3 and Sandpiper cross the same distance for each of the land ownership types.

[b] The source of this data is the MNDNR 2008 GAP Stewardship dataset available on MNDNR's DataDeli. This data should be used as an approximation only, as the GAP dataset has overlapping features, causing some crossings to be over-represented. NDPC continues to consult with private landowners, counties, and state agencies regarding the ownership of lands crossed by the route.

4.2.5 Developed Land

Table 4.3.5-1 presents the number of residences within 50 and 500 feet of the co-located projects. Based on examination of aerial photographs, there is one additional residence within 500 feet and three additional residences within 50 feet of Line 3 as compared to Sandpiper.

Table 4.3.5-1
Residences within 50 and 500 feet of co-located Sandpiper Pipeline Project and L3R Project

County	Sandpiper		Line 3	
	500 feet	50 feet	500 feet	50 feet
Clearwater	20	0	19	1
Hubbard	39	3	40	4
Cass	7	1	7	1
Crow Wing	2	0	2	0
Aitkin	18	0	18	1
Carlton	43	1	44	1
Total	**129**	**5**	**130**	**8**

6.2.2 Soil Characteristics and Assessments

NDPC digitized and overlaid the preferred route and additional temporary workspaces onto SSURGO/STATSGO2 database data to identify soil mapping units in the co-located project area. Based on that analysis, NDPC identified cumulative impacts on highly wind erodible soils, prime farmland and hydric soils that could be affected by pipeline construction (see Table 6.2.2-1).

Construction of Line 3 next to Sandpiper will impact an additional 136.5 acres (20.6 percent more) of prime farmland, 252.2 acres (24.4 percent more) of hydric soils, and 662.3 acres (22.0 percent more) of highly wind erodible soils.

Table 6.2.2-1
Soil Characteristics Along the Sandpiper Pipeline Project co-located with L3R Project

Project	Prime Farmland (acres)	Hydric Soils (acres)	Highly Wind Erodible Soils (acres)
Sandpiper[a]	525.7 (79.4%)	782.2 (75.6%)	2,346.4 (78.0%)
Line 3[b]	136.5 (20.6%)	252.2 (24.4%)	662.3 (22.0%)
Total	**662.2**	**1,034.4**	**3,008.7**

[a] Acreage is based on the construction right-of-way dimensions as discussed in Exhibit D Table 1.2-1 and additional temporary workspace.

[b] Area of impact within the Line 3 construction workspace is based typically on a 25-foot-wide workspace. The additional120 feet of workspace required for construction of Sandpiper in uplands will have already been prepared.

8.2.3 Water Supply Wells

A review of civil survey field-verified wells located to date as well as the CWI database (MGS, 2013) identified 23 wells and drilling records within 200 feet of the co-located construction workspace (see Table 8.2.3-1).

Table 8.2.3-1
Wells/Boreholes identified within 200 feet of Sandpiper Pipeline Project and L3R Project Co-located Workspace

County	Milepost	Distance from Co-located Workspace (feet)	Direction from Co-located Workspace	Use
Clearwater	380.0	56	East	Domestic
Hubbard	412.6	Within workspace	--	Domestic
	415.1	12	West	Abandoned test hole
	415.1	Within workspace	--	Irrigation
	415.2	44	East	Domestic
	422.6	Within workspace	--	Domestic
	431.8	Within workspace	--	Domestic
	437.9	Within workspace	--	Domestic
	449.5	41	Northeast	Irrigation
Crow Wing	481.4	54	North-Northeast	Domestic
Aitkin	535.7	Within workspace	--	From civil survey, presumably domestic
	545.588	129	West	From civil survey, presumably domestic
	545.590	128	West	From civil survey, presumably domestic
Carlton	582.5	35	Southeast	Domestic
	582.5	47	South	Abandoned well or test hole
	583.7	40	South	Domestic
	586.7	Within workspace	--	Domestic
	593.0	44	North	Domestic
	595.6	34	Northeast	Domestic
	595.7	56	Northeast	Domestic
	597.4	6	North	Domestic
	600.6	Within	--	From civil survey,

Table 8.2.3-1 Wells/Boreholes identified within 200 feet of Sandpiper Pipeline Project and L3R Project Co-located Workspace				
County	**Milepost**	**Distance from Co-located Workspace (feet)**	**Direction from Co-located Workspace**	**Use**
Clearwater	380.0	56	East	Domestic
		workspace		presumably domestic

9.2 Waterbody Crossings

As presented in Table 9.2, Line 3 crosses similar waterbody features as Sandpiper[1]. Line 3 crosses nine additional waterbody features including one additional Public Water Inventory (PWI) basin compared to Sandpiper.

Table 9.2
Waterbodies Crossed by Sandpiper Pipeline Project and L3R Project

Waterbody/Agency Designation	Sandpiper Crossings (number)	Line 3 Crossings (number)
All Waterbody Designations[a]	135	144
State Canoe Routes[b]	4	4
Trout Streams/Tributaries[c]	6	6
Navigable Waters[d]	5	5
Impaired Streams – 2012 (Proposed 2014)[e]	10 (12)	10 (12)
PWI Stream[f]	40	40
PWI Basin[g]	10	11

[a] MNDNR (2013a)
[b] MNDNR (2013b)
[c] MNDNR (2013c); Designated a Trout Stream, per Minnesota Rules 6264, Subp.4.
[d] Mississippi River, Sandy River, Kettle River, West Branch Moose River, and Moose River.
[e] MPCA's 2012/2014 List of Impaired Waters
[f] MNDNR (2013d)
[g] MNDNR (2013d); Line 3 crosses the Frandsen Slough twice near milepost 450.6

[1] Table 9.2 presented in this Exhibit is a compilation of several tables in Section 9.2 of the EIR (Table 9.2-1, 9.2.1-1, 9.2.2-1). There is no corresponding Table 9.2 in the EIR.

9.3.1 Existing Wetland Resources

Table 9.3.1-1 provides a list of wetlands crossed by the co-located projects, the total length of crossing, acres affected by construction, acres affected by operation, and acres of permanent wetland conversion.

Table 9.3.1-1
Wetlands Crossed by Sandpiper Pipeline Project and Co-located L3R Project

Wetland Type[a]	Sandpiper Crossing Length (mile)[b]	Line 3 Crossing Length (mile)[b]	Sandpiper Wetland Impact: Construction (acres)[c]	Line 3 Wetland Impact: Construction (acres)[d]	Sandpiper Wetland Impact: Operation (acres)[e]	Line 3 Wetland Impact: Operation (acres)[f]	Sandpiper Permanent Wetland Conversion (acres)[e, g]	Line 3 Permanent Wetland Conversion (acres)[f, g]
PEM	28.0	24.7	305.0	86.5	173.3	73.0	-	-
PFO	20.1	22.9	249.2	91.7	118.9	70.8	118.9	70.8
PSS	17.7	18.6	216.0	68.7	107.8	57.0	107.8	57.0
PUB	0.5	0.6	6.4	2.0	3.1	1.9	-	-
R2U	<0.1	<0.1	0.4	0.1	0.2	0.1	-	-
TOTAL[h]	**66.4**	**66.8**	**777.0 (75.7%)**	**249.0 (24.3%)**	**403.2 (66.5%)**	**202.8 (33.5%)**	**226.7 (63.9%)**	**127.8 (36.1%)**
Co-Located Workspace Total:			1026.0		606.0		354.5	

[a] PEM = Palustrine Emergent; PFO = Palustrine Forested; PSS=Palustrine Scrub Shrub; PUB = Palustrine Unconsolidated Bottom; R2U = Riverine; Cowardin et al, 1979.
[b] Crossing length of proposed pipeline centerline across wetlands.
[c] Acreage is based on the construction right-of-way dimensions as discussed in Exhibit D Table 1.2-1 and additional temporary workspace.
[d] Area of wetland impact within the construction workspace is based typically on a 25-foot-wide workspace. The additional 95 feet of workspace required for construction will have already been prepared during installation of the Sandpiper pipeline, which will be permitted as a separate action.
[e] Area affected by Sandpiper operation is based on the new permanent easement where the pipeline right-of-way will be maintained by periodic clearing activities as discussed in Exhibit D Table 1.2-1.
[f] Area affected by Line 3 operations is based typically on a 25-foot-wide maintained right-of-way. The additional 25 feet of right-of-way required for operations will already be maintained for Sandpiper.
[g] Permanent conversion impacts include the area within the new permanent easement where the pipeline right-of-way will be maintained in an herbaceous state.
[h] Totals are included for the Sandpiper workspace/easement, Line 3 additional workspace/easement, and combined workspace/easement defined in Exhibit D Table 1.2-1. Percent of each project within the total combined workspace/easement is included. Due to rounding, totals may be off slightly.

The addition of Line 3 in the Co-located Right-of-Way will increase construction related wetlands impacts by 249.0 acres (24.3 percent). The cumulative temporary wetlands impact resulting from construction of both projects is 1,026.0 acres.

The addition of Line 3 in the Co-located Right-of-Way will permanently maintain 202.8 acres or 33.5 percent more wetlands in an herbaceous state, free of trees and shrubs following construction. Sandpiper and Line 3 together will permanently maintain 606.0 acres of wetlands.

Line 3 will permanently maintain an additional 127.8 acres of Palustrine Forested and Palustrine Shrub-Scrub wetlands in an herbaceous state, free of trees and shrubs following construction. Enbridge will allow other wetland types to revert back to previous cover types.

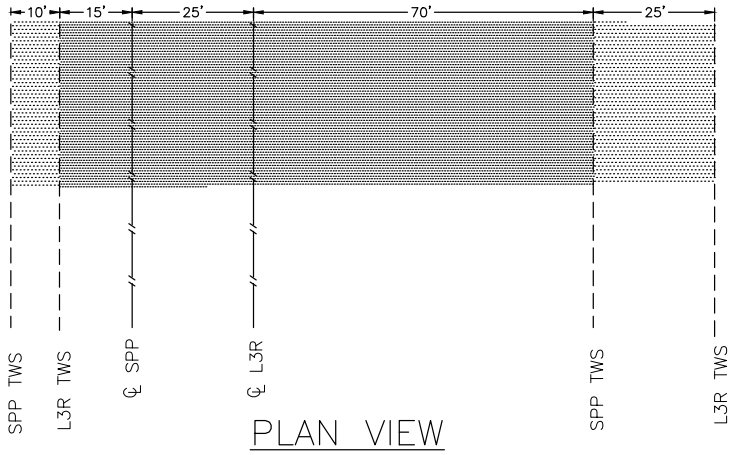

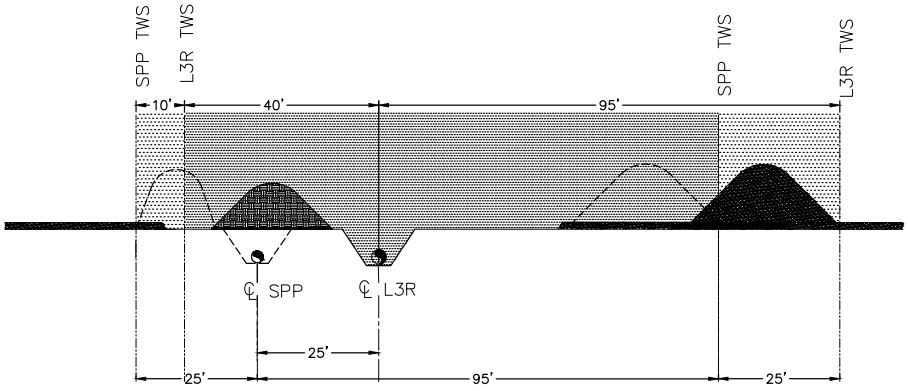

PRELIMINARY
05/27/14

SPP = 30" SANDPIPER PIPELINE
L3R = 36" LINE 3 REPLACEMENT
TWS = TEMPORARY WORK SPACE

NOTE:

1) This typical is for upland areas. For wetland areas reduce by 25' on the working (right) side.

ENBRIDGE

DWN. BY: AJH	DATE 05/27/14	TYPICAL CONSTRUCTION WORKSPACE CLEARBROOK MN TO SUPERIOR WI LINE 3 AND SANDPIPER PARALLEL UTILITY
CHK. TJB	05/27/14	
PROJ. ENGR.		
PROJ. MGR. TJB	05/27/14	SCALE NO SCALE / DWG. NO. PRELIMINARY
CLIENT APP.		

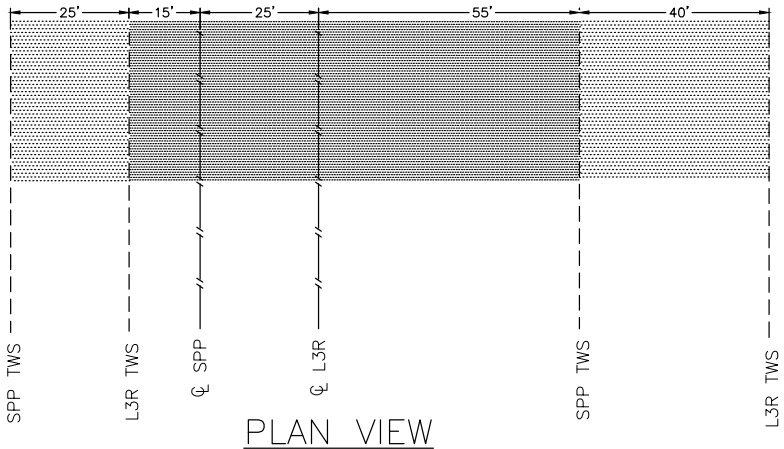

PLAN VIEW

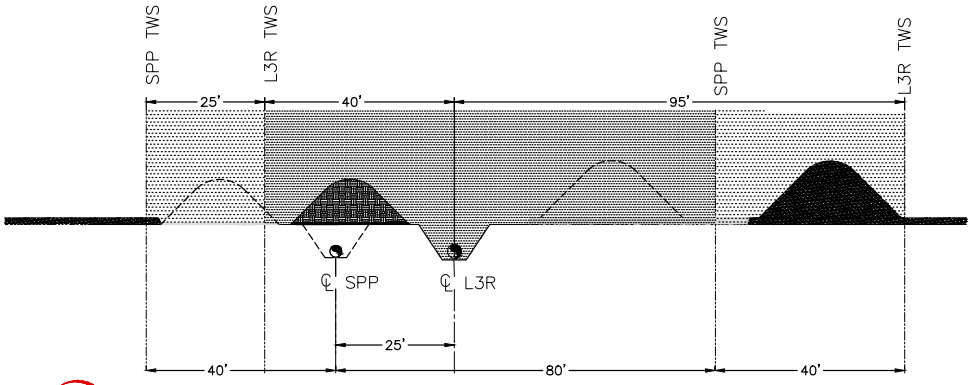

SECTION VIEW

PRELIMINARY
05/27/2014

SPP = 30" SANDPIPER PIPELINE
L3R = 36" LINE 3 REPLACEMENT
TWS = TEMPORARY WORK SPACE

NOTE:

1) This typical is for upland areas. For wetland areas reduce by 25' on the working (right) side.

ENBRIDGE

DWN. BY: AJH	DATE 05/27/14	TYPICAL CONSTRUCTION WORKSPACE
CHK. TJB	05/27/14	CLEARBROOK MN TO SUPERIOR WI
PROJ. ENGR.		LINE 3 AND SANDPIPER GREENFIELD
PROJ. MGR. TJB	05/27/14	SCALE NO SCALE / DWG. NO. PRELIMINARY
CLIENT APP.		

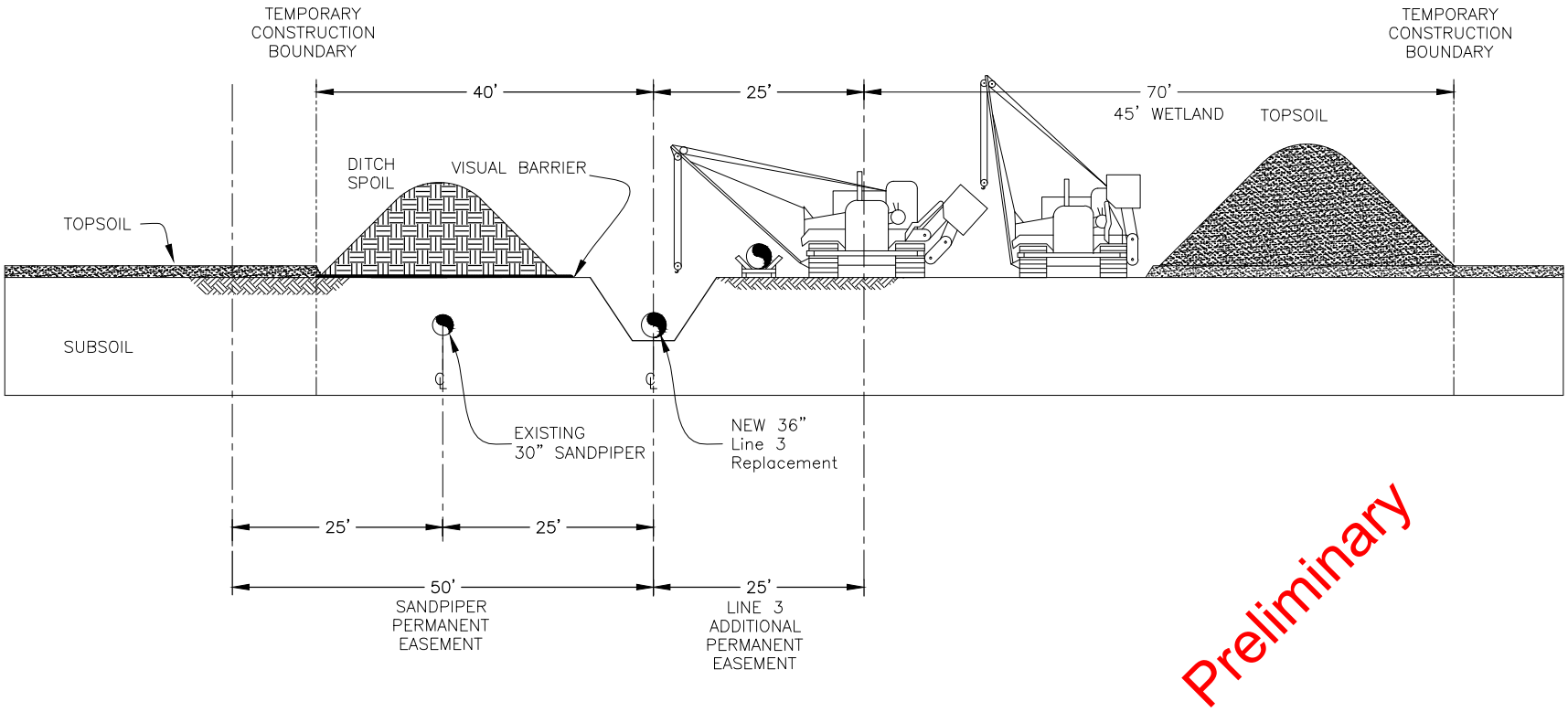

ENBRIDGE®

TYPICAL CONSTRUCTION WORKSPACE
COLLOCATED WITH SANDPIPER
CLEARBROOK EAST TO WISCONSIN BORDER

Date: 1/06/2014

Drawn By: DST

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

[Amdt. 195–22, 46 FR 38360, July 27, 1981; 47 FR 32721, July 29, 1982]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 195.3, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at www.fdsys.gov.

§ 195.4 Compatibility necessary for transportation of hazardous liquids or carbon dioxide.

No person may transport any hazardous liquid or carbon dioxide unless the hazardous liquid or carbon dioxide is chemically compatible with both the pipeline, including all components, and any other commodity that it may come into contact with while in the pipeline.

[Amdt. 195–45, 56 FR 26925, June 12, 1991]

§ 195.5 Conversion to service subject to this part.

(a) A steel pipeline previously used in service not subject to this part qualifies for use under this part if the operator prepares and follows a written procedure to accomplish the following:

(1) The design, construction, operation, and maintenance history of the pipeline must be reviewed and, where sufficient historical records are not available, appropriate tests must be performed to determine if the pipeline is in satisfactory condition for safe operation. If one or more of the variables necessary to verify the design pressure under § 195.106 or to perform the testing under paragraph (a)(4) of this section is unknown, the design pressure may be verified and the maximum operating pressure determined by—

(i) Testing the pipeline in accordance with ASME B31.8, Appendix N, to produce a stress equal to the yield strength; and

(ii) Applying, to not more than 80 percent of the first pressure that produces a yielding, the design factor F in § 195.106(a) and the appropriate factors in § 195.106(e).

(2) The pipeline right-of-way, all aboveground segments of the pipeline, and appropriately selected underground segments must be visually inspected for physical defects and operating conditions which reasonably could be expected to impair the strength or tightness of the pipeline.

(3) All known unsafe defects and conditions must be corrected in accordance with this part.

(4) The pipeline must be tested in accordance with subpart E of this part to substantiate the maximum operating pressure permitted by § 195.406.

(b) A pipeline that qualifies for use under this section need not comply with the corrosion control requirements of subpart H of this part until 12 months after it is placed into service, notwithstanding any previous deadlines for compliance.

(c) Each operator must keep for the life of the pipeline a record of the investigations, tests, repairs, replacements, and alterations made under the requirements of paragraph (a) of this section.

[Amdt. 195–22, 46 FR 38360, July 27, 1981, as amended by Amdt. 195–52, 59 FR 33396, June 28, 1994; Amdt. 195–173, 66 FR 67004, Dec. 27, 2001]

§ 195.6 Unusually Sensitive Areas (USAs).

As used in this part, a USA means a drinking water or ecological resource area that is unusually sensitive to environmental damage from a hazardous liquid pipeline release.

(a) An USA drinking water resource is:

(1) The water intake for a Community Water System (CWS) or a Nontransient Non-community Water System (NTNCWS) that obtains its water supply primarily from a surface water source and does not have an adequate alternative drinking water source;

(2) The Source Water Protection Area (SWPA) for a CWS or a NTNCWS that obtains its water supply from a Class I or Class IIA aquifer and does not have an adequate alternative drinking water source. Where a state has not yet identified the SWPA, the Wellhead Protection Area (WHPA) will be used until the state has identified the SWPA; or

(3) The sole source aquifer recharge area where the sole source aquifer is a karst aquifer in nature.

(b) An USA ecological resource is:

(1) An area containing a critically imperiled species or ecological community;

(2) A multi-species assemblage area;

(3) A migratory waterbird concentration area;

(4) An area containing an imperiled species, threatened or endangered species, depleted marine mammal species, or an imperiled ecological community where the species or community is aquatic, aquatic dependent, or terrestrial with a limited range; or

(5) An area containing an imperiled species, threatened or endangered species, depleted marine mammal species, or imperiled ecological community where the species or community occurrence is considered to be one of the most viable, highest quality, or in the best condition, as identified by an element occurrence ranking (EORANK) of A (excellent quality) or B (good quality).

(c) As used in this part—

Adequate Alternative Drinking Water Source means a source of water that currently exists, can be used almost immediately with a minimal amount of effort and cost, involves no decline in water quality, and will meet the consumptive, hygiene, and fire fighting requirements of the existing population of impacted customers for at least one month for a surface water source of water and at least six months for a groundwater source.

Aquatic or Aquatic Dependent Species or Community means a species or community that primarily occurs in aquatic, marine, or wetland habitats, as well as species that may use terrestrial habitats during all or some portion of their life cycle, but that are still closely associated with or dependent upon aquatic, marine, or wetland habitats for some critical component or portion of their life-history (*i.e.*, reproduction, rearing and development, feeding, etc).

Class I Aquifer means an aquifer that is surficial or shallow, permeable, and is highly vulnerable to contamination. Class I aquifers include:

(1) Unconsolidated Aquifers (Class Ia) that consist of surficial, unconsolidated, and permeable alluvial, terrace, outwash, beach, dune and other similar deposits. These aquifers generally contain layers of sand and gravel that, commonly, are interbedded to some degree with silt and clay. Not all Class Ia aquifers are important water-bearing units, but they are likely to be both permeable and vulnerable. The only natural protection of these aquifers is the thickness of the unsaturated zone and the presence of fine-grained material;

(2) Soluble and Fractured Bedrock Aquifers (Class Ib). Lithologies in this class include limestone, dolomite, and, locally, evaporitic units that contain documented karst features or solution channels, regardless of size. Generally these aquifers have a wide range of permeability. Also included in this class are sedimentary strata, and metamorphic and igneous (intrusive and extrusive) rocks that are significantly faulted, fractured, or jointed. In all cases groundwater movement is largely controlled by secondary openings. Well yields range widely, but the important feature is the potential for rapid vertical and lateral ground water movement along preferred pathways, which result in a high degree of vulnerability;

(3) Semiconsolidated Aquifers (Class Ic) that generally contain poorly to moderately indurated sand and gravel that is interbedded with clay and silt. This group is intermediate to the unconsolidated and consolidated end members. These systems are common in the Tertiary age rocks that are exposed throughout the Gulf and Atlantic coastal states. Semiconsolidated conditions also arise from the presence of intercalated clay and caliche within primarily unconsolidated to poorly consolidated units, such as occurs in parts of the High Plains Aquifer; or

(4) Covered Aquifers (Class Id) that are any Class I aquifer overlain by less than 50 feet of low permeability, unconsolidated material, such as glacial till, lacustrian, and loess deposits.

Class IIa aquifer means a Higher Yield Bedrock Aquifer that is consolidated and is moderately vulnerable to contamination. These aquifers generally consist of fairly permeable sandstone or conglomerate that contain lesser amounts of interbedded fine grained clastics (shale, siltstone, mudstone) and occasionally carbonate units. In general, well yields must exceed 50 gallons per minute to be included in this class. Local fracturing may contribute to the dominant primary porosity and permeability of these systems.

Community Water System (CWS) means a public water system that serves at least 15 service connections used by year-round residents of the area or regularly serves at least 25 year-round residents.

Critically imperiled species or ecological community (habitat) means an animal or plant species or an ecological community of extreme rarity, based on The Nature Conservancy's Global Conservation Status Rank. There are generally 5 or fewer occurrences, or very few remaining individuals (less than 1,000) or acres (less than 2,000). These species and ecological communities are extremely vulnerable to extinction due to some natural or man-made factor.

Depleted marine mammal species means a species that has been identified and is protected under the Marine Mammal Protection Act of 1972, as amended (MMPA) (16 U.S.C. 1361 *et seq.*). The term ''depleted'' refers to marine mammal species that are listed as threatened or endangered, or are below their optimum sustainable populations (16 U.S.C. 1362). The term ''marine mammal'' means ''any mammal which is morphologically adapted to the marine environment (including sea otters and members of the orders Sirenia, Pinnipedia, and Cetacea), or primarily inhabits the marine environment (such as the polar bear)'' (16 U.S.C. 1362). The order Sirenia includes manatees, the order Pinnipedia includes seals, sea lions, and walruses, and the order Cetacea includes dolphins, porpoises, and whales.

Ecological community means an interacting assemblage of plants and animals that recur under similar environmental conditions across the landscape.

Element occurrence rank (EORANK) means the condition or viability of a species or ecological community occurrence, based on a population's size, condition, and landscape context. EORANKs are assigned by the Natural Heritage Programs. An EORANK of A means an excellent quality and an EORANK of B means good quality.

Imperiled species or ecological community (habitat) means a rare species or ecological community, based on The Nature Conservancy's Global Conservation Status Rank. There are generally 6 to 20 occurrences, or few remaining individuals (1,000 to 3,000) or acres (2,000 to 10,000). These species and ecological communities are vulnerable to extinction due to some natural or man-made factor.

Karst aquifer means an aquifer that is composed of limestone or dolomite where the porosity is derived from connected solution cavities. Karst aquifers are often cavernous with high rates of flow.

Migratory waterbird concentration area means a designated Ramsar site or a Western Hemisphere Shorebird Reserve Network site.

Multi-species assemblage area means an area where three or more different critically imperiled or imperiled species or ecological communities, threatened or endangered species, depleted marine mammals, or migratory waterbird concentrations co-occur.

Non-transient Non-community Water System (NTNCWS) means a public water system that regularly serves at least 25 of the same persons over six months per year. Examples of these systems include schools, factories, and hospitals that have their own water supplies.

Public Water System (PWS) means a system that provides the public water for human consumption through pipes or other constructed conveyances, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. These systems include the sources of the water supplies—*i.e.*, surface or ground. PWS can be community, non-transient non-community, or transient non-community systems.

Ramsar site means a site that has been designated under The Convention on Wetlands of International Importance Especially as Waterfowl Habitat program. Ramsar sites are globally critical wetland areas that support migratory waterfowl. These include wetland areas that regularly support 20,000 waterfowl; wetland areas that regularly support substantial numbers of individuals from particular groups of waterfowl, indicative of wetland values, productivity, or diversity; and wetland areas that regularly support 1% of the individuals in a population of one species or subspecies of waterfowl.

Sole source aquifer (SSA) means an area designated by the U.S. Environmental Protection Agency under the Sole Source Aquifer program as the ''sole or principal'' source of drinking water for an area. Such designations are made if the aquifer's ground water supplies 50% or more of the drinking water for an area, and if that aquifer were to become contaminated, it would pose a public health hazard. A sole source aquifer that is karst in nature is one composed of limestone where the porosity is derived from connected solution cavities. They are often cavernous, with high rates of flow.

Source Water Protection Area (SWPA) means the area delineated by the state for a public water supply system (PWS) or including numerous PWSs, whether the source is ground water or surface water or both, as part of the state source water assessment program (SWAP) approved by EPA under section 1453 of the Safe Drinking Water Act.

Species means species, subspecies, population stocks, or distinct vertebrate populations.

Terrestrial ecological community with a limited range means a non-aquatic or non-aquatic dependent ecological community that covers less than five (5) acres.

Terrestrial species with a limited range means a non-aquatic or non-aquatic dependent animal or plant species that has a range of no more than five (5) acres.

Threatened and endangered species (T&E) means an animal or plant species that has been listed and is protected under the Endangered Species Act of 1973, as amended (ESA73) (16 U.S.C. 1531 et seq.). ''Endangered species'' is defined as ''any species which is in danger of extinction throughout all or a significant portion of its range'' (16 U.S.C. 1532). ''Threatened species'' is defined as ''any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range'' (16 U.S.C. 1532).

Transient Non-community Water System (TNCWS) means a public water system that does not regularly serve at least 25 of the same persons over six months per year. This type of water system serves a transient population found at rest stops, campgrounds, restaurants, and parks with their own source of water.

Wellhead Protection Area (WHPA) means the surface and subsurface area surrounding a well or well field that supplies a public water system through which contaminants are likely to pass and eventually reach the water well or well field.

Western Hemisphere Shorebird Reserve Network (WHSRN) site means an area that contains migratory shorebird concentrations and has been designated as a hemispheric reserve, international reserve, regional reserve, or endangered species reserve. Hemispheric reserves host at least 500,000 shorebirds annually or 30% of a species flyway population. International reserves host 100,000 shorebirds annually or 15% of a species flyway population. Regional reserves host 20,000 shorebirds annually or 5% of a species flyway population. Endangered species reserves are critical to the survival of endangered species and no minimum number of birds is required.

[Amdt. 195–71, 65 FR 80544, Dec. 21, 2000]

§ 195.8 Transportation of hazardous liquid or carbon dioxide in pipelines constructed with other than steel pipe.

No person may transport any hazardous liquid or carbon dioxide through a pipe that is constructed after October 1, 1970, for hazardous liquids or after July 12, 1991 for carbon dioxide of material other than steel unless the person has notified the Administrator in writing at least 90 days before the transportation is to begin. The notice must state whether carbon dioxide or a hazardous liquid is to be transported and the chemical name, common name, properties and characteristics of the hazardous liquid to be transported and the material used in construction of the pipeline. If the Administrator determines that the transportation of the hazardous liquid or carbon dioxide in the manner proposed would be unduly hazardous, he will, within 90 days after receipt of the notice, order the person that gave the notice, in writing, not to

eDocket No. 20151-106463-05

GAO

United States Government Accountability Office

Report to Congressional Committees

January 2013

PIPELINE SAFETY

Better Data and Guidance Needed to Improve Pipeline Operator Incident Response

G A O

Accountability * Integrity * Reliability

eDocket No. 20151-106463-05

Highlights of GAO-13-168, a report to congressional committees

January 2013

PIPELINE SAFETY

Better Data and Guidance Needed to Improve Pipeline Operator Incident Response

Why GAO Did This Study

The nation's 2.5 million mile network of hazardous liquid and natural gas pipelines includes more than 400,000 miles of "transmission" pipelines, which transport products from processing facilities to communities and large-volume users. To minimize the risk of leaks and ruptures, PHMSA requires pipeline operators to develop incident response plans. Pipeline operators with pipelines in highly populated and environmentally sensitive areas ("high-consequence areas") are also required to consider installing automated valves.

The Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 directed GAO to examine the ability of transmission pipeline operators to respond to a product release. Accordingly, GAO examined (1) opportunities to improve the ability of transmission pipeline operators to respond to incidents and (2) the advantages and disadvantages of installing automated valves in high-consequence areas and ways that PHMSA can assist operators in deciding whether to install valves in these areas. GAO examined incident data; conducted a literature review; and interviewed selected operators, industry stakeholders, state pipeline safety offices, and PHMSA officials.

What GAO Recommends

DOT should (1) improve incident response data and use these data to evaluate whether to implement a performance-based framework for incident response times and (2) share guidance and information on evaluation approaches to inform operators' decisions. DOT agreed to consider these recommendations.

View GAO-13-168. For more information, contact Susan A. Fleming at (202) 512-2834 or flemings@gao.gov.

What GAO Found

The Department of Transportation's (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) has an opportunity to improve the ability of pipeline operators to respond to incidents by developing a performance-based approach for incident response times. The ability of transmission pipeline operators to respond to incidents—such as leaks and ruptures—is affected by numerous variables, some of which are under operators' control. For example, the use of different valve types (manual valves or "automated" valves that can be closed automatically or remotely) and the location of response personnel can affect the amount of time it takes for operators to respond to incidents. Variables outside of operators' control, such as weather conditions, can also influence incident response time, which can range from minutes to days. GAO has previously reported that a performance-based approach—including goals and associated performance measures and targets—can allow those being regulated to determine the most appropriate way to achieve desired outcomes. In addition, several organizations in the pipeline industry have developed methods for quantitatively evaluating response times to incidents, including setting specific, measurable performance goals. While defining performance measures and targets for incident response can be challenging, PHMSA could move toward a performance-based approach by evaluating nationwide data to determine response times for different types of pipeline (based on location, operating pressure, and pipeline diameter, among other factors). However, PHMSA must first improve the data it collects on incident response times. These data are not reliable both because operators are not required to fill out certain time-related fields in the reporting form and because operators told us they interpret these data fields in different ways. Reliable data would improve PHMSA's ability to measure incident response and assist the agency in exploring the feasibility of developing a performance-based approach for improving operator response to pipeline incidents.

The primary advantage of installing automated valves is that operators can respond quickly to isolate the affected pipeline segment and reduce the amount of product released; however, automated valves can have disadvantages, including the potential for accidental closures—which can lead to loss of service to customers or even cause a rupture—and monetary costs. Because the advantages and disadvantages of installing an automated valve are closely related to the specifics of the valve's location, it is appropriate to decide whether to install automated valves on a case-by-case basis. Several operators we spoke with have developed approaches to evaluate the advantages and disadvantages of installing automated valves. For example, some operators of hazardous liquid pipelines use spill-modeling software to estimate the amount of product release and extent of damage that would occur in the event of an incident. While PHMSA conducts a variety of information-sharing activities, the agency does not formally collect or share evaluation approaches used by operators to decide whether to install automated valves. Furthermore, not all operators we spoke with were aware of existing PHMSA guidance designed to assist operators in making these decisions. PHMSA could assist operators in making this decision by formally collecting and sharing evaluation approaches and ensuring operators are aware of existing guidance.

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Abbreviations

DOT	Department of Transportation
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration

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eDocket No. 20151-106463-05

January 23, 2013

The Honorable John D. Rockefeller IV
Chairman
The Honorable Ranking Member
Committee on Commerce, Science, and Transportation
United States Senate

The Honorable Fred Upton
Chairman
The Honorable Henry Waxman
Ranking Member
Committee on Energy and Commerce
House of Representatives

The Honorable Bill Shuster
Chairman
The Honorable Nick J. Rahall
Ranking Member
Committee on Transportation and Infrastructure
House of Representatives

The United States has over 2.5 million miles of hazardous liquid and natural gas pipelines that transport approximately 65 percent of the energy we consume. These pipelines, which are largely regulated by the Department of Transportation's (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA), are relatively safe when compared with other modes of transporting hazardous goods (e.g., highway and rail). However, when pipelines leak or rupture the results can be devastating, including fatalities, injuries, and extensive property or environmental damage. Such an "incident" occurred in September 2010 in San Bruno, California, killing 8 people and damaging or destroying over 100 homes.[1] To minimize the risk of a pipeline incident, pipeline operators are required to develop leak detection methods and emergency response plans. Operators with pipelines in highly populated or environmentally sensitive areas (called "high-consequence areas") are subject to supplemental risk-

[1]In its regulations, PHMSA refers to the release of natural gas from a pipeline as an "incident" (49 C.F.R. § 191.3) and a spill from a hazardous liquid pipeline as an "accident." (49 C.F.R. §195.50). For simplicity, this report will refer to both as "incidents."

based regulations under PHMSA's integrity management program.[2] Through this program, PHMSA requires that operators conduct a risk assessment to determine what additional measures to take to mitigate the consequences of pipeline failures. One mitigation measure operators can take based on the results of the risk assessment is to install automated valves, which in the event of an incident, close automatically or are closed remotely by operators in a control room.[3] Since 1971, the National Transportation Safety Board (NTSB) has made recommendations that DOT develop standards and requirements for automated valves. Following the San Bruno incident, NTSB recommended that DOT require natural gas pipeline operators install automated valves in all high-consequence areas.[4]

The Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 mandated that GAO examine the ability of transmission pipeline[5] operators to respond to a hazardous liquid or natural gas release from an

[2]"High-consequence areas" are defined differently for hazardous liquid and natural gas. For natural gas, such areas typically include highly populated or frequented areas, such as parks. For hazardous liquid, high-consequence areas include highly populated areas, other populated areas, navigable waterways, and areas unusually sensitive to environmental damage.

[3]For the purposes of this report we use the term "install an automated valve" to refer to any actions that allow the operator to remotely or automatically close a valve. Such actions do not necessarily mean an operator is installing a completely new valve. For example, operators may install an actuator and communications at an existing valve location.

[4]See NTSB, *Pipeline Accident Report: Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire, San Bruno, California*, September 9, 2010, NTSB/PAR-11/01 (Washington, D.C: Aug. 30, 2011). According to NTSB, PHMSA is in the process of responding to this recommendation. Specifically, in August 2011, PHMSA began a rulemaking process that could address the extent to which operators will be required to install automated valves. 76 Fed. Reg. 53086 (Aug. 25, 2011).

[5]For the purposes of this report, we use the term "transmission pipeline" to refer to both onshore hazardous liquid and natural gas pipelines carrying product over long distances to users.

existing pipeline segment.[6] Accordingly, this report contains information on: (1) opportunities to improve the ability of transmission pipeline operators to respond to incidents, and (2) the advantages and disadvantages of installing automated valves in high-consequence areas and ways that PHMSA can assist operators in deciding whether to install valves in these areas.

To determine what opportunities exist to improve the ability of transmission pipeline operators to respond to incidents, we identified the variables that influence operators' incident response capabilities. To do so, we spoke with selected operators about their prior incidents and variables that influenced their ability to respond. Operators were selected based on criteria, including amount and types of pipeline owned in high-consequence areas[7] and geographic diversity. We also discussed prior incidents, incident response times, and federal oversight of the pipeline industry with officials from PHMSA, state pipeline safety offices, industry associations, and safety groups. Based on our discussions and review of prior incidents, we identified variables that influence operators' ability to respond to incidents. We also examined 2007 to 2011 PHMSA incident data, including data on:

- total number of incidents;
- type of incident (leak or rupture);
- type of pipeline where the incident occurred; and
- the dates and times when an incident occurred, the operator identified the incident, the operator's resources (personnel and equipment) arrived on site, and the operator shut down a pipeline or facility.

[6]The Act also directed the Secretary of Transportation to consider additional regulations requiring the use of automated valves where economically, technically, and operationally feasible on new transmission facilities. Pub. L. No. 112-90, § 4, 125 Stat. 1904, 1906 (2012). In response, PHMSA contracted with Oak Ridge National Laboratory to draft a study, which found that automated valves were feasible under certain conditions. Oak Ridge National Laboratory, *Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety*, ORNL/TM-2012/411 (Oct. 31, 2012).

[7]According to 2010 PHMSA data, the eight operators we selected represented 19 percent of hazardous liquid and 10 percent of natural gas miles in these areas. There were 682 hazardous liquid and natural gas transmission pipeline operators with 98,013 pipeline miles in high-consequence areas.

We assessed the reliability of data through discussions with PHMSA officials and select operators and determined that data elements related to numbers of incidents, types of releases, and types of pipeline where incidents occurred were reliable for the purpose of providing context. However, we determined that data elements related to response time were not sufficiently reliable for the purpose of conducting a detailed analysis of relationships between response time and other factors. Finally, we reviewed federal requirements, and industry and government performance standards related to emergency response within the pipeline industry.

To determine the advantages and disadvantages of installing automated valves in high-consequence areas and ways that PHMSA can assist operators in deciding whether to install these valves, we identified the key factors that should be used in deciding whether to install automated valves in high-consequence areas. To do so, we conducted a literature review of previous research dating back to 1995 and interviewed officials from industry associations and pipeline safety groups. In addition, we collected information from selected operators on their methods for deciding whether to install automated valves, as well as specific pipeline segments and valve locations on which they made such decisions. We also discussed the regulations with officials from PHMSA, state pipeline safety offices, and pipeline operators to determine what, if any, additional guidance would help operators apply the current regulations on installing automated valves. For further details on our scope and methodology, see appendix I.

We conducted this performance audit from March 2012 to January 2013 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Three main types of pipelines carry hazardous liquid[8] and natural gas from producing wells to end users (residences and businesses) and are managed by about 2,500 operators:

- *Gathering pipelines* collect hazardous liquid and natural gas from production areas and transport the products to processing facilities, which in turn refine and send the products to transmission pipelines. These pipelines tend to be located in rural areas but can also be located in urban areas. PHMSA estimates there are 200,000 miles of natural gas gathering pipelines and 30,000 to 40,000 miles of hazardous liquid gathering pipelines.

- *Transmission pipelines* carry hazardous liquid or natural gas, sometimes over hundreds of miles, to communities and large-volume users, such as factories. Transmission pipelines tend to have the largest diameters and operate at the highest pressures of any type of pipeline. PHMSA has estimated there are more than 400,000 miles of hazardous liquid and natural gas transmission pipelines across the United States. (See fig. 1.)

- *Distribution pipelines* then split off from transmission pipelines to transport natural gas to end users—residential, commercial, and industrial customers. There are no hazardous liquid distribution pipelines. PHMSA has estimated there are roughly 2 million miles of natural gas distribution pipelines, most of which are intrastate pipelines.

[8]Hazardous liquid products include petroleum (crude oil, condensate, natural gasoline, natural gas liquids, and liquefied petroleum gas); petroleum products (flammable, toxic, or corrosive products obtained from distilling and processing of crude oil, unfinished oils, natural gas liquids, blend stocks, and other miscellaneous hydrocarbon compounds); and anhydrous ammonia.

Figure 1: Transmission Pipeline across the United States, as of September 2012

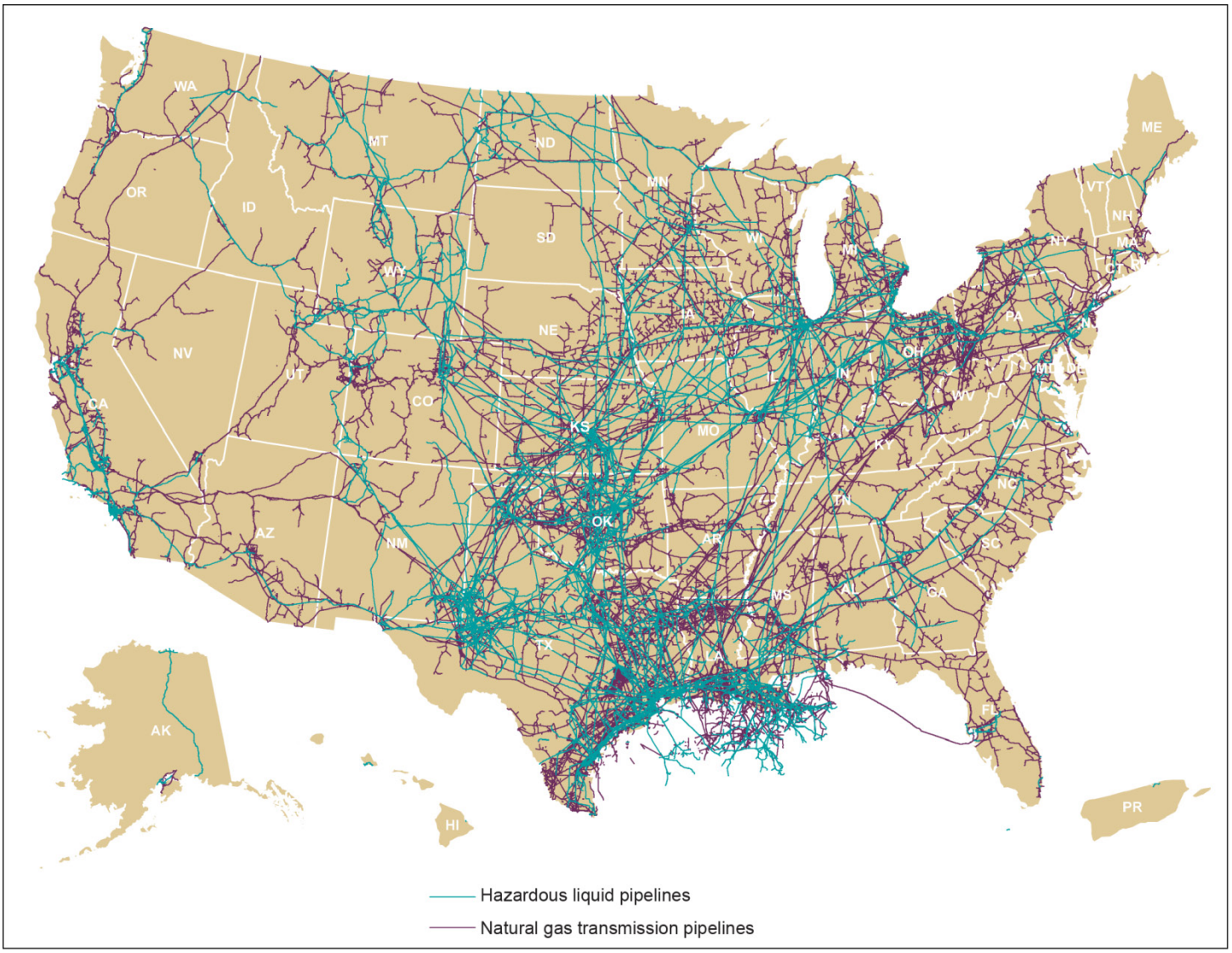

Source: PHMSA.

PHMSA administers the national regulatory program to ensure the safe transportation of hazardous liquid and natural gas by pipeline, including developing safety requirements that all pipeline operators regulated by

PHMSA must meet.[9] In 2012, the agency's budget was $201 million, which was used, in part, to employ over 200 staff in its pipeline safety program. About half of the pipeline safety program staff inspects hazardous liquid and gas pipelines for compliance with safety regulations. Besides PHMSA, over 300 state inspectors help oversee pipelines and ensure safety. State and federal officials may also investigate specific pipeline incidents to determine the reason for the pipeline failure and to take enforcement actions, when necessary.[10]

PHMSA enforces two general sets of pipeline safety requirements. The first are minimum safety standards that cover specifications for the design, construction, testing, inspection, operation, and maintenance of pipelines. The second set of safety requirements are part of a supplemental risk-based regulatory program termed "integrity management."[11] Under transmission pipeline integrity management programs, operators are required to systematically identify and mitigate risks to pipeline segments—discrete sections of the pipeline system separated by valves that can stop the flow of product—that are located in high-consequence areas where an incident would have greater consequences for public safety or the environment. To ensure operators comply with minimum safety standards and integrity management requirements, PHMSA conducts inspections in partnership with state pipeline safety agencies. Inspections may focus on specific pipeline segments or aspects of an operator's safety program, or both. According to PHMSA, officials conduct an inspection for each operator at least once every 5 to 7 years, but may conduct additional inspections based on safety risk or at the discretion of PHMSA or state officials. PHMSA is authorized to take enforcement actions against operators, including

[9]PHMSA does not regulate all pipelines. For example, many gathering pipelines have not been subject to PHMSA regulations because they are generally located away from population centers and operate at low pressures.

[10]PHMSA may conduct an incident investigation in instances when an NTSB investigation is also under way. In such cases, PHMSA does not determine the cause of the incident; rather its review is to determine regulatory compliance.

[11]PHMSA established requirements (49 C.F.R. § 195.452) for integrity management for hazardous liquid pipeline operators with 500 or more miles of pipelines in December 2000 (65 Fed. Reg. 75378, (Dec. 1, 2000)) and for operators with less than 500 miles in January 2002 (67 Fed. Reg. 2136, (Jan.16, 2002)). In 2003, PHMSA issued integrity management regulations for all operators of gas transmission pipelines (68 Fed. Reg. 69778, (Dec.15, 2003)).

issuing warning letters, notices of probable violation, notices of amendment, notices of proposed safety order, corrective action orders, and imposing civil penalties.[12]

Transporting hazardous liquids and natural gas by pipelines is associated with far fewer fatalities and injuries than other modes of transportation. From 2007 to 2011, there was an average of about 14 fatalities per year for all pipeline incidents reported to PHMSA, including an average of about 2 fatalities per year resulting from incidents on hazardous liquid and natural gas transmission pipelines. In comparison, in 2010, 3,675 fatalities resulted from incidents involving large trucks and 730 additional fatalities resulted from railroad incidents. Yet risks to pipelines exist, such as corrosion and third party excavation, which can damage a pipeline's integrity and result in leaks and ruptures. A leak is a slow release of a product over a relatively small area. A rupture is a breach in the pipeline that may occur suddenly; the product may then ignite resulting in an explosion.[13] According to pipeline operators we met with, of the two types of pipeline incidents, leaks are more common but generally cause less damage. Ruptures are relatively rare but can have much higher consequences because of the damage that can be caused by an associated explosion.

[12]*Warning letters* are issued for lower risk probable violations and program deficiencies. Through such letters PHMSA notifies the operator of the alleged violations and directs it to correct them or be subject to further enforcement action. *Notices of probable violation* allege specific regulatory violations and, where applicable, propose corrective action in a compliance order and/or civil penalties. The operator has a right to respond and request an administrative hearing. *Notices of amendment* allege that an operator's plans and procedures are inadequate and require that they be amended. The operator has a right to respond and request an administrative hearing. *Notices of proposed safety order* notify an operator that a particular pipeline facility has a condition or conditions that pose a pipeline integrity risk to public safety, property, or the environment. These notices propose measures the operator must take to address the identified risk, including inspection, testing, and repair. *Corrective action orders* are issued to operators with a pipeline that represents a serious hazard to life, property, or the environment. The order identifies actions that must be taken by the operator to assure safe operation, including the shutdown of a pipeline or operation at reduced pressure, physical inspection or testing of the pipeline, and repair or replacement of defective pipeline segments, among other actions.

[13]The risks and consequences posed by gas and hazardous liquids incidents also differ. Natural gas tends to ignite more easily, resulting in more explosions. Hazardous liquids ignite less easily, but can spill and pollute the environment.

According to PHMSA, industry, and state officials, responding to either a hazardous liquid or natural gas pipeline incident typically includes steps such as detecting that an incident has occurred, coordinating with emergency responders, and shutting down the affected pipeline segment. (See fig. 2.) Under PHMSA's minimum safety standards, operators are required to have a plan that covers these steps for all of their pipeline segments and to follow that plan during an incident. Officials from PHMSA and state pipeline safety offices perform relatively minor roles during an incident, as they rely on operators and emergency responders to take actions to mitigate the consequences of such events. Following an incident, operators must report incidents that meet certain thresholds—including incidents that involve a fatality or injury, excessive property damage or product release, or an emergency shutdown—to the federal National Response Center,[14] as well as conduct an investigation to identify the root cause and lessons learned. Federal and state authorities may also use their discretion to investigate some incidents, which can involve working with operators to determine the cause of the incident. If necessary, authorities will take steps to correct deficiencies in operator safety programs, including taking enforcement actions.

[14]The National Response Center is the sole federal point of contact for reporting oil and chemical spills.

Figure 2: Steps Operators Take When Responding to Incidents

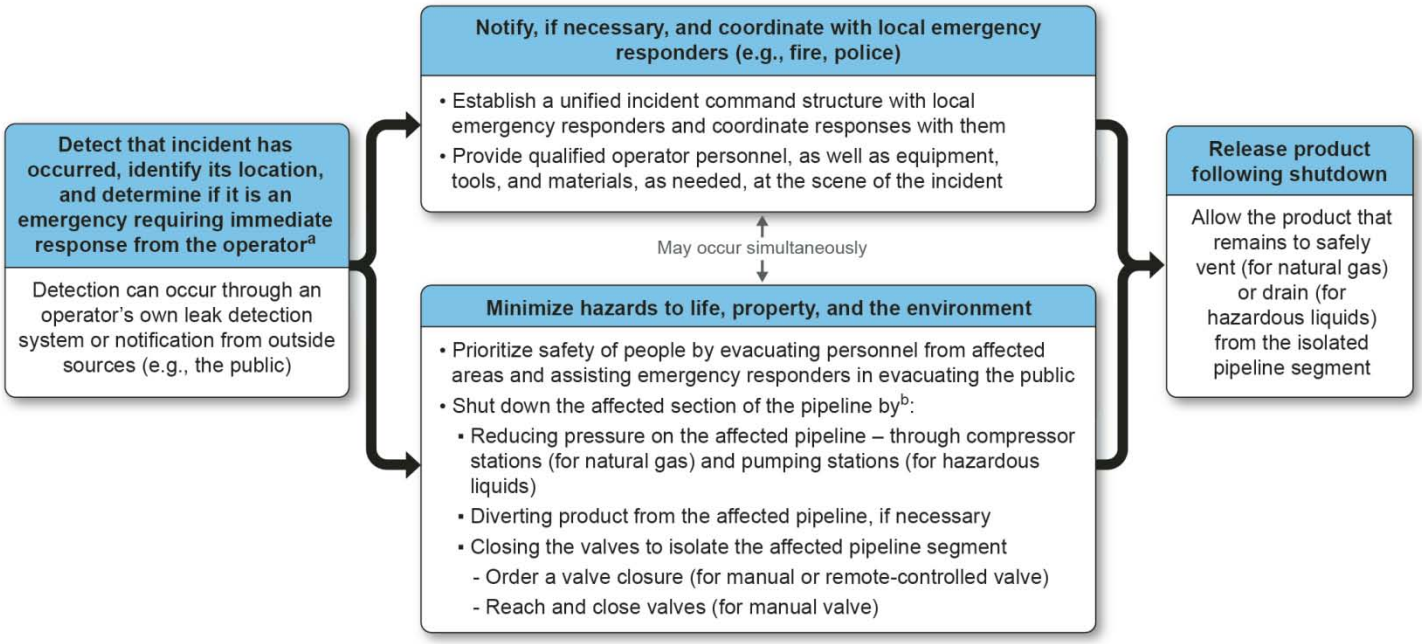

Sources: GAO analysis, PHMSA, industry stakeholders, and pipeline operators.

[a]Some incidents, such as very small leaks, do not create a hazardous condition and may not require an immediate response from the operator. The operator can address these non-emergency incidents while maintaining normal operations.
[b]Emergency shutdown procedures can be initiated remotely by control room operators or through personnel in the field.

While prior research shows that most of the fatalities and damage from an incident occur in the first few minutes following a pipeline rupture, operators can reduce some of the consequences by taking actions that include closing valves that are spaced along the pipeline to isolate segments. The amount of time it takes to close a valve depends upon the equipment installed on the pipeline. For example, valves with manual controls (referred to as "manual valves") require a person to arrive on site and either turn a wheel crank or activate a push-button actuator. Valves that can be closed without a person located at the valve location (referred to as "automated valves") include both remote-control valves, which can be closed via a command from a control room, and automatic-shutoff valves, which can close without human intervention based on sensor

readings.[15,16] (See fig. 3.) Automated valves generally take less time to close than manual valves. PHMSA's minimum safety standards dictate the spacing of all valves, regardless of type of equipment installed to close them,[17] while integrity management regulations require that transmission pipeline operators conduct a risk assessment for high-consequence areas that includes the consideration of automated valves.[18]

[15]Hazardous liquid regulations refer to emergency flow restriction devices, which include remote-control valves and "check" valves that automatically prevent product from flowing in a specific direction. See 49 C.F.R. § 195.452(i)(4). For the purposes of this report we describe all of these valves as automated valves.

[16]PHMSA does not collect data on the number of manual and automated valves. The Interstate Natural Gas Association of America—the primary industry group for natural gas transmission pipelines—has collected valve equipment information for almost half of the 300,000 miles of natural gas transmission pipeline in the United States and reports that of the 29,827 valves reported 5,013, or 17 percent, are automated. In highly populated and frequented locations 1,972, or 23 percent, of the 8,693 total valves, were automated.

[17]49 C.F.R. §§ 192.179, 195.260.

[18]Automated valves are one of several measures that operators can take to prevent and mitigate the consequences of a pipeline incident. Other measures include additional leak detection and damage prevention activities.

Figure 3: A Hand Wheel Used to Close a Manual Valve (Outlined in Red on Left) and an Actuator Used to Remotely Close an Automated Valve (Outlined in Red on Right)

Source: GAO.

A manual valve on the Northwest Pipeline system near Pocatello, Idaho

Source: GAO.

A remotely-controlled valve on an Enterprise Products hazardous liquid pipeline system near Houston, Texas

Performance-Based Approach Offers Opportunity to Improve Incident Response, but Better Data Are Needed

The ability of transmission pipeline operators to respond to incidents, such as leaks and ruptures, is affected by a number of variables—some of which are under operators' control—resulting in variances in response time; for a given incident, that time can range from minutes to days. Several states and industry organizations have developed performance-based requirements for operators to meet in responding to incidents. PHMSA has some performance-based requirements, but its current performance goal related to incident response is not well defined. More precise performance measures and targets could lead to improved response times and less damage from incidents in some cases. However, PHMSA would need better data on incidents to determine the feasibility of such an approach.

Incident Response Time Depends on Multiple Variables, Some of Which Operators Can Control

According to PHMSA officials, pipeline safety officials, and industry stakeholders and operators, multiple variables—some controllable by transmission pipeline operators—can influence the ability of operators to respond quickly to an incident. Ensuring a quick response is important because according to pipeline operators and industry stakeholders, reducing the amount of time it takes to respond to an incident can also reduce the amount of property and environmental damage stemming from an incident and, in some cases, the number of fatalities and injuries. For example, several natural gas pipeline operators noted that a faster incident response time could reduce the amount of property damage from secondary fires (after an initial pipeline rupture) by allowing fire departments to extinguish the fires sooner. In addition, hazardous liquid pipeline operators told us that a faster incident response time could result in lower costs for environmental remediation efforts and less product lost. We identified five variables that can influence incident response time and that are within an operator's control:

- *Leak detection capabilities*. How quickly a leak is detected affects how soon an operator can initiate a response. Pipeline operators must perform a variety of leak detection activities to monitor their systems and identify leaks.[19] These activities commonly include periodic external monitoring, such as aerial patrols of the pipeline, as well as continuous internal monitoring, such as measuring the intake and outtake volumes or pressure flows on the pipeline. In addition, pipeline operators must conduct public awareness programs for those living near pipeline facilities about how to recognize, respond to, and report pipeline emergencies; these programs can influence how quickly an operator becomes aware of an incident. Attempting to confirm an incident can also affect response time. Pipeline operators may prefer to have two sources of information to confirm an incident, such as data from a pipeline sensor and a visual confirmation, especially if shutting down the system is a likely response to the incident. Natural gas pipeline operators in particular generally seek to confirm an incident before a shutdown, as shutdowns interrupt the gas flow and can cut off service to their customers.

[19]Hazardous liquid pipeline operators are required to have a leak detection system on their pipeline. Natural gas pipeline operators may choose to install a leak detection system, although they are required to periodically survey their pipeline to identify leaks.

- *Location of qualified operator response personnel*. The proximity of the operator's response personnel to a facility or shutoff valve can affect the response time. Response personnel who have a greater distance to travel to the facility or valve site can take longer to establish an incident command center or to close manual valves. Along with proximity, incident response time depends on whether qualified operator response personnel—those who are trained and are authorized to take necessary action, such as closing manual valves—are dispatched.

- *Type of valves*. The type of valve an operator has installed on a pipeline segment can affect how quickly the segment can be isolated. Automated valves, which can be closed automatically or remotely, can shorten incident response time compared to manual valves, which require that personnel travel to the valve site and turn a wheel crank or activate a push-button actuator to close the valve. However, if affected valves happen to be located at or close to facilities where personnel are permanently stationed, the type of valve could be less critical in influencing incident response time.

- *Control room management*. Clear operating policies and shutdown protocols for control room personnel can influence response time to incidents.[20] For example, incident response time might be reduced if control room personnel have the authority to shut down a pipeline or facility if a leak is suspected, and are encouraged to do so. A few of the operators we met with told us that while in the past it was a common practice in the industry to avoid shutdowns unless absolutely necessary, the practice now for these operators is to shut down the line if there is any doubt about safety. An official from one natural gas pipeline operator told us that his company instructs control room personnel that they will not suffer repercussions from shutting down a line for safety reasons. Another official from a hazardous liquid pipeline operator told us that the authority to shut down is at the control room level and that even personnel in the field can make the call to shut down a line.

[20]PHMSA requires pipeline operators to develop and follow written control room management procedures that define the roles and responsibilities of control room personnel in normal, abnormal, and emergency operating situations. This requirement allows individual operators to define the specific responsibilities for control room management by considering the characteristics of the operator's pipeline and its methods of safely managing pipeline operation.

- *Relationships with local first responders*. Operators that have already established effective communications with local first responders—such as fire and police departments—may respond more quickly during emergencies.[21] For example, one natural gas pipeline operator told us that during one incident, the local first responders had turned to the operator personnel for direction on how to respond to a rupture. As a result, the operator said that one of the lessons learned was that the company needed to conduct more emergency response exercises, such as mock drills, with the local first responders so the responders would know their roles and responsibilities.

We identified four other variables that influence a pipeline operator's ability to respond to an incident, but are beyond an operator's control:

- *Type of release*. The type of release—leak or rupture—can influence how quickly an operator responds to an incident. Leaks are generally a slow release of product over a small area, which can go undetected for long periods. Once a leak is detected, it can take additional time to confirm the exact location. Ruptures, which usually produce more significant changes in the external or internal conditions of the pipeline, are typically easier to detect and locate.

- *Time of day*. The time of day when an incident occurs can affect incident response time. The operator's response personnel may be delayed in reaching facilities in urban or suburban areas during peak traffic times. Conversely, if an incident occurs during the evening or on a weekend, the operator's response personnel could be able to reach the facility more quickly, because of lighter traffic. For example, one natural gas pipeline operator told us about an incident that occurred on a Saturday afternoon, which meant that traffic did not delay response personnel traveling to the scene.

- *Weather conditions*. Weather conditions can affect how quickly an operator can respond to an incident. For example, one natural gas pipeline operator described an incident caused by a hurricane's storm

[21]PHMSA requires pipeline operators to establish and maintain communications with fire, police, and other appropriate public officials to learn the responsibility and resources of each government organization that may respond to a natural gas or hazardous liquid pipeline emergency and acquaint the officials with the operator's ability in responding to an emergency. Operators must also plan and coordinate their responses to emergency incidents with these officials.

surge that pushed debris into the pipeline at a facility, and flooding prevented the response personnel from reaching the site for several days, during which time the pipe continued to leak gas. Winter conditions can also make it more difficult for the operator's response personnel to reach a facility or to access valve sites in remote areas. As another example, windy conditions can disperse natural gas and make it hard to detect a leak.

- *Other operators' pipeline in the same area*. If two or more operators own pipeline in a shared right of way,[22] determining whose system is affected can increase incident response time. Operators may delay responding if they have not confirmed that the incident is on their pipeline. For example, one natural gas pipeline operator told us about an incident that took 2 days to repair because when their personnel first detected a leak, the personnel initially contacted another operator, whose line crossed over theirs, to make sure the leak was not the other operator's.

Operators we spoke with stated that the amount of time it takes to respond to an incident can depend on all of the variables listed above and can range from several minutes to days (see table 1).

[22]A right of way is a strip of land, usually between 25 to 150 feet wide, containing one or more pipelines.

Table 1: Examples of Response Times in Select Pipeline Incidents from 2009 to 2011

Incident response time	Description
1 minute	A rupture on a natural-gas transmission pipeline located underground in a sparsely populated area was caused when a construction company worker accidentally struck the pipeline, which then ignited and exploded. When the line broke, automatic-shutoff valves on either side of the rupture closed within one minute. Despite the fast valve closure, the explosion caused one fatality—the worker who struck the pipeline—and injured seven others. The affected pipeline segment was 20 miles long. Though the valves were closed, there was enough gas remaining in the pipeline to fuel the fire for several hours. In addition to causing a fatality and injuries, the incident cost the operator an estimated $1 million, due primarily to the value of the lost product ($740,000), as well as damage to the pipeline ($288,000).
3 minutes	A rupture on a hazardous liquid transmission pipeline, located underground near a creek in a sparsely populated area, was caused when heavy rains shifted the land which broke the pipeline, releasing over 1,700 barrels of propane. The line break was immediately picked up by the operator's computer-based leak detection system, and operator personnel on site closed manual valves to isolate the segment within 3 minutes. Because propane is a highly volatile liquid, which turns to gas when released into the atmosphere, there was no soil or water contamination or environmental cleanup costs. The incident cost the operator an estimated $128,000, due primarily to the cost of repairs ($73,000) and value of lost product ($55,000).
8 minutes	During the night, unknown individuals operating construction equipment punctured a hazardous liquid transmission pipeline located underground in an environmentally sensitive area, causing 56 barrels of crude oil to leak into the soil. The puncture caused a drop in pressure that the control room operator detected in 2 minutes. Six minutes later, the control room operator shut down the pipeline and isolated the affected segment with remote-control valves. About two hours later, the operator's response personnel arrived on site. The incident cost the operator an estimated $1.3 million, due primarily to its environmental remediation efforts ($1 million) and emergency response ($250,000).
2 hours	A crack on an above-ground portion of a hazardous liquid pipeline, located in a populated area, caused 120 barrels of crude oil to spray into the air. About 15 minutes after the incident started, a local resident reported to the fire department that crude oil was spraying into the air at a pipeline station. The fire department went to the incident site and, about 30 minutes after the initial call, notified the pipeline operator of a broken oil pipeline. About 20 minutes after receiving the fire department's call, the control room began shutting down the pipeline system and isolating the affected segment by ordering the closure of the upstream valve. Approximately 50 minutes later—about 2 hours after the incident started—response personnel arrived on site and manually closed the valve, which stopped the leak. The incident cost the operator an estimated $183,000, due primarily to its emergency response ($118,000) and environmental remediation efforts ($61,000).
7 days	A natural gas transmission pipeline, located underground in a sparsely populated area, developed a small leak as the result of a construction defect. The operator did not discover the leak on the pipeline for almost a week following initial reports due to the size of the leak in combination with wind gusts in the area that dissipated the escaping natural gas, reducing the common signs of a gas leak, such as the smell and damage to vegetation. Once the operator detected the leak during routine, periodic external monitoring of the pipeline, it took over a day to identify its exact location. The incident cost the operator an estimated $128,000 in repairs ($106,000) and lost product ($22,000).

Source: GAO presentation of information obtained during interviews with pipeline operators.

A Performance-Based Approach Could Improve Incident Response Times

We and others have recommended that the federal government move toward performance-based regulatory approaches to allow those being regulated to determine the most appropriate way to achieve desired, measurable outcomes.[23] For example, Executive Order 13563 calls for improvements to the nation's regulatory system, including the use of the best, most innovative and least burdensome tools for achieving regulatory ends.[24] We have also previously reported on the benefits of a performance-based framework,[25] which helps agencies focus on achieving outcomes.[26] Such a framework should include: 1) national goals; 2) performance measures that are linked to those national goals; and 3) appropriate performance targets that promote accountability and allow organizations to track their progress towards goals.

PHMSA has included these three elements of a performance-based framework in some aspects of its pipeline safety program, but not for incident response times. For example, PHMSA has set national goals intended to reduce the number of pipeline incidents involving fatality or major injury and the number of hazardous liquid pipeline spills with environmental consequences. Each of these national goals has associated performance measures (i.e., the number of such incidents) and specific targets (such as reducing the number of incidents involving a fatality or major injury from 39 to less than 28 per year by 2016) that allow PHMSA to track its progress toward the goals. However, while PHMSA has established a national goal for incident response times, it has not linked performance measures or targets to this goal. Specifically, PHMSA

[23]We consider performance-based regulations those that focus on desired, measurable outcomes, rather than prescriptive processes, techniques, or procedures.

[24]76 Fed. Reg. 3821, § 1 (a), (b)(4) (Jan. 21, 2011).

[25]GAO, *Statewide Transportation Planning: Opportunities Exist to Transition to Performance-Based Planning and Federal Oversight*, GAO-11-77 (Washington, D.C.: December 2010).

[26]In addition, NTSB has recommended that the Department of Transportation conduct an audit to assess the effectiveness of PHMSA's oversight of performance-based safety programs. See NTSB, *Pipeline Accident Report: Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire, San Bruno, California*, September 9, 2010, NTSB/PAR-11/01 (Washington, D.C: Aug. 30, 2011). In response to the NTSB recommendation, the Department of Transportation is currently conducting an audit, which it expects to issue in early 2013, that will evaluate the effectiveness of PHMSA's inspection and oversight of pipeline operators' integrity management programs, including expanding the use of meaningful metrics and setting goals for pipeline operators and tracking performance against those goals.

directs operators to respond to certain incidents–emergencies that require an immediate response–in a "prompt and effective" manner,[27] but neither PHMSA's regulations nor its guidance describe ways to measure progress toward meeting this goal. Without a performance measure and target for a prompt and effective incident response, PHMSA cannot quantitatively determine whether an operator meets this goal. PHMSA officials told us that because each incident presents unique circumstances, its inspectors must determine whether an operator's incident response was prompt and effective on a case-by-case basis. According to PHMSA, in making this determination, inspectors must use their professional judgment to balance any challenges the operator faced in responding with the operator's obligation to the public's safety.

Other organizations in the pipeline industry, including some state regulatory agencies, have developed methods for measuring the performance of operators responding to incidents by using specific incident response times. According to the National Association of Pipeline Safety Representatives, several state pipeline safety offices have initiatives that require natural gas pipeline operators to respond within a specified time frame to reports of pipeline leaks. For example, the New Hampshire Public Utilities Commission has established incident response time standards—ranging from 30 to 60 minutes, with performance targets—for natural gas distribution companies to meet when responding to reports of a leak.[28] In addition, members of the Interstate Natural Gas Association of America have committed to achieving a 1-hour incident response time for large diameter (greater than 12 inches) natural gas

[27]Emergencies include natural gas detected inside or near a building, accidental release of hazardous liquid or carbon dioxide from a pipeline facility, fire or explosion occurring near or directly involving a pipeline facility, operational failure causing a hazardous condition, or natural disaster affecting pipeline facilities.

[28]According to these standards, gas distribution companies have three response time targets—30 minutes, 45 minutes, and 60 minutes—which companies must meet between 76 to 97 percent of the time, depending on the response time target and the operator's working hours when the call is received (i.e., normal business hours, after hours, and weekends/holidays). For example, gas distribution companies are expected to achieve a 30-minute response 76 percent of the time during weekends and holidays, but 82 percent of the time during normal business hours. These response time standards also apply to other events, such as odor complaints or reports of damage to the pipeline.

pipelines in highly populated areas.[29] To meet this goal, operators are planning changes to their systems, such as relocating response personnel and automating over 1,800 valves throughout the United States.

According to PHMSA officials, pipeline incidents often have unique characteristics, so developing a performance measure and associated target for incident response time similar to those used by other pipeline organizations would be difficult. In particular, it would be challenging to establish a performance measure using incident response time in a way that would always lead to the desired outcome of a prompt and effective response. Officials stated that the intention behind requiring operators to respond promptly and effectively is to make the area safe as quickly as possible. In some instances, an operator can accomplish this outcome in the time it takes to close valves and isolate pipeline segments, while in other instances, an operator might need to completely vent or drain the product from the pipeline. Likewise, it would be difficult to identify a specific target for incident response time, as pipeline operators likely should respond to some incidents more quickly than others. For example, industry officials noted that while most fatalities and injuries caused by a pipeline explosion occur in the initial blast, a faster incident response time could help reduce fatalities and injuries in cases where there are sites nearby whose occupants have limited mobility (e.g., prisons, hospitals). In these situations, operators told us they want to ensure their incident response time is faster than for more remote locations where an explosion would have less of an impact on people, property, and the environment.

Although defining performance measures and targets for incident response can be challenging, one way for PHMSA to move toward a more quantifiable, performance-based approach would be to develop strategies to improve incident response based on nationwide data. For example, performing an analysis of nationwide incident data—similar to PHMSA's current analyses of fatality and injury data—could help PHMSA

[29]According to officials from the Interstate Natural Gas Association of America, which represents natural gas transmission pipeline operators, members will conduct a risk analysis on a case-by-case basis to determine the appropriate maximum incident response time for small diameter (i.e., 12 inches or less) natural gas pipelines in highly populated areas. Prior to the 1-hour goal for large diameter pipelines, members did not have any incident response time commitment.

determine response times for different types of pipelines (based on characteristics such as location, operating pressure, and diameter); identify trends; and develop strategies to improve incident response. Furthermore, as part of this analysis of response times for various types of pipelines, PHMSA could explore the feasibility of integrating incident response performance measures and targets for individual pipelines into its integrity management program. For example, PHMSA might identify performance measures that are appropriate for various types of pipelines and allow operators to determine which measures and targets best apply to their individual pipeline segments, based on the characteristics of those segments. Such an approach would be consistent with our prior work on performance measurement, as it would allow operators the flexibility to meet response time targets in several ways, including changes to their leak detection methods, moving personnel closer to the valve location, or installing automated valves. PHMSA would then review an operator's selection of measures and targets as part of ongoing integrity management inspections; this process is similar to how inspectors review other provisions in the integrity management program.

PHMSA Data on Incident Response Time Are Limited

PHMSA would need reliable national data to implement a performance-based framework for incident response times to ensure operators are responding in a prompt and effective manner.[30] However, the data currently collected by PHMSA do not enable them to accurately determine incident response times for all recent incidents for two reasons: 1) operators are not required to fill out certain time-related fields in the PHMSA incident-reporting form and 2) when operators do provide these data, they are interpreting the intended content of the data fields in different ways. Specifically, PHMSA requires operators to report the date and time when the incident occurred. Operators are not required to report the dates and times when:

- the operator identified the incident;
- the operator's resources (personnel or equipment) arrived on site; and
- the operator shut down and restarted a pipeline or facility.

[30]We have reported on the need for comprehensive and reliable data to implement a performance-based approach. See GAO, *Surface Transportation: Restructured Federal Approach Needed for More Focused, Performance-Based, and Sustainable Programs,* GAO-08-400 (Washington, D.C.: Mar. 6, 2008).

As a result, our analysis determined that hazardous liquid pipeline operators did not report the date and time for two of these variables—when the incident was identified and when operator resources arrived on site—for 26 percent (178 out of 674) of incidents that occurred in 2010 and 2011. Also, these operators did not identify whether a shutdown took place in 16 percent (108 out 674) of incidents over the same time period.[31] In comparison, natural gas pipeline operators reported more complete data; these operators did not report data for when the operator identified the incident and resources arrived on site in only 3 percent (6 out of 191) of incidents that occurred in 2010 and 2011. Also, these operators did not identify whether a shutdown took place in only about 2 percent (3 out of 191) of incidents over the same period. PHMSA officials told us that because they have not used the time-related data to identify safety trends, the omissions have not been a problem for them, although in the future they may decide to make some of these data fields mandatory.

In addition to omitting certain incident data fields, several officials from pipeline operators told us that they interpret what to include in the time-related, incident data fields differently. For example, according to one official from a natural gas operator, some operators interpret the time when an operator identified the incident as the time when operator personnel first received a call about a potential leak, while others may interpret the time when an operator identified an incident as the time when operator personnel received an on-site confirmation of a leak. These differing interpretations occur even though guidance on PHMSA's

[31]The DOT Inspector General has also reported on significant data problems with PHMSA hazardous liquid pipeline operator data. In its 2012 audit, the DOT Inspector General identified shortcomings in PHMSA data management and quality that limit the usefulness of incident and annual report data. For example, according to the audit, PHMSA lacks a method to detect duplicate reporting of annual shipment volumes from one year to the next. PHMSA reported that it created a data quality assurance plan in 2010 and has implemented many improvements in its pipeline safety data systems, but still faces significant staffing and funding needs to make further improvements. See Office of Inspector General, U.S. Department of Transportation, *Hazardous Liquid Pipeline Operators' Integrity Management Programs Need More Rigorous PHMSA Oversight*, AV-2012-140 (Washington, D.C.: June, 2012).

website instructs operators how to complete the reporting forms, including the time-related data fields.[32]

Improved Information Sharing about Evaluating Automated Valve Advantages and Disadvantages Could Inform Operators' Decisions

The primary advantage of installing automated valves is reducing the time to shut down and isolate a pipeline segment after a leak or rupture occurs, while disadvantages include the potential for accidental closures and monetary cost. Because these advantages and disadvantages vary among valve locations, operators should make decisions about whether to install automated valves—as opposed to other safety measures—on a case-by-case basis. PHMSA has several opportunities to assist operators in making these evaluations, including communicating guidance and sharing information on some methods operators use to make these decisions.

Improved Response Times, Potential for Accidental Closures, and Costs Should be Evaluated on a Case-by-Case Basis

Research and industry stakeholders indicate that the primary advantage of installing automated valves is related to the time it takes to respond to an incident. Although automated valves cannot mitigate the fatalities, injuries, and damage that occur in the initial blast, quickly isolating the pipeline segment through automated valves can significantly reduce subsequent damage by reducing the amount of hazardous liquid and natural gas released. For example, NTSB found that automated valves would have reduced the amount of time taken to stop the flow of natural gas in the San Bruno incident and, therefore, reduced the severity of property damage and life-threatening risks to residents and emergency responders.[33] According to research and industry stakeholders, automated valves will only decrease the number of fatalities and injuries in those cases when people cannot easily evacuate the area, such as cases involving hospital patients or prison inmates.

Research and industry stakeholders identified several disadvantages operators should consider when determining whether to install automated

[32]PHMSA guidance states that when reporting on when an operator identified the incident, operators should enter the date and time when the operator became aware or first identified when the incident had occurred, and not when the operator determined that the incident met the reporting criteria.

[33]NTSB, *Pipeline Accident Report: Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire, San Bruno, California*, September 9, 2010, NTSB/PAR-11/01 (Washington, D.C: Aug. 30, 2011).

valves, related to potential accidental closures and the monetary costs of purchasing and installing the equipment. Specifically, automated valves can lead to accidental closures, which can have severe, unintended consequences, including loss of service to residences and businesses. For example, according to a pipeline operator, an accidental closure on a natural gas pipeline in New Jersey resulted in significant disruption and downstream curtailments to customers in New York City during high winter demand. In addition, the monetary costs of installing automated valves can range from tens of thousands to a million dollars per valve, which may be significant expenditures for some pipeline operators.[34] (See table 2.)

Table 2: Advantages and Disadvantages of Installing Automated Valves on Pipelines

Advantages	Improved response time	• Can reduce injuries and fatalities for some locations, such as hospitals or prisons, where people cannot evacuate quickly. • Can reduce the amount of damage by limiting the amount of fuel for secondary fire(s) and environmental cleanup. • Can allow operator personnel and emergency responders to access the affected segment more quickly and safely. • Can reduce the potential monetary cost of an incident for the operator by limiting the amount of product lost.
Disadvantages	Accidental closures	• For natural gas pipelines, accidental closures can result in the loss of service to utilities and critical customers (e.g., winter-time outages can leave people without heat). • For hazardous liquid pipelines, accidental closures can cause an incident, when a valve closes and the subsequent pressure buildup causes the pipeline to rupture.
	Monetary costs	• Requires operators to purchase equipment, including devices to remotely communicate or sense pressure drops, actuators to close the valve, and power sources for this new equipment. • Requires operators to take on installation costs, which can involve temporarily shutting down the pipeline, purging the product from the pipeline, and pulling product from the market. Operators may also have costs related to accessing the valve location (e.g., right of way, permitting, and physical space to install the new equipment) and updating their leak detection technologies. • May require operators to incur additional recurring costs to train staff, maintain the valves, increase security, and conduct inspections of the new valve.

Source: GAO analysis of research and industry stakeholder opinions.

Research and industry stakeholders also indicate the importance of determining whether to install valves on a case-by-case basis because

[34]See below and appendix III for a discussion on the costs of automated valves.

the advantages and disadvantages can vary considerably based on factors specific to a unique valve location. These sources indicated that the location of the valve, existing shutdown capabilities, proximity of personnel to the valve location, the likelihood of an ignition, type of product being transported, operating pressure, topography and pipeline diameter, among others, all play a role in determining the extent to which an automated valve would be advantageous.

Operators Have Developed Approaches to Evaluate Advantages and Disadvantages of Installing Automated Valves

Operators we met with are using a variety of methods for determining whether to install automated valves. One of the eight operators we met with had decided to install automatic-shutoff valves across its pipeline system, regardless of risk, to eliminate the need for control room staff to make judgment calls on whether or not to close valves to isolate pipeline segments. However, seven of the eight operators we met with developed their own risk-based approach for considering potential advantages and disadvantages when making these decisions on a case-by-case basis. For example, two natural gas pipeline operators told us that they applied a decision tree analysis to all pipeline segments in highly populated and frequented areas. They used the decision tree to guide a variety of yes-or-no questions on whether installing an automated valve would improve response time to less than an hour and provide advantages for locations where people might have difficulty evacuating quickly in the event of a pipeline incident. Other operators said they used computer-based spill modeling to determine whether the amount of product release would be significantly reduced by installing an automated valve. These seven operators told us that their approaches for making decisions about whether to install automated valves considered the advantages and the disadvantages we identified above.[35]

- *Improved response time*. Most operators we spoke with considered whether automated valves would lead to a faster response time. For example, the primary criterion used by two of the natural gas pipeline operators was the amount of time it would take to shut down the pipeline and isolate the segment and population along the segment. In one instance, an operator decided to install a remote-control valve in a location that would take pipeline personnel 2.5 hours to reach and 30 minutes more to close the valve. Installing the automated valve is

[35]See appendix II for more details on the methods used by each operator to determine whether or not to install automated valves.

expected to reduce the total response time to under an hour, including detecting the incident and making the decision to isolate the pipeline segment. In addition, several hazardous liquid pipeline operators used spill modeling to determine whether an automated valve would result in a reduced amount of damage from product release at individual locations. This spill modeling typically considered topography, operating pressure, and placement of existing valves. For example, one hazardous liquid pipeline operator used spill modeling to make the decision to install a remote-control valve on a pipeline segment with a large elevation change after evaluating the spill volume reduction.

- *Accidental closures*. Operators indicated that installing automated valves, especially automatic-shutoff valves, could have unintended consequences, which they considered as part of their decisions to install automated valves. For example, two natural gas pipeline operators considered whether there is the potential for accidentally cutting off service when assessing individual locations for the possible installation of an automatic-shutoff valve. As noted, one natural gas pipeline operator has made the decision to install automatic-shutoff valves across its pipeline system. The operator stated that in the past, there were concerns with relying on automatic-shutoff valves because of the possibility for accidental closures, but the operator believes it has developed a process that effectively adapts to pressure and flow change and minimizes or eliminates the risk of the valve accidentally closing. Other natural gas pipeline operators stated that relying on pressure sensing systems can be dangerous because “tuning” the pressure activation in an effort to avoid accidental closures can result in situations where the valve will not automatically close during an actual emergency. For hazardous liquid, all operators we spoke with stated that they either do not consider or do not typically install automatic-shutoff valves because an accidental closure has the potential to lead to an incident. Specifically, operators stated that an unexpected valve closure can result in decompression waves in the pipeline system, which might cause the pipeline to rupture if operators cannot reduce the flow of product promptly.

- *Monetary costs*. According to operators and other industry stakeholders, considering monetary costs is important when making decisions to install automated valves because resources spent for this purpose can take away from other pipeline safety efforts. Specifically, operators and industry stakeholders told us they often would rather focus their resources on incident prevention to minimize the risk of an incident instead of focusing resources on incident response. PHMSA

stated that it generally supports the idea that pipeline operators should be given flexibility to target compliance dollars where they will have the most safety benefit when it is possible to do so. Operators we spoke with stated that they considered costs associated with purchasing and installing equipment. For example, four operators indicated that they will consider the costs related to communications equipment when determining whether to install automated valves. In addition, three operators stated that decisions to install automated valves are affected by whether the operator has or can gain access to the pipeline right of way. Other cost considerations mentioned by at least one operator included local construction costs and possible changes to leak detection systems. Finally, two natural gas pipeline operators stated that monetary cost plays a role in determining what steps they plan to take to meet a one-hour response time goal for pipelines in highly populated areas. For example, the operator might choose to move personnel closer to valves rather than installing automated valves, if that is the more cost-effective option.[36]

Opportunities Exist for PHMSA to Better Communicate Guidance and Share Best Practices Operators Use to Determine Whether to Install Automated Valves

PHMSA has developed guidance to help operators understand current regulations[37] on what operators must consider when deciding to install automated valves, but not all operators are aware of the guidance. PHMSA includes on its primary website two types of guidance that can be useful for operators in determining whether to install automated valves on transmission pipelines. First, PHMSA has developed inspection protocols for both the hazardous liquid and natural gas integrity management program. Second, PHMSA has developed guidance on the enforcement actions inspectors will take—such as a notice of proposed violation and warning letter, among others—should PHMSA discover a violation. Both of these pieces of guidance provide additional detail—not included in regulation—on the steps operators might take in considering whether to install automated valves. For example, PHMSA's inspection protocol for

[36]For a discussion of the costs of installing automated valves see appendix III.

[37]Federal regulations require hazardous liquid and natural gas pipeline operators to consider measures to prevent and mitigate the consequences of a pipeline failure that could affect a high-consequence area, including installing automated valves on individual pipeline segments if the operator determines such a valve would add protection and enhance public safety. As part of this determination, operators must consider certain factors at a minimum. These factors relate to descriptive characteristics of individual pipeline segments—such as pipeline profile and operating pressure—and consideration of the possible safety and environmental outcomes. See 49 C.F.R. §§ 192.935, 195.452(i).

natural gas operators describes several studies on the generic costs and benefits of automated valves and indicates that operators may use this research as long as they document the reasons why the study is applicable to the specific pipeline segment. However, operators we spoke with were unaware of existing guidance to varying degrees. Specifically, of the eight operators we met with, three were unaware of both the inspection and enforcement guidance, and the remaining five operators were unaware of the enforcement guidance. Operators we spoke with, including those that were unaware of the guidance, told us that having this information would be helpful in making decisions to install automated valves. According to PHMSA, the agency provides this guidance to operators to ensure operators follow it as they make decisions on whether to install automated valves, but does not re-distribute the guidance at regular intervals (e.g., annually).

According to PHMSA, inspectors see examples of how operators make decisions to install automated valves during integrity management inspections, but the inspectors do not formally collect this information or share it with other operators. Current regulations give operators a large degree of flexibility in making decisions in deciding to install automated valves. As mentioned earlier, we spoke with operators that are using a variety of risk-based methods for making decisions about automated valves. For example, some used basic yes-or-no criteria, while others applied commercially available computer software to model potential incident outcomes. According to PHMSA, officials do not formally share what they view as good methods for determining whether to install automated valves. Officials stated they do not believe it is appropriate for PHMSA to publicly share decision-making approaches from a single operator, as doing so might be seen as an endorsement of that approach. However, according to PHMSA, its inspectors may informally discuss methods used by operators for making decisions to install automated valves and suggest these approaches to other operators during inspections. While the operators we spoke with represent roughly 18 percent of the overall hazardous liquid and natural gas transmission pipelines in high-consequence areas in 2010, there are over 650 additional pipeline operators we did not speak with that may be using other methods for determining whether to install automated valves. As such, we believe that both operators and inspectors could benefit from exposure to some of the methods used by other operators to make decisions on whether to install automated valves.

We have previously reported on the value of organizations reporting and sharing information and recommended that PHMSA develop methods to

share information on practices that can help ensure pipeline safety.[38] PHMSA already conducts a variety of information-sharing activities that could be used to ensure operators are aware of both existing guidance and of approaches used by other operators for making decisions to install valves. While, according to PHMSA officials, the agency will not endorse a particular operator's approach or practice, it can and does facilitate the exchange of information among operators and other stakeholders. For example, PHMSA issues advisory alerts in the Federal Register on emerging safety issues, including identified mechanical defects on pipelines, incidents that occurred under special circumstances, and reminders to correctly implement safety programs (e.g., drug and alcohol screening). In addition, PHMSA administers a website different from its primary website that, according to officials, is intended to ensure communication with pipeline safety stakeholders, including the public, emergency officials, pipeline safety advocates, regulators, and pipeline operators.[39] PHMSA also periodically conducts public workshops with pipeline stakeholders on a wide variety of topics, including one in March 2012 on automated valves.

Conclusions

While PHMSA currently requires operators to respond to incidents in a "prompt and effective manner," the agency does not define these terms or collect reliable data on incident response times to evaluate an operator's ability to respond to incidents. A more specific response time goal may not be appropriate for all pipelines. However, some organizations in the pipeline industry believe that such a performance-based goal can allow operators to identify actions that could improve their ability to respond to incidents in a timelier manner, and are taking steps to implement a performance-based approach. A performance-based goal that is more specific than "prompt and effective" could allow operators to examine the numerous variables under their control within the context of an established time frame to understand their current ability to respond and identify the most effective changes to improve response times, if needed, on individual pipeline segments. Reliable data would improve PHMSA's

[38]GAO, *Pipeline Safety: Collecting Data and Sharing Information on Federally Unregulated Gathering Pipelines Could Help Enhance Safety*, GAO-12-388 (Washington, D.C.: Mar. 22, 2012) and GAO, *Rail Transit: FTA Programs Are Helping Address Transit Agencies' Safety Challenges, but Improved Performance Goals and Measures Could Better Focus Efforts*, GAO-11-199 (Washington, D.C.: Jan. 31, 2011).

[39]See http://primis.phmsa.dot.gov/comm/.

ability to measure incident response and assist the agency in exploring the feasibility of developing a performance-based approach for improving operator response to pipeline incidents.

One of the methods operators could choose to meet a performance-based approach to incident response is installing automated valves, a measure some operators are already taking to reduce risk. Given the different characteristics among valve locations, it is important for operators to carefully weigh the potential for improved incident response times against any disadvantages, such as the potential for accidental closure and monetary costs, in deciding whether to install automated valves as opposed to other safety measures. However, not all operators we spoke with were aware of existing PHMSA guidance and PHMSA does not formally collect or share evaluation approaches used by other operators to make decisions about whether to install automated valves. Such information could assist operators in evaluating the advantages and disadvantages of these valves and help them determine whether automated valves are the best option for meeting a performance-based incident response goal.

Recommendations for Executive Action

We recommend that the Secretary of Transportation direct the PHMSA Administrator to take the following two actions:

- To improve operators' incident response times, improve the reliability of incident response data and use these data to evaluate whether to implement a performance-based framework for incident response times.
- To assist operators in determining whether to install automated valves, use PHMSA's existing information-sharing mechanisms to alert all pipeline operators of inspection and enforcement guidance that provides additional information on how to interpret regulations on automated valves, and to share approaches used by operators for making decisions on whether to install automated valves.

Agency Comments

We provided the Department of Transportation with a draft of this report for review and comment. The department had no comments and agreed to consider our recommendations.

We are sending copies of this report to relevant congressional committees, the Secretary of Transportation, and other interested parties. In addition, this report will also be available at no charge on GAO's website at http://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-3824 or flemings@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix IV.

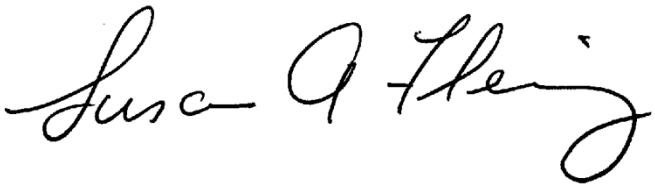

Susan Fleming
Director, Physical Infrastructure

Appendix I: Objectives, Scope, and Methodology

The objectives of our review were to determine (1) the opportunities that exist to improve the ability of transmission pipeline operators to respond to incidents and (2) the advantages and disadvantages of installing automated valves in high-consequence areas and ways that the Pipeline and Hazardous Materials and Safety Administration (PHMSA) can assist operators in deciding whether to install valves in these areas.

To address our objectives, we reviewed regulations, National Transportation Safety Board (NTSB) incident reports, and PHMSA guidance and data on enforcement actions, pipeline operators, and incidents, related to onshore natural gas transmission and hazardous liquid pipelines. We also attended industry conferences and interviewed officials at PHMSA headquarters and regional offices (Eastern, Southwestern, and Western), state pipeline safety agencies, pipeline safety groups, and industry associations. Specifically, we interviewed officials from the American Gas Association, American Petroleum Institute, Arizona Office of Pipeline Safety, Association of Oil Pipelines, Interstate Natural Gas Association of America, National Association of Pipeline Safety Representatives, NTSB, Pipeline Research Council International, Public Utilities Commission of Ohio, and West Virginia Public Service Commission.

To address both objectives, we also conducted case studies on eight hazardous liquid and natural gas pipeline operators. We selected these operators based on our review of PHMSA data on the operators' onshore pipeline mileage, product type and prior incidents, recommendations from industry associations and PHMSA, and to ensure geographic diversity. We selected six hazardous liquid and natural gas pipeline operators with a large amount of pipeline miles in high-consequence areas that also reported recent incidents (i.e., one or more incident(s) reported from 2007 through 2011) with a range of characteristics, such as: affected a high-consequence area; resulted in an ignition/explosion; or involved an automated valve. We also selected one natural gas pipeline operator and one hazardous liquid pipeline operator with a small number of pipeline miles in high-consequence areas, to obtain the perspective of smaller pipeline operators.[1] Specifically, we interviewed officials from:

[1]According to 2010 PHMSA data, the eight operators we selected represented 19 percent of hazardous liquid and 10 percent of natural gas miles in high-consequence areas. There were 682 hazardous liquid and natural gas transmission pipeline operators with 98,013 pipeline miles in high-consequence areas.

- Belle Fourche Pipelines (Casper, Wyoming)—Hazardous Liquids;
- Buckeye Partners (Breinigsville, Pennsylvania)—Hazardous Liquids;
- Enterprise Products (Houston, Texas)—Hazardous Liquids and Natural Gas;
- Granite State Gas Transmission (Portsmouth, New Hampshire)—Natural Gas;
- Kinder Morgan-Natural Gas Pipeline Company (Houston, Texas)—Natural Gas;
- Phillips 66 (Houston, Texas)—Hazardous Liquids;
- Northwest Pipeline GP (Salt Lake City, Utah)—Natural Gas; and
- Williams-Transco (Houston, Texas)—Natural Gas.

To determine what opportunities exist to improve the ability of transmission pipeline operators to respond to incidents, we identified several factors that influence pipeline operators' incident response capabilities. To do so, we discussed prior incidents, incident response times, and federal oversight of the pipeline industry with officials from PHMSA, state pipeline safety offices, industry associations, and safety groups. We also spoke with operators about their prior incidents and the factors that influenced their ability to respond. We also examined 2007 to 2011 PHMSA incident data, including data on total number of incidents, type of incident (leak or rupture), type of pipeline where the incident occurred, and the date and time when: an incident occurred; an operator identified the incident; operator resources (personnel and equipment) arrived on site; and an operator shut down a pipeline or facility. We assessed the reliability of these data through discussions with PHMSA officials and selected operators. We determined that data elements related to numbers of incidents, types of releases, and types of pipeline where incidents occurred were reliable for the purpose of providing context, but that data elements related to response time were not sufficiently reliable for the purpose of conducting a detailed analysis of relationships between response time and other factors. We also reviewed federal requirements, prior GAO reports, and industry and government performance standards related to emergency response within the pipeline industry.

To determine the advantages and disadvantages of installing automated valves in high-consequence areas and the ways that PHMSA can assist operators in deciding whether to install these valves, we identified the key factors that should be used in deciding whether to install automated valves in high-consequence areas. We used two categories of sources to identify the key factors:

(1) *Literature review*. We conducted a literature review of previous research on pipeline incidents. Specifically, we used online research software to search through databases of scholarly and peer-reviewed materials—including articles, journals, reports, studies, and conferences dating back to 1995—which identified over 200 sources.

(2) *Interviews with industry stakeholders*. During our interviews with officials from industry associations and pipeline safety groups, we discussed the advantages and disadvantages of installing these valves.

To ensure that the literature review included just those documents that were relevant to our purpose, two analysts independently reviewed abstracts from the 200 sources identified to determine whether they were within the scope of our review. Each source had to meet specific criteria, including mentioning automated valves, pipeline incidents, and operator emergency response. We excluded sources that were overly technical for the purposes of our review. To ensure these analysts were making similar judgments, they separately examined a random sampling of each other's sources. The analysts then added sources suggested by industry stakeholders during our interviews and reviewed them using the same criteria. After excluding documents that were not publicly available, one analyst reviewed these sources to identify advantages and disadvantages operators should consider when making decisions to install automated valves. A second analyst reviewed the analysis and performed a spot check on identified advantages and disadvantages. Specifically, the second analyst picked four of the sources at random to review and compared the advantages and disadvantages he identified to those of the first analyst. As part of our case studies, we discussed these advantages and disadvantages with operators. We also collected information from operators on their methods for deciding whether to install automated valves, as well as specific pipeline segments and valve locations where operators made such decisions (see app. II). We contacted vendors (manufacturers and installers) of automated valves to identify the range of costs for purchasing and installing these valves. We also discussed the regulations with officials from PHMSA headquarters and regional offices, state pipeline safety offices, and pipeline operators to determine what, if any, additional guidance would help operators apply the current regulations on installing automated valves.

We conducted this performance audit from March 2012 to January 2013 in accordance with generally accepted government auditing standards.

Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: How Select Operators Determined Whether to Install Automated Valves

We conducted site visits to eight hazardous liquid and natural gas pipeline operators with different amounts of pipeline miles in or affecting high-consequence areas.[1] Seven of the eight operators we visited told us they use approaches that consider both the advantages and disadvantages of installing automated valves on a case-by-case basis as opposed to other safety measures; the eighth operator stated that it follows a corporate strategy of installing automated valves in all high-consequence areas. A brief description of the approach used by each of the eight operators, based on our discussions with them, follows.

Pipeline operator: Belle Fourche

Product type: Hazardous liquid

Number of pipeline miles: 460 (total); 135 (could affect high-consequence areas)

Decision-making approach: The operator assesses each pipeline segment[2] using spill-modeling software to determine the amount of product release and extent of damage that would occur in the event of an incident. The software considers flow rates, pressure, terrain, product type, and whether the segment is located over land or a waterway. Monetary costs are considered as part of the decision-making process, including the cost of installing communications equipment and gaining access to the valve location when the operator does not own the right of way. The operator stated that installing a remote-control valve costs between $100,000 and $500,000. Automatic-shutoff valves are not considered as the operator believes an accidental closure could lead to pipeline ruptures.

[1]Requirements for integrity management require hazardous liquid pipeline operators to determine whether an incident on their pipeline could affect a high-consequence area, while natural gas pipeline operators are required to determine whether their pipeline is in a high-consequence area. Regulations also define how to identify high-consequence areas for these two types of operators.

[2]Pipeline segments are discrete sections of the pipeline system separated by valves that can stop the flow of product. The distance between valves is dictated in federal regulations. C.F.R. §§ 192.179, 195.260.

Results to date: According to Belle Fourche officials, this approach has not resulted in any decisions to install automated valves because the advantages have not outweighed the disadvantages on any of the pipeline segments assessed.[3]

Pipeline operator: Buckeye Partners

Product type: Hazardous liquid

Number of pipeline miles: 6,400 (total); 4,179 (could affect high-consequence areas)

Decision-making approach: The operator assesses each pipeline segment using spill-modeling software to determine the amount of product release and extent of damage that would occur in the event of an incident. The operator considers installation of an automated valve when this modeling shows such a valve would 1) reduce the size of the incident by 50 percent or more and 2) significantly reduce the consequences of an incident. The operator conducts additional analysis to determine the location where the automated valve would lead to the largest reduction in spill volume and overall consequences of an incident. Monetary costs are considered as part of the decision-making process, including costs for gaining access to pipeline when the operator does already not own the right of way. The operator stated that installing a remote-control valve costs between $35,000 and $325,000. Automatic-shutoff valves are considered, but not typically installed, as the operator believes an accidental closure could lead to a pipeline rupture.

Results to date: According to Buckeye Partners officials, this approach has resulted in additional analysis of the possible installation of 25 remote-control valves along 75 pipeline segments assessed.

Pipeline operator: Phillips 66

Product type: Hazardous liquid

[3]According to the operator, several automated valves have been installed independent from this decision-making approach.

Number of pipeline miles: 11,290 (total); 3,851 (could affect high-consequence areas)

Decision-making approach: The operator assesses every 100 feet of pipeline (which covers all pipeline segments) using spill-modeling software to determine the amount of product release and extent of damage that would occur in the event of a complete rupture. The operator also uses a relative consequence index for individual pipeline segments that considers the impact to high-consequence areas. Automated valve projects are further evaluated if 1) the potential drain volume is greater than 1,000 barrels, 2) the pipeline segment exceeds a certain threshold on the consequence index, or 3) the existing automated valves are greater than 7.5 miles apart. Monetary costs are considered as part of the decision-making process, including the cost of installing communications equipment, access to power, gaining access to the valve's location when the operator does not own the right of way, and local construction costs. The operator stated that installing an automated valve costs between $250,000 and $500,000. Automatic-shutoff valves are not considered as the operator believes an accidental closure could lead to pipeline ruptures.

Results to date: According to the Phillips 66 officials, this approach has resulted in decisions to install 71 automated valves in the 508 high-consequence area locations assessed.

Pipeline operator: Enterprise Products

Product type: Hazardous liquid and natural gas

Number of pipeline miles: 23,012 (total); 8,783 (could affect or in high-consequence areas)

Decision-making approach: The operator assesses each pipeline segment using spill-modeling software to determine the amount of product release and extent of damage that would occur in the event of an incident. The software considers factors such as topography and the placement of existing valves. The operator also uses a risk algorithm to identify threats to individual pipeline segments. The operator told us that it does not have specific criteria for guiding decisions to install automated valves; rather, officials make judgment calls based on the results of spill modeling and the application of the risk algorithm. Monetary costs are considered as part of the decision-making process, including the cost of

installing communications equipment and the amount of necessary infrastructure work. The operator stated that installing a remote-control valve costs between $250,000 and $500,000. Pipelines carrying gas or highly volatile liquids—which are in gas form when released into the atmosphere—are excluded from consideration, according to the operator, because industry studies have shown that automated valves do not significantly improve incident outcomes for these product types.

Results to date: According to Enterprise Products officials, this approach has not resulted in any decisions to install automated valves because the advantages have not outweighed the disadvantages on any of the pipeline segments assessed.

Pipeline operator: Granite State Gas Transmission

Product type: Natural gas

Number of pipeline miles: 86 (total); 11 (high-consequence areas)

Decision-making approach: The operator assesses individual pipeline segments in high-consequence areas using risk analysis software that considers the operator's response time to an incident, population in the area, and pipeline diameter, among other variables. Monetary costs are considered as part of the decision-making process, including the cost of installing communications equipment and costs to change or improve the existing leak detection system. The operator stated that installing an automated valve costs between $40,000 and $50,000. Automatic-shutoff valves are not considered, as officials believe that they could lead to unintended consequences, such as accidental closures.

Results to date: According to Granite State Gas Transmission officials, this approach has resulted in decisions to install remote-control valves in 30 of the 30 locations assessed.

Pipeline operator: Kinder Morgan-Natural Gas Pipeline Company of America (NGPL)

Product type: Natural gas

Number of pipeline miles: 9,800 (total); 569 (high-consequence areas)

Decision-making approach: The operator follows a long-term corporate risk management strategy for NGPL, developed in the 1960s, that calls for installing automatic-shutoff valves across its pipeline system regardless of advantages and disadvantages for individual pipeline segments. The operators told us that automatic-shutoff valves, as opposed to remote-control valves, were chosen because they reduce the potential for human error when making decisions to close valves. Officials stated that the biggest concern of using automatic-shutoff valves is the potential for accidental closures, but they believe they have developed a procedure for managing the pressure sensing system that effectively adapts to pressure and flow change and minimizes or eliminates these types of closures. Monetary costs are not considered as part of the decision-making process. The operator stated that installing automatic-shutoff valve on an existing manual valve costs between $48,000 and $100,000.

Results to date: According to Kinder Morgan officials, this approach has resulted in the installation of automated valves at 683 out of 832 locations across the pipeline system. Officials plan to automate the remaining valves over the next several years.

Pipeline operator: Northwest Pipeline GP[4]

Product type: Natural gas

Number of pipeline miles: 3,900 (total); 170 (high-consequence areas)

Decision-making approach: The operator uses a decision tree to assess individual pipeline segments based on several criteria, including the location of the valve (e.g., high-consequence area), diameter of the pipe, and the amount of time it takes for an operator to respond upon notification of an incident. The operator will install an automated valve in

[4]Williams Gas Pipeline is the parent company of two operators we visited: Northwest Pipeline GP and Williams Gas Pipeline-Transco. Northwest Pipeline GP is also referred to as WGP West. Williams Gas Pipeline-Transco is one of three pipeline systems that make up WGP East, which also includes Gulfstream Pipeline and Cardinal Pipeline.

any high-consequence, class 3, or class 4 areas[5] on large diameter pipe (i.e., above 12 inches) where personnel cannot reach and close the valve in under an hour. Monetary costs are considered as part of the decision-making process for the purposes of determining the most cost-effective way to ensure the operator can respond within one hour to incidents in high-consequence areas. The operator stated that installing an automated valve costs between $37,000 and $240,000. Automatic-shutoff valves are not installed in areas where an accidental closure could lead to customers losing service (i.e., in places where there is a single line feed servicing the entire area) or where pressure fluctuations may inadvertently activate the valve.

Results to date: According to Northwest Pipeline GP officials, this approach has resulted in decisions to install automated valves at 59 of the 730 locations assessed.

Pipeline operator: Williams Gas Pipeline-Transco[6]

Product type: Natural gas

Number of pipeline miles: 11,000 (total); 1,192 (high-consequence areas)

Description of decision-making method: The operator uses a decision tree to assess individual pipeline segments based on several criteria, including the location of the valve (e.g., high-consequence area), diameter of the pipe, and the amount of time it takes for an operator to respond upon notification of an incident. The operator will install an automated valve in any high-consequence, class 3, or class 4 areas on

[5]The Pipeline and Hazardous Materials Administration regulates natural gas pipelines based on class locations. Class 3 includes any location with more than 46 buildings intended for human occupancy within 220 yards of a pipeline, or an area where the pipeline lies within 100 yards of either a building or a small, well-defined outside area (such as a playground) that is occupied by 20 or more persons at least 5 days a week for 10 weeks in any 12-month period. Class 4 includes any location where unit buildings with four or more stories above ground are prevalent. See 49 CFR 192.5.

[6]Williams Gas Pipeline is the parent company of two operators we visited: Northwest Pipeline GP and Williams Gas Pipeline-Transco. Northwest Pipeline GP is also referred to as WGP West. Williams Gas Pipeline Transco is one of three pipeline systems that make up WGP East, which also includes Gulfstream Pipeline and Cardinal Pipeline.

large diameter pipe (i.e., above 12 inches) where personnel cannot reach and close the valve in under an hour. Monetary costs are considered as part of the decision-making process for the purposes of determining the most cost-effective way to ensure the operator can respond within one hour to incidents in high-consequence areas. The operator stated that installing an automated valve costs between $75,000 and $500,000. Automatic-shutoff valves are not installed in areas where an accidental closure could lead to customers losing service (i.e., in places where there is a single line feed servicing the entire area) or where pressure fluctuations may inadvertently activate the valve.

Results to date: According to Williams Gas Pipeline-Transco officials, this approach has resulted in decisions to install automated valves at 56 of the 2,461 locations assessed.

Appendix III: Automated Valve Costs

The eight operators we spoke with provided a range of cost estimates for installing automated valves—from as low as $35,000 to as high as $500,000 depending on the location and size of the pipeline, and the type of equipment being installed, among other things.[1] While both hazardous liquid and natural gas transmission pipeline operators estimated a similar cost range from about $35,000 to $500,000, hazardous liquid pipeline operators tended to estimate higher costs. Specifically, two of the three operators that exclusively transport hazardous liquids estimated that the minimum costs of installing an automated valve was $100,000 or higher and the maximum was $500,000. In contrast, pipeline operators that exclusively transport natural gas all estimated that the minimum cost was $75,000 or lower and three of the four operators estimated that maximum costs would be $240,000 or lower.

We also spoke with five equipment vendors and six contractors that install valves to gather additional perspective on the cost of purchasing and installing automated valve equipment.[2] According to estimates provided by these businesses, the combined equipment and labor costs range between $40,000 and $380,000. Specifically, equipment costs range from $10,000 to $75,000 while labor costs range from $30,000 to $315,000. (See table 3.) Vendors stated that the cost of installing an automated valve depends primarily on the functionality of the equipment (for example, additional controls would increase the cost), while contractors stated that these costs depend on the diameter and location of the pipeline. Vendors and contractors had varying opinions on whether the costs were greater to install an automated valve on hazardous liquid or natural gas pipeline.

[1]Several hazardous liquid operators indicated that the cost of installing an automated valve could be as high as $1 million under specific circumstances, but stated that these high costs are unusual.

[2]One pipeline contractor we spoke with had not yet installed an automated valve and did not did not provide cost estimates for doing so. Instead the contractor stated that the labor costs of installing a manual valve on an existing pipeline would be between $60,000 and $80,000.

Table 3: Range of Equipment and Labor Costs, According to Pipeline Vendors and Contractors

Equipment vendor	Range of equipment costs	Contractor	Range of labor costs
#1	$10,000 – $75,000	#1	$30,000 – $150,000
#2	$15,000 – $30,000	#2	$35,000 – $175,000
#3	$15,500 – $43,000	#3	$40,000 – $150,000
#4	$30,500 – $43,500	#4	$100,000 – $200,000
#5	$32,000 – $46,000	#5	$120,000 – $315,000
Average	**$20,600 – $47,500**	**Average**	**$65,000 – $198,000**

Source: GAO presentation of vendor and contractor information.

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact

Susan Fleming, (202) 512-3824 or flemings@gao.gov.

Staff Acknowledgments

In addition to the contact above, Sara Vermillion (Assistant Director), Sarah Arnett, Melissa Bodeau, Russ Burnett, Matthew Cook, Colin Fallon, Robert Heilman, David Hooper, Mary Koenen, Grant Mallie, Josh Ormond, Daniel Paepke, Anne Stevens, and Adam Yu made key contributions to this report.

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C-1 Montana IPTF

"Construction of the Northern Border Pipeline in Montana", Paul Stolen, Assistant Director, Interagency Pipeline Task Force, Montana Department of Natural Resources and Conservation

CONSTRUCTION OF THE NORTHERN BORDER PIPELINE IN MONTANA

Report to File

by

Paul Stolen, Assistant Coordinator

Interagency Pipeline Task Force

Montana Department of Natural Resources and Conservation

January 1982

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ACKNOWLEDGEMENTS

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INTRODUCTION

The Northern Border Pipeline, a 42-inch natural gas pipeline, was built in Phillips, Valley, and Roosevelt counties in 1981. It is part of the Alaskan Natural Gas Transportation System (ANGTS) which is being built by a consortium of pipeline companies to carry gas from the North Slope of Alaska to California via the Western Leg, and to Illinois via the Eastern Leg. The Northern Border Pipeline is that part of the Eastern Leg from the U.S. - Canada border in Montana to Iowa. The Northern Plains Natural Gas Company of Omaha, Nebraska, one of the consortium members, is the builder and operator of the pipeline. Completion is expected by the end of 1982.

Because of the large size of the ANGTS, legislation was passed by Congress setting up special procedures for building it. Some of these included establishing the Office of Federal Inspector to monitor and expedite permitting and construction, and the imposition of environmental requirements on the builders of the pipeline. There was little recognition of the role of states in the legislation, except for Alaska. In addition, Montana has little authority over gas pipelines, which are largely under the jurisdiction of the Federal Energy Regulatory Administration.

Regulatory actions that were taken by Montana state government were: 1) preparation of a draft and final environmental impact statement by the Department of Natural Resources and Conservation, published in 1980, 2) issuance of numerous state and local permits, and 3) establishment of the Interagency Pipeline Task Force Force (IPTF).

The IPTF was first established by executive order by Governor Judge for the Northern Tier oil pipeline. Governor Schwinden modified it to include any large-diameter pipeline, which allowed the IPTF to negotiate a limited

funding and policy agreement with the Northern Border Pipeline Company (NBPC). The IPTF operated from April 1, 1981 to December 31, 1981 on Northern Border, assisted NBPC with obtaining permits, and assisted state agencies with monitoring construction activities.

Northern Border is one of the first large-diameter pipeline built in Montana. As such, there are lessons to be learned from it. What follows is a description of pipeline construction, right-of-way requirements, special concerns of Montana state lands crossings, a short statement about federal-state relations on the project, and a few suggestions concerning state actions on future large pipeline projects. The project and natural environment of northeast Montana is described in detail in the EIS. Most photographs were selected from IPTF files. The report is not intended to be a complete description of all the issues that occurred, but rather was formulated as a guide to assist agency personnel working on future pipeline projects. Additional interpretations can be drawn from the data, tables, and photographs that may be useful in planning and regulating other large-diameter pipelines, but I have not presented detailed interpretations here.

GENERAL ASPECTS OF NORTHERN BORDER CONSTRUCTION

Construction of the approximately 181 miles of pipeline in Montana began on May 4, 1981. The photographs in this section depict the main features of construction, which are right-of-way (r-o-w) clearing, pipe-stringing, pipe bendings, ditching, welding, taping, lowering-in, back-filling (covering the pipe and trench), tie-ins (welding, lowering, and covering openings in the pipeline that were bypassed by the other operations), contouring and clean-up, river crossings, hydrostatic testing, and initial reclamation practices. These operations were largely completed by October 15, 1981. Work on valves, compressor station site, and reclamation operations continued after this date. Photographs frequently are of state-owned land (a total of about 13 miles of the 181 miles in Montana) crossed by the pipeline. If so, they are identified by the parcel number used by NBPC, such as PH012. Letters refer to counties: PH is Phillips county, VA is Valley county, and RO is Roosevelt County. A list of the state parcels, the legal description of locations and photographs of them is given in Table 1 on page 4.

A detailed description of the sequence of pipeline construction, and the differential rate at which separate construction operations proceeded, is given in Table 2. These operations are described in photos #1 through #49.

Table 1.

MONTANA STATE LANDS CROSSED BY THE
NORTHERN BORDER PIPELINE

"As-Built" Survey Stations*

Tract#	Enter	Leave	Legal Description	Photograph#
SPREAD NO. 1				
PH012.0	328+67.8	392+47.4	Sec. 36-T37N-R32E	15, 17, 19, 61, 62, 72, 73
PH018.0	516+03.8	572+84.7	Sec. 16-T36N-R33E	11
PH019.0	572+84.7	599+07.4	Sec. 21 T36N-R33E	11
PH021.0	648+36.7	651+46.2	Sec. 22-T36N-R33E	56, 57
PH022.0	651+46.2	667+37.3	Sec. 27-T36N-R33E	-
PH023.0	667+37.3	687+94.4	Sec. 26-T36N-R33E	-
PH026.0	741+59.1	809+47.1	Sec. 36-T36N-R33E	58, 63-66
PH033.0	992+62.8	1016+40.5	Sec. 16-T35N-R34E	81
VA001.0**	1326+02	1339+26.9	Sec. 7-T34N-R35E	20, 28, 29, 30, 45
VA006.0	1448+06.9	1502+51.2	Sec. 16-T34N-R35E	59
VA027.5	1994+02.5	2026+28.6	Sec. 36-T34N-R36E	68, 77
VA051.0	2804+01.2	2858+36.4	Sec. 17-T33N-R39E	69-71
VA052.0	2858+36.4	2913+76.7	Sec. 16-T33N-R39E	8, 74
VA053.5	2913+76.7	2922+92	Sec. 15-733N-R39E	-
VA055.0	2941+52	2968+29	Sec. 15-T33N-R39E	-
VA056.0	2968+29	2969+10.4	Sec. 22-T33N-R39E	76
VA057.0	2969+10.4	3023+11.9	Sec. 23-T33N-R39E	5, 50, 51, 75
VA058.0	3023+11.9	3046+56.4	Sec. 24-T33N-R39E	-
SPREAD NO. 2				
RO142	262+54.8	266+15.0	Sec. 16-T29N-R55E	79, 80
RO195***	1341+38	1407+72	Sec. 36-T28N-R58E	53, 54

* Submitted to DNRC August 10, 1981. "As-Built" refers to the survey made after the pipeline is buried. On Spread One, this is the distance in feet from the United States - Canadian Border; i.e. read 328+67.8 as 32,876.8 ft. On Spread Two, the survey began at Big Muddy Creek.

** This is a DNRC parcel; the rest are DSL.

*** As-Built surveying had not reached this point yet; this is a preliminary survey.

Table 2. Weekly progress of pipeline construction operations, given in miles, on Spread One, the 148.6 miles between the United States-Canada Border and Big Muddy Creek.

	May*	June			July				August		
		4-10	11-17	18-23	24-1	2-8	9-15	16-22	23-29	30-5	6-12
Temporary fencing	87.4	0	17.8	14.8	9.6	14.7	4.3	complete	--	--	--
Clear/grade right-of-way	80.4	6.6	16.0	15.0	10.2	13.8	5.8	complete	--	--	--
Pipe-stringing	10.0	5.3	5.9	12.1	13.6	8.1	6.6	9.1	10.0	11.9	13.2
Ditching	6.5	7.4	5.0	9.6	8.1	8.6	8.1	12.2	12.0	14.1	14.5
Bending	1.5	8.3	3.5	10.7	10.3	6.7	7.3	10.3	12.5	14.2	14.6
Welding	0	0.3	1.2	6.8	9.2	8.5	9.8	11.9	12.2	16.3	13.1
Tape/lower-in/back-fill	0	0	0.3	5.2	9.7	7.2	9.7	8.5	12.8	16.5	9.5
Right-of-way clean-up	0	0	0	0	8.2	4.5	2.4	3.6	9.3	6.8	16.9
Tie-ins	0	0	0	0	14.8	7.2	8.2	4.5	9.6	15.0	13.9
Hydrostatic testing	0	0	0	0	0	0	0	0	0	0	0

Table 2. Continued

	August			September				October	
	13-19	20-26	27-2	3-9	10-16	17-23	24-30	1-7	8-14
Temporary fencing	--	--	--	--	--	--	--	--	--
Clear/grade right-of-way	--	--	--	--	--	--	--	--	--
Pipe-stringing	14.7	13.3	12.2	2.1	complete	--	--	--	--
Ditching	12.8	11.9	10.0	7.3	complete	--	--	--	--
Bending	14.5	9.3	10.4	14.0	complete	--	--	--	--
Welding	10.9	12.2	5.3	9.1	9.2	4.8	7.0	0.6	complete
Tape/lower-in/back-fill	14.8	11.3	10.6	7.3	10.4	2.5	1.8	3.6	complete
Right-of-way clean-up	28.0	19.1	12.2	9.4	6.4	12.2	5.2	2.2	0.6 (complete)
Tie-ins	15.4	12.2	9.9	10.8	6.3	14.6	0	4.2	1.6 (complete)
Hydrostatic testing	0	0	0	51.3	6.0	76.6	9.4	0	5.3 (complete)

* A weekly breakdown for May was not reported to the IPTF

SOURCE: Reported to the Montana IPTF by the Office of the Federal Inspector, as reported by NBPC's inspectors. There may be discrepencies. Daily averages should be computed on the basis of a seven-day work week.

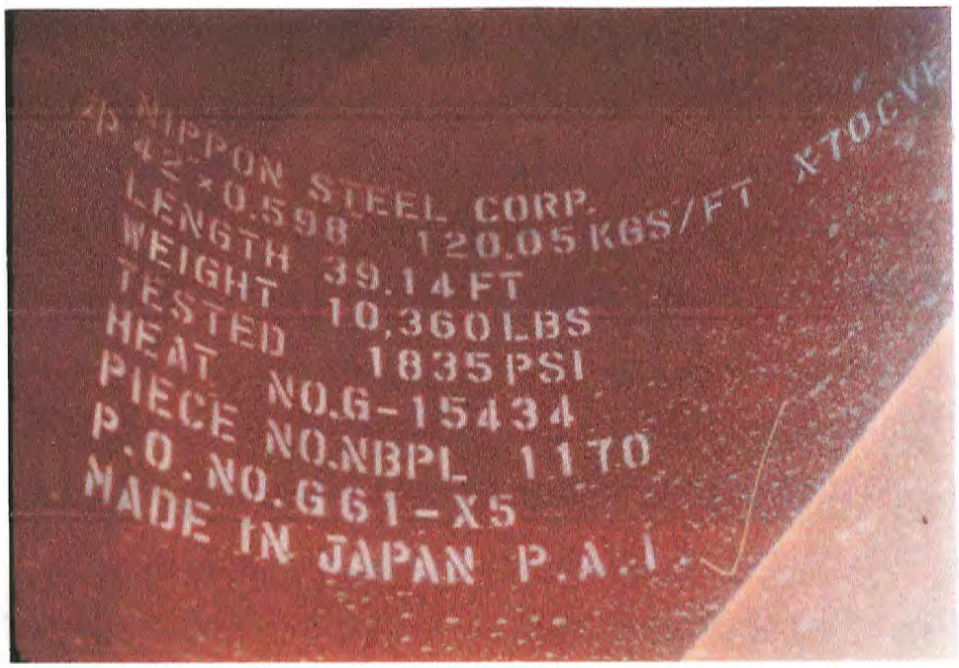

#1 Label inside a pipe section showing origin, strength, weight, thickness, and grade (X70). American-made pipe was used in other states along the Northern Border route. Forty-foot sections were transported by rail to the Valley Industrial Park near Glasgow.

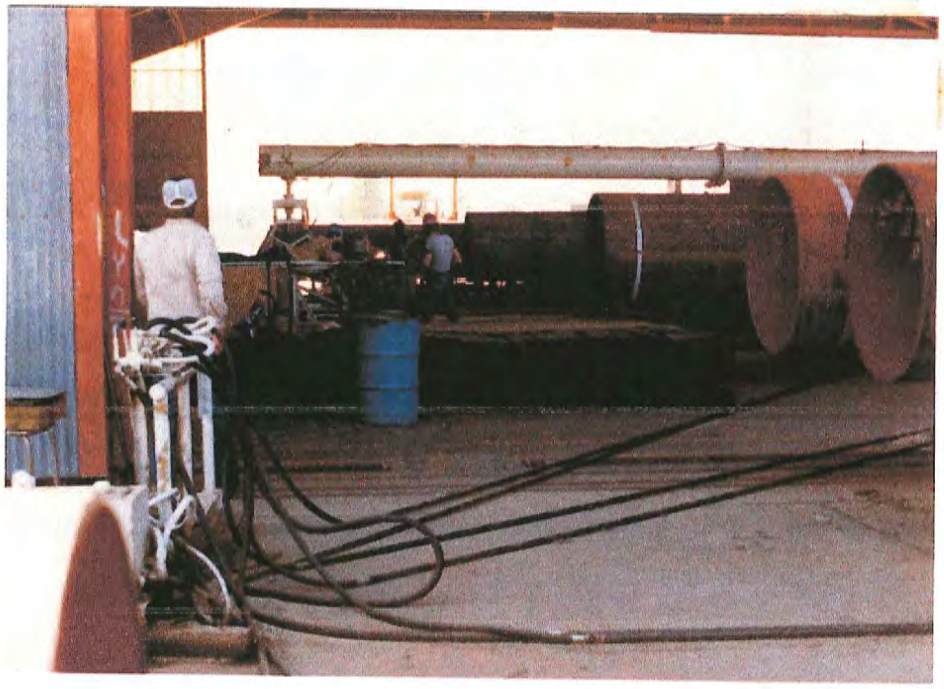

#2 Two forty-foot sections were machine welded together at Valley Industrial Park ("double-jointing").

#3 Storage of 80-foot sections ("joints) at VIP.

#4 Right-of-way clearing June 26. Soil and spoil is usually moved perpendicular to the centerline to simplify recontouring. All clearing was completed in Montana by July 15.

#5 Dozer blading 3-4 inches of topsoil from over trench area prior to ditching. This operation was combined with r-o-w clearing when the terrain was not as flat as shown in the photo, taken on July 16 on state land parcel VA057 west of the West Fork Procupine Creek.

#6 Pipe truck hauling three 80-foot joints on U.S. Highway 2. Load is approximately 63,000 pounds.

#7 Stringing pipe on r-o-w, which was used as road in many locations, after clearing was completed. Photo taken June 23.

#8 Trenching on state parcel VA052 on July 16. Note the grass remaining on the work area. Terrain was flat and little side-hill cutting was required.

#11 Welding spread in Phillips County on state land parcel PH018 near Turkey Track Road. Photo taken June 25. Note the welding trailers at each weld. The farm tractor on the right side of the r-o-w was used to pull the trailer. The bus was used to bring pipeliners to work. It was about a 1.5 hour one-way trip to this work site from Glasgow.

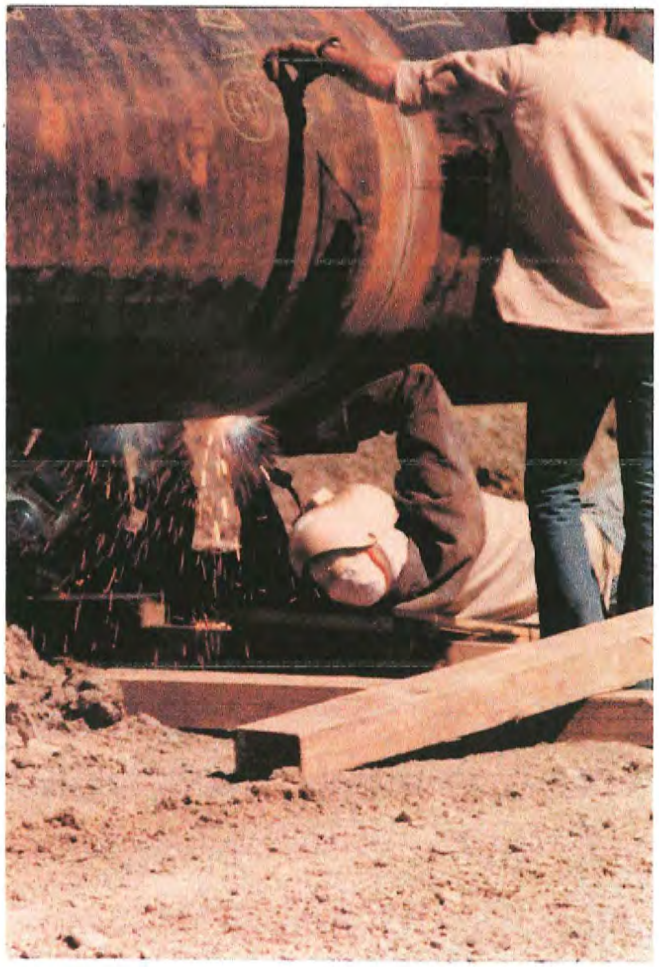

#12 Two welders joining 80-foot joints. Eleven welding passes were needed to join the .598 inch thickness pipe. Each weld was x-rayed for damage or faulty welds.

#9 Pipe joint in bending machine in Idaho on the Western Leg of the ANGTS. Similar machines were used in Montana. Pipe was coated with teflon, rather than tape, on the Western Leg. Pipe is bent to closely conform to terrain after it is strung out on the r-o-w.

#10 Bending machine again in Idaho. Note the "pig" which is run into the pipe joint to prevent kinking during bending by applying hydraulic pressure against the inside of the pipe. Photo taken June 24, 1981.

#11 Welding spread in Phillips County on state land parcel PH018 near Turkey Track Road. Photo taken June 25. Note the welding trailers at each weld. The farm tractor on the right side of the r-o-w was used to pull the trailer. The bus was used to bring pipeliners to work. It was about a 1.5 hour one-way trip to this work site from Glasgow.

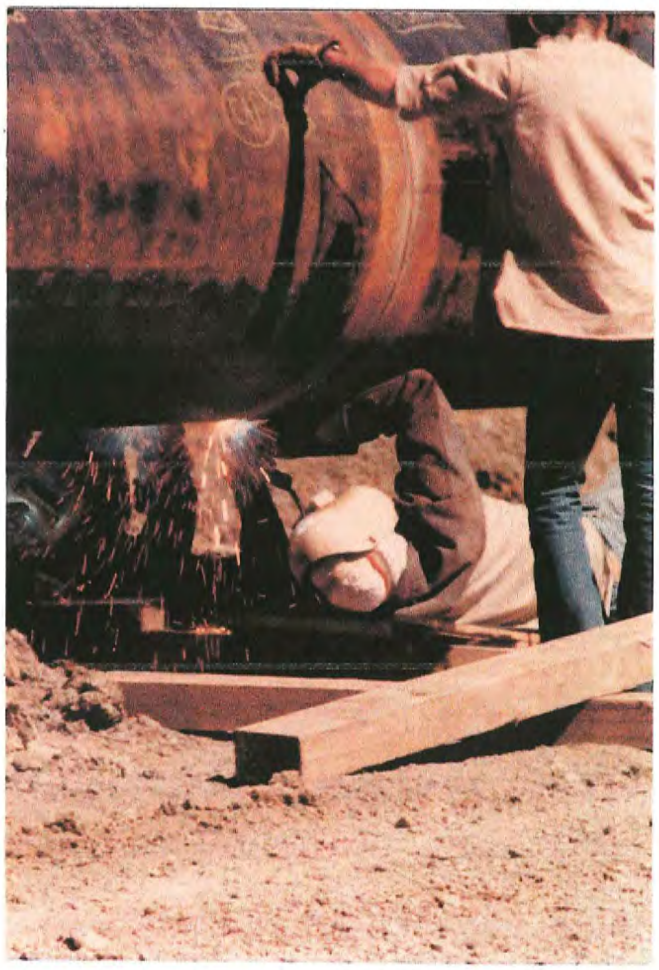

#12 Two welders joining 80-foot joints. Eleven welding passes were needed to join the .598 inch thickness pipe. Each weld was x-rayed for damage or faulty welds.

#13 Welding completed, and pipe ready for wrapping and lowering-in in Phillips County.

#14 Taping machine. In operation, it is suspended by a side-boom tractor. Pipe was coated with Teflon on the Western Leg of ANGTS rather than being wrapped with tape (see photo #9).

#15 Side-boom tractors lifting pipe and feeding it into the tape machine behind them. The tractors move slowly forward and the pipe is suspended on rollers. After wrapping, the pipe is lowered into the trench. The tractor in the foreground pulls a cart which carries hardwood blocks that prop up the welded pipe. This is state parcel PH012 on June 26.

#16 Taping machine wrapping pipe with plastic tape to prevent corrosion. It was stalled at the time of the photograph.

#17 Taped pipe after lowering-in, ready to be covered.
Photo taken June 26 on state parcel PH012.

#18 Ditch spoil being replaced by auger mounted on front of tractor.

#19 Backfill operation consists of: augering, a dragline pulling in the rest of the ditch spoil, and a front-loader bringing up the rear acting as a packer. The man on the pipe in front of the auger is responsible for flipping rocks off the pipe to prevent damage to the wrap. Photo taken June 26 on state parcel PH012.

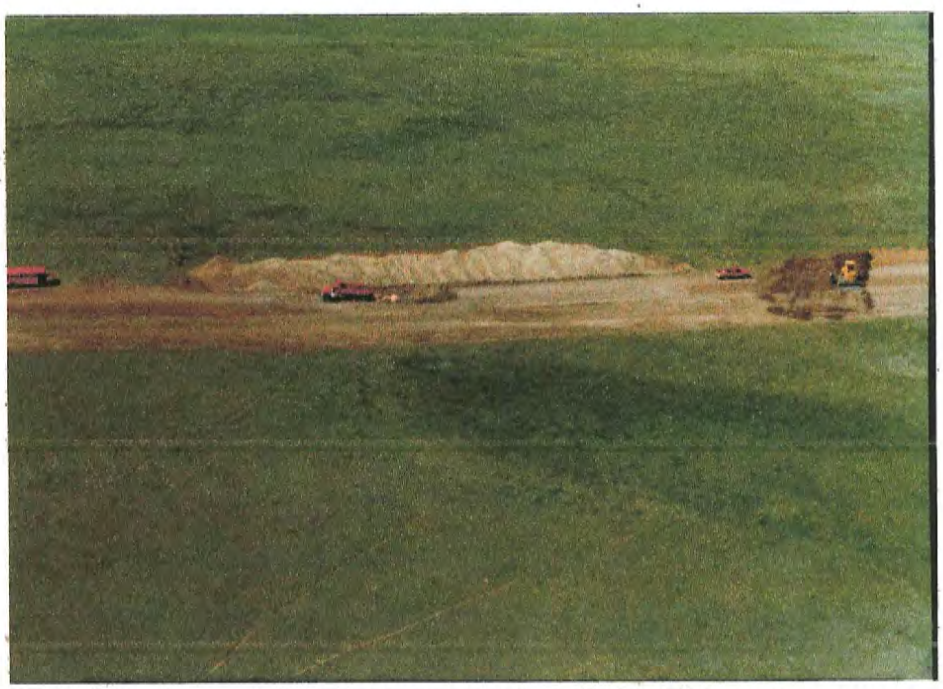

#20 Aerial view of clean-up operation in Phillips County as it begins on June 26. The dump truck is burying rock, dug up during trenching and clearing, in a side-hill cut.

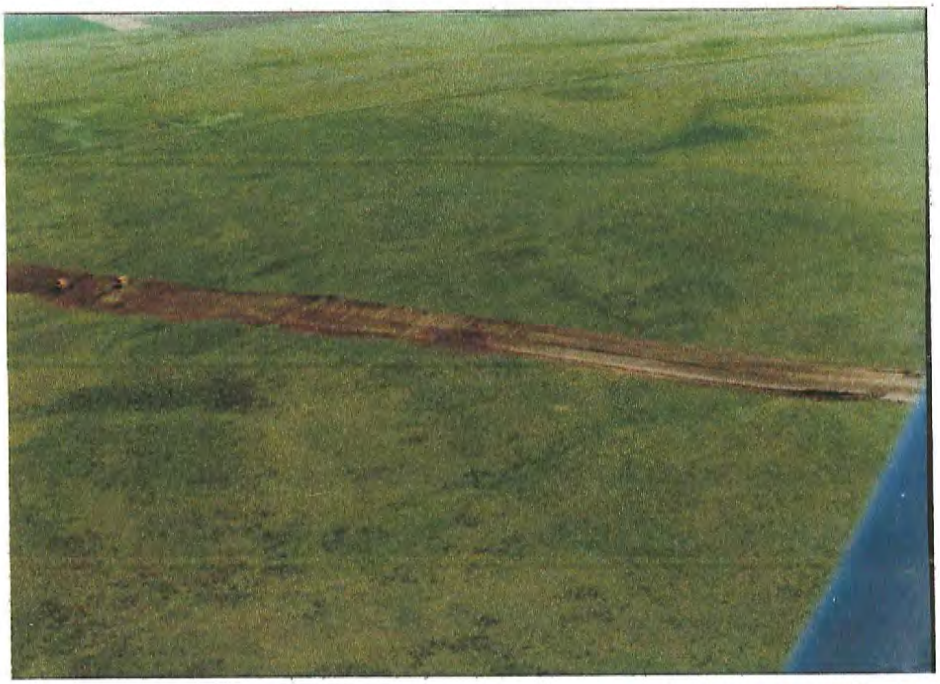

#21 Clean-up, Phillips County, looking northwest on June 26. Note the subsoil showing through. The ditch is on the north side of the r-o-w. (See also photo #78)

#22 West bluff of Frenchman Creek Valley being re-contoured on July 22. See photos #40 to #43 for a more detailed description of restoration on rough terrain.

#23 Clean-up completed by July 24th at the beginning of Spread #2, about 3 miles east of Big Muddy Creek in Roosevelt County.

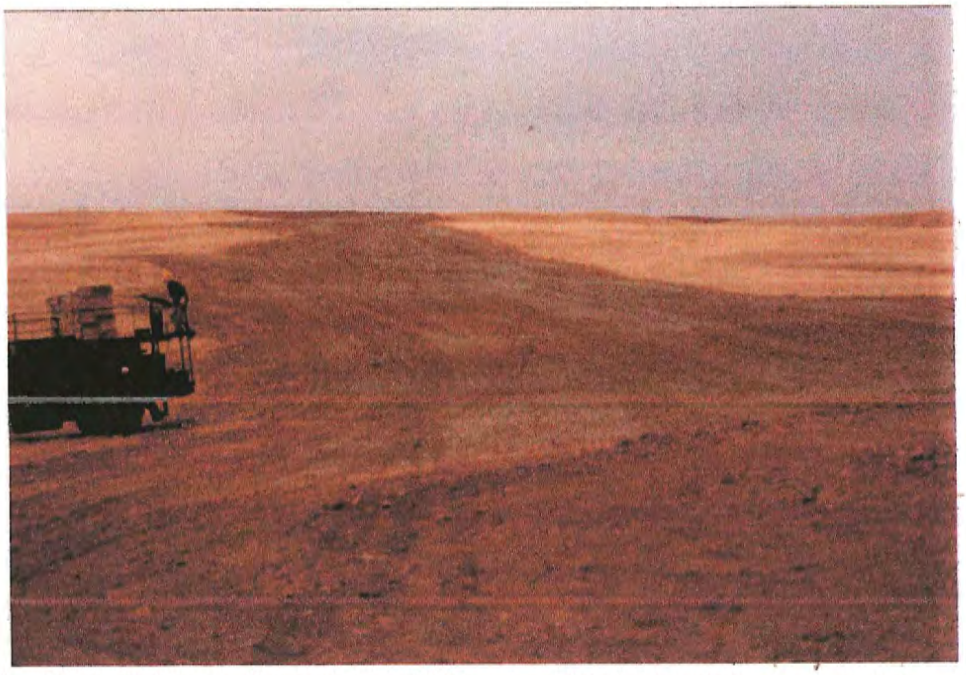

#24 Reclamation, November, 1981, in Phillips County. Mulch has been applied (photos#24 through #27 courtesy of Office of the Federal Inspector.)

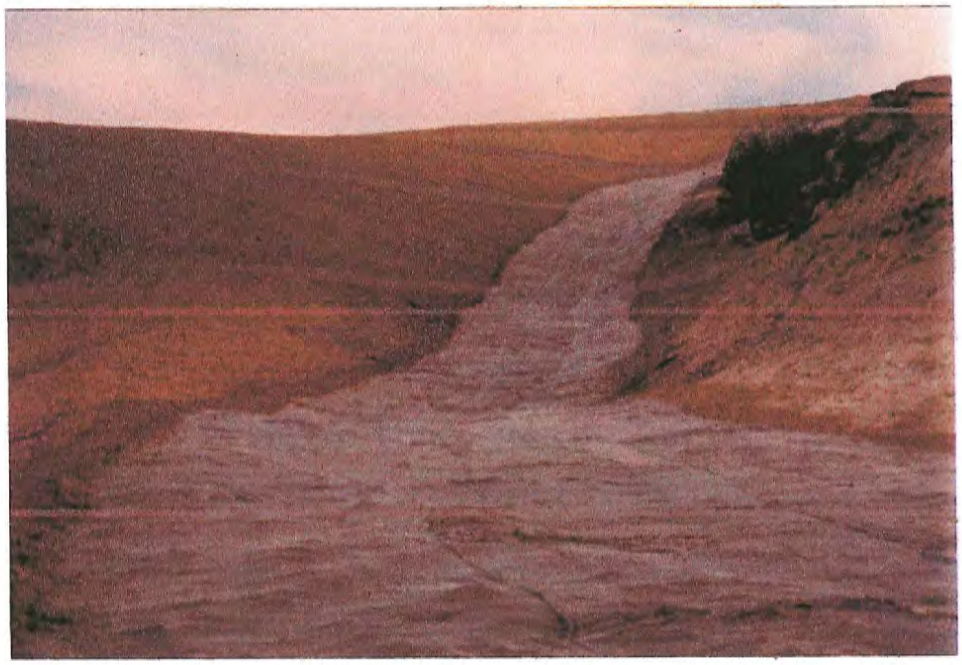

#25 Erosion prevention in drainageway, November 1981. The exposed soil surface is covered with a biodegradable mesh after seeding has been completed.

#26 Helicopter seeding crew. The helicopter carries a bucket that spreads native grass seeds on the r-o-w.

#27 Helicopter seeding crew.

#28 Crossing of Frenchman Creek Valley looking east on June 26. The Frenchman Reservoir is just downstream, and a proposal to raise the reservoir level would result in this area being flooded. Note: 1) the east bluff had not been cleared at the time of the photo because no final agreement had been reached with the landowner, even though construction began nearly 7 weeks before, 2) the DNRC owns 40 acres of flood-plain just west of the base of the bluff which is crossed by the pipeline (VA001), 3) a floating bridge which remained until completion of construction.

#29 East side of Frenchman Creek floodplain on July 14, pipe ready for welding. The eastern side of state parcel VA001 is just beyond the pipe bend. Note: 1) Trench filled with water across most of floodplain seen in #28, 2) Concrete weights to prevent pipe rising out of saturated floodplain, ready to be placed on pipe. Two kinds can be seen; rectangular "set-ons", and rounded "bolt-ons" are placed both above and below the pipe, 3) Trench side-wall slump, requiring additional backhoe excavation.

#30 Set-on weights being placed on pipe after it is in trench. Note the thick felt pads placed around the pipe to protect it. Photo taken July 14 on state parcel VA001.

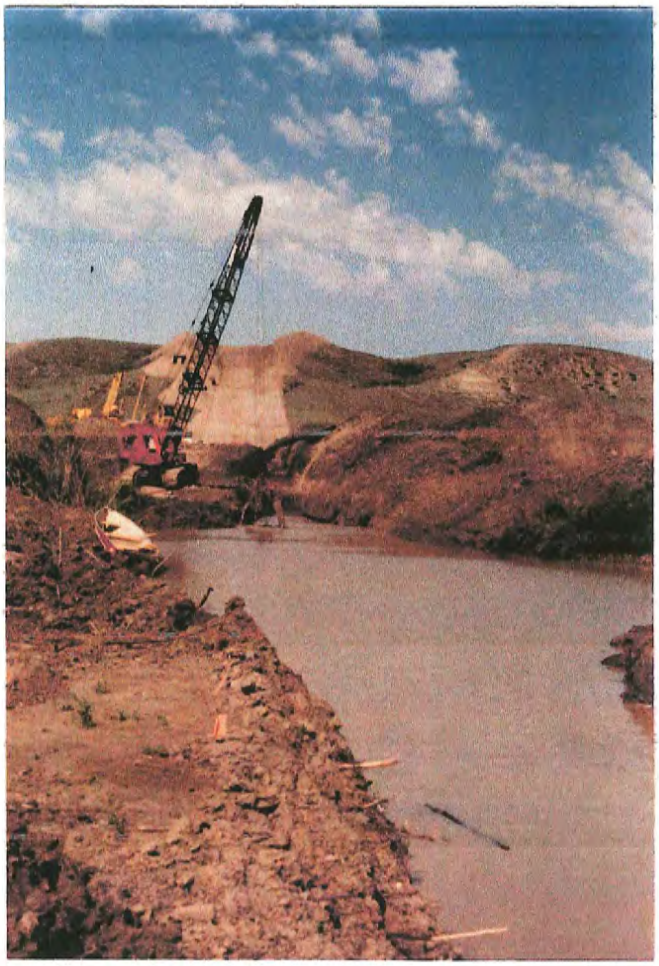

#31 Dragline opening ditch across Frenchman Creek, the last step before placing the pipe. Taken looking west from the east bank on July 14.

#32 Side-boom tractors lifting the creek section to pull it across. Concrete weights in place. The lead tractor, which winches the section across the creek with a cable, is in the foreground.

#33 Another view of the river section ready for pulling. View is looking west on July 14.

#34 Approaching the creek from the west. The lead tractor, not in the photo, has started to run out cable for pulling pipe. The foreman across the stream stands on the spoil bank to the right and orchestrates the movement of the tractors.

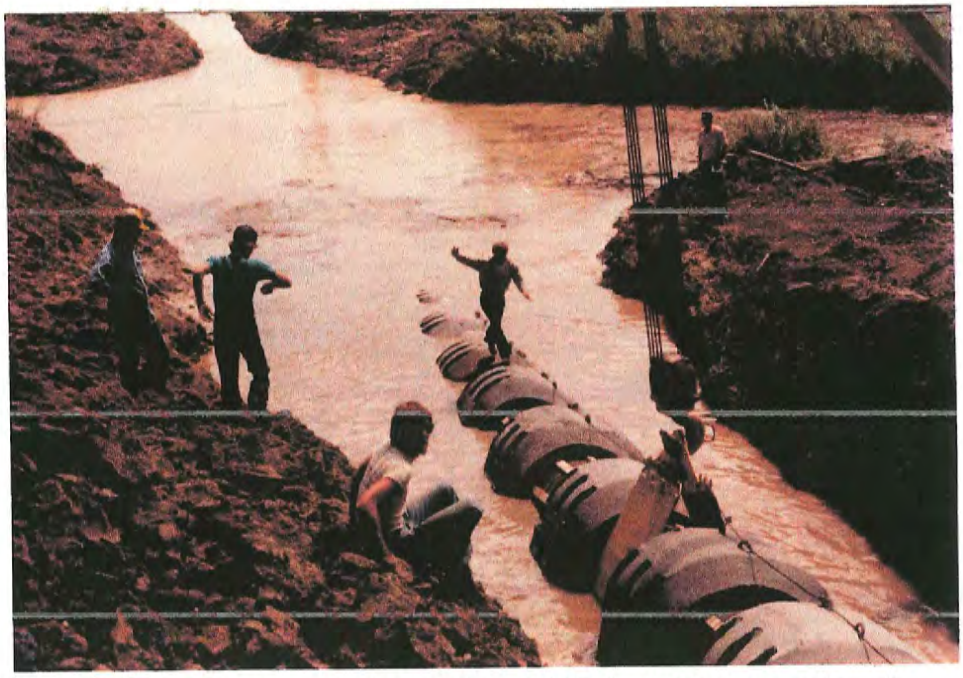

#35 Frenchman Creek section being pulled, looking east. A tractor, out of the picture, is winching it across the stream.

#36 Ditched floodplain of Big Muddy Creek, Roosevelt County, looking west from creek edge on July 24.

#37 Rock Creek Canyon, Valley County, looking south from the pipeline right-of-way on the east bluff on July 14.

#38 Rock Creek Canyon, looking west on July 22, construction in progress. Note: 1) Dozer covering pipeline, 2) River section lying next to creek on the base of the west bluff. This was the roughest terrain encountered in Montana.

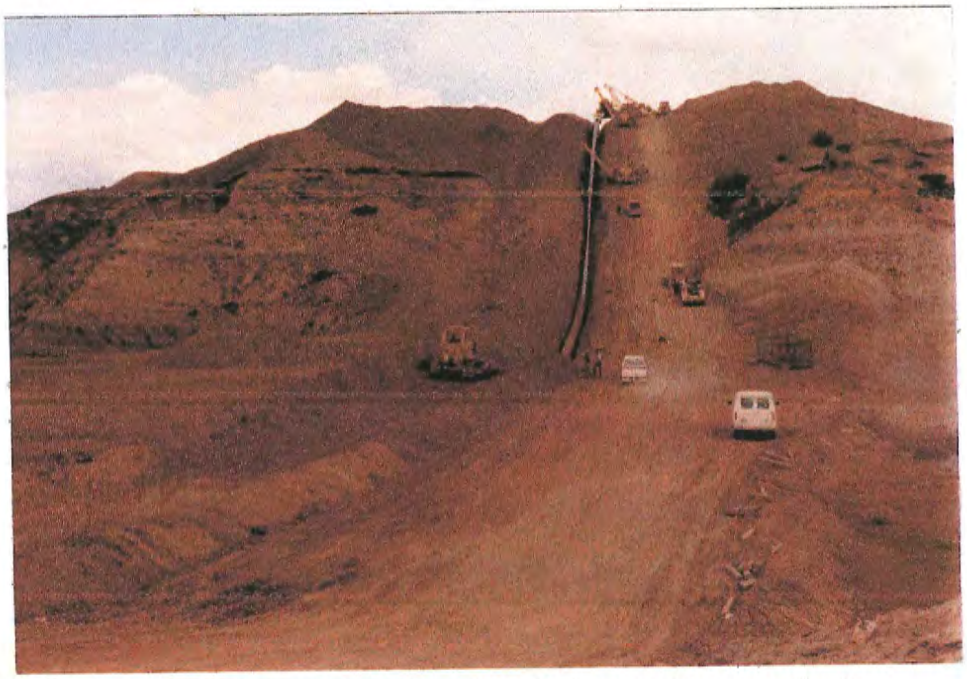

#39 East bluff of Rock Creek, pipe being laid on July 22. Note: 1) Sandstone ledge which required blasting, 2) tractor pulling truck up slope, 3) dozer blading spoil back into ditch.

#40 Aerial view of Coyote Coulee area, Phillips County, looking east on June 26 toward Frenchman Creek on the horizon. (This is partially BLM land, parcels PH028 and PH029.) Compare this with next three photos and see "Right-of-way requirements" section.

#41 Same coulee as above, looking west on June 25. Note: 1) the side-boom tractor negotiating the 80-foot pipe section, 2) depth of burial of the pipe in some cuts (see photos #69-#73 below).

#44 Construction across badlands. The r-o-w crosses an unvegetated shale knob on the east side of the Bitter Creek Valley. The top of the knob was crossed rather than a drainageway because less erosion would occur on top. Note the depth of cut into the knob on the right side of the picture. Photo taken looking west on July 22.

#45 Frenchman Creek crossing after re-contouring, looking east from the base of the west bluff on July 22.

#42 Same coulee looking west from east side on June 25.

#43 Same coulee on July 22, from approximately the same spot as #42, after re-contouring. Waterbars, small dikes built across slopes to slow water erosion, are present but not visible.

#46 Deciduous shrub/tree coulee about six miles east of Big Muddy Creek, Roosevelt County. American elm and green ash are the main tree species. The black material on the spoil bank is lignite. Photo taken July 24.

#47 Bored road crossing, Valley County. Boring was done, even on small roads, to prevent road maintenance problems. Photo taken June 23.

#48 Boring equipment (Idaho).

#49 Survey stakes along the r-o-w. Locations are given in the format "0+00". Table 1 gives survey stations for points where the pipeline enters and leaves state lands.

RIGHT-OF-WAY REQUIREMENTS AND STRIPPING OF TOPSOIL

One of the more important issues that appeared during construction was that of the amount of land needed. NBPC has indicated in its environmental assessment and in its easement application to the Montana Department of State Lands (DSL) that a 100-foot r-o-w would be needed for construction in most cases, because of the generally flat terrain in northeast Montana, with some additional space needs on rougher areas and at road and creek crossings. R-o-w width was an issue in DNRC's impact statements on both the Northern Tier and Northern Border pipelines, and the department recommended in both cases a 90-foot r-o-w. These recommendations were based on engineering work done by contractor to the department. Also, on parcels where easement agreements had not been reached, NBPC instituted condemnation proceedings on a 100-foot strip. This caused problems for the company, when, a short time later, construction began (see photo #28). It rapidly became clear that more than 100 feet were required in many areas and NBPC might have to return to the courts to procure the desired easement. In most cases, this did not occur and NBPC worked out an arrangement with the landowner.

This issue of r-o-w width was important to document for several reasons: 1) the extent of side-hill cutting, and subsequent potential for soil horizon mixing and other environmental problems, was underestimated by the applicant and the DNRC, 2) the potential construction delay, landowner problems and expense it caused the company, and 3) the relationship of r-o-w width to other reclamation issues, such as topsoil storage space requirements when extensive side-hill cutting is needed.

Construction on flat terrain, hillsides, and across drainages.

The photographs that follow show specific construction situations in northeast Montana that support the generalizations about r-o-w requirements that are depicted in figures 1-4. They also depict correct and incorrect topsoil storage techniques. According to Bob Morris, Leonard Pipeline Company's foreman for most of the clearing and clean-up operations, there were three chief constraints and requirements guiding r-o-w preparation operations: 1) a level work pad measuring 50 feet from the ditch centerline on the working side of the ditch, and measuring 35 feet on the ditch spoil side, 2) spoil from side-hill cuts had to be pushed away from its original location perpendicular to the centerline to prevent problems for the re-contouring crew (i.e., if spoil is placed in this manner, dozer operators can push it back without guessing where it came from), and 3) the pipe cannot be placed in fill for various engineering and structural reasons.

#50 State land parcel VA057 near the west boundary of the Fort Peck Reservation looking west on April 21 shortly before construction began. (see next photo).

#51 Same view as #50, about 300 yards farther west and from atop the trench spoil bank on July 23. Note that in the distance a trencher was used and in the foreground a backhoe was used. An 85-foot right-of-way was cleared in this area, and it became slightly wider after ditching, especially where the backhoe was used.

#52 An 85-foot cleared right-of-way on cropland in Roosevelt County on June 26. The r-o-w width increased slightly as the pipeline was constructed, but the width was well within 100 feet in most cases on this flat terrain.

#53 State parcel R0195 southeast of Bainville, looking west on April 21 at an approaching dust storm two weeks before construction began. See next photo.

#54 Same view as #53 on July 24. This was the only state parcel that was cropped. The r-o-w was generally about 85 feet wide on this parcel although it was wider in the foreground because the field road was bored under rather than ditched through.

#55 Compare this view with that at cross-section "B" in Figures 1-3 (this view is to the east, however). Note the cut on the left providing fill for the work space on the right. This is taken about 1.5 miles west of state parcel PH018 near Turkey Track Road. Photo taken June 25.

#56 Looking northwest on state parcel PH021 on April 21 before construction began. See next photo.

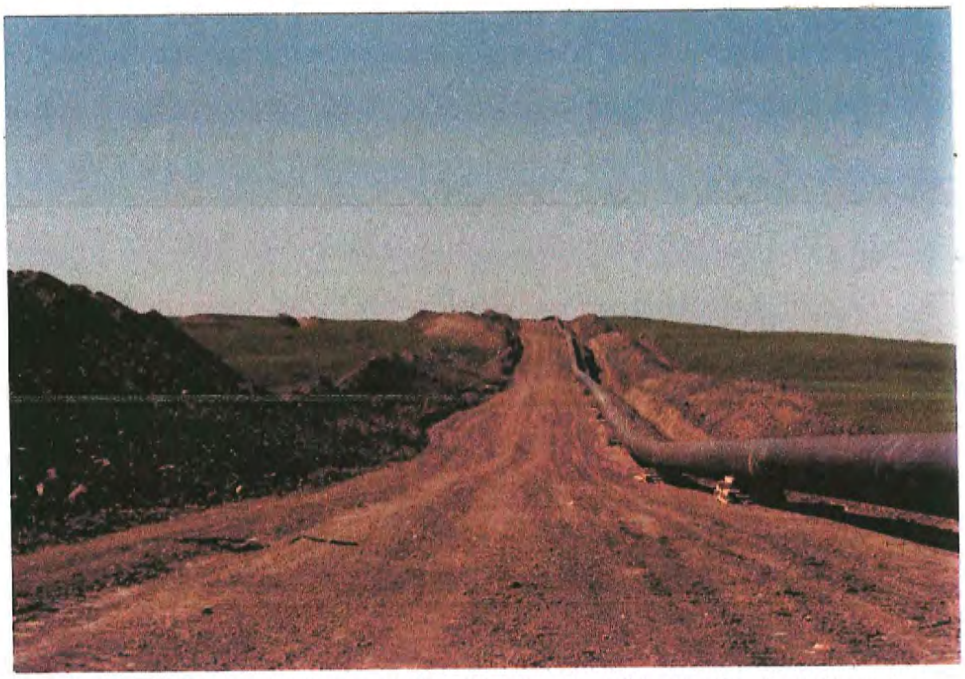

#57 Same view as #56 on June 25 about 150 yards farther to the southeast. Note similarities to cross section "B" on Figures 1-3.

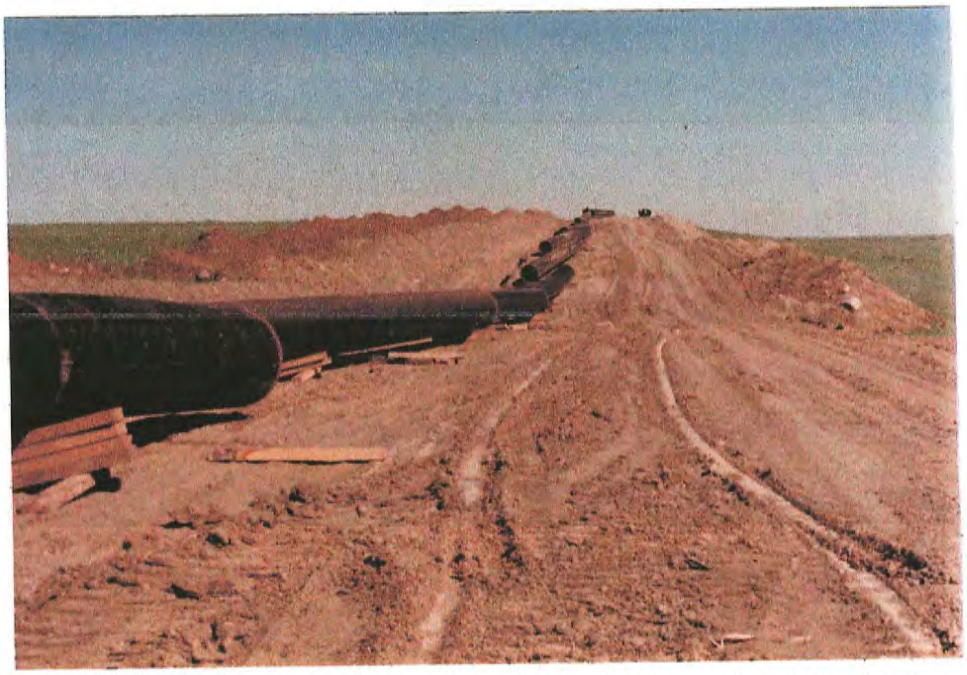

#58 Looking east on June 25 at a long stretch of south-facing slope on state parcel PH026. Note that on this parcel topsoil has been stored uphill to the left.

#59 Compare this view to views of cross section "A" on Figures 1-3. This photo, taken July 15, looks west on state parcel VA006. Note that there is poor topsoil separation in this area, although a small pile can be seen behind the large pile of subsoil.

#60 Compare this view to cross section "A" (on Figures 1-3) and to #59. This view looks west on private land several miles west of the parcel shown in #59. Note the pile of topsoil on the outside of the pile of material from the cut.

#61 Compare this view with that of #62. Both look west on state parcel PH012 from about the same spot. This photo was taken a few feet downhill from #62 on April 21, shortly before construction began.

#62 Same view as #61 on June 26, and see view "A" on Figures 1-3. Note the lack of topsoil storage piles. This section was cleared in the first few days after construction began, and little topsoil was saved even though saving 12 inches of "topsoil" was stipulated on the Department of Lands lease. (See conclusions section.)

#63 State parcel PH026 on April 21, looking southeast past the reservoir in the middle of the section. See #64, #65, and #66.

#64 Side-hill cut on work pad (as in cross section "A" on Figure 2) on state parcel PH026. This was the cut made in the hill on the other side of the drainage way shown in #63. Note the shallow depth of the A horizon (compare to #74 below.) Slope is about 7 degrees on this hill. Photo taken June 25.

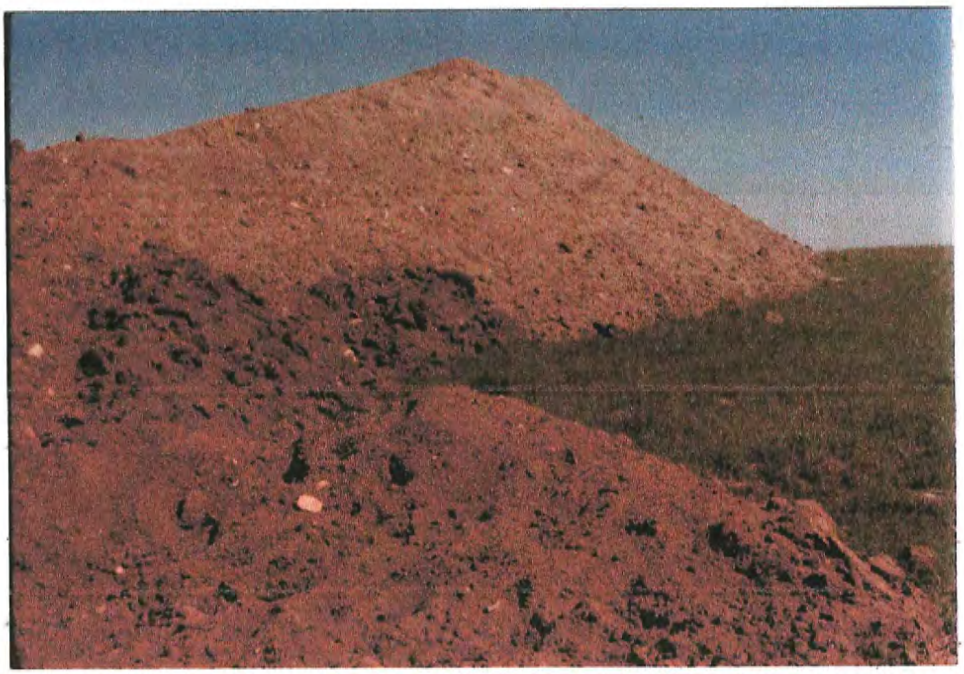

#65 Topsoil storage pile covered by spoil from cut close to spot where #64 was taken. Photo taken June 25.

#66 Topsoil storage on PH026. View is to the southeast on June 25.

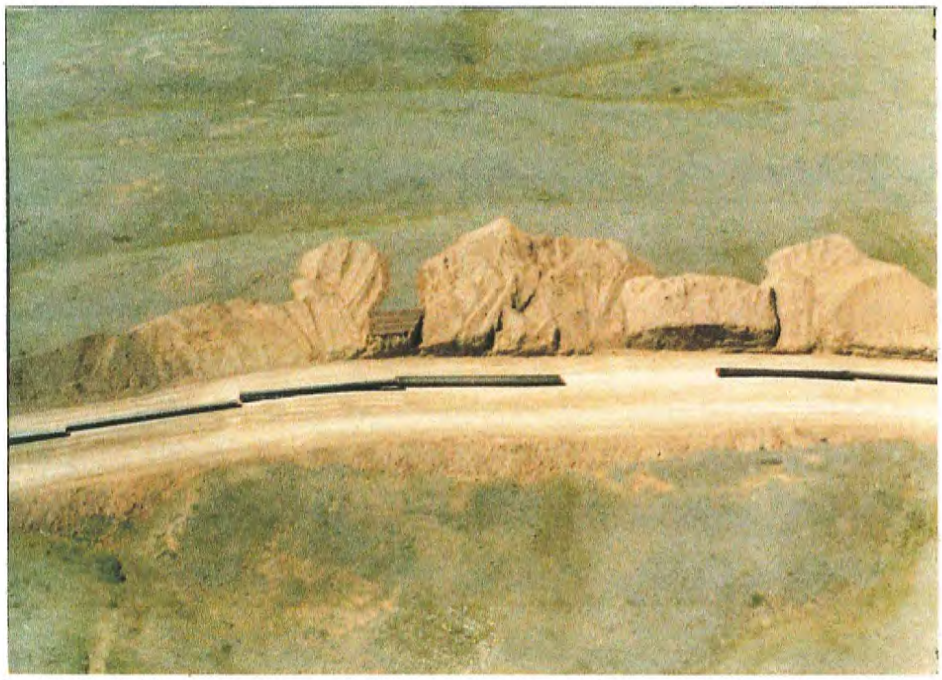

#67 Side-hill cutting similar to cross-section "B" on Figures 1-3. The ditch will be dug next to the cut and the work space is on the near side. This side hill is along a drainage. Photo taken June 26.

#68 View of state parcel VA27.5 looking southeast toward the Willow Creek valley before pipe-stringing began. Note: 1) soil/spoil storage is on alternate sides of the r-o-w, depending on the direction of slope, 2) the cleared r-o-w is about 85 feet wide on the flat areas shown in the photo, and 3) r-o-w requirements rapidly expand when soil/spoil storage areas are needed. VA27.5 begins on the other side of the fence beyond the sharp bend. This bend is the beginning of the "Bitter Creek Re-route" which follows an old road through the Bitter Wilderness Study area. Photo taken on June 26.

Extra-deep pipe burial on rough terrain

On steeply rolling terrain, or on bluffs above river valleys, pipe bends do not exactly follow the terrain. For example, on the Rock Creek bluffs seen in #38, the drop-off bend into the valley began before it reached the extreme edge of the bluff. This is done to avoid sharp bends as much as possible, and to reduce the overall amount of bending. This can be seen also in the terrain shown in #13. This requirement causes substantial increases in the right-of-way width at the bluff edge, primarily for soil/spoil storage. Photographs #69 through #73 depict some areas where this occurred.

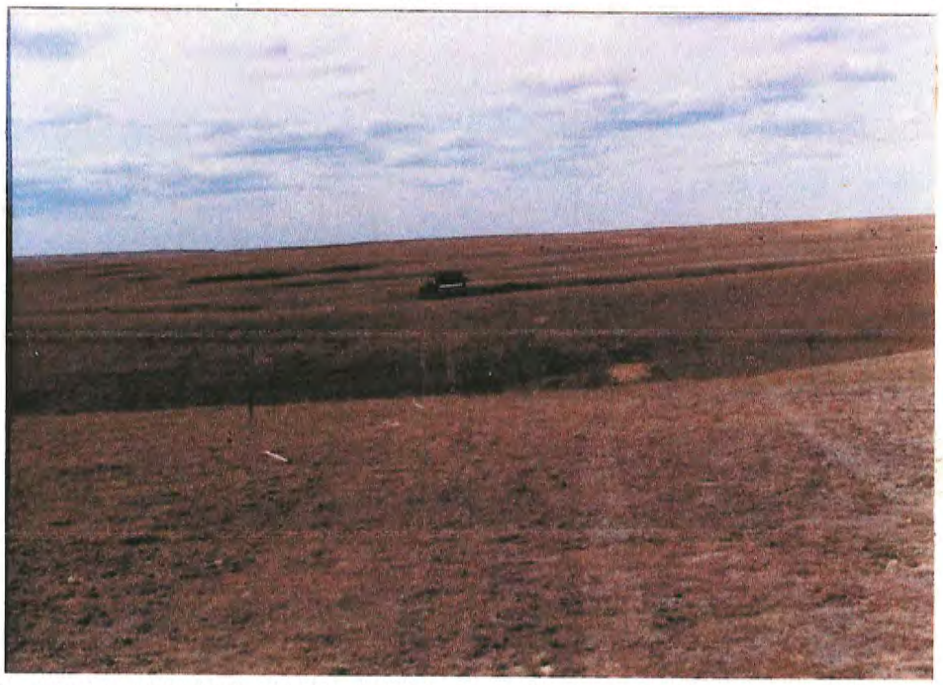

#69 State section VA051 looking west down staked centerline on April 21, 2 weeks before construction began. Compare with #70 and #71. This area is about four miles west of the west boundary of the Fort Peck Reservation.

#70 Same view as #69, same spot, taken June 26, before ditching and pipe stringing began. Note that each ridge is cut extensively, resulting in more gradual bends on top of the hills. This result cannot be obtained at the bottom of drainageways, however, because the pipe cannot be placed in unconsolidated fill.

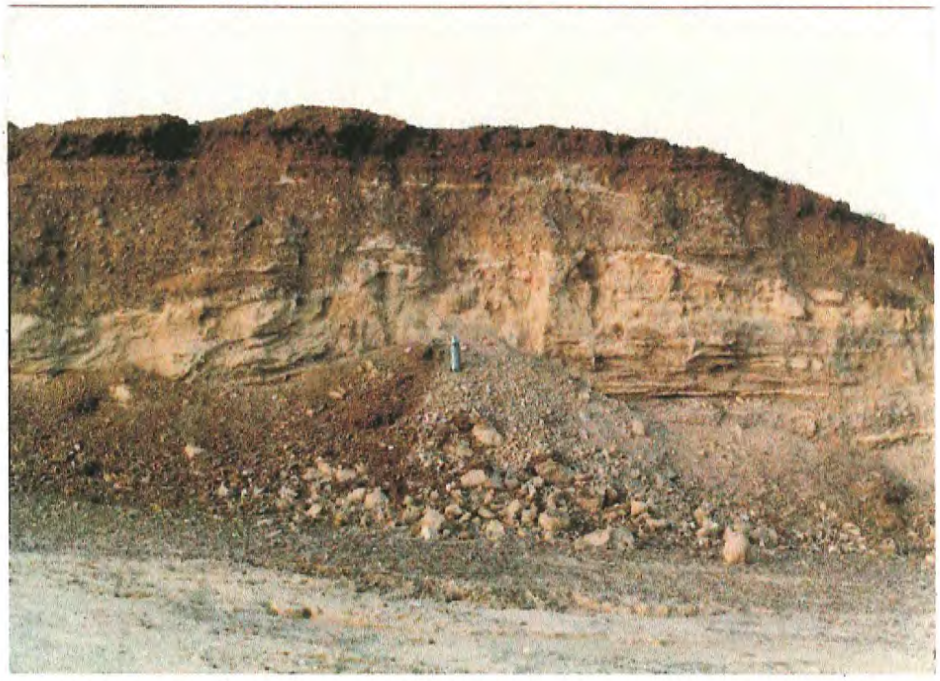

#71 Close-up view of the first cut on the right side of #70. Note the 1 quart thermos for scale. This area was very gravelly and sandy. The bottom of the pipe will be 7 feet below the level surface at the bottom of the photo. This means pipe burial of about 13 feet deep from the top of this ridge. The cut shown is about 10 feet deep.

#72 State parcel PH012 looking southeast on April 21 down the staked centerline before construction began. NBPC personnel estimated a r-o-w width of 100 feet here on this date. Compare with #73.

#73 Looking southeast at approximately the same spot as #72 on June 25. The r-o-w was about 230 feet wide here as a result of this side-hill cutting, which occurred within a few days of construction start-up (May 4).

Estimates of general r-o-w width requirements.

Figures 1-4 depict the r-o-w requirements for the Northern Border pipeline in Montana, as constructed by the Leonard Pipeline Company. Leonard Company built Spread #1, the first 148 miles, and Leonard/Rohart Inc., a joint venture of Leonard and a minority contractor, built Spread #2, the 28.5 miles from Big Muddy Creek to the North Dakota border. The figures are based on discussions with personnel from Northern Border and Leonard Pipeline Comapny and are generalized from measurements taken at numerous sites, mostly those shown in photos #50 through #73.

It should be kept in mind that figures 1-3 are most applicable to rangeland, which tends to be more rolling terrain, and are thus applicable to not more than half the Montana route. The other half is flat cropland and figure 4 shows the r-o-w requirements that are more typical of this terrain.

Explanation of Figures 1 through 3

Figure 1

Perspective view of a west-to-east pipeline r-o-w across rolling terrain. The situation depicted is similar to situations encountered on the Northern Border route (also generally west-to-east) across rangeland in northeast Montana. In this figure, looking west, the route first crosses a north-facing slope of about 7 degrees, then a relatively level area, and then a south facing slope, also about 7 degrees. Based on field

measurements, slopes on most of the rolling terrain rangeland in northeast Montana crossed by Northern Border did not exceed 7 degrees, except for ravines such as in photo #40, and frequently were about 5 degrees.

Figures 2 and 3

The cross sections and vertical views show the different effects of clearing on the slopes shown in figure 1. The work space must be on the same side of the right-of-way because the ditch and pipe cannot be crossed by equipment, and is usually on the right side of the ditch when facing the direction of construction, because of convention. Equipment such as side-boom tractors and trenchers have thus been constructed with booms on the left. In other words, side-boom tractors cannot build a pipeline from east-to-west on the right-of-way depicted here. The main requirement is a level work space, with little deviation, on either side of the trench. This level space requirement allows a trench of uniform depth to be dug, safe and smooth operation of the very heavy equipiment required to move large pipe, easier construction, and lower stress on welded pipe moved into the trench.

Note that the south facing slope, "B", has a narrower r-o-w because spoil can be used as fill and thus less space is needed for soil and spoil storage. As shown in the pictures in the previous section, there is considerable variation from site-to-site, especially with spoil and soil storage.

Figure 4

Vertical view of a cleared and ditched r-o-w on level terrain. Commonly, sod remains on the work space on this terrain, if it is rangeland. "Grade debris" refers to small amounts of soil, sod bladed from high spots, and the above-surface portions of any woody plants that are present.

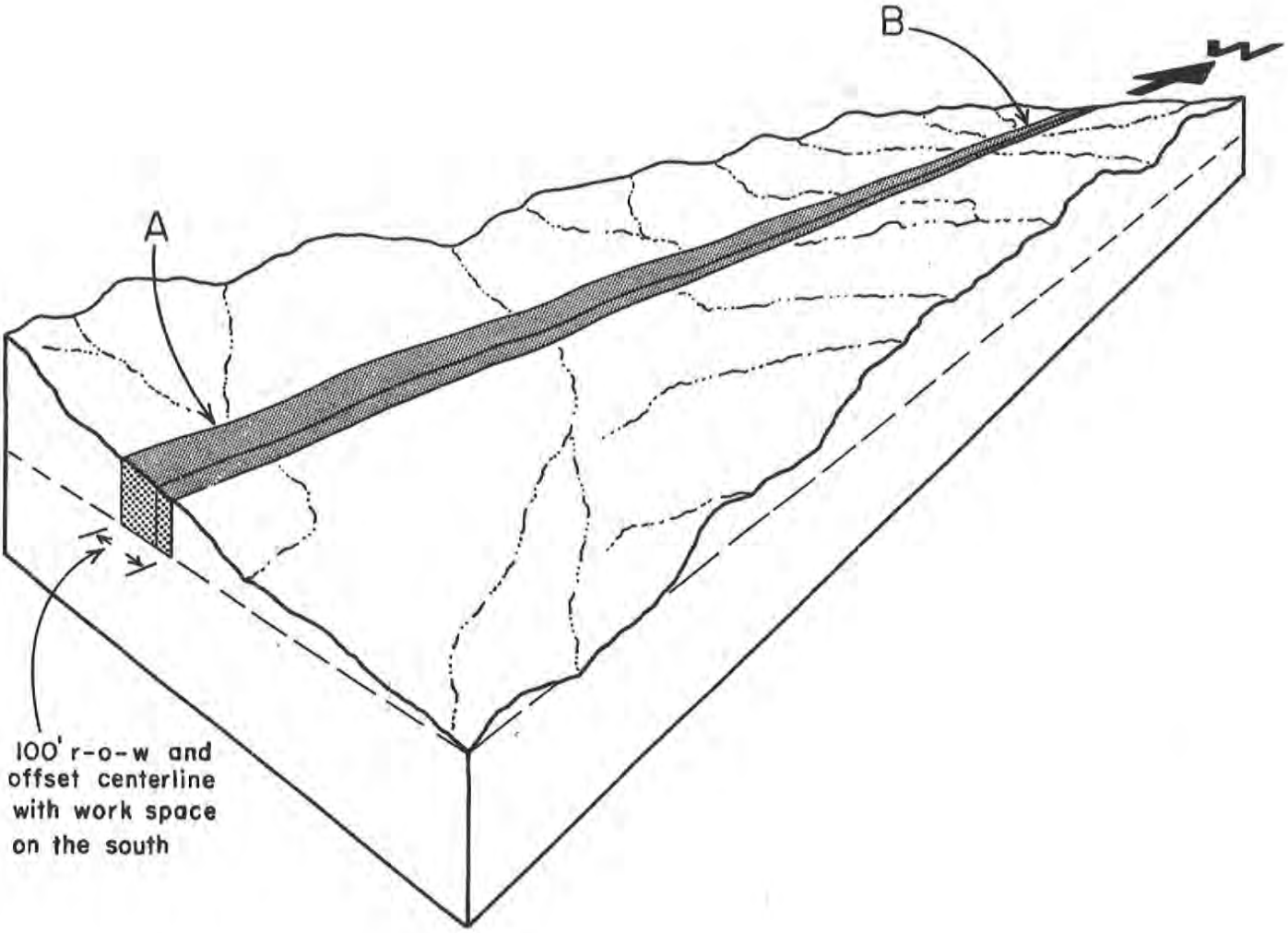

FIGURE I

Generalized view of an east-west 100' pipeline Construction right-of-way as foreseen in Northern Border Pipeline Company's applications to cross Montana state lands. The terrain is typical of Montana state lands crossed in Phillips and Valley counties, where, aside from drainages, the steepest slopes are on the order of 5-7°, and rangeland is the primary land use.

December 1981

DNRC

Northern Border Pipeline

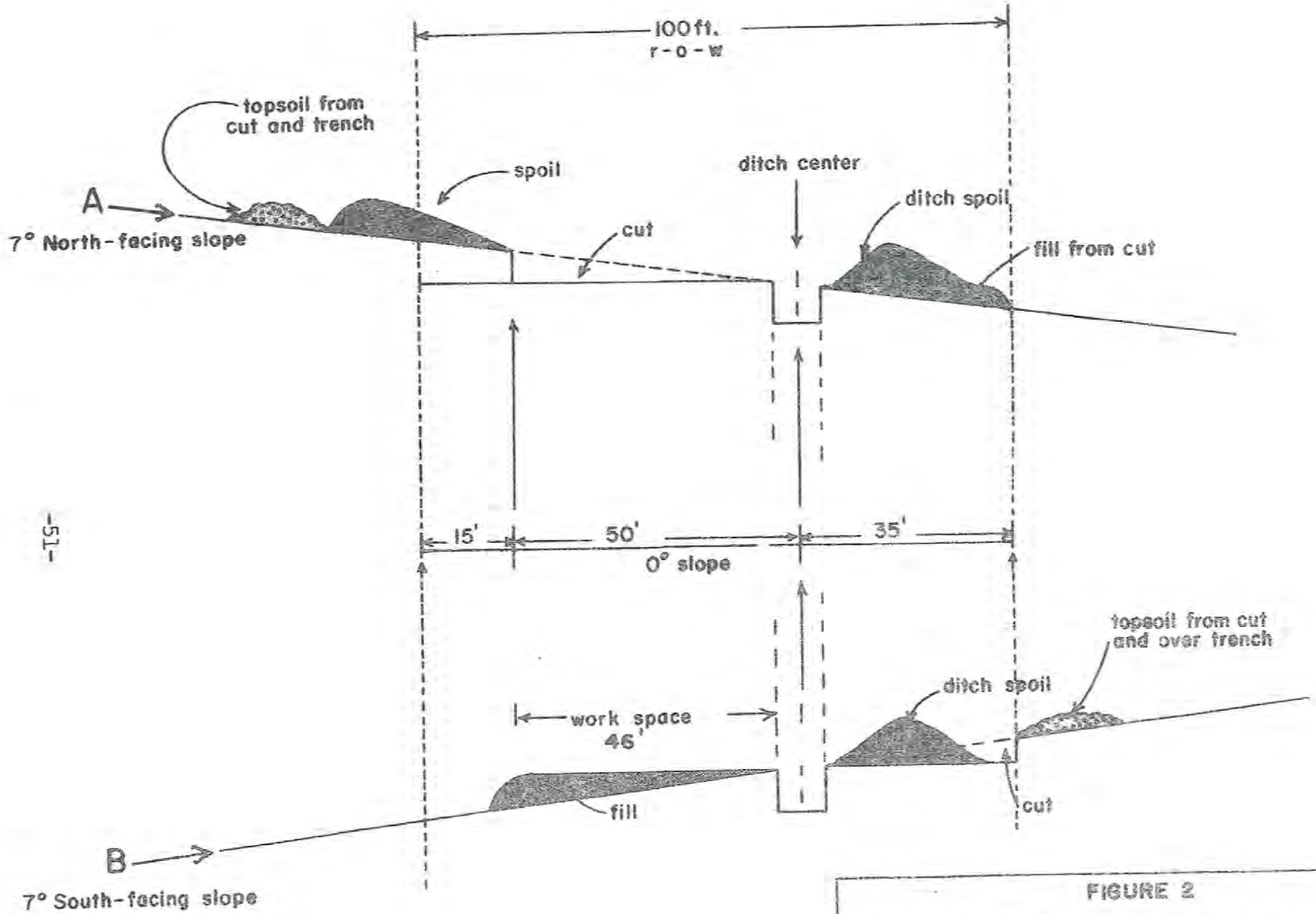

FIGURE 2

Cross sections of the cleared right-of-way at points A and B in Figure 1, as seen looking west.

Trench dimensions are depicted at 7' deep and 8' wide.

December 1981

DNRC

Northern Border Pipeline

FIGURE 3

Vertical view of cleared right-of-way at "A" and "B" locations of Figure 1. See figure 2 for additional measurements.

December 1981

DNRC
Northern Border Pipeline

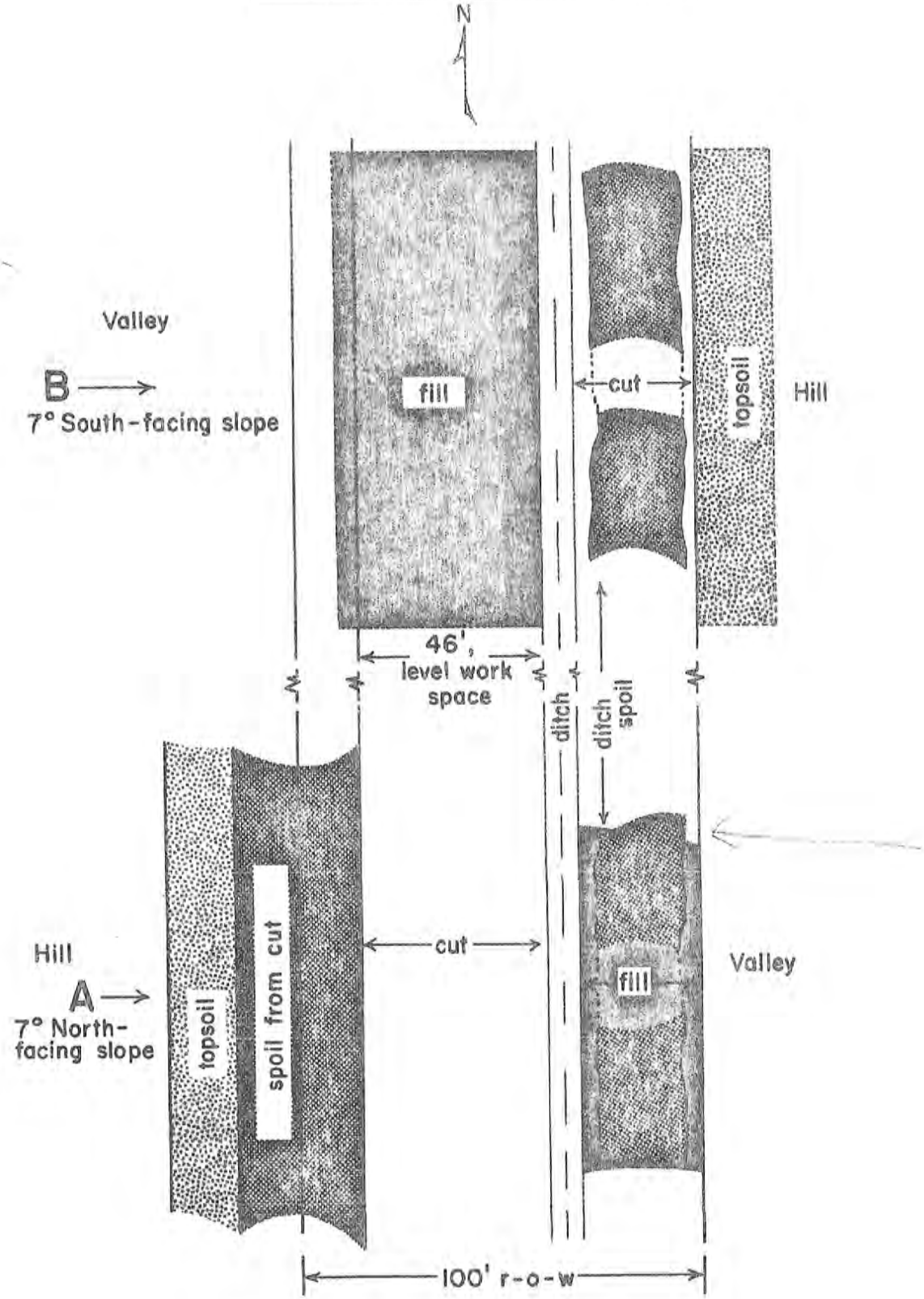

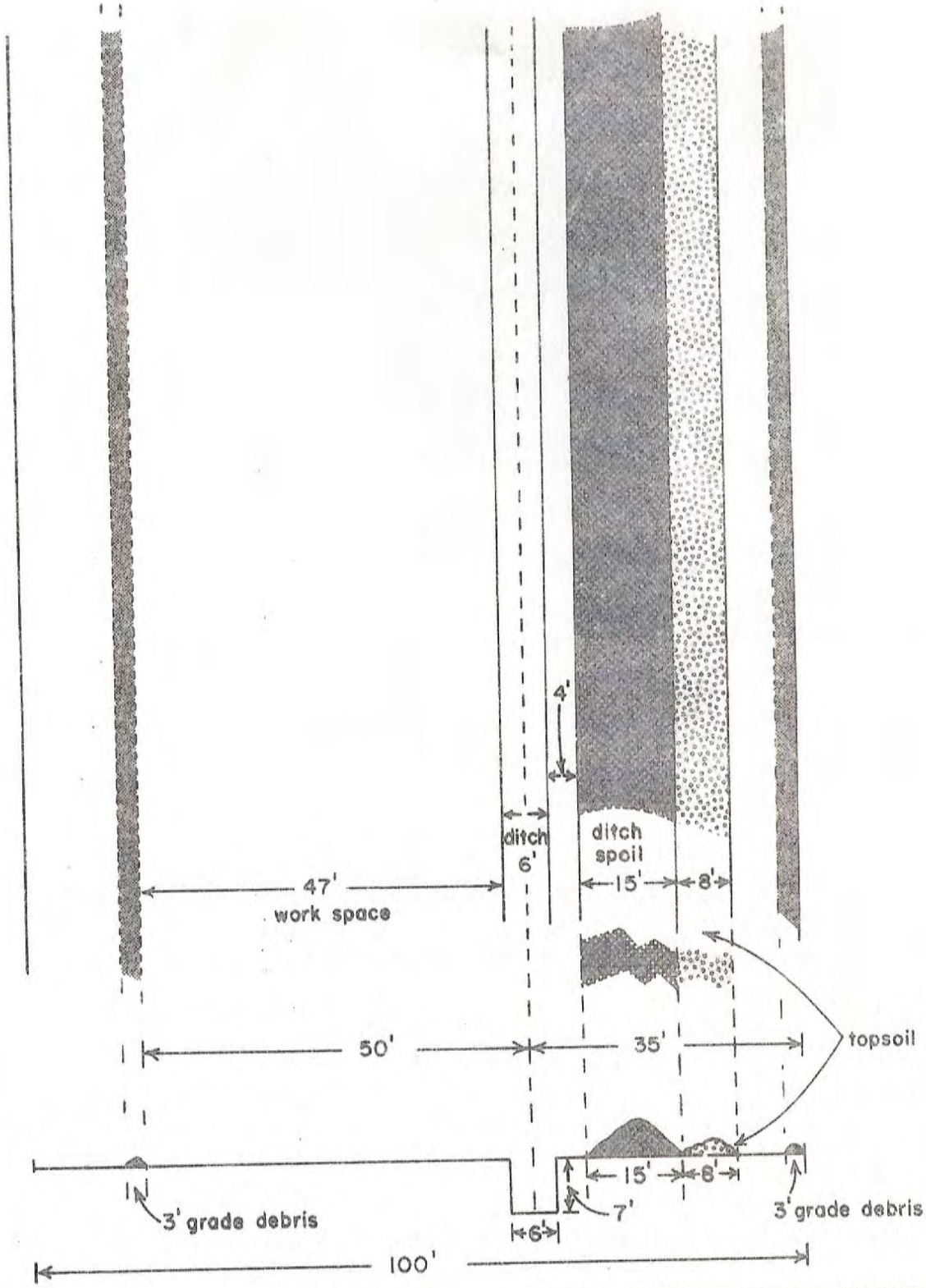

FIGURE 4

Construction across flat terrain. In this case a six-foot-wide ditch is depicted, which occurs when a trenching machine is used, and no backhoe work was necessary.

December 1981

DNRC

Northern Border Pipeline

Conclusions

The photographs and figures in this section indicate the following possible conclusions about r-o-w width requirements and topsoil stripping:

1) Any deviation from flat terrain (0 degree slope) causes a geometric increase in width requirements, primarily for soil and spoil storage.

2) There is often a progressive increase in r-o-w width after initial r-o-w clearing as the different stages of construction proceed.

3) There were numerous areas of extra r-o-w width needed beyond the 100 foot requested by DNRC.

4) There was a high potential for topsoil mixing in the numerous side-hill cuts.

5) There was an inconsistency in depths to which topsoil was stripped on state land parcels, and an inconsistency in keeping topsoil and substrate in separate piles.

6) Construction crews demonstrated an exceptional ability to re-contour the disturbed surface to the original configuration and replace topsoil when it had been correctly stripped.

7) A r-o-w narrower than 100 feet (apprxoimately 85 feet) is quite possible and reasonable on truly flat terrain (0 degree slope), but apears impractical on terrain with a slope greater than 5 degrees.

8) Separate topsoil storage piles on side-hills require a wide r-o-w. Recontouring without tearing up ground beyond the piles requires even greater widths.

These issues are discussed further in the next section on state lands, and in the conclusions section.

CONSRUCTION ON MONTANA STATE LANDS

NBPC applied for an easement to cross lands managed by the Department of State Lands (DSL) in early January, 1981. At its April meeting the State Board of Land Commissioners refused them an easement, preferring a lease, effective May 2. Construction started two days later. The IPTF assisted DSL staff and NBPC in the necessary paperwork primarily because of time constraints, and because DNRC (and IPTF) was in the midst of negotiations with the Office of the Federal Inspector concerning federal and state roles during and after construction (see pages 64 and 74 below).

Federal legislation on the ANGTS required that NBPC build the pipeline according to general and site-specific environmental stipulations developed in part with federal and state agencies, and under the supervision of the OFI. The DNRC had examined drafts of these stipulations during the preparation of the EIS on the project. To keep federal and state

requirements as uniform as possible, the IPTF recommended that DSL adopt a modified version of MBPC's environmental plan and stipulations as a binding part of the lease. The modifications were minor, and mostly involved removal of ambiguity about whom would make decisions about reclamation. The DSL accepted this proposal, with some changes. The IPTF also helped develop the site specific stipulations. These stipulations are contained in Exhibit B of the lease.

The main features of the lease stipulations that later became problematic were: 1) insufficient topsoil removal and replacement from over the trench and on side-hill cuts, 2) substantial activity outside the approved r-o-w without prior permission from DSL or notification of the IPTF, 3) relief of soil compaction caused by heavy equipment, and 4) modification of the reseeding program specified in the lease. The significance of these problems is discussed below.

The extent to which additional space was needed beyond that originally requested can be seen in the photographs in this report. The amount of land that MBPC first applied for in its state land easement request (temporary and permanent combined) was about 152 acres. In December, 1981, the final platted calculation of additional space needs submitted by MBPC to DSL was about 43 acres more, or a 28 percent increase. As can be seen in the photos, this added space was largely for soil and spoil storage, indicating an underestimation of the amount of side-hill cutting needed.

The problem of inadequate topsoil handling is more serious, since it would result in some productivity loss. The problem is, of course, confined to those areas where side-hill cutting occurred, and over the trench. Problems on state parcels, however, could indicate problems on the whole route because there was no apparent difference between

construction on state lands and other lands. There is also no apparent reason for the inconsistencies in topsoil handling, although it might indicate an attempt to keep the r-o-w as narrow as possible.

Soil samples were taken in several locations to determine the extent to which topsoil was mixed with parent material. The results of a soil analysis on these samples are given in Appendix A, and it confirms the photographic evidence that there was inconsistent and insufficient topsoil removal and handling during r-o-w clearing and grading. Tests with 7 percent acid solution (HCL) on state parcels VA051, VA052, VA053.5, and VA057 indicated that the calcium carbonate layer on the trench sidewall ranged from 6 inches to 23 inches from the surface after blading and trenching (see photo #74). IPTF observers also saw substantial amounts of gypsum on the soil surface after clean-up on parcels PH018 and Ph019. These crystals were evidence that ditch spoil from several feet below the surface were mixed with top soil.

Soil compaction problems in traffic lanes were dealt with to some extent during clean-up by the Leonard Pipeline Company. NBPC's reclamation plan, however, and the DSL lease, required compaction relief in the fall as part of seedbed preparation. This reclamation work was covered by a separate reclamation contract that was not let until the fall. Even though Leonard Company personnel did have some compaction-reducing equipment, discussions with their field people gave the impression that their contract with NBPC did not require consistent treatment of compaction from a reclamation viewpoint.

The extent of the problem cannot now be readily determined because clean-up operations have replaced topsoil, spoil, and grade debris, and covered compacted areas to varying degress. Studies of soil compaction

have shown that heavy equipment can cause long-term soil damage (see DNRC's draft EIs on Northern Border). Soil in traffic lanes was severely compacted in certain areas, especially where there was a relatively high clay and gravel content, based on observations during construction. The r-o-w was used as a road, and received a high amount of traffic from heavy equipment, pipe-hauling trucks, other trucks, buses, pick-ups, and cars. Leonard Company field people said that heavy-duty, hydraulically-operated, chisel equipment would be necessary to break up the compacted areas.

If NBPC had attempted to relieve soil compaction in the fall, as part of seedbed preparation, there would have been problems with pulling up rocks and boulders which were plentiful in some areas. This would have required another round of removing rocks and boulders. The conclusion indicated by these observations is that compaction relief is best done at the time of r-o-w clean-up. R-o-w width problems led NBPC to request permission from DSL to wait until construction was completed before formally requesting modification of their state land lease. This was granted. Photos #74 through #81 cover some of the reasons for unpredictable increases in r-o-w width.

Difficulties with NBPC's reclamation contracts led to a program of aerial seeding rather than the on-the-ground program stipulated in the DSL lease (see photos #24, #26, and #27). It was felt that getting the seed on the ground in the fall was important. This method is usually used in steep terrain, and is considered to be not as reliable as ground-seeding where seed is drilled in with a seeder.

#74 Lack of sufficient topsoil removal as indicated on trench side wall on state parcel VA052. The top of the yard stick is at the surface after removal of 3-4 inches of topsoil. The pencil is at the level where an acid reaction began (see text). Note the dark and deep A & B horizon.

#75 Traffic off the r-o-w under muddy conditions on state parcel VA57. Photo taken July 15.

#76 Traffic off the r-o-w to avoid a mudhole on state parcel VA56. The praire in this area was poorly drained. Photo taken July 23.

#77 Traffic off the r-o-w on state parcel VA027.5 to avoid two gates near the northern part of parcel. Photo taken July 15.

#78 Typical clean-up in progress in wide r-o-w area in Phillips County. Dozers first push the soil back roughly to the original contour, then a road grader with chisels reduces soil compaction and finishes contouring. Note that there has been extensive traffic outside soil/spoil storage areas. This adds to r-o-w width requirements as noted earlier. Photo taken July 22.

#79 State parcel R0142. Only the area shown in the photo is crossed by the pipeline. Note that the r-o-w was fenced but backhoe widening of the trench added material to the spoil pile, covering the fence and topsoil. The view looks northwest on July 24 from the southern edge of the parcel.

#80 Lignite seam cut by trench on R0142. The seam is directly below the vantage point in #79.

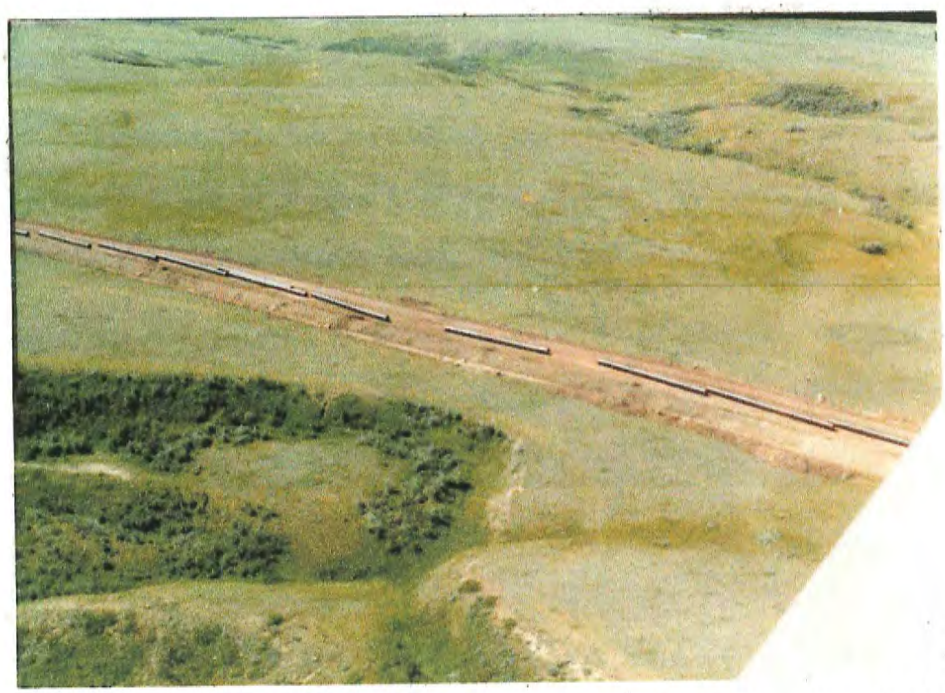

#81 State parcel PH033, looking south on June 26. The route passes closely to a known buffalo jump at the lower left and crossed several archaeological sites.

HYDROSTATIC TESTING

NBPC had difficulty obtaining water for hydrostatic testing in Phillips and Valley counties. Negotiations with the Frenchman Water Users Association fell through, and NBPC eventually constructed a 10-inch steel water pipeline along Highway 24 from Valley Industrial Park to the route, joining the pipeline next to the West Fork Porcupine Creek. Water from a well at VIP, and from the Missouri River via VIP's pipeline, was used.

IPTF and the Montana DHES visited water discharge points and found no water quality problems, and insignificant erosion. The problem that did occur, however, was a failure to give DHES two weeks prior notice of discharge. This was caused by a Leonard Pipeline Company employee telling the testing foreman that notice had been given.

OFFICE OF THE FEDERAL INSPECTOR

The relationship of the OFI, landowners, and local and state agencies was not clearly stated in the federal legislation, and was not clarified by the time construction began, even though DNRC demonstrated a high degree of interest in coming to an agreement. It may be an understatement to say that the OFI dragged its feet. This probably was largely due to differences of opinion on federal/state jurisdictional issues. Appendix B presents a description and chronology of communications between the DNRC and the OFI regarding such an agreement. Some of these communications are contained in the EIS and the rest are in IPTF files.

At no time during the Northern Border project was there any formalized communication system established between the state and OFI. It was not clear as to how the OFI interpreted its responsibilities on state or private lands. This may have contributed to some of the r-o-w problems and the inconsistency in topsoil removal. For example, the OFI gave NPPC "Notice to Proceed" without having its field inspection system fully in place. Table 2 demonstrates that construction, once begun, proceeds very rapidly. With r-o-w grading proceeding at an average of 20 miles per week in May, there is little time for changing the clearing practice.

As indicated in the correspondence in Appendix B, the problem with the OFI reluctance to deal with state interests probably came from a failure by top-level OFI policy-makers to set up a system for interjecting state interests into the overall monitoring program of the OFI. The evidence indicates that the OFI interpreted the federal legislation to mean that complete authority to build the project resided in Washington. States are unlikely to concede to federal agencies this kind of authority, especially if it is ambiguously stated in the federal legislation. Rather than expediting construction, this may have contributed to delays and expense.

It should be noted that during construction, OFI field personnel indicated a willingness to cooperate and provide information and assistance. The Omaha office of the OFI, overseeing construction of the Eastern Leg, was also quite helpful.

IPTF OPERATIONS

IPTF operations for Northern Border were funded voluntarily by NBPC through a negotiated contract with DNRC. Duties were described in the contract and were largely confined to assisting NBPC obtain permits, and responding to state agency requests for assistance with permits and monitoring of the project. Most of the IPTF work concerned the permit for crossing state lands (both DSL administered land and the DNRC land near Frenchman Creek), the hydrostatic test water discharge permit from DHES, the Conservation District 310 permits, and the DNRC water withdrawal permits. Efforts were made throughout the construction period to document the project in order to apply the knowledge to other large pipelines, especially the Northern Tier oil pipeline which looked as if it was soon to be built.

A description of the purpose and concept of the IPTF is contained in Montana's EIS's on the Northern Tier and Northern Border pipelines. Perhaps the major reason for the creation of the IPTF was that large pipelines are not regulated by the Major Facility Siting Act, although there have been proposals to place them under the act in the last two legislative sessions. The primary concern came from the Northern Tier proposal because the DNRC perceived a high level of public interest in environmental issues and because of the potential red tape for the company caused by the high number of separate governmental jurisdictions involved and the variety of landownerships.

All other states along the Northern Border route (North and South Dakota, Minnesota, and Iowa) regulate pipelines more closely than does Montana. The latter three passed

legislation in response to the ANGTS, and all four provide for county or state inspection during construction. Inspection is in most cases paid for by a per-mile assessment on the company.

Inspection must be carried out as a pipeline is built. On the Northern Border pipeline, there were NBPC inspectors for each of the operations listed in Table 2. OFI inspectors checked the overall operations of pipeline construction throughout the pipeline system in the five states affected.

As can be seen in Table 2, pipeline construction moves rapidly once begun. Problems with one operation can influence others and cause expensive delays. Rapid inspection and resolution of problems is important. It is also difficult to foresee exactly what will happen once construction begins and decisions may have to be made on the spot about environmental stipulations. The best example of this kind of difficulty on this project was the problems with topsoil salvage and r-o-w width. Thus, the inspection system should be compatible with construction operations. Experienced people with sufficient authority to make decisions at the construction site are essential to a functional inspection/construction system, especially during the beginning of construction. No inspection system was provided for in the IPTF agreement with NBPC. Any inspection carried out was to assist the DSL in monitoring the execution of the stipulations attached to the lease for crossing state lands.

LANDOWNER ASSISTANCE

One of the IPTF functions was to respond to questions and complaints of landowners. There was, however, no provision for the IPTF initiating contacts with landowners. There were a few calls or comments to the IPTF from landowners or surface lessees of state lands concerning open fences and misunderstandings about how construction operations would block cattle movement. There was a general complimentary attitude on the part of the citizens toward NRPC during construction, and high interest in the project. Most contacts with DNRC occurred the year before construction began during the period when r-o-w agents were contacting landowners for easements. Most of these requests were for information on the project, and complaints about levels of reimbursement for damages. Although it is not envisioned that IPTF should interject itself into contract negotiations between the landowner and the company, an earlier role in providing general information to landowners could have eliminated some anxieties concerning easement negotiations and the condemnation process.

CONCLUSIONS AND RECOMMENDATIONS

The conclusions that follow are my opinions gained from experience with preparing the EIS on the project, and on observations made while it was being built. I have made an attempt to base the conclusions on interpretations of the photographic evidence and other objective material presented in this report.

1. MPPC and its main contractor on Spread 1, Leonard Pipeline Company, generally did a good job observing environmental stipulations and state permit conditions. Personnel were very responsive and helpful when problems were brought to their attention. MPPC developed a sound reclamation plan which should mitigate long-term environmental impacts resulting from construction if revegetation and soil stabilization proceed favorably in the future.

2. There were some problems with topsoil handling and insufficient attention to relieving soil compaction on state parcels and on other lands across Montana. This problem may have been made worse by MPPC obtaining easements on r-o-w's that were too narrow for soil and spoil storage in side-hill cut areas.

3. Lack of an agreement between the OFI and Montana contributed to some problems during construction. It is likely that agreement was not reached because the Washington OFI office did not institute an effective and early relationship with the states. Early discussions would have allowed substantial agreements to be consumated which would clearly outline state/federal interaction on the project. The federal legislation on the ANGTS included specific mandates for direct participation by the state of Alaska during construction. It is recommended that the Montana Congressional delegation insist that provisions be made to describe Montana's role in any future legislation or similar projects. It appears that the federal government does not have a strong committment to recognizing the state's interests on projects such as the ANGTS.

4. Construction of a large-diameter pipeline involves a certain amount of surface disturbance, and has a high potential for long-term damage to topsoil due to mixing with parent material. This potential can be reduced to a minimal level through environmental planning such as that done for this project, and through a well managed inspection system during construction. Inspection during the early stages of construction is crucial for environmental stipulations to be effective.

5. If large-diameter pipelines are not placed under the jurisdiction of the Major Facility Siting Act, the Montana legislature should consider establishing some form of inspection and IPTF-like coordination function in state government.

APPENDIX A

DESCRIPTION OF NORTHERN BORDER SOIL SAMPLES,
STATE LAND SECTIONS

Samples 1-5 Taken August 4, 1981 from the side wall of the open trench 28 yds. west of survey station 3028+32 (preliminary survey on VA058.0, Sec. 24, T33N R39E, Valley County). This is about 250 ft. west of the fence where the North/South road crosses the pipeline, and about 500 ft. east of the west boundary of the section. This is on top of the west bluff of the W. Fork, Porc. Creek and is rangeland that doesn't appear to have been plowed.

1. Sample of top layer. At most, 3-4 in. of topsoil had been removed before ditching. Layer is 5-1/2 in. thick. Hard texture, brown.

2. Sample of second layer. Layer is about 3-1/2 in. thick and is brown. Blocky, clayey looking. Layer ends 9 in. below surface. Distinction between #1 and #2 is texture, i.e., #2 is structured (blocky).

3. Sample of top of layer where a strong acid reaction occurs. Whitish deposits begin to be seen at this same depth (9 in. from surface). Brown color disappears.

4. Sample taken 21 in. below surface. Hard, clayey color, with pebbles. (Well within root zone.) Whitish deposits are largely gone. Occasional streaks.

5. Sample taken 84 in. from surface (very close to the bottom of the trench). Wet, clayey.

Samples 5-10 Taken August 4, from the sidewall of the open trench about 1/4 miles east of the west boundary of VA052 (Sec. 16, T33N R39E, Valley County). There is a fenceline along this west boundary. The location is similar (rolling prairie), is in grass and hasn't been plowed.

6. Sample taken from top 3 in. Soil is sandy appearing, and distinctly brown.

7. Sample taken 13 in. from surface, and is just above the point in the profile where the acid reaction begins. Sandy, brown, definite blocky structure. The top two layers are 16 to 18 in. deep in this area.

8. Sample taken about 17 in. from surface. Acid reaction layer -- whitish deposits in it, and brown color fadesaway. Sandy. As one looks down the trench this whitish layer is deeper in the swales and shallower on the knolls.

9. Sample taken 27 in. from surface. At bottom of portion of profile with whitish deposits.

9A. Sample of gravel layer at 58 in. in the profile (this sample was not analyzed). Stones up to egg sized.

10. Sample taken at trench bottom, or about 84 in. from surface. Very sandy.

Samples 11-13 Taken August 4 from the surface after clean-up and restoration on VA006 (Sec. 16, T34N R35E, Valley County). This parcel is rangeland and doesn't appear to have been plowed. Clean-up crew had completed work within previous 10 days.

11. Sample taken from surface over the buried pipeline about 200 ft. east of the west boundary (which is a fenceline). Distinct crown over pipeline was not present, so pipe location was approximate (but within 5 ft.)

12. Sample taken from surface about 500 ft. east of the fenceline on top of the ditch. Distinct crown of soil was present, so sample was taken right above pipe.

13. Sample taken from undisturbed soil surface alongside right-of-way directly south of #12.

Samples 14 and 15 Taken October 14, 1981 from R0195 after clean-up and restoration. This section is on a very flat, cropped floodplain of Shotgun Creek 2 mi. east of Bainville.

14. Sample taken from surface 3 in. directly over the buried pipeline, about 400 yds. southeast of the fenceline which is on the western edge of the parcel. The sample was loose and wet when taken. There was a crown over the pipeline, which appeared as a grayish band as one looked down the r-o-w to the southeast.

15. Sample taken from the same location as #14, but off the r-o-w edge (about 30 ft. north) and beyond the disturbed area. Top 3 in. taken, and soil was wet, loose, and blacker (blacker than #14).

Table 3. Analysis of Soil Samples Taken on State Land Sections

Samples #1-10 were taken on ditch sidewalls, #11-15 are surface samples

Sample Number	Nitrate (ppm)	Phosphorus (olsen) (ppm)	Potassium (ppm)	PH	Electrical Conductivity (mmhos/cm)	Organic Matter (%)	Sand (%)	Silt (%)	Clay (%)	Extractable			Soluable			Sodium Adsorption Ratio
										Calcium (Meq/100)	Magnesium (Meq/100)	Sodium (Meq/100)	Calcium (Meq/100)	Magnesium (Meq/100)	Sodium (Meq/100)	
1	--	29	509	6.2	0.7	4.2	37	40	23				3.8	4.0	0.6	0.3
2	--	10	>598	7.3	0.4	2.3	--	--	--				--	--	--	--
3	--	3	572	8.0	0.5	1.5	--	--	--				1.5	3.0	0.2	0.1
4	--	6	257	8.5	1.0	1.5	40	22	38				--	--	--	--
5	--	9	335	7.2	4.8	1.6	24	30	46				19.0	26.3	32.2	6.8
6	--	3	281	7.0	0.4	2.2	37	35	28				--	--	--	--
7	--	0.6	216	7.8	0.5	0.5	--	--	--				2.0	28	0.7	0.5
8	--	0.2	164	8.1	0.4	0.5	--	--	--				--	--	--	--
9	--	0.6	158	8.3	0.4	0.2	57	15	29				0.7	2.1	3.0	2.5
10	--	4	187	8.3	1.4	<0.1	30	33	37				1.2	6.1	14.8	7.8
11	8	4	257	7.5	4.4	1.0	35	32	33				22.0	32.9	20.0	3.8
12*	9	5	240	7.6	4.8	1.5	41	30	29				25.0	37.9	21.8	3.9
13*	11	4	305	6.7	0.5	4.3	47	37	16				2.5	1.6	0.2	0.1
14**	25	1	305	8.2	4.6	1.2	32	41	27	40	11	1.9	24	31.5	3.0	0.6
15**	48	4	7598	8.0	1.5	3.7	16	44	40	26	5.9	0.1	10	3.6	0.9	0.4

* #12, taken over the ditch after spoil replacement, should be compared with #13, taken from an undisturbed area next to the r-o-w.

** #14 and 15 can be similarly compared. #15 is the undisturbed sample.

APPENDIX B

DESCRIPTION AND CHRONOLOGY OF MONTANA DNRC DISCUSSION WITH THE OFFICE OF THE FEDERAL INSPECTOR REGARDING A FEDERAL-STATE COOPERATIVE AGREEMENT CONCERNING THE NORTHERN BORDER PIPELINE

1) October 19, 1979 - Proposal to begin discussions with the OFI concerning an agreement. (Letter to John Rhett, OFI, from Ted Schwinden, Acting Governor, enclosed.) Note: A contact person was eventually designated in the governor's office, but no discussions regarding an agreement took place.

2) April 8, 1980 - Staff discussions being held between State (DNRC) and Bureau of Land Management (BLM) concerning a draft cooperative agreement (See letter to Neil Morck from Randy Moy, p. 123 of draft EIS).

3) July 30, 1980 - Draft EIS on Northern Border issued. Interagency Pipeline Task Force (IPTF) recommended by Montana DNRC for Northern Border (See p. 107 of draft EIS).

4) July 30, 1980 - Governor Judge issues executive order establishing IPTF for the Northern Tier oil pipeline.

5) August 15, 1980 - BLM, commenting on IPTF proposal in draft EIS, recommends that OFI coordinate responsibilities (Memo from Neil Morck to BLM Director, p. 39, final EIS).

6) August 28, 1980 - OFI questions need for IPTF. (See letter from John Rhett to Ted Doney, DNRC Director, p. 36 of final EIS.)

7) September 15, 1980 - U.S. Department of Interior, representative to OFI, gives partial support to IPTF in letter to OFI (Letter from William Toskey to Robert Mosher, p. 40 of final EIS).

8) October 30, 1980 - Montana DNRC reiterates to OFI the cooperative aspects and advantages of the IPTF and asks for support for the concept (Letter to John Rhett, OFI, from Ted Doney, DNRC Director, p. 43 of final EIS).

9) November 19, 1980 - OFI transfers responsibility for answering the October 30th letter (#8 above) to its Omaha office which was established in September (Letter from Peter Cook, OFI deputy Director, to Ted Doney, enclosed).

10) December 19, 1980 - Montana DNRC issues its final EIS, reiterating support for IPTF, and answering comments received on its proposal (p. 25, 26 of the final EIS).

11) December 24, 1980 - Omaha office of OFI, in responding to Montana's October 30th letter (#8 above) casts doubt on the funding mechanism for the IPTF, by noting that under current FERC rules it appears to be a cost over-run. (See letter from Dennis Schroeder to Ted Doney, enclosed.)

12) February 25, 1981 - Montana DNRC, responding to OFI letter of December 24th, #11 above), explains the status of negotiations with the pipeline company, disagrees with the OFI's interpretation of the FERC financing mechanism, and notes the urgency of some of the state concerns (letter from Leo Berry, DNRC Director to Dennis Schroeder, enclosed).

13) March 4, 1981 - Montana Governor Ted Schwinden signs a new executive order allowing for the inclusion of Northern Border in the IPTF (enclosed).

14) March 13, 1981 - OFI agrees to discuss a cooperative agreement with Montana (letter from Dennis Schroeder to Leo Berry, enclosed).

15) March 25, 1981 - DNRC and OFI staff meet.

16) April 9, 1981 - Montana DNRC informs OFI of its view of the contents of a cooperative agreement based on the March 25th meeting (letter from Leo Berry, Director, DNRC, to Russ Soulen, OFI Staff Director, enclosed).

17) April 30, 1981 - OFI proposes an umbrella agreement to eastern leg of state crossed by the pipeline (letter from Rhodell Fields, OFI Deputy General Counsel, to Randy Moy, enclosed).

18) May 2, 1981 - Construction, including clearing on state lands, begins in Montana.

19) May 8, 1981 - Montana DNRC comments on OFI's proposed agreement (#17 above) and notes that concerns expressed earlier (#16 above) were not addressed, the agreement was not specific enough, and that Montana could not concede complete legal authority to the OFI but, nevertheless, wished to come to an agreement (letter from Leo Berry to Rhodell Fields, enclosed).

20) May 13-14, 1981 - Staff discussion between Montana DNRC, Montana Department of State Lands, and OFI. Some specific language was worked out but no agreement reached. OFI stated that Montana's position would be explained to OFI officials in Washington and, if approval could be obtained, another draft would be sent.

21) No other draft agreements were sent to Montana for review and all discussions on the part of OFI with Montana ceased.

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MANAGED BY UT-BATTELLE
FOR THE DEPARTMENT OF ENERGY

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Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety

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ORNL/TM-2012/411

STUDIES FOR THE REQUIREMENTS OF AUTOMATIC AND REMOTELY CONTROLLED SHUTOFF VALVES ON HAZARDOUS LIQUIDS AND NATURAL GAS PIPELINES WITH RESPECT TO PUBLIC AND ENVIRONMENTAL SAFETY

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ABBREVIATIONS AND ACRONYMS

°C	Degree Celsius
°F	Degree Fahrenheit
AGA	American Gas Association
AIChE	American Institute of Chemical Engineers
ANPRM	Advanced Notice of Proposed Rulemaking
ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
ASV	Automatic Shutoff Valve
B	Billion
BOSCEM	Basic Oil Spill Cost Estimation Model
Btu	British Thermal Unit
Btu/hr ft^2	British Thermal Unit per Hour Square Foot
CFR	Code of Federal Regulations
DHS	U.S. Department of Homeland Security
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EFRD	Emergency Flow Restricting Device
EPA	U.S. Environmental Protection Agency
ft	Foot
ft^2	Square Foot
ft^3	Cubic Foot
gpm	Gallons per Minute
HCA	High Consequence Area
hr	Hour
HUD	U.S. Department of Housing and Urban Development
ILI	In-line Inspection
IM	Integrity Management
in.	Inch
INGAA	Interstate Natural Gas Association of America
kg	Kilogram
km	Kilometer
kW/m^2	Kilowatt per Square Meter
l/min	Liter per Minute
lb.	Pound
m	Meter
M	Million
m^2	Square Meter
m^3	Cubic Meter
MAOP	Maximum Allowable Operating Pressure
MCV	Manual Control Valve
mi.	Mile
min.	Minute
mph	Miles per Hour
NFPA	National Fire Protection Association
NIST	National Institute of Standards and Technology
NTSB	National Transportation Safety Board
ORNL	Oak Ridge National Laboratory

PAPA	Pipeline Association for Public Awareness
PHMSA	Pipeline and Hazardous Material Safety Administration
PIR	Potential Impact Radius
psig	Pounds per Square Inch, gage
RCV	Remote Control Valve
RSPA	Research and Special Programs Administration
s	Second
SCADA	Supervisory Control and Data Acquisition System
SFPE	Society of Fire Protection Engineers
sq. ft.	Square Feet
TETCO	Texas Eastern Transmission Corporation
USA	Unusually Sensitive Area
W	Watt
yd	Yard

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Most respectfully,

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ABSTRACT

This study assesses the effectiveness of block valve closure swiftness in mitigating the consequences of natural gas and hazardous liquid pipeline releases on public and environmental safety. It also evaluates the technical, operational, and economic feasibility and potential cost benefits of installing automatic shutoff valves (ASVs) and remote control valves (RCVs) in newly constructed and fully replaced transmission lines. Risk analyses of hypothetical pipeline release scenarios are used as the basis for assessing: (1) fire damage to buildings and property in Class 1, Class 2, Class 3, and Class 4 high consequence areas (HCAs) caused by natural gas pipeline releases and subsequent ignition of the released natural gas; (2) fire damage to buildings and property in HCAs designated as high population areas and other populated areas caused by hazardous liquid pipeline releases and subsequent ignition of the released propane; and (3) socioeconomic and environmental damage in HCAs caused by hazardous liquid pipeline releases of crude oil. These risk analyses use engineering principles and fire science practices to characterize thermal radiation effects on buildings and humans and to quantify the total damage cost of socioeconomic and environmental impacts. The risk analysis approach used for natural gas pipelines is consistent with risk assessment standards developed by industry and incorporated into Federal pipeline safety regulations. Feasibility evaluations for the hypothetical pipeline release scenarios considered in this study show that installation of ASVs and RCVs in newly constructed and fully replaced natural gas and hazardous liquid pipelines is technically, operationally, and economically feasible with a positive cost benefit. However, these results may not apply to all newly constructed and fully replaced pipelines because site-specific parameters that influence risk analyses and feasibility evaluations often vary significantly from one pipeline segment to another and may not be consistent with those considered in this study. Consequently, the technical, operational, and economic feasibility and potential cost benefits of installing ASVs and RCVs in newly constructed or fully replaced pipelines need to be evaluated on a case-by-case basis. In theory, installing ASVs and RCVs in pipelines can be an effective strategy for mitigating potential consequences of unintended releases because decreasing the total volume of the release reduces overall impacts on the public and to the environment. However, block valve closure has no effect on preventing pipeline failure or stopping the product that remains inside the isolated pipeline segments from escaping into the environment. The benefits in terms of cost avoidance attributed to block valve closure swiftness increase as the time required to isolate the damaged transmission pipeline segment decreases. Block valve closure swiftness is most effective in mitigating damage resulting from a pipeline release and subsequent fire when the damaged pipeline segment is isolated and the thermal radiation produced by the fire declines in time so that emergency responders can safely begin fire fighting activities immediately upon arrival at the scene. Similarly, the avoided cost of socioeconomic and environmental damage for hazardous liquid pipeline releases without ignition increase as time required to isolate the damaged pipeline segment decreases.

EXECUTIVE SUMMARY

The U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) is the Federal safety authority responsible for ensuring safety in the design, construction, operation and maintenance, and spill response planning for the 2.3 million (M) miles of natural gas and hazardous liquid transportation pipelines in the United States. Its mission is to protect people and the environment from the risks inherent in transportation of hazardous materials by pipeline and other modes of transportation. Section 4 of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 calls for the Secretary of the U.S. Department of Transportation (DOT) to require by regulation the use of automatic or remotely controlled shutoff valves, or equivalent technology, where it is economically, technically, and operationally feasible on hazardous liquid and natural gas transmission pipeline facilities constructed or entirely replaced after the final rule was issued. The Act also requires a study to discuss the ability of transmission pipeline facility operators to respond to a hazardous liquid or natural gas release from a pipeline segment located in a high consequence area (HCA). In addition, PHMSA is evaluating related concerns raised by the National Transportation Safety Board (NTSB) in its accident report for the September 9, 2010, pipeline rupture in San Bruno, California that resulted in eight deaths. The NTSB concluded that the damage caused by the pipeline rupture could have been significantly reduced with the use of automatic shutoff valves (ASVs) and remote control valves (RCVs).

Gas transmission pipelines are currently required to incorporate sectionalizing block valves at intervals that vary depending on population density. These block valves are not required to be remotely operable or to operate automatically in the event of an unexpected reduction in pressure (*e.g.* from a pipeline rupture). However, pipeline operators are required to conduct risk assessments of their pipelines and take additional measures to mitigate the consequences of a pipeline failure in a HCA. Such additional measures may include, but are not limited to, installing ASVs or RCVs.

Hazardous liquid pipeline operators are required to install block valves at prescribed locations to facilitate isolation of pump stations, breakout storage tanks, and lateral takeoffs and other points along the pipeline near designated bodies of water and populated areas to minimize damage and pollution from an accidental hazardous liquid discharge. In addition, operators are required to consider installing emergency flow restricting devices such as check valves and RCVs on pipeline segments to protect a HCA in the event of a hazardous liquid pipeline release. In making this determination, an operator must, at least, consider the swiftness of leak detection and pipeline shut down capabilities and benefits expected by reducing the spill size.

In March 2012, PHMSA requested assistance from the Oak Ridge National Laboratory (ORNL) in preparing a report titled "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety." This report, which documents the study results, addresses the issues defined in Sect. 4 of the Act and those raised by the NTSB in its accident report for the San Bruno natural gas pipeline accident. The study assesses the effectiveness of block valve closure swiftness in mitigating the consequences of natural gas and hazardous liquid pipeline releases on public and environmental safety. It also evaluates the technical, operational, and economic feasibility and potential cost benefits of installing ASVs and RCVs in newly constructed and fully replaced pipelines. The results of this study apply to natural gas and hazardous liquid transmission lines.

Potential effects of unintended releases from natural gas and hazardous liquid pipelines on public and environmental safety are categorized as personal injuries and fatalities, property damage, and environmental impacts. The scope and magnitude of these effects depends on the type and amount of

product released; the exact sequence of events; and site-specific factors such as the separation distance between an individual or building and the release point, building type and construction, terrain features, and atmospheric conditions. In this study, fire consequence modeling is limited to thermal radiation effects resulting from unintended releases from: (1) natural gas pipelines, and (2) hazardous liquid pipelines that transport propane. Propane rather than gasoline, butane, or propylene was chosen to present the worst case fire consequences. The scope of the study is further limited by considering only worst case pipeline release scenarios in HCAs involving guillotine-type breaks rather than other more common breaks, such as punctures and through-wall cracks. Although ignition of the released product following a rupture is not ensured, this study only models release scenarios that result in immediate ignition of the released product at the break location. The study also assesses potential socioeconomic and environmental effects of unintended crude oil releases without ignition from hazardous liquid pipelines in HCAs.

E.1 CONSEQUENCE MODELS

Risk analyses of hypothetical pipeline release scenarios are used as the basis for assessing: (1) fire damage to buildings and property in Class 1, Class 2, Class 3, and Class 4 HCAs caused by natural gas pipeline releases and subsequent ignition of the released natural gas; (2) fire damage to buildings and property in HCAs designated as high population areas and other populated areas caused by hazardous liquid pipeline releases and subsequent ignition of the released propane; and (3) socioeconomic and environmental damage in HCAs caused by hazardous liquid pipeline releases of crude oil. These risk analyses use engineering principles and fire science practices to characterize thermal radiation effects on buildings and humans, and to quantify the total damage cost of socioeconomic and environmental impacts. The risk analysis approach used for natural gas pipelines is consistent with risk assessment standards developed by industry and incorporated into Federal pipeline safety regulations.

The methodology used to quantify the effectiveness of block valve closure swiftness in reducing potential consequences of an unintended natural gas or hazardous liquid pipeline release is based on a conservative approach to pipeline safety that considers effects of a time-dependent discharge resulting from a guillotine-type break. These consequences involve potential fire damage to buildings, vehicles, and personal property caused by ignition and combustion of the released hydrocarbon that begins as soon as the break in a natural gas or hazardous liquid pipeline occurs; potential burn injuries to fire fighters and the public caused by exposure to thermal radiation; and potential socioeconomic and environmental effects resulting from a hazardous liquid pipeline release without ignition. Thermal radiation is the primary mechanism for injury or damage from fire and is the significant mode of heat transfer for situations in which a target is located laterally to the exposure fire source. Models were developed to quantifying the time-dependent variations in separation distances (radii) for specific heat flux intensities because thermal radiation effects on buildings and humans are a function of heat flux intensity and exposure duration. The following heat flux thresholds for fire damage to buildings, fire fighting activities, and open spaces where people congregate were established and used to quantify potential fire damage. By comparison, nominal solar radiant heat flux on a clear day is approximately 1.0 kW/m^2 (320 $Btu/hr\ ft^2$).

- Exposure to a heat flux of 1.4 kW/m^2 (450 $Btu/hr\ ft^2$) is considered acceptable for outdoor, unprotected facilities or open spaces where people congregate.
- Exposure to a heat flux of 2.5 kW/m^2 (800 $Btu/hr\ ft^2$) is considered acceptable while conducting continuous fire fighting and emergency response activities.

- Exposure of a building to a heat flux of 15.8 kW/m^2 (5,000 Btu/hr ft^2) is considered acceptable for an extended period of time (30 minutes) without burning and the threshold for minor damage to buildings.
- Exposure of a building to a heat flux of 31.5 kW/m^2 (10,000 Btu/hr ft^2) is considered acceptable for an extended period of time (15 minutes) without burning and the threshold for moderate damage to buildings.
- Exposure to a heat flux of 40.0 kW/m^2 (12,700 Btu/hr ft^2) for any period of time is considered the maximum tolerable level of radiation at the facade of an exposed building and the threshold for severe damage to buildings. Based on analysis, the potentially severe damage radius for a natural gas pipeline release is approximately 1.5 times the potential impact radius (PIR).

Fire damage cost estimates are based on home and vehicle sales data published by the U.S. Census Bureau. Potential socioeconomic and environmental effects resulting from a hazardous liquid pipeline release without ignition are based on the Basic Oil Spill Cost Estimation Model (BOSCEM) used by the Environmental Protection Agency (EPA) for estimating response, socioeconomic damage, and environmental damage costs.

E.2 ASSESSMENT METHODOLOGY AND RESULTS FOR NATURAL GAS PIPELINE RELEASES

Natural gas pipeline release events are subdivided into three sequential phases – (1) Detection Phase, (2) Block Valve Closure Phase; and (3) Blowdown Phase. The total discharge volume equals the sum of the volumes released during each phase. Immediately following a guillotine-type break in a natural gas pipeline, the gas begins flowing rapidly through the break and into the surrounding atmosphere. The escaping natural gas creates a highly turbulent mushroom shaped vapor cloud that increases in height above the release point due to the source momentum and buoyancy. The fireball, which is the result of combustion of the mushroom-shaped vapor cloud, typically lasts 30 seconds or less leaving a quasi-steady-state fire that continues to burn until all of the escaping natural gas is consumed. Guillotine-type breaks with immediate ignition of the escaping natural gas produce thermal radiant intensities that are considered worst case because this type of rupture results in the greatest release of natural gas in the shortest time period. The presumption of worst case, guillotine-type breaks is consistent with risk assessment standards adopted by industry and Federal pipeline safety regulations for natural gas pipelines.

The effectiveness of block valve closure swiftness in mitigating the potential consequences of a natural gas pipeline release was evaluated using the following methodology.

- Compute heat flux versus time data for hypothetical release scenarios involving 12-in. and 42-in. nominal diameter pipelines operating at 300 psig and 1,480 psig with block valve closure at 8 minutes (5 minutes for leak detection plus 3 minutes for block valve closure) and 13 minutes (10 minutes for leak detection plus 3 minutes for block valve closure) after the break. In addition, establish baselines for comparison by computing heat flux versus time data for release scenarios in which the block valves remain open for at least 60 minutes after the break.
- Use the heat flux versus time data to prepare separation distance (radius from break) versus time plots for specific heat flux thresholds.
- Compare the heat flux threshold curves for different block valve closure times and separation distances to the baseline curves.

- Determine the time when the heat flux equals 2.5 kW/m^2 (800 Btu/hr ft^2) at the potentially severe damage radius (1.5 times the PIR) for each separation distance versus time plot.
- Use these exposure time differences to evaluate the effectiveness of block valve closure swiftness on reducing the heat flux at the potentially severe damage radius. The difference in exposure times represents additional time available to fire fighters to conduct fire fighting activities at the potentially severe damage radius.
- Quantify avoided fire damage to buildings and property based on the exposure time difference.
- Determine the benefit in terms of avoided fire damage costs attributed to block valve closure swiftness.

Results of these comparisons and avoided fire damage cost determinations show that block valves have no influence on the volume of natural gas released during the detection phase because the block valves are open and the compressors are operating when natural gas begins escaping from the break. Fire damage to buildings and personal property located in Class 1, Class 2, Class 3, and Class 4 HCAs resulting from natural gas combustion immediately following guillotine-type breaks in natural gas pipelines is considered potentially severe for all areas within 1.5 to 1.7 times the PIR. Severe damage to buildings and personal property within these areas is possible because the heat flux produced by natural gas combustion immediately following the break equals or exceeds the severe damage threshold, 40 kW/m^2 (12,700 Btu/hr ft^2). In addition, the radius for potentially severe damage envelopes the radii for potentially moderate damage, which corresponds to a heat flux of 31.5 kW/m^2 (10,000 Btu/hr ft^2) and an exposure duration of 15 minutes, and potentially minor damage, which corresponds to a heat flux of 15.8 kW/m^2 (5,000 Btu/hr ft^2) and an exposure duration of 30 minutes. These results are based on computed heat flux versus time data and apply to natural gas pipelines with nominal diameters ranging from 12-in. to 42-in. and operating pressures ranging from 300 psig to 1,480 psig.

Without fire fighter intervention, the swiftness of block valve closure has no effect on mitigating potential fire damage to buildings and personal property in Class 1, Class 2, Class 3, and Class 4 HCAs resulting from natural gas pipeline releases. The basis for this result follows.

- The heat flux produced by hydrocarbon combustion immediately following the break equals or exceeds the threshold of 40.0 kW/m^2 (12,700 Btu/hr ft^2) for potentially severe damage within a distance of approximately 1.5 times the PIR.
- The time required to detect the break, isolate the damaged line section by closing the block valves, and begin reducing the natural gas discharge rate exceeds the time required to cause potentially severe building and personal property damage.

Block valve closure swiftness also has no effect on reducing building and personal property damage costs. Consequently, without fire fighter intervention, there is no quantifiable benefit in terms of cost avoidance for damage to buildings and personal property attributed to swiftly closing block valves located upstream and downstream from guillotine-type breaks in natural gas pipelines. However, when combined with fire fighter intervention, the swiftness of block valve closure has a potentially beneficial effect on mitigating fire damage to buildings and personal property located in Class 1, Class 2, Class 3, and Class 4 HCAs.

The benefit in terms of cost avoidance is based on the ability of fire fighters to mitigate fire damage to buildings and personal property located within a distance of approximately 1.5 times the PIR by conducting fire fighting activities as soon as possible upon arrival at the scene. The ability of fire

fighters to conduct fire fighting activities within a distance of approximately 1.5 times the PIR is only possible if the heat flux at this distance is below 2.5 kW/m^2 (800 Btu/hr ft^2) and fire hydrants are available at locations where needed. The study results further show that for natural gas release scenarios, block valve closure within 8 minutes after the break can result in a potential cost avoidance of at least $2,000,000 for 12-in. nominal diameter natural gas pipelines and $8,000,000 for 42-in. nominal diameter natural gas pipelines depending on the configuration of buildings within the Class 3 HCA. Delaying block valve closure by an additional 5 minutes can reduce the cost avoidance by approximately 50%. In addition, block valve closure in 8 minutes increases the time fire fighters are able to conduct effective fire fighting operations within a distance of 1.5 times the PIR by approximately 15 minutes or more.

The analytical approach and computational models used to assess the hypothetical natural gas pipeline release scenarios were also used to study the San Bruno natural gas pipeline accident that occurred in a residential area in San Bruno, California on September 9, 2010. Study results for this actual natural gas pipeline release provide evidence that the analytical approach and computational models produce credible results.

E.3 ASSESSMENT METHODOLOGY AND RESULTS FOR HAZARDOUS LIQUID PIPELINE RELEASES WITH IGNITION

Hazardous liquid pipeline release events are subdivided into four sequential phases – (1) Detection Phase, (2) Continued Pumping Phase, (3) Block Valve Closure Phase, and(4) Pipeline Drain Down Phase. The total discharge volume equals the sum of the volumes released during each phase. Following a guillotine-type break in a hazardous liquid pipeline and ignition of the released hydrocarbon onto level ground, a pool fire begins to form and continues to increase in diameter as liquid flows from the break. Eventually, the pool reaches an equilibrium diameter when the mass flow rate from the break equals the fuel mass burning rate. The fire will continue to burn until the liquid that remains in the isolated pipeline segments stops flowing from the pipeline.

The effectiveness of block valve closure swiftness on limiting the spill volume of a release is influenced by the location of the block valves relative to the location of the break, the pipeline elevation profile between adjacent block valves, and the time required to close the block valves after the break is detected and the pumps are shut down. The volume of liquid spilled during the detection and continued pumping phases is unaffected by block valve closure swiftness because the block valves are open from the time the break occurs until the end of the block valve closure phase. However, the total spill volume is reduced by rapidly detecting the break and taking immediate corrective actions including shutting down the pumps and closing the block valves.

The effectiveness of block valve closure swiftness in mitigating potential fire consequences of a liquid propane release from a hazardous liquid pipeline with ignition was evaluated using the following methodology.

- Compute heat flux versus time data for hypothetical release scenarios involving 8-in. and 36-in. nominal diameter propane pipelines with different elevation profiles operating at 400 and 1,480 psig with block valve closure at 13 minutes and 70 minutes after the break.
- Use the heat flux versus time data to prepare separation distance (radius from break) versus time plots for specific heat flux thresholds.
- Compare the heat flux threshold curves for the 13-minute and 70-minute block valve closure times and separation distances.

- Determine the potentially severe damage radius for a heat flux of 40.0 kW/m^2 (12,700 Btu/hr ft^2), the potentially moderate damage radius for a heat flux of 31.5 kW/m^2 (10,000 Btu/hr ft^2) and an exposure duration of 15 minutes, and the potentially minor damage radius for a heat flux of 15.8 kW/m^2 (5,000 Btu/hr ft^2) and an exposure duration of 30 minutes.
- Use these radii to compute areas of avoided moderate and minor damage.
- Quantify avoided fire damage to buildings and property based on these areas.
- Determine the benefit in terms of avoided fire damage costs attributed to block valve closure swiftness.

The potentially severe damage radius for each of the 8-in. nominal diameter liquid propane pipeline release scenarios considered in this study are unaffected by the swiftness of block valve closure. The pools reach their equilibrium diameters in 2 minutes which is less than the 13 minutes required to detect the leak (5 minutes), shutdown the pumps (5 minutes), and close the valves (3 minutes). Similarly, the potentially severe damage radius for each of the 30-in. nominal diameter liquid propane pipeline release scenarios considered in this study are unaffected by the swiftness of block valve closure because the pools reach their equilibrium diameters in 8 minutes. Therefore, the avoided damage costs associated with the potentially severe damage radius cannot be realized unless the detection phase and the continued pumping phase decrease to much less than 5 minutes.

Fire damage to buildings and personal property in a HCA resulting from liquid propane combustion immediately following guillotine-type breaks in hazardous liquid pipelines is considered potentially severe for a radius up to 2.6 times the equilibrium diameter. Severe damage to buildings and personal property within this area is possible because the heat flux produced by liquid propane combustion following the break eventually reaches or exceeds the severe damage threshold, 40 kW/m^2 (12,700 Btu/hr ft^2). Calculations show the radii for potentially moderate damage, which corresponds to a heat flux of 31.5 kW/m^2 (10,000 Btu/hr ft^2) for a minimum exposure period of 15 minutes, and potentially minor damage, which corresponds to a heat flux of 15.8 kW/m^2 (5,000 Btu/hr ft^2) for a minimum exposure period of 30 minutes, are reduced or eliminated as the block valves closure time decreases. These results are based on computed heat flux versus time data for liquid propane pipelines with nominal diameters ranging from 8 to 30 in. and operating pressures ranging from 400 psig to 1,480 psig.

The swiftness of block valve closure has a significant effect on mitigating potential fire damage to buildings and personal property in a HCA resulting from liquid propane pipeline releases. The benefit in terms of cost avoidance for damage to buildings and personal property attributed to block valve closure swiftness increases as the duration of the block valve shutdown phase decreases. Risk analysis results for a hypothetical 30-in. nominal diameter hazardous liquid pipeline release of liquid propane show that the estimated total avoided cost for building and property damage resulting from block valve closure in 13 rather than 70 minutes is over $6M.

E.4 ASSESSMENT METHODOLOGY AND RESULTS FOR HAZARDOUS LIQUID PIPELINE RELEASES WITHOUT IGNITION

Potential consequences on the human and natural environments resulting from a hazardous liquid release without ignition generally involve socioeconomic and environmental impacts. These impacts are influenced by the total quantity of hazardous liquid released and the habitats, resources, and land uses that are affected by the release. The methodology used in this study to quantify socioeconomic and environmental impacts resulting from a hazardous liquid release involves computing the quantity

of hazardous liquid released as a function of block valve closure time and then using this quantity to establish the total damage cost based on the EPA's BOSCEM. The total damage cost is determined as follows:

- Add the unit response cost, the unit socioeconomic damage cost, and the unit environmental damage cost;
- Multiply the sum of these costs by the number of barrels spilled; and
- Apply a damage cost adjustment factor which aligns the total damage cost with the actual cleanup costs reported for recent crude oil spills in environmentally sensitive areas. The damage cost for crude oil released in the Enbridge Line 6B pipeline rupture in Marshall, Michigan in 2010 was approximately $38,000 per barrel.

The BOSCEM accounts for effects of spill size on the total damage cost by reducing the unit cost of damage as the number of barrels spilled increases.

The swiftness of block valve closure has a significant effect on mitigating potential socioeconomic and environmental damage to the human and natural environments resulting from hazardous liquid pipeline releases because damage costs increase as the spill size increases. The benefit in terms of cost avoidance for damage to the human and natural environments attributed to block valve closure swiftness increases as the duration of the block valve shutdown phase decreases.

E.5 FEASIBILITY EVALUATIONS

Feasibility evaluations conducted as part of this study show that under certain conditions installing ASVs and RCVs in newly constructed and fully replaced natural gas and hazardous liquid pipelines is technically, operationally, and economically feasible with a positive cost benefit. However, these results may not apply to all newly constructed and fully replaced pipelines because site-specific parameters that influence risk analyses and feasibility evaluations often vary significantly from one pipeline segment to another, and may not be consistent with those considered in this study. Consequently, the technical, operational, and economic feasibility and potential cost benefits of installing ASVs and RCVs in newly constructed or fully replaced pipelines need to be evaluated on a case-by-case basis.

The technical feasibility of installing ASVs and RCVs in newly constructed or fully replaced pipelines depends primarily on physical space limitations at the valve installation location. Installation of ASVs in newly constructed and fully replaced pipelines is considered technically feasible provided sufficient space is available for the valve body, actuators, power source, sensors and related electronic equipment, and the appropriate personnel required to install and maintain the valves. Installation of RCVs in newly constructed and fully replaced pipelines is also considered technically feasible. However, sufficient space must be available for the valve body, actuators, power source, sensors and related electronic equipment, and personnel required to install and maintain the valves as well as additional space for the communications equipment that links the site to the control room. Installation of RCVs in newly constructed and fully replaced pipelines is also considered technically feasible based on field evaluations in which RCVs performed reliably and as intended.

Installation of ASVs and RCVs is considered operationally feasible provided communication links between the RCV site and the control room are continuous and reliable. It is also important that inadvertent block valve closure does not occur. It is undesirable to disrupt service to critical customers, and also sudden block valve closure that occurs inadvertently may cause a pressure surge that could damage equipment.

Operational feasibility evaluations also need to consider factors such as the remoteness and accessibility of the valve location; effects of service disruptions for valve maintenance, repair and testing; and possible travel delays caused by severe weather or traffic congestion. In addition, there may be limited times during the year that pipelines serving critical customers can be shutdown due to service reliability considerations. Therefore, operators must consider downstream system demands when scheduling maintenance. Operational feasibility evaluations may also need to consider workplace hazards. For example, working on a pressurized pipeline presents some of the most safety-sensitive work performed by pipeline operators, and workers must strictly follow company safety practices when conducting such work.

Economic feasibility evaluations based on risk analysis results for the worst-case release scenarios considered in this study show that installing ASVs and RCVs in newly constructed and fully replaced natural gas and hazardous liquid pipelines is economically feasible with a positive cost benefit. However, these release scenarios do not model the unique features of a particular pipeline facility or its site-specific design features and operating conditions. These unique features and conditions can invalidate the underlying assumptions in this study and, therefore, reduce or eliminate the positive cost benefits attributed to block valve closure swiftness. Meaningful economic feasibility assessments and cost benefit analyses for specific pipeline segments need to be based on avoided damage costs and valve automation costs that reflect the actual pipeline design features and operating conditions and the site-specific parameters appropriate for the area where the pipeline segment is located. Consideration of site-specific variables is essential in determining whether the cost benefit is positive or negative and whether installation of ASVs or RCVs in newly constructed or fully replaced pipelines is economically feasible.

E.6 POTENTIAL CONSEQUENCE REDUCTION STRATEGIES

In theory, installing ASVs and RCVs in newly constructed and fully replaced pipelines can reduce overall impacts on the public and to the environment by decreasing the total volume of the release. However, block valve closure has no effect on preventing pipeline failure or stopping the product that remains inside the isolated pipeline segments from escaping into the environment. Positive effects in terms of reduced fire, socioeconomic, and environmental damage resulting from rapid block valve closure are only realized through the combined efforts of pipeline operators and emergency responders.

For natural gas pipelines, installing ASVs and RCVs can be an effective strategy for mitigating potential fire consequences resulting from a release and subsequent ignition provided all of the following conditions are satisfied.

- The leak is detected and the appropriate ASVs and RCVs close completely so that the damaged pipeline segment is isolated within 10 minutes or less after the break and fire fighting activities within the area of potentially severe damage can begin soon after the fire fighters arrive on the scene.
- Fire fighters arrive on the scene and are ready to begin fire fighting activities within 10 minutes or less after the break.
- Fire hydrants are accessible in the vicinity of the potentially severe damage radius.
- Block valves close in time to reduce the heat flux at the potentially severe damage radius (1.5 times the PIR) to 2.5 kW/m^2 (800 $Btu/hr\ ft^2$) or less within 10 to 20 minutes after the break.

For hazardous liquid pipelines, installing ASVs and RCVs can be an effective strategy for mitigating potential fire damage resulting from a guillotine-type break and subsequent ignition provided the leak

is detected and the appropriate ASVs and RCVs close completely so that the damaged pipeline segment is isolated within 15 minutes after the break. After continuous exposure to a heat flux of 31.5 kW/m^2 (10,000 Btu/hr ft^2) for 15 minutes, buildings located with the potentially moderate damage radius may begin burning. If the damaged pipeline segment is not isolated within 30 minutes after the break, buildings located with the potentially minor damage radius that are continuously exposed to a heat flux of 15.8 kW/m^2 (5,000 Btu/hr ft^2) may begin burning. The cost effectiveness of installing ASVs or RCVs in newly constructed or fully replaced hazardous liquid pipelines decreases as delays in leak detection, pump shutdown, and block valve closure increase.

Adding automatic closure capability to block valves in newly constructed or fully replaced hazardous liquid pipelines can also be an effective strategy for mitigating potential socioeconomic and environmental damage resulting from a release that does not ignite. Delays in closing block valves immediately following a break result in a release rate that approximates the normal pipeline flow rate. This flow rate continues until block valve closure isolates the damaged pipeline segment and the drain down phase begins. The cost effectiveness of installing ASVs or RCVs in newly constructed or fully replaced hazardous liquid pipelines increases as the time required to isolate a damage pipeline segment decreases because block valve closure swiftness affects the amount of product released following an unintended hazardous liquid pipeline rupture.

1. INTRODUCTION

The U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) is the Federal safety authority responsible for ensuring safety in the design, construction, operation and maintenance, and spill response planning for the 2.3 million (M) miles of natural gas and hazardous liquid transportation pipelines in the United States. Its mission is to protect people and the environment from the risks inherent in transportation of hazardous materials by pipeline and other modes of transportation. Under Congressional action in 2004, PHMSA is required to consider the assignment and maintenance of safety as the highest priority, recognizing the clear intent, encouragement, and dedication of Congress to the furtherance of the highest degree of safety in pipeline transportation and hazardous materials transportation (U.S. Congress, 2004). In performing its duties, PHMSA promulgates comprehensive minimum safety standards for the transportation of gas and hazardous liquids by pipeline (U.S. Congress, 1996). These standards are contained in Title 49, Parts 186 to 199 of the *Code of Federal Regulations* (CFR).

The Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 (U.S. Congress, 2012) calls for the Secretary of the U.S. Department of Transportation (DOT) to require by regulation the use of automatic or remotely controlled shutoff valves, or equivalent technology, where it is economically, technically, and operationally feasible on hazardous liquid and natural gas transmission pipeline facilities constructed or entirely replaced after the final rule was issued. The Act also requires a study to discuss the ability of transmission pipeline facility operators to respond to a hazardous liquid or natural gas release from a pipeline segment located in a high consequence area (HCA). In addition, PHMSA is evaluating related concerns raised by the National Transportation Safety Board (NTSB) in its accident report for the pipeline rupture in San Bruno, California (NTSB. 2011) that resulted in eight deaths. The NTSB concluded that the damage caused by the pipeline rupture could have been significantly reduced with the use of automatic shutoff valves (ASVs) or remote control valves (RCVs).

In March 2012, PHMSA requested assistance from the Oak Ridge National Laboratory (ORNL) in preparing a report titled "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety." This report, which documents the study results, addresses the issues defined in Sect. 4 of the Act and those raised by the NTSB in its accident report for the San Bruno accident. The work is administered through an interagency agreement between the DOT and the U.S. Department of Energy (DOE) that authorizes ORNL to provide specialized engineering assistance and technical support to PHMSA.

1.1 STUDY BASIS

Gas transmission pipelines are currently required to incorporate sectionalizing block valves[1] at intervals that vary depending on population density. These requirements apply to initial gas transmission pipeline construction. However, if the population increases after a pipeline is placed in service, such that the class location changes, operators must reduce pressure, conduct pressure tests, or verify the adequacy of prior pressure tests, or replace the pipeline to allow continued operation at the existing pressure. If operators replace the pipeline, then these prescribed valve spacing intervals apply. If operators reduce pressure or verify that prior pressure tests are sufficient to justify continued operation without reducing pressure or replacing the pipeline, then current regulations do not require installation of additional block valves to comply with the prescribed spacing requirements. Further, block valves are not required to be remotely operable or to operate automatically in the event of an unexpected reduction in pressure (*e.g.* from a

[1] Sectionalizing block valves are used to isolate a section of pipeline for maintenance or in response to an incident. The term block valve is synonymous with sectionalizing block valve.

pipeline rupture). Section 2.1 discusses additional safety regulations adopted by PHMSA for natural gas pipelines.

Operators of hazardous liquid pipelines are required to install block valves at prescribed locations to facilitate isolation of pump stations, breakout storage tanks, and lateral takeoffs and other points along the pipeline near designated water bodies and populated areas to minimize damage and pollution from an accidental hazardous liquid discharge. In addition, operators are required to consider installing emergency flow restricting devices (EFRDs) such as check valves and RCVs on pipeline segments to protect a HCA in the event of a hazardous liquid pipeline release. Section 2.2 discusses additional safety regulations adopted by PHMSA for hazardous liquid pipelines.

On October 18, 2010, PHMSA published an advanced notice of proposed rulemaking (ANPRM) for safety of on-shore hazardous liquid pipelines (DOT, 2010a). In this rulemaking, PHMSA is considering whether changes are needed to the regulations covering hazardous liquid onshore pipelines. In particular, PHMSA sought comment on whether it should extend regulation to certain pipelines currently exempt from regulation; whether other areas along a pipeline should either be identified for extra protection or be included as additional HCAs for Integrity Management (IM) protection; whether to establish and adopt standards and procedures for minimum leak detection requirements for all pipelines; whether to require the installation of EFRDs in certain areas; whether revised valve spacing requirements are needed on new construction or existing pipelines; whether repair timeframes should be specified for pipeline segments in areas outside the HCAs that are assessed as part of the IM; and whether to establish and/or adopt standards and procedures for improving the methods of preventing, detecting, assessing and remediating stress-corrosion cracking in hazardous liquid pipeline systems.

Under separate action, PHMSA issued a related ANPRM on August 25, 2011 for safety of gas transmission pipelines (DOT. 2011a). In this rulemaking, PHMSA is considering whether changes are needed to the regulations governing the safety of gas transmission pipelines. In particular, PHMSA is considering whether IM requirements should be changed, including adding more prescriptive language in some areas, and whether other issues related to system integrity should be addressed by strengthening or expanding non-IM requirements. Among the specific issues involving IM requirements, PHMSA is considering whether the definition of a HCA should be revised, and whether additional restrictions should be placed on the use of specific pipeline assessment methods. With respect to non-IM requirements, PHMSA is considering whether revised requirements are needed on new construction or existing pipelines concerning mainline valves, including valve spacing and installation of remotely operated or automatically operated valves; whether requirements for corrosion control of steel pipelines should be strengthened; and whether new regulations are needed to govern the safety of gathering lines and underground gas storage facilities. Within this ANPRM, PHMSA sought public comments on valve spacing and the need for remotely or automatically controlled valves.

1.1.1 Previous Studies and Recommendations

Congress has previously required PHMSA to "assess the effectiveness of remotely controlled valves to shut off the flow of natural gas in the event of a rupture" and to require use of such valves if they were shown technically and economically feasible. The NTSB has also issued a number of recommendations concerning requirements for use of automatic or remotely operated mainline valves, including one following a 1994 pipeline rupture in Edison, New Jersey (NTSB, 1995a and NTSB, 1995b). PHMSA's predecessor agency, the Research and Special Programs Administration (RSPA) conducted the evaluation mandated by Congress and concluded that remotely and automatically controlled mainline valves are technically feasible but not, on a generic basis, economically feasible (DOT, 1999). Nevertheless, IM regulations require that an operator must install an automatic or remotely operated valve if the operator determines, based on a risk analysis, that these would be an efficient means of adding protection to a

HCA in the event of a gas release (49 CFR 192.935(c)). In publishing this regulation, PHMSA acknowledged its prior conclusion that installation of these valves was not economically feasible but noted that this was a generic conclusion. PHMSA stated that it did not expect operators to re-perform the generic analyses but rather to "evaluate whether the generic conclusions are applicable to their HCA pipeline segments."

The accident in San Bruno, California on September 9, 2010, raised public concern about the ability of pipeline operators to isolate sections of gas transmission pipelines in the event of an accident promptly and whether remotely or automatically operated valves should be required to assure this. Based upon the investigation of this accident, the NTSB issued the following recommendation.

> NTSB Recommendation P-11-11:
> *Amend Title 49 Code of Federal Regulations Section 192.935(c) to directly require that automatic shutoff valves (ASV) or remote control valves (RCV) in high consequence areas and in class 3 and 4 locations be installed and spaced at intervals that consider the population factors listed in the regulations.*

The NTSB determined that the damage caused by the pipeline rupture could have been significantly reduced with the use of ASVs or RCVs and that the industry references for the evaluation of ASVs and RCVs are flawed. These industry references conclude that the majority of damage caused by a pipeline rupture occurs within the first 30 seconds and the duration of the fire's threat to human safety and property damage is minimal. In response to these concerns, PHMSA is considering changes to its requirements for sectionalizing block valves.

1.1.2 Study Authorization and Purpose

On January 3, 2012, Congress amended Title 49, United State Code, through the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 (U.S. Congress, 2012). This Act provides for enhanced safety and environmental protection in pipeline transportation, enhanced reliability in the transportation of the Nation's energy products by pipeline, and other purposes. Requirements in Section 4 include the addition of a subsection and the removal of an existing subsection on Remotely Controlled Valves in The Pipeline Safety Statute 49 USC 60102. The removed section addressed a required study in 1998 and the implementation of requirements for Remotely Controlled Valves to shut off the flow of natural gas in the event of a rupture of an interstate natural gas pipeline. With the striking of the previous subsection, the new subsection calls for the DOT Secretary to require by regulation the use of automatic or remote controlled shutoff valves, or equivalent technology, where it is economically, technically, and operationally feasible on hazardous liquid and natural gas transmission pipeline facilities constructed or entirely replaced after the final rule was issued. In addition, the Act requires a study to discuss the ability of transmission pipeline facility operators to respond to a hazardous liquid or natural gas release from a pipeline segment located in a HCA. The purpose of this study is to investigate the swiftness of leak detection and pipeline isolation capabilities, the location of the nearest response personnel as well as the cost, risk and benefit of installing ASVs and RCVs. The NTSB Recommendation P-11-11 falls in line with the Act's study requirements for natural gas transmission line while at the same time adds additional requirements for the consideration of ASVs and RCVs inside Class 3 and Class 4 areas.

On February 9, 2012, PHMSA published a "Pipeline Safety: Notice of Public Meetings on Improving Pipeline Leak Detection System Effectiveness and Understanding the Application of Automatic/Remote Control Valves" I the *Federal Register* (DOT, 2012a). The public workshop on "Improving Pipeline Leak Detection System Effectiveness and Understanding the Application of Automatic/Remote Control Valves" was held in Bethesda, Maryland on March 27 and 28, 2012. This workshop examined how to

encourage operators to expand usage of leak detection systems and improve system effectiveness on the Nation's pipeline infrastructure and how remote control and automatic control valves can be installed to lessen the volume of natural gas and hazardous liquid released during catastrophic pipeline events. These public meetings provided an open forum for exchanging information on the challenges associated with leak detection systems and automatic/remote control valves.

Following the meeting, PHMSA published a notice of public comment on the scope of leak and valve studies mandated by the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 (DOT, 2012b). This notice defined the tentative work scope for the automatic and remote control valve study and subdivided the work into the following tasks.

- Task 1: Kickoff Meeting
- Task 2: Attend Public Workshop The contractor will attend PHMSA's Understanding the Application of Automatic Control and Remote Control Valves public workshop on March 28, 2012.
- Task 3: Required Study on Automatic and Remote-Controlled Shut-off Valves on HCAs and Class 3 and Class 4 Areas on Natural Gas Pipelines
- Task 4: Required Study on Automatic and Remote Controlled Shut-Off Valves on Newly Constructed or Entirely Replaced Facilities
- Task 5: Review and Assess Previous Pipeline Incidents[2]

On May 4, 2012, the Interstate Natural Gas Association of America (INGAA) submitted comments on the leak and valve study mandated by the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 (INGAA. 2012). After discussing a variety of incident management mitigation issues, INGAA concluded that the study should involve far more than an examination of valve spacing and technology including:

> *The respective roles of the pipeline, emergency responders and the public; the numerous, individual steps that go into pipeline incident management; the impact of false closures of automated valves; the overall cost and individual cost elements associated with valve automation and installation; the current and potential impact of emerging leak and rupture detection technologies; and the identification and development of appropriate incident management metrics.*

1.2 STUDY SCOPE AND OBJECTIVES

The objective of the agreement between PHMSA and ORNL is to address the requirements of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 and the recommendations on ASVs and RCVs from the NTSB investigation of the San Bruno accident. The study scope includes the following work activities.

1. Study the ability of transmission pipeline facility operators to respond to a hazardous liquid release from a pipeline segment located in a high-consequence area as well as Class 3 and Class 4 areas for natural gas transmission.
2. Study the economic, technical, and operational feasibility of requiring the installation of automatic or remote controlled shutoff valves on newly constructed or entirely replaced pipelines.

[2] PHMSA defines "incident" in 49 CFR 191.3 as an event that involves a release of gas from a pipeline causing death or personal injury necessitating inpatient hospitalization or estimated property damage, including the cost of gas lost, that is $50,000 or more.

3. Analyze the requirements of valve spacing and the effects of requiring a more stringent minimum spacing of either ASVs or RCVs.
4. Evaluate the fire science behind initial accident rupture and response time provided by ASVs and RCVs by developing models that show the benefits of rapid response time.
5. Conduct cost, risk, and benefit analysis of installing ASVs and RCVs in HCAs and Class 3 and Class 4 areas.

Completion of these objectives will facilitate a favorable closure of NTSB Recommendation (P-11-11) and will enable PHMSA to successfully report the status of transmission pipeline facility operator to respond to a hazardous liquid or gas release from a pipeline segment.

Key areas of assessment and evaluation include:

- Analysis of the technical and operational ability of the swiftness of the existing leak detection system and the operator's capability to shut down the affected pipeline;
- Consideration of upstream and downstream controls, automation, supervisory control and data acquisition (SCADA) systems, and valve spacing effects;
- Assessment of human factors of response including the minimum response time and the nearest required human to initiate isolation of the pipeline;
- Analysis of costs and benefits for installing ASVs and RCVs in HCAs and in Class 3 and Class 4 areas for gas transmission pipelines including the lifetime operational cost of the system, benefits that may be seen by the public and surrounding environment, and economic impacts of damage to surrounding environments and the public based on standard fire science practices;
- Assessment of risks of installing ASVs and RCVs as compared to local manual operation of isolation valves on transmission pipelines;
- Analysis of the benefits to the public and the environment resulting from installation of ASVs and RCVs within HCA and Class 3 and Class 4 areas;
- Comparison of all types of ASVs and RCVs and determine whether available technologies are able to adequately protect the public and environment from pipeline leaks and incidents through rapid valve closure;
- Analysis of technological shortfalls specific to ASV reliability;
- Assessment of alternative technology to ASVs and RCVs to determine if these technologies should be investigated and explained in the study;
- Review of current DOT regulations in regards to installation of ASVs and RCVs on hazardous liquid and natural gas pipelines and determine how operators are currently complying with these regulations;
- Consideration of reliability, availability, and maintainability system aspects;
- Analysis of how ASV and RCV installation could affect pipeline operations including operational aspects (i.e. procedures, protocols, best practices, workforce, etc.);
- Consideration of emergency first responders; and
- Examination of past pipeline incidents to determine whether installation of either ASVs or RCVs could have mitigated effects to the public and surrounding environment.

The results of this study apply to natural gas and hazardous liquid transmission lines.

1.3 STUDY PARAMETERS AND BOUNDARIES

Potential effects of unintended releases from natural gas and hazardous liquid pipelines are categorized as follows (Muhlbauer, 2006):

- human impacts including personal injuries and fatalities,
- property damage,
- environmental impacts, and
- supply losses and business interruptions.

These effects are considered in evaluating the effectiveness of RCVs and ASVs in mitigating the consequences of a release. The scope and magnitude of these effects depends on the type and amount of product released; the exact sequence of events; and site-specific factors such as the separation distance between an individual or building and the release point, building type and construction, terrain features, and atmospheric conditions. Modeling each potential release scenarios is not practical because an unlimited number of scenario permutations are possible.

In this study, modeling is limited to potential fire consequences and thermal radiation effects resulting from unintended releases from: (1) natural gas pipelines, and (2) hazardous liquid pipelines that transport gasoline, propane, butane, and propylene. The scope of the study is further limited by considering only worst case releases of these products resulting from a guillotine-type break[3] in the pipeline. Although ignition of the released product following a guillotine-type break is not ensured, this study only considers release scenarios that result in immediate ignition of the released product at the break location. Effects of hazardous liquid pipeline releases on the human and natural environments are discussed in Sections 3.2 and 3.3.

Blast, overpressure, shrapnel, and earthquake-type effects resulting from an unintended natural gas or hazardous liquid pipeline release are hazards that can adversely affect humans, property, and the environment. However, these effects are beyond the scope of this study because they occur immediately after the break and RCVs and ASVs, which typically require several minutes to close, cannot mitigate these hazards.

1.3.1 Natural Gas Pipeline Release Events

Immediately following a guillotine-type break in a natural gas pipeline, the gas begins flowing rapidly through the break and into the surrounding atmosphere. The escaping natural gas creates a highly turbulent mushroom shaped vapor cloud that increases in height above the release point due to the source momentum and buoyancy. Initially, the natural gas flow from each broken pipeline segment is balanced, and the natural gas escapes to the atmosphere in the form of jets that depend on the alignment of the line pipe ends. Natural gas will not burn unless the gas-to-air ratio is between 4% and 15%. Noise produced by the escaping natural gas is normally audible for a long distance.

[3] A guillotine-type break is defined as complete separation or rupture of line pipe along a circumferential fracture plane (as compared to more common breaks, such as punctures and through-wall cracks). The term leak is used in this study to describe the release of product resulting from a pipeline break.

For buried pipelines, the escaping natural gas ejects the overlying soil forming a crater of a size and shape which influences the behavior of the released gas. Figure 1.1 shows the crater produced by the natural gas pipeline rupture that occurred near Carlsbad, New Mexico (NTSB, 2003). As the release continues, the natural gas jet feeds the vapor cloud and entrains air that may contain ejected soil particles. Without an ignition source, the vapor cloud and the escaping gas disperse into the atmosphere.

Fig. 1.1. Crater resulting from natural gas pipeline release near Carlsbad, New Mexico (NTSB, 2003).

If ignition of the released natural gas occurs immediately, or shortly after, the guillotine-type break, a transient fireball[4] will occur. The fireball, which is the result of combustion of the mushroom-shaped vapor cloud, typically lasts 30 seconds or less leaving a quasi-steady-state fire that continues to burn until all of the escaping natural gas is consumed (Acton, 2000 and Cleaver, 2001). Figure 1.2 shows the fireball produced by the natural gas pipeline rupture that occurred near Carlsbad, New Mexico (NTSB, 2003).

Fig. 1.2. Fire resulting from natural gas pipeline release near Carlsbad, New Mexico (NTSB, 2003).

[4] A fireball is a burning fuel-air cloud whose energy is emitted primarily in the form of radiant heat (AIChE, 1994).

The possibility of a significant flash fire[5] resulting from delayed remote ignition of the released natural gas is extremely low due to the buoyant nature of the vapor which generally precludes the formation of a persistent flammable vapor cloud at ground level. Consequently, the dominant hazard from a natural gas pipeline release is thermal radiation from a sustained jet fire, which may be preceded by a short-lived fireball (Stephens, 2000). Fireballs and jet fires have the potential to injury humans, damage property, and impact the environment by damaging plants and animals in the vicinity of the break. Any potential environmental impacts on air and water quality caused by the released natural gas, its products of combustions, and runoff from fire fighting operations are beyond the scope of this study.

At later stages of the release, the flow through each pipeline segment may vary depending on the location and closure status of upstream and downstream block valves and the distance between the break and these block valves. The flow may also be affected by features such as compressor stations or connections with other pipelines. These boundary conditions determine whether the flow through the pipeline at the break decreases to zero or transitions to a quasi-steady-state condition (Acton, 2001). The size and intensity of a fire resulting from a natural gas pipeline release depends on the effective rate of gas released which is primarily influenced by the pressure differential and the size and shape of the break (Stephens, 2000). For worst case, guillotine-type breaks, where the effective hole size is equal to the line pipe diameter, the governing parameters are, therefore, the line pipe diameter and the internal operating pressure at the time of the break.

Thermal radiation hazard zones with increasing impact severity are described by concentric circles centered on the pipeline rupture. The thermal radiation intensities at the perimeters of these concentric circles increase as the radii decrease. Table 1.1 summarizes the effects of progressively higher heat fluxes on buildings and humans. Because thermal radiation effects on buildings and humans are a function of radiant heat flux and exposure duration, quantifying the time-dependent variations in heat flux intensity for specific radii is key to assessing the benefits of installing RCVs and ASVs in natural gas pipelines.
Given the wide range of actual pipeline sizes and operating pressures, leak detection periods, and block valve spacing and closure times, ORNL developed methodologies for quantifying the impacts of these parameters on areas affected by combustion of the escaping natural gas. The methodologies, which are described in Section 3.1, also characterize time-dependent radiant thermal intensities at various separation distances from the break.

The terms “sectionalizing block valve” and “block valve” are used interchangeably in 49 CFR 192 but these terms are not defined in the regulation. To minimize possible confusion, the terms “sectionalizing block valve” and “block valve” are used in this document to mean a valve that is installed in a natural gas pipeline to isolate a line section. A line section means a continuous run of transmission line between adjacent compressor stations, between a compressor station and storage facilities, between a compressor station and a block valve, or between adjacent block valves.

1.3.1.1 Phases of a Natural Gas Pipeline Release

A pipeline break can range in size and shape from a short, through-wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. A break that occurs adjacent to a block valve and renders the block valve inoperable will result in the greatest volume of natural gas released to the atmosphere compared to a break that occurs at another location along the same line section. Guillotine-type breaks with immediate ignition of the escaping natural gas produce thermal radiant intensities that are considered worst case because this type of rupture results in the greatest release of natural gas in the shortest time period.

[5] A flash fire is the non-explosive combustion of a vapor cloud resulting from a release of flammable material into the open air which, after mixing with air, ignites (AIChE, 1994).

Table 1.1. Effects of thermal radiation intensity on buildings and humans

Approximate Radiant Heat Flux		Effects and Consequences
kW/m^2	$Btu/hr\ ft^2$	
1.0	320	Nominal solar radiant heat flux on a clear summer day (NFPA, 2011a)
1.4	450	Thermal radiation flux considered acceptable by HUD for outdoor, unprotected facilities or open spaces where people congregate (HUD, 2011a)
2.5	800	Common thermal radiation exposure while fire fighting. This energy level may cause burn injuries with prolonged exposure (NFPA, 2011a).
4.0	1,270	Glass breakage after exposure for 30 minutes (LaChance, 2009).
4.7	1,500	Maximum radiant heat flux in areas where emergency actions lasting 2 to 3 minutes can be required by personnel without shielding but with appropriate clothing. Appropriate clothing consists of hard hat, long-sleeved shirts with cuffs buttoned, work gloves, long-legged pants and work shoes. Appropriate clothing minimizes direct skin exposure to thermal radiation (API, 2007).
6.3	2,000	Maximum radiant heat flux in areas where emergency actions lasting up to 30 seconds can be required by personnel without shielding but with appropriate clothing. Appropriate clothing consists of hard hat, long-sleeved shirts with cuffs buttoned, work gloves, long-legged pants and work shoes. Appropriate clothing minimizes direct skin exposure to thermal radiation (API, 2007). Personnel are commonly protected from high thermal radiation intensity by restricting access to any area where the thermal radiation can exceed this radiant heat flux. The boundary of a restricted access area can be marked with signage warning of the potential thermal radiation exposure hazard. Personnel admittance to, and work within, the restricted access area should be controlled administratively. It is essential that personnel within the restricted area have immediate access to thermal radiation shielding or protective apparel suitable for escape to a safe location (API, 2007).
12.5	4,000	Minimum energy to ignite wood with a flame, melts plastic tubing, first-degree burns in 10 seconds, 1% lethality in 1 minute (NFPA, 1995).
15.8	5,000	Threshold radiant heat flux used as the basis for determining *Potential Impact Radius* (PIR) which is defined by PHMSA in 49 CFR 912.903 as the radius of a circle within which the potential failure of a natural gas pipeline could have significant impact on people or property (Stephens, 2000 and DOT, 2011b). Radiant heat flux at which human skin experiences pain within 3 seconds and blisters within 6 seconds of exposure with second-degree burn injury (NFPA, 2011a). Radiant heat flux: • at which a wooden structure is not expected to burn and it, thereby, affords indefinite protection to sheltered persons; • corresponding to piloted ignition of whitewood after about 20 minutes of sustained exposure; and • corresponding to approximately a 1% chance of fatality for persons exposed for a credible period of time before reaching shelter (Stephens, 2000).

Table 1.1. Effects of thermal radiation intensity on buildings and humans (Cont.)

Approximate Radiant Heat Flux		Effects and Consequences
kW/m^2	$Btu/hr\ ft^2$	
20	6,340	Radiant heat flux for average ignition time of dry wood (poplar) in 75 seconds (McAllister, 2010). Cable insulation degrades after exposure for 30 minutes (LaChance, 2009). Heat flux on residential family room floor at the beginning of flashover (NFPA, 2011a).
25	7,930	Minimum energy to ignite wood at indefinitely long exposure without a flame (NFPA, 1995). Steel deformation after exposure for 30 minutes (LaChance, 2009).
29	9,200	Radiant heat flux at which wood ignites spontaneously after prolonged exposure (NFPA, 2011a)
30	9,510	Radiant heat flux for average ignition time of dry wood (poplar) in 30 seconds (McAllister, 2010)
31.5	10,000	Allowable thermal radiation flux for determining the acceptable separation distance of a proposed HUD-assisted project building from a hazardous facility. This is based upon the assumption that there will be fire department response to protect exposed combustible buildings within 15 minutes and that the exposed combustible materials will not spontaneously ignite before the fire department responds (HUD, 2011b).
37.5	11,900	Damage to process equipment, 100% lethality in 1 minute, 1% lethality in 10 seconds (NFPA, 1995). Process equipment and structural damage after exposure for 30 minutes (LaChance, 2009).
39.4	12,500	Maximum tolerable level of radiation at the facade of an exposed building. This value, originally derived from work of the Joint Fire Research organization in the United Kingdom, is now generally accepted as that below which the pilot ignition of most cellulosic materials (wood) is unlikely to occur. Pilot ignition is the ignition of a material by radiation where a local high-temperature igniting source is located in the stream of gases and volatiles issuing from the exposed material. Substantially higher levels of radiation are necessary to cause spontaneous ignition (NFPA, 2011b).
40	12,700	Radiant heat flux for average ignition time of dry wood (poplar) in 17 seconds (McAllister, 2010)
50	15,900	Radiant heat flux for average ignition time of dry wood (poplar) in 10 seconds (McAllister, 2010)
52	16,500	Radiant heat flux at which fiberboard ignites spontaneously after 5 seconds (NFPA, 2011a)
100	31,700	Steel structures collapse after exposure for 30 minutes (LaChance, 2009).

Although the volume of natural gas released depends on many factors, natural gas releases are subdivided into three sequential phases – Phase 1: Detection, Phase 2: Block Valve Closure, and Phase 3: Blowdown. The total discharge volume equals the sum of the volumes released during each phase. Events associated with each phase are described below.

Phase 1 – Detection: The detection phase begins immediately after the pipeline ruptures, t_0, and continues until the leak is detected by any method and recognized by the Pipeline Operator, t_d. The volume of natural gas discharged during the detection phase depends on the duration of this phase, $t_d - t_0$,

and is influenced by factors such as the size, shape, and location of the rupture; the performance characteristics of the compressors; the pipeline pressure at the time of the release; and the effectiveness of the leak detection system. In theory, the entire length of the pipeline and its branch lines contribute to the release during the detection phase because the compressors are operating and the block valves are open.

Phase 2 – Block Valve Closure: The block valve closure phase begins after the leak is detected and corrective actions are initiated to mitigate the consequences of the release, t_d, and continues until the upstream and downstream block valves are closed, isolating the line section with the break, t_s. During the block valve closure phase, natural gas continues to flow from the break. The compressors may continue to operate after the block valves are closed, but their operation does not further affect the gas release. The duration of this phase can vary from a few minutes for systems with remotely operated block valves to an hour or more for manually operated equipment located in remote areas. The volume of natural gas discharged during the block valve closure phase, $t_s - t_d$, depends on the duration of this phase and is influenced by factors such as the type of equipment controls (automatically, remotely, or manually operated) and personnel travel time to shut down manually operated equipment. The volume of natural gas discharged during the block valve closure phase is affected by the swiftness of block valve closure.

Phase 3 – Blowdown: The blowdown phase begins when the portion of the pipeline that includes the break is isolated by closure of upstream and downstream block valves. This phase ends when the natural gas remaining in the isolated portions of the upstream and downstream pipeline segments flows from the break and burns, reducing the line pressure to one atmosphere. The volume of natural gas discharged during the blowdown phase depends on the duration of the previous phases and is influenced by the line pipe diameter and the distances from the break to the nearest upstream and downstream block valves.

1.3.1.2 Block Valve Effects on a Natural Gas Pipeline Release

Block valves have no influence on the volume of natural gas released during the detection phase because the block valves are open and the compressors are operating when natural gas begins escaping from the break. However, rapid detection of the leak and implementation of corrective actions including closing block valves to isolate the line section with the break reduce the total volume of natural gas released. The effectiveness of block valve closure in mitigating the consequences of a natural gas pipeline release decreases as the duration of the detection and block valve closure phases increase because thermal radiation effects on buildings and humans are a function of radiant heat flux and exposure duration.

1.3.2 Hazardous Liquid Pipeline Release Events

After a hazardous liquid pipeline ruptures, liquid begins flowing from the break and continues until draining is complete. The amount of material released following the break is influenced by a variety of factors. These factors include the type of liquid, the operating pressure of the pipeline, the size and position of the hole through which the liquid is released, the rate at which the liquid is being pumped through the pipeline, the response of the operator in terms of shutting off pumps and closing valves, the pipeline route and elevation profile, and the location of the break relative to the pumps and block valves. Block valves are installed in hazardous liquid pipelines to facilitate maintenance, operations, or construction and to limit the amount of liquid spilled following a pipeline rupture. For worst case, guillotine-type breaks, the effective hole size is equal to the line pipe diameter.

The behavior of the released liquid depends on its physical properties and the terrain in the vicinity of the break. For example, the liquid could flash on release of pressure to form a vapor cloud containing a fine mist of residual liquid droplets, accumulate in a pool on the ground surface near the pipeline break, create a stream that flows away from the release point, or soak into the surrounding soil (Acton, 2001).

If the released liquid ignites following the break, it could result in a pool fire, a flash fire, or, under certain conditions, a vapor cloud explosion. Pool fires can spread out in all directions or flow in a particular path depending on the terrain. Figure 1.3 shows fire damage along a creek caused by a hazardous liquid pipeline release in Bellingham, Washington (NTSB, 2002). If ignition is delayed, the resulting evolution of vapor from the release could influence the magnitude and extent of a subsequent flash fire or explosion.

Fig. 1.3. Fire damage resulting from hazardous liquid pipeline release in Bellingham, Washington (NTSB, 2002).

Impacts resulting from time-dependent radiant thermal intensities at various separation distances from the break are based on the following hazardous liquid pipeline release scenario. The release occurs following a guillotine-type break where the escaping liquid accumulates in a pool on an impermeable level ground surface and ignites immediately upon release. Pool size is affected by the type of liquid released, the line pipe diameter, the pipeline operating pressure, the time required to detect the leak and initiate corrective actions to mitigate the consequences of the release, the spacing of block valves, the time required to close block valves and isolate the break, and the terrain features. Any potential environmental impacts to air and water quality caused by the released liquids and their products of combustions are beyond the scope of this study.

As discussed in Section 1.3.1, thermal radiation hazard zones with increasing impact severity are described by concentric circles centered on the pipeline rupture. The thermal radiation intensities at the perimeters of these concentric circles increase as the radii decrease. Effects of progressively higher heat fluxes on buildings and humans are described in Table 1.1. Because thermal radiation effects on buildings and humans are a function of radiant heat flux and exposure duration, quantifying the time-

dependent variations in radiant heat fluxes for specific radii is key to assessing the benefits of installing RCVs and ASVs in hazardous liquid pipelines.

Given the wide range of actual pipeline sizes and operating pressures, leak detection periods, and block valve spacing and closure times, ORNL developed methodologies for quantifying the impacts of these parameters on areas affected by combustion of the escaping liquid hydrocarbon. The methodologies, which are described in Section 3.2, also characterize time-dependent radiant thermal intensities at various separation distances from the break.

Without ignition, the escaping liquid could adversely affect waterway navigation, surface and ground water quality, and other aspects of the human and natural environments. In addition, the cost to remediate the affected areas could be substantial. Consequence mitigation for a hazardous liquid pipeline release without ignition requires rapid detection, pump shutdown, and block valve closure. However, even if these actions are taken quickly, some amount of liquid in the pipeline will drain out of the broken pipeline segments. Methodologies for quantifying spill volumes for hazardous liquid pipelines releases and for estimating socioeconomic and environmental damage caused by the spill are described in Section 3.3.

1.3.2.1 Phases of a Hazardous Liquid Pipeline Release

A pipeline break can range in size and shape from a short, through-wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Although the volume of the discharge depends on many factors, the event is subdivided into four sequential phases – Phase 1 Detection, Phase 2 Continued Pumping, Phase 3 Block Valve Closure, and Phase 4 Pipeline Drain Down (Borener, 1994 and California State Fire Marshal, 1993). The total discharge volume equals the sum of the volumes released during each phase. Events associated with each phase are described below.

Phase – 1 Detection: The detection phase begins immediately after the pipeline ruptures, t_0, and continues until the leak is detected by any means and the Operator initiates corrective actions to mitigate the consequences of the release, t_d. The volume of liquid discharged during the detection phase, V_d, depends on the duration of this phase and is influenced by factors such as the size, shape, and location of the rupture; the pumping rate; the pipeline pressure; and the effectiveness of the leak detection system.

The volume of liquid discharged during the detection phase is determined using the following equation.

$$V_d = Q_d(t_d - t_0) \tag{1.1}$$

where

- V_d is the volume of liquid discharged during the detection phase, barrels (m^3)
- Q_d is the discharge rate through the break that depends on the size and shape of the rupture, the pipeline pressure at the time of the rupture, and the pipeline pressure resulting from continued pumping, barrels (m^3) per minute
- $t_d - t_0$ is the interval between the time the pipeline ruptures and the time the operator detects the leak and takes corrective actions to mitigate the consequences of the release, minutes

The closure swiftness of block valves located upstream and downstream from the break has no effect on the volume of liquid discharged during the detection phase.

Phase 2 – Continued Pumping: The continued pumping phase starts after corrective actions are initiated to mitigate the consequences of the release, t_d, and ends when the pumps stop operating, t_p.

During this time, additional hazardous liquid spills from the break. The duration of this phase can vary from a few minutes for systems with remotely operated pumps to hours for manually operated equipment located in remote areas. The volume of liquid discharged during the continued pumping phase, V_p, depends on the duration of this phase and is influenced by factors such as the type of equipment controls (automatically, remotely, or manually operated); personnel travel time to shutdown manually operated equipment; and the flow rates of the pumps.

The volume of liquid discharged during the continued pumping phase can be determined using the following equation.

$$V_p = Q_p(t_p - t_d) \tag{1.2}$$

where

- V_p is the volume of liquid discharged during the continued pumping phase, barrels (m^3)
- Q_p is the discharge rate through the break that depends on the size and shape of the rupture and the pipeline pressure resulting from continued pumping, barrels (m^3) per minute
- $t_p - t_d$ is the interval between the time the operator detects the leak and takes corrective actions to mitigate the consequences of the release and the time the pumps stop operating, minutes

The swiftness of block valve closure has no effect on the volume of liquid discharged during the continued pumping phase.

Phase 3 – Block Valve Closure: The block valve closure phase starts when the pumps stop operating, t_p, and ends when the upstream and downstream block valves close, t_s. During this time, an additional amount of liquid in the pipeline spills from the break. The volume of liquid discharged during the block valve closure phase, V_s, depends on the duration of this phase and is influenced by factors such as the speed at which block valves located upstream and downstream from the break close. The duration of this phase can vary from a few minutes for systems with automatic or remotely controlled valves to hours for systems with manually operated valves located in remote areas.

The volume of liquid discharged during the block valve closure phase can be determined using the following equation.

$$V_s = Q_s(t_s - t_p) \tag{1.3}$$

where

- V_s is the volume of liquid discharged during the block valve closure phase, barrels (m^3)
- Q_s is the discharge rate through the rupture that depends on the size and shape of the break and the transient pipeline pressure after the pumps stop operating, barrels (m^3) per minute
- $t_s - t_p$ is the interval between the time the pumps stop operating and the time the block valves close, minutes

The swiftness of block valve closure has a significant effect on the volume of liquid discharged during the block valve closure phase.

Phase 4 – Pipeline Drain Down: The pipeline drain down phase starts when the upstream and downstream block valves close isolating the portion of the pipeline that includes the break, t_s. This phase

ends when the remaining contents of the isolated portion of the damaged pipeline segment drain from the break, t_f. The volume of liquid discharged during the drain down phase, V_f, is affected by the pipeline elevation profile including siphon action and the location of the break. A break that occurs at the highest elevation in the isolated portion of the pipeline results in no drain down volume, whereas a break that occurs at the lowest elevation could result in significant or complete drain down of the isolated portion of the pipeline.

The rate at which liquid drains from a break in the isolated portion of the damaged pipeline segment depends primarily on the size of the break and the pipeline elevation profile. It is also affected by the flow rate of air that must enter the break to replace the liquid and allow the draining to continue. In hilly or mountainous terrain, determining the length of pipeline, L, available to drain from a break must consider site-specific design and construction details. The volume of liquid discharged from the contributory length of pipeline, L, during the drain down phase, V_f, and the transient discharge rate, Q_f, cannot be accurately determined without knowing the actual pipeline elevation profile as illustrated in Fig. 1.4.

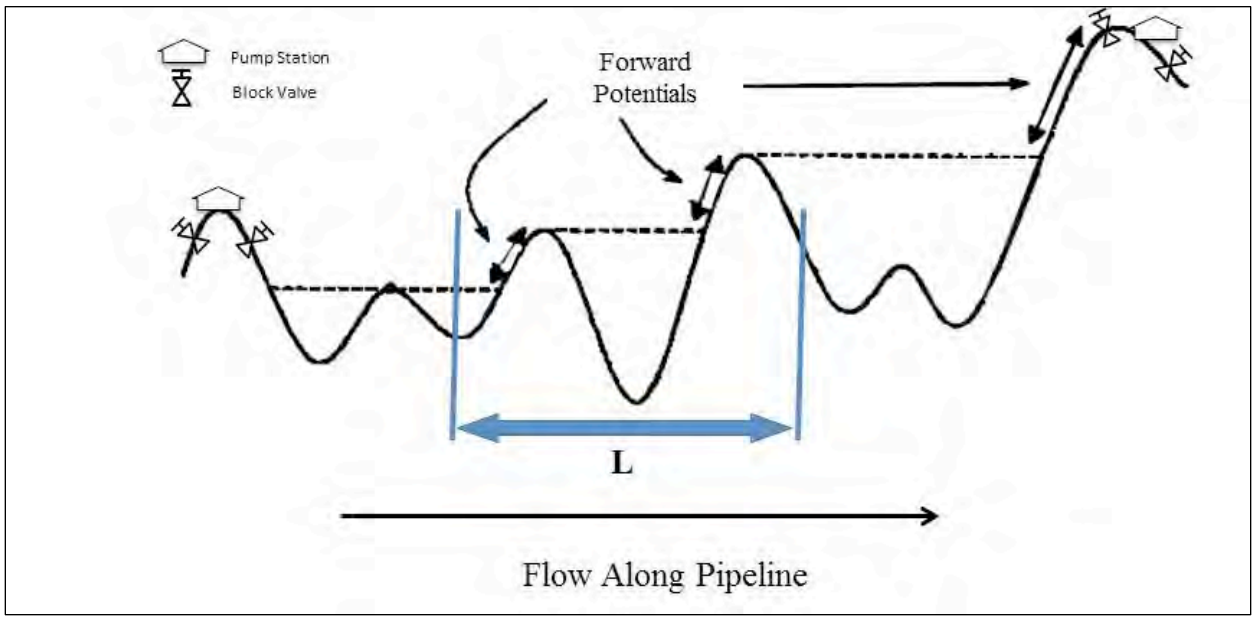

Fig. 1.4. Pipeline drain down segment, L.

Block valve closure is an effective means for reducing the drain down volume of a ruptured hazardous liquid pipeline, but the terrain can reduce the actual drain down volume to only a fraction of the total volume contained within the damaged line section. Peaks and plateaus in a pipeline elevation profile have a significant effect on the drain down volume because they have a higher potential than the surrounding pipeline segments and thus act to restrict flow.

1.3.2.2 Block Valve Effects on a Hazardous Liquid Pipeline Release

The effectiveness of block valve closure swiftness on limiting the spill volume of a hazardous liquid pipeline release is influenced by the location of the block valves relative to the location of the break, the pipeline elevation profile between adjacent block valves, and the time required to close the block valves after the break is detected and the pumps are shut down.

Block valves do not reduce the volume of liquid spilled during the detection and continued pumping phases because they are open. However, the total spill volume can be reduced by rapidly detecting the leak and taking immediate corrective actions including shutting down the pumps and closing the block valves to mitigate the consequences of the release. The effectiveness of block valve closure in mitigating the consequences of a hazardous liquid pipeline release decreases as the time required to close the block valve increases.

1.3.3 Fire Science and Potential Fire Consequences

Fire is a combustion or burning process accompanied by flame in which substances combine chemically with oxygen from the air and typically evolve bright light, heat, and smoke. A fuel is any substance that can undergo combustion. Most fuels must be in a gaseous or vapor state to ignite. Combustion of liquids and most solid fuels occurs above the surface in a region of vapors created by heating the surface of the material. The time and energy required for ignition to occur is a function of the energy of the ignition source, the thermal inertia of the fuel, the minimum ignition energy, and the geometry of the fuel. For fuel to increase in temperature, the rate of heat transfer to the fuel must be greater than the sum of the conduction losses, convection losses, radiation losses, energy associated with phase changes (such as the heat of vaporization), and energy associated with chemical changes. For fuel to reach its ignition temperature, the heat source itself must have a temperature higher than the fuel's ignition temperature.

Fire can spread either by direct flame impingement or by remote ignition of adjacent fuel packages through heat transfer by conduction, convection, or radiation. A fuel package is a collection or array of fuel items in close proximity with one another such that flames can spread throughout the array of fuel items. Flame impingement involves the deflection of flames from one fuel package to adjacent fuel packages. If the surfaces of adjacent fuel package are combustible, they can ignite through direct flame contact. However, the dominant method of spreading fire from one remote location to another remote location is through radiation (NFPA, 2011a).

Pipeline releases present some of the most dangerous situations that emergency responders encounter. Key strategic considerations for fire fighters and other emergency responders to a pipeline release and fire are life safety, extinguishment, and property conservation. Upon arrival at the scene, when resources are often limited, initial response typically focuses on life safety as the number one priority, followed by extinguishment and then property conservation. Extinguishment and life safety are often related. If the fire is extinguished, rescue may take care of itself and emergency responder operations are much safer. Response time by fire fighters and emergency personnel involves the following sequential components: ignition, combustion, discovery, call processing, dispatch time, turnout time, drive time, setup time, combat, and extinguishment. Based on data from 2000 and 2001, response times were less than 5 minutes nearly 50% of the time and less than 8 minutes about 75% of the time. Nationally, average response times were generally less than 8 minutes. The overall 90th percentile was less than 11 minutes (DHS, 2006).

1.3.3.1 Standard for Organization and Deployment of Fire Suppression Operations

The NFPA established minimum requirements for organization and deployment of fire suppression operations, emergency medical operations, and special operations to the public by career fire departments in NFPA 1710, 2010 edition (NFPA, 2010). These requirements state the following objectives.

- The turnout time for fire and special operations response is 80 seconds.
- The turnout time for first responder response is 60 seconds.

- The travel time for the arrival of the first arriving engine company at a fire suppression incident is 4 minutes or less to 90% of the incidents.
- The deployment of an initial full alarm assignment at a fire suppression incident is 8 minutes travel time or less to 90% of the incidents.

Based on these objectives, the time interval from receipt of the alarm until the first emergency response unit initiates action or intervenes to control the incident is 9 minutes and 20 seconds.

The NFPA also requires that the initial full alarm assignment to a 2,000 sq. ft., two-story single-family dwelling fire involves establishing an effective water flow application rate of 300 gpm (1,140 l/min) from two handlines, each of which has a minimum flow rate of 100 gpm (380 l/min) with each handline operated by a minimum of two individuals to effectively and safely maintain the line (NFPA, 2010).

1.3.3.2 Fireground Field Experiments

The National Institute of Standards and Technology (NIST) conducted live-fire experiments to study the effects that varying crew sizes have on response and operational times at structure fires and provide true operating times for typical fireground operations and tasks at a common residential structure fire (Averill, 2010). The results provide true scale operational times using actual fire fighters at a true structure fire and provides data that can be accurately applied to approximate at what time in the fire development curve fire fighters most likely arrive on the scene, prepare to make entry, stretch lines to the fire compartment, and initiate fire attack.

The overall response time assumptions used to design the NIST experiments involved the following segments based on a previous edition of NFPA 1710 (Averill, 2010).

1. Fire ignition = time zero.
2. 60 seconds for recognition (detection of fire) and call to 9-1-1.
3. 60 seconds for call processing/dispatch.
4. 60 seconds for turnout (80 seconds in NFPA 1710, 2010 edition).
5. Close Stagger = 240 seconds travel time first engine with 60 seconds ladder-truck lag and 90 seconds lag for each subsequent engine.
    a. Truck arrives at 300 seconds from notification.
    b. Second engine at 330 seconds from notification.
    c. Third engine at 420 seconds from notification.
6. Far Stagger = 240 seconds travel time first engine with 120 seconds ladder-truck lag and 150 seconds lag for each subsequent engine.
    a. Truck arrives at 360 seconds from notification.
    b. Second engine arrives at 390 seconds from notification.
    c. Third engine arrives at 540 seconds from notification.

In the study, times for fire fighters to begin their travel to the fire started at 3-1⁄2 minutes from when the fire started, and response times are 3 to 5 minutes. These times placed the first-due engine arriving at 6-1⁄2 minutes and 8-1⁄2 minutes after the fire started. The study also recorded the "Advance Attack Line Time," which is the time required for the first engine to arrive, stretch the first line, and initiate fire attack.

The report states that a three-person engine company took 3 minutes and 36 seconds, and a four-person engine company took 3 minutes and 2 seconds to stretch the initial attack line to the fire. The time at which water was first applied to the room-and-contents fire area ("Time to Water") for the first-due engine company was 9 minutes and 15 seconds for the three-person company and 8 minutes and 41 seconds for the four-person company (Averill, 2010).

1.3.3.3 Emergency Response Guidance

The *2008 Emergency Response Guidebook* (DOT, 2008) provides guidance to aid first responders in quickly identifying the hazards of the materials involved in an incident and protecting themselves and the general public during the initial response phase of the incident. The initial response phase is that period following arrival at the scene of an incident during which the presence and identification of dangerous situations is confirmed, protective actions and area securement are initiated, and assistance of qualified personnel is requested. The *Guidebook* includes the following safety guidance that applies to all types of incidents including natural gas and hazardous liquid pipeline releases.

- Approach Cautiously from Upwind. If wind direction allows, consider approaching the incident from uphill. Resist the urge to rush in; others cannot be helped until the situation has been fully assessed.
- Secure the Scene. Without entering the immediate hazard area, isolate the area and assure the safety of people and the environment, keep people away from the scene and outside the safety perimeter. Allow enough room to move and remove your own equipment.
- Identify the Hazards. Placards, container labels, shipping documents, material safety data sheets, Rail Car and Road Trailer Identification Charts, and/or knowledgeable persons on the scene are valuable information sources. Evaluate all available information and consult the recommended guide to reduce immediate risks. Additional information, provided by the shipper or obtained from another authoritative source, may change some of the emphasis or details found in the guide. Remember, the guide provides only the most important and worst case scenario information for the initial response in relation to a family or class of dangerous goods. As more material-specific information becomes available, the response should be tailored to the situation.
- Assess the Situation. Consider the following:
  - ✓ Is there a fire, a spill or a leak?
  - ✓ What are the weather conditions?
  - ✓ What is the terrain like?
  - ✓ Who/what is at risk: people, property or the environment?
  - ✓ What actions should be taken: Is an evacuation necessary? Is diking necessary? What resources (human and equipment) are required and are readily available?
  - ✓ What can be done immediately?
- Obtain Help. Advise your headquarters to notify responsible agencies and call for assistance from qualified personnel.
- Decide on Site Entry. Any efforts made to rescue persons, protect property or the environment must be weighed against the possibility that you could become part of the problem. Enter the area only when wearing appropriate protective gear.
- Respond. Respond in an appropriate manner. Establish a command post and lines of communication. Rescue casualties where possible and evacuate if necessary. Maintain control of the site. Continually reassess the situation and modify the response accordingly. The first duty is to consider the safety of people in the immediate area, including your own.

- Above All. Do not walk into or touch spilled material. Avoid inhalation of fumes, smoke and vapors, even if no dangerous goods are known to be involved. Do not assume that gases or vapors are harmless because of lack of a smell—odorless gases or vapors may be harmful.

The *Guidebook* also includes the following precautionary statements. A natural gas pipeline fire should not be extinguished unless the leak can be stopped and use of water spray when fighting a hazardous liquid pipeline fire may be ineffective for fires involving very low flash point materials such as gasoline.

The Pipeline Association for Public Awareness (PAPA) published the *Pipeline Emergency Response Guidelines* as a concise resource for reference prior to and during a pipeline emergency (PAPA, 2011). This publication includes an incident response checklist that is subdivided into the following four action categories applicable to fire fighters and other emergency response personnel.

1. Assess the Situation.
2. Protect People, Property, and the Environment.
3. Call for Assistance of Trained Personnel.
4. Work Together with the Pipeline Operator.

This checklist includes the following additional guidance.

> *Pipeline operators will concentrate on shutting down pipeline facilities. Responders should focus on protecting the public and isolating or removing ignition sources.*

Appendix A to the *Pipeline Emergency Response Guidelines* includes a table of recommended minimum evacuation distances for natural gas pipeline leaks and ruptures. These distances vary depending on the pipeline pressure and size and apply to leak or rupture condition for a sustained trench fire fueled by non-toxic natural gas escaping from two full bore pipe ends but not for butane, propane, or other hazardous liquids. The evacuation distances listed in the table are intended to provide protection from burn injury and correspond to a thermal heat flux exposure level of 1.4 kW/m^2 (450 $Btu/hr\ ft^2$) which is accepted by the HUD as the limit of heat exposure for unprotected outdoor areas where people congregate (HUD, 2011a).

The methodology used by PAPA to compute the recommended minimum evacuation distances was developed by the Gas Research Institute (Stephens, 2000) for sizing high consequence areas associated with natural gas pipelines. However, it does not take into consideration wind or other factors that could greatly influence thermal heat flux contours. Recommended minimum evacuation distances range from 474 ft for 12-in. natural gas pipelines that operate at 300 psig to 3,709 ft for 42-in. pipelines that operate at 1,500 psig. Users of recommended minimum evacuation distances are advised by PAPA that these distances are considered to be "general information" only and are not intended to replace a site specific risk analysis.

1.3.3.4 Standard for Fire Hydrant Spacing and Flow Rate

Water needed to conduct effective fire fighting operations is normally supplied from fire hydrants located in the vicinity of the fire. According to International Fire Code requirements, the maximum average spacing between fire hydrants with a maximum fire-flow requirement of 1,750 gpm is 500 ft (ICC, 2012a). However, additional fire hydrants with greater fire-flow requirements and closer average spacing available to a building are required for a complex or subdivision.

1.3.3.5 Fire Science and Potential Fire Consequence Assessment Criteria

After considering the various factors that contribute to overall response time and the studies performed to quantify actual response time, ORNL selected 10 minutes as the overall fire fighter response time to evaluate the effectiveness of block valve closure swiftness on mitigating the consequences of a fire resulting from a natural gas or hazardous liquid pipeline release. This time begins when the pipeline break occurs and ends when the engines arrive at the scene and the fire fighters deploy equipment and begin fire fighting operations. Overall fire fighter response times for the first, second, and third engines that arrive at the scene are 9, 9-1/2, and 10 minutes, respectively.

In determining the effectiveness of fire fighting activities, ORNL based its assessment on the following assumptions.

- Fire hydrants are located equally around the perimeter of the area affected by the pipeline release at a maximum spacing of 500 ft.
- The maximum number of engines that respond to a natural gas pipeline release within 10 minutes after the break is 12.
- Each fire hydrant provides adequate water flow for one engine.
- Each engine can extinguish one building fire within 30 minutes after the break.
- Without fire fighter intervention, the value of each building (including contents) that ignites as a result of the break reduces linearly from 100% to 0% at 20 minutes after the break, at which time fire fighting activities evolve from controlling fire damage to preventing fire spread.
- With fire fighter intervention, the avoided damage cost for each building (including contents) that ignites as a result of the break increases at a rate of 5% per minute for each additional minute that fire fighting activities begin up to a maximum of 10 minutes.

1.3.4 Thermal Radiation Effects

Thermal radiation is the primary mechanism for injury or damage from fire and is the significant mode of heat transfer for situations in which a target is located laterally to the exposure fire source (Iqbal and Salley, 2003). Radiation is the transfer of heat energy from a hot surface or gas to a cooler material by electromagnetic waves without the need of an intervening medium. Thermal radiation from flames to a remote surface decreases rapidly with distance.

The rate of heat transfer from a radiating material is proportional to that material's absolute temperature raised to the fourth power. Thermal radiation hazards from a hydrocarbon fire depend on a number of parameters including the composition of the hydrocarbon, the size and shape of the fire, the duration of the fire, its proximity to the object at risk, and the thermal characteristics of the object exposed to the fire (NFPA, 1995). A range of thermal radiation effects on buildings and humans are described in Table 1.1.

1.3.4.1 Effects on Humans

Hyperthermia is the condition of overheating of the body. Victims exposed to the hot environment of a fire, including high moisture content, are subject to incapacitation or death due to hyperthermia, especially if the person is active. The time duration and type of exposure can lead to either simple hyperthermia or acute hyperthermia.

Simple hyperthermia results from prolonged exposures (typically more than 15 minutes) to hot environments where the ambient temperature is too low to cause burns. Such conditions range from 80°C

to 120°C (176°F to 248°F) depending on the relative humidity, and usually result in a gradual increase in the body core temperature. High humidity makes it harder for the body to dispel excess heat by evaporation and thereby accelerates the heating process. Core body temperatures above approximately 43°C (109°F) are generally fatal within minutes unless treated.

Acute hyperthermia involves exposure to high temperatures for short periods of time (less than 15 minutes). This type of hyperthermia is accompanied by burns. However, when death occurs shortly after exposure to severe heat, the cause of death is generally considered to be from a rise in blood temperatures rather than from burns (NFPA, 2011a).

When the temperature of the skin reaches approximately 45ºC (113ºF), pain will result and an additional increase in temperature will cause thermal burns. Thermal burns can result from conductive, convective, or radiant heat exposure. Clothing, especially heavier cellulosic fabrics like denim or canvas, can transmit enough heat by conduction to cause skin burns even though the fabric does not exhibit any burning or charring. When skin is exposed to convective heat, pain and the onset of burns occur at air temperatures above 120ºC (248ºF).

When radiant heating raises the temperature of the skin, the higher the radiant flux, the faster damage will occur. For instance, a heat flux of 2 kW/m^2 (635 Btu/hr ft^2) will cause pain after a 30-second exposure, while a heat flux of 10 kW/m^2 (3,175 Btu/hr ft^2) will cause pain after just 5 seconds. A heat flux of 2 kW/m^2 (635 Btu/hr ft^2) will not cause blisters, but a heat flux of 10 kW/m^2 (3,175 Btu/hr ft^2) will blister in 12 seconds. A heat flux of 20 kW/m^2 (6,350 Btu/hr ft^2), typically associated with flashover, is sufficient to ignite clothing or cause severe burns or death by brief thermal exposure. Radiant heat, sufficient to cause burns, can be reflected from some surfaces. Heat can be transferred through clothing, causing burns to the underlying skin, without any readily identifiable damage to the clothing (NFPA, 2011a).

The NFPA *Guide for Fire and Explosion Investigations* states that heat flux of 2.5 kW/m^2 (800 Btu/hr ft^2) is a common thermal radiation exposure while fighting fires, however, this energy level may cause burn injuries with prolonged exposure (NFPA, 2011a).

According to HUD, a thermal radiation heat flux of 1.4 kW/m^2 (450 Btu/hr ft^2) is considered the acceptable level of thermal radiation for people in open spaces where people congregate, such as parks and playgrounds (HUD, 2011b).

The NTSB defines *fatal injury* as any injury that results in death within 30 days of the accident and *serious injury* as an injury that: (1) requires hospitalization for more than 48 hours, commencing within 7 days of the date the injury was received; (2) results in a fracture of any bone (except simple fractures of fingers, toes, or nose); (3) causes severe hemorrhages or nerve or tendon damage; (4) involves any internal organ; or (5) involves second- or third-degree burns, or any burn affecting more than 5% of the body surface (DOT, 2011c).

1.3.4.2 Effects on Buildings and Construction Materials

The NFPA *Guide for Fire and Explosion Investigations* describes observed effects of radiant heat fluxes on various materials used for building construction (NFPA. 2011a). For instance, fiberboard ignites spontaneously after 5 seconds of exposure to a radiant heat flux of 52 kW/m^2 (16,500 Btu/hr ft^2). Wood ignites spontaneously after prolonged exposure to a radiant heat flux of 29 kW/m^2 (9,200 Btu/hr ft^2) and wood volatiles ignite with extended exposure and piloted ignition to a radiant heat flux of 12.5 kW/m^2 (4,000 Btu/hr ft^2).
According to HUD, the tolerance on combustible materials on the maximum thermal radiation exposure reduces gradually as the thermal heat flux increases from 15.75 kW/m^2 (5,000 Btu/hr ft^2) to 28.35 kW/m^2

(9,000 Btu/hr ft^2). In addition, HUD determined that a thermal radiation heat flux of 31.5 kW/m^2 (10,000 Btu/hr ft^2) is an acceptable standard for buildings. This standard is based upon the assumption that there will be fire department response to protect exposed combustible buildings within 15 minutes and that the exposed combustible materials will not spontaneously ignite before the fire department responds (HUD, 2011b).

Following the Pacific Gas and Electric Company natural gas transmission pipeline rupture and fire in San Bruno, California on September 9, 2010, the city of San Bruno, California used the following damage categories to classify structural damage to houses at the accident site: (1) severe indicated that a house was not safe to occupy and most likely would need to be demolished or completely renovated prior to occupancy, (2) moderate indicated that a house had substantial damage and repairs would be necessary prior to occupancy, and (3) minor indicated that a house had the least amount of damage and could be legally occupied while repairs were being made (NTSB, 2011).

Thermal radiation hazard zones with increasing impact severity are described by concentric circles centered on the pipeline rupture. The thermal radiation intensities at the perimeters of these concentric circles increase as the radii decrease. However, the thermal radiation intensity at a particular radius changes with time as the blowdown progresses and the amount of natural gas that escapes decreases. A threshold heat flux of 15.8 kW/m^2 (5,000 Btu/hr ft^2) was used by PHMSA as the basis for determining Potential Impact Radius (PIR) which is defined in 49 CFR 192.903 as the radius of a circle within which the potential failure of a natural gas pipeline could have significant impact on people or property (DOT, 2011a). Because spontaneous ignition is not possible at this heat flux, it represents a reasonable estimate of the heat flux below which wooden structures are not destroyed, and below which wooden structures should afford indefinite protection to occupants (Stephens, 2000).

Quantifying time-dependent variations in heat flux for specific radii is key to assessing the benefits of installing RCVs and ASVs in natural gas and hazardous liquid pipelines, because thermal radiation effects on buildings, vehicles, personal property, and humans are a function of heat flux intensity and exposure duration. For this reason, ORNL developed heat flux versus time data needed to quantify the effects of block valve closure time on exposure durations for the radiant heat flux intensities listed in Table 1.2. The heat flux intensities and exposure durations defined in this table correspond to specific thresholds used to quantify fire damage and establish safe separations distances for fire fighters, emergency responders, and the public. The methodologies used to compute heat flux vs. time data for natural gas and hazardous liquid pipelines are discussed in Sections 3.1 and 3.2, respectively.

Table 1.2. Heat flux threshold basis

Heat Flux Threshold		Threshold Basis
kW/m^2	$Btu/hr\ ft^2$	
1.4	450	Maximum heat flux for continuous exposure considered acceptable for outdoor, unprotected facilities or open spaces where people congregate
2.5	800	Maximum heat flux for continuous exposure considered acceptable for common fire fighting and emergency response activities
15.8	5,000	Heat flux threshold for minor damage to buildings after 30-minutes exposure
31.5	10,000	Heat flux threshold for moderate damage to buildings after 15-minutes exposure
40.0	12,700	Heat flux threshold for severe damage to buildings after instantaneous exposure

1.3.5 Socioeconomic and Environmental Effects of a Hazardous Pipeline Release

Potential consequences and effects on the human and natural environments resulting from a hazardous liquid pipeline release without ignition generally involve socioeconomic and environmental impacts. These impacts are influenced by the total quantity of hazardous liquid released and the habitats, resources, and land uses that are affected by the release. The methodology used to quantifying socioeconomic and environmental impacts resulting from a hazardous liquid release involves computing the quantity of hazardous liquid released and then using this quantity to establish the total damage cost. The total damage cost is determined by adding the response cost, the socioeconomic damage cost, and the environmental damage cost as described in Section 3.3.3.

2. REGULATORY REQUIREMENTS

The CFR is a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government. The Code is divided into 50 titles which bear the name of the issuing agency and represent broad areas subject to Federal regulation. Title 49—Transportation is composed of nine volumes. The second volume (Parts 100–185) and the third volume (Parts 186–199) contain current regulations issued under Chapter I—Pipeline and Hazardous Materials Safety Administration (DOT). Parts192, 194, and 195 include safety regulations issued by PHMSA specifically for natural gas and hazardous liquid pipelines. The following sections summarize pipeline safety regulations that affect strategies and response plans for mitigating the consequences of an accidental release.

2.1 49 CFR 192—TRANSPORTATION OF NATURAL AND OTHER GAS BY PIPELINE: MINIMUM FEDERAL SAFETY STANDARDS

Minimum safety requirements for pipeline facilities and the transportation of gas are defined in 49 CFR 192, Subparts A through P (DOT, 2011b). According to definitions in Part 192, a pipeline means all parts of those physical facilities through which gas moves in transportation, including pipe, valves, and other appurtenance attached to pipe, compressor units, metering stations, regulator stations, delivery stations, holders, and fabricated assemblies. In addition, a pipeline facility means new and existing pipelines, rights-of-way, and any equipment, facility, or building used in the transportation of gas or in the treatment of gas during the course of transportation.

Prescribed minimum requirements for the design and installation of natural gas pipeline components and facilities are contained in Subpart C. According to rules in 49 CFR 192.179, each transmission line, other than offshore segments, must have sectionalizing block valves spaced as follows, unless in a particular case the Administrator finds that alternative spacing would provide an equivalent level of safety:

(1) Each point on the pipeline in a Class 4 location must be within 2–1⁄2 mi. (4 km) of a valve,

(2) Each point on the pipeline in a Class 3 location must be within 4 mi. (6.4 km) of a valve,

(3) Each point on the pipeline in a Class 2 location must be within 7–1⁄2 mi. (12 km) of a valve, and

(4) Each point on the pipeline in a Class 1 location must be within 10 mi. (16 km) of a valve.

Class locations are defined in 49 CFR 192.5 as follows.

- A Class 1 location is an offshore area or any class location unit that has 10 or fewer buildings intended for human occupancy.
- A Class 2 location is any class location unit that has more than 10 but fewer than 46 buildings intended for human occupancy.
- A Class 3 location is any class location unit that has 46 or more buildings intended for human occupancy; or an area where the pipeline lies within 100 yd (91 m) of either a building or a small, well-defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period. (The days and weeks need not be consecutive.)
- A Class 4 location is any class location unit where buildings with four or more stories above ground are prevalent.

The term class location unit is defined as an onshore area that extends 220 yd (200 m) on either side of the centerline of any continuous 1-mile (1.6 kilometers) length of pipeline. The length of Class locations 2, 3, and 4 may be adjusted as follows: (1) A Class 4 location ends 220 yd (200 m) from the nearest building with four or more stories above ground, (2) When a cluster of buildings intended for human occupancy requires a Class 2 or 3 location, the class location ends 220 yd (200 m) from the nearest building in the cluster. Each separate dwelling unit in a multiple dwelling unit building is counted as a separate building intended for human occupancy.

Pipeline operators are also required to take additional measures beyond those already required by 49 CFR 192 to prevent a pipeline failure and to mitigate the consequences of a pipeline failure in a HCA. According to 49 CFR 192.935, an operator must base the additional measures on the threats the operator has identified to each pipeline segment. An operator must conduct a risk analysis of its pipeline in accordance with one of the risk assessment approaches in ASME/ANSI B31.8S, Section 5 (ASME, 2010) to identify additional measures to protect the HCA and enhance public safety. Such additional measures include, but are not limited to, installing ASVs or RCVs, installing computerized monitoring and leak detection systems, replacing pipe segments with pipe of heavier wall thickness, providing additional training to personnel on response procedures, conducting drills with local emergency responders and implementing additional inspection and maintenance programs.

If an operator determines, based on a risk analysis, that an ASV or RCV would be an efficient means of adding protection to a HCA in the event of a gas release, an operator must install the ASV or RCV. In making that determination, an operator must, at least, consider the following factors—swiftness of leak detection and pipe shutdown capabilities, the type of gas being transported, operating pressure, the rate of potential release, pipeline profile, the potential for ignition, and location of nearest response personnel.

A HCA is defined in 49 CFR 192.903 as follows.

> *High consequence area* means an area established by one of the methods described in paragraphs (1) or (2) as follows:
>
> (1) An area defined as—
> - (i) A Class 3 location under § 192.5; or
> - (ii) A Class 4 location under § 192.5; or
> - (iii) Any area in a Class 1 or Class 2 location where the potential impact radius is greater than 660 ft (200 m), and the area within a potential impact circle contains 20 or more buildings intended for human occupancy; or
> - (iv) Any area in a Class 1 or Class 2 location where the potential impact circle contains an identified site.
>
> (2) The area within a potential impact circle containing—
> - (i) 20 or more buildings intended for human occupancy, unless the exception in paragraph (4) applies; or
> - (ii) An identified site.
>
> (3) Where a potential impact circle is calculated under either method (1) or (2) to establish a high consequence area, the length of the high consequence area extends axially along the length of the pipeline from the outermost edge of the first potential impact circle that contains either an identified site or 20 or more buildings intended for human occupancy to the outermost edge of the last contiguous potential impact circle that contains either an identified site or 20 or more buildings intended for human occupancy. (See figure E.I.A. in appendix E.)

(4) If in identifying a high consequence area under paragraph (1) (iii) of this definition or paragraph (2) (i) of this definition, the radius of the potential impact circle is greater than 660 ft (200 m), the operator may identify a high consequence area based on a prorated number of buildings intended for human occupancy with a distance of 660 ft (200 m) from the centerline of the pipeline until December 17, 2006. If an operator chooses this approach, the operator must prorate the number of buildings intended for human occupancy based on the ratio of an area with a radius of 660 ft (200 m) to the area of the potential impact circle (i.e. the prorated number of buildings intended for human occupancy is equal to 20 × (660 ft) [or 200 m] / potential impact radius in ft [or m]^2).

An identified site means each of the following areas as defined in 49 CFR 192.903.

(a) An outside area or open structure that is occupied by twenty (20) or more persons on at least 50 days in any twelve (12)-month period. (The days need not be consecutive.) Examples include but are not limited to, beaches, playgrounds, recreational facilities, camping grounds, outdoor theaters, stadiums, recreational areas near a body of water, or areas outside a rural building such as a religious facility; or

(b) A building that is occupied by twenty (20) or more persons on at least five (5) days a week for ten (10) weeks in any twelve (12)-month period. (The days and weeks need not be consecutive.) Examples include, but are not limited to, religious facilities, office buildings, community centers, general stores, 4-H facilities, or roller skating rinks; or

(c) A facility occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate. Examples include but are not limited to hospitals, prisons, schools, day-care facilities, retirement facilities or assisted-living facilities.

The term PIR means the radius of a circle within which the potential failure of a pipeline could have significant impact on people or property. The PIR is determined by the following formula.

$$R = 0.69(pd^2)^{1/2} \tag{2.1}$$

where

- R is the radius of a circular area in ft surrounding the point of failure
- p is the maximum allowable operating pressure (MAOP) in the pipeline segment in pounds per square inch
- d is the nominal diameter of the pipeline in inches.

A potential impact circle is a circle of radius equal to the PIR.

According to requirements in 49 CFR 192.745, each transmission line valve that might be required during any emergency must be inspected and partially operated at intervals not exceeding 15 months, but at least once each calendar year. Each operator must take prompt remedial action to correct any valve found inoperable, unless the operator designates an alternative valve.

2.2 49 CFR 195—TRANSPORTATION OF HAZARDOUS LIQUIDS BY PIPELINE

Safety standards and reporting requirements for pipeline facilities used in the transportation of hazardous liquids or carbon dioxide are defined in 49 CFR 195, Subparts A through G (DOT, 2011d). A hazardous liquid is defined in 49 CFR 195.2 as petroleum, petroleum products, or anhydrous ammonia. The term petroleum means crude oil, condensate, natural gasoline, natural gas liquids, and liquefied petroleum gas.

Valve location requirements for hazardous liquid pipeline are included in 49 CFR 195.260. According to these requirements, a block valve must be installed at each of the following locations.

1. On the suction end and the discharge end of a pump station in a manner that permits isolation of the pump station equipment in the event of an emergency.
2. On each line entering or leaving a breakout storage tank area in a manner that permits isolation of the tank area from other facilities.
3. On each mainline at locations along the pipeline system that will minimize damage or pollution from accidental hazardous liquid discharge, as appropriate for the terrain in open country, for offshore areas, or for populated areas.
4. On each lateral takeoff from a trunk line in a manner that permits shutting off the lateral without interrupting the flow in the trunk line.
5. On each side of a water crossing that is more than 100 ft (30 m) wide from high-water mark to high-water mark unless the DOT Administrator finds in a particular case that valves are not justified.
6. On each side of a reservoir holding water for human consumption.

Pumping equipment requirements for hazardous liquid pipeline are included in 49 CFR 195.262. According to these requirements, each pump station must include the following features.

- Safety devices that prevent over pressurizing of pumping equipment, including the auxiliary pumping equipment within the pumping station.
- A device for the emergency shutdown of each pumping station.
- If power is necessary to actuate the safety devices, an auxiliary power supply.

Preventative and mitigative measures that operators of hazardous liquid pipelines in HCAs must take to protect the HCAs are included in 49 CFR 195.452(i). These measures include conducting a risk analysis of the pipeline segment to identify additional actions to enhance public safety or environmental protection. Such actions may include, but are not limited to, implementing damage prevention best practices, better monitoring of cathodic protection where corrosion is a concern, establishing shorter inspection intervals, installing EFRDs on the pipeline segment, modifying the systems that monitor pressure and detect leaks, providing additional training to personnel on response procedures, conducting drills with local emergency responders, and adopting other management controls.

The term HCA is defined in 49 CFR 195.450 as a follows.

- A commercially navigable waterway means a waterway where a substantial likelihood of commercial navigation exists.
- A high population area means an urbanized area, as defined and delineated by the Census Bureau, that contains 50,000 or more people and has a population density of at least 1,000 people per square mile.

- Another populated area means a place, as defined and delineated by the Census Bureau, that contains a concentrated population, such as an incorporated or unincorporated city, town, village, or other designated residential or commercial area.
- An unusually sensitive area (USA) means a drinking water or ecological resource area that is unusually sensitive to environmental damage from a hazardous liquid pipeline release. The terms USA drinking water resource and USA ecological resource are defined in 49 CFR 195.6.

An EFRD is either a check valve or a RCV. The term check valve means a valve that permits fluid to flow freely in one direction and contains a mechanism to automatically prevent flow in the other direction. An RCV is any valve that is operated from a location remote from where the valve is installed and is usually operated by the SCADA system. The linkage between the pipeline control center and the RCV may be by fiber optics, microwave, telephone lines, or satellite.

If an operator determines that an EFRD is needed on a pipeline segment to protect a HCA in the event of a hazardous liquid pipeline release, an operator must install the EFRD. In making this determination, an operator must, at least, consider the following factors—the swiftness of leak detection and pipeline shut down capabilities, the type of commodity carried, the rate of potential leakage, the volume that can be released, topography or pipeline profile, the potential for ignition, proximity to power sources, location of nearest response personnel, specific terrain between the pipeline segment and the HCA, and benefits expected by reducing the spill size.

Based on the definition of EFRD in 49 CFR 195.450, an ASV is not considered an EFRD. However, installing an ASV in a hazardous liquid pipeline to protect an HCA could be considered a preventative or mitigative measure that is consistent with the safety objectives in 49 CFR 195.452(i).

Hazardous liquid pipeline operators must prepare a manual of written procedures for conducting normal operations and maintenance activities and handling abnormal operations and emergencies. According to requirements in 49 CFR 195.402, the manual must include procedures for providing safety when an emergency condition occurs. These procedures must address the following areas.

- Receiving, identifying, and classifying notices of events which need immediate response by the operator or notice to fire, police, or other appropriate public officials and communicating this information to appropriate operator personnel for corrective action.
- Prompt and effective response to a notice of each type emergency, including fire or explosion occurring near or directly involving a pipeline facility, accidental release of hazardous liquid from a pipeline facility, operational failure causing a hazardous condition, and natural disaster affecting pipeline facilities.
- Having personnel, equipment, instruments, tools, and material available as needed at the scene of an emergency.
- Taking necessary action, such as emergency shutdown or pressure reduction, to minimize the volume of hazardous liquid that is released from any section of a pipeline system in the event of a failure.
- Control of released hazardous liquid at an accident scene to minimize the hazards, including possible intentional ignition in the cases of flammable highly volatile liquid.
- Minimization of public exposure to injury and probability of accidental ignition by assisting with evacuation of residents and assisting with halting traffic on roads and railroads in the affected area, or taking other appropriate action.

- Notifying fire, police, and other appropriate public officials of hazardous liquid or carbon dioxide pipeline emergencies and coordinating with them preplanned and actual responses during an emergency, including additional precautions necessary for an emergency involving a pipeline system transporting a highly volatile liquid.
- In the case of failure of a pipeline system transporting a highly volatile liquid, use of appropriate instruments to assess the extent and coverage of the vapor cloud and determine the hazardous areas.
- Providing for a post-accident review of employee activities to determine whether the procedures were effective in each emergency and taking corrective action where deficiencies are found.
- Actions required to be taken by a controller during an emergency.

An operator of a hazardous liquid pipeline facility with a controller working in a control room that monitors and controls all or part of a pipeline facility through a SCADA system must have and follow written control room management procedures. These procedures must be integrated with the operator's written procedures for conducting normal operations and maintenance activities and handling abnormal operations and emergencies. According to requirements in 49 CFR 195.446 for control room management, operators must develop the procedures no later than August 1, 2011 and implement the procedures no later than February 1, 2013.

Hazardous liquid pipeline operators are also required to establish and conduct a continuing training program for instructing emergency response personnel. Emergency response training requirements in 49 CFR 195.403 state that the training must instruct emergency response personnel in performing the following duties.

- Carry out emergency procedures in accordance with the procedural manual for operations, maintenance, and emergencies that relate to their assignments.
- Know the characteristics and hazards of the hazardous liquids transported, including, in case of flammable of highly volatile liquids, flammability of mixtures with air, odorless vapors, and water reactions.
- Recognize conditions that are likely to cause emergencies, predict the consequences of facility malfunctions or failures and hazardous liquids or carbon dioxide spills, and take appropriate corrective action.
- Take steps necessary to control any accidental release of hazardous liquid or carbon dioxide and to minimize the potential for fire, explosion, toxicity, or environmental damage.
- Learn the potential causes, types, sizes, and consequences of fire and the appropriate use of portable fire extinguishers and other on-site fire control equipment, involving, where feasible, a simulated pipeline emergency condition.

2.3 49 CFR 194—RESPONSE PLANS FOR ONSHORE OIL PIPELINES

Requirements for oil spill response plans to reduce the environmental impact of oil discharged from onshore oil pipelines are defined in 49 CFR 194, Subparts A and B (DOT, 2011e). Oil is defined in 49 CFR 194.5 as oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, vegetable oil, animal oil, sludge, oil refuse, oil mixed with wastes other than dredged spoil.

Regulations in Subpart B require each operator of an onshore pipeline facility to prepare and submit a response plan to PHMSA. The term response plan means the operator's core plan and the response zone

appendices for responding, to the maximum extent practicable, to a worse case discharge of oil, or the substantial threat of such a discharge. The term worst case discharge is defined as the largest foreseeable discharge of oil, including a discharge from fire or explosion, in adverse weather conditions.

A hazardous liquid pipeline operator is required to determine the worst case discharge for each of its response zones (49 CFR 194.105). A response zone is a geographic area either along a length of pipeline or including multiple pipelines, containing one or more adjacent line sections, for which the operator must plan for the deployment of, and provide, spill response capabilities. The size of the zone is determined by the operator after considering available capability, resources, and geographic characteristics. A line section is a continuous run of pipe that is contained between adjacent pressure pump stations, between a pressure pump station and a terminal or breakout tank, between a pressure pump station and a block valve, or between adjacent block valves.

Federal regulations included in 49 CFR 194.105(b) require operators to provide the methodology, including calculations, used to arrive at the worst case discharge volume. Operators must determine the worst case discharge, which is the largest volume, in barrels (m^3), based on one of the following methods:

(1) The pipeline's maximum release time in hours, plus the maximum shut down response time in hours (based on historic discharge data or in the absence of such historic data, the operator's best estimate), multiplied by the maximum flow rate expressed in barrels per hour (based on the maximum daily capacity of the pipeline), plus the largest line drainage volume after shut down of the line section(s) in the response zone expressed in barrels (m^3), or

(2) The largest foreseeable discharge for the line section(s) within a response zone, expressed in barrels (m^3), based on the maximum historic discharge, if one exists, adjusted for any subsequent corrective or preventive action taken, or

(3) If the response zone contains one or more breakout tanks, the capacity of the single largest tank or battery of tanks within a single secondary containment system, adjusted for the capacity or size of the secondary containment system, expressed in barrels (m^3).

3. RISK ANALYSIS

The risk of an unintended natural gas or hazardous liquid pipeline release is a function of two independent variables: (1) magnitude of consequences, and (2) probability of failure. From a historical viewpoint, the probability of an unintended release is low, but the consequences are potentially catastrophic for humans and the environment (DOT, 2010b).

Unintended releases are categorized as either line pipe leaks (punctures) or breaks (ruptures). These releases often result from internal or external corrosion; cracking; fatigue; welding defects; natural phenomena such as earthquakes, landslides, and floods; third party damage; and other failure mechanisms (ASME, 2010). The failure mode is determined by the length, depth, and type of defect, and is dependent on the pipe diameter, wall thickness, material properties, stress state, and the operating pressure. Inspecting, testing, repairing, and replacing deficient pipeline segments and implementing one-call notification systems are effective methods for reducing, but not eliminating, risk by decreasing the probability of an unintended release.

Mitigating the consequences of an unintended release requires limiting the overall volume of natural gas or hazardous liquid that escapes from the pipeline and flows into the surrounding environment. However, completely eliminating the consequences of an unintended release is not possible because pipelines operate above atmospheric pressure and any puncture or through-wall break in the pipeline will result in an unintended release. Isolating the damaged pipeline segment by quickly closing upstream and downstream block valves is an effective method for mitigating the consequences of an unintended release and thus reducing risk by controlling the overall volume of the release. Although block valve closure swiftness is often effective in limiting the magnitude of potential consequences, block valve closure has no effect on reducing the probability of an unintended release.

The effectiveness of block valve closure swiftness in reducing potential consequences of an unintended natural gas or hazardous liquid pipeline release is assessed in Sections 3.1, 3.2, and 3.3. These risk analyses examine the effectiveness of ASV and RCV installation in newly constructed or entirely replaced pipeline facilities in mitigating the consequences of a release compared to the effectiveness of manually operated block valves installed at the same locations.

The methodology used to quantify the effectiveness of block valve closure swiftness in reducing potential consequences of an unintended natural gas or hazardous liquid pipeline release is based on a conservative approach to pipeline safety that considers consequences of a time-dependent discharge resulting from a guillotine-type break. These consequences involve:

- potential fire damage to buildings, vehicles, and personal property caused by ignition and combustion of the released hydrocarbon that begins as soon as the break in a natural gas or hazardous liquid pipeline occurs;
- potential burn injuries to fire fighters and the public caused by exposure to thermal radiation; and
- potential socioeconomic and environmental effects resulting from a hazardous liquid pipeline release without ignition.

Table 1.1 describes the effects and consequences of various thermal radiation intensities on buildings, materials, and humans. Heat flux thresholds used to assess potential fire damage resulting from natural gas and hazardous liquid pipeline releases are defined in Table 1.2. Potential socioeconomic and environmental effects resulting from a hazardous liquid release are discussed in Section 3.3.

3.1 NATURAL GAS PIPELINES

A methodology for quantifying the consequences of a natural gas pipeline release was developed at ORNL and used to determine: (1) the time-dependent discharge from a natural gas transmission pipeline resulting from a guillotine-type break, and (2) the time-dependent thermal radiant intensities resulting from a fire produced by combustion of the released natural gas. The size and intensity of a fire resulting from a natural gas pipeline release depends on the effective rate of gas release which is primarily influenced by the pressure differential and the size and shape of the break. For worst case, guillotine-type breaks, where the effective hole size is equal to the line pipe diameter, the governing parameters are the line pipe diameter, pipeline length, and the internal operating pressure when the break occurs.

The risk analysis approach used by ORNL to evaluate the consequences of a natural gas pipeline release is consistent with the *(1) Subject Matter Expert* and the *(3) Scenario-Base Models* risk assessment approaches described in ASME/ANSI B31.8S, Section 5 – Risk Assessment (ASME, 2010). The risk analysis results discussed in this report only address consequences of unintended natural gas pipeline releases because the risk analysis approach is based on the premise that the releases occur (100% failure likelihood). This presumption is considered acceptable because ASVs and RCVs are installed in natural gas pipelines to mitigate the consequences of an unintended release. Their installation and operation have no effect on failure likelihood. The presumption of worst case, guillotine-type breaks is also consistent with the release scenario used to develop the PIR equation in 49 CFR 192.903, and the following statements in ASME/ANSI B31.8S, Section 5.

> *Ruptures have more potential for damage than leaks. Consequently, when a risk assessment approach does not consider whether a failure may occur as a leak or rupture, a worst-case assumption of rupture shall be made.*

3.1.1 Analysis Scope, Parameters, and Assumptions

The methodology is based on fundamental fluid mechanics and heat transfer principles for computing the time-dependent pressure response of natural gas pipelines following a guillotine-type break. It is also suitable for assessing the effects of leak detection, block valve closure, and blowdown durations on fire damage to buildings and property located in Class 1, Class 2, Class 3, and Class 4 HCAs. The heat flux versus time data computed using this methodology were used to quantify effects of block valve closure swiftness on thermal radiant intensities and exposure durations based on a series of case studies for hypothetical release scenarios.

The methodology is consistent with federal safety regulations in 49 CFR 192 for natural gas pipelines (DOT, 2011b) and fire science and fire hazard assessment techniques developed by the Society of Fire Protection Engineers (NFPA, 1995) and the National Fire Protection Association (NFPA, 2011a).

The configuration of the hypothetical natural gas pipeline used to evaluate the effectiveness of RCVs and ASVs in mitigating the consequences of a release has the following design features and operating characteristics:

- The pressure pump stations are located at 100 mile intervals along the pipeline;
- Each pressure pump station has an emergency shutdown system that can be activated by the pipeline operator to shutdown compressor stations consistent with compressor station emergency shutdown requirements in 49 CFR 192.167;
- The rupture is a guillotine-type break that initiates the release;

- The break is located adjacent to a block valve and renders the valve inoperable following the break;
- The block valves are spaced at the maximum allowable distance specified in 49 CFR 192.179 for the particular class where the line section is located;
- The following times are study variables:
  - ✓ The time when the operator detects the leak, and
  - ✓ The time when the upstream and downstream block valves are closed and the line section with the break is isolated;
- The total volume of the release equals the combined volumes of natural gas released during the detection, shutdown, and blowdown phases; and
- The time-dependent mass flow rate is a study variable.

Study variables used to characterize natural gas pipeline releases are listed in Table 3.1.

Table 3.1. Study variables for characterizing natural gas pipeline releases

Variable	Description	Variable Values
LHV	Lower heating value of natural gas, Btu/ft^3	1,000
L	Minimum upstream and downstream pipeline length, mi	50
D	Nominal line pipe diameter, in.	12, 16, 20, 24, 30, 36, 42
t_0	Time pipeline ruptures	See discussion in Section 1.3.1.1
t_d	End of detection phase	See discussion in Section 1.3.1.1
t_s	End of block valve closure phase	See discussion in Section 1.3.1.1
t_b	End of blowdown phase	See discussion in Section 1.3.1.1
$t_d - t_0$	Duration of detection phase, minutes	5, 10
$t_s - t_d$	Duration of block valve closure phase, minutes	3, 30, 60, 90, 180
$t_b - t_s$	Duration of blowdown phase, minutes	Determined by calculation
$\dot{Q}$	Time-dependent mass flow, ft^3/h	Determined by calculation
S	Block valve spacing based on class location, mi.	Class 1 locations: 20 mi. Class 2 locations: 15 mi. Class 3 locations: 8 mi. Class 4 locations: 5 mi.
P_1	Maximum allowable operating pressure, psig	300, 400, 500, 600, 700, 800, 900, 1,000, 1,100, 1200, 1,300, 1,400, 1,480

3.1.2 Analytical Approach and Computational Models

Computational models used to determine time-dependent mass flow for different pipeline diameters, operating and pressures, and detection and block valve closure durations are described in Section 3.1.2.1. Models used to compute heat flux intensities at different distances from the break (separation distances) are described in Section 3.1.2.2. These models are tools for identifying differences in release scenarios and for quantifying the effectiveness of block valve closure swiftness in mitigating consequences resulting from the natural pipeline release scenarios discussed in Sect. 3.1.4. Analytical results are presented using the PIR as a scalar to effectively quantify and normalize the radial distance from the pipeline break for different heat flux intensities.

The models are based on engineering principles and fire science practices but are not intended to be exact solutions to these complex engineering problems or for use in complying with the risk analysis

requirements in 49 CFR 192.935 to identify additional measures to protect a high consequence area and enhance public safety. In addition, the mass flow and heat flux data computed using the models were not validated by comparison with actual pipeline release events or experimental pipeline release test data.

3.1.2.1 Computational Model for Determining Mass Flow Rates for Natural Gas Pipeline Releases

The basic calculation for the pipeline blowdown uses a solution developed at ORNL (Sulfredge, 2006). The solution is a simple blowdown calculation using a total pipe length and adiabatic expansion of the gas through the orifice with the flow rate given by the expression for choked flow. The result gives closed-form expressions for pressure and temperature as functions of time. The model is also capable of determining the mass loss rate through the orifice as a function of time.

A key aspect of analyzing natural gas pipeline releases is developing a model for the gas discharge rate as a function of time. According to the Gas Research Institute report (Stephens, 2000), the choked discharge of gas from a reservoir has a mass flow rate, m_{dot}, given by the following equation.

$$M_{dot} = C_D\, P\, A_c\, [(\gamma/RT)\, (2/(\gamma+1))^{((\gamma+1)/(\gamma-1))}]^{1/2} \tag{3.1}$$

where

- P is the absolute reservoir pressure,
- T is the absolute temperature,
- γ is the ratio of specific heats for the gas, and
- R is the ideal gas constant for the gas involved.

In Eq. 3.1, A_c is the cross-sectional area of the opening and C_D is an empirical factor called the discharge coefficient (approximately 0.62), which accounts for the fact that the outflow stream tends to narrow and not make full use of the entire cross-sectional area of the opening. The minimum flow area is called the "vena contracta."

Equation 3.1 shows that the discharge mass flow rate depends on both the reservoir pressure and reservoir temperature, which are themselves changing throughout the transient blowdown. It is reasonable to assume an adiabatic condition for the gas due to the blowdown process being relatively rapid not allowing much time for heat transfer between the reservoir walls and the gas. A relationship between the reservoir gas temperature and pressure is obtained by applying the energy equation. Under adiabatic conditions, the energy equation requires the sum of time rate of change for the internal energy of the gas in the reservoir and the rate of enthalpy transport by the escaping gas to equal zero, seen in the equation below.

$$d/dt\,(mu) + m_{dot}\, h = 0 \tag{3.2}$$

where

- m is the mass of gas in the reservoir,
- u is the internal energy of the gas, and
- h is the enthalpy, [$u + Pv$] (Van Wylen and Sonntag, 1985).

If one expands the first term in Eq. 3.2 and notes that $m_{dot} = -\, dm/dt$ from the conservation of mass, then:

$$m\,(du/dt) + u\,(dm/dt) - h\,(dm/dt) = 0 \tag{3.3}$$

Because $h = u + Pv$ and $Pv = RT$ from the ideal gas law, it follows that:

$$m(du/dt) = RT\,(dm/dt) \tag{3.4}$$

The internal energy of an ideal gas can be expressed in terms of the gas temperature as $u = c_v T$ where c_v is the specific heat of the gas at constant volume.

$$M\,c_v\,(dT/dt) = RT\,(dm/dt) \tag{3.5}$$

Simplify Eq. 3.5, using the chain rule by noting that $dT/dt = (dT/dm)(dm/dt)$:

$$m\,c_v\,(dT/dm) = RT \tag{3.6}$$

Furthermore, $R/c_v = \gamma - 1$, separating Eq. 3.6, dT/T can be expressed as:

$$dT/T = (dm/m)\,(\gamma - 1) \tag{3.7}$$

Integrating Eq. 3.7 yields:

$$T/T_i = (m/m_i)^{\gamma-1} \tag{3.8}$$

Converting Eq. 3.8 into a relationship between pressure and temperature, recognizing gas specific volumes are the inverse ratio of the reservoir gas masses,

$$T/T_i = (v_i/v)^{\gamma-1} \tag{3.9}$$

noting $Pv = RT$ from the ideal gas law. The calculation then yields:

$$T/T_i = (P/P_i)^{(\gamma-1)/\gamma} \tag{3.10}$$

Equation 3.10 is a standard relationship for the temperature and pressure of an ideal gas undergoing an isentropic process (Van Wylen and Sonntag, 1985).

The equation for calculating the mass of the gas in the reservoir consists of a pipe segment of length L, with the same cross-sectional area as the pipe diameter is given by:

$$m = A_c L P/(RT) \tag{3.11}$$

Replacing m_{dot} in Eq. 3.1 with dm/dt yields:

$$(d/dt)\,[A_c\,L\,P/(RT)] = -\,C_D\,P\,A_c\,[(\gamma/RT)\,(2/(\gamma+1))^{(\gamma+1)/(\gamma-1)}]^{1/2} \tag{3.12}$$

Eq. 3.10 is used to eliminate T in terms of P in Eq. 3.12 to obtain a single differential equation for the reservoir pressure as a function of time.

$$P_i^{(\gamma-1)/(2\gamma)}\,(L/T_i^{1/2})(1/\gamma)\,P^{(1/\gamma)\,-1}(dP/dt) = -\,C_D\,[\gamma R\,(2/(\gamma+1))^{(\gamma+1)/(\gamma-1)}]^{1/2}\,P^{(\gamma+1)/(2\gamma)} \tag{3.13}$$

Defining constant, ζ, as:

$$\zeta = -\,C_D\,[\gamma R\,(2/(\gamma+1))^{(\gamma+1)/(\gamma-1)}]^{1/2}\,P_i^{-(\gamma-1)/(2\gamma)}\,T_i^{1/2}/L \tag{3.14}$$

and separating variables in Eq. 3.14 gives:

$$(1/\gamma)\, P^{(1-3\gamma)/(2\gamma)}\, dP = \zeta\, dt \tag{3.15}$$

Integrating between pressure P_i at time $t = 0$ and pressure P at some later time, the resulting equation becomes:

$$P(t) = [((1-\gamma)/2)\, \zeta\, t + P^{(1-\gamma)/(2\gamma)}]^{2\gamma/(1-\gamma)} \tag{3.16}$$

After determining the pressure at time, t, using Eq. 3.16, the temperature for that time is obtained from Eq. 3.10. The corresponding discharge mass flow rate is then obtained from Eq. 3.1. The calculated flow rate remains valid, assuming the reservoir pressure is high enough to cause choked flow at the exit plane, such that (John, 1984):

$$P > P_{atm}\, [(\gamma+1)/2]^{\gamma(\gamma-1)} \tag{3.17}$$

Using $\gamma = 1.32$ for natural gas and $P_{atm} = 14.7$ psi for the absolute atmospheric pressure, Eq. 3.17 indicates that choked flow will occur for reservoir pressures of $P > 27.1$ psi.

The preceding model was coded using spreadsheet software for determining the mass flow rates of escaping gas from natural gas pipeline releases as a function of time following the break. The approximation has some flaws. The initial outflow rate is independent of the assumption of spatially uniform pressure and is considered correct. However, that assumption gives a slower reduction in flow rate in the minutes after the break compared to real life situations. Given that the early time outgas rates are the most significant from the standpoint of fire hazards, this is a conservative error. At later times, i.e. when the content of the pipeline is below approximately 20-25%, the outgas rate given by the Sulfredge (2006) solution should be lower than expected in real life.

The Sulfredge (2006) solution was modified to account for closing of valves using a simple approximation. At time, t_{close}, the volume of the pipeline is reset to the new pipeline length. The pressure and temperature are set to the same values that were appropriate for time, t_{close}. The result is a continuation of the blowdown computation, only with changes in volume.

The simulation of constant inflow to the unbroken end of the pipe that models the additional natural gas supplied by compressors to the broken line as they continue to operate after the break is approximated by adding the inflow rate to the outflow rate calculated by the Sulfredge (2006) blowdown solution. However, it is well recognized that the "true" state of the flow under these conditions is not exactly simulated by this simple linear addition. Instead, the inflow leads to a mixing of the inflowing material with the expanding material in the pipe so that both the pressure and temperature inside the pipe are higher than given by the blowdown solution. On the other hand, given the other approximations inherent in the assumption of spatially uniform pressure and temperature for the gas in the pipe, this additional approximation is not considered a significant error. In any case, the flow rates for the inflow are only a few percent of the blowdown rates until late in the blowdown phase.

The model used to approximate the effects of block valve closure on the constant inflow is a simple exponential decay of the rate that starts when the valve closes. The model is based on a presumption that there is an amount of natural gas in the pipeline that represents the flow of the inflow from its initial entry to the exit. At the instant of valve closure, there is a hypothetical additional partial pressure due to this flow. After the valve is closed, the mass in the portion of the pipeline still outgassing is the volume of the pipeline times this notional additional pressure. The model assumes that the velocity of the gas remains the same, but that the extra pressure drops and, therefore, so does the outflow rate. As a simple approximation, this flow velocity is given by the mass flow rate divided by the flow area and further divided by the initial density of the gas. The declining mass flow rate is determined as follows.

$$\text{Rate } (t > t_{close}) = \text{initial inflow rate} * \exp[-(\textit{inflowvelocity}/\textit{newpipelength}\,(\text{time}-t_{close})] \quad (3.18)$$

where

newpipelength is the length of pipe between the break and the closed valve.

To account for different upstream and downstream pipeline lengths, the model was used to independently compute the mass flow rates from each damaged segment. These two mass flow rates were then added to create a total mass flow rate. This approach is considered acceptable because as long as the separate segments have the same initial pressure and line pipe diameter, the combined mass flow rates and, therefore, the initial heat flux intensities are unaffected by different upstream and downstream pipeline lengths. In addition, this approach provides a method for computing the mass flow rates from pipelines with block valves spaced at different distances from the break or pipelines with different block valve closure times. This was certainly the case for the San Bruno (NTSB, 2011a) release where the distance to the Milpitas station was approximately 38.5 miles and the distance to Martin station was approximately 7 miles.

3.1.2.2 Computational Model for Determining Heat Flux Intensities for Natural Gas Pipeline Releases

The analytical approach used by PHMSA to establish the PIR equation in 49 CFR 192.903 is described in a report titled "A Model for Sizing High Consequence Areas Associated with Natural Gas Pipelines" published by the Gas Research Institute (Stephens, 2000). In this report, the PIR is defined as the potential hazard area from a jet or trench fire and is the radius inside which people and structures could be exposed to an average heat flux that exceeds 15.8 W/m^2 (5,000 Btu/hr ft^2) for the first 30 seconds following a double ended guillotine pipeline break and immediate ignition of the escaping gas. The point source fire model used in this study to determine heat flux, I, follows.

$$I = \eta X_g Q_{eff} H_c / 4\pi r^2 \quad (3.19)$$

where

I	is the thermal radiant intensity or heat flux, W/m^2 (Btu/h ft^2),
η	is the combustion efficiency factor = 0.35 (Technica, Ltd. 1988),
X_g	is the emissivity factor = 0.2 (Technica, Ltd. 1988),
Q_{eff}	is the gas release rate fraction of heat radiated,
H_c	is the heat of combustion = 50,000 kJ/kg for methane, and
r	is the radial distance from the heat source to the location of interest.

The Gas Research Institute report (Stephens, 2000) states that the heat flux versus distance relationship given by Eq. 3.19 represents an extension of the widely recognized flare radiation model given in American Petroleum Institute (API) Recommended Practice 521, Third Edition, 1990. The report further states that it can be shown to be less conservative than the API flare model (i.e., it gives lower heat intensity estimates at a given distance) but this should not be considered surprising since the API model is widely recognized to be conservative.

The Gas Research Institute report (Stephens, 2000) also states that the model is preferred over some of the more generic, multi-purpose models available for industrial fire hazard analysis because it acknowledges factors ignored by other models that play a significant role in mitigating the intensity of real-world jet fire events. In particular, it accounts for the incomplete combustion of the escaping gas stream (through the combustion efficiency factor, η), and it acknowledges (through the emissivity factor, X_g) that a significant

portion of the radiant heat energy is absorbed by the atmosphere before it reaches targets at any significant distance from the flame surface. Additional discussions about these factors are presented in a report published by Michael Baker Jr., Inc. in 2005 (Baker, 2005).

Although the PIR model considers both heat flux and duration, it does not take into account such factors as total exposure time, total quantity of gas released, area of service disrupted, or impacts on emergency responders that arrive at the scene soon after the release begins (Sulfredge, 2006). Consequently, ORNL developed an alternative analytical approach for estimating thermal radiation fields surrounding natural gas pipeline jet and trench fires. This approach involved the following steps.

- Determine the geometric characteristics of the fire including the burning rate and the physical dimensions of the fire.
- Determine the average irradiance of the flames based on consideration of the fuel type, fire size, flame temperature, and composition.
- Calculate the thermal radiant intensity at a specified distance from the fire.

The alternative analytical approach is based on a point source radiation model and the following assumptions.

- The flame can be represented by a small source of thermal energy.
- The energy radiated from the flame is a specified fraction of energy released during combustion.
- The thermal radiation intensity varies proportionally with the inverse square of the distance from the source.

The following equation, which is reported as Eq. 24 in API Standard 521, expresses the thermal radiant intensity, K, at any distance, X, from the source, (NFPA, 1995 and API, 2007).

$$K = \tau F Q / 4\pi X^2 \tag{3.20}$$

where

K	is the thermal radiant intensity or heat flux, W/m^2 (Btu/hr ft^2),
Q	is the heat release rate (lower heating value), W (Btu/hr),
τ	is the fraction of radiated heat transmitted through the atmosphere,
F	is the fraction of heat radiated, and
X	is the radial distance from center of flame to edge of target (building, person, etc.), m (ft).

Although the variables in Eq. 3.19 are defined differently from those in Eq. 3.20, both equations are based on the common approach for determining the flame radiation from a single radiant epicenter to a point of interest as defined in API Standard 521, Eq. 24 (API, 2007).

The following simplifying assumptions for the alternative analytical approach provide the basis used to determine thermal radiant intensities for natural gas pipeline jet and trench fires.

- All of the natural gas that escapes from a guillotine-type break is consumed by fire. The heat release (lower heating value) for natural gas, Q, kW (Btu/hr) is determined by multiplying the heat content of natural gas 37,260 kJ/m^3 (1,000 Btu/ft^3) times the volumetric flow rate of the escaping gas, $\dot{Q}$, m^3/h (ft^3/hr).

- The fraction of heat radiated, F, ranges from 0.192 to 0.232 for natural gas depending on the diameter of the flame source (API, 2007). A value of 0.2 is used to solve Eq. 3.20 because it is within the range of values reported in API Standard 521 (API, 2007) and equal to the corresponding values reported in the Gas Research Institute report (Stephens, 2000), the Journal of Pipeline Safety (Haklar and Dresnack, 1999), and The World Bank report (Technica, Ltd. 1988) to determine thermal radiant intensity.
- The fraction of radiated heat transmitted through the atmosphere, τ, is determined using the following equation, which is reported as Eq. C11 in API Standard 521 (API, 2007).

$$T = 0.79[(100 / R_H)^{1/16}][(100 / D)^{1/16}] \tag{3.21}$$

where

τ is the fraction of radiated heat transmitted through the atmosphere,
R_H is the relative humidity, expressed as a percentage, and
D is the distance from the flame to the illuminated area, m (ft).

The following limitations apply to the methodology used to estimate the time-dependent thermal radiant intensity resulting from fires produced by combustion of the released natural gas.

- The alternative analytical approach is based on a point source radiation model which overestimates the intensity of thermal radiation at target locations close to the fire.
- The energy radiated from the flame is a specified fraction of the energy released during combustion.
- The fire has a cylindrical shape, the ambient air temperature is 70°F, the relative humidity is 50%, and the wind is calm.
- The natural gas that escapes from the upstream and downstream pipeline segments burn in the open.
- The constants used in this study are only used for computational purposes because the exact values for a specific release scenario are unknown.

The following discussion identifies the key differences between heat flux intensities computed using Eqs. 3.1 and 3.2 and explains the reasons for the differences.

The equation for determining thermal radiation intensities provided in the Gas Research Institute report (Eq. 3.19) and the equation used in the alternative analytical approach (Eq. 3.20) are each based on the flare radiation model in API Standard 521 (API, 2007) which considers the flame to have a single radiant epicenter and is a common approach for determining the flame radiation to a point of interest. Although Eqs. 3.19 and 3.20 are based on the same model, the thermal radiant intensities computed using Eq. 3.19 are significantly less than the thermal radiant intensities computed using Eq. 3.20 for the following reasons.

In Eq. 3.19, the computed thermal radiant intensity is proportional to the combustion efficiency factor, η, which equals 0.35. The basis for this value is not discussed in either the Gas Research Institute report (Stephens, 2000) or the cited reference source (Technica, Ltd, 1988).

In Eq. 3.20, the computed thermal radiant intensity is proportional to the fraction of the radiated heat transmitted through the atmosphere, τ. This factor varies depending on relative humidity and the distance

between an object and the flame according to the relationship established by Eq. 3.21. At a relative humidity of 50%, the factor, τ, ranges from 1.000 at a distance of 60 ft to 0.839 at a distance of 1,000 ft. Although Eqs. 3.20 and 3.21 are reported in a consensus standard, API does not provide any experimental evidence for validating these equations. However, a complementary value, $\tau = 0.746$, is reported in the Journal of Pipeline Safety (Haklar, and Dresnack, 1999) and is based on a relative humidity of 50% and a distance of 500 ft from the flame. The corresponding value computed using Eq. 3.21 for a relative humidity of 50% and a distance of 500 ft from the flame is 0.876.

Comparisons of thermal radiant intensities computed using Eqs. 3.19 and 3.20 confirm the statement by the Gas Research Institute (Stephens, 2000) that the adopted heat flux versus distance relationship given by Eq. 3.19 is less conservative (i.e. it gives lower heat intensity estimates at a given distance) than the API flare model given by Eq. 3.20. The comparisons also confirm that thermal radiant intensities computed using Eqs. 3.20 and 3.21 are between 2.9 (1.000 / 0.35) and 2.4 (0.839 / 0.35) times those computed using Eq. 3.19 for distances from the flame between 60 and 1,000 ft, respectively.

For these reasons, the thermal radiant intensities computed using Eqs. 3.20 and 3.21, which are equivalent to Eqs. 24 and C.11 in API Standard 521 (API, 2007), are considered conservative from a safety viewpoint and appropriate for assessing effects of block valve closure swiftness on the heat flux versus time response of natural gas pipelines under the same release conditions. Therefore, these equations are used in the alternative analytical approach as the basis for determining time-dependent heat flux intensities during natural gas pipeline releases.

3.1.3 Thermal Radiation Intensities and Thresholds

The methodology developed at ORNL for quantifying potential fire damage resulting from a natural gas pipeline release applies to: (1) buildings and dwellings intended for human occupancy, (2) buildings with four or more stories above ground, (3) identified sites with outside recreational facilities, and (4) personal property. The methodology is also used to quantify potential fire damage resulting from a hazardous liquid pipeline release with ignition.

3.1.3.1 Potential Fire Damage to Buildings and Dwellings Intended for Human Occupancy

Thermal radiation resulting from combustion of hydrocarbons can damage buildings and dwellings intended for human occupancy, particularly if they are constructed with materials such as plastic (vinyl) and wood that can melt or ignite and burn. Damage severity depends on the types of materials used to construct the buildings and dwellings, the heat flux intensity, and the exposure duration.

Following the Pacific Gas and Electric Company natural gas transmission pipeline rupture and fire in San Bruno, California on September 9, 2010, the city of San Bruno used the following damage categories to classify structural damage to houses at the accident site (NTSB, 2011).

- Severe indicates that a house is not safe to occupy and most likely needs to be demolished or completely renovated prior to occupancy. (Such damage may be perceived as catastrophic to the homeowner.)
- Moderate indicates that a house has substantial damage and repairs are necessary prior to occupancy.
- Minor indicates that a house has the least amount of damage and could be legally occupied while repairs are made.

The methodology uses these terms and definitions to characterize fire damage to buildings and dwellings intended for human occupancy. Conditions for categorizing severe, moderate, and minor damage to buildings and dwellings intended for human occupancy are defined as follows.

Severe Damage to Buildings and Dwellings Intended for Human Occupancy

Damage to a building or dwelling intended for human occupancy caused by fire resulting from a pipeline release is considered severe if all or part of the building or dwelling is consumed by flames. Buildings and dwellings with severe damage are considered a total (100%) loss. Each dwelling unit in a multiple dwelling unit building is counted as a separate building intended for human occupancy.

Without direct flame impingement, an average heat flux of 50 kW/m^2 (15,900 Btu/hr ft^2) will cause dry wood to ignite in about 10 seconds. A lower average heat flux of 40 kW/m^2 (12,700 Btu/hr ft^2) will cause dry wood to ignite in about 17 seconds (McAllister, 2010). For this study, any building or dwelling intended for human occupancy exposed to a heat flux greater than 40 kW/m^2 (12,700 Btu/hr ft^2) is conservatively considered to have severe damage and a total loss.

Moderate Damage to Buildings and Dwellings Intended for Human Occupancy

Moderate damage to a building or dwelling intended for human occupancy caused by fire resulting from a pipeline release can occur when the building or dwelling is exposed to a heat flux of 39.4 kW/m^2 (12,500 Btu/hr ft^2) for a prolonged period. These exposure conditions can distort vinyl windows, melt vinyl siding, and degrade other nonstructural plastic elements.

For this study, any building or dwelling intended for human occupancy exposed to a heat flux greater than 31.5 kW/m^2 (10,000 Btu/hr ft^2) for more than 15 minutes is conservatively considered to have moderate damaged. The cost to repair a building or dwelling with moderate damage is estimated to be 50% of the cost of a new house constructed at the same location.

Minor Damage to Buildings and Dwellings Intended for Human Occupancy

Damage to buildings and dwellings intended for human occupancy caused by fire resulting from a pipeline release is considered minor if the heat flux does not exceed 15.8 kW/m^2 (5,000 Btu/hr ft^2) because: (1) residential buildings and dwellings exposed to this heat flux intensity are not expected to burn, and (2) they are capable of affording indefinite protection to sheltered persons (Stephens, 2000). However, glass breakage can occur at heat flux intensities that exceed 4.0 kW/m^2 (1,270 Btu/hr ft^2) for 30 minutes (LaChance, 2009).

For this study, any building or dwelling intended for human occupancy exposed to a heat flux that exceeds 15.8 kW/m^2 (5,000 Btu/hr ft^2) for a prolonged period of at least 30 minutes is conservatively considered to have minor damage. The cost to repair a building or dwelling with minor damage is estimated to be 20% of the cost of a new house constructed at the same location.

Figure 3.1 illustrates the relationships among heat flux intensities and exposure durations for severe, moderate, and minor damage categories for buildings and dwelling intended for human occupancy.

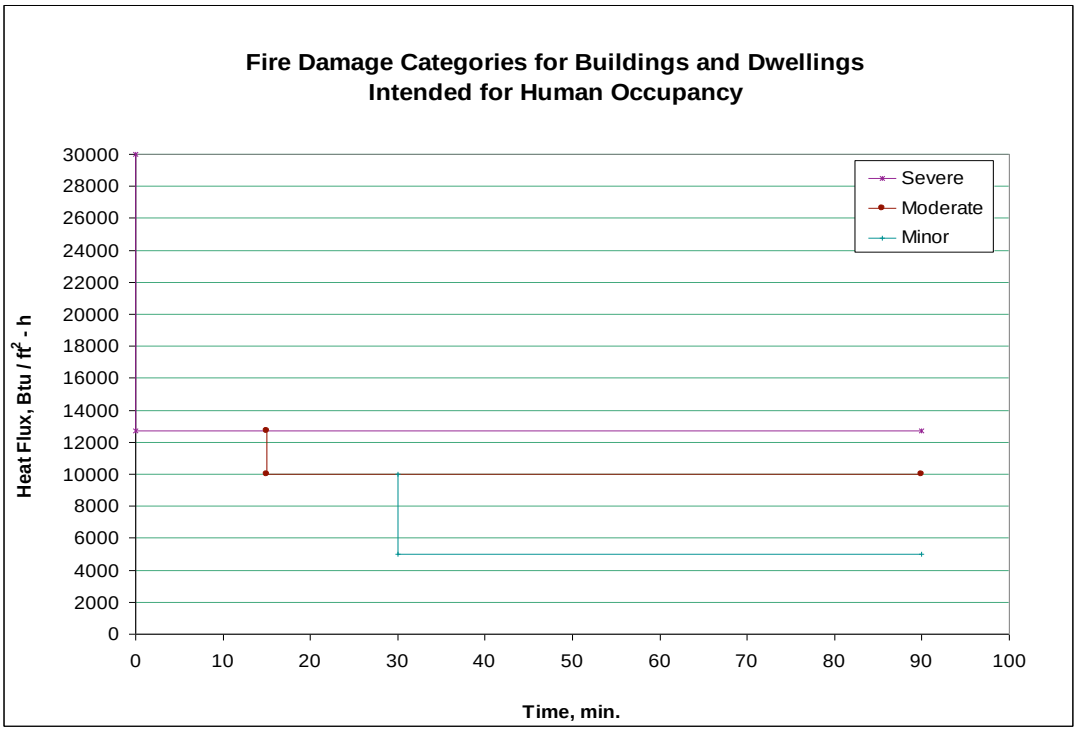

Fig. 3.1. Relationships among heat flux intensities and exposure durations for fire damage categories for buildings and dwellings intended for human occupancy.

The cost of fire damage to buildings and dwellings intended for human occupancy resulting from a pipeline release are based on the median cost of new homes sold in the United States. According to recent data published by the U.S. Census Bureau, the median and average sales prices of new homes sold in United States in 2009 including land is $221,800 and $272,900, respectively (U.S. Census Bureau. 2012a). Using a land value of 20% of the total sale price, the unit value of buildings and dwellings intended for human occupancy damaged or destroyed by fire resulting from a pipeline release is estimated at $180,000.

Buildings and dwellings intended for human occupancy that are potentially susceptible to fire damage resulting from a natural gas pipeline release are located in the following areas.

- Areas within and adjacent to HCAs in Class 1 Locations with buildings or dwellings intended for human occupancy configured as shown in Fig. 3.2
- Areas adjacent to HCAs in Class 1 Locations with an identified site consisting of buildings with four or more stories above ground configured as shown in Fig. 3.3
- Areas within and adjacent to HCAs in Class 1 Locations with an identified site consisting of an outdoor recreational facility that is occupied by 20 or more people on at least 50 days in any 12-month period configured as shown in Fig. 3.4
- Areas within and adjacent to HCAs in Class 2 Locations with buildings or dwellings intended for human occupancy configured as shown in Fig. 3.5
- Areas within and adjacent to HCAs in Class 2 Locations with an identified site consisting of buildings with four or more stories above ground configured as shown in Fig. 3.6

- Areas within and adjacent to HCAs in Class 2 Locations with an identified site consisting of an outdoor recreational facility that is occupied by 20 or more people on at least 50 days in any 12-month period configured as shown in Fig. 3.7
- Areas within and adjacent to Class 3 Locations with buildings or dwellings intended for human occupancy configured as shown in Fig. 3.8
- Areas adjacent to Class 3 Locations with an outside recreational facility configured as shown in Fig. 3.9
- Areas adjacent to Class 4 Locations with buildings with four or more stories above ground configured as shown in Fig. 3.10

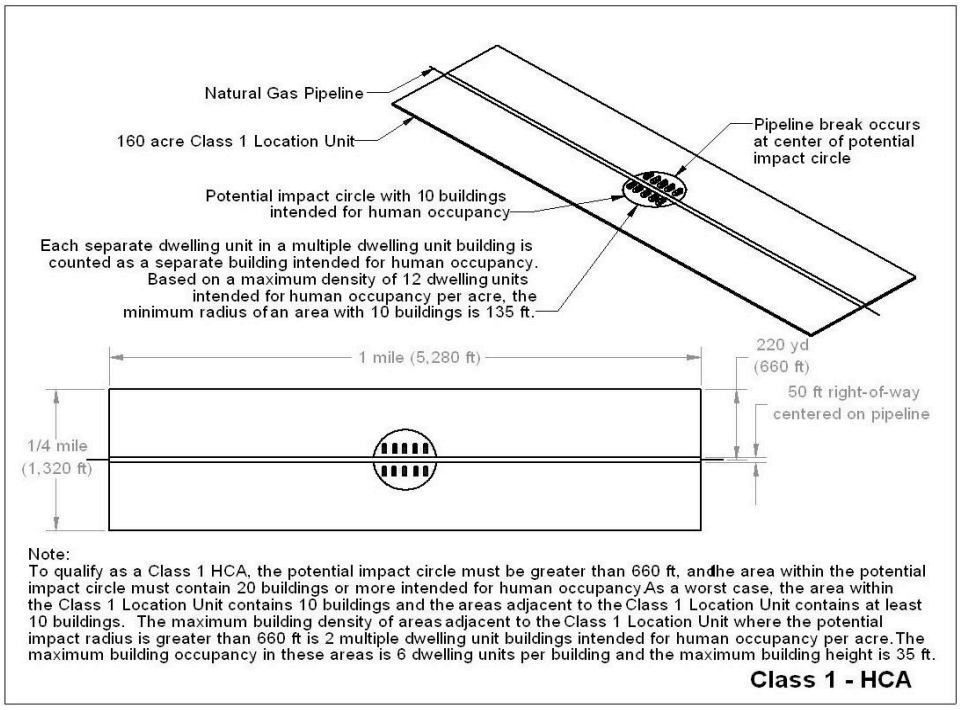

Fig. 3.2. Configuration of a Class 1 HCA with buildings or dwellings intended for human occupancy.

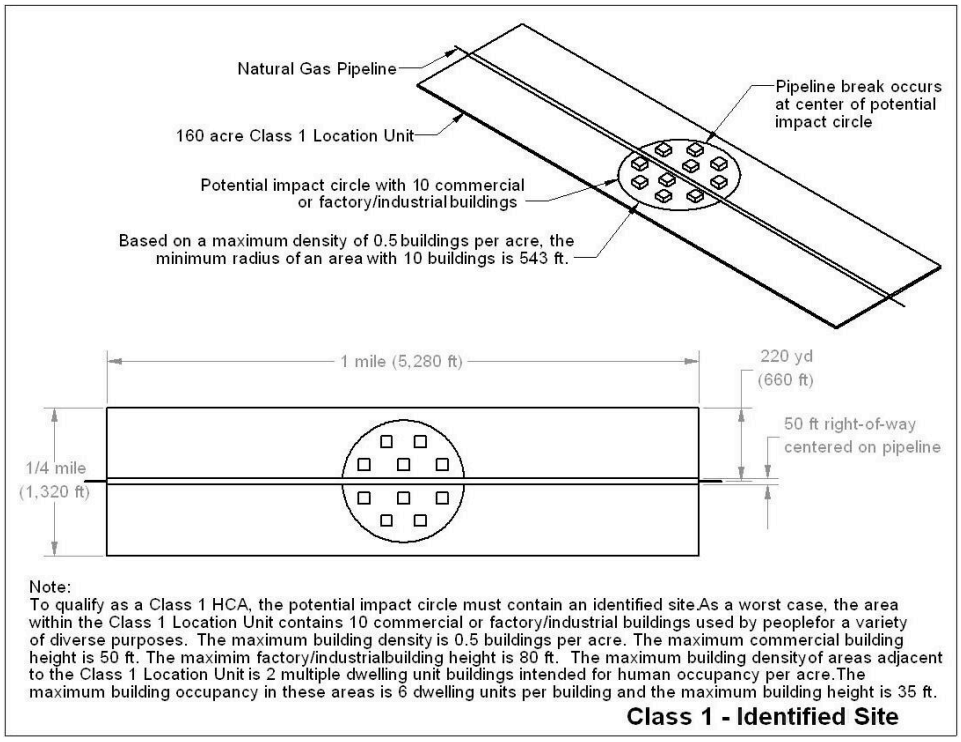

Fig. 3.3. Configuration of a Class 1 HCA with an identified site consisting of buildings with four or more stories.

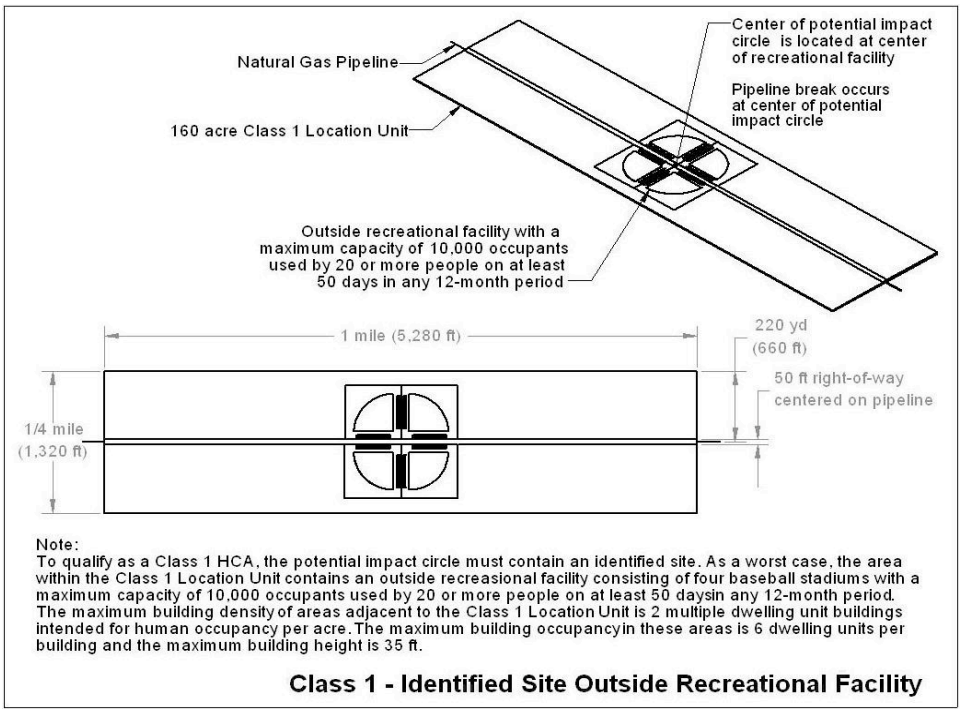

Fig. 3.4. Configuration of a Class 1 HCA with an identified site consisting of an outdoor recreational facility that is occupied by 20 or more people on at least 50 days in any 12-month period.

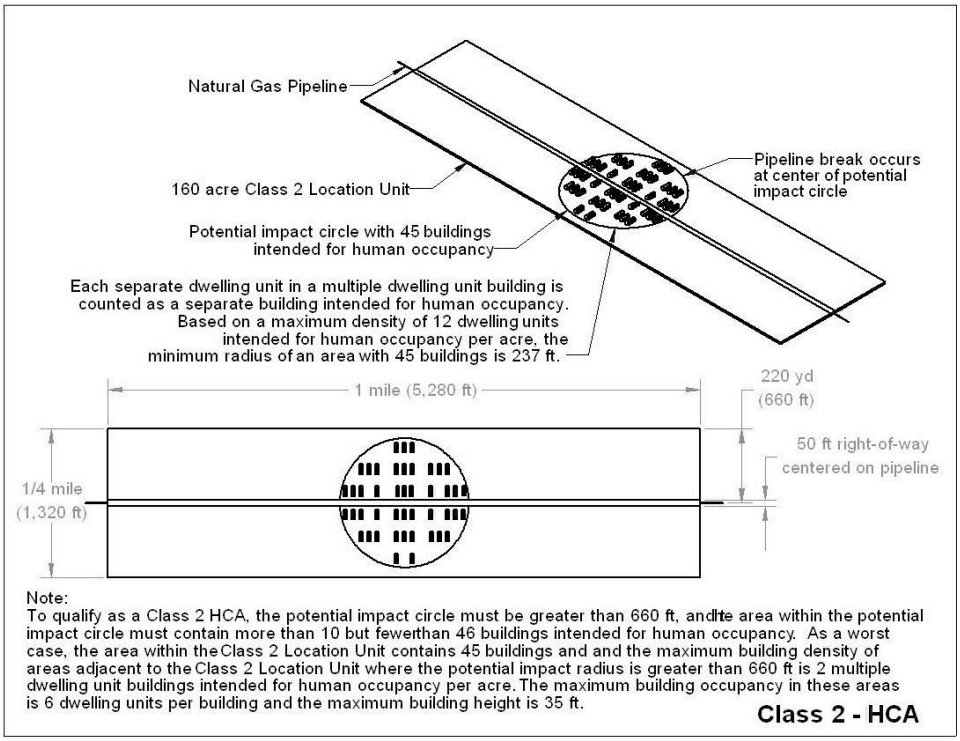

Fig. 3.5. Configuration of a Class 2 HCA with buildings or dwellings intended for human occupancy.

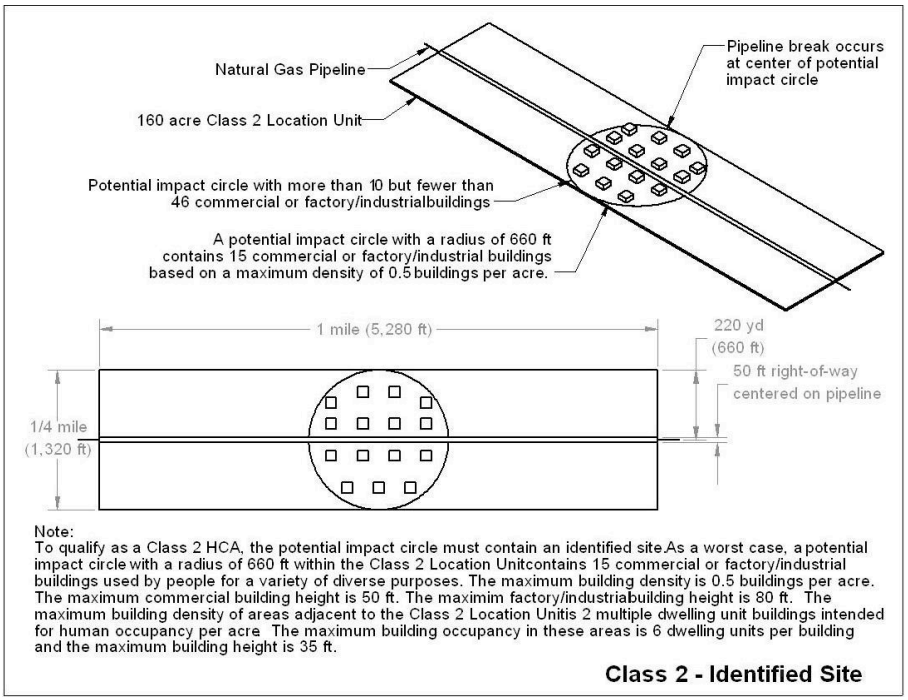

Fig. 3.6. Configuration of a Class 2 HCA with an identified site consisting of buildings with four or more stories.

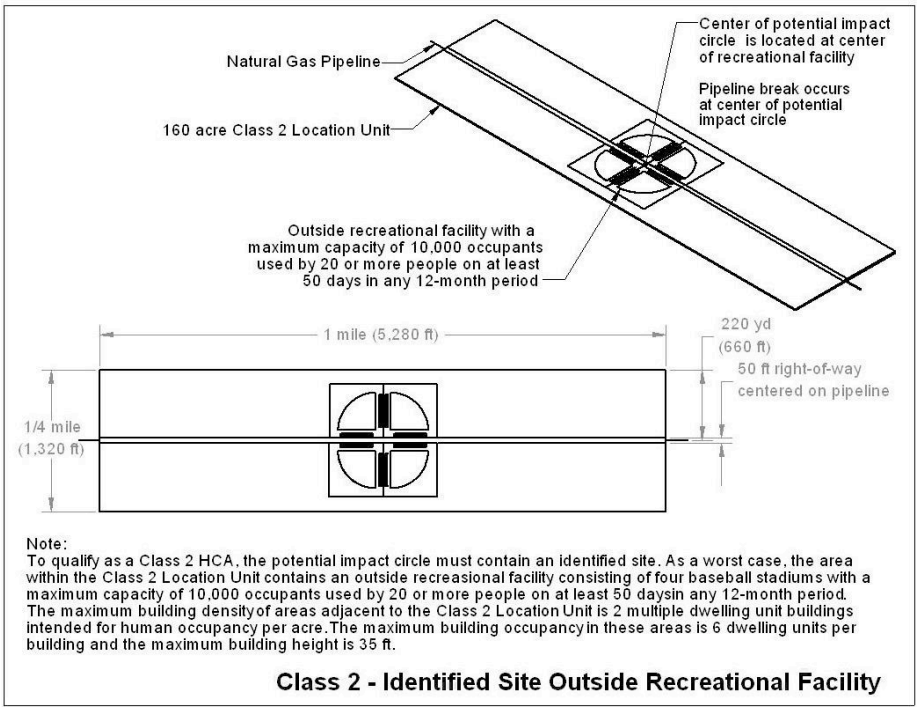

Fig. 3.7. Configuration of a Class 2 HCA with an identified site consisting of an outdoor recreational facility that is occupied by 20 or more people on at least 50 days in any 12-month period.

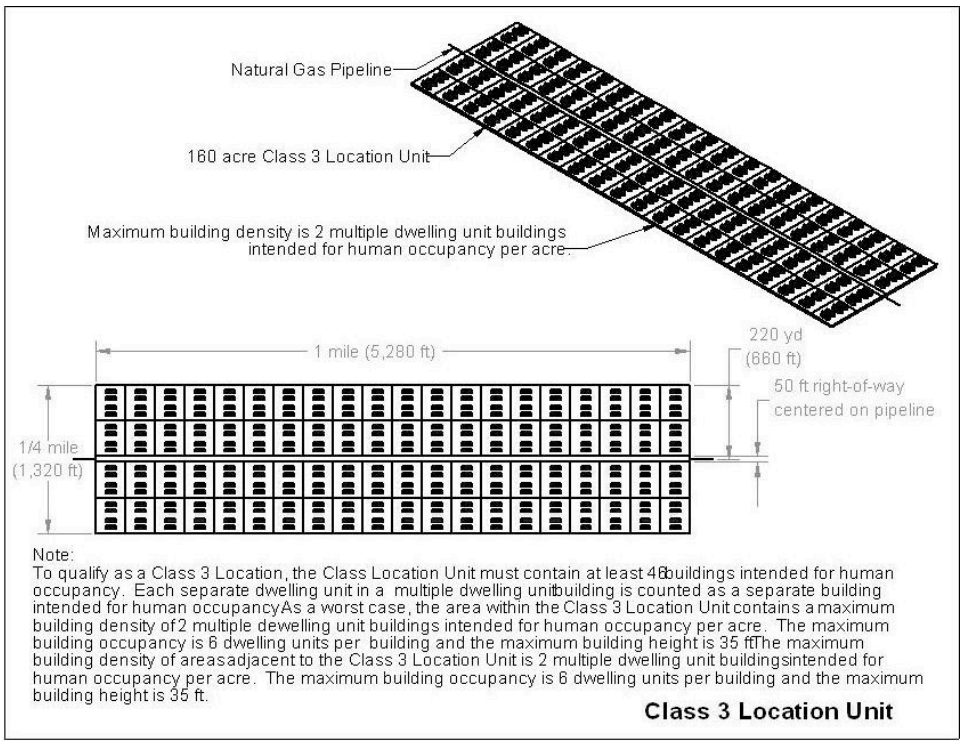

Fig. 3.8. Configuration of a Class 3 Location with buildings and dwellings intended for human occupancy.

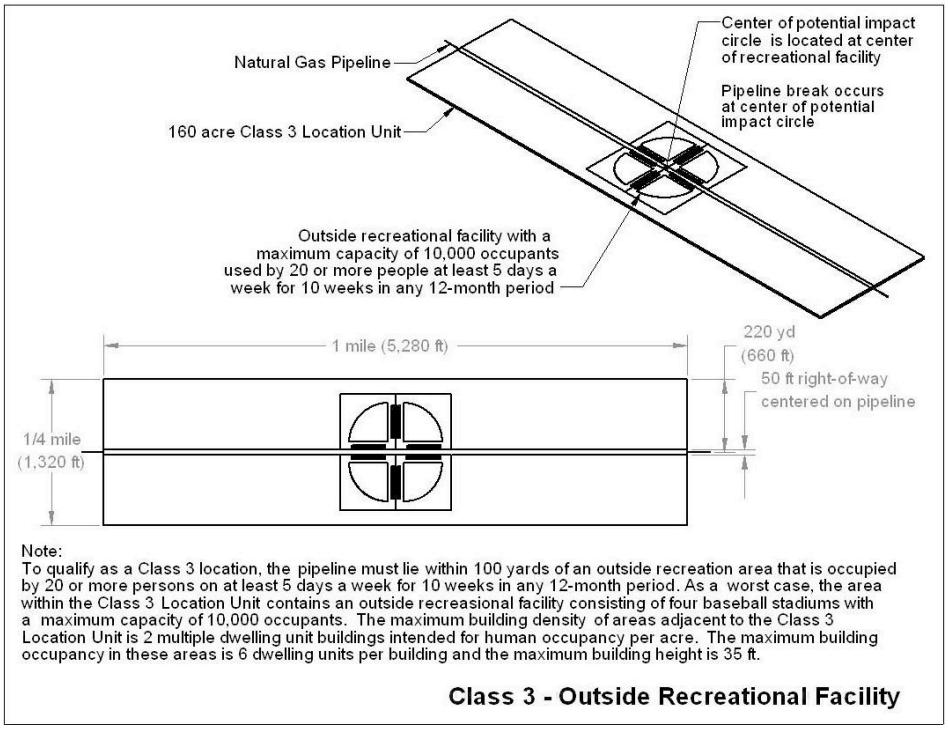

Fig. 3.9. Configuration of a Class 3 Location with an outside recreational facility.

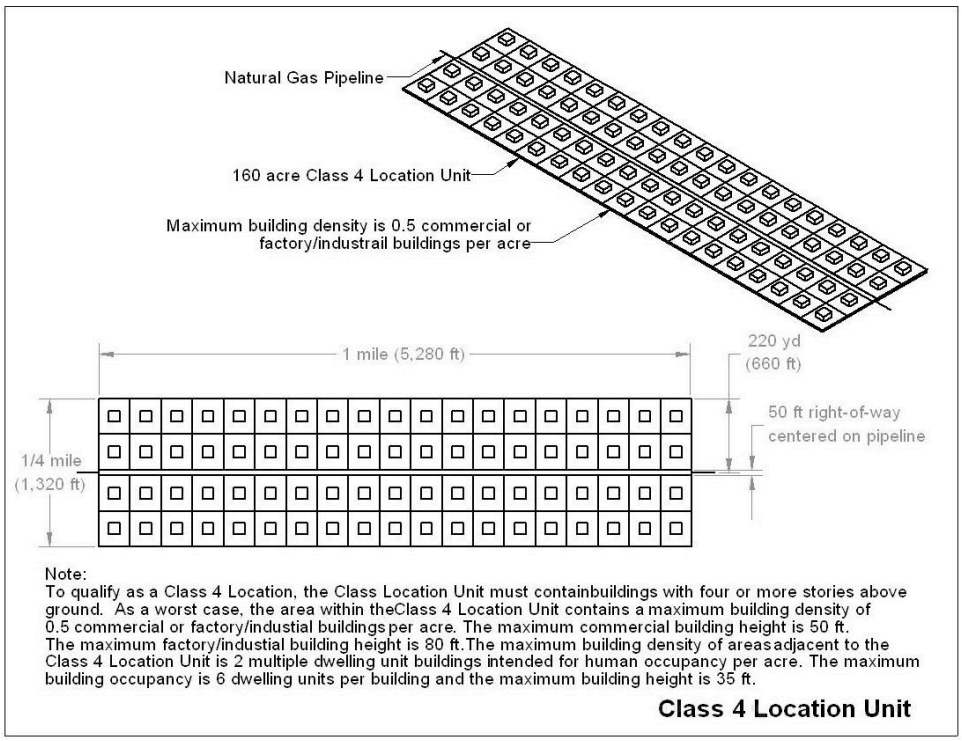

Fig. 3.10. Configuration of a Class 4 Location with buildings with four or more stories above ground.

In addition to buildings and dwellings intended for human occupancy that are potentially susceptible to fire damage resulting from a natural gas pipeline release located in Class 1, Class 2, Class 3, and Class 4 HCAs, buildings and dwellings intended for human occupancy that are potentially susceptible to fire damage resulting from a hazardous liquid pipeline release in HCAs as defined in 49 CFR 195.450 (DOT, 2011d). The configuration of buildings and dwellings intended for human occupancy in HCAs designated as either high population areas or other populated areas is shown in Fig. 3.11.

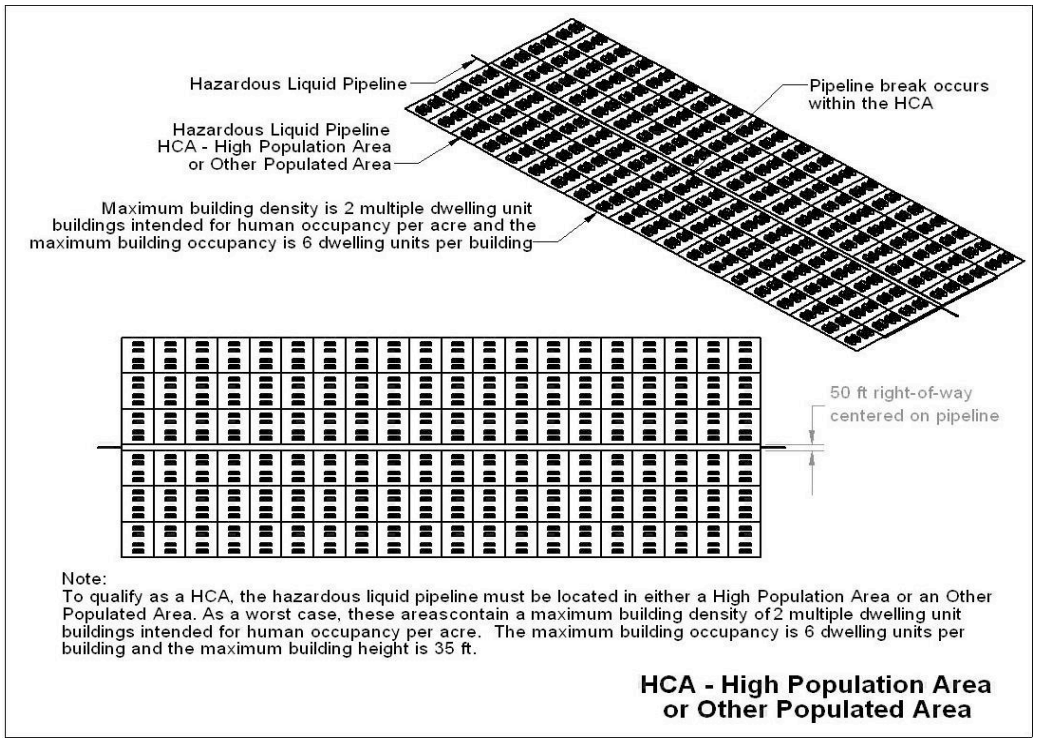

Fig. 3.11. Configuration of a High Population Area or an Other Populated Area.

3.1.3.2 Potential Fire Damage to Buildings with Four or More Stories above Ground

Buildings with four or more stories above ground are categorized as either a Commercial zone with a maximum permitted building height ranging from 40 to 50 ft or a Factory/Industrial zone with a maximum permitted building height ranging from 60 to 80 ft based on zoning criteria in the 2012 International Zoning Code (ICC, 2012b). For this study, each building with four or more stories above ground that is susceptible to fire damage resulting from a natural gas pipeline release has the following design features:

- a total gross floor area of 40,000 sq. ft.,
- 200 parking spaces with stall dimensions of 9 ft by 22 ft,
- two-way enter and exit driveways that are 24 ft wide,
- sidewalks that are at least 4 ft wide,
- a lot size of 2 acres, and
- designs that comply with International Fire Code and International Building Code requirements (ICC, 2012a and ICC, 2012c).

Buildings with four or more stories above ground that comply with International Fire Code and International Building Code requirements (ICC, 2012a and ICC, 2012c) generally include design features such as fire walls and fire doors with required fire ratings. They also have automatic sprinklers or other types of fire-suppression systems capable of limiting fire spread and protecting the building occupants. In addition, the exterior surfaces of buildings with four or more stories above ground are typically constructed with metallic and cement-based materials that are fire resistant. Consequently, fire damage to buildings with four or more stories above ground resulting from a natural gas pipeline release is not expected if the heat flux is less than 31.5 kW/m^2 (10,000 Btu/hr ft^2). Minor damage to non-structural building elements such as adhesives and sealants is possible if the building is exposed to a heat flux greater than 31.5 kW/m^2 (10,000 Btu/hr ft^2) for more than 15 minutes. Severe and moderate damage such as curtain-wall panel buckling and window breakage is expected if the building is exposed to a heat flux greater than 40 kW/m^2 (12,700 Btu/hr ft^2).

For this study, the cost to repair minor damage to a building with four or more stories above ground caused by fire resulting from a pipeline release is conservatively estimated to be 10% of the cost of a new building constructed at the same location. Based on an estimated cost of $125 per sq. ft. to construct a building with four or more stories above ground and 40,000 sq. ft. of gross floor space, the cost to repair minor damage is $500,000. The cost to repair severe and moderate damage to a building with four or more stories above ground caused by fire resulting from a pipeline release is conservatively estimated to be 20% of the cost of a new building constructed at the same location. The cost to repair severe and moderate damage to a building with four or more stories above ground and 40,000 sq. ft. of gross floor space is $1,000,000.

Relationships among heat flux intensities and exposure durations for severe, moderate, and minor damage to buildings with four or more stories above ground are illustrated in Fig. 3.12.

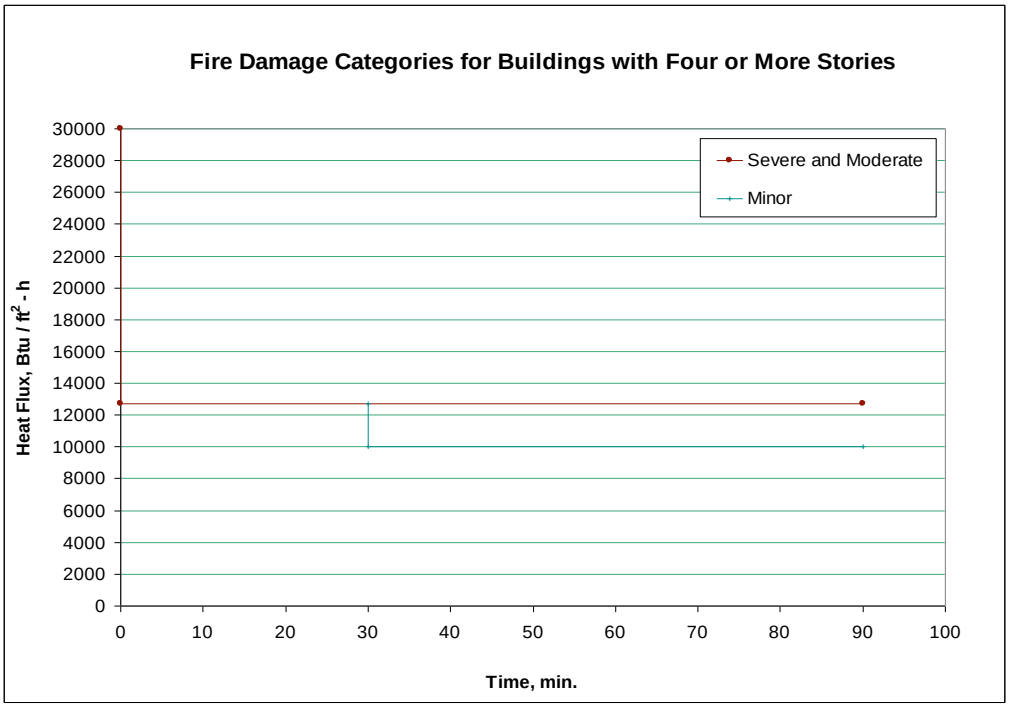

Fig. 3.12. Relationships among heat flux intensities and exposure durations for fire damage categories for buildings with four or more stories above ground.

3.1.3.3 Potential Fire Damage to Outside Recreational Facility

Damage to an outside recreational facility caused by fire resulting from a pipeline release is based on a facility with the following design features.

- The outside recreational facility has a maximum capacity of 10,000 occupants.
- The facility is used by 20 or more people at least 5 days a week for 10 weeks in any 12-month period.
- Design and construction of the outdoor recreational facility buildings and structures comply with applicable International Fire Code and International Building Code requirements (ICC, 2011a and ICC, 2012c).

Bleachers and food preparation, utility, storage, and toilet rooms at outside recreational facilities are generally constructed with metallic and cement-based materials that are fire resistant. Consequently, fire damage to these items from a natural gas pipeline release is not expected if the heat flux exceeds 40 kW/m^2 (12,700 Btu/hr ft^2). However, severe and moderate damage to seating, signs, coatings, food storage and preparation equipment, supplies, and retail commodities is expected if the heat flux exceeds 40 kW/m^2 (12,700 Btu/hr ft^2). Minor damage to these items is expected if the heat flux exceeds 31.5 kW/m^2 (10,000 Btu/hr ft^2) for more than 15 minutes.

The replacement cost of seating, signs, coatings, food storage and preparation equipment, supplies, and retail commodities with severe and moderate damage caused by exposure to a heat flux greater than 40 kW/m^2 (12,700 Btu/hr ft^2) is conservatively estimated at $500,000. The replacement cost of food storage and preparation equipment, supplies, and retail commodities with minor damage caused by exposure to a heat flux greater than 31.5 kW/m^2 (10,000 Btu/hr ft^2) for more than 15 minutes is conservatively estimated at $250,000.

Relationships among heat flux intensities and exposure durations for severe, moderate, and minor damage to outside recreational facilities are illustrated in Fig. 3.13.

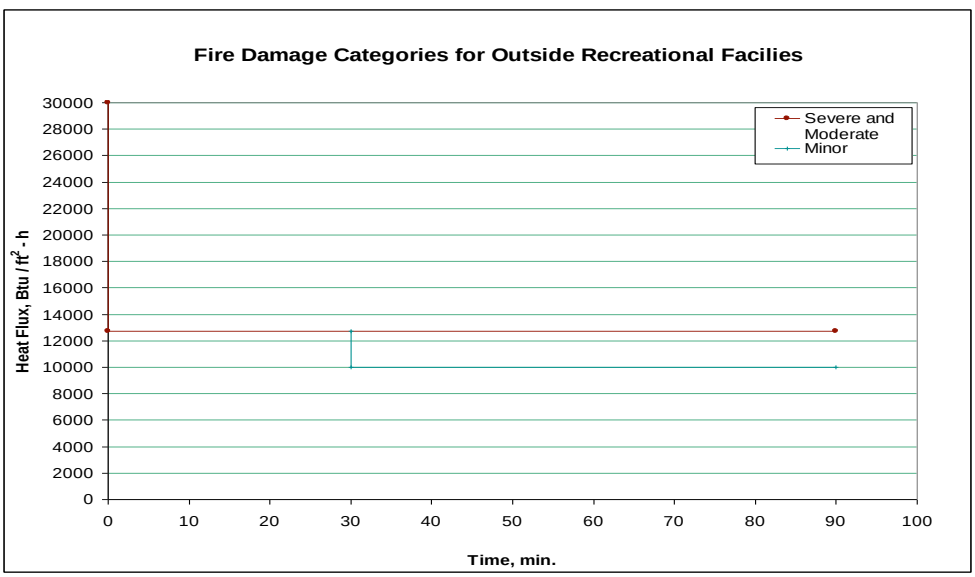

Fig. 3.13. Relationships among heat flux intensities and exposure durations for fire damage categories for outside recreational facilities.

3.1.3.4 Potential Fire Damage to Personal Property

Personal property damaged caused by a fire resulting from a pipeline release is categorized as either: (1) vehicles that are parked outside, or (2) personal possessions that are destroyed inside buildings and dwellings intended for human occupancy.

Fire Damage to Vehicles Parked Outside

Passenger cars, vans, and trucks; watercraft; camping trailers; and motor cycles are types of vehicles that may be parked outside of buildings and dwellings intended for human occupancy, buildings with four or more stories above ground, and outside recreational facilities. Severe damage to these vehicles is expected if the heat flux exceeds 40 kW/m^2 (12,700 Btu/hr ft^2). Moderate damage is expected if the heat flux exceeds 31.5 kW/m^2 (10,000 Btu/hr ft^2) for more than 15 minutes because these vehicles include non-metallic parts that can degrade, melt, or distort. No damage is expected if the heat flux does not exceed 31.5 kW/m^2 (10,000 Btu/hr ft^2) for more than 15 minutes.

Based on U.S. Census Bureau sales data for 2009 (U.S. Census Bureau, 2012b), the retail price of new and used passenger cars, vans, and trucks was $26,245 and $8,483, respectively, and the total value of new and used vehicle sales was approximately equal. Therefore, the estimated retail sales price for each passenger car, van, or truck damaged by a fire resulting from a pipeline release is $17,000. The retail sales price for other types of vehicles including watercraft; camping trailers; and motor cycles is conservatively estimated at $17,000 per unit.

For this study, fire damage to vehicles parked outside will be based on the following simplifying assumptions.

- The cost of severe damage to vehicles parked outside caused by exposure to a heat flux that exceeds 40 kW/m^2 (12,700 Btu/hr ft^2) is estimated at $17,000 per vehicle which is 100% of the retail sales price of the vehicle.
- The cost to repair moderate damage to a vehicle parked outside caused by exposure to a heat flux that is greater than 31.5 kW/m^2 (10,000 Btu/hr ft^2) for more than 15 minutes is estimated at $5,000 which is approximately 30% of the retail sales price of the vehicle.
- No damage to vehicles parked outside is expected if the heat flux does not exceed 31.5 kW/m^2 (10,000 Btu/hr ft^2) for more than 15 minutes.

According to the 2012 International Zoning Code (ICC, 2012b), at least two off-street parking spaces are required for each residential dwelling unit. Therefore, multiple dwelling unit buildings with a maximum density of 12 dwellings per acre require a minimum of 24 parking spaces (24 per acre). Similarly, a building with four or more stories above ground which is located on a 2-acre plot and has a total floor area of 40,000 sq. ft. is required to have at least 200 parking spaces (100 per acre). The vehicle density of parking lots for outside recreational facilities is approximately 140 parking spaces per acre based on stall dimensions that are 9 ft by 22 ft and two-way enter and exit driveways that are 24 ft wide.

The cost of fire damage to vehicles parked outside resulting from a pipeline release is estimated as follows.

- $408,000 per acre for vehicles with severe damage parked outside of buildings and dwellings intended for human occupancy.
- $120,000 per acre for vehicles with moderate damage parked outside of buildings and dwellings intended for human occupancy.

- $1,700,000 per acre for vehicles with severe damage parked outside of buildings with four or more stories.
- $500,000 per acre for vehicles with moderate damage parked outside of buildings with four or more stories.
- $2,380,000 per acre for vehicles with severe damage parked outside of outside recreational facilities.
- $700,000 per acre for vehicles with moderate damage parked outside of outside recreational facilities.

Relationships among heat flux intensities and exposure durations for severe and moderate damage to outside recreational facilities are illustrated in Fig. 3.14.

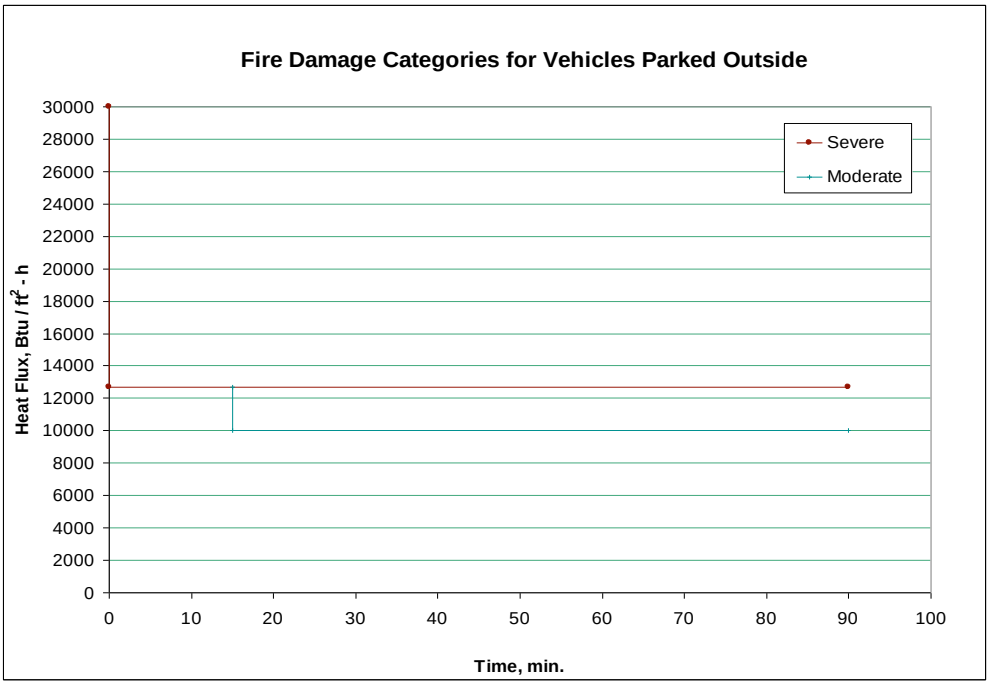

Fig. 3.14. Relationships among heat flux intensities and exposure durations for fire damage categories for vehicles parked outside.

Fire Damage to Personal Possessions

The replacement cost of personal possessions that are destroyed inside a building or dwelling intended for human occupancy with severe damage caused by fire resulting from a pipeline release is estimated at $45,000 which is 25% of the value of the building. Similarly, the replacement cost of personal possessions that are destroyed inside a building or dwelling intended for human occupancy with moderate and minor damage caused by fire resulting from a pipeline release is estimated at $27,000 and $9,000 which is 15% and 5% of the value of the building, respectively.

3.1.4 Risk Analysis Results for Natural Gas Pipeline Releases

The methodology for assessing effects of valve closure time on fire damage resulting from a natural gas pipeline release is based on: (1) the cost avoidance for damage to buildings and personal property within

areas susceptible to severe, moderate, and minor damage, and (2) the cost avoidance for damage to buildings and personal property attributed to actions taken by fire fighters. Computed heat flux versus time data and the applicable heat flux thresholds for severe, moderate, and minor damage listed in Table 1.2 are used to quantify the radii of areas susceptible to each of these damage levels. The cost of damage to buildings and personal property located within the various damage areas are based on the applicable repair and replacement data described in Sections 3.1.3.1 to 3.1.3.4 and summarized in Table 3.2.

Table 3.2. Estimated costs of property damage caused by fire resulting from a pipeline release

Property Damage Type	Minimum Heat Flux, kW/m^2 (Btu/hr ft^2)		
	40 (12,700) for any duration	31.5 (10,000) for at least 15 minutes	15.8 (5,000) for at least 60 minutes
Buildings Intended for Human Occupancy	Severe Damage	Moderate Damage	Minor Damage
Dwellings (12/acre or 6/building)	$2,160,000/acre $1,080,000/building	$1,080,000/acre $1,080,000/building	$432,000/acre $216,000/building
Vehicles (24/acre or 2/building)	$408,000/acre $204,000/building	$120,000/acre $60,000/building	$0/acre $0/building
Possessions (12/acre or 6/building)	$540,000/acre $45,000/building	$324,000/acre $22,500/building	$108,000/acre $9,00/building
Total Damage Cost	$3,108,000/acre $1,554,000/building	$1,524,000/acre $762,000/building	$540,000/acre $270,000/building
Building Unit with 4 or More Stories	Severe Damage	Moderate Damage	Minor Damage
Building (0.5/acre)	$500,000/acre $1,000,000/building	$500,000/acre $1,000,000/building	$250,000/acre $500,000/building
Vehicles (100/acre or 200/building)	$1,700,000/acre $3,400,000/building	$1,700,000/acre $3,400,000/building	$0/acre $0/building
Total Damage Cost	$2,200,000/acre $4,400,000/building	$2,200,000/acre $4,400,000/building	$250,000/acre $500,000/building
Outside Recreational Facility	Severe Damage	Moderate Damage	Minor Damage
Buildings and Structures	$0	$0	$0
Vehicles (140/acre)	$2,380,000	$700,000	$0
Equipment and Supplies	$500,000	$500,000	$250,000
Total Damage Cost per Facility:	$500,000 + $2,380,000/acre	$500,000 + $700,000/acre	$250,000

Notes: Combustible materials exposed to a heat flux that exceeds 40 kW/m^2 (12,700 Btu/hr ft^2) for any time are considered a total loss. Each separate dwelling unit in a multiple dwelling unit building is counted as a separate building intended for human occupancy. Estimated damage costs are based on U.S. Census Bureau data for 2009.

The avoided cost of damage to buildings and personal property resulting from fire fighting activities is based on the following considerations and simplifying assumptions.

- 12-in. Natural Gas Pipeline Releases

  The number of fire hydrants available for extinguishing building fires resulting from a 12-in. nominal diameter natural gas pipeline release with a MAOP equal to 300 psig is 3 based on a maximum spacing of 500 ft. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres. Up to 12 engines arrive at the scene and connect to the available fire hydrants within 10 minutes after

the break, but fire fighters cannot begin fire fighting operations within areas where the heat flux exceeds 2.5 kW/m^2 (800 Btu/hr ft^2). The avoided damage cost for each four-story building or each building intended for human occupancy (including contents) that ignites when the break occurs is 50% within the first 10 minutes after the break and increases at a rate of 5% per minute for each additional minute that fire fighting activities are delayed beyond the 10 minute deployment time because the heat flux at 1.5 times PIR exceeds the severe damage threshold or 40.0 kW/m^2 (12,700 Btu/hr ft^2). The avoided damage cost for vehicles parked outside within an area of 0.25 acres is 50% within the first 10 minutes after the break and increases at a rate of 5% per minute for each additional minute that fire fighting activities are delayed beyond the 10 minute deployment time because the heat flux at 1.5 times PIR exceeds the severe damage threshold.

- 42-in. Natural Gas Pipeline Releases

  The number of fire hydrants available for extinguishing building fires resulting from a 42-in. nominal diameter natural gas pipeline release with a MAOP equal to 1,480 psig is 21 based on a maximum spacing of 500 ft. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres. Up to 12 engines arrive at the scene and connect to the available fire hydrants within 10 minutes after the break, but fire fighters cannot begin fire fighting operations within areas where the heat flux exceeds 2.5 kW/m^2 (800 Btu/hr ft^2). The avoided damage cost for each four-story building or each building intended for human occupancy (including contents) that ignites when the break occurs is 50% within the first 10 minutes after the break and increases at a rate of 5% per minute for each additional minute that fire fighting activities are delayed beyond the 10 minute deployment time because the heat flux at 1.5 times PIR exceeds the severe damage threshold or 40.0 kW/m^2 (12,700 Btu/hr ft^2). The avoided damage cost for vehicles parked outside within an area of 0.25 acres is 50% within the first 10 minutes after the break and increases at a rate of 5% per minute for each additional minute that fire fighting activities are delayed beyond the 10 minute deployment time because the heat flux at 1.5 times PIR exceeds the severe damage threshold.

Design features and operating conditions for the hypothetical natural gas pipelines considered in the risk analysis are summarized in Table 3.3. Natural gas pipelines with these design features and operating conditions envelope the range of natural gas pipelines within the scope of this study.

Table 3.3 Design features and operating conditions for hypothetical natural gas pipelines considered in the risk analysis

Design Feature	Nominal Line Pipe Diameter, in.	
	42	12
MAOP, psig	1,480	300
PIR, ft	1,115	143
Overall length of pipeline, mi.	100	100
Block valve closure time, minutes after break	8 and 13	8 and 13
Compressor inflow after break, ft/s	0 and 15	0 and 15
Block valve spacing, mi.		
Class 1	20	20
Class 2	15	15
Class 3	8	8
Class 4	5	5

Note: The break occurs adjacent to a block valve rendering the block valve inoperable.

The baseline for the natural gas pipeline risk analysis is represented by separation distance versus time plots shown in Figs. 3.15, 3.16, 3.17, and 3.18.

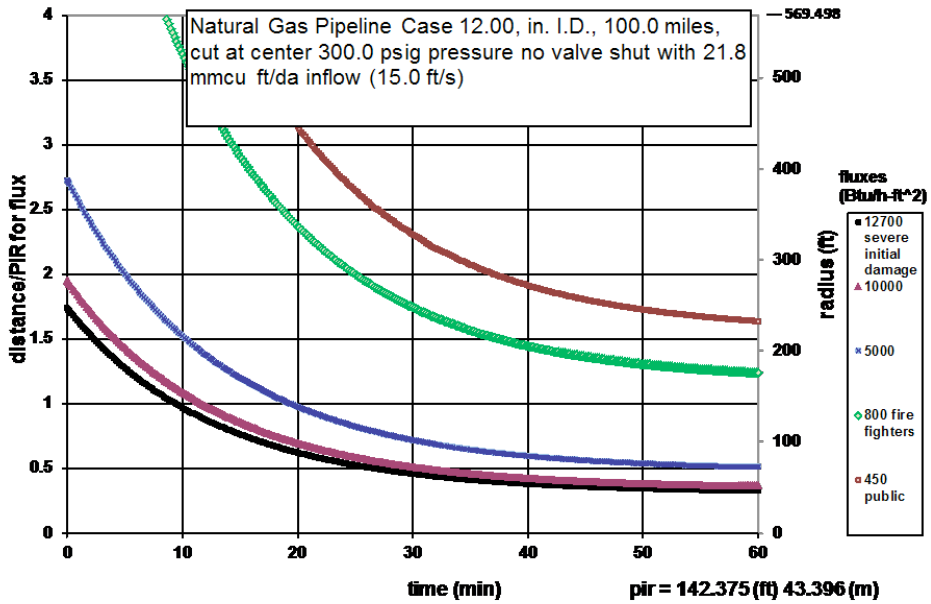

Fig. 3.15. 12-in. Baseline-15: Separation distances for 12-in. natural gas pipeline operating at a MAOP of 300 psig with no block valve closure and compressor inflow equal to 15 ft/s.

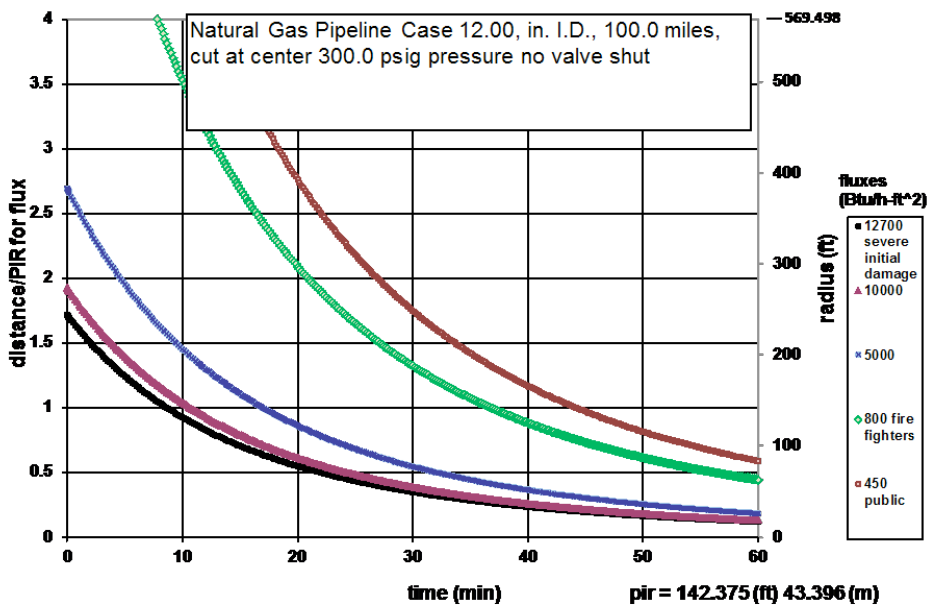

Fig. 3.16. 12-in. Baseline-0: Separation distances for 12-in. natural gas pipeline operating at a MAOP of 300 psig with no block valve closure and compressor inflow equal to 0 ft/s.

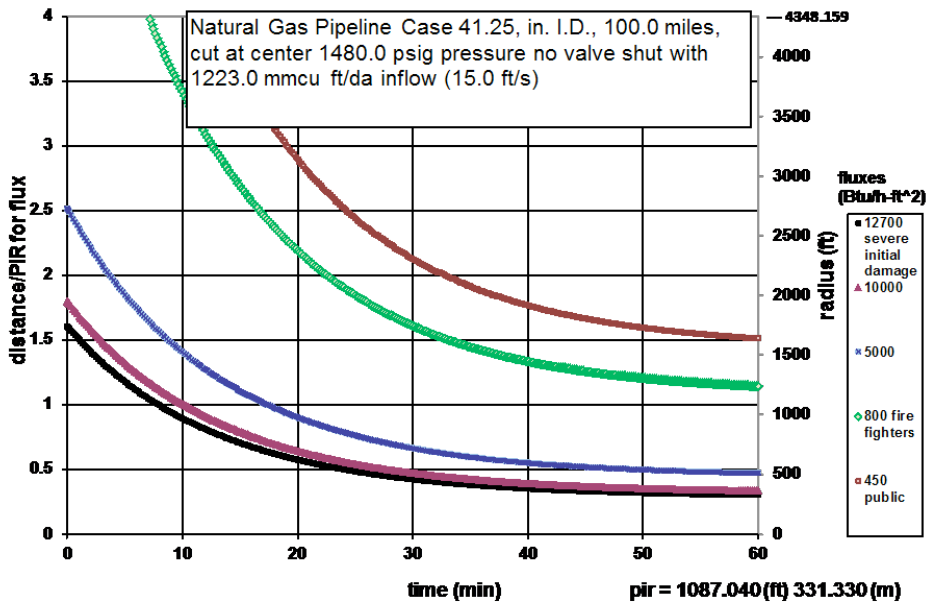

Fig. 3.17. 42-in. Baseline-15: Separation distances for 42-in. natural gas pipeline operating at a MAOP of 1,480 psig with no block valve closure and compressor inflow equal to 15 ft/s.

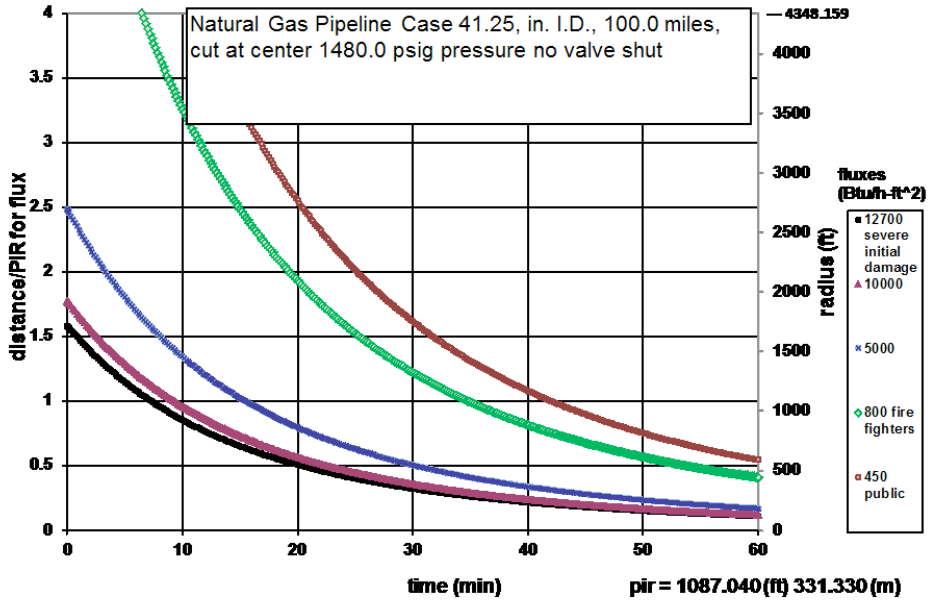

Fig. 3.18. 42-in. Baseline-0: Separation distances for 42-in. natural gas pipeline operating at a MAOP of 1,480 psig with no block valve closure and compressor inflow equal to 0 ft/s.

These plots compare the contribution of compressor inflow on time-dependent blowdown behavior for a 100-mi. pipeline segment with a break in the exact middle of the segment and no block valve closure. Figures 3.15 and 3.17 are plots of blowdown behavior for pipeline segments with compressor inflow equal to 15 ft/s. Figures 3.16 and 3.18 are plots of blowdown behavior for the same pipeline segments without compressor inflow. The separation distance versus time plots shown in Figs. 3.15, 3.16, 3.17, and 3.18 apply to pipelines located in Class 1, 2, 3, and 4 Locations because the model assumes that the block valves, which are located at different intervals along each 50-mi. line section depending on the class location, remain open.

The plot in Fig. 3.15 for the 12-in. natural gas pipeline with compressor input (12-in. Baseline-15) shows that without block valve closure and compressor inflow equal to 15 ft/s, fire fighting activities within a distance of 1.5 times PIR cannot begin for at least 37 minutes after the break occurs because the heat flux at this distance is greater than 2.5 kW/m^2 (800 Btu/hr ft^2). Similarly, the plot in Fig. 3.17 for the 42-in. natural gas pipeline with compressor input (42-in. Baseline-15) shows that without block valve closure and compressor inflow equal to 15 ft/s, fire fighting activities within a distance of 1.5 times PIR cannot begin for at least 33 minutes. Without compressor inflow, these times decrease to 27 and 25 minutes, respectively.

Hypothetical natural gas pipeline releases and associated separation distance versus time plots are discussed in Section 3.1.4.1 through 3.1.4.4 for 12-in. and 42-in. natural gas pipeline releases in Class 1, 2, 3, and 4 Locations, respectively. These plots provide the basis for comparing effects of different block valve closure times on time-dependent blowdown behavior to the baseline plots shown in Figs. 3.15, 3.16, 3.17, and 3.18 and evaluating the effectiveness of block valve closure swiftness on mitigating the potential consequences of a natural gas pipeline release.

3.1.4.1 Hypothetical Natural Gas Pipeline Releases in Class 1 Locations

A Class 1 Location is defined in 49 CFR 192.5 as an offshore area or any class location unit that has 10 or fewer buildings intended for human occupancy. An HCA in a Class 1 Locations is defined in 49 CFR 192.903 as: (1) any area where the PIR is greater than 660 ft (200 m) and the area within a potential impact circle contains 20 or more buildings intended for human occupancy, and (2) area where the potential impact circle contains an identified site. Identified sites are described in Section 2.1.

For this study, the effects of valve closure time on fire damage resulting from a natural gas pipeline release in an area in a Class 1 Location that meets the criteria for an HCA were considered for hypothetical natural gas pipeline releases that affect areas with the following characteristics.

- Areas where the PIR is greater than 660 ft (200 m) and the area within a potential impact circle contains 20 or more buildings intended for human occupancy as described in Section 3.1.3.1. As a worst case, 10 buildings are located within the Class 1 Location Unit near the break as shown in Fig. 3.2 and at least 10 buildings are located greater than 660 ft (200 m) from the break.
- Areas where the potential impact circle contains an identified site consisting of a building that is occupied by twenty (20) or more persons on at least five (5) days a week for ten (10) weeks in any twelve (12)-month period. As a worst case, the identified site includes 10 office buildings with four or more stories above ground that are located in the Class 1 Location Unit within the potential impact circle near the break as described in Section 3.1.3.2 and shown in Fig. 3.3. In addition, if the identified site is within a potential impact radius greater than 660 ft (200 m), areas located greater than 660 ft (200 m) from the break contain buildings intended for human occupancy as described in Section 3.1.3.1.

- Areas where the potential impact circle contains an identified site consisting of an outside recreational facility described in Section 3.1.3.3 and shown in Fig. 3.4. In addition, if the identified site is within a PIR greater than 660 ft (200 m), areas located greater than 660 ft (200 m) from the break contain buildings intended for human occupancy as described in Section 3.1.3.1.

Fire damage to these areas is considered worst case because the cost of potential fire damage to other areas that qualify as an HCA in a Class 1 Location is less in comparison.

Separation distance versus time plots for 12-in. and 42-in. nominal diameter natural gas pipelines in Class 1 Locations are shown in Figs. 3.19, 3.20, 3.21, and 3.22. These plots compare the effects of block valve closure swiftness on time-dependent blowdown behavior. Figures 3.19 and 3.21 are plots of blowdown behavior for block valve closure 8 minutes after the break (i.e. 5 minutes to detect the leak plus 3 minutes to close the valve). Figures 3.20 and 3.22 are plots of blowdown behavior for the same pipeline segments with block valve closure 13 minutes after the break (i.e. 10 minutes to detect the leak plus 3 minutes to close the valve).

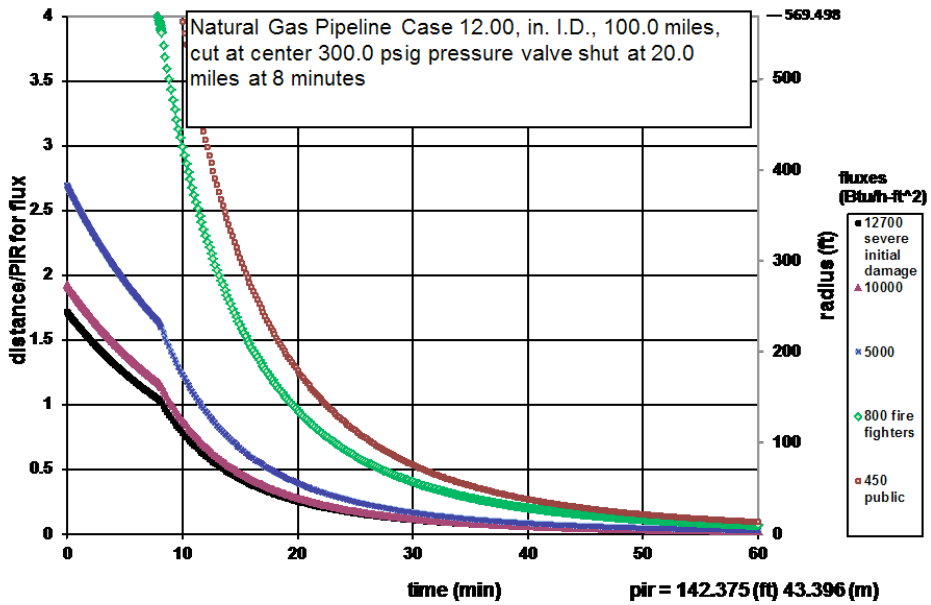

Fig. 3.19. Separation distances for 12-in. natural gas pipeline in a Class 1 Location operating at a MAOP of 300 psig with block valve closure 8 minutes after break.

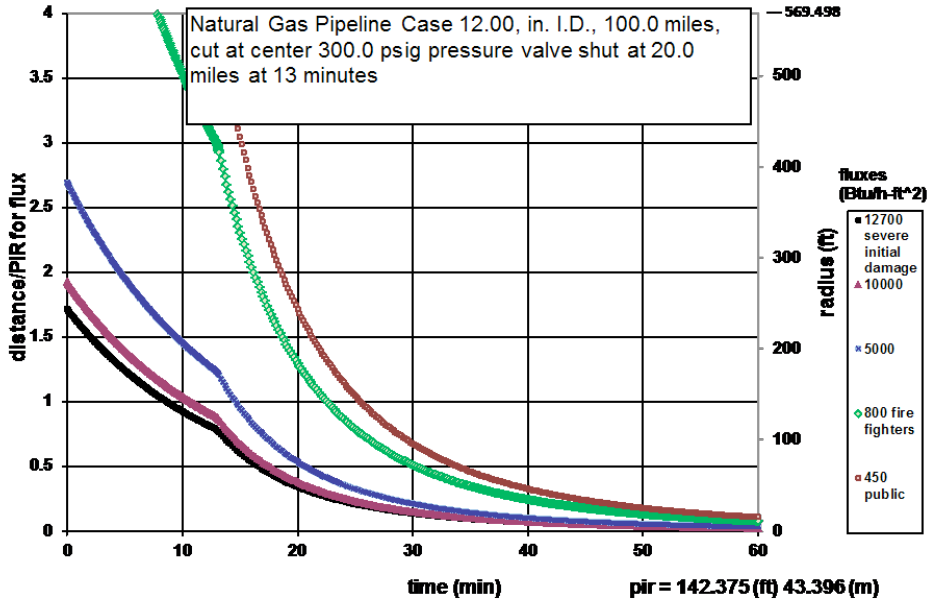

Fig. 3.20. Separation distances for 12-in. natural gas pipeline in a Class 1 Location operating at a MAOP of 300 psig with block valve closure 13 minutes after break.

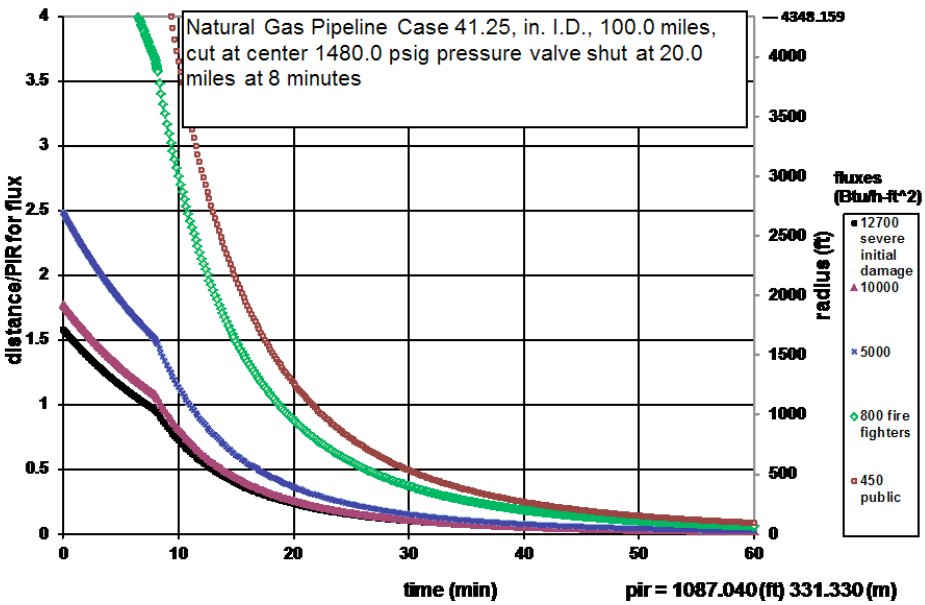

Fig. 3.21. Separation distances for 42-in. natural gas pipeline in a Class 1 Location operating at a MAOP of 1,480 psig with block valve closure 8 minutes after break.

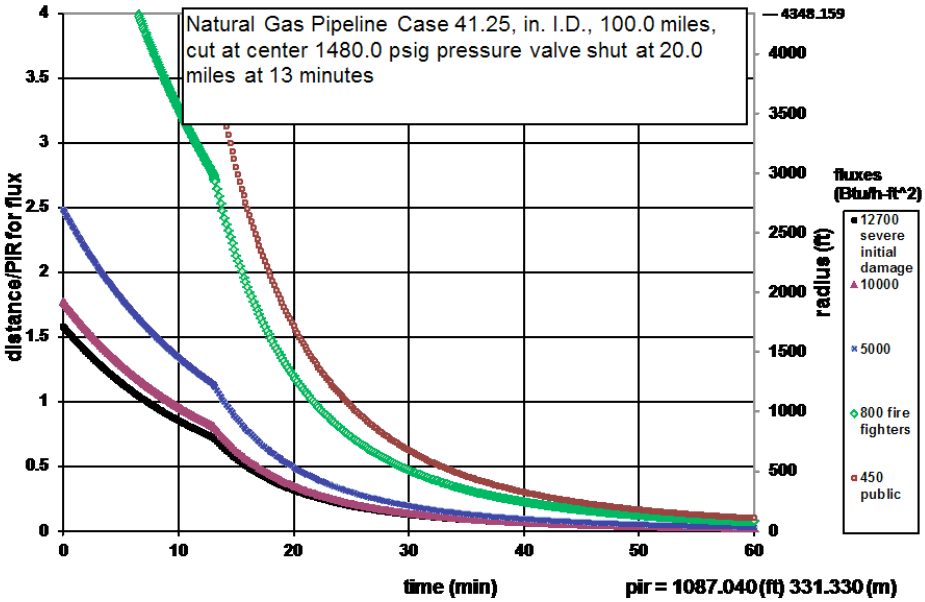

Fig. 3.22. Separation distances for 42-in. natural gas pipeline in a Class 1 Location operating at a MAOP of 1,480 psig with block valve closure 13 minutes after break.

Figures 3.19 and 3.20 for 12-in. nominal diameter natural gas pipeline releases show that delaying block valve closure from 8 to 13 minutes after the break reduces the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR from 19 to 16 minutes without exceeding the 2.5 kW/m^2 (800 Btu/hr ft^2) heat flux threshold. Comparison of time-dependent blowdown behavior plots in Figs. 3.15, 3.16, and 3.19 show that closing block valves within 8 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 11 minutes (27 minutes – 16 minutes) without compressor inflow and 21 minutes (37 minutes – 16 minutes) if the compressor inflow is 15 ft/s. Similarly, comparison of time-dependent blowdown behavior plots in Figs. 3.15, 3.16, and 3.20 show that closing block valves within 13 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 8 minutes (27 minutes – 19 minutes) without compressor inflow and 18 minutes (37 minutes – 19 minutes) if the compressor inflow is 15 ft/s.

Figures 3.21 and 3.22 for 42-in. nominal diameter natural gas pipeline releases show that delaying block valve closure from 8 to 13 minutes after the break reduces the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR from 15 to 18 minutes without exceeding the 2.5 kW/m^2 (800 Btu/hr ft^2) heat flux threshold. Comparisons of time-dependent blowdown behavior plots in Figs. 3.17, 3.18, and 3.21 show that closing block valves within 8 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 10 minutes (25 minutes – 15 minutes) without compressor inflow and 18 minutes (33 minutes – 15 minutes) if the compressor inflow is 15 ft/s. Similarly, comparison of time-dependent blown behavior plots in Figs. 3.17, 3.18, and 3.22 show that closing block valves within 13 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 7 minutes (25 minutes – 18 minutes) without compressor inflow and 15 minutes (33 minutes – 18 minutes) if the compressor inflow is 15 ft/s.

Hypothetical Natural Gas Pipeline Releases in a HCA in a Class 1 Location with Buildings Intended for Human Occupancy and a Potential Impact Radius Greater than 660 feet

Two case studies involving 42-in. nominal diameter hypothetical natural gas pipelines in HCAs in Class 1 Locations are considered to assess effects of valve closure time on fire damage to buildings intended for human occupancy and personal property. Design features and operating conditions for these hypothetical natural gas pipelines are defined in Table 3.3. Case studies 1A and 1B compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 42-in. nominal diameter natural gas pipelines with MAOPs equal to 1,480 psig and valve closure durations or either 8 minutes or 13 minutes after the break.

Results of the case studies including comparisons to baseline conditions and the avoided damage costs attributed to block valve closure swiftness are shown in Table 3.4. Areas with potentially severe, moderate, and minor damage for the hypothetical natural gas pipelines in HCAs in Class 1 Locations with buildings intended for human occupancy and a PIR greater than 660 ft are shown in Figs. 3.23 to 3.24.

Table 3.4. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in Class 1 Locations with buildings intended for human occupancy and a PIR greater than 660 feet

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 1A	Case Study 1B
Nominal Line Pipe Diameter, in.	42	42	42	42
MAOP, psig	1,480	1,480	1,480	1,480
Potential Impact Radius (PIR), ft	1,115	1,115	1,115	1,115
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost	$1,554,000 per building	$1,554,000 per building	$1,554,000 per building	$1,554,000 per building
Total Moderate Damage Cost	$762,000 per building	$762,000 per building	$762,000 per building	$762,000 per building
Total Minor Damage Cost	$270,000 per building	$270,000 per building	$270,000 per building	$270,000 per building
Potentially Severe Damage Radius, ft	1,716	1,740	1,716	1,716
Potentially Moderate Damage Radius, ft	792	858	476	709
Potentially Minor Damage Radius, ft	546	719	166	211
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	25	33	15	18
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	15	15	15	15

Table 3.4. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in Class 1 Locations with buildings intended for human occupancy and a PIR greater than 660 feet (Cont.)

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 1A	Case Study 1B
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	12	12	12	12
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 25%) * 12 * $1,524,000 = $4,572,000	(50% - 40%) * 12 * $1,524,000 = $1,828,800

Note: The arc length of the potentially severe damage area located outside the Class 1 Location unit is 7,795 ft. Fifteen fire hydrants are available outside the potentially severe damage area. Twelve engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres.

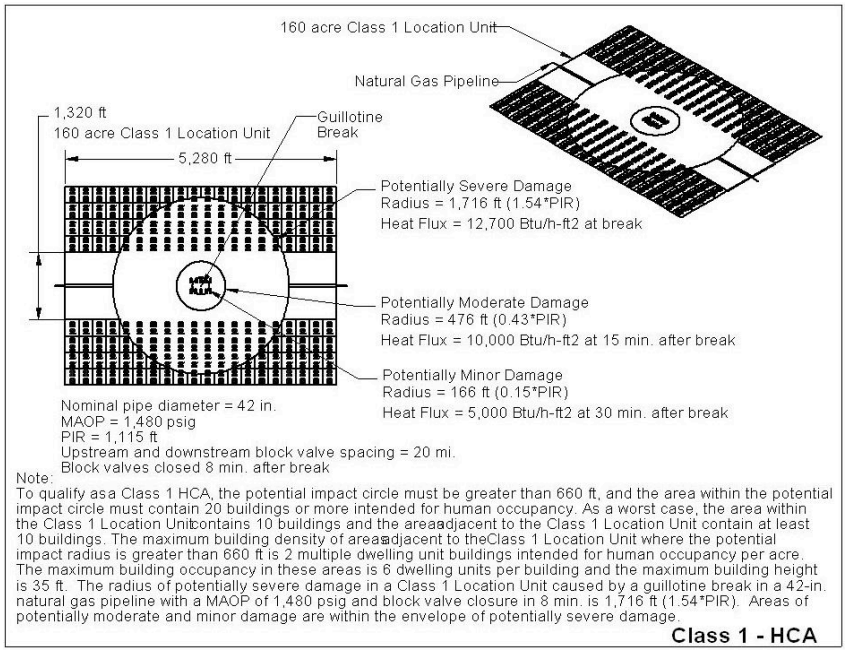

Fig. 3.23. Case Study 1A – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in a HCA in a Class 1 Location with buildings intended for human occupancy and a PIR greater than 660 feet – 1,480 psig MAOP and block valve closure 8 minutes after break.

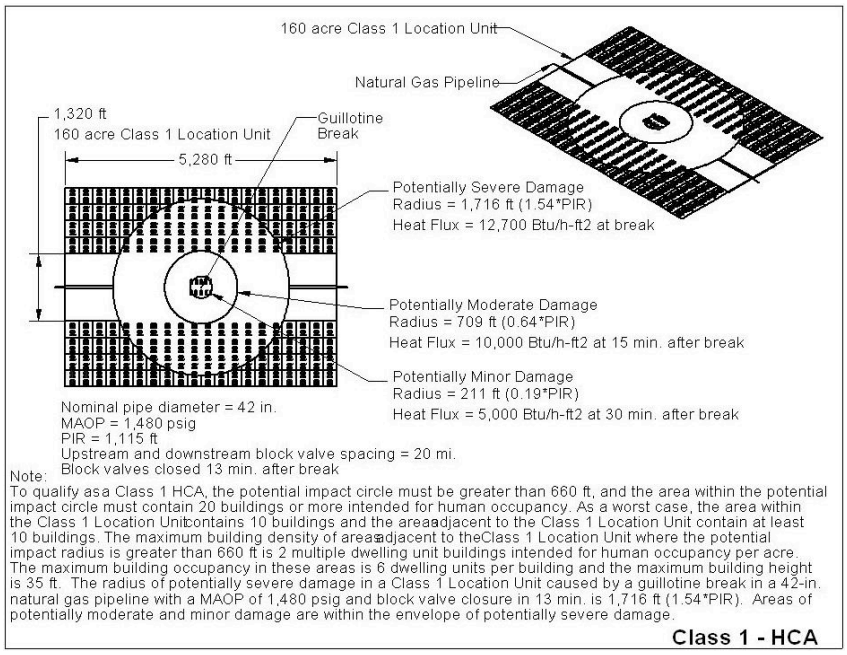

Fig. 3.24. Case Study 1B – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in a HCA in a Class 1 Location with buildings intended for human occupancy and a PIR greater than 60 feet – 1,480 psig MAOP and block valve closure 13 minutes after break.

Hypothetical Natural Gas Pipeline Releases in a HCA in a Class 1 Location with an Identified Site Consisting of Buildings with Four or More Stories above Ground

Four case studies involving 12-in. and 42-in. nominal diameter hypothetical natural gas pipelines in HCAs in Class 1 Locations are considered to assess effects of valve closure time on fire damage to identified sites consisting of buildings with four or more stories above ground. Design features and operating conditions for these hypothetical natural gas pipelines are defined in Table 3.3. The four case studies compare the following effects on avoided damage costs.

- Case studies 1C and 1D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 12-in. nominal diameter natural gas pipelines with MAOPs equal to 300 psig and valve closure durations or either 8 minutes or 13 minutes after the break.
- Case studies 1E and 1F compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 42-in. nominal diameter natural gas pipelines with MAOPs equal to 1,480 psig and valve closure durations or either 8 minutes or 13 minutes after the break.

Results of the case studies including comparisons to baseline conditions and the avoided damage costs attributed to block valve closure swiftness are shown in Tables 3.5 and 3.6. Areas with potentially severe, moderate, and minor damage for the hypothetical natural gas pipelines within HCAs in Class 1 Locations with identified sites consisting of buildings with four or more stories above ground are shown in Figs. 3.25 to 3.28.

Table 3.5. Avoided damage costs for hypothetical 12-in. natural gas pipeline releases in HCAs in Class 1 Locations with identified sites consisting of buildings with four or more stories above ground

Characteristic	12-in. Baseline-0, compressor inflow = 0 ft/s	12-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 1C	Case Study 1D
Nominal Line Pipe Diameter, in.	12	12	12	12
MAOP, psig	300	300	300	300
Potential Impact Radius (PIR), ft	143	143	143	143
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building
Total Moderate Damage Cost	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building
Total Minor Damage Cost	$500,000 per building	$500,000 per building	$500,000 per building	$500,000 per building
Potentially Severe Damage Radius, ft	244	247	244	244
Potentially Moderate Damage Radius, ft	112	122	68	97
Potentially Minor Damage Radius, ft	77	102	24	30
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	27	37	16	19
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	3	3	3	3
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	3	3	3	3

Table 3.5. Avoided damage costs for hypothetical 12-in. natural gas pipeline releases in HCAs in Class 1 Locations with identified sites consisting of buildings with four or more stories above ground (Cont.)

Characteristic	12-in. Baseline-0, compressor inflow = 0 ft/s	12-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 1C	Case Study 1D
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 30%) * 3 * $1,000,000 = $600,000	(50% - 40%) * 3 * $1,000,000 = $300,000

Note: The perimeter of the potentially severe damage area is 1,348 ft. Three fire hydrants are available outside the potentially severe damage area. Three engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes.

Table 3.6. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in HCAs in Class 1 Locations with identified sites consisting of buildings with four or more stories above ground

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 1E	Case Study 1F
Nominal Line Pipe Diameter, in.	42	42	42	42
MAOP, psig	1,480	1,480	1,480	1,480
Potential Impact Radius (PIR), ft	1,115	1,115	1,115	1,115
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost	$1,554,000 per building	$1,554,000 per building	$1,554,000 per building	$1,554,000 per building
Total Moderate Damage Cost	$762,000 per building	$762,000 per building	$762,000 per building	$762,000 per building
Total Minor Damage Cost	$270,000 per building	$270,000 per building	$270,000 per building	$270,000 per building
Potentially Severe Damage Radius, ft	1,716	1,740	1,716	1,716
Potentially Moderate Damage Radius, ft	792	858	476	709
Potentially Minor Damage Radius, ft	546	719	166	211
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	25	33	15	18
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	15	15	15	15
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	12	12	12	12

Table 3.6. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in HCAs in Class 1 Locations with identified sites consisting of buildings with four or more stories above ground (Cont.)

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 1E	Case Study 1F
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 25%) * 12 * $1,524,000 = $4,572,000	(50% - 40%) * 12 * $1,524,000 = $1,828,800

Note: The perimeter of the potentially severe damage area is 10,509 ft. Twenty-one fire hydrants are available outside the potentially severe damage area. Twelve engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes.

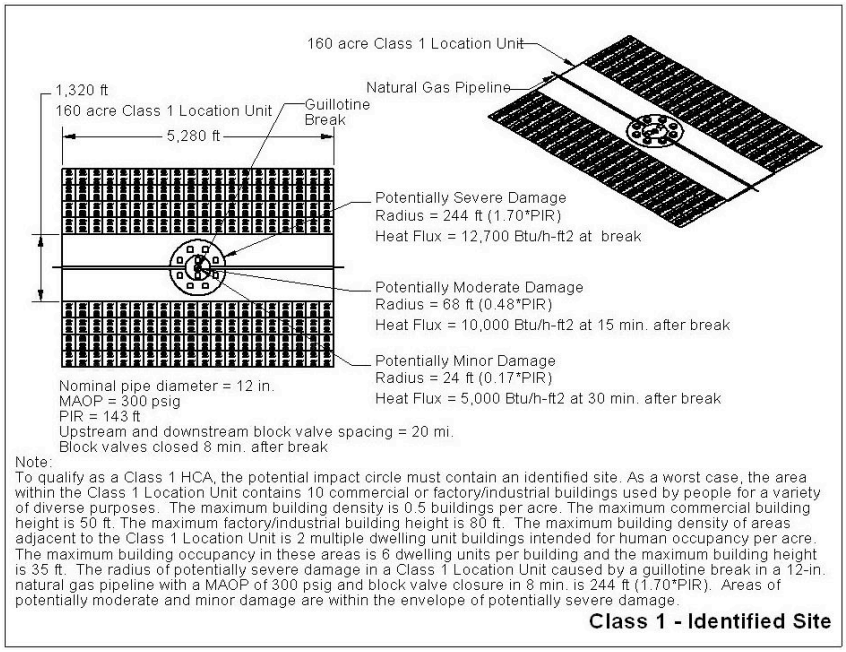

Fig. 3.25. Case Study 1C – areas affected by 12-in. nominal diameter hypothetical natural gas pipeline release in HCAs in Class 1 Location with an identified site consisting of buildings with four or more stories above ground – 1,480 psig MAOP and block valve closure 8 minutes after break.

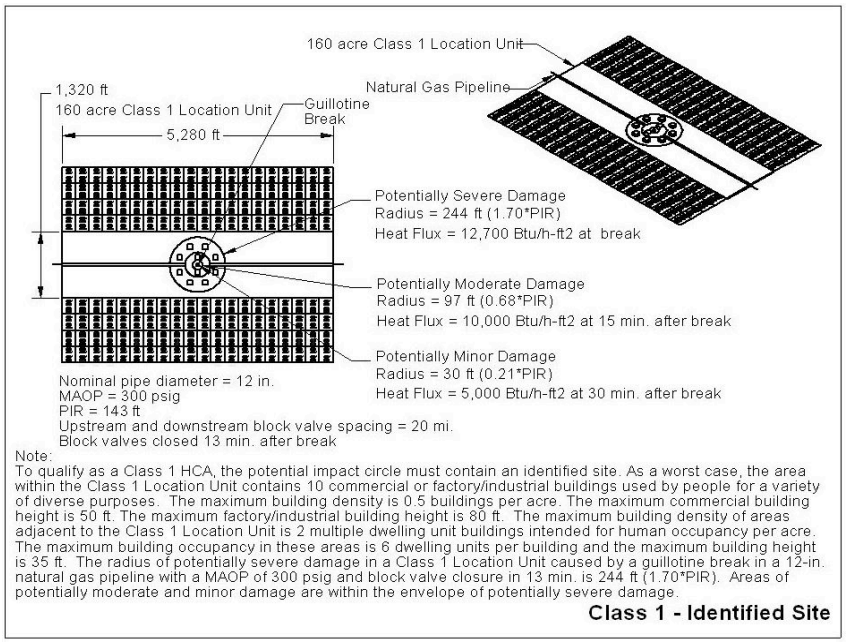

Fig. 3.26. Case Study 1D – areas affected by 12-in. nominal diameter hypothetical natural gas pipeline release in HCAs in Class 1 Location with an identified site consisting of buildings with four or more stories above ground – 1,480 psig MAOP and block valve closure 13 minutes after break.

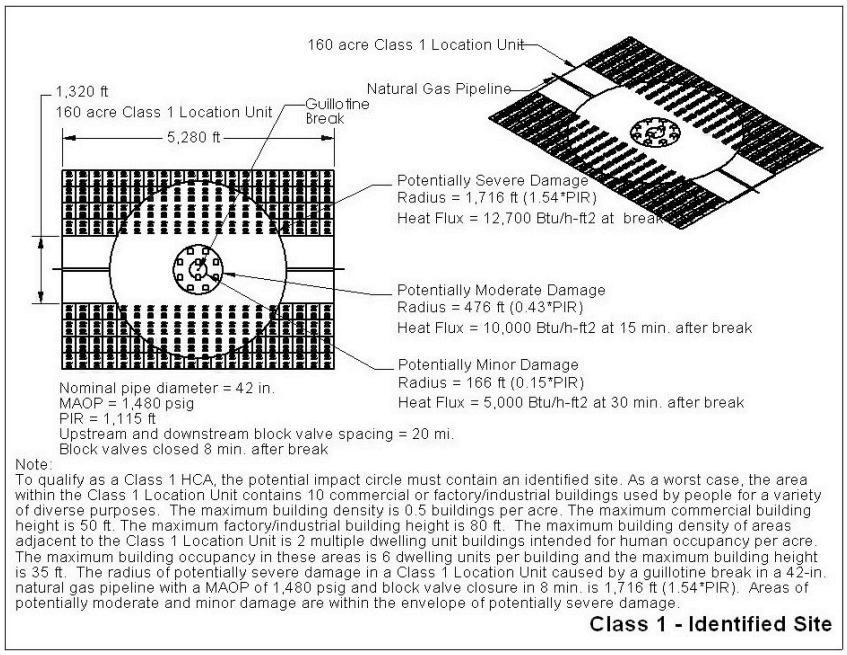

Fig. 3.27. Case Study 1E – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in HCAs in Class 1 Location with an identified site consisting of buildings with four or more stories above ground – 1,480 psig MAOP and block valve closure 8 minutes after break.

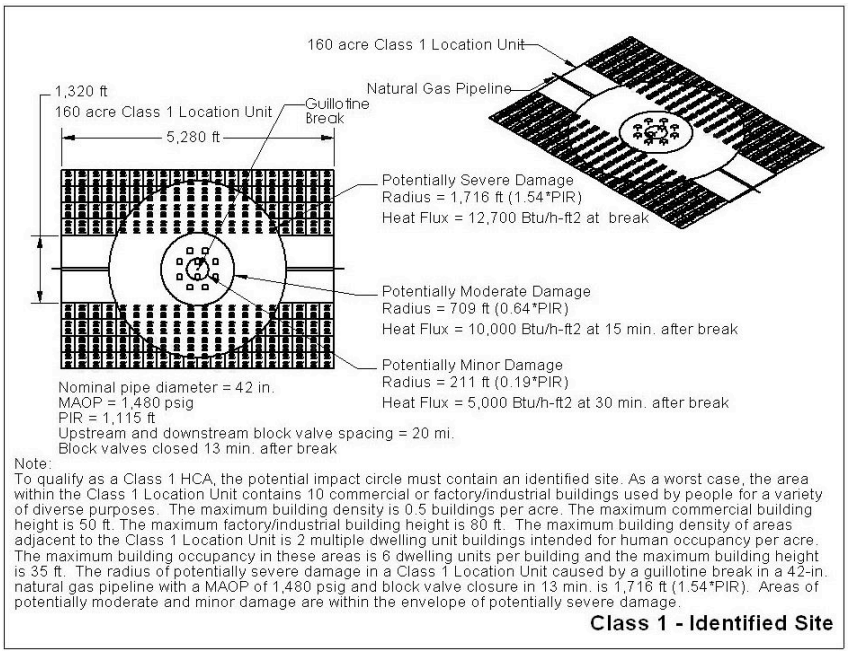

Fig. 3.28. Case Study 1F – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in HCAs in Class 1 Location with an identified site consisting of buildings with four or more stories above ground – 1,480 psig MAOP and block valve closure 13 minutes after break.

Hypothetical Natural Gas Pipeline Releases in a HCA in a Class 1 Location with an Identified Site Consisting of Outside Recreational Facility

Four case studies involving 12-in. and 42-in. nominal diameter hypothetical natural gas pipelines in HCAs in Class 1 Locations are considered to assess effects of valve closure time on fire damage to identified sites consisting of outside recreational facilities. Design features and operating conditions for these hypothetical natural gas pipelines are defined in Table 3.3. The four case studies compare the following effects on avoided damage costs.

- Case studies 1G and 1H compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 12-in. nominal diameter natural gas pipelines with MAOPs equal to 300 psig and valve closure durations of either 8 minutes or 13 minutes after the break.
- Case studies 1I and 1J compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 42-in. nominal diameter natural gas pipelines with MAOPs equal to 1,480 psig and valve closure durations of either 8 minutes or 13 minutes after the break.

Results of the case studies including comparisons to baseline conditions and the avoided damage costs attributed to block valve closure swiftness are shown in Tables 3.7 and 3.8. Areas with potentially severe, moderate, and minor damage for the hypothetical natural gas pipelines in HCAs in Class 1 Locations with identified sites consisting of outside recreational facilities are shown in Figs. 3.29 to 3.32.

Table 3.7. Avoided damage costs for hypothetical 12-in. natural gas pipeline releases in an HCA in a Class 1 Location with an identified site consisting of outside recreational facilities

Characteristic	12-in. Baseline-0, compressor inflow = 0 ft/s	12-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 1G	Case Study 1H
Nominal Line Pipe Diameter, in.	12	12	12	12
MAOP, psig	300	300	300	300
Potential Impact Radius (PIR), ft	143	143	143	143
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost	$500,000 + $2,380,000 per acre	$500,000 + $2,380,000 per acre	$500,000 + $2,380,000 per acre	$500,000 + $2,380,000 per acre
Total Moderate Damage Cost	$500,000 + $700,000 per acre	$500,000 + $700,000 per acre	$500,000 + $700,000 per acre	$500,000 + $700,000 per acre
Total Minor Damage Cost	$250,000	$250,000	$250,000	$250,000
Potentially Severe Damage Radius, ft	244	247	244	244
Potentially Moderate Damage Radius, ft	112	122	68	97
Potentially Minor Damage Radius, ft	77	102	24	30
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	27	37	16	19
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	3	3	3	3
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	3	3	3	3

Table 3.7. Avoided damage costs for hypothetical 12-in. natural gas pipeline releases in an HCA in a Class 1 Location with an identified site consisting of outside recreational facilities (Cont.)

Characteristic	12-in. Baseline-0, compressor inflow = 0 ft/s	12-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 1G	Case Study 1H
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 5%) * 3 * $595,000 = $803,250	(50% - 25%) * 3 * $595,000 = $446,250

Note: The perimeter of the potentially severe damage area is 1,348 ft. Three fire hydrants are available outside the potentially severe damage area. Twelve engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres.

Table 3.8. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in an HCA in a Class 1 Location with an identified site consisting of outside recreational facilities

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 1I	Case Study 1J
Nominal Line Pipe Diameter, in.	42	42	42	42
MAOP, psig	1,480	1,480	1,480	1,480
Potential Impact Radius (PIR), ft	1,115	1,115	1,115	1,115
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost	$1,554,000 per building	$1,554,000 per building	$1,554,000 per building	$1,554,000 per building
Total Moderate Damage Cost	$762,000 per building	$762,000 per building	$762,000 per building	$762,000 per building
Total Minor Damage Cost	$270,000 per building	$270,000 per building	$270,000 per building	$270,000 per building
Potentially Severe Damage Radius, ft	1,716	1,740	1,716	1,716
Potentially Moderate Damage Radius, ft	792	858	476	709
Potentially Minor Damage Radius, ft	546	719	166	211
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	25	33	15	18
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	21	21	21	21
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	12	12	12	12

Table 3.8. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in an HCA in a Class 1 Location with an identified site consisting of outside recreational facilities (Cont.)

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 1I	Case Study 1J
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0	$\pi(1{,}716 - 1{,}716)^2 =$ 0 acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 25%) * 12 * $595,000 = $1,785,000	(50% - 40%) * 12 * $595,000 = $714,000

Note: The perimeter of the potentially severe damage area is 10,509 ft. Twenty-one fire hydrants are available outside the potentially severe damage area. Twelve engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres.

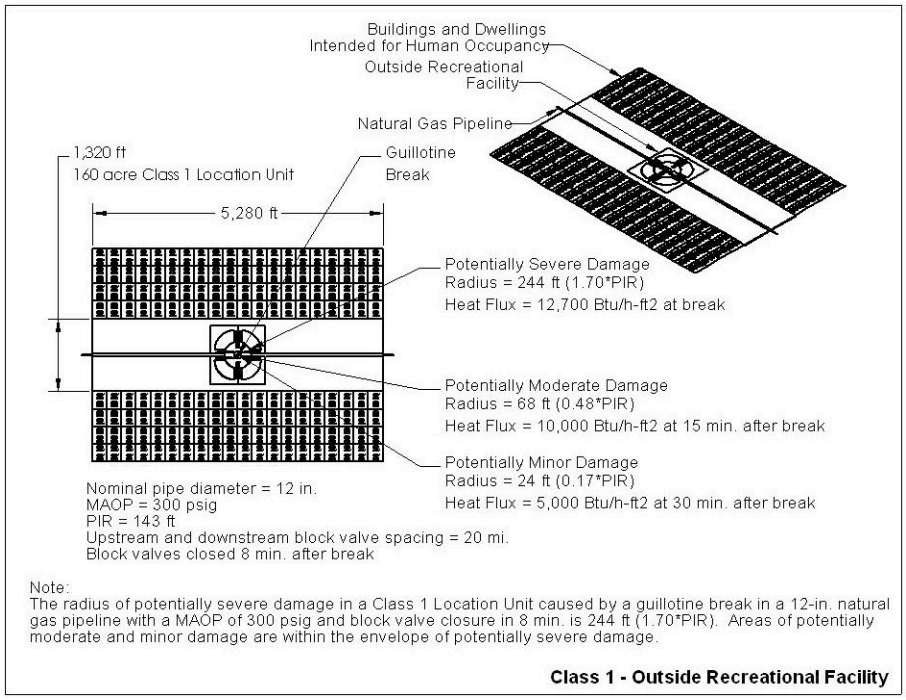

Fig. 3.29. Case Study 1G – areas affected by 12-in. nominal diameter hypothetical natural gas pipeline release in HCAs in Class 1 Location with an identified site consisting of outside recreational facilities – 1,480 psig MAOP and block valve closure 8 minutes after break.

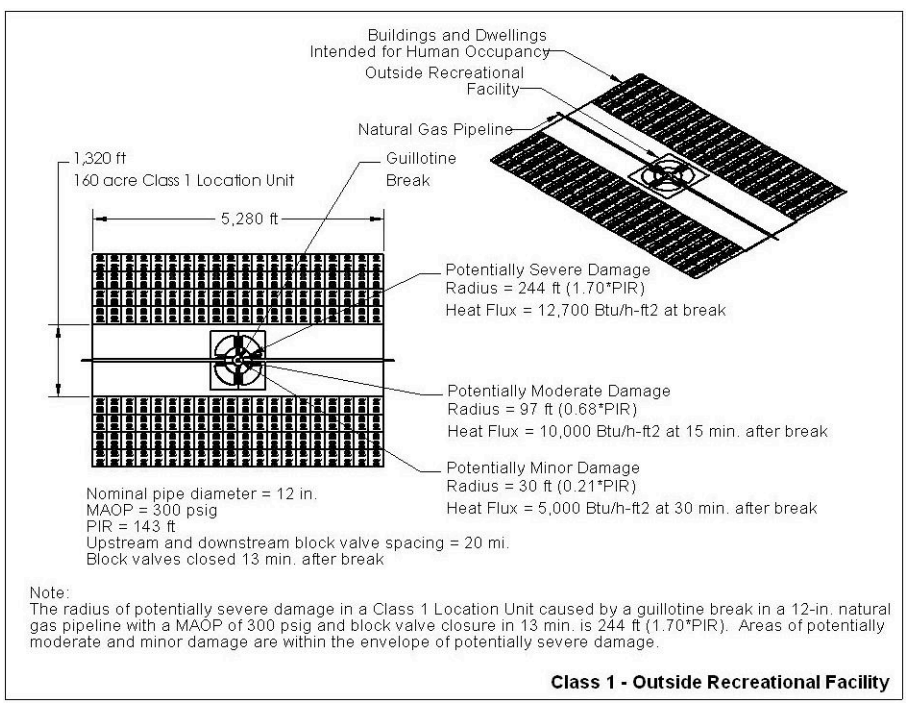

Fig. 3.30. Case Study 1H – areas affected by 12-in. nominal diameter hypothetical natural gas pipeline release in HCAs in Class 1 Location with an identified site consisting of outside recreational facilities – 1,480 psig MAOP and block valve closure 13 minutes after break.

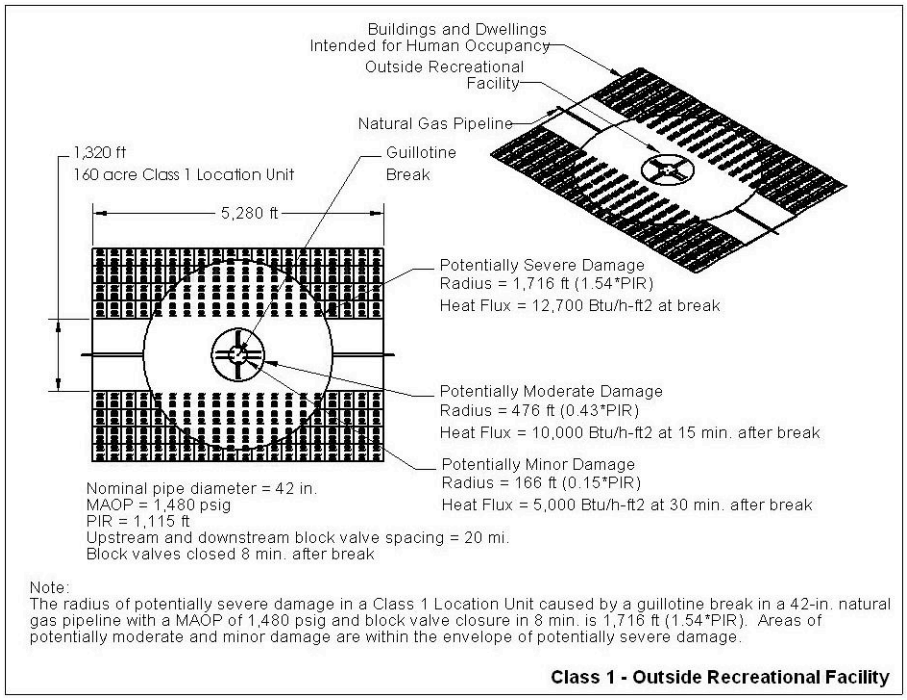

Fig. 3.31. Case Study 1I – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in HCAs in Class 1 Location with an identified site consisting of outside recreational facilities – 1,480 psig MAOP and block valve closure 8 minutes after break.

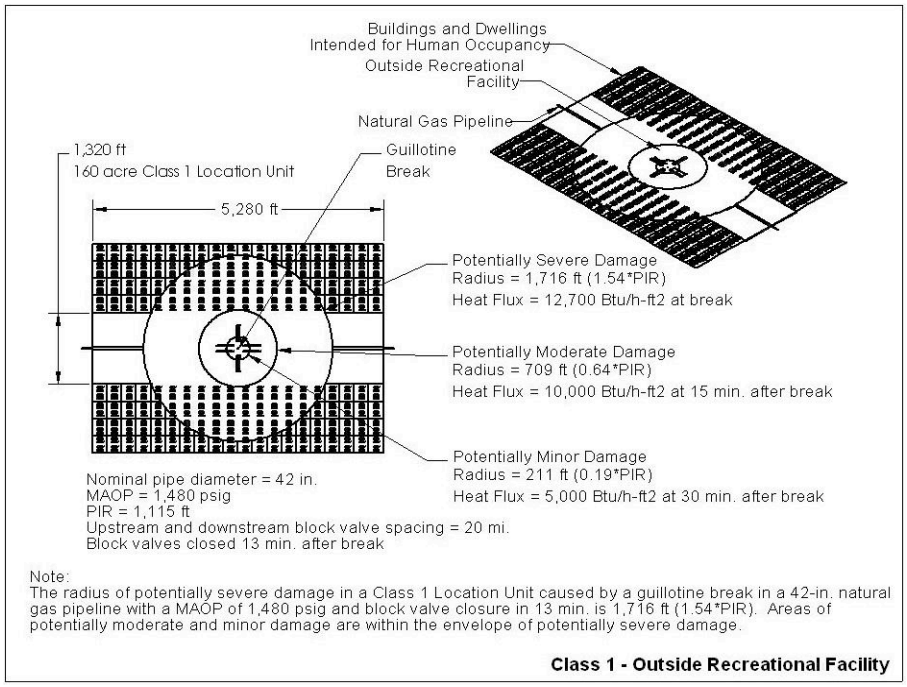

Fig. 3.32. Case Study 1J – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in HCAs in Class 1 Location with an identified site consisting of outside recreational facilities – 1,480 psig MAOP and block valve closure 13 minutes after break.

Damage Resulting from Hypothetical Natural Gas Pipeline Releases in HCAs in Class 1 Locations

Fire damage to buildings and personal property in HCAs in Class 1 Locations resulting from natural gas combustion immediately following guillotine-type breaks in natural gas pipelines is considered potentially severe for all areas within 1.5 to 1.7 times PIR. Severe damage to buildings and personal property within these areas is possible because the heat flux produced by natural gas combustion immediately following the break equals or exceeds the severe damage threshold, 40 kW/m^2 (12,700 Btu/hr ft^2). The radii for severe damage envelopes the radii for moderate, 31.5 kW/m^2 (10,000 Btu/hr ft^2) for 15 minutes, and minor damage, 15.8 kW/m^2 (5,000 Btu/hr ft^2) for 30 minutes These results are based on computed heat flux versus time data and apply to natural gas pipelines with nominal diameters ranging from 12-in. to 42-in. and MAOPs ranging from 300 to 1,480 psig.

Benefits of Block Valve Closure Swiftness for a Hypothetical Natural Gas Pipeline Releases in Class 1 Locations

Without fire fighter intervention, the swiftness of block valve closure has no effect on mitigating potential fire damage to buildings and personal property in HCAs in Class 1 Locations resulting from natural gas pipeline releases. The basis for this result follows.

- The heat flux produced by hydrocarbon combustion immediately following the break equals or exceeds the threshold of 40.0 kW/m^2 (12,700 Btu/hr ft^2) for potentially severe damage within a distance of approximately 1.5 times PIR.
- The time required to detect the break, isolate the damaged line section by closing the block valves, and begin reducing the natural gas discharge rate exceeds the time required to cause potentially severe building and personal property damage.

Valve closure swiftness also has no effect on reducing building and personal property damage costs. Consequently, without fire fighter intervention, there is no quantifiable benefit in terms of cost avoidance for damage to buildings and personal property attributed to swiftly closing block valves located upstream and downstream from guillotine-type breaks in natural gas pipelines.

When combined with fire fighter intervention, the swiftness of block valve closure has a potentially beneficial effect on mitigating fire damage to buildings and personal property in HCAs in Class 1 Locations. The benefit in terms of cost avoidance is based on the ability of fire fighters to mitigate fire damage to buildings and personal property located within a distance of approximately 1.5 times PIR by conducting fire fighting activities as soon as possible upon arrival at the scene. The ability of fire fighters to conduct fire fighting activities within a distance of approximately 1.5 times PIR is only possible if the heat flux at this distance is below 2.5 kW/m^2 (800 Btu/hr ft^2) and fire hydrants are available at locations where needed. Block valve closure within 8 minutes after the break can result in a potential cost avoidance of at least $800,000 for 12-in. nominal diameter natural gas pipelines and $1,700,000 for 42-in. nominal diameter natural gas pipelines depending on the configuration of buildings within the Class 1 HCA. Delaying block valve closure by an additional 5 minutes reduces the cost avoidance by approximately 50%.

3.1.4.2 Hypothetical Natural Gas Pipeline Releases in Class 2 Locations

A Class 2 Location is defined in 49 CFR 192.5 as an offshore area or any class location unit that has 10 or fewer buildings intended for human occupancy. An HCA in a Class 2 Locations is defined in 49 CFR 192.903 as: (1) any area where the PIR is greater than 660 ft (200 m) and the area within a potential impact circle contains 20 or more buildings intended for human occupancy, and (2) area where the potential impact circle contains an identified site. Identified sites are described in Section 2.1.

For this study, the effects of valve closure time on fire damage resulting from a natural gas pipeline release in an area in a Class 2 Location that meets the criteria for an HCA were considered for hypothetical natural gas pipeline releases that affect areas with the following characteristics.

- Areas where the PIR is greater than 660 ft (200 m) and the area within a potential impact circle contains 20 or more buildings intended for human occupancy as described in Section 3.1.3.1. As a worst case, 10 buildings are located within the Class 2 Location Unit near the break as shown in Fig. 3.5 and at least 10 buildings are located greater than 660 ft (200 m) from the break.
- Areas where the potential impact circle contains an identified site consisting of a building that is occupied by twenty (20) or more persons on at least five (5) days a week for ten (10) weeks in any twelve (12)-month period. As a worst case, the identified site includes 10 office buildings with four or more stories above ground that are located in the Class 2 Location Unit within the potential impact circle near the break as described in Section 3.1.3.2 and shown in Fig. 3.6. In addition, if the identified site is within a PIR greater than 660 ft (200 m), areas located greater than 660 ft (200 m) from the break contain buildings intended for human occupancy as described in Section 3.1.3.1.
- Areas where the potential impact circle contains an identified site consisting of an outside recreational facility described in Section 3.1.3.3 and shown in Fig. 3.7. In addition, if the identified site is within a PIR greater than 660 ft (200 m), areas located greater than 660 ft (200 m) from the break contain buildings intended for human occupancy as described in Section 3.1.3.1.

Fire damage to these areas is considered worst case because the cost of potential fire damage to other areas that qualify as an HCA in a Class 2 Location is less in comparison.

Separation distance versus time plots for 12-in. and 42-in. nominal diameter natural gas pipelines in Class 2 Locations are shown in Figs. 3.33, 3.34, 3.35, and 3.36. These plots compare the effects of block valve closure swiftness on time-dependent blowdown behavior. Figures 3.33 and 3.35 are plots of blowdown behavior for block valve closure 8 minutes after the break (i.e. 5 minutes to detect the leak plus 3 minutes to close the valve). Figures 3.34 and 3.36 are plots of blowdown behavior for the same pipeline segments with block valve closure 13 minutes after the break (i.e. 10 minutes to detect the leak plus 3 minutes to close the valve).

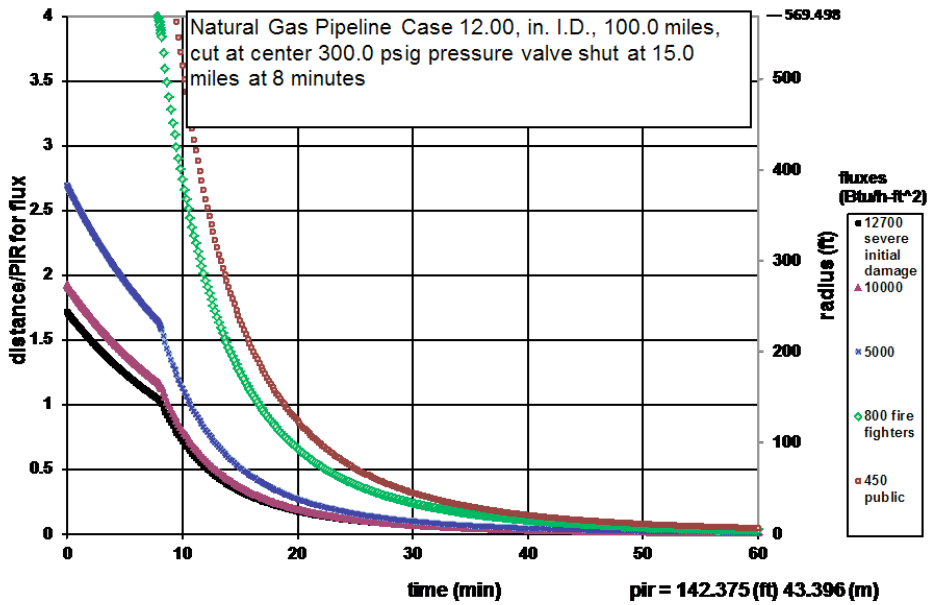

Fig. 3.33. Separation distances for 12-in. natural gas pipeline in a Class 2 Location operating at a MAOP of 300 psig with block valve closure 8 minutes after break.

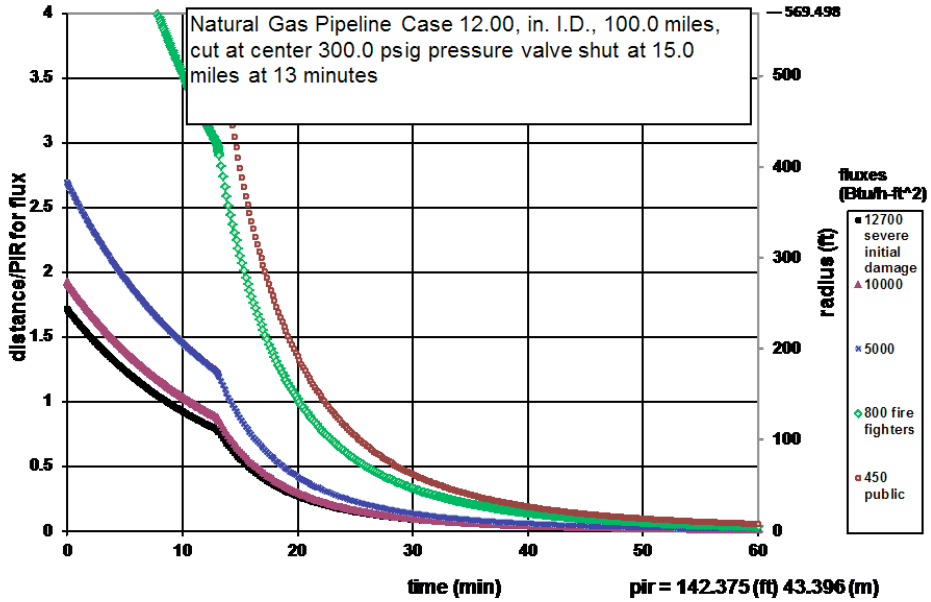

Fig. 3.34. Separation distances for 12-in. natural gas pipeline in a Class 2 Location operating at a MAOP of 300 psig with block valve closure 13 minutes after break.

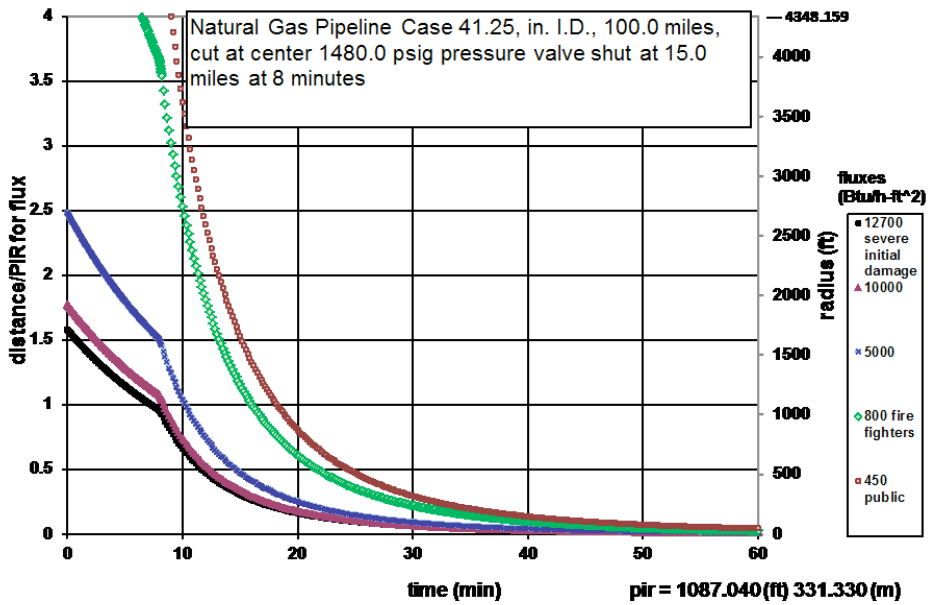

Fig. 3.35. Separation distances for 42-in. natural gas pipeline in a Class 2 Location operating at a MAOP of 1,480 psig with block valve closure 8 minutes after break.

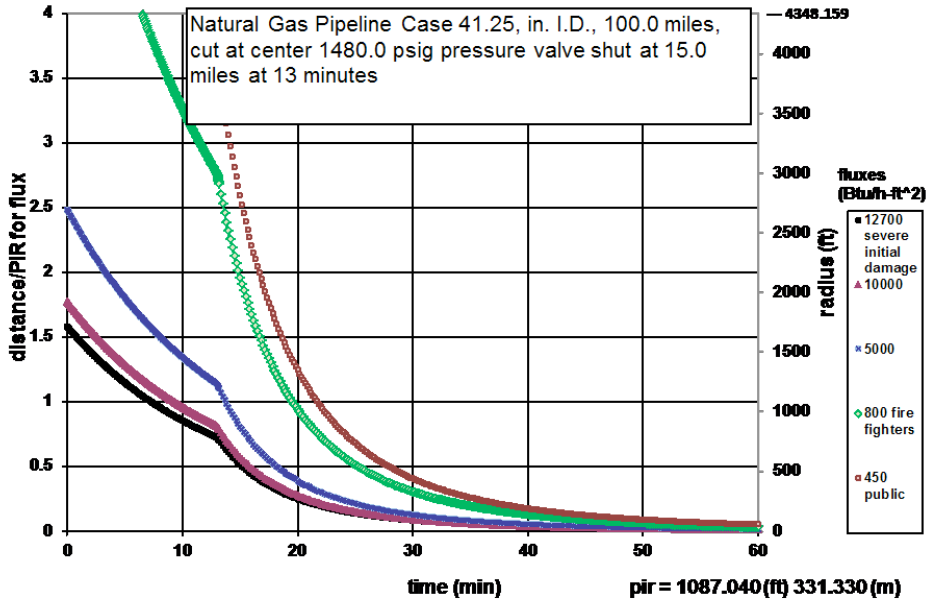

Fig. 3.36. Separation distances for 42-in. natural gas pipeline in a Class 2 Location operating at a MAOP of 1,480 psig with block valve closure 13 minutes after break.

Figures 3.33 and 3.34 for 12-in. nominal diameter natural gas pipeline releases show that delaying block valve closure from 8 to 13 minutes after the break reduces the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR from 17 to 14 minutes without exceeding the 2.5 kW/m^2 (800 Btu/hr ft^2) heat flux threshold. Comparison of time-dependent blown behavior plots in Figs. 3.15, 3.16, and 3.33 show that closing block valves within 8 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 13 minutes (27 minutes - 14 minutes) without compressor inflow and 23 minutes (37 minutes - 14 minutes) if the compressor inflow is 15 ft/s. Similarly, comparison of time-dependent blown behavior plots in Figs. 3.15, 3.16, and 3.34 show that closing block valves within 13 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 10 minutes (27 minutes - 17 minutes) without compressor inflow and 20 minutes (37 minutes - 17 minutes) if the compressor inflow is 15 ft/s.

Figures 3.35 and 3.36 for 42-in. nominal diameter natural gas pipeline releases show that delaying block valve closure from 8 to 13 minutes after the break reduces the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR from 15 to 17 minutes without exceeding the 2.5 kW/m^2 (800 Btu/hr ft^2) heat flux threshold. Comparisons of time-dependent blown behavior plots in Figs. 3.17, 3.18, and 3.35 show that closing block valves within 8 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 12 minutes (25 minutes - 13 minutes) without compressor inflow and 20 minutes (33 minutes - 13 minutes) if the compressor inflow is 15 ft/s. Similarly, comparison of time-dependent blown behavior plots in Figs. 3.17, 3.18, and 3.36 show that closing block valves within 13 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 8 minutes (25 minutes - 17 minutes) without compressor inflow and 16 minutes (33 minutes - 17 minutes) if the compressor inflow is 15 ft/s.

Hypothetical Natural Gas Pipeline Releases in a HCA in a Class 2 Location with Buildings Intended for Human Occupancy and a PIR Greater than 660 feet

Two case studies involving 42-in. nominal diameter hypothetical natural gas pipelines in HCAs in Class 2 Locations are considered to assess effects of valve closure time on fire damage to buildings intended for human occupancy and an impact radius greater than 660 ft. Design features and operating conditions for these hypothetical natural gas pipelines are defined in Table 3.3. Case studies 2A and 2B compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 42-in. nominal diameter natural gas pipelines with MAOPs equal to 1,480 psig and valve closure durations or either 8 minutes or 13 minutes after the break.

Results of the case studies including comparisons to baseline conditions and the avoided damage costs attributed to block valve closure swiftness are shown in Table 3.9. Areas with potentially severe, moderate, and minor damage for the hypothetical natural gas pipelines in HCAs in Class 2 Locations with buildings intended for human occupancy and PIR greater than 660 ft are shown in Figs. 3.37 to 3.38.

Table 3.9. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in HCAs in Class 2 Locations with buildings intended for human occupancy and a PIR greater than 660 feet

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 2A	Case Study 2B
Nominal Line Pipe Diameter, in.	42	42	42	42
MAOP, psig	1,480	1,480	1,480	1,480
Potential Impact Radius (PIR), ft	1,115	1,115	1,115	1,115
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost	$1,554,000 per building	$1,554,000 per building	$1,554,000 per building	$1,554,000 per building
Total Moderate Damage Cost	$762,000 per building	$762,000 per building	$762,000 per building	$762,000 per building
Total Minor Damage Cost	$270,000 per building	$270,000 per building	$270,000 per building	$270,000 per building
Potentially Severe Damage Radius, ft	1,716	1,740	1,716	1,716
Potentially Moderate Damage Radius, ft	792	858	368	626
Potentially Minor Damage Radius, ft	546	719	99	137
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	25	33	13	17
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	15	15	15	15
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	12	12	12	12

Table 3.9. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in HCAs in Class 2 Locations with buildings intended for human occupancy and a PIR greater than 660 feet (Cont.)

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 2A	Case Study 2B
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 25%) * 12 * $1,524,000 = $4,572,000	(50% - 40%) * 12 * $1,524,000 = $1,828,800

Note: The arc length of the potentially severe damage area located outside the Class 2 Location unit is 7,795 ft. Fifteen fire hydrants are available outside the potentially severe damage area. Twelve engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres.

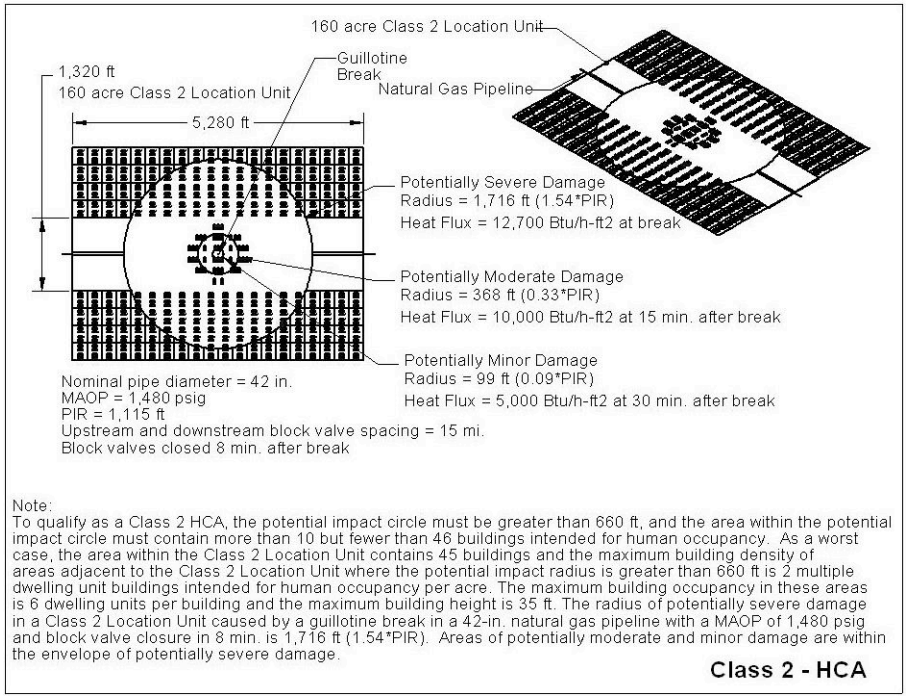

Fig. 3.37. Case Study 2A – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in Class 2 Location with buildings intended for human occupancy – 1,480 psig MAOP and block valve closure 8 minutes after break.

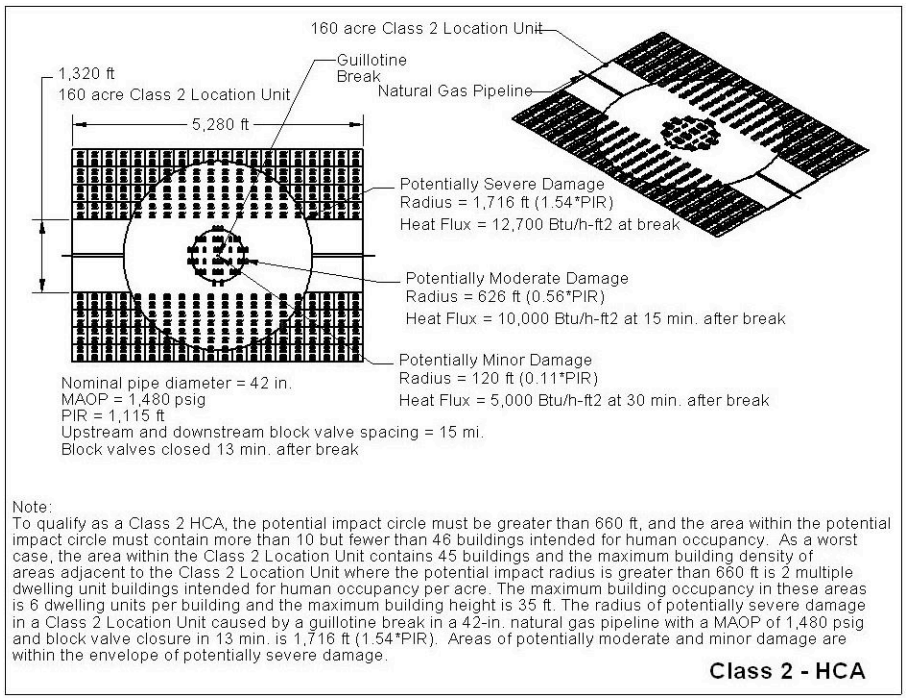

Fig. 3.38. Case Study 2B – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in Class 2 Location with buildings intended for human occupancy – 1,480 psig MAOP and block valve closure 13 minutes after break.

Hypothetical Natural Gas Pipeline Releases in a HCA in a Class 2 Location with an Identified Site Consisting of Buildings with Four or More Stories above Ground

Four case studies involving 12-in. and 42-in. nominal diameter hypothetical natural gas pipelines in Class 2 Locations are considered to assess effects of valve closure time on fire damage to identified sites consisting of buildings with four or more stories above ground. Design features and operating conditions for these hypothetical natural gas pipelines are defined in Table 3.3. The four case studies compare the following effects on avoided damage costs.

- Case studies 2C and 2D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 12-in. nominal diameter natural gas pipelines with MAOPs equal to 300 psig and valve closure durations or either 8 minutes or 13 minutes after the break.
- Case studies 2E and 2F compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 42-in. nominal diameter natural gas pipelines with MAOPs equal to 1,480 psig and valve closure durations or either 8 minutes or 13 minutes after the break.

Results of the case studies including comparisons to baseline conditions and the avoided damage costs attributed to block valve closure swiftness are shown in Tables 3.10 and 3.11. Areas with potentially severe, moderate, and minor damage for the hypothetical natural gas pipelines within Class 2 Locations with identified sites consisting of buildings with four or more stories above ground are shown in Figs. 3.39 to 3.42.

Table 3.10. Avoided damage costs for hypothetical 12-in. natural gas pipeline releases in HCAs in Class 2 Locations with identified sites consisting of buildings with four or more stories above ground

Characteristic	12-in. Baseline-0, compressor inflow = 0 ft/s	12-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 2C	Case Study 2D
Nominal Line Pipe Diameter, in.	12	12	12	12
MAOP, psig	300	300	300	300
Potential Impact Radius (PIR), ft	143	143	143	143
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building
Total Moderate Damage Cost	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building
Total Minor Damage Cost	$500,000 per building	$500,000 per building	$500,000 per building	$500,000 per building
Potentially Severe Damage Radius, ft	244	247	244	244
Potentially Moderate Damage Radius, ft	112	122	52	89
Potentially Minor Damage Radius, ft	77	102	14	19
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	27	37	14	17
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	3	3	3	3
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	3	3	3	3

Table 3.10. Avoided damage costs for hypothetical 12-in. natural gas pipeline releases in HCAs in Class 2 Locations with identified sites consisting of buildings with four or more stories above ground (Cont.)

Characteristic	12-in. Baseline-0, compressor inflow = 0 ft/s	12-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 2C	Case Study 2D
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 30%) * 3 * $1,000,000 = $600,000	(50% - 40%) * 3 * $1,000,000 = $300,000

Note: The perimeter of the potentially severe damage area is 1,348 ft. Three fire hydrants are available outside the potentially severe damage area. Twelve engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres.

Table 3.11. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in HCAs in Class 2 Locations with identified sites consisting of buildings with four or more stories above ground

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 2E	Case Study 2F
Nominal Line Pipe Diameter, in.	42	42	42	42
MAOP, psig	1,480	1,480	1,480	1,480
Potential Impact Radius (PIR), ft	1,115	1,115	1,115	1,115
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost	$1,554,000 per building	$1,554,000 per building	$1,554,000 per building	$1,554,000 per building
Total Moderate Damage Cost	$762,000 per building	$762,000 per building	$762,000 per building	$762,000 per building
Total Minor Damage Cost	$270,000 per building	$270,000 per building	$270,000 per building	$270,000 per building
Potentially Severe Damage Radius, ft	1,716	1,740	1,716	1,716
Potentially Moderate Damage Radius, ft	792	858	368	626
Potentially Minor Damage Radius, ft	546	719	99	137
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	25	33	13	17
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	15	15	15	15
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	12	12	12	12

Table 3.11. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in HCAs in Class 2 Locations with identified sites consisting of buildings with four or more stories above ground (Cont.)

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 2E	Case Study 2F
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 25%) * 12 * $1,524,000 = $4,572,000	(50% - 40%) * 12 * $1,524,000 = $1,828,800

Note: The perimeter of the potentially severe damage area is 10,509 ft. Twenty-one fire hydrants are available outside the potentially severe damage area. Twelve engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres.

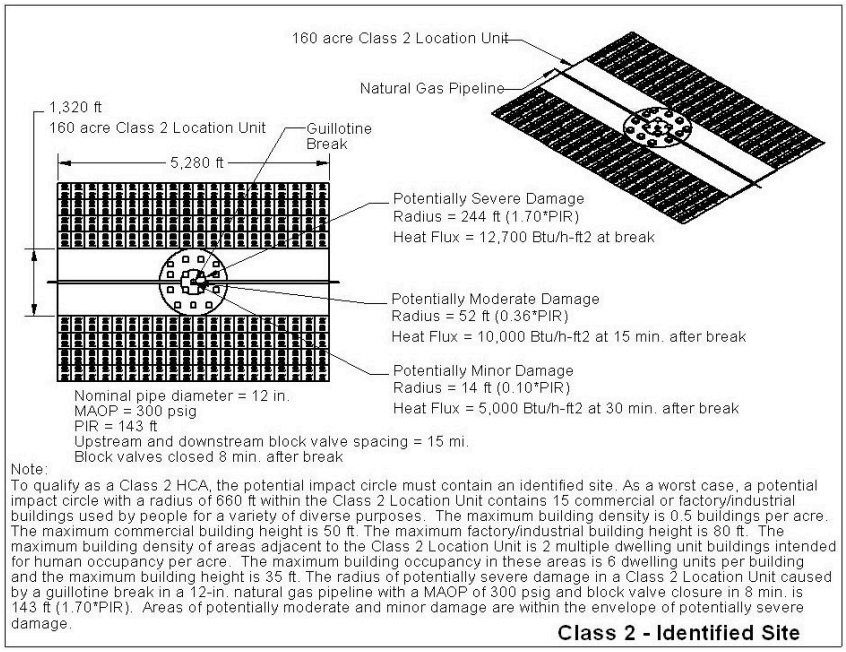

Fig. 3.39. Case Study 2C – areas affected by 12-in. nominal diameter hypothetical natural gas pipeline release in a HCA in a Class 2 Location with an identified site consisting of buildings with four or more stories above ground – 300 psig MAOP and block valve closure 8 minutes after break.

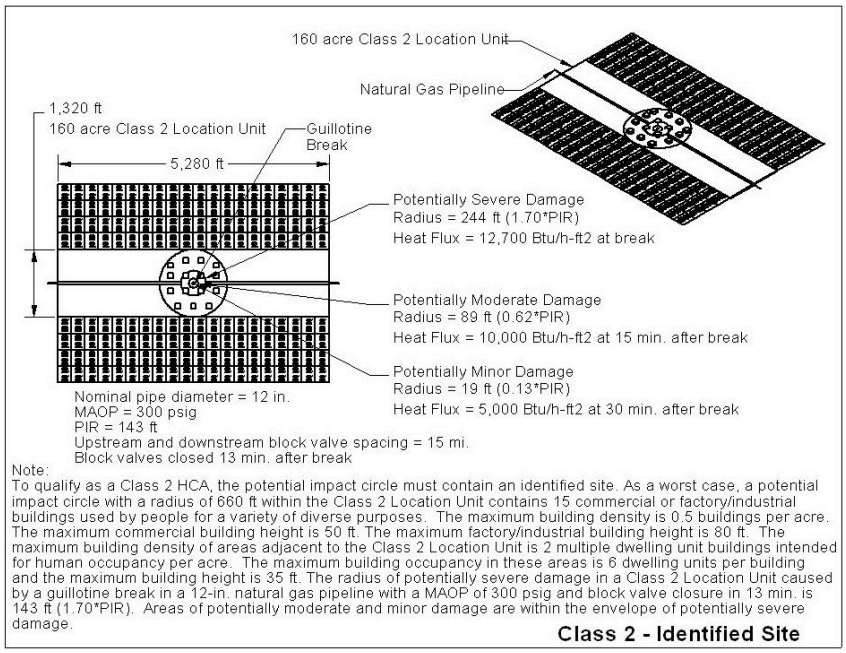

Fig. 3.40. Case Study 2D – areas affected by 12-in. nominal diameter hypothetical natural gas pipeline release in a HCA in a Class 2 Location with an identified site consisting of buildings with four or more stories above ground – 300 psig MAOP and block valve closure 13 minutes after break.

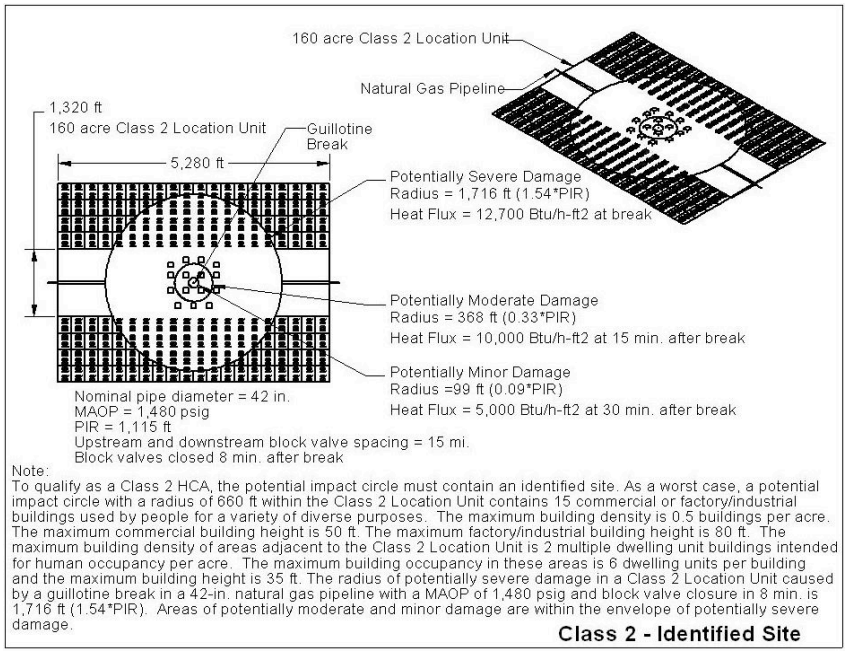

Fig. 3.41. Case Study 2E – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in a HCA in a Class 2 Location with an identified site consisting of buildings with four or more stories above ground – 1,480 psig MAOP and block valve closure 8 minutes after break.

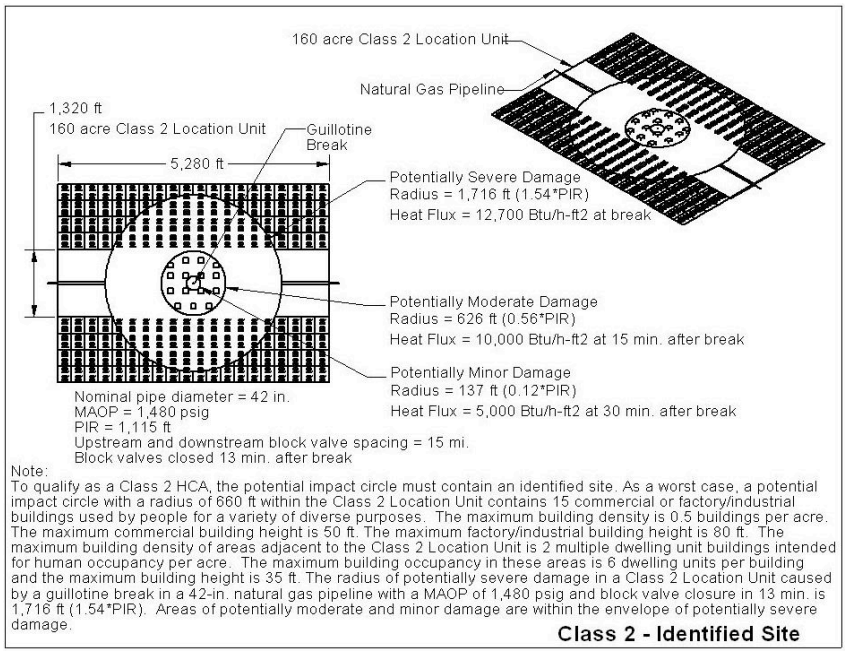

Fig. 3.42. Case Study 2F – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in a HCA in a Class 2 Location with an identified site consisting of buildings with four or more stories above ground – 1,480 psig MAOP and block valve closure 13 minutes after break.

Hypothetical Natural Gas Pipeline Releases in a HCA in a Class 2 Location with an Identified Site Consisting of an Outside Recreational Facility

Four case studies involving 12-in. and 42-in. nominal diameter hypothetical natural gas pipelines in HCAs I Class 2 Locations are considered to assess effects of valve closure time on fire damage to identified sites consisting of outside recreational facilities. Design features and operating conditions for these hypothetical natural gas pipelines are defined in Table 3.3. The four case studies compare the following effects on avoided damage costs.

- Case studies 2G and 2H compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 12-in. nominal diameter natural gas pipelines with MAOPs equal to 300 psig and valve closure durations of either 8 minutes or 13 minutes after the break.
- Case studies 2I and 2J compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 42-in. nominal diameter natural gas pipelines with MAOPs equal to 1,480 psig and valve closure durations of either 8 minutes or 13 minutes after the break.

Results of the case studies including comparisons to baseline conditions and the avoided damage costs attributed to block valve closure swiftness are shown in Tables 3.12 and 3.13. Areas with potentially severe, moderate, and minor damage for the hypothetical natural gas pipelines in HCAs in Class 2 Locations with identified sites consisting of outside recreational facilities are shown in Figs. 3.43 to 3.46.

Table 3.12. Avoided damage costs for hypothetical 12-in. natural gas pipeline releases in a HCA in a Class 2 Location with an identified site consisting of outside recreational facilities

Characteristic	12-in. Baseline-0, compressor inflow = 0 ft/s	12-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 2G	Case Study 2H
Nominal Line Pipe Diameter, in.	12	12	12	12
MAOP, psig	300	300	300	300
Potential Impact Radius (PIR), ft	143	143	143	143
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost	$500,000 + $2,380,000 per acre	$500,000 + $2,380,000 per acre	$500,000 + $2,380,000 per acre	$500,000 + $2,380,000 per acre
Total Moderate Damage Cost	$500,000 + $700,000 per acre	$500,000 + $700,000 per acre	$500,000 + $700,000 per acre	$500,000 + $700,000 per acre
Total Minor Damage Cost	$250,000	$250,000	$250,000	$250,000
Potentially Severe Damage Radius, ft	244	247	244	244
Potentially Moderate Damage Radius, ft	112	122	52	89
Potentially Minor Damage Radius, ft	77	102	14	19
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	27	37	14	17
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	3	3	3	3
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	3	3	3	3

Table 3.12. Avoided damage costs for hypothetical 12-in. natural gas pipeline releases in a HCA in a Class 2 Location with an identified site consisting of outside recreational facilities (Cont.)

Characteristic	12-in. Baseline-0, compressor inflow = 0 ft/s	12-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 2G	Case Study 2H
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 5%) * 3 * $595,000 = $803,250	(50% - 25%) * 3 * $595,000 = $446,250

Note: The perimeter of the potentially severe damage area is 1,348 ft. Three fire hydrants are available outside the potentially severe damage area. Twelve engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres.

Table 3.13. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in a HCA in a Class 2 Location with an identified site consisting of outside recreational facilities

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 2I	Case Study 2J
Nominal Line Pipe Diameter, in.	42	42	42	42
MAOP, psig	1,480	1,480	1,480	1,480
Potential Impact Radius (PIR), ft	1,115	1,115	1,115	1,115
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost	$500,000 + $2,380,000 per acre	$500,000 + $2,380,000 per acre	$500,000 + $2,380,000 per acre	$500,000 + $2,380,000 per acre
Total Moderate Damage Cost	$500,000 + $700,000 per acre	$500,000 + $700,000 per acre	$500,000 + $700,000 per acre	$500,000 + $700,000 per acre
Total Minor Damage Cost	$250,000	$250,000	$250,000	$250,000
Potentially Severe Damage Radius, ft	1,716	1,740	1,716	1,716
Potentially Moderate Damage Radius, ft	792	858	368	626
Potentially Minor Damage Radius, ft	546	719	99	137
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	25	33	13	17
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	21	21	21	21
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	12	12	12	12

Table 3.13. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in a HCA in a Class 2 Location with an identified site consisting of outside recreational facilities (Cont.)

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 2I	Case Study 2J
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 25%) * 12 * $595,000 = $1,785,000	(50% - 40%) * 12 * $595,000 = $714,000

Note: The perimeter of the potentially severe damage area is 10,509 ft. Twenty-one fire hydrants are available outside the potentially severe damage area. Twelve engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres.

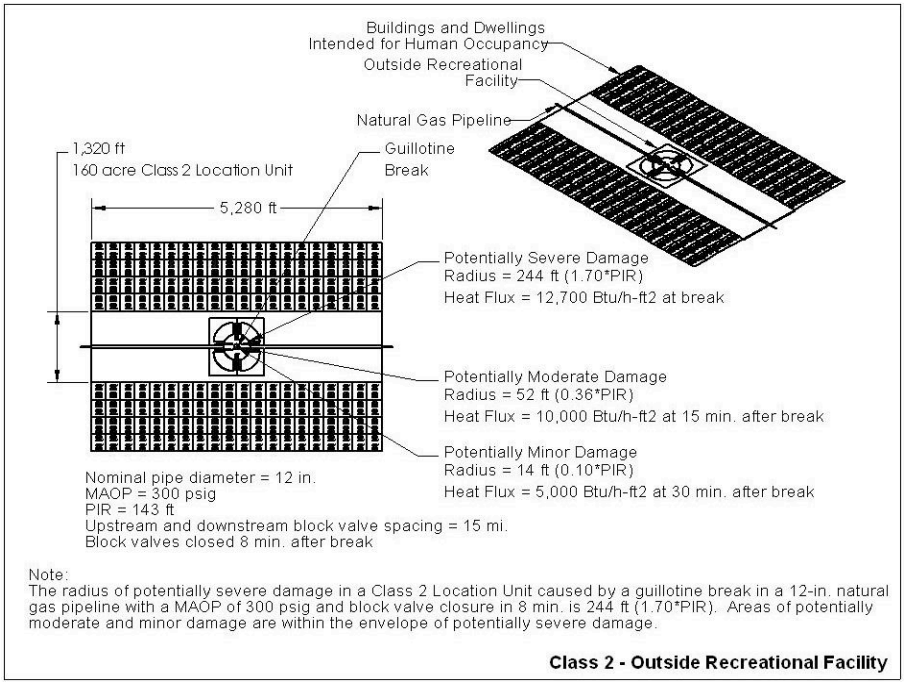

Fig. 3.43. Case Study 2G – areas affected by 12-in. nominal diameter hypothetical natural gas pipeline release in a HCA in a Class 2 Location with an identified site consisting of an outside recreational facility – 300 psig MAOP and block valve closure 8 minutes after break.

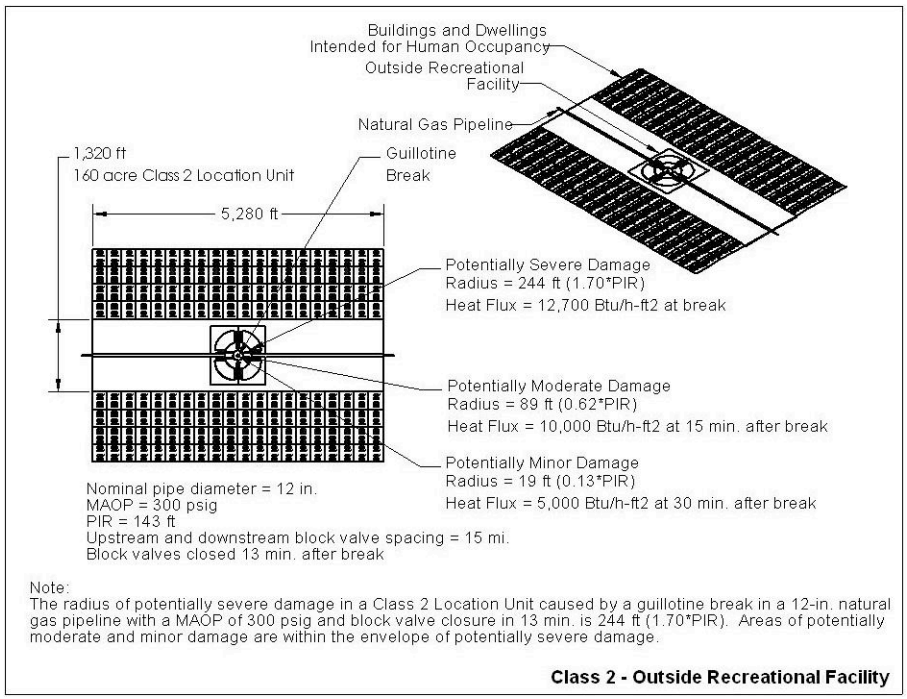

Fig. 3.44. Case Study 2H – areas affected by 12-in. nominal diameter hypothetical natural gas pipeline release in a HCA in a Class 2 Location with an identified site consisting of an outside recreational facility – 300 psig MAOP and block valve closure 13 minutes after break.

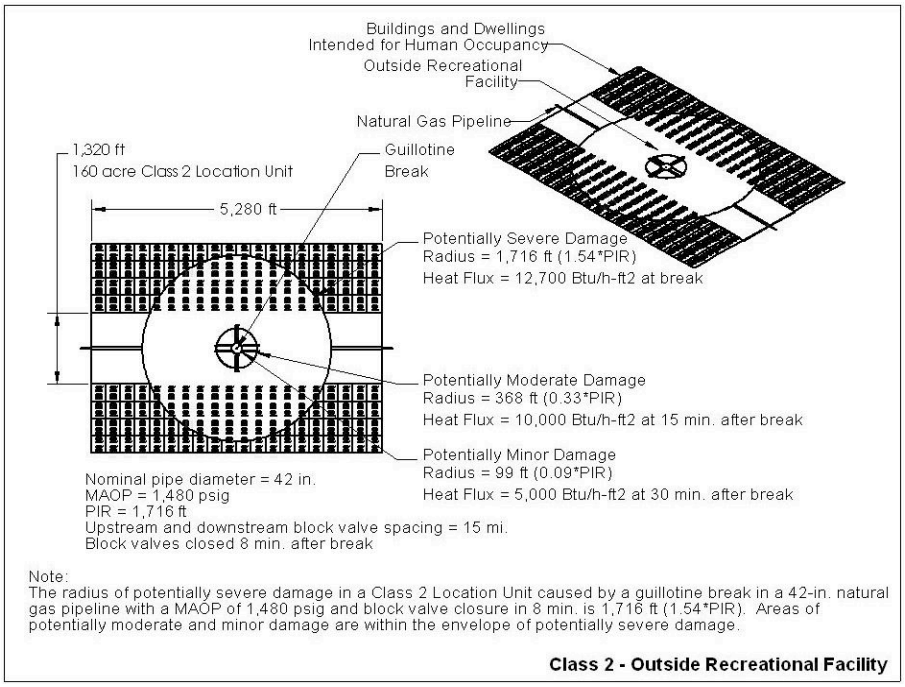

Fig. 3.45. Case Study 2I – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in a HCA in a Class 2 Location with an identified site consisting of an outside recreational facility – 1,480 psig MAOP and block valve closure 8 minutes after break.

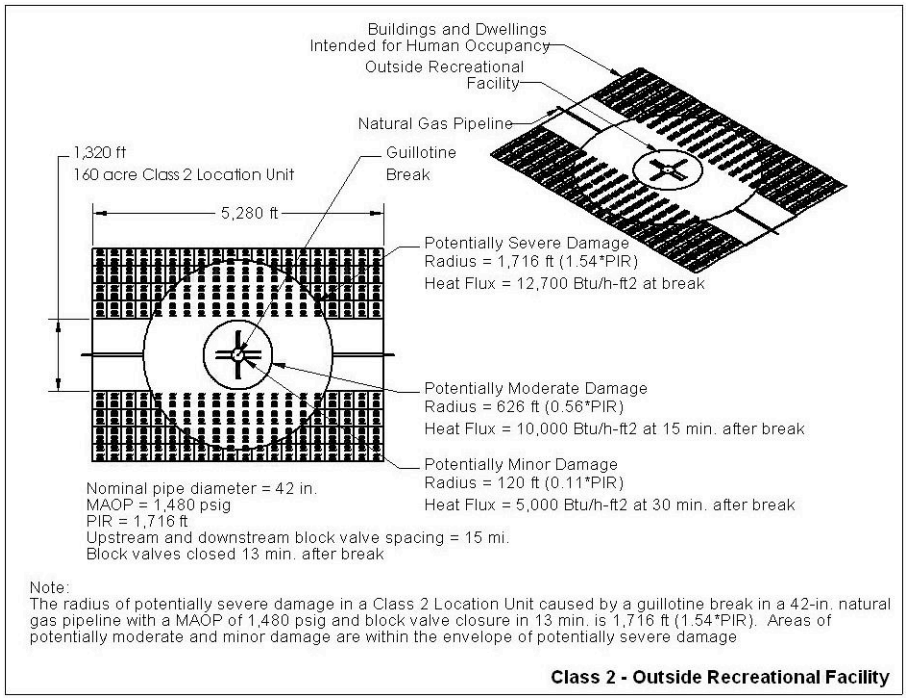

Fig. 3.46. Case Study 2J – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in a HCA in a Class 2 Location with an identified site consisting of an outside recreational facility – 1,480 psig MAOP and block valve closure 13 minutes after break.

Damage Resulting from Hypothetical Natural Gas Pipeline Releases in HCAs in Class 2 Locations

Fire damage to buildings and personal property in HCAs in Class 2 Locations resulting from natural gas combustion immediately following guillotine-type breaks in natural gas pipelines is considered potentially severe for all areas within 1.5 to 1.7 times the PIR. Severe damage to buildings and personal property within these areas is possible because the heat flux produced by natural gas combustion immediately following the break equals or exceeds the severe damage threshold, 40 kW/m^2 (12,700 Btu/hr ft^2). The radii for severe damage envelopes the radii for moderate, 31.5 kW/m^2 (10,000 Btu/hr ft^2) for 15 minutes, and minor damage, 15.8 kW/m^2 (5,000 Btu/hr ft^2) for 30 minutes These results are based on computed heat flux versus time data and apply to natural gas pipelines with nominal diameters ranging from 12 to 42 in. and MAOPs ranging from 300 to 1,480 psig.

Benefits of Block Valve Closure Swiftness for a Hypothetical Natural Gas Pipeline Releases in Class 2 Locations

Without fire fighter intervention, the swiftness of block valve closure has no effect on mitigating potential fire damage to buildings and personal property in HCAs in Class 2 Locations resulting from natural gas pipeline releases. The basis for this result follows.

- The heat flux produced by hydrocarbon combustion immediately following the break equals or exceeds the threshold of 40.0 kW/m^2 (12,700 Btu/hr ft^2) for potentially severe damage within a distance of approximately 1.5 times PIR.
- The time required to detect the break, isolate the damaged line section by closing the block valves, and begin reducing the natural gas discharge rate exceeds the time required to cause potentially severe building and personal property damage.

Valve closure swiftness also has no effect on reducing building and personal property damage costs. Consequently, without fire fighter intervention, there is no quantifiable benefit in terms of cost avoidance for damage to buildings and personal property attributed to swiftly closing block valves located upstream and downstream from guillotine-type breaks in natural gas pipelines.

When combined with fire fighter intervention, the swiftness of block valve closure has a potentially beneficial effect on mitigating fire damage to buildings and personal property in HCAs in Class 2 Locations. The benefit in terms of cost avoidance is based on the ability of fire fighters to mitigate fire damage to buildings and personal property located within a distance of approximately 1.5 times PIR by conducting fire fighting activities as soon as possible upon arrival at the scene. The ability of fire fighters to conduct fire fighting activities within a distance of approximately 1.5 times PIR is only possible if the heat flux at this distance is below 2.5 kW/m^2 (800 Btu/hr ft^2) and fire hydrants are available at locations where needed. Block valve closure within 8 minutes after the break can result in a potential cost avoidance of at least $800,000 for 12-in. nominal diameter natural gas pipelines and $4,500,000 for 42-in. nominal diameter natural gas pipelines depending on the configuration of buildings within the Class 2 HCA. Delaying block valve closure by an additional 5 minutes reduces the cost avoidance by approximately 50%.

3.1.4.3 Hypothetical Natural Gas Pipeline Releases in Class 3 Locations

According to the definition of a Class 3 Location in 49 CFR 192.5, a Class 3 Location is any class location unit that has: (1) 46 or more buildings intended for human occupancy; or (2) an area where the pipeline lies within 100 yd (91 m) of either a building or a small, well-defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period. Based on the definition of HCA in 49 CFR 192.903, all Class 3 Locations are classified as HCAs.

For this study, the effects of valve closure time on fire damage resulting from a natural gas pipeline release in a Class 3 Location were considered for hypothetical natural gas pipeline releases that affect areas with buildings intended for human occupancy as described in Section 3.1.3.1 and shown in Fig. 3.8 and the outside recreational facility described in Section 3.1.3.3 and shown in Fig. 3.9.

Fire damage to these areas is considered worst case because the cost of potential fire damage to other areas that qualify as a Class 3 Location is less in comparison.

Separation distance versus time plots for 12-in. and 42-in. nominal diameter natural gas pipelines in Class 3 Locations are shown in Figs. 3.47, 3.48, 3.49, and 3.50. These plots compare the effects of block valve closure swiftness on time-dependent blowdown behavior. Figures 3.47 and 3.49 are plots of blowdown behavior for block valve closure 8 minutes after the break (i.e. 5 minutes to detect the leak plus 3 minutes to close the valve). Figures 3.48 and 3.50 are plots of blowdown behavior for the same pipeline segments with block valve closure 13 minutes after the break (i.e. 10 minutes to detect the leak plus 3 minutes to close the valve).

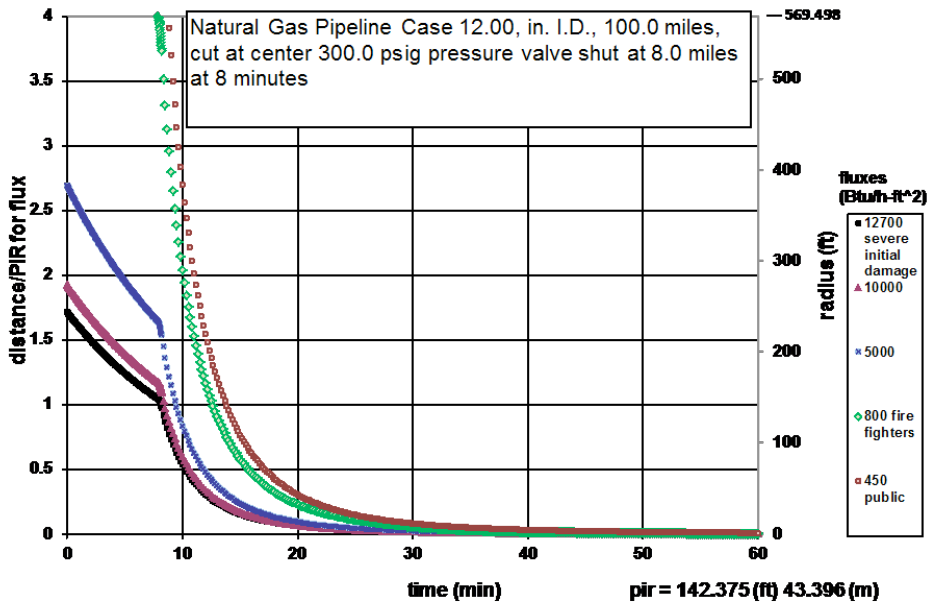

Fig. 3.47. Separation distances for 12-in. natural gas pipeline in a Class 3 Location operating at a MAOP of 300 psig with block valve closure 8 minutes after break.

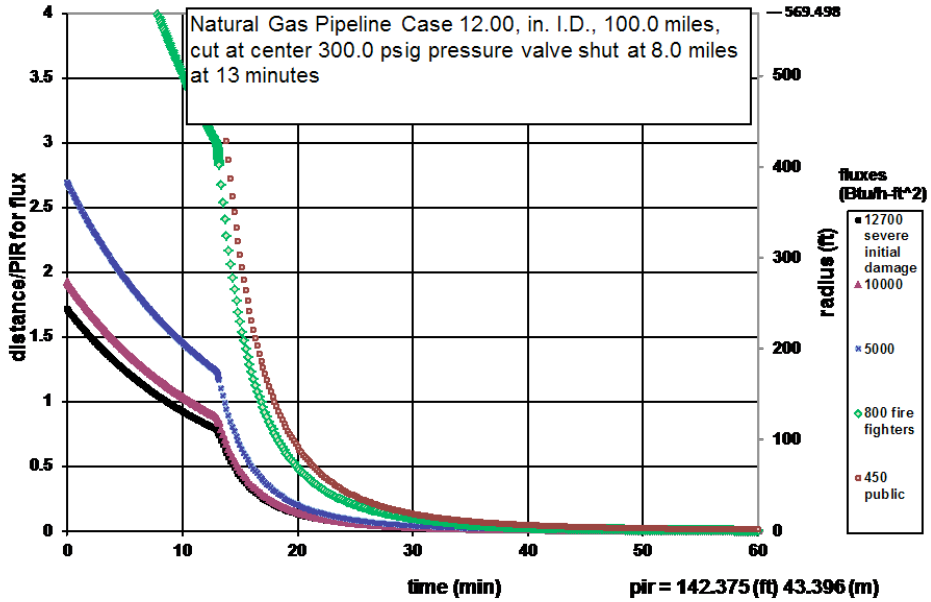

Fig. 3.48. Separation distances for 12-in. natural gas pipeline in a Class 3 Location operating at a MAOP of 300 psig with block valve closure 13 minutes after break.

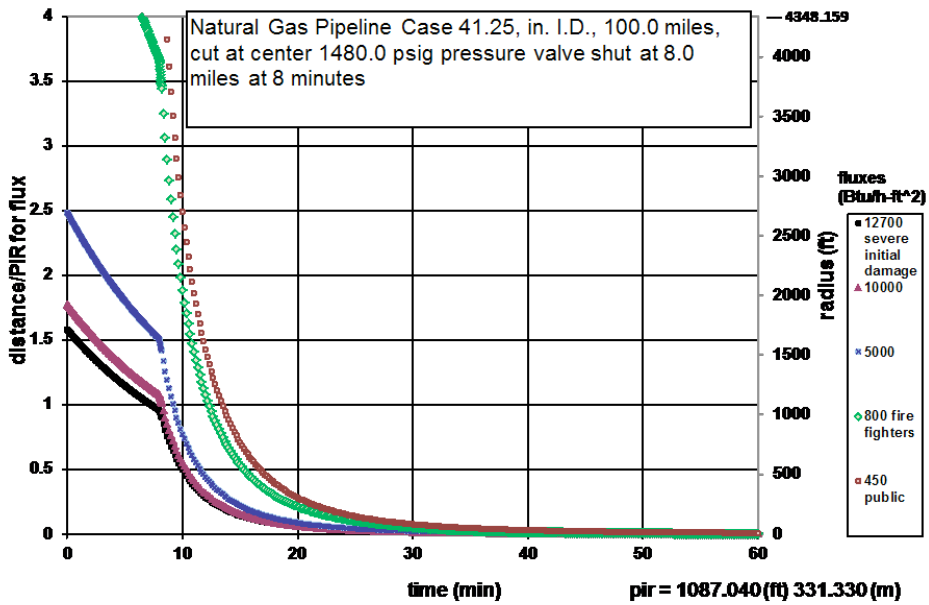

Fig. 3.49. Separation distances for 42-in. natural gas pipeline in a Class 3 Location operating at a MAOP of 1,480 psig with block valve closure 8 minutes after break.

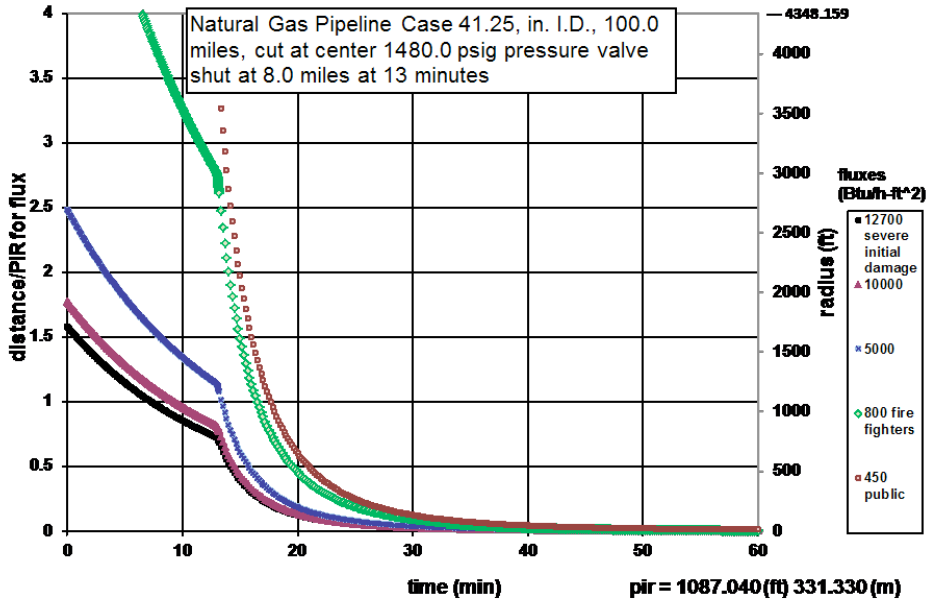

Fig. 3.50. Separation distances for 42-in. natural gas pipeline in a Class 3 Location operating at a MAOP of 1,480 psig with block valve closure 13 minutes after break.

Figures 3.47 and 3.48 for 12-in. nominal diameter natural gas pipeline releases show that delaying block valve closure from 8 to 13 minutes after the break reduces the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR from 11 to 15 minutes without exceeding the 2.5 kW/m^2 (800 Btu/hr ft^2) heat flux threshold. Comparison of time-dependent blown behavior plots in Figs. 3.12, 3.13, and 3.47 show that closing block valves within 8 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 16 minutes (27 minutes - 11 minutes) without compressor inflow and 27 minutes (37 minutes - 11 minutes) if the compressor inflow is 15 ft/s. Similarly, comparison of time-dependent blown behavior plots in Figs. 3.12, 3.13, and 3.48 show that closing block valves within 13 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 12 minutes (27 minutes - 15 minutes) without compressor inflow and 22 minutes (37 minutes - 15 minutes) if the compressor inflow is 15 ft/s.

Figures 3.49 and 3.50 for 42-in. nominal diameter natural gas pipeline releases show that delaying block valve closure from 8 to 13 minutes after the break reduces the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR from 11 to 15 minutes without exceeding the 2.5 kW/m^2 (800 Btu/hr ft^2) heat flux threshold. Comparisons of time-dependent blown behavior plots in Figs. 3.14, 3.15, and 3.49 show that closing block valves within 8 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 14 minutes (25 minutes - 11 minutes) without compressor inflow and 22 minutes (33 minutes - 11 minutes) if the compressor inflow is 15 ft/s. Similarly, comparison of time-dependent blown behavior plots in Figs. 3.14, 3.15, and 3.50 show that closing block valves within 13 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 10 minutes (25 minutes - 15 minutes) without compressor inflow and 18 minutes (33 minutes - 15 minutes) if the compressor inflow is 15 ft/s.

Hypothetical Natural Gas Pipeline Releases in Class 3 Locations with Buildings Intended for Human Occupancy

Four case studies involving 12-in. and 42-in. nominal diameter hypothetical natural gas pipelines in Class 3 Locations are considered to assess effects of valve closure time on fire damage to buildings intended for human occupancy and personal property. Design features and operating conditions for these hypothetical natural gas pipelines are defined in Table 3.3. The four case studies compare the following effects on avoided damage costs.

- Case studies 3A and 3B compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 12-in. nominal diameter natural gas pipelines with MAOPs equal to 300 psig and valve closure durations of either 8 minutes or 13 minutes after the break.
- Case studies 3C and 3D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 42-in. nominal diameter natural gas pipelines with MAOPs equal to 1,480 psig and valve closure durations of either 8 minutes or 13 minutes after the break.

Results of the case studies including comparisons to baseline conditions and the avoided damage costs attributed to block valve closure swiftness are shown in Tables 3.14 and 3.15. Areas with potentially severe, moderate, and minor damage for the hypothetical natural gas pipelines within Class 3 Locations with buildings intended for human occupancy are shown in Figs. 3.51 to 3.54.

Table 3.14. Avoided damage costs for hypothetical 12-in. natural gas pipeline releases in Class 3 Locations with buildings intended for human occupancy

Characteristic	12-in. Baseline-0, compressor inflow = 0 ft/s	12-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 3A	Case Study 3B
Nominal Line Pipe Diameter, in.	12	12	12	12
MAOP, psig	300	300	300	300
Potential Impact Radius (PIR), ft	143	143	143	143
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost	$1,554,000 per building	$1,554,000 per building	$1,554,000 per building	$1,554,000 per building
Total Moderate Damage Cost	$762,000 per building	$762,000 per building	$762,000 per building	$762,000 per building
Total Minor Damage Cost	$270,000 per building	$270,000 per building	$270,000 per building	$270,000 per building
Potentially Severe Damage Radius, ft	244	247	244	244
Potentially Moderate Damage Radius, ft	112	122	24	67
Potentially Minor Damage Radius, ft	77	102	4	6
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	27	37	11	15
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	3	3	3	3
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	3	3	3	3

Table 3.14. Avoided damage costs for hypothetical 12-in. natural gas pipeline releases in Class 3 Locations with buildings intended for human occupancy (Cont.)

Characteristic	12-in. Baseline-0, compressor inflow = 0 ft/s	12-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 3A	Case Study 3B
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 5%) * 3 * $1,524,000 = $2,057,400	(50% - 25%) * 3 * $1,524,000 = $1,143,000

Note: The perimeter of the potentially severe damage area is 1,348 ft. Three fire hydrants are available outside the potentially severe damage area. Twelve engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres.

Table 3.15. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in Class 3 Locations with buildings intended for human occupancy

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 3C	Case Study 3D
Nominal Line Pipe Diameter, in.	42	42	42	42
MAOP, psig	1,480	1,480	1,480	1,480
Potential Impact Radius (PIR), ft	1,115	1,115	1,115	1,115
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost	$1,554,000 per building	$1,554,000 per building	$1,554,000 per building	$1,554,000 per building
Total Moderate Damage Cost	$762,000 per building	$762,000 per building	$762,000 per building	$762,000 per building
Total Minor Damage Cost	$270,000 per building	$270,000 per building	$270,000 per building	$270,000 per building
Potentially Severe Damage Radius, ft	1,716	1,740	1,716	1,716
Potentially Moderate Damage Radius, ft	792	858	171	476
Potentially Minor Damage Radius, ft	546	719	25	41
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	25	33	11	15
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	21	21	21	21
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	12	12	12	12

Table 3.15. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in Class 3 Locations with buildings intended for human occupancy (Cont.)

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 3C	Case Study 3D
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 5%) * 12 * $1,524,000 = $8,229,600	(50% - 25%) * 12 * $1,524,000 = $4,572,000

Note: The perimeter of the potentially severe damage area is 10,509 ft. Twenty-one fire hydrants are available outside the potentially severe damage area. Twelve engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres.

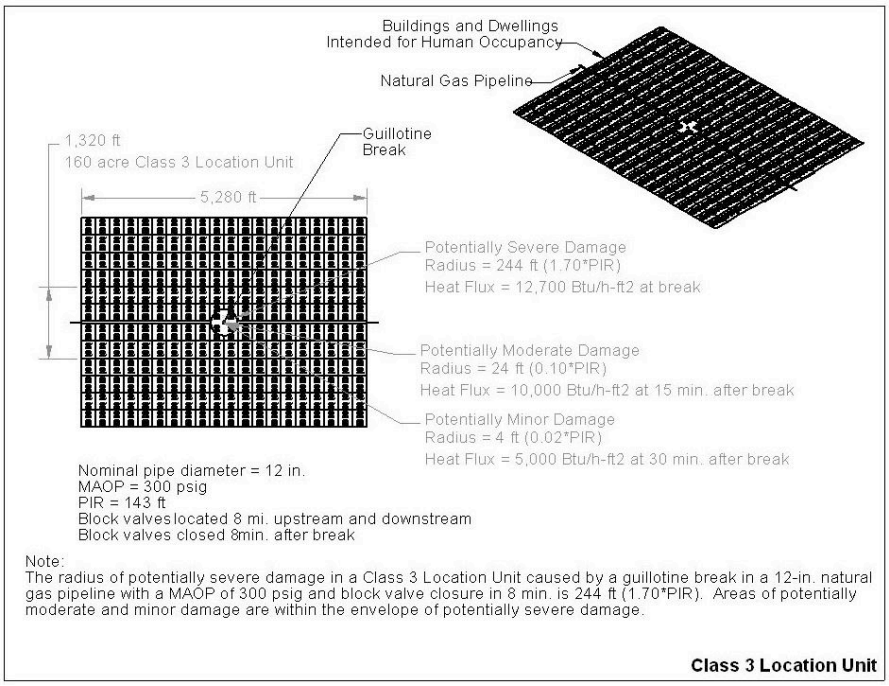

Fig. 3.51. Case Study 3A – areas affected by 12-in. nominal diameter hypothetical natural gas pipeline release in Class 3 Location with buildings intended for human occupancy – 300 psig MAOP and block valve closure 8 minutes after break.

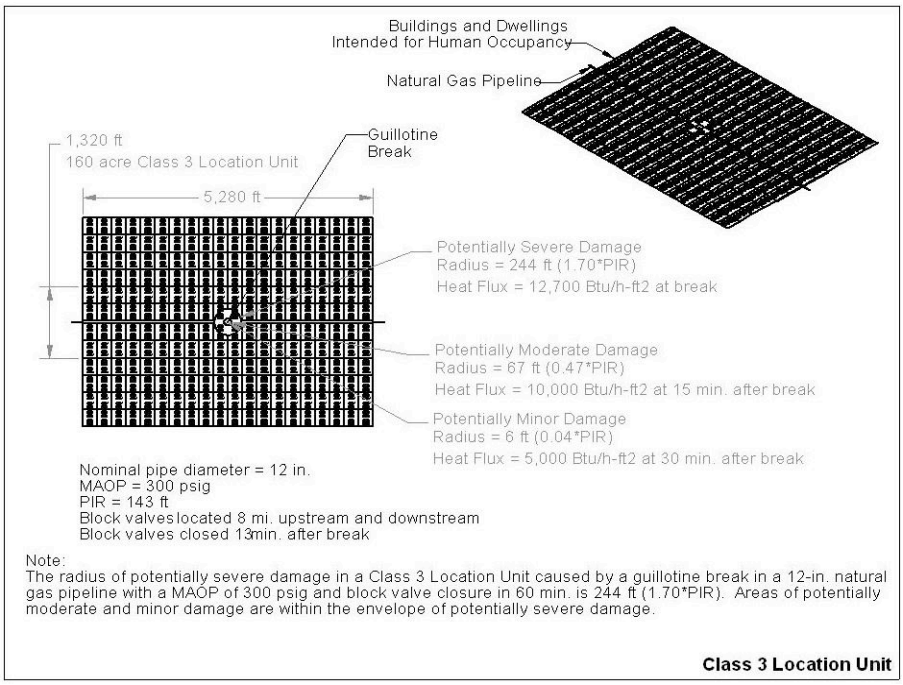

Fig. 3.52. Case Study 3B – areas affected by 12-in. nominal diameter hypothetical natural gas pipeline release in Class 3 Location with buildings intended for human occupancy – 300 psig MAOP and block valve closure 13 minutes after break.

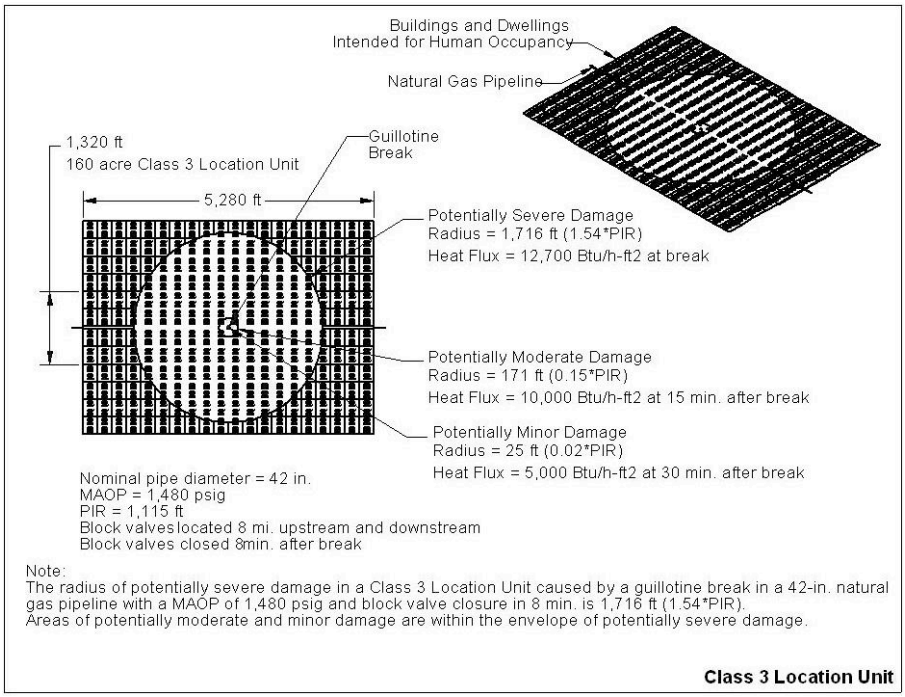

Fig. 3.53. Case Study 3C – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in Class 3 Location with buildings intended for human occupancy – 1,480 psig MAOP and block valve closure 8 minutes after break.

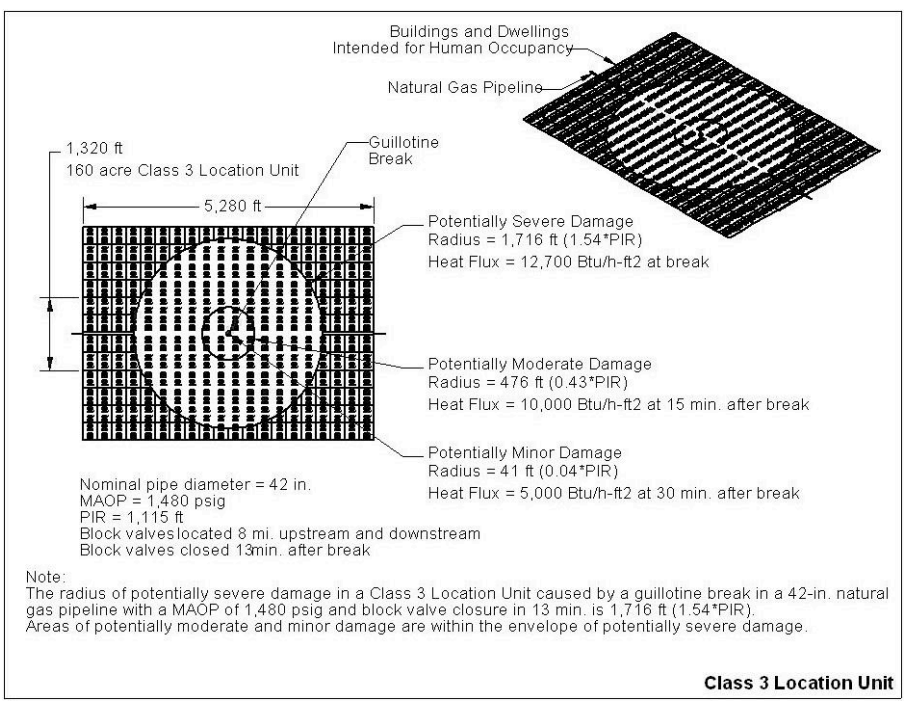

Fig. 3.54. Case Study 3D – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in Class 3 Location with buildings intended for human occupancy – 1,480 psig MAOP and block valve closure 13 minutes after break.

Hypothetical Natural Gas Pipeline Releases in Class 3 Locations with an Outside Recreational Facility

Four case studies involving 12-in. and 42-in. nominal diameter hypothetical natural gas pipelines in Class 3 Locations are considered to assess effects of valve closure time on fire damage to outside recreational facilities. Design features and operating conditions for these hypothetical natural gas pipelines are defined in Table 3.3. The four case studies compare the following effects on avoided damage costs.

- Case studies 3E and 3F compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 12-in. nominal diameter natural gas pipelines with MAOPs equal to 300 psig and valve closure durations of either 8 minutes or 13 minutes after the break.
- Case studies 3G and 3H compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 42-in. nominal diameter natural gas pipelines with MAOPs equal to 1,480 psig and valve closure durations of either 8 minutes or 13 minutes after the break.

Results of the case studies including comparisons to baseline conditions and the avoided damage costs attributed to block valve closure swiftness are shown in Tables 3.16 and 3.17. Areas with potentially severe, moderate, and minor damage for the hypothetical natural gas pipelines within Class 3 Locations with outside recreational facilities are shown in Figs. 3.55 to 3.58.

Table 3.16. Avoided damage costs for hypothetical 12-in. natural gas pipeline releases in Class 3 Locations with outside recreational facilities

Characteristic	12-in. Baseline-0, compressor inflow = 0 ft/s	12-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 3E	Case Study 3F
Nominal Line Pipe Diameter, in.	12	12	12	12
MAOP, psig	300	300	300	300
Potential Impact Radius (PIR), ft	143	143	143	143
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost	$100,000 + $2,380,000 per acre	$100,000 + $2,380,000 per acre	$100,000 + $2,380,000 per acre	$100,000 + $2,380,000 per acre
Total Moderate Damage Cost	$100,000 + $700,000 per acre	$100,000 + $700,000 per acre	$100,000 + $700,000 per acre	$100,000 + $700,000 per acre
Total Minor Damage Cost	$50,000	$50,000	$50,000	$50,000
Potentially Severe Damage Radius, ft	244	247	244	244
Potentially Moderate Damage Radius, ft	112	122	24	67
Potentially Minor Damage Radius, ft	77	102	4	6
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	27	37	11	15
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	3	3	3	3
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	3	3	3	3

Table 3.16. Avoided damage costs for hypothetical 12-in. natural gas pipeline releases in Class 3 Locations with outside recreational facilities (Cont.)

Characteristic	12-in. Baseline-0, compressor inflow = 0 ft/s	12-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 3E	Case Study 3F
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 5%) * 3 * $595,000 = $803,250	(50% - 25%) * 3 * $595,000 = $446,250

Note: The perimeter of the potentially severe damage area is 1,348 ft. Three fire hydrants are available outside the potentially severe damage area. Twelve engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres.

Table 3.17. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in Class 3 Locations with outside recreational facilities

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 3G	Case Study 3H
Nominal Line Pipe Diameter, in.	42	42	42	42
MAOP, psig	1,480	1,480	1,480	1,480
Potential Impact Radius (PIR), ft	1,115	1,115	1,115	1,115
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost	$500,000 + $2,380,000 per acre	$500,000 + $2,380,000 per acre	$500,000 + $2,380,000 per acre	$500,000 + $2,380,000 per acre
Total Moderate Damage Cost	$500,000 + $700,000 per acre	$500,000 + $700,000 per acre	$500,000 + $700,000 per acre	$500,000 + $700,000 per acre
Total Minor Damage Cost	$250,000	$250,000	$250,000	$250,000
Potentially Severe Damage Radius, ft	1,716	1,740	1,716	1,716
Potentially Moderate Damage Radius, ft	792	858	171	476
Potentially Minor Damage Radius, ft	546	719	25	41
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	25	33	11	15
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	21	21	21	21
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	12	12	12	12

Table 3.17. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in Class 3 Locations with outside recreational facilities (Cont.)

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 3G	Case Study 3H
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 5%) * 12 * $595,000 = $3,213,000	(50% - 25%) * 12 * $595,000 = $1,785,000

Note: The perimeter of the potentially severe damage area is 10,509 ft. Twenty-one fire hydrants are available outside the potentially severe damage area. Twelve engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres.

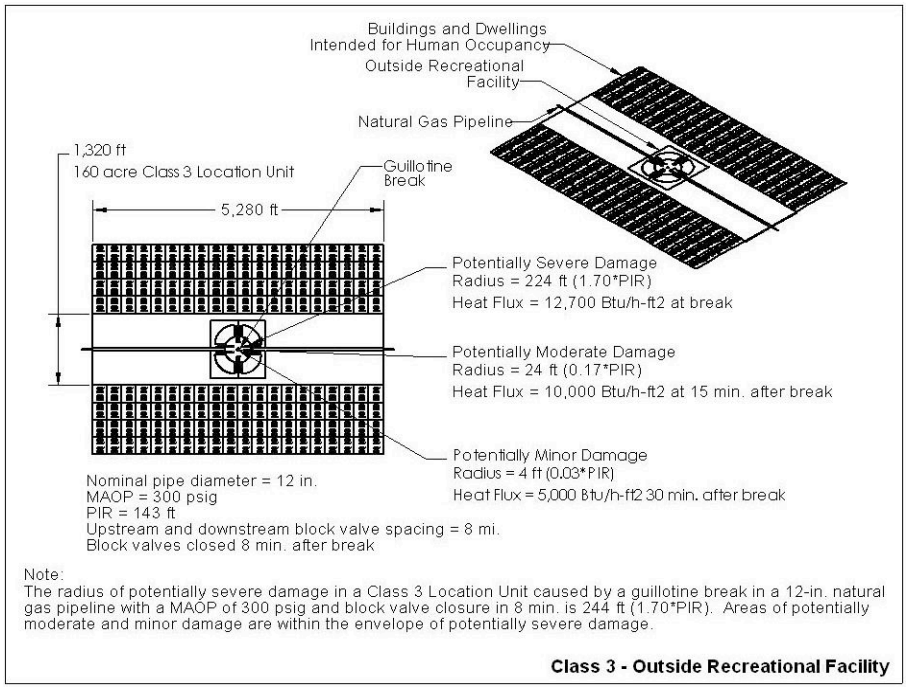

Fig. 3.55. Case Study 3E – areas affected by 12-in. nominal diameter hypothetical natural gas pipeline release in Class 3 Location with an outside recreational facility – 300 psig MAOP and block valve closure 8 minutes after break.

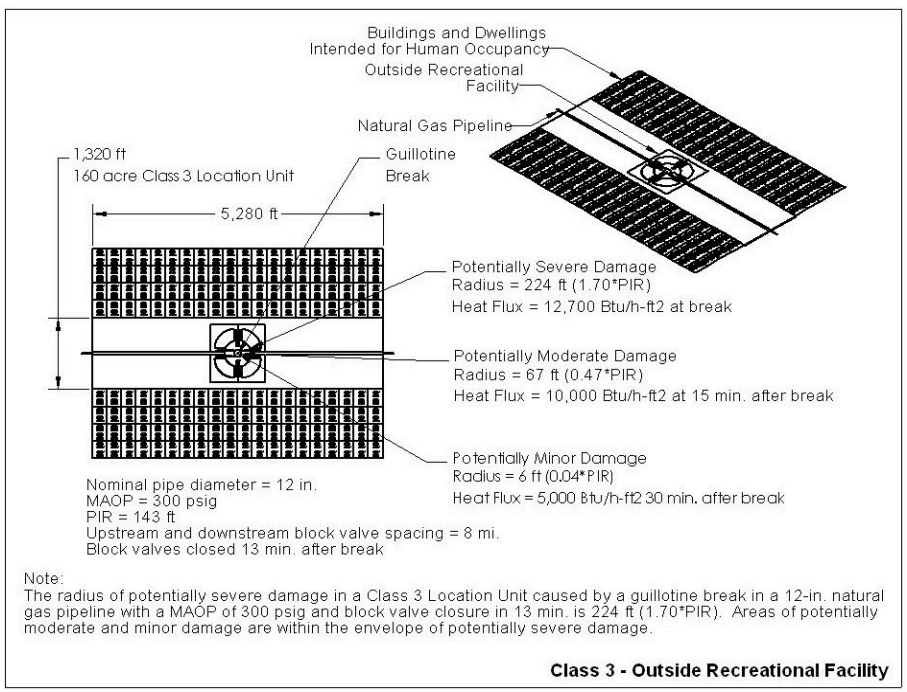

Fig. 3.56. Case Study 3F – areas affected by 12-in. nominal diameter hypothetical natural gas pipeline release in Class 3 Location with an outside recreational facility – 300 psig MAOP and block valve closure 13 minutes after break.

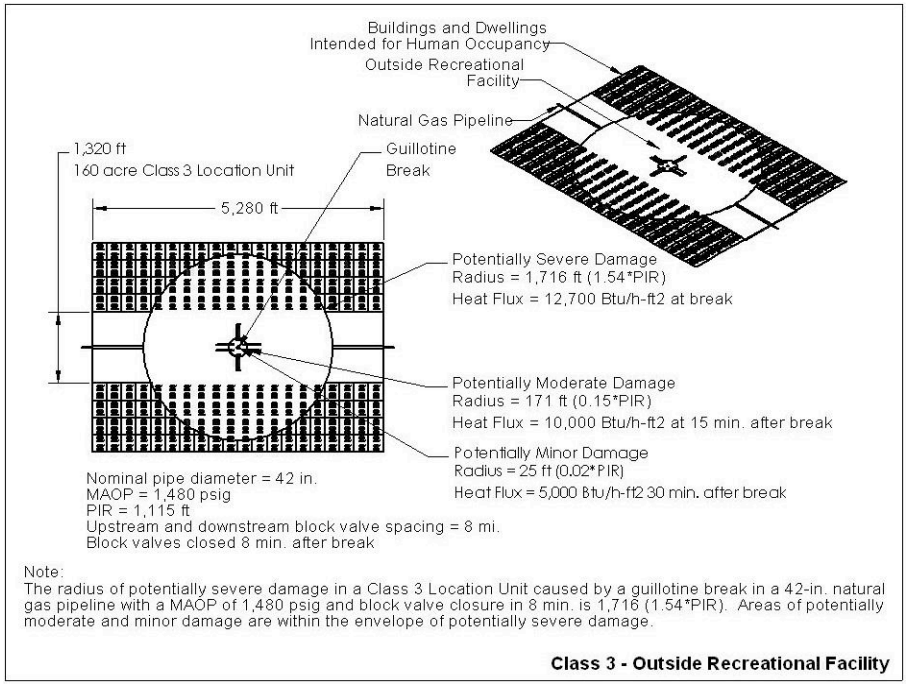

Fig. 3.57. Case Study 3G – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in Class 3 Location with an outside recreational facility – 1,480 psig MAOP and block valve closure 8 minutes after break.

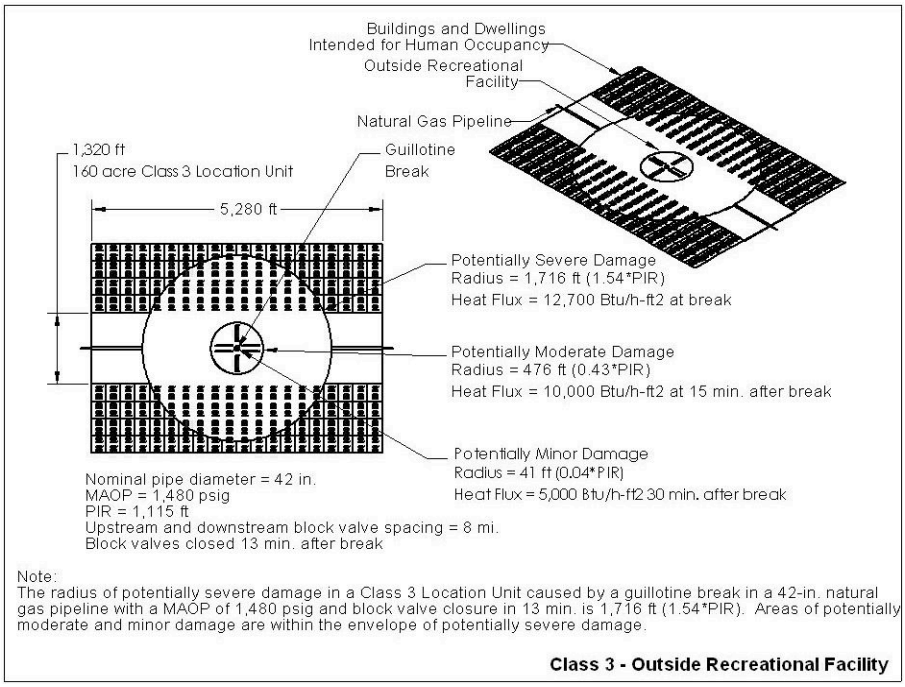

Fig. 3.58. Case Study 3H – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in Class 3 Location with an outside recreational facility – 1,480 psig MAOP and block valve closure 13 minutes after break.

Damage Resulting from Hypothetical Natural Gas Pipeline Releases in Class 3 Locations

Fire damage to buildings and personal property in Class 3 Locations resulting from natural gas combustion immediately following guillotine-type breaks in natural gas pipelines is considered potentially severe for all areas within 1.5 to 1.7 times the PIR. Severe damage to buildings and personal property within these areas is possible because the heat flux produced by natural gas combustion immediately following the break equals or exceeds the severe damage threshold, 40 kW/m^2 (12,700 Btu/hr ft^2). The radii for severe damage envelopes the radii for moderate, 31.5 kW/m^2 (10,000 Btu/hr ft^2) for 15 minutes, and minor damage, 15.8 kW/m^2 (5,000 Btu/hr ft^2) for 30 minutes These results are based on computed heat flux versus time data and apply to natural gas pipelines with nominal diameters ranging from 12-in. to 42-in. and MAOPs ranging from 300 to 1,480 psig.

Benefits of Block Valve Closure Swiftness for a Hypothetical Natural Gas Pipeline Releases in Class 3 Locations

Without fire fighter intervention, the swiftness of block valve closure has no effect on mitigating potential fire damage to buildings and personal property in Class 3 Locations resulting from natural gas pipeline releases. The basis for this result follows.

- The heat flux produced by hydrocarbon combustion immediately following the break equals or exceeds the threshold of 40.0 kW/m^2 (12,700 Btu/hr ft^2) for potentially severe damage within a distance of approximately 1.5 times PIR.
- The time required to detect the break, isolate the damaged line section by closing the block valves, and begin reducing the natural gas discharge rate exceeds the time required to cause potentially severe building and personal property damage.

Valve closure swiftness also has no effect on reducing building and personal property damage costs. Consequently, without fire fighter intervention, there is no quantifiable benefit in terms of cost avoidance for damage to buildings and personal property attributed to swiftly closing block valves located upstream and downstream from guillotine-type breaks in natural gas pipelines.

When combined with fire fighter intervention, the swiftness of block valve closure has a potentially beneficial effect on mitigating fire damage to buildings and personal property in Class 3 Locations. The benefit in terms of cost avoidance is based on the ability of fire fighters to mitigate fire damage to buildings and personal property located within a distance of approximately 1.5 times PIR by conducting fire fighting activities as soon as possible upon arrival at the scene. The ability of fire fighters to conduct fire fighting activities within a distance of approximately 1.5 times PIR is only possible if the heat flux at this distance is below 2.5 kW/m^2 (800 Btu/hr ft^2) and fire hydrants are available at locations where needed. Block valve closure within 8 minutes after the break can result in a potential cost avoidance of at least $2,057,400 for 12-in. nominal diameter natural gas pipelines and $8,229,600 for 42-in. nominal diameter natural gas pipelines with buildings intended for human occupancy. Similarly, block valve closure within 8 minutes after the break can result in a potential cost avoidance of at least $803,250 for 12-in. nominal diameter natural gas pipelines and $3,213,000 for 42-in. nominal diameter natural gas pipelines with outside recreational facilities. Delaying block valve closure by an additional 5 minutes reduces the cost avoidance by approximately 50%.

3.1.4.4 Hypothetical Natural Gas Pipeline Releases in Class 4 Locations

According to the definition of a Class 4 Location in 49 CFR 192.5, a Class 4 Location is any class location unit where buildings with four or more stories above ground are prevalent. Based on the definition of HCA in 49 CFR 192.903, all Class 4 Locations are classified as HCAs.

For this study, the effects of valve closure time on fire damage resulting from a natural gas pipeline release in a Class 4 Location were considered for hypothetical natural gas pipeline releases that effect areas with buildings with four or more stories above ground as described in Section 3.1.3.2 and shown in Fig. 3.10.

Separation distance versus time plots for 12-in. and 42-in. natural gas pipelines in Class 4 Locations are shown in Figs. 3.59, 3.60, 3.61, and 3.62. These plots compare the effects of block valve closure swiftness on time-dependent blowdown behavior. Figures 3.59 and 3.61 are plots of blowdown behavior for block valve closure 8 minutes after the break (i.e. 5 minutes to detect the leak plus 3 minutes to close the valve). Figures 3.60 and 3.62 are plots of blowdown behavior for the same pipeline segments with block valve closure 13 minutes after the break (i.e. 10 minutes to detect the leak plus 3 minutes to close the valve).

Figures 3.59 and 3.60 for 12-in. nominal diameter natural gas pipeline releases show that delaying block valve closure from 8 to 13 minutes after the break reduces the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR from 10 to 14 minutes without exceeding the 2.5 kW/m^2 (800 Btu/hr ft^2) heat flux threshold. Comparison of time-dependent blowdown behavior plots in Figs. 3.15, 3.16, and 3.59 show that closing block valves within 8 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 17 minutes (27 minutes - 10 minutes) without compressor inflow and 27 minutes (37 minutes - 10 minutes) if the compressor inflow is 15 ft/s. Similarly, comparison of time-dependent blowdown behavior plots in Figs. 3.15, 3.16, and 3.60 show that closing block valves within 13 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 13 minutes (27 minutes - 14 minutes) without compressor inflow and 23 minutes (37 minutes - 14 minutes) if the compressor inflow is 15 ft/s.

Figures 3.61 and 3.62 for 42-in. nominal diameter natural gas pipeline releases show that delaying block valve closure from 8 to 13 minutes after the break reduces the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR from 10 to 14 minutes without exceeding the 2.5 kW/m^2 (800 Btu/hr ft^2) heat flux threshold. Comparisons of time-dependent blowdown behavior plots in Figs. 3.17, 3.18, and 3.61 show that closing block valves within 8 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 15 minutes (25 minutes - 10 minutes) without compressor inflow and 23 minutes (33 minutes - 10 minutes) if the compressor inflow is 15 ft/s. Similarly, comparison of time-dependent blowdown behavior plots in Figs. 3.17, 3.18, and 3.62 show that closing block valves within 13 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 11 minutes (25 minutes - 14 minutes) without compressor inflow and 19 minutes (33 minutes - 14 minutes) if the compressor inflow is 15 ft/s.

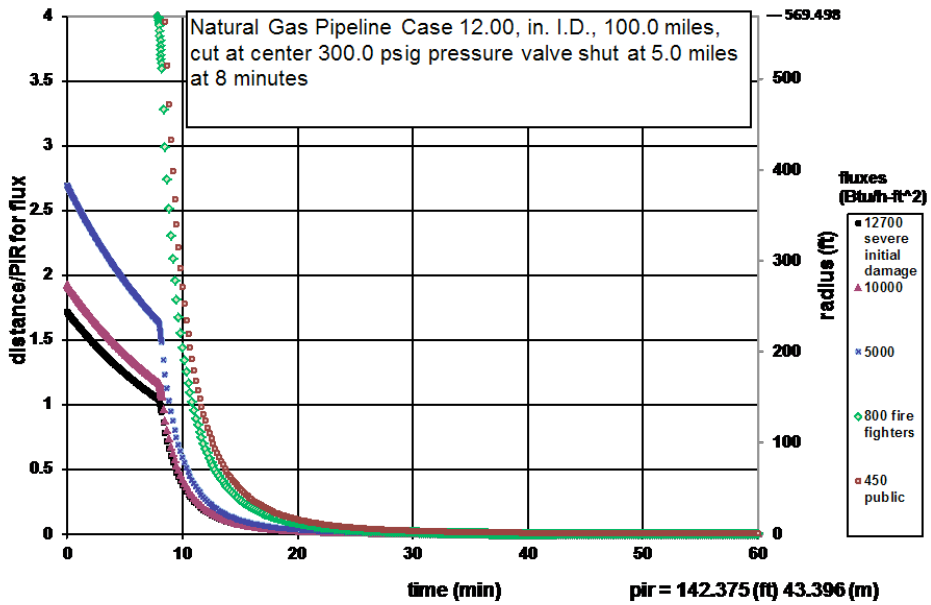

Fig. 3.59. Separation distances for 12-in. natural gas pipeline in a Class 4 Location operating at a MAOP of 300 psig with block valve closure 8 minutes after break.

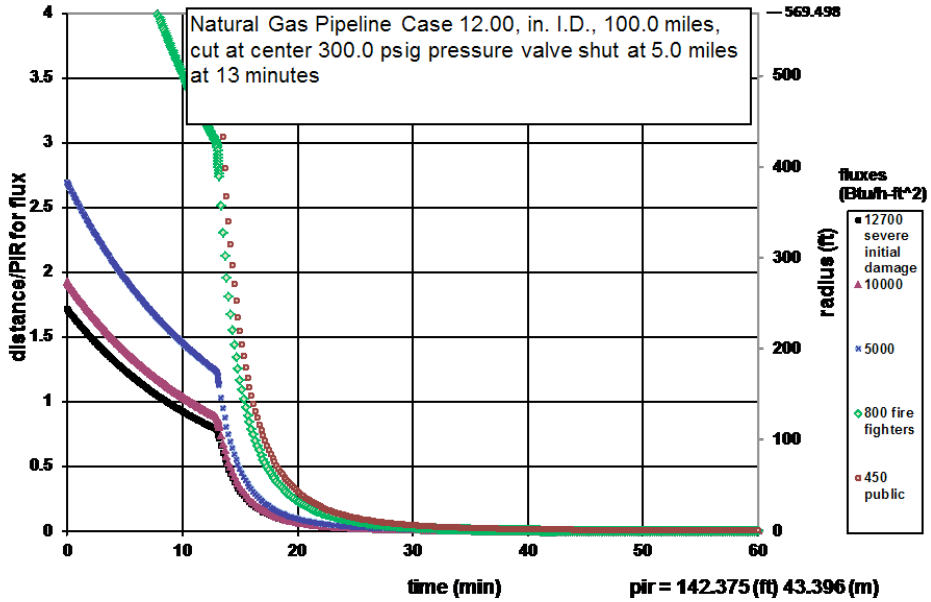

Fig. 3.60. Separation distances for 12-in. natural gas pipeline in a Class 4 Location operating at a MAOP of 300 psig with block valve closure 13 minutes after break.

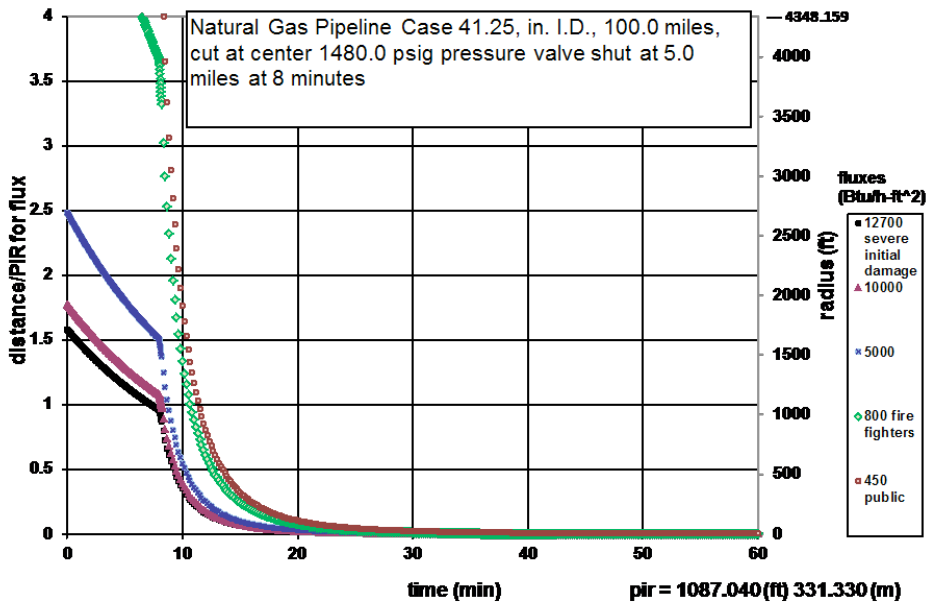

Fig. 3.61. Separation distances for 42-in. natural gas pipeline in a Class 4 Location operating at a MAOP of 1,480 psig with block valve closure 8 minutes after break.

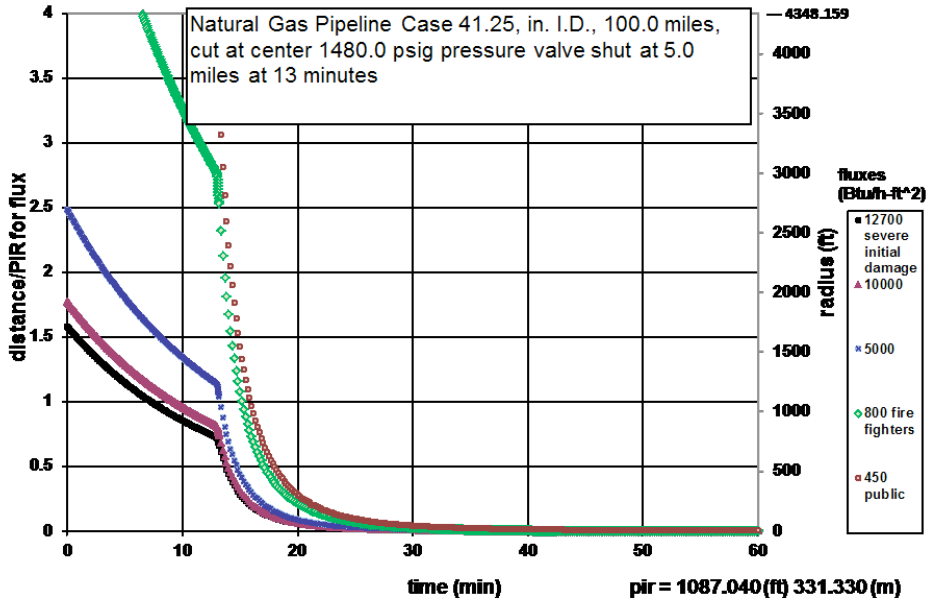

Fig. 3.62. Separation distances for 42-in. natural gas pipeline in a Class 4 Location operating at a MAOP of 1,480 psig with block valve closure 13 minutes after break.

Figures 3.59 and 3.60 for 12-in. nominal diameter natural gas pipeline releases show that delaying block valve closure from 8 to 13 minutes after the break reduces the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR from 10 to 14 minutes without exceeding the 2.5 kW/m^2 (800 Btu/hr ft^2) heat flux threshold. Comparison of time-dependent blowdown behavior plots in Figs. 3.15, 3.16, and 3.59 show that closing block valves within 8 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 17 minutes (27 minutes - 10 minutes) without compressor inflow and 27 minutes (37 minutes - 10 minutes) if the compressor inflow is 15 ft/s. Similarly, comparison of time-dependent blowdown behavior plots in Figs. 3.15, 3.16, and 3.60 show that closing block valves within 13 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 13 minutes (27 minutes - 14 minutes) without compressor inflow and 23 minutes (37 minutes - 14 minutes) if the compressor inflow is 15 ft/s.

Figures 3.61 and 3.62 for 42-in. nominal diameter natural gas pipeline releases show that delaying block valve closure from 8 to 13 minutes after the break reduces the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR from 10 to 14 minutes without exceeding the 2.5 kW/m^2 (800 Btu/hr ft^2) heat flux threshold. Comparisons of time-dependent blowdown behavior plots in Figs. 3.17, 3.18, and 3.61 show that closing block valves within 8 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 15 minutes (25 minutes - 10 minutes) without compressor inflow and 23 minutes (33 minutes - 10 minutes) if the compressor inflow is 15 ft/s. Similarly, comparison of time-dependent blowdown behavior plots in Figs. 3.17, 3.18, and 3.62 show that closing block valves within 13 minutes increases the time fire fighters are able to conduct fire fighting activities within a distance of 1.5 times PIR by 11 minutes (25 minutes - 14 minutes) without compressor inflow and 19 minutes (33 minutes - 14 minutes) if the compressor inflow is 15 ft/s.

Four case studies involving 12-in. and 42-in. nominal diameter hypothetical natural gas pipelines, in Class 4 Locations are considered to assess effects of valve closure time on fire damage to buildings with four or more stories above ground. Design features and operating conditions for these hypothetical natural gas pipelines are defined in Table 3.3. The four case studies compare the following effects on avoided damage costs.

- Case studies 4A and 4B compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 12-in. nominal diameter natural gas pipelines with MAOPs equal to 300 psig and valve closure durations of either 8 minutes or 13 minutes after the break.
- Case studies 4C and 4D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 42-in. nominal diameter natural gas pipelines with MAOPs equal to 1,480 psig and valve closure durations of either 8 minutes or 13 minutes after the break.

Results of the case studies including comparisons to baseline conditions and the avoided damage costs attributed to block valve closure swiftness are shown in Tables 3.18 and 3.19. Areas with potentially severe, moderate, and minor damage for the hypothetical natural gas pipelines within Class 4 Locations with buildings with four or more stories above ground are shown in Figs. 3.63 to 3.66.

Table 3.18. Avoided damage costs for hypothetical 12-in. natural gas pipeline releases in Class 4 Locations with buildings with four or more stories above ground

Characteristic	12-in. Baseline-0, compressor inflow = 0 ft/s	12-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 4A	Case Study 4B
Nominal Line Pipe Diameter, in.	12	12	12	12
MAOP, psig	300	300	300	300
Potential Impact Radius (PIR), ft	143	143	143	143
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost for Building	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building
Total Moderate Damage Cost for Building	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building
Total Minor Damage Cost for Building	$500,000 per building	$500,000 per building	$500,000 per building	$500,000 per building
Potentially Severe Damage Radius, ft	244	247	244	244
Potentially Moderate Damage Radius, ft	112	122	11	49
Potentially Minor Damage Radius, ft	77	102	1	2
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	27	37	10	14
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	3	3	3	3
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	3	3	3	3

Table 3.18. Avoided damage costs for hypothetical 12-in. natural gas pipeline releases in Class 4 Locations with buildings with four or more stories above ground (Cont.)

Characteristic	12-in. Baseline-0, compressor inflow = 0 ft/s	12-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 4A	Case Study 4B
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0	$\pi(244 - 244)^2 = 0$ acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 0%) * 3 * $1,000,000 = $1,500,000	(50% - 20%) * 3 * $1,000,000 = $900,000

Note: The perimeter of the potentially severe damage area is 1,348 ft. Three fire hydrants are available outside the potentially severe damage area. Twelve engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres.

Table 3.19. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in Class 4 Locations with buildings with four or more stories above ground

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 4C	Case Study 4D
Nominal Line Pipe Diameter, in.	42	42	42	42
MAOP, psig	1,480	1,480	1,480	1,480
Potential Impact Radius (PIR), ft	1,115	1,115	1,115	1,115
Detection Phase Duration, minutes	N/A	N/A	5	5
Valve closure after break, minutes	N/A	N/A	8	13
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break	At least 10,000 for 15 minutes after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break	At least 5,000 for 30 minutes after break
Common Fire Fighting Heat Flux Threshold, Btu/hr ft^2	800	800	800	800
Total Severe Damage Cost	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building
Total Moderate Damage Cost	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building	$1,000,000 per building
Total Minor Damage Cost	$500,000 per building	$500,000 per building	$500,000 per building	$500,000 per building
Potentially Severe Damage Radius, ft	1,716	1,740	1,716	1,716
Potentially Moderate Damage Radius, ft	792	858	78	345
Potentially Minor Damage Radius, ft	546	719	8	14
Initiate Fire Fighting Activities at 1.5 times PIR, minutes after break	25	33	10	14
Number of Fire Hydrants Available for Fire Fighting Activities within 10 minutes after break	21	21	21	21
Number of Fire Engines Involved in Fire Fighting Activities within 10 minutes after break	12	12	12	12

Table 3.19. Avoided damage costs for hypothetical 42-in. natural gas pipeline releases in Class 4 Locations with buildings with four or more stories above ground (Cont.)

Characteristic	42-in. Baseline-0, compressor inflow = 0 ft/s	42-in. Baseline-15, compressor inflow = 15 ft/s	Case Study 4C	Case Study 4D
Avoided Severe Damage Cost for Valve Closure in 8 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to Baseline	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0	$\pi(1{,}716 - 1{,}716)^2$ = 0 acres $0
Avoided Moderate Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Moderate Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 8 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to Baseline	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0	Potentially Minor Damage Radius is less than Potentially Severe Damage Radius $0
Avoided Damage Cost Resulting from Fire Fighting Activities within 1.5 times PIR Compared to Baseline	$0	$0	(50% - 0%) * 12 * $1,000,000 = $6,000,000	(50% - 20%) * 12 * $1,000,000 = $3,600,000

Note: The perimeter of the potentially severe damage area is 10,509 ft. Twenty-one fire hydrants are available outside the potentially severe damage area. Twelve engines arrive on scene and fire fighters begin fire fighting activities within 10 minutes. Each fire hydrant can provide enough water for one engine to extinguish one building fire or vehicles parked outside within an area of 0.25 acres.

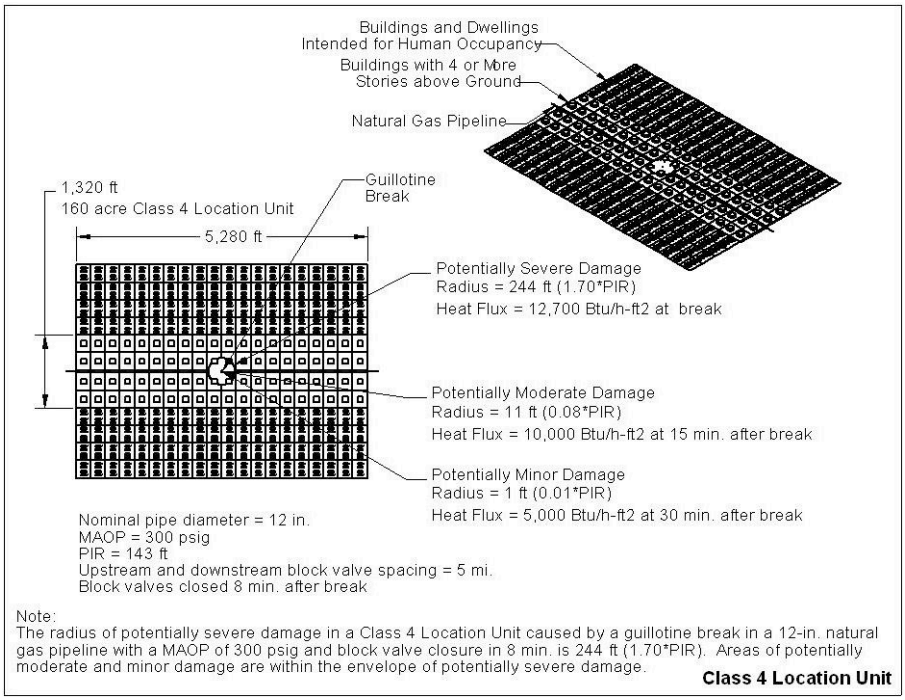

Fig. 3.63. Case Study 4A – areas affected by 12-in. nominal diameter hypothetical natural gas pipeline release in a Class 4 Location with four or more stories above ground – 300 psig MAOP and block valve closure 8 minutes after break.

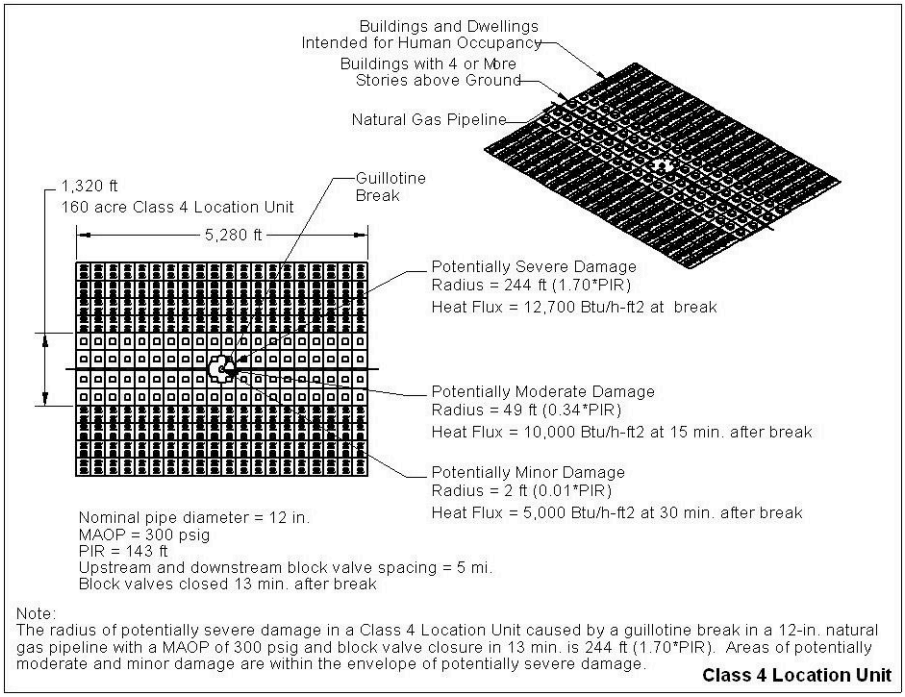

Fig. 3.64. Case Study 4B – areas affected by 12-in. nominal diameter hypothetical natural gas pipeline release in a Class 4 Location with four or more stories above ground – 300 psig MAOP and block valve closure 13 minutes after break.

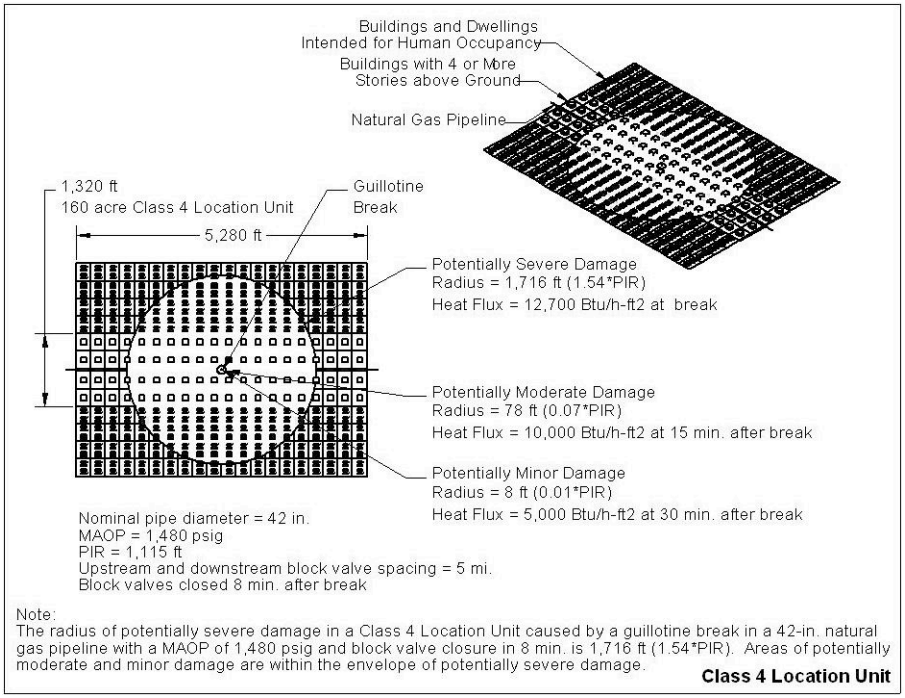

Fig. 3.65. Case Study 4C – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in a Class 4 Location with four or more stories above ground – 1,480 psig MAOP and block valve closure 8 minutes after break.

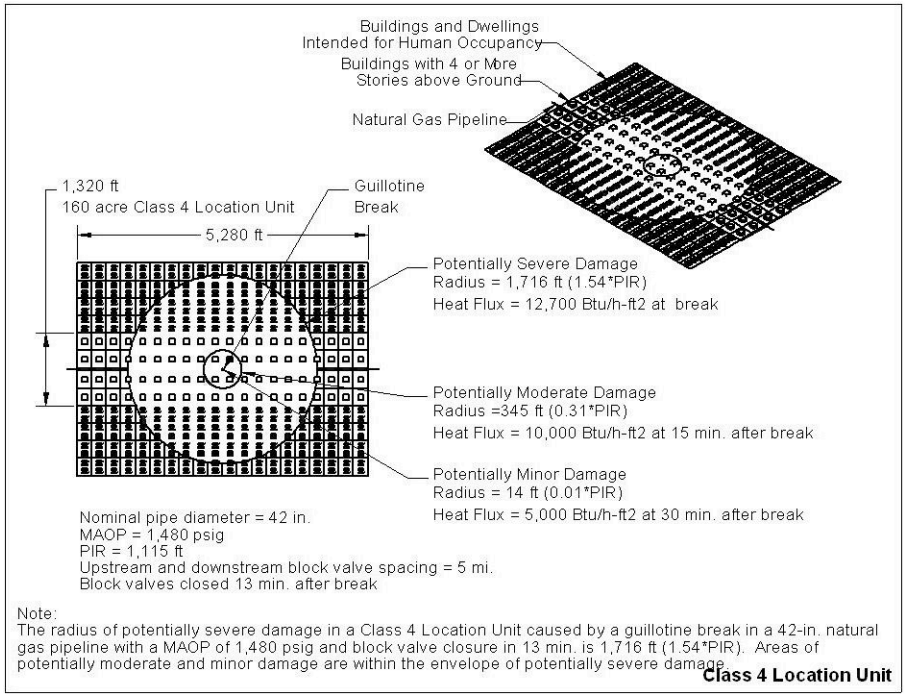

Fig. 3.66. Case Study 4D – areas affected by 42-in. nominal diameter hypothetical natural gas pipeline release in a Class 4 Location with four or more stories above ground – 1,480 psig MAOP and block valve closure 13 minutes after break.

Damage Resulting from Hypothetical Natural Gas Pipeline Releases in Class 4 Locations

Fire damage to buildings with four or more stories above ground in Class 4 Locations resulting from natural gas combustion immediately following guillotine-type breaks in natural gas pipelines is considered potentially severe for all areas within 1.5 to 1.7 times the PIR. Severe damage to buildings and personal property within these areas is possible because the heat flux produced by natural gas combustion immediately following the break equals or exceeds the severe damage threshold, 40 kW/m^2 (12,700 Btu/hr ft^2). The radii for severe damage envelopes the radii for moderate, 31.5 kW/m^2 (10,000 Btu/hr ft^2) for 15 minutes, and minor damage, 15.8 kW/m^2 (5,000 Btu/hr ft^2) for 30 minutes These results are based on computed heat flux versus time data and apply to natural gas pipelines with nominal diameters ranging from 12-in. to 42-in. and MAOPs ranging from 300 to 1,480 psig.

Benefits of Block Valve Closure Swiftness for a Hypothetical Natural Gas Pipeline Releases in Class 4 Locations

Without fire fighter intervention, the swiftness of block valve closure has no effect on mitigating potential fire damage to buildings with four or more stories above ground in Class 4 Locations resulting from natural gas pipeline releases. The basis for this result follows.

- The heat flux produced by hydrocarbon combustion immediately following the break equals or exceeds the threshold of 40.0 kW/m^2 (12,700 Btu/hr ft^2) for potentially severe damage within a distance of approximately 1.5 times PIR.
- The time required to detect the break, isolate the damaged line section by closing the block valves, and begin reducing the natural gas discharge rate exceeds the time required to cause potentially severe building and personal property damage.

Valve closure swiftness also has no effect on reducing building and personal property damage costs. Consequently, without fire fighter intervention, there is no quantifiable benefit in terms of cost avoidance for damage to buildings and personal property attributed to swiftly closing block valves located upstream and downstream from guillotine-type breaks in natural gas pipelines.

When combined with fire fighter intervention, the swiftness of block valve closure has a potentially beneficial effect on mitigating fire damage to buildings and personal property in Class 4 Locations. The benefit in terms of cost avoidance is based on the ability of fire fighters to mitigate fire damage to buildings and personal property located within a distance of approximately 1.5 times PIR by conducting fire fighting activities as soon as possible upon arrival at the scene. The ability of fire fighters to conduct fire fighting activities within a distance of approximately 1.5 times PIR is only possible if the heat flux at this distance is below 2.5 kW/m^2 (800 Btu/hr ft^2) and fire hydrants are available at locations where needed. Block valve closure within 8 minutes after the break can result in a potential cost avoidance of at least $1,500,000 for 12-in. nominal diameter natural gas pipelines and $6,000,000 for 42-in. nominal diameter natural gas pipelines. Delaying block valve closure by an additional 5 minutes reduces the cost avoidance by approximately 50%.

3.1.4.5 Comparative Analysis for Natural Gas Pipeline Releases

The analytical approach and computational models described in Section 3.1.2 were used to study the San Bruno natural gas pipeline release that occurred in a residential area in San Bruno, California on September 9, 2010, in the segment of intrastate natural gas transmission pipeline known as Line 132, owned and operated by the Pacific Gas and Electric Company (NTSB, 2011). The study results provide evidence that the analytical approach and computational models produce credible results compared to an actual natural gas pipeline release.

Figures 3.67 and 3.68 show separation distance versus time plots for the San Bruno 30-in. nominal diameter natural gas pipeline release at an operating pressure of 386 psig. These plots were developed using the computational models and present results for two different release scenarios. Figure 3.67 corresponds to a release from 59.4 miles of pipeline, and Fig. 3.68 corresponds to a release from 124.6 miles of pipeline. Release scenarios involving different pipeline lengths were modeled to study the contribution of other pipelines that were cross-connected with Line 132 to overall severity of the incident. Comparison of the 2.5 kW/m^2 (800 Btu/hr ft^2) plots in Figs. 3.67 and 3.68 suggests that fire fighters were unable to conduct fire fighting activities within the potentially severe damage radius (1.5 times PIR) for approximately 80 minutes after the break and that cross-connected pipelines did not contribute significantly to the delay or incident severity. These plots also demonstrate the effectiveness of block valve closure in reducing the heat flux intensity within the potentially severe damage radius. The PIR that corresponds to the pressure at the time of the release is approximately 400 ft.

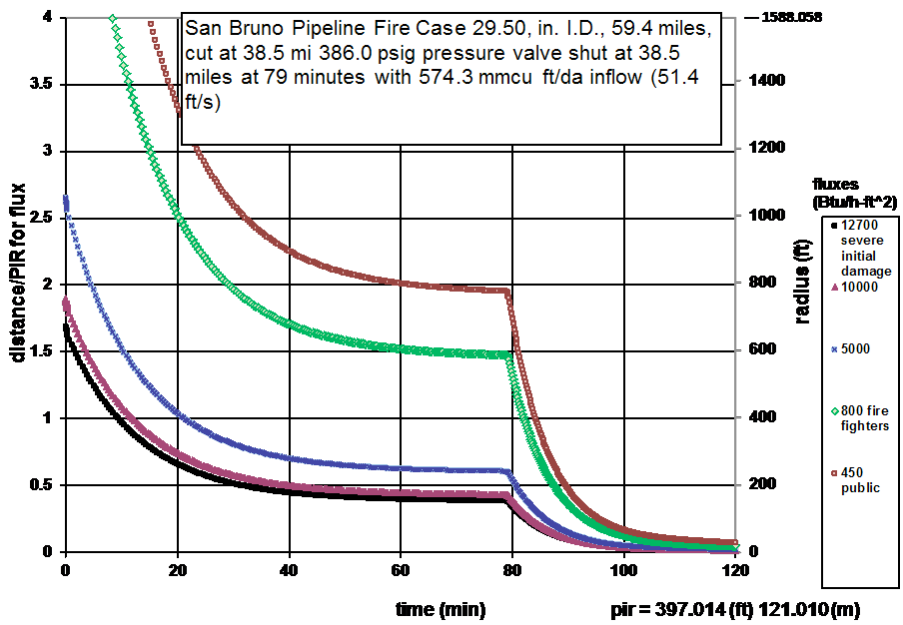

Fig. 3.67. Separation distance versus time plot for the San Bruno natural gas pipeline release –59.4 to 38.5 mi. segment.

Figures 3.67 and 3.68 also show that the heat flux at a distance of 600 ft (1.5 PIR) from the break exceeded the 2.5 kW/m^2 (800 Btu/hr ft^2) heat flux threshold for fire fighting activities until block valve closure isolated the damaged pipeline segment approximately 79 minutes after the break. These plots also show that the radius for potentially severe damage envelopes the radii for moderate, 31.5 kW/m^2 (10,000 Btu/hr ft^2) for 15 minutes, and minor damage, 15.8 kW/m^2 (5,000 Btu/hr ft^2) for 30 minutes.

Although the analytical approach and computational models do not consider terrain features or wind effects[6], which are factors that contributed to the distribution of fire damage for this release, Fig. 3.69 shows that the computed potentially severe damage radius of 1.5 times PIR envelopes most of the damaged and destroyed buildings located in the area surrounding the rupture site.

[6] The wind across the northern and central portion of the San Francisco peninsula was estimated to have been from the west with magnitudes from 17–29 mph (NTSB, 2011).

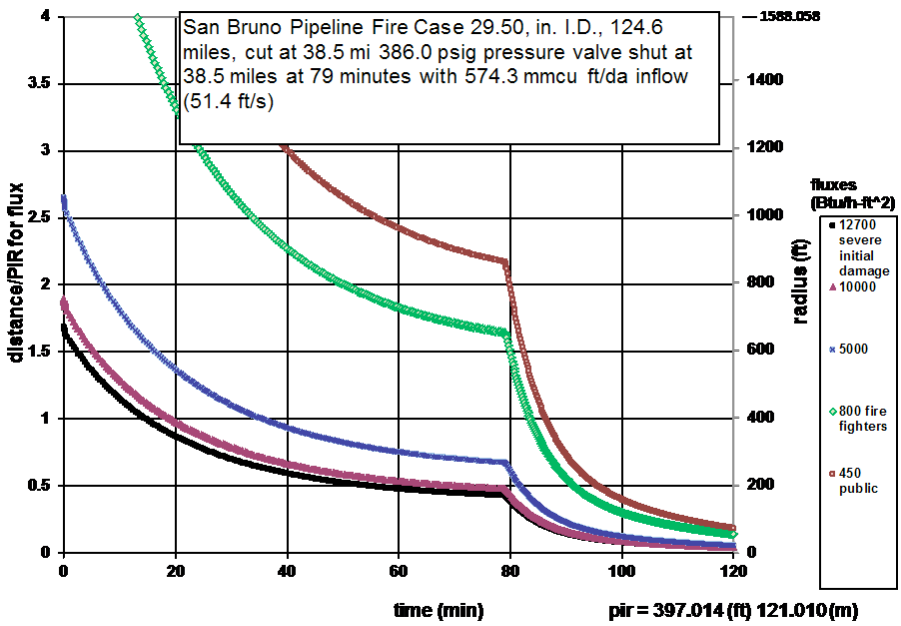

Fig. 3.68. Separation distance versus time plot for the San Bruno natural gas pipeline release –124.6 to 38.5 mi. segment.

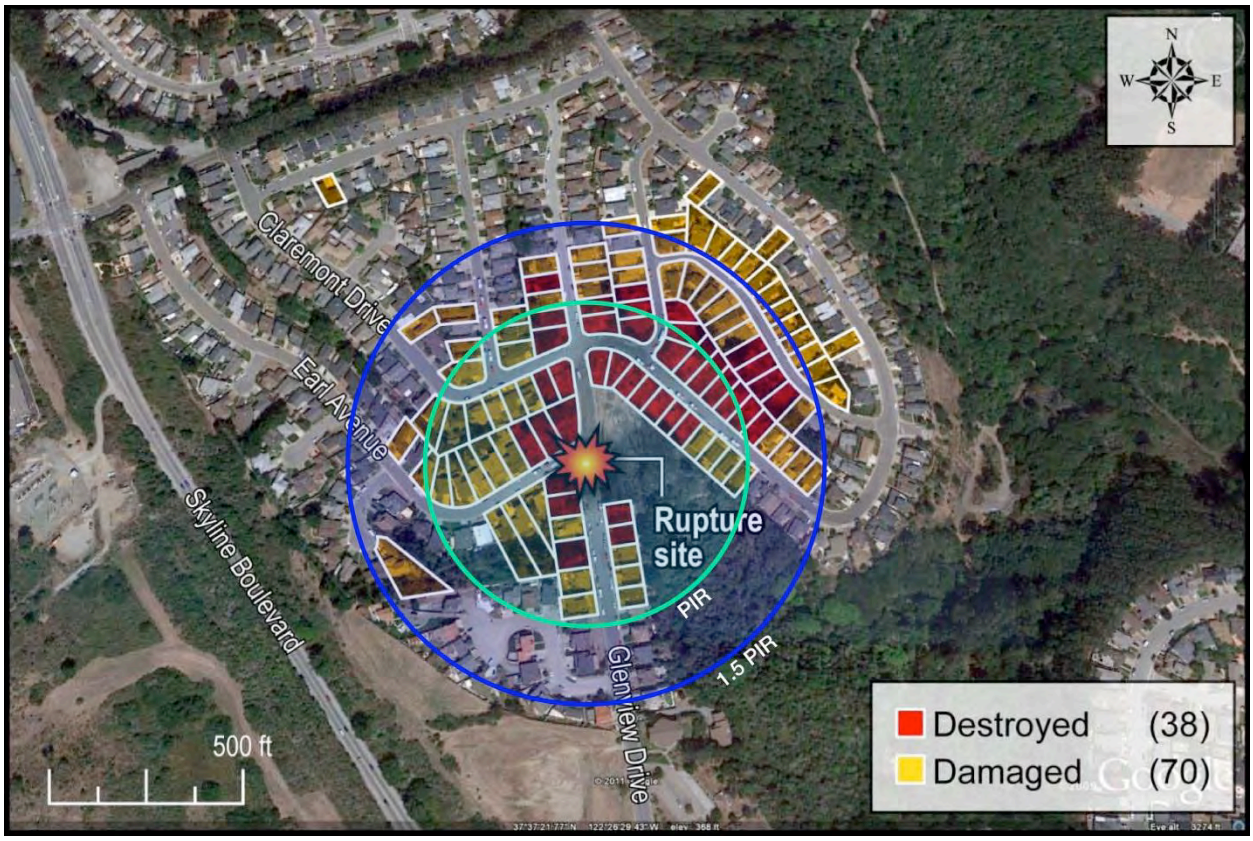

Fig. 3.69. Aerial view of the September 9, 2010 San Bruno natural gas pipeline release showing residential properties damaged and destroyed.

These study results are consistent with the timeline for emergency response and the damage assessments discussed in the NTSB accident report for the San Bruno natural gas transmission pipeline rupture and fire (NTSB, 2011). They also provide the basis for concluding that the analytical approach and computational models described in Section 3.1.2 produce credible results.

3.2 HAZARDOUS LIQUID PIPELINES WITH IGNITION

Following a guillotine-type break in a hazardous liquid pipeline and ignition of the released hydrocarbon, a pool fire begins to form and continues to increase in diameter as liquid flows from the break. Eventually, the pool reaches an equilibrium diameter when the mass flow rate from the break equals the fuel mass burning rate. The fire will continue to burn until the liquid that remains in the isolated pipeline segments stops flowing from the pipeline.

A pipeline break can range in size and shape from a short, through-wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Guillotine-type breaks are less common than other pipeline breaks such as fish-mouth type openings, but they can occur as a result of different causes including landslides, earthquakes, soil subsidence, soil erosion (e.g. scour in a river) and third-party damage. The guillotine-type break is the largest possible break and is therefore considered in this study as the worst case scenario. Although the volume of the discharge depends on many factors, to enable analysis, the event is divided into four sequential phases with the total discharge volume equal to the sum of the volumes released during each phase. The four phases (detection, continued pumping, block valve closure and pipeline drain down) are explained in Section 1.3.2.1.

The thermal radiation hazards from a hydrocarbon release and resulting pool fire depend on a variety of factors including the composition of the hydrocarbon, the size and shape of the fire, the duration of the fire, its proximity to the objects at risk, and the thermal characteristics of the object exposed to the fire. Estimating the thermal radiation fields surrounding a fire involve the following steps.

- Determine the geometric characteristics of the pool fire including the burning rate and the physical dimensions of the fire.
- Determine the average irradiance of the pool fire flames based on consideration of the fuel type, fire size, flame temperature, and composition.
- Compute time-dependent variations in distance from the break for specified heat flux intensities.

3.2.1 Analysis Scope, Parameters, and Assumptions

After a hazardous liquid pipeline ruptures, the resulting discharge is assumed to pool on the ground, ignite, and burn until all of the fuel is consumed. In this study, fire damage resulting from propane, butane, propylene, and gasoline releases were considered. However, propane was selected as the study variable because propane has the greatest heat of combustion and produces the worst case fire damage compared to the other fuels.

The following simplifying assumptions were used to determine thermal radiant intensities for a propane pool fire.

- The fuel mass burning rate per unit area per unit time, $\dot{m}''$, is 0.099 kg/m^2-s for propane.
- The effective heat of combustion, H, is 46,000 kJ/kg for propane.
- The empirical constant, $k\beta$, is 1.4 m^{-1}for propane.
- The regression rate, B, is 1.37×10^{-4} m/s for propane.

- The density of propane, ρ, is 545 kg/m^3 for propane.
- The flame can be represented by a small source thermal energy.
- The energy radiated from the flame is a specified fraction of energy released during combustion.
- The thermal radiation intensity varies proportionally with the inverse square of the distance from the source.

The following limitations apply to the ORNL methodology for estimating the time-dependent thermal radiant intensity resulting from fires produced by combustion of the released liquids.

- The proposed methodology is based on a point source radiation model which overestimates the intensity of thermal radiation at target locations close to the fire.
- The energy radiated from the flame is a specified fraction of the energy released during combustion.
- The pool fire is circular and horizontal, the ambient air temperature is 70°F, and the wind is calm.
- The pool fires burn in the open and are characterized by instantaneous and complete involvement of the hazardous liquids.
- The constants used in this study are only used for computational purposes, the exact values are unknown.

Study variables used to characterize hazardous liquid pipeline releases are listed in Table 3.20.

Table 3.20. Study variables for hypothetical hazardous liquid pipeline releases

Variable	Description	Proposed Variable Values
H	Elevation distance from break, ft	100, 500, 1,000
L	Maximum length between plateaus and peaks, mi.	3
D	Nominal line pipe diameter, in.	8, 12, 16, 24, 30, 36
v_p	Flow rate, ft/s	5, 10, 15
v_g	Drain down liquid velocity	Calculated based on H
t_d-t_0	Duration of detection phase, minutes	5
t_p-t_d	Duration of continued pumping phase, minutes	5
t_s-t_p	Duration of block valve closure phase, minutes	3, 30, 60, 90
t_{dd}-t_s	Duration of drain down phase, minutes	Calculated based on v_g
P_1	Maximum allowable operating pressure (MAOP), psig	400, 800, 1,200, 1,480

3.2.2 Analytical Approach and Computational Models

The Society of Fire Protection Engineers (SFPE) published equations for determining fire hazards from large open hydrocarbon fires in its Handbook of Fire Protection Engineering (NFPA, 1995). According to these equations, the flame diameter of a hydrocarbon pool fire depends on the spill size and the regression rate. The flame height depends on the flame diameter and the type of fuel. In the case of a continuous release, the liquid spreads and increases the burning area until the total regression rate is equal to the spill rate. The maximum or equilibrium diameter of a pool fire, D_{eq}, depends on the release mode, release rate, and regression rate. This diameter is computed using the following equation.

$$D_{eq} = 2(Q_{fr} / \pi B)^{1/2} \tag{3.22}$$

where

D_{eq} is the pool fire diameter, m,
Q_{fr} is the maximum flow rate, m^3/s, and
B is the regression rate (liquid burn rate), m/s.

In some cases, the regression rate is not known for various hazardous liquids. The regression rate is calculated using the following equation.

$$B = \dot{m}''/\rho_l \tag{3.23}$$

where

$\dot{m}''$ is the fuel mass burning rate, kg/m^2-s, and
ρ_l is the density of the liquid, kg/m^3.

Equation 3.21 is also used to calculate the pool fire diameter for the four phases of the release.

The diameter of the pool fire is greatly dependent on the flow rate through the break. From the time the break occurs until the equilibrium diameter is reached, the computed pool fire diameter is calculated through backward interpolation from the equilibrium diameter which may occur during the detection phase, continued pumping phase, or block valve closure phase. The equilibrium diameter is determined using the applicable input variables for a particular release scenario.

Requirements in 49 CFR 194.105(b) (1) state that the worst case discharge is the largest volume of fluid released based on the pipeline's maximum release time, plus the maximum shutdown response time, multiplied by the maximum flow rate, which is based on the maximum daily capacity of the pipeline, plus the largest line drainage volume after shutdown of the line sections. In this methodology, the maximum flow rate can be estimated by multiplying the fluid speed at the pump by the cross sectional area of the line pipe. Although operators can use this rule to determine a worst case discharge, the actual flow rate during the block valve closure phase may be greater (less conservative) due to factors such as fluid density, pressure changes, pump performance characteristics, and the elevation profile of the pipeline which are not reflected in the methodology. These factors are important in a risk analysis because their effects influence time-dependent damage resulting from a release.

The influence of fluid density, pressure changes, and the elevation profile of the pipeline is taken into consideration in this study by using Bernoulli's equation to calculate the flow rate during the block valve closure and drain down phases. However, there are recognized limitations in using Bernoulli's equation to determine drain down time because it does not model the effects of air flow through the pipeline break which occurs as the fluid escapes following block valve closure. Although Bernoulli's equation does not produce an exact solution to this fluid dynamics problem, comparison of the results provides a consistent approach for evaluating the effectiveness of block valve closure swiftness on mitigating release consequences. Bernoulli's equation follows.

$$z_1 + \frac{v_1^2}{2g} + P_1 v_1 \frac{g_c}{g} = z_2 + \frac{v_2^2}{2g} + P_2 v_2 \frac{g_c}{g} \tag{3.24}$$

where

z_1 is the elevation of the closed valve, ft,

z_2 is the elevation of the break, ft,
v_1 is the average velocity of the fluid at the closed valve, ft/s,
v_2 is the average velocity of the fluid at the break (also known as v_{exit}), ft/s,
P_1 is the pressure of the fluid at the closed valve, psig,
P_2 is the pressure of the fluid at the break, psig,
v is the specific volume of the fluid, $ft^3/lb.$,
g is the acceleration due to gravity, ft/s^2, and
g_c is the gravitational constant, (32.17 ft-lbm/lbf-s^2).

After rearranging Bernoulli's equation, the velocity of the liquid that exits the pipe is determined using the following equation.

$$v_{exit} = \sqrt{2g[(z_1 - z_2) + (P_1 - P_2)v\frac{g_c}{g} + \frac{v_1^2}{2g}]} \tag{3.25}$$

When the diameter of the pool fire is determined using this equation, lateral pool spreading will stop and a steady pool fire will result as long as the flow and burn rates are maintained. The equilibrium diameter given by this equation is reached over a time given by the following equation.

$$t_{eq} = 0.564[D_{eq} / (g'BD_{eq}^{1/3})] \tag{3.26}$$

where

t_{eq} is the time required for the pool fire to reach the equilibrium diameter, s, and
g' is the effective acceleration of gravity (determined by the following equation), m/s^2,

$$g' = g(1 - \rho_l / \rho_w) \tag{3.27}$$

where

g is the acceleration of gravity (9.81), m/s^2, and
ρ_w is the density of water (978), kg/m^3.

3.2.3 Thermal Radiation Intensities and Thresholds

The methodology used for determining hazardous liquid pipeline pool fire thermal radiant intensities is based on a point source radiation model also found in the SPFE Handbook of Fire Protection Engineering (NFPA, 1995). The following equation expresses the radiant intensity at any distance from the source.

$$q''_r = \dot{Q} / 4\pi x^2 \tag{3.28}$$

where

q''_r is the thermal radiant intensity or heat flux, W/m^2, and
$\dot{Q}$ is the total energy radiated per unit of time (determined by the following equation), W

$$\dot{Q} = \dot{m}'' H A_f (1-e^{-k\beta D_{eq}}) \quad (3.29)$$

where

A_f	is the horizontal burning area of the fuel ($D_{eq}^2\pi/4$), m^2,
$k\beta$	is the empirical constant for the fire's fuel, m^{-1},
H	is the effective heat of combustion, kJ/kg, and
x	is the radial distance from center of flame to edge of target (building, person, etc.).

The methodology developed at ORNL for quantifying potential fire damage resulting from a natural gas pipeline release applies to: (1) buildings and dwellings intended for human occupancy, and (2) personal property. This methodology, which is discussed in Section 3.1.3, applies equally to fire damage resulting from combustion of hydrocarbons released from a hazardous liquid pipeline following a guillotine-type break.

3.2.4 Risk Analysis Results for Propane Pipeline Releases

Effects of block valve closure swiftness on mitigating potential fire damage to buildings and personal property resulting from a hazardous liquid pipeline release were evaluated based on a hypothetical liquid propane pipeline release in a HCA. The evaluation focused on damage to buildings intended for human occupancy arranged into the configuration described in Section 3.1.3.1 and shown in Fig. 3.11. Fire damage to buildings intended for human occupancy within the HCA is considered worst case because potential fire damage to other building types and configurations that qualify as HCAs is less in comparison. Section 2.2 includes additional information about hazardous liquid pipeline HCAs defined in 49 CFR 195.450. The method used in this analysis for defining maximum flow rate through the break during the detection and continued pumping phases are based on the worst case discharge as defined the method as defined in 49 CFR 194.105(b)(1). While in the block valve closure and drain down phases are defined by Bernoulli's equation.

Hypothetical Liquid Propane Pipeline Releases in HCA with Buildings Intended for Human Occupancy

Eight case studies involving 8-in. and 30-in. nominal diameter hazardous liquid pipelines in HCAs are considered to assess effects of valve closure time on fire damage to buildings intended for human occupancy and personal property. Design features and operating conditions for these hypothetical pipelines are defined in Table 3.21.

Table 3.21. Design features and operating conditions for hypothetical hazardous liquid pipelines considered in the risk analysis

Design Feature	Nominal Line Pipe Diameter, in.	
	8	30
Hazardous liquid	Propane	Propane
MAOP, psig	400 and 1,480	400 and 1,480
Drain down length. mi.	3	3
Overall length of pipeline, mi.	100	100
Elevation change, ft	100	1,00
Velocity, ft/s	5	5
Block valve spacing, mi.	50	50
Detection phase duration, minutes	5	5
Continued pumping phase duration, minutes	5	5
Block valve closure time, minutes after break	13 and 70	13 and 70

Characteristics for Case Study 5A, 5B, 5C, and 5D that involve 8-in. nominal diameter liquid propane pipelines are tabulated in Table 3.22. These case studies compare the following effects on avoided damage costs.

- Case studies 5A and 5B compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 8-in. nominal diameter liquid propane pipelines with MAOPs equal to 400 psig and valve closure durations or either 13 minutes or 70 minutes after the break.
- Case studies 5C and 5D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 8-in. nominal diameter liquid propane pipelines with MAOPs equal to 1,480 psig and valve closure durations or either 13 minutes or 70 minutes after the break.
- Case studies 5A and 5C compare effects of MAOP on the avoided damage costs for hypothetical 8-in. nominal diameter liquid propane pipelines with valve closure durations of 13 minutes after the break.
- Case studies 5B and 5D compare effects of MAOP on the avoided damage costs for hypothetical 8-in. nominal diameter liquid propane pipelines with valve closure 70 minutes after the break.

Note that the avoided damage costs are not sensitive to pressure and elevation changes because the model is based on the methodology in 49 CFR 194.105 (b)(1) for a worst case discharge which has a constant flow rate.

Figures 3.70 to 3.73 show potentially severe, moderate, and minor damage radii as a function of time for hypothetical 8-in. nominal diameter liquid propane pipelines.

Table 3.22. Avoided damage costs for hypothetical 8-in. liquid propane pipeline releases

Characteristic	Case Study 5A	Case Study 5B	Case Study 5C	Case Study 5D
Nominal Line Pipe Diameter, in.	8	8	8	8
MAOP, psig	400	400	1,480	1,480
Elevation Change, ft	100	100	100	100
Equilibrium Diameter, ft	70	70	70	70
Detection Phase Duration, minutes	5	5	5	5
Continued Pumping Phase Duration, minutes	5	5	5	5
Valve closure after break, minutes	13	70	13	70
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 min, after break	At least 10,000 for 15 min, after break	At least 10,000 for 15 min, after break	At least 10,000 for 15 min, after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 min, after break	At least 5,000 for 30 min, after break	At least 5,000 for 30 min, after break	At least 5,000 for 30 min, after break
Total Severe Damage Cost	$3,108,000/acre	$3,108,000/acre	$3,108,000/acre	$3,108,000/acre
Total Moderate Damage Cost	$1,524,000/acre	$1,524,000/acre	$1,524,000/acre	$1,524,000/acre
Total Minor Damage Cost	$540,000/acre	$540,000/acre	$540,000/acre	$540,000/acre
Potentially Severe Radius, ft	186	186	186	186
Potentially Moderate Radius, ft	104	209	104	209
Potentially Minor Radius, ft	42	289	42	289
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to 70 minutes	$\pi(186 - 186)^2 =$ 0 acres $0	$\pi(186 - 186)^2 =$ 0 acres $0	$\pi(186 - 186)^2 =$ 0 acres $0	$\pi(186 - 186)^2 =$ 0 acres $0
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to 70 minutes	$\pi(209 - 186)^2 =$ 0 acres $0 M	$\pi(209 - 209)^2 =$ 0 acres $0 M	$\pi(209 - 186)^2 =$ 0 acres $0 M	$\pi(209 - 209)^2 =$ 0 acres $0 M

Table 3.22. Avoided damage costs for hypothetical 8-in. liquid propane pipeline releases (Cont.)

Characteristic	Case Study 5A	Case Study 5B	Case Study 5C	Case Study 5D
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to 70 minutes	$\pi(289 - 186)^2 =$ 0.77 acres $0.416 M	$\pi(289 - 289)^2 =$ 0 acres $0	$\pi(289 - 186)^2 =$ 0.77 acres $0.416 M	$\pi(289 - 289)^2 =$ 0 acres $0
Total Damage Cost Avoided for Valve Closure in 13 minutes	$0.416 M	$0	$0.416 M	$0

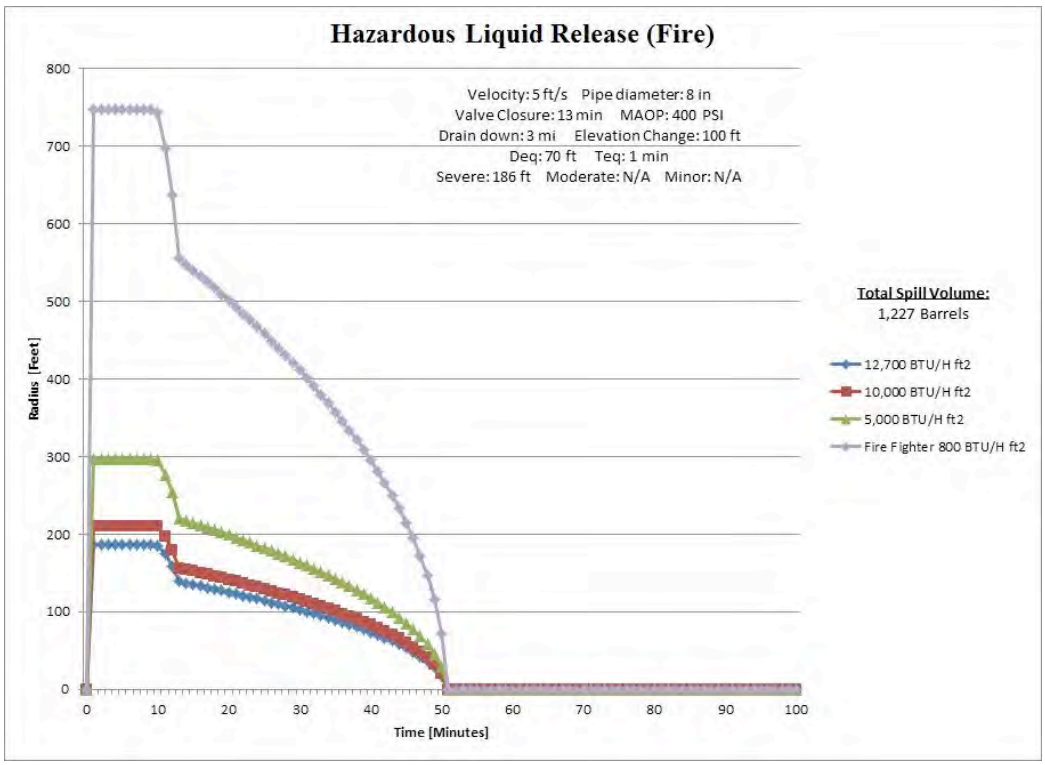

Fig. 3.70. Case Study 5A – Separation distance for 8-in. nominal diameter hazardous liquid pipeline release – velocity = 5 ft/s, MAOP = 400 psig, elevation change = 100 ft, drain down length = 3 mi., valve closure time = 13 minutes.

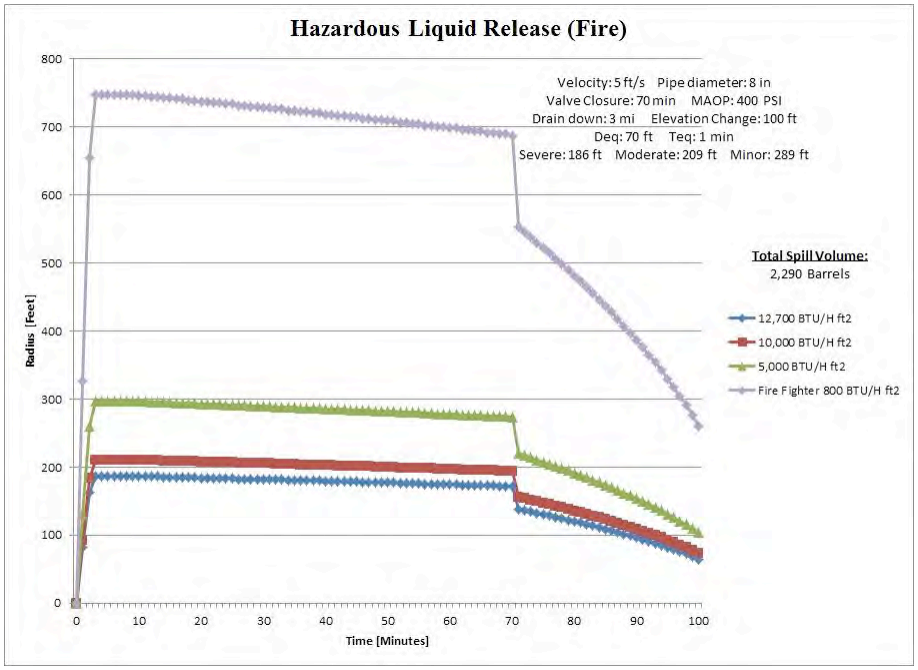

Fig. 3.71. Case Study 5B – Separation distance for 8-in. nominal diameter hazardous liquid pipeline release – velocity = 5 ft/s, MAOP = 400 psig, elevation change = 100 ft, drain down length = 3 mi., valve closure time = 70 minutes.

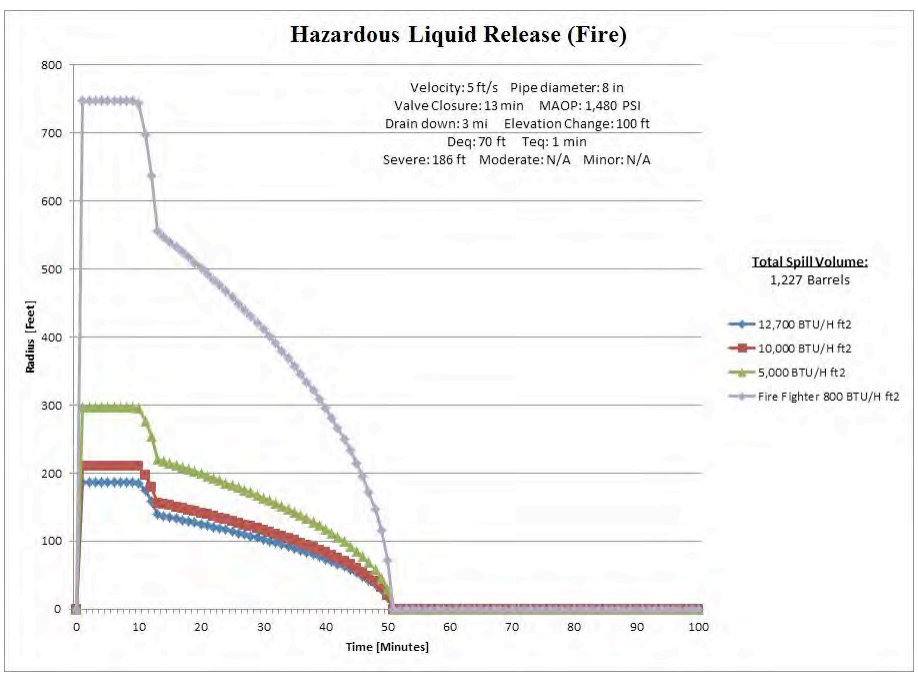

Fig. 3.72. Case Study 5C – Separation distance for 8-in. nominal diameter hazardous liquid pipeline release – velocity = 5 ft/s, MAOP = 1,480 psig, elevation change = 100 ft, drain down length = 3 mi., valve closure time = 13 minutes.

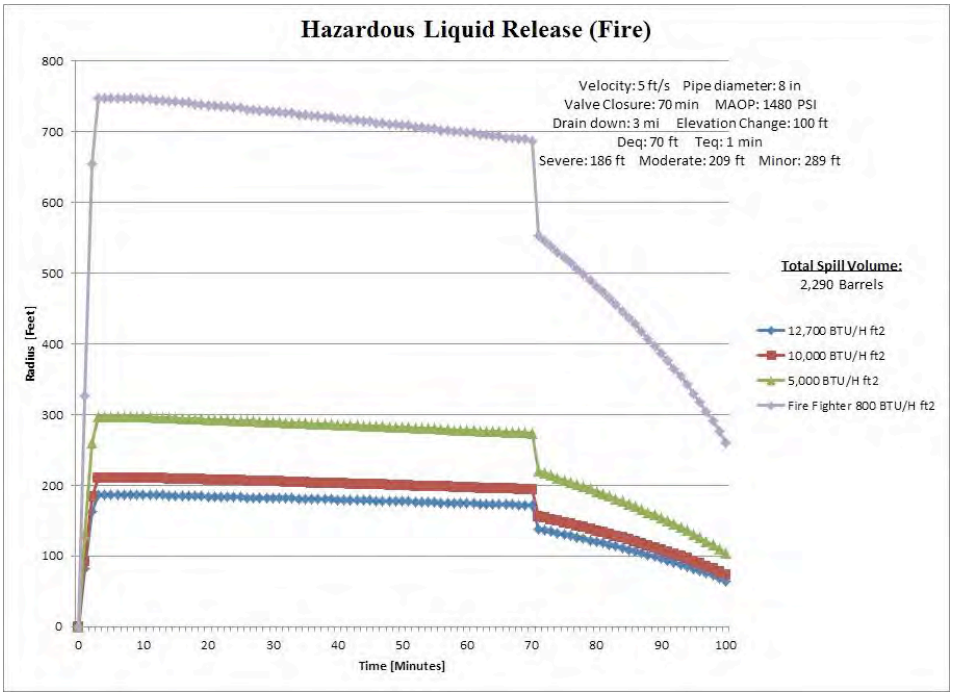

Fig. 3.73. Case Study 5D – Separation distance for 8-in. nominal diameter hazardous liquid pipeline release – velocity = 5 ft/s, MAOP = 1,480 psig, elevation change = 100 ft, drain down length = 3 mi., valve closure time = 70 minutes.

Characteristics for Case Study 6A, 6B, 6C, and 6D that involve 30-in. nominal diameter liquid propane pipelines are tabulated in Table 3.23. These case studies compare the following effects on avoided damage costs.

- Case studies 6A and 6B compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 30-in. nominal diameter liquid propane pipelines with MAOPs equal to 400 psig and valve closure durations or either 13 minutes or 70 minutes after the break.
- Case studies 6C and 6D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 30-in. nominal diameter liquid propane pipelines with MAOPs equal to 1,480 psig and valve closure durations or either 13 minutes or 70 minutes after the break.
- Case studies 6A and 6C compare effects of MAOP on the avoided damage costs for hypothetical 30-in. nominal diameter liquid propane pipelines with valve closure durations of 13 minutes after the break.
- Case studies 6B and 6D compare effects of MAOP on the avoided damage costs for hypothetical 30-in. nominal diameter liquid propane pipelines with valve closure 70 minutes after the break.

Note that the avoided damage costs are not sensitive to pressure and elevation changes because the model is based on the methodology in 49 CFR §194.105 (b) (1) for a worst case discharge which has a constant flow rate.

Figures 3.74 to 3.77 show potentially severe, moderate, and minor damage radii as a function of time for hypothetical 30-in. nominal diameter liquid propane pipelines.

Table 3.23. Avoided damage costs for hypothetical 30-in. liquid propane pipeline releases

Characteristic	Case Study 6A	Case Study 6B	Case Study 6C	Case Study 6D
Nominal Line Pipe Diameter, in.	30	30	30	30
MAOP, psig	400	400	1,480	1,480
Elevation Change, ft	1,000	1,000	1,000	1,000
Equilibrium Diameter, ft	264	264	264	264
Detection Phase Duration, minutes	5	5	5	5
Continued Pumping Phase Duration, minutes	5	5	5	5
Valve closure after break, minutes	13	70	13	70
Severe Damage Heat Flux, Btu/hr ft^2	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break	12,700 or greater at break
Moderate Damage Heat Flux, Btu/hr ft^2	At least 10,000 for 15 min, after break	At least 10,000 for 15 min, after break	At least 10,000 for 15 min, after break	At least 10,000 for 15 min, after break
Minor Damage Heat Flux, Btu/hr ft^2	At least 5,000 for 30 min, after break	At least 5,000 for 30 min, after break	At least 5,000 for 30 min, after break	At least 5,000 for 30 min, after break
Total Severe Damage Cost	$3,108,000/acre	$3,108,000/acre	$3,108,000/acre	$3,108,000/acre
Total Moderate Damage Cost	$1,524,000/acre	$1,524,000/acre	$1,524,000/acre	$1,524,000/acre
Total Minor Damage Cost	$540,000/acre	$540,000/acre	$540,000/acre	$540,000/acre
Potentially Severe Radius, ft	699	699	699	699
Potentially Moderate Radius, ft	571	784	571	784
Potentially Minor Radius, ft	613	1085	613	1085
Avoided Severe Damage Cost for Valve Closure in 13 minutes Compared to 70 minutes	$\pi(699 - 699)^2 =$ 0 acres $0	$\pi(699 - 699)^2 =$ 0 acres $0	$\pi(699 - 699)^2 =$ 0 acres $0	$\pi(699 - 699)^2 =$ 0 acres $0

Table 3.23. Avoided damage costs for hypothetical 30-in. liquid propane pipeline releases (Cont.)

Characteristic	Case Study 6A	Case Study 6B	Case Study 6C	Case Study 6D
Avoided Moderate Damage Cost for Valve Closure in 13 minutes Compared to 70 minutes	$\pi(784 - 699)^2$ = 0.52 acres $0.792 M	$\pi(784 - 784)^2$ = 0 acres $0	$\pi(784 - 699)^2$ = 0.52 acres $0.792 M	$\pi(784 - 784)^2$ = 0 acres $0
Avoided Minor Damage Cost for Valve Closure in 13 minutes Compared to 70 minutes	$\pi(1{,}085 - 699)^2$ = 10 acres $5.40 M	$\pi(1{,}085 - 1{,}085)^2$ = 0 acres $0	$\pi(1085 - 699)^2$ = 10 acres $5.40 M	$\pi(1{,}085 - 1{,}085)^2$ = 0 acres $0
Total Damage Cost Avoided for Valve Closure in 13 minutes	$6.19 M	$0	$6.19 M	$0

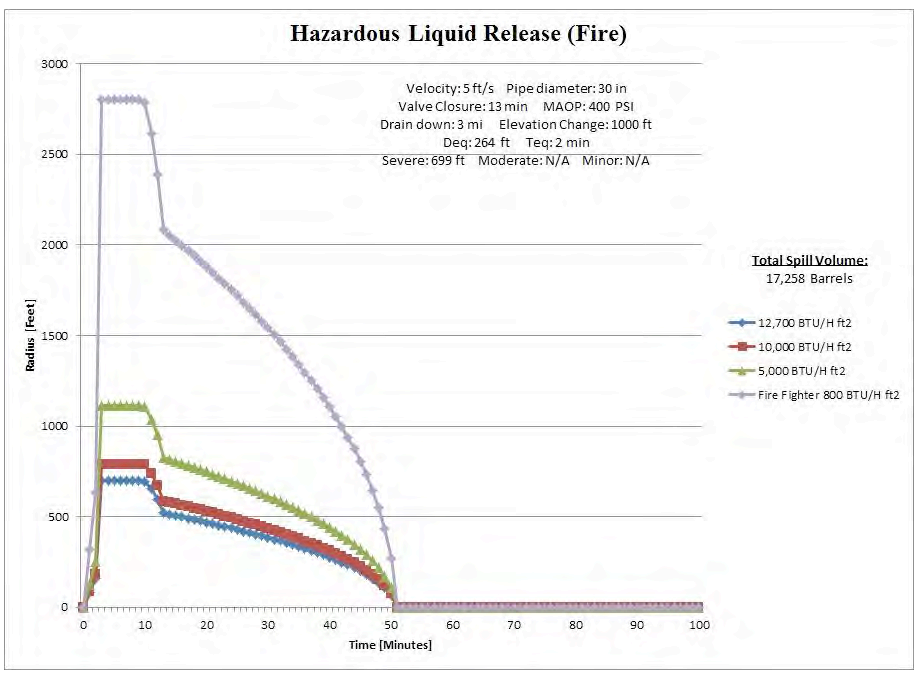

Fig. 3.74. Case Study 6A – Separation distance for 30-in. nominal diameter hazardous liquid pipeline release – velocity = 5 ft/s, MAOP = 400 psig, elevation change = 1,000 ft, drain down length = 3 mi., valve closure time = 13 minutes.

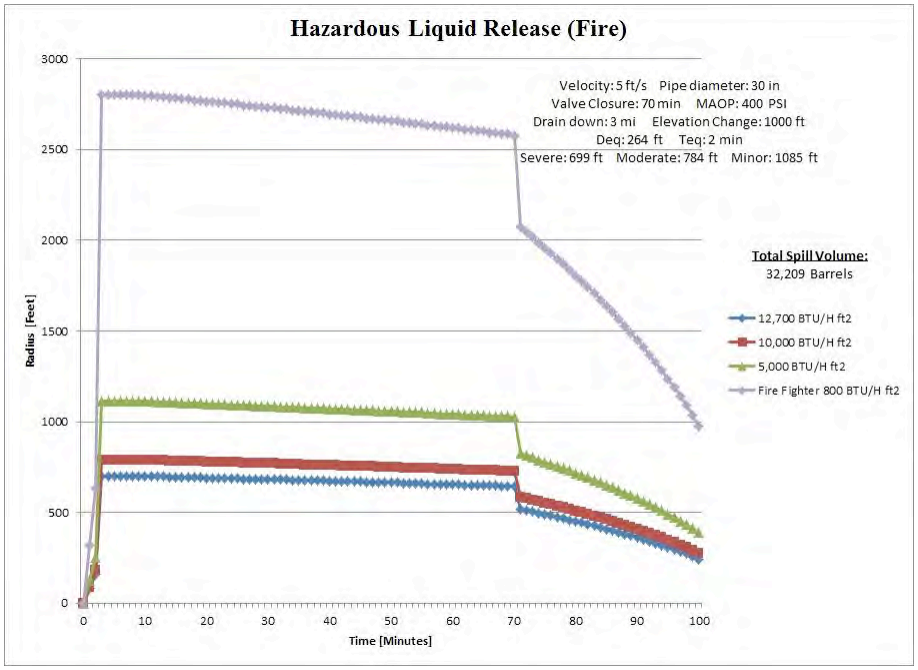

Fig. 3.75. Case Study 6B – Separation distance for 30-in. nominal diameter hazardous liquid pipeline release – velocity = 5 ft/s, MAOP = 400 psig, elevation change = 1,000 ft, drain down length = 3 mi., valve closure time = 70 minutes.

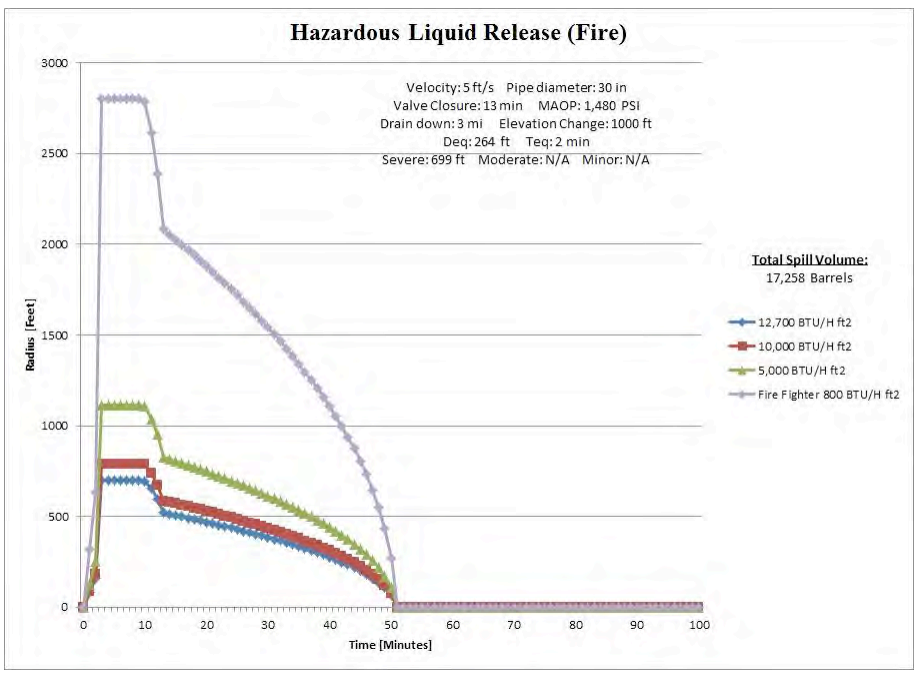

Fig. 3.76. Case Study 6C – Separation distance for 30-in. nominal diameter hazardous liquid pipeline release – velocity = 5 ft/s, MAOP = 1,480 psig, elevation change = 1,000 ft, drain down length = 3 mi., valve closure time = 13 minutes.

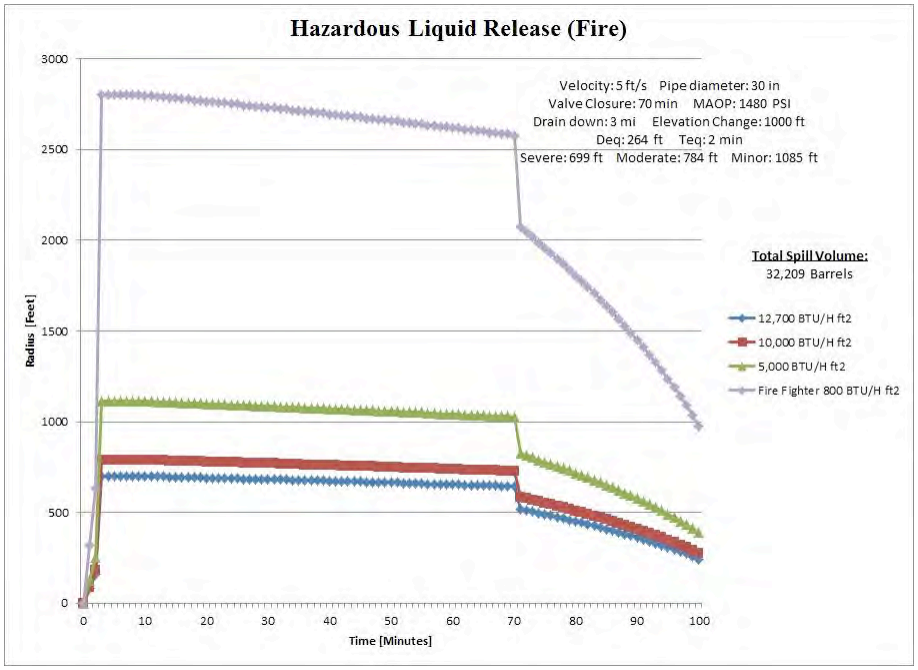

Fig. 3.77. Case Study 6D – Separation distance for 30-in. nominal diameter hazardous liquid pipeline release – velocity = 5 ft/s, MAOP = 1,480 psig, elevation change = 1,000 ft, drain down length = 3 mi., valve closure time = 70 minutes.

Damage Resulting from Hypothetical Liquid Propane Pipeline Releases with Ignition in a HCA

The potentially severe damage radius for each of the 8-in. nominal diameter liquid propane pipeline release scenarios considered in this study are unaffected by the swiftness of block valve closure. The pools reach their equilibrium diameters in 1 minute which is less than the 13 minutes required to detect the leak (5 minutes), shutdown the pumps (5 minutes), and close the valves (3 minutes). Similarly, the potentially severe damage radius for each of the 30-in. nominal diameter liquid propane pipeline release scenarios considered in this study are unaffected by the swiftness of block valve closure because the pools reach their equilibrium diameters in 2 minutes. Therefore, the avoided damage costs associated with the potentially severe damage radius cannot be actualized unless the detection phase and the continued pumping phase decrease to much less than 5 minutes.

The avoided damage costs attributed to block valve closure swiftness within areas of potentially moderate damage are calculated as follows.

- Determine the potentially severe damage radius for a heat flux of 40 kW/m^2 (12,700 Btu/hr ft^2).
- Determine the potentially moderate damage radius determined for a heat flux of 31.5 kW/m^2 (10,000 Btu/hr ft^2) for 15 minutes and block valve closure in 70 minute. Note that the severe damage radius is used as the limiting factor because the potentially moderate damage radius corresponding to block valve closure in 70 minutes exceeds the potentially severe damage radius.
- Use the difference between these two radii to compute the area of potentially moderate damage.
- Compute the avoided damage cost by multiplying the area of potentially moderate damage by the appropriate unit cost for moderate damage.

The avoided damage costs attributed to block valve closure swiftness within areas of potentially minor damage are calculated as follows.

- Determine the potentially severe damage radius for a heat flux of 40 kW/m^2 (12,700 Btu/hr ft^2).
- Determine the potentially minor damage radius determined for a heat flux of 15.8 kW/m^2 (5,000 Btu/hr ft^2) for 30 minutes and block valve closure in 70 minute. Note that the severe damage radius is used as the limiting factor because the potentially minor damage radius corresponding to block valve closure in 70 minutes exceeds the potentially severe damage radius.
- Use the difference between these two radii to compute the area of potentially minor damage.
- Compute the avoided damage cost by multiplying the area of potentially minor damage by the appropriate unit cost for minor damage.

Fire damage to buildings and personal property in a HCA resulting from liquid propane combustion immediately following guillotine-type breaks in liquid propane pipelines is considered potentially severe for a radius up to 2.6 times the equilibrium diameter. Severe damage to buildings and personal property within this area is possible because the heat flux produced by liquid propane combustion following the break eventually reaches or exceeds the severe damage threshold, 40 kW/m^2 (12,700 Btu/hr ft^2). The radii for moderate, 31.5 kW/m^2 (10,000 Btu/hr ft^2) for 15 minutes, and minor damage, 15.8 kW/m^2 (5,000 Btu/hr ft^2) for 30 min, are reduced or eliminated as the block valves closure time decreases. These results are based on computed heat flux versus time data for liquid propane pipelines with nominal diameters ranging from 8 to 30 in. and MAOPs ranging from 400 to 1,480 psig.

Benefits of Block Valve Closure Swiftness for Hypothetical Liquid Propane Pipeline Releases with Ignition

The swiftness of block valve closure has a significant effect on mitigating potential fire damage to buildings and personal property in a HCA resulting from liquid propane pipeline releases in large diameter pipelines. The benefit in terms of cost avoidance for damage to buildings and personal property attributed to block valve closure swiftness increases as the duration of the block valve shutdown phase decreases.

3.3 HAZARDOUS LIQUID PIPELINES WITHOUT IGNITION

The socioeconomic and environmental effects of an oil spill are strongly influenced by the circumstances surrounding the spill including the type of product spilled, the location and timing of the spill, sensitive areas affected or threatened, liability limits in place, local and national laws, and cleanup strategy. The most important factors determining a per-unit cost are location and oil type, and possibly total spill amount.

The amount of oil spilled can have a profound effect on the cleanup costs. Obviously, the more oil spilled, the more oil there is to remove or disperse, and the more expensive the cleanup operation. However, cleanup costs on a per-unit basis decrease significantly with increasing amounts of oil spilled. Smaller spills are often more expensive on a per-unit basis than larger spills because of the costs associated with setting up the cleanup response, bringing in the equipment and labor, as well as bringing in the experts to evaluate the situation (Etkin, 1999).

The following methodology was used to determine: (1) the time-dependent discharge from a hazardous liquid transmission pipeline resulting from a guillotine-type break, and (2) the quantity of hazardous liquid released during the detection, continued pumping, block valve closure, and drain down phases

needed to estimate cleanup costs. The total volume of a hazardous liquid pipeline release is primarily influenced by the flow rate at the time of the break; the combined durations of the detection, continued pumping, block valve closure phases; and the size and shape of the break. For worst case, guillotine-type breaks, where the effective hole size is equal to the line pipe diameter, the governing parameters are the line pipe diameter and the pipeline length between plateaus and peaks in the vicinity of the break.

Appendix A: Spill Volume Released Due to Valve Closure Times in Liquid Propane Pipelines, contains a family of curves for various hazardous liquid pipeline release scenarios that quantify the volume of liquid released following a guillotine-type break.

3.3.1 Analysis Scope, Parameters, and Assumptions

The methodology is based on fundamental fluid mechanics principles for computing the time-dependent response of hazardous liquid pipelines following a guillotine-type break. It is also suitable for determining the effects that detection, continued pumping, block valve closure duration have on a worst case discharge release determined in accordance with federal pipeline safety regulations in 49 CFR 194 for estimating worst case discharges from hazardous liquid pipelines (DOT, 2011e).

The configuration of the hypothetical hazardous liquid pipeline used to evaluate the effectiveness of RCVs and ASVs in mitigating the consequences of a release has the following design features and operating characteristics:

- The pump stations are located at 100 mile intervals along the pipeline.
- Each pressure pump station has a remote control device that can be activated by the pipeline operator to shut down the compressors after a rupture occurs.
- The rupture is a guillotine-type break that initiates the release event.
- The break is located at a low point in the pipeline elevation profile.
- The following times are study variables.
  - ✓ The time when the operator detects the leak.
  - ✓ The time when the operator stops the pumps.
  - ✓ The time when the upstream and downstream block valves are closed and the line section with the break is isolated.
- The total volume of the hazardous liquid release equals the volume of liquid released during the detection, continued pumping, block valve closure, and drain down phases.
- The time-dependent flow rate is a study variable.

Study variables used to characterize hazardous liquid pipeline releases are listed in Table 3.24.

3.3.2 Analytical Approach and Computational Models

After a hazardous liquid pipeline ruptures without ignition, liquid begins flowing from the break and continues until draining is complete. A pipeline break can range in size and shape from a short, through-wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Although the volume of the discharge depends on many factors, the event is subdivided into the four sequential phases with the total discharge volume equal to the sum of the volumes released during each phase. The phases of a hazardous liquid pipeline release are outlined in Section 1.3.2.1.

Table 3.24. Study variables for characterizing hazardous liquid pipeline releases.

Variable	Description	Variable Values
H	Elevation distance from break, ft	100, 500, 1,000
L	Maximum length between plateaus and peaks, mi.	3
D	Nominal line pipe diameter, in.	8, 12, 16, 24, 30, 36
v_p	Flow rate, ft/s	5, 10, 15
v_g	Drain down liquid velocity	Calculated based on H
t_d-t_0	Duration of detection phase, minutes	5
t_p-t_d	Duration of continued pumping phase, minutes	5
t_s-t_p	Duration of block valve closure phase, minutes	3, 30, 60, 90
t_{dd}-t_s	Duration of drain down phase, minutes	Calculated based on v_g
P_1	Maximum allowable operating pressure (MAOP), psig	400, 800, 1,200, 1,480

The flow rate through the break remains constant through both the detection and continued pumping phases. In the block valve closure phase, the maximum flow rate through the break is based on the elevation difference of liquid in the pipeline. During the pipeline drain down phase, the maximum flow rate through the break is based on the difference between the operating pressure of the pipeline and atmospheric pressure. Requirements in 49 CFR 194.105(b)(1) state the worst case discharge is the largest volume of fluid released based on the pipeline's maximum release time, plus the maximum shutdown response time, multiplied by the maximum flow rate, which is based on the maximum daily capacity of the pipeline, plus the largest line drainage volume after shutdown of the line sections. In this methodology, the maximum flow rate can be estimated by multiplying the fluid speed at the pump by the cross sectional area of the line pipe. Although operators can use this rule to determine a worst case discharge, the actual flow rate during the block valve closure phase may be greater (less conservative) due to factors such as fluid density, pressure changes, pump performance characteristics, and the elevation profile of the pipeline which are not reflected in the methodology. These factors are important in a risk analysis because their effects influence time-dependent damage resulting from a release.

The influence of fluid density, pressure changes, and the elevation profile of the pipeline is taken into consideration in this study by using Bernoulli's equation to calculate the flow rate during the block valve closure and drain down phases. However, there are recognized limitations in using Bernoulli's equation to determine drain down time because it does not model the effects of air flow through the pipeline break which occurs as the fluid escapes following block valve closure. Although Bernoulli's equation does not produce an exact solution to this fluid dynamics problem, comparison of the results provides a consistent approach for evaluating the effectiveness of block valve closure swiftness on mitigating release consequences. Bernoulli's equation follows.

$$z_1 + \frac{\nu_1^2}{2g} + P_1 v_1 \frac{g_c}{g} = z_2 + \frac{\nu_2^2}{2g} + P_2 v_2 \frac{g_c}{g} \tag{3.30}$$

where

z_1	is the elevation of the closed valve, ft,
z_2	is the elevation of the break, ft,
ν_1	is the average velocity of the fluid at the closed valve, ft/s,
ν_2	is the average velocity of the fluid at the break (also known as ν_{exit}), ft/s,
P_1	is the pressure of the fluid at the closed valve, psig,
P_2	is the pressure of the fluid at the break, psig,
ν	is the specific volume of the fluid, ft^3/lb.,
g	is the acceleration due to gravity, ft/s^2, and
g_c	is the gravitational constant, (32.17 ft-lbm/lbf-s^2).

After rearranging Bernoulli's equation, the following equation is used to determine the velocity of the liquid exiting the break.

$$v_{exit} = \sqrt{2g[\Delta z + \Delta P v \frac{g_c}{g} + \frac{v_1^2}{2g}]} \tag{3.31}$$

3.3.3 Socioeconomic and Environmental Effects

The methodology for quantifying potential environmental effects resulting from a hazardous liquid release involves computing the quantity of hazardous liquid released and then using this quantity to establish the total damage cost. The total damage cost, C_d, is determined by adding the response cost, C_r, the socioeconomic damage cost, C_s, and the environmental damage cost, C_e. This methodology applies to crude oil and light fuel (gasoline) releases that affect the following areas.

- Commercially navigable waterways which means a waterway where a substantial likelihood of commercial navigation exists.
- High population areas and another populated areas which mean an urbanized area as defined and delineated by the Census Bureau that contains 50,000 or more people and has a population density of at least 1,000 people per square mile and a place as defined and delineated by the Census Bureau that contains a concentrated population, such as an incorporated or unincorporated city, town, village, or other designated residential or commercial area, respectively.
- Unusually Sensitive Areas (USAs) which is defined in 49 CFR 195.6 to mean a drinking water or ecological resource area that is unusually sensitive to environmental damage from a hazardous liquid pipeline release.

The response cost, C_r, is determined by multiplying the applicable unit response cost shown in Table 3.25 by the applicable medium modifier shown in Table 3.26.

Table 3.25. Unit response costs for crude oil and light fuel releases

Release Quantity, barrels	Crude Oil, $ per barrel	Light Fuels, $ per barrel
<12	9,240	4,200
12-24	9,156	4,116
24-240	9,030	4,074
240-2,400	8,190	3,654
2,400-240,000	5,166	3,108
> 240,000	3,864	1,302

Note: 2004 cost basis

Table 3.26. Modifier for location medium categories for crude oil and light fuel releases

Medium Category	Medium Modifier
Open Water/Shore	1.0
Soil/Sand	0.6
Pavement/Rock	0.5
Wetland	1.6
Mudflat	1.4
Grassland	0.7
Forest	0.8
Taiga (boreal forest)	0.9
Tundra	1.3

The socioeconomic damage cost, C_s, is determined by multiplying the applicable unit socioeconomic cost shown in Table 3.27 by applicable the socioeconomic cost modifier shown in Table 3.28.

Table 3.27. Unit socioeconomic and environmental costs for crude oil and light fuel releases

Release Quantity, barrels	Crude Oil, $ per barrel		Light Fuels, $ per barrel	
	Socioeconomic	Environmental	Socioeconomic	Environmental
<12	2,100	3,780	3,360	3,570
12-24	8,400	3,654	13,860	3,360
24-240	12,600	3,360	21,000	2,940
240-2,400	5,880	3,066	8,400	2,730
2,400-240,000	2,940	1,470	4,200	1,260
> 240,000	2,520	1,260	3,780	1,050

Note: 2004 cost basis

Table 3.28. Socioeconomic and cultural value ranking for crude oil and light fuel releases

Value Rank	Release Impact Site Description	Examples	Cost Modifier Value
Extreme	Predominated by areas with high socioeconomic value that may potentially experience a large degree of long-term impact if oiled.	Subsistence/commercial fishing, aquaculture areas	2.0
Very High	Predominated by areas with high socioeconomic value that may potentially experience some long-term impact if oiled.	National park/reserves for ecotourism/nature viewing; historic areas	1.7
High	Predominated by areas with medium socioeconomic value that may potentially experience some long-term impact if oiled.	Recreational areas, sport fishing, farm/ranchland	1.0
Moderate	Predominated by areas with medium socioeconomic value that may potentially experience short-term impact if oiling occurs.	Residential areas; urban/suburban parks; roadsides	0.7
Minimal	Predominated by areas with a small amount of socioeconomic value that may potentially experience short-term impact if oiled.	Light industrial areas; commercial zones; urban areas	0.3
None	Predominated by areas already moderately to highly polluted or contaminated or of little socioeconomic or cultural import that would experience little short- or long-term impact if oiled.	Heavy industrial areas; designated dump sites	0.1

Note: Long-term impacts are those impacts that are expected to last months to years after the spill or be relatively irreversible. Short-term impacts are those impacts that are expected to last days to weeks after the spill occurs and are generally considered to be reasonably reversible.

The environmental damage cost, C_e, is determined by multiplying the applicable unit environmental cost shown in Table 3.27 by one half of the applicable freshwater modifier shown in Table 3.29 plus the wildlife modifier shown in Table 3.30.

Table 3.29. Freshwater vulnerability categories for crude oil and light fuel releases

Freshwater Vulnerability Category	Freshwater Vulnerability Modifier
Wildlife Use	1.7
Drinking	1.6
Recreation	1.0
Industrial	0.4
Tributaries to Drinking/Recreation	1.2
Non-Specific	0.9

Table 3.30. Habitat and wildlife sensitivity categories for crude oil and light fuel releases

Habitat and Wildlife Sensitivity Category	Habitat and Wildlife Sensitivity Modifier
Urban/Industrial	0.4
Roadside/Suburb	0.7
River/Stream	1.5
Wetland	4.0
Agricultural	2.2
Dry Grassland	0.5
Lake/Pond	3.8
Estuary	1.2
Forest	2.9
Taiga	3.0
Tundra	2.5
Other Sensitive	3.2

This methodology is consistent with the U.S. Environmental Protection Agency (EPA) Basic Oil Spill Cost Estimation Model (BOSCEM) that was developed to provide the US EPA Oil Program with a methodology for estimating oil spill costs, including response costs and environmental and socioeconomic damages, for actual and hypothetical spills (Etkin, 2004).

Total Damage Cost Validation

The following case studies compare the actual damage costs for two hazardous liquid pipeline releases to the corresponding total damage costs determined using BOSCEM.

Case Study 1 – Enbridge 2010

The Enbridge Line 6B pipeline ruptured in Marshall, Michigan on July 25, 2010, and released approximately 20,000 barrels of crude oil. This release from the 30-in. nominal diameter pipeline caused environmental impacts along Talmadge Creek and the Kalamazoo River (Nicholson, 2012). Cleanup and recovery costs for this release totaled $767,000,000.

Using the EPA BOSCEM, the estimated total damage cost for this release is approximately $307,900,000. This total damage cost, C_d, includes the response cost, C_r, the socioeconomic damage cost, C_s, and the environmental damage cost, C_e, determined as follows.

> Response cost, C_r = unit response cost × medium modifier (Wetland) = $5,166 × 1.6 = $8,265/barrel
>
> Socioeconomic damage cost, C_s = unit socioeconomic cost × socioeconomic cost modifier (High) = $2,940 × 1.0 = $2,940/barrel

Environmental damage cost, C_e = unit environmental cost × 0.5 × [freshwater modifier (Wildlife Use) + wildlife modifier (Wetland)] = \$1,470 × 0.5 × (1.7 + 4.0) = \$4,190/barrel

Total damage cost (2004 basis), C_d = 20,000 barrels × (\$8,265 + \$2,940 + \$4,190)/barrel = \$307,900,000.

After adjusting for inflation, the total damage cost (2012 basis), C_d = \$307,900,000 × 1.25 (inflation factor) = \$384,875,000 which is approximately 50% of the actual cost.

Case Study 2 – Yellowstone 2011

A 12-in. hazardous liquid pipeline owned by ExxonMobil Pipeline Company ruptured on July 1, 2011 under the Yellowstone River 20 miles upstream from Billings, Montana. The Yellowstone River is navigable water in the United States (EPA, 2011). The ruptured pipeline released an estimated 1,509 barrels of oil that entered the river before the pipeline was closed. Cleanup and recovery costs for this release totaled \$135,000,000.

The estimated total damage cost for this release is \$48,044,000 based on 2004 cost data. This total damage cost, C_d, includes the response cost, C_r, the socioeconomic damage cost, C_s, and the environmental damage cost, C_e, determined as follows.

Response cost, C_r = unit response cost × medium modifier (Wetland) = \$8,190 × 1.6 = \$13,104/barrel.

Socioeconomic damage cost, C_s = unit socioeconomic cost × socioeconomic cost modifier (Very High) = \$5,880 × 1.7 = \$9,996/barrel.

Environmental damage cost, C_e = unit environmental cost × 0.5 × [freshwater modifier (Wildlife Use) + wildlife modifier (Wetland)] = \$3,066 × 0.5 × (1.7 + 4.0) = \$8,738/barrel.

Total damage cost (2004 basis), C_d = 1,509 barrels × (\$13,104 + \$9,996 + \$8,738)/barrel = \$48,044,000.

After adjusting for inflation, the total damage cost (2012 basis), C_d = \$48,044,000 × 1.25 (inflation factor) = \$60,054,000 which is approximately 44% of the actual cost.

Damage Cost Adjustment Factor

For this study, total damage costs of hazardous liquid pipeline releases are determined using the EPA BOSCEM and then increased by a damage cost adjustment factor of 2.1. This factor aligns the model with cleanup and recovery costs for two recent hazardous liquid pipeline releases of crude oil into sensitive socioeconomic and environmental areas.

3.3.4 Risk Analysis Results for Hazardous Liquid Pipeline Releases

The methodology for assessing socioeconomic and environmental damage to HCAs is based on computed release volumes corresponding to the detection, continued pumping, block valve closure, and drain down phases of a hazardous liquid pipeline release of crude oil without ignition. The method used in this analysis for defining maximum flow rate through the break is as defined in 49 CFR 195.105(b)(1) for the detection, pump shut down, block valve closure, and drain down phases. The damage is quantified using the EPA BOSCEM and the damage cost adjustment factor described in Section 3.3.3.

Eight case studies involving hypothetical hazardous liquid pipeline releases in HCAs are considered to assess effects of block valve closure time on socioeconomic and environmental damage resulting from a guillotine-type break. The duration of the detection and continued pumping phases for the hypothetical hazardous liquid pipelines are 5 minutes and 5 minutes, respectively. The duration of the block valve closure phases is 3 minutes.

Characteristics for Case Study 7A, 7B, 7C, and 7D that involve 8-in. nominal diameter hazardous liquid pipelines are tabulated in Table 3.31. These case studies compare the following effects on avoided damage costs.

- Case studies 7A and 7B compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 8-in. nominal diameter hazardous liquid pipelines with MAOPs equal to either 400 psig or 1,480 psig, an elevation change of 100 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes
- Case studies 7C and 7D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 8-in. nominal diameter hazardous liquid pipelines with MAOPs equal to either 400 psig or 1,480 psig, an elevation change of 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.
- Case studies 7A and 7C compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 8-in. nominal diameter hazardous liquid pipelines with MAOPs equal to 400 psig, an elevation change equal to either 100 ft or 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.
- Case studies 7B and 7D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 8-in. nominal diameter hazardous liquid pipelines with MAOPs equal to 1,480 psig, an elevation change equal to either 100 ft or 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

Table 3.31. Avoided damage costs for hypothetical 8-in. hazardous liquid pipeline releases without ignition

Characteristic	Case Study 7A		Case Study 7B		Case Study 7C		Case Study 7D	
Type Hazardous Liquid	Crude Oil		Crude Oil		Crude Oil		Crude Oil	
Flow Velocity, ft/s	15		15		15		15	
Nominal Line Pipe Diameter, in.	8		8		8		8	
Drain Down Length, mi.	3		3		3		3	
MAOP, psig	400		1,480		400		1,480	
Elevation Change, ft	100		100		1,000		1,000	
Detection Phase Duration, minutes	5		5		5		5	
Continued Pumping Phase Duration, minutes	5		5		5		5	
Released Amount, barrels*	240 – 2,400	2,400 – 240,000	240 – 2,400	2,400 – 240,000	240 – 2,400	2,400 – 240,000	240 – 2,400	2,400 – 240,000
Medium Modifier (Wetland)	1.6		1.6		1.6		1.6	
Response Cost, C_r	13,104	8,266	13,104	8,266	13,104	8,266	13,104	8,266
Unit Socioeconomic Cost, $/barrel	5,880	2,940	5,880	2,940	5,880	2,940	5,880	2,940
Socioeconomic Cost Modifier (Very High)	1.7		1.7		1.7		1.7	
Socioeconomic Damage Cost, C_s	9,996	4,998	9,996	4,998	9,996	4,998	9,996	4,998
Unit Environmental Cost, $/barrel	3,066	1,470	3,066	1,470	3,066	1,470	3,066	1,470
One half Freshwater Modifier (Wildlife Use = 1.7) and Wildlife Modifier (Wetland = 4.0)	2.85		2.85		2.85		2.85	
Environmental Damage Cost, C_e	8,738	4,190	8,738	4,190	8,738	4,190	8,738	4,190
Total Damage Unit Cost, C_d, $/barrel	31,838	17,454	31,838	17,454	31,838	17,454	31,838	17,454
Damage Cost Adjustment Factor for Hazardous Liquid Pipeline Releases	2.1		2.1		2.1		2.1	
Total Damage Unit Cost on 2012 Basis, $/barrel	66,860	36,653	66,860	36,653	66,860	36,653	66,860	36,653
Detection Phase Release, barrels	280		280		280		280	
Continued Pumping Phase Release, barrels	280		280		280		280	
Drain Down Phase Release, barrels	985		985		985		985	
Block Valve Closure Phase for Valve Closure in 3 minutes, barrels	168		168		168		168	

Table 3.31. Avoided damage costs for hypothetical 8-in. hazardous liquid pipeline releases without ignition (Cont.)

Characteristic	Case Study 7A	Case Study 7B	Case Study 7C	Case Study 7D
Block Valve Closure Phase for Valve Closure in 30 minutes, barrels	1,679	1,679	1,679	1,679
Block Valve Closure Phase for Valve Closure in 60 minutes, barrels	3,357	3,357	3,357	3,357
Block Valve Closure Phase for Valve Closure in 90 minutes, barrels	5,036	5,036	5,036	5,036
Avoided Damage Cost for Valve Closure in 3 minutes Compared to 90 minutes	5,036 – 168 = 4,868 Barrels $173 M	5,036 – 168 = 4,868 Barrels $173 M	5,036 – 168 = 4,868 Barrels $173 M	5,036 – 168 = 4,868 Barrels $173 M
Avoided Damage Cost for Valve Closure in 30 minutes Compared to 90 minutes	5,036 – 1,679 = 3,357 Barrels $123 M	5,036 – 1,679 = 3,357 Barrels $123 M	5,036 – 1,679 = 3,357 Barrels $123 M	5,036 – 1,679 = 3,357 Barrels $123 M
Avoided Damage Cost for Valve Closure in 60 minutes Compared to 90 minutes	5,036 – 3,357 = 1,679 Barrels $61.5 M	5,036 – 3,357 = 1,679 Barrels $61.5 M	5,036 – 3,357 = 1,679 Barrels $61.5 M	5,036 – 3,357 = 1,679 Barrels $61.5 M
Avoided Damage Cost for Valve Closure in 90 minutes Compared to 90 minutes	5,036 – 5,036 = 0 Barrels $0 M	5,036 – 5,036 = 0 Barrels $0 M	5,036 – 5,036 = 0 Barrels $0 M	5,036 – 5,036 = 0 Barrels $0 M

Notes: *See Tables 3.25 and Table 3.27. The avoided cost resulting from reducing the block valve closure phase is significantly more than the cost for converting a manually operated block valve to either a RCV or ASV for hazardous liquid pipelines with 8-in. nominal diameters.

Figures 3.78 to 3.81 list the discharge volumes in barrels for Case Study 7A, 7B, 7C, and 7D. Discharge volumes listed in Table 3.31 for each case study are determined by adding the discharge volumes for the detection (5 minutes), continued pumping (5 minutes), block valve closure (3, 30, 60, and 90 minutes), and drain down (3 miles) phases. Avoided damage costs, which are also listed in Table 3.31, represent the differences between the discharge volumes for the various block valve closure durations and the 3 minute block valve closure duration multiplied by the avoided damage unit cost. The total damage unit cost for these case studies is estimated at $66,860 per barrel for a released amount of 240 – 2,400 barrels and $36,653 per barrel for a released amount of 2,400 – 240,000 barrels. This total damage cost is the sum of the response cost plus the socioeconomic damage cost plus the environmental damage cost. Note that the avoided damage costs are not sensitive to pressure and elevation changes because the model is based on the methodology in 49 CFR 194.105 (b) (1) for a worst case discharge which has a constant flow rate.

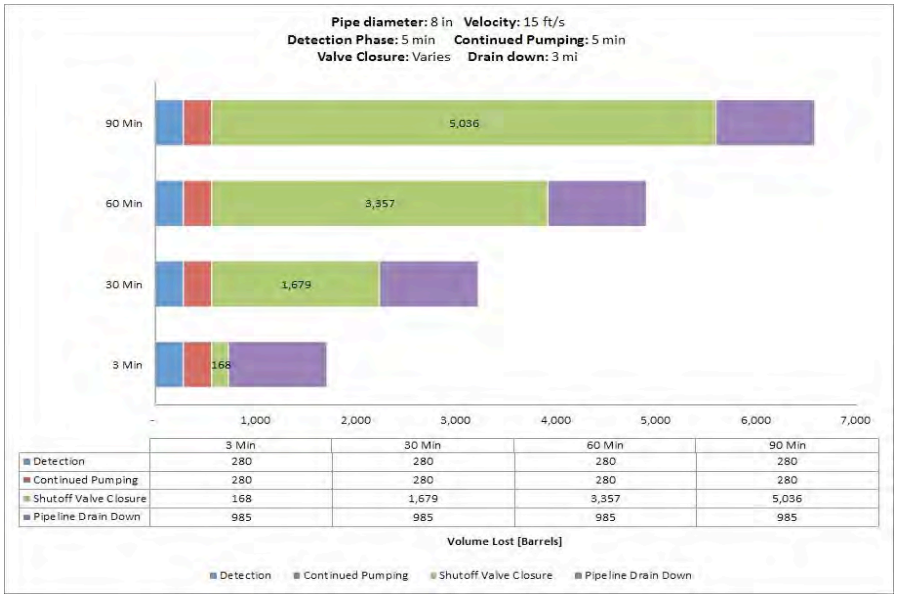

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. 3.78. Case Study 7A – Discharge volumes for an 8-in. hazardous liquid pipeline with a 400 psig MAOP and an elevation change of 100 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

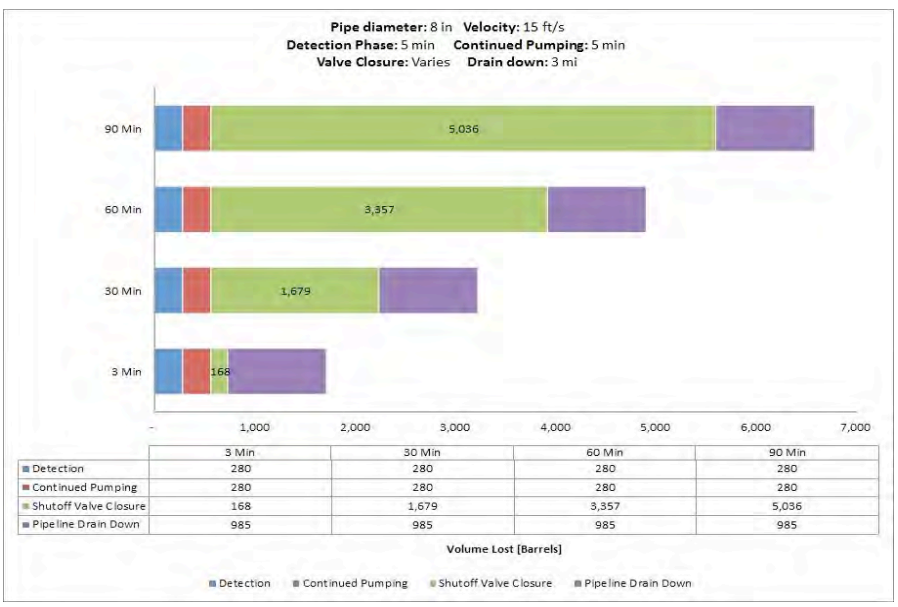

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. 3.79. Case Study 7B – Discharge volumes for an 8-in. hazardous liquid pipeline with a 1,480 psig MAOP and an elevation change of 100 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

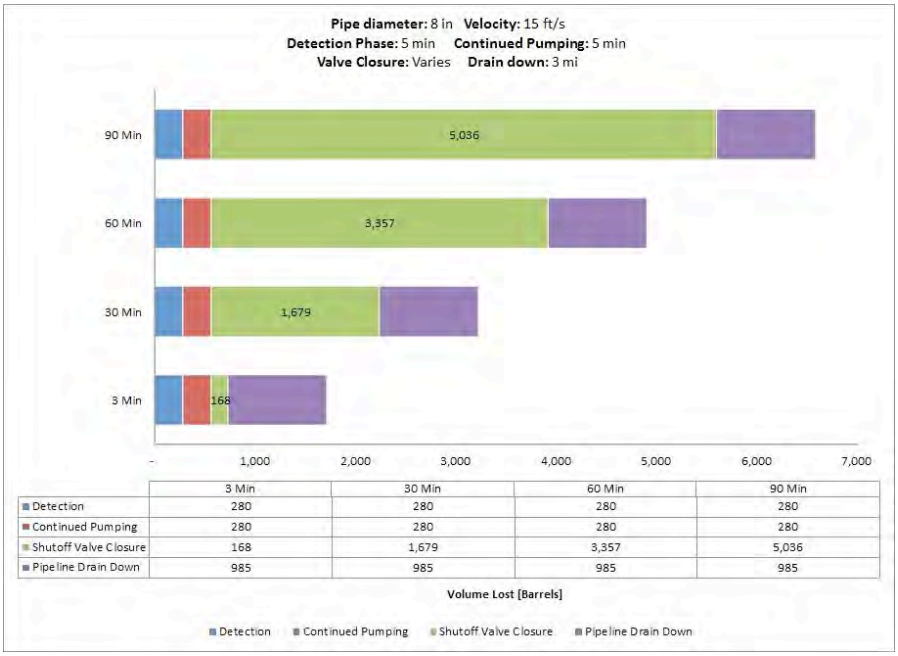

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. 3.80. Case Study 7C – Discharge volumes for an 8-in. hazardous liquid pipeline with a 400 psig MAOP and an elevation change of 1,000 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. 3.81. Case Study 7D – Discharge volumes for an 8-in. hazardous liquid pipeline with a 1,480 psig MAOP and an elevation change of 1,000 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

Characteristics for Case Study 8A, 8B, 8C, and 8D that involve 36-in. nominal diameter hazardous liquid pipelines are tabulated in Table 3.32. These case studies compare the following effects on avoided damage costs.

- Case studies 8A and 8B compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to either 400 psig or 1,480 psig, an elevation change of 100 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.
- Case studies 8C and 8D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to either 400 psig or 1,480 psig, an elevation change of 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.
- Case studies 8A and 8C compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to 400 psig, an elevation change equal to either 100 ft or 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.
- Case studies 8B and 8D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to 1,480 psig, an elevation change equal to either 100 ft or 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

Figures 3.82 to 3.85 list the discharge volumes in barrels for Case Study 8A, 8B, 8C, and 8D. Discharge volumes listed in Table 3.32 for each case study are determined by adding the discharge volumes for the detection (5 minutes), continued pumping (5 minutes), block valve closure (3, 30, 60, and 90 minutes), and drain down (3 miles) phases. Avoided damage costs, which are also listed in Table 3.32, represent the differences between the discharge volumes for the various block valve closure durations and the 3 minute block valve closure duration multiplied by the avoided damage unit cost. The total damage unit cost for these case studies is estimated at $29,520 per barrel. This total damage cost is the sum of the response cost plus the socioeconomic damage cost plus the environmental damage cost. Note that the avoided damage costs are not sensitive to pressure and elevation changes because the model is based on the methodology in 49 CFR §194.105 (b) (1) for a worst case discharge which has a constant flow rate.

Benefits of Block Valve Closure Swiftness for a Hypothetical Hazardous Liquid Pipeline Releases without Ignition

The swiftness of block valve closure has a significant effect on mitigating potential socioeconomic and environmental damage to the human and natural environments resulting from hazardous liquid pipeline releases. The benefit in terms of cost avoidance for damage to the human and natural environments attributed to block valve closure swiftness increases as the duration of the block valve shutdown phase decreases.

Table 3.32. Effects of hypothetical 36-in. hazardous liquid pipeline releases without ignition

Characteristic	Case Study 8A	Case Study 8B	Case Study 8C	Case Study 8D
Type Hazardous Liquid	Crude Oil	Crude Oil	Crude Oil	Crude Oil
Flow Velocity, ft/s	15	15	15	15
Nominal Line Pipe Diameter, in.	36	36	36	36
Drain Down Length, mi.	3	3	3	3
MAOP, psig	400	1,480	400	1,480
Elevation Change, ft	100	100	1,000	1,000
Detection Phase Duration, minutes	5	5	5	5
Continued Pumping Phase Duration, minutes	5	5	5	5
Unit Response Cost, $/barrel	3,864	3,864	3,864	3,864
Medium Modifier (Wetland)	1.6	1.6	1.6	1.6
Response Cost, C_r	6,182	6,182	6,182	6,182
Unit Socioeconomic Cost, $/barrel	2,520	2,520	2,520	2,520
Socioeconomic Cost Modifier (Very High)	1.7	1.7	1.7	1.7
Socioeconomic Damage Cost, C_s	4,284	4,284	4,284	4,284
Unit Environmental Cost, $/barrel	1,260	1,260	1,260	1,260
One half Freshwater Modifier (Wildlife Use = 1.7) and Wildlife Modifier (Wetland = 4.0)	2.85	2.85	2.85	2.85
Environmental Damage Cost, C_e	3,591	3,591	3,591	3,591
Total Damage Unit Cost, C_d, $/barrel	14,057	14,057	14,057	14,057
Damage Cost Adjustment Factor for Hazardous Liquid Pipeline Releases	2.1	2.1	2.1	2.1
Total Damage Unit Cost on 2012 Basis, $/barrel	29,520	29,520	29,520	29,520
Detection Phase Release, barrels	5,665	5,665	5,665	5,665
Continued Pumping Phase Release, barrels	5,665	5,665	5,665	5,665
Drain Down Phase Release, barrels	19,942	19,942	19,942	19,942
Block Valve Closure Phase for Valve Closure in 3 minutes, barrels	3,399	3,399	3,399	3,399
Block Valve Closure Phase for Valve Closure in 30 minutes, barrels	33,992	33,992	33,992	33,992

Table 3.32. Effects of hypothetical 36-in. hazardous liquid pipeline releases without ignition (Cont.)

Characteristic	Case Study 8A	Case Study 8B	Case Study 8C	Case Study 8D
Block Valve Closure Phase for Valve Closure in 60 minutes, barrels	66,984	66,984	66,984	66,984
Block Valve Closure Phase for Valve Closure in 90 minutes, barrels	101,976	101,976	101,976	101,976
Avoided Damage Cost for Valve Closure in 3 minutes Compared to 90 minutes	101,976 – 3,399 98,577 Barrels $2.91 B	101,976 – 3,399 98,577 Barrels $2.91 B	101,976 – 3,399 98,577 Barrels $2.91 B	101,976 – 3,399 98,577 Barrels $2.91 B
Avoided Damage Cost for Valve Closure in 30 minutes Compared to 90 minutes	101976 – 33,992 = 97,984 Barrels $2.01 B	101976 – 33,992 = 97,984 Barrels $2.01 B	101976 – 33,992 = 97,984 Barrels $2.01 B	101976 – 33,992 = 97,984 Barrels $2.01 B
Avoided Damage Cost for Valve Closure in 60 minutes Compared to 90 minutes	101,976 – 67,984 = 33,992 Barrels $1.00 B	101,976 – 67,984 = 33,992 Barrels $1.00 B	101,976 – 67,984 = 33,992 Barrels $1.00 B	101,976 – 67,984 = 33,992 Barrels $1.00 B
Avoided Damage Cost for Valve Closure in 90 minutes Compared to 90 minutes	101,976 – 101,976 = 0 Barrels $0 B	101,976 – 101,976 = 0 Barrels $0 B	101,976 – 101,976 = 0 Barrels $0 B	101,976 – 101,976 = 0 Barrels $0 B

Note: The avoided cost resulting from reducing the block valve closure phase is significantly more than the cost for converting a manually operated block valve to either a RCV or ASV for hazardous liquid pipelines with 36-in. nominal diameters.

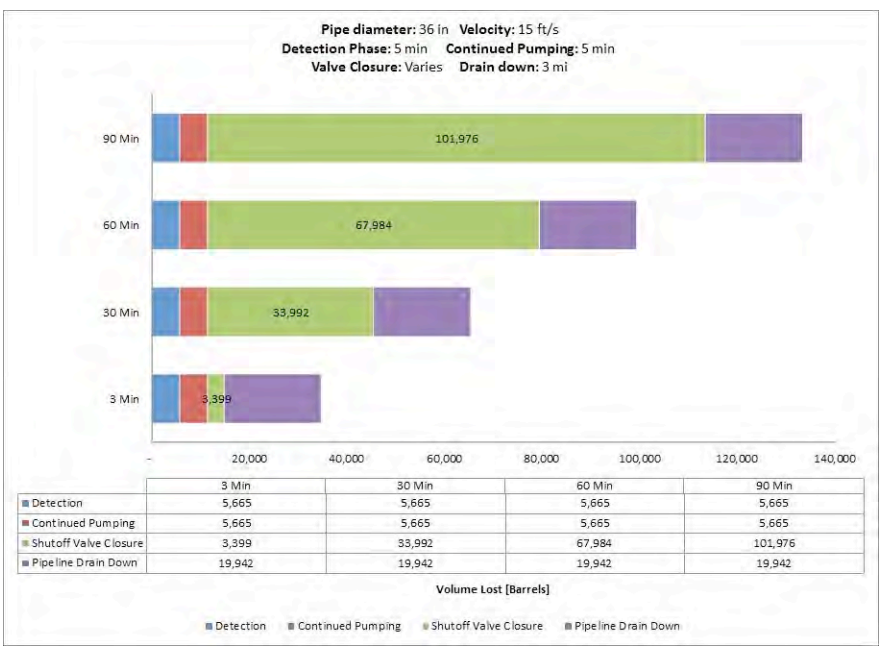

Fig. 3.82. Case Study 8A – Discharge volumes for a 36-in. hazardous liquid pipeline with a 400 psig MAOP and an elevation change of 100 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

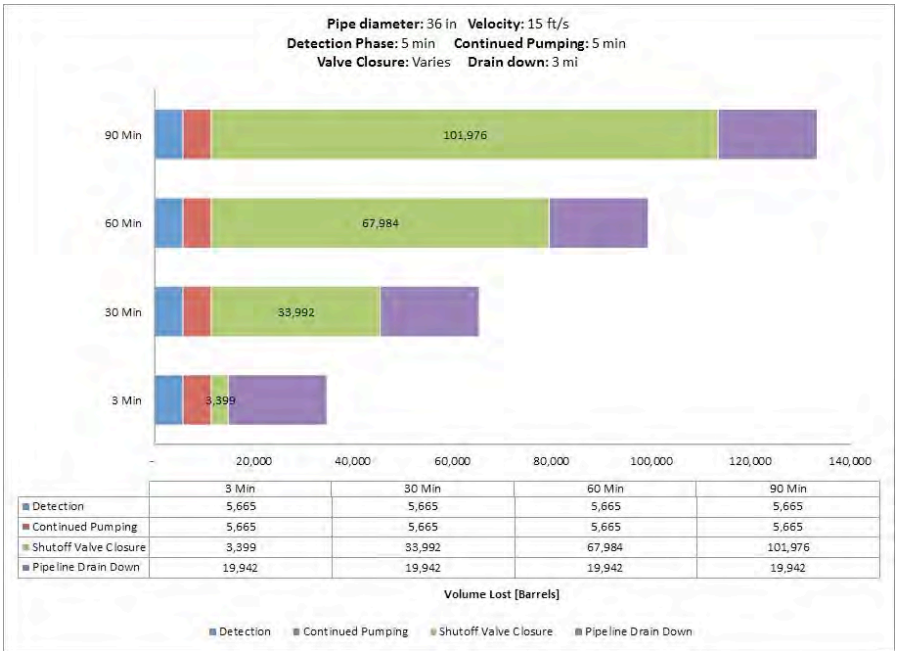

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. 3.83. Case Study 8B – Discharge volumes for a 36-in. hazardous liquid pipeline with a 1,480 psig MAOP and an elevation change of 100 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. 3.84. Case Study 8C – Discharge volumes for a 36-in. hazardous liquid pipeline with a 400 psig MAOP and an elevation change of 1,000 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

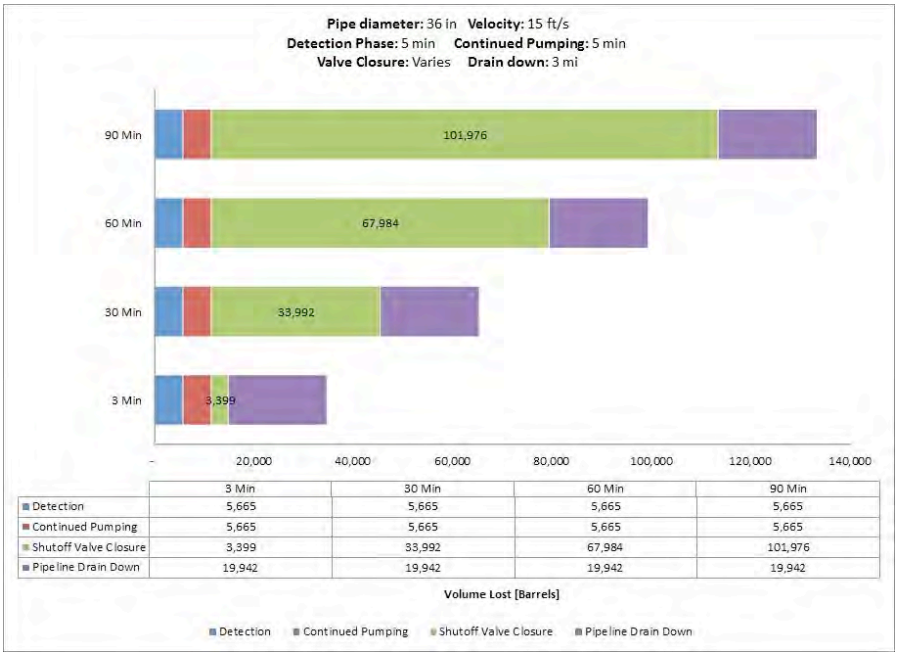

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. 3.85. Case Study 8D – Discharge volumes for a 36-in. hazardous liquid pipeline with a 1,480 psig MAOP and an elevation change of 1,000 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

In its simplest form, a transmission line is a single pipeline segment that connects a product supply to a receiving terminal via a compressor or pumping station and operates continuously under steady-state conditions. However, in reality, most interstate transmission lines are integrated into complex infrastructure systems with parallel and cross connected lines and continuous product supply and demand fluctuations. During normal operation, the computer-based SCADA system collects and processes feedback and control signals from pressure and temperature sensors, flow meters, and other types of mechanical and electrical devices located at various points along the pipeline. These real-time signals are used by the SCADA system and the control room operators to maintain continuous operations while accommodating routine maintenance and in-service testing, equipment repairs and replacements, and product supply and demand fluctuations. In emergency situations, these signals are used to detect deviations that may indicate a leak or rupture.

After detecting a signal deviation that exceeds established limits, an analysis is initiated to determine the cause for the deviation and to determine if the deviation is: (1) consistent with acceptable system performance, or (2) an indication of a system failure such as a leak or rupture. In the event of a system failure, the signals are used to identify the type and possible causes for the failure, locate the point of failure, and determine the proper course of action to limit the potential consequences of the failure and to minimize impacts on the remainder of the system. Without positive evidence of a leak or failure based on field observations, the decision by control room operators to close block valves to isolate a line segment only occurs after analysis confirms a critical emergency situation. However, pipeline operators use different decision-making processes because every pipeline has unique design features, control schemes, and operating requirements that affect the decision to initiate block valve closure.

Standards that specify requirements and provide recommendations for the design, manufacturing, testing and documentation of ball, check, gate, and plug valves for application in pipeline systems for the petroleum and natural gas industries are provided in API Specification 6D (API, 2008). This standard requires valves fitted with manual or powered actuators[7] to have a visible indicator to show the open and the closed position of the obturator[8]. Valve actuators are categorized as follows.

- Manual Control Valve (MCV) where a human travels to the valve location and then closes the valve by operating a mechanical or electrical device. These valves are typically geared to close against line pressure and accommodate human strength. Closure times may exceed 30 minutes for some large-diameter MCVs.
- Remote Control Valve (RCV) where the valve closure mechanism is controlled from a remote location and value closure is initiated through human intervention. Some RCVs are capable of closing in about 3 minutes.
- Automatic Shutoff Valve (ASV) where the valve closure mechanism is connected to sensors that monitor specific operating parameters and initiate valve closure, without human intervention, when the feedback signal exceeds a specified limit or set point. Some ASVs are capable of closing in about 3 minutes.

Types of block valves commonly installed in pipelines include gate valves, plug valves, reduced-port ball valves, and full-port ball valves. A gate valve contains a rectangular or circular plate that is lowered into

[7] A powered actuator is an electric, hydraulic, or pneumatic device bolted or otherwise attached to the valve for powered opening and closing of the valve.
[8] An obturator is a part of a valve, such as a ball, clapper, disc, gate, or plug that is positioned in the flow stream to permit or prevent flow.

the line pipe to stop flow when closed. Plug valves contain a tapered plug with a rectangular opening that is lowered into the line pipe to stop flow when closed. The rectangular opening is relatively small compared to the inside cross-section of the pipe, restricting the flow significantly and presenting an obstacle to the passage of in-line inspection (ILI) tools. A reduced-port ball valve contains a spherical ball with an opening that allows flow when the valve is rotated to the open position. This opening is larger than the opening in a plug valve, but still smaller than the cross-section of the line pipe, restricting flow and presenting a potential obstacle to the passage of ILI tools. Full-port ball valves are similar to reduced-port ball valves except that the opening in the spherical ball is approximately the same size as the cross-section of the line pipe, presenting little restriction to flow and the passage of ILI tools.

Plug valves and gate valves are more commonly found in older transmission lines. The majority of block valves installed in newer transmission lines are reduced-port or full-port ball valves. Since 1994, Federal pipeline safety regulations require all new transmission line installations to be capable of passing an ILI tool. For this reason, operators generally install full-port ball valves in new transmission lines or fully replaced transmission lines.

Flow and pressure sensors used to monitor pipeline operations are generally located adjacent to block valves. However, additional sensors may be required between block valves to provide complementary or redundant feedback signals. These signals are monitored by the SCADA system and operators and used to detect abnormal operating conditions, especially for systems with complex piping configurations with multiple cross connections.

Differences between ASV and RCV feedback and control schemes are gradually merging with advances in sensor technology and improvements in the capabilities of microprocessor-based programmable logic controllers to detect deviations consistent with a leak or rupture and initiate valve closure. However, without effective integration of these technologies into an efficient control system, delays in identifying and locating leaks or ruptures can occur. The following statement from the NTSB accident report for San Bruno supports this conclusion (NTSB, 2011).

> *The PG&E SCADA system lacked several tools that could have assisted the staff in recognizing and pinpointing the location of the rupture, such as real-time leak or line break detection models, and closely spaced flow and pressure transmitters. A real-time leak detection application is a computer-based model of the transmission system that runs simultaneously with SCADA and provides greater feedback to SCADA operators when a large scale leak, line break, or system anomaly is present. Such models use actual SCADA pressures and flows to calculate actual and expected hydraulic performance; when the values do not match, an alarm is generated. Appropriate spacing of pressure transmitters at regular intervals allows SCADA operators to quickly identify pressure decreases that point toward a leak or line break.*

Technologies, equipment, and sensors used in ASV and RCV feedback and control schemes to detect and locate pipeline breaks and initiate valve closure are important factors that affect the overall time required to isolate a damaged pipeline segment. These factors are beyond the scope of this study. However, this study considers variations in detection time in evaluating the effectiveness of block valve closure swiftness in mitigating the consequences of an unintended release.

When ASVs or RCVs are used to isolate a damaged pipeline segment following a guillotine-type break and subsequent fire, the overall amount of natural gas or hazardous liquid released is reduced which in turn reduces the radiant heat flux produced by combustion of the released hydrocarbon. However, the swiftness of block valve closure will not prevent a release from occurring and may not lessen any related injury to persons or damage to property. The amount of time for a section of transmission line to

"blowdown" (depressurize to 0 psig) following block valve closure is based on a number of variables including the diameter of the pipeline, distance between block valves, internal pipeline restrictions, pressure at the time of valve closure, and physical dimensions of the opening at the point of pipeline failure. Depending on these physical parameters, a pipeline may take a considerable amount of time (30 minutes or more) to depressurize after the block valves close and isolate the damaged pipeline segment.

The swiftness of block valve closure in mitigating the consequences of a pipeline release depends on the time required to dispatch a human to manually close the appropriate block valves or the sophistication of the ASV and RCV feedback and control schemes to detect a leak or rupture and initiate block valve closure. An ASV or RCV will normally close more rapidly than a MCV because operating personnel must first travel to the valve location and then close the valve. However, traffic congestion during an emergency can increase the normal travel time or even prevent operating personnel from completing the trip.

Federal safety standards for natural gas and hazardous liquid pipelines require operators to conduct risk analyses to evaluate the need for ASVs and RCVs to protect HCAs in the event of a release. Sections 2.1 and 2.2 identify the regulations that apply to natural gas and hazardous liquid pipelines and summarize the applicable evaluation criteria.

Regulations defined in 49 CFR 192.935 require operators of natural gas pipelines to conduct a risk analysis of its pipeline in accordance with one of the risk assessment approaches in ASME/ANSI B31.8S, Section 5 (ASME, 2010). According to this regulation, if an operator determines, based on a risk analysis, that an ASV or RCV would be an efficient means of adding protection to a HCA in the event of a gas release, an operator must install the ASV or RCV. In making that determination, an operator must, at least, consider the following factors—swiftness of leak detection and pipe shutdown capabilities, the type of gas being transported, operating pressure, the rate of potential release, pipeline profile, the potential for ignition, and location of nearest response personnel.

Preventative and mitigative measures that operators of hazardous liquid pipelines in HCAs must take to protect the HCAs are defined in 49 *CFR* 195.452(i). These measures include conducting a risk analysis of the pipeline segment to identify additional actions to enhance public safety or environmental protection. Such actions may include, but are not limited to, implementing damage prevention best practices, better monitoring of cathodic protection where corrosion is a concern, establishing shorter inspection intervals, installing EFRDs on the pipeline segment, modifying the systems that monitor pressure and detect leaks, providing additional training to personnel on response procedures, conducting drills with local emergency responders, and adopting other management controls. If an operator determines that an EFRD is needed on a pipeline segment to protect a HCA in the event of a hazardous liquid pipeline release, an operator must install the EFRD. In making this determination, an operator must, at least, consider the following factors—the swiftness of leak detection and pipeline shut down capabilities, the type of commodity carried, the rate of potential leakage, the volume that can be released, topography or pipeline profile, the potential for ignition, proximity to power sources, location of nearest response personnel, specific terrain between the pipeline segment and the HCA, and benefits expected by reducing the spill size.

Although ASVs and RCVs are capable of isolating damaged pipeline segments more quickly than MCVs, their use introduces the possibility of unintended or unnecessary block valve closure and the associated consequences for the operator and the public. For example, human error could be the cause for unnecessary or unwanted RCV closure or an ASV could inadvertently close due to a plausible, but infrequent, event such as a decrease in pipeline pressure caused by changes in demand resulting from extremely cold or hot weather. The resulting service disruption could adversely affect thousands of

customers including residences, hospitals, schools, nursing homes, chemical plants, and power plants for days or weeks (AGA, 2011). Possible causes for inadvertent or undesired block valve closure that can adversely affect pipeline operators, the public, and the environment include the following.

- Failure to activate an automated mainline valve during a line break.
- Failure to close a remote or manual mainline valve during a line break.
- Failure of alarm to indicate a line break.
- Leak detection software failure or false alarm.
- Failure of SCADA communications during a line break.

The cost to install a block valve with automatic closure capability in a newly constructed or fully replaced pipelines ranges from approximately $100,000 to $1,000,000 (AGA, 2011 and INGAA, 2012). This cost range is significantly affected by a multitude of factors such as pipe size, location, operating pressure, and proximity to adjacent utilities. The costs to install block valves with automatic closure capability in a rural location is generally lower due to less congestion with other utilities in the underground rights-of-way and the possibility of installing the block valve in above-ground locations that do not require the installation of a vault. For pipelines in urban areas or contained within distribution systems, the lack of underground space immediately adjacent to the existing valve, which is necessary to install a vault to contain the block valve and the actuating equipment, make the conversion of a manual valve to an ASV or RCV extremely difficult or nearly impossible. Complementary cost data for installing new block valves and automating existing valves that range in size from 12-in. to 42-in. are reported in a letter, which was submitted to PHMSA in May 2012, commenting on the leak and valve study mandated by the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 (INGAA, 2012). Table 4.1 shows the costs for adding automatic closure capability to block valves installed in newly constructed or fully replaced pipelines used to perform the cost benefit analyses discussed in Section 5.

Table 4.1. Estimated cost for adding automatic closure capability to block valves installed in newly constructed or fully replaced pipelines

System/Item	12-in. nominal diameter	42-in. nominal diameter
RCV System		
• Actuator	$30,000	$120,000
• RCV Adder	$100,000	$100,000
• Alternative Power and Telemetry System	$50,000	$50,000
• Reserve Gas Bottle	$5,000	$15,000
• Building	$15,000	$15,000
Total	$200,000	$300,000
ASV System	$30,000	$30,000

Source: INGAA 2012 and AGA 2011.

4.1 AUTOMATIC SHUTOFF VALVES

An ASV is a block valve equipped with an electric, pneumatic, or natural gas-powered actuator capable of closing the valve automatically when a change in pressure or flow rate exceeds a specified limit. Data needed to determine change are provided by sensors attached to the pipeline. Under most leak or rupture scenarios, ASVs will not close instantaneous after a pipeline break occurs because the required change in pressure or flow rate needed to trigger closure may not be detected for a number of minutes after the break. In addition, ASVs do not allow or require human evaluation or interpretation of other pertinent information and relevant sensor data to determine if the change in pressure or flow rate is caused by a

legitimate leak or rupture. Consequently, ASVs are subject to inadvertent closure for a variety of causes other than a leak or break.

The time required for an ASV to detect a leak or rupture and close automatically depends on a number of factors including the initial operating pressure of the pipeline, distance from the rupture to the ASV, physical characteristics (size and type) of the fracture, set point of the actuator to initiate valve closure, rate at which additional material is added to the damaged pipeline segment either from interconnected pipelines or contributions from compressor or pumping stations, and the amount of time it takes the valve to completely close following actuation. If the ASV detects a change in pressure or flow rate that exceeds the specified limit or set point immediately following the break, the ASV can close in about 3 minutes. However, if the ASV does not detect a change in pressure or flow rate that exceeds the specified limit or set point, the valve will remain open.

4.1.1 Automatic Shutoff Valve Features and Operating Characteristics

Early versions of ASVs used mechanical pressure sensors to detect high or low pressure and to sense an excessive rate of pressure change. As soon as the sensors detected a predetermined pressure change, the valve closed automatically. Current versions of ASVs use redundant sensors and other electronic technology to filter interference that can trigger inadvertent valve closure.

Specifying an optimum pressure change limit for detecting legitimate leaks or ruptures while preventing unwanted valve closure is sometimes difficult because pressure fluctuations from one valve location to another are sometimes significantly different. For example, when normal operating conditions such as compressor start up causes a pressure change that exceeds the specified pressure-change limit, false or unnecessary valve closure occurs resulting in service disruptions. Conversely, relaxing the pressure change limit to avoid the possibility of false valve closure may not trigger valve closure following a pipeline break. Advances in microprocessor-based technology for ASV applications allow recording (or learning) normal system pressure fluctuations and, over time, establishing an acceptable pressure or flow rate change limit.

4.1.2 Automatic Shutoff Valve Technical Feasibility Assessment

Current designs for ASVs include actuators, power sources, pressure and flow sensing devices, and other types of mechanical and electrical components that occupy relatively large spaces compared to simpler MCVs. Depending on the application, this space may be located either above or below ground. In a HCA, such as a subdivision or downtown location, this equipment must be installed in an underground vault large enough to house the valve body, actuators, power source, sensors and related electronic equipment, and maintenance personnel. Vaults are typically about 10 ft by 16 ft by 10 ft, but may be larger depending on the size of the valve and the configurations of utilities and other pipelines in the vicinity.

Underground infrastructure around a pipeline in a HCA that is buried under a city street is typically congested with water pipes, sewer lines, communication cables, power and traffic signal lines, and other underground infrastructure. Finding enough underground real estate to house the ASV and the related equipment needed to operate the valve is sometimes not feasible. In addition, the vault must be designed and constructed to structurally support vehicular traffic loads and accommodate surface and ground water infiltration.

Installation of ASVs in newly constructed and fully replaced pipelines is considered technically feasible provided sufficient space is available for the valve body, actuators, power source, sensors and related electronic equipment, and personnel required to install and maintain the valve.

4.1.3 Automatic Shutoff Valve Operational Feasibility Assessment

Instrumentation and activation of ASVs requires a reliable power source. Sources of pneumatic power for closing ASVs include pressure obtained from a tap in the natural gas pipeline or compressed gas storage cylinders located at the valve site. In areas that are susceptible to electrical power outages, reliability is a potential concern and redundant, alternative, or backup power sources may be required to ensure continuous availability of electricity for motors, solenoids, and electronic components. Proper valve maintenance involving seat and valve-body cleaning, packing and gasket replacement, and valve closure testing to ensure that ASVs actuate on command and close completely are issues that influence operational feasibility.

Operators must consider downstream system demands when scheduling maintenance. Due to service reliability considerations, there may be limited times during the year that pipelines serving critical customers can be shutdown. In addition, working on a pressurized pipeline presents some of the most safety-sensitive work performed by pipeline operators, and operators must strictly follow company safety practices when conducting such work.

In practice, natural gas pipeline operators tend to install ASVs on pipeline segments that:

- do not experience wide pressure fluctuations,
- are not expected to experience wide pressure fluctuations in the future,
- where the risk analysis indicates the ASV will provide added protection to an HCA, and
- in certain remote locations due to access restrictions or excessive travel time (AGA, 2011).

Use of ASVs in hazardous liquid pipelines is potentially problematic from an operational viewpoint because inadvertent block valve closure can:

- result in pumping against a closed valve, or
- initiate undesirable fluid hammer and flow transient effects capable of damaging equipment or triggering other ASVs to close unnecessarily.

Installation of ASVs in newly constructed and fully replaced pipelines is considered operationally feasible provided: (1) inadvertent block valve closure does not cause damage to equipment or trigger other ASVs to close unnecessarily, and (2) the consequences of service disruptions to critical customers due to inadvertent block valve closure do not exceed the potential public and environmental safety benefits realized by rapid block valve closure.

4.2 REMOTE CONTROL VALVES

A RCV is a block valve equipped with an electric, pneumatic, or natural gas-powered actuator capable of closing the valve based on a signal from a remote location such as a control room. These valves also include a communications link between the sensors, which are located near the RCV and at various points along the pipeline, and the remote location. The communications link generally involves telemetry which is a highly automated communications process by which data are collected from instruments located at remote or inaccessible points and transmitted to receiving equipment for measurement, monitoring, display, and recording. Transmission of the information may be over wires (telephone lines or fiber optic cables), or, more commonly, by wireless communication. Although RCVs are designed to close automatically, human intervention is required to initiate closure. In the event of communication loss between the block valve and the control room, microprocessor equipped RCVs can be programmed to act autonomously.

The decision to close a RCV involves evaluating the sensor data received at the remote location and determining whether a problem does, or does not, exist. The evaluation process includes consideration of real-time pressure and flow data and communications with the public, emergency responders, or company field personnel. If the operator determines that block valve closure is necessary, the operator initiates the closure procedure by sending a signal to the valve site via the communications link. The time between a pipeline break and RCV closure can vary from about 3 minutes for immediate leak or rupture detection to hours if field confirmation of a break is necessary to validate the closure decision.

4.2.1 Remote Control Valve Features and Operating Characteristics

Sources of pneumatic power for closing RCVs include pressure obtained from a tap in the natural gas pipeline or compressed gas storage cylinders located at the valve site. In areas that are susceptible to electrical power outages, reliability is a potential operational concern. Redundant, alternative, or backup power sources may be required to ensure continuous availability of electrical components including the communications link. Proper valve maintenance involves seat and valve body cleaning, packing and gasket replacement, and valve closure testing to ensure that RCVs actuate on command and close completely.

Successful use of RCV technology to mitigate the consequences of a pipeline release requires effective communication between the RCV and the remote location where the sensor signals are received and processed. Maintenance and reliability of the communication link and the primary and backup electrical power sources are additional design and operational considerations for RCV technology compared to simpler ASV and MCV technology.

Operators must consider downstream system demands when scheduling maintenance. Due to service reliability considerations, there may be limited times during the year that pipelines serving critical customers can be shutdown. In addition, working on a pressurized pipeline presents some of the most safety-sensitive work performed by pipeline operators, and workers must strictly follow company safety practices when conducting such work.

4.2.2 Remote Control Valve Technical Feasibility Assessment

In 1999, the Research and Special Programs Administration (RSPA) published a report that addresses the four main issues raised by the Congressional mandate to study RCVs (DOT, 1999). These issues include effectiveness, technical feasibility, economic feasibility, and risk reduction. The report also contains the results of an RCV field evaluation conducted by Texas Eastern Transmission Corporation (TETCO) that provides information on TETCO's experience with RCVs. According to conclusions in this report,

> *The results from the TETCO one year field evaluation of 90 installed RCVs reported in section 3.0 confirm that RCVs are effective. The valves were operated approximately 200 times with no valve closure problems. They closed the first time when commanded to close 100 percent of the time.*

and

> *The TETCO experience demonstrates that RCVs are technically feasible. TETCO has installed 90 RCVs and has proven that they operate reliably when remotely commanded. There is considerable anecdotal evidence from other operators of successful installations of RCVs, mostly at compressor stations, that confirms their technical feasibility. It is unquestionably feasible to install equipment on manually operated valves to convert them to RCVs because the necessary equipment exists and has been used for years.*

Current designs for RCVs include actuators, power sources, pressure and flow sensing devices, communications equipment, and other types of mechanical and electrical components that occupy relatively large spaces compared to simpler MCVs. Depending on the application, this space may be located either above or below ground. In a HCA, such as a subdivision or downtown location, this equipment must be installed in an underground vault large enough to house the valve body, actuators, power source, sensors and related electronic equipment, and maintenance personnel. Vaults are typically about 10 ft by 16 ft by 10 ft, but may be larger depending on the size of the valve and the configurations of utilities and other pipelines in the vicinity.

Installation of RCVs in newly constructed and fully replaced pipelines is considered technically feasible based on field evaluations in which RCVs performed reliably and as intended. However, sufficient space must be available for the valve body, actuators, power source, sensors and related electronic equipment, communications equipment, and personnel required to install and maintain the valve.

4.2.3 Remote Control Valve Operational Feasibility Assessment

Although RCVs are less susceptible to inadvertent closure compared to ASVs, use of RCV technology introduces the possibility of human error into the valve closure process (AGA, 2011). In practice, natural gas pipeline operators tend to install RCVs on the following pipeline segments.

- In HCAs at remote locations
- At sites where severe weather or traffic congestion limit accessibility
- In dense urban environments

For hazardous liquid pipelines, inadvertent RCV closure due to operator error or computer system design deficiencies can result in pumping against a closed valve or initiate undesirable fluid hammer and flow transient effects capable of destroying equipment.

Installation of RCVs in newly constructed and fully replaced pipelines is considered operationally feasible provided inadvertent block valve closure does not cause damage to equipment, the communications link between the RCV and the control room is continuous and reliable, and the consequences of service disruptions to critical customers due to inadvertent block valve closure do not exceed the potential public and environmental safety benefits realized by rapid block valve closure.

5. COST BENEFIT AND ECONOMIC FEASIBILITY

Previous studies published by the Gas Research Institute (Sparks, 1998) and RSPA (DOT, 1999) present results of cost benefit and economic feasibility assessments of installing RCVs in natural gas transmission lines. These studies considered the following potential benefits of installing RCVs.

- reducing personal injuries and fatalities associated with pipeline rupture
- preventing property damage
- minimizing product loss

Conclusions from the "Cost Benefit Study of Remote Controlled Main Line Valves" (Sparks, 1998) follow.

1. *Virtually all injuries caused by pipeline breaks occur at, or very near, the time of the initial rupture. Of 81 injury incidents reviewed (1970 to 1997 NTSB Incident Reports), 75 reported injuries at the initial rupture. Of the other six incidents, four occurred within 3 minutes of the rupture. It seems clear, therefore, that early valve closure time will have little or no effect on injuries sustained, and no effect on rupture severity. Valve closure will be "after the fact" as far as most injuries and damage are concerned. There is no evidence that prolonged blowdown of a ruptured line causes injuries.*
2. *Further, a line break does not immediately evacuate the pipeline. Because of line pack (gas compressibility) some 5 to 10 minutes are normally required for low pressure alarms to be generated at Gas Control and/or nearby compressor stations. Delays depend upon break size and location, line size, operating pressure, and other operating and configurational variables. Additional time is then required (a) to determine the cause of low line pressure (e.g., loss of compression, load transients, faulty instrumentation, line break, or other causes) and (b) to determine break location. This will likely consume an additional 5 minutes. Consequently, delays of about 10 minutes will be required before RCV closure can be initiated for a typical line break scenario, if field verification of the break is not required. Early valve closure can, however, have a significant effect in reducing the volume of gas lost after a line break. Simulations show savings of about 50% for valve closure at 10 minutes versus closure at 40 minutes in a typical 30-inch/900-psi rupture scenario.*
3. *Because of potential damage and safety hazards associated with false closures, some companies require field verification of a break before line valves are remotely closed. Much of the quick response capability of the RCV can be lost in that instance. (Policies regarding field verification should be established as a part of the pipeline's risk management activities.)*
4. *From a survey of equipment suppliers and gas industry users, the estimated cost for retrofitting existing main line valves varies from $25,000 to $39,000 each, depending upon valve size. This cost includes retrofit actuator equipment, a communication link, and retrofit labor. If 50% of the existing 300,000 miles of U.S. gas transmission lines were retrofitted for RCV operation, the total estimated cost to the industry would amount to some $300 million to $400 million, with no discernible improvement in safety.*

The RSPA (DOT, 1999) study conclusions follow.

> *We can not find that RCVs are economically feasible. The quantifiable costs far outweigh the quantifiable benefits from installing RCVs.*

and

> *Installation of RCVs would reduce risk, but the degree of reduction is unknown. The reduction is primarily due to less gas escaping to the atmosphere after a rupture because RCV closure can be in 10 minutes versus 40 minutes (4) if the valves require manual closing, resulting in possible reduced effects, such as property damage. There is some evidence from the NTSB report on the Edison failure (1), that faster valve closure might have allowed firemen to enter the area sooner to extinguish the blazes and might have controlled the spread of the fires to adjacent buildings. However, a quantifiable value can not be placed on this savings to property damage.*

The RSPA report also states that property damage prevention and the value of gas saved from early valve closure are the only measurable benefits of RCVs. It further states that comparing property damage from ruptures where RCVs are installed versus where manually operated valves are installed is not possible because RSPA is not aware of any studies that have been conducted that compared these damages.

The bibliography included in this report lists all of the documents that were identified during the literature search conducted by ORNL and used as resources for this study. The literature search identified no publically available reports that discuss the cost benefits and economic feasibility of installing ASVs and RSVs in hazardous liquid pipelines. However, a DOT report published in 1994 titled "Remote Control Spill Reduction Technology: A Survey and Analysis of Applications for Liquid Pipeline Systems" describes findings from a survey and assessment of the effectiveness of EFRDs (including remotely controlled valves and check valves) and other procedures, systems, and equipment used to detect and locate pipeline ruptures and minimize commodity releases from pipeline facilities (Borener, 1994). One of the study objectives involved investigating the feasibility and cost to liquid pipeline operators of EFRDs. The report includes a model for deriving the optimal utilization of EFRDs based on their cost and the estimated spill volume reductions attributable to the EFRDs. The report also repeats the statement in the California State Fire Marshal's Hazardous Liquid Pipeline Risk Assessment report (California State Fire Marshal, 1993) that adding more block valves to all pipelines would not be cost effective, because the average spill size is a very small fraction of the amount of product that could be contained in a pipeline segment of average length.

5.1 EVALUATION METHODOLOGY AND ACCEPTANCE CRITERIA

The agreement between PHMSA and ORNL required an evaluation of the economic feasibility of requiring installation of ASVs or RCVs on newly constructed or entirely replaced pipelines. Section 3 describes the risk analysis methodology used to quantify potential economic benefits to the public and the surrounding environment attributed to the application of ASV and RCV technology. This methodology is based on engineering principles and fire science practices and is consistent with the federal pipeline safety regulations discussed in Section 2. Section 4 defines the estimated costs for adding ASV and RCV technology to block valves installed on newly constructed or entirely replaced pipelines. These costs, which are summarized in Table 4.1, are used in the cost benefit analysis discussed in Section 5.2.

5.1.1 Damage Costs for Natural Gas Pipeline Releases with Ignition

Potential cost benefits of rapid block valve closure are quantified based on results of risk assessments for a range of hypothetical natural gas and hazardous liquid pipeline release scenarios. Cost benefits for these scenarios are measured in terms of avoided costs associated with reduced fire damage attributed to

fire fighter actions and decreased exposure to damaging thermal radiation produced by hydrocarbon combustion. The basis for quantifying avoided costs of property damage caused by fire are discussed in Sections 3.1.3.1 through 3.1.3.4 and summarized in Table 3.2.

Risk analysis results discussed in Section 3.1.4 show that without fire fighter intervention following natural gas pipeline releases, the swiftness of block valve closure has no effect on mitigating potential fire damage to buildings and personal property in HCAs. Block valve closure swiftness also has no effect on reducing building and personal property damage costs (with no fire fighter intervention) because thermal radiation is most intense immediately following the break. Consequently, without fire fighter intervention, there is no quantifiable benefit in terms of cost avoidance for damage to buildings and personal property attributed to block valve closure swiftness in natural gas pipelines. However, when combined with fire fighter intervention, the swiftness of block valve closure has a potentially beneficial effect on mitigating fire damage to buildings and personal property in HCAs. Closing block valves sooner decreases the natural gas release rate which in turn reduces the thermal radiation intensity at a specific location and point in time. After the heat flux at a particular location decreases to an acceptable level, fire fighters can safely initiate fire fighting activities.

The benefit of block valve closure swiftness in terms of cost avoidance is based on the ability of fire fighters to mitigate fire damage to buildings and personal property located within a distance of approximately 1.5 times the PIR by conducting fire fighting activities as soon as possible upon arrival at the scene. Block valve closure within 8 minutes after the break can result in significantly less damage to buildings and property compared to delaying block valve closure by 5 minutes or allowing block valves to remain open for a substantially longer period of time (60 minutes or more) after the break. Table 5.1 summarizes the avoided damage costs for hypothetical natural gas pipeline releases following guillotine-type breaks resulting from fire fighting activities within the potentially severe damage radius (approximately 1.5 times PIR) compared to the baseline. The baseline is a guillotine-type break in a hypothetical natural gas pipeline without block valve closure for 60 minutes or longer.

5.1.2 Damage Costs for Hazardous Liquid Pipeline Releases with Ignition

Risk analysis results for liquid propane pipeline releases that ignite immediately following a guillotine-type break are discussed in Section 3.2.4. These results show that for large diameter pipelines the swiftness of block valve closure has a significant effect on mitigating potential fire damage to buildings and personal property in HCAs designated high population areas or other populated areas for large diameter pipelines. The benefit in terms of cost avoidance for damage to buildings and personal property attributed to block valve closure swiftness increases as the time required to isolate the damaged pipeline segment decreases.

The benefit of block valve closure swiftness in terms of cost avoidance of fire damage to buildings and personal property for the release scenarios considered in this study is based on the differences in potentially moderate and minor damage radii for block valve closure in 13 minutes rather than delaying block valve closure for a longer period of time. The radii for potentially moderate damage, 31.5 kW/m^2 (10,000 Btu/hr ft^2) for 15 minutes, and potentially minor damage, 15.8 kW/m^2 (5,000 Btu/hr ft^2) for 30 minutes decrease as the block valves closure time decreases. Table 5.2 summarizes the avoided damage costs for hypothetical liquid propane pipeline releases following a guillotine-type break and block valve closure in 13 rather than 70 minutes.

Table 5.1. Summary of avoided damage costs for hypothetical natural gas pipeline releases resulting from fire fighting activities within 1.5 times PIR

Location	Nominal diameter = 12-in. MAOP = 300 psig		Nominal diameter = 42-in. MAOP = 1,480 psig	
	Valve closure 8 min. after break	Valve closure 13 min. after break	Valve closure 8 min. after break	Valve closure 13 min. after break
Class 1 HCA				
Buildings or dwellings intended for human occupancy and a PIR greater than 660 ft	N/A PIR is less than 660 ft	N/A PIR is less than 660 ft	$4.572M	$1.829M
Identified site consisting of buildings with four or more stories	$0.600M	$0.300M	$4.572M	$1.829M
Outside recreational facility	$0.803M	$0.446M	$1.785M	$0.714M
Class 2 HCA				
Buildings or dwellings intended for human occupancy and a PIR greater than 660 ft	N/A PIR is less than 660 ft	N/A PIR is less than 660 ft	$4.572M	$1.829M
Identified site consisting of buildings with four or more stories	$0.600M	$0.300M	$4.572M	$1.829M
Outside recreational facility	$0.803M	$0.446M	$1.785M	$0.714M
Class 3 HCA				
Buildings or dwellings intended for human occupancy.	$2.057M	$1.143M	$8.230M	$4.572M
Outside recreational facility	$0.803M	$0.446M	$3.213M	$1.785M
Class 4 HCA				
Buildings or dwellings intended for human occupancy.	$1.500M	$0.900M	$6.000M	$3.600M

Although the swiftness of block valve closure has a beneficial effect in reducing potentially moderate and minor damage for larger diameter pipelines, it has no effect on reducing potentially severe fire damage to buildings and personal property in high population areas or other populated areas located within a radius up to 2.6 times the equilibrium diameter. Severe damage to buildings and personal property within these areas is possible because the heat flux produced by liquid propane combustion following the break exceeds the severe damage threshold, 40 kW/m^2 (12,700 $Btu/hr\ ft^2$).

Table 5.2. Summary of avoided fire damage costs for hypothetical hazardous liquid pipeline releases of propane with block valve closure in 13 minutes after break

Area	Nominal diameter = 8 in. 100 ft elevation change		Nominal diameter = 30 in. 1,000 ft elevation change	
	MAOP = 400 psig Case Study 5A	MAOP = 1,480 psig Case Study 5B	MAOP = 400 psig Case Study 6A	MAOP = 1,480 psig Case Study 6C
Avoided Minor Damage Cost	$0.416M	$0.416M	$5.4M	$5.4M
Avoided Moderate Damage Cost	$0	$0	$0.792M	$0.792M
Avoided Severe Damage Cost	$0	$0	$0	$0

5.1.3 Damage Costs for Hazardous Liquid Pipeline Releases without Ignition

Risk analysis results discussed in Section 3.3.4 for hazardous liquid pipeline releases that do not ignite show that the swiftness of block valve closure has a significant effect on mitigating potential socioeconomic and environmental damage to the human and natural environments. The benefit in terms of cost avoidance for damage to the human and natural environments attributed to block valve closure swiftness increases as the time required to isolate the damaged pipeline segment decreases.

Avoided socioeconomic and environmental costs for hazardous liquid pipeline releases that do not ignite are based on EPA's BOSCEM (Etkin, 2004) discussed in Section 3.3.3 and the information presented in Tables 3.25 through 3.30.

Tables 5.3 and 5.4 summarize the beneficial effects of rapid block valve closure on avoided damage costs for hypothetical crude oil pipeline releases in HCAs following a guillotine-type break.

Table 5.3. Summary of avoided socioeconomic and environmental damage costs for 8-in. nominal diameter hypothetical crude oil pipeline releases in HCAs

Avoided Socioeconomic and Environmental Damage Cost	Nominal diameter = 8-in. Flow velocity = 15 ft/s			
	MAOP = 400 psig Elevation change = 100 ft Case Study 7A	MAOP = 1,480 psig Elevation change = 100 ft Case Study 7B	MAOP = 400 psig Elevation change = 1,000 ft Case Study 7C	MAOP = 1,480 psig Elevation change = 1,000 ft Case Study 7D
Avoided damage cost for valve closure in 3 min. compared to 90 min.	$173M	$173M	$173M	$173M
Avoided damage cost for valve closure in 30 min. compared to 90 min.	$123M	$123M	$123M	$123M
Avoided damage cost for valve closure in 60 min. compared to 90 min.	$61.5M	$61.5M	$61.5M	$61.5M

Table 5.4. Summary of avoided socioeconomic and environmental damage costs for 36-in. nominal diameter hypothetical crude oil pipeline releases in HCAs

Avoided Socioeconomic and Environmental Damage Cost	Nominal diameter = 36 in. Flow velocity = 15 ft/s			
	MAOP = 400 psig Elevation change = 100 ft = 100 ft Case Study 8A	MAOP = 1,480 psig Elevation change = 100 ft Case Study 8B	MAOP = 400 psig Elevation change = 1,000 ft Case Study 8C	MAOP = 1,480 psig Elevation change = 1,000 ft Case Study 8D
Avoided damage cost for valve closure in 3 min. compared to 90 min.	$2.91B	$2.91B	$2.91B	$2.91B
Avoided damage cost for valve closure in 30 min. compared to 90 min.	$2.01B	$2.01B	$2.01B	$2.01B
Avoided damage cost for valve closure in 60 min. compared to 90 min.	$1.0B	$1.0B	$1.0B	$1.0B

5.2 COST BENEFIT ANALYSIS

A series of hypothetical natural gas and hazardous liquid pipeline releases resulting from guillotine-type breaks were used to quantify the avoided costs attributed to block valve closure swiftness. The cost benefits were quantified by comparing the avoided cost of fire damage to buildings and property to the cost for adding automatic closure capability to block valves installed in newly constructed or fully replaced pipelines. Avoided costs for fire damage were determined for buildings and property located in Class 1, Class 2, Class 3, and Class 4 HCAs for natural gas pipelines and in HCAs designated as high population areas and other populated areas for hazardous liquid pipelines. Avoided socioeconomic and environmental costs were determined for hazardous liquid pipeline releases without ignition in HCAs.

A cost benefit is considered positive if the avoided cost of damage attributed to block valve closure swiftness exceeds the cost of adding automatic closure capability to block valves installed in newly constructed or fully replaced pipelines. Conversely, a cost benefit is considered negative if the cost of adding automatic closure capability exceeds the avoided cost of damage attributed to block valve closure swiftness.

The cost benefit analysis methodology does not include the cost of avoided product loss attributed to block valve closure swiftness. This cost is not considered a public or environmental safety concern and is therefore beyond the scope of this study.

5.2.1 Cost Benefit Analysis for Natural Gas Pipeline Releases with Ignition

Risk analysis results presented in Section 3.1 demonstrate that there are avoided fire damage costs attributed to block valve closure swiftness following a guillotine-type break and subsequent fire in natural gas pipelines located in Class 1, Class 2, Class 3, and Class 4 HCAs. The magnitude of these avoided costs depends primarily on the type, configuration, and density of buildings located within the particular HCA and the replacement value of the buildings and property damaged by the fire, but also on the efforts

of fire fighters to mitigate fire damage to buildings and property located within the potentially severe damage radius.

The risk analyses show that there are no avoided costs for fire damage to buildings and property attributed to block valve closure swiftness because potentially severe damage occurs before block valve closure can isolate the damaged pipeline segment and begin limiting the amount of natural gas that escapes and burns. Immediately following the break, buildings and property located within the potentially severe damage radius (approximately 1.5 times PIR) are exposed to thermal radiation that exceeds the heat flux threshold of 40.0 kW/m^2 (12,700 Btu/hr ft^2) which can cause potentially severe damage. In addition, injuries to unsheltered humans and emergency responders located within this radius are very probable because the thermal radiation far exceeds the heat flux threshold of 1.4 kW/m^2 (450 Btu/hr ft^2) which is considered the acceptable level of thermal radiation for people in open spaces. Firefighting activities are also limited within areas where the thermal radiation exceeds the heat flux threshold of 2.5 kW/m^2 (800 Btu/hr ft^2) which is considered the acceptable level for common firefighting activities.

Although the cost for adding either RCV or ASV closure capability is considered a negative cost benefit because the swiftness of block valve closure has no effect on mitigating fire damage to buildings and property located within the potentially severe damage radius, positive cost benefits attributed to block valve closure swiftness may be realized when all of the following conditions are satisfied.

- Fire fighters arrive on the scene and are ready to begin fire fighting activities within 10 minutes after the break.
- Fire hydrants are accessible and uniformly spaced around the perimeter of the potentially severe damage circle.
- Block valves close in time to reduce the heat flux at the potentially severe damage radius to 2.5 kW/m^2 (800 Btu/hr ft^2) within 20 minutes or less after the break.

Comparison of the avoided damage costs listed in Table 5.1 and the estimated costs listed in Table 4.1 for adding either RCV or ASV closure capability to a minimum number of block valves[9] needed to isolate a damaged natural gas pipeline segment suggests that positive cost benefits attributed to block valve closure swiftness may be realized for the following natural gas pipeline release scenarios.

- For a 12-in. nominal diameter natural gas pipeline located in either a Class 3 or Class 4 HCA with a MAOP of 300 psig, block valve closure within 8 minutes after the break, and a cost of $600,000 for adding remote closure capability to three block valves.
- For a 12-in. nominal diameter natural gas pipeline located in either a Class 3 or Class 4 HCA with a MAOP of 300 psig, block valve closure in 13 minutes after the break, and a cost of $600,000 for adding remote closure capability to three block valves.
- For a 42-in. nominal diameter natural gas pipeline located in a Class 1, Class 2, Class 3, or Class 4 HCA with a MAOP of 1,480 psig, block valve closure in 8 minutes after the break, and a cost of $900,000 for adding remote closure capability to three block valves.
- For a 42-in. nominal diameter natural gas pipeline located in a Class 1, Class 2, Class 3, or Class 4 HCA (except a Class 1 or Class 2 HCA with an identified site consisting of an outside recreational facility) with a MAOP of 1,480 psig, block valve closure in 13 minutes after the break, and a cost of $900,000 for adding remote closure capability to three block valves.

[9] At least three block valves are required to isolate a damaged natural gas pipeline segment because for these hypothetical release scenarios the break occurs at a block valve and renders the valve inoperable.

The cost benefit analysis should only consider costs for automating block valves because block valves (with or without automation) must be installed in newly constructed and fully replaced pipelines in accordance with 49 CFR 192 requirements. Consequently, the technical, operational, and economic feasibility and potential cost benefits of automating valves in newly constructed or fully replaced pipelines need to be evaluated on a case-by-case basis.

5.2.2 Cost Benefit Analysis for Hazardous Liquid Pipelines with Ignition

Risk analysis results presented in Section 3.2 demonstrate that there are avoided fire damage costs attributed to block valve closure swiftness following a guillotine-type break and subsequent fire in propane pipelines for some, but not all areas located in HCAs designated high population areas or other populated areas with buildings and dwellings intended for human occupancy.

The risk analyses show that there are no avoided costs for fire damage to buildings and property attributed to block valve closure swiftness because the damage occurs within the potentially severe damage radius block valve closure can isolate the damaged pipeline segment and begin limiting the amount of propane that escapes and burns. Within minutes after the break, buildings and property located within the potentially severe damage radius (approximately 2.6 times the equilibrium diameter) are exposed to thermal radiation that exceeds the heat flux threshold of 40.0 kW/m^2 (12,700 Btu/hr ft^2) which can cause potentially severe damage. In addition, injuries to unsheltered humans and emergency responders located within this radius are very probable because the thermal radiation far exceeds the heat flux threshold of 1.4 kW/m^2 (450 Btu/hr ft^2) which is considered the acceptable level of thermal radiation for people in open spaces. Firefighting activities are also limited within areas where the thermal radiation exceeds the heat flux threshold of 2.5 kW/m^2 (800 Btu/hr ft^2) which is considered the acceptable level for common firefighting activities. Consequently there is a negative cost benefit for adding automatic block valve closure capability to mitigate fire damage to buildings and property located within the potentially severe damage radius.

However, positive cost benefits attributed to block valve closure swiftness may be realized in areas located beyond the potentially severe damage radius for the following reason. The radii for potentially moderate damage, 31.5 kW/m^2 (10,000 Btu/hr ft^2) for 15 minutes, and potentially minor damage, 15.8 kW/m^2 (5,000 Btu/hr ft^2) for 30 minutes, decrease as the block valves closure time decreases. Difference in areas of potentially moderate and minor damage associated with block valve closure times of 13 and 70 minutes after the break translate into substantial avoided damage costs.

Comparison of the avoided damage costs listed in Table 5.2 and the estimated costs listed in Table 4.1 for adding either RCV or ASV closure capability to two block valves[10] needed to isolate a damaged pipeline segment suggests that positive cost benefits attributed to block valve closure swiftness may be realized because the avoided cost for fire damage to buildings and personal property far exceeds the cost of adding automatic closure capability to two RCVs or two ASVs in newly constructed or fully replaced hazardous liquid pipelines.

5.2.3 Cost Benefit Analysis for Hazardous Liquid Pipelines without Ignition

Risk analysis results presented in Section 3.3 demonstrate that there are avoided socioeconomic and environmental damage costs attributed to block valve closure swiftness following a guillotine-type break in crude oil pipelines located in HCAs. These results suggest that the swiftness of block valve closure has a significant effect on mitigating potential socioeconomic and environmental damage to the human and

[10] At least two block valves are required to isolate a damaged pipeline segment because for these propane pipeline release scenarios the break occurs between block valves.

natural environments resulting from hazardous liquid pipeline releases. The benefit in terms of cost avoidance for damage to the human and natural environments attributed to block valve closure swiftness increases as the duration of the block valve shutdown phase decreases.

Comparison of the avoided damage costs listed in Tables 5.3 and 5.4 and the estimated costs listed in Table 4.1 for adding either RCV or ASV closure capability to two block valves[11] needed to isolate a damaged pipeline segment suggests that positive cost benefits attributed to block valve closure swiftness may be realized because the avoided cost for socioeconomic and environmental damage far exceeds the cost of adding automatic closure capability to two RCVs or two ASVs in newly constructed or fully replaced hazardous liquid pipelines.

5.3 ECONOMIC FEASIBILITY ASSESSMENT

Results of the cost benefit analysis discussed in Section 5.2 provide evidence that installation of ASVs or RCVs in newly constructed or fully replaced pipelines is economically feasible. This result is based on risk analysis results for hypothetical natural gas pipelines located in Class 1, Class 2, Class 3, and Class 4 HCAs and for hypothetical hazardous liquid pipelines located in HCAs with operating parameters and release scenarios within the range of those considered in this study. However, this result may not be valid for all pipelines located in HCAs for the following reasons.

The risk analyses described in Sections 3.1, 3.2, and 3.3 use various methodologies to quantify the effectiveness of block valve closure swiftness in mitigating damage to the human and natural environments by evaluating a series of case studies for a limited number of hypothetical natural gas and hazardous liquid pipeline release scenarios. These case studies were used to determine the avoided fire damage costs for natural gas and hazardous liquid pipeline releases with ignition and the avoided socioeconomic and environmental damage costs for hazardous liquid pipeline releases without ignition for a range of valve closure times and pipeline operating parameters. The hypothetical natural gas and hazardous liquid pipeline release scenarios were selected for comparison purposes to bound the risk analysis results and provide a consistent technical basis for comparing the results. However, these release scenarios do not model any particular or unique pipeline configurations or site-specific conditions that could invalidate the underlying assumptions or reduce consequence severity. In addition, the risk analyses are based on theoretical models that approximate actual pipeline release behavior, but do not account for natural phenomena such as weather conditions at the time of the release and physical barriers such as terrain features and vegetation that can also affect reduce consequence severity.

Consequently, economic feasibility assessments for specific pipeline segments need to be based on avoided damage costs and valve automation costs that reflect the actual pipeline design features and operating conditions and the site-specific parameters appropriate for the area where the pipeline segment is located. Avoided damage costs needed to assess economic feasibility could be determined using methodologies similar to those described in Sections 3.1, 3.2, and 3.3 or other, more appropriate, methodologies for characterizing specific types of damage and quantifying the associated damage costs. Consideration of site-specific variables in the risk analysis is essential in determining whether the cost benefit is positive or negative and whether installation of ASVs or RCVs in newly constructed or fully replaced pipelines is economically feasible.

[11] At least two block valves are required to isolate a damaged pipeline segment because for these crude oil pipeline release scenarios the break occurs between block valves.

5.4 COST EFFECTIVE IMPLEMENTATION STRATEGIES FOR CONSEQUENCE REDUCTION

Installation of ASVs or RCVs in newly constructed or fully replaced natural gas or hazardous liquid pipelines can be a cost effective strategy for mitigating the consequences of a guillotine-type break for some, but not necessarily all, release scenarios. Key factors to consider in evaluating cost effectiveness include the cost of installing automatic closure capability to all of the block valves that need to close to isolate the damage pipeline segment and the potential public and environmental safety benefits realized by reducing the time required to close these block valves after the release.

For natural gas pipelines, adding automatic closure capability to block valves in newly constructed or fully replaced pipeline facilities may be a cost effective strategy for mitigating potential fire consequences resulting from a release and subsequent ignition provided all of the following conditions are satisfied.

- Fire fighters arrive on the scene and are ready to begin fire fighting activities within 10 minutes or less after the break.
- Fire hydrants are accessible in the vicinity of the potentially severe damage radius.
- The leak is detected and the appropriate ASVs and RCVs close completely so that the damaged pipeline segment is isolated within 10 minutes or less after the break, and fire fighting activities within the area of potentially severe damage can begin soon after the fire fighters arrive on the scene.
- Block valves close in time to reduce the heat flux at the potentially severe damage radius to 2.5 kW/m^2 (800 Btu/hr ft^2) within 20 minutes or less after the break.

The cost effectiveness of installing ASVs or RCVs in newly constructed or fully replaced natural gas pipelines decreases as delays in leak detection and block valve closure increase. If the damaged pipeline segment is not isolated within 20 minutes after the break, fire fighting activities may evolve from controlling fire damage to preventing fire spread.

For hazardous liquid pipelines, adding automatic closure capability to block valves in newly constructed or fully replaced pipeline facilities may be a cost effective strategy for mitigating potential fire damage resulting from a guillotine-type break and subsequent ignition provided one of the following conditions is satisfied.

- The leak is detected and the appropriate ASVs and RCVs close completely so that the damaged pipeline segment is isolated within 15 minutes after the break. After continuous exposure to a heat flux of 31.5 kW/m^2 (10,000 Btu/hr ft^2) for 15 minutes, buildings located with the potentially moderate damage radius may begin burning.
- The leak is detected and the appropriate ASVs and RCVs close completely so that the damaged pipeline segment is isolated within 30 minutes after the break. If the damaged pipeline segment is not isolated within 30 minutes after the break, buildings located with the potentially minor damage radius that are continuously exposed to a heat flux of 15.8 kW/m^2 (5,000 Btu/hr ft^2) may begin burning.

The cost effectiveness of installing ASVs or RCVs in newly constructed or fully replaced hazardous liquid pipelines decreases as delays in leak detection, pump shutdown, and block valve closure increase.

Adding automatic closure capability to block valves in newly constructed or fully replaced hazardous liquid pipelines may also be a cost effective strategy for mitigating potential socioeconomic and environmental damage resulting from a release that does not ignite. Delays in isolating the damaged

pipeline segment beyond immediate block valve closure following the break result in a release rate that approximates the normal pipeline flow rate.

The cost effectiveness of installing ASVs or RCVs in newly constructed or fully replaced hazardous liquid pipelines increases as the number of barrels released decreases because socioeconomic and environmental damage costs are often measured in tens of thousands of dollars per barrel.

6. SUMMARY OF RESULTS

Section 4 of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 (U.S. Congress, 2012) states that the DOT Secretary, if appropriate, shall require by regulation the use of automatic or remote controlled shut-off valves, or equivalent technology, where economically, technically, and operationally feasible on transmission pipeline facilities constructed or entirely replaced. The Act also requires a study to discuss the ability of transmission pipeline facility operators to respond to a hazardous liquid or natural gas release from a pipeline segment located in a HCA. In March 2012, PHMSA requested assistance from ORNL in preparing a report titled "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety." This study addresses issues defined in Section 4 of the Act and those raised by the NTSB in its accident report for the San Bruno incident (NTSB, 2011). The study scope includes the following work activities:

1. Study the ability of transmission pipeline facility operators to respond to a hazardous liquid or gas release from a pipeline segment located in a high-consequence area as well as Class 3 and Class 4 areas for natural gas transmission;
2. Study the economic, technical, and operational feasibility of requiring the installation of automatic or remote controlled shutoff valves on newly constructed or entirely replaced facilities;
3. Analyze the requirements of valve spacing and the effects of requiring a more stringent minimum spacing of either ASVs or RCVs;
4. Evaluate the fire science behind initial accident rupture and response time provided by ASVs and RCVs by developing models that show the benefits of rapid response time; and
5. Conduct cost, risk, and benefit analysis of installing ASVs and RCVs in HCAs and Class 3 and Class 4 areas.

Initial study efforts involved attending a public workshop on Improving Pipeline Leak Detection System Effectiveness and Understanding the Application of Automatic/Remote Control Valves that was held on March 27–28, 2012, and conducting a literature search to identify publically available references and resources that discuss relevant topics such as emergency response, fire science, building and fire code requirements, methods for assessing socioeconomic and environmental impacts, and ASV and RCV technology. The study is based on results of risk analyses that were conducted using engineering principles and fire science practices to quantify the consequences of pipeline releases and to determine the effectiveness of block valve closure swiftness in mitigating the consequences of the releases. The risk analyses evaluated the following types of damage resulting from pipeline releases in HCAs and Class 3 and Class 4 areas.

1. Fire damage to buildings and property in Class 1, Class 2, Class 3, and Class 4 HCAs caused by natural gas pipeline releases and subsequent ignition of the released natural gas.
2. Fire damage to buildings and property in HCAs designated as high population areas and other populated areas caused by hazardous liquid pipeline releases and subsequent ignition of the released propane.
3. Socioeconomic and environmental damage in HCAs caused by crude oil releases without ignition in hazardous liquid pipelines.

The study also evaluated the technical, operational, and economic feasibility of installing ASVs and RCVs in newly constructed and fully replaced pipelines and determined the potential cost benefits to public and environmental safety.

6.1 POTENTIAL CONSEQUENCES AND EFFECTS

Potential effects of unintended natural gas and hazardous liquid pipeline releases are categorized as human impacts including personal injuries and fatalities, property damage, environmental impacts, and supply losses and business interruptions. These effects were considered in evaluating the effectiveness of RCVs and ASVs in mitigating the consequences of a release. Modeling focused on potential fire consequences and thermal radiation effects resulting from guillotine-type breaks in natural gas pipelines and hazardous liquid pipelines that transport gasoline, propane, butane, and propylene because evaluating all potential release scenarios is not practical. Although ignition of the released product following a guillotine-type break is not ensured, this study only considered release scenarios that result in immediate ignition of the released product at the break location. Models were also developed to study the socioeconomic and environmental effects of crude oil pipeline releases on the human and natural environments.

Natural gas pipeline release events are subdivided into three sequential phases – (1) Detection Phase, (2) Block Valve Closure Phase, and (3) Blowdown Phase. The total discharge volume equals the sum of the volumes released during each phase. Guillotine-type breaks with immediate ignition of the escaping natural gas produce thermal radiant intensities that are considered worst case because this type of rupture results in the greatest release of natural gas in the shortest time period. Block valves have no influence on the volume of natural gas released during the detection phase because the block valves are open and the compressors are operating when natural gas begins escaping from the break. However, rapid detection of the break followed by immediate implementation of corrective actions including closing block valves to isolate the damaged pipeline segment reduces the total volume of natural gas released which in turn reduces the radiant heat flux produced by combustion of the released natural gas. The effectiveness of block valve closure swiftness in mitigating the consequences of a natural gas pipeline release decreases as the duration of the detection and block valve closure phases increases.

Thermal radiation is the primary mechanism for injury or damage from fire and is the significant mode of heat transfer for situations in which a target is located laterally to the exposure fire source. Models were developed to quantifying the time-dependent variations in separation distances (radii) for specific heat flux intensities because thermal radiation effects on buildings and humans are a function of heat flux intensity and exposure duration. The model results were used to quantify thermal radiation effects on buildings and humans based on the following heat flux and exposure duration criteria:

- Exposure to a heat flux of 1.4 kW/m^2 (450 Btu/hr ft^2) is considered acceptable for outdoor, unprotected facilities or open spaces where people congregate;
- Exposure to a heat flux of 2.5 kW/m^2 (800 Btu/hr ft^2) is considered acceptable while conducting fire fighting and emergency response activities;
- Exposure of a building to a heat flux of 15.8 kW/m2 (5,000 Btu/hr ft^2) is considered acceptable for an extended period of time (30 minutes) without burning and the threshold for minor damage to buildings;
- Exposure of a building to a heat flux of 31.5 kW/m^2 (10,000 Btu/hr ft^2) is considered acceptable for an extended period of time (15 minutes) without burning and the threshold for moderate damage to buildings; and
- Exposure to a heat flux of 40.0 kW/m^2 (12,700 Btu/hr ft^2) is considered the maximum tolerable level of radiation at the facade of an exposed building and the threshold for severe damage to buildings;

Hazardous liquid pipeline release events are subdivided into four sequential phases – (1) Detection Phase, (2) Continued Pumping Phase, (3) Block Valve Closure Phase, and (4) Pipeline Drain Down Phase. The total discharge volume equals the sum of the volumes released during each phase. The effectiveness of block valve closure swiftness on limiting the spill volume of a release is influenced by the location of the block valves relative to the location of the break, the pipeline elevation profile between adjacent block valves, and the time required to close the block valves after the break is detected and the pumps are shut down. Block valves do not affect the volume of liquid spilled during the detection and continued pumping phases because the block valves are open. However, the total spill volume is reduced by rapidly detecting the break and taking immediate corrective actions including shutting down the pumps and closing the block valves. The effectiveness of block valve closure in mitigating the consequences of a hazardous liquid pipeline release decreases as the time required to isolate the damaged pipeline segment increases.

Potential consequences on the human and natural environments resulting from a hazardous liquid release without ignition generally involve socioeconomic and environmental impacts. These impacts are influenced by the total quantity of hazardous liquid released and the habitats, resources, and land uses that are affected by the release. The methodology used to quantify socioeconomic and environmental impacts resulting from a hazardous liquid release involves computing the quantity of hazardous liquid released and then using this quantity to establish the total damage cost. The total damage cost is determined by adding the response cost, the socioeconomic damage cost, and the environmental damage cost based on the EPA's BOSCEM and applying a damage cost adjustment factor. This factor aligns the total damage cost with the actual cleanup costs reported for recent crude oil spills in environmentally sensitive areas.

6.2 TECHNICAL AND OPERATIONAL FEASIBILITY ASSESSMENT RESULTS

In general, installation of ASVs and RCVs in newly constructed and fully replaced natural gas and hazardous liquid pipelines is technically and operationally feasible. However, the technical and operational feasibility of installing ASVs and RCVs at specific locations is conditional because unique design features and operating conditions can affect feasibility assessment results.

Installation of ASVs and RCVs is considered technically feasible provided sufficient space is available for the valve body, actuators, power source, sensors and related electronic equipment, and personnel required to install and maintain the valve. Although field evaluations of RCVs show that they are reliable and function as intended, the technical feasibility of installing RCVs also depends on the availability of additional space required by the communications equipment that links the site to the control room.

Installation of ASVs and RCVs is considered operationally feasible provided communication links between the RCV site and the control room are continuous and reliable. It is also important that inadvertent block valve closure does not occur. It is undesirable to disrupt service to critical customers, and also sudden block valve closure that occurs inadvertently may cause a pressure surge that could damage equipment.

6.3 COST BENEFIT AND ECONOMIC FEASIBILITY ASSESSMENT RESULTS

Installation of ASVs and RCVs in newly constructed and fully replaced natural gas and hazardous liquid pipelines is economically feasible with a positive cost benefit for the release scenarios considered in this study. However, these release scenarios do not model the unique features of a particular pipeline facility or its site-specific design features and operating conditions. These unique features and conditions can

invalidate the underlying assumptions in this study and, therefore, reduce or eliminate the positive cost benefits attributed to block valve closure swiftness.

Meaningful economic feasibility assessments and cost benefit analyses for specific pipeline segments need to be based on avoided damage costs and valve automation costs that reflect the actual pipeline design features and operating conditions and the site-specific parameters appropriate for the area where the pipeline segment is located. Consideration of site-specific variables is essential in determining whether the cost benefit is positive or negative and whether installation of ASVs or RCVs in newly constructed or fully replaced pipelines is economically feasible.

6.4 STRATEGIES FOR CONSEQUENCE REDUCTION

In theory, installing ASVs and RCVs in pipelines can be an effective strategy for mitigating potential consequences of unintended releases because decreasing the total volume of the release reduces overall impacts on the public and to the environment. However, block valve closure has no effect on preventing pipeline failure or stopping the material that remains inside the isolated pipeline segments from escaping into the environment. Positive effects in terms of reduced fire, socioeconomic, and environmental damage resulting from rapid block valve closure are only realized through the combined efforts of pipeline operators and emergency responders.

Installing ASVs and RCVs in newly constructed or fully replaced natural gas and hazardous liquid pipelines can be an effective strategy for mitigating potential fire consequences resulting from a release and subsequent ignition provided all of the following conditions are satisfied.

- The leak is detected and the appropriate ASVs and RCVs close completely so that the damaged pipeline segment is isolated within 10 minutes or less after the break, and fire fighting activities within the area of potentially severe damage can begin soon after the fire fighters arrive on the scene.
- Fire fighters arrive on the scene and are ready to begin fire fighting activities within 10 minutes or less after the break.
- Fire hydrants are accessible in the vicinity of the potentially severe damage radius.
- Block valves close in time to reduce the heat flux at the potentially severe damage radius to 2.5 kW/m^2 (800 $Btu/hr\ ft^2$) within 20 minutes or less after the break.

Adding automatic closure capability to block valves in newly constructed or fully replaced hazardous liquid pipelines can be an effective strategy for mitigating potential fire damage resulting from a guillotine-type break and subsequent ignition provided the leak is detected and the appropriate ASVs and RCVs close completely so that the damaged pipeline segment is isolated within 15 minutes after the break. After continuous exposure to a heat flux of 31.5 kW/m^2 (10,000 $Btu/hr\ ft^2$) for 15 minutes, buildings located with the potentially moderate damage radius may begin burning. If the damaged pipeline segment is not isolated within 30 minutes after the break, buildings located with the potentially minor damage radius that are continuously exposed to a heat flux of 15.8 kW/m^2 (5,000 $Btu/hr\ ft^2$) may begin burning. The cost effectiveness of installing ASVs or RCVs in newly constructed or fully replaced hazardous liquid pipelines decreases as delays in leak detection, pump shutdown, and block valve closure increase.

Adding automatic closure capability to block valves in newly constructed or fully replaced hazardous liquid pipelines can also be an effective strategy for mitigating potential socioeconomic and environmental damage resulting from a release that does not ignite. Delays in closing block valves immediately following a break result in a release rate that approximates the normal pipeline flow rate.

This flow rate continues until block valve closure isolates the damaged pipeline segment and the drain down phase begins. The cost effectiveness of installing ASVs or RCVs in newly constructed or fully replaced hazardous liquid pipelines increases as the time required to isolate a damage pipeline segment decreases because block valve closure swiftness affects the amount of product released following an unintended hazardous liquid pipeline rupture.

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APPENDIX A: SPILL VOLUME RELEASED DUE TO VALVE CLOSURE TIMES IN LIQUID PROPANE PIPELINES

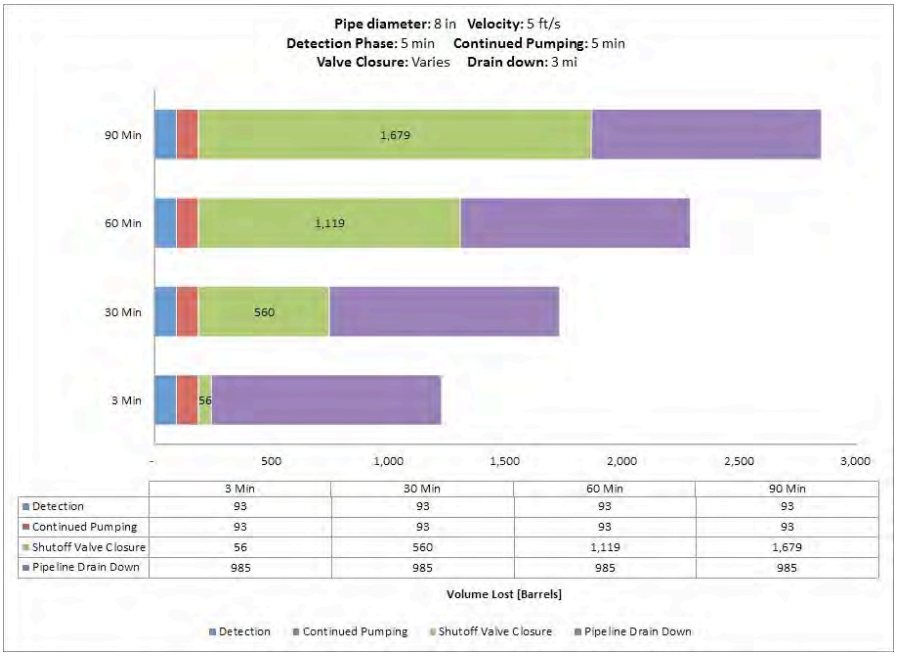

	3 Min	30 Min	60 Min	90 Min
Detection	93	93	93	93
Continued Pumping	93	93	93	93
Shutoff Valve Closure	56	560	1,119	1,679
Pipeline Drain Down	985	985	985	985

Fig. A-1.8 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

	3 Min	30 Min	60 Min	90 Min
Detection	93	93	93	93
Continued Pumping	93	93	93	93
Shutoff Valve Closure	56	560	1,119	1,679
Pipeline Drain Down	985	985	985	985

Fig. A-2.8 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

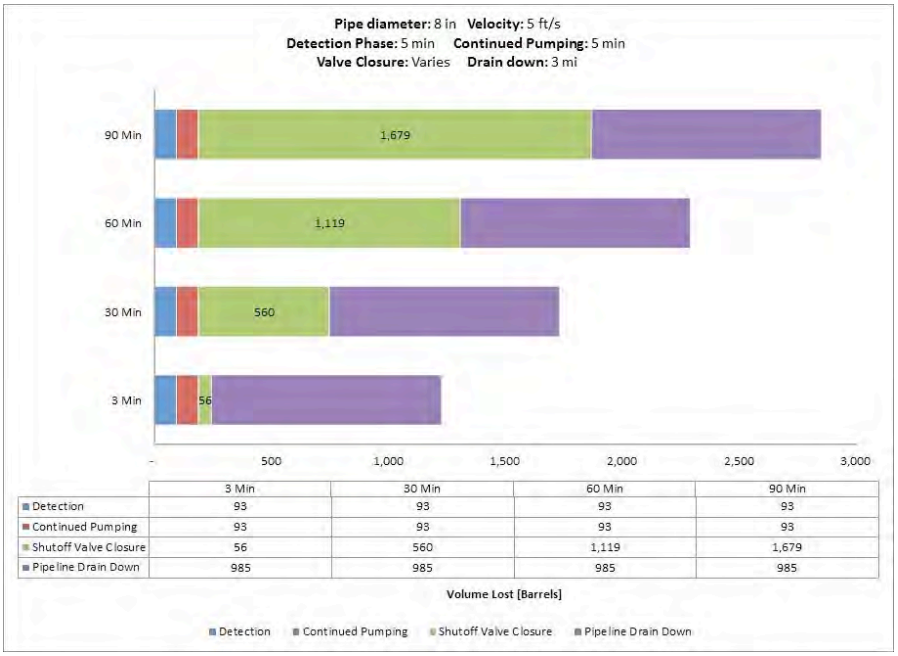

	3 Min	30 Min	60 Min	90 Min
Detection	93	93	93	93
Continued Pumping	93	93	93	93
Shutoff Valve Closure	56	560	1,119	1,679
Pipeline Drain Down	985	985	985	985

Fig. A-3.8 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

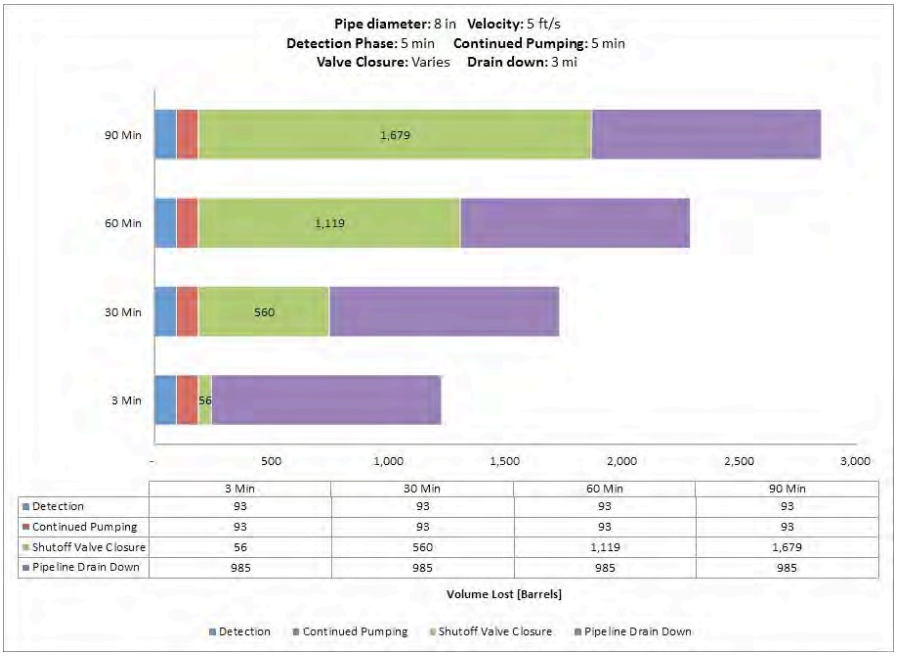

	3 Min	30 Min	60 Min	90 Min
Detection	93	93	93	93
Continued Pumping	93	93	93	93
Shutoff Valve Closure	56	560	1,119	1,679
Pipeline Drain Down	985	985	985	985

Fig. A-4.8 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

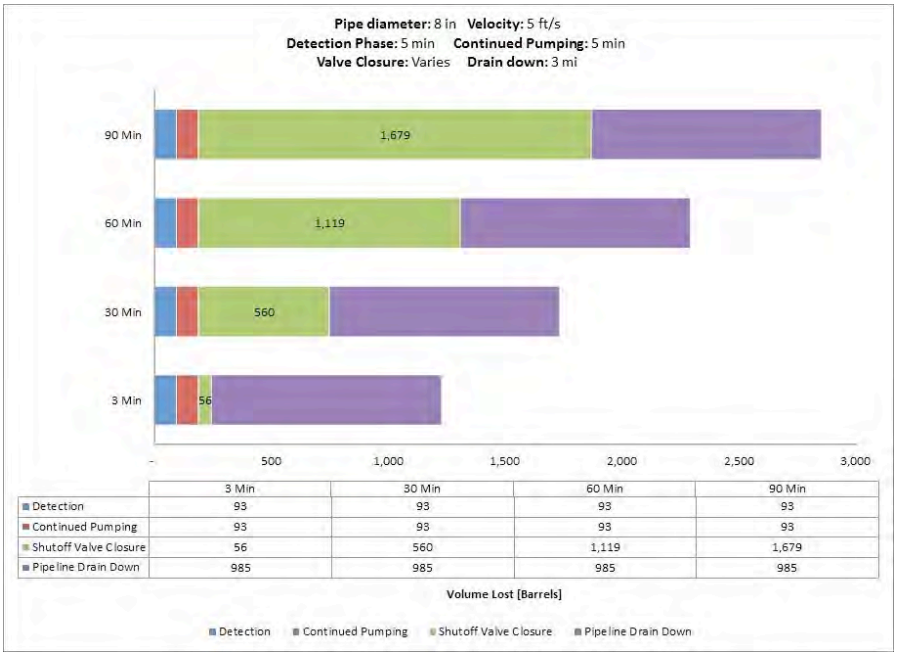

	3 Min	30 Min	60 Min	90 Min
Detection	93	93	93	93
Continued Pumping	93	93	93	93
Shutoff Valve Closure	56	560	1,119	1,679
Pipeline Drain Down	985	985	985	985

Fig. A-5. 8 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

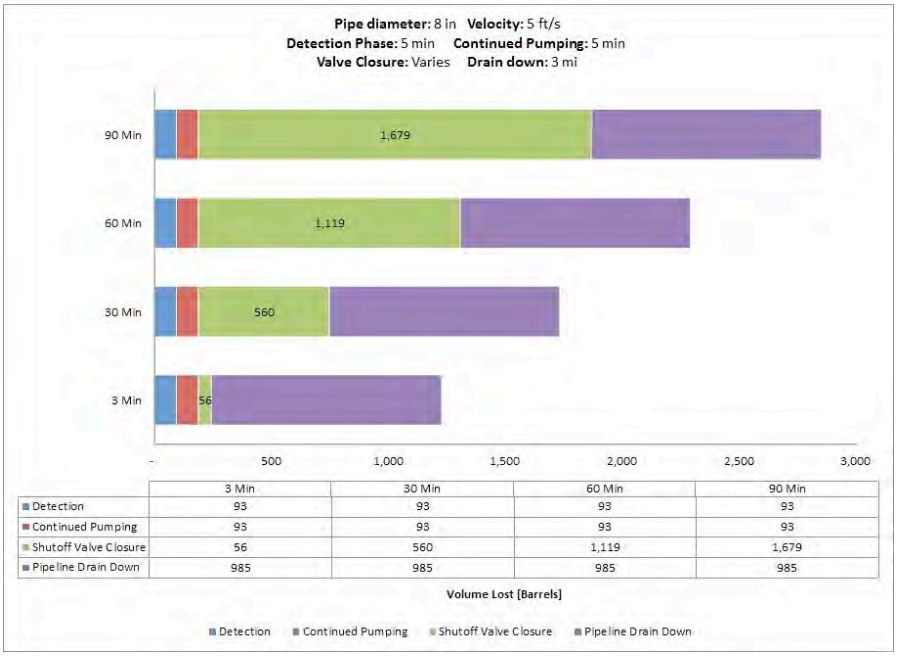

	3 Min	30 Min	60 Min	90 Min
Detection	93	93	93	93
Continued Pumping	93	93	93	93
Shutoff Valve Closure	56	560	1,119	1,679
Pipeline Drain Down	985	985	985	985

Fig. A-6.8 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

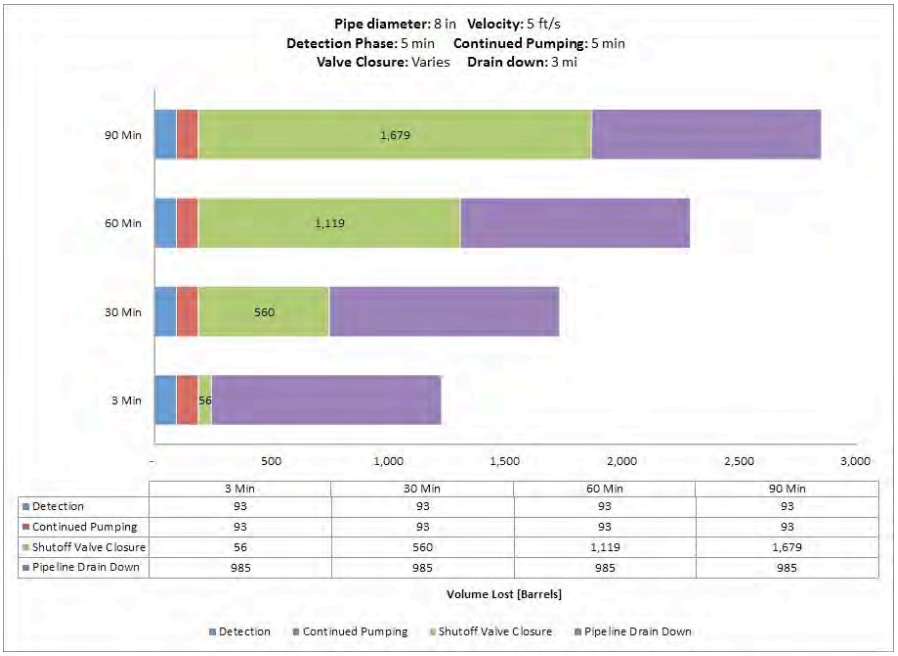

	3 Min	30 Min	60 Min	90 Min
Detection	93	93	93	93
Continued Pumping	93	93	93	93
Shutoff Valve Closure	56	560	1,119	1,679
Pipeline Drain Down	985	985	985	985

Fig. A-7.8 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

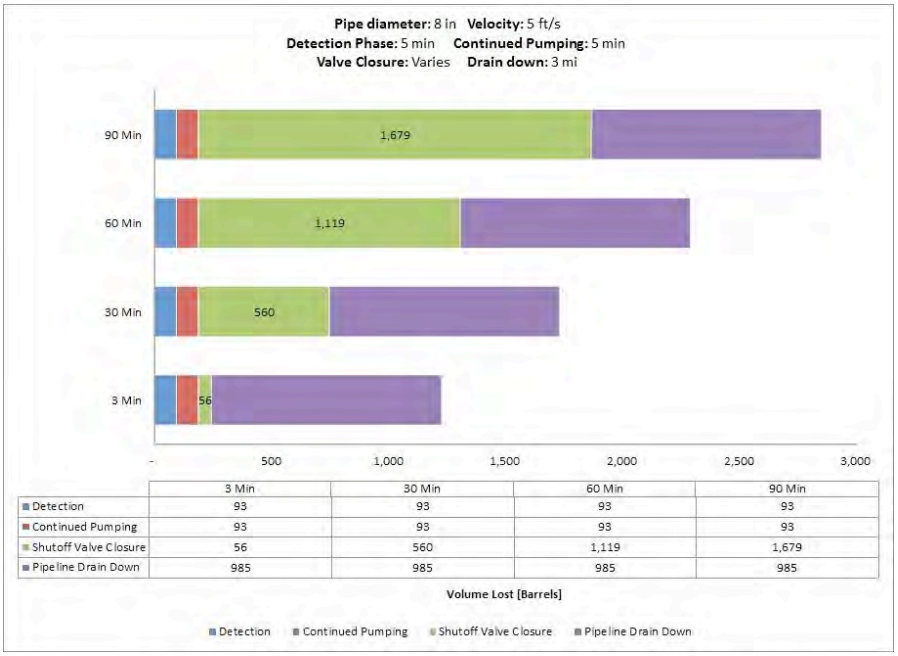

	3 Min	30 Min	60 Min	90 Min
Detection	93	93	93	93
Continued Pumping	93	93	93	93
Shutoff Valve Closure	56	560	1,119	1,679
Pipeline Drain Down	985	985	985	985

Fig. A-8.8 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

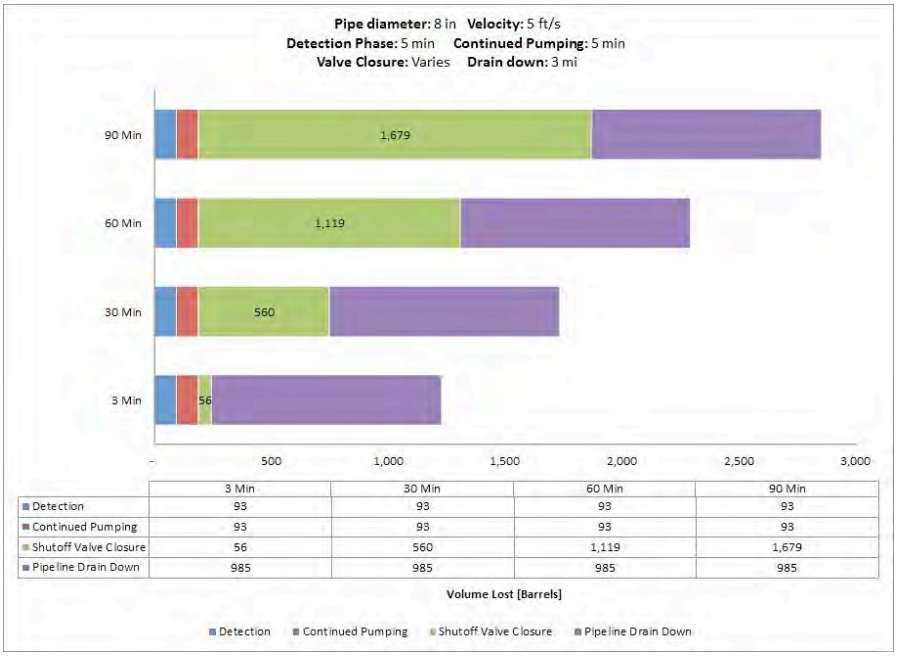

	3 Min	30 Min	60 Min	90 Min
Detection	93	93	93	93
Continued Pumping	93	93	93	93
Shutoff Valve Closure	56	560	1,119	1,679
Pipeline Drain Down	985	985	985	985

Fig. A-9. 8 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

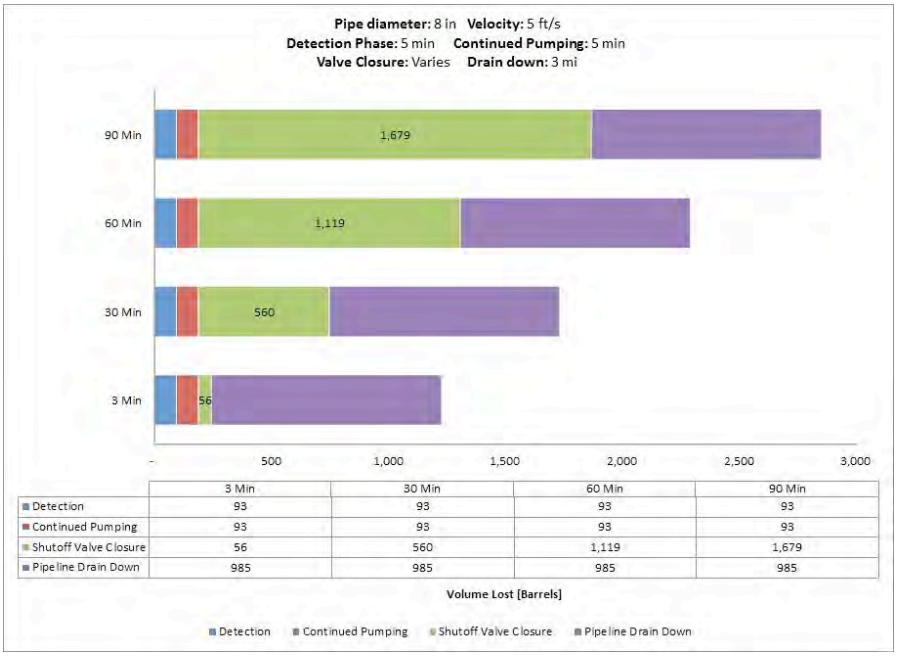

	3 Min	30 Min	60 Min	90 Min
Detection	93	93	93	93
Continued Pumping	93	93	93	93
Shutoff Valve Closure	56	560	1,119	1,679
Pipeline Drain Down	985	985	985	985

Fig. A-10. 8 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

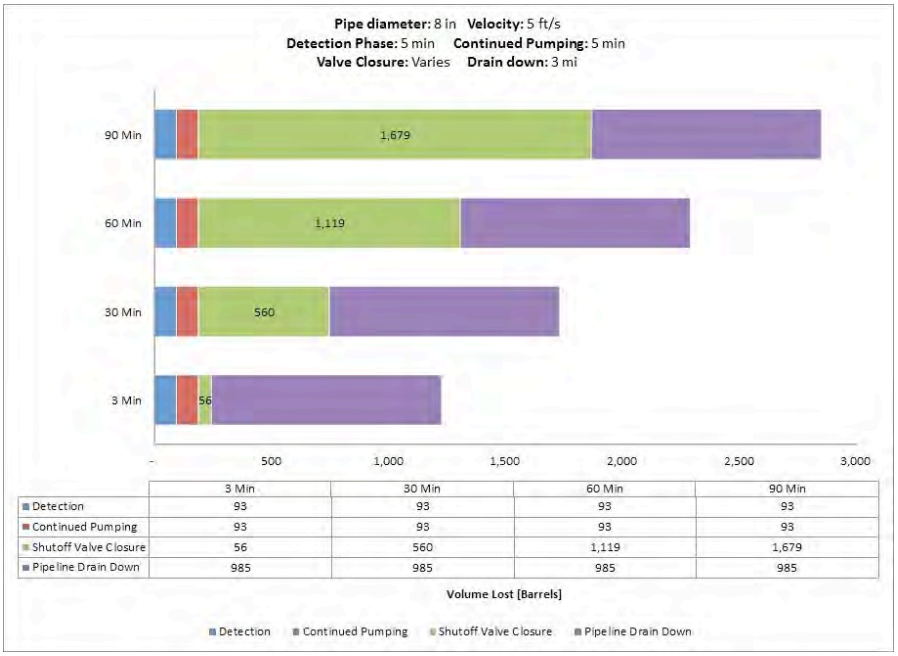

	3 Min	30 Min	60 Min	90 Min
Detection	93	93	93	93
Continued Pumping	93	93	93	93
Shutoff Valve Closure	56	560	1,119	1,679
Pipeline Drain Down	985	985	985	985

Fig. A-11. 8 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

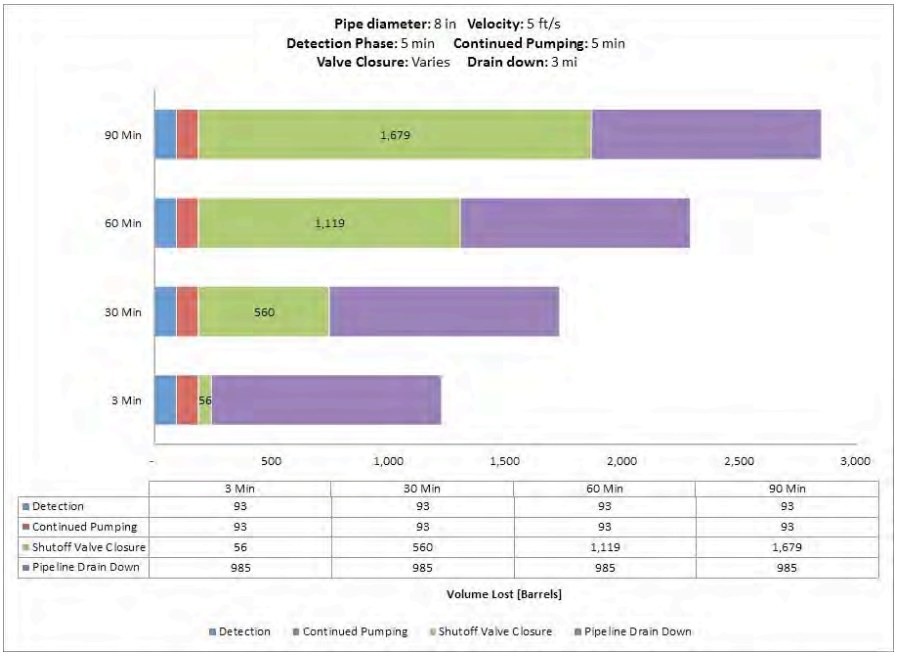

	3 Min	30 Min	60 Min	90 Min
Detection	93	93	93	93
Continued Pumping	93	93	93	93
Shutoff Valve Closure	56	560	1,119	1,679
Pipeline Drain Down	985	985	985	985

Fig. A-12. 8 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

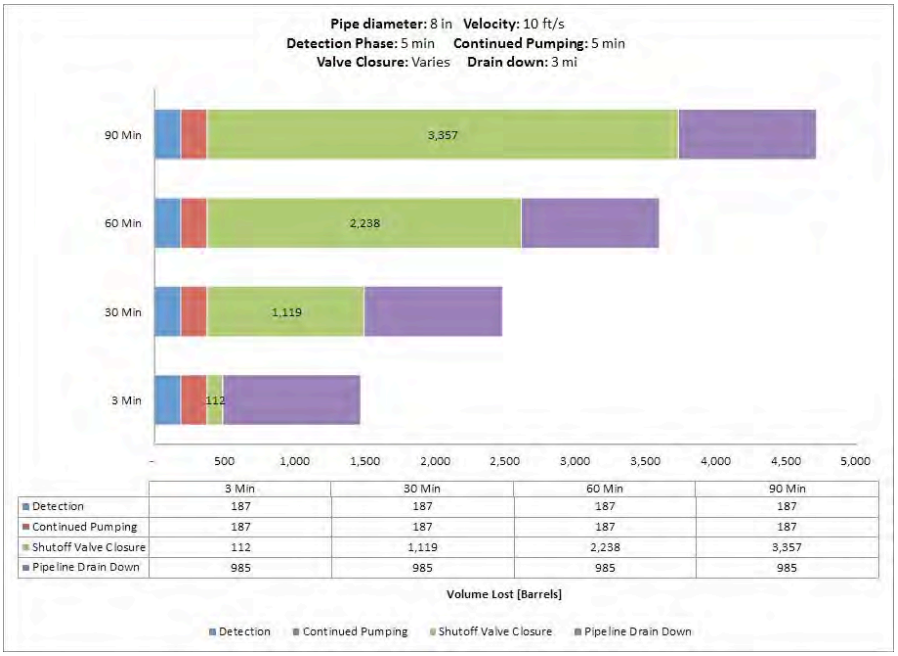

	3 Min	30 Min	60 Min	90 Min
Detection	187	187	187	187
Continued Pumping	187	187	187	187
Shutoff Valve Closure	112	1,119	2,238	3,357
Pipeline Drain Down	985	985	985	985

Fig. A-13. 8 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

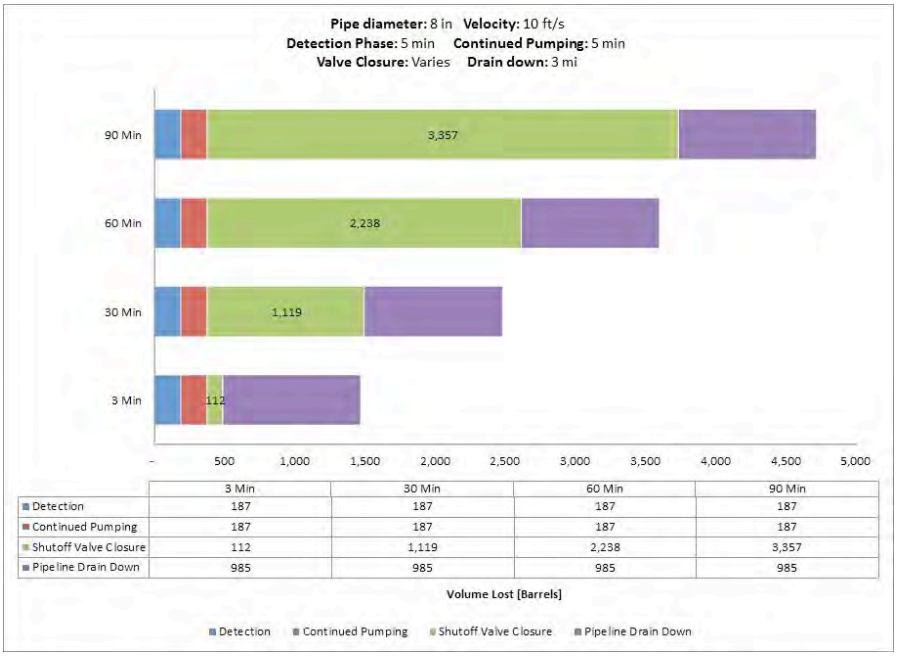

	3 Min	30 Min	60 Min	90 Min
Detection	187	187	187	187
Continued Pumping	187	187	187	187
Shutoff Valve Closure	112	1,119	2,238	3,357
Pipeline Drain Down	985	985	985	985

Fig. A-14. 8 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

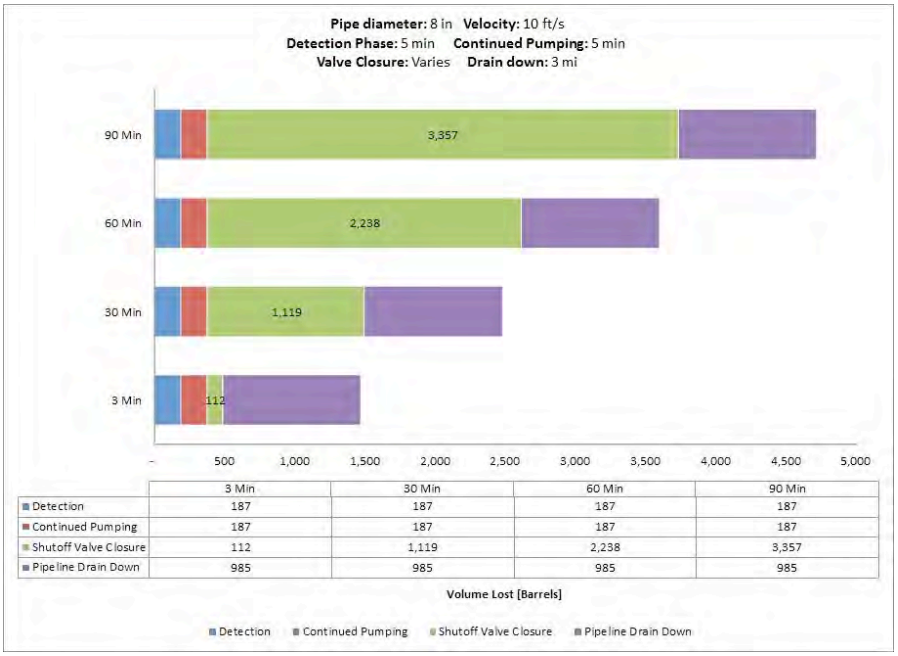

	3 Min	30 Min	60 Min	90 Min
Detection	187	187	187	187
Continued Pumping	187	187	187	187
Shutoff Valve Closure	112	1,119	2,238	3,357
Pipeline Drain Down	985	985	985	985

Fig. A-15. 8 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

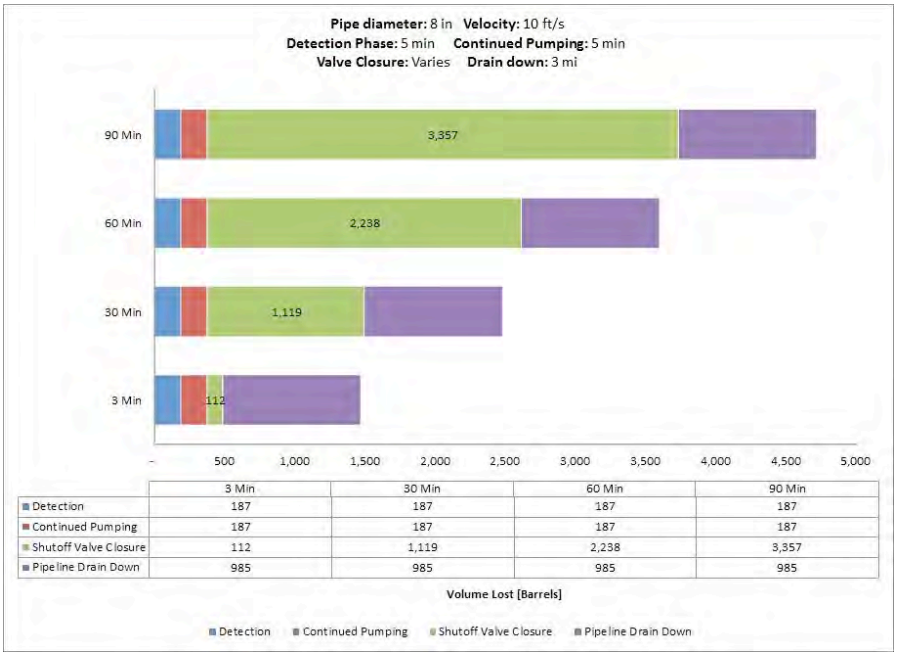

	3 Min	30 Min	60 Min	90 Min
Detection	187	187	187	187
Continued Pumping	187	187	187	187
Shutoff Valve Closure	112	1,119	2,238	3,357
Pipeline Drain Down	985	985	985	985

Fig. A-16. 8 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

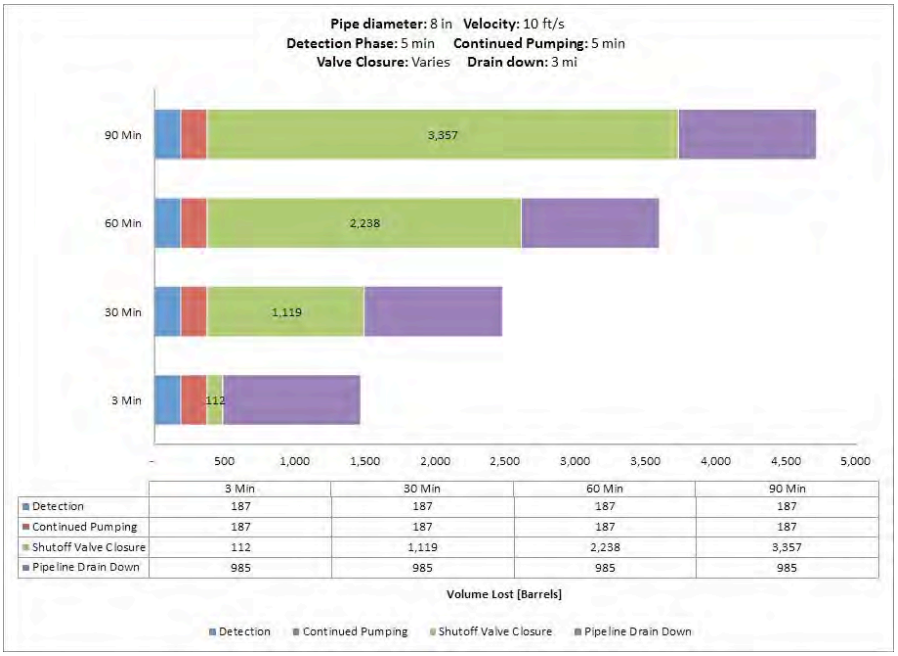

	3 Min	30 Min	60 Min	90 Min
Detection	187	187	187	187
Continued Pumping	187	187	187	187
Shutoff Valve Closure	112	1,119	2,238	3,357
Pipeline Drain Down	985	985	985	985

Fig. A-17. 8 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

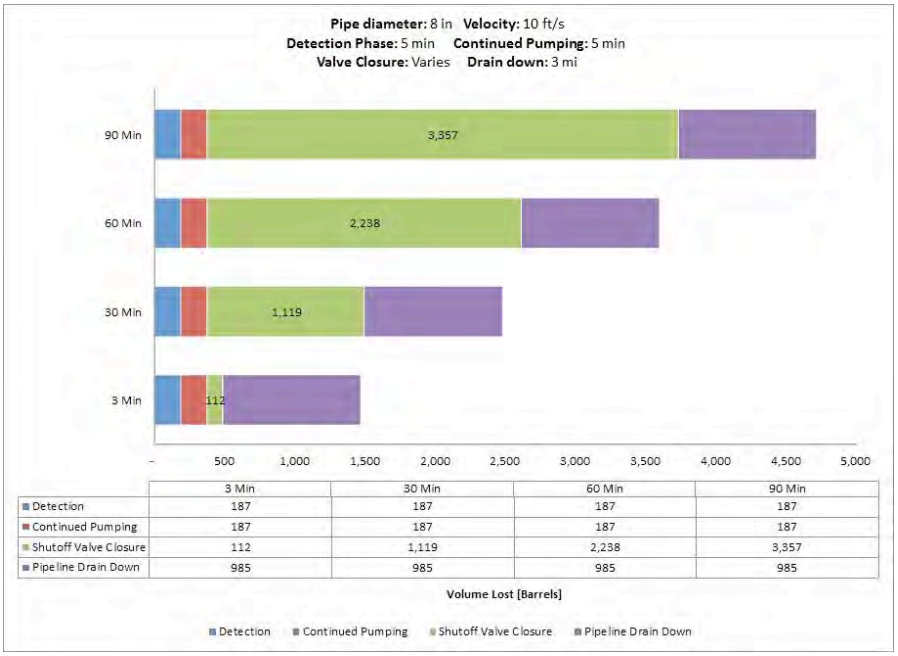

	3 Min	30 Min	60 Min	90 Min
Detection	187	187	187	187
Continued Pumping	187	187	187	187
Shutoff Valve Closure	112	1,119	2,238	3,357
Pipeline Drain Down	985	985	985	985

Fig. A-18. 8 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

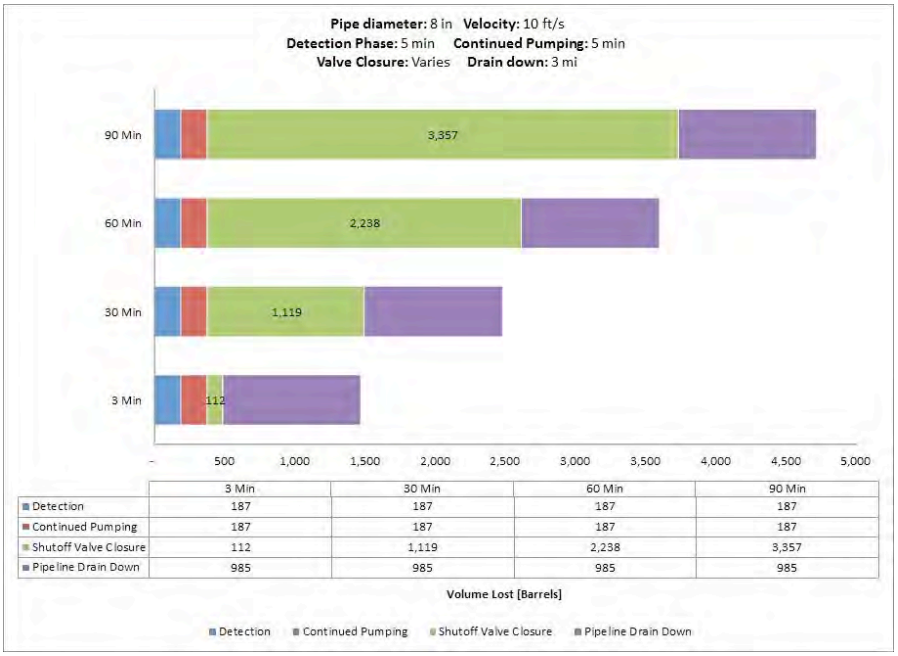

	3 Min	30 Min	60 Min	90 Min
Detection	187	187	187	187
Continued Pumping	187	187	187	187
Shutoff Valve Closure	112	1,119	2,238	3,357
Pipeline Drain Down	985	985	985	985

Fig. A-19. 8 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

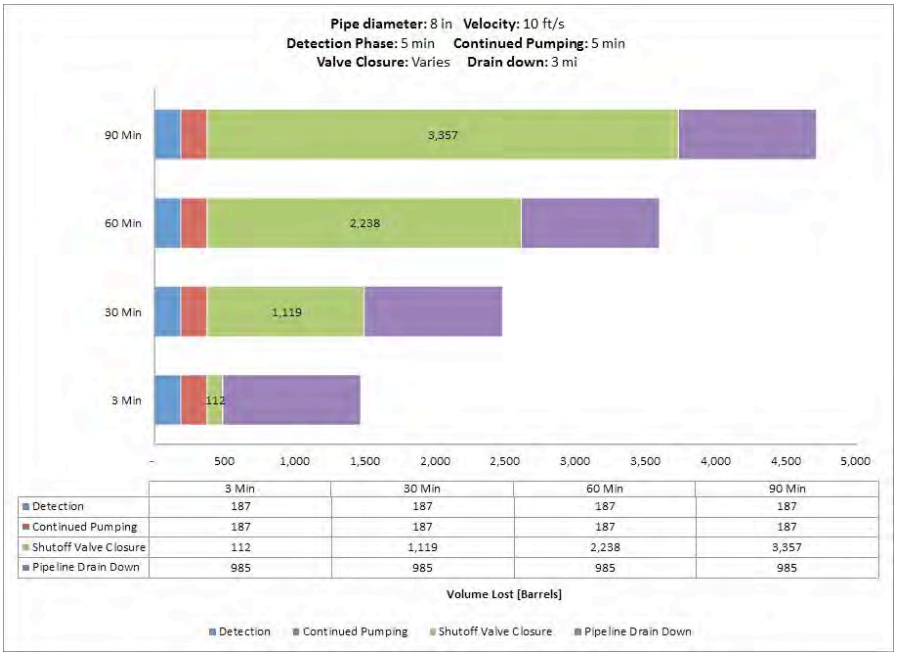

	3 Min	30 Min	60 Min	90 Min
Detection	187	187	187	187
Continued Pumping	187	187	187	187
Shutoff Valve Closure	112	1,119	2,238	3,357
Pipeline Drain Down	985	985	985	985

Fig. A-20. 8 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

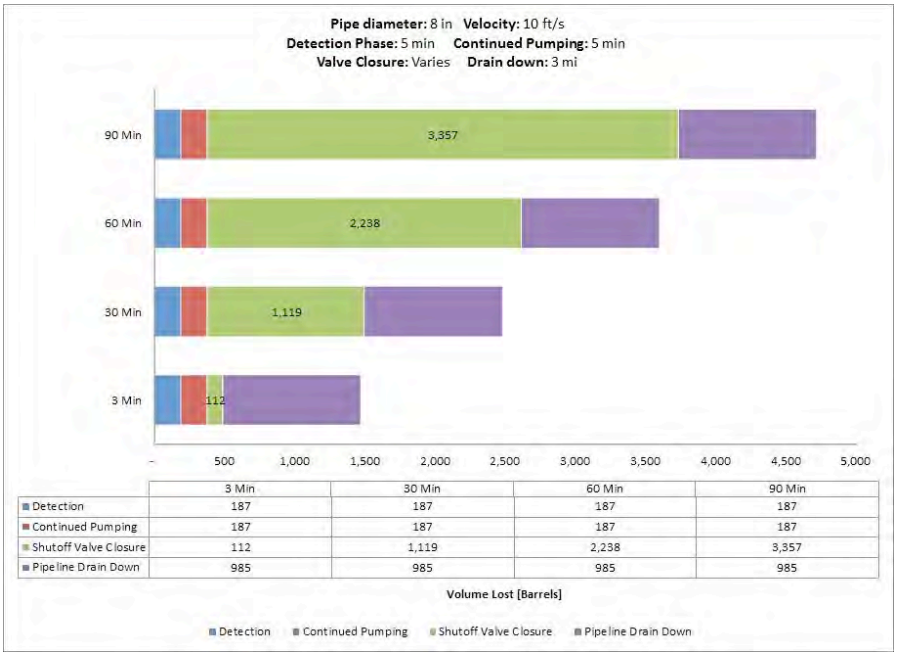

	3 Min	30 Min	60 Min	90 Min
Detection	187	187	187	187
Continued Pumping	187	187	187	187
Shutoff Valve Closure	112	1,119	2,238	3,357
Pipeline Drain Down	985	985	985	985

Fig. A-21. 8 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

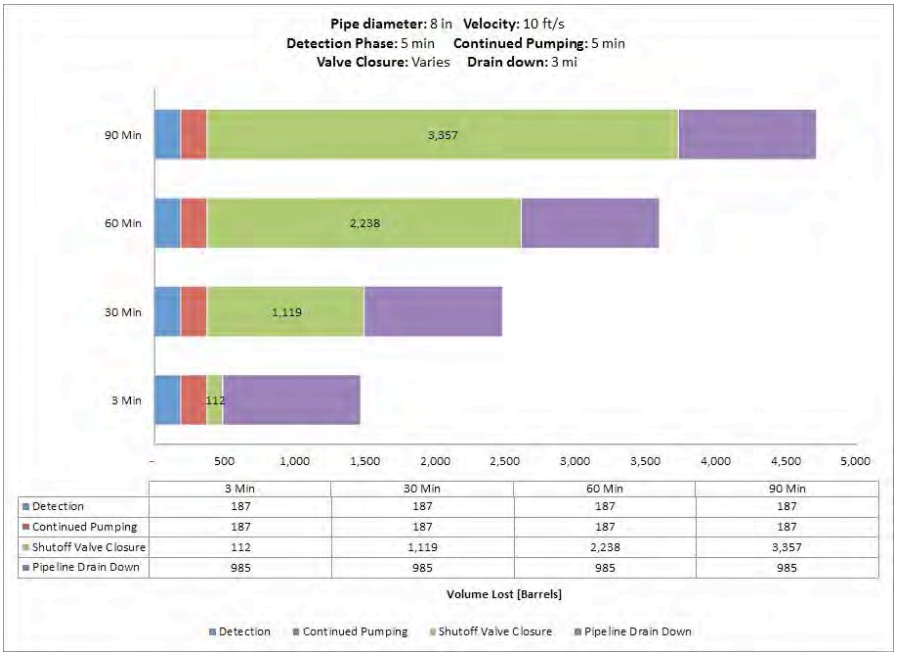

	3 Min	30 Min	60 Min	90 Min
Detection	187	187	187	187
Continued Pumping	187	187	187	187
Shutoff Valve Closure	112	1,119	2,238	3,357
Pipeline Drain Down	985	985	985	985

Fig. A-22. 8 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

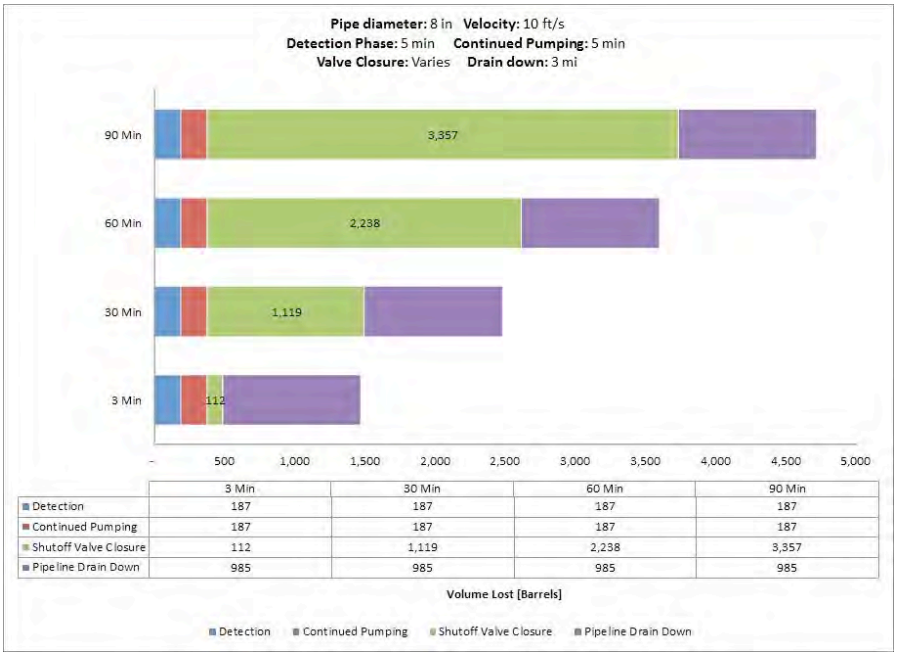

	3 Min	30 Min	60 Min	90 Min
Detection	187	187	187	187
Continued Pumping	187	187	187	187
Shutoff Valve Closure	112	1,119	2,238	3,357
Pipeline Drain Down	985	985	985	985

Fig. A-23. 8 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

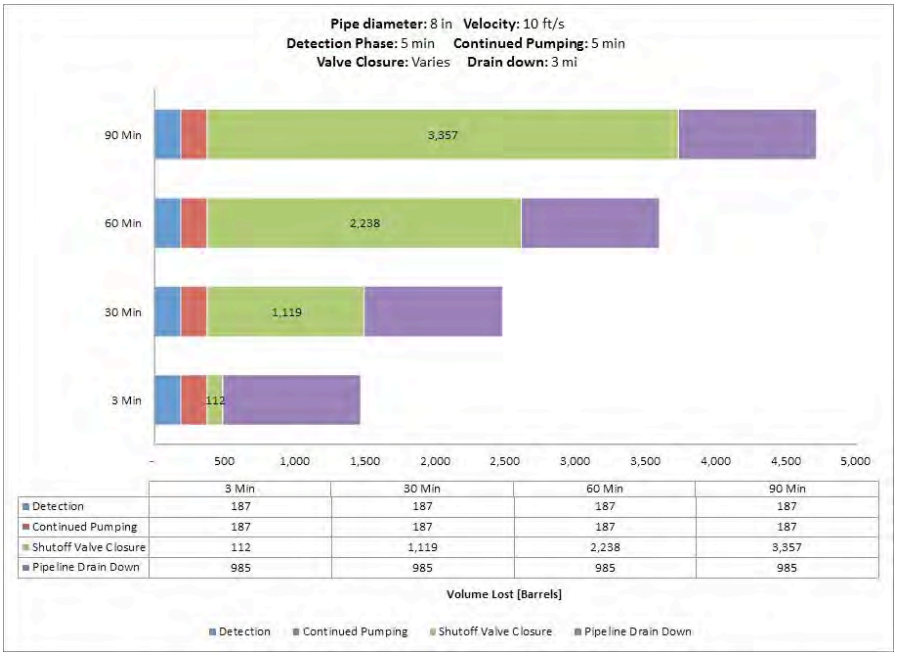

	3 Min	30 Min	60 Min	90 Min
Detection	187	187	187	187
Continued Pumping	187	187	187	187
Shutoff Valve Closure	112	1,119	2,238	3,357
Pipeline Drain Down	985	985	985	985

Fig. A-24. 8 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

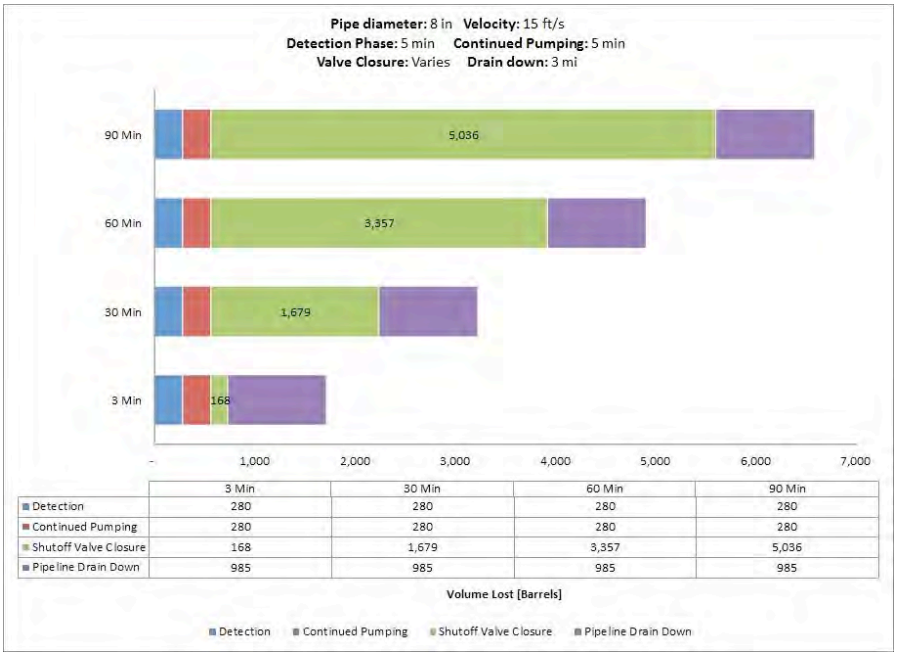

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. A-25. 8 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

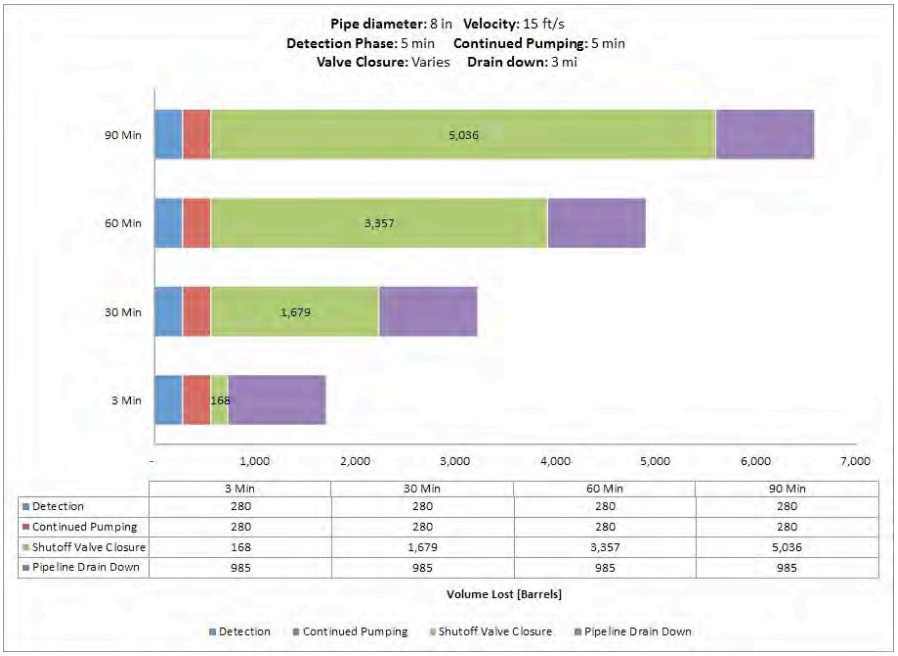

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. A-26. 8 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

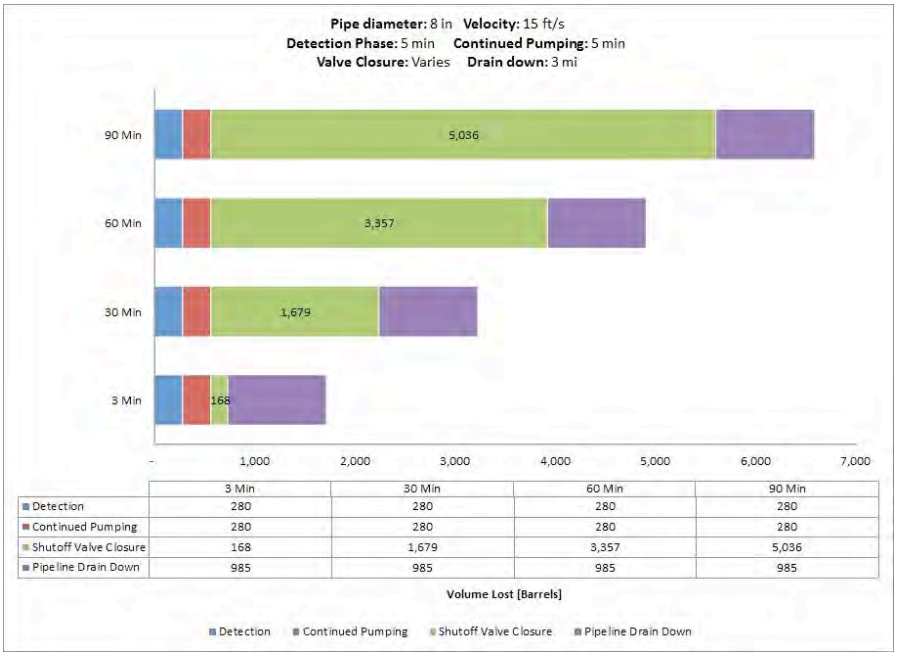

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. A-27. 8 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

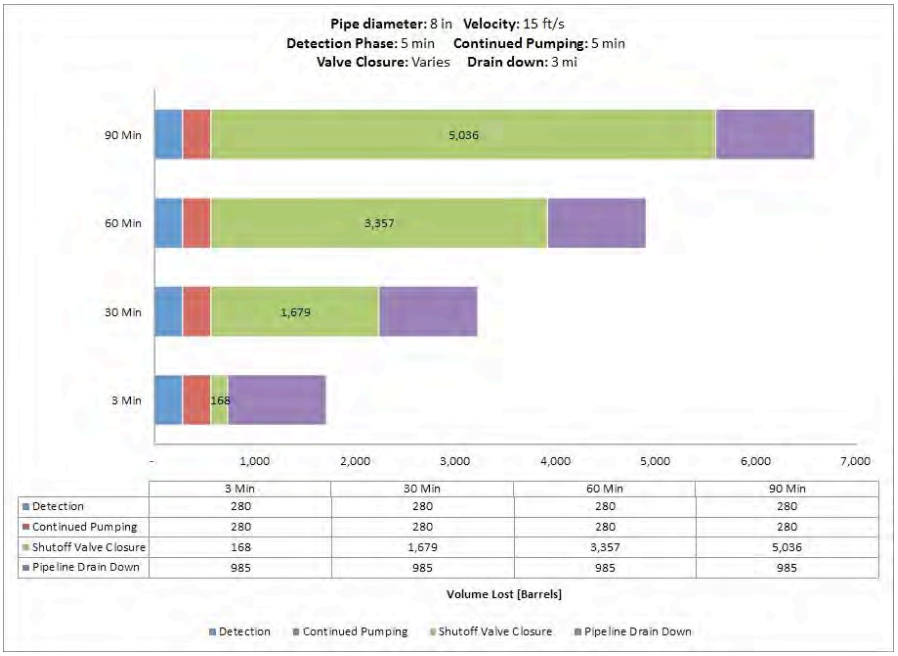

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. A-28. 8 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

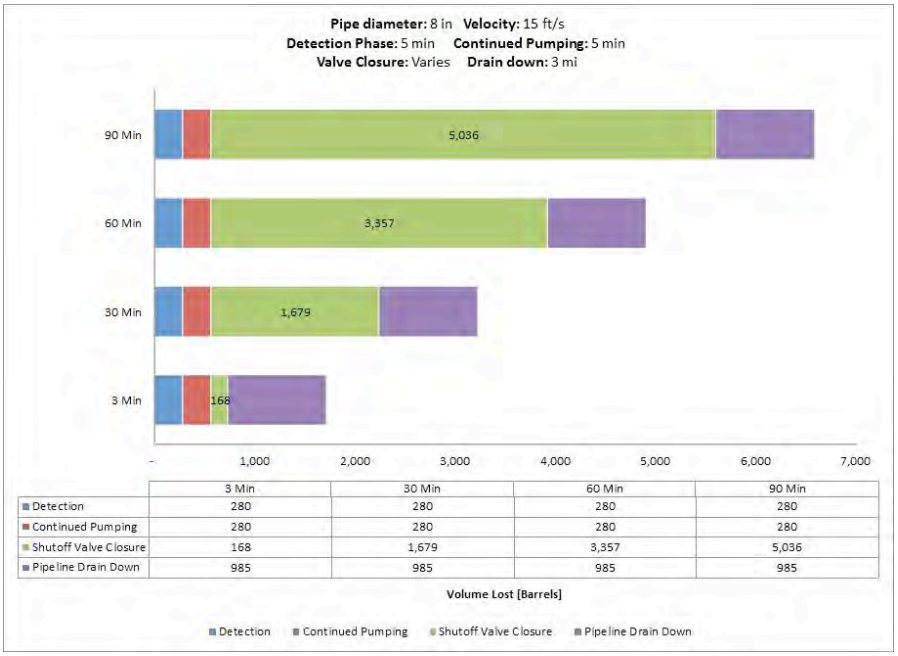

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. A-29. 8 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

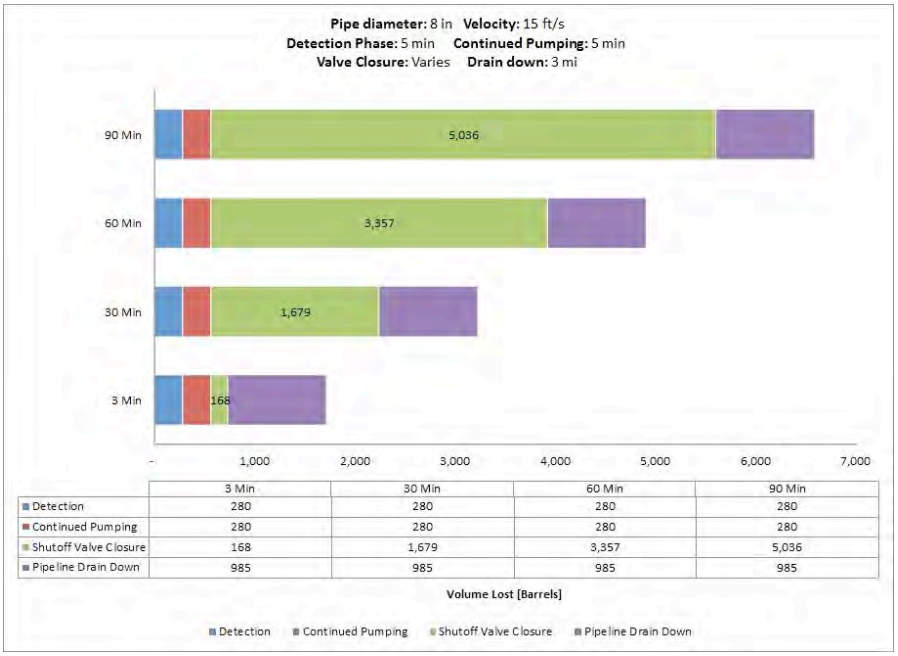

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. A-30. 8 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

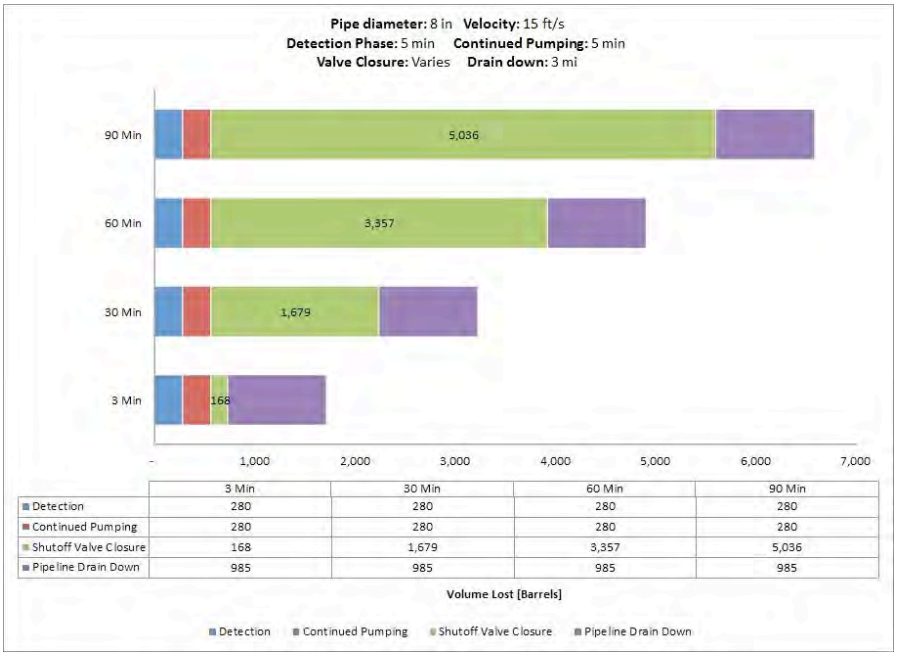

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. A-31. 8 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

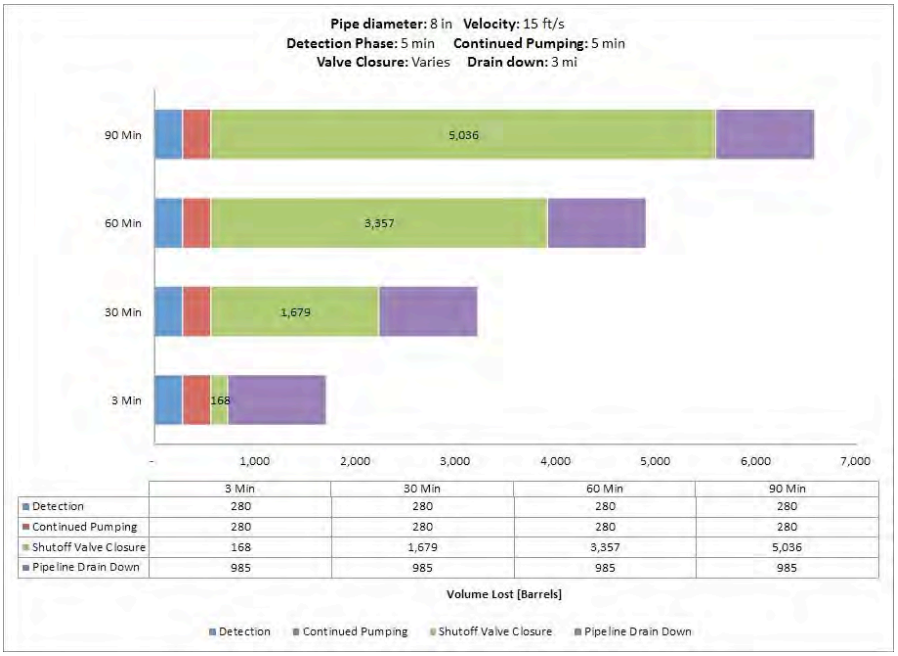

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. A-32. 8 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

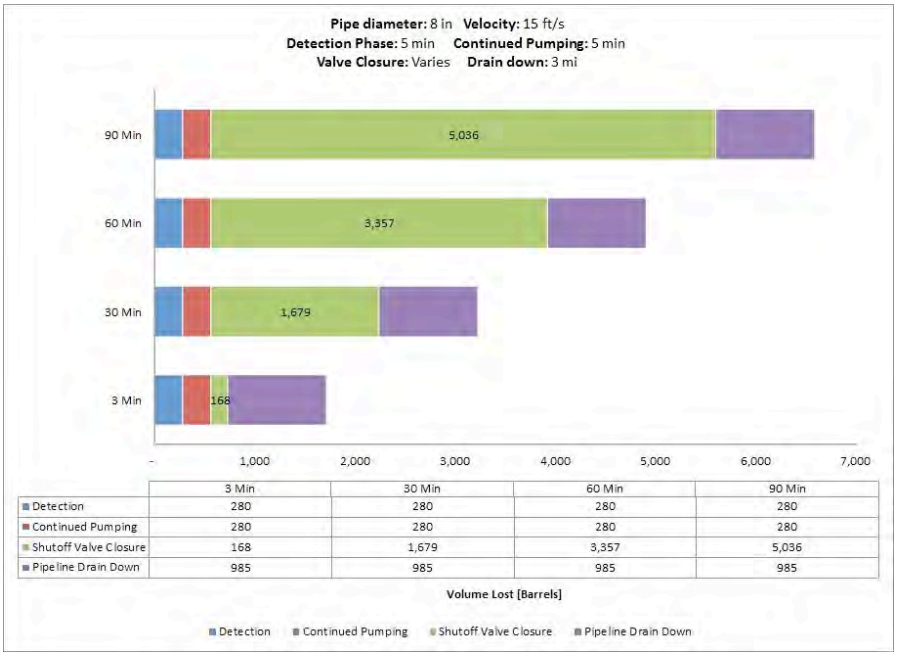

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. A-33. 8 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

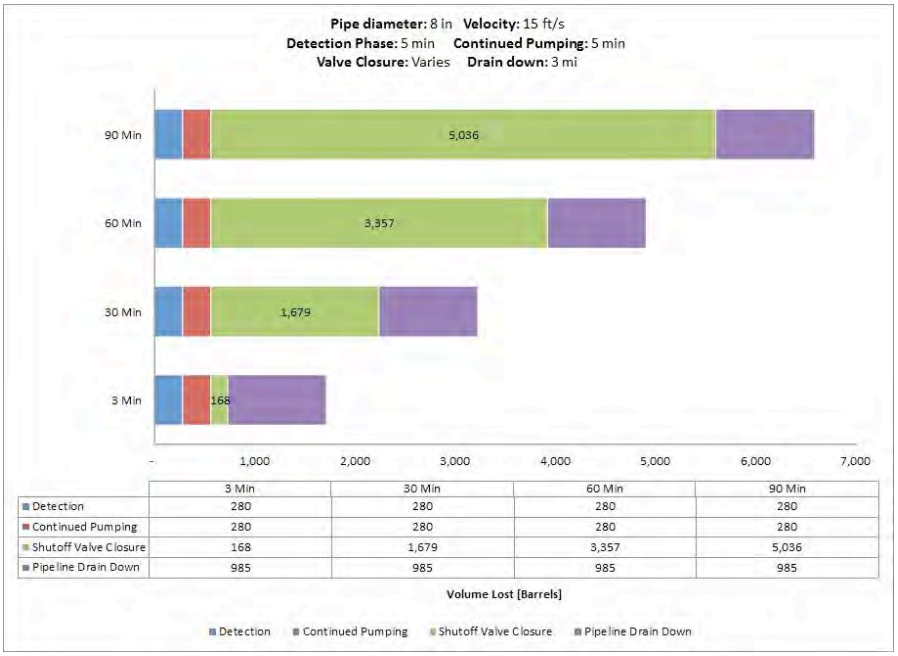

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. A-34. 8 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

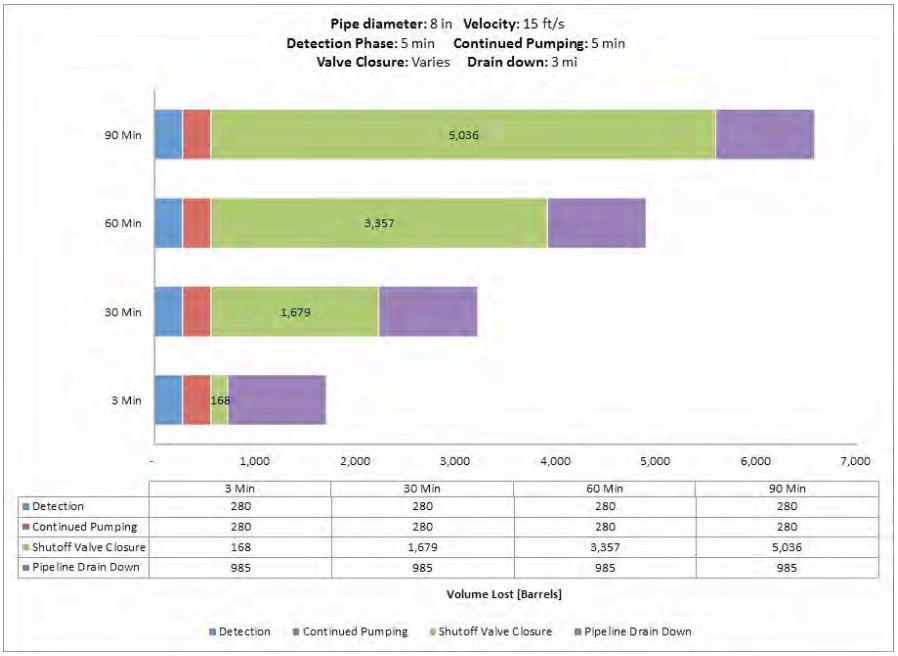

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. A-35. 8 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

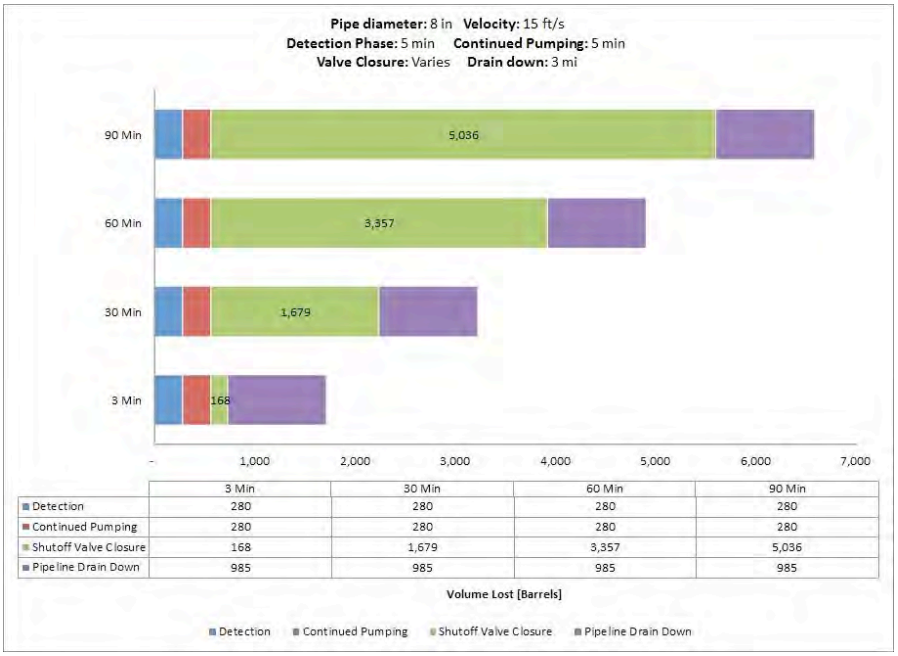

	3 Min	30 Min	60 Min	90 Min
Detection	280	280	280	280
Continued Pumping	280	280	280	280
Shutoff Valve Closure	168	1,679	3,357	5,036
Pipeline Drain Down	985	985	985	985

Fig. A-36. 8 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

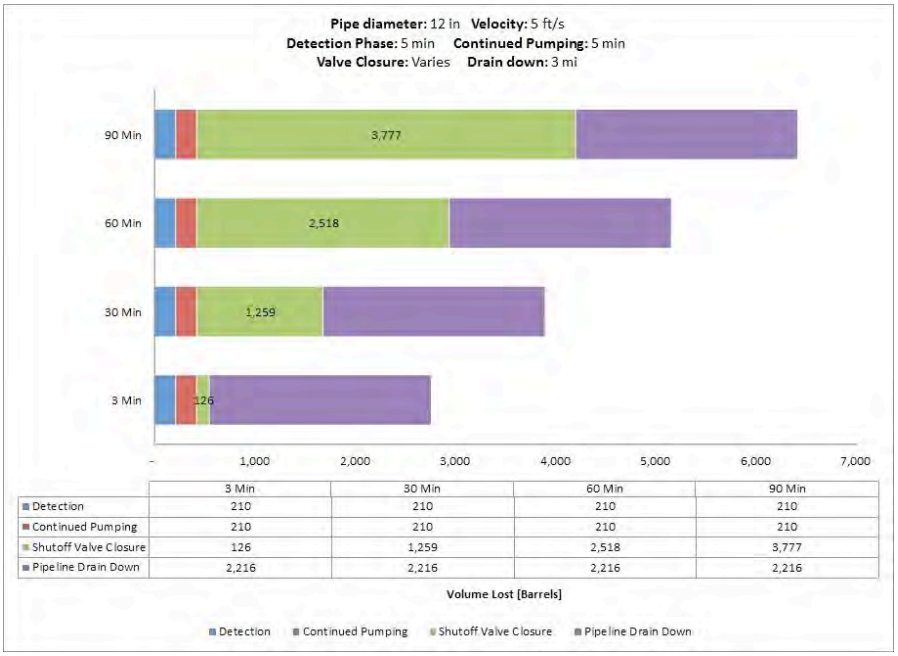

	3 Min	30 Min	60 Min	90 Min
Detection	210	210	210	210
Continued Pumping	210	210	210	210
Shutoff Valve Closure	126	1,259	2,518	3,777
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-37. 12 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

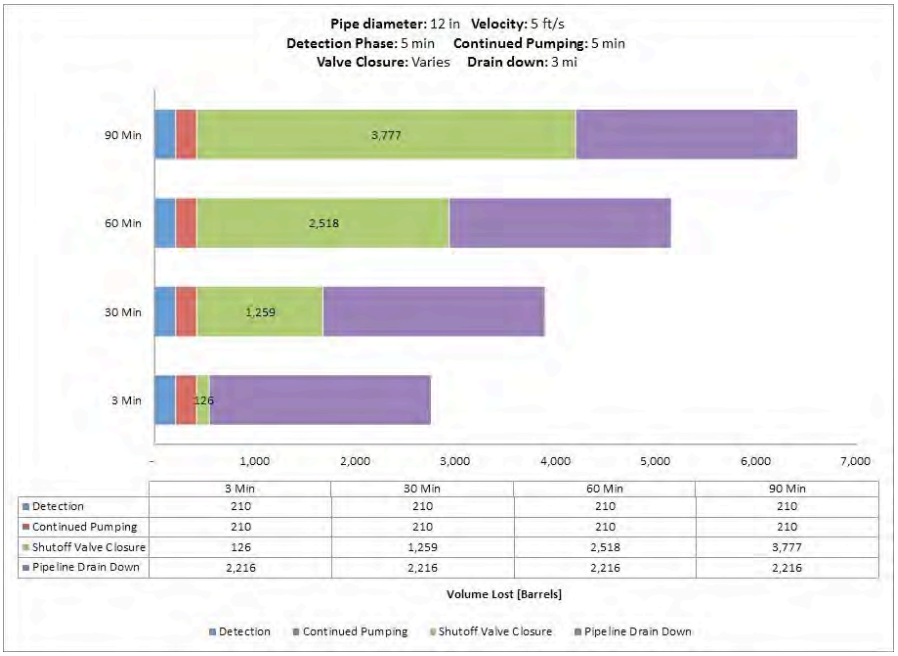

	3 Min	30 Min	60 Min	90 Min
Detection	210	210	210	210
Continued Pumping	210	210	210	210
Shutoff Valve Closure	126	1,259	2,518	3,777
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-38. 12 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

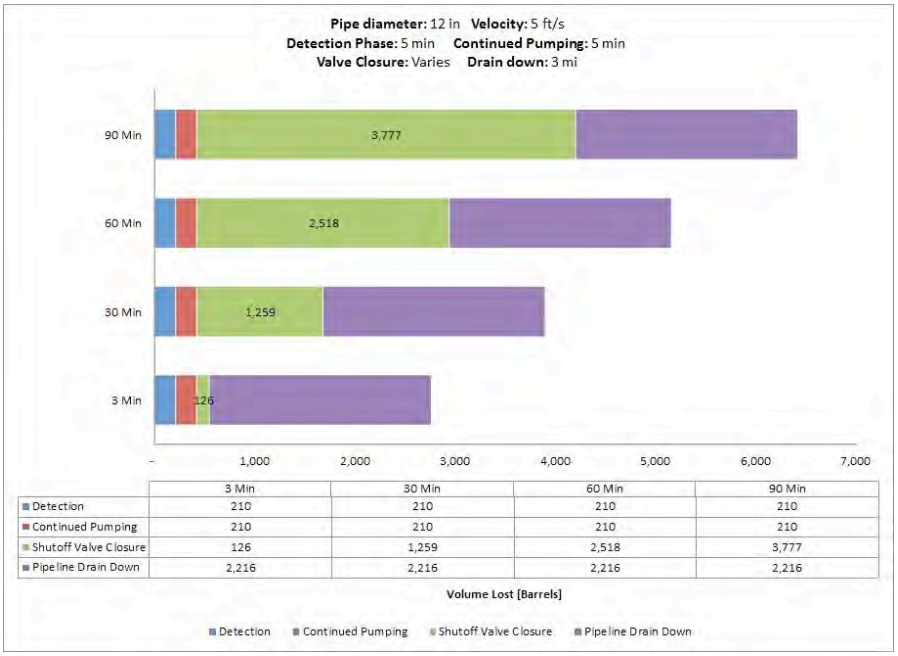

	3 Min	30 Min	60 Min	90 Min
Detection	210	210	210	210
Continued Pumping	210	210	210	210
Shutoff Valve Closure	126	1,259	2,518	3,777
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-39. 12 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

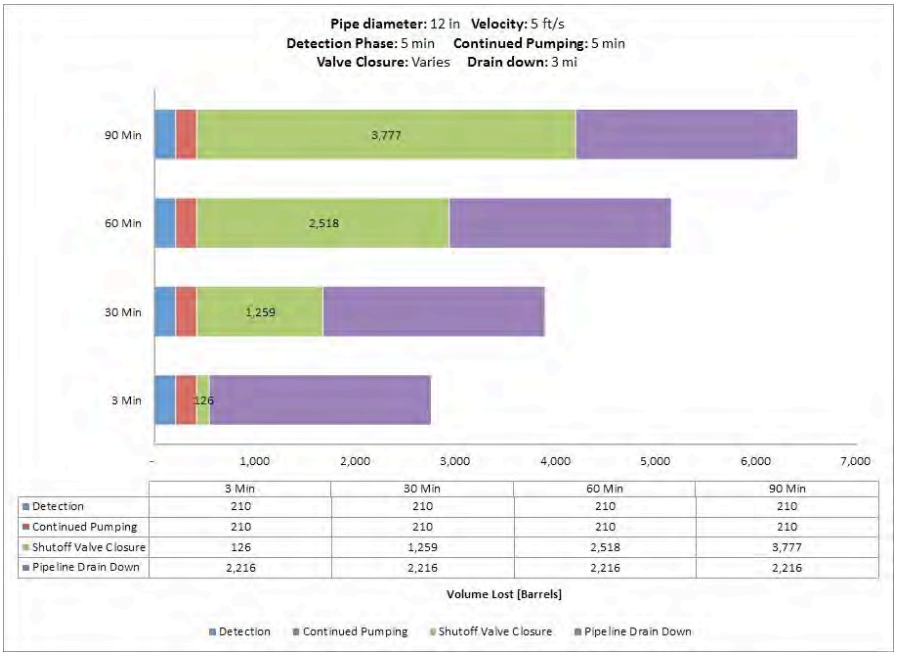

	3 Min	30 Min	60 Min	90 Min
Detection	210	210	210	210
Continued Pumping	210	210	210	210
Shutoff Valve Closure	126	1,259	2,518	3,777
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-40. 12 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

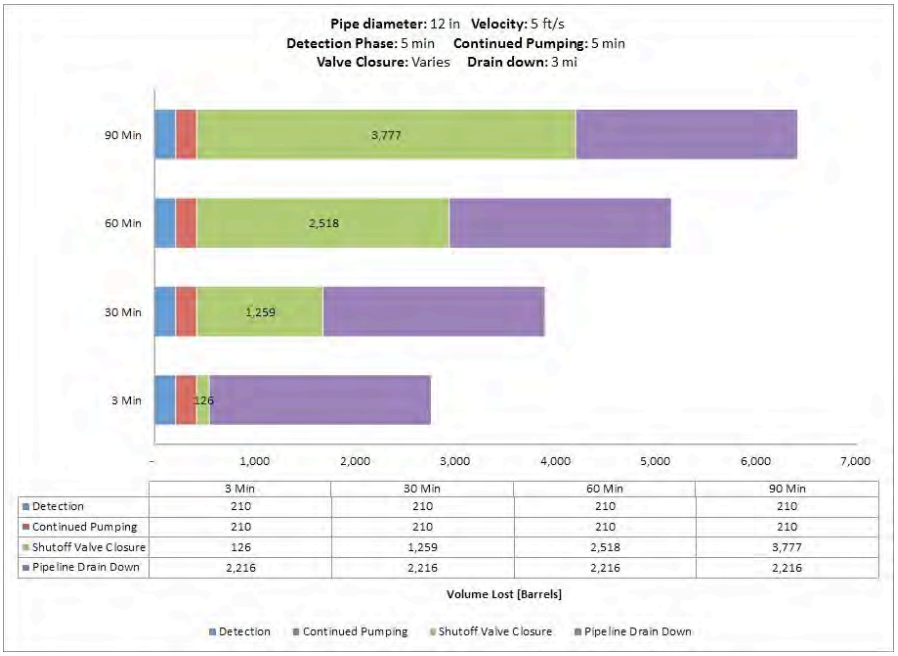

	3 Min	30 Min	60 Min	90 Min
Detection	210	210	210	210
Continued Pumping	210	210	210	210
Shutoff Valve Closure	126	1,259	2,518	3,777
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-41. 12 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

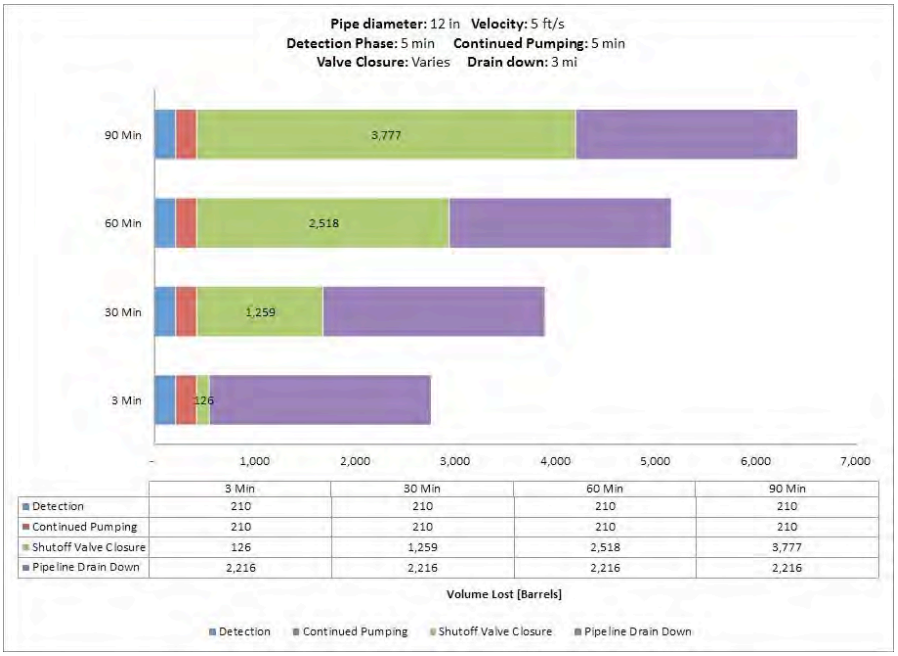

	3 Min	30 Min	60 Min	90 Min
Detection	210	210	210	210
Continued Pumping	210	210	210	210
Shutoff Valve Closure	126	1,259	2,518	3,777
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-42. 12 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

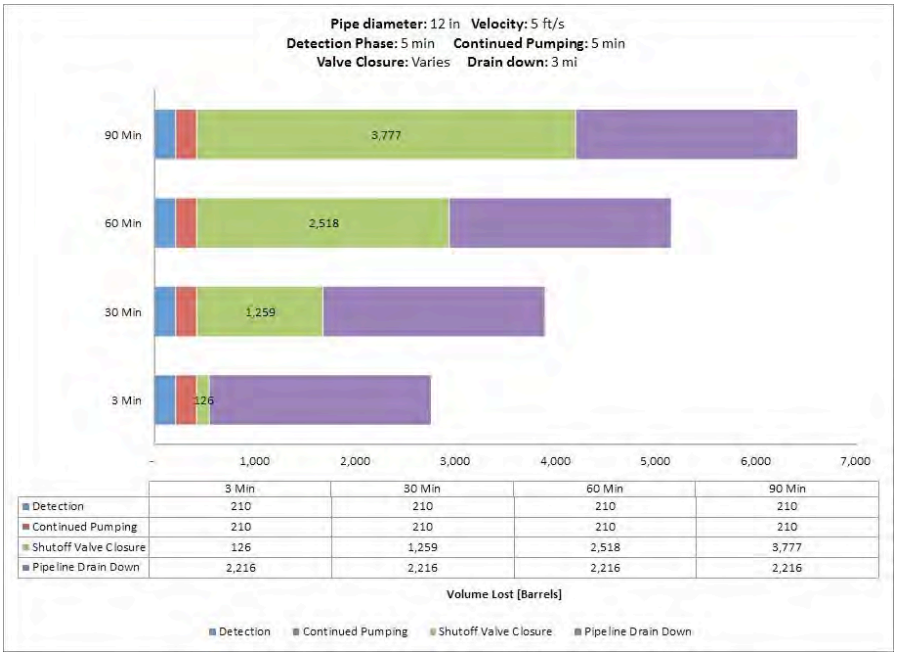

	3 Min	30 Min	60 Min	90 Min
Detection	210	210	210	210
Continued Pumping	210	210	210	210
Shutoff Valve Closure	126	1,259	2,518	3,777
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-43. 12 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

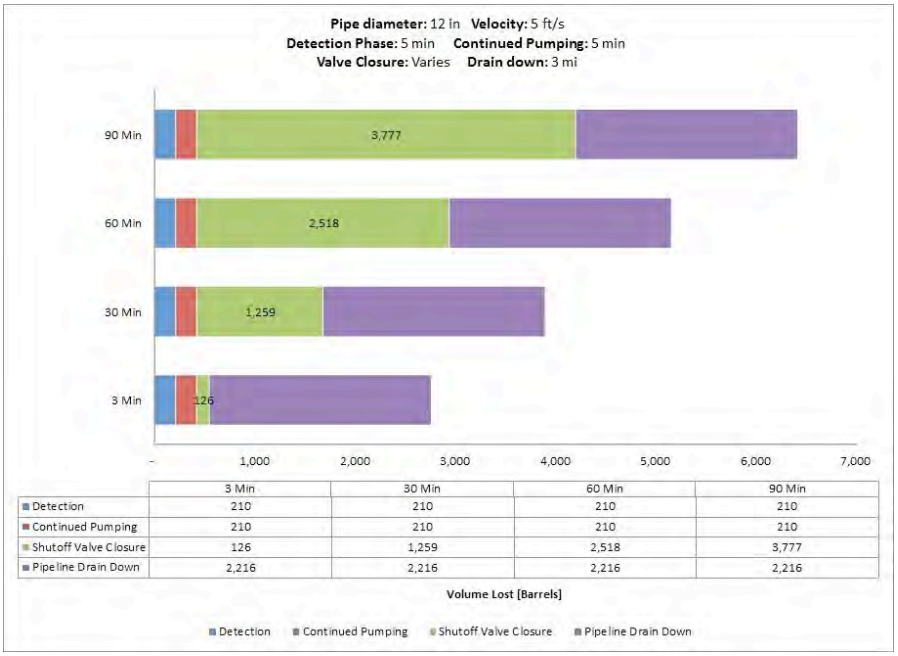

	3 Min	30 Min	60 Min	90 Min
Detection	210	210	210	210
Continued Pumping	210	210	210	210
Shutoff Valve Closure	126	1,259	2,518	3,777
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-44. 12 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

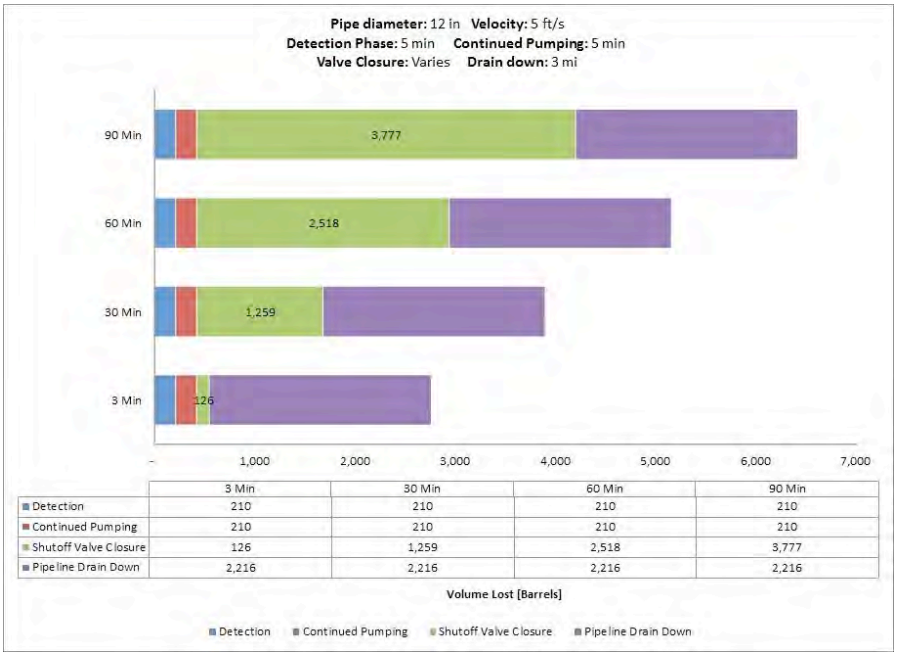

	3 Min	30 Min	60 Min	90 Min
Detection	210	210	210	210
Continued Pumping	210	210	210	210
Shutoff Valve Closure	126	1,259	2,518	3,777
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-45. 12 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

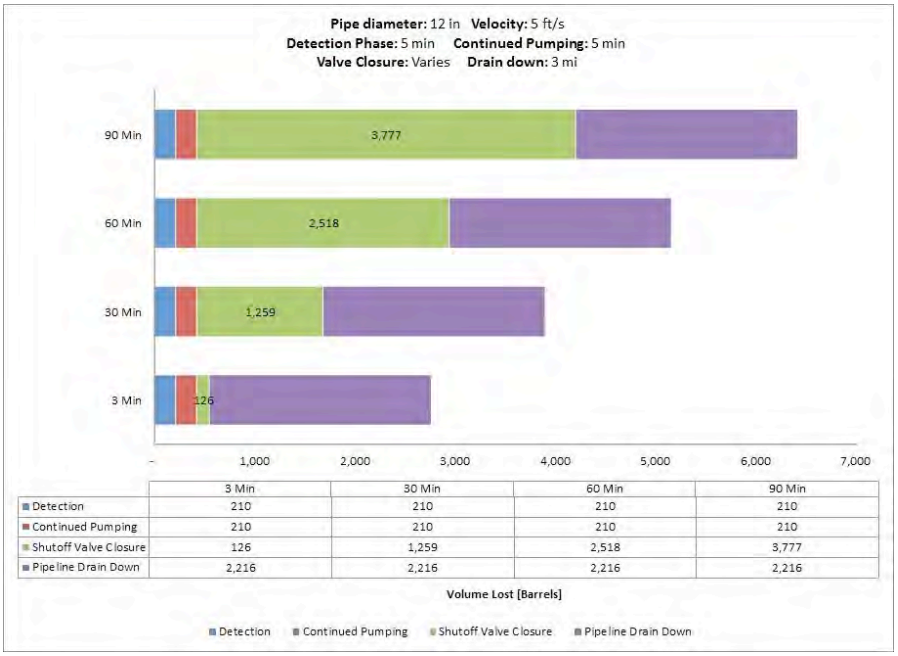

	3 Min	30 Min	60 Min	90 Min
Detection	210	210	210	210
Continued Pumping	210	210	210	210
Shutoff Valve Closure	126	1,259	2,518	3,777
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-46. 12 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

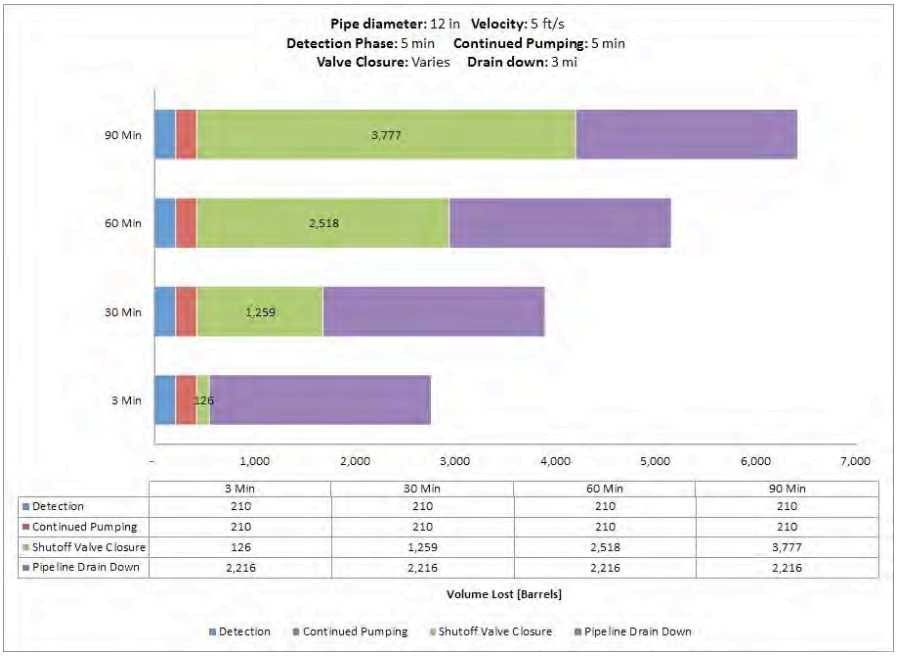

	3 Min	30 Min	60 Min	90 Min
Detection	210	210	210	210
Continued Pumping	210	210	210	210
Shutoff Valve Closure	126	1,259	2,518	3,777
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-47. 12 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

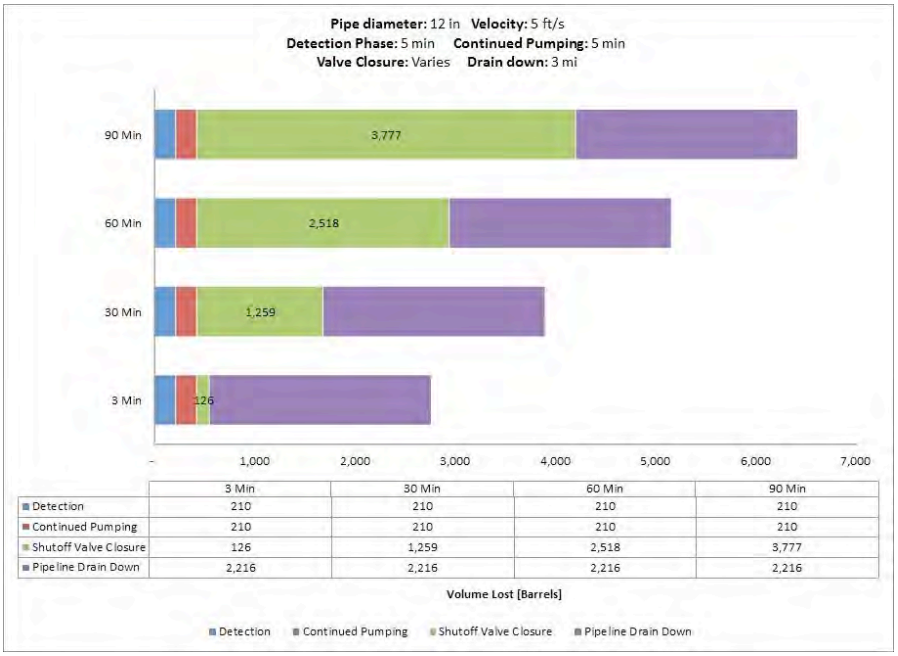

	3 Min	30 Min	60 Min	90 Min
Detection	210	210	210	210
Continued Pumping	210	210	210	210
Shutoff Valve Closure	126	1,259	2,518	3,777
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-48. 12 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

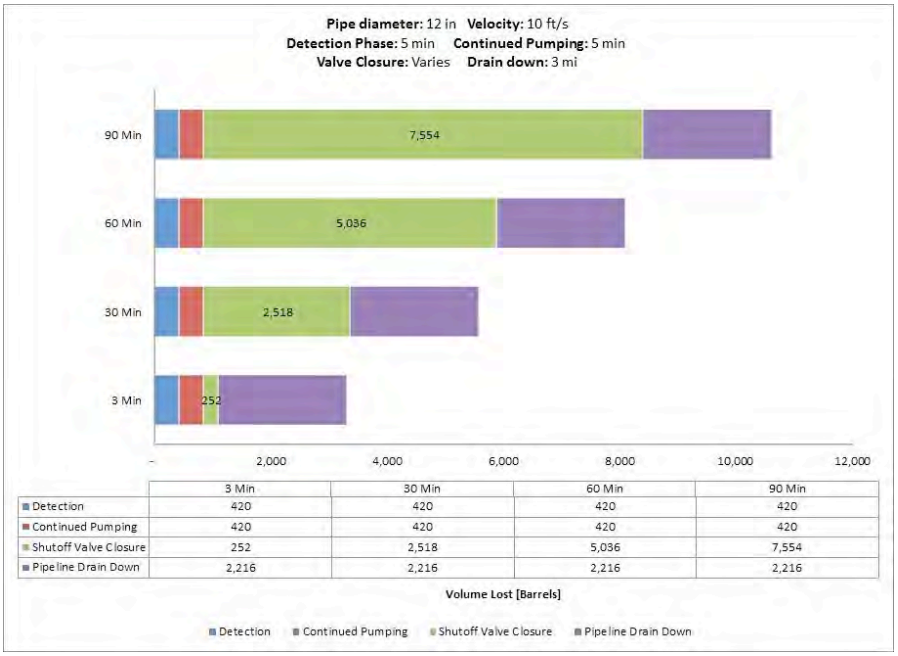

	3 Min	30 Min	60 Min	90 Min
Detection	420	420	420	420
Continued Pumping	420	420	420	420
Shutoff Valve Closure	252	2,518	5,036	7,554
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-49. 12 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

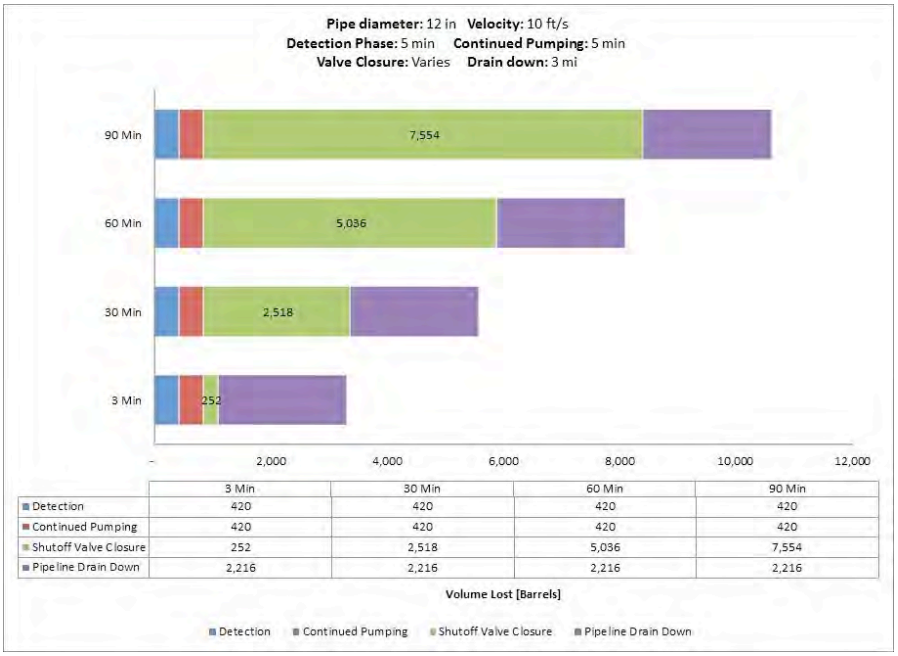

	3 Min	30 Min	60 Min	90 Min
Detection	420	420	420	420
Continued Pumping	420	420	420	420
Shutoff Valve Closure	252	2,518	5,036	7,554
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-50. 12 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

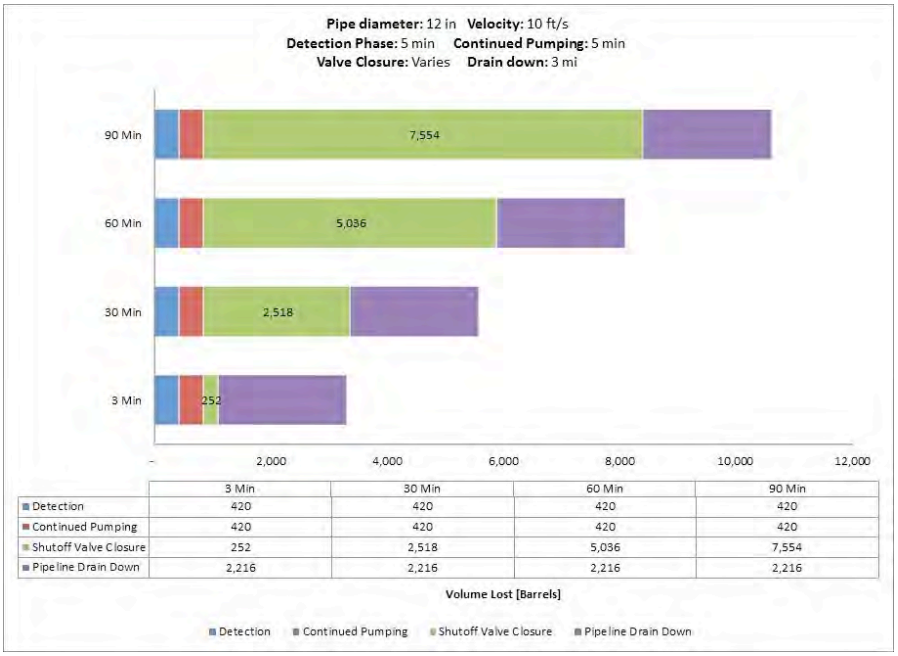

	3 Min	30 Min	60 Min	90 Min
Detection	420	420	420	420
Continued Pumping	420	420	420	420
Shutoff Valve Closure	252	2,518	5,036	7,554
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-51. 12 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

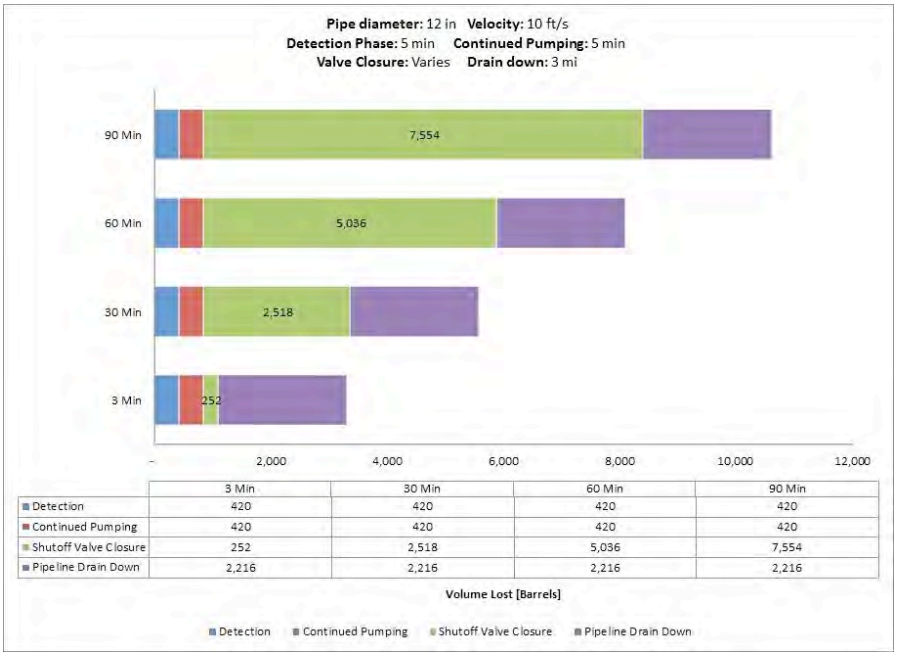

	3 Min	30 Min	60 Min	90 Min
Detection	420	420	420	420
Continued Pumping	420	420	420	420
Shutoff Valve Closure	252	2,518	5,036	7,554
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-52. 12 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

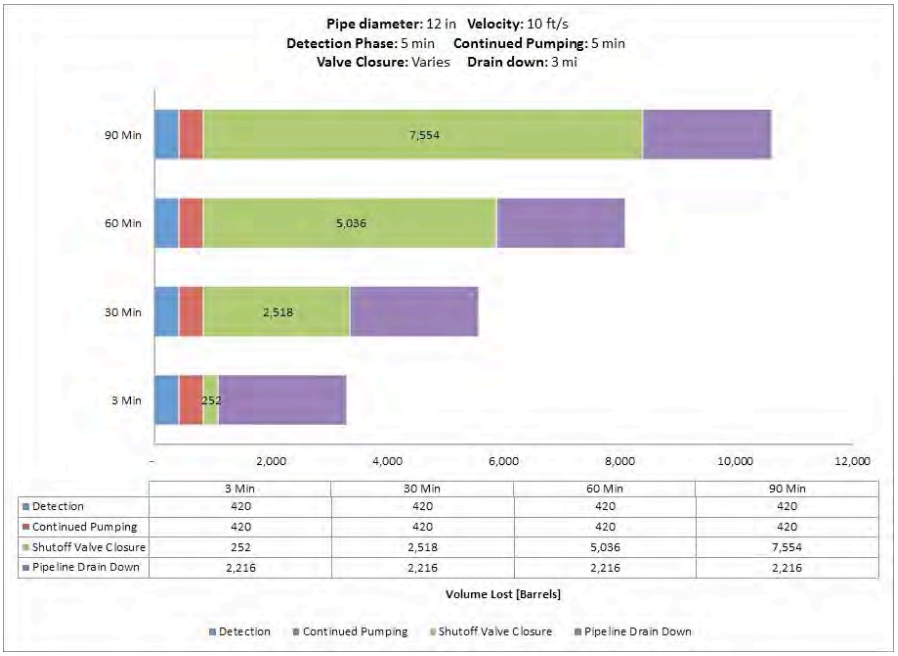

	3 Min	30 Min	60 Min	90 Min
Detection	420	420	420	420
Continued Pumping	420	420	420	420
Shutoff Valve Closure	252	2,518	5,036	7,554
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-53. 12 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

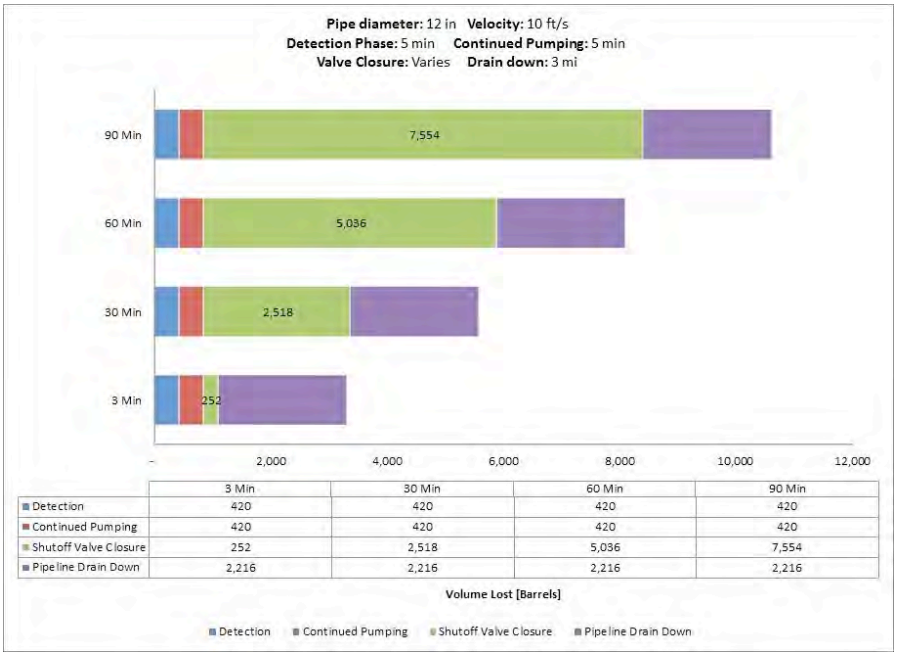

	3 Min	30 Min	60 Min	90 Min
Detection	420	420	420	420
Continued Pumping	420	420	420	420
Shutoff Valve Closure	252	2,518	5,036	7,554
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-54. 12 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

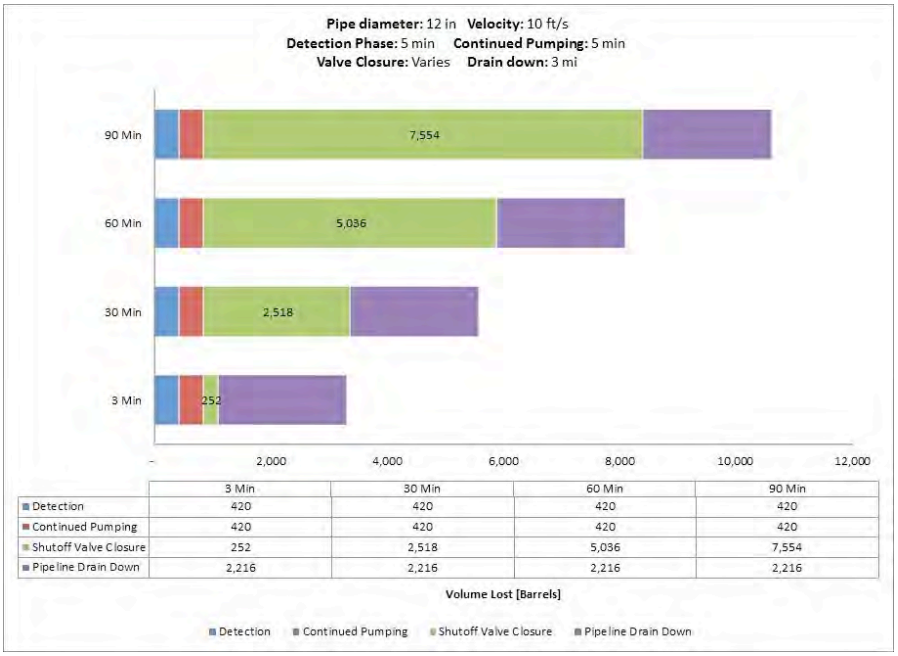

	3 Min	30 Min	60 Min	90 Min
Detection	420	420	420	420
Continued Pumping	420	420	420	420
Shutoff Valve Closure	252	2,518	5,036	7,554
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-55. 12 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

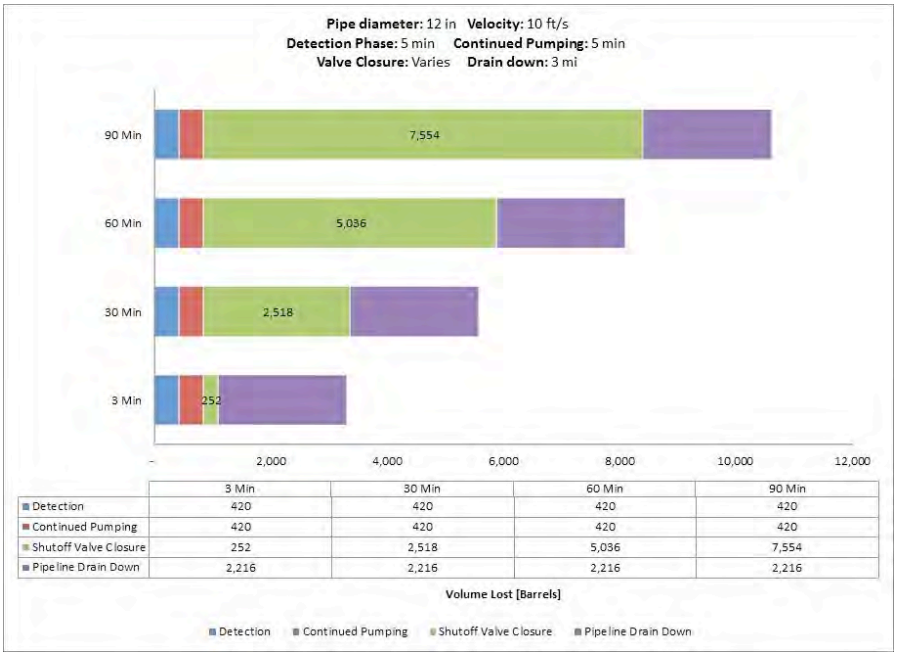

	3 Min	30 Min	60 Min	90 Min
Detection	420	420	420	420
Continued Pumping	420	420	420	420
Shutoff Valve Closure	252	2,518	5,036	7,554
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-56. 12 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

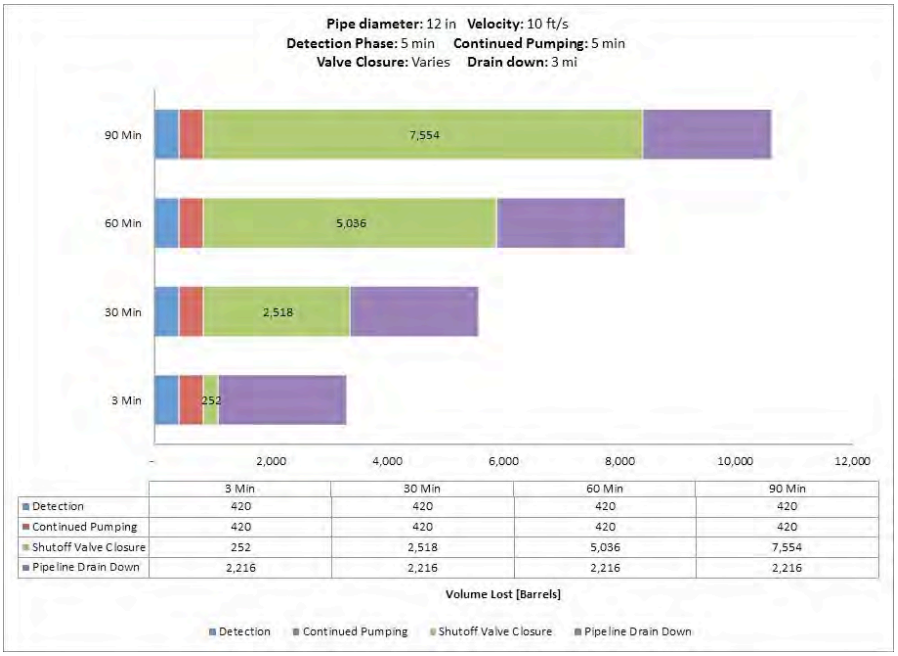

	3 Min	30 Min	60 Min	90 Min
Detection	420	420	420	420
Continued Pumping	420	420	420	420
Shutoff Valve Closure	252	2,518	5,036	7,554
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-57. 12 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

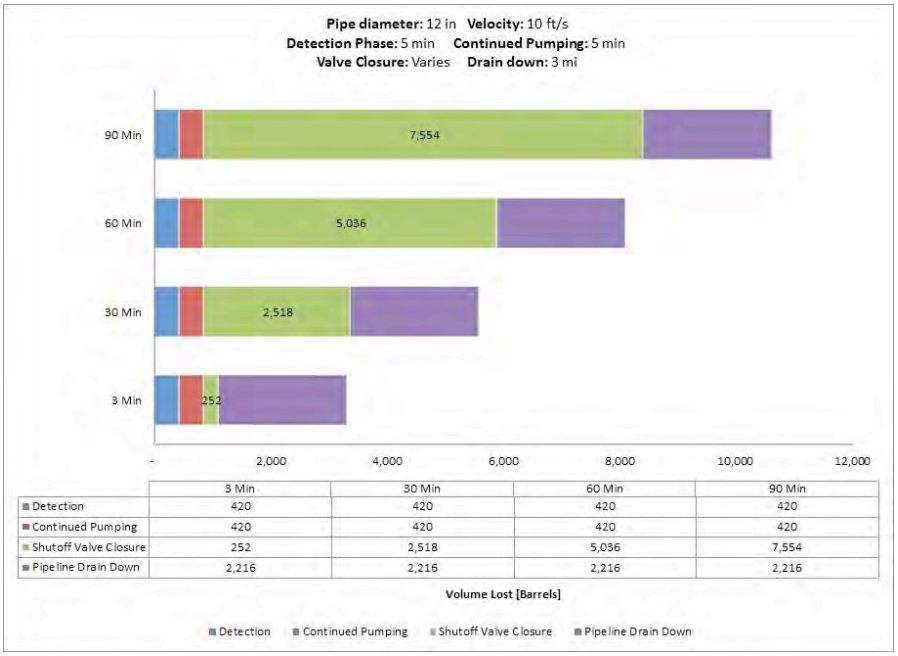

	3 Min	30 Min	60 Min	90 Min
Detection	420	420	420	420
Continued Pumping	420	420	420	420
Shutoff Valve Closure	252	2,518	5,036	7,554
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-58. 12 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

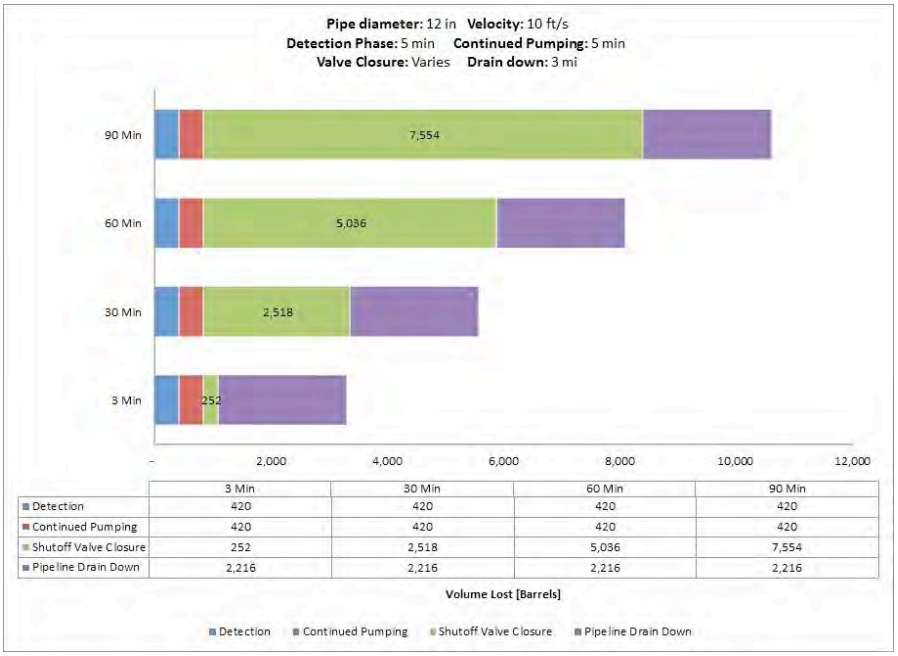

	3 Min	30 Min	60 Min	90 Min
Detection	420	420	420	420
Continued Pumping	420	420	420	420
Shutoff Valve Closure	252	2,518	5,036	7,554
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-59. 12 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

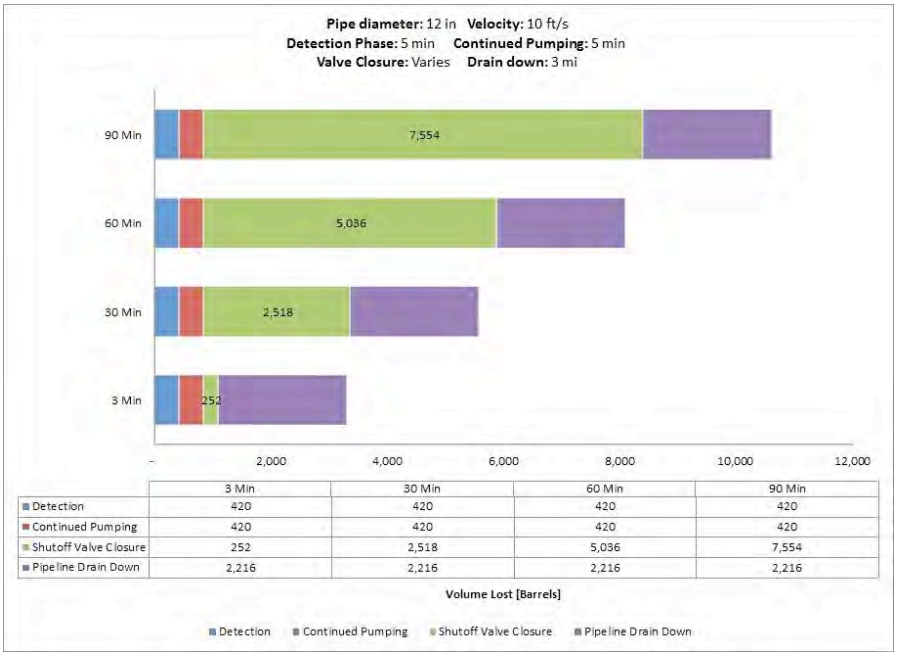

	3 Min	30 Min	60 Min	90 Min
Detection	420	420	420	420
Continued Pumping	420	420	420	420
Shutoff Valve Closure	252	2,518	5,036	7,554
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-60. 12 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

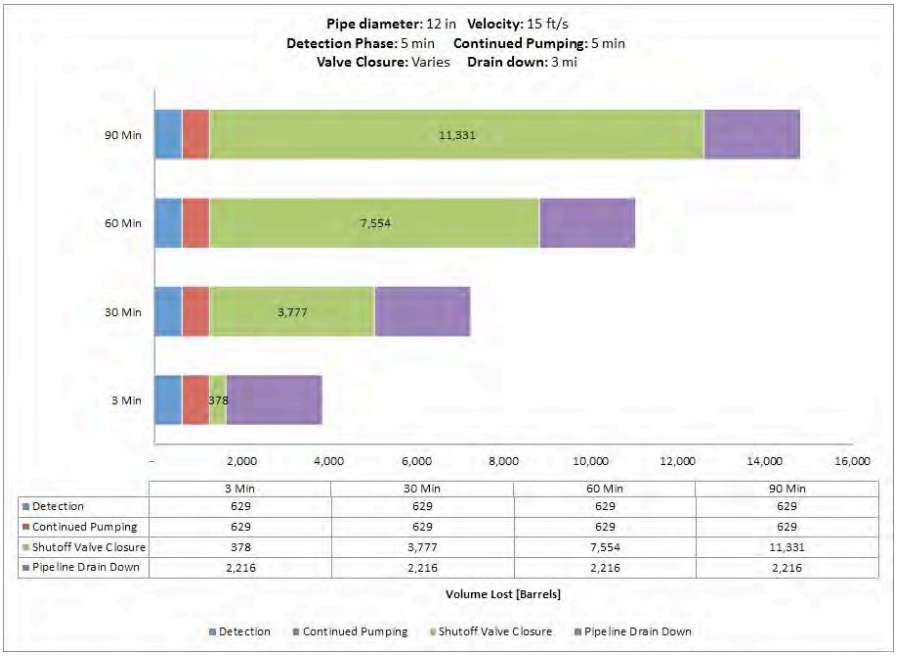

	3 Min	30 Min	60 Min	90 Min
Detection	629	629	629	629
Continued Pumping	629	629	629	629
Shutoff Valve Closure	378	3,777	7,554	11,331
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-61. 12 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

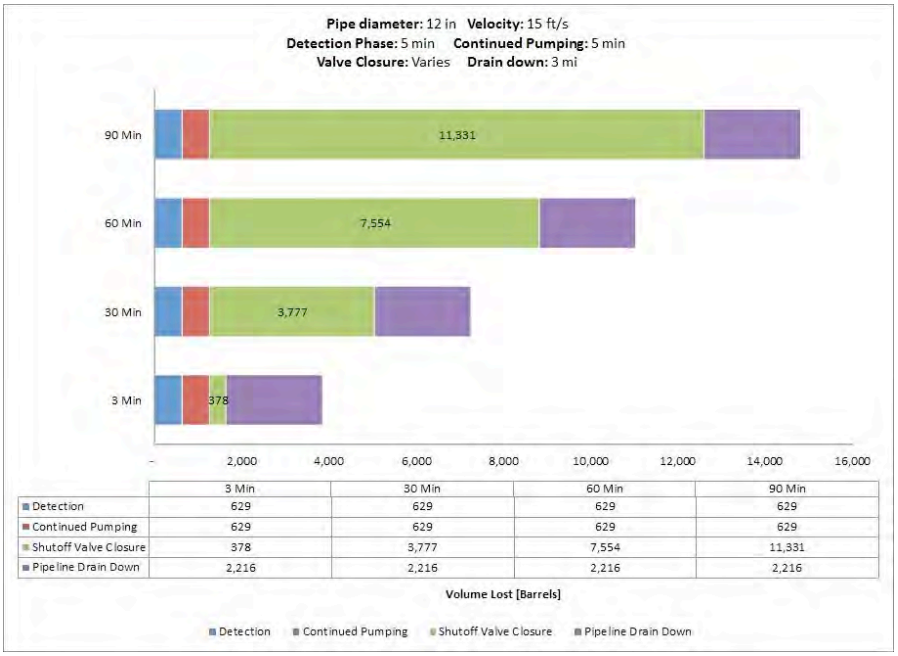

	3 Min	30 Min	60 Min	90 Min
Detection	629	629	629	629
Continued Pumping	629	629	629	629
Shutoff Valve Closure	378	3,777	7,554	11,331
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-62. 12 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

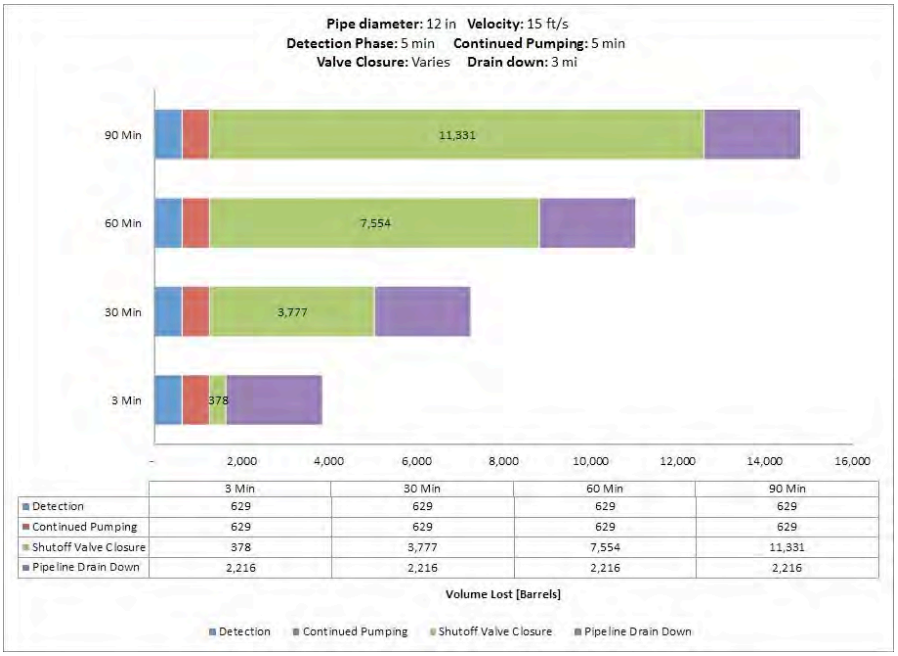

	3 Min	30 Min	60 Min	90 Min
Detection	629	629	629	629
Continued Pumping	629	629	629	629
Shutoff Valve Closure	378	3,777	7,554	11,331
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-63. 12 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

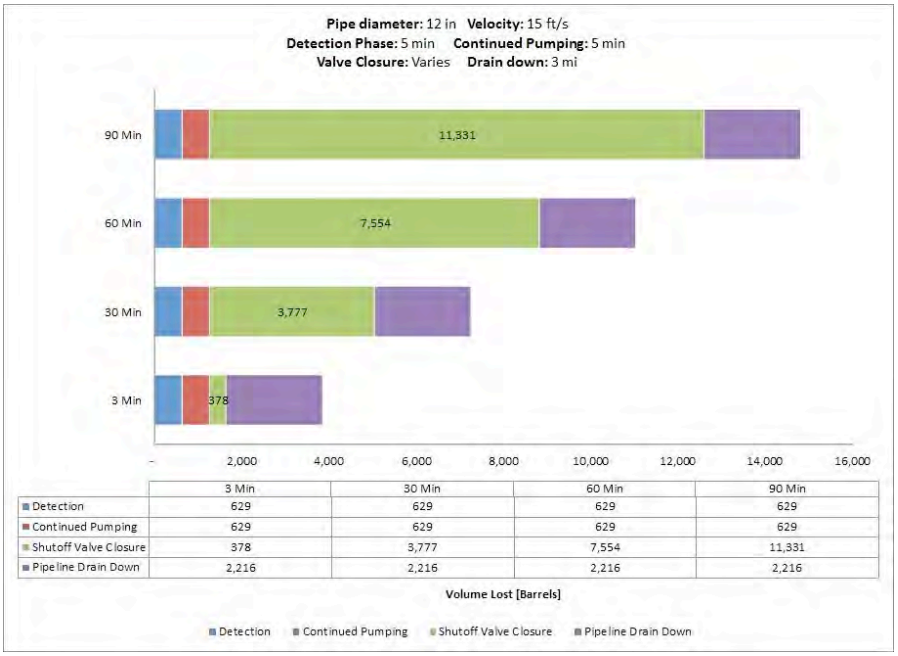

	3 Min	30 Min	60 Min	90 Min
Detection	629	629	629	629
Continued Pumping	629	629	629	629
Shutoff Valve Closure	378	3,777	7,554	11,331
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-64. 12 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

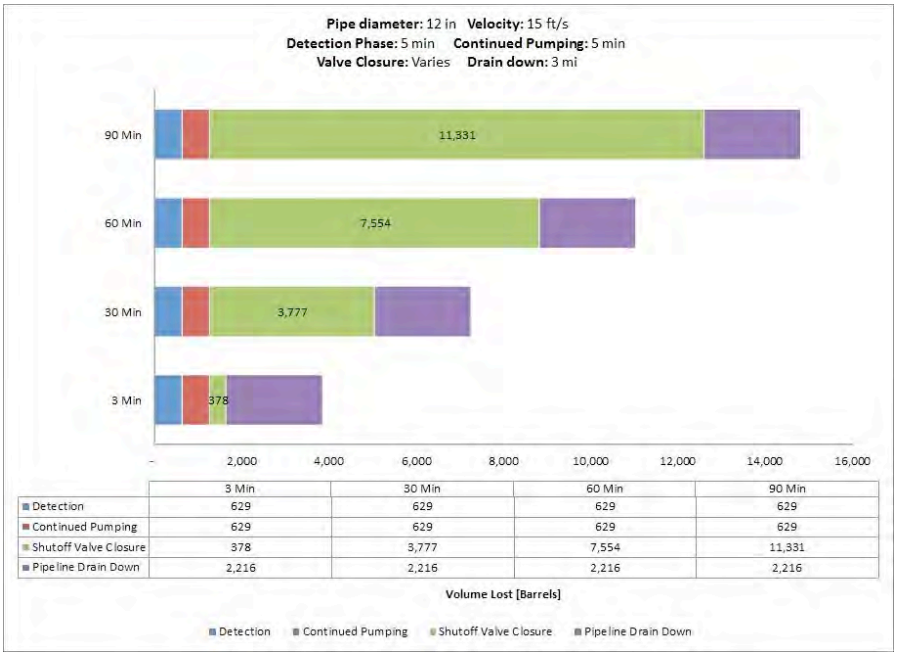

	3 Min	30 Min	60 Min	90 Min
Detection	629	629	629	629
Continued Pumping	629	629	629	629
Shutoff Valve Closure	378	3,777	7,554	11,331
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-65. 12 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

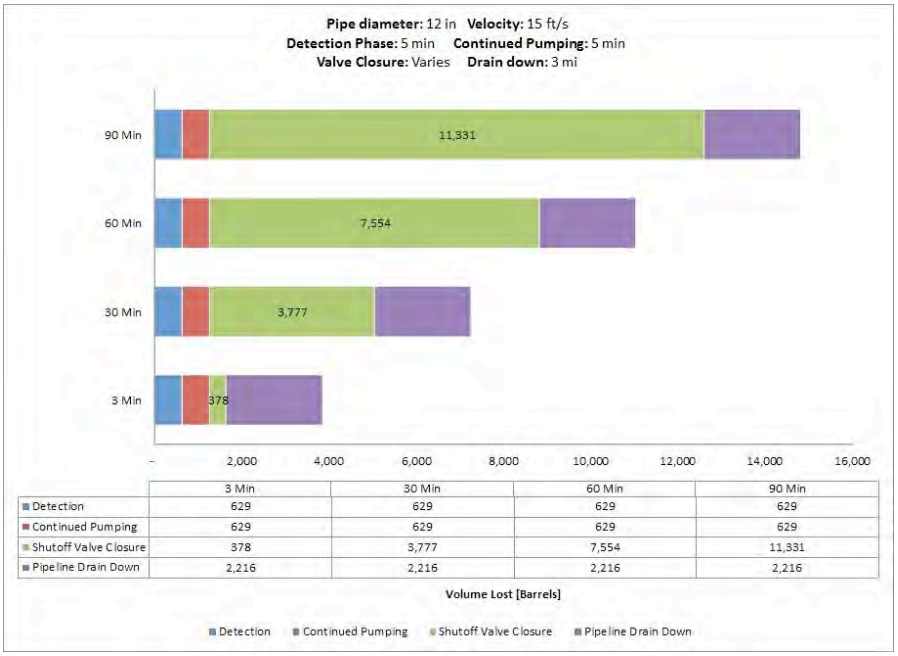

	3 Min	30 Min	60 Min	90 Min
Detection	629	629	629	629
Continued Pumping	629	629	629	629
Shutoff Valve Closure	378	3,777	7,554	11,331
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-66. 12 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

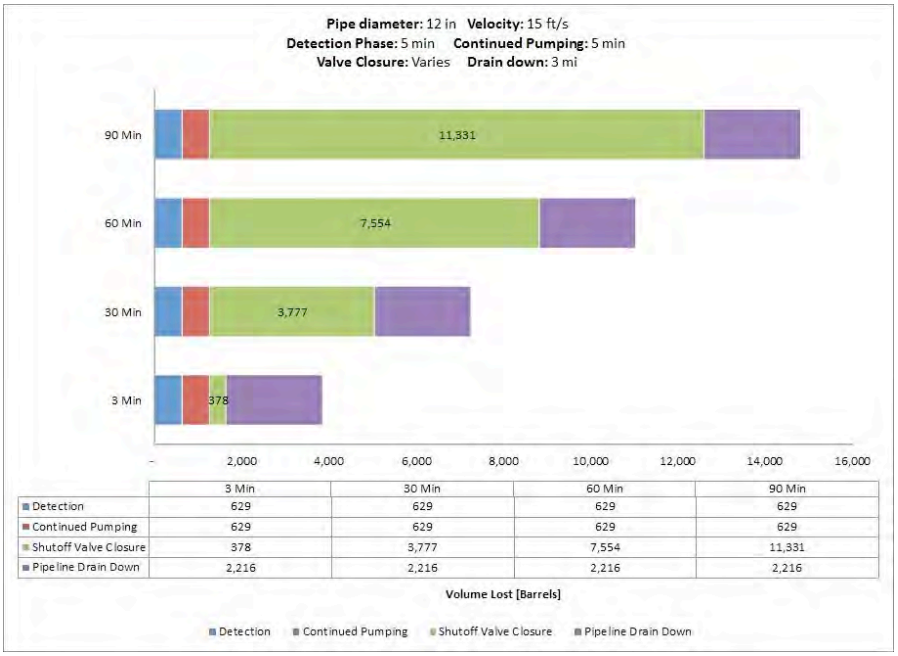

	3 Min	30 Min	60 Min	90 Min
Detection	629	629	629	629
Continued Pumping	629	629	629	629
Shutoff Valve Closure	378	3,777	7,554	11,331
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-67. 12 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

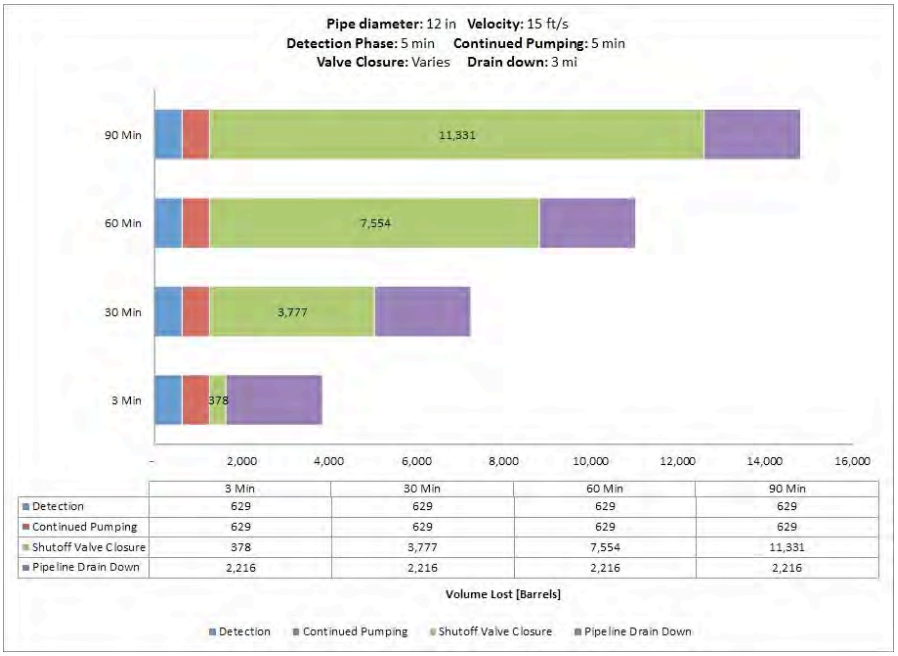

	3 Min	30 Min	60 Min	90 Min
Detection	629	629	629	629
Continued Pumping	629	629	629	629
Shutoff Valve Closure	378	3,777	7,554	11,331
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-68. 12 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

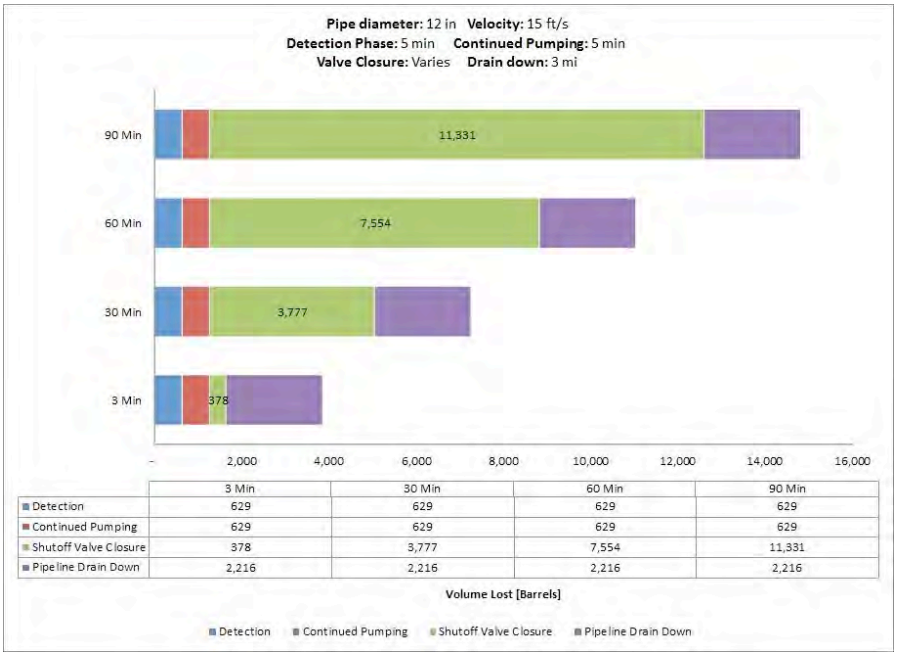

	3 Min	30 Min	60 Min	90 Min
Detection	629	629	629	629
Continued Pumping	629	629	629	629
Shutoff Valve Closure	378	3,777	7,554	11,331
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-69. 12 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

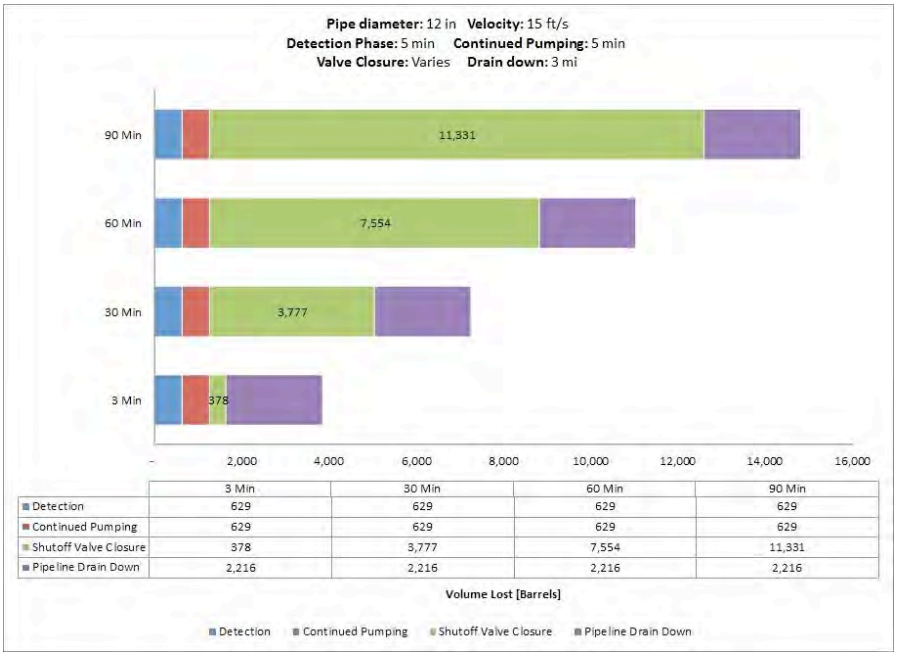

	3 Min	30 Min	60 Min	90 Min
Detection	629	629	629	629
Continued Pumping	629	629	629	629
Shutoff Valve Closure	378	3,777	7,554	11,331
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-70. 12 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

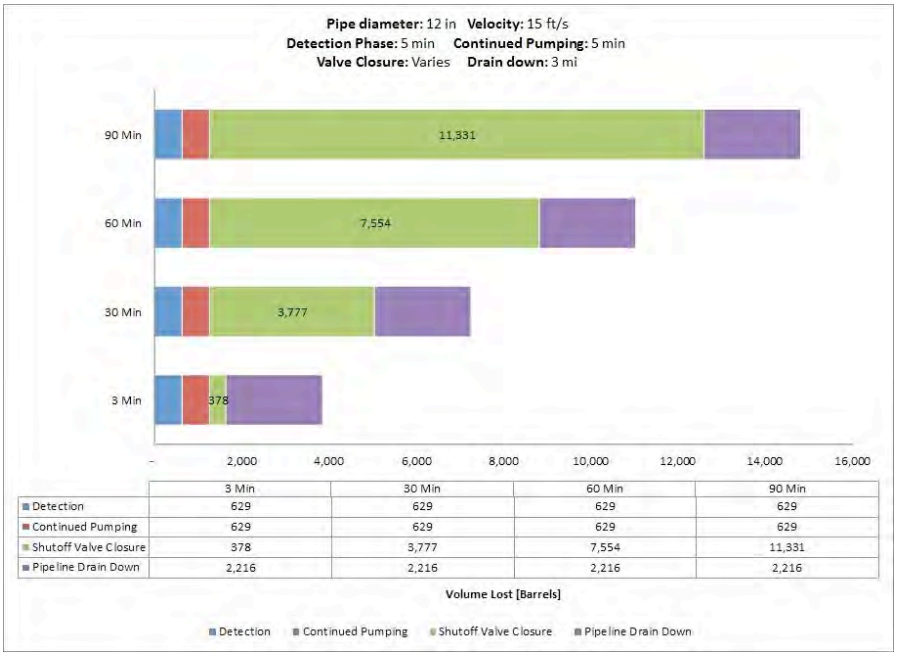

	3 Min	30 Min	60 Min	90 Min
Detection	629	629	629	629
Continued Pumping	629	629	629	629
Shutoff Valve Closure	378	3,777	7,554	11,331
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-71. 12 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

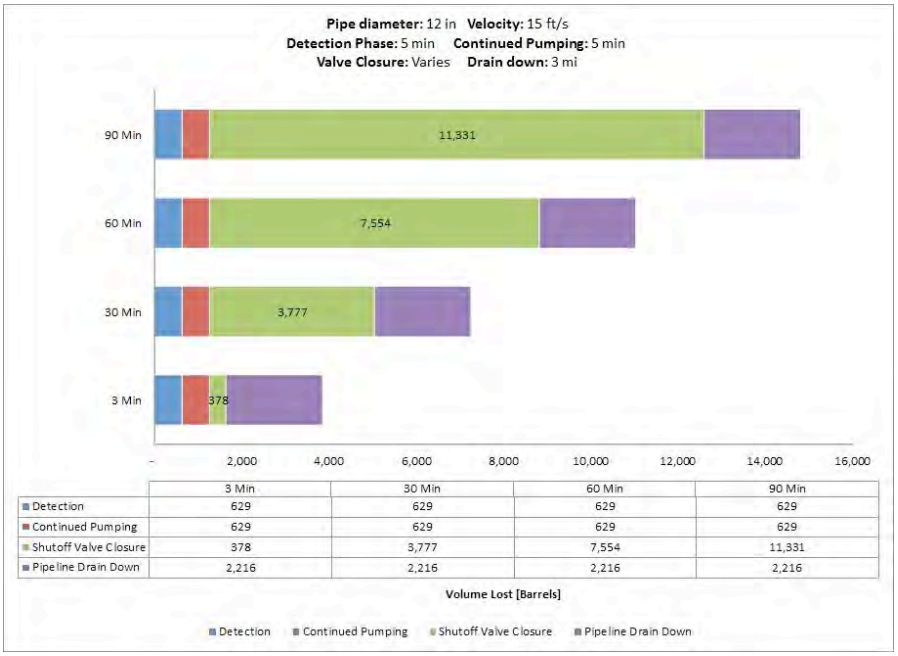

	3 Min	30 Min	60 Min	90 Min
Detection	629	629	629	629
Continued Pumping	629	629	629	629
Shutoff Valve Closure	378	3,777	7,554	11,331
Pipeline Drain Down	2,216	2,216	2,216	2,216

Fig. A-72. 12 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

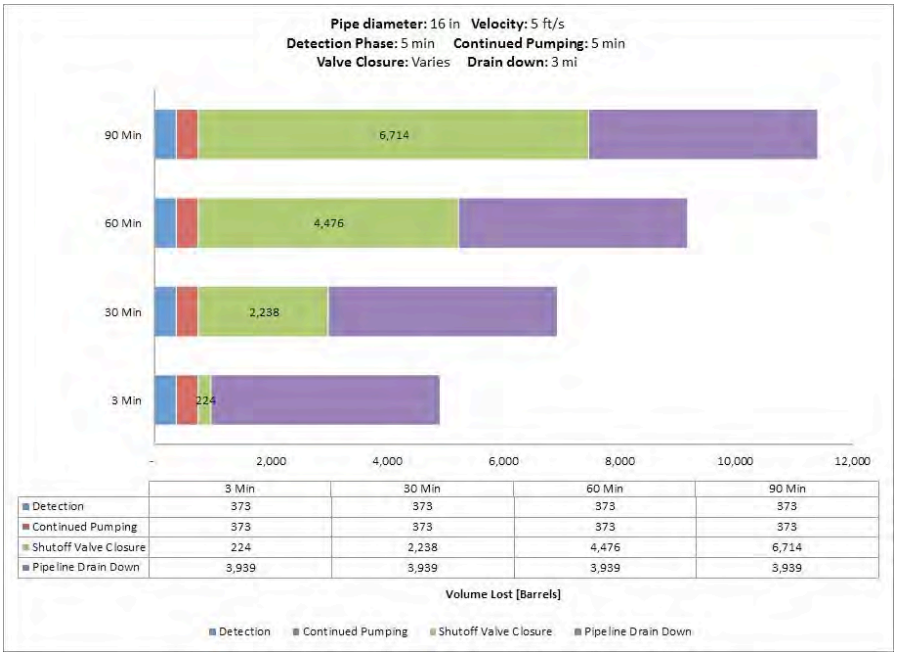

	3 Min	30 Min	60 Min	90 Min
Detection	373	373	373	373
Continued Pumping	373	373	373	373
Shutoff Valve Closure	224	2,238	4,476	6,714
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-73. 16 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

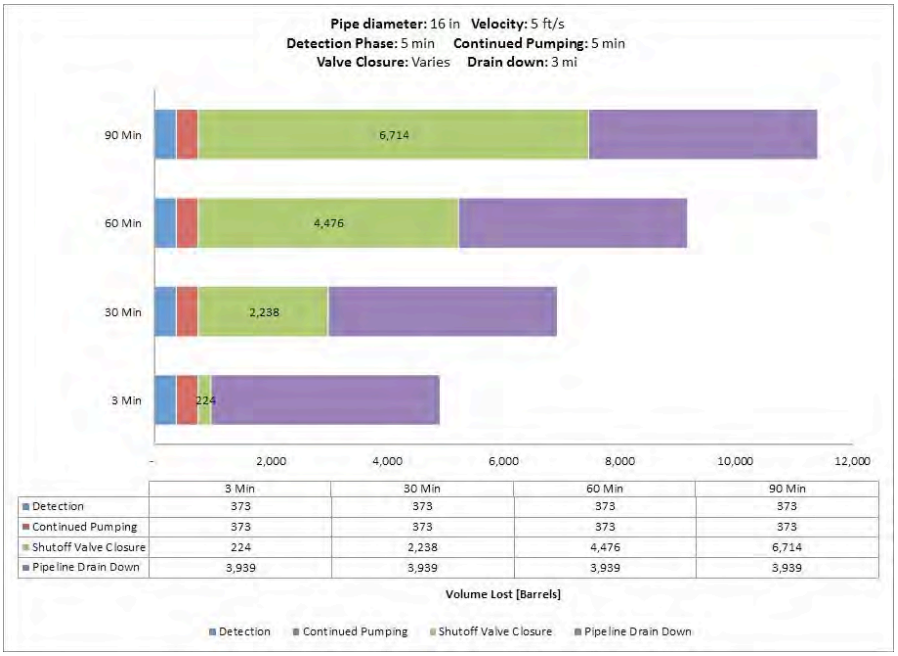

	3 Min	30 Min	60 Min	90 Min
Detection	373	373	373	373
Continued Pumping	373	373	373	373
Shutoff Valve Closure	224	2,238	4,476	6,714
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-74. 16 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

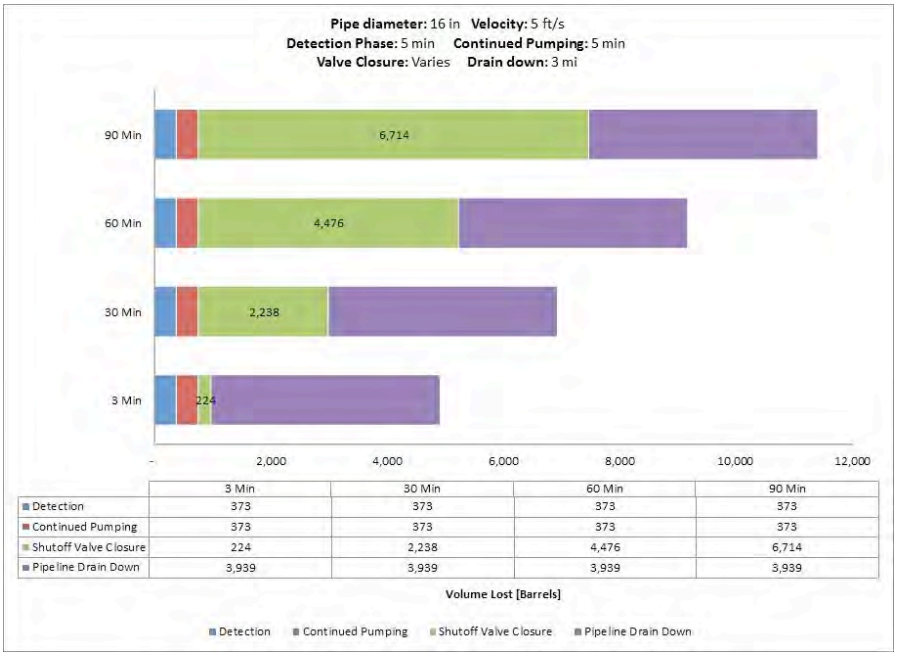

	3 Min	30 Min	60 Min	90 Min
Detection	373	373	373	373
Continued Pumping	373	373	373	373
Shutoff Valve Closure	224	2,238	4,476	6,714
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-75. 16 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

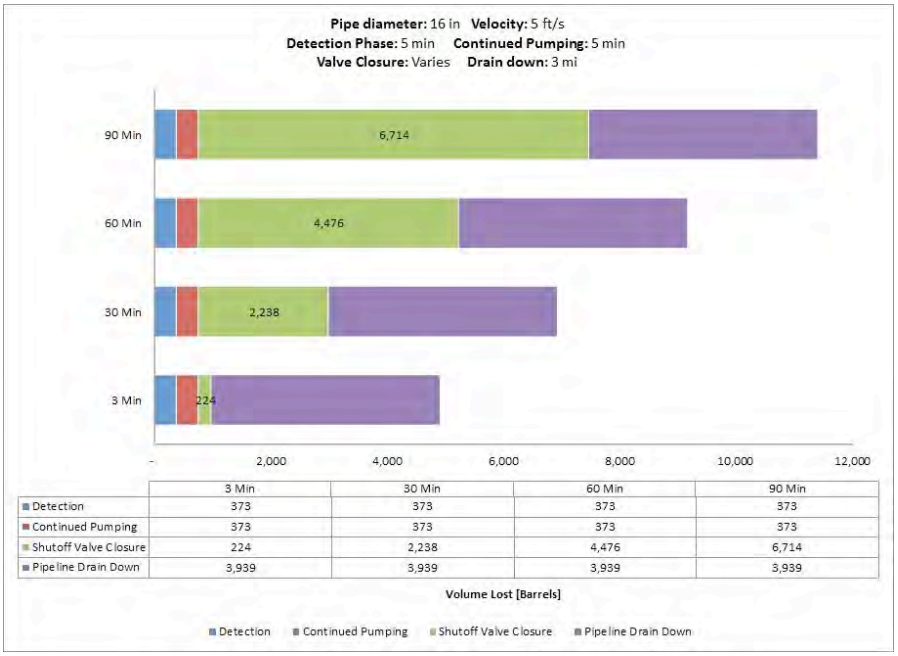

	3 Min	30 Min	60 Min	90 Min
Detection	373	373	373	373
Continued Pumping	373	373	373	373
Shutoff Valve Closure	224	2,238	4,476	6,714
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-76. 16 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

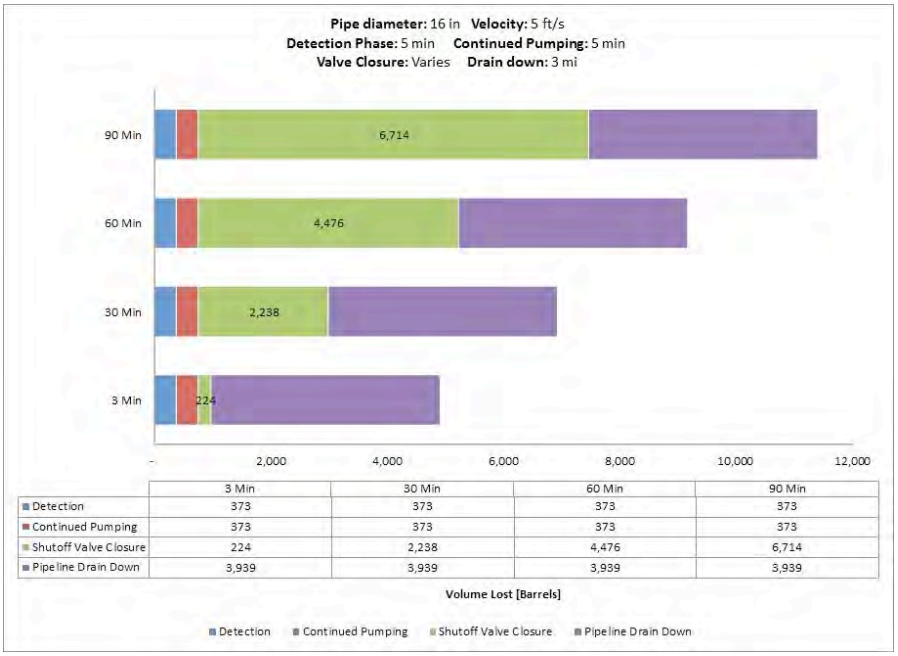

	3 Min	30 Min	60 Min	90 Min
Detection	373	373	373	373
Continued Pumping	373	373	373	373
Shutoff Valve Closure	224	2,238	4,476	6,714
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-77. 16 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

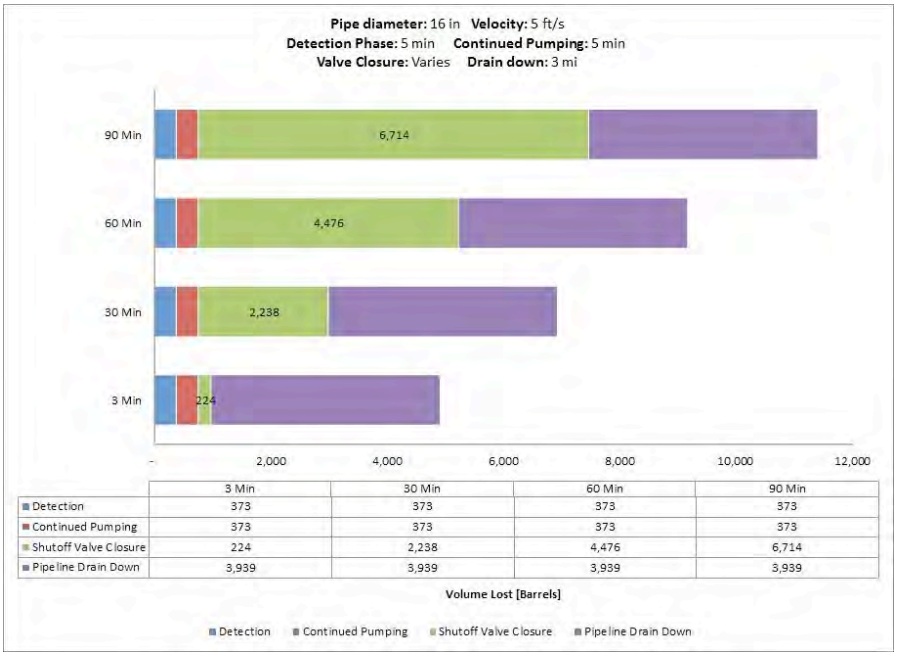

	3 Min	30 Min	60 Min	90 Min
Detection	373	373	373	373
Continued Pumping	373	373	373	373
Shutoff Valve Closure	224	2,238	4,476	6,714
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-78. 16 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

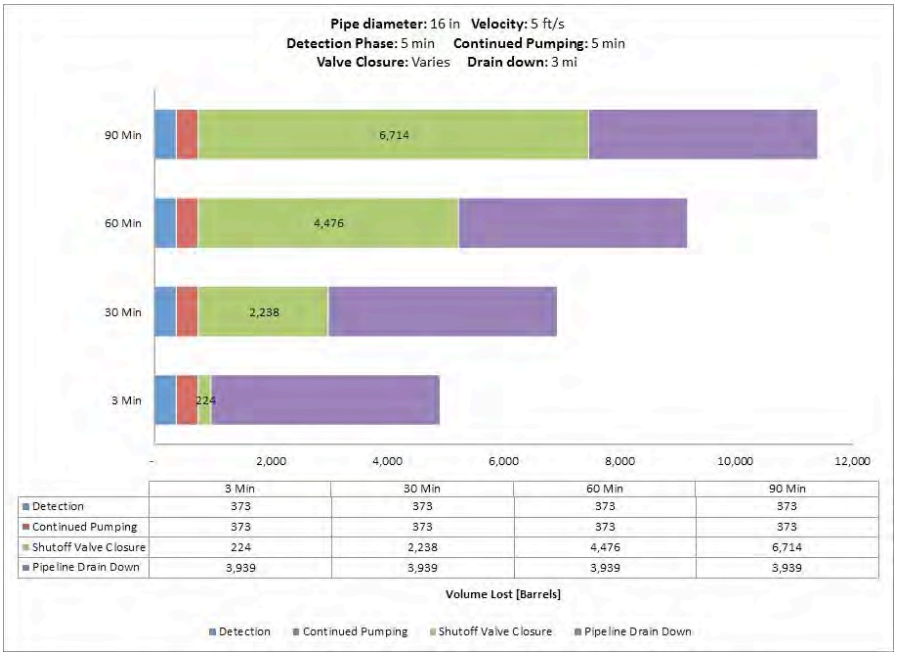

	3 Min	30 Min	60 Min	90 Min
Detection	373	373	373	373
Continued Pumping	373	373	373	373
Shutoff Valve Closure	224	2,238	4,476	6,714
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-79. 16 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

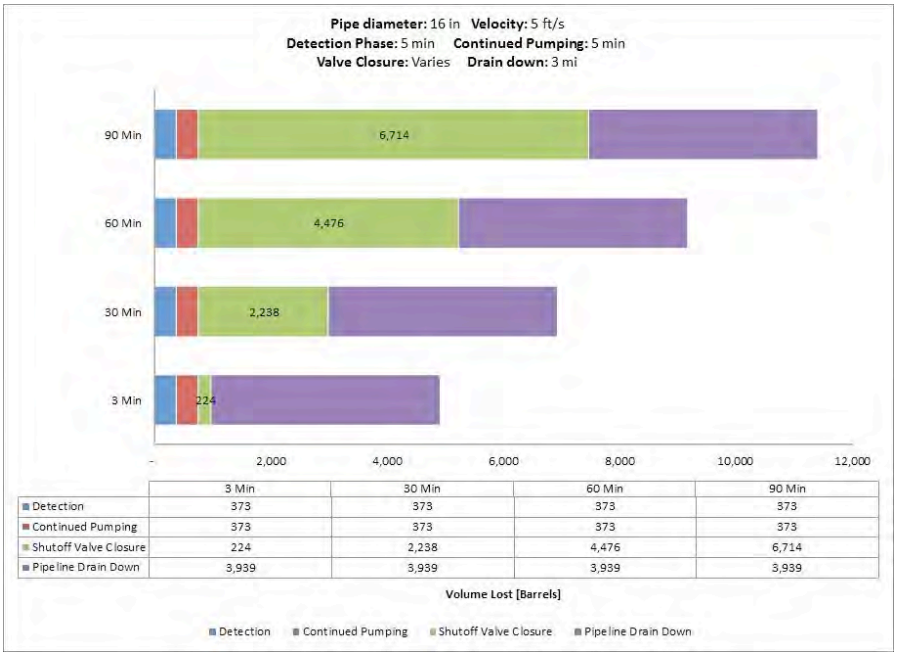

	3 Min	30 Min	60 Min	90 Min
Detection	373	373	373	373
Continued Pumping	373	373	373	373
Shutoff Valve Closure	224	2,238	4,476	6,714
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-80. 16 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

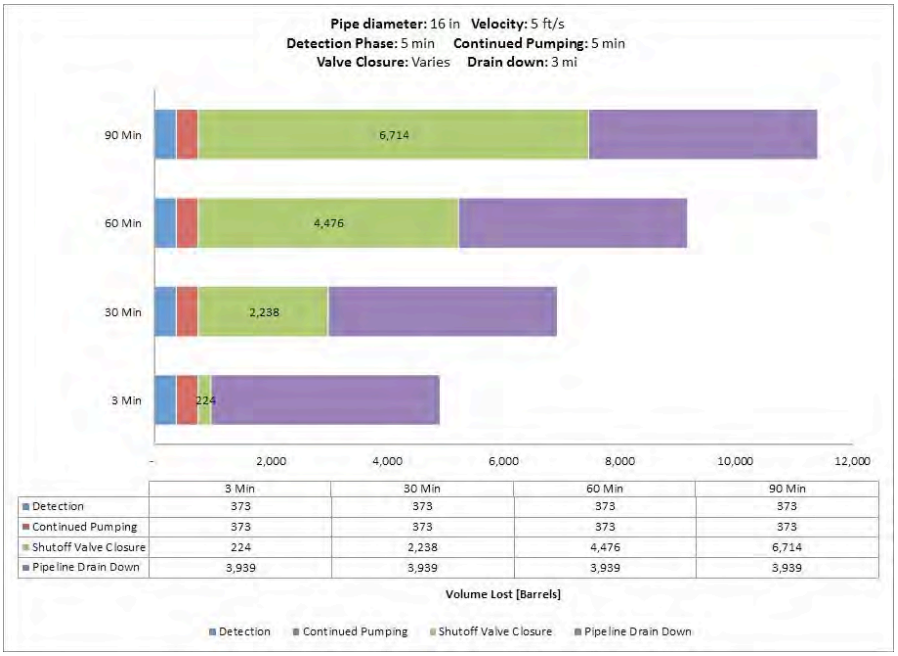

	3 Min	30 Min	60 Min	90 Min
Detection	373	373	373	373
Continued Pumping	373	373	373	373
Shutoff Valve Closure	224	2,238	4,476	6,714
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-81. 16 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

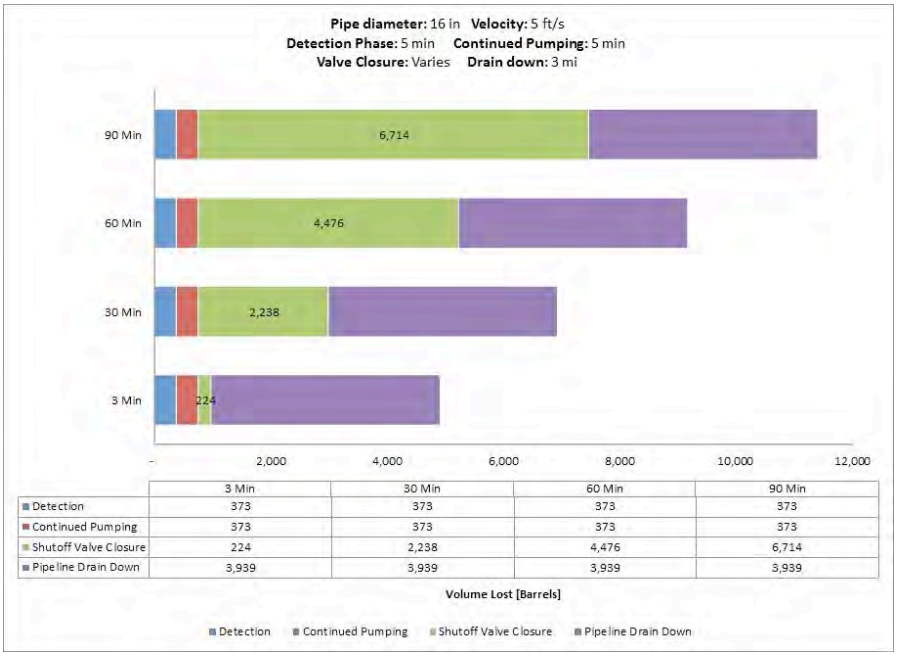

	3 Min	30 Min	60 Min	90 Min
Detection	373	373	373	373
Continued Pumping	373	373	373	373
Shutoff Valve Closure	224	2,238	4,476	6,714
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-82. 16 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

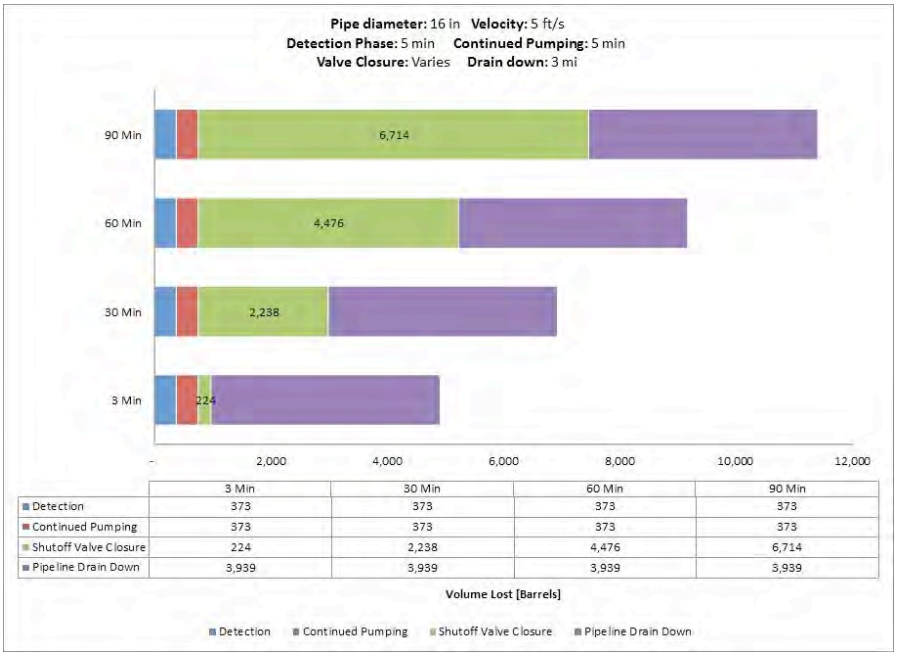

	3 Min	30 Min	60 Min	90 Min
Detection	373	373	373	373
Continued Pumping	373	373	373	373
Shutoff Valve Closure	224	2,238	4,476	6,714
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-83. 16 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

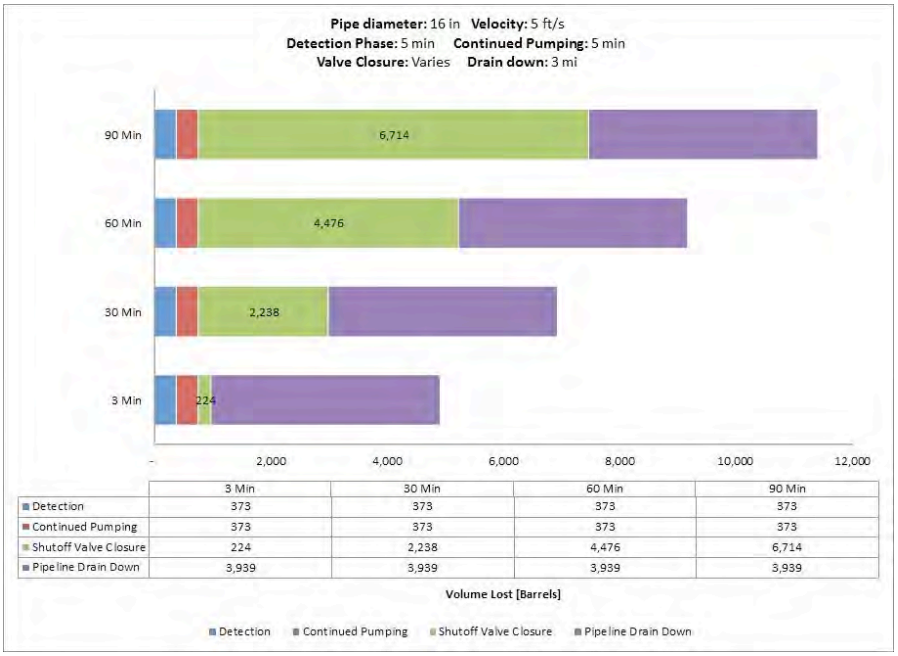

	3 Min	30 Min	60 Min	90 Min
Detection	373	373	373	373
Continued Pumping	373	373	373	373
Shutoff Valve Closure	224	2,238	4,476	6,714
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-84. 16 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

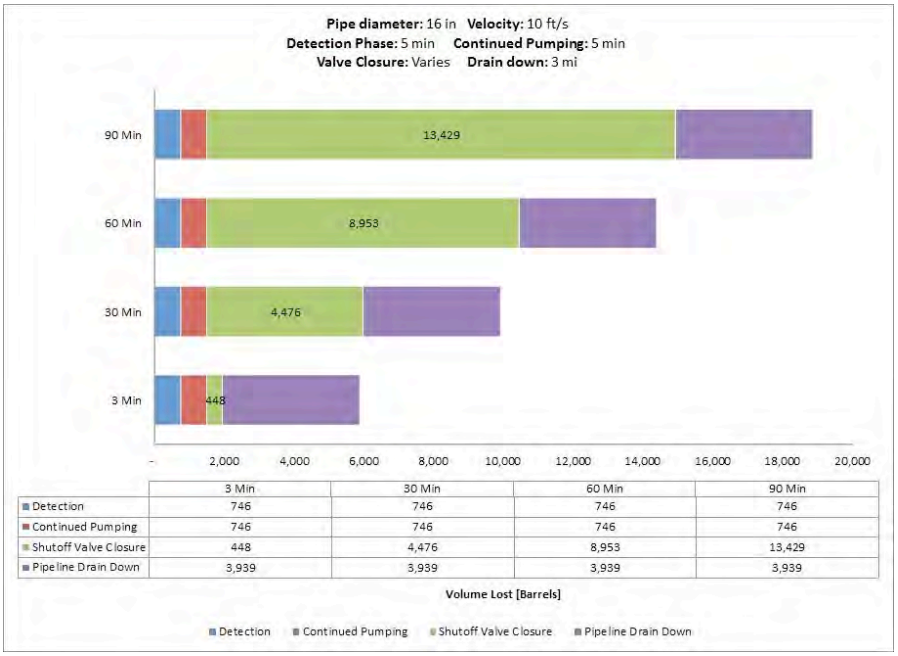

	3 Min	30 Min	60 Min	90 Min
Detection	746	746	746	746
Continued Pumping	746	746	746	746
Shutoff Valve Closure	448	4,476	8,953	13,429
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-85. 16 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

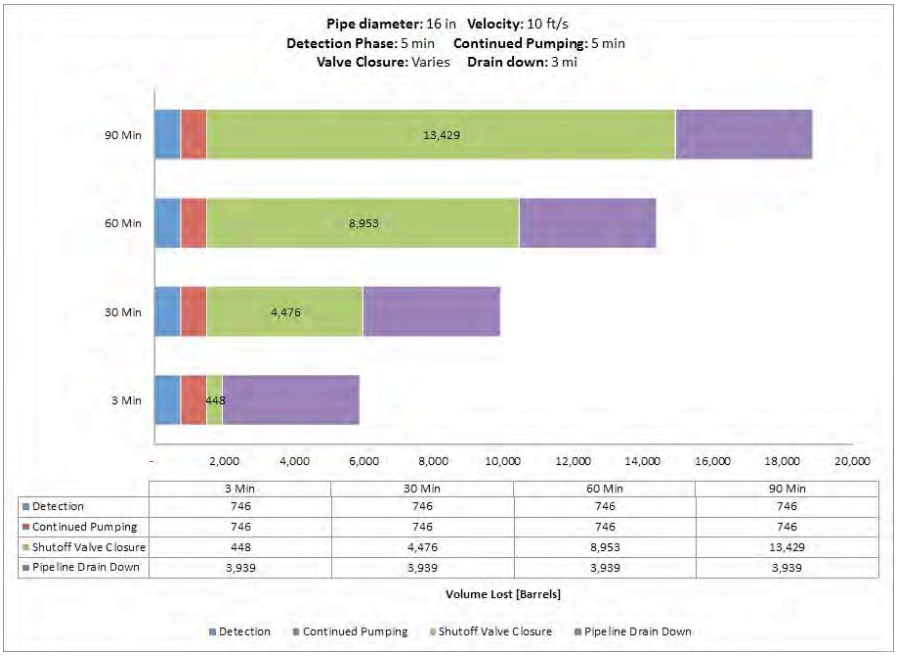

	3 Min	30 Min	60 Min	90 Min
Detection	746	746	746	746
Continued Pumping	746	746	746	746
Shutoff Valve Closure	448	4,476	8,953	13,429
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-86. 16 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

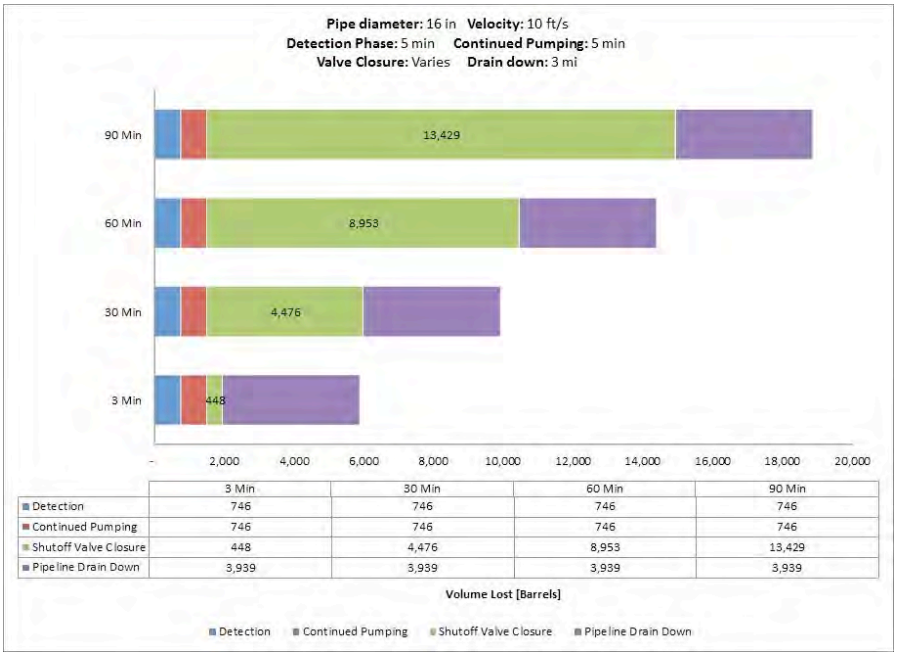

	3 Min	30 Min	60 Min	90 Min
Detection	746	746	746	746
Continued Pumping	746	746	746	746
Shutoff Valve Closure	448	4,476	8,953	13,429
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-87. 16 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

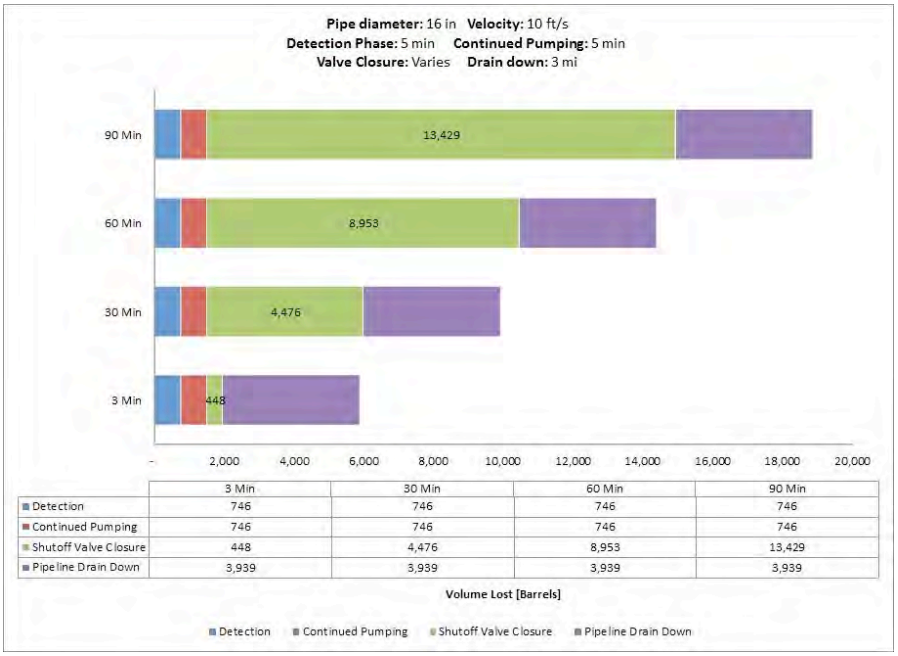

	3 Min	30 Min	60 Min	90 Min
Detection	746	746	746	746
Continued Pumping	746	746	746	746
Shutoff Valve Closure	448	4,476	8,953	13,429
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-88. 16 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

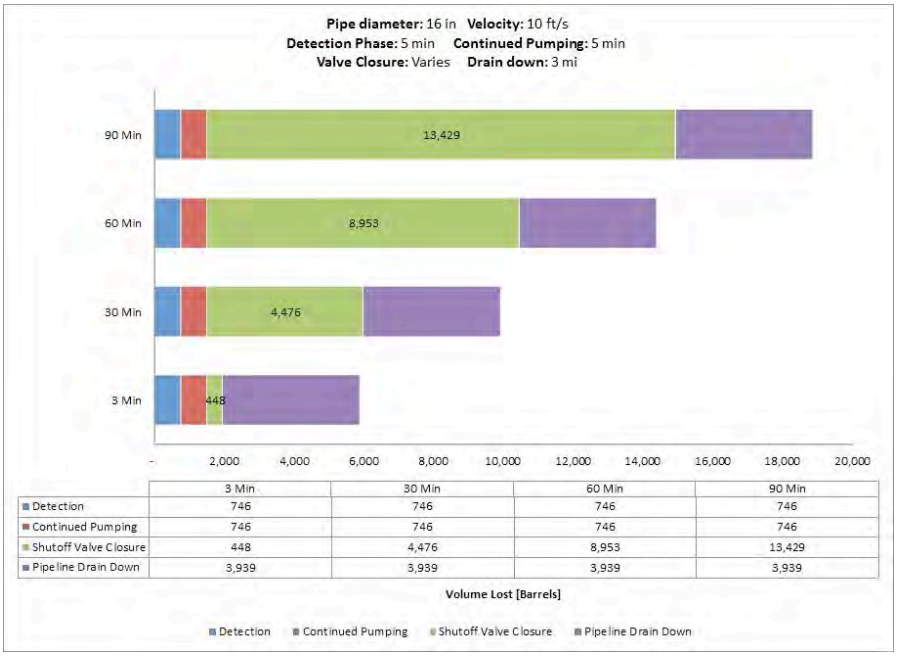

	3 Min	30 Min	60 Min	90 Min
Detection	746	746	746	746
Continued Pumping	746	746	746	746
Shutoff Valve Closure	448	4,476	8,953	13,429
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-89. 16 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

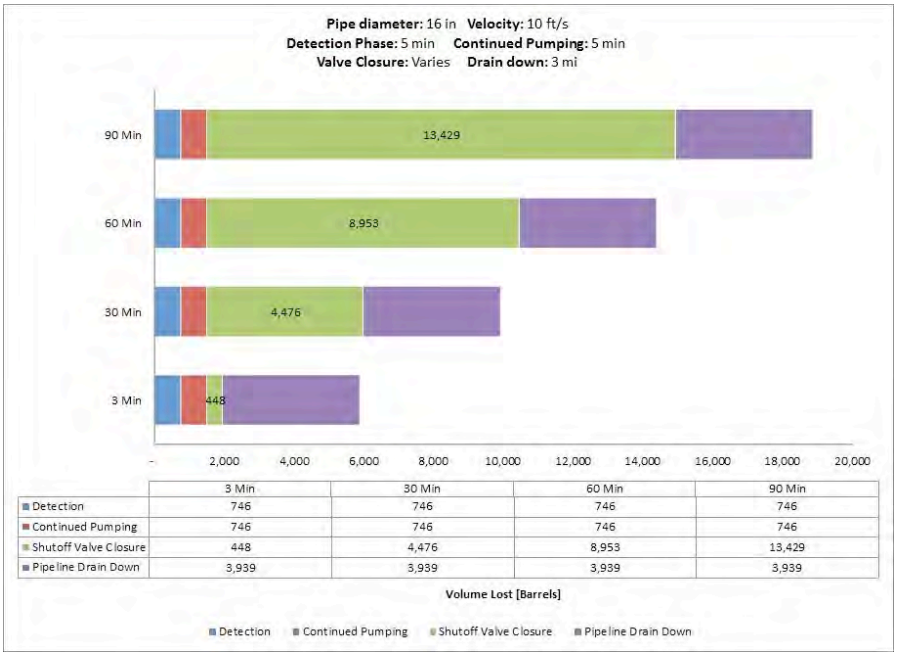

	3 Min	30 Min	60 Min	90 Min
Detection	746	746	746	746
Continued Pumping	746	746	746	746
Shutoff Valve Closure	448	4,476	8,953	13,429
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-90. 16 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

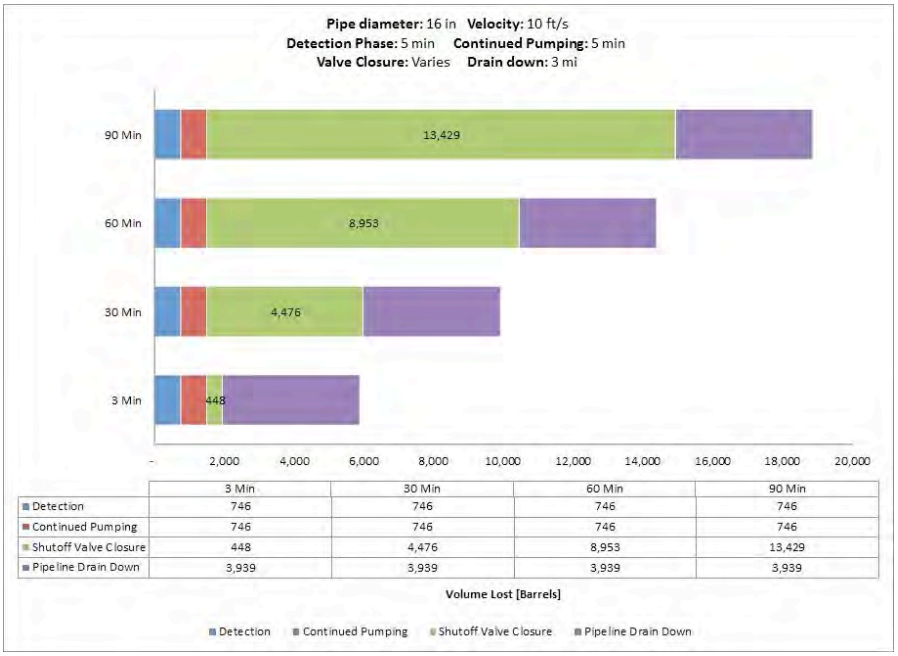

	3 Min	30 Min	60 Min	90 Min
Detection	746	746	746	746
Continued Pumping	746	746	746	746
Shutoff Valve Closure	448	4,476	8,953	13,429
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-91. 16 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

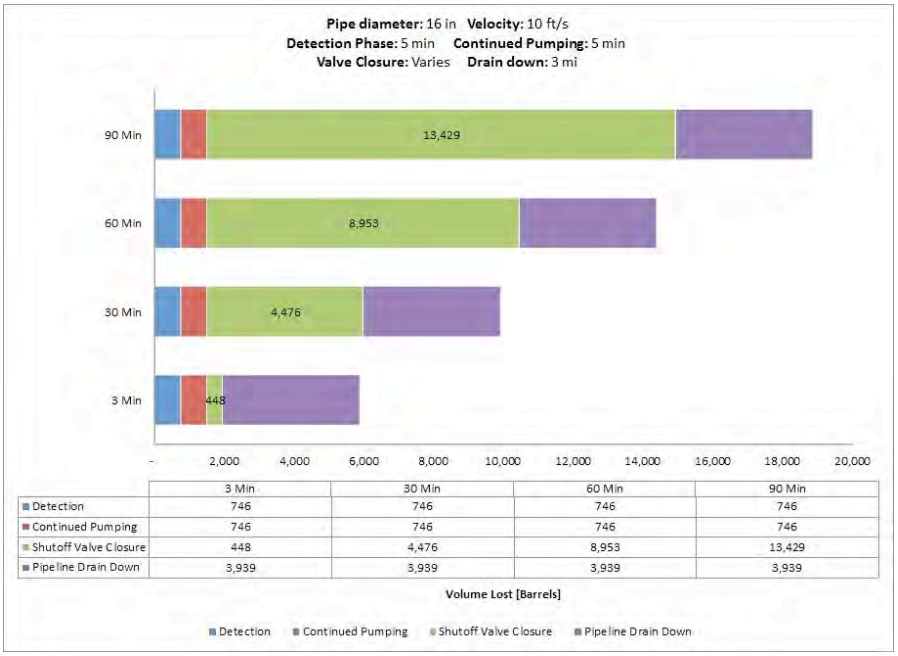

	3 Min	30 Min	60 Min	90 Min
Detection	746	746	746	746
Continued Pumping	746	746	746	746
Shutoff Valve Closure	448	4,476	8,953	13,429
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-92. 16 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

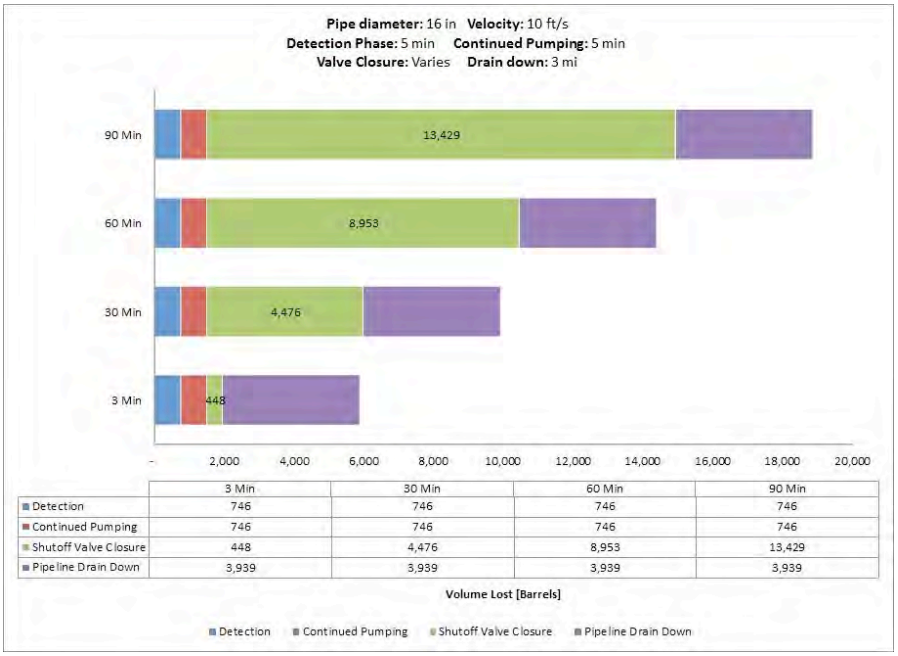

	3 Min	30 Min	60 Min	90 Min
Detection	746	746	746	746
Continued Pumping	746	746	746	746
Shutoff Valve Closure	448	4,476	8,953	13,429
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-93. 16 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

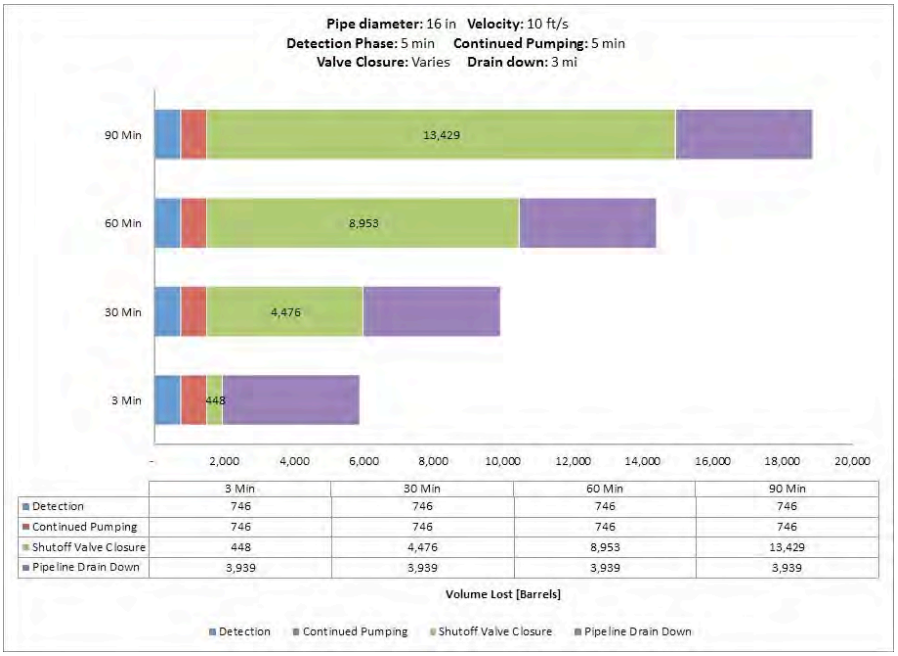

	3 Min	30 Min	60 Min	90 Min
Detection	746	746	746	746
Continued Pumping	746	746	746	746
Shutoff Valve Closure	448	4,476	8,953	13,429
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-94. 16 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

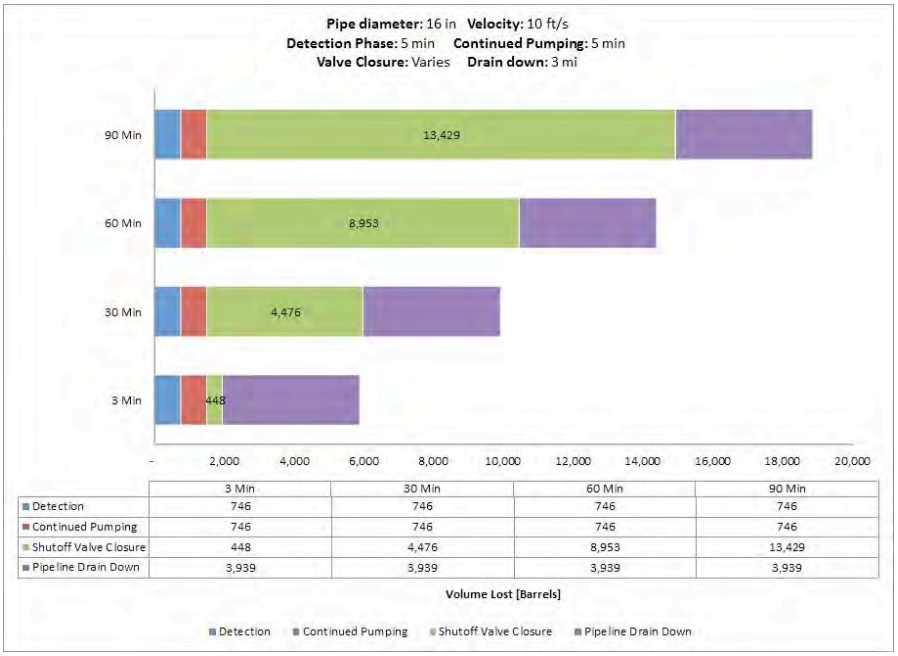

	3 Min	30 Min	60 Min	90 Min
Detection	746	746	746	746
Continued Pumping	746	746	746	746
Shutoff Valve Closure	448	4,476	8,953	13,429
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-95. 16 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

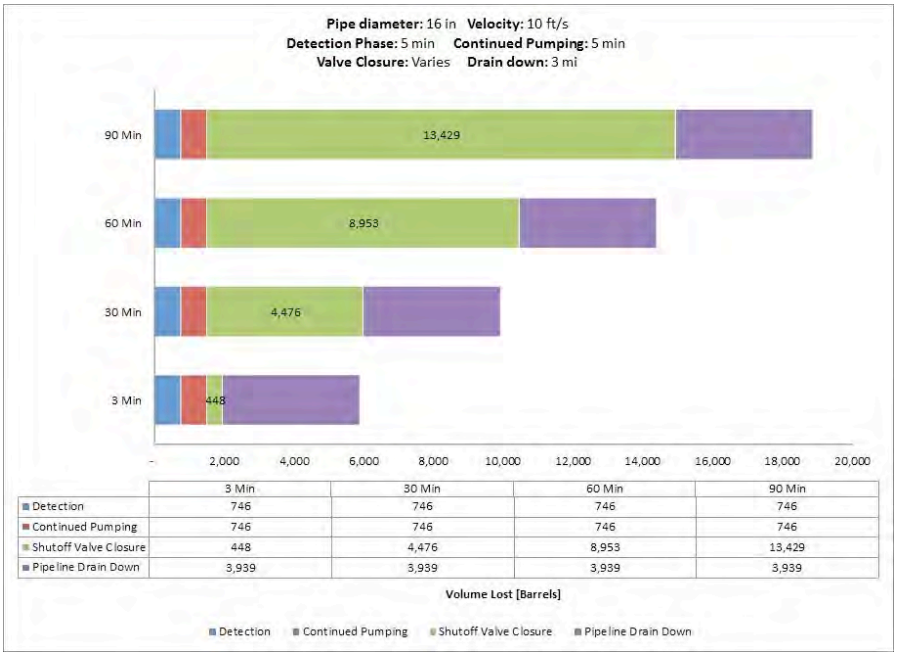

	3 Min	30 Min	60 Min	90 Min
Detection	746	746	746	746
Continued Pumping	746	746	746	746
Shutoff Valve Closure	448	4,476	8,953	13,429
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-96. 16 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

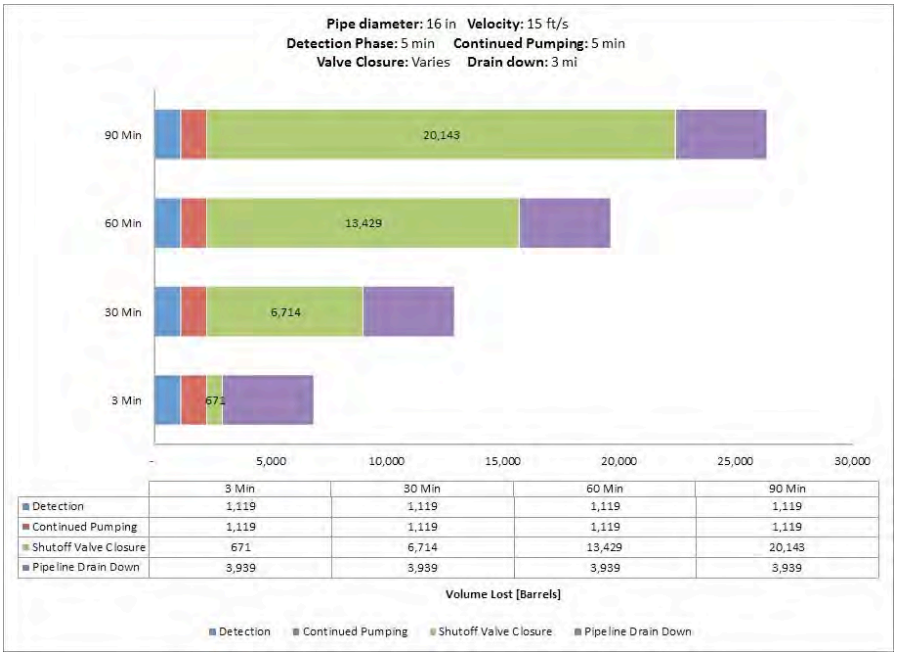

	3 Min	30 Min	60 Min	90 Min
Detection	1,119	1,119	1,119	1,119
Continued Pumping	1,119	1,119	1,119	1,119
Shutoff Valve Closure	671	6,714	13,429	20,143
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-97. 16 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

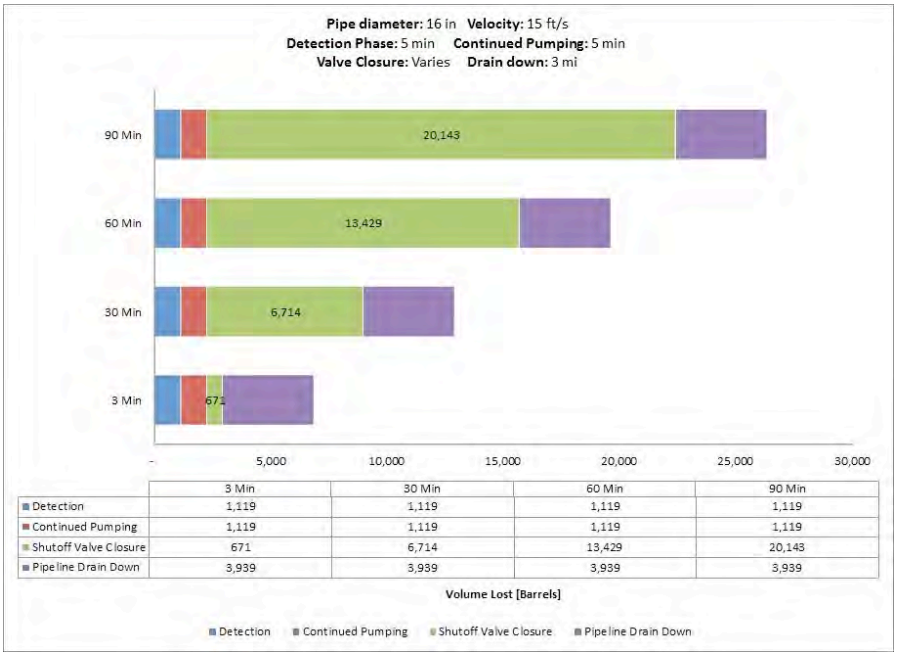

	3 Min	30 Min	60 Min	90 Min
Detection	1,119	1,119	1,119	1,119
Continued Pumping	1,119	1,119	1,119	1,119
Shutoff Valve Closure	671	6,714	13,429	20,143
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-98. 16 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

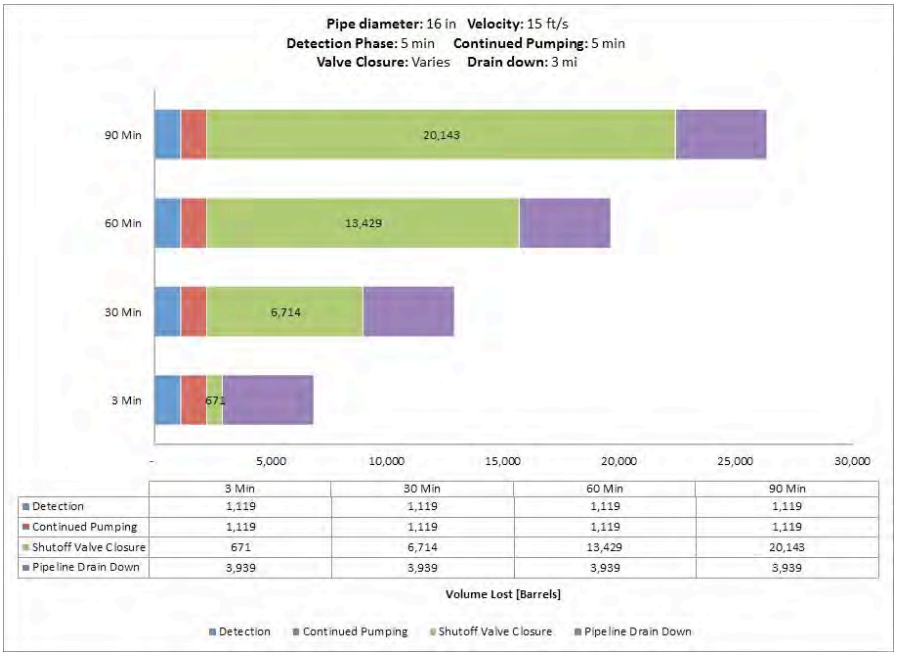

	3 Min	30 Min	60 Min	90 Min
Detection	1,119	1,119	1,119	1,119
Continued Pumping	1,119	1,119	1,119	1,119
Shutoff Valve Closure	671	6,714	13,429	20,143
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-99. 16 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

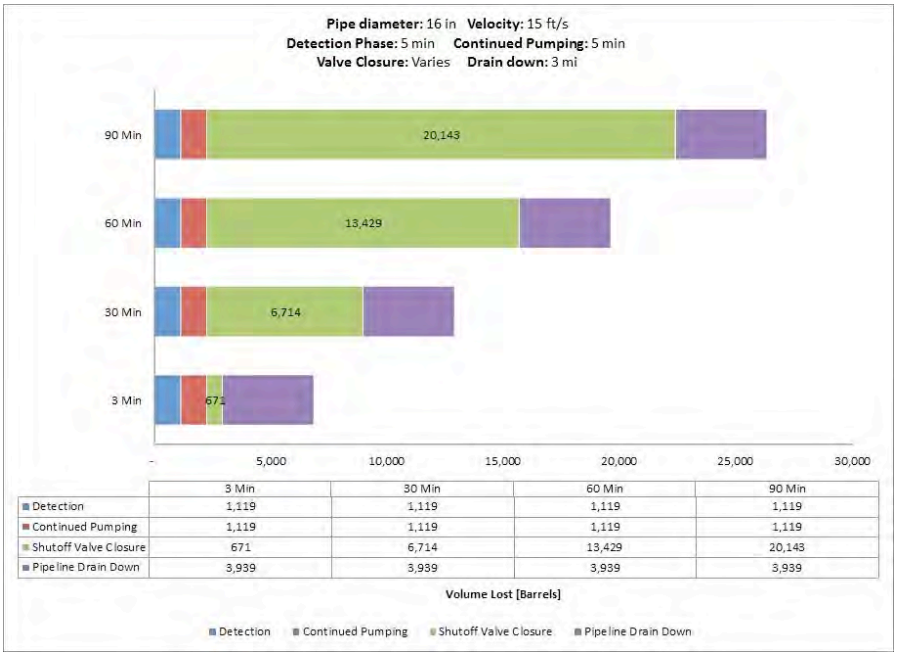

	3 Min	30 Min	60 Min	90 Min
Detection	1,119	1,119	1,119	1,119
Continued Pumping	1,119	1,119	1,119	1,119
Shutoff Valve Closure	671	6,714	13,429	20,143
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-100. 16 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

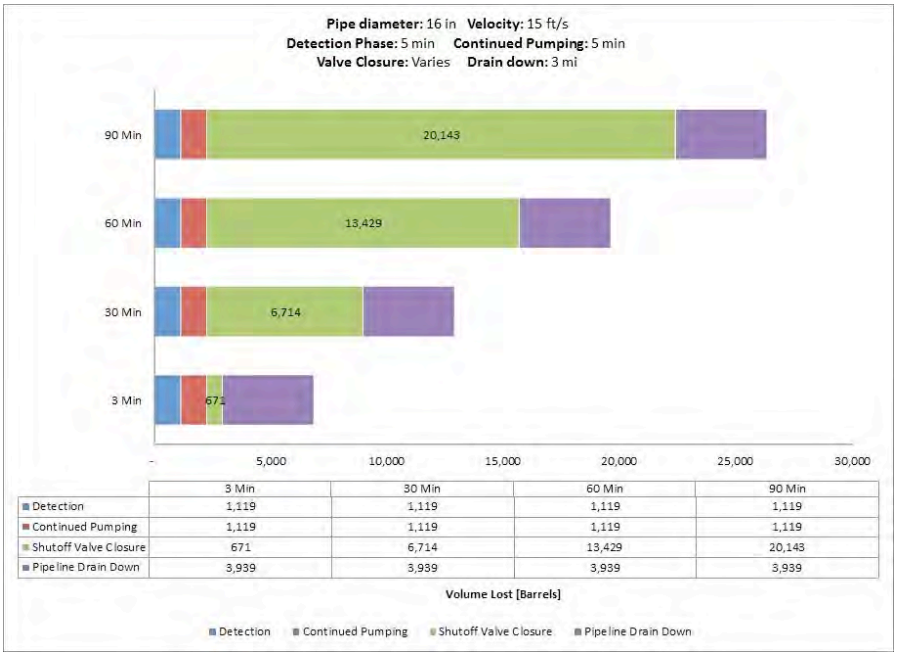

	3 Min	30 Min	60 Min	90 Min
Detection	1,119	1,119	1,119	1,119
Continued Pumping	1,119	1,119	1,119	1,119
Shutoff Valve Closure	671	6,714	13,429	20,143
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-101. 16 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

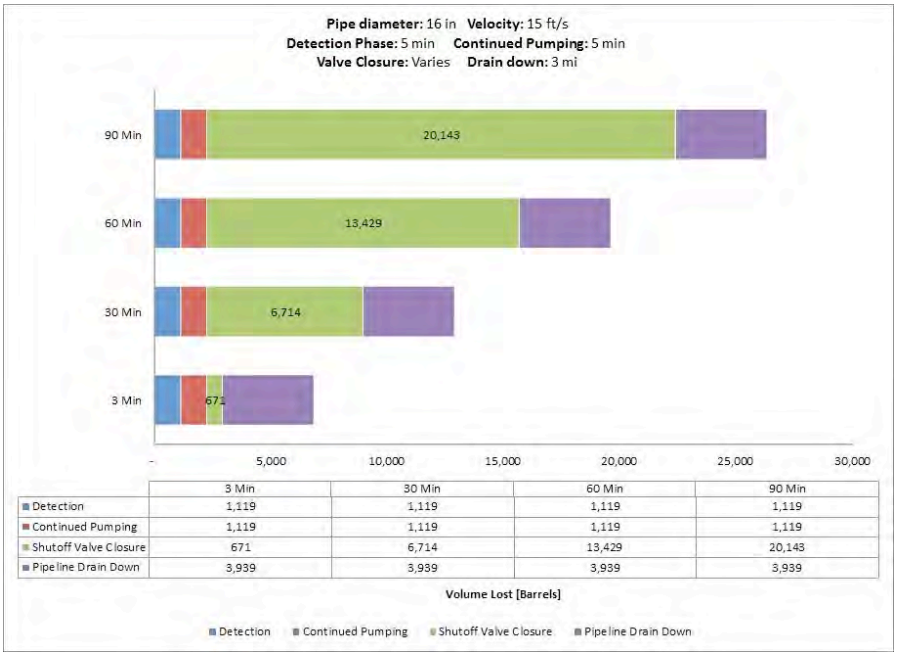

	3 Min	30 Min	60 Min	90 Min
Detection	1,119	1,119	1,119	1,119
Continued Pumping	1,119	1,119	1,119	1,119
Shutoff Valve Closure	671	6,714	13,429	20,143
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-102. 16 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

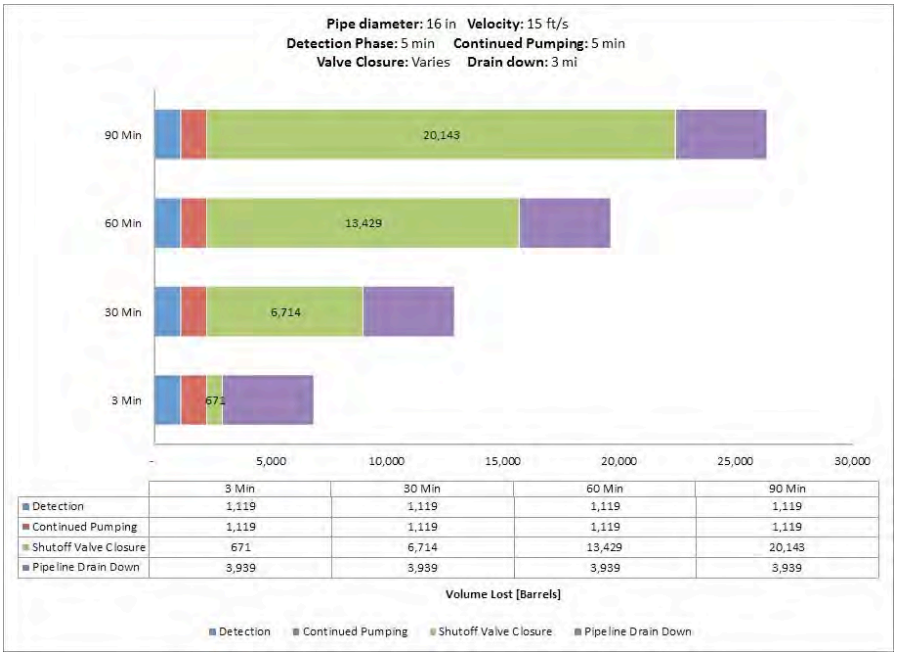

	3 Min	30 Min	60 Min	90 Min
Detection	1,119	1,119	1,119	1,119
Continued Pumping	1,119	1,119	1,119	1,119
Shutoff Valve Closure	671	6,714	13,429	20,143
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-103. 16 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

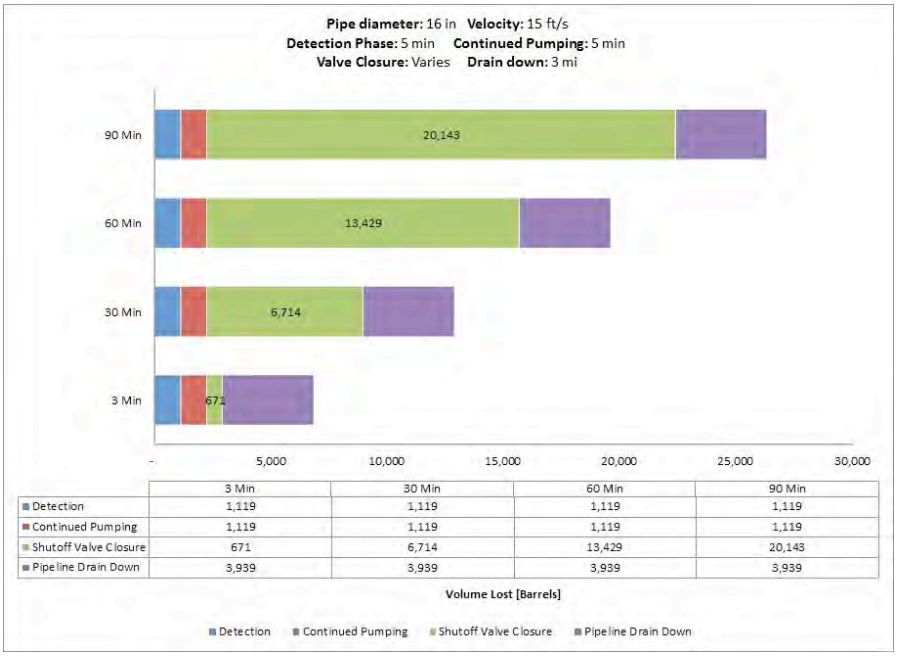

	3 Min	30 Min	60 Min	90 Min
Detection	1,119	1,119	1,119	1,119
Continued Pumping	1,119	1,119	1,119	1,119
Shutoff Valve Closure	671	6,714	13,429	20,143
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-104. 16 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

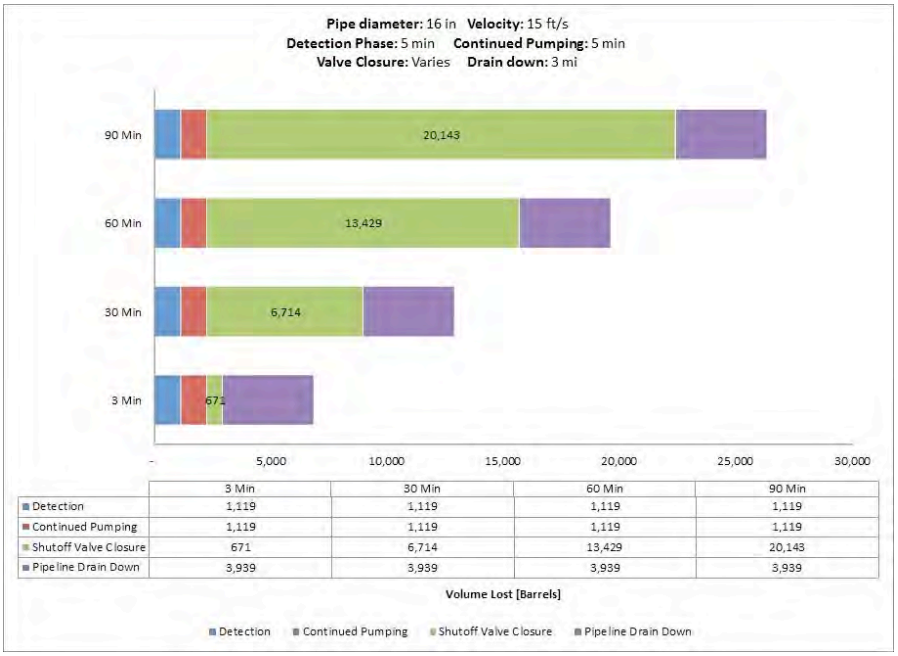

	3 Min	30 Min	60 Min	90 Min
Detection	1,119	1,119	1,119	1,119
Continued Pumping	1,119	1,119	1,119	1,119
Shutoff Valve Closure	671	6,714	13,429	20,143
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-105. 16 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

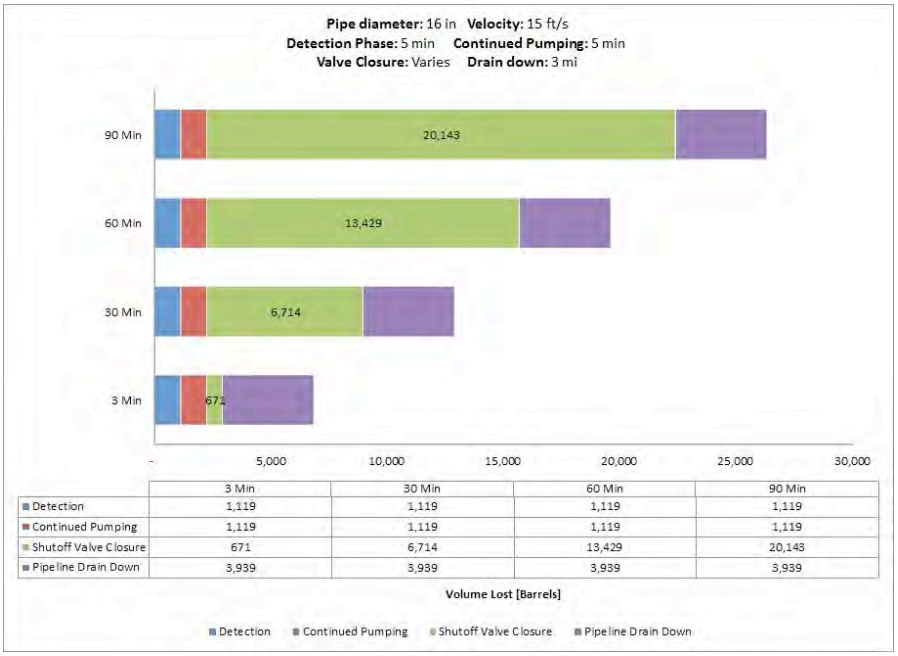

	3 Min	30 Min	60 Min	90 Min
Detection	1,119	1,119	1,119	1,119
Continued Pumping	1,119	1,119	1,119	1,119
Shutoff Valve Closure	671	6,714	13,429	20,143
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-106. 16 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

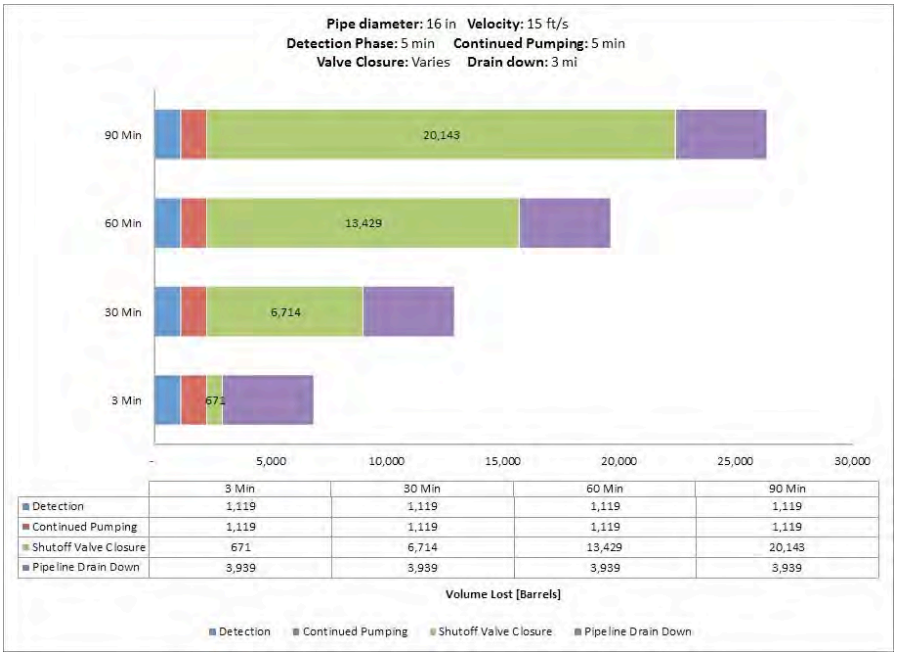

	3 Min	30 Min	60 Min	90 Min
Detection	1,119	1,119	1,119	1,119
Continued Pumping	1,119	1,119	1,119	1,119
Shutoff Valve Closure	671	6,714	13,429	20,143
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-107. 16 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

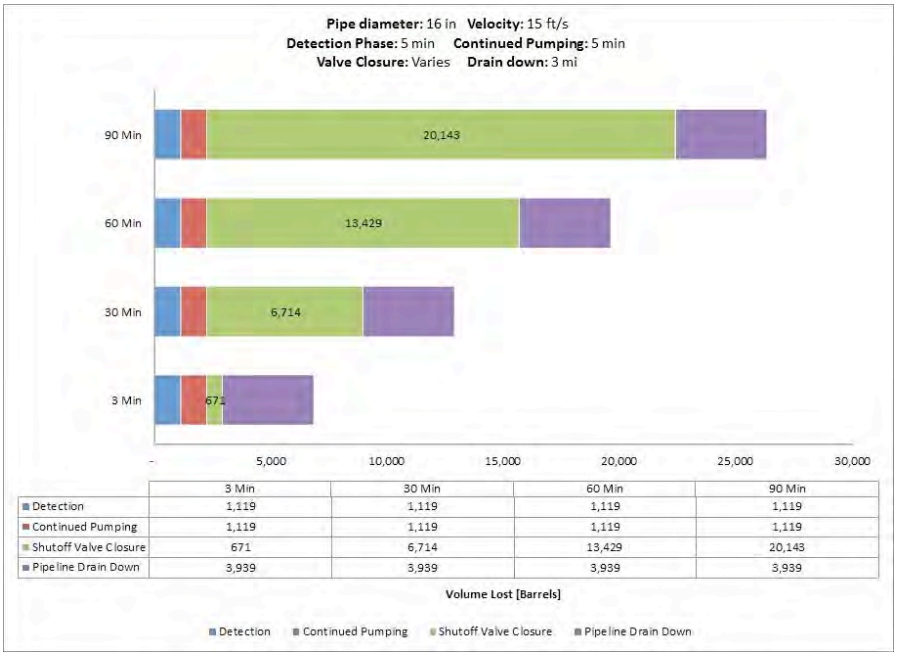

	3 Min	30 Min	60 Min	90 Min
Detection	1,119	1,119	1,119	1,119
Continued Pumping	1,119	1,119	1,119	1,119
Shutoff Valve Closure	671	6,714	13,429	20,143
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-108. 16 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

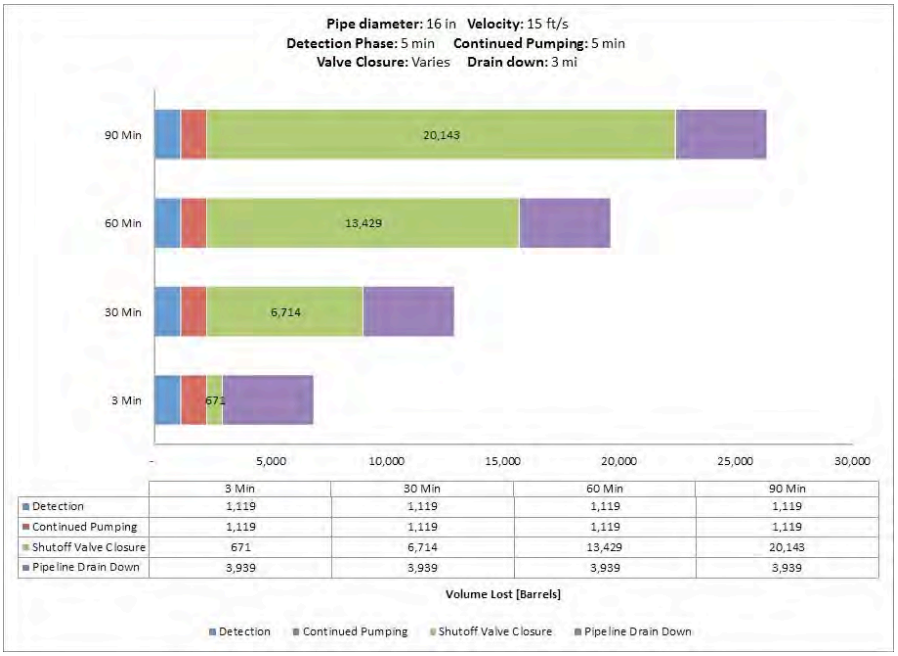

	3 Min	30 Min	60 Min	90 Min
Detection	1,119	1,119	1,119	1,119
Continued Pumping	1,119	1,119	1,119	1,119
Shutoff Valve Closure	671	6,714	13,429	20,143
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-109. 24 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

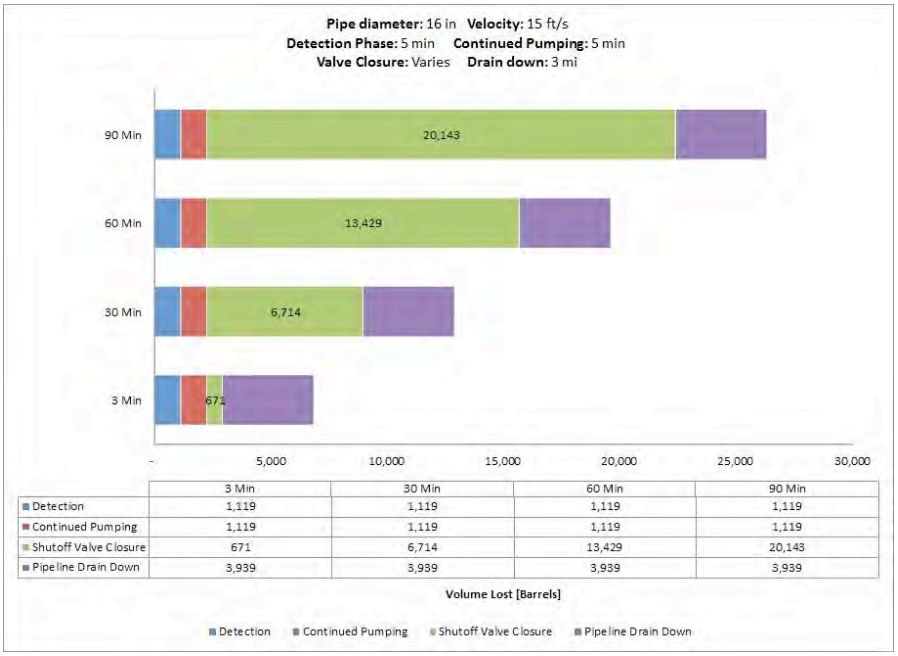

	3 Min	30 Min	60 Min	90 Min
Detection	1,119	1,119	1,119	1,119
Continued Pumping	1,119	1,119	1,119	1,119
Shutoff Valve Closure	671	6,714	13,429	20,143
Pipeline Drain Down	3,939	3,939	3,939	3,939

Fig. A-110. 24 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

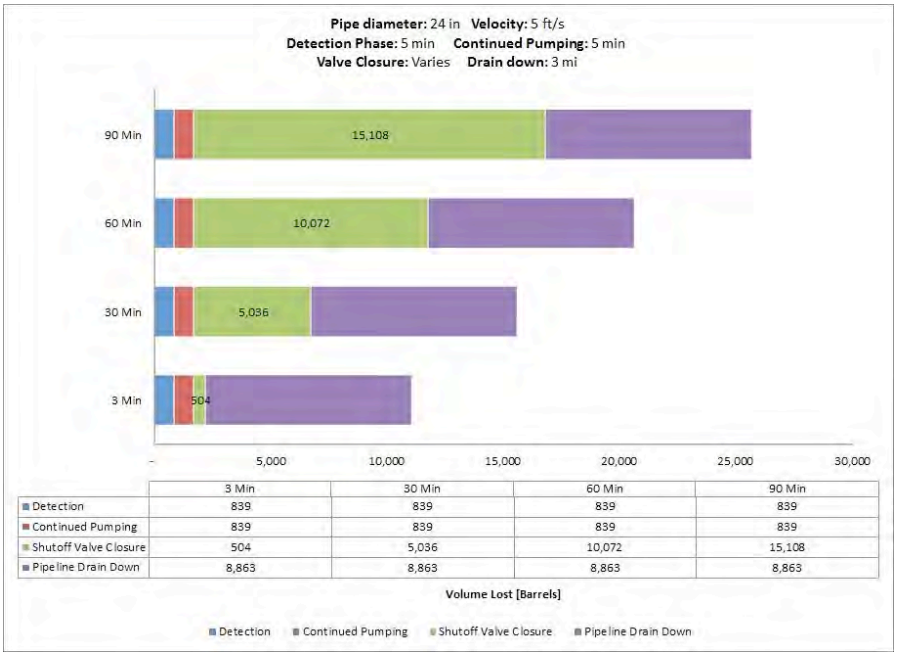

	3 Min	30 Min	60 Min	90 Min
Detection	839	839	839	839
Continued Pumping	839	839	839	839
Shutoff Valve Closure	504	5,036	10,072	15,108
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-111. 24 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

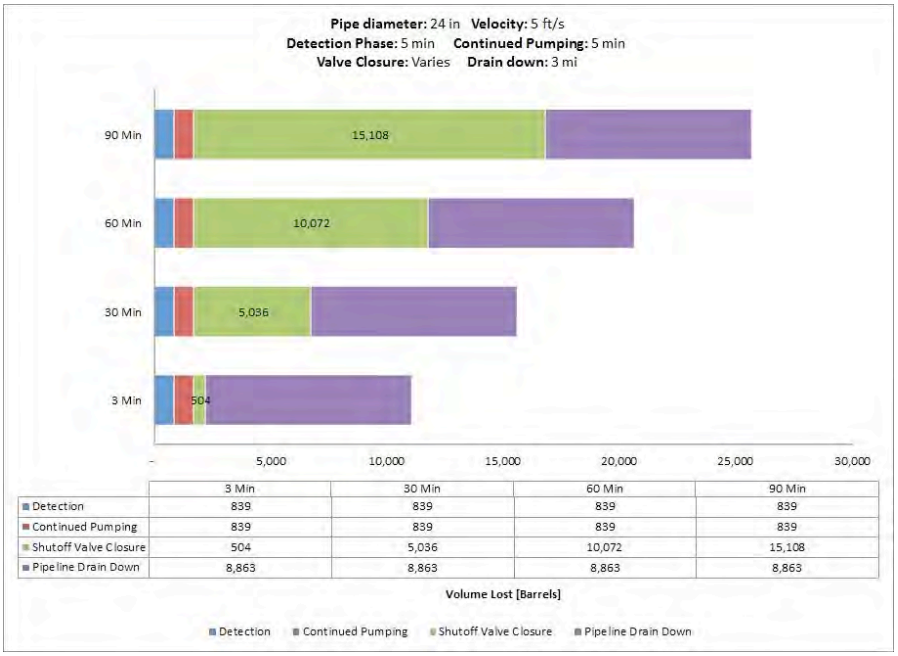

	3 Min	30 Min	60 Min	90 Min
Detection	839	839	839	839
Continued Pumping	839	839	839	839
Shutoff Valve Closure	504	5,036	10,072	15,108
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-112. 24 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

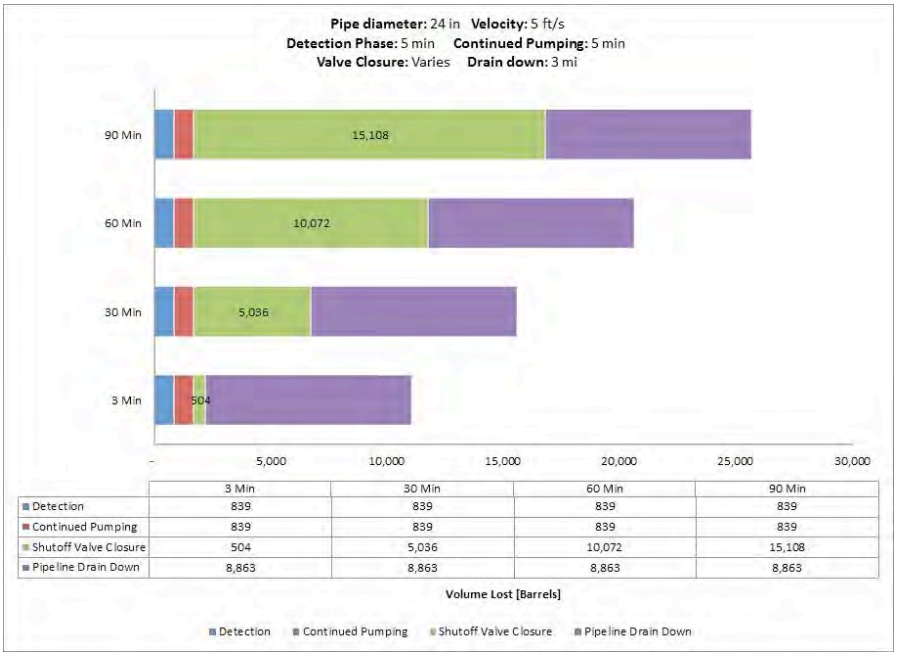

	3 Min	30 Min	60 Min	90 Min
Detection	839	839	839	839
Continued Pumping	839	839	839	839
Shutoff Valve Closure	504	5,036	10,072	15,108
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-113. 24 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

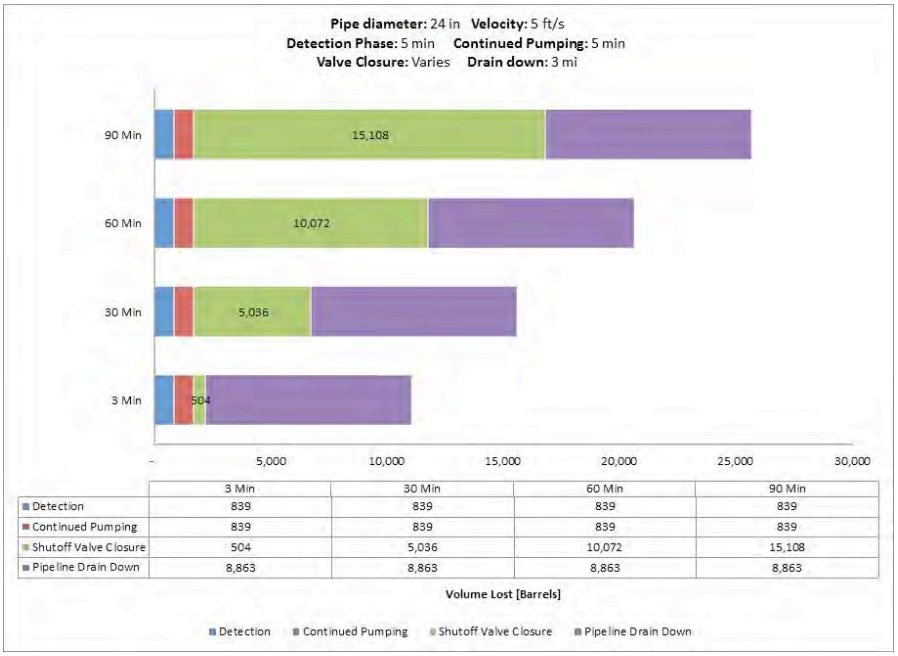

	3 Min	30 Min	60 Min	90 Min
Detection	839	839	839	839
Continued Pumping	839	839	839	839
Shutoff Valve Closure	504	5,036	10,072	15,108
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-114. 24 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

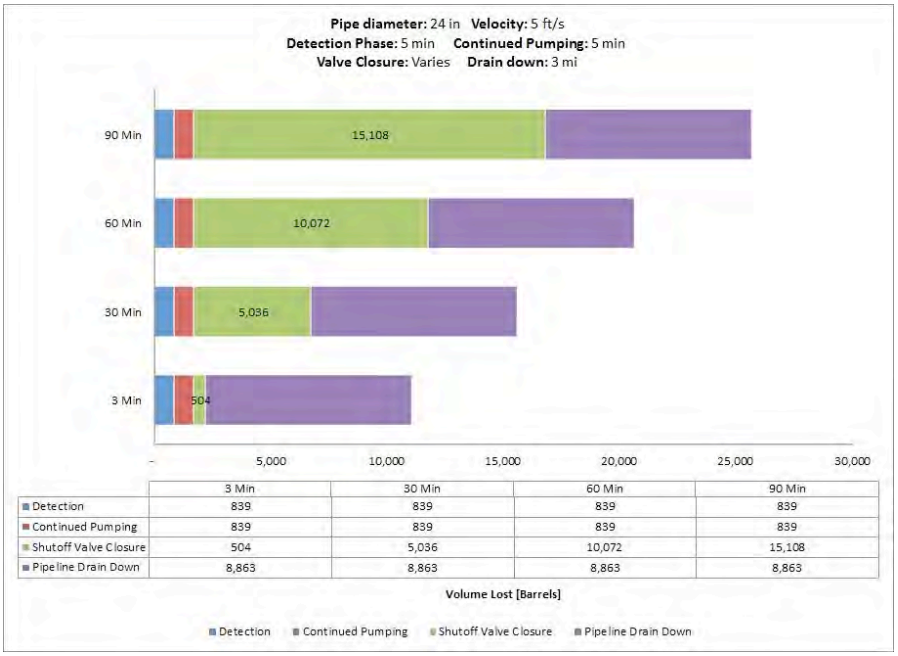

	3 Min	30 Min	60 Min	90 Min
Detection	839	839	839	839
Continued Pumping	839	839	839	839
Shutoff Valve Closure	504	5,036	10,072	15,108
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-115. 24 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

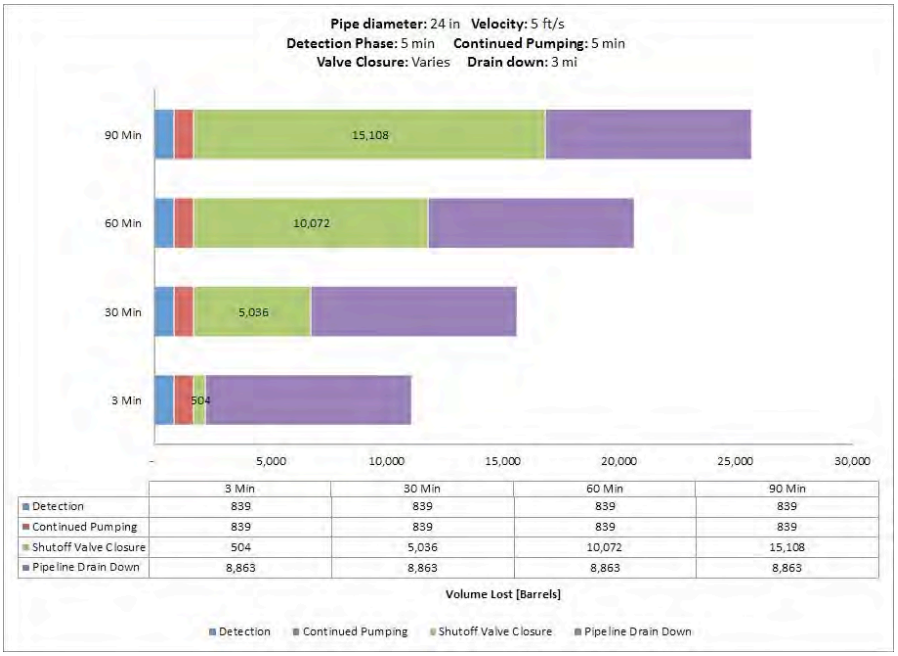

	3 Min	30 Min	60 Min	90 Min
Detection	839	839	839	839
Continued Pumping	839	839	839	839
Shutoff Valve Closure	504	5,036	10,072	15,108
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-116. 24 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

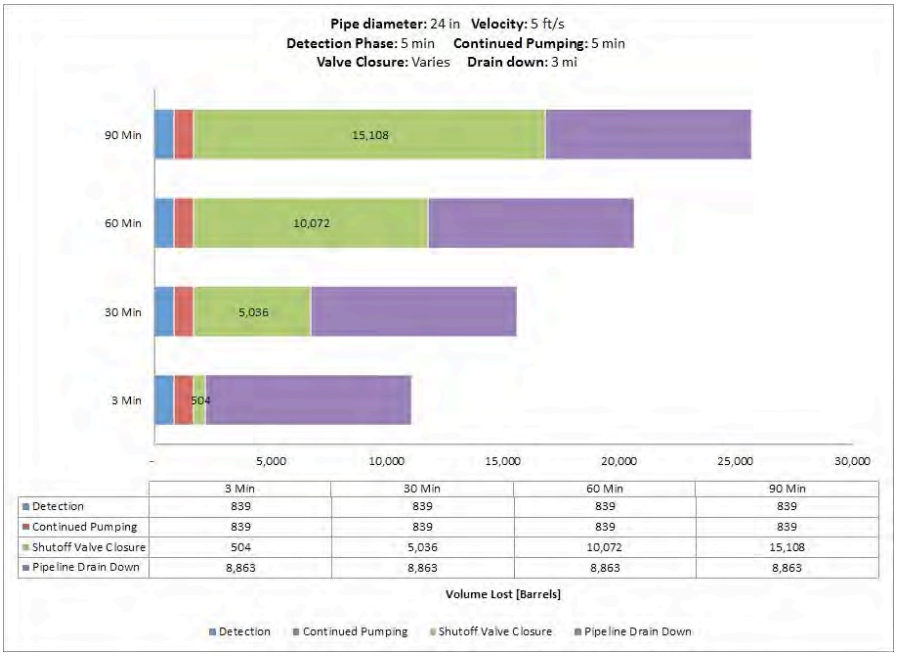

	3 Min	30 Min	60 Min	90 Min
Detection	839	839	839	839
Continued Pumping	839	839	839	839
Shutoff Valve Closure	504	5,036	10,072	15,108
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-117. 24 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

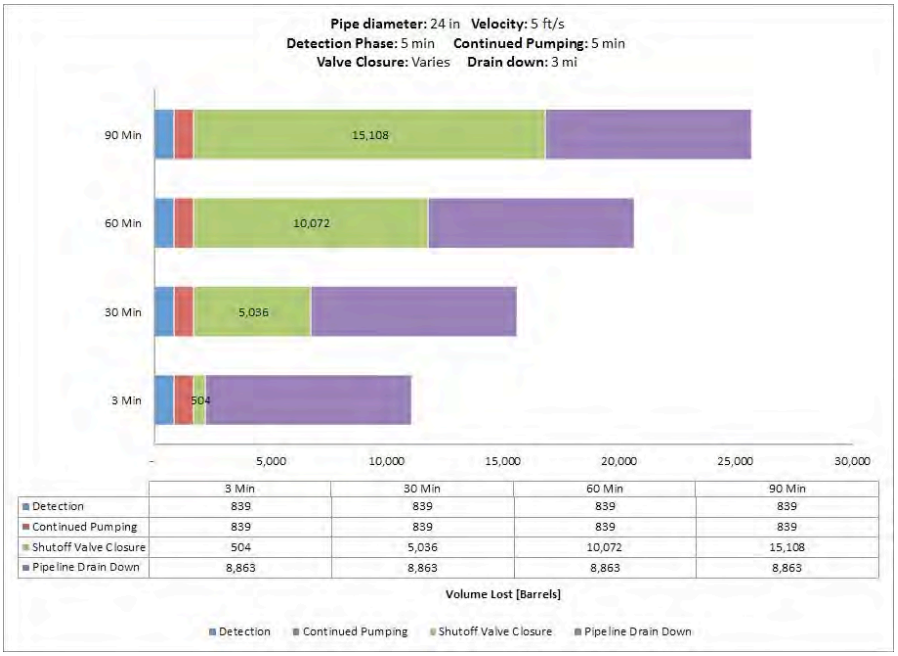

	3 Min	30 Min	60 Min	90 Min
Detection	839	839	839	839
Continued Pumping	839	839	839	839
Shutoff Valve Closure	504	5,036	10,072	15,108
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-118. 24 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

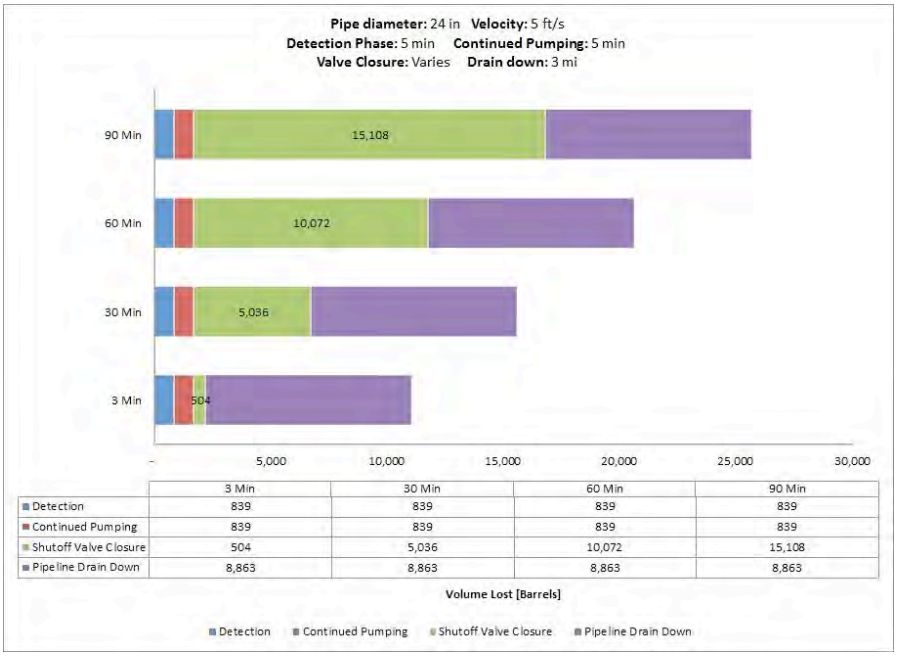

	3 Min	30 Min	60 Min	90 Min
Detection	839	839	839	839
Continued Pumping	839	839	839	839
Shutoff Valve Closure	504	5,036	10,072	15,108
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-119. 24 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

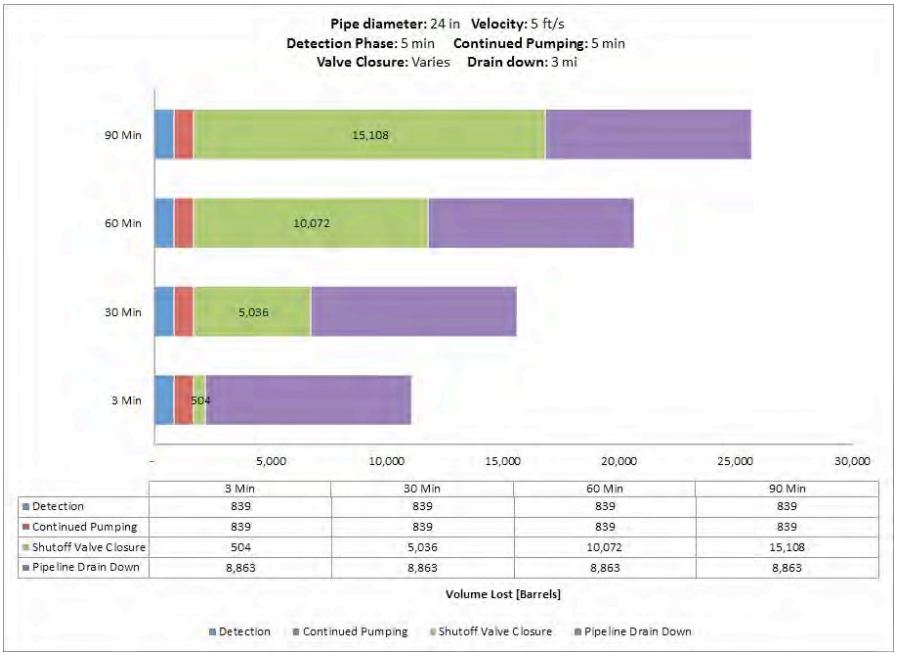

	3 Min	30 Min	60 Min	90 Min
Detection	839	839	839	839
Continued Pumping	839	839	839	839
Shutoff Valve Closure	504	5,036	10,072	15,108
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-120. 24 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

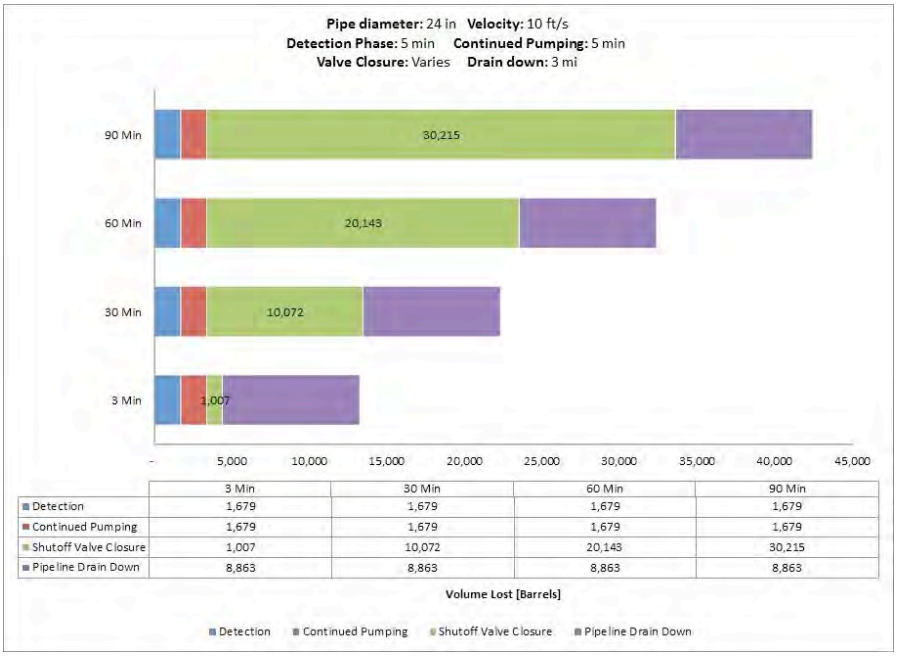

	3 Min	30 Min	60 Min	90 Min
Detection	1,679	1,679	1,679	1,679
Continued Pumping	1,679	1,679	1,679	1,679
Shutoff Valve Closure	1,007	10,072	20,143	30,215
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-121. 24 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

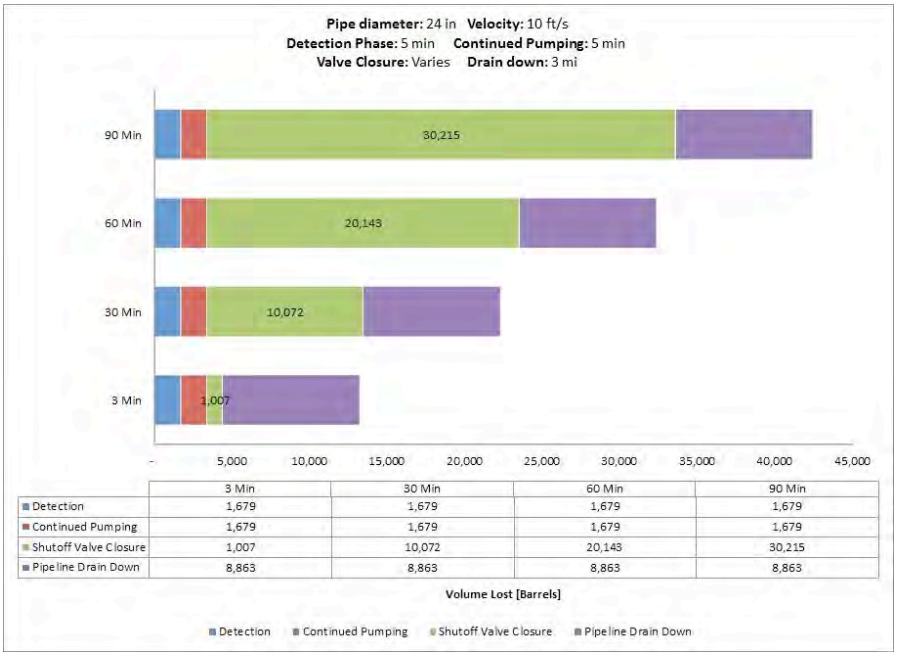

	3 Min	30 Min	60 Min	90 Min
Detection	1,679	1,679	1,679	1,679
Continued Pumping	1,679	1,679	1,679	1,679
Shutoff Valve Closure	1,007	10,072	20,143	30,215
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-122. 24 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

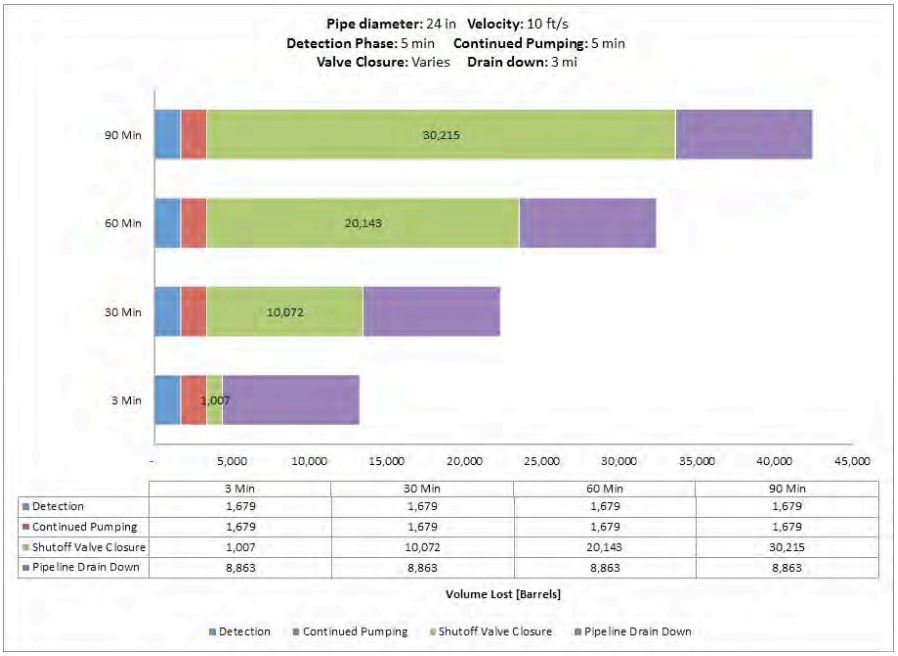

	3 Min	30 Min	60 Min	90 Min
Detection	1,679	1,679	1,679	1,679
Continued Pumping	1,679	1,679	1,679	1,679
Shutoff Valve Closure	1,007	10,072	20,143	30,215
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-123. 24 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

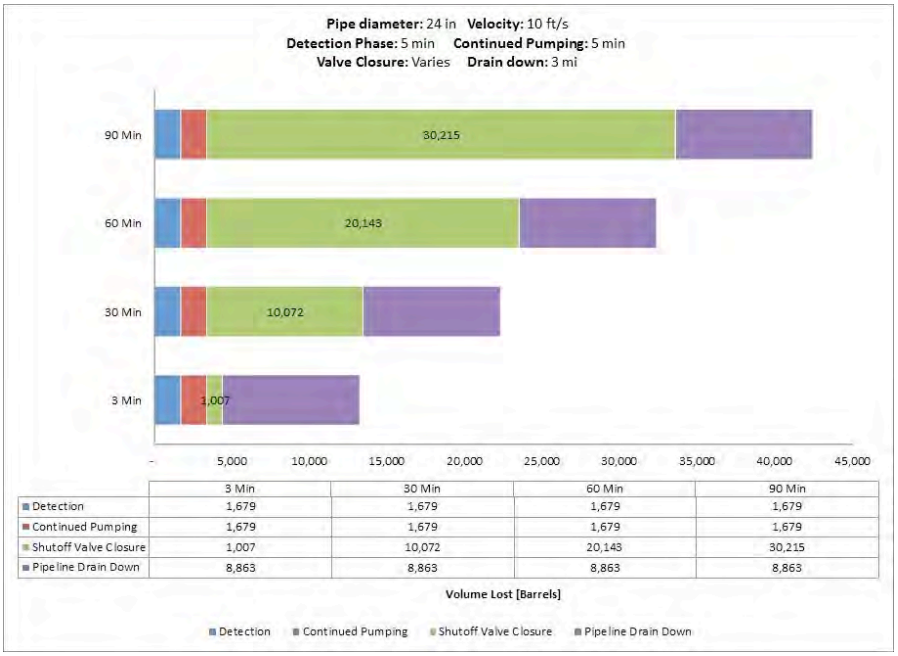

	3 Min	30 Min	60 Min	90 Min
Detection	1,679	1,679	1,679	1,679
Continued Pumping	1,679	1,679	1,679	1,679
Shutoff Valve Closure	1,007	10,072	20,143	30,215
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-124. 24 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

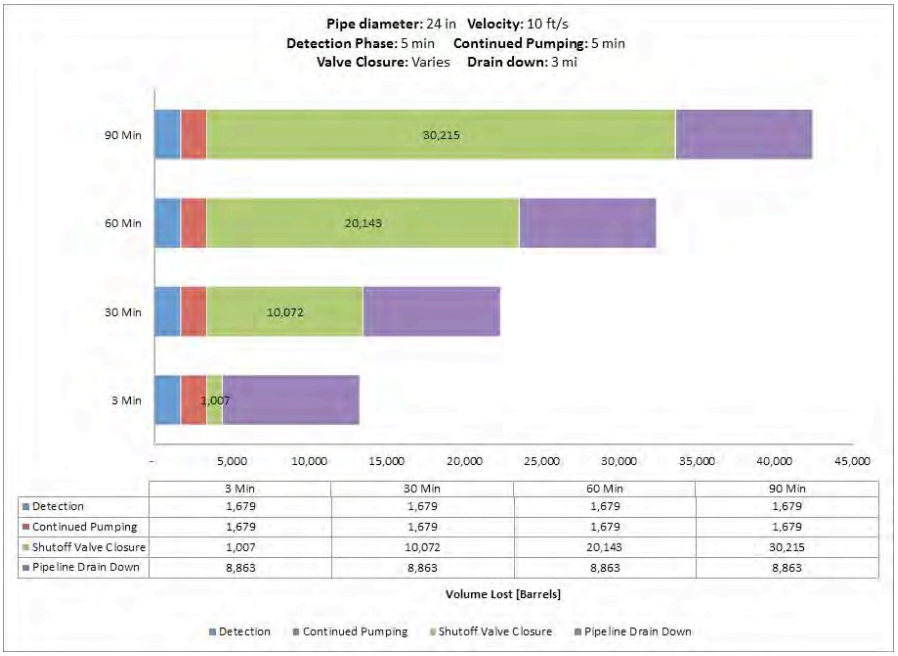

	3 Min	30 Min	60 Min	90 Min
Detection	1,679	1,679	1,679	1,679
Continued Pumping	1,679	1,679	1,679	1,679
Shutoff Valve Closure	1,007	10,072	20,143	30,215
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-125. 24 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

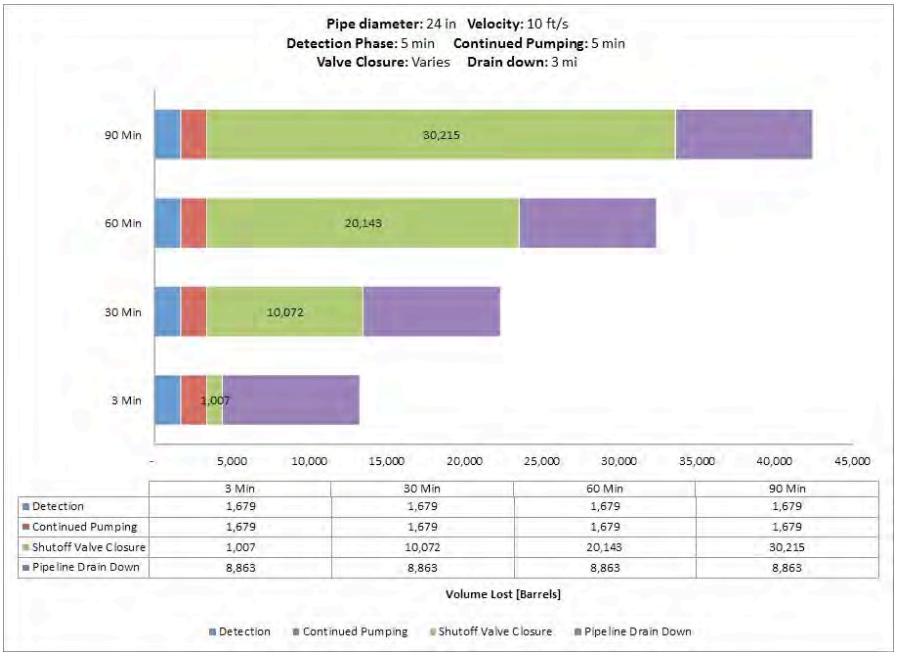

	3 Min	30 Min	60 Min	90 Min
Detection	1,679	1,679	1,679	1,679
Continued Pumping	1,679	1,679	1,679	1,679
Shutoff Valve Closure	1,007	10,072	20,143	30,215
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-126. 24 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

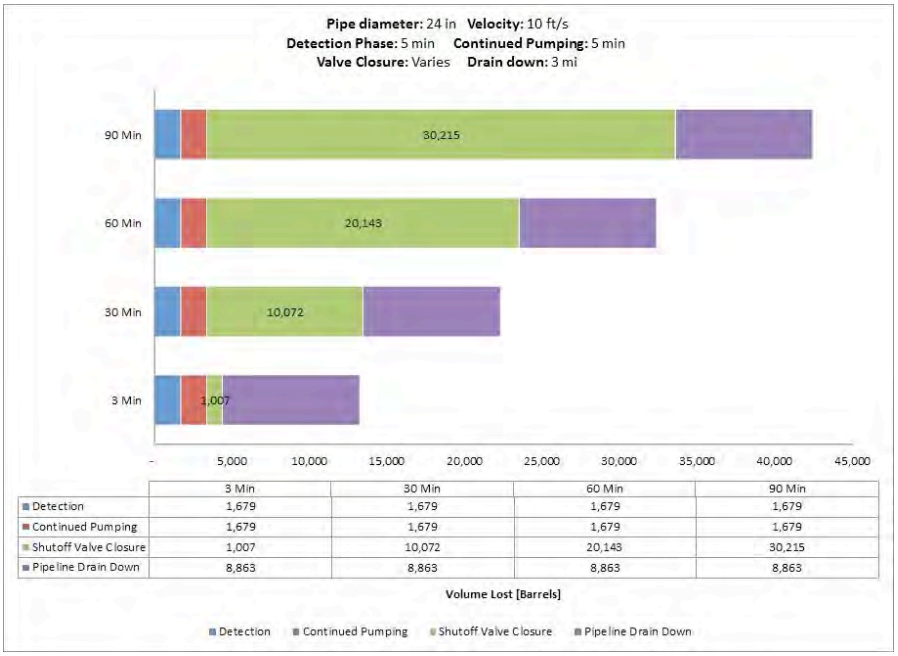

	3 Min	30 Min	60 Min	90 Min
Detection	1,679	1,679	1,679	1,679
Continued Pumping	1,679	1,679	1,679	1,679
Shutoff Valve Closure	1,007	10,072	20,143	30,215
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-127. 24 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

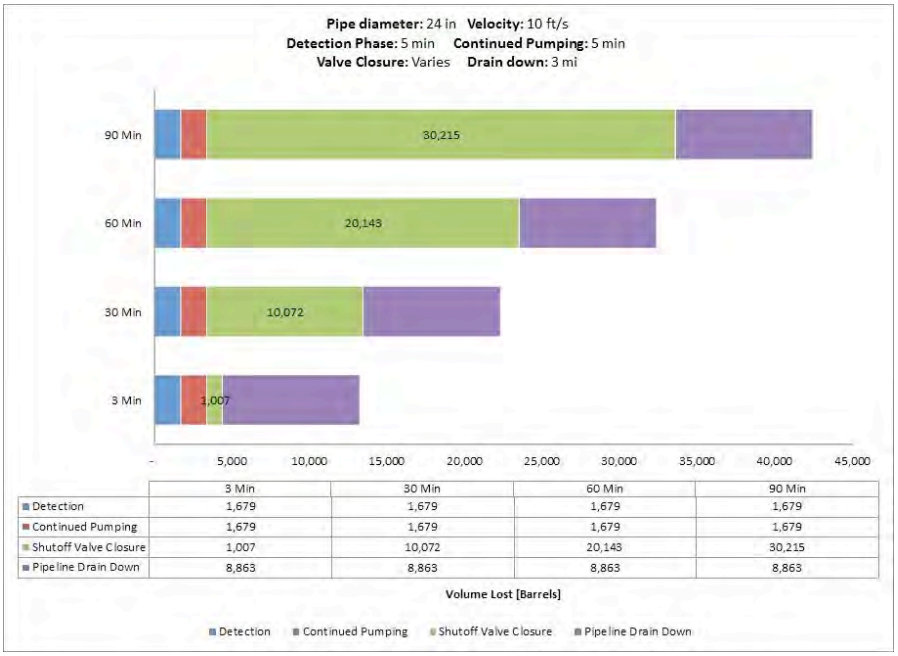

	3 Min	30 Min	60 Min	90 Min
Detection	1,679	1,679	1,679	1,679
Continued Pumping	1,679	1,679	1,679	1,679
Shutoff Valve Closure	1,007	10,072	20,143	30,215
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-128. 24 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

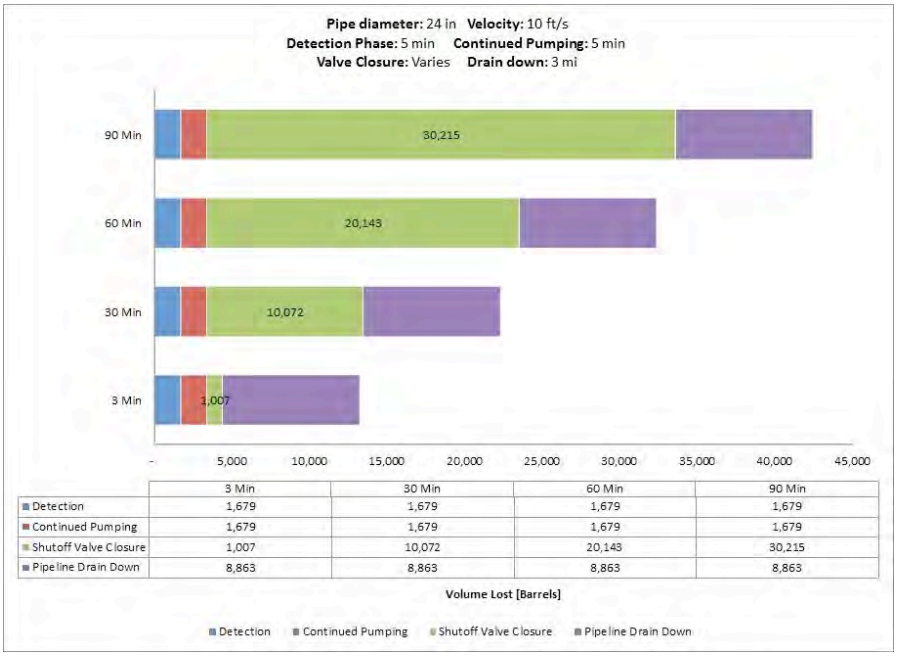

	3 Min	30 Min	60 Min	90 Min
Detection	1,679	1,679	1,679	1,679
Continued Pumping	1,679	1,679	1,679	1,679
Shutoff Valve Closure	1,007	10,072	20,143	30,215
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-129. 24 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

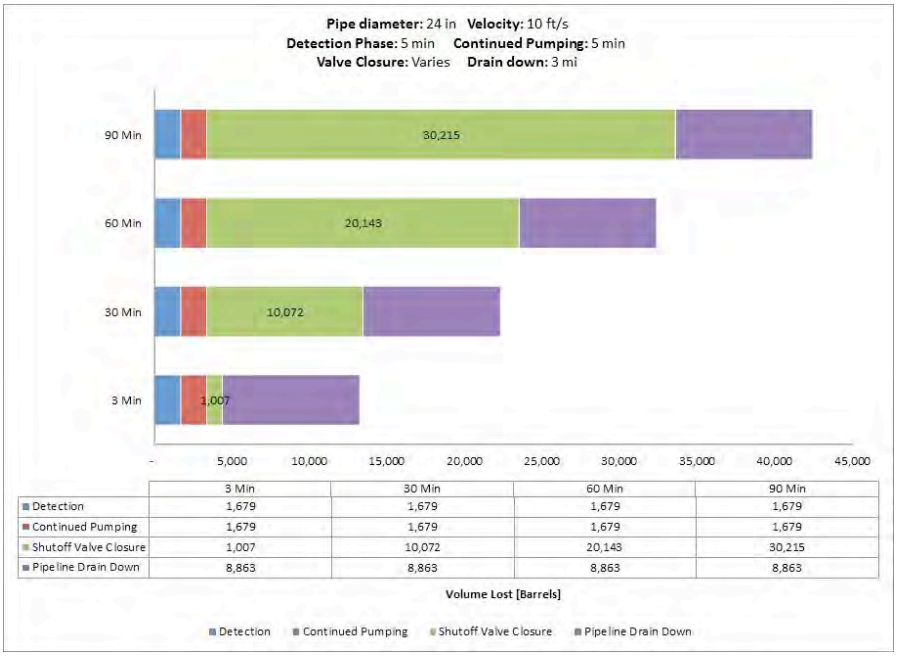

	3 Min	30 Min	60 Min	90 Min
Detection	1,679	1,679	1,679	1,679
Continued Pumping	1,679	1,679	1,679	1,679
Shutoff Valve Closure	1,007	10,072	20,143	30,215
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-130. 24 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

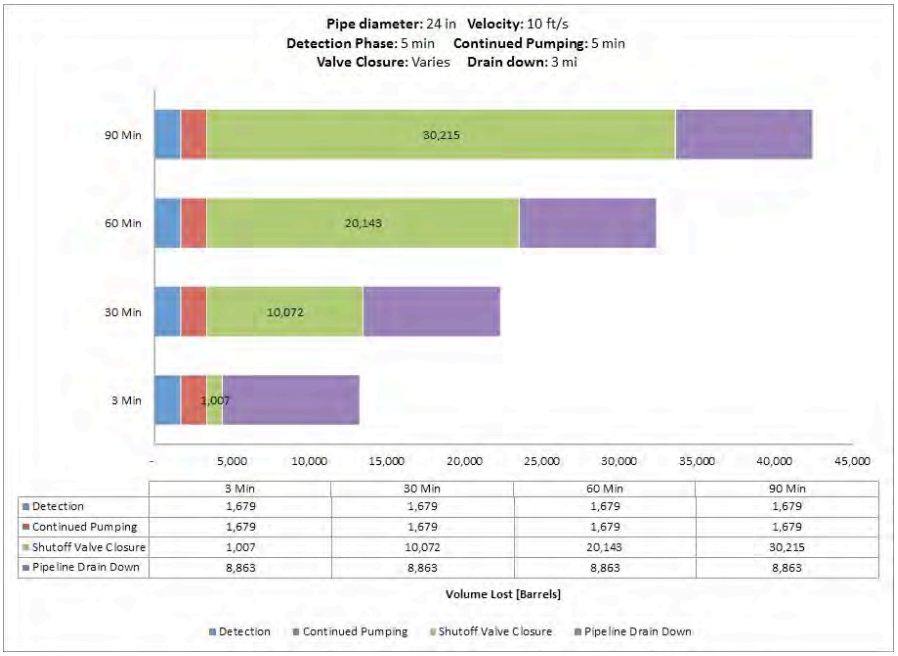

	3 Min	30 Min	60 Min	90 Min
Detection	1,679	1,679	1,679	1,679
Continued Pumping	1,679	1,679	1,679	1,679
Shutoff Valve Closure	1,007	10,072	20,143	30,215
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-131. 24 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

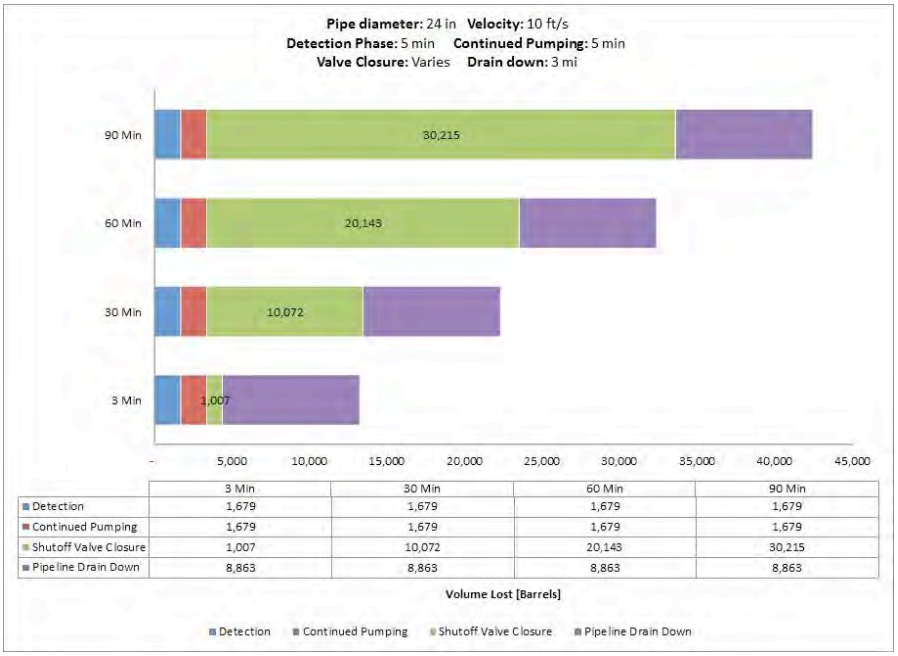

	3 Min	30 Min	60 Min	90 Min
Detection	1,679	1,679	1,679	1,679
Continued Pumping	1,679	1,679	1,679	1,679
Shutoff Valve Closure	1,007	10,072	20,143	30,215
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-132. 24 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

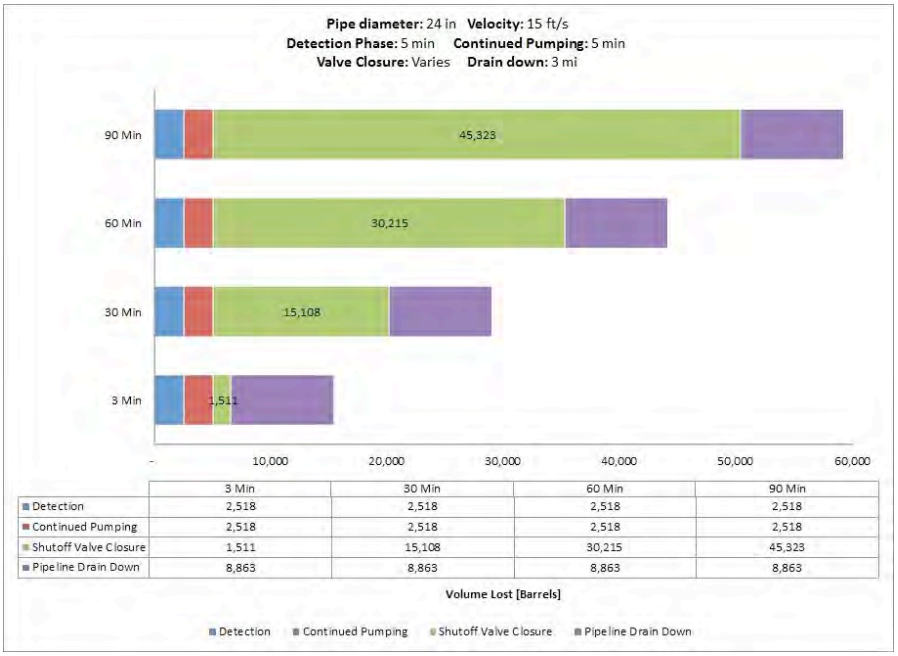

	3 Min	30 Min	60 Min	90 Min
Detection	2,518	2,518	2,518	2,518
Continued Pumping	2,518	2,518	2,518	2,518
Shutoff Valve Closure	1,511	15,108	30,215	45,323
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-133. 24 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

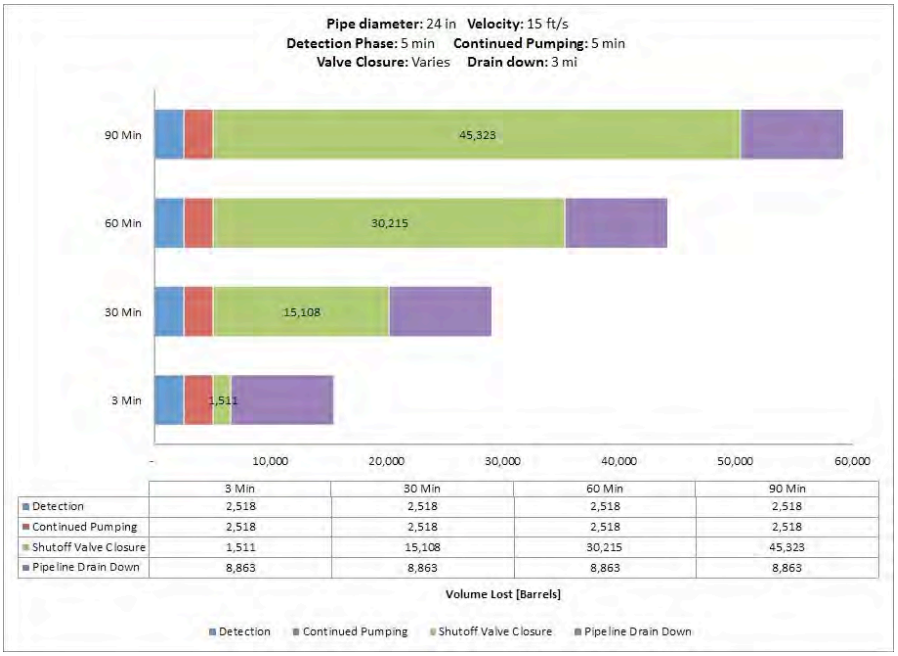

	3 Min	30 Min	60 Min	90 Min
Detection	2,518	2,518	2,518	2,518
Continued Pumping	2,518	2,518	2,518	2,518
Shutoff Valve Closure	1,511	15,108	30,215	45,323
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-134. 24 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

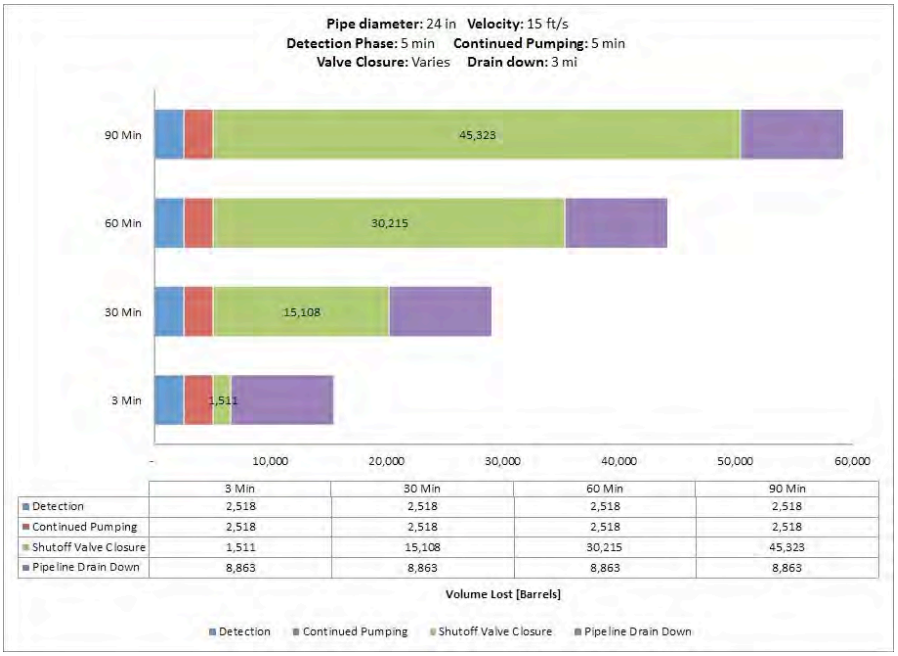

	3 Min	30 Min	60 Min	90 Min
Detection	2,518	2,518	2,518	2,518
Continued Pumping	2,518	2,518	2,518	2,518
Shutoff Valve Closure	1,511	15,108	30,215	45,323
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-135. 24 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

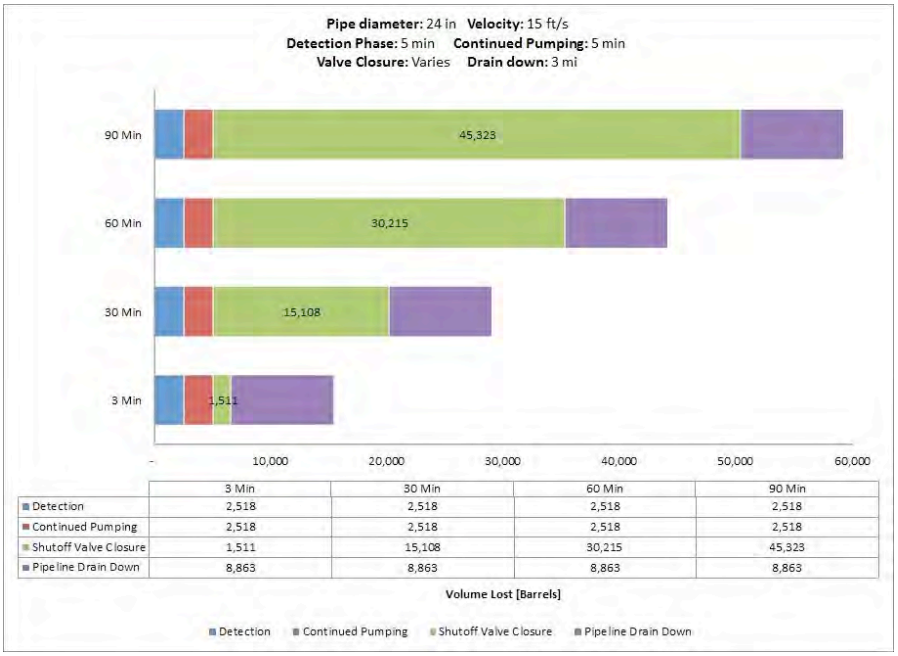

	3 Min	30 Min	60 Min	90 Min
Detection	2,518	2,518	2,518	2,518
Continued Pumping	2,518	2,518	2,518	2,518
Shutoff Valve Closure	1,511	15,108	30,215	45,323
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-136. 24 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

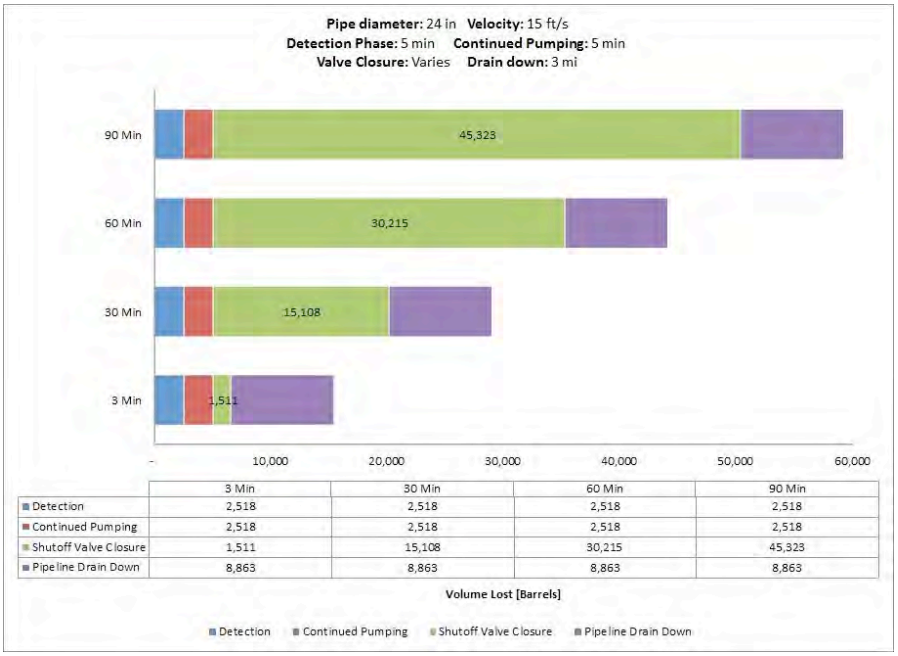

	3 Min	30 Min	60 Min	90 Min
Detection	2,518	2,518	2,518	2,518
Continued Pumping	2,518	2,518	2,518	2,518
Shutoff Valve Closure	1,511	15,108	30,215	45,323
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-137. 24 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

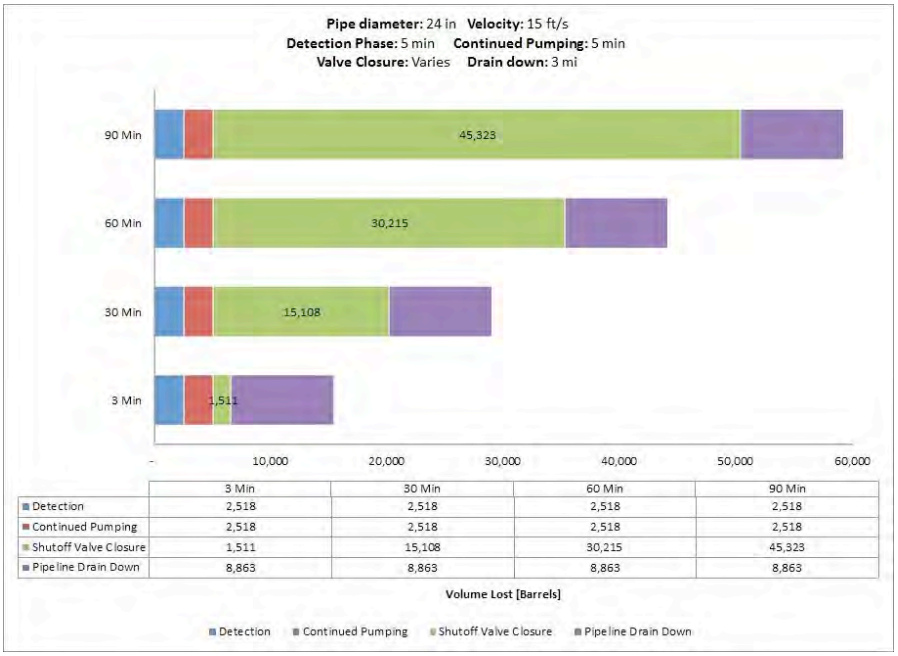

	3 Min	30 Min	60 Min	90 Min
Detection	2,518	2,518	2,518	2,518
Continued Pumping	2,518	2,518	2,518	2,518
Shutoff Valve Closure	1,511	15,108	30,215	45,323
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-138. 24 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

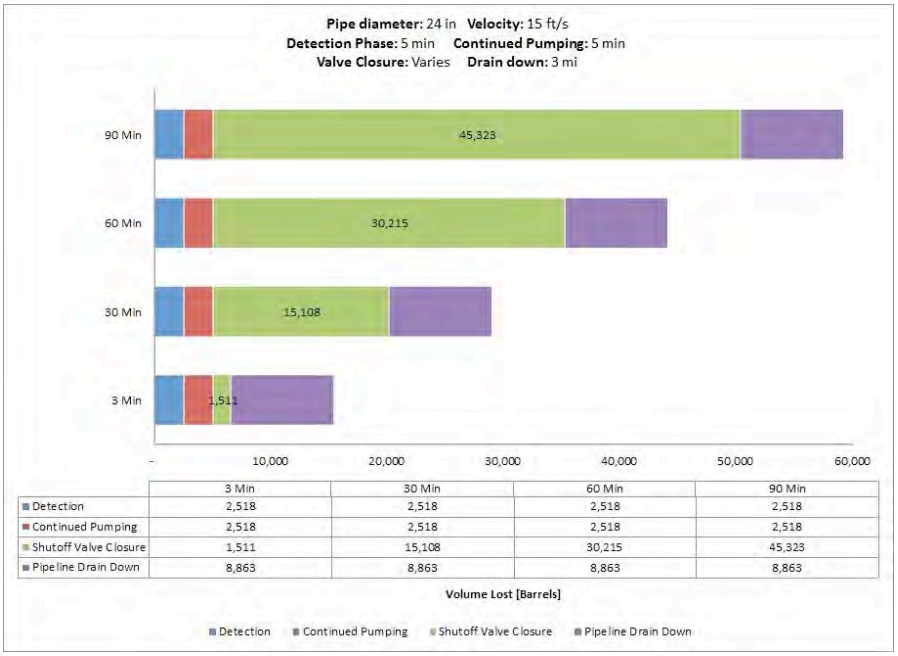

	3 Min	30 Min	60 Min	90 Min
Detection	2,518	2,518	2,518	2,518
Continued Pumping	2,518	2,518	2,518	2,518
Shutoff Valve Closure	1,511	15,108	30,215	45,323
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-139. 24 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

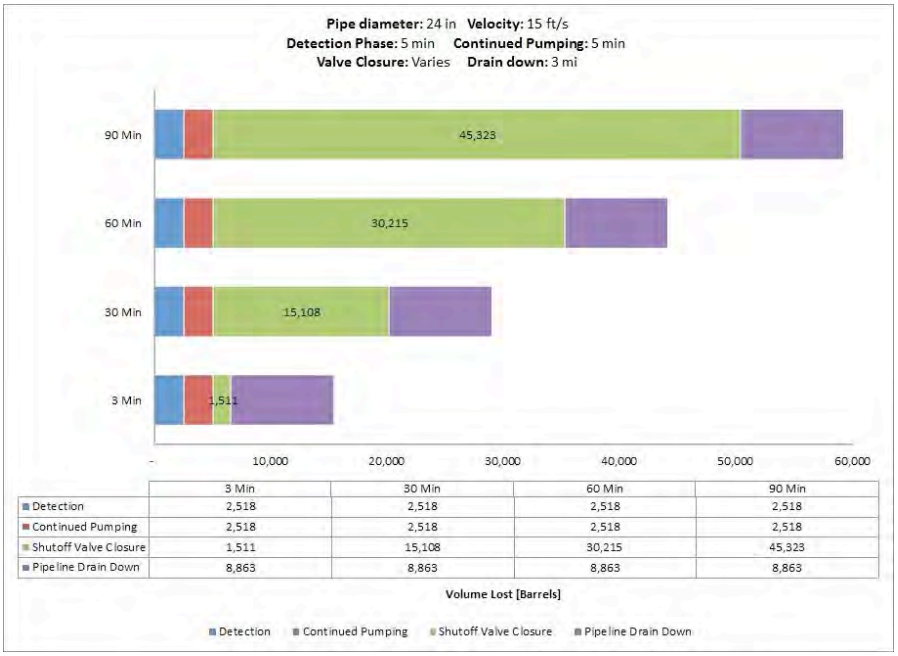

	3 Min	30 Min	60 Min	90 Min
Detection	2,518	2,518	2,518	2,518
Continued Pumping	2,518	2,518	2,518	2,518
Shutoff Valve Closure	1,511	15,108	30,215	45,323
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-140. 24 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

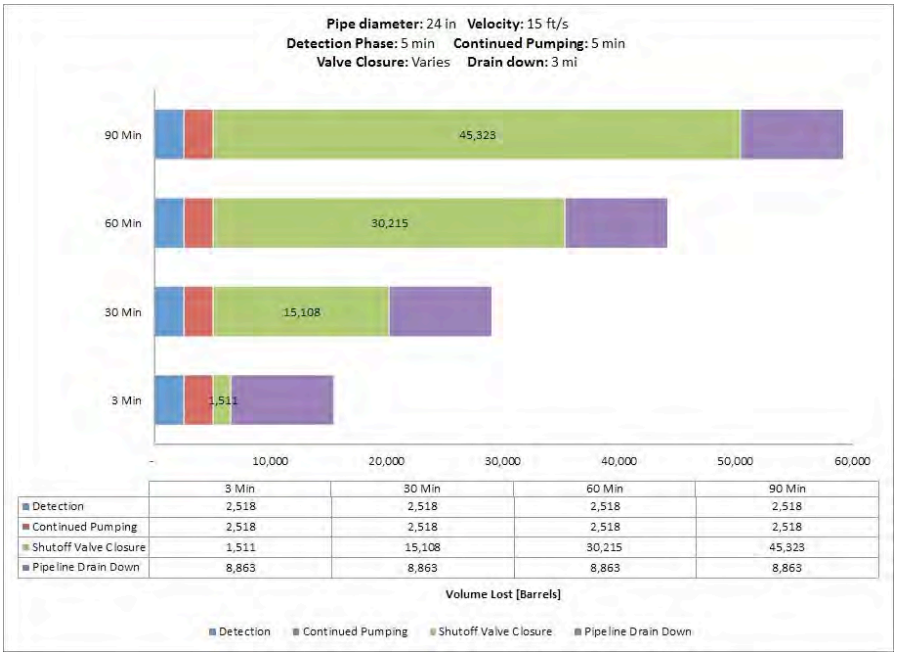

	3 Min	30 Min	60 Min	90 Min
Detection	2,518	2,518	2,518	2,518
Continued Pumping	2,518	2,518	2,518	2,518
Shutoff Valve Closure	1,511	15,108	30,215	45,323
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-141. 24 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

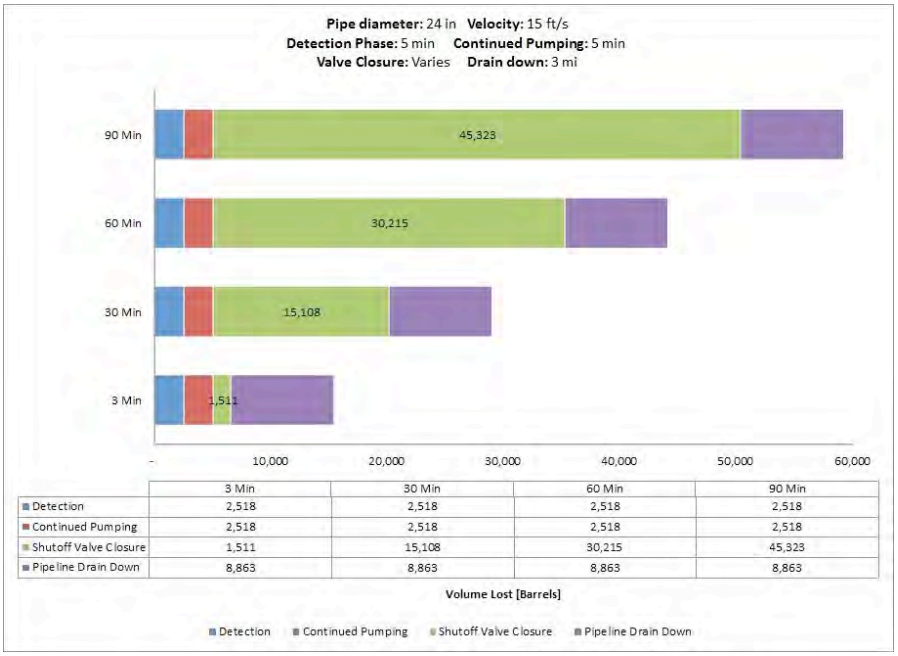

	3 Min	30 Min	60 Min	90 Min
Detection	2,518	2,518	2,518	2,518
Continued Pumping	2,518	2,518	2,518	2,518
Shutoff Valve Closure	1,511	15,108	30,215	45,323
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-142. 24 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

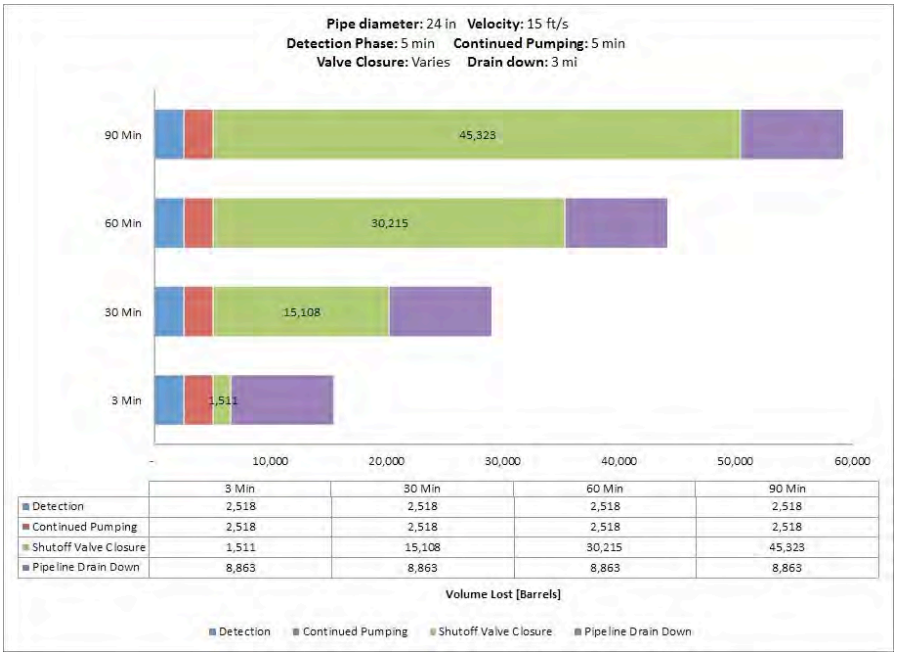

	3 Min	30 Min	60 Min	90 Min
Detection	2,518	2,518	2,518	2,518
Continued Pumping	2,518	2,518	2,518	2,518
Shutoff Valve Closure	1,511	15,108	30,215	45,323
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-143. 24 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

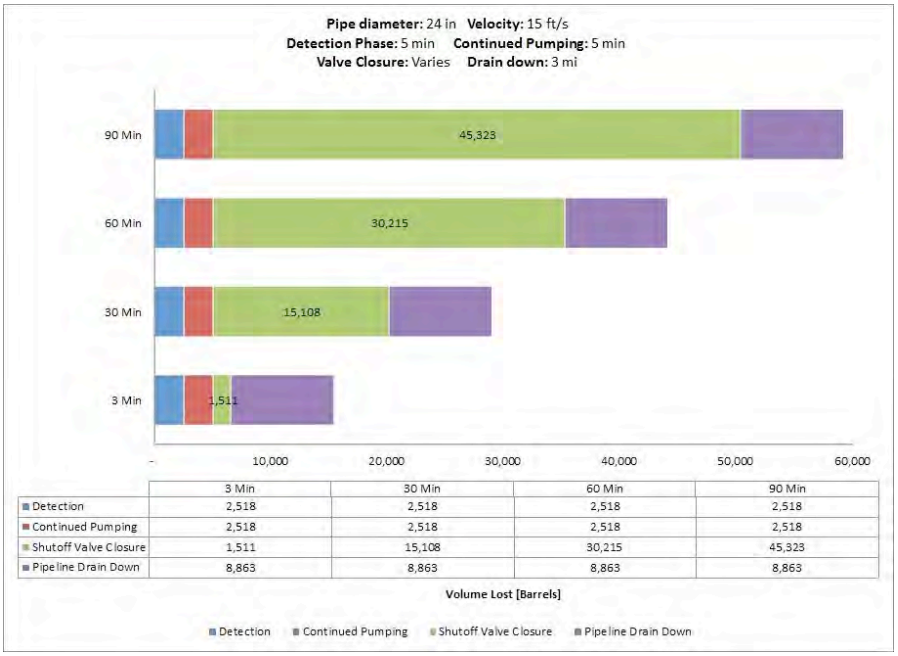

	3 Min	30 Min	60 Min	90 Min
Detection	2,518	2,518	2,518	2,518
Continued Pumping	2,518	2,518	2,518	2,518
Shutoff Valve Closure	1,511	15,108	30,215	45,323
Pipeline Drain Down	8,863	8,863	8,863	8,863

Fig. A-144. 24 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

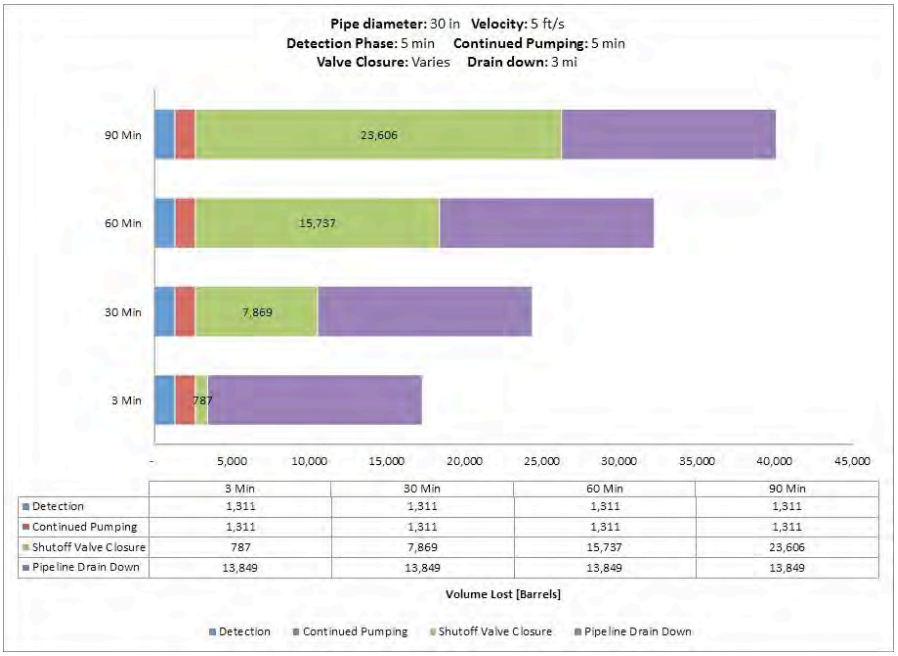

	3 Min	30 Min	60 Min	90 Min
Detection	1,311	1,311	1,311	1,311
Continued Pumping	1,311	1,311	1,311	1,311
Shutoff Valve Closure	787	7,869	15,737	23,606
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-145. 30 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

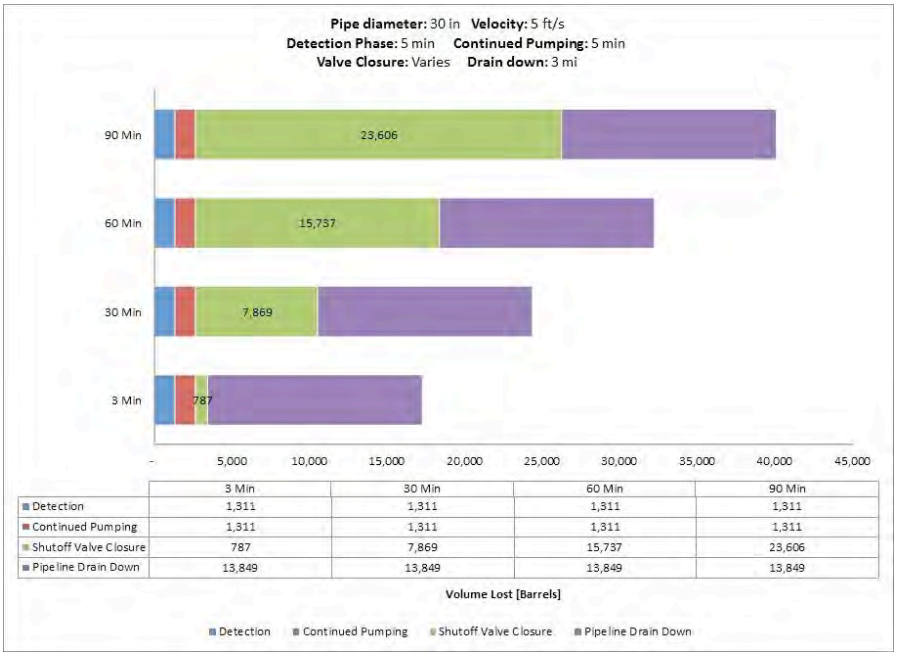

	3 Min	30 Min	60 Min	90 Min
Detection	1,311	1,311	1,311	1,311
Continued Pumping	1,311	1,311	1,311	1,311
Shutoff Valve Closure	787	7,869	15,737	23,606
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-146. 30 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

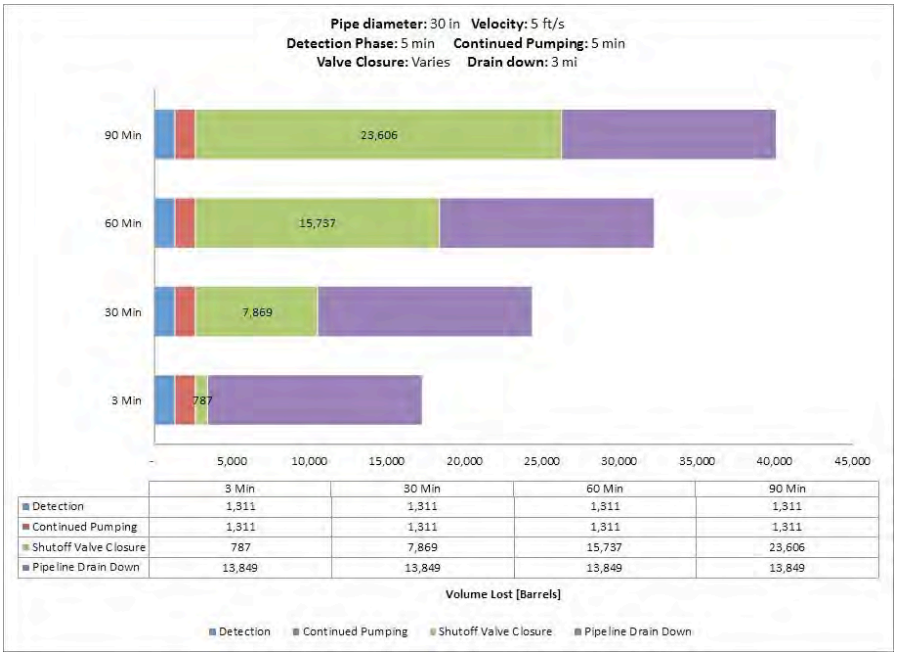

	3 Min	30 Min	60 Min	90 Min
Detection	1,311	1,311	1,311	1,311
Continued Pumping	1,311	1,311	1,311	1,311
Shutoff Valve Closure	787	7,869	15,737	23,606
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-147. 30 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

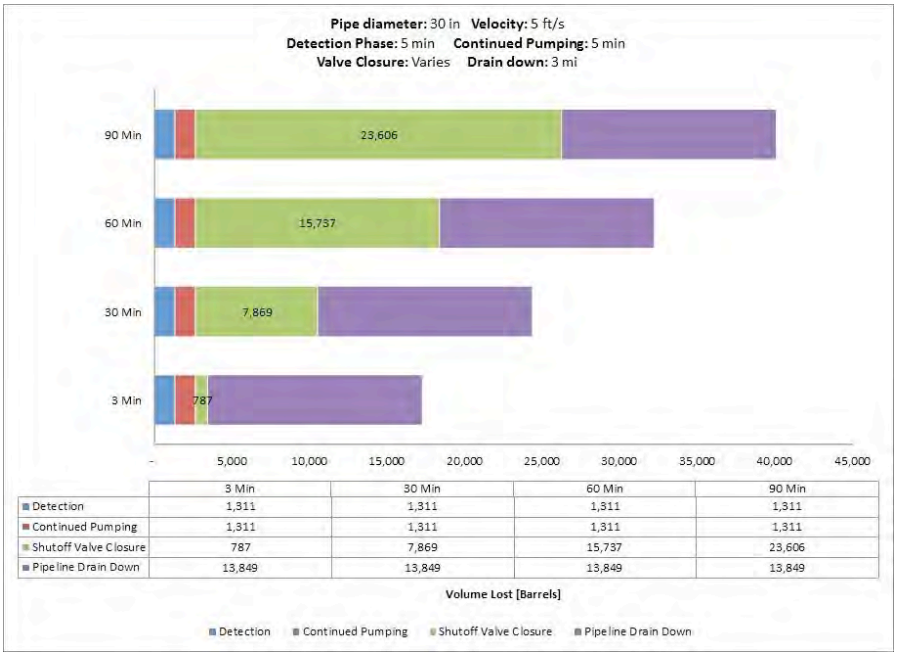

	3 Min	30 Min	60 Min	90 Min
Detection	1,311	1,311	1,311	1,311
Continued Pumping	1,311	1,311	1,311	1,311
Shutoff Valve Closure	787	7,869	15,737	23,606
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-148. 30 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

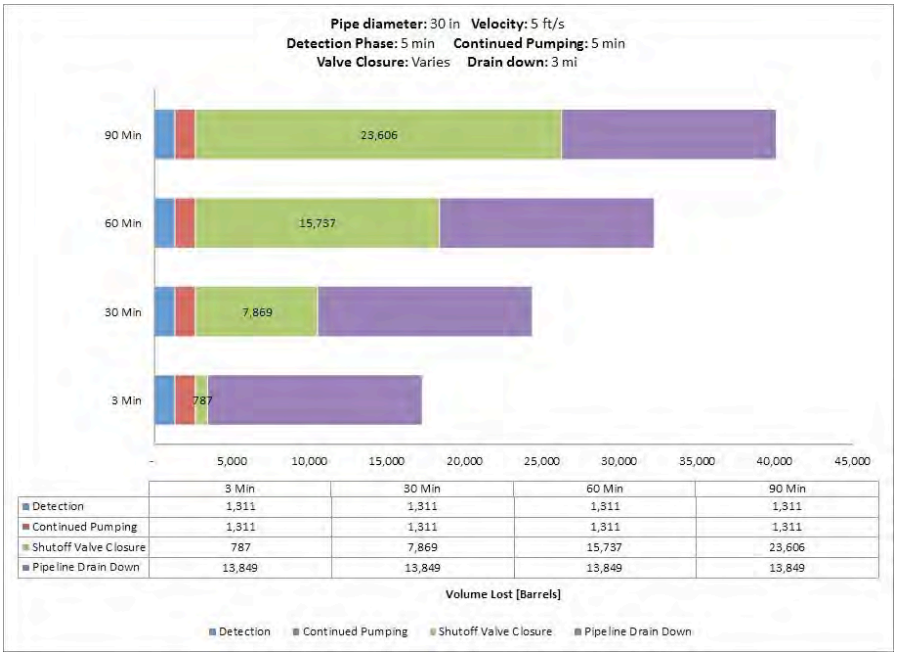

	3 Min	30 Min	60 Min	90 Min
Detection	1,311	1,311	1,311	1,311
Continued Pumping	1,311	1,311	1,311	1,311
Shutoff Valve Closure	787	7,869	15,737	23,606
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-149. 30 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

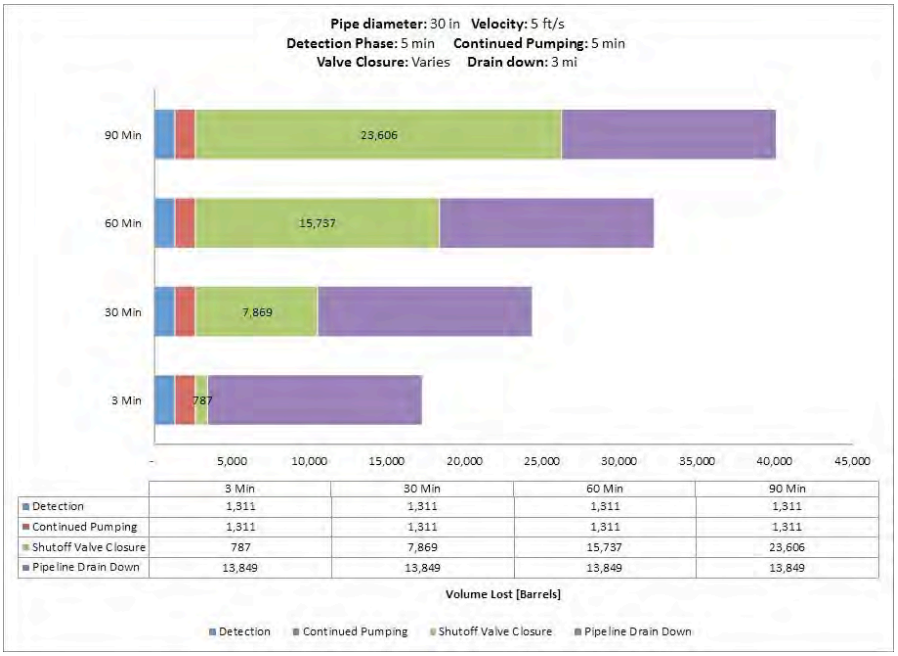

	3 Min	30 Min	60 Min	90 Min
Detection	1,311	1,311	1,311	1,311
Continued Pumping	1,311	1,311	1,311	1,311
Shutoff Valve Closure	787	7,869	15,737	23,606
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-150. 30 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

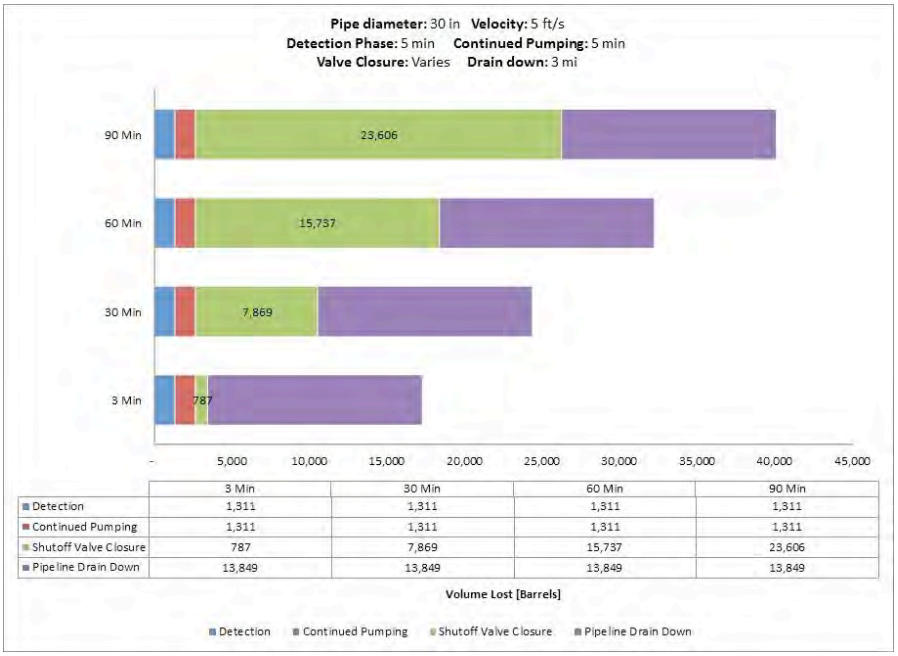

	3 Min	30 Min	60 Min	90 Min
Detection	1,311	1,311	1,311	1,311
Continued Pumping	1,311	1,311	1,311	1,311
Shutoff Valve Closure	787	7,869	15,737	23,606
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-151. 30 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

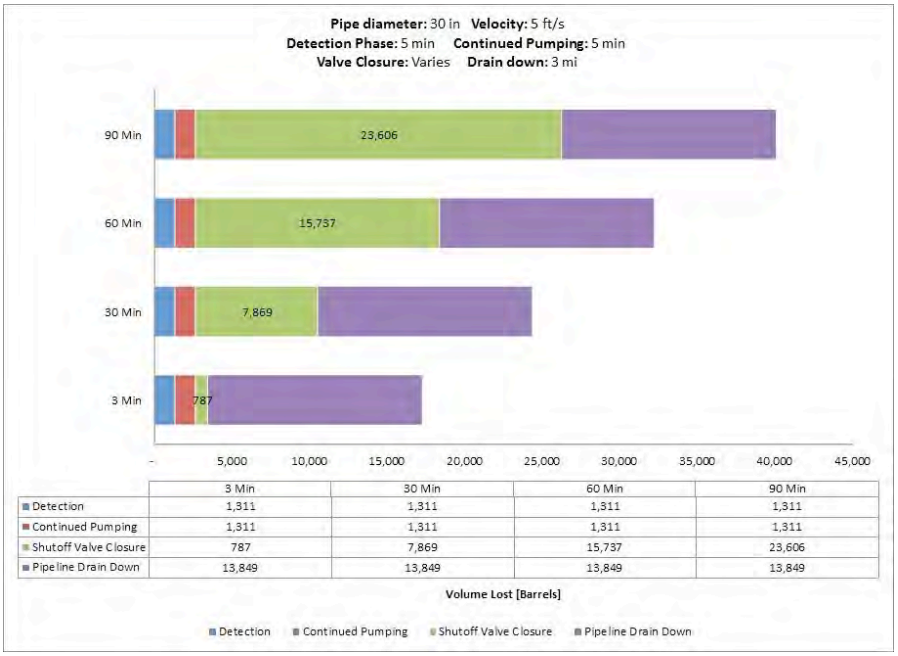

	3 Min	30 Min	60 Min	90 Min
Detection	1,311	1,311	1,311	1,311
Continued Pumping	1,311	1,311	1,311	1,311
Shutoff Valve Closure	787	7,869	15,737	23,606
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-152. 30 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

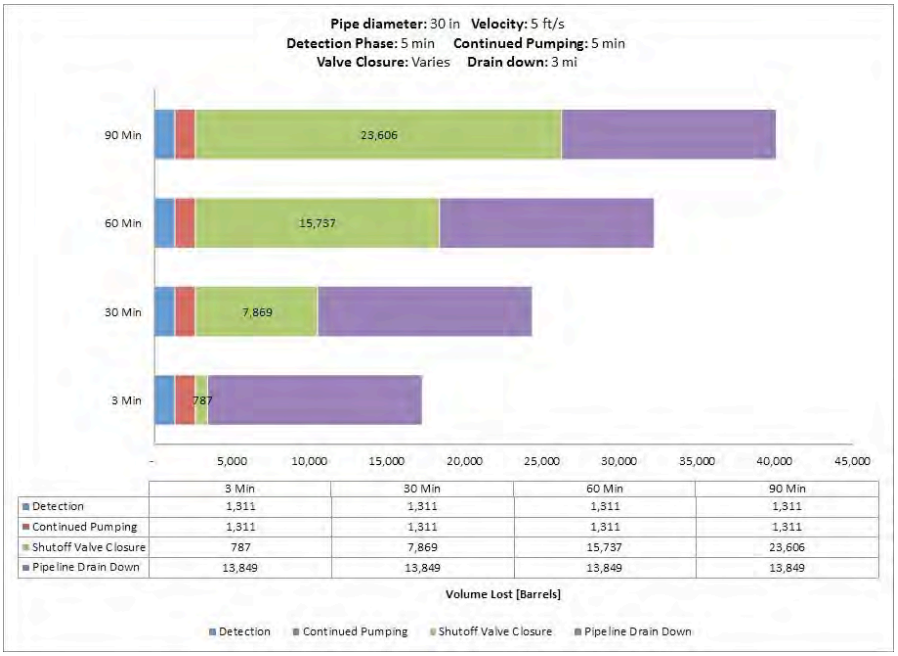

	3 Min	30 Min	60 Min	90 Min
Detection	1,311	1,311	1,311	1,311
Continued Pumping	1,311	1,311	1,311	1,311
Shutoff Valve Closure	787	7,869	15,737	23,606
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-153. 30 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

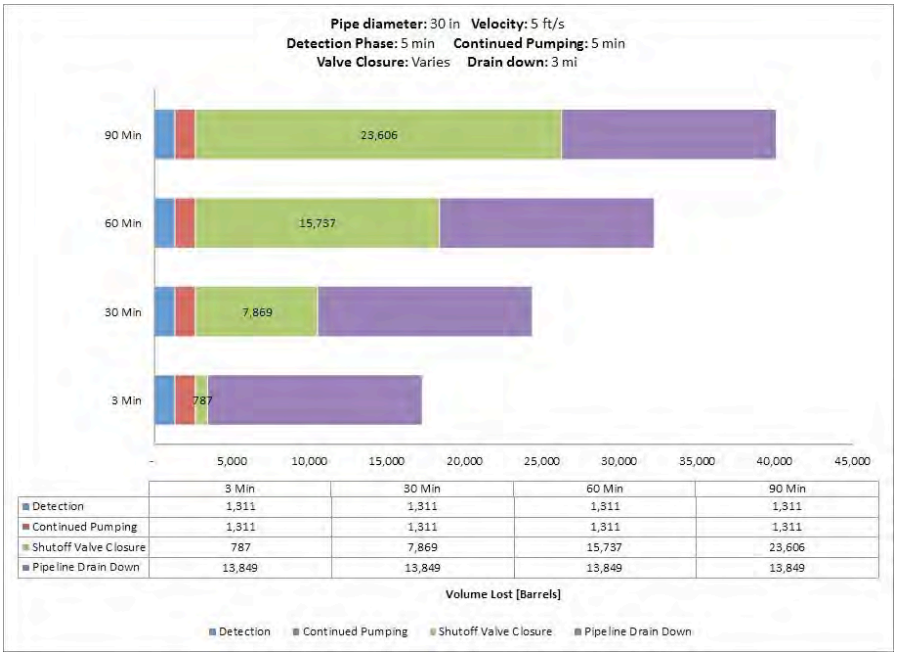

	3 Min	30 Min	60 Min	90 Min
Detection	1,311	1,311	1,311	1,311
Continued Pumping	1,311	1,311	1,311	1,311
Shutoff Valve Closure	787	7,869	15,737	23,606
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-154. 30 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

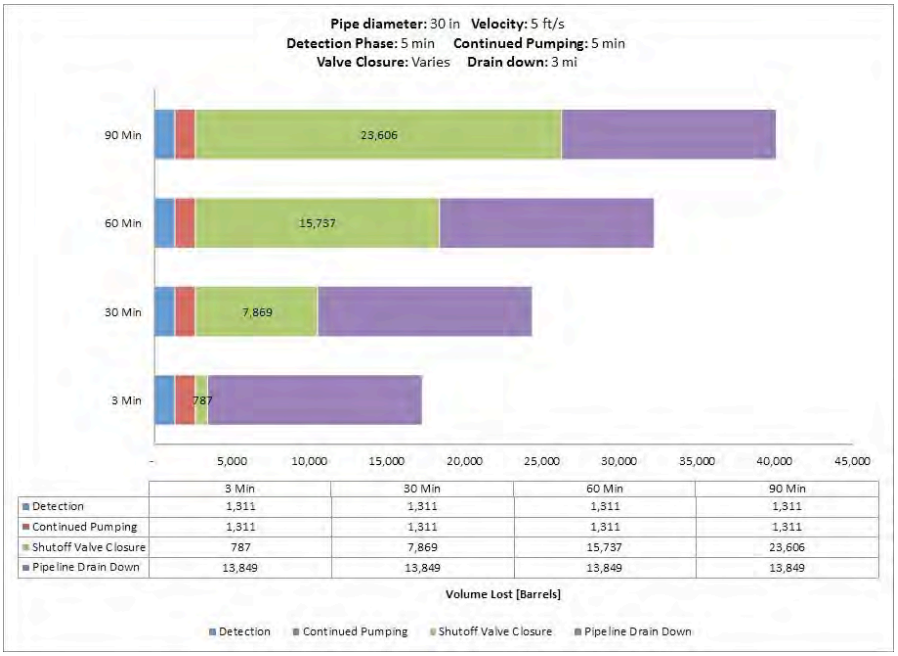

	3 Min	30 Min	60 Min	90 Min
Detection	1,311	1,311	1,311	1,311
Continued Pumping	1,311	1,311	1,311	1,311
Shutoff Valve Closure	787	7,869	15,737	23,606
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-155. 30 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

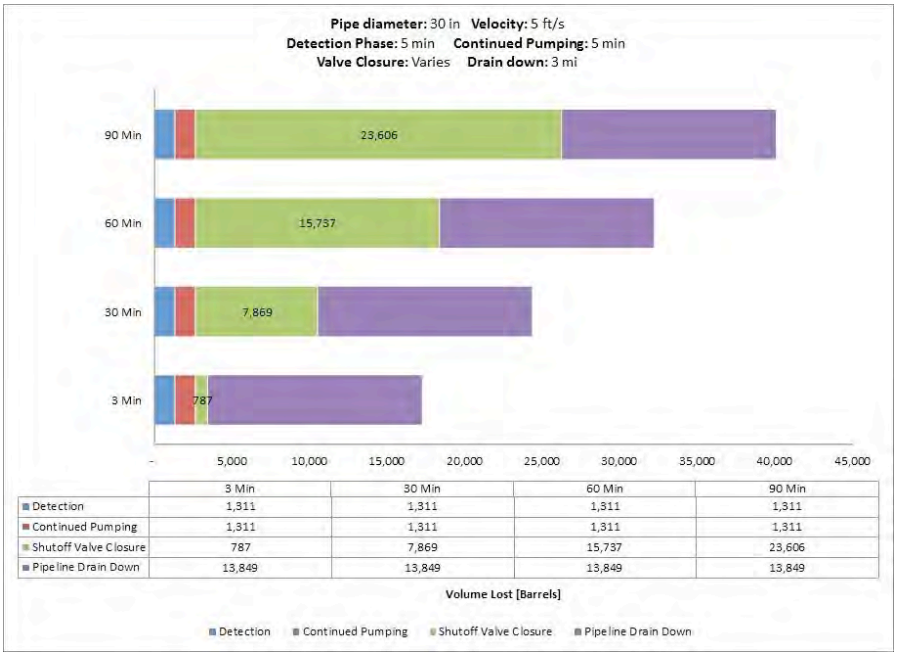

	3 Min	30 Min	60 Min	90 Min
Detection	1,311	1,311	1,311	1,311
Continued Pumping	1,311	1,311	1,311	1,311
Shutoff Valve Closure	787	7,869	15,737	23,606
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-156. 30 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

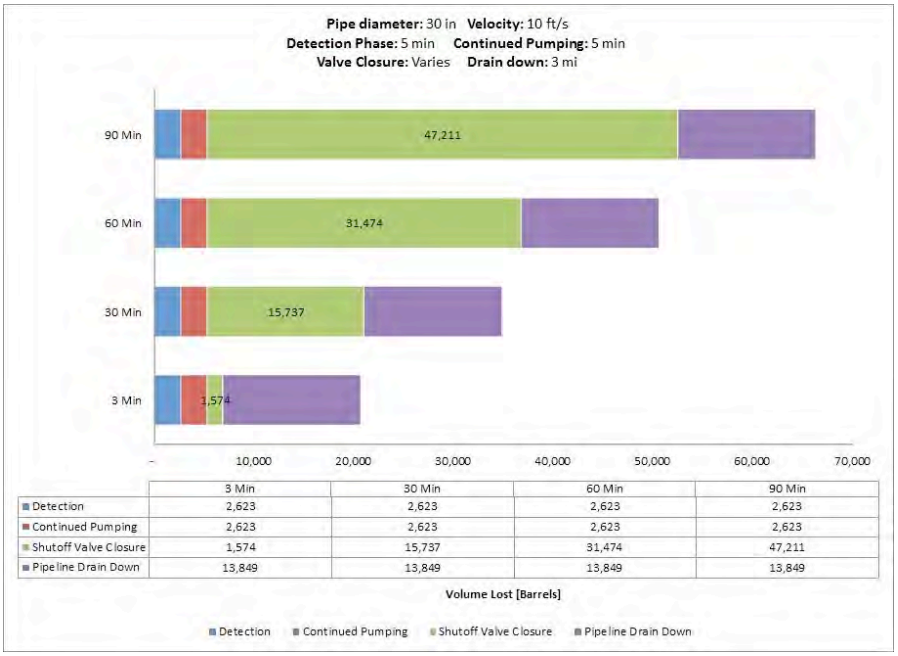

	3 Min	30 Min	60 Min	90 Min
Detection	2,623	2,623	2,623	2,623
Continued Pumping	2,623	2,623	2,623	2,623
Shutoff Valve Closure	1,574	15,737	31,474	47,211
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-157. 30 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

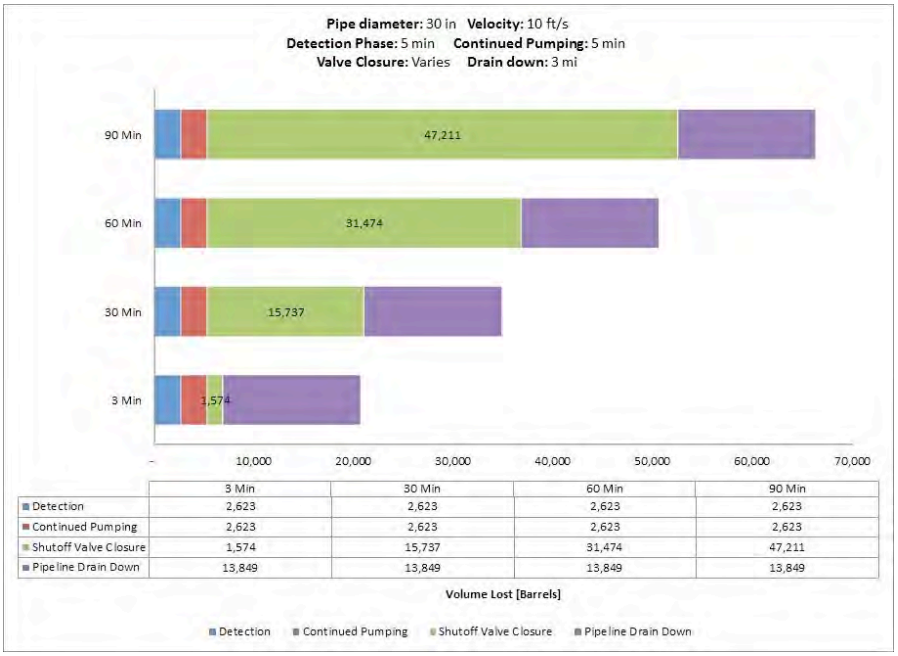

	3 Min	30 Min	60 Min	90 Min
Detection	2,623	2,623	2,623	2,623
Continued Pumping	2,623	2,623	2,623	2,623
Shutoff Valve Closure	1,574	15,737	31,474	47,211
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-158. 30 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

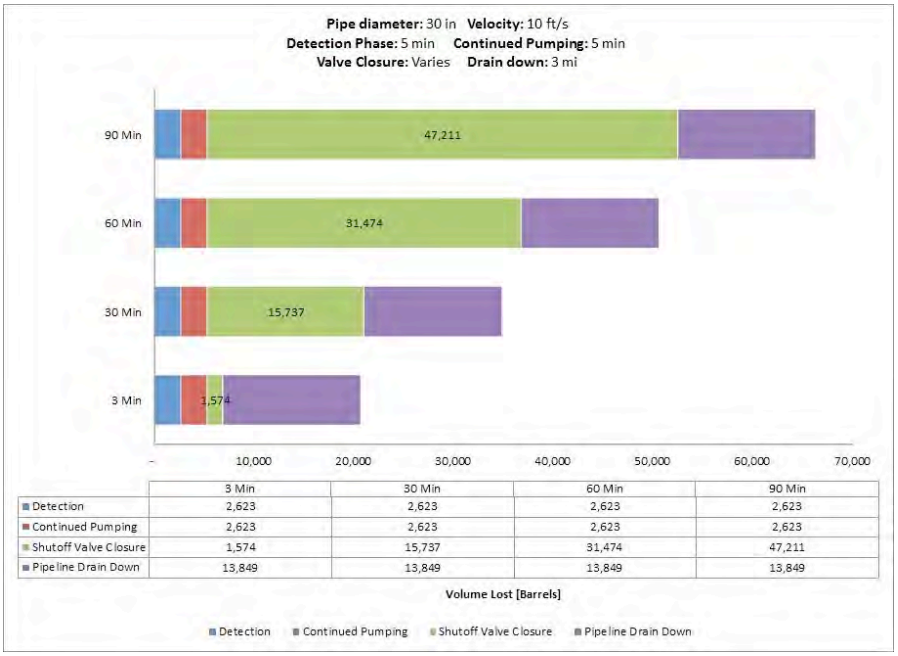

	3 Min	30 Min	60 Min	90 Min
Detection	2,623	2,623	2,623	2,623
Continued Pumping	2,623	2,623	2,623	2,623
Shutoff Valve Closure	1,574	15,737	31,474	47,211
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-159. 30 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

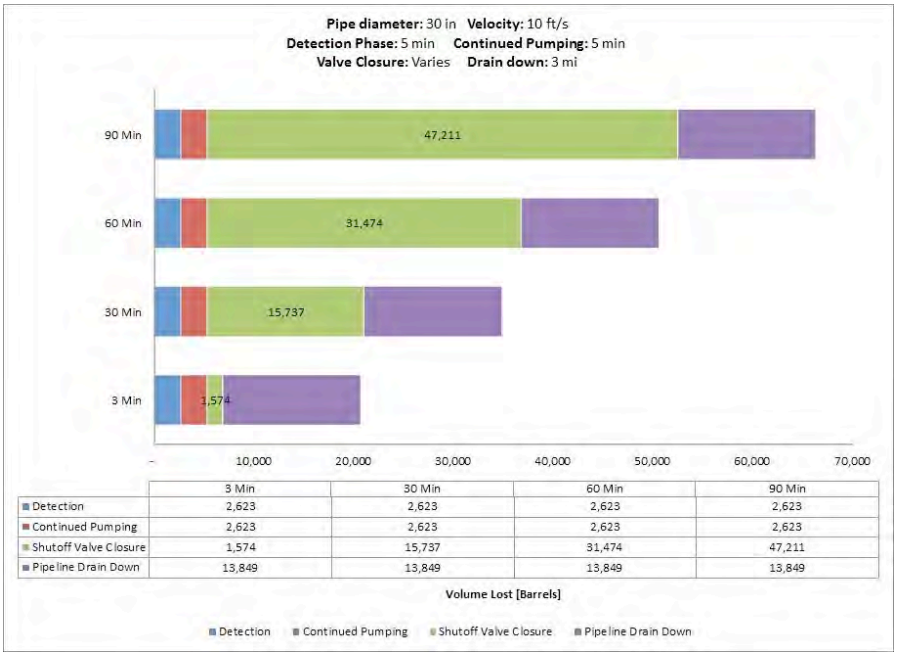

	3 Min	30 Min	60 Min	90 Min
Detection	2,623	2,623	2,623	2,623
Continued Pumping	2,623	2,623	2,623	2,623
Shutoff Valve Closure	1,574	15,737	31,474	47,211
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-160. 30 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

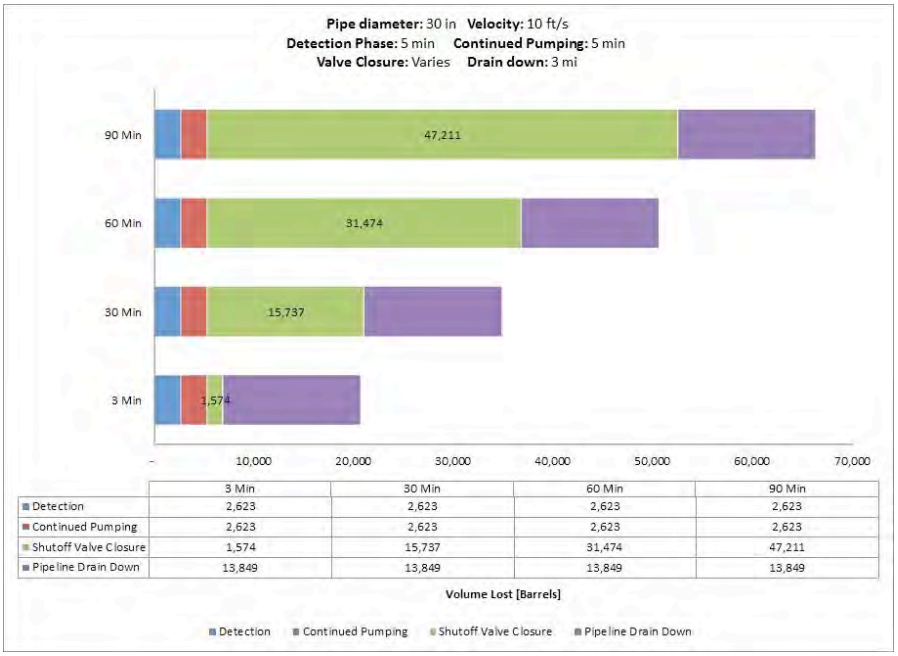

	3 Min	30 Min	60 Min	90 Min
Detection	2,623	2,623	2,623	2,623
Continued Pumping	2,623	2,623	2,623	2,623
Shutoff Valve Closure	1,574	15,737	31,474	47,211
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-161. 30 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

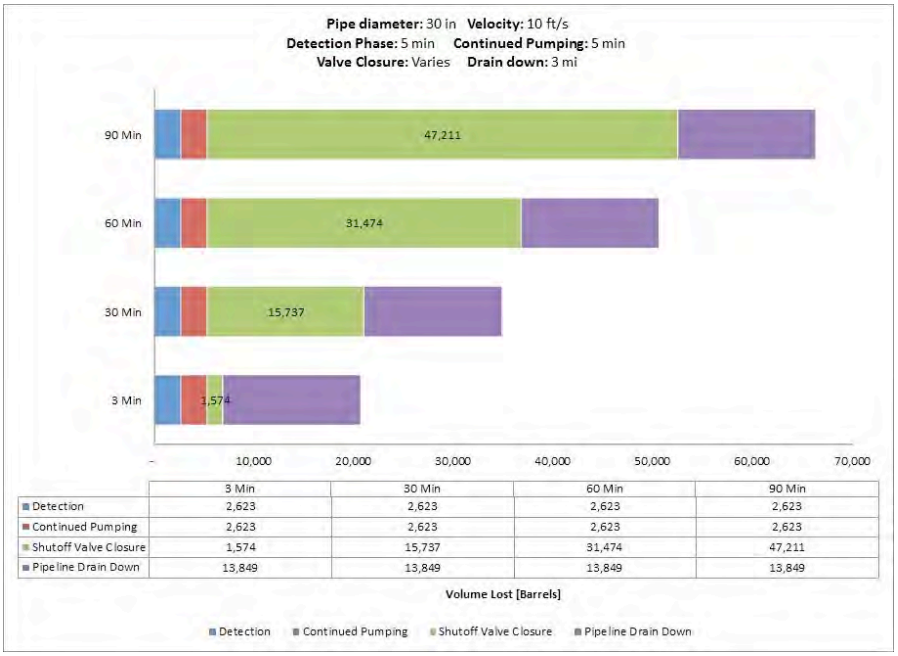

	3 Min	30 Min	60 Min	90 Min
Detection	2,623	2,623	2,623	2,623
Continued Pumping	2,623	2,623	2,623	2,623
Shutoff Valve Closure	1,574	15,737	31,474	47,211
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-162. 30 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

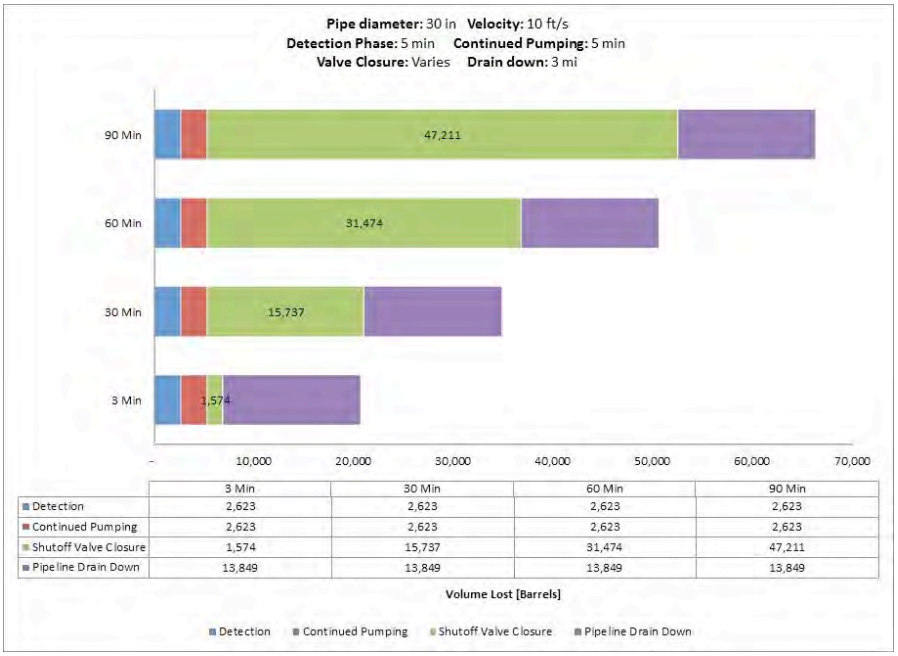

	3 Min	30 Min	60 Min	90 Min
Detection	2,623	2,623	2,623	2,623
Continued Pumping	2,623	2,623	2,623	2,623
Shutoff Valve Closure	1,574	15,737	31,474	47,211
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-163. 30 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

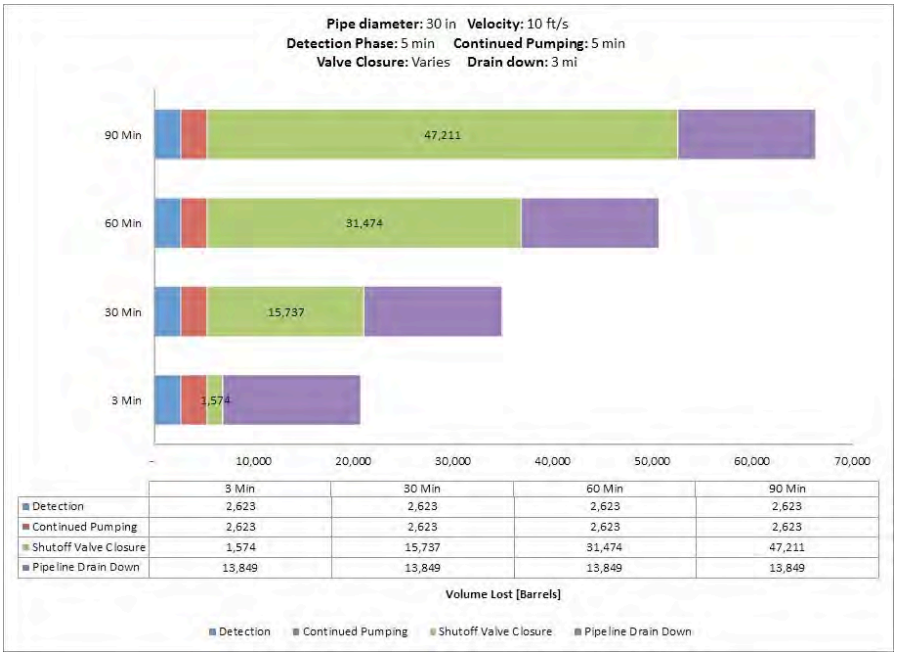

	3 Min	30 Min	60 Min	90 Min
Detection	2,623	2,623	2,623	2,623
Continued Pumping	2,623	2,623	2,623	2,623
Shutoff Valve Closure	1,574	15,737	31,474	47,211
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-164. 30 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

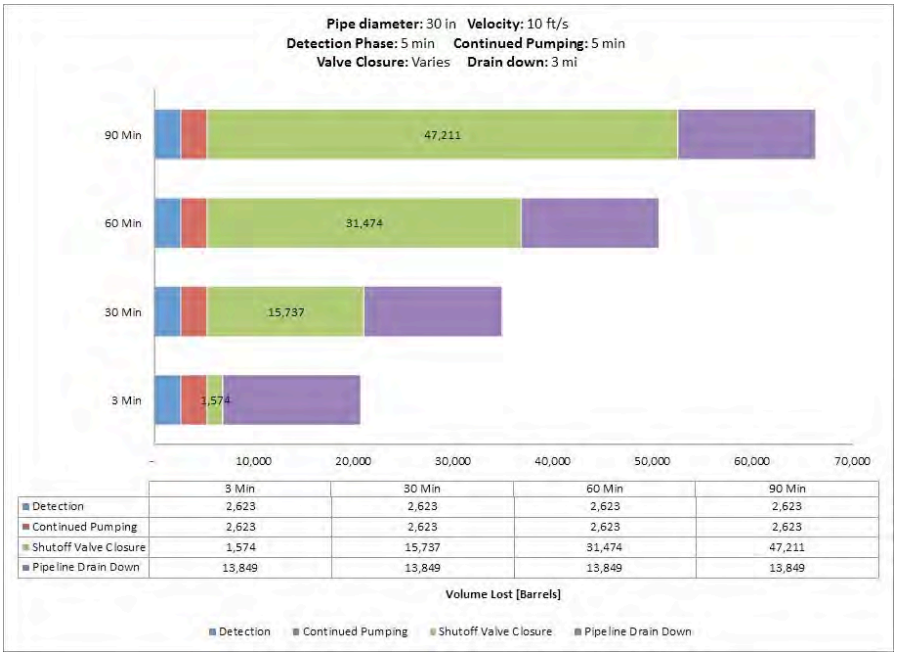

	3 Min	30 Min	60 Min	90 Min
Detection	2,623	2,623	2,623	2,623
Continued Pumping	2,623	2,623	2,623	2,623
Shutoff Valve Closure	1,574	15,737	31,474	47,211
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-165. 30 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

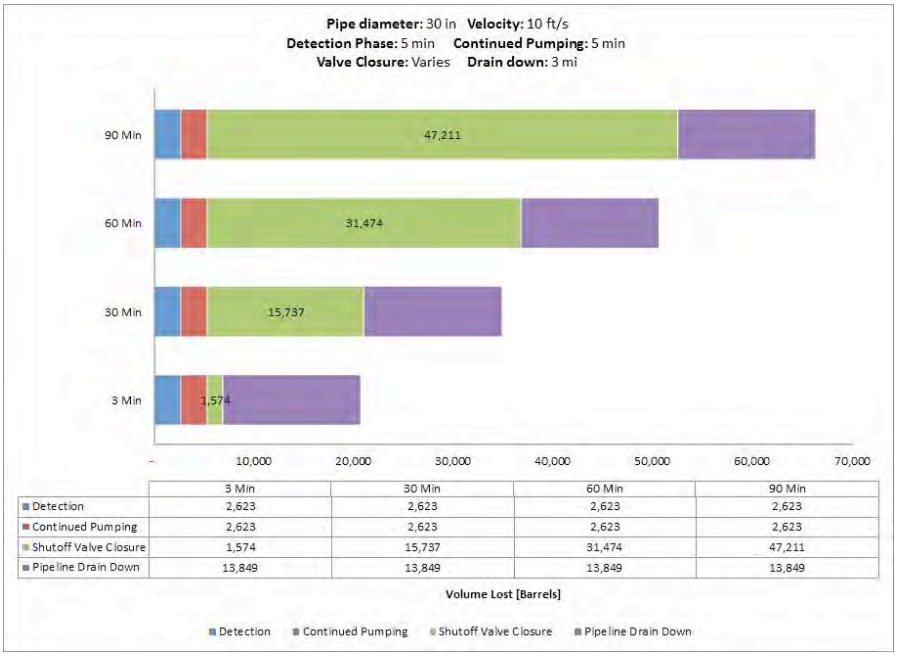

	3 Min	30 Min	60 Min	90 Min
Detection	2,623	2,623	2,623	2,623
Continued Pumping	2,623	2,623	2,623	2,623
Shutoff Valve Closure	1,574	15,737	31,474	47,211
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-166. 30 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

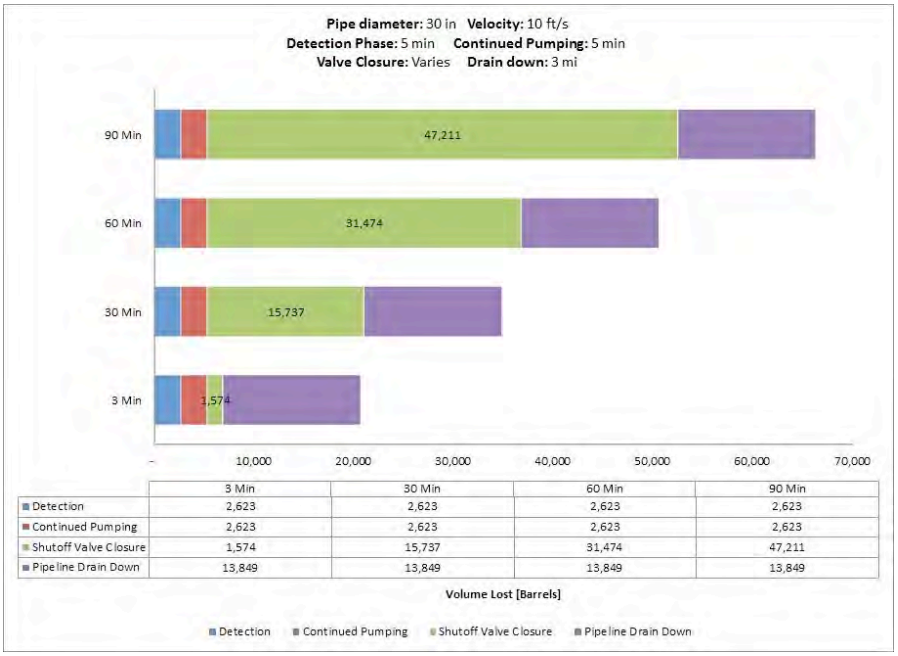

	3 Min	30 Min	60 Min	90 Min
Detection	2,623	2,623	2,623	2,623
Continued Pumping	2,623	2,623	2,623	2,623
Shutoff Valve Closure	1,574	15,737	31,474	47,211
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-167. 30 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

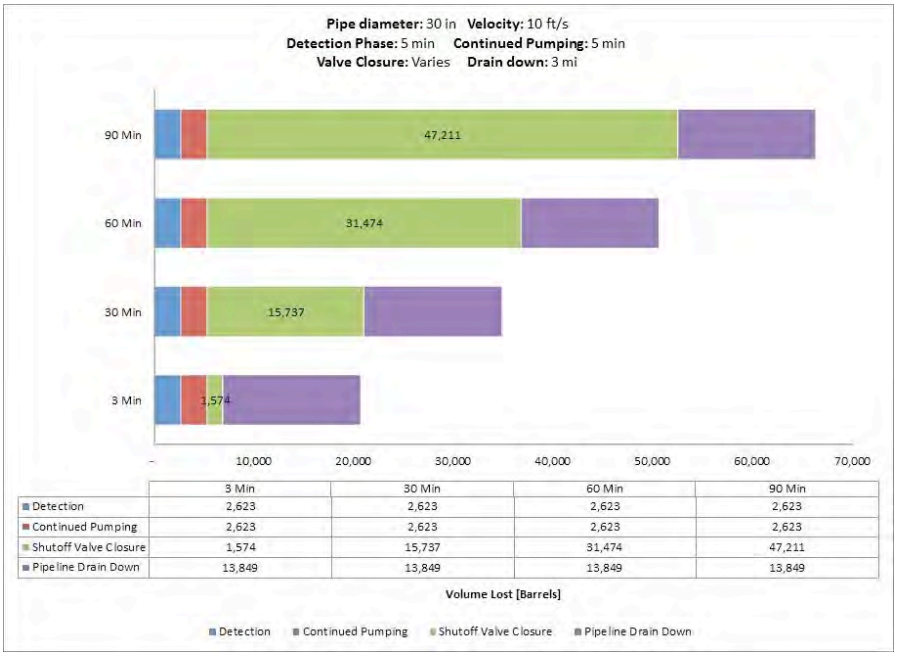

	3 Min	30 Min	60 Min	90 Min
Detection	2,623	2,623	2,623	2,623
Continued Pumping	2,623	2,623	2,623	2,623
Shutoff Valve Closure	1,574	15,737	31,474	47,211
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-168. 30 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

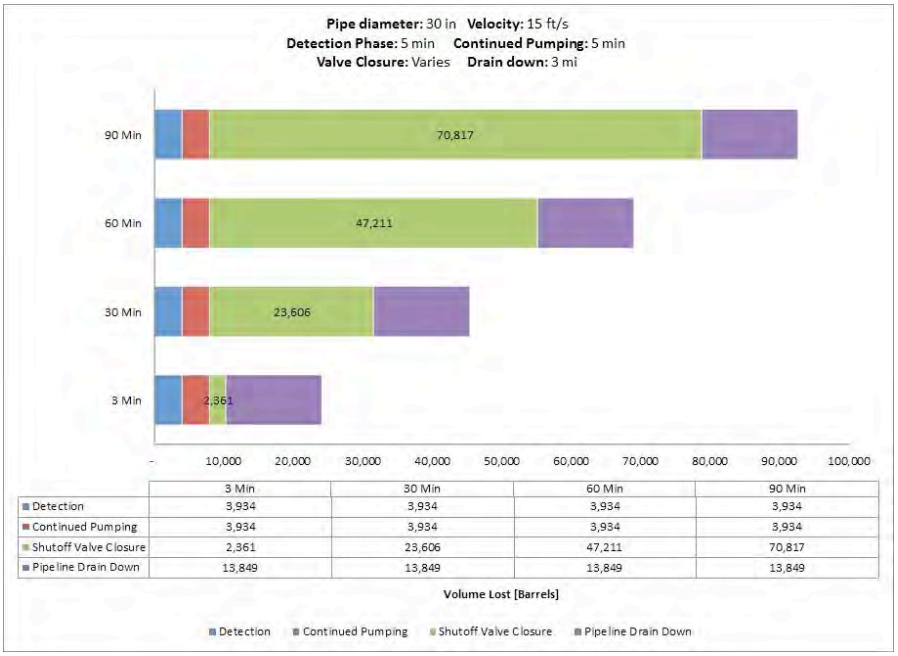

	3 Min	30 Min	60 Min	90 Min
Detection	3,934	3,934	3,934	3,934
Continued Pumping	3,934	3,934	3,934	3,934
Shutoff Valve Closure	2,361	23,606	47,211	70,817
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-169. 30 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

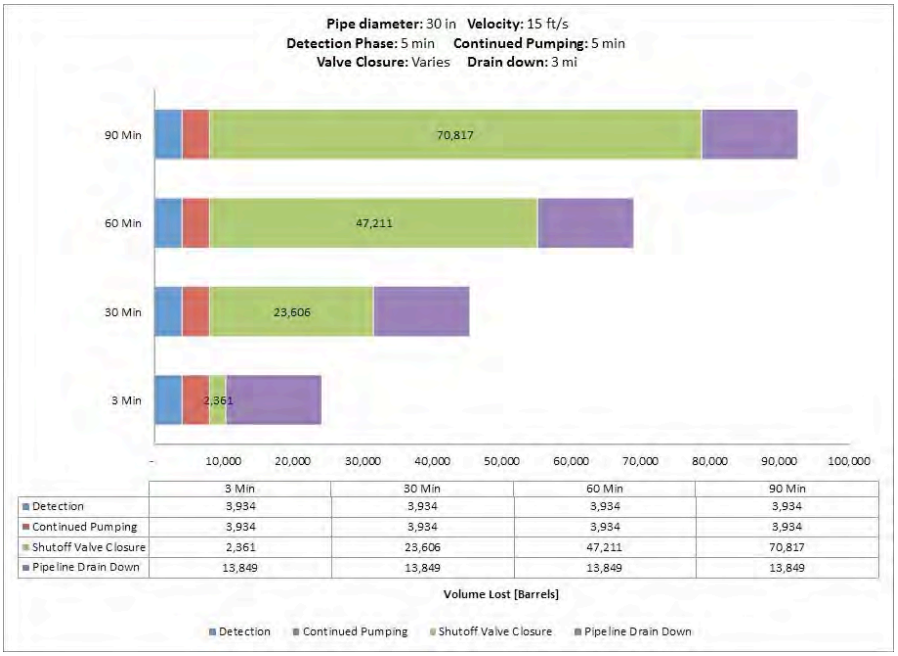

	3 Min	30 Min	60 Min	90 Min
Detection	3,934	3,934	3,934	3,934
Continued Pumping	3,934	3,934	3,934	3,934
Shutoff Valve Closure	2,361	23,606	47,211	70,817
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-170. 30 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

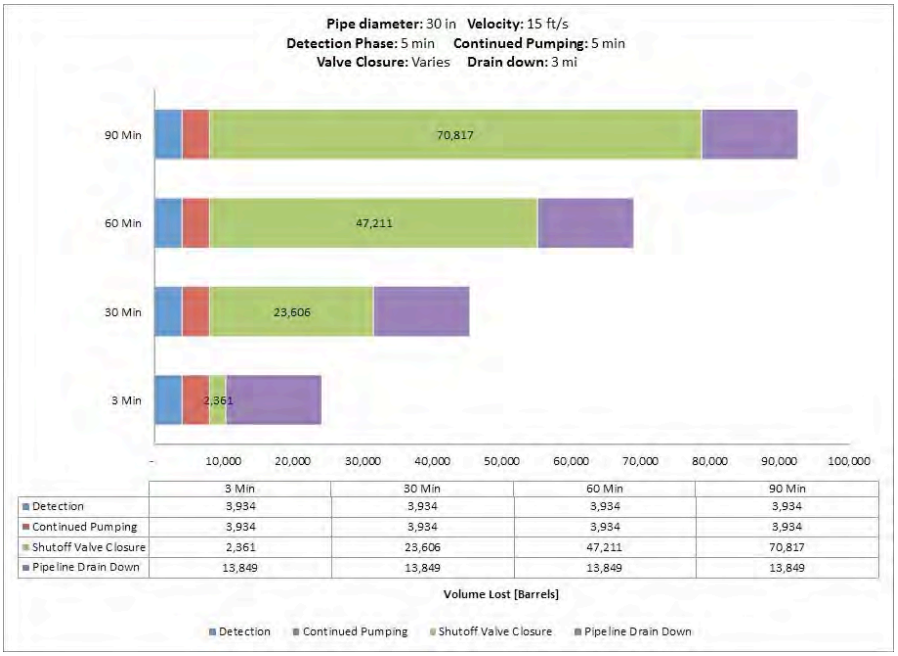

	3 Min	30 Min	60 Min	90 Min
Detection	3,934	3,934	3,934	3,934
Continued Pumping	3,934	3,934	3,934	3,934
Shutoff Valve Closure	2,361	23,606	47,211	70,817
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-171. 30 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

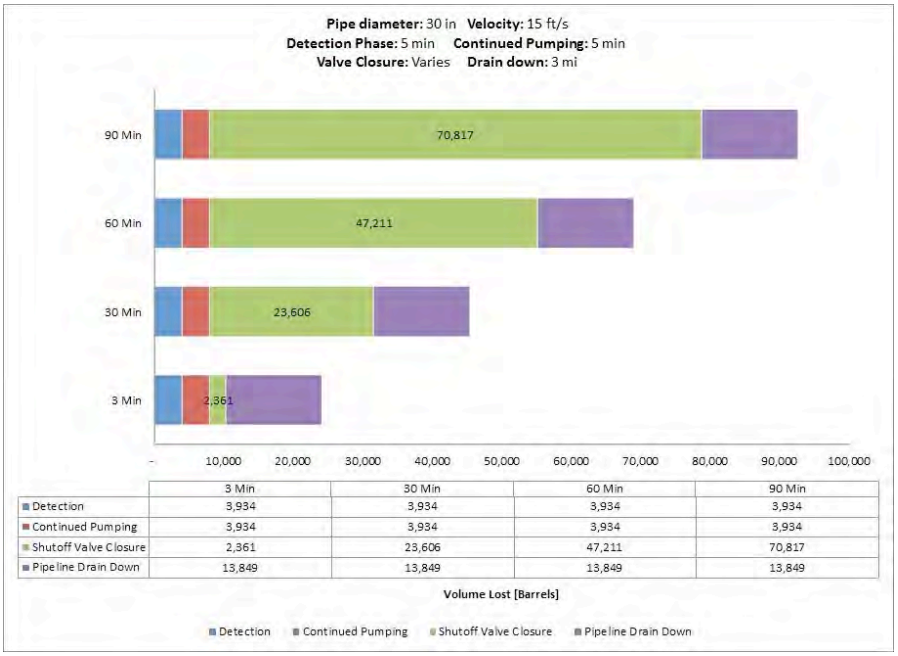

	3 Min	30 Min	60 Min	90 Min
Detection	3,934	3,934	3,934	3,934
Continued Pumping	3,934	3,934	3,934	3,934
Shutoff Valve Closure	2,361	23,606	47,211	70,817
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-172. 30 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

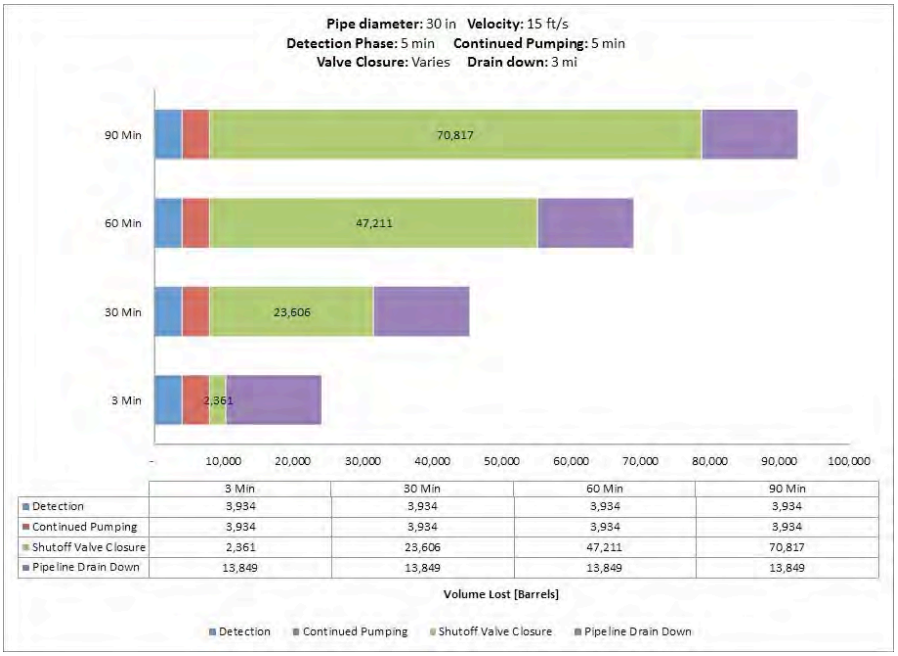

	3 Min	30 Min	60 Min	90 Min
Detection	3,934	3,934	3,934	3,934
Continued Pumping	3,934	3,934	3,934	3,934
Shutoff Valve Closure	2,361	23,606	47,211	70,817
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-173. 30 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

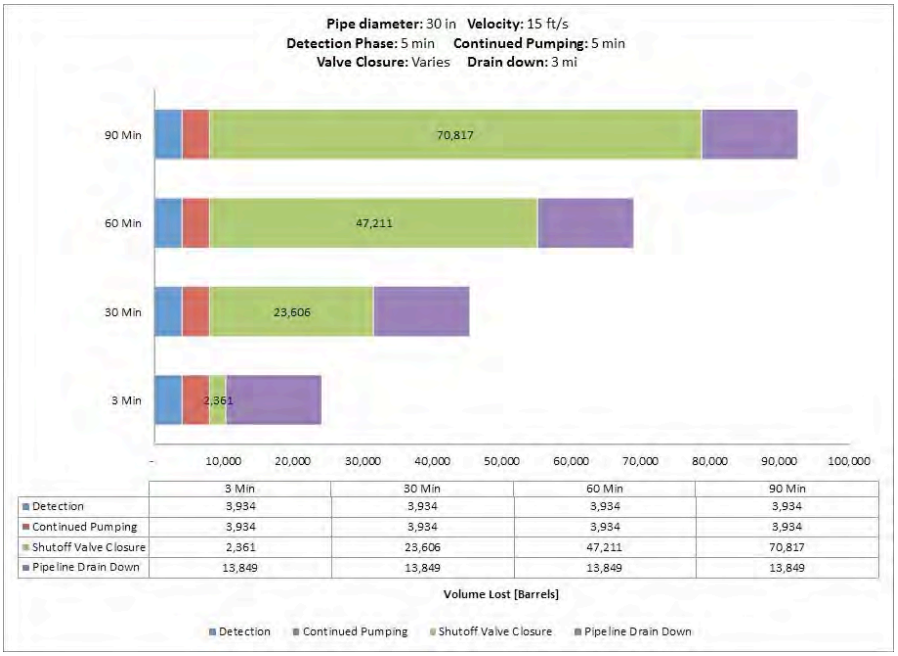

	3 Min	30 Min	60 Min	90 Min
Detection	3,934	3,934	3,934	3,934
Continued Pumping	3,934	3,934	3,934	3,934
Shutoff Valve Closure	2,361	23,606	47,211	70,817
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-174. 30 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

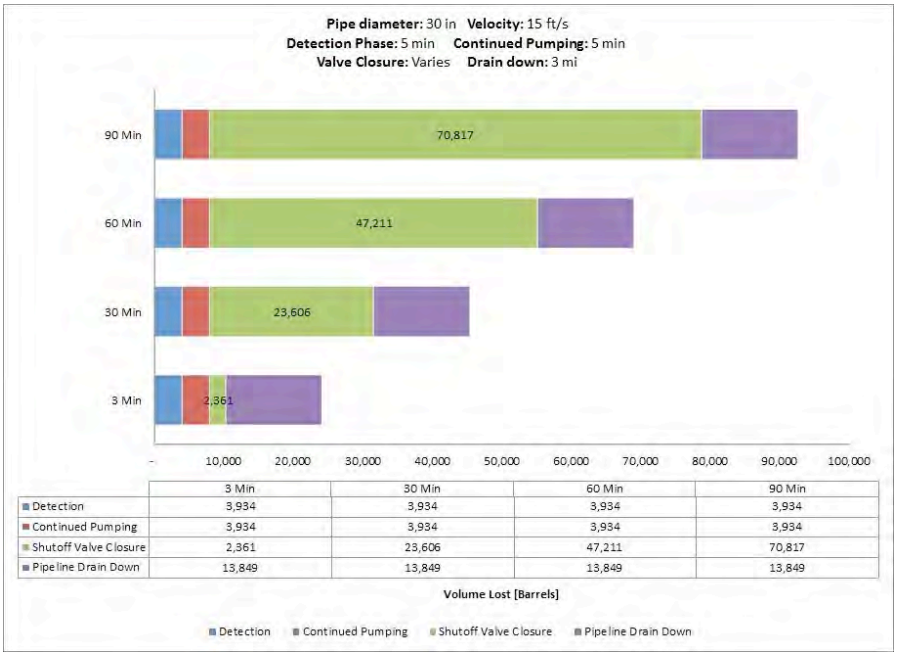

	3 Min	30 Min	60 Min	90 Min
Detection	3,934	3,934	3,934	3,934
Continued Pumping	3,934	3,934	3,934	3,934
Shutoff Valve Closure	2,361	23,606	47,211	70,817
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-175. 30 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

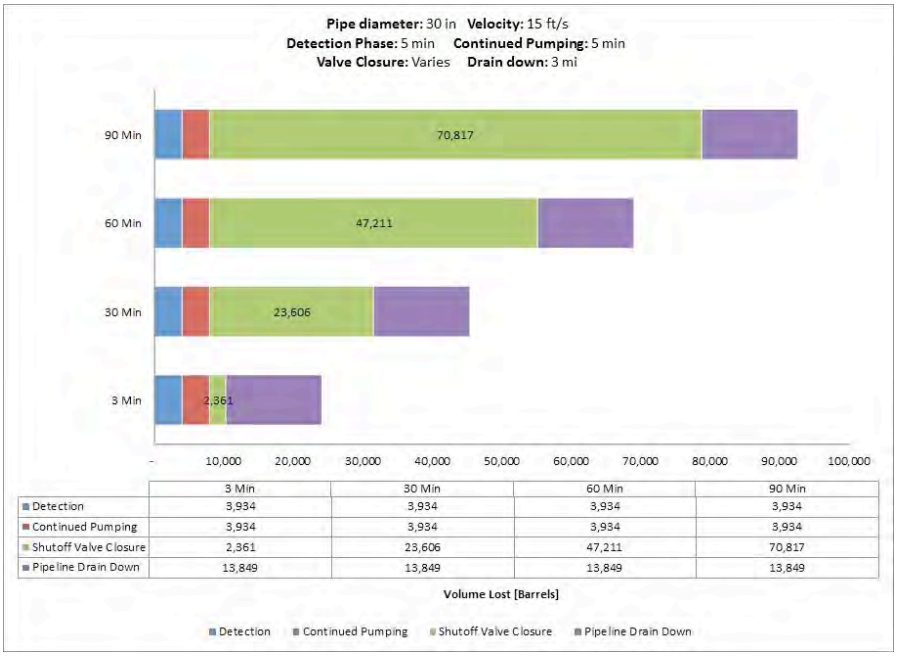

	3 Min	30 Min	60 Min	90 Min
Detection	3,934	3,934	3,934	3,934
Continued Pumping	3,934	3,934	3,934	3,934
Shutoff Valve Closure	2,361	23,606	47,211	70,817
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-176. 30 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

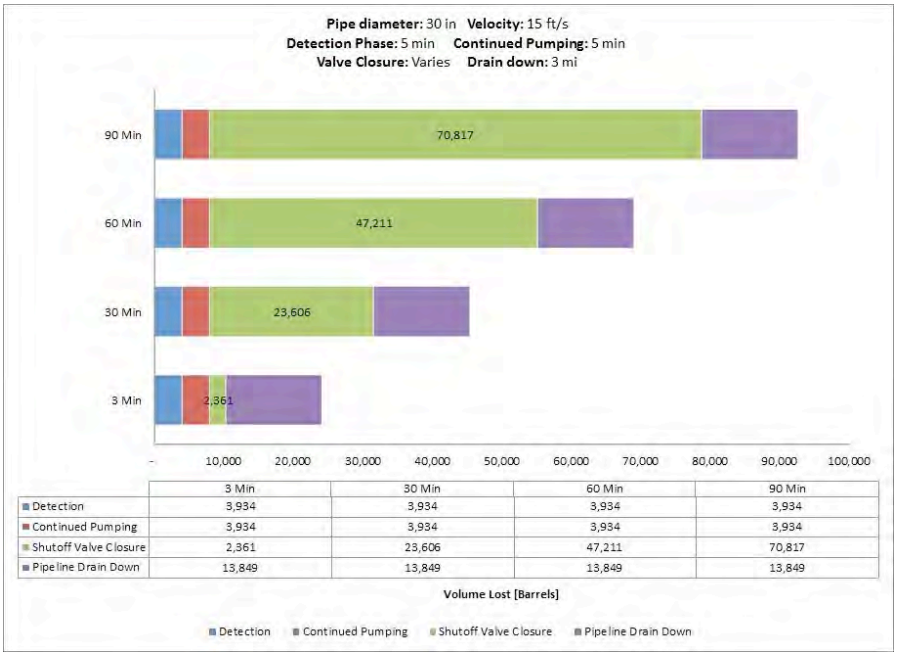

	3 Min	30 Min	60 Min	90 Min
Detection	3,934	3,934	3,934	3,934
Continued Pumping	3,934	3,934	3,934	3,934
Shutoff Valve Closure	2,361	23,606	47,211	70,817
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-177. 30 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

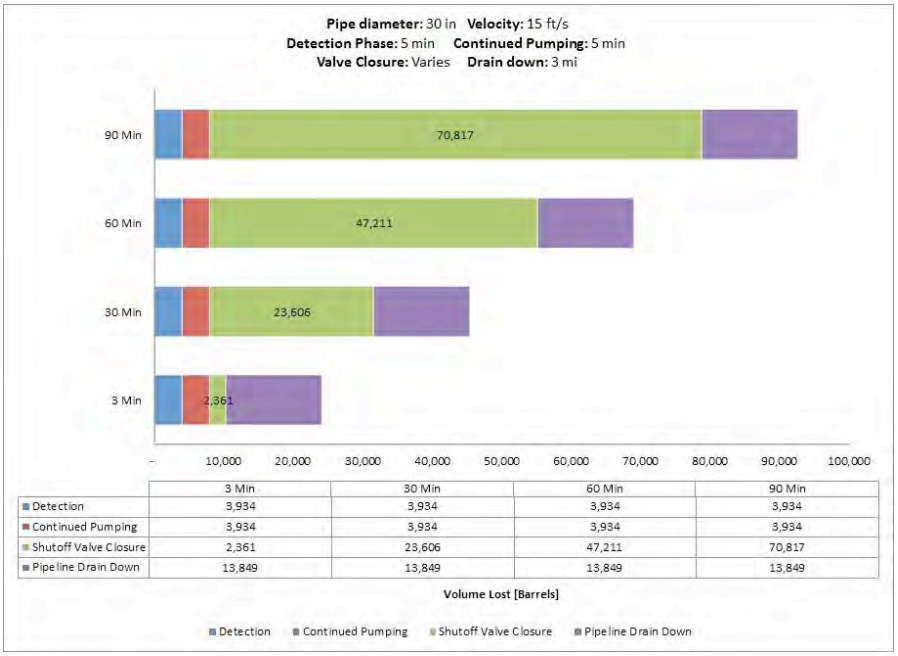

	3 Min	30 Min	60 Min	90 Min
Detection	3,934	3,934	3,934	3,934
Continued Pumping	3,934	3,934	3,934	3,934
Shutoff Valve Closure	2,361	23,606	47,211	70,817
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-178. 30 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

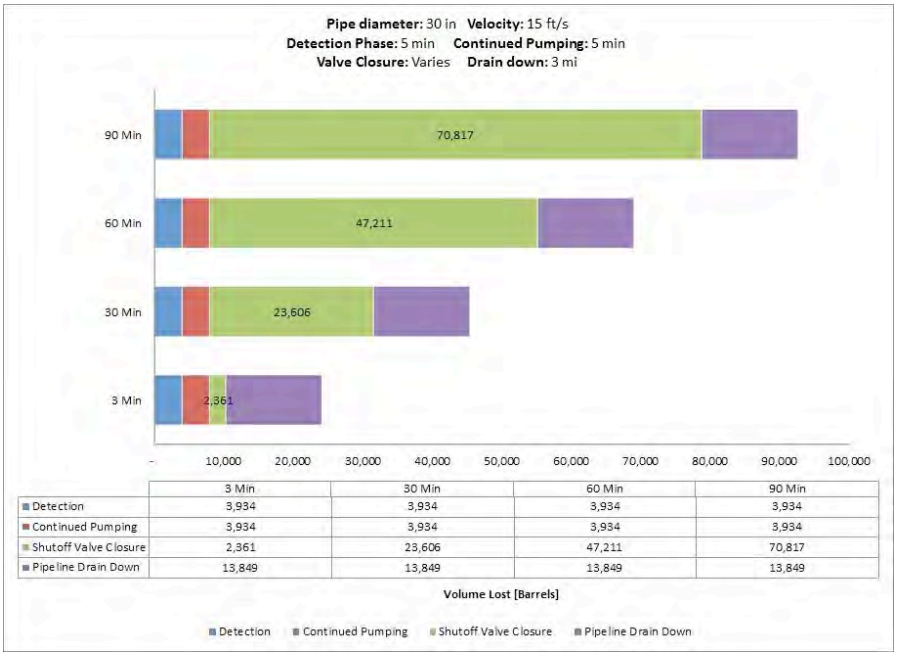

	3 Min	30 Min	60 Min	90 Min
Detection	3,934	3,934	3,934	3,934
Continued Pumping	3,934	3,934	3,934	3,934
Shutoff Valve Closure	2,361	23,606	47,211	70,817
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-179. 30 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

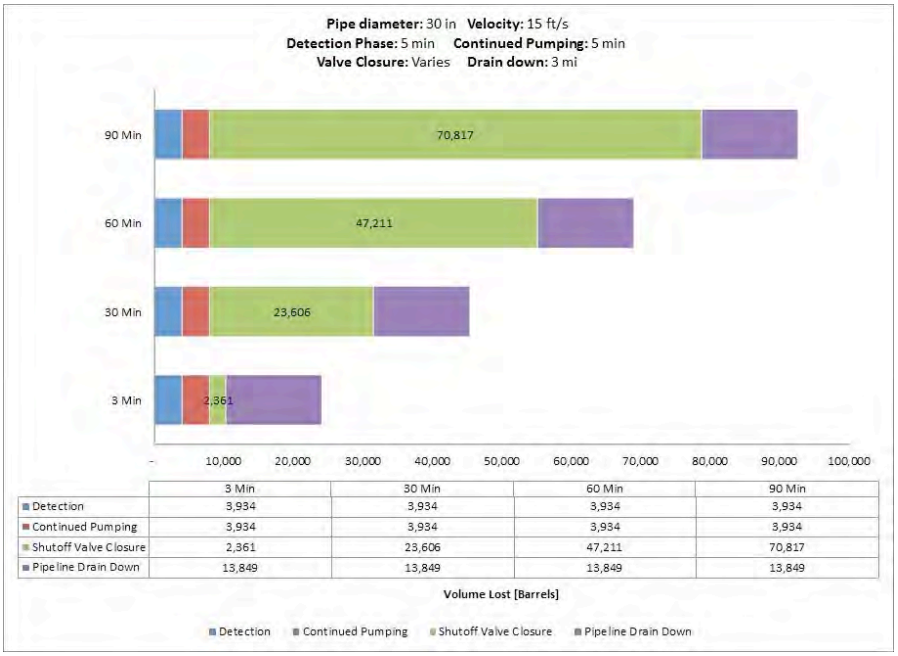

	3 Min	30 Min	60 Min	90 Min
Detection	3,934	3,934	3,934	3,934
Continued Pumping	3,934	3,934	3,934	3,934
Shutoff Valve Closure	2,361	23,606	47,211	70,817
Pipeline Drain Down	13,849	13,849	13,849	13,849

Fig. A-180. 30 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

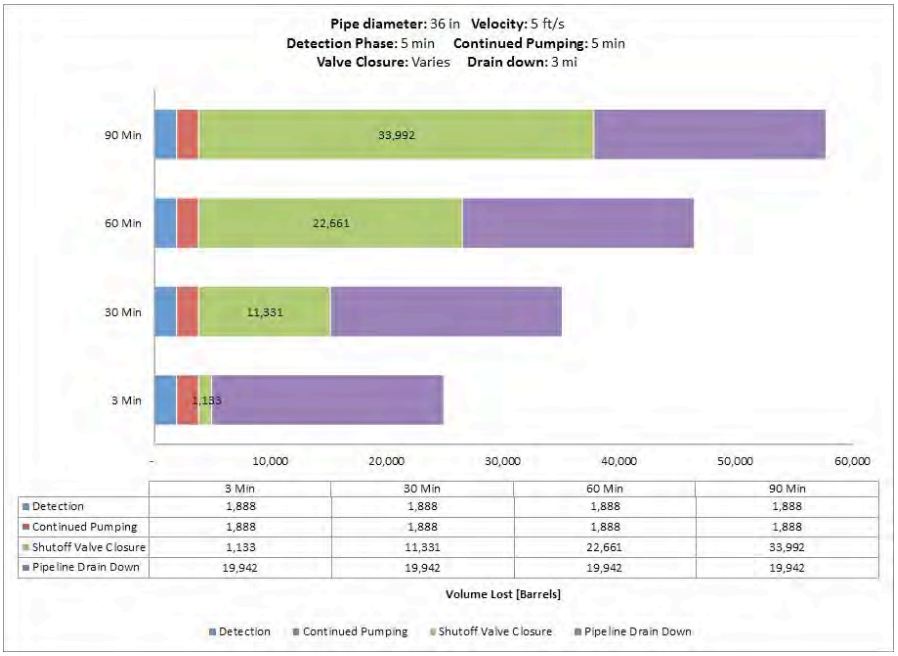

	3 Min	30 Min	60 Min	90 Min
Detection	1,888	1,888	1,888	1,888
Continued Pumping	1,888	1,888	1,888	1,888
Shutoff Valve Closure	1,133	11,331	22,661	33,992
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-181. 36 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

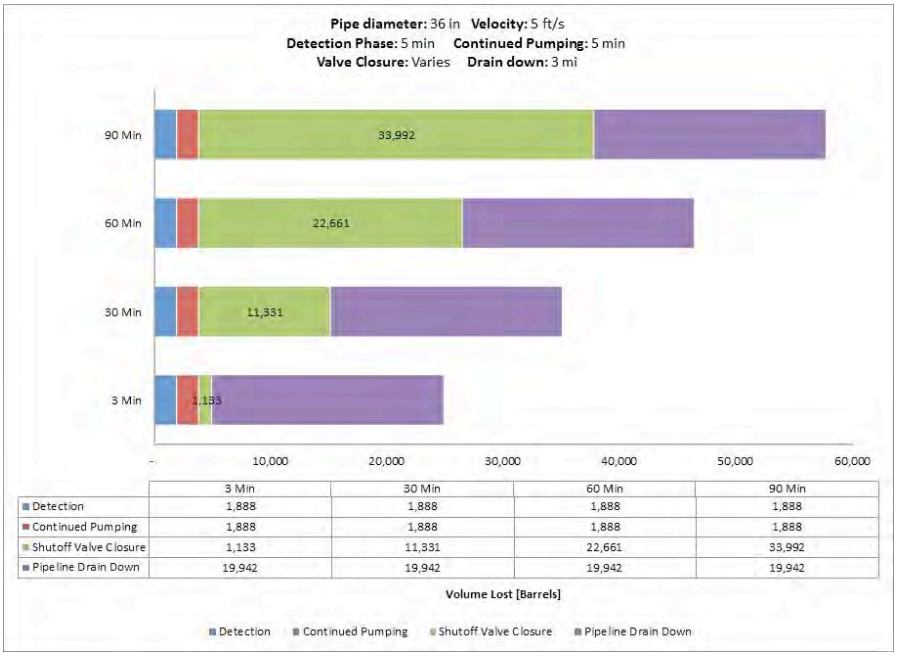

	3 Min	30 Min	60 Min	90 Min
Detection	1,888	1,888	1,888	1,888
Continued Pumping	1,888	1,888	1,888	1,888
Shutoff Valve Closure	1,133	11,331	22,661	33,992
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-182. 36 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

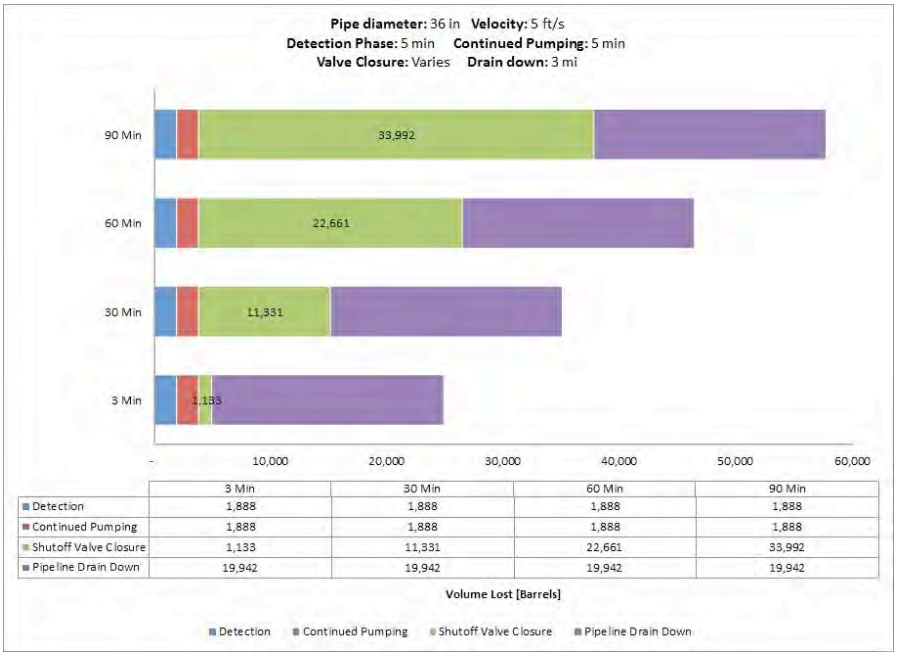

	3 Min	30 Min	60 Min	90 Min
Detection	1,888	1,888	1,888	1,888
Continued Pumping	1,888	1,888	1,888	1,888
Shutoff Valve Closure	1,133	11,331	22,661	33,992
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-183. 36 Inch Pipe Diameter, 5 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

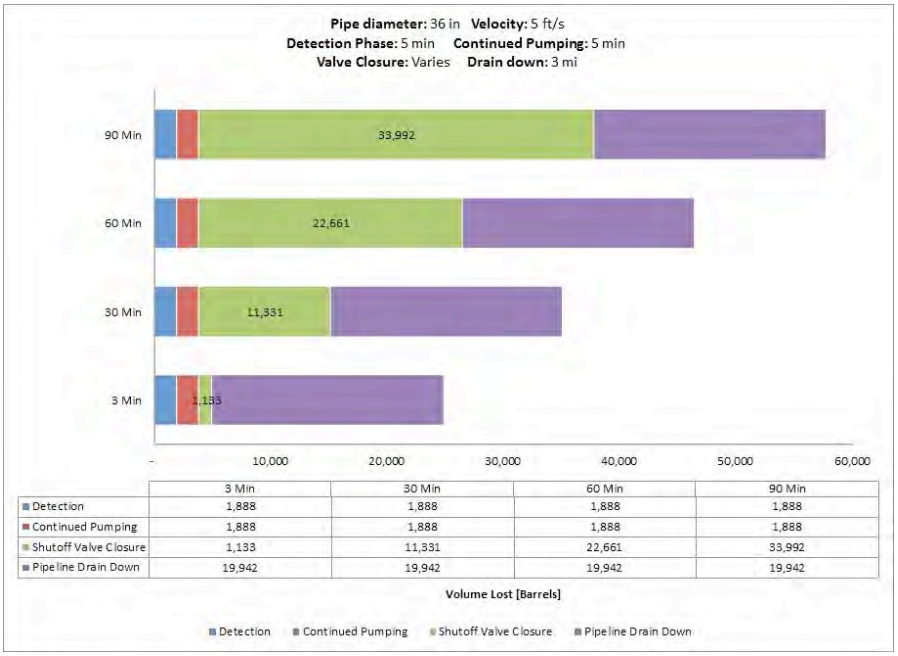

	3 Min	30 Min	60 Min	90 Min
Detection	1,888	1,888	1,888	1,888
Continued Pumping	1,888	1,888	1,888	1,888
Shutoff Valve Closure	1,133	11,331	22,661	33,992
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-184. 36 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

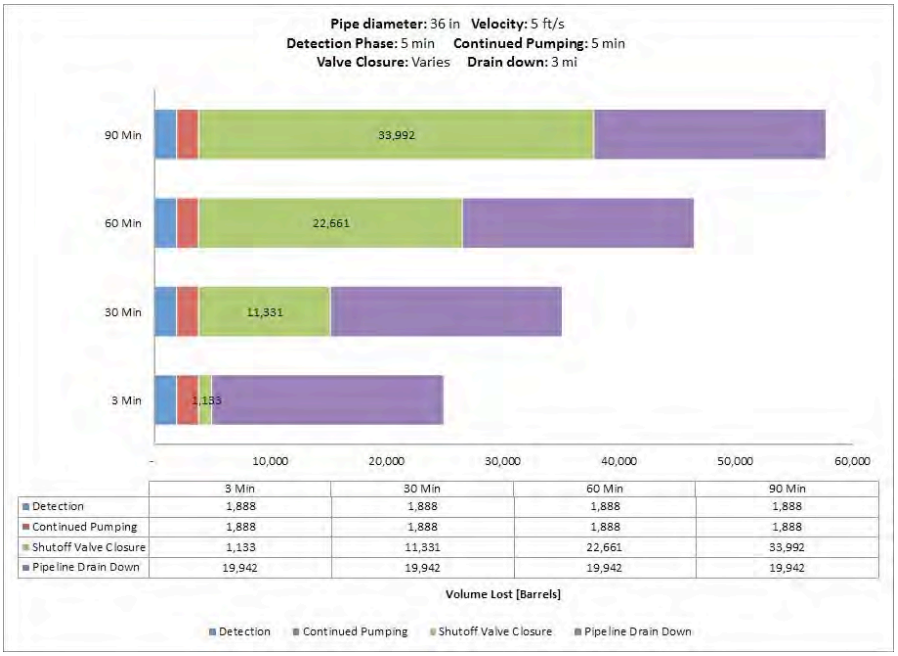

	3 Min	30 Min	60 Min	90 Min
Detection	1,888	1,888	1,888	1,888
Continued Pumping	1,888	1,888	1,888	1,888
Shutoff Valve Closure	1,133	11,331	22,661	33,992
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-185. 36 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

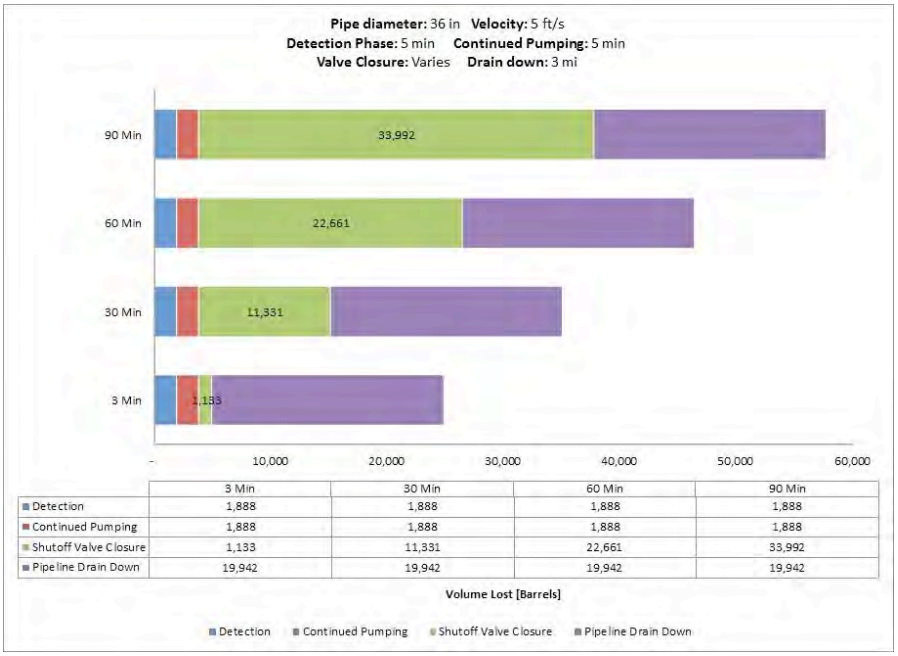

	3 Min	30 Min	60 Min	90 Min
Detection	1,888	1,888	1,888	1,888
Continued Pumping	1,888	1,888	1,888	1,888
Shutoff Valve Closure	1,133	11,331	22,661	33,992
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-186. 36 Inch Pipe Diameter, 5 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

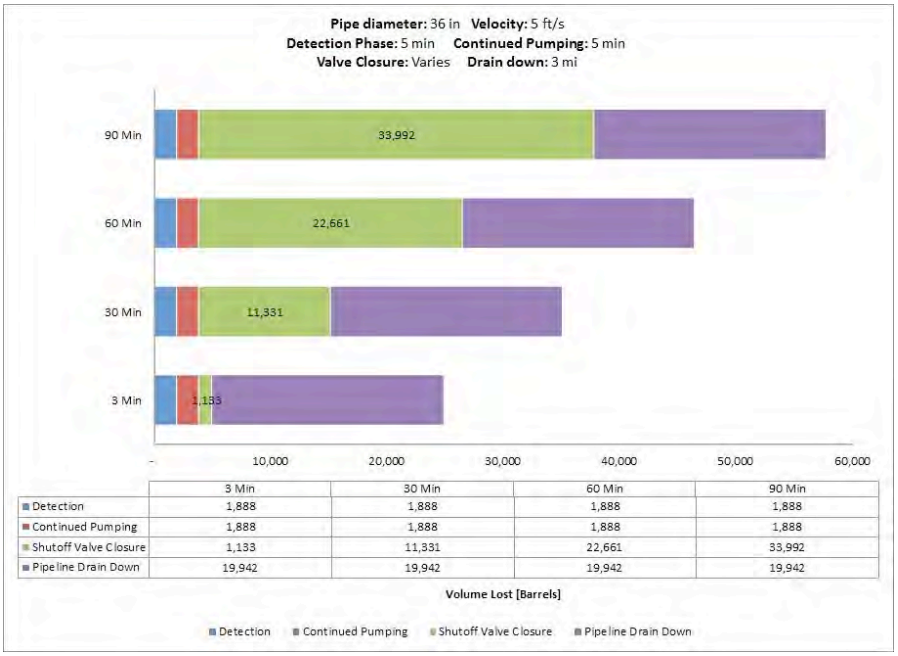

	3 Min	30 Min	60 Min	90 Min
Detection	1,888	1,888	1,888	1,888
Continued Pumping	1,888	1,888	1,888	1,888
Shutoff Valve Closure	1,133	11,331	22,661	33,992
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-187. 36 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

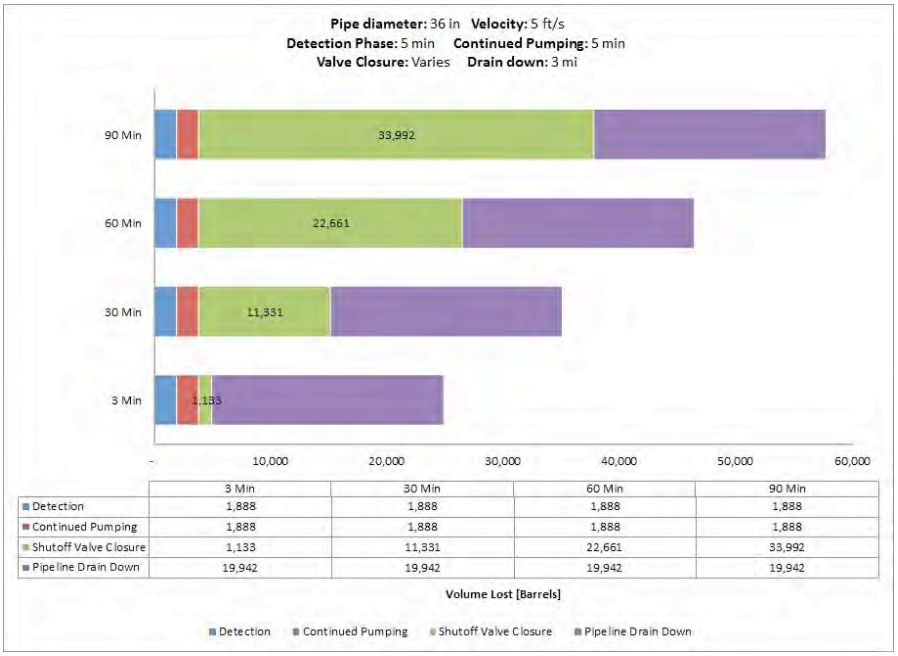

	3 Min	30 Min	60 Min	90 Min
Detection	1,888	1,888	1,888	1,888
Continued Pumping	1,888	1,888	1,888	1,888
Shutoff Valve Closure	1,133	11,331	22,661	33,992
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-188. 36 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

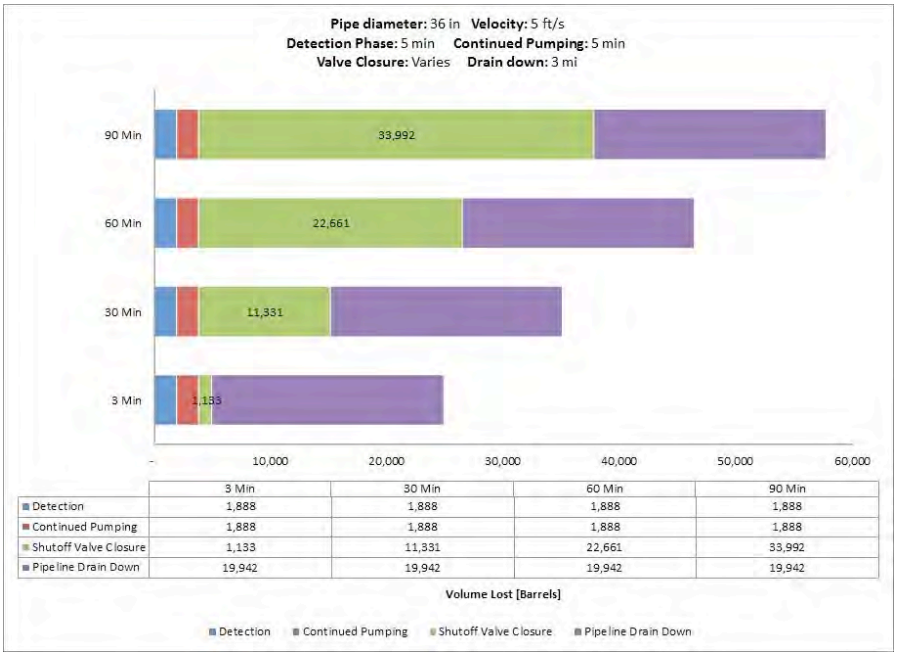

	3 Min	30 Min	60 Min	90 Min
Detection	1,888	1,888	1,888	1,888
Continued Pumping	1,888	1,888	1,888	1,888
Shutoff Valve Closure	1,133	11,331	22,661	33,992
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-189. 36 Inch Pipe Diameter, 5 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

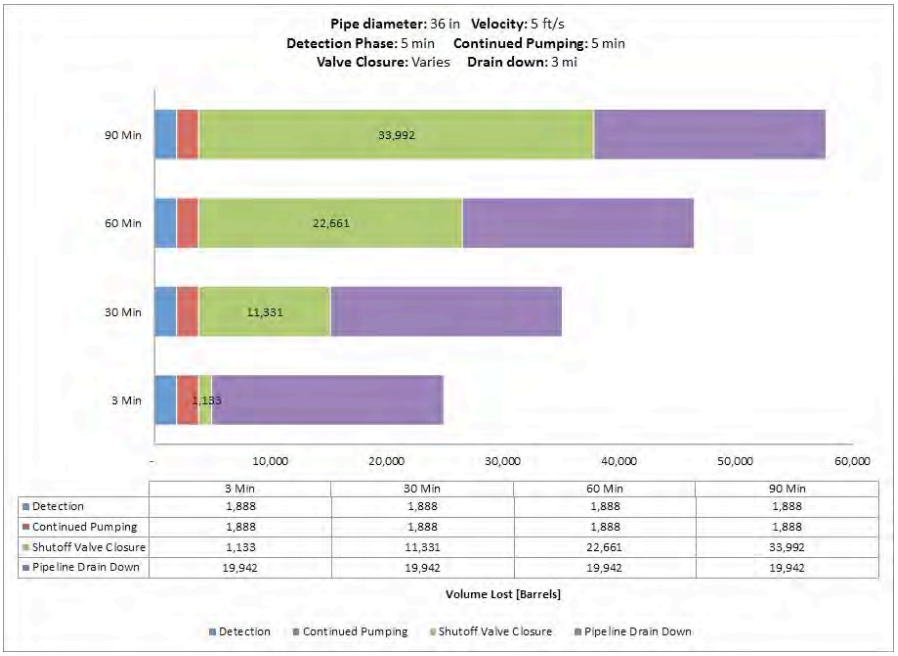

	3 Min	30 Min	60 Min	90 Min
Detection	1,888	1,888	1,888	1,888
Continued Pumping	1,888	1,888	1,888	1,888
Shutoff Valve Closure	1,133	11,331	22,661	33,992
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-190. 36 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

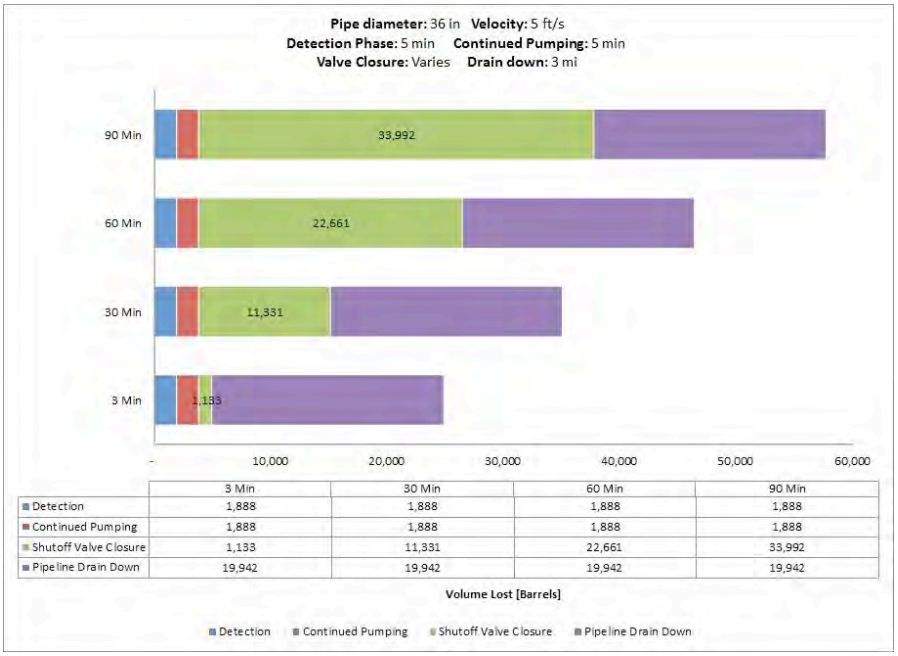

	3 Min	30 Min	60 Min	90 Min
Detection	1,888	1,888	1,888	1,888
Continued Pumping	1,888	1,888	1,888	1,888
Shutoff Valve Closure	1,133	11,331	22,661	33,992
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-191. 36 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

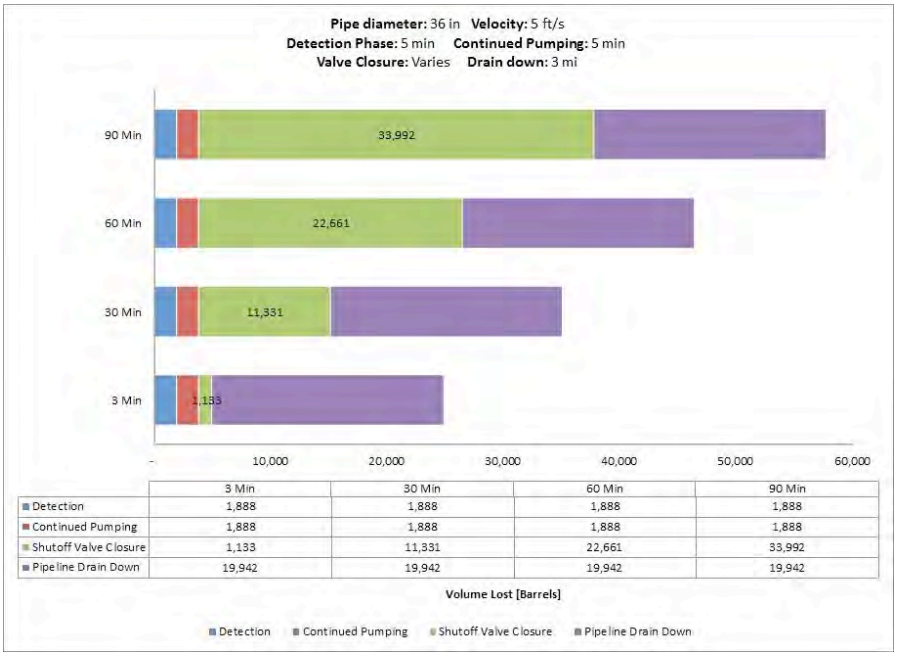

	3 Min	30 Min	60 Min	90 Min
Detection	1,888	1,888	1,888	1,888
Continued Pumping	1,888	1,888	1,888	1,888
Shutoff Valve Closure	1,133	11,331	22,661	33,992
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-192. 36 Inch Pipe Diameter, 5 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

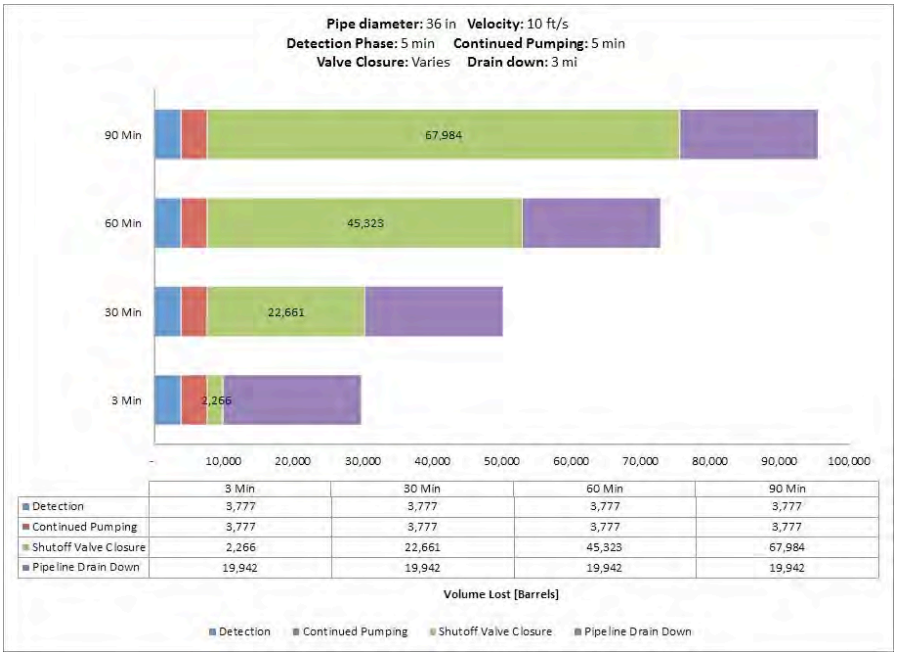

	3 Min	30 Min	60 Min	90 Min
Detection	3,777	3,777	3,777	3,777
Continued Pumping	3,777	3,777	3,777	3,777
Shutoff Valve Closure	2,266	22,661	45,323	67,984
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-193. 36 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

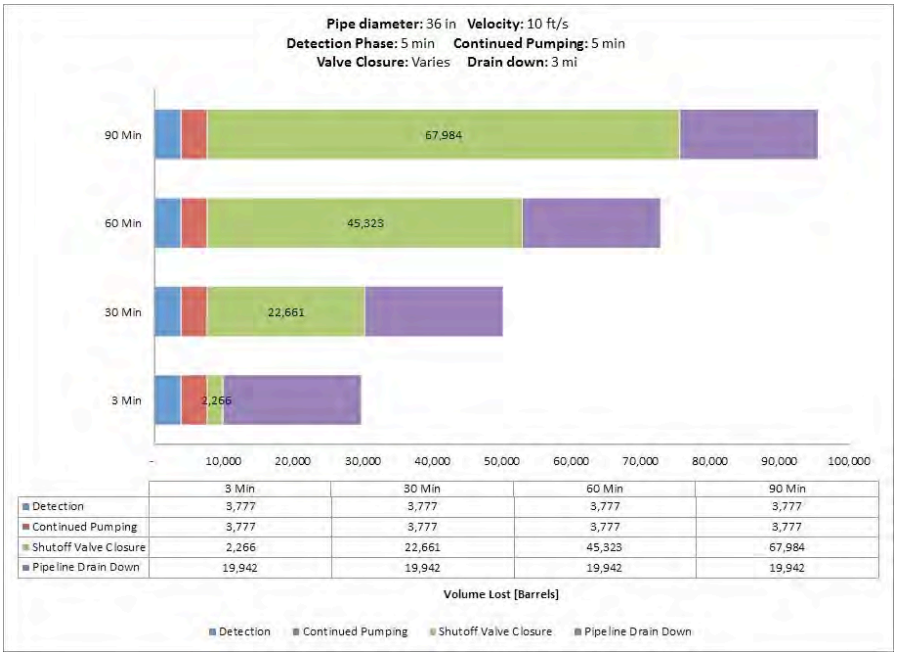

	3 Min	30 Min	60 Min	90 Min
Detection	3,777	3,777	3,777	3,777
Continued Pumping	3,777	3,777	3,777	3,777
Shutoff Valve Closure	2,266	22,661	45,323	67,984
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-194. 36 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

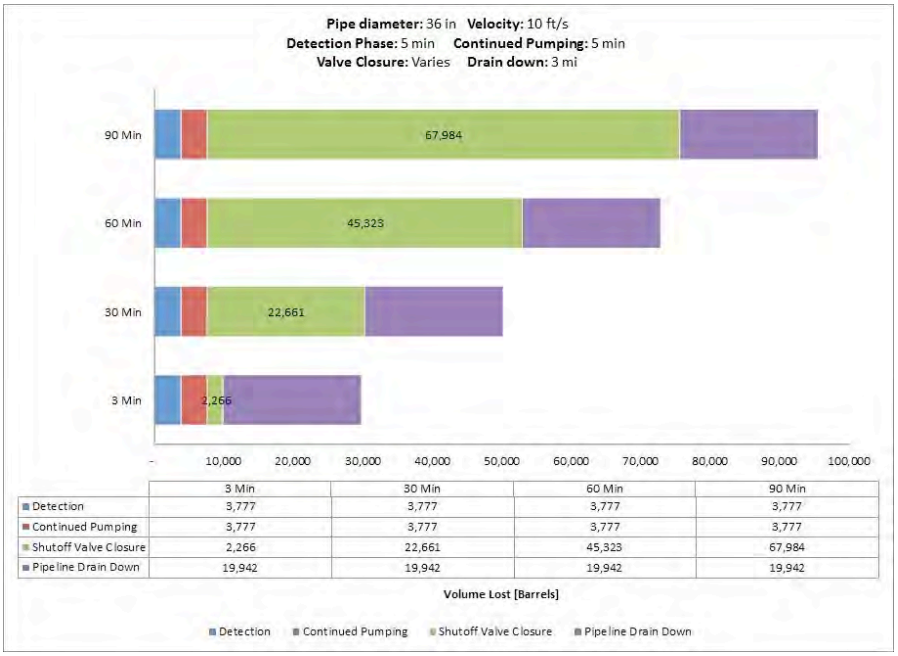

	3 Min	30 Min	60 Min	90 Min
Detection	3,777	3,777	3,777	3,777
Continued Pumping	3,777	3,777	3,777	3,777
Shutoff Valve Closure	2,266	22,661	45,323	67,984
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-195. 36 Inch Pipe Diameter, 10 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

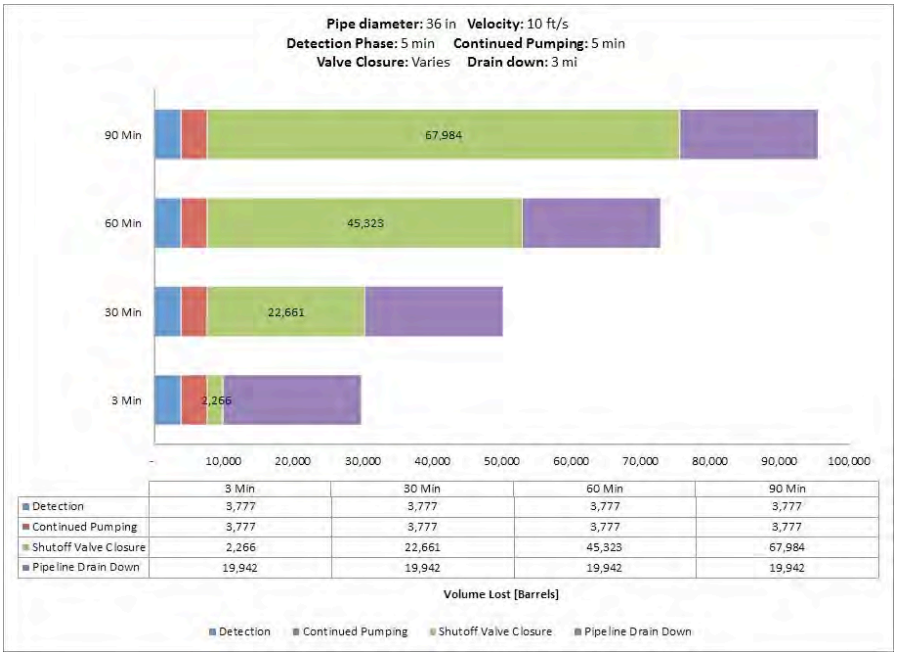

	3 Min	30 Min	60 Min	90 Min
Detection	3,777	3,777	3,777	3,777
Continued Pumping	3,777	3,777	3,777	3,777
Shutoff Valve Closure	2,266	22,661	45,323	67,984
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-196. 36 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

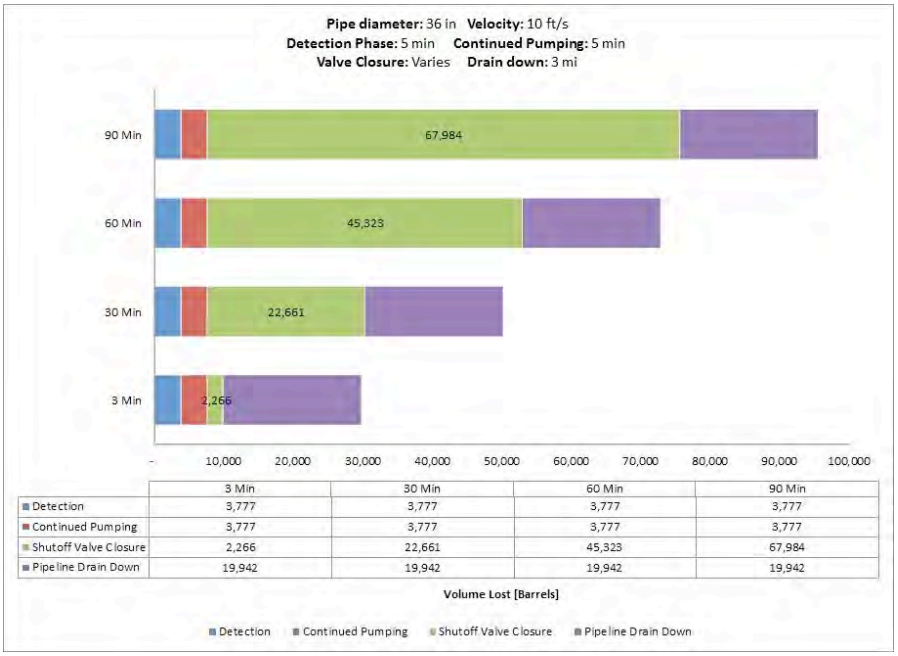

	3 Min	30 Min	60 Min	90 Min
Detection	3,777	3,777	3,777	3,777
Continued Pumping	3,777	3,777	3,777	3,777
Shutoff Valve Closure	2,266	22,661	45,323	67,984
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-197. 36 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

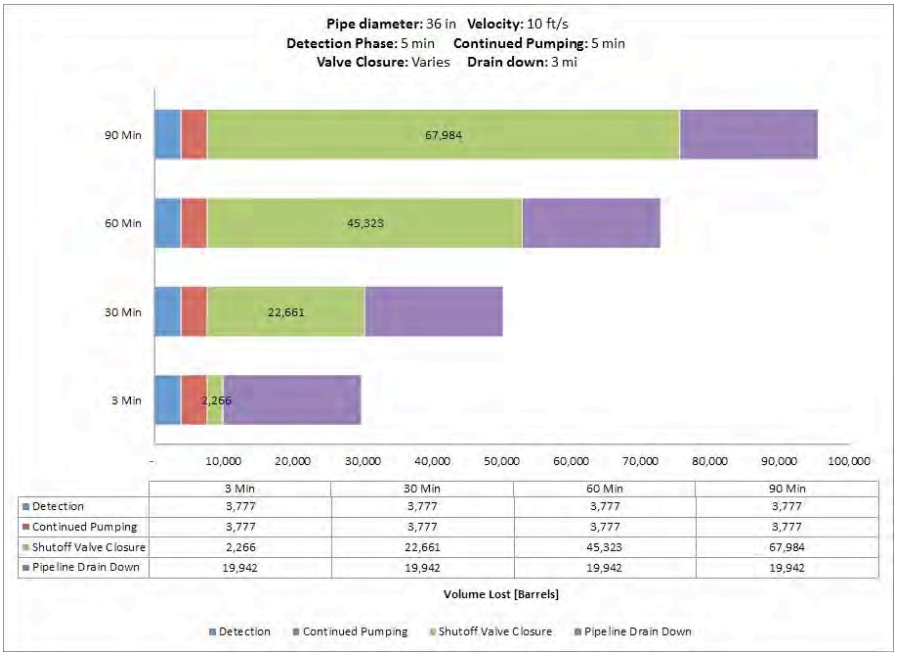

	3 Min	30 Min	60 Min	90 Min
Detection	3,777	3,777	3,777	3,777
Continued Pumping	3,777	3,777	3,777	3,777
Shutoff Valve Closure	2,266	22,661	45,323	67,984
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-198. 36 Inch Pipe Diameter, 10 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

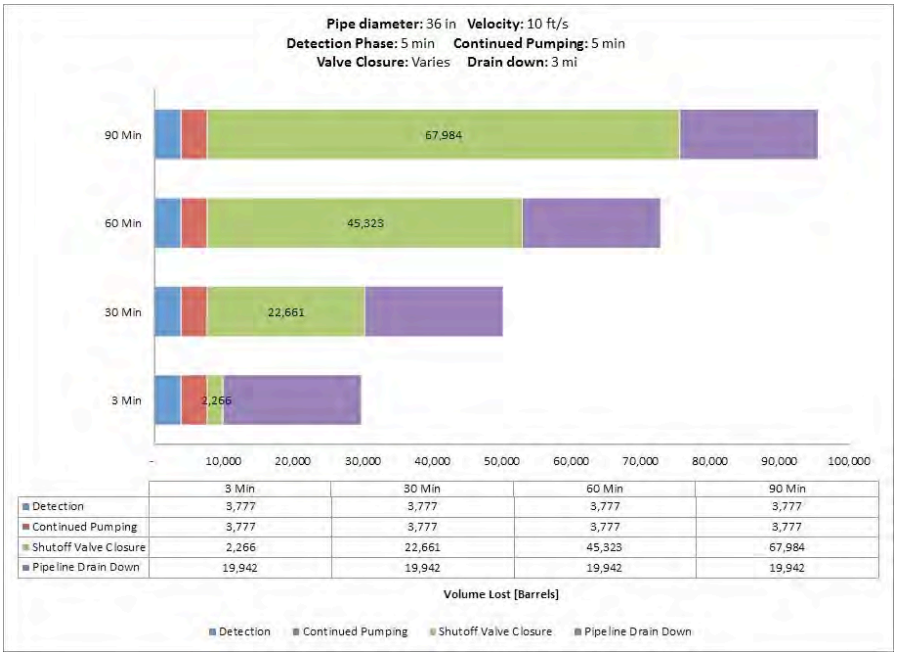

	3 Min	30 Min	60 Min	90 Min
Detection	3,777	3,777	3,777	3,777
Continued Pumping	3,777	3,777	3,777	3,777
Shutoff Valve Closure	2,266	22,661	45,323	67,984
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-199. 36 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

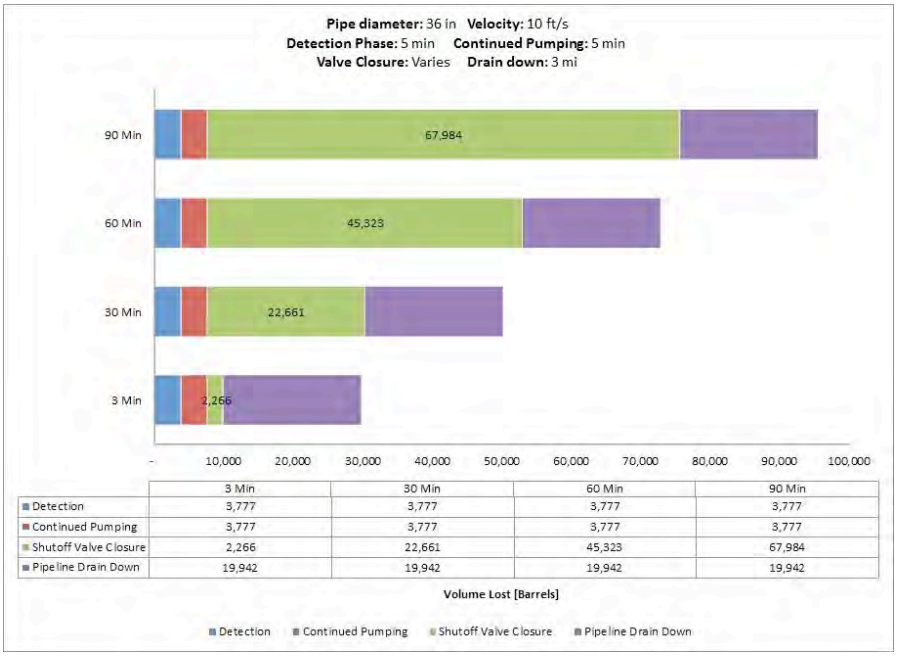

	3 Min	30 Min	60 Min	90 Min
Detection	3,777	3,777	3,777	3,777
Continued Pumping	3,777	3,777	3,777	3,777
Shutoff Valve Closure	2,266	22,661	45,323	67,984
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-200. 36 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

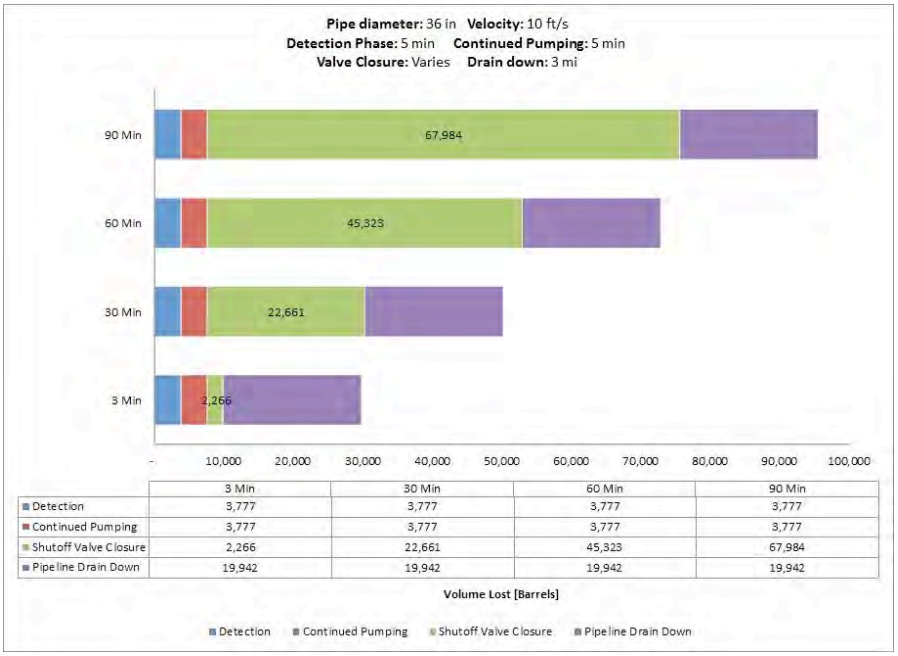

	3 Min	30 Min	60 Min	90 Min
Detection	3,777	3,777	3,777	3,777
Continued Pumping	3,777	3,777	3,777	3,777
Shutoff Valve Closure	2,266	22,661	45,323	67,984
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-201. 36 Inch Pipe Diameter, 10 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

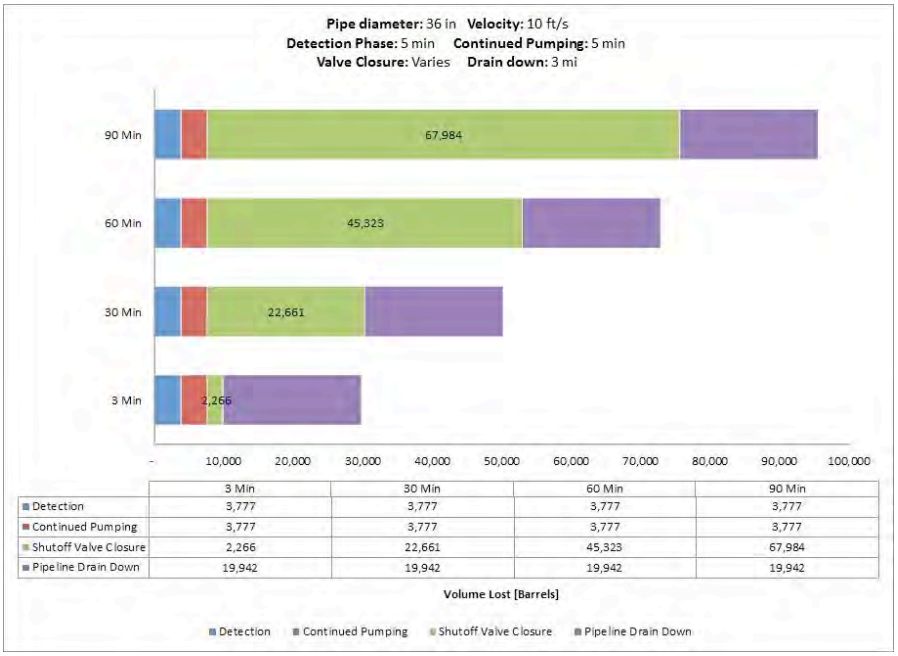

	3 Min	30 Min	60 Min	90 Min
Detection	3,777	3,777	3,777	3,777
Continued Pumping	3,777	3,777	3,777	3,777
Shutoff Valve Closure	2,266	22,661	45,323	67,984
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-202. 36 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

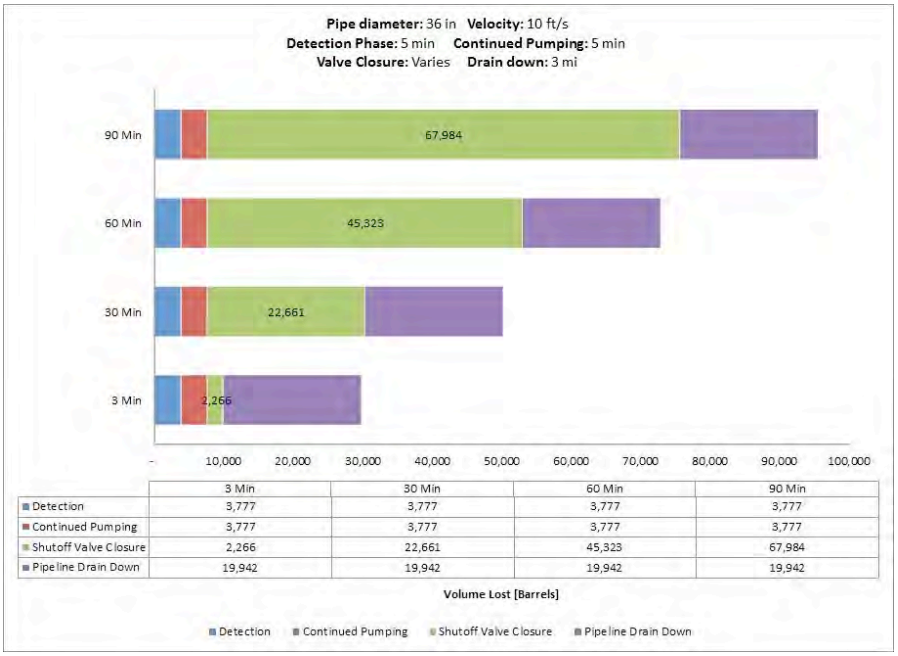

	3 Min	30 Min	60 Min	90 Min
Detection	3,777	3,777	3,777	3,777
Continued Pumping	3,777	3,777	3,777	3,777
Shutoff Valve Closure	2,266	22,661	45,323	67,984
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-203. 36 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

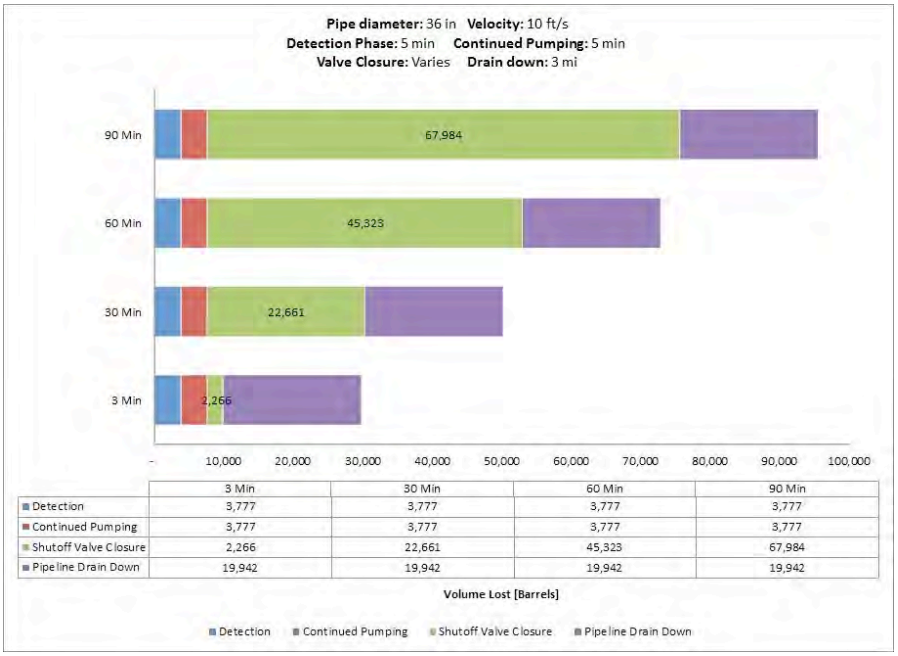

	3 Min	30 Min	60 Min	90 Min
Detection	3,777	3,777	3,777	3,777
Continued Pumping	3,777	3,777	3,777	3,777
Shutoff Valve Closure	2,266	22,661	45,323	67,984
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-204. 36 Inch Pipe Diameter, 10 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

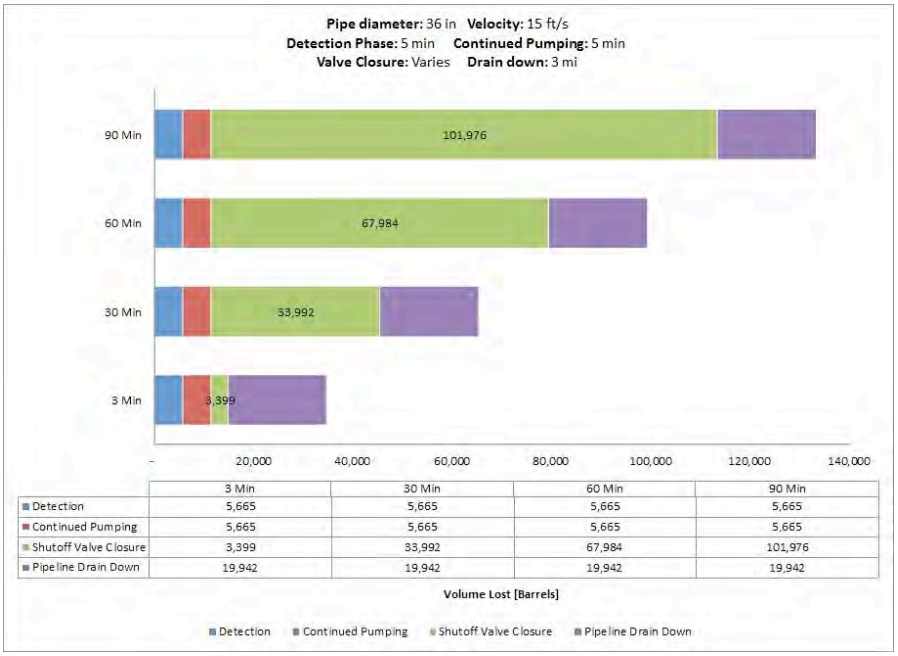

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-205. 36 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 100 Feet Elevation Change.

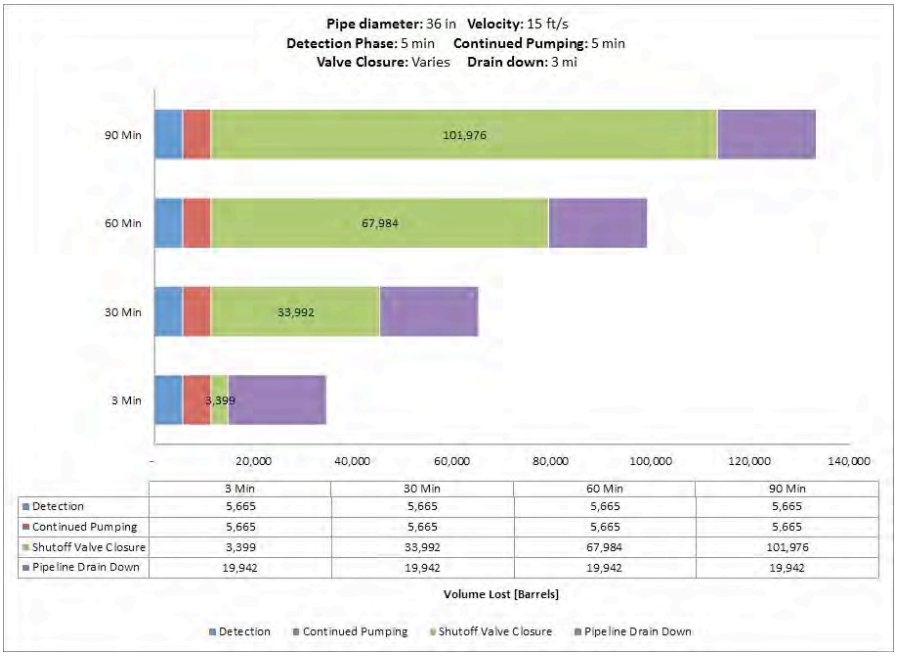

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-206. 36 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 500 Feet Elevation Change.

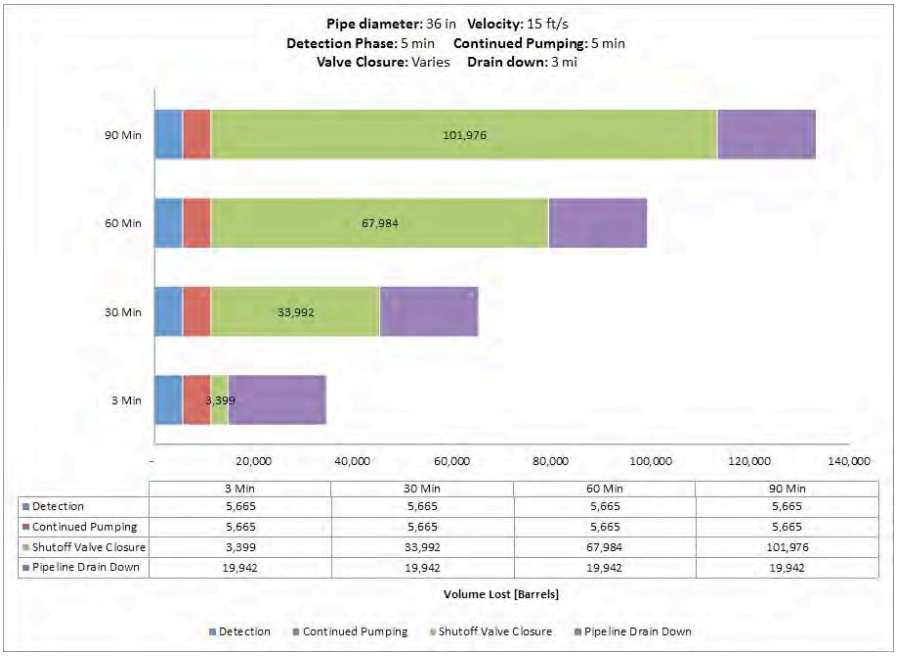

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-207. 36 Inch Pipe Diameter, 15 ft/s, 400 psi MAOP, 1000 Feet Elevation Change.

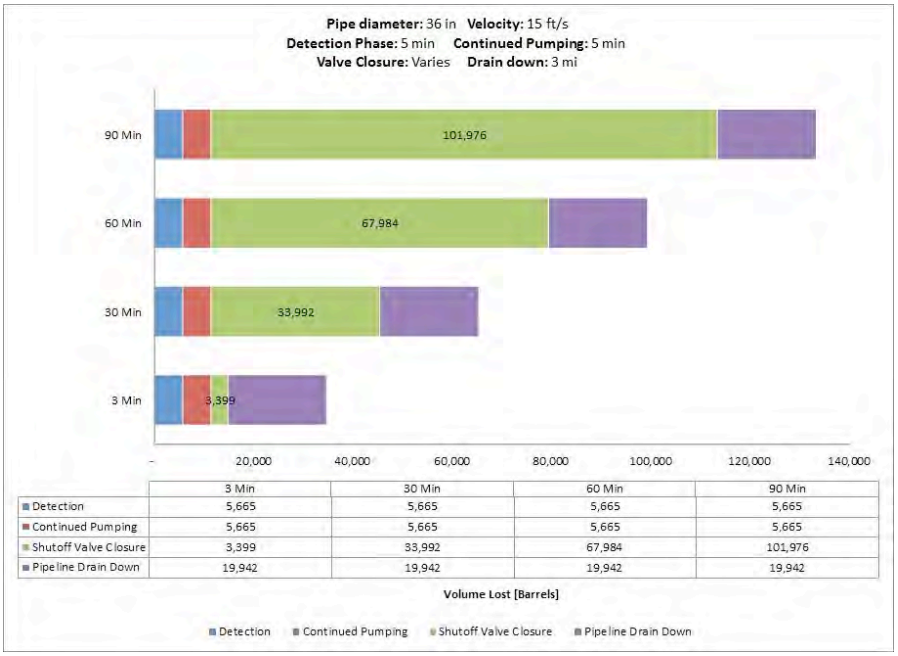

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-208. 36 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 100 Feet Elevation Change.

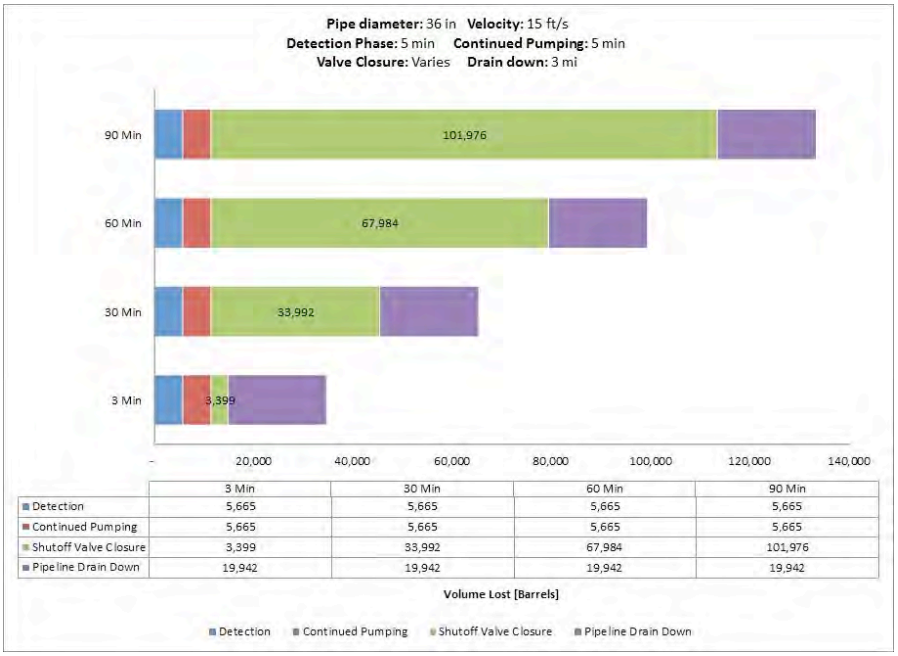

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-209. 36 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 500 Feet Elevation Change.

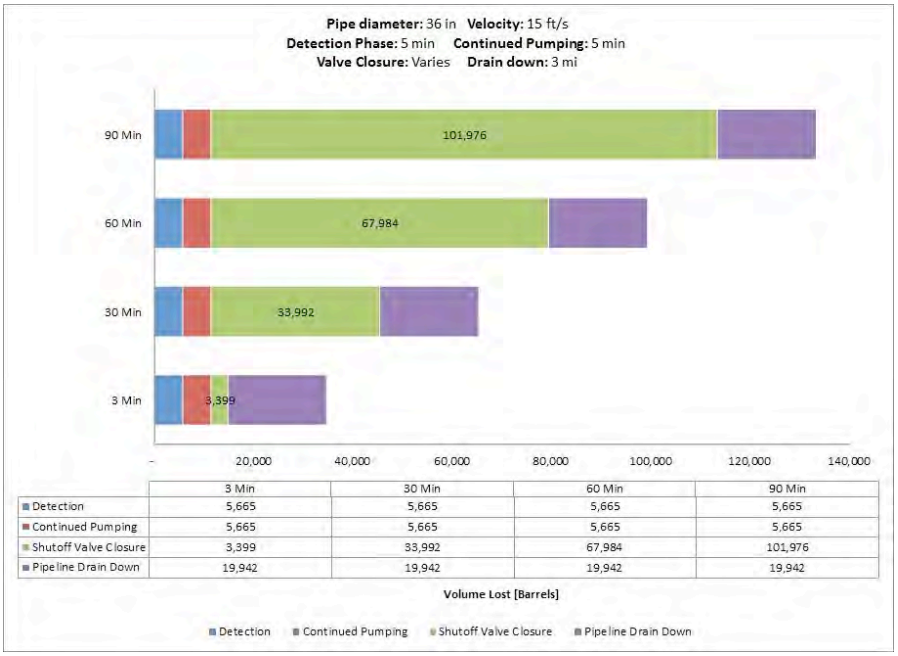

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-210. 36 Inch Pipe Diameter, 15 ft/s, 800 psi MAOP, 1000 Feet Elevation Change.

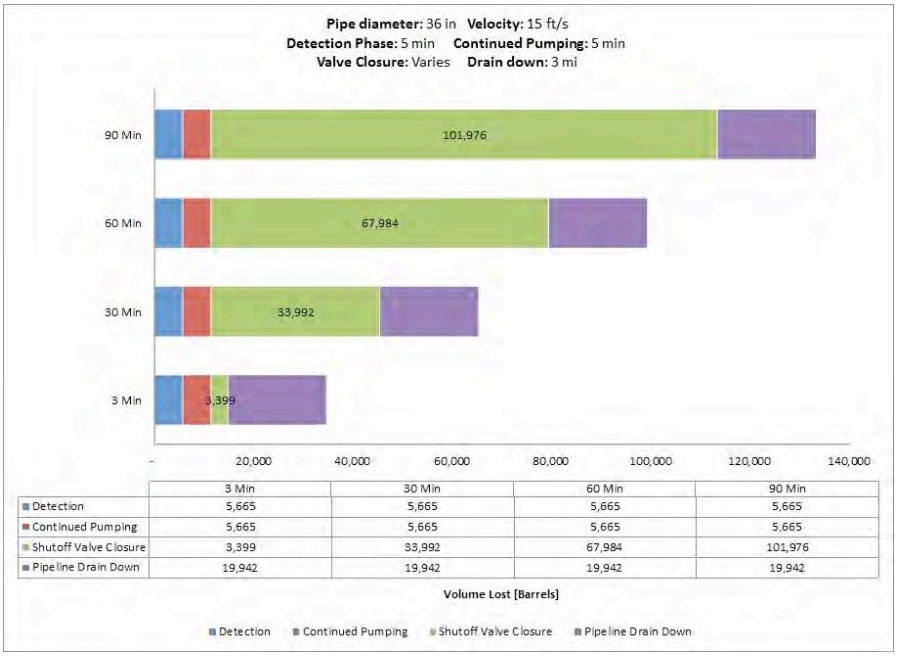

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-211. 36 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 100 Feet Elevation Change.

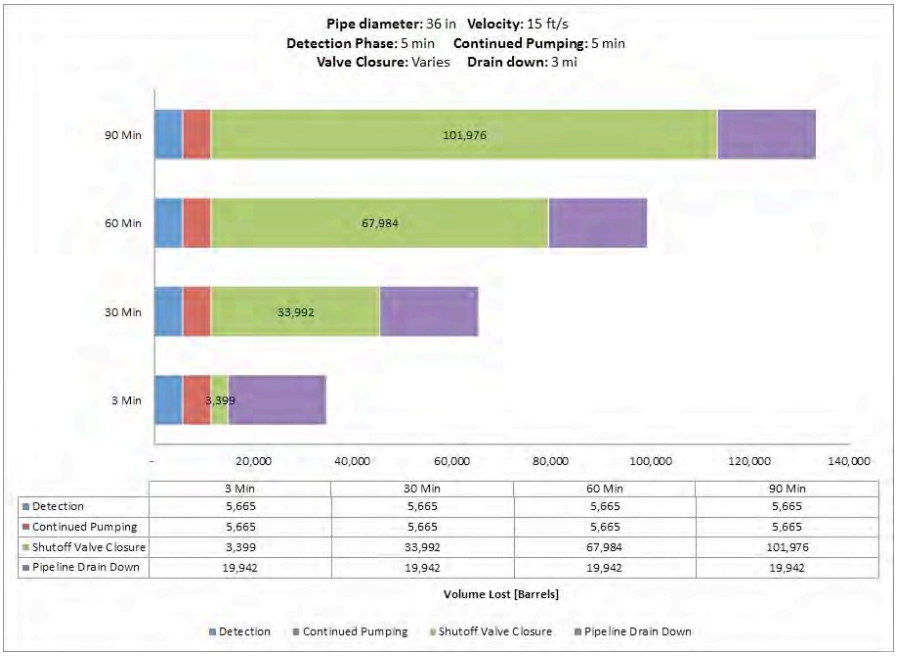

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-212. 36 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 500 Feet Elevation Change.

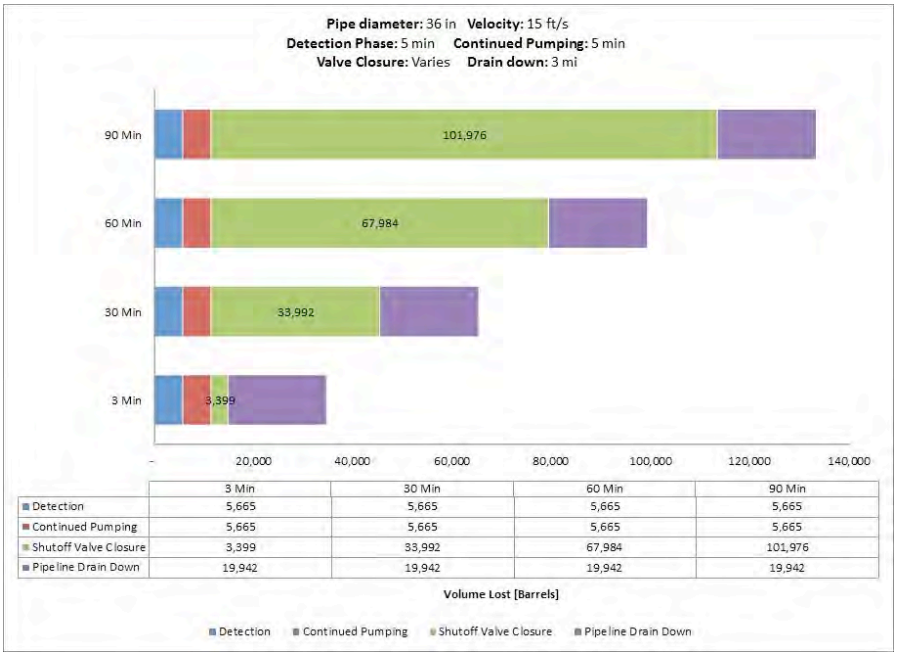

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-213. 36 Inch Pipe Diameter, 15 ft/s, 1200 psi MAOP, 1000 Feet Elevation Change.

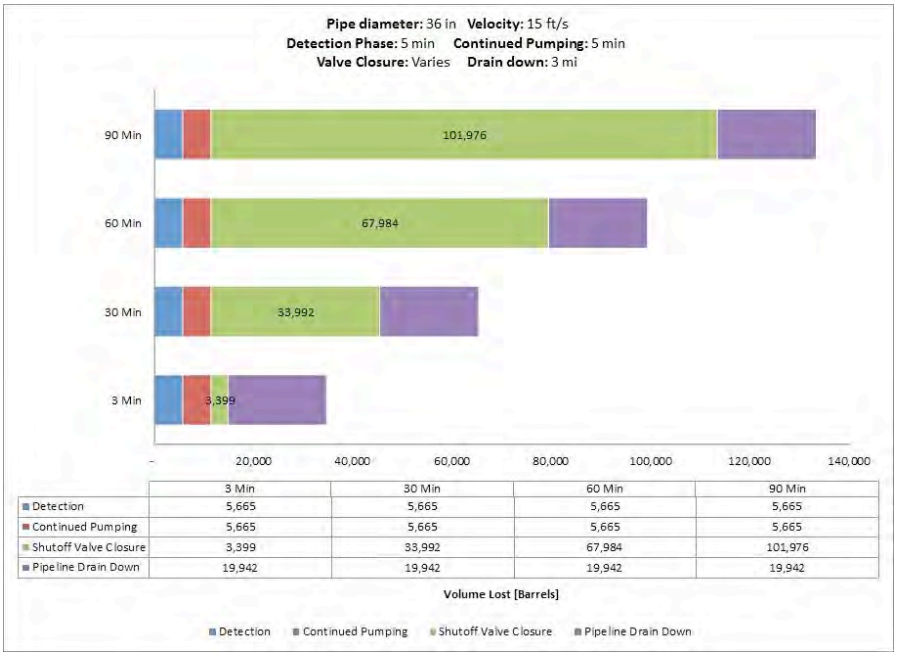

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-214. 36 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 100 Feet Elevation Change.

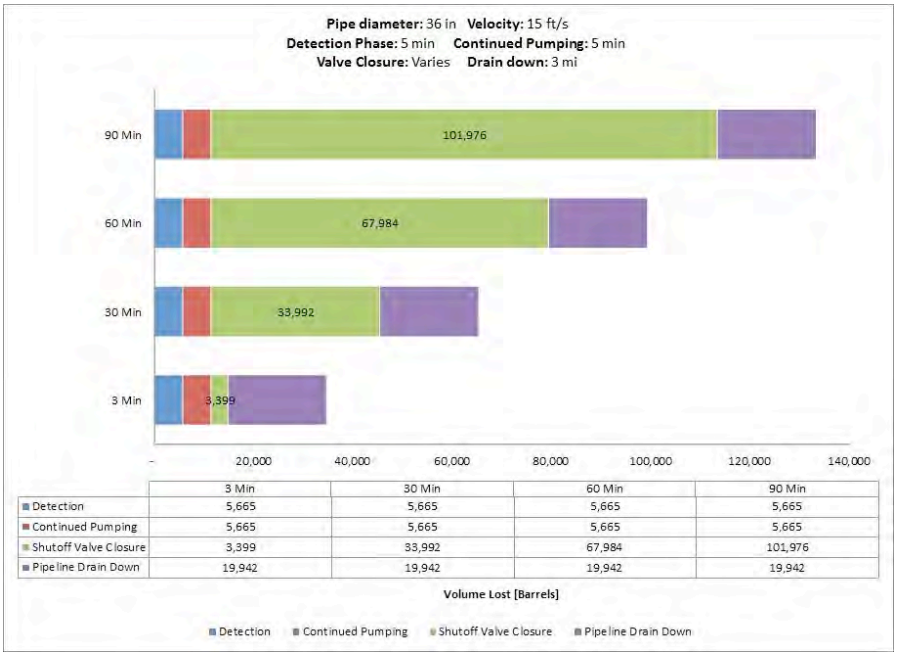

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-215. 36 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 500 Feet Elevation Change.

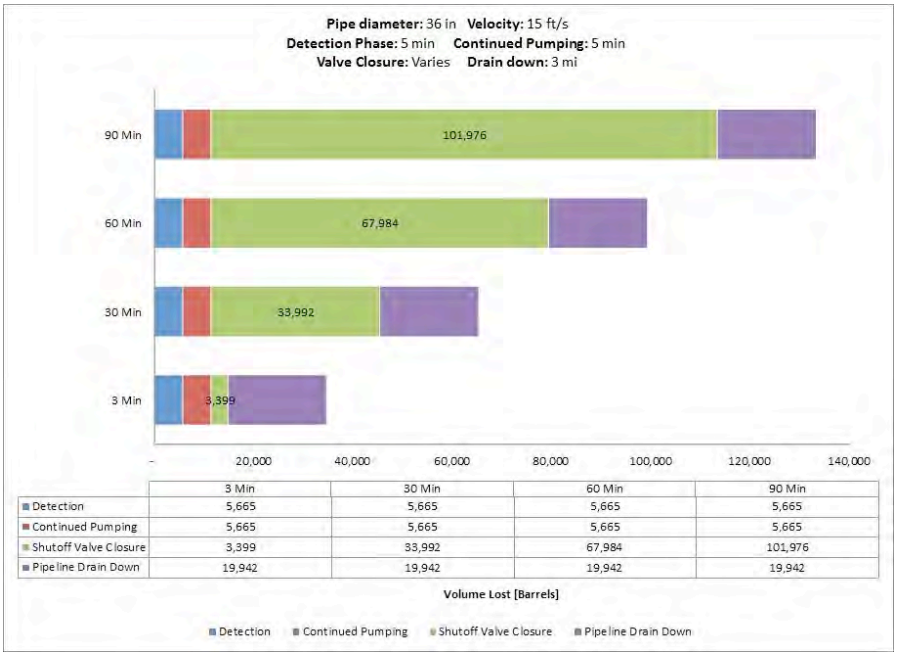

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. A-216. 36 Inch Pipe Diameter, 15 ft/s, 1480 psi MAOP, 1000 Feet Elevation Change.

QuickTime™ and a
decompressor
are needed to see this picture.

Potential Impacts of Large-diameter Pipelines to Wetlands

From NE, overview of Mud Lake, Clearwater County.

The ice road in the marshes of Mud Lake.

Ice road.

Water, ice slush and peat soil slurry refills trench, Mud Lake.

Blocks of driven-in ice on W side of ROW off trench, Mud Lake.

Ice block with plant debris and soil on bottom, Mud Lake.

Though melting occurred, soil and plant material remain on surface off trench, Mud Lake.

Trench and blocks of material laden ice prominent on the surface of Mud Lake.

Another view from N, Mud Lake.

From E side ROW looking SW across Mud Lake.

From far E side of ROW near mid-crossing, looking SW across ROW through Mud Lake.

From N, trench and piles of spoil to Mud Lake.

From W side ROW looking SE across transition from upland to wetland, Mud Lake.

Overview from N ROW crossing, Mud Lake.

Status of a portion of ditchline within DNR LC 6, Mud Lake.

View from N across Mud Lake.

Drilling mud over HDD within S side of Hay Creek.

Frac bubbling up within containment over depression of HDD.

From S, view of Hay Creek clean-up operation.

Turbidity indication of frac disturbance near frac mound at Hay Creek.

Inspector: Steve Toman

Inspection Date: 9/5/2008

Report Type: Frac-out

Agency: DNR

Compliance Level: Problem Area

Activity: Boring

County: Marshall

Begin Station: 3824+00

End Station:

Milepost Start: 845.7

Milepost End: 0

Tract Number 1: T-901

Tract Number 2:

Frac-out Location:

In stream: ☐

Upland: ☐

Near Stream: ☐

Wetland: ☑

Drill Phase: Pull-Back

Drill Pass:

Containment Measures:

None

Amount of Bentonite Dispersed:

100 Gallons within wetland W-845D, 500 Gallons within wetland W-845E

Control Measures Implemented to Continue Drilling:

The frac-out in wetland W-845D occurred during the last moments of the pipe pullback. The pullback was completed. No additional drill mud was released once the pullback stopped.

DNR Waterbody:

Wetland and/or Non-DNR Waterbody: W-845D

Inspection Notes:

A frac-out occurred during the guided bore beneath the south bar ditch of 250th St. NW. Communication confusion resulted, due to earlier frac-outs that occurred during this bore. Environmental Inspector Aric Donajkowki was present when a 500-gallon frac-out emerged from the road surface and within the north bar ditch of wetland W-845E. A short time later a 100-gallon frac-out occurred within wetland W-845D.
The contractor assumed that proper agency notification was occurring with Aric's presence. However, Aric was not present during the W-845D frac-out occurrence.

Frac-out containment could have been better. Inadequate sand bags were available for the containment of the frac-out and no vacuum truck was present. All the frac-outs have now been cleaned up.

Designed and Developed by Merjent, Inc. ©2008

MP 845.80, Frac-out, W-845D, view southeast.

Designed and Developed by Merjent, Inc. ©2008

MP 845.80, Frac-out cleanup, W-845D, view east.

Designed and Developed by Merjent, Inc. ©2008

MP 845.70, Wetland W-845E and road surface frac-out, view southeast.

Designed and Developed by Merjent, Inc. ©2008

MP 845.70, Wetland W-845E, Frac-out cleanup, view east.

Designed and Developed by Merjent, Inc. ©2008

ROW		T-880	T-879-RX R.O.W. 82.5'	T-879-00	T-879	T-878	T-878-RX R.O.W. 85'	T-876	T-877	
LAND USE		CROP (48" COVER)	ROAD (GRAVEL) (SEE NOTE 11)	DITCH/WETLAND (MUCK/SILT) (45" COVER)	DITCH/WETLAND (MUCK/SILT) (36" COVER)	OPEN (48" COVER)	WETLAND (36" COVER)	OPEN (48" COV.)	ROAD (GRAVEL) (SEE NOTE 11)	CROP (48" COVER)	WETLAND (36" COVER)	CROP (48" COVER)

PLAN 1"=200'

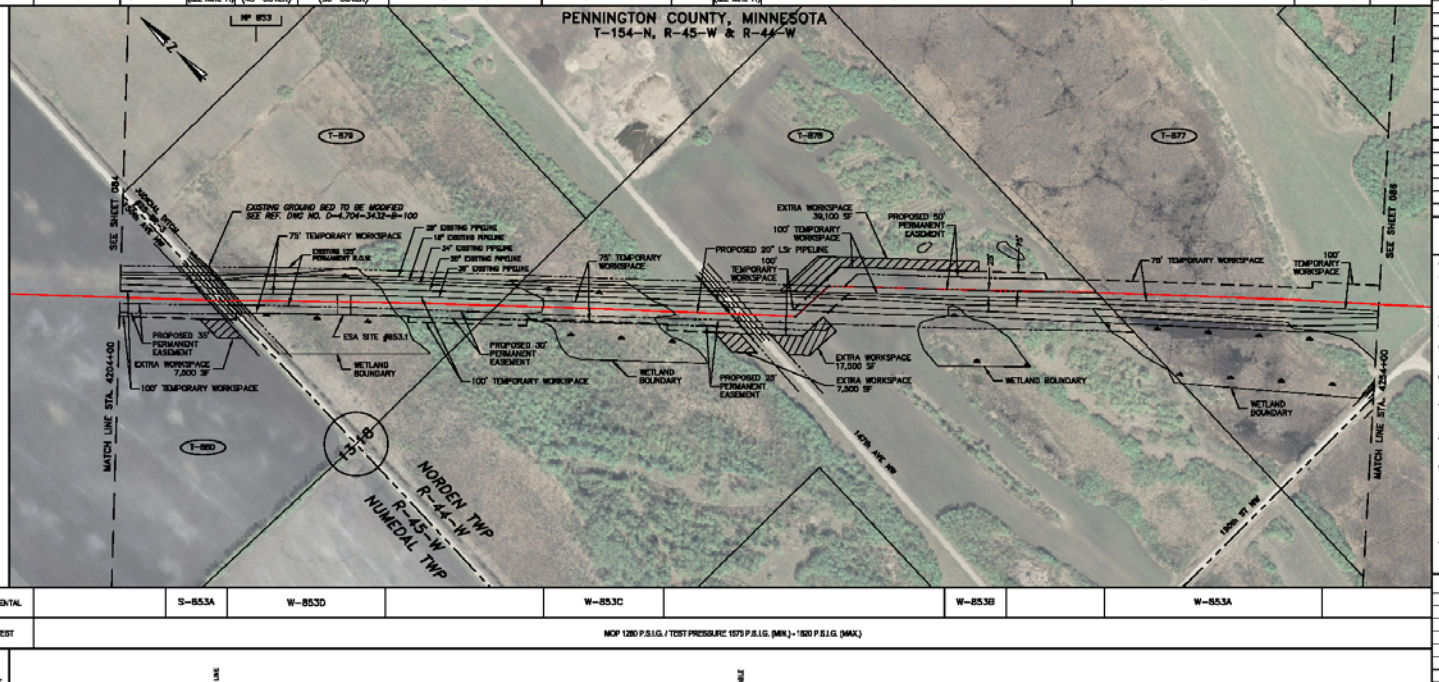

ENVIRONMENTAL		S-853A	W-853D		W-853C		W-853B		W-853A	
HYDROTEST	NOP 1280 P.S.I.G. / TEST PRESSURE 1575 P.S.I.G. (MIN.) - 1920 P.S.I.G. (MAX.)									

PROPOSED LINE 15 (20") LSr PIPELINE

CROSSING INFORMATION

MATERIALS

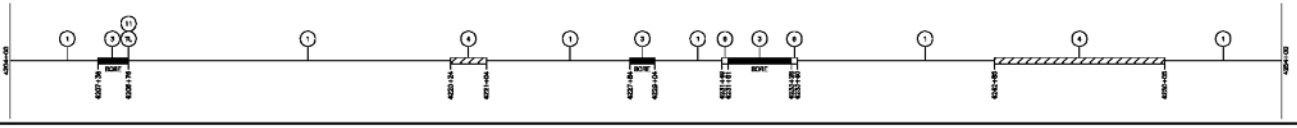

PIPE PROFILE HORIZONTAL: 1"=200' VERTICAL: 1"=10'

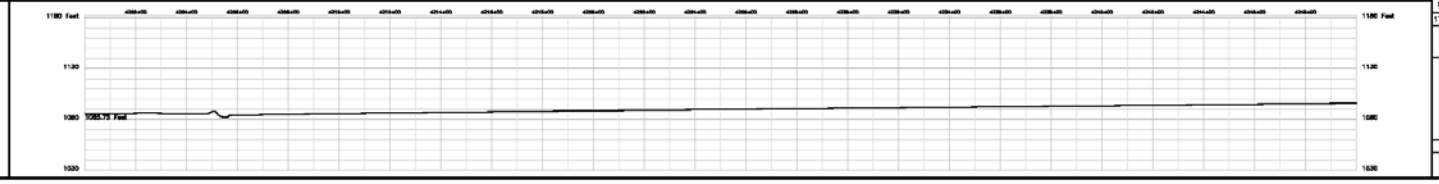

NO.	LSr (20") PIPELINE MATERIAL SUMMARY	QTY.
1	20" O.D. x 0.250" W.T. x API-5L X-70, ERW, 14 MILS FBE	3746 LF
3	20" O.D. x 0.312" W.T. x API-5L X-70, ERW, 40 MILS A/R FBE	427 LF
4	20" O.D. x 0.312" W.T. x API-5L X-70, ERW, 16 MILS FBE W/ 3" CONC. COATING	800 LF
6	INDUCTION BEND(S) 20" O.D. x 0.312" W.T. x API-5L X-70, ERW, 14 MILS FBE	24 LF
11	TEST LEAD(S)	1 EA

SCALE IN FEET

1. ENBRIDGE ENERGY EMERGENCY NUMBER: 1-800-858-5253
2. CONTRACTOR IS REQUIRED TO HAVE UTILITIES LOCATED BEFORE THEY DIG. CALL 811 OR THE STATE UTILITY LOCATE SERVICE APPLICABLE TO THE STATE IN WHICH CONTRACTOR IS WORKING.
3. ALL DIMENSIONS SHALL BE FIELD VERIFIED.
4. ALL HORIZONTAL AND VERTICAL DIMENSIONS ARE IN FEET, UNLESS OTHERWISE SPECIFIED.
5. HYDROTEST: CONTRACTOR SHALL SUBMIT A HYDROTEST PLAN FOR COMPANY (ENBRIDGE ENERGY) APPROVAL BEFORE PERFORMING A HYDROTEST.
6. CONTRACTOR SHALL ADDITIONALLY COMPLY WITH THE REQUIREMENTS SPECIFIED IN THE REFERENCE DRAWINGS NOTED ON THIS ALIGNMENT SHEET.
7. QUANTITY OF SET ON WEIGHTS IS APPROXIMATE. THE ACTUAL QUANTITY OF SET ON WEIGHTS SHOULD BE DETERMINED BY THE GIVEN FIELD CONDITIONS.
8. WETLAND STATIONING IS APPROXIMATE ONLY. ACTUAL WETLAND BOUNDARIES WILL BE STAKED BY THE APPROPRIATE COMPANY ENVIRONMENTAL PERSONNEL.
9. CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF THE PROJECT AGRICULTURAL MANAGEMENT PLAN (AMP) AND ENVIRONMENTAL MANAGEMENT PLAN (EMP).
10. PIPELINE IS HORIZONTALLY STATIONED AND PIPELINE LOCATION IS BASED ON MINNESOTA STATE PLANE (NORTH ZONE) COORDINATE SYSTEM, NAD 83, U.S. SURVEY FEET UNITS.
11. AS A MINIMUM, THE DEPTH OF COVER UNDER ROAD DITCHES SHALL BE 54", AND UNDER THE ROAD SURFACE SHALL BE 60", UNLESS SHOWN OTHERWISE.

DWG. NO.	REFERENCE DRAWING TITLE

NO.	REVISION - DESCRIPTION	BY	DATE	CHK'D	APP'D
A	ISSUED FOR REVIEW	GIE	12-15-07	LR	RH
B	GENERAL REVISIONS	GIE	2-06-08	LR	RH
C	ISSUED FOR CONSTR. PLANNING	GIE	3-21-08	LR	RH
D	ISSUED FOR CONSTRUCTION	GIE	5-16-08	LR	RH

SCALE	DATE	DESIGNED	DRAWN	CHK'D	APP'D	APP'D
1"=200'	11/19/07	GIE	GIE	LR	RH	

ENBRIDGE

LSr PIPELINE
PROPOSED 20" LINE
M.P. 852.9 TO M.P. 853.8
PENNINGTON COUNTY, MINNESOTA

DRAWING NUMBER	ROUTE SHEET
D-65-5.92-1386-085-D-100	085

Enbridge En Sen MP 852

Clearwater River Crossings, Beltrami County, a designated trout stream. Indicates long-term changes in the floodplain and river channels. Photo 6 was taken on Nelson Dam Road in the upper right corner of this photo. Milepost

Close-up of the Clearwater River Crossing, Beltrami County.

ATV traffic up and down Clearwater River bluffs through slope-breakers constructed to prevent erosion on Terrace III project.

Clearwater River floodplain indicating permanent changes to wetlands from the existing corridor as well as slope erosion and sparse re-vegetation from Terrace III. Top of bluff is about 60 feet above the Floodplain.

Clearwater River, bottom of E bluff. Cement barriers used to impede ATV access to the ROW after an access road was recently constructed for pipeline repair.

Site is adjacent to Clearwater River by railroad grade, which is now a motorized OHV recreational trail. Boulders placed at base of slope to impede ATV off-trail use.

Grant Creek pipeline corridor crossing at approximately MP 929.8. OHV trail is on railroad grade.

Close-up of Grant Creek pipeline corridor looking N toward OHV trail on railroad grade, indicating OHV off-trail destruction of stream banks and vegetation

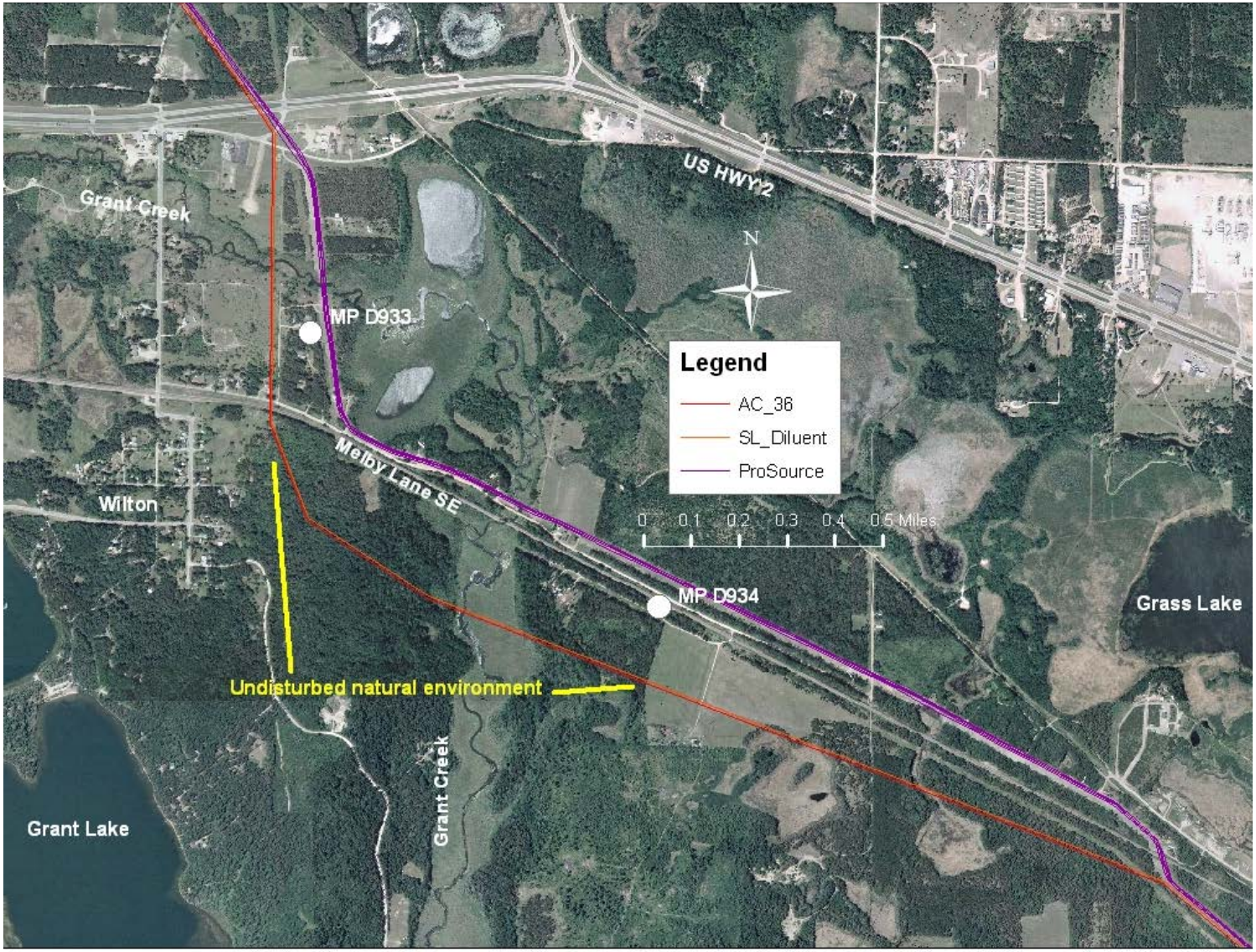

New corridor proposed through undisturbed natural area and new Grant Creek crossing, a revision of the June 2007 filing. Approximately MP 932.5 through MP935.3

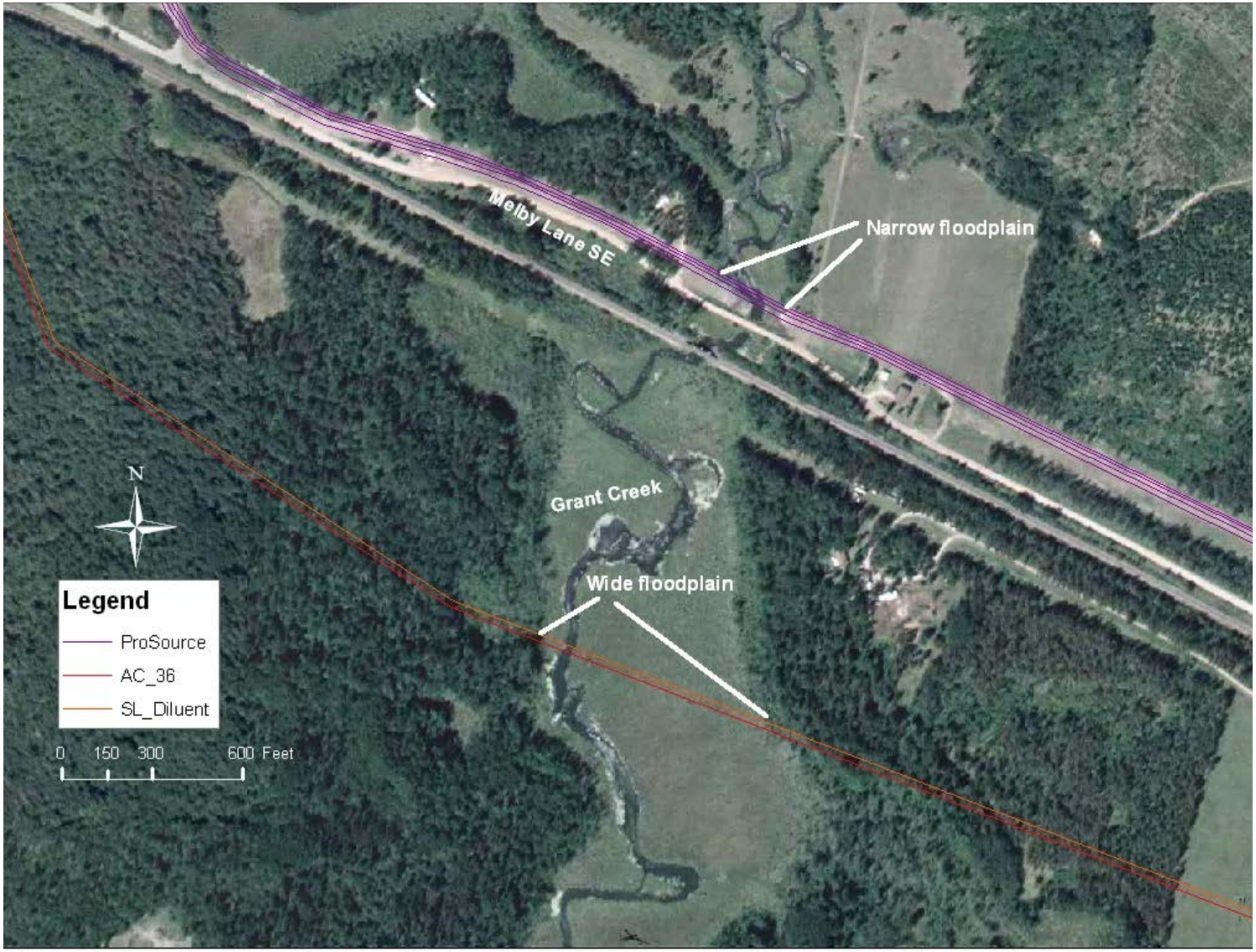

Close-up view of new Grant Creek crossing and corridor, portion of Photo 9 area.

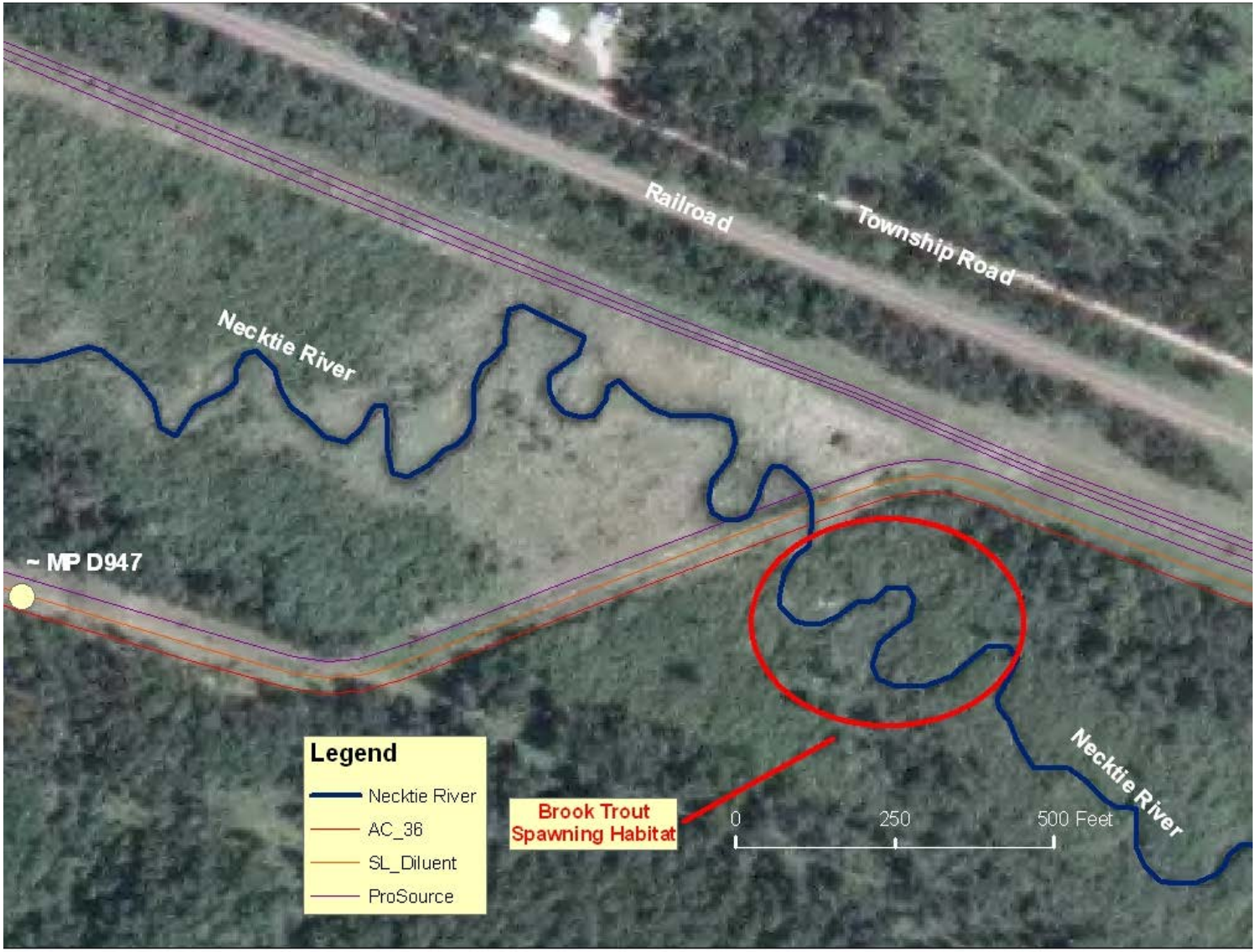

Enbridge crossing of Necktie River, a designated trout stream indicating brook trout spawning habitat adjacent to the crossing, MP 927.

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENTS "F"

F-1 LaSalle Creek-MinnCan Response Activities report bentonite frac-out

MinnCan Pipeline Company letter to Minnesota Department of Natural Resources regarding a bentonite "frac-out" in the LaSalle Creek Valley in 2008

F-2 LaSalle Creek-Barr Response Activities Work Plan Bentonite clean-up plan

Barr Engineering Technical Memorandum to MinnCan Pipeline Company regarding a clean-up work plan for the bentonite "frac-out" in the LaSalle Creek Valley

MINNCAN PROJECT
of Minnesota Pipe Line Company

P.O. Box 64596
Saint Paul, MN 55164

TOLL-FREE PHONE: 877-796-7846
WEB: www.MinnCanProject.com

MAY 2008
RECEIVED
LANDS & MINERALS
NW REGION

May 16, 2008

Ms. Cindy Buttleman
Regional Supervisor
Minnesota Department of Natural Resources
Division of Lands & Minerals
2115 Birchmont Beach Road NE
Bemidji, MN 56601

Subject: La Salle Creek Response Activities Work Plan Implementation Report

Dear Ms. Buttleman:

The purpose of this letter is to document bentonite recovery activities recently completed at the La Salle Creek frac-out location in Hubbard County, Minnesota. Recovery activities were conducted in accordance with the *Final LaSalle Creek Response Activities Work Plan* (Work Plan), which was submitted on February 1, 2008 and approved by the Minnesota Department of Natural Resources (DNR) on February 4, 2008. Background information regarding the site was provided in the Work Plan and is not re-iterated in this report. Recovery activities were conducted by Minnesota Limited Inc. under the direct supervision of Minnesota Pipe Line Company (MPL) staff.

Results

The objective of the recovery activities was to remove bentonite material from the creek to the extent practical utilizing methods that do not create a high degree of disturbance to the creek or surrounding wetland. Recovery activities were based on the three criteria that were outlined in the Work Plan:

- Minimize the disturbance to the wetland area and La Salle Creek
- Minimize the risk to the active pipelines
- Protection of worker safety

Based on pilot scale test results, MPL utilized a vacuum-type recovery device operated with a 3-inch diameter trash pump to remove a bentonite/water slurry. The recovery flowrate was approximately 75 gallons per minute (gpm). The vacuum-type recovery device utilized low-suction pressure at the inlet to minimize the amount of natural streambed material removed, yet was effective at capturing the bentonite material. The intake device was fitted with a screen to prevent removal of rocks and natural material. MPL maintained an inspector on-site during active recovery periods to monitor progress and verify

compliance with the three criteria described above. Site visits and inspections were also conducted by DNR staff and the Agency Monitor for the MinnCan project to verify that activities were conducted to minimize impacts, in accordance with the Work Plan

Once recovery activities commenced, the bentonite material had settled considerably, which enabled recovery with a high solids content. Minimal turbidity was observed in the river during recovery operations, which allowed for clear monitoring of progress as bentonite was removed and the river bottom was reached.

Initial recovery activities were commenced in the South Area (as defined in the Work Plan) on February 22, 2008 and consisted of pumping a bentonite/water slurry through 3-inch diameter hoses across La Salle Creek approximately 350 feet to a 500 gallon transfer tank staged on a tracked bombardier (i.e. low ground pressure vehicle) on the right of way (ROW). Bombardiers were utilized to transport the material to an upland area where it was transferred to a 1,500 gallon tank mounted on a dump truck. The dump truck hauled the material off-site to an upland area for re-use at a nearby farm field. Activities were completed in this manner for 4 days and 24,500 gallons of slurry was hauled off-site. However, progress was slow as the haul time of the bombardier prevented continuous operation of the recovery pump. In addition, progress was delayed by temperatures below 0°F which prevented operation of the recovery pump.

As described in the Work Plan, MPL continually evaluated progress to determine if modification or enhancement was needed. Based on the initial results, MPL determined it was necessary to increase the recovery rate due to concerns of the upcoming spring thaw and run-off period. Since hauling of the recovered material in the bombardier was the rate-limiting step, MPL considered additional options. After consideration and discussions with DNR staff, MPL pursued pumping to an infiltration pit in a nearby upland area for dewatering within the ROW in a manner that would not impact the wetland area. The location, northwest of La Salle Creek within the ROW, was chosen based on the topography and utilized a recently backfilled excavation conducted as part of the MinnCan Project. A dike was formed around the excavation area with an approximate size of 20 feet by 300 feet. Clearwater County is the landowner, and permission to land apply was received from the Clearwater County Land Commissioner on February 25, 2008.

MPL proceeded with recovery activities on March 10 and utilized six pumps and approximately 2000 feet of 3-inch hose to move the material to the upland infiltration pit. The diked area around the infiltration pit was constantly monitored with radio communications between on-site workers to control pumping. The low point around the diked area was the east side, so an additional backup dike was added on this side. The first infiltration pit did become saturated after a few days of operation and one additional infiltration pit was added directly to the north on the ROW. MPL conducted frequent inspections of the infiltration pits to verify that material was not running off toward the wetland.

Recovery activities were concluded on March 14th with a total volume of slurry pumped of approximately 170,000 gallons. The majority of the bentonite remains on-site in the upland dewatering pit and will be hauled off-site once conditions allow. This material was not able to be removed in March due to wet conditions from thawing which prevented truck access.

The majority of the bentonite in the Creek was contained in the section referred to as the South Area (as described in the Work Plan). As a result, MPL focused recovery efforts on the South Area moving from south to north with removal down to the Creek bottom, along the bank, and completely across the Creek. The only exception is a small area between the second and third divider (from south) in which flowing water around the second divider created thin ice and limited access.

Upon completion of recovery activities in the South Area on March 14, MPL moved equipment to the North Area (as defined in the Work Plan). Upon inspection, reduced bentonite thicknesses were found in the North Area as the material had settled considerably. The frac-out near the North Area had occurred in the wetland area and traveled to the west side of the Creek. It was determined that bentonite was not completely across the Creek, as was the case in the South Area. In fact, it was only identified along the west side of an outside bend in the Creek. The initial bentonite volume estimate in the Work Plan was based on a maximum thickness of 18 inches and an average thickness of 9 inches across the Creek. Upon re-inspection, it was found that the maximum thickness was only 6 inches and this was for a limited area (approximately 4 square feet). The bentonite thickness in the majority of this area ranged from 0 to 1.5 inches. It is also believed that the bentonite settled in this area as the initial measurements were conducted shortly after the frac-out entered the Creek. To verify that bentonite had not migrated downstream, MPL inspected the river bottom downgradient of the North Area and did not find that any additional material. It is anticipated that any remaining material will be scoured from the river bed during spring thaws.

MPL also attempted to remove bentonite material from the wetland area that did not reach the stream. However, this material was frozen in place and could not be removed by hand shoveling or with a small excavator. To minimize impact to the wetland, MPL does not intend to mobilize equipment to remove this small amount of material. MPL will re-inspect the wetland areas after complete thawing to identify any potential spots that can be removed manually.

Remaining Work

Upon conclusion of the recovery activities on March 14, MPL attempted to remove the in-stream sediment barriers. One barrier was successfully removed; however, the remaining were frozen into the stream bank and could not be readily removed. Cold evening temperatures continued beyond March 14, which allowed limited worker access utilizing plywood planking and removal of all barriers on March 28th and March 31st. The only exception is a small section of silt barrier fabric frozen underwater to one side of the Creek bank. Barrier material has been temporarily placed on the ROW on-site and will be removed off-site in the near future.

As previously mentioned, MPL will remove the accumulated bentonite from the infiltration pit and haul it off-site to the identified upland area for re-use in a farm field. Upon completion of recovery activities on March 14th, the access road had become too wet for a hauling truck to access. MPL intends to remove this material during drier ground conditions that allow for truck access.

Within the written approval dated February 4, 2008 of the La Salle Creek Recovery Plan, a special request was made by the DNR to take an additional step beyond effective bentonite removal from the Creek to remove the downstream beaver dam. MPL worked with the United States Department of Agriculture-Animal and Plant Health Inspection Services-Wildlife Services (USDA-APHIS-Wildlife Services) to have the beavers trapped and the dam removed. A total of four dams were removed from La Salle Creek, one upstream of the pipeline crossing and three downstream of the pipeline crossing, but prior to Big La Salle Lake. MPL did seek and receive approval from he DNR prior to all four being removed.

Evaluation and Testing Results

During the course of this project, DNR staff requested a summary of the ideas and techniques that were evaluated and tested, the results of the testing, methods used, and the lessons learned during full-scale implementation. The remainder of this section provides a bullet-list summary of these items.

- MPL and DNR maintained close communication during horizontal direction drilling (HDD) and bentonite recovery activities. This teamwork with DNR allowed for quick discussion and review of *LaSalle Creek Frac-Out Monitoring and Response Plan* and *LaSalle Creek Response Activities Work Plan*. DNR input and on-site visits provided valuable assistance during this project.
- Ice removal to facilitate bentonite recovery was minimized by pushing ice out of the way versus lifting and removal from the Creek. The ice was cut with a chainsaw and could be pushed into previously vacuumed areas.
- Construction of a vacuum-type recovery device provided efficient bentonite removal in combination with a trash pump. Per a suggestion from DNR, a clear section of hose was installed which allowed the operator to gauge the amount of bentonite versus water being recovered. The vacuum-type recovery device was made out of steel exhaust pipe with a length of approximately 8 feet. The length allowed the operator to reach the Creek bank and bottom, which had pockets that were over 7 feet deep.
- The creek bottom was dark while the bentonite material was light grey. This allowed the operator to verify that the bentonite was removed down to bottom of Creek and the side of the bank.
- Bentonite/water removal with the vacuum-type recovery device worked well moving upstream or downstream. There was not a lot of turbidity and what little there was cleared quickly and did not flow over the downstream barrieres. The challenge was the bentonite did not easily separate and flow into the intake device. Thus it was required to apply pressure and constantly move the intake device to recover the bentonite.
- A series of 6 transfer pumps were utilized to move the slurry to the upland infiltration pit and were able to run continually without plugging or breakdown. Each transfer station had secondary containment, and all hose connections were wired or locked to provide additional protection. Pump refueling was performed within secondary containment. Bombardiers were initially used to haul the bentonite/water mix to an upland area. This was found to be

inefficient as the recovery pump could not operate continuously. This practice also created an additional risk of spillage at the transfer points.

- The upland area selected for infiltration was within the ROW with a natural berm on two sides. Two additional dikes were constructed on a low side to ensure containment. MPL utilized a recently backfilled trench from the MinnCan Project to act as an infiltration pit. The bentonite/water was pumped into the trench against straw bales with a slight slope to reduce erosion.
- Pilot scale filter testing showed that dewatering the bentonite slurry would be difficult as a sock type filter plugged immediately. During recovery activities, MPL also attempted to pump through a bag type filter in the infiltration pit at 75 gpm; however, the bag filter plugged after one hour of pumping and it was also found to allow some bentonite through the filter. The bentonite material proved to be too fine to efficiently separate from water with a filter material.
- Once the bentonite had dewatered in the infiltration pit, the accumulated bentonite was removed and hauled to an off-site location for re-use in a farm field. MPL staff inspected the off-site disposal site to verify containment within an upland area.
- MPL minimized the size of equipment to provide the least environmental disturbance to wetland and maintain safety near existing buried pipelines. Low ground pressure vehicles, such as a tracked bombardier, were utilized. MPL also utilized a hand-held pump intake device to eliminate the need for a backhoe to hold a larger intake device.
- Development and sharing of a site safety plan prior to work starting helped ensure safety. MPL performed a safety orientation with personnel prior to work starting, with topics including the following: identifying nearest medical facility with directions, wearing personal floatation devices, wearing proper rough service footwear on the ice, cold weather protection, chaps for chain saw use, and hearing protection.

If you have any questions regarding this implementation report, please feel free to call me.

Sincerely,

Mick Hemenway
Minnesota Pipe Line Company, MinnCan Project
Governmental Agency Coordinator
651-470-1788

Barr Engineering Company
4700 West 77th Street • Minneapolis, MN 55435-4803
Phone: 952-832-2600 • Fax: 952-832-2601 • www.barr.com *An EEO Employer*

Minneapolis, MN • Hibbing, MN • Duluth, MN • Ann Arbor, MI • Jefferson City, MO

Technical Memorandum

To: Mick Hemenway, Minnesota Pipe Line Company
From: Brian Angerman and Brian Sillanpaa
Subject: FINAL - LaSalle Creek Response Activities Work Plan
MinnCan Project, Minnesota Pipe Line Company
Date: February 1, 2008
Project: 23/19-997 LSCR 002

Introduction

This technical memorandum presents a work plan for recovering bentonite from the LaSalle Creek frac-out location which occurred during horizontal drilling activities completed as part of the MinnCan pipeline project. The site location is shown on Figure 1. Minnesota Pipe Line (MPL) intends to work closely with the Minnesota Department of Natural Resources (DNR) on an ongoing basis to determine the best method of recovery and disposal of the bentonite material. Therefore, MPL requests that the DNR approve this plan, and any subsequent plans/modifications as necessary, prior to proceeding with the work.

Based on a meeting with DNR staff held January 30, 2007, this memo has been revised to address DNR questions/concerns and represents a final work plan describing the proposed bentonite recovery effort. The following individuals were in attendance at the meeting:

- Cynthia Buttleman, MN DNR, Regional Operations Supervisor, Divison of Lands and Minerals
- Doug Kingsley, MN DNR, Area Fisheries Supervisor, Divionion of Fish and Wildlife
- Paul Stolen, MN DNR, Regional Environmental Assessment Ecologist, Ecological Resources
- Peter Buesseler, MN DNR, Regional Manager, Ecological Resources
- Walter Lundahl, MN DNR, Division of Lands and Minerals
- Mick Hemenway, Minnesota Pipe Line Company, Government Agency Coordinator
- Jim Mattson, Minnesota Pipe Line Company, Project Safety Director
- Brian Sillanpaa, Barr Engineering Company

Objectives

Although not a contaminant, the bentonite material is considered potentially detrimental to the creek and, therefore, will be removed to the extent practical. However, the objective of the recovery effort is to remove the bentonite utilizing methods that do not create a high degree of disturbance to the creek and surrounding wetland. Recovery options were evaluated based on the following criteria:

- Disturbance to the wetland area and LaSalle Creek
- Risk to the active pipelines, as any damage potential caused by large-scale equipment could result in a release
- Worker safety, as the work will be completed during winter conditions with varying ice conditions/thickness due to flow in the creek

Multiple recovery options were evaluated, but not recommended in this plan, based on concerns with the above criteria. During the January 30th meeting, MPL discussed with DNR staff a potential endpoint/goal for the removal of the bentonite material. It was acknowledged that, removal of all the bentonite is likely not feasible and attempting to do so could result in removal of the natural stream bed, resulting in a higher degree of disturbance to the creek. Therefore, it was agreed that a target endpoint would be to remove the readily available bentonite down to the natural substrate/streambed. It was also acknowledged that, because of the unique circumstances associated with this project, it will be somewhat of a “discovery process”; therefore, it’s difficult to state at this point in time just how effective the overall recovery effort will be.

If additional options or enhancements are necessary, MPL will continue to work closely with DNR staff to address potential risks associated with the above criteria. Depending on the effectiveness of the recovery effort and the volume of bentonite material remaining, removal of a downstream beaver dam was discussed as a potential option for increasing the flow velocity in the creek to remove and disperse the material.

Background Information

Background monitoring has been performed to characterize the existing conditions of the creek. Field observations of the two frac-out locations (designated as the South and North Areas) and approximate bentonite thickness are shown on Figure 2. Based on the preliminary field observations, the following baseline assumptions are made:

- The South Area encompasses approximately 300 feet of the creek. In this area, the thickness of bentonite varies from 12 to 32 inches.
- The volume of water in the South Area is approximately 51,000 gallons based on an average depth of 3.5 feet and an average width of 10 feet with 1:1 side slopes.
- The total in-place volume of bentonite in the South Area is 100 cubic yards.
- The North Area encompasses approximately 100 feet of creek. In this area, the thickness of bentonite varies from 1 to 18 inches.
- The volume of water in the North Area is approximately 28,000 gallons based on an average depth of 5 feet and an average width of 10 feet with 2:1 side slopes.
- The total in-place volume of bentonite in the North Area is 15 cubic yards.

Bentonite Recovery

A pilot-scale study was completed to develop and test potential recovery equipment and possible treatment techniques. The pilot study was designed to simulate the conditions in the creek and was completed using bentonite material supplied by the driller.

Completion of the pilot study suggests a vacuum-type recovery device operated with a small trash pump could produce the desired results. A high-end flow rate for the equipment is estimated at 50 to 100 gpm. The vacuum-type recovery device utilizes low-suction pressure at the inlet to prevent large amounts of natural streambed material from being removed, yet will be effective at capturing the bentonite material. The intake device will be fitted with a screen to prevent removal of rocks and natural material. Photos of the pilot-study equipment and testing are provided as Attachment A. As suggested, a translucent intake device will be considered in order to assess the solids content of the slurry mixture during recovery.

In order to minimize the overall impact to the creek and surrounding wetland environment, MPL proposes to use small scale equipment that can be handled and maneuvered manually (limit the number of swamp mats required and also minimizes risk to the active pipelines in the area). Access and equipment transport to the site will be provided using a tracked bombardier and cargo box operated within the existing pipeline right-of-way.

Access holes in the creek will be cut using a new chainsaw that does not contain bar oil. A 'dark house' type structure will be placed over the access holes in order to enhance the visual capability of the operator. Operation of the recovery equipment will be performed in a manner that limits, to the degree possible, the amount of turbidity created during active recovery. Recovery activities will likely start on the downstream portion of each impacted area and progress upstream. Spacing of the access holes will be determined in the field based on the observed effectiveness and reach of the recovery equipment.

During active recovery, monitoring will be conducted at the furthest downstream weir of the work area. It was acknowledged during the January 30th meeting with DNR staff that some turbidity/bentonite solids may migrate over the top of the containment weir during the recovery effort and that coming up with a quantitative measure and/or standard governing this flow is not feasible. Rather, the effectiveness of the recovery effort will be based on a qualitative measure of the solids being recovered versus the turbidity of flow exiting the work area. Based on this evaluation it will be determined if the recovery methods being used are considered effective or should be stopped and further modified/enhanced prior to proceeding.

Once the recovery efforts have been completed to the extent practical and creek has been inspected and approved by DNR staff, the containment weirs will be removed and the natural flow of the creek returned to normal. As previously stated, if the natural stream flow is not sufficient at dispersing any remaining bentonite residual, removal of the downstream beaver dam will be considered and discussed with DNR.

Materials Handling

As discussed, a pilot scale study was completed to develop and test potential recovery equipment and potential treatment techniques. Use of a bag filter was tested for treatment of the recovered bentonite water slurry. Results of the pilot scale study (see Attachment A for photos) showed that filtering the

material will be difficult due mainly to the fact that the small size of the bentonite particles requires a small filter opening, thus causing frequent plugging. Also, due to the recovery method (i.e., pumping) the bentonite/water mixture will likely become highly emulsified, likely resulting in some percentage of solids passing through the filter media. Due to the unknown effectiveness of the filter process it was determined that onsite discharge of the filtrate could be problematic from an ecological standpoint. Also, an onsite discharge would require additional consultation and potential permitting by the Army Corp of Engineers, the County Soil and Water Conservation District, and the MPCA. In terms of schedule, this could significantly delay completion of the work which, if completed this winter, would minimize impact to the creek and disturbance to the surrounding wetland. Therefore, as discussed during the January 30th meeting with DNR staff, MPL will attempt to pump the bentonite slurry mixture to an upland area where it can be safely loaded into a vac-truck or tanker for application to agricultural land offsite in accordance with an existing contract with the landowner. This will involve utilizing a series of small tanks and pumps as “lift stations” in order to convey the material to an upland area for further transportation. To reduce the number of lift stations, MPL will likely incorporate the use of a small tank within the bombardier for some portion of the transfer. If dilution of the recovered material results in higher then anticipated volume, this disposal method may need to be revaluated and further discussed with DNR staff.

As discussed with DNR staff, the bentonite materials located outside of the creek in the surrounding wetland will be removed to the extent possible using hand tools and also disposed offsite. The silt fence material will be left in place for now and inspected in the spring, at which point some additional bentonite may be recovered if necessary prior to removing the silt fences.

Regulatory Permitting and Approvals

In conjunction with the MinnCan Project, the following permits have been obtained by MPL:

- Major Modified NPDES/SDS Permit 56472
- Water Appropriation General Permit dated December 12, 2007, for activities relating to frac-out response in LaSalle Creek

It is assumed that the above permits for the MinnCan project cover the activities described in this work plan, and that DNR approval of this plan acknowledges that additional permitting is not necessary.

Site Safety

As previously discussed, a primary concern is the use of equipment over the existing pipelines, as any damage to the lines could result in a pipeline failure and have serious impacts to the environment and worker safety. MPL plans to minimize activity around the existing pipelines to the extent possible.

Work completed as part of this plan will be performed in accordance with the MinnCan Project health and safety program. All personnel will be required to attend training prior to working onsite. Personal protective equipment (PPE) shall be worn in accordance with the MinnCan health and safety program, with additional PPE for winter conditions and working in a wetland area. Due to the unstable nature of the snow and ice in the wetland area, the "buddy system" will be employed for all personnel within the wetland area. Full-scale recovery activities are currently planed for daylight hours only. If winter conditions require a more aggressive schedule, additional safety issues will be considered.

Schedule and Reporting

MPL is tentatively scheduled to begin recovery activities the week of February 4, 2008, pending DNR approval of this work plan. Written authorization to proceed is requested by February 4, 2008. It is anticipated that the project duration will be three to four weeks, including mobilization and demobilization. Within that timeframe, it is anticipated that there will be approximately three weeks of recovery operation.

MPL anticipates frequent communications with the Agency Monitor during this time, and will provide updates at a minimum of every 48 hours. If any significant changes in the process are considered, the changes will be discussed with the Agency Monitor and/or DNR prior to implementation. At the conclusion of this project, MPL intends to submit a report to DNR summarizing recovery activities and completion of the work in accordance with this work plan and any subsequent DNR communications.

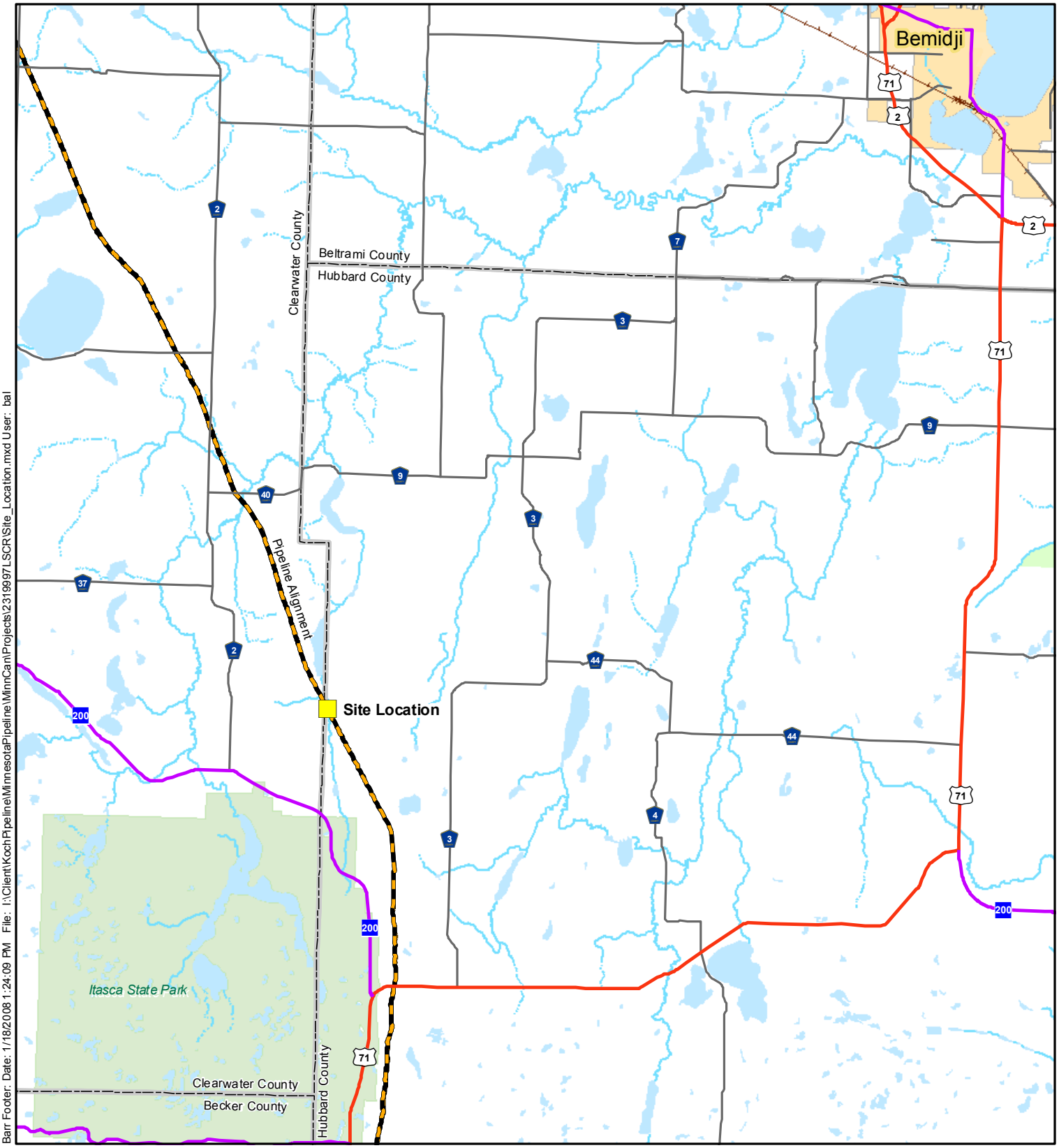

N

Miles

1 0 1 2 3 4 5 6

Kilometers

2 0 2 4 6 8 10

BARR

Figure 1

SITE LOCATION
LaSalle Creek
MinnCan Project

Barr Footer: Date: 1/18/2008 1:24:09 PM File: I:\Client\KochPipeline\MinnesotaPipeline\MinnCan\Projects\2319997\LSCR\Site_Location.mxd User: bal

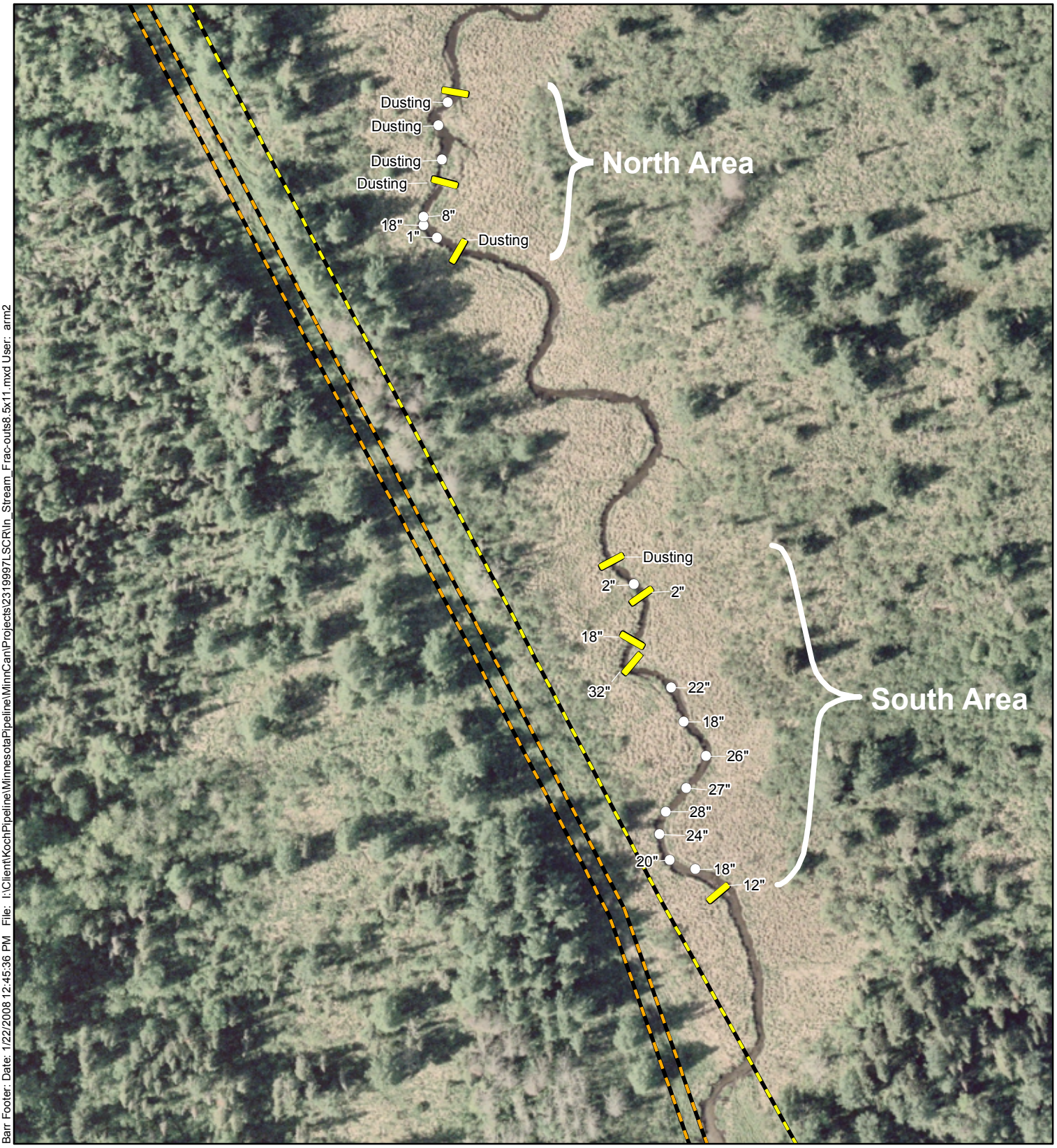

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Observation Site

Silt Barrier

Existing Pipeline Alignment

MinnCan Pipeline Alignment

Feet

60 0 60 120 180 240

Meters

20 0 20 40 60

BARR

Figure 2

SITE MAP
LaSalle Creek
MinnCan Project

Attachment A

6060

FIRE
EXTINGUISHER
260574

WASTE
OIL
ONLY

EXTINGUISHER

EXIT

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENT "G"

G-1 RRVWNA Drake Letter

John Drake, PHD, National Center for Ecological Analysis and Synthesis, Santa Barbara, CA, letter to Paul Stolen regarding the proposed Surface Water Diversion Project between the Missouri River Basin and the Red River of the North in North Dakota

National Center for Ecological Analysis and Synthesis
735 State Street, Suite 300
Santa Barbara, CA 93101
21 March 2006

Paul Stolen
Minnesota Department of Natural Resources
2115 Birchmont Beach Road NE
Bemidji, MN 56601

Dear Paul,

Thank you for bringing to my attention the recent report *Risk and Consequence Analysis Focused on Biota Transfers Potentially Associated with Surface Water Diversions Between the Missouri River and Red River Basins* by Greg Linder et al. (July 2005). This is an ambitious report, which is admirable. I believe such a comprehensive risk analysis for introductions of multiple species has not previously been attempted. Unfortunately, while the intended scope of this project is commendable, it overreaches and fails to deliver satisfactory answers to a number of important questions. In what follows, I try to address the questions you raised, followed by some additional concerns of my own.

1. **What is this study, since it appears not to be an ecological risk assessment? Page 1-7 explicitly states "USGS/CERC did not conduct an ecological risk assessment"**

In the EPA "Guidelines for Ecological Risk Assessment" a distinction is drawn between *risk assessment* and *risk analysis*, in which risk analysis is the scientific component of risk assessment. The other two components are prior problem formulation and (after analysis is complete) risk characterization. In section 1.3.2 the authors report that problem formulation was conducted, but do not report in detail how this step was conducted, which is not the purpose of this document. Accordingly, it is not possible to evaluate the appropriateness of the current problem formulation based on this report (*i.e.*, endpoints, conceptual models, etc.).

Before risk assessment will be complete, risk characterization must also occur, including risk estimation, risk description, development of alternative scenarios, and evaluation of evidence and uncertainty. In order to be viable, such a process should be well documented, transparent, and available for public comment as this is the stage where the relationship between the probabilities of hazards being realized and society's aversion to risk is determined.

2. **How can it be a risk analysis if it doesn't address the possible failure of the proposed biota treatment plant?**

Risk analysis must take into consideration any possible failures envisioned during the stage of problem formulation. This underscores the importance of integrating the

different components of a risk assessment. Certainly it is acceptable to treat any possible component of failure as a "black box" or in some qualitative way. However, this judgment must be made transparent and is open to criticism. If the present risk analysis fails to consider the possible failure of technological components of the system (*e.g.*, failure of the treatment plant) or sets the probability of failure to zero, then problem formulation must be revisited. I find it inconceivable that a proposed technological solution (*e.g.*, treatment plant) should be assumed completely reliable (no engineered system is ever completely reliable). Indeed, I hope that before installing any technology there would be an independent comprehensive effectiveness analysis of proposed systems. My experience with technologies for reducing potentially invasive species in ships' ballast tanks inclines me to think that effective solutions will be extremely costly, possibly prohibitive. I believe these costs should be incorporated in any cost-effectiveness or cost-benefit analysis for the diversion project as a whole.

Given that research and development of technologies for treatment may yet not be completed, an alternative is to perform risk analysis along a range of possible failure rates for a hypothetical treatment technology. A cost-benefit analysis could be performed on this basis and a minimal cost-effectiveness tradeoff could be identified which would set a minimal standard for R&D to achieve, *i.e.*, on the basis of prospective analysis it could be determined that the ratio of economic cost to effectiveness (in terms of water quality standards, system down time, and other metrics) must be below some threshold to be acceptable. Such an approach would be defensible from the risk analysis standpoint while not relying on nonexistent data (*i.e.*, technology failure rates, which presumably are unknown).

3. **What other decision tools and analyses should be performed to improve this risk analysis?**

The assessment of uncertainty is insufficient throughout this study. Risk analysis must make very clear the potential sources of error in projected scenarios. Sometimes the focus of risk analysis on inherently unpredictable events (in the technical jargon, stochastic processes) obscures other sources of errors that must be assessed. These errors include estimation uncertainty of the ordinary statistical variety; uncertainty concerning the choice and structure of models used for making forecasts; uncertainty about extrapolation beyond observed values or from past experiences into the future; and uncertainty concerning the data used for model selection and estimation, particularly that they are representative. Additionally, supporting sensitivity analysis should be conducted for all analyses and reported in order to allow to decision makers to weigh the importance of different modeling assumptions.

The risk maps for invasion of New Zealand mud snail, zebra mussel, etc. are just one example of the failure to adequately estimate and represent uncertainty. These maps were produced using the genetic algorithm for rule-set production (GARP). Despite its faults (which are known and documented in the scientific literature) GARP is one of the most sophisticated tools for potential range mapping currently available and I recommend its use for risk analysis. It is important to realize, however, that the output gradient of the

algorithm reflects only the uncertainty that the algorithm has identified the model that it intended to identify (*i.e.*, the model with the greatest ability to discriminate observations of species presence from places where species have not been collected). It does not represent any uncertainty associated with the correct selection of habitat variables, estimation from a finite data set, appropriateness of the set of models considered, etc. How sensitive these projections are to the choice of habitat variables is evident in an analysis I previously performed in which GARP was used to estimate zebra mussel distribution (Drake, J.M. and J.M. Bossenbroek. 2004. Bioscience 54:931-941). This analysis found that it was difficult to identify spurious predictors of habitat and that changing the set of habitat variables had a large effect on the outcome. I believe it is appropriate to continue using GARP for such analyses while we await development of technologies that overcome these limitations, but it is crucial that thorough sensitivity analysis be performed. It is too easy to misinterpret the stochastic output of the GARP algorithm as representing model uncertainty. Particularly, the percentage values associated with GARP-based risk maps should not be interpreted as probabilities of habitat presence.

As I mentioned earlier, the ambition of this analysis is proportionate to the magnitude of the decision under consideration to complete the diversion. In my view, the comprehensiveness of the analysis should be equally extensive. Other analyses that should be performed are:

(1) Better estimation of failure rates for different components of the treatment system (preferably based on experimentation);

(2) Bioeconomic analysis of system failure on markets for natural products or services derived from the Red River basin;

(3) Assessment of the risks of species transfer from Red River basin to the Missouri River basin (Note: Due to the direction of flow these would be extremely rare, but, because of connections between the Missouri River and Mississippi River basins, have the potential for extensive impacts; these kind of low-probability high-impact assessments are notoriously difficult);

(4) Non-market evaluation of the impact of system failure on environmental services, threatened and endangered species, and cultural activities within the basin;

(5) Legal and ethical analysis with respect to the relocation of species and causing new threats to native organisms;

(6) Forecasts of the effects of introduced species on physical properties of affected ecosystems (some species, such as carp, can affect whole ecological communities, not just individual species, by physically altering environments to which they are introduced);

(7) Cascading effects on lake food webs of potentially introduced pathogens and predators;

(8) Explicit analysis of the potential effects of zebra mussels on this system should be performed, particularly if there is any underwater infrastructure within the basin as this has been one of the most costly consequences of zebra mussels in the Midwest United States (Leung, B., et al. 2002. Proc. R. Soc. Lond. B 269:2407-2413) (Note: zebra mussels generally spread during a planktonic larval stage and the effectiveness of water treatment technologies would therefore be crucial to preventing their spread).

Obviously, such analyses represent numerous disciplines and a range of biologists, ecologists, engineers, statisticians, economists, and anthropologists would need to be consulted for an adequate assessment.

4. **Should this BRA receive an independent review, given its apparent breaking of "new ground"?**

It is my opinion that this risk assessment attempts to be the most comprehensive invasive species risk analysis to date. While invasive species risk analysis should be a part of any decision process and environmental impact assessment in which species translocations may result, this analysis would set a poor precedent for thoroughness and transparency. I strongly urge independent peer review.

5. **Is a 50 year time frame appropriate for a risk analysis of this scale? Are range expansions inevitable, such that even without the diversion project the Red River basin will soon be invaded by species of concern?**

Generally, environmental risk analyses presume much longer time frames than 50 years (*i.e.*, thousands to millions of years), particularly when hazards to human health are involved (*e.g.*, Committee on Technical Bases for Yucca Mountain Standards, National research Council. 1995. *Technical Bases for Yucca Mountain Standards*. National Academy Press: Washington D.C.). Arguments for and against these timeframes usually turn on a tension between bioeconomic arguments in which economic discounting devalues events in the moderate to distant future versus ethical arguments concerning rights of and duties to future generations and/or the natural environment that inflate the costs of such hazards. From the strictly economic standpoint, 50 years is probably sufficient as future value beyond this point will be small. However, it is important to underscore that invasive species are increasingly recognized to have effects on systems of natural and human production (*e.g.*, fisheries) and should therefore be viewed as investments with recurring and future (compounding) returns. Invasive species are also increasingly recognized as reservoirs, vectors, or indirect drivers of disease transmission in both wildlife and humans, including in aquatic ecosystems (*e.g.*, the probable link between zebra mussels and type E botulism).

In my view, range expansions of presently invading species are extremely likely but strictly speaking not inevitable. Given current levels of funding for invasive species management and control, reversing invasions of any but the most recent introductions is impossible. However, it is important to recognize that slowing a range expansion (*e.g.*, the slow-the-spread project for gypsy moths) can represent a substantial net economic benefit even if the program is quite costly. This is the other side of economic discounting. If invasion can be delayed, future economic damages can be considerable reduced from the standpoint of present value.

Further, it is important to note that introduction pathways are generally independent and therefore at least additive. Thus, the presence of a background introduction rate does not obviate the effects of a new pathway (in this case the diversion project), which will contribute to effects proportionally. In numerical terms, this means that if the rate of introduction is doubled by the addition of a new pathway, the expected time to invasion is decreased by half. Moreover, many species of interest will exhibit a nonlinear collective phenomenon referred to as the Allee effect which results in an acceleration of risk with the rate of introduction. In these cases, a doubling of the introduction rate results in a reduction in the expected time to invasion by more than half. Notably, this effect has already been documented for zebra mussels (Leung, B. et al. 2004. Ecology 85:1651-1660).

Conclusion

In my view, this report is an ambitious attempt to perform risk analysis for invasive species. If successful it would represent an important precedent for future projects. While this report's attempt at comprehensiveness is admirable, it ultimately fails to address some important questions while the questions it does address have not been sufficiently thoroughly researched to draw definite conclusions. A fuller analysis would have considered a greater range of scenarios (particularly with respect to failure of the proposed treatment facility and to consequences of invasions) and would attempt to thoroughly identify sources of uncertainty and estimate its magnitude. Probably the assistance of a wider variety of experts will be required for an analysis complete enough to adequately characterize risk of biotic transfer.

As a compilation of current knowledge about the risk of biotic exchange due to water diversion between the Missouri and Red River basins, this report is undeniably comprehensive. The problem is that this knowledge is currently quite limited. Of course, whether this knowledge is required to make a decision depends on legal and political contingencies that go far beyond this risk analysis itself. The point is just that based on this report one cannot conclude that biotic transfer is either likely or unlikely and what the associated economic and environmental consequences would be. Undoubtedly this is because the study itself was under funded compared with its goals, a reflection on the devaluation of information necessary to make informed decisions of environmental consequence generally.

Sincerely yours,

John M. Drake, Ph.D.

National Center for Ecological Analysis and Synthesis
735 State Street, Suite 300
Santa Barbara, CA 93101

805-892-2529 (phone)
805-892-2510 (fax)

(Affiliation is for identification purposes and contact information only. The opinions expressed in this letter are my own and do not necessarily reflect the position of my organization.)

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENTS "H"

H-1 Stolen - Risk & Consequences

Paul Stolen Letter to:
Commissioner Mike Rothman, Minnesota Department of Commerce
Ken Westlake, Regional NEPA Contact, USEPA
Tamara Cameron, Chief, Regulatory Branch, USACE

Re: Proposed Enbridge Sandpiper and Line 3 Enlargement/Relocation/Abandonment projects in Minnesota: "Policy and technical reasons for independent, scientifically sound analysis of the risk and environmental, cultural, and human consequences of oil releases for the 50+ years of the project."

H-2 DHS Solar Magnetic Storm Impact on Control Systems

Department of Homeland Security Report "Solar Magnetic Storm Impact on Control Systems" Revised Jan 2014

H-3 AC Corrosion HV Power LIne Cathodic Protected Pipeline

CEIT'14 Report "AC Corrosion Induced by High Voltage Power Line on Cathodically Protected Pipeline

August 29, 2015
Paul Stolen
37603 370th Av. SE
Fosston, MN 56542
218-435-1138

Michael Rothman, Commissioner
Minnesota Department of Commerce
85 7th Pl E, #500,
St Paul, MN 55101

Tamara Cameron,
Chief, Regulatory Branch
St. Paul District
U.S. Army Corps of Engineers
180 5th St. East, Ste. 700
St. Paul, MN 55101-1678

Ken Westlake
Regional NEPA Contact
US EPA, Region 5, 77 West Jackson Blvd.
Chicago, IL 60604-3507

Re: Proposed Enbridge Sandpiper and Line 3 Enlargement/Relocation/Abandonment projects in Minnesota: *Policy and technical reasons for independent, scientifically sound analysis of the risk and environmental, cultural, and human consequences of oil releases for the 50 + years of the projects*

Dear Commissioner Rothman, Ms. Cameron, and Mr. Westlake:

I am writing this letter because two large industrial oil facilities are planned for a Minnesota landscape highly susceptible to oil releases. This landscape contains highly valuable natural and cultural resources, many of which are in inaccessible locations. . But even more concerning, they are being planned, to-date, *without adequate independent review by any government entity.* The topic of this letter is the portion of the independent review I refer to in the topic line of this memo: *independent, scientifically sound analysis of the risk and environmental, cultural, and human consequences of oil releases for the 50 + years of the projects.*

I am writing you at this time because crucial and as-yet unmade policy decisions are sorely needed on these two pipeline projects. Such decisions are past due. As I describe below, Minnesota agencies are currently not yet taking the proper approach to this subject. *I am thus urging that you collectively implement a coordinated state-federal policy that results in the proper science-based review of the two Enbridge pipelines with respect to the risks and impacts of oil releases.* And it is simply bad government to not coordinate federal and state reviews. The federal government, especially the Environmental Protection Agency, has more experience supervising the type of studies I am recommending. The model for such studies are contained in the three studies in Item 3 of Attachment 1 of this letter. I note that all of them were instigated by federal agencies.

I have the credentials for speaking about this topic. I worked for over 30 years on environmental policy and on the review of the potential impacts of many kinds of projects. This included numerous energy projects, and the review of about 12 pipeline projects—natural gas, carbon dioxide, crude oil, and water pipelines. (A short bio is included at the end of Attachment 1.) I am also familiar with risk assessment methods and with interstate and cross-border projects. I helped coordinate many reviews of projects with overlapping federal and state jurisdiction and permits. Such coordinated reviews simply reflect good government practice, but they are also written into regulations to some extent.

The three addressees of this letter are individuals who have the legal and policy authority to make decisions about the depth of technical analysis as well as locations of alternatives routes to be studied for the two proposed Enbridge pipelines. This is the level where policy, law, and regulations are interpreted and subsequent directives given to technical staff. Both the Clean Water Act and the National Environmental Policy Act provide this authority, and require that reasonable alternatives that have less potential impact be studied. And the US Fish and Wildlife Act *requires* federal consultation with the state fish and wildlife agency with respect to impacts of a project. This agency is the Minnesota Department of Natural Resources.

I am a copying key federal and state decision-makers with this letter. This includes the US Fish and Wildlife Service, and three State of Minnesota agencies—the Department of Natural Resources, Pollution Control Agency, and Department of Health. I have also included public participants who have been deeply involved and concerned about these projects. The other four agencies have the statutory ability to insist that the three addressees of this letter authorize the type of studies that are needed, and to insist that alternative routes through less sensitive landscapes be included in the analysis.

I have looked at the draft proposed contents of the Department of Commerce Comparative Environmental Assessment for the Sandpiper project (and cumulative impacts of Line 3.) "Worst-case" risk is mentioned only in passing. This is completely inadequate and, if pursued as proposed, will neither result in a proper risk assessment nor consequence analysis. It will not result in proper comparison of routes because alternative routes through landscapes less susceptible to damage from oil spills and that are more accessible are not being included in the analysis.

Up to now, it appears that Minnesota agencies contemplating permits for proposed new oil pipelines have never previously considered potential impacts of oil spills. Nor have they considered the cumulative impacts of adding new and ever larger pipelines alongside old and small pipelines permitted long before modern environmental laws were created—*even though Minnesota environmental law and regulations require that this be done.* Given this woeful lack of study, It is not surprising that existing pipeline corridors are given automatic preference.

The two Enbridge projects apparently are still being treated by Minnesota agencies as if they are relatively routine pipeline projects. As if there are no better landscapes than where old pipelines were originally routed. As if the chances of pipeline rupture and serious leaks are only theoretical events that happen in other states or countries. *As if selecting pipeline routes that all cross environmentally sensitive, difficult landscapes does not bias the outcome of a comparison of routes with respect to human, environmental, and cultural impacts.* I believe that this is not because of ill intent by state employees—rather it is because of lack of policy analysis and coordination, and lack of understanding of risk and consequence analysis methods for large industrial oil facilities. This is why I believe that federal assistance on the complex topic is needed.

Attachment 1 provides the technical reasons why the studies I am recommending must be accomplished for these two projects. For example, In recent weeks, the new Nexen pipeline in Canada recently ruptured and apparently leaked for weeks in spite of sophisticated new automated control systems. The Keystone 1 pipeline in Missouri, built in 2009, *suffered extreme and unexpected corrosion only three years after installation*. An internal report commissioned by the pipeline company found that this was caused by stray voltages. The result was deep corrosion pits that nearly ate through the pipeline wall. And time and time again, pipeline management failures have caused serious spills or explosions that caused loss of life.

Furthermore, there are even some indications that new technologies, new engineering complexities, and sophisticated control systems may even introduce new risks and causes of pipeline failures. These two Enbridge projects, costing billions of dollars, are technically complex industrial facilities, and will be remotely monitored and controlled from a high-tech, satellite-connected control center 1,000 miles away in Canada. Such control centers are the subject of a 2014 Department of Homeland Security warning that they can fail or result in false pipeline pressure readings from the effects of solar storms.

Attachment 2 contains descriptions of two specific areas extremely vulnerable to very damaging oil releases. These are: 1. The LaSalle Creek Valley, with its lakes north of Itasca Park, and the short distance to the Mississippi river; and 2. Upper and Lower Rice Lakes in southern Clearwater County. Both areas have very extensive and important wetlands, as well as highly valued public and cultural natural resources. *Should a significant release occur at the pipeline river crossings at these sites under certain normal conditions, oil recovery would likely be very difficult or impossible, recovery efforts would add to the damages, and human and natural resource impacts could occur for generations into the future.*

I am not claiming the Enbridge pipelines will certainly rupture and severely damage Minnesota's human and natural environment. But they will be in place for 50 or more years. I am *merely* saying an independent, appropriate, and thorough analysis be done of the risk and consequences of such events. *This is an eminently reasonable request, based in law, regulations, and common sense*. And I expect that route alternatives be included in the study that cross landscapes inherently less prone to damage from oil releases and more prone to easier clean-up. In fact, in my 30 year career doing environmental review—sometimes of complex projects—I have never encountered a situation where such large projects are not thoroughly and independently reviewed in this manner. *Ever.*

Of course, I am not a lawyer, but I have lots of policy experience, including interpreting the policy implications of court opinions and providing direction to other staff. I am reminded of a project I was deeply involved in where a federal judge made a statement quite appropriate to the current Enbridge situation. It was a proposal from the state of North Dakota to move Missouri River water into the Hudson Bay drainage, and was one of two such projects under consideration. Such proposals have lots of potential problems, including policy problems. The Bureau of Reclamation had only done an Environmental Assessment on one of the projects, known as "NAWS." They had dismissed adverse effects from introducing damaging biota across the Continental Divide into the Hudson Bay basin during the transfer. They were hoping to do the same with the other project. Manitoba sued, asking for an Environmental Impact Statement.

In an opinion admonishing the error of the Bureau of Reclamation, one could almost replace Judge Collyer's reference to "biota" with "risk and consequences of oil releases":

"*Federal Defendants argue that the risks of leakage are low and, therefore, that no further study is necessary.. . . "What may seem minor in terms of percentages may be substantial in net effect. . . . Therefore, even a low risk of leakage may be offset by the possibility of catastrophic consequences should any leakage occur. Without some reasonable attempt to measure these consequences instead of bypassing the issue out of indifference, fatigue, or through administrative legerdemain, the Court cannot conclude that BOR took a hard look at the problem.*" (My emphasis added.) (United States District Court for the District of Columbia, Government of the Province of Manitoba, Plaintiff, v. Gail A. Norton, Secretary, United Stated Department of the Interior, et al., Defendants. Civil Action No. 02-cv-02057 (RMC) February 3, 2005.

I have in the past served as a technical consultant to Friends of the Headwaters, a citizens group advocating a more suitable route for these projects. Technical testimony I prepared was submitted by this group during the early rounds of hearings on the Sandpiper project. This current letter is my own, and has not been reviewed by that organization. For those who seek motives behind this letter, mine is simple and uncomplicated: I am profoundly concerned that these very large projects could greatly damage Minnesota's environment during the more than 50 year project life. My career experience with pipelines and other very large projects also drives this concern.

Thank you for your consideration, and please give me a call if you have any questions.

Sincerely,

Paul Stolen

Paul Stolen

C: John Linc Stine, PCA Commissioner
Tom Landwehr, DNR Commissioner
Will Seuffert, Minnesota EQB
Joe Plumer, Counsel, White Earth
Richard Smith, Friends of the Headwaters
Steve Schulstrom, Carlton County Land Stewards
Craig Sterle, CCLS
Bill Grant, Department of Commerce
Willis Mattison
Bill Sierks, MPCA
Tom Melius, US Fish and Wildlife Service
Dr. Edward Ehlinger, Commissioner for Health
Kathryn Hoffman, Counsel, MCEA
Jerry Von Korff, Counsel for Carlton County Land Stewards
Molly Pederson, Governor Dayton's Office
Randall Doneen, MDNR
Winona LaDuke, Honor the Earth
Paul Blackburn
Todd Moilanen, Mille Lacs Ojibway Band

ATTACHMENT 1

Enbridge Sandpiper and Line 3 Enlargement/Relocation/Abandonment projects
Policy and technical reasons for independent, scientifically sound analysis of the risk and environmental, cultural, and human consequences of oil releases for the 50 + years of the projects

1. Lack of study to-date. No study of the Enbridge Sandpiper and Line 3 proposals has yet been done by any government agency of Minnesota--or any federal agency--of the risk of oil releases and consequences to natural resources and to people from such releases. There may be an assumption that the decision to do such a study is connected with the decision to do an EIS. The need for a state EIS is under litigation, and the need for a federal EIS has been recommended, but not yet decided. A proper risk and consequence analysis of oil releases is needed to determine where to locate the pipelines, is also needed for proper environmental permitting and any other public interest decision. It is not dependent on the decision to do an EIS.

2. Recent (since about 2009) very large and damaging pipeline accidents and ruptures have changed how risk assessments are conducted and demonstrated why they are needed. These events, and subsequent studies, all have occurred after the last two large Enbridge projects were permitted in Minnesota (Alberta Clipper (now Line 67) and Southern Lights.) These events caused extreme damage to natural resources, loss of life, and have demonstrated lack of adequate federal oversight of pipeline regulations. They have demonstrated appalling failures of those managing the pipelines, and ensuring their integrity. Some of the events include the Enbridge oil pipeline rupture in Michigan, the San Bernadino gas pipeline explosion in California, the two recent river pipeline ruptures in the Yellowstone River riverbed. In addition, there are two 2015 incidents with new pipelines specifically described below in Items #5 and 6. These events have led to recent studies of pipeline oil release risk and consequence analysis that are much more rigorous than studies done prior to 2009. Some are described in Item #3 below. (*See Sandpiper hearing record before the Minnesota PUC.)*

3. Keystone XL Environmental Impact Statement studies, as well as other recent studies provide sound guidance for conducting the proper risk and consequence studies. Excellent studies of the risk and consequences of oil releases from pipeline ruptures and leaks were recently completed for the Keystone pipeline. Another excellent study was done recently by the Oak ridge National Laboratory. It contained highly useful methods of determining potential costs of pipeline ruptures and damage to natural resources. These studies were accomplished even though natural resources—a surface and groundwater resources—along the Keystone route are of less magnitude and extant than those found along the Enbridge proposed route. The three main studies that can be used as a rough model are:

--"Third-Party Consultant Environmental Review of the TransCanada Keystone XL Pipeline Risk Assessment" Exponent, 1800 Diagonal Road, Suite 500 Alexandria, VA 22314 April 26, 2013

--"Keystone XL Pipeline: Independent Engineering Assessment – Final Report" December 2013. Energy Systems, Battelle Memorial Institute, 505 King Avenue, Columbus, OH 43201

"Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety." October 2012. Prepared by Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831-6283, managed by UT-Battelle, LLC for the U.S. Department of Energy.

4. Forecasts of new pipeline failures over a 25 year period contained in the Bristol Bay EIS on Pebble Mine. There are three pipelines in support of this proposed Alaska mining project. The final EIS indicated the probability of large rupture under several scenarios over the 25 year life of the project. It found that the chance of rupture ". . . .would exceed 25%, 30%, and 67% . . . . (and) In each of the three scenarios, there would be a greater than a 99.9% chance that at least one of the three pipelines carrying liquid would fail during the project." (*See January 2014 Final EIS release, Chapter 11, pipeline failures.*)

5. July 2015 rupture of the new Nexen Pipeline in Alberta. This double-walled pipe was carrying a mixture of hot tar sand oil and water. Over 31,000 barrels leaked out into wetlands, and, in spite of a new automatic monitoring system, the rupture might have gone undetected for as long as two weeks (*See Toronto Globe and Mail article on Nexen Pipeline, July 23, 2015.*)

6. Deep corrosion in only three years of the new Keystone 1 pipeline in Missouri. This pipeline, built in 2009, was found in 2012 to have developed deep corrosion pits at sites in Missouri. According to an internal report prepared for the company, and inadvertently made public, these pits had corroded almost through the pipeline wall in only three years, and were caused by stray electrical voltage. This was in spite of modern, high-tech and cathodic protection coatings similar to those used by Enbridge, which are touted as sufficient to protect against such corrosion. A possible cause of such rapid erosion is discussed in Item #7 below. (*Note: See available on the web: TransCanadaKeystone Root Cause Report_ Feb 15 ver1docx _2_.pdf; a confidential report prepared for TransCanada Pipeline Company that was inadvertently put into the public record of the South Dakota Public Utility Commission.*)

7. Pipelines are subject to rapid corrosion in certain conditions of exposure to electric fields that induce an electric current. Long steel structures develop measurable electrical currents because of the earth's electromagnetic field, proximity to high voltage power lines, stray ground currents, large solar storms, and so forth. This has long been known to increase corrosion. Pipeline owners have responded with "cathodic protection" measures to prevent the corrosion. (Note the previous Item #6 regarding the Keystone 1 rapid erosion caused by stray voltage.) However, such protection itself isolates the pipeline further, which in turn can increase the induced current, and result in more difficult design issues, including site specific variations, and even more rapid corrosion. Enbridge proposes to follow some existing high voltage transmission lines, as well as places where such lines cross the proposed routes. (*See for example,* ***a.*** *" AC Corrosion Induced by High Voltage Power Line on Cathodically Protected Pipeline, " 2014. International Conference on Control, Engineering & Information Technology (CEIT'14) Proceedings IPCO-2014 ISSN 2356-5608;* ***b.*** *"The effects of geomagnetic disturbance on electrical systems at the earth's surface", Adv. Space Res. Vol 22, No. 1, pp. 17-27;* ***c.*** *"Geomagnetic disturbances and their impact on power systems, Status report," Olof Samuelsson, Industrial Electrical Engineering and Automation, Lund University;* ***d.*** *"Solar Storm Impacts on Wireless Networks, 2012. Nigel McKelvey, International Journal of Engineering and Technology Volume 2 No. 4, April, 2012. ISSN: 2049-3444 © 2012 Letterkenny Institute of Technology, Port Rd., Letterkenny, Co Donegal, Ireland; and* ***e.*** *Calculation and Analysis of the Coupling Effects of High Voltage Transmission Lines in Joint-use Corridors Shared by Multi-systems. 2011. PIERS Proceedings, Suzhou, China, September 12{16, 2011 School of Electrical Engineering, Southwest Jiaotong University.*)

8. Department of Homeland Security 2014 warnings about pipeline control system damage from solar storm events. This federal agency issued an advisory warning about the effects on satellite based pipeline control systems, as well as effects on other types of industrial control systems from solar storms. The advisory pertains to systems such as Enbridge's modern control center in Alberta, and

indicated that GPS as well as satellites could be affected. This advisory has partly resulted because of the very rapid adoption of such control systems in a short period of time, accompanied by the realization that large and unusual solar storms have not occurred during this recent short time period. With respect to other pipeline effects besides control systems, the advisory also states: "Solar storms can affect pipe-to-soil voltages, leading to currents that disturb flow meter signals, which can result in false pipeline flow rate data. The induced currents can also increase pipeline corrosion rates. Insulating flanges meant to interrupt current flow create an additional point where electric potential can result in current flow to ground, increasing the risk for corrosion." (*See Department of Homeland Security Advisory (ICSA-11-084-01) "Solar Magnetic Storm Impact on Control Systems Original," release date: March 26, 2011 | Last revised: January 02, 2014. See also Risk Management Issue Brief, May 2011. "Geomagnetic Storms: An Evaluation of Risks and Risk Assessments," By the U.S. Federal Office of Risk Management and Analysis*)

9. Rupture of pipelines of this size can result in large oil releases even if ideal rupture detection and shutdown actions occur. Enbridge relies on what they say is a state of the art pressure and automatic block valve control system based in Alberta. It relies on GPS and satellite systems. They say this will allow rapid shutdown of any pipeline that is ruptured by third party actions (such as non-pipeline company excavators) or any other cause of rupture. But on pipelines of the size of Line 3 (36 inches), even ideal shutdown response times can result in a worst-case release of over 20,000 barrels of oil from the rupture. The Sandpiper/Line 3 route has landscapes particularly susceptible to long-term damage from such a release. (*For "worst case" risk assessment results, and discussions of the kinds of damage that can occur, as well as discussions of the kind of landscape susceptibility along the proposed Enbridge routes, see "Third-Party Consultant Environmental Review of the TransCanada Keystone XL Pipeline Risk Assessment" Exponent, 1800 Diagonal Road, Suite 500 Alexandria, VA 22314 April 26, 2013; "Keystone XL Pipeline: Independent Engineering Assessment – Final Report" December 2013. Energy Systems, Battelle Memorial Institute, 505 King Avenue, Columbus, OH 43201; and "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety." Prepared by Oak Ridge National laboratory, Oak Ridge, Tennessee 37831-6283, managed by UT-Battelle, LLC for the U.S. Department of Energy.)*

10. Modern remote controlled block valves can accidentally close and result in oil releases. A report to Congress that was recently done after a number of pipeline accidents found that automatic block valves can shut down accidentally, resulting in oil releases. (*See "PIPELINE SAFETY, Better Data and Guidance Needed to Improve Pipeline Operator Incident Response," Report to Congressional Committees January 2013. GAO-13-168. United States Government Accountability Office (GAO)*).

11. Highly significant leaks of many barrels per day can remain undetected for weeks. Automatic monitoring systems respond to drops in pipeline pressure. Even the most sophisticated leak and pressure detection systems cannot detect some leaks. This can occur because small leaks don't result in a pressure drop that is detectable by monitoring systems. According to the Exponent report cited it #3 above, such leaks can go undetected for months. They estimated that for a 36-inch pipeline the leak was about 28 barrels/day. If this is correct, this means a potential underground leak of 840 barrels, or 20 35,280 gallons, per month. Such leaks are only found when they reach the surface. Clearly, given the project's 50-year life, deep pipeline burial under rivers due to Horizontal Directional Drills, and the prevalence of both surface and groundwater, along the proposed route, this issue must be thoroughly addressed in a risk and consequences study, and when comparing alternative routes. (*See "Third-Party Consultant Environmental Review of the TransCanada Keystone XL Pipeline Risk Assessment, " Exponent 1800 Diagonal Road, Suite 500 Alexandria, VA 22314 April 26, 2013.)*

12. Federal pipeline safety regulations require "worst-case" risk assessments yet these studies allow companies to keep them from the public. Enbridge has done these for the Sandpiper project and their other pipelines. Therefore, since they are secret, there is no ability to determine findings or adequacy of the reports. The Keystone XL review indicated substantial underestimation of risk when the company's forecasts were made available. (*See several locations in the PUC hearing record, Sandpiper project; also note the discussion above about the rapid corrosion of the Keystone 1 pipeline discussed in #6 above.*)

13. Standard risk assessment methods require assessing rare events when they have high consequences. Many miles of pipelines in the United State haven't ruptured. But a fundamental principle of risk assessments as practiced in the USA and elsewhere is that if the consequences of a pipeline rupture are very high, then rare and unlikely scenarios must be addressed in the risk assessment. The large size of the Sandpiper and Line 3 pipelines and their location in highly sensitive areas certainly mean potentially large releases and large consequences over a 50 or more year project life. Furthermore, there are obviously differences in landscapes such that consequences are lower in some locations, and containment of spills is easier in some locations. Therefore, it is a certainty that risk and consequence analysis results should be considered in deciding the proper location of pipelines. (*See hearing record, Sandpiper before the Minnesota PUC. See also Risk Management Issue Brief, May 2011. "Geomagnetic Storms: An Evaluation of Risks and Risk Assessments," By the U.S. Federal Office of Risk Management and Analysis*)

14. Standard "worst case" risk assessments should also consider the consequences of liquid pipeline ruptures being accompanied by fire that damages adjacent pipelines. Since Enbridge proposes to locate its pipelines as close as 25 feet from its other pipeline, a rupture and fire scenario may cascade to adjacent pipelines. Some products carried by these large pipelines (30-36 inches in diameter) are considered to be as explosive as gasoline. Risk and consequence studies need to consider whether cascading damages to adjacent lines could occur, and, if so, examine consequences. (*For a risk assessment study of liquid pipeline rupture accompanied by fire see "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety." October 2012. Prepared by Oak Ridge National Laboratory, Oak Ridge, Tennessee.)*

Summary biography of Paul Stolen

My scientific training is in fisheries and wildlife management, and I have published papers on waterfowl behavior in refereed journals. I also attended graduate school in the University of Minnesota School of Journalism and Humphrey Institute of Public Affairs. I am retired, after working for the University of Minnesota, Minnesota Department of Natural Resources, Minnesota Legislature, Montana Department of Natural Resources and Conservation (Energy Division), University of Minnesota, and a short time for a private consulting firm.

My professional experience and personal interest involves a focus on the use of scientific information in public policy and decision making. A main focus while employed and as an involved citizen during this 40 year career has been on applying impact assessment laws and regulations, and on policy analysis. I have written and reviewed many environmental impacts studies, and written environmental regulations for energy facilities, including pipelines. I've worked with other states and the federal government on water, energy, and other projects. I have worked as a reviewer/regulator on about 12 different pipeline projects, was Assistant Director of the Montana Interagency Pipeline Task Force, and have been an environmental inspector on a number of pipeline projects. I first began my involvement with pipelines

as a union laborer on the bending crew of 34-inch pipeline in Minnesota, which is now known as Enbridge Line #3.

I have also worked with Canada—both the federal Foreign Affairs Office, Manitoba, and Canadian Consulate in Minneapolis—and U.S. federal agencies and other states on water issues, including boundary issues with Canada. I am a veteran of the US Army, and spent a year at the Walter Reed Institute of Research in Washington, D.C. and a year in Vietnam doing diagnostic work and research on tropical diseases affecting people and animals.

ATTACHMENT 2

Two examples of locations along the Enbridge proposed route needing careful analysis of the risk and consequences of "worst-case" oil releases.

I have selected the following two examples because I am familiar with both locations. This knowledge comes from my professional and educational career, as well as personal knowledge. During the initial period of review of the Sandpiper project, several alternative routes were proposed to take Bakken oil directly to its destination in the Chicago instead of continuing to expand pipeline corridors—or create new ones—through landscapes sensitive to damage from oil spills. My education and career in the Minnesota DNR, Minnesota Legislature, and Minnesota EQB, and with a private consulting company, has given me broad knowledge of the landscapes of Minnesota. I can say with some confidence that those southern and western routes are unlikely to cross areas of such high cultural, ecological, and natural resource significance as the following two examples. In addition, those southern and western routes are *much* more accessible when compared to these two examples, should a serious oil release occur.

Example 1: Proposed Enbridge Sandpiper/Line 3 projects crossings of LaSalle Creek Valley and potential impacts to LaSalle Creek, Big LaSalle Lake, associated wetlands, LaSalle Lake State Recreation Area, Scientific and Natural Area, cultural and historic sites, Mississippi River, etc.

Example 1: Site description and Enbridge proposals. This site straddles the Clearwater and Hubbard County line and is about five miles north of Itasca Park, Minnesota. This area is very hilly glacial till, with many isolated depressions that result in precipitation entering groundwater rather than running off. The till is very mixed, with gravel or sand layers mixed in with more impervious material. Groundwater flows can be very rapid laterally, and are complex. LaSalle Creek runs through a glacial tunnel valley with steep ridges on each side that are on the order of 100 feet above the valley. The valley bottom is covered in wetlands with deep organic material—likely 40 or more feet deep--except where the lakes are present. Many emergent springs from the hillsides result in wetlands actually are being found on the lower slopes of the hills. The creek itself is a trout stream at the pipeline crossing location, and it meanders through the wetlands until reaching Big LaSalle Lake about one-half mile from the pipeline crossing.

The proposed Enbridge route follows a pipeline corridor established 60 or so years ago, prior to any significant environmental laws. My familiarity with the site dates to 2007-2008 when I was employed by the MDNR. The 24-inch MinnCan pipeline was constructed within a few feet of the old pipelines in that time period. I also am familiar with groundwater issues in this terrain. While employed at the DNR, I was the representative dealing with a nearby difficult highway project. Test drilling for bridge foundations resulted in severe eruption of groundwater from the test hole when groundwater under high pressure from nearby higher terrain was intercepted.

I recommended, after an internal coordinated review of the MinnCan proposal, that the LaSalle Creek Valley area was the most problematic in my work area. At that time, this was about a 100 mile length of the proposed pipeline. After the project was approved by the Department of Commerce, the creek crossing was done with an HDD bore of about 3,000 feet in length in the winter. There was a large "frac-out" of drilling mud that resulted in a major clean-up operation and difficulty. The cause of this was almost certainly the uprising groundwater, and very saturated muck in the valley. The issues that came up during this clean-up operation are somewhat indicative of the problems that could occur if there was a pipeline rupture in this location, as discussed in the next section regarding oil release consequences in this area.

Now, Enbridge proposes—with Sandpiper—to cross the valley with a trenched crossing closer to Big LaSalle Lake. I assume they will propose the same with the Line 3 project. In my experience, this type of site will need sheet pile, at best, in order to dig a trench. At worst, this could well be a construction engineering experiment with very bad environmental consequences during construction, such as a very wide disturbed area, and siltation into Big LaSalle lake. Concrete weights will be needed to suspend the pipes below the surface within the water-saturated wetland muck soils.

There are two lakes downstream of Big LaSalle Lake in the same tunnel valley, Middle LaSalle Lake (a small lake about two miles from the pipeline crossing,) and LaSalle Lake, about 3.5 miles from the crossing. The Mississippi River is immediately downstream of LaSalle Lake, about 5.5 miles from the pipeline crossing. LaSalle Lake is an extremely high value Minnesota resource, based on the following information from the DNR about the LaSalle Lake State Recreation Area (SRA):

"At 221 acres and 213 feet deep, with over 18,600 feet of shoreline, LaSalle Lake is one of Minnesota's most pristine and deepest lakes. The lake supports walleye, northern pike, largemouth bass, black crappie, and bluegill sunfish populations. . . .In the early 1990s, an early Native American Elk Lake Culture prehistoric site was discovered adjacent to LaSalle Creek near the outlet of LaSalle Lake. The site was identified during planning for an upgrade of the county highway and was partially excavated in 1995 before the road was rebuilt.

The Institute for Minnesota Archaeology states: "...artifacts recovered from the LaSalle Creek site have provided archaeologists with a clearer picture of how the producers of Brainerd Ware ceramics lived, what they ate, and what tools they made. In addition, the date of 3,180 years ago obtained from charred residue on the inside of a ceramic shard at the LaSalle Creek Site is one of the earliest known dates for an Elk Lake Culture occupation in Minnesota."

The northern headwaters of the Mississippi River is an extremely important area for these early archaeological sites, and additional cultural resource areas may be discovered on the property. Because the side slopes of the LaSalle Creek glacial tunnel valley and LaSalle Lake's bottom are so steep, the lake's littoral zone is relatively narrow and represents a very small portion of the lake's surface area.. . . .The landscape was identified by the Minnesota County Biological Survey (MCBS) as an area of "High and Outstanding Biodiversity Significance." Over 90 species of trees and shrubs and more than 140 species of herbaceous plants, including 12 species of orchids, have been surveyed and recorded growing in the area.

MCBS has also identified numerous rare, threatened, endangered, and special concern species of plants and animals, including ram's head lady slipper, hair-like sedge, northern oak fern, two species of caddisfly, and trumpeter swan.

LaSalle Lake's west facing slopes host red pine and jack pine forests and woodlands. East facing slopes are covered with hardwood forests that include occasional large white pines, balsam fir, and white spruce. To the north, close to where the LaSalle Creek empties into the Mississippi River, a small but high quality old-growth northern white cedar forest exists where springs emerge from terraced slopes. A portion of La Salle Lake SRA has been designated as a scientific and natural area (SNA), recognizing the high quality native communities and rare plant and animal species found there." (MDNR web site description of SRA.)

Example 1: Consequence analysis of an "worst-case" pipeline rupture and oil release at the crossing of the LaSalle Creek tunnel valley. The following is a preliminary list of issues that need to be addressed in a proper analysis:

1. A "worst-case" pipeline rupture for a 36 inch pipeline is calculated to be about 20,000 barrels of oil, according to the studies cited in Item #3 above, even with a rapid response time. Also, the Enbridge 36-inch pipeline rupture in 2010 in Michigan was about 20,000 barrels, even though it wasn't a "worst-case" rupture with respect to the type of rupture that occurred (a "fish-mouth" break occurred whereas normal "worst-case" considers a "decapitation" break where the entire pipe is opened. The issue at the Michigan spill was that Enbridge didn't shut down the pipeline for 17 hours after the rupture.) That rupture polluted at least 35 miles of the Kalamazoo River, and clean-up costs have reached $1.3 billion.

2. As noted, the two Enbridge pipelines are proposed to be constructed alongside three other older pipelines now present at the LaSalle Creek crossing. As discussed in Item #14 in Attachment 1, "worst-case" risk assessments consider the scenario of a pipeline rupture accompanied by fire. Therefore, study is needed to assess whether if this occurs, adjacent pipelines will be damage and also rupture before they could be shut down.

3. Critical resources are very close to the pipeline route. Big LaSalle Lake is one-half mile downstream of the pipeline crossing of the tunnel valley and creek, and would be closer than that with the proposed Enbridge crossings. The LaSalle Lake State Recreation Area is 3.5 miles downstream, and the Mississippi River is 5.5 miles downstream from the crossing. In other words, *these stream reaches are much closer and could have a similar result as occurred in the 35 mile stretch of the Kalamazoo River in Michigan polluted by another Enbridge project.* In addition, the Exponent Report cited in Item #3 in attachment 1 indicated that impacts associated with small streams should be assessed out to 10 miles from the pipeline in landscapes such as this.

4. All of the tunnel valley, creeks, lakes, and Mississippi River have poor access for clean-up equipment.

5. Steep terrain means pipeline ruptures at various locations can reach these critical waters.

6. The break-out of drilling mud during construction of the MinnCan pipeline occurred in the winter. Springs were so abundant that the ground and wetland surfaces were unfrozen even in a cold midwinter. Even relatively light motorized equipment for clean-up could not be used, and clean-up was done largely by hand, and with small pumps. This characteristic of the lower parts of the slopes of the LaSalle Creek tunnel valley is present all the way to the outlet of LaSalle Lake. *Therefore, heavy equipment either will not be able to be used for clean-up, or, if used, will cause all sorts of long-term environmental damage.*

7. A proper assessment must take into account whether an oil spill at this location could ever be cleaned up, and would need to address potential impacts to all of the values inherent in these downstream locations.

8. A proper assessment of alternatives must compare potential impacts at this site with potential impacts along other routes, such as the southern and western alternative to take Bakken oil directly to the Chicago area rather than through Superior, Wisconsin. The federal Clean Water Act, and National Environmental Policy Act requires that alternatives that have fewer impacts be carefully considered.

Example 2: Proposed Enbridge Sandpiper/Line 3 projects effects on Upper and Lower Rice lakes, the Wild Rice River and potential impacts to wetlands, cultural resources, wild rice, and environmental justice issues. Southern Clearwater County Minnesota.

Site description and Enbridge proposals. The proposed route crosses the upper watershed of the Wild Rice River, and crosses the edge of Mud Lake, a small shallow lake containing wild rice. This lake has an outlet that reaches the Wild Rice River via a ditch about three miles long. The river itself originates as an outlet of Upper Rice Lake. The existing pipeline route also crosses wetlands that are about one-half mile from Upper Rice Lake.

Upper Rice Lake is a well-known wild rice lake, and is considered a highly important waterfowl lake. Even though shallow, at times it has a significant northern pike population and fishery. The Upper Rice Lake Wildlife Management Area is adjacent to this lake, and is described as follows: "*This WMA is mixed grassland, wetland and forest which adjoins Upper Rice Lake, a 1860-acre major migratory waterfowl and wild rice lake. About 40% of this unit is upland and lowland forest, 35%wet meadow, shrub wetland and marsh. Deer, bear, ruffed grouse, goose and duck hunting and wildlife observation opportunities exist on this unit.*" (DNR web site.)

I became acquainted with this area when the MinnCan pipeline was proposed and constructed through the Mud Lake wetland. While working at the Minnesota DNR, I documented that long-term impacts have resulted from installation of the pipelines at this location.

Lower Rice Lake is about seven miles "as the crow flies" from Upper Rice Lake, and likely about 10 river miles downstream on the Wild Rice River. This lake is about 2,000 acres in size, and, according to a report on the lake, it is "*the major wild rice producing lake on (the White Earth Reservation and) produces more than 200,000 pounds of rice each year. Many individuals gather here in the fall to harvest wild rice.*" ("Lower Rice Lake, the major wild rice-producing lake on the White Earth Reservation: Historic to Present Water Levels," Lainey Fineday, White Earth Tribal and Community College, 2011 NASA- Kiksapa Summer REU.)

The surface of Lower Rice Lake, as well as and a number of square miles surrounding it, are closed for ricing and hunting by non-White Earth band members. Therefore, little is known about it outside of Ojibway people and waterfowl specialists. My personal knowledge of the lake comes from two technical sources, and a long-term personal knowledge of the lake and its surrounding area. I did a waterfowl study of the lake for an undergraduate class while attending the University of Minnesota field station at Itasca State Park. But importantly, while employed at the DNR, I was involved in the restoration of the river and wetlands south of Minnesota Highway 200. They are immediately upstream of the lake, and are important to its water quality and growth of rice. The Wild Rice River crosses Highway 200 twice, first flowing south, and then back north and on into the lake. A bypass ditch was built in the 1930s to divert flow along the north side of the highway in order to reduce the need for bigger bridges for the two crossings. I worked with the Minnesota Department of Highways, and the White Earth Biology Office to accomplish the restoration while employed at the Minnesota DNR.

The restoration of the river and wetlands resulted in less fluctuations of water levels in Lower Rice Lake and potential long-term improvement in water quality—because flood flows spread out over the wetlands instead of immediately dumping into the lake. The White Earth Biology Office concluded that this benefited the wild rice growth, and reduced the potential for contamination from large, old poultry operations a short distance upstream on the Wild Rice River.

Since I have had a professional and personal interest in this lake for many years, I have seen first-hand the abundance of waterfowl that use the lake when the wild rice is ripe. I have seen waterfowl concentrations as large or larger than those I have seen elsewhere, including in other states. Data on this use will be available in DNR files, since they fly the lake doing waterfowl counts. One autumn about seven years ago, while I watched from Bonga Landing, the ricing access near the outlet, enormous numbers of waterfowl flights were in the air and in the rice. Many species were represented. Later, I learned the DNR had coincidentally flown the lake about the time I was there in order to count waterfowl. They estimated conservatively that 20,000 waterfowl were on the lake. When pressed, the individual who did the count said it could have been 40,000 birds present. There were so many birds in the air they could only safely make one pass over the lake, he said.

Lower Rice Lake is of high cultural and heritage significance to not only the White Earth Band, but likely to the Ojibway of Minnesota in general. George Bonga, for which the name "Bonga Landing" comes from, was an early fur trader and historic figure in this area. Also, according to an individual in the White Earth Biology Office, this was the pre-settlement site of peaceful gatherings between the Ojibway and the Santee from the Dakotas—while trading for rice and perhaps buffalo hides. (These tribes were normally enemies, at least at times.) In addition, the original land survey of Minnesota identified a trail already in existence at the time of the 1850s survey from the Lower Rice Lake area to the outlet of the Red Lake River at Upper Red Lake Northwest of Bemidji.

Lastly, I need not describe the cultural and religious significance of wild rice to the Ojibway. I only wish to emphasize as strongly as possible that wild rice on Lower Rice Lake could be considered almost the epitome of growth of this plant, and of its significance to the Ojibway. At times, it looks as if the entire 2,000 acres is all in one stand of rice. Below is a picture taken of ricing at the lake. (Source: Canku Ota (Many Paths), An Online Newsletter Celebrating Native America, October 1, 2009 - Volume 7 Number 10.)

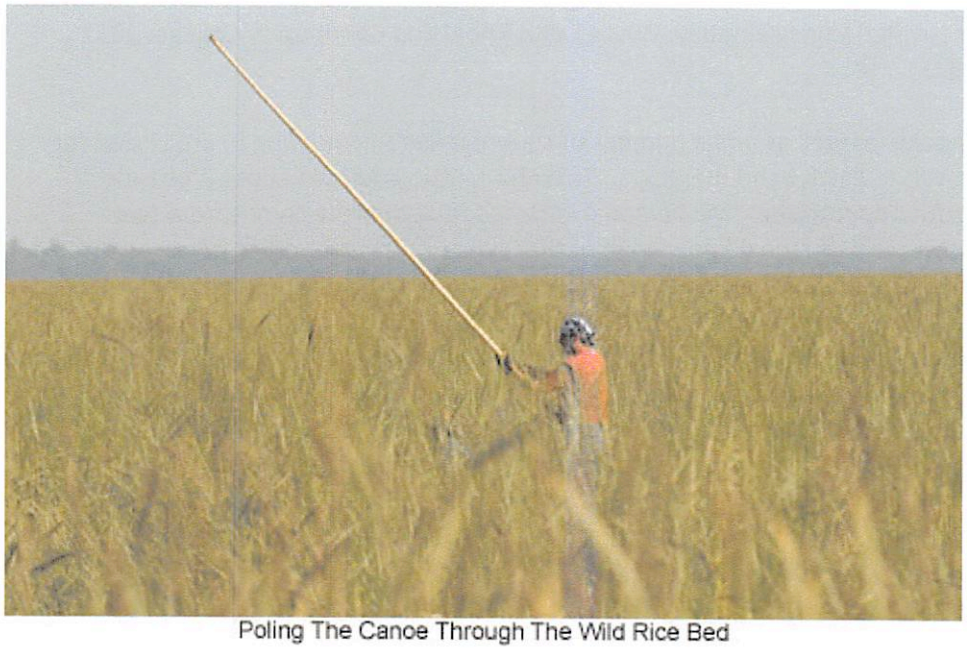

Poling The Canoe Through The Wild Rice Bed

Example 2: Consequence analysis of an "worst-case" pipeline rupture and oil release affecting Upper and Lower Rice Lakes, adjacent wetlands, cultural and religious significance of wild rice, and waterfowl and other natural resources values.

The following is a preliminary list of issues that need to be addressed in a proper analysis. There are some similarities to Example 1 for the LaSalle Creek area:

1. A "worst-case" pipeline rupture for a 36 inch pipeline is calculated to be about 20,000 barrels of oil, according to the studies cited in Item #3 above, even with a rapid response time. Also, the Enbridge 36-inch pipeline rupture in 2010 in Michigan was about 20,000 barrels—even though it wasn't a "worst-case" rupture with respect to the type of rupture that occurred (a "fish-mouth" break occurred whereas normal "worst-case" considers a "decapitation" break where the entire pipe is opened. The issue at the Michigan spill was that Enbridge didn't shut down the pipeline for 17 hours after the rupture.) That rupture polluted at least 35 miles of the Kalamazoo River, and clean-up costs have reached $1.3 billion.

2. The two Enbridge pipelines are proposed to be constructed alongside 3-4 other older pipelines now present on this route. As discussed in Item #14 in Attachment 1, "worst-case" risk assessments consider the scenario of a pipeline rupture accompanied by fire. Therefore, study is needed to assess whether there is any chance adjacent pipelines will be damaged and also rupture before they could be shut down. If so, the analysis must address this additional "worst-case."

3. Both Upper and Lower Rice Lake and associated wetlands are within about 10 miles of the Enbridge proposed crossings of their watershed and of waterways capable of carrying oil downstream. The Exponent Report cited in Item #3 in attachment 1 indicated that impacts associated with small streams should be assessed out to 10 miles from the pipeline in landscapes such as this. Furthermore, as noted above, the Enbridge pipeline rupture in Michigan in 2010 polluted a 35 mile stretch of the Kalamazoo River in Michigan.

4. Wild rice is sensitive to oil pollution, and is likely sensitive to dredging operations to clean up oil spills. Wetlands adjacent to wild rice waters are important for maintaining water quality in these lakes.

5. This area has extremely poor access for clean-up equipment, especially heavier equipment. Clean-up operations themselves can damage wetlands for the long-term.

6. Steep terrain is less of an issue in this area as compared to the LaSalle Creek area. However, the large drainage area can mean rapid downstream transport of oil if leaks and ruptures that reach the Wild Rice River during high flow periods.

7. A proper assessment must take into account whether an oil spill at this location could ever be cleaned up. It would need to address potential impacts to all of the values inherent in these downstream locations, including environmental, cultural, historic, and religious issues.

8. A proper assessment of alternatives must compare potential impacts at this site with potential impacts along other routes, such as the southern and western alternative to take Bakken oil and Line 3 oil directly to the Chicago area rather than through Superior, Wisconsin, given the requirements of the federal Clean Water Act, and National Environmental Policy Act to address alternatives that have fewer impacts.

Department of Homeland Security
Solar Magnetic Storm Impact on Control Systems | ICSCERT
https://icscert.uscert.gov/advisories/ICSA1108401 1/4
Advisory (ICSA1108401) 3/12/2015
Solar Magnetic Storm Impact on Control Systems
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Overview

The sun generates solar flare and coronal mass ejection (CME) events in an approximate 11year cycle. The plasma clouds generated from these events have the potential to cause geomagnetic storms that can interfere with terrestrial communications and other electronic systems, posing a risk to critical infrastructure.

In a recent case, Earthorbiting satellites detected the strongest magnetic storm in more than 4 years resulting from a solar flare and CME event.(a) Figure 1 illustrates the size of the CME shockwave edge in relation to the size of the sun at the point of the eruption.

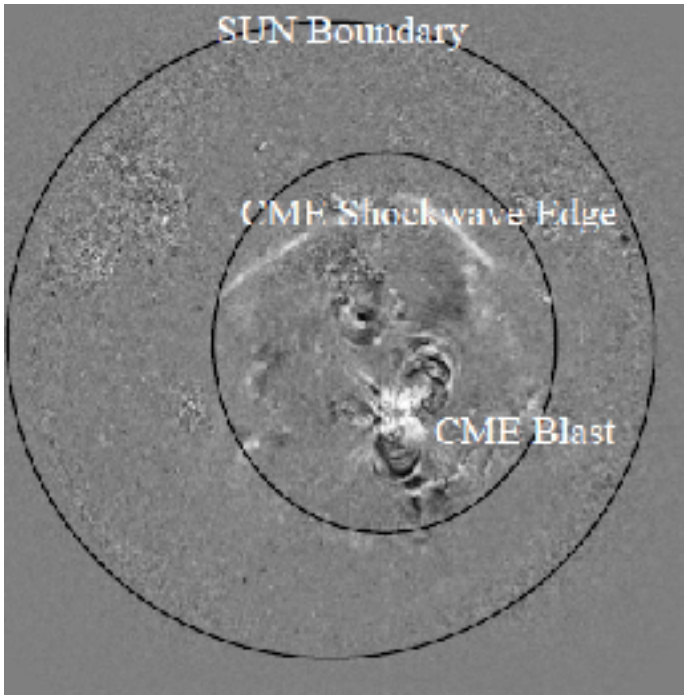

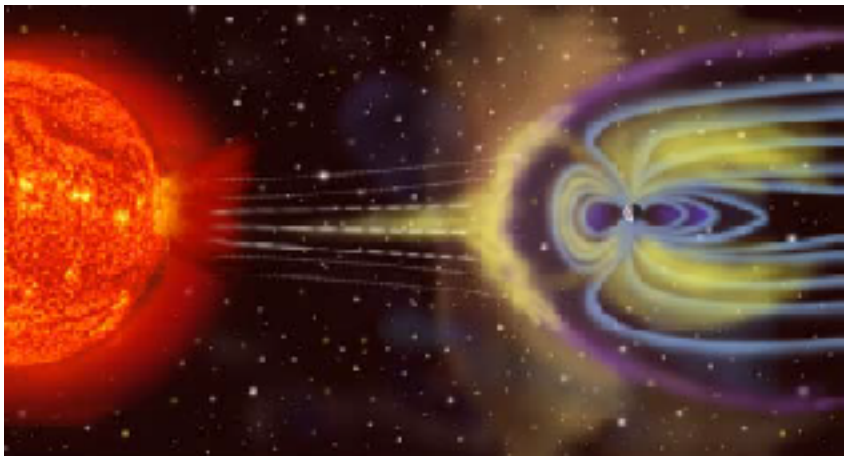

Figure 1. X2solar flare and coronal mass ejection at the time of the eruption.

At 0156 UT on February 15, 2011, Active Region 11158 unleashed an X2class eruption. X-flares are the largest type of Xray flares, and this is the first such eruption of new Solar Cycle 24. The explosion that produced this flare also sent a solar tsunami rippling through the sun's atmosphere and hurled a CME toward Earth. By the time the CME reached the Earth, the shockwave leading edge had expanded to approximately 40 million miles across. CME activity will continue to occur as this solar cycle progresses.

The purpose of this Advisory is to inform the industrial control systems (ICS) community of the possible impacts of solar magnetic storms on critical infrastructure control systems. This Advisory provides a highlevel overview of the potential problems and offers some general mitigation strategies for consideration by the ICS community.

Forecasts

The National Oceanic and Atmospheric Administration (NOAA) provides daily weather forecasts regarding solar activity as well as space weather alerts and advisories for solar flare and CME events that could impact navigation, radio, electric power, and satellite operations.

Solar Storm Background

Solar events associated with sunspot activity fall into three categories:

1. Solar flares involve a powerful burst of radiation (Xrays, extreme UV rays, gamma rays and radio frequency waves) that heats and increases the ionization of the upper atmosphere. Solar flares cause interference with satellite communications, radar, and shortwave radio. The radiation burst travels at the speed of light, reaching the Earth about 8 minutes after the eruption. Solar flares are categorized by relative size: Bclass flares are roughly 10% the size of Cclass flares; Cclass flares are roughly 10% the size of Xclass flares. Within the Xclass, flares are categorized on a linear scale (e.g., X1, X2). The largest measured solar flare occurred on November 4, 2003, and was rated as X45. (b)

2. Solar proton events (SPE) follow the flares. They travel at sublight speeds, reaching the Earth about 1 hour after the eruption. A SPE involves highenergy cosmic rays (protons and ions) that can disorient satellites, damage spacecraft electronics, interfere with shortwave radio in the Earth's polar regions, and deplete the atmosphere's ozone layer.

3. CMEs involve large clouds of charged plasma with an embedded magnetic field whose leading edge can expand to nearly 40 million miles across by the time it reaches the Earth. CME shockwaves travel at various speeds, some at nearly 5 million miles per hour, reaching Earth in about 18 hours or more.

The ionosphere (the upper layer of the atmosphere, 85 to 600 kilometers above the Earth) is critical to radio signal propagation. Solar radiation creates the ionosphere by ionizing the

upper layer of the atmosphere. Broadcast radio transmissions reflect off the ionosphere to reach the intended receiver.

When the magnetic field associated with a CME impacts the Earth's magnetic field, the resulting geomagnetic storm can last several days, with storm effects continuing 1 to 2 days more. The CME's electromagnetic energy disrupts the ionosphere's reflectivity, adversely impacting broadcast radio signal transmissions. This can also affect global positioning system (GPS) satellite signals, interfering with the GPS timing reference used by navigation systems and many control systems.

As a geomagnetic storm impacts the Earth's magnetic field, it generates potential differences across the surface because of variations in the Earth's resistivity (see Appendix A). The electromagnetic field from a CME changes the potential difference in power distribution and transmission system groundtoline voltages, producing geomagneticinduced currents (GIC) that can damage the large wyeconnected transformers used at power plants and substations. GICs of 1000 A are theoretically possible, though most large transformers are not tested for GICs in that range. Those transformers are typically critical power grid devices; they are expensive and have extended replacement lead times (often 1 to 2 years).

Effects on Critical Infrasctucture Control Systems

Radio Interference

Geomagnetic storms can interfere directly with GPS and radio communication because of the ionosphere disturbances. The interference can range from induced noise to complete signal loss. Geomagnetic storms can indirectly affect many other systems, including control systems that rely on GPS or radio technologies.

Control systems that employ the following technologies may experience partial or complete service outages of varying durations, depending on the intensity of the storm (and other factors).

Directly Affected Systems

Distributed control systems relying on GPS Position Navigation and Timing (PNT) signals to sequence and control processes

Used in oil and gas, electrical, marine, aviation, water and wastewater, trains

Shortwave frequency band wireless communications

Emergency services handheld wireless communications.

Indirectly Affected Systems

Control systems components supporting wireless technologies (e.g., WiFi, cellular) that rely on GPS timing signals

Remote terminal units (RTUs), programmable logic controllers (PLCs), intelligent electronic devices (IEDs), and other controllers

Portable instrumentation and test equipment.

Electrical Grid Interference

The continuing trend toward transmitting more electrical power over longer transmission lines, closer to maximum power limits, creates a directly proportional relationship between the intensity of a geomagnetic storm and electric grid impact. A geomagnetic storm can cause severe problems for electrical power systems during their peak hours of operation. This is especially true in certain regions of the northern United States and in coastal regions where igneous rock geology reduces the Earth's conductivity in those areas (see Appendix B).

During a solar storm, the CME plasma cloud and its magnetic field collides with the Earth's magnetic field, causing large transient magnetic disturbances. These disturbances, or geomagnetic storms, can affect the Earth's magnetic field for as much as 2 days. The geomagnetic storms can induce voltage variations along the Earth's surface, creating

potential differences in voltage between grounding points that cause GICs to flow through transformers, power transmission lines, and grounding points. GICs can severely affect grounded wyeconnected transformers and autotransformers because of cumulative overheating effects on winding insulation and induced harmonics (see Appendix C).

Regions of low conductivity, such as the regions of igneous rock geology that are common over large portions of North America, are more susceptible to geomagnetic storm affects. Power transmission systems built in those areas experience significantly larger GICs from geomagnetic disturbances. The Earth's conductivity varies by as much as five orders of magnitude across North America (see Appendix A). The magnitude of GICs is also inversely proportional to the resistivity of the transmission system. The transmission lines become an effective short circuit between distribution system transformers for GICs flowing through the transformer ground connections.

A solar storm can affect the power grid simultaneously at many points, resulting in multi-point failures. Large transformers that support transmission lines are costly and can also have long lead times for delivery and commissioning, sometimes as long as 2 years (see Appendix B).

The NOAA Space Weather Prediction Center provides several scales for geomagnetic and solar radiation storms, and radio blackouts. The following two links to the NOAA Space Weather Prediction Center should be a part of all electric utility weather situational awareness programs.

Electric Power—Electrical Utilities Information Site (Alerts and Advisories):
http://www.swpc.noaa.gov/ElecPower/

NOAA Space Weather Scales (NOAA Space Weather for Geomagnetic Storms Table): http://www.swpc.noaa.gov/NOAAscales/index.html#RadioBlackouts.

While the NOAA scales reflect the 3hour average for changes in the magnetic field, GICs are a result of the rate of change in the magnetic field. That is analogous to a storm that causes damage not from the low atmospheric pressure, but from the wind created by the changing pressure. Magnetic field rate of change information is not currently readily available, though NASA is working on a new index that will include the rate of change.

Oil, Gas, and Other Pipeline Interference

Solar storms can affect pipetosoil voltages, leading to currents that disturb flow meter signals, which can result in false pipeline flow rate data. The induced currents can also increase pipeline corrosion rates. Insulating flanges meant to interrupt current flow create an additional point where electric potential can result in current flow to ground, increasing the risk for corrosion.

Mitigation

Electrical Grid

For electrical power systems, mitigations should start long before an actual solar storm occurs. Mitigation involves significant engineering and simulations regarding the fault protection design employed for protection of the stepup feeder transformers supplying transmission lines. Without a proper engineering review, making changes to the distribution system to potentially protect against the effects of solar storms can defeat or reduce the effectiveness of the original power systemprotection design. Adequate protection against these risks requires a holistic approach to the system design to avoid such undesired interactions. Reverse current and voltage effects must be analyzed and understood to ensure optimal overall fault protection in system design. In addition, asset owners and control system vendors must also consider methods for shielding the fault protection instrumentation and its communication media. If an asset owner determines, based on engineering fault calculations, that the expected induced energy from a CME event may exceed system protection capabilities, the best mitigation option may be a controlled outage for the duration of the storm.

Other proposed mitigation methods (some patents exist) involve switching either a capacitor or resistor bank (or combination) into the ground leg of distribution transformers to reduce the maximum GIC. Such a system would also require a GIC sensor to trigger the switching and reset the ground leg circuit after the storm passes. The expense to develop and deploy such systems makes their actual deployment unlikely in the near term. In addition, the switching circuit impedes the intended ground leg safety function while it is active. NERC currently has a geomagnetic disturbance task force that is expected to recommend more active research in this area.

Other Control Systems

During solar storm events, operations personnel should monitor control system communications data to detect offnormal ranges or outages, because data communication may be affected. Communication systems may experience temporary or extended outages. Communications using shielded physical layer media may not experience outages. The owner should continue to monitor surge protection and uninterruptible power supply (UPS) systems during this period. PLC, RTU, IED, and other controllers, if installed with effective voltage and current protection, will not be affected by cellular or wireless service interruptions.

Electronics installed in metal building facilities are likely to be adequately shielded from direct electromagnetic interaction. However, utilities should still audit line power protection devices to confirm proper operation. Owners can consider adding protection to electronic devices not shielded by metal packaging. If not essential to operation, owners can consider powering off equipment and disconnecting from the power sources during a stormwarning period.

Control system communication systems are not directly affected by GICs, but they rely on the electric grid for power. Many also rely on GPS timing signals. For those control systems, the engineering staff should use engineering judgment regarding the system's resilience in the event of electric grid or GPS outages.

Based on engineering fault calculations, if the engineering staff determines that the potentialinduced energy may exceed system design protection capabilities, a possible mitigation is a controlled outage.

Solar storm interference may impact rail supervisory control and data acquisition (SCADA) system dispatch operations and communication networks that employ wireless technologies, especially those dependent on GPS timing signals. Engineers and field maintenance personnel will need to coordinate efforts during the CME event, especially if the decision is made to run systems in manual mode.

As a longterm approach, owners and operators of industrial control systems that are reliant on GPS timing signals (i.e., cellular RTUs, IEDs) should consider including integrated backup timing systems to accommodate the temporary loss of GPS because of interference or actual failure. Interference with GPS navigation and position information may also impact critical infrastructure in the oil and gas industries' marine fleets, where exploration activities often require precise station keeping operations. Vessels may be equipped with bottom fix capability as a redundant functionality. However, when the shipcontrol system does not include bottom fix capability, mitigation may require suspending operations until the solar storm subsides.

APPENDIX A: Earth Ground Resistivity

Figure 2. Earth ground resistivity based on underlying rock strata. Conductivity measurements from the Geomagnetic Laboratory of the Geological Survey of Canada in Ottawa with Extension to the United States Completed by Electric Power Research Institute-Sunburst Project. Units: siemens per meter (regions in red are essentially nonconductive).

APPENDIX B: Historical Impacts of Solar Storm Activity

August 2, 1972—GICs resulting from a solar storm caused a 230 kV transformer explosion at a hydro and power plant.

December 19, 1980—A 735 kV transformer failed 8 days after the Great Red Aurora. A replacement 735 kV transformer also failed the next year after another geomagnetic storm.

March 13, 1989—GICs resulting from a solar storm overloaded transformers on a North American power system, causing the deactivation of reactive power compensators at various substations. Within 1½ minutes, the power system was in complete blackout due to the linked malfunction of more than 15 discrete protective system operations. In addition, GICs resulting from the solar storm destroyed a $12 million generator stepup transformer in another power system. The transformer was a criticalcomponent for electrical power distribution from the generating plant in that system. The 288.8/24 kV singlephase shellform transformers were connected in a groundedwye configuration. The damage to the transformers included damage to the low-voltage windings, thermal degradation of the insulation of all three phases, and conductor melting. When the utility ordered a replacement, the supplier indicated the order would receive top priority but would still require nearly 2 years to fill. The utility obtained an interim spare unit that still required 6 weeks for installation before going online.

October 30, 2003—A power grid in Sweden experienced a 20 to 50minute blackout due to a strong solar storm. The same storm damaged 15 transformers in South Africa, some beyond repair.

APPENDIX C: Technical Analysis of Solar Storm Effects on Transformers

US Navy physicist, James A. Marusek, in his paper titled, “Solar Storm Threat Analysis,” reported the following analysis:

“Geomagnetic Induced Currents (GIC) can cause transformers to be driven into halfcycle saturation where the core of the transformer is magnetically saturated on alternate half cycles. A few amperes are needed to disrupt transformer operation. A GIC levelinduced voltage of 1 to 2 volts per kilometer and 5 amperes in neutral of the highvoltage windings is sufficient to drive grounded wyeconnected distribution transformers into saturation in a second or less.

[i] During geomagnetic storms, GIC currents as high as 184 amperes have been measured in the United States in the neutral leg of transformers. [f] The largest GIC measured thus far was 270amperes during a geomagnetic storm in Southern Sweden on April 6, 2000. “If transformer halfcycle saturation is allowed to continue, stray flux can enter the transformer structural tank member and current windings. Localized hot spots can develop quickly inside the transformer’s tank as temperatures rise hundreds of degrees within a few minutes.

[k] Temperature spikes as high as 750°F have been measured. As transformers switch 60 times per second between saturated and unsaturated, the normal hum of a transformer becomes a raucous, cracking whine. Regions of opposed magnetism as big as a fist in the core steel plates crash about and vibrate 100ton transformers, which are nearly the size of a small house. This punishment can go on for hours for the duration of the geomagnetic storm. GIC-induced saturation can also cause excessive gas evolution within transformers.

Besides outright failure, the evidence of distress is increased gas content in transformer oil, especially those gases generated by decomposition of cellulose, vibration of the transformer tank and core, and increased noise levels of the transformers (noise level increases of 80 dB have been observed).

i GIC transformer damage is progressive in nature. Accumulated overheating damage results in shortening transformer winding insulation lifespan eventually leading to premature failure.

“In addition to problems in the transformer, halfcycle saturation causes the transformer to draw a large exciting current which has a fundamental frequency component that lags the supply voltage by 90 degrees and leads to the transformer becoming an unexpected inductive load on the system. This results in harmonic distortions and added loads due to reactive power or VoltAmpere Reactive (VAR) demands. This results in both a reduction in the electrical system voltage and the overloading of long transmission tielines. In addition,

harmonics can cause protective relays to operate improperly and shunt capacitor banks to overload. The conditions can lead to major power failures."

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AC Corrosion Induced by High Voltage Power Line on Cathodically Protected Pipeline

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Abstract — The implications of the influence of alternating currents on buried pipelines are of great concern to all pipeline owners in world. The relevance of the interference is always increasing for operational personnel and for the protection of buried metallic structures from corrosion. The paper studies the electromagnetic interference problem between an existing high voltage power line and a newly designed underground pipeline cathodically protected. Induced voltages and currents are evaluated for steady state operating conditions of the power line. It is found that on pipelines suffering from A.C. interference traditional pipe-to-soil potential measurements do not guarantee efficient cathodic protection against corrosion. A specific approach to assess the effectiveness of cathodic protection should be adopted.

Keywords— AC Interference, Induced Voltages, Electric Power Transmission Lines, pipeline, AC Corrosion, cathodic protection, soil resistivity.

I. INTRODUCTION

A new corrosion phenomenon has been added to the list of corrosion phenomena, and it is related to A.C. currents. These usually result from A.C. voltages induced into the pipeline where the pipeline route is in parallel with, or crosses, high voltage power lines [1].

AC Corrosion is caused by current exchange between soil and metal. This exchange of current depends on the voltage induced on pipelines. The amplitude of induced voltage is due to various parameters such as: the distance between phase cables, the distance between the high voltage electricity lines and the pipeline and the overhead line operating current. Corrosion is mainly influenced, or associated with the A.C. current density, size of coating defect and the local soil resistivity [2], [3] and [4].

The interference between a power system network and neighboring gas pipeline has been traditionally divided into three main categories: capacitive, conductive and inductive coupling [5], [6], [7], and [8].

Capacitive Coupling: Affects only aerial pipelines situated in the proximity of HVPL. It occurs due to the capacitance between the line and the pipeline. For underground pipelines the effect of capacitive coupling may not to be considered, because of the screening effect of earth against electric fields.

Inductive Coupling: Voltages are induced in nearby metallic conductors by magnetic coupling with high voltage lines, which results in currents flowing in a conducting pipeline and existence of voltages between it and the surrounding soil. Time varying magnetic field produced by the transmission line induces voltage on the pipeline.

Conductive Coupling: When a ground fault occurs in HVPL the current flowing through the grounding grid produce a potential rise on both the grounding grid and the neighboring soil with regard to remote earth. If the pipeline goes through the "zone of influence" of this potential rise, then a high difference in the electrical potential can appear across the coating of the pipeline metal.

There has been a considerable amount of research into interference effects between AC power line and pipeline including computer modeling and simulation. [9], [10]. A general guide on the subject was issued later by CIGRE [11], while CEOCOR [12] published a report focusing on the AC corrosion of pipelines due to the influence of power lines.

This piper evaluates and analyzes the electromagnetic interference effects on buried pipelines cathodically protected created by the nearby high voltage transmission lines. We calculate the various parameters of the sacrificial anode cathodic protection system, then we analyze the problem of interference between the power line and pipeline by the calculation of the magnetic field, induced voltage and current density during both normal conditions on the power line and finally we evaluate the AC corrosion likelihoods of pipelines. It is found that on pipelines suffering from A.C. interference traditional pipe-to-soil potential measurements do not guarantee efficient cathodic protection against corrosion. A specific approach to assess the effectiveness of cathodic protection should be adopted.

II. CATHODIC PROTECTION

To protect buried pipelines against corrosion, a noncorrosive coating is used and additional protection is applied by means of cathodic protection (CP) in order to control galvanic current in such a way as to avoid anodic current flow from the pipe to the soil. Though large voltage differences are an efficient protection, this is limited by the thickness of the coating. The usual rule is to maintain the pipeline at a constant potential between 0.850 V to 1.3 V (with respect to a copper/saturated copper sulfate electrode $Cu/CuSo_4$) [13], [14].

There are two main CP system types:

A first method consist of connecting a galvanically more active metal to the pipeline, in this case the metal will behave as the anode (typically Zn, Al or Mg); thus the galvanically more active metal (anode) sacrifices itself to protect the pipeline (cathode). A galvanically more active metal is a metal that is able to lose its peripheral electrons faster other than other metals. The first method is described in figure1.

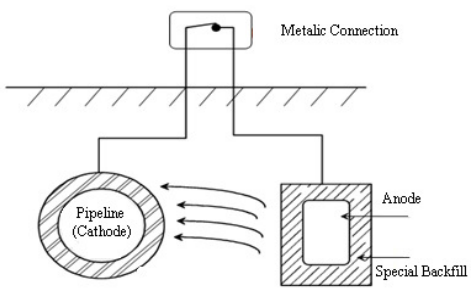

Fig.1. sacrificial anode cathodic protection System

As shown in figure.2, in the second method a DC current source is connected which will force the current to flow from an installed anode to the pipeline causing the entire pipeline to be a cathode. This method is called impressed current cathodic protection where the DC power supply may be a rectifier, solar cell or generator.

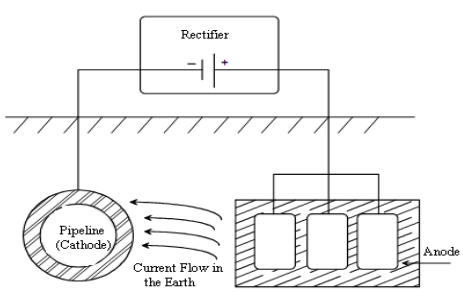

Fig.2. Impressed current cathodic protection System

III. INDUCTIVE INTERFERENCE

A. *Electric field*

To calculate the electric field under the power line, phase conductors are considered as infinite line charges. The horizontals and verticals components of the electric field due to the three phase conductors at the desired locations are calculated separately using equation (1) given below. Figure 3 shows the components of the electric field at the observation point M(x,y) due to one phase conductor and its image.

$$\begin{cases} E_{hi} = \dfrac{Q_i}{2\pi\varepsilon_0}(x-x_i)\left[\dfrac{1}{(D_i)^2} - \dfrac{1}{(D_i')^2}\right] \\ E_{vi} = \dfrac{Q_i}{2\pi\varepsilon_0}\left[\dfrac{(y-y_i)}{(D_i)^2} - \dfrac{(y+y_i)}{(D_i')^2}\right] \end{cases} \quad (1)$$

Where:

Q is the charge of the conductor, ε_0 is the relative permittivity.

Resultant of horizontal and vertical components of the field gives the total electric field at the desired locations as shown in equation given below.

$$E=\sqrt{(E_{hi})^2+(E_{vi})^2}$$

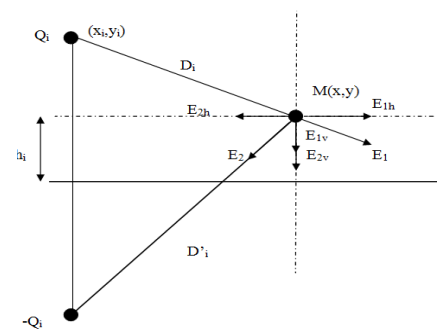

Fig.3: Components of electric field due to HVPL

B. *Magnetic field*

A magnetic field will be created by the current going though the conductors. As in the electric field, each point charge will produce a magnetic field having a horizontal and a vertical component.

$$B=\sqrt{(B_{hi})^2+(B_{vi})^2}$$

Where B is the magnetic field, B_{hi} and B_{vi} are the horizontal and vertical components respectively.

$$\begin{cases} B_{hi} = \dfrac{\mu I}{2\pi}(x-x_i)\left[\dfrac{1}{(D_i)^2} - \dfrac{1}{(D_i')^2}\right] \\ B_{vi} = \dfrac{\mu I}{2\pi}\left[\dfrac{(y-y_i)}{(D_i)^2} - \dfrac{(y+y_i)}{(D_i')^2}\right] \end{cases} \quad (2)$$

Where:

μ is the air relative permeability, I is the current through the conductor.

C. Induced Voltage

The induced voltage on the pipeline is generated by the electromagnetic field in the soil. The level of induced voltage from a high voltage power transmission line on an adjacent pipeline is a function of geometry, soil resistivity and the transmission line operating parameters. The image method was used to calculate the induced voltage in a pipeline, in a single soil resistivity layer.

$$V=\frac{\rho I}{4\pi}\left(\frac{1}{\sqrt{x^2+y^2+(z-h)^2}}+\frac{1}{\sqrt{x^2+y^2+(z+h)^2}}\right) \quad (4)$$

Where, ρ is the soil resistivity, I is the current in the line, h is the depth of the pipeline in the soil and x, y, z represent the point where the voltage potential should be found.

IV. RESULTS

A. Design details for the sacrificial anode CP system

The pipeline under study is buried. Table.1 lists the characteristics for the buried pipeline such as radius, wall thickness, length, coating thickness. The anode material should not be located at three meter from the pipeline and must be surrounded by a backfill. Table .2 lists the characteristics for the Mg sacrificial anode. The following eight steps are required when designing galvanic cathodic protection systems.

Tab.1. Pipeline characteristic

Material	X42
Length	10 (Km)
Pipe diameter	219.1 (mm)
Coating thickness	6.4 (mm)

Tab. 2. Anode characteristic

Constituents	90% Mg,6%Al 3%Zinc
Consumption Rate	7 (Kg/A an)
Dimension	3 inch x3 inch x14 inch
Potential	-1.7 (V)
Current efficiency	1100 (Ah/Kg)
Weight	20 (kg)
backfill material	75% hydrated gypsum, 20%bentonite and 5% sodium sulfate.
Backfill resistivity	3 (Ω.m)
Efficiency (%)	50

1. Review soil resistivity

If resistivity variations are not significant, the average resistivity will be used for design calculations. The soil resistivity measurements are given in table3.

$$\rho_{soil}=\frac{1}{N}\sum_{1}^{N}\rho_i=72.5\ \Omega.m$$

Tab. 3. Soil resistivity measurements

PK(km)	Resistivity (Ω.m)	PK(km)	Resistivity (Ω.m)	PK(km)	Resistivity (Ω.m)
00.000	65	04.980	45	06.900	90
01.000	70	05.000	55	07.250	90
01.500	80	05.750	70	07.560	85
02.000	65	05.950	70	07.850	85
02.500	65	06.100	70	08.100	90
03.000	60	06.350	90	08.500	90
03.500	45	04.500	50	09.150	90
04.000	50	06.450	90	09.255	80

2. Area to be protected

The area to be protected by is calculated by:

$$A=\pi(d+2tc)L=0.7281*10^4\ m^2$$

Where:
d is the pipe diameter (m), tc is the coating thickness (mm) and L is the length of pipe (m).

3. Current to protect the steel structure

Using a design current density of J=0.15 mA/m2, the current demand required to protect the steel structure from corrosion is determined by the following formula:

$$I=A*J_{dc}=1.09\ A$$

4. Calculate net driving potential for anodes

The average potential of the pipeline system is -0.67 V. Hence the net initial driving potential (E) is given by:

$$E=-1.70-(-0.67)=-1.03\ V$$

5. Anode-to-electrolyte resistance

The anode to electrolyte resistance is an important parameter in order to predict the current output of an anode. To determine the resistance of a single vertical anode, the following relationship is applied (Dwight's equation): [15]

$$R_{anode}=R_{anode/backfill}+R_{backfill/soil}$$

$$R_{anode/backfill}=\frac{0.00521\rho_{backfill}}{L_{anode}}\left(\ln\frac{8L_{anode}}{d_{anode}}-1\right)$$

$$R_{backfill/soil}=\frac{0.00521\rho_{soil}}{L_{backfill}}\left(\ln\frac{8L_{backfill}}{d_{backfill}}-1\right)$$

Where:

$\rho_{backfill}$: Resistivity of backfill in ohm-m;
ρ_{soil} : Soil resistivity in ohm-m;
L_{anode} : Length of anode in meters;

L_{anode} : Length of backfill in meters;
d_{anode} : Diameter of anode in meters;
$d_{backfill}$: Diameter of backfill in meters.

$$R_{anode} = 1.58\ \Omega$$

6. *Current per anode*

To predict the current output of protective current from a sacrificial anode the voltage between anode and cathode (driving voltage) is divided by the resistance of the anode to the electrolyte. The maximum output current from each anode is given by:

$$I_{max} = E/R = 0.65\ A$$

7. *Number of anodes needed*

The number of galvanic anodes required to protect the pipeline is given by

$$N = I_{total}/I_{max} \simeq 2 \text{ anode}$$

8. *Net driving force of the anodes*

This implies that the anodes should be spaced at 3.3 km intervals. Because the pipeline will be polarised to at least a potential of (-0.850 V/Cu-cuSo4), the net driving force of the anodes is given by;

$$E = -1.70V-(-0.85V) = -0.85V$$

Current (I) per anode 0.54A

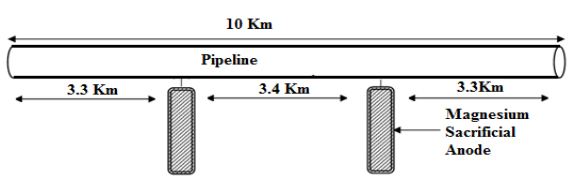

Fig.4. Schematic of the distribution of galvanic anodes along the pipeline

B. Interference Problem

We carried out within the context of this work the calculations carried out on a high voltage power line (HVPL) having the following characteristics. P = 750 MW under a cos (θ) =0.85 and U = 400 KV. Metallic pipeline (MP) Crossings with power lines at the points PK00.970 Km and PK01.170 Km (Figure5)

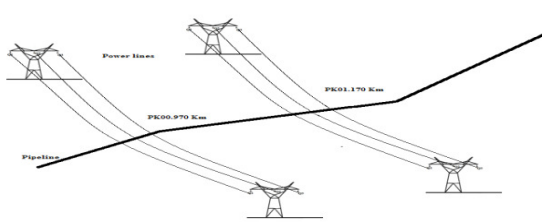

Fig.5. Plan view of the HVPL-MP common distribution corridor.

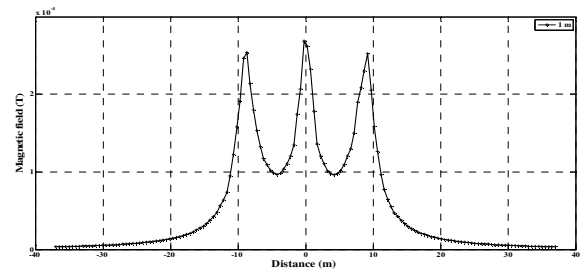

Fig.6. Magnetic field

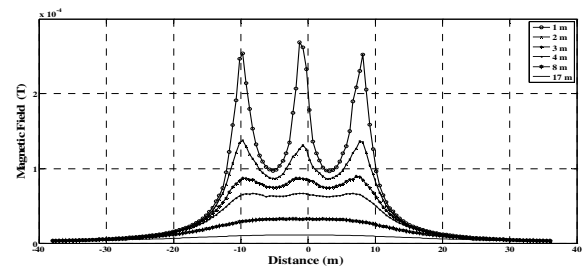

Fig.7. Magnetic field with varying height

Figure 6 shows the magnetic field profile for the horizontal configuration less than one meter of the high voltage power line. Three peaks corresponding to the location of the three phase conductors. The peak at the center of the right of way has a slightly larger magnitude than the two peripheral peaks.

Figure7 shows the magnetic field for horizontal configuration of the power line with varying height. As the height increases, the distance between the charges and the pipe line increases causing a decrease in the magnitude of the magnetic field.

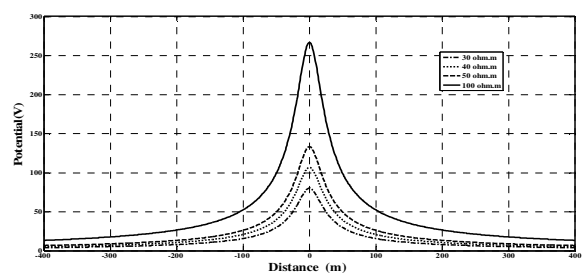

Fig.8. Induced voltage

The resultant pipeline induced voltages are calculated with the variation of the soil resistivity (soil resistivity varied from 30 to 100 Ω.m). In Fig.8, it is clear that the soil resistivity has an influence on the induced voltage. The pipeline induce-voltage reduces by reducing the soil resistivity (i.e. high soil resistivity gives high induced voltage).

V. AC CORROSION

The risk of AC corrosion of the metallic structures is closely linked with the pipeline isolation defects, which might occur, for instance during construction work. From an electrical point of view, coating holidays can be seen as

a small, low impedance AC earthing system connected to the pipeline. If the coating holiday size for example exceeds a certain dimension, corrosion risk likelihood neutralizes according to the relevant current density.

We consider a situation where a pipeline is buried near a high voltage power lines, and let us assume that the pipeline coating has a single defect. At the defect point, the pipeline has a resistance to earth whose approximate value is:

$$R=\frac{\rho_{soil}}{2.D}.\left(1+\frac{8t_c}{D}\right) \quad (4)$$

Thus the current density J_{ac} (A/m^2) through the coating defect is:

$$J_{ac}=\frac{8.U_{ac}}{\rho_{soil}.\pi(8t_c+D)} \quad (5)$$

U_{ac} is the induced voltage, t_c is the thickness of the coating, ρ_{soil} is the soil resistively, D is the diameter of the coating defect.

Based on actual investigation in the field of AC corrosion, as well as to the actual European technical specifications [16] the AC corrosion risk can already be expected from current densities at coating holidays among 30 A/m^2 . For current densities between 30 A/m^2 and 100 A/m^2 there exists medium AC corrosion likelihood. For current densities upper 100 A/m^2 there is a very high A/m^2 corrosion likelihood [17].

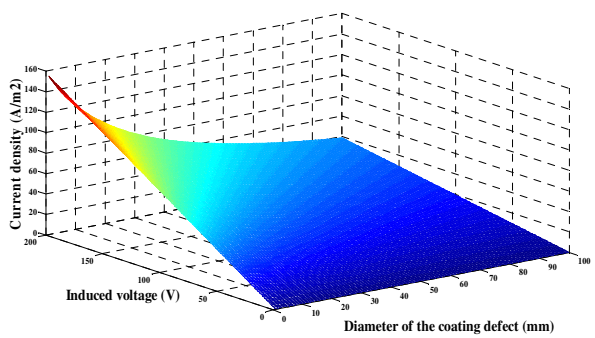

Fig.9. Current density

In Fig.9, the current density varies linearly with induced voltage and depends on soil characteristics by its resistivity, i.e. current density is greater in soil with low electrical resistivity. Moreover, current density increases by decreasing the dimension of the coating defect. The structures with a coating defect of small size may have a higher risk of AC corrosion.

VI. CONCLUSION

The interference problems that affect pipelines near high voltage AC power (HVAC) transmission lines have been well defined .The magnetic field on the pipeline in the vicinity of a high voltage power line have been calculated for horizontal configuration. The voltage profiles for normal operation conditions have been simulated. It is found that on pipelines suffering from A.C. interference traditional pipe-to-soil potential measurements do not guarantee efficient cathodic protection against corrosion.

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FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENTS "I"

I-1 FOH 4.4.14 Sandpiper Public Comments Part1
I-2 FOH 4.4.14 Sandpiper Public Comments Part2
I-3 FOH 5.30.14 Sandpiper Public Comments
I-4 FOH 8.21.14 Sandpiper Public Comments Part1
I-5 FOH 8.21.14 Sandpiper Public Comments Part2

All Friends of the Headwaters documents and maps submitted to the Minnesota Department of Commerce for the respective Public Comment periods for the proposed Sandpiper Pipeline project

FRIENDS of the HEADWATERS

April 3, 2014

Mr. Larry Hartman, Environmental Review Manager
Energy Environmental Review and Analysis (EERA)
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

Dear Mr. Hartman,

Regarding Public Utilities Commission (PUC) Docket No. PL9/PPL-13-474:

Please find attached our letter concerning the Enbridge/North Dakota Pipeline Company, LLC Sandpiper pipeline request for a proposed southern corridor route across northern Minnesota from Grand Forks, ND to Superior, WI.

The Friends of the Headwaters oppose this current projected route. You, the DOC and the Public Utility Commissioners will find our reasoning for our opposition and our proposal for an alternate route in the attached documents.

Friends of the Headwaters requests these documents be posted to the eDocket website as soon as possible.

Writing for the members of Friends of the Headwaters I thank you for your attention to these documents and for your attention to our concerns for the welfare and quality of our lands, waters and lives in the Headwaters Country.

Sincerely,

Richard Smith
President
Friends of the Headwaters

P.O. Box 583, Park Rapids, MN 56470
mnfriendsoftheheadwaters@gmail.com
facebook.com/savemississippiheadwaters
www.friendsoftheheadwaters.org

POSITION PAPER - ENBRIDGE/NORTH DAKOTA PIPELINE COMPANY (NDPC) LLC
SANDPIPER PIPELINE PROJECT

Public Utilities Commission (PUC) Docket Number: PL-6668/PPL-13-474

April 2, 2014

Prepared by
Richard Smith
Friends of the Headwaters
P.O. Box 583
Park Rapids, MN 56470

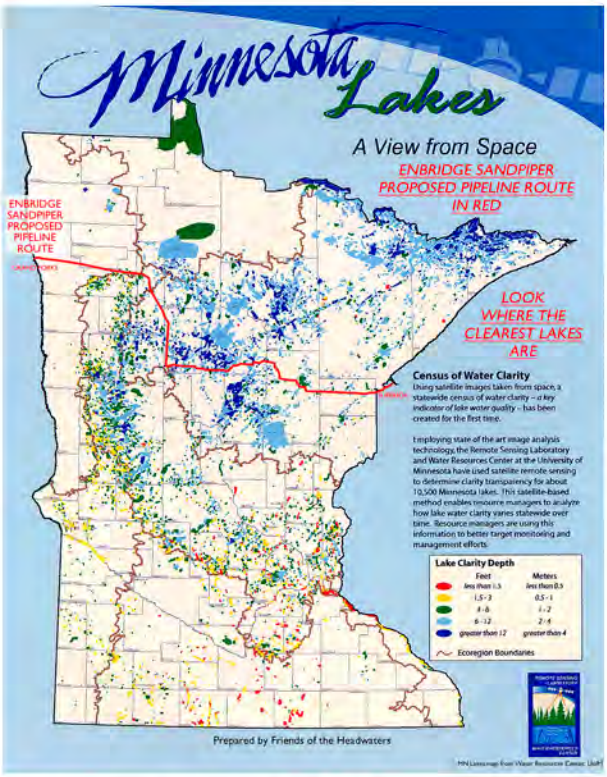

Friends of the Headwaters opposes the Enbridge/NDPC Sandpiper pipeline as currently projected to cross Minnesota's lake country from Grand Forks, ND to Superior, WI.

We believe Enbridge/NDPC's proposed "southern corridor" will NOT protect the high quality waters along this route.

Friends of the Headwaters also believes Enbridge intends to proliferate another multiple pipeline corridor with their southern route proposal.

Note: Enbridge presented just that in an investor conference held April 2, 2014 in New York City. See 50th page of their pdf at this link:
http://www.enbridgepartners.com/WorkArea/linkit.aspxLinkIdentifier=id&ItemID=17004

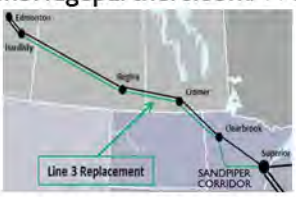

Besides our important residential and recreational lakes Minnesota's best wild rice lakes are also extremely vulnerable to this proposed pipeline. Those lakes are culturally and economically significant to Minnesota's Ojibwa tribes as well as being important food sources for our migratory waterfowl populations.

The "southern corridor" will severely jeopardize the Straight River aquifer in southern Hubbard County. The aquifer is critical as the sole drinking water source for the county seat, Park Rapids. as well as supporting the county's primary agricultural crop, potatoes. Annual revenue from the potato crop approaches $500 million. A leak/rupture in the aquifer would severely impact this agricultural revenue, damage Park Rapids' potable water source, and despoil a renowned brown trout stream, as well.

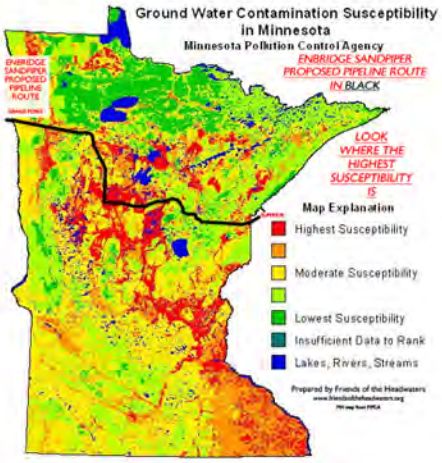

Hubbard County natural resources support a vibrant tourism community with nearby Itasca State Park, home to the headwaters of America's most famous river, the Mississippi, and with its family-owned lake country resort businesses. The Minnesota Tourism Office estimates $30 million dollars are spent in Hubbard County every vacation season. A catastrophic oil spill on the level of Enbridge's Kalamazoo River spill would devastate the county's tourism business.

Given the high risks to the county, state and private lands and waters along the proposed southern route, *Friends of the Headwaters* strongly disagrees with the PUC/DOC's position that a full environmental impact study (EIS) is not necessary for the confirmation of Enbridge/NDPC's route proposal. A PUC/DOC conducted CEA (comparative environmental analysis) will fail to meet MEPA standards. *Friends of the Headwaters* believes a complete EIS with the requisite and cumulative leak/spill scenarios and assessments for the lakes and rivers, trout streams, wild rice beds, lake homes and resorts, ground water sources, farmlands, wetlands, wildlife, local communities and their economies will validate Friends of the Headwaters' position of moving the Sandpiper route to a lower risk part of the state.

Therefore, *Friends of the Headwaters* is proposing a number of alternate routes for the Enbridge/NDPC Sandpiper pipeline that do not traverse any of Minnesota's clearest and cleanest lakes, rivers, trout streams, and fragile aquifers. Details and maps to follow.

Prior to presenting the details and maps *Friends of the Headwaters* wants it known that its technical consultants' requests for the Enbridge GIS mapping software were ignored by the company and the PUC. Access to the software was ultimately granted a few days before the closing date for public comment on route alternatives, but much too late to be of effective use by *Friends of the Headwaters* consultants. Maps were constructed from satellite aerial photography, road maps, DNR & PCA maps and existing pipeline corridor maps available at various sources on the Internet including Enbridge's website.

Before preparing these alternate routes *Friends of the Headwaters* first used the document
7852.1900 "Criteria for Pipeline Route Selection"
made available at the March 12, 2014 PUC/Enbridge Sandpiper Public Hearing in Park Rapids, MN to determine the fallibility of Enbridge/NDPC's proposed southern corridor route. *Friends of the Headwaters'* comparative economic and environmental analysis of the impact of Enbridge/NDPC's Sandpiper pipeline upon the listed "Criteria for Pipeline Route Selection" fell short of meeting the requirements to maintain, sustain and protect the lands, waters and people along the proposed corridor.

Under Subp. 3. Criteria:
A. human settlement, existence and density of populated areas, existing and planned future land use, and management plans.

Hubbard County realizes $34 million dollars annually in tax revenue(2012 data). 59% of its properties are water-influenced, meaning either on or have a view of a lake or river. Those parcels yield a $20 million dollar figure. The Fishhook Chain of Lakes watershed is mostly in Todd and Arago Townships. Taxes on the water-influenced properties in those two townships is about $2 million annually.

If a large rupture on the order of the Enbridge 1991 Grand Rapids, MN spill (1.7 million gallons) occurs at Hay Creek near the top of that watershed, it would dramatically impact the property values on those lakes resulting in a significant loss of tax revenue to the county, state, Park Rapids and its school district. It will be years before the county recovers from the damage. Not only will it incur the loss of tax revenues, but also the loss of residents, small businesses, tourists, and property values.

B. the natural environment, public and designated lands, including but no limited to natural areas, wildlife habitat, water, and recreational lands.

Any pipeline leak/spill/rupture will severely impact the sustainable environmental quality of life in Hubbard County. Itasca State Park, Mississippi River headwaters, LaSalle Scientific and Natural Area, Straight River brown trout fishery, Hay Creek and the Fishhook Chain of Lakes watershed, Straight River aquifer, Shell River, the Crow Wing River, and the many other nearby lakes all support and provide numerous recreational opportunities, swimming, fishing, hunting, hiking, biking, bird watching, boating, and others. $30 million tourism dollars a season are at risk.

C. lands of historical, archaeological and cultural significance

The history of Native Americans and the early explorers in and around Itasca State Park is an asset to drawing tourists to the park. The wild rice waters in Hubbard and Clearwater Counties are culturally and economically significant. The proposed Sandpiper route is dangerously close to Upper Rice Lake, the Anishinaabe's best wild ricing lake in Clearwater County. The wild rice harvested there is commercially and domestically important to the White Earth Ojibwa.

D. economies within the route, including agricultural, commercial or industrial, forestry, recreational, and mining operations.

All future business, residential, retirement and agricultural growth will be impacted by any pipeline leak/spill/rupture. Over 500 jobs and $500 million dollars in revenue/year is generated by the potato crop alone. Besides potatoes and the commodity crops of corn and beans, fresh fruit and vegetables are also grown and marketed locally to residents and tourists by smaller farms operating within the Straight River aquifer. Farm incomes and tourists dollars drive the local small business economy.

Although some small businesses may see a short term gain from pipeline construction, the long term economic vitality of the community, its businesses and people may not recover from a spill.

Enbridge/NDPC touts the tax payments it will be making annually to Hubbard County. The public has heard two figures, either $3 million or $5 million dollars, but relative to the value of the Bakken crude proposed to pass through the county each year, $14.6 billion dollars, that tax revenue seems woefully short for the risks assumed. What costs will the county incur for infrastructure repair after construction? What will be the costs of training police, fire, paramedic and medical personnel in the special hazards of oil spills and fires? We haven't heard anything about the PUC requiring a significant Escrow account to ensure funds are available when a pipeline fails.

The state and its northern counties derive income from their forest lands. Those forest taken out of production along "Greenland" portions of the proposed route will mean a loss of timber jobs and income, as well as a loss of habitat for wildlife, especially birds.

E. pipeline cost and accessibility

How much higher are the construction costs of multiple bores under rivers and streams? What are the contingency plans and costs for controlling "frackouts" in stream beds during a bore. Friends of the Headwaters has learned a "frackout" occurred on nearly every stream or river bore during this area's last pipeline construction project in 2007. What are the costs and issues for winter construction of wetland areas along the route? How do the company and clean-up agencies access those wetlands areas in non-winter seasons if and when a leak/spill/rupture occurs? What are the economic consequences of summer construction and congestion issues with roads and traffic? How will availability of lodging not just for construction crews but also for tourists be affected. How will the compatibility of construction workers be with tourists, residents and local businesses. How trustworthy and reliable will these workers be with respect to property and paying for services. Some resort owners have informed Friends of the Headwaters they will not provide lodging for pipeline workers due to previous pipeline worker negative experiences. Will Enbridge/NDPC be financially responsible for covering damages or lost income from disreputable and irresponsible workers? *Friends of the Headwaters* believes only a properly executed EIS will provide the comprehensive assessment for the above scenarios.

F. use of existing rights-of-way and right-of-way sharing and paralleling.

Although Enbridge/NDPC is proposing to use existing energy corridors in Hubbard County numerous landowners along the route have complained of poor easement usage, property damage, poor restoration or reclamation efforts, and generally bad relations with other pipeline companies. They are skeptical of Enbridge claims to treat them better given accounts they have seen or heard from landowners on the Enbridge northern

pipeline corridor. Landowners along the proposed route are also concerned of the liability issues regarding detection and reporting of any leaks or spills. Attorneys have warned landowners to be wary of the language within the Enbridge/NDPC easement contract.

G. natural resources and features

Friends of the Headwaters has no faith in Enbridge/NDPC's word they can safely protect the lands and waters of Minnesota's lake country.

All pipelines leak eventually. While conducting a complete EIS for the Pebble Mine near Bristol Bay, Alaska, the EPA examined the history of pipeline spills relative to the age and mileage of all pipelines. They determined that every pipeline will leak at least once every 30 years over every 30 miles of length. Not surprising the history of Enbridge spills along their northern corridor in Minnesota fits that profile quite well. To quote from a 2003 MPCA report to the NTSB: "nearly three dozen non-third-party spills, leaks or ruptures on just one Enbridge 34 inch line between 1972 and 2003. About 87% of the petroleum gallons spilled from all Minnesota pipelines in the period 1991 to 2002 was from that Enbridge line. This is equal to about 48% of the reported gallons of petroleum spilled from all sources in Minnesota during that period. Included in the Enbridge 34 inch line spills are the 1.7 million gallon rupture in 1991 in Grand Rapids and the 250,000 gallon rupture on July 4, 2002 in Cohasset. 300,000 gallons of the Grand Rapids spilled flowed to a river. Luck with the timing of the spill and river ice conditions kept thousands of gallons of crude from entering the Mississippi River. Oil in the Mississippi would likely have fouled the St. Cloud, St. Paul, and Minneapolis drinking water intakes for months. Likewise the Cohasset spill could have easily entered the Mississippi River if it had happened in a different segment of that 34 inch pipeline."

The Mississippi River Headwaters, Itasca State Park, the Straight River aquifer and brown trout stream, the Shell and Crow Wing Rivers, the Fishhook Chain of Lakes, Upper Rice Lake and other wild rice lakes, and some of the clearest lakes in the state are all at risk from this proposed Sandpiper southern corridor and Enbridge's stated plans to make it a multiple pipeline corridor.

H. the extent to which human or environmental effects are subject to mitigation by regulatory control and by application of the permit conditions contained in Minn. Rule, part 7852.3600 for pipeline right-of-way preparation, construction, cleanup, and restoration practices.

Enbridge's history with the Alberta Clipper line, Line 3 and other lines in the northern corridor is well known as stated above. The PUC completely ignored the numerous landowner complaints of Enbridge's poor behavior, cleanup, followup, and restoration efforts or lack thereof on the Certificate of Route and Need Applications for the Alberta Clipper line. *Friends of the Headwaters* has learned some landowners are losing buildings, well houses, wood lots, and in some cases homes to Enbridge/NDPC's easement demands. Eminent domain actions are especially disliked.

I. cumulative potential effects of related or anticipated future pipeline construction

Now that Enbridge has stated the Line 3 rebuild (NYC Investor Conference 4/2/14) will occur in the Sandpiper "southern corridor", a comprehensive EIS(environmental impact study) conducted by the proper state and federal regulatory authorities is absolutely essential. As previously stated, all leak/spill/rupture risk scenarios must be assessed and fully described for high value resources. The EIS must also compare all reasonable and prudent alternative routes. EIS studies should be required to use GIS software to optimize the potential alternative routes other than Enbridge/NDPC's routes.

J. the relevant applicable policies, rules, and regulations of other state and federal agencies, and local governmental land use laws including ordinances adopted under Minnesota Statutes, section 299J.05, relating to the location, design, construction, or operation of the proposed pipeline and associated facilities.

A project of this magnitude as planned through the heart of *"The Land of 10,000 Lakes"* must conform to the standards prescribed in MEPA.

"No state action significantly affecting the quality of the environment shall beallowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other naturalresources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct."

Since *Friends of the Headwaters* does not believe this proposed multiple pipeline "southern" corridor with the Sandpiper and now Line 3 rebuild can meet the high standards set above for quality, safety and sustainability of the lands and especially waters along the route, *Friends of the Headwaters* is proposing a "real" southern corridor for Sandpiper.

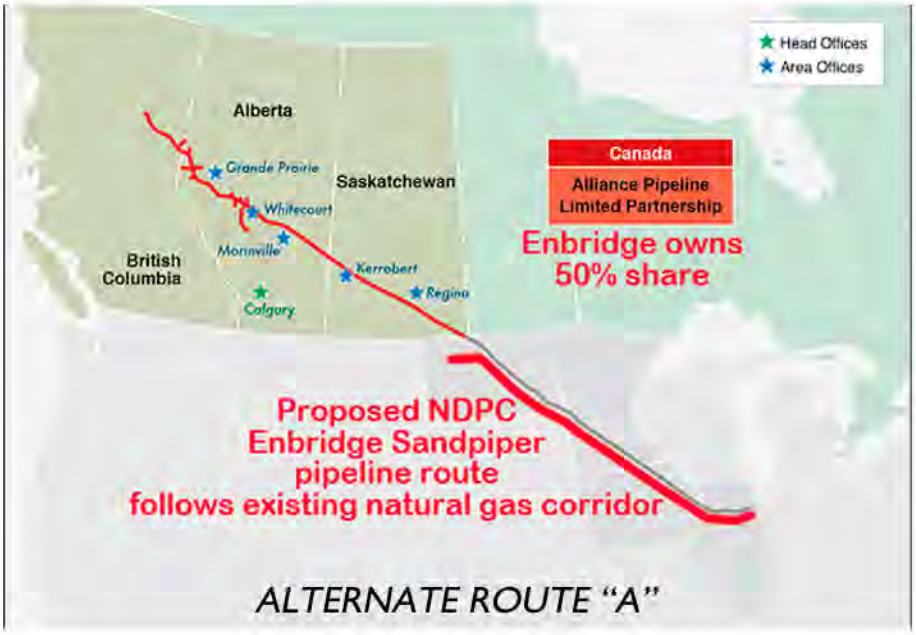

ALTERNATE ROUTE "A"

This ALTERNATE ROUTE A utilizes an existing energy corridor of which Enbridge is a 50% shareholder with Alliance Company of Canada. This corridor originates in Canada and ends west of the Chicago. The proposed Enbridge/NDPC pipeline route would intersect this corridor east of Minot, ND at which point NDPC would turn and follow the corridor to Illinois.

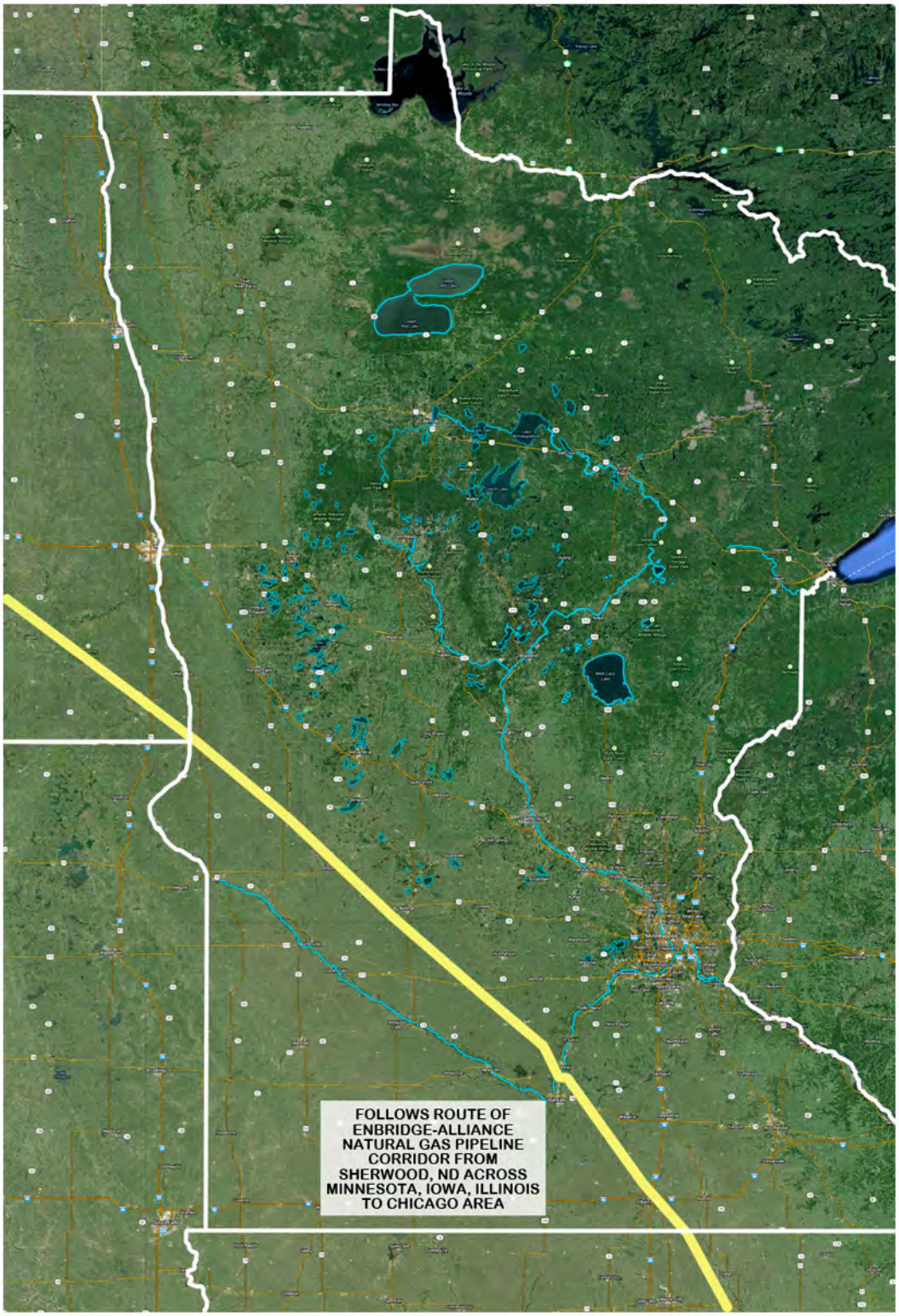

ALT ROUTE A traverses almost exclusively agricultural lands below Minnesota's primary lake country. This area is sparsely populated with mostly small towns among the farmlands.

ALTERNATE ROUTE "A"

Note: Enbridge's Mark Curwin, Senior Director for Strategic Coordination of Major Project Executions in the US, stated their construction preference is to build pipelines across farmland. He made these remarks at a public meeting in Park Rapids on Jan. 29, 2014. In attendance were two Minnesota legislators, Roger Erickson and Rod Skoe,as well as local Hubbard County government, agency and business officials. Mr. Curwin gave the reasons of better soils, easier construction, easier access, less natural habitat destruction, cheaper and quicker. After construction the farmland can be put back into crop production. Access to leaks and spills is much easier. Winter wetland construction would be at a minimum.

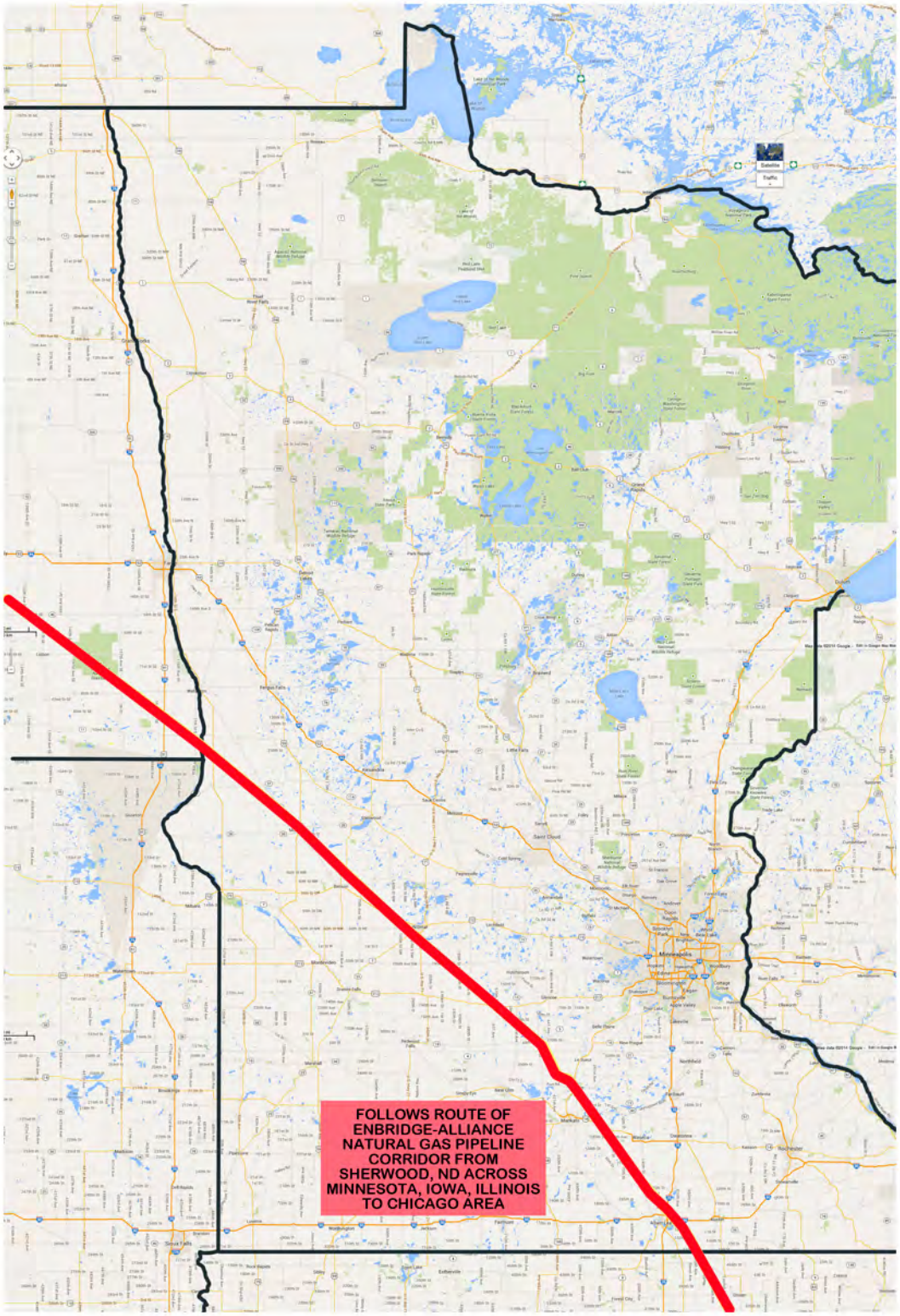

ALTERNATE ROUTE "A"

ALT ROUTE A avoids all the major risk areas of the lake country: high quality lakes and streams, sensitive aquifers, culturally significant wild ricing waters, and valuable lakeshore and vacationland assets.

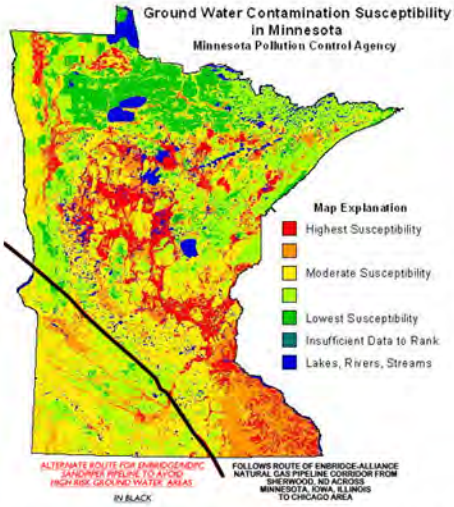

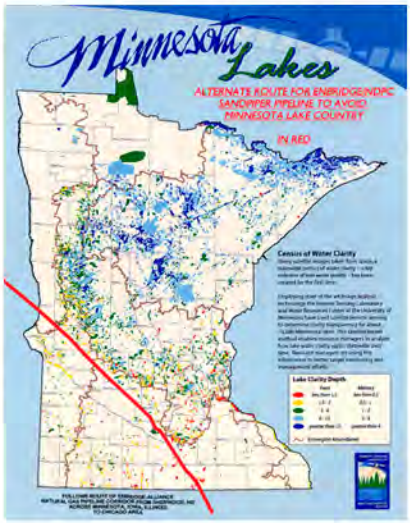

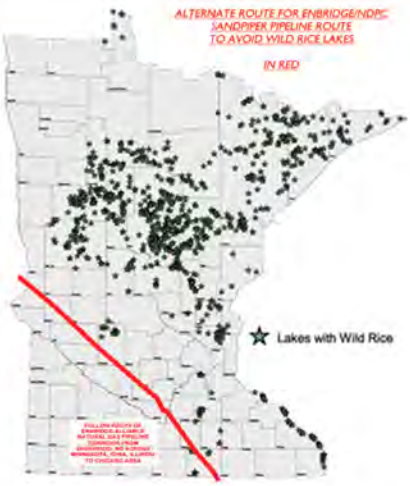

Minnesota still gets to keep jobs the construction will provide as well as North Dakota plus Iowa and Illinois. Jobs for Americans.

Although the route does not end in Superior, it still ties into the existing Enbridge system in Illinois with routing options to Michigan and Ontario that avoid our greatest freshwater lakes of Lake Superior and the Mackinac Straits of Lakes Michigan and Huron. The Illinois Hub also allows Enbridge access to its pipelines to Oklahoma and points south.

Since it's an existing corridor the company should have access to the mapping previously done for the pipeline already there. ALT ROUTE A also intersects in southern Minnesota pipelines owned and operated by other companies which provide the option of re-routing Bakken crude to the refineries in Rosemont and Saint Paul Park in the south Twin Cities Metro. Perhaps Minnesotans will actually get to fuel their cars and trucks with gasoline from Bakken crude.

As currently planned with the exception of a few tax dollars and short term construction monies Minnesotans derive no long term benefits from these pipelines and assume all the risks from leaks/spills/ruptures. And eventually these pipelines will leak or break. THE EPA Pebble Mine statistics said so and Enbridge's spill history in Minnesota proves it true.

Friends of the Headwaters therefore recommends to the PUC, DOC and other state agencies that they enforce our MEPA statutes and deny the Certificate of Route permit for the Enbridge/NDPC's proposed Sandpiper pipeline corridor through Minnesota's prime lake country. A perfectly viable, low risk alternative is available south of our best waters.

Friends of the Headwaters believes a barrel of water IS worth more than a barrel of oil.

POSITION PAPER - ENBRIDGE/NORTH DAKOTA PIPELINE COMPANY (NDPC) LLC
SANDPIPER PIPELINE PROJECT

Public Utilities Commission (PUC) Docket Number: PL-6668/PPL-13-474

ADDENDUM TO FRIENDS OF THE HEADWATERS ALTERNATIVE ROUTE PROPOSAL

Friends of the Headwaters preferred alternate to the Sandpiper pipeline corridor is Route A as previously presented. We do, however, have 2 other alternate route proposals which are listed below. The principal reasoning and decisions for *Friends of the Headwaters'* primary Alternate Route "A" also stand for these optional route alternatives. Both of these routes move the Sandpiper pipeline corridor out of the high risk lands and waters of central and northern Minnesota. Both routes move the potential of oil spills away from the Lake Superior basin as well. Alt Route "B" would tie into the existing Enbridge pipeline system in Illinois. Alt Route "C" would connect to the refineries, Flint Hills or Saint Paul Park, southeast of the Minneapolis-St.Paul area or would connect with pipeline systems in the Twin Cities metro area that also connect across Wisconsin to the primary Enbridge pipeline corridor running northwest to southeast down through Wisconsin.The routes attempt to utilize existing energy corridors as much as possible.

ALTERNATE ROUTE "B"

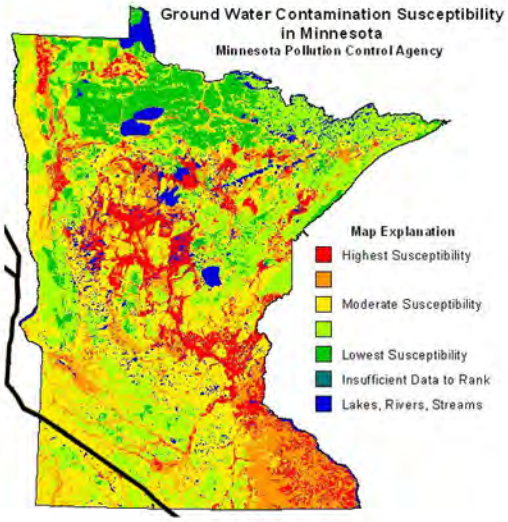

ALTERNATE ROUTE "B"

ALTERNATE ROUTE "C"

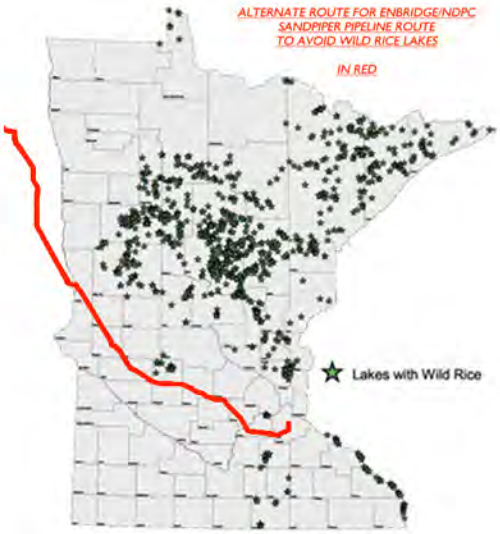

ALTERNATE ROUTE "C"

ADDENDUM TO FRIENDS OF THE HEADWATERS ALTERNATIVE ROUTE PROPOSAL

ALTERNATE ROUTE "B"

This is modeled after Alt Route A in that it begins in North Dakota on the Enbridge/Alliance natural gas pipeline corridor. Upon reaching the I29 corridor in eastern North and South Dakota it follows the I29 corridor south until intersecting another natural gas pipeline corridor at which point it follows that corridor to Illinois. This route traverses mostly farmland in the southwest corner of the state and also avoids the two major river crossings of the Red River north of Wheaton, MN and the Minnesota River near Mankato.

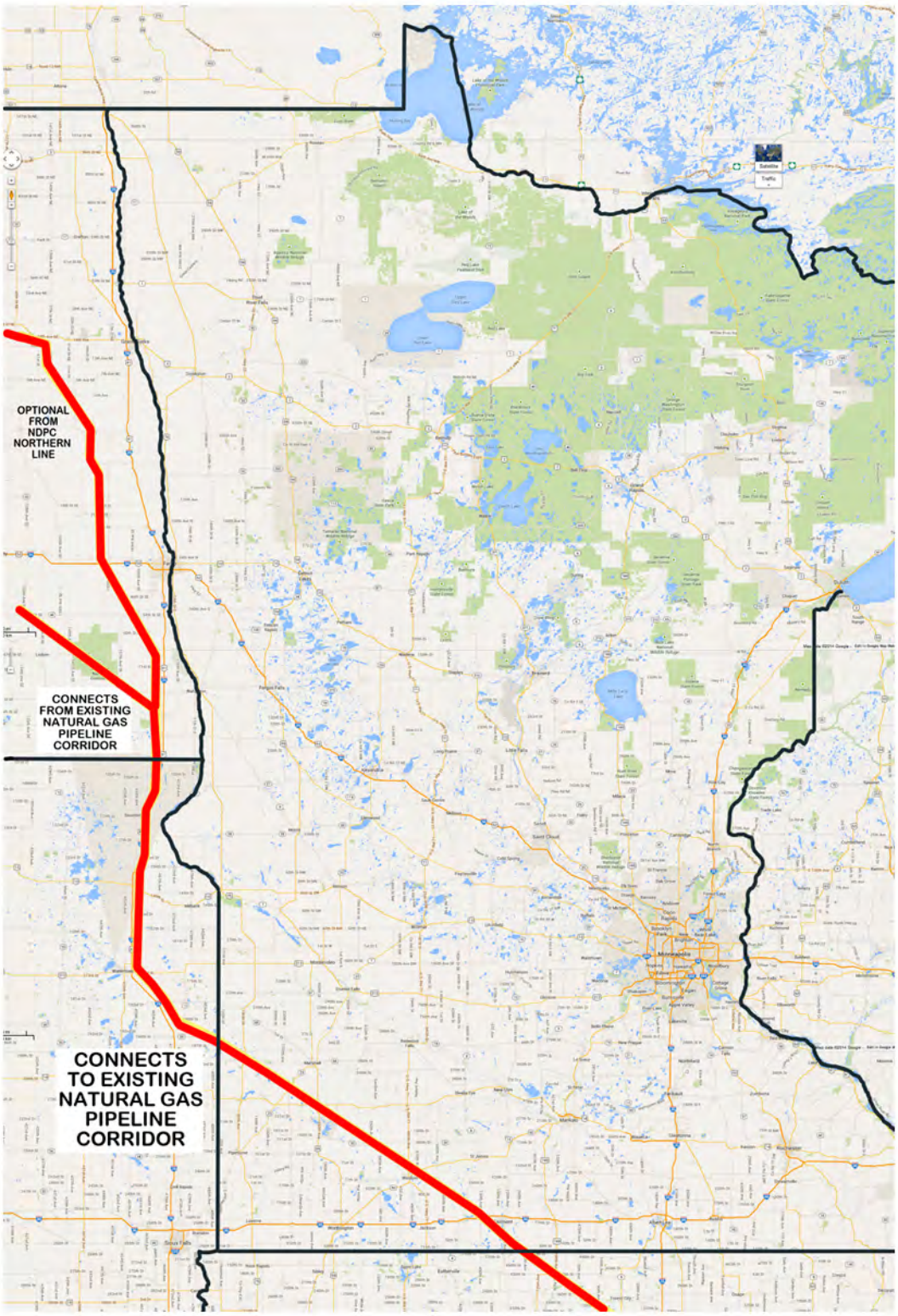

ADDENDUM TO FRIENDS OF THE HEADWATERS ALTERNATIVE ROUTE PROPOSAL

ALTERNATE ROUTE "B"

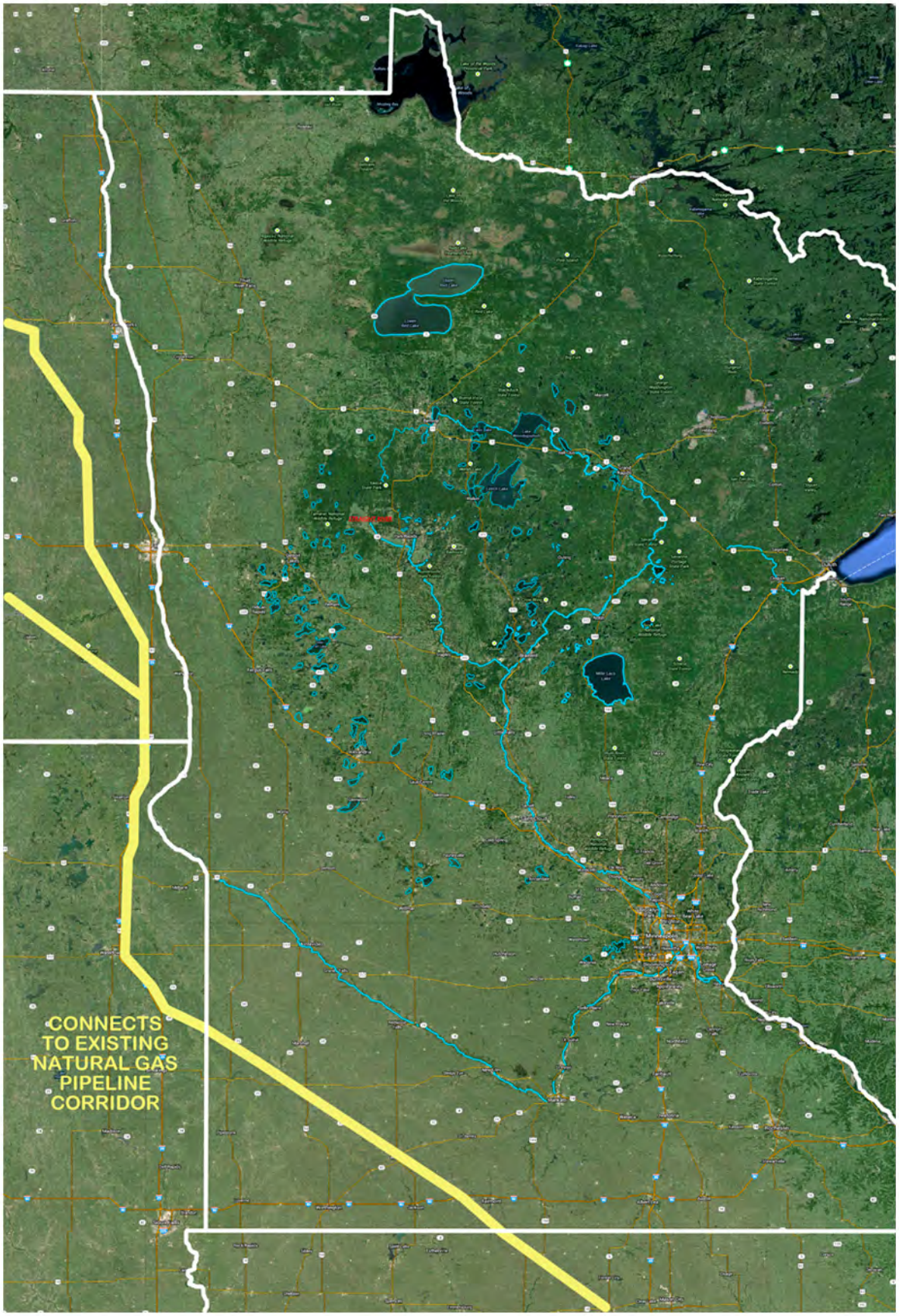

ADDENDUM TO FRIENDS OF THE HEADWATERS ALTERNATIVE ROUTE PROPOSAL

ALTERNATE ROUTE "C"

West of Grand Forks near Larimore the Sandpiper would turn south following either railroad easements or road easements south-southeast down the Red River Vally, crossing the Red River near Wahpeton, ND and continuing along MN Hgy 9 until it intersects an existing pipeline corridor owned by the Magellan Company. The Sandpiper follows this corridor until its intersection with the MinnCan pipeline corridor at which point it follows this corridor to the Flint Hills and Saint Paul Park refineries and pipeline system southeast of the Twin Cities Metro area.

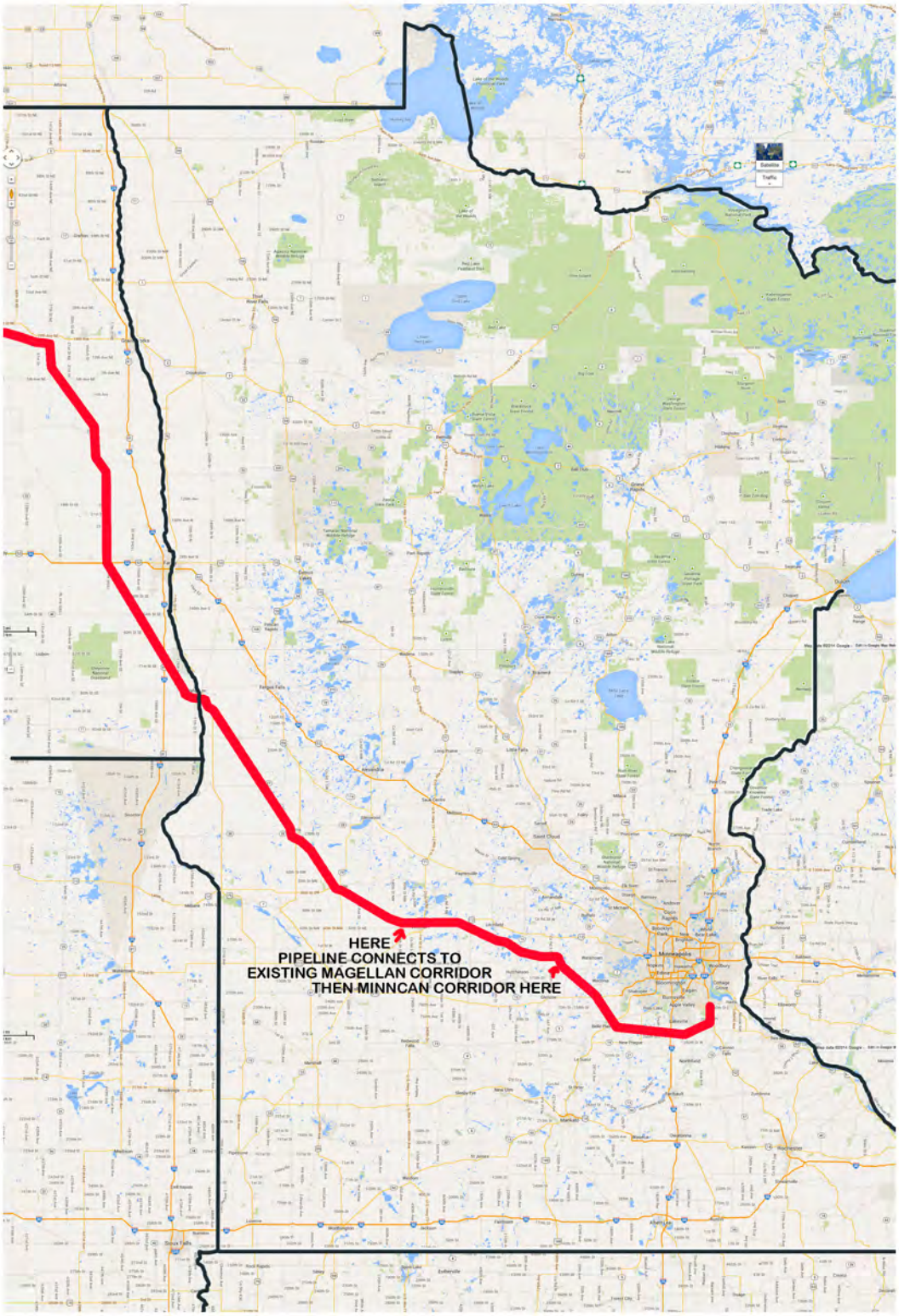

ADDENDUM TO FRIENDS OF THE HEADWATERS ALTERNATIVE ROUTE PROPOSAL

ALTERNATE ROUTE "C"

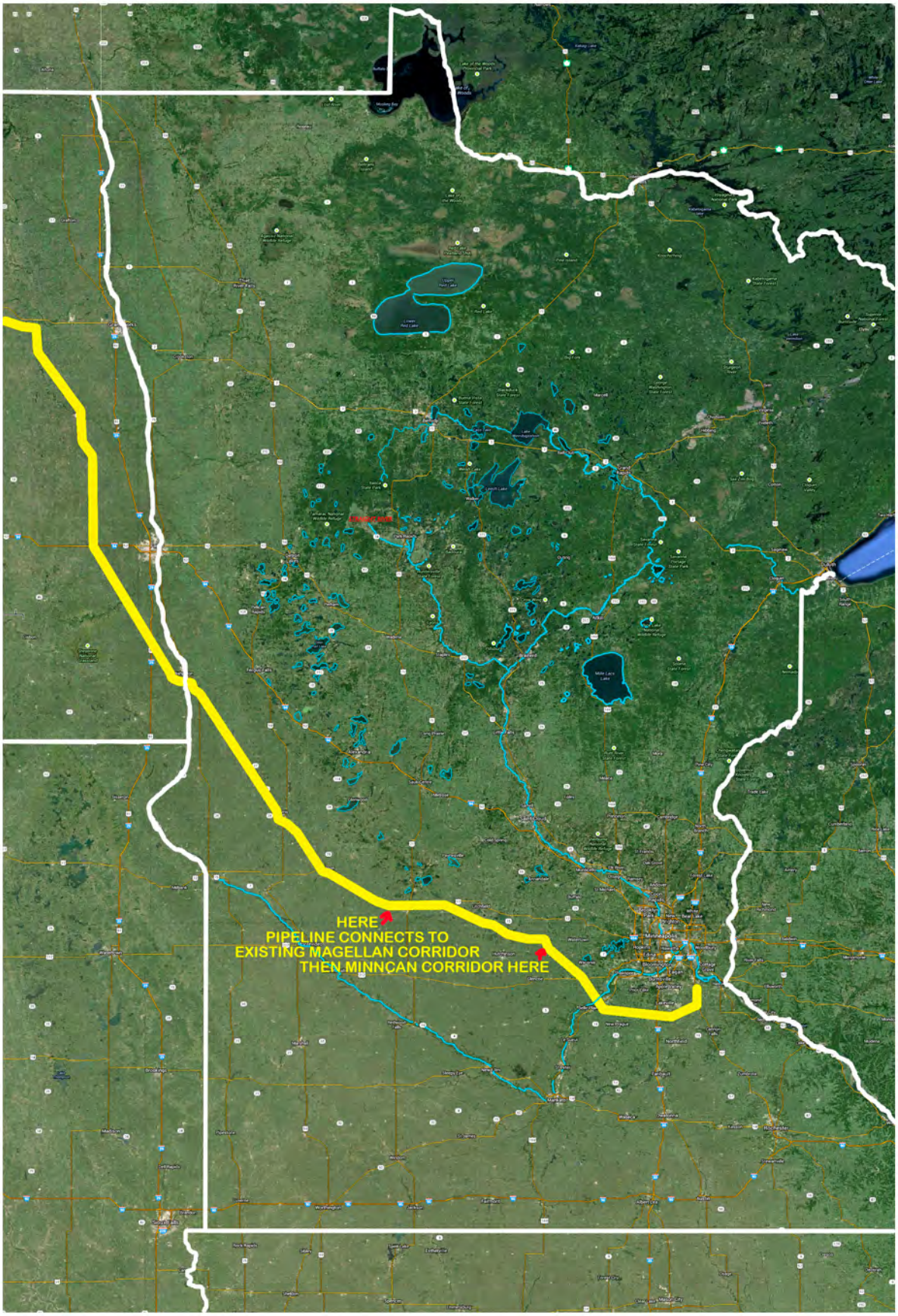

April 4, 2014

Larry Hartman, Environmental Review Manager
Energy Environmental Review and Analysis (EERA)
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul MN 55101

Email: larry.hartman@state.mn.us

Re: PUC Docket Number 13-473 and 13-474

Dear Mr. Hartman,

Please consider the comments below the collective and cumulative concerns and recommendation of Friends of the Headwaters (FOH), a local citizen's group organized for the purpose of protecting Minnesota's resources; advocating for citizen's right to fully participate in its government's decisions and ensuring adherence to all local, state and federal laws in all actions taken in regard to Enbridge Pipeline, (now dba North Dakota Pipeline LLC) and their plans to construct and operate the Sandpiper Crude Oil Pipeline in Minnesota. Friends of the Mississippi have over 600 members and supporters who share the concerns, comments and recommendations expressed below.

We have organized our comments into twelve sections under the following broad categories:

1. Concerns, objections, and failure to provide due process;
2. Quality and scope of alternative environmental reviews;
3. Certain time and resource constraints;
4. Unjustified limited scope of environmental review;
5. Pipeline leak/rupture event impact scenario analysis;
6. Need for additional leak/rupture scenarios unique to sandpiper routes;
7. Bakken sweet crude oil volatility/flammability consideration in leak/rupture scenario development;
8. Dept. of Commerce staff commitment to provide FOE assistance in development of alternative route data;
9. Methods of developing and comparing alternative routes;
10. Cumulative impacts;
11. Financial assurance;
12. Transparency, equal access and equal treatment;

1. CONCERNS, OBJECTIONS, AND FAILURE TO PROVIDE DUE PROCESS

Our primary concern is for what appears to be a decoupling and therefore the confusion of the procedures employed by your Department and the Public Utilities Commission in performing the state's responsibilities under the provisions of the various Statutes and Administrative Rules pertaining specifically to both the need for and the routing of petroleum pipelines in Minnesota.

The effect of the apparent decoupling of the Certificate of Need and Routing permit is the perception if not the reality that the applicant's realization of the pipeline project is but a foregone conclusion and that the routing process is relegated to simply comparing the applicant's preferred route to any other route that can possible manage to clear the myriad regulatory hurdles of requirements for complex supporting data and survive the virtually insurmountable maze of procedural requirements. The process has the appearance of being so favorably stacked in favor of the applicant's preferred route as to discourage the public from mounting the effort necessary to have any other route qualify for serious consideration. In fact, the applicant is acting in ways that would readily lead even the most casual observer to believe that the proposed southern route for the Sandpiper pipeline is a "done deal". Why else would Enbridge representatives gamble so much money to secure landowner easements all along their "preferred" route were they not so confident that the "process" will work in their favor?

FOH is requesting affirmative action on the part of the DOC and PUC that demonstrate that the need and associated pipeline routing process are transparent avoiding even the appearance of a process with a pre-determined outcome. The public has a right to expect a meticulously developed, well coordinated and interrelated need and routing process such that all material evidence is adequately weighed and publically well reasoned throughout.

It is very unclear and disturbing to the public that serious social, economic and environmental considerations seem so narrowly defined and constrained by unreasonable time schedules that favor the applicant at the expense of the public interest. It is unclear who develops the environmental impact information required by rule in the Certificate of Need (CON) process and how this environmental information may differ from the "comparative environmental analysis" or CEA prepared by the DOC that has the appearance of being operative only in the pipeline routing process. It is unclear and somewhat disturbing to realize, if it is true, that the narrow constraints imposed on the CEA document may also constrain the quality of the only environmental decision document available for the parallel but still separate CON process.

Furthermore, FOH is particularly concerned for your Department's actions which may violate the Minnesota Environmental Policy Act (MEPA) in the preparation of the CEA, particularly if the CEA is the only environmental review document made available for the CON decision as well.

It is our belief that while the several recent amendments to Minnesota Statutes you have cited at recent public meetings regarding the Sandpiper project provide for an "alternative" environmental review process for pipelines these Statutes and Rules to not allow for "inferior" environmental review for either the CON or the CEA developed for the Routing Permit.

Our reviews of all pertinent Minnesota Statutes and Rules applicable to the either the determinations of need and/or for the selection of routes for crude oil pipelines find

nothing that absolves the applicant or any state agencies from adherence to either the letter or the spirit of certain overarching and vital policy provisions of MEPA. For example, we believe that the applicant and your respective departments as well as commenting state agencies are bound by Subdivision 6, Minnesota Statutes 116D.04 regarding which states:

> **Prohibitions.** No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct.

This provision of MEPA sets a very high standard for making a finding that all "reasonable and prudent alternatives" have indeed been considered before any state action may be taken to permit projects such as a crude oil pipeline.

2. QUALITY AND SCOPE OF ALTERNATIVE ENVIRONMENTAL REVIEW

FOH recognizes that the Departments of Commerce and/or the Public Utilities Commission are empowered by certain Statutes to utilize alternative environmental review for certain crude oil pipelines as authorized by Minnesota Statutes 216G.02 pertaining to Routing of Certain Pipelines and Minnesota Statutes 2004, section 216B.2421 that applies to certain large energy facilities and specifically, subdivision 2, subsection 4. specifies that these provisions apply to pipelines such as the Sandpiper.

FOH further recognizes that Minnesota Statutes 2004, section 216B.2421, Subdivision 5 describing environmental review goes on to state:

> [ENVIRONMENTAL REVIEW.] For the projects identified in subdivision 2 and following these procedures, the commissioner of the Department of Commerce shall prepare for the commission an environmental assessment. The environmental assessment shall contain information on the human and environmental impacts of the proposed project and other sites or routes identified by the commission and shall address mitigating measures for all of the sites or routes considered. The environmental assessment shall be the only state environmental review document required to be prepared on the project.

However, while MEPA specifically, in Subdivision 4a. makes provisions for such forms of exclusive "alternative review" as allowed in Statutes 216B, this section of MEPA also makes the intentions of such alternative review quite clear.

> Subd. 4a. Alternative review. The board shall by rule identify alternative forms of environmental review which will address the same issues and utilize similar procedures as an environmental impact statement in a more timely or more efficient manner to be utilized in lieu of an environmental impact statement.

FOH brings your attention to the fact that while the purpose of "alternative review' as contemplated under Subdivision 4a of MEPA is to allow for "a more timely or more efficient manner to be utilized in lieu of an environmental impact statement, such alternative review is also required to: …"address the same issues and utilize similar procedures as an environmental impact statement…"

3. CERTAIN TIME AND RESOURCE CONSTRAINTS

The expedited time schedules and the omission of certain requirements for publishing of drafts documents and for soliciting public and other agency comments on draft documents are all streamlining of the normal EIS process provided as special privilege for pipelines under MN Statutes 216 G.02. The compression of time-lines and reduction of time and limiting opportunity for public or other agency comments does not excuse the PUC and/or the DOC from preparing robust, thorough and complete environmental review documents for pipelines. If the compressed nine and twelve month schedules provided for in rule and law, respectively for both issuing Certificates of Need (CON) and Routing Permits place constraints on the quality or completeness of the public involvement or the quality and completeness of environmental review portions of these processes it is incumbent on the PUC and DOC to either act to secure the necessary resources to accomplish these tasks within the provided timeframes or grant itself sufficient time extensions to perform the environmental review adequately. Your individual departments have ample provision in rule and law to shift the costs of the accelerated pubic input and environmental review to the applicant as their responsibility in return for the benefits of the streamlined process.

Specifically, in regard to cost constraints, Minnesota Statutes 216G.02 ROUTING OF CERTAIN PIPELINES. Subdivision 3.B Section 6 requires the PUC to:

> (Section 6) provide for the payment of fees by persons proposing to construct pipelines to cover the costs of the commission in implementing this section;

Lacking sufficient resources your departments have little choice, if acting in the better interest of the public than to request additional funding and/or extend the time taken to properly meet these obligations to the citizens of Minnesota.

It is FOH's understanding of these Statutes and Rules that if at any time during CON or Routing Permit process your respective departments become aware that more extensive public involvement will be needed, or that more detailed information must be analyzed or

that more alternative routes than anticipated will have to be evaluated to meet the minimum requirements of MEPA or other applicable rules the Public Utilities Commission on recommendation from the Department of Commerce, in providing such just cause, can extend either of the CON or the Routing Permit schedules. Specifically PUC procedural rules in Section 5 states:

> "(Section 5) provide a procedure that the commission will follow in issuing pipeline routing permits and require the commission to issue the permits within nine months after the permit application is received by the commission, unless the commission extends this deadline for cause;" (emphasis added by FOH)

FOH contends that citizen comments have by appropriate mean requested, sufficiently justified and provided evidence in support to constitute the required "cause" for the commission to extend the several deadlines necessary to allow full and complete public involvement and for expanding the time and resources necessary for preparation of appropriate environmental review documents.

4. UNJUSTIFIED LIMITED SCOPE OF ENVIRONMENTAL REVIEW

FOH finds that the Department of Commerce Environmental Review staff may believe that the Comparative Environmental Analysis for alternative routes and comments from any state or federal agencies or from the general public are necessarily constrained to impacts of pipeline construction only. FOH point out that under PUC Rules 7852.1900 CRITERIA FOR PIPELINE ROUTE SELECTION states in Subpart. 3 Criteria and in section J:

> Criteria. In selecting a route for designation and issuance of a pipeline routing permit, the commission shall consider the impact on the pipeline of the following:
>
> > J. the relevant applicable policies, rules, and regulations of other state and federal agencies, and local government land use laws including ordinances adopted under Minnesota Statutes, section 299J.05, relating to the location, design, construction, or **operation** of the proposed pipeline and associated facilities. (note: bold underlining added by FOH)

Therefore, FOH requests that the Comparative Environmental Review for the preferred route and all alternative routes include all *operational* impacts of the proposed Sandpiper pipeline. Operational aspects of crude oil pipelines over their entire projected life history include the high potential for pipeline failure, rupture, leaks and other releases of product into the environment. Probabilities of these types of releases have been found in other recent pipeline project environmental reviews to be high enough to be considered reasonably predictable impacts of operating crude oil pipelines over their projected lifetimes. These were the findings of a recently published 2014 Federal Environmental Impact Statement (EIS) prepared by the U.S. Environmental Protection Agency (EPA) for the proposed Pebble Mine in Bristol Bay Alaska. The full EIS is available on line at:

http://cfpub.epa.gov/ncea/bristolbay/recordisplay.cfm?deid=253500#Download

In Chapter 11 of the aforementioned EIS the EPA supports this conclusion by statistical analysis of United States, Canadian pipeline operating history as well as data from other countries: The EPA's rather sobering and significant conclusions are shown in two excerpts from the EIS below:

> *"This overall estimate of annual failure probability, coupled with the 113-km length of each pipeline as it runs along the transportation corridor within the Kvichak River watershed, results in an 11% probability of a failure in each of the four pipelines each year. Thus, the probability of a pipeline failure occurring over the duration of the Pebble 2.0 scenario (i.e., approximately 25 years) would be 95% for each pipeline."*
>
> *"The chance of a large rupture in each of the three pipelines over the life of the mine would exceed 25%, 30%, and 67% in the Pebble 0.25, 2.0, and 6.5 scenarios, respectively. In each of the three scenarios, there would be a greater than 99.9% chance that at least one of the three pipelines carrying liquid would fail during the project lifetime".*

The Bristol Bay EIS goes on to discount the likelihood that improved engineering standards for pipeline materials would reduce pipeline failure rates because engineering has little effect on the rate of human errors leading to leaks and ruptures. See this discussion in a following paragraph:

> *"It may be argued that engineering can reduce pipeline failures rates below historical levels, but improved engineering has little effect on the rate of human errors. Many pipeline failures, such as the cyanide water spill at the Fort Knox mine (Fairbanks, Alaska) that resulted from a bulldozer ripper blade hitting the pipeline (ADEC 2012), are due to human errors. Perhaps more important, human error can negate safety systems. For example, on July 25 and 26, 2010, crude oil spilled into the Kalamazoo River, Michigan, from a pipeline operated by Enbridge Energy. A series of in-line inspections had showed multiple corrosion and crack-like anomalies at the river crossing, but no field inspection was performed (Barrett 2012). When the pipeline failed, more than 3 million L (20,000 barrels) of oil spilled over 2 days as operators repeatedly overrode the shut-down system and restarted the line (Barrett 2012). The spill was finally reported by a local gas company employee who happened to witness the leak. The spill may have been prevented if repairs had been made when defects were detected, and the release could have been minimized if operators had promptly shut down the line".*

The following January 27, 2012 article in the Watershed Sentinel, an online British Columbian Newsletter reviews a 10- year spill history of the Enbridge Pipeline System in the U.S. and Canada demonstrating that Enbridge pipeline leak/spill history is consistent with the data analyzed in the Bristol Bay EIS.

A Decade of Enbridge Oil Pipeline Spills
by Joyce Nelson,

2000: 7,513 barrels. Enbridge reported 48 pipeline spills and leaks, including a spill of 1,500 barrels at Innes, Sask.

2001: 25,980 barrels. Enbridge pipelines reported 34 spills and leaks, totalling 25,980 barrels of oil, including a January spill from Enbridge's Energy Transportation North Pipeline that leaked 23,900 barrels of crude oil into a slough near Hardisty, Alberta, and a September spill of 598 barrels in Binbrook, Ont.

2002: 14,683 barrels. Enbridge reported 48 oil spills and leaks, totalling 14,683 barrels, including a leak of 6,133 barrels in Kerrobert, Sask. in January; a seam failure in May that spilled 598 barrels in Glenboro, Man.; and a pipeline rupture into a marsh west of Cohasset, Minn. To prevent 6,000 barrels of crude oil from reaching the Mississippi River, Enbridge set the oil on fire.

2003: 6,410 barrels. Enbridge pipelines had 62 spills and leaks, totalling 6,410 barrels, including a January spill of 4,500 barrels of oil at the company's oil terminal near Superior, Wisc., and a June spill of 452 barrels of oil into Wisconsin's Nemadji River. In April, an Enbridge gas pipeline exploded, levelling a strip mall in Etobicoke, Ont. and killing seven people.

2004: 3,252 barrels. Enbridge pipelines had 69 reported spills, totalling 3,252 barrels of oil, including a February valve failure in Fort McMurray, Alta. that leaked 735 barrels of oil.

2005: 9,825 barrels. Enbridge had 70 reported spills, totalling 9,825 barrels of oil.

2006: 5,363 barrels. Enbridge had 61 reported spills, totalling 5,363 barrels of oil, including a March 613 barrel spill at its Willmar terminal in Saskatchewan and a December spill of 2,000 barrels at a pumping station in Montana.

2007: 13,777 barrels. Enbridge had 65 spills and leaks, totalling 13,777 barrels of oil, including a January pipeline break near Stanley, North Dakota, which spilled 215 barrels of oil; two pipeline incidents in January/February in Clark and Rusk Counties in Wisconsin which spilled 4,200 barrels of oil; and an April spill of approximately 6,227 barrels of oil into a field down-stream of an Enbridge pumping station at Glenavon, Sask. In November, an Enbridge pipeline carrying bitumen to U.S. Midwest markets exploded near Clearbrook, Minn., killing two workers.

2008: 2,682 barrels. Enbridge had 80 reported spills and leaks, totalling 2,682 barrels of oil, including a January incident at an Enbridge pumping station at the

Cromer Terminal in Manitoba that leaked 629 barrels of crude; a February incident in Weyburn, Sask., which leaked 157 barrels; and a March spill of 252 barrels of oil in Fort McMurray, Alberta.

2009: 8,441 barrels. Enbridge had 103 reported oil spills and leaks, totalling 8,441 barrels, including a pipeline incident at the Enbridge Cheecham Terminal tank farm that spilled 5,749 barrels of oil near Anzac, Alberta; a spill of 704 barrels in Kisbey, Sask.; and a spill of 1,100 barrels at Odessa, Sask.

2010: 34,122 barrels. Enbridge had 80 reported pipeline spills, totalling 34,122 barrels, including a January Enbridge pipeline leak near Neche, North Dakota of 3,000 barrels of oil; an April incident near Virden, Man. that leaked 12 barrels of oil into Bosshill Creek; a July pipeline spill in Marshall, Michigan that dumped 20,000 barrels of tar sands crude into the Kalamazoo River, causing the biggest oil spill in U.S. Midwest history; and a September pipeline spill of 6,100 barrels in Romeoville, Ill.

Total: 132,715 barrels of oil, more than half the Exxon Valdez spill of 257,000 barrels

Sources: Prince George Citizen (March 12, 2010); The Polaris Institute (May 2010); The Tyee (31 July 2010); Reuters (Sept. 10, 2010); Enbridge.com 2010; Vancouver Sun (May 10, 2011); The Globe & Mail (June 17, 2011); Dogwood Initiative

- See more at: http://www.watershedsentinel.ca/content/enbridge-spills#sthash.e8U7c4zM.dpuf

FOH asserts that Minnesota Statute and Rule applicable to pipeline route permit review and comparative environmental analysis both permit and justify inclusion and assessments of impact from predictable events during the life history of the pipeline including the high probability for major leaks and/or ruptures releasing large quantities of crude oil into the environment. These predictable releases of oil are very likely to have significant adverse impacts on persons, property and natural resources along and downstream of each of the several route alternatives evaluated. Comparing these predictable impacts for all alternative routes should be a major factor in final route selection of the Sandpiper pipeline.

5. Pipeline Leak/Rupture Event Impact Scenario Analysis

The Bristol Bay EIS continues in Section 11.2 with identification of 64 streams and rivers as potential product spill receiving waters because they were proposed to be crossed by the pipeline. But there were many more watersheds crossed at points near enough to downstream receiving waters to also be within the impact zone of a predicted pipeline leak or rupture.

In sections 11.3 of the EIS pipeline rupture/leak scenarios are described in detail including extensive treatment of probable duration and volumes of spills and flow times

to and extending predictable distances down receiving waters. Impacts are then described for two receiving streams typical of the landscape traversed by the pipeline.

The leak/rupture scenarios are developed fully in terms of:

1. Exposure – the physical mechanisms by which aquatic organisms would become exposed to the spilled product;
2. Transport and fate – the distance down stream the toxic components would travel down stream before dissipating, degrading or diluting below applicable water quality standards for each or most important chemical constituent of the product spilled;
3. Exposure - Response – A full analysis of the product for all toxic components, state and federal water quality standards for these chemicals and laboratory methods used to simulate water column concentrations of each chemical of concern;
4. A review of analogous spills into likely receiving water types including isolated lakes, lake chains, high or low quality streams, wetlands of different types;
5. Risk Characterization –comparing exposure levels to toxicological benchmark levels, duration of risks, actual spill histories including potential for remediation and recovery of spilled product, site specific factors and overall weight of evidence; and
6. The Range of Uncertainties in each of these pieces of evidence.

Scenarios for important Bakken Sweet Crude flowing to receiving rivers, streams, lakes, wetlands or wild rice beds along preferred Sandpiper route (and all accepted alternative routes) could then be developed similar to that developed for diesel fuel spill scenario in the Bristol Bay EIS with similar assumptions and calculations in Table 11-7 from that EIS below:

Table 11-7. Parameters for diesel pipeline spills to Chinkelyes and Knutson Creeks.

Parameter	Spill into Chinkelyes Creek		Spill into Knutson Creek
	Chinkelyes Creek	Iliamna River	Knutson Creek
Water Flow			
Discharge (m^3/s)	1.8	22	3.4
Velocity (m/s)	2.2	2.0	2.2
Channel Length (km)	14	7.6	2.6
Pipeline Drainage and Dilution			
Flow rate while draining (m^3/s)	0.035	-	0.023
Flow rate while pumping (m^3/s)	0.005	-	0.005
Release time—draining (minutes)	13	-	7.9
Release time—pumping (minutes)	5	-	5
Volume—total (m^3)	30	-	12
Volume % diesel to water in stream at spill	2.2%	-	0.83%
Mass of diesel in stream at input (mg/L)	17,000	1,500	6,500
Maximum concentration dissolved diesel (mg/L)	1.9–7.8	1.7–7.2	1.9–7.8
Distance traveled during release (km)	1.7		1.1
Travel time to confluence (minutes)[a]	110	64	19
Pipeline and Diesel Specifications			
Length from top of nearest hill to valve (m)	2100	-	810
Elevation drop (m)	150	-	25
Viscosity of diesel at 15°C (cP)	2		
Density of diesel at 15°C (metric tons/m^3)	0.85		

Notes:
Dashes (-) indicate that spill is not directly into Iliamna River, which receives flow from Chinkelyes Creek.
[a] Confluence with Iliamna River for Chinkelyes Creek; confluence with Iliamna Lake for the Iliamna River and Knutson Creek.

Based on these spill parameters similar predictions could be developed for important aquatic plant and/or animal life in the selected receiving waters along each alternative route in the CEA as shown in the following chart from the Bristol Bay EIS that compares the scenarios developed for Alaskan steams to other case histories of similar spills around the country as a means of “ground truthing” or testing validity of their predictive scenarios

Table 11-9. Cases of diesel spills into streams. For comparison, the diesel pipeline failure scenarios evaluated here would release 30 and 8 m^3 of diesel into receiving streamflows of 1.8 and 3.4 m^3/s for spills into Chinkelyes Creek and Knutson Creek, respectively.

Case	Diesel Released (m^3)	Receiving Streamflow (m^3/s)	Observed Effects
Happy Valley Creek, AK	3.7	14	Significant declines in the abundance and species richness of invertebrates
Camas Creek, MT	Unknown	0.42	Low invertebrate abundance and richness
Hayfork Creek, CA	15	4.1	Large kill of vertebrates and invertebrates
Mine Run Creek, VA	240	1.2	Reduced invertebrate abundance and diversity
Reedy River, SC	3,600	6.4	Near-complete fish kill
Cayuga Inlet, NY	26	1.8	Fish kill and reduced abundance, reduced invertebrate abundance and species composition
Westlea Brook, UK	9.8	1.34	Fish kill, invertebrates severely affected
Hemlock Creek, NY	0.5	0.76	No significant effects on invertebrates

Notes:
- Mean flow from NHDPlus v2; others as reported by the authors.

6. NEED FOR ADDITIONAL LEAK/RUPTURE SCENARIOS UNIQUE TO SANDPIPER ROUTES

Sandpiper Leak/Rupture Ground Water Aquifer Contamination Scenario

In the Bristol Bay/Pebble Mine EIS there was no identified need to assess potential for groundwater contamination that might result from a typical leak or spill from the pipelines serving the mines. However, in the case of the preferred route for the Sandpiper crude oil pipeline there are several highly vulnerable aquifers including the Straight River Aquifer near Park Rapids that has been extensively studied.
To fully appreciate the nature and scope of the contamination risk to this important aquifer a set of leak/spill scenarios similar to the surface water impact scenarios used in the Bristol Bay EIS should be developed in the Comparative Environmental Analysis for Sandpiper and any of the alternative routes accepted for consideration in the analysis.

Preparation of groundwater aquifer impact scenarios in susceptible glacial outwash formations that exist along the proposed Sandpiper route are likely to be made significantly more accurate by virtue of extensive study of an historic Enbridge (then dba Lakehead Pipeline Company in Minnesota) pipeline rupture in 1979 west of Bemidji near the small community of Pinewood. The Pinewood study would provide case study calibration data and the equivalent "ground truthing" of predictive groundwater contamination scenarios developed for Sandpiper route alternatives as was recommended in the surface water scenarios above..

A summary of the history and some of the research results applicable and useful in preparation of the Comparative Environmental Analysis for the Sandpiper project is found in a US Geological Survey factsheet found at the website shown below and an excerpt from this factsheet follows:

http://mn.water.usgs.gov/projects/bemidji/results/fact-sheet.pdf

(Excerpt from factsheet)
Description and History of Site
On August 20, 1979 approximately 16 kilometers northwest of Bemidji, Minnesota, the land surface and shallow subsurface were contaminated when a crude-oil pipeline burst, spilling about 1,700,000 L (liters) (about 10,700 barrels) of crude oil onto a glacial outwash deposit (fig. 1). Crude oil also sprayed to the southwest covering an approximately 7,500 m2 (square meter) area of land (spray zone). After cleanup efforts were completed about 400,000 L (about 2,500 barrels) of crude oil remained. Some crude oil percolated through the unsaturated zone to the water table near the rupture site (North oil pool, fig. 1). Some of this sprayed oil flowed over the surface toward a small wetland forming a second area of significant oil infiltration (South oil pool).

The land surface is a glacial outwash plain underlain by stratified glacial outwash deposits. The water table ranges from near land surface to about 11 m below the land surface. About 370 wells and test holes had been installed as of 1998.

Research Results
The fate, transport, and multiphase flow of hydrocarbons depends on geochemical processes and on the processes of volatilization, dissolution, biodegradation, transport, and sorption (fig. 2). An interdisciplinary investigation of these processes is critical to successfully evaluate the migration of hydrocarbons in the subsurface. The investigation at the Bemidji site involved the collection and analysis of crude oil, water, soil, vapor, and sediment samples. The oil phase that occurs as floating product on the water table and as residuum on sediment grains provided a continued source of hydrocarbon to the ground-water and vapor plumes. Knowledge of the geochemistry of a contaminated aquifer is important to understanding the chemical and biological processes controlling the migration of hydrocarbon contaminants in the subsurface. Studies were also conducted to document the concentrations of gases in the unsaturated zone.

Predictable Sandpiper pipeline lead/rupture ground water impact scenarios for susceptible glacial outwash aquifers along the preferred and all alternative routes evaluated could be modeled graphically (as in the figure below from that study) with methods developed in the Pinewood Spill study. Graphics thus developed could be made available in the CEN for the public and regulatory agencies to weigh in making various permit decisions and choices between alternative routes.

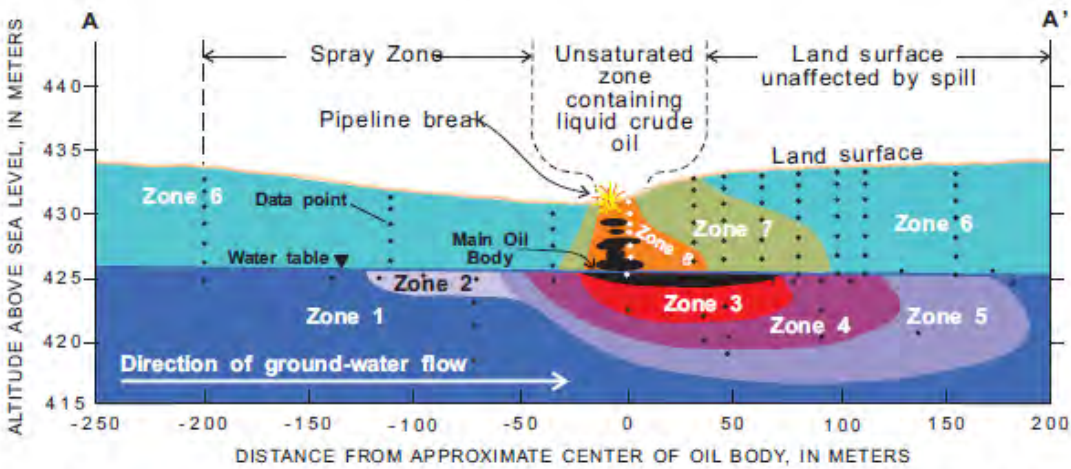

Figure 4. Geochemical zones in the unsaturated and saturated zones at the North oil pool, 1997 (Modified from Baedecker and others, 1993).

Note: Predictive models for groundwater contaminant plumes in leak/rupture scenarios can be used for comparing alternative routes and for setting GIS Spatial Analysis friction parameters discussed elsewhere in these comments.

A brief bibliography of studies of the Bemidji/Pinewood spill site assembled by the U.S. Geological Survey Minnesota Water Science Center that can be used to develop and support groundwater contamination scenarios for selected susceptible glacial outwash aquifers along the proposed Sandpiper route and its alternatives is shown below:

Fact sheet describing results from the Bemidji Toxics project

Toxics Papers:

- "Ground water contamination by crude oil" (146 KB) by Geoffrey Delin and William Herkelrath.
- "Long-term monitoring of unsaturated-zone properties to estimate recharge at the Bemidji crude-oil spill site"(498 KB) by Geoffrey Delin and William Herkelrath.
- "Aromatic and Polyaromatic Hydrocarbon Degradation under Fe (III)-Reducing Conditions" (135 KB) by Robert T. Anderson, et al.
- "Coupled Biogeochemical Modeling of Ground Water Contamination at the Bemidji Minnesota Crude Oil Spill Site" (60 KB) by Gary Curtis, et al.
- "Investigating the Potential for Colloid- and Organic Matter-Facilitated Transport of Polycyclic Aromatic Hydrocarbons in Crude Oil-Contaminated Ground Water" (136 KB) by Joseph Ryan, et al.
- "Determining BTEX Biodegradation Rates Using In Situ Microcosms at the Bemidji site, Minnesota: Trials and Tribulations" (69KB) by E. Michael Godsy, et al.
- "Inhibition of Acetoclastic Methanogenesis by Crude Oil from Bemidji, Minnesota" (143 KB) by Ean Warren, Barbara Bekins, and E. Michael Godsy.

Posters Presented at Technical Conferences:

- "Estimating multiphase hydraulic properties at a crude-oil spill site" by William Herkelrath, Hedeff Essaid, and Leslie Dillard, USGS, Menlo Park CA

  A poster presented at the "International workshop on Characterization and measurement of the hydraulic properties of unsaturated porous media", Riverside, CA, October 22-24, 1997.

Related links that include results from the Bemidji site:

- Fate of Organic Chemicals in Subsurface Environments
- Microbiology and Molecular Ecology studies in Bemidji, MN
- Multiphase flow, transport, reaction and biodegradation
- Comprehensive Organic Analysis of Water
- Transport and Biogeochemical Fate of Organic Substances in Aquatic Environments
- Biogeochemical Controls on Organic Contaminant Degradation in Heterogeneous Near Surface Environments
- Comparative Study of Organic Degradation in Selected Hydrologic Environments

Figures:

- Geochemical zonation (17 KB) diagram.
- Plan view aerial photo from 1991 (85 KB) showing topographic contours and well locations at the site.

7. Bakken Sweet Crude Oil Volatility/Flammability Consideration in Leak/Rupture Scenario Development

Transportation Safety Board of Canada's Operation Service Branch Laboratory Report # LP148/2013 entitled "Analysis of Crude Oil Samples - Montreal, Maine & Atlantic Railway, Train MMA-002 - Date of Occurrence: 06-Jul-2013" which was just released on released on February 6th 2014. The relevance of this report to the Sandpiper routing process Comparative Environmental Analysis is that the train derailment investigated involved a major spill of the same product proposed to be shipped by the Sandpiper, namely Bakken sweet crude oil. The full report is available at:

http://www.tsb.gc.ca/eng/enquetes-investigations/rail/2013/R13D0054/lab/20140306/LP1482013.asp

Excerpts from the report follow:

> "On 06 July 2013, a unit train carrying petroleum crude oil operated by Montreal, Maine & Atlantic Railway derailed in Lac-Mégantic, Quebec. Numerous tank cars ruptured and a fire ensued.
>
> "Conventional oil, which can range from light to medium in grade, is found in reservoir rocks with sufficient permeability to allow the oil to flow through the rock to a well. The petroleum crude oil on the occurrence train originated from suppliers with producing wells in the Bakken Shale formation region of North

> Dakota. The Bakken Shale formation is a tight oil reservoir. Tight oil is a type of conventional oil that is found within reservoirs with very low permeability. Most oil produced from low-permeability reservoirs is of the light to medium variety, with a lower viscosity. "

Elsewhere in this Canadian TSB report Bakken Sweet Crude is compared to the volatility of unleaded gasoline:

> "The Environmental Technology Centre (ETC) Oil Properties Database reports the following properties for unleaded gasoline: [45]
>
> Flash point -30°C
>
> Density at 15°C 750 to 850 kg/m3
>
> Kinematic viscosity <1 cSt at 38°C
>
> "Comparing these values to the occurrence crude oil results summarized in Table 2, it is apparent that the occurrence crude oil's flash point is similar to that of unleaded gasoline. The density results obtained for the occurrence crude oil samples (see Table 10) are also within the range reported for unleaded gasoline. However, unleaded gasoline has lower viscosity than the occurrence crude oil samples."

The Canadian TSB report includes the following pertinent conclusions that would be important in the development of leak/rupture incident response scenarios in the Sandpiper comparative environmental analysis:

> "4.3 The occurrence crude oil's properties were consistent with those of a light sweet crude oil with volatility comparable to that of a condensate or gasoline product.
>
> 4.6 The large quantities of spilled crude oil, the rapid rate of release, and the oil's high volatility and low viscosity were likely the major contributors to the large post-derailment fireball and pool fire.
>
> 4.7 The occurrence crude oil contained concentrations of BTEX that were comparable to typical values reported for crude oils. This explains why concentrations of benzene and other VOCs well above exposure limits were detected at the derailment site."

8. DEPT OF COMMERCE STAFF COMMITMENT TO PROVIDE FOH ASSISTANCE IN DEVELOPMENT OF ALTERNATIVE ROUTE DATA.

FOH has complained strenuously to Department of Commerce, to the Public Utilities Commission and to the applicant that two factors have severely limited its member's ability to identify and develop reasonable and prudent alternative routes for use in preparation of the planned Comparative Environmental Analysis for Sandpiper. Most important among these limitations has been the very short amount of time allotted for the public to prepare route proposals and the withholding by both Enbridge and the two

Departments of certain techical data in the form of Geographic Information System (GIS) data files called "GIS shapefiles" for the proposed Sandpiper route.

Requests by FOH for extensions of time beyond the established deadline of April 4th 2014 for submitting alternative route proposals have been steadfastly refused by Department staff. These denials of FOH's requests for such time extensions, while provided for in applicable administrative rules with showing of cause, have issued from the Department's staff without their providing justification for denying such requests.

FOH takes very seriously all the considerations as described in Subpart 3. that must be taken into account when selecting suitable alternative routes for transporting such hazardous material as Bakken Crude Oil across Minnesota. As required by the rules as set forth in PUC 7852.1400 great multitude of parameters must be considered simultaneously and repeatedly for what could be endless possible routes. Thankfully, technology has recognized the complexity of the task and the enormity of data that one has to consider to meet the rule and Geographic Information Spatial Analysis is one such technology.

From Enbridge's Minnesota Environmental Information Report on Sandpiper submitted to the PUC as part of the company's application it is apparent that Enbridge used Geographic Information System data analysis method similar to the Spatial Analysis referenced above. The following paragraphs are excerpted in part from that report:

> "EPND assessed the route from Tioga, North Dakota to Superior, Wisconsin, with the intent of maximizing existing right-of-way to the extent practicable while identifying specific areas where co-location may not be practicable. The first step in the environmental review of the route and the selection process consisted of collecting publicly available environmental data to identify routing constraints. The sources of data consisted primarily of: Geographic Information Systems ("GIS") digital information layers, including U.S. Geological Survey ("USGS") topographic maps, USGS land use database, U.S. Department of Agriculture ("USDA") Farm Services Agency aerial photography and GIS data, National Wetlands Inventory ("NWI") maps, Minnesota Department of Natural Resources ("MNDNR") Natural Heritage Information System ("NHIS") data, Minnesota Department of Transportation ("MDOT") highway maps, USDA state soil geographic (State Soil Geographic ["STATSGO2"] and Soil Survey Geographic ["SSURGO"]) databases, and other natural feature databases obtained from the MNDNR website and other state and federal sources. Existing major utility rights-of-way also were identified for potential use in co-location.
>
> 2.3.3 Comparison of Route Alternatives
> EPND conducted a detailed quantitative analysis of environmental impacts along each route alternative identified during the routing process. The analysis used the same sources of publicly available environmental data described in Section 2.3.1 to compare a variety of factors, including proximity to existing rights-of-way,

> wetlands, highly wind erodible soils, bedrock outcrops, prime farmland soils, perennial waterbodies, national forest land, tribal land, state forest land, state Wildlife Management Area ("WMA") land, state Aquatic Management Area ("AMA") land, railroads crossed, roads crossed, and other site-specific matters. No field survey data was used in the alternatives analysis as field surveys were not completed along the alternate routes. EPND identified and analyzed four route alternatives, which are presented in the following subsections and shown in Figure 2.3.2-1. None of the route alternatives were adopted as the Project's preferred route."

Enbridge apparently had submitted the GIS information they developed for their preferred route to the PUC including the GIS shapefile they constructed. FOH had hoped to utilize the GIS Shapefiles Enbridge had applied to their alternative route analysis to explore the applicants preferred southern route to any and all alternative routes considered viable by cursory examination of various maps and other resources. However neither Enbridge nor the Department of Commerce (DOC) staff would release the shapefile claiming it was protected information under both Federal and State statute.

FOH was never granted access to the subject GIS shapefile by either Enbridge or Dept of Commerce but did successfully obtain the shapefile from the Minnesota Department of Natural Resources after finding that the data were not protected by either Federal or State Statute as claimed by Enbridge and DOC. Unfortunately, the release of the GIS shapefile for the Sandpiper preferred route was far too late into the comment period for FOH to make productive use of the data.

Having made its case that FOH was severely hindered in its efforts FOH has appealed to DOC staff for assistance in meeting the rigorous criterion that must be met in 7852.1400 Subp. 3. Requirements for other route sources.

> Subp. 3. A person other than one listed in subpart 2 (the applicant) may propose a route or a route segment according to items A to C. In Subpart 3.B. of this rule it states that: "The pipeline route or route segment proposal must contain the data and analysis required in parts7852.2600, subpart 3, and 7852.2700, unless the information is substantially the same as provided by the applicant."

Department of Commerce staff, in a prehearing scheduling conference call in the presence of all the parties to the Sandpiper project and the Administrative Law Judge, Judge Eric Lipman agreed to assist FOH in developing the necessary detailed information necessary to meet the minimum requirements of MN 7852.1400 cited above such that suggested alternative routes put forth by FOH would not be summarily dismissed from consideration for lack of required supporting data analysis required by that rule. FOH is committed to meeting with DOC staff immediately following the April 4th comment deadline. FOH will, under separate cover be submitting alternative routes for Sandpiper before the comment deadline. It was understood that the alternative routes thus submitted by FOH will require the DOC staff assistance offered to meet the criterion in the rule to

make them viable per this agreement thus it is expected that the DOC will continue to develop FOH alternatives submitted such that the FOH alternatives will be found acceptable by the commission.

9. METHODS OF DEVELOPING AND COMPARING ALTERNATIVE ROUTES

The applicant, the PUC, the DOC and the public are all confronted with the same challenge. That is to develop alternative routes for Sandpiper that meet the criterion established in MN Rules 7852.1900 CRITERIA FOR PIPELINE ROUTE SELECTION while satisfying the requirement in MEPA for having considered all reasonable and prudent alternatives.

The applicant, having already utilized considerable GIS technology should be well positioned to employ computerized route optimization algorithms to evaluate their preferred route against any and all routes that meet PUC criterion. In fact, they may have already done so during their own comparison of routes. Furthermore, it is the understanding of FOH that the DOC is considering hiring an outside consultant for purposes of assisting the DOC in preparing the Comparative Environmental Analysis. There are many private consultants in the United States performing optimization analysis of linear public and private utilities by applying route optimization software. We would be happy to provide such consultant lists to the DOC staff upon their request.

We provide below, for those who may not be familiar with this technology, a brief description of how Geographic Information Spatial Analysis Systems have evolved into a powerful tool for selecting optimal routes for linear facilities like power lines, pipelines, highways and other utilities. FOH strongly encourages the DOC to specifically contract with outside consultants skilled and experienced in linear facility route optimization to more fully satisfy the requirements in applicable rules and statute to find and select the most reasonable and prudent alternative route for the Sandpiper and all future linear facilities of this nature. It is recommended that the DOC exercise its and the PUC's authority under rule to also develop alternative routes for Sanpiper.

Here is a detailed description of how this technology could be used to satisfy the statutory requirement to examine all reasonable and prudent alternative routes for Sandpiper while adhering most closely to the constraints of time frames provided in rule and law.

5.1.1.20 Graphical Information System

5.1.1.20.1 General

Geographic Information Systems (GIS) are scientific and technological tools that enable the integration of data from different sources into a centralized database from which the data is modeled and analyzed based on its spatial component. GIS-based tools and processes have been extensively used to address the challenges of optimizing pipeline route selection and route networks based on the collection, processing and analysis of spatial data such as topography, vegetation, soil type, land use, geology and landslide areas.

Traditional manual pipeline routing uses available paper maps, drawings, aerial photographs, surveys and engineer experience. GIS techniques combine all of these sources of data in a convenient computer-based information system. The key to the GIS is that it has advantages in terms of speed of data processing and analytical capability.

Fig. 2 is a simplified representation of how data is combined and processed in a GIS to produce models and required outputs. Data, such as well locations, surface topography, land use activities, soil conditions and infrastructure features, are combined based on their spatial component. This enables the engineer to test real-world scenarios within the spatial models.

Fig. 2: Process To Optimize Pipeline Routes

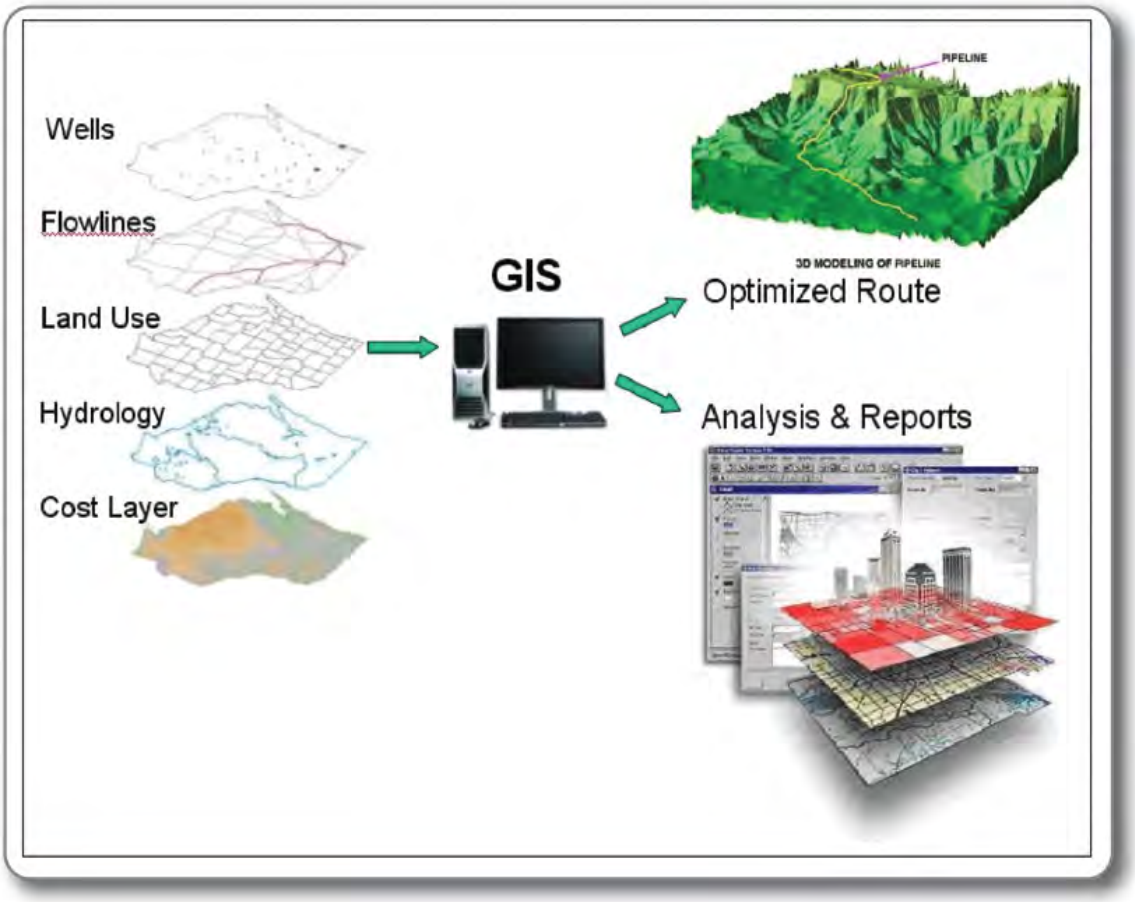

GIS represents an innovative approach to pipeline routing that is both systematic and effective. Optimizing a pipeline route is essentially an optimization between costs of the material and the costs of the construction. Natural and man-made terrain obstructions cause spatial variations in construction cost due to changing features like types of soils, intervals of slope. GIS allows the engineer to use dynamic spatial models to aid in selecting an optimized pipeline route. The GIS software and data enables the processing of a large amount of location-based information to find a least cost path (LCP) between two locations by taking into account natural and manmade obstructions and features.

5.1.1.20.2 GIS Routing Optimization Methodology

The GIS approach to pipeline routing optimization is based on relative rankings and weights assigned to project specific factors that may affect the potential route. The result of this process is a least cost path (LCP) which represents that most economic path between the origin and the destination points of the pipeline.

Fig. 3 is a representation of the methodology flow used to determine the LCP

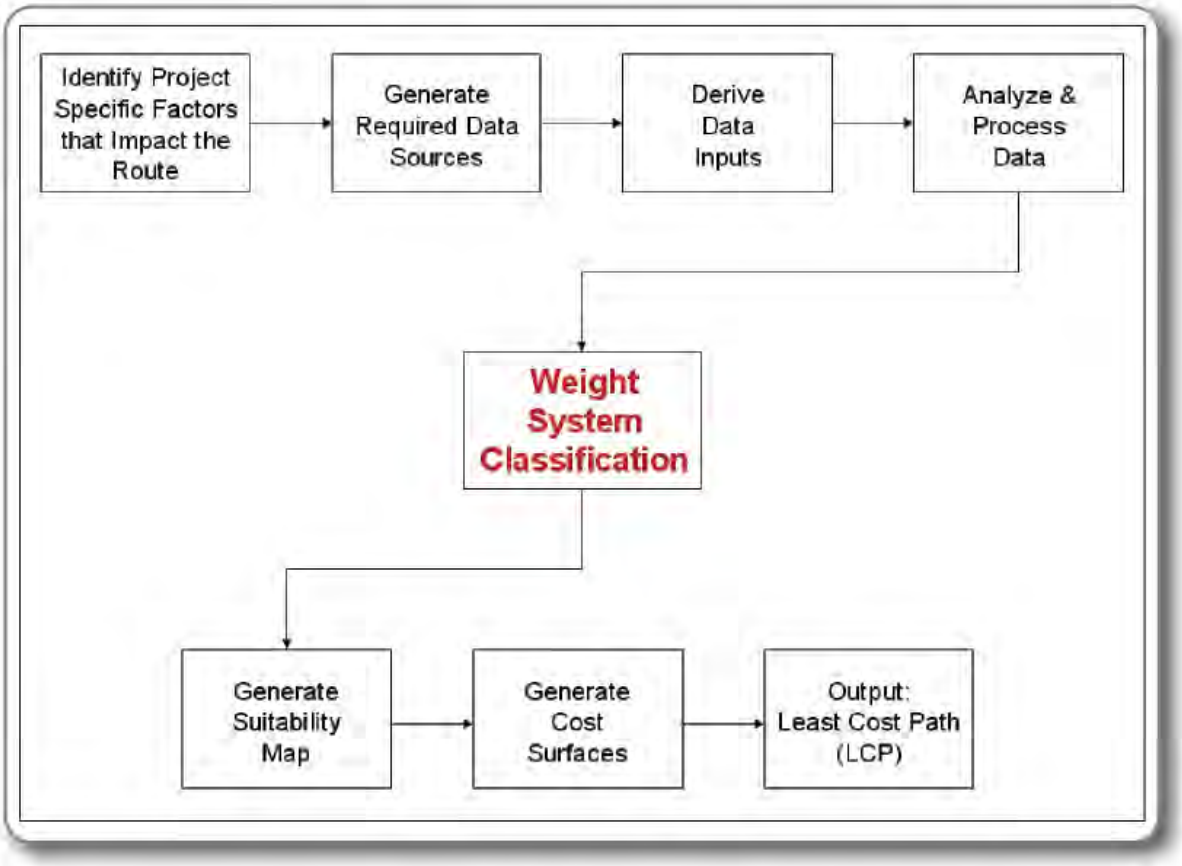

Fig. 3: Pipeline Optimization Methodology

5.1.1.20.3 Identification of Factors Affecting the Route

As mentioned in the previous section on selection criteria the identification of project-specific factors that may constrain or impact on the pipeline is an important step and a vital input to the GIS. Several factors such as geo-hazards, social issues and construction costs impact on the route and need to be taken into account. At this stage a set of rules are determined that will be used in the routing exercise. Input from experienced engineers is required to ensure that the appropriate features are identified and the correct rules established. The accuracy of the subsequent analysis is dependent on the factors being correctly identified as the analysis is only as good as the inputted data. Examples of some factors and rules include:

Factor/Feature	Rule
Roads	• Avoid road crossings • Proximity to roads is important
Railway lines	• Avoid railway line crossings
Rivers	• Avoid river crossings
Urban areas	• Avoid built up/populated areas • Avoid future development areas
Terrain/topography	• Avoid steep slopes • Use flat terrain where possible

Environmental areas	• Avoid highly-sensitive areas
Wetlands	• Avoid wetland crossings
Water bodies	• Avoid water bodies
Surface geology	• Avoid surface/sub-surface rock • Stable soils are important

5.1.1.20.4 GIS Data and Data Sources

Satellite imagery, maps, aerial photography, existing GIS data, LiDAR surveys and traditional geotechnical and topographical surveys are all sources of data that should be gathered and incorporated into the project GIS. The maps, satellite imagery and remote sensed data are scanned and geo-referenced and are then used to derive spatial features such as roads, rivers, urban areas and geological boundaries which form the GIS data to be used in the routing process.

5.1.1.20.5 GIS Data Processing and Analysis

Once the data has been captured it needs to be processed and converted into raster data. The raster data is used to calculate the feature distance cost for each feature – the weighted cost as one moves away from a feature. For example rivers are given a high cost and the further you move away from the river the lower the feature distance cost becomes.

The significance of the effect of a single feature on the pipeline route varies for each feature. For example, it is more important to avoid a deep valley crossing than it is to avoid a road crossing. The analytical hierarchy process (AHP) is one of the structured methods that can be employed to quantitatively rank each of the identified factors. Each factor is assigned a cost value which is benchmarked with typical constructions costs. The input from experienced engineers is vital when it comes to ranking and assigning weights to each layer.

5.1.1.20.6 GIS Suitability Map Generation

After the feature layers have been ranked the data layers are combined together into one single layer based on the numerical value factor derived from the weighting process. The resultant layer is referred to as the suitability layer and this layer forms the basis for the GIS analytical work.

The suitability map is used to create cost maps which related to relative construction costs. The highest costs are in steep mountainous terrain, urban areas, roads and large bodies of water. Moderate costs are associated with wetlands, forests and high slope areas. The lowest costs are to be found in areas of relatively flat bare ground, agricultural land or less dense native vegetation. See Fig. 4 for an example of a cost map.

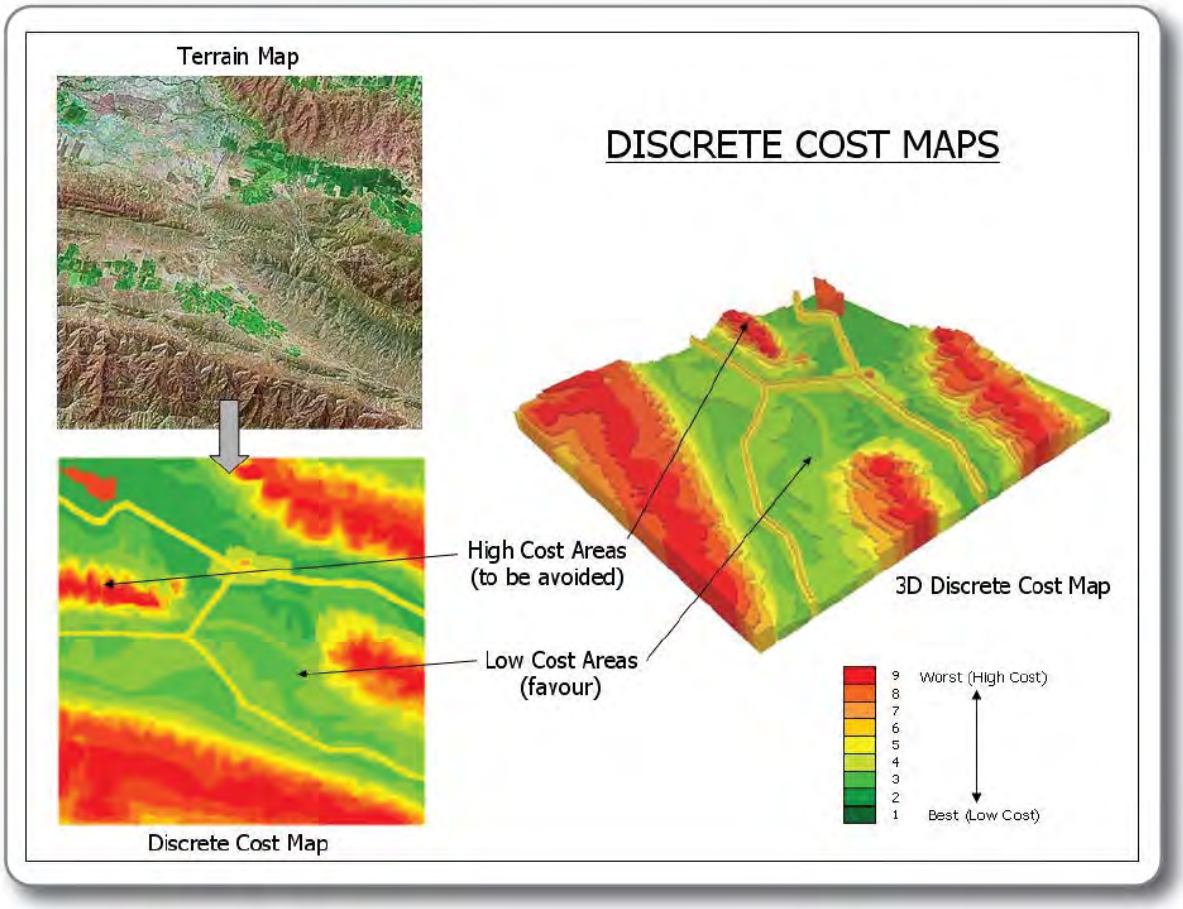

Fig. 4: Discrete Cost Map

The least cost path is the product of the GIS analysis and represents the path of least resistance from the origin of the pipeline along a surface to the destination point.

The strength of the GIS is that re-routes can quickly be incorporated into the system and the implications of the reroutes or alternative routes can be quickly assessed.

The combination of the data layers allows the engineer to test multiple pipeline network design and selection scenarios easily and efficiently. The GIS automatically calculates the lengths of new pipelines or pipeline networks. This allows for rapid total cost calculations and the running of multiple 'what if' scenarios to see the effect of changes to the pipeline design.

A GIS can produce a number of outputs quickly and efficiently in relation to pipeline routing:

- Survey request area delimitation drawings
- Land allocation/permitting drawings
- Pipeline routing drawings
- Alignment sheets (see Fig. 5)
- Tabular outputs (i.e. MTOs)
- Pipeline coordinates

(The GIS Route Optimization shown above is an open source document available on the internet and is not the property of FOH)

It is a vitally important step in employing GIS route optimization methodology that the selection of factors (environmental, demographic, social issues, and others) that are to affect the potential route selected and the weight each of these factors has in the final outcome must be carefully constructed. (See Section 5.1.1.20.2 GIS Routing Optimization Methodology in the method description above). FOH strongly recommends that a Citizen Advisory Committee or other expert panel be assembled to generate a draft set of criterion that includes the mandatory criterion set forth in PUC pipeline routing rules and other factors that may reasonably be considered and suggest a scheme of weighting of these factors to be utilized in identifying the "least cost path" and ranking of all alternative routes being considered for the Sandpiper pipeline.

This draft set of route selection criterion and assigned weights of each factor should be subjected to a full round of public information and comment sessions as required by applicable rules in the routing and/or pipeline need process. After a full public vetting and consensus building process the GIS Route Optimization product or products produced with this final set of weighted criterion would be ready to move forward through the remaining steps of the prescribed permitting process.

Minnesota is fortunate to have had forward looking government agency staff that recognized the importance and utility of providing the public with access to statewide data sets in GIS digital format. The MDNR maintains the state Data Deli system available at: http://deli.dnr.state.mn.us/ and provide links to many other state and federal sources of useful GIS data.

As a special note here, one important criterion that FOH believes has been under represented in past pipeline routing efforts in Minnesota and that must be included here as a heavily weighted routing criterion is groundwater aquifer susceptibility.

10. CUMMULATIVE IMPACTS

A. Reasonably Foreseeable Future Actions

In an investor conference held on April 2nd 2014 Enbridge announced publically and publically published the company's future plans for expanding pipeline infrastructure in Minnesota. Contained in this published document was a map for the replacement of Enbridge's existing line three which was announce earlier this spring. What was not disclosed in the earlier announcement was that Enbridge's preferred route for the line 3 replacement follows the proposed preferred route for the Sandpiper pipeline. This constitutes a "reasonably foreseeable future action" that must be folded in to any environmental review document assessing impacts of the Sandpiper pipeline including the CEA being prepared by the DOC on sandpiper.

See the cover page with date and authors and the map from page 50 of the Enbridge document.

Line 3 Replacement

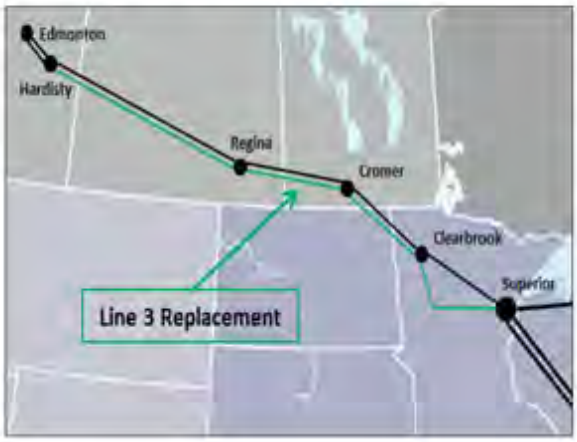

The Project:
•Replace 1,031 miles of 34" pipeline with 36" pipeline

Cost:
•U.S. Portion: $2.6 Billion*

In-service date:
•2017

Status:
•Reassembled successful Alberta Clipper project team
•Securing supply chain
•Known corridor with established relationships

* Project to be jointly funded by ENB and EEP at participation levels to be finalized and approved by a Special Committee of the independent Board of Directors.

B. Impacts of Pipelines on Future Urban or Rural Development

Pipelines become significant impediments to growth and development along their easement corridors. Because of the risk for damage to an operating pipeline, pipeline companies have very strict and complex requirements for granting encroachments into their easements. As a result, it becomes costly and time consuming for local governments to extend roads and underground utilities over a pipeline easement. This has not been factored into the State's process of reviewing proposed pipeline routes because it is outside of their purview. It might prove useful to contact every local jurisdiction along the route to let them know how difficult it will be for them to obtain permission to extend new roads or utilities across pipeline easements and the extra time and expense they can expect. Communities should be alerted to the need for reviewing their comprehensive growth plans and considering future road needs as a relevant issue to evaluate. Areas within orderly annexation districts should consider future private development interests and realize that developers will shy away from parcels with pipeline easements recognizing they are as difficult to deal with as railroads and they can present adverse marketing impacts.

Pipelines have been handled differently by states and larger cities across the country with some establishing conditions and laws to address the above

concerns. Minnesota has not yet done that, leaving the local governments simply adversely impacted without compensation. Developing this information in the comparative environmental analysis could be used to both minimize these impacts on local units of government as well as to alert those along the route finally selected of the need to update comprehensive plans and transportation plans to respond to the presence of the new pipeline.

The impacts of the several alternative routes for sandpiper should include these impediments to development as a cumulative impact.

C. Community Preparedness For Pipeline Rupture/Leak Incidents

Scenario development for highly predictable leak/rupture events logically lead to considerations for disaster preparedness needed by communities near the pipeline route. Special training for first responders that alert communities to the volatility, flammability, explosiveness and human exposure concerns would be essential. Rupture/leak disaster preparedness would involve consideration and possible need to procure special fire fighting, remediation and recovery equipment and training local fire departments would need to be alert to and prepared for extraordinarily difficult fire fighting conditions. Consideration of the consequent new burdens and or risks imposed on local fire/rescue personnel and the need for more or specialized equipment posed by having a pipeline transporting hazardous materials near or through their communities should be included in the CEA. Alternative routes could be evaluated to explore ways to lessen or to mitigate these predictable impacts.

FOH recommends that this socio-economic impact be included in the CEA among the potential cumulative impacts of the project.

11. FINANCIAL ASSURANCE

FOH has serious concerns for the apparent ephemeral nature of a Limited Liability Corporation being created by Enbridge for the sole purpose of constructing and operating the proposed Sandpiper and possibly other crude oil pipelines in Minnesota. This is especially true for pipelines intended to transport the extremely hazardous Bakken Sweet Crude, the nature of which is described earlier in these comments. FOH would urge your Departments, if it has such authority, to seriously examine the financial assurance Minnesota citizens will have that North Dakota Pipeline Company LLC will be financially capable and responsible for appropriate response, remediation, and long term care of any pipeline or pipeline product impacts on people, property and/or the natural environment, whether intended or accidental. If neither the DOC nor the PUC have the authority to impose requirements of special financial instruments that can assure such financial assurance exists, FOH requests that your departments work with such agencies that may have this authority or, lacking any such authority in state or federal government, we request that your respective department's join with FOH to approach the state legislature with draft legislation enabling the appropriate state agency with the necessary

authority to require adequate financial assurance from all pipeline companies doing business in Minnesota.

12. TRANSPARENCY, EQUAL ACCESS AND EQUAL TREATMENT

FOH concludes its comments with some remarks about the PUC and DOC "general responsibilities" as provided in rule and principles of good government and citizen's right to basic freedom of speech. We remind you of one of the applicable rules here.

> 7852.4100 GENERAL RESPONSIBILITIES.
> The commission shall monitor the effectiveness of this chapter and shall take appropriate measures to modify and improve the effectiveness of this chapter. The commission shall assist governmental units and interested persons in understanding the rules.

The overall experience of FOH members throughout their involvement in the matter of the proposed Sandpiper pipeline has ranged from frustration to befuddlement, to confusion, rejection, and exclusion. Having our state government department staffs perform in ways that have been outwardly defiant, defensive, obfuscating and off putting has created a deep sense of distrust, suspicion and at times utter outrage. Our members and organization representative's attempts to fully participate in the decision-making process have been rebuffed on numerous occasions.

When FOH members prepared an information display for the public viewing at the several public meetings Enbridge's attorney and both Commerce Department (DOC) and Public Utilities Commission (PUC) staff rejected us advising us that such a display was not allowed in this public forum. This rejection was in spite of the fact that Enbridge was allowed to use similar visual aids in the form of posters, charts, maps and mounted photographs to not only present the facts of their pipeline proposal but to self-promote and embellish themselves as good corporate citizens claiming the company was a stellar corporate citizen with an excellent record of pipeline operating safety. FOH contends that for our state government to create a public forum for the express purpose of receiving public comment on a pending permit action and then deny the public the opportunity to voice its questions, concerns and to counter misrepresentations of Enbridge's safety record utilizing similar media methods is an infringement of citizen's freedom of speech as protected by the First Amendment of the U.S. Constitution.

FOH was denied access to certain technical data including Geographic Information System (GIS) files submitted to the PUC by Enbridge with their application. And when FOH, many individual citizens, a number of state wide organizations representing these citizens as well as Township and County government units requested extensions of comment deadlines to allow disenfranchised "snowbird" citizens opportunity to participate in the important "routing" phase of the project, DOC staff have summarily rejected these requests. DOC staffs defend their refusal to extend timelines as being firmly based on their unswerving intent to honor the compressed timeline set out in

recently amended statutes and rules that clearly favor pipeline industry interests over those of the public.

And, to add insult to injury, when the DOC and PUC staff established an on-line public record website that is advertised a "full record" of documents and comments received in the matter of the pipeline project they refuse to post the many petitions they received requesting that timelines be extended. This denies the general public the right to know that if they have made a request for comment period extension that they are not alone. This refusal by government agencies to fully and accurately publish the public record in the manner intended acts to discourage citizens from participating believing that their voices are not being heard. This defiance of citizen's right to be heard on the part of government agencies not only violates First Amendment rights but works to destroy the general public's trust in fair and equal treatment under the laws that govern us as a people.

Implore you to acknowledge the respective Department's responsibility to prioritize the citizen's rights to know fully about and be effectively involved in all decisions of your respective departments in regard to the Sandpiper project. This has not been our experience with your departments to date. We respectfully resubmit our standing request to meet with the Commissioner of the Department of Commerce and the Executive Secretary of the Public Utilities Commission and department staff with the intent to find ways to improve the public's overall perception of both the process of pipeline permit review and the manner in which the public is allowed to be fully involved in important government decisions the effect their lives.

This concludes the comments and FOH thanks you and the Department of Commerce for considering our concerns, we look forward to opportunities to fully participate in the remainder of the process.

Sincerely,

Richard Smith, President
Friends of the Headwaters

FRIENDS of the HEADWATERS

May 29, 2014

Mr. Larry Hartman, Environmental Review Manager
Energy Environmental Review and Analysis (EERA)
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

Dear Mr. Hartman,

Regarding Public Utilities Commission (PUC) Docket No. PL9/PPL-13-474:

Please find attached our supplemental comments to be added to our position paper dated April 2, 2014 concerning the Enbridge/North Dakota Pipeline Company, LLC Sandpiper pipeline request for a proposed southern corridor route across northern Minnesota from Grand Forks, ND to Superior, WI.

The Friends of the Headwaters oppose this current projected route. You, the DOC and the Public Utility Commissioners will find further reasoning for our opposition and our proposal for an alternate route in the attached documents.

Friends of the Headwaters requests these documents be posted to the eDocket website as soon as possible.

Writing for the members of Friends of the Headwaters I thank you for your attention to these documents and for your attention to our concerns for the welfare and quality of our lands, waters and lives in the Headwaters Country.

Sincerely,

Richard Smith
President
Friends of the Headwaters

P.O. Box 583, Park Rapids, MN 56470
mnfriendsoftheheadwaters@gmail.com
facebook.com/savemississippiheadwaters
www.friendsoftheheadwaters.org

SUPPLEMENTAL COMMENTS TO POSITION PAPER DATED 4/2/2014
REGARDING THE ENBRIDGE/NORTH DAKOTA PIPELINE COMPANY (NDPC) LLC
SANDPIPER PIPELINE PROJECT

Public Utilities Commission (PUC) Docket Number: PL-6668/PPL-13-474

May 29, 2014

Prepared by
Richard Smith
Friends of the Headwaters
P.O. Box 583
Park Rapids, MN 56470

TO REVIEW:

Friends of the Headwaters opposes the Enbridge/NDPC Sandpiper pipeline as currently projected to cross Minnesota's lake country from Grand Forks, ND to Superior, WI.

We believe Enbridge/NDPC's proposed "southern corridor" will NOT protect the high quality waters and other natural resoures along this route.

Friends of the Headwaters also believes Enbridge intends to proliferate another multiple pipeline corridor with their southern route proposal. Enbridge presented just that in an investor conference held April 2, 2014 in New York City.

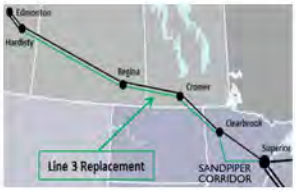

We believe Enbridge/NDPC could not have chosen a worse route as evidenced by the maps below.

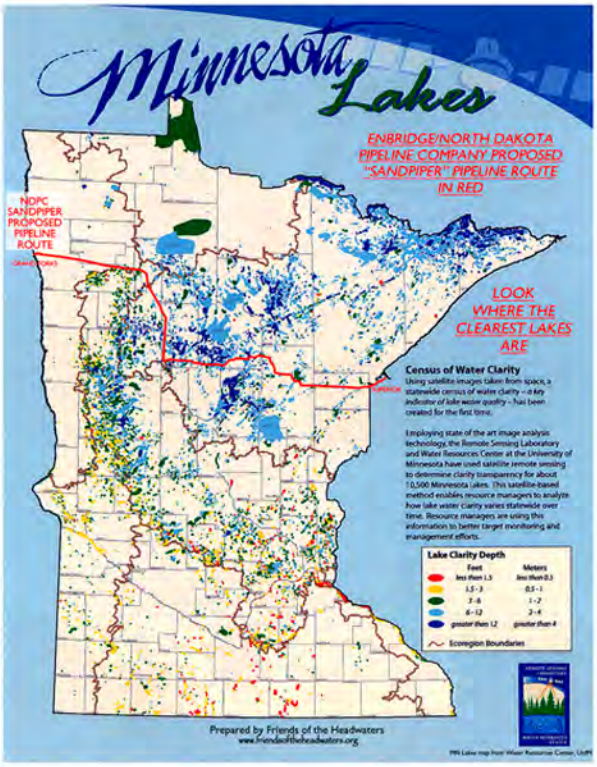

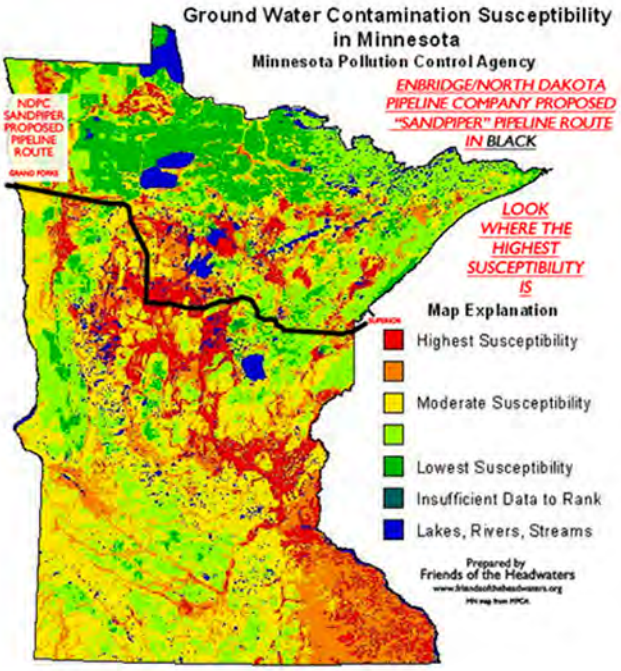

AT RISK: MINNESOTA'S

CLEAREST AND CLEANEST LAKES
GROUND WATER AQUIFERS
WILD RICE LAKES
WETLANDS
MOST SENSITIVE SOILS TO SPILLS
DIVERSITY OF VEGETATION
SENSITIVE ECOLOGICAL ZONES
THE LAKE SUPERIOR BASIN
HIGH VALUE RECREATIONAL AND RESIDENTIAL WATERS

- $342 million annual revenue from fishing
- $4.3 billion annual retail sales hunting, fishing, wildlife watching
- $2 billion water-influenced properties in Hubbard County alone.

ENBRIDGE/NDPC COULD NOT HAVE PICKED A WORSE ROUTE.

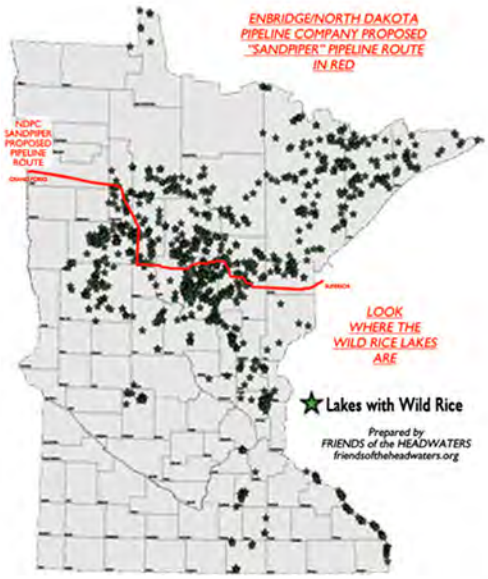

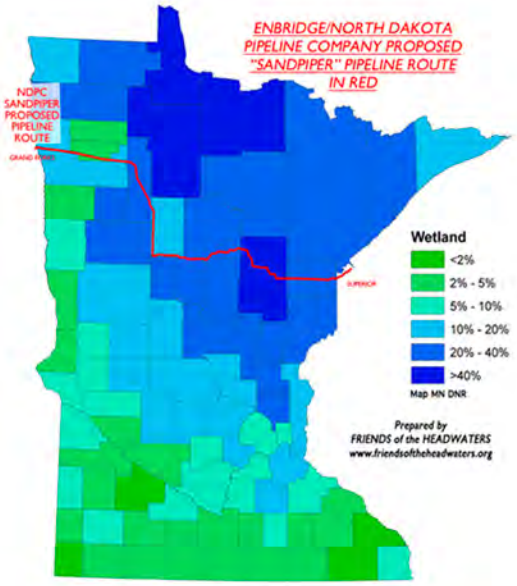

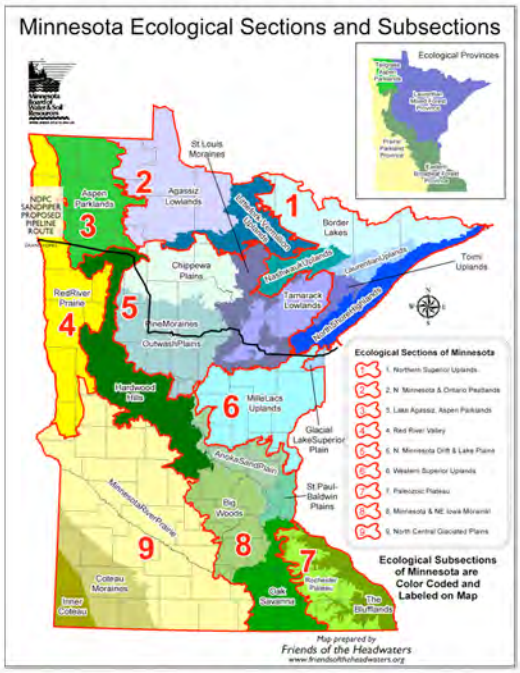

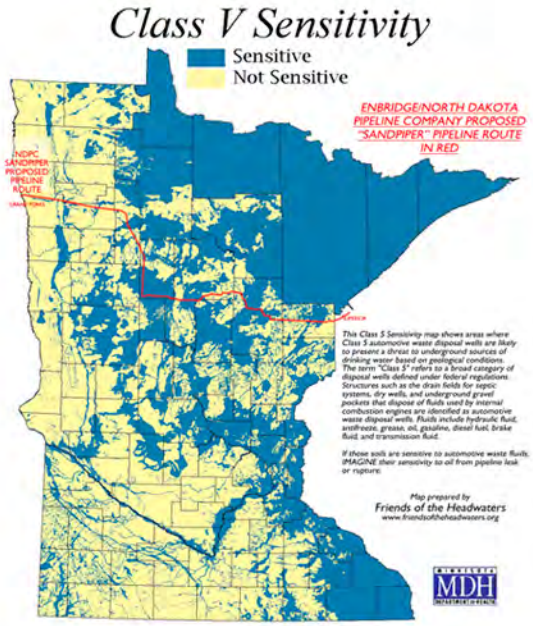

Given the high risk factors of Enbridge/NDPC's proposed Sandpiper 'southern corridor' route *FRIENDS of the HEADWATERS* has proposed a true 'southern corridor' across Minnesota which eliminates the potential for spills and damage to the state's most environmentally sensitive lands and waters.

FRIENDS of the HEADWATERS Alternate Route A utilizes an existing energy corridor of which Enbridge is a 50% shareholder with Alliance Company of Canada. This corridor originates in Canada and ends west of Chicago. The proposed Enbridge/NDPC pipeline route would intersect this corridor east of Minot, ND at which point NDPC would turn and follow the corridor to Illinois.

Alternate Route A below.

Compare the route risk factors in following maps.

A

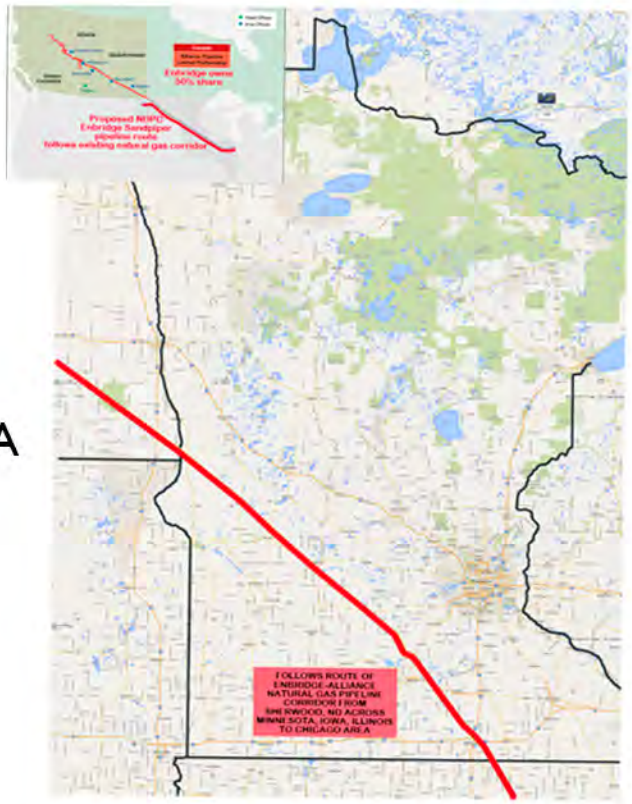

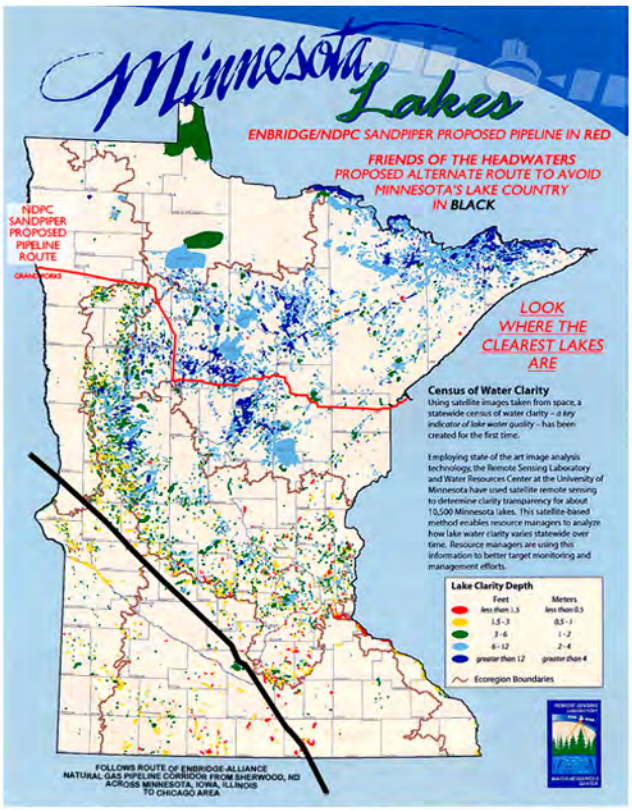

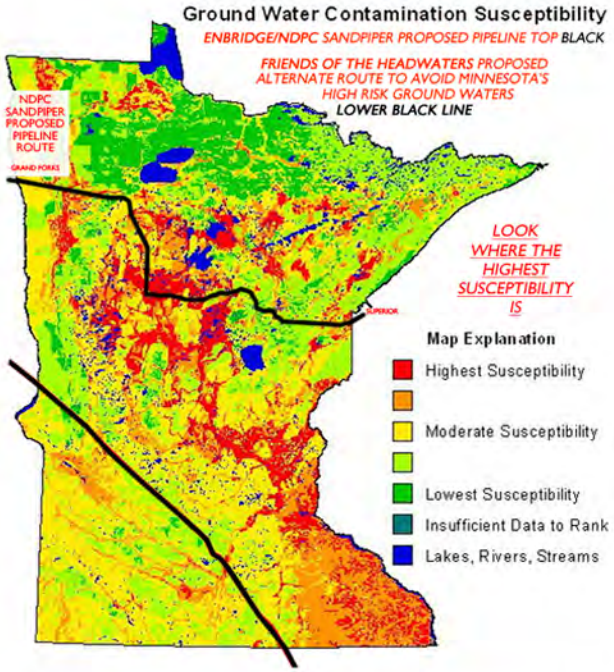

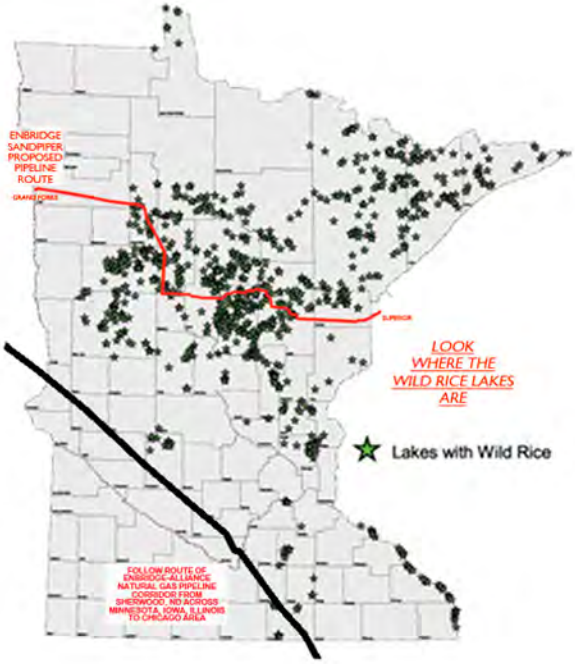

Route map comparisons continued:

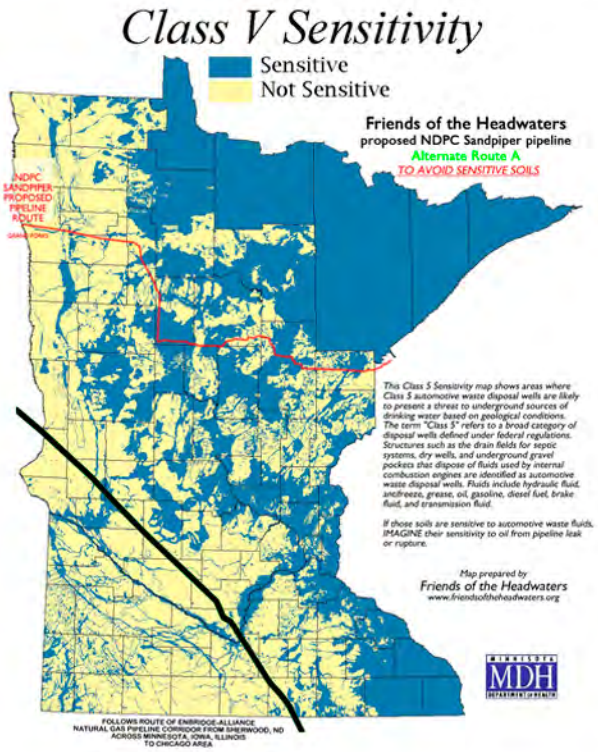

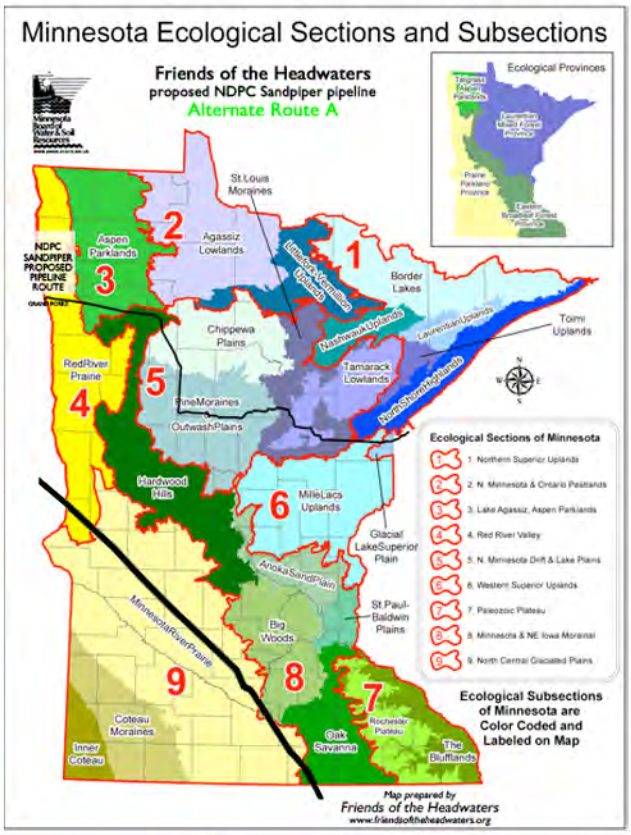

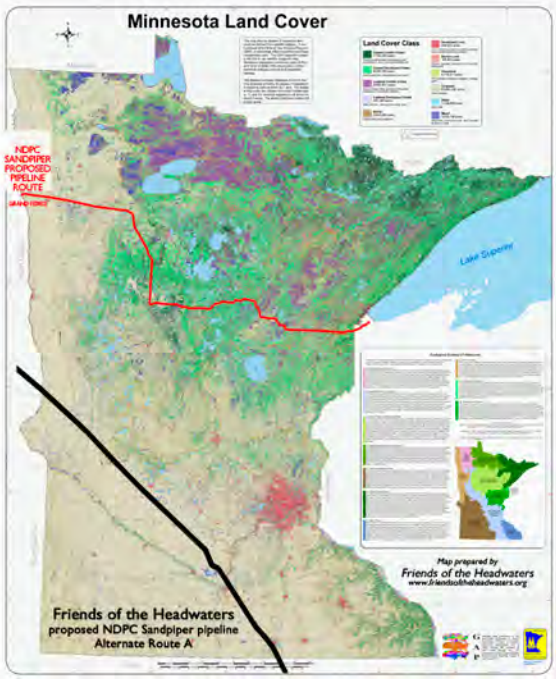

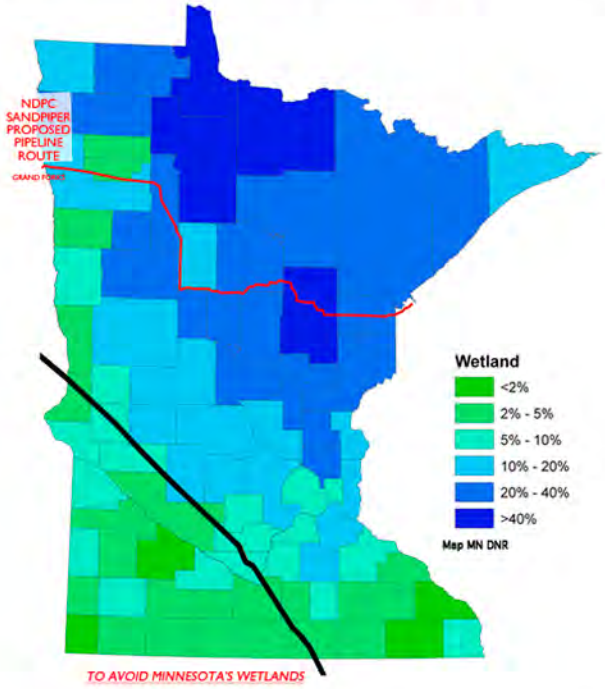

ALT ROUTE A traverses almost exclusively agricultural lands below Minnesota's primary lake country. This area is sparsely populated with mostly small towns among the farmlands.

Note: Enbridge's Mark Curwin, Senior Director for Strategic Coordination of Major Project Executions in the US, stated their construction preference is to build pipelines across farmland. He made these remarks at a public meeting in Park Rapids on Jan. 29, 2014. Mr. Curwin gave the reasons of better soils, easier construction, easier access, less natural habitat destruction, cheaper and quicker. After construction the farmland can be put back into crop production. Access to leaks and spills is much easier. Winter wetland construction would be at a minimum.

Two additional maps by Bob Merritt, hydrologist, showing Alternate Route A in better detail.

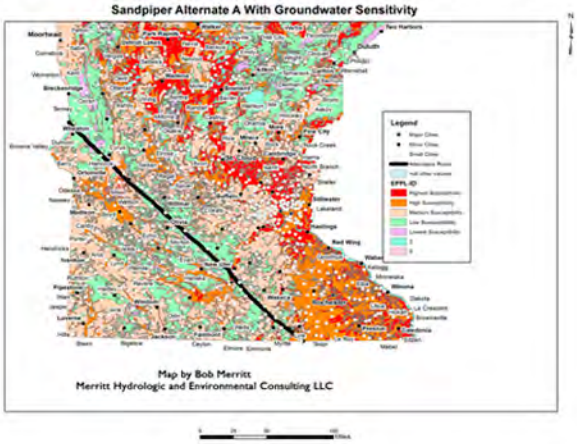

Minnesota still gets to keep jobs the construction will provide as well as North Dakota plus Iowa and Illinois.

Although the route does not end in Superior, it still ties into the existing Enbridge system in Illinois with routing options to Michigan and Ontario that avoid our greatest freshwater lakes of Lake Superior and the Mackinac Straits of Lakes Michigan and Huron.

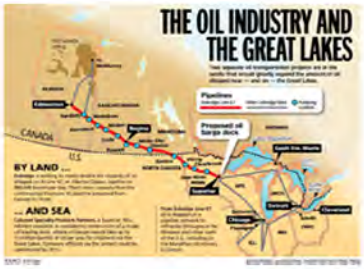

Since it's an existing corridor the company should have access to the mapping previously done for the pipeline already there. ALT ROUTE A also intersects pipelines in southern Minnesota owned and operated by other companies which provide the option of re-routing Bakken crude to the refineries in Rosemont and Saint Paul Park in the south Twin Cities Metro.

The Illinois Hub also allows Enbridge access to its pipelines to Oklahoma and points south.

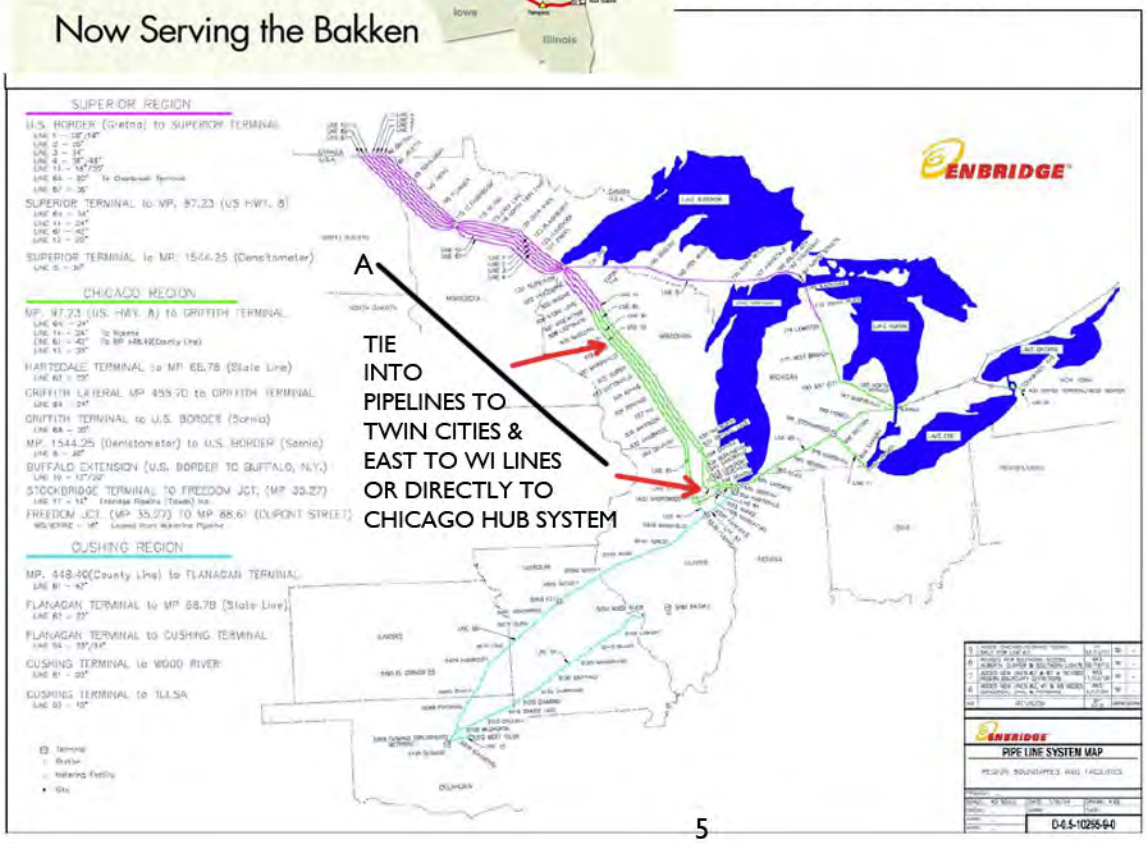

The *FRIENDS of the HEADWATERS* disputes Enbridge/NDPC's contention that the Sandpiper must end in Superior, Wisconsin. Enbridge has provided no rationale for the route ending in Superior other than "We want it. It connects to our existing system in Superior." The Alternate Route A proposed by *FRIENDS of the HEADWATERS* also connects to their existing system hub near Chicago, Illinois. It does not prevent Enbridge from then transporting the Bakken crude either south to Oklahoma and the Gulf Coast nor across Illinois, Indiana, Michigan and across the border to Sarnia, Ontario, Canada on their existing system.

Figure 78:53.0510-2
Pipeline System Map

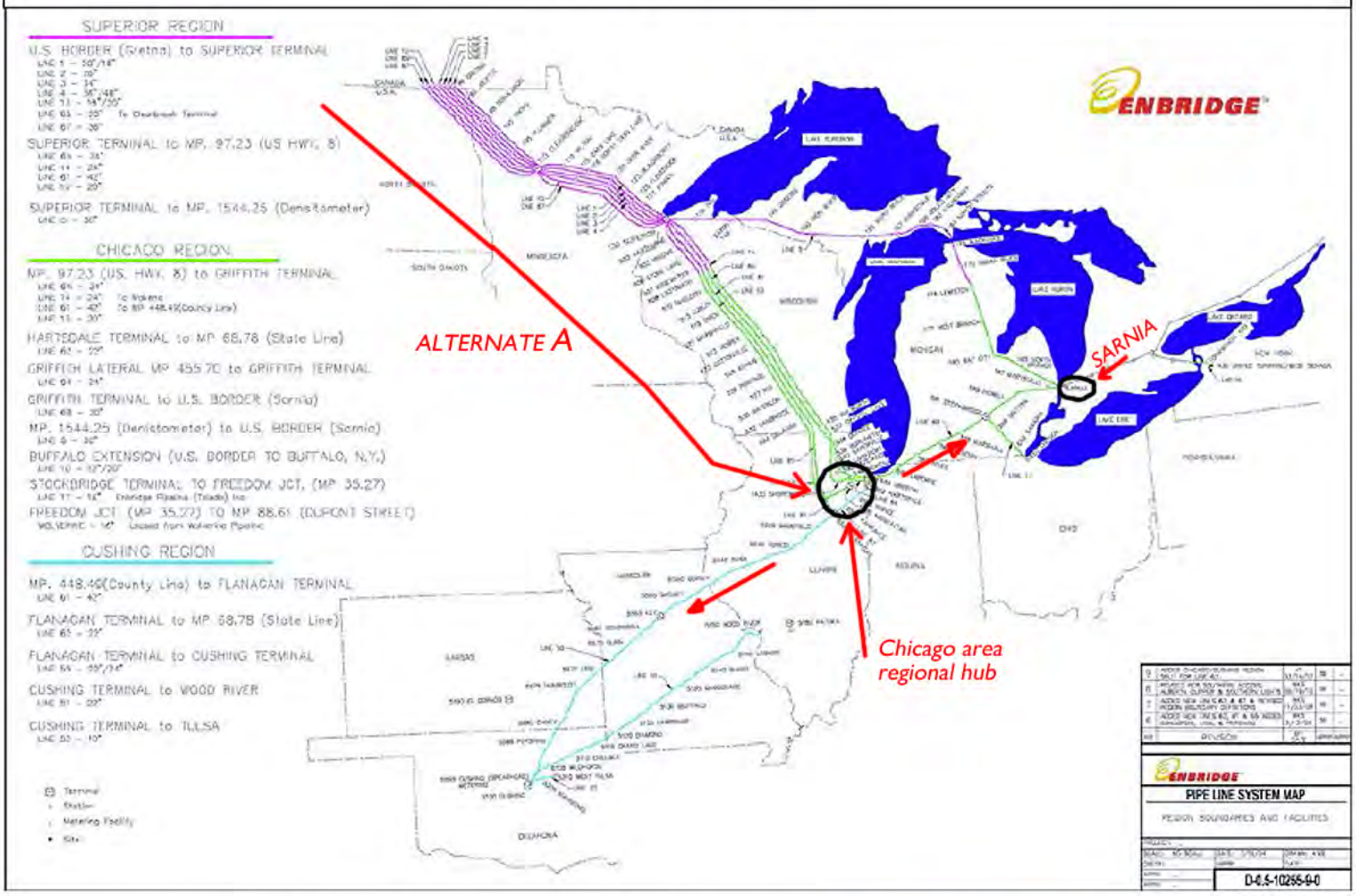

Alternate Route A already fits into their existing pipeline corridor system as evidenced by the map at right. Alternate Route A also appears to be a more direct route from the North Dakota Bakken Oil Fields to the primary energy markets of the US Midwest.

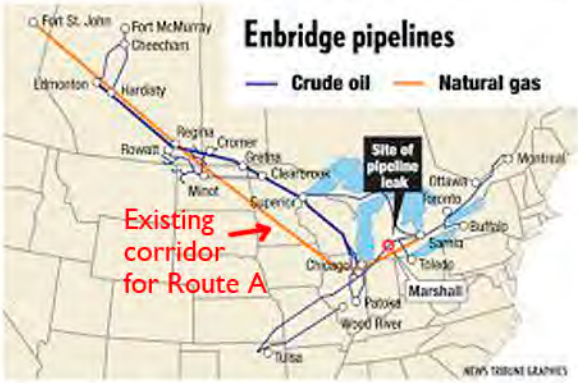

Friends of the Headwaters believes the citizens of Minnesota have the right to determine the route parameters of this pipeline corridor, not Enbridge/NDPC. The considerations of the Sandpiper pipeline and the Line 3 Rebuild proposed to run alongside the Sandpiper should not be dictated to the citizens of Minnesota by the company. The company already has too many pipelines crossing Minnesota's most valuable waters and lands.
The cumulative risk of adding additional lines to this region is too high to have the routing parameters set by what Enbridge 'wants'. They should not be allowed to frame the debate on this issue. The citizens of Minnesota and this state's governing and regulatory agencies need to reject this framing by Enbridge/NDPC

and reframe the discussion regarding the need and route of the proposed Sandpiper pipeline as what is beneficial to Minnesota, its people, its communities and its natural resources. Until Enbridge/NDPC adequately provides a detailed explanation for demanding why the Sandpiper pipeline must end in Superior, Wisconsin, *Friends of the Headwaters* believes all alternative routes must be given full consideration, even those proposing a system overhaul of how and where Enbridge wants to cross the state.

If Enbridge/NDPC were truly committed to protecting our lakes, rivers, wetlands, aquifers and lands as they publically state they are, then prove it by not just giving Minnesotans statistics about how safe their pipelines are (their history says otherwise), but by actually moving their proposed route to the lowest risk part of the state as portrayed on the previously presented illustrated maps.

Costs should not be a factor. After all, once the Sandpiper is constructed, 375,000 barrels of oil will pass through it daily. At the current world price for a barrel of oil that amounts to $40 million dollars per day or $14.6 billion dollars annually. Even though Enbridge is charging a fee to move the amount of oil, it should not take too many years to recoup their construction costs. Plus it appears from the map below the company has plans to expand the pipeline system through Wisconsin. The money allocated for that extension could easily be applied to the extra construction costs of building Alternate Route A.

Since the company is adamant about Superior as a destination for the Bakken crude, perhaps this proposed extension in Wisconsin could be used to move the oil from the end of Alternative Route A back north to Superior.

Enbridge has ambitious expansion plans not just in Minnesota but nationally it appears.

If their intensions are to expand rapidly towards the southern U.S. Alternative Route A would conform to those expansion plans more directly than their current proposed Sandpiper corridor.

The *FRIENDS of the HEADWATERS* also sponsors other alternate routes at this time.

These routes can be connected back to Superior along existing energy corridors.

ALTERNATE ROUTE "C" as previously proposed in Position Paper of 4/2/2014

West of Grand Forks near Larimore the Sandpiper would turn south following either railroad easements or road easements south-southeast down the Red River Vally, crossing the Red River near Wahpeton, ND and continuing along MN Hgy 9 until it intersects an existing pipeline corridor owned by the Magellan Company. The Sandpiper follows this corridor until its intersection with the MinnCan pipeline corridor at which point it follows this corridor to the Flint Hills and Saint Paul Park refineries and pipeline system southeast of the Twin Cities Metro area. Optionally the route could turn south from Enbridge/NDPC's proposed pumping station near Lakota, ND.

Route C bypasses Minnesota's sensitive lands and waters and gives Enbridge the option of two routes back to Superior. They can use an existing pipeline corridor along I35 to Duluth whereupon they would intersect their northern corridor and can turn east to Superior. Or they can use another existing pipeline corridor, the Magellan straight east into Wisconsin where that line intersects the Enbridge system in central Wisconsin. At that point Enbridge can use their proposed expansion line to move the oil back to Superior or down to Illinois.

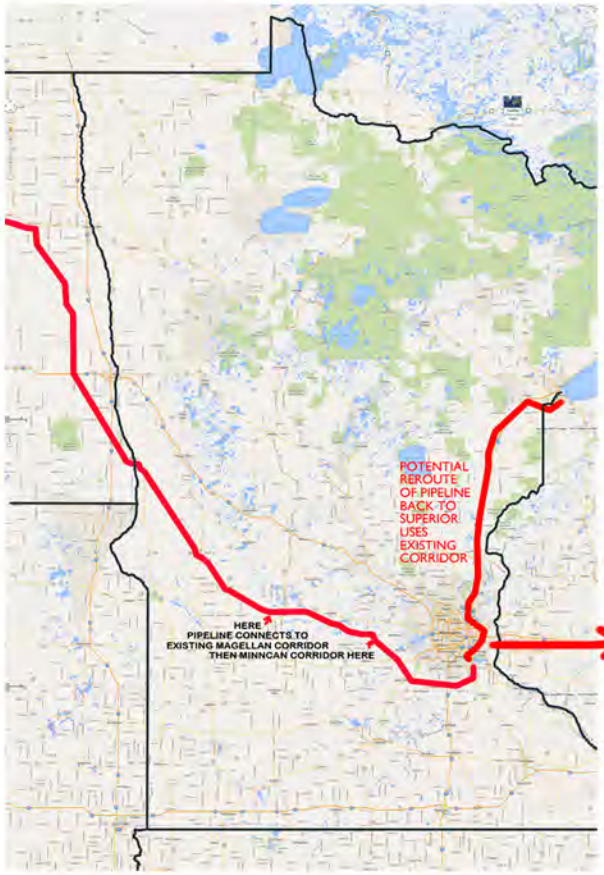

MAP APPENDIX

Friends of the Headwaters does question how excited the people of Wisconsin might be about new pipelines.

The *FRIENDS of the HEADWATERS* also sponsors other alternate routes at this time.

These routes can be connected back to Superior along existing energy corridors.

ALTERNATE ROUTE "D" as previously proposed in Position Paper of 4/2/2014

Near Grand Forks the Sandpiper would turn south following an existing pipeline corridor along Interstate 29 south towards Fargo, North Dakota then follow the same corridor east southeast adjacent Interstate 94. This existing pipeline corridor is owned by the Magellan Company, the same company which has the line continuing east from Minneapolis-StPaul into Wisconsin to intersect Enbridge's existing corridor there. The Sandpiper follows this corridor until its intersection with the MinnCan pipeline corridor at which point it follows this corridor to the Flint Hills and Saint Paul Park refineries and pipeline system southeast of the Twin Cities Metro area.

Route D bypasses most of Minnesota's sensitive lands and waters and gives Enbridge the option of two routes back to Superior. They can use an existing pipeline corridor along I35 to Duluth whereupon they would intersect their northern corridor and can turn east to Superior. Or they can use another existing pipeline corridor, the Magellan straight east into Wisconsin where that line intersects the Enbridge system in central Wisconsin. At that point Enbridge can use their proposed expansion line to move the oil back to Superior or down to Illinois.

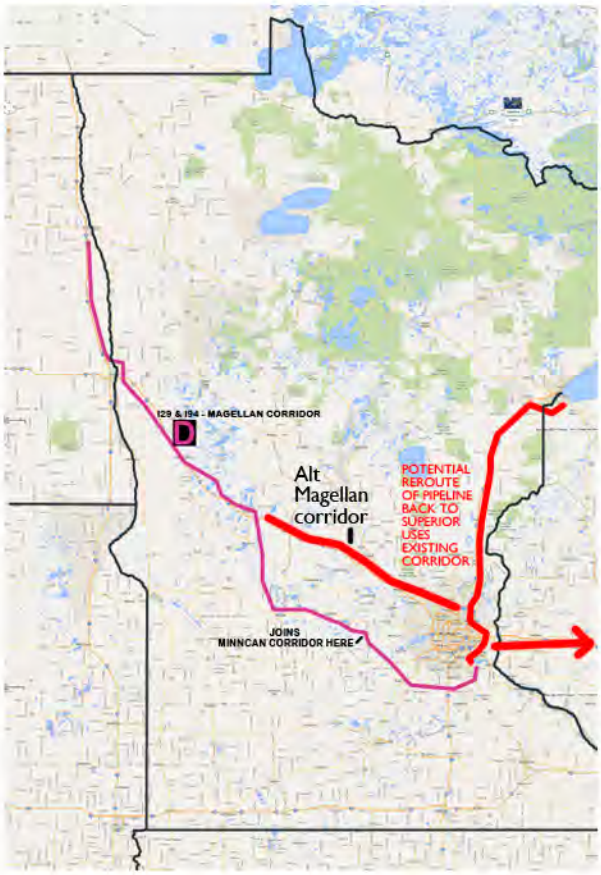

Route D could also stay in the Magellan corridor along I94 and continue on into Wisconsin.

MAP APPENDIX

Wisconsin Petroleum Pipelines

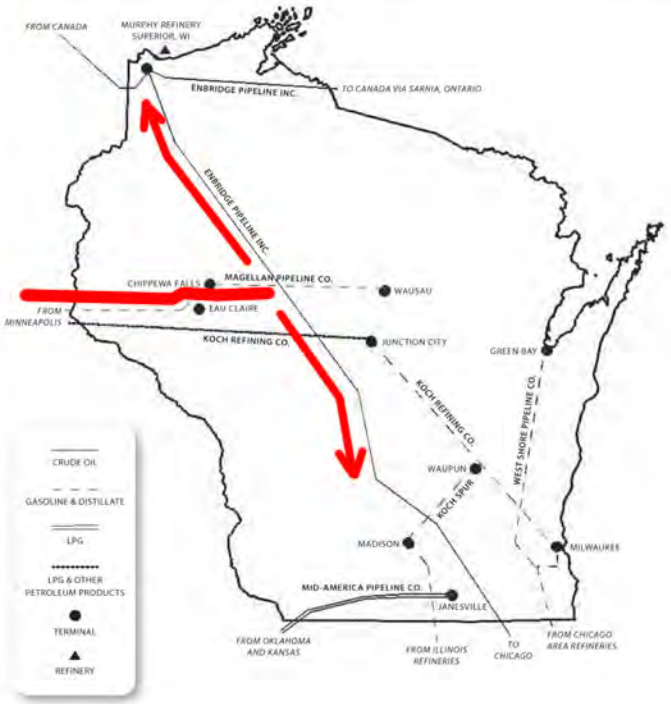

WISCONSIN ENERGY STATISTICS 2010 | 157

Although these alternate routes avoid the high risk environmental lands and waters of the state as exhibited in the maps below, they do traverse areas of higher population near the Twin Cities. This route does allow a connection along existing pipeline corridors into western and central Wisconsin to Enbridge's pipeline system in Wisconsin. Enbridge has option to ship oil north back to Superior, WI or south to Chicago hub.

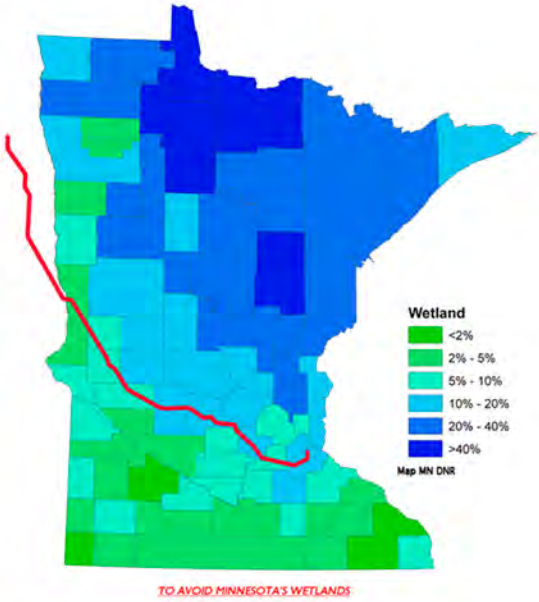

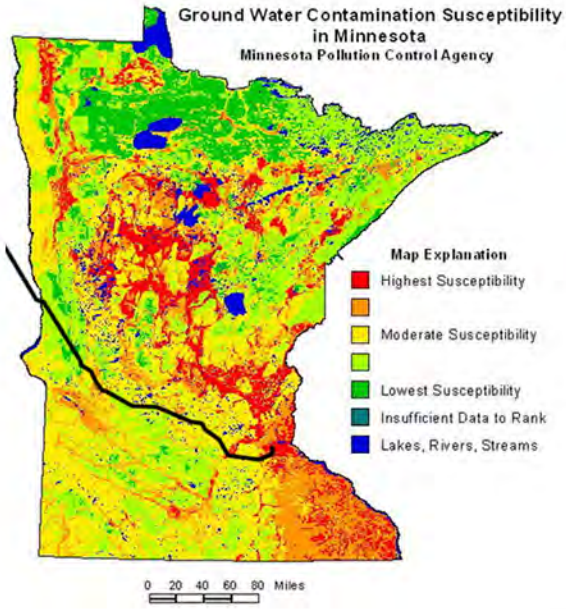

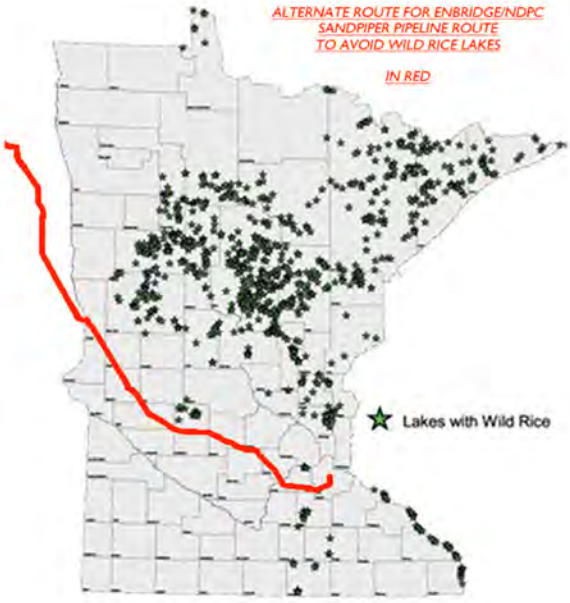

As currently planned with the exception of a few tax dollars and short term construction monies Minnesotans derive no long term benefits from these pipelines and assume all the risks from leaks/spills/ruptures. And eventually these pipelines will leak or break. Enbridge's spill history in Minnesota proves it true.

Friends of the Headwaters therefore recommends to the PUC, DOC and other state agencies that they enforce our MEPA statutes and deny the Certificate of Route permit for the Enbridge/NDPC's proposed Sandpiper pipeline corridor through Minnesota's prime lake country. A perfectly viable, low risk alternative is available south of our best waters.

In summary the *FRIENDS of the HEADWATERS* opposes the Enbridge/NDPC Sandpiper Pipeline route proposal as marked on the map below. What does it say about a company that would neglect to feature the state's most famous river, the Mississippi, on their proposed route map? Perhaps this is evidence of their true concern for Minnesota's valuable and cherished water resources.

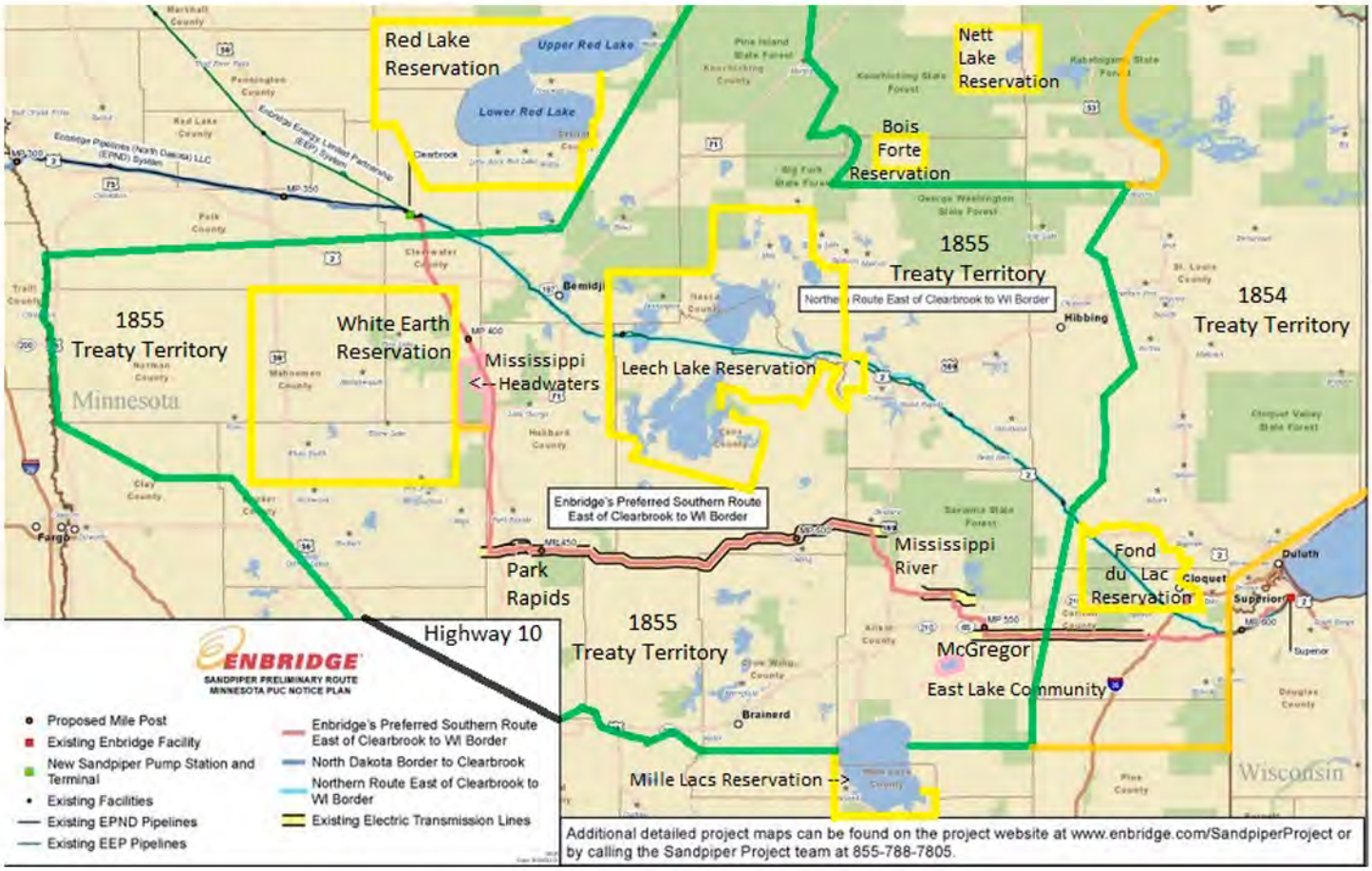

Enbridge already has too large a footprint across Minnesota's Headwaters Country.

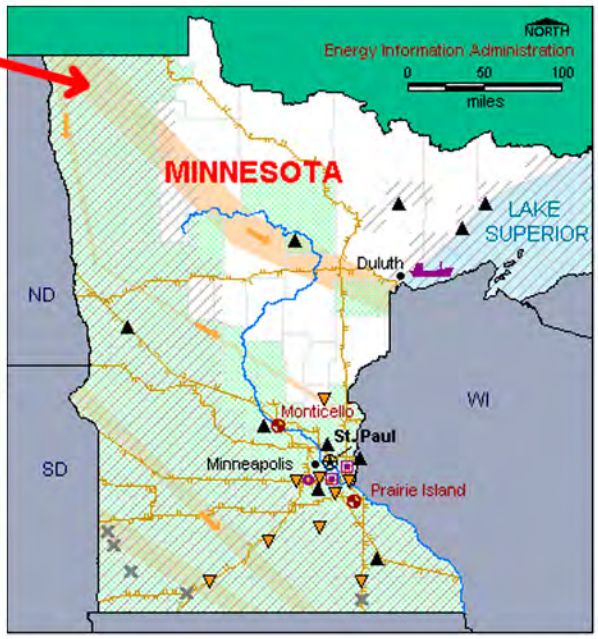

Too much is at risk, not only with the state's clearest lakes; ground water aquifers; fish and wildlife; wild rice; lake and riverfront homes, businesses, and communities; tourism industry; lands and forests; but there's also Lake Superior.

Does Enbridge's insistence on the pipeline ending at Superior portend a future of shipping oil on the Great Lakes? Ironic that a ship icon just happens to be on the adjacent map.

The people of Minnesota should not allow a Canadian corporation with its North Dakota Pipeline Company US subsidiary to dictate the terms of this project.

The company has yet to explain the need for Superior as the end point. This proposed pipeline route should not proceed without legitimate justification. Said reasoning should not include corporate profits.

Friends of the Headwaters believes up here a barrel of water IS worth more than a barrel of oil.

STATE OF MINNESOTA
PUBLIC UTILITIES COMMISSION

Beverly Jones Heydinger	Chair
Dr. David C. Boyd	Commissioner
Nancy Lange	Commissioner
Dan Lipschultz	Commissioner
Betsy Wergin	Commissioner

In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota	OAH Docket No. 8-2500-31259 PUC Docket No. PL-6668/CN-13-473
In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project in Minnesota	OAH Docket No. 8-2500-31260 PUC Docket No. PL-6668 / PPL-13-474

FRIENDS OF THE HEADWATERS COMMENTS ON CONSIDERATION OF SYSTEM ALTERNATIVES AND THE LEGAL BASIS FOR CONSIDERATION OF SYSTEM ALTERNATIVES IN THE NEED AND ROUTING PROCEEDINGS

Friends of the Headwaters ("FOH") hereby provides its comments in response to the Minnesota Public Utilities Commission ("Commission") Notice of Comment Period dated August 12, 2014. This notice identified the following topics for comment:

- What if any of the eight system alternatives identified in the Department of Commerce Alternative Routes Summary Report should be considered further in these proceedings?
- What is the legal basis for determining whether a system alternative should be considered in the certificate of need proceeding?

- What is the legal basis for determining whether a system alternative should be considered in the route permit proceeding?

In response, FOH provides the following comments and also incorporates by reference its August 5, 2014, Reply Comments on the Comments and Recommendations of the Minnesota Department of Commerce on Selection of Alternative Routes ("FOH August 5 Comments").

I. CONSIDERATION OF SYSTEM ALTERNATIVES

Selection of so called "system alternatives" by the Commission under Minn. Stat. Ch. 216G ("Routing Law") and Minn. Stat. Ch. 116D, the Minnesota Environmental Policy Act ("MEPA"), must take into consideration the "underlying" need for the Project, the potential for an alternative to reduce environmental impacts, and an alternative's apparent feasibility with regard to this need. The factors that should be considered in the Commission's consideration are discussed in the FOH August 5 Comments at 24-27, 37-39.

A. The Alleged Underlying Need for the Project

FOH contests the overall need for the Project and intends to present evidence that the Commission must deny NDPC a Certificate of Need for failing to meet its burden of proof under Minn. Stat. § 216B.243 and Minn. R. Ch. 7853. This being said, NDPC has alleged a number of facts in its Application for a Certificate of Need ("CON Application") related to commercial demand for the Project and its plan to upgrade its infrastructure to meet this alleged demand. As described in detail in the FOH August 5 Comments at 6-8, NDPC has described the commercial purpose of the Project as follows:

> The Project's purpose is to transport the growing production of domestic crude oil from the Bakken and Three Forks formations in the Williston Basin of eastern Montana and western North Dakota to meet the increased demands of refineries and markets in the Midwest and the East Coast.

NDPC Environmental Impact Report ("EIR") at 1-2 (footnote omitted). In its CON Application, NDPC describes this purpose similarly:

> Enbridge's shippers will use the pipeline for the transportation of crude oil to Enbridge's breakout tankage facilities at Clearbrook, Minnesota or Superior, Wisconsin. At Clearbrook, the crude oil will be delivered to interconnected facilities operated by Minnesota Pipe Line Company for delivery to Minnesota refineries. At Superior, the crude oil will be delivered into the Enbridge Mainline System and other third-party pipelines for delivery to refineries in the Midwest and the East Coast.

CON Application at Section 7853.0230 at 5 (footnotes omitted.) Thus, NDPC has described three potential markets for the transportation services to be offered by the Project:

- Minnesota refineries;
- Midwestern refineries; and
- East Coast refineries.

NDPC has also claimed that serving these refinery markets require that the Project connect to its Clearbrook and Superior Terminals.

The following discusses the NDPC and Enbridge pipelines systems at issue, the alleged demand for the transportation services to be provided by the Project, and the need for NDPC to ship crude oil on the Project to this demand via the Clearbrook and Superior Terminals.

1. Description of Pipeline Systems at Issue

The following map provides a simplified view of the pipeline systems at issue in this proceeding.

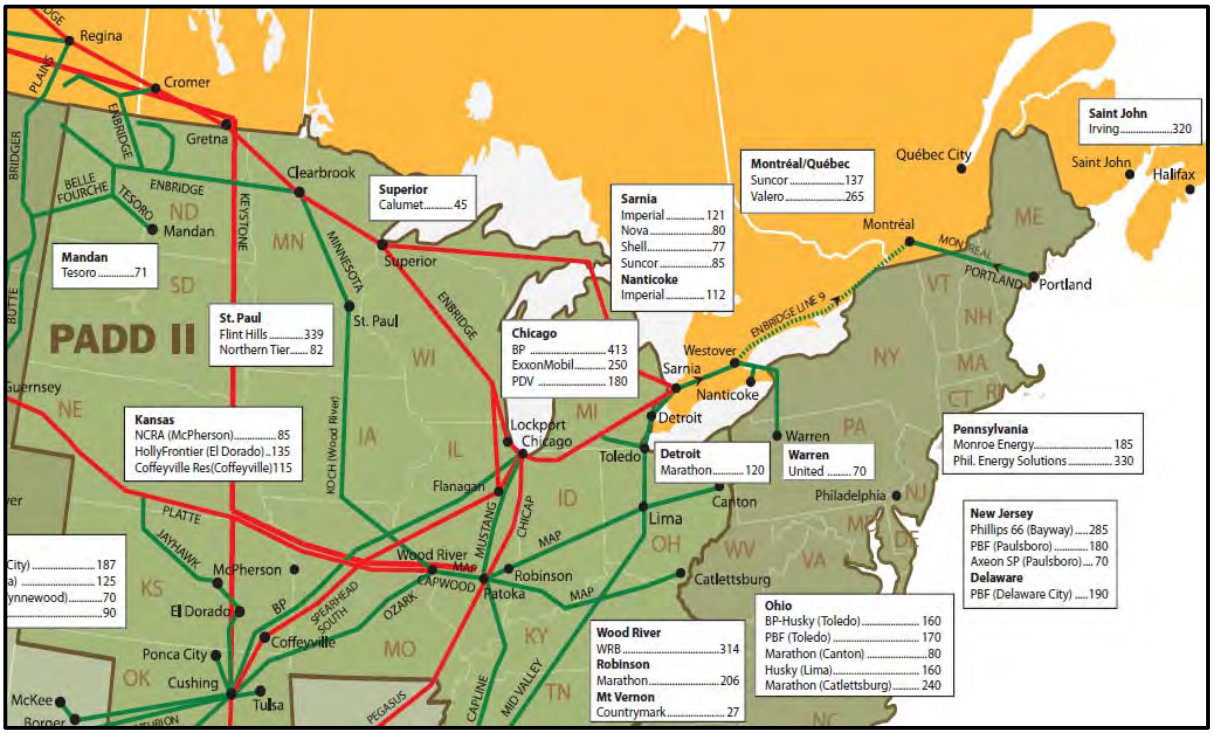

In addition, Enbridge has published the following System Configuration graphic that schematically describes its Mainline System. (A complete map and system configuration graphic are included as Attachment A).

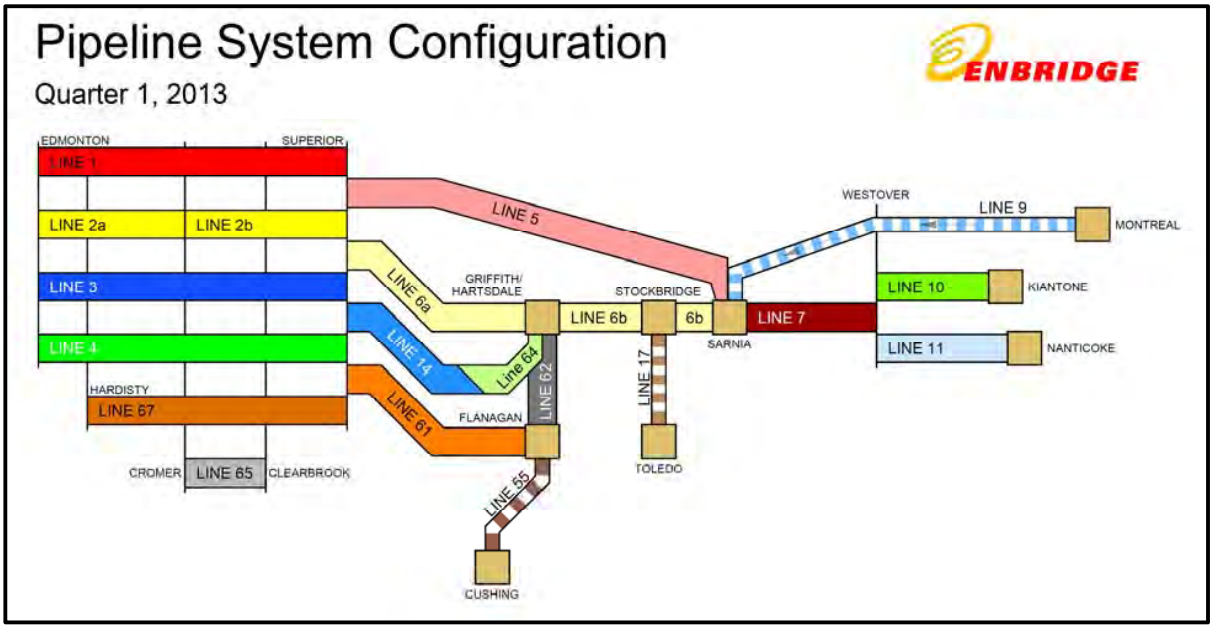

Together, the foregoing map and graphic show that the Clearbrook Terminal serves two structural purposes:

1) to transfer crude oil to the Minnesota Pipeline for delivery to Minnesota refineries; and
2) to accept oil from the North Dakota Pipeline for delivery to the Superior Terminal.

They also show that the Superior Terminal has four structural purposes:

1) delivery of crude oil via local pipeline to the Calumet Refinery in Superior, Wisconsin;
2) delivery of crude oil via Line 5 to the Sarnia Terminal in Ontario;
3) delivery of crude oil via Lines 6a, 14, and 64 to the Lockport Terminal in northern Illinois;
4) delivery of crude oil via Line 61 to the Flanagan Terminal in northern Illinois.

FOH notes that no U.S. East Coast refineries are served by pipelines, nor are the Canadian East Coast refineries in Quebec City, Quebec, and St. John, New Brunswick.

To understand the possible need for the Project to pass through the Clearbrook and Superior Terminals, it is necessary to determine the potential customer demand for service through these terminals. The following analyzes potential customer demand for U.S. Bakken Formation crude oil in U.S. and Canadian markets in relation to the specific functional purposes of the Clearbrook and Superior Terminals. This analysis shows that there is absolutely no need for additional crude oil pipeline service to the Clearbrook Terminal, and that what need exists related to the Superior Terminal is for transportation service to the Flanagan Terminal in

Northern Illinois, such that direct service to the Flanagan Terminal would meet most if not all of Enbridge's predicted customer need.

2. The Alleged Need for a Route Connection to Clearbrook and for Additional Pipeline Capacity to Ship Oil to Minnesota Refineries

Although Enbridge does not include service to Minnesota refineries in its statements of purpose, it nonetheless implies that part of the purpose for the Project is to provide service to these refineries. The Commission should understand that available evidence unequivocally shows that there is no need for additional crude oil pipeline deliveries from North Dakota to Minnesota through the Clearbrook Terminal.

On March 14, 2014, the St. Paul Park Refining Company ("SPPRC"), which owns the 89,000 bpd St. Paul Park Refinery, filed a Protest at the Federal Energy Regulatory Commission (Attachment B) in which it states, *inter alia*:

> this Protest demonstrates that the proposed expansion pipeline and expansion surcharge (a) are not needed, (b) do not have broad shipper support, [and] (c) will provide no benefit to shippers taking delivery at Clearbrook . . . .[1]
>
> * * *
>
> SPPRC does not believe the expansion pipeline proposed by NDP is necessary or desirable to meet the transportation needs of SPPRC.[2]
>
> * * *
>
> the purported shipper benefits cited by NDP have no value to SPPRC."[3]

In addition, the SPPRC Protest contains substantial evidence in the form of 104 pages of expert affidavits and documentation in support of SPPRC's position.[4] It also severely criticizes a

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[1], *Petition for Declaratory Order of North Dakota Pipeline Company*, FERC Docket No. OR14-21-000. PROTEST OF ST. PAUL PARK REFINING CO. LLC (March 13, 2014) at 1.
[2] *Id.* at 4.
[3] *Id.*
[4] *Id.* at s.

NDPC study that alleges need for the Project.[5] Thus, the SPPRC has stated in unequivocal terms that there is no need for the Project to connect to the Clearbrook Terminal for ultimate delivery to the St. Paul Park Refinery, or for that matter to the Flint Hills Refinery.

Although FERC denied this Protest, it did so on procedural grounds and did not review SPPRC's factual claims.[6] FERC stated:

> More importantly, and especially pertinent to the instant petition, because the Commission does not regulate the entry14 or exit15 into the oil pipeline business as it does with natural gas pipelines, there is nothing preventing an oil pipeline from building or expanding a pipeline on a traditional common carrier cost-of-service basis and making the required initial rate filing thirty days prior to the requested effective date. Therefore, while the protesters criticize North Dakota Pipeline's study and assert there is no need for the proposed expansion and extension of the system, the arguments have no bearing on our determination here. <u>Since the Commission does not have jurisdiction to grant certificates to oil pipelines or otherwise authorize or prevent construction, determining whether a pipeline is needed is not within its authority.</u> Therefore, the Commission denies the protesters' requests to reject this petition based upon an alleged lack of need for the new construction or that issues concerning the justification for expanding the pipeline require examination at a hearing, before a declaratory order approving the general framework for the project is granted.

(Emphasis added, footnotes omitted.) FERC did not explain how an unneeded pipeline can ever have reasonable rates, nor did it discuss the fact that pre-approval of a tariff structure tends to promote pipeline development because there is almost no risk that FERC will impose a tariff that does not allow a return on investment. In contrast to FERC, the Commission has "jurisdiction to grant certificates [of need] to oil pipelines or otherwise authorize or prevent construction, determining whether a pipeline is needed . . . ." Thus, the claims of SPPRC are relevant to this proceeding.

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[5] *Id.* at 7-9.

[6] Petition for Declaratory Order of North Dakota Pipeline Company, FERC Docket No. OR14-21-000. Order on Petition for Declaratory Order (May 15, 2014) at 9.

Flint Hills Resources, LP, ("Flint Hills"), which owns the 339,000 bpd Flint Hills Refinery in Rosemount, Minnesota, also filed comments in the same FERC docket (Attachment C).[7] While Flint Hills did not directly challenge the need for the Project, it did argue that it and other uncommitted shippers should "not bear financial responsibility for underutilization of the Sandpiper Project should shipper demand be less than NDPC anticipates . . . ."[8] Much of Flint Hill's comments relate to the financial risk resulting from underutilization of the Project. It seems unlikely that Flint Hills would focus on underutilization unless it anticipated a significant risk of it.

With regard to historical deliveries of U.S. Bakken Formation crude oil to Minnesota refineries by Line 81, FERC data filed by NDPC (and its predecessor) and the Minnesota Pipeline Company show the following quarterly deliveries[9]:

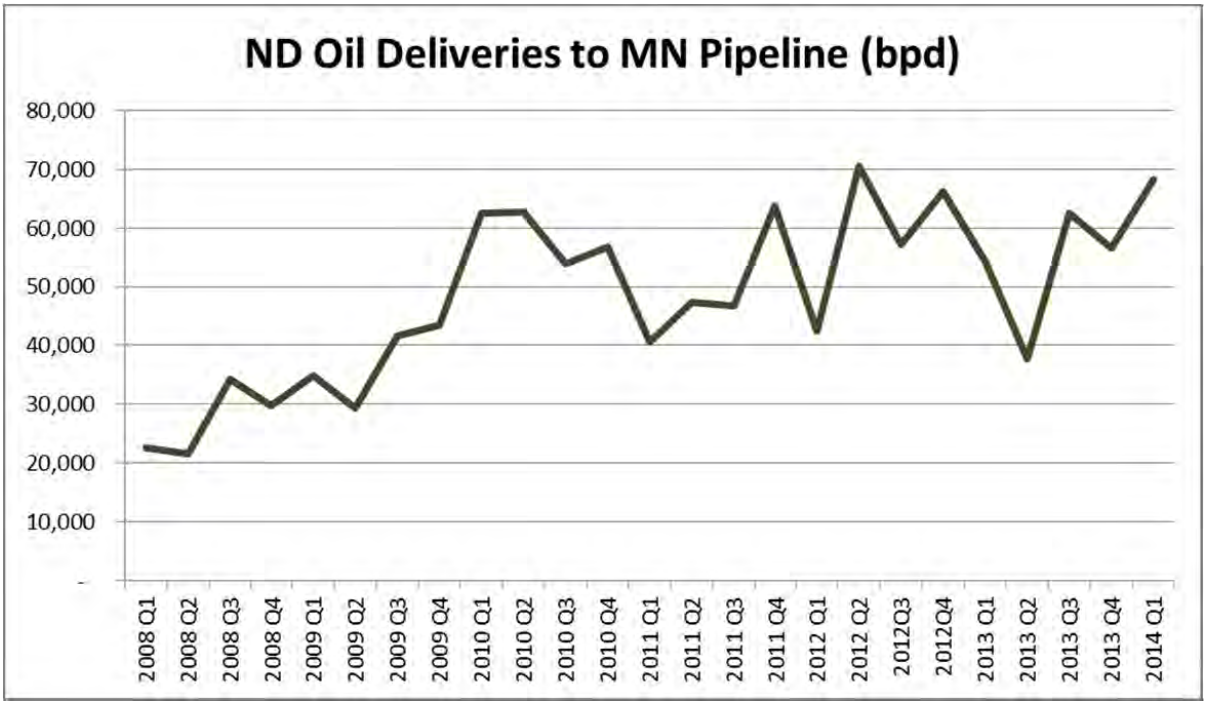

[7] *Petition for Declaratory Order of North Dakota Pipeline Company,* FERC Docket No. OR14-21-000. Comments of Flint Hills Resources, LP.
[8] *Id.* at 11
[9] This data is available at ferc.gov and comprises a substantial volume of material and therefore has not been attached hereto.

The data also shows that deliveries from North Dakota have been relatively stable for the past four years, ranging between approximately 50,000 bpd and 60,000 bpd, compared to a total refining capacity in the Twin Cities of 428,000 bpd. Assuming that Minnesota's refineries are operating at about 90% capacity, approximately 14% of the crude oil refined in Minnesota comes by pipeline from North Dakota. The average annual deliveries are shown below:

Year	BPD
Average 2010	58,993
Average 2011	49,650
Average 2012	59,087
Average 2013	51,569

The data filed at FERC by NDPC and the Minnesota Pipeline Company indicate that:

(1) the current capacity of the North Dakota Pipeline System (210,000 bpd) far exceeds historical deliveries to Minnesota refineries from North Dakota; and

(2) deliveries of North Dakota oil by pipeline to Minnesota are stable and show no sign of increasing.

NDPC has claimed that the Project will benefit Minnesota by providing redundant service to Clearbrook,[10] but the value, if any, of such redundant service appears low given that Minnesota's refineries have relied on the existing pipeline service from North Dakota for years and have not found it unreliable. FOH asserts that the benefit of such redundant service should not outweigh the risks to Minnesota's environment caused by the Project, and should not itself require service to the Clearbrook Terminal.

Taken together, the Protest filed by SPPRC and the FERC data indicate that Minnesota refineries do not need the Project such that connecting the Project to the Clearbrook Terminal is unnecessary. Although the Flint Hills refinery did not make as clear statements as SPPRC, it did

[10] CON Application, Section 7853.0230 at 5.

voice concerns about the risk of underutilization of the Project, including the risk that construction of the Project could unnecessarily increase Minnesota refinery costs. Such concern indicates that Flint Hills is likewise concerned about the future need for the Project. This position also suggests that there is no need for the Project route to pass through Clearbrook.

Moreover, NDPC has proposed to configure the Project so that no oil can be introduced into it from the Enbridge's Mainline System at Clearbrook. In the absence of a need to deliver crude oil to or receive oil at Clearbrook, there is no reason at all for the Project route to go through Clearbrook, except to the extent it might provide redundant service, which likely is of little to no value.

Given this information, the Commission should find that for the purposes of selecting alternative routes for further study, there is no need for such routes to connect to the Clearbrook Terminal. In fact, the evidence presented herein indicates that the Project could not be built at all or could bypass the Clearbrook Terminal without having any adverse impacts on Minnesota's refineries or Enbridge's downstream operations. Therefore, the Commission should find that connection to the Clearbrook Terminal and deliveries to Minnesota refineries are not a necessary component of the Project, such that it must consider "system alternatives" that do not include a connection to Clearbrook.

3. The Alleged Need for a Route Connection to the Superior Terminal

Evaluating the alleged need for the Project to end at the Superior Terminal is somewhat more complex, but can be understood through a systematic analysis of each of the downstream markets served by this terminal. The following provides a preliminary analysis. Although a full analysis of need will depend on completion of the contested case hearing under Minn. Stat. Ch. 216G, the purpose of the following analysis is to help the Commission gain an adequate

understanding of the customer needs alleged by NDPC in relation to the Superior Terminal, so that it can better understand why it must consider "system alternatives" that could feasibly meet Enbridge's alleged underlying purpose and need for the Project by connecting to other Mainline System terminals.

As noted, Enbridge can ship oil from the Superior Terminal directly to one refinery and three other terminals that serve differing refinery market. Specifically, from the Superior Terminal, Enbridge can ship crude oil:

1) via local pipeline to the Calumet Refinery in Superior, Wisconsin;
2) via Line 5 to the Sarnia Terminal in Ontario, which terminal serves a number of refineries in Sarnia, as well as refineries downstream in Detroit, Michigan, Warren, Pennsylvania, Nanticoke, Ontario, and Montreal, Quebec;
3) via Lines 6a, 14, and 64 to the Lockport Terminal in northern Illinois, that transfers oil for delivery to refineries in Illinois, Detroit, Ohio, the Sarnia Terminal and all the refineries served by it, as well as refineries in the Midwest and Gulf Coast; and
4) via Line 61 to the Flanagan Terminal in Illinois, which can serve essentially the same refineries as Lines 6a, 14, and 64, but which also has a higher capacity connection to the U.S. Gulf Coast.

The question before the Commission with regard to the Superior Terminal is whether this is the only delivery point on the Enbridge Mainline System that could feasibly serve the customer needs alleged by Enbridge. Each of the foregoing delivery options is discussed below, in turn.

Deliveries to the Calumet Refinery

The Calumet Refinery, which refines primary light crude oil, is one of the smallest in the U.S., with a rated capacity of only 45,000 bpd.[11] This capacity is dwarfed by the Mainline System's current light crude oil capacity of 1,254,300 bpd.[12] Thus, the Calumet Refinery is adequately served by existing light oil pipeline capacity to the Superior Terminal and does not itself justify a routing requirement that the Project terminate at the Superior Terminal.

Deliveries Via Line 5 to Sarnia, Ontario, and Downstream Refineries

Line 5 begins at the Superior Terminal and ends at the Sarnia Terminal in Ontario, Canada. However, Line 5 is not the only Enbridge pipeline to Sarnia, because Line 6b also terminates at Sarnia. Thus, it is possible to ship light crude oil to northern Illinois and then on to Sarnia.

It is not possible to ship crude oil from Sarnia further south than perhaps Toledo, Ohio, though it is not clear that all of the refineries in Toledo have access to this crude oil. Thus, Line 5 at most serves only three U.S. Midwestern refineries: the Detroit Marathon Refinery and the PBF and BP-Husky Refineries in Toledo, Ohio. To FOH's knowledge, none of these refineries has announced plans to refine greater amounts of light sweet crude oil, or to increase their overall capacity. Also, all of these refineries are also served by spurs off of Line 6b. and the Toledo refineries are also served by the Mid-Valley Pipeline from the south, such that the pipeline infrastructure that currently serves them is adequate to meet their needs. Thus, the evidence indicates that these refineries will have no increased demand for U.S. Bakken Formation crude oil, and to the extent that marginal increases might be needed, they are currently served by two other pipelines in addition to Line 5. As such, demand from these three

[11] CAPP North American Pipeline Map, Attachment A.
[12] Enbridge System Configuration, Attachment A.

Midwestern U.S. refineries does not justify increased shipments of U.S. Bakken Formation crude oil through the Superior Terminal on Line 5.

Crude oil shipped on Line 5 can also reach the small United Refining Refinery in Warren, Pennsylvania, but this refinery consumes mostly heavy crude oil and has no expansion plans. Therefore, this refinery, too, provides no justification to ship increased amounts of Bakken Formation crude oil to the Superior Terminal for transportation on Line 5.

Other than the foregoing U.S. refineries, Line 5 serves only eastern Canadian refineries. With regard to the need for increased shipments of Bakken Formation crude oil to eastern Canada, a group of NDPC's customers also filed a protest in Enbridge's FERC tariff case ("Shipper Protest") (Attachment D), in which they alleged that this need was specious.[13] The Shipper Protest includes the following statement about NDPC's claim that the Project serves refinery needs in eastern Canada:

> [NDPC's] suggestion that Bakken crude can break into the Eastern Canadian market is also fanciful. This region receives large quantities of its pipeline crude oil supplies from Western Canadian producers and Canadian producers view this area as a target market for their growing production. It is faulty economic logic to assume that those producers will permit their markets to be eroded by Bakken crude oil without taking responsive action. Furthermore, 330,000 bpd of Eastern Canadian refining capacity is not even connected to pipelines.[14]

(Emphasis added.) The Shipper Protest also states:

> there is no economic basis to [NDPC's] conclusion that the construction of the Sandpiper pipeline will permit Bakken crude oil to replace existing crude oil supplies to U.S. Mid-Continent and Eastern Canadian refineries. . . . these refineries are currently buying Western Canadian crude oil and Canadian producers will

[13] Petition for Declaratory Order of North Dakota Pipeline Company, FERC Docket No. OR14-21-000, Protest and Opposition and Renewed Motion to Intervene of Concord Energy LLC, Enserco Energy LLC, Enwest Marketing LLC and WPX Energy Marketing, LLC in Response to North Dakota Pipeline Company LLC Petition for Declaratory Order (March 14, 2014).
[14] *Id.* at 21.

> certainly not permit American Bakken crude deliveries to undercut their markets. In fact, . . . when faced with price competition in the past, Canadian producers have taken whatever measures they believed necessary to preserve their market. There is every reason to believe that they will continue to do so in the future, particularly in view of the long distance pipelines that TransCanada and Enbridge are building from Western Canadian crude oil fields to Eastern Canadian refineries.[15]

(Footnotes omitted.) In short, it is very unlikely that eastern Canadian refineries will demand U.S. Bakken Formation crude oil because they are already supplied by domestic Canadian crude oil producers. Moreover, all of the refineries served by pipeline in eastern Canada are owned by companies (Imperial Oil, Nova, Shell, and Suncor) that also own crude oil extraction facilities in the Tar Sands Region, such that they can buy crude oil from themselves. Therefore, it appears very unlikely that these eastern Canadian refineries will demand Bakken Formation crude oil deliveries through the Superior Terminal via Line 5.

With regard to Enbridge's alleged need to transport oil by pipeline to U.S. East Coast refineries, which are in New Jersey, Pennsylvania, and Delaware, this is not currently physically possible because none of these refineries are served by pipelines. The same is true for Canada's coastal refineries in Quebec City and St. John. Thus, it appears that deliveries to these refineries do not create a need to ship Bakken Formation crude oil through the Superior Terminal to Line 5.

Therefore, available evidence indicates that NDPC and Enbridge have no need to ship oil to the Superior Terminal for delivery via Line 5 to Sarnia, because none of the refineries served by Line 5 are likely to demand more or even any U.S. Bakken Formation crude oil. As such, the Commission should not assume that deliveries to the Superior Terminal for transportation on Line 5 are a substantial purpose of the Project.

[15] *Id.* at 35-36.

Deliveries Via Lines 6a, 14, and 64 to the Lockport Terminal in Northern Illinois

Shipments to the Superior Terminal can also be forwarded to the Lockport Terminal in northern Illinois via Lines 6a, 14, and 64, and from there on to refineries in the Chicago area. From the Chicago area, there are connections east on Line 6b to Toledo, Detroit, Sarnia, Warren, Pennsylvania, and eastern Canada; and connections south to Patoka, Illinois, from where pipelines continue to refineries in Toledo, Lima, Canton, and Catlettsburg, Ohio, Cushing, Oklahoma, and the U.S. Gulf Coast.

As previously discussed, the likelihood of increased demand for U.S. Bakken Formation crude oil shipments via the Lockport Terminal by refineries in Toledo, Detroit, or Sarnia, or in refineries downstream from Sarnia, is a best limited, if not "fanciful." Thus, these refineries do not provide a need for increased Bakken Formation crude oil deliveries to the Superior Terminal for delivery to the Lockport Terminal.

The other refineries directly served by the Lockport Terminal are three Chicago area refineries:

(1) BP's 413,000 bpd Whiting Refinery, which recently completed a major modification to allow it to process primarily heavy sour crude oil, such that it will likely demand much less light crude oil;

(2) Exxon Mobil's 250,000 bpd Joliet Refinery, which is configured to process primarily heavy sour crude oil; and

(3) PDV/CITGO's 180,000 bpd Lemont Refinery in Lemont, Illinois; which is also configured to process primarily heavy sour crude oil, originally from its parent corporation in Venezuela.

Due to the configuration of these refineries, it is doubtful that they will demand greater supplies of U.S. Bakken Formation crude oil. Thus, it is unlikely that Enbridge can show a need to ship U.S. Bakken Formation crude oil via the Superior and Lockport Terminals to these refineries.

It is also possible to ship crude oil from Chicago to the Patoka Terminal in southern Illinois on the 100,000 bpd Mustang Pipeline, for delivery to refineries in Ohio, the southern Midwest, and the U.S. Gulf Coast. However, the small size of the Mustang Pipeline means that relatively little crude oil can flow through the Superior and Lockwood Terminals to these more distant markets. Instead, it appears that Enbridge intends to serve these more distant markets via Line 61 and the Flanagan Terminal.

Therefore, service through the Superior Terminal on Lines 6a, 14, and 64 to the Lockwood Terminal, is mostly confined to refineries in the Chicago area, Toledo, Detroit, Sarnia, and refineries downstream from Sarnia. As previously discussed, none of these refineries are likely to demand greater quantities of light sweet U.S. Bakken Formation crude oil. Therefore, there appears to be little reason for Enbridge to need additional pipeline capacity from North Dakota to the Superior Terminal for service to these refineries. This conclusion is also supported by the opinion of an expert who provided a sworn declaration included in the Shipper Protest, which declaration states:

> As far as the U.S. Midwest– *i.e.*, Eastern PADD II – is concerned, there are 13 refineries located in Michigan, Illinois, Indiana, Kentucky, Tennessee and Ohio. These refineries collectively use approximately 2.5 million bpd of crude oil. In 2012, these refineries imported over 1.2 million bpd of crude oil. Ninety-seven percent of these imports were from Western Canada. Canadian crude oil producers delivered a total of approximately 1.7 million bpd into the entire American Midwest region in 2012. <u>I do not believe that there is any real possibility that Western Canadian producers will permit North Dakota Bakken crude oil to replace any of the crude oil Mid-Continent refiners are now receiving from</u>

> Western Canada. In fact, if anything, Western Canadian crude oil will occupy an increasing portion of this PADD II market.[16]

(Emphasis added, footnotes omitted.) Thus, a number of Enbridge's shippers also believe that demand in the eastern Midwest for U.S. Bakken Formation crude oil will at best remain stagnant, but will more like drop due to increased pressure from Canadian crude oil imports.

Therefore, the Commission should not assume that the Project needs to connect to the Superior Terminal to allow increased quantities of light sweet U.S. Bakken Formation crude oil to flow via Lines 6a, 14, and 64 and the Lockport Terminal to downstream refineries. Since the need for increased service to the Lockport Terminal is at best limited and at worst non-existent, the Commission should not require alternative routes to terminate at the Superior Terminal based on a need to provide service to the Lockport Terminal.

Deliveries Via Line 61 to the Flanagan Terminal in Northern Illinois

The largest potential new pathways for oil from the Superior Terminal are on either:

- Line 61 to the Flanagan Terminal, which has a maximum capacity of 1,200,000 bpd, but currently is rated at only 400,000 bpd; or
- the yet to be announced Line 66 project to the Flanagan Terminal, which will likely be an 800,000 bpd pipeline.

From the Flanagan Terminal, Enbridge can at present, or plans via expansions, to ship crude oil to:

1) the Chicago area and markets downstream from Chicago on Line 6b or the Mustang Pipeline;

[16] Shipper Protest, Exhibit D, Sworn Declaration of Robert P. Garner in Support of Enwest Marketing Llc's Protest and Opposition to North Dakota Pipeline Company LLC's Petition for Declaratory Order and Enwest's Motion to Intervene at 13.

2) the Patoka Terminal, which has connections to Ohio refineries, Wood River, and possibly the U.S. Gulf Coast (if Marathon reverses its Capline Pipeline); and

3) the Cushing Terminal, which has connections to a number of refineries in southern states, as well as to U.S. Gulf Coast refineries via the Seaway Pipeline.

Each of the foregoing shipping options is discussed below.

Although crude oil can or will be able to flow from the Flanagan Terminal to the Chicago area via Enbridge's planned Line 78, as previously discussed, the likelihood of increased shipments of U.S. Bakken Formation crude oil to these markets is limited or even non-existent. There are no pipelines from Chicago to the U.S. East Coast refineries, increased demand by eastern Canadian refineries for U.S. Bakken crude oil appears "fanciful," and the refineries in the upper and eastern Midwest are primarily configured to refine heavy crude oil, which is provided by competing Canadian crude oil suppliers, and these refineries have not announced any significant expansions of light sweet crude oil refining capacity.

In contrast, Enbridge's planned pipeline expansions from the Flanagan Terminal south on the Southern Access Extension or Flanagan South Pipeline suggest that Enbridge's primary target market for the Project is the lower Midwest or U.S. Gulf Coast. From the Flanagan Terminal, Enbridge plans to ship oil via the Southern Access Extension to the Patoka Terminal and from there to Ohio refineries on Marathon's MAP Pipeline, and possibly to the U.S. Gulf Coast should Marathon reverse its Capline Pipeline to Louisiana. It also plans to ship crude oil on the Flanagan South Pipeline to Cushing, Oklahoma, which has connections to a number of southern refineries and the U.S. Gulf Coast. Thus, the primary new crude oil pathways planned or being built by Enbridge all pass through the Flanagan Terminal, which is intended to serve refineries in Ohio, a number of southern states, and the U.S. Gulf Coast.

This conclusion is also supported by the recently filed Direct Testimony of Neil Earnest, which provides the following chart on page 48 of the attached Schedule 2 Report.

Figure 18

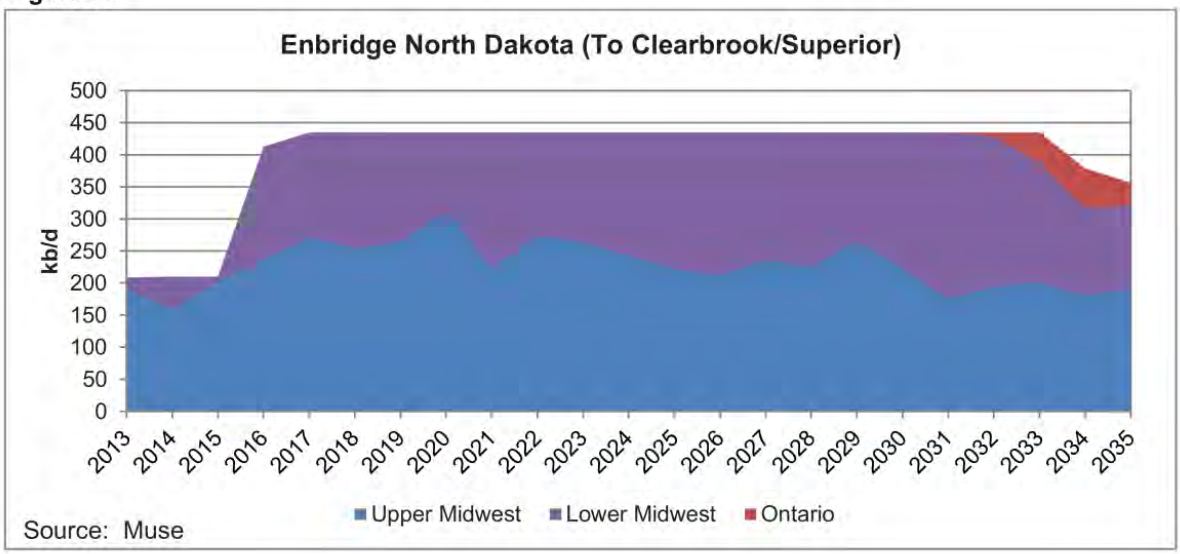

While FOH does not agree that the historical or forecast data on which this chart is based are accurate, it does show that almost all of the new markets that Enbridge hopes will use the Project are in the "Lower Midwest." It shows that currently Enbridge is shipping between 150,000 to 200,000 bpd of U.S. Bakken Formation crude oil to the "Upper Midwest" and almost none of this oil to the "Lower Midwest." This forecast predicts that shipments to the "Upper Midwest" will increase to an average of approximately 250,000 bpd and then decline. In contrast, it predicts that shipments of U.S. Bakken Formation crude oil to the "Lower Midwest" will increase from current levels of 25,000 bpd or less to about 225,000 bpd. Thus, this chart reinforces FOH's contention that <u>the primary purpose for the Project anticipated by NDPC and Enbridge is to ship more Bakken Formation crude oil to the Flanagan Terminal for shipment south</u>.

This chart also confirms the contention in the SPPRC and Shipper Protests that shipments to eastern Canadian refineries are unlikely, because it shows no forecasted shipments to Ontario refineries until about 2032, which is far enough in the future to make such shipments entirely speculative.

To the extent that Enbridge hopes to ship crude oil to Ohio refineries, its best route is not through the Lockport Terminal and Chicago, but via the Flanagan Terminal and the planned Southern Access Extension to Patoka and then on Marathon's MAP Pipeline System to the Ohio Refineries.

Thus, the underlying need hoped for by NDPC and Enbridge is not primarily to deliver more oil through Lines, 5, 6a, 14, and 64 to the Sarnia, Lockwood and Chicago area Terminals, but rather on Lines 61 and 66 to the Flanagan Terminal for delivery through the Patoka and Cushing Terminals to markets to the south.

Given this underlying alleged need to move oil to the Flanagan Terminal, it is reasonable for the Commission to investigate "system alternative" options that serve the Flanagan Terminal, because such alternatives could meet most if not all of Enbridge's underlying alleged need.

B. The Commission Must Select One or More Routes that Connect to the Flanagan Terminal and Avoids Minnesota's Pristine Aquatic Resources, Because Such Route Would Meet Most if Not All of Enbridge's Alleged Underlying Need and Likely Reduce Environmental Impacts

In response to the Commission's January 31, 2014, Notice of Application Acceptance and Public Information Meetings, FOH volunteers proposed a number of alternative routes, including the routes enumerated by the Department of Commerce Report dated July 17, 2014, ("DOC Report") as SA-04, SA-05, SA-06, SA-07, and SA-08. In addition, Honor the Earth proposed a route that followed Interstate 29 to Interstate 94 through Minnesota, and the

Minnesota Pollution Control Agency ("PCA") proposed route SA-03 and voiced support for consideration of other routes through central Minnesota.

The general policy intent of these routes was to avoid going through Minnesota's most pristine aquatic and wild rice while still providing crude oil transportation service to northern Illinois. It is true that these routes are not technically specific and were based on uncertainty about Enbridge's alleged commercial need for its Project, but the Commission should not expect citizens to provide alternative routes with the same level of precision as that possessed by NDPC and Enbridge. Instead, FOH suggests that the Commission understand that its purpose should be to focus on the underlying policy goals of citizen commenters and then direct the Department of Commerce to develop more precise alternative routes that meet these goals.

Moreover, the Commission should consider these routes in light of the June 25, 2014, approval by the North Dakota Public Service Commission of a route through North Dakota, because this approval did not exist during Minnesota's routing comment period. Should this approval have been made before or during Minnesota's comment routing comment period, citizens would have adapted their routes to it. The Commission has the discretion to recognize this recent development and modify previously proposed routes accordingly.

1. FOH Combined Routes

After reviewing all of its own proposed routes, as well as the routes proposed by Honor the Earth and the PCA, in light of the North Dakota approval, the DOC Route Report, and the more detailed need analysis presented in these comments, FOH proposes that the Commission adapt different elements of the various proposals into an alternative route or routes that likely meet the policy goals of the citizen commenters, as well as many Minnesotans, while still

meeting most if not all of Enbridge's alleged need. Specifically, FOH proposes the following combined route alternatives:

a) **Combined SA-03, SA-07, and SA-04 Route**: Due to the completion of the North Dakota Public Service Commission routing process, FOH proposes to start SA-04 at the terminus of the North Dakota route and then follow SA-03 south along the Viking Pipeline to the point where the Viking Pipeline turns east. At his point, this proposed alternative route would continue south to the Magellan Pipeline and follow it to the SA-04 route (Alliance Pipeline), from where it would follow the Alliance Pipeline to northern Illinois and ultimately the Flanagan Terminal. The policy purpose of this route is to combine the SA-03, SA-07, and SA-04 routes so as to recognize the North Dakota approval and follow existing pipeline corridors to the maximum extent possible while avoiding northern Minnesota's aquatic resources and providing crude oil transportation service to northern Illinois.

b) Combined SA-03 and SA-08 Route Extended Through Wisconsin:

This proposed route is intended to acknowledge the decision of the North Dakota Public Service Commission by entering Minnesota at the terminus of the approved route in North Dakota, then following SA-03 south along the Viking Pipeline to the point that it turns east, and continuing south from there to the SA-07/SA-08 routes, at which point the route would follow the Magellan Pipeline to into central Wisconsin, to a connection with Line 61. The policy purpose of this route is to combine the SA-03, SA-07, and SA-08 routes so as to follow existing pipeline corridors to the maximum extent possible while avoiding northern Minnesota's aquatic resources and providing crude oil transportation service to northern Illinois.

c) Combined SA-03, SA-07, and Wood River Pipeline Route:

This proposed route is intended to acknowledge the decision of the North Dakota Public Service Commission by entering Minnesota at the terminus of the approved route in North Dakota, then following SA-03 south along the Viking Pipeline to the point that it turns east. At this point, this proposed alternative route would continue south to the Magellan Pipeline and follow it to the terminus of the Wood River Pipeline, from where Enbridge would purchase and use the Wood River Pipeline to transport crude oil to its Flanagan South Pipeline and/or Wood River. The policy purpose of this route is to combine the SA-03, SA-07, and currently mothballed Wood River Pipeline so as to follow existing pipeline corridors to the maximum extent possible and fully utilize existing pipeline infrastructure within the state while avoiding northern Minnesota's aquatic resources and providing crude oil transportation service to central Illinois. Although the Wood River Pipeline has been discussed by a number of commenters, FOH believes the Commission would be remiss if it did not at least investigate why an existing unused pipeline through Minnesota that could serve much of the need alleged by Enbridge is not being used by the industry.

2. The Environmental Advantages of FOH's Proposed Combined Routes Relative to the NDPC Preferred Route

As previously described in FOH written and oral comments, the NDPC proposed route cuts through the heart of Minnesota's pristine lake county, Mississippi River headwaters, and the wild rice that grows abundantly in this region. In addition, it impacts sensitive soil types and ground water resources. In contrast, the routes proposed by citizens and the PCA seek to avoid these impacts while continuing to serve Enbridge's alleged commercial need for the Project. The following maps show with great clarity that NDPC's proposed route puts critical environmental resource at risk.

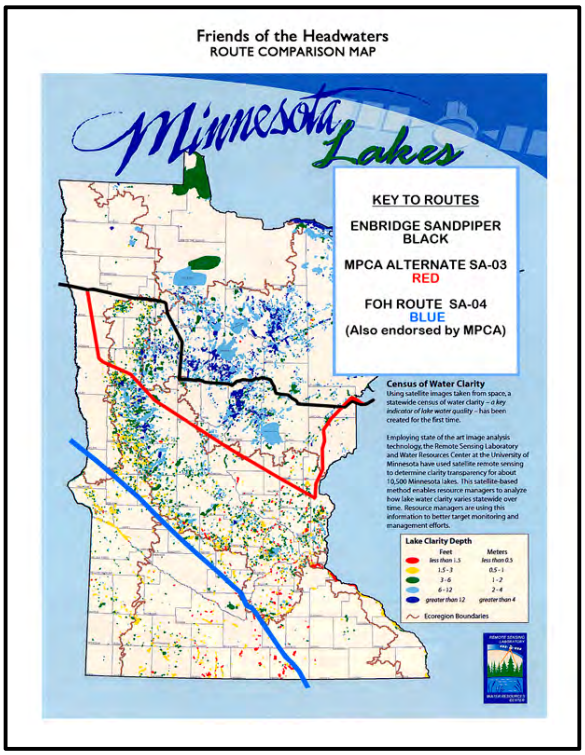
Friends of the Headwaters
ROUTE COMPARISON MAP
Minnesota Lakes
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(Also endorsed by MPCA)
Census of Water Clarity
Using satellite images taken from space, a statewide census of water clarity – a key indicator of lake water quality – has been created for the first time.
Employing state of the art image analysis technology, the Remote Sensing Laboratory and Water Resources Center at the University of Minnesota have used satellite remote sensing to determine clarity transparency for about 10,500 Minnesota lakes. This satellite-based method enables resource managers to analyze how lake water clarity varies statewide over time. Resource managers are using this information to better target monitoring and management efforts.
Lake Clarity Depth
Feet
Meters
less than 1.5
less than 0.5
1.5 - 3
0.5 - 1
3 - 6
1 - 2
6 - 12
2 - 4
greater than 12
greater than 4
Ecoregion Boundaries

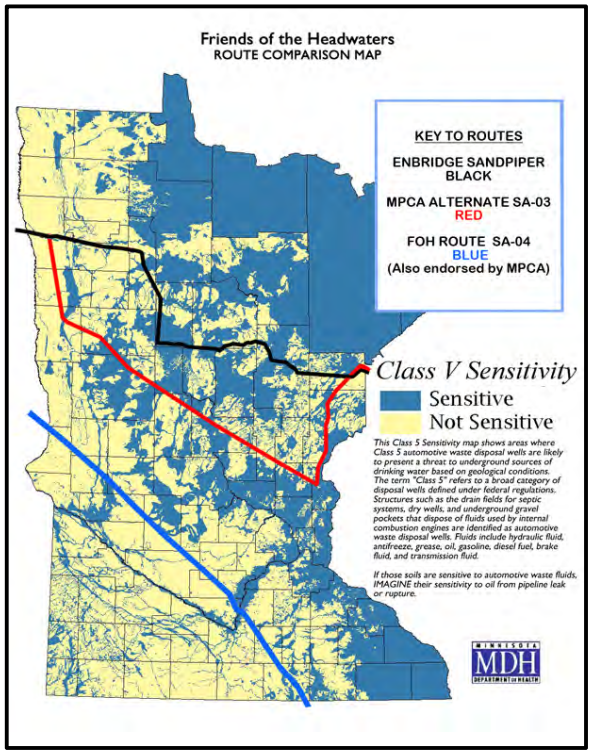
Friends of the Headwaters
ROUTE COMPARISON MAP
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(Also endorsed by MPCA)
Class V Sensitivity
Sensitive
Not Sensitive
This Class 5 Sensitivity map shows areas where Class 5 automotive waste disposal wells are likely to present a threat to underground sources of drinking water based on geological conditions. The term "Class 5" refers to a broad category of disposal wells defined under federal regulations. Structures such as the drain fields for septic systems, dry wells, and underground gravel pockets that dispose of fluids used by internal combustion engines are identified as automotive waste disposal wells. Fluids include hydraulic fluid, antifreeze, grease, oil, gasoline, diesel fuel, brake fluid, and transmission fluid.
If those soils are sensitive to automotive waste fluids, IMAGINE their sensitivity to oil from pipeline leak or rupture.
MINNESOTA
MDH
DEPARTMENT of HEALTH

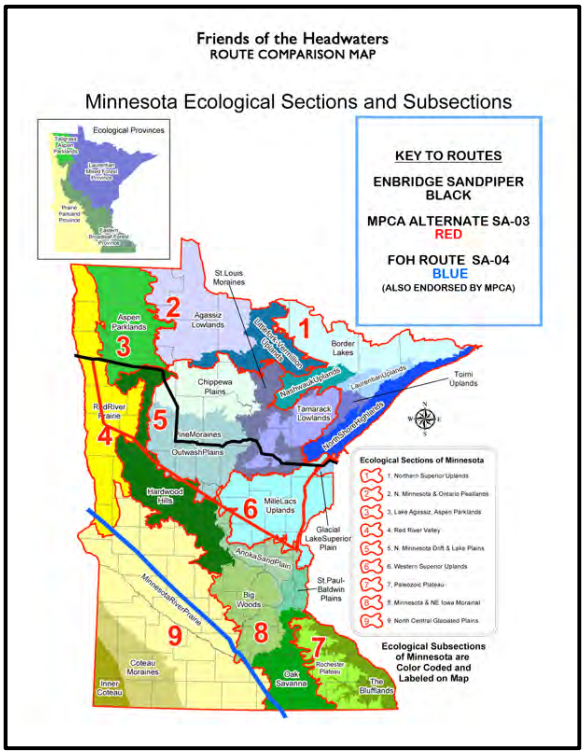
Friends of the Headwaters
ROUTE COMPARISON MAP
Minnesota Ecological Sections and Subsections
Ecological Provinces
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(ALSO ENDORSED BY MPCA)
St Louis Moraines
Aspen Parklands
Agassiz Lowlands
Border Lakes
Chippewa Plains
Northwest Uplands
Laurentian Uplands
Torni Uplands
Tamarack Lowlands
Red River Prairie
InnMoraines
OutwashPlains
Hardwood Hills
MilleLacs Uplands
Glacial LakeSuperior Plain
AnokaSandPlain
St Paul-Baldwin Plains
Big Woods
MinnesotaRiverPrairie
Côteau Moraines
Inner Côteau
Oak Savanna
Rochester Plateau
The Blufflands
Ecological Sections of Minnesota
1. Northern Superior Uplands
2. N. Minnesota & Ontario Peatlands
3. Lake Agassiz, Aspen Parklands
4. Red River Valley
5. N. Minnesota Drift & Lake Plains
6. Western Superior Uplands
7. Paleozoic Plateau
8. Minnesota & NE Iowa Morainal
9. North Central Glaciated Plains
Ecological Subsections of Minnesota are Color Coded and Labeled on Map

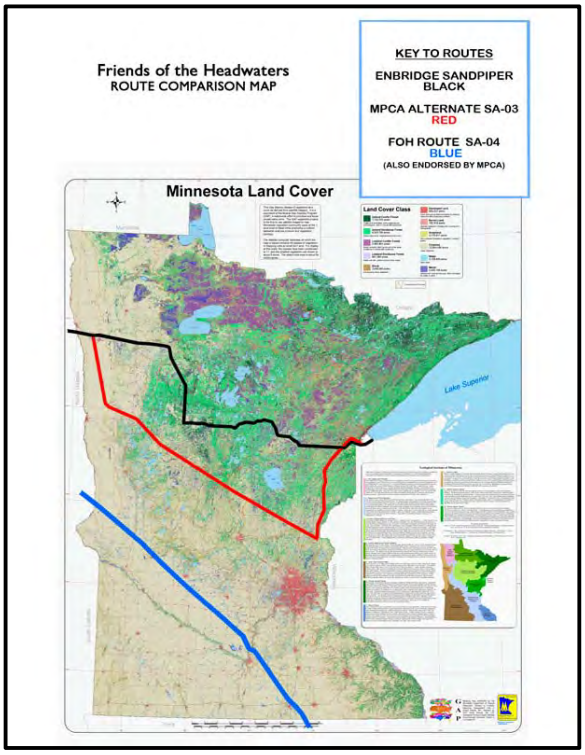
Friends of the Headwaters
ROUTE COMPARISON MAP
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(ALSO ENDORSED BY MPCA)
Minnesota Land Cover
Land Cover Class
Lake Superior

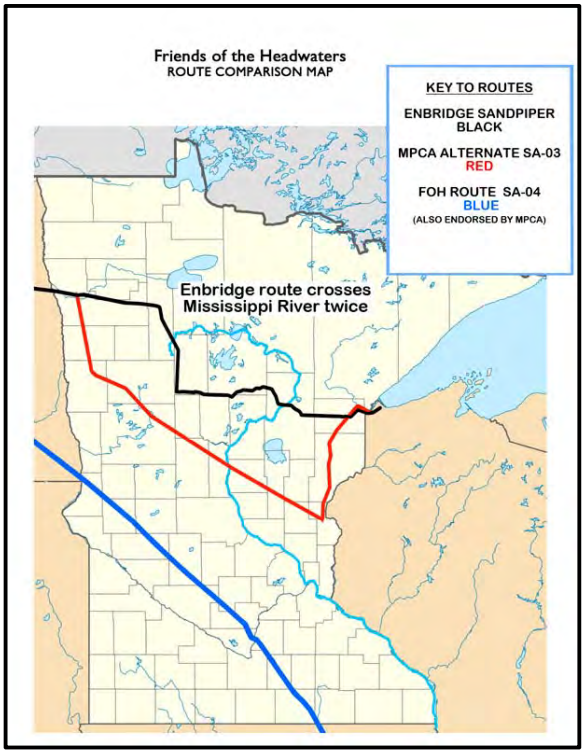
Friends of the Headwaters
ROUTE COMPARISON MAP
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(ALSO ENDORSED BY MPCA)
Enbridge route crosses
Mississippi River twice

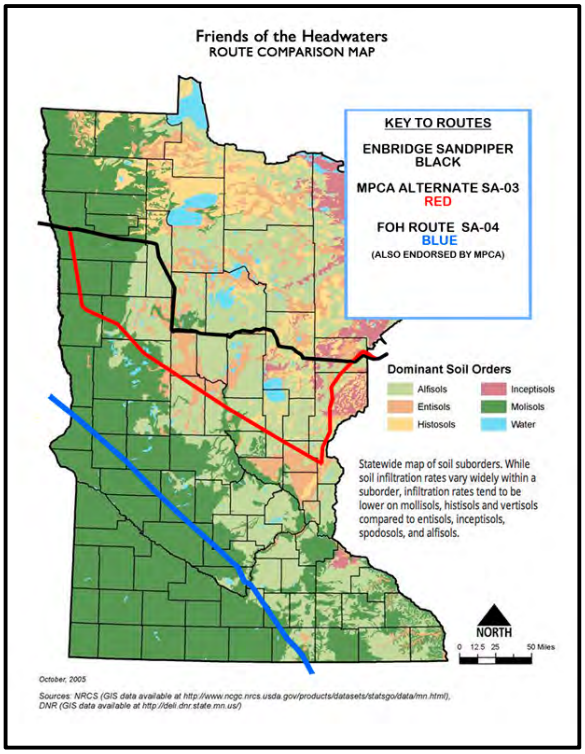
Friends of the Headwaters
ROUTE COMPARISON MAP
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(ALSO ENDORSED BY MPCA)
Dominant Soil Orders
Alfisols
Inceptisols
Entisols
Mollisols
Histosols
Water
Statewide map of soil suborders. While soil infiltration rates vary widely within a suborder, infiltration rates tend to be lower on mollisols, histisols and vertisols compared to entisols, inceptisols, spodosols, and alfisols.
NORTH
0 12.5 25 50 Miles
October, 2005
Sources: NRCS (GIS data available at http://www.ncgc.nrcs.usda.gov/products/datasets/statsgo/data/mn.html),
DNR (GIS data available at http://deli.dnr.state.mn.us/)

While it is true that all routes have an impact, it is also true that some routes have fewer environmental impacts than others. The foregoing maps make clear that the NDPC preferred route has far more significant impacts to treasured resources then the alternatives proposed herein. According, if one or more proposed routes appear to be feasible to the extent that they could reasonably be expected to substantially meet the need alleged by the NDPC, then MEPA requires that the Commission include them for consideration within the Comparative Environmental Analysis ("CEA").

3. The Economic Merits of the Various Routes to the Flanagan Terminal Are Uncertain and Require Consideration of the Cost of the Line 61 and 66 Projects in Comparison to SA-04

It seems likely that NDPC will continue to present economic evidence related to the alternative routes in an effort to convince the Commission that they are not feasible. FOH understands that MEPA requires consideration of alternatives without requiring detailed economic analysis ahead of time. Instead, the CON docket is intended to address economic analysis, such that the Commission should not base its routing decision for the CEA on economic data provided by Enbridge. Moreover, consideration of such data would be entirely unfair to citizens who do not have access to Enbridge's level of financial, personnel, and data resources.

II. What Is the Legal Basis for Determining Whether a System Alternative Should Be Considered in the Certificate of Need Proceeding?

The CON process is required by Minn. Stat. § 216B.243. This law does not expressly describe the range of alternatives that must be considered by the Commission. Due to the legislature's confusing decision to apply what was historically a law written for electric power line siting to underground pipelines, much of the language in this section relates poorly to the decision at hand. The only language in it that relates to the Commission's obligation to consider alternatives is in Subd. 3(6), which states in relevant part:

> No proposed large energy facility shall be certified for construction . . . unless the applicant has otherwise justified its need. In assessing need, the commission shall evaluate:
> (6) possible alternatives for satisfying the energy demand or transmission needs including but not limited to potential for increased efficiency and upgrading of existing energy generation and transmission facilities . . . .

In an effort to interpret this law, the Commission promulgated Minn. R. Ch. 7853. It also does not provide significant guidance with regard to the scope of alternatives that the Commission must consider. Part 7853.0120 requires that the Commission "consider only those alternatives proposed before the close of the public hearing and for which there exists substantial evidence on the record with respect to each of the criteria listed in part 7853.0130." Thus, this Part limits the Commission's consideration to (1) alternatives proposed before the end of the hearing, (2) for which substantial evidence exists with regard to the criteria listed in Part 7853.0130.

Part 7853.0130 states in relevant part:

> A certificate of need shall be granted to the applicant if it is determined that:
>
> * * *
>
> B. a more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record by parties or persons other than the applicant, considering:
> (1) the appropriateness of the size, the type, and the timing of the proposed facility compared to those of reasonable alternatives;
> (2) the cost of the proposed facility and the cost of energy to be supplied by the proposed facility compared to the costs of reasonable alternatives and the cost of energy that would be supplied by reasonable alternatives;
> (3) the effect of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives; and
> (4) the expected reliability of the proposed facility compared to the expected reliability of reasonable alternatives;

However, when read in light of Part 7853.0120, it is clear that this language does not apply to a pre-determination of the alternatives that must be considered in the CEA, because parties that propose alternatives have until the "close of the public hearing" to meet this burden.

Minn. Stat. § 216B.243 and Minn. R. Ch. 7853 are not the only laws that govern the CON process. As more fully discussed in the FOH August 5 Comments, the Commission must prepare an environmental review for the CON decision, as well as the routing decision. Under MEPA, an EIS or alternative form of review must be prepared for "major governmental actions" "where there is potential for significant environmental effects" resulting from the action. Minn. Stat. § 116D.04, Subd. 2a. In this regard, Minn. Stat. § 116D.04, Subd. 1a(d), defines "governmental action" as activities, including projects wholly or partially conducted, permitted, assisted, financed, regulated, or approved by units of government . . . ." A key policy component of the MEPA process is "[a]n early and open process" "to determine . . . the alternatives which are appropriate for consideration in the statement." Minn. Stat. § 116D.04, Subd. 2a(f).

Here, granting a CON is a "major governmental action" within the meaning of MEPA, such that a decision under it requires an environmental review of the environmental impacts related to the Commission CON decision. The plain language of Minn. R. Ch. 7853 demonstrates that the Commission must consider environmental impacts within the CON docket. *See, e.g.*, Minn. R. 7853.0130(B)(3); 7853.0130(C)(2),(4); and 7853.0600 to 0800. Therefore, it cannot be argued that the Commission's decision in the CON docket has no environmental impacts. The Commission may choose to conduct a separate Environmental Impact Statement ("EIS") for the CON docket, or it may choose to include consideration of CON issues in its CEA, but it cannot ignore MEPA as it applies to the CON docket.

Thus, the answer to the Commission's question about "the legal basis for determining whether a system alternative should be considered" at this phase of the proceeding depends not on Minn. Stat. § 216B.243 or Minn. R. Ch. 7853, but on MEPA.

Moreover, to avoid irreparable conflicts between these laws, the Commission must simply ensure that its scoping process for the CEA considers not only route permit alternatives, but also non-route alternatives. Unfortunately, the Commission has not fully addressed its responsibilities in this regard and has chosen to elicit comments on only route alternatives. To rectify this situation, the Commission must open its docket to allow scoping related to the CON docket. After it identifies both route and non-route alternatives, the DOC-EERA will be able to complete a CEA or EIS that fully complies with MEPA.

Therefore, at this phase of this proceeding, the law that applies to the Commission's decision about the range of alternatives to consider is governed by MEPA. After the close of the public hearing, the Commission has discretion to disregard those alternatives that are not supported by substantial evidence. But, the Commission may not apply this "substantial evidence" test now, because the public hearing process has just begun.

III. What is the legal basis for determining whether a system alternative should be considered in the route permit proceeding?

The routing permit law, Minn. Stat. § 216G, does not specify the alternatives that must be considered by the Commission. Likewise, Minn. R. Ch. 7852 does not specify the alternatives that the Commission must consider. Instead, it states:

> A comparative environmental analysis of all of the pipeline routes accepted for consideration at public hearings shall be prepared by the commission staff or by the applicant and reviewed by the commission staff. This comparative environmental analysis must be submitted as prefiled testimony as required by part 1405.1900.

By reference the "comparative environmental analysis," the regulation makes clear that it defers to the policy standards for alternative review under MEPA Section. § 116D.04, Subd. 4a, including the policy standards for selection of alternatives. These policy standards are described more fully in the FOH August 5 Comments at 23-27.

Thus, the legal basis for determining whether a system alternative should be considered in the Commission's routing permit proceeding is the standard for alternative review provided by MEPA.

IV. CONCLUSION

For the foregoing reasons, FOH respectfully requests that the Commission issue an order:

1) requiring consideration of a route or routes that do not pass through northern Minnesota yet still serve the underlying need alleged by Enbridge;
2) directing the DOC-EERA to include consideration in the CEA those reasonable alternatives proposed by parties in the CON docket; and
3) directing the DOC-DER to consider all routes evaluated by the CEA to be alternatives in the CON docket.

Date: August 21, 2014

Respectfully submitted,

/s Paul C. Blackburn
Attorney for Friends of the Headwaters
P.O. Box 17234
Minneapolis, MN 55417
Phone: 612-599-5568
Bar No. 0391685

FRIENDS of the HEADWATERS

August 20, 2014

Mr. Burl Haar,
Executive Secretary,
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

Re: PUC Docket Numbers PL-6668/CN-13-373 and PL-6668/PPL-13-474
North Dakota Pipeline Company LLC Sandpiper pipeline

Dear Mr. Haar and the Honorable Public Utility Commissioners of Minnesota,

Please find attached testimony from Friends of the Headwaters (FOH) regarding routing alternatives for the proposed Enbridge/North Dakota Pipeline Company (NDPC) Sandpiper pipeline project.

Your attention and consideration of the enclosed contents is most appreciated. FOH and its members want to thank you for this additional opportunity to comment on the issue.

Sincerely,

Richard Smith
President
Friends of the Headwaters

P.O. Box 583, Park Rapids, MN 56470
mnfriendsoftheheadwaters@gmail.com
facebook.com/savemississippiheadwaters
www.friendsoftheheadwaters.org

POSITION PAPER

ENBRIDGE/NORTH DAKOTA PIPELINE COMPANY (NDPC) LLC
SANDPIPER PIPELINE PROJECT

Public Utilities Commission (PUC) Docket Number: PL-6668/PPL-13-473
Public Utilities Commission (PUC) Docket Number: PL-6668/PPL-13-474

August 20,2014

Prepared by
Richard Smith
Friends of the Headwaters (FOH)
P.O. Box 583
Park Rapids, MN 56470

Friends of the Headwaters opposes the Enbridge/NDPC Sandpiper pipeline as currently projected to cross Minnesota's lake country from Grand Forks, ND to Superior, WI. We believe this proposed corridor will NOT protect the high quality waters only this route. Enbridge/NDPC could not have picked a worse route across Minnesota's critical and valuable water resources.

Therefore given the magnitude and scope of this project and the company's request to construct a large stretch of a totally new pipeline corridor with the already announced prospects of building an additional pipeline, the larger Line 3 Rebuild, in this new corridor, FOH is asking the Commissioners to give very serious consideration to the overall environmental and economic consequences of NDPC's proposed route through Minnesota's cherished water resources.

FOH believes there is a better way to accommodate the industry's demand for this new pipeline without exposing Minnesota's most sensitive waters to the potential risks inherent with pipeline facilities. Our suggested alternative route or routes would still provide construction jobs and dollars and retain the pipeline tax benefits for the state. These alternative routes would remove the risks to our lakes, rivers, wetlands, wild rice lakes and drinking water sources. These are issues that concern all Minnesotans who spend a great deal of money to be in, on and around water. This is also an issue about drinking water not only for Minnesota's northern communities and residents, but also the millions who reside in the Greater Minneapolis/St.Paul Metro area. For many that drinking water source is the Mississippi River.

Although FOH does not have remotely near the financial resources of Enbridge, through thoughtful, diligent research and many, many volunteer hours, FOH has produced viable testimony substantiating its proposed routes of which we are presenting below. Some of these maps were presented to you during my testimony at your August 7 hearing. (As an aside, thank you for your endurance and patience on what was a very long day for you all. The opportunity was most appreciated by many who spoke.) The maps have been altered to feature the two routes, NDPC's and SA-03, which you approved for inclusion in the CEA plus FOH's preferred route, SA-04.

Please note: these initial maps are to illustrate and compare the three routes to particular environmental features.

Friends of the Headwaters
ROUTE COMPARISON MAP

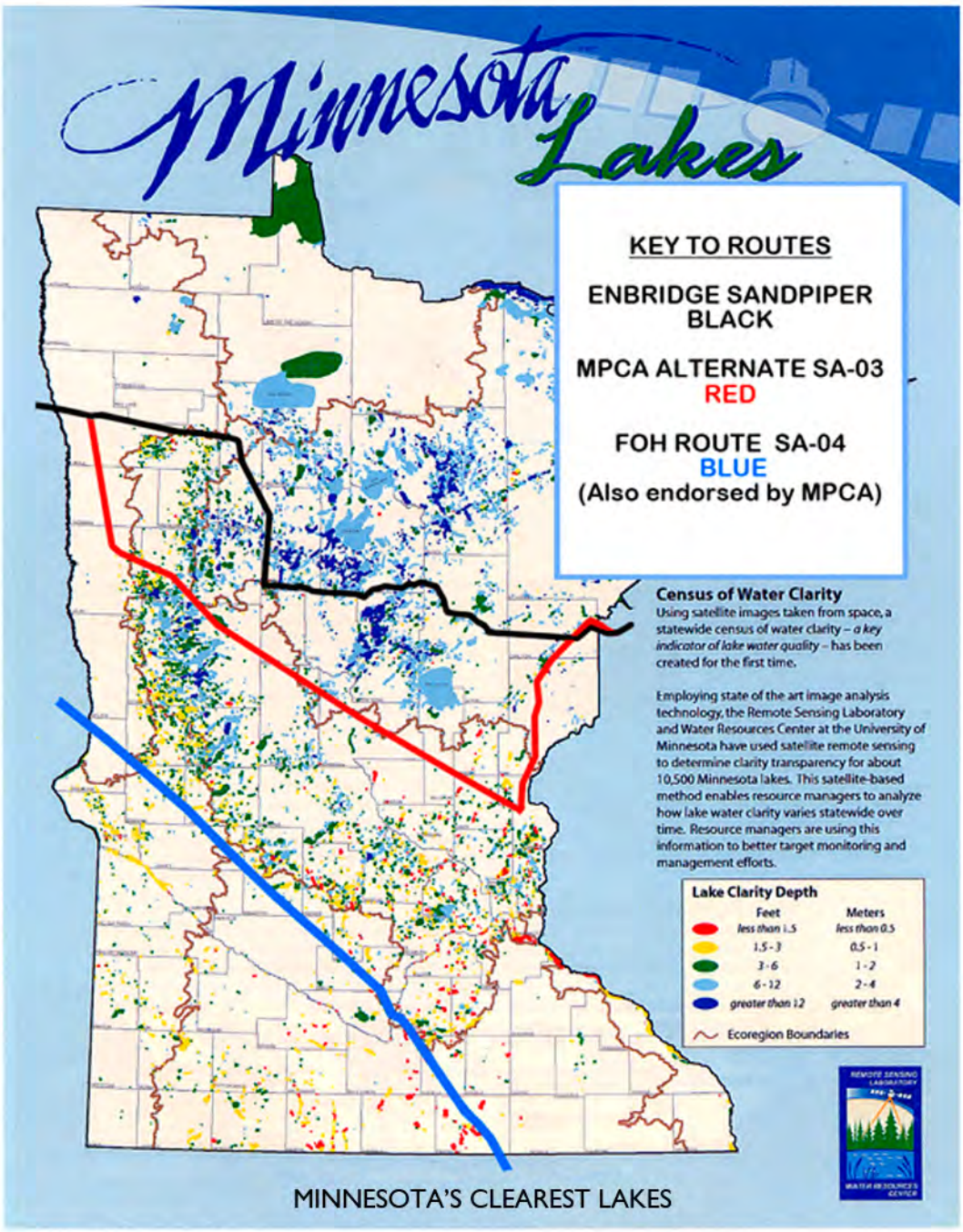

Clear lakes are the key to Minnesota's tourism business.

Fishing alone generates $342 million annually in tax revenue for the state. $4.3 billion in annual retail sales is earned from fishing, hunting and wildlife watching.*
*National Sportfishing Association

For Hubbard County tourism was $99M annually with 60% in June - Aug.
For Crow Wing County it was $150M with 49% in June - Aug.

A tourist dollar is spent by a person with a residence beyond 50 miles of the county.

Note that this study was completed during a recessionary economic period 2007-08. This is the latest study with local and county data.

http://www.exploreminnesota.com/industry-minnesota/research-reports/researchdetails/download.aspx?id=811

Clear lakes mean high lake shore property values which is a key factor in available property taxes to their respective counties.

The Fishhook Watershed in Hubbard County is worth $2 billion alone.

NDPC's proposed route crosses the largest tributary, Hay Creek, to the Fishhook Chain of Lakes, 4700 water acres.

If a large rupture on the order of the Enbridge 1991 Grand Rapids, MN spill (1.7 million gallons) occurs at Hay Creek near the top of that watershed, it would dramatically impact the property values on those lakes resulting in a significant loss of tax revenue to the county, state, Park Rapids and its school district. It will be years before the county recovers from the damage. Not only will it incur the loss of tax revenues, but also the loss of residents, small businesses, tourists, and property values.

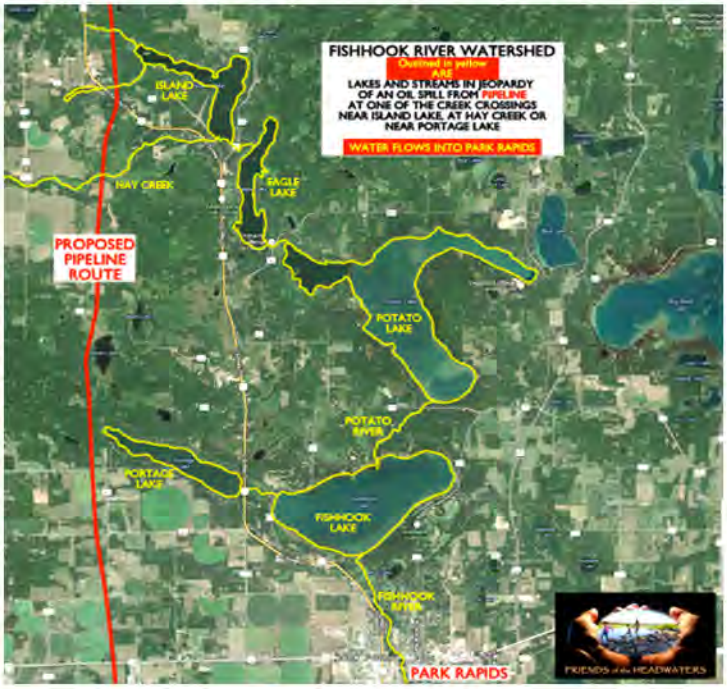

Multiple those property values for the other lake chains along the proposed Sandpiper route. Whitefish, Pine River, Fifty Lakes, Big Sandy, Lake Superior, and others.

Friends of the Headwaters
ROUTE COMPARISON MAP

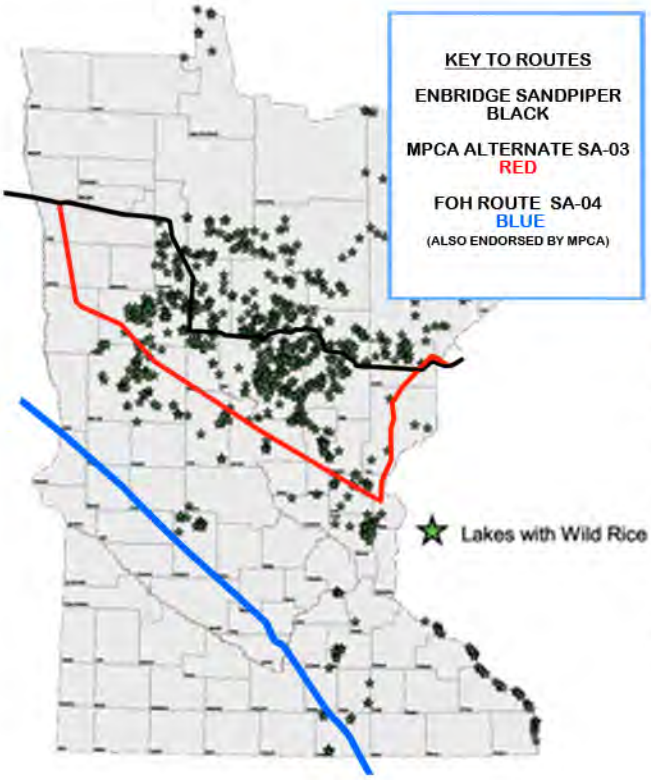

Could Enbridge have picked a worse route for jeopardizing the state's prime wild rice lakes and wetlands?

Wild rice is Minnesota's native grain and a part of our heritage and history. For the Ojibwe Nation it is their culture and identity. To them wild rice is priceless.

Research done during the Polymet Mine hearings showed wild rice to be extremely sensitive to sulfides and sulfates, which are found in most crude oils to varying degrees. Will a proper risk analysis be executed to determine the financial and social damage to the Ojibwe and all MInnesotans from a spill in these wild rice waters? Will that risk assessment also include the potential damage to Minnesota's waterfowl populations which depend on wild rice.

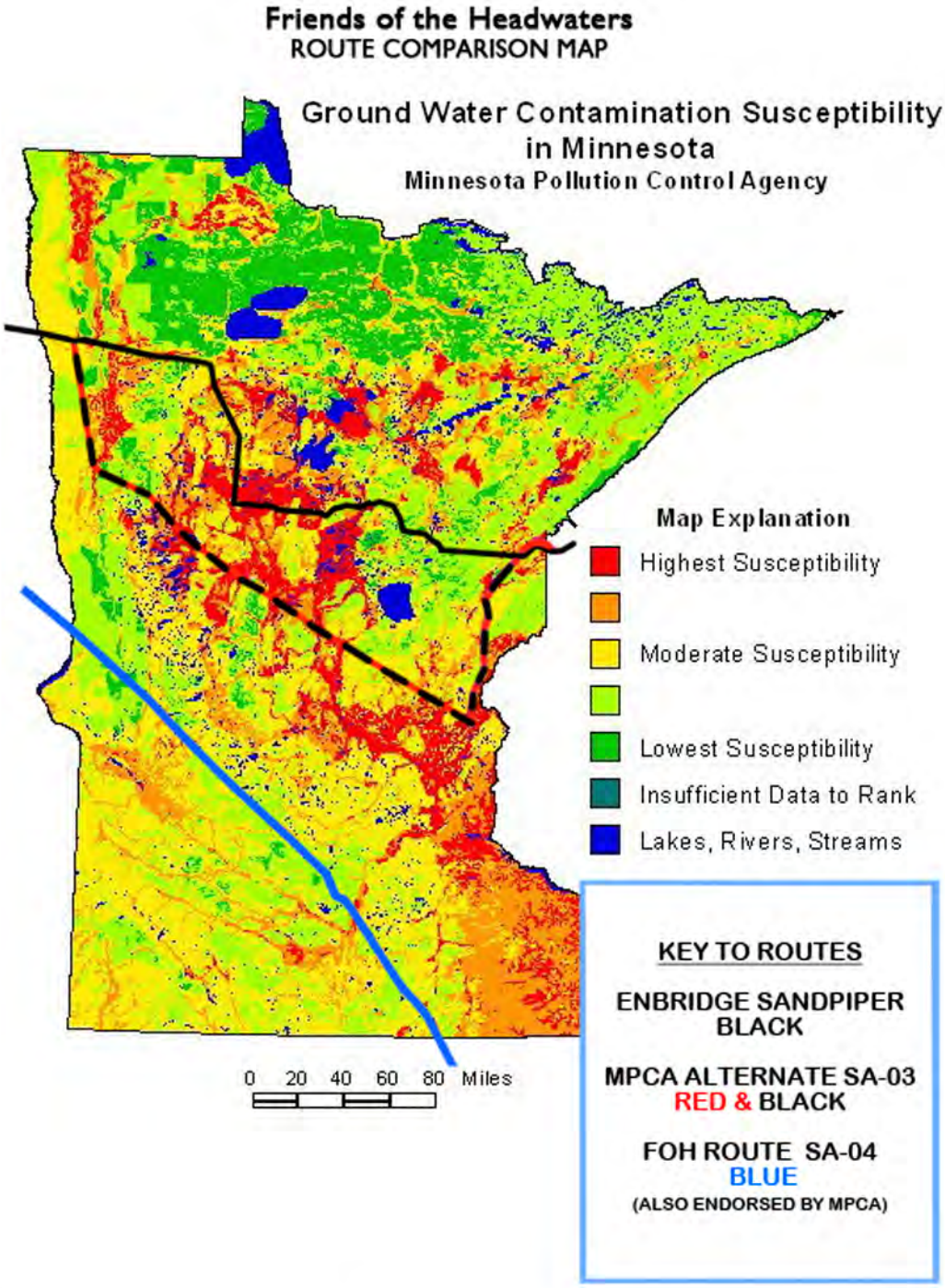

Nothing is more critical than our drinking water sources.

Those bright red areas on the above map, besides being extremely susceptible to contamination, also just happen to be critical aquifers. Besides providing drinking water these aquifers also irrigate thousands of acres of farmland for Minnesota's farmers and the state's agri-business economy.

RDO/Lamb Weston Company in Park Rapids earns $500 million in annual revenue from potatoes. The Straight River aquifer not only grows great potatoes for MacDonald's french fries; it supports the county's largest employer; it supplies all the drinking water for the county seat, Park Rapids and provides clear, cold water for a nationally renowned brown trout stream. All that at that right turn elbow in the Enbridge/NDPC route.

Will the CEA evaluate the full environmental and economic consequences of a spill scenario in the Straight River aquifer? Will it include benzene, naphathalene, toluene in the analysis?

NDPC's proposed route will cross the Mississippi River twice. A spill on the river will expose downriver communities dependent on the river as a drinking water source to a toxic mix of carcinogenic chemicals.

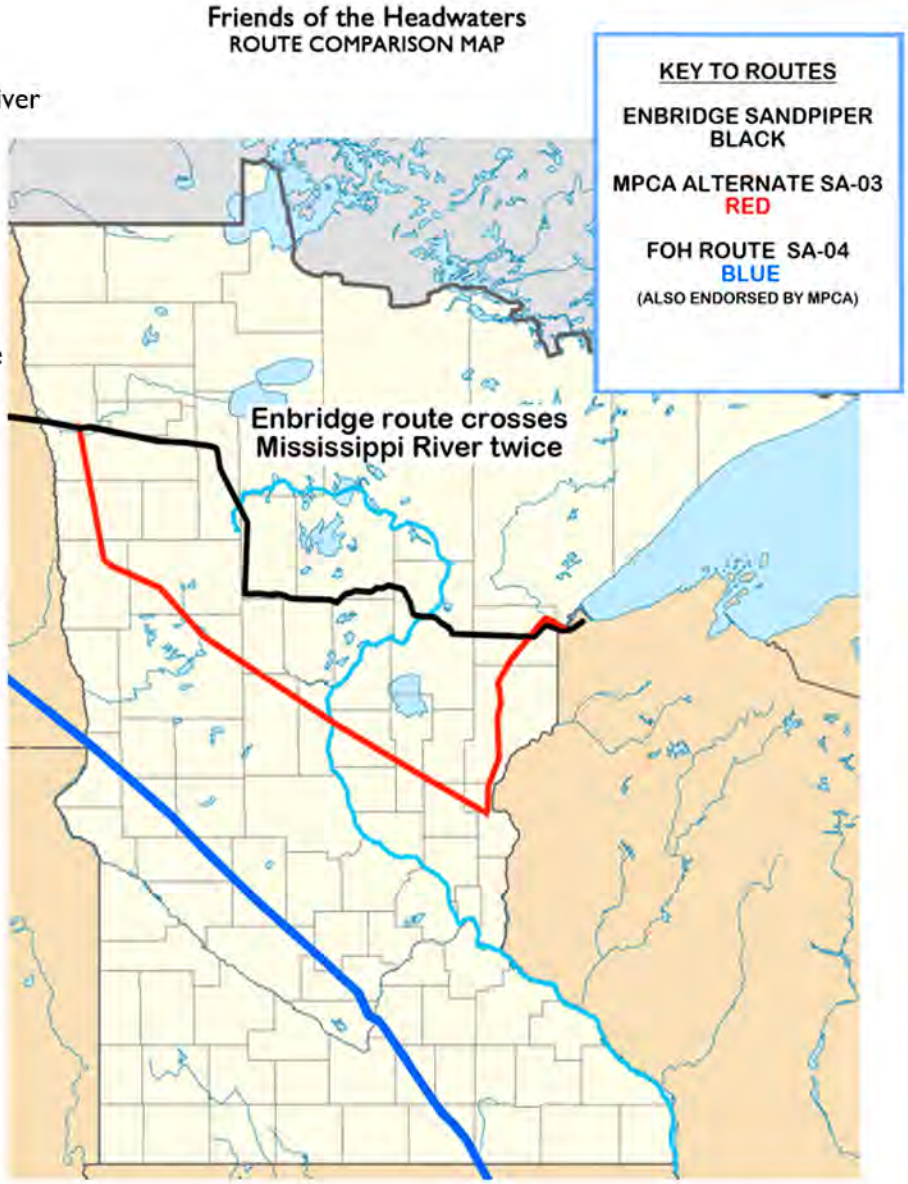

Stan Sattinger, a registered mechanical engineer, provided this information on the risk to drinking water posed by the Alberta Clipper Line 67. Since the larger Line 3 Rebuild is planned to run parallel to the proposed Sandpiper corridor, the info herein on Line 67 should also apply here.

"A study by Professor John Stansbury of the Department of Civil Engineering of the University of Nebraska addressed worst-case spills from the proposed Keystone XL pipeline's crossings of the Missouri and Yellowstone Rivers. He predicted that benzene concentrations at either event would rise to 19 times the Safe Drinking Water Act Maximum Contaminant Level (MCL) for benzene at the spill location, and that concentrations in the plume would remain above the MCL for a distance of 450 miles downstream.

The benzene concentrations for a worst-case spill from the upgraded Line 67 at the town of Ball Club, Minnesota, crossing of the Mississippi River have been calculated using Prof. Stansbury's methods. At the spill location, the concentration would reach 32 times the MCL, and it would remain above the MCL over a distance of 280 miles as the plume travelled downstream. The drinking water intakes for the communities of Grand Rapids, Libby, Aitkin, Brainerd, Royalton, and St. Cloud would be affected. Serious health risks would be created for tens of thousands of Minnesota residents, and aquatic habitats and recreational activities would be compromised. Other chemical constituents from the spill would pose additional risks to humans and to aquatic species in the river.

This kind of analysis is not mandated by Section 7853.0620 Subpart 1, Point discharges to water, or any other section of Minnesota Rules, but I believe that it should be. This increased risk to drinking water supplies in Minnesota is a risk that should not be taken."

Note: his Mississippi River crossing point (Ball Club, west of Grand Rapids) is much farther upstream than the second proposed Sandpiper/Line 3 Rebuild/Mississippi River crossing point. A benzene spill on the river would pose a greater risk to drinking water supplies due to closer proximity to downstream communities including the Greater Minneapolis/St. Paul metropolitan region.

The first crossing point is a few miles downstream of our oldest state park, Itasca, home to the headwaters of the river. At that crossing the daily pipeline volume, 375,000 BPD or 15.750,000 gallons per day, will exceed the average daily volume of the young river by fourfold.

Enbridge proposed route has high risk potential for the headwaters of three major watersheds, Red River of the North, Lake Superior and the Mississippi plus exposure to the St. Croix National Wild and Scenic River watershed.

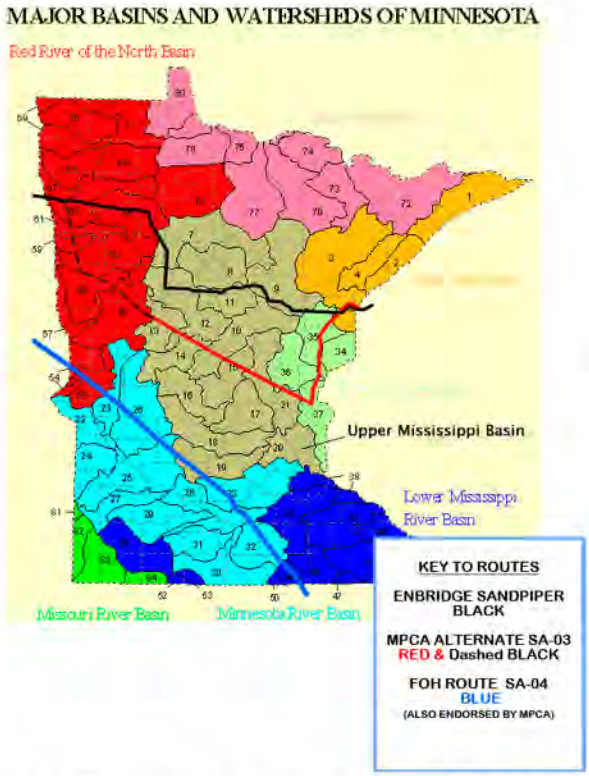

The MPCA listed 28 stream crossings along the Enbridge/NDPC Sandpiper route that if a spill or rupture were to occur, emergency response crews would not be able to access within 2000 ft of the crossing.

All pipelines leak eventually. While conducting a complete EIS for the Pebble Mine near Bristol Bay, Alaska, the EPA examined the history of pipeline spills relative to the age and mileage of all pipelines.They determined that every pipeline will leak at least once every 30 years over every 30 miles of length. Not surprising the history of Enbridge spills along their northern corridor in Minnesota fits that profile quite well. To quote from a 2003 MPCA report to the NTSB: "nearly three dozen non-third-party spills, leaks or ruptures on just one Enbridge 34 inch line between 1972 and 2003. About 87% of the petroleum gallons spilled from all Minnesota pipelines in the period 1991 to 2002 was from that Enbridge line. This is equal to about 48% of the reported gallons of petroleum spilled from all sources in Minnesota during that period. Included in the Enbridge 34 inch line spills are the 1.7 million gallon rupture in 1991 in Grand Rapids and the 250,000 gallon rupture on July 4, 2002 in Cohasset. 300,000 gallons of the Grand Rapids spilled flowed to a river. Luck with the timing of the spill and river ice conditions kept thousands of gallons of crude from entering the Mississippi River. Oil in the Mississippi would likely have fouled the St. Cloud, St. Paul, and Minneapolis drinking water intakes for months. Likewise the Cohasset spill could have easily entered the Mississippi River if it had happened in a different segment of that 34 inch pipeline."

How much higher are the construction costs of multiple bores under rivers and streams? What are the contingency plans and costs for controlling "frackouts" in stream beds during a bore. *Friends of the Headwaters* has learned a "frackout" occurred on nearly every stream or river bore during this area's last pipeline construction project in 2007. What are the costs and issues for winter construction of wetland areas along the route? How do the company and clean-up agencies access those wetlands areas in non-winter seasons if and when a leak/spill/rupture occurs? What are the economic consequences of summer construction and congestion issues with roads and traffic? How will availability of lodging not just for construction crews but also for tourists be affected. How will the compatibility of construction workers be with tourists, residents and local businesses. How trustworthy and reliable will these workers be with respect to property and paying for services. Some resort owners have informed *Friends of the Headwaters* they will not provide lodging for pipeline workers due to previous pipeline worker negative experiences. Will Enbridge/NDPC be financially responsible for covering damages or lost income from disreputable and irresponsible workers? *Friends of the Headwaters* believes only a properly executed EIS will provide the comprehensive assessment for the above scenarios.

The Class V Sensitivity map regards soils especially sensitive to the discharge of petroleum based materials. Compare those 'sensitive' areas along the Sandpiper route to the similar bright red areas indicated on the "Soils susceptible to ground water contamination" map.

The second soils map illustrates various soil types. The dark green area consists of mollisols, the soil order with lower infiltration rates. FOH's SA-04 traverses the lowest risk soils to infiltration, the migration and contamination of oil spill effluents.

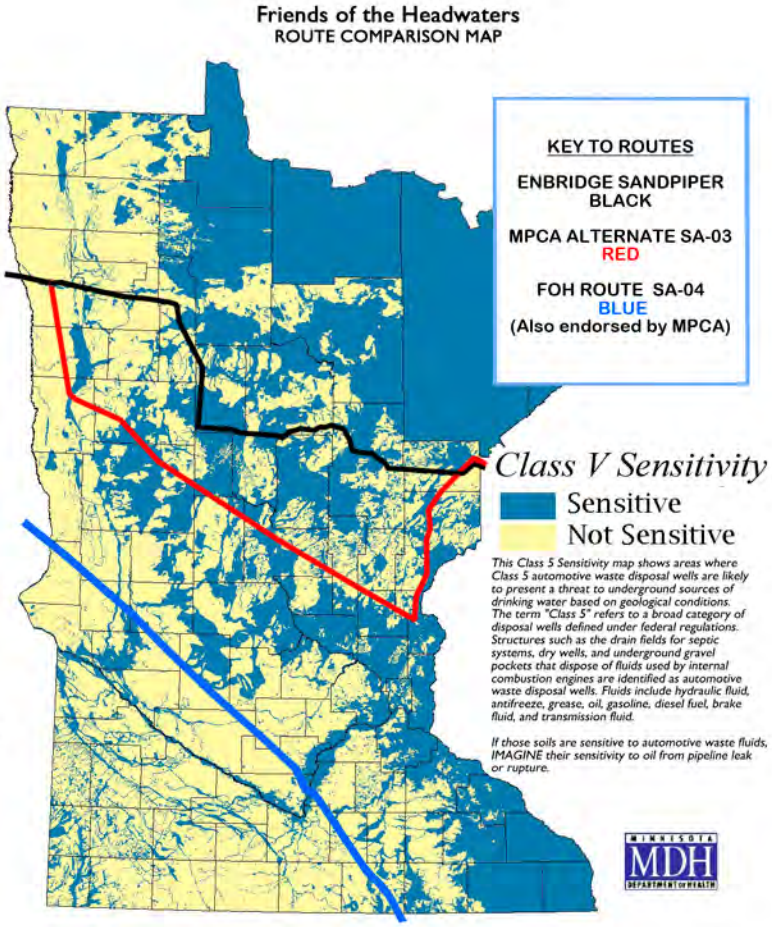

Note: Enbridge's Mark Curwin, Senior Director for Strategic Coordination of Major Project Executions in the US, stated their construction preference is to build pipelines across farmland.

He made these remarks at a public meeting in Park Rapids on Jan. 29, 2014.

Mr. Curwin gave the reasons
of better soils,
easier construction,
easier access,
less natural habitat destruction,
cheaper and quicker.

After construction the farmland can be put back into crop production.

Access to leaks and spills is much easier.

Winter wetland construction would be at a minimum.

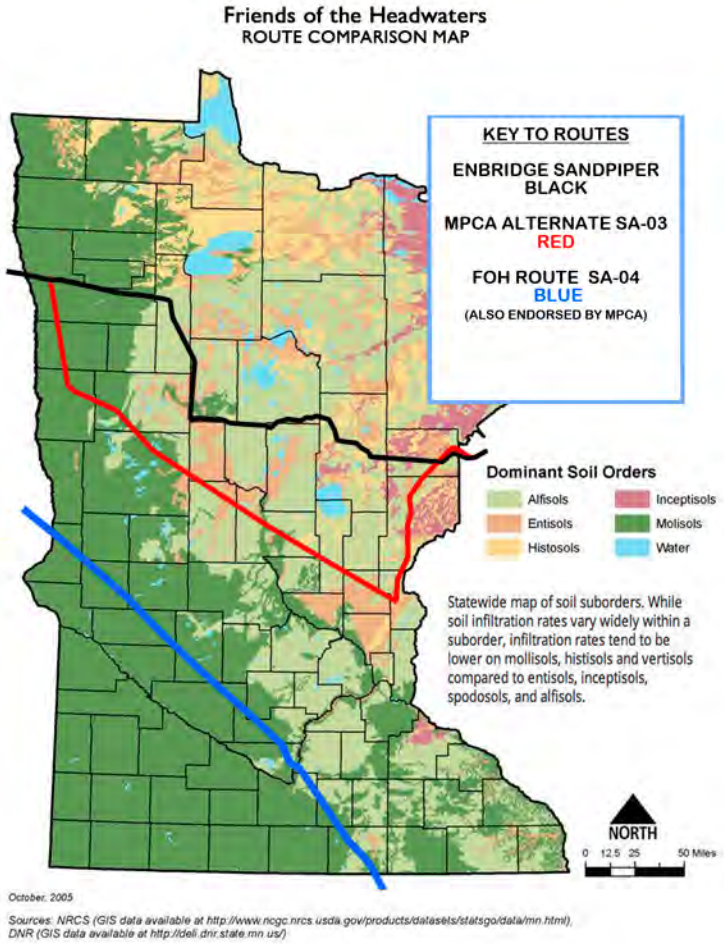

Should the state be sacrificing its natural resources to a new energy corridor when an existing corridor, the Enbridge/Alliance natural gas pipeline corridor, is already available and crosses the state at its lowest risk point to the environment and economy.

The MPCA conducted a comparative environmental analysis of the proposed routes (SA-01 to SA-08) listed on the DOC EERA's map . A high score was least damaging to the environment, a low score the most damaging.

FOH's SA-04 scored the highest,

Enbridge Sandpiper - the lowest.

AT RISK: MINNESOTA'S

CLEAREST AND CLEANEST LAKES
GROUND WATER AQUIFERS
WILD RICE LAKES
WETLANDS
MOST SENSITIVE SOILS TO SPILLS
DIVERSITY OF VEGETATION
SENSITIVE ECOLOGICAL ZONES
THE LAKE SUPERIOR BASIN
HIGH VALUE RECREATIONAL AND RESIDENTIAL WATERS

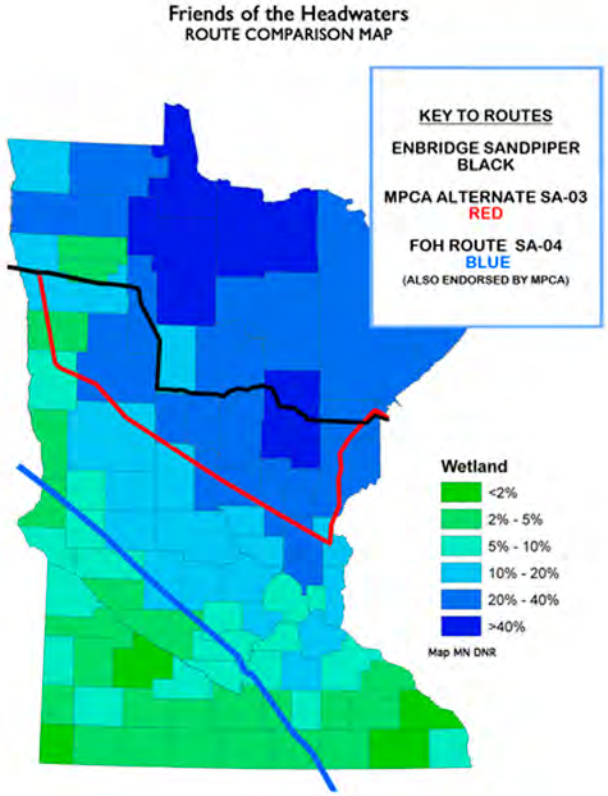

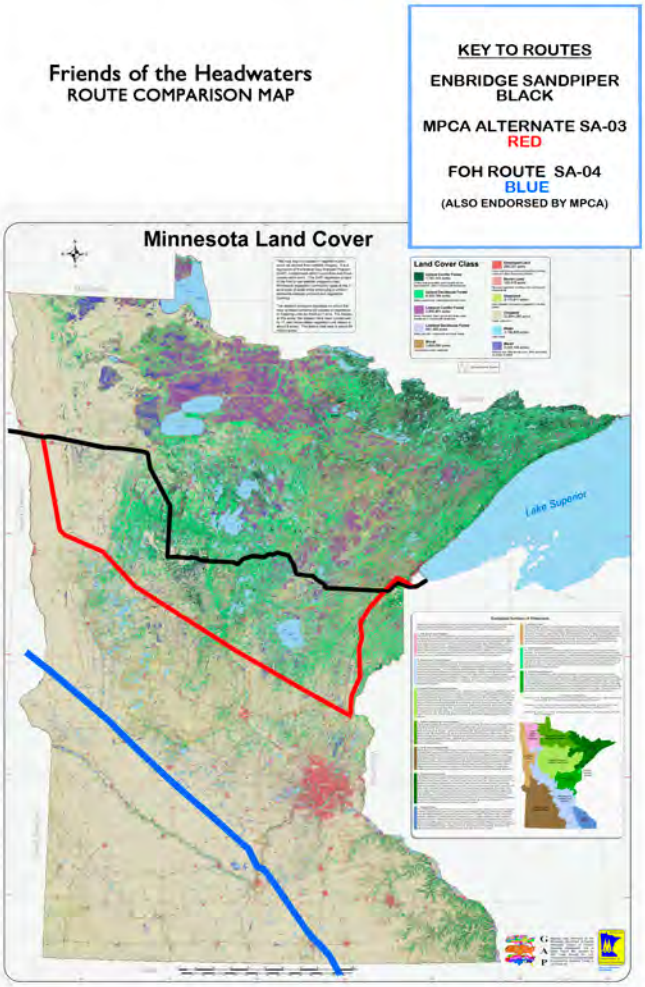

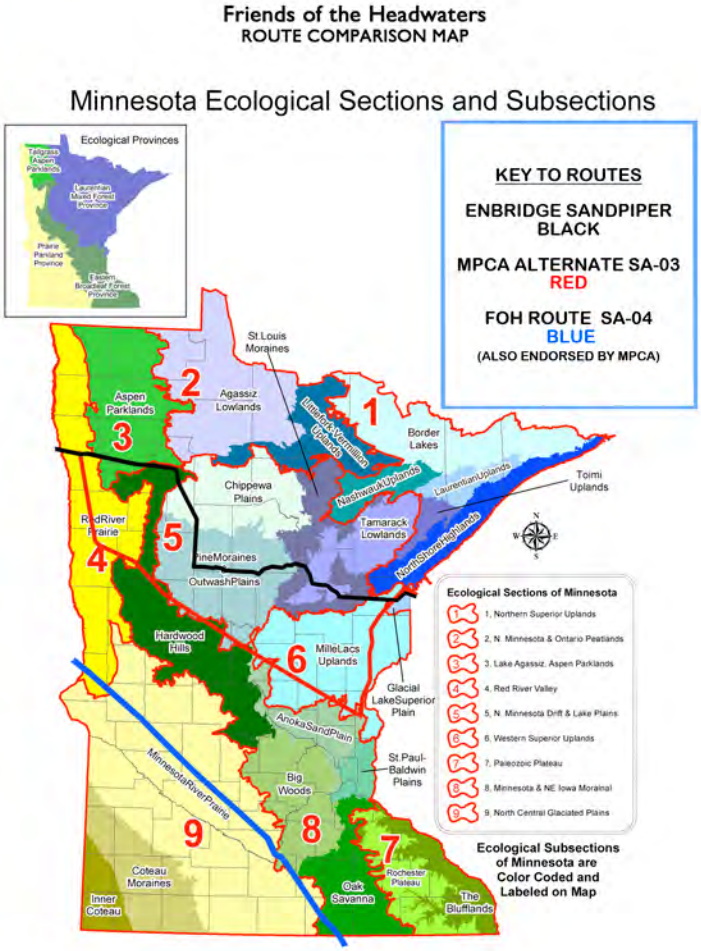

As illustrated above the risks to Minnesota's environment and especially its valuable and critical northern water resources and water-based economy are too great. Why is the state sacrificing these waters for so little gain when so much is at risk. Most of the oil traversing the state is traveling elsewhere. Now that a mostly new pipeline corridor is being proposed by Enbridge, a company with less than a stellar record, it is time for the state to slow down and strongly consider all the factors as to where this pipeline should be located. And as previously stated, the company's intention is to apply to the state for a permit next year to build another larger pipeline, the Line 3 Rebuild, next to the Sandpiper pipeline.

FOH proposes the state reject the company's requested route and consider the following option:
Move the Sandpiper proposed transfer station scheduled to be built near Clearbrook, but not at its current Clearbrook plant, west towards Crookston where the Sandpiper pipeline intersects the Viking natural gas pipeline corridor OR move the transfer station to North Dakota where the Sandpiper intersects the Magellan oil pipeline corridor. From either of those locations the Sandpiper can turn south along those existing corridors and connect to SA-04. SA-04 in its entirety connects to an existing Enbridge facility in Flanagon, IL. From Flanagon, oil can be moved on the Enbridge system either east to Canada or south to the Gulf, both of which are supply points Enbridge says they must meet. If it is necessary to meet an obligation to MinnCan and the Flint Hills Refinery in the south Metro, Enbridge can use the abandoned MinnCan Wood River pipeline to move oil north to Flint Hills. The Wood River line runs between Minneapolis and Missouri.

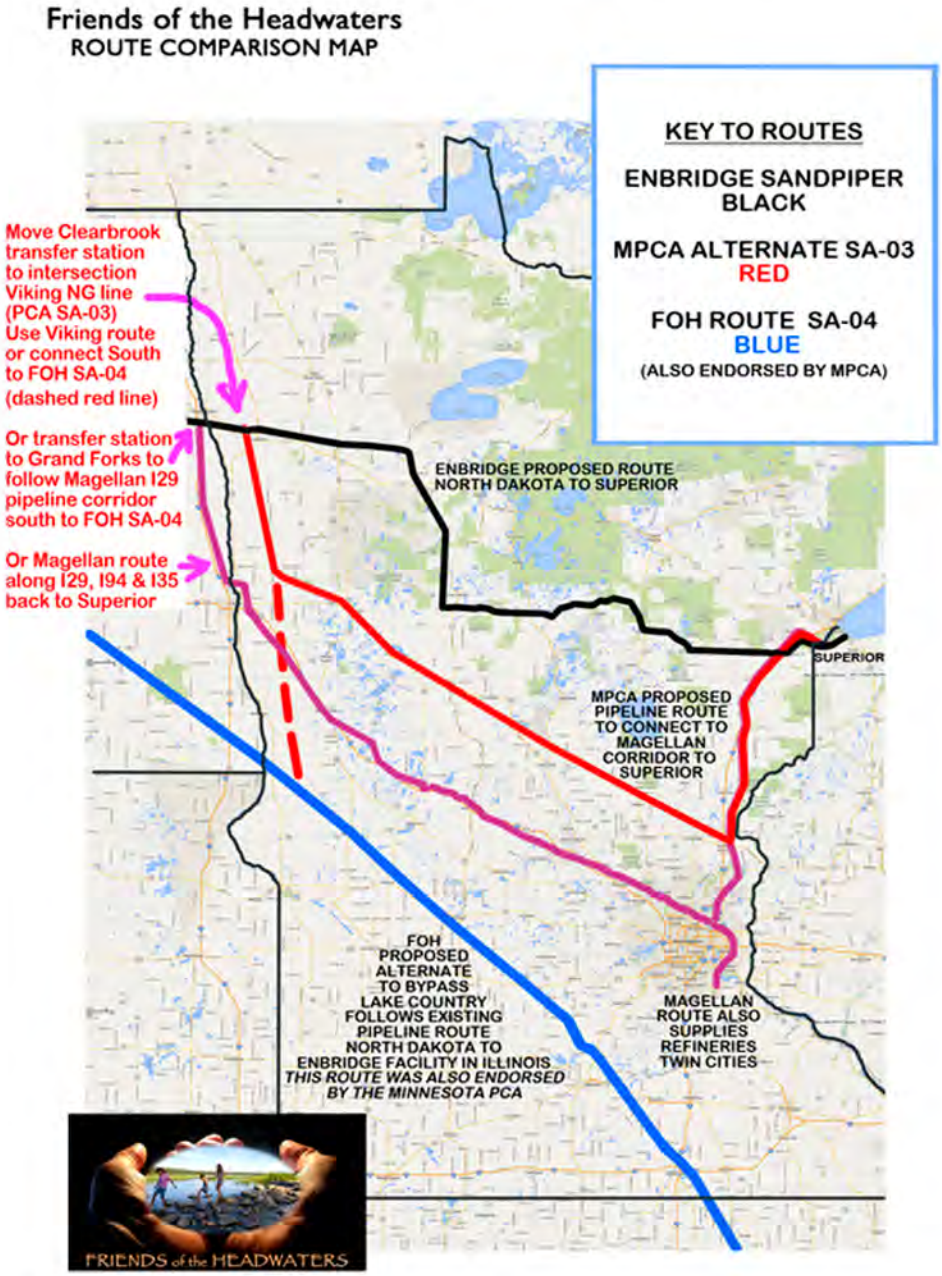

Two additional maps by Bob Merritt, hydrologist, showing FOH SA-04 in better detail.

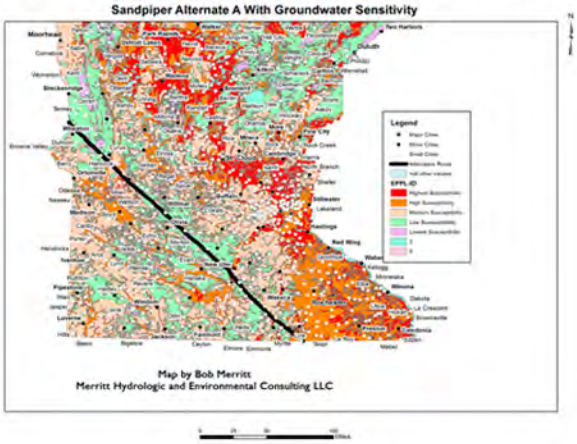

Minnesota still gets to keep jobs the construction will provide as well as North Dakota plus Iowa and Illinois.

Although the route does not end in Superior, it still ties into the existing Enbridge system in Illinois with routing options to Michigan and Ontario that avoid our greatest freshwater lakes of Lake Superior and the Mackinac Straits of Lakes Michigan and Huron.

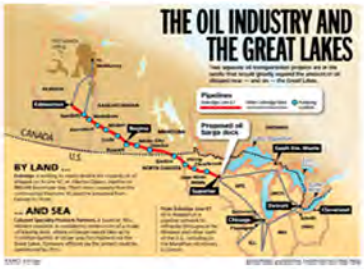

Since it's an existing corridor the company should have access to the mapping previously done for the pipeline already there. FOH SA-04 also intersects pipelines in southern Minnesota owned and operated by other companies which provide the option of re-routing Bakken crude to the refineries in Rosemont and Saint Paul Park in the south Twin Cities Metro.

The Illinois Hub also allows Enbridge access to its pipelines to Oklahoma and points south.

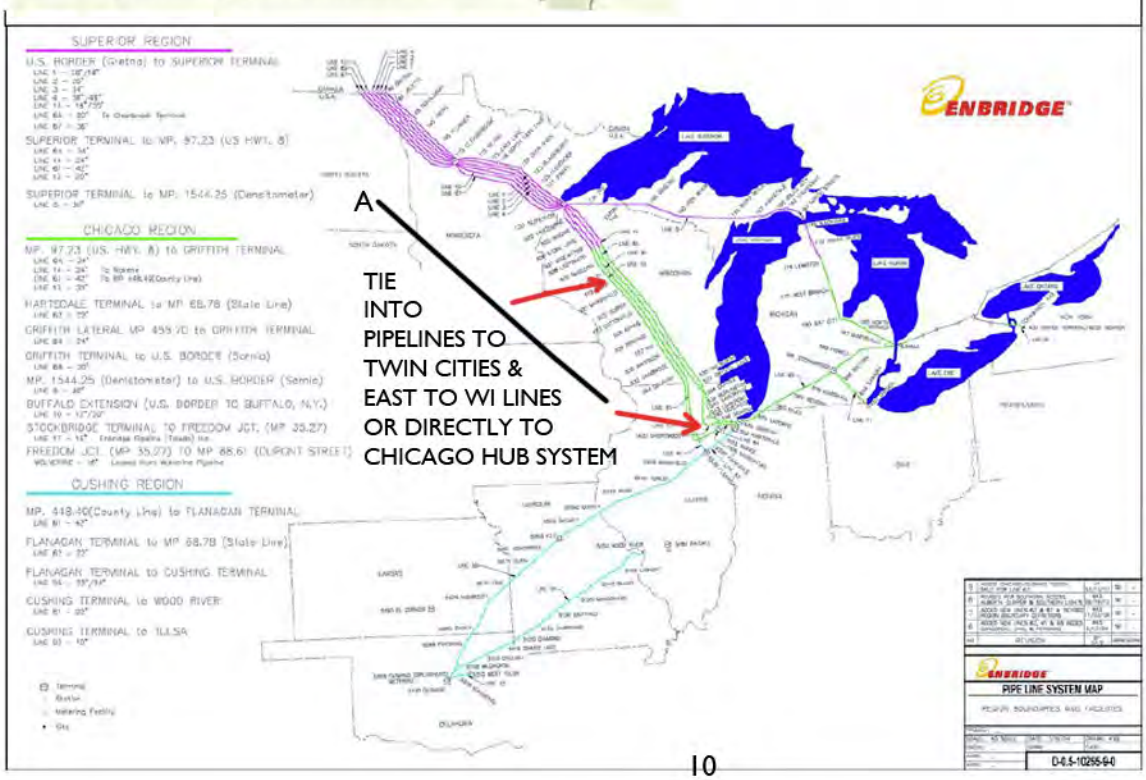

The *FRIENDS of the HEADWATERS* disputes Enbridge/NDPC's contention that the Sandpiper must end in Superior, Wisconsin. Enbridge has provided no rationale for the route ending in Superior other than "We want it. It connects to our existing system in Superior." The Alternate Route SA-04 proposed by *FRIENDS of the HEADWATERS* also connects to their existing system hub near Chicago, Illinois. It does not prevent Enbridge from then transporting the Bakken crude either south to Oklahoma and the Gulf Coast nor across Illinois, Indiana, Michigan and across the border to Sarnia, Ontario, Canada on their existing system.

Figure 7853.0510-2
Pipeline System Map

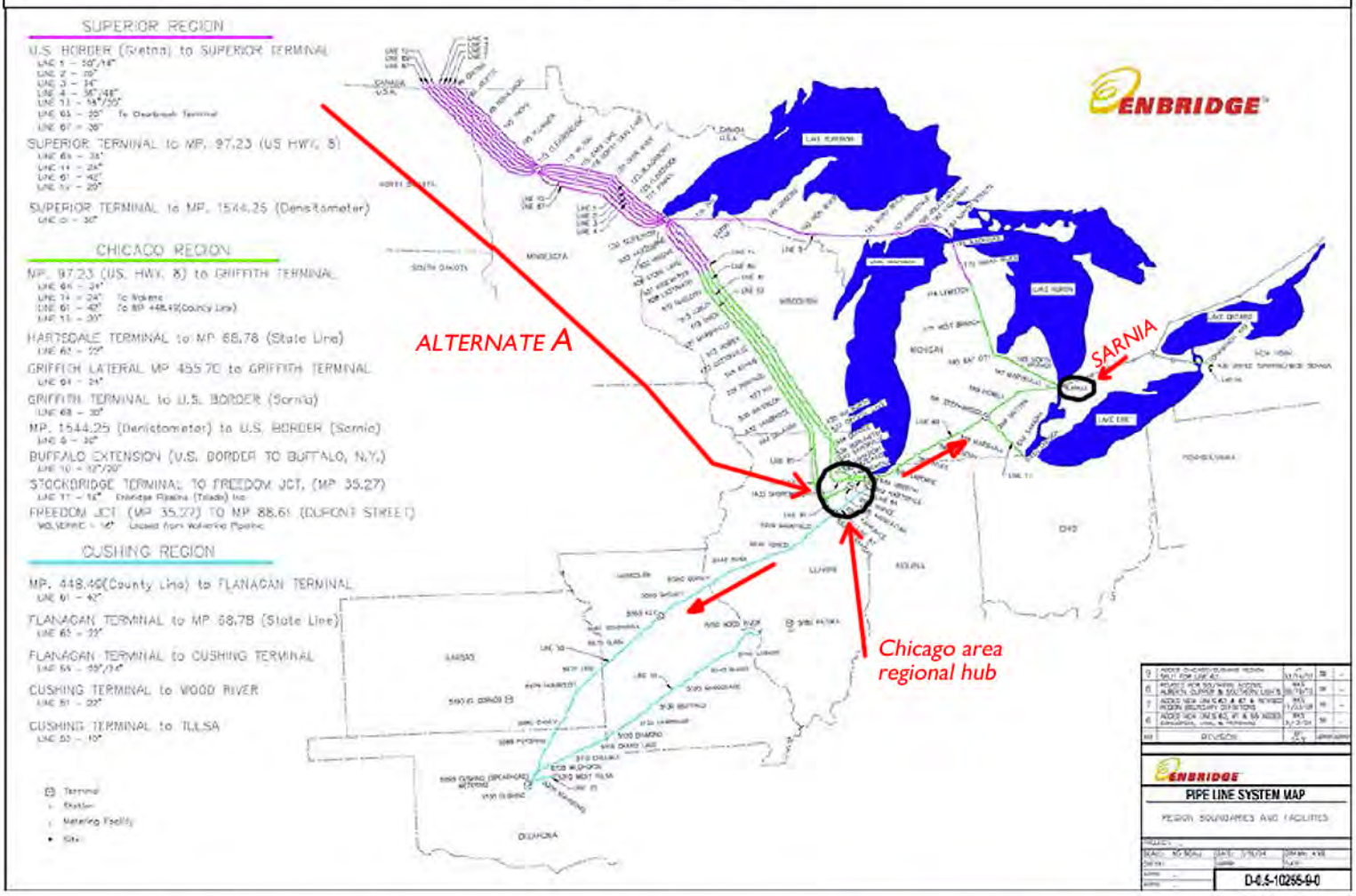

FOH SA-04 already fits into their existing pipeline corridor system as evidenced by the map at right. Alternate Route A also appears to be a more direct route from the North Dakota Bakken Oil Fields to the primary energy markets of the US Midwest.

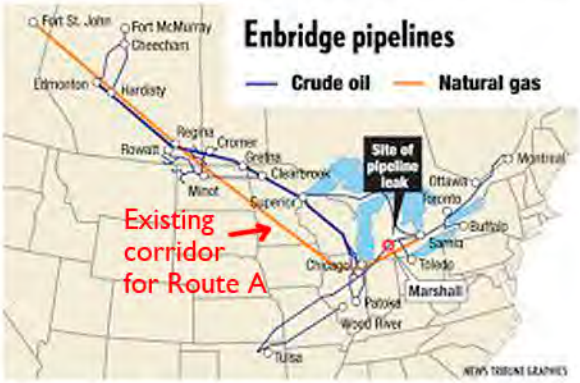

Friends of the Headwaters believes the citizens of Minnesota have the right to determine the route parameters of this pipeline corridor, not Enbridge/NDPC. The considerations of the Sandpiper pipeline and the Line 3 Rebuild proposed to run alongside the Sandpiper should not be dictated to the citizens of Minnesota by the company. The company already has too many pipelines crossing Minnesota's most valuable waters and lands.
The cumulative risk of adding additional lines to this region is too high to have the routing parameters set by what Enbridge 'wants'. They should not be allowed to frame the debate on this issue. The citizens of Minnesota and this state's governing and regulatory agencies need to reject this framing by Enbridge/NDPC

and reframe the discussion regarding the need and route of the proposed Sandpiper pipeline as what is beneficial to Minnesota, its people, its communities and its natural resources. Until Enbridge/NDPC adequately provides a detailed explanation for demanding why the Sandpiper pipeline must end in Superior, Wisconsin, *Friends of the Headwaters* believes all alternative routes must be given full consideration, even those proposing a system overhaul of how and where Enbridge wants to cross the state.

If Enbridge/NDPC were truly committed to protecting our lakes, rivers, wetlands, aquifers and lands as they publically state they are, then prove it by not just giving Minnesotans statistics about how safe their pipelines are (their history says otherwise), but by actually moving their proposed route to the lowest risk part of the state as portrayed on the previously presented illustrated maps.

Costs should not be a factor. After all, once the Sandpiper is constructed, 375,000 barrels of oil will pass through it daily. At the current world price for a barrel of oil that amounts to $40 million dollars per day or $14.6 billion dollars annually. Even though Enbridge is charging a fee to move the amount of oil, it should not take too many years to recoup their construction costs. Plus it appears from the map below the company has plans to expand the pipeline system through Wisconsin. The money allocated for that extension could easily be applied to the extra construction costs of building Alternate Route A.

Since the company is adamant about Superior as a destination for the Bakken crude, perhaps this proposed extension in Wisconsin could be used to move the oil from the end of FOH SA-04 back north to Superior.

Enbridge has ambitious expansion plans not just in Minnesota but nationally it appears.

If their intensions are to expand rapidly towards the southern U.S. Alternative Route A would conform to those expansion plans more directly than their current proposed Sandpiper corridor.

In summary the *FRIENDS of the HEADWATERS* opposes the Enbridge/NDPC Sandpiper Pipeline route proposal as marked on the map below. What does it say about a company that would neglect to feature the state's most famous river, the Mississippi, on their proposed route map? Perhaps this is evidence of their true concern for Minnesota's valuable and cherished water resources.

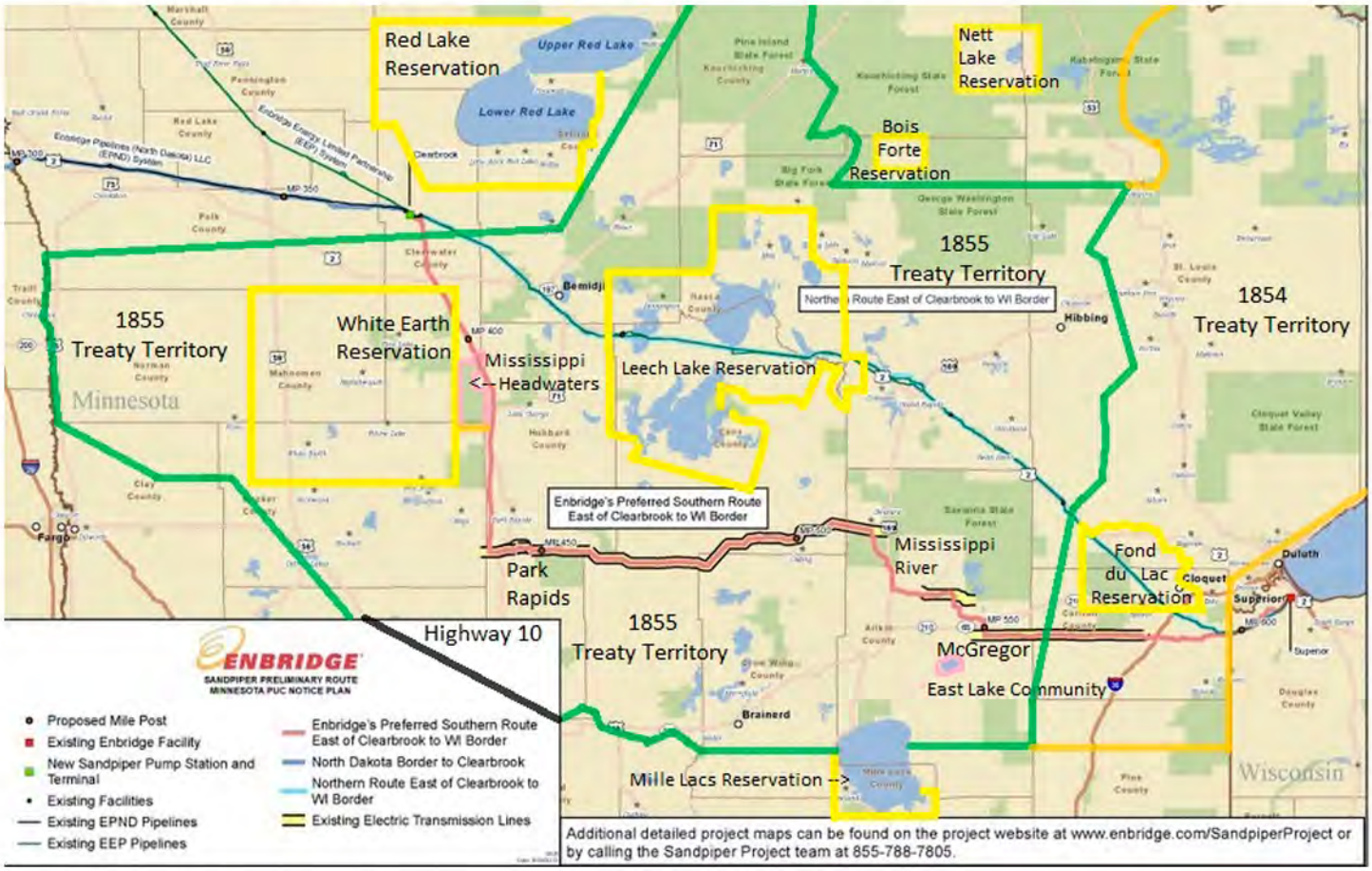

Enbridge already has too large a footprint across Minnesota's Headwaters Country.

Too much is at risk, not only with the state's clearest lakes; ground water aquifers; fish and wildlife; wild rice; lake and riverfront homes, businesses, and communities; tourism industry; lands and forests; but there's also Lake Superior.

Does Enbridge's insistence on the pipeline ending at Superior portend a future of shipping oil on the Great Lakes? Ironic that a ship icon just happens to be on the adjacent map.

The people of Minnesota should not allow a Canadian corporation with its North Dakota Pipeline Company US subsidiary to dictate the terms of this project.

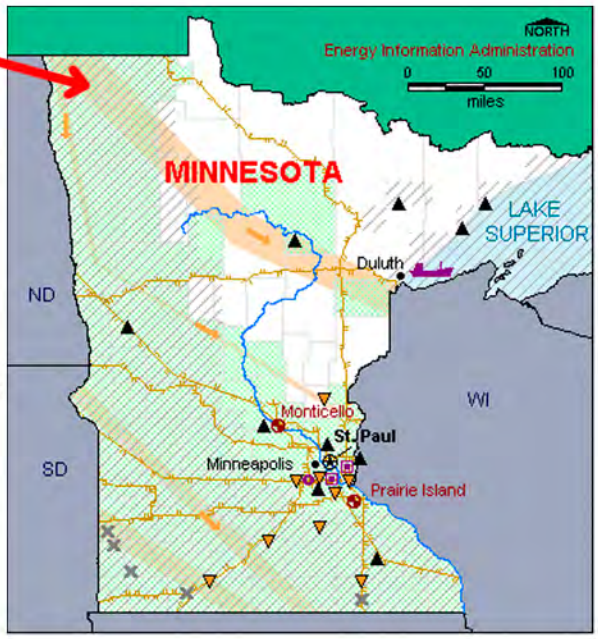

A project of this magnitude as planned through the heart of *"The Land of 10,000 Lakes"* must conform to the standards prescribed in MEPA.

"No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct."

Friends of the Headwaters does not believe this proposed multiple pipeline corridor with the Sandpiper and now Line 3 Rebuild can meet the high standards set above for quality, safety and sustainability of the lands and especially waters along the route.

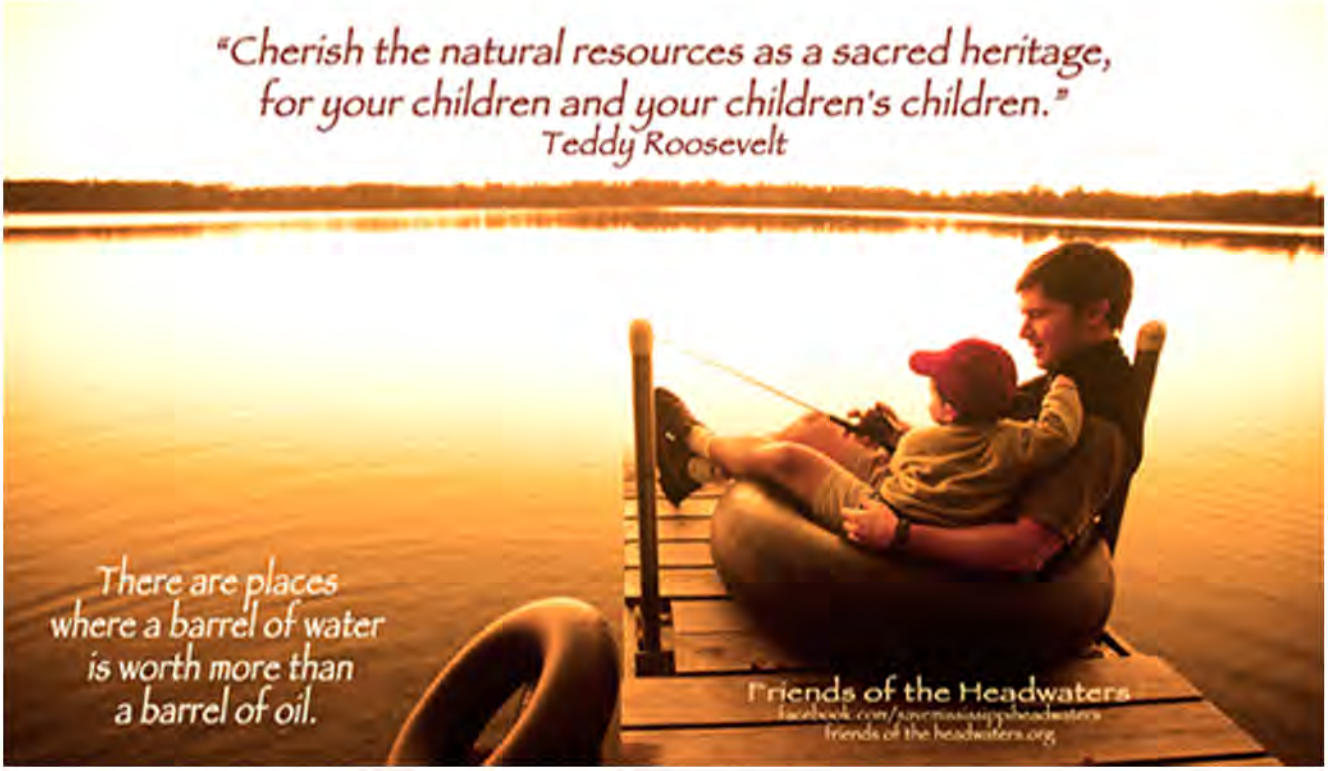

Thank you for your attention and consideration.

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENTS "J"

J-1 FOH 5.12.15 Line 3 Comments L3 Application
J-2 FOH 9.30.15 Line 3 Public Comments

All Friends of the Headwaters documents and maps submitted to the Minnesota Department of Commerce for the respective Public Comment periods for the proposed Line 3 Enlargement and Relocation Pipeline project

May 12, 2015

Scott Eck
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

Re: Comment on the completeness of the applications of Enbridge Energy for a Certificate of Need (CN, PUC Docket Number: PL-9/CN-14-916) and Pipeline Route Permit (PRP, PL-9/PPL-15-137

Dear Mr. Eck:

Friends of the Headwaters (FOH) requested an extension of the comment deadline for this project (See attached letter). The public notice was issued on April 28, 2015, and the initial comment period closes today, May 12, 2015. This allowed only two weeks for comment, which is insufficient time to comment on this complicated, huge, and potentially damaging project. We submit these comments anticipating that this request may not be granted by the May 12 deadline.

We wish to emphasize in the strongest terms that the two Enbridge projects must be addressed together according to many numerous state and federal laws. Enbridge proposes to locate these lines only 25 feet apart for most of the routes. The lines, if authorized, will be constructed in the same time frame, and will affect 10,000 or more acres of highly significant and water rich landscapes. Because everything FOH submitted relating to Sandpiper applies equally to this proposal, we are incorporating by reference our testimony submitted during the contested case hearings on the Sandpiper project.

The applications are not complete. In addition, the public notice is too restrictive in its lists of subjects that are open for comment. FOH recommends that the PUC itself determine the scope of topics open to comment given the uniqueness of this situation, and the weight given to the Enbridge applications in subsequent proceedings. Specific points supporting this contention are included in our comments. If you have any questions, please reply.

Sincerely,

Richard Smith
Friends of the Headwaters
P.O. Box 583, Park Rapids, MN 56470
218-699-3737

Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

Dear Honorable Commissioners,

Friends of the Headwaters
May 12, 2015
Comments on the completeness of the applications of Enbridge Energy for a Certificate of Need (CN, PUC Docket Number: PL-9/CN-14-916)
Pipeline Route Permit (PRP, PL-9/PPL-15-137)

INTRODUCTION

With its initial filing, Enbridge presumes and expects the Commission to assume that this is business as usual. That, really, the Commission and the public will consider Line 3 as just a housekeeping detail, will find the application to be complete and will treat it as a simple administrative matter. Under business as usual, a couple of weeks to scan thousands of pages of application material, is just fine. That's how it has always been done, after all.

For Enbridge, business as usual, has worked well. Until Sandpiper, it received the approvals it wanted when it wanted them. And Enbridge has continued to make public statements full of confidence that, even with the minor inconveniences of the Commission's actions in Sandpiper, things will of course go their way in the end. Business as usual has allowed Enbridge to construct pipelines in Minnesota without having to obey the environmental law or policy that other companies obey, because such laws didn't exist when the original Line 3 was built. Enbridge built facilities associated with the pipelines where they wanted to, and then snapped a chalk line (with minor deviations) to get the shortest distance between those facilities in Clearbrook and Superior – a perfectly reasonable corporate cost containment strategy, but terrible environmental policy.

The real world and the Commission's experience with the Sandpiper request tell us that business as usual leaves Minnesota exposed to unreasonable environmental risks, bad environmental policy and, perhaps, a ruinous financial burden if there is a substantial pipeline failure, like that of Kalamazoo, Michigan. But real world also tells us that the Bakken oil fields and Alberta tar sands happened, that modern environmental policy and laws happened, and that public participation happened – people who want to be involved in government processes and decisions that will intimately affect their lives and their property for decades.

At this very preliminary stage, the Commission can inform Enbridge that it, like all the other companies doing business in Minnesota, must enter the modern era of accountability, good corporate citizenship and responsible environmental stewardship.

I. OBJECTION TO THE PORTRAYAL OF THE PROJECT IN THE PUBLIC NOTICE.

The public notice states that the topics open for comment are whether the CN and PRP contains information required by the CN and PRP rules, and whether there are contested issues of fact with respect to the representations made in the applications.

Enbridge has named this project the "Line 3 Pipeline Replacement Project," and describes it as being a "safety and integrity project" that would minimize "impacts to landowners and the environment." Such language is misleading since Line 3 simply is not just being "replaced."

In fact, this project is a new pipeline in a largely new location that is over 10 percent larger than the existing pipeline—which Enbridge proposes to leave in the ground instead of replacing it.

II. THE MINNESOTA ENVIRONMENTAL POLICY ACT (MEPA) APPLIES TO THE PROPOSED PROJECT

MEPA applies to large projects proposed in environmentally sensitive areas “where there is potential for significant environmental effects.” (116D.04, Subd. 2a).

II. A. The Minnesota Environmental Policy Act (MEPA).

There is only one topic in the pipeline laws and regulations that specifically concern superseding some MEPA requirements. That topic involves the Comparative Environmental Assessment in the route permit process. Law and rule say that this document suffices for an Environmental Impact Statement. Content regarding impact analysis, scope of the analysis, need for objective review, purpose of the environmental review, applicability of Subd. 6 of MEPA and so forth is not affected. Nothing in the pipeline law and rules says that the quality and depth of the environmental analysis for a large pipeline project should be anything less than for any other large project. State agencies must also analyze the need for and impacts of large projects independent of the applicant's analysis.

In other words, pipeline law and regulation do not trump other environmental review laws and regulations; rather, they work in tandem. Therefore, the specific requirements for content of applications for a CNA and PRP regarding environmental topics must be read in light of MEPA requirements.

MEPA fully applies to the CNA. Therefore, FOH recommends an EIS be accomplished for this project for the CNA and that the route permit be held in abeyance until it is completed. This recommendation is based on the large size of the project, the potential for significant impacts identified during the Sandpiper review process by the DNR, PCA, and other environmental experts, the problematic location of the project, and the proposed location next to the Sandpiper.

The applications should be either deemed incomplete or put on hold pending progress on the EIS. As noted in Section III, an option for the PUC is to re-notice the filing of the applications with an added request for provide scoping comments in preparation of an EIS for the project.

II.B. The proposed Line 3 project is a new pipeline.

In both the CNA and PRP, Enbridge prominently refers to a "replacement… and integrity and maintenance" project. Such statements are immaterial with respect to potential impacts of the project, which are dependent on project size and location. Most of Line 3's proposed route is a new location in Minnesota. It is also larger than the current pipeline.

Furthermore, as noted below in VI.A., the project has two more purposes beyond being an "integrity and maintenance" project. Enbridge is attempting to downplay the project by using labels such as "maintenance" which suggest less rigorous review than would be applied to new projects.

II.C. Project size, location, and potential consequences guide the depth, quality, and independence of environmental analysis.

The larger the project the more intense scrutiny it must receive, according to MEPA, MEQB guidance documents, agency practices, and a long history of applying the law to large, complex and potentially damaging projects. Unfortunately, specific pipeline regulations have not caught up with this long and well established body of policy and law. However, silence in the rules cannot mean that very large projects—such as the Line 3 proposal—are treated as if they are small projects. This is a $2.1 billion project in Minnesota, potentially affecting thousands of acres, that is proposed to be located in a sensitive and controversial location. Pipeline leaks and catastrophic failure would wreck further major damage on the environment.

II.D. Cumulative impact and cumulative potential effects

Sandpiper and Line 3 must be considered together by the PUC under MEPA, its regulations, and MEQB guidance documents for two reasons. 1. Sandpiper and Line 3 are connected actions under MEPA. 2. Because of their close proximity and size the impacts of both need to be addressed together in any environmental review documents.

Cumulative impacts as described in MEQB/MEPA rules and guidance documents are especially important because of the large size of these projects, and because rights of way can become wider than interstate freeways as more linear projects are added.

The regulatory definitions of "cumulative impact" and "cumulative potential effects" clearly spell out the responsibility of the PUC to thoroughly address impacts of both projects together.

"*Subp. 11. Cumulative impact. "Cumulative impact" means the impact on the environment that results from <u>incremental effects of the project in addition to other past, present, and reasonably foreseeable future projects</u> regardless of what person undertakes the other projects. Cumulative impacts can result from individually minor but <u>collectively significant projects taking place over a period of time</u>*." (emphasis added.)

"*Subp. 11a. Cumulative potential effects. "Cumulative potential effects" means <u>the effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis</u>*

of expectation has been laid,…. In determining if a basis of expectation has been laid, . . . the RGU must consider: whether any applications for permits have been filed with any units of government; whether detailed plans and specifications have been prepared for the project; whether future development is indicated by adopted comprehensive plans or zoning or other ordinances; whether future development is indicated by historic or forecasted trends; and any other factors determined to be relevant by the RGU." (emphasis added.)

Minnesota has a policy of following existing corridors when new linear projects are sited when possible and feasible. However, FOH submitted extensive comments on "corridor fatigue" on the Sandpiper project. We noted this issue has never been properly addressed during the decision process on pipelines.

We recommend that the PUC re-notice the filing of the applications with an added request for provide scoping comments regarding cumulative impacts on existing and proposed corridors, regarding past and proposed projects.

III. THE APRIL 22, 2015 PUBLIC NOTICE REQUESTING COMMENTS ON THE COMPLETENESS OF THE APPLICATIONS IS TOO RESTRICTIVE AND, THEREFORE, INADEQUATE.

It is possible that there is a legal clause somewhere that allows the PUC staff to so narrowly interpret state law and regulations that they can restrict public comment to the a narrow set of pipeline regulations to the exclusion of the most of Minnesota's other laws and regulations. And it is possible there is another legal clause somewhere that allows the public notice to be silent on another Enbridge project that is controversial, not yet permitted, and is proposed to be right next to the proposed pipeline. Perhaps it is legally possible to ignore the fact that each of these projects are huge and could well be in an environmentally inappropriate location for 50 years or more.

Finally, the notice does not even state the important fact that Enbridge has requested that the CN and PRP be processed together—in spite of the fact that on the Sandpiper project, the PUC split the proceedings.

FOH believes such a public notice does not comply with the intent or specific clauses of MEPA or of pipeline regulations, and does not comply with good public policy and current 'best practices' for meaningful public participation.

116D.03 ACTION BY STATE AGENCIES.

*Subdivision 1.**Requirement.***

The legislature authorizes and directs that, to the fullest extent practicable the policies, rules and public laws of the state shall be interpreted and administered in accordance with the policies set forth in sections 116D.01 to 116D.06.

*Subd. 2. **Duties.***

All departments and agencies of the state government shall:

(1) on a continuous basis, seek to strengthen relationships between state, regional, local and federal-state environmental planning, development and management programs;

(2) utilize a systematic, interdisciplinary approach that will insure the integrated use of the natural and social sciences and the environmental arts in planning and in decision making which may have an impact on the environment; as an aid in accomplishing this purpose there shall be established advisory councils or other forums for consultation with persons in appropriate fields of specialization so as to ensure that the latest and most authoritative findings will be considered in administrative and regulatory decision making as quickly and as amply as possible;

(3) identify and develop methods and procedures that will ensure that environmental amenities and values, whether quantified or not, will be given at least equal consideration in decision making along with economic and technical considerations;

(4) study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources;

(5) recognize the worldwide and long range character of environmental problems and, where consistent with the policy of the state, lend appropriate support to initiatives, resolutions, and programs designed to maximize interstate, national and international cooperation in anticipating and preventing a decline in the quality of the world environment;

(6) make available to the federal government, counties, municipalities, institutions and individuals, information useful in restoring, maintaining, and enhancing the quality of the environment, and in meeting the policies of the state as set forth in Laws 1973, chapter 412;

(7) initiate the gathering and utilization of ecological information in the planning and development of resource oriented projects; and

(8) undertake, contract for or fund such research as is needed in order to determine and clarify effects by known or suspected pollutants which may be detrimental to human health or to the environment, as well as to evaluate the feasibility, safety and environmental effects of various methods of dealing with pollutants.

The PUC has the authority to recognize and respond innovatively to the unique situation of these huge pipelines proposed to be built together for 67% of the 337 mile route in Minnesota. Furthermore, MEPA requires such innovation.

Yet the public notice does not appear to recognize this authority to respond to unique situations. For example, Rule 7853.0100, "*CRITERIA FOR ASSESSMENT OF NEED*", lists obviously relevant criteria to the environmental decisions that need to be made for these projects. It states "*The factors listed under each of the criteria set forth in part 7853.0130 shall be evaluated to the extent* <u>*that the commission deems them*</u>." This gives the PUC clear authority to do whatever is necessary to address the unique of these two projects.

The environmental impact of this very large project must be carefully examined under Minnesota law and rules, along with its sister project, Sandpiper. Yet the public notice does not list rule 7852.1900, which contains decision criteria on the applications. (However, rule 7852.1900 and therefore the criteria themselves are open for public comment because of this reference.)

With respect to the PRP, the rules are flexible enough to respond to this unique situation of two large pipelines proposed together. Rule 7852.2700 says: "*ENVIRONMENTAL IMPACT*

OF PREFERRED ROUTE. The applicant must also submit to the commission along with the application an analysis of the potential human and environmental impacts that may be expected from pipeline right-of-way preparation and construction practices and operation and maintenance procedures. These impacts include but are not limited to the impacts for which criteria are specified in part . . . .7852.1900. " (emphasis added.)

III. A. Reasons for expanding public notice.

It is entirely appropriate that the PUC ask for input on more topics than in this restrictive public notice. MEPA applies directly to both projects, and the problems with the proposed Sandpiper route expressed by the DNR, PCA, and other environmental experts indicate an obvious need to expand the notice. Consider the following:

III.A.1. Cumulative effects and related actions.

The fact that two pipeline projects are proposed to be located generally within 25 feet of each other across hundreds of miles of environmentally sensitive landscape of Minnesota is a unique situation that cries out against "business as usual" by Minnesota's state agencies. It is also an affront to the public to give them two weeks to look at the most recent of Enbridge's application, which consists of thousands of pages and has the effect of excluding the public from this critical part of the process.

III.A.2. Narrowing the scope of review affects outcomes.

The scope of review of the applications will greatly influence the outcomes of the permitting process in favor of Enbridge, a private company pursuing its own interest.

III.A.3. Great weight given applications during the review process.

An assertion of the PUC staff that such issues can be addressed during the contested case hearings and subsequent permitting is illogical, given the great weight placed on the Enbridge applications during those proceedings. Starting the review process on such a large project based on defective and incomplete applications compromises the integrity of the entire process that will follow.

III.B. Recommendation and examples of topics that should be open for comment on the applications:

FOH recommends that the PUC itself rather than the staff make a decision on the scope of topics open for public comment.

Examples of additional topics that should be open for discussion, based on MEPA and other requirements include, but are not limited to:

III.B.1.

Requesting scoping comments for the environmental review that is required by MEPA—and EIS in this case—with specific attention to deficiencies in the applications.

III.B.2.

Requesting comments on whether the applications provide sufficient information for the PUC to make the decisions regarding the 14 decision criteria in the CNA rule (7853.1300) and the 11 decision criteria in the PRP 7852.1900.

III.B.3.

Requesting comments regarding compliance with the phrase in Rule 7852.2700 as to whether the impacts related to the criteria in 7852.1900 are sufficient or whether there are other potentially significant impacts not mentioned in the criteria list, according to the phrase in the rule that "*These impacts include <u>but are not limited to the impacts</u> for which criteria are specified in part . . . .7852.1900*" (emphasis added.)

III.B.4.

Requesting comments regarding cumulative impacts and effects on existing and proposed corridors.

IV. SPECIFIC DEFICIENCIES IN THE CNA APPLICATION ITSELF AS SUBMITTED.

IV.A. 7853.0540 requires a discussion of alternatives.

Alternatives that are included in the PRP are not included in the CNA. In the PRP, Enbridge describes two alternatives that follow its mainline route to Superior, both of which are shorter than the proposed route. These are: a) digging up current Line #3 and actually putting a new Line 3 in the same place, and b.) Following the mainline corridor with a new Line 3. These need to be addressed in the CNA.

IV.B. 7853.0250 (C) Effects of the facility on inducing future development.

The CNA is deficient in recognizing that opening up a new "greenfield" route will induce the development of other pipelines in the same corridor. And, of course, the Sandpiper pipeline has not yet been approved. Locating Line 3 in this corridor will enhance the likelihood of Sandpiper being in this corridor.

IV.C. 7853.0250 (D) Subp 1 maximum number of pumping stations

This rule states that the CNA application must describe the ultimate design capacity and maximum number of pumping stations in Minnesota. Page 8-3 of the CNA states a higher ultimate design capacity of 915,000 b/day, but says only that further engineering designs are need to determine pumping stations. This is insufficient in meeting the rule, and meeting the requirements of MEPA regarding cumulative impacts.

IV.D. 7853.0640, Subp. 1, induced development, utilities.

This rule, as well as MEPA, requires a description of induced development caused by the project. This includes electrical transmission lines for powering the pumping stations, as well as future additional pipelines. The CNA only recognizes that such power is needed, and

doesn't describe the additional facilities. (See page 9-23) Enbridge knows where the pump stations are to be located, and needs to calculate where the future stations will be located when the line reaches its maximum capacity. Enbridge also knows the power requirements. Therefore, they must include the approximate location of such lines.

Note: This rule itself refers to "expanded utilities." A pipeline is defined as a "utility" in some Minnesota laws, and, in fact, Enbridge is seeking a utility exemption for its application under Minnesota's Wetland Conservation Act requirements. Therefore, it cannot be said that this rule only applies to *electrical* utilities.

IV.E. 7853.0640, Subp. 4, agriculture.

Enbridge has now conceded that there is potential for excavation in hilly terrain in order to construct the flat workspace needed to safely build the pipeline. (See pg 4-10 of the Route Permit application.) Such excavation can be substantial in hilly terrain, including hilly terrain that is farmland. The CNA does not contain such estimates, nor does the PRP.

IV.F. 7853.0640, Subp. 5, displacement of people.

This is a major topic, and the CNA contains no estimate—it merely reads displacement "could" happen. In fact, during its pursuit of easements on the Sandpiper route—the same route proposed for much of Line 3—people have been displaced already. Furthermore, according to the PRP, the offset of the pipeline from electrical transmission lines requires a wider ROW than from other types of linear facilities.

Additionally, pages 4-10 of the PRP application indicate that Enbridge used an offset of 250 feet from existing pipeline or transmission line corridors in its calculation of extent of "greenfield" on its proposed route. Table 4-6.6.1 indicates that there are about 5 miles of greenfield route between Clearbrook and the point where the proposed route turns east just south of Park Rapids. Yet this section of the proposed route is supposed to be following existing pipelines. Therefore, three are 5 miles where Line 3 is more than 250 from the existing lines. Adding Sandpiper to this mix raises the question: just how wide will this corridor become, and what about houses between these pipelines—would people become bracketed by large pipelines on either side of them?

This example illustrates how important this number is to making the public interest decisions regarding the CNA decision criteria.

V. DEFICIENCIES IN THE ROUTE PERMIT APPLICATION

V.A. THE APPLICATION IGNORES THE NECESSITY OF RISK ASSESSMENT

Rules 7852.1900 and 7852.2700 require that oil releases must be addressed in the applications. Furthermore, risk assessment is the proper vehicle for addressing this topic.

These rules, along with MEPA requirements, are sufficient to conclude that the potential impacts of oil leaks and releases, whatever the cause, must be addressed in the environmental review. The application is inadequate on this topic. The following points support this contention.

V.A.1. Necessity of risk assessment.

The DNR, PCA, FOH, and others established during the review of Sandpiper that the potential impacts of these releases must be considered during route comparisons, and with respect to environmental impacts

V.A.2. Risk assessment principles.

The principle of risk assessment employed throughout industry is that if the potential consequences are very high, even low probability events must be considered. It is inconvertible that these two factors are present, given the large quantity of oil in these two lines, the 50+ years of project operation, and the landscape. This was established during the hearing on Sandpiper, where Enbridge did not challenge the need for a risk assessment.

V.A.3. Enbridge does in fact assess some of the risk of oil releases.

During the Sandpiper hearing, Enbridge indicated that it is required by federal regulations to do a "worst-case" estimate of oil releases that might affect High Consequence Areas. Yet they would not release this information. FOH is aware that on the Keystone Project, two risk assessments were done for that project for use in the federal EIS. One was prepared for Keystone, and later another independent review was done. (See Attachment 2 below.) In both cases, the information became public, with the agreement of the pipeline company. Therefore, it is entirely within Enbridge's ability to supply information on this and must be required to do so before the application can be deemed complete.

V.A.4. Enbridge's statement in the route application about oil release risks is inaccurate, dismissive, and not up to industry practices on risk assessment.

Enbridge discusses the risk of an oil spill in a mere three paragraphs in Section 7-1 of its PRP. It is an inaccurate portrayal of the major discussion that took place regarding this topic during the contested case hearing on Sandpiper. This topic, we believe, must be a major decision topic for the PUC on both pipelines. If it can be said that leaving out highly significant information could be regarded as a factual defect of the applications, then Enbridge has committed such a breach: FOH and other parties contributed major information on oil releases and risk assessment during the Sandpiper hearings. Enbridge ignored this testimony and continues to do so in its application for Line 3.

V.A.5 Enbridge cites estimates of the risk of oil releases on the Keystone pipeline that are simply wrong.

The numbers Enbridge uses come from an earlier risk assessment done for the Keystone pipeline. Attachment 2 below provides detailed quotes first from the outdated 2009 Keystone assessment (used by Enbridge in the PRP), then also quotes from the authoritative 2013 risk assessment done by Battelle Labs. Some of the key findings of the Battelle assessment are underlined in Attachment 1, and summarized here:

V.A.5.a. The 2009 risk assessment substantially underestimated risks and potential volumes of releases;

V.A.5.b. Overall averages of risks as well as risk volumes are not appropriate for protecting sensitive areas or for characterizing risk,

V.A.5.c. Location-specific risks should be assessed;

V.A.5.d. The Battelle risk assessment notes that a burial depth of 48 inches is a measure that reduces risk, and recommends it for the Keystone project as a whole. Enbridge, on Line 3, says it will generally use a burial depth of 30 inches. Therefore, they are not using a technique that will reduce risks from third-party damage, one of the major causes of pipeline oil releases.

V.A.5.e. The Battelle risk assessment provides helpful discussion of the role of PHSMA in approving the project, and notes problems with this role.

V.A.5.f. A number of the findings are entirely relevant for addressing site-specific sensitive environments found in Minnesota.

V.B. Section 4.6.2, page 4-10. Extra Work Space. (PRP application).

Understanding the actual construction of the pipeline is key to understanding impact potential. When topsoil is lost due to deep excavation, long-term impacts result. These include chronic erosion because of poor re-vegetation, invasion of exotic species, and loss of plant or forest productivity. Deep excavation can occur on side slopes when the level work pad—often 50 feet in width—is constructed. Enbridge resisted accepting this during the review of Sandpiper, but now they admit that it can occur. However, Enbridge erroneously call this a "limited" issue, and refuse to discuss the acreage where it can potentially occur, and the whether they intend to mitigate it by topsoil separation. This defect must be rectified.

V.C. Section 4.6.6, right-of-way sharing.

This section discusses following existing pipelines, utility lines, or transportation corridors. There are two deficiencies in the application regarding this topic:

V.C.1. Sharing rights of way.

The application indicates that Enbridge considers that it meets the criteria of corridor sharing—an important topic in locating linear facilities because of Minnesota policy—as long as the pipeline is within 250 feet of an existing linear facility. Use of this number means that corridors can become very wide. Conceivably, if both Sandpiper and Line 3 were built along an existing corridor of some kind, this figure results in two pipelines up to 500 feet wide plus whatever the width of the existing facility—and still be regarded as a good thing as far as following state policy. This has significant environmental and social consequences, because of the potentially wide swath, and impacts to nearby residences. It seems very reasonable that more residents will be forced to relocate under such conditions. What is the justification for using such a figure when it seems to be a perversion of the state policy on following existing corridors?

V.C.2. Compatibility with HVTL.

The application needs to address compatibility of the pipeline with high voltage transmission lines. Proximity of these facilities to each other results in complications since there are induced currents in pipelines from the earth's magnetic field, which are also increased by the electromagnetic field around high voltage transmission lines. These effects are site specific, and have increased with the increasing success of pipeline coatings. Pipeline companies take countermeasures to deal with this, but these need to be described in the application. A discussion of corridor compatibility because of this phenomenon also is needed, including whether a standard offset can be used, or are there site-specific factors that increase the offset distance. This section needs expansion so that cumulative impacts and "corridor fatigue" can be properly assessed.

V.D. Enbridge pipeline safety and control center operation.

The PRP contains extensive discussion of Enbridge's programs for preventing pipeline oil releases. A major part of this program is a sophisticated and newly updated control center that monitors Enbridge's entire system via satellite and other communication systems.

The PRP needs to be expanded to include a discussion of the consequences to control systems such as that used by Enbridge, which uses satellites and GPS systems. According to a recent advisory from the Department of Homeland Security, solar storms can disrupt such control systems. " *The purpose of this Advisory is to inform the industrial control systems (ICS) community of the possible impacts of solar magnetic storms on critical infrastructure control systems. . . . . (Such storms) can also affect global positioning system (GPS) satellite signals, interfering with the GPS timing reference used by navigation systems and many control systems…..(including those used in the oil and gas industry.*)" (ICS-CERT ADVISORY ICSA-11-084-01—SOLAR MAGNETIC STORM IMPACT ON CONTROL SYSTEMS, March 25, 2011) Enbridge also needs to explain whether such events have the potential to increase malfunctions of the control system that could lead to pressure spikes that result in oil releases.

There apparently are some measures that can be taken to reduce such effects. Enbridge needs to describe how its control center could potentially be affected—such as false pipeline pressure readings that some publications indicate as a possibility from GPS systems—as well as whether or not such affects have been factored into risk assessments. .

VI. PROJECT ALTERNATIVES

VI. A. Background.

As noted in the April 22 PUC notice, Enbridge has described two other project purposes besides the need to fix an aging pipeline: the project is intended to "reduce ongoing apportionment, and optimize the pipeline system." These purposes are highly significant with respect to the necessity of studying alternatives under Minnesota and federal laws. Alternatives chosen for study during federal and state environmental review, as well as permitting under the Clean Water Act, must be able to accomplish the project's purpose. Alternatives are then examined to determine whether there is a reasonable alternative that will have less impact than the one proposed.

In fact, under the federal National Environmental Policy Act, in the experience of FOH technical advisers, even more attention is given to dissecting a project's purported purpose than under Minnesota law and regulation. Broad purpose statements such as "reduce ongoing apportionment" and "optimizing the pipeline system" open the door to many possible alternatives, as well as necessitating objective examination of Enbridge's system beyond Minnesota borders. Furthermore, since the PCA administers Clean Water Act permits in Minnesota, federal law is pertinent to the PUC decisions that must be made with respect to which alternatives to study.

Yet Enbridge has proposed extremely limited options for alternatives. And both follow the Enbridge mainline system, one actually digging up old line and putting another in its place, and the other adding a new pipeline along that corridor. Enbridge rejects the first in part on the grounds that they couldn't deliver product to customers while this line was out of service. This claim ignores the availability of alternative ways to deliver oil.

Enbridge's very broad statement of purpose of "optimizing its pipeline system" opens the door to many different options and many different alternatives. It also opens the door for the PUC to examine the entire Enbridge system to look for less damaging alternative routes in Minnesota, even though it does not have regulatory authority beyond Minnesota's borders. It does, however, have clear authority to deny a CN when it finds a less damaging alternative.

Enbridge's pipeline system extends south and east of Minnesota. Routes proposed by FOH for the Sandpiper project avoid going to Superior, WI. Given Enbridge's expansive project purpose, routes with endpoints other than Superior must be addressed. Although Enbridge has tried to mock, dismiss and ignore those routes, they have been taken seriously by both the state’s environmental agencies, the MPCA and DNR, and have emerged from the pipeline proceeding as very viable alternatives.

VI.B. Recommended additional alternatives.

The following alternatives must to be addressed in the CNA.

VI.B.1.

All alternatives routes recommended for Sandpiper as described in the Testimony of Richard Smith, Public comments to DOC EERA 4/4/14 & 5/30/14, Direct Testimony 11/19/14.

VI.B.2.

A Line 3 connection to an enlarged Sandpiper pipeline west of Clearbrook, and on Sandpiper alternative SA-04 that follows mostly an existing pipeline to the Enbridge Flanagan Terminal in Illinois would be coupled with the shutting down of the existing Line 3 while it is dug up and replaced. The Sandpiper pipeline would be somewhat larger than proposed in order to carry additional product from Canada from the point where a new line intersected Sandpiper. This would allow Enbridge to meet existing commitments for Line 3 while it was out of service. It would also provide additional benefits to Enbridge by the having the interconnection in place.

VI.B.3.

Enbridge has a 48 inch pipeline in its mainline corridor. An alternative needs to be examined that combines Sandpiper and Line 3 and follows the unmodified SA-03 PCA route to Superior.

VII. FOH COMMENTS ON SANDPIPER INCORPOREATED BY REFERENCE AS COMMENTS ON THE LINE 3 PUC APRIL 22 PUBLIC NOTICE

FOH incorporates by reference the following comments that were entered into the contested case hearing record for the Sandpiper project.

VII.A. Direct Testimony of Richard Smith, November 19, 2014, describing alternative routes for Sandpiper**.**

VII.B. Direct Testimony of Paul Stolen, for FOH, November 19, 2014

VII.C. Comments on CEA Richard Smith, Public Comments, DOC EERA, 4/4/14 & 5/30/14

VII.D. Surrebuttal testimony of Paul Stolen, January 21. 2015

VII.E. Cross examination testimony of Richard Smith, January 29, 2015

ATTACHMENT 1
INADEQUACY OF ENBRIDGE LINE 3 STATEMENTS ABOUT RISK OF OIL RELEASES

This attachment is quotes from the Keystone Pipeline environmental review. Section I contains quotes from the original risk assessment done for this pipeline in 2009 and submitted by the company to the US State Department. This 2009 assessment provides estimates of incidents per mile (0.00035), and also for the whole project over a 10 year time span (2.2 spills over a 10 year period.)

Page 7-2 of the Enbridge's route permit application for Line 3 uses these figures as a basis for its calculation.

Section II of this attachment uses an independent risk assessment completed at the end of 2013 by the authoritative Battelle labs. It found the earlier risk assessment flawed in a number of important ways, and that it underestimated event frequency as well as amounts of oil releases. Furthermore, it recommended much more useful techniques, and found that using overall project averages to be an unacceptable approach. FOH notes that its testimony on Sandpiper indicated that significant pipeline accidents and ruptures occurred after 2009 that likely resulted in modifications of the assessment of risk (See November 19 testimony of Paul Stolen.)

1. link to the Battelle report:

http://keystonepipeline-xl.state.gov/documents/organization/221277.pdf

2. link to the 2009 outdated assessment:

http://keystonepipeline-xl.state.gov/documents/organization/205569.pdf

SECTION 1. EXCERPTS FROM 2009 RISK ASSESSMENT SUBMITTED BY KEYSTONE TO THE US STATE DEPARTMENT

. Appendix Q of US State Department EIS 2009, Keystone XL Project Pipeline Risk Assessment and Environmental Consequence Analysis July 6 2009

PAGE 3-2: "While future events cannot be known with absolute certainty, historic incident frequencies can be used to estimate the number of events that might occur over a period of time. Based on available PHMSA data, the spill frequency analysis produced a conservative incident frequency <u>of 0.000135 incident per mile per year, equivalent to no more than 2.2 spills in 10 years for the 1,672 miles of the Project</u>, including the Keystone Cushing Extension. For any 1-mile segment, this probability is equivalent to 1 spill every 7,400 years. Table 3-1 shows the number of spills that might occur along the entire Project during 10 years of service." (Emphasis added.)

SECTION II. EXCERPTS FROM 2013 RISK ASSESSMENT BY BATTELLE LABS

(Note: FOH has added underling and bold to emphasize transitions from one section to another. No changes have been made in the text.)

Keystone XL Pipeline: Independent Engineering Assessment – Final Report
31 December 2013
Author: Energy Systems Battelle Memorial Institute 505 King Avenue Columbus, OH 43201
Brian N. Leis, Thomas I. McSweeney, J. Bruce Nestleroth, Edward B. Clark, and Diane M. Sanzone
To: TransCanada Keystone Pipeline LP 717 Texas Street Houston, TX 77002-2761
Privileged and Confidential

PAGE 45 excerpt: (**Note**: **The underlining below is FOH emphasis)**

"2.2.4 Incident and Spill Frequency

"2.2.4.5 Summary, Conclusions, and Recommendations
The incident frequencies for the major threats to the pipeline considered by Keystone were assessed. It is noted here (as was pointed out in regard to Table 4 and Section 2.1.2) that a quantitative rationale should be presented for causes that have not been recognized as threats. This should be done with the realization that a pipeline system is much more than the lineal portion traversing the RoW. In addition, Keystone should detail their data screening process and the method(s) to deal with nulls, so that a simple query could replicate the baseline frequencies on a threat-specific basis. ……"(FOH note: "nulls" means items for which data is absent, such as causes of an oil release.) "While currently restricted to use by government agencies and selectively by operators, a better approach would capitalize on the PHMSA National Pipeline Mapping System website to geo-locate the historic spill records as the means to better quantify localized threats. "
"A related observation is that sensitivity analysis apparently was not used to understand underlying drivers for incidents by Keystone when estimating spill frequencies. Such analysis could help to identify localized threats. Further, although Keystone might have relied on SMEs to help quantify infrequent events like flash floods, general flooding, landslides, and so on, the scope and results of such activity are not clearly evident.
Finally, in regard to expressions of average risk, care should be taken when stating a US threat rate or a state-level incident rate because this downplays the absolute importance of potentially large localized and/or periodic events. This practice does not help focus preventive, protective, or mitigative actions at specific locations along the pipeline, so an alternative risk assessment approach should be adopted if the PHMSA approves construction. At that time, Keystone should assess incident likelihood considering the benefits of alternative, preventive, protective, and mitigative features in place. Recognizing that Appendix C of 49 CFR 195 requires assessment of both the need for and the effectiveness of preventive and mitigative safety features, changes to deal with any shortfall at that time could be very expensive. Thus, although not typically considered nor required by the regulations at this time, prudence suggests that sufficient detail be considered if and when the Project moves forward."

PAGE 46 excerpt:

"2.2.5 Total Spill Volume
2.2.5.1 Introduction
The spill volume is an essential input to fate and transport and environmental consequence modeling because larger spills are more likely to affect sensitive areas and cause greater environmental damage. Thus, an accurate understanding of spill volume and its likelihood as a

function of the threats is an important consideration. Because the Keystone assessment apparently focused on spills along the RoW, this subsection retains that focus. Keystone quantified spill volume in regard to the PHMSA database. They also quantified spill volume using a numerical model that simulated the pipeline, including the valves and the effects of elevation over the length of the pipeline segment considered. This subsection addresses outcomes in regard to the PHMSA database. "

PAGE 50-51, excerpt (FOH note: MLV stands for "main line valve." The underlining below is FOH emphasis)

"2.2.5.5 Summary, Conclusions, and Recommendations

Adopting the All Spills outcomes relative to those for other choices based on the General Cause categories in the PHMSA database (as done by Keystone) significantly underestimates the median spill volume relative to the environmental exposure along the pipeline RoW. Trending of the cumulative distributions of spill volumes shows that the Keystone benchmark under-predicts the likelihood of larger spills except at the higher percentiles, where all trends converge. The results indicate that parsing on the Incorrect Operations, Natural Forces/TPD, and Pipeline/MLV General Cause categories leads to larger values for the median spill and at the 90th percentile. Accordingly, there is the potential for much larger spills than has been considered relative to the All Spills benchmark case. Because such trends represent a system-level analysis of historic incidents that typically involve much smaller-diameter line pipe as compared to the Project, there is the potential for still larger spills where unique site-specific threats exist along the RoW. Thus, if Project construction is approved by PHMSA, consideration should be given to a broader assessment of the environmental consequences relative to the probability of occurrence and spill volume, including the potential implications of pipe diameter.

50

2.2.6 Conclusions and Recommendations

Adopting the All Spills outcomes relative to those for other choices based on the General Cause categories in the PHMSA database, as was done by Keystone, significantly underestimates the median spill volume relative to the environmental exposure along the pipeline RoW. Trending of the cumulative distributions of spill volumes shows that the Keystone benchmark under-predicts the likelihood of larger spills except at the higher percentiles, where these trends converge. The results indicate that parsing on the Incorrect Operations, Natural Forces/TPD, and Pipeline/MLV General Cause categories leads to order-of-magnitude or larger values for the median spill, and a factor of 5 or larger values at the 90th percentile. Likewise, it appears that Keystone has ignored the nulls, which indicates a higher spill frequency than has been estimated. If the historical data are relevant to the Project, there is the potential for more frequent spills as well as for larger spills than was considered in regard to the All Spills benchmark. In addition, because such trends represent a system-level analysis of historic incidents that typically involve much smaller-diameter line pipe compared to the Project, there is the potential for still larger spills where unique site-specific threats exist along the RoW.

PAGE 54 START excerpts (FOH note: The Exponent Report cited below was effectively used in FOH comments on the Sandpiper Project contested case hearing; see November 19 FOH testimony of Paul Stolen. The underlining below is FOH emphasis.)

"2.4 Fate and Transport
2.4.1 Introduction
The previous sections established criteria to assess the Keystone Risk Assessment and evaluated the methodology used and the threats, spill frequencies, and spill volumes. The next logical step is to consider the fate and transport of crude oil from an engineering perspective in the event of a release. The analysis and discussion regarding fate and transport develops in reference to the related assessment done for the Project[7e].
Because environmental transport and fate of petroleum products depend on many factors, modeling transport and fate is a complex exercise. In addition to work presented in the Risk Assessment, evidence of the complexity involved with fate and transport specific to the Project can be found in Exponent's report[2] and in Annex F of Battelle's original third-party review (January 2012). Major factors affecting the behavior and fate of crude oil in the environment are: (1) the nature of product spilled; (2) the volume and rate of the spill; (3) the physical, chemical, and biological characteristics of the receiving environment; (4) the weather conditions at the time of the spill; (5) the amount of time elapsed until detection; and (6) the adequacy and timing of response activities. Once a spill occurs, the focus turns to consequences and mitigation, with consequences being dictated by the amount spilled, the timing and extent of the spilled product (transport and fate), and the adequacy of the response capabilities. Of particular importance is the receiving environment (e.g., water and soil attributes, slope, gradient, topography, underlying, geology, and weather and climate), which in turn impacts the dispersion, fate, plume size, and transport. Fate and transport in this context can be viewed as the bridge between the prior spill frequency and volume discussion and the consequences as impacted by environmental transport and fate of the spilled product."

PAGE 74, EXCERPT (FOH Note: The underlining below is FOH emphasis)

"2.6.2 Preventive Actions
Preventive actions in the context of an oil spill are directed at avoiding a release. They focus on keeping the product within the line-pipe and the system components. As noted above, Parts 194 and 195 (and appendices) of Title 49 of the CFR establish the minimum requirements for any hazardous liquid pipeline. The eventual implementation of these requirements is under the oversight of the PHMSA. Accordingly, details associated with the PHMSA approval that comprise preventive actions are not well defined at this stage of the Federal process. Considering for present purposes that the preventive actions implicit in PHMSA approval are "existing," this section focuses on additional actions over and above minimum that either are known or otherwise merit consideration for the Project. Key actions include the following:

0. At present, discussions and documentation[7] indicate that the following actions are over and above the Code minimum: the entire pipeline is being designed as if it transits an HCA; greater than the required depth of cover will be provided for usual trenched construction (4 feet in general, locally deeper for select sites); and horizontal directional drills (HDDs) will be used for select crossings."

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PAGE 90 SUMMARY AND CONCLUSIONS EXCERPTS (FOH Note: underlining is our emphasis.)

"3.3 Risk Assessment
The fundamental source of spill data is the PHMSA Liquid Hydrocarbon Incident Database. The risk assessments performed for the FEIS and the SEIS were reviewed and the database

was also used to provide histograms and cumulative probability distributions for spill volumes as a function of pipe diameter and age. The historical distribution of failure causes was also developed to show the effect of improvements in the material of construction and in welding and coating technologies over the last several decades. The analysis of the data clearly showed that the time to recover from a spill was longer and the amount of material recovered was smaller along the mainline pipe RoW. This indicates the difficulty in recovering from spills in more remote areas, as opposed to fixed facilities such as pumping stations.

PAGE 91 EXCERPTS (FOH Note: underlining is our emphasis.)

"Additional results from the queries of the database are as follows:

0. The flow rate and diameter (and so the transported volume) of this pipeline are among the largest for hazardous liquid pipelines in service in the US. a. Accordingly, the time over which a spill is controlled (noted as 12 minutes) corresponds to a minimum release close to 90 barrels (for the worst-case full-bore rupture).
0. b. This volume excludes outflow through drain-down (the loss that occurs while the leak remains undetected) such that 90 barrels is a lower bound to the worst-case spill volume.
0. c. Based on simulations of system response, an estimate of the upper-bound worst-case spill is about 20,000 barrels, with this value reduced significantly by planned valve placement. Based on responses to Battelle's inquiries, valves will cut this level by a factor of two to four, depending on the scenario considered.
0. ……
0. Because of the pipeline's flow rate and diameter, if a leak develops, the Project has the potential for a very large spill well in excess of those quantified for the existing history tabulated in the PHMSA database (and other databases as well). a. Response plans matched to the product, threats, and potential consequences should be developed if this Project is sanctioned.

……

Significant spills do occur, as was evident more than once during 2011. a. The projected historic risk rate per mile-year (adjusted for application to this pipeline) points to a spill every several years.

…….

The engineering evaluation of spill frequency in Section 3.2 states the importance of breaking the system down so that components with very different failure rates are treated separately. The 2013 Battelle risk analysis shows that a breakout of the system elements results in a much better estimate of the median spill volume for mainline pipe and recommends, for planning purposes, a median spill volume of 100 barrels."

PAGE 101 BEGIN (FOH Note: underlining is our emphasis.)

"4. High-Level Recommendations

The proposed Keystone XL Project, as described in the DoS 2013 SEIS[(1)], consists of a crude oil pipeline and related facilities to transport WCSB crude oil from an oil supply hub near Hardisty, Alberta, Canada, to existing pipeline facilities near Steele City, Nebraska, for delivery to Cushing, Oklahoma, and the Gulf Coast area. The US portion of the transboundary Project consists of approximately 875 miles of new, 36-inch-diameter pipeline across portions of Montana, South Dakota, and Nebraska.

The DoS released the FEIS for the Project in August 2011. Following its release, the DoS,

PHMSA, and the EPA jointly concluded that it would be beneficial to have a third-party review of the Risk Assessment prepared by AECOM and Dynamic Risk Assessment Systems, Inc., on behalf of TransCanada Keystone Pipeline, LP. As part of this third-party review, Battelle was charged to evaluate the following engineering components of the pipeline and original Risk Assessment: (1) failure frequency (2) risk assessment, (3) outflow analysis and placement of valves; (4) fate and transport; (5) detection of leaks; (6) prevention of leaks, and (7) mitigative and protective measures in the event of a spill.

The recommendations that follow are based on (1) our review of the Risk Assessment commissioned by Keystone (Appendix P of the FEIS and Appendix Q of the SEIS); (2) analysis of the historical record of crude oil pipeline performance from the PHMSA database; (3) the regulatory requirements currently in place and overseen by PHMSA; (4) implementation of the 57 Regulatory Conditions imposed by PHMSA; and (5) our best engineering and risk assessment judgment.

Failure Frequency: The PHMSA Liquid Hydrocarbon Incident Database should continue to be used, but the analysis should be limited to crude oil spills and should consider the very different spill performance data for major systems (i.e., mainline pipe). The results should be presented without the use of engineering adjustment factors. Until there is enough modern pipeline performance data to negate the need for adjustment factors, data from other sources, such as performance data on the more modern Australian pipeline system, should be used to show that the results presented are conservative. Appendix K of the SEIS should be used as the starting point for such an updated analysis. Until that re-evaluation is performed, it is recommended that, for planning purposes, a medium spill volume of 100 barrels be used. A larger volume may have to be used in locations where the terrain produces a hydraulic gradient.

Risk Assessment: Future risk assessments for this pipeline should divide the pipeline system into component parts, assess the risk for each component, and then calculate the system risk from its components. The risk analysis performed by Battelle used Total Incident (Damage) Cost as a measure of the consequences. The risk analysis shows that the subsystems that generate almost all the risk are the mainline pipe and the fixed facilities such as the pumping stations. Thus, when developing preventive, protective, and mitigative programs, equal focus should be on the mainline pipe and the fixed facilities.

Outflow Analysis and Valve Placement: It is essential that the pipeline design protect the environment by controlling a spill through valves located to minimize both the potential spill volume and its consequences. The model and the process that were used by Keystone to ensure that valves are placed to minimize the total outflow from a breach appear to be correct and should continue to be used. It is recommended that portions of the outflow analysis be redone to reflect the new route and thereby ensure that the results are not significantly different from the results presented at the time the FEIS was published.

Fate and Transport: Exponent developed and applied criteria to identify potentially sensitive environments downstream of small stream crossings, with a number of such environments identified along the pipeline route. From an engineering perspective, concern for small streams could and should be managed proactively during construction via micro-bore or such techniques. During construction, and continuing into the operational phase, further analysis should be done to assess overland flow (spreading) and transport for specific pipeline sections that intersect identified sensitive habitats, including the four streams identified by Exponent. This modeling exercise could then be used to inform ERPs. Well depth and depth of release should also be assessed relative to the water table to screen / identify sensitive groundwater resources that may be more vulnerable to exposure to a hydrocarbon plume in the event of an oil spill. Finally, it is recommended that the presence of PAHs and naphthenic acids be better

quantified for the products that are actually transported in the pipeline to better inform environmental remediation and response planning.

Leak Detection: No matter how effectively pipeline systems are designed and constructed, there will always be a finite chance that a leak will occur. Therefore, leak detection is essential across the range of potential release components of the pipeline. Because facility risks are significant, it is recommended that leak detection efforts be placed on both the mainline pipe sections and facilities (including tanks). As new leak detection technologies emerge and start to be deployed in the field, Keystone should continue to evaluate these technologies and consider them for implementation if they represent a significant increase in leak detection sensitivity. In-line leak detectors should also be deployed as part of the pig trains run under the integrity management programs. Leaks are not expected to be frequent; however, because many of the failures are the result of human activities, it is recommended that aerial surveys and/or ground patrol frequency be increased to once a week.

Leak Prevention: The objective of this task was to quantify the effectiveness of the current design, construction, and operation practices in preventing leaks. Along the mainline pipe, leak prevention focuses on detection of defects in the pipe itself, on the longitudinal welds made during fabrication, and on the girth welds that connect the line pipe across the RoW. Battelle's evaluation of leak prevention considered the effectiveness of wall thickness, controls for steel and longitudinal seams, and the external coating placed on the pipe and on the girth welds, as well as on the CP system. It is recommended that ILI be performed proactively prior to the start of operations. These inspections are capable of detecting major defects in welds and in the pipe wall, as well as defects caused by placement of the pipe in the ground. Any detected defects can be repaired before the start of operations and thereby reduce the probability that a leak will occur soon after the start of operations. It is understood that Keystone has committed to these ILIs prior to the start of operations.

Mitigative and Protective Measures: The information provided to Battelle was quite limited and did not address any spills in sensitive areas. Additional spreading analyses should be performed in areas where sensitive environmental receptors are found to demonstrate that these areas are being adequately protected and that additional valves would not have a net benefit. Since it is very expensive to move the placement of valves after all the construction details have been developed, the greatest utility of these calculations would be to have preliminary results available early in the process with the formal validation of their placement, demonstrating that the placement does minimize spill volumes.

During the construction phase, response team and equipment needs should be identified based on the scope of transported products <u>and their potential interaction with the ecosystems that the pipeline traverses.</u> Keystone has recently stated concurrence with this action and has indicated that they will (1) target response plans to the ecosystems and resources traversed, and (2) reduce the response time to two hours in such cases as compared to the minimum 12 hours of 49 CFR 194. Response teams and packages should be selectively located at ecosystems and resources deemed high-value, <u>at a level more refined than the current narrow PHMSA definitions of an HCA or USA.</u>

Since areas along the pipeline where seals and seats are present (e.g., on equipment and pumps) have a higher potential for spills, Keystone should be diligent about the material selection for seals and seats, from both the design and maintenance perspectives, over the life-cycle of the equipment. They should also consider more frequent scheduled maintenance for valves and other equipment, at least initially, and utilize pre-service offsite leak checks and equipment shakedown where plausible.

Depending on need dictated by the nature of the terrain, aspects of the water table, and other factors, Keystone should consider the selective use of concrete coated line pipe (or an

equivalent or better approach). For location-specific elements, like facilities, which are currently sited in sensitive ecosystems or resources, Keystone should also consider unique approaches to protect those sites, such as containment of facility leaks through the use of concrete pads and berms.

Although analysis of anomaly response and trending of the incident causes as a function of the diameter clearly show that the lineal portion of the Keystone XL Project is robust from a preventive perspective in regard to axially oriented anomalies, care should be taken to ensure that similar analyses are considered in the context of the girth welds, and that related defect tolerance is assessed and achieved, subject to the PHMSA process.

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In the Matter of the Applications of Enbridge Energy, Limited Partnership for a Certificate of Need and a Pipeline Routing Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border
Public Utilities Commission (PUC) Docket Numbers:
PL-9/CN-14-916 – Certificate of Need
PL-9/PPL-15-137 – Route Permit

Friends of the Headwaters (FOH) provides the following statement.

NO FURTHER ACTION ON LINE 3 NOR THE SANDPIPER ROUTE PERMIT PROCESS SHOULD OCCUR UNTIL THE APPEALS COURT ORDERED EIS ON THE SANDPIPER CERTIFICATE OF NEED IS EXECUTED AND COMPLETED. A FULL ENVIRONMENTAL IMPACT STATEMENT (EIS) MUST ALSO BE EXECUTED ON THE LINE 3 REPLACEMENT PROJECT BEFORE A CERTIFICATE OF NEED IS ISSUED BY THE MINNESOTA PUBLIC UTILITIES COMMISSION.

Comment 1. An EIS must address the Line 3 pipeline as well as the Sandpiper pipeline.

Minnesota's Public Utilities Commission (PUC) must make a decision to conduct an EIS on the Line 3 proposed pipeline for the following reasons. These include but are not limited to the following:

A. The Minnesota Court of Appeals has ordered an EIS on the Enbridge/North Dakota Pipeline Company Sandpiper pipeline project.

B. A good portion of Line 3 is proposed to share a new corridor with the Sandpiper pipeline. They may only be a few yards apart in this corridor. Both lines are proposed to be constructed at approximately the same time.

C. As proposed the Line 3 project is the placement of a larger pipeline mostly into a new location other than the existing Line 3 corridor. Therefore it is a new pipeline, not a "replacement". FOH strongly objects to Enbridge's continual mischaracterization of this project as a mere "replacement."

D. The Sandpiper administrative hearing record has established a high degree of concern for significant environmental impacts on much of the route proposed for Line 3. This concern was expressed by *all* the experts having natural resource and environmental expertise who participated in the Sandpiper administrative procedures *except for those employed by Enbridge*.

E. The PUC made a decision to address the cumulative impacts of Sandpiper and Line 3 taken together in their Sandpiper written order for the Certificate of Need. The CEA included in the written order has been vacated by the Appeals Court decision.

F. Line 3 will affect ten thousand acres or more of land when taken together with Sandpiper. It will also affect many bodies of water, wetlands, wild rice lakes and other natural resources.

G. No risk assessment and consequence analysis has been accomplished by any party on Sandpiper or Line 3.

Comment 2. The Appellate Court's order of an EIS has yet to be addressed by the PUC.

By ordering an EIS the Court's unanimous decision also voided the Certificate of Need for the Sandpiper pipeline. This casts doubt not only on the administrative process that was completed for Sandpiper but also on what remains to be done. Since a portion of Line 3 is proposed to co-locate with the Sandpiper, the court order has ramifications for Line 3.

The EIS is a more deliberate, comprehensive, administrative and scientific process. With more public input, more checks and balances and a full risk analysis the EIS is considerably more thorough than the CEA process planned for the Sandpiper route permit. There is no basis whatsoever for concluding that the same outcome will occur from a CEA. An EIS means a new look with respect to all alternatives. There will be new substantive findings. In fact, one can easily envision an entirely different outcome given the evidence, expertise and opinions of Minnesota's two environmental and natural resource agencies, the Department of Natural Resources and the Pollution Control Agency, and with oversight by the Minnesota Environmental Quality Board.

The PUC's Notice for Public Comments on Line 3 contains a good example of how the implications of the Appeals Court EIS order are not yet integrated into the PUC process.

In the Notice:

Item 3 asks if there are *"alternative routes or route segments that should be considered? (Related to the Route Permit)"*

Item 4 asks if there are *"alternatives to the project that should be considered? (Related to the Certificate of Need)"*

As described by Enbridge their "project" specifies a particular location with prescribed start and endpoints and few, if any, alternative routes for its suggested CEA. <u>This is not how an EIS works.</u> All alternative routes, source and endpoints must be studied from the very beginning of an EIS analysis with an emphasis on whether the project is needed at all.

Another example was the partial attempt to examine other end points for the Sandpiper project other than Superior. This resulted in the poorly done, and very shallow, look at "system alternatives" during the Sandpiper review. Obviously, the EIS on Sandpiper will be giving these and any other route and system alternatives a much more serious look in order to comply with EIS requirements.

Therefore, FOH recommends to the PUC a four-pronged approach to executing an EIS on Sandpiper:

1) Fully comprehend and accept that the outcome of preparing an EIS on Sandpiper will be quite different than the outcome of the administrative process previously conducted.

2) The PUC suspends any of its conclusions on Sandpiper including opinions on which alternative routes need to be analyzed as well as the merits of the CEA prepared by Commerce on the Sandpiper project,

3) Conducts a proper, comprehensive and honest EIS on BOTH projects together, and

4) Follows the reasoning on project purposes and resulting identification of alternatives described in Comment #4 below.

Comment 3. An EIS on a liquid pipeline is a new ball game for Minnesota.

The Minnesota government has never done an EIS on a large-diameter liquid pipeline. Ever. Therefore, it needs to take a very logical step and examine recent environmental impact statements and supporting studies on similar pipelines. We stress recent studies. As FOH pointed out during the unfinished Sandpiper administrative process, a number of recent and very damaging pipeline accidents and oil releases have heightened the review of such pipelines and necessitated a thorough look at risk and consequences.

The PUC notice specifically asks for input on these questions:

1. What human and environmental impacts should be studied in the environmental analysis?

2. Are there any specific methods to address these impacts that should be studied in the environmental analysis?

These are highly relevant questions for which we have a clear and compelling answer. Use the Keystone XL EIS and its accompanying studies. Their excellent results and methodologies will provide answers to these questions. This is especially important because there are no consulting companies in Minnesota who have experience preparing such studies. It is likely that Minnesota agencies will need to reach outside the state, something which also happened on the Keystone XL studies.

Comment 4. Overview of project alternatives.

Both federal and state regulations stress the need for the proper and serious examination of alternatives since this is the heart of environmental review. In other words, impacts to the human and natural environments can be reduced by finding better locations for a project. This kind of analysis is crucial for linear projects, since when end points change, alternative routes become more evident. Given this, pipeline projects are entirely different from other linear projects such as high voltage transmission line (HVTL) projects. It is a huge mistake to use HVTL projects as a model for pipelines. Service areas and electrical demands do a good job of determining end points for those projects. This is not true of pipelines, where refinery location, corporate priorities and secret contract information drive the end point locations. These define the corporate priorities - not public needs or benefits.

A. Project facts related to alternatives analysis.

There are four overriding factual statements about the purpose of the Line 3 proposal that must drive the alternatives analysis:

1. The physical aspect of the project is the physical pipeline, but the purpose of the project is to carry product. Therefore the project's purpose and its subsequent alternatives analysis must focus on the source and end points of the products the physical pipeline carries. There are multiple locations between these beginning and end points that would achieve the project's purpose.

2. Two of the three project purposes as stated by Enbridge refer to the entire Enbridge system:

"Second, the Project will reduce on-going and forecasted apportionment to the refining industry in PADD II, Eastern Canada, and the Gulf Coast, including Flint Hills and Northern Tier Energy in Minnesota.

"Third, the restored operational flexibility will allow Enbridge to more efficiently operate the Enbridge Mainline System, optimize its pipeline system and reduce power utilization on a per barrel basis."

3. Most of the Enbridge system is outside of Minnesota, as shown on the various maps included in the application. The vast majority of product

goes to the Chicago area; then east and south. Therefore the end point(s) of most of the product carried by the project are not in Superior but are much farther south.

4. The pipeline will be larger and of higher capacity than the existing Line 3.

B. Given these facts, Enbridge's analysis of project alternatives is completely deficient.

It is clearly to Enbridge's benefit to focus its "need" discussion on the big picture—the need and desires of refineries in general, use of its existing system, and such things as shortages making apportionment among users necessary. It also is clearly to Enbridge's benefit to focus on its desire to place the physical pipeline in the location it desires—along its existing pipelines and, when it deems this not feasible, the shortest alternative to reach Superior. It has done both of these things in its CN and Route Permit applications.

What are missing are alternative routes to reach and/or accomplish the two purposes listed above. More importantly, also missing is the information in its application to determine whether alternative end points and routes might actually be in the public interest, be beneficial to users, or to refineries, and eliminate or reduce apportionment.

This is not surprising: it is not the role of a private entity to provide objective information that another project might be more beneficial to the public interest or the private interest of other users.

This cherry-picking of data by Enbridge, and the resulting bias of analysis is plainly evident if one looks at how many pages in the route application Enbridge spends trying to demonstrate that its mainline corridor in Minnesota is congested and problematic. Meanwhile it is completely silent on discussing congestion and constraints along its proposed route from Clearbrook to Park Rapids. In fact, this corridor already has 3-4 pipelines which are forcing high impacts because of the clear environmental problems along this clearly inappropriate pipeline corridor.

For example, Enbridge talks about the number of "cross-overs" on its mainline corridor—accomplished by boring a line under existing lines to reach the other side because of obstacles to building the line along one side. In fact, there are numerous cross-overs on the existing corridor between Clearbrook and Park Rapids. (Source: Paul Stolen, retired DNR, experience with MinnCan corridor) Why isn't this discussed in the application?

C. "System alternatives" studied for the Sandpiper project.

There was a partial effort to study alternative endpoints for the Sandpiper project in the uncompleted Sandpiper review. The EIS will develop a more formal, deliberative and objective effort without allowing the Enbridge information to dominate as it did during the past administrative process. A similar, but more more comprehensive approach is needed for Line 3 with objective examination of other endpoints besides Superior.

D. Conclusion about an overview of project alternatives.

The project purpose as stated by Enbridge requires the need for a much more broadly defined alternatives analysis including a thorough, independent review of Enbridge's product apportionment, commitments to refiners, and alternative physical routes and physical structures to meet these commitments. Such a review would result in identification of other alternatives to meet the project purpose.

In summary, the following considerations yield a conclusion that significantly different routes other than expanding Enbridge's mainline corridor or following Enbridge's proposed southern route must be considered. This essentially means establishing another pipeline corridor in a safer location that also likely is a more direct route to Enbridge's customers.

1. As noted above, the approach to defining alternatives must be accomplished by addressing the project's purpose by integrating the proposed project into the entirety of the Enbridge system of supplying refineries, not the purpose of going to Superior, Wisconsin.

2. Enbridge's mainline corridor is described by Enbridge as being congested east of Clearbrook, and also having problems obtaining approval from Indian Tribes and the U.S. Forest Service.

3. The administrative record on the Sandpiper project, incomplete and inadequate because an EIS has not been accomplished, did nonetheless demonstrate major problems with the proposed Sandpiper corridor. This proposed corridor from Clearbrook to Park Rapids is congested in the same manner as Enbridge's mainline corridor.

4. Minnesota and federal law and regulations state that economic considerations alone are not given pre-eminence in reviews and permits, and that alternatives with less impact must be given a hard look.

Comment 5. Risk assessment and consequence analysis.

FOH received a report prepared by Paul Stolen concerning the need for a scientifically sound assessment of risk and consequences of oil releases for the Sandpiper and Line 3 projects. Based on information in the report we are deeply concerned with many aspects of this report, including the vulnerability of highly complex centralized and satellite operated control systems such as used by Enbridge, and by the recent evidence of new pipelines rapidly corroding or rupturing. We agree with his conclusions

Comment 6. Specific alternative routes

The following routes should be examined for the Line #3 Replacement project. These alternative routes reflect FOH's position that no new pipelines should be constructed through Minnesota's northern water landscape. Rather this new energy corridor should be placed in a location that has the lowest risk environmentally for the state and is the easiest to mitigate should a spill occur. These routes also provide jobs and tax revenues for the state while preserving the high water quality of Minnesota's lakes, streams, and aquifers and insuring the future of these waters for generations to come.

Alternate Route A (This is designated as SA-04 in the Sandpiper docket)

Alliance pipeline corridor from Alberta, Canada to Illinois

Alternate Route B

Viking and Alliance pipeline corridors with short link of new corridor

Alternate Route C

Keystone 1 and Alliance pipeline corridors

See attached maps for description and illustration of route alternatives A, B & C.

There is one other alternative replacement proposal for Line 3 which deserves serious consideration and study by Minnesota's governing agencies and the public. Enbridge's stated reasons for replacing Line 3 are its age, 50 years old, and its numerous integrity anomalies (corrosion, cracks, holes, leaks, spills) along the line due to its age. FOH is aware there are two older pipelines, over 60 years old, also sharing the Enbridge Mainline northern corridor with Line 3. Is this a situation wherein it is advisable to replace all three old pipelines with one large pipeline with the equivalent capacity of the three old lines.

It is evident to FOH that Enbridge will be coming back to the state in the near future with an application to replace one of those 60 year old pipes. Do the Minnesota government, the Company and the public want to expend the time, money and resources to re-fight, re-litigate, and potentially incur long and expensive delays again?

The Appeals Court order for an EIS before any further pipeline proceedings can occur has provided Minnesota with the perfect opportunity to address this matter with a more deliberative and comprehensive process. A properly conducted EIS that encompasses and examines all of the state's features will greatly inform the decision of how and where a new hazardous liquids energy corridor, if necessary, should cross the state.

ALTERNATE ROUTE "A" (Designated SA-04 in Sandpiper docket)

ALTERNATE ROUTE A utilizes an existing energy corridor of which Enbridge is a 50% shareholder with Alliance Company of Canada. This corridor shares crossing points with Enbridge's Line 3 corridor in Alberta, Canada and links to the Enbridge system near Flanagan, Illinois. At this point it is connected to the remainder of Enbridge's pipeline system. The Line 3 Replacement project can follow this corridor.

FOH believes another pipeline replacement option should be considered utilizing this corridor. Given Enbridge's stated reason for replacing Line 3, its age (over 50) and serious integrity anomaly issues, and given Enbridge has two other aging pipelines, both 60+, perhaps the option of replacing all three aging pipelines with one very large diameter pipeline with equivalent capacity should be considered and studied. In light of the Appeals Court order for an EIS it makes sense to execute that EIS on a large scale in Minnesota and regionally to determine the ideal and environmentally lowest risk location for a new energy corridor that will take into account the longevity and future use and transport of hazardous liquid materials. That location is not through Minnesota's pristine northern lake country region as well as that of Wisconsin and Lake Superior.

Figure 7853.0510-2
Pipeline System Map

ALT ROUTE A traverses almost exclusively agricultural lands below Minnesota's primary lake country. This area is sparsely populated with mostly small towns among the farmlands.

ALTERNATE ROUTE "A" (Designated SA-04 in Sandpiper docket)

Note: Enbridge's Mark Curwin, Senior Director for Strategic Coordination of Major Project Executions in the US, stated their construction preference is to build pipelines across farmland. He made these remarks at a public meeting in Park Rapids on Jan. 29, 2014. In attendance were two Minnesota legislators, Roger Erickson and Rod Skoe, as well as local Hubbard County government, agency and business officials. Mr. Curwin gave the reasons of better soils, easier construction, easier access, less natural habitat destruction, cheaper and quicker. After construction the farmland can be put back into crop production. Access to leaks and spills is much easier. Winter wetland construction would be at a minimum.

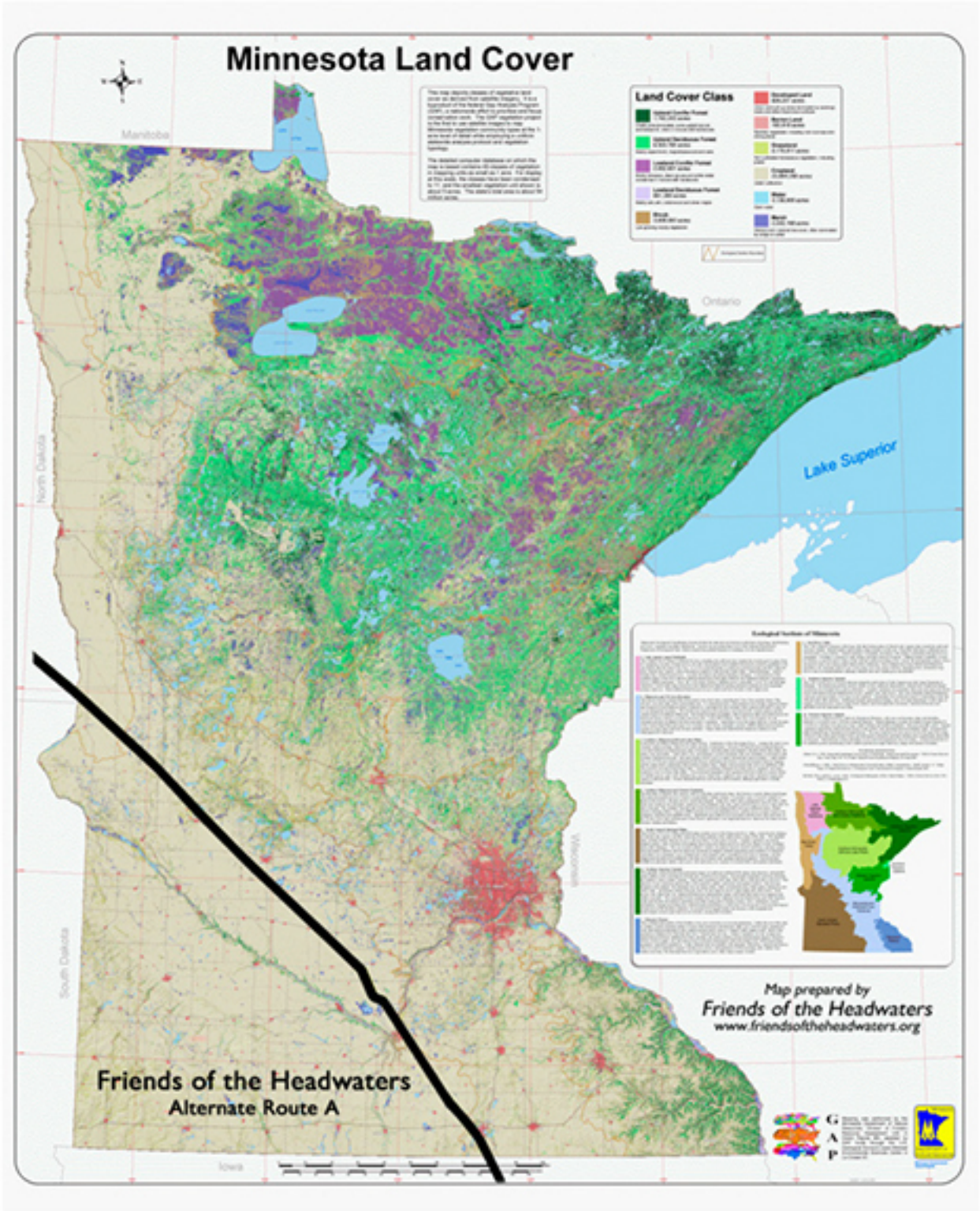

ALTERNATE ROUTE A
(Designated SA-04, Sandpiper docket)

It is plainly clear from these maps the differences between Enbridge's proposed Line 3 and Sandpiper "southern" corridor and FOH's proposed alternate energy corridor for Minnesota. During the Sandpiper proceedings the PCA rated these routes. FOH's scored lowest risk to environment. Enbridge's the highest risk.

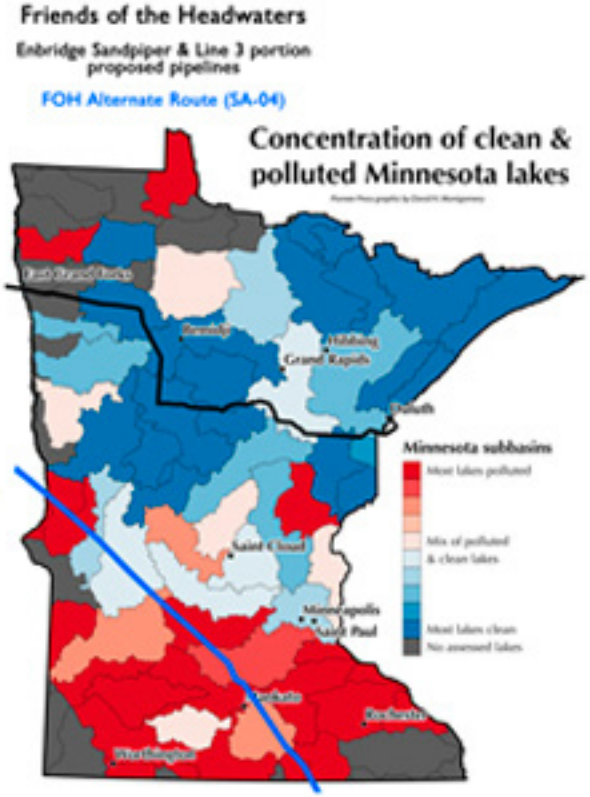

ALTERNATE ROUTE B

Alternate route B (red) uses Viking & Alliance (SA-04)(Sandpiper docket) pipeline corridors. It will require short link of new corridor from Viking to Alliance corridor. At intersection point of Enbridge "mainline" corridor and Viking corridor (purple), Line 3 Replacement follows Viking south. Where Viking turns southeast, Line 3 continues south (new corridor) until meeting Alliance corridor (blue). Line 3 joins Alliance and continues onto the Enbridge facilities in Flanagan, Illinois and Enbridge pipeline system.

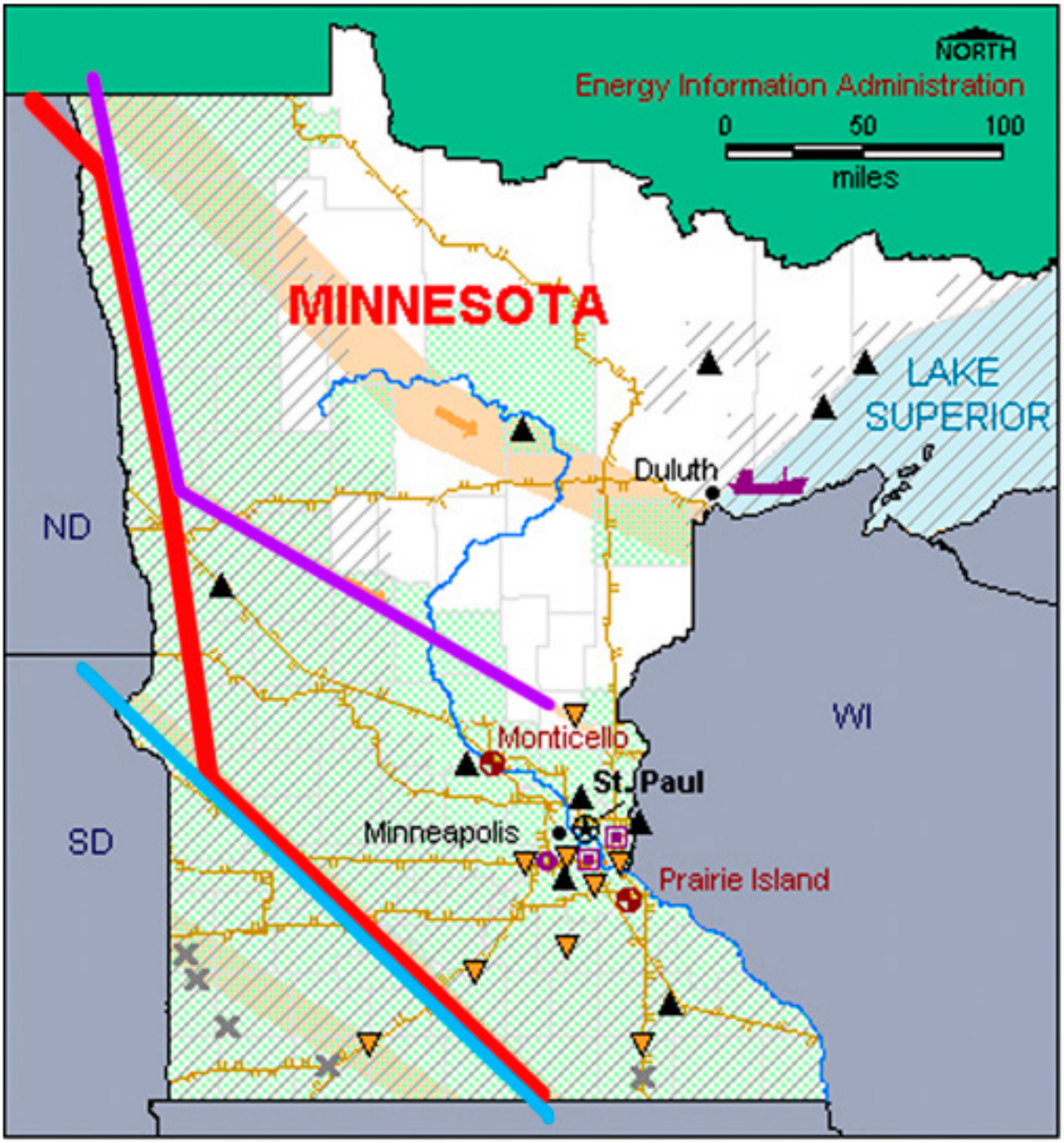

ALTERNATE ROUTE C

Alternate C (blue) uses the Keystone 1 corridor (green) and Alliance (SA-04)(Sandpiper docket) pipeline corridor (red). Enbridge's Line 3 Replacement (ourple) at its junction with Keystone would turn south and join that corridor in North Dakota until intersecting the Alliance corridor. At which point Line 3 would follow the Alliance corridor and continue onto to Enbridge facilities in Flanagan, Illinois. As previously noted, it is now connected to Enbridge's pipeline network servicing the Midwest, eastern Canada and Gulf Coast.

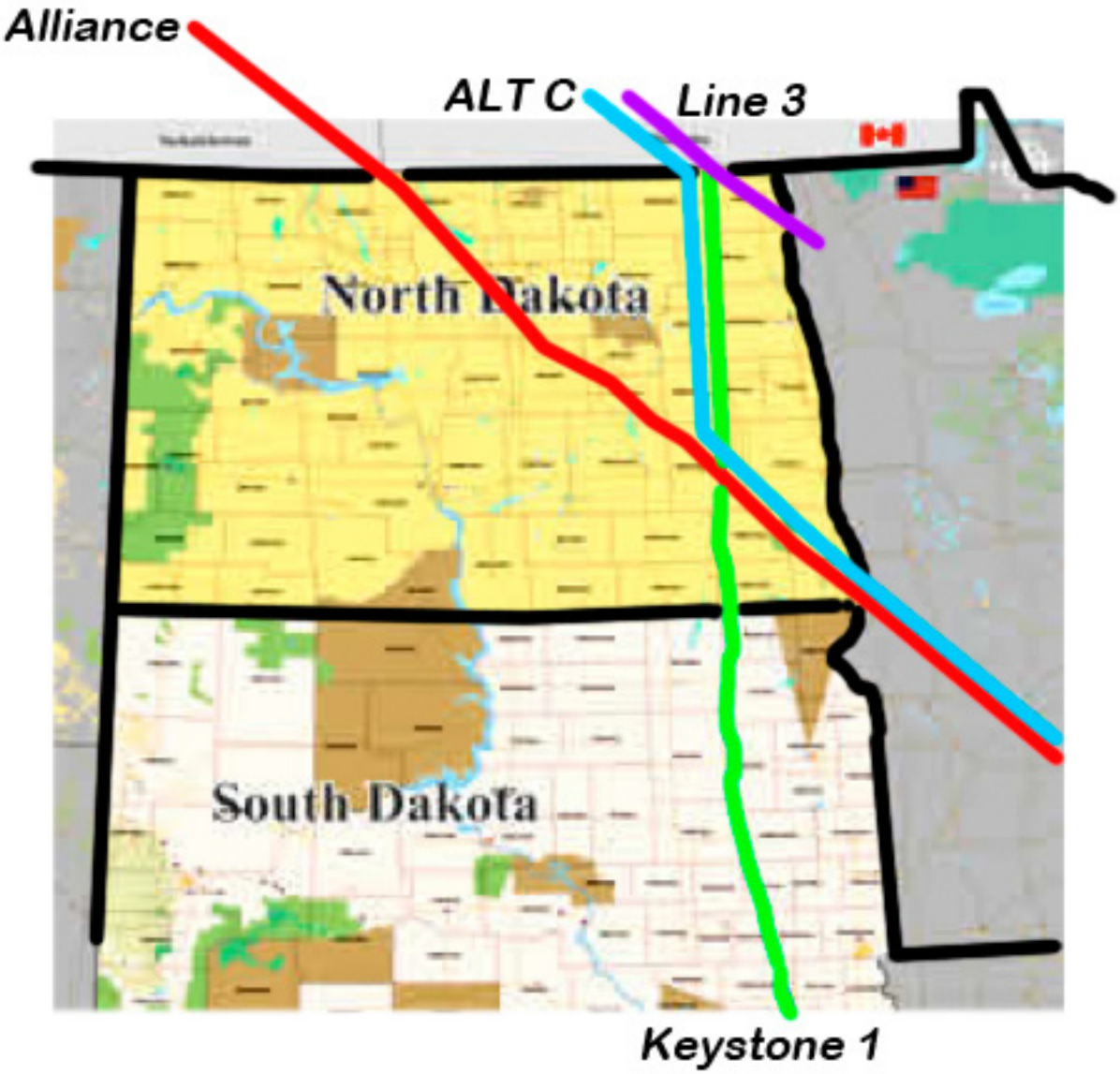

As previously suggested this route could also be used for the option of building a large new pipeline to replace the three aging lines currently in the Enbridge Mainline "northern" corridor.

PART 2

In the Matter of the Applications of Enbridge Energy Ltd Partnership for a Certificate of Need and a Pipeline Routing Permit for the Line 3 Pipeline Replacement Project in Minnesota
Public Utilities Commission (PUC) Docket Numbers: PL-9/CN-14-916 (Certificate of Need), PL-9/PPL-15-137 (Route Permit)

September 28, 2015

Prepared by
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Friends of the Headwaters ("FOH") opposes the Enbridge Energy Line 3 pipeline as currently projected to cross Minnesota's lake country from North Dakota to Superior, Wisconsin.

The Line 3 Pipeline Replacement project is proposed to co-locate alongside the, as yet approved, Enbridge dba NDPC Sandpiper pipeline "southern corridor" from Clearbrook, MN to Superior.

We believe Enbridge's proposed Sandpiper/Line 3 "southern corridor" will NOT protect the high quality waters along this route.

Friends of the Headwaters also believes Enbridge intends to proliferate other pipelines into this corridor with their southern route proposal.

Enbridge is proposing to replace Line 3 because it is an aging 50 year old line with numerous "integrity anomalies", corporate speak for corrosion, leaks, ruptures and spills. Line 3 currently resides alongside two older pipelines (in their 60s) yet. Does Enbridge propose to relocate those into this southern corridor?

Besides our important residential and recreational lakes Minnesota's best wild rice lakes are also extremely vulnerable to this proposed pipeline. Those lakes are culturally and economically significant to Minnesota's Ojibwa tribes as well as being important food sources for our migratory waterfowl populations.

The "southern corridor" will severely jeopardize the Straight River aquifer in southern Hubbard County. The aquifer is critical as the sole drinking water source for the county seat, Park Rapids. as well as supporting the county's primary agricultural crop, potatoes. Annual revenue from the potato crop approaches $500 million. A leak/rupture in the aquifer would severely impact this agricultural revenue, damage Park Rapids' potable water source, and despoil a renowned brown trout stream, as well.

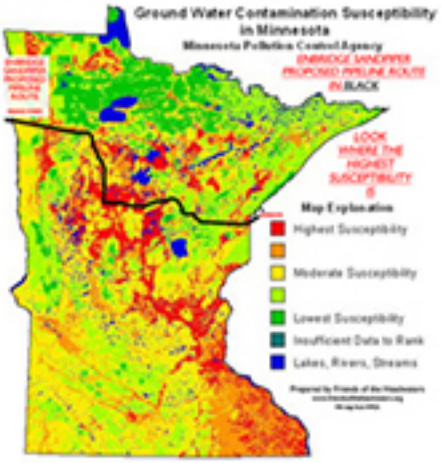

Hubbard County natural resources support a vibrant tourism community with nearby Itasca State Park, America's second oldest state park after Niagara Falls and home to the headwaters of America's most famous river, the Mississippi, and with its family-owned lake country resort businesses. The Minnesota Tourism Office estimates $100 million dollars per year are spent in the county, 60% of that during vacation season. A catastrophic oil spill on the level of Enbridge's Kalamazoo River spill would devastate the county's tourism business.

Given the high risks to the county, state and private lands and waters along the proposed southern route, *FOH* strongly disagrees with the PUC/DOC's position that a full environmental impact study (EIS) is not necessary for the confirmation of Enbridge Line 3 route proposal. A PUC/DOC conducted CEA (comparative environmental analysis) will fail to meet MEPA standards. *FOH* believes a complete EIS with the requisite and cumulative leak/spill scenarios and assessments for the lakes and rivers, trout streams, wild rice beds, lake homes and resorts, ground water sources, farmlands, wetlands, wildlife, local communities and their economies will validate *FOH's* position of moving this joint Line 3/Sandpiper route to a lower risk part of the state.

On September 14, 2015 the Minnesota Appellate Court agreed with Friends of the Headwaters and by unanimous decision ordered the PUC to conduct an EIS for the Sandpiper Certificate of Need docket. The Court's order also voided the PUC's written order previously granting Enbridge/NDPC its Certificate of Need. Since Line 3 is proposed to be co-located in the Sandpiper Corridor, FOH believes all Line 3 proceedings must be stayed until the proper EIS is executed and completed on Sandpiper and a final resolution on all permits is determined.

Therefore, *FOH* is proposing some alternate routes for the Enbridge Energy Line 3 Replacement pipeline and Sandpiper pipeline that do not traverse any of Minnesota's clearest and cleanest lakes, rivers, trout streams, and fragile aquifers. Details and maps to follow.

Before preparing these alternate routes *Friends of the Headwaters* first used the document
7852.1900 "Criteria for Pipeline Route Selection"
made available at the August 18, 2015 PUC/Enbridge Line 3 Public Hearing in Park Rapids, MN to determine the fallibility of Enbridge Energy's proposed southern corridor route. *Friends of the Headwaters'* comparative economic and environmental analysis of the impact of Enbridge Energy's Line 3 pipeline upon the listed "Criteria for Pipeline Route Selection" fell short of meeting the requirements to maintain, sustain and protect the lands, waters and people along the proposed corridor.

Under Subp. 3. Criteria:
A. human settlement, existence and density of populated areas, existing and planned future land use, and management plans.

Hubbard County realizes $34 million dollars annually in tax revenue(2012 data). 59% of its properties are water-influenced, meaning either on or have a view of a lake or river. Those parcels yield a $20 million dollar figure. The Fishhook Chain of Lakes watershed is principally affected by the Line 3 pipeline. The value of the water-influenced properties on the Fishhook Watershed is about $2 billion.

If a large rupture on the order of the Enbridge 2010 Kalamazoo River, Michigan spill (1 million gallons) occurred at Hay Creek near the top of that watershed, it would dramatically impact the property values on those lakes resulting in a significant loss of tax revenue to the county, state, Park Rapids and its school district. It will be years before the county recovers from the damage. Not only will it incur the loss of tax revenues, but also the loss of residents, small businesses, tourists, and property values.

B. the natural environment, public and designated lands, including but no limited to natural areas, wildlife habitat, water, and recreational lands.

Any pipeline leak/spill/rupture will severely impact the sustainable, environmental quality of life in Hubbard County. Itasca State Park, Mississippi River headwaters, LaSalle Scientific and Natural Area, Straight River brown trout fishery, Hay Creek, the Fishhook Chain of Lakes watershed, Straight River aquifer, Shell River, the Crow Wing River, and the many other nearby lakes all support and provide numerous recreational opportunities - swimming, fishing, hunting, hiking, biking, bird watching, boating, and others. $100 million tourism dollars/yr are at risk for Hubbard Cty alone. $600 million annually for the northern counties on the proposed route.

C. lands of historical, archaeological and cultural significance

The history of Native Americans and the early explorers in and around Itasca State Park is an asset to drawing tourists to the park (500,000 annually). The wild rice waters in Hubbard and Clearwater Counties are culturally and economically significant. The proposed Line 3 & Sandpiper route is dangerously close to Upper Rice Lake, the Anishinaabeg's best wild ricing lake in Clearwater County. The wild rice harvested there is commercially and domestically important to the White Earth Ojibwe.

D. economies within the route, including agricultural, commercial or industrial, forestry, recreational, and mining operations.

All future business, residential, retirement and agricultural growth will be impacted by any pipeline leak/spill/rupture. Over 500 jobs and $500 million dollars in revenue/year are generated by the potato crop alone. Besides potatoes and the commodity crops of corn and beans, fresh fruit and vegetables are also grown and marketed locally to residents and tourists by smaller farms operating within the Straight River aquifer. Farm incomes and tourists dollars drive the local small business economy.

Although some small businesses may see a short term gain from pipeline construction, the long term economic vitality of the community, its businesses and people may not recover from a spill.

Enbridge touts the tax payments it will be making annually to Hubbard County. The public has heard the figure of $5 million for the Sandpiper, but relative to the value of the Bakken and Alberta tar sands oils proposed to pass through the county each year, that tax revenue seems woefully short for the risks assumed. What costs will the county incur for infrastructure repair after construction? What will be the costs of training police, fire, paramedic and medical personnel in the special hazards of oil spills and fires? We haven't heard anything about the PUC requiring a significant Escrow account to ensure funds are available when a pipeline fails. Does the PUC know Enbridge has sued these same northern counties for a refund on previously paid property tax dollars?

The state and its northern counties derive income from their forest lands. Those forest taken out of production along "Greenland" portions of the proposed route will mean a loss of timber jobs and income, as well as a loss of habitat for wildlife, especially birds.

E. pipeline cost and accessibility

How much higher are the construction costs of multiple bores under rivers and streams? What are the contingency plans and costs for controlling "frackouts" in stream beds during a bore. *FOH* has learned a "frackout" occurred on nearly every stream or river bore during this area's last pipeline construction project. What are the costs and issues for winter construction of wetlands along the route? How do the company and clean-up agencies access those wetlands in non-winter seasons if a leak/spill/rupture occurs? What are the economic consequences of summer construction and congestion issues with roads and traffic? How will lodging, not just for construction crews, but also for tourists be affected. How will the compatibility of construction workers be with tourists, residents and local businesses. How trustworthy and reliable will these workers be with respect to property and paying for services. FOH knows some resort owners have will not provide lodging for pipeline workers due to previous pipeline worker negative experiences. Will Enbridge be financially responsible for covering damages or lost income from disreputable and irresponsible workers? Only a full EIS will provide the public and governing agencies this information.

F. use of existing rights-of-way and right-of-way sharing and paralleling.

Although Enbridge is proposing to use existing energy corridors in Hubbard County numerous landowners along the route have complained of poor easement usage, property damage, poor restoration or reclamation efforts, and generally bad relations with other pipeline companies. They are skeptical of Enbridge claims to treat them better given accounts they have seen or heard from landowners on the Enbridge northern

pipeline corridor. Landowners along the proposed route are also concerned of the liability issues regarding detection and reporting of any leaks or spills. Attorneys have warned landowners to be wary of the language within the Enbridge easement contract.

G. natural resources and features

FOH has no faith in Enbridge word they can safely protect the lands and waters of Minnesota's lake country.

All pipelines leak eventually. While conducting a complete EIS for the Pebble Mine near Bristol Bay, Alaska, the EPA examined the history of pipeline spills relative to the age and mileage of all pipelines. They determined that every pipeline will leak at least once every 30 years over every 30 miles of length. Not surprisingly the history of Enbridge spills along their northern corridor in Minnesota fits that profile quite well. To quote from a 2003 MPCA report to the NTSB: "nearly three dozen non-third-party spills, leaks or ruptures on just one Enbridge 34 inch line occurred between 1972 and 2003. About 87% of the petroleum gallons spilled from all Minnesota pipelines in the period 1991 to 2002 was from that Enbridge line. This is equal to about 48% of the reported gallons of petroleum spilled from all sources in Minnesota during that period. Included in the Enbridge 34 inch line spills are the 1.7 million gallon rupture in 1991 in Grand Rapids and the 250,000 gallon rupture on July 4, 2002 in Cohasset. 300,000 gallons of the Grand Rapids spilled flowed to a river. Luck with the timing of the spill and river ice conditions kept thousands of gallons of crude from entering the Mississippi River. Oil in the Mississippi would likely have fouled the St. Cloud, St. Paul, and Minneapolis drinking water intakes for months. Likewise the Cohasset spill could have easily entered the Mississippi River if it had happened in a different segment of that 34 inch pipeline."

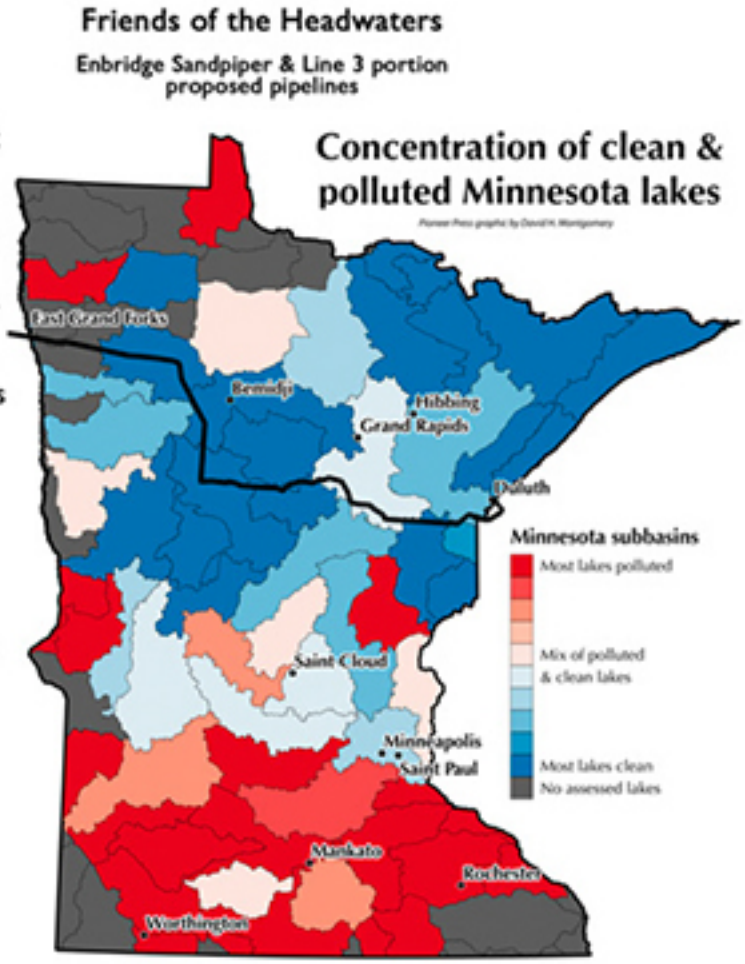

The Mississippi River Headwaters, Itasca State Park, the Straight River aquifer and brown trout stream, the Shell and Crow Wing Rivers, the Fishhook Chain of Lakes, Upper Rice Lake and other wild rice lakes, the Pine River and Whitefish Lake Watershed, the Big Sandy region, and some of the clearest lakes in the state are all at risk from this proposed Enbridge "southern corridor" and their stated plans to make it a multiple pipeline corridor.

H. the extent to which human or environmental effects are subject to mitigation by regulatory control and by application of the permit conditions contained in Minn. Rule, part 7852.3600 for pipeline right-of-way preparation, construction, cleanup, and restoration practices.

Enbridge's history with the Alberta Clipper line, Line 3 and other lines in the northern corridor is well known as stated above. The PUC completely ignored the numerous landowner complaints of Enbridge's poor behavior, cleanup, follow-up, and restoration efforts or lack thereof on the Certificate of Route and Need Applications for the Alberta Clipper line. *FOH* has learned some landowners are losing buildings, well houses, wood lots, and in some cases homes to Enbridge's easement demands. Eminent domain actions are especially disliked.

I. cumulative potential effects of related or anticipated future pipeline construction

Enbridge has stated the Line 3 Replacement will occur in the proposed Sandpiper "southern corridor". FOH has advocated for a full, comprehensive EIS (environmental impact study) to be conducted by the proper state and federal regulatory authorities as absolutely essential. And the Minnesota Appellate Court agreed. An EIS must be conducted. All leak/spill/rupture risk scenarios must be assessed and fully described for high value resources. The EIS must also compare all reasonable and prudent alternative routes.

J. *"the relevant applicable policies, rules, and regulations of other state and federal agencies, and local governmental land use laws including ordinances adopted under Minnesota Statutes, section 299J.05, relating to the location, design, construction, or operation of the proposed pipeline and associated facilities."*

A project of this magnitude as planned through the heart of *"The Land of 10,000 Lakes"* must conform to the standards prescribed in MEPA.

"No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct."

Since *Friends of the Headwaters* does not believe this proposed multiple pipeline "southern" corridor with the Sandpiper and Line 3 Replacement can meet the high standards set above for quality, safety and sustainability of the lands and especially waters along the route, *FOH* is proposing a "real" southern corridor for Sandpiper and the Line 3 Replacement project. Map below previously produced for Sandpiper proceedings. The suggested corridor is the same for Line 3 Replacement only extending from Alberta.

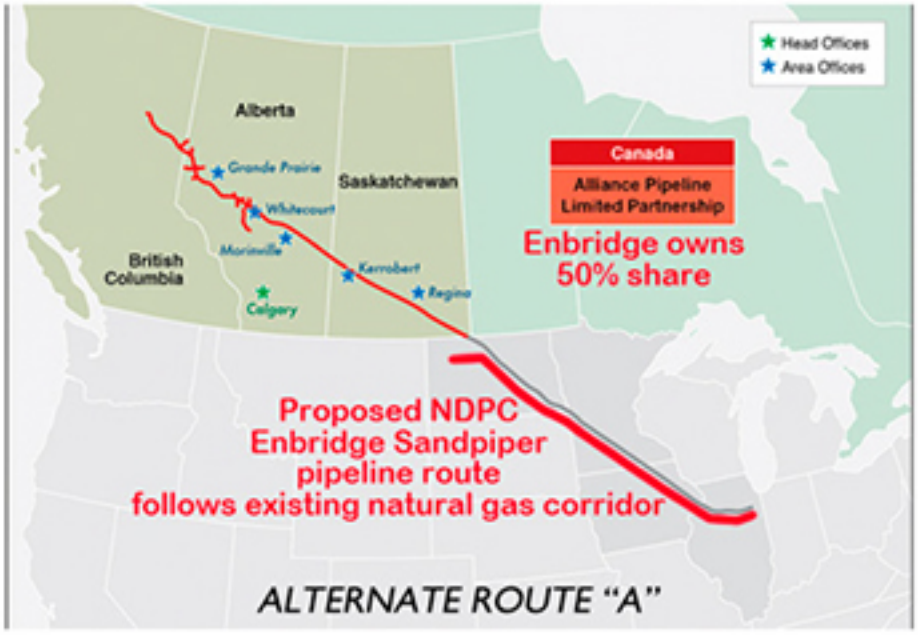

ALTERNATE ROUTE "A" (Designated SA-04 in Sandpiper docket)

ALTERNATE ROUTE A utilizes an existing energy corridor of which Enbridge is a 50% shareholder with Alliance Company of Canada. This corridor shares crossing points with Enbridge's Line 3 corridor in Alberta, Canada and links to the Enbridge system near Flanagan, Illinois. At this point it is connected to the remainder of Enbridge's pipeline system. The Line 3 Replacement project can follow this corridor.

FOH believes another pipeline replacement option should be considered utilizing this corridor. Given Enbridge's stated reason for replacing Line 3, its age (over 50) and serious integrity anomaly issues, and given Enbridge has two other aging pipelines, both 60+, perhaps the option of replacing all three aging pipelines with one very large diameter pipeline with equivalent capacity should be considered and studied. In light of the Appeals Court order for an EIS it makes sense to execute that EIS on a large scale in Minnesota and regionally to determine the ideal and environmentally lowest risk location for a new energy corridor that will take into account the longevity and future use and transport of hazardous liquid materials. That location is not through Minnesota's pristine northern lake country region as well as that of Wisconsin and Lake Superior.

Figure 7853.0510-2
Pipeline System Map

ALT ROUTE A traverses almost exclusively agricultural lands below Minnesota's primary lake country. This area is sparsely populated with mostly small towns among the farmlands.

ALTERNATE ROUTE "A" (Designated SA-04 in Sandpiper docket)

Note: Enbridge's Mark Curwin, Senior Director for Strategic Coordination of Major Project Executions in the US, stated their construction preference is to build pipelines across farmland. He made these remarks at a public meeting in Park Rapids on Jan. 29, 2014. In attendance were two Minnesota legislators, Roger Erickson and Rod Skoe, as well as local Hubbard County government, agency and business officials. Mr. Curwin gave the reasons of better soils, easier construction, easier access, less natural habitat destruction, cheaper and quicker. After construction the farmland can be put back into crop production. Access to leaks and spills is much easier. Winter wetland construction would be at a minimum.

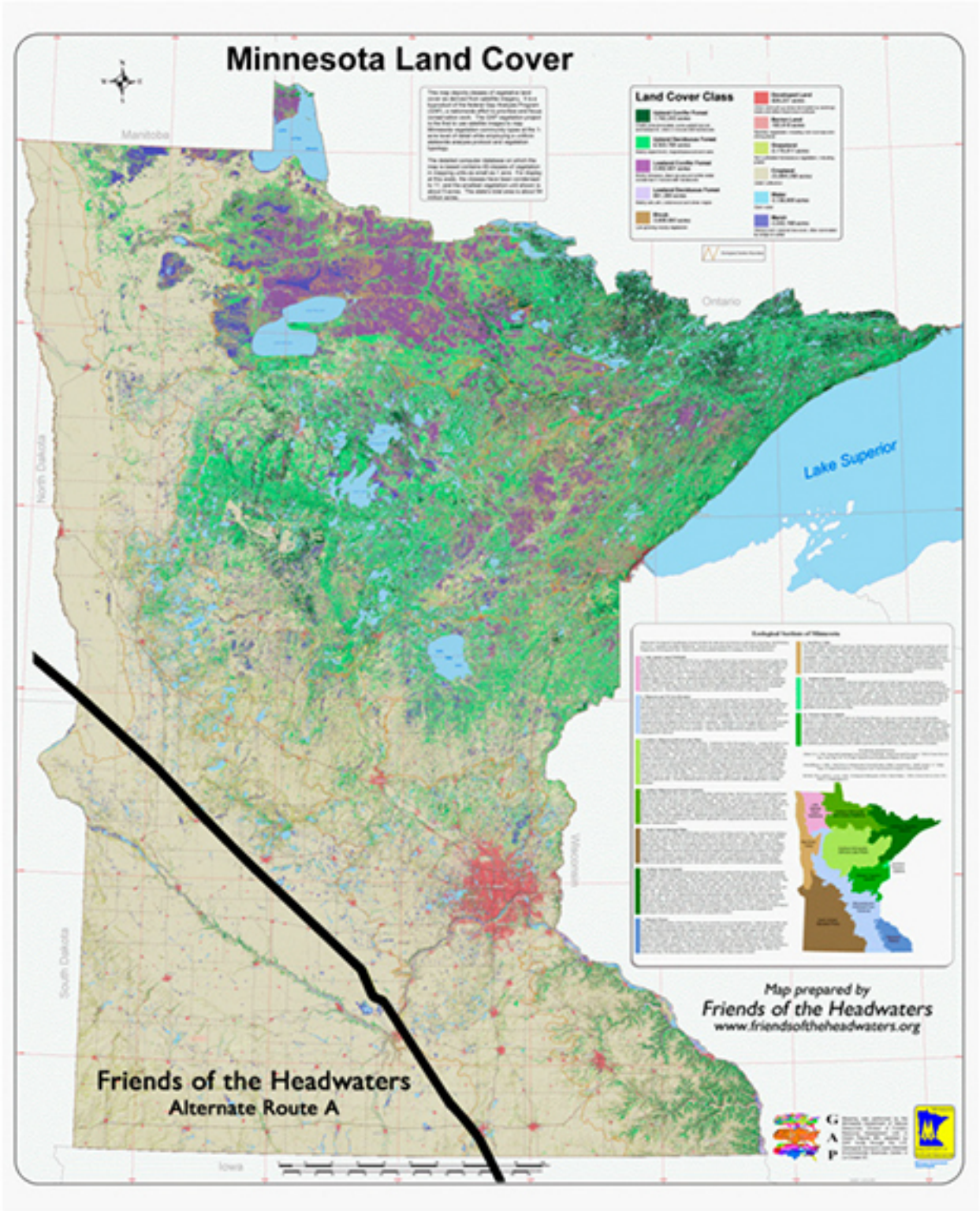

ALT ROUTE A avoids all the major risk areas of the lake country: high quality lakes and streams, sensitive aquifers, culturally significant wild ricing waters, and valuable lakeshore and vacationland assets.

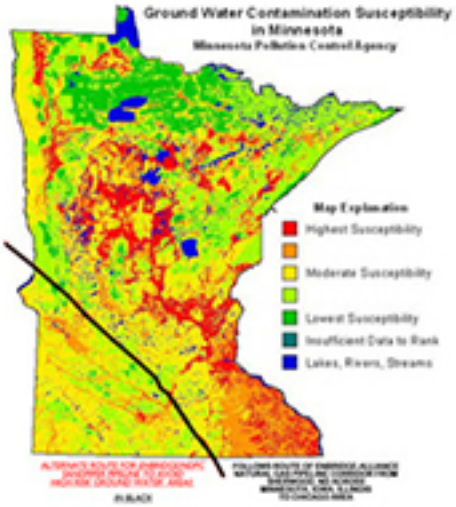

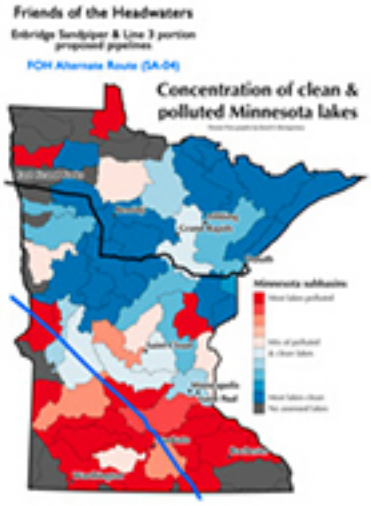

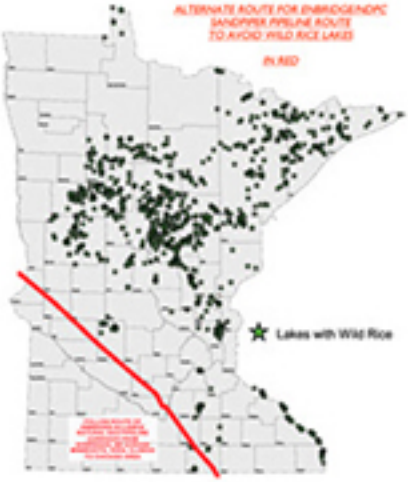

Minnesota still gets to keep jobs the construction will provide as well as North Dakota plus Iowa and Illinois. Jobs for Americans.

Although the route does not end in Superior, it still ties into the existing Enbridge system in Illinois with routing options to Michigan and Ontario that avoid our greatest freshwater lakes of Lake Superior and the Mackinac Straits of Lakes Michigan and Huron, including the northern lake country of Wisconsin and the St. Croix Nat'l Wild and Scenic River. The Illinois Hub also allows Enbridge access to its pipelines to Oklahoma and points south.

Since it's an existing corridor the company should have access to the mapping previously done for the pipeline already there. ALT ROUTE A also intersects in southern Minnesota pipelines owned and operated by other companies which provide the option of re-routing Bakken or tar sands oil to the refineries in Rosemont and St Paul Park in the south Twin Cities Metro.

As currently planned with the exception of a few tax dollars and short term construction monies Minnesotans derive no long term benefits from these pipelines and assume all the risks from leaks/spills/ruptures. And eventually these pipelines will leak or break. THE EPA Pebble Mine statistics said so and Enbridge's spill history in Minnesota proves it true.

Friends of the Headwaters therefore recommends to the PUC, DOC and other state agencies that they enforce our MEPA statutes and deny the Certificate of Route permit for the Enbridge proposed Line 3 pipeline corridor through Minnesota's prime lake country. A perfectly viable, low risk alternative is available south of our best waters.

Friends of the Headwaters believes a barrel of water IS worth more than a barrel of oil.

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENTS "K"

K-1 Smith 11.19.14 Direct Testimony SP
K-2 Smith 1.15.15 Surrebuttal Testimony SP

Record of Richard Smith's Direct Testimony and Surrebuttal Testimony for Sandpiper Pipeline Contested Case and Evidentiary Hearings

Smith Direct Testimony on Behalf of Friends of the Headwaters, Ex. 181

FRIENDS OF THE HEADWATERS

MINNESOTA PUBLIC UTILITIES COMMISSION

MPUC DOCKET NO. PL-6668/CN-13-473
OAH DOCKET NO. OAH-8-2500-31260

DIRECT TESTIMONY OF RICHARD SMITH

NOVEMBER 19, 2014

Q. Please state your name, organization, title and on whose behalf you are testifying.

A. My name is Richard Smith. I am President of the Friends of the Headwaters (FOH) organization, an Intervener in this case, on whose behalf I am testifying.

Q. Have you testified in proceedings before the Public Utilities Commission before?

A. No.

Q. What is your background, education and experience?

A. I am a professional photographer and small business owner, and have been since 1979. Between 1988 and 2008 I owned and operated a commercial advertising photography business. As part of my business, I secured extensive on the job training in design, layout, advertising, graphics, Adobe Acrobat, Photoshop, Lightroom, film and digital photography and editing. I directed production crews of up to fifty persons for major advertising campaigns for top brands and companies in the world. My clients have included 3M, BMW, American Express, Budweiser, McDonalds, Microsoft, Tourism Turkey, the Wall Street Journal, Harpers, the New York Times, Sports Illustrated, The Nature Conservancy and the Foundation for Deep Ecology to name a few.

Since 2010 I have continued my photography business, with an emphasis on environmental and nature photography and clients. Since becoming President of the Friends of the Headwaters, because of the demands or participation in this process, I have reduced the hours devoted to my business by approximately fifty per cent.

I graduated Summa Cum Laude, Phi Beta Kappa from the University of North Dakota with a degree in Psychology and a secondary emphasis on Earth Sciences, geology, ecology, biology, chemistry, geomorphology and mathematics.

I taught ecology and natural sciences at the Environmental Learning Center in Isabella, Minnesota; I also drafted the curriculum for the North Woods Resource Center, an environmental and outdoor recreational learning center near the Boundary Waters Canoe Area Wilderness in Ely, Minnesota, where I worked for four years. This curriculum centered on

natural sciences with an emphasis on ecology. I taught orienteering, map reading (USGS topographic maps), hiking, cross country skiing, snowshoeing and winter camping skills. I worked with children in grades 6 through high school. I worked for a year as Program Director at the Center. For nine years I guided canoe trips in the Boundary Waters Canoe Area Wilderness and the Quetico Provincial Park in Canada and guided extended 21 day trips in northern Ontario as well as forty-two day and a seventy day expeditions in the Northwest Territories of Canada. I did this work in pre-GPS days, so used my extensive map reading skills. I used my photographic skills for various environmental groups who were working to secure protection for the Boundary Waters Canoe Area.

I have lived in Minnesota for 42 years. For the past 14 years, I have lived outside of Park Rapids, in Hubbard County, Minnesota. I moved to my present residence from Minneapolis because of my longstanding love for Northern Minnesota and its natural resources.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to introduce maps and other materials I have prepared in response to the pipeline that is being proposed in this proceeding and to summarize the position of the Friends of the Headwaters.

Q. Please summarize the Friends of the Headwaters' position in this case.

A. FOH is not opposed to pipelines, per se, but is definitely opposed to Enbridge/NDPC's Sandpiper pipeline route as currently proposed. Rather than the Applicant telling Minnesota it *needs* this pipeline as proposed, we believe Minnesota *needs* to make that determination on what is good and safe for Minnesota, not Enbridge/NDPC. Our position is Minnesota does not need another new pipeline corridor passing through the state's most sensitive water resources. Too much is at risk environmentally, economically and culturally. Our position is also that given the large scale nature of this project and that this new corridor is already the proposed site for a second pipeline, the Line 3 Rebuild, that the state should not only conduct a full environmental impact statement (EIS) with a complete environmental and economic risk assessment of the Applicant's proposed route, but also include a number of the System Alternative Routes

proposed by citizen groups. FOH is not confident the DOC-EERA environmental review as ordered by the PUC can be completed in a thorough and comprehensive manner in the short time provided. In order to fully address the Certificate of Need in these proceedings the state must not limit its consideration only to pipeline economics, but must include environmental economics in its assessment. It is our position only a full scope EIS can determine the state's NEED for this pipeline as currently proposed.

The Friends of the Headwaters disputes Enbridge/NDPC's contention that the Sandpiper must end in Superior, Wisconsin. Enbridge has provided no rationale for needing Superior other than "We want it. We need it to connect to our existing system in Superior." SA-04 also connects to their existing system hub near Chicago. It does not prevent Enbridge from then transporting the Bakken crude either south or across Illinois, Indiana, Michigan and across the border to Sarnia, Ontario, Canada on their existing system.

In summary, the Friends of the Headwaters opposes the NEED for the Enbridge/NDPC Sandpiper Pipeline route proposal. Enbridge already has too large a footprint across Minnesota's Headwaters Country. Too much is at risk, not only with the state's clearest lakes; groundwater aquifers, fish and wildlife; wild rice; lake and riverfront homes, businesses, and communities; tourism industry; lands and forests; and Lake Superior. The people of Minnesota should not allow a Canadian corporation with its "limited liability" US subsidiary, North Dakota Pipeline Company LLC, to dictate the terms of this project. Friends of the Headwaters does not believe this proposed multiple pipeline corridor with the Sandpiper and now Line 3 can meet the Minnesota's NEED for high standards for quality, safety and sustainability of the lands and especially waters along the route.

The position of Friends of the Headwaters is perfectly summarized in Minnesota's environmental law:

> *"No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable*

requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct." [MEPA 116D.04,Subd.6]

Q. Please describe the developments of your maps.

A. When I first heard about the proposed Sandpiper pipeline, friends, neighbors and other concerned citizens gathered together and formed Friends of the Headwaters. In order to educate ourselves and others about all the environmental aspects of the Applicant proposed Sandpiper route, I began to develop a series of maps using my background, interests and computer graphics ability to graphically illustrate where the proposed pipeline would go and the natural resources it would go through, across or near as it made its way to Wisconsin, and the threats is would, therefore pose to the region. After I spent hundreds of hours studying the potential environmental impact of the proposed route, I continued developing a series of maps showing other routes that were safer because emergency vehicles could more quickly reach spill sites, were less of a threat to fragile and in some cases rare ecological resources, and posed less threat to both surface and groundwater.

The maps I created were intended to inform the Commerce Department, this proceeding, and the Public Utilities Commission of the location where the risk of oil spills would be most damaging to the natural environment. According to a 2003 MPCA report to the National Transportation Safety Board, there were "nearly three dozen non-third party spills, leaks or ruptures on just one Enbridge 34 inch line between 1972 and 2003. About 87% of the petroleum gallons spilled from all Minnesota pipelines in the period 1991 to 2002 was from that Enbridge line….Included in the Enbridge 34 inch line spills are the 1.7 million gallon rupture in 1991 in Grand Rapids and the 250,000 gallon rupture on July 4, 2002 in Cohasset. 300,000 gallons of the Grand Rapids spill flowed to a river. Luck with the timing of the spill and river ice conditions kept thousands of gallons of crude from entering the Mississippi River. Oil in the Mississippi would likely have fouled the St. Cloud, St. Paul and Minneapolis drinking water intakes for months. Likewise the

Cohasset spill could have easily entered the Mississippi River if it had happened in a different segment of that 34 inch pipeline."

These maps were submitted as part of our comments to the Commerce Department in the preliminary stages of this proceeding, and have served as the basis for our presentations to the Public Utilities Commission, organizations, and other government bodies since that time. They have also served as the basis for now-designated system alternatives that are being studied by the Minnesota Department of Commerce for presentation on December 16 (target date). Each map attached to this testimony shows three routes/system alternatives: The black line shows the route the Applicant wants to use. The Red line shows a route developed by the Minnesota Pollution Control Agency, although, as I mentioned, it later stated that the third route/system alternative proposed by FOH is the best from an environmental perspective. The blue line shows FOH's preferred route, SA-04.

SA-04 was developed with a number of goals in mind. It would:

- still provide construction jobs and dollars;
- retain the pipeline's tax benefits for the state;
- remove the risks to our lakes, rivers, wetlands, wild rice lakes and drinking water sources for residents of Northern Minnesota, as well as those who depend on Mississippi River water throughout the state, including the Greater Minneapolis/St. Paul Metro area.
- protect businesses that rely on outdoor recreation, including fishing, hunting and wildlife watching, which bring in $4.3 billion in annual retail sales. (Fishing alone generates $342 million annually in tax revenue for the state.) Figures are based on a study completed during the recessionary economic period or 2007-09, which is the latest study with local and county data. (*See* http://www.exploreminnesota.com/industry-minnesota/research-reports/researchdetails/download. aspx?id=811)
- protect clear lakes, which mean high lakeshore property values, a key factor in property tax assessments;

By contrast, the maps show the serious problems with the route proposed by the Applicant. These serious problems must be addressed in the CON proceedings. FOH believes a full scope EIS comparing all the economic, environmental and cultural factors of the Applicant's route against the System Alternative routes is needed before any Certificate of Need is granted to the Applicant.

- The MPCA conducted a comparative environmental analysis for this docket of the proposed routes. A high score was least damaging to the environment; a low score the most damaging. FOH's SA-04 scored the highest. Enbridge's preferred route scored the lowest of the 8 system alternatives.

Q. Please describe the specific maps you created.

The attached pages contain the respective maps with the descriptions and graphics which were created. Although I agree these maps are primarily about routes I believe the environmental aspects of the maps presented must be addressed in these CON proceedings. The long term environmental health, economic welfare and cultural vitality of Minnesota's northern lake country and its clean water resources must be consider in the NEED for this pipeline and proposed location.

SEE ATTACHMENTS BELOW

Q. Does this conclude your testimony?

A. Yes.

Friends of the Headwaters
ROUTE COMPARISON MAP

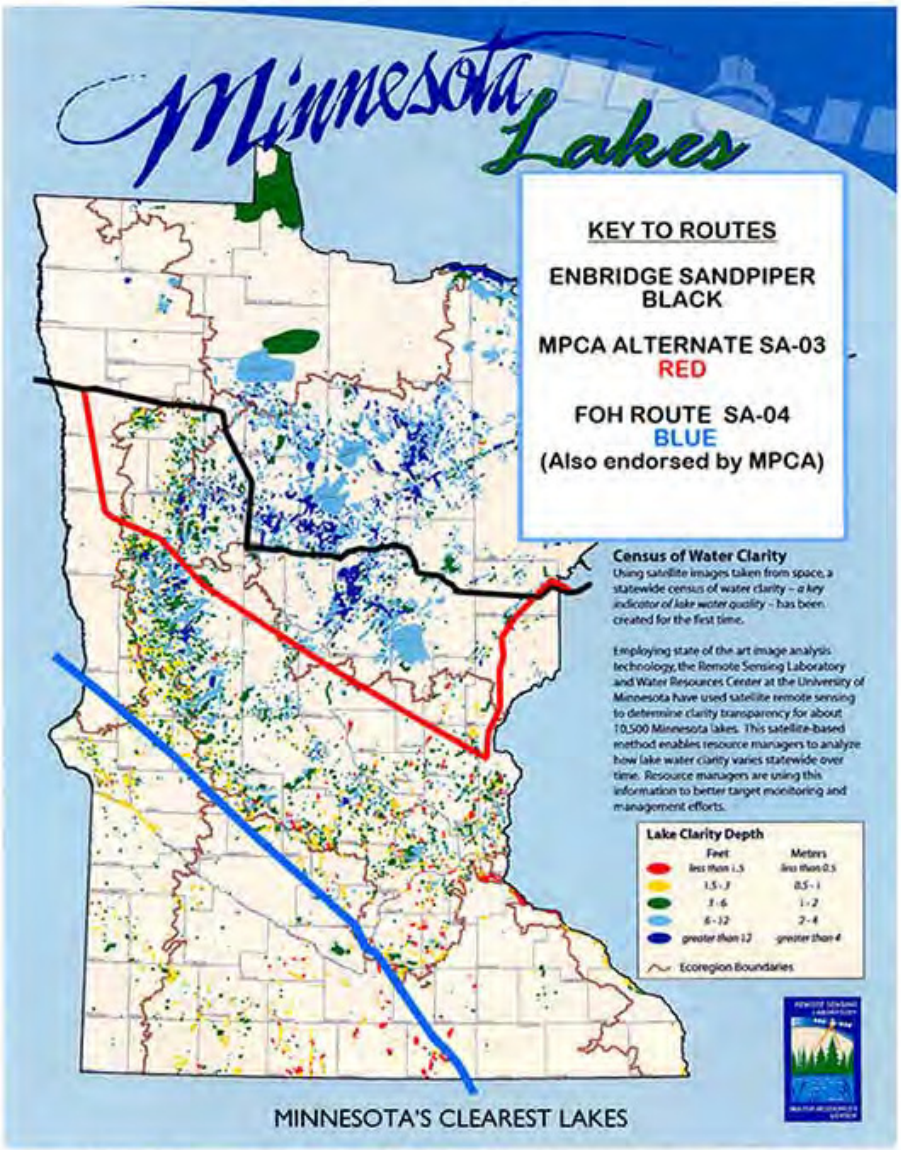

The Minnesota Water Resources Center at the University of Minnesota compiled the data on this map. Using satellite remote sensing they surveyed 10,500 lakes in the state, then ranked them for clarity. The dark blue lakes have the greatest clarity. A member of the Friends of the Headwaters found the map at a Minnesota Pollution Control Agency office. Using my Adobe Photoshop skills I scaled and overlaid the Enbridge/NDPC proposed Sandpiper route (in black) onto this map to indicate its proximity to these high value waters. I later added the two system alternative routes, SA-03 (red) and SA-04 (blue), to the map to illustrate how they compare in proximity to the state's clearest lakes.

Clear lakes are the key to Minnesota's tourism business. Fishing alone generates $342 million annually in tax revenue for the state. $4.3 billion in annual retail sales is earned from fishing, hunting and wildlife watching.*
*National Sportfishing Association

For Hubbard County tourism was $99M annually with 60% in June - Aug.
For Crow Wing County it was $150M with 49% in June - Aug.

www.exploreminnesota.com/industry-minnesota/research-reports/researchdetails/download.aspx?id=811

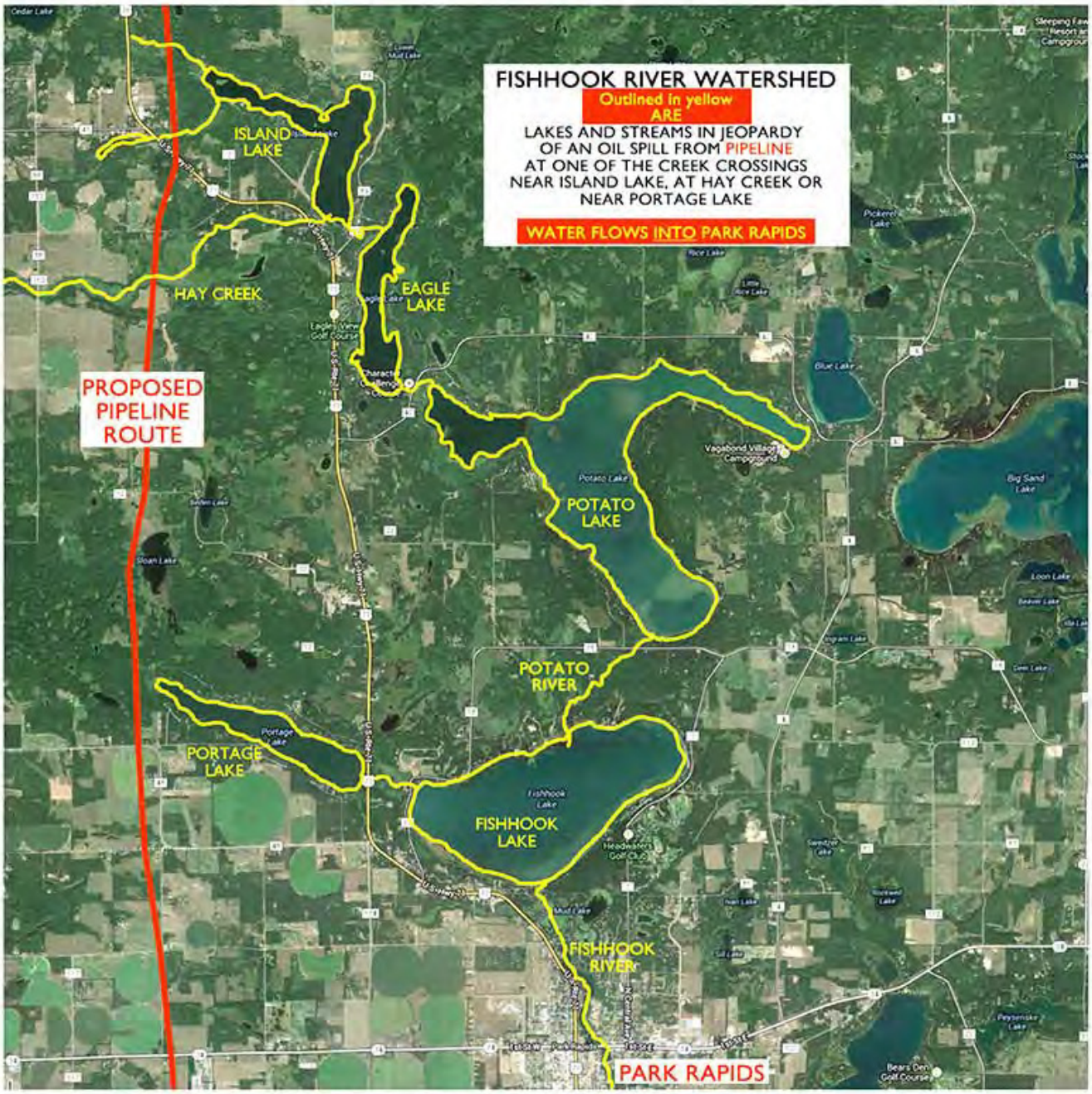

MINNESOTA'S CLEAREST LAKES MEAN HIGH PROPERTY VALUES

Clear lakes mean high lake shore property values which is a key factor in available property taxes to their respective counties.

Utilizing Google Maps I created this map of the Fishhook Watershed in Hubbard County. This map is my $2 Billion dollar map. That is the county's accessed property value of the water influenced properties along the yellow outlined shorelines of the watershed. The pipeline crosses three tributaries of this watershed as well as passing in close proximity to one of its lakes. Multiply those property values for the other lake chains and watersheds along the proposed Sandpiper route. Whitefish, Pine River, Fifty Lakes, Big Sandy, Lake Superior, and others.

Friends of the Headwaters
ROUTE COMPARISON MAP

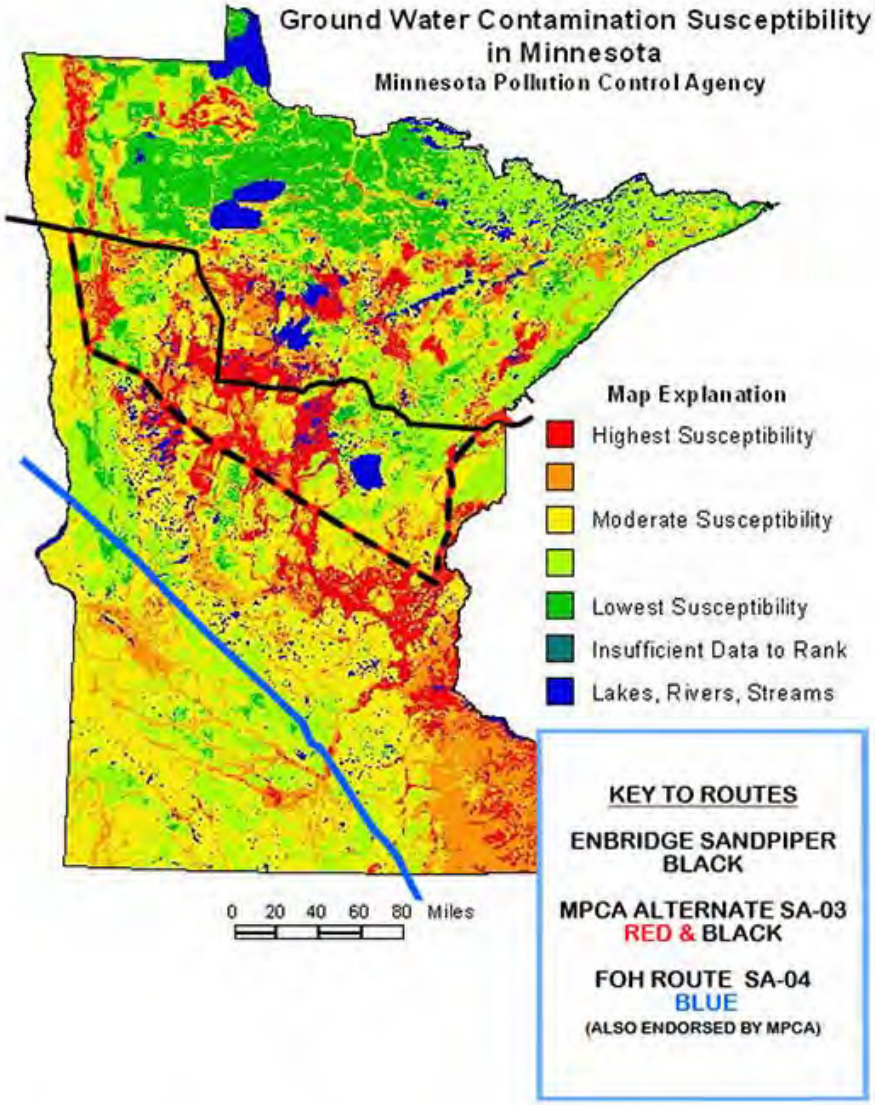

This map was found on the Minnesota Pollution Control Agency's website. Again, I overlaid the company's proposed route as well as the two system alternative routes.

Those bright red areas on the above map, besides being extremely susceptible to contamination, also just happen to be critical aquifers. Besides providing drinking water these aquifers also irrigate thousands of acres of farmland for Minnesota's farmers and the state's agri-business economy.

The Straight River aquifer supports the county's largest employer, the RDO/LambWeston Company, which grows and makes french fries for MacDonalds besides other potato products. The aquifer supplies all the drinking water for the county seat, Park Rapids and provides clear, cold water for a nationally renowned brown trout stream. All that at that right turn elbow in the Enbridge/NDPC route.

Nothing is more critical than our drinking water sources.

Friends of the Headwaters
ROUTE COMPARISON MAP

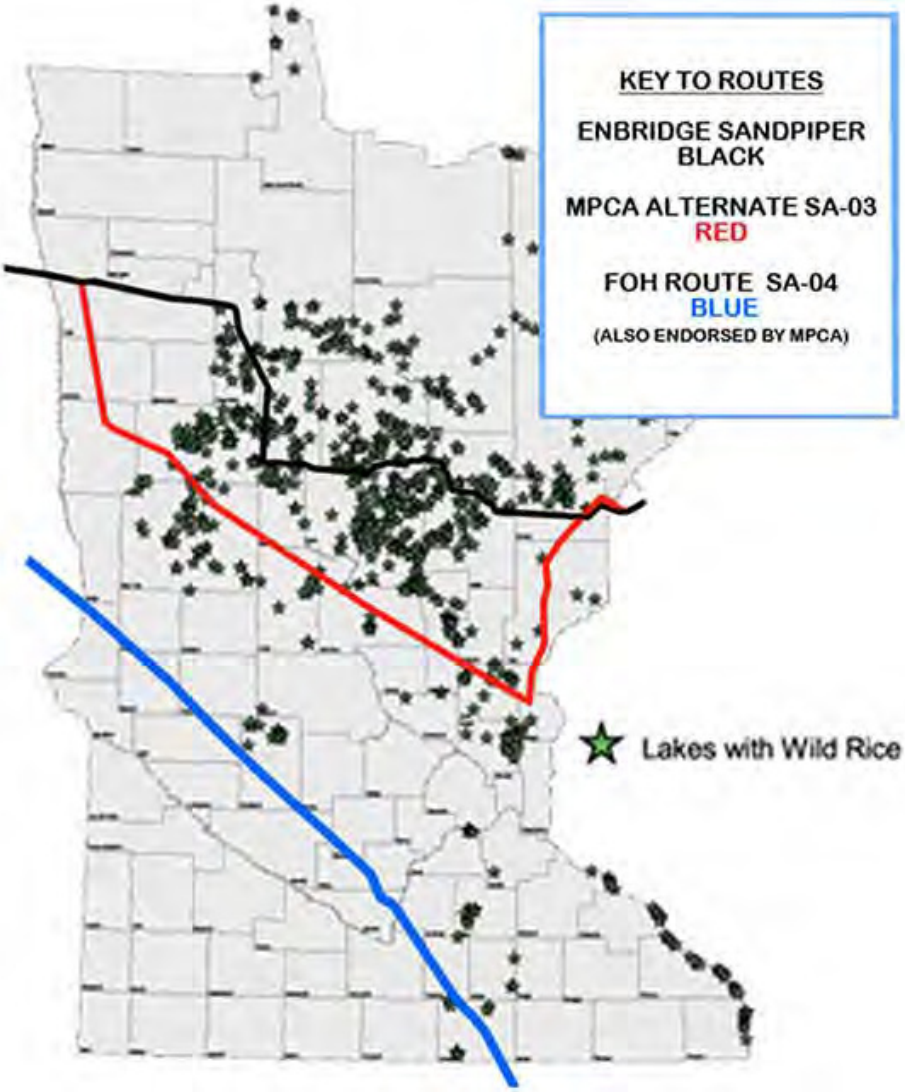

Located on the Minnesota Department of Natural Resources website, this map identifies the locations of Minnesota's wild rice lakes . Again, using my Photoshop skills I layered the company's proposed route as well as the two system alternative routes, SA-03 and SA-04. The intention was to illustrate the extreme risk to the state's wild rice waters by the proposed Enbridge/NDPC Sandpiper route. Could Enbridge have picked a worse route for jeopardizing the prime wild rice lakes and wetlands.

Wild rice is Minnesota's native grain and a part of our heritage and history. For the Ojibwe Nation it is their culture and identity. To them wild rice is priceless.

Wild rice is also critical to Minnesota's nesting and migratory waterfowl.

Friends of the Headwaters
ROUTE COMPARISON MAP

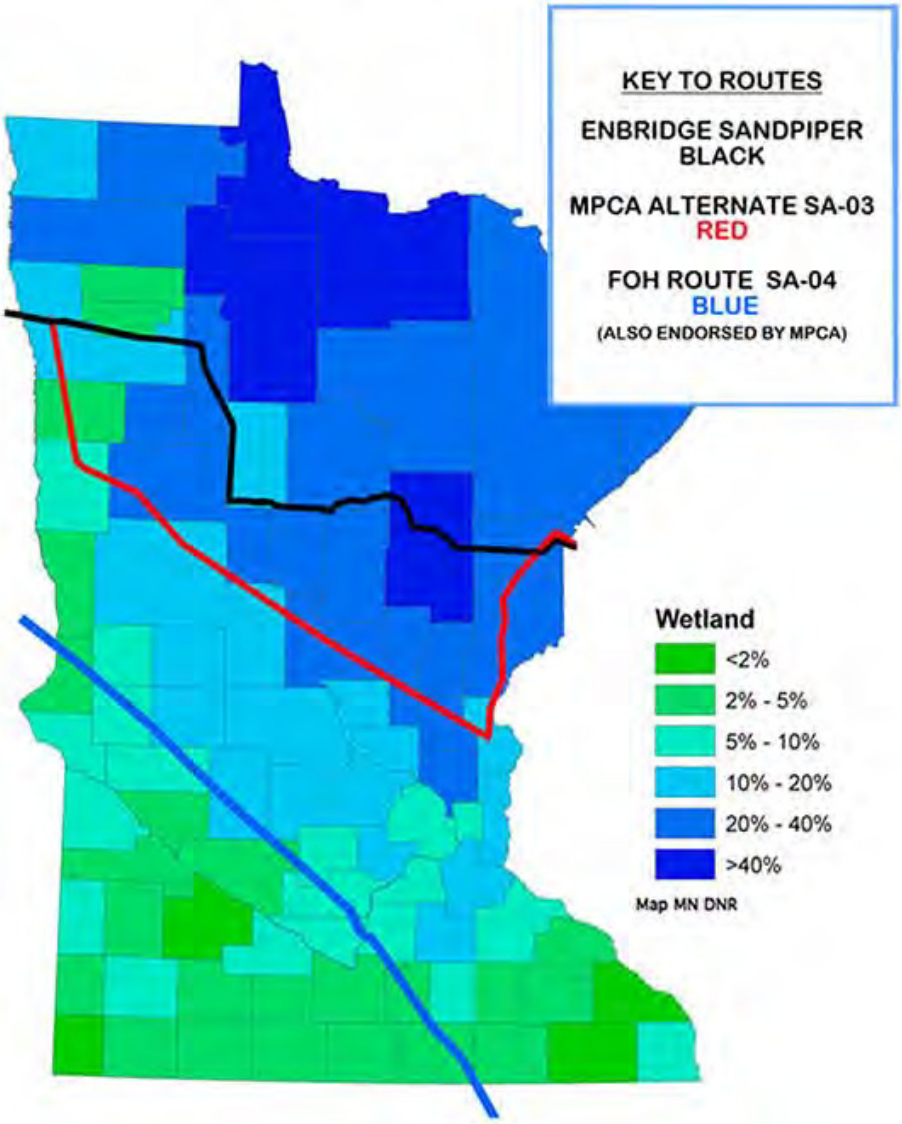

This comparative map juxtaposes the proposed Sandpiper route and the two system alternatives in relationship to the state's prime wetlands areas as identified on this map developed by the Minnesota Department of Natural Resources and found on its website. Again, the intention was to illustrate the risk to the state's wetlands. Note the correlation of this wetlands map to the previous wild rice map.

These wetlands are also critical to Minnesota's nesting and migratory waterfowl.

Friends of the Headwaters
ROUTE COMPARISON MAP

These three maps were located at various sources on the Internet. The maps identify the respective river basins and watersheds of Minnesota. Using Photoshop I wanted to show how the routes relate to these watersheds.

Enbridge's Sandpiper route has major risk exposure to the headwaters of three major watersheds, the Red River of the North, Lake Superior and the Mississippi River plus exposure to the St. Croix National Wild and Scenic River watershed.

Enbridge/NDPC's proposed route will cross the Mississippi River twice. A spill on the river will expose downriver communities dependent on the river as a drinking water source to a toxic mix of carcinogenic chemicals that are present in Bakken crude such as benzene, toluene, naphalene.

The first crossing point is a few miles downstream of our oldest state park, Itasca, home to the headwaters of the river. At that crossing the daily pipeline volume, 375,000 BPD or 15.750,000 gallons per day, will exceed the average daily volume of the young river by fourfold.

Friends of the Headwaters
ROUTE COMPARISON MAP

Retrieved from the Minnesota Department of Health's website, the Class V Sensitivity map regards soils especially sensitive to the discharge of petroleum based materials. Compare those 'sensitive' areas along the Sandpiper route to the similar bright red areas indicated on the "Soils susceptible to ground water contamination" map previously on page 3. Again, overlaying the routes allowed me to illustrate the environmental risk of the Sandpiper route as compared to the system alternatives.

The second soils map illustrates various soil types. The dark green area consists of mollisols, the soil order with lower infiltration rates. FOH's SA-04 traverses the lowest risk soils to infiltration, the migration and contamination of oil spill effluents. Sources for the soil orders map were the NRCS/USDA and the Minnesota DNR.

Note: Enbridge's Mark Curwin, Senior Director for Strategic Coordination of Major Project Executions in the US, stated their construction preference is to build pipelines across farmland.

He made these remarks at a public meeting in Park Rapids on Jan. 29, 2014.

Mr. Curwin gave the reasons
of better soils,
easier construction,
easier access,
less natural habitat destruction,
cheaper and quicker.

After construction the farmland can be put back into crop production.

Access to leaks and spills is much easier.

Winter wetland construction would be at a minimum.

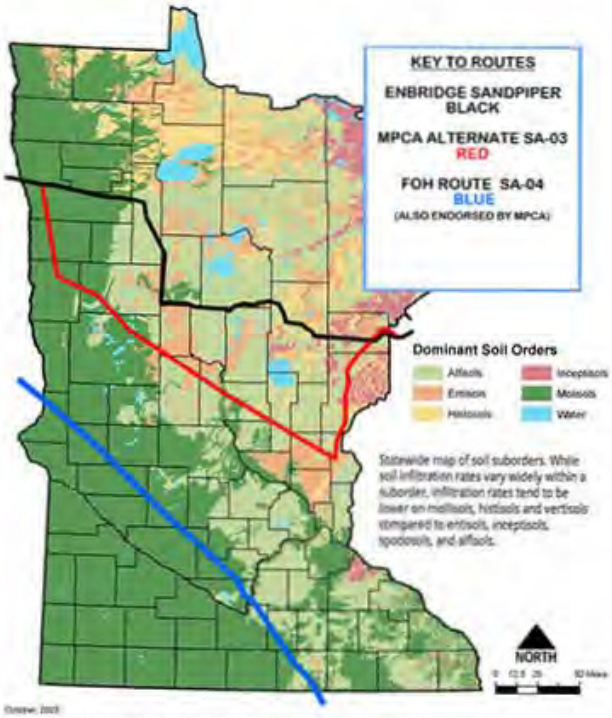

Friends of the Headwaters
ROUTE COMPARISON MAP

These two maps were located on the Minnesota Department of Natural Resources' website.

Besides showing the environmental risks to Minnesota's watersheds and aquifers, its soil types, I also wanted to illustrate the routes as to how they traversed the state's land cover and ecological zones. The purpose was to compare the respective routes and their potential damage to our forest lands.

The Enbridge route will dramatically involve more forest cover than the system alternatives, SA-03 and SA-04.

The MPCA conducted a comparative environmental analysis of these proposed routes. A high score was least damaging to the environment, a low score the most damaging.

FOH's SA-04 scored the highest.

Enbridge Sandpiper - the lowest.

Should the state be sacrificing its natural resources to a new energy corridor when an existing corridor, the Enbridge/Alliance natural gas pipeline corridor, is already available and crosses the state at its lowest risk point to the environment and economy. The Enbridge/Alliance corridor is the proposed route of SA-04.

I produced these assembled maps because I believe Minnesota does not NEED Enbridge/NDPC's Sandpiper pipeline route as currently proposed traverse the state's northern water resources

AT RISK: MINNESOTA'S

CLEAREST AND CLEANEST LAKES
GROUND WATER AQUIFERS
WILD RICE LAKES
WETLANDS
MOST SENSITIVE SOILS TO SPILLS
DIVERSITY OF VEGETATION
SENSITIVE ECOLOGICAL ZONES
THE LAKE SUPERIOR BASIN
THE HEADWATERS OF THE MISSISSIPPI RIVER AND ITASCA STATE PARK
HIGH VALUE RECREATIONAL AND RESIDENTIAL WATERS

Minnesota Ecological Sections and Subsections

Friends of the Headwaters
ROUTE COMPARISON MAP

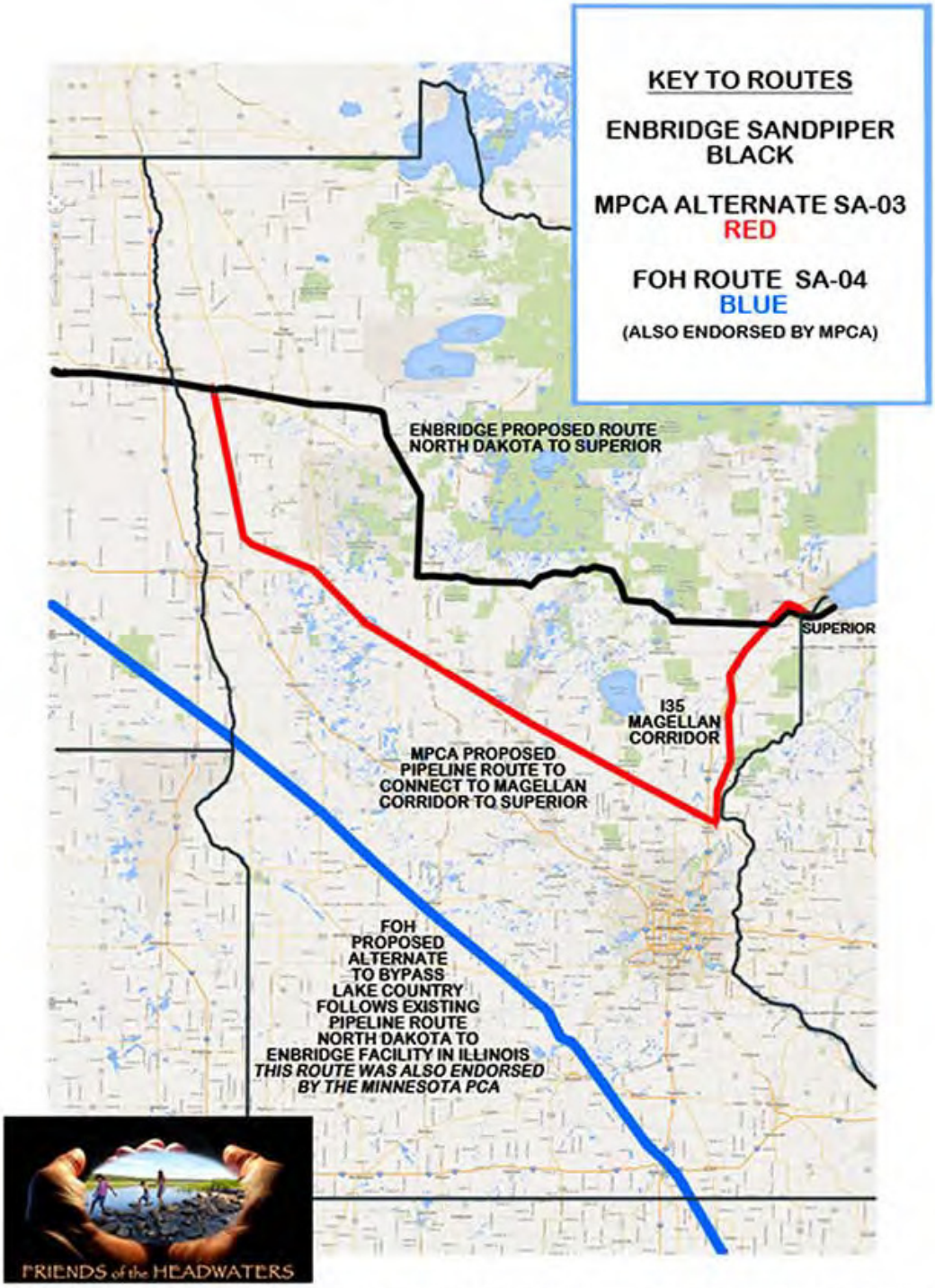

I produced this map to show the relationship of the Company route and the two system alternatives in relationship to a roadmap of the state. The maps on the next page provide more detail yet for SA-04 and the justification for my reasoning.

Two additional maps by Bob Merritt, hydrologist, showing FOH SA-04 in better detail.

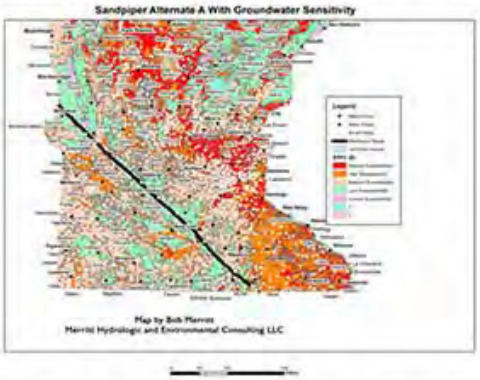

Minnesota still gets to keep jobs the construction will provide as well as North Dakota plus Iowa and Illinois.

Although the route does not end in Superior, it still ties into the existing Enbridge system in Illinois with routing options to Michigan and Ontario that avoid our greatest freshwater lakes of Lake Superior and the Mackinac Straits of Lakes Michigan and Huron.

Since it's an existing corridor the company should have access to the mapping previously done for the pipeline already there. FOH SA-04 also intersects pipelines in southern Minnesota owned and operated by other companies which provide the option of re-routing Bakken crude to the refineries in Rosemont and Saint Paul Park in the south Twin Cities Metro.

The Illinois Hub also allows Enbridge access to its pipelines to Oklahoma and points south.

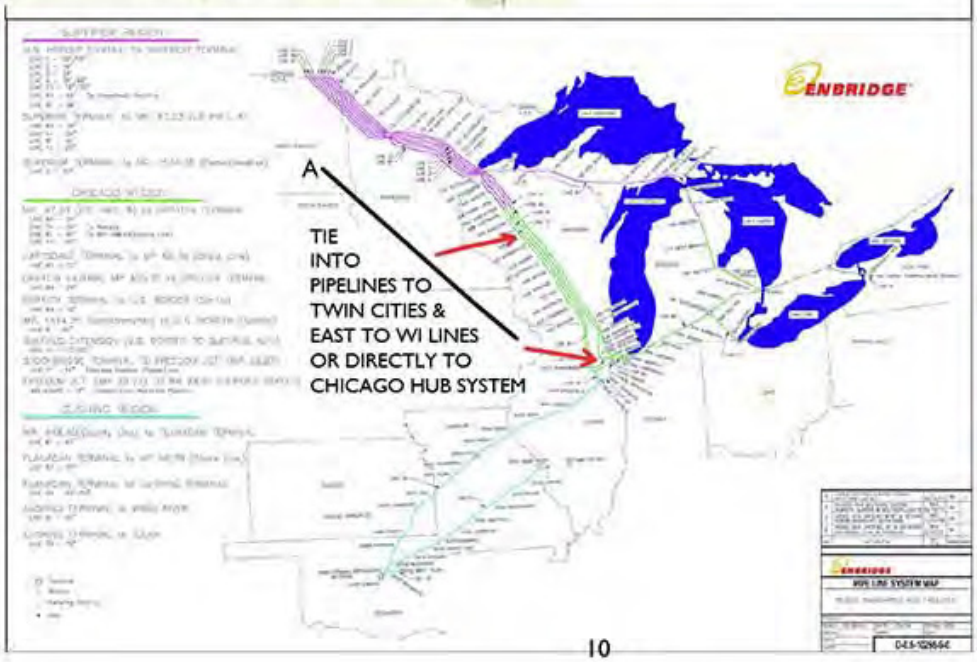

Friends of the Headwaters
Exhibit _____

STATE OF MINNESOTA
OFFICE OF ADMINISTRATIVE HEARINGS
FOR THE MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota	**PUC Docket No. PL-6668/CN-13-473** **OAH Docket No. 8-2500-31260**

SURREBUTTAL TESTIMONY

OF

RICHARD SMITH

SUBMITTED ON BEHALF OF:

FRIENDS OF THE HEADWATERS

January 21, 2015

I. INTRODUCTION

Q: Please state your name, job title, and business address.

A: My name is Richard Smith. I am President of Friends of the Headwaters, P.O. Box 583, Park Rapids, MN 56470.

Q: For whom are you testifying?

A: I am testifying on behalf of Friends of the Headwaters.

Q: Are you the same Richard Smith who has previously had testimony filed in this case?

A: Yes, I submitted direct testimony on November 19, 2014.

Q: What is the purpose of this surrebuttal testimony?

A: I am responding to the rebuttal testimony submitted by the North Dakota Pipeline Company ("NDPC") witness Sara Ploetz submitted January 5, 2015. I also provide additional information regarding the system alternatives proposed by Friends of the Headwaters.

II. RESPONSE TO MS. PLOETZ

Q: Have you reviewed the rebuttal testimony submitted by Ms. Ploetz?

A: Yes.

Q: On pages 16-18 of Ms. Ploetz's Rebuttal Testimony, Ms. Ploetz claims she is responding to your testimony but then goes on to discuss an analysis conducted by the Minnesota Pollution Control Agency ("MPCA"). Were you involved with the MPCA's analysis of the potential impact of the Sandpiper Pipeline?

A: No.

Q: On pages 5-6 of your direct testimony you refer to the MPCA's analysis of the proposed system alternatives. How did you become aware of this analysis if you were not involved in conducting it?

A: The MPCA report with analysis of the proposed system alternatives was posted to the Sandpiper Pipeline project docket, 13-473 and 13-474, on Aug. 21, 2014. Report is attached as Schedule 1.

Q: Why is the MPCA Report valuable in terms of considering the potential environmental impacts of the proposed locations of the system alternatives being considered in this certificate of need proceeding?

A: From its first public comments filed April 4, 2014 Friends of the Headwaters ("FOH") has advocated for a full environmental impact statement ("EIS") with a complete risk analysis and assessment for not only construction impacts but also including any post installation spill and leak impacts to the environment inclusive of both natural and human resources. Such an EIS must include a qualitative analysis of the natural resources, particularly water resources, at stake from the Applicant's Preferred Route.[1] Ms. Ploetz's testimony only provides and relies upon quantitative data for analysis and comparison. That no qualitative analysis of this quantitative data is supplied affirms FOH's advocacy of a full EIS. The MPCA Report, although not a full EIS is helpful because it includes a qualitative assessment of the system alternatives.

III. ADDITIONAL SYSTEM ALTERNATIVES INFORMATION

Q: When did FOH first propose the various system alternatives being considered here?

A: FOH proposed its system alternatives for the NDPC Sandpiper Pipeline in its April 4, 2014 Comments made to the Department of Commerce EERA during the Public Comment Period. A copy is attached as Schedule 2.

Q: Was it your intent that these system alternatives would be of essentially the same size and type as the Sandpiper Pipeline?

A: Yes, I intended the proposed alternative locations for pipelines to involve pipelines of the same general diameter and with the ability to transport the same volume of oil. I recognize that the number of miles of pipeline needed varies by each proposed location.

Q: Why did FOH feel compelled to propose these system alternatives?

A: FOH filed comments in this docket on April 4 (Schedule 2), May 30 (attached as Schedule 3) and again on August 21, 2014 (attached as Schedule 4) to address the reasons that FOH decided to suggest route alternatives.

---

[1] Or is it Project "Sandpiper" Route? Ms. Ploetz uses both in her testimony which appears to obscure and confuse the data between the two routes.

In summary, as FOH began to study the Enbridge/NDPC Sandpiper proposal and its maps, FOH became increasingly concerned that environmental threats had not been adequately considered and would not be considered under the process that had been followed in the past. After reading the PUC's and DOC's rules we realized we had the right to suggest alternatives. At the time we did not know whether the oil *needed* to be moved, so we decided to focus on the best way to move it assuming the PUC Commissioners would make the need determination. We believed that Minnesotans, through our Public Utilities Commission, should have the right to require a company that wants to cross its state with an oil pipeline carrying 375,000 barrels per day of oil to assess the environmental sensitivity of possible locations for such a pipeline and then construct it in an area of the state best able to withstand a possible catastrophic event. We therefore tried to propose alternative locations that would be better located from an environmental perspective.

Using my general environmental background, my computer skills and the publicly available maps and information primarily from the Minnesota Department of Natural Resources, the Minnesota Pollution Control Agency, the University of Minnesota and other state agencies, I, and others, began to study whether there was a better way to move the Bakken crude oil across Minnesota while reducing the risks to Minnesota's natural resources, especially its northern waters resources, lakes, streams, aquifers, wetlands, the Mississippi Headwaters and Lake Superior. I developed the FOH maps to graphically show the environmental threats posed by Enbridge/NDPC's proposed route and offered alternatives that were illustrative of other ways it could get its oil to the markets it needed to reach.

Of course, we were encouraged the Minnesota Pollution Control Agency in its analysis found this work to be competent and useful in offering less environmental damaging solutions to the problems present in NDPC Sandpiper proposal.

Q: Does this conclude your testimony?

A: Yes.

Minnesota Pollution Control Agency

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300

800-657-3864 | 651-282-5332 TTY | www.pca.state.mn.us | Equal Opportunity Employer

August 21, 2014

Mr. Burl Haar, Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

RE: Enbridge Sandpiper Pipeline Project
Docket Nos. PL-6668/CN-13-473 (Certificate of Need) and PL-6668/PPL-13-474 (Route Permit)

Dear Mr. Haar:

This is the response of the Minnesota Pollution Control Agency (MPCA) to the Notice of Comment Period issued by the Minnesota Public Utilities Commission (Commission) on August 12, 2014, for the Enbridge Sandpiper Pipeline project (Sandpiper). The Sandpiper project includes a Route Permit and Certificate of Need proceeding. It is our understanding that the Certificate of Need decision will likely not be made for several months.

The Commission identified three topics open for comment in its August 12, 2014 Notice:

- *What, if any, of the eight system alternatives identified in the Department of Commerce Alternative Routes Summary Report should be considered further in these proceedings?*

  The MPCA evaluated system alternatives SA-03, SA-04, SA-05, SA-06, SA-07, and SA-08 using a number of criteria described below. All these system alternatives have fewer potential environmental effects than the Sandpiper proposal. At a minimum, we recommend system alternatives SA-03, SA-04 and SA-05 for further consideration in these proceedings.

- *What is the legal basis for determining whether a system alternative should be considered in the certificate of need proceeding?*

  The legal basis supporting our position is discussed on page 2 of our response.

- *What is the legal basis for determining whether a system alternative should be considered in the route permit proceeding?*

  See above.

The MPCA is the state agency with responsibilities and authorities related to the issuance of various permits that may be required for the project, including permits and regulations administered under state and/or federal programs for construction stormwater, industrial stormwater, wastewater, and spill and emergency response. A part of our mission is to protect and improve the environment. The MPCA submitted earlier comment letters and provided remarks at the August 7, 2014 prehearing meeting describing our concerns about the potential for adverse environmental effects from the proposed Sandpiper project route. Comments provided by the MPCA included system alternatives that it believes have lesser potential environmental effects.

The MPCA appreciates that the Route Permit and Certificate of Need parts of the Sandpiper proceeding are separate approval processes, each with its own requirements. Our offer of system alternatives was not intended to conflate the Route Permit process with the Certificate of Need process. The MPCA defers to the Commission regarding matters of interpretation and implementation of the Commission's specific statutory authorities and regulations, and of practice and procedure before the Commission. The MPCA's comments, in furtherance of its mission, are intended to provide information regarding the potential environmental effects from the Sandpiper route and to encourage the Commission to obtain additional environmental analysis on system alternatives to inform its Certificate of Need decision. We believe that the Commission has discretion under the Minnesota Environmental Policy Act (MEPA), Minnesota Statutes ch. 116D, to gather information it needs to include in the administrative record and to decide how to gather such information, including soliciting such analysis.

In addition, as the Department of Commerce Division of Energy Resources (DOC-DER) indicates in its August 18, 2014 letter filed in these proceedings, the Commission has authority under Minnesota Rule 7853.0130 to consider system alternatives that can better achieve the claimed need. That rule requires the applicant to meet four separate criteria before the Commission shall grant a Certificate of Need. Analysis of alternatives is governed by Subpart B of this Rule, which states in relevant part:

> A more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record by parties or persons other than the applicant...

As the DOC-DER states in its August 18 letter, this subpart allows a party, or individual, who proposes an alternative to provide evidence showing that its alternative can better achieve the claimed need as stated by the applicant or that the claimed need is not reasonable.

Below we provide comment with respect to the need for additional information and assessment of environmental effects to inform your decision-making on the Certificate of Need and with respect to the potential adverse environmental effects of the proposed Sandpiper route for consideration in the Route Permit process as appropriate.

Analysis of Environmental Effects - Certificate of Need

While no environmental report is expressly required by Commission enabling laws or its regulations, the Commission as a governmental entity has discretion under MEPA to investigate environmental effects. Minnesota Stat. § 116D.03. A comparative analysis of system alternatives would provide valuable information to the Commission to be weighed along with other information of record when making the need decision. Conducting environmental analysis of system alternatives in this need decision is similar to what is done in non-pipeline need decisions. The MPCA believes that certain system alternatives present lesser potential for adverse environmental effects than does the proposed Sandpiper route and that they represent more prudent and environmentally protective options. Given the potential for environmental harm from the proposed Sandpiper route noted in the MPCA's previous comments and in this letter, it is reasonable to investigate the potential environmental effects of system alternatives as part of the need decision. The MPCA respectfully requests that the Commission exercise its discretion under MEPA to ensure that environmental values are given equal consideration along with economic and technical considerations.

The MPCA agrees with the comments filed by the Department of Commerce Energy Environmental Review and Analysis (EERA) unit on August 21, 2014 concerning the Commission's authority to consider environmental impacts of system alternatives in these proceedings. EERA emphasized that MEPA requires all departments and agencies to consider environmental impacts and alternatives in their decision making. MEPA further notes in 116D.06, subdivision 2, that the requirements and goals of the act are supplementary to those set forth in an agencies' existing authorizations. MPCA supports EERA's conclusion that the Commission has the ability to determine what it needs to insure that the record

developed in the Certificate of Need proceeding, or any proceeding, is adequate for its decision making, be it through testimony from parties, supplemental reports from the applicant or an Environmental Report-like (ER-like) document prepared by EERA, as was requested in the Xcel Competitive Resource Acquisition proceeding (12-1240).

Environmental Effects - Proposed Routing Project

The MPCA seeks to provide additional comment regarding the potential for negative environmental effects and a scoring analysis of six system alternatives, known as SA-03, SA-04, SA-05, SA-06, SA-07, SA-08, and the Enbridge's Sandpiper route in the context of the criteria set forth in Minnesota Rule 7852.1900 subp. 3 and 7853.0130 as these criteria pertain to the MPCA's regulatory authority. Please note that proposed system alternative SA-02 is not addressed in the following comments because previous examination of this route showed that it did not merit further consideration based on the risk to natural resources that MPCA believes must be considered. SA-01 was also not entered in the following comparison because it would require crossing the border into Canada. This would appear to change the jurisdiction and authority over the project from the state level to federal, and would thus no longer be under Commission authority.

The MPCA's comments are intended to demonstrate the importance and the utility of the Commission developing an environmental effects analysis of the various system alternatives in the Certificate of Need part of this combined proceeding.

Minnesota Rule 7852.1900 Subp. 3, B, D, E, F, G, H, I and J Criteria

MPCA has considered the criteria in Minnesota Rule 7852.1900 Subp. 3 to compare the proposed system alternatives and the Sandpiper route by identifying corresponding Geographic Information System (GIS) layers to these criteria, and then visually examining the resulting maps. Without having access to specific locations of the proposed system alternatives, a detailed quantification is not possible; however, the MPCA presents this high level approach to help identify the system alternatives which seem to meet the required considerations most effectively. A more detailed analysis of the environmental impacts of system alternatives would be performed in an ER-like document suggested by MPCA and EERA. In the information below, lower numbers represent greater potential environmental effects, while higher numbers represent lesser environmental effects. The information is meant to illustrate one way of roughly comparing one alignment to another.

Minnesota Rule 7852.1900 Subp. 3.B. The natural environment, public and designated lands, including but not limited to natural areas, wildlife habitat, water and recreational lands.

Several layers were used to depict these criteria, including Cumulative Disturbance Index (a score showing how human activity has affected the environment which could be used as an indicator of the quality of wildlife habitat), a map showing Water Quality mean score (the score for overall water quality within a watershed), and another map identifying public land ownership, state parks, and wildlife management areas.

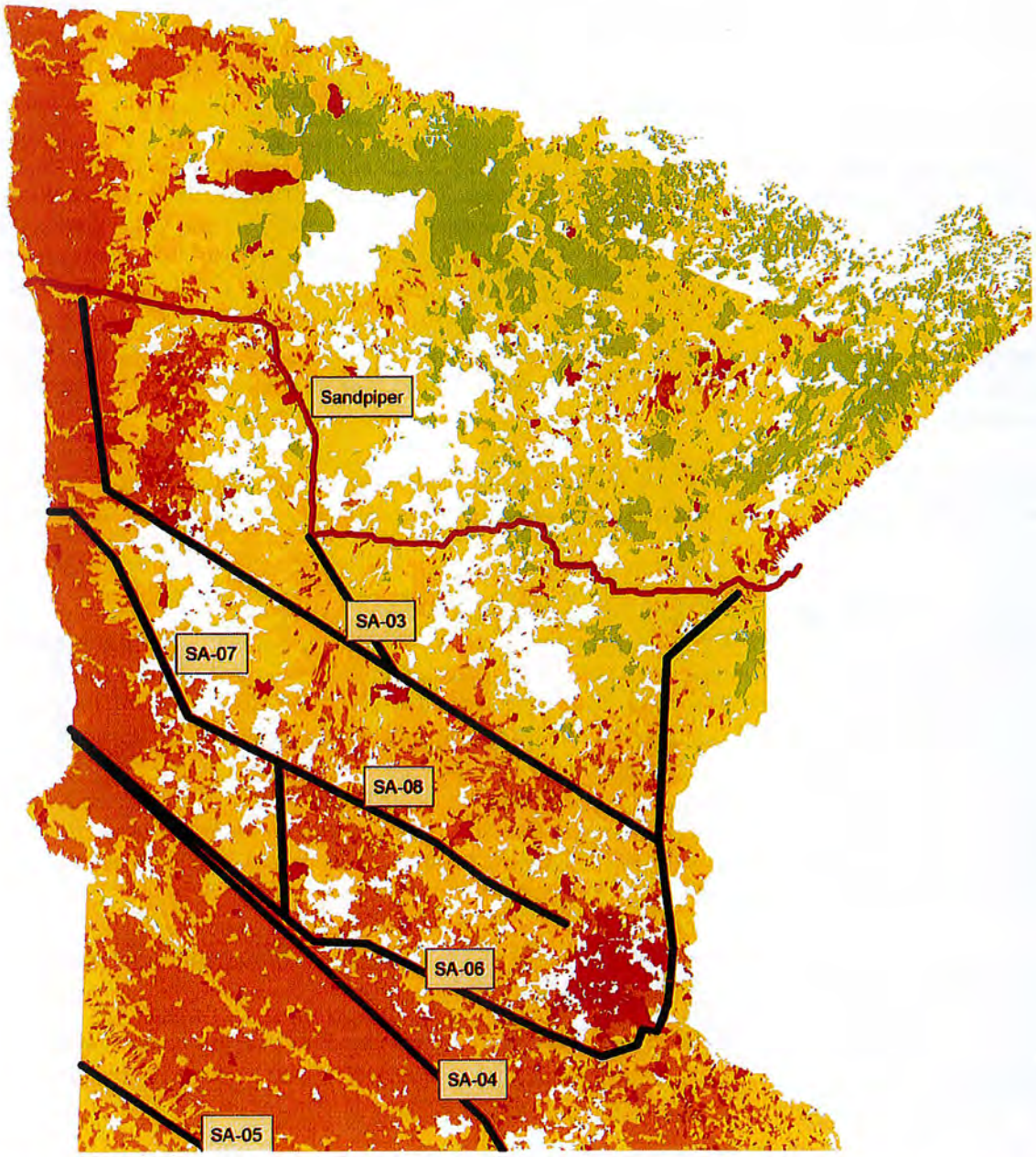

The above map shows Cumulative Disturbance Index scores for the state. The green areas are undisturbed or minimally disturbed areas. The yellow and darker orange to red indicate areas of increasingly heavy human impact, and likely have poor habitat for wildlife; the areas in white have not been assessed. Based on this illustration, it appears that the proposed Sandpiper route has the greatest potential to impact pristine areas of the state and/or areas that have high habitat scores, while the potential for impact decreases with system alternatives located further south in the state.

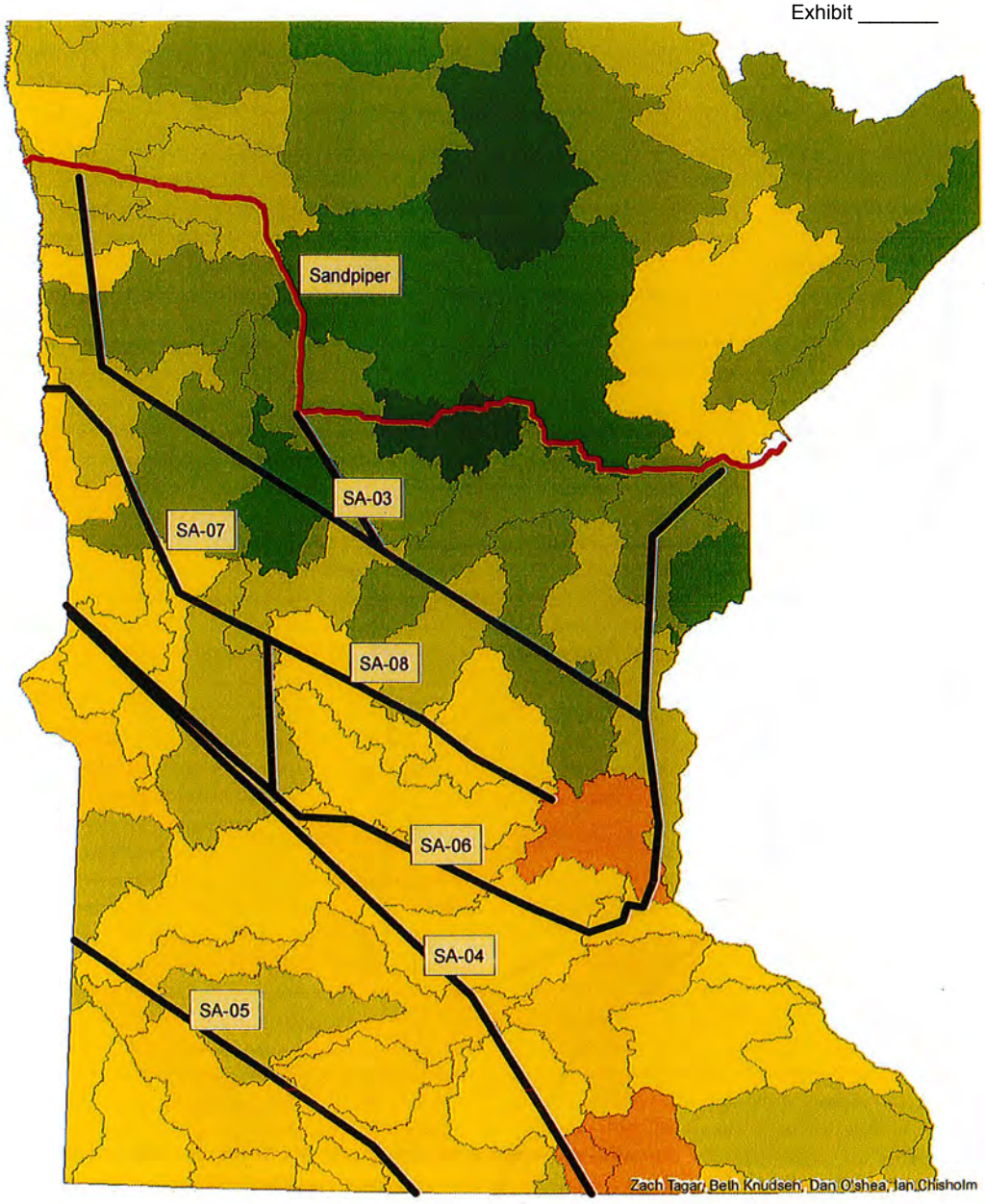

This map shows mean scores for water quality in the state watersheds. Dark green identifies the best water quality in the state; yellow and orange identify areas of lesser water quality. In this depiction, the proposed Sandpiper route has the greatest potential to impact the areas of the state with the best water quality, while system alternatives SA-04, SA-05, and SA-06 traverse areas of fewer surface waters and lower water quality.

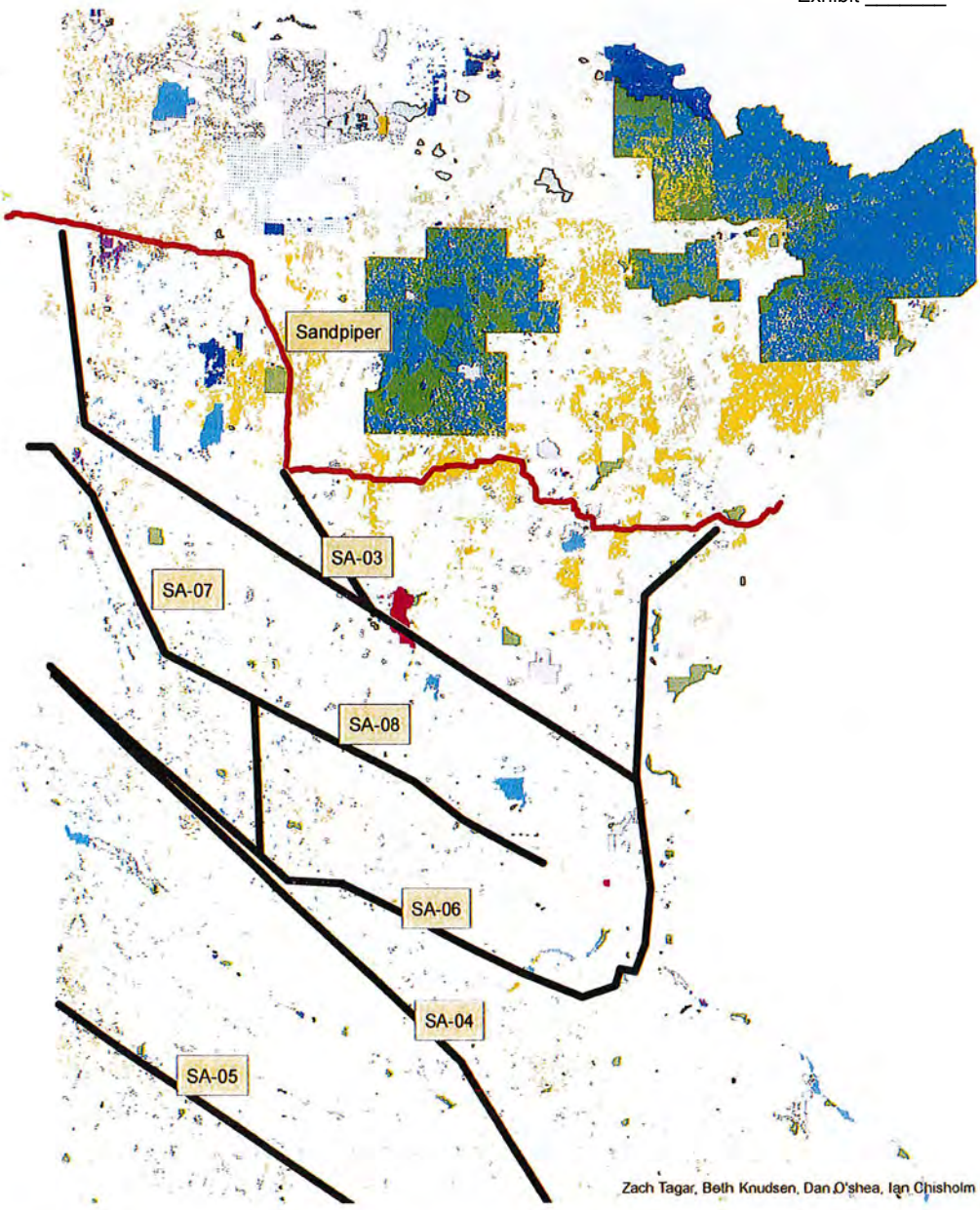

The map above identifies state and federal ownership of lands, state forests, state parks, wildlife management areas, and areas under conservation easements (Nature Conservancy). Wildlife management areas on the map are identified as light pink, darker purple areas are conservation lands, light green are state parks, dark green are national forests, yellow areas are state forests, and bright blue areas are U.S. Forest service land. Notable on this map is that the proposed Sandpiper route borders or crosses a substantial amount of state forest land, and borders several wildlife management areas and one area of nature conservancy land near the North Dakota border. SA-03 crosses near Camp Ripley. All of the proposed system alternatives encroach on some state land, but it appears from this context that the proposed Sandpiper route poses a greater risk to state forests, state parks, and wildlife management areas than any of the system alternatives.

Environmental and natural resource protection and the prevention of impacts tend to be less costly and more effective than restoration; therefore, scoring in this instance is based on preventing impacts to higher quality areas. Scoring of the proposed system alternatives based on criteria in Minnestoa Rule 7852.1900 Subp. 3.B. is as follows:

- 5 points (small potential impact to criteria): SA-04, SA-05, SA-06
- 3 points- (moderate potential impact to criteria): SA-03, SA-07, SA-08
- 1 point (stronger potential to impact criteria): Sandpiper

Minnesota Rule 7852.1900 Subp. 3.D. Economies within the route, including agricultural, commercial or industrial, forestry, recreational, and mining operations.

It is noted that an Enbridge pipeline would help the Minnesota economy by creating temporary jobs and also paying property taxes; however, for the purpose of this comparison, these economic benefits would occur regardless of where the pipeline is located. Therefore, this analysis addresses other economies that may be impacted based on where the Sandpiper pipeline is located.

The following map identifies both major industrial lands (paper company lands, potato farms, mining lands, etc. in gray), major non-industrial lands (livestock operations, miscellaneous trusts, sugar beet operations, etc. in tan).

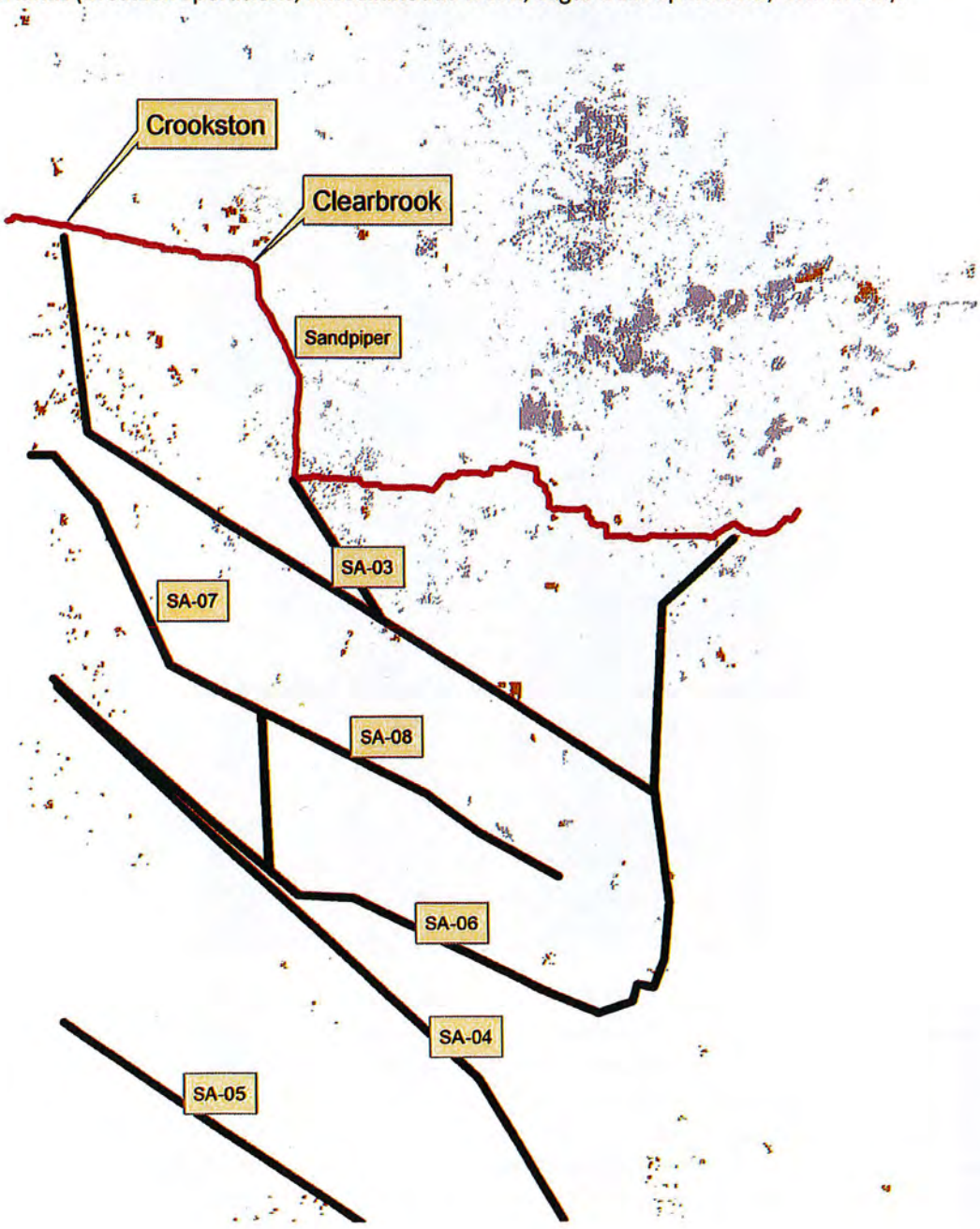

In this example, the proposed Sandpiper route encroaches on relatively few industrial-related facilities compared to SA-06 or SA-08, but the Sandpiper comes closest to or directly encroaches on a number of major industrial lands, particularly potato farms and paper company forests. SA-03 also comes near to several livestock operations. In this view, it appears that SA-04 poses the least potential impact to any of the facilities or lands depicted in this layer.

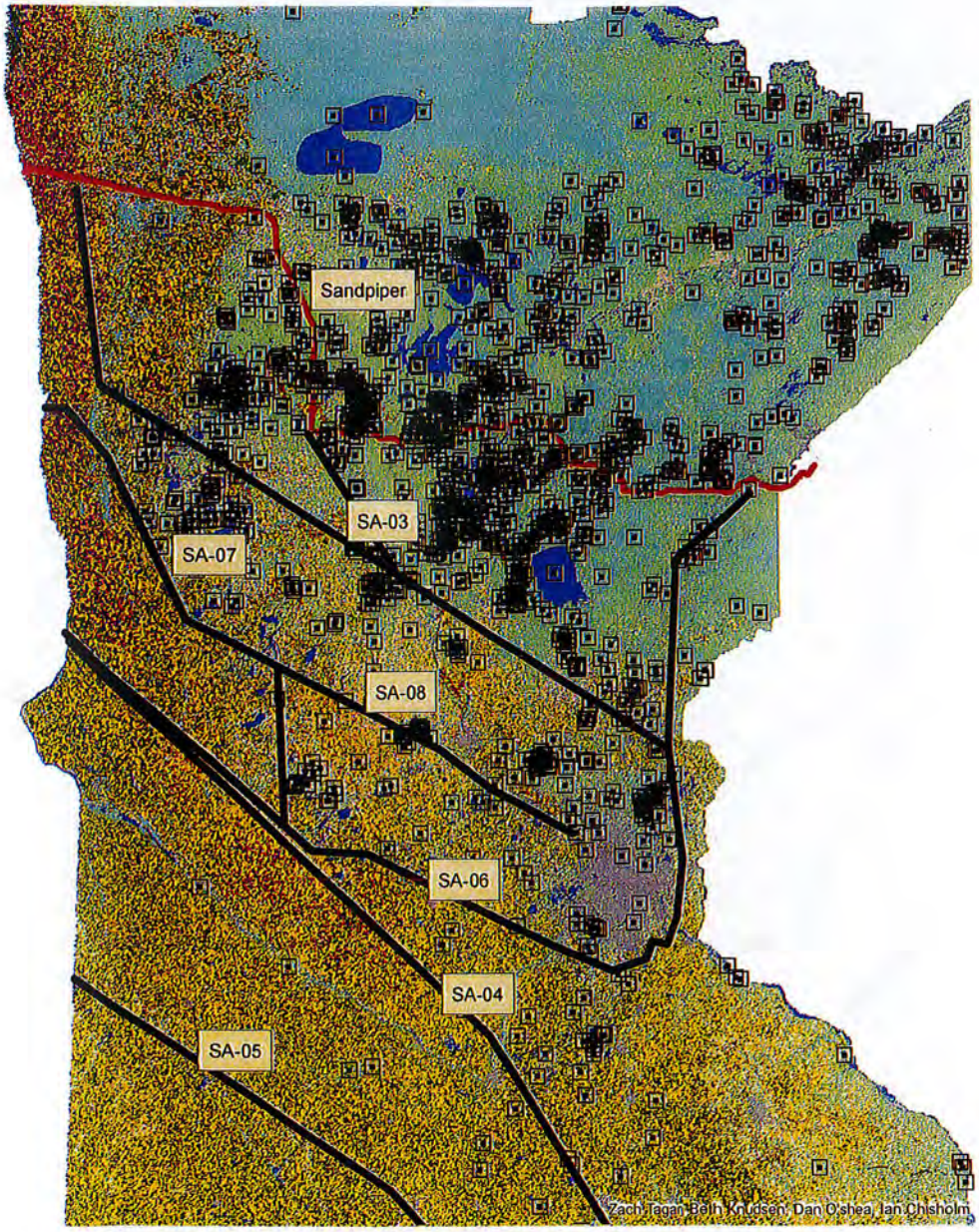

This map identifies cropland in Minnesota, and also stands of wild rice (black squares with black dots). The yellow or dark green areas are corn and soybeans, while the lighter green and blue-green are forested areas. The state appears fairly evenly divided between forest land above SA-03, and heavily cropped land (mostly corn and soybeans) below SA-03. Of special note on this map is the high concentration of stands of wild rice around the proposed Sandpiper route. Unlike corn, soybeans or other exports, stands of wild rice are uniquely sensitive to water quality and disturbance of its native habitat. Therefore, the MPCA concluded that the proposed Sandpiper route would pose a higher threat to the stands of wild rice economy than the system alternatives would pose to other crops. Other Minnesota economic

sectors, such as tourism, resorts, and recreation, are also heavily dependent on water quality; thus with consideration toward potential impacts to the economic sectors that significantly depend on water quality, the MPCA scored the proposed system alternatives as follows:

- 5 points (small potential impact to criteria) SA-04, SA-05, SA-07
- 3 points- (moderate potential impact to criteria) SA-03, SA-06, SA-08
- 1 point (stronger potential to impact criteria) Sandpiper

Minnesota Rule 7852.1900 Subp. 3.E. Pipeline cost and accessibility.

It was not clear whether this criterion applies to the Enbridge's cost and accessibility to route locations, or to potential cost to the State of Minnesota to access the pipeline route, especially in sensitive areas. However, as accessibility to the proposed system alternatives was a major concern of the MPCA's June 24, 2014 letter, it is worth reviewing the result of that analysis as it does apply to accessibility of the proposed Sandpiper route and two of the system alternatives.

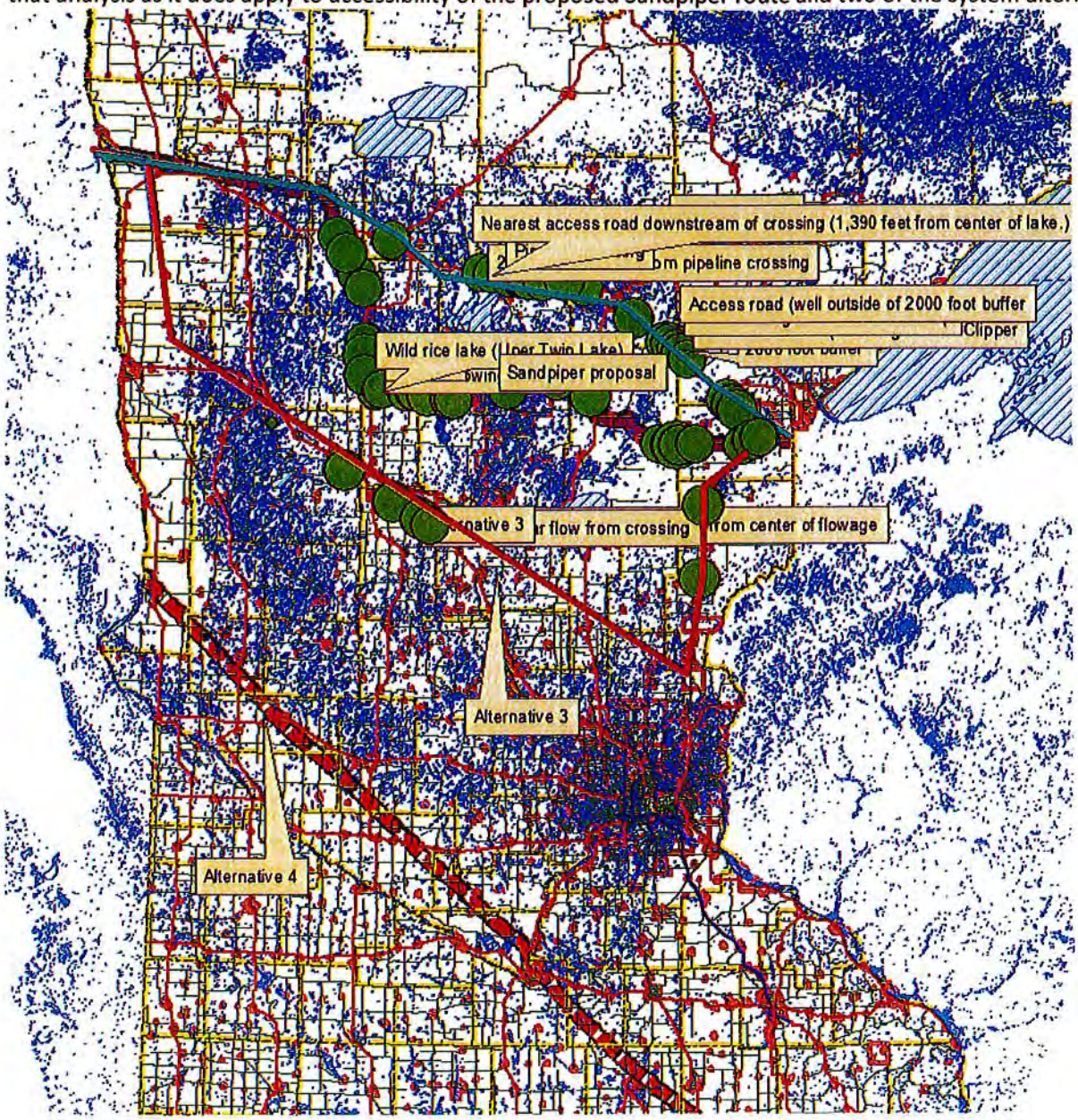

As described in the MPCA's June 24, 2014 letter, the MPCA studied the Sandpiper route proposal, SA-03, and SA-04 for accessibility downstream of water crossings. The criteria set for this study involved road access to water crossing areas within 250 feet of the center of a flowage or water body for a distance of 2,000 linear feet downstream of the crossing. One of the objectives of the analysis was to identify areas with poor or no access to water bodies being crossed by each of the proposed system alternatives, with the above described criteria used to measure this objective. The analysis indicated that SA-03 had seven water crossings with poor or no access as described, SA-04 had zero such access issues, and the proposed Sandpiper route has 28 water crossings with no access within 2000 linear feet.

Based simply on this data and without further analysis, the scoring for SA-03, SA-04 and the proposed Sandpiper route is as follows:

- 5 points (small potential impact to criteria) SA-04
- 3 points (moderate potential impact to criteria) SA-03
- 1 point (stronger potential to impact criteria) Sandpiper

Minnesota Rule 7852.1900 Subp. 3.F. Use of existing rights-of-way and right-of-way sharing or paralleling.
All of the system alternatives follow existing pipeline corridors except for one. The proposed Sandpiper route follows MinnCan pipeline from Clearbrook south, but does not follow any existing pipeline corridor (although some of it follows power line corridor) once it turns east near Park Rapids. Note the area circled on the following map, where the Sandpiper follows either power line corridor, or no corridor:

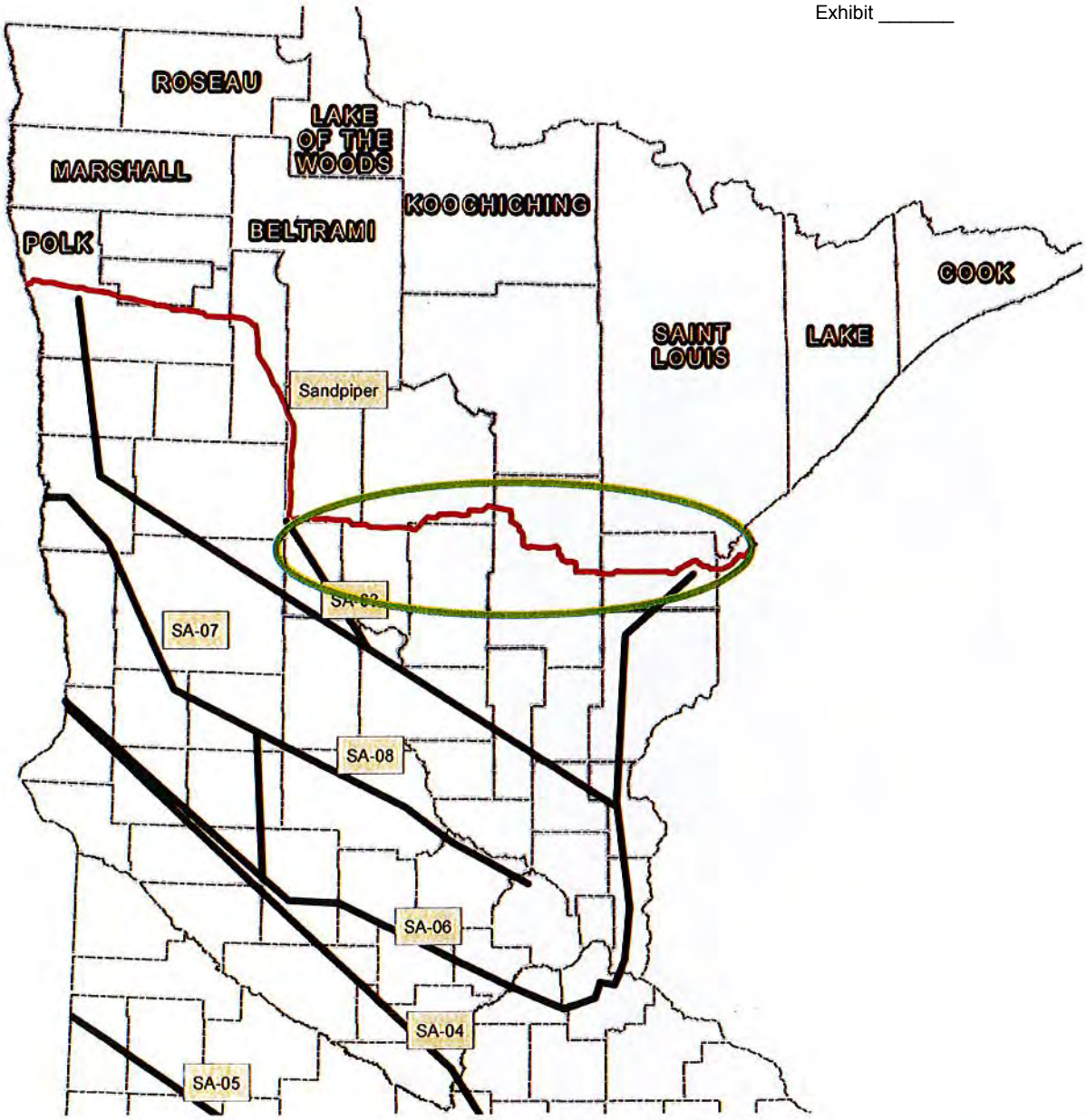

Through much of Aitkin County, and small areas of Carlton County, the Sandpiper proposal does not appear to follow any existing corridors at all. Thus, based on these criteria, the Sandpiper route and system alternatives would score as follows:

- 5 points (small or no variance from criteria) SA-03, SA-04, SA-05, SA-06, SA-07, SA-08
- 3 points- (moderate potential impact to criteria) Sandpiper
- 1 point (significant variance from criteria) not applicable

Minnesota Rule 7852.1900 Subp. 3.G. Natural resources and features.

The map below was put together by combined efforts of Minnesota State and federal agencies. It identifies ground water susceptibility to contamination based on a number of criteria. On this map, the color red identifies the highest potential for groundwater contamination, dark orange is second highest, the lighter greens are low susceptibility, and the lightest green being the least susceptible. The dark greens represent lakes.

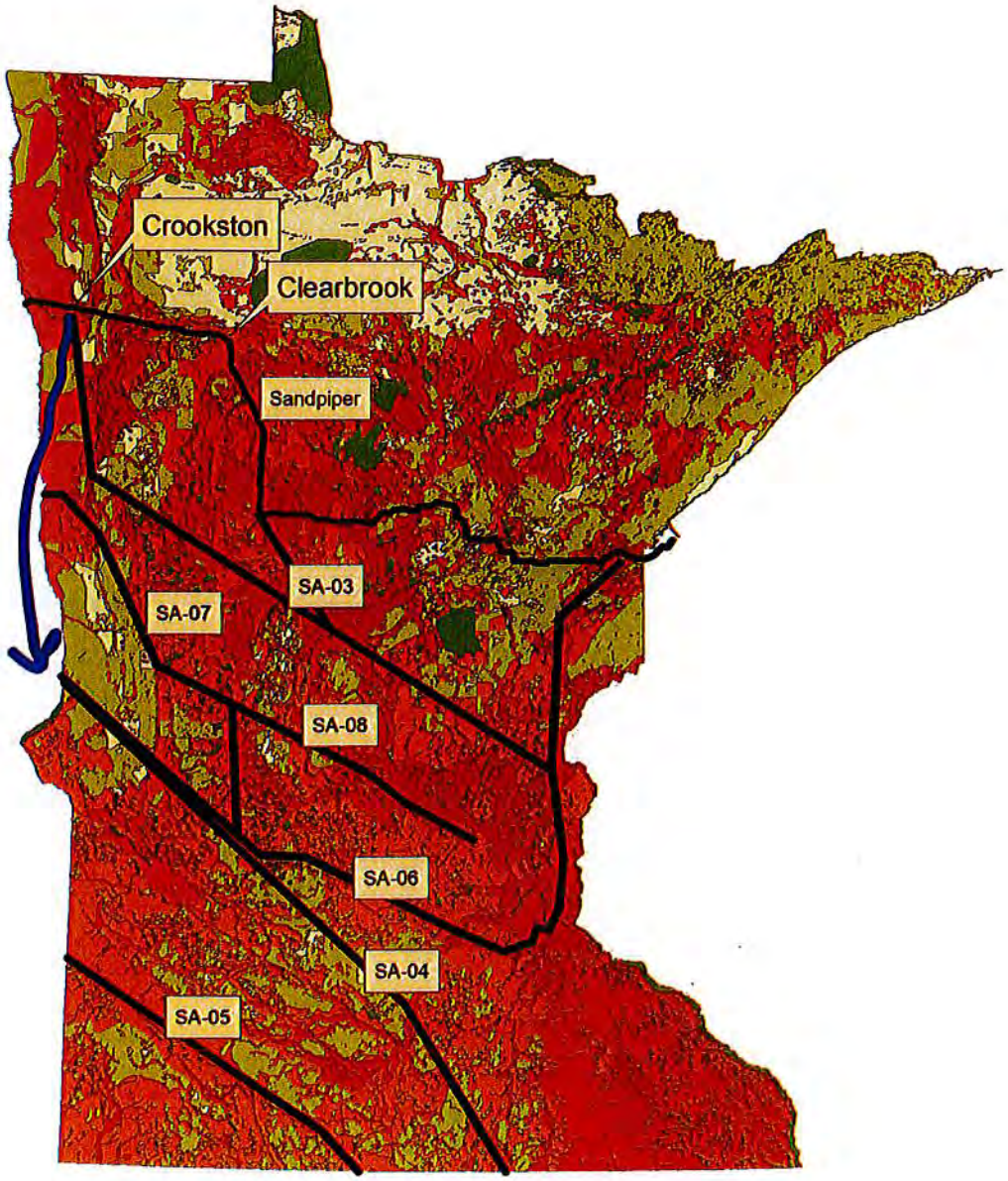

As seen on this map, the proposed Sandpiper route crosses some of the areas of the state that are most susceptible to contamination of groundwater, especially around the Park Rapids area. SA-03 also crosses significant sensitive areas, while the system alternative that crosses the least susceptible ground water is the SA-04 proposal. Of all the proposals, the Sandpiper route appears to cover the most linear miles of susceptible groundwater, from Red Lake Falls to Clearwater, then down to Park Rapids, and east to Fifty Lakes. SA-03 appears to be a close second in terms of potential to impact susceptible groundwater areas.

The map below identifies state surface waters, including lakes and wetlands. Although all of the proposed alternatives cross some water bodies, or encroach on some, the Sandpiper again crosses or encroaches on more surface waters than does any proposed system alternative. There is also more diversity of surface water types along the proposed Sandpiper route than any system alternative.

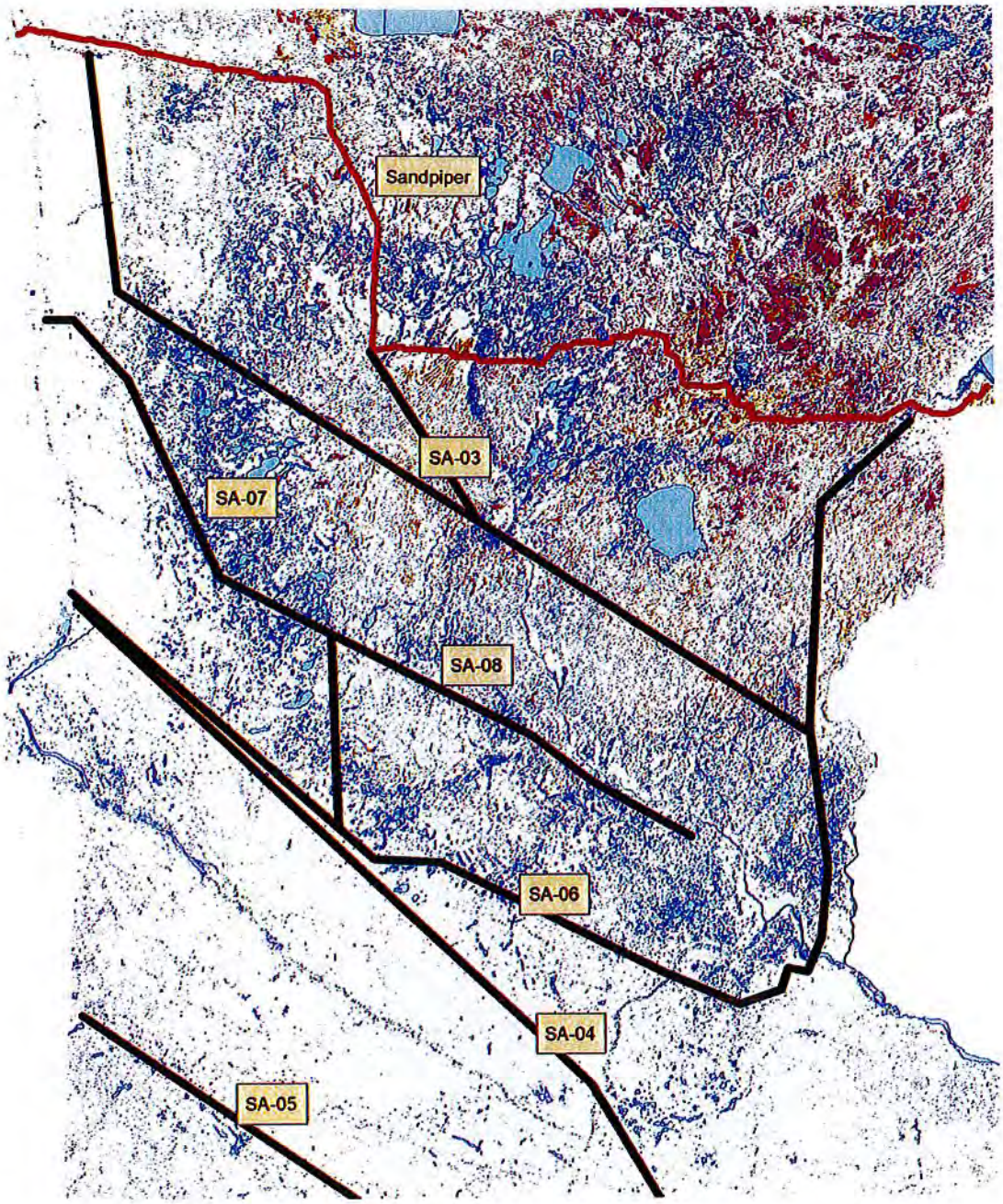

Although the proposed Sandpiper route was comparable to SA-03 with regard to potential for groundwater contamination, the Sandpiper route appears to encroach on a much higher density of surface waters. SA-07 and SA-08 also encroach on a significant concentration of surface water, although without as much diversity (i.e. rivers, lakes, streams, wetlands, etc.) as the Sandpiper route, nor as much overall surface water area. When combining the potential for impact to surface water and ground water, the proposed system alternatives average out in this manner:

- 5 points (small potential impact to criteria) SA-04, SA-05
- 3 points- (moderate potential impact to criteria) SA-03, SA-06, SA-07, SA-08
- 1 point (stronger potential to impact criteria) Sandpiper

Minnesota Rule 7852.1900 Subp. 3.H. The extent to which human or environmental effects are subject to mitigation by regulatory control and by application of the permit conditions contained in 7852.3400 for pipeline right-of-way preparation, construction, cleanup, and restoration practices.

Although MPCA staff has not identified a GIS layer to correlate with these criteria, exposed sections of Enbridge pipeline in the Tamarac River have raised serious questions regarding regulatory authority to require re-burying of exposed pipe when erosion has uncovered existing infrastructure. Exposed pipe creates a greater risk of spills or injuries to people. The significant number of water crossings along the proposed Sandpiper route would appear to increase the likelihood that similar pipe exposures with their attendant risks will occur in the future.

Minnesota Rule 7852.1900 Subp. 3.I. Cumulative potential effects of related or anticipated future pipeline construction.

A significant component of the Sandpiper proposal is the construction of a new terminal at the Clearbrook location. MPCA has expressed concern that with each terminal constructed at Clearbrook, the likelihood of additional or future pipeline infrastructure that will be built will come through Clearbrook. This, in turn, increases the potential for new pipeline to impact the large concentration of sensitive surface and groundwater that lies immediately to the east of Clearbrook, as demonstrated in the map below. The blue color on the map typically identifies open water, with green and purple, etc. indicating various other types of wetlands. The brownish/pink octagons represent cities.

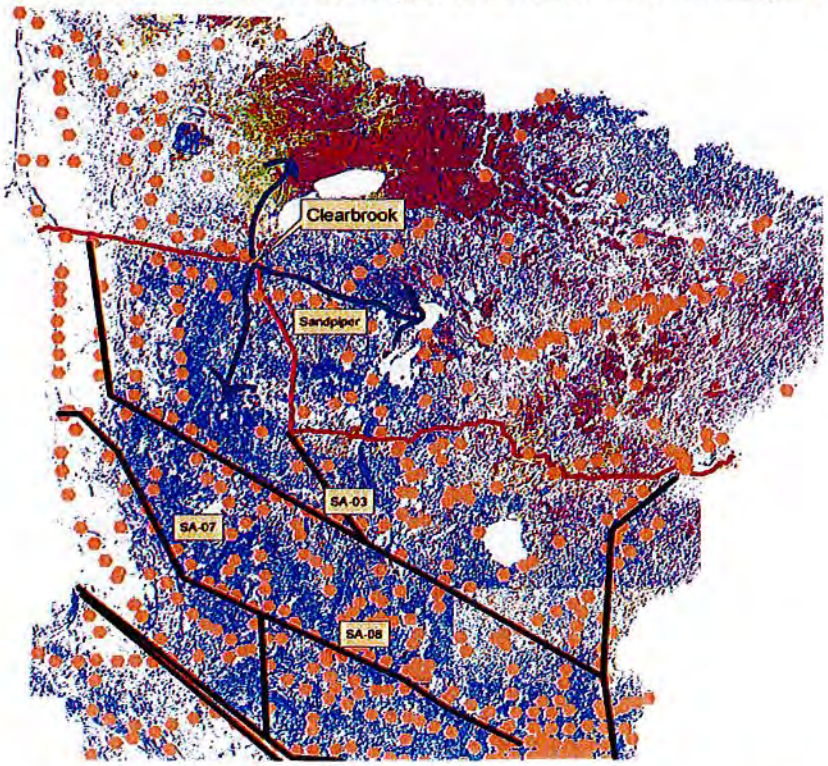

Due to the fact that pipelines are often placed in the same corridors, it is MPCA's concern that by continuing to allow pipelines through Clearbrook, the state will enable expansion of future pipeline infrastructure expansion in areas of the state that will have an increasingly concentrated impact on the state's most valuable surface and groundwater resources. This increases the potential for natural resource impacts and degradation due to spills or releases.

The MPCA believes that cumulative potential effects associated with high-risk crude oil routes can be reduced or avoided if future terminal facilities were constructed at a location west of Clearbrook. Such facilities could be constructed along the old line 3 corridor, or near Crookston as shown on the following map. The possible benefits to reducing potential impact to our state's valuable resources are depicted below:

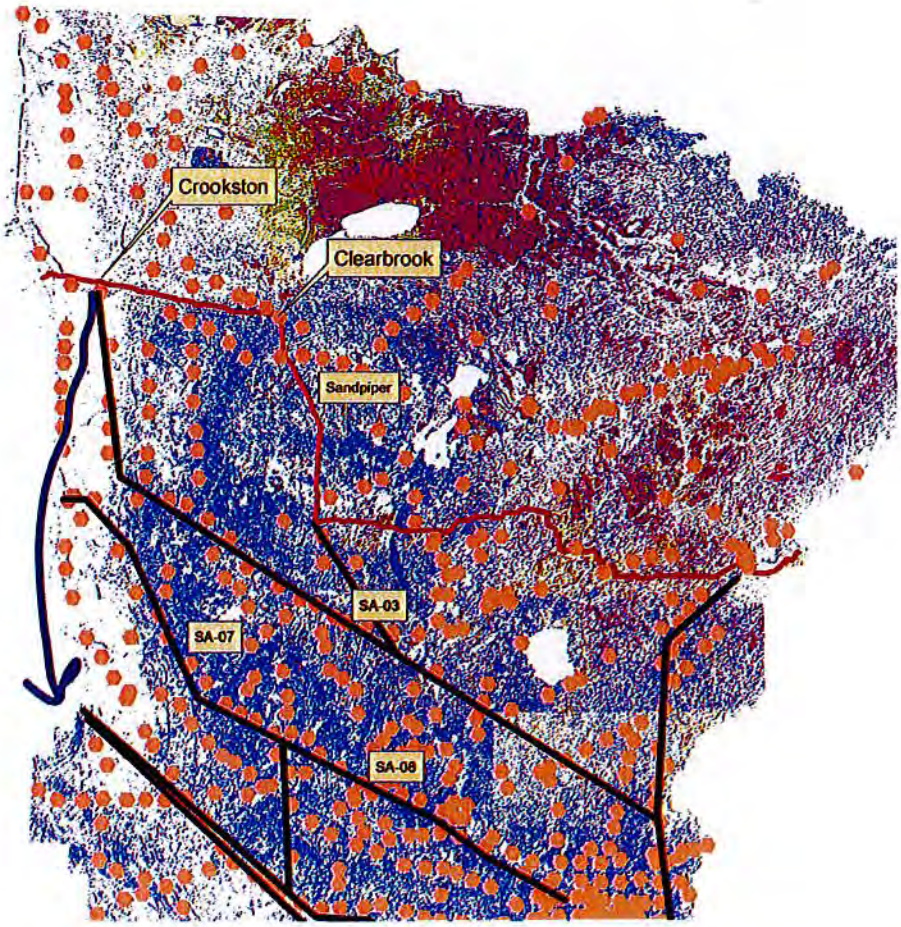

By relocating new terminal facilities west of Clearbrook, a corridor can be created in which potential resource impacts can be minimized, and a number of possibly less environmentally hazardous routes opened up. The Sandpiper route as currently proposed, as well as future pipelines that may use this same corridor, increase cumulative risk with consideration of most of the criteria from 7852.1900 as described above.

Minnesota Rule 7852.1900 Subp. 3.J. The relevant applicable policies, rules, and regulations of other state and federal agencies, and local government land use laws including ordinances adopted under Minnesota Statutes, section 299J.05, relating to the location, design, construction, or operation of the proposed pipeline and associated facilities.
Minnesota Statute 116.04D, Subd. 6 states: "No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct."

In summary, all the currently proposed system alternatives evaluated by the MPCA here are worthy of further consideration, especially when compared with the Sandpiper proposal. The MPCA recommends that at a minimum, the Commission approve SA-03, SA-04, and SA-05 for further consideration in these proceedings. Further, the MPCA urges the Commission to gather additional environmental effects information on the system alternatives through preparation of an ER-like document and is willing to assist EERA by providing additional data, comments, and review for the document that both agencies recommend here.

The MPCA thanks the Commission for the opportunity to comment upon these issues. The agency continues to emphasize that the environmental effects of system alternatives need to be considered in the Certificate of Need process. System alternatives that will transport oil to an alternative terminal with significantly less environmental harm should be evaluated in these proceedings.

Sincerely,

Craig Affeldt, for

Bill Sierks,
Manager, Environment and Energy Section
Minnesota Pollution Control Agency

BS:bt
cc: Deborah Pile, Department of Commerce
Larry Hartman, Department of Commerce
Sara Ploetz, Enbridge

eDocket No. 20151-106460-06

April 4, 2014

Paul Stolen
37603 370th Av SE,
Fosston, MN 56542,
218-435-1138

Mr. Larry Hartman
Environmental Review Manager
Minnesota Department of Commerce
85 67th Place East, Suite 500
St. Paul, MN 55101

Re: Comments on proposed Enbridge Sandpiper Pipeline, PUC Docket #13-474

Dear Mr. Hartman:

Enclosed are my comments on this proposed project. They concern the main topics solicited in the January 31, 2014 public notice. I suggest alternative routes and route segments, and provide answers to public notice questions "What human and environmental impacts should be studied in the comparative environmental analysis?" and "Are there any specific methods to address these impacts that should be studied in the comparative environmental analysis?"

My comments address human and environmental impacts. They identify appropriate methods of studying such impacts, based on PUC rules and standard methods used in Minnesota and elsewhere to review pipelines.

The most important point in these comments concerns the enormous quantity of oil and other hazardous product that is already flowing through multiple pipelines in one or two narrow corridors This project, and the new Line 3 Enbridge replacement and enlargement will add even larger amounts of oil and product to these corridors. These corridors cross highly valued natural resource areas that have many lakes and clean rivers,. They are often at or near the headwaters of drainages and in hilly areas, as well as being close to people and concentrations of residences.

It is time for Minnesota and federal regulatory agencies to address the problem of multiple large diameter pipelines in close proximity to each other. This concentration makes the consequences of a single site event—whether such an event is natural, accidental, or intentional—potentially catastrophic. Furthermore, my comments will show that the flow of oil and other product will be so large as to be larger than—or a significant portion of—the flow of well-known rivers crossed by the corridors.

I am submitting these comments as a citizen but also as an expert. These are my personal comments written without review or reimbursement of any party. I will be willing to provide testimony as such in legal and legislative forums, should this be necessary, depending on personal availability.

In lieu of providing a c.v. at this time, I summarize here my credentials for asserting that I have expertise regarding the Sandpiper review.

I have regulatory experience with large natural gas, carbon dioxide, water, and oil and product pipelines in Montana and Minnesota. This has involved on the order of 10-12 pipeline projects while employed at the Montana Department of Natural Resources and Conservation and the Minnesota Department of Natural Resources. In Montana, the DNRC had environmental review, locational approval, and Certificate of Need Authority for energy facilities combined in one agency. I have also supervised , and /or participated in the preparation of EISs or EAs of such pipelines. This included conducting training sessions for other regulatory personnel on how to review pipelines for impacts and on pipeline construction methods.

I have written or coordinated the writing of major environmental review regulations for fixed linear energy facilities, including pipelines and HVTL lines. This experience included reviewing specific proposed linear and fixed large energy facilities (power plants and HVTL lines), and high-level nuclear waste repositories. I have been an environmental inspector on a number of large pipeline projects, including presenting agency views at pre-construction conferences with pipeline builders and sub-contractors.

I have policy-level experience with both federal and state laws and regulations regarding environmental review, pipelines, and solid and hazardous waste topics. This includes legislative staff work, legal depositions, testimony in court, and presentations to other agencies. Finally, this experience also includes years of doing environmental reviews of many other types of projects, including experience with formal risk assessment, and supervising and/or writing scopes of work for the preparation of highly technical studies conducted by outside consultants.

Review and permitting of significant projects such as the Sandpiper project, and the 36-inch Enbridge upgrade of its old Line 3, means that there are overlapping jurisdiction with other federal and state agencies. Some of these are broader than the narrow PUC review requirements. My comments also pertain to those other agency responsibilities. It is necessary to exchange information among such government authorities as a matter of good government. Many of my comments attempt to accomplish such a goal. Therefore, I am providing copies of my comments to these other agencies.

My comments are enclosed. Thank you for consideration of them.

Sincerely,

Paul D. Stolen

C: Tom Landwehr, Commissioner, Minnesota DNR
John Stine, Commissioner, Minnesota PCA
Tamara Cameron, Regulatory Chief, Corps of Engineers
Bob Eleff, Minnesota Legislature, House Research
Ken Westlake, USEPA, Chicago Office
US State Department, Washington DC

Comments on proposed Enbridge Sandpiper Pipeline, PUC Docket #13-474
Expert Testimony of Paul Stolen, Fosston Minnesota
April 4, 2014

I. Potential oil leaks and pipeline ruptures must be addressed in the route permit, by Minnesota state agencies, and by the US Corps of Engineers and EPA.

Summary: In this section I make the case for using accepted methods of risk assessment to address the consequences of pipeline ruptures to the Minnesota environment and people from this project. A foundation principle of risk assessment is that the greater the consequences of an event, the greater the need to examine rare or unlikely events. There are five reasons why unlikely events need to be considered in this risk assessment for this project:

1) Risk assessment scenarios in Attachment 4 are roughly applicable to one of the existing and proposed pipeline corridors in Minnesota. For example, a 36-inch pipeline rupture of the "worst case" type used in the assessment, may still release on the order of 40,000 barrels of oil, even assuming the quickest reaction time of pipeline operators to close block valves(13 minutes.) If valve closure time is delayed for 30 minutes, this rises to about 70,000 barrels, and if delay is 60 minutes, the amount is 100,000 barrels.

Such releases could have extremely high consequences to the Minnesota environment, and higher releases are possible under some risk assessment scenarios.

2) The portion of the Sandpiper route between Clearbrook and Park Rapids already contains three pipelines. Enbridge is apparently planning one more 36-in line in the same corridor as the 30 inch Sandpiper route. I raise the question as to what "worst-case" scenario should be used when there are 5 pipelines in close proximity in remote areas and at least somewhat susceptible to natural or intentional damage, perhaps to all of them at one time?

3) The corridor Enbridge proposes to use traverses a landscape rich in aquatic and other natural resources, highly valued by Minnesotans, and that includes major groundwater resources.

4) The portion of the Sandpiper route between Clearbrook and Park Rapids was fraught with problems during construction of the MinnCan pipeline, which were at least partially due to the corridor being created for a small pipeline long before modern environmental laws were passed.

5) The other route likely to be considered in the Sandpiper comparative review—the Enbridge mainline corridor—suffers from very similar problems as do at least the first three listed above. There are already as much as 7 pipelines present in this corridor.

The Sandpiper project, as well as other new projects in the planning stages, will add significantly to the enormous quantity of oil and other hazardous product that is already flowing through two narrow pipeline corridors.

It is time for Minnesota and federal regulatory agencies to address this problem of multiple large diameter pipelines in close proximity to each other. This concentration makes them vulnerable to natural events, accident or intentional act—such as the Oklahoma City federal building bombing. In fact, in Comment II.A. I discuss a specific case on the Alberta Clipper route where very high flows caused by the large rainfall events

that seemed to be caused by global warming could threaten the integrity of more than one of the large pipelines in this narrow corridor.

My comments on this topic are based on my experience with pipelines in Minnesota and Montana, as well as with exposure to risk assessment concepts and methods. Enbridge may object to the use of the ORNL study in Attachment 4, and say it is not appropriate to apply to these projects. I disagree: of course it isn't directly applicable, but its methods are modifiable so that it is. Extrapolating the findings of Attachment 4 to the two corridors could be pushing things a little—but I have found no information that anyone else is considering these issues and the deadline for PUC comment is now due. It is therefore entirely appropriate to use it, and I hope to trigger a helpful debate. And, I know for certain my view this topic is important will be shared by the public.

The jurisdiction of the PUC and other Minnesota agencies regarding the scope of review as it pertains to pipeline design and location lacks clarity and confusion among regulators as well as the pipeline company personnel. This is related to the issue of pipeline "safety standards", and is discussed in detail in Comment II below. This lack of clarity and confusion should not be allowed to continue, since in my view, Minnesota's natural resources and citizens are threatened by rare but reasonably foreseeable events.

As noted in Comment II, I believe the evidence is firm that the Minnesota state agencies can effectively develop measures regarding mandatory design features related to pipeline ruptures and leaks in order to that protect people and the environment without encroaching on federal "safety standards." Such involvement is extremely important, given the magnitude of oil and product potentially moving through these corridors.

I. A. Estimates of existing and proposed pipeline oil and product flows in Minnesota as compared to selected river flows.

After burial, pipelines, when functioning correctly, are largely invisible to the public and most policy makers—such as those currently concerned with oil transport by rail. In order to make considered judgment on policy and permits—as well as allowing proper public involvement—this needs to change. It is no longer acceptable to have an "out of sight, out of mind" attitude on the magnitude of current and potential oil transport through Minnesota in restricted corridors with multiple pipelines.

It is not possible to begin to analyze potential impacts from pipeline leaks and ruptures without knowing amounts of oil and product being transported. Attachment A provides details about oil flow into and through Minnesota in the corridors relevant to the Sandpiper analysis. It thus provides a basis for analyzing socio-economic, public safety, and environmental impacts from leaks and ruptures. Pipe size and amounts of oil and product pumped are given, as is ownership and origin (for most of the lines.) Attachment 2 provides a description of most of the Enbridge pipelines.

Also included on page 3 of Attachment A is a comparison of pipeline oil and product flow and selected river flows near where corridors cross the named rivers. These data, while in cubic feet per second (cfs), are useful for both public understanding of local residents as well as resource managers. The public in these locations can at least visualize the rivers even though most do not directly understand cfs figures.

The river flow data shown are long-term median flows for April 2, not current flows. Therefore, they are indicative of long-term spring runoff conditions, and are likely substantially higher than low-flow conditions.

In addition, the percentages listed comparing oil/product flow to river flow use the highest amounts based on the proposed pipeline projects in the permitting and planning stages.

There are some caveats with respect to the numbers in Attachment 1. First, I used reliable sources for the numbers. When I used news reports, I only used those where pipeline companies were directly quoted, and checked multiple news sources. However, the amounts indicated for the Minnesota Pipeline Company older lines rely on indirect conclusions based on Citation #2 figures and subtracting known amounts from specific projects. The Enbridge figures for existing pipelines in its Mainline corridor are taken directly from them. (Attachment 2) Finally, the source of oil/product was somewhat difficult to determine in some cases.

Attachment 1 indicates the following with respect to comparison of April 2 long-term median river flows with oil flow amounts in pipelines, both expressed in cubic feet per second:

--Four of the listed rivers, Snake River above Warren, Clearwater river at Plummer, Straight River at Park Rapids, and Prairie River at Taconite, have oil/product flows substantially higher than current spring flows in the rivers. In two cases oil flow is 200 percent of water flow.

--In all cases, especially if one considers large releases during higher flow conditions resulting in rapid dispersion downstream, these rivers are important and sensitive natural resources. For instance, the Straight River south of Park Rapids is a nationally recognized brown trout fishery.

<u>I.B. Methods of determining socio-economic and environmental impacts of pipeline ruptures</u> The PUC public notice on Sandpiper requested advice on methods of addressing potential impacts. There are indeed methods already in place, such as:

I.B.1. *Identification of "High Consequence Areas."* Comment II.B.1. addresses this topic in detail and provides recommendations for how to use this category in the project review. These areas are also roughly described in the federal agency prepared Attachment 3, which includes somewhat useful guidance as to their possible use in the Sandpiper project.

I.B.2. *Risk Assessment with respect to potential amounts of oil/product released by ruptures.* A foundation principle of risk assessment is that the greater the consequences of an event, the greater the need to examine rare or unlikely events in the risk assessment. Attachment 4 is a clear illustration of this principle. For example, it indicates that a "worst-case" pipeline rupture needs to be used, and justifies why it is needed. Such a rupture is called a "guillotine" rupture : "Guillotine-type breaks are less common than other pipeline breaks such as fish-mouth type openings, but they can occur as a result of different causes including landslides, earthquakes, soil subsidence, soil erosion (e.g. scour in a river) and third-party damage. The guillotine-type break is the largest possible break and is therefore considered in this study as the worst case scenario. " (page 5.)

The study goes on to use this scenario in its analysis of the cost-effectiveness of installing block valves, as well as assessing (some) environmental and socio-economic damages from ruptures. It calculates hypothetical releases in different scenarios in its appendix, including those figures listed in the above summary. More detail is provided in the verbatim (except for underlining) excerpts in Attachment 4.

As noted in the above summary, the estimates of amounts spilled from "guillotine" type ruptures of just one pipeline are large—perhaps a minimum of 40,000 barrels from a 36-inch line. Magnify this by the scenario of

intentional serious efforts to damage several pipelines at one time—and this amount becomes potentially massive.

*I.B.3. Actual damages from recent spills associated with rivers.*_Attachment 4 also describes two case studies of actual spills. (pp. 10-11.) These two case studies were used to develop a factor to increase the estimated costs according to the Attachment 4 methods by a factor of two, since both found the risk assessment method underestimated actual costs by about 50%.

a. Enbridge spill into Talmadge Creek and the Kalamazoo River in Michigan. Approximately 20,000 barrels of oil were released. The cost of that spill from a 30-inch diameter pipeline was of 2012 was $767 million.

b. ExxonMobil Pipeline company rupture under the bed of the Yellowstone River 20 miles upstream of Billings, Montana. This was caused by scour from flooding that exposed and fractured the pipeline that was trenched under the river bed. An estimated 1,509 barrels of oil were released before the pipeline was closed. Clean-up and recovery costs were $135 million. (Recent news reports indicate final costs and fines are not yet resolved.)

I.B.4. *Comparison of pipeline flow rates compared to river flows.* Attachment 1 indicates total amounts of oil/product flows in the numerous pipelines that cross these rivers. They portray possible amounts subject to the most catastrophic possible pipeline rupture event—that of an event that caused damage severe enough to rupture more than one pipeline. Some of these lines have been trenched under these rivers, in other cases they have been bored so that burial is deep and not subject to certain kinds of rupture events. Damage could conceivably occur due to river scour from unusually large flood events, or from an outside party successfully and deliberately accomplishing such a rupture.

My intent in comparing river flows to oil flows is not to imply that the worst-possible event be used in an analysis. Rather, it is to portray the magnitude of the oil/product flows in terms that the public and reviewers can understand it. Again, I am responding to normal methods of conducting risk assessments: Very high consequences deserve be paired with looking at rare events. The possible use of this information in any kind of corridor analysis or spill magnitude is subject to a number of questions being answered first. This is discussed next.

I.C. <u>Recommendations regarding pipeline rupture for analysis of impacts, corridor/route comparison, and estimates of spill magnitude based on risk assessment.</u>

I.C.1. The Sandpiper project should be analyzed with respect to potential impacts from pipeline rupture using risk assessment methods modified from those used in Attachment 1. This would:

a. Entail determining Enbridge's methods for locating such valves on the Sandpiper pipeline, and making this available for critical review, and

b. Include both estimates of spill magnitude based on ideal block valve locations and rupture scenarios, such as the "guillotine" scenario, and differential valve response times.

c. Estimate the spill magnitude (in a range of minimum spill to somewhat longer response time spills) that then should then be used to assess socio-economic and environmental impact along the existing corridor.

d. The risk assessment should take into account the larger rainfall events in recent years possibly caused by global warming, including an assessment of the possibility of increased scouring in rivers crossed by these corridors.

I.C.2. *What is the "worst case" when multiple pipelines are in close proximity to use in the risk assessment*? "A review should be undertaken with respect what should be the proper "worst-case" rupture scenario when multiple pipelines are packed close together in a corridor. This should include:

a. An assessment of whether a "worst-case" rupture on one line threatens rupture of another line, such as a large fire.

b. An assessment of whether the response to a "worst case" event on one line is slowed by the presence of other lines either on one or both sides of the ruptured line because equipment can't cross the shallowly buried other lines. This should also include a description of circumstances where all or some lines still operating need to be shut-down during the response and the practicality of doing so. (It needs to be recognized that in some locations there are "cross-overs" where one line is constructed underneath other lines because of existing facilities on one side—such as railroad tracks—prevent construction on the preferred side.)

c. Consultation with state and federal pipeline authorities as well as the authors of the Attachment 4 study as to what constitutes "worst-case" ruptures when there are multiple lines in close proximity.

d. Consultation with the ORNL authors and others regarding the vulnerability of a corridor with multiple large pipelines in close proximity to deliberate actions and how this should be addressed in socio-economic and environmental impact reviews.

I.C.3. *A process is needed whereby problems found during review of additional pipelines in any given corridor that might threaten pipeline integrity are thoroughly reviewed by government personnel*. While perhaps outside the scope of the PUC Sandpiper review, procedures should be developed whereby state agency field staff who find potential problems at significant pipeline locations could be assured that the problems are adequately responded to by government agencies rather than pipeline owners. I have personal knowledge of three such locations along these corridors, as discussed in Comment II.A below.

II. The PUC and Minnesota agencies indeed have significant jurisdiction over pipeline design issues related to oil spills and leaks and site-specific measures to prevent them.

<u>II.A. Overview and significance of the problem</u>. This is an important issue because a properly *designed and located* pipeline can result in the least amount of impact and be a safe way to transport petroleum products.

The central issue is that there is both federal and state jurisdiction and authority, and that it overlaps to some extent. In these comments I maintain that the PUC has clear authority to influence both pipeline *design* and location with respect to analyzing and mitigating impacts to people and the environment.

MDNR and MPCA field staff often have intimate knowledge of site specific conditions along pipeline corridors, and are trained to have such knowledge. Yet some pipeline companies, their consultants, and even some people in Minnesota government try to claim that pipeline *design* is solely the bailiwick of federal agencies and federal standards because such design pertains only to "safety standards."

On several occasions during my employment with the MDNR, and while working with other field staff, we suggested site-specific changes in design that would add more resource protection or mitigation, "pipeline safety standards" were invoked. This was strongly prevalent when DNR was trying to determine how block valve locations were selected, and why specific block valve recommendations weren't followed.

Other issues involved lack of clarity as to Minnesota Office of Pipeline Safety responsibilities regarding possible environmental damage at locations where pipe integrity was threatened. For example, during one review of the MinnCan pipeline, DNR staff (Fisheries and Ecological Resources) found a location at a proposed river crossing where a large tree had fallen into the river. This resulted in bottom scour exposing one of the older pipelines. Company officials were not interested, and indicated it was not in MDNR jurisdiction to solve this problem. A call to the State Office of Pipeline Safety only elicited a question as to whether it was brought to the attention of the pipeline company.

On another occasion during the Alberta Clipper review, an older pipeline was found to be hanging a foot or two over the surface of a designated trout stream east of Bemidji. A call to the Minnesota Office of Pipeline Safety elicited a statement that it was up to the pipeline company to correct the problem. This was likely Enbridge Line 1 because of its small size. (See attachment 2 for a description.)

The most serious problem occurred on the Alberta Clipper route on a Grant Creek crossing just west of Bemidji. I was directly involved in this site, and provided several written documentations as to what occurred. At this site, Grant Creek flows south through a narrow gap in an old railroad grade. Upstream of this gap Grant Creek flows through s a large expanse of wetland. The creek is also subject to numerous beaver dams upstream. The railroad bridge at this site had collapsed into the gap, which was also filled with segments of a five foot concrete culvert.

Immediately below the gap are 5 or 6 large pipelines, with the first being within just a few feet of the steep railroad grade. Grant Creek takes sharp turn to the east, actually following the pipeline in a parallel manner, until again turning south where it flows over the trenched pipes. I observed that bank erosion had removed 6 or 7 feet of the bank, and that this had all occurred since the previous summer. Therefore, this large pipeline was now only protected by about 5 feet of riverbank.

A large and rare rainfall event in the drainage above this site would have taken out beaver dams, and added to the flow through this narrow gap. It is likely that the first pipeline would have easily been exposed. In addition, the heavy concrete sections could have been eroded into the pipelines, threatening ruptures. Since Enbridge wanted to do something off the right of way in this location to "clean up" the site. They asked for my advice regarding permitting and repair. Since there were concrete sections available, and it looked as if there was a pipeline integrity issue present, I supplied the advice on armoring the eroding bank next to the pipeline, and moving the bank farther from the pipe. This was done by driving the 5 foot concrete sections into the stream bank, a technique I had essentially learned while employed at the DNR. I documented that this was a temporary solution

This site should be thoroughly assess at to susceptibility to scour—since it is an ideal site for down cutting caused by human activity restricting the floodplain of this river. On several other occasions, when DNR staff found exposed pipe on older—and large—pipelines in sensitive areas next to rivers, the same thing happened—staff were told it was up the pipeline company to fix the problem.

II.B. Specific PUC rules on "safety standards." The PUC rules for the route permit, in 7852.0200, Subp. 2 "Scope," has two sentences containing language pertaining to pipeline safety standards. In fact, the language is so similar as to be almost redundant:

--Second sentence: "This chapter does not set safety standards for pipelines."

--Last sentence: "The (permit) must not contravene applicable state or federal jurisdiction, rules, or regulations that govern safety standards for pipelines nor shall the permit set safety standards for the design or construction of pipelines."

I submit that the State of Minnesota has a number of clear ways it can influence Sandpiper (and any other liquid pipeline) without "setting safety standards." These are as follows:

II.B.1. Location of High Consequence Areas (HCA) is not necessarily only a "safety standard." These areas are referred to in federal safety standards for pipelines. They are areas where ". . .a release could have the most significant and adverse impact." Attachment 3 provides lots of detail concerning both human and ecologically important areas, such as "land area in which spilled liquids could affect the water supply……critically imperiled species…..areas where migratory birds congregate…..(pipelines) that pass near enough that a release could reach the area by flow over land or within a river, stream, lake, or other means, are assumed to affect (the HCA.)"

Strangely, this document doesn't mention an HCA identified by state authorities, but actually refers pipeline operators to Nature Conservancy personnel to be consulted on important areas. (A personal comment here: Might this not imply a rather over-reaching and likely unconstitutional claim of federal legal authority?)

In addition, while I was employed by the Minnesota DNR, we had a meeting with the Minnesota Office of Pipeline Safety regarding issues along the MinnCan route. The people we met with never mentioned the concept of HCAs. They were not familiar with or interested in site-specific environmental issues, in fact, and only referred to specific generic safety standards.

II.B.2. Recommendations top reduce confusion and lack of clarity among agencies with overlapping responsibilities.

a. PUC, DNR, BWSR and PCA staff consult the Minnesota Attorney General's Office to investigate the specific federal rules pertaining to HCA's to determine the ability of state authority to identify and influence the identification of both project-specific HSAs and more permanent HSAs. Examples of state-identified areas should include groundwater recharge zones, designated trout streams, canoe routes, rivers with significant fisheries or rivers leading to significant fisheries or drinking water supplies, and a number of others.

b. PUC, DNR, BWSR, and PCA should notify the federal Office of Pipeline Safety that Minnesota intends to actively propose additions to the National Pipeline Mapping System referred to in Attachment 3, based on the review of the Sandpiper proposal as well as the other Enbridge and Minnesota Pipeline company expansion plans. This should include the corridors identified in Attachment 1 as well as any other corridors and new pipelines.

c. The environmental analysis of the Sandpiper and alternatives identify HCAs along all alternative routes, including already-identified HCAs and ones identified by the public, Minnesota DNR, PCA, BWSR, federal COE during this pipeline review. The outside consultant hired by the PUC to do the analysis of impacts and the

route comparison should be charged with consulting and coordinating with Minnesota state agencies to identify these areas. The route comparisons should then include these locations in the analysis.

d. Extra care should be taken in the identification of HCAs along any corridor with multiple pipelines because of the increased magnitude of possible ruptures affecting a wider area that normal for one pipeline.

II.C. Pipeline design features that protect people and the environment are site-specific and thus need site-specific design features. It should not be necessary to have to make this point because we are many years past such knowledge based on normal and standard techniques for assessing impacts and mitigating them. Almost every environmental permit given has site-specific measure.

Large-impact projects always should have site-specific design. In fact, well-designed pipeline projects when they are finally ready to be constructed uses something often called a "line list" which identifies down to the foot what environmental mitigation measures are to be used in sensitive locations.

II. D. Support for my contention that pipeline design features such as some block valve locations are not always a "safety standards" issue. The following information clearly supports this contention:

II.D.1. Citation 8 (Attachment 4). Block valves and other related design features work to rapidly shut down and isolate pipeline segments when a sudden pressure drop indicates a pipeline rupture of enough magnitude to trigger the designated pressure drop. They can either be manual valves or remotely-operated valves.

Attachment 4 is a recent (late 2012) major study regarding improving block valve usage to reduce releases of large amounts of hazardous liquids. This was done under the auspices of an internationally known energy research institution, the Oak Ridge National Laboratory. The instigation for this study was primarily driven by the natural gas pipeline explosion in California that killed 8 people, but also seems likely that it was influenced by the large Enbridge rupture in Michigan, since it uses both as case studies. This document illustrates why features such as block valves are clearly not always a "safety standard." Here are quotes relevant to site specific pipeline design that are not "safety standards."

".. . ..site-specific parameters that influence risk analyses and feasibility evaluations often vary significantly from one pipeline segment to another and may not be consistent with those considered in this study. Consequently, the technical, operational, and economic feasibility and potential cost benefits . . . . . .need to be evaluated on a case-by-case basis." (p. 1 of Attachment 4.)

"Section 4 of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 calls for the Secretary of the U.S. Department of Transportation (DOT) to require by regulation the use of automatic or remotely controlled shutoff valves, or equivalent technology, where it is economically, technically, and operationally feasible on hazardous liquid and natural gas transmission pipeline facilities constructed or entirely replaced after the final rule was issued. . . . .The Act also requires a study to discuss the ability of transmission pipeline facility operators to respond to a hazardous liquid or natural gas release from a pipeline segment located in a high consequence area (HCA)." (p. 1 of attachment 4)

"In addition, operators are required to consider installing emergency flow restricting devices such as check valves and RCVs on pipeline segments to protect a HCA in the event of a hazardous liquid pipeline release. In making this determination, an operator must, at least, consider the swiftness of leak detection and pipeline shut down capabilities and benefits expected by reducing the spill size." (p. 2 attachment 4)

II.D.2. Citation 9. This engineering study, entitled "Method determines valve automation for remote pipelines," describes methods of determining where automated block valves are to be located. The method is clearly based on site-specific design features. In addition, the following quote summarizes how block valve location is not directly based on "safety standards":

"Most pipeline codes do not stipulate requirements for block valve spacing or remote pipeline valve operations along transmission pipelines carrying low-vapor-pressure petroleum products. This requirement is generally industry driven to control hazards and reduce environmental effects of pipeline ruptures or failures causing hydrocarbon spills. . . . . This article summarizes pipeline codes for valve spacing and spill limitations in high consequence areas (HCAs). It also provides a criterion for an acceptable oil spill volume caused by pipeline leak or full rupture. The criterion is based on industry's best practice." (Introduction to the study.)

Note: This study noted at the end that the acceptable spill volume used to determine the valve spacing was about 20,000 barrels of oil. The study was done for several large pipelines in Brazil. I did not attempt to decipher the meaning of that large amount being acceptable for design of block valve location.

II.D.3. Recommendations for Sandpiper review and analysis regarding block valve locations.

a. Enbridge be required to clearly describe their method of determining block valve determinations, including identifying what HCAs they used, as well as any other factors for determining such locations, including cost factors and "minimum acceptable leaks." This information should be submitted to the MPCA, MDNR, and COE in time for them to respond appropriately, and in time for incorporation into the analysis of impacts and Comparative Route Assessment.

b. MDNR, MPCA, and/or PUC (and COE) should request information from the Office of Pipeline Safety as to whether they have provided any advice to Enbridge as to method of determining block valve locations and acceptable minimum amounts of oil at HCA locations, potential HCA locations, and other-than HCA locations, including cost-factors.

c. Minnesota state agencies and the Corps of Engineers develop a cooperative and partnership relationship regarding the potential socio-economic and environmental risks of having multiple large pipelines in close proximity to each other.

III. The PUC, other Minnesota agencies, and the US Corps of Engineers and EPA must address "corridor fatigue."

PUC pipeline rules favor following existing corridors—even when the pipelines are squeezed into environmentally and socially sensitive areas. The current rules also allow pipeline companies to use the rules to their benefit and to reduce the scope of the analysis. Clearly, this needs a legislative solution. However, there are methods that can be used in the Sandpiper review that are within the current rules that can attempt to get at the "corridor fatigue" problem. I provide some detail in these comments because of the importance of this issue. My recommendations as to how to handle this in the Sandpiper review are in III.C. below.

III.A. Background. "Corridor fatigue" is a term that has been used to talk about what happens when multiple linear facilities such as pipelines and High Voltage Power Lines reach a point where cumulative impacts,

objections from people nearby, and crowding of various sensitive areas along the edge of corridors began to be more and more apparent.

In fact, this term is inappropriate with respect to the pipeline corridors described in Attachment 1. Much more proper terms are "corridor sickness" or "corridor exhaustion."

Any resource manager with experience in environmental review of linear facilities in Minnesota (or elsewhere) knows the reasons that lead to overuse of corridors. Some of these are generic, and others are specifically relevant to the Sandpiper proposal. These are:

III.A. 1. *Original linear facility routes pre-date almost all environmental laws*. This meant the route went through high-impact locations that wouldn't otherwise be crossed under current laws and regulations. Essentially, these routes were the shortest distance between endpoints unless there were prohibitive obstacles in effect at the time of building. these original facilities were usually small pipelines. This is true of both the Enbridge Mainline corridor and the Minnesota Pipeline Corridor.

III.A.2. *Each additional facility was assessed independent of others.* Methodology to fairly assess cumulative impact of additional facilities after the second facility was usually not used. (It is often the third facility that starts to show the strain.)

III.A.3. *Large linear facilities are almost always controversial.* There was strong pressure to follow existing corridors. This then became embedded more and more strongly in either informal or formal policy, and finally made it into regulations. Unfortunately, when this was done, there was no concurrent regulation requiring an objective assessment of the pros and cons.

III.A.4. *Lack of appropriate regulations.* Policy-makers formalizing existing corridor locations as the most likely place to put new facilities didn't write corresponding policies that required a look at impacts of ever-larger corridors. Likely the best example of this I know of is the LaSalle Creek valley north of Itasca Park on the Minnesota Pipeline Corridor. This site is covered in detail below.

5. Citizens living next to corridors have little recourse to challenge expanding corridors, since the energy companies and PUC are essentially in agreement for all practical purposes. The PUC has not developed objective methodology to address this major problem. The result is that adjacent landowners are subject to the highest impact.

<u>III. B. Known potential impacts of enlarging Minnesota Pipeline and Enbridge mainline corridors because of previous recent reviews.</u> There are recent reviews of both of these corridors (except for the Sandpiper Green field route.) Therefore, these reviews, including comments of agencies with responsibilities for environmental protection during those reviews, are relevant to the current reviews.

II.B.1. PUC, MDNR,PCA, and COE review of the MinnCan pipeline. During the review process for the MinnCan pipeline, there were many issues raised by agencies with natural resource, wetland, and permitting authority. There was an important ALJ report prepared for this project. All of this is available in the PUC records for this project. There were also major problems identified during construction. The review of that project is recent enough so that environmental concerns raised are still relevant.

<u>I</u>*II.B.2. PUC, MDNR,PCA, and COE review of the Alberta Clipper/Southern Lights/LSr projects.* Even more recently, the Enbridge proposals follow its mainline corridor to Clearbrook. An alternative route to Sandpiper

follows the Mainline corridor on to Superior. Now, just 5 years later, Enbridge proposes to follow this same problematic route.

III.C. Route width for new reviews too restricted so that it exacerbates corridor fatigue. The PUC rules allow Enbridge to select the route width for their application. The rules state a route can be as narrow as the right of way required to construct the pipeline, and as wide as 1.25 miles. An examination of the Enbridge proposal indicates in many locations that Enbridge has selected a very narrow route width. It is obvious that the narrower the route width for this review along the existing Minnesota Pipeline Corridor, the more advantageous to Enbridge—because it becomes too late to adjust the right of way to avoid impacts found after finalization of the route width by the PUC.

Generally speaking, the PUC waits for others to object to this restrictive situation and propose enlargements, or other route segments or routes.

A good example concerns river and flood plain crossings. Normally, the clear standard for crossing of such environmentally sensitive features with linear facilities is perpendicular to the floodplain, and perpendicular to the river meander. In addition, as mentioned in Comment V, the MDNR does not have permit jurisdiction beyond the Ordinary High Water of the river or stream (this is the top of the bank in most cases.) The DNR has two options for influencing this—proposing a route segment change or widening, or relying on the PUC authority to require moving the centerline. Furthermore, DNR often indicates to applicants to begin preparing detailed applications for its license to cross before the environmental analysis of routes is completed.

In other areas, the 1.25 mile width is still too narrow to address the problems of pipeline corridors expanding more and more in high-impact areas.

III. D. LaSalle Creek problem area. More than any other location, this area epitomizes the landscape and regulatory issues of "corridor fatigue" and problems of following old straight-line routes. The crossing and surrounding landscape has the following characteristics:

--This location is not far north of Itasca park in a heavily forested area with steep and convoluted glacial moraine. LaSalle Creek itself is a small designated trout stream flowing in a glacial tunnel valley toward LaSalle Lake. The stream channel is deeply incised in the wetland with many meanders. Right at the crossing point, the stream and valley narrow upstream and widens out substantially downstream toward the lake. The ridges on either side of the tunnel valley are likely more than 100 feet higher than the stream.

--The existing Minnesota Pipeline Company pipelines transverse the valley at the almost the worst possible manner: a sharp oblique angle side-hilling down portions of the west hillside from the north, then side-hilling out of the valley on the east side after crossing the creek.

III.D.1. *Severe problems with the MinnCan crossing*. There were severe and numerous problems with this area. I am supplying some detail on these problems because I am proposing a re-route around this area several miles in length. The problems are as follows.

a. MDNR sent an "early-coordination" letter to the MinnCan consultant warning that this crossing was the worst site of all the locations in the Bemidji Region portion of the project. There was no response from MinnCan, and near-failure months later for MinnCan to even acknowledge such a letter. By then the PUC

process had proceeded past the point for the MDNR to effectively examine another route in this high-resource area.

b. The two old and small pipelines were closely followed with the 24-inch MinnCan line with close separation, on the order of 40 feet if I recall. The old cleared right of way was fairly narrow. This greatly expanded during construction. MDNR measured a cleared right of way over 350 feet wide on the north end of the valley. (This was necessitated by the large amount of earth moving required to construct a 50-foot wide level construction word pad.) Topsoil was generally not separated here either, so impacts are long-term.

c. MinnCan did a directionally bore deep under LaSalle Creek. It was somewhat over 3,000 feet in length and done in the winter. As they bored under the creek itself, there was a large frac-out into the creek. Drilling mud escaped from several other locations besides the creek bed, all characterized by obvious groundwater upwelling. (In spite of the very cold temperatures the ground and wetland surface was not frozen.)

Construction stopped and clean-up was complicated and protracted. Because of the lack of frost from groundwater upwelling, it was impossible to get equipment to the site so that most work need to be done by hand.

However, it was necessary to get some equipment to the site, which was a very delicate operation because of the deep, soft, water saturated organic muck at the site. There were two existing pipelines floating in this water saturated muck near the surface. These could have been threatened by heavy equipment tipping into this area. Oil/ product flow was *not* shut off during these operations taking place a few feet from the pipes.

d. A large beaver dam downstream of the crossing had backed up water right to the crossing point, and covered parts of the creek receiving drilling mud. In other words, there was thin ice over the flooded creek channel. This obscured drilling mud material and caused safety problems in minus 15 degree weather.

III.D.2. Current Enbridge plans at this site. According to maps I examined during the public meeting at Clearbrook, Enbridge is now planning a warm weather crossing of the creek itself downstream from the existing crossing out in the broader wetland that leads to LaSalle Lake. The proposed crossing location is at a more perpendicular angle to the creek itself but not perpendicular to the valley, since the centerline of the pipe makes a sharp bend after coming down into the valley from the north. After the creek crossing, the Enbridge plan is to open up a new cleared right-of-way on the east side-hill of the valley. This plan was confirmed to me by MDNR staff. Enbridge had indicated to them they would accomplish the trenched crossing in a very short time to reduce impacts. I believe this is a very bad idea for the following reasons:

a. There is wetland along very much of this centerline proposal, including as the centerline comes down the hill from the north. There are wetlands on the slopes of the west hill side caused by abundant groundwater emergence. There is deep muck in this area, as well as out in the flat valley. Trenching through this soft area will require very large amounts of construction maps which usually require firmer wetland soils than are present. Furthermore, the trying to trench in such an area will result in slumping and the necessity of removing large amounts of material.

b. I have been involved in several wetland situations with some similarities to this site—but not such as large problem area as this. None of them approach the red flags of this area. The nature of the muck soil and substrate in the other areas meant that sheet pile had to be driven in on both sides of the trench in order to remove enough material to sink a weighted pipeline. I estimate that more than 1/4 mile of wetland is

involved. Furthermore, both ends of this wetland traverse are on inclined wetland at the bottom of slopes. Attempting to excavate a temporary trench through such a location trenching could also easily open a channel so that unpredictable amounts of silt laden water—both groundwater and surface water—flows down the channel into LaSalle Creek.

c. The new right of way on the east side of the valley will also traverse groundwater emergent areas some distance before it rises far enough out of the valley to rejoin the corridor south some distance. This is also an additional impact of such a crossing.

d. I recommend that a route around LaSalle Creek and its valley be considered (see below.)

Recommendation: The route width should be expanded to the maximum 1.25 miles at every floodplain crossing that is oblique (not perpendicular to the floodplain.)

<u>III.C. Recommendations to begin to address "corridor fatigue" concerns relative to existing corridors followed by Sandpiper</u>.

II.C.1. *Federal EIS on Sandpiper.* The US Corps of Engineers should prepare a federal environmental impact statement for the Sandpiper project. The COE should do this for additional reasons beyond this topic, which will be contained in a separate recommendation to them.

It is clear that the PUC environmental analysis falls far short of what can be explored in an EIS. Nevertheless, Minnesota law says that the environmental analysis done by the PUC fulfils state environmental review requirements.

However, the MPCA and MDNR who are more familiar with the merits of EIS review than is the PUC, should certainly recommend to the COE that an EIS be done on this project.

III.C.2. *Incorporation by reference of the previous environmental analysis in these corridors*. I hereby incorporate by reference the PUC record of Alberta Clipper, LSr, Southern Lights and MinnCan projects into this Sandpiper review by the PUC. This should jump-start the review of "corridor fatigue" problems.

Examples of relevant documents for these four projects include: These issues and comments include:

--The ALJ report son MinnCann and the Enbridge projects
--All PCA and MDNR comments on the projects. There should be special focus on the MDNR objections to detailed and extensive comments that were ignored in ALJ findings.
--All key determinations of the US COE on all projects, and all comments on the 404 notices for the projects

III.C.3. *Any records of specific unforeseen problems and impacts that developed post-permitting on these projects.* If the records cannot be found, these topics should be addressed in the environmental analysis:

a. "Frac-outs" on the MinnCan project. Frac-out is the common term for when drilling mud escapes from the bore from directionally drilled crossings, whether they be short or deep bores. Generally, this becomes evident by mud appearing on the surface or in water bodies. There were a large number of such events on the MinnCan project. Some of which were very large. These occurred in or next to the following rivers north of the point where the Sandpiper route turns east: Clearwater River floodplain east of Bagley, Mississippi

River at the crossing north of Itasca park, LaSalle Creek floodplain and creek bottom north of Itasca Park, and the Straight river just south of Park rapids. There were other frac-outs south of Park Rapids beyond the point where Sandpiper turns east on a Greenfield route.

Frac-outs occurred during winter bores, which greatly increased the difficulty with addressing them for several reasons. Determining amount and location of material was obstructed by ice. Recovery of material was difficult due to ice. Finally, ice conditions on flowing water was a hazard to workers attempting to recover material.

All records of frac-outs that occurred on MinnCan should be carefully examined as to amounts and locations. This may help to determine if there is a pattern as to when they occur. In each of the four rivers mentioned above, landscape conditions were such that groundwater upwelling zones were either present or suspected at the site of the frac-out. If this is correct, such landscape conditions that are present in other locations are a red flag for bores in the future.

Drilling mud is primarily bentonite clay but contains additives at the discretion of the pipeline company. Additives are a two edged sword: they can increase the success of the bore and reduce frac-outs, but some additives can be toxic to aquatic life. Furthermore, MinnCan initially claimed trade secret status on the first frac-out at the Clearwater river, which became a big obstacle to resolution. Therefore, PUC should require specific listing of any constituents of drilling mud before. Some of the frac-outs were in locations subject to direct DNR permit authority, but others were outside of the OHW so were not. PUC should make it a condition of the Route permit that frac-outs be handled in essentially the same manner wherever they occur, after recommendations from the DNR and MPCA.

b. *Winter construction successes and problems on MinnCan and Alberta Clipper.* Topsoil separation is important in all areas of deep excavation, including over the trench as well as side-cuts done to prepare the 50-foot level work pad. Poor separation leads to more successful invasive species invasion, and lost productivity. Frozen ground made topsoil separation problematic. In addition, winter construction made it erosion control more difficult and led to substantially higher erosion problems during spring runoff in certain locations.

IV. PUC and Hearing Officer must address concerns of the MDNR regarding natural resources not directly subject to MDNR and MPCA permits.

Environmental impact assessment includes—by law as well as best practice—consideration of impacts not necessarily covered by permits. As noted in a letter to the ALJ on the Alberta Clipper and Southern Lights project, the MDNR said it only had direct jurisdiction on less than 0.5 percent of the route. (April 21, 2008 letter to AlJ Judge Eric Lippman, from Matt Langan, MDNR). This jurisdiction involved public land crossings and river crossings restricted to the OHW (generally the top of the riverbank.)

Subsequently, the MDNR made extensive factually supported comments regarding natural resources in their areas of expertise. Serious problems with Enbridge's data, lack of supporting information, and assessment of impacts were noted. Some of these were glaring errors, such as obvious underestimation of area of impact. The ALJ report finalized its report without discussing the merits of the DNR comments, and did not address any of them in numerous findings on the route permit conditions. At the same time, it praised Enbridge's approach. A "reasonable person" perhaps would find it troubling that an ALJ, who lacks natural resource expertise, would replace the expertise of an important state agency charged by Minnesota law with protecting its natural resources, with that of an energy company with obvious motivations for downplaying

impacts to such resources. The lack of attention to the MDNR comments is documented in three subsequent letters to the PUC staff after the ALJ report was finalized (April 25, 2008 letter to Larry Hartman from Matt Langan, MDNR; August 1, 2008 letter to Bill Haar, PUC Executive Director from Matt Langan, and November 13, 2008 letter to Larry Hartman from Matt Langan, MNDR.

Recommendation. The PUC should ensure that this does not happen again, and ensure that the ALJ for this project is charged with specifically making findings regarding potential environmental impacts found to be of concern by state agencies such as the PCA and MDNR.

V. PUC and ALJ must use accepted impact analysis methods and its own rules to proactively address the Sandpiper project and future even though its environmental report substitutes for an EIS or EA according to law and stature.

V.A. Pipeline rules available to the PUC to improve its responsibility, process ,and results. Many of the pipeline route permit rules appear on their face to restrict and narrow the environmental analysis as compared to that done under EIS rules and ;procedures for other large facilities. However, a reading of the rules indicates that the PUC has lots more authority than it used on the Alberta Clipper projects. All of the following rules allow the PUC to address **all** of the topics I have raised in these comments:

V.A.1. Rule "7852.3200, Subpart1: "When the commission issues a pipeline routing permit for the construction of a pipeline and associated facilities, the commission shall designate a route…..conditions for right of way preparation, construction, cleanup, and restoration. . . . **and any other conditions relevant to minimizing environmental and human impact.**" (emphasis added.)

Note: The PUC could have chosen to fully address the MDNR comments that were not addressed on Alberta Clipper using the highlighted language. It now needs to respond to comments by other state agencies on the Sandpiper project and use this clause.

V.A. 2. Rule "7852.0200 Authority, scope, purpose, and objectives

"Subp. 3. Purpose. Minnesota Statutes, section 216G.02, recognizes that pipeline location and restoration of the affected area after construction is important to citizens and their welfare **and that the presence or location of a pipeline may have a significant impact on humans and the environment**. To properly assess and determine the location of a pipeline**, it is necessary to understand the impact that a proposed pipeline project will have on the environment**. .. .. The purpose of this chapter is to aid in the selection of a pipeline route and **to aid in the understanding of its impacts and how those impacts may be reduced or mitigated through the preparation and review of information contained in pipeline routing permit applications and environmental review documents**.

Note: The PUC can use this clause to address pipeline rupture risk, corridor fatigue, and so forth.

"Subp. 4. Objectives. The process created by this chapter is designed to:
A. locate proposed pipelines in an orderly manner that minimizes adverse human and environmental impact;
B. provide information **to the project proposer, governmental decision makers, and the public** concerning the primary human and environmental effects of a proposed pipeline project**;**

*Note: Note that this clause contains the phrase "**to** the project proposer. . . .decision makers, and the public" concerning the human and environmental effects of the project. On the Alberta Clipper project, the PUC, and ALJ passively turned this phrase entirely on its head and accepted the Enbridge analysis of many issues rather than accept expert analysis from responsible state agencies. This must not happen on the Sandpiper project. The PUC should insist on its role of providing objective information **to** other parties. It should do so on the main topics of these comments.*

V.A. 3. "7852.1400 Route proposal acceptance.

> Subp. 2. Sources of route proposals. **The Public Utilities Commission staff and the citizen advisory committee may propose routes or route segments directly to the commission**.

Note: The PUC can use this clause to address corridor fatigue and to attempt to obtain objective comparisons of alter=natives to problem locations.

V.A. 4. "7852.1900 Criteria for pipeline route selection.

> "I. cumulative potential effects of related or anticipated future pipeline construction; . . ."

Note: The PUC can clearly address the issues of "corridor fatigue" by using this clause.

<u>V.B. PUC can use standard impact assessment methods</u> The statute governing pipelines indicates that the PUC Environmental report meets the requirements of an EIS or EA. However, this does not mean that methods of analysis of impacts do not need to reflect standard methods used in EISs.

The request to the public to propose methods of analysis in the PUC public notice actually is strange. There are effective methods for analyzing impacts to humans and the environment and methods for comparing routes for linear facilities. These methods have been in effective use for many years. All one needs to do is find an EIS that has done so effectively.

<u>V.C. PUC staff needs to acknowledge the limitations of the pipeline environmental analysis .</u> I was present at the Sandpiper public meeting Clearbrook some weeks ago. A citizen asked how the PUC environmental analysis compared to an EIS. The PUC lead person said it was essentially the same. I was taken aback, as were some others that were present. I was later informed that this same statement was made at the Park Rapids meeting. This is highly concerning since the citizen was misled. It also is concerning because it implies PUC staff is unaware of important and routine methods of analyzing impacts and alternatives in EISs on linear facilities. Such methods are an answer to the question in the Sandpiper public notice of "topics open to public discussion. . . .Are there specific methods to address these impacts. . . .?".

Here are some reasons how the PUC environmental report very much differs from an EIS:

--PUC rules on pipelines allow the project proposer to so narrowly define the project that there is a large burden to overcome to define alternatives and even to analyze impacts. Pipeline rules favor existing corridors without a specific requirement to objectively analyze impacts of concentrating facilities in environmentally inappropriate areas. This would be impossible under an EIS.

--The PUC environmental report is finalized in-house. There is no opportunity to comment on a public review draft report. On draft EISs, the preparer is bound by law and rule to address reasonable comments

supported by sound data. No such process exists for pipelines under PUC rules. With the case of Alberta Clipper, the ALJ report would have been found deeply flawed if it had been subject to the standards for responding to comments that are found in the EIS process.

--Finally, compare the PUC process for siting HVTL lines: it uses routine methods of comparing routes and alternatives that are answers to the question posed as to how

VI. Proposed alternative routes and route enlargements

The PUC public notice solicits suggestions for alternative routes or route segments. In addition, Larry Hartman, the PUC person leading the Clearbrook public meeting, received a number of questions as to the burdensome format that appeared to be required for such proposals to be successful. He indicated alternatives would be considered that left out factors apparently required by the rules, and that a simple hand-drawn line on a map would be sufficient.

Therefore, the following recommendations for analyzing additional routes are provided:

VI. A. Widen Sandpiper route width wherever it is less than 1.25 miles in width. Enbridge has in many locations along its route narrowed the route nearly its minimum required by the PUC rule. This greatly reduces the scope of analysis of impacts very early in the siting process. This very much reduces the flexibility of moving the centerline to reduce impacts as problems are discovered during site reviews. This problem was severe during the Alberta Clipper review. Therefore, the route width should be expanded to the maximum allowable along the entire proposed route, as well as any new routes or route segments accepted for study. This is 1.25 miles in width. This will more appropriately meet the PUC requirements to adequately study environmental impacts. This is especially important at all crossings of rivers and other sensitive locations.

V.B. Route segment following Enbridge's North Dakota Pipeline corridor to Clearbrook. Enbridge's web site indicates that the existing pipeline has the capacity carry 475,000 bpd, yet Citation #2 says it is carrying 210,000 bpd at this time. If this is correct, there is excess capacity in the North Dakota line so as to allow it to carry the 225,000 bpd of the Sandpiper line. Therefore, there is a question as to whether another line is needed at this time for this route segment.

This route is clearly indicated on Enbridge's application.

V.C. Enbridge Mainline Corridor, Clearbrook to Superior. This route should be studied as an alternative to Enbridge's preferred route. The study corridor should be widened to the maximum 1.25 miles. This route is clearly indicated on the Alberta Clipper PUC files, which are incorporated into this PUC record by reference.

V.D. Any route alternatives studied for the Alberta Clipper project. There were a number of alternatives studied for the Alberta Clipper project. These routes are clearly identified on maps in the PUC record of that project. These include HVTL corridors and gas pipeline corridors. They should be re-studied for the Sandpiper project.

V.E. LaSalle Creek alternative. An alternative which avoids the major problems of crossing LaSalle Creek and its valley at an angle needs to be studied. Adding two large diameter pipelines to this area—Sandpiper and the Line 3 replacement/upgrade—is extremely likely to have large off-right-of-way impacts to groundwater, Big LaSalle Lake, and LaSalle Creek. In addition, given the sub-surface conditions, it will be very hard to

predict site-specific technical engineering plans for how to construct and maintain pipelines in this area. This could lead to massive problems and impact area growth during construction. This area could well become a case study of where not to build large pipelines.

A route avoiding this feature also crosses other areas with natural resource value, other private and public lands, and opens a new corridor. However, such an alternative for study must be accomplished because of escalating consequences of adding two more pipelines. I do not have an ability to submit a map today of my proposal, since I have to submit comments electronically in order to meet today's comment deadline. I can submit this by mail later. However, based on PUC statements made at the Clearbrook public meeting, this is sufficient as long as I describe the alternative in enough detail to identify it.

Here is a verbal description of the route: It is a 1.25 mile wide route deviating from the existing corridor in section 11 of Itasca Township in Clearwater County, then goes southwest to turn south along the east side of Clearwater County 2. It then turns SE to follow the north side of state highway 92, roughly paralleling it with the south edge of the route along this highway. It then turns east to rejoin the corridor in Section 32 of Lake Hattie township in Hubbard County.

On a final note, I believe it is within the PUCs ability to widen the "route" to more than 1.25 miles in this area.

V.D. Enbridge Line #3 enlargement/replacement. PUC needs to formally include the potential routes for this project that is clearly now in the planning stage. In addition, PUC should begin entering into studies for this project to analyze the alternative of following the corridors for the Great Northern Transmission line, now under review, since this line comes from Canada, and is potentially a route to Superior.

V. Significant impacts not otherwise indicated in these comments.

Here is a list of potential important impacts that need be addressed in the review of all route proposals, initially in a generic manner, and then as the focus is on site specific areas:

1. Analyze the advantages of topsoil separation in all areas where excavation into subsoil and parent material would otherwise result in mixing of parent material with top soil. It has been clearly demonstrated that creation of such disturbed areas leads to greater success for invasive species such as spotted knapweed and other noxious weeds. This also results in lowered productivity on not only farmland, but forest land, and reduced habitat value. In addition, it is becoming standard practice for responsible pipeline companies to accomplish this.

2. Requiring accurate depiction of any areas where excavation into parent material and subsoil occurs. Such excavation is routine in non-flat terrain in order to obtain the necessary 50-foot wide work pad for construction.

3. Detailed analysis of the product shipped in order to explore the environmental and human impacts of pipeline rupture.

4. Detailed analysis of the content of drilling muds to be used, and requirements for immediate notice to appropriate agencies when frac-outs occur during bores. Route permits should require agency review of any new additives considered during construction.

5. Careful analysis of the pros and cons of winter construction vs warm season construction. Such an analysis should be entirely independent of Enbridge desires to construct on their timetable, or for solely cost reduction reasons.

6. Careful analysis of the need for deep ripping of the work pad in areas of high clay soils. Operation of very heavy equipment along the work pad—which is essentially a road during construction—can create compaction layers in clayey soils that persist for as long as a projected 200 years.

7. Careful analysis and critique of proposed extra work space areas in sensitive locations such as stream crossings. Such areas sometimes are based solely on engineering requirements rather than given a careful review to reduce environmental impacts.

8. Careful review of the project's off-right of way affected area, and a PUC requirement that Enbridge submit all such areas to agencies for review.

9. An analysis of the damages caused by encroachment on the right of way from ATVs and other off-road highway vehicles. This has been observed to be intense in some areas, according to DNR comment letters. The MDNR has no jurisdiction to respond to this use which can cause stream bank erosion, siltation, and so forth.

V. Cumulative Impacts.

As noted in the above comments, the PUC rules require that the Commission **shall** consider "cumulative potential impacts of related or anticipated future pipeline construction. . . ."

Enbridge recently announced it is planning to "replace" in the near future its Line 3 pipeline that is in now within the mainline corridor from Canada to Superior. The announcements also note that operation of the old Line 3 will continue until the new line—upgraded to 36 inches—is completed. Therefore the new line will not be in the same location as the old line. Enbridge has indicated in the announcements that it is considering both the Mainline Corridor to Superior and its preferred Sandpiper route. Therefore, the PUC needs to conduct the following analysis:

--Cumulative impacts of adding two large pipelines in these routes, including the existing corridors and the new Greenfield route east of Park Rapids, and on any alternatives to the Sandpiper project accepted for study.

--PUC needs to inform state agencies that are currently in the early stages of reviewing applications for Sandpiper, (such as the DNR and PCA) that PUC is conducting a cumulative effects analysis on these two pipelines that may result in changes in locations. This should be done under the PUC rule cited above concerning responsibilities of the PUC to provide information **to** other stakeholders and the public.

List of attachments

1. Attachment 1. Estimates of oil/product flows in proposed and alternative corridors
2. Attachment 2. Enbridge schematic of its pipeline systems
3. Attachment 3. Web page from the US Department of transportation describing HCA areas
4. Attachment 4. Verbatim excerpts from an ORNL risk assessment appropriate for the Sandpiper project

CITATIONS

#1. Enbridge. 2013. "Enbridge Pipeline System Configuration." Quarter 1, 2013. Color chart showing entire Enbridge system in the United States and Canada, including data on individual lines, pipeline size, product type, and pipeline capacities (based on annual capacities). Available from one of the Enbridge web sites, and downloaded March 2014.

#2. Minnesota House of Representatives, House research. June 2013. Bob Eleff, Legislative Analyst. "Minnesota's Petroleum Infrastructure: :Pipelines, Refineries, Terminals.

#3. Thompson/Reuters News Service. March 31, 2014. "Enbridge to expand Southern Lights Pipeline as demand rises." Reuters Business and Financial News.

#4. Reuters News Services. March 4, 2014. "Update 2—Enbridge to spend C$7 billion (Canadian) to replace pipeline to US." Reuters Business and Financial News. (Concerns Line #3) Also, at the same time, Enbridge web sites indicate this 34 inch line will be upgraded to 36 inches from 34, and the old line won't be decommissioned until the new line is in service.

#5. Forum News Services. March 5, 2014. John Myers. "Another Enbridge proposal would replace line from Canada to Wisconsin." Concerns Enbridge Line 3 upgrade as in #4, but this article quotes an Enbridge spokesperson that both the Sandpiper Route/Corridor and the Enbridge Mainline Corridor along US 2 are being looked at as possible locations.

$6. Federal Reserve Bank of Minneapolis. May 1, 2007. Kathy Cobb. "This nation's rapacious appetite for oil products and Canada's vast supply spur district pipeline projects." Newsletter. This article notes that MinnCan can be increased by 185,000 bpd to increase the Mn Pipeline Corridor to 640,000 bpd.

$7. Minnesota Public Utility Commission (PUC) public notice on Sandpiper, January 31, 2014.

#8. Oak Ridge National Laboratory 2012. "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety" Date Published: October 2012. Revised: December 2012. For U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration Pipeline Safety Program | East Building 2nd Floor 1200 New Jersey Avenue, S.E. Washington, DC 20590

#9. Online Oil and Gas Journal. January 17 2005. (Printed from site 3/29/2014.) "Method determines valve automation for remote pipelines."

Attachment 1

ESTIMATES OF EXISTING AND PROPOSED PIPELINE FLOWS RELATED TO PROPOSED SANDPIPER CORRIDORS AND TRANSLATED TO SELECTED RIVER FLOWS

Note: Pipeline capacities are given in barrels per day (bpd). Product flow rates are converted to cubic feet per second (cfs) in order to compare to typical river flows along the routes. Rates are calculated based on 42 gallons/barrel. A useful rule of thumb is that 100,000 bpd converts to 6.5 cfs. Product type is variable, and some information about types is given in Attachment 2.

A. Enbridge Pipelines from Minnesota border east to Clearbrook

Note: All lines are in one corridor except for North Dakota Pipeline which joins the "Mainline Corridor" at Clearbrook which then goes on to Superior roughly along US Highway #2.; Enbridge refers to the main corridor as "Enbridge Mainline Corridor.

A. 1. Existing Enbridge Pipelines

Note: All product flow is to the East-southeast except for the diluent line, which takes product from Illinois refineries back to Alberta for "thinning" heavy crude so it can be pumped in pipelines. Product types are listed by Enbridge in Attachment 2.

Pipeline name	Barrels per Day Amount	Flow rate cfs	Source	Pipe diameter	Citation
Line 1	236,500	15.4	Alberta	18/20 inches	#1
Line 2b	442,200	28.7	Alberta	24/26 inches	#1
Line 3	390,000	25.4	Alberta	34 inches	#1
Line 4	795,700	51.7	Alberta	36/48 inches	#1
Line 67 (Alberta Clipper)	450,000	29.2	Alberta	36 inches	#1
Line 65 (LSr)	186,000	12.1	North Dakota	20 inches	#1,#2
North Dakota Pipeline	210,000	13.6	North Dakota	?	#1, #2
Southern Lights Diluent	180,000	11.7	US refineries	20 inches	#2, #3
Totals	2,890,400 bpd	188 cfs			

A.2. Expansion proposals by Enbridge, Minnesota border east to Clearbrook

Expansions:	bpd amount	cfs		Pipe Diameter	Citation
Line 3 increase**:**	370,000	24.0	(total 760,000)	34 inches to 36	#4
Line 67 increase:	350,000	22.8	(total 800,000)	Pumps added	#2
Southern Lights increase:	95,000	6.2	(total 275,000)	Pumps added	#3
New line					
Sandpiper	225,000	14.6		24 inches	#7
Subtotal (new + expand)	1,040,000	67.6			
Grand total, existing and expanded	3,930,400	255 cfs			

B. Enbridge Pipelines from Clearbrook east to Superior

Note: There is a major facility at Clearbrook whereby some product is routed south to the Twin Cities on 3 pipelines owned by the Minnesota Pipeline Company—a different company from Enbridge. One of these, the MinnCan line, was recently constructed. (There are "loops" at a few locations, so that there may be 4 lines in place in the corridor at those locations.) According to Citation #2, currently this amount is 455,000 bpd. It is difficult to determine exact amounts in the two older lines, but it is not necessary for this level of analysis.

B.1. Existing Enbridge pipelines from Clearbrook to Superior

Note: For purposes of this analysis, it is sufficient to calculate a total of existing product flows from Clearbrook to Superior by subtracting the amount diverted south at Clearbrook from the total amount entering the Clearbrook terminal:

Total entering Clearbrook terminal: 2,890,400 bpd
Amount routed south: - 455,000 bpd
Total existing flows to Superior: 2,435,400 bpd or 158 cfs

B.2. **Expansion proposals by Enbridge, Clearbrook to Superior**
Note: An alternative route for the new proposed Sandpiper project is along this Enbridge mainline corridor. It is not listed here, but if it did follow this corridor, it would increase flows by 225,000 bpd, or 14.6 cfs. Also, the Line 3 replacement/expansion could follow the southern route, but is included here. If Line 3 would instead go south of Clearbrook, the amounts listed here should be decreased by 760,000 bpd or 49.4 cfs.

Pipeline name	bpd Amount	cfs		Pipe diameter	Citation
Line 3 increase:	370,000	24.0	(total 760,000)	34 inches to 36	#4
Line 67 increase:	350,000	22.8	(total 800,000)	Pumps added	#2
Southern Lights increase:	95,000	6.2	(total 275,000)	Pumps added	#3

Total increase: 815,000 53.0 cfs
Grand total, existing
+ increases 3,250,400 bpd 211.2 cfs

C. Pipelines routed south from Clearbrook
Note: New Enbridge proposals are to follow the existing Minnesota Pipeline Company corridor to near Park Rapids, and then create a new corridor east to Superior, Wisconsin,

C. 1. Existing Pipelines to Twin Cities, Minnesota Pipeline Company (owned by Koch Industries)

Pipeline name	Amount	cfs	Source	Pipe diameter	Citation
MinnCan	165,000	10.7	Canada	24	#2
Two older pipelines	290,000	16.9	ND, Canada?	?	#2

Total, Minnesota Pipeline: 455,000 29.6

C.2 Expanded capacity of Minnesota Pipeline Company

Total	640,000	41.6	Adding pumps?	#2

D. New Enbridge Pipelines potentially routed to existing corridor south from Clearbrook, then east from Park Rapids to Superior on new corridor

Note: Enbridge recently announced it is planning to "replace" and expand its older Line #3 in its mainline corridor across northern Minnesota to Superior, WI. It says it is also looking at instead going south from Clearbrook, then east from Park Rapids to follow the proposed Sandpiper route. Therefore, Line #3 is listed here in order to portray amounts of product potentially flowing in these corridors.

Pipeline name	bpd Amount	cfs	Source	Pipe diameter	Citation
Sandpiper	375,000	24.4	Alberta	30	#7
Line 3 expansion	760,000	49.4	Alberta	36	#4, #5

Total expansion: 1,135,000bpd 73.8cfs

E. Total potential Enbridge and Minnesota Pipeline company from Clearbrook to Park Rapids

Pipeline Company	bpd Amount	cfs	Source	Citation
Minnesota Pipeline Co.	640,000	41.6	North Dakota, Canada	#2
Enbridge	1,135,000	73.8	Canada	#2, #5

Total in corridor: 1,775,000 115.4

F. SUMMARY OF EXISTING AND PROPOSED OIL/PRODUCT FLOWS IN EXISTING PIPELINE CORRIDORS AS COMPARED TO SELECTED RIVER FLOWS

Company	Existing	cfs	Existing+Proposed	cfs
1. Enbridge N.D. Pipeline to Clearbrook	210,000	13.6	no increase	13.6
2. Enbridge mainline to Clearbrook	2,680,400	174.2	3,720,400	242 cfs
3. Enbridge Clearbrook to Superior	2,435,400	158.0	3,930,400	255 cfs
(Existing and proposed column includes Sandpiper and #3 expansion)				
4. Enbridge and MinnPipe Co. Clearbrook To south of Park Rapids	455,000	29.6	1,775,000	115.4
5. Enbridge, Park Rapids to Superior	No corridor	000	1,135,000	73.8

River name and location	Long-term median river flows (cfs) on this date from USGS Gauges, April 2, 2014	Approximate % of maximum oil flow to river flow
Snake river above Warren	124	195 percent
Clearwater river at Plummer	172	141 percent
Mississippi river at Bemidji	334	76 percent
Straight River south of Park Rapids	69	167 percent
Mississippi River at Grand Rapids	716	36 percent
Mississippi River at Aitkin	2,859	2.6 percent*
Prairie River at Taconite	125	204 percent
St. Louis River at Scanlon	1,850	14 percent

*New Enbridge corridor from Park Rapids to Superior crosses in this vicinity; all else are Enbridge mainline

Pipeline System Configuration

Docket No. 20157-166460-06

Quarter 1, 2013

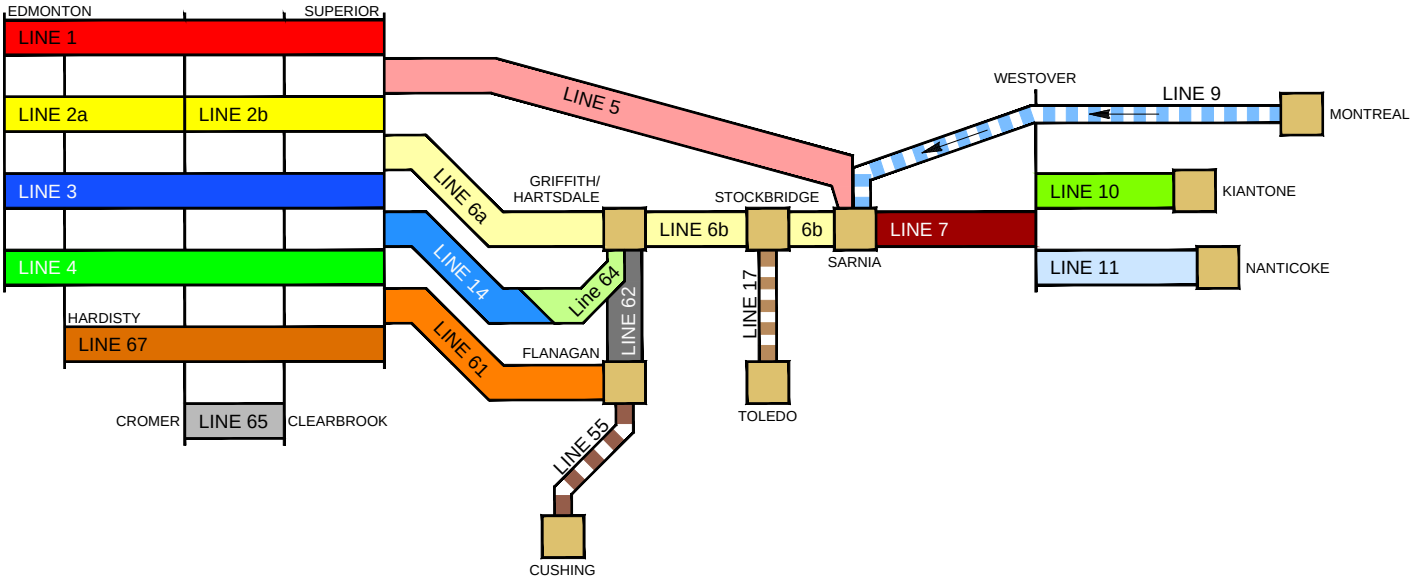

Line 1

37,600 m^3/d (236.5 kbpd)
18"/20" - 1098 miles
NGL
Refined Products
Light Synthetics

Line 2

Line 2a
70,300 m^3/d (442.2 kbpd)
24" - 596 miles
Line 2b
70,300 m^3/d (442.2 kbpd)
24"/26" - 502 miles
Condensates
Light Synthetics
Sweet
Light & High Sour

Line 3

62,000 m^3/d (390.0 kbpd)
34" - 1098 miles
Condensates (Edmonton to Hardisty)
Light Synthetics
Sweet
Light & High Sour

Line 4

126,500 m^3/d (795.7 kbpd)
36"/48" - 1098 miles
Heavy
Medium (Ex-Clearbrook)
Light Sour (Ex-Clearbrook)

Line 5

78,100 m^3/d (491.2 kbpd)
30" - 645 miles
NGL
Light Synthetics
Sweet
Light & High Sour

Line 6

Line 6a
106,000 m^3/d (666.7 kbpd)
34" - 467 miles
Line 6b
45,000 m^3/d (283.0 kbpd)
30" - 293 miles
Light Synthetics (Superior to Lockport)
Sweet (Superior to Lockport)
Light & High Sour
Medium
Heavy

Line 7

23,900 m^3/d (150.3 kbpd)
20" - 120 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 65

29,500 m^3/d (185.6 kbpd)
20" - 313 miles
Light Sour
Medium

Line 10

11,800 m^3/d (74.2 kbpd)
12"/20" - 91 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 11

18,600 m^3/d (117.0 kbpd)
16"/20" - 47 miles
Condensates
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 62

20,700 m^3/d (130.2 kbpd)
22" - 75 miles
Heavy

L 14 / L 64

50,500 m^3/d (317.6 kbpd)
24" - 467 miles
Light Synthetics
Sweet
Light & High Sour
Medium

Line 61

63,600 m^3/d (400.0 kbpd)
42" - 454 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 67

71,500 m^3/d (449.7 kbpd)
36" - 999 miles
Heavy

Not Part of the Enbridge Mainline System

Line 9

38,200 m^3/d (240.3 kbpd)
30" - 524 miles
Condensates
Sweet
Medium
Light & High Sour

Line 17

16,000 m^3/d (100.6 kbpd)
16" - 88 miles
Heavy

Line 55

30,700 m^3/d (193.3 kbpd)
22"/24" - 575 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

NOTES:

Capacities provided are Annual Capacities and do not include current restrictions.

Updated: January 2013
File: 2013_Q1 System Config.dwg

Revised by: YZ
Drawn by: DRD

Choose One...

contained within each circle.

- Potential impact circles that contain 20 or more structures intended for human occupancy;, buildings housing populations of limited mobility; buildings that would be hard to evacuate (e.g., nursing homes, schools); or buildings and outside areas occupied by more than 20 persons on a specified minimum number of days each year, are defined as HCA's.

How do operators of pipelines know where HCA's are located?

- High population areas and other populated areas are identified using maps and data from the U.S. Census bureau.
- Critical drinking water sources and unusually sensitive ecological areas are identified using information from National Heritage Programs and Conservation Data Centers in each state, in conjunction with The Nature Conservancy.
- Because of the complexity of HCAs for Hazardous Liquid Pipelines, the Office of Pipeline Safety identifies and maps HCAs for Hazardous Liquids on its National Pipeline Mapping System (NPMS). These maps are revised periodically by OPS based on new and updated information.
- Operators of natural gas transmission pipelines must use a specified equation to calculate the radius of "potential impact circles" along their pipeline and compare the structures in those circles to the HCA criteria in the rule.

How do operators determine what pipeline segments require extra integrity protection due to the presence of HCAs?

- Pipeline operators must determine which segments of their pipeline could affect HCAs in the event of a release. This determination must be made assuming that a release can occur at any point, even though the likelihood of a release at any given point is very small.
- Hazardous liquid pipelines that pass through an HCA, or that pass near enough that a release could reach the area by flow over land or within a river, stream, lake, or other means, are assumed to have the potential to affect that area.
- Gas transmission pipelines that pass within any of the HCA potential impact circles are assumed to have the potential to affect that area. (Or, alternatively, operators may choose to treat all of their pipeline segments in Class 3 and 4 areas as HCAs.)

Date of Revision: 12012011

ATTACHMENT 4
VERBATIM EXCERPTS FROM THE FOLLOWING PIPELINE RISK ASSESSMENT OF SHUTOFF VALVES, INCLUDING ESTIMATES OF AMOUNTS OF RELEASES OF OIL AND OTHER PRODUCT FROM RUPTURES

Oak Ridge National Laboratory 2012. "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety" Date Published: October 2012. Revised: December 2012. For U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration Pipeline Safety Program | East Building 2nd Floor 1200 New Jersey Avenue, S.E. Washington, DC 20590

ABSTRACT

Author's note: This 340 page study primarily concerns worst-case pipeline ruptures in populated areas, and was stimulated by a large California rupture of a gas pipeline in a urban area in California that killed 8 people. However, it also considers oil pipelines that do not catch fire, and those in High Consequence Areas (HCAs) that are also in or near ecologically significant areas. Therefore, it is highly relevant to certain the necessary route evaluation and environmental impact evaluation of the Sandpiper proposal. The underlined portions are indicate relevancy to Sandpiper, and in each case are the author's emphasis when they appear in the text.Page numbers at the bottom of the pages are excerpt page numbers rather than as in the original text.

This study assesses the effectiveness of block valve closure swiftness in mitigating the consequences of natural gas and hazardous liquid pipeline releases on public and environmental safety. It also evaluates the technical, operational, and economic feasibility and potential cost benefits of installing automatic shutoff valves (ASVs) and remote control valves (RCVs) in newly constructed and fully replaced transmission lines. Risk analyses of hypothetical pipeline release scenarios are used as the basis for assessing: . . . . and <u>(3) socioeconomic and environmental damage in HCAs caused by hazardous liquid pipeline releases of crude oil</u>. . . . . .However, these results may not apply to all newly constructed and fully replaced pipelines because <u>site-specific parameters that influence risk analyses and feasibility evaluations often vary significantly from one pipeline segment to another and may not be consistent with those considered in this study. Consequently, the technical, operational, and economic feasibility and potential cost benefits . . . . . .need to be evaluated on a case-by-case basis</u>. In theory, installing ASVs and RCVs in pipelines can be an effective strategy for mitigating potential consequences of unintended releases because decreasing the total volume of the release reduces overall impacts on the public and to the environment. <u>However, block valve closure has no effect on preventing pipeline failure or stopping the product that remains inside the isolated pipeline segments from escaping into the environment</u>. The benefits in terms of cost avoidance attributed to block valve closure swiftness increase as the time required to isolate the damaged transmission pipeline segment decreases. Block valve closure swiftness is most effective in mitigating damage resulting from a pipeline release. . . . .. Similarly, the avoided cost of socioeconomic and environmental damage for hazardous liquid pipeline releases without ignition increase as time required to isolate the damaged pipeline segment decreases.. . . .

The scope of the study is further limited by considering <u>only worst case pipeline release scenarios in HCAs involving guillotine-type breaks rather than other more common breaks, such as punctures and through-wall cracks.</u> Although ignition of the released product following a rupture is not ensured, this study only models release scenarios that result in immediate ignition of the released product at the break location. <u>The study also assesses potential socioeconomic and environmental effects of unintended crude oil releases without ignition from hazardous liquid pipelines in HCAs.</u>

EXECUTIVE SUMMARY

The U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) is the Federal safety authority responsible for ensuring safety in the design, construction, operation and maintenance, and spill response planning for the 2.3 million (M) miles of natural gas and hazardous liquid transportation pipelines in the United States. Its mission is to protect people and the environment from the risks inherent in transportation of hazardous materials by pipeline and other modes of transportation. . . . Section 4 of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 calls for the Secretary of the U.S. Department of Transportation (DOT) to require by regulation the use of automatic or remotely controlled shutoff valves, or equivalent technology, where it is economically, technically, and operationally feasible on hazardous liquid and natural gas transmission pipeline facilities constructed or entirely replaced after the final rule was issued.. . . .The Act also requires a study to discuss the ability of transmission pipeline facility operators to respond to a hazardous liquid or natural gas release from a pipeline segment located in a high consequence area (HCA). . . . . .

(This) study assesses the effectiveness of block valve closure swiftness in mitigating the consequences of natural gas and hazardous liquid pipeline releases on public and environmental safety. . . . . .It also evaluates the technical, operational, and economic feasibility and potential cost benefits of installing ASVs and RCVs in newly constructed and fully replaced pipelines. The results of this study apply to natural gas and hazardous liquid transmission lines. . . . .
Potential effects of unintended releases from natural gas and hazardous liquid pipelines on public and environmental safety are categorized as personal injuries and fatalities, property damage, and environmental impacts.
.
Hazardous liquid pipeline operators are required to install block valves at prescribed locations to facilitate isolation of pump stations, breakout storage tanks, and lateral takeoffs and other points along the pipeline near designated bodies of water and populated areas to minimize damage and pollution from an accidental hazardous liquid discharge. In addition, operators are required to consider installing emergency flow restricting devices such as check valves and RCVs on pipeline segments to protect a HCA in the event of a hazardous liquid pipeline release. In making this determination, an operator must, at least, consider the swiftness of leak detection and pipeline shut down capabilities and benefits expected by reducing the spill size.

E.1 CONSEQUENCE MODELS

Risk analyses of hypothetical pipeline release scenarios are used as the basis for assessing: . . . . . .(3) socioeconomic and environmental damage in HCAs caused by hazardous liquid pipeline releases of crude oil.

E.4 ASSESSMENT METHODOLOGY AND RESULTS FOR HAZARDOUS LIQUID PIPELINE RELEASES WITHOUT IGNITION

Potential consequences on the human and natural environments resulting from a hazardous liquid release without ignition generally involve socioeconomic and environmental impacts. These impacts are influenced by the total quantity of hazardous liquid released and the habitats, resources, and land uses that are affected by the release. The methodology used in this study to quantify socioeconomic and environmental impacts resulting from a hazardous liquid release involves computing the quantity xxvii

of hazardous liquid released as a function of block valve closure time and then using this quantity to establish the total damage cost based on the EPA's BOSCEM. The total damage cost is determined as follows:

☐ Add the unit response cost, the unit socioeconomic damage cost, and the unit environmental damage cost;

☐ Multiply the sum of these costs by the number of barrels spilled; and

☐ Apply a damage cost adjustment factor which aligns the total damage cost with the actual cleanup costs reported for recent crude oil spills in environmentally sensitive areas. The damage cost for crude oil released in the Enbridge Line 6B pipeline rupture in Marshall, Michigan in 2010 was approximately $38,000 per barrel.

The BOSCEM accounts for effects of spill size on the total damage cost by reducing the unit cost of damage as the number of barrels spilled increases.

The swiftness of block valve closure has a significant effect on mitigating potential socioeconomic and environmental damage to the human and natural environments resulting from hazardous liquid pipeline releases because damage costs increase as the spill size increases. The benefit in terms of cost avoidance for damage to the human and natural environments attributed to block valve closure swiftness increases as the duration of the block valve shutdown phase decreases.

1.3.2 Hazardous Liquid Pipeline Release Events

After a hazardous liquid pipeline ruptures, liquid begins flowing from the break and continues until draining is complete. The amount of material released following the break is influenced by a variety of factors. These factors include the type of liquid, the operating pressure of the pipeline, the size and position of the hole through which the liquid is released, the rate at which the liquid is being pumped through the pipeline, the response of the operator in terms of shutting off pumps and closing valves, the pipeline route and elevation profile, and the location of the break relative to the pumps and block valves. Block valves are installed in hazardous liquid pipelines to facilitate maintenance, operations, or construction and to limit the amount of liquid spilled following a pipeline rupture. For worst case, guillotine-type breaks, the effective hole size is equal to the line pipe diameter.

The behavior of the released liquid depends on its physical properties and the terrain in the vicinity of the break. For example, the liquid could flash on release of pressure to form a vapor cloud containing a fine mist of residual liquid droplets, accumulate in a pool on the ground surface near the pipeline break, create a stream that flows away from the release point, or soak into the surrounding soil (Acton, 2001).

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If the released liquid ignites following the break, it could result in a pool fire, a flash fire, or, under certain conditions, a vapor cloud explosion. Pool fires can spread out in all directions or flow in a particular path depending on the terrain. Figure 1.3 shows fire damage along a creek caused by a hazardous liquid pipeline release in Bellingham, Washington (NTSB, 2002). If ignition is delayed, the resulting evolution of vapor from the release could influence the magnitude and extent of a subsequent flash fire or explosion.

Fig. 1.3. Fire damage resulting from hazardous liquid pipeline release in Bellingham, Washington (NTSB, 2002).

Impacts resulting from time-dependent radiant thermal intensities at various separation distances from the break are based on the following hazardous liquid pipeline release scenario. The release occurs following a guillotine-type break where the escaping liquid accumulates in a pool on an impermeable level ground surface and ignites immediately upon release. Pool size is affected by the type of liquid

released, the line pipe diameter, the pipeline operating pressure, the time required to detect the leak and initiate corrective actions to mitigate the consequences of the release, the spacing of block valves, the time required to close block valves and isolate the break, and the terrain features. Any potential environmental impacts to air and water quality caused by the released liquids and their products of combustions are beyond the scope of this study.

As discussed in Section 1.3.1, thermal radiation hazard zones with increasing impact severity are described by concentric circles centered on the pipeline rupture. The thermal radiation intensities at the perimeters of these concentric circles increase as the radii decrease. Effects of progressively higher heat fluxes on buildings and humans are described in Table 1.1. Because thermal radiation effects on buildings and humans are a function of radiant heat flux and exposure duration, quantifying the time-

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dependent variations in radiant heat fluxes for specific radii is key to assessing the benefits of installing RCVs and ASVs in hazardous liquid pipelines.

Given the wide range of actual pipeline sizes and operating pressures, leak detection periods, and block valve spacing and closure times, ORNL developed methodologies for quantifying the impacts of these parameters on areas affected by combustion of the escaping liquid hydrocarbon. The methodologies, which are described in Section 3.2, also characterize time-dependent radiant thermal intensities at various separation distances from the break.

Without ignition, the escaping liquid could adversely affect waterway navigation, surface and ground water quality, and other aspects of the human and natural environments. In addition, the cost to remediate the affected areas could be substantial. Consequence mitigation for a hazardous liquid pipeline release without ignition requires rapid detection, pump shutdown, and block valve closure. However, even if these actions are taken quickly, some amount of liquid in the pipeline will drain out of the broken pipeline segments. Methodologies for quantifying spill volumes for hazardous liquid pipelines releases and for estimating socioeconomic and environmental damage caused by the spill are described in Section 3.3.

1.3.2.1 Phases of a Hazardous Liquid Pipeline Release

A pipeline break can range in size and shape from a short, through-wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Although the volume of the discharge depends on many factors, the event is subdivided into four sequential phases – Phase 1 Detection, Phase 2 Continued Pumping, Phase 3 Block Valve Closure, and Phase 4 Pipeline Drain Down (Borener, 1994 and California State Fire Marshal, 1993). The total discharge volume equals the sum of the volumes released during each phase. Events associated with each phase are described below.

Phase – 1 Detection: The detection phase begins immediately after the pipeline ruptures, t0, and continues until the leak is detected by any means and the Operator initiates corrective actions to mitigate the consequences of the release, td. The volume of liquid discharged during the detection phase, Vd, depends on the duration of this phase and is influenced by factors such as the size, shape, and location of the rupture; the pumping rate; the pipeline pressure; and the effectiveness of the leak detection system.

The volume of liquid discharged during the detection phase is determined using the following equation.

$Vd = Qd(td – t0)$ (1.1)

where

Vd is the volume of liquid discharged during the detection phase, barrels (m3)

Qd is the discharge rate through the break that de

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Phase 2 – Continued Pumping: The continued pumping phase starts after corrective actions are initiated to mitigate the consequences of the release, td, and ends when the pumps stop operating, tp.

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During this time, additional hazardous liquid spills from the break. The duration of this phase can vary from a few minutes for systems with remotely operated pumps to hours for manually operated equipment located in remote areas. The volume of liquid discharged during the continued pumping phase, Vp, depends on the duration of this phase and is influenced by factors such as the type of equipment controls (automatically, remotely, or manually operated); personnel travel time to shutdown manually operated equipment; and the flow rates of the pumps.

…..Phase 3 – Block Valve Closure: The block valve closure phase starts when the pumps stop operating, tp, and ends when the upstream and downstream block valves close, ts. During this time, an additional amount of liquid in the pipeline spills from the break. The volume of liquid discharged during the block valve closure phase, Vs, depends on the duration of this phase and is influenced by factors such as the speed at which block valves located upstream and downstream from the break close. The duration of this phase can vary from a few minutes for systems with automatic or remotely controlled valves to hours for systems with manually operated valves located in remote areas.

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Phase 4 – Pipeline Drain Down: The pipeline drain down phase starts when the upstream and downstream block valves close isolating the portion of the pipeline that includes the break, ts. This phase

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ends when the remaining contents of the isolated portion of the damaged pipeline segment drain from the break, tf. The volume of liquid discharged during the drain down phase, Vf, is affected by the pipeline elevation profile including siphon action and the location of the break. A break that occurs at the highest elevation in the isolated portion of the pipeline results in no drain down volume, whereas a break that occurs at the lowest elevation could result in significant or complete drain down of the isolated portion of the pipeline.

The rate at which liquid drains from a break in the isolated portion of the damaged pipeline segment depends primarily on the size of the break and the pipeline elevation profile. It is also affected by the flow rate of air that must enter the break to replace the liquid and allow the draining to continue. In hilly or mountainous terrain, determining the length of pipeline, L, available to drain from a break must consider site-specific design and construction details. The volume of liquid discharged from the contributory length of pipeline, L, during the drain down phase, Vf, and the transient discharge rate, Qf, cannot be accurately determined without knowing the actual pipeline elevation profile as illustrated in Fig. 1.4.

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1.3.2.2 Block Valve Effects on a Hazardous Liquid Pipeline Release

The effectiveness of block valve closure swiftness on limiting the spill volume of a hazardous liquid pipeline release is influenced by the location of the block valves relative to the location of the break, the pipeline elevation profile between adjacent block valves, and the time required to close the block valves after the break is detected and the pumps are shut down.

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Block valves do not reduce the volume of liquid spilled during the detection and continued pumping phases because they are open. However, the total spill volume can be reduced by rapidly detecting the leak and taking immediate corrective actions including shutting down the pumps and closing the block valves to mitigate the consequences of the release. The effectiveness of block valve closure in mitigating the consequences of a hazardous liquid pipeline release decreases as the time required to close the block valve increases.

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1.3.5 Socioeconomic and Environmental Effects of a Hazardous Pipeline Release

Potential consequences and effects on the human and natural environments resulting from a hazardous liquid pipeline release without ignition generally involve socioeconomic and environmental impacts. These impacts are influenced by the total quantity of hazardous liquid released and the habitats, resources, and land uses that are affected by the release. The methodology used to quantifying socioeconomic and environmental impacts resulting from a hazardous liquid release involves computing the quantity of hazardous liquid released and then using this quantity to establish the total damage cost. The total damage cost is determined by adding the response cost, the socioeconomic damage cost, and the environmental damage cost as described in Section 3.3.3.

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3.2 HAZARDOUS LIQUID PIPELINES WITH IGNITION

Following a guillotine-type break in a hazardous liquid pipeline and ignition of the released hydrocarbon, a pool fire begins to form and continues to increase in diameter as liquid flows from the break. Eventually, the pool reaches an equilibrium diameter when the mass flow rate from the break equals the fuel mass burning rate. The fire will continue to burn until the liquid that remains in the isolated pipeline segments stops flowing from the pipeline.

A pipeline break can range in size and shape from a short, through-wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Guillotine-type breaks are less common than other pipeline breaks such as fish-mouth type openings, but they can occur as a result of different causes including landslides, earthquakes, soil subsidence, soil erosion (e.g. scour in a river) and third-party damage. The guillotine-type break is the largest possible break and is therefore considered in this study as the worst case scenario. Although the volume of the discharge depends on many factors, to enable analysis, the event is divided into four sequential phases with the total discharge volume equal to the sum of the volumes released during each phase. The four phases (detection, continued pumping, block valve closure and pipeline drain down) are explained in Section 1.3.2.1.

The thermal radiation hazards from a hydrocarbon release and resulting pool fire depend on a variety of factors including the composition of the hydrocarbon, the size and shape of the fire, the duration of the fire, its proximity to the objects at risk, and the thermal characteristics of the object exposed to the fire.

3.3 HAZARDOUS LIQUID PIPELINES WITHOUT IGNITION

The socioeconomic and environmental effects of an oil spill are strongly influenced by the circumstances surrounding the spill including the type of product spilled, the location and timing of the spill, sensitive areas affected or threatened, liability limits in place, local and national laws, and cleanup

strategy. The most important factors determining a per-unit cost are location and oil type, and possibly total spill amount.

The amount of oil spilled can have a profound effect on the cleanup costs. Obviously, the more oil spilled, the more oil there is to remove or disperse, and the more expensive the cleanup operation. However, cleanup costs on a per-unit basis decrease significantly with increasing amounts of oil spilled. Smaller spills are often more expensive on a per-unit basis than larger spills because of the costs associated with setting up the cleanup response, bringing in the equipment and labor, as well as bringing in the experts to evaluate the situation (Etkin, 1999).

The following methodology was used to determine: (1) the time-dependent discharge from a hazardous liquid transmission pipeline resulting from a guillotine-type break, and (2) the quantity of hazardous liquid released during the detection, continued pumping, block valve closure, and drain down phases

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needed to estimate cleanup costs. The total volume of a hazardous liquid pipeline release is primarily influenced by the flow rate at the time of the break; the combined durations of the detection, continued pumping, block valve closure phases; and the size and shape of the break. For worst case, guillotine-type breaks, where the effective hole size is equal to the line pipe diameter, the governing parameters are the line pipe diameter and the pipeline length between plateaus and peaks in the vicinity of the break.

Appendix A: Spill Volume Released Due to Valve Closure Times in Liquid Propane Pipelines, contains a family of curves for various hazardous liquid pipeline release scenarios that quantify the volume of liquid released following a guillotine-type break.

3.3.1 Analysis Scope, Parameters, and Assumptions

The methodology is based on fundamental fluid mechanics principles for computing the time-dependent response of hazardous liquid pipelines following a guillotine-type break. It is also suitable for determining the effects that detection, continued pumping, block valve closure duration have on a worst case discharge release determined in accordance with federal pipeline safety regulations in 49 CFR 194 for estimating worst case discharges from hazardous liquid pipelines (DOT, 2011e).

The configuration of the hypothetical hazardous liquid pipeline used to evaluate the effectiveness of RCVs and ASVs in mitigating the consequences of a release has the following design features and operating characteristics:

- The pump stations are located at 100 mile intervals along the pipeline.
- Each pressure pump station has a remote control device that can be activated by the pipeline operator to shut down the compressors after a rupture occurs.
- The rupture is a guillotine-type break that initiates the release event.
- The break is located at a low point in the pipeline elevation profile.
- The following times are study variables.
- The time when the operator detects the leak.
- The time when the operator stops the pumps.
- The time when the upstream and downstream block valves are closed and the line section with the break is isolated.
- The total volume of the hazardous liquid release equals the volume of liquid released during the detection, continued pumping, block valve closure, and drain down phases.
- The time-dependent flow rate is a study variable.

Study variables used to characterize hazardous liquid pipeline releases are listed in Table 3.24.

3.3.2 Analytical Approach and Computational Models

After a hazardous liquid pipeline ruptures without ignition, liquid begins flowing from the break and continues until draining is complete. A pipeline break can range in size and shape from a short, through-

wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Although the volume of the discharge depends on many factors, the event is subdivided into the four sequential phases with the total discharge volume equal to the sum of the volumes released during each phase. The phases of a hazardous liquid pipeline release are outlined in Section 1.3.2.1.

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block valve closure phase, minutes

The flow rate through the break remains constant through both the detection and continued pumping phases. In the block valve closure phase, the maximum flow rate through the break is based on the elevation difference of liquid in the pipeline. During the pipeline drain down phase, the maximum flow rate through the break is based on the difference between the operating pressure of the pipeline and atmospheric pressure. Requirements in 49 CFR 194.105(b)(1) state the worst case discharge is the largest volume of fluid released based on the pipeline's maximum release time, plus the maximum shutdown response time, multiplied by the maximum flow rate, which is based on the maximum daily capacity of the pipeline, plus the largest line drainage volume after shutdown of the line sections. In this methodology, the maximum flow rate can be estimated by multiplying the fluid speed at the pump by the cross sectional area of the line pipe. Although operators can use this rule to determine a worst case discharge, the actual flow rate during the block valve closure phase may be greater (less conservative) due to factors such as fluid density, pressure changes, pump performance characteristics, and the elevation profile of the pipeline which are not reflected in the methodology. These factors are important in a risk analysis because their effects influence time-dependent damage resulting from a release.

The influence of fluid density, pressure changes, and the elevation profile of the pipeline is taken into consideration in this study by using Bernoulli's equation to calculate the flow rate during the block valve closure and drain down phases. However, there are recognized limitations in using Bernoulli's equation to determine drain down time because it does not model the effects of air flow through the pipeline break which occurs as the fluid escapes following block valve closure. Although Bernoulli's equation does not produce an exact solution to this fluid dynamics problem, comparison of the results provides a consistent approach for evaluating the effectiveness of block valve closure swiftness on mitigating release consequences.

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3.3.3 Socioeconomic and Environmental Effects

The methodology for quantifying potential environmental effects resulting from a hazardous liquid release involves computing the quantity of hazardous liquid released and then using this quantity to establish the total damage cost. The total damage cost, Cd, is determined by adding the response cost, Cr, the socioeconomic damage cost, Cs, and the environmental damage cost, Ce. This methodology applies to crude oil and light fuel (gasoline) releases that affect the following areas.

☐ Commercially navigable waterways which means a waterway where a substantial likelihood of commercial navigation exists.

☐ High population areas and another populated areas which mean an urbanized area as defined and delineated by the Census Bureau that contains 50,000 or more people and has a population density of at least 1,000 people per square mile and a place as defined and delineated by the Census Bureau that contains a concentrated population, such as an incorporated or unincorporated city, town, village, or other designated residential or commercial area, respectively.

☐ Unusually Sensitive Areas (USAs) which is defined in 49 CFR 195.6 to mean a drinking water or ecological resource area that is unusually sensitive to environmental damage from a hazardous liquid pipeline release.

The response cost, Cr, is determined by multiplying the applicable unit response cost shown in Table 3.25 by the applicable medium modifier shown in Table 3.26.

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The response cost, C_r, is determined by multiplying the applicable unit response cost shown in Table 3.25 by the applicable medium modifier shown in Table 3.26.

Table 3.25. Unit response costs for crude oil and light fuel releases Release Quantity, barrels	**Crude Oil, $ per barrel**	**Light Fuels, $ per barrel**
<12	9,240	4,200
12-24	9,156	4,116
24-240	9,030	4,074
240-2,400	8,190	3,654
2,400-240,000	5,166	3,108
> 240,000	3,864	1,302

Table 3.26. Modifier for location medium categories for crude oil and light fuel releases Medium Category	**Medium Modifier**
Open Water/Shore	1.0
Soil/Sand	0.6
Pavement/Rock	0.5
Wetland	1.6
Mudflat	1.4
Grassland	0.7
Forest	0.8
Taiga (boreal forest)	0.9
Tundra	1.3

The socioeconomic damage cost, C_s, is determined by multiplying the applicable unit socioeconomic cost shown in Table 3.27 by applicable the socioeconomic cost modifier shown in Table 3.28.

Table 3.27. Unit socioeconomic and environmental costs for crude oil and light fuel releases Release Quantity, barrels	**Crude Oil, $ per barrel**		**Light Fuels, $ per barrel**	
Socioeconomic	**Environmental**		**Socioeconomic**	**Environmental**
<12	2,100	3,780	3,360	3,570
12-24	8,400	3,654	13,860	3,360
24-240	12,600	3,360	21,000	2,940
240-2,400	5,880	3,066	8,400	2,730
2,400-240,000	2,940	1,470	4,200	1,260
> 240,000	2,520	1,260	3,780	1,050

Table 3.28. Socioeconomic and cultural value ranking for crude oil and light fuel releases Value Rank	**Release Impact Site Description**	**Examples**	**Cost Modifier Value**

Extreme	Predominated by areas with high socioeconomic value that may potentially experience a large degree of long-term impact if oiled.	Subsistence/commercial fishing, aquaculture areas	2.0
Very High	Predominated by areas with high socioeconomic value that may potentially experience some long-term impact if oiled.	National park/reserves for ecotourism/nature viewing; historic areas	1.7
High	Predominated by areas with medium socioeconomic value that may potentially experience some long-term impact if oiled.	Recreational areas, sport fishing, farm/ranchland	1.0
Moderate	Predominated by areas with medium socioeconomic value that may potentially experience short-term impact if oiling occurs.	Residential areas; urban/suburban parks; roadsides	0.7
Minimal	Predominated by areas with a small amount of socioeconomic value that may potentially experience short-term impact if oiled.	Light industrial areas; commercial zones; urban areas	0.3
None	Predominated by areas already moderately to highly polluted or contaminated or of little socioeconomic or cultural import that would experience little short- or long-term impact if oiled.	Heavy industrial areas; designated dump sites	0.1

Note: Long-term impacts are those impacts that are expected to last months to years after the spill or be relatively irreversible. Short-term impacts are those impacts that are expected to last days to weeks after the spill occurs and are generally considered to be reasonably reversible.

Table 3.29. Freshwater vulnerability categories for crude oil and light fuel releases Freshwater Vulnerability Category	**Freshwater Vulnerability Modifier**
Wildlife Use	1.7
Drinking	1.6
Recreation	1.0
Industrial	0.4
Tributaries to Drinking/Recreation	1.2
Non-Specific	0.9

Table 3.30. Habitat and wildlife sensitivity categories for crude oil and light fuel releases Habitat and Wildlife Sensitivity Category	**Habitat and Wildlife Sensitivity Modifier**
Urban/Industrial	0.4
Roadside/Suburb	0.7
River/Stream	1.5
Wetland	4.0
Agricultural	2.2
Dry Grassland	0.5
Lake/Pond	3.8
Estuary	1.2
Forest	2.9
Taiga	3.0
Tundra	2.5
Other Sensitive	3.2

This methodology is consistent with the U.S. Environmental Protection Agency (EPA) Basic Oil Spill Cost Estimation Model (BOSCEM) that was developed to provide the US EPA Oil Program with a methodology for estimating oil spill costs, including response costs and environmental and socioeconomic damages, for actual and hypothetical spills (Etkin, 2004).

Total Damage Cost Validation

The following case studies compare the actual damage costs for two hazardous liquid pipeline releases to the corresponding total damage costs determined using BOSCEM.

Case Study 1 – Enbridge 2010

The Enbridge Line 6B pipeline ruptured in Marshall, Michigan on July 25, 2010, and released approximately 20,000 barrels of crude oil. This release from the 30-in. nominal diameter pipeline caused environmental impacts along Talmadge Creek and the Kalamazoo River (Nicholson, 2012). Cleanup and recovery costs for this release totaled $767,000,000.

Using the EPA BOSCEM, the estimated total damage cost for this release is approximately $307,900,000. This total damage cost, C_d, includes the response cost, C_r, the socioeconomic damage cost, C_s, and the environmental damage cost, C_e, determined as follows.

Response cost, C_r = unit response cost ☐ medium modifier

Socioeconomic damage cost, C_s = unit socioeconomic cost ☐ socioeconomic cost modifier (High) = $2,940 ☐ 1.0 = $2,940/barrel

Environmental damage cost, C_e = unit environmental cost ☐ 0.5 ☐[freshw

wildlife modifier (Wetland)] = $1,470 ☐ 0.5 ☐(1.7 + 4.0) = $4,190/barrel

Total damage cost (2004 basis), C_d = 20,000 barrels ☐ ($8,265 + $2

After adjusting for inflation, the total damage cost (2012 basis), C_d = $307,900,000 ☐ 1.25 (inflation factor) = $384,875,000 which is approximately 50% of the actual cost.

Case Study 2 – Yellowstone 2011

A 12-in. hazardous liquid pipeline owned by ExxonMobil Pipeline Company ruptured on July 1, 2011 under the Yellowstone River 20 miles upstream from Billings, Montana. The Yellowstone River is navigable water in the United States (EPA, 2011). The ruptured pipeline released an estimated 1,509 barrels of oil that entered the river before the pipeline was closed. Cleanup and recovery costs for this release totaled $135,000,000.

The estimated total damage cost for this release is $48,044,000 based on 2004 cost data. This total damage cost, C_d, includes the response cost, C_r, the socioeconomic damage cost, C_s, and the environmental damage cost, C_e, determined as follows.

Response cost, C_r = unit response cost ☐ modifier (Wetland) = $8,190 ☐ 1.6 = $13,104/b

Socioeconomic damage cost, C_s = unit socioeconomic cost ☐ socioeconom
$5,880 ☐ 1.7 = $9,996/barrel.
Environmental damage cost, C_e = unit environmental cost ☐ 0.5 ☐ (Wildlife Use) +
wildlife modifier (Wetland)] = $3,066 ☐ 0.5 ☐ (1.7 + 4.0) = $8,738/barrel.
Total damage cost (2004 basis), C_d = 1,509 barrels ☐ ($13,104 + $9,9

After adjusting for inflation, the total damage cost (2012 basis), Cd = $48,044,000 ☐ 1.25 (inflation factor) = $60,054,000 which is approximately 44% of the actual cost.

Damage Cost Adjustment Factor
For this study, total damage costs of hazardous liquid pipeline releases are determined using the EPA BOSCEM and then increased by a damage cost adjustment factor of 2.1. This factor aligns the model with cleanup and recovery costs for two recent hazardous liquid pipeline releases of crude oil into sensitive socioeconomic and environmental areas.

3.3.4 Risk Analysis Results for Hazardous Liquid Pipeline Releases
The methodology for assessing socioeconomic and environmental damage to HCAs is based on computed release volumes corresponding to the detection, continued pumping, block valve closure, and drain down phases of a hazardous liquid pipeline release of crude oil without ignition. The method used in this analysis for defining maximum flow rate through the break is as defined in 49 CFR 195.105(b)(1) for the detection, pump shut down, block valve closure, and drain down phases. The damage is quantified using the EPA BOSCEM and the damage cost adjustment factor described in Section 3.3.3.
Eight case studies involving hypothetical hazardous liquid pipeline releases in HCAs are considered to assess effects of block valve closure time on socioeconomic and environmental damage resulting from a guillotine-type break. The duration of the detection and continued pumping phases for the hypothetical hazardous liquid pipelines are 5 minutes and 5 minutes, respectively. The duration of the block valve closure phases is 3 minutes.

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Characteristics for Case Study 8A, 8B, 8C, and 8D that involve 36-in. nominal diameter hazardous liquid pipelines are tabulated in Table 3.32. These case studies compare the following effects on avoided damage costs.
☐ Case studies 8A and 8B compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to either 400 psig or 1,480 psig, an elevation change of 100 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

☐ Case studies 8C and 8D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to either 400 psig or 1,480 psig, an elevation change of 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

☐ Case studies 8A and 8C compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to 400 psig, an elevation change equal to either 100 ft or 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

☐ Case studies 8B and 8D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to 1,480 psig, an elevation change equal to either 100 ft or 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

Figures 3.82 to 3.85 list the discharge volumes in barrels for Case Study 8A, 8B, 8C, and 8D. Discharge volumes listed in Table 3.32 for each case study are determined by adding the discharge volumes for the detection (5 minutes), continued pumping (5 minutes), block valve closure (3, 30, 60, and 90 minutes), and drain down (3 miles) phases. Avoided damage costs, which are also listed in Table 3.32, represent the differences between the discharge volumes for the various block valve closure durations and the 3 minute block valve closure duration multiplied by the avoided damage unit cost. The total damage unit cost for these case studies is estimated at $29,520 per barrel. This total damage cost is the sum of the response cost plus the socioeconomic damage cost plus the environmental damage cost. Note that the avoided damage costs are not sensitive to pressure and elevation changes because the model is based on the methodology in 49 CFR §194.105 (b) (1) for a worst case discharge which has a constant flow rate.

Benefits of Block Valve Closure Swiftness for a Hypothetical Hazardous Liquid Pipeline Releases without Ignition

The swiftness of block valve closure has a significant effect on mitigating potential socioeconomic and environmental damage to the human and natural environments resulting from hazardous liquid pipeline releases. The benefit in terms of cost avoidance for damage to the human and natural environments attributed to block valve closure swiftness increases as the duration of the block valve shutdown phase decreases.

Table 3.32. Effects of hypothetical 36-in. hazardous liquid pipeline releases without ignition Characteristic	**Case Study 8A**	**Case Study 8B**	**Case Study 8C**	**Case Study 8D**
Type Hazardous Liquid	Crude Oil	Crude Oil	Crude Oil	Crude Oil
Flow Velocity, ft/s	15	15	15	15
Nominal Line Pipe Diameter, in.	36	36	36	36
Drain Down Length, mi.	3	3	3	3
MAOP, psig	400	1,480	400	1,480
Elevation Change, ft	100	100	1,000	1,000
Detection Phase Duration, minutes	5	5	5	5
Continued Pumping Phase Duration, minutes	5	5	5	5
Unit Response Cost, $/barrel	3,864	3,864	3,864	3,864
Medium Modifier (Wetland)	1.6	1.6	1.6	1.6
Response Cost, Cr	6,182	6,182	6,182	6,182
Unit Socioeconomic Cost, $/barrel	2,520	2,520	2,520	2,520
Socioeconomic Cost Modifier (Very High)	1.7	1.7	1.7	1.7
Socioeconomic	4,284	4,284	4,284	4,284

Damage Cost, C_s				
Unit Environmental Cost, $/barrel	1,260	1,260	1,260	1,260
One half Freshwater Modifier (Wildlife Use = 1.7) and Wildlife Modifier (Wetland = 4.0)	2.85	2.85	2.85	2.85
Environmental Damage Cost, C_e	3,591	3,591	3,591	3,591
Total Damage Unit Cost, C_d, $/barrel	14,057	14,057	14,057	14,057
Damage Cost Adjustment Factor for Hazardous Liquid Pipeline Releases	2.1	2.1	2.1	2.1
Total Damage Unit Cost on 2012 Basis, $/barrel	**29,520**	**29,520**	**29,520**	**29,520**
Detection Phase Release, barrels	5,665	5,665	5,665	5,665
Continued Pumping Phase Release, barrels	5,665	5,665	5,665	5,665
Drain Down Phase Release, barrels	19,942	19,942	19,942	19,942
Block Valve Closure Phase for Valve Closure in 3 minutes, barrels	3,399	3,399	3,399	3,399
Block Valve Closure Phase for Valve Closure in 30 minutes, barrels	33,992	33,992	33,992	33,992

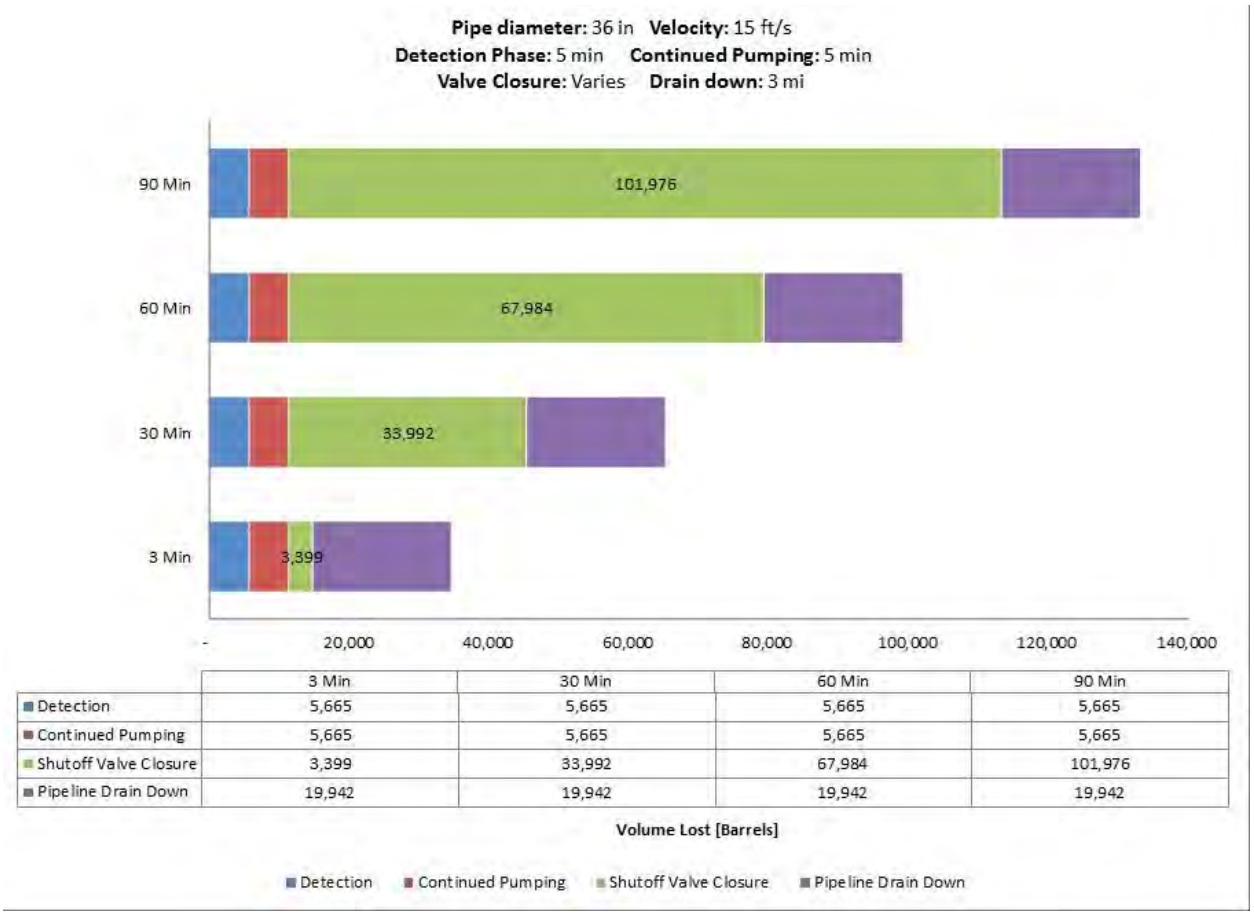

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. 3.82. Case Study 8A – Discharge volumes for a 36-in. hazardous liquid pipeline with a 400 psig MAOP and an elevation change of 100 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

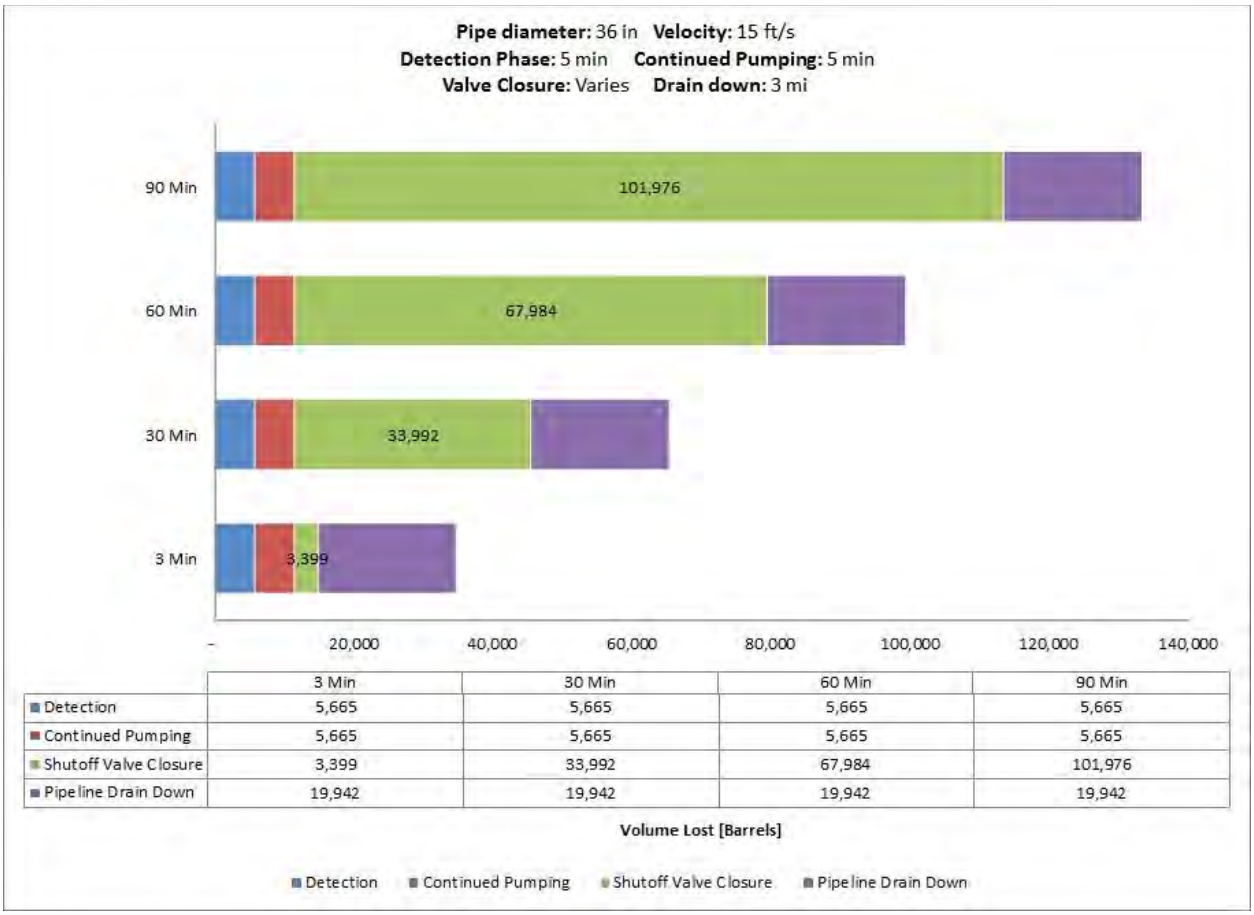

	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. 3.83. Case Study 8B – Discharge volumes for a 36-in. hazardous liquid pipeline with a 1,480 psig MAOP and an elevation change of 100 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

FRIENDS of the HEADWATERS

May 29, 2014

Mr. Larry Hartman, Environmental Review Manager
Energy Environmental Review and Analysis (EERA)
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

Dear Mr. Hartman,

Regarding Public Utilities Commission (PUC) Docket No. PL9/PPL-13-474:

Please find attached our supplemental comments to be added to our position paper dated April 2, 2014 concerning the Enbridge/North Dakota Pipeline Company, LLC Sandpiper pipeline request for a proposed southern corridor route across northern Minnesota from Grand Forks, ND to Superior, WI.

The Friends of the Headwaters oppose this current projected route. You, the DOC and the Public Utility Commissioners will find further reasoning for our opposition and our proposal for an alternate route in the attached documents.

Friends of the Headwaters requests these documents be posted to the eDocket website as soon as possible.

Writing for the members of Friends of the Headwaters I thank you for your attention to these documents and for your attention to our concerns for the welfare and quality of our lands, waters and lives in the Headwaters Country.

Sincerely,

Richard Smith
President
Friends of the Headwaters

P.O. Box 583, Park Rapids, MN 56470
mnfriendsoftheheadwaters@gmail.com
facebook.com/savemississippiheadwaters
www.friendsoftheheadwaters.org

eDocket No. 20151-106460-07

SUPPLEMENTAL COMMENTS TO POSITION PAPER DATED 4/2/2014
REGARDING THE ENBRIDGE/NORTH DAKOTA PIPELINE COMPANY (NDPC) LLC
SANDPIPER PIPELINE PROJECT

Public Utilities Commission (PUC) Docket Number: PL-6668/PPL-13-474

May 29, 2014

Prepared by
Richard Smith
Friends of the Headwaters
P.O. Box 583
Park Rapids, MN 56470

TO REVIEW:

Friends of the Headwaters opposes the Enbridge/NDPC Sandpiper pipeline as currently projected to cross Minnesota's lake country from Grand Forks, ND to Superior, WI.

We believe Enbridge/NDPC's proposed "southern corridor" will NOT protect the high quality waters and other natural resoures along this route.

Friends of the Headwaters also believes Enbridge intends to proliferate another multiple pipeline corridor with their southern route proposal. Enbridge presented just that in an investor conference held April 2, 2014 in New York City.

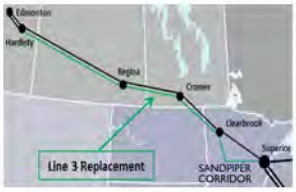

We believe Enbridge/NDPC could not have chosen a worse route as evidenced by the maps below.

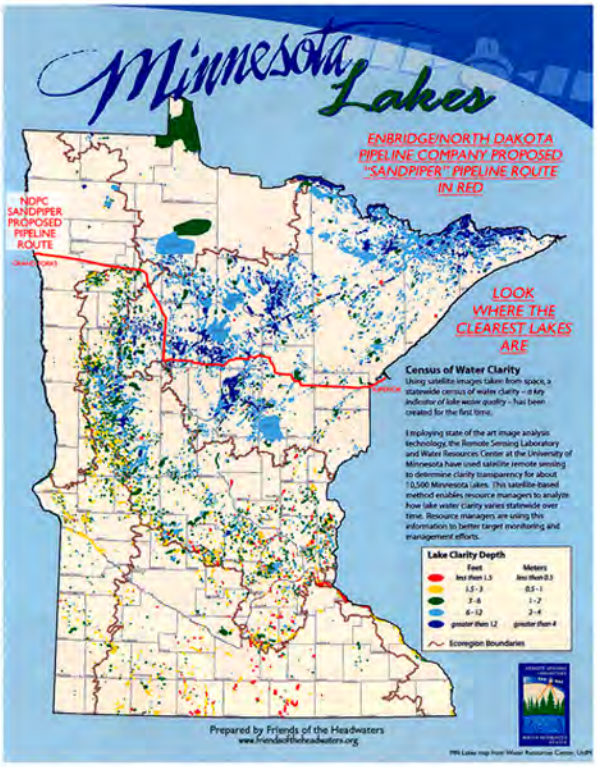

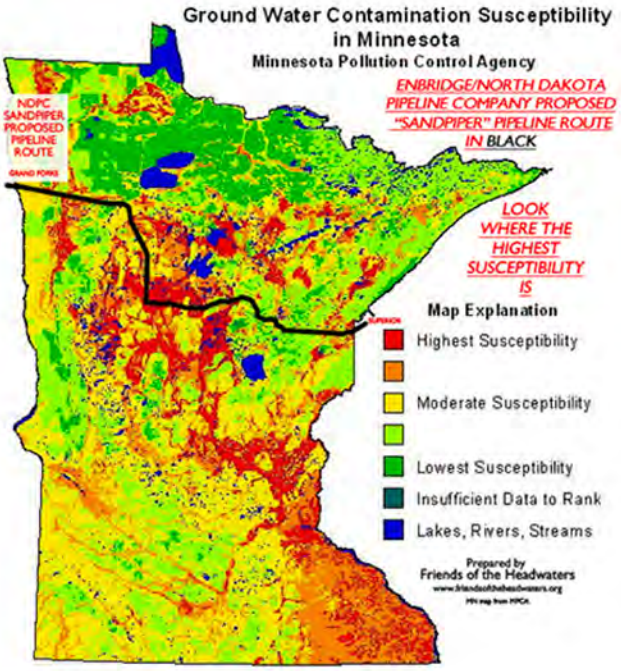

AT RISK: MINNESOTA'S
eDocket No. 20151-106460-07

CLEAREST AND CLEANEST LAKES
GROUND WATER AQUIFERS
WILD RICE LAKES
WETLANDS
MOST SENSITIVE SOILS TO SPILLS
DIVERSITY OF VEGETATION
SENSITIVE ECOLOGICAL ZONES
THE LAKE SUPERIOR BASIN
HIGH VALUE RECREATIONAL AND RESIDENTIAL WATERS

- $342 million annual revenue from fishing
- $4.3 billion annual retail sales hunting, fishing, wildlife watching
- $2 billion water-influenced properties in Hubbard County alone.

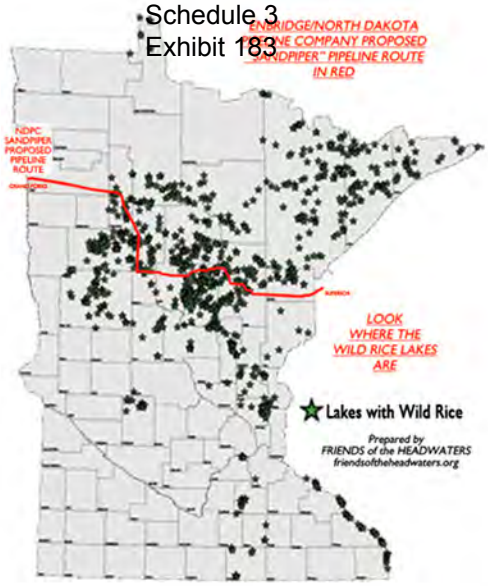

ENBRIDGE/NDPC COULD NOT HAVE PICKED A WORSE ROUTE.

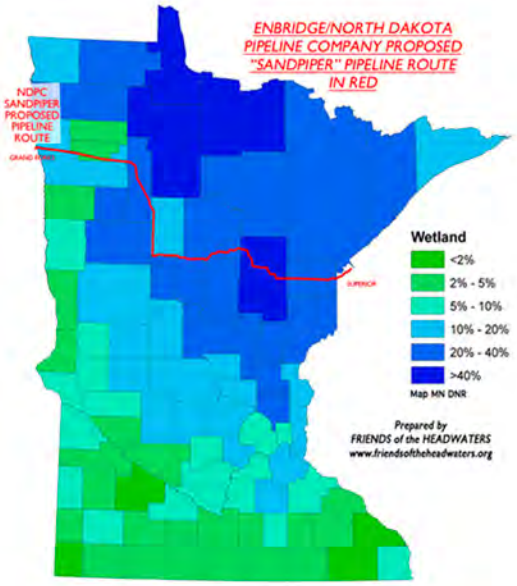

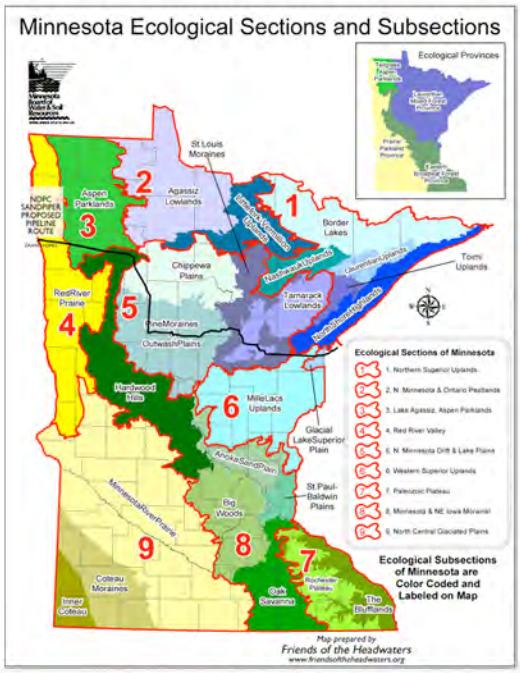

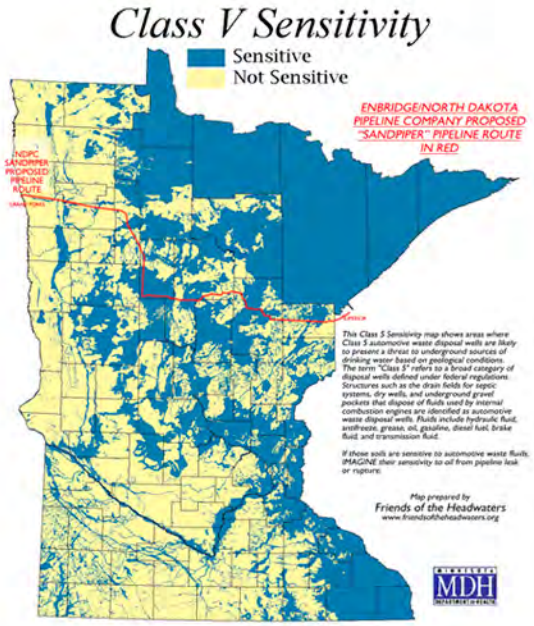

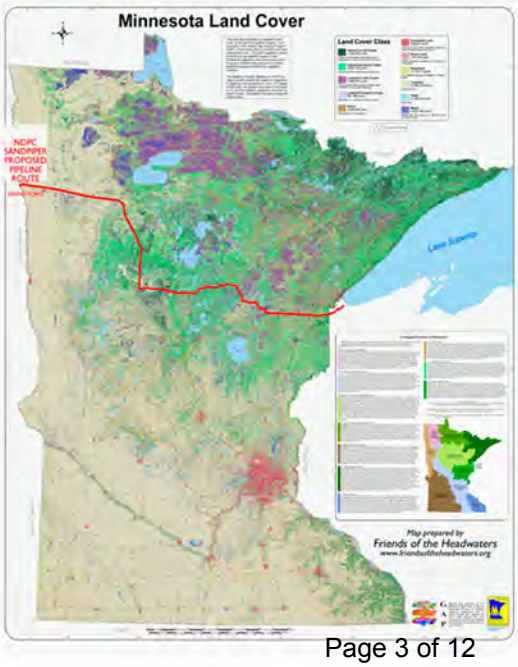

Given the high risk factors of Enbridge/NDPC's proposed Sandpiper 'southern corridor' route *FRIENDS of the HEADWATERS* has proposed a true 'southern corridor' across Minnesota which eliminates the potential for spills and damage to the state's most environmentally sensitive lands and waters.

FRIENDS of the HEADWATERS Alternate Route A utilizes an existing energy corridor of which Enbridge is a 50% shareholder with Alliance Company of Canada. This corridor originates in Canada and ends west of Chicago. The proposed Enbridge/NDPC pipeline route would intersect this corridor east of Minot, ND at which point NDPC would turn and follow the corridor to Illinois.

Alternate Route A below.

Compare the route risk factors in following maps.

A

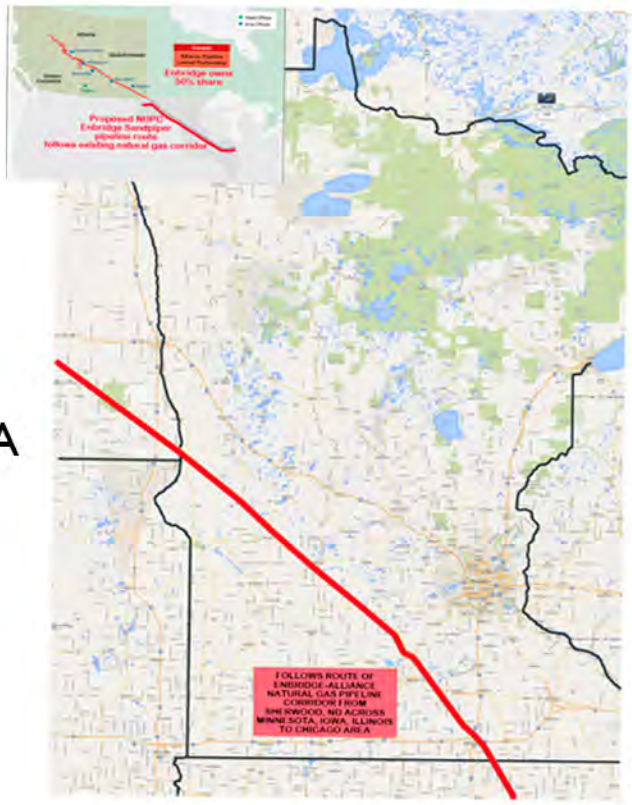

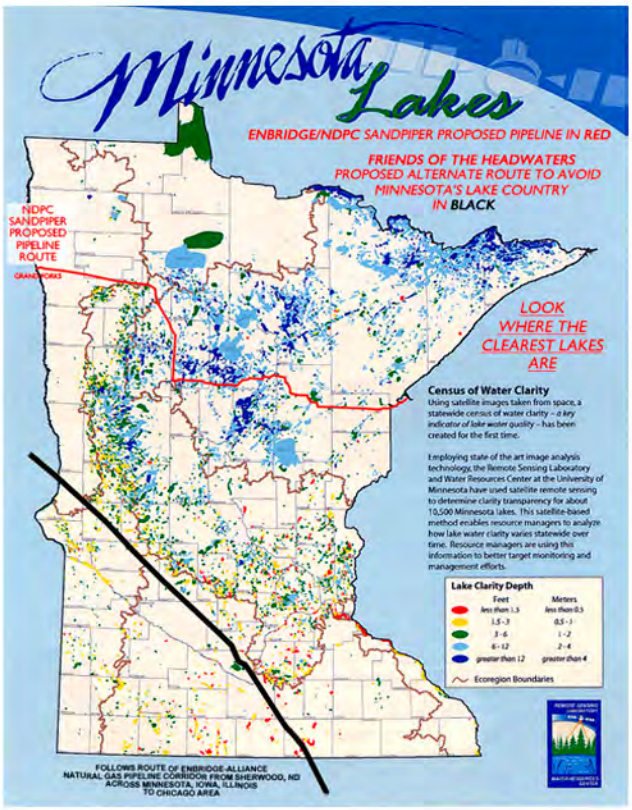

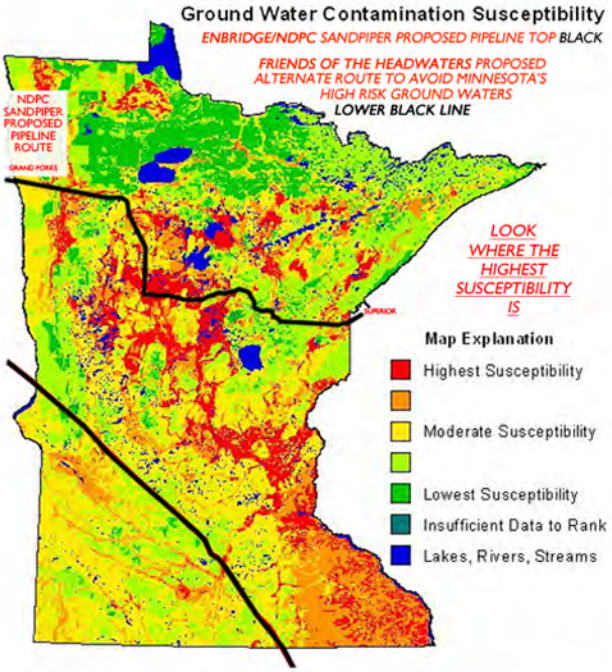

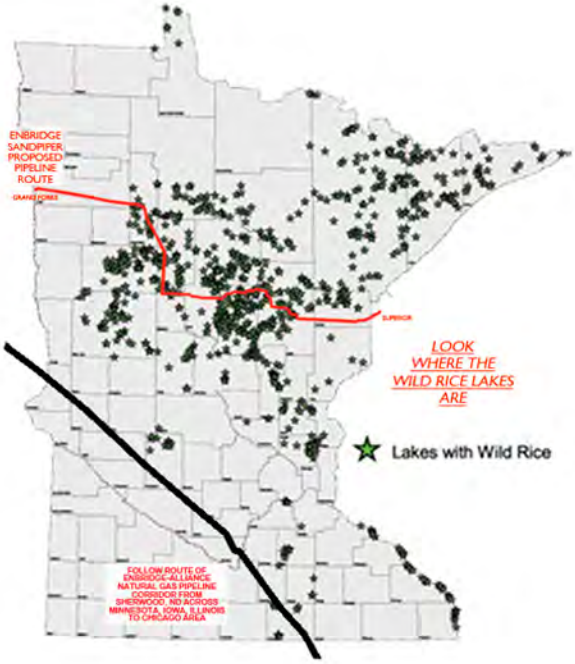

Route map comparisons continued:
eDocket No. 20151-106460-07

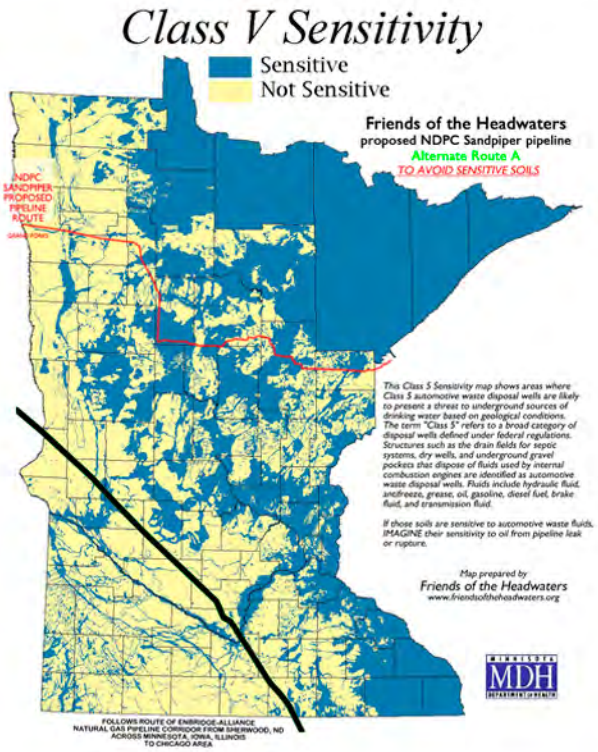

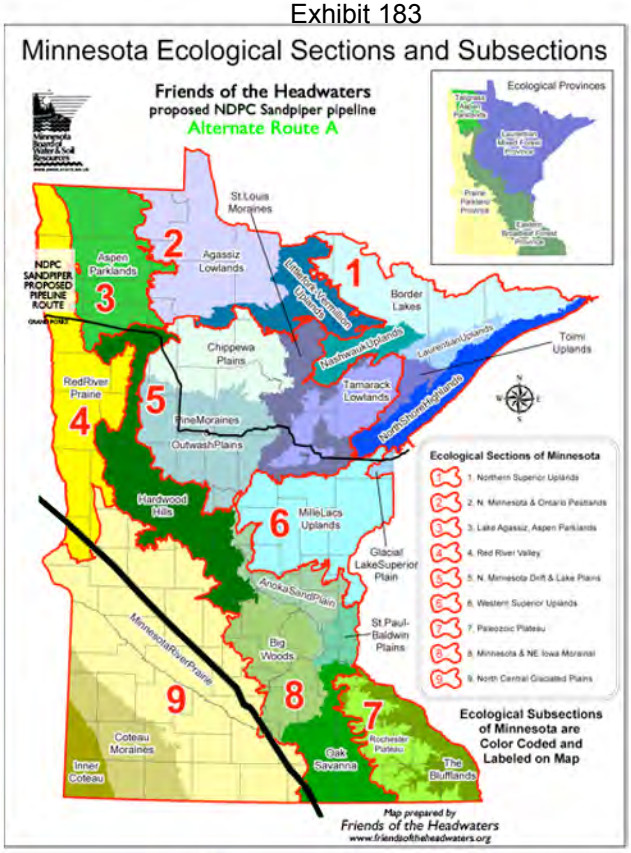

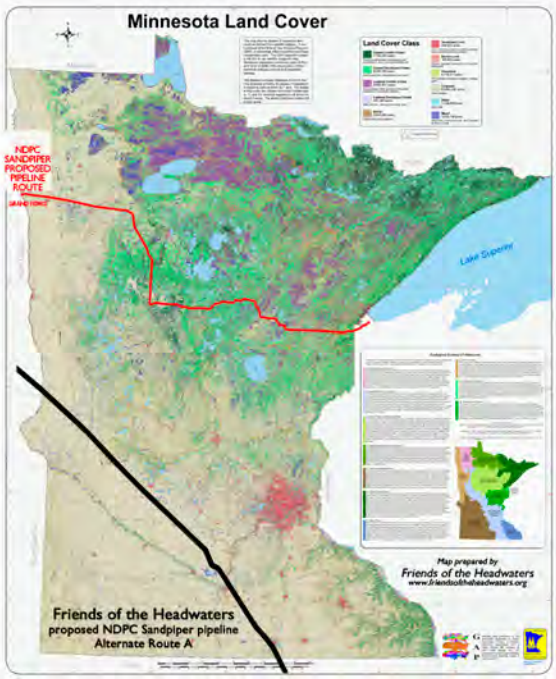

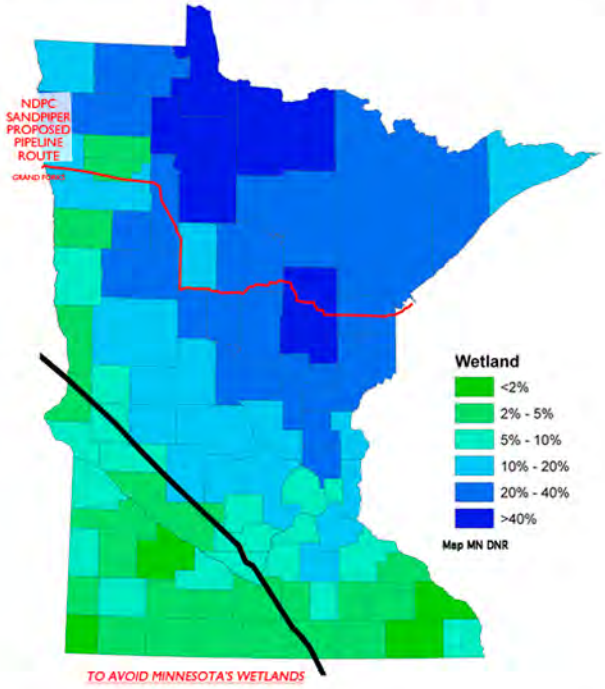

ALT ROUTE A traverses almost exclusively agricultural lands below Minnesota's primary lake country. This area is sparsely populated with mostly small towns among the farmlands.

Note: Enbridge's Mark Curwin, Senior Director for Strategic Coordination of Major Project Executions in the US, stated their construction preference is to build pipelines across farmland. He made these remarks at a public meeting in Park Rapids on Jan. 29, 2014. Mr. Curwin gave the reasons of better soils, easier construction, easier access, less natural habitat destruction, cheaper and quicker. After construction the farmland can be put back into crop production. Access to leaks and spills is much easier. Winter wetland construction would be at a minimum.

Two additional maps by Bob Merritt, hydrologist, showing Alternate Route A in better detail.

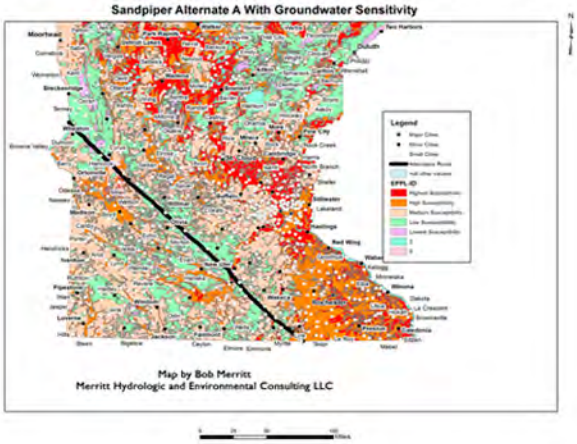

Minnesota still gets to keep jobs the construction will provide as well as North Dakota plus Iowa and Illinois.

Although the route does not end in Superior, it still ties into the existing Enbridge system in Illinois with routing options to Michigan and Ontario that avoid our greatest freshwater lakes of Lake Superior and the Mackinac Straits of Lakes Michigan and Huron.

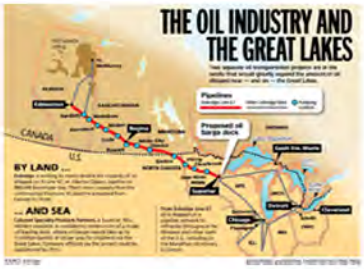

Since it's an existing corridor the company should have access to the mapping previously done for the pipeline already there. ALT ROUTE A also intersects pipelines in southern Minnesota owned and operated by other companies which provide the option of re-routing Bakken crude to the refineries in Rosemont and Saint Paul Park in the south Twin Cities Metro.

The Illinois Hub also allows Enbridge access to its pipelines to Oklahoma and points south.

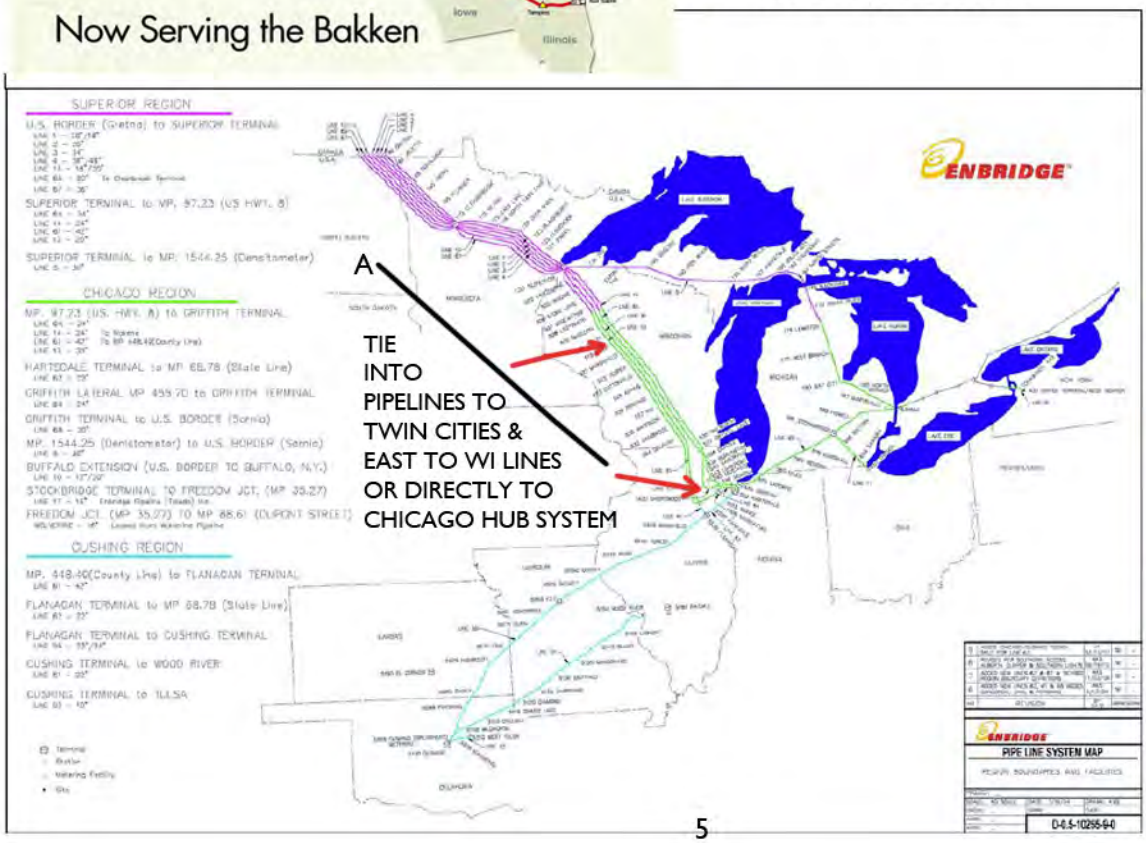

FRIENDS of the HEADWATERS disputes Enbridge/NDPC's contention that the Sandpiper must end in Superior, Wisconsin. Enbridge has provided no rationale for the route ending in Superior other than "We want it. It connects to our existing system in Superior." The Alternate Route A proposed by *FRIENDS of the HEADWATERS* also connects to their existing system hub near Chicago, Illinois. It does not prevent Enbridge from then transporting the Bakken crude either south to Oklahoma and the Gulf Coast nor across Illinois, Indiana, Michigan and across the border to Sarnia, Ontario, Canada on their existing system.

Figure 7853.0510-2
Pipeline System Map

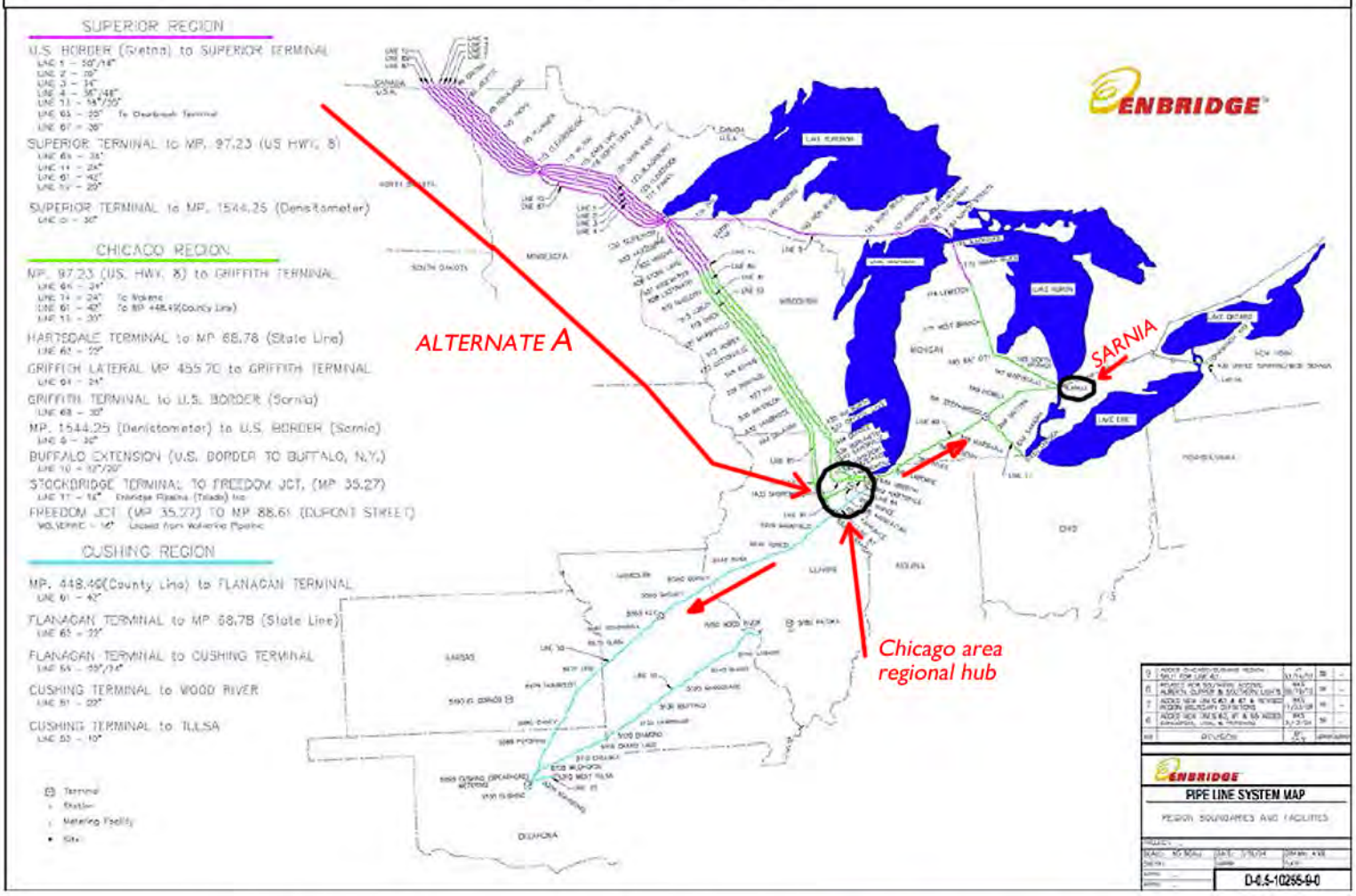

Alternate Route A already fits into their existing pipeline corridor system as evidenced by the map at right. Alternate Route A also appears to be a more direct route from the North Dakota Bakken Oil Fields to the primary energy markets of the US Midwest.

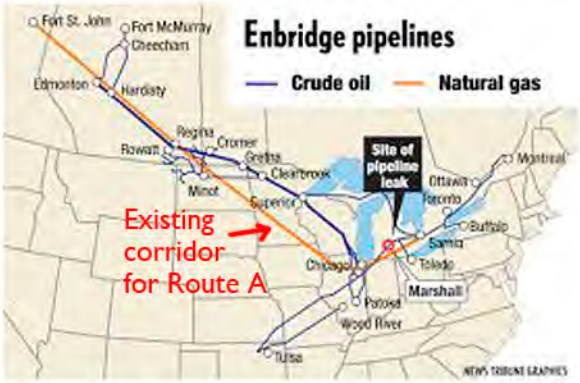

Friends of the Headwaters believes the citizens of Minnesota have the right to determine the route parameters of this pipeline corridor, not Enbridge/NDPC. The considerations of the Sandpiper pipeline and the Line 3 Rebuild proposed to run alongside the Sandpiper should not be dictated to the citizens of Minnesota by the company. The company already has too many pipelines crossing Minnesota's most valuable waters and lands.
The cumulative risk of adding additional lines to this region is too high to have the routing parameters set by what Enbridge 'wants'. They should not be allowed to frame the debate on this issue. The citizens of Minnesota and this state's governing and regulatory agencies need to reject this framing by Enbridge/NDPC

and reframe the discussion regarding the need and route of the proposed Sandpiper pipeline as what is best for the people, its communities and its natural resources. Until Enbridge/NDPC adequately provides a detailed explanation for demanding why the Sandpiper pipeline must end in Superior, Wisconsin, *Friends of the Headwaters* believes all alternative routes must be given full consideration, even those proposing a system overhaul of how and where Enbridge wants to cross the state.

If Enbridge/NDPC were truly committed to protecting our lakes, rivers, wetlands, aquifers and lands as they publically state they are, then prove it by not just giving Minnesotans statistics about how safe their pipelines are (their history says otherwise), but by actually moving their proposed route to the lowest risk part of the state as portrayed on the previously presented illustrated maps.

Costs should not be a factor. After all, once the Sandpiper is constructed, 375,000 barrels of oil will pass through it daily. At the current world price for a barrel of oil that amounts to $40 million dollars per day or $14.6 billion dollars annually. Even though Enbridge is charging a fee to move the amount of oil, it should not take too many years to recoup their construction costs. Plus it appears from the map below the company has plans to expand the pipeline system through Wisconsin. The money allocated for that extension could easily be applied to the extra construction costs of building Alternate Route A.

Since the company is adamant about Superior as a destination for the Bakken crude, perhaps this proposed extension in Wisconsin could be used to move the oil from the end of Alternative Route A back north to Superior.

Enbridge has ambitious expansion plans not just in Minnesota but nationally it appears.

If their intensions are to expand rapidly towards the southern U.S. Alternative Route A would conform to those expansion plans more directly than their current proposed Sandpiper corridor.

The *FRIENDS of the HEADWATERS* also sponsors other alternate routes at this time.

These routes can be connected back to Superior along existing energy corridors.

ALTERNATE ROUTE "C" as previously proposed in Position Paper of 4/2/2014

West of Grand Forks near Larimore the Sandpiper would turn south following either railroad easements or road easements south-southeast down the Red River Vally, crossing the Red River near Wahpeton, ND and continuing along MN Hgy 9 until it intersects an existing pipeline corridor owned by the Magellan Company. The Sandpiper follows this corridor until its intersection with the MinnCan pipeline corridor at which point it follows this corridor to the Flint Hills and Saint Paul Park refineries and pipeline system southeast of the Twin Cities Metro area. Optionally the route could turn south from Enbridge/NDPC's proposed pumping station near Lakota, ND.

Route C bypasses Minnesota's sensitive lands and waters and gives Enbridge the option of two routes back to Superior. They can use an existing pipeline corridor along I35 to Duluth whereupon they would intersect their northern corridor and can turn east to Superior. Or they can use another existing pipeline corridor, the Magellan straight east into Wisconsin where that line intersects the Enbridge system in central Wisconsin. At that point Enbridge can use their proposed expansion line to move the oil back to Superior or down to Illinois.

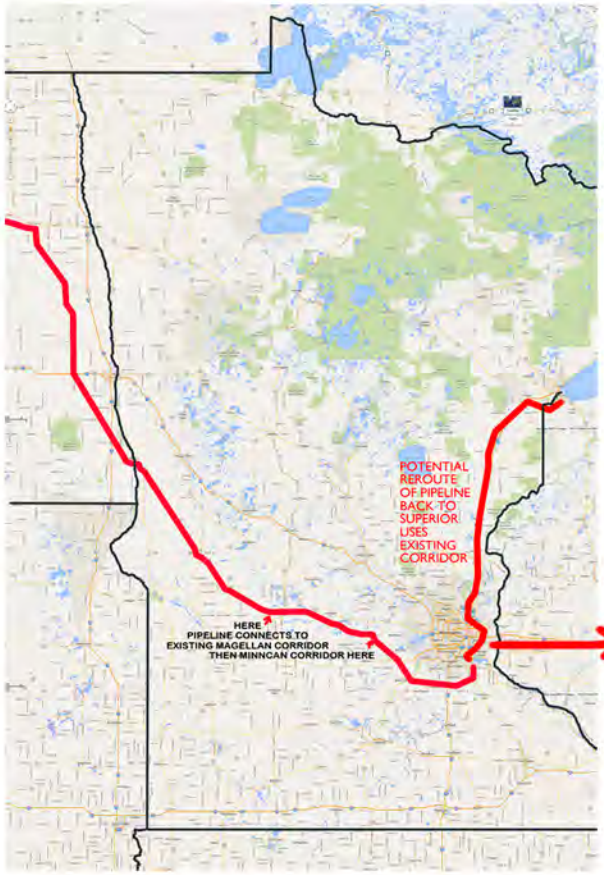

MAP APPENDIX

Friends of the Headwaters does question how excited the people of Wisconsin might be about new pipelines.

The *FRIENDS of the HEADWATERS* also sponsors other alternate routes at this time.

These routes can be connected back to Superior along existing energy corridors.

ALTERNATE ROUTE "D" as previously proposed in Position Paper of 4/2/2014

Near Grand Forks the Sandpiper would turn south following an existing pipeline corridor along Interstate 29 south towards Fargo, North Dakota then follow the same corridor east southeast adjacent Interstate 94. This existing pipeline corridor is owned by the Magellan Company, the same company which has the line continuing east from Minneapolis-StPaul into Wisconsin to intersect Enbridge's existing corridor there. The Sandpiper follows this corridor until its intersection with the MinnCan pipeline corridor at which point it follows this corridor to the Flint Hills and Saint Paul Park refineries and pipeline system southeast of the Twin Cities Metro area.

Route D bypasses most of Minnesota's sensitive lands and waters and gives Enbridge the option of two routes back to Superior. They can use an existing pipeline corridor along I35 to Duluth whereupon they would intersect their northern corridor and can turn east to Superior. Or they can use another existing pipeline corridor, the Magellan straight east into Wisconsin where that line intersects the Enbridge system in central Wisconsin. At that point Enbridge can use their proposed expansion line to move the oil back to Superior or down to Illinois.

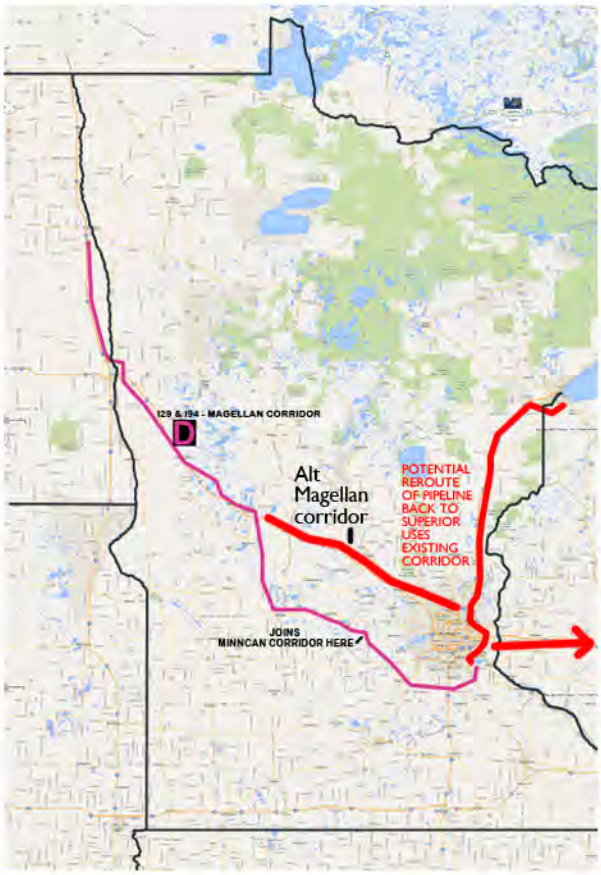

Route D could also stay in the Magellan corridor along I94 and continue on into Wisconsin.

MAP APPENDIX

Wisconsin Petroleum Pipelines

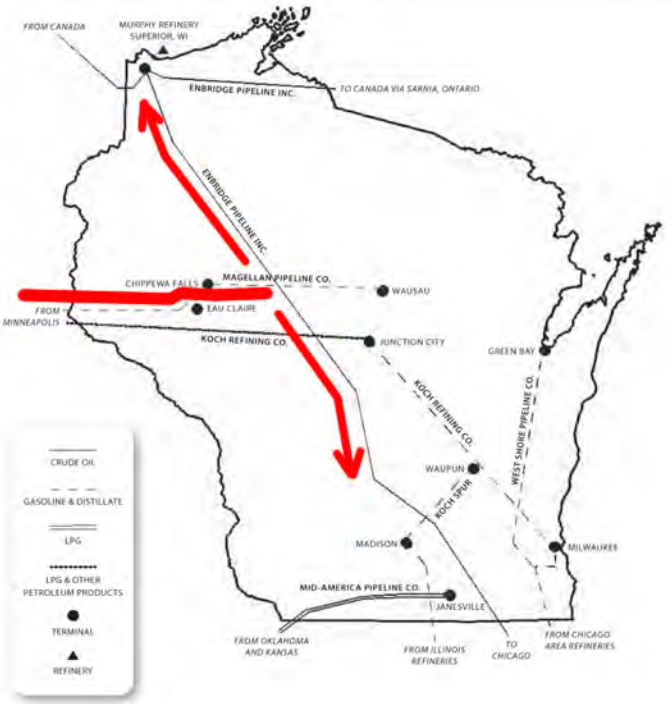

WISCONSIN ENERGY STATISTICS 2010 | 157

Although these alternate routes avoid the high risk environmental lands and waters of the state as exhibited in the maps below, they do traverse areas of higher population near the Twin Cities. This route does allow a connection along existing pipeline corridors into western and central Wisconsin to Enbridge's pipeline system in Wisconsin. Enbridge has option to ship oil north back to Superior, WI or south to Chicago hub.

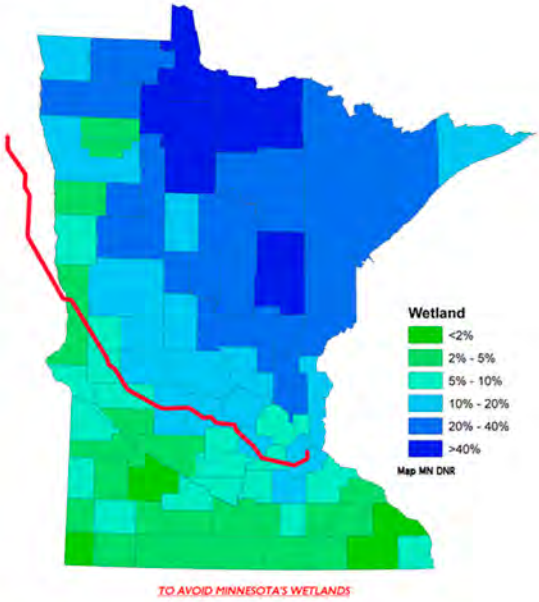

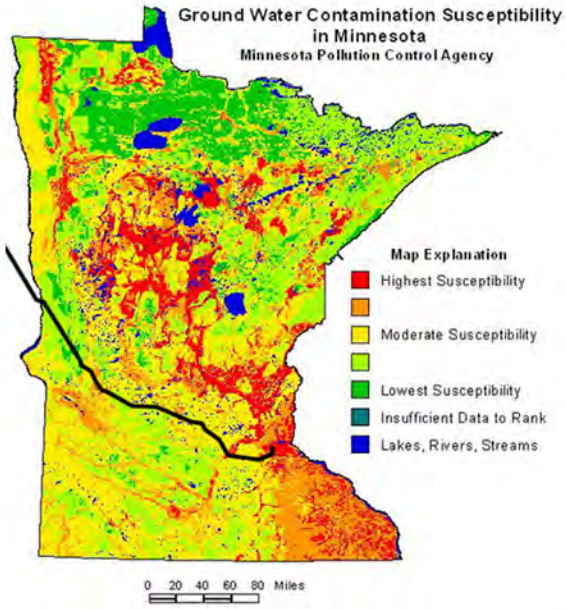

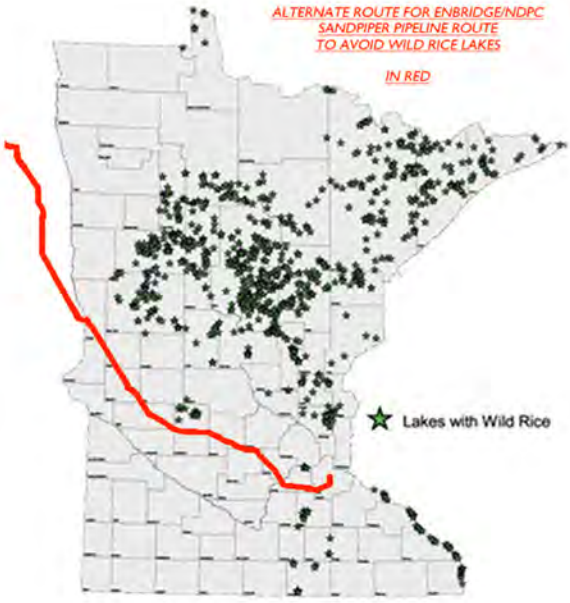

As currently planned with the exception of a few tax dollars and short term construction monies Minnesotans derive no long term benefits from these pipelines and assume all the risks from leaks/spills/ruptures. And eventually these pipelines will leak or break. Enbridge's spill history in Minnesota proves it true.

Friends of the Headwaters therefore recommends to the PUC, DOC and other state agencies that they enforce our MEPA statutes and deny the Certificate of Route permit for the Enbridge/NDPC's proposed Sandpiper pipeline corridor through Minnesota's prime lake country. A perfectly viable, low risk alternative is available south of our best waters.

Friends of the HEADWATERS opposes the Enbridge/NDPC Sandpiper Pipeline route proposal as marked on the map below. What does it say about a company that would neglect to feature the state's most famous river, the Mississippi, on their proposed route map? Perhaps this is evidence of their true concern for Minnesota's valuable and cherished water resources.

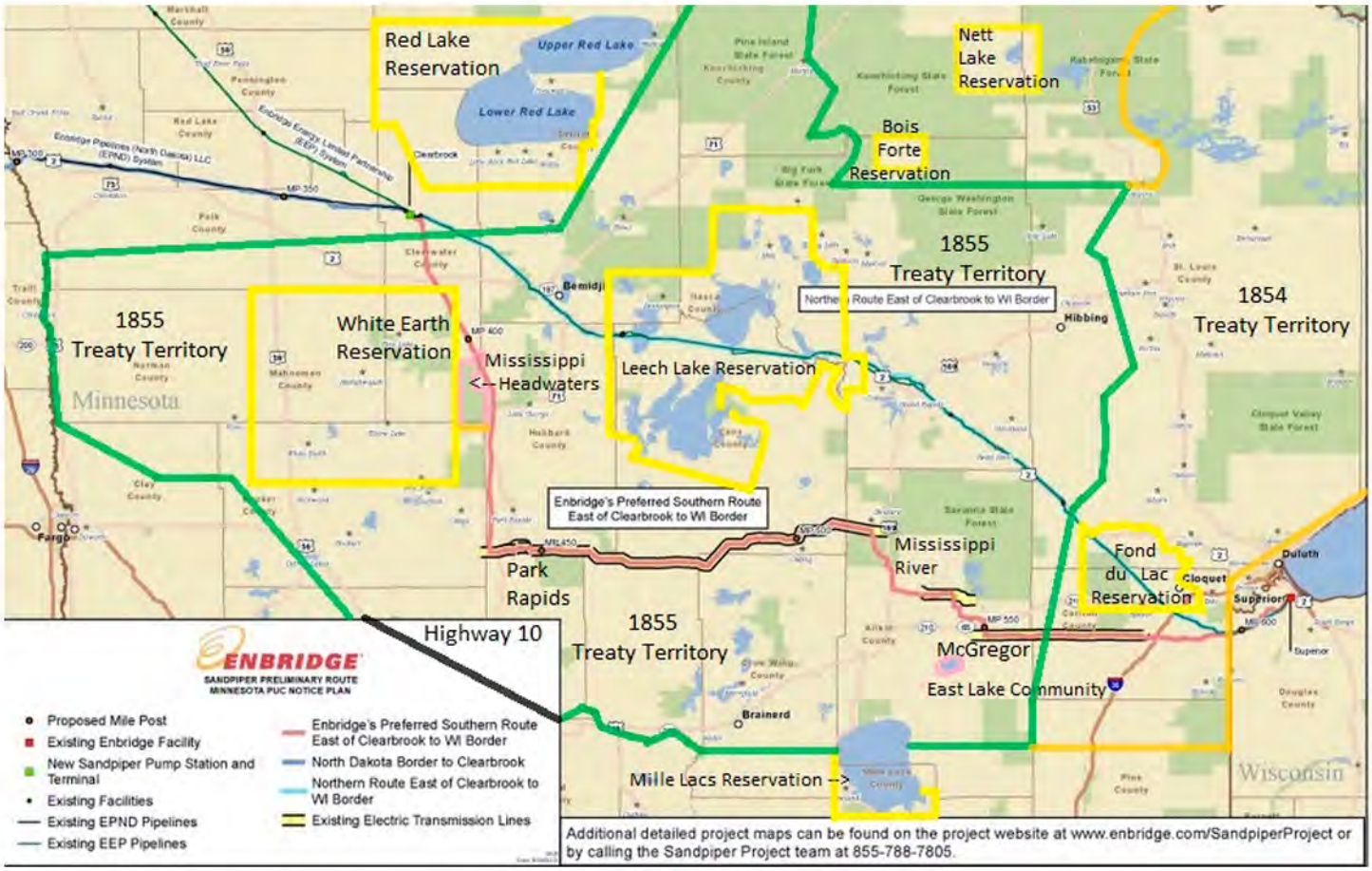

Enbridge already has too large a footprint across Minnesota's Headwaters Country.

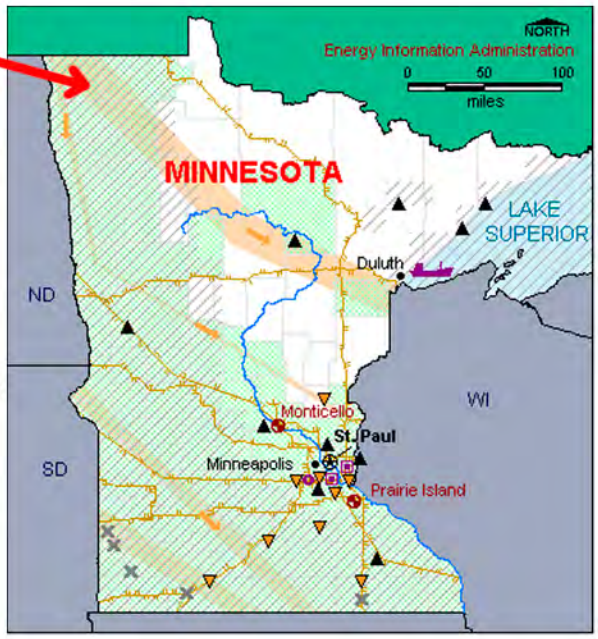

Too much is at risk, not only with the state's clearest lakes; ground water aquifers; fish and wildlife; wild rice; lake and riverfront homes, businesses, and communities; tourism industry; lands and forests; but there's also Lake Superior.

Does Enbridge's insistence on the pipeline ending at Superior portend a future of shipping oil on the Great Lakes? Ironic that a ship icon just happens to be on the adjacent map.

The people of Minnesota should not allow a Canadian corporation with its North Dakota Pipeline Company US subsidiary to dictate the terms of this project.

The company has yet to explain the need for Superior as the end point. This proposed pipeline route should not proceed without legitimate justification. Said reasoning should not include corporate profits.

Friends of the Headwaters believes up here a barrel of water IS worth more than a barrel of oil.

STATE OF MINNESOTA
PUBLIC UTILITIES COMMISSION

Beverly Jones Heydinger	Chair
Dr. David C. Boyd	Commissioner
Nancy Lange	Commissioner
Dan Lipschultz	Commissioner
Betsy Wergin	Commissioner

In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota	OAH Docket No. 8-2500-31259 PUC Docket No. PL-6668/CN-13-473
In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project in Minnesota	OAH Docket No. 8-2500-31260 PUC Docket No. PL-6668 / PPL-13-474

FRIENDS OF THE HEADWATERS COMMENTS ON CONSIDERATION OF SYSTEM ALTERNATIVES AND THE LEGAL BASIS FOR CONSIDERATION OF SYSTEM ALTERNATIVES IN THE NEED AND ROUTING PROCEEDINGS

Friends of the Headwaters ("FOH") hereby provides its comments in response to the Minnesota Public Utilities Commission ("Commission") Notice of Comment Period dated August 12, 2014. This notice identified the following topics for comment:

- What if any of the eight system alternatives identified in the Department of Commerce Alternative Routes Summary Report should be considered further in these proceedings?
- What is the legal basis for determining whether a system alternative should be considered in the certificate of need proceeding?

- What is the legal basis for determining whether a system alternative should be considered in the route permit proceeding?

In response, FOH provides the following comments and also incorporates by reference its August 5, 2014, Reply Comments on the Comments and Recommendations of the Minnesota Department of Commerce on Selection of Alternative Routes ("FOH August 5 Comments").

I. CONSIDERATION OF SYSTEM ALTERNATIVES

Selection of so called "system alternatives" by the Commission under Minn. Stat. Ch. 216G ("Routing Law") and Minn. Stat. Ch. 116D, the Minnesota Environmental Policy Act ("MEPA"), must take into consideration the "underlying" need for the Project, the potential for an alternative to reduce environmental impacts, and an alternative's apparent feasibility with regard to this need. The factors that should be considered in the Commission's consideration are discussed in the FOH August 5 Comments at 24-27, 37-39.

A. The Alleged Underlying Need for the Project

FOH contests the overall need for the Project and intends to present evidence that the Commission must deny NDPC a Certificate of Need for failing to meet its burden of proof under Minn. Stat. § 216B.243 and Minn. R. Ch. 7853. This being said, NDPC has alleged a number of facts in its Application for a Certificate of Need ("CON Application") related to commercial demand for the Project and its plan to upgrade its infrastructure to meet this alleged demand. As described in detail in the FOH August 5 Comments at 6-8, NDPC has described the commercial purpose of the Project as follows:

> The Project's purpose is to transport the growing production of domestic crude oil from the Bakken and Three Forks formations in the Williston Basin of eastern Montana and western North Dakota to meet the increased demands of refineries and markets in the Midwest and the East Coast.

NDPC Environmental Impact Report ("EIR") at 1-2 (footnote omitted). In its CON Application, NDPC describes this purpose similarly:

> Enbridge's shippers will use the pipeline for the transportation of crude oil to Enbridge's breakout tankage facilities at Clearbrook, Minnesota or Superior, Wisconsin. At Clearbrook, the crude oil will be delivered to interconnected facilities operated by Minnesota Pipe Line Company for delivery to Minnesota refineries. At Superior, the crude oil will be delivered into the Enbridge Mainline System and other third-party pipelines for delivery to refineries in the Midwest and the East Coast.

CON Application at Section 7853.0230 at 5 (footnotes omitted.) Thus, NDPC has described three potential markets for the transportation services to be offered by the Project:

- Minnesota refineries;
- Midwestern refineries; and
- East Coast refineries.

NDPC has also claimed that serving these refinery markets require that the Project connect to its Clearbrook and Superior Terminals.

The following discusses the NDPC and Enbridge pipelines systems at issue, the alleged demand for the transportation services to be provided by the Project, and the need for NDPC to ship crude oil on the Project to this demand via the Clearbrook and Superior Terminals.

1. Description of Pipeline Systems at Issue

The following map provides a simplified view of the pipeline systems at issue in this proceeding.

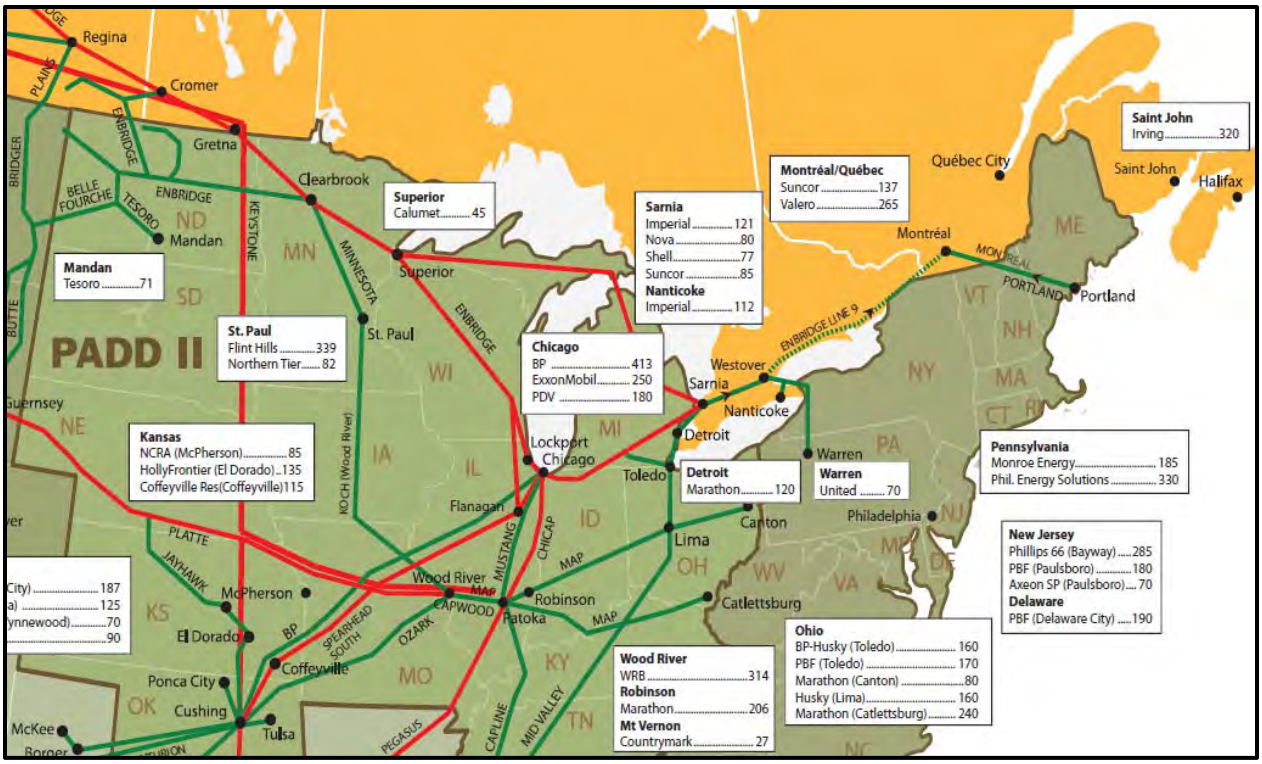

In addition, Enbridge has published the following System Configuration graphic that schematically describes its Mainline System. (A complete map and system configuration graphic are included as Attachment A).

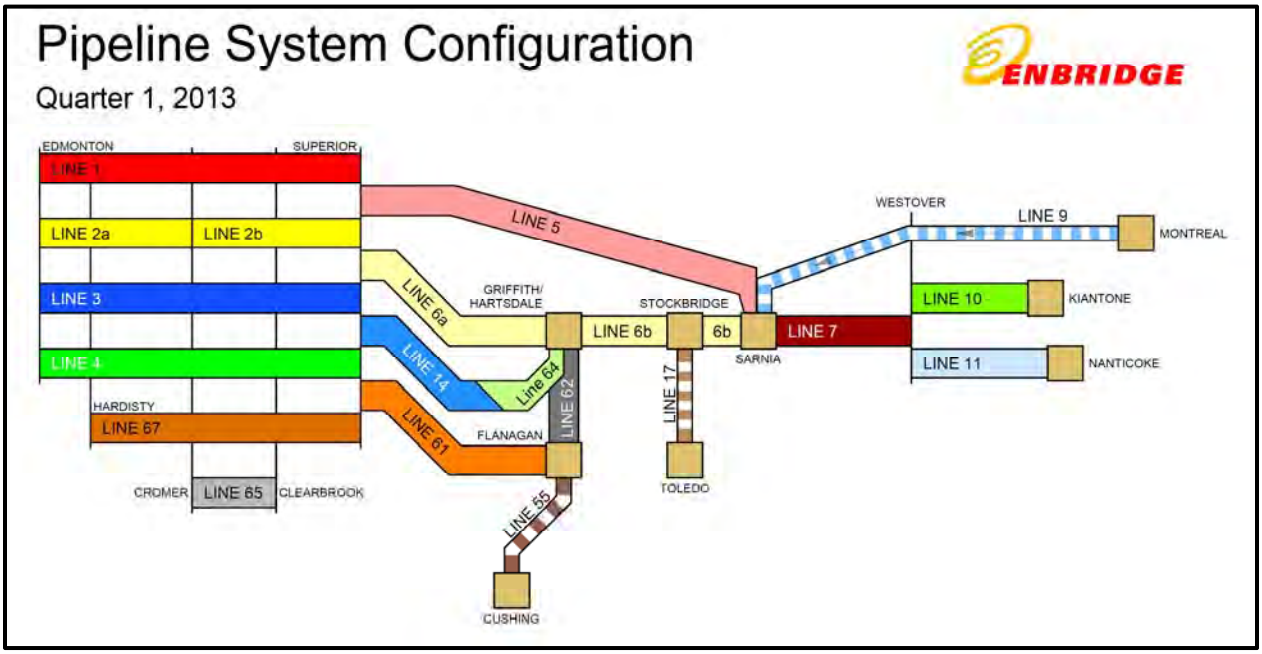

Together, the foregoing map and graphic show that the Clearbrook Terminal serves two structural purposes:

1) to transfer crude oil to the Minnesota Pipeline for delivery to Minnesota refineries; and
2) to accept oil from the North Dakota Pipeline for delivery to the Superior Terminal.

They also show that the Superior Terminal has four structural purposes:

1) delivery of crude oil via local pipeline to the Calumet Refinery in Superior, Wisconsin;
2) delivery of crude oil via Line 5 to the Sarnia Terminal in Ontario;
3) delivery of crude oil via Lines 6a, 14, and 64 to the Lockport Terminal in northern Illinois;
4) delivery of crude oil via Line 61 to the Flanagan Terminal in northern Illinois.

FOH notes that no U.S. East Coast refineries are served by pipelines, nor are the Canadian East Coast refineries in Quebec City, Quebec, and St. John, New Brunswick.

To understand the possible need for the Project to pass through the Clearbrook and Superior Terminals, it is necessary to determine the potential customer demand for service through these terminals. The following analyzes potential customer demand for U.S. Bakken Formation crude oil in U.S. and Canadian markets in relation to the specific functional purposes of the Clearbrook and Superior Terminals. This analysis shows that there is absolutely no need for additional crude oil pipeline service to the Clearbrook Terminal, and that what need exists related to the Superior Terminal is for transportation service to the Flanagan Terminal in

Northern Illinois, such that direct service to the Flanagan Terminal would meet most if not all of Enbridge's predicted customer need.

2. The Alleged Need for a Route Connection to Clearbrook and for Additional Pipeline Capacity to Ship Oil to Minnesota Refineries

Although Enbridge does not include service to Minnesota refineries in its statements of purpose, it nonetheless implies that part of the purpose for the Project is to provide service to these refineries. The Commission should understand that available evidence unequivocally shows that there is no need for additional crude oil pipeline deliveries from North Dakota to Minnesota through the Clearbrook Terminal.

On March 14, 2014, the St. Paul Park Refining Company ("SPPRC"), which owns the 89,000 bpd St. Paul Park Refinery, filed a Protest at the Federal Energy Regulatory Commission (Attachment B) in which it states, *inter alia*:

> this Protest demonstrates that the proposed expansion pipeline and expansion surcharge (a) are not needed, (b) do not have broad shipper support, [and] (c) will provide no benefit to shippers taking delivery at Clearbrook . . . .[1]
>
> * * *
>
> SPPRC does not believe the expansion pipeline proposed by NDP is necessary or desirable to meet the transportation needs of SPPRC.[2]
>
> * * *
>
> the purported shipper benefits cited by NDP have no value to SPPRC."[3]

In addition, the SPPRC Protest contains substantial evidence in the form of 104 pages of expert affidavits and documentation in support of SPPRC's position.[4] It also severely criticizes a

[1], *Petition for Declaratory Order of North Dakota Pipeline Company*, FERC Docket No. OR14-21-000. PROTEST OF ST. PAUL PARK REFINING CO. LLC (March 13, 2014) at 1.
[2] *Id.* at 4.
[3] *Id.*
[4] *Id.* at s.

NDPC study that alleges need for the Project.[5] Thus, the SPPRC has stated in unequivocal terms that there is no need for the Project to connect to the Clearbrook Terminal for ultimate delivery to the St. Paul Park Refinery, or for that matter to the Flint Hills Refinery.

Although FERC denied this Protest, it did so on procedural grounds and did not review SPPRC's factual claims.[6] FERC stated:

> More importantly, and especially pertinent to the instant petition, because the Commission does not regulate the entry14 or exit15 into the oil pipeline business as it does with natural gas pipelines, there is nothing preventing an oil pipeline from building or expanding a pipeline on a traditional common carrier cost-of-service basis and making the required initial rate filing thirty days prior to the requested effective date. Therefore, while the protesters criticize North Dakota Pipeline's study and assert there is no need for the proposed expansion and extension of the system, the arguments have no bearing on our determination here. <u>Since the Commission does not have jurisdiction to grant certificates to oil pipelines or otherwise authorize or prevent construction, determining whether a pipeline is needed is not within its authority.</u> Therefore, the Commission denies the protesters' requests to reject this petition based upon an alleged lack of need for the new construction or that issues concerning the justification for expanding the pipeline require examination at a hearing, before a declaratory order approving the general framework for the project is granted.

(Emphasis added, footnotes omitted.) FERC did not explain how an unneeded pipeline can ever have reasonable rates, nor did it discuss the fact that pre-approval of a tariff structure tends to promote pipeline development because there is almost no risk that FERC will impose a tariff that does not allow a return on investment. In contrast to FERC, the Commission has "jurisdiction to grant certificates [of need] to oil pipelines or otherwise authorize or prevent construction, determining whether a pipeline is needed . . . ." Thus, the claims of SPPRC are relevant to this proceeding.

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[5] *Id.* at 7-9.
[6] Petition for Declaratory Order of North Dakota Pipeline Company, FERC Docket No. OR14-21-000. Order on Petition for Declaratory Order (May 15, 2014) at 9.

Flint Hills Resources, LP, ("Flint Hills"), which owns the 339,000 bpd Flint Hills Refinery in Rosemount, Minnesota, also filed comments in the same FERC docket (Attachment C).[7] While Flint Hills did not directly challenge the need for the Project, it did argue that it and other uncommitted shippers should "not bear financial responsibility for underutilization of the Sandpiper Project should shipper demand be less than NDPC anticipates . . . ."[8] Much of Flint Hill's comments relate to the financial risk resulting from underutilization of the Project. It seems unlikely that Flint Hills would focus on underutilization unless it anticipated a significant risk of it.

With regard to historical deliveries of U.S. Bakken Formation crude oil to Minnesota refineries by Line 81, FERC data filed by NDPC (and its predecessor) and the Minnesota Pipeline Company show the following quarterly deliveries[9]:

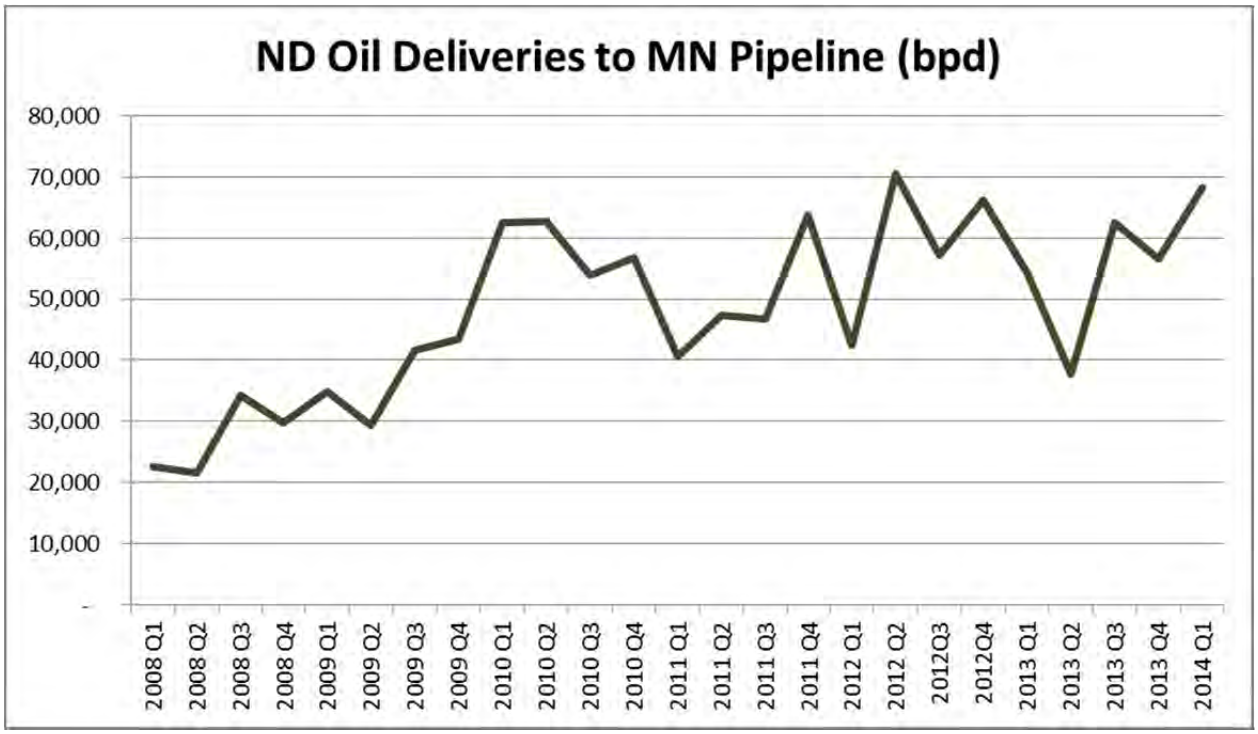

[7] *Petition for Declaratory Order of North Dakota Pipeline Company*, FERC Docket No. OR14-21-000. Comments of Flint Hills Resources, LP.
[8] *Id.* at 11
[9] This data is available at ferc.gov and comprises a substantial volume of material and therefore has not been attached hereto.

The data also shows that deliveries from North Dakota have been relatively stable for the past four years, ranging between approximately 50,000 bpd and 60,000 bpd, compared to a total refining capacity in the Twin Cities of 428,000 bpd. Assuming that Minnesota's refineries are operating at about 90% capacity, approximately 14% of the crude oil refined in Minnesota comes by pipeline from North Dakota. The average annual deliveries are shown below:

Year	BPD
Average 2010	58,993
Average 2011	49,650
Average 2012	59,087
Average 2013	51,569

The data filed at FERC by NDPC and the Minnesota Pipeline Company indicate that:

(1) the current capacity of the North Dakota Pipeline System (210,000 bpd) far exceeds historical deliveries to Minnesota refineries from North Dakota; and

(2) deliveries of North Dakota oil by pipeline to Minnesota are stable and show no sign of increasing.

NDPC has claimed that the Project will benefit Minnesota by providing redundant service to Clearbrook,[10] but the value, if any, of such redundant service appears low given that Minnesota's refineries have relied on the existing pipeline service from North Dakota for years and have not found it unreliable. FOH asserts that the benefit of such redundant service should not outweigh the risks to Minnesota's environment caused by the Project, and should not itself require service to the Clearbrook Terminal.

Taken together, the Protest filed by SPPRC and the FERC data indicate that Minnesota refineries do not need the Project such that connecting the Project to the Clearbrook Terminal is unnecessary. Although the Flint Hills refinery did not make as clear statements as SPPRC, it did

[10] CON Application, Section 7853.0230 at 5.

voice concerns about the risk of underutilization of the Project, including the risk that construction of the Project could unnecessarily increase Minnesota refinery costs. Such concern indicates that Flint Hills is likewise concerned about the future need for the Project. This position also suggests that there is no need for the Project route to pass through Clearbrook.

Moreover, NDPC has proposed to configure the Project so that no oil can be introduced into it from the Enbridge's Mainline System at Clearbrook. In the absence of a need to deliver crude oil to or receive oil at Clearbrook, there is no reason at all for the Project route to go through Clearbrook, except to the extent it might provide redundant service, which likely is of little to no value.

Given this information, the Commission should find that for the purposes of selecting alternative routes for further study, there is no need for such routes to connect to the Clearbrook Terminal. In fact, the evidence presented herein indicates that the Project could not be built at all or could bypass the Clearbrook Terminal without having any adverse impacts on Minnesota's refineries or Enbridge's downstream operations. Therefore, the Commission should find that connection to the Clearbrook Terminal and deliveries to Minnesota refineries are not a necessary component of the Project, such that it must consider "system alternatives" that do not include a connection to Clearbrook.

3. The Alleged Need for a Route Connection to the Superior Terminal

Evaluating the alleged need for the Project to end at the Superior Terminal is somewhat more complex, but can be understood through a systematic analysis of each of the downstream markets served by this terminal. The following provides a preliminary analysis. Although a full analysis of need will depend on completion of the contested case hearing under Minn. Stat. Ch. 216G, the purpose of the following analysis is to help the Commission gain an adequate

understanding of the customer needs alleged by NDPC in relation to the Superior Terminal, so that it can better understand why it must consider "system alternatives" that could feasibly meet Enbridge's alleged underlying purpose and need for the Project by connecting to other Mainline System terminals.

As noted, Enbridge can ship oil from the Superior Terminal directly to one refinery and three other terminals that serve differing refinery market. Specifically, from the Superior Terminal, Enbridge can ship crude oil:

1) via local pipeline to the Calumet Refinery in Superior, Wisconsin;
2) via Line 5 to the Sarnia Terminal in Ontario, which terminal serves a number of refineries in Sarnia, as well as refineries downstream in Detroit, Michigan, Warren, Pennsylvania, Nanticoke, Ontario, and Montreal, Quebec;
3) via Lines 6a, 14, and 64 to the Lockport Terminal in northern Illinois, that transfers oil for delivery to refineries in Illinois, Detroit, Ohio, the Sarnia Terminal and all the refineries served by it, as well as refineries in the Midwest and Gulf Coast; and
4) via Line 61 to the Flanagan Terminal in Illinois, which can serve essentially the same refineries as Lines 6a, 14, and 64, but which also has a higher capacity connection to the U.S. Gulf Coast.

The question before the Commission with regard to the Superior Terminal is whether this is the only delivery point on the Enbridge Mainline System that could feasibly serve the customer needs alleged by Enbridge. Each of the foregoing delivery options is discussed below, in turn.

Deliveries to the Calumet Refinery

The Calumet Refinery, which refines primary light crude oil, is one of the smallest in the U.S., with a rated capacity of only 45,000 bpd.[11] This capacity is dwarfed by the Mainline System's current light crude oil capacity of 1,254,300 bpd.[12] Thus, the Calumet Refinery is adequately served by existing light oil pipeline capacity to the Superior Terminal and does not itself justify a routing requirement that the Project terminate at the Superior Terminal.

Deliveries Via Line 5 to Sarnia, Ontario, and Downstream Refineries

Line 5 begins at the Superior Terminal and ends at the Sarnia Terminal in Ontario, Canada. However, Line 5 is not the only Enbridge pipeline to Sarnia, because Line 6b also terminates at Sarnia. Thus, it is possible to ship light crude oil to northern Illinois and then on to Sarnia.

It is not possible to ship crude oil from Sarnia further south than perhaps Toledo, Ohio, though it is not clear that all of the refineries in Toledo have access to this crude oil. Thus, Line 5 at most serves only three U.S. Midwestern refineries: the Detroit Marathon Refinery and the PBF and BP-Husky Refineries in Toledo, Ohio. To FOH's knowledge, none of these refineries has announced plans to refine greater amounts of light sweet crude oil, or to increase their overall capacity. Also, all of these refineries are also served by spurs off of Line 6b. and the Toledo refineries are also served by the Mid-Valley Pipeline from the south, such that the pipeline infrastructure that currently serves them is adequate to meet their needs. Thus, the evidence indicates that these refineries will have no increased demand for U.S. Bakken Formation crude oil, and to the extent that marginal increases might be needed, they are currently served by two other pipelines in addition to Line 5. As such, demand from these three

[11] CAPP North American Pipeline Map, Attachment A.
[12] Enbridge System Configuration, Attachment A.

Midwestern U.S. refineries does not justify increased shipments of U.S. Bakken Formation crude oil through the Superior Terminal on Line 5.

Crude oil shipped on Line 5 can also reach the small United Refining Refinery in Warren, Pennsylvania, but this refinery consumes mostly heavy crude oil and has no expansion plans. Therefore, this refinery, too, provides no justification to ship increased amounts of Bakken Formation crude oil to the Superior Terminal for transportation on Line 5.

Other than the foregoing U.S. refineries, Line 5 serves only eastern Canadian refineries. With regard to the need for increased shipments of Bakken Formation crude oil to eastern Canada, a group of NDPC's customers also filed a protest in Enbridge's FERC tariff case ("Shipper Protest") (Attachment D), in which they alleged that this need was specious.[13] The Shipper Protest includes the following statement about NDPC's claim that the Project serves refinery needs in eastern Canada:

> [NDPC's] suggestion that Bakken crude can break into the Eastern Canadian market is also fanciful. This region receives large quantities of its pipeline crude oil supplies from Western Canadian producers and Canadian producers view this area as a target market for their growing production. It is faulty economic logic to assume that those producers will permit their markets to be eroded by Bakken crude oil without taking responsive action. Furthermore, 330,000 bpd of Eastern Canadian refining capacity is not even connected to pipelines.[14]

(Emphasis added.) The Shipper Protest also states:

> there is no economic basis to [NDPC's] conclusion that the construction of the Sandpiper pipeline will permit Bakken crude oil to replace existing crude oil supplies to U.S. Mid-Continent and Eastern Canadian refineries. . . . these refineries are currently buying Western Canadian crude oil and Canadian producers will

[13] Petition for Declaratory Order of North Dakota Pipeline Company, FERC Docket No. OR14-21-000, Protest and Opposition and Renewed Motion to Intervene of Concord Energy LLC, Enserco Energy LLC, Enwest Marketing LLC and WPX Energy Marketing, LLC in Response to North Dakota Pipeline Company LLC Petition for Declaratory Order (March 14, 2014).
[14] *Id.* at 21.

> certainly not permit American Bakken crude deliveries to undercut their markets. In fact, . . . when faced with price competition in the past, Canadian producers have taken whatever measures they believed necessary to preserve their market. There is every reason to believe that they will continue to do so in the future, particularly in view of the long distance pipelines that TransCanada and Enbridge are building from Western Canadian crude oil fields to Eastern Canadian refineries.[15]

(Footnotes omitted.) In short, it is very unlikely that eastern Canadian refineries will demand U.S. Bakken Formation crude oil because they are already supplied by domestic Canadian crude oil producers. Moreover, all of the refineries served by pipeline in eastern Canada are owned by companies (Imperial Oil, Nova, Shell, and Suncor) that also own crude oil extraction facilities in the Tar Sands Region, such that they can buy crude oil from themselves. Therefore, it appears very unlikely that these eastern Canadian refineries will demand Bakken Formation crude oil deliveries through the Superior Terminal via Line 5.

With regard to Enbridge's alleged need to transport oil by pipeline to U.S. East Coast refineries, which are in New Jersey, Pennsylvania, and Delaware, this is not currently physically possible because none of these refineries are served by pipelines. The same is true for Canada's coastal refineries in Quebec City and St. John. Thus, it appears that deliveries to these refineries do not create a need to ship Bakken Formation crude oil through the Superior Terminal to Line 5.

Therefore, available evidence indicates that NDPC and Enbridge have no need to ship oil to the Superior Terminal for delivery via Line 5 to Sarnia, because none of the refineries served by Line 5 are likely to demand more or even any U.S. Bakken Formation crude oil. As such, the Commission should not assume that deliveries to the Superior Terminal for transportation on Line 5 are a substantial purpose of the Project.

[15] *Id.* at 35-36.

Deliveries Via Lines 6a, 14, and 64 to the Lockport Terminal in Northern Illinois

Shipments to the Superior Terminal can also be forwarded to the Lockport Terminal in northern Illinois via Lines 6a, 14, and 64, and from there on to refineries in the Chicago area. From the Chicago area, there are connections east on Line 6b to Toledo, Detroit, Sarnia, Warren, Pennsylvania, and eastern Canada; and connections south to Patoka, Illinois, from where pipelines continue to refineries in Toledo, Lima, Canton, and Catlettsburg, Ohio, Cushing, Oklahoma, and the U.S. Gulf Coast.

As previously discussed, the likelihood of increased demand for U.S. Bakken Formation crude oil shipments via the Lockport Terminal by refineries in Toledo, Detroit, or Sarnia, or in refineries downstream from Sarnia, is a best limited, if not "fanciful." Thus, these refineries do not provide a need for increased Bakken Formation crude oil deliveries to the Superior Terminal for delivery to the Lockport Terminal.

The other refineries directly served by the Lockport Terminal are three Chicago area refineries:

(1) BP's 413,000 bpd Whiting Refinery, which recently completed a major modification to allow it to process primarily heavy sour crude oil, such that it will likely demand much less light crude oil;

(2) Exxon Mobil's 250,000 bpd Joliet Refinery, which is configured to process primarily heavy sour crude oil; and

(3) PDV/CITGO's 180,000 bpd Lemont Refinery in Lemont, Illinois; which is also configured to process primarily heavy sour crude oil, originally from its parent corporation in Venezuela.

Due to the configuration of these refineries, it is doubtful that they will demand greater supplies of U.S. Bakken Formation crude oil. Thus, it is unlikely that Enbridge can show a need to ship U.S. Bakken Formation crude oil via the Superior and Lockport Terminals to these refineries.

It is also possible to ship crude oil from Chicago to the Patoka Terminal in southern Illinois on the 100,000 bpd Mustang Pipeline, for delivery to refineries in Ohio, the southern Midwest, and the U.S. Gulf Coast. However, the small size of the Mustang Pipeline means that relatively little crude oil can flow through the Superior and Lockwood Terminals to these more distant markets. Instead, it appears that Enbridge intends to serve these more distant markets via Line 61 and the Flanagan Terminal.

Therefore, service through the Superior Terminal on Lines 6a, 14, and 64 to the Lockwood Terminal, is mostly confined to refineries in the Chicago area, Toledo, Detroit, Sarnia, and refineries downstream from Sarnia. As previously discussed, none of these refineries are likely to demand greater quantities of light sweet U.S. Bakken Formation crude oil. Therefore, there appears to be little reason for Enbridge to need additional pipeline capacity from North Dakota to the Superior Terminal for service to these refineries. This conclusion is also supported by the opinion of an expert who provided a sworn declaration included in the Shipper Protest, which declaration states:

> As far as the U.S. Midwest– *i.e.*, Eastern PADD II – is concerned, there are 13 refineries located in Michigan, Illinois, Indiana, Kentucky, Tennessee and Ohio. These refineries collectively use approximately 2.5 million bpd of crude oil. In 2012, these refineries imported over 1.2 million bpd of crude oil. Ninety-seven percent of these imports were from Western Canada. Canadian crude oil producers delivered a total of approximately 1.7 million bpd into the entire American Midwest region in 2012. <u>I do not believe that there is any real possibility that Western Canadian producers will permit North Dakota Bakken crude oil to replace any of the crude oil Mid-Continent refiners are now receiving from</u>

> Western Canada. In fact, if anything, Western Canadian crude oil will occupy an increasing portion of this PADD II market.[16]

(Emphasis added, footnotes omitted.) Thus, a number of Enbridge's shippers also believe that demand in the eastern Midwest for U.S. Bakken Formation crude oil will at best remain stagnant, but will more like drop due to increased pressure from Canadian crude oil imports.

Therefore, the Commission should not assume that the Project needs to connect to the Superior Terminal to allow increased quantities of light sweet U.S. Bakken Formation crude oil to flow via Lines 6a, 14, and 64 and the Lockport Terminal to downstream refineries. Since the need for increased service to the Lockport Terminal is at best limited and at worst non-existent, the Commission should not require alternative routes to terminate at the Superior Terminal based on a need to provide service to the Lockport Terminal.

Deliveries Via Line 61 to the Flanagan Terminal in Northern Illinois

The largest potential new pathways for oil from the Superior Terminal are on either:

- Line 61 to the Flanagan Terminal, which has a maximum capacity of 1,200,000 bpd, but currently is rated at only 400,000 bpd; or
- the yet to be announced Line 66 project to the Flanagan Terminal, which will likely be an 800,000 bpd pipeline.

From the Flanagan Terminal, Enbridge can at present, or plans via expansions, to ship crude oil to:

1) the Chicago area and markets downstream from Chicago on Line 6b or the Mustang Pipeline;

[16] Shipper Protest, Exhibit D, Sworn Declaration of Robert P. Garner in Support of Enwest Marketing Llc's Protest and Opposition to North Dakota Pipeline Company LLC's Petition for Declaratory Order and Enwest's Motion to Intervene at 13.

2) the Patoka Terminal, which has connections to Ohio refineries, Wood River, and possibly the U.S. Gulf Coast (if Marathon reverses its Capline Pipeline); and

3) the Cushing Terminal, which has connections to a number of refineries in southern states, as well as to U.S. Gulf Coast refineries via the Seaway Pipeline.

Each of the foregoing shipping options is discussed below.

Although crude oil can or will be able to flow from the Flanagan Terminal to the Chicago area via Enbridge's planned Line 78, as previously discussed, the likelihood of increased shipments of U.S. Bakken Formation crude oil to these markets is limited or even non-existent. There are no pipelines from Chicago to the U.S. East Coast refineries, increased demand by eastern Canadian refineries for U.S. Bakken crude oil appears "fanciful," and the refineries in the upper and eastern Midwest are primarily configured to refine heavy crude oil, which is provided by competing Canadian crude oil suppliers, and these refineries have not announced any significant expansions of light sweet crude oil refining capacity.

In contrast, Enbridge's planned pipeline expansions from the Flanagan Terminal south on the Southern Access Extension or Flanagan South Pipeline suggest that Enbridge's primary target market for the Project is the lower Midwest or U.S. Gulf Coast. From the Flanagan Terminal, Enbridge plans to ship oil via the Southern Access Extension to the Patoka Terminal and from there to Ohio refineries on Marathon's MAP Pipeline, and possibly to the U.S. Gulf Coast should Marathon reverse its Capline Pipeline to Louisiana. It also plans to ship crude oil on the Flanagan South Pipeline to Cushing, Oklahoma, which has connections to a number of southern refineries and the U.S. Gulf Coast. Thus, the primary new crude oil pathways planned or being built by Enbridge all pass through the Flanagan Terminal, which is intended to serve refineries in Ohio, a number of southern states, and the U.S. Gulf Coast.

This conclusion is also supported by the recently filed Direct Testimony of Neil Earnest, which provides the following chart on page 48 of the attached Schedule 2 Report.

Figure 18

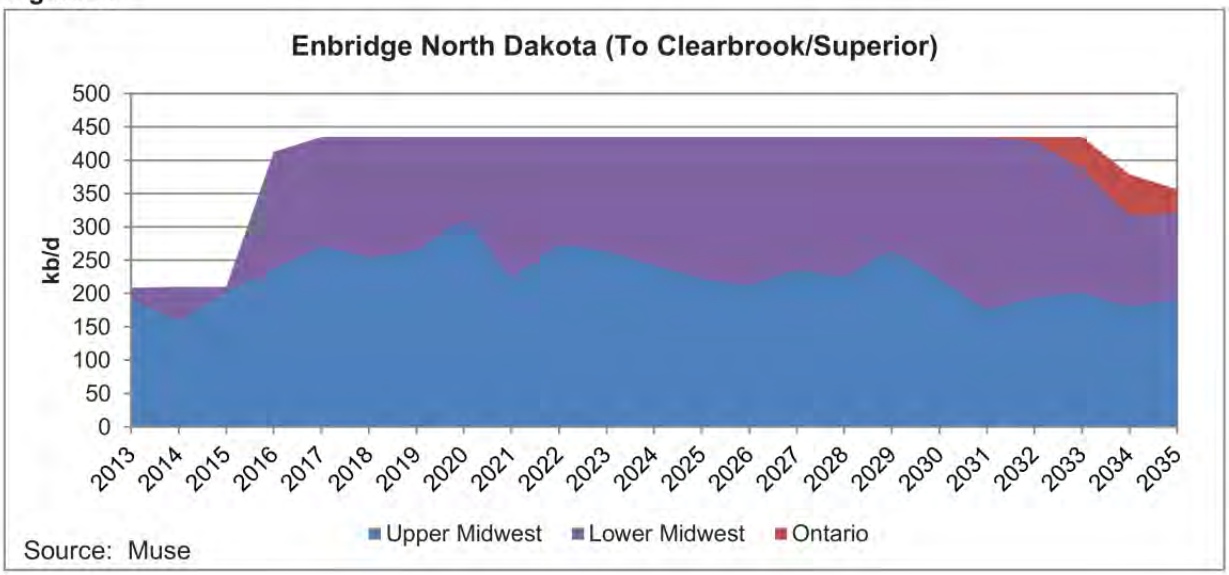

While FOH does not agree that the historical or forecast data on which this chart is based are accurate, it does show that almost all of the new markets that Enbridge hopes will use the Project are in the "Lower Midwest." It shows that currently Enbridge is shipping between 150,000 to 200,000 bpd of U.S. Bakken Formation crude oil to the "Upper Midwest" and almost none of this oil to the "Lower Midwest." This forecast predicts that shipments to the "Upper Midwest" will increase to an average of approximately 250,000 bpd and then decline. In contrast, it predicts that shipments of U.S. Bakken Formation crude oil to the "Lower Midwest" will increase from current levels of 25,000 bpd or less to about 225,000 bpd. Thus, this chart reinforces FOH's contention that <u>the primary purpose for the Project anticipated by NDPC and Enbridge is to ship more Bakken Formation crude oil to the Flanagan Terminal for shipment south</u>.

This chart also confirms the contention in the SPPRC and Shipper Protests that shipments to eastern Canadian refineries are unlikely, because it shows no forecasted shipments to Ontario refineries until about 2032, which is far enough in the future to make such shipments entirely speculative.

To the extent that Enbridge hopes to ship crude oil to Ohio refineries, its best route is not through the Lockport Terminal and Chicago, but via the Flanagan Terminal and the planned Southern Access Extension to Patoka and then on Marathon's MAP Pipeline System to the Ohio Refineries.

Thus, the underlying need hoped for by NDPC and Enbridge is not primarily to deliver more oil through Lines, 5, 6a, 14, and 64 to the Sarnia, Lockwood and Chicago area Terminals, but rather on Lines 61 and 66 to the Flanagan Terminal for delivery through the Patoka and Cushing Terminals to markets to the south.

Given this underlying alleged need to move oil to the Flanagan Terminal, it is reasonable for the Commission to investigate "system alternative" options that serve the Flanagan Terminal, because such alternatives could meet most if not all of Enbridge's underlying alleged need.

B. The Commission Must Select One or More Routes that Connect to the Flanagan Terminal and Avoids Minnesota's Pristine Aquatic Resources, Because Such Route Would Meet Most if Not All of Enbridge's Alleged Underlying Need and Likely Reduce Environmental Impacts

In response to the Commission's January 31, 2014, Notice of Application Acceptance and Public Information Meetings, FOH volunteers proposed a number of alternative routes, including the routes enumerated by the Department of Commerce Report dated July 17, 2014, ("DOC Report") as SA-04, SA-05, SA-06, SA-07, and SA-08. In addition, Honor the Earth proposed a route that followed Interstate 29 to Interstate 94 through Minnesota, and the

Minnesota Pollution Control Agency ("PCA") proposed route SA-03 and voiced support for consideration of other routes through central Minnesota.

The general policy intent of these routes was to avoid going through Minnesota's most pristine aquatic and wild rice while still providing crude oil transportation service to northern Illinois. It is true that these routes are not technically specific and were based on uncertainty about Enbridge's alleged commercial need for its Project, but the Commission should not expect citizens to provide alternative routes with the same level of precision as that possessed by NDPC and Enbridge. Instead, FOH suggests that the Commission understand that its purpose should be to focus on the underlying policy goals of citizen commenters and then direct the Department of Commerce to develop more precise alternative routes that meet these goals.

Moreover, the Commission should consider these routes in light of the June 25, 2014, approval by the North Dakota Public Service Commission of a route through North Dakota, because this approval did not exist during Minnesota's routing comment period. Should this approval have been made before or during Minnesota's comment routing comment period, citizens would have adapted their routes to it. The Commission has the discretion to recognize this recent development and modify previously proposed routes accordingly.

1. FOH Combined Routes

After reviewing all of its own proposed routes, as well as the routes proposed by Honor the Earth and the PCA, in light of the North Dakota approval, the DOC Route Report, and the more detailed need analysis presented in these comments, FOH proposes that the Commission adapt different elements of the various proposals into an alternative route or routes that likely meet the policy goals of the citizen commenters, as well as many Minnesotans, while still

meeting most if not all of Enbridge's alleged need. Specifically, FOH proposes the following combined route alternatives:

a) **Combined SA-03, SA-07, and SA-04 Route**: Due to the completion of the North Dakota Public Service Commission routing process, FOH proposes to start SA-04 at the terminus of the North Dakota route and then follow SA-03 south along the Viking Pipeline to the point where the Viking Pipeline turns east. At his point, this proposed alternative route would continue south to the Magellan Pipeline and follow it to the SA-04 route (Alliance Pipeline), from where it would follow the Alliance Pipeline to northern Illinois and ultimately the Flanagan Terminal. The policy purpose of this route is to combine the SA-03, SA-07, and SA-04 routes so as to recognize the North Dakota approval and follow existing pipeline corridors to the maximum extent possible while avoiding northern Minnesota's aquatic resources and providing crude oil transportation service to northern Illinois.

b) Combined SA-03 and SA-08 Route Extended Through Wisconsin:

This proposed route is intended to acknowledge the decision of the North Dakota Public Service Commission by entering Minnesota at the terminus of the approved route in North Dakota, then following SA-03 south along the Viking Pipeline to the point that it turns east, and continuing south from there to the SA-07/SA-08 routes, at which point the route would follow the Magellan Pipeline to into central Wisconsin, to a connection with Line 61. The policy purpose of this route is to combine the SA-03, SA-07, and SA-08 routes so as to follow existing pipeline corridors to the maximum extent possible while avoiding northern Minnesota's aquatic resources and providing crude oil transportation service to northern Illinois.

c) Combined SA-03, SA-07, and Wood River Pipeline Route:

This proposed route is intended to acknowledge the decision of the North Dakota Public Service Commission by entering Minnesota at the terminus of the approved route in North Dakota, then following SA-03 south along the Viking Pipeline to the point that it turns east. At this point, this proposed alternative route would continue south to the Magellan Pipeline and follow it to the terminus of the Wood River Pipeline, from where Enbridge would purchase and use the Wood River Pipeline to transport crude oil to its Flanagan South Pipeline and/or Wood River. The policy purpose of this route is to combine the SA-03, SA-07, and currently mothballed Wood River Pipeline so as to follow existing pipeline corridors to the maximum extent possible and fully utilize existing pipeline infrastructure within the state while avoiding northern Minnesota's aquatic resources and providing crude oil transportation service to central Illinois. Although the Wood River Pipeline has been discussed by a number of commenters, FOH believes the Commission would be remiss if it did not at least investigate why an existing unused pipeline through Minnesota that could serve much of the need alleged by Enbridge is not being used by the industry.

2. The Environmental Advantages of FOH's Proposed Combined Routes Relative to the NDPC Preferred Route

As previously described in FOH written and oral comments, the NDPC proposed route cuts through the heart of Minnesota's pristine lake county, Mississippi River headwaters, and the wild rice that grows abundantly in this region. In addition, it impacts sensitive soil types and ground water resources. In contrast, the routes proposed by citizens and the PCA seek to avoid these impacts while continuing to serve Enbridge's alleged commercial need for the Project. The following maps show with great clarity that NDPC's proposed route puts critical environmental resource at risk.

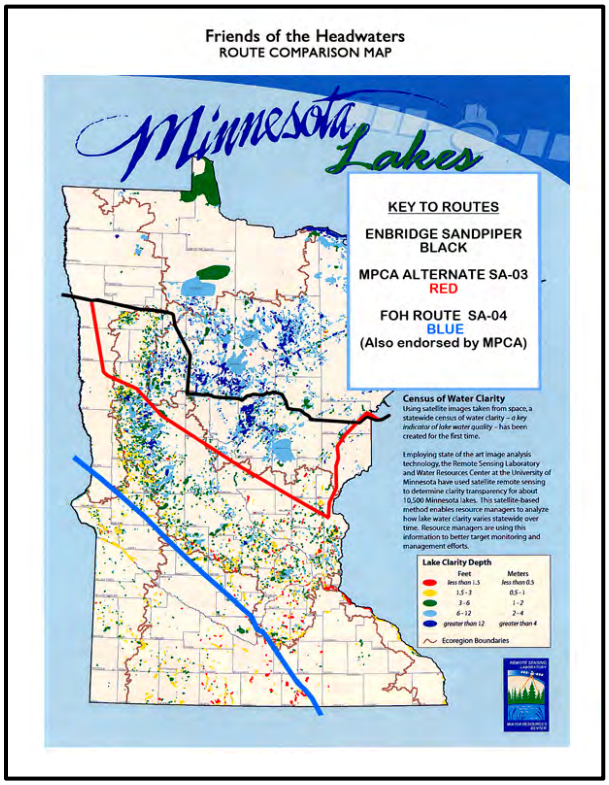
Friends of the Headwaters
ROUTE COMPARISON MAP
Minnesota Lakes
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(Also endorsed by MPCA)
Census of Water Clarity
Using satellite images taken from space, a statewide census of water clarity – a key indicator of lake water quality – has been created for the first time.
Employing state of the art image analysis technology, the Remote Sensing Laboratory and Water Resources Center at the University of Minnesota have used satellite remote sensing to determine clarity transparency for about 10,500 Minnesota lakes. This satellite-based method enables resource managers to analyze how lake water clarity varies statewide over time. Resource managers are using this information to better target monitoring and management efforts.
Lake Clarity Depth
Feet
Meters
less than 1.5
less than 0.5
1.5 - 3
0.5 - 1
3 - 6
1 - 2
6 - 12
2 - 4
greater than 12
greater than 4
Ecoregion Boundaries

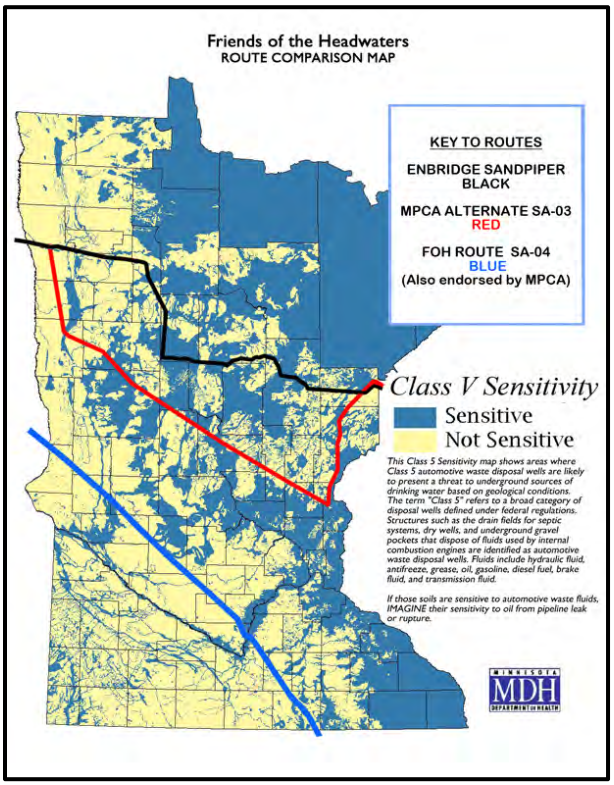
Friends of the Headwaters
ROUTE COMPARISON MAP
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(Also endorsed by MPCA)
Class V Sensitivity
Sensitive
Not Sensitive
This Class 5 Sensitivity map shows areas where Class 5 automotive waste disposal wells are likely to present a threat to underground sources of drinking water based on geological conditions. The term "Class 5" refers to a broad category of disposal wells defined under federal regulations. Structures such as the drain fields for septic systems, dry wells, and underground gravel pockets that dispose of fluids used by internal combustion engines are identified as automotive waste disposal wells. Fluids include hydraulic fluid, antifreeze, grease, oil, gasoline, diesel fuel, brake fluid, and transmission fluid.
If those soils are sensitive to automotive waste fluids, IMAGINE their sensitivity to oil from pipeline leak or rupture.
MINNESOTA
MDH
DEPARTMENT OF HEALTH

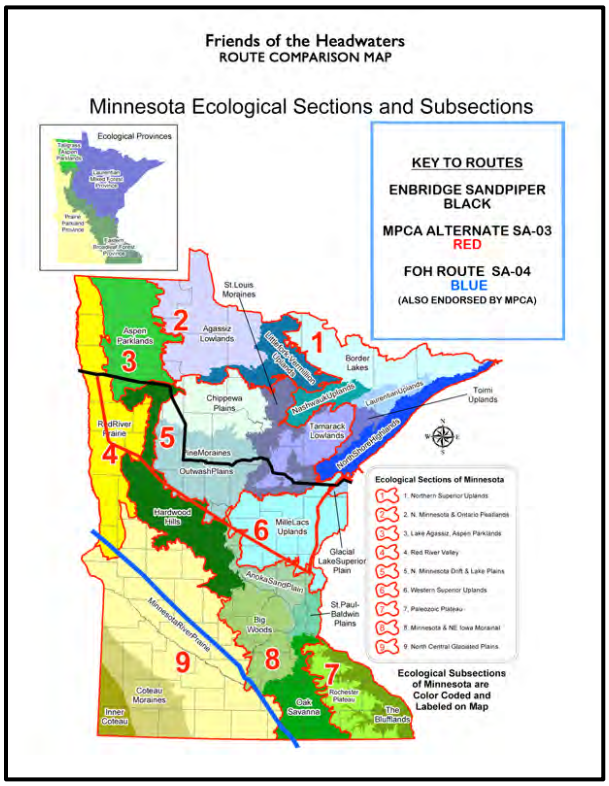
Friends of the Headwaters
ROUTE COMPARISON MAP
Minnesota Ecological Sections and Subsections
Ecological Provinces
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(ALSO ENDORSED BY MPCA)
St.Louis Moraines
Agassiz Lowlands
Aspen Parklands
Border Lakes
Chippewa Plains
Nashwauk Uplands
Laurentian Uplands
Toimi Uplands
Tamarack Lowlands
Upper Red Lake Peatlands
RedRiver Prairie
OutwashPlains
Hardwood Hills
MilleLacs Uplands
Glacial LakeSuperior Plain
AnokaSandPlain
St.Paul-Baldwin Plains
Big Woods
MinnesotaRiverPrairie
Coteau Moraines
Inner Coteau
Oak Savanna
Rochester Plateau
The Blufflands
Ecological Sections of Minnesota
1. Northern Superior Uplands
2. N. Minnesota & Ontario Peatlands
3. Lake Agassiz, Aspen Parklands
4. Red River Valley
5. N. Minnesota Drift & Lake Plains
6. Western Superior Uplands
7. Paleozoic Plateau
8. Minnesota & NE Iowa Morainal
9. North Central Glaciated Plains
Ecological Subsections of Minnesota are Color Coded and Labeled on Map

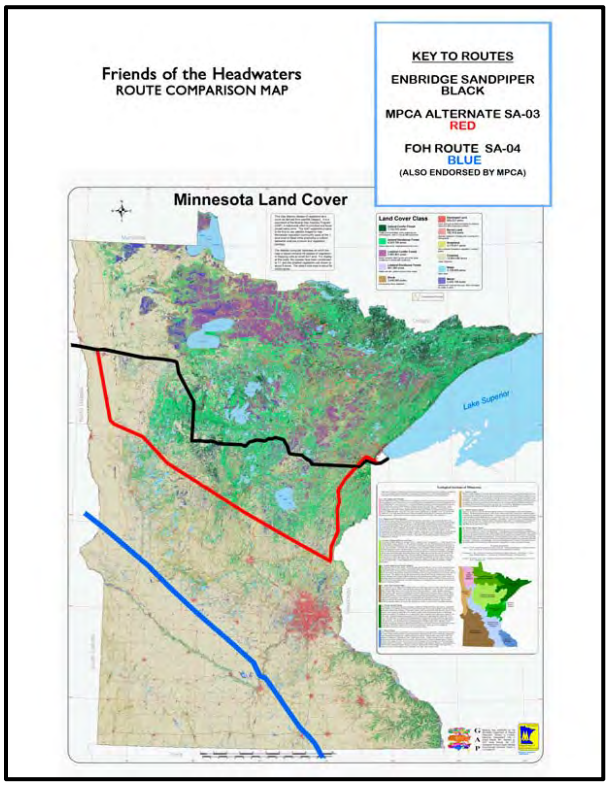
Friends of the Headwaters
ROUTE COMPARISON MAP
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(ALSO ENDORSED BY MPCA)
Minnesota Land Cover
Land Cover Class
Lake Superior

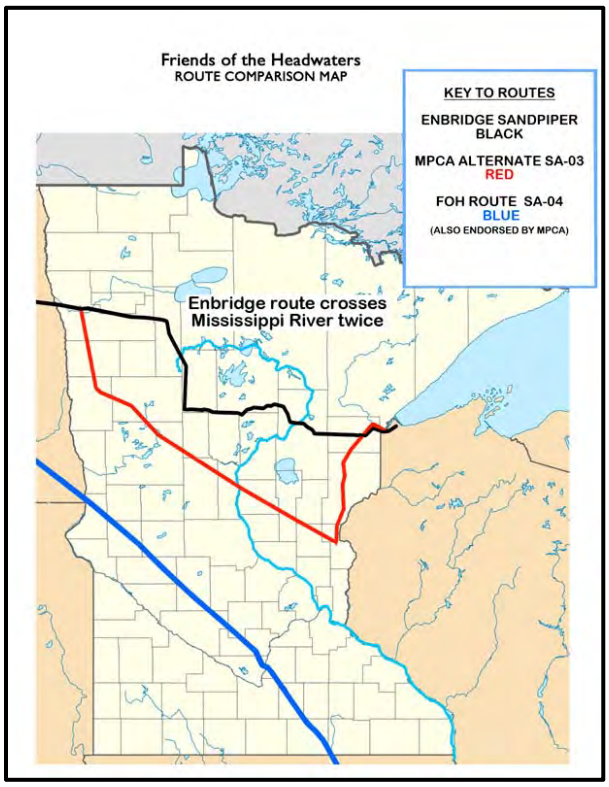
Friends of the Headwaters
ROUTE COMPARISON MAP
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(ALSO ENDORSED BY MPCA)
Enbridge route crosses
Mississippi River twice

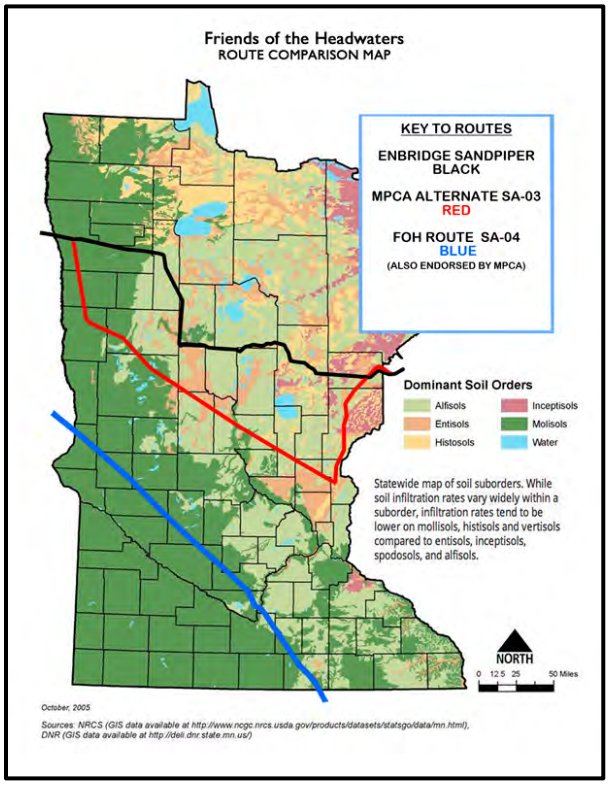
Friends of the Headwaters
ROUTE COMPARISON MAP
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(ALSO ENDORSED BY MPCA)
Dominant Soil Orders
Alfisols
Inceptisols
Entisols
Mollisols
Histosols
Water
Statewide map of soil suborders. While soil infiltration rates vary widely within a suborder, infiltration rates tend to be lower on mollisols, histisols and vertisols compared to entisols, inceptisols, spodosols, and alfisols.
NORTH
0 12.5 25 50 Miles
October, 2005
Sources: NRCS (GIS data available at http://www.ncgc.nrcs.usda.gov/products/datasets/statsgo/data/mn.html),
DNR (GIS data available at http://deli.dnr.state.mn.us/)

While it is true that all routes have an impact, it is also true that some routes have fewer environmental impacts than others. The foregoing maps make clear that the NDPC preferred route has far more significant impacts to treasured resources then the alternatives proposed herein. According, if one or more proposed routes appear to be feasible to the extent that they could reasonably be expected to substantially meet the need alleged by the NDPC, then MEPA requires that the Commission include them for consideration within the Comparative Environmental Analysis ("CEA").

3. The Economic Merits of the Various Routes to the Flanagan Terminal Are Uncertain and Require Consideration of the Cost of the Line 61 and 66 Projects in Comparison to SA-04

It seems likely that NDPC will continue to present economic evidence related to the alternative routes in an effort to convince the Commission that they are not feasible. FOH understands that MEPA requires consideration of alternatives without requiring detailed economic analysis ahead of time. Instead, the CON docket is intended to address economic analysis, such that the Commission should not base its routing decision for the CEA on economic data provided by Enbridge. Moreover, consideration of such data would be entirely unfair to citizens who do not have access to Enbridge's level of financial, personnel, and data resources.

II. What Is the Legal Basis for Determining Whether a System Alternative Should Be Considered in the Certificate of Need Proceeding?

The CON process is required by Minn. Stat. § 216B.243. This law does not expressly describe the range of alternatives that must be considered by the Commission. Due to the legislature's confusing decision to apply what was historically a law written for electric power line siting to underground pipelines, much of the language in this section relates poorly to the decision at hand. The only language in it that relates to the Commission's obligation to consider alternatives is in Subd. 3(6), which states in relevant part:

> No proposed large energy facility shall be certified for construction . . . unless the applicant has otherwise justified its need. In assessing need, the commission shall evaluate:
> (6) possible alternatives for satisfying the energy demand or transmission needs including but not limited to potential for increased efficiency and upgrading of existing energy generation and transmission facilities . . . .

In an effort to interpret this law, the Commission promulgated Minn. R. Ch. 7853. It also does not provide significant guidance with regard to the scope of alternatives that the Commission must consider. Part 7853.0120 requires that the Commission "consider only those alternatives proposed before the close of the public hearing and for which there exists substantial evidence on the record with respect to each of the criteria listed in part 7853.0130." Thus, this Part limits the Commission's consideration to (1) alternatives proposed before the end of the hearing, (2) for which substantial evidence exists with regard to the criteria listed in Part 7853.0130.

Part 7853.0130 states in relevant part:

> A certificate of need shall be granted to the applicant if it is determined that:
>
> * * *
>
> B. a more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record by parties or persons other than the applicant, considering:
> (1) the appropriateness of the size, the type, and the timing of the proposed facility compared to those of reasonable alternatives;
> (2) the cost of the proposed facility and the cost of energy to be supplied by the proposed facility compared to the costs of reasonable alternatives and the cost of energy that would be supplied by reasonable alternatives;
> (3) the effect of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives; and
> (4) the expected reliability of the proposed facility compared to the expected reliability of reasonable alternatives;

However, when read in light of Part 7853.0120, it is clear that this language does not apply to a pre-determination of the alternatives that must be considered in the CEA, because parties that propose alternatives have until the "close of the public hearing" to meet this burden.

Minn. Stat. § 216B.243 and Minn. R. Ch. 7853 are not the only laws that govern the CON process. As more fully discussed in the FOH August 5 Comments, the Commission must prepare an environmental review for the CON decision, as well as the routing decision. Under MEPA, an EIS or alternative form of review must be prepared for "major governmental actions" "where there is potential for significant environmental effects" resulting from the action. Minn. Stat. § 116D.04, Subd. 2a. In this regard, Minn. Stat. § 116D.04, Subd. 1a(d), defines "governmental action" as activities, including projects wholly or partially conducted, permitted, assisted, financed, regulated, or approved by units of government . . . ." A key policy component of the MEPA process is "[a]n early and open process" "to determine . . . the alternatives which are appropriate for consideration in the statement." Minn. Stat. § 116D.04, Subd. 2a(f).

Here, granting a CON is a "major governmental action" within the meaning of MEPA, such that a decision under it requires an environmental review of the environmental impacts related to the Commission CON decision. The plain language of Minn. R. Ch. 7853 demonstrates that the Commission must consider environmental impacts within the CON docket. *See, e.g.*, Minn. R. 7853.0130(B)(3); 7853.0130(C)(2),(4); and 7853.0600 to 0800. Therefore, it cannot be argued that the Commission's decision in the CON docket has no environmental impacts. The Commission may choose to conduct a separate Environmental Impact Statement ("EIS") for the CON docket, or it may choose to include consideration of CON issues in its CEA, but it cannot ignore MEPA as it applies to the CON docket.

Thus, the answer to the Commission's question about "the legal basis for determining whether a system alternative should be considered" at this phase of the proceeding depends not on Minn. Stat. § 216B.243 or Minn. R. Ch. 7853, but on MEPA.

Moreover, to avoid irreparable conflicts between these laws, the Commission must simply ensure that its scoping process for the CEA considers not only route permit alternatives, but also non-route alternatives. Unfortunately, the Commission has not fully addressed its responsibilities in this regard and has chosen to elicit comments on only route alternatives. To rectify this situation, the Commission must open its docket to allow scoping related to the CON docket. After it identifies both route and non-route alternatives, the DOC-EERA will be able to complete a CEA or EIS that fully complies with MEPA.

Therefore, at this phase of this proceeding, the law that applies to the Commission's decision about the range of alternatives to consider is governed by MEPA. After the close of the public hearing, the Commission has discretion to disregard those alternatives that are not supported by substantial evidence. But, the Commission may not apply this "substantial evidence" test now, because the public hearing process has just begun.

III. What is the legal basis for determining whether a system alternative should be considered in the route permit proceeding?

The routing permit law, Minn. Stat. § 216G, does not specify the alternatives that must be considered by the Commission. Likewise, Minn. R. Ch. 7852 does not specify the alternatives that the Commission must consider. Instead, it states:

> A comparative environmental analysis of all of the pipeline routes accepted for consideration at public hearings shall be prepared by the commission staff or by the applicant and reviewed by the commission staff. This comparative environmental analysis must be submitted as prefiled testimony as required by part 1405.1900.

By reference the "comparative environmental analysis," the regulation makes clear that it defers to the policy standards for alternative review under MEPA Section. § 116D.04, Subd. 4a, including the policy standards for selection of alternatives. These policy standards are described more fully in the FOH August 5 Comments at 23-27.

Thus, the legal basis for determining whether a system alternative should be considered in the Commission's routing permit proceeding is the standard for alternative review provided by MEPA.

IV. CONCLUSION

For the foregoing reasons, FOH respectfully requests that the Commission issue an order:

1) requiring consideration of a route or routes that do not pass through northern Minnesota yet still serve the underlying need alleged by Enbridge;
2) directing the DOC-EERA to include consideration in the CEA those reasonable alternatives proposed by parties in the CON docket; and
3) directing the DOC-DER to consider all routes evaluated by the CEA to be alternatives in the CON docket.

Date: August 21, 2014

Respectfully submitted,

/s Paul C. Blackburn
Attorney for Friends of the Headwaters
P.O. Box 17234
Minneapolis, MN 55417
Phone: 612-599-5568
Bar No. 0391685

ATTACHMENT A

ATTACHMENT B

ATTACHMENT C

ATTACHMENT D

CAPP
CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS
For Information Contact: (403) 267-1141 / www.capp.ca

Vancouver to:
Japan - 4,300 miles
Taiwan - 5,600 miles
S.Korea - 4,600 miles
China - 5,100 miles

San Francisco - 800 miles
Los Angeles - 1,100 miles

2013 Canadian Crude Oil Production

	000 m³/d	000 b/d
British Columbia	6	40
Alberta	421	2,651
Saskatchewan	77	487
Manitoba	8	51
Northwest Territories	2	11
Western Canada	515	3,241
Eastern Canada	37	232
Total Canada	**552**	**3,473**

Pipeline Tolls for Light Oil (US$ per barrel)

Edmonton to	
Burnaby (Trans Mountain)	2.55
Anacortes (Trans Mountain/Puget)	2.80
Sarnia (Enbridge)	4.00
Chicago (Enbridge)	3.60
Wood River (Enbridge/Mustang/Capwood)	5.00
USGC (Enbridge/Spearhead/Seaway)	7.65*
Hardisty to	
Guernsey (Express/Platte)	1.60*
Wood River (Express/Platte)	1.95*
Wood River (Keystone)	4.70**
USGC (Keystone/TC Gulf Coast)	7.00**
USEC to Montréal (Portland/Montréal)	1.50
St. James to Wood River (Capline/Capwood)	1.25

Pipeline Tolls for Heavy Oil (US$ per barrel)

Hardisty to:	
Chicago (Enbridge)	4.05
Cushing (Enbridge/Spearhead)	5.20
Cushing (Keystone)	6.15**
Cushing (Keystone)	6.50*
Wood River (Enbridge/Mustang/Capwood)	5.85
Wood River (Keystone)	5.35**
Wood River (Express/Platte)	2.40*
USGC (Enbridge/Spearhead/Seaway)	8.65*
USGC (Keystone/TC Gulf Coast)	7.95**

Notes 1) Assumed exchange rate = 0.92 US$ / 1C$ (May 2014 average)
2) Tolls rounded to nearest 5 cents
3) Tolls in effect July 1, 2014

* 10-year committed toll
**20-year committed toll

Canadian and U.S. Crude Oil Pipelines and Refineries

Area Refineries - Capacities as at Jun 1 , 2014 (in '000s barrels per day)

PADD **Petroleum Administration for Defense District**

Major Existing Crude Oil Pipelines carrying Canadian crude oil

Selected Other Crude Oil Pipelines

Upgraders
Syncrude (Fort McMurray) 465
Suncor (Fort McMurray) 438
Shell (Scotford) 240
CNRL Horizon 135
OPTI/Nexen Long Lake 72

Prince George
Husky 12

Vancouver
Chevron 55

Puget Sound
BP (Cherry Pt) 234
Phillips 66 (Ferndale) 100
Shell (Anacortes) 150
Tesoro (Anacortes) ... 120
US Oil (Tacoma) 39

Great Falls
Calumet MT Rfg 10

Billings
CHS (Laurel) 57
Phillips 66 58
ExxonMobil 60

San Francisco
Chevron 257
Phillips 66 120
Shell 160
Tesoro 166
Valero 170

Wyoming
Little America (Casper) 20
Sinclair Oil (Sinclair) 80
Wyoming (Newcastle) 14
HollyFrontier (Cheyenne) 52

Salt Lake City
Big West 35
Chevron 45
HollyFrontier 31
Tesoro 58

Denver/Commerce City
Suncor 98

Bakersfield
Kern Oil 26
San Joaquin 15

Los Angeles
Alon USA 94
Tesoro (Carson) 266
Chevron 290
ExxonMobil 155
Phillips 66 139
Tesoro (Wilmington) 97
Valero 135

Oklahoma
Phillips 66 (Ponca City) 187
HollyFrontier (Tulsa) 125
Coffeyville Res. (Wynnewood) 70
Valero (Ardmore) 90

Borger/McKee
WRB 146
Valero 170

New Mexico/W. Texas
Western Refining (El Paso) 128
HollyFrontier (Artesia) 100
Alon (Big Spring) 70

Three Rivers
Valero 100
Corpus Christi
CITGO 165
Flint 300
Valero 325

Sweeny
Phillips 66 247

Houston/Texas City
PRSI (Pasadena) 117
Marathon (Galveston) 451
Shell (Deer Park) 340
ExxonMobil 584
Houston Refining 268
Marathon 80
Valero (2) ..... 160+245

Tyler
Delek 60

Edmonton
Imperial 187
Suncor 142
Shell 100
Lloydminster
Husky 29
Husky Upgrader 82

Regina
Co-op Refinery/ Upgrader 135
Moose Jaw
Moose Jaw 19

Mandan
Tesoro 71

St. Paul
Flint Hills 339
Northern Tier 82

Kansas
NCRA (McPherson) 85
HollyFrontier (El Dorado) .. 135
Coffeyville Res(Coffeyville) 115

Superior
Calumet 45

Chicago
BP 413
ExxonMobil 250
PDV 180

Sarnia
Imperial 121
Nova 80
Shell 77
Suncor 85
Nanticoke
Imperial 112

Montréal/Québec
Suncor 137
Valero 265

Detroit
Marathon 120

Warren
United 70

Wood River
WRB 314
Robinson
Marathon 206
Mt Vernon
Countrymark 27

Ohio
BP-Husky (Toledo) 160
PBF (Toledo) 170
Marathon (Canton) 80
Husky (Lima) 160
Marathon (Catlettsburg) 240

Memphis
Valero 195
El Dorado
Delek 80

Mississippi
Chevron (Pascagoula) 330
Alabama
Hunt (Tuscaloosa) 72
Shell (Saraland) 85

Mississippi River
ExxonMobil (Baton Rouge) 503
Chalmette 192
Marathon (Garyville) 522
Motiva (Convent) 235
Motiva (Norco) 220
Valero (Norco) 270
Valero (Meraux) 135
Phillips 66 (Belle Chasse) 247
Alon (Krotz Springs) 83
Shell (St. Rose) *idled* 55
Placid (Port Allen) 60

Port Arthur/Beaumont
ExxonMobil 365
Motiva 600
Valero 310
Total 174

Lake Charles
CITGO 425
Phillips 66 239
Calcasieu 75

Pennsylvania
Monroe Energy 185
Phil. Energy Solutions 330

New Jersey
Phillips 66 (Bayway) 285
PBF (Paulsboro) 180
Axeon SP (Paulsboro) 70
Delaware
PBF (Delaware City) 190

Newfoundland & Labrador
North Atlantic 115

Saint John
Irving 320

Come by Chance
Hibernia
White Rose
Hebron
Terra Nova

Pipeline System Configuration

Quarter 1, 2013

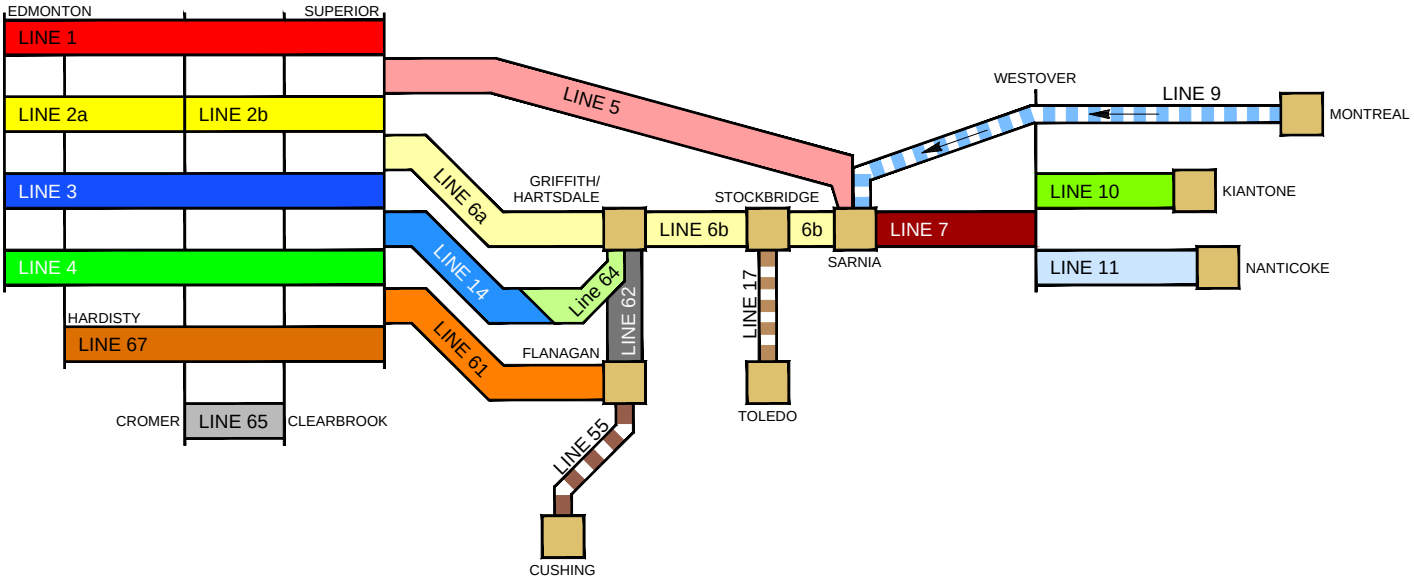

Line 1

37,600 m^3/d (236.5 kbpd)
18"/20" - 1098 miles
NGL
Refined Products
Light Synthetics

Line 2

Line 2a
70,300 m^3/d (442.2 kbpd)
24" - 596 miles
Line 2b
70,300 m^3/d (442.2 kbpd)
24"/26" - 502 miles
Condensates
Light Synthetics
Sweet
Light & High Sour

Line 3

62,000 m^3/d (390.0 kbpd)
34" - 1098 miles
Condensates (Edmonton to Hardisty)
Light Synthetics
Sweet
Light & High Sour

Line 4

126,500 m^3/d (795.7 kbpd)
36"/48" - 1098 miles
Heavy
Medium (Ex-Clearbrook)
Light Sour (Ex-Clearbrook)

Line 5

78,100 m^3/d (491.2 kbpd)
30" - 645 miles
NGL
Light Synthetics
Sweet
Light & High Sour

Line 6

Line 6a
106,000 m^3/d (666.7 kbpd)
34" - 467 miles
Line 6b
45,000 m^3/d (283.0 kbpd)
30" - 293 miles
Light Synthetics (Superior to Lockport)
Sweet (Superior to Lockport)
Light & High Sour
Medium
Heavy

Line 7

23,900 m^3/d (150.3 kbpd)
20" - 120 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 65

29,500 m^3/d (185.6 kbpd)
20" - 313 miles
Light Sour
Medium

Line 10

11,800 m^3/d (74.2 kbpd)
12"/20" - 91 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 11

18,600 m^3/d (117.0 kbpd)
16"/20" - 47 miles
Condensates
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 62

20,700 m^3/d (130.2 kbpd)
22" - 75 miles
Heavy

L 14 / L 64

50,500 m^3/d (317.6 kbpd)
24" - 467 miles
Light Synthetics
Sweet
Light & High Sour
Medium

Line 61

63,600 m^3/d (400.0 kbpd)
42" - 454 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 67

71,500 m^3/d (449.7 kbpd)
36" - 999 miles
Heavy

Not Part of the Enbridge Mainline System

Line 9

38,200 m^3/d (240.3 kbpd)
30" - 524 miles
Condensates
Sweet
Medium
Light & High Sour

Line 17

16,000 m^3/d (100.6 kbpd)
16" - 88 miles
Heavy

Line 55

30,700 m^3/d (193.3 kbpd)
22"/24" - 575 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

NOTES:

Capacities provided are Annual Capacities and do not include current restrictions.

Updated: January 2013
File: 2013_Q1 System Config.dwg

Revised by: YZ
Drawn by: DRD

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATION COMMISSION

North Dakota Pipeline Company LLC Docket No. OR14-21-000

PROTEST OF ST. PAUL PARK REFINING CO. LLC

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March 14, 2014

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATION COMMISSION

North Dakota Pipeline Company LLC Docket No. OR14-21-000

PROTEST OF ST. PAUL PARK REFINING CO. LLC

1. Pursuant to Rule 211 and to the Notice of Petition for Declaratory Order issued herein on February 19, 2014, St. Paul Park Refining Co. LLC ("SPPRC") hereby protests the petition for declaratory order ("Petition") filed herein by North Dakota Pipeline Company LLC ("NDP") on February 12, 2014. The petition of NDP seeks certain advance rulings on the rate treatment for a proposed expansion and extension of its pipeline system known as the "Sandpiper Project." The proposed project would include a new pipeline installed alongside the existing NDP pipeline from Beaver Lodge, ND to Clearbrook, MN. Petition at 14-16. NDP proposes to recover the cost of the new parallel pipeline by charging uncommitted shippers to Clearbrook and beyond a surcharge styled as an "Expansion Rate Component." Petition at 28-29.

2. SPPRC protests NDP's request for approval of the proposed Expansion Rate Component to be imposed on shippers, such as SPPRC, which take delivery at the Clearbrook destination point. Contrary to the Petition, this Protest demonstrates that the proposed expansion pipeline and expansion surcharge (a) are not needed, (b) do not have broad shipper support, (c) will provide no benefit to shippers taking delivery at Clearbrook, and (d) are not based on any intelligible cost allocation or rate design. Accordingly, the Commission should deny the Petition. If the Petition is not denied, the

Commission should refer the Petition to an Administrative Law Judge for discovery and hearing.

The Petition of NDP

3. According to NDP, the current pipeline from Beaver Lodge to Clearbrook has a capacity of 210,000 bpd, but has been curtailed temporarily to 170,000 bpd by a pipeline integrity program. Petition at 12. The new parallel pipeline to Clearbrook would add 230,000 bpd so that the combined pipeline system would have a capacity of 440,000 bpd. Petition at 15. The proposed Expansion Rate Component would be designed to recover the cost of service of the new pipeline at the time of start-up, calculated pursuant to the Commission's Opinion No. 154-B methodology and using design capacity as the initial throughput assumption.

4. NDP states that it conducted an open season through which it obtained Transportation Services Agreements ("TSAs") containing ship-or-pay commitments for 155,000 bpd. Those commitments represent 35 percent of the new combined pipeline capacity to Clearbrook. Petition at 23. NDP acknowledges that the "anchor shipper" for the project is Marathon Petroleum Corporation ("Marathon"), which is also a part-owner of NDP through a subsidiary company. *Id*. NDP does not disclose the volume commitment contained in the TSA executed by Marathon.

5. NDP's claim that the Sandpiper Project is needed is based on a study by Muse Stancil & Co. ("Muse") entitled "Market Prospects and Benefits Analysis for the Sandpiper Project" dated February 2014 ("Muse study"). The Muse study purports to show that the expanded pipeline system would operate at capacity during its entire useful

life. Petition at 18-22. NDP relies on the Muse study, and on its claim that the existing pipeline is subject to prorationing, as a basis for requiring existing shippers to pay an expansion surcharge designed to recover the cost of the new pipeline.

Motion of SPPRC to Intervene

6. On March 4, 2014, SPPRC filed a timely motion to intervene in this proceeding pursuant to Rule 214 and 18 C.F.R. § 343.2(a). SPPRC is a captive uncommitted shipper of crude oil to the Clearbrook destination on NDP's existing system and would be a captive uncommitted shipper of crude oil to Clearbrook on the proposed expansion system. Thus, SPPRC would be subject to the expansion surcharge proposed by NDP if the surcharge is approved by the Commission. Accordingly, SPPRC has an interest as a customer which may be directed affected by the outcome of this proceeding. *See* Rule 214(b)(2)(ii)(B). The position of SPPRC, and the basis in fact for that position, are set forth in the prior motion of SPPRC to intervene and in this Protest.

Lack of Shipper Support or Benefits

7. SPPRC questions NDP's claim that the proposed expansion has received widespread shipper support. Petition at 24-25. NDP concedes that the "anchor shipper" for the project is Marathon Petroleum Corporation ("Marathon"), which is a part-owner in NDP through a subsidiary company. Petition at 23, n.27. NDP does not disclose how much of the 155,000 bpd in committed contract volume is accounted for by Marathon, nor does NDP indicate the extent to which other committed shippers are affiliated with NDP or Marathon. Thus, discovery is needed to determine the actual level of independent shipper support for the proposed expansion.

8. As a regular uncommitted shipper to Clearbrook, SPPRC has no reason to support the proposed expansion. As explained below, SPPRC does not believe the expansion pipeline proposed by NDP is necessary or desirable to meet the transportation needs of SPPRC. SPPRC has not suffered from chronic prorationing on the NDP system, and SPPRC has seen no operational evidence that the system is subject to persistent excess demand.

9. Contrary to the Petition, imposition of the proposed expansion surcharge on existing uncommitted shippers is not supported by the Commission's prior decisions in *Colonial Pipeline Co*., 116 FERC ¶ 61,078 (2006), *order denying reh'g*, 119 FERC ¶ 61,183 (2007) or *Calnev Pipe Line LLC*, 120 FERC ¶ 61,073 (2007). In both those cases, there were undisputed constraints on existing capacity and there was universal agreement that the expansion capacity was needed. In this case, there is evidence that the prior congestion on the NDP system has been relieved and that the system has recently operated well below capacity. Here, unlike the *Colonial* and *Calnev* cases, SPPRC and other shipper parties have expressed serious doubts that the proposed expansion pipeline is needed.

10. Moreover, the purported shipper benefits cited by NDP have no value to SPPRC. The proposed expansion surcharge will require SPPRC to pay a higher transportation cost for the level of service it currently receives, while SPPRC is entirely satisfied with its current level of service. Nor will SPPRC benefit from the increased price of Bakken crude oil which NDP predicts as a result of the expansion. To the extent that the expansion causes an increase in the price of Bakken crude oil, the effect will be

to increase the feedstock acquisition cost of the SPPRC refinery served by NDP, which will in turn increase the refined product prices paid by the customers of SPPRC. Any such crude oil price increase will harm, not benefit, the business of SPPRC and its customers.

11. Indeed, NDP's Petition acknowledges that the proposed expansion pipeline is not designed or intended to benefit shippers to Clearbrook. The Petition concedes that the existing system did not operate at capacity in 2013, but claims that new pipeline projects downstream from Superior will create strong demand for the expanded upstream NDP system. Petition at 14. This confirms that the expansion pipeline is designed to benefit and will benefit shippers to destinations downstream from Superior, not shippers, such as SPPRC, which use the existing system to reach Clearbrook. Thus, NDP is proposing to collect a surcharge from upstream Clearbrook shippers to pay for an expansion designed to benefit shippers to downstream destinations.

Limited Prorationing

12. As mentioned above, SPPRC has not experienced any chronic prorationing on the NDP system, and SPPRC has seen no operational evidence that the system is subject to persistent excess demand. On the contrary, the recent instances of prorationing experienced by SPPRC have involved specific segments and have been temporary and transitory in nature. SPPRC has not incurred the type of sustained curtailment which could justify a major expansion. Discovery is needed to establish the extent to which prorationing is, or is not, a sustained problem on the NDP system.

13. In his attached Affidavit, Mr. Justin Amoah disputes NDP's claim that demand for space on its system has consistently outstripped available capacity. Petition at 12. Mr. Amoah explains that, since September 2012, temporary integrity maintenance work has been primarily responsible for any necessary prorationing. By the end of the third quarter of 2014, the full nameplate capacity of 210,000 bpd should be available. Even with the temporary reduction in available capacity, prorationing in 2013 was intermittent, not sustained. Amoah Affidavit at P 9.

14. Mr. Amoah also points out that the Bakken Portal Expansion Pipeline ("BPEP"), which is owned by an affiliate of NDP, has been severely underutilized since its inception in March 2013. BPEP transported less than 4,500 bpd between March 2013 and January 2014, which was less than three percent of its 145,000 bpd capacity. The management of BPEP reported that its capacity "was not well utilized in 2013." Amoah Affidavit at P 10.

Unexplained Cost Allocation and Rate Design

15. The Petition does not explain which costs will support the committed rates and which costs will support the uncommitted rates and the expansion surcharge. In this regard, the Petition merely states that uncommitted shippers will have no responsibility for the cost of the portion of the pipeline used to transport committed volumes, and that NDP will deduct $7.5 million from the cost of service for the upstream facilities in recognition of the premium paid by priority committed shippers. Petition at 42. The Petition provides no economic or regulatory basis for the amount of the cost-of-service deduction. Thus, discovery is needed to provide an understanding of the basis for the

proposed $7.5 million deduction and the proposed allocation of costs between the committed and uncommitted rates.

16. NDP claims that uncommitted shippers will be protected against the risk that the expansion pipeline will be underutilized because NDP will use full capacity as the design throughput volume in calculating the initial Expansion Rate Component. Petition at 28-29. However, NDP reserves the ability to change the surcharge by any of the Commission's ratemaking methodologies, which presumably would include cost-of-service ratemaking pursuant to 18 C.F.R. §§ 346.1, *et seq*. Petition at 26, n.30. That option could allow NDP to increase the expansion surcharge to account for a shortfall in actual throughput volume, which would place the impact of underutilization squarely on the uncommitted shippers. Thus, if the Commission allows NDP to impose the expansion surcharge, the Commission should require NDP to use full capacity as the design throughput volume in calculating any future change in the initial Expansion Rate Component.

Errors in the Muse Study

17. In his attached Affidavit, Mr. Amoah concludes that the Muse study is a highly questionable attempt to overcome the simple fact that there is and will continue to be adequate takeaway serving the Williston Basin for the foreseeable future. Amoah Affidavit at P 3. Mr. Amoah provides a detailed table showing that there will be more than 2.25 million bpd of takeaway capacity in place by the end of 2015, prior to Sandpiper's proposed start in the first quarter of 2016. The Muse study itself adopts a production forecast indicating that Williston Basin production will peak at approximately

1.4 million bpd in the 2025-27 timeframe, after which it will begin to decline. Muse study at 25. Thus, there will continue to be sufficient takeaway capacity to handle all of the current and future Bakken production through the 2035 period, leaving no logistical need for the Sandpiper Project. Amoah Affidavit at P 3.

18. Mr. Amoah further explains that the Muse study, in attempting to dismiss the excess capacity serving the Williston Basin, relies on a highly speculative prediction that shippers will shift away from rail transportation to Sandpiper. Amoah Affidavit at P 4; Muse study at 6-7. The Muse study ignores the fact that substantial producers, marketers, and refiners have made large financial commitments to ship production by rail from Montana and North Dakota, including investments by Statoil and Hess. An affiliate of NDP has also invested in an 80,000 bpd rail facility that allows crude oil volumes to reach the "premium markets" the Muse study contends will be served by Sandpiper. Amoah Affidavit at P 4. The Muse study essentially assumes that these shippers, and others which have made equally large financial commitments, would abandon their investments in rail in favor of using Sandpiper, an assumption which has no basis in fact. In this regard, it is highly unlikely that shippers with significant investments in rail have made volume commitments to Sandpiper by executing TSAs.

19. The Muse study contends that Sandpiper would allow shippers to reach "premium markets" for light sweet crude oil. Muse study at 11. However, Mr. Amoah points out that markets for light sweet crude oil are already accessible by rail at Cushing, Oklahoma, the East Coast, the West Coast, and the Gulf Coast. The crude oil markets in those regions are all currently priced at a premium relative to the upper mid-continent

market, where Sandpiper will terminate. Amoah Affidavit at P 5. In fact, producers, marketers, and refiners operating in the Williston Basin have confirmed that rail transportation gives them the ability to move Bakken crude oil out of the once-constrained Williston region to markets offering premium prices. Amoah Affidavit at P 6.

20. Furthermore, Mr. Amoah notes that the Muse study admittedly does not consider or analyze costs that are fundamental in evaluating the Sandpiper Project. Those costs include "physical loss allowances, miscellaneous pump-over fees at pipeline interconnections, terminal storage costs, and working capital costs." Muse study at 31; Amoah Affidavit at P 7. By excluding such costs—which are not equivalent across separate transportation systems—the Muse study does not accurately portray the economics of the Sandpiper Project relative to other projects. Amoah Affidavit at P 7.

21. Finally, the Muse study uses estimates for rail freight rates that may not be accurate. Mr. Amoah points out that many rail shippers have been provided with private freight rates by railroads that are well below the estimated rail costs used in the Muse study. Amoah Affidavit at P 8. Some rail shippers also have their own loading and unloading facilities and therefore do not pay the loading and unloading fees used in the Muse study. *Id.*

Deficiencies in the Muse Study

22. In addition to the errors identified by Mr. Amoah, the attached expert affidavit of Dr. Daniel S. Arthur identifies deficiencies in the Muse study which undermine the credibility of its conclusion that the Sandpiper Project would be fully utilized. Dr. Arthur finds that the Muse study fails to provide information to support several assumptions which have a material impact on the analysis and conclusions in the study. These unsupported assumptions include assumed crude oil production and grade of crude oil for several geographic areas and assumed prices for refined petroleum products that presumably affect the crude oil refining value inputs to the Muse model. Arthur Affidavit at PP 8-12.

23. Dr. Arthur also finds that the Muse study provides incomplete information regarding the capacities and prices of transportation alternatives and the capacities of refineries. He observes that the Muse study apparently assumes that the transportation and refinery capacities that are known today, as well as several transportation projects expected to be in service over the period 2014-2020, will be the capacities that persist over the period 2016-2035. Dr. Arthur finds it more reasonable to expect that there will be changes in transportation and refining capacities in response to changes in crude oil production volumes in various basins, including the Bakken region and other production basins in North America. Arthur Affidavit at PP 13-15.

24. Finally, Dr. Arthur sees no indication that the Muse study factored into its analysis any potential alternative scenarios other than its set of baseline assumptions with and without the Sandpiper Project. He notes that alternative scenarios would provide

information on whether the Muse study's conclusion that the expanded NDP system after the Sandpiper Project would be operating at or near capacity for the forecast period 2016-2035 is robust under alternative scenarios, or whether other plausible scenarios exist whereby the expanded NDP system may not operate at full capacity over that period. Arthur Affidavit at P 16.

25. Dr. Arthur concludes that the deficiencies in the Muse study undermine the credibility of its conclusion that the expanded NDP system will operate at or near capacity for the forecast period 2016-2035. He observes that it is not possible, in the brief period of time available to respond to the petition of NDP for a declaratory order, to perform a more complete or thorough analysis. However, Dr. Arthur identifies several categories of information regarding the inputs, assumptions, and optimization model used in the Muse study which are needed in order for the validity of the study to be intelligently evaluated. Arthur Affidavit at P 17.

Need for Discovery and Hearing

26. If the Commission does not deny the Petition, it should refer the Petition to an Administrative Law Judge for discovery and hearing. The Muse study purports to justify NDP's claim that there is a pressing need for new takeaway capacity out of the Bakken. However, as demonstrated herein, the Muse study is based on questionable, unsupported, and unverifiable assumptions. Discovery and hearing are therefore necessary for the Commission to resolve the issues of fact created by the Muse study. As the Commission recognized in *Express*, discovery is appropriate in a declaratory order

proceeding to resolve disputed issues of fact that cannot be resolved on the basis of pleadings alone. *Express Pipeline Partnership*, 76 FERC ¶ 61,245, 62,253 (1996).

27. In addition, there are material issues of fact regarding the extent of prorationing on the NDP system. The Petition claims that prorationing has been persistent and that there is growing demand for capacity. Petition at 11-14. This Protest, and the Affidavit of Mr. Amoah, indicate that recent prorationing has been intermittent and that there is no evidence of excess demand for capacity on the NDP system. Amoah Affidavit at PP 9-10. Information regarding recent system-wide prorationing, which is within the possession of NDP, is needed to resolve this factual issue.

28. There is also a material factual issue regarding the level of independent shipper support for the proposed expansion. NDP acknowledges that part-owner Marathon accounts for an undisclosed portion of the 155,000 bpd in TSA commitments. Only NDP has the information necessary to determine the extent to which the 155,000 bpd in TSA commitments is by NDP affiliates or by independent shippers. Discovery is needed to obtain the pertinent information.

29. The Commission's procedural rules expressly contemplate that protests against petitions may be set for hearing. Rule 211(a)(1) provides that any person may file a protest against any petition. Rule 211(a)(3) provides that the Commission will consider protests in determining further appropriate action. Rule 211(a)(4) specifies that a protest is not part of the decisional record where a proceeding is set for hearing.

30. Thus, there are multiple disputed issues of material fact in this case which warrant denial of the Petition or require discovery and hearing. To summarize, those disputed factual issues include:

a. Whether there is a need for additional takeaway capacity to serve the Williston Basin in the foreseeable future.

b. Whether prorationing on NDP has been persistent or intermittent in the recent past or can be expected to be persistent or intermittent in the foreseeable future.

c. Whether Sandpiper can be expected to operate at full capacity over its useful life as predicted by the Muse study.

d. Whether current rail shippers can reasonably be expected to shift to Sandpiper as predicted by the Muse study.

e. Whether shippers which take delivery a Clearbrook will actually benefit from the proposed expansion pipeline.

f. Whether there is broad independent shipper support for the expansion pipeline.

g. What is the proposed basis for allocating costs between the committed and uncommitted rates and does that basis constitute a reasonable rate design?

h. What design throughput volume does NDP propose to use in calculating future changes in the Expansion Rate Component and will that rate design protect uncommitted shippers from the risk of underutilization?

31. In addition, Dr. Arthur identifies several basic categories of missing or incomplete information which are required in order for the validity of the Muse study to be intelligently evaluated. Arthur Affidavit at P 17. Those basic information requirements include:

a. Complete information on assumptions made regarding inputs to the optimization model.

b. Complete information on outputs of the optimization model, including information on estimated transportation flows and the

shadow price of crude oil in the producing basins predicted by the optimization model.

c. A description of Muse's process for validating the results of the optimization model, together with related documents.

d. A working version of the optimization model, or some mechanism for access to the model, in order to perform model runs using alternative assumptions to examine the sensitivity and robustness of the conclusions presented in the Muse study under varying input assumptions.

Conclusion

32. For the foregoing reasons, the Commission should deny the Petition. If the Petition is not denied, the Commission should refer the Petition to an Administrative Law Judge for discovery and hearing.

Respectfully submitted,

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/s/Marcus W. Sisk, Jr.
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Attorneys for St. Paul Park Refining Co. LLC

March 14, 2014

CERTIFICATE OF SERVICE

I hereby certify that I have this 14th day of March, 2014, served the foregoing Protest of St. Paul Park Refining Co. LLC by email on each person designated on the official service list compiled by the Secretary of the Commission in this proceeding.

/s/ Frederick G. Jauss IV
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AFFIDAVIT OF

JUSTIN AMOAH

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATION COMMISSION

North Dakota Pipeline Company LLC Docket No. OR14-21-000

AFFIDAVIT OF JUSTIN AMOAH

Being duly sworn, the undersigned Justin Amoah hereby states as follows:

1. My name is Justin Amoah, and I serve as a Crude Oil Trader for St. Paul Park Refining Company LLC ("SPPRC"). My business address is 770 S. Post Oak Lane, Suite 270, Houston, TX 77056. I am submitting this affidavit in support of the protest of SPPRC in the above-captioned proceeding.

2. I have been asked by SPPRC to review and evaluate the petition for declaratory order ("Petition") filed by North Dakota Pipeline Company LLC ("NDP") with the Federal Energy Regulatory Commission on February 12, 2014, and the supporting study by Muse Stancil & Co. ("Muse") entitled "Market Prospects and Benefits Analysis for the Sandpiper Project" dated February 2014 ("Muse study").

3. The Muse study is a highly questionable attempt to overcome the simple fact that there is and will continue to be more than adequate takeaway capacity serving the Williston Basin for the foreseeable future. Attached as Exhibit A is a detailed table that shows that there will be more than 2.25 million bpd of takeaway capacity in place by the end of 2015, prior to Sandpiper's proposed start in the first quarter of 2016. The Muse study itself adopts a production forecast indicating that Williston Basin production

will peak at approximately 1.4 million bpd in the 2025-27 timeframe, after which it will begin to decline. Muse study at 25. Thus, there will continue to be sufficient takeaway capacity to handle all of the current and future Bakken production through the 2035 period, leaving no logistical need for the Sandpiper Project.

4. In attempting to dismiss the excess capacity serving the Williston Basin, the Muse study relies on a highly speculative prediction that shippers will shift away from rail transportation to Sandpiper. Muse study at 6-7. The Muse study ignores the fact that substantial producers, marketers, and refiners have made large financial commitments to ship production by rail from Montana and North Dakota, including investments by Statoil and Hess, which rank among the largest producers in the region. *See* "Statoil Using Rails to Ease Bottleneck," Wall Street Journal, August 29, 2012; "Hess Credit Suisse Presentation," February 11, 2014. An affiliate of NDP has also invested in a rail 80,000 bpd facility at Berthold that allows crude volumes to reach premium markets. *See St. Paul Park Refining Co. LLC v. Enbridge Pipelines (North Dakota) LLC*, Docket No. OR13-28-000, "Affidavit of Robert Steede In Support of Motion to Dismiss and Answer of Enbridge Pipelines (North Dakota) LLC In Response to Complaint of St. Paul Park Refining Co. LLC" at P 10 (August 14, 2013). The Muse study essentially assumes that these shippers, and others which have made equally large financial commitments, would abandon their investments in rail in favor of using Sandpiper, an assumption which has no basis in fact. In this regard, it is highly unlikely that shippers with significant investments in rail have made volume commitments to Sandpiper by executing Transportation Services Agreements.

5. The Muse study contends that Sandpiper would allow shippers to reach "premium markets" for light sweet crude oil. Muse study at 11. However, markets for light sweet crude oil are already accessible by rail at Cushing, Oklahoma, the East Coast, the West Coast, and the Gulf Coast. The crude oil markets in those regions are all currently priced at a premium relative to the upper mid-continent market, where Sandpiper will terminate.

6. For example, producers, marketers, and refiners operating in the Williston Basin have confirmed that rail transportation gives them the ability to move Bakken crude oil out of the once-constrained Williston region to markets offering premium prices. *See* "Bakken crude prices rise as railroad reach grows" Wall Street Journal, October 4, 2012.

7. Furthermore, the Muse study admittedly does not consider nor analyze costs that are fundamental in evaluating the Sandpiper Project. Those costs include "physical loss allowances, miscellaneous pump-over fees at pipeline interconnections, terminal storage costs, and working capital costs." Muse study at 31. By excluding such costs—which are not equivalent across separate transportation systems—the Muse study does not accurately portray the economics of the Sandpiper Project relative to other projects.

8. Finally, the Muse study uses estimates for rail freight rates that may not be accurate. Many rail shippers have been provided with private freight rates by railroads that are well below the estimated rail costs used in the Muse study. Some rail shippers

also have their own loading and unloading facilities and therefore do not pay the loading and unloading fees used in the Muse study.

9. On the subject of prorationing, NDP's claim that demand for space on its system has consistently outstripped available capacity is not supported by the facts. Petition at 12. Since September 2012, temporary integrity maintenance work has been primarily responsible for any necessary prorationing. By the end of the third quarter of 2014, the full nameplate capacity of 210,000 bpd should be available. Even with the temporary reduction in available capacity, prorationing in 2013 was intermittent, not sustained. Exhibit B shows the available capacity and actual throughput on the NDP system from May 2012 through March 2014.

10. Moreover, the Bakken Portal Expansion Pipeline ("BPEP"), which is owned by an affiliate of NDP, has been severely underutilized since its inception in March 2013. BPEP transported less than 4,500 bpd between March 2013 and January 2014, which is less than three percent of its 145,000 bpd capacity. In reporting its operating results, BPEP stated that its capacity "was not well utilized in 2013." *See* Enbridge Income Fund Holdings Inc., "Management's Discussion and Analysis, December 31, 2013. Exhibit C shows the nameplate capacity and actual throughput on the BPEP system from March 2013 through December 2013.

Justin Amoah

March 14, 2014

VERIFICATION

State of Texas

County of Harris

Before me Donna Arnold, a notary public, on this day personally appeared Justin Amoah, known to be as the person whose name is subscribed to the foregoing Affidavit, and stated to me that the facts contained in said Affidavit are true and correct to the best of his knowledge and belief.

Given under my hand and seal this 14 day of March, 2014.

DONNA ARNOLD
My Commission Expires
October 7, 2015

Notary Public

My commission expires: 10/7/15

EXHIBIT A

North Dakota & Montana Takeaway Capacity At Year End 2015 (Prior to the Proposed Sandpiper Expansion)		
Facility / Pipeline	**Location**	**Capacity (BPD)**
EOG Rail	Stanley, ND	65,000
Hess Rail	Tioga, ND	60,000
Dakota Plains / World Fuel Services Rail	New Town, ND	80,000
Crestwood Colt Rail	Epping, ND	120,000
Bakken Oil Express Rail	Dickinson, ND	200,000
Savage Rail	Trenton, ND	90,000
Enbridge Berthold Rail	Berthold, ND	80,000
Musket Rail	Dore, ND	60,000
Plains Manitou Rail	Ross, ND	65,000
Plains Van Hook Rail	Van Hook, ND	65,000
Basin Transload / Global Partners Stampede Rail	Columbus, ND	100,000
Basin Transload / Global Partners Beulah Rail	Beulah, ND	60,000
Red River Supply Rail	Williston, ND	10,000
Enserco Rail	Gascoyne, ND	10,000
Northstar Transloading	East Fairview, ND	180,000
North Dakota Port Services	Minot, ND	10,000
Bakken Transload	Ross, ND	10,000
Great Northern Midstream Rail	Fryburg, ND	60,000
Total Rail Takeaway Capacity		**1,325,000**
North Dakota Pipeline	Clearbrook, ND	210,000
Bakken Portal Expansion Pipeline	Cromer, SK	145,000
Pony Express Pipeline	Cushing, OK	230,000
Butte Pipeline	Guernsey, WY	150,000
Butte Loop	Guernsey, WY	50,000
Plains Bakken North Pipeline	Regina, SK	50,000
Total Pipeline Takeaway Capacity		**835,000**
Tesoro Manadan Refinery	Mandan, ND	71,000
Dakota Prairie Refining	Dickinson, ND	20,000
Total Refinery		**91,000**
TOTAL NORTH DAKOTA + MONTANA TAKEAWAY CAPACITY		**2,251,000**

EXHIBIT B

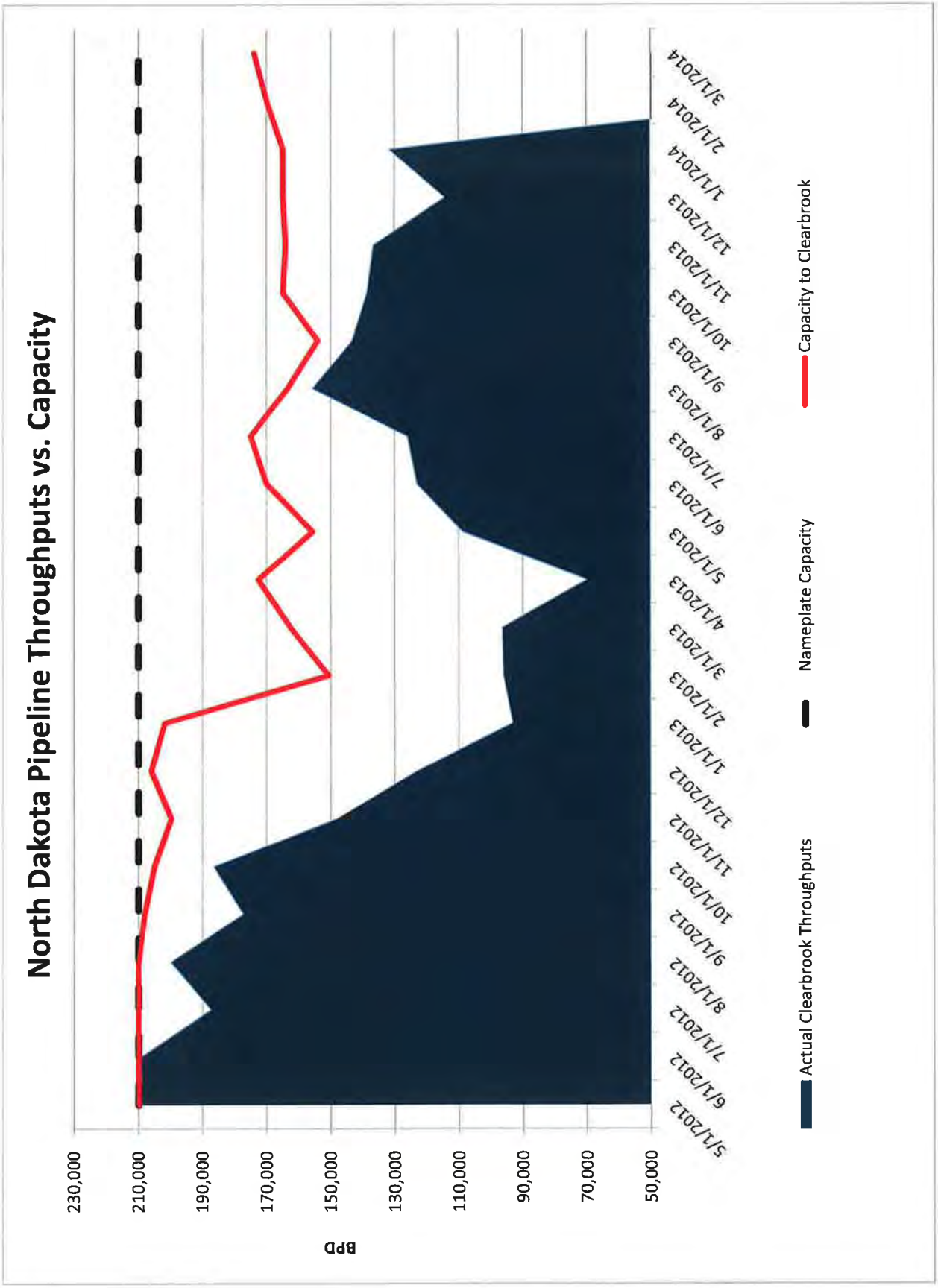
North Dakota Pipeline Throughputs vs. Capacity
BPD
230,000
210,000
190,000
170,000
150,000
130,000
110,000
90,000
70,000
50,000
5/1/2012
6/1/2012
7/1/2012
8/1/2012
9/1/2012
10/1/2012
11/1/2012
12/1/2012
1/1/2013
2/1/2013
3/1/2013
4/1/2013
5/1/2013
6/1/2013
7/1/2013
8/1/2013
9/1/2013
10/1/2013
11/1/2013
12/1/2013
1/1/2014
2/1/2014
3/1/2014
Actual Clearbrook Throughputs
Nameplate Capacity
Capacity to Clearbrook

North Dakota Pipeline Throughputs vs. Capacity				
Date	Nameplate Capacity	Capacity to Clearbrook	Actual Clearbrook Throughputs	NDP Utilization
5/1/2012	210,000	210,000	208,996	99.5%
6/1/2012	210,000	210,000	209,481	99.8%
7/1/2012	210,000	210,000	187,435	89.3%
8/1/2012	210,000	210,000	200,038	95.3%
9/1/2012	210,000	208,000	177,341	85.3%
10/1/2012	210,000	205,000	186,594	91.0%
11/1/2012	210,000	199,720	148,132	74.2%
12/1/2012	210,000	206,000	123,064	59.7%
1/1/2013	210,000	201,750	93,198	46.2%
2/1/2013	210,000	150,600	96,068	63.8%
3/1/2013	210,000	162,600	96,416	59.3%
4/1/2013	210,000	172,600	70,033	40.6%
5/1/2013	210,000	155,600	108,725	69.9%
6/1/2013	210,000	170,000	123,036	72.4%
7/1/2013	210,000	175,000	126,036	72.0%
8/1/2013	210,000	163,475	155,760	95.3%
9/1/2013	210,000	154,000	143,303	93.1%
10/1/2013	210,000	165,000	138,698	84.1%
11/1/2013	210,000	164,100	136,656	83.3%
12/1/2013	210,000	165,000	114,322	69.3%
1/1/2014	210,000	165,000	131,772	79.9%
2/1/2014	210,000	170,000	N/A	N/A
3/1/2014	210,000	174,000	N/A	N/A
4/1/2014	210,000	189,000	N/A	N/A

EXHIBIT C

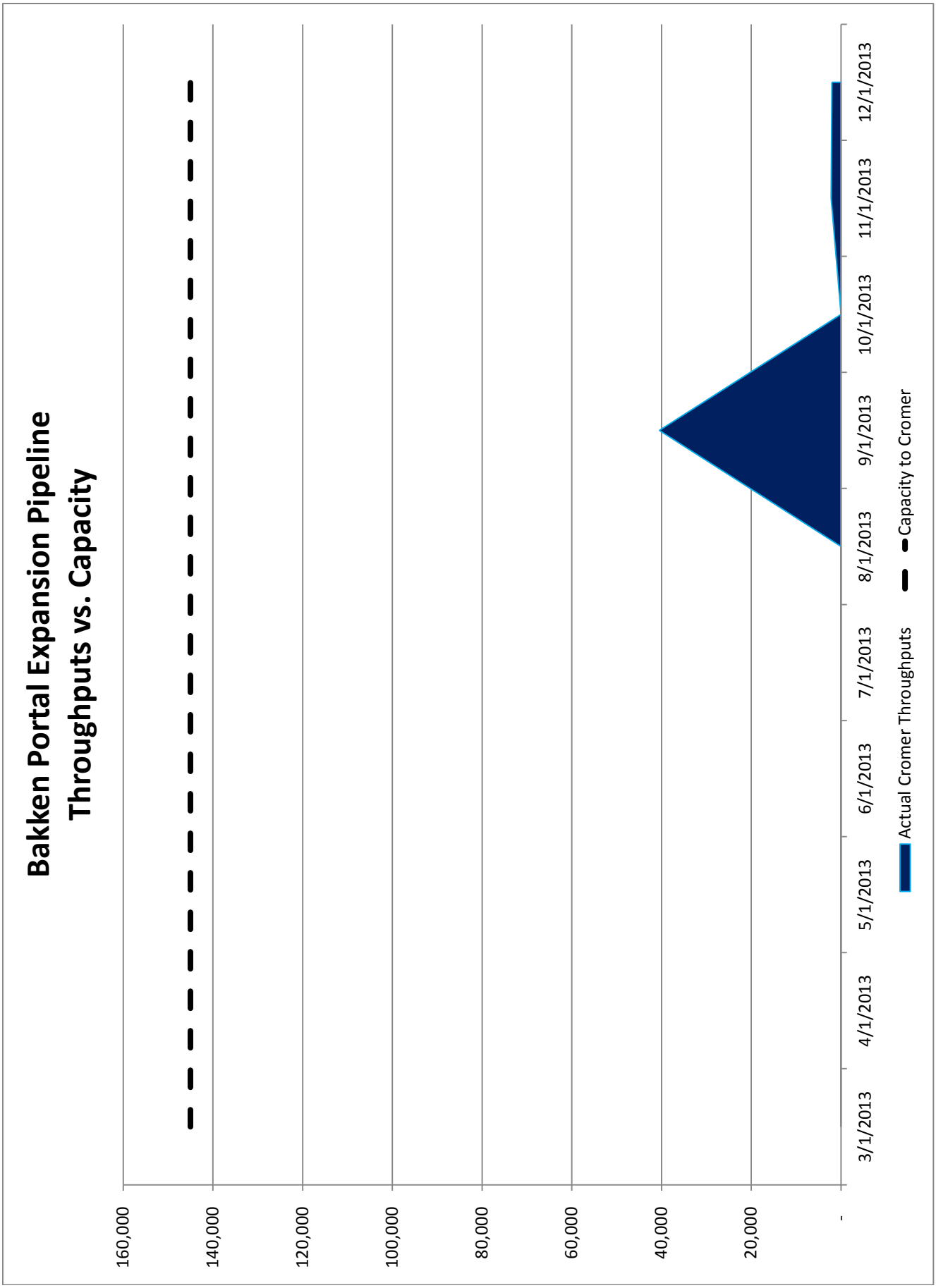
Bakken Portal Expansion Pipeline
Throughputs vs. Capacity
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
-
3/1/2013
4/1/2013
5/1/2013
6/1/2013
7/1/2013
8/1/2013
9/1/2013
10/1/2013
11/1/2013
12/1/2013
Actual Cromer Throughputs
Capacity to Cromer

Bakken Portal Expansion Pipeline Throughputs vs. Capacity			
Date	**Capacity to Cromer**	**Actual Cromer Throughputs**	**BPEP Utilization**
3/1/2013	145,000	-	0.0%
4/1/2013	145,000	-	0.0%
5/1/2013	145,000	-	0.0%
6/1/2013	145,000	-	0.0%
7/1/2013	145,000	-	0.0%
8/1/2013	145,000	-	0.0%
9/1/2013	145,000	40,514	27.9%
10/1/2013	145,000	0	0.0%
11/1/2013	145,000	2,198	1.5%
12/1/2013	145,000	2,028	1.4%
1/1/2014	145,000	-	0.0%
2/1/2014	145,000	N/A	N/A
3/1/2014	145,000	N/A	N/A
4/1/2014	145,000	N/A	N/A

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Statoil Using Rails to Ease Bottleneck

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By ÁNGEL GONZÁLEZ

Updated Aug. 29, 2012 6:20 p.m. ET

HOUSTON— Statoil AS STL.OS +0.13% A said it is leasing more than 1,000 railroad cars to carry crude oil from fields in North Dakota to refiners across North America, in a bid to overcome pipeline bottlenecks that plague the booming oil-producing region.

The Norwegian oil giant's railroad effort is a new sign of how the U.S. pipeline network is having a hard time keeping pace with the oil boom triggered by hydraulic fracturing, forcing companies to come up with creative workarounds.

Nowhere is the challenge more apparent than in North Dakota, which this year unseated Alaska as the country's second-largest oil-producing state. In May the state produced 639,000 barrels per day, or about 10% of the oil produced in the U.S., up from 364,000 barrels per day in May 2011, according to the U.S. Energy Information Administration.

Beginning in early September, the trains that Statoil will have secured with long-term leases will have the capacity to move some 45,000 barrels of crude per day to refiners across North America, more than enough to cover the entirety of the company's current net production there, company spokesman Ola Morten Aanestad said. Potential destinations include refineries in the East, West and Gulf Coasts and Canada, Mr. Aanestad said.

It would take 14 or 15 days for the trains to make a round trip to Canada, the U.S. East Coast or the Gulf of Mexico, including the loading and unloading of crude, Statoil said. The company didn't disclose the party it was leasing rail cars from or the price it would pay.

The railroad effort would help Statoil get a better price for oil produced in the Bakken and Three Forks oil-shale formations in North Dakota, which currently trades at discounts ranging between $5 and $20 per barrel because of the limited capacity to transport it to refining centers elsewhere in the U.S., resulting in a supply glut. On Wednesday, oil futures in New York settled at $95.49 per barrel, down 84 cents.

Statoil became a big player in the Bakken Shale when it agreed last year to buy independent firm Brigham Exploration Co. for $4.4 billion. The Norwegian company, which also has significant investments in south Texas's oil-rich Eagle Ford Shale and in the natural-gas rich Marcellus Shale in the Northeast, is seeking to establish itself as a major producer of U.S. unconventional oil and gas.

"The rail solution supporting the Bakken business will increase the value of the oil significantly. This translates to substantial profits as production continues to grow," Torstein Hole, senior vice president for Statoil's U.S. onshore activities, said in a statement.

Statoil is not the first energy company to see railroads as an outlet to its fast-rising production in the Bakken region. In June, more than 325,000 barrels a day of North

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Dakota crude were estimated to be shipped by rail, more than double the amount seen at the end of last year, according to the state's Pipeline Authority.

Refiner Phillips 66 PSX -0.99% has bought 2,000 cars to bring crude from the U.S. interior to its refineries all over the country. Tesoro Corp. also plans to bring in Bakken crude to its Anacortes, Wash., refinery by train starting in September. Marathon Oil Corp. MRO -0.76% , an oil producer with large Bakken operations, ships about 14% of its Bakken production by rail.

Statoil, which is majority owned by the Norwegian government, says it plans to increase its North America oil-and-gas production from under 100,000 barrels of oil equivalent per day in 2011 to more than 500,000 barrels of oil equivalent per day in 2020.

—Ben Lefebvre contributed to this article.

Write to Ángel González at angel.gonzalez@dowjones.com

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HESS CORPORATION

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FEBRUARY 11, 2014

Forward-Looking Statements and Other Information

This presentation contains projections and other forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. These projections and statements reflect the company's current views with respect to future events and financial performance.

No assurances can be given, however, that these events will occur or that these projections will be achieved, and actual results could differ materially from those projected as a result of certain risk factors. A discussion of these risk factors is included in the company's periodic reports filed with the Securities and Exchange Commission.

We use certain terms in this presentation relating to reserves other than proved, such as unproved resources. Investors are urged to consider closely the disclosure relating to proved reserves in Hess' Form 10-K, File No. 1-1204, available from Hess Corporation, 1185 Avenue of the Americas, New York, New York 10036 c/o Corporate Secretary and on our website at www.hess.com. You can also obtain this form from the SEC on the EDGAR system.

Pure Play E&P – Driving Shareholder Value

- **Focused World Class Portfolio**
  - **Visible growth in production of 5%-8% CAGR (2012 Pro Forma - 2017)**
  - **Long life assets in areas where Hess has proven capability**
  - **Five key areas represent 80% of reserves and 87% of production**
  - **Highest leverage to oil prices in peer group; industry leading cash margin**

- **Three Pronged Strategy to Drive Growth and Returns While Managing Risk**
  - ***Unconventional:* Strong production growth from leading U.S. shale positions**
  - ***Exploitation:* Lower risk development of discovered resources**
  - ***Exploration:* Focused exploration supports long term growth**

- **Financial Flexibility to Fund Future Growth**
  - **Reduced debt and increased cash on balance sheet**
  - **Significant reduction in capital and exploratory expenditures**
  - **Expect to be free cash flow positive post 2014**

- **Providing Current Returns to Shareholders**
  - **Increased annual dividend by 150% to $1 per share**
  - **Up to $4 billion share repurchase funded by 2013 restructuring; commenced 3Q13**
  - **Additional return of capital from sale of Utica dry gas and monetization of Bakken midstream**

Continuing commitment to capital discipline

Transformation to Pure Play E&P

What We've Promised		Key Deliverables
Focused Pure Play E&P	✓	• Divested more than 50% of E&P assets over 4 years • Built leading U.S. shale positions, e.g. Bakken & Utica • Increased production visibility and industry leading cash margins
Exit Downstream	✓	• Closed HOVENSA and Port Reading facilities • Sold Energy Marketing ($1.2 billion) • Sold Terminals ($1.75 Billion) • Remaining divestitures underway
Financial Flexibility to Fund Future Growth	✓	• E&P spend cut 24% in 2013 and 6% in 2014 • $150 million annual cost reduction underway • Reduced debt and increased cash on balance sheet
Providing Current Returns to Shareholders	✓	• Increased annual dividend by 150% to $1.00/sh • Commenced share repurchase of up to $4 billion • Additional cash returns planned from monetization of Bakken midstream

Delivering on commitments and creating value

Progress on Divestitures Announced in 2013

Asset	Terms Agreed Date	Completion Date	After Tax Proceeds (in millions)
Beryl	Oct-2012	Jan-2013	$440
Azerbaijan (ACG)	Sep-2012	Mar-2013	$880
Eagle Ford	Mar-2013	May-2013	$280
Russia (Samara-Nafta)	Apr-2013	May-2013	$1,900
Energy Marketing	Jul-2013	Nov-2013	$1,200
Terminal Network	Oct-2013	Dec-2013	$1,750
Indonesia (Natuna)	Dec-2013	Dec-2013	$650
Indonesia (Pangkah)	Dec-2013	Jan-2014	$650
Thailand (Sinphuhorm + Pailin)	In Progress		-
Energy Trading (Hetco)	In Progress		-
Retail	In Progress (Form 10 filed for tax-free spin)		-
Bakken Midstream Assets	Preparing for monetization by 2015		-

Total Completed: $7.8 billion

E&P Portfolio Focused in Five Areas

Located in Areas Where Hess is Competitively Advantaged

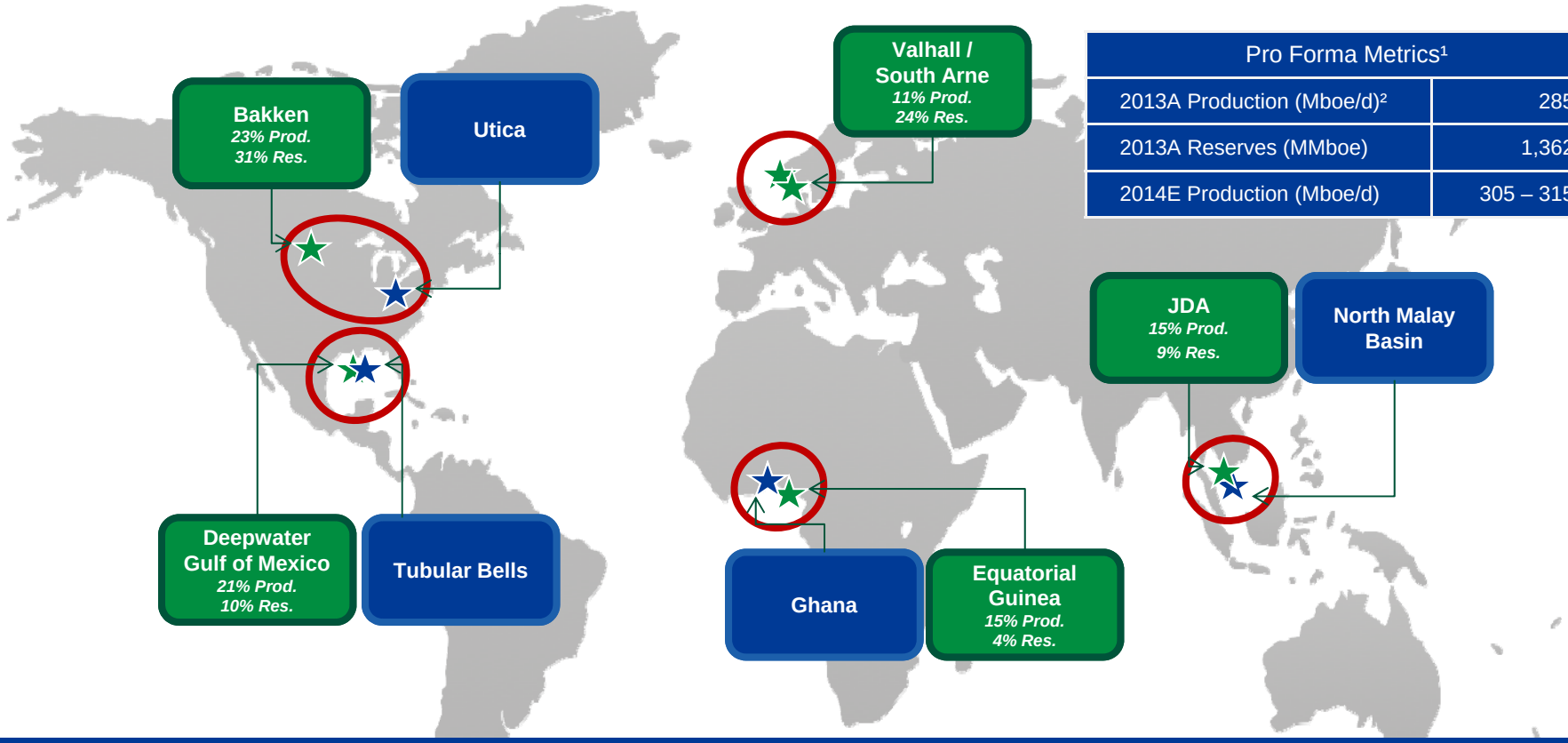

Pro Forma Metrics[1]	
2013A Production (Mboe/d)[2]	285
2013A Reserves (MMboe)	1,362
2014E Production (Mboe/d)	305 – 315

Five Areas Represent 80% of Reserves / 87% of Production

Existing Key Assets New Growth Assets

[1] Beryl area, Azerbaijan assets, Eagle Ford, Russia subsidiary (Samara Nafta), Indonesia and Thailand assets assumed sold as of January 1, 2013.
[2] Actual 2013 production includes Libya (15 Mboe/d); 2014 production guidance excludes Libya

Three Pronged Strategy to Drive Growth and Returns

Unconventional
- Bakken free cash positive in 2015
- Large inventory of high return Bakken well locations – goal of 150mbd by 2018
- Leading position in emerging Utica wet gas window

Exploitation
- High return infill drilling opportunities
- Tubular Bells first oil in 3Q14
- North Malay Basin early production commenced 4Q13; full field in 2017

Exploration
- Reduce risk through partnering
- Geographically focused:
  - Deepwater Gulf of Mexico
  - Offshore West Africa
  - Kurdistan
  - Malaysia

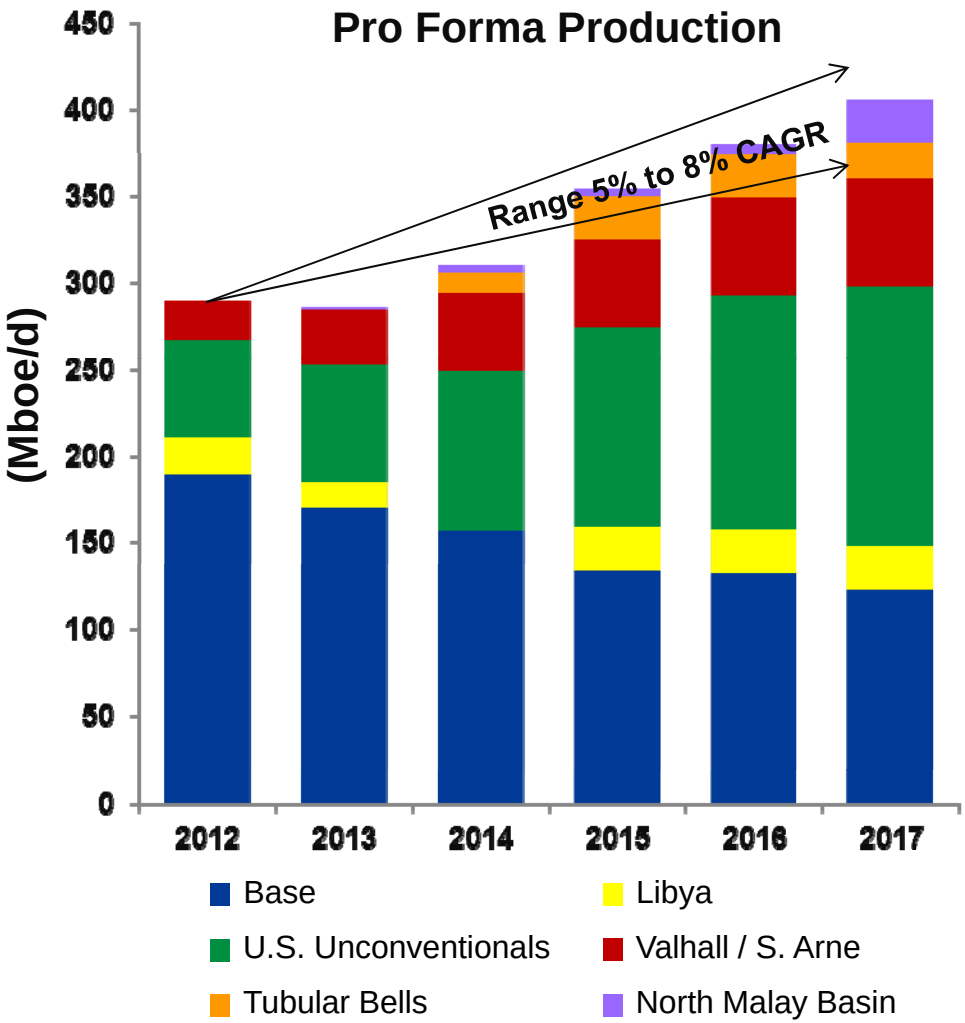

Note: 2013 actual production 336 Mboe/d. 2014 guidance is 305-315 Mboe/d.

Leading Oil-Linked Asset Base

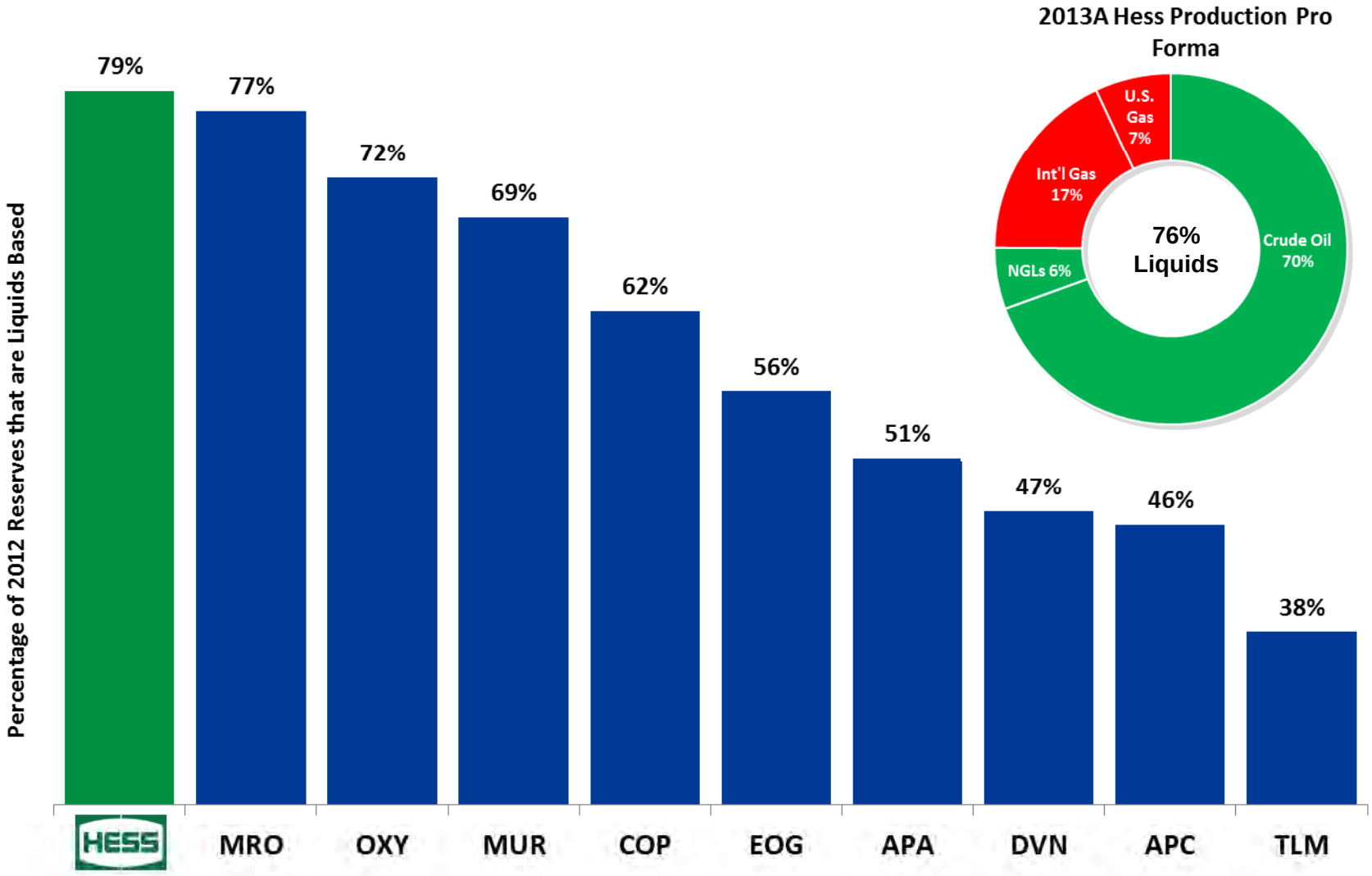

Source: SEC filings, company annual reports, and company press releases
Note: Percentage of reserves that are liquids based for peers calculated as per 2012 year-end SEC filings; Hess pro forma

Industry Leading Cash Margin

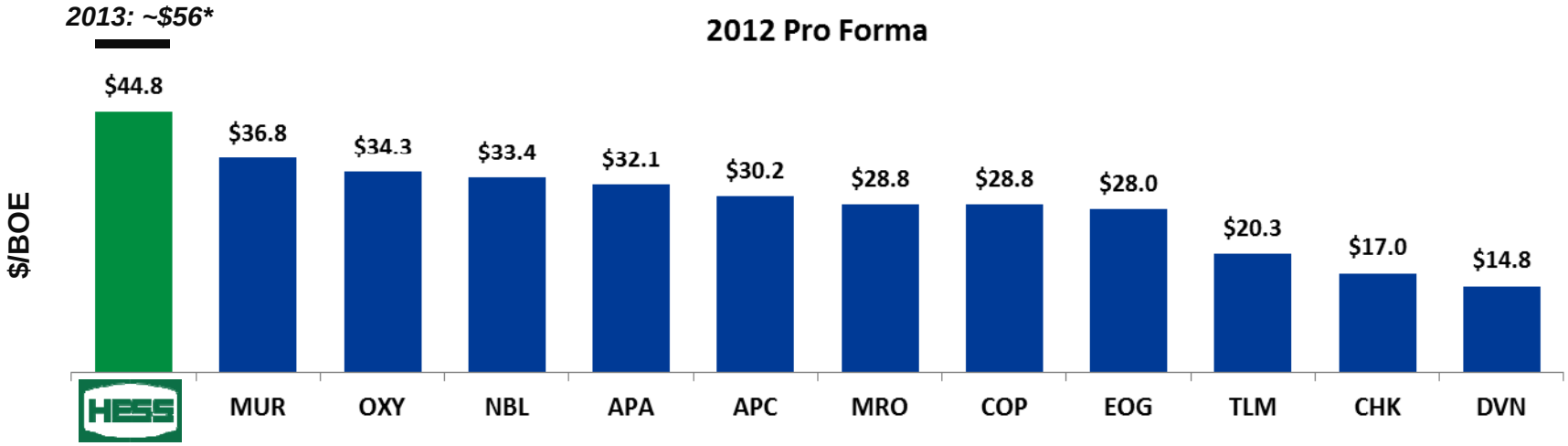

* 2013 Hess pro forma cash margin includes Libya (~$57 excluding Libya)
Note: E&P Cash Margin = E&P Net Income + DD&A + Exploration Expense
Hess 2012 cash margin is pro forma for asset sales. Actual cash margin was $40.3; Five-year data are actual
Source: Evaluate Energy, including hedges and oil sands; excluding specials

Enhanced Financial Flexibility and Providing Current Returns to Shareholders

- **Financial Flexibility to Fund Future Growth**
  - Paid down $2.4 billion of short term debt with initial divestiture proceeds
  - Increasing cash balance by $1 billion
- **Portfolio Free Cash Flow Positive Post 2014**
  - Substantial reductions in capital and exploratory expenditures
  - $150 million cost reduction program underway
- **Providing Current Returns to Shareholders**
  - Annual dividend increased 150% to $1.00 per share in 3Q13
  - Authorized share repurchase program of up to $4 billion

Total Upstream Capital and Exploratory Expenditures

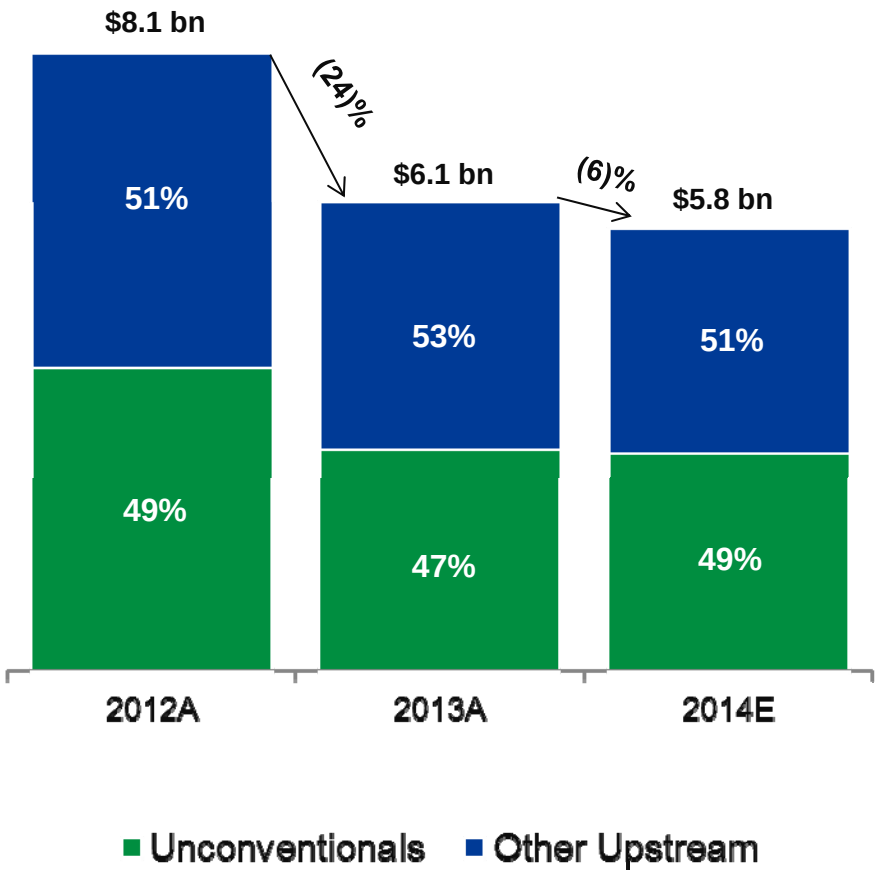

ASSET OVERVIEW

World Class Position in Bakken Shale

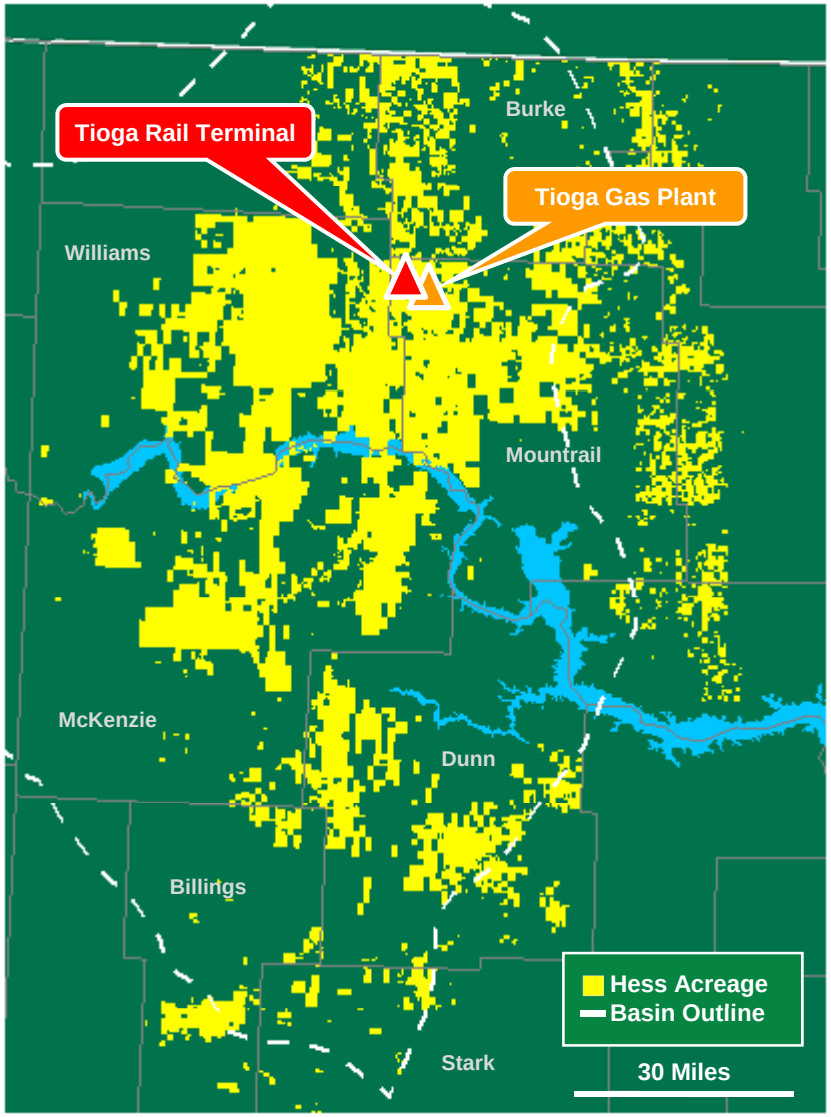

Strategic / Portfolio Context

- Single biggest contributor to production growth through 2018
- Competitively advantaged; lean manufacturing and infrastructure
- Industry leading well cost and productivity
- Material upside through infill drilling in Middle Bakken and Three Forks
- Tighter infill testing program underway in 2014

Asset Details

- 640,000 net acres; Hess ~70% W.I., operator
- 17 rig program in 2014; Capex of $2.2 B
- 2014 net production forecast is 80-90 Mboe/d
- Net production goal of ~125 Mboe/d in 2016
- Net production goal of ~150 Mboe/d in 2018
- >3,000 total operated drilling locations
- 2013 30 Day IPs: 750-900 boe/d
- 2013 EURs: 550,000-650,000 boe
- Estimated recoverable resource ~1.2 Bboe

Driving Performance in the Bakken

Reducing Well Costs…

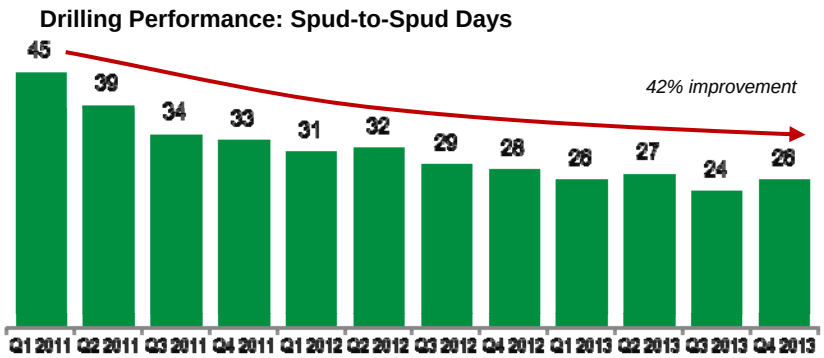

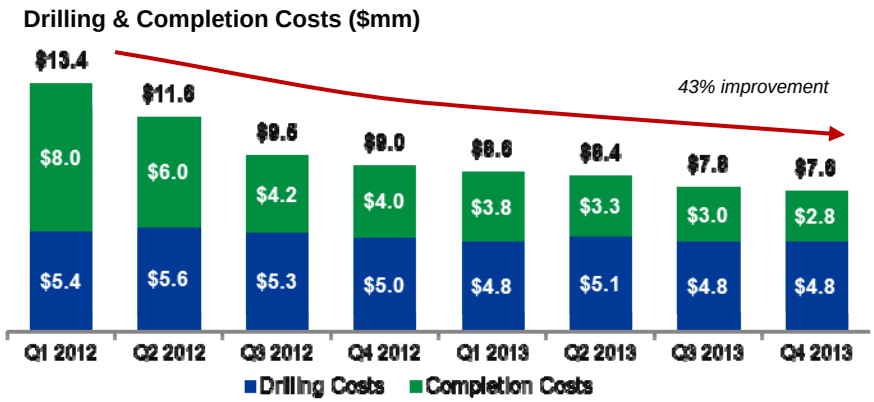

…While Optimizing Well Productivity

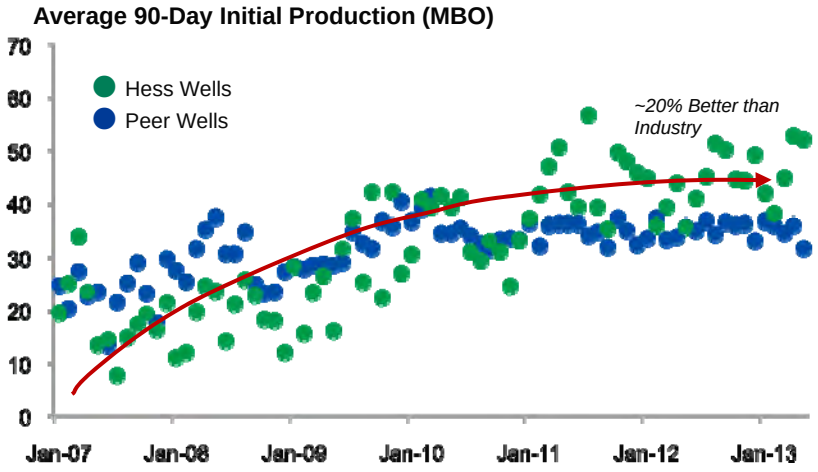

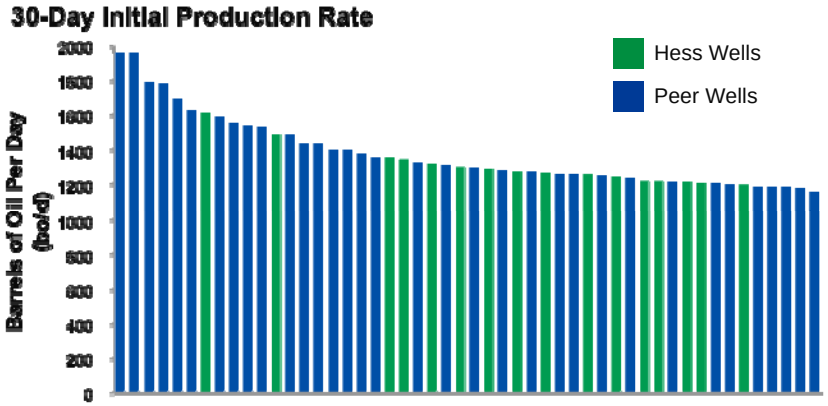

Hess Completed 16 of the Top 50 Wells in the Bakken since 2012

Source: NDIC Database

Significant Value Uplift From Bakken Infrastructure

- **Strategic / Portfolio Context**
  - Flexibility to access highest value markets
  - Maximize value per boe
  - Intend to monetize in 2015; maintain operating control

- **Asset Details**
  - **Tioga Rail Terminal**
    - 54 Mb/d capacity; expandable to 120 Mb/d
    - 9 crude oil train sets of 104 cars each
      - Entire fleet meets latest Petition 1577 standards
    - 240 Mbbls crude oil storage
    - 12 Mb/d NGL loading capacity
  - **Tioga Gas Plant**
    - Expansion from 110 Mmcf/d to 250 Mmcf/d
    - Increased NGL fractionation
    - Ethane sold under long-term contract
  - **Field Compression, Pipeline and Gathering Systems**

Core Position in Emerging Ohio Utica Shale Play

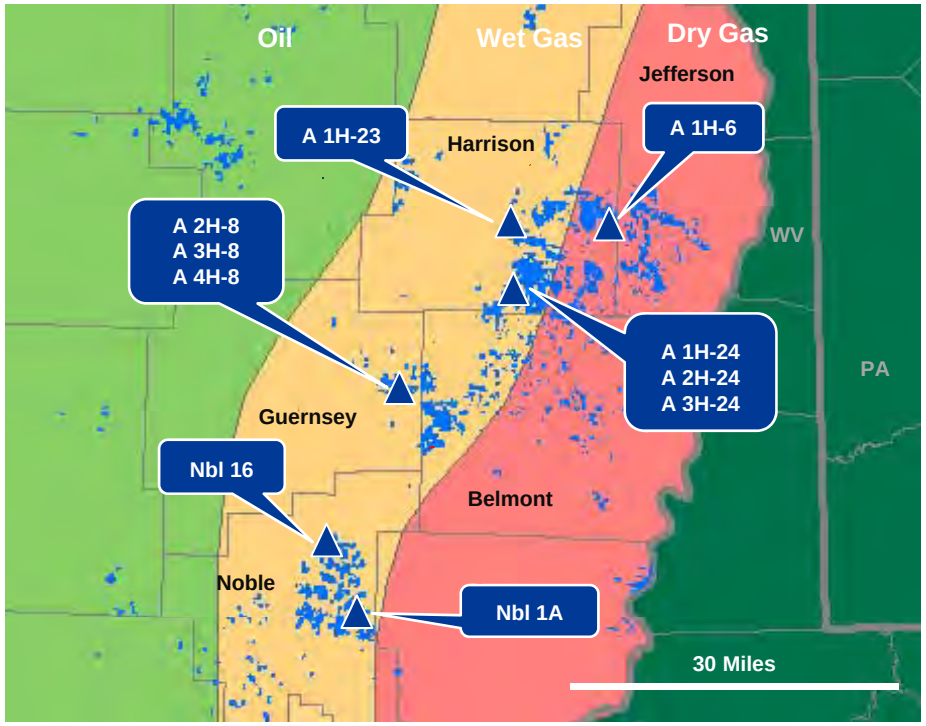

Well No	County	Well Test Result
Nbl 1A (Consol Op.)	Noble	1,950 boe/d, 39% Liquids
Nbl 16 (Consol Op.)	Noble	3,604 boe/d, 61% Liquids
Athens A 1H-24	Harrison	2,519 boe/d, 52% Liquids
Green A 1H-6	Harrison	1,432 boe/d, 20% Liquids
Cadiz A 1H-23	Harrison	2,251 boe/d, 57% Liquids
Athens A 2H-24	Harrison	2,489 boe/d, 48% Liquids
Athens A 3H-24	Harrison	2,111 boe/d, 49% Liquids
Oxford A 2H-8	Guernsey	1,421 boe/d, 66% Liquids
Oxford A 3H-8	Guernsey	1,211 boe/d, 65% Liquids
Oxford A 4H-8	Guernsey	1,819 boe/d, 67% Liquids

Strategic / Portfolio Context

- Material position in wet gas area
- Leverages Bakken capability
- 2014 focused on appraising wet gas acreage
- Shift from appraisal to development in 2015
- Sold 74,000 acres in the dry gas area for $924 million in January 2014

Asset Details

- 50% W.I; 96% gross N.R.I.
- ~42,000 core net acres
- ~32 wells planned in wet gas area in 2014
- Overall 2014 capex of $550 million

Valhall – Multi-Year Drilling Opportunities

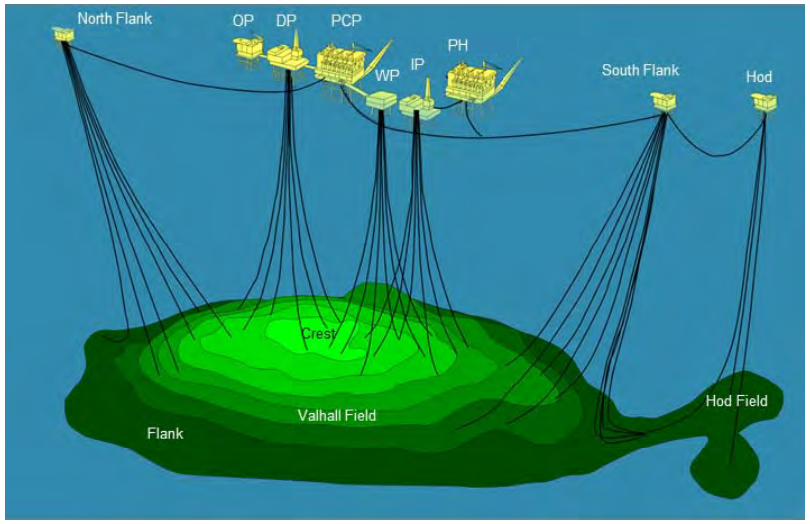

- **Strategic / Portfolio Context**
  - Long life, material asset; 3.2 Bboe originally in place (gross)
  - Key forward contributor to reserves, production and cash flow
  - Leverages chalk reservoir experience and capability
- **Asset Details**
  - Hess ~64% W.I.; BP operated
  - Field redevelopment completed 1Q13
  - Multi-year drilling program commenced in 2013
  - 2014 capex of $300 million
  - 2014 net production forecast is 30-35 Mboe/d
  - Net production goal of 40-50 Mboe/d by 2017

South Arne – High Margin with Exploitation Upside

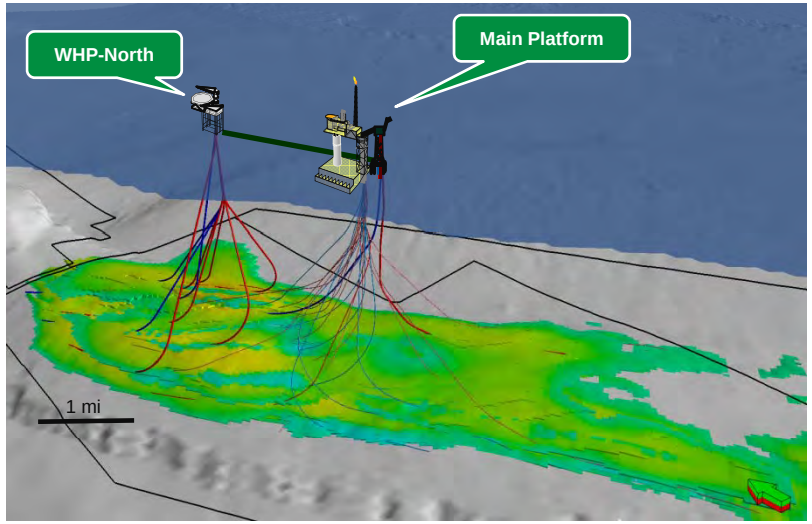

- **Strategic / Portfolio Context**
  - High margin and free cash flow
  - Exploitation upside through infill drilling and near field tie backs
  - Leverages chalk reservoir experience and capability
- **Asset Details**
  - Hess ~61% W.I., operator
  - Multi-year drilling program commenced in 2013
  - 2014 capex of $200 million
  - 2014 net production forecast is 10-15 Mboe/d
  - Net production goal of 15-20 Mboe/d by 2017

Equatorial Guinea Block G – 4-D Seismic Unlocking Value

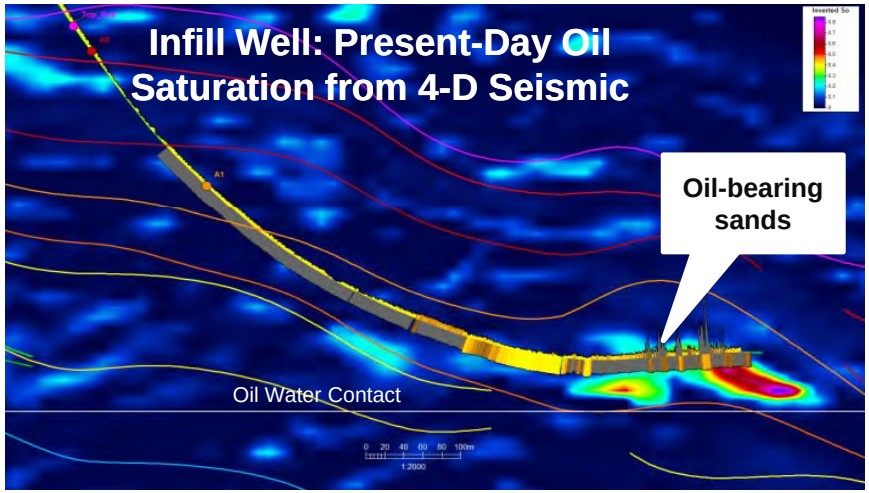

Strategic / Portfolio Context

- High margin and strong cash flow
- Material contributor to production
- 4D seismic has resulted in additional high value drilling opportunities to maintain production plateau
- Leverages deep water capability

Asset Details

- Hess 81% W.I., operator
- 2014 capex of $350 million
- Net production forecast is 40-45 Mboe/d in 2013-2015

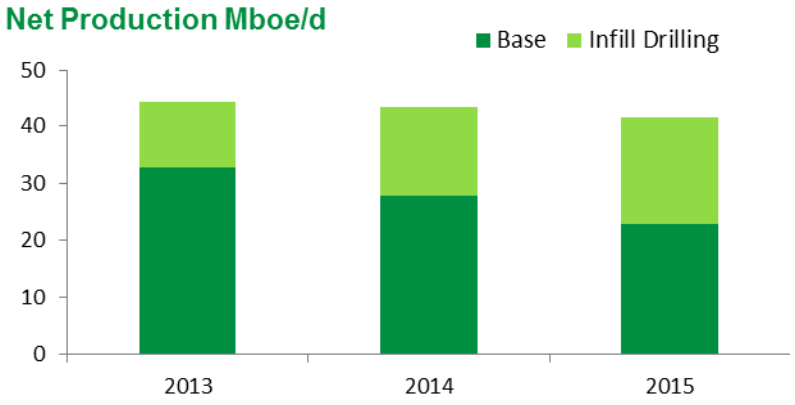

JDA – Material Production and Free Cash Flow

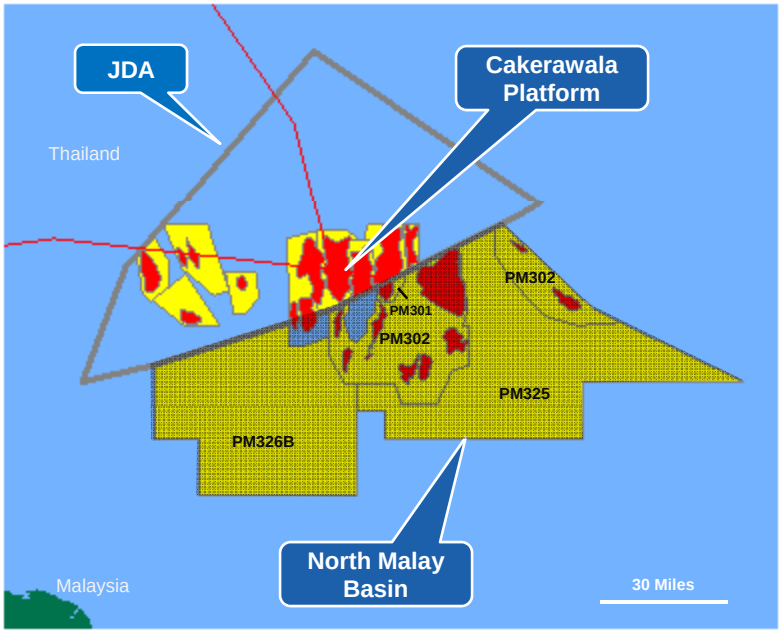

- **Strategic / Portfolio Context**
  - Low cost, long life gas asset
  - Material production and free cash flow
  - Exploitation upside
  - Leverages offshore development capabilities
- **Asset Details**
  - Hess 50% W.I.
  - 2014 capex of $300 million
  - 2014 net production forecast is ~250 MMcfe/d
  - Oil linked gas price
  - PSC through 2029

North Malay Basin – Low Risk Oil-Linked Gas Development

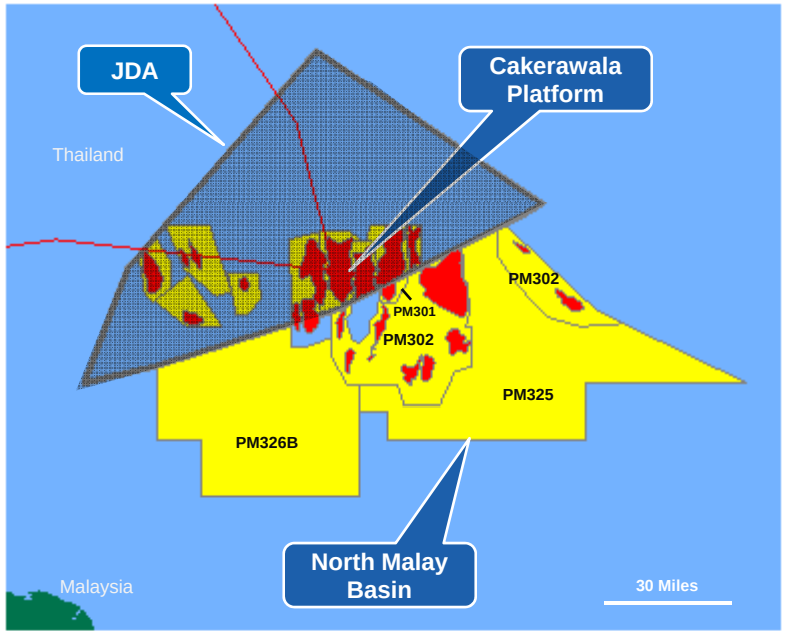

- **Strategic / Portfolio Context**
  - Low risk development of 9 discovered gas fields
  - Material production and free cash flow 2017+
  - Leverages JDA experience and capabilities
  - Material exploration upside
- **Asset Details**
  - Hess 50% W.I., operator
  - 2014 capex of $400 million
  - Early production forecast is 40 MMcf/d 2014-2016
  - Full field production forecast is 165 MMcf/d 2017+
  - Oil linked gas price
  - PSC through 2033

Deepwater Gulf of Mexico Portfolio

Strategic / Portfolio Context

- Target to maintain production of ~70 Mboe/d through 2017
- Material, high margin assets with successful exploitation track record
- Leverages proven deepwater capability
- Exploration upside

Asset Details

- Key producing assets: Shenzi, Conger and Llano
- Two major operated developments
  - Tubular Bells first production in 3Q14
  - Stampede sanction decision in 2H14
- Large acreage position in Miocene and Paleogene plays

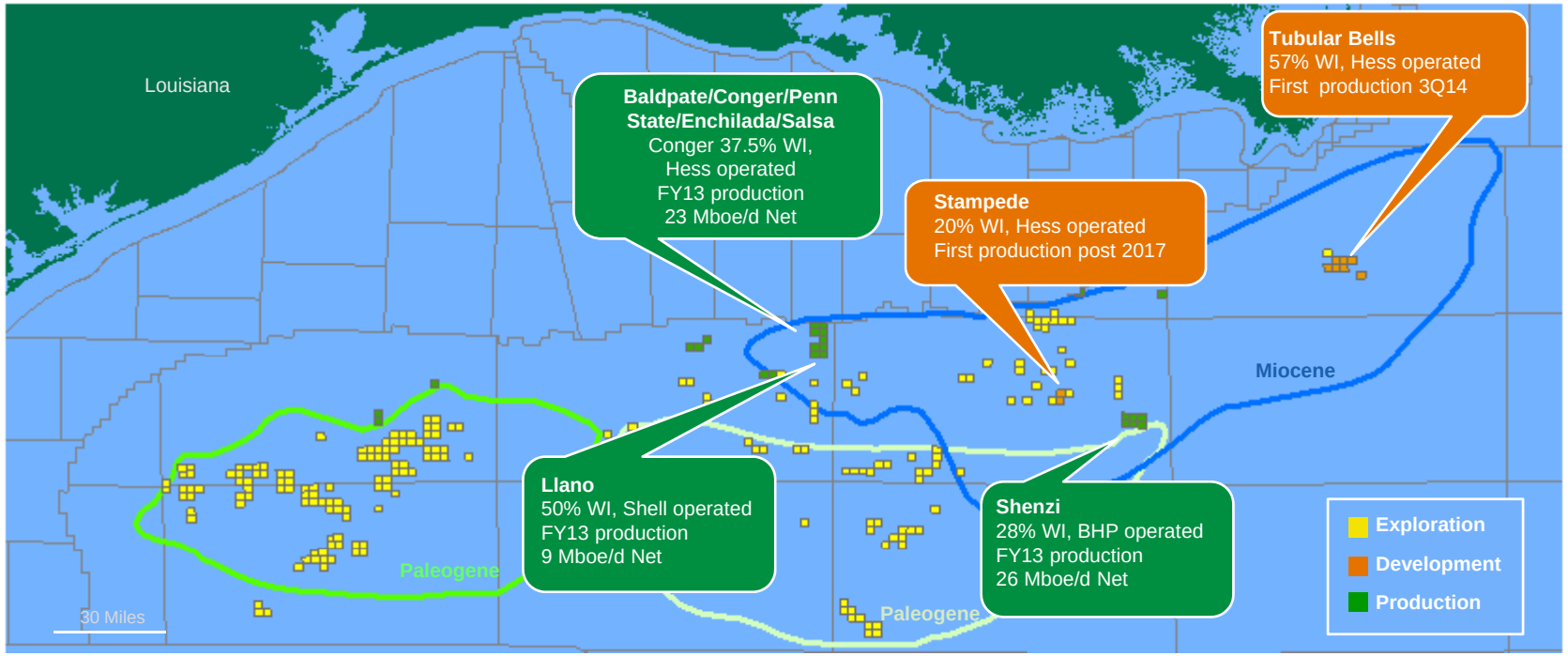

Tubular Bells – High Margin Asset; On Line 3Q14

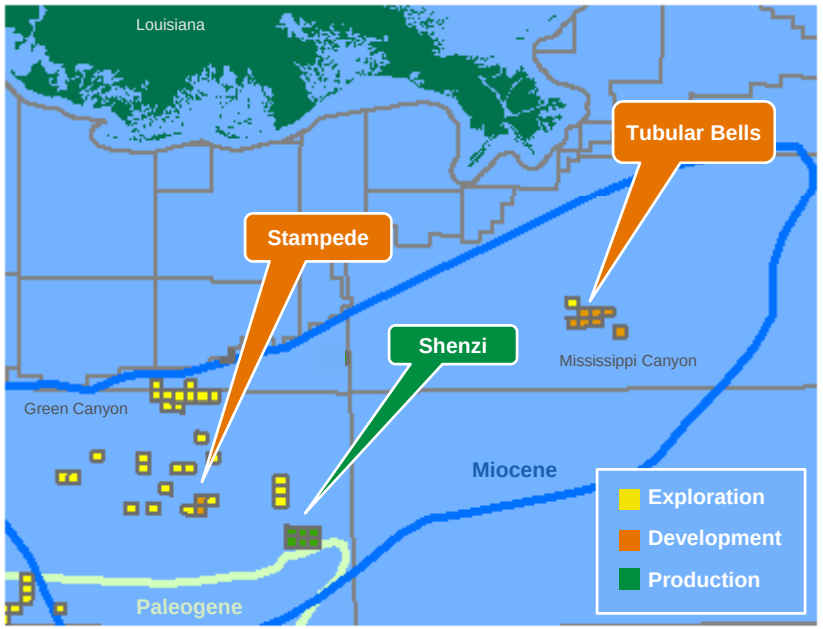

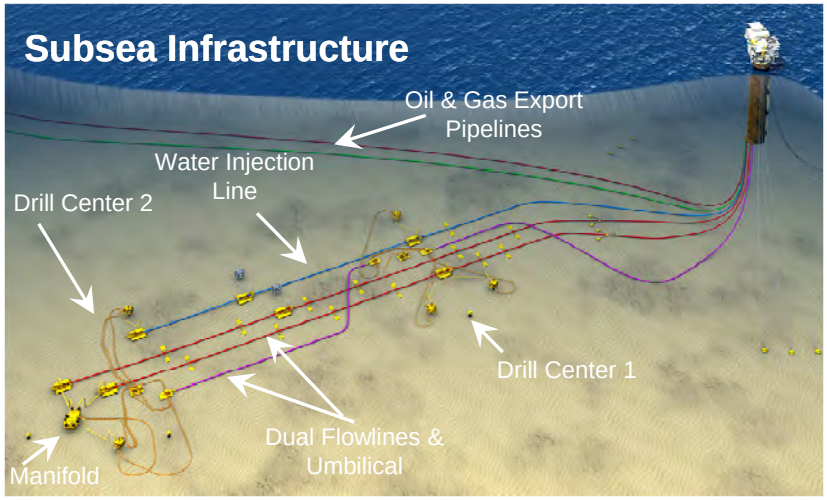

- **Strategic / Portfolio Context**
  - Material high margin asset
  - Key contributor to production growth and cash flow
  - Leverages deepwater capability
  - Recent drilling provides further upside
- **Asset Details**
  - Hess 57% W.I., operator
  - Water Depth: 4,400 feet
  - Subsea wells tied back to third party owned SPAR facility
  - 2014 capex of $400 million
  - First production targeted for 3Q14 at net rate of ~25 Mboe/d

Ghana – Deep Water Tano Cape Three Points

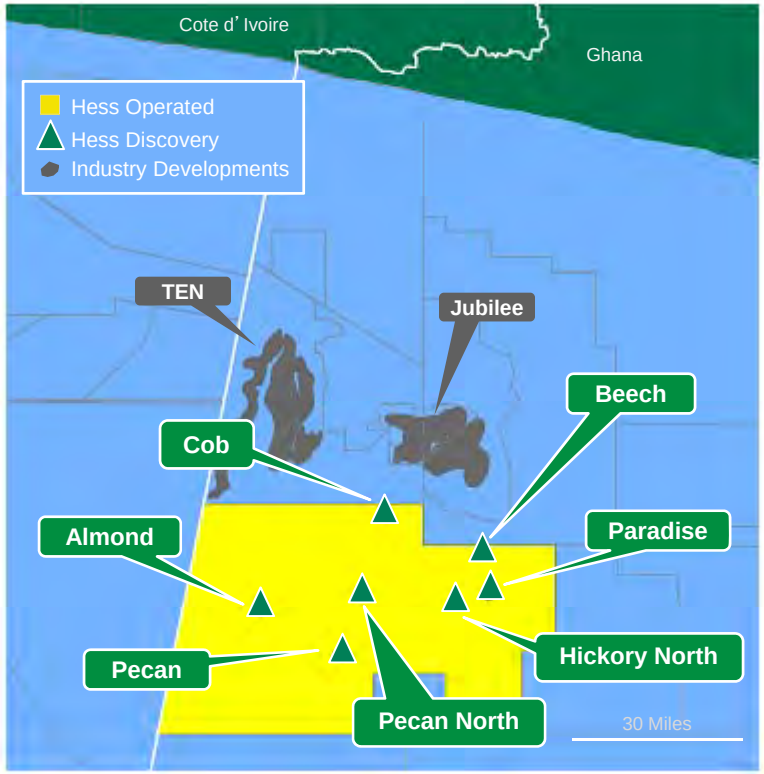

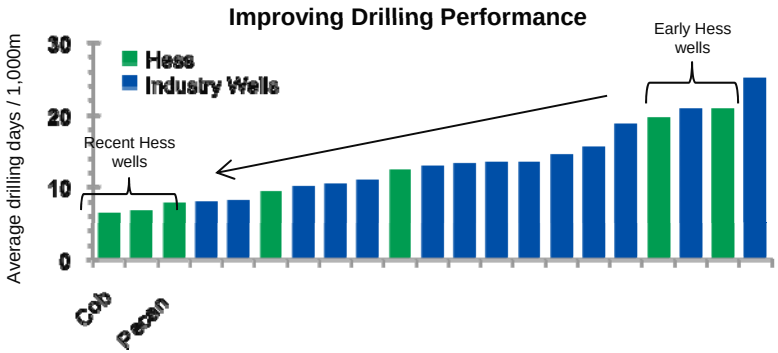

Source: Rushmore (West Africa drilling greater than 1,200 meters WD)

- Hess 90% W.I., operator
- 7 discoveries material to resource base
- Builds on West African deep water experience
- Industry leading well costs
- Pursuing partnership strategy
- Plan to drill 3 appraisal wells, commencing 2H14

Well Name	Completion Date	Net Pay (ft)	Hydrocarbon	Water Depth (ft)
Paradise-1	Jun-11	415	Oil and gas condensate	6,040
Hickory North-1	Jun-12	98	Gas condensate	6,455
Beech-1	Jul-12	146	Oil	5,623
Almond-1	Oct-12	53	Oil	7,251
Pecan-1	Dec-12	245	Oil	8,245
Cob-1	Jan-13	31	Oil	6,330
Pecan North-1	Feb-13	40	Oil	7,411

Kurdistan – Dinarta and Shakrok

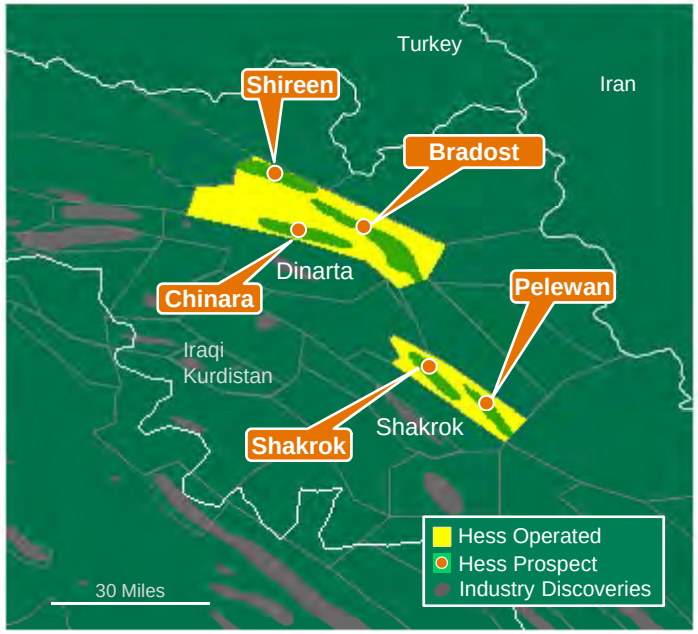

- Hess 64% W.I., operator
- Spud Shakrok in 3Q13; TD and production testing 2Q14
- Expect to spud Shireen in 2Q14
- Surface anticlines with oil seeps
- 8 recent nearby discoveries with >200MMboe each
- >425,000 gross acres

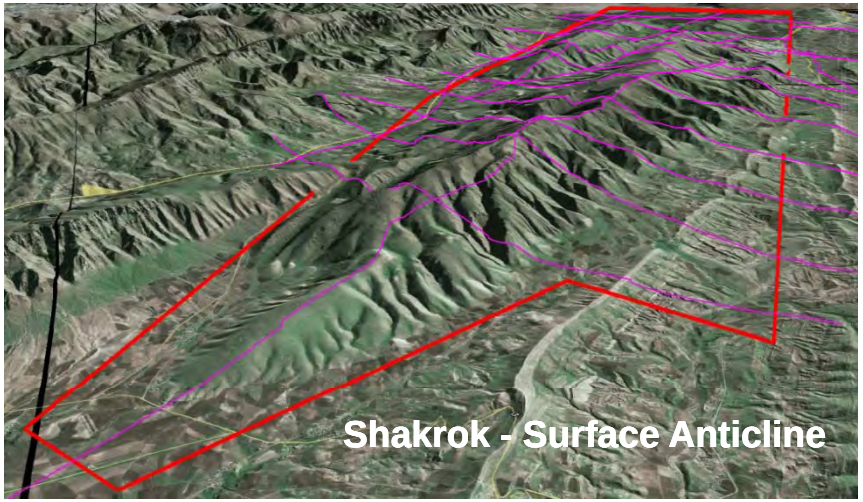

Pure Play E&P – Driving Shareholder Value

- **Focused World Class Portfolio**
- **Three Pronged Strategy to Drive Growth and Returns While Managing Risk**
- **Financial Flexibility to Fund Future Growth**
- **Providing Current Returns to Shareholders**

Continuing commitment to capital discipline

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

St. Paul Park Refining Co. LLC	)	
	)	
Complainant,	)	
	)	
v.	)	**Docket No. OR13-28-000**
	)	
Enbridge Pipelines (North Dakota) LLC	)	
	)	
Respondent.	)	

AFFIDAVIT OF ROBERT STEEDE
IN SUPPORT OF MOTION TO DISMISS AND ANSWER OF
ENBRIDGE PIPELINES (NORTH DAKOTA) LLC
IN RESPONSE TO COMPLAINT OF ST. PAUL PARK REFINING CO. LLC

Robert Steede, being first duly sworn, states as follows:

1. My business address is 2505 16 Street SW, Ste. 100, Minot, North Dakota, 58701.

2. My current position is Director at Enbridge Pipelines (North Dakota) LLC ("Enbridge North Dakota"), which I have held since September 2012. I am responsible for the safe and reliable operation of the Enbridge North Dakota system. Prior to becoming a Director, I was the Manager of Environmental Operations – U.S since October 2010.

3. I am providing this affidavit in support of the Motion to Dismiss and Answer of Enbridge North Dakota to the Complaint of St. Paul Park Refining Co. LLC.

4. The Enbridge North Dakota System originates in the Bakken oil fields in western North Dakota and extends east to Clearbrook, Minnesota. Enbridge North Dakota has embarked on a series of staged expansions to meet demand from the Bakken region, including the investment of more than $800 million. As a result, the capacity into Clearbrook increased from 80,000 barrels per day ("bpd") to approximately 210,000 bpd, and additional export capacity totaling 225,000 bpd has been created to serve connecting facilities at Berthold, North Dakota. This has been a benefit to shippers and the region as a whole by providing greater access to downstream markets.

5. Two of these expansions, known as the Phase 5 and Phase 6 expansions, were the subject of settlements approved by the Commission. Together, those expansions resulted in 81,000 bpd of expanded capacity into Clearbrook.

6. Following the Phase 5 expansion and earlier expansions, the demand for transportation continued to outpace the capacity of the Enbridge North Dakota system, resulting in prolonged prorationing. In response to shipper requests, Enbridge North Dakota developed the Phase 6 expansion. The Phase 6 expansion included significant improvements to the system, such as increased horsepower at twelve pump stations, measurement and station upgrades at Clearbrook, extensive use of Drag Reducing Agent ("DRA"), which enhances the capacity of a crude oil pipeline by facilitating flows, and installation of tankage at Beaver Lodge. Enbridge North Dakota undertook the Phase 6 Expansion Project in 2009 and 2010 at a cost of approximately $145 million. The Phase 6 expansion added approximately 40,000 bpd of capacity into Minot from the western end of the pipeline system and approximately 51,000 bpd of capacity from Minot to the

eastern end of the system at Clearbrook. The Clearbrook shippers were the intended beneficiaries of the Phase 6 expansion.

7. The cost recovery method for the Phase 6 expansion was established in a settlement approved by the Commission ("2008 Settlement"). Enbridge North Dakota relied on the 2008 Settlement to undertake the large investment necessary to complete the Phase 6 expansion. The settlement methodology, allowing Enbridge North Dakota to recover the costs of the expansion through a seven-year surcharge on all barrels to Clearbrook with an annual true-up to actual costs and volumes, was an essential part of Enbridge North Dakota's decision to go forward with the Phase 6 Expansion, which has benefitted shippers by providing increased capacity to Clearbrook and downstream markets during a time of booming production in the Bakken region. The provision limiting the application of the surcharge to Clearbrook volumes was an important aspect of the 2008 Settlement, because the Phase 6 expansion was designed to benefit, and would primarily benefit, shippers moving to Clearbrook as opposed to other destinations. The seven-year term of the Phase 6 surcharge was also a critical component of the 2008 Settlement on which Enbridge North Dakota relied in making its investment of $145 million in the Phase 6 Expansion Project. Since that time, the 2008 Settlement has functioned as intended. Because the surcharge is based on forecasted costs and volumes, the amount has fluctuated depending on various factors, including throughput on the system to Clearbrook. The annual true-up mechanism ensures the surcharge reflects actual costs and volumes, thereby protecting shippers from any over-recovery. Consistent with that methodology, the surcharge amount was lower in 2011 and 2012

than in 2010. The decrease in the surcharge in 2011 and 2012 was largely the result of Enbridge North Dakota's actions to increase capacity on the system through the sour removal project and total pipeline control project, but would not have been automatic without the 2008 Settlement. In 2010 and 2011 when the Settlement methodology resulted in a decrease in the surcharge, St. Paul Park accepted the Settlement mechanism without protest.

8. Subsequent to the Phase 6 expansion, Enbridge North Dakota continued its efforts to expand the system. In 2011, Enbridge North Dakota undertook a sour removal project and total pipeline control project, which further increased capacity without increasing tariff rates for shippers. The sour removal project consisted of eliminating segregated movements of sour crude oil on the system, which enabled Enbridge North Dakota to place all barrels in a continuous stream, thereby enhancing the capacity available to shippers. Along with increased use of DRA, the total pipeline control expansion improved communication between stations and increased line pressure protection which enabled a more efficient operating system, thereby increasing the capacity from 185,000 bpd to 210,000 bpd. Those two projects resulted in a total of 49,000 bpd of additional capacity into Clearbrook, bringing the total capacity to Clearbrook from its post-Phase 6 expansion level of 161,000 bpd to approximately 210,000 bpd.

9. At that point, the existing mainline between Beaver Lodge and Clearbrook had reached its maximum capacity without building a new parallel pipeline. In order to create additional export capacity from the Bakken without having to construct a new

pipeline to Clearbrook, Enbridge North Dakota (in coordination with affiliated pipelines) undertook the Bakken Expansion Program. That Program consisted of: (1) Enbridge North Dakota constructing a new line from Beaver Lodge to Berthold (the "Beaver Lodge Loop"); (2) the reversal and reopening of the Portal Line, which is a line extending north from Berthold to the U.S.-Canada border; and (3) the reversal and refurbishment of a pipeline from the U.S.-Canada border to Steelman, Saskatchewan, and the building of a new line from Steelman to Cromer, Manitoba, where that line connects to the Enbridge Mainline in Canada, permitting access to downstream markets via the Lakehead System in the U.S.

10. The Beaver Lodge Loop was originally planned with a capacity of 145,000 bpd to match the capacity of the two northbound segments between Berthold and Cromer. However, Enbridge North Dakota subsequently changed the design of the Beaver Lodge Loop so that its capacity was expanded to 225,000 bpd into Berthold. The additional 80,000 bpd of capacity on the Beaver Lodge Loop is available to feed a rail terminal at Berthold operated by an affiliated company (Enbridge Rail North Dakota LLC), which went into service in March 2013. The Berthold Rail Facility has a takeaway capacity of up to 80,000 bpd.

11. Enbridge North Dakota offered firm service on the Beaver Lodge Loop through open seasons held in 2010 and 2012 at rates set under the Transportation Service Agreements offered in the open seasons. Under the rate structure, the costs of the Beaver Lodge Loop are recovered from the shippers that deliver to Berthold (both committed and uncommitted) through the rates charged for movements to Berthold as a delivery point.

None of the costs of the Beaver Lodge Loop are recovered through the rates charged to shippers to Clearbrook. The Beaver Lodge Loop went into service on February 1, 2013. As is evident from the diagram below, the Beaver Lodge Loop created enough capacity to serve deliveries at Berthold.

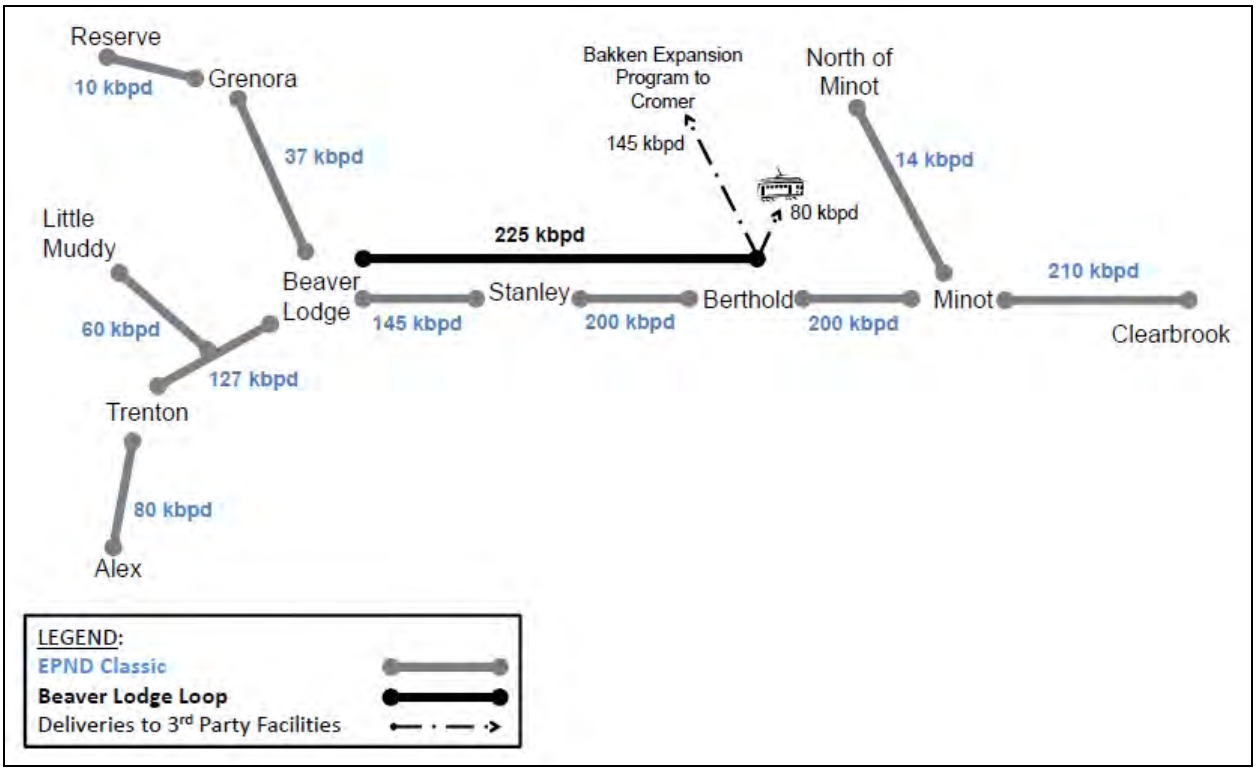

Accordingly, the capacity added through the Phase 6 expansion continued to be available for shippers who delivered into Clearbrook, as the 2008 Settlement anticipated.

12. The Phase 6 surcharge is not applied to the shippers that deliver their crude oil into Berthold, either into the Bakken pipeline going north or the Berthold Rail Facility. Instead, those shippers bear the costs of the more recent Beaver Lodge Loop Project. Similarly, shippers moving barrels to Clearbrook do not bear any costs of the Beaver Lodge Loop Project.

13. For the past four years, Enbridge North Dakota has calculated the Phase 6 surcharge according to the methodology as agreed to by shippers in the 2008 Settlement. The surcharge has fluctuated depending on various factors including capacity, volumes, and costs. To illustrate, below is a chart of the surcharge as filed each year:

Year	Surcharge
2010	$0.6078
2011	$0.3993
2012	$0.2257
2013	$0.8269

As shown in the chart, in 2011 and 2012 the surcharge decreased relative to the initial 2010 surcharge amount. This resulted primarily from Enbridge North Dakota's efforts to increase capacity on the system from about 160,000 bpd to about 210,000 bpd through the sour removal project and total pipeline control project, without increasing tariff rates for shippers. The surcharge mechanism automatically flowed the resulting rate decreases through to shippers.

14. As shown in the chart below, the throughput to Clearbrook began declining in November of 2012, before beginning to recover in the past three months.

Month	Enbridge North Dakota Deliveries in Barrels Per Day to Berthold Rail	Enbridge North Dakota Deliveries in Barrels Per Day to Clearbrook
January 2012		204,067
February 2012		206,403
March 2012		194,877
April 2012		203,535
May 2012		208,996
June 2012		209,481
July 2012		187,435
August 2012		200,038
September 2012		177,341
October 2012		186,594
November 2012		148,132
December 2012		123,064
January 2013		93,198
February 2013		96,038
March 2013	14,008	96,416
April 2013	21,351	70,083
May 13	31,530	108,725
June 2013	34,183	123,036
July 2013	28,850	126,036

The chart shows that there is no correlation between the monthly deliveries to Clearbrook and Berthold Rail. The throughput to Clearbrook began declining well before the Berthold Rail Facility became operational. The decline in volumes to Clearbrook began several months before the Berthold Rail Facility commenced service, and since that facility has been operating, the volumes to Clearbrook have increased substantially at the same time the Berthold volumes were increasing. The average volume transported to Clearbrook in January of 2012 was 204,067 bpd, while the average for January 2013 was less than half that amount at 93,198 bpd. All of that decline pre-dated the existence of

the Berthold Rail Facility and occurred due to shippers' individual nominating decisions based on crude price differentials, over which Enbridge North Dakota has no control. When there is a large price differential between crude oil prices in the midcontinent area and prices in the coastal regions (as existed in 2012 and the first half of 2013), shippers have an incentive to transport crude by rail carrier to the higher value markets so long as the differential exceeds the rail transport cost. Where the price differentials shrink (as has recently occurred), that incentive declines and shippers typically revert to pipeline movements of oil. The throughput moving to Clearbrook increased to an average of 123,036 bpd in June of this year, despite barrels moved at the new Berthold Rail Facility, which went into service in March. The barrels moved to the Berthold Rail Facility have to date been far less than the throughput decrease at Clearbrook.

15. Pursuant to the 2008 Settlement, Enbridge North Dakota filed a new rate in Tariff No. 72.22.0, updating the calculation of the Phase 6 surcharge for 2013 to 82.69 cents per barrel. In calculating the Phase 6 surcharge, Enbridge North Dakota forecasted total trunkline throughput at 160,000 bpd. The throughput estimate was conservative. In order to forecast throughput, Enbridge North Dakota assumed actuals for the months in which it had data, and then assumed the pipeline would operate at close to capacity for the remainder of the year. As shown in the chart, the actual volumes to date for 2013 have fallen below the projection, although volumes are expected to increase in the second half of the year. The surcharge is trued-up at the end of each year to actual volumes. In the true-up, any discrepancy between the forecasted throughput and actuals for the year is factored into the surcharge calculation for the next year. If Enbridge North Dakota's

throughput forecast for 2013 turns out to be higher than actual throughput for the year, Enbridge North Dakota will not retain any of the over-recovery. Instead, the discrepancy will be trued-up in the 2014 surcharge calculation, thereby returning the over-recovery amount to the shippers through a lower 2014 surcharge. The true-up eliminates any risk of harm to shippers resulting from Enbridge North Dakota's throughput forecast.

16. To the extent there are loading and unloading fees charged to shippers on the North Dakota system, they are imposed by third-party operators other than Enbridge North Dakota, and over which Enbridge North Dakota has no control. These rates are the subject of private agreements to which Enbridge North Dakota is not a party. The one fee Enbridge North Dakota does charge at Berthold is a terminal fee of 20.92 cents and it applies to all barrels gathering into or truck unloading onto Enbridge North Dakota facilities at Berthold, regardless of whether that barrel ultimately ends up at Berthold Rail, Clearbrook or other destinations sites.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and accurate.

August 14, 2013

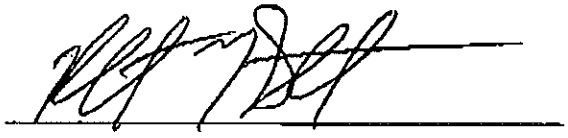

Richard Smith Surrebuttal Testimony
Friends of the Headwaters
Schedule 4
Exhibit _____

MarketWatch
THE WALL STREET JOURNAL.

Oct. 4, 2012, 2:24 p.m. EDT

Bakken crude prices rise as railroad reach grows

By Ben Lefebvre

HOUSTON--The rapidly growing crude oil flow out of North Dakota has broken out of its transportation bottleneck thanks to an expanding railway network, lifting prices for the crude and profits for those who pump it.

Bakken oil prices in September traded at a premium to U.S. crude benchmark West Texas Intermediate for the first time in nearly a year.

Much of the credit goes to the newly developed system of rail lines and terminals built by Tesoro Corp. (NYSE:TSO) , EOG Resources (NYSE:EOG) , Statoil ASA (NYSE:STO) and others, which have started hauling the crude from its geographically isolated source to refineries all over the country.

The growing availability of the North Dakota crude demonstrates how new sources of crude unleashed by hydraulic fracturing are rapidly changing the U.S. oil market. Bakken's wider reach is benefitting coastal refiners who had been dependent on more expensive imported crude, but dull the edge for those in the Midwest who had depended on its formerly steep discounts to pad their profit margins.

"Rail terminals are enabling shipments to St. James [Louisiana], East Coast and West Coast terminals, avoiding the traffic jam" at Cushing, Oklahoma, where most of the Bakken crude shipped via pipeline ends up, said Rusty Braziel, president of energy consulting firm RBN Energy. "This has pulled some barrels out of the pipelines and resulted in an overall tightening of the supply-demand balance."

Hess Corp. (NYSE:HES) , EOG and others had until recently produced more oil out of North Dakota's Bakken shale formation than pipeline and rail cars could haul, leading to a regional supply glut and discounted prices for the crude. Most Bakken crude that did travel through pipeline wound up at the Cushing, Okla., oil storage hub, which is under its own glut because of the recent boom in U.S. oil production resulting from hydraulic fracturing. The average Bakken discount since November 2011 was $7 below WTI, hitting as low as $28 in February, according to Platts data.

Bakken oil production in July reached 675,000 barrels a day, an all-time high and more than twice as much as could be carried by pipeline, according to the North Dakota Department of Mineral Resources. But as more rail lines and terminals have been built in the North Dakota region--Statoil said in August it is leasing more than 1,000 railroad cars to carry crude oil from North Dakota to refiners across North America--Bakken oil has still become available to more buyers, boosting its price.

At Clearbrook, Minn., where Bakken crude is loaded into a pipeline, Bakken oil cost $5 more than WTI for most of September, according to Platts.

"We have a big flexibility built into these crude-by-rail systems," said Bill Thomas, president of EOG Resources, which produced 56,400 barrels of oil equivalent a day in the Bakken last year and has spent three years building rail systems out of North Dakota. "We really take most of our crude mostly from the Bakken to the Gulf Coast and get a really good price," he said in a conference call with investors.

The Bakken premium will likely last until late 2013, when TransCanada Corp. (NYSE:TRP) , Enterprise Products Partners LP (NYSE:EPD) and other pipeline companies finish projects that will expand the amount of crude oil flowing out of the Cushing oil hub, according to a recent Raymond James report.

Once pipelines are in place, WTI will flow more efficiently to the U.S. Gulf Coast refining hub and Bakken crude prices will fall back while producers search for other markets for their crude, said Raymond James energy analyst Stacey Hudson. At that point, Bakken crude will once more have to fight for room in the marketplace.

"The question is, where do you want to send your Bakken barrels once Cushing gets fixed?," Ms. Hudson said.

More expensive Bakken crude eats into the advantage some refiners with ready access to it had. Tesoro, whose refineries in Mandan, North Dakota, and Anacortes, Wash., use the crude extensively, is especially apt to see its profit margins shrink as the Bakken price rises.

"There are a few refiners like Tesoro's Mandan refinery that are not enjoying as big a discount as they were last year," RBN Energy's Mr. Braziel said.

But Valero Energy Corp. (VLO) and other refiners still prefer it to the more expensive coastal crude, which can still cost up to $20 more.

"There's still incentive to run it," said Bill Day, spokesman for Valero, which runs 140,000 barrels a day of Bakken crude at its refinery in Memphis, Tenn.

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ENBRIDGE INCOME FUND HOLDINGS INC.

MANAGEMENT'S DISCUSSION AND ANALYSIS

December 31, 2013

MANAGEMENT'S DISCUSSION & ANALYSIS
FOR THE YEAR ENDED DECEMBER 31, 2013

This Management's Discussion and Analysis (MD&A) dated February 10, 2014 should be read in conjunction with the audited financial statements and notes thereto of Enbridge Income Fund Holdings Inc. (ENF or the Company) as at and for the year ended December 31, 2013, which are prepared in accordance with International Financial Reporting Standards (IFRS). Unless otherwise noted, all financial information is presented in Canadian dollars. Additional information related to the Company, including its Annual Information Form, is available on SEDAR at www.sedar.com.

OVERVIEW

ENF is a publicly traded corporation whose common shares trade on the Toronto Stock Exchange under the symbol ENF. The Company's business is limited to ownership of its interest in Enbridge Income Fund (the Fund) and its objective is to pay out a high proportion of available cash in the form of dividends to shareholders. At December 31, 2013, ENF held 85.6% (2012 – 84.5%) of the issued and outstanding trust units of the Fund, representing a 40.8% (2012 – 40.3%) overall economic interest in the Fund, with the balance held by Enbridge Inc. (Enbridge), a North American transporter, distributor and generator of energy. The Fund is involved in the generation, transportation and storage of energy through its interests in 579 (524 net) megawatts (MW) of renewable and alternative power generation capacity (Green Power), its liquids transportation and storage business in Western Canada (Liquids Transportation and Storage) and natural gas transmission through its 50% interest in the Canadian segment of Alliance Pipeline (Alliance Canada).

ENF Financial Performance

	Three months ended December 31,		Year ended December 31,	
	2013	2012	**2013**	2012
(thousands of Canadian dollars, except share and per share amounts)				
Distribution and other income	**23,102**	16,611	**91,044**	59,835
Earnings	**22,139**	16,591	**86,570**	59,828
Earnings per common share, basic and diluted	**$0.39**	$0.39	**$1.55**	$1.48
Cash flow from operating activities	**22,814**	13,975	**92,174**	53,071
Dividends declared	**19,233**	15,918	**75,264**	52,758
Dividends per common share	**$0.340**	$ 0.317	**$1.342**	$1.244
Total assets[1]			**1,346,926**	1,254,240
Number of common shares outstanding[1]			**56,491,000**	51,723,000

1 As at December 31, 2013 and 2012.

The Company's earnings and cash flows are derived from its investment in the Fund and are dependent upon its ownership interest, the level of cash distributions paid by the Fund, and income taxes.

The proceeds from an equity offering by the Company in February 2013 were used to subscribe for an additional 4,768,000 trust units of the Fund, increasing its overall ownership of Fund trust units to 85.6%. Effective with the November 2013 distribution, the Fund increased its distribution rate to $0.135 per Fund trust unit per month. As a result of the Fund's increased distribution rate and the Company's increased ownership interest, the Company realized incremental earnings during the year ended December 31, 2013 compared to the year ended December 31, 2012.

In December 2012, the Company increased its overall ownership of Fund trust units to 84.5% in connection with an equity offering by the Fund. The Fund used the proceeds to acquire a portfolio of crude oil storage facilities and wind and solar power generation facilities. The assets acquired included the Hardisty Contract Terminals, the Hardisty Storage Caverns, the 99 MW Greenwich Wind Project, the 15 MW Amherstburg Solar Project and the 5 MW Tilbury Solar Project (the Crude Oil Storage and Renewable Energy Assets). The contribution of incremental cash flows from this portfolio of assets enabled the Fund to increase its distribution rate to $0.134 per Fund trust unit per month effective with the December 2012 distribution. Comparatively, the Company received distributions equivalent to $0.121 per Fund trust unit per month during the first 11 months of 2012.

The Company incurs income taxes on distributions received from the Fund, the level of which will vary depending on the taxability of such trust distributions in any given year. To the extent a portion of the distribution represents a tax-free inter-corporate dividend or return of capital, cash tax will not be incurred on a portion of the distribution. The Company recorded current income tax expense on a portion of distributions received during the year ended December 31, 2013, whereas distributions received in the comparable period of 2012 were not taxable.

The Company's objective is to pay out a high proportion of available cash in the form of dividends to shareholders. The Company declared dividends totalling $75.3 million during the year ended December 31, 2013, a rate equivalent to $0.111 per common share per month for the first ten months and $0.115 per common share for November and December 2013. The 3% increase in the monthly dividend in November 2013 reflects organic growth of the Fund's existing asset base. This represents a payout ratio of 86.9% in 2013, compared to a payout ratio of 88.2% in 2012. Retained cash is expected to be used for future income tax payments and acts as a reserve to sustain dividends long term.

Enbridge Income Fund Financial Performance

A summary of financial information of the Company's investee, Enbridge Income Fund, derived from the Fund's consolidated financial statements prepared in accordance with U.S. GAAP, for the years ended December 31, 2013 and 2012 is provided below. Readers are encouraged to read the Fund's financial statements and MD&A which are filed on SEDAR at www.sedar.com.

Year ended December 31,	**2013**	2012
(thousands of Canadian dollars)		
Cash available for distribution, Enbridge Income Fund[1]		
Green Power	**155,823**	121,412
Liquids Transportation and Storage	**130,194**	74,151
Alliance Canada	**68,383**	70,850
Corporate	**(91,244)**	(70,863)
Cash available for distribution, Enbridge Income Fund	**263,156**	195,550
ECT preferred unit distributions	**(116,127)**	(80,798)
Cash retained	**(41,278)**	(41,177)
Cash distributions declared to trust unitholders by Enbridge Income Fund	**105,751**	73,575
Percentage of units held by ENF	**84.5%-85.6%**	80.7%-84.5%
Distribution and other income, ENF	**91,044**	59,835
Income tax	**(4,474)**	(7)
Earnings, ENF	**86,570**	59,828

1 See Non-GAAP Measures.

The Fund's cash available for distribution (CAFD) totaled $263.2 million for the year ended December 31, 2013, compared with $195.6 million for the prior year. The increase in CAFD was attributable to incremental cash flows from the portfolio of crude oil storage and wind and solar power generation facilities acquired in December 2012 and the Bakken Expansion which was placed into service in March 2013, offset partially by an increase in interest expense, associated with the debt incurred to finance a portion of the acquisition.

FORWARD-LOOKING INFORMATION

In the interest of providing the Company's shareholders and potential investors with information about the Company and its investee, the Fund, and the Fund's subsidiaries and joint ventures, including management's assessment of future plans and operations of the Company and the Fund, certain information provided in this MD&A constitutes forward-looking statements or information (collectively, "forward-looking statements"). This information may not be appropriate for other purposes. Forward-looking statements are typically identified by words such as "anticipate", "expect", "project", "estimate", "forecast", "plan", "intend", "target", "believe" and similar words suggesting future outcomes or statements regarding an outlook. In particular, forward-looking statements include:

- *expected earnings or earnings per share;*
- *expected costs related to projects under construction;*
- *expected scope and in-service dates for projects under construction;*
- *expected timing and amount of recovery of capital costs of assets;*
- *expected capital expenditures;*
- *expected future dividends, Fund distributions and taxability thereof;*
- *the Fund's expected cash available for distribution; and*
- *expected future actions of regulators.*

Although the Company believes that these forward-looking statements are reasonable based on the information available on the date such statements are made and the processes used to prepare the information, such statements are not guarantees of future performance and readers are cautioned against placing undue reliance on forward-looking statements. By their nature, these statements involve a variety of assumptions, known and unknown risks and uncertainties and other factors, which may cause actual results, levels of activity and achievements to differ materially from those expressed or implied by such statements. Material assumptions include assumptions about: the expected supply and demand for crude oil, natural gas, natural gas liquids and green energy; prices of crude oil, natural gas, natural gas liquids and green energy; expected exchange rates; inflation; interest rates; the availability and price of labour and construction materials; operational reliability; customer project approvals; maintenance of support and regulatory approval for the Fund's projects; anticipated in-service dates; and weather. Assumptions regarding the expected supply and demand of crude oil, natural gas, natural gas liquids and green energy, and the prices of these commodities, are material to and underlay all forward-looking statements. These factors are relevant to all forward-looking statements as they may impact current and future levels of demand for the Fund's products and services. Similarly, exchange rates, inflation and interest rates impact the economies and business environments in which the Company and the Fund operate, may impact levels of demand for the Fund's products, services and cost of inputs, and are therefore inherent in all forward-looking statements. Due to the interdependencies and correlation of these macroeconomic factors, the impact of any one assumption on a forward-looking statement cannot be determined with certainty, particularly with respect to expected earnings and associated per unit or per share amounts, or estimated future distributions or dividends. The most relevant assumptions associated with forward-looking statements on projects under construction, including estimated in-service dates and expected capital expenditures, include: the availability and price of labour and construction materials; the effects of inflation on labour and material costs; the effects of interest rates on borrowing costs; and the impact of weather, customer and regulatory approvals on construction schedules.

The Company's forward-looking statements and forward-looking statements with respect to the Fund are subject to risks and uncertainties pertaining to operating performance, regulatory parameters, project approval and support, weather, economic and competitive conditions, changes in tax law, tax rates, exchange rates, interest rates and commodity prices, including but not limited to those risks and uncertainties discussed in this MD&A and in the other filings of the Company and the Fund with Canadian securities regulators. The impact of any one risk, uncertainty or factor on a particular forward-looking statement is not determinable with certainty as these are interdependent and the Company's and the Fund's future course of action depends on management's assessment of all information available at the relevant time. Except to the extent required by law, the Company and the Fund assume no obligation to publicly update or revise any forward-looking statements made in this MD&A or otherwise, whether as a result of new information, future events or otherwise. All subsequent forward-looking statements whether written or oral, attributable to the Company or the Fund or persons acting on the Company's or the Fund's behalf, are expressly qualified in their entirety by these cautionary statements.

NON-GAAP MEASURES

This MD&A contains references to the Fund's cash available for distribution (CAFD). CAFD represents the Fund's cash available to fund distributions on trust units and Enbridge Commercial Trust (ECT) preferred units as well as for debt repayments and reserves. CAFD consists of operating cash flow from the Fund's underlying businesses less deductions for maintenance capital expenditures, the Fund's administrative and operating expenses, corporate segment interest expense, applicable taxes and other reserves determined by the Manager of the Fund. This measure is important to shareholders as the Company's objective is to provide a predictable flow of dividends to shareholders and the Company's cash flows are derived from its investment in the Fund. CAFD is not a measure that has standardized meaning prescribed by United States Generally Accepted Accounting Principles (U.S. GAAP) and is not considered a GAAP measure. Therefore, this measure may not be comparable with similar measures presented by other issuers.

CORPORATE STRUCTURE

ENF was incorporated on March 26, 2010 under the *Business Corporations Act* (Alberta) (ABCA) for the sole purpose of participating in the Plan of Arrangement (the Plan) to restructure the Fund, which became effective December 17, 2010. Pursuant to the Plan, all publicly held units of the Fund and 5,000,000 units held by Enbridge were exchanged on a one-for-one basis for common shares of the Company, resulting in the Company owning 25,125,000, or 72.6%, of the Fund's issued and outstanding trust units. The Company's common shares commenced trading on the Toronto Stock Exchange on December 21, 2010 under the symbol ENF.

In October 2011, the Company subscribed for 14,616,000 trust units of the Fund at a price of $18.75 per unit to partially fund the Fund's acquisition of three renewable power generation facilities owned by subsidiaries of Enbridge (the 2011 Transaction). The assets acquired were the 80 MW Sarnia Solar Project, the 190 MW Ontario Wind Project and the 99 MW Talbot Wind Project. Following the 2011 Transaction and related equity financing by the Fund, the Company held 39,741,000, or 80.7%, of the Fund's issued and outstanding trust units.

In December 2012, the Company subscribed for 11,982,000 trust units of the Fund at a price of $23.15 per unit to partially fund the Fund's acquisition of crude oil storage facilities and three renewable power generation facilities owned by Enbridge and subsidiaries of Enbridge (the 2012 Transaction). Following the 2012 Transaction and related equity financing by the Fund, the Company held 51,723,000 or 84.5%, of the Fund's issued and outstanding trust units.

The proceeds from an equity offering by the Company in February 2013 were used to subscribe for an additional 4,768,000 trust units of the Fund at a price of $25.00 per common share, increasing its overall ownership of trust units of the Fund to 56,491,000, or 85.6%. The Fund used the proceeds of the issuance to repay debt used to fund capital expenditures and to partially fund ongoing capital expenditures associated with its organic expansion strategy.

The Company is managed by Enbridge Management Services Inc. (EMSI or the Manager), a wholly-owned subsidiary of Enbridge. EMSI also manages the Fund and the Fund's subsidiary Enbridge Commercial Trust (ECT).

STRATEGY

The Company's business is limited to the ownership of its interest in the Fund. The Company's objective is to provide a predictable flow of cash dividends to its investors.

The Fund's strategy is focused on:

- maximization of the efficiency and profitability of its existing assets while ensuring safe and reliable operations;
- pursuing organic growth and expansion opportunities; and
- acquisition and development of energy infrastructure businesses that are complimentary and consistent with the risk and return profile of its existing business.

Each of the Fund's businesses is closely focused on system performance and operating effectiveness. Green Power strategies are driven by the objective to manage and maintain its facilities in such a way to maximize power generation and related revenue when the relevant wind, solar or waste heat energy resource is available. The Liquids Transportation and Storage business in Saskatchewan is focused on attracting new volumes to the System through increasing customer connections while working with customers to create reliable transportation solutions and toll structures to retain and attract growing regional production over the long term. The Liquids Transportation and Storage business at Hardisty, Alberta, is situated at a major hub for aggregating and exporting crude oil out of the Western Canadian Sedimentary Basin (WCSB). It is focused on connecting Canada's oil producers to markets in eastern Canada and the United States. Alliance Canada is implementing solutions to enhance its unique capability to safely and cost-effectively transport liquids rich gas (gas with a high component of inherent natural gas liquids) to attract growing production of high-value, liquids rich gas in the WCSB.

The expansion and extension of existing systems and facilities has been a significant driver of growth in recent years and the Fund continued to execute on its organic expansion strategy during 2013. The Bakken Expansion Program undertaken within Liquids Transportation and Storage was declared in service on March 1, 2013, bringing 145,000 barrels per day (bpd) of new capacity to producers in the Bakken region in North Dakota. The Fund continues to actively search for new opportunities to profitably grow the footprint of its existing assets and announced a $25 million Rail Interconnection Project in January 2014.

The Fund also seeks to achieve growth through acquisitions of complimentary energy infrastructure. In 2012 the Company delivered strong dividend growth through acquisitions from its sponsor, Enbridge. The assets acquired are all underpinned by long-term fixed price contracts which generate steady cash flow and lower the Fund's risk profile.

Preservation of financial flexibility will continue to be a strategic priority. Ongoing access to cost effective sources of debt and equity capital is critical to the successful execution of the Fund's strategy to expand existing assets and acquire or develop new energy infrastructure.

ENBRIDGE INCOME FUND RECENT DEVELOPMENTS

Cromer Rail Interconnection Project

On January 29, 2014, the Fund announced plans to construct a pipeline interconnection that will connect the Westspur System and Bakken Expansion to a crude oil rail terminal near Cromer, Manitoba. The estimated cost of the project is $25 million and is expected to be in-service in the fourth quarter of 2014. The project is fully backstopped by the operator of the crude oil rail terminal pursuant to a five-year Financial Support Agreement. In addition, the Fund has an option to acquire 50% of the rail terminal which is currently capable of handling 30,000 bpd and is expandable to 60,000 bpd.

Westspur Settlement
On April 1, 2013, the Fund announced it concluded a settlement (the Settlement) with a group of shippers relating to new tolls on the Westspur System. At the request of certain shippers that did not execute the Settlement, the National Energy Board (NEB) did not remove the interim status from the historical tolls and made the new tolls interim as well. A modified agreement was subsequently entered into with substantially all of the shippers, and such shippers requested the NEB make both the historical tolls and the new tolls (collectively, the "Tolls") final. On February 6, 2014, the NEB ordered the Tolls final.

The Settlement establishes a toll methodology for an initial term of five years and will renew for additional one year terms thereafter unless otherwise terminated. Pursuant to the Settlement, the tolls on the Westspur System are fixed and increase annually with reference to an inflation index, subject to throughput remaining within a prescribed volume band close to volumes recently transported on the Westspur System. To preserve a relatively stable cash flow profile, toll surcharges or discounts will be applied should throughput increase or decrease on a sustained basis outside this pre-defined band. Additionally, tolls will be increased should integrity or regulatory costs exceed defined thresholds or if new capital projects are undertaken.

The Settlement resulted in the discontinuance of rate regulated accounting for the Westspur System and as such the Fund recorded an after-tax write-off of $12.0 million in the first quarter of 2013 related to previously-recorded deferred revenue which will not be collected under the terms of the Settlement. The financial impact of the Settlement is not expected to materially affect the Fund's consolidated financial prospects, distribution coverage or practices.

Bakken Expansion
The Bakken Expansion was undertaken to expand crude oil pipeline capacity to accommodate growing production from the Bakken and Three Forks formations located in North Dakota. This project, undertaken by the Fund in Canada and Enbridge Energy Partners (EEP), a party related to Enbridge, in the United States, reversed and expanded an existing pipeline, running from Berthold, North Dakota, to Steelman, Saskatchewan, and constructed a new 16-inch pipeline from a new pump station near Steelman to the Enbridge terminal near Cromer, Manitoba. It was placed into service in March 2013, providing capacity of 145,000 bpd to producers in North Dakota. Expenditures incurred by the Fund for the Canadian portion of the project through December 31, 2013 were approximately $165 million. After completion of site remediation and post-implementation expenditures, the total cost of the Canadian portion of the Bakken Expansion is expected to be under the original budget of approximately $190 million.

As a result of high crude oil differentials between local delivery points and markets not serviced by downstream pipelines, capacity was not well utilized in 2013. Crude differentials narrowed and throughputs improved modestly in the second half of 2013. The Fund continues to collect cash tolls regardless of actual system throughput pursuant to firm take-or-pay commitments totaling 100,000 bpd, a portion of which are subject to a waiver of 25% of the take-or-pay amount in 2013.

Whitecourt Recovered Energy Project
The Whitecourt Recovered Energy Project is a new waste heat recovery facility being constructed by NRGreen, adjacent to a compressor station on the Alliance Pipeline near Whitecourt, Alberta. The Fund has contributed approximately $42 million as at December 31, 2013 to the Whitecourt Recovered Energy Project. Completion of the project has been delayed due to various construction and equipment delivery challenges. Originally scheduled to be completed in 2013, completion is now anticipated to occur in the second quarter of 2014.

ENBRIDGE INCOME FUND OPERATIONAL OVERVIEW

The performance of the Company's investment in the Fund is ultimately derived from the underlying operating segments through which the Fund executes its low-risk business strategy. An overview of the Fund's operating segments, Green Power, Liquids Transportation and Storage and Alliance Canada is provided below.

Green Power

Overview

Green Power includes assets that produce electricity from renewable and alternative energy sources. Each of the wind and solar assets is currently operating and has full-service operations and maintenance contracts with third parties. The cost to generate electricity through wind and solar resources is significantly lower than most other technologies, given the absence of fuel costs.

Green Power consists of the following:

Wind Projects

The Fund has a 100% interest in the following projects which have an aggregate power generation capacity of 388 MW:

- The Ontario Wind Project, located near Lake Huron, Ontario, utilizes 115 turbines with an aggregate capacity of 190 MW.
- The Talbot Wind Project, located on the north shore of Lake Erie, Ontario, utilizes 43 turbines with an aggregate capacity of 99 MW.
- The Greenwich Wind Project, located on the north shore of Lake Superior, Ontario, utilizes 43 wind turbines with an aggregate capacity of 99 MW.

All power produced from these wind projects is sold to the Ontario Power Authority (OPA) pursuant to power purchase agreements (PPAs) which expire between 2028 and 2031.

The Fund also has interests in three wind power projects with a net capacity of 26 MW including:

- A 50% interest in the SunBridge Wind Project at Gull Lake, Saskatchewan, which utilizes 17 turbines with an aggregate capacity of 11 MW (6 MW net to the Fund).
- A 33% interest in each of the Magrath and Chin Chute Wind Projects in southern Alberta, each utilizing 20 turbines with an aggregate capacity of 30 MW per project (10 MW per project net to the Fund).

The power from SunBridge is delivered into the Saskatchewan power grid, while the energy produced at Magrath and Chin Chute is delivered into the Alberta power grid. Power price swap agreements, which are in place to mitigate the risk of fluctuating power prices in Alberta, expire between 2017 and 2024.

Solar Projects

The Fund has a 100% interest in the following solar generation projects with an aggregate capacity of 100 MW:

- The Sarnia Solar Project, an 80 MW solar project located near Lake Huron, in Sarnia, Ontario, comprised of approximately 1.3 million thin film panels with a surface area of 966,000 m^2.
- The Amherstburg Solar Project, a 15 MW solar project near Sarnia, Ontario, comprised of approximately 0.2 million thin film panels with a surface area of 175,700 m^2.
- The Tilbury Solar Project, a 5 MW solar project located near Sarnia, Ontario, comprised of 0.1 million thin film panels with a surface area of 67,700 m^2.

All power produced from these solar projects is sold to the OPA pursuant to PPAs which expire between 2028 and 2031.

In response to amendments passed by Ontario's Independent Electricity System Operator (IESO) in November 2012 which would allowed curtailment of intermittent generators in times of surplus generation, the Fund and other renewable power generators reached an agreement with the OPA in February 2013 to amend certain existing PPAs to include both annual and contract term curtailment caps beyond which renewable power generators will be compensated for forgone production. The Fund expects uncompensated curtailment, which will impact the Ontario Wind Project, Talbot Wind Project and Greenwich Wind Project, to be less than 1% of the operating hours of the affected assets both annually and over the life of the PPAs.

NRGreen
The Fund also has a 50% interest in NRGreen. NRGreen operates four waste heat recovery facilities with an aggregate capacity of 20 MW (10 MW net to the Fund), all of which are located in Saskatchewan at compressor stations along the Alliance Pipeline. The first facility located at Kerrobert, Saskatchewan has been operating since December 2006. The three other facilities, located in Loreburn, Estlin and Alameda, Saskatchewan, began operations during 2008. Electricity is generated by harnessing the waste heat produced by gas turbines at Alliance Canada's compressor stations and converting the waste heat to electrical energy.

The power generated from the NRGreen facilities is sold under long-term PPAs to SaskPower. The PPAs expire ten years after the in-service date for each facility with two five-year options to renew at NRGreen's election, to provide an additional ten-year extension to the initial PPA term.

Liquids Transportation and Storage

Overview
The Fund's Liquids Transportation and Storage business serves customers in Western Canada and North Dakota and includes the Saskatchewan System which transports crude oil and natural gas liquids (NGLs) from producing fields and facilities in southeastern Saskatchewan, southwestern Manitoba and North Dakota to Cromer, Manitoba where the crude oil and NGLs enter Enbridge's Mainline System to be transported to the United States or eastern Canada. Liquids Transportation and Storage also includes related terminals and tankage facilities in Saskatchewan and the Hardisty Contract Terminals and Hardisty Storage Caverns located near Hardisty, Alberta, a key crude pipeline hub in Western Canada.

Collectively referred to as the Saskatchewan System, the Saskatchewan Gathering, Westspur, Weyburn and Virden pipeline systems, as well as the Canadian portion of the Bakken Expansion, collectively comprise approximately 545 kilometres of trunk line and approximately 1,800 kilometres of gathering pipeline. The Bakken Expansion is a joint project which further expands crude oil pipeline capacity to accommodate growing production from the Bakken and Three Forks formations located in North Dakota. The capacity of each of the Saskatchewan Gathering and the Westspur Systems is 255,000 bpd, the capacity of the Weyburn and Virden Systems is approximately 47,000 bpd and 37,000 bpd, respectively, and the capacity of the Bakken Expansion is 145,000 bpd. The Saskatchewan System also includes storage terminals and tankage facilities in Saskatchewan, comprised of 21 above ground storage tanks with total capacity of approximately 450,000 barrels.

The Saskatchewan Gathering System tolling agreement is designed to provide toll revenues sufficient to recover operating costs, depreciation, deemed interest expense, deemed income tax, a return on rate base and an administrative expense allowance. The rate base upon which the equity return is calculated will change over time due to depreciation as well as maintenance and enhancement capital additions and expansions. Tolls on the Westspur, Weyburn and Virden Systems are based on agreements with customers, and are updated to reflect changes in market conditions when warranted. Tolls on the Bakken Expansion are based on long term take-or-pay agreements with anchor shippers, market-based tolls for spot capacity and the recovery of operating costs incurred. Earnings from the Westspur, Weyburn, Virden and Bakken Systems reflect toll revenue less costs incurred.

The Hardisty Contract Terminals are located adjacent to Enbridge's Mainline System terminal in Hardisty, Alberta and are comprised of 18 above ground crude oil storage tanks, ranging in size from 250,000 to 560,000 barrels, and one above ground condensate storage tank with a capacity of 250,000 barrels, which together have an aggregate storage capacity of 7.5 million barrels. The Hardisty Storage Caverns are comprised of four underground salt caverns and two above ground storage tanks, with approximately 3.5 million barrels of storage capacity. The above ground storage tanks are used primarily to facilitate movement of crude oil in and out of the caverns, as well as limited trim blending of product when operationally required. Each of the Hardisty assets has long-term take-or-pay storage contracts in place with credit-worthy counterparties in respect of virtually all of their storage capacity. Most of the revenue received under the storage contracts is comprised of fixed fees for storage capacity, with a small component derived from usage fees for services which vary with demand. Upon expiry or termination of existing contracts, Enbridge will enter into escalating take-or-pay contracts with the Fund for an additional 15 years at the then prevailing contract rate. The proximity of the Hardisty storage facilities, which are adjacent to Enbridge's Mainline System operational terminal and at the junction of various regional receipt and export pipelines, make it an attractive option for oil producers to manage their operational needs and the effects of price swings.

Alliance Canada

Overview
Alliance Canada consists of 1,560 kilometres of the Alliance System's natural gas mainline pipeline beginning near Gordondale, Alberta and connecting to Alliance US at the Canada/United States border near Elmore, Saskatchewan. Alliance Canada also includes the Alliance System's lateral pipelines, which connect the mainline to a number of upstream receipt points, primarily at natural gas processing facilities in northwestern Alberta and northeastern British Columbia, and related infrastructure.

The Alliance System is designed to transport 1,325 million cubic feet per day of natural gas on a firm service basis primarily from supply areas in northwestern Alberta and northeastern British Columbia to delivery points near Chicago, Illinois. Additional transportation capacity is available to shippers for no additional cost other than the cost of the associated fuel requirements through Authorized Overrun Service (AOS).

Alliance Canada has transportation service agreements (TSAs) with shippers for substantially all of its available firm transportation capacity. The TSAs are designed to provide toll revenues sufficient to recover prudently incurred costs of service, including operating and maintenance, depreciation, an allowance for income tax, costs of indebtedness and an allowed return on equity of 11.26% after tax, based on a deemed 70/30 debt/equity ratio. The initial term of the TSAs expires in December 2015, with the exception of a small proportion of shippers that have elected to extend their contracts beyond 2015.

Tolls and tariffs for Alliance Canada are regulated by the NEB. Toll adjustments, based on variances between the cost of service forecast used to calculate the toll and the actual cost of service, are made annually. Following consultation with shippers, amended tolls are filed annually with the NEB.

Alliance Canada expects to continue to be competitive with other export pipelines given its geographic positioning and its ability to efficiently move liquids-rich gas to market. It is seeking to secure new term contracts for capacity for periods beyond 2015 and is in the process of discussing its service offerings with the shipper community.

LIQUIDITY AND CAPITAL RESOURCES

The cash distributions the Company receives from its investment in the Fund are its primary source of liquidity. The Company pays out a high proportion of the distributions received from the Fund after prudently reserving for contingencies and future taxes, with the objective of sustaining a predictable stream of dividends to its shareholders. Cash not required to fund dividends or to meet working capital requirements is advanced to subsidiary corporations of the Fund pursuant to a demand loan, which the Company may request repayment of at any time. At December 31, 2013, the Company had $24.3 million outstanding pursuant to the demand loan. The Company did not have any outstanding long-term debt as at December 31, 2013 and 2012.

The Company's working capital requirements are not expected to be significant in 2013. The Company has an agreement with ECT whereby ECT reimburses the Company for certain corporate costs.

Additional capital resources to finance the Company's future investment in the Fund, if necessary, are expected to be available through access to equity markets. The Company maintains a current equity shelf prospectus with Canadian securities regulators, which enables ready access to Canadian public capital markets, subject to market conditions.

Operating Activities
Cash flows from operating activities totaled $92.2 million for the year ended December 31, 2013 (2012 – $53.1 million). Cash flows from operating activities represented distributions received from the Fund, net of income taxes and changes in operating assets and liabilities. The Fund declared distributions of $1.612 per unit in 2013 or $221.9 million in aggregate (2012 – $1.462 per unit or $154.4 million in aggregate).

Financing Activities
In February 2013, the Company completed an equity offering of 3,820,000 common shares of the Company at a price of $25 per common share for gross proceeds of $95.5 million. Concurrent with the closing, Enbridge subscribed for 948,000 common shares at a price of $25 per common share on a private placement basis to maintain its 19.9% ownership interest in the Company.

The Company declared monthly dividends at a rate of $0.11125 per share for the months January to October 2013 and $0.1146 per share for the months of November and December 2013. The Company declared monthly dividends at a rate of $0.103 per share for the months January to November 2012 and $0.11125 per share for the month of December 2012.

Investing Activities
The proceeds from the issuance of common shares of $119.2 million ($95.5 million public offering and $23.7 million private placement) were used by the Company to subscribe for 4,768,000 trust units of the Fund at a price of $25 per unit in the first quarter of 2013, increasing the Company's overall ownership of Fund trust units to 85.6%. Also included in investing activities are advances to a subsidiary corporation of the Fund pursuant to a demand loan, of which $24.3 million was outstanding as at December 31, 2013.

SELECTED ANNUAL FINANCIAL INFORMATION

(thousands of Canadian dollars, except per share amounts)	**2013**	2012	2011
Distribution and other income	**91,044**	59,835	40,270
Earnings	**86,570**	59,828	37,326
Total assets	**1,346,926**	1,254,240	806,074
Dividends per common share	**$1.342**	$1.244	$1.166

Significant items that have impacted the selected annual financial information are as follows:

- The Company increased its investment in the Fund to 80.7% of the Fund's issued and outstanding trust units in October 2011 with an investment of $274.1 million, the proceeds of which were used to partly fund the 2011 Transaction. The contribution of incremental cash flows from the 2011 Transaction enabled the Fund to increase its distribution rate to $0.121 per unit per month effective with the November 2011 distribution which supported a corresponding increase in the Company's dividend.
- In December 2012, the Company increased its overall ownership of Fund trust units to 84.5% with an investment of $277.4 million, the proceeds of which were used to partially fund the 2012 Transaction. Following the completion of the 2012 Transaction, the Fund increased its distribution to $0.134 per unit effective with the December 2012 distribution, which supported a corresponding increase in the Company's dividend.
- In February 2013, the Company completed a bought deal underwriting offering of 3,820,000 common shares at a price of $25.00 per common share for gross proceeds of $95.5 million. Enbridge also subscribed for an additional 948,000 common shares at a price of $25.00 per common share for gross proceeds of $23.7 million. The Company used the aggregate gross proceeds of $119.2 million to subscribe for 4,768,000 trust units of the Fund, which increased distribution and other income during the year ended December 31, 2013. This increased the Company's investment in the Fund to 85.6%.
- The Company's Board of Directors approved an increase in the Company's monthly cash dividend, from $0.111 per share to $0.115 per share, effective with the November 2013 dividend payment.

RELATED PARTY TRANSACTIONS

In connection with the Company's February 2013 offering of 3,820,000 common shares, the Fund reimbursed the Company for share issue costs of $4.1 million. Proceeds from the offering of common shares were used by the Company to purchase additional trust units of the Fund.

In connection with the Company's December 2012 offering of 9,597,000 subscription receipts, the Fund reimbursed the Company for share issue costs of $9.2 million. Proceeds from the offering of subscription receipts were used by the Company to purchase additional trust units of the Fund.

In 2013, the Company advanced $17.5 million (2012 – $6.8 million) to a subsidiary corporation of the Fund pursuant to a subordinated demand loan. At December 31, 2013, $24.3 million (2012 – $6.8 million) was outstanding. Interest on the demand loan was charged at 4.25% per annum. Interest income earned on the loan was $0.6 million (2012 – $0.1 million) for the year ended December 31, 2013 and $85,436 (2012 – $16,278) was included in accounts receivable and other as at December 31, 2013.

At December 31, 2013, accounts payable to Enbridge totaled $1,770 (2012 – $23,835) related to corporate costs paid by Enbridge on behalf of the Company. Accounts payable to the Fund were nil (2012 – $0.2 million) at December 31, 2013.

The Company has an agreement with ECT whereby ECT reimburses the Company for certain corporate costs. ECT reimbursed the Company $1.0 million (2012 – $1.4 million) for corporate costs incurred in 2013. At December 31, 2013, accounts receivable from ECT totaled $0.1 million (2012 – $0.4 million).

The Company has an agreement with Enbridge Management Services Inc. (EMSI), a wholly owned subsidiary of Enbridge, to provide management and administrative services to the Company. EMSI also provides management and administrative services to the Fund and the Fund's subsidiary, ECT. Provided that the Fund is paying a base fee to EMSI for the services received by the Fund, there is no fee payable to EMSI by the Company as was the case for the years ended December 31, 2013 and 2012.

RISK MANAGEMENT AND FINANCIAL INSTRUMENTS

The Company pays out a high proportion of cash in the form of dividends to investors, while maintaining a reliable and low-risk business model. The Company and the Fund perform annual corporate risk assessments to identify potential risks. Risks are ranked based on the severity and likelihood both before and after mitigating actions. In addition, the Fund has adopted a Cash Flow at Risk (CFAR) policy to manage exposure to movements in interest rates, foreign exchange rates and commodity prices across all segments. CFAR is a statistically derived measurement that quantifies the maximum adverse impact on cash flows over a specified period of time within a pre-defined level of statistical confidence. The Fund's CFAR limit has been set at 2.5% of forward annual CAFD.

Market Price Risk

The Company's other comprehensive income (OCI) is subject to market price risk resulting from changes in the fair value of the Company's investment in the Fund, which is referenced to the Company's common share price. The Company does not typically manage this risk. A $1.00 increase or decrease in the Company's common share price at December 31, 2013 would have resulted in an increase or decrease in OCI, before income taxes of $56.5 million (2012 – $51.7 million) due to the revaluation of the investment.

Liquidity Risk

Liquidity risk is the risk that the Company will not be able to meet its financial obligations as they become due. Accounts payable and accrued liabilities and dividends payable are due within one month. In order to manage this risk, the Company forecasts its cash flow over the near and long term and ensures that sufficient funds will be available when required. The Company's primary source of liquidity is cash distributions it receives from its investment in the Fund. Additional liquidity, if necessary, is expected to be available through collection of amounts advanced to a subsidiary of the Fund pursuant to a demand loan.

The future level of distributions received from the Fund may vary depending on, but not limited to, the performance of the Fund's businesses, the level of continued investment or the Fund's ability to obtain financing. Further factors which may impact the Fund's ability to sustain distributions include future demand for the services provided by its businesses, the effective maintenance of the productive capacity of its assets and the Fund's ability to comply with covenants in its debt agreements and repay or refinance its debt as it comes due.

The Company oversees its investment in the Fund through its Directors who are also ECT Trustees. The ECT Board of Trustees provides oversight into the productive capacity of each operating segment and the future sustainability of distributions through regular maintenance programs, periodic maintenance capital expenditures and the pursuit of growth opportunities, where it sees fit.

Credit Risk

Credit risk arises from the possibility that counterparties may default on their contractual obligations to the Company. The demand loan due from a subsidiary of the Fund, accounts receivable, interest receivable, distributions receivable and cash and cash equivalents are subject to credit risk, the maximum exposure of which is their carrying value as presented on the statement of financial position. The Company manages its exposure to credit risk by ensuring counterparties are of high credit quality.

Fair Value of Financial Instruments
At December 31, 2013 and 2012, the Company's financial instruments were comprised of the Company's investment in the Fund, a demand loan due from a subsidiary corporation of the Fund, cash and cash equivalents, accounts receivable, distributions receivable, accounts payable and accrued liabilities and dividends payable. The fair value of the Company's investment in the Fund is based on the quoted market price of the Company's common shares adjusted for assets and liabilities of the Company which are not applicable to the Fund. The fair value of cash and cash equivalents, the demand loan due from a subsidiary of the Fund, accounts receivable, distributions receivable, accounts payable and accrued liabilities and dividends payable approximates their carrying values due to their short-term maturities.

Business Risks
Readers are referred to the Fund's risk factor disclosure under the headings "Green Power – Business Risks", "Liquids Transportation and Storage – Business Risks", "Alliance Canada – Business Risks" and "Risk Management" in the Fund's MD&A and "Risk Factors" in the Company's AIF and the Fund's AIF.

The following are certain risk factors relating to the activities of ENF and ownership of ENF common shares.

Future Dividends
Dividends declared on the common shares will be wholly-dependent on the declaration of distributions by the Fund. Future dividend payments by the Company and the level thereof are uncertain as the Company's dividend practices and the funds available for the payment of dividends from time to time will be dependent upon, among other things, operating cash flow generated by subsidiaries of the Fund and their respective operations and investments, financial requirements for the Fund and its subsidiaries' operations and the Fund's ability to execute its growth strategy. Further, the Company must satisfy solvency and liquidity tests imposed by the ABCA in respect of the declaration and payment of dividends.

Pre-emptive Right
Pursuant to pre-emptive rights contained in the Fund Trust Indenture, the Company and Enbridge are entitled to acquire any Fund trust units proposed to be issued by the Fund in proportion to their respective economic interest in the Fund, taking into account the ECT Preferred Units. If the Company fails to fully subscribe for its proportionate economic interest, its holdings in the Fund may be diluted.

Restriction in Business Activities
The Company's business is restricted to investment in the Fund. Therefore, the Company's financial results are dependent on the Fund. The inability of the Fund to manage its business effectively could have a material adverse impact on the Company's operations and prospects. Further, the level of the consolidated indebtedness of the Fund and its subsidiaries from time to time could impair the Company's ability to obtain additional financing on a timely basis to take advantage of permitted business opportunities that may arise.

Availability of Financing
If the Company pays out a high proportion of the distributions received from the Fund to shareholders by way of dividend, it may have to enter into financings or other transactions involving the issuance of securities by the Company in order to obtain funds for business purposes. An inability to raise new equity capital may limit the Company's ability to grow and execute its business plan. The issuance of equity securities may also be dilutive to shareholders.

CRITICAL ACCOUNTING ESTIMATES

Long-term Investment

The Company holds an investment in the Fund, representing 85.6% (2012 – 84.5%) of the outstanding Fund trust units as at December 31, 2013. The Company accounts for its investment as an available-for-sale financial asset. Management concluded that the Company does not control the Fund, but rather that Enbridge, through the combination of direct and indirect equity interests, ECT preferred unit investment and its role as manager of the Fund, is the primary beneficiary of the Fund. Significant estimates are also required in determining the fair value and recoverability of the investment. The fair value of the investment is estimated by relying on the quoted market price of the Company's common shares adjusting for other assets and liabilities not attributable to the Fund and significant or prolonged declines in fair value below cost are assessed for evidence of impairment.

CHANGES IN ACCOUNTING POLICIES

Fair Value Measurement

Effective January 1, 2013, the Company adopted IFRS 13, *Fair Value Measurement* which defines fair value and provides a single IFRS framework for the measurement and disclosure of fair value within IFRS standards. As the adoption of this standard impacted disclosure only, there was no impact to the Company's financial position for the current or prior periods presented.

Future Accounting Policy Changes

IFRS 9, *Financial Instruments* addresses classification and measurement of financial assets. IFRS 9 replaces the model for measuring equity instruments and will require recognition of the Company's investment in the Fund at fair value through earnings. The mandatory effective date for accounting periods beginning on or after January 1, 2015 was removed in November 2013 until the IFRS 9 project is finalized. Although immediate application of IFRS 9 is permitted, the Company does not anticipate early adoption of this standard.

CONTROLS AND PROCEDURES

Disclosure Controls and Procedures

Disclosure controls and procedures are designed to provide reasonable assurance that information required to be disclosed in reports filed with, or submitted to, securities regulatory authorities is recorded, processed, summarized and reported within the time periods specified under Canadian securities law. Based on the requirements of National Instrument 52-109 (NI 52-109), EMSI, the Manager of ENF, evaluated the effectiveness of ENF's disclosure controls and procedures (as defined in NI 52-109) and concluded that ENF's disclosure controls and procedures were effective as of December 31, 2013.

Management's Report on Internal Controls Over Financial Reporting

The Manager of the Company is responsible for establishing and maintaining adequate internal control over financial reporting as such term is defined in the rules of the Canadian Securities Administrators. ENF's internal control over financial reporting is a process designed, under the supervision and with the participation of executive and financial officers of the Manager of ENF, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of the Company's financial statements for external reporting purposes in accordance with IFRS.

The Company's internal controls over financial reporting include policies and procedures that:

- pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect transactions and dispositions of assets of ENF;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of ENF's assets that could have a material effect on the financial statements.

ENF's internal control over financial reporting may not prevent or detect all misstatements because of inherent limitations of any control system. Additionally, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions or deterioration in the degree of compliance with ENF's policies and procedures.

EMSI, the Manager of ENF, assessed the effectiveness of ENF's internal control over financial reporting as of December 31, 2013, based on the framework established in Internal Control - Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this assessment, the Manager concluded that ENF maintained effective internal control over financial reporting as of December 31, 2013.

SELECTED QUARTERLY FINANCIAL INFORMATION

The following table presents a summary of the Company's quarterly financial results.

	2013				2012			
	Q4	Q3	Q2	Q1	Q4	Q3	Q2	Q1
(thousands of Canadian dollars, except per share amounts)								
Revenues	**23,102**	22,924	22,836	22,182	16,611	14,434	14,399	14,391
Earnings	**22,139**	21,507	21,770	21,154	16,591	14,638	14,315	14,284
Earnings per common share, basic and diluted	**0.39**	0.38	0.39	0.40	0.39	0.37	0.36	0.36
Dividends declared, per common share	**0.340**	0.334	0.334	0.334	0.317	0.309	0.309	0.309

- The Company increased its dividend per common share by 3.0% to $0.115 per month effective with the November 2013 dividend.
- The Company subscribed for 4,768,000 trust units of the Fund in February 2013. The incremental ownership of trust units of the Fund increased the amount of distributions received on the trust units of the Fund and therefore, increased the Company's revenues and earnings.
- The Company increased its dividend per common share by 8.0% to $0.111 per month effective with the December 2012 dividend, which corresponded with a distribution increase from the Fund.
- The Company subscribed for 11,982,000 trust units of the Fund in December 2012 in connection with the acquisition of a portfolio of crude oil storage and wind and solar assets, which increased the total trust units of the Fund owned by the Company from 39,741,000 to 51,723,000. The incremental ownership of trust units of the Fund increased the amount of distributions received on the trust units and therefore, increased the Company's revenues and earnings.

OUTSTANDING SHARE DATA

As at February 10, 2014, 56,491,000 common shares and 1 special voting share of the Company were issued and outstanding.

ENBRIDGE INCOME FUND HOLDINGS INC.

FINANCIAL STATEMENTS

December 31, 2013

MANAGEMENT'S REPORT

To the Shareholders of Enbridge Income Fund Holdings Inc. (ENF)

Financial Reporting
The management of Enbridge Management Services Inc. (EMSI) is responsible for the accompanying financial statements. The financial statements have been prepared in accordance with International Financial Reporting Standards and necessarily include amounts that reflect management's judgment and best estimates.

The Board of Directors and the Audit Committee are responsible for all aspects related to governance of ENF. The Audit Committee, composed of independent and financially literate directors, has a specific responsibility to oversee management's efforts to fulfil its responsibilities for financial reporting and internal controls related thereto. The Audit Committee meets regularly during the year with management, internal auditors and independent auditors to review the financial statements, Management's Discussion and Analysis, and Annual Information Form, as well as internal controls related thereto, prior to submission to the Board of Directors for approval.

Internal Control over Financial Reporting
To meet its responsibility for reliable and accurate financial statements, management has established or assumed responsibility for monitoring and maintaining adequate systems of internal control which are designed to provide reasonable assurance that financial information is relevant, reliable, timely and accurate, and that assets are safeguarded from loss or unauthorized use and transactions are executed in accordance with management's authorization. The internal control system includes an internal audit function as well as monitoring of an established code of business conduct.

PricewaterhouseCoopers LLP, appointed by the shareholders as ENF's independent auditors, conducts an examination of the financial statements in accordance with Canadian generally accepted auditing standards.

"signed"
Perry F. Schuldhaus
President

"signed"
Colin K. Gruending
Chief Financial Officer

February 10, 2014

February 10, 2014

Independent Auditor's Report

To the Shareholders of
Enbridge Income Fund Holdings Inc.

We have audited the accompanying financial statements of Enbridge Income Fund Holdings Inc., which comprise the statements of financial position as at December 31, 2013 and December 31, 2012 and the statements of comprehensive income, changes in shareholders' equity and cash flows for the years then ended, and the related notes, which comprise a summary of significant accounting policies and other explanatory information.

Management's responsibility for the financial statements
Management is responsible for the preparation and fair presentation of these financial statements in accordance with International Financial Reporting Standards, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's responsibility
Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained in our audits is sufficient and appropriate to provide a basis for our audit opinion.

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"PwC" refers to PricewaterhouseCoopers LLP, an Ontario limited liability partnership.

Opinion

In our opinion, the financial statements present fairly, in all material respects, the financial position of Enbridge Income Fund Holdings Inc. as at December 31, 2013 and December 31, 2012 and its financial performance and its cash flows for the years then ended in accordance with International Financial Reporting Standards.

PricewaterhouseCoopers LLP

Chartered Accountants

ENBRIDGE INCOME FUND HOLDINGS INC.
STATEMENTS OF COMPREHENSIVE INCOME

Year ended December 31,	**2013**	2012
(thousands of Canadian dollars, except per share amounts)		
Distribution and other income *(Note 4)*	**91,044**	59,835
Income tax *(Note 6)*	**(4,474)**	(7)
Earnings	**86,570**	59,828
Items that may be reclassified to earnings		
Other comprehensive income/(loss)		
Unrealized fair value change in available-for-sale investment *(Note 4)*	**(42,386)**	164,336
Income tax (expense)/recovery *(Note 6)*	**5,309**	(20,542)
	(37,077)	143,794
Comprehensive income	**49,493**	203,622
Basic and diluted earnings per common share	**1.55**	1.48

The accompanying notes are an integral part of these financial statements.

ENBRIDGE INCOME FUND HOLDINGS INC.
STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY

Year ended December 31,	**2013**	2012
(thousands of Canadian dollars)		
Share capital		
Common shares *(Note 5)*		
Balance at beginning of year	**802,683**	525,300
Issued for cash	**119,200**	277,383
	921,883	802,683
Special voting share *(Note 5)*	**-**	-
Balance at end of year	**921,883**	802,683
Share premium *(Note 5)*	**192,458**	192,458
Retained earnings		
Balance at beginning of year	**9,562**	2,492
Earnings	**86,570**	59,828
Common share dividends declared	**(75,264)**	(52,758)
Balance at end of year	**20,868**	9,562
Accumulated other comprehensive income		
Balance at beginning of year	**212,266**	68,472
Other comprehensive income/(loss)	**(37,077)**	143,794
Balance at end of year	**175,189**	212,266
Total shareholders' equity	**1,310,398**	1,216,969

The accompanying notes are an integral part of these financial statements.

ENBRIDGE INCOME FUND HOLDINGS INC.
STATEMENTS OF CASH FLOWS

Year ended December 31,	**2013**	2012
(thousands of Canadian dollars)		
Operating activities		
Earnings	**86,570**	59,828
Deferred income taxes	**114**	35
Changes in operating assets and liabilities		
Accounts receivable and other	**2,457**	(2,329)
Distributions receivable	**(699)**	(2,144)
Accounts payable and accrued liabilities	**(591)**	137
Income taxes payable	**4,323**	(2,456)
	92,174	53,071
Financing activities		
Subscription receipts issued *(Note 5)*	**-**	222,170
Common shares issued *(Note 5)*	**119,200**	55,213
Common share dividends paid *(Note 5)*	**(74,544)**	(51,097)
	44,656	226,286
Investing activities		
Purchase of Enbridge Income Fund trust units *(Note 4)*	**(119,200)**	(277,383)
Demand loan advances to investee *(Note 10)*	**(17,450)**	(6,800)
	(136,650)	(284,183)
Change in cash and cash equivalents	**180**	(4,826)
Cash and cash equivalents at beginning of year	**90**	4,916
Cash and cash equivalents at end of year	**270**	90
Supplementary cash flow information		
Income taxes paid	**37**	4,658

The accompanying notes are an integral part of these financial statements.

ENBRIDGE INCOME FUND HOLDINGS INC.
STATEMENTS OF FINANCIAL POSITION

December 31,	**2013**	2012
(thousands of Canadian dollars)		
Assets		
Current assets		
Cash and cash equivalents	**270**	90
Accounts receivable and other	**221**	2,678
Demand loan due from investee *(Note 10)*	**24,250**	6,800
Distributions receivable *(Note 4)*	**7,640**	6,941
	32,381	16,509
Investment in Enbridge Income Fund *(Note 4)*	**1,314,545**	1,237,731
	1,346,926	1,254,240
Liabilities and shareholders' equity		
Current liabilities		
Accounts payable and accrued liabilities	**79**	670
Income taxes payable	**4,323**	-
Dividends payable *(Note 5)*	**6,474**	5,754
	10,876	6,424
Deferred income taxes *(Note 6)*	**25,652**	30,847
	36,528	37,271
Shareholders' equity		
Share capital *(Note 5)*	**921,883**	802,683
Share premium *(Note 5)*	**192,458**	192,458
Retained earnings	**20,868**	9,562
Accumulated other comprehensive income	**175,189**	212,266
	1,310,398	1,216,969
	1,346,926	1,254,240

The accompanying notes are an integral part of these financial statements.

Approved by the Board of Directors:

"signed"
E.F.H. Roberts
Director

"signed"
Gordon G. Tallman
Director

ENBRIDGE INCOME FUND HOLDINGS INC.
NOTES TO THE FINANCIAL STATEMENTS

1. GENERAL BUSINESS DESCRIPTION

Enbridge Income Fund Holdings Inc. (ENF or the Company) is a publicly traded corporation, incorporated on March 26, 2010 under the laws of the Province of Alberta. The Company's common shares commenced trading on the Toronto Stock Exchange on December 21, 2010. The Company holds an investment in Enbridge Income Fund (the Fund), which is an unincorporated open-ended trust established by a trust indenture under the laws of the Province of Alberta. The Company's registered office is 3000, 425 – 1st Street SW, Calgary, Alberta, Canada.

The business of ENF is limited to investment in the Fund. The Fund is involved in the generation, transportation and storage of energy through its green power generation facilities, liquids transportation and storage facilities and 50% interest in the Canadian segment of the Alliance Pipeline.

2. BASIS OF PREPARATION

The Company prepares its financial statements in accordance with International Reporting Standards (IFRS) as issued by the International Accounting Standards Board.

Amounts are stated in Canadian dollars, the Company's functional and presentation currency, unless otherwise indicated.

The Company has consistently applied the same accounting policies throughout all periods presented, as if these policies had always been in effect.

The policies applied in these financial statements are based on IFRS issued and outstanding as of February 10, 2014, the date the Board of Directors approved the statements.

3. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Measurement
These financial statements have been prepared under the historical cost convention except for the revaluation of available-for-sale financial assets to fair value.

Cash and Cash Equivalents
Cash and cash equivalents include short-term investments with an initial term to maturity of three months or less.

Financial Instruments
The Company classifies financial assets and liabilities as held for trading, available-for-sale, loans and receivables and financial liabilities at amortized cost. All financial instruments are initially recorded at fair value on the statement of financial position. Subsequent measurement of the financial instrument is based on its classification.

Available-for-Sale
Available-for-sale financial assets are non-derivatives that are not classified in any of the other categories. The Company's available-for-sale asset is comprised of an investment in the Fund. Available-for-sale financial assets are recognized initially at fair value plus transaction costs and subsequently carried at fair value. Gains or losses arising from changes in fair value are recognized in other comprehensive income (OCI). Distributions from available-for-sale instruments are recognized in earnings when the Company's right to receive payment is established.

The Company accounts for its investment in trust units of the Fund as an available-for-sale financial asset rather than under the equity method of accounting, which would typically apply in situations where an investor has significant influence over an investee, due to the redeemable nature of the trust units. The Fund trust units do not qualify as equity instruments under IFRS due to the redemption feature which permits holders to redeem trust units for cash, subject to certain limitations. Further, the Company does not consolidate its investment in the Fund as its investment does not confer control. Enbridge Inc. (Enbridge) is the controlling party for accounting purposes through the combination of its direct and indirect equity interests and preferred unit investment in Enbridge Commercial Trust (ECT), a subsidiary of the Fund, as well as through Enbridge's role as manager of the Fund.

Loans and Receivables
Loans and receivables, which include cash and cash equivalents, accounts receivable, demand loan due from investee and distributions receivable, are measured at amortized cost, using the effective interest rate method, net of any impairment losses recognized.

Financial Liabilities at Amortized Cost
Other financial liabilities are recorded at amortized cost using the effective interest rate method and include accounts payable and accrued liabilities and dividends payable.

Impairment
With respect to loans and receivables, the Company assesses the assets for impairment when it no longer has reasonable assurance of timely collection. If evidence of impairment is noted, the Company reduces the value of the loan or receivable to its estimated realizable amount, determined using discounted expected future cash flows.

For available-for-sale financial assets, the Company assesses at the end of each reporting period whether there is objective evidence that a financial asset is impaired. In the case of equity investments classified as available-for-sale, a significant or prolonged decline in the fair value of the security below its cost is evidence that the asset is impaired. If any such evidence of impairment exists, the cumulative loss, measured as the difference between the acquisition cost and the current fair value, less any impairment loss on that financial asset previously recognized in earnings, is removed from OCI and recognized in earnings. Impairment losses on available-for-sale equity instruments are not reversed.

Income Taxes
The liability method of accounting for income taxes is followed. Deferred income tax assets and liabilities are recorded based on temporary differences between the tax bases of assets and liabilities and their carrying values for accounting purposes. Deferred income tax assets and liabilities are measured using the tax rate that is expected to apply when the temporary differences reverse.

Earnings per Share
Basic and diluted earnings per share is calculated by dividing earnings for the year by the weighted average number of common shares outstanding during the year. At December 31, 2013 and 2012, no potentially dilutive instruments were outstanding.

Dividends
Dividends on common shares are recognized in the Company's financial statements in the period in which the dividends are declared by the Board of Directors of the Company.

Accounting Estimates
The preparation of financial statements in conformity with IFRS requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues and expenses, as well as the disclosure of contingent assets and liabilities in the financial statements. Significant estimates and assumptions used in preparation of the financial statements include, but are not limited to: the fair value of available-for-sale financial assets *(Note 8)* and income taxes *(Note 6)*. Actual results could differ from these estimates.

Changes in Accounting Policies
Effective January 1, 2013, the Company adopted IFRS 13, *Fair Value Measurement* which defines fair value and provides a single IFRS framework for the measurement and disclosure of fair value within IFRS standards. As the adoption of this standard impacted disclosure only, there was no impact to the Company's financial position for the current or prior periods presented.

Future Accounting Policy Changes
IFRS 9, *Financial Instruments* addresses classification and measurement of financial assets. IFRS 9 replaces the model for measuring equity instruments and will require recognition of the Company's investment in the Fund at fair value through earnings. The mandatory effective date for accounting periods beginning on or after January 1, 2015 was removed in November 2013 until the IFRS 9 project is finalized. Although immediate application of IFRS 9 is permitted, the Company does not anticipate early adoption of this standard.

4. INVESTMENT IN ENBRIDGE INCOME FUND

Year ended December 31,	**2013**	2012
(thousands of Canadian dollars)		
Balance at beginning of year	**1,237,731**	796,012
Investment acquired	**119,200**	277,383
Fair value change for the year	**(42,386)**	164,336
Balance at end of year	**1,314,545**	1,237,731

Plan of Arrangement
On December 17, 2010, pursuant to a plan of arrangement (the Plan) to restructure the Fund, all publicly held trust units of the Fund and 5,000,000 trust units of the Fund held by Enbridge were exchanged on a one-for-one basis for common shares of the Company, resulting in the Company owning 25,125,000, or 72.6%, of the Fund's issued and outstanding trust units. The Company's common shares commenced trading on the Toronto Stock Exchange on December 21, 2010.

Renewable Energy Acquisition
In October 2011, the Company subscribed for 14,616,000 trust units of the Fund at a price of $18.75 per unit to partially fund the Fund's acquisition of three renewable power generation facilities owned by subsidiaries of Enbridge (the 2011 Transaction). The assets acquired were the Sarnia Solar Project, the Ontario Wind Project and the Talbot Wind Project. Following the 2011 Transaction and related equity financing by the Fund, the Company held 39,741,000, or 80.7%, of the Fund's issued and outstanding trust units.

Crude Oil Storage and Renewable Energy Acquisition
In December 2012, the Company subscribed for 11,982,000 trust units of the Fund at a price of $23.15 per unit to partially fund the Fund's acquisition of crude oil storage facilities and three renewable power generation facilities owned by Enbridge and subsidiaries of Enbridge (the 2012 Transaction). The assets acquired were the Hardisty Contract Terminals, the Hardisty Storage Caverns, the Greenwich Wind Project, the Amherstburg Solar Project and the Tilbury Solar Project. Following the 2012 Transaction and related equity financing by the Fund, the Company held 51,723,000 or 84.5%, of the Fund's issued and outstanding trust units.

Enbridge Income Fund

The Fund is involved in the generation, transportation and storage of energy. The Fund conducts business through three operating segments: Green Power, Liquids Transportation and Storage, and Alliance Canada. The Green Power segment includes interests in renewable and alternative power generation facilities. The Liquids Transportation and Storage segment includes the Saskatchewan System crude oil and liquids pipeline systems which connects to the Enbridge Mainline System at Cromer, Manitoba, as well as liquids storage assets in both Saskatchewan and Alberta. Alliance Canada consists of the Fund's 50% interest in the Canadian portion of the Alliance System which transports natural gas from supply areas in northwestern Alberta and northeastern British Columbia to delivery points near Chicago, Illinois.

Summarized financial information of the Fund, derived from the Fund's consolidated financial statements prepared in accordance with United States generally accepted accounting principles (U.S. GAAP), is as follows:

Year ended December 31,	**2013**	2012[1,2]
(thousands of Canadian dollars)		
Revenues	**403,224**	389,642
Earnings	**79,815**	89,651

December 31,	**2013**	2012[2]
(thousands of Canadian dollars)		
Total assets	**2,756,810**	3,000,404
Total liabilities	**2,197,052**	2,555,731

1 Retrospectively adjusted to furnish comparative information related to an acquisition of crude oil storage facilities and wind and solar power generation facilities in December 2012.
2 Previously issued consolidated financial statements for the Fund have been revised. See "Revision of Prior Period Financial Statements" section.

Revision of Prior Period Financial Statements

In connection with the preparation of the Fund's consolidated financial statements for the three months ended March 31, 2013, an error was identified in the manner in which the Fund's investee, Alliance Canada, recorded a deferred regulatory asset associated with the difference between depreciation expense calculated in accordance with U.S. GAAP and negotiated depreciation rates recovered in transportation tolls. This resulted in an overstatement of the Fund's carrying value of its investment in Alliance Canada. Further, a deferred income tax liability and an offsetting regulatory asset were recognized by the Fund related to the carrying value of its investment. The Fund assessed the error and concluded that the related amount was not material to any of its previously issued consolidated financial statements. The Fund revised its previously issued consolidated financial statements to correct the effect of this error. This non-cash revision does not impact cash flows for any prior period.

The Fund's summarized financial information, prepared in accordance with U.S. GAAP, would differ had it been prepared under IFRS. The most significant differences between U.S. GAAP and IFRS applicable to the Fund are as follows:

Rate Regulation
The operations of Alliance Canada and certain Liquids Transportation and Storage businesses are subject to regulation by various authorities which exercise statutory authority over matters such as construction, rates and ratemaking and agreements with customers. The timing of recognition of certain revenues and expenses impacted by regulation and the recognition of regulatory assets and liabilities under U.S. GAAP differs from IFRS. IFRS does not historically recognize regulatory assets and liabilities and also prohibits recognition of the equity component of allowance for funds used during construction (AFUDC), which is permitted under U.S. GAAP. At December 31, 2013, the Fund's net regulatory asset as presented in accordance with U.S. GAAP was approximately $60.9 million (December 31, 2012 – $72.9 million) including an equity component of AFUDC. The earnings impact of rate regulation was an approximate after tax decrease of $8.9 million for the year ended December 31, 2013 (2012 – $8.2 million increase).

Property, Plant and Equipment
Under U.S. GAAP similar assets are grouped and depreciated as a pool. Gains or losses are not recognized when the assets are disposed or retired. IFRS does not permit the pool method of accounting and would require gains or losses on retirement to be recognized in earnings.

Preferred and Trust Unit Presentation
Under U.S. GAAP, the ECT preferred units and trust units of the Fund are presented as mezzanine equity on the Consolidated Statements of Financial Position between long-term liabilities and unitholders' deficit. The ECT preferred units and trust units of the Fund are recorded at their maximum redemption value with changes in estimated redemption value reflected as a charge or credit to deficit.

Under IFRS, the ECT preferred units would be designated as a financial liability at fair value through profit or loss. The Fund's trust units would be recognized at amortized cost and presented as a liability by virtue of the holders' right to redeem the trust units for cash, subject to certain limitations. Adjustments to estimated future cash flows of a financial liability carried at amortized cost would be recognized in earnings.

Distribution Income
The Fund declared distributions on a monthly basis from January to October 2013 at a rate of $0.13417 per unit and at a rate of $0.13525 per unit for the months of November and December 2013. The Fund declared distributions on a monthly basis from January to November 2012 at a rate of $0.12067 per unit and at a rate of $0.13417 per unit for the month of December 2012.

5. SHARE CAPITAL AND SHARE PREMIUM

Authorized
The authorized share capital of the Company consists of an unlimited number of common shares with no par value, first preferred shares issuable in series limited to one half of the number of common shares issued and outstanding at the relevant time and one special voting share.

Issued and Outstanding

	2013		2012	
Year ended December 31,	Number of Shares	Amount	Number of Shares	Amount
(thousands of Canadian dollars except number of shares)				
Common shares				
Balance at beginning of year	**51,723,000**	**802,683**	39,741,000	525,300
Issued for cash	**4,768,000**	**119,200**	11,982,000	277,383
Balance at end of year[1]	**56,491,000**	**921,883**	51,723,000	802,683
Special voting share[1]	**1**	**-**	1	-
Balance at end of year	**56,491,001**	**921,883**	51,723,001	802,683

1 Enbridge owns 11,242,000 (2012 – 10,294,000) common shares and the special voting share.

Plan of Arrangement
Pursuant to the Plan, 20,125,000 trust units of the Fund held by public unitholders, together with 5,000,000 trust units of the Fund held by Enbridge, were exchanged for 25,125,000 common shares of the Company on December 17, 2010.

The initial stated capital of the Company for purposes of the *Business Corporations Act* (Alberta) (ABCA) was established to be $251.2 million, as determined at the discretion of the Company's Board of Directors. The residual amount of $192.5 million by which the fair value of the consideration received exceeded the stated capital was assigned to Share Premium. The Board may elect in the future to reinstate Share Premium to stated capital under certain circumstances.

Common Shares
Each common share represents an equal undivided beneficial interest in the net assets in the event of termination or wind-up of the Company. Holders of common shares are entitled to one vote per share at meetings of the Company's shareholders.

Dividends
The Board of Directors of the Company declared monthly dividends at a rate of $0.11125 per share for the months January to October 2013 and $0.1146 per share for the months of November and December 2013. The Board of Directors of the Company declared monthly dividends at a rate of $0.103 per share for the months January to November 2012 and $0.11125 per share for the month of December 2012.

On January 15, 2014, the Company declared a dividend of $0.1146 per share to be paid on February 18, 2014 to shareholders of record on January 31, 2014.

Special Voting Share
Enbridge, the holder of the special voting share is entitled to receive notice of and to attend all annual and special meetings of shareholders and is entitled to elect one director to the Board for so long as it beneficially owns or controls, directly or indirectly, between 15% and 39% of the issued and outstanding common shares, provided that if it elects to exercise its right to elect one director, it will not exercise the votes attaching to the portion of common shares representing its pro-rata representation on the Board in respect of the election of the remaining directors of the Company at meetings of shareholders. The holder of the special voting share will not be entitled to receive, in respect of the special voting share, any dividends or to participate in any distribution of the property or assets of the Company upon the liquidation, dissolution or winding-up of the Company. The special voting share may only be transferred or assigned to an affiliate of Enbridge.

2013 Common Share Offering and Private Placement
In February 2013, the Company completed a bought deal underwriting offering of 3,820,000 common shares at a price of $25.00 per common share for gross proceeds of $95.5 million. Enbridge also subscribed for an additional 948,000 common shares at a price of $25.00 per common share for gross proceeds of $23.7 million. The Company used the aggregate gross proceeds of $119.2 million to subscribe for 4,768,000 units of the Fund.

2012 Subscription Receipts Offering and Private Placement
In November 2012, the Company completed a bought deal underwriting offering of 9,597,000 subscription receipts at a price of $23.15 per subscription receipt for gross proceeds of $222.2 million. The gross proceeds were held by an escrow agent pending closing of the 2012 Transaction.

In December 2012, shareholders of the Company approved the 2012 Transaction, the gross proceeds from the subscription receipt offering of $222.2 million were released from escrow and each holder of a subscription receipt automatically received one common share of the Company without further consideration together with $2.0 million representing October and November dividends. Enbridge also subscribed for an additional 2,385,000 common shares at a price of $23.15 per common share for gross proceeds of $55.2 million. The Company used the aggregate gross proceeds of $277.4 million to subscribe for 11,982,000 units of the Fund and the Fund in turn used these proceeds to complete the 2012 Transaction.

Earnings Per Common Share
Earnings per common share is calculated by dividing earnings by the weighted average number of common shares outstanding. Weighted average shares outstanding used to calculate both basic and diluted earnings per share were 55,746,408 for the year ended December 31, 2013 (2012 – 40,430,376).

Shareholders' Rights Plan
The Shareholders' Rights Plan is designed to ensure the fair treatment of shareholders in connection with any takeover offer for the Company. Rights issued under the plan become exercisable when a person and any related parties, acquires or announces its intention to acquire shares which combined with existing holdings would represent 20% or more of the Company's outstanding common shares without complying with certain provisions set out in the plan or without approval of the Company's Board of Directors. Should such an acquisition occur, each rights holder other than the acquiring person and related parties will have the right to purchase common shares of the Company at a 50% discount to the market price at the time.

Dividend Reinvestment and Share Purchase Plan
Under the Dividend Reinvestment and Share Purchase Plan, registered shareholders may reinvest dividends in common shares of the Company and make additional cash payments to purchase common shares, free of brokerage or other charges. Common shares may be issued directly from the treasury by the Company, be purchased through the facilities of the TSX or be acquired through a combination of the two methods. For the years ended December 31, 2013 and 2012, the Company did not issue common shares from the treasury pursuant to the Dividend Reinvestment and Share Purchase Plan.

6. INCOME TAXES

The initial acquisition of Fund trust units under the Plan did not constitute a business combination, nor did the transaction affect earnings. As such, recognition of the resulting deferred income tax liability relating to the estimated taxable temporary difference of $71.4 million which arose on initial recognition of the investment in the Fund is not permitted.

At December 31, 2013 and 2012, deferred income taxes represented the difference in accounting and tax bases of the Investment in Enbridge Income Fund, less the deferred income tax liability not recognized on initial acquisition of the investment on December 17, 2010.

Income tax expense for the year ended December 31, 2013 was comprised of current income tax expense of $4.4 million (2012 – $28,114 recovery) and deferred income tax expense of $0.1 million (2012 – $35,119).

Income Tax Rate Reconciliation

Year ended December 31,	**2013**	2012
(thousands of Canadian dollars)		
Earnings before income taxes	**91,044**	59,835
Combined statutory income tax rate	**25.0%**	25.0%
Income taxes at statutory income tax rate	**22,761**	14,959
Decrease resulting from		
Non-taxable dividend	**(18,175)**	(14,923)
Return of capital	**(112)**	-
Other	**-**	(29)
Income tax expense	**4,474**	7
Effective income tax rate	**4.9%**	-

7. RISK MANAGEMENT

Market Price Risk
The Company's OCI is subject to market price risk resulting from changes in the fair value of the Company's investment in the Fund, which is referenced to the Company's common share price. The Company does not typically manage this risk. A $1.00 increase or decrease in the Company's common share price at December 31, 2013 would have resulted in an increase or decrease in OCI, before income taxes of $56.5 million (2012 – $51.7 million) due to the revaluation of the investment.

Liquidity Risk
Liquidity risk is the risk that the Company will not be able to meet its financial obligations as they become due. Accounts payable and accrued liabilities and dividends payable are due within one month. In order to manage this risk, the Company forecasts its cash flow over the near and long term and ensures that sufficient funds will be available when required. The Company's primary source of liquidity is cash distributions it receives from its investment in the Fund. Additional liquidity, if necessary, is expected to be available through collection of amounts advanced to a subsidiary of the Fund pursuant to a demand loan.

Credit Risk
Credit risk arises from the possibility that a counterparty may default on its contractual obligations to the Company. Demand loan due from investee, accounts receivable, interest receivable, distributions receivable and cash and cash equivalents are subject to credit risk, the maximum exposure of which is the carrying value as presented on the statement of financial position. The Company manages its exposure to credit risk by ensuring counterparties are of high credit quality. At December 31, 2013, accounts receivable were due from ECT and the Fund.

8. FAIR VALUE OF FINANCIAL INSTRUMENTS

The fair value of financial instruments reflects the Company's best estimates of market value based on valuation techniques, supported by observable market prices where available. The fair value of cash and cash equivalents, loans and receivables and other financial liabilities approximate their carrying value due to the short period to maturity.

The Company categorizes those financial assets and liabilities measured at fair value into one of three different levels depending on the observability of the inputs employed in the measurement.

Level 1
Level 1 includes financial instruments measured at fair value based on unadjusted quoted prices for identical assets and liabilities in active markets that are accessible at the measurement date. An active market for a financial instrument is considered to be a market where transactions occur with sufficient frequency and volume to provide pricing information on an ongoing basis. The Company did not have any financial instruments categorized as Level 1 as at December 31, 2013 or December 31, 2012.

Level 2
Level 2 includes financial instrument valuations determined using directly or indirectly observable inputs other than quoted prices included within Level 1. The fair value measurement of the investment in the Fund is classified as Level 2, as the valuation technique references the quoted market price of the Company's common shares, and adjusts for assets and liabilities not applicable to the Fund. At December 31, 2013, the Company's investment in the Fund had a fair value of $1.3 billion (December 31, 2012 – $1.2 billion).

Level 3
Level 3 includes financial instrument valuations based on inputs which are less observable, unavailable or where the observable data does not support a significant portion of the financial instruments' fair value. Generally, Level 3 financial instruments are longer dated transactions, occur in less active markets, occur at locations where pricing information is not available or have no binding broker quote to support Level 2 classification. The Company did not have any financial instruments categorized as Level 3 as at December 31, 2013 or December 31, 2012.

The Company's policy is to recognize transfers as of the last day of the reporting period. There were no transfers between levels as at December 31, 2013 and December 31, 2012.

9. CAPITAL DISCLOSURES

The Company defines capital as shareholders' equity less cash and cash equivalents. Capital totaled $1.3 billion (2012 – $1.2 billion) at December 31, 2013.

The Company's objectives when managing capital are to provide liquidity for additional investment in the Fund and to generate adequate returns and predictable cash flow for distribution to shareholders in the form of dividends. New capital, if necessary, may be raised through the issuance of equity securities.

10. RELATED PARTY TRANSACTIONS

In connection with the Company's February 2013 offering of 3,820,000 common shares, the Fund reimbursed the Company for share issue costs of $4.1 million. Proceeds from the offering of common shares were used by the Company to purchase additional trust units of the Fund.

In connection with the Company's December 2012 offering of 9,597,000 subscription receipts, the Fund reimbursed the Company for share issue costs of $9.2 million. Proceeds from the offering of subscription receipts were used by the Company to purchase additional trust units of the Fund.

In 2013, the Company advanced $17.5 million (2012 – $6.8 million) to a subsidiary corporation of the Fund pursuant to a subordinated demand loan. At December 31, 2013, $24.3 million (2012 – $6.8 million) was outstanding. Interest on the demand loan was charged at 4.25% per annum. Interest income earned on the loan was $0.6 million (2012 – $0.1 million) for the year ended December 31, 2013 and $85,436 (2012 – $16,278) was included in accounts receivable and other as at December 31, 2013.

At December 31, 2013, accounts payable to Enbridge totaled $1,770 (2012 – $23,835) related to corporate costs paid by Enbridge on behalf of the Company. Accounts payable to the Fund were nil (2012 – $0.2 million) at December 31, 2013.

The Company has an agreement with ECT whereby ECT reimburses the Company for certain corporate costs. ECT reimbursed the Company $1.0 million (2012 – $1.4 million) for corporate costs incurred in 2013. At December 31, 2013, accounts receivable from ECT totaled $0.1 million (2012 – $0.4 million).

The Company has an agreement with Enbridge Management Services Inc. (EMSI), a wholly owned subsidiary of Enbridge, to provide management and administrative services to the Company. EMSI also provides management and administrative services to the Fund and the Fund's subsidiary, ECT. Provided that the Fund is paying a base fee to EMSI for the services received by the Fund, there is no fee payable to EMSI by the Company as was the case for the years ended December 31, 2013 and 2012.

AFFIDAVIT OF DR.

DANIEL S. ARTHUR

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North Dakota Pipeline Co. LLC) Docket No. OR14-21-000

AFFIDAVIT OF DANIEL S. ARTHUR

I. BACKGROUND

1. My name is Daniel S. Arthur. I am a Principal at The Brattle Group, an economic and management consulting firm located at 44 Brattle Street, Cambridge, Massachusetts. I have over fifteen years of experience consulting to firms in the regulated energy transmission industries on pricing and ratemaking, competition and antitrust issues, and market assessment. I have filed testimony on cost-of-service matters in prior Federal Energy Regulatory Commission ("Commission") dockets including SFPP, L.P. Docket Nos. OR03-5-000, OR03-5-001, IS08-390, and IS09-437 and Mid-America Pipeline Company, LLC Docket Nos. IS05-216-003, *et al*. I have also filed testimony on cost-of-service matters in Enterprise TE Products Pipeline LLC Docket No. IS12-203-000. I have also presented testimony in prior proceedings before the Commission regarding oil pipeline market-based rates, including testimony in the Magellan Pipeline Company, L.P.,[1] Enterprise TE Products Pipeline Company LLC,[2] and Enterprise Products Partners L.P. and Enbridge Inc. proceedings.[3] Additional details of my professional and educational background are appended to this affidavit as Attachment A.

2. I have been asked by St. Paul Park Refining Co. LLC ("SPPRC") to evaluate the information and analysis contained in North Dakota Pipeline Company LLC's ("NDP")

[1] *Magellan Pipeline Co., L.P.*, Docket No. OR10-6-000 (2011).
[2] *Enterprise TE Products Pipeline Company LLC*, Docket No. OR11-6-000 (2011).
[3] *Enterprise Products Partners L.P. and Enbridge Inc.*, Docket No. OR12-4-000 (2012).

February 12, 2014 petition for declaratory order ("Petition") requesting certain advance rulings on the rate treatment for a proposed expansion and extension of its pipeline system known as the Sandpiper Project, and specifically the study by Muse Stancil & Co. ("Muse") entitled "Market Prospects and Benefits Analysis for the Sandpiper Project" dated February 2014 ("Muse Study") attached to NDP's Petition.[4]

II. INTRODUCTION AND SUMMARY

3. The Muse Study purports to provide a quantitative assessment of the expanded NDP system and the implications of the Sandpiper project on Bakkan crude oil pricing.[5] The Muse Study concludes that the expanded NDP system after the Sandpiper project will be operating at or near capacity for the forecast period 2016 through 2035.[6] In order to reach this conclusion, Muse constructed an optimization model that relies on a specific set of assumptions on the inputs to the model, including the crude oil supply by major production area and grade of crude oil, capacities and expansions of transportation alternatives (including pipeline volume commitments), prices for the transportation alternatives, refinery crude oil capacity and refinery specific constraints, and the refining value of the crude oil grades at each refinery.[7]

4. Because of missing or incomplete information regarding several of the assumptions contained in the Muse Study, it is not possible to determine whether the analysis and conclusions contained therein are accurate absent additional information. Several of the assumptions where no or incomplete information is provided would be expected to have a material impact on the analysis and conclusions of the report, and if those assumptions do not reflect accurate projections, the ultimate conclusions of the report may not be accurate. The assumptions with no information provided in the Muse Study include the assumed crude oil production and grade of crude oil for several geographic areas, and assumed prices for refined petroleum products that presumably affect the crude oil refining values inputs to the model.[8]

[4] The Muse Study is included in Exhibit 4 to NDP's Petition.

[5] Muse Study at 3.

[6] Muse Study at 6 - 7.

[7] Muse Study at 34 - 41.

[8] Muse Study at 35, 41.

5. Other assumptions where incomplete information is provided in the Muse Study include the capacities and prices of transportation alternatives, and refinery capacities. However, based on the information provided in the Muse Study, it is not clear that the assumptions are reliable over the 20-year period 2016 through 2035. It appears that the Muse Study assumes that the transportation and refinery capacities that are known today, as well as several transportation expansion projects projected to be in service over the period 2014 through 2020 will be the capacities that persist over the 20-year period of 2016 through 2035.[9] However, given the changes in volume of crude oil production presently occurring in various producing basins, including the Bakken area as well as other producing basins in North America, it is reasonable to expect that there will be changes in transportation capacities, as well as potential changes in the refinery capacities, occurring in response to changes in the crude oil production volumes in various basins.

6. It is not clear that the Muse Study has factored into its analysis any potential alternative scenarios other than its set of baseline assumptions with and without the Sandpiper project expansion.[10] Alternative scenarios would provide information on whether the Muse Study's conclusion that the expanded NDP system after the Sandpiper project will be operating at or near capacity for the forecast period 2016 through 2035 is robust under alternative scenarios, or whether other plausible scenarios exist whereby the expanded NDP system may not fully operate at capacity over the 20-year period 2016 through 2035.

III. KNOWN AND UNKNOWN ASSUMPTIONS IN THE MUSE STANCIL OPTIMIZATION MODEL

7. The Muse Study states that it relies on mathematical linear programming techniques to optimize the aggregate crude oil netback price in all producing basins examined, given the numerous assumptions regarding the crude oil production volumes, types of crude oil produced, transportation capacity and prices, refinery capacity, and crude oil refining values.[11] The Muse Study provides a brief overview of the assumptions made in the model inputs, however, the Muse Study does not provide sufficient information to be able to determine all of the inputs used in the optimization model, or the impact of the assumptions on the ultimate conclusions contained therein. The assumptions with missing information

[9] Muse Study at 35 – 41.

[10] Muse Study at 33.

[11] Muse Study at 33 – 41.

provided in the Muse Study include the crude oil supply by major production area and grade of crude oil, and assumed prices for refined petroleum products that presumably affect the crude oil refining values inputs to the model.[12] Other inputs where incomplete information provided include the capacities and prices of transportation alternatives, and refinery capacities. As discussed further below, it is not clear that the single set of assumptions made regarding transportation capacities and prices, and refinery capacities, is accurate over the 20-year period of the study.

A. MISSING INFORMATION REGARDING CRUDE OIL PRODUCTION INPUTS

8. The Muse Study states that it relies on forecasts of U.S. crude oil production by region provided by Crane Energy and the Energy Information Administration ("EIA"), and a forecast of crude oil production for Western Canada provided by the Canadian Association of Petroleum Producers ("CAPP").[13] In addition, because several of these forecasts end prior to the 2035 end-date of Muse's analysis, the forecasts are "extended" by Muse out to 2035.[14]

9. The EIA and CAPP crude oil production forecasts are publicly available; however, it is my understanding that crude oil production forecasts by Crane Energy are not publicly available. While there is a forecast of crude oil production in the states of North Dakota and Montana provided by Crane Energy attached to NDP's Petition,[15] there is no information provided for forecasts provided by Crane Energy for other US regions such as West Texas, the Rockies, or Alaska that were stated to be provided by Crane Energy in the Muse Study.[16] There is also no information provided in the Muse Study regarding the "extensions" of forecasts to 2035 performed by Muse.[17]

10. The crude oil production forecasts that are used as inputs in the Muse Study have an effect on the volumes predicted to move on the various transportation alternatives that are also inputs to Muse's optimization model. Crude oil production levels are changing rapidly in several producing areas in the US and Canada, with the change experienced and forecast in the Bakken formation being only one area that is experiencing significant production

[12] Muse Study at 35, 41.
[13] Muse Study at 35.
[14] *Id*.
[15] Exhibit 3 to NDP's Petition.
[16] Muse Study at 35.
[17] *Id*.

changes. For example, while production in the Bakken formation in the Williston Basin in North Dakota and Montana increased approximately 500% since 2009 to approximately 1 million barrels per day,[18] production in the Eagle Ford formation in south Texas also increased significantly from less than 1,000 barrels per day in early 2009 to nearly 1 million barrels per day by mid-2013.[19]

11. As crude oil production changes occur geographically, the price of crude oil at a basin will be affected by the capacity and prices of transportation alternatives moving product from the producing area to refineries. If transportation capacity out of a basin becomes constrained, the price of crude in the basin will decrease as production continues to increase, making purchasing crude in the basin more attractive in terms of price to refineries, and ultimately leading to changes in transportation capacity. Thus, the forecast of crude oil production in a particular geographic area relative to transportation capacity is a significant input to an optimization model attempting to estimate flows of crude oil from multiple production basins to refineries. Changes in the forecast of crude oil production in each producing basin should have an impact on whether transportation alternatives are found to be operating at or below capacity as a result of running an optimization model. However, based on the information contained in the Muse Study, it is not possible to tell what the assumed level of the crude oil production is at multiple production areas over the 20-year time period examined, and whether the forecasts are reasonable.

B. MISSING INFORMATION REGARDING CRUDE OIL REFINING VALUE INPUTS

12. The Muse Study states that a key input to its optimization model is the value of various North American crude oils to the potential refinery customers.[20] In order to derive these refining values, Muse relies on the AspenTech PIMS® linear programing system that is used by refineries to optimize refinery operations.[21] However, inputs to this linear programming model to optimize refinery operations and determine the value of various crude oils are the prices of the refined products produced from the various crude oils

[18] *See* the graph of Williston Basin (that contains the Bakken formation) crude oil production contained on page 24 of the Muse Study.

[19] *See* the EIA's Feb. 10, 2014 analysis titled "Eagle Ford Production Increasingly Targets Oil Rich Areas," available electronically at http://www.eia.gov/todayinenergy/detail.cfm?id=14951.

[20] Muse Study at 41.

[21] *Id*.

refined at the refinery.[22] The Muse Study does not provide any information on the assumptions made regarding the prices, and relative prices, for the refined products downstream of the individual refineries included in its optimization model that would affect the various values of crude oil inputs to the refineries. If the assumed prices for refined products are not accurate, then the resulting refining values for the various crude oils are also not likely to be accurate.

C. INCOMPLETE INFORMATION REGARDING ASSUMPTIONS FOR OTHER INPUTS THAT MAY NOT BE ACCURATE OVER THE 20-YEAR PERIOD EXAMINED

13. The Muse Study does provide limited, but incomplete information on several input assumptions to its optimization model. These assumptions where only limited information is provided include the capacities and prices of transportation alternatives, and refinery capacities. However, based on the information provided in the Muse Study, it is not clear that the assumptions are reliable over the entire 20-year period 2016 through 2035. The assumptions made regarding transportation and refinery capacities will have an impact on whether an optimization model estimates that a specific transportation alternative such as the expanded NDP system will be operating at or below capacity over a 20-year period. If the assumptions regarding the capacities and prices of transportation alternatives, and refinery capacities, are not accurate, then the results of the optimization model are also likely not to be accurate.

14. It appears that the Muse Study assumes that the transportation and refinery capacities that are known today, as well as several transportation expansion projects projected to be in service over the period 2014 through 2020, will be the capacities that persist over the 20-year period of 2016 through 2035.[23] However, as crude oil production changes, including the amounts of various types of crude oil, both transportation capacities and refinery capacities to process various types of crude change. Changes in transportation capacity should be expected to correspond with changes in the geographic location of the changes in crude oil production, in the same manner that NDP is proposing to expand as crude oil production from the Bakken formation continues to increase. However, because the Muse Study does not provide any information on its assumed forecasts of crude oil production in

[22] *See* the description of the AspenTech PIMS® model available electronically at https://www.aspentech/com/PIMS_Brochure.pdf .

[23] Muse Study at 35 – 41.

many areas of the U.S., it is not possible to determine whether the assumptions made regarding transportation capacity are accurate given the assumptions regarding crude oil production. In addition, changes in crude oil production relative to assumed transportation capacity can lead to bottlenecks in the interconnected transportation system that could lead to some pipelines being found not to be operating at capacity due to constraints in downstream pipelines. Further, as constraints develop that are expected to persist, it is likely that the constraint would eventually be alleviated through capacity expansion. However, it appears that the Muse Study does not incorporate any future capacity expansions that result from pipelines being estimated to be at capacity, but rather assumes that pipelines that are found to be operating at capacity simply remain at capacity.

15. With respect to transportation prices, it appears that the Muse Study assumes transportation prices remain constant at current levels for existing capacity, with missing information regarding Muse's assumptions for the prices for expansion projects assumed to go into service in the future.[24] In addition to changes in crude oil transportation capacity occurring in response to changes in crude oil production, there are likely to be changes in transportation rates on existing systems that occur over a 20-year period. These changes in transportation rates are likely to occur as volumes change, as systems change capacity, or as systems depreciate or experience other cost changes. Changes in transportation rates are likely to have an impact on which transportation alternatives are estimated to be operating at or near capacity in an optimization model. Whether the assumptions made by Muse regarding transportation prices over the 20-year period are accurate cannot be determined without information regarding the prices Muse assumed for future expansions, and whether the assumed transportation capacities are consistent with the assumed changes in crude oil production.

IV. LACK OF ALTERNATIVE SCENARIO ANALYSIS

16. It appears that the Muse Study conducted only two sets of input assumptions for each year it analyzed, one set with the NDP system at its current capacity, and a second set of assumptions with the only change from the first set being an expansion of the NDP system capacity to include the Sandpiper project.[25] Examining the results of an optimization model over multiple sets of input assumptions at varying the levels of crude oil production,

[24] Muse Study at 40.

[25] Muse Study at 33.

transportation capacities and prices, and refinery capacities would provide information on whether the Muse Study's conclusion that the expanded NDP system will be operating at or near capacity for the forecast period 2016 through 2035 is robust under alternative scenarios, or whether other plausible scenarios exist whereby the expanded NDP system may not fully operate at capacity over the 20-year period 2016 through 2035.

V. CONCLUSIONS

17. The deficiencies in the Muse Study described above undermine the credibility of its conclusion that the expanded NDP system will be operating at or near capacity for the forecast period 2016 through 2035. In the brief period of time available to respond to the petition of NDP for a declaratory order, it is not possible to perform a more complete or thorough analysis. However, before the validity of the Muse Study can be intelligently evaluated, Muse should be required, at a minimum, to provide the following information:

- Complete information on assumptions made regarding inputs to Muse's optimization model;
- Complete information on outputs of the optimization model, including information on estimated transportation flows and the shadow prices of crude oil in the producing basins predicted by the optimization model;
- A description of, and documents related to, Muse's process for validating the results of the optimization model;
- A working version of the Muse Crude Oil Market Optimization Model, or some mechanism for access to the model in order to perform model runs using alternative assumptions to examine the sensitivity and robustness of the conclusions presented in the Muse Study under varying input assumptions.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North Dakota Pipeline Co. LLC) Docket No. OR14-21-000

AFFIDAVIT

COMMONWEALTH OF MASSACHUSETTS)
) ss.
COUNTY OF MIDDLESEX)

Daniel S. Arthur, being first duly sworn, deposes and says he is the same Daniel S. Arthur, whose Affidavit accompanies this Affidavit of Daniel S. Arthur, that such testimony was prepared by him; that he is familiar with the contents thereof; and the facts set forth herein are true and correct to the best of his knowledge, information, and belief; and that he does adopt the same as his sworn testimony in this proceeding.

Daniel S. Arthur

On this 14rd day of March 2014, before me, the undersigned notary public, personally appeared Daniel S. Arthur, proved to me through satisfactory evidence of identification, which were personally known to Notary to be the person whose name is signed above, and who swore or affirmed to me that the contents of the document are truthful and accurate to the best of his knowledge and belief.

Notary Public

My commission expires November 7, 2014

MARJORIE J. FISCHER
Notary Public
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires
November 7, 2014

DANIEL S. ARTHUR
Principal

Cambridge, MA | +1.617.864.7900 | Daniel.Arthur@brattle.com

Dr. Daniel Arthur is an economist consulting and providing litigation support primarily in the natural gas and oil industries. His economic areas of specialty include antitrust, pricing and ratemaking, and regulatory economics. Dr. Arthur holds both an M.A. and a Ph.D. in Economics from Northwestern University. He also has a B.S. in Business (Finance and Economics) and a B.S. in Mathematics and Statistics from Miami University. Prior to joining *The Brattle Group,* Dr. Arthur worked at Indiana University, where he worked on a team performing research in health economics. Dr. Arthur joined *The Brattle Group* in 1997.

AREAS OF EXPERTISE

- Antitrust
- Pricing and Ratemaking
- Regulatory Economics

EXPERIENCE

Antitrust

For numerous clients, Dr. Arthur has been involved in antitrust and market power cases before the Federal Energy Regulatory Commission, the Federal Trade Commission, and civil antitrust cases. Dr. Arthur's antitrust work includes the analysis of horizontal and vertical market power that would result from a proposed merger as well as the historical review of pricing behavior to determine whether market power was in fact exercised by an entity (or entities). Some of Dr. Arthur's consulting experience includes:

- On behalf of an oil refiner, Dr. Arthur presented testimony before the Federal Energy Regulatory Commission analyzing the market power held by a refined petroleum products pipeline seeking market based rates. Dr. Arthur's analysis focused on the competitiveness of alternatives to the pipeline from the refiner's perspective and the ability of the pipeline to increase prices in its destination markets. This analysis focused on the competitiveness of several geographic markets as well as how contracting between entities affects the substitutability of alternatives in the market.

- For a hearing before the Federal Energy Regulatory Commission and subsequent civil litigation, Dr. Arthur analyzed the market power resulting from control of natural gas pipeline capacity. The analysis involved defining the relevant markets, examining the anti-competitive behavior of

holders of capacity to the destination market, and examining affiliate operations in the upstream market. One area of focus in this case was the impact of capacity constraints on the definition of the relevant market as well as the substitutability of alternatives to purchasing delivered natural gas. Analysis included examining the pricing behavior of market participants as well as examining the physical withholding of transportation capacity from the market.

- As the result of a settlement in a civil antitrust case, Dr. Arthur assessed the damages to entities consuming natural gas and electricity due to anti-competitive behavior in the natural gas transportation market. These damage estimates were performed at the class and individual entity level for numerous types of consumers and were used as the basis for the division of over $1 billion in settlement funds.

- On behalf of a natural gas pipeline involved in an antitrust suit, Dr. Arthur analyzed whether the pipeline was (or is) a monopolist within a specific market. His analysis focused on defining the relevant product and geographic markets and assessing which firms competing within the relevant markets possessed market power. Analysis for this case focused on three factors in defining what the alternatives available in the relevant market are: (1) the impact of capacity constraints; (2) natural gas pipelines' ability to expand; and (3) the substitutability of purchasing the right to pipeline capacity on the secondary release market to contracting directly with the pipeline for primary capacity rights.

- Dr. Arthur assisted in the development of expert testimony regarding the evaluation of market power and allegations of a conspiracy to monopolize by a gas gathering, processing and natural gas liquids transportation company in Texas. Analysis in this case involved: (1) a detailed comparison of the cost of entry into the natural gas processing market to the prices charged for the service; (2) the contracting behavior of purchasers of natural gas gathering and processing services; and (3) the relationship between the regulated natural gas liquids pipeline's rate and its underlying cost structure.

- Dr. Arthur assisted in the evaluation of whether a crude oil pipeline possessed market power in the context of a market based rates application before the Federal Energy Regulatory Commission. The primary issue in this case was how the substitutability of different grades of crude oil from a refiner's perspective affects the ability to use alternative pipeline transportation.

- On behalf of an electric utility, Dr. Arthur was part of a team which assessed the state of intrastate transmission, storage, and distribution services of the natural gas utilities in California, focusing on the aspects of the market that were functioning well under current regulations, where there existed or the potential existed for market power abuse, and made recommendations for restructuring or changing regulatory policy.

- On behalf of an owner of a natural gas pipeline, Dr. Arthur analyzed the antitrust implications of the owner's acquisition of another natural gas pipeline in the geographic area. This analysis was

performed prior to making the decision on whether to acquire the pipeline and assisted the client in determining how the Federal Trade Commission would view the proposed transaction.

- Dr. Arthur assisted in the development of expert testimony on vertical market power relating to a proposed merger of a gas distribution company and an electric utility, examining the relationship between the natural gas and electric markets. Analysis focused on determining what the relevant product and geographic markets are and the incentives that would result from the proposed merged entity, as well as an assessment of whether behavioral or structural remedies would be necessary to alleviate potential market power concerns.

- Dr. Arthur analyzed the anti-competitive incentives that would result from the combination of two general partners of partnerships involved in natural gas liquids processing, fractionation, transportation, and trading. This analysis included examining the incentives to manipulate the availability of infrastructure to influence the commodity price, as well as the extent of the information regarding competitors' and customers' market positions that would be obtained as a result of the proposed combination.

Pricing and Ratemaking

Dr. Arthur's experience includes participation in several ratemaking proceedings for crude oil pipelines, refined petroleum products pipelines, natural gas pipelines, and natural gas liquids pipelines. Some of Dr. Arthur's areas of analysis in these proceedings include:

- Rate Base Determination: Dr. Arthur's analysis in several proceedings includes the issue of what is a reasonable rate base level when there are historical contracts that provided for the recovery of capital associated with the initial investment in the facilities.

- Income Tax Allowance: A contested issue in numerous proceedings, Dr. Arthur has been involved in the determination of the level of income tax allowance that should be provided to the unit holders of the master limited partnership that owns the regulated pipeline.

- Allocation of Unallocated Overhead Expenses to the Regulated Pipeline: Dr. Arthur has analyzed what a reasonable allocation is of unallocated overhead expenses from the parent organization to the regulated pipeline subsidiary using methodologies employed at the Federal Energy Regulatory Commission.

- Rate Design: Dr. Arthur's work regarding costs associated with pipeline expansions includes analyzing the question of whether to allocate the expansion costs to a subset of the pipeline system's customers, or to roll-in the costs with the rest of the system's costs and allocate the costs across all customers based on volumes and distances.

- Volume Level for Going-Forward Rates: Dr. Arthur's analysis for determining just and reasonable rates to be established on a going-forward basis includes examining what a

representative level of volumes to be used to derive rates is. Proceedings where this issue has been particularly relevant is when there has been a recent capacity expansion or pro-rationing has been occurring due to operational restrictions that are expected to be lifted in the future.

- Analysis of Changed Circumstances: Dr. Arthur assisted in the development of expert testimony in an oil pipeline ratemaking proceeding before the Federal Energy Regulatory Commission, addressing the establishment of substantially changed circumstances in the economic basis of the rates in order for a shipper to successfully challenge an existing pipeline rate.

Other Economic Analysis

- On behalf of electric utilities owning nuclear generation plants and for testimony filed in Federal court, Dr. Arthur developed an empirical model of a trading market for rights to remove spent nuclear fuel. The model determined when individual utilities could expect their spent nuclear fuel to be removed if a trading market for rights existed.

- For a proposed gas pipeline expansion, Dr. Arthur analyzed whether there existed sufficient market demand to justify the expansion, and the impact of the proposed expansion on existing pipelines and producers.

- For an arbitration, Dr. Arthur assisted in the determination of the underlying events that caused a refined products pipeline to enter into bankruptcy protection. Dr. Arthur's analysis included an examination of the pipeline's changing financial position through time, sources of financing, requests for regulated rate changes, and the required pipeline integrity management program.

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UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North Dakota Pipeline Company LLC) Docket No. OR14-21-000

MOTION TO INTERVENE AND COMMENTS
OF FLINT HILLS RESOURCES, LP

Pursuant to Rule 214 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission ("Commission" or "FERC"),[1] Flint Hills Resources, LP ("Flint Hills") submits its motion to intervene and comments in the above-captioned proceeding, which was instituted by the Petition for Declaratory Order ("Petition") filed on February 12, 2014, by North Dakota Pipeline Company LLC ("NDPC" or "the Company").[2]

I. SUMMARY OF COMMENTS

Flint Hills does not oppose construction of NDPC's proposed Sandpiper Project ("Sandpiper" or "the Project"). Nor does Flint Hills take a position with respect to NDPC's projected utilization of the Project. There are several aspects of the Petition, however, which require clarification. *First*, the Commission should clarify that uncommitted shippers will not bear financial responsibility for underutilization of the Sandpiper Project should shipper demand prove to be less than NDPC anticipates. Even if NDPC proposes in the future to change the initial rates through a method other than indexing, NDPC should remain at risk for costs associated with any such

[1] 18 C.F.R. § 385.214 (2013).

[2] NDPC was formerly known as Enbridge Pipelines (North Dakota) LLC.

underutilization.[3] At the least, the Commission should clarify that approval of the rate structure proposed in the Petition does not limit the ability of parties to oppose any future proposal by NDPC to allocate costs associated with underutilization of the system to uncommitted shippers if and when such a rate filing is submitted.

Second, the Commission should clarify that, to the extent that the tariff rate structure proposed by NDPC contemplates recoupment through uncommitted rates of any revenue deficiency associated with the discounted committed rates, the Petition should be denied as inconsistent with Commission policy. The Commission should clarify that any approval of the use of discounted rates for Committed Non-Priority shippers is without prejudice to parties' rights to challenge any proposal to recover the costs associated with discounting the Committed Non-Priority rates from uncommitted shippers at the time NDPC makes its initial rate filing for the Sandpiper Project.

Finally, the Commission should require NDPC to provide additional information concerning its proposal to credit $7.5 million to the cost of service of each major segment of the Sandpiper Project. Without additional context, it is impossible for the Commission or the participants to determine whether this specific aspect of NDPC's proposed tariff rate structure is reasonable.

II. MOTION TO INTERVENE

A. Interest of Flint Hills

Flint Hills Resources Pine Bend, LLC owns and operates a crude oil refinery at Pine Bend, Minnesota that receives crude oil delivered via the NDPC system at

[3] The Commission should also find that NDPC's proposed definition of "design capacity," does not comport with Commission policy, and specify that NDPC must propose a definition of design capacity consistent with Commission policy when it makes its initial rate filing, at which time parties will have an opportunity to address the issue in detail. *See* Petition at 29, n.32.

Clearbrook, Minnesota. Flint Hills historically has purchased and shipped both North Dakota sweet and sour production on NDPC as feedstock for the Pine Bend Refinery. Therefore, Flint Hills has a direct and substantial economic interest in matters involving the transportation of North Dakota crude oil production to the Pine Bend Refinery. As a shipper and purchaser on the NDPC system, Flint Hills has a direct and substantial economic interest in this proceeding that cannot be protected adequately by another shipper. Accordingly, Flint Hills moves to intervene as a party.

B. Communications

Communication with respect to this matter should be addressed to:

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III. DESCRIPTION OF THE FILING

NDPC asks the Commission to issue a declaratory order approving a number of principles relating to the proposed tariff rate structure and prorationing practices of NDPC's Sandpiper Project. The $2.7 billion Project will consist of two primary segments: (1) an upstream expansion of the existing system consisting of a 24-inch pipeline running from Beaver Lodge to Clearbrook, Minnesota ("Upstream Expansion") estimated to cost $1.5 billion; and (2) a downstream extension consisting of 30-inch pipeline running 233 miles from Clearbrook to Superior, Wisconsin ("Downstream Extension") projected to cost $1.2 billion.[4] NDPC states that the current capacity of its

[4] *See* Petition at 14-15.

single line from Berthold to Clearbrook is 210,000 barrels per day ("bpd"). The Upstream Expansion would increase this capacity by 230,000 bpd, for a total of 440,000 bpd.[5] The Downstream Extension is expected to have an annual average capacity of 380,000 bpd.[6]

The Petition presents a significantly different rate framework from the one NDPC proposed in its 2012 declaratory order petition rejected by the Commission.[7] The principal difference between the earlier filing and the new Petition is that NDPC has dropped its proposal for a rate for uncommitted shippers based on actual costs and actual throughput with a true-up mechanism. NDPC now proposes to support the Sandpiper Project with ship-or-pay contract commitments for a portion of the Project capacity. Specifically, NDPC states that, after conducting an open season, it has executed Transportation Services Agreements ("TSAs") for 155,000 bpd.[8]

The Petition proposes three categories of shippers:

Committed Priority Shippers are committed under ship-or-pay TSAs and pay a rate expected to be *above* the comparable rate for uncommitted shippers. In exchange for the higher rate, Committed Priority Shippers would not be prorated under ordinary operating conditions. NDPC states that "the majority" of the committed volumes will be subject to the premium rate for priority service.[9] Notably, if the rate for Committed Priority Shippers should ever fall below the uncommitted rate, the Committed Priority

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[5] *Id.* at 15.

[6] *Id.* NDPC states that the 60,000 bpd difference between the upstream capacity of 440,000 bpd and the downstream capacity of 380,000 bpd is attributable to the volume typically delivered to the Minnesota Pipeline at Clearbrook each month. *See id.* at 15, n.15.

[7] *Enbridge Pipelines (North Dakota) LLC*, 142 FERC ¶ 61,212 (2013).

[8] Petition at 23.

[9] *Id.*

Shippers would have the choice of paying a rate one cent per barrel higher than the uncommitted rate *or* opting to be treated as a Committed Non-Priority Shipper.[10]

Committed Non-Priority Shippers are committed under ship-or-pay TSAs and would pay a rate expected to be *below* the comparable rate for uncommitted shippers.[11] These customers would be subject to proration, but would be deemed to have a history for proration purposes equal to the greater of their volume commitment or average shipments during the applicable base period.[12]

Uncommitted Shippers would pay the uncommitted rate – including rolled-in costs of the new Sandpiper capacity. While a shipper like Flint Hills taking deliveries at Clearbrook would not pay the additional rate for the Downstream Expansion, a customer taking deliveries at Superior would pay the entire rate for both segments.[13]

The Petition states that initial uncommitted rates will be based on the design capacity of the North Dakota Pipeline.[14] The uncommitted rates would be based on FERC's Opinion No. 154-B methodology, with indexing.[15]

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[10] *Id.* at 37-38.

[11] *Id.*at 25-26.

[12] *Id.*

[13] *Id.* at 41.

[14] *Id.* at 29.

[15] *Id.*

IV. COMMENTS

A. Underutilization Risk

1. Any Commission Order Approving NDPC's Proposed Rate Structure Should Clarify that Uncommitted Shippers Will Not Bear Financial Responsibility for Underutilized Capacity on the Sandpiper Project

The Commission should clarify in any order approving the Company's proposed tariff rate structure that NDPC will remain at risk for underutilization of the Sandpiper capacity, even if NDPC proposes a change to the initial rates using a method other than indexing. The Commission's general policy is to require initial rates for new projects to be calculated based on the design capacity of the project, with the pipeline at risk for underutilization of the project capacity.[16] Although NDPC's proposed initial rate structure ostensibly adheres to this policy, NDPC reserves the right to file to adjust the uncommitted rates by a method other than indexing.[17] Absent the clarification requested by Flint Hills, therefore, NDPC could circumvent the protection that use of design capacity provides uncommitted shippers by filing to change the rates using a method other than indexing.

NDPC asserts that its proposed rate structure for the Sandpiper Project adequately protects uncommitted shippers from the risk that the Project will be underutilized, pointing, in particular, to its proposal to calculate initial uncommitted rates based on the design capacity of the expanded system.[18] By calculating rates in this manner, NDPC argues, "throughput risk will fall on the pipeline, not on the existing shippers, at the time

[16] *See White Cliffs Pipeline, L.L.C.*, 126 FERC ¶ 61,070 at P 31 (2009); *Enbridge Energy Co., Inc.*, 110 FERC ¶ 61,211 at PP 44-46 (2005).

[17] Petition at 26, n.30.

[18] Petition at 43.

of start-up of Sandpiper."[19] NDPC also maintains that the Petition makes a sufficient factual showing that the Sandpiper Project is likely to be utilized at or near capacity through 2035.[20]

As a threshold matter, the Commission should find that NDPC's proposed definition of "design capacity" as used in the Petition is not consistent with Commission policy.[21] NDPC purports to define "design capacity" as "'annual average capacity' meaning the volume of crude oil the pipeline can be expected to transport over the course of a year."[22] Contrary to the Company's assertion, this definition of design capacity is not consistent with Commission precedent. While NDPC is correct that design capacity is not necessarily a pipeline's "maximum theoretical capacity," neither is it defined by the volumes the pipeline "can be expected to transport over the course of a year."[23] NDPC's definition conflates design capacity with annual throughput. Determining design capacity instead involves an engineering analysis aimed at identifying the "design day" capacity that a pipeline will be able to transport on a year-round basis regardless of variables such as the effect of ambient temperature on system facilities, as the cases cited by NDPC itself make clear.[24] While Flint Hills does not believe this issue must be resolved conclusively here, the Commission should direct NDPC to propose a definition

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[19] *Id.*

[20] *Id.*

[21] *See id.* at 29, n.32.

[22] *Id.*

[23] *Id.*

[24] *See Islander East Pipeline Co., L.L.C.*, 97 FERC ¶ 61,363 at PP 144-145 (2001); *Alliance Pipeline, L.P.*, 80 FERC ¶ 61,149 at 61,597 (1997); *see also Portland Natural Gas Transmission System*, 125 FERC ¶ 61,198 at P 16 (2008).

of design capacity consistent with Commission policy when it makes its initial rate filing, at which time parties will have an opportunity to address the matter in detail.

Notwithstanding this disagreement over how to define design capacity, Flint Hills agrees that, at least for the *initial* uncommitted rates, calculation of rates based on the properly-established design capacity of the Sandpiper Project would insulate existing uncommitted shippers from throughput risk should the utilization of the Project fall short of the Company's projections. In this respect, NDPC's proposed rate structure conforms with Commission policy, which generally requires that initial rates for new projects be calculated based on the design capacity of the project, with the pipeline at risk for underutilization of the project capacity.[25]

NDPC makes no commitment, however, to remain at risk for underutilization of the Sandpiper Project beyond establishment of the initial rates. While the Company states that it intends "to rely primarily on indexing of the initial uncommitted rates"[26] – which would preserve the use of design capacity in calculating the uncommitted rates – NDPC specifically states that it "reserves the same right that all other oil pipelines have to utilize the other rate-changing methods set forth in the Commission's regulations to the extent those other methods may apply in the future."[27] As to underutilization risk, NDPC argues that the Company's reservation of its right to change the initial rates "imposes no greater risk on uncommitted shippers than exists on any other oil pipeline regulated by the Commission."[28]

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[25] *White Cliffs*, 126 FERC ¶ 61,070 at P 31; *Enbridge Energy Co.*, 110 FERC ¶ 61,211 at PP 44-46.

[26] Petition at 26, n.30.

[27] *Id.*

[28] *Id.* at 43.

NDPC's reservation of the right to use a rate-changing method other than indexing in the future to change the initial rates, unaccompanied by any commitment to insulate uncommitted shippers from underutilization risk, potentially shifts the Sandpiper throughput risk back on to uncommitted shippers like Flint Hills. Although Flint Hills takes no position at this time with respect to NDPC's utilization projections for the Sandpiper Project, the Project, like any large pipeline project, faces some level of underutilization risk. Contrary to NDPC's assertion that uncommitted shippers would face "no greater risk . . . than exists on any other oil pipeline regulated by the Commission" should Sandpiper be underutilized, NDPC is asking the Commission to approve a rate structure under which the rates for committed shippers would be fixed by TSAs. This means that uncommitted shippers on the NDPC system indeed face "greater risk" of being required to pay the costs of underutilized capacity that cannot be allocated to committed shippers. Such risk is heightened by the fact that only about 67 percent of the Sandpiper capacity is committed under TSAs (*i.e.*, 155,000 bpd of the 230,000 bpd Upstream Expansion capacity), and 36 percent of the total capacity of the expanded and extended NDPC system.[29]

To be sure, NDPC proposes that the rates for Committed Priority Shippers would always remain at least one cent higher than the uncommitted rate.[30] In theory, this commitment would require Committed Priority Shippers to share the costs associated with any underutilized capacity should NDPC seek to change its initial rates to allocate such costs to uncommitted shippers. But NDPC qualifies the commitment by proposing that if the rate for Committed Priority Shippers should ever fall below the uncommitted

[29] *Id.* at 36-37.

[30] *Id.* at 37-39.

rate (thereby invoking the requirement to increase the Committed Priority rate above the uncommitted rate), the Committed Priority Shippers would have the *choice* of paying a rate one cent per barrel higher than the uncommitted rate *or* being treated as a Committed Non-Priority Shipper.[31] In choosing to be treated as a Committed Non-Priority Shipper, a Committed Priority Shipper would pay only the discounted ship-or-pay rate, and thus, would presumably be insulated from an allocation of costs associated with underutilized capacity.[32] While a Committed Priority Shipper opting to become a Committed Non-Priority Shipper would give up the right to avoid proration under ordinary operating conditions, if capacity on NDPC system was being *underutilized* such that costs were being shifted to the uncommitted rate, such underutilization makes it more likely that a Committed Shipper would be willing to relinquish its priority status without fear of proration, thereby avoiding sharing in the costs associated with underutilized capacity.

For these reasons, the Commission should clarify in any order approving the rate structure that NDPC would remain at risk for underutilization of the Sandpiper capacity even if NDPC proposes a change to the initial rates in the future through a methodology other than indexing.

2. At a Minimum, the Commission Should Clarify that Approval of NDPC's Proposed Tariff Rate Structure does not Foreclose Parties from Challenging the Allocation of Costs Associated with any Underutilized Capacity on the Sandpiper Project in a Future Rate Filing

If the Commission declines to clarify that NDPC remains at risk for underutilized capacity on the Sandpiper Project, the Commission should, at a minimum, specifically clarify that approval of the rate structure proposed in the Petition does not limit the ability

[31] *Id.*

[32] *Id.*

of parties to oppose any future proposal by NDPC to allocate costs associated with underutilization of the system to uncommitted shippers if and when such a rate change is proposed. While NDPC notes that future rate changes "will be subject to the Commission's existing regulations,"[33] the Petition is not clear concerning the extent to which NDPC contends that approval of the proposed rate structure would foreclose objections to the future allocation of costs to uncommitted shippers.

The Commission should specify that any approval of NDPC's proposed committed/uncommitted rate structure does not serve as authorization, either express or implied, that NDPC may allocate to uncommitted shippers the costs associated with underutilization of the Sandpiper Project that are not recoverable from committed shippers. Parties must have the opportunity, should NDPC ever seek to change its initial rates based on design capacity, to oppose having to pay a higher uncommitted rate because of the TSAs' limits on the costs that may be recovered from committed shippers.

The Commission should also state that approval of the Petition does not foreclose objections to the Sandpiper capacity as imprudent or not used and useful. NDPC appears generally to agree that granting the Petition would not foreclose such challenges to Project cost recovery. NDPC's Petition does not request, for example, an advance finding that the Sandpiper Project capacity will be deemed used and useful, as was granted in *Calnev Pipe Line LLC*, 120 FERC ¶ 61,073 at P 28 (2007). Nor does NDPC request an advance finding that the decision to construct the Sandpiper Project is prudent. Based on NDPC's March 4, 2013 Response to Concord Energy LLC, *et al.*, moreover, NDPC appears to agree that parties would have the right to raise prudence and used and

[33] Petition at 43.

useful objections to the Sandpiper capacity.[34] Uncommitted shippers and other interested parties should not be foreclosed from opposing any future request to shift costs associated with underutilized capacity to uncommitted rates on the grounds that the decision to construct the Sandpiper Project was imprudent and/or that the Sandpiper capacity is not used and useful, and the Commission should so state in any order granting NDPC's Petition.

B. The Commission Should Clarify that Uncommitted Shippers Are Not Responsible for any Revenue Shortfall Associated with Discounted Committed Capacity

As explained above, NDPC's proposed rate structure includes a class of Committed Non-Priority Shippers who are expected to be charged a discounted rate relative to the uncommitted rates. Because NDPC's Petition lacks all but the most basic descriptive information about how NDPC's rates will be designed, it is impossible to tell from the Petition whether NDPC proposes to recoup any revenue deficiency associated with these discounts in uncommitted rates. To the extent, however, that NDPC may be contemplating such a discount adjustment to the uncommitted rates, the Commission should clarify that such an adjustment is inconsistent with Commission policy absent additional support.

The Commission recently explained in *Seaway Crude Pipeline Company LLC*, 146 FERC ¶ 61,151 (2014), that the availability of a cost-based uncommitted rate resembles a recourse rate under the Commission's natural gas alternative rate policy.[35] Similarly, the Commission indicted that committed shipper contracts resemble negotiated

[34] *See North Dakota Pipeline Company LLC*, "Response of North Dakota Pipeline Company LLC to Concord Energy LLC, Enwest Marketing LLC, And WPX Energy Marketing, LLC Motions to Compel Limited Discovery, Extend the Comment Date, and Enter a Protective Order" at 12, n.10 (March 4, 2014).

[35] *See Seaway*, 146 FERC ¶ 61,151 at P 31 (citing *Alternatives to Traditional Cost-of-Service Ratemaking of Nat. Gas Pipelines*, 74 FERC ¶ 61,076 (1996) ("Alternative Rate Policy").

rates under the Alternative Rate Policy.[36] Committed rates established by contract, the Commission explained in *Seaway*, need not be based on costs, and may be either higher or lower than a cost-of-service recourse rate.[37] Under the Commission's Alternative Rate Policy cited in *Seaway*, pipelines generally are not permitted to apply a discount-type adjustment for negotiated rates absent a specific showing that the negotiated rate was required to meet competition and that the adjustment does not have an adverse impact on recourse rate shippers.[38] In considering whether a discount-type adjustment for a negotiated rate is appropriate, the Commission will consider whether the pipeline should be entitled to retain any negotiated revenues in excess of the recourse rate.[39]

Here, the Petition does not specifically address how the discounted rates will be designed relative to the uncommitted rates, let alone justify any discount-type adjustment to the uncommitted rates. In the absence of such evidence, the Commission should clarify that NDPC is not entitled to adjust uncommitted rates to account for the discount provided to Committed Non-Priority Shippers. At a minimum, the Commission should clarify that approval of NDPC's proposed rate structure in this docket would be without prejudice to parties' right to challenge any proposal to recover the costs associated with discounting the Committed Non-Priority rates at the time NDPC makes its initial rate filing for the Sandpiper Project.

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[36] *Id.*

[37] *See id.* at PP 26, 30-31.

[38] *See, e.g., Texas Gas Transmission, LLC*, 138 FERC ¶ 61,175 at P 35 (2012).

[39] *Id.* at PP 35-39.

C. Additional Information is Necessary to Evaluate NDPC's Proposal to Credit $7.5 Million to the Cost of Service of Each Segment of the Sandpiper Project

The Commission should require NDPC to clarify its proposal to deduct $7.5 million from the cost of service of each major segment of the Sandpiper Project.[40] This $15 million credit proposal ($7.5 million per Sandpiper segment) is seemingly part of the "proposed tariff rate structure" for which NDPC requests Commission approval in this proceeding. Given the lack of rate information in the Petition, however, NDPC's $15 million credit proposal lacks any context that would allow Flint Hills or other interested parties to evaluate the reasonableness of the proposal. While a $15 million credit presumably is better than no credit at all, it is impossible to judge the reasonableness of this proposal in the overall context of the Sandpiper Project rate structure based on the limited information in the Petition. Accordingly, NDPC should be required to provide additional information concerning its proposed $15 million credit and support for why this level of credit is reasonable in the overall context of the Sandpiper rate structure proposal.

V. CONCLUSION

Based on the foregoing, Flint Hills respectfully requests the Commission to grant its motion to intervene in this docket and to consider its comments. In particular, the Commission should: (1) clarify that uncommitted shippers will not bear financial responsibility for underutilization of the Sandpiper Project should shipper demand be less than NDPC anticipates, even if NDPC proposes in the future to change the initial rates through a method other than indexing; (2) in the alternative, clarify that any approval of

[40] Petition at 42.

the rate structure proposed in the Petition does not limit the ability of parties to oppose any future proposal by NDPC to allocate costs associated with underutilization of the system to uncommitted shippers if and when such a rate filing is submitted; (3) clarify that the Commission is not approving any shifting of costs associated with discounted committed capacity to uncommitted rates, and any approval of the use of discounted rates for Committed Non-Priority shippers is without prejudice to parties' rights to challenge any proposal to recover the costs associated with discounting the Committed Non-Priority rates at the time NDPC makes its initial rate filing for the Sandpiper Project; and (4) require NDPC to provide additional information and support concerning its proposal to credit $7.5 million to the cost of service of each major segment of the Sandpiper Project.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that I have this day served a copy of the foregoing document, via electronic or first class mail, upon each party on the official service list compiled by the Secretary of the Federal Energy Regulatory Commission in this proceeding.

Dated at Washington, D.C., this 14th day of March, 2014.

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Document Content(s)

FHR_Comment_OR14-21.PDF.....Exhibit 1-16

Richard Smith Surrebuttal Testimony
Friends of the Headwaters
Schedule 4

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North Dakota Pipeline Company LLC **Docket No. OR14-21-000**

PROTEST AND OPPOSITION AND RENEWED MOTION TO INTERVENE OF CONCORD ENERGY LLC, ENSERCO ENERGY LLC, ENWEST MARKETING LLC AND WPX ENERGY MARKETING, LLC IN RESPONSE TO NORTH DAKOTA PIPELINE COMPANY LLC PETITION FOR DECLARATORY ORDER

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Enbridge Pipelines (Southern Pipeline) LLC, 144 FERC ¶ 61,044 (2013). **[page 43]**

Express Pipeline Partnership, 75 FERC ¶ 61,303 (1996), *order on rehearing and declaratory order*, 76 FERC ¶ 61,245 (1996). **[page 43]**

Seaway Crude Pipeline Company LLC, 146 FERC ¶ 61,151 (Feb. 28, 2014). **[page 43]**

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SFPP, L.P., 121 FERC ¶ 61,211 (2007). **[page 45]**

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18 C.F.R. § 385.211 **[page 5, 12]**

18 C.F.R. § 385.214 **[page 5]**

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

North Dakota Pipeline Company LLC **Docket No. OR14-21-000**

PROTEST AND OPPOSITION AND RENEWED MOTION TO INTERVENE OF CONCORD ENERGY LLC, ENSERCO ENERGY LLC, ENWEST MARKETING LLC AND WPX ENERGY MARKETING, LLC IN RESPONSE TO NORTH DAKOTA PIPELINE COMPANY LLC PETITION FOR DECLARATORY ORDER

Pursuant to Rule 211 of the Commission's Rules of Practice and Procedure, 18 C.F.R § 385.211, Concord Energy LLC (Concord), Enserco Energy LLC (Enserco), EnWest Marketing LLC (EnWest) and WPX Energy Marketing, LLC (WPX), collectively referred to as "Shippers," hereby submit this Protest and Opposition to the Petition for Declaratory Order (Petition) that North Dakota Pipeline Company LLC (NDP) filed on February 12, 2014 with the Federal Energy Regulatory Commission (FERC or Commission).

Concord, EnWest and WPX have previously requested that the Commission grant their Motion to Intervene in all proceedings involving the NDP Declaratory Order pursuant to 18 C.F.R. § 385.214.[1] They respectfully renew that Motion at this time, and are joined by Enserco in requesting that they be permitted to intervene as parties in all proceedings involving the NDP Declaratory Order.

[1] Motion to Intervene and Petitions or Motions of Concord Energy LLC; EnWest Marketing LLC and WPX Energy Marketing, LLC to: (A) Shorten the Period for Responses by Respondent North Dakota Pipeline Company LLC to these Petitions and Motions; (B) Compel Limited Discovery; (C) Extend the Comment Date for Responses to North Dakota Pipeline Petition for Declaratory Order; and (D) Enter an Appropriate Protective Order in this Proceeding, Docket OR14-21-000, dated February 25, 2014.

I. SUMMARY OF PROTEST

This is the second time that NDP and its predecessor, Enbridge Pipelines (North Dakota) LLC (Enbridge), have asked the Commission to approve a pipeline expansion project that has been repeatedly rejected by shippers in North Dakota.

On November 12, 2012, Enbridge first sought Commission approval of its Sandpiper project. Because shippers in North Dakota had repeatedly rejected participating in the project, Enbridge never held an Open Season. Instead, it filed a Declaratory Order petition that asked the Commission to impose the costs of building a new pipeline on shippers of the existing pipeline, more than doubling the rates that they would pay. At that time, as well as at the present time, there was considerable unused capacity in the existing Enbridge line.

On March 22, 2013 the Commission rejected the Enbridge Petition without prejudice. The Commission first pointed out that, "Enbridge North Dakota's filing does not contain the cost support required by Part 346 of the Commission's regulations to establish cost-of-service rates."[2] The Commission then stated that if Enbridge refiles its Petition, it needed to file rates, "fully supported pursuant to the Commission's regulations."

Neither Enbridge nor NDP has done so. The current NDP Petition is much the same as the Enbridge 2012 filing, and does not include a cost of service.

As in 2012, NDP is now proposing to add a new 230,000 barrels per day (bpd) pipeline from Beaver Lodge, ND to Clearbrook, MN. When combined with its present pipeline, NDP would have the capacity to transport 440,000 bpd of Bakken crude oil to

[2] *Enbridge Pipelines (North Dakota) LLC*, 142 FERC ¶ 61,212 at P 28 (2013).

Clearbrook. NDP further proposes to extend its pipeline from Clearbrook to Superior, WI by constructing 233 miles of 30-inch pipe that would have an annual average pipeline capacity of 380,000 bpd. In connection with the new extension from Clearbrook, MN to Superior, WI, NDP proposes to eliminate Clearbrook as a destination for North Dakota shippers.

And again, once the new line is constructed, NDP is also proposing to raise the rates that current captive shippers would have to pay to levels that could potentially be double or more the current rates. In addition, NDP is again proposing to impose on uncommitted shippers the obligation of ensuring the pipeline's rate of return regardless of whether the new capacity that NDP proposes to build is in fact actually used by any shipper. In its Petition, NDP claims that it is abandoning any "true-up" mechanism, which previously required uncommitted shippers to bear the risk that shippers will not actually use the entire new capacity that NDP is building.[3] NDP's statement is not correct. In its current Petition, it appears that NDP is asking uncommitted shippers to pay whatever rate is necessary after the first year of operation in order to ensure NDP's rate of return and recovery of its costs, including the cost of investment in the new and expanded pipeline segments.

In fact, contrary to NDP's representations in its Petition, there are still further similarities between the Enbridge 2012 proposal that the Commission rejected and the present NDP Petition. In its 2012 project, Enbridge abandoned an Open Season for lack of shipper interest. In its 2014 solicitations, NDP found as little support for the pipeline project as Enbridge encountered in 2012. According to NDP, there are approximately 185

[3] Petition for Declaratory Order of North Dakota Pipeline Company LLC (NDP Petition), OR14-21-00, dated February 12, 2014, pages 42-43.

shippers on the NDP pipeline in North Dakota. Yet only 15 shippers, 8% of the total number of shippers on the NDP pipeline, were sufficiently interested to even ask for a *pro forma* Transportation Services Agreement (TSA) during the Open Season that NDP conducted from November 26, 2013 to January 24, 2014. NDP does not state how many of those 15 shippers went on to actually execute a TSA. However, only 155,000 bpd of the 440,000 bpd of total capacity of the Beaver Lodge to Clearbrook pipeline were committed during the Open Season.

Moreover, at least one of the committed shippers, Marathon Pipeline Company (Marathon), and possibly more, is an affiliate of the pipeline. According to news reports, Marathon is the "anchor" shipper on the pipeline and its parent company, Marathon Petroleum Corp., holds a 27% equity interest in NDP.[4] Thus, it appears that the majority of the 155,000 bpd subscribed to during the Open Season is attributable to affiliates of the equity owners of the pipeline. Moreover, as we will discuss more fully below, it also appears that the very structure of the Sandpiper project is designed to permit Marathon to use capacity for which uncommitted shippers will be paying to transport crude oil at lower rates to its Illinois and Ohio refineries.

[4] NDP stated that Marathon Pipeline Company was the anchor shipper for the project. According to a recent Wall Street Journal article, "Marathon Petroleum Corp., which operates refineries in Detroit, Mich., Canton, Ohio, and Catlettsburg, Ky., has agreed to help foot the $2.6 billion construction bill and provide much of the oil in exchange for a 27% stake in Enbridge's North Dakota pipeline network." See "In Dakota Oil Patch, Trains Trump Pipelines," Alison Sider, *Wall Street Journal*, dated March 3, 2014. http://online.wsj.com/news/articles/SB10001424052702304071004579407140444547268?mg=reno64wsj&url=http%3A%2F%2Fonline.wsj.com%2Farticle%2FSB10001424052702304071004579407140444547268.html.

It is clear that, NDP's current Petition represents an effort by the pipeline to use the Commission's processes to require captive shippers to finance and pay for a project that a majority of the shipping community does not want or need.

In this Protest, we will discuss in detail the reasons why a majority of the shipper community has not supported the Sandpiper project and why there is no justification for imposing on uncommitted shippers the unnecessary burden and unreasonable rate design that NDP is proposing.

- First, there is no substance to NDP's claim that an additional 230,000 bpd of pipeline capacity from Beaver Lodge to Clearbrook is necessary to meet crude oil demand for North Dakota Bakken production. Virtually every governmental study shows that current pipeline and rail facilities are more than sufficient for the foreseeable future to transport Bakken crude oil production from North Dakota to refining centers throughout the United States.[5]
- A Muse Stancil & Co. (Muse) study that NDP commissioned to support its contention that additional pipeline capacity is necessary is seriously flawed. It fails to taken into account existing North Dakota pipelines, is based on

[5] The Declaration of Robert P. Garner (Garner Declaration), which is attached to this Protest as Exhibit D, discusses North Dakota Pipeline Authority data regarding the capacities of rail and pipeline projects in the Bakken. See Exhibit D, pages 5-6, as well as Attachment A to Exhibit D. The Declaration of Peter K. Ashton (Ashton Declaration), attached as Exhibit F to this Protest, discusses data from the Energy Information Agency (EIA) and United States Geological Survey (USGS) regarding crude production in the Bakken. See Exhibit F, pages 23-24.

secret data that Muse refuses to share with either shippers or the Commission, and is contradicted by NDP's own prior statements.[6]

- The present NDP pipeline is adequate. The present capacity of the NDP pipeline from Beaver Lodge to Clearbrook is 210,000 bpd. During a prior Enbridge proceeding, NDP reported to the Commission that only 100,000 bpd – i.e., less than 50% of the pipeline's capacity – were shipped on the pipeline during certain months in the January 2012 to July 2013 period.[7] The monthly average shipment on the pipeline for the 12-month period from August 2012 through July 2013 was only 129,000 bpd or only about 60% of capacity.[8] In addition, the Shippers have stated in sworn Declarations attached to the Protest that they have been able to ship all the crude oil they wished on the NDP pipeline in 2013 and 2014.
- There is approximately 1 million bpd of rail take-away capacity in Western North Dakota today. That rail take-away capacity is expected to increase by 2016 to approximately 1.35 million bpd, an amount equal to the maximum level of production expected in the whole Bakken for the foreseeable future.
- The NDP rate design appears to impose inordinate cost burdens on uncommitted shippers. NDP is proposing to charge committed shippers – largely, we believe, affiliates of the equity owners of the pipeline – as little

[6] See Ashton Declaration, page 21-22, discussing statements made by Robert Steede in proceeding OR13-28-000.
[7] Appendix to *St. Paul Park Refining Co. LLC v. Enbridge Pipelines (North Dakota) LLC*, 145 FERC ¶ 61,050 (October 17, 2013).
[8] *Id*.

as one cent above the rates that uncommitted shippers pay in the first year. However, after that first year of operation, NDP could, under the rate design that it is now asking the Commission to approve, impose rates on uncommitted shippers that substantially exceed the rates that committed shippers pay. That could well mean that uncommitted shippers would bear the lion's share of the cost of constructing and operating a pipeline that they do not need. In fact, based on a review of the NDP rate structure, it is possible that current captive shippers could see their rates more than double if the NDP rate design were approved.

- The NDP project structure is inherently discriminatory and appears to be designed to confer economic benefits on an affiliated shipper, Marathon, at the expense of uncommitted shippers.

There is yet another critical issue that the Shippers are asking the Commission to address. As we pointed out previously, in its 2013 Decision dismissing the Enbridge Sandpiper project, the Commission pointed to the requirements that rates be justified by a cost of service filing, unless NDP was seeking market based rates or rates agreed to by all shippers on the pipeline.[9] However, in its current Petition, NDP is instead attempting to push all cost issues to a later stage of this proceeding. Doing so would place an unjust and unreasonable burden on the Shippers. It is therefore critical that cost and rate issues be decided *at this time*. If the NDP rate design were approved at this time as NDP requests, the Shippers' only recourse to contest cost and rate issues would be to file a Protest of an NDP cost of service *after* the new Sandpiper pipeline has already been constructed. The

[9] *Enbridge Pipelines (North Dakota) LLC*, 142 FERC ¶ 61,212 at P 28, 30.

Shippers would then only have 15 days to fully analyze and describe to the Commission the defects in NDP's cost structure. Moreover, even if the Shippers were successful in their Protest, the most likely outcome would be a protracted evidentiary hearing and subsequent appeal proceedings with the Shippers paying the pipeline's rates until the very end of the case. We respectfully suggest that this is a burden that is unjust and unreasonable.

For each of these reasons, the Commission should not approve an NDP rate design at this time that permits the pipeline to load disproportionate and unreasonable costs onto uncommitted captive shippers of the present NDP pipeline. We therefore respectfully urge the Commission to reject outright NDP's proposed Expansion Surcharge on uncommitted shippers and the rate design it proposes to establish. If, however, the Commission does not do so, it should certainly establish evidentiary hearing procedures, with all the attendant rights of discovery, so that disputed issues of fact regarding the underlying justification for the pipeline expansion and the costs that uncommitted shippers should properly bear if the pipeline project proceeds can be fairly resolved. That type of evidentiary hearing is expressly contemplated in Section 385.211(a)(4) of the Commission's procedural regulations.[10] To underscore the necessity of holding an evidentiary hearing if the NDP Petition is not denied, we are attaching to this Protest as Exhibit A, a list of disputed issues of fact, which NDP has the burden of proving in order to justify the relief it seeks in its Petition for Declaratory Order.

II. COMMUNICATIONS AND CORRESPONDENCE

Communications and correspondence regarding this Protest should be directed to:

[10] 18 C.F.R. § 385.211(a)(4).

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III. STATEMENT OF ECONOMIC INTEREST AND MOTION TO INTERVENE OF CONCORD, ENSERCO, ENWEST AND WPX

A. Concord

Concord is a marketer of crude oil in North Dakota, Montana and Colorado. As the sworn Declaration of Brad Vodicka (Vodicka Declaration) attached to this Protest as Exhibit B demonstrates, Concord purchases crude oil from supply sources throughout the Bakken Shale Region and transports this crude oil to appropriate markets. Concord is currently a shipper on NDP's pipeline system, and has been a regular shipper of record on

the NDP pipeline system for the past three years. Concord has also made substantial investments in order to use the NDP pipeline system, including the construction of lact inject facilities at Ramberg, ND, as well as investments in truck unloading facilities, tankage and other facilities to determine crude oil quantities and quality control.

B. Enserco

As the sworn Declaration of Jonathan Molis (Molis Declaration), attached to this Protest as Exhibit C states, Enserco is a privately-held subsidiary of Twin Eagle Resource Management, LLC (Twin Eagle). Enserco owns and operates crude oil logistical assets in North Dakota, Montana and Wyoming. Enserco's parent company, Twin Eagle, engages in the acquisition of crude oil from North Dakota, Montana, Utah and Wyoming producers at the well head. Presently, a significant portion of Enserco's business activities is focused on the Bakken producing areas of North Dakota. Enserco has been a regular shipper of record on the NDP pipeline system and its predecessor, Enbridge Pipelines (North Dakota) LLC (Enbridge) for the past six years.

C. EnWest

As the sworn Declaration of Robert P. Garner, attached to this Protest as Exhibit D indicates, EnWest has been a regular shipper of record on the NDP pipeline system for at least the past three years and plans to continue shipping crude oil into the foreseeable future. EnWest has also made substantial investments in order to use the NDP pipeline system, including the construction of a crude oil injection facility at the NDP site at Stanley, ND. EnWest's investments at Stanley include truck unloading facilities, tankage, as well as other facilities to determine crude oil quantities and quality control.

D. WPX

In his sworn Declaration, attached to this Protest as Exhibit E, William Woodard, WPX's Director of Crude Trading, states that WPX is a substantial shipper of crude oil on the NDP pipeline system and intends to continue to use the NDP pipeline in the future.

In addition, the parent company of WPX, WPX Energy, Inc., is an independent oil and gas exploration and production company specializing through subsidiaries in producing natural gas, natural gas liquids and oil from non-conventional resources such as tight-sands and shale formations. WPX Energy, Inc. holds approximately 81,000 net acres on the Fort Berthold Indian Reservation, where it produces approximately 28,000 bpd from the Bakken Shale formation.

Accordingly, Concord, Enserco, EnWest, and WPX each have a substantial economic interest in this proceeding and have standing to file this Protest. The Shippers therefore respectfully request that their Motion to Intervene be granted.

IV. BACKGROUND

As discussed above, this is the second time that NDP and its predecessor, Enbridge, have asked the Commission to approve a rate design for a new pipeline that few independent shippers want or need. When Enbridge sought Commission approval of the Sandpiper project in 2012, the Commission strongly suggested that it needed to come forward with a cost of service that justified the rates it was proposing to charge.

Neither Enbridge nor NDP has done so.

A. NDP Position in this Proceeding.

Rather than submitting a cost of service for Commission approval, in its present Petition, NDP is instead asking the Commission to approve a rate design that has major

cost implications for uncommitted shippers, with the cost of service to follow at some unspecified time in the future.

As a part that rate design, NDP is specifically asking the Commission to approve the imposition of an "Expansion Surcharge" on uncommitted shippers for the Beaver Lodge to Clearbrook segment as well as a Downstream Extension rate for the new Clearbrook to Superior line. The uncommitted shippers who would pay those fees are largely the historic shippers on the present NDP pipeline system. NDP's entire justification for the Expansion Surcharge is its claim that (i) there is a pressing need for additional pipeline capacity on the NDP system in order to relieve prorationing; and (ii) the precedents established by the Commission in the *Colonial*[11] and *Calnev*[12] cases.

With respect to the first item – the pressing need for additional capacity on the exiting NDP pipeline – NDP relies entirely on a study conducted by Muse, a consulting firm. With respect to the second item - the *Colonial* and *Calnev* cases - NDP is relying on Commission precedent in which every shipper acknowledged the need for expanding the capacity of the pipeline.

Although NDP states that it is no longer proposing a "true-up" system in which uncommitted shippers are asked to effectively guarantee NDP's full cost recovery and return on equity even if the pipeline is undersubscribed, the actual NDP Petition appears to state the opposite. We discuss this aspect of the NDP rate design as well as the alleged justification for any expansion of the existing NDP pipeline system in a subsequent portion of this Protest.

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[11] *Colonial Pipeline Company*, 116 FERC ¶ 61,078 (2006), *order denying reh'g*, 119 FERC ¶ 61,183 (2007).
[12] *Calnev Pipe Line LLC*, 120 FERC ¶ 61,073 (2007).

B. NDP Pipeline Expansion Proposal

In its Petition, NDP outlines a pipeline construction project that is physically the same as the 2012 Sandpiper proposal.

The NDP pipeline presently originates at Alexander, ND, and terminates at Clearbrook, MN. At Clearbrook, an affiliate of NDP, Lakehead Pipeline Partners (Lakehead), interconnects with the NDP system and transports North Dakota crude oil to such destinations as Superior, WI, Chicago, IL, and Cushing, OK. NDP proposes to more than double its current 210,000 bpd pipeline from Beaver Lodge to Clearbrook by adding another 230,000 bpd of capacity.[13] In addition, NDP proposes to build a 380,000 bpd pipeline from Clearbrook, MN to Superior, WI.[14]

C. Justification for Expansion Surcharge on Uncommitted Shippers

The crude oil that NDP transports largely originates in the Bakken producing fields. As the Commission is well aware, the Bakken producing area of North Dakota has become one of the principal sources of crude oil in the United States. In the past, the result of increasing Bakken production has been bottlenecks in transporting Bakken crude out of the area to refining centers in other parts of the country. Those bottlenecks have occurred in the transportation of crude oil from North Dakota to Clearbrook, MN, as well

[13] Petition for Declaratory Order of North Dakota Pipeline Company LLC, OR14-21-00, dated February 12, 2014, page 15. Enbridge's 2012 Petition stated that the expansion capacity would amount to 225,000 bpd, increasing capacity to a total of 435,000 bpd. Petition for Declaratory Order and Offer of Settlement of Enbridge Pipelines (North Dakota) LLC, OR13-6-000, dated November 2, 2012, page 7.

[14] Petition for Declaratory Order of North Dakota Pipeline Company LLC, OR14-21-00, dated February 12, 2014, page 15. Enbridge's 2012 Petition stated that this line would have an initial capacity of 375,000 bpd. Petition for Declaratory Order and Offer of Settlement of Enbridge Pipelines (North Dakota) LLC, OR13-6-000, dated November 2, 2012, page 7.

as in the transportation of crude oil from Clearbrook on the Lakehead system to Superior, WI.

However, the marketplace has already reacted in a decisive manner to these transportation constraints. First, NDP has expanded its pipeline system on the basis of market factors. On February 28, 2012, Enbridge Energy Partners L.P. and other Enbridge entities announced an open season for the transportation of 145,000 bpd of Bakken crude oil from Berthold, ND, to Cromer, Manitoba, which connects to the Enbridge Mainline System (Bakken Pipeline Expansion).[15] This system reaches American refineries as far south as the US Gulf Coast. At the same time, Enbridge announced the construction of an 80,000 bpd rail facility at Berthold, ND.[16] This facility too would transport Bakken crude oil to American refining centers. Enbridge announced the completion of the Bakken Pipeline Expansion on March 4, 2013.[17]

In addition to this pipeline expansion, the market has supported the development and expansion of an extensive rail transportation system. As of December 2013, this rail system has had the ability to transport 965,000 bpd of crude oil from Bakken fields to refining centers throughout the country. By year-end 2014, another 230,000 bpd will have been added to this capability, so that the rail take-away capacity from the Bakken will be 1,195,000 bpd.[18]

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[15] "Enbridge Launches Binding Open Season for Sanish Pipeline Project and Bakken Expansion Program," Enbridge Press Release, February 28, 2012: http://www.enbridge.com/MediaCentre/News.aspx?yearTab=en2012&id=1557567.
[16] *Id.*
[17] "Enbridge Energy Partners and Enbridge Income Fund Announce Completion of Bakken Pipeline Expansion Project, News Release," March 4, 2013: http://www.enbridge.com/MediaCentre/News.aspx?yearTab=en2013&id=1693907.
[18] Attachment A attached to the Sworn Declaration of Robert P. Garner (hereinafter "Garner Attachment A").

As a result of this rapid expansion of rail transport, there is at the present time, sufficient rail and pipeline transportation facilities to ship approximately 1.5 million bpd of Bakken crude oil.[19] The use of extensive rail transport clearly indicates that the market regards the availability, pricing and terms of service of rail transport as equally desirable as the pipeline service on the Enbridge and NDP systems.

Furthermore, the present NDP pipeline system has been underutilized. According to the Order on Complaint in FERC Docket OR13-28-000, the existing NDP line transported less than 100,000 bpd from Beaver Lodge to Clearbrook in several months between January 2012 to July 2013. In April 2013, the NDP shipped only 70,083 bpd.[20] On average, throughput during that January 2012 to July 2013 period was less than 75% of the 210,000 bpd capacity of the pipeline. During the period August 2013 to the present date, the NDP pipeline has also been able to transport virtually all of the crude oil tendered to it.[21]

NDP nonetheless cites a study it commissioned from Muse to support its position that the Sandpiper project is needed. The Muse report states that in its opinion, sufficient demand for pipeline transportation exists from Beaver Lodge to Superior to fill the entire pipeline expansion throughout its expected life. Muse bases this conclusion on its view that the demand for Bakken crude oil by Midcontinent and Eastern Canadian refineries is so strong that they will fill the entire Sandpiper pipeline. According to Muse, rail

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[19] Garner Attachment A.
[20] *St. Paul Park Refining Co. LLC v. Enbridge Pipelines (North Dakota) LLC*, 145 FERC ¶ 61,050 (October 17, 2013) at P 35. Also see the Appendix attached to that order.
[21] Garner Declaration, page 8; Vodicka Declaration, page 2; Molis Declaration, page 2; Declaration of William Woodard, page 2.

transportation to these locations is significantly more expensive and therefore will not be competitive with the rates that it believes Sandpiper will charge.

However, as we will discuss in greater detail below, the Muse study is seriously flawed.

- The Muse report concludes that it is downstream pipeline capacity constraints that have prevented NDP from transporting crude oil at the capacity of the line during 2012 and 2013. That position, however, is directly contrary to the position that Enbridge took in a prior Commission proceeding. In the OR13-28-000 proceeding, Enbridge contended that it was not downstream capacity constraints but rather widening crude oil price differentials at different locations in the United States that led to the underutilization of the NDP, a position that the Commission itself accepted.
- It does not appear that the Muse report considered all of the pipelines and refineries in North Dakota that presently consume and transport Bakken crude oil and will do so in the future.
- The Muse report appears to treat rail transportation as a "second best alternative" based on its alleged higher cost without recognizing the substantial investment in rail capacity that already exists and is currently being made to transport Bakken crude oil.
- The Muse study fails to take into account the growing investment in rail transportation by refining operations around the country. For example, a number of West Coast refiners, including Tesoro, Valero, and Phillips 66 have announced plans to build rail-offloading facilities at their refineries in Washington and

California. There are over 80 rail loading and unloading facilities being built or in the process of being built around the country.

- It is very unlikely that U.S. Mid-Continent refineries in PADD II will use Bakken crude oil transported by Sandpiper as the Muse study concludes. In 2012 over 1.2 million bpd of crude oil from western Canada were imported into PADD II. The expansions of Enbridge's Canadian system means that even more Western Canadian crude oil, not Bakken crude, will be used in this area.
- Muse's suggestion that Bakken crude can break into the Eastern Canadian market is also fanciful. This region receives large quantities of its pipeline crude oil supplies from Western Canadian producers and Canadian producers view this area as a target market for their growing production. It is faulty economic logic to assume that those producers will permit their markets to be eroded by Bakken crude oil without taking responsive action. Furthermore, 330,000 bpd of Eastern Canadian refining capacity is not even connected to pipelines.
- The Muse report and its "black box" model appear to be highly sensitive to assumed future production levels in the Bakken area. Consequently, if production does not reach the levels Muse assumes, the supposed benefits that Muse claims would flow from the expansion of the NDP will never materialize.
- Muse's claim that $5 billion in benefits would inure to producers if the NDP expansion were constructed is a misleading and overstated figure.

In any event, the Muse study is of limited value in this proceeding because both the model Muse uses and the inputs to that model are supposedly proprietary and confidential and will not be shared with the Shippers or their experts. Surely the

Commission should not give any weight to a disputed expert report, particularly when the expert has failed to reveal the underlying basis of his assumptions and conclusions.

D. The Colonial and Calnev Cases

Based on the Muse study – which is so seriously flawed that no meaningful conclusions can be drawn from it – NDP claims that the Commission's *Colonial*[22] and *Calnev*[23] cases establish a precedent for imposing an Expansion Surcharge on the existing uncommitted shippers for the construction of the Sandpaper project.

In *Colonial*, the Commission stated that Colonial had indicated that its pipeline system running between Houston, TX and Linden, NJ had been under significant prorationing during the summer and winter months, and expected to be further constrained in the near future by increased Gulf Coast refinery capacity of approximately 700,000 bpd.[24] The Commission specifically stated in granting the petition that all intervenors in this case, including the two protestants, agreed that the new transportation capacity was needed.[25]

A similar situation existed in the *Calnev* proceeding, in which the pipeline proposed constructing a 16-inch diameter line to parallel its existing system from Colton, CA to Las Vegas NV. Space on the existing Calnev system had been significantly constrained by growing demand from southern Nevada - demand that was expected to continue to grow and had even been the focus of an inquiry by the Board of

[22] *Colonial Pipeline Company*, 116 FERC ¶ 61,078 (2006), *order denying reh'g*, 119 FERC ¶ 61,183 (2007).
[23] *Calnev Pipe Line LLC*, 120 FERC ¶ 61,073 (2007).
[24] *Colonial*, PP 4-6
[25] *Colonial*, P 43.

Commissioners of Clark County, NV.[26] In approving Calnev's petition, the Commission specifically stated:

> It is important to recognize that all of Calnev's shippers agree that the proposed expansion is necessary to meet the increasing demand for capacity in Calnev's markets, especially in the Las Vegas area. Because of the increasing demand for motor fuel and jet fuel in the Las Vegas area, all parties agree that demand will outstrip supply in the next few years and that the only viable method of meeting the long term demands of the region is a pipeline expansion.[27]

Clearly that is not the situation in this case. NDP has not been in significant prorationing. All parties do not agree that the production of crude oil in the Bakken exceeds the take-away capacity. Quite to the contrary, it is clear that the NDP pipeline expansion is not needed to meet demand. The facts of the present case do not have any similarity to either the *Colonial* or the *Calnev* cases.

E. Rate Issues Embedded in the NDP Rate Design

It is important that the Commission be aware of the implications of the rate design issues that NDP is asking it to decide at this time.

First, NDP is asking the Commission to determine at this time that uncommitted shippers, which includes the historic shippers on the present NDP pipeline system, should pay a substantial portion of the costs of constructing NDP's new pipeline system and thus pay significantly higher rates than they currently pay.

Secondly, NDP is asking the Commission to approve at this time a rate regime in which committed shippers will, throughout the life of the pipeline, only be required to pay the base rates specified in their TSA's plus a flow through power charge. The direct consequence of this proposition is that uncommitted shippers might well be required to

[26] *Calnev*, PP 4-5.
[27] *Calnev*, P 24.

pay rates that are substantially higher than committed shippers in order to ensure that the pipeline recovers its costs including its rate of return, regardless of the volume of crude oil that the pipeline actually transports. We discuss this point in detail below.

It is true that certain portions of the NDP Petition state that uncommitted shippers will pay at least one cent below the rates of committed shippers and that the pipeline has abandoned a "true-up" mechanism guaranteeing the pipeline's cost recovery and rate of return. However, other portions of the NDP Petition seemingly contradict those statements. The Shippers are very concerned that the Commission's approval of the rate design that NDP proposes will place inordinate financial burdens on uncommitted shippers and relieve the pipeline and its shipping affiliates from assuming any risk.

We discuss this issue as well below.

Finally, the rate design that NDP proposes could well result in more than doubling the rates that current shippers pay, without providing any corresponding benefit to them. We point out below why this portion of the NDP rate design is unjust and unreasonable.

V. BASIS OF PROTEST AND OPPOSITION TO NDP PETITION FOR DECLARATORY ORDER

A. NDP has Failed to Demonstrate That There Is an Economic Justification for Constructing a Pipeline That Doubles the Present Capacity of the NDP Line.

The entire NDP Petition is based on NDP's allegation that the current NDP pipeline is inadequate to meet the demand for transportation of crude oil and that doubling the capacity of the line is required to alleviate serious congestion. The acceptance of this proposition is the entire basis for the imposition on uncommitted shippers of the

Expansion Surcharge for the Beaver Lodge to Clearbrook segment and the Downstream Extension rate component for the new Clearbrook to Superior line.[28]

However, NDP's claim is without basis and unsupported by the facts.

1. Government Reports Indicate that There Is More Than Ample Take-Away Capacity of Bakken Crude Oil and That the NDP Sandpiper Project Is Not Needed and Will Not Be Used.

As Peter K. Ashton, a transportation economist states in his sworn Declaration attached to this Protest as Exhibit F, an assessment of the need for a new pipeline transportation project can generally be made by comparing the current and expected demand with the current and prospective facilities that can meet this demand.[29]

This comparison of supply and demand conclusively demonstrates that there is no need for the additional capacity that the Sandpiper project would provide.

Attachment A to the sworn Declaration of Robert P. Garner includes a chart of crude oil pipelines and crude oil rail transportation facilities in the Bakken area of North Dakota. The chart was prepared by the North Dakota Pipeline Authority. An excerpt of that chart is provided below.

US Williston Basin Crude Export Options - January 22, 2014
Year End System Capacity, Barrels Per Day (BPD)

	2007	2008	2009	2010	2011
Pipeline / Refining Total	230,000	272,000	286,000	337,500	413,000
Rail Only Total		30,000	95,000	115,000	265,000
All Transportation Total	230,000	302,000	381,000	452,500	678,000

	2012	2013	2014	2015	2016
Pipeline / Refining Total	463,000	583,000	783,000	843,000	1,168,000
Rail Only Total	660,000	965,000	1,195,000	1,355,000	1,355,000
All Transportation Total	1,123,000	1,548,000	1,978,000	2,198,000	2,523,000

[28] NDP Petition, pages 5-6, 28-29.
[29] Ashton Declaration, page 29.

As the chart demonstrates, the North Dakota Pipeline Authority has stated that by year end 2013, there was a total of 583,000 bpd of pipeline and refinery take-away capacity from the Bakken. During that same 2013 period, there was 965,000 bpd of take-away rail capacity. The total take-away capacity was therefore 1,548,000 bpd. The North Dakota Pipeline Authority predicts that by the end of 2015, there will be a total of 843,000 bpd of pipeline capacity without the Sandpiper project.[30] Rail capacity is predicted to be 1,355,000 bpd. The total projected take-away capacity at the end of 2015, not including the Sandpiper expansion, is therefore 2,198,000 bpd.

As Mr. Ashton reports in his Declaration, the Energy Information Agency (EIA) reports that in 2013, about 930,000 bpd of crude oil were produced from the Bakken. The EIA predicts that 950,000 bpd will be produced in 2021.[31] Those figures are considerably lower than the production estimate of Steven D. Crane, an expert for NDP. According to the Crane analysis, crude oil production by year-end 2015 will be approximately 1.2 million bpd and Bakken crude oil production in 2026 will peak at 1.4 million bpd.

The U.S. Geological Survey of the U.S. Department of the Interior also projects significantly lower production rates from the Bakken area than Mr. Crane, a fact that Mr. Crane himself notes in his affidavit.[32] USGS projects only 7.4 billion barrels will be produced from the Bakken area between 2012 and 2041 whereas Mr. Crane projects a figure that is 50% higher (11.1 billion barrels).[33]

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[30] According to Garner Attachment A, total pipeline capacity by year end 2016 would be 1,168,000 bpd, which includes estimate of 225,000 bpd of capacity for Sandpiper. See Garner Attachment A.
[31] Ashton Declaration, pages 23-24.
[32] Crane Affidavit, page 5.
[33] See Ashton Declaration, pages 23-24.

Using the EIA data, it is entirely clear that more than sufficient take-away capacity presently exists for Bakken crude oil. *Current pipeline and rail capacity is more than 1 million bpd in excess of production*. Using EIA's projected production, pipeline and rail take-away capacity will still be more than 1 million bpd greater than production.

The same conclusion is compelled using the higher Crane and North Dakota Pipeline Authority production forecast data. *Current pipeline and rail capacity is more than 982,000 bpd in excess of production using the Crane forecast*. Using Crane's projected 1.2 million bpd production for 2015, pipeline and rail take-away capacity will be 998,000 bpd more than production.

The data that Federal and North Dakota state agencies have published clearly demonstrate that there will be more than ample take-away capacity for Bakken crude oil without the NDP Sandpiper project. That conclusion stands even using the crude oil production projections of NDP's own expert.

2. There Is Excess Unused Capacity on the Present NDP Pipeline.

For at least the past two years there has been excess capacity on the existing NDP pipeline system.

On March 1, 2013 Enbridge filed tariffs, which included the Phase 5 and Phase 6 surcharges for the pipeline expansions it built from 2006 to 2009. In connection with that March 1, 2013 filing, Enbridge provided considerable data regarding the operation of the pipeline.[34] In the Appendix to its decision in that case, the Commission stated the throughput on the NDP pipeline. It reported that the average monthly throughput from

[34] See Oil Pipeline Tariff Filing filed in Docket IS13-189-000, dated March 1, 2013.

January 2012 to July 2013 on the NDP pipeline was 155,973 bpd.[35] The Commission also reported that in certain months deliveries on the pipeline to Clearbrook were less than 100,000 bpd. Since the pipeline has a capacity of 210,000 bpd, the decline in throughput on the existing pipeline was certainly dramatic.

The overall situation has not changed since July 2013. As the sworn Declarations of representatives of Concord, Enserco, EnWest and WPX state, all four companies have been shippers on the NDP system and intend to continue shipping on the NDP line into the foreseeable future.[36] All four companies have also stated that they have not been subject to prorationing and have not been prevented by prorationing from shipping crude oil on the NDP pipeline. [37]

It is also significant that in explaining the dramatic decline in throughput in the Phase 6 Surcharge case, Enbridge claimed that it was the result of individual shipper decisions based on the fact that crude oil price differentials between the Midcontinent and U.S. coastal areas had widened considerably.[38] According to Enbridge it was those price differentials that gave shippers an incentive to transport Bakken crude by rail carrier to higher value markets.[39] That is a far cry from NDP's contention in this case that crude oil

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[35] Appendix to Order on Complaint, 145 FERC ¶ 61,050 (October 17, 2013).
[36] The declarations are attached to this Protest as Exhibits B, C, D, and E.
[37] On page 6 of its Motion to Intervene dated March 4, 2014, St. Paul Park Refining Company LLC (SPPRC) states that it has not suffered from chronic prorationing on the NDP system and has seen operational evidence that the system is subject to persistent excess demand. The Affidavit of Justin Amoah attached to SPPRC's Motion also states that prorationing on the system was intermittent, and that temporary integrity maintenance on the system was primarily responsible for any sporadic prorationing. Affidavit of Justin Amoah, page 4.
[38] Motion to Dismiss and Answer of Enbridge Pipelines (North Dakota) in Response to Complaint of St. Paul Park Refining Co. LLC, OR13-28-000, dated August 14, 2013, pages 20-21. Also see the Affidavit of Robert Steede attached to that Motion, pages 8-9.
[39] *Id*.

deliveries from the Bakken have been constrained because of downstream pipeline limitations.

There are still further facts that refute NDP's contention that its present pipeline is inadequate to satisfy demand. In his Declaration, Mr. Garner points out that the NDP pipeline system taken as whole has even more unused capacity than just the Beaver Lodge to Clearbrook segment. In addition to this segment of the pipeline there is further capacity on another part of the NDP system. In its Phase 6 project, NDP built a 145,000 bpd pipeline connection between Berthold, ND and Steelman, Saskatchewan. From Steelman, the line continues to Cromer, Manitoba where it connects to the Enbridge system mainline. The pipeline then delivers crude oil at Clearbrook, Superior and points beyond.

As a result, when the present 210,000 bpd take-away capacity from Beaver Lodge is added to the 145,000 Berthold to Cromer to Clearbrook connection, there is a total of 355,000 bpd of take-away capacity of Bakken crude from North Dakota on the NDP system. According to Mr. Garner, the Berthold to Cromer connection is significantly underutilized and is currently transporting only 4,500 bpd.[40]

Consequently, the *existing* combined NDP/Enbridge system provides sufficient capacity to transport the crude oil of all committed shippers on the Sandpiper project. According to the Petition, the NDP pipeline, which is now at 170,000 bpd, will be able to use all of its 210,000 bpd design capacity in early 2015. That is equivalent to 40,000 bpd more than the pipeline is now shipping. The Berthold to Cromer segment of the NDP pipeline has a design capacity of 145,000, but is now only transporting 4,500 bpd. That leaves an additional 140,500 bpd that is not being used. The 40,000 bpd for the NDP main

[40] Garner Declaration, page 8.

line and the 140,500 for the Berthold to Cromer line equals 180,500 bpd of additional capacity. That surplus is more than sufficient to service the 155,000 bpd of the Sandpiper project's committed shippers

3. The Lack of Shipper Interest in Sandpiper Provides Telling Evidence That It Is Not Needed or Wanted.

In its Petition NDP states that there are 185 shippers on its pipeline system. According to NDP only 15 shippers were sufficiently interested in the NDP Open Season to request further information. Presumably significantly few shippers actually subscribed to committed capacity. Furthermore, of the 440,000 bpd capacity of the new line, only 155,000 bpd were committed. Thus, only 8% of the shippers on the pipeline were sufficiently interested in the NDP Open Season to request further information, and NDP received commitments for only 35% of the pipeline. Moreover, the majority of this 155,000 bpd was subscribed to by an equity owner of the pipeline.

Clearly, a majority of the shipping community does not believe that the new Sandpiper expansion is needed or will benefit them.

4. New Rail Facilities That Are Currently Under Construction or Recently Put into Service Obviate Any Need for the Sandpiper Project.

New rail facilities that are presently under construction in the Bakken highlight the fact that there is no need for the additional Sandpiper capacity.

- Dakota Plains has recently expanded its New Town, ND terminal by constructing a double loop track to accommodate two 120-car unit trains, a high-speed loading facility designed to handle 10 rail cars simultaneously, and transfer stations to receive crude oil from local gathering pipelines and trucks. The $50 million dollar

project was commissioned on December 18.[41] According to Attachment A to the Garner Declaration, an additional 50,000 bpd of rail transportation capability is expected to be available by year-end 2014 at the New Town terminal, for a total of 80,000 bpd of rail transportation capability.

- A new open rail transload facility is being constructed by Mountrail Rail, Inc. in Palermo, ND and is intended to be in service in 2014.[42] This facility will have a rail throughput capacity of 160,000 bpd.

As Attachment B to the Garner Declaration shows, there are also nearly 80 U.S. rail projects that are either under construction or were recently put into service that involve rail loading facilities at production sites or unloading facilities at refineries and terminals across the country. A number of these projects enable Bakken crude to reach West Coast and Gulf Coast refiners by rail.

5. Koch Pipeline Company, L.P.'s Abandonment of Its Pipeline Project Further Underscores the Lack of Demand for Additional Pipeline Capacity in the Bakken.

On July 1, 2013, Koch Pipeline Company, L.P. (Koch Pipeline) launched the first phase of a non-binding open season for its Dakota Express Pipeline (Dakota Express). The proposed project, which would include approximately 600 miles of new pipeline construction, was intended to transport Bakken crude oil from western North Dakota to

[41] "Dakota Plains to Open Expanded Crude Terminal in North Dakota Next Week, Progressive Railroading, dated December 3, 2013: http://www.progressiverailroading.com/rail_industry_trends/article/Dakota-Plains-to-open-expanded-crude-terminal-in-North-Dakota-next-week--38596. This article is attached as part of Attachment B to the Garner Declaration.

[42] Attachment A to the Garner Declaration shows that by year end 2014, that 160,000 bpd would be available from this project. Mountrail Rail, Inc. also maintains a website: http://mountrailrail.com/

points in Hartford and Patoka, Illinois.[43] The project was slated to enter service in 2016, with an expected initial capacity of approximately 250,000 bpd.[44]

Phase I of Koch Pipeline's open season was designed to last for 45 days, closing on August 14, 2013. A press release issued by Koch Pipeline on July 1, 2013 stated that if sufficient shipper interest was received in Phase I, the company could proceed to the Phase II open season, during which binding commitments would be sought.

On January 22, 2014, however, the Dakota Express project was abruptly cancelled. Though no formal explanation was given as to why the pipeline project was cancelled, it has been suggested in the press that it was likely due to lack of shipper interest.[45]

6. Despite a Recent Accident, Rail Will Continue to Provide Cost-Effective and Safe Transportation of Bakken Crude Oil.

NDP will undoubtedly claim that the data which we have reported above regarding take-away capacity relies to a very heavy extent on rail transportation from the Bakken. We expect that NDP will also claim that rail transportation is inherently less safe than pipelines, thereby creating a demand for the Sandpiper project.

It is of course true that there has been a recent accident in Quebec involving rail transport of Bakken crude oil.[46] It is also true that governmental agencies have been

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[43] "Open Season on Proposed Bakken Pipeline Project Begins Today," Koch Pipeline Company, L.P. News Release, dated July 1, 2013. This News Release is attached as part of Attachment B to the Garner Declaration.
[44] *Id*.
[45] "Crude Pipeline Wars in the Bakken," *Oil & Gas Financial Journal*, dated February 25, 2014: http://www.ogfj.com/articles/2014/02/crude-pipeline-wars-in-the-bakken.html; A Wall Street Journal article from March 3, 2014 suggested that tepid shipper interest was to blame for Koch's cancellation of the project. See "In Dakota Oil Patch, Trains Trump Pipelines," Alison Sider, *Wall Street Journal*, dated March 3, 2014: http://online.wsj.com/news/articles/SB10001424052702304071004579407140444547268?mg=reno64wsj&url=http%3A%2F%2Fonline.wsj.com%2Farticle%2FSB10001424052702304071004579407140444547268.html. This material is attached to the Garner Declaration as part of Attachment B.

focusing on the safety of rail transportation.[47] However, those inquiries have resulted in improvements in rail transport that will increase, not decrease, rail transportation.[48]

In addition, as NDP certainly knows pipeline transportation does not eliminate the possibility of accidents and spills. For example, on July 26, 2010, Enbridge notified the Environmental Protection Agency (EPA) that a rupture of one of its lines had occurred near Talmadge Creek in Marshall, Michigan. Over 843,000 gallons of crude oil were discharged into the Kalamazoo River. We refer to this incident only to show that safety issues are present whenever crude oil is transported, not to cast any blame on NDP.

B. The Muse Report Does Not Provide Convincing Evidence That the Sandpiper Project Is Needed or That It Will Be Used.

The only evidentiary support in the entire NDP Petition for the proposition that the Sandpiper expansion is needed and will be used is the Muse Report.

But, the Muse Report is so flawed that it cannot properly serve as an evidentiary basis for finding that an Expansion Surcharge should be imposed on unwilling historic shippers of the present NDP pipeline. At best, the Muse Report presents disputed factual issues that need to be set for hearing before the Commission can resolve them.

The first and most basic flaw of the Muse report is the fact that it ignores the data that shows existing and projected crude oil take-away capacity from the Bakken. Muse

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[46] "U.S. Announces New Nation-wide Train Safety Regulations in Response to Lac-Mégantic Disaster," *National Post*, dated August 3, 2013: http://news.nationalpost.com/2013/08/03/u-s-announces-new-nation-wide-train-safety-regulations-in-response-to-lac-megantic-disaster/.

[47] *Id*.; "North Dakota Governor Addresses Crude-by-Rail Safety with BNSF, Trinity," *Progressive Railroading*, dated January 15, 2014: http://www.progressiverailroading.com/safety/news/North-Dakota-governor-addresses-crudebyrail-safety-with-BNSF-Trinity--39106.

[48] Garner Declaration, pages 7-8.

never even addressed the reports of governmental agencies that show that there is more than enough take-away capacity to meet any possible projections of crude oil production.

Instead of addressing existing pipeline and rail facilities, Muse postulated that (i) there is a growing demand for Bakken crude oil by Mid-Continent and Eastern Canadian refiners; (ii) shipping crude oil by rail to these refineries would be more costly than using the Sandpiper expansion; (iii) the demand for the Bakken crude oil that is being transported to the Gulf Coast will diminish because of the availability locally of less expensive sweet crude oil; and (iv) netbacks to producers using the Sandpiper project will be greater than alternative transportation.

None of these points is valid.

In his Declaration, Mr. Ashton points to a number of deficiencies in the Muse report.[49] These include the fact that the assumed future production from the Bakken is likely overstated given the lower forecasts generated by the USGS and EIA. Mr. Ashton states that if either the EIA or USGS forecast for the Bakken were used in the Muse model in place of the Crane forecast, the Muse model would probably show no need for the Sandpiper project. Mr. Ashton also notes that there may be an inconsistency between the price forecast underlying the Bakken production estimate generated by Mr. Crane and the price results from the Muse model.[50]

Mr. Ashton further points to the fact that the Muse report did not consider all options for consuming and moving Bakken crude oil and has understated the capacity of those other options.[51] By understating the capability of competing transportation and

[49] Ashton Declaration, paragraphs 42-53.
[50] Ashton Declaration, paragraph 45.
[51] Ashton Declaration, paragraph 47-51.

refining outlets, Mr. Ashton states the Muse model is skewed to show greater benefits for the Sandpiper project than actually exist, even assuming the production supply forecasts are accurate.[52] Mr. Ashton then points to the errors in the Muse report in stating the capacity of certain pipelines and new refineries in North Dakota. Mr. Ashton shows that Muse's understatements of these pipelines, which will transport Bakken crude, and refineries, that will consume Bakken crude in North Dakota, represent almost half of the capacity of the Sandpiper expansion project.[53] Mr. Ashton also indicates that the Muse report significantly understates available rail transportation capacity and appears to always treat rail capacity as a "second best" alternative due to its higher cost without considering other factors that could make rail transportation preferable to pipeline transportation.[54] These other factors include widening crude price differentials, the ability of rail to reach refineries to which pipelines cannot deliver crude oil and the significant investments already made in rail capacity by producers and shippers of Bakken crude.

Finally Mr. Ashton shows that the claimed benefits of the Sandpiper project of almost $5 billion computed by Muse are vastly overstated, even assuming all of the inputs and assumptions underlying the Muse model are correct and that in all likelihood there are no benefits to producers from the Sandpiper project and certainly none for existing uncommitted shippers.[55]

Mr. Garner also discusses the Muse Report in his Declaration.

Mr. Garner points out that there is no economic basis to Muse's conclusion that the construction of the Sandpiper pipeline will permit Bakken crude oil to replace existing

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[52] Ashton Declaration, paragraph 48.
[53] Ashton Declaration, paragraph 48-50.
[54] Ashton Declaration, paragraph 51.
[55] Ashton Declaration, paragraph 52.

crude oil supplies to U.S. Mid-Continent and Eastern Canadian refineries. Mr. Garner discusses the fact that these refineries are currently buying Western Canadian crude oil and Canadian producers will certainly not permit American Bakken crude deliveries to undercut their markets.[56] In fact, according to Mr. Garner, when faced with price competition in the past, Canadian producers have taken whatever measures they believed necessary to preserve their market.[57] There is every reason to believe that they will continue to do so in the future, particularly in view of the long distance pipelines that Trans Canada and Enbridge are building from Western Canadian crude oil fields to Eastern Canadian refineries.[58]

As for the Muse Report's conclusion that Gulf Coast markets will be drying up for further Bakken crude oil supplies, Mr. Garner points to the fact that Muse ignored at least two million bpd of Gulf Coast refining capacity that is presently receiving Bakken crude oil or could become markets for Bakken crude oil in the near future.[59] These refiners would most likely continue to receive rail shipments of Bakken crude oil even if the Sandpiper project were completed because pipeline shipments, in contrast to rail shipments, are made from a common stream and include interface contamination.[60] Furthermore, one of the principal local sweet crude oils, which the Muse Report claims will replace the Bakken market, Eagle Ford crude oil, is primarily a light condensate that

[56] Garner Declaration, pages 14-16.
[57] Garner Declaration, page 15.
[58] Garner Declaration, page 17.
[59] Garner Declaration, pages 17-18.
[60] Garner Declaration, page 12.

can be used in only limited quantities in most refineries because of the unbalanced composition of its components.[61]

In sum, all of the principal assumptions and conclusions of the Muse Report are either flawed, incorrect or disputed.

C. The NDP Rate Design Is Unjust, Unreasonable and Discriminatory.

As we have pointed out above, in its prior Decision dismissing the 2012 Sandpiper Petition for Declaratory Order, the Commission discussed the fact that Enbridge (now NDP) had failed to file a cost of service and directed Enbridge to ensure that any future petition is fully supported under the Commission's regulations. NDP has once again failed to file a cost of service specifying its costs for constructing and operating the Sandpiper expansion and the precise rates that NDP will establish for the shippers on its pipeline.

Instead, NDP is requesting the Commission to approve its rate design at this time and put off until a later date any consideration of cost issues. If the Commission were to accede to NDP's request, Shippers may never be able to contest cost and rate issues that result directly from the rate design methodology in the current NDP Petition. The Shippers therefore urge the Commission to either require NDP to respond at this time to discovery as the Shippers requested in a Motion and Petition which they filed on February 26, 2014 or dismiss the present NDP petition pending the submission of a full cost of service analysis. Alternatively, the Commission could convene an evidentiary hearing to resolve all disputed factual issues.

[61] Garner Declaration, page 18.

The provision of cost information at this time is particularly important since the meager data that NDP has provided strongly suggests that its entire rate design is unjust, unreasonable and discriminatory.

1. Approval of the NDP Rate Design Could Result in Uncommitted Shippers Ensuring That NDP Will Fully Recover Its Costs of Operation and Return on Equity Regardless of the Quantity of Crude Oil the Pipeline Actually Ships.

In the prior proceeding, several Commissioners expressed concern about Enbridge's attempt to require uncommitted shippers to assume the risk that the pipeline will fully recover all of its costs of construction and operation and a substantial return of equity – regardless of the volume of crude oil the pipeline actually ships.[62] In its current Petition, NDP claims that it has abandoned that "true-up" feature of its prior Petition.

However, it is far from certain that NDP has really done so.

In its Petition, NDP states that initially, it will establish rates for uncommitted shippers on the basis of the current grandfathered pipeline rates plus a component that reflects the Expansion Surcharge.[63] According to the affidavit submitted by Mr. MacPhail, the Expansion Surcharge will be based on a cost of service using the Commission's Opinion 154-B methodology.[64] For the purpose of this cost of service Mr. MacPhail states that volume will be based on the pipeline's design capacity.[65] Mr. MacPhail defines "design capacity" as: "synonymous with 'annual average capacity,'

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[62] *Enbridge Pipelines (North Dakota) LLC*, 142 FERC ¶ 61,212, page 2 (Commissioners Clark and Norris dissenting) ("Certain shippers, for example, claim that Enbridge North Dakota seeks a guaranteed return on equity through its proposed annual true-up mechanism. … However, the Commission must ensure that, in addressing Enbridge North Dakota's cost recovery mechanisms, shippers are protected from risks that should appropriately be assigned to the pipeline.")
[63] MacPhail Affidavit, page 28.
[64] *Id*., page 29-30.
[65] *Id*.

meaning the volume of crude oil the pipeline can be expected to transport over the course of a year (as opposed to the maximum theoretical capacity)."[66]

Although it is not entirely clear, we interpret Mr. MacPhail's statement as meaning that the post-construction throughput of the pipeline expansions, i.e., 230,000 bpd from Beaver Lodge to Clearbrook and 380,000 bpd from Clearbrook to Superior, will be used in establishing initial rates for uncommitted shippers.

However, the regulatory regime that NDP uses will apparently be substantially different in establishing rates for uncommitted shippers after the pipeline's first year of operation. According to Mr. MacPhail, "Thereafter [the first year], the initial uncommitted rate will be subject to the Commission's usual rate-changing regulations."[67] We believe that this statement means that following the first year, NDP will file a cost of service that establishes rates to uncommitted shippers on the basis of the actual throughput of the pipeline.

At that time, we anticipate that NDP will argue that the actual quantity of crude oil that the pipeline transports, not the larger design capacity, should be used in its cost of service. NDP will contend, we believe, that the issue of "used and useful" was already definitively established in this Declaratory Order proceeding when the Commission approved the construction of a pipeline with a capacity of 440,000 bpd from Beaver Lodge to Clearbrook and 380,000 bpd from Clearbrook to Superior. If this view of NDP's statements in the Petition is correct, NDP will, after the first year of pipeline operations, effectively require uncommitted shippers to ensure that even if the pipeline is utilized substantially below its capacity, it will still recover all of its costs of operation and a

[66] MacPhail Affidavit, note 5.
[67] MacPhail Affidavit, page 29.

significant return on equity. Thus, NDP will require the uncommitted shippers to assume the risk that the Sandpiper expansion will not be used at its design capacity.

This view of NDP's plans is further supported by the committed/uncommitted rate structure that NDP is asking the Commission to approve.

According to Section 6.01.1(d) of the TSA attached to the MacPhail Affidavit, a committed shipper can at any point abandon its right to be free of prorationing and become an uncommitted shipper. However, the rates that the TSA guarantees that the former committed shipper pays will continue to be the base rate specified in the TSA with an increment for fuel and power costs for different pipeline segments.[68] As Mr. Ashton points out in his Declaration, this aspect of the rate design that NDP is asking the Commission to approve at this time, will mean that uncommitted shippers could pay rates that are significantly more than the rates that committed shippers will pay.

In his Declaration Mr. Ashton provides a detailed example that illustrates this point.[69]

Contrary to its statement in its Petition, NDP is not really abandoning the "true-up" requirement in its prior Petition, it is simply re-packaging it.

2. The NDP Petition and Rate Design Confer Discriminatory Benefits on Equity Owners of the Pipeline at the Expense of Uncommitted Shippers.

The Shippers do not oppose NDP building a new pipeline—if NDP wishes to do so using its own funds. What the Shippers do object to is NDP seeking to impose on the Shippers the costs of a pipeline system that they do not need or want in order to benefit the equity owners of NDP.

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[68] TSA Section 6.01.01 and 6.02.
[69] Ashton Declaration, pages 15-19.

That is precisely what is happening here.

NDP has attracted committed shippers for only 35% of the pipeline capacity it is planning to build. Although we do not have the detailed information that we sought in discovery to determine who the committed shippers are, the majority of the 155,000 bpd volume to which committed shippers have subscribed is undoubtedly attributable to affiliates of equity owners of the pipeline. We also believe these affiliates of equity owners are already shipping considerable quantities of crude oil on the existing NDP pipeline. Therefore the 155,000 subscription will not be entirely new crude oil shipments, but rather a shift from the current pipeline to the expansion.

It is in fact apparent that the major motivating factor of the Sandpiper project was an effort to assure Marathon Petroleum Corporation, an equity owner of the pipeline and the "anchor" committed shipper, that Sandpiper will enable it to deliver crude oil to its Illinois and Ohio refineries. For example, Paragraph 4.02(b) of the TSA states that Marathon can terminate its commitment to the Sandpiper project if Enbridge does not begin construction of the Southern Access Extension. As Mr. Garner points out in his Declaration, the Southern Access Extension is designed to enable Marathon to supply crude oil to its Illinois and Ohio refineries.[70] Marathon's termination of its commitment would of course also terminate Sandpiper as well. It therefore appears that the rationale for building Sandpiper is an effort by NDP, acting in concert with Marathon, to ensure a supply source to the Marathon refineries which, under the current Sandpiper rate design, would be financed by unwilling historic shippers on the present NDP pipeline system. The arrangement embodies discrimination.

[70] Garner Declaration, pages 20-21.

Moreover, in view of the profitability of NDP, Enbridge and Marathon, it is manifestly unfair for NDP to ask captive shippers to build it a new pipeline. For example, NDP reported very high operating profits in its most recent FERC Form 6 report. For 2012 when the pipeline was operating at significantly less than full capacity it reported an operating margin of 35% and in 2011 the pipeline earned an operating margin of 54%.[71] Enbridge Energy Partners L.P., the sole owner of NDP until November 2013, reported an operating margin of 25% for its liquids pipeline operations in 2013 and a 52.5% operating margin in 2012.[72] Effective November 25, 2013, Marathon Petroleum's pipeline segment has also earned very high profit margins – in 2013 it earned a 39% operating margin and in 2012 it generated a 47% margin.[73]

NDP and its equity owners can certainly afford to build a pipeline if they wish to do so. But, it is highly discriminatory for NDP to ask the Commission to impose on uncommitted captive shippers the costs of a pipeline which is designed to benefit primarily its equity owners.

D. It is Manifestly Unfair for NDP to Seek Commission Approval of Its Entire Rate Design at this Time While Withholding Any Meaningful Cost Information.

The NDP Petition asks the Commission to approve definitively its rate design at this time in the absence of meaningful cost data. It would be manifestly unfair to the uncommitted shippers on the NDP pipeline for the Commission to do so.

As we have pointed out above, NDP's rate design as outlined in its Petition and the TSA's that it signed with committed shippers could well require uncommitted shippers to

[71] Enbridge Pipelines (North Dakota) LLC, FERC Form 6, 2012 page 114.
[72] Enbridge Energy Partners, LP, SEC Form 10-K, 2013.
[73] Marathon Petroleum Corporation, SEC Form 10-K, 2013, pages 42-43.

pay the lion's share of the cost of constructing and operating the pipeline in the future. The Commission's approval at this time of a rate design that is not supported by cost data could therefore equate to the approval of uncommitted rates that exceed committed rates when the pipeline is not fully subscribed. That possibility is quite real since the pipeline is not being fully utilized at this time and has not attracted substantial shipper interest.[74]

These factors make it imperative that cost data be provided at this time, as the Shippers requested in the discovery motion that they filed on February 25, 2014.

In fact, in its Decision in *Seaway Crude Pipeline Company LCC* last month, the Commission underscored the importance of cost data in evaluating a pipeline's rate design. The Commission stated as follows:

> Cost-of-service data may also, in certain instances, be relevant in determining whether certain rate structures proposed by an oil pipeline are just and reasonable. Requiring that an oil pipeline provide cost-of-service data recognizes that such information may be relevant to deciding the issues, but it is not a requirement that all rates must be cost-based rates.[75]

Referring specifically to the committed service rates established in a TSA, the Commission also pointed out that:

> One area where contract modification may be appropriate is in certain circumstances where it is necessary to protect third parties, primarily where the negotiated rate places an excess burden on other customers. Such a party would still need to demonstrate that the negotiated rate was unjust and unreasonable.[76]

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[74] *Enbridge Pipelines (Southern Pipeline) LLC*, 144 FERC ¶ 61,044 (2013) (denying rate challenges where Commission had approved prior 2 to 1 cost ratio for uncommitted versus committed rates).

[75] *Seaway Crude Pipeline Company LLC*, 146 FERC ¶ 61,151 at P 15 (Feb. 28, 2014); *Express Pipeline Partnership*, 75 FERC ¶ 61,303 at p. 61,867 (1996), *order on rehearing and declaratory order*, 76 FERC ¶ 61,245 (1996) (requiring cost of service data when all of the initial rates were challenged);

[76] *Seaway Crude Pipeline Company LLC*, 146 FERC ¶ 61,151 at P 33.

As the Shippers' expert witness Peter K. Ashton points out in his Declaration, in this case, the examination of cost data is critical in determining whether NDP's rate structure is just, reasonable and non-discriminatory. Mr. Ashton states as follows in his Declaration:

> […] the Petition states that uncommitted shippers will pay their "relative share" but it provides no information on how costs will be allocated so that uncommitted shippers pay that "relative share." As a result, neither the Commission nor the shippers have any idea of how costs will be allocated among the three classes of shippers and whether the result may be discriminatory. Since we do not have access to the cost data and cost allocation methodology that supports the committed rate and the costs that NDP will likely use to support the uncommitted expansion rate and the downstream extension rate, it is simply impossible to determine whether NDP's rate design is reasonable or non-discriminatory. However, as I discuss in greater detail below, based on the limited information that is available, it does not appear that the NDP rate design is either fair, reasonable or non-discriminatory.[77]

There are still further reasons why cost data should be considered at this time.

According to the NDP Petition, the Commission's consideration of cost data should be staged. First, according to NDP, the Commission should approve its entire rate design at this time, including the rates that committed shippers will pay. NDP would then submit its costs at a later date when NDP formally requests that the Commission approve the actual rates that uncommitted shippers will pay.

However, that process places inordinate and unreasonable burdens on uncommitted shippers. If NDP were permitted to delay presenting cost data until the date on which it files a cost of service requesting Commission approval of its rates, the Shippers' recourse would be to file a Protest. Under the Commission's protest procedure, the Shippers would then have only 15 days to analyze the NDP cost structure, develop their position with the assistance of experts and present their fully developed position as to

[77] Ashton Declaration, paragraph 9.

why the Commission should not sanction the rates that NDP proposes. Moreover, the Shippers would have to do so in the context of a rate design which the Commission has, if it accedes to NDP's request, already approved. That rate design would presumably approve the rates specified in the TSA for committed shippers. As a result, uncommitted shippers might well be precluded from arguing in later stages of this proceeding that the actual cost data that NDP produces demonstrates that committed shippers should bear a larger portion of the unrecovered costs of the pipeline. Uncommitted shippers might also be precluded from contending that NDP's actual cost data also demonstrates that other aspects of the NDP rate design are unjust, unreasonable, and discriminatory and should never have been approved in the first place.

Furthermore, under Commission precedents, the best that uncommitted shippers could expect in a Protest proceeding would be an Order suspending the NDP rates for one day and permitting them to go into effect pending the outcome of an evidentiary hearing.[78] That would mean that uncommitted shippers could be paying more than double the present NDP tariff for the two to three years that could be required to ultimately resolve the case.[79]

We submit that under the circumstances present in this case, that process would result in an unjust and unreasonable adverse impact on shippers.

The Shippers therefore respectfully request the Commission to consider cost issues at this time.

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[78] *SFPP, L.P.*, 128 FERC ¶ 61,214 at P 21 (2009) (noting normal practice of suspending for one day); *SFPP, L.P.*, 121 FERC ¶ 61,211 (2007); *Buckeye Pipe Line Company*, 13 FERC ¶ 61,267 (1980).
[79] Ashton Declaration, Table 1.

VI. RELIEF REQUESTED

The Shippers do not oppose the construction of the NDP or any other pipeline that could transport Bakken crude oil. If NDP or Enbridge wishes to construct a new pipeline that parallels the existing NDP pipeline in North Dakota and Minnesota, it should certainly do so. NDP does not even need FERC approval to build that new line.[80] However, NDP should not be asking others – such as the captive shippers on the existing NDP pipeline – to pay for a pipeline that primarily benefits the equity owners of the NDP pipeline system.

Therefore, for the reasons discussed above, Concord Energy LLC, Enserco Energy LLC, EnWest Marketing LLC and WPX Energy Marketing, LLC respectfully request that the Commission:

(1) Grant their Motion to Intervene in this proceeding;

(2) Deny the Petition for Declaratory Order that North Dakota Pipeline Company LLC (NDP) filed on February 12, 2014;

(3) In the alternative, dismiss the NDP Declaratory Order Petition pending the submission of a full cost of service;

(4) In the further alternative, set this matter for evidentiary hearing with full rights by the Protestants to discovery as set forth in 18 CFR § 385.401 to 18 CFR § 385.411 of the Commission's Rules of Practice and Procedure.

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[80] *SFPP, L.P.*, 140 FERC ¶ 61,220 at P 50 (2012) ("Unlike natural gas pipelines, oil pipelines do not need to seek approval from the Commission before beginning construction of a pipeline (or a pipeline expansion), but an oil pipeline may file a petition for declaratory order seeking certain assurances regarding rate treatment and other issues"), *order clarified*, 141 FERC ¶ 61,051 (2012).

Respectfully submitted,

/s/ Melvin Goldstein

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Counsel for Concord Energy LLC, Enserco Energy LLC, EnWest Marketing LLC and WPX Energy Marketing, LLC

Dated: March 14, 2014

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding in accordance with 18 C.F.R. § 385.2010(f)(3).

Dated at Washington, D.C., this 14th day of March, 2014.

/s/ Aaron Wesley Korenewsky
Aaron Wesley Korenewsky
Legal Assistant
GOLDSTEIN & ASSOCIATES, P.C.
1757 P. St, NW
Washington, D.C. 20036

EXHIBIT A

EXHIBIT A

DISPUTED FACTUAL ISSUES

The issues of fact listed below are disputed.

For each disputed factual issue, a reference is provided to the discussion of that particular issue in North Dakota Pipeline Company LLC's (NDP) Petition; the Protest filed by Concord Energy LLC, Enserco Energy LLC, EnWest Marketing LLC and WPX Energy Marketing, LLC (collectively "Shippers"); or the Answer of St. Paul Park Refining Company (SPPRC) to the Shippers Motion to Compel Discovery.

Disputed Issues of Fact

1. **The level of shipper support for NDP's Sandpiper project:**

   [NDP Petition: pages 8, 23-24, 43; MacPhail Affidavit: page 21; Shippers' Protest: pages 8, 30; Garner Declaration: pages 17-20; Ashton Declaration: page 23; SPPRC Answer: page 6];

2. **The economic need for the 230,000 bpd of additional pipeline capacity NDP proposes to build from Beaver Lodge, ND to Clearbrook, MN:**

   [NDP Petition: pages 12, 18-19, 21; MacPhail Affidavit: page 20; Shippers' Protest: page 29];

3. **The economic need for the 380,000 bpd extension NDP proposes to build from Clearbrook, MN to Superior, WI:**

   [NDP Petition: pages 17-19; MacPhail Affidavit: pages 14-16; Shippers' Protest: page 29];

4. **The correct crude production forecast for the Bakken region through 2016 as well as the correct projected level of crude production at its peak:**

[Crane Affidavit: pages 2-3, Exhibit SDC-2; Muse Stancil Analysis: pages 15, 23-25; Shippers' Protest: pages 19, 26; Garner Declaration: pages 4-6, Attachment A; Ashton Declaration: pages 24-25];

5. **The amount of pipeline and rail take-away capacity that presently exists to transport Bakken crude from North Dakota to American refining facilites:**

   [NDP Petition: pages 13-14; Muse Stancil Analysis: pages 7-8, 38-39; Shippers' Protest: pages 10, 18-19, 25-26; Garner Declaration: pages 5-7, 12, Attachments A and B; Ashton Declaration: pages 23-24, 28; SPPRC Answer: pages 8-9; Amoah Affidavit: pages 1-2,];

6. **The amount of pipeline and rail take-away capacity that will be available in the foreseeable future to transport Bakken crude from North Dakota to American refining facilities:**

   [Shippers' Protest: pages 20-21, 26, 30; Ashton Declaration: pages 12, 23-25, 27-28];

7. **The extent, if any, of prorationing on the NDP pipeline system during 2013 and 2014:**

   [NDP Petition: pages 12-14; MacPhail Affidavit: pages 9-12; Shippers' Protest: pages 16, 23, 28; Garner Declaration: page 7; Ashton Declaration: pages 6, 8-11, 16-21, Vodicka Declaration, page 2; Woodard Declaration, page 2; Molis Declaration: page 2; SPPRC Answer: page 7; Amoah Affidavit: page 4];

8. **The extent to which rail transportation will be used in the foreseeable future for Bakken crude oil:**

   [NDP Petition: page 14; MacPhail Affidavit: pages 19-20; Earnest Affidavit:

pages 2-3; Muse Stancil Analysis: pages 7, 30-32, 39-40; Shippers' Protest: pages 20-21; Garner Declaration: pages 4-5; Ashton Declaration: pages 28-30];

9. **The benefits, if any, of the Sandpiper project to Bakken producers:**

[NDP Petition: pages 21-22; Muse Stancil Analysis: pages 5, 10-12; Ashton Declaration: pages 30-31; SPPRC Answer: pages 9-11; Amoah Affidavit: pages 2-3];

10. **The likelihood that Bakken producers will transport substantial quantities of crude oil to U.S. Mid-Continental refineries if the Sandpiper project were completed:**

[Muse Stancil Analysis: pages 16, 20-21; Shippers' Protest: page 21; Garner Declaration: pages 13-15];

11. **The likelihood that Bakken producers will transport substantial quantities of crude oil to Eastern Canadian refineries if the Sandpiper project were completed:**

[Muse Stancil Analysis: pages 16, 19-20; Shippers' Protest: page 21; Garner Declaration: pages 15-16, Attachment C];

12. **The level of demand for Bakken crude in the Gulf Coast region in the foreseeable future:**

[Muse Stancil Analysis: pages 16, 21-22; Garner Declaration, page 16];

13. **The impact of NDP's proposed rate structure on the rates of uncommitted shippers and the risks uncommitted shippers will be assuming:**

[NDP Petition: pages 7, 24; MacPhail Declaration: pages 22-23, 26; Ashton Declaration: pages 6, 8];

14. **The extent to which existing uncommitted shippers will be paying for the Sandpiper project:**

    [NDP Petition: pages 26, 29, 42; MacPhail Affidavit: page 3; Shippers' Protest: pages 7, 39; Ashton Declaration: pages 5-6];

15. **The extent to which uncommitted shippers will be subsidizing the rates of the committed shippers:**

    [Ashton Declaration: page 13];

16. **The impact on the rates that uncommitted shippers will pay in the future if throughput on the new pipeline falls significantly below design capacity:**

    [Shippers' Protest: pages 39-40; Ashton Declaration: pages 8-10, 15-16, 18-19];

17. **The impact on uncommitted shippers of the differential treatment of power costs in the NDP rate structure proposal:**

    [Ashton Declaration: page 11];

18. **The impact on uncommitted shippers of the differential treatment of capital construction cost variances in the NDP rate structure:**

    [Ashton Declaration: pages 12-13];

19. **The extent to which uncommitted shippers will be subsidizing and conferring undue benefits on equity owners of the pipeline if the NDP rate design were approved:**

    [Shippers' Protest: pages 34-38; Ashton Declaration: pages 6-7, 13-14].

EXHIBIT B

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North Dakota Pipeline Company LLC **(Docket No. OR14-21-000**

SWORN DECLARATION OF BRAD VODICKA IN SUPPORT OF CONCORD ENERGY LLC'S PROTEST AND OPPOSITION TO NORTH DAKOTA PIPELINE COMPANY LLC'S PETITION FOR DECLARATORY ORDER

Brad Vodicka states as follows, pursuant to the provisions of 18 U.S.C. § 1746:

1. My name is Brad Vodicka. I am the Executive Vice President of Crude Oil Marketing for Concord Energy LLC (Concord). The business address of Concord is 707 17th Street, Suite 3020, Denver, Colorado 80202. I have been employed by Concord since 2013.

Concord's Substantial Economic Interest in this Proceeding

2. Concord is a marketer of crude oil in North Dakota, Montana and Colorado. Concord typically purchases substantial quantities of crude oil from crude oil production companies. It then transports that crude oil in common carrier pipelines to appropriate markets. At the present time, a major portion of Concord's business activities is focused on the Bakken producing areas of North Dakota. In serving this market, Concord transports substantial quantities of crude oil on the pipeline system operated by North Dakota Pipeline Company LLC (NDP). Concord has been a regular shipper of record on the NDP pipeline system and its predecessor, Enbridge Pipelines (North Dakota) LLC (Enbridge) for the past 3 years.

3. Concord has also made a substantial investment in order to use the NDP pipeline system, including the construction of lact inject facilities at Ramberg, North Dakota. Concord's investments also include truck unloading facilities, tankage, as well as other facilities to determine crude oil quantities and quality control.

4. As a result of its investment in these lact inject facilities, Concord does not have viable economic alternatives to using the existing NDP pipeline system.

5. Concord will therefore be impacted to a substantial extent by the Petition for Declaratory Order that NDP filed with the Commission on February 12, 2014 and has a direct and substantial economic interest in the outcome of this proceeding that no other party can adequately represent.

Prorationing Status of NDP

6. I understand that NDP is claiming that its present pipeline system from Beaver Lodge ND to Clearbrook MN is constrained and has been subject to prorationing for some time. I do not believe that statement is correct. For at least the past 36 months, Concord has been able to ship all of the crude oil it wished on the NDP pipeline system. In fact, when the NDP pipeline is restored to its design capacity of 210,000 bpd in 2015, there will be more than sufficient capacity to meet any foreseeable demand on the pipeline for capacity.

I Brad Vodicka state under penalty of perjury that the foregoing is true and correct to the best of my information and belief.

Executed on March 11, 2014.

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EXHIBIT C

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North Dakota Pipeline Company LLC **(Docket No. OR14-21-000)**

SWORN DECLARATION OF JONATHAN MOLIS IN SUPPORT OF ENSERCO ENERGY LLC'S PROTEST AND OPPOSITION TO NORTH DAKOTA PIPELINE COMPANY LLC'S PETITION FOR DECLARATORY ORDER AND ENSERCO'S MOTION TO INTERVENE

Jonathan Molis, states as follows, pursuant to the provisions of 18 U.S.C. § 1746:

1. My name is Jonathan Molis. I am the Manager of Projects and Business Development for Enserco Energy LLC (Enserco). The business address of Enserco is 1900 16th Street, Suite 450, Denver, Colorado 80202.

Enserco's Substantial Economic Interest in this Proceeding

2. Enserco is a privately-held subsidiary of Twin Eagle Resource Management, LLC (Twin Eagle). Enserco owns and operates crude oil logistical assets in North Dakota, Montana and Wyoming. Enserco's parent company, Twin Eagle, engages in the acquisition of crude oil from North Dakota, Montana, Utah and Wyoming producers at the well head. Their services include marketing, storage, trucking, and producer services.

3. At the present time, a significant portion of Enserco's business activities is focused on the Bakken producing areas of North Dakota. In serving this market, Enserco transports substantial quantities of crude oil on the pipeline system operated by North Dakota Pipeline Company LLC (NDP). Enserco has been a regular shipper of record on the NDP pipeline system and its predecessor, Enbridge Pipelines (North Dakota) LLC (Enbridge) for the past 6 years.

4. I have reviewed the Petition for Declaratory Order that NDP filed with the Federal Energy Regulatory Commission on February 12, 2014. The approval by the Commission of the Sandpiper project that NDP outlines in its Petition will adversely affect Enserco to a very substantial extent. Enserco therefore has standing to protest the NDP Petition and no other person can adequately represent Enserco's interests.

Prorationing Status of NDP

5. I understand that NDP is claiming that its present pipeline system from Beaver Lodge, North Dakota to Clearbrook, Minnesota is constrained and has been subject to prorationing for some time. I do not believe that statement is correct. For at least the past 12 months, Enserco has been able to ship all of the crude oil it wished on the NDP pipeline system. In fact, when the NDP pipeline is restored to its design capacity of 210,000 barrels per day (bpd) in 2015, there will be more than sufficient capacity to meet any foreseeable demand on the pipeline for capacity.

I, Jonathan Molis, state under penalty of perjury that the foregoing is true and correct to the best of my information and belief.

Jonathan Molis

March 13, 2014

EXHIBIT D

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North Dakota Pipeline Company LLC **(Docket No. OR14-21-000**

SWORN DECLARATION OF ROBERT P. GARNER IN SUPPORT OF ENWEST MARKETING LLC'S PROTEST AND OPPOSITION TO NORTH DAKOTA PIPELINE COMPANY LLC'S PETITION FOR DECLARATORY ORDER AND ENWEST'S MOTION TO INTERVENE

Robert P. Garner, states as follows, pursuant to the provisions of 18 U.S.C. § 1746:

1. My name is Robert P. Garner. I am the Managing Partner of EnWest Marketing LLC (EnWest). The business address of EnWest is 2501 Wall Avenue, Ogden, UT 84401. I have been in a management position with EnWest ever since it was formed in 2007.

EnWest's Substantial Economic Interest in this Proceeding

2. EnWest is a marketer of crude oil in North Dakota, Montana, Utah, Colorado and Wyoming. EnWest typically purchases substantial quantities of crude oil from crude oil production companies. It then transports that crude oil in common carrier pipelines to appropriate markets. At the present time, a major portion of EnWest's business activities is focused on the Bakken producing areas of North Dakota. In serving this market, EnWest transports substantial quantities of crude oil on the pipeline system operated by North Dakota Pipeline Company LLC (NDP). EnWest has been a regular shipper of record on the NDP pipeline system and its predecessor, Enbridge Pipelines (North Dakota) LLC (Enbridge) for the past four years. EnWest has also made a substantial investment in order to use the NDP pipeline system, including the construction of a crude

oil injection facility at the NDP site at Stanley, ND. EnWest's investments at Stanley include truck unloading facilities, tankage, as well as other facilities to determine crude oil quantities and quality control.

3. I have reviewed the Petition for Declaratory Order that NDP filed with the Federal Energy Regulatory Commission (FERC or Commission) on February 12, 2014. The approval by the Commission of the Sandpiper project that NDP outlines in its Petition will adversely affect EnWest, to a very substantial extent. EnWest therefore has standing to protest the NDP Petition and no other person can adequately represent EnWest's interests.

Background of NDP Sandpiper Project

4. NDP presently operates a crude oil pipeline that originates at various points in North Dakota and terminates at Clearbrook, MN. At Clearbrook, an affiliate of NDP, Lakehead Pipeline Partners (Lakehead), receives the crude oil transported by NDP and transports it to Superior, WI. From Superior, Lakehead and various connecting pipelines transport the crude oil to refining centers in the Midwest and Gulf Coast. Presently, the throughput capacity of the NDP is 210,000 bpd, although NDP has at times operated the pipeline at considerably lower levels.

5. In its Petition, NDP is proposing to build a new pipeline in North Dakota that would parallel its existing pipeline system. The new NDP pipeline would be a 24-inch line that would carry an additional 230,000 bpd of crude oil, increasing capacity to 440,000 bpd. NDP also proposes to build a 380,000 bpd 30-inch pipeline from Clearbrook, MN to Superior, WI.

6. Enbridge, NDP's predecessor, previously sought approval of an almost identical project through a Petition and Offer of Settlement it filed with the Commission on November 2, 2012 (2012 Petition). On November 27, 2012, EnWest filed a Protest against NDP's 2012 Petition, arguing, as it is now, that the NDP Sandpiper project was unnecessary, was opposed by its existing shippers, and would place the financial burden and risks of the project on uncommitted shippers who did not support or need the excess capacity.[1] On March 22, 2013, the Commission denied NDP's 2012 Petition without prejudice and, after discussing cost of service data, told Enbridge that if it wished to file a new Petition it had to conform to the Commission's regulations for establishing initial pipeline rates.[2]

7. In its current Petition for the Sandpiper project, NDP seeks approval of the same project that Enbridge had filed two years ago. Once again, there is no cost of service attached to the Declaratory Order Petition.

Forecasted Bakken Production and Take-Away Crude Oil Capacity From Bakken Producing Areas

8. Over the past 25 years, I have had considerable experience with the production of Bakken crude oil, the facilities for transporting crude oil from the Bakken producing areas and the prices that the market has established. This experience was acquired, in part, as Manager Crude and LPG Supply for Flying J Inc., which was, at the time I worked for the company, the eighth largest crude oil producer in the Rocky Mountain region. Flying J had extensive crude oil production properties in North Dakota in

[1] Both Concord Energy LLC and WPX Energy Marketing LLC filed Motions to Intervene in FERC Docket OR13-6-000. Concord Energy LLC later filed a notice on December 6, 2012, stating that it adopted as its own the positions articulated by EnWest in its Protest.

[2] *Enbridge Pipelines (North Dakota) LLC*, 142 FERC ¶ 61,212 (March 22, 2013).

particular. On the basis of my experience, I do not believe that the demand that NDP forecasts for the pipeline system that it is proposing to build is anywhere near accurate. In my opinion, the NDP project will be largely unused and will become a substantial burden for current and future shippers. My opinion is based on (i) generally accepted projections of Bakken crude oil production over the next eight to ten years; (ii) the available "take-away" capability for Bakken crude oil; and (iii) the comparative prices available on pipelines as compared to rail shipments.

9. With respect to projected crude oil production of Bakken crude oil, NDP provides the Affidavit of Stephen D. Crane. Mr. Crane projects through his analysis that Bakken area crude production will reach roughly 1.2 million bpd by year-end 2015.[3] Mr. Crane also states that production will peak at 1.4 million bpd by 2026.[4] According to Mr. Crane's crude forecast table, which was provided in conjunction with his affidavit as part of Attachment SDC-2, the average production for 2014 will be approximately 996,000 bpd.

10. I am providing as Attachment A to my Declaration, a compilation of crude oil take-away facilities in the Bakken prepared by the North Dakota Pipeline Authority.[5] These facilities consist of both pipelines and rail transport facilities. According to this compilation, at year-end 2013, total crude oil pipeline throughput capacity from the Bakken area was 583,000 bpd. Rail facilities at year-end 2013 had the capability of transporting 965,000 bpd of Bakken crude oil. The total take-away capability of North

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[3] Affidavit of Steven D. Crane in Support of Petition for Declaratory Order, dated February 10, 2014, page 2.
[4] *Id*.
[5] ND Pipeline Authority Oil Transportation Table, North Dakota Pipeline Authority, prepared January 22, 2014, accessed February 28, 2014 at: http://northdakotapipelines.com/oil-transportation-table/.

Dakota Bakken crude oil at year-end 2013 was therefore 1,548,000 bpd. According to the same compilation, total crude oil pipeline throughput capacity will amount to 783,000 bpd at year end 2015, while rail capabilities will equal approximately 1,355,000 bpd. Total take-away capability in the Bakken will therefore be 2,198,000 bpd at year-end 2015. This means that the total take-way capability for 2015, before Sandpiper is operational, will be 998,000 bpd *more* than the 1.2 million bpd of crude oil that NDP projects. In other words, the *current* take-away capability of 1,548,000 bpd in the Bakken area is more than sufficient to handle the Bakken production that NDP asserts will reach the market at any time between the present date and 2026.

11. The data in Attachment A further demonstrates that there will certainly not be a market demand in 2015 or 2016, for the additional pipeline capacity NDP is proposing to put on stream through Sandpiper. Attachment A shows that if all the pipeline expansion projects that are now being proposed were in fact constructed, pipeline take-away capacity of Bakken crude in 2016 will be 1,168,000 bpd. This figure is nearly equal to the crude oil that NDP projects will be produced in 2016. If we were to add the anticipated rail take-away capacity to the projected pipeline capacity, then the total take-away capability from the Bakken in 2016 would be 2,523,000 bpd – *more than double* NDP's projection of Bakken crude production.

12. Furthermore, for those shippers who are not captive to various pipelines, rail transportation from the Bakken area is currently a very attractive economic alternative to pipeline transportation and is very likely to increase in attractiveness in the future. I attach to my Declaration as Attachment B various news articles and press releases discussing recent rail investment and development in the region. For example, BNSF

Railway announced on August 15, 2013 that it was investing $220 million to improve and expand rail capacity in North Dakota, a process that would include the replacement of about 315 miles of rail and 415,000 ties. The same press release indicated that as part of a greater capital improvement program BNSF intended to invest $1 billion in new locomotive, freight car and equipment acquisitions, many of which would service North Dakota.

13. As I discuss later in this Declaration with particular reference to inaccuracies in the Muse Stancil study commissioned by NDP, there are a number of advantages to Bakken crude oil producers in using rail rather than pipelines. As a result, a number of large refineries have made significant investments in rail loading and unloading facilities. There is no doubt that rail will continue to be an attractive transportation option for producers and consumers of Bakken crude.

14. I am aware of the fact that there have been some accidents of rail trains carrying Bakken crude oil. However, I do not believe that these accidents will have any appreciable effect on the use of rail cars and new safety measures will enhance the use of rail cars to transport Bakken crude oil. The federal agencies responsible for rail movements (Department of Transportation, Pipeline and Hazardous Materials Safety Administration, and Federal Railroad Administration), the American Petroleum Institute, and Transportation Community Awareness and Emergency Response (TRANSCAER) are all working together with the goal of zero rail accidents. Secondly, several companies have already replaced their rail car fleets with new generation rail cars built to higher standards. Safety issues revolving around product specifications, rail car design, rail road

operation, rail track conditions, and emergency response are all being effectively addressed.

15. In view of the wide use of rail transportation and the existing pipelines available in North Dakota, I do not believe that there is any viable market for the additional capacity that NDP proposes in its Petition through its Sandpiper project. My opinion, I believe, is further supported by the fact that there appears to be excess capacity on the NDP system at this time. My company, for example, has been able to ship all the crude oil it wished to ship on the present NDP pipeline system for at least the past 18 months. I know that Concord Energy LLC, Enserco Energy LLC, and WPX Energy Marketing, LLC, who have joined EnWest in protesting the Sandpiper project have made similar statements. In addition, the Butte pipeline system that terminates in Guernsey, WY is only operating at between 60% and 70% of capacity.

16. There are still other reasons why the present NDP pipeline system is sufficient to handle any additional crude oil that will reasonably be tendered for shipment. For example, I do not believe that the 155,000 bpd of Sandpiper committed capacity represents new shipments on the NDP pipeline. I think it is very likely that a substantial part of the 155,000 bpd is already being shipped on the NDP system by historic shippers. But, even if the 155,000 bpd did represent entirely new shipments, the existing Enbridge/NDP pipeline could easily accommodate that supposed new supply.

17. Enbridge completed its Phase 6 project in March 2013. The Enbridge Phase 6 project involved building a new pipeline from Berthold, ND to Steelman, Saskatchewan. From Steelman, the pipeline continues to Cromer, Manitoba where it connects to the main Enbridge pipeline to Clearbrook. This Phase 6 pipeline project has a capacity of

145,000 bpd, and only 4,500 of that total capacity is now being used.[6] Therefore, the excess unused capacity of the Enbridge Phase 6 project and the additional 40,000 bpd that NDP states will come on stream in 2015 when repairs are completed to the existing NDP pipeline can easily accommodate any additional crude oil, including the 155,000 bpd that shippers have committed to the Sandpiper project.

18. For these reasons, pipeline expansion projects in the Bakken have drawn very limited interest from shippers. I am aware of at least two major pipeline projects in the region that were recently cancelled due to lack of shipper interest. Koch Pipeline Company L.P.'s (Koch Pipeline) held a non-binding open season in July 2013 for its Dakota Express pipeline. The Dakota Express line would have involved the construction of approximately 600 miles of new pipeline between North Dakota and points in Patoka and Hartford, Illinois. This new line would have also utilized the existing Wood River Pipeline system and Hartford terminal. Koch Pipeline had projected that the new line would go into service in 2016 with an expected initial capacity of approximately 250,000 bpd. Koch Pipeline specifically stated that if the company received sufficient shipper interest after the close of its 45-day Phase I open season, it would launch a second binding open season. In January 2014 Koch Pipeline announced that the project had been cancelled.[7]

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[6] Motion to Intervene of St. Paul Park Refining Company LLC and Answer in Support of Petitions and Motions of Concord Energy LLC, EnWest Marketing LLC, and WPX Energy Marketing, LLC, OR14-21-000, dated March 4, 2014, page 7; Amoah Affidavit, page 4.

[7] See Lynn Doan, *Bloomberg*, "Koch Ends Plans for Pipeline to Illinois from Bakken," dated January 21, 2014: http://www.bloomberg.com/news/2014-01-22/koch-ends-plans-for-pipeline-to-illinois-from-bakken.html. A Wall Street Journal article dated March 3, 2014 suggested that tepid shipper interest was to blame for Koch's cancellation of the project. See "In Dakota Oil Patch, Trains Trump Pipelines," Alison Sider, *Wall Street*

19. Another major pipeline project designed to transport Bakken crude was Oneok Inc.'s Bakken Crude Express pipeline. According to news articles discussing the pipeline's cancellation, the proposed 1,300-mile pipeline would have run adjacent to the existing Overland Pass Pipeline, allowing for shipments from points in North Dakota to Cushing, OK.[8] The project, expected to cost $1.8 billion would have had a throughput capacity of 200,000 bpd. In November 2012, the project was cancelled due to lack of shipper interest.[9]

The Muse Stancil Report

20. I have read the Muse Stancil (Muse) Report that NDP attached to its Petition. I understand that Muse concludes that the Sandpiper project will be fully utilized because: (a) there is a pressing need that is not being currently met by Mid-Continent and Eastern Canadian producers for Bakken crude oil; (b) rail transport cannot compete with the $3.69 rate that Muse believes the Sandpiper pipeline will charge uncommitted shippers; (c) current markets for Bakken crude in the Gulf Coast are saturated with local production and refineries on the Gulf Coast that run primarily sour crude oil do not need

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Journal, dated March 3, 2014: http://online.wsj.com/news/articles/SB10001424052702304071004579407140444547268?mg=reno64wsj&url=http%3A%2F%2Fonline.wsj.com%2Farticle%2FSB10001424052702304071004579407140444547268.html. These articles are provided as part of Attachment B to this Declaration, as is a Koch Pipeline open season press release discussing the project.

[8] "Oneok Shares Fall After Bakken Pipeline Canceled," Mike Lee, *Bloomberg*, dated November 28, 2012: http://www.bloomberg.com/news/2012-11-28/oneok-shares-fall-after-bakken-pipeline-canceled.html; ONEOK Cancels 200,000 bpd Bakken Pipeline Project, *Chicago Tribune*, dated November 27, 2012: http://articles.chicagotribune.com/2012-11-27/news/sns-rt-oneok-bakkenpipeline-update-1l1e8mrbzd-20121127_1_overland-pass-pipeline-bakken-crude-express-pipeline-oneok-partners-lp. These articles are provided as part of Attachment B to this Declaration.

[9] *Id*.

any more sweet crude oil; and (d) the netback to producers from using the Sandpiper pipeline will be so high that they will fill the line.

21. I do not think Muse's conclusions are valid.

22. First, the Muse Report begins with the fundamental fallacious assumption that rail transportation of crude oil from the Bakken area of North Dakota is inferior to pipeline transportation.[10] That statement might have been true five to ten years ago. But it is no longer the case. In order to understand crude oil markets today, it is essential to recognize that even though rail transportation from the Bakken might be more expensive than pipelines on a barrel mile basis, rail can be used by Bakken producers to access markets that have substantially higher netbacks than the markets to which pipelines deliver crude oil. When producers transport crude oil on the NDP system to Clearbrook and on the Enbridge Lakehead system to Superior, they receive a price for that crude oil which is generally determined as a discount from the Cushing, OK West Texas Intermediate (WTI) price. In contrast, producers that use rail connections in North Dakota in order to deliver crude oil to the Gulf Coast, West Coast or East Coast will receive a price that is based on world crude oil prices with a Brent Crude Index as the benchmark. Brent-based prices, adjusting for transportation costs, generally result in a significantly higher netback to producers than prices determined on the basis of a Cushing WTI index.

23. It is for that reason that the quantities of crude oil transported on the NDP began to fall precipitously beginning in July 2012. For example, even though the NDP pipeline

[10] "Absent Sandpiper, Bakken crude oil producers must either forgo incremental sales to the crude oil markets accessible via the Enbridge Mainline, or use rail transportation which is typically is more costly, to access these markets." Exhibit 4 of the NDP Petition, page 5.

can transport up to 210,000 bpd, the NDP pipeline only transported 70,000 bpd in April 2013.[11] In contrast, as I will discuss below, rail transportation increased significantly during this time period. It is important to realize that the low utilization of the NDP pipeline in 2013 and 2014 as well is not due to a lack of downstream pipeline connections as NDP claims in its Petition. Rather, the reason is because rail has now become a permanent feature of transportation from the Bakken and enables producers to achieve higher netbacks. In fact, refiners throughout the United States are embarked on major efforts to tie in their plants to rail connections from the Bakken.

24. Refiners are doing so for a number of reasons. First, Bakken crude oil is an excellent product for refinery feedstock. It is a whole bodied crude that is low in undesirable bottoms as well as low in sulfur and liquid petroleum gases (LPG). In addition, refiners on the Gulf Coast, West Coast and East Coast have had to buy considerable quantities of their feedstocks on the world market at world market prices serviced by ships on the high seas. They view domestic Bakken crude as considerably more economic, taking into account the quality of Bakken crude oil and relative transportation costs. In addition, rail transport assures refiners that they will receive the precise crude oil that they purchase rather than a commingled crude oil that pipelines deliver from a common sweet stream. This is particularly true since crude oil delivered from a common stream can be contaminated by other crude oil interfaces during pipeline transportation. Rail also now permits refiners to rely on more ratable delivery schedules than pipelines.

[11] See Appendix to *St. Paul Park Refining Co. LLC v. Enbridge Pipelines (North Dakota) LLC*, 145 FERC ¶ 61,050 (October 17, 2013).

25. For these reasons, there is approximately 1 million bpd of rail take away capacity from Bakken fields at the present time, and by 2016 that figure will rise to 1.35 million bpd. That quantity of rail takeaway capacity – i.e., 1.35 million bpd – is equal to the entire quantity of Bakken crude production in the foreseeable future.

26. As a result of these economic factors, there are now more than 80 crude oil rail loading and unloading facilities in place or in the process of being built in the United States.[12] In addition, refiners on both the East and West Coast of the United States have recently signed long term supply agreements to obtain Bakken crude oil by rail. For example, PBF Energy, Inc., which operates a 190,000 bpd refinery in Delaware City, Delaware made significant investments in rail unloading facilities in 2012 and expanded those facilities in 2013.[13] PBF now has the ability to unload 110,000 bpd of Bakken crude oil.[14]

27. On the West Coast, according to the Canadian Association of Petroleum Producers' (CAPP) June 2013 Crude Oil Forecast, Markets & Transportation Report: "Tesoro has announced plans to unload trains in Washington and then transfer the crude to vessels for further distribution to its refineries in California by 2014. Valero has announced plans for rail unloading facilities at its refinery at Benicia, near San Francisco that is scheduled to be completed in mid-2014. The current plans are for receipts of up to

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[12] "Factbox-U.S. Crude-By-Rail Projects; Valero to Start Up Port Arthur TX Project," *Chicago Tribune*, dated February 12, 2014: http://articles.chicagotribune.com/2014-02-12/news/sns-rt-usa-cruderail-factbox-20140210_1_bpd-port-arthur-tx-canadian-crude-production. This article is attached to this Declaration as part of Attachment B.

[13] *Crude Oil Forecast, Markets & Transportation*, Canadian Association of Petroleum Producers, dated June 2013, page 13. This report is attached as Attachment C to this Declaration.

[14] *Id*.

70,000 b/d of crude oil from North Dakota and Montana or western Canada."[15] A Reuters article dated December 10, 2013 elaborated on the interest of refineries in crude by rail options, stating that an executive of Tesoro Corp. saw rail-unloading capacity for North Dakota Bakken crude oil all along the U.S. West Coast growing to nearly 1 million bpd through 2015, an increase of more than 300% from current unloading capacity.[16] According to that same article, Tesoro Corp. is investing $100 million in a joint-venture railport project in Washington State, with a capacity of about 300,000 bpd.[17] Additionally, "Phillips 66 has announced plans to build a rail offloading facility at its Ferndale refinery to receive both Bakken and western Canadian crude oil."[18]

28. With this background, I would like to focus on the particular conclusions of the Muse study. Muse would have us believe that there is a market of Mid-Continent and Eastern Canadian refiners that is ripe for the plucking by Bakken producers if only the current NDP pipeline were doubled in size. I frankly don't know why anyone would believe that since the present NDP pipeline has been operating at only a fraction of its capacity. But, aside from that point, the facts of current demand and supply of crude oil to Mid-Continental U.S. and Eastern Canadian refineries do not support Muse's assertions.

29. As far as the U.S. Midwest– i.e., Eastern PADD II – is concerned, there are 13 refineries located in Michigan, Illinois, Indiana, Kentucky, Tennessee and Ohio. These

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[15] *Id*., page 18.
[16] See "UPDATE 1 - Tesoro - West Coast Crude Rail Unloading to Hit Nearly 1 Mln Bpd," Reuters, dated December 10, 2013. This article is attached as part of Attachment B.
[17] *Id*.
[18] Attachment C, page 18.

refineries collectively use approximately 2.5 million bpd of crude oil.[19] In 2012, these refineries imported over 1.2 million bpd of crude oil. Ninety-seven percent of these imports were from Western Canada.[20] Canadian crude oil producers delivered a total of approximately 1.7 million bpd into the entire American Midwest region in 2012.[21] I do not believe that there is any real possibility that Western Canadian producers will permit North Dakota Bakken crude oil to replace any of the crude oil Mid-Continent refiners are now receiving from Western Canada. In fact, if anything, Western Canadian crude oil will occupy an increasing portion of this PADD II market.

30. In its June 2013 Report, CAPP states that: "The potential growth of western Canadian crude oil supplies exceeds the demand growth outlook in the whole of the North American market. The United States, given its geographic proximity will remain the primary market for western Canadian crude oil."[22] CAPP further states that Canadian crude oil production will double within the next 15 years.[23] In the past Canadian crude oil producers have made it absolutely clear that they will protect their American Mid-Continent markets. For example, we have seen Canadian producers dump crude onto the U.S. market in the past when production in Canada was in excess supply relative to market demand. This situation resulted in the past in a substantial price squeeze on those Bakken producers that did not have rail options. There is no doubt whatever that Canadian producers will not willingly abandon their Mid-Continent American refinery markets to make room for Bakken crude oil, since their alternative would be to shut in

[19] *Id*., page 15.
[20] *Id*.
[21] *Id*., pages iii, 14.
[22] *Id*., page 19.
[23] *Id*., page 3.

their production. Muse's conclusion that Bakken will replace Western Canadian crude oil in the U.S. Mid-Continent if the Sandpiper project is built is both highly unrealistic as well as highly improbable. PADD II refiners will simply use the availability of Bakken productions as leverage to obtain lower prices for the crude oil that western Canadian producers are selling them. Canadian producers will ensure that they become the lowest cost crude suppliers to the region.

31. It is equally improbable that Bakken crude oil will find a market in Eastern Canada as Muse concludes. The Muse Report states that the Sandpiper project will enable Bakken producers to transport their crude oil by pipeline to Eastern Canadian refiners because Bakken producers will receive a higher netback than from rail shipments to other locations. According to Muse, Bakken producers will therefore fill the Sandpiper pipeline with crude oil destined for Eastern Canada.

32. There is absolutely no basis to Muse's conclusions.

33. According to CAPP, the total capacity of refineries in eastern Canada is about 1.3 million bpd and includes refineries located in Ontario, Québec and Atlantic Canada.[24] Of that total refining capacity, approximately 330,000 bpd is located in Halifax and St. John. It is common knowledge that the refineries at these locations are not connected to any pipelines. Therefore, the Sandpiper project cannot possibly transport to them. CAPP states that the four refineries in Ontario have a combined refining capacity of 393,000 bpd.[25] CAPP also states that Statistics Canada stated that Ontario refineries received 366,200 bpd of crude oil with 336,700 bpd (92 per cent) derived from domestic Canadian

[24] *Id*., page 11.
[25] *Id*.

sources.[26] I find it hard to believe that Canadian crude oil producers will simply allow Bakken North Dakota producers to supplant their markets. The majority of refineries in eastern Canada are owned by Canadian companies, that also produce substantial quantities of crude oil in Western Canada. I think it is highly unrealistic to expect these companies to shut in their own production while buying third party production from the Bakken. In fact, TransCanada Corp. understands well the demand in Eastern Canada for crude and is building the Energy East Pipeline which will be operational in the fourth quarter of 2017 and will transport up to 1.1 million bpd of crude from western Canada to all of the refineries on the East Coast of Canada as well as to export terminals.[27] Energy East Pipeline's recent Open Season was fully subscribed.

34. Muse also reached the conclusion that Bakken producers will find a contracted market for their crude oil in the Gulf Coast because the demand of Gulf Coast refineries is for sour crude oil not the sweet light crude oil that is found in the Bakken. Muse also points to the fact that Gulf Coast refiners will use the sweet crude oil that is now being produced from new fields in Texas rather than Bakken crude. Both Muse conclusions are incorrect.

35. First, Muse only discussed six million bpd of the eight million bpd of Gulf Coast refining capacity. The remaining two million bpd of refining capacity, which Muse simply ignored, are situated in refineries that are currently using, or could well become a market for Bakken crude oil. In addition, Gulf Coast refineries are considering converting their facilities to enable them to run sweet crude oil in view of plentiful new

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[26] *Id.*, page 12.

[27] "TransCanada to Proceed with 1.1 Million Barrel/Day Energy East Pipeline Project to Saint John," dated August 1, 2013. Material regarding the Energy East Pipeline project is attached as part of Attachment D to this Declaration.

supplies available in the United States. Furthermore, contrary to Muse's assumption, some of the new supplies of sweet crude oil from Texas, such as the Eagle Ford field, are not comparable to Bakken crude. Eagle Ford crude is primarily a light condensate that can be used in only limited quantities in most refineries because of the unbalanced composition of its components when processed in a refinery. On the other hand, Bakken crude is a very balanced crude that enables some refineries to run almost exclusively on this type of crude oil. For this reason, there is an oversupply of Eagle Ford condensate and producers of Eagle Ford are actually separating the condensate into components and then trying to export a major portion of the components. If we factor in the fact that Eagle Ford crude is not comparable or competitive with Bakken crude and further consider the fact that Muse never addressed two million bpd of refining capacity in the Gulf Coast that is a current or potential market for Bakken crude oil, it becomes apparent that Muse's assessment of the crude oil market on the Gulf Coast is flawed. Neither current market demand in the Gulf Coast nor market requirements in the future exclude Bakken crude oil from continuing to make inroads into the market. The sheer size of the Gulf Coast market and the fact that Gulf Coast refineries are now considering retooling their plants to run more sweet crude will continue to provide profitable netbacks for Bakken rail deliveries.

Shipper Reaction to the Project that NDP is Proposing

36. It is not only my opinion that the NDP Sandpiper project is not economically viable. In opposing a previous incarnation of the project, I discussed several occasions in which shippers had voiced their concerns with NDP about the sustainability of NDP's Sandpiper plans. I had stated during that proceeding that there had been at least four

occasions from January 2012 to September 2012 that I was aware of in which shippers had raised very substantial concerns about the economic viability of the project and the rates that NDP proposed to charge. These shippers told NDP they would not financially support the pipeline being proposed and would not subscribe to pipeline capacity offered in an open season.[28] The project being opposed in those meetings and the project being proposed in NDP's current Petition are virtually the same.

37. Shipper support for the current incarnation of the project is similarly muted. Of the 440,000 bpd of pipeline capacity being made available, only 155,000 bpd were subscribed to during the open season. While NDP does not state how many shippers actually signed Transportation Service Agreements (TSA) for the project, only 15 apparently signed the confidentiality agreement necessary to gain access to the pro forma TSA. NDP recognizes that there are at least 185 shippers on the current NDP pipeline system, which means potentially fewer than 8% of all shippers on the current system were willing to become committed shippers. Of those shippers, the anchor shipper for the project is also a part owner of NDP, Marathon Petroleum Corporation.[29]

38. Enbridge's announcement that Marathon Petroleum Corporation (Marathon), through its subsidiary Williston Basin Pipeline Company LLC, has acquired a 37.5% equity interest in the NDP and is the "anchor" committed shipper on the NDP expansion raises very substantial questions regarding the motivation of both NDP and Marathon in

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[28] Sworn Declaration of Robert P. Garner attached to Protest, Complaint, Opposition, Request for Rejection and Motion to Intervene of EnWest Marketing LLC in Response to Enbridge Pipelines (North Dakota) LLC Petition for Declaratory Order and Offer of Settlement, Docket OR13-6-000, dated November 26, 2012, pages 5-6.

[29] "Marathon Petroleum Corporation Commits to Sandpiper Project," Marathon Petroleum Corporation Press Release, dated November 25, 2013: http://ir.marathonpetroleum.com/phoenix.zhtml?c=246631&p=irol-newsArticle&ID=1879930&highlight.

proceeding with the Sandpiper project.[30] These questions are highlighted by a provision of the TSA that permits Marathon to terminate its commitment to the NDP if another Enbridge pipeline, the Southern Access Extension, is not built.[31] I think it is important that the Commission understand the background of Marathon's involvement in both pipelines in deciding whether the entire structure of the Sandpiper project is discriminatory.

39. Marathon is one of the largest refining companies in the United States. It operates large refineries in Robinson, IL; Canton, OH; Catlettsburg, KY; as well as other locations in the Mid-West.[32] One of Marathon's major supply routes to transport crude oil to its Illinois and Ohio refineries is a Marathon Pipeline LLC pipeline that originates in Patoka, IL. I am attaching to my Declaration as Attachment E, an enlarged version of the map provided in the Canadian Association of Petroleum Producers' (CAPP) June 2013 Report, which is also attached to my Declaration as Attachment C, which shows the supply route from Patoka to the Marathon refineries in Illinois and Ohio.

40. In the past, Marathon has faced bottlenecks at Superior in transporting crude oil to Patoka for further shipment to its Midwest refineries. As a result, Marathon has been a strong supporter of an alternative supply route, the Enbridge Southern Access Extension. This pipeline is a 165-mile line from Flanagan, IL to Patoka. The initial capacity of this proposed pipeline is 300,000 bpd. Marathon is able to connect to Flanagan and thereafter Patoka by using the Enbridge Lakehead pipeline from Superior, WI.

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[30] NDP Petition, footnote 1.
[31] Attachment A to the MacPhail Affidavit, Section 4.02(b).
[32] The Robinson refining capacity is 206,000 barrels per day (bpd); the Canton refining capacity is 80,000 bpd; the Catlettsburg refining capacity is 240,000 bpd.

41. With this background, it is apparent that the Sandpiper project is simply a vehicle for permitting Marathon to supply its Illinois and Ohio refineries and shifting the costs of enabling Marathon to do so to the uncommitted captive shippers on the present NDP pipeline. In fact, if Marathon is not able to use the NDP to supply its refineries, then the entire Sandpiper project will collapse. As I pointed out above, the TSA says that Marathon can pull out of the Sandpiper project if Enbridge does not provide the pipeline connection that Marathon needs from Flanagan to Patoka.[33] These facts underscore the extent to which the entire Sandpiper project represents an effort by a major equity owner of the pipeline to use the funds of uncommitted shippers to finance its own crude oil supply plans.

Captive Shippers on the NDP Pipeline System

42. I anticipate that NDP may respond to the information that I have presented in this Declaration by claiming that a shipper that did not wish to support the project could avoid shipping entirely on the NDP system. However, that position ignores the fact that a number of shippers have already made substantial fixed investments in order to permit them to ship crude oil on the NDP pipeline. EnWest, as I pointed out at the beginning of my Declaration, has invested a considerable amount of capital in a crude oil injection facility in Stanley, ND. That investment, together with a truck unloading facility and tankage were necessary to enable EnWest to inject crude oil into the NDP system.

43. Shippers, including EnWest, cannot simply walk away from these types of investments without suffering substantial financial losses. At the same time, EnWest has

[33] Attachment A to the MacPhail Affidavit, Paragraph 4.02(b).

no need for the additional capacity that the 230,000 bpd expansion facilities would provide.

44. In addition to the shippers that have made investments similar to EnWest, there are also are a number of production fields and gathering systems that are connected only to the NDP pipeline. These producers and shippers built their facilities on the basis of the existing NDP system and are also captive to the pipeline.

I, Robert P. Garner, state under penalty of perjury that the foregoing is true and correct to the best of my information and belief.

Robert P. Garner

March 13, 2014

ATTACHMENT A

US Williston Basin Crude Oil Export Options - January 22, 2014

Year End System Capacity, Barrels Per Day

	2007	2008	2009	2010	2011	2012	2013	2014	2015*	2016*
Butte Pipeline	92,000	104,000	118,000	118,000	145,000	160,000	160,000	160,000	160,000	160,000
Butte Loop (Q3 2014)	-	-	-	-	-	-	-	110,000	110,000	110,000
Tesoro Mandan Refinery	58,000	58,000	58,000	58,000	58,000	68,000	68,000	68,000	68,000	68,000
Enbridge Mainline North Dakota	80,000	110,000	110,000	161,500	185,000	210,000	210,000	210,000	210,000	210,000
Enbridge Bakken Expansion Program (Q1-11/Q1-13)	-	-	-	-	25,000	25,000	145,000	145,000	145,000	145,000
Plains Bakken North (Up to 70,000 BOPD)	-	-	-	-	-	-	-	40,000	40,000	40,000
Enbridge Sandpiper* (Q1 2016)	-	-	-	-	-	-	-	-	-	225,000
TransCanada Keystone XL* (2016)	-	-	-	-	-	-	-	-	-	100,000
Dakota Prairie Refinery (Q4 2014/Q1 2015)	-	-	-	-	-	-	-	-	20,000	20,000
Thunder Butte Refinery (2015)	-	-	-	-	-	-	-	-	20,000	20,000
Dakota Oil Processing Refinery (2015)*	-	-	-	-	-	-	-	-	20,000	20,000
Hiland Partners Double H Pipeline (Q3 2014, Up to 100,000 BOPD)	-	-	-	-	-	-	-	50,000	50,000	50,000
Pipeline/Refining Total	**230,000**	**272,000**	**286,000**	**337,500**	**413,000**	**463,000**	**583,000**	**783,000**	**843,000**	**1,168,000**
EOG Rail, Stanley, ND (Up to 90,000 BOPD)	-	-	65,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000
Dakota Plains, New Town, ND	-	-	-	20,000	30,000	30,000	30,000	80,000	80,000	80,000
Various Sites in Minot, Dore, Donnybrook, Gascoyne, and Stampede (est)	-	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Inergy COLT Hub, Epping, ND (Q2 2012)	-	-	-	-	-	120,000	120,000	120,000	120,000	120,000
Hess Rail, Tioga, ND (Up to 120,000 BOPD)	-	-	-	-	-	60,000	60,000	60,000	60,000	60,000
Bakken Oil Express, Dickinson, ND	-	-	-	-	100,000	100,000	200,000	200,000	200,000	200,000
Savage Services, Trenton, ND (Q2 2012 Unit Trains)	-	-	-	-	-	90,000	90,000	90,000	90,000	90,000
Enbridge, Berthold, ND (Q4 2012)	-	-	-	-	-	10,000	80,000	80,000	80,000	80,000
Great Northern Midstream, Fryburg, ND (Q1 2013)	-	-	-	-	-	-	60,000	60,000	60,000	60,000
Musket, Dore, ND (Q2 2012)	-	-	-	-	-	60,000	60,000	60,000	60,000	60,000
Plains, Ross, ND	-	-	-	-	20,000	20,000	65,000	65,000	65,000	65,000
Plains - Van Hook, New Town, ND	-	-	-	-	-	35,000	65,000	65,000	65,000	65,000
Global/Basin Transload, Zap, ND (Estimate Not Confirmed)	-	-	-	-	20,000	40,000	40,000	40,000	40,000	40,000
Mountrail Rail - Palermo, ND		-	-	-	-	-	-	160,000	160,000	160,000
Northstar Transloading - Fairview, MT (Q3 2014)	-	-	-	-	-	-	-	20,000	180,000	180,000
Rail Only Total	-	30,000	95,000	115,000	265,000	660,000	965,000	1,195,000	1,355,000	1,355,000
All Transportation Total	**230,000**	**302,000**	**381,000**	**452,500**	**678,000**	**1,123,000**	**1,548,000**	**1,978,000**	**2,198,000**	**2,523,000**

*Project Still in the Review or Proposed Phase

Source: ND Pipeline Authority Chart/Table Data, North Dakota Pipeline Authority, prepared January 22, 2014, accessed February 2014 at http://northdakotapipelines.com/datastatistics/; Click on red option on top titled Oil Transportation Table at http://northdakotapipelines.com/oil-transportation-table/

ATTACHMENT B

Richard Smith Surrebuttal Testimony
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News Release

BNSF Plans $220 Million Capital Program in North Dakota to Improve and Expand Rail Capacity

FORT WORTH, TEXAS, August 15, 2013:

BNSF Railway Company (BNSF) plans to invest an estimated $220 million to improve and expand rail capacity in North Dakota this year.

BNSF's 2013 capacity enhancement projects in North Dakota include constructing three new sidings west of Minot near Manitou, Tioga, and Palermo; extending the sidings near Glen Ullin and Hillsboro; improvements to six sidings between Minot and Grand Forks; raising10 miles of track over Devils Lake by 1 to 5 feet to keep the track above rising water; upgrading the line between Berthold and Northgate on the Canadian border; installing Centralized Traffic Control signal systems on three sidings near Devils Lake, Hillsboro and Towner; constructing a new double crossover track east of Williston; and lengthening existing tracks or adding new tracks at BNSF rail yards in Mandan, Minot and Williston.

BNSF will also continue its robust track maintenance program in North Dakota, which will include nearly 1,900 miles of track surfacing and undercutting work, the replacement of about 315 miles of rail and 415,000 ties, as well as significant signal upgrades for federally mandated positive train control (PTC).

“BNSF's capital investments in North Dakota will help ensure our network is prepared for growing demand for freight rail,” said Matthew K. Rose, chairman and chief executive officer. “We are focused on investing to meet our customers' expectations and on expanding capacity where growth is occurring. Given the importance of a low cost supply chain to the U.S. economy, our privately funded rail infrastructure is well positioned to help all North Dakota industries compete in global markets.”

The planned capital investments in North Dakota are part of BNSF's record 2013 capital commitment of $4.3 billion. The largest component of the capital plan is spending $2.3 billion on BNSF's core network and related assets. BNSF also plans to spend approximately $1 billion on locomotive, freight car and other equipment acquisitions, many of which will serve North Dakota. The program also includes about $200 million for positive train control and $800 million for terminal, line and intermodal expansion and efficiency projects.

Unlike other modes of transportation, U.S. freight railroads use their own private dollars, not tax dollars, to build and maintain their freight rail networks. Since the year 2000, BNSF has invested more than $42 billion to improve and expand its freight rail network.

About BNSF

BNSF Railway is one of North America's leading freight transportation companies operating on 32,500 route miles of track in 28 states and two Canadian provinces. BNSF is one of the top transporters of consumer goods, grain and agricultural products, low-sulfur coal, and industrial goods such as petroleum, chemicals, housing materials, food and beverages. BNSF's shipments help feed, clothe, supply, and power American homes and businesses every day. BNSF and its employees have developed one of the most technologically advanced, and efficient railroads in the industry. We work continuously to improve the value of the safety, service, energy, and environmental benefits we provide to our customers and the communities we serve. You can learn more about BNSF at www.BNSF.com.

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Bloomberg

Koch Ends Plans for Pipeline to Illinois From Bakken

By Lynn Doan - Jan 21, 2014

Koch Pipeline Co. called off plans to build a 250,000-barrel-a-day crude line to Illinois from North Dakota's Bakken formation, where a shale boom has helped lift domestic production to the highest in a quarter-century.

The indirect subsidiary of Koch Industries Inc., one of the largest private companies in the U.S., is no longer developing the so-called Dakota Express pipeline, Jake Reint, a Koch spokesman, said by e-mail yesterday. He didn't provide a reason for the decision. The Wichita, Kansas-based company was scheduled to begin a 45-day open season to gauge interest from potential shippers on the line in July.

"The non-binding open season for the Dakota Express pipeline is no longer being pursued," Reint, based in Wichita, said in the e-mail.

Hydraulic fracturing and horizontal drilling have helped producers reach shale deposits of oil across the middle of the U.S. from North Dakota to Texas, sending domestic output to the highest level since 1988. Koch proposed the Dakota Express line to help get the growing glut of oil to refiners in the U.S. Midwest. It was considering a extension to the Gulf Coast.

Koch would have used its existing Wood River pipeline, which has delivered crude to refineries in the Minneapolis-St. Paul region, to complete the project, the company said in June. While the Wood River line "remains operable and in good condition," Koch stopped accepting nominations on it in February 2013, Reint said yesterday.

To contact the reporter on this story: Lynn Doan in San Francisco at ldoan6@bloomberg.net

To contact the editor responsible for this story: Dan Stets at dstets@bloomberg.net

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BUSINESS

In Dakota Oil Patch, Trains Trump Pipelines

Flexibility of Shifting Crude to Higher Priced Markets Strands Proposed Projects

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By ALISON SIDER CONNECT

March 3, 2014 7:31 p.m. ET

Two pipelines stalled for little demand. Shown, railcars in North Dakota. *Associated Press*

Moving North Dakota's oil riches out of state on trains was supposed to be a stopgap solution until pipelines could be built.

But even as crude gushes from the state's Bakken Shale at a rate of nearly 1 million barrels a day, some pipeline companies are abandoning proposed projects, and it is becoming clear that rail transport won't be a temporary phenomenon.

In January, Koch Pipeline Company walked away from a project because of what it said was tepid interest by local oil producers. A year earlier Oneok Partners OKS +0.59% LP canceled plans for a $2 billion pipeline from North Dakota to Oklahoma for the same reason.

Rail is almost always a more expensive way to transport crude than pipelines—as much as twice the price a barrel over similar distances. But in North Dakota's case, rail's greater flexibility to ferry oil to where it fetches the highest price trumped the economics of pipelines, said energy experts.

Riding the Rails
Crude oil shipping capacity out of North Dakota, by method of transportation

The abandoned pipeline projects could have tied into existing and proposed lines bringing oil to refiners in Texas and Louisiana, a market already awash in oil from nearby shale fields.

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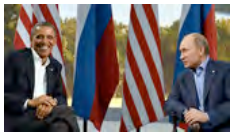

3 Behind the West's Miscalculations in Ukraine

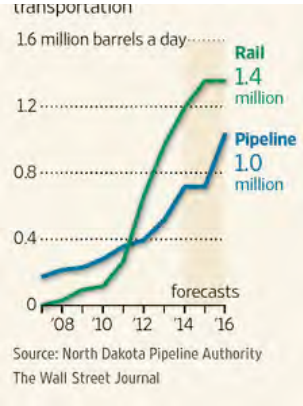

Ethan Bellamy, an analyst at Robert W. Baird & Co., said producers want the ability to sell oil flowing out of the Midwest to the highest bidder—often refineries in Washington state, New Jersey and Pennsylvania that are only accessible by rail.

"Making a pipeline volume commitment is like getting married. Shipping by rail is like a one-night stand," said Baird's Mr. Bellamy. "Right now I suspect producers would rather stay bachelors."

In part, the crude produced in North Dakota is a low-sulfur type that is highly prized right now among East Coast refiners. On average, the state's oil sold for $74 a barrel in January, much less than the about $104 a barrel that East Coast refineries paid to import overseas oil during the same month, according to state and federal data. Even with the between $5 and $15 a barrel cost of shipping crude via train, it still made economic sense to head east.

Greg Garland, chief executive of U.S. refiner Phillips 66, PSX +0.57% said while demand for Bakken crude is greatest along the East and West Coasts, that's not where proposed pipelines are headed. "We don't think you'll see pipelines going east and west," he said.

Trains also can reach refineries that pipelines cannot, said Tad True, a vice president at True Cos., which operates pipelines in North Dakota and Wyoming. That flexibility means there is little incentive to build or expand lines to carry oil from North Dakota, Mr. True said. His company believes new pipeline construction will largely be to connect the network of pipes already in the ground to rail systems—so they fit together more seamlessly, he added.

Train operators including BNSF Railway Co. and Union Pacific Corp. UNP +1.63% moved nearly three-fourths of all the oil pumped in North Dakota in December, according to the latest state estimates. That same month, crude oil flowing through pipelines slumped 2%.

The state agency formed to facilitate pipeline development estimates that even after the handful of new pipelines currently under construction start transporting oil in 2016, well over half of North Dakota's crude oil shipping capacity will remain on the rails.

One major pipeline company hopes to buck the trend. Enbridge Inc. ENB.T +1.32% is building a new line that would carry as much as 225,000 barrels of oil a day out of North Dakota when it goes into service in 2016. Marathon Petroleum Corp. MPC +0.29% , which operates refineries in Detroit, Mich., Canton, Ohio, and Catlettsburg, Ky., has agreed to help foot the $2.6 billion construction bill and provide much of the oil in exchange for a 27% stake in Enbridge's North Dakota pipeline network.

Helping keep hopes alive for more such projects is the congestion and the potential hazards on rail shipments leaving the area. Oil tanker traffic has stressed parts of the rail system unaccustomed to hauling such large volumes of crude. In the past year a string of derailments—one deadly—caused massive explosions.

Last week, the U.S. Transportation Dept. issued new rules requiring that Bakken crude be tested before it is shipped on trains. The American Association of Railroads also agreed to a number of voluntary safety measures for transporting crude, such as lowering some speed limits and redirecting trains around high-risk areas. Still, the new regulations aren't expected to be costly or create a burden on oil companies that want to rail North Dakota crude, said Wells Fargo WFC +0.93% energy analyst Roger Read.

But in the long run, producers say they would like more pipelines build. "Our philosophy is that pipelines are the best transportation solution, because it takes traffic off the road and you've seen the consequences of the burden on the railroad system," Whiting Petroleum Corp. WLL +1.57% spokesman Jack Ekstrom said.

—Russell Gold contributed to this article.

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5 The Debate Over Juice Cleanses and Detox

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KOCH
KOCH PIPELINE COMPANY, L.P.

News Release

July 1, 2013

Contact: Heidi Larson
651-292-8062
Heidi@goffpublic.com

Open Season on Proposed Bakken Pipeline Project Begins Today

Wichita, KS – Koch Pipeline Company, L.P. ("Koch Pipeline") today launched Phase I of a non-binding open season for the Dakota Express Pipeline, a proposed pipeline to transport Bakken crude oil from western North Dakota to Hartford, Illinois and Patoka, Illinois. Koch Pipeline is actively exploring a connection at Patoka, Illinois, to the Eastern Gulf Crude Access Pipeline, which would be capable of delivering Bakken crude oil to eastern U.S. Gulf Coast refineries. Dakota Express Pipeline would begin service in 2016 with an expected initial capacity of approximately 250,000 barrels per day.

The project presents an opportunity for Koch Pipeline to bring Bakken crude oil from the Williston Basin to the U.S. market more efficiently by using a combination of new and existing pipeline infrastructure. Koch Pipeline's system is anticipated to provide a competitive solution for shippers to access important crude oil demand centers.

The Dakota Express Pipeline would include approximately 600 miles of new pipeline construction while also utilizing Koch Pipeline's existing Wood River Pipeline and Hartford terminal. Historically, the Wood River Pipeline has transported crude oil south to north from Hartford, Illinois, to the Saint Paul, Minnesota, area. Koch Pipeline has completed an engineering feasibility study on reversing the flow of the Wood River Pipeline and utilizing it as part of the Dakota Express Pipeline system.

Phase I of the open season, which will last 45 days, and will close on August 14, 2013, is non-binding and intended to solicit expressions of interest from potential shippers. If sufficient shipper interest is received in Phase I, Koch Pipeline may proceed to Phase II of the open season, during which binding commitments would be sought. The project is subject to management approval and receipt of necessary permits.

About Koch Pipeline Company
Koch Pipeline Company, L.P. has earned numerous local, state and national safety awards. Koch Pipeline operates more than 4,000 miles of pipelines in Texas, Wisconsin, Minnesota, Missouri, Iowa and Illinois that transport crude oil, refined products, ethanol, natural gas liquids, and chemicals. Koch Pipeline recently completed a series of pipeline construction projects in south Texas to expand the ability to transport Eagle Ford crude oil to U.S. Gulf Coast refineries. Koch Pipeline Company, L.P. is an indirect, wholly owned subsidiary of Koch Industries, Inc. Learn more at www.kochpipeline.com.

Shipper inquiries:
Bruce Eldredge, Business Development Manager, Koch Pipeline Company, L.P.
DakotaExpressPipeline@kochpipeline.com
316-828-7394

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Bloomberg

Oneok Shares Fall After Bakken Pipeline Canceled

By Mike Lee - Nov 28, 2012

Oneok Inc. (OKE), the company spending as much as $4.8 billion to expand its network, fell after a subsidiary canceled plans for a $1.8 billion pipeline connecting the Bakken shale formation to crude oil terminals in Oklahoma.

Oneok, based in Tulsa, Oklahoma, declined 1.5 percent to $44.88 at the close in New York. Earlier, it fell 3 percent, the biggest intraday drop since Aug. 1.

Oneok Partners LP (OKS), which is controlled by Oneok Inc., wasn't able to sign up enough oil producers to justify building the Bakken Crude Express pipeline, President Terry Spencer said in a statement yesterday. The 1,300-mile (2,100-kilometer) pipeline would have given Oneok a toehold in the lucrative oil transportation business in Montana and North Dakota. The company already is one of the region's largest natural gas processors.

An "abundance of rail," which allows producers to ship oil to higher-priced markets on the East Coast, probably made the project unviable, according to a research note from Tudor Pickering Holt & Co.

The Bakken, part of the Williston Basin that stretches from Canada into North Dakota and Montana, holds an estimated 3.6 billion barrels of crude, according to the U.S. Energy Department. Production is expected to hit 1 million barrels a day in five years. A lack of pipelines to bring the oil to refiners has caused crude in North Dakota to trade at a discount to West Texas Intermediate, the U.S. benchmark.

The Oneok pipeline would have carried as much as 200,000 barrels a day to the oil storage hub at Cushing, Oklahoma. The company is already building a pipeline to ship natural gas liquids such as propane and butane, which are produced in the Bakken.

"While we are disappointed with the results of the open season, we remain committed to serving Williston Basin producers for their natural gas, natural gas liquids and crude-oil infrastructure needs," Spencer said in the statement.

To contact the reporter on this story: Mike Lee in Dallas at mlee326@bloomberg.net

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NEWS

UPDATE 1-ONEOK

Cancels 200,000 bpd Bakken pipeline project

November 27, 2012 | Reuters

NEW YORK, Nov 27 (Reuters) - ONEOK Partners LP has cancelled plans to construct a 200,000 barrel per day pipeline to carry crude oil from the prolific Bakken shale deposit to Cushing, Oklahoma, due to a lack of long-term shipper commitments.

The natural gas and transport company in April announced plans to construct the Bakken Crude Express pipeline, which aimed to take advantage of the lack of pipe capacity to take oil from the Williston Basin in North Dakota and Montana to markets.

Companies have been racing to build out pipeline capacity to accommodate surging production from the Bakken, and oil traders said ONEOK's move to cancel the project could be an early sign that there are sufficient plans on the books at present to handle expected output levels.

"Despite the robust outlook for crude-oil supply growth in the Williston Basin in the Bakken Shale, we did not receive sufficient long-term commitments under the terms we needed to construct the Bakken Crude Express Pipeline," Terry Spencer, ONEOK Partners president, said in a statement released on Tuesday.

Richard Smith Surrebuttal Testimony
Friends of the Headwaters
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Exhibit _____

Crude from the Bakken, as well as from the Canadian oil sands, has been backing up at Cushing - the delivery point for the U.S. oil futures contract, and shippers have used rail, trucks, and barges to move it to the Gulf Coast refining hub, where it fetches a hefty premium.

Recently, companies have been announcing plans to ship more crude on railways to East Coast refineries, where plants have traditionally been forced to pay high prices to import crude from overseas, weakening margins and even forcing some plants to close.

ONEOK planned the Bakken Crude Express Pipeline to run partially parallel to a natural gas liquids pipeline already under construction that will run from the Williston Basin in Montana to Colorado. The oil line would then have run next to the Overland Pass Pipeline, in which ONEOK has a 50 percent interest, from Colorado to Oklahoma.

(Reporting by Matthew Robinson; editing by Matthew Lewis)

NEWS

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FACTBOX-U.S. crude-by-rail projects; Valero to start up Port Arthur TX project

February 12, 2014 | Reuters

(Updates Valero Energy Corp projects)
HOUSTON, Feb 12 (Reuters) - U.S. oil producers, refiners and logistics companies are deep into the crude-by-rail movement with dozens of projects throughout the United States and crude
movements via rail that jumped 71 percent in 2013 compared to the prior year.
Rapid proliferation of oil-by-train shipments started more than three years ago to get oil to markets as pipeline infrastructure lagged booming U.S. and Canadian crude production. The
Association of American Railroads said more than 780,000 barrels per day moved by rail in 2013,
more than 10 percent of average U.S. output of 7.5 million bpd last year. AAR said crude movements were expected to reach about 782,465 barrels per day in 2013, a 71 percent jump from
457,151 bpd in 2012.
The East and West coasts, in particular, turned to rail to tap cheaper U.S. and Canadian crude with no major oil pipelines in operation, or even planned, to move inland crude to those markets.
Valero Energy Corp, the largest U.S. refiner, is moving forward with a plan to start up a new 70,000 bpd rail offloading facility at its 290,000 bpd refinery in Port Arthur, Texas, in the fourth quarter of 2014. The company says it will take "price-advantaged North American
crude," but a spokesman noted further that Valero has been eager to get heavy Canadian crude to
the Port Arthur plant for some time.
However, rail evolved past a stopgap measure into an integral crude sourcing mode for refiners, adding flexibility to choose the best-priced crude from various shale and tight oil plays. Contracts are shorter, and they are not completely locked into specific types of crude moved from fixed points via pipeline.

Here is a rundown of nearly 80 U.S. rail projects - both loading at production sites and unloading at refineries and terminals - that have emerged as U.S. shale and Canadian production
grows:

Hottest Shale Oil Play

investmentu.com/Shale

Could be the biggest shale find in the lower 48 states. Free Report.

WEST COAST
Company Name Type Location State Capacity (bpd) Crude Status

Tesoro Corp Ref Anacortes WA 50,000 (refinery Bakken Operational
120,000 bpd)

U.S. Oil and Ref Tacoma WA N/A (refinery 40,700 Bakken Operational
Refining bpd)

Tesoro Corp Port Port of WA 120,000 initially, Bakken Approved by port
and Savage Vancouver expandable to 280,000 and July 23, awaiting
Services Canadian OK from state
governor;
operational in 2014

Phillips 66 Ref Ferndale WA 30,000 bpd capacity Bakken Permits approved;
total; currently and operational in Q4
receiving 20,000 of Canadian 2014
N.American crude via
mixed-freight
shipments (refinery
100,000 bpd)

BP Plc Ref Cherry WA 60,000 (refinery Bakken Operational
Point 225,000 bpd)

Royal Dutch Ref Anacortes WA N/A (Puget Sound Bakken, Awaiting permits
Shell refinery 145,000 bpd) Canadian

Alon Energy Ref Bakersfield CA Up to 70,000 Bakken, Awaiting permits
USA (Bakersfield, Texas
Paramount and Long Permian
Beach refineries, Basin,

three refineries Canadian
70,000 bpd)

Plains All Term Bakersfield CA Phase I 65,000 to Bakken, Phase I mid-2014,
American 70,000; Phase II can Niobrara, Phase II awaiting
double volumes to up Eagle permits to test an
to 140,000; pipelines Ford inactive pipeline
can then move crude to move railed
to refineries in Los crude to San
Angeles and San Francisco area
Francisco areas

Valero Energy Ref Benicia CA 30,000 to 50,000 bpd Inland Seeking permits;
Corp (132,000 bpd U.S. and delayed until 1Q
refinery) Canadian 2015 from 4Q 2013
to allow for
environmental
assessment

Valero Ref Wilmington CA 60,000 (78,000 bpd Inland Seeking permits
refinery) U.S. and
Canadian

Grays Harbor Port Aberdeen(Gr WA Up to 50,000 with a Bakken, Seeking permits
Rail Terminal ays Harbor) 120-car unit-train Canadian
(U.S. delivery every two
Development days
Group)

Westway Port Aberdeen(Gr WA Up to 50,000 bpd with Bakken, Seeking permits
Terminals LLC ays Harbor) 120-car unit train Canadian
delivery every other
day (expands from 18
loading/unloading
spots to 76)

Tesoro Ref Martinez CA Unit train to Bakken Operational
third-party rail
offloading (refinery
166,000 bpd)

Phillips 66 Ref Rodeo CA Extend rail Bakken, Seeking permits
infrastructure at Canadian
Arroyo Grande to take
up to 20,000
(Refinery 120,200
bpd)
Questar Corp Load Essex CA Considering rail Permian Pipeline segment
loading facility at must be converted

Essex to move crude to crude from
via rail to 96-mile natural gas for
pipeline in rail project to go
Whitewater, CA, forward; if
connected to West approved, converted
Hynes crude-oil pipeline to start
distribution system up 2015 or 2016
in Long Beach, CA.

EAST COAST
Company Name Type City State Capacity (bpd) Crude Status

Phillips 66, Ref Linden NJ 80,000-90,000 at Bakken Operational
Global times 70,000 (Railed
Partners LP to Albany, NY, then
barged to 238,000 bpd
Bayway refinery in
Linden, New Jersey)

Plains All Term Yorktown VA 140,000 Bakken, Operational
American Niobrara,
Eagle
Ford

CERAWeek Partner Siemens
energy.siemens.com/ceraweek-2014
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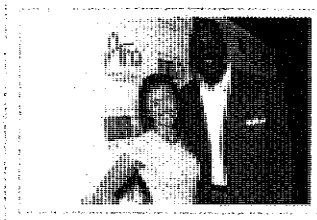

Michael Jordan marries longtime girlfriend

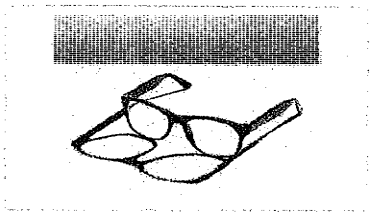

A closer look at online shopping for eyeglasses

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Harold Ramis, Chicago actor, writer and director, dead at 69

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FACTBOX-U.S. crude-by-rail projects; Valero to start up Port Arthur TX project

February 12, 2014 | Reuters

PBF Energy Ref Delaware DE Up to 100,000 Bakken, Bakken Operational; to
City 40,000 Canadian and expand Bakken
(refinery 182,200 Canadian; offloading to up to
bpd) some 125,000 Bakken by
Bakken 3Q 2014, 80,000
barged to Canadian by 3Q 2014
160,000
bpd
Paulsboro
, NJ

Philadelphia Ref Philadelphi PA 160,000; plus another Bakken Operational
Energy a 30,000 via rail and
Solutions barge combination
(refinery 330,000
bpd)

Natural Gas Forecast 2014
investmentu.com/Natural-Gas
Natural Gas Price Forecast: Where We Are
and Where We're Going.

Monroe Energy Ref Trainer PA Can receive Bakken Barge shipments
35,000-40,000 via operational
barge once railed to
Albany NY; plans to
receive up to 75,000
bpd (refinery 185,000
bpd)

Buckeye Term Albany NY 130,000 (rail to Bakken, Operational
Partners barge, onward to in
300,000 bpd Irving partnersh
Oil refiner in St. ip with
John, New Brunswick) Irving
Oil
Sunoco Term Eagle Point NJ 40,000 (rail to Bakken Operational
Logistics barge)
Partners LP

Enbridge Inc Term Eddystone PA 80,000 by end 2013; Bakken First phase
(Near to expand to 160,000 operational,
Philadelphi (rail to barge) expansion in 2014
a)
Buckeye Term Perth Amboy NJ Capacity undisclosed Bakken 2Q 2014
Partners LP

Phillips 66 Ref Linden NJ 75,000 bpd Bakken Building new rail
offloading;
Operational in
second half 2014

GULF COAST
Company Name Type City State Capacity (bpd) Crude Status

Kinder Morgan Term Houston TX 210,000 Cushing Under construction,
Energy Oklahoma, startup in February
Partners LP West 2014
, Texas,
Watco Bakken,
Companies LLC Canadian
and Mercuria

Plains All Term St. James LA 140,000 Niobrara Operational
American

Plains All Load Gardendale TX 25,000 Eagle Operational
American Ford

Genesis Load Wink TX 75,000 Permian Operational;
Energy LP Basin Expansion to
increase loading to
140 railcars
targeted for 4Q
2014

Cetane Energy Load Carlsbad NM 70,000 Permian Operational
LLC and Murex Basiin
LLC

Rangeland Load Loving NM 100,000 in phases Permian 2Q 2014
Energy Basin

Genesis Term Walnut Hill FL 75,000 Bakken, Operational
Energy (near Mobile West
Bay AL) Texas

Valero Ref St. James LA 100,000 (via Bakken Operational
Capline to 180,000
bpd Memphis,
Tennessee, refinery

Sunoco Term Nederland TX 21,500 Bakken Operational
Logistics

Alon Energy Ref Krotz LA 6,000 (refinery Inland Operational
Springs 80,000 bpd) U.S, type
depends
on price

Genesis Term Natchez MS 43,000 (adding 60 Canadian Operational
Energy railcar spots to
existing 40 in 1Q
2014)

NuStar Energy Term St. James LA in talks with Canadian No announced plans
LP producers to expand yet

NuStar Term St. James LA 70,000 at each Bakken Both operational
Energy, EOG facility
Resources Inc

Canadian Term Port of AL 75,000, up to 120 Canadian Seeking permits
National Mobile tank cars per day
Railway (offload crude,
and backhaul
Arc Terminals condensate)

Petroplex Term St. James LA 70,000 (engineering Bakken, 1Q 2015
International Parish and design for bulk Canadian
LLC, head of liquids terminal
a consortium including unit
backed by train)
Macquarie
Group
and
others

Valero Ref Port Arthur TX 70,000 bpd Canadian 4Q 2014
and other
North
American
crudes

Valero Ref St. Charles LA 20,000 via rail, Canadian, 1Q 2014; seeking
35,000 bpd via with room permit to increase
barge(refinery to take rail offloading
205,000 bpd) some capacity to 30,000
inland
U.S.
light-swe
et

Genesis Term Maryland LA N/A (near Exxon Bakken, Operational in
Energy Mobil Corp's Eagle second quarter
502,500 bpd Ford, 2014
refinery in Baton Canadian
Rouge)

CBD Hemp Oil, Cannabidiol
bluebird-botanicals.com/CBDHempOil
Therapeutic Cannabidiol Hemp Oil- Free Shipping
and 10% Off 1st Order

GT Logistics Term Port Arthur TX 100,000 (rail to Bakken Operational
Omniport barge)
Terminal

Jefferson Term Port of TX 70,000 (rail to Eagle Operational
Refinery LLC Beaumont barge) Ford,
(Orange Bakken,
County Canadian
Terminal)

Kansas City Term Port Arthur TX N/A (in talks to N/A
Southern develop rail to Canadian
barge)

Kinder Morgan Term Battleground TX 6,000 bpd N/A Phase I
Energy Oil initially operational,
Partners and Specialty (unloading for 12 expansion startup
TransMontaign Terminal cars, expandable to in fourth quarter
e Partners LP Company LLC 30 cars) 2014
(BOSTCO)

EOG Resources Load Harwood TX Average 12,000 at Eagle Operational
98 shipments of Ford
about 45,000
barrels per train
in 2012

EOG Resources Load Barnhart TX Average 3,000 at 24 Permian Operational
shipments of about Basin
45,000 barrels per
train in 2012

Navigator Load Big Spring TX 60,000 bpd Permian Targeted for fourth
Energy Basin quarter 2014
Services
Genesis Load Raceland LA 140,000 bpd Eagle August 2014
Energy Ford,
Bakken,
Canadian,
Permian
Basin,
Niobrara

MIDCONTINENT
Company Name Type City State Capacity (bpd) Crude Status

Enbridge Load Berthold ND 120,000 Bakken Operational

Plains All Load Manitou and ND 65,000 at Manitou; Bakken Operational; Van
American Van Hook 35,000 at Van Hook Hook to 65,000
bpd by mid-2014

Musket Corp Load Dore ND 60,000 Bakken Operational

EOG Resources Load Stanley ND 65,000 Bakken Operational
(Watco)

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FACTBOX-U.S. crude-by-rail projects; Valero to start up Port Arthur TX project

February 12, 2014 | Reuters

Hess Corp Load Tioga ND More than 60,000 Bakken Operational
(Watco)

Inergy Load Epping ND More than 135,000 Bakken Operational

Dakota Plains Load New Town ND 80,000 Bakken Operational
Holdings

Lario Load Bakken Oil ND 100,000 expandable Bakken Operational
Logistics Express, to 200,000
near
Dickinson

Bakken Oil & Gas Show
dugbakken.com
News, Data & Emerging Trends Hear from
Bakken & Niobrara Experts

Savage Load Trenton ND 90,000 Bakken Operational
Services

Great Northern Load Fryburg ND 60,000 Bakken Operational
Midstream LLC

Global Basin Load Columbus ND 160,000 Bakken Operational
LP, Basin and Beulah
Transload LLC

Northstar Load Fairview MT 100,000 (Q1 2014) Bakken Operational
Transloading

Delek U.S. Ref El Dorado AR 25,000 light U.S. Inland Startup in early
Holdings or 12,000 Canadian. U.S., 2014
Can also access Canadian
20,000 bpd of light
crude offloading at
a third-party
facility adjacent
to the refinery
(refinery 80,000
bpd)

HollyFrontier Ref Artesia NM 70,000 (refinery WTS, WTI, Operational
Corp 105,000 bpd) Canadian

Marquis Energy Term Hayti MS 75,000 (rail to Bakken, Operational; to
Miss. barge) Canadian increase to
150,000

Indigo Term Osceola AR 140,000 (rail to Bakken, Startup in late
Resources Miss. barge) Canadian 2014

SEACOR Term Sauget IL 65,000 (rail to Bakken, Operational
Holdings Inc (Gateway Miss. barge) Canadian
Terminals)

Savage Term Lordstown OH N/A (transloading Utica, when Awaiting
Services at Ohio Commerce production takers
Center, expanding ramps up
for unit trains)

Kinder Morgan, Term Stroud OK 65,000 bpd, Bakken Operational
Watco offloading EOG
Companies output crude to
Hawthorn Pipeline

Buckeye Load Chicago IL Crude arrives via Bakken, Operational
Partners pipeline, loaded on Canadian
railcars to go to
West, East and Gulf
coasts; capacity
undisclosed

ROCKIES
Company Name Type City State Capacity (bpd) Crude Status

Plains All Load Carr, Tampa CO 15,000 at Carr, to Niobrara Carr operating,
American expand to 30,000; expansion slated
65,000 at Tampa for 2014; Tampa
(ships to CA, LA) operational

Musket Corp Load Windsor CO Initially 16,000 Niobrara Operational
expandable to more
than 30,000
Enersco Load Douglas WY 60,000 expandable Bakken, Manifest
Midstream LLC, to 120,000 Niobrara, shipments under
subsidiary of Canadian way, unit-train
Twin Eagle capability added
Resource by March 2014
Management

Eighty-Eight Load Guernsey WY 80,000 Bakken, Operational
Oil LLC Niobrara,
Canadian,
Big Horn
Basin,
Wyoming

Cogent Energy Load Caspar WY 80,000 Niobrara Late spring 2014
Solutions LLC
and Granite
Peak
Development
LLC

Savage Load Price, Salt UT 9,000 Unita Awaiting takers
Services Lake City Basin

United Energy Load 7 sites in More than 68,000 Bakken, Operational
Trading ND, CA, CO, Niobrara,
WY, TX Eagle
Ford,
Permian
Genesis Energy Load Douglas WY 70,000 Niobrara Operational

Sources: Company filings, presentations and announcements; North Dakota Pipeline Authority

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UPDATE 1-Tesoro- West Coast crude rail unloading to hit nearly 1 mln bpd

Tue, Dec 10 2013

* West Coast offloading expected to reach 910,000 bpd by 2015

* Rail-to-barge project part of growth

By Kristen Hays

HOUSTON, Dec 10 (Reuters) - Independent refiner Tesoro Corp sees rail unloading capacity all along the U.S. West Coast for North Dakota Bakken crude oil growing to nearly 1 million barrels per day through 2015, an executive said on Tuesday.

The projected jump to 910,000 bpd from the industry's current unloading capacity of 218,000 bpd - an increase of more than 300 percent - includes Tesoro's $100 million joint-venture railport project in Washington state, Keith Casey, senior vice president of strategy and business development for Tesoro, said on a webcast of the company's annual meeting with analysts.

Other refiners and logistics companies are building or seeking to build smaller projects to bring in cheaper crude via rail as well.

"Loading capacity is keeping pace with production growth," Casey said.

The growth will accommodate increasing efforts by West Coast refiners to tap inland U.S. and Canadian heavy crudes via rail - cheaper alternatives to imports and Alaskan crude - as no major pipelines move crude to that largely isolated market.

Tesoro's rail-to-barge project with Savage Services is the largest of the offloading projects announced so far.

Tesoro Chief Executive Greg Goff told analysts that the railport is seeking a state permit that would allow handling of up to 380,000 barrels per day of crude.

"That will be the permit," Goff said. "But the way the system is being built, rail shipments we estimate will be around 300,000 barrels per day there."

Tesoro expects the permit to be awarded by the third quarter next year.

Casey said West Coast refiners now receive about 810,000 bpd in what he called "substitutable" waterborne imports and Alaskan crude, or shipments that can be replaced by cheaper crudes received via rail.

The region's expected rail unloading capacity growth to 910,000 bpd will more than surpass that, he said.

Tesoro is committed to take up to 60,000 bpd of crude railed to the Port of Vancouver once the project starts up in late 2014 and early 2015, and the joint venture can offer the rest to other west Coast refiners.

Several also are working on their own rail offloading projects, including BP Plc, Phillips 66 and Alon Energy USA. Tesoro also rails up to 50,000 bpd of Bakken crude to its 120,000 bpd refinery in Anacortes, Washington.

CRUDE FLEXIBILITY

Goff noted that Tesoro doesn't have long-term contracts for imports, so the company can easily substitute cheaper U.S. crude at its refineries.

"In no case do we have long-term contracts that limit our flexibility to take crude" except for a seven-year deal with Newfield Exploration Co to supply the company's 57,500 bpd refinery in Salt Lake City, Utah, Goff said.

"Otherwise, we have the flexibility to optimize on a short-term basis," he said.

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12/3/2013

Rail Industry Trends Article

Dakota Plains to open expanded crude terminal in North Dakota next week

Rail Industry Trends

Dakota Plains Holdings Inc.'s Pioneer Terminal expansion in New Town, N.D., is nearly finished and will be commissioned on Dec. 18, the company announced last week.

The $50 million project includes a double loop track to accommodate two 120-car unit trains, a high-speed loading facility designed to handle 10 rail cars simultaneously, and transfer stations to receive crude oil from local gathering pipelines and trucks. Canadian Pacific will serve the loading facility.

One gathering pipeline already is in service and is expected to handle about 8,000 barrels per day, Dakota Plains officials said in a press release.

Construction also continues on a $15 million frac sand terminal the firm is jointly building in New Town with UNIMIN Corp. To open in May 2014 and be served by CP, the terminal will feature 8,000 tons of fixed sand storage space, an enclosed transloading facility and four ladder tracks. Interim frac sand transloading is expected to start in January while construction of the permanent facility continues, Dakota Plains officials said.

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Crude pipeline wars in the Bakken

February 25, 2014

Sandy Fielden, RBN Energy

Since the start of 2014 two competing pipeline projects designed to provide crude producers in North Dakota with additional takeaway capacity have met with very different fates. The first proposal – the Sandpiper project launched by Enbridge in late 2012 has completed a successful Open Season and petitioned federal regulators for approval of its tariff structure. Sponsor Koch Industries quietly canceled the second competing proposal – the Dakota Express pipeline first proposed in July 2013. Looking at rail and pipeline takeaway capacity versus crude production in North Dakota, both these pipelines are “nice to have” not “need to have”. Today we begin a two part analysis of these competing projects.

Earlier this month (February 13, 2014) the North Dakota Pipeline Company (jointly owned by Enbridge and Marathon Petroleum Company – MPC) petitioned the Federal Energy Regulatory Commission (FERC) for a Declaratory Order approving the principals of a revised tariff structure for their Sandpiper crude oil pipeline project. [An earlier petition for a Sandpiper Tariff structure approval made at the end of 2012 was denied by the FERC in March 2013 in part due to shipper concerns about how the pipeline would be financed.] The Sandpiper project involves expansion of Enbridge’s North Dakota Pipeline System that has current capacity to deliver 210 Mb/d of crude from western North Dakota to the Enbridge Mainline

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230 Mb/d initial capacity expected online in 2016. During that Open Season Enbridge announced in November 2013 that MPC (through subsidiary Williston Basin Pipeline Company) would purchase 37.5 percent of Sandpiper, which will translate into 25 percent of North Dakota Pipeline Company when the project is completed. In the process MPC also became the anchor shipper on Sandpiper.

Three weeks before the latest Sandpiper petition to the FERC, a rival pipeline project to move Bakken crude out of Western North Dakota, known as the Dakota Express pipeline, was cancelled by Koch industries (January 22, 2014) without explanation. We assume that Dakota Express was cancelled because of a lack of shipper interest during the initial non-binding 45 day Open Season that Koch held for the pipeline in July and August 2013.

In this two part blog series we try to untangle why Sandpiper appears to be succeeding where Dakota Express failed. But before we get to that we look at whether either of these pipelines is actually needed by North Dakota producers. Analyzing "the stack" – comparing actual and projected crude production in North Dakota against existing and proposed takeaway capacity, provides the answer to that question. In the Bakken such "stack" analysis requires us to account for both pipeline and rail loading capacities, since both compete for shipper business in North Dakota. Below is our "stack" chart based on data provided by the North Dakota Pipeline Authority (NDPA).

Oil & Gas Financial Journal
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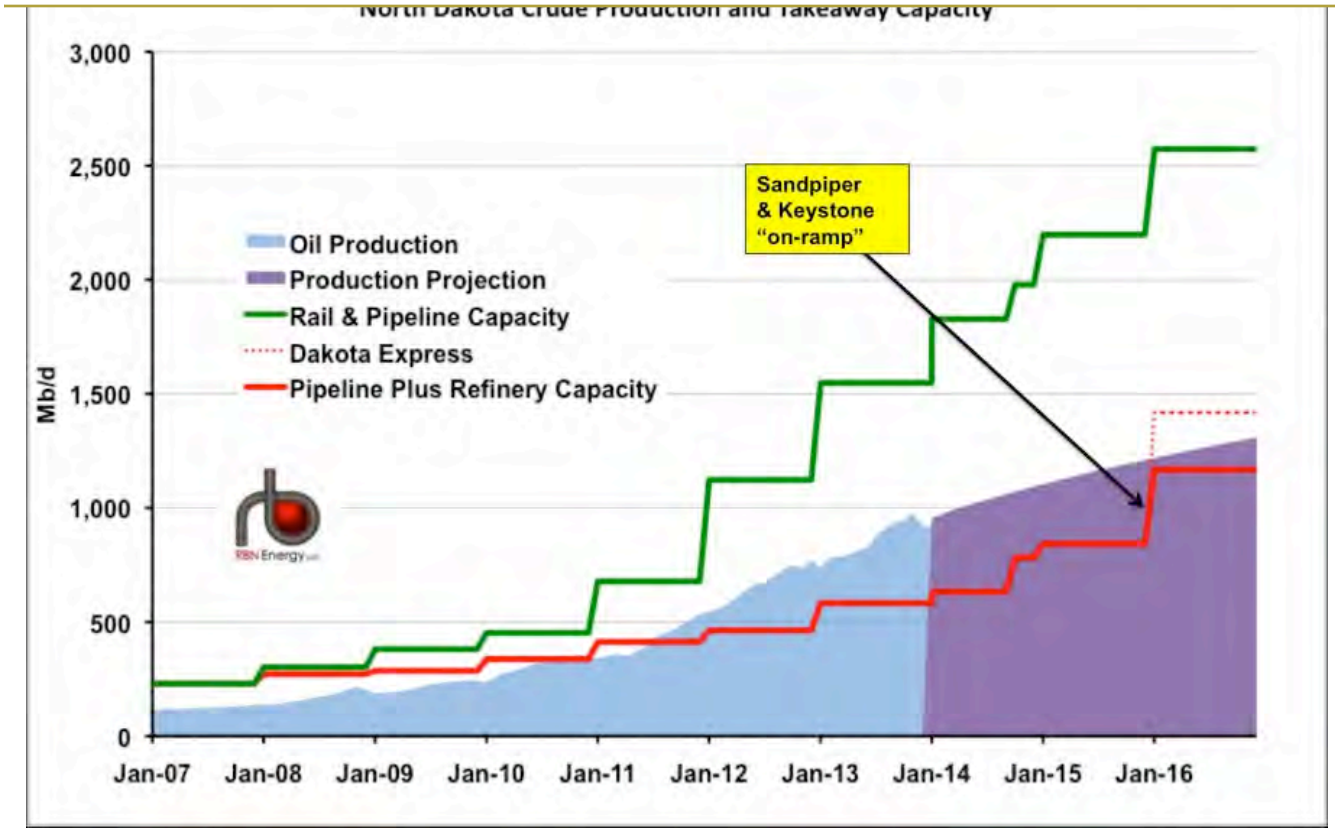

Source: NDPA and RBN Energy

The chart shows actual Bakken crude oil production in North Dakota up until December 2013 (pale blue shaded area) and projected production through the end of 2016 (purple shaded area based on NDPA and Bentek estimates). The solid red line is pipeline takeaway capacity out of North Dakota plus local refinery consumption. From 2014 onwards that number includes build out projects expected to be complete by the end of 2016 including the addition of 230 Mb/d of capacity on Sandpiper and 100 Mb/d on the Keystone XL Bakken Marketlink "on-ramp" at Baker, Montana during 2016. Above the solid red line is a dotted line representing the Dakota Express capacity if that project had not been cancelled. The green line is rail-loading capacity on top of the pipeline and refinery numbers (not including Dakota Express).

Assuming for a minute that North Dakota producers relied entirely on pipeline takeaway (after local refinery consumption) to get their crude to market, the solid red line on the chart shows that they would have been inadequately served from 2011 onwards because production exceeded pipeline capacity. In fact pipeline capacity only comes close to meeting crude

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then the Dakota Express (200 mb/d) capacity would not have been required until after 2020.

But of course that assumption ignores the huge growth in rail loading terminal capacity in North Dakota that was easily making up for any pipeline shortfall by 2012 and accounted for more than double the available pipeline capacity in 2013. In fact if only rail-loading capacity were available, it would theoretically be able to handle projected crude production in 2016 without any pipelines let alone building two new ones. (We say theoretically because the actual capacity of rail facilities to move barrels is typically less than their nameplate, due to operating constraints, rail car availability and other vagaries of rail transportation.) Bottom line - pipeline and rail load capacity together currently provide more than adequate crude takeaway capacity from the Bakken such that the Sandpiper or Dakota Express additions in 2016 are “nice to have” not “need to have” additions.

So in effect two pipeline projects were launched by Enbridge and Koch in December 2012 and July 2013 respectively, even though there was already more than adequate combined rail and pipeline crude takeaway capacity from North Dakota. Which begs the question – why did these projects see the light of day at all and why has Sandpiper apparently succeeded where Dakota Express failed?

The answer to the first question – why launch a pipeline project when there is adequate rail takeaway capacity already – is fairly easy. It comes down to meeting long term pent up demand for additional pipeline capacity out of North Dakota. And there was plenty of demand for pipeline expansion before the build out of rail capacity in North Dakota during 2012 and 2013 as crude production surged past takeaway capacity. So although crude-by-rail loading terminals came to the rescue of beleaguered North Dakota producers in 2012 (see From a Famine of Pipeline to a Feast of Rail) that did not happen before they had suffered big pricing discounts for their crude versus the domestic benchmark West Texas Intermediate (WTI). So while crude by rail increased Bakken producer netbacks (market price less transport costs from the wellhead – see for example Brent, WTI and the Impact on Bakken Netbacks), rail transport is more expensive than pipelines. That means pipelines still offer a better transport deal for producers when the route offered is flexible enough to reach the refining markets where prices are best. As a result, even though there was adequate rail capacity in North Dakota, the right pipeline project could still be attractive to producers. The key word here is flexibility – giving producers the option of pipeline routes to market that compliment the rail options they have now grown used to having.

And that is where we will go in the second part of our analysis – to assess whether either Dakota Express or Sandpiper offered North Dakota producers the flexibility to beat existing rail alternatives.

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CAPP
CANADIAN ASSOCIATION
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Crude Oil

Forecast, Markets & Transportation

June 2013

On Cover:
Cenovus *in situ* project
BP Whiting refinery - courtesy of BP: photo by Marc Morrison

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EXECUTIVE SUMMARY

CAPP annually publishes its long-term outlook for Canadian crude oil production to provide a basis on which to build a common understanding among stakeholders, including industry, governments, and the general public regarding the growth in Canadian oil supply and the need for additional market access.

The key points of this year's outlook are:

- Canadian oil production continues to grow and although oil sands remains the largest component of growth, the resurgence of conventional crude oil production represents the largest year over year change to the previous forecast. This resurgence in conventional tight oil is occuring both in Canada and the U.S., enabling greater continental energy security and changing the historical flows throughout North America.
- The main market opportunities occur in the replacement of offshore foreign crude imports in Canada and the United States and in the potential for exports beyond North America.
- Transportation capacity is currently tight and in addition to new pipeline options coming forward, rail has quickly become another way to move oil to market.

Crude Oil Production and Supply

Canadian crude oil production is expected to grow steadily to 2030. Oil sands production reaches 5.2 million b/d by the end of the outlook. Declining eastern Canada production is offset by growth in conventional production from western Canada, so combined production stabilizes at a level of almost 1.5 million b/d. Compared to last year's forecast, conventional production is higher by 300,000 b/d while oil sands production is up by 200,000 b/d by 2030.

Conventional Oil

The application of advanced drilling technology to previously inaccessible tight oil reserves has reversed the steady decline seen in conventional production over the last several decades. Currently conventional production in western Canada is 1.2 million b/d and is expected to grow to 1.4 million b/d by 2015. Light, tight crude oil production is expected to account for most of this growth.

Canadian Crude Oil Production

million b/d	2012	2015	2020	2025	2030
Total* Canadian (including oil sands)	3.2	3.9	4.9	6.0	6.7
Eastern Canada	0.2	0.2	0.2	0.2	0.1
Western Canada					
Conventional (including condensate)	1.2	1.4	1.4	1.4	1.4
Oil sands	1.8	2.3	3.2	4.5	5.2

*Totals may not add up due to rounding.

Oil Sands

The oil sands represent the vast majority of Canada's crude oil reserves, so naturally this resource will be the primary driver for future overall growth. The 2013 outlook for oil sands is similar in aggregate to last year's forecast but with a higher growth outlook for *in situ* production that offsets a lower growth outlook for mining production.

Canadian Oil Sands & Conventional Production

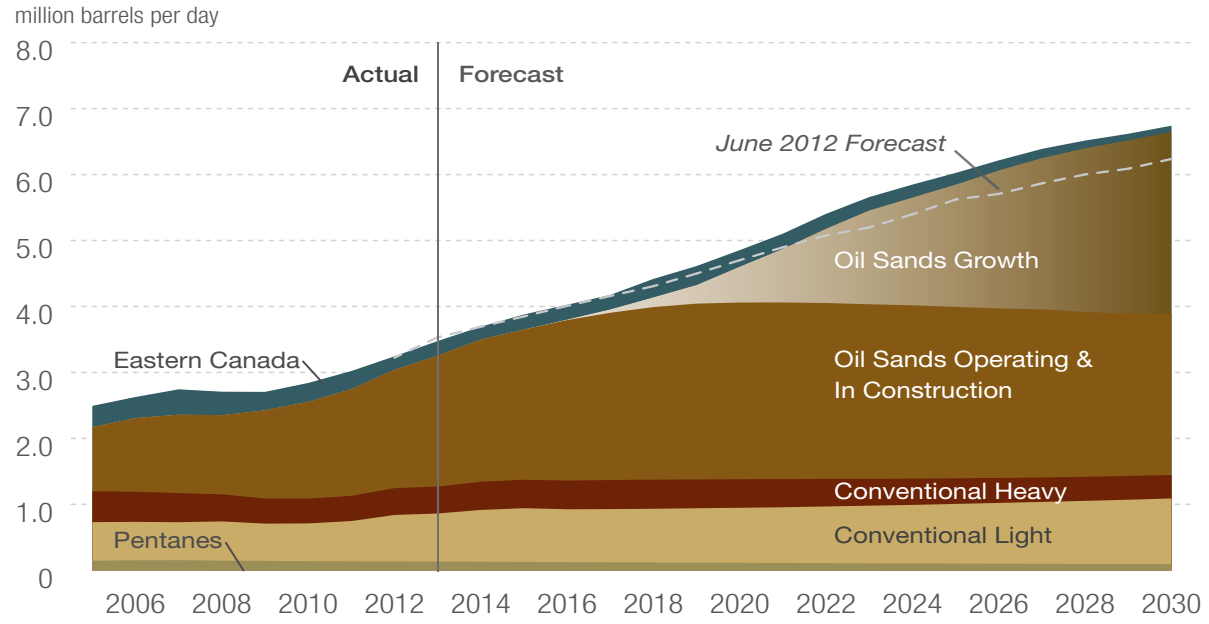

In 2012, 1.8 million b/d were produced from the oil sands of which 800,000 b/d was from mining and 1.0 million b/d were recovered by *in situ* techniques. Looking ahead to 2030, mining production is forecast to increase to 1.7 million b/d and *in situ* production is forecast to grow to 3.5 million b/d.

Eastern Canada

Eastern Canada produced about 6 per cent, or 202,000 b/d of total Canadian crude oil production. Hebron, the fourth major offshore project, is expected to begin production by the end of 2017 and will help offset declines from mature existing projects.

Crude Oil Markets

Given the growing production outlook, the need to reach new markets is a top priority for Canadian oil producers. A fundamental shift is occurring in the market due to strong growth in light crude oil production, which is replacing offshore imports to the light oil refineries in eastern Canada and the United States. Markets for growing heavy oil supplies are primarily found in the U.S. Midwest and Gulf Coast. New market opportunities are also emerging as a result of growing demand in Asia.

Eastern Canada

Refineries in Québec and Atlantic Canada currently import 86 per cent of their requirements. This means there is a potential 700,000 b/d domestic market for growing Canadian oil supplies. Refineries in Ontario have already shifted their main source of supply and obtain more than 90 per cent of their crude oil feedstock from Canadian supplies.

2012 Canada and U.S. Crude Oil Demand by Market Region

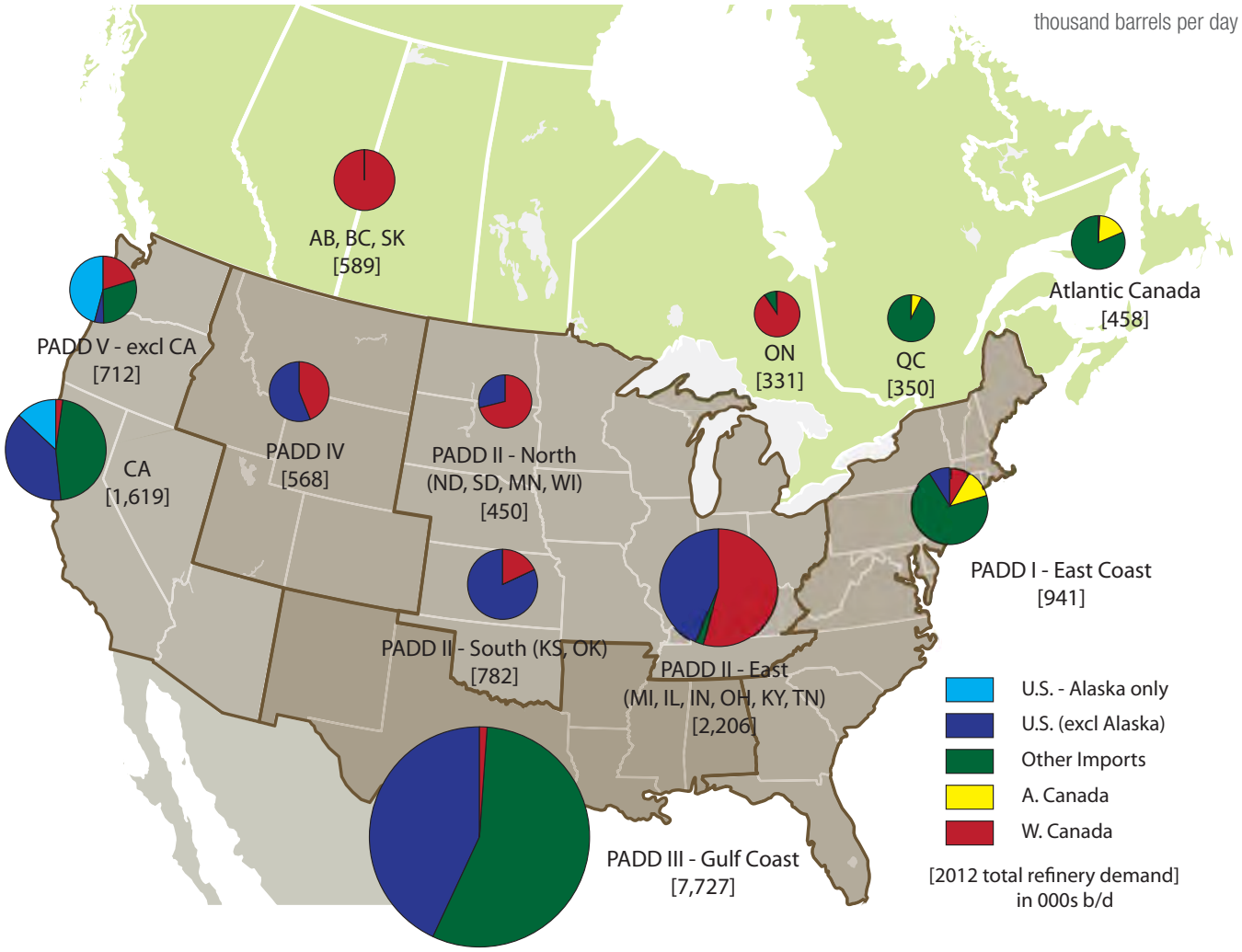

Sources: CAPP, CA Energy Commission, EIA, Statistics Canada

United States

Crude oil demand by U.S. Gulf Coast refineries in 2012 was almost 8 million b/d. Most of these refineries have the capacity to process heavy crude oil that has traditionally been imported primarily from Venezuela and Mexico. Over 2.2 million b/d of heavy crude oil imports were processed in 2012. Canadian producers could displace some of these imported volumes and is forecast to supply at least 1.1 million b/d to this market by 2020 up from the 100,000 b/d that is currently supplied.

In 2012, Canada supplied 1.7 million b/d to the Midwest, making it Canada's largest export market. A number of refinery conversion projects for processing heavy crude oil have recently been completed and are anticipated to increase demand in the region by 460,000 b/d by 2020.

Refineries in Washington and California need to replace their traditional sources of supply that are now declining and may represent a future market opportunity for Canadian producers.

Asia

Asia is a region of strong growth in energy demand to which Canada currently has very limited access. China and India in particular are obvious markets as they currently have the fastest growing economies in the world. According to the U.S. Energy Information Administration (EIA), their combined oil imports are forecast to increase by 6 million b/d; going from 9.2 million b/d in 2012 to 15.7 million b/d by 2030.

Canadian & U.S. Crude Oil Pipelines and Proposals

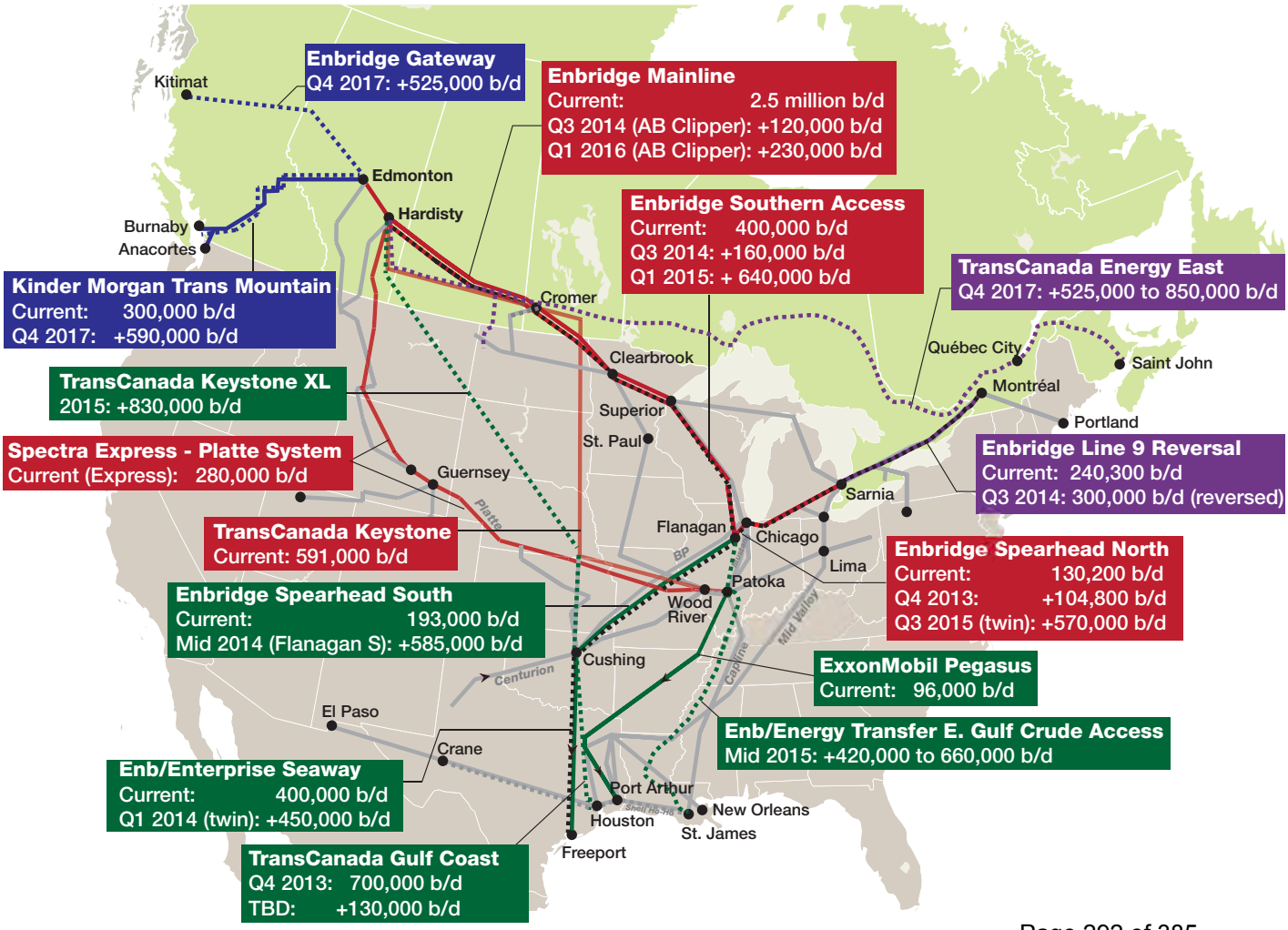

Crude Oil Transportation

Transportation capacity is currently tight, however, there have been no reports of this resulting in production being shut-in. This outlook assumes transportation capacity can grow to accommodate the projected increase in supply.

Western Canadian supplies are essentially landlocked and will need additional transportation infrastructure to bring this growing oil supply to markets. Protracted approval processes for new pipeline projects are resulting in a variety of creative transportation proposals to access markets.

It is clear that based on the pipeline projects being proposed (see figure on previous page), industry continues to broaden the scope of markets that it wants to access. Transportation projects involve both the expansion and conversion of existing infrastructure as well as the development of new infrastructure to diversify market access for Canadian producers.

Rail is a growing transportation option for moving crude oil to markets, which is being enabled by construction of new loading facilities and the manufacturing of new tank cars.

The figure below shows the existing and proposed takeaway capacity from the Western Canada Sedimentary Basin versus forecasted supply. Only current railway capacity is shown although this capacity could be increased significantly to fulfill future demand relatively quickly.

WCSB Takeaway Capacity vs. Supply Forecast

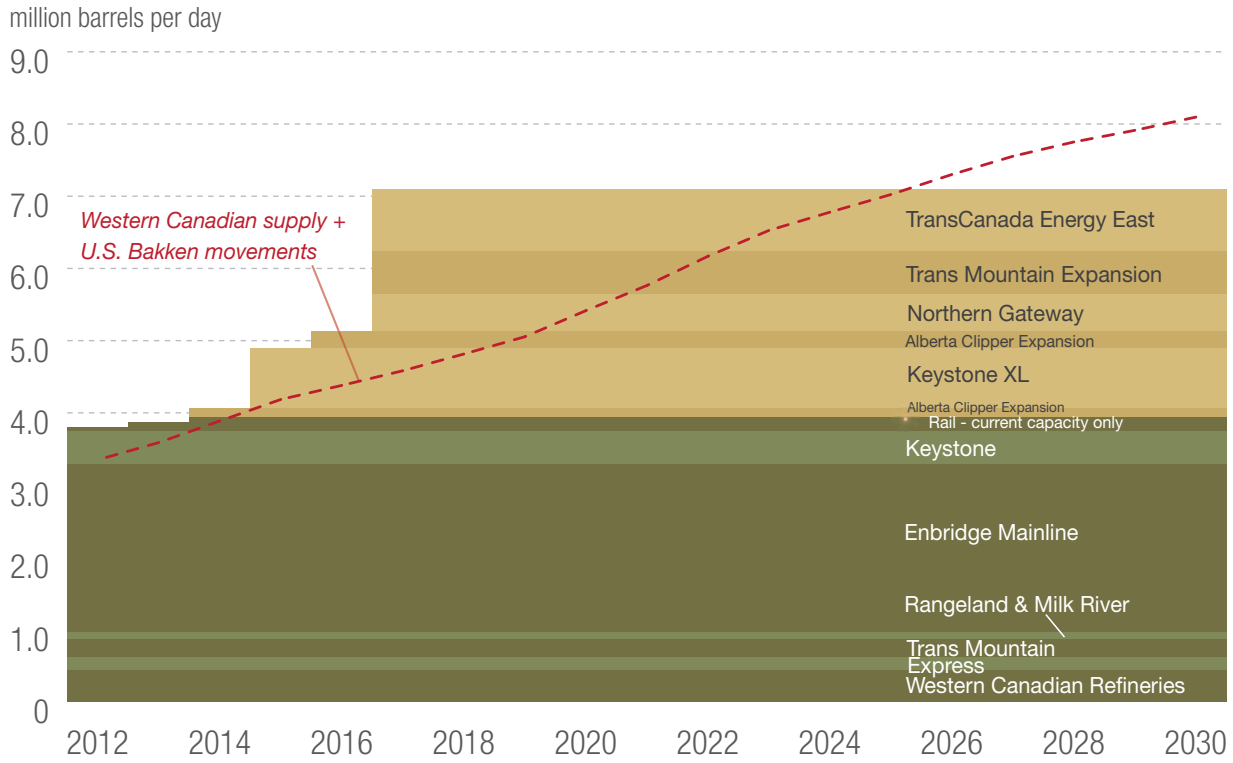

Capacity shown can be reduced by temporary operating and physical constraints.

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1 INTRODUCTION

CAPP annually publishes its long-term outlook for Canadian crude oil production to provide a basis on which to build a common understanding among stakeholders, including industry, governments, and the general public regarding the growth in Canadian supply and the need for additional market access. This report also includes a summary of market opportunities available in North America and globally; and discusses the transportation projects being developed to connect the growing crude oil supplies to various markets.

Canadian crude oil production is expected to grow steadily to 2030. The oil sands represent the vast majority of Canada's crude oil reserves, so naturally this resource will be the primary driver for future overall growth. CAPP's estimate of industry capital spending on oil sands development is $23 billion for 2013, which is unchanged from the estimated expenditure for 2012. In addition, declining production from eastern Canada is offset by growth in conventional production from western Canada.

1.1 Production and Supply Forecast Methodology

CAPP surveyed oil producers in Saskatchewan regarding their annual drilling outlook by well type (horizontal or vertical), as well as their anticipated initial production rates. The conventional production by province component of the forecast was developed through internal analysis of historical trends, the Saskatchewan survey, expected drilling activity, recent announcements, and discussions with industry stakeholders and government agencies.

The oil sands component of the forecast is derived from CAPP's survey of all oil sands producers and as such, reflects the latest industry insight on factors such as production capability from individual projects and general market opportunities. In this analysis, production is not constrained by lack of any transportation infrastructure. However, the report does compare the supply that the analysis produces against the current and proposed pipeline and rail projects to determine where bottlenecks may occur. CAPP does not forecast crude oil prices. Producers responded to the survey with an outlook based on their own internal view of the long-term oil price. In this manner, CAPP is assuming that the oil price will be sufficient to make these projects economic so that this production will be available to the market.

Producers were surveyed for the following data:

a) expected production by project and phase;

b) upgraded light crude oil production; and

c) amount of synthetic crude oil and condensate used as diluent required to move the volumes to market.

The survey results were then risked based on each project's stage of development. Past performance of each company's existing projects or phases was also considered in determining the pace of activity in future project stages, which is an important factor in the case of *in situ* projects that typically have their production capacity divided into multiple phases. The overall forecast was then verified for reasonableness against historical trends. No constraints were put on the forecast due to availability of condensate for blending purposes.

1.2 Market Demand Outlook Methodology

CAPP surveyed refiners in Canada and the U.S. to develop its market outlook. No risk adjustments were made to the responses. However, some assumptions based on discussions with refiners and publicly available information were made and EIA data was used to complete gaps in the survey data for actual demand for each region of the U.S.

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2 | CRUDE OIL PRODUCTION AND SUPPLY FORECAST

Although crude oil is known primarily as a feedstock for transportation fuels such as gasoline, it is actually used in the manufacture of a wider range of products that include plastics and even pharmaceuticals. Not surprisingly, all the industrialized countries of the world are extremely dependent on crude oil. According to the EIA, Canada currently ranks as the sixth largest crude oil producing country in the world and remains the largest source of crude oil imports by the United States. The Oil & Gas Journal ranks Canada's 173 billion barrels of proven crude oil reserves as the world's third largest reserves after Venezuela and Saudi Arabia.

2.1 Canadian Crude Oil Production

In 2012, total Canadian production increased from 2011 levels by 223,000 b/d to over 3.2 million b/d and continued growth is forecast in the long term. Eastern Canada produced about 6 per cent, or 202,000 b/d of the total Canadian crude oil production. Western Canada produced 3.0 million b/d from combined conventional and oil sands production. Table 2.1 shows the forecast for total Canadian production divided between eastern and western Canada. Figure 2.1 shows the total Canadian production forecast. Conventional production from western Canada is expected to remain fairly constant at around 1.4 million b/d throughout the outlook period while production from the oil sands is expected to grow from 1.8 million b/d today to 5.2 million b/d at the end of the forecast period. It is this growth from oil sands production that drives the overall increase in current production levels from 3.2 million b/d to 6.7 million b/d in 2030.

Table 2.1 Canadian Crude Oil Production

million b/d	2012	2015	2020	2025	2030
Total* Canadian (including oil sands)	3.24	3.88	4.85	6.03	6.74
Eastern Canada	0.20	0.23	0.25	0.18	0.09
Western Canada	3.04	3.65	4.61	5.85	6.65

*Totals may not add up due to rounding.

2.2 Eastern Canadian Crude Oil Production

Eastern Canada's crude oil production is sourced from Atlantic Canada supplemented by a small volume coming from Ontario. Since 2007, some minor volumes have been produced from New Brunswick but Atlantic Canada's oil resources are essentially being developed by three offshore oil projects: Hibernia, Terra Nova and White Rose, located off the shores of Newfoundland and Labrador. Continued drilling development at satellite fields associated with these projects (e.g. Hibernia South Extension, North Amethyst and West White Rose) has extended production at these facilities. First oil from Hebron, the fourth major project, is expected by the end of 2017.

In 2012, production declined by 26 per cent to 197,000 b/d. This decrease of 69,000 b/d from 2011 production mostly resulted from extended maintenance shutdowns and to a lesser extent, natural declines at all three projects. Hibernia was offline for 30 days between August and September; Terra Nova for 183 days between June and December and White Rose for 102 days between May and August. Production in 2013 is projected to increase due to a return to steady-state operations.

The outlook for Atlantic Canada production is slightly higher than forecast last year due to an increase in the reserve estimate for the Terra Nova field. In April 2013, the Canada-Newfoundland and Labrador Offshore Petroleum Board stated that it expected the field to operate until 2027, seven years more than it previously estimated.

Figure 2.1 Canadian Oil Sands & Conventional Production

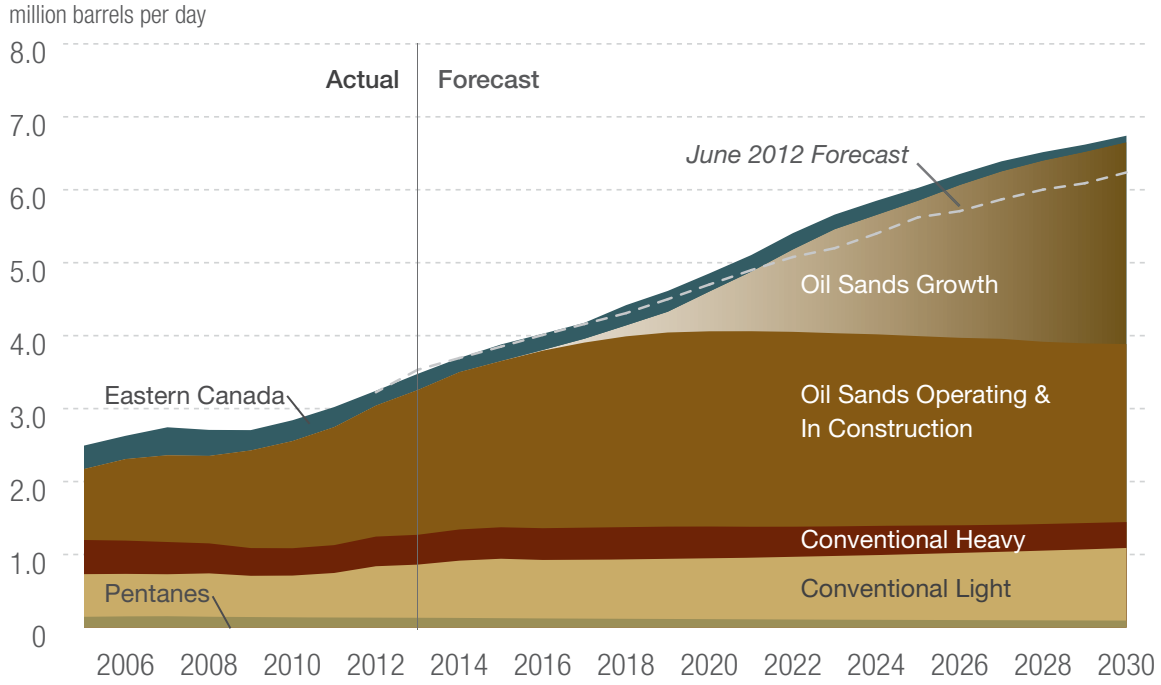

2.3 Western Canadian Crude Oil Production

Western Canadian crude oil production can be divided between conventional and oil sands production. Both categories are expected to contribute significantly to the forecast outlook for western Canadian oil production (Table 2.2). Oil sands production essentially only occurs in the province of Alberta, while conventional resources underlie Alberta, northeast British Columbia, Saskatchewan and parts of Manitoba and the Northwest Territories.

Table 2.2 Western Canadian Crude Oil Production

million b/d	2012	2015	2020	2025	2030
Total*	3.04	3.65	4.61	5.85	6.65
Conventional (including condensate)	1.25	1.37	1.38	1.40	1.44
Oil sands (bitumen & upgraded)	1.80	2.28	3.22	4.45	5.21

*Totals may not add up due to rounding.

Relative to CAPP's 2012 report, production at the latter end of the outlook period from 2020 to 2030 is higher than previously forecast and shows an average annual growth of 200,000 b/d. Conventional production is forecast to contribute about 1.4 million b/d to the total output; the impact of the steep declines expected from mature fields is expected to be entirely offset by production from new horizontal wells. Compared to last year's forecast, conventional production is higher by 300,000 b/d in 2030. Oil Sands production is higher than previously forecast by 200,000 b/d in 2030 due to greater anticipated production from *in situ* wells.

2.3.1 Conventional Crude Oil Production

Conventional crude oil production from western Canada is benefiting from the application of horizontal multistage hydraulic fracturing in tight oil basins to reinvigorate mature basins, a recent trend that has been even more pronounced in the United States. Horizontal drilling has doubled or even tripled the percentage of the resource that industry expects to be able to recover from the reservoirs. Historically, conventional production had been declining steadily since 2002 but flattened out in 2011. Production, including condensates in 2012, was 1.2 million b/d, which returned production to levels not seen since 2004. Further growth is anticipated as conventional production is forecast to ultimately reach 1.4 million b/d despite a decline in condensate production which is primarily recovered from natural gas wells. In last year's report, conventional production was expected to increase in the next few years and then decline during the latter part of the forecast. This latest forecast, however, shows a revised outlook to reflect the expectation that production from new wells will more than offset the natural declines from existing wells in the next few years before maintaining production levels for the remainder of the forecast period. Most of the conventional production comes from Alberta and Saskatchewan and is primarily light crude oil (Figure 2.2). The split between heavy and light conventional crude oil will remain essentially constant to 2030.

Alberta

According to the Alberta Energy Resources Conservation Board (ERCB), out of the 3,107 new oil wells placed on production in 2012, horizontal wells, including those using multistage fracturing techniques, accounted for 2,379 or 77 per cent. This is more than double the number of new horizontal wells placed on production in 2010, the first year horizontal drilling really ramped up in the province.

There are six key shale oil formations in Alberta that have been identified to represent a crude oil in-place endowment of about 424 billion barrels. These formations are Duvernay, Muskwa, Montney, Banff/Exshaw, Nordegg and Wilrich. It is important though to differentiate this estimate from recoverable reserves. Typically recoverable reserves form less than 5 per cent of the in-place reserve estimate. Alberta is leading tight oil drilling activity in western Canada due to the potential of plays such as the Cardium and Viking.

In 2012, conventional Alberta oil production, excluding condensates, was 556,000 b/d and is forecast to increase by 257,000 b/d to 813,000 b/d by 2030. In contrast, in last year's report production was forecast to decline to 522,000 b/d by 2030. With only a few years of production data from horizontal wells, it is too early to establish the ultimate flow rates for wells drilled using the newer technology. However, if the early performance is any indication, CAPP's current forecast outlook may be conservative.

Saskatchewan

The Bakken play is widely recognized as the source of the skyrocketing production in North Dakota but the delineated play area also reaches into Montana, and Canada, including parts of Saskatchewan and a small portion of southwest Manitoba.

Total (light and heavy) Saskatchewan oil production is currently 470,000 b/d and is forecast to increase to 490,000 b/d by 2030. This is similar to last year's forecast. In 2012, CAPP initiated its survey of Saskatchewan oil producers and has surveyed them again in early 2013 for an update to their drilling plans. Robust drilling and production from horizontal wells is expected to generally grow production year over year throughout the forecast period.

Manitoba, NWT

Manitoba production has steadily increased from 2004 and has more than tripled since then but from a total Canadian context, Manitoba accounts for 7 per cent of light conventional production from western Canada.

Little production currently comes from the Northwest Territories but investment dollars are being attracted to one of North America's oldest fields – the Sahtu region of Canada's Northwest Territories (NWT). Canol oil shale in the NWT is attracting significant attention but assessments of this play are in the very preliminary stages.

Figure 2.2 Western Canada Conventional Production (Light & Medium) 2000-2020

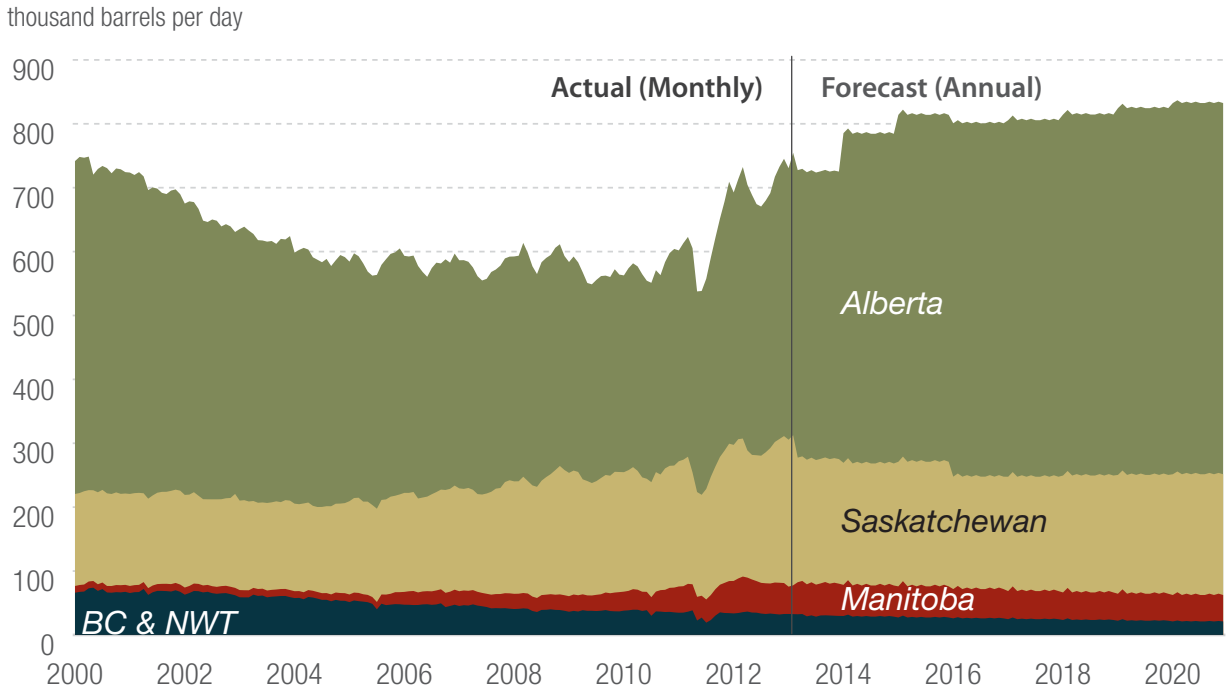

2.3.2 Oil Sands

Three designated oil sands areas in northern Alberta have been defined and used to differentiate the extra heavy crude oil, produced from these regions, termed bitumen, from conventional crude oil production. The regions are referred to as the Athabasca, Cold Lake and Peace River deposits (Figure 2.3). The ERCB estimated at year-end 2012, that these areas contain remaining established reserves of 168 billion barrels.

Depending on the depth of the deposit, one of two methods is used to recover the bitumen. Surface or open pit mining can be used to recover bitumen that occurs near the surface. At greater depths, *in situ* techniques are employed. These refer to both, primary development, that uses methods similar to conventional crude oil production, and enhanced development techniques - the main methods being cyclic steam stimulation (CSS) and steam-assisted gravity drainage (SAGD).

Of the remaining established reserves in Alberta, 33 billion barrels or 20 per cent is considered recoverable by mining and 135 billion barrels or 80 per cent can be recovered using *in situ* techniques.

Figure 2.3 Oil Sands Regions

Figure 2.4 Western Canada Oil Sands & Conventional Production

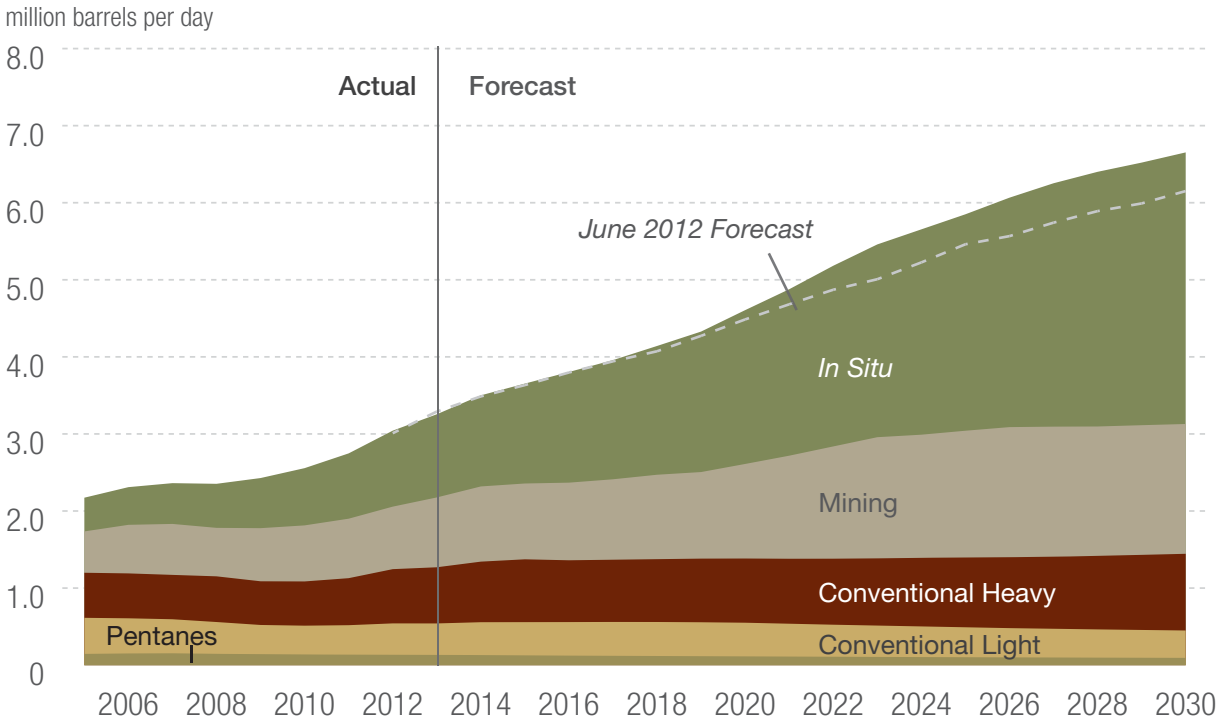

Compared to CAPP's 2012 forecast, while this latest oil sands forecast is very similar in aggregate for most of the outlook period, this similarity is in fact the net result of a higher growth outlook for *in situ* production that offsets the lower growth outlook for mining production. In 2012, oil sands production totaled 1.8 million b/d. Of these volumes, 1.0 million b/d were recovered by *in situ* techniques. Mining production is forecast to grow up to 1.7 million b/d by 2030. Most of the growth is expected from *in situ* production, which is forecast to grow to 3.5 million b/d by 2030 (Table 2.3).

Table 2.3 Oil Sands Production

million b/d	2012	2015	2020	2025	2030
Total*	1.80	2.28	3.22	4.45	5.21
Mining	0.81	0.98	1.23	1.65	1.68
In Situ	0.99	1.30	2.00	2.81	3.52

*Total may not add up due to rounding.

Production volumes from oil sands are typically reported using the upgraded crude oil volumes from integrated projects instead of the raw bitumen volumes processed by these projects. The yield losses associated with upgraded bitumen volumes from non-integrated have been included in the supply volumes that are discussed in the next section of this report. Production from oil sands currently accounts for 59 per cent of western Canada's total crude oil production. In this forecast, oil sands production rises from 1.8 million b/d in 2012, to double in 10 years and reaches 5.5 million b/d by 2030 (Figure 2.4). The oil sands forecast by 2030, is approximately 200,000 b/d higher than forecast in the last report. Please refer to Appendix B.1 for detailed production data.

Currently, Nexen's Long Lake project is the only *in situ* project coupled with upgrading facilities whereas in contrast, historically all mined bitumen has been transformed into upgraded light crude oil. However, Imperial's Kearl mining project started producing bitumen at the end of April 2013 and is the first mining project operating without an affiliated upgrader. This project will deliver diluted bitumen to the market. Some *in situ* volumes from Suncor's Firebag project are upgraded at the Suncor upgrader.

Existing integrated operating and upgrading projects are listed below:

- Suncor Steepbank and Millennium Mine;
- Syncrude Mildred Lake Mine and Aurora Mine;
- Athabasca Oil Sands Project (AOSP);
- Shell Jackpine Mine; and
- Canadian Natural's Horizon Project.

2.4 Western Canadian Crude Oil Supply

The composition of the various crude types available in the market differs from crude oil at the production level. Both conventional heavy crude oil and bitumen from oil sands are either upgraded or blended in order to be transported or to meet optimal refinery specifications. In addition, some volumes of light crude oil may also be used for blending. In any event, it is this crude oil supply that is available after upgrading and blending that is more relevant to market observers because it is these volumes that are ultimately delivered to the end-use markets.

In this report, CAPP categorizes the various crude oil types that comprise western Canadian crude oil supply into the following main categories: Conventional Light, Conventional Heavy, Upgraded Light and Oil Sands Heavy. Oil Sands Heavy includes upgraded heavy sour crude oil, bitumen diluted with upgraded light crude oil (also known as "SynBit") and bitumen diluted with condensate (also known as "DilBit"). Blending for DilBit differs by project but requires approximately a 70:30 bitumen to condensate ratio while the blending ratio for SynBit is approximately 50:50. Bitumen volumes transported by rail are currently relatively minor; however, these volumes would require less diluent for blending versus moving by pipeline or may even be transported as raw bitumen (also known as "RailBit").

In 2012, about 1.0 million b/d or 58 per cent of the total bitumen produced in Canada was upgraded, including volumes of bitumen that were processed at the Suncor refinery in Edmonton. This refinery intake was included since it can process oil sands feedstock. Upgraded volumes are forecast to rise to 1.5 million b/d by 2030. The five bitumen upgraders located in Alberta produce a variety of upgraded products. Suncor produces light sweet crude and medium sour crudes, including diesel; Syncrude, Canadian Natural Horizon, and Nexen Long Lake produce light sweet synthetic crude; and Shell produces an intermediate refinery feedstock for the Shell Scotford refinery, as well as sweet and heavy synthetic crude.

Figure 2.5 Western Canada Oil Sands & Conventional Supply

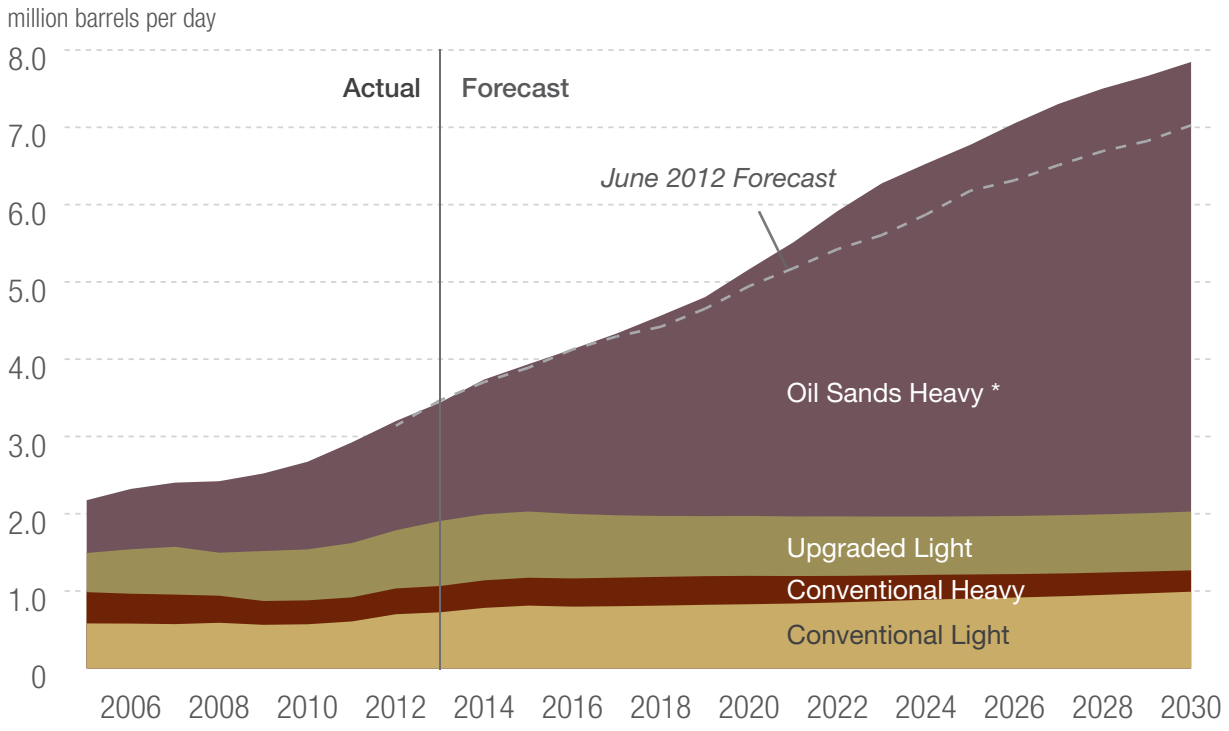

* Oil Sands Heavy includes some volumes of upgraded heavy sour crude oil and bitumen blended with diluent or ugpraded crude oil.

Canada's upgrading capacity is not expected to rise proportionally as bitumen production rises due to a number of investment challenges. These include the high capital costs incurred with upgrading and the need for a sustained differential between light and heavy crude oil of at least $25 per barrel. It is difficult for a new upgrader to compete with the option of transporting heavy crude oil to existing refineries located throughout North America with spare coking capacity that are able to refine such heavy crudes.

If it is not upgraded, bitumen is so viscous at its production stage that it needs to be diluted with a lighter hydrocarbon or diluent to create a type of crude that meets pipeline specifications for density and viscosity. Bitumen at 10° Celsius has the consistency of a hockey puck and generally cannot be moved on pipelines. Less diluent is required when bitumen is moved by rail where it is transported in heated rail cars that lower the viscosity of the bitumen. The main source of diluent is condensate that is recovered from processing natural gas in western Canada. This source of condensate is declining while the needs of growing bitumen production already exceed this supply and continues to grow. In 2012, over 260,000 b/d of imported condensates, diluents from upgraders, as well as quantities of butane were needed to supplement the condensate supply from natural gas wells. This latest forecast is not constrained by the availability of condensate imports as new sources of condensate are assumed to be available to meet market requirements. Refer to Section 4.7 for details on existing and proposed diluent import pipeline projects. The potential for bitumen to travel by rail with reduced diluent requirement has not been factored into the analysis of condensate demand but this would reduce the estimated need for diluent to the extent it becomes a significant transportation option.

Table 2.4 shows the projections for total western Canadian crude oil supply. Refer to Appendix B.2 for detailed data. Light crude oil supply is projected to be relatively stable at around 1.6 million /d throughout the outlook. Heavy crude oil supply is projected to grow from 1.8 million b/d in 2012 to 3.6 million b/d in 2020 to more than triple the current volume in 2030, when it reaches 6.1 million b/d.

Table 2.4 Western Canadian Crude Oil Supply

million b/d	2012	2015	2020	2025	2030
Total*	3.20	3.94	5.16	6.77	7.85
Light	1.45	1.67	1.60	1.65	1.75
Heavy	1.75	2.27	3.56	5.12	6.09

*Total may not add up due to rounding.

The Upgraded Light crude oil supply includes the light crude oil volumes produced from:

- Upgraders that process conventional heavy oil, e.g., the Husky Upgrader at Lloydminster and the CCRL Upgrader in Regina;
- Integrated mining and upgrading projects, e.g., Suncor, Syncrude and Canadian Natural Resources operations;
- Integrated *in situ* projects, e.g., the Nexen Long Lake project; and
- Off site upgraders, e.g., the Athabasca Oil Sands Project.

Compared to the 2012 forecast, the upgraded light crude oil supply is lower due to the announcement of some upgrader projects being cancelled. The Oil Sands Heavy category is forecast to increase from 1.4 million b/d to 5.8 million b/d by 2030 as a result of increased production volumes and higher imported diluent requirements for these additional non-upgraded volumes (Figure 2.5).

2.5 Crude Oil Production and Supply Summary

The production outlook in eastern Canada from offshore Atlantic Canada is expected to be stable at levels above 200,000 b/d until 2024, supported by production from satellite fields and the Hebron project starting up in 2017. This outlook has been revised slightly upward to reflect the Canada-Newfoundland and Labrador Offshore Petroleum Board's latest, higher reserve estimate for the Terra Nova field.

CAPP's 2013 production forecast predicts continued strong growth in western Canada and is higher than the previous outlook by 500,000 b/d by the end of the outlook in 2030. This is due to upward revisions primarily in the conventional category but also better performance from the oil sands than previously anticipated, specifically from *in situ* projects. The overall Canadian picture in terms of the supply outlook is 820,000 b/d higher in 2030 due to the cumulative effects of higher production, lower yield losses associated with less upgrading, and higher volumes of imported condensates needed to blend with the greater volumes of non-upgraded bitumen being produced.

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3 | CRUDE OIL MARKETS

Given the growing production outlook discussed in the previous section, the need to reach new markets is a top priority for Canadian oil producers. This chapter examines the demand outlook for Canadian crude oil and reports on the new developments in both traditional and potential markets that could be reached. Figure 3.1 shows the relative demand for crude oil in the major refining regions in Canada and the United States. The Gulf Coast is a key target market in North America for Canadian producers due to the large amount of refining capacity and the ability to process heavy crude oil. There are also other opportunities in eastern Canada, particularly the refineries in Québec and the Atlantic provinces. New market opportunities are also emerging as a result of growing demand in Asia.

Figure 3.1 Canada and U.S. Market Demand for Crude Oil in 2012 by Source

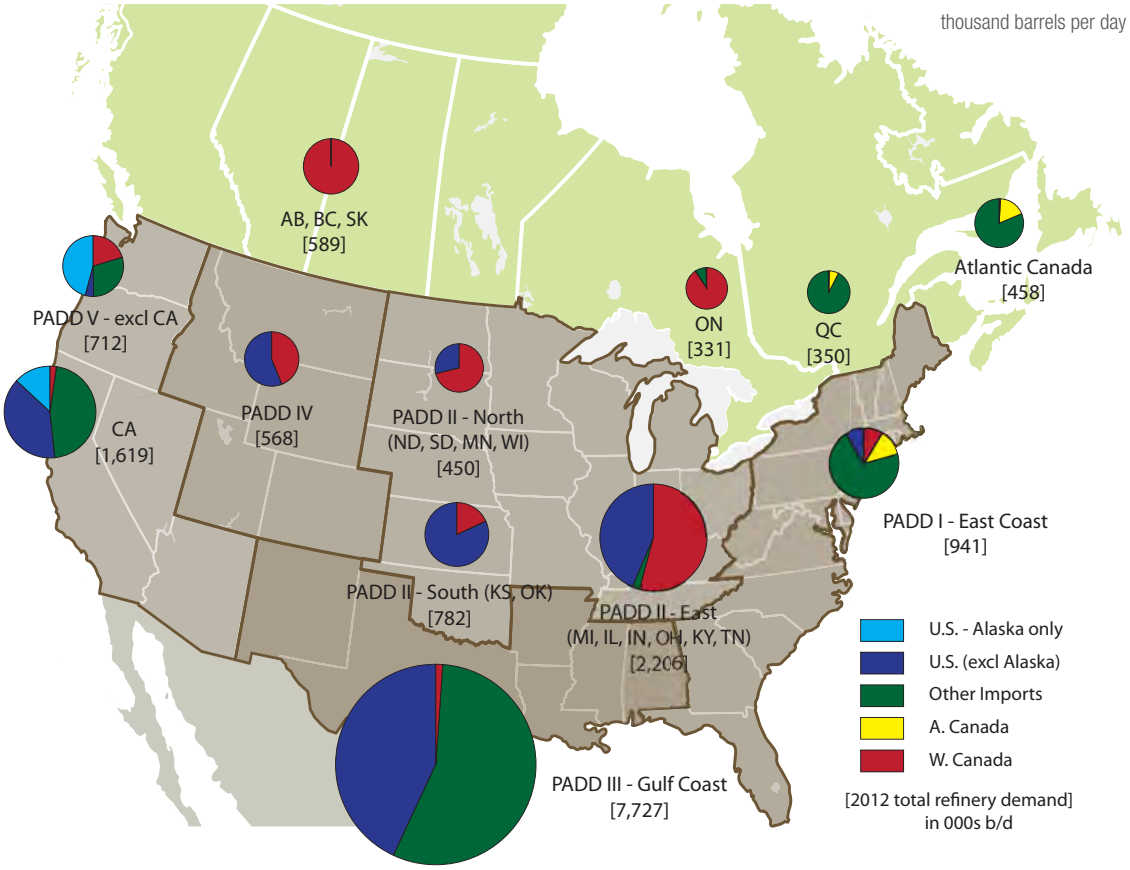

Sources: CAPP, CA Energy Commission, EIA, Statistics Canada

In 2012, Canadian refineries processed 894,000 b/d of western Canadian crude oil. The remaining 2.3 million b/d or 72 per cent of available supplies was exported (Figure 3.2). PADD II is the largest regional market for western Canadian crude oil. Depending on the development of various rail and pipeline projects, refineries in eastern Canada have indicated a potential doubling of current demand for western Canadian crude oil by 2020. In addition, demand from refineries in the U.S. Gulf could reach over 1 million b/d.

3.1 Canada

Canadian refineries have the capacity to process almost 2 million b/d of crude oil. However, only about 60 per cent of the crude oil processed in Canada is sourced from domestic production since refineries in eastern Canada have only limited access to western Canadian crude oil supplies. In 2012, Canadian refineries processed 894,000 b/d of western Canadian crude oil; 110,000 b/d of crude oil produced in eastern Canada; and 722,000 b/d of foreign imports. The current oil pipeline network exiting western Canada is connected to refineries in western Canada and Ontario. Based on data from Statistics Canada, in the last two years, Québec refineries have received small volumes of western Canadian crude while Atlantic Canada refineries received crude oil from western Canada for the first time in July 2012. Some refineries are developing transportation solutions involving rail and/or trucks to diversify their supply portfolio. The domestic demand for western Canadian crude oil is expected to increase to 1.3 million b/d by 2020 as a result of planned refinery expansions and future transportation infrastructure developments.

3.1.1 Western Canada

The eight refineries located in western Canada have a total refining capacity of 683,000 b/d. In 2012, they refined 589,000 b/d of crude oil that was sourced exclusively from western Canada. By 2020, western Canadian crude oil should remain the sole feedstock for these refineries and demand is expected to increase by 86,000 b/d to 675,000 b/d (Figure 3.3). Future additional crude oil receipts are related to a debottlenecking project at the Moose Jaw refinery, expansion plans at the Consumers' Co-operative Complex refinery, which are both located in Saskatchewan, and the startup of the Sturgeon refinery near Redwater in Sturgeon County, about 45 km northeast of Edmonton, Alberta. The Moose Jaw refinery is an asphalt refinery while the other refineries produce a wide range of petroleum products.

Figure 3.2 Market Demand for Western Canadian Crude Oil: Actual 2012 and 2020 Additional

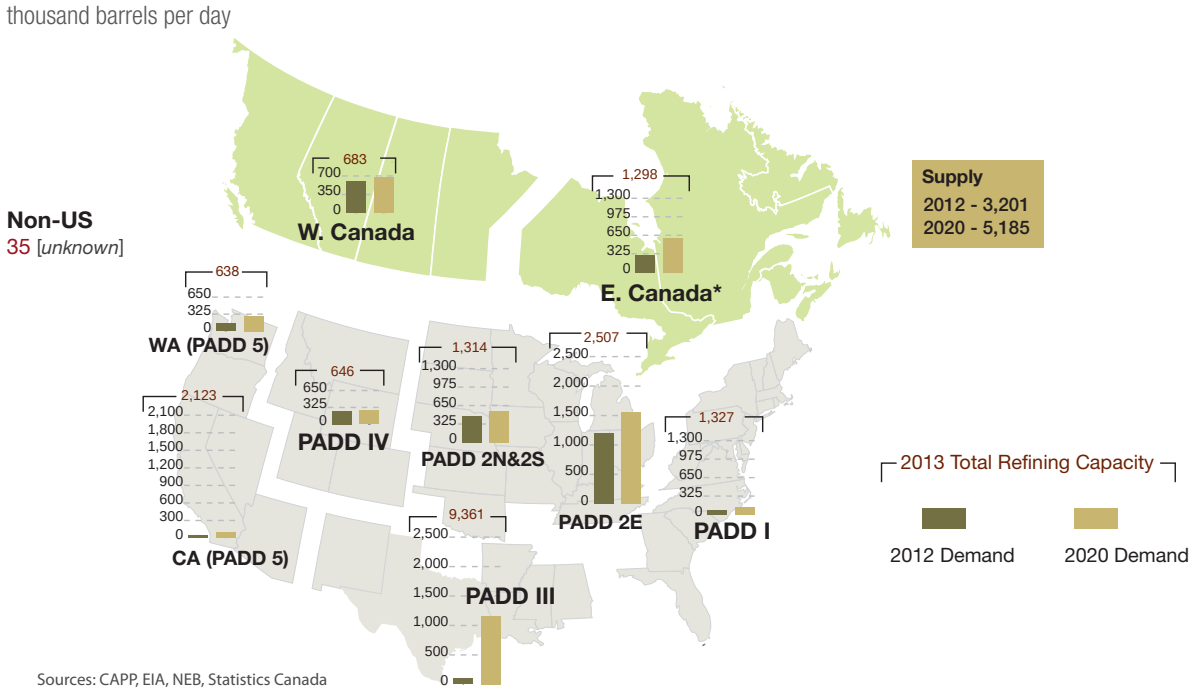

Sources: CAPP, EIA, NEB, Statistics Canada

* E.Canada demand for W. Canadian crude oil in 2012 consisted almost entirely of receipts from Ontario. Projected receipts in 2020 include growth from Québec and Atlantic provinces.

Note: 2012 demand exceeds available supply likely due to factors such as inventory adjustment and data discrepancies in information collection.

Figure 3.3 Western Canada:
Crude Oil Receipts from Western Canada

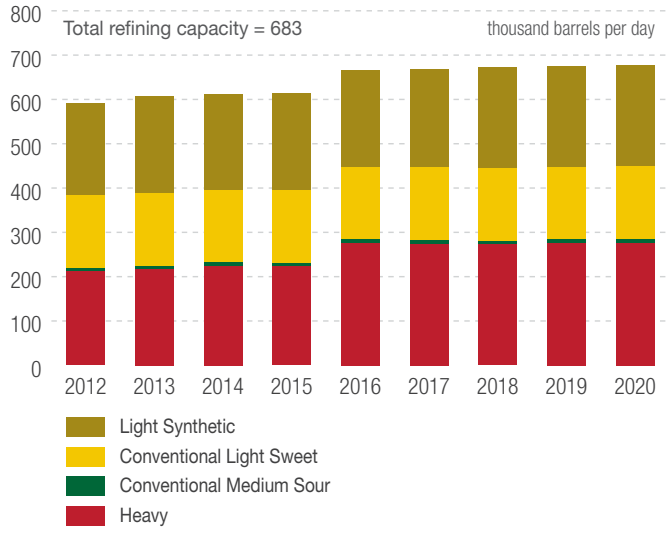

Source: 2013 CAPP Refinery Survey

North West Redwater Partnership's proposed Sturgeon refinery will take bitumen feedstock with its first phase designed to process 50,000 b/d. Partners are North West Upgrading Inc. and Canadian Natural Upgrading Ltd., a wholly owned subsidiary of Canadian Natural Resources Ltd. The Alberta Petroleum Marketing Commission, an agent of the province of Alberta, will supply 75 per cent of the feedstock under 30-year processing agreements and Canadian Natural will supply the rest. The suppliers will receive proportionate shares of the products. Construction is planned to start in spring of 2013 and projected to take three years. Two additional phases that would each provide capacity of 50,000 b/d are envisioned for the refinery. The main product will be ultralow-sulphur diesel.

Newspaper publisher, David Black has announced a proposal to build a $13 billion, world-scale, export refinery in Kitimat, British Columbia. The refinery would be designed specifically to process DilBit and would be capable of processing 550,000 b/d; it could be operating by 2020.

3.1.2 Eastern Canada

Total capacity of refineries in eastern Canada is about 1.3 million b/d and includes the refineries located in Ontario, Québec and Atlantic Canada. In 2012, western Canada supplied 340,000 b/d to these refineries amounting to only 29 per cent of total refinery demand. Almost all of these receipts were delivered to Ontario. It should be noted, however, that the refineries in the other eastern provinces have just started to receive western Canadian supplies via rail. By 2020, overall demand in this market for western Canadian crude oil is expected to increase significantly if the Enbridge Line 9 reversal project and the TransCanada Energy East project proceed (Figure 3.4).

Figure 3.4 Eastern Canada:
Crude Oil Receipts from Western Canada

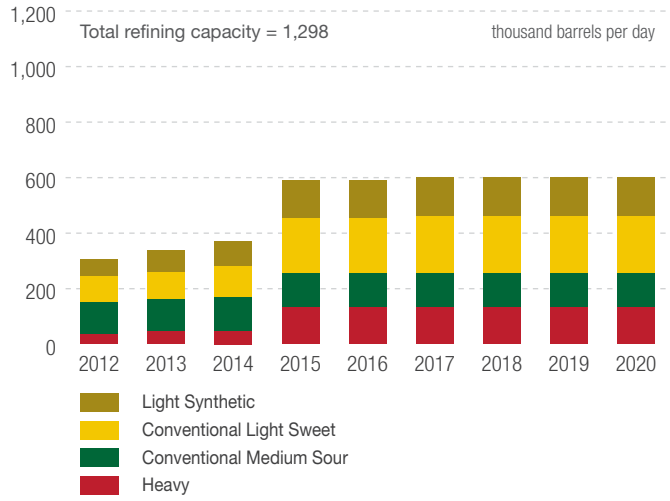

Source: 2013 CAPP Refinery Survey

Ontario

The four refineries located in Ontario have a combined refining capacity of 393,000 b/d. The Nova Chemical refinery and petrochemical complex, located in Sarnia, is not included in this number as crude oil is not the primary feedstock. The majority of the crude processed at the Ontario refineries is sourced from western Canada but they also refine some foreign imported crude oil and crude oil transferred from Atlantic Canada. The supply from the latter two sources arrive on the Atlantic seaboard by tanker and are then transported through the Portland-to-Montréal Pipeline before being transported on the Enbridge Montréal-to-Sarnia Pipeline (Line 9).

Enbridge plans to re-reverse the direction of Line 9 to flow east from Sarnia, Ontario to Montréal, Québec. It is already in the process of of reversing the first phase of the project which would enable crude oil to flow east from Sarnia to North Westover, Ontario in 2013. Once in service, this first phase could provide light crude oil to Imperial's refinery in Nanticoke, Ontario. Refer to Section 4.6 for details on oil pipelines to Eastern Canada. Ultimately, all refineries in the region will have access to a variety of sources and will select their feedstock based on availability and price.

According to Statistics Canada, Ontario refineries received 366,200 b/d of crude oil. A further breakdown of these supplies shows 336,700 b/d (92 per cent) from domestic sources; 17,700 b/d (5 per cent) from the North Sea; 3,800 b/d (1 per cent) from Venezuela; 1,700 b/d (0.5 per cent) from the U.S.; and 6,400 b/d (2 per cent) from other foreign sources.

Québec & Atlantic Provinces

Québec has two refineries with a combined capacity of 402,000 b/d while the three Atlantic refineries have total capacity of 503,000 b/d. The crude oil processed at these refineries generally originates from either Atlantic Canada or foreign sources. Of note, Statistics Canada data indicated that the Québec refineries have received small volumes of western Canadian crude since 2011. Valero has recently announced plans to build rail off-loading facilities at its refinery in Levis, Québec in order to receive more volumes of light western Canadian crude oil. Despite the considerable distance, Atlantic Canada also received western Canadian crude oil deliveries in 2012 by rail. These refineries are designed to process mostly light crude oil.

If Enbridge's Line 9 re-reversal proposal is successful, western Canadian crude oil could be transported by pipeline to Montréal and then further in the province by alternative modes of transport. Refineries in these provinces would have access to the growing light oil production from both western Canada and the U.S. Bakken in Montana and North Dakota. Once crude oil reaches Montréal, companies could barge oil from there to Québec City, and potentially even ship it by rail to the Irving refinery in Saint John, New Brunswick. In the meantime, the Irving refinery is expected to receive a regular supply of Bakken crude oil by rail. Its first shipment, in June 2012, was 72,000 barrels aboard a 102 car unit train. By 2018, TransCanada's Energy East pipeline project proposes to provide pipeline access from western Canada to Québec City and all the way to Saint John, New Brunswick.

3.2 United States

Canada and the U.S. are natural trading partners due to their geographic proximity. Canada is the top foreign supplier of crude oil to the U.S. while the U.S. is almost Canada's only market. New U.S. production from enhanced drilling programs in the shale and tight oil plays in the Eagle Ford and Permian basins in Texas and Bakken in North Dakota, have caused a displacement of foreign imports of light crude oil. Despite this fact, imports from Canada grew by 200,000 b/d or 9 per cent versus 2011. Growing western Canadian crude oil supplies are predominately heavy crude oil, therefore, the U.S. Gulf Coast refineries, with their substantial heavy oil processing capabilities, remain a key target market.

The U.S. Department of Energy divides the 50 states into five market regions termed the Petroleum Administration of Defense Districts or PADDs. These PADDs were originally created during World War II to help allocate fuels derived from petroleum products. Today, this delineation continues to be used to describe the U.S. market regions.

3.2.1 PADD I (East Coast)

Since a portion of previously idled refinery capacity restarted in 2012, the refining capacity on the U.S. East Coast now totals 1.3 million b/d. The 10 refineries that form this capacity are located in the states of Delaware, Georgia, New Jersey, Pennsylvania, and West Virginia. Table 3.1 summarizes the refining capacity developments in this region.

Most of the refineries in the region process light sweet crude (Figure 3.5). In 2012, imports of foreign crude oil by refineries in PADD I totaled 941,000 b/d, which is significantly lower than in 2011. This decline was due to a combination of some refining capacity being idled for most of the year and some displacement of foreign imports with growing domestic supplies. In 2013, there should be an increase in the total volumes processed in the region given that some previously idled refineries have returned to operations (Table 3.1). The boom in U.S. shale has presented a new source of supply for refineries in this region.

Table 3.1 Summary of Recent Refinery Developments in PADD I

Operator	Location	Current Capacity (thousand b/d)	Scheduled In-Service	Description
Monroe Energy LLC	Trainer, PA	185	restarted Sep 2012 (previously idled since Sep 2011)	Monroe Energy LLC, a wholly owned subsidiary of Delta Airlines, purchased the idled refinery in April 2012; The transaction closed in Sep 2012 and the refinery has restarted.
PBF Energy	Delaware City, DE	190	restarted Oct 2011	PBF purchased the refinery in an idled state from Valero in June 2010. The refinery was idle from Nov 2009 to Oct 2011.
Philadelphia Energy Solutions	Philadelphia, PA	330	July 2012	Although it continued operations, Sunoco had announced that it would close the refinery if no buyer was found. In July 2012, the Carlyle Group announced a 50/50 joint venture with Sunoco to create Philadelphia Energy Solutions, a new entity that would own and operate the refinery.
Sunoco	Marcus Hook, PA	175 (loss)	shutdown Feb 2012	The refinery was idled since Dec 2011. Sunoco shut down the refinery in Feb 2012.

Figure 3.5 2012 PADD I: Foreign Sourced Supply by Type and Domestic Crude Oil

Total refining capacity** = 1,327 thousand barrels per day

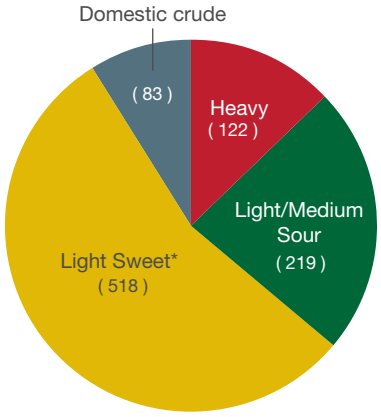

* Includes small volumes of Medium Sweet
** Capacity as of Jun 2013; two refineries were idled in late 2011
Source: EIA

The east coast refineries are primarily supplied by waterborne crude delivered from the U.S. Gulf Coast and internationally-sourced crude. However, with the development of new rail unloading facilities, a number of the east coast refineries have growing access to Bakken crude oil produced in North Dakota. Phillips 66 and PBF Energy have signed agreements for Bakken crude supplies for its east coast refineries. There was also speculation that growing production from the Utica shale would present another prospect for increased domestic supplies of crude in the future. Given the fact these volumes would originate in Ohio, these crude oil supplies would need to travel a much shorter distance by rail to reach refineries on the east coast. However, recent reports suggest that the future potential from the Utica shale is more gas prone.

PADD I refineries imported 194,300 b/d of crude oil from Canada in 2012. About 64,800 b/d was sourced from western Canada and was primarily delivered to the United refinery in Warren, Pennsylvania.

Imports of heavy crude oil from western Canada could rise in the next few years via deliveries by rail. PBF Energy has made significant investments in its rail unloading facilities in 2012 for its Delaware refinery and intends to expand this capacity in 2013. PBF Energy's current rail unloading facility has 110,000 b/d of capacity comprised of about 40,000 b/d of heavy crude oil capacity and 70,000 b/d for light crude oil. The company also plans to increase heavy unloading capacity by another 40,000 b/d by Q4 2013. Although PBF Energy's Paulsboro refinery does not have a rail unloading facility, crude oil could be moved by barge from the Delaware facility up river to Paulsboro.
PBF Energy's Paulsboro and Delaware City refineries and NuStar Energy's asphalt refinery in New Jersey are the only refineries on the east coast with the coking capacity to process heavy bitumen blends from western Canada.

3.2.2 PADD II (Midwest)

Over 3.8 million b/d of refining capacity is located in PADD II. In 2012, these refineries received 1.7 million b/d of foreign sourced crude oil, almost all of which was from western Canada and were predominantly heavy supplies (Figure 3.6). In 2012, this market absorbed almost all of the growth in western Canadian supplies.

Figure 3.6 2012 PADD II: Foreign Sourced Supply by Type and Domestic Crude Oil

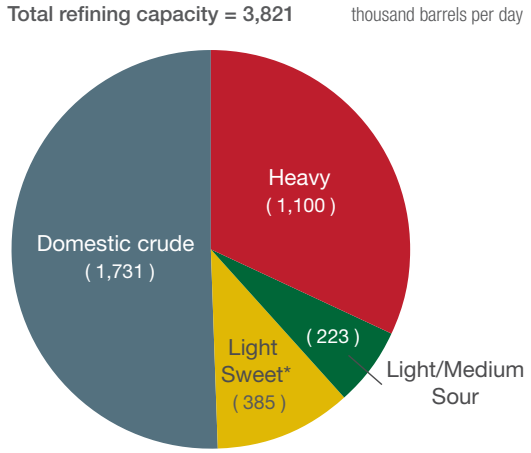

* Includes small volumes of Medium Sweet
Source: EIA

PADD II can be further divided into the Northern, Eastern, and Southern PADD II states. The primary market hubs within PADD II are located at Clearbrook, Minnesota for the Northern PADD II states; Wood River-Patoka, Illinois area for the Eastern PADD II states; and Cushing, Oklahoma for the Southern PADD II states.

The Midwest region is currently Canada's largest market due to its close proximity, large size and established pipeline network. However, this traditional market has become saturated as evidenced by the high level of inventories from growing domestic production and imports from western Canada. A number of refineries have recently been upgraded to increase the heavy oil processing capacity in the region, which accounts for most of the expected growth in heavy oil demand.

Northern and Southern PADD II

There are four refineries in Northern PADD II; two that are located in Minnesota, and one each in North Dakota and Wisconsin. These refineries have a combined capacity of 507,000 b/d. In 2012, imports from western Canada totaled 320,000 b/d and were the only source of foreign imports. These foreign imports comprised over 70 per cent of the total crude oil feedstock demand in the region. Approximately 89 per cent of these volumes were heavy crude oil supplies.

The seven refineries in Southern PADD II, all of which are located in Kansas or Oklahoma, account for a combined capacity of 807,000 b/d. Almost all of the foreign imports into the region were also sourced from western Canada but in contrast to Northern PADD II, U.S. domestic production satisfies most (over 80 per cent) of the feedstock demand for these refineries. The majority, or 66 per cent, of the 142,000 b/d of western Canadian crude oil imports were heavy oil supplies.

Given the small relative size of these two markets and increased competition with U.S. light oil production the growth in demand for western Canadian crude oil is limited. It is forecast to grow by 100,000 b/d by 2020 (Figure 3.7).

Figure 3.7 PADD II (North & South): Crude Oil Receipts from Western Canada

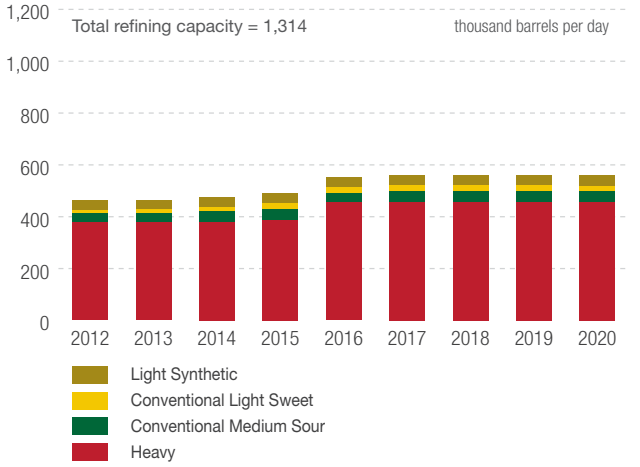

Source: 2013 CAPP Refinery Survey

Table 3.2 Summary of Recent Refinery Upgrades in Northern PADD II

Operator	Location	Current Capacity (thousand b/d)	Scheduled In-Service	Description
Northern Tier Energy LP	St. Paul Park, MN	82	Completed May 2013	A 10% expansion of its crude distillation unit. Capacity increased from 72,000 b/d.
Tesoro	Mandan, ND	68	Completed June 2012	Increased crude capacity by 10,000 b/d to 68,000 b/d to process more Bakken crude oil.

Table 3.3 Summary of Recent Refinery Upgrades in Eastern PADD II

Operator	Location	Current Capacity (thousand b/d)	Scheduled In-Service	Description
WRB Refining	Roxana, IL	306	Completed Nov 2011	New 65,000 b/d coker; increased total crude oil refining capacity by 50,000 b/d and heavy oil capacity to 240,000 b/d.
BP	Whiting, IN	413	2H 2013	Construction of 70,000 b/d new coker and a new crude distillation unit. The modernized refinery will have the capacity to process up to 85% heavy crude vs 20% currently
Marathon	Detroit, MI	120	Completed Nov 2012	Increase heavy oil processing capacity by 80,000 b/d; total crude oil refining capacity increased by 14,000 b/d.

Eastern PADD II

The total refining capacity in Eastern PADD II is over 2.5 million b/d from 13 refineries located throughout the six states of Michigan, Illinois, Indiana, Kentucky, Tennessee and Ohio. In 2012, this market collectively imported over 1.2 million b/d of crude oil supplies, of which 97 per cent were sourced from western Canada. Imports of heavy western Canadian crude oil are estimated to increase from current levels by over 400,000 b/d by 2020 (Figure 3.8) with the completion of a number of previously announced refinery projects designed to increase heavy oil processing capacity at various refineries. Although the BP refinery in Whiting, Indiana is anticipated to come on stream in the second half of 2013, the refinery is not expected to operate its full heavy processing capacity until 2014. Table 3.3 summarizes the recent and upcoming refinery upgrades announced for Eastern PADD II.

Figure 3.8 PADD II (East): Crude Oil Receipts from Western Canada

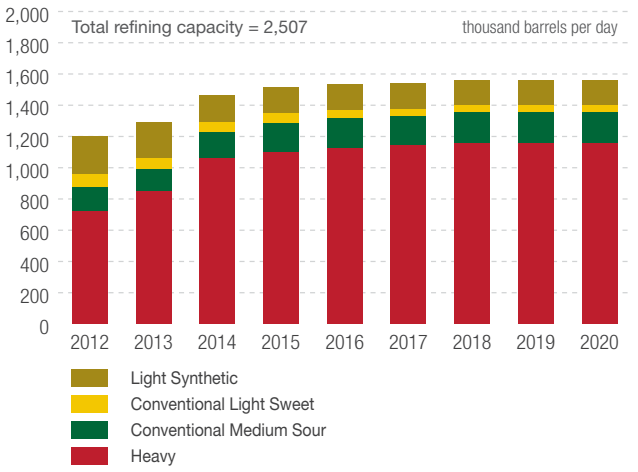

Source: 2013 CAPP Refinery Survey

3.2.3 PADD III (Gulf Coast)

The U.S. Gulf coast area has a capacity of 9.4 million b/d from 50 refineries. Refineries are located in Alabama, Arkansas, Louisiana, Mississippi, New Mexico and Texas. Louisiana and Texas account for the vast majority of refining capacity in this region with 8.6 million b/d.

Foreign imports of crude oil totaled 4.4 million b/d in 2012, of which 2.2 million b/d was heavy crude oil. Only 100,000 b/d of western Canadian crude was able to reach the U.S. Gulf Coast region due to limited pipeline infrastructure. As a result of surging production from U.S. shale and tight oil plays such as the Eagle Ford and Permian Basin in Texas, some refineries along the U.S. Gulf Coast no longer import light-sweet crude since domestic production is available to fill their feedstock requirements. Venezuela, Mexico, Columbia and Brazil collectively account for 88 per cent of all heavy imports into the region, with Mexico and Saudi Arabia each accounting for 22 per cent and Venezuela following closely at 20 per cent. Crude oil imports from Saudi Arabia consist mostly of light and medium sour crude oil types. The opportunity for growing supplies from western Canada lies in the displacement of heavy imports that does not directly compete with U.S. domestic production, which is primarily comprised of light crude oil. In addition, some refineries are also contemplating blending Canadian heavy crude oil with Eagle Ford light oil to create a medium sour crude oil that could displace additional offshore imports (Figure 3.9).

Figure 3.9 2012 PADD III: Foreign Sourced Supply by Type and Domestic Crude Oil

Total refining capacity = 9,361 thousand barrels per day

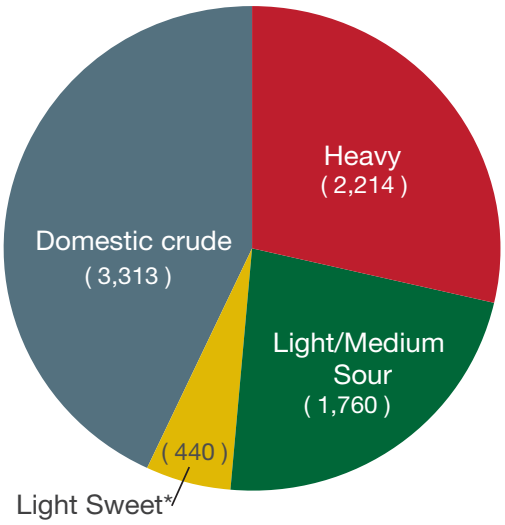

* Includes small volumes of Medium Sweet
Source: EIA

Crude oil imports from Mexico fell by 130,000 b/d to below 1 million b/d for the first time since 1994, reflecting the steady decline in Mexico's crude oil production. Venezuelan imports have declined 27 per cent from 2005 levels to 906,000 b/d in 2012, a trend that will likely continue as Venezuela increases exports to China.

Despite Venezuela having the world's largest reserves of crude oil and announcing projects designed to increase production capacity by over 2 million b/d, growth in Venezuelan production will be difficult to achieve. There has been substantial under investment in the oil industry as a result of diverting oil revenues to fund social programs and considerable investments will be needed to just offset the decline in production from the mature fields. If there is no substantial growth in production, exports to the U.S. will be limited as Venezuela has substantial supply commitments to China, Cuba, the Dominican Republic and Nicaragua.

There are three new pipeline projects planned for operations over the next three years that will be major conduits between western Canadian producers and the Gulf Coast market. By 2020, CAPP has estimated that this market could receive at least an additional 1.1 million b/d based on contractual commitments on the Keystone XL and Flanagan South pipelines.

Table 3.4 summarizes the recently completed major refinery upgrades and future upgrades announced for the region.

Table 3.4 Summary of Recent Refinery Upgrades in PADD III

Operator	Location	Current Capacity (thousand b/d)	Scheduled In-Service	Description
Motiva Enterprises	Port Arthur, TX	285	2012	Addition of new single-train distillation unit with capacity of 325,000 b/d that would increase total capacity to over 600,000 b/d. New 95,000 b/d delayed coker; 85,000 b/d catalytic reformer, 75,000 b/d.
Valero	McKee, TX	170	2014	Increase capacity by 25,000 b/d. Expansion will process WTI and locally produced crude oil.
Valero	Port Arthur, TX	310	Q3 2012	New hydrocracker.
Valero	Norco, LA	250	Q4 2012 completed	New hydrocracker. Recently completed FCC revamp. Ramp up to full operations by Q2 2013.
LyondellBasell Industries NV	Houston, TX	268	2015	Increase ability to process heavy crude oil from 60,000 b/d to 175,000 b/d.

3.2.4 PADD IV (Rockies)

There are 17 refineries throughout Colorado, Montana, Utah, and Wyoming representing the refining capacity in PADD IV. The total refining capacity in this market region is 646,000 b/d and all foreign imports are sourced from western Canada.

In 2012, PADD IV refineries processed 250,000 b/d of Canadian crude oil, representing 44 per cent of total feedstock requirements in the region. Receipts of heavy western Canadian supply are forecast to remain steady with slight growth in light synthetic volumes anticipated in 2013, which level off thereafter (Figure 3.10). If Canadian heavy crude oil continues to be priced at an attractive discount, refineries are expected to continue to take heavy volumes to optimize refinery configuration despite the light crude oil surplus in the region.

Figure 3.10 PADD IV: Crude Oil Receipts from Western Canada

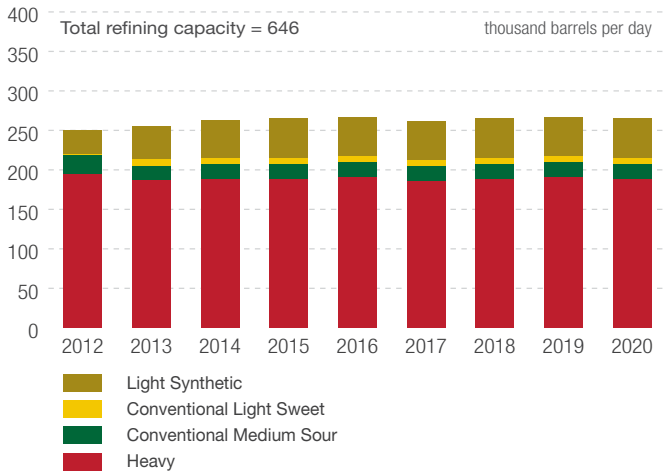

Source: 2013 CAPP Refinery Survey

3.2.5 PADD V (West Coast)

PADD V is geographically divided from the rest of the U.S. by the Rocky Mountains and this geographical isolation has affected the development of crude supply sources to the region. The states in PADD V that have refineries are Alaska, California, Hawaii, and Washington. These refineries are located in close proximity to production in California and Alaska and also have good access to tankers that can import crude from more distant regions. There is over 3.3 million b/d of refining capacity in the region. Foreign imports typically supply around 50 per cent of the crude oil feedstock demand (Figure 3.11) and this share is expected to supplement the declining production from Alaska.

Figure 3.11 2012 PADD V: Foreign Sourced Supply by Type and Domestic Crude Oil

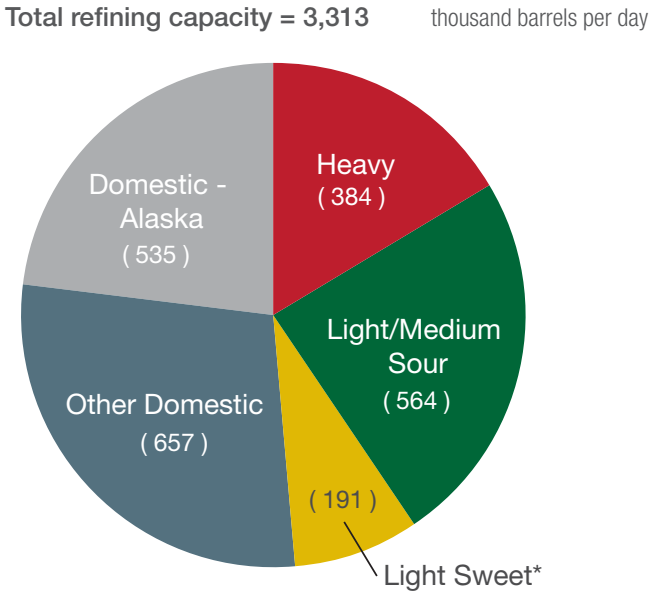

* Includes small volumes of Medium Sweet
Source: EIA

The following section only focuses on Washington and California as demand from the refineries in these states account for both current and future prospects for western Canadian crude oil in this region.

Washington

Refining capacity in Washington totals 638,000 b/d. There is no indigenous crude oil production within the state so its five refineries have been primarily supplied with Alaskan production delivered by tanker. However, Alaskan production has fallen dramatically from its peak in 1988 of over 2 million b/d to only 525,000 b/d in 2012. The Washington refineries have become increasingly dependent on foreign imports but some have also recently been able to start using rail to access some of the growing crude oil production supply in North Dakota.

In 2012, Washington refineries received 241,000 b/d of foreign imports, 81 per cent of which was supplied by the top three sources – Canada (60 per cent); Russia (13 per cent); and Angola (8 per cent). Results from CAPP's refinery survey indicate crude oil demand from western Canada doubling in 2020 from current levels (Figure 3.12). This growth in demand relies on the successful construction of proposed pipeline projects that would reach the west coast. Refer to Section 4.5 Pipelines to the West Coast for details.

Figure 3.12 Washington: Crude Oil Receipts from Western Canada

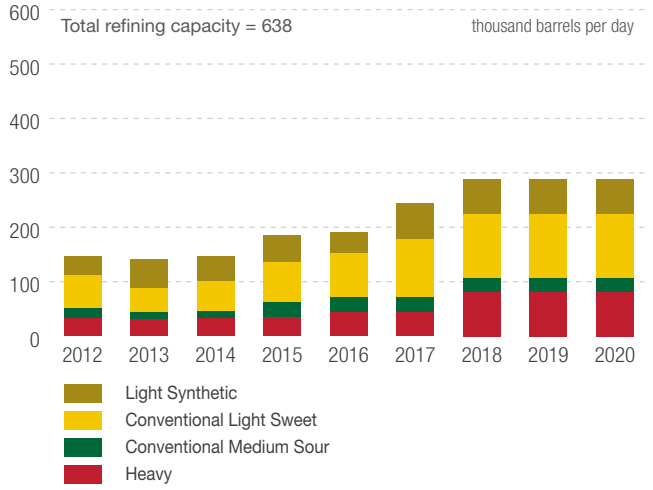

Source: 2013 CAPP Refinery Survey

In 2012, Washington started to receive deliveries of light sweet North Dakota Bakken crude oil by rail. Continued investment in rail facilities has been announced to primarily enable receipts of additional volumes from this supply source and accommodate deliveries from western Canada as well. Phillips 66 has announced plans to build a rail offloading facility at its Ferndale refinery to receive both Bakken and western Canadian crude oil.

California

California dominates PADD V in terms of state production and refining capacity. There are 16 refineries, almost all of which are located near the coast in the Los Angeles and the San Francisco Bay areas and contribute a total refining capacity of 2.1 million b/d. There is no direct pipeline access to neighboring producing regions so domestic supplies have historically come from indigenous supplies and shipments by tanker from Alaska.

The steady decline in California production seen since 1997 has stabilized in the last two years. Recent surveys from the U.S. EIA have indicated that 15.4 billion barrels of oil (64 per cent) of the total recoverable shale oil in the U.S. can be found in California. Notable plays include the Monterey Shale in southern and central California and the Kreyenhagen. Although California's potential growth in unconventional oil production is enormous, there are many challenges to overcome before significant commercial production develops. For example, an efficient regulatory framework still has to be developed, the appropriate stimulation techniques have to be identified and even then the costs of development could still be prohibitively high.

In the meantime, as Alaskan crude oil production continues to decline, an opportunity has risen for supplemental supplies to serve the state from the Bakken in North Dakota and potentially Canada. Western Canadian crude oil can reach this market either on the Trans Mountain pipeline to the Westridge dock or by rail to the west coast where it would be loaded onto tankers. The Enbridge Gateway pipeline and the Trans Mountain Pipeline Expansion projects represent future opportunities for greater Canadian access to the California market. Direct pipeline access to this market is unlikely due to its limited size but there could potentially be increased access through rail.

Development of rail terminal infrastructure has been slower in California than in Washington due to a more complicated permitting process. Tesoro has announced plans to unload trains in Washington and then transfer the crude to vessels for further distribution to its refineries in California by 2014. Valero has announced plans for rail unloading facilities at its refinery at Benicia, near San Francisco that is scheduled to be completed in mid-2014. The current plans are for receipts of up to 70,000 b/d of crude oil from North Dakota and Montana or western Canada.

In 2012, California refineries imported 784,400 b/d of crude oil from foreign sources (Figure 3.13). Almost two-thirds of these imports were sourced from Saudi Arabia (27 per cent); Ecuador (19 per cent); and Iraq (18 per cent). Canada accounted for only 5 per cent of total foreign imports.

Figure 3.13 2012 PADD V (California): Foreign Sourced Supply by Type and Domestic Crude Oil

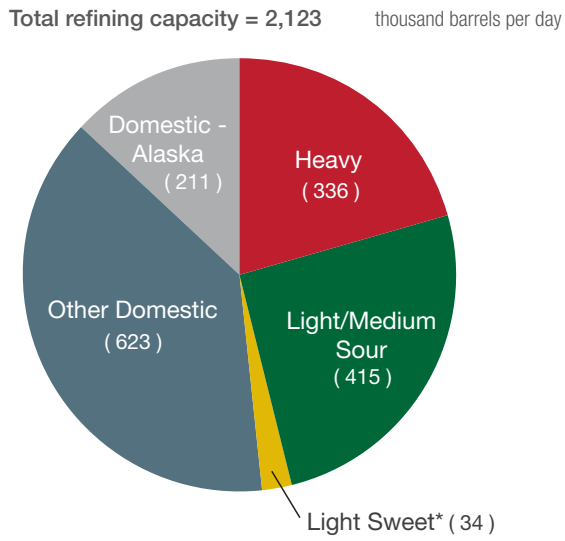

* Includes small volumes of Medium Sweet
Source: EIA and California Energy Commission

3.3 Asia

At an aggregate level, demand for oil in North America is either flat or even declining but the demand for crude oil and petroleum products in the Asia-Pacific countries comprises the fastest growing in the world. Table 3.5 shows oil demand from 2010 to 2013 in major Asian markets. Western Canadian oil producers are essentially land-locked and need tidewater access to gain market share in what is now the world's premium crude oil market. The earliest in service date for any of the proposed pipeline projects to the west coast to reach this market is at the end of 2017.

China and India are two of the fastest growing economies in the world and naturally, their demand for oil is growing accordingly (Figure 3.14). China's current ability to process large volumes of heavy crude oil from Canada may be limited but new refineries with high conversion capacity are being built due to China's higher demand for diesel fuel versus gasoline. Generally speaking, refineries able to process heavy crude oil can increase their production of diesel more easily than those configured to process light crude oil. Heavy crudes typically yield greater quantities of heavier and less valuable residual fuel oil. That residual fuel oil can then be converted to increase the yield of middle distillates such as diesel.

Indian Oil Corp., India's largest refining company has expressed interest in investing in Canada's oil sands with the intent to gain access to these supplies for export but the lack of transportation infrastructure, specifically pipelines, remains an obstacle. Continued delays in establishing tidewater access could translate into a foregone opportunity to serve these large markets.

Table 3.5 Total Oil Demand in Major Asian Countries

million b/d	2010	2011	2012	2013
China	8.85	9.23	9.60	9.98
India	3.37	3.52	3.65	3.74
Japan	4.46	4.48	4.73	4.56
Korea	2.27	2.23	2.27	2.27

Source: IEA Oil Market Report, April 2013

Figure 3.14 Net Oil Imports: Asia 2012 to 2030

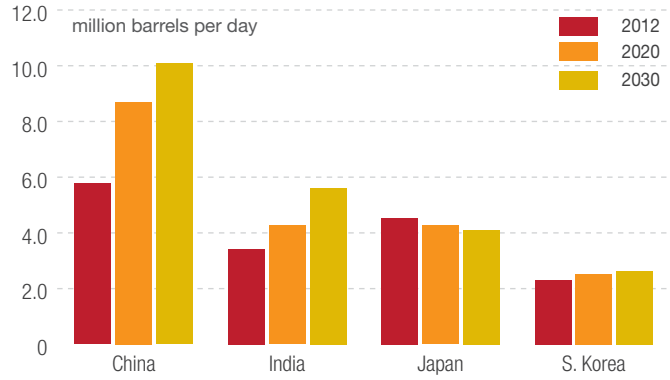

Source: EIA 2013 Annual Energy Outlook, Early Release

3.4 Markets Summary

The potential growth of western Canadian crude oil supplies exceeds the demand growth outlook in the whole of the North American market. The United States, given its geographic proximity will remain the primary market for western Canadian crude oil. In particular, Canadian producers need to extend their access to the Gulf Coast, which is the home of numerous complex refineries that account for over half of the total refining capacity in the nation. Besides the significant size of this market, most of these refineries are configured with the ability to process heavy western Canadian supplies. The development of rail infrastructure during the next two years will help to debottleneck transportation constraints and connect western Canadian crude oil to smaller niche markets such as eastern Canada, the U.S. East Coast and PADD V. On a global scale, the attention of producers is shifting away from the U.S. to Asian countries where demand is forecast to grow significantly. Canadian producers are aware of these changing market dynamics and continue to focus on developing all opportunities to extend or expand into new markets.

4 | CRUDE OIL PIPELINES

Crude oil in western Canada is essentially landlocked and will need additional transportation infrastructure to bring this steadily growing supply to markets. The transportation capacity available to deliver western Canadian crude oil supplies to markets is currently tight. This fact, combined with the phenomenal rise in U.S. production has contributed to the large price discounts on western Canadian crude oil relative to crude oil sold on world markets. There has been further development in a number of pipeline proposals and increased use of transportation by rail to connect growing Canadian production to markets. This chapter examines these proposals in more detail. Figure 4.1 shows major existing and proposed projects which provide take away capacity from the Western Canada Sedimentary Basin (WCSB) to key export markets including eastern Canada, Asia and the U.S. Gulf Coast.

Figure 4.1 Canadian and U.S. Crude Oil Pipelines - All Proposals

4.1 Existing Crude Oil Pipelines Exiting Western Canada

There are four major pipelines which move western Canadian crude out of the WCSB. The Enbridge Mainline and the Kinder Morgan Trans Mountain pipelines originate at Edmonton, Alberta. The Spectra Express and the TransCanada Keystone pipelines originate at Hardisty, Alberta. Together, these pipelines provide about 3.5 million b/d of capacity out of western Canada. In addition, a number of proposals have been announced that could increase this capacity during the next five years (Table 4.1). Currently capacity is tight. Operational and physical constraints can reduce available capacity to below stated capacity.

Table 4.1 Major Existing Crude Oil Pipelines and Proposals Exiting the WCSB

Pipeline	Capacity (thousand b/d)	Target In-Service
Enbridge Mainline	2,500	Operating since 1950
Enbridge Alberta Clipper Expansion	+120	Q3 2014
Enbridge Alberta Clipper Expansion	+230	Q1 2016
Kinder Morgan Trans Mountain	300	Operating since 1953
Trans Mountain Expansion	+590	Q4 2017
Spectra Express *downstream Platte operating since 1952	280	Operating since 1997*
TransCanada Keystone	591	Operating since 2010
TransCanada Keystone XL	+830	2015
Enbridge Northern Gateway	+525	Q4 2017
TransCanada Energy East	+525 to 850	Q4 2017
Total Existing Capacity		**3,548**
Total Proposed Capacity		**+2,820 to 3,145**

The following sections briefly summarize the existing pipeline projects. The proposed pipeline projects are discussed in the subsequent sections distinguished by the destination markets.

4.1.1 Enbridge Mainline

The Enbridge Mainline consists of numerous lines which deliver light and heavy crude oil as well as refined products from western Canada, Montana and North Dakota to markets in western Canada, the U.S. Midwest and Ontario. The Mainline connects with a number of pipelines in the U.S.: the Minnesota Pipeline at Clearbrook, Minnesota; Spearhead South and Flanagan South at Flanagan, Illinois; Chicap at Patoka, Illinois; Mustang at Chicago, Illinois and Toledo at Stockbridge, Michigan. The annual average receipt capacity from western Canada into the Mainline system is about 2.4 million b/d. However, the effective capacity is slightly less due to operational pressure restrictions on certain lines and physical constraints at terminals on the system.

There is also some U.S. production which enters the Enbridge Mainline and competes for capacity on the pipeline and in turn reduces the available capacity for crude oil from western Canada. The Enbridge North Dakota pipeline originates at Plentywood, Montana and ends at Clearbrook, Minnesota. It has a current capacity of 210,000 b/d which serves local markets and markets further east. Some U.S. crude oil production from the Bakken formation currently enters the Enbridge Mainline system at Clearbrook, Minnesota.

In response to significant growth in North Dakota and Montana, Enbridge is proposing an expansion of its North Dakota system. The project known as Sandpiper would include: a new 24-inch diameter pipeline from Beaver Lodge, North Dakota to Clearbrook, Minnesota with an incremental capacity of 225,000 b/d and a new 24-inch diameter pipeline from Clearbrook, Minnesota to Superior, Wisconsin with an initial capacity of 375,000 b/d. As part of the project scope, Enbridge would relocate the interconnection of the Enbridge North Dakota pipeline to the Lakehead System from Clearbrook, Minnesota. As a result, about 375,000 b/d of Bakken crude could enter the Enbridge Mainline at Superior, Wisconsin. The target in-service date for this project is January 2016.

The Enbridge Bakken Expansion project from Berthold, North Dakota to Cromer, Manitoba was put in service in March 2013. It provides 145,000 b/d of capacity to move U.S. Bakken crude into the Mainline destined for markets in the U.S. Midwest, Midcontinent and eastern Canada.

Enbridge Mainline Expansions - Alberta Clipper and Southern Access

Enbridge has planned two major expansions for its Mainline which will allow western Canadian crude to reach existing markets in the Midwest and Ontario and new markets in the U.S. Gulf Coast. The Alberta Clipper is a 36-inch diameter pipeline which extends from Hardisty, Alberta to Superior, Wisconsin. It is integrated with and forms part of the Enbridge Mainline.

The current capacity of the line is 450,000 b/d. Enbridge has received regulatory approval to expand the Alberta Clipper pipeline by 120,000 b/d. The target in-service date is Q3 2014. There are further plans to expand the line by an additional 230,000 b/d in Q1 2016. Upon completion of these expansions, the Alberta Clipper line will have reached its ultimate capacity of 800,000 b/d.

The Southern Access Pipeline is part of the Lakehead System (U.S. Mainline) and runs from Superior, Wisconsin to Flanagan, Illinois. The current capacity is 400,000 b/d. Enbridge has announced plans to expand the line by 160,000 b/d in Q3 2014. As part of its Light Oil Market Access program, Enbridge plans to increase capacity on the line by an additional 640,000 b/d in Q1 2015. Upon completion of these expansions, the Southern Access pipeline will have reached its ultimate capacity of 1.2 million b/d.

4.1.2 Spectra Express-Platte

In March 2013, Spectra Energy acquired the Express-Platte pipeline system from Kinder Morgan for $1.5 billion. The Express Pipeline is a 24-inch diameter pipeline that originates at Hardisty, Alberta and terminates at the Casper, Wyoming facilities on the Platte Pipeline. The pipeline capacity on Express is 280,000 b/d. In 2012, the average monthly throughput was 192,000 b/d versus 174,000 b/d in 2011. The ability to move crude on the Express pipeline is limited due to insufficient downstream capacity on the Platte pipeline.

The Platte Pipeline which is a 20-inch diameter pipeline moves crude oil from Western Canada, the Rockies (PADD IV), including the Bakken play area to refineries in the Midwest (PADD II). It runs from Casper, Wyoming to Wood River, Illinois. The capacity on the pipeline ranges from 164,000 b/d in Wyoming to 145,000 b/d in Illinois. In 2012, the average monthly deliveries into the Platte system were 216,000 b/d versus 193,000 b/d in 2011.

4.1.3 Kinder Morgan Trans Mountain

The Trans Mountain system is currently the only crude oil pipeline to Canada's west coast. It originates at Edmonton, Alberta, delivering both crude oil and petroleum products, to points in British Columbia, Washington, and the Westridge marine terminal. From the marine terminal located at Burnaby, British Columbia, crude oil is loaded onto vessels for offshore exports destined to California, the U.S. Gulf Coast and Asia.

The current capacity on the pipeline system is 300,000 b/d (assuming 20 per cent of the volumes being transported are heavy crude oil). Of the total capacity, 221,000 b/d is allocated to refineries with connections in British Columbia and Washington State and 79,000 b/d is allocated to the Westridge terminal for marine exports. Of the capacity designated to the marine terminal, 54,000 b/d or 68 per cent is underpinned by firm contracts and the remainder is available for spot shipments. Capacity on this pipeline has been in apportionment since late 2010.

4.1.4 TransCanada Keystone

The Keystone pipeline system originates at Hardisty, Alberta to Steele City, Nebraska. From this junction crude oil can be transported east to terminals in Wood River and Patoka, Illinois or south to Cushing, Oklahoma. The pipeline system can deliver a total of 590,000 b/d between the two routes. The pipeline started up in June 2010 while the Cushing extension came online in February 2011. About 530,000 b/d of capacity is contracted.

4.2 New Regional Infrastructure Projects in Western Canada

The major pipelines which move western Canadian crude out of the basin are investing significant capital in regional pipeline infrastructure to move incremental production to markets. The upstream expansions into Hardisty, Alberta could feed the Enbridge Mainline, Keystone, Keystone XL and the proposed TransCanadaEnergy East Pipeline into Eastern Canada.

4.2.1 Enbridge - Alberta Regional Pipeline

Enbridge - Edmonton to Hardisty

Enbridge is proposing to build a 36-inch diameter pipeline from Edmonton to Hardisty with a capacity of 800,000 b/d. The project includes five new tanks and terminal facilities at the Edmonton South terminal. The estimated cost is $1.8 billion. A regulatory application was submitted in December 2012 and the NEB has indicated that it would complete its review by April 2014, at the latest, in accordance with legislated time limits. The target in-service date is 2015.

4.2.2 TransCanada - Alberta Regional Pipelines

Heartland Pipeline and Terminal

TransCanada is proposing a 36-inch diameter pipeline from Heartland to Hardisty, Alberta the initiating point of its Keystone pipeline system with an ultimate capacity of 900,000 b/d. Heartland is an industrial area north of Edmonton, Alberta. At Hardisty, Alberta the pipeline would have connections to Keystone, Keystone XL and Energy East and Hardisty infrastructure. At the Heartland terminal, there will be up to 1.9 million barrels of tankage capacity available. The target in-service date for the Heartland pipeline is the second half of 2015.

Grand Rapids Pipeline Project

TransCanada announced a partnership with Phoenix Energy Holdings Limited (Phoenix) to develop the Grand Rapids Pipeline in northern Alberta. Each party will own 50 per cent of the proposed pipeline system. The project includes both a crude oil line and a diluent line between the producing area northwest of Fort McMurray and Heartland. The system could move up to 900,000 b/d of bitumen blend and up to 330,000 b/d of diluent. TransCanada anticipates filing a regulatory application in Q2 2013. The project has a target in-service date of 2017. TransCanada will operate the pipeline and Phoenix has entered into a long-term commitment to ship crude oil and diluent on the pipeline system.

4.3 Oil Pipelines to the U.S. Midwest

The U.S. Midwest is the largest market for western Canadian crude oil. The key market hubs in this region are located at Wood River and Patoka in Illinois and at Cushing, Oklahoma. Table 4.2 summarizes the pipelines which deliver Canadian crude oil to the Midwest.

4.3.1 Spectra Express-Platte

See Section 4.1.2.

4.3.2 TransCanada Keystone

See Section 4.1.4.

4.3.3 Southern Access Extension

Enbridge is proposing an extension to its Southern Access line which would run from Flanagan, Illinois to Patoka, Illinois. Enbridge will be holding a second open season in Q2 2013 to determine interest from shippers. The pipeline size and capacity will be determined following the open season. The target in-service date is Q2 2015.

4.3.4 Enbridge Line 6B

As part of Enbridge's Eastern Access Phase 2 program a segment of Line 6B will be replaced, from Ortonville, Michigan to the U.S. / Canada, border which would increase capacity from 240,000 b/d to 500,000 b/d in 2014. An expansion of the Line 6B between Chicago, Illinois and Stockbridge, Michigan from 500,000 b/d to 570,000 b/d will occur in 2016.

4.3.5 Minnesota Pipeline System

The Minnesota Pipeline system runs from Clearbrook, Minnesota to the Twin Cities. It is operated by Koch Pipeline Company. The pipeline delivers crude to the Northern Tier refinery in St. Paul Park and the Pine Bend refinery owned by Flint Hills in Rosemont. The system has a current capacity of 465,000 b/d that can be expanded to 650,000 b/d.

Table 4.2 Summary of Crude Oil Pipelines to the U.S. Midwest

Pipeline	Originating Point	Destination	Status	Capacity (thousand b/d)
Minnesota Pipeline	Clearbrook, MN	Minnesota refineries	Operating	465
Enbridge Mainline	Superior, WI	various delivery points via L5, L6, L14/64, Spearhead North Flanagan, IL	Operating	1,551
Southern Access Expansion	Superior, WI	Flanagan, IL	Proposed - Q3 2014	+70
Southern Access Expansion			Proposed - Q1 2015	+260
Enbridge Spearhead North	Flanagan, IL	Chicago, IL	Operating	130
Spearhead North Expansion			Proposed - Q4 2013	+105
Enbridge Spearhead North Twin	Flanagan, IL	Chicago, IL	Proposed - Q3 2015	+570
Enbridge Spearhead South	Flanagan, IL	Cushing, OK	Operating	193
Enbridge Flanagan South	Flanagan, IL	Cushing, OK	Proposed - Q3 2014	+585
Enbridge Mustang	Lockport, IL	Patoka, IL	Operating	100
Spectra Express-Platte	Guernsey, WY	Wood River, IL	Operating	145
TransCanada Keystone	Hardisty, AB to Steel City, NE	east to Patoka, IL / Wood River, IL or south to Cushing, OK	Operating	591

4.3.6 Koch Wood River

The Minnesota refineries receive western Canadian crude oil via connections to the Enbridge system as well as via deliveries from the Express-Platte pipeline system to Wood River, Illinois and a connection to the Wood River Pipeline. In January 2013, Koch Pipeline filed its tariff with the FERC advising the line is being purged and that nominations will no longer be accepted and that the tariff was to remain in effect until linefill was delivered and the tariff cancelled.

4.3.7 Spearhead

The Spearhead Pipeline receives crude oil from the Enbridge Mainline and originates at Flanagan, Illinois. From there, crude oil can be transported to Griffith, Indiana via Spearhead North (commonly referred to as Line 62) or to Cushing, Oklahoma on Spearhead South (commonly referred to as Line 55). The current capacity on Spearhead North is 130,200 b/d. It will expanded by 104,800 b/d to 235,000 b/d by the end of 2013. As part of its Light Oil Market Access, Enbridge is considering a twin of the Spearhead North line along the existing pipeline which would provide an incremental capacity of 570,000 b/d by Q3 2015.

The current capacity on Spearhead South is 193,000 b/d. The proposed Flanagan South Pipeline Project discussed in section 4.4 would provide an additional 585,000 b/d along this pipeline corridor in 2014.

4.3.8 Enbridge Toledo Pipeline Expansion

The 16-inch diameter pipeline runs from Stockbridge, Michigan to Toledo, Ohio and has a capacity of 100,000 b/d. In May 2013, Enbridge completed construction of a new 20-inch diameter pipeline which added 80,000 b/d. A total capacity of 180,000 b/d is now available to satisfy refineries in Toledo, Ohio and Detroit, Michigan. This pipeline is commonly referred to as Line 7.

4.4 Oil Pipelines to the U.S. Gulf Coast

The Gulf Coast represents the most significant opportunity for market growth for heavy Canadian crude oil supplies in North America. Refineries in the region rely on domestic supply and imports primarily from Mexico, Saudi Arabia, and Venezuela to meet their requirements.

Table 4.3 Summary of Crude Oil Pipelines to the U.S. Gulf Coast

Pipeline	Originating Point	Destination	Status	Capacity (thousand b/d)
ExxonMobil Pegasus	Patoka, IL	Nederland, TX	Operating	96
Seaway Seaway Twin Line	Cushing, OK	Freeport, TX	Operating Proposed - Q1 2014	400 +450
TransCanada Keystone XL *TransCanada Cushing Extension* *TransCanada Gulf Coast*	Hardisty, AB *Steele City, NE* *Cushing, OK*	Steele City, NE *Cushing, OK* *Nederland, TX*	Proposed - 2015 *Operating* *Proposed - Q4 2013* *Proposed - TBD*	 +700 +130
Enbridge/Energy Transfer Eastern Gulf Crude Access	Patoka, IL	St, James, LA	Proposed - Mid 2015	+420 to 660

Given the significant increase in western Canadian and Bakken production and a lack of takeaway capacity at Cushing, Oklahoma, a number of pipeline projects are vying to bring supply from the Midwest to the U.S. Gulf Coast (Table 4.3).

4.4.1 ExxonMobil Pegasus

The ExxonMobil Pegasus Pipeline is one of only two pipelines that can currently deliver Canadian crude oil to the U.S. Gulf Coast Pegasus is a 20-inch diameter pipeline with a capacity of 96,000 b/d. It runs from Patoka, Illinois to Nederland, Texas. Western Canadian crude can access the Pegasus pipeline via three routes: the Enbridge Mainline then onto the Mustang pipeline; the Express/Platte system then onto the Woodpat Pipeline; and the Keystone Pipeline.

4.4.2 Enbridge Flanagan South

The Flanagan South Pipeline project is a 36-inch diameter pipeline that will be built along the existing Enbridge Spearhead South Pipeline. The pipeline which originates at Flanagan, Illinois and terminates at Cushing, Oklahoma would have an initial capacity of 585,000 b/d. The pipeline is currently under construction and has a target in-service date of July 2014. Enbridge has indicated that Flanagan South can be expanded up to 785,000 b/d through the addition of horse power.

4.4.3 Enbridge/Enterprise Seaway

The Seaway Pipeline is jointly owned by Enbridge Inc. and Enterprise Products Partners L.P. The pipeline flow was reversed in May 2012 to move crude oil from Cushing, Oklahoma to the U.S. Gulf Coast. The capacity on the pipeline gradually increased from 150,000 b/d to 400,000 b/d by January 2013, however, a lack of takeaway capacity at Jones Creek, located on the southern end of the pipeline, has limited the effective capacity at this time. The pipeline has experienced considerable levels of apportionment since coming into service.

Enbridge and Enterprise have secured sufficient commercial support to build a new twin line along the existing Seaway pipeline. The project scope includes laterals from Jones Creek to the Echo terminal that is connected to the Houston refinery complex and from Echo to the Port Arthur/Beaumont refinery complex.

The initial capacity on the new Seaway twin line is 450,000 b/d. Once completed, the Seaway pipeline system would have a total capacity of 850,000 b/d. The target in-service for the lateral from Jones Creek to Echo is late 2013 while target in-service date for the Seaway twin and lateral from Jones Creek to Port Arthur/Beaumont is Q1 2014.

4.4.4 Enbridge/Energy Transfer Eastern Gulf Crude Access

In February 2013, Enbridge and Energy Transfer announced a joint development for the Eastern Gulf Crude Access Pipeline Project. The project involves the conversion of a 30-inch diameter pipeline from natural gas service to crude oil service of certain segments of pipeline that are currently in operation as part of the natural gas system of Trunkline Gas Company, LLC. The pipeline would provide service from Patoka, Illinois to refining markets near Memphis, Tennessee, Baton Rouge and St. James in Louisiana. Western Canadian crude and Bakken crude can access the Patoka Hub via a number of existing and proposed pipelines including: Enbridge Southern Access Extension, TransCanada Keystone, Mustang, Ozark Pipeline/Woodpat Pipeline.

The pipeline capacity would range from 420,000 b/d to 660,000 b/d depending on the crude slate and level of commitments from shippers. An open season is anticipated in Q2 2013. Subject to regulatory approval, the 30-inch diameter pipeline would provide oil service in mid-2015.

4.4.5 TransCanada Keystone XL

In May 2012, TransCanada filed a new Presidential Permit application for Keystone XL for a proposed pipeline from Hardisty, Alberta to Steele City, Nebraska. In September 2012, TransCanada submitted an environmental report to the Nebraska Department of Environmental Quality. On January 23, 2013, the revised route in Nebraska was supported by the Governor of the state of Nebraska. A draft supplemental Environmental Impact Statement (EIS) was issued and a public comment period ended on April 22, 2013. The U.S. Department of State is continuing its review and will issue a final EIS. The next step in the regulatory process is the national interest determination. Should the project be approved, it would provide 830,000 b/d of capacity in 2015.

The Bakken Marketlink project from Baker, Montana, to Cushing, Oklahoma is designed to allow receipts of up to 100,000 b/d of crude oil from the Williston Basin, using capacity on the northern leg of Keystone XL. The Bakken Marketlink project is underpinned by 65,000 b/d of firm commitments.

4.4.6 TransCanada Gulf Coast

TransCanada Keystone announced that it was proceeding with its Gulf Coast Project regardless as to whether its Keystone XL project receives regulatory approval. The 36-inch diameter pipeline would provide capacity from Cushing, Oklahoma to Port Arthur and Houston, Texas. The initial capacity is 700,000 b/d which can be expanded to 830,000 b/d. Construction started in August 2012 and the target in-service date is late 2013.

The Keystone Pipeline System which includes Keystone, the Gulf Coast Project and the Keystone XL would provide 1.4 million b/d of capacity of which 1.1 million b/d is underpinned by long term contracts.

4.5 Oil Pipelines to the West Coast of Canada

The Kinder Morgan Trans Mountain pipeline is currently the only pipeline transporting crude oil from Alberta to the west coast. There is significant interest in building new pipeline capacity to the west coast. Once crude oil reaches the coast, it can be loaded off onto crude carriers to reach markets such as California, the U.S. Gulf Coast and Asia. Table 4.4 summarizes the Enbridge Northern Gateway and Kinder Morgan's pipeline proposals to the west coast.

Table 4.4 Summary of Crude Oil Pipelines to the West Coast of Canada

Pipeline	Originating Point	Destination	Status	Capacity (thousand b/d)
Kinder Morgan Trans Mountain	Edmonton , AB	Burnaby, BC	Operating	300
Kinder Morgan Trans Mountain Expansion			Proposed - Q4 2017	+590
Enbridge Northern Gateway	Bruderheim, AB	Kitimat, BC	Proposed - Q4 2017	+525

4.5.1 Enbridge Northern Gateway

The Northern Gateway Project includes a new 36-inch diameter crude oil pipeline with an initial capacity of 525,000 b/d from Bruderheim, Alberta (near Edmonton, Alberta) to Kitimat, British Columbia. The National Energy Board conducted extensive public hearings which concluded on May 1, 2013. Final oral arguments for the project will be heard in June 2013. The regulator will issue its recommendation on the project by December 29, 2013 as per the legislated time limits. A final decision will then be made by the Governor in Council. The target in-service date for the project is late 2017.

4.5.2 Kinder Morgan Trans Mountain Expansion

Kinder Morgan has proposed to expand its existing system (see section 4.1.3) with the addition of a new 36-inch diameter pipeline (twin pipeline to existing line), new pump stations, tanks and new tanker berths. If approved and constructed, the Trans Mountain system would then be comprised of two pipelines, the existing line (Line 1) and a new line (Line 2).

Line 1 could transport 350,000 b/d of refined petroleum products and light crude oil; heavy crude oil could also be moved but at a loss of capacity. The new Line 2 would have a capacity of 540,000 b/d for heavy crude oil and could also transport light crude oil, if necessary. The new pipeline and this configuration would add 590,000 b/d to the system for a total capacity of 890,000 b/d.

The expansion is underpinned by contracts totaling 707,500 b/d under 15 and 20-year commitments. The target in-service date is late 2017. In May 2013, Kinder Morgan received approval of its tolling methodology and principles for the proposed expansion on its system. The company plans on submitting a facilities application with the NEB in the fall of 2013.

4.6 Oil Pipelines to Eastern Canada

In 2012, refineries in Eastern Canada imported 680,000 b/d of crude from foreign sources. There is currently no pipeline infrastructure that connects western Canadian crude oil supply to markets in Atlantic Canada. This market represents an opportunity for western Canadian producers. Table 4.5 lists the pipeline proposals that could be conduits to this market

4.6.1 Enbridge Line 9 Reversal

The Enbridge Line 9 is a 30-inch diameter crude oil pipeline which runs from Montréal, Québec to Sarnia, Ontario. Line 9A refers to the portion from Sarnia, Ontario to North Westover, Ontario while 9B refers to the portion from North Westover, Ontario to Montréal, Québec. The pipeline has a current capacity of 240,000 b/d. In 2012, Enbridge received regulatory approval and is currently in the process of reversing the flow of Line 9A. The pipeline will move primarily light crude oil from Western Canada and the Bakken play. Of note, when Line 9 was first built, it moved crude from western Canada to Ontario and Montréal, Québec. The flow of the pipeline was reversed in 1999 and is expected to be re-reversed later this year.

In November 2012, Enbridge submitted a regulatory application to reverse the flow on Line 9B and increase the capacity by 60,000 b/d through the use of a drag reducing agent which does not require building additional facilities. The NEB will be holding a written hearing with oral final arguments in the summer of 2013. The target in-service date for Line 9B reversal is Q3 2014.

Table 4.5 Summary of Crude Oil Pipelines to Eastern Canada

Pipeline	Originating Point	Destination	Status	Capacity (thousand b/d)
Enbridge Line 9 re-Reversal	Sarnia, ON	Montréal, QC	Proposed	+300
9A	Sarnia, ON	North Westover, ON	Q3 2013	
9B	North Westover, ON	Montréal, QC	Q3 2014	
TransCanada Energy East	Hardisty, AB	Québec City, QC / St. John, NB	Proposed - Q4 2017	+525 to 850

4.6.2 TransCanada Energy East

TransCanada announced the Energy East Pipeline Project which includes the conversion of a natural gas pipeline to oil service and new pipeline segments to provide transportation service from Hardisty, Alberta to Québec City, Québec and St. John, New Brunswick. The proposed pipeline would have a capacity ranging from 525,000 to 850,000 b/d depending on market requirements. Currently there is a receipt point planned in southeast Saskatchewan that would enable Saskatchewan Bakken and other volumes to enter into the system. TransCanada is holding a binding open season which closes on June 17, 2013. The target in-service date for deliveries to Québec City and St. John is Q4 2017 and 2018, respectively.

4.7 Diluent Pipelines

Table 4.6 provides a summary of projects which aim to bring diluent supply which may be required to satisfying growing supply of heavy oil from western Canada.

4.7.1 Enbridge Southern Lights

The Southern Lights pipeline which runs from Manhattan, Illinois (near Chicago) to Edmonton, Alberta has been moving diluent since 2010. The current capacity of the pipeline is 180,000 b/d. In Q1 2013, Enbridge conducted an open season for 50,000 b/d of capacity available under firm contracts. In early May, Enbridge announced that the responses exceeded the amount of capacity available. As a result, Enbridge will conduct another open season later this year and will pursue an expansion of the diluent line from 180,000 b/d to 275,000 b/d.

4.7.2 Enbridge Northern Gateway Diluent

As part of its Northern Gateway Project, Enbridge is proposing a diluent pipeline that would run from Kitimat, British Columbia to Bruderheim, Alberta. The proposed capacity of the pipeline is 193,000 b/d. The Joint Review Panel (JRP) conducted extensive public hearings which concluded on May 1, 2013. Final arguments for the project will be heard in June 2013. The NEB will issue its recommendation on the project by December 29, 2013, at the latest, as per the legislated time limits.

4.7.3 TransCanada Grand Rapids Diluent

As part of its Grand Rapids Pipeline, TransCanada is proposing a diluent line from the Heartland region to Fort McMurray. The pipeline would have a capacity of 330,000 b/d in 2017. A regulatory application is expected to be filed with the provincial regulator in 2013.

4.7.4 Kinder Morgan Cochin Reversal Project

Kinder Morgan has secured firm transportation commitments for its Cochin Reversal Project. The project would allow movement of light condensate from Kankakee County, Illinois to existing terminal facilities near Fort Saskatchewan, Alberta. The project requires modifying the western leg of the Cochin pipeline to connect to the Explorer Pipeline Company located in Kankakee County and the reversal of product flow to move condensate northwest to Canada. The existing Cochin pipeline system is a 12-inch diameter multi-product pipeline with a current capacity of 70,000 b/d. The Cochin Reversal project will have a capacity of 95,000 b/d. During the open season, Kinder Morgan secured more than 100,000 b/d of commitments for a minimum 10-year term. The target in-service date for the project is July 2014 subject to regulatory approval.

Table 4.6 Summary of Diluent Pipelines

Pipeline	Originating Point	Destination	Status	Capacity (thousand b/d)
Enbridge Southern Lights Southern Lights Expansion	Flanagan, IL	Edmonton, AB	Operating Proposed - TBD	180 +95
Enbridge Northern Gateway	Kitimat, BC	Bruderheim, AB	Proposed - Q4 2017	+193
Kinder Morgan Cochin Conversion	Kankakee County, IL	Fort Saskatchewan, AB	Proposed - Q3 2014	+95
TransCanada Grand Rapids	Heartland, AB	Fort McMurray, AB	Proposed - 2017	+330

4.8 Rail

Transporting crude oil by rail has been growing quickly in the U.S. for a number of years but this trend is only now just emerging for crude oil originating from western Canada. Statistics Canada data reports 12,989 rail cars (1.1 million tonnes) were loaded in February 2013 transporting fuel oils and crude petroleum – a 60 per cent growth from February 2012 (Figure 4.2). According to the National Energy Board, in 2012, approximately 46,000 b/d of crude oil was exported to the U.S. by rail with most going to the U.S. Gulf Coast (48 per cent) and PADD I (43 per cent) with the remainder exported to PADD II and PADD V. This upward trend becomes more apparent when the fact that exports were as high as 120,000 b/d in December is considered. Experts forecast these exports to reach as much as 200,000 b/d by the end of 2013.

Figure 4.2 Canadian Fuel Oil and Crude Petroleum Moved by Rail: Car Loadings & Tonnage

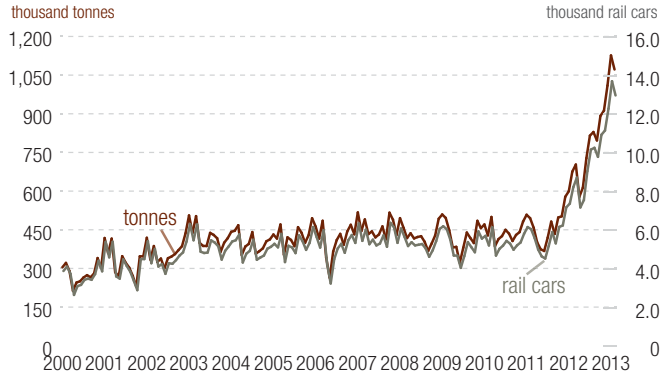

Source: Statistics Canada

Figure 4.3 CP Rail Network

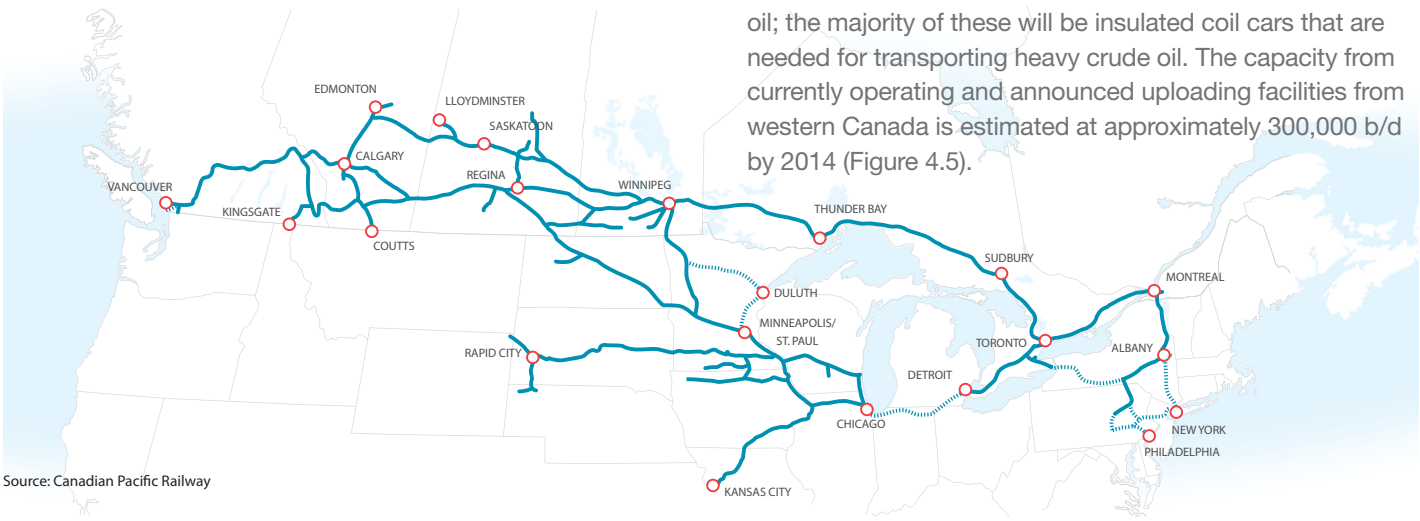

Source: Canadian Pacific Railway

Although rail tends to be a more expensive transportation option for crude oil it has a number of advantages over pipelines that help make it a viable alternative. In the long term, rail may even act as a complementary mode of transportation to pipelines as pipeline bottlenecks are alleviated. Extensive rail infrastructure is already in place, allowing producers the flexibility to reach essentially any market on the continent that has an unloading facility. Until pipelines are available, this means producers could reach higher priced markets using rail. In addition, movement of bitumen by rail requires significantly less diluent than pipelines, which can represent significant cost savings. Also, the sulphur content restriction on the crude oil transported by rail is less than when transported by pipelines. Refiners may also have greater certainty regarding the quality of crude oil received since there will be no mixing with other batches during transport, which is an event that often occurs during pipeline transportation.

Rail tracks are already in place to deliver crude oil to a number of markets from western Canada (Figure 4.3 and Figure 4.4). Therefore the major additional capital expenditures that are required are for terminal facilities needed for the uploading and offloading of crude oil. Larger, long-term terminal facilities with the capacity to load 100 car unit trains (65,000 to 70,000 barrels) that provide significant economies of scale can take from one to two years to be built. In contrast, start-up transloading facilities (which are smaller scale and limited to 2,000 to 20,000 barrels) can be put in place in only a few months.

The other main limitation on increasing current capacity is the availability of rail cars. There is about a two year waiting period from the time of ordering to the time of delivery. According to industry estimates, the backlog for tank rail car orders is close to 48,000. It is expected that that between 12,000 to 15,000 cars will be delivered in 2013 for crude oil; the majority of these will be insulated coil cars that are needed for transporting heavy crude oil. The capacity from currently operating and announced uploading facilities from western Canada is estimated at approximately 300,000 b/d by 2014 (Figure 4.5).

Figure 4.4 CN Rail Network

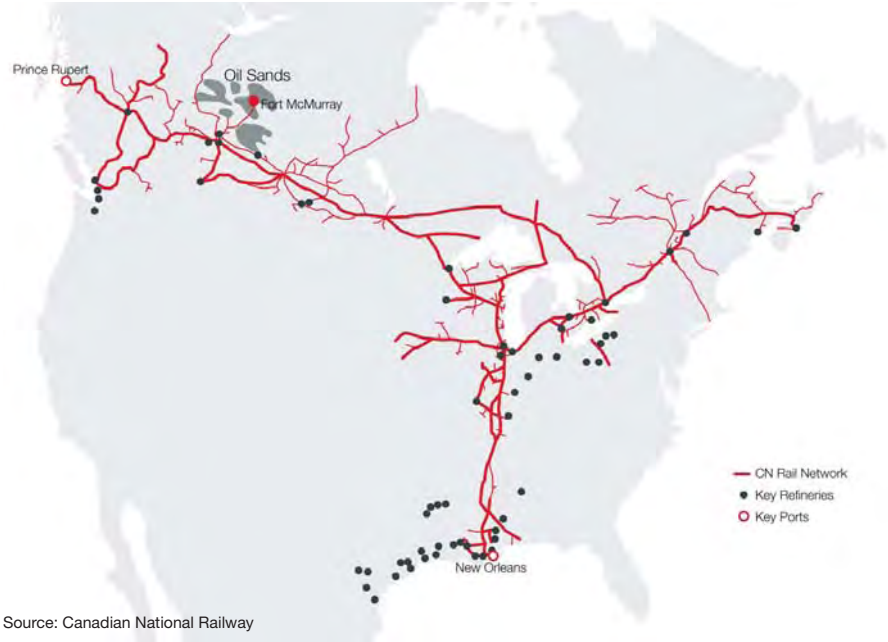

Source: Canadian National Railway

Rail Quick Facts

- Rail car capacity carrying light oil: 600 to 700 bbls
- Rail car capacity carrying heavy oil: 500 to 525 bbls
- RailBit and raw bitumen is transported in coiled and insulated rail cars to prevent solidifying in cold weather
- Unit train: 70 to 120 cars carrying only crude oil
- Manifest trains are mixed cargo trains delivering to different destinations
- Unit trains are used to carry one type of cargo from one location to another
- Economics for transport by rail improves with unit trains, however, unit train offloading capability is needed at destination

G-7 Generations' Alberta-Alaska Railway Concept

G7G Railway Corp. has introduced the concept of a new rail link from Fort McMurray to the Delta Junction in Alaska where oil would enter the Trans-Alaska (TAPS) pipeline system to reach tidewater at the Valdez marine terminal. The project propoents are in the process of seeking financial support to produce a feasibility study for this project.

Churchill Export Port

Churchill Gateway Development Corp. is looking to transform the Port of Churchill in northern Manitoba into a key export hub for western Canadian crude oil. It has traditionally been a key export point for western Canadian grain but is currently under utilized. Some challenges include the fact that the port is only ice-free from July to mid-October. The shipping season could be extended if shippers used icebreakers to accompany tankers but the added cost may be prohibitive. Target markets would include Europe, and refineries along the east coast of Canada and the U.S. The port is at the northern terminus of the Hudson Bay Railway owned by railroad holding company, OmniTRAX.

Figure 4.5 Rail Loading Terminals in Western Canada

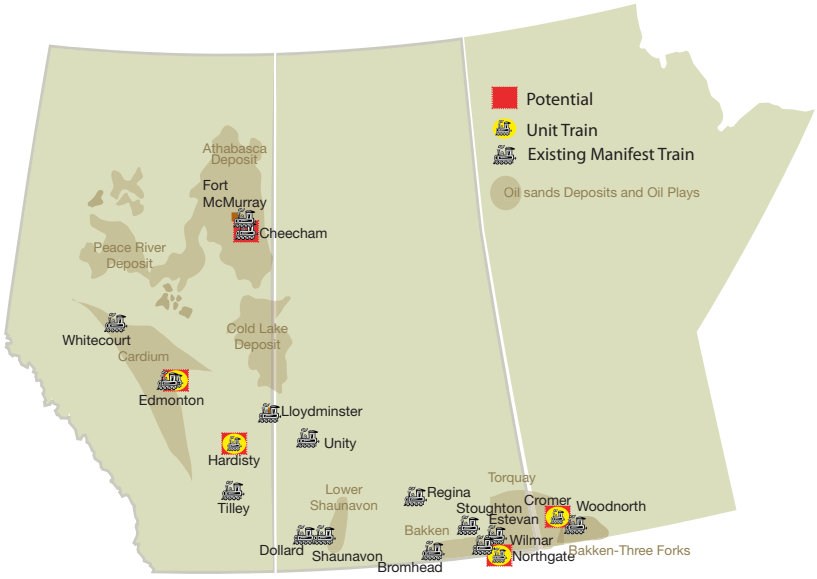

Major Announced Rail Uploading Terminals in Western Canada

Operator	*Location*	*Capacity (thousand b/d)*	*Scheduled Startup*
Tundra	*Cromer, MB*	*Phase 1 - 30* *Phase 2 - 30*	*Q3 2013* *Q1 2014*
Keyera	*Cheecham, AB*	*32*	*Q3 2013*
Canexus	*Bruderheim, AB (near Edmonton, AB)*	*70*	*Q3 2013*
Gibson	*Hardisty, AB*	*60*	*2014*
Ceres Global	*Northgate, SK*	*70*	*Q4 2013*

4.9 Pipeline Summary

The dynamics of the North American crude oil market are changing as growing western Canadian and Midcontinent crude oil production emerges while North American crude oil consumption is anticipated to be fairly flat. Despite the forecast for flat demand for crude oil, the U.S., specifically the Gulf Coast, remains a large, attractive market for western Canadian producers due to the opportunity to displace crude oil supplies from international sources. A number of pipeline proposals to the Gulf Coast have recently been announced that will increase access by 2014 through connections to existing infrastructure as well as new projects. In addition to looking for increased penetration to U.S. markets, western Canadian crude oil producers are also seeking much greater market diversification through increased connectivity to eastern Canadian and world markets. This would primarily be achieved through more pipeline capacity to the west coast, where crude oil could be shipped to the burgeoning economies of Asia. There is also significant interest in improving connectivity to western Canadian supplies for all Canadians. As such, a number of projects to increase pipeline access from western Canada to eastern Canadian markets are being pursued.

Projects that increase the downstream capacity of existing pipelines have been proposed that could partially alleviate tight capacity as access to markets is enhanced. However, additional capacity exiting western Canada will need to be built if growing production is to avoid facing chronic apportionment as a result of limited pipeline capacity to desired markets. Figure 4.4 shows the existing and proposed takeaway capacity exiting the WCSB versus forecasted supply. The forecasted supply volume was developed by coupling CAPP's latest supply forecast of western Canadian production with U.S. Bakken volumes that could utilize a portion of the capacity that exits western Canada.

Transportation of crude oil by rail is growing since it has the advantage of quick start-up and its network extends to a number of markets that are currently not connected through the pipeline network. However, pipelines will remain the preferred mode of transportation for crude oil. This analysis indicates that additional transportation capacity exiting western Canada will be required by 2014.

Figure 4.6 WCSB Takeaway Capacity vs Supply Forecast

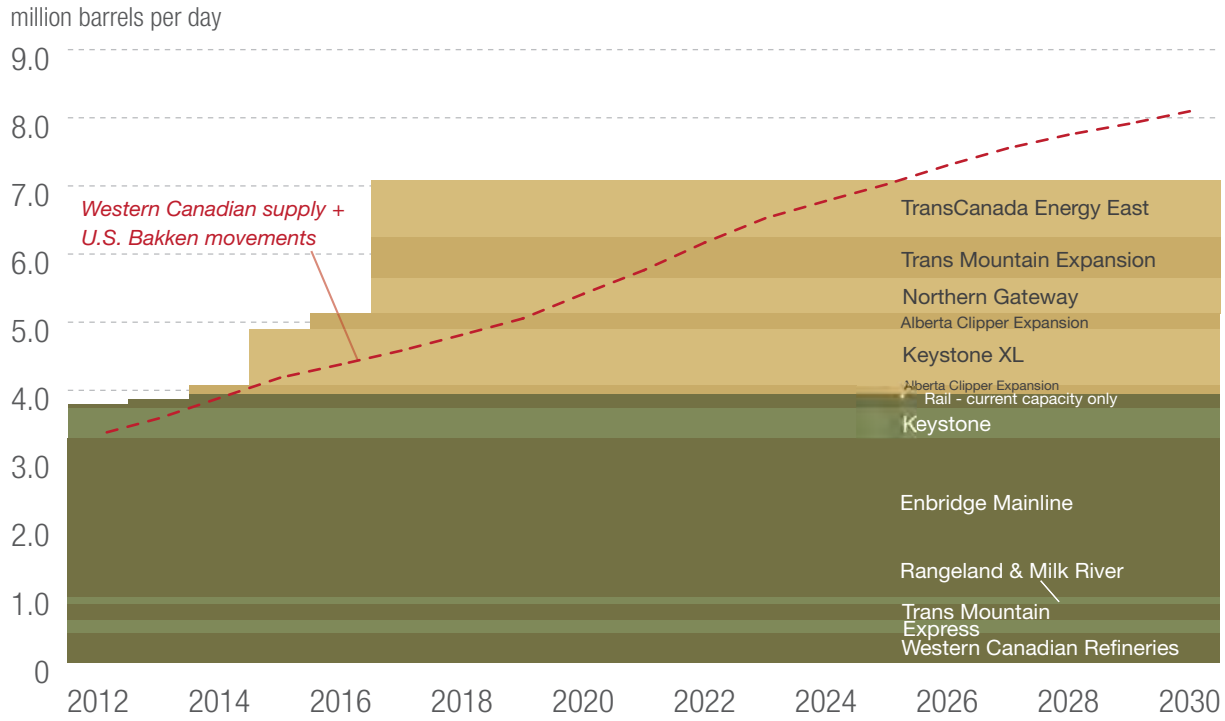

Capacity shown can be reduced by temporary operating and physical constraints.

GLOSSARY

API Gravity	A specific gravity scale developed by the American Petroleum Institute (API) for measuring the relative density or viscosity of various petroleum liquids.
Barrel	A standard oil barrel is approximately equal to 35 Imperial gallons (42 U.S. gallons) or approximately 159 litres.
Bitumen	A heavy, viscous oil that must be processed extensively to convert it into a crude oil before it can be used by refineries to produce gasoline and other petroleum products.
Coker	The processing unit in which bitumen is cracked into lighter fractions and withdrawn to start the conversion of bitumen into upgraded crude oil.
Condensate	A mixture of mainly pentanes and heavier hydrocarbons. It may be gaseous in its reservoir state but is liquid at the conditions under which its volumes is measured or estimated.
Crude oil (Conventional)	A mixture of pentanes and heavier hydrocarbons that is recovered or is recoverable at a well from an underground reservoir. It is liquid at the conditions under which its volumes is measured or estimated and includes all other hydrocarbon mixtures so recovered or recoverable except raw gas, condensate, or bitumen.
Crude oil (heavy)	Crude oil is deemed, in this report, to be heavy crude oil if it has an API of 27° or less. No differentiation is made between sweet and sour crude oil that falls in the heavy category because heavy crude oil is generally sour.
Crude oil (medium)	Crude oil is deemed, in this report, to be medium crude oil if it has an API greater than 27° but less than 30°. No differentiation is made between sweet and sour crude oil that falls in the medium category because medium crude oil is generally sour.
Crude oil (synthetic)	A mixture of hydrocarbons, similar to crude oil, derived by upgrading bitumen from the oil sands.
Density	The mass of matter per unit volume.
DilBit	Bitumen that has been reduced in viscosity through addition of a diluent (or solvent) such as condensate or naphtha.
Diluent	Lighter viscosity petroleum products that are used to dilute bitumen for transportation in pipelines.
Extraction	A process unique to the oil sands industry, in which bitumen is separated from their source (oil sands).
Feedstock	In this report, feedstock refers to the raw material supplied to a refinery or oil sands upgrader.
Integrated mining project	A combined mining and upgrading operation where oil sands are mined from open pits. The bitumen is then separated from the sand and upgraded by a refining process.
***In Situ* recovery**	The process of recovering crude bitumen from oil sands by drilling.
Merchant upgrader	Processing facilities that are not linked to any specific extraction project but is designed to accept raw bitumen on a contract basis from producers.

Oil	Condensate, crude oil, or a constituent of raw gas, condensate, or crude oil that is recovered in processing and is liquid at the conditions under which its volume is measured or estimated.
Oil sands	Refers to a mixture of sand and other rock materials containing crude bitumen or the crude bitumen contained in those sands.
Oil Sands Deposit	A natural reservoir containing or appearing to contain an accumulation of oil sands separated or appearing to be separated from any other such accumulation. The ERCB has designated three areas in Alberta as oil sands areas.
Oil Sands Heavy	In this report, Oil Sands Heavy includes upgraded heavy sour crude oil, and bitumen to which light oil fractions (i.e. diluent or upgraded crude oil) have been added in order to reduce its viscosity and density to meet pipeline specifications.
Open Season	A period of time designated by a pipeline company to determine shipper interest on a proposed project. Potential customers can indicate their interest/support by signing a transportation services agreement for capacity on the pipeline.
Pentanes Plus	A mixture mainly of pentanes and heavier hydrocarbons that ordinarily may contain some butanes and is obtained from the processing of raw gas, condensate or crude oil.
PADD	Petroleum Administration for Defense District that defines a market area for crude oil in the U.S.
Refined Petroleum Products	End products in the refining process (e.g. gasoline).
Specification	Defined properties of a crude oil or refined petroleum product.
SynBit	A blend of bitumen and synthetic crude oil that has similar properties to medium sour crude oil.
Train (Manifest)	Manifest trains carry multiple cargoes and make multiple stops. These are small group or single car load.
Train (Unit)	Unit trains carry a single cargo and deliver a single shipment to one destination, lowering the cost and shortening the trip.
Upgrading	The process that converts bitumen or heavy crude oil into a product with a lower density and viscosity.
West Texas Intermediate	WTI is a light sweet crude oil, produced in the United States, which is the benchmark grade of crude oil for North American price quotations.

APPENDIX A
ACRONYMS, ABBREVIATIONS, UNITS AND CONVERSION FACTORS

Acronyms

API	American Petroleum Institute
CAPP	Canadian Association of Petroleum Producers
EIA	Energy Information Administration
ERCB	(Alberta) Energy Resources Conservation Board
FERC	Federal Energy Regulatory Commission
IEA	International Energy Agency
NEB	National Energy Board
PADD	Petroleum Administration for Defense District
U.S.	United States
WCSB	Western Canada Sedimentary Basin
WTI	West Texas Intermediate

Canadian Provincial Abbreviations

AB	Alberta
BC	British Columbia
MB	Manitoba
NWT	Northwest Territories
ON	Ontario
QC	Québec
SK	Saskatchewan

Units

b/d	barrels per day

Conversion Factor

1 cubic metre = 6.293 barrels (oil)

U.S. State Abbreviations

AL	Alabama
AK	Alaska
AZ	Arizona
AR	Arkansas
CA	California
CO	Colorado
CT	Connecticut
DE	Delaware
FL	Florida
GA	Georgia
ID	Idaho
IL	Illinois
IN	Indiana
IA	Iowa
KS	Kansas
KY	Kentucky
LA	Louisiana
ME	Maine
MD	Maryland
MA	Massachusetts
MI	Michigan
MN	Minnesota
MS	Mississippi
MO	Missouri
MT	Montana
NE	Nebraska
NV	Nevada
NH	New Hampshire
NJ	New Jersey
NM	New Mexico
NY	New York
NC	North Carolina
ND	North Dakota
OH	Ohio
OK	Oklahoma
OR	Oregon
PA	Pennsylvania
SC	South Carolina
SD	South Dakota
TN	Tennessee
TX	Texas
UT	Utah
VT	Vermont
VA	Virginia
VI	Virgin Islands
WA	Washington
WV	West Virginia
WI	Wisconsin
WY	Wyoming

APPENDIX B.1

CAPP Canadian Crude Oil Production Forecast 2013 – 2030

thousand barrels per day	Actual	*Forecast*																	
CONVENTIONAL	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Light & Medium																			
Alberta	408	447	516	543	553	558	565	574	581	588	598	611	626	636	645	657	671	687	703
B.C.	21	19	18	17	16	16	15	14	13	13	12	11	11	10	10	9	9	8	8
Saskatchewan [1,2]	211	201	191	195	176	179	183	186	189	193	198	203	209	215	221	227	233	238	244
Manitoba	50	50	50	50	47	45	44	43	42	41	41	40	39	38	37	37	36	35	34
N.W.T.	13	12	11	11	10	10	9	9	8	8	7	7	7	6	6	6	6	6	5
Ontario	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Atlantic Provinces [3]	197	218	192	225	221	217	276	284	247	226	222	199	193	174	149	136	114	97	87
W. Canada Light & Medium	**704**	**729**	**786**	**815**	**802**	**807**	**815**	**826**	**833**	**842**	**856**	**873**	**891**	**906**	**919**	**935**	**954**	**974**	**995**
E. Canada Light & Medium	**198**	**219**	**193**	**226**	**222**	**218**	**277**	**285**	**248**	**227**	**223**	**200**	**194**	**175**	**150**	**137**	**115**	**98**	**88**
Heavy																			
Alberta Conv. Heavy	148	151	152	149	146	143	140	137	135	132	129	127	124	122	119	117	115	112	110
Saskatchewan Conv. Heavy [1,2]	259	258	275	282	289	296	301	303	302	295	287	279	272	266	261	256	252	248	245
W. Canada Heavy	**406**	**408**	**428**	**431**	**435**	**439**	**441**	**440**	**437**	**427**	**416**	**406**	**396**	**388**	**380**	**373**	**367**	**361**	**355**
PENTANES/CONDENSATE	**139**	**135**	**130**	**127**	**124**	**121**	**119**	**116**	**113**	**111**	**109**	**107**	**105**	**103**	**101**	**99**	**97**	**96**	**94**
W. Canada Conventional (incl. condensates)	**1,246**	**1,270**	**1,343**	**1,373**	**1,361**	**1,368**	**1,375**	**1,382**	**1,384**	**1,380**	**1,381**	**1,385**	**1,392**	**1,396**	**1,400**	**1,408**	**1,418**	**1,431**	**1,445**
E. Canada Conventional (incl. condensates)	**202**	**221**	**193**	**226**	**222**	**218**	**277**	**285**	**248**	**227**	**223**	**200**	**194**	**175**	**150**	**137**	**115**	**98**	**88**
OIL SANDS (BITUMEN & UPGRADED CRUDE OIL)																			
Oil Sands Mining	811	906	976	984	1,007	1,044	1,095	1,123	1,227	1,337	1,457	1,572	1,598	1,645	1,689	1,687	1,679	1,683	1,684
Oil Sands *In situ*	986	1,079	1,182	1,296	1,436	1,546	1,671	1,823	1,996	2,160	2,344	2,501	2,664	2,808	2,977	3,158	3,304	3,407	3,524
TOTAL OIL SANDS	**1,797**	**1,985**	**2,158**	**2,280**	**2,443**	**2,590**	**2,766**	**2,946**	**3,223**	**3,497**	**3,801**	**4,074**	**4,262**	**4,454**	**4,666**	**4,845**	**4,983**	**5,090**	**5,208**
W. Canada Oil Production	*3,042*	*3,255*	*3,501*	*3,653*	*3,804*	*3,958*	*4,141*	*4,328*	*4,606*	*4,877*	*5,182*	*5,459*	*5,654*	*5,850*	*6,066*	*6,253*	*6,401*	*6,521*	*6,653*
E. Canada Oil Production	*202*	*221*	*193*	*226*	*222*	*218*	*277*	*285*	*248*	*227*	*223*	*200*	*194*	*175*	*150*	*137*	*115*	*98*	*88*
TOTAL CANADIAN OIL PRODUCTION	**3,245**	**3,476**	**3,694**	**3,879**	**4,026**	**4,176**	**4,418**	**4,613**	**4,854**	**5,104**	**5,405**	**5,659**	**5,848**	**6,025**	**6,216**	**6,390**	**6,516**	**6,619**	**6,741**
OIL SANDS RAW BITUMEN**																			
Oil Sands Mining	930	1,032	1,109	1,117	1,143	1,184	1,243	1,276	1,387	1,506	1,634	1,756	1,783	1,831	1,874	1,884	1,888	1,892	1,894
Oil Sands *In Situ*	996	1,116	1,216	1,332	1,471	1,579	1,701	1,853	2,027	2,191	2,378	2,536	2,699	2,844	3,014	3,195	3,343	3,446	3,563
TOTAL OIL SANDS	**1,926**	**2,148**	**2,325**	**2,449**	**2,614**	**2,763**	**2,944**	**3,129**	**3,414**	**3,696**	**4,012**	**4,292**	**4,482**	**4,674**	**4,888**	**5,080**	**5,231**	**5,338**	**5,457**

Notes:

1. *CAPP allocates Saskatchewan Area III Medium crude as heavy crude. Also 17% of Area IV is > 900 kg/m³.*
2. *CAPP has revised from the June 2007 report historical light/heavy ratio for Saskatchewan starting in 2005.*
3. *Atlantic Canada production includes Newfoundland & Labrador production and negligible volumes from New Brunswick.*

*** Raw bitumen numbers are highlighted. The oil sands production numbers (as historically published) are a combination of upgraded crude oil and bitumen and therefore incorporate yield losses from integrated upgrader projects. Production from off-site upgrading projects are included in the production numbers as bitumen.*

APPENDIX B.2 CAPP Western Canadian Crude Oil Supply Forecast 2013-2030

Blended Supply to Trunk Pipelines and Markets *thousand barrels per day*

Actual *Forecast*

CONVENTIONAL	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Light and Medium	700	725	782	811	798	803	811	822	829	838	852	869	887	902	915	931	950	970	991
Net Conventional Heavy to Market	334	340	356	361	365	370	372	371	367	355	344	332	322	312	304	296	289	282	276
TOTAL CONVENTIONAL	**1,034**	**1,065**	**1,138**	**1,172**	**1,163**	**1,173**	**1,183**	**1,192**	**1,196**	**1,194**	**1,196**	**1,201**	**1,209**	**1,214**	**1,218**	**1,227**	**1,239**	**1,252**	**1,267**
OIL SANDS																			
Upgraded Light (Synthetic)[1]	752	841	855	857	834	807	788	777	775	771	770	763	755	752	752	753	754	755	761
Oil Sands Heavy [2]	1,413	1,532	1,744	1,907	2,133	2,353	2,593	2,835	3,194	3,548	3,952	4,312	4,565	4,808	5,080	5,323	5,508	5,655	5,817
TOTAL OIL SANDS AND UPGRADERS	**2,166**	**2,374**	**2,599**	**2,763**	**2,967**	**3,160**	**3,381**	**3,611**	**3,969**	**4,319**	**4,722**	**5,075**	**5,320**	**5,559**	**5,832**	**6,076**	**6,263**	**6,410**	**6,578**
Total Light Supply	1,452	1,566	1,637	1,668	1,632	1,610	1,600	1,598	1,604	1,610	1,622	1,631	1,642	1,653	1,667	1,685	1,704	1,726	1,752
Total Heavy Supply	1,747	1,872	2,100	2,267	2,498	2,722	2,965	3,205	3,561	3,904	4,296	4,644	4,887	5,120	5,383	5,618	5,797	5,937	6,093
WESTERN CANADA OIL SUPPLY	**3,199**	**3,438**	**3,738**	**3,935**	**4,130**	**4,333**	**4,564**	**4,804**	**5,165**	**5,513**	**5,918**	**6,276**	**6,529**	**6,773**	**7,051**	**7,303**	**7,501**	**7,662**	**7,844**

Notes:

1. *Includes upgraded conventional.*
2. *Includes: a) imported condensate b) manufactured diluent from upgraders and c) upgraded heavy volumes coming from upgraders.*

Richard Smith Surrebuttal Testimony
Friends of the Headwaters
Schedule 4
Exhibit _____

APPENDIX C

Crude Oil Pipelines and Refineries

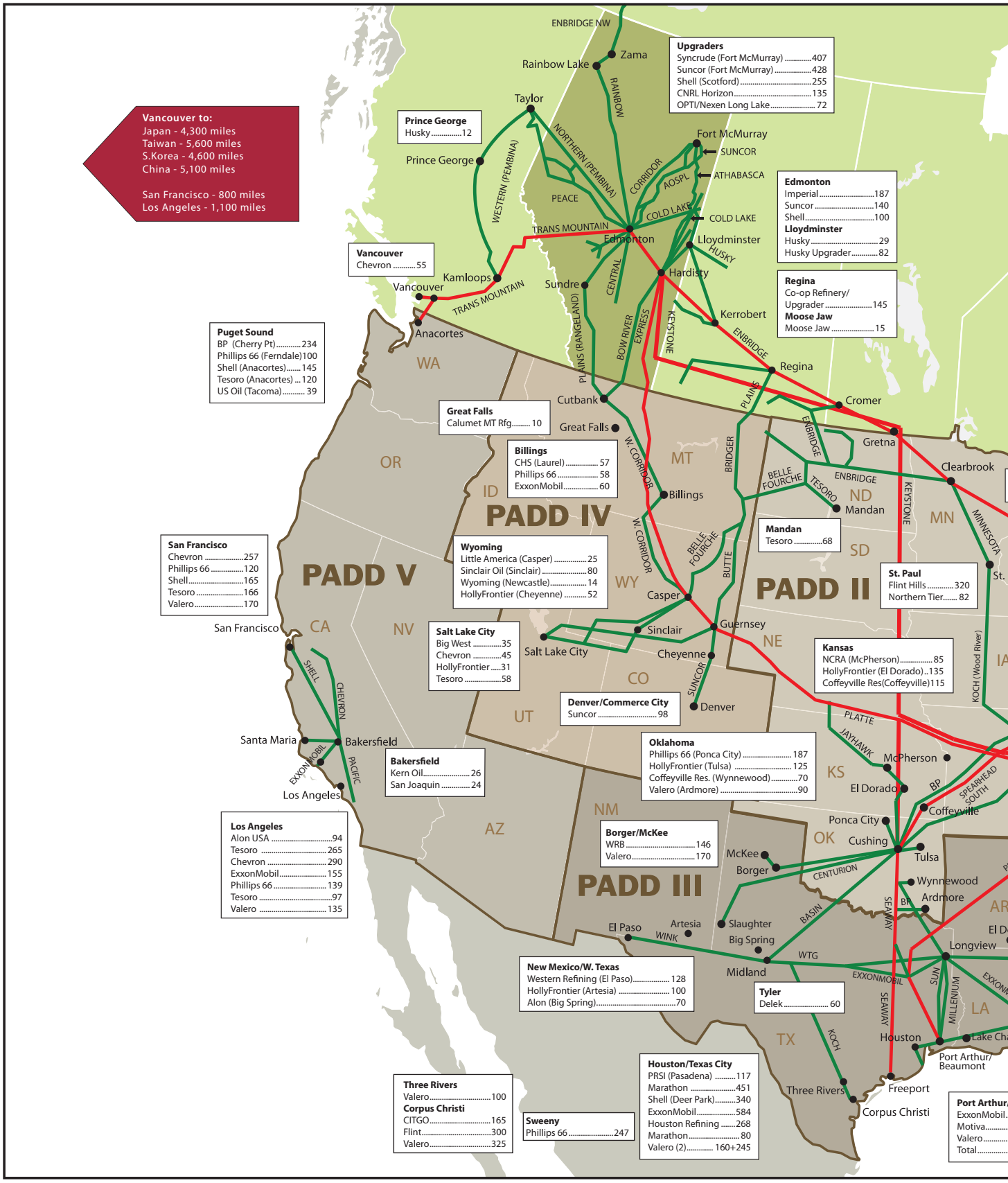

Richard Smith Surrebuttal Testimony
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Schedule 4
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CAPP
CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS
For Information Contact: (403) 267-1141 / www.capp.ca

2012 Canadian Crude Oil Production

	000 m³/d	000 b/d
British Columbia	6	40
Alberta	392	2,469
Saskatchewan	75	471
Manitoba	8	50
Northwest Territories	2	13
Western Canada	483	3,042
Eastern Canada	32	202
Total Canada	516	3,245

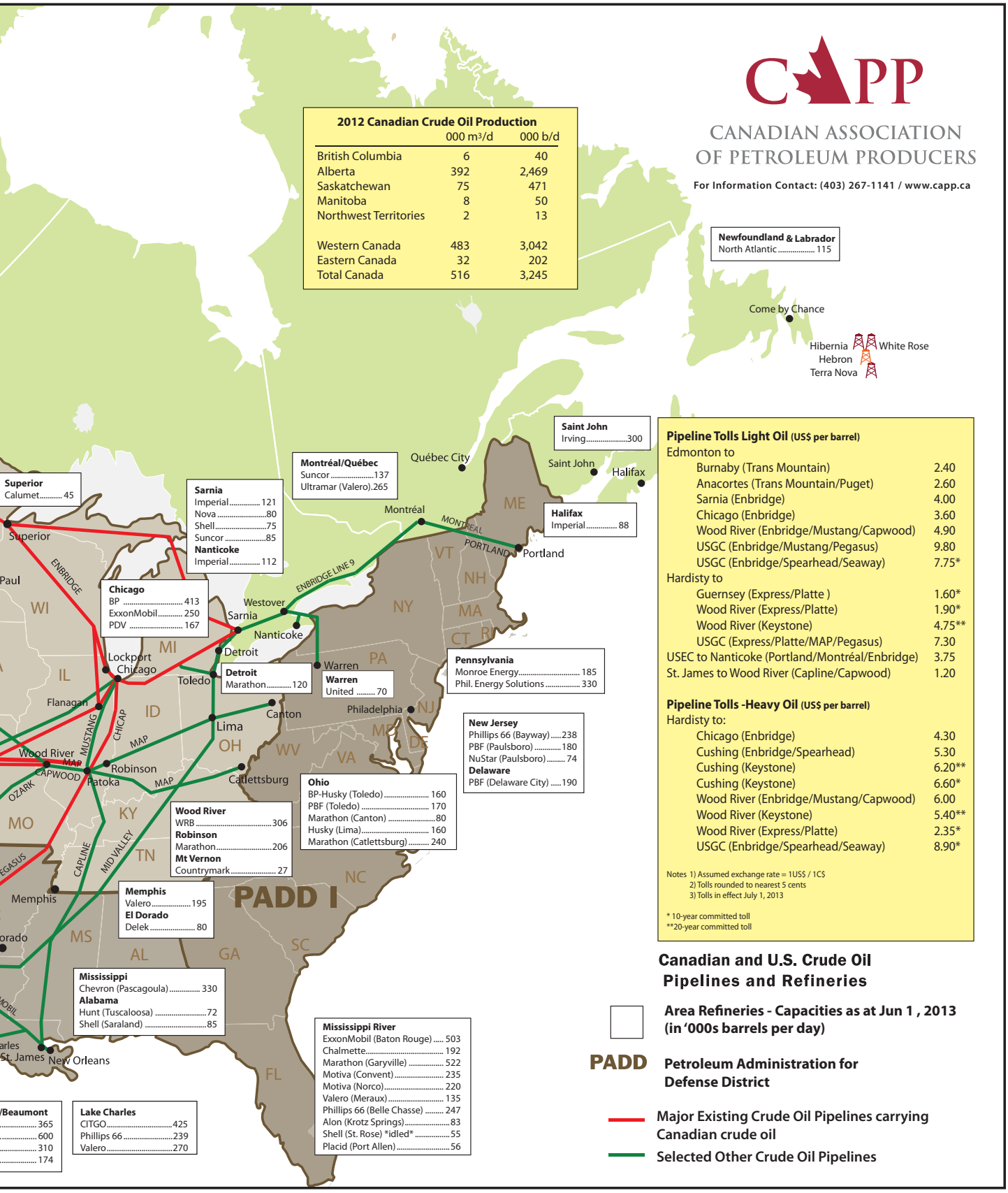

Pipeline Tolls Light Oil (US$ per barrel)

Edmonton to	
Burnaby (Trans Mountain)	2.40
Anacortes (Trans Mountain/Puget)	2.60
Sarnia (Enbridge)	4.00
Chicago (Enbridge)	3.60
Wood River (Enbridge/Mustang/Capwood)	4.90
USGC (Enbridge/Mustang/Pegasus)	9.80
USGC (Enbridge/Spearhead/Seaway)	7.75*
Hardisty to	
Guernsey (Express/Platte)	1.60*
Wood River (Express/Platte)	1.90*
Wood River (Keystone)	4.75**
USGC (Express/Platte/MAP/Pegasus)	7.30
USEC to Nanticoke (Portland/Montréal/Enbridge)	3.75
St. James to Wood River (Capline/Capwood)	1.20

Pipeline Tolls -Heavy Oil (US$ per barrel)

Hardisty to:	
Chicago (Enbridge)	4.30
Cushing (Enbridge/Spearhead)	5.30
Cushing (Keystone)	6.20**
Cushing (Keystone)	6.60*
Wood River (Enbridge/Mustang/Capwood)	6.00
Wood River (Keystone)	5.40**
Wood River (Express/Platte)	2.35*
USGC (Enbridge/Spearhead/Seaway)	8.90*

Notes 1) Assumed exchange rate = 1US$ / 1C$
2) Tolls rounded to nearest 5 cents
3) Tolls in effect July 1, 2013

* 10-year committed toll
**20-year committed toll

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CAPP
CANADIAN ASSOCIATION
OF PETROLEUM PRODUCERS

The Canadian Association of Petroleum Producers (CAPP) represents companies, large and small, that explore for, develop and produce natural gas and crude oil throughout Canada. CAPP's member companies produce about 90 per cent of Canada's natural gas and crude oil. CAPP's associate members provide a wide range of services that support the upstream crude oil and natural gas industry. Together CAPP's members and associate members are an important part of a national industry with revenues of about $100 billion-a-year.

CAPP's mission is to enhance the economic sustainability of the Canadian upstream petroleum industry in a safe and environmentally and socially responsible manner, through constructive engagement and communication with governments, the public and stakeholders in the communities in which we operate.

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ATTACHMENT D

TransCanada to Proceed with 1.1 Million Barrel/Day Energy East Pipeline Project to Saint John

Successful Open Season Confirms Strong Support to Move Crude Oil to Eastern Canada

CALGARY, ALBERTA--(Marketwired - Aug. 1, 2013) -

Editor's note: News Conference today at 9:30 a.m. (MDT). Details below.

TransCanada Corporation (TSX:TRP) (NYSE:TRP) (TransCanada) is pleased to announce it is moving forward with the 1.1 million barrel per day (bbl/d) Energy East Pipeline project based on binding, long-term contracts received from producers and refiners. The conclusion of the successful open season confirmed strong market support for a pipeline with approximately 900,000 bbl/d of firm, long-term contracts to transport crude oil from Western Canada to Eastern Canadian refineries and export terminals.

"We are very pleased with the outcome of the open season for the Energy East Pipeline held earlier this year and are excited to move forward with a major project that will bring many benefits across Canada," said Russ Girling, TransCanada's president and chief executive officer. "This is an historic opportunity to connect the oil resources of western Canada to the consumers of eastern Canada, creating jobs, tax revenue and energy security for all Canadians for decades to come."

Girling added that interest in Energy East supports refineries' desire to have access to a stable and reliable supply of Western Canadian crude oil - pushing out more expensive crude oil from foreign regimes. Eastern Canada currently imports approximately 700,000 bbl/d. It also confirms the desire producers have to support safe and innovative ways to get their crude oil to market.

"Energy East is one solution for transporting crude oil but the industry also requires additional pipelines such as Keystone XL to transport growing supplies of Canadian and U.S. crude oil to existing North American markets," added Girling. "Both pipelines are required to meet the need for safe and reliable pipeline infrastructure and are underpinned with binding, long-term agreements."

The project is expected to cost approximately $12 billion, excluding the transfer value of Canadian Mainline natural gas assets. The Energy East Pipeline will have a capacity of approximately 1.1 million bbl/d and is anticipated to be in service by late-2017 for deliveries in Québec and 2018 for deliveries to New Brunswick.

The Energy East Pipeline project involves converting a portion of natural gas pipeline capacity in approximately 3,000 kilometres (1,864 miles) of TransCanada's existing Canadian Mainline to crude oil service and constructing approximately 1,400 kilometres (870 miles) of new pipeline. The pipeline will transport crude oil from receipt points in Alberta and Saskatchewan to delivery points in Montréal, the Québec City region and Saint John, New Brunswick, greatly enhancing producer access to Eastern Canadian and international markets. The pipeline will terminate at Canaport in Saint John, New Brunswick where TransCanada and Irving Oil have formed a joint venture to build, own and operate a new deep water marine terminal.

While Energy East will use a portion of Canadian Mainline capacity, TransCanada is committed to continuing to meet the needs of its gas customers in eastern Canada and the N.E. United States.

Our 60 years of pipeline experience has taught us that to advance a project of this size, we must engage in open and meaningful discussions with Aboriginal communities and key stakeholder groups. TransCanada has been out in the field collecting data and engaging with Aboriginal and stakeholder groups for the past several months as part of its initial design and planning work for the project and that will continue.

"TransCanada is a leading North American energy infrastructure company with one of the best safety records in the industry and that is something we are very proud of," concluded Girling. "Energy East will be designed and operated with a singular focus on safety - that is what Canadians expect and that is what TransCanada will deliver. We all recognize that oil is essential in our daily lives. We need it to heat our homes, operate our vehicles and make thousands of products we rely on every day. What we must do is ensure the oil is transported safely and reliably."

The company intends to proceed with the necessary regulatory applications for approvals to construct and operate the pipeline project and terminal facilities in early 2014.

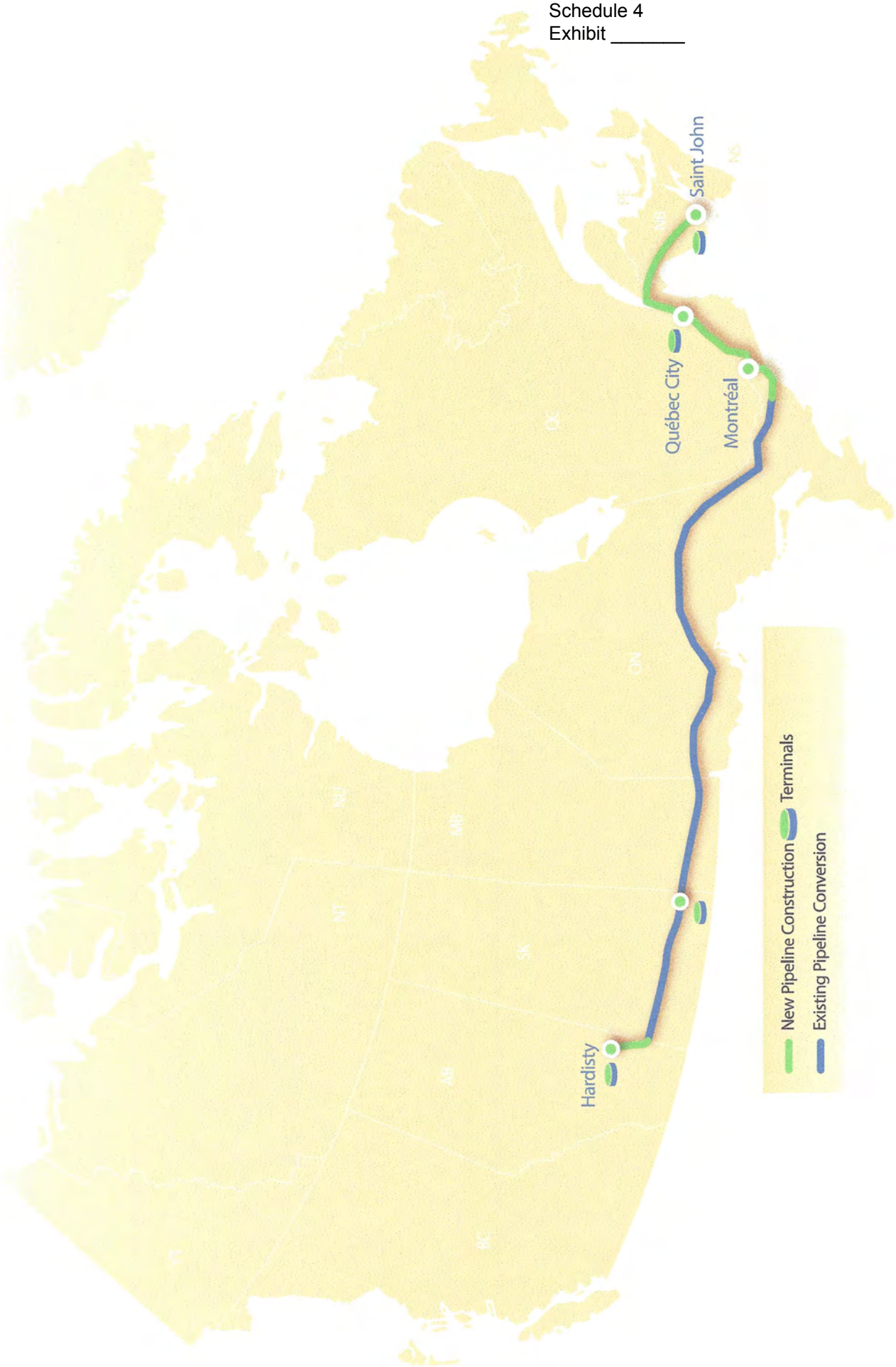
Saint John
Québec City
Montréal
Hardisty
New Pipeline Construction
Terminals
Existing Pipeline Conversion
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ATTACHMENT E

Richard Smith Surrebuttal Testimony
Friends of the Headwaters
Schedule 4
Exhibit ___

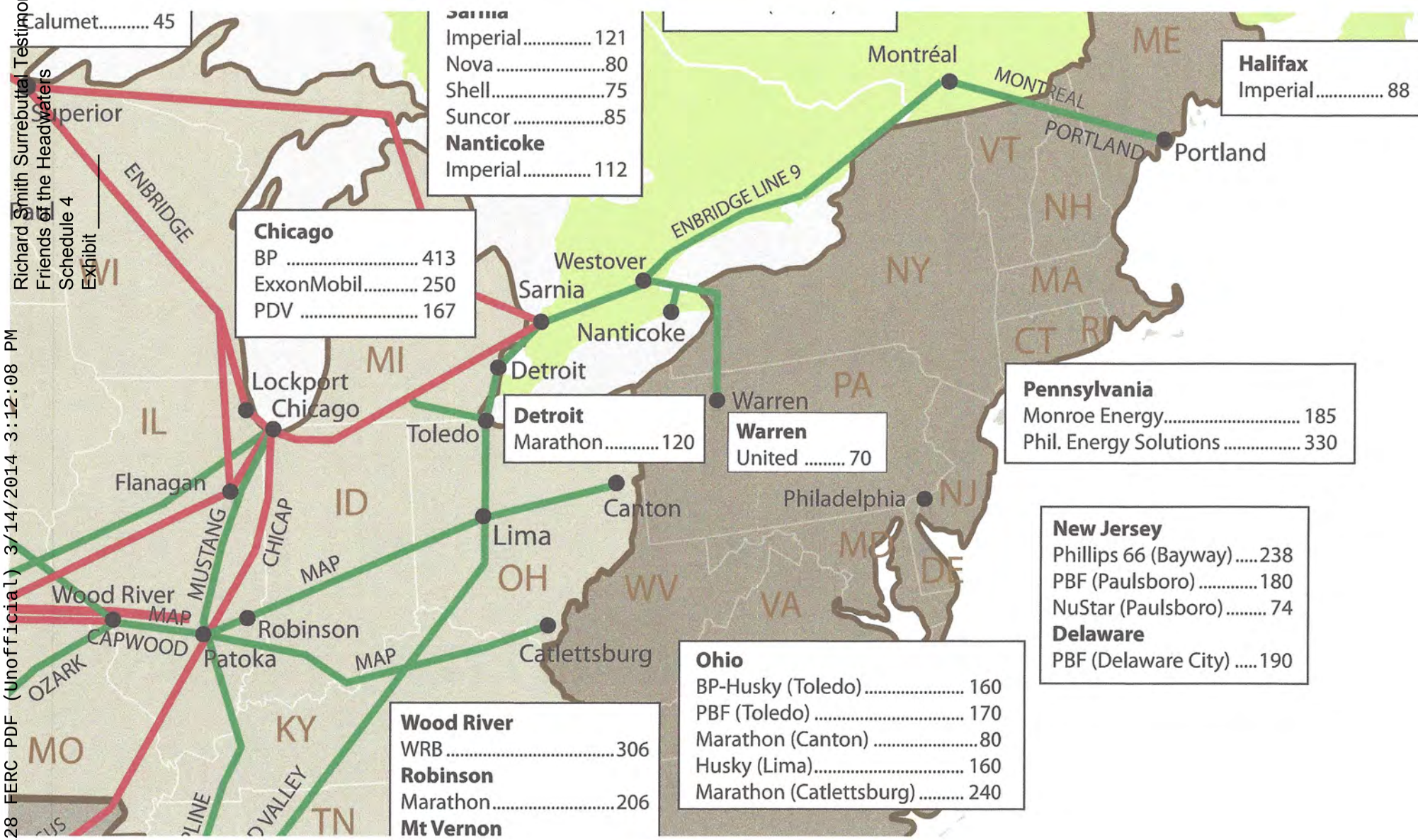

EXHIBIT E

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North Dakota Pipeline Company LLC **Docket No. OR14-21-000**

SWORN DECLARATION OF WILLIAM WOODARD IN SUPPORT OF WPX ENERGY MARKETING LLC'S PROTEST AND OPPOSITION TO NORTH DAKOTA PIPELINE COMPANY LLC'S PETITION FOR DECLARATORY ORDER AND WPX ENERGY MARKETING'S MOTION TO INTERVENE

William Woodard states as follows, pursuant to the provisions of 18 U.S.C. § 1746:

1. 1 am Director, WPX Crude Trading, WPX Energy Marketing, LLC ("WPX"). My business address is One Williams Center, 720 Level, Tulsa, OK 74172.

2. WPX's parent company, WPX Energy, Inc. ("WPX Energy") is an independent oil and gas exploration and production company specializing through subsidiaries in producing natural gas, natural gas liquid and oil from non-conventional resources such as tight-sands and shale formations. WPX Energy holds approximately 81,000 net acres on the Fort Berthold Indian Reservation, in North Dakota, where it produces approximately 28,000 barrels of crude oil per day (bpd) from the Bakken Shale formation.

3. WPX provides sales and marketing services for WPX Energy, Inc.'s crude oil production not previously dedicated to gathering companies. Virtually all of the crude oil that WPX markets is transported on the pipeline system that is owned and operated by North Dakota Pipeline Company LLC ("NDP").

4. In addition, WPX is party to an agreement with a NDP affiliate, which involves a multi-year commitment to utilize rail-loading services for volumes received from NDP at the NDP affiliate's Berthold Station.

5. WPX intends to continue to use the NDP pipeline in the future either through buy/sell arrangements with other parties or as a shipper in its own name.

6. As Director of WPX Crude Trading I am knowledgeable as to the shipment of crude oil on the NDP system. During the past year, WPX has been able to ship or arrange the shipment of all of the crude oil it wished to transport on the NDP pipeline. Therefore during the past year, I have not been aware of any curtailment in the shipment of WPX Energy crude oil on the NDP pipeline because of prorationing.

7. I am familiar with the Petition for Declaratory Order that NDP filed with the Commission on February 12, 2012. WPX would be adversely affected to a substantial extent by the project that NDP plans to implement as described in its Petition. WPX therefore wishes to Protest and state its Opposition to the NDP Petition.

8. Since no other person can adequately represent WPX's position, WPX respectfully requests leave to intervene in that proceeding as a party.

I, William Woodard, state under penalty of perjury that the foregoing is true and correct to the best of my information and belief.

WILLIAM WOODARD

Executed on March 11, 2014.

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EXHIBIT F

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North Dakota Pipeline Company LLC **Docket No. OR14-21-000**

SWORN DECLARATION OF PETER K. ASHTON IN SUPPORT OF PROTEST AND OPPOSITION OF CONCORD ENERGY LLC, ENSERCO ENERGY LLC, ENWEST MARKETING LLC AND WPX ENERGY MARKETING, LLC TO NORTH DAKOTA PIPELINE COMPANY LLC PETITION FOR DECLARATORY ORDER

Peter K. Ashton, states as follows, pursuant to the provisions of 18 U.S.C. § 1746:

1. My name is Peter K. Ashton, and I am a senior consultant with Premier Quantitative Consulting, Inc., an economics and financial consulting firm with offices in Concord, Massachusetts and Orlando, Florida. Previously I was the President of Innovation & Information Consultants, Inc. (IIC, Inc.), an economics and management consulting firm located in Concord, Massachusetts. I have analyzed all facets of the petroleum industry including regulatory issues related to pipeline ratemaking and pipeline operations. I have filed testimony in several rate matters before FERC in which I analyzed rates, developed cost of service and stand alone cost models and analyzed petroleum markets. Most recently, I have testified in *Enterprise TE Products Pipeline Company LLC*, Docket No. IS12-203-000 on issues related to cost of service and rate design. I have also testified in *SFPP, L.P.*, Docket No. IS05-230-000 and in *SFPP, L.P.*, Docket No. IS08-390-002. Other cases include *Big West Oil Co. and Chevron Products Co. v. Anschutz Ranch East Pipeline, Inc.*, Docket No. OR01-03-000 and OR01-05-000 (consolidated); *Big West Oil Co. and Chevron Products Co. v. Frontier Pipeline Co.*, Docket No. OR01-02-000 and OR01-04-000 (consolidated); *Big West Oil, LLC, Chevron Products Company, and Tesoro Refining and Marketing Company v. Express Pipeline LLC and Platte Pipe Line Company*, Docket No. OR02-5-000; *Big West Oil, LLC, Chevron Products Company,*

Sinclair Oil Corporation and Tesoro Refining and Marketing Company v. Express Pipeline LLC, Docket No. OR02-8-000; *Big West Oil, LLC, Chevron Products Company, and Tesoro Refining and Marketing Company v. Platte Pipe Line Company*, Docket No. IS02-384-000; and *Sinclair Oil Corporation v. BP Pipelines (N.A.), Inc.*, Docket No. OR02-6-02. I have also assisted various shippers in other matters before FERC, including FERC's review and analysis of the Form 6 reporting requirements (*Revision to and Electronic Filing of the FERC Form 6 and Related Uniform Systems of Accounts*, Docket No. RM99-10-000 and *Review of FERC Form Nos. 6 and 6-Q*, Docket No. RM07-9-000) and the five year review of the rate indexation rules (*Five Year Review of Oil Pipeline Pricing Index*, Docket No. RM00-11-000 and Docket No. RM05-22-00) of the Commission.

2. In addition to the matters before FERC to which I just referred, I have also testified on several occasions before the California Public Utilities Commission (CPUC) on issues related to pipeline rates, access, cost allocation, market power, and other issues. I recently provided testimony in *Application of SFPP, L.P.* in A.12-01-015, and before that I testified in *Application of SFPP, L.P.* in A.09-05-014 et al. on rate, cost of service and market power issues. I have also presented testimony on cost of service and rate design issues in the *Application of San Pablo Bay Pipeline LLC*, A.08-09-024 and several other cases. I have attached a copy of my curriculum vita to this declaration, which provides more detail on my background and experience.

3. I have been asked by counsel for Concord Energy LLC, Enserco Energy LLC, EnWest Marketing LLC and WPX Energy Marketing, LLC to evaluate the Petition for Declaratory Order filed with the Commission by North Dakota Pipeline Company LLC (NDP) on February 12, 2014. The NDP submission relates to its proposed Sandpiper Project and is the second time NDP and its predecessor, Enbridge Pipelines (North Dakota) LLC (Enbridge) have asked the

Commission to approve a pipeline expansion project. I provided a declaration in November 2012 in support of EnWest Marketing's Protest against the first Sandpiper expansion proposal. In particular, I have been asked to comment on the proposed rate design, the likely impact of the rate design on uncommitted shippers, and the market need for the Sandpiper project.

Overview of the Sandpiper Project

4. As in 2012, NDP is proposing to add a new 230,000 barrels per day (bpd) pipeline from Beaver Lodge, North Dakota to Clearbrook, Minnesota. When combined with its present pipeline, NDP would have the capacity to transport 440,000 bpd of Bakken crude oil to Clearbrook. NDP further proposes to extend its pipeline from Clearbrook to Superior, Wisconsin by constructing 233 miles of 30-inch pipeline that would have an annual average capacity of 380,000 bpd. This new pipeline would eliminate Clearbrook as a destination for North Dakota shippers. NDP held an open season and obtained volume commitments totaling 155,000 bpd. These commitments are divided into two classes of service: (1) committed priority and (2) committed non-priority service. Priority committed shippers would not be subject to prorationing, whereas non-priority committed shippers would be subject to prorationing. NDP proposes to recover the costs of the Sandpiper project through a rate design structure based on three classes of service. This includes the two classes of committed service described above as well as uncommitted shippers, who did not sign Transportation Service Agreements (TSA) and represent about 65% or more of the total capacity of the new pipeline.[1]

[1] The 65% figure is based on total capacity from Beaver Lodge to Clearbrook of 440,000 and 155,000 of committed capacity. The uncommitted capacity is therefore 285,000 [65% = 285,000/440,000]. Of the 155,000 bpd capacity that was subscribed, it is not known if any or all of that capacity would continue on the extension from Clearbrook to Superior or be sent south from Clearbrook on the Minnesota Pipeline. If some or all of that crude oil is transported south on the Minnesota Pipeline, then uncommitted shippers could be potentially responsible for up to 75% of the capacity on the pipeline extension from Clearbrook to Superior [75% =

5. NDP also claims that the Sandpiper project is necessary and will benefit all classes of shippers because (i) there is a demonstrable need for the project; (ii) the new pipeline will be at full capacity; and (iii) the pipeline will provide substantial economic benefits to producers of Bakken crude oil.[2] These assertions are based on a report prepared by Muse Stancil (Muse), sponsored by Neil K. Earnest which is attached to the Petition.[3]

6. NDP claims that a large share of the costs of the Sandpiper project will be borne by the committed shippers. Yet as noted above committed shippers will only be shipping at most 35% of the capacity on the expansion portion of the pipeline from Clearbrook to Superior. NDP proposes to recover the remaining costs through a rate structure that will vary by the three classes of service. The committed shippers will pay a base rate plus a flow-through power cost based on actual costs plus any other existing surcharges. NDP states that priority service will pay a substantial premium relative to non-priority committed shippers, and priority committed shippers will pay a premium of at least one cent above the initial uncommitted rate.[4] Non-priority committed shippers will pay a discount relative to uncommitted shippers.

7. The base rate for committed shippers was specified in the TSA that committed shippers signed during the NDP Open Season and is subject to change only if capital costs diverge from the Class 5 estimates used to generate this base rate.[5] The uncommitted rate to Clearbrook will consist of the existing indexed base rate, any existing surcharges and an expansion rate

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285,000/380,000]. This would seem to indicate that uncommitted shippers will be paying a large majority of the costs on the expansion portion of the pipeline.

[2] Petition for Declaratory Order of North Dakota Pipeline Company LLC ("NDP Petition"), pages 19-20.

[3] See Exhibit 4 to the NDP Petition.

[4] NDP claims that the initial premium that priority committed shippers will pay over the uncommitted rate will be in the range of $0.15 to $0.30 per barrel, but notes that the actual differential may vary (MacPhail Affidavit, page 26). Since NDP did not provide cost data with its Petition, it is impossible to evaluate this claim.

[5] See Section 7.03 of the TSA attached to the MacPhail Affidavit.

component which NDP states is designed to capture a "relative share" of the costs of the pipeline expansion.[6] However NDP never defines what a "relative share" is or how it will be determined, so it is impossible to determine the ultimate rate impact.[7] For the Clearbrook to Superior extension, NDP states that the uncommitted rate will be based on an Opinion 154-B cost of service analysis for the "relative share" of the costs of that segment assigned to uncommitted shippers. The TSA included an "illustrative" uncommitted rate, but the actual uncommitted rate will not be known until NDP files its cost of service analysis.

Summary of Issues and Conclusions

8. Based on my review and analysis of the Petition and the attachments to the Petition, I have concluded as follows:

- NDP has failed to provide sufficient information and data to enable the Commission or shippers on the pipeline to fully understand and evaluate the likely impacts of the rate design and rate structure being proposed. As one example, it is clear that NDP must have developed a cost of service analysis including a cost allocation methodology to develop the data shown in the TSA as well as the data discussed in the affidavit of Mr. MacPhail, but NDP has not provided any cost of service information in its Petition.
- Nevertheless, despite the limited information available, it appears that the Sandpiper proposal would require existing, uncommitted shippers to pay for a substantial portion of the new and expanded pipeline initially, and in the long run, uncommitted shippers are likely to pay a highly disproportionate share of the

[6] NDP Petition, page 41.
[7] See MacPhail Affidavit, page 28.

costs of the new pipeline and assume virtually all of the risks of under recovery of the cost of the project.

- Apart from NDP's assertions, there is no evidence that existing shippers have been under continuous prorationing or that insufficient transportation capacity exists and will exist in the future to move crude oil out of the Bakken area.
- The Muse report is based on proprietary information and data and therefore cannot be reasonably evaluated. However, based on what information is provided, the Muse report suffers from a series of flaws and omissions that calls into serious question its conclusions.
- In my opinion existing shippers will not see any benefits from this new pipeline and should not be required to pay for it, let alone pay for what appears to be a highly disproportionate share of the new capacity.

NDP Has Failed to Provide Adequate Information to Evaluate Its Proposed Rate Design and Cost Allocation Methodology

9. NDP has failed to provide any cost of service information in its Petition even though it is requesting the Commission to approve its rate design at this time. My understanding is that the rate design approvals that NDP is requesting at this time are approvals of the base rates that committed shippers will pay as specified in the TSA and a rate structure in which priority committed shippers would be able to pay only one cent a barrel more than uncommitted shippers. Under that rate design, it is likely that the pipeline will incur substantial additional unrecovered cost. Under the NDP rate design those costs will probably be borne by uncommitted shippers. As I pointed out previously, the Petition states that uncommitted shippers will pay their "relative share" but it provides no information on how costs will be allocated so that uncommitted shippers pay that "relative share." As a result, neither the Commission nor the shippers have any

idea of how costs will be allocated among the three classes of shippers and whether the result may be discriminatory. Since we do not have access to the cost data and cost allocation methodology that supports the committed rate and the costs that NDP will likely use to support the uncommitted expansion rate and the downstream extension rate, it is simply impossible to determine whether NDP's rate design is reasonable or non-discriminatory. However, as I discuss in greater detail below, based on the limited information that is available, it does not appear that the NDP rate design is either fair, reasonable or non-discriminatory.

10. Based on the information contained in the Petition, it is clear that NDP must have performed a cost of service analysis including a cost allocation study. First, it has calculated base rates for committed service which are shown in Attachment A to the TSA.[8] Indeed it is my understanding that these are the rates that NDP requests the Commission to approve as part of its Petition for Declaratory Order. Committed shippers will represent 35% or less of the total capacity of the pipeline, and for the downstream expansion portion they could represent less than 35%. Yet it is impossible to determine what level of costs will be recovered in the committed base rates.

11. NDP states that it "expects" that the rate for priority committed service will be 30 cents per barrel higher than the initial uncommitted rate for movements to Superior and 15 cents per barrel higher than the initial uncommitted rate to Clearbrook.[9] NDP goes on to state that if final construction costs change, then the priority committed rate might well be only be 1 cent higher than the *initial* uncommitted rate.[10] Clearly for NDP to be able to make statements such as these

[8] Schedule B to Attachment A to the MacPhail Affidavit.
[9] NDP Petition, page 27.
[10] I place emphasis on the word "initial" as NDP is careful in its Petition to use that word whenever it discusses the uncommitted rate. As I point out below, the reason that NDP underscores the fact that it is discussing only "initial" rates is because NDP might well increase

regarding the likely range of expected initial rates, it must have developed a cost of service and cost allocation analysis.

12. NDP also goes on to state that in computing the rates for uncommitted shippers it will deduct $7.5 million from the cost of service of the expansion facilities and another $7.5 million from the cost of service underlying the extension rate. NDP provides no basis for these figures but simply asserts that these deductions will ensure that uncommitted shippers pay less than their proportionate share of the costs. Again, it is impossible to assess the accuracy of this statement without access to the underlying cost data and allocation methodology that NDP is using. But what is clear is that NDP must have performed those calculations in order to have made the $7.5 million calculation and predict the impact it will have on uncommitted rates while allowing it to recover its cost of service from all shippers.

The Limited Evidence Available Suggests that Uncommitted Ratepayers Will Face Large Rates Increases, Assume All Volume Risk and Likely Pay a Disproportionate Share of the Costs of the Project

13. I have constructed Table 1 below to illustrate the impact on the initial rates for uncommitted shippers of the portion of the NDP rate design that provides that uncommitted shippers would pay an initial rate that could be anywhere from 30 cents per barrel less to 1 cent per barrel less than the priority committed rate for a ten year commitment. As Table 1 demonstrates, initial uncommitted rates could be as much as 94% to 125% higher than the existing uncommitted rate for these same movements as shown in Table 1.[11] Moreover, even if the initial priority committed rate premium ends up falling within the range predicted by NDP

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the uncommitted rate significantly after the first year of operation if the pipeline does not operate at or near design capacity.

[11] I have excluded the Phase 6 surcharge in each case as committed and uncommitted shippers will pay the same surcharge.

(between 15 and 30 cents per barrel higher than the initial uncommitted rate), uncommitted shippers will still pay a rate that is between 84% and 110% higher than the existing rate.

Table 1
Rate Increase for Uncommitted Shippers

	Existing Rates for Uncommitted Service*	Maximum Uncommitted Rate^	Difference	Percent Increase
Beaver Lodge to Clearbrook	$ 1.32	$ 2.56	$ 1.24	94%
Beaver Lodge to Superior**	$ 1.95	$ 4.36	$ 2.41	124%

Sources:
Enbridge Pipelines (North Dakota) LLC, Oil Pipeline Tariff Filing, March 1, 2013
Enbridge Energy Partners Tariff FERC No. 43.13.0
Schedule B to NDPL TSA
** Excludes Phase 6 surcharge*
*** Assumes existing movement from Clearbrook to Superior via Lakehead system*
^ Base committed priority rate for ten year term at less than 20,000b/d volume commitment plus illustrative power charge less one cent

14. Table 1 compares existing base rates for uncommitted service to Clearbrook and to Superior with the maximum initial uncommitted rate NDP states could occur which is one cent less than the priority committed rate. The existing uncommitted rate to Clearbrook is the base rate taken from Enbridge Pipelines (North Dakota) LLC March 1, 2013 tariff filing, and indexed according to the July 2013 FERC indexation increase. To show the existing base rate from Beaver Lodge to Superior I add to that base rate to Clearbrook the rate for movement on Enbridge's Lakehead system from Clearbrook to Superior. The maximum uncommitted rate is simply the base rate for committed priority service plus the illustrative power charge as shown in Schedule B to Attachment A of the Affidavit of Mr. MacPhail less one cent. In all cases for simplicity, I omit consideration of the Phase 6 surcharge.

15. The limited information NDP provided also suggests that there is a strong likelihood that uncommitted shippers will pay a disproportionate share of the costs of the Sandpiper project. There are several reasons that contribute to this result. NDP's rate structure envisions that committed shippers will pay a "flow through power cost charge" which includes a true-up mechanism so that committed shippers will pay only actual power costs.[12] On the other hand, uncommitted shippers will pay a power cost that is embedded in the initial Opinion 154-B cost of service study which will be indexed each year into the future. Uncommitted shippers therefore will pay a power cost that will in all probability increase every year, while committed shippers pay actual power costs which are likely to fluctuate to lower as well as higher levels. To the extent that actual power costs decline from the initial estimate, committed shippers will receive an unfair and discriminatory advantage by paying a lower power cost component in their rates than uncommitted shippers. Over a ten year period, the discriminatory impact could be quite substantial.

16. For instance, I have assumed in the example in Table 2 below that (i) in the first year of pipeline operations both committed and uncommitted shippers pay the same power cost of $0.30 per barrel and (ii) over a ten year period, uncommitted shippers face a 5% indexation increase each year, while the actual power costs that committed shippers pay increase by only 1% per year on average.[13] By the 10th year, uncommitted shippers will be paying $0.16 per barrel more for power costs than committed shippers. In other words uncommitted shippers will be paying

[12] Power costs includes fuel, power and DRA.

[13] Over the past five years, the annual average increase in the FERC index for oil pipelines has been slightly more than 5% whereas the actual annual inflation rate for energy and electricity as measured by the Bureau of Labor Statistics over the last five years has averaged slightly more than 1% per year.

almost 50% more than committed shippers for the fuel and power that the pipeline uses. This conclusion is illustrated in Table 2 below.

Table 2
Discriminatory Impact of Differential Treatment of Power Costs

	Initial Power Cost	Inflation Index over 10 years*	Power Cost After 10 Years
Uncommitted Service	$ 0.30	1.629	$ 0.49
Committed Service	$ 0.30	1.105	$ 0.33
Premium Paid by Uncommitted Shippers			$ 0.16
Percent Premium Paid by Uncommitted Shippers			47%

* Committed service faces a 1% per year average actual cost inflation
Uncommitted shippers face a 5% indexation increase each year

17. In my opinion there is no reason for the NDP rate design to treat power costs differently between committed and uncommitted shippers. The additional costs uncommitted shippers will be paying seems to me discriminatory on its face.

18. Under NDPA's proposed rate design, uncommitted shippers also appear likely to assume disproportionately higher pipeline costs as a result of a capital cost-sharing risk adjustment contained in the TSA.[14] In his affidavit, Mr. MacPhail describes a cost variation sharing mechanism under which committed shippers will only pay for 50 percent of any variance between NDP's Class 3 capital cost estimate and final construction costs.[15] For example, if actual costs exceed the Class 3 estimate by $10 million, then the base components of the

[14] Section 7.04 of the TSA describes the cost variation sharing mechanism. The language is specifically directed to the committed base components.
[15] MacPhail Affidavit, page 25. A Class 3 estimate is part of the cost estimate classification system for various industries and reflects a preliminary cost estimate with semi-detailed cost data used for budget, authorization and control purposes. See Association of Advancement of Cost Engineering.

committed service rates will only include 50 percent of this variance, and the remaining $5 million will not be included in the base component for the committed rates. The Petition does not define the impact of those remaining cost variances on uncommitted service and whether in the example the pipeline's unrecovered $5 million are included in the uncommitted expansion and extension rates. Table 3 below presents a hypothetical example which indicates that under certain assumptions, the proposed capital cost risk-sharing mechanism would shift a higher proportion of costs to uncommitted shippers.

Table 3
Analysis of Cost Variance Sharing Mechanism

($ millions)	Base	Actual
Class 3 Estimate	$ 1,400	
Actual Cost		$ 1,600
Difference		$ 200
Allocation By Category:		
Committed service	$ 944	$ 1,011
Uncommitted service	$ 456	$ 589
Percent Borne by Uncommitted	32.6%	36.8%

19. In Table 3, I have assumed – hypothetically – that the upstream expansion Class 3 estimate for total capital costs is $1.4 billion. I have also assumed that final capital construction costs are actually $1.6 billion, which represents slightly less than a 15 percent increase over the Class 3 estimate. In the example, I further assume that initially costs are shared proportionate to volume on the expanded portion of the pipeline. Consequently committed shippers would pay 67% of those costs and uncommitted shippers would pay 33%.[16] The $1.4 billion Class 3 cost estimate would therefore be allocated by assigning $994 million to committed shippers and $456

[16] I computed this amount assuming that of the 230,000 bpd of expansion capacity, 155,000 (67%) is committed capacity and therefore the rest (75,000 – 33%) is uncommitted capacity.

to uncommitted shippers. That would leave a $200 million difference since actual costs are not $1.4 billion but $1.6 billion. Under the TSA, committed shippers would incur only 50 percent of their share of the $200 million cost variance between actual costs and the Class 3 estimate. Therefore total costs allocated to the committed shippers would be $1.01 billion.[17] The TSA clearly indicates that the cost variance sharing mechanism only applies to the base components of the committed rates.[18] Therefore I assume that the pipeline would pass through the "unrecoverable" committed portion of the cost variance sharing mechanism to uncommitted shippers. In this case, that additional cost would be allocated through the cost of service analysis underlying the upstream expansion rate, and uncommitted shippers' allocation of total costs would, in the example I am using, increase from 32.6% to 36.8% as shown on Table 3.

20. In my opinion increasing the share of the uncommitted shippers' costs because the TSA limits the amount of costs allocated to committed shippers unfairly discriminates against uncommitted shippers. Under the NDP rate design, if cost overruns do occur, uncommitted shippers would be unfairly subsidizing committed shippers.

21. Uncommitted shippers also face significant exposure to large rate increases because under the proposed rate design they will assume virtually all of the risk associated with the extension and expansion projects. The Petition indicates that the initial uncommitted shipper rate will be based on cost of service studies for the upstream expansion and downstream extension portions of the project using the Commission's standard Opinion 154-B methodology. NDP further states that the initial cost of service will assume a "design capacity" of the pipeline

[17] The amount I calculated represents 67 percent of the Class 3 estimate plus 67 percent of 50 percent of the $200 million cost overrun.
[18] See Attachment A to the MacPhail Affidavit, Article 7, pages 23-24.

system in establishing rates.[19] Although the term "design capacity" is not defined in the Petition or the TSA, NDP states in Mr. MacPhail's Affidavit that the term "design capacity" is synonymous with "annual average capacity" meaning the volume of crude oil the pipeline can be expected to transport over the course of a year (as opposed to the maximum theoretical capacity). It would therefore appear from Mr. MacPhail's Affidavit that if the pipeline is expected to transport less than its full design capacity in the first year of operation, the fact that it is underutilized will not directly affect the rates that uncommitted shippers will be responsible for paying. I interpret the NDP Petition as stating that in the first year of operation, rates will be established on the basis of a 440,000 bpd throughput for the Beaver Lodge to Clearbrook segment and a throughput of 385,000 bpd from Clearbrook to Superior.

22. However, that situation is substantially different after the first year of operation. Although NDP indicates the rates of uncommitted shippers will be indexed following the pipeline's initial year of operation as prescribed by the Commission's indexation policy, NDP also states that it "reserves the right to use other rate-changing methods set forth in the Commission's regulations to the extent possible."[20] NDP's statement that it could establish the rates of uncommitted shippers after the first year of operation on the basis of non-indexation rate-setting mechanisms exposes uncommitted shippers to significant rate increases. Under the Commission's regulations if NDP were able to show a "substantial divergence" between the actual costs incurred on the expansion and extension segments – including the debt service and return on equity the pipeline believes it is entitled to receive – and the rate that would result from

[19] See NDP Petition at page 29, citing MacPhail Affidavit at ¶74.
[20] MacPhail Affidavit, footnote 4, page 23.

application of the index, it could file a new cost of service.[21] Under that new cost of service, NDP could seek uncommitted rates that essentially enable the pipeline to recover all of its costs and a return on equity for the expansion and extension segments based on the *actual* quantity of crude oil the pipeline transports.

23. However, the TSA, states that, aside from the fuel and power costs and application of the annual FERC index which I previously discussed, the base rate for committed shippers will not change.[22] As a result, it would be the uncommitted shippers who would face a significant rate increase on the basis of the pipeline's inability to cover its costs and rate of return for the expansion and extension segments. In essence NDP is saying in its proposed rate design that the uncommitted shippers will bear all of the risk, after the first year of operation, that the pipeline's throughput will actually meet its full design capacity. If it does not, then the rates that the uncommitted shippers will be required to pay could be set at a high enough level to ensure that NDP recovers all of its costs as well as the rate of return it seeks. In view of the serious questions, which the Shippers have raised as to whether the expansion and extension is needed in the first place, there is a very substantial possibility that uncommitted rates will rise to very high levels.

24. In fact, the potential for a significant rate increase for uncommitted shippers is clear in an example that assumes that throughput volumes fall short of design capacity. Although NDP has not provided cost of service or cost allocation data, I have assumed that the illustrative

[21] 18 CFR 342.4(a) states that a carrier may change a rate if it shows that there is a substantial divergence between the actual costs experienced by the carrier and the rate resulting from application of the index such that the rate at the ceiling level would preclude the carrier from being able to charge a just and reasonable rate within the meaning of the ICA.

[22] The priority committed rate would be set at one cent above the uncommitted rate, but as discussed below, given the reduced level of throughput on the pipeline, no committed shipper would choose to maintain its priority status and thus no shipper would pay that rate.

uncommitted rate specified in the NDP TSA, Exhibit B from Beaver Lodge to Clearbrook is based on a certain design capacity that matches the initial cost of service for the upstream expansion. In other words, I am assuming that the rate that NDP states is the rate that permits it to fully recover its cost of service assuming that the pipeline actually transports the design capacity.[23] In my example I use this rate and assume that the rate generates sufficient revenues to enable the pipeline to fully recover its cost of service. I am further assuming a design capacity of 75,000 barrels per day applicable to the uncommitted capacity on the expansion segment.[24] The initial Expansion Rate component is equal to $1.0314 per barrel which is equal to the uncommitted rate stated by NDP in Exhibit B to the TSA less the existing rate. The revenue requirement (or cost of service) for the expansion portion of the uncommitted service is then computed using the uncommitted design capacity of 75,000 bpd and initial Expansion Rate component of $1.0314 per barrel for a total revenue requirement of $28.2 million from uncommitted shippers.[25]

25. If we were to assume that actual uncommitted volumes in year 1 were only 10,000 bpd, rather than 75,000 bpd, then NDP would under-recover its cost of service by 87 percent in year 1. That under-recovery would be approximately one percent less, or 86 percent in Year 2, if we assume that (i) the Expansion Rate component would be indexed in year 2 by 5%; (ii) the volume transported in Year 1 remained at 10,000 bpd; and (iii) the initial cost of service that

[23] The example and assumptions that I am using focuses upon the upstream expansion rate component, although a similar example would apply to the downstream extension rate component as well.

[24] I compute this amount by assuming that of the 230,000 bpd of expansion capacity, 155,000 bpd is committed capacity and therefore the rest (75,000) is uncommitted capacity.

[25] For simplicity I do not deduct the $7.5 million that NDP states it will deduct form the cost of service for uncommitted service as that does not alter the fundamental conclusion of the analysis.

NDP submitted remained the same. [26] Under these circumstances, NDP would file a rate increase on the upstream expansion rate component claiming that it satisfied the substantial divergence test of Section 342.4(a) of the Commission's regulations. All other factors remaining equal, it would seem that NDP would in fact satisfy the substantial disparity standard in view of the volume shortfall.[27]

26. As Table 4 below illustrates, these factors could result in a rate increase for uncommitted shippers to $6.7401for the Expansion Surcharge for a total Expansion Rate component of $7.7355 per barrel or a 650% increase from existing rates.

[26] If we were to assume that the cost of service increases in year 2 then the under recovery amount would increase as well.

[27] It is unclear from the Petition, but NDP could file for an increase on the total uncommitted rate, including the base component, but again for simplicity I have simply focused on the Expansion Rate component.

Table 4
Illustrative Example of Volume Shortfall on Uncommitted Shipper Rates

Assumed revenue requirement for uncommitted service - expansion portion	(a)	$28,234,575
Assumed uncommitted volume for expansion portion (bpd)	(b)	75,000
Total annual volume	(c) = (b) * 365	27,375,000
Initial COS-based Uncommitted Expansion Rate Component*	(d) = (a) / (c)	$1.0314
Actual volumes - Year 1 (10,000 b/d)	(e)	3,650,000
Total uncommitted revenue - Year 1	(f)	$3,764,610
Underrecovery - Year 1	(g) = (a) - (f)	$24,469,965
Percent underrecovery in Year 1	(h) = (g) / (a)	87%
Indexed rate - Year 2 (assuming 5 percent indexation rate)	(i) = (d) * 1.05	$1.0830
Uncommitted service revenues in Year 2 assuming Year 1 volumes	(j) = (i) * (e)	$3,952,841
Underrecovery in Year 2 assuming no change in cost of service**	(k) = (a) - (j)	$24,281,735
Percent underrecovery forecasted for Year 2	(l) = (k) / (a)	86.0%
New rate necessary to cover cost of service	(m) = (a) / (e)	$7.7355
Rate increase from Year 1 to Year 2 based on full recovery	(n) = (m) - (d)	$6.7041
Percent increase in Expansion rate to recover costs given volume shortfall	(o) = (n) / (d)	650%

* Assumes a rate of $2.3414 per barrel less the existing $1.31 per barrel Beaver Lodge to Clearbrook rate
** It is likely that the cost of service would increase in year 2 and this would only increase the underrecovery

27. I believe that Table 4 illustrates how uncommitted shippers would pay for the entire volume shortfall of the pipeline and, under the NDP rate design, would be the only group assuming the risk that the expansion portion of the project would not meet the design capacity of the line.[28]

28. I think it is somewhat disingenuous for the Petition to attempt to mask the fact that the uncommitted shippers are assuming all of the risk that the throughput of the pipeline will fall below its design capacity by stating that in the event the committed priority rate falls below the uncommitted rate, as would occur in the illustration above, then committed priority shippers will have the option to maintain their priority status by paying the uncommitted rate plus one cent per barrel. If the throughput of the pipeline falls below its design capacity, it would be foolish for a committed shipper to pay the uncommitted rate plus one cent. Having priority in the event of

[28] The same analysis can be shown for the uncommitted extension rate as well.

prorationing has no value whatever if the pipeline has excess capacity. What would likely happen under these circumstances is that committed priority shippers would elect to forego their priority status since it would have no value and shift to becoming non-priority committed shippers. They would then pay a rate that is lower than uncommitted shippers.[29]

29. The Petition is ambiguous regarding the specific rate a committed priority shipper would pay if the priority committed rate falls below the uncommitted rate. It is also unclear whether a shipper electing to give up its priority status pays the same rate as a committed non-priority shipper, or alternatively pays a rate that is less than the uncommitted rate but higher than the non-priority committed rate. However, regardless of which of the two rates a committed shipper foregoing its priority status pays, the effect of the NDP rate design is to shift virtually all of the volume risk of the pipeline to the uncommitted shippers.[30]

Uncommitted Shippers Have Not Faced Any Constraints in Using the Existing NDP Pipeline and Sufficient Capacity to Handle Bakken Crude Will Exist in the Future

30. An assessment of whether the Sandpiper project is necessary can generally be made by comparing the current and expected demand for crude oil take away capacity in North Dakota with the current and prospective facilities that can meet this demand. In making this assessment, I would first consider the recent historical pattern of usage and then turn to expected future demand and supply.

[29] NDP Petition, page 27.
[30] Moreover depending on how costs are actually being allocated between committed and uncommitted service, with priority committed shippers now paying a lower rate than in year 1, NDP's revenues will decline further which could prompt NDP to request an additional rate increase from uncommitted shippers.

31. It is my understanding that existing uncommitted shippers have been able to access the NDP without prorationing in recent years.[31] Indeed public data shows that throughput on the NDP since 2012 has not been at capacity which raises questions as to why existing uncommitted shippers should be asked to pay for a substantial portion of the new pipeline. The data shown in Table 5 below indicates that throughput on the NDP has been significantly below capacity during much of 2012 and at least through July 2013. In fact during the period August 2012 through July 2013, the pipeline was operating at only about 60% of capacity and even over the entire period January 2012 through July 2013, it was operating at slightly less than 75% of capacity.

[31] Declaration of Robert P. Garner, page 8; Declaration of William Woodard, page 2; Declaration of Brad Vodicka, page 2; Declaration of Jonathan Molis, page 2.

Table 5
Throughput on NDP 2012 – 2013

	Throughput on NDPL to Clearbrook (B/D)	Capacity (B/D)	Utilization
Jan - 12	204,067	210,000	97%
Feb -12	206,403	210,000	98%
Mar- 12	194,877	210,000	93%
Apr - 12	203,535	210,000	97%
May - 12	208,996	210,000	100%
Jun - 12	209,481	210,000	100%
Jul - 12	187,435	210,000	89%
Aug - 12	200,038	210,000	95%
Sep - 12	177,341	210,000	84%
Oct - 12	186,594	210,000	89%
Nov - 12	148,132	210,000	71%
Dec - 12	123,064	210,000	59%
Jan - 13	93,198	210,000	44%
Feb -13	96,038	210,000	46%
Mar - 13	96,416	210,000	46%
Apr - 13	70,083	210,000	33%
May - 13	108,725	210,000	52%
Jun - 13	123,036	210,000	59%
Jul - 13	126,036	210,000	60%
Averages:			
Aug 12 - July 13	129,058	210,000	61%
Jan 12 - July 13	155,973	210,000	74%

Source: Enbridge Pipelines (North Dakota) Motion to Dismiss Complaint of St. Paul Park Refining in OR13-28, August 14, 2013

32. In its Petition, NDP recognizes that the pipeline experienced a significant shortfall in throughput and states that the reason was a lack of downstream pipeline capacity.[32] According to NDP, existing supplies of Bakken crude currently do not have access to sufficient pipeline capacity beyond Clearbrook, Superior, and Chicago to reach downstream markets. NDP states that it was this lack of downstream pipeline facilities that led to rail service being used instead of the NDP. NDP claims that once various expansion projects for pipelines downstream of Sandpiper are completed, there will no longer be a constraint on NDP, and not only will it return

[32] NDP Petition, pages 13-14.

to full capacity, but there will be a clear need for the expanded capacity provided by the Sandpiper project.[33]

33. However, this explanation is contradicted by the explanation that Enbridge gave the Commission in 2013 when the shortfall in NDP throughput was being experienced. In response to a Complaint filed by St. Paul Refining regarding the Phase 6 surcharge for 2013 on the NDP, Enbridge explained the shortfall in throughput as follows:

> [The decline] occurred due to individual shippers' nominating decisions based on crude price differentials, over which Enbridge North Dakota has no control. When there is a large price differential between crude oil prices in the midcontinent area and prices in the coastal regions (as existed in 2012 and the first half of 2013), shippers have an incentive to transport crude by rail carrier to the higher value markets so long as the differential exceeds the rail transport cost.[34]

34. The Commission agreed with this assessment in its Decision, stating:

> […] the economics of crude price differentials dictate a shipper's choice of rail or pipeline transportation. When there is a large price differential between mid-continent and coastal markets, shippers will transport by rail to the higher value coastal markets as long as the price differential exceeds the cost of rail transport.[35]

35. Clearly whenever crude oil price differentials diverge by a significant amount NDP is and will be underutilized as shippers use rail service *notwithstanding any new downstream pipeline capacity*. Since, as Enbridge correctly stated, crude oil pricing differentials is something over which it has "no control," its construction of additional pipeline capacity in North Dakota to reach Superior and Chicago is a somewhat risky venture.

36. Moreover, the downstream pipeline projects that NDP believes will create a market for its expansion and extension projects are not connected to refineries on either the U.S. West Coast

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[33] NDP Petition, page 14.
[34] Affidavit of Robert Steede, filed with the Motion to Dismiss and Answer of Enbridge Pipelines (North Dakota) LLC to Complaint of St. Paul Park Refining Co. LLC, OR13-28-000, August 14, 2013.
[35] *St. Paul Park Refining Co. LLC v. Enbridge Pipelines (North Dakota), LLC*, 145 FERC ¶ 61,050 (October 17, 2013).

or the U.S. East Coast which is where the crude oil price differentials widened sufficiently to make rail transport economic in 2012 and 2013. Therefore, there is no guarantee that these downstream projects will prevent these wide crude oil price differentials from reappearing in the future. Finally, these downstream projects are not yet completed, and there is no guarantee that they will all be completed. For these reasons, even if we were to assume that the downstream pipeline constraint argument offered by NDP were correct, there would still be no assurance that the downstream bottleneck would no longer constrain the NDP pipeline.

37. There also appears to be a real lack of genuine interest in the Sandpiper project. NDP states that there are 185 shippers on its pipeline system. However, according to the Petition, only 15 shippers were sufficiently interested in the open season to request further information. Presumably fewer shippers actually subscribed to committed capacity. Thus, only 8% of the shippers on the pipeline were sufficiently interested in the open season to request further information.

38. In addition to the evidence of excess capacity on the existing NDP pipeline system and the absence of strong shipper interest in the Sandpiper project, projections of Bakken production and the available transportation alternatives to ship crude oil out of North Dakota strongly suggest that there will be sufficient capacity to handle Bakken crude in the future without the Sandpiper project. The Declaration of Robert P. Garner of EnWest includes a chart of crude oil pipelines and crude oil rail transportation facilities in the Bakken area of North Dakota based on data compiled by the North Dakota Pipeline Authority. This chart indicates that by year end 2013, there was a total of 583,000 bpd of pipeline and refinery takeaway capacity from the Bakken. During that same 2013 period, there was 965,000 bpd of rail capacity and total take-away capacity was therefore 1,548,000 bpd. The North Dakota Pipeline Authority predicts that

by 2016, there will be a total of 943,000 bpd of pipeline and refinery takeaway capacity without the Sandpiper project. The chart also indicates that pipeline capacity will be expanded by another 80,000 bpd for an eventual total of 1,023,000 bpd of crude oil take away capacity. Rail capacity in 2016 is predicted to be 1,355,000 bpd. The total projected 2016 take-away capacity, not including the Sandpiper expansion, is therefore 2,298,000 bpd.

39. This transportation infrastructure is more than sufficient to handle current and projected Bakken production. There are widely varying estimates of expected production from the Bakken area. Stephen D. Crane, who is NDP's expert on crude oil production, projects a continued increase in annual production peaking at 1.38 million bpd in 2026. On the other hand, the Energy Information Administration (EIA) of the U.S. Department of Energy, projects that peak production will occur much earlier in 2021 at slightly less than 1 million bpd.[36] Whereas Mr. Crane projects total Bakken production between 2012 and 2041 to reach 11.1 billion barrels, EIA estimates that total production over that period will be 8.2 billion barrels, and this figure is actually higher than a recent projection by the U.S. Geological Survey[37] which indicates that total production over that period will be only 7.5 billion barrels.

40. If we were to rely on the USGS and EIA data, there is more than sufficient transportation and refining infrastructure to handle peak production in the Bakken. In fact by 2016 the data from the North Dakota Pipeline Authority suggests that there will almost be enough pipeline and refining capacity alone to handle peak production. If we were to include the potential expansion

[36] U.S. Department of Energy, Energy Information Administration, Annual Energy Outlook, 2013, April 2013, www.eia.gov/forecasts/aeo. This forecast appears to exclude conventional production which is only 0.1% of total forecast production according to the USGS and therefore is immaterial.

[37] U.S. Geological Survey, Assessment of Undiscovered Oil Resources in the Bakken and Three Forms Formations Williston Basin Province, Montana, North Dakota, and South Dakota 2013, http://pubs.usgs.gov/fs/2013/3013/.

capacity of the Plains Bakken North[38] and Hiland Partners Double H[39] pipelines in our assessment, then total pipeline and refinery takeaway capacity – not including any rail facilities – would be 1.023 million bpd which would be sufficient to handle Bakken production using the EIA and USGS estimates of production. Even using the higher production estimates of Mr. Crane, there would be more than sufficient capacity including some rail transport (approximately 400,000 bpd at peak) to meet peak production without the Sandpiper project.

41. The highly varying levels of projected peak production and its duration is certainly one reason that there has been limited interest by shippers in additional pipeline facilities in North Dakota. Over the last two years, two other pipeline projects have been announced and sought to gain acceptance through open seasons, but have failed to receive sufficient interest and subsequently have been abandoned. These projects include the ONEOK Bakken Crude Express pipeline which would have transported 200,000 b/d of Bakken crude to Cushing, OK.[40] And just recently, Koch Pipeline announced that it failed to receive sufficient interest in its proposed Dakota Express pipeline which would have moved 250,000 bpd of Bakken crude to Illinois.[41]

The Muse Report Does Not Provide Convincing Evidence That the Sandpiper Project Is Needed or That It Will Be Used.

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[38] The Plains Wascana Pipeline is discussed on page 30 of the Muse report. As discussed below, Muse understates the potential capacity of this line.

[39] This pipeline is mentioned in footnote 25 of the Muse report. As I discuss below, Muse understates the project's capacity, which was given as far higher by the North Dakota Pipeline Authority and press materials. See "Hiland Partners Planning New Bakken Oil Pipeline: Potential Capacity of 100,000 b/d to Guernsey, WY," April 8, 2013: http://bakkenshale.com/pipeline-midstream-news/hiland-partners-planning-new-bakken-oilpipeline/.

[40] "Oneok Cancels Bakken Crude Express Pipeline, *Oil & Gas Journal*, November 27, 2012: http://www.ogj.com/articles/2012/11/oneok-cancels-bakken-crude-express-pipeline.html.

[41] "Crude Pipeline Wars in the Bakken," *RBN Energy*, February 25, 2014: http://www.ogfj.com/articles/2014/02/crude-pipeline-wars-in-the-bakken.html.

42. The NDP Petition relies heavily on the Muse report for the proposition that the Sandpiper project is needed, will be fully utilized, and will provide benefits to all, including existing shippers. The Muse report is based on proprietary information and data and therefore cannot be completely evaluated. However, based on the information that is provided, I believe that the Muse report suffers from a series of flaws and omissions that calls its conclusions into serious question.

43. It is my understanding that the Muse model and the inputs into the model are considered proprietary and therefore are not available to the public for review and analysis. As a result, key assumptions such as future crude oil supply, price differentials and refining values cannot be evaluated. The Muse report notes that these are important inputs and results of the model,[42] yet no data is provided on these key factors. As I noted earlier, changes in the values of crudes in different downstream markets can have a significant impact on the choice of transportation mode, but I am unable to evaluate this issue fully because no such data has been provided.

44. The Muse report states[43] that it relied on the Crane forecast for Bakken production as well as for production in other parts of the United States, other than for the Gulf of Mexico. I discussed previously the fact that that the Crane forecast for the Bakken region is significantly higher than the EIA and USGS forecasts for the Bakken area. Since no information was provided for Crane's forecasts for other U.S. regions, we do not know whether they are similarly skewed and to what extent incorrect crude oil projection data might affect Muse's conclusions regarding demand for competing transportation resources.

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[42] Muse report, pages 33-35.

[43] Muse report, page 35. Muse notes that it has extended these forecasts for the period 2026-2035, but again no information is provided on how such an extension was developed.

45. In addition, we do not know the assumed crude oil price forecast that underlies the Crane supply estimates. This factor too could have a significant impact on the model. For example, we cannot determine if the price forecasts used to generate the Crane supply estimates are consistent with the crude oil price results that come from the Muse model. However, this would be an important test we would want to perform to evaluate the internal reliability of the Muse model. If these price estimates were inconsistent, it would raise serious questions about the reliability of the Crane supply estimate, the Muse model or both.

46. It is, in fact, quite likely that the Muse model is very sensitive to assumed levels of crude oil production and supply in the Bakken region as well as throughout the U.S. Consequently, if either the EIA or USGS forecast for the Bakken were used in the Muse model in place of the Crane forecast, I would expect that the Muse model would show no need for the Sandpiper project and no consequent benefits for producers as a result of the construction of the Sandpiper expansion. But again, without access to the model and its inputs, neither I nor the Commission itself has any way of evaluating this alternative scenario.

47. There are still other problems with the Muse study. The Muse report did not consider all available options for consuming and transporting Bakken crude oil and has understated the capacity of those other options. By understating the capability of competing transportation and refining alternatives, it is very likely that the Muse model has been skewed to show greater benefits for the Sandpiper project than actually exist – even assuming that the production supply forecasts Muse uses are accurate.

48. For example, in discussing the potential refiners of Bakken crude oil, Muse has omitted two refineries that the North Dakota Pipeline Authority has listed as having capability to process North Dakota crude oil by 2015. These are the Dakota Prairie Refinery and the Dakota Oil

Processing Refinery. Each of these facilities has the capability of handling 20,000 bpd of Williston Basin crude oil. They were not considered by Muse, but are listed by the North Dakota Pipeline Authority as consumers of Williston Basin crude oil.[44]

49. The Muse report mentions the Hiland Partners Double H pipeline in a footnote[45] stating that it could add 46,000 bpd of additional capacity from Baker MT to Guernsey, WY. In fact the plans for this pipeline are for capacity to reach 100,000 bpd, not the 46,000 bpd assumed by Muse. Again this capacity is recognized by the North Dakota Pipeline Authority as well as trade press reports relating to the pipeline.[46] The Muse report also understates the potential capacity of the Plains Wascana Bakken North Pipeline which it states has a capacity of 50,000 bpd. The North Dakota Pipeline Authority states that this pipeline has the potential to reach 70,000 bpd capacity. These understatements of potential pipeline transportation capacity and refining consumption of Williston Basin crude represent almost half of the capacity of the Sandpiper expansion project.

50. The Muse report also understates the available rail capacity to handle Bakken crude oil. It states that in 2013 available rail capacity was 865,000 bpd when in fact the North Dakota Pipeline Authority shows that there was 965,000 bpd of rail capacity to handle Williston Basin crude oil. Furthermore, Muse states that it used a figure of 825,000 bpd of "effective rail capacity for Bakken crude" in its model for 2016 and beyond.[47] Muse does not define what it means by "effective capacity" although it claims that the capacity figure for rail makes no difference in the model because the model never uses more than that amount of current rail

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[44] Garner Attachment A.
[45] Muse report, page 28, footnote 25.
[46] "Hiland Partners Planning New Bakken Oil Pipeline: Potential Capacity of 100,000 b/d to Guernsey, WY," April 8, 2013: http://bakkenshale.com/pipeline-midstream-news/hiland-partners-planning-new-bakken-oilpipeline/.
[47] Muse report, page 40.

capacity. However, the North Dakota Pipeline Authority shows that in 2016 there will be 1,355,000 bpd of rail capacity, a figure far higher than the amount that Muse assumes in its model.

51. The assumption that the Muse model never uses more rail capacity than is currently available also calls into question the assumptions underlying the model. The model appears to treat rail capacity as always being a "second best" alternative because of its higher cost. But, Muse does not appear to ever consider other factors that could make rail transportation preferable to pipeline transportation. As I discussed previously, changes in regional crude oil price differentials can and have altered the economics of rail vs. pipeline transportation for Bakken crude in recent years and could very well do so again in the future. In addition, it is important to take into account the fact that rail facilities enable shippers to reach some refineries that pipelines simply cannot and will not reach in the future. This is particularly true for West Coast and East Coast U.S. markets where crude price differentials have in the past made it economic to ship by rail and may continue to do so in the future.[48] It is also important for any assessment of supply and demand for transportation facilities to take into account the fact that some producers and shippers of Bakken crude have invested in rail facilities, and thus have a preference to use rail as opposed to paying the cost of a new pipeline. I therefore believe that the Muse approach is defective since it appears to have artificially constrained the model it is using by limiting future rail capacity to only 825,000 bpd when in fact actual rail capacity will be significantly greater in the future and there are a number of economic factors that could well result in further utilization of rail capacity.

[48] "Who Wants an Oil Pipeline?" *Wall Street Journal*, March 4, 2014, p. B1.

52. Finally, the Muse report provides an estimate of what it considers are the benefits to producers of the Sandpiper project as a result of receiving higher prices for Bakken crude. It claims that over the period 2016-2035, producers that use the expanded Sandpiper pipeline will receive on average $0.56 per barrel more for Bakken crude and that this differential translates into a "benefit" of slightly less than $5 billion. This "benefit" is grossly overstated for several reasons. First as the Muse report points out the benefited stated is a pre-tax figure. Second it is an undiscounted number and simply reflects the multiplication of the $0.56 per barrel figure by the roughly 8.67 billion barrels that will be produced over time.[49] To determine the economic value today we would have to discount this figure over the life of the project which reduces the value to about $1.4 billion and on after-tax basis to less than $1 billion.[50] Of course, these corrected figures still utilize what appear to be faulty and erroneous assumptions and inputs into the Muse model which have the effect of overstating any beneficial impact of the Sandpiper project.

53. Given these flaws and apparent errors in the Muse report, I do not believe that it should be relied upon as the basis for concluding that the Sandpiper project is needed or will confer benefits on Bakken producers or shippers. What is known is that uncommitted shippers will pay a much higher rate for transportation than they are currently paying and that there is no demonstrable need for the additional capacity the Sandpiper pipeline would provide. The existing pipeline has not been in continual prorationing and most shippers do not want or need this new pipeline. Moreover, other viable transportation options exist, and the project shifts virtually all of the throughput risk onto a group that has stated that it does not need or want to pay for the project – the uncommitted shippers. In my opinion existing shippers will not see any

[49] This is confirmed at page 11, footnote 10 to the Muse report.
[50] This calculation assumes a 12% discount rate and a 35% tax rate.

benefits from this new pipeline and should not be required to pay for it, let alone pay for what appears to be a highly disproportionate share of that new capacity.

I, Peter K. Ashton, state under penalty of perjury that the foregoing is true and correct to the best of my information and belief.

Peter K. Ashton

March 13, 2014

ATTACHMENT A

Peter K. Ashton

Peter K. Ashton is a senior consultant with Premier Quantitative Consulting, Inc. and previously founded and was the president of Innovation & Information Consultants, Inc. Prior to founding Innovation & Information Consultants, Inc., Mr. Ashton was a senior consultant with Putnam, Hayes & Bartlett, Inc. and Charles River Associates Incorporated. He has directed major consulting projects for private clients as well as in the public sector. Mr. Ashton's primary fields of expertise are the economic analysis of energy industries, regulatory and transportation economics, valuation and transfer pricing issues. A sample of Mr. Ashton's work in these areas includes the following.

Regulatory Analysis, Expert Testimony and Litigation Support

- Mr. Ashton has assisted numerous ratepayers and ratepayer groups in various regulatory proceedings and investigations involving the analysis of revenue requirements, cost of service models, estimates of a reasonable rate of return, analysis of operating costs, cost allocation methods, functional analysis of costs and rate design methodologies.

- Mr. Ashton provided expert testimony before the Federal Regulatory commission (FERC) on various issues related to a refined products pipeline's request for a rate increase in its regulated markets. Mr. Ashton analyzed the rate design methodology employed by the pipeline's rate design expert and Mr. Ashton demonstrated how that rate design methodology led to cross subsidization between market-based rate destinations and regulated destinations. He quantified the magnitude of the cross subsidization, and offered an alternative approach to rate design that eliminated any subsidization. In addition, Mr. Ashton criticized the approach taken by the pipeline to transfer certain regulated assets to a non-regulated entity and the corresponding charge-back fee that was assessed by the non-regulated entity to the regulated entity. His testimony and advice to the client provided the basis for a successful settlement of the matter shortly prior to hearing.

- Mr. Ashton recently testified before the California Public Utilities Commission in a pipeline rate proceeding in which he computed the cost of service and just and reasonable rates for a crude oil pipeline that had recently been declared a common carrier. He developed a cost of service model and a fully allocated cost model to design rates for the pipeline. Mr. Ashton also developed a just and fair rate of return for the pipeline based on a proxy group analysis. He also critiqued the rate design model and the cost of service analysis of the opposing expert.

- He opined regarding the just and reasonable rates for a major refined products pipeline system in California before the California Public Utilities Commission in two separate proceedings. Mr. Ashton developed a cost of service model and projected future anticipated throughput as part of his rate analysis. He criticized the rate of return model used by the pipeline's expert and showed that a reasonable rate of return was 250 basis points lower than claimed by the pipeline. He also

demonstrated that the overhead cost allocation model used by the pipeline was flawed and led to subsidization between regulated and unregulated affiliates. Finally, he developed a rate design model and showed that just and reasonable rates should be 20-25% lower than what the pipeline was charging.

- Mr. Ashton testified before the Maine Public Utilities Commission regarding rate design, the functional allocation of costs and the cost of service for a utility that served both regulated and unregulated markets. Mr. Ashton demonstrated the existence of cross subsidization between the regulated and unregulated markets and the harm imposed on ratepayers.

- Mr. Ashton testified in a rate case before FERC involving the calculation of just and reasonable rates for an interstate common carrier refined products pipeline in the southwest. Mr. Ashton's analysis focused on determining the appropriate rate of return, analyzing the just and reasonable operating expenses of the pipeline including allocation of overhead expenses, and projecting throughput volumes on the pipeline taking into account the temporary impact of the economic recession on the demand for petroleum products. Mr. Ashton also provided rebuttal testimony on these issues, and provided assistance to attorneys in the cross examination of other expert witnesses.

- Mr. Ashton provided expert testimony before the Maine Public Utilities Commission regarding the rates charged by a regulated water transportation carrier who also provided unregulated service. He analyzed the regulated entity's revenue requirement and found that it was including costs for the regulated entity that should be allocated to the non-regulated subsidiary. He also testified that the entity's cost allocation model was flawed and the revenue and plant factors were skewed to allocate an unreasonable level of costs to the regulated entity.

- Mr. Ashton provided expert analyses regarding the FERC's policy regarding the calculation of the rate of return on equity for oil pipelines. He assisted in the development of various position papers, provided comments on the submissions of others and researched the impact of the proposed rule on oil pipeline ratemaking. He also analyzed the results of a similar proceeding held earlier by the National Energy Board and commented on the pros and cons of each proposed approach.

- He testified twice in U.S. Tax Court regarding the nature of the formula used to compute the Windfall Tax enacted by the U.K. government in 1997. The issue was whether the tax was imposed on the difference between two values for recently privatized companies, and as a result whether the tax constituted a tax on value not a tax on income. Mr. Ashton opined that the formula was indeed a valuation formula based on a market multiples or capitalized earnings valuation methodology and thus was a valuation tax not an income tax. He also testified regarding generally accepted valuation methodologies commonly used in the appraisal business.

- Mr. Ashton testified regarding the fair market value of various leasehold interests held by a major integrated oil and gas producer. He analyzed the value of certain leases in the Alaskan Outer Continental Shelf (OCS) area that had been purchased in the late 1980s. Based on his analysis, Mr. Ashton found that these leases no longer had any value as of 1992 as most other companies had relinquished their interests and all exploratory activity had ceased in this remote area. He also analyzed the cost to develop resources in this area, and demonstrated that it would take oil prices in excess of $125 per barrel to make these leases economic as of 1992.

- Mr. Ashton prepared an expert report and testified regarding the value of crude oil produced in the Gulf of Mexico, and evaluated the cost of transporting this crude oil to onshore marketing points. He evaluated the prices reported by producers of crude oil in this area, and reviewed various transactions relating to this crude oil to determine the market value of this crude oil. He developed estimate of damages in this matter as it relates to the proposer determination of the value of crude oil.

- Mr. Ashton has prepared expert reports and testified on numerous occasions in cases involving the computation of lost earnings, lost profits, and other economic losses associated with wrongful death, personal injury and a variety of breach of contract claims and other claims of business loss. He has estimated lost profits using various methods and he has also developed various models of earnings capacity in different professions. He has also commented on the expert reports of others and provided assistance in the analysis of such reports, including cross examination of opposing experts.

Public Policy and Tax Issues

- Coauthored a major study that examined the impact of antitrust enforcement activity relating to merger and acquisition activity on small businesses in several industries. Mr. Ashton utilized empirical data to analyze both pre- and post merger industry structure to assess the effects of divestiture and other enforcement actions, as well as situations in which no enforcement activity occurred. Major findings included the fact that enforcement activity had less of an impact than exogenous factors in changing market structure and performance.

- Mr. Ashton has performed a detailed analysis of the impacts of deepwater royalty relief on leasing, exploration and production in the Gulf of Mexico. This study involved the use of econometric models of MMS leasing behavior that analyzed the impacts of competition, royalty relief, changes in technology, movement in oil and gas prices and numerous other factors on lease bonus bids and the number of leases sold. Mr. Ashton also projected future impacts of various royalty relief scenarios on royalty and lease bonus revenue as well as impacts on future exploration, development and production of oil and gas resources in the Gulf of Mexico.

- Assisted various gasoline and heating oil dealers understand the causes for price volatility in the market, and the role that various factors including crude oil pricing, demand, speculation in futures trading, and other factors may have had on the increase in spot prices for these products at various points in time.

- For the U.S. Small Business Administration, Mr. Ashton directed a study that examined the differential impact of the trend toward electronic commerce and procurement by the federal government. The study concluded that small firms generally are less effective in taking advantage of e-business and e-procurement tools, although small firms are making improvements in their ability to attract business via the web.

- Mr. Ashton has analyzed various cost sharing agreements in the pharmaceutical and medical products industries and associated buy-in and buy-out payments for the transfer of intellectual property related to these agreements. Mr. Ashton has valued the intangible property under these agreements and estimating the reasonably anticipated benefits accruing from such intangibles. He has computed running royalty payments and lump sum payments as compensation for the buy-in and buy-out payments.

- Mr. Ashton completed an expert report valuing various intangible assets transferred by a domestic parent to various foreign corporations for purposes of developing an appropriate arm's length royalty rate consistent with the Section 482 transfer pricing regulations. He examined the relative profitability contributed by these intangible assets domestically and also applied a CPM approach to the application of the intangibles in various foreign markets. He also reviewed and assessed the Section 6662 transfer pricing report of the taxpayer.

- He analyzed the fair market value of the worldwide assets of a major multinational company for purposes of determining an appropriate method and basis for allocating interest expense under Section 861 of the IRS regulations. Mr. Ashton has provided expert advice to the Treasury Department on this issue, pointing out the need for consistency with the relevant regulations and use of appropriate valuation methods.

- Prepared expert analyses computing an arm's length royalty consistent with Section 482 of the IRS regulations for various intangible assets transferred under a licensing agreement between a domestic parent and a foreign subsidiary. The work involved estimating the value of the technology being transferred and determination of an appropriate royalty rate.

- Analyzed the impact of various tax expenditure programs on small and large firms. Mr. Ashton utilized detailed data from the Treasury to assess the impact on effective tax rates of various

programs such as foreign tax credits, low income housing credit, accelerated depreciation, and the business means and entertainment tax deduction.

Business Strategy Studies

- For an oil producer, Mr. Ashton evaluated a proposed sliding scale royalty agreement for leasehold interests that were pegged to future oil prices. Mr. Ashton analyzed the most likely royalty payment under the proposed scheme given information on projections of crude oil prices, inflation and production costs over the next ten years. He analyzed alternatives to the proposed royalty schedule and quantified the effect of these alternatives on the estimated royalty payments.

- Prepared a detailed study of crude oil marketing in the United States and changes which have occurred in the manner in which crude oil is bought, sold, and traded over the last twenty years. Examined the manner in which crude oil is shipped throughout the country, and the impact of transportation alternatives on marketing options. Also compiled a large database on spot and other relevant crude oil prices and data on quality adjustment factors for use in evaluating various crude oils. Provided supplemental analyses regarding specific market areas in the United States including the Rocky Mountain producing area.

- Mr. Ashton completed a forecast of supply and demand factors influencing future oil and gas development and production activity in the Rocky Mountain states. This work included an analysis of the demand and supply for crude oil and refined products in the Rocky Mountain states, including imports of refined products from states outside the area. He also examined the role of Canadian imports into the Rocky Mountain area and projected the demand for such imports over the next 40 years.

Mr. Ashton received an A.B. degree in Economics and Political Science from Colby College (*magna cum laude* and *Phi Beta Kappa*) in 1976, and received an M.I.A. degree in International Economics and Business from the School of International Affairs at Columbia University in 1978.

Publications and Speeches (Last 10 Years)

Modeling Exploration, Development and Production in the Gulf of Mexico, U.S. Department of Interior, Minerals Management Service, Environmental Studies Program, Herndon, VA, OCS Study MMS 2—4-018, March 2004.

The Impact of Tax Expenditure Policies on Incorporated Small Businesses, with Justin White, U.S. Small Business Administration, Office of Advocacy, Washington, D.C., April 2004.

Trends in Electronic Procurement and E-Commerce and Their Impact on Small Business, with Mary Ann Buescher, U.S. Small Business Administration, Office of Advocacy, Washington, D.C., June 2004.

Report on Gasoline Pricing in Florida, with Dr. Keith Leffler, prepared for the Office of the Attorney General, State of Florida, June 2005.

Effects of Royalty Incentives for Gulf of Mexico Oil and Gas Leases, U.S. Department of Interior, Minerals Management Service, Economics Division, Herndon, VA, OCS Study MMS 2004-077, September 2005.

An Empirical Approach to Characterize Rural Small Business Growth and Profitability, with Lee O. Upton and Meghan Overom, U.S. Small Business Administration, Office of Advocacy, Washington, D.C. December 2005.

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"The Crude Oil Price Bubble of 2008: The Role of Speculators and Devalued Dollars," with Meghan O. Law, IIC, Inc. Working Paper, 2009; updated 2011.

Testimony (Last 4 Years)

Application of San Pablo Bay Pipeline Company, LLC for Approval of Tariffs for the San Joaquin Valley Pipeline, A.08-09-024 et al., prepared answering testimony, filed December 2009; reply testimony, filed March 2010; trial testimony, May 2010.

Application of SFPP, L.P., A.09-05-014 and A.08-06-008, prepared answering testimony, filed December 2009.

Enbridge Pipeline's Application for Approval of Incentive Toll Principles of Settlement for the Year 2010 and Final 2010 Tolls and Tariffs for the Enbridge Mainline System, in the Matter of Hearing Order RH-2-2010, Sworn Affidavit and Prepared Written Testimony, August and September 2010.

James B. Crook v. Hawk Scallop, Inc., C.A. No. 09-10682-RWZ, Expert report, August 2010, and trial testimony, January 2011.

Mark Henderson v. Atlantic Pelagic Seafood, LLC, CV-00068-DBH, Expert report, January 2011, trial testimony, February 2011.

Commonwealth of Kentucky v. Marathon Petroleum Corporation et al., Sworn affidavits and oral testimony in a matter relating to Motion for Temporary Injunction in Civil Action No. 07-CI-00751, May 2011.

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Enterprise TE Products Pipeline, Docket No. IS12-203-000, Answering testimony, October 2012; cross-answering testimony, November 2012.

Application of SFPP, L.P. to Change Rates for Pipeline Transportation Service, A.12-01-015, Direct testimony, November 2012, Reply and Supplemental Reply testimony, February 2013, and Rebuttal testimony, April 2013.

Pramer Oyster Company, Inc., et al. v. Patriot Marine et al., Expert report, May 2013; deposition testimony, June 2013.

Document Content(s)

Concord, Enserco, EnWest, WPX Protest for NDP Petition.PDF.....1-209

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENTS "L"

L-1 FOH MCEA 4.22.15 Appellate Court Brief

Friends of the Headwaters and the Minnesota Center for Environmental Advocacy Brief to the Minnesota Appellate Court resulting in unanimous decision later upheld by the Minnesota Supreme Court for a full EIS on Enbridge's proposed new pipelines in Minnesota.

L-2 FOH MCEA 5.21.15 Gunton Evaluation of SP-L3 DSDD

Report: "Evaluation of Minnesota Draft Scoping Decision Document for Sandpiper Pipeline Project" by Dr. Thomas Gunton, Director, Resource and Environmental Planning Program, Simon Fraser University

L-3 FOH MCEA 5.26.16 Comments SP-L3 DSDD

Friends of the Headwaters and the Minnesota Center for Environmental Advocacy Comments on the Minnesota Department of Commerce's Sandpiper and Line 3 Draft Scoping Decision Document

I. INTRODUCTION

This case presents a simple question of statutory interpretation. The Minnesota Environmental Policy Act ("MEPA") mandates environmental review for governmental actions with the potential for significant environmental effects, such as pipelines proposed to carry over one millions gallons of crude oil per day across Minnesota in a specific location. And MEPA prohibits final decisions related to those actions until environmental review is complete. Here, there is no question that Intervenor Respondent North Dakota Pipeline Company ("NDPC") has proposed a project that requires a major governmental action from Respondent Minnesota Public Utilities Commission (the "Commission"). NDPC has proposed a large petroleum pipeline that requires a route permit from the Commission and route permits require environmental review. This is not in dispute.

But the Commission issued an Order in this case indicating that it was going to proceed with a final governmental decision on a certificate of need before this mandatory environmental review is complete. To avoid this MEPA violation, Relator Friends of the Headwaters requested MEPA-compliant environmental review, namely an Environmental Impact Statement, as part of the certificate-of-need proceeding. But the Commission denied this request. The Commission instead ordered a level of environmental review that is foreign to MEPA and insufficient to discharge the prohibition against final governmental decisions related to the project. The Commission's Order allowing the final governmental decision on a certificate of need to proceed absent mandatory environmental review violates MEPA and must be reversed.

II. STANDARD OF REVIEW

Respondents erroneously state the standard of review as something other than de novo. Respondents focus solely on the deference that agencies deserve when a court is asked to review an agency decision involving facts within its area of expertise or involving a reasonable

interpretation of an unclear rule. *See*, *e.g.*, *In re Annandale NPDES/SDS Permit Issuance*, 731 N.W.2d 502, 515 (Minn. 2007) (noting that deference is appropriate when an agency is interpreting an ambiguous regulation); *In re Excess Surplus Status of Blue Cross & Blue Shield of Minn.*, 624 N.W.2d 264, 278 (Minn. 2001) (describing when an agency decision within its unique field of expertise is due deference). But neither of these situations is present in this case: the statute and rule are unambiguous and the Commission's decision did not rely on facts within its area of expertise.

This singular focus on agency deference ignores the proper standard of review when, as here, an error of law stems from the misapplication of a statute. "We retain the authority to review de novo errors of law which arise when an agency decision is based upon the meaning of words in a statute." *In re Denial of Eller Media Co.'s Applications for Outdoor Adver. Device Permits*, 664 N.W.2d 1, 7 (Minn. 2003). In these situations, this Court need not defer to the agency. "When a decision turns on the meaning of words in a statute a legal question is presented. In considering such questions of law, reviewing courts are not bound by the decision of the agency and need not defer to agency expertise." *St. Otto's Home v. Minn. Dep't of Human Servs.*, 437 N.W.2d 35, 39-40 (Minn. 1989) (citations omitted). Because this case involves the interpretation of the plain meaning of a statute, the proper standard of review is de novo.

III. RESPONDENTS HAVE FAILED TO ADDRESS THE FUNDAMENTAL QUESTION IN THIS APPEAL.

MEPA prohibits any "final governmental decision . . . to grant a permit, approve a project, or begin a project" until environmental review is complete. Minn. Stat. § 116D.04, subd. 2b. Rather than addressing the fundamental question raised on appeal, which is whether the Commission can grant a certificate of need for a pipeline before environmental review has been completed, Respondents try to confuse the issue. Respondents try to avoid application of

subdivision 2b by claiming that separate environmental review is not required for a certificate of need for a pipeline. But whether environmental review would be required for a pipeline seeking *only* a certificate of need is not a question the Court needs to reach in this appeal. The question before the Court is whether a certificate of need can be granted for a pipeline subject to environmental review *before* the required environmental review takes place.

A. The Prohibition In Subdivision 2b Of MEPA Applies To The Sandpiper Pipeline Project.

MEPA states that "[i]f an environmental assessment worksheet or an environmental impact statement is required for a governmental action under subdivision 2a, a project may not be started and a final governmental decision may not be made to grant a permit, approve a project, or begin a project until" environmental review is complete. Minn. Stat. § 116D.04, subd. 2b. Respondents attempt to avoid application of this prohibition by claiming that no environmental impact statement ("EIS") is required under subdivision 2a. But this position contradicts the plain language of the statute and Respondents' own arguments.

All of the parties agree that the Sandpiper Pipeline Project will be subject to environmental review under MEPA. Relator and Respondents all agree that environmental review under MEPA is mandatory for pipelines such as the Sandpiper Pipeline Project. For example, the Commission states on page 22 of its brief that "[c]onsistent with [MEPA's] mandate, environmental review on the proposed Sandpiper Pipeline project will occur as part of any route permit proceeding conducted under Minn. Stat. § 216G.02 and Minn. R. Ch. 7852" and NDPC states at pages 23-24 of its Brief that "the required EIS-equivalent environmental review occurs at [the route permit] stage." This mandate referred to by both Respondents is contained in subpart 24 of Rule 4410.4400, which states that "[f]or routing of a pipeline subject to the full route selection procedures under Minnesota Statutes, section 216G.02, the Public Utilities

Commission is the RGU." The "governmental action" referred to in section 2b is granting or denying NDPC's route permit which is a mandatory EIS category. Accordingly, "an environmental impact statement is required for governmental action under subdivision 2a." *Id*.

Relator and Respondents also agree that the Environmental Quality Board ("EQB") is authorized to establish alternative review procedures and that it did so for pipelines. Relator and Respondents further agree that this alternative environmental review, known as the comparative environmental analysis, or "CEA," has not yet been completed and, according to the Commission's October 7, 2014 Order at issue here will not be completed until *after* the Commission makes a final decision on the certificate of need.

To avoid application of the prohibition on final governmental decisions contained in MEPA, Respondents attempt to divorce the certificate of need for a pipeline from the pipeline project as a whole. Despite recognizing that MEPA is project-based and that the "determination of whether a project requires environmental documents shall be made by reference to the physical activities to be undertaken and *not to the governmental process* of approving the project," NDPC repeatedly refers to the certificate of need for a pipeline as "standing alone" and fails to view the project as a whole. (NDPC Brief pp. 23-24.) This theoretical situation where a certificate of need application is pending absent a route permit application is not present here and need not be addressed.

Rather, there is a route permit application pending and there is mandatory environmental review. This satisfies the first clause of subdivision 2b requiring subdivision 2a to apply to a proposed action. The fact that subdivision 2a applies to the Sandpiper Pipeline Project cannot be disputed. The sole dispute, therefore, is the legal question of whether subdivision 2b of MEPA prohibits the Commission from proceeding with a decision on NDPC's application for a

certificate of need *before* this mandatory environmental review is complete. There is no need to reach the question of whether, in some hypothetical vacuum, an EIS for a stand-alone certificate of need would be required under MEPA. We are not in a vacuum and everybody agrees that MEPA requires environmental review of a pipeline project of this magnitude.

B. A Certificate Of Need Is A "Final Governmental Decision" To Grant A "Permit" And Is Prohibited Under MEPA Until Environmental Review Is Complete.

The fact that the Sandpiper Pipeline Project is subject to environmental review establishes the applicability of Minn. Stat. § 116D.04, subd. 2b. The only issue on appeal, therefore, is whether the certificate of need decision underway at the Commission is a prohibited "final governmental decision" to "permit" a project absent environmental review. The answer to this question is clearly "yes." Respondents offered no argument as to why a certificate of need does not meet these definitions because there is no such argument.

1. A certificate of need is a "permit."

MEPA prohibits a "final governmental decision" to grant a "permit" whenever environmental review is required under MEPA. A permit is defined to include "a permit, lease, license, *certificate*, or other entitlement for use or permission to act that may be granted or issued by a governmental unit." Minn. R. 4410.0200, subp. 58 (emphasis added). Neither Respondent offered an argument that a certificate of need does not meet this definition.

2. A certificate of need is a "final governmental decision."

Granting a certificate of need for a project is a "final governmental decision" prohibited under subdivision 2b of MEPA. Respondent Commission does not refute this, and Respondent NDPC conflates the definition of a "major governmental action" in Minn. Stat. § 116D.04, subd. 1a with a "final governmental decision" referenced in subdivision 2b of MEPA. (*See*, *e.g.*,

NDPC Brief at 21 referencing a "final governmental action"—a term that appears nowhere in the statute.)

It is clear that a governmental decision—such as whether or not to grant a certificate of need—does not have to be a "major governmental action" to be considered a "final governmental decision" under subdivision 2b. Nothing in a plain reading of the statute or applicable rules limits a "final governmental decision" referenced in subdivision 2b of MEPA to "major governmental actions" described in subdivision 2a of MEPA. Rather, the use of these different terms indicates the opposite. "When the Legislature uses different words, we normally presume that those words have different meanings." *Nelson v. Schlener*, 859 N.W.2d 288, 294 (Minn. 2015); *see also Citizens Advocating Responsible Development v. Kandiyohi Cnty. Bd. Of Comm'rs*, 713 N.W.2d 817, 829-30 (Minn. 2006) (determining in the context of MEPA that the phrases "cumulative impacts" and "cumulative potential effects" have different meanings).

Relator agrees with Respondents that if a MEPA-triggering project had not been proposed, final governmental decisions on permits or approvals would not be prohibited under subdivision 2b. For example, leases for mineral rights can be issued by the State without violating MEPA when no on-the-ground activity has been proposed. *See In re Envtl. Assessment Worksheet for 33rd Sale of Metallic Leases*, 838 N.W.2d 212, 216 (Minn. Ct. App. 2013) ("*Metallic Leases*"). In contrast, if a mine or mineral exploration activity falling into a mandatory EIS category had already been proposed, a lease for the land on which it would be built would be a final governmental decision and would be prohibited under subdivision 2b. Here, we have a scenario akin to this second hypothetical. The question is not whether a stand-alone lease or a stand-alone certificate of need triggers MEPA. The question is whether a certificate of need can be granted or denied given that a pipeline falling into a mandatory EIS category has already been

proposed and the mandatory environmental review has not been completed. Neither the Commission nor NDPC offered any authority to suggest that this would be allowed.

NDPC cites one unpublished case to assert that a certificate of need could be granted before mandatory environmental review has been completed. (NDPC Brief at 24-25 citing *In re Application of Great River Energy*, No. A09-1646, 2010 WL 2266138 at *4 (Minn. Ct. App. June 8, 2010)). But *Great River* is not analogous. Relators in that case were challenging the adequacy of the environmental report after a certificate of need had been issued. *Great River*, 2010 WL 22661138 at *4. The court distinguished the level of detail that was in the environmental report under scrutiny from the environmental review that would occur at the route stage, but the court did not address and the relators did not assert that MEPA was violated because the certificate of need was granted before mandatory environmental review had occurred. *Id.* This is because the rules governing environmental review of transmission lines are different in a critical way: the EQB-approved environmental review for transmission lines occurs at *both* the certificate of need and the route stage. *See* Minn. R. 4410.4400, subp. 6 (stating that "[f]or construction of a high voltage transmission line, environmental review shall be conducted according to parts 7849.1000 to 7849.2100 (certificate of need rules) and 7850.100 to 7850.5600 (route permit rules)). The fact that the court affirmed a certificate of need for a transmission line *after* the mandatory environmental review for that project had been completed is irrelevant to the question raised by this appeal. The question here is whether the certificate of need can be granted *before* that review occurs.

In addition to the lack of statutory or case law authority that would allow the Commission to proceed in the manner it did here, the prior orders of the Public Utilities Commission cited by NDPC were not issued in cases analogous to this case. (*See* NDPC Brief at 20-21.) In fact, no

party can point to a case where the certificate of need decision was bifurcated from the route permit decision and where the Commission ordered the certificate of need decision to proceed first in time and in the absence of the environmental review that would accompany the route permit decision. There simply is no precedent for what the Commission has ordered in this case.

C. Relator Sought Compliance With MEPA By Requesting An EIS For The CON

Respondents have substituted Relator's request to the Commission for an Environmental Impact Statement prior to the certificate of need for Relator's issue raised on appeal. Relator's legal issue raised on appeal is stated on page two of its principal brief: "Was the Public Utilities Commission's determination to proceed with a final decision on a certificate of need for a large oil pipeline without first complying with the Minnesota Environmental Policy Act contrary to law?" This remains the question on appeal and the question that neither Respondent has squarely addressed. Instead, Respondents focus on Relator's request to the Commission for a potential remedy to this statutory violation. This statutory violation could have been avoided by conducting MEPA-compliant environmental review before the certificate of need proceeding commenced and this is what Relator requested and what the Commission denied in its October 7, 2014 Order and December 5 denial of reconsideration.

The prohibition in subdivision 2b of MEPA would not apply and Relator would not have brought this appeal if either an EIS or EIS-equivalent had been prepared to inform the certificate of need decision. Relator believes that an EIS is more appropriate environmental review than the CEA at this stage because it is unclear how the Commission could ensure compliance with the CEA provisions, contained in chapter 7852, outside of the route permit proceeding.[1] It *is* clear,

[1] While Relator requested an EIS, Relator does not assert in this appeal that this would have been the only mechanism by which the Commission could have complied with MEPA. It is possible

on the other hand, that an EIS would comply with MEPA and Relator therefore requested an EIS. What is also clear is that the Commission's decision to deny the request for an EIS and to fail to order MEPA-compliant environmental review to be completed *before* the certificate-of-need proceeding commenced violates MEPA and must be reversed.

Contrary to assertions in NDPC's brief, Relator did not request and is not requesting duplicative environmental review at *both* the certificate of need and the route permit stage. Relator is challenging the Commission's decision to proceed with the certificate of need without conducting the mandatory environmental review under MEPA. Relator agrees that if an EIS or EIS-equivalent had been ordered by the Commission instead of the "high-level" review not recognized under MEPA there would be no need for a similar level of review at the route permit stage.

IV. EVEN IF THE COURT ADOPTED RESPONDENTS' INACCURATE INTERPRETATION OF MEPA, THE COMMISSION'S ORDER MUST STILL BE REVERSED BECAUSE A CERTIFICATE OF NEED IS A "MAJOR GOVERNMENTAL ACTION" UNDER SUBDIVISION 2A.

Even though it is not necessary to determine if a certificate of need, in the absence of a route permit, would warrant an EIS, it is clear that in this case it would. "Where there is potential for significant environmental effects resulting from any major governmental action, the action shall be preceded by a detailed environmental impact statement prepared by the responsible governmental unit." Minn. Stat. § 116D.04, subd. 2a. A "governmental action" is defined as "activities, including projects wholly or partially conducted, permitted, assisted, financed, regulated, or approved by units of government including the federal government." *Id.* subd. 1a(d). Respondents claim that making a final decision on a certificate of need, "standing alone,"

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that the steps in chapter 7852 approved by the EQB as an EIS alternative could occur at the certificate of need stage. That is a question that the Commission will need to address on remand.

would not meet the definition of a "major governmental action" because it is not a "project." This is incorrect.

A. A Pipeline Of The Magnitude Of The Sandpiper Pipeline Is A Project With The Potential For Significant Environmental Effects.

A "Project" is defined in EQB rules as "a governmental action, the results of which would cause physical manipulation of the environment, directly or indirectly. The determination of whether a project requires environmental documents shall be made by reference to the physical activity to be undertaken and *not to the governmental process of approving the project*." Minn. R. 4410.0200, subp. 65 (emphasis added). NDPC recognizes that MEPA is project-based and that "environmental review provided for in the rules will apply to the project as a whole." (NDPC Brief at 21, 22 n. 4.) Yet despite this recognition, Respondent nevertheless argues that in a hypothetical situation when a pipeline company applies for a certificate of need for a large petroleum pipeline without also applying for a route permit, *no* environmental review would be necessary. The Commission similarly asserts that there is no "project" proposed in this case and therefore environmental review is not necessary. To make these arguments Respondents distort the certificate of need proceedings and the questions addressed therein.

The Commission refers to the certificate-of-need proceedings as determining a "generic need for the proposed facility" and argues that because it ordered system alternatives to be considered as part of the certificate-of-need proceeding there are no "actual definite, site-specific plans for anything" including, presumably, NDPC's proposed project. (Commission Brief at 34, 34 n. 16.) This argument is particularly confusing in light of the Commission's statement earlier in its Brief that "NDPC submitted the same environmental report containing the same environmental data in support of both [its certificate of need and route permit] applications." (Commission Brief at 27.) It is difficult to understand how the same environmental report could

be used to support a site-specific application requiring an EIS-equivalent review on the one hand and on the other hand be devoid of any site-specific information. Similarly, NDPC ignores its own application for a certificate of need and claims that "any system alternatives considered at the certificate-of-need stage are not site-specific locations but are alternative modes of transportation (*e.g.*, truck and rail) or as in this case, alternative two-mile-wide corridors somewhere within which a pipeline could be routed." (NDPC Brief at 24.) Both Respondents distort the certificate-of-need determination in making these assertions.

First, the certificate-of-need rules require consideration of "the effect of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives" and "the effect of the proposed facility, or a suitable modification of it, upon the natural and socioeconomic environments compared to the effect of not building the facility." Minn. R. 7853.0130 B(3), C(2). If the certificate-of-need determination were truly "generic" with no site-specific information, it would be impossible to comply with this rule. But it is possible to comply with this rule just as it would be possible to conduct environmental review prior to making a decision on a certificate-of-need application. Indeed, NDPC already

> submit[ted] data into the record that it had gathered regarding the additional costs and environmental demands that would be posed by the system alternatives in terms of added pipe length, associated facilities, power usage, and costs. The Company also submitted broad level environmental data it gathered from publicly available information on the system alternatives in a series of tables demonstrating, e.g., the number of stream crossings, perennial waterbodies, wetlands, state forest lands, and other factors.

(Add. at 8.) NDPC provided all of this information while maintaining the no environmental review was necessary. It does not follow from these actions that environmental review that would have complied with MEPA is impossible at the certificate-of-need stage.

Second, the certificate-of-need decision in this case, perhaps more so than in past certificate-of-need proceedings, is tied to the location of the pipeline. In its comments opposing the Commission's ultimate decision to include system alternatives in the certificate-of-need proceeding NDPC argued that the "rules do not contemplate allowing different endpoints to be proposed by parties, only the location of the pipeline between the endpoints. . . . The starting and ending points of a route are of vital importance to all applicants, because these points define the purpose of a proposed pipeline." (R-473 Doc. 243 at 6.) NDPC opposed consideration of the system alternatives because they "fail[] to connect at either Tioga, North Dakota; Clearbrook, Minnesota; or Superior, Wisconsin." (R-473 Doc. 243 at 16.) NDPC was therefore not requesting a "generic" determination of need but rather the need for a pipeline to be placed within a specific corridor in Minnesota. But the Commission rejected NDPC's arguments that the need for a pipeline should be limited to its proposed corridor and instead forwarded the system alternatives to the certificate-of-need proceeding concluding that the rules "allow[] a party or individual who proposes an alternative to the Company's proposed facility to provide evidence in the certificate of need proceeding showing that the alternative can better achieve the claimed need articulated by the applicant, or that the claimed need is not reasonable." (Add. at 7.) Accordingly, the decision to be made by the Commission in the certificate-of-need proceeding is a determination of which location, namely the start and end points for the pipeline that determine the corridor, will best meet NDPC's stated need. This decision will necessarily eliminate from consideration certain proposed corridors for the pipeline and is therefore site-specific.

Respondents' attempts to distort the question to be addressed during the certificate-of-need proceeding fail to change the definition of a project under MEPA. A project refers to the on-the-ground activity proposed and not any particular governmental approval. Minn. R.

4410.0200, subp. 65. The Sandpiper Pipeline is the on-the-ground activity proposed, it is site-specific even at the certificate-of-need stage, and it clearly meets the definition of a project.

B. The Case Relied On By The Commission And NDPC Is Inapposite

Respondents rely heavily on *Metallic Leases* to support their assertion that the Sandpiper Pipeline is not a project under MEPA. (NDPC Brief at 22-23; Commission Brief at 32-35.) This case is inapposite. Relator in *Metallic Leases* petitioned the EQB for an Environmental Assessment Worksheet ("EAW") on 63,859 acres of land offered for lease by the state. *Mineral Leases*, 838 N.W.2d at 215. At the time of this EAW petition, no mineral exploration activity or mining activity was proposed. *Id.* Moreover, the state received bids for only 9,509 of the 63,859 acres offered for lease. *Id.* The Minnesota Department of Natural Resources denied the petition for an EAW because at the time the petition was submitted, there was no "project" that could be reviewed. *Id.* This Court affirmed stating that "the proper focus is not on what activity might be allowed to take place under the mineral leases, but on what activity is actually planned." *Id.* at 219.

Here, in contrast to the facts of *Mineral Leases*, there is a project actually proposed and a route application pending at the Commission. Even if the route permit had not been submitted, which is the hypothetical situation Respondents seem to want this Court to address, the fact that a pipeline has been proposed distinguishes it from the situation in *Mineral Leases*. In *Mineral Leases*, the lease could have resulted in activity that was exempt from environmental review under MEPA. *See* Minn. R. 4410.4600, subp. 8A (including in categories of exempt activities "[g]eneral mine site evaluate activities that do not result in a permanent alteration of the environment including mapping, aerial surveying, visual inspection, geologic field reconnaissance, geophysical studies, and surveying"). There is no possibility here that granting a

certificate of need for pipeline confers the right to any activity that is exempt from environmental review. The only right a certificate of need for a pipeline confers is the right to construct that pipeline. And constructing a pipeline the size of the Sandpiper requires environmental review.

Simply put, MEPA applies to the on-the-ground activity proposed; not any particular approval. Minn. R. 4410.0200, subp. 65. Here, the on-the-ground activity is building a pipeline, not granting or denying a certificate of need. Accordingly, even if this Court were being asked to determine if a stand-alone certificate of need for a large petroleum pipeline is a "major governmental action with the potential for significant environmental effects," the answer would be "yes," and the Commission's October 7, 2014 Order would violate MEPA.

V. CONCLUSION

The language in MEPA is clear and unambiguous. The Commission cannot proceed with a "final governmental decision" related to the Sandpiper Pipeline Project until mandatory environmental review required under Minnesota Rule 4410.4400 subpart 24 is complete. The Commission's October 7, 2014 Order denying Relator's request for environmental review that would fulfill this mandate and proceeding with its final decision on the certificate of need for the Sandpiper Pipeline therefore violates MEPA. Relator respectfully requests that the Court reverse this Order and remand the case to the Commission to comply with MEPA.

Evaluation of Minnesota Draft Scoping Decision Document for Sandpiper Pipeline Project

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1. Introduction

The purpose of this report is to comment on the Draft Scoping Decision Document (DSDD) prepared by the Minnesota Department of Commerce (MDOC) for the Sandpiper Pipeline Project (the Project). We begin by providing an overview of the Project and a brief description of the proponent's justification and rationale for the Project. In our discussion of need for the Project, we assess whether the stated purpose of the Project of shipping oil to an endpoint in Superior, Wisconsin is appropriate and whether other transportation projects that ship Bakken oil to other locations should be considered as alternatives to the Project. The implications of major changes in oil markets since 2014 (principally the decline in the price of crude oil and the prospect of new pipelines coming online in the near future) are analyzed. Finally, additional social, economic, and environmental impacts that should be addressed in the Environmental Impact Statement (EIS) for the Project, but are not referenced in the DSDD, are identified.

2. Overview of Sandpiper Project

The Sandpiper Project is a proposed 616-mile oil pipeline to be constructed and operated by North Dakota Pipeline Company LLC (NDPC), a joint venture between Enbridge Energy Partners, L.P. and Williston Basin Pipe Line LLC, a subsidiary of Marathon Petroleum Corporation. The Project would transport 225 thousand barrels per day (kbpd) of crude oil from Beaver Lodge Station, south of Tioga, North Dakota, to a new terminal facility at Clearbrook, Minnesota via a 24-inch pipeline. From Clearbook, the pipeline would transport 375 kbpd of Bakken crude oil a distance of 229 miles and terminate at a terminal and tank farm in Superior, Wisconsin. The Bakken crude can then be carried via the Enbridge Mainline for delivery to refineries in the Midwest and Eastern Canada. If approved, the Project will also include construction of a new oil terminal with two 150,000-barrel tanks and pump station near the existing terminal and storage tanks in Clearbrook as well as pipeline inspection gauge launcher and receiver types and mainline valve facilities at Pine River, Minnesota.

In August 2015, the Minnesota Court of Appeals ruled that Sandpiper requires a full EIS before the state can grant a certificate of need. The state's Public Utilities Commission had authorized Sandpiper without an EIS. This has delayed the proposed start-up date of the Project to 2019.

3. Rationale for Sandpiper

The rationale for the Sandpiper Project provided in the application and testimony of Paul Eberth,[1] Michael Palmer,[2] and Neil Earnest[3] includes the following points:

- Sufficient market demand exists for the crude oil to be delivered by Sandpiper.
- Sandpiper will operate at, or close to, capacity throughout the forecast period (2016 to 2035).
- Shipper commitments for 155 kbpd of the capacity on Sandpiper indicate demand for the Project and supports commercial viability of the Project.
- Sandpiper's transport of crude oil to the Midwest and Eastern Canada markets will displace rail transportation, which is generally more costly and less efficient than pipeline transportation.
- Improved market access and lower transport costs provided by Sandpiper would provide Bakken producers with pre-tax economic benefit of approximately $5 billion over the forecast period.

4. Assessment of Need for Sandpiper

In this section, the rationale and need for the Project are assessed. This assessment shows that there are significant issues regarding the DSDD's treatment of the project's need and rationale.

4.1 Purpose of the Project

The foremost deficiency associated with the assessment of the need for Sandpiper is the unreasonably narrow stated purpose of the Project. The DSDD states, "[t]he alternative must meet the underlying purpose of the project."[4] The DSDD adopts the proponent's definition of the Project from a public notice issued in June 2013, which is "to transport growing crude oil production from the Bakken Formation in North Dakota to the Superior, Wisconsin, terminal and

[1] See Direct Testimony of Paul E. on behalf North Dakota Pipeline Company LLC, MPUC Docket No. PL-6668/CN-13-473, August 8, 2014.
[2] See Direct Testimony of C. Michael P. on behalf North Dakota Pipeline Company LLC, MPUC Docket No. PL-6668/CN-13-473, August 8, 2014.
[3] See Direct Testimony of Neil E. on behalf North Dakota Pipeline Company LLC, MPUC Docket No. PL-6668/CN-13-473, August 8, 2014.
[4] MDOC 2016, p. 6.

then connect to various other pipelines expanding access to refinery markets in the US Midwest and beyond."[5]

This definition of the purpose of the Project does not capture the Project's broader reason for being proposed, which is to transport Bakken oil to viable market destinations. By using the narrow definition of specifying Superior as a destination for Bakken oil shipments as the Project's purpose, other viable transportation alternatives that meet Sandpiper's primary objective of transporting Bakken oil to markets may be omitted from consideration.

Currently, Bakken oil is also shipped south of the Williston Basin via pipelines and rail in addition to the North Dakota Pipeline System that carries crude east to Clearbrook and then to Superior, Wisconsin. For example, the Bridger, Butte, and Belle Fourche pipelines serve refineries in Cheyenne, Wyoming, and Denver, Colorado. Further, the Palermo Rail Terminal project, designed to have an initial capacity of 100 kbpd with the flexibility to be expanded to 200 kbpd, will have direct access to the Sacagawea Pipeline and facilitate access to the East and West Coast once construction is completed. There are alternative routing options available for transporting Bakken oil to markets that do not include Superior. Therefore, the DSDD should require that the assessment of the Project take into account all current, proposed, and planned Bakken oil transportation capacity capable of shipping Bakken oil to markets instead of relying on a narrow definition of market access that excludes viable options.

Second, existing and planned Bakken transportation capacity must be compared to forecasted Bakken oil shipments in the assessment of need and rationale for the Project. A comprehensive analysis of the supply and demand for Bakken oil transportation services is essential to assess the need for Sandpiper, the existence of reasonable and prudent alternatives to Sandpiper, and whether the consequences of approving Sandpiper are more favourable than not approving it. This analysis of supply and demand for Bakken oil transportation services should be included in the Special Studies referenced in the DSDD,[6] but most critically, the results of this analysis must inform the selection of alternatives analyzed in the EIS, including the No Action Alternative.

The data on Bakken supply and demand for transportation services show why a comprehensive supply and demand analysis of Bakken transportation capacity is important. Current transportation capacity in the Bakken region exceeds oil production, and this gap is

[5] MDOC 2016, p. 6.
[6] MDOC 2016, p. 30.

expected to grow (Table 1). Even if rail capacity is excluded, there is still expected to be surplus transportation capacity of between 516 – 866 kbpd in 2020. If rail is included, the surplus capacity could exceed 2,400 kbpd.

While some degree of surplus capacity is inevitable as new pipeline projects come into operation and is beneficial to provide some degree of flexibility in the oil transportation system, the forecast surplus capacity if all projects are built is excessive: it is equivalent to about ten Sandpiper projects of unused capacity. Surplus capacity, on Sandpiper or other pipelines serving the Bakken, could impose a significant cost on the oil sector and on economies of the states the pipeline traverses, like Minnesota. Clearly not all proposed projects are needed or prudent and an evaluation of all the alternatives is necessary to determine whether Sandpiper is needed and the negative consequences of approving Sandpiper in terms of contributing to surplus transportation capacity.[7]

Table 1. Oil Transportation Supply and Demand, Bakken Region

	2016 (kbpd)	**2020 (kbpd)**
Pipeline/Refinery Capacity	851	1,541
Sandpiper	0	225
Rail Capacity	1,590	1,590
All Transportation Total	2,441	3,356
Production (February 2016)	1,118	900 – 1,250
Surplus Transportation Capacity Without Rail	**-267**	**516 – 866**
All Surplus Transportation Capacity	**1,323**	**2,106 – 2,456**

Sources: North Dakota Pipeline Authority (NDPA) (2016a; 2016b); Kringstad (2016).

The evaluation of transportation alternatives to Sandpiper should be based on a comprehensive benefit cost analysis of each option that includes all economic, social and environmental costs. It is also important that the cost comparison of existing and proposed pipelines and rail capacity be based on the marginal cost of transporting Bakken oil. To do this, it is important to distinguish between variable cost and fixed cost. For existing projects, the

[7] The proponent states that they have shipper contracts for Sandpiper that will ensure that Sandpiper capacity is used. The likelihood of fulfillment of these contractual obligations depends on the terms of the contracts, which should be assessed in the project review. However, even if the contracts ensure that Sandpiper is used, the costs of surplus capacity created by Sandpiper will still exist and will be imposed on other shippers who will lose the shipments diverted to Sandpiper.

marginal cost of shipments is just the variable cost (capital has already been invested and the capital costs are sunk costs), while for a proposed project not yet constructed the marginal cost is variable cost plus the fixed costs required to provide a return to the new capital investment. The variable cost of operating pipelines is significantly less than the fixed cost so the marginal cost of shipments on an existing pipeline will be much lower than the marginal costs for a proposed pipeline like Sandpiper[8]. The cost comparisons of alternatives provided in the proponent's application prepared by Muse, Stancil & Co. ("Muse") do not make this distinction and therefore overstate the cost of existing transportation capacity relative to proposed new capacity, such as Sandpiper. The result is that the relative benefits of the Sandpiper Project are overstated. Furthermore, the analysis of the Project does not assess the costs of any surplus capacity that Sandpiper may create. The absence of an analysis of the costs of surplus capacity as a requirement by the DSDD is a deficiency that should be remedied. Estimates of surplus capacity costs should be included in the DSDD as part of the benefit cost analysis (BCA) for the Project.

4.2 Oil Market Changes

Since the Project application and the Muse benefits analysis were submitted in 2013-14, there have been important changes in the market that impact the economic prospects for Sandpiper. The steep decline in oil prices that started in summer 2014 has lead to an enduring low oil price scenario for Bakken crude. As shown in Figure 1, North Dakota oil prices have fallen from an average of $96 per barrel (bbl) in June 2014 to about $38/bbl in January 2015. There has not been any indication of a rebound either as prices averaged less than $23/bbl in February 2016. This has led oil analysts to lower their oil price forecasts, with some forecasting that oil will remain in the $50/bbl to $70/bbl range for the next several decades (Wolak 2015). The International Energy Agency (IEA) has also recently reduced their longer-term forecasts and included a long-term low price scenario (IEA 2015).

[8] For example, Enbridge mainline pipeline variable costs average about 23% of the total pipeline cost, while the remaining 76% is required to cover fixed costs (calculated from data in Enbridge 2014). This means that the marginal cost of shipments on an existing pipeline with a toll of $3.00 per barrel would be $.69 per barrel while the marginal cost of a proposed pipeline will a toll of $3.00 would be $.69 per barrel to cover variable cost plus $2.31 per barrel to cover fixed costs of the new capital investment. The ratio of variable to fixed costs will vary among pipelines and between pipelines and other modes of transportation such as rail. Variable costs for rail shipments, for example, will be a higher proportion of total costs than for pipelines. Therefore the marginal cost analysis will need to examine the specific costs of each transportation option.

Figure 1 North Dakota Oil Price (Jan 2009 - Feb 2016)

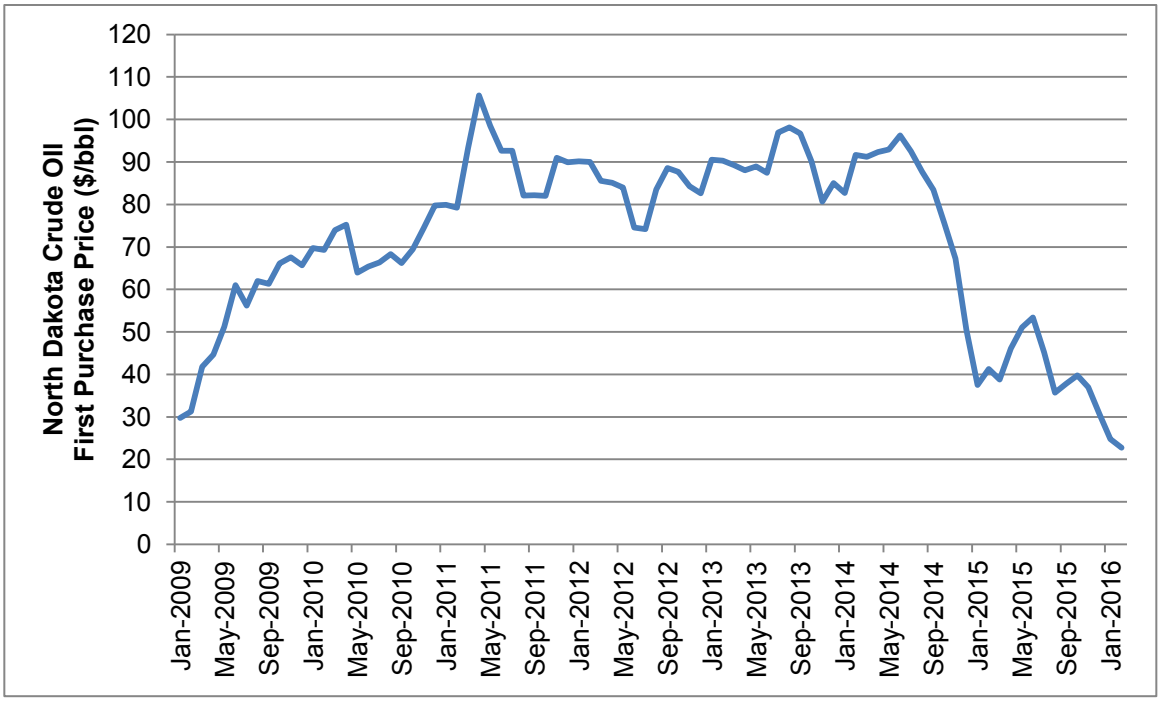

Source: EIA (2016)

The decline in oil prices has fundamentally altered the economics of investment in oil development. The U.S. Energy Information Administration (EIA) forecasts total U.S. crude oil production to decline by 800 kbpd in 2016 and 600 kbpd in 2017 (EIA 2016). In the Bakken, drilling activity has slowed as a result of the price decline from a high of 194 rigs in September 2014 to only 32 active rigs in March 2016 (Kringstad 2016). The corresponding reduction in Bakken oil production is evident from Figure 2. The sharp decline in oil prices precedes the peak in Bakken oil production, and production has since declined by approximately 216 kbpd. This downward pressure on production reduces forecast shipments and further aggravates the potential for excess transportation capacity. These changes in oil markets show that the forecast used in the Muse market analysis for the Project, which is based on pre-2014 oil prices, is no longer valid.

Figure 2 - Bakken Region Oil Production

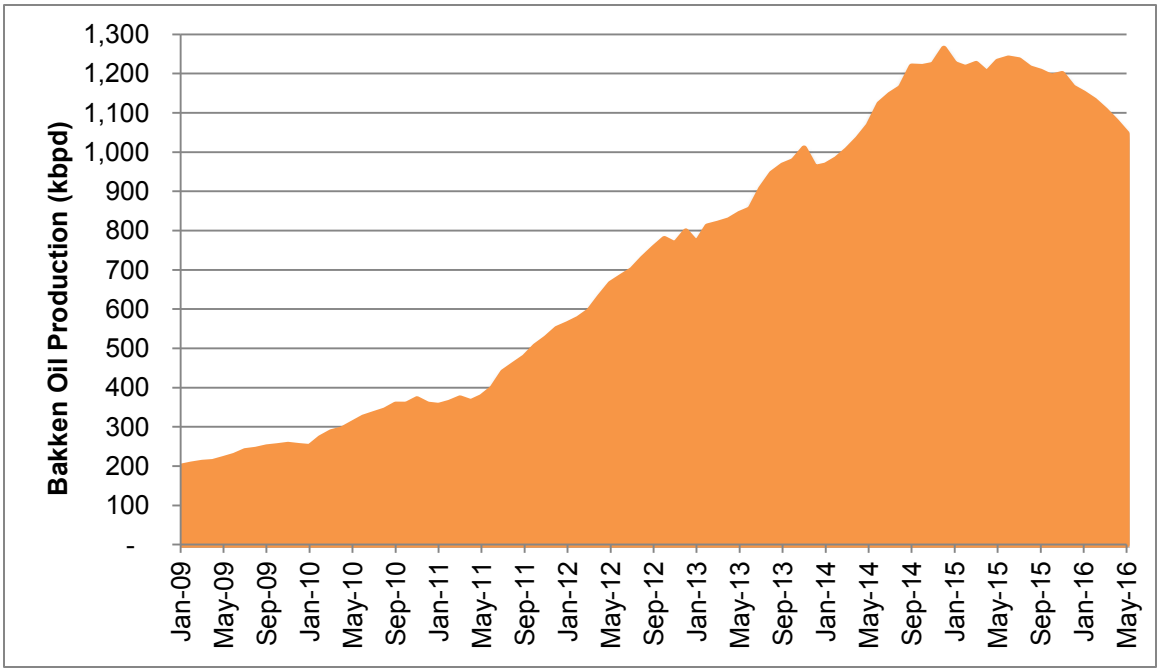

Source: EIA (2016)

The marginal cost of production relative to oil prices is an important consideration for forecasting future Bakken production levels, and therefore for evaluating transportation alternatives. It is also a critical factor in assessing the environmental and socioeconomic impacts of the No Action Alternative. If declining production levels reduce the need for transportation capacity, then the No Action Alternative addresses the same need as the proposed project: delivering appropriate volumes of Bakken crude to the refineries that demand it.

The Bakken oil formation is host to about 6,288 wells capable of producing a minimum of 400 bpd. The completed well costs of these wells are in the range of $6-8 million. However, according to Kringstad (2016), at a $35/bbl oil price and a 20% internal rate of return (after production taxes and royalties), none of the wells in the Bakken region would be economical at production levels below 600 bpd. In fact, when oil prices are $35/bbl, wells completed at a cost of $7 million must be capable of producing more than 1,000 bpd to earn greater than a 20% IRR. Only about 8% of the $6-8 million wells in the Bakken region can produce more than 1,000 bpd. In other words, the breakeven wellhead price for the majority of Bakken wells is much higher than $35/bbl (in the $45-75/bbl range). Since the North Dakota crude oil price is currently

below even the $35/bbl mark, a major rise in oil prices would be required for Bakken production to return and surpass mid-2014 levels like projected in the Muse analysis.

While our assessment points to lower Bakken production in the near term, Sandpiper could contribute to higher Bakken production volumes under certain conditions. If oil prices recover and/or producers are able to achieve deep cuts in their costs that make new investments in the Bakken region viable again, it is possible Sandpiper could result in incremental oil production by providing lower transportation costs.

4.3 New Projects Not Considered

Several of the major new projects included in the North Dakota Pipeline Authority transportation analysis summarized in Table 1 are not included in the Muse analysis submitted by the proponent in support of Sandpiper. The new projects, their expected in-service dates, and the changes in capacity omitted from the Muse analysis are shown in Table 2. All are scheduled to be in operation before Sandpiper, with the exception of the TransCanada Upland Pipeline. In total, the Muse analysis omits 628 kbpd of transportation capacity and regional refinery expansion. The largest change is due to the 450 kbpd of capacity expected to be available through the Energy Transfer Partners Bakken Pipeline in 2017. These new projects that have been proposed since the Muse analysis was completed are additional alternatives to Sandpiper that need to be assessed.

Table 2. Williston Basin Crude Oil Export Capacity Not Included in Muse Analysis

Project	In-service date	Change in Capacity from Muse (kbpd)
Butte Expansion	Q3 2014	+10*
Keystone XL Pipeline	Permit denied	-100*
Kinder Morgan Double H Pipeline	Q1 2015	+8*
Energy Transfer Partners Bakken Pipeline	Late 2016	+450
TransCanada Upland Pipeline	2020	+220
Dakota Prairie Refinery	Q2 2015	+20
Thunder Butte Refinery	2018	+20
Pipeline/Refining Total		**+628**

Source: NDPA (2016a)

*Included in Muse analysis, but capacity has changed. Difference in capacity shown.

4.4 Summary

In summary, changes in oil markets, Bakken production, and the forecast potential transportation capacity since the Muse analysis was conducted impact the rationale for Sandpiper. As discussed, the price of oil has not recovered since its collapse in 2014. A lower oil price has lead to a downturn in Bakken oil production, and as a result, the production forecast used in the Muse analysis is now too high. In addition, new proposed transportation and refinery projects could mean that, if approved, the capacity provided by Sandpiper in 2019 will contribute to costly surplus capacity. At the scoping stage, this implies that the current transportation needs for Bakken crude may be met by either No Action at all, or by alternative projects that are expected to be in operations before Sandpiper. Constructing unneeded pipeline infrastructure would impose long-term costs on the oil and gas sector, as well as costs to government in the form of lower tax revenue. For these reasons, it is essential that the DSDD include a re-evaluation of the need for the Project, a comprehensive assessment of alternatives, and an estimate of the costs of any surplus capacity created by the Project.

5. Other Issues in Scoping

We identify the following three additional omissions in the DSDD that should be required as part of the EIS for the Sandpiper Project[9]:

1. The DSDD needs to include an assessment of damage costs for a worst-case scenario oil spill. The Enbridge Kalamazoo River spill, which is estimated to have cost $1.21 billion (Enbridge 2014), shows that the magnitude of spill damages can be substantial and consequently it is important to assess the financial capacity of NDPC (insurance and assets) to cover the costs associated with a worst-case spill and its legal obligation to pay damage costs and compensate third parties.

2. The DSDD needs to include a review of the spill response capacity of NDPC. The importance of assessing spill response is again illustrated by the Kalamazoo River spill near Marshall, Michigan in July 2010. Enbridge's emergency response was characterized by the National Transportation Safety Board (NTSB) as being

[9] It is important to note that the DSDD stipulates that the EIS will also analyze the potential impacts of the Line 3 Replacement (L3R) Project as part of the EIS's cumulative impacts discussion given the L3R route parallels the Sandpiper route between Clearbrook, Minnesota, and Superior, Wisconsin. Although our assessment of need focuses on Sandpiper, the omissions in scoping we have identified also apply to the environmental assessment for the L3R Project.

"not sufficiently focused on source control and demonstrated a lack of awareness and training in the use of effective containment methods" (2012, p. 119). The pipeline ruptured for over 17 hours despite monitoring systems and after the spill was detected, Enbridge experienced considerable difficulties locating contractors and other necessary resources to contain the spill (NTSB 2012).

3. The DSDD needs to include an assessment of upstream impacts of the Project. If, as Muse concludes, Sandpiper will provide Bakken producers with pre-tax economic benefits through higher netback prices for their product, the impacts of any incremental production need to be included in the EIS. The Canadian Government has developed a methodology to assess the upstream greenhouse gas (GHG) emissions from projects under review (Department of Environment and Climate Change 2016). In their definition, the upstream includes all industrial activities from the point of resource extraction, which are generally the extraction, processing, handling and transportation of the product. The assessment of upstream GHGs should consist of both a quantitative estimation of the GHG emissions released as a result of upstream production associated with Sandpiper, and a discussion of the projects' potential impact on national and global GHG emissions.

6. Benefit Cost Evaluation

The best method to assess the costs and benefits of the Project and whether the consequences of approving Sandpiper are more favourable than the consequences of not approving it is benefit cost analysis (BCA). BCA is a standard requirement for approval of many major projects in the United States and should be used to assess projects such as Sandpiper. The objective of BCA is to identify all the positive and negative consequences of a project and to assess the relative significance of these consequences to determine whether a project generates a net gain or net loss to society. BCA is based on a well-developed theoretical foundation, its methodology and application is outlined in numerous publications, and it is required for various types of approvals in many jurisdictions. Since potential environmental effects associated with the Line 3 Replacement (L3R) Project must be incorporated in the cumulative impacts analysis of the EIS for Sandpiper, costs and benefits associated with L3R should factor into a BCA for Sandpiper too. Therefore, the Final Scoping Decision Document

should require a BCA of Sandpiper, the L3R Project, and alternatives as part of its “Special Studies or Research” identified in part 5 of the DSDD.

7. Conclusion

In this report, we have examined the purpose of the Sandpiper Pipeline Project and the proposed scope of the DSDD. Subsequent to the submission and review of the application for Sandpiper there have been major changes in oil markets that impact the need for and potential costs and benefits of Sandpiper. The dramatic decline in oil prices has reduced current and forecast Bakken oil production. At the same time, there are more new oil transportation projects proposed for the Bakken region, which increase the number of alternatives to Sandpiper and the likelihood of building costly excess transportation capacity that could exceed over 2 million bpd by 2020. These developments require a comprehensive reassessment of the need for and costs and benefits of approving Sandpiper. To ensure the Project is needed and in the public interest, the final scoping decision document needs to:

- Expand the objective of Sandpiper from the narrow definition of shipping oil to Superior, Wisconsin to the primary objective of shipping Bakken oil to market and consider all other viable options that meet this primary objective.
- Require a comprehensive oil transportation supply and demand analysis for the Bakken region that incorporates major changes that have occurred since the original application (additional projects, lower production forecasts).
- Evaluate all the alternative projects for transporting Bakken oil to market by conducting a benefit cost analysis.
- Estimate the costs of any surplus capacity created by building Sandpiper.
- Assess the terms of shipper service transportation agreements for Sandpiper to identify provisions or factors that allow shippers to abrogate terms of the contract.
- Assess other potential impacts of the Project, specifically:
    - Damage costs for worst-case oil spills.
    - The financial capacity of the proponent (insurance and assets) to cover the costs associated with a worst-case spill and its legal obligation to pay damage costs and compensate third parties.
    - Estimate of upstream emissions and environmental impacts.

Again we emphasize the importance of undertaking a comprehensive BCA as part of the EIS to quantitatively estimate the costs and benefits of the Project with potential L3R impacts incorporated. This approach would allow for a comparison of all viable transportation options and help identify the option or mix of options that meets the transportation needs of the Bakken oil sector in the most cost-effective social, environmental, and economic manner.

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Minnesota Center for Environmental Advocacy
and
Friends of the Headwaters

Comments on the EAW and Draft Scoping Document for the Sandpiper Pipeline Project and the Line 3 Replacement Project

Submitted to the Minnesota Department of Commerce and the Public Utilities Commission

May 26, 2016

The EISs now being scoped are, in part, the result of years of work by FOH. FOH members have contributed thousands of volunteer hours in order to protect the Headwaters of the Mississippi from the dual threats of the proposed Sandpiper and Line 3 pipelines. The Headwaters of the Mississippi is a unique place, and its rivers, lakes, streams, wild rice waters and wetlands are uniquely threatened by both the immediate impacts of pipeline construction and the catastrophic impacts of a potential oil spill, a risk that will persist throughout the lifespan of these pipelines, which could easily be 50 years or more. FOH has never opposed all pipelines, but has sought from the beginning to show that there is a better place to put these pipelines. It brought forth alternative locations, including SA-04 and SA-05, to demonstrate its point.

The EIS is a critical step for these pipelines because it provides by far the best vehicle for considering alternatives to the applicant's proposal. While the Commission was persuaded that alternative locations for the proposed Sandpiper pipeline should be investigated in the Certificate of Need hearings, the Certificate of Need process never provided the platform that it should have to thoroughly investigate these alternatives. The limitation under the Certificate of Need proceedings is that, under the rules, the party presenting the alternative bears the burden of proof to show that there is a "more reasonable and prudent alternative" to the applicant's proposal.[1] This burden of proof, if interpreted literally under the rule,[2] raises real questions about whether *any* party could ever propose a "more reasonable and prudent alternative" unless they happen to be a pipeline company willing to build that alternative.

But an EIS can succeed where the Certificate of Need process failed, because "alternatives" under MEPA are different than "alternatives" under the Certificate of Need rule. Under MEPA, the statutory mandate is to consider "appropriate alternatives to the proposed action."[3] The MEPA rules clarify that the EIS must "compare the potentially significant impacts of the proposal with those of other reasonable alternatives to the project."[4] The EIS "must address one or more alternatives" of a range of types, including:

- alternative sites,
- alternative technologies,
- modified designs or layouts,
- modified scale or magnitude, and
- alternatives incorporating reasonable mitigation measures.[5]

If the EIS does not analyze alternatives of each type, it must explain why it failed to do so.[6]

Thus, under MEPA, there is no longer a problem with the burden of proof. The Commission and its delegate, the Department of Commerce, must make their own determination about alternatives to be considered in the EIS, and must engage in the work itself, without relying solely on the public (or the applicant) to provide all information about potential alternatives

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[1] Minn. R. 7853.0130(B).
[2] As FOH noted in its exceptions to Judge Lipman's recommendations on the Certificate of Need, the authorizing law for this rule, Minn. Stat. § 216B.243, does not assign a burden of proof for alternatives, and thus FOH and MCEA continue to maintain that the Commission can turn to the statute, and not the rule, when evaluating alternatives in Certificate of Need proceedings.
[3] Minn. Stat. § 116D.04.
[4] Minn. R. 4410.2300(G).
[5] *Id.*
[6] *Id.*

Once completed, the EIS itself will dictate which alternatives may enter the Certificate of Need process. After the Commission has selected the range of alternatives to be considered through the scoping decision, the Commission must ultimately select its own preferred alternative as part of the final determination on the adequacy of the EIS. MEPA specifically prohibits the Commission from selecting a proposal that:

> is likely to cause pollution, impairment or destruction of the air, water, land or other natural resources located within the state so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction.[7]

Importantly, MEPA requires that the Commission look beyond the Applicant's private financial and business preferences when considering "feasible and prudent alternatives." The same provision of MEPA concludes, with crystal clarity: "Economic considerations alone shall not justify such conduct."[8] If the applicant's preferred route is not the environmentally preferred route, that will be decided before this project returns to the Certificate of Need hearings. A properly scoped EIS therefore provides a much more thorough assessment of reasonable alternatives than is typically seen in Certificate of Need proceedings, limited as they are by prohibitively restrictive burdens of proof.

But environmental review only works if the Commission's scoping decision reflects the public interest, and not the company's private interest. If the Commission decides that this EIS should be limited to analyzing NDPC's proposed corridor, than the State of Minnesota and its legacy of clean water will be at the mercy not only of this Applicant, but every other pipeline company for the foreseeable future who wishes to utilize eminent domain to cut a swath across the state for a new pipeline. These are the first state-only EISs on crude oil pipelines in Minnesota history, and the Commission stands at a historic crossroads. If the Commission scopes this EIS narrowly and does not allow a wide-ranging consideration of alternatives, the precedent will be set, and future pipeline EISs will look the same, absent legal challenge. Put simply, the Commission need not reject all pipelines, but if there are areas of the state that should be protected from pipelines, and FOH firmly believes that there are, now is the time to make that determination. Such an opportunity may never come again.

SECTION 1: STATEMENT OF PURPOSE AND NEED

1.1 Inappropriately Narrow Statement of Purpose and Need

The Statements of Purpose and Need are Phrased so Narrowly as to Severely Restrict Analysis of Reasonable Alternatives in the EIS. The information developed in the EIS must inform two critical decisions: Do we need these pipelines to transport oil? And if so, where should they go? In order to supply information relevant to these two broad questions, the definitions of purpose and need that inform the scope of the EIS must also be broad.

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[7] Minn. Stat. § 116D.04, subd. 6.
[8] *Id.*

The various problems with the statements of Purpose and Need, identified below, collectively demonstrate that when preparing this EIS, the Department will rely on NDPC, Marathon, and Enbridge expertise at its peril. While MEPA allows an agency to utilize the applicant's work, when appropriate, it also obligates the agency to be responsible for any such work if it appears in the EIS.[9] In other words, the agency must either do the work itself, or thoroughly and independently evaluate any work prepared by the applicant.

While this duty is incumbent upon the Responsible Governmental Unit (RGU) throughout the MEPA process, the RGU's duties are even more pronounced in relation to the purpose and need section of an EIS, where public and not private interests must predominate.

1.1.1 The Purpose Statements in the EAW and DSDD for the Sandpiper Project Have Been Stated Too Narrowly

The scope of an EIS is largely determined by the statement of purpose and need for the project. State regulations provide that any alternative that does not meet the purpose and need of the proposed project may be eliminated from consideration in the EIS.[10] Each of the four statements of purpose and need – for the Sandpiper EAW, the Sandpiper DSDD, the L3R EAW, and the L3R DSDD – are phrased so narrowly that they effectively limit the choice of reasonable alternatives, contrary to state and federal laws on environmental review. The statements of purpose included in these scoping documents represent statements of private, corporate need, and state and federal law clearly prohibit environmental review based on such a constricted premise.

Because the alternatives analysis is the heart of the environmental impact statement, state and federal law is clear that agencies should not "slip past the strictures" of environmental review by "contriv[ing] a purpose so slender as to define competing 'reasonable alternatives' out of consideration."[11] To avoid this, agencies cannot simply rely on statements of what is "desirable from the standpoint of the applicant"; they must also consider alternatives that are practical or feasible from the standpoint of common sense.[12]

None of the statements of purpose in the scoping documents for Sandpiper/L3R consider any purpose other than what the applicant prefers, and none bear a significant relationship to the types of public purposes that traditionally justify PUC decisions. The Sandpiper EAW, for instance, appears to have been drafted by the applicant, and states that production volumes in the Williston Basin have resulted in a need for "more oil pipeline capacity to reduce the use of trains and tracks for oil transport."[13] The only stated reason that such capacity would need to go through Clearbrook or Superior, however, is to "use existing NDPC and Enbridge pipeline facilities."[14] Clearly, if the stated purpose is to increase pipeline capacity by connecting to Enbridge's existing facilities, then many reasonable means of bringing Bakken crude to market would be eliminated from consideration, ultimately undermining the very purpose of environmental review. Similarly, the Sandpiper DSDD frames the project's purpose as transporting growing volumes of Bakken crude production to

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[9] Minn. R. 4410.0400, subp. 2.
[10] Minn. R. 4410.2300.
[11] *Simmons v. U.S. Army Corps of Eng'rs*, 120 F.3d 664, 666 (7th Cir. 1997).
[12] 46 Fed. Reg. 18,026 (1981).
[13] Environmental Assessment Worksheet for the Sandpiper Pipeline Project (hereinafter "SPP EAW"), Minnesota Public Utilities Commission, April 11, 2016, at 7.
[14] *Id.*

"refinery markets in the US Midwest and beyond" via the terminal at Superior.[15] If Superior is a crucial component of the project's purpose, then there is only one way to meet that need: to go through Superior. This is not what environmental review is for. It is not intended to provide a *post hoc* validation of the applicant's private, corporate preference. It is not the state's obligation to facilitate the expansion of the applicant's infrastructure network, but by adopting the applicant's statement of purpose and need, the Department has done just that. The Department has transferred a private, corporate preference into a public preference, in violation of state law.

1.1.2 The Purpose Statements in the EAW and DSDD for the L3R Project Have Been Stated Too Narrowly

The DSDD for the L3R Project states that the underlying purpose is to "address safety and integrity concerns of the existing Line 3 pipeline."[16] With this very narrow purpose, the DSDD proposes to restrict analysis of several reasonable alternatives, including rail and trucking. The DSDD reasons that rail and trucking will not address pipeline safety and integrity concerns, but it concludes that rail and trucking "will be looked at as an alternative to continuing to operate the Line 3 pipeline." MCEA and FOH are uncertain as to the meaning of these apparently contradictory statements, and recommend that the statement of purpose be broadened to reflect what the document appears to implicitly acknowledge: that the underlying purpose is to deliver diluted bitumen to oil refinery markets in the U.S., by safe and environmentally responsible means. The fact that the L3R proposal would virtually double the capacity of the existing line is a clear indication that the purpose of the project is not merely to address safety and integrity concerns. The increased capacity of the new pipeline as proposed is also not solely the result of enhanced pressure capabilities. The new pipeline will be two inches larger in diameter than the existing pipeline, and there is no identified safety concern that indicates a need for a larger diameter. The purpose of the project, rather, is to deliver large quantities of petroleum products to the refineries that can utilize it. This more accurate framing of the underlying purpose clarifies that alternatives such as rail and trucking are properly examined as alternatives in the EIS.

1.2 Sandpiper EAW and DSDD Purpose and Need

The internal inconsistency of the stated purpose for the Sandpiper project demonstrates the need to take a broader look at the underlying purposes behind the proposal. The EAW states that the purpose is to increase delivery capacity to "refineries located throughout the Midwest, Midcontinent, and East Coast via the existing Minnesota Pipe Line System at Clearbrook, Minnesota, via an existing terminal in Superior, Wisconsin."[17] But going through Enbridge's existing system is only one way to increase delivery capacity to refineries across the Midwest and East Coast. The statements in the scoping documents mistake *means* with *purpose*. The means to an end are not the purpose of that end. Perhaps the clearest indicator of this confusion is the statement of purpose in the DSDD for the Sandpiper Project, which states that the purpose "is to transport growing crude oil production from the Bakken Formation in North Dakota to the Superior, Wisconsin, terminal and then

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[15] Draft Scoping Decision Document for Sandpiper Pipeline Project (hereinafter "SPP DSDD"), Docket Nos. PL-6668/CN-13-473; PL-6668/PPL-13-474, Minnesota Department of Commerce-Energy Environmental Review and Analysis, April 8, 2016 at 6.
[16] Draft Scoping Decision Document for Line 3 Replacement Project (hereinafter "L3R DSDD"), Docket Nos. PL-15-137/CN-14-916, Minnesota Department of Commerce-Energy Environmental Review and Analysis, April 8, 2016 at 5.
[17] SPP EAW at 30.

connect to various other pipelines expanding access to refinery markets in the US Midwest and beyond."[18] Pipelines terminating at Enbridge's terminal at Superior are one means of "transport[ing] growing crude oil production . . . to refinery markets in the US Midwest and beyond," but many other alternatives will achieve that same end without going through Superior.

The statement of purpose and need in the scoping documents must therefore be modified to encapsulate the true purpose, which is to deliver Bakken crude to the oil refinery market that can utilize it, thereby "expanding access to refinery markets in the US Midwest and beyond."[19] The EIS must analyze the means of achieving that end, including the applicant's preference for utilizing its existing infrastructure but also including any other means of achieving that same end.

1.3 Outdated Oil Market Conditions in Sandpiper Purpose and Need

The Report of Dr. Gunton, attached as Exhibit 1, provides more detail on the changes in the oil markets since the Sandpiper Project was initially proposed.[20] The oil market changes bear serious implications both for the overall need for the project and for the analysis of alternatives to the project in the EIS, and yet none of the scoping documents even acknowledge the drastic changes occurring in the Bakken. The Sandpiper EAW, for instance, states that "crude oil production in the Williston Basin . . . has risen rapidly in recent years"[21] and exceeded existing pipeline capacity, necessitating additional pipeline capacity from North Dakota. When the applicant conducted its open season in January of 2014, production volumes in the Bakken were indeed increasing rapidly. In that month, production had increased 30% from the previous January.[22] However, production peaked in December of that year, and since the peak production has actually declined 14%.[23] Production at individual wells has declined even further. Daily production per well has precipitously declined to a volume not seen since 2008.[24] Production volumes per well peaked in mid-2012, and have been declining ever since.[25]

Clearly it is no longer true that "crude oil production in the Williston Basin" is "growing." The statement of purpose and need in the Sandpiper DSDD, which states that the purpose of the projects is to "transport growing crude oil production from the Bakken formation," is demonstrably inaccurate and should be revised to reflect the fact that production volumes have in fact peaked and are in a state of accelerating decline.

1.4 Dr. Gunton's Report as a Separate Comment

The report, attached as Exhibit 1, details changes in the oil markets since the Sandpiper Project was initially proposed and analyzes the impact of those changes on the scoping process for the SPP EIS, particularly with regard to the DSDD's assessment of the project's purpose and need. Although it is submitted as an

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[18] SPP DSDD at 6.
[19] SPP DSDD at 6.
[20] Ex. 1 (Dr. Thomas Gunton & James Hoffele, *Evaluation of Minnesota Draft Scoping Decision Document for Sandpiper Pipeline Project*, May 21, 2016).
[21] SPP EAW at 6.
[22] *See* Ex. 2 (North Dakota Industrial Commission, Dep't of Mineral Resources, Oil & Gas Division, "Historical Monthly Bakken Oil Production Statistics," https://www.dmr.nd.gov/oilgas/stats/statisticsvw.asp, last retrieved May 2, 2016).
[23] *Id.*
[24] *Id.*
[25] *Id.*

attachment to the comments of FOH and MCEA, the report is an independent comment on the SPP DSDD, and should be responded to by the agency.

SECTION 2: ALTERNATIVES PROPOSED FOR INCLUSION IN THE EIS

2.1 Alternatives Must Include SA-03, SA-04 and SA-05

Alternatives to the Applicant's preferred route for Sandpiper must include alternatives that do not terminate in Superior, Wisconsin, including, at a minimum, SA-03, SA-04, SA-05 and alternatives terminating in Patoka, Illinois. As noted above, the more appropriate statement of purpose and need for the Sandpiper Project is:

> The purpose of this project is to transport crude oil from Bakken oilfields to the refineries that demand it, in a manner that is safe and environmentally responsible.

This statement accords with state and federal environmental review principles that caution against uncritically accepting the applicant's account of the project's need. Properly framed, it is therefore clear that the EIS must include an analysis of alternatives that do not necessarily terminate at Enbridge's terminal in Superior, Wisconsin. Any alternative that offers a reasonable means of transporting Bakken light sweet crude to oil refineries that demand it, particularly in the American Midwest and Midcontinent regions, should be analyzed and compared to the applicant's preferred route. This would include system alternatives such as SA-04 (terminating in Joliet, IL), SA-05 (Joliet, IL), and other as yet-unidentified alternatives that could terminate in Patoka, Illinois, where anchor shipper Marathon maintains its system pipeline hub and the destination point for the great majority of crude oil proposed for shipment by the project. One such alternative could be the route of the Energy Transfer Partners' Dakota Access Pipeline, which is now fully permitted and will begin construction in the spring of 2016 with operations commencing in late 2016. The Dakota Access Pipeline begins at the Williston Basin near Stanley, North Dakota and terminates near Marathon's pipeline hub in Patoka, Illinois.[26] The pipeline is projected to transport up to half of all crude production originating in the Bakken oilfields.[27]

In addition to the alternatives discussed above, Dr. Gunton's report (Ex. 1) also details several transportation corridors and methods that would serve as alternate means of transporting Bakken crude to the refinery market.[28] FOH and MCEA hereby incorporate those comments by reference.

2.2 L3R Alternatives that May Not Include Continued Operation of the Existing Line 3.

Because the true underlying purpose of the existing Line 3 is to deliver heavy diluted bitumen from Canada to the American refineries that demand it and can utilize it, the purpose of the L3R project is to do so in a manner that is safe and environmentally responsible. The applicant's preferred alternative clearly fits this statement of purpose and need, as complete replacement of an aging pipeline is one way to deliver this petroleum product to American refineries. Other alternatives, however, would be to utilize different forms of crude transportation, such as rail and trucking, but the L3R scoping documents appear to exclude such alternatives, noting that they would not address safety and integrity issues in the existing Line 3.[29] Despite concluding that rail and trucking will not meet the stated purpose of the project, the DSDD nevertheless

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[26] Ex. 3 (Richard Nemec, *Construction Starts on Dakota Access Pipeline,* Natural Gas Intelligence, May 2, 2016).
[27] *Id.*
[28] *See* Ex. 1 at 3-5.
[29] L3R DSDD at 7.

concludes that rail and trucking "will be looked at as an alternative to continuing to operate the Line 3 pipeline."[30] As described above, MCEA and FOH are uncertain as to the meaning of these apparently contradictory statements, but a properly broadened statement of purpose would clarify that alternatives such as rail and trucking are properly examined as alternatives in the EIS.

2.3 Alternatives Based on Actual Demand

Alternatives utilizing alternate modes of transportation (rail, trucking) for either the Sandpiper Project or the L3R Project must be based on actual demonstrated demand for crude oil shipped via rail and truck, not on the volumes and destinations assumed by the Project As Proposed. Both the Sandpiper Project and the L3R Project will increase the transportation capacities of existing petroleum pipeline corridors.[31] The L3R Project would "restore the line to its historic intended operating capacity of 760,000 barrels per day (bpd) from its current capacity of 390,000 bpd."[32] Sandpiper "is being designed to expand by 265,000 bpd to an ultimate annual capacity of 640,000 bpd" from Clearbrook to Superior, and up to 365,000 bpd from Beaver Lodge to Clearbrook.[33] Absent future upgrades, the Sandpiper Project as currently proposed would transport 225,000 bpd from Beaver Lodge to Superior.[34]

Transportation choices do not take place in a vacuum. It is not reasonable to assume that if the Sandpiper project was not built (the No Action Alternative), producers would instead ship via rail or truck the same volumes that Sandpiper would otherwise carry. It is similarly unreasonable to assume that, if a rail or trucking alternative were chosen instead of Sandpiper, producers would utilize that transportation to the same extent that they would utilize a pipeline. Shipping decisions would instead be based on case-by-case consideration of fixed costs, which would be different in a rail or trucking alternative.

The DSDD should clarify that the alternatives of rail and trucking must not be evaluated as if they would transport Sandpiper's volumes, unless the alternative proposed actually increases capacity to ship oil via that method. The Draft EIS should conduct a separate analysis of alternatives in which rail or trucking were modestly scaled up to meet transportation needs from the Bakken, but projections of use of those alternatives should be based on actual economic analysis, not just an assumption that the same volumes would be shipped as Sandpiper and the Line 3 Replacement propose to ship.

2.4 Pipe Thicknesses as Modified Scale or Magnitude Alternatives to the Sandpiper Project

Both the Sandpiper and the L3R DSDDs state that "the EIS will not be evaluating alternatives of different pipe dimensions or different pipe metal thickness. Due to engineering requirements and requirements under PHMSA, this EIS will not address variations in different pipe dimensions or different pipe metal thickness as an alternative; pipe thickness will be discussed as a mitigation option."[35] These statements are overly conclusory, and provide no verifiable justification for excluding an alternative other than simply providing a

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[30] *Id.*
[31] Although the Applicant's preferred route for the Sandpiper Project deviates from its existing system, the preferred route nevertheless connects two endpoints that are connected today, and thus the preferred route maintains the same fundamental connectivity, albeit with increased capacity.
[32] Environmental Assessment Worksheet for the Line 3 Replacement Project (hereinafter "L3R EAW"), Minnesota Public Utilities Commission, April 11, 2016, at 6-7.
[33] SPP EAW at 6.
[34] SPP DSDD at 8.
[35] L3R DSDD at 12-13; SPP DSDD at 13-14.

generic reference to engineering and regulatory requirements. Presumably these requirements do not preclude consideration of higher engineering standards as a project option that might affect capacity, integrity and corresponding risks of releases. At a minimum, specific engineering or regulatory requirements that affect the viability of pipe thickness as an alternative must be identified and discussed, and an explanation must be given detailing why those requirements render the alternative unsuitable. Because environmental review is fundamentally an information-gathering exercise, cursory or generic statements that a particular alternative is unsuitable are not sufficient.[36]

2.5 Alternatives that Would Transport Lower Volumes

As described in more detail in Dr. Gunton's report, attached as Exhibit 1, production volumes in the Williston Basin have been declining since 2014.[37] The Sandpiper Project was originally proposed at a time when production volumes were continuing to increase, and the proposal reflects those assumptions. Those volumetric trends have since reversed, and it is now reasonable to consider alternatives that may increase pipeline capacities more modestly than the project as proposed. Such alternatives could include upgrading pump stations on the existing Line 81 corridor to increase capacity of the existing system. Modestly increased transportation capacities may now satisfy the needs posed by the current production volumes in the Williston Basin, while also avoiding many environmental impacts caused by the proposed project. Under the criteria of 4410.2300(G) requiring consideration of alternatives of modified scale or magnitude, then, such lower transportation volume alternatives should be analyzed in the EIS.

2.6 Contrasting Landscapes With Respect to Potential Impacts of Oil Releases

Many alternatives have been proposed for study in the EIS, including several by FOH. The Applicant's proposed routes cross landscapes often characterized by morainal hills, high value wetlands, rivers, and other natural resources, and that have fewer roads than alternative proposed locations to the west and southwest. Alternatives such as SA-04 cross much flatter landscapes with substantially higher road densities. FOH and MCEA contend that oil releases on the flatter terrain are easier to contain and much less likely to quickly move away from the pipeline. Oil releases on flat terrain with lots of roads are much less likely to cause long-term impacts and are more likely to permit rapid response to a pipeline ruptures. The EIS should therefore ensure that these two landscape types are thoroughly contrasted in the alternatives analysis.

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[36] Minn. R. 4410.2300(G).

[37] Ex. 1 at 6 (Expert Report of Dr. Gunton).

2.7 No-Action Alternative for the Sandpiper Component of the EIS

2.7.1 The Analysis of the No-Action Alternative Must Incorporate the Increased Pipeline Capacity Provided by the Dakota Access Pipeline Currently Under Construction, As Well As Other Current and Future Proposals for Pipeline Capacity

As required by Minn. R. 4410.2300(G), a no-action alternative must be included in the EIS. The DSDD for the Sandpiper Project states that the "No Action Alternative assumes transport of Bakken oil will continue by other means, including rail, interstate highways and other pipeline systems."[38] Currently, Energy Transfer Partners' proposed Dakota Access Pipeline has received all necessary regulatory approvals, and construction for the pipeline has begun.[39] The project will provide new pipeline capacity of between 450,000 and 570,000 bpd, representing well over half of all production in the Bakken.[40] The new pipeline will terminate in Patoka, Illinois, providing access to oil markets in the Midwest, East Coast, and Gulf Coast.[41] Because Dakota Access Pipeline has moved from the proposal stage to the construction stage, the capacity that it will provide should be analyzed in the No Action Alternative as part of the assumptions concerning available transportation capacity.

But the Dakota Access Pipeline is not the only project that will provide crude oil transportation from the Bakken. As detailed in Dr. Gunton's report, current forecasts estimate *surplus* pipeline capacity from the Bakken of up to 866,000 bpd in 2020. Including rail, total surplus capacity is forecasted at up to 2.5 million bpd.[42] The analysis of the No Action Alternative in the EIS must include an assessment of total surplus transportation capacity that would exist should the Sandpiper Project not be built.

2.7.2 The Analysis of the No-Action Alternative Must Incorporate an Economic Analysis of the Effect of Continued Low Oil Prices on Production Volumes in the Williston Basin

As described in more detail in Dr. Gunton's report (Ex. 1), there is substantial evidence that, in an environment of continued low oil prices, total production volumes in the Bakken will decline. The EIS should therefore include the economic analysis exploring the relationship between oil prices, transportation capacity, transportation cost and production volumes, so that the environmental impacts associated with those production volumes can be compared.

2.7.3 The Analysis of the No-Action Alternative Must Clarify that It Will Avoid the Environmental Impacts of Increased Production Volumes in the Williston Basin, Including But Not Limited to Ground Water Contamination, Climate Change Impacts, Methane and Ethane Leakage, and Air Quality Impacts

Because denial of applicant's proposal will likely result in continued decreasing production volumes in the Williston Basin (as described in Dr. Gunton's report, Ex. 1), the environmental impacts associated with extraction of crude oil in the Williston Basin, including ground water contamination, methane and ethane

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[38] SPP DSDD at 14.
[39] Ex. 3 (Natural Gas Intelligence Article on Dakota Access Pipeline Construction).
[40] Ex. 4 (Dakota Access Pipeline Factsheet); Ex. 2 (Bakken Oil Production Statistics).
[41] *Id.*.
[42] Ex. 1 at 4 (Expert Report of Dr. Gunton).

leakage, climate change and air quality impacts, will be lessened in the No Action Alternative. The analysis of the No Action Alternative should clarify that denial of the applicant's proposal will avoid those environmental impacts.

2.7.4 The Environmental Impacts of Subsection 2.6.3 Must be Quantified as an Economic Value of Damages Utilizing Regulatory Impact Analysis Tools Such as the Social Cost of Carbon or Its Equivalent

To the extent practicable, all environmental impacts avoided by the No Action Alternative should be quantified and expressed as economic damages avoided. The environmental impacts avoided by the No Action Alternative – avoided climate change impacts, methane and ethane leakage, ground water contamination and air quality impacts – are all readily quantifiable by widely available regulatory impact analysis tools, such as the Federal Social Cost of Carbon. The Social Cost of Carbon can be used to estimate the avoided damages from avoided CO2 emissions as a result of low oil prices constraining extraction activities in the Williston Basin (thus avoiding combustion of the petroleum products that would have been produced by those extraction activities), and it can also be used to estimate avoided damages from methane and ethane leakage in extraction, once those gases are converted to tons of CO2 equivalent.

2.7.5 The No Action Alternative Must Indicate that Denial of the Applicant's Proposal Will Not Result in Higher Rail Traffic Volumes in Minnesota

As described in sections 2.7.2 and Dr. Gunton's report, Bakken production volumes in the No Action Alternative are likely to continue their currently decreasing trend. The applicant's original CON application, however, asserts that the No Action Alternative would involve greater rail transportation through Minnesota, arguing that "as Bakken production increases, so would train traffic carrying crude oil through Minnesota."[43] These assumptions are no longer true, and it now appears that Bakken production will *not* continue to increase in the absence of the Sandpiper Project's capacity. As described above, as oil markets stay in a low-price environment and the only transportation options are comparatively more expensive, producers respond by restricting production. This is empirically demonstrated by indicators of Bakken production from the last two years.[44] Rail shipments from the Bakken have also correspondingly declined.[45] Rail traffic from the Bakken peaked in 2014 and has been declining since that time.[46] This trend will continue in the No Action Alternative. The analysis of the No Action Alternative must therefore clarify that denial of the Sandpiper Project will not increase rail traffic through Minnesota.

2.7.6 The No Action Alternative Must Indicate that Denial of the Sandpiper Project Will Not Result in Higher Consumer Prices for Petroleum Products

Because petroleum transportation is diverse and interconnected in the U.S., there is no empirical evidence that consumer prices for petroleum products like gasoline are significantly affected by the construction of

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[43] Docket Nos. PL-6668/PPL-13-473; PL-6668/CN-13-473, *Enbridge Pipelines (North Dakota) LLC Sandpiper Pipeline Project Environmental Information Report*, filed Nov. 8, 2013, at 2-2.
[44] Ex. 1 at 5-6 (Expert Report of Dr. Gunton).
[45] Ex. 5 (EIA Crude Oil Rail Transportation Statistics).
[46] *Id.*

new pipelines. In fact, "varying pipeline availability has little impact on the prices that that U.S. consumers pay for refined products such as gasoline."[47]

2.8 No-Action Alternative for the L3R Component of the EIS

2.8.1 The "No Action" Alternative for L3R Must Be Identified in the Draft EIS

Enbridge must clarify what would happen if the L3R project did not go through. Presumably, the choices are that Enbridge would either continue to run the line at increased cost, or it would decommission it because it would no longer be economical to operate. Either way, the "no action" alternative is a key part of the EIS because it gives decision-makers a baseline against which to compare impacts of the project.

If Enbridge would continue to operate the existing Line 3, the EIS should consider an additional alternative to decommission Line 3 entirely, utilizing alternative means of transportation for all volumes transported by the existing line.

2.8.2 The Analysis of the No-Action Alternative Must Incorporate an Economic Analysis of the Effect of Continued Pipeline Restrictions on the Production Volumes of the Alberta Oil Sands Deposits

As described in more detail in Dr. Gunton's report (Ex. 1) there is substantial evidence indicating that, in an environment of continued low oil prices and high transportation costs from restricted pipeline capacity, total production volumes in the Alberta oil sands region will decline.[48] The Final Supplemental Environmental Impact Statement for the Keystone XL Project noted that:

> Oil sands production is expected to be most sensitive to increased transport costs in a range of prices around $65 to $75 per barrel. Assuming prices fell in this range, higher transportation costs could have a substantial impact on oil sands production levels— possibly in excess of the capacity of the proposed Project—because many in situ projects are estimated to break even around these levels. Prices below this range would challenge the supply costs of many projects, regardless of pipeline constraints, but higher transport costs could further curtail production.[49]

The EIS should therefore include an economic analysis exploring the relationship between pipeline capacity and production volumes, so that the environmental impacts associated with those production volumes can be compared. The Draft EIS should address the fact that increased pipeline capacity will increase extraction and production of bitumen from the Alberta oil sands region in a low oil price market, identify the impacts of that increase, and clarify that the No Action Alternative will avoid the impacts of that increased extraction and production.

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[47] Ex. 6 at ES-12 (Keystone XL SEIS Executive Summary).
[48] Ex. 1 at 8 (Expert Report of Dr. Gunton); *see also* Ex. 6 at ES-12 (Keystone XL SEIS Executive Summary).
[49] Ex. 6 at ES-12.

2.8.3 The Analysis of the No-Action Alternative Must Clarify that It Will Avoid the Environmental Impacts of Increased Production Volumes of Alberta Oil Sands, Including But Not Limited to Water Withdrawals, Water Contamination, Energy Consumption, Air Quality Impacts and Climate Change Impacts

Because denial of applicant's proposal will likely result in decreased production volumes in the Alberta oil sands region,[50] the environmental impacts associated with extraction of oil sands and the production of bitumen products, including water withdrawals, water contamination, energy consumption, air quality impacts and climate change impacts, will be lessened in the No Action Alternative. The analysis of the No Action Alternative should clarify that denial of the applicant's proposal will avoid those environmental impacts.

2.8.4 The Environmental Impacts of Subsection 2.7.2 Must be Quantified as an Economic Value of Damages Utilizing Regulatory Impact Analysis Tools Such as the Social Cost of Carbon or its Equivalent

The environmental impacts avoided by the No Action Alternative – water withdrawals, water contamination, energy consumption, air quality impacts and climate change impacts – are all readily quantifiable by widely available regulatory impact analysis tools, such as the Federal Social Cost of Carbon. The Social Cost of Carbon can be used to estimate the avoided damages from avoided CO2 emissions as a result of low oil prices and low pipeline capacity constraining extraction activities in the Alberta oil sands region (thus avoiding combustion of the petroleum products that would have been produced by those extraction activities), and it can also be used to estimate avoided damages from other greenhouse gases, once those gases are converted to tons of CO2 equivalent. To the extent practicable, all environmental impacts avoided by the No Action Alternative should be quantified and expressed as economic damages avoided.

SECTION 3: ANALYSIS OF THE PROPOSED PROJECT'S ENVIRONMENTAL, ECONOMIC, EMPLOYMENT AND SOCIOLOGICAL IMPACTS

3.1 Method for Assessing Impacts of Crude Oil Releases

Of all potential impacts of a pipeline, impacts to water from an oil spill may well be the most catastrophic. While FOH and MCEA expect the EIS to identify mitigation measures, we also expect the EIS to provide an independent assessment of potential oil spill scenarios and the devastating consequences on nearby lakes, rivers, streams and wetlands.

3.1.1 The EIS's Treatment of the Environmental Impacts of Oil Spills Must Include Narrative Descriptions in Addition to Any Numerical Risk Assessment

An EIS that analyzes the environmental impacts of oil spills by relying primarily on numerical risk assessments and engineering forecasts of oil release amounts (based on shutdown systems and other safety measures) is inadequate. The purpose of an EIS is full disclosure of potential impacts in a manner understandable to citizens and agencies.[51] Both the Sandpiper and L3R Projects are complex and

[50] Ex. 1 at 8; Ex. 6 at ES-12.
[51] *See, e.g.,* Minn. R. 4410.2300 ("An EIS shall be written in plain and objective language."); Minn. R. 4410.0300 (The purpose of the an EIS is to "provide usable information to the project propose,

controversial proposals that have the attention of many citizens and decision-makers that lack the technical expertise to appreciate impact analysis that is primarily technical and numerical. The oil spill risk assessment in the EISs for the proposed pipelines should be narrative-based, similar to the Oak Ridge National Laboratory's 2012 study submitted with the Direct Testimony of Paul Stolen in previous Sandpiper proceedings.[52] That study looked at a range of shut-down times and described the consequences that might ensue. The sites selected for modeling should include this type of narrative impact analysis in addition to any technical, numerical risk assessments.

3.1.2 The EIS Should Economically Quantify the Environmental Impacts of Oil Spills Modeled by OILMAPLAND and SIMAP

The DSDD for the Sandpiper Project and the L3R Project state that large volume spill modeling will be conducted by RPS ASA using OILMAPLAND and SIMAP modeling software.[53] For any such spill modeling in the combined EIS, the environmental impacts of the modeled spills must be economically quantified as a projected estimate of socioeconomic damages. The accounting of damages is a routine practice, and there is no reason why an EIS would not include a quantification of modeled oil spill impacts. If a spill were to occur of the type modeled in the EIS, federal law requires that the environmental impacts be quantified in a Natural Resource Damage Assessment.[54] Federal regulations require that the degree and extent of oil spill damages are quantified relative to a baseline, and that quantification forms the basis for a demand for payment issued to the responsible party.[55] Because this process would be a requirement if a spill were to occur, the modeling of oil spill impacts in the EIS must include the economic quantification process as part of the EIS itself. One possible methodology for this quantification analysis is contained in the Oak Ridge National Laboratory's 2012 study referenced above.[56]

3.1.3 The Economic Damages for Oil Spills Modeled in the EIS Must Be Compared Against the Coverage and Limits Included in the Applicant's Liability Insurance Policy

In the event that an oil spill should occur, any response or restoration costs that are not covered by the applicant's liability insurance policy would be borne by the responsible party. If such uninsured costs exceeded the responsible party's liquid assets, the responsible party's bankruptcy could result in the costs being borne by public funds. In 2014, for instance, Enbridge estimated that its total cost estimate for the Line 6B crude oil release near Marshall, Michigan was $1.21 billion.[57] Larger oil spills modeled in the EIS would of course incur larger estimated restoration costs, and to the extent that any potential cost estimates exceeded the limits of NDPC's liability insurance coverage, those costs could cause a liquidity crisis and potential bankruptcy proceeding that would imperil public funds. In order to provide some indication of the likelihood of a spill-induced corporate bankruptcy, the EIS should include a comparison of potential spill liabilities with

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governmental decision makers and the public concerning the primary environmental effects of a proposed project.").

[52] Ex. 16, at Apx. 1 (Direct Testimony of Paul Stolen, eDocket No. 201411-104748-02, Docket No. PL-6668/CN-13-473, Nov. 19, 2014).

[53] SPP DSDD at 27, L3R DSDD at 26.

[54] 15 C.F.R. Part 990, promulgated pursuant to the Oil Pollution Act of 1990.

[55] 15 C.F.R. § 990.52, 15 C.F.R. § 990.62.

[56] Ex. 16 at Apx. 1, Ex. 4.

[57] Ex. 7 at 19.

the applicant's insurance coverage and limits. Such an analysis requires transparency by NDPC and Enbridge on existing or projected insurance coverage.[58]

3.1.4 Oil Spill Modeling Should Not Be Based on Data Provided by NDPC

Both DSDDs indicate that "the Applicant will provide data on maximum spill volumes, spill frequency and the types of crude oil being transported" for the purposes of modeling large volume oil spills.[59] The project applicant's vested economic interest in limiting oil spill modeling requires that the RGU conduct an independent analysis of the risk of large volume oil spill releases. Spill volumes and frequencies are consistently underestimated by entities proposing pipeline projects, and federal agencies have noted that many estimates of Enbridge's 2010 Line 6B oil spill have been "substantially greater" than Enbridge's estimate. [60] There have also been discrepancies in the pipeline operator's estimate of shut down times in the event of a spill, as compared to actual shut down times. Data provided by the applicant is similarly unlikely to provide an adequate basis for evaluating the environmental impacts of a potential spill, and the oil spill modeling for the Sandpiper/L3R EIS must accordingly be based on an independent assessment of projected spill volumes and frequencies.

3.1.5 The Estimate of Spill Frequency Must be Based on Realistic Assumptions that Include the Incidence of Human Error

Because risk analysis is so greatly influenced by the probability of an event, the oil spill modeling included in the EIS is crucially dependent on accurate assumptions regarding spill frequency. Reliance on NDPC data for spill frequency assumptions is clearly inadequate, as NDPC's economic interest in minimizing the risk of oil spills ensures that any supplied data would be affected by a conflict of interest. Moreover, while NDPC and Enbridge will certainly propose mitigation measures designed to decrease the risk of a spill, human error poses a risk that cannot be mitigated. The probability of oil spills must therefore be independently evaluated in the EIS. Other studies indicate that human error is a significant cause of oil releases from facilities associated with pipelines, such as storage tanks.[61] The spill volumes resulting from incorrect operations of tank facilities, furthermore, tend to be larger than mainline spill volumes.[62] The EIS for the Sandpiper and L3R Projects must therefore include a consideration of the frequency of human error in equipment operations, the resulting likelihood that such human error would cause oil releases, and the environmental impacts of those potential releases.

3.1.6 Oil Spill Modeling for the L3R Project Must Include Diluted Bitumen

The L3R DSDD states that the oil spill models "will be run for a set of scenarios that include the following crude oil types: light sweet Bakken crude oil, Cold Lake Blend and Cold Lake Winter Blend."[63] Although the proposed pipeline is physically designed to transport a variety of crude products, including light, medium and heavy crudes, the primary purpose of the L3R Project is to transport diluted bitumen from Hardisty, Alberta. Diluted bitumen is a fundamentally different product than Bakken light sweet crude, and oil spills of diluted

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[58] Minn. R. 4410.2400 ("No material may be incorporated [into an EIS] by reference unless it is reasonably available for inspection by interested persons within the time allowed for comment.").
[59] *See, e.g.*, L3R DSDD at 25.
[60] *See* Ex. 8 at i (Final Damage Assessment and Restoration Plan for Line 6B Spill).
[61] *See* Ex. 9 at 3 (Keystone XL SEIS Attachment K).
[62] *Id.*
[63] L3R DSDD at 26.

bitumen differ significantly in their environmental impact.[64] Any EIS that conducted oil spill modeling for the L3R Project without modeling the effects of a diluted bitumen spill would clearly be inadequate. The EIS should also include the results of the National Academy of Sciences recent study concerning the environmental impacts of diluted bitumen spills.[65] That study "brought together diverse expertise on the chemistry and environmental impacts of crude oils and broad experience in spill response," and its findings were independently reviewed by an extensive committee of experts.[66] Among its key findings was the conclusion that "spills of diluted bitumen pose particular challenges when they reach water bodies. In some cases, the residues can submerge or sink to the bottom of the water body."[67]

3.1.7 The Environmental Impacts of a Diluted Bitumen Spill Must Incorporate the Findings of the National Academy of Sciences

The EIS should address the implications of the NAS study of bitumen to the sensitive locations, including wetlands crossed by the proposed routes. The study suggests that it may be impossible to clean up diluted bitumen from certain locations, and/or that the attempts to clean up oil releases from such areas will in effect destroy these areas. The implication of this finding is that should Line 3 be permitted in the location desired by the Applicant the state of Minnesota would need to make this decision based on an assumption that no significant oil releases would ever occur for the life of the project.

3.1.8 The FSDDs Must Identify the Representative Sites Proposed for Oil Spill Modeling

Both DSDDs describe a modeling process consisting of 2-D modeling at five representative sites and 3-D modeling at two sites.[68] None of these proposed modeling sites are identified. It is accordingly impossible to assess whether the selected sites are indeed representative, or whether they represent best-case scenario oil spill locations. The selection of representative sites cannot be delegated to the applicant or to RPS ASA, the environmental modeling consultant for the EIS. The location of those sites is a critical detail in ensuring that the oil spill modeling assesses realistic scenarios based on a variety of sites along the proposed route. The selected sites should, at a minimum, sample critical terrains, ecosystems, water bodies, habitats, High Consequence Areas and Natural Disaster Hazard Areas crossed by the proposed route. Although the DSDDs indicate an awareness that releases at High Consequence Areas and Natural Disaster Hazard Areas represent particularly significant impacts, the documents do not provide any indication of the analysis of those impacts that will occur in the EIS. At a minimum, the oil spill modeling must incorporate High Consequence Areas and Natural Disaster Hazard Areas as representative sites. At least one site must be located beneath the bed of a large volume flowing river such as the Mississippi or St. Croix. These representative sites must be chosen by the RGU in the FSDD.

3.1.9 Oil Spill Modeling in the EIS Must Include Representative Sites on Enbridge's Pipeline System Outside the Tioga-Superior Segment, Including Sites at a Variety of Terrains, Ecosystems, Water Bodies and Habitats Crossed by Enbridge's System South and East of North Dakota

The direct effect of the Sandpiper Project and the L3R Project will be to increase the volumes of crude oil products being transported by Enbridge's pipeline system. This includes not only the proposed project within

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[64] See Ex. 10 (NAS Study of Spills of Diluted Bitumen).
[65] *Id.*.
[66] *Id.* at viii, xiii.
[67] *Id.* at 3.
[68] L3R DSDD at 26, SPP DSDD at 28.

the borders of Minnesota, but the entirety of Enbridge's system south and east of North Dakota. The higher volumes enabled by the two projects will continue on to refineries in the Midwest, Midcontinent, and Gulf Coast regions.[69] These higher volumes being transported throughout the U.S. will necessarily increase either the volumes or frequency of spills occurring on Enbridge's system outside Minnesota. As an illustration, the 2010 oil spill near Marshall, Michigan occurred on Enbridge's Line 6B, which connects to Enbridge's hub outside Chicago.[70] The Chicago hub is supplied in part by connections from Superior, Wisconsin. [71] Both projects would therefore cause higher volumes of crude oil products to be transported through pipelines such as Line 6B, which accordingly increases the environmental impact of any oil spill that occurs, whether the location of that spill is within Minnesota or outside its borders. Any oil spill modeling in the EIS must therefore model potential spill sites at a variety of terrains, ecosystems, water bodies, habitats, High Consequence Areas and Natural Disaster Hazard Areas crossed by Enbridge's entire system south and east of North Dakota, not just those located in Minnesota.

3.1.10 Representative Sites Outside the Tioga-Superior Corridor Must Include Potential Worst Case Scenarios Such as a Line 5 Spill in the Straits of Mackinac

As described above, the increased capacities of the Sandpiper and L3R Projects will increase the volumes of crude oil products being transported by all of Enbridge's pipeline system, not just the segments proposed for Minnesota. From Superior, these increased oil volumes will be shipped southward and eastward on existing pipelines. One such pipeline that will connect with both Sandpiper and L3R is Enbridge's Line 5, which passes under the Straits of Mackinac, the waterway joining Lakes Michigan and Huron. The increased transportation volumes of both proposed projects will cause a corresponding increase in the risk of a spill outside Minnesota, including in Line 5. The potential impacts of a spill in the Straits of Mackinac has been studied and modeled by the University of Michigan's Water Center, and the results of that study should be incorporated in the both EISs as a means of analyzing the increased risks of such a catastrophic spill resulting from the higher pipeline volumes enabled by the two proposed pipelines.[72]

3.1.11 The EIS Must Evaluate the Potential Impact of a Large or Small Volume Oil Release on the Trout Streams Crossed by the SPP Project

The Sandpiper Project EAW identifies six trout streams crossed by the applicant's preferred route.[73] The DSDD for the project, however, does not specify that the oil spill modeling will incorporate an analysis of the effects of an oil spill on these designated trout streams. The FSDD must indicate that the analysis of potential oil spill impacts will include the impacts of a large or small volume oil release on the designated trout streams and the habitat therein crossed by the project as proposed.

3.1.12 The EIS Must Evaluate the Environmental Impact of the Spacing and Locations of the Automatic Shutoff Valves Designed to Limit Oil Releases in the Event of a Rupture

The oil spill modeling incorporated into the EIS should evaluate the effect of the project's proposed locations of mainline valves capable of limiting releases in the event of a rupture. The modeling should also incorporate

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[69] SPP DSDD at 6, Ex. 20; Direct Testimony of C. Michael Palmer, Docket No. PL-6668/CN-13-473, Aug. 8, 2014, at 7.
[70] Ex. 20 (Enbridge Pipeline Map).
[71] *Id.*
[72] Ex. 12 (University of Michigan Straits of Mackinac Oil Spill Study).
[73] SPP EAW at 107.

an analysis of alternate locations as an aid in assessing potential mitigation options, as alternate locations of mainline valves could be strategically placed to mitigate impacts to particularly sensitive environments.[74]

3.1.13 The EIS Must Evaluate the Environmental Impact of Oil Spills with Ignition

As described in the Direct Testimony of Paul Stolen, oil spill modeling must incorporate the potential effects of an oil spill with ignition. Neither DSDD in this matter specifies that the oil spill modeling will incorporate the increased environmental impacts of an oil spill featuring ignition of a pool fire, flash fire, or vapor cloud explosion.[75] Bakken crude is known to be particularly volatile, and poses a significant risk of ignition upon release.[76] The effects of such spills have been evaluated and quantified by studies conducted by federal agencies, and given the DSDD's statements that the oil spill modeling will be conducted in accordance with federal PHMSA regulations,[77] the effects of oil spills with ignition must be included in the EIS.

3.1.14 The EIS Must Evaluate a Catastrophic Oil Spill Scenario in Which a Large Oil Spill with Ignition Damages Co-Located Pipelines

Environmental review principles require the evaluation of low probability, high-risk environmental impacts. Such impacts for the Sandpiper Project and the L3R Project would include a catastrophic oil spill with ignition, in a sensitive area, in which co-located pipelines are also damaged, increasing the volume of the release. Neither DSDD requires the modeling of such a scenario, and is therefore inadequate in assessing the likelihood and the impacts of such an event. The FSDD must require modeling for catastrophic scenarios, even those that are low probability, because the consequences would be so severe. Such consequences are unaccounted for in the EIS as currently scoped.

3.1.15 The EIS Must Evaluate the Potential for Groundwater Contamination by a Large or Small Volume Oil Release

The DSDDs for the two projects state that the EIS will analyze the potential for groundwater contamination within 1,000 feet of the pipeline corridor.[78] This boundary is based on "work done previously in Exponent's risk assessment of the Keystone XL Pipeline."[79] Although reliance on previously completed work is allowed by state environmental review regulations,[80] that work must be relevant to the current project. To the extent that the groundwater contamination modeling incorporated into the EIS for SPP and L3R is based on particular mixes of petroleum products that are unique to the Keystone XL proposal, or the terrain on which that pipeline was proposed, that modeling may not accurately represent the risks to groundwater posed by the SPP and L3R projects. Different crude oil products may pose different risks upon release into surface waters or onto permeable soils. The particular risks to groundwater posed by the transport of Bakken light sweet crude and diluted bitumen on SPP and L3R, respectively, must be independently evaluated in the EIS. That analysis should also include specific information about the aquifers crossed by the proposed projects,

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[74] *See* Ex. 16 at 27 (Stolen Direct).
[75] *See Id.* at Ex. A, 86-87.
[76] PHMSA Safety Alert, January 2, 2014, *Preliminary Guidance from Operation Classification*, available at http://phmsa.dot.gov/pv_obj_cache/pv_obj_id_111F295A99DD05D9B698AE8968F7C1742DC70000/filename/1_2_14%20Rail_Safety_Alert.pdf, last retrieved May 24, 2016.
[77] L3R DSDD at 26, SPP DSDD at 27.
[78] SPP DSDD at 28.
[79] *Id.*
[80] *See, e.g.*, Minn. R. 4410.2200; 4410.2400.

particularly shallow groundwater aquifers that may be especially vulnerable to contamination by large or small volume releases.

3.1.16 The EIS Must Analyze the Probability and Impacts of Small Leaks with an Unusually Long Detection Period

The DSDDs for the two pipelines indicate that the impacts of pinhole leaks will be assessed based on the assumption that a small volume leak would be detected within a matter of "several months."[81] The proposed projects, however, cross a significant acreage of remote and inaccessible areas, and it is therefore possible that a small leak would remain undetected for a longer period of time than assumed in the EIS as currently scoped. A small leak underneath a river bed could pose an especially damaging risk of evading detection for longer than "several months." The probability and impacts of such an event must be analyzed in the EIS.

3.1.17 The Oil Spill Analysis Must Evaluate the Potential Impacts of an Oil Spill Occurring During Winter Conditions, Including Under Ice

Minnesota's climate present unique obstacles in oil spill response and recovery. Access to a spill site can be severely restricted or prohibited in winter conditions, particularly if the location of the rupture is beneath ice cover. Montana's experience with the spill into the Yellowstone River in January 2015 was only one example of this problem. In that case, over 40,000 gallons of crude spilled into the river, and groundwater was contaminated while cleanup was hindered due to ice on the river. Any oil spill analysis included in the EIS must assess the probability and risks of an oil spill occurring during the winter months, including the possibility that the volumes of released oil would be affected by diminished access to the site during the response time.

3.2 'Upstream' Environmental Impacts of Increased Crude Extraction at Production Sites

3.2.1 The Environmental Impacts of Increased Crude Extraction in the Williston Basin, Including But Not Limited To Methane Leakage, Ethane Leakage, Air Quality Impairments and Ground, Surface and Drinking Water Contamination Must be Analyzed as Impacts of the Sandpiper Pipeline Proposal

A new crude oil pipeline can make a difference to suppliers of crude oil, as well as refiners and other users. Indeed, a large crude oil pipeline can change the face of the crude oil market across the nation. It can increase both supply and demand for crude oil. That, of course, is why NDPC wishes to build it. But changing the face of the crude oil market has consequences, and many of those are environmental.

An EIS must include "a thorough but succinct discussion of potentially significant adverse or beneficial effects generated, be they direct, indirect, or cumulative."[82] If the Sandpiper and Line 3 pipelines cause increased production of Bakken oil and/or tar sands oil in Canada, the two products they will carry, then that is surely an indirect adverse impact of the pipeline under MEPA.

As described in Dr. Gunton's report, the increased pipeline capacity provided by the Sandpiper Proposal will increase the pace of extraction in the Williston Basin, reversing recent declines caused by low oil prices and limited pipeline transportation availability. With the new, cheaper pipeline capacity of Sandpiper coming

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[81] SPP DSDD at 28; L3R DSDD at 26.
[82] Minn. R. 4410.2300(H).

online, individual wells' break-even points will be lowered, and Bakken production volumes will begin to increase once again, even in a continued low oil price market. Well producers' investment decisions are based on current oil prices and the costs of production, of which transportation costs are a significant portion. Lowering these transportation costs will of course change those investment decisions, leading to more wells and more extraction by hydraulic fracturing. The federal courts have made clear that NEPA requires an EIS to consider the increased production (and ultimately consumption) that is the direct result of lowered transportation costs for fossil fuels.[83] This increased extraction activity carries a significant environmental footprint, all of which is currently ignored in the Sandpiper DSDD.

Bakken crude is a tight oil resource recovered by hydraulic fracturing techniques. These techniques have a variety of well-known and well-documented environmental impacts, including methane and ethane leakage, air quality impairments, and ground, surface and drinking water contamination.[84] These impacts significantly affect global climate change, human health, water quality and wildlife, but none are included for analysis in the EIS.

3.2.2 The Environmental Impacts of Increased Oils Sands Extraction in the Alberta Oil Sands Region, Including But Not Limited To: Emissions of Polycyclic Aromatic Hydrocarbons to the Air, Water and Soil; Air Quality Impairments; Adverse Effects on Wildlife and Habitats; and Ground, Surface and Drinking Water Contamination Must be Analyzed as Impacts of the L3R Proposal

As described above, the increased pipeline capacity provided by the L3R Proposal will increase the pace of extraction in the Alberta Oil Sands Region. The Line 3 replacement doubles the capacity of the line, resulting in over 300 bpd additional crude oil shipped out of the tar sands region. Moreover, the EIS must compare the effects of the project to the "no action" alternative. In this case, presuming that the existing Line 3 is no longer financially viable, then the "no action" alternative would be to retire the existing Line 3, but not replace it. In that case, the impact of the proposed Line 3 is the entire volume of tar sands at 750 bpd. The EIS must compare 750 bpd shipped out of the tar sands region on Line 3 to zero bpd.

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[83] *Mid States Coalition for Progress v. Surface Transportation Board*, 345 F.3d 520, 549 (8th Cir. 2003) ("But the proposition that the demand for coal will be unaffected by an increase in availability and a decrease in price, which is the stated goal of the project, is illogical at best. The increased availability of inexpensive coal will at the very least make coal a more attractive option to future entrants into the utilities market when compared with other potential fuel sources, such as nuclear power, solar power, or natural gas").

[84] *See* EA Kort, ML Smith, LT Murray, A Gvakharia, AR Brandt, J Peischl, TB Ryerson, C Sweeney, and K Travis, *Fugitive Emissions from the Bakken Shale Illustrate Role of Shale Production In Global Ethane Shift*, Geophys. Res. Lett., 43, doi: 10.1002/2016GL068703; J Peischl, A Karion, C Sweeney, EA Kort, ML Smith, AR Brandt, T Yeskoo, KC Aikin, SA Conley, A Gvakharia, M Trainer, S Wolter, and TB Ryerson, *Quantifying Atmospheric Methane Emissions from Oil and Natural Gas Production in the Bakken Shale Region of North Dakota*, J. Geophys. Res., May 11, 2016, available at http://onlinelibrary.wiley.com/doi/10.1002/2015JD024631/abstract, last retrieved May 12, 2016; Joshua P. Schwarz, John S. Holloway, Joseph M. Katich, Stuart McKeen, Eric A. Kort, Mackenzie L. Smith, Thomas B. Ryerson, Colm Sweeney, and Jeff Peischl, Black Carbon Emissions from the Bakken Oil and Gas Development Region, *Environmental Science & Technology Letters*, 2015; NE Lauer, JS Harkness, and A Vengosh, *Brine Spills Associated with Unconventional Oil Development in North Dakota,* Environmental Science & Technology, April 27, 2016, available at http://pubs.acs.org/doi/abs/10.1021/acs.est.5b06349, last retrieved May 12, 2016;

With the doubled pipeline capacity of a new Line 3 coming online, individual production projects' break-even points will be lowered, and production volumes will accelerate, even in a continued low oil price market.[85] Production projects in the oil sands region are based on current oil prices and the costs of production, of which transportation costs are a significant portion. Lowering these transportation costs will of course change those investment decisions, leading to more extraction and ultimately more consumption. The federal courts have made clear that NEPA requires an EIS to consider the increased production (and ultimately consumption) that is the direct result of lowered transportation costs for fossil fuels.[86] This increased extraction activity carries a significant environmental footprint, all of which is currently ignored in the L3R DSDD.

The environmental impacts of oil sands extraction and processing have been documented for decades. Primarily, those impacts are: (1) impacts on water quality from waste water releases; (2) water quality impacts from water withdrawal and use; (3) greenhouse gas emissions, (4) air pollutants (including SOx, NOx, volatile organic chemicals such as polycyclic aromatic hydrocarbons, and particulate emissions), (5) tailings disposal, and (6) land disturbances, including habitat fragmentation or destruction.[87]

3.3 "Downstream" Impacts of Increased Petroleum Production, Transport and Use.

3.3.1 The EIS Should Examine the Impacts of Increased Bakken and Tar Sands Petroleum Use.

Federal courts have held that increased production from a new transportation corridor is an indirect impact that must be analyzed under MEPA.[88] In one case, a rail company sought to build a new rail line from the coal mines of Wyoming's Powder River Basin to service power plants in Minnesota.[89] At the Eighth Circuit, the Sierra Club argued that the rail line would increase the emissions of various noxious pollutants by increasing access to the low-sulfur coal. The Surface Transportation Board, which prepared the EIS, argued that its new rail line would not affect the demand for coal, but the court found this unlikely, as the stated purpose of the project was to increase availability and decrease the price of Powder River Basin coal. The rail company also argued that any such impact was too speculative to be determined, but the court also dismissed this argument. It held that increased use and access to low-sulfur coal fall under "indirect effects" that must

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[85] Ex. 6 at ES-12 (Keystone XL SEIS Executive Summary) (noting that increased pipeline capacity will increase oil sands production in a low oil price market).

[86] *Mid States Coalition for Progress*, 345 F.3d at 549 ("But the proposition that the demand for coal will be unaffected by an increase in availability and a decrease in price, which is the stated goal of the project, is illogical at best. The increased availability of inexpensive coal will at the very least make coal a more attractive option to future entrants into the utilities market when compared with other potential fuel sources, such as nuclear power, solar power, or natural gas").

[87] Council of Canadian Academies, *Technological Prospects for Reducing the Environmental Footprint of Canadian Oil Sands: Executive Summary*, 2015, available at http://www.scienceadvice.ca/uploads/ENG/AssessmentsPublicationsNewsReleases/OilSands/OilSandsExecSummEn.pdf, last retrieved May 12, 2016; A Parajulee and F Wania, *Evaluating officially reported polycyclic aromatic hydrocarbon emissions in the Athabasca oil sands region with a multimedia fate model,* March 4, 2014, PNAS 111: 3344-3349.

[88] MEPA is modeled on the National Environmental Policy Act, and Minnesota state courts often turn to federal courts for guidance on interpreting MEPA. *See, e.g., Minnesota Center for Environmental Advocacy v. Minnesota Pollution Control Agency*, 644 N.W.2d 457, 468 n.10 (Minn. 2002) (noting that NEPA is similar to MEPA in their primary procedural requirements, and that "therefore looking to federal case law is appropriate and helpful in this case.").

[89] *Mid States Coalition for Progress*, 345 F.3d at 520.

be analyzed under NEPA. Even if the *extent* of the impact is uncertain, the *nature* of the impact is not, and therefore it must analyzed with as much detail as possible.[90]

Similarly, in this case, the EIS must include the indirect impacts of increased usage of crude oil from both the Bakken associated with Sandpiper, and the tar sands, associated with Line 3. While it is may be difficult if not impossible to predict the precise uses of the crude oil shipped via the proposed Sandpiper and Line 3 pipelines, it is possible to make rough estimates. MEPA requires such calculations even where there is some uncertainty.[91] For instance, the EPA has determined that carbon dioxide emissions per barrel of crude oil may be analyzed using a formula of "heat content times the carbon coefficient times the fraction oxidized times the ratio of the molecular weight of carbon dioxide to that of carbon (44/12)."[92] Using this formula, the EPA calculated that the average carbon emissions per barrel of crude oil in the U.S. is 0.43 metric tons CO_2. The EIS could likely provide a more refined analysis specific to Bakken and tar sands crude oils. Similar calculations could also be performed for other pollutants from refining crude oil.

3.3.2 The EIS Should Examine the "Downstream" Impact of Increased Impacts of Increased Crude Oil Transport.

Increasing the volume of oil shipped into Superior, Wisconsin will increase the volume of oil shipped out of Superior, Wisconsin to other refineries, especially in the Chicago area and lower Midwest. In the now-defunct Certificate of Need proceedings for the Sandpiper Pipeline, Marathon Petroleum made no secret of the fact that Superior, Wisconsin was not the final destination for the Bakken crude to be shipped on the Sandpiper. The same is certainly true for the oil on Line 3, as the refining capacity in Superior, Wisconsin is already greatly exceeded by the volume of oil coming in. All of that oil will need to be shipped elsewhere, either by pipeline, train or truck.

As a result of increased volume of oil arriving in Superior, the following indirect impacts may occur:

- New pipelines may need to be built;
- Existing pipelines may need to be expanded;
- Additional oil may be shipped on aging pipelines, resulting in increased pressure;
- Additional oil may be shipped on aging pipelines, resulting in prolonged life for those pipelines and increased risk of spill;
- Increased rail or truck traffic carrying crude oil out of Superior, Wisconsin.

There may be other indirect impacts that we have not identified here. All of these impacts are "indirect" impacts under MEPA, and must be analyzed.

When analyzing these impacts, NDPC's preferred route must be compared with similar indirect impacts of the system alternatives. SA-04 and SA-05 were proposed by FOH in part because those proposed alternatives terminate closer to the refineries that are the final destination for the oil, at least in the case of Sandpiper.

In addition, when analyzing Line 3, the EIS should compare the indirect impacts to the "no-action alternative" of not replacing Line 3. If the oil currently shipped on Line 3 is no longer shipped to Superior,

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[90] *Id.* at 549-550.
[91] Minn. R. 4410.2500.
[92] U.S. EPA, *GHG Equivalencies Calculator – Calculations and References*, https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references, last accessed May 24, 2016.

Wisconsin, then the indirect impacts may include retirement of existing pipelines out of Superior, WI; less utilization of existing pipelines out of Superior, WI; less rail or truck traffic out of Superior; etc. The impact of replacing Line 3 is to avoid those potentially advantageous outcomes.

3.4 Environmental Impacts of Pipeline Construction

3.4.1 The EIS must analyze the construction and permanent "footprints" of the two projects on the differing landscapes crossed by the proposed pipelines and not rely on Enbridge's estimates and descriptions

Construction of pipelines has both temporary and permanent impacts. Permanent impacts are caused by removal of, for example, forest vegetation over the permanent right of way for the project life. This in turn causes other impacts, including impacts to wildlife or of increased runoff. Another important potential permanent or long-term impact is from topsoil mixing over the trench or on side-hill cuts needed to construct the 50-60 foot wide flat work area needed for pipe installation. This results in, for example, increased erosion on hillsides, sediment reaching streams, and invasion of exotic species of plants. Other long term impacts include forest removal on hilly terrain outside of the permanent right-of-way that is needed for spoil storage and ROW needs during construction.

In addition, even temporary impacts must be accurately characterized in the EIS to assess impacts. The temporary area needed for pipeline construction in hilly terrain is much wider than that needed in flat terrain. Normally, the affected area in flat terrain can be limited to a 100-120 foot width for one pipeline. On hilly terrain, the temporary ROW can be as much as 350-400 feet in width, requirement extensive forest clearing in forested areas.

The EIS should independently analyze:

- The temporary and permanent size of the construction zone needs--the "footprint"--on flat terrain vs. hilly terrain.
- The geographic extent of topsoil mixing and over the trench and on side-hill cuts and on temporary and permanent access roads for these scenarios: 1) the Applicant's proposal to only separate topsoil in agricultural areas and leave the rest up to landowner desires; 2) the geographic extent of topsoil mixing if the Applicant's permit--if eventually given--requires topsoil separation on all locations over the trench and where there are side-hill cuts deeper than the topsoil (where topsoil is potentially lost by burial in parent material).
- The impacts of topsoil loss to burial in substrate based on the estimates of geographic extent cited above.
- The increases in ROW width due to topsoil separation in hilly terrain vs. flat terrain.
- The pros and cons of constructing the two pipelines at the same time, should they eventually be permitted.
- The pros and cons of winter construction on wetlands and uplands, including the difficulties in topsoil separation and replacement on frozen ground.
- The specific extent of land clearing and pipeline separation from existing pipelines and other linear facilities, and the extent to which the two new pipelines will or will not be able to maintain the 25 foot separation proposed by the Applicant. This will provide a more objective and accurate indication of the width of the expanded pipeline corridor. Such information is crucial to the analysis

of other impacts such as to wildlife and the cumulative impacts of adding pipelines. It is also crucially needed to determine whether the Applicant's portrayal of following existing corridors is accurate or reasonable. Due to many obstacles as additional pipelines have been added to the existing pipeline corridors, locating the new pipeline 25 feet from an existing pipeline is often not possible. Sometimes the new pipelines must cross over to the other side of the existing pipelines, or they must deviate from the existing pipeline corridor. The result is a much different actual on-the-ground impact than that indicated by the Applicant's limited environmental assessment.

3.5 Wetland Impacts

When analyzing the potential impacts of the project, the Commission should consider the purpose of the Wetland Conservation Act, which is to:

A. achieve no net loss in the quantity, quality, and biological diversity of Minnesota's existing wetlands;
B. increase the quantity, quality, and biological diversity of Minnesota's wetlands by restoring or enhancing diminished or drained wetlands;
C. avoid direct or indirect impacts from activities that destroy or diminish the quantity, quality, and biological diversity of wetlands; and
D. replace wetland values where avoidance of activity is not feasible and prudent.[93]

Under Minnesota law, the project must be designed to prevent or avoid impacts on wetlands.

3.5.1 Impacts to Wetlands Due to Construction

Impacts to wetlands from construction are described as temporary, but the EIS should analyze whether that is the case. It is not enough to simply assume that because the soil is replaced, the wetland will be restored. It seems unlikely that sensitive wetlands can maintain their integrity when they are excavated, a pipeline put underneath, and then the materials put back. Previous pipeline projects through wetlands make this clear – once the construction is completed, the wetland has been permanently altered. Potential impacts to wetlands from construction include, but are not limited to:

- Some types of wetlands take decades or even centuries to form and cannot tolerate this type of treatment.
- Disturbance or destruction of wetlands is likely to present the opportunity for introduction of invasive plants, or loss of native plants.
- Disturbance is likely to change drainage patterns, which could cause wetlands to become drier or wetter. This could also have an indirect impact on nearby wetlands.
- Permanent impacts from spills of oil, gas, drilling fluid or other materials used during construction.

[93] Minn. R. 8420.0100, subp. 1.

3.5.2 The EIS Should Clarify Actual Impacts to Wetlands

Constructing the pipeline clearly would result in permanent impacts to wetlands, yet the EAW misleadingly claims that "only 1.0 acres would be permanently filled wetlands." Sandpiper EAW, p. 90. Table 7-1 on p. 31 of the Sandpiper EAW similarly suggests that all wetland cover except for one acre will be maintained after construction. While only one acre may be permanently filled, there is no doubt that the other 958.2 acres will be altered, in many cases to be unrecognizable; a different type of wetland or even no longer wetlands at all. The EAW currently reads to suggest as if none of these wetlands will be permanently affected, let alone lost. The analysis should be refined to determine which acres will be permanently affected, and how.

3.5.3 The EIS Must Analyze the Effects of Oil Releases in Wetlands Including the Effects of Bitumen

The EIS must analyze the effects of an oil release on wetlands, including especially sensitive, high-value wetlands, and assess whether bitumen can ever be cleaned up from such wetlands. It must also analyze the destructive effects of the bitumen clean-up processes themselves. It should assess the long term consequences and costs of both the spill and clean-up efforts and the time frame for when such wetlands will return to their current condition, whether it be 10 years or 500 or more years. Examples of such wetlands are those in the LaSalle Creek/LaSalle Lake area, along the Mississippi River, and the Upper Rice Lake area.

3.6 Impacts on Aquatic Life, Including Habitat Loss

In addition to permanent changes to wetlands, pipeline construction may also cause permanent changes to habitat for aquatic plants and animals. Although potential impacts on fish and other aquatic life beyond the pipeline boundaries are addressed briefly in the EAWs under cumulative impacts, these are also direct impacts of the proposed pipelines.

3.7 Environmental Impacts of Surface Uses

3.7.1 The Proposed Consideration of the Impacts of Access Roads Necessary for Construction and Maintenance is Unreasonably Narrow

Although the DSDDs for both projects include access roads in their descriptions of the project, neither document gives any indication that the EIS will specifically include the environmental impacts of those roads. The new roads attract a variety of third party uses, including ATVs, motorbikes and snowmobiles, regardless of whether those uses are permitted by Enbridge or the state. The environmental impact of those uses are currently unaccounted for in the proposed scope of the EIS, which would therefore exclude consideration of impacts such as habitat fragmentation, soil erosion and compaction, poor air quality, aesthetic impairments, invasive species, turbidity impacts on designated trout streams and excessive noise. These impacts may be heightened by the intensity of the surface uses, which should therefore be analyzed in the EIS.

3.7.2 The Proposed Consideration of the Impacts of the Cleared Right of Way is Unreasonably Narrow

A cleared right of way produced by a pipeline project attracts a variety of third party uses, including ATV use and snowmobile use. These uses cause direct environmental impacts through soil compaction and erosion, and also pose a risk of interference with the pipeline itself, including the risk of rupture. This is particularly

acute where surface uses have the potential to erode soil cover above the pipeline, compromising the structural integrity of the pipeline itself. The EIS should consider the probability and intensity of such surface uses and evaluate the environmental impact of the increased surface activity resulting from the pipeline construction. These impacts include habitat fragmentation, soil erosion and compaction, poor air quality, aesthetic impairments, excessive noise, turbidity impacts on designated trout streams and the risk of compromised pipeline integrity or rupture.

3.7.3 The EIS Must Consider Impacts Resulting from Surface Clearance for the Impressed Current Cathodic Protection System

The proposed Sandpiper Project requires the construction of an impressed current cathodic protection system, which involves a 20-30 foot wide construction workspace 600 feet perpendicular to the pipeline.[94] The surface of this workspace must be routinely cleared of all woody plants. As noted in the sections above, these cleared areas attract a variety of third party uses, and the environmental impact of those uses must be evaluated in the EIS.

3.8 Potential for Failure of Mitigation Measures

3.8.1 Impacts Resulting from the Failure of Mainline Shutoff Valves

The Sandpiper Project and the L3R Project both propose to install mainline shutoff valves (21 for Sandpiper and 22 for L3R) that can be remotely controlled from the NDPC Control Center.[95] Although the DSDDs for the two projects both propose to include oil spill modeling in the EIS, neither document identifies any analysis of the potential impacts of failures in the mainline intelligent valve control system, despite the fact that federal data indicate equipment failures cause 32% of pipeline spills.[96] These impacts could be the result of faulty valve operation or failures in the communication system between the valve and NDPC's Control Center (such as by interference from solar magnetic storms),[97] either of which would potentially increase potential oil releases by an order of magnitude in the event of a rupture. The EIS must also indicate the significant limitations of mainline valve shutoff systems in an oil spill event, particularly that a rupture would typically allow the release of the entire volume of petroleum in the affected segment. Valve shutoffs have the potential to prevent further releases from the pipeline, but the EIS must clarify the minimum and maximum quantities that would be released in a rupture event, even assuming optimal mainline valve operation as well as mainline valve failure.

3.8.2 Impacts Caused by Corrosion Resulting from Failure or Inadequacy of the Cathodic Protection System

Cathodic protection is designed to protect the pipeline from the corrosive effects electrical currents induced in the pipeline by the earth's magnetic field or by stray AC or DC voltage interference. By directing the current to an anode, the cathodic protection system is intended to direct the corrosive effects to structures external to the pipeline itself, therefore protecting the pipeline integrity. The effectiveness of these cathodic

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[94] SPP EAW at 27.
[95] SPP EAW at 12; L3R EAW at 25.
[96] Ex. 9 at 11 (Keystone XL SEIS Attachment K)
[97] *See* U.S. Dep't of Homeland Security, Industrial Control Systems Cyber Emergency Response Team, *Solar Magnetic Storm Impact on Control Systems*, March 26, 2011, available at https://ics-cert.us-cert.gov/advisories/ICSA-11-084-01, last accessed May 23, 2016.

protection systems must be evaluated in the EIS, including the probability and impacts of pipeline corrosion resulting from cathodic protection system failure. In 2012, for instance, a portion of TransCanada's newly built Keystone pipeline was discovered to be severely corroded, despite the presence of the same impressed current ground bed cathodic protection system proposed for the Sandpiper and L3R Projects.[98] The report investigating that incident found that "highly accelerated rates of corrosion on buried pipelines" can be caused by microbial activity, stray direct current interference, and stray alternating current interference.[99] The report notes that one source of AC current interference is induced current caused by electromagnetic interference in collocated right of ways.[100] Possible sources of this interference include existing pipelines collocated in the right of way (particularly "foreign" cathodic protection systems) and high voltage transmission lines in close proximity to the pipeline.[101] High voltage transmission lines in particular have been studied as a likely source of pipeline corrosion, with one recent study concluding that "on pipelines suffering from A.C. interference traditional pipe-to-soil potential measurements do not guarantee efficient cathodic protection against corrosion."[102] The incidences of pipeline corrosion investigated by the report "rais[ed] the possibility that the Cathodic Protection in some areas was inadequate and/or interference conditions were rendering the CP system ineffective and likely accelerating corrosion."[103] The DSDDs for the Sandpiper and L3R Projects give no indication that the environmental impacts of such corrosive activity will be analyzed, and is accordingly inadequate.

3.9 Phased and Connected Actions

3.9.1 The Line 3 and Sandpiper Pipeline EIS Should Also Cover Transmission Lines and Similar Related Actions.

The EIS should cover all related actions, including transmission lines. Confusingly, the notice for the Environmental Assessment of the Bull Moose Transmission Line Project and Clearbrook West Transmission Line Project have been noticed separately from the pipeline EISs, despite the fact that the transmission lines serve the applicant's proposed route for Sandpiper and Line 3.[104]

The Commission is legally obligated to include all "phased and connected actions" in the EIS.[105] These phased and connected actions include new transmission lines necessary for the operation of the pipelines, all "associated facilities" mentioned in the EAWs, and any other related projects not yet defined that are in the same geographic area and are necessary to the operation of the pipelines.

Also, all phased and connected actions must be identified at the time of the Draft EIS. Analysis of these actions may not be put off until a later date. The EAW states that there may be additional transmission lines required that are not yet specified. Any additional transmission lines must be identified and the impacts analyzed as part of the Draft EIS.

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[98] *See* Ex. 13 at 4 (Transcanada Keystone Corrosion Root Cause Report)
[99] *Id.* at 9.
[100] *Id.* at 11.
[101] *Id.* at 32; Ex. 14 at 6 (AC Transmission Line and Corrosion Study).
[102] Ex. 14 at 6 (AC Transmission Line and Corrosion Study)
[103] Ex. 13 at 31 (Transcanada Keystone Corrosion Root Cause Report).
[104] Ex. 15 (screen shot taken 5/9/2016).
[105] Minn. R. 4410.2000, subp. 4.

Even if the Commission were not legally obligated to include associated facilities and transmission lines, the Commission has the discretion to include these actions under the EIS as "related actions."[106] Putting these connected actions such as the transmission lines on separate tracks creates the appearance of bias because it looks as if the agency is proceeding with the applicant's preferred route by approving facilities that are only required to support the applicants preferred route. This was the problem that arose when the Bull Moose and Clearbrook West Transmission lines were noticed simultaneously - but separately - from the Sandpiper and Line 3 EISs. There is no reason to approve the Bull Moose or Clearbrook West Transmission lines if NDPC's proposed pipelines do not proceed in NDPC's preferred location. Thus there is no reason to keep them on a separate track for environmental review. It creates the perception that the Commission intends to approve NDPC's proposed route, illegally presupposing the outcome of the EIS.

3.10 Cumulative Impacts

Minn. R. 4410.2300(H) states that an EIS shall include a discussion of potentially significant cumulative effects, which are defined by rule as

> the impact on the environment that results from incremental effects of the project in addition to other past, present, and reasonably foreseeable future projects regardless of what person undertakes the other projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.[107]

The Draft Scoping Decision Documents for the Sandpiper and L3R Projects identify a few cumulative impacts that will be discussed in the EIS, including cumulative impacts of collocating two pipelines in one right of way and the impacts of high-voltage transmission lines and substations needed to serve pipeline pump stations.[108] Aside from those two impacts, the DSDDs articulate a 'cumulative impact methodology' intended to identify existing or proposed projects that may interact with the Sandpiper or L3R Projects. One such project that is not identified in the scoping documents is Minnesota Pipe Line Company, LLC's Reliability Project for Line 4,[109] which proposes to install pump stations and other upgrades to an existing pipeline that receives crude oil from Enbridge's facilities in Clearbrook, MN.

A particularly notable omission from the draft scoping documents is any mention of the cumulative impacts of climate change. The pipelines proposed by the applicant have a projected lifespan measured in many decades, and within that time climate change will cause numerous, wholesale change upon the landscapes of Minnesota. Warmer temperatures and changes in precipitation patterns will reduce the extent of wetlands in our state, further exacerbating any wetlands impact caused by the proposed pipelines. Climate change may also affect river flows or soil cover through increased evapotranspiration or extreme precipitation events, respectively, which could in turn affect the appropriate burial depth for the pipeline in order to mitigate potential oil spills. Minnesota is especially vulnerable to increases in extreme weather events that have the potential to quickly scour soil cover protecting the pipeline from interference by surface uses.[110] The FSDD

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[106] Minn. R. 4410.2000, subp. 5.
[107] Minn. R. 4410.0200, subp. 11.
[108] SPP DSDD at 29.
[109] Docket No. PL-5/CN-14-320, *ORDER GRANTING CERTIFICATE OF NEED*, August 31, 2015.
[110] Pryor, S. C., D. Scavia, C. Downer, M. Gaden, L. Iverson, R. Nordstrom, J. Patz, and G. P. Robertson, 2014: Ch. 18: Midwest. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 418-440; Saunders, S., Findlay, D., Easley, T., Spencer, T. (2012). Doubled Trouble: More

should clarify that the EIS will discuss these cumulative impacts in addition to those identified by the DSDD and the implementation of the DSDD's cumulative impact methodology.

3.11 Climate Change Impacts

Climate change impacts must be incorporated into the EISs for the proposed projects. Guidance from the Council on Environmental Quality states that "[c]limate change is a fundamental environmental issue, and the relation of Federal actions to it falls squarely within NEPA's focus."[111] Because the procedural requirements of MEPA hew so closely to those of its federal counterpart, any state-only EIS must also incorporate a full analysis of climate change impacts in an EIS.[112] The CEQ guidance further states that when addressing climate change, agencies should consider both "(1) the potential effects of a proposed action on climate change as indicated by its GHG emissions; and(2) the implications of climate change for the environmental effects of a proposed action."[113] As such, the EIS should quantify the greenhouse gas emissions that would result both directly and indirectly from the Sandpiper and L3R proposals and investigate how these emissions would affect the climate system.

Pursuant to the guidance, the acting agency should use "projected GHG emissions and when appropriate, potential changes in carbon sequestration and storage as the proxy" for potential climate change impacts.[114] The EIS must quantify the greenhouse gas emissions that would be produced during construction of the pipeline facilities. These include direct emissions such as construction vehicle and machine usage, and open burn land clearing as well as indirect emissions from electricity use. Additionally, CEQ's definition for emissions includes the "release of stored GHGs as a result of destruction of natural GHG sinks…as well as future sequestration capability."[115] Thus the EIS must quantify the loss of current and future carbon sequestration and storage from the clearing and destruction of forested areas and wetlands that would occur during construction of the Sandpiper and L3R projects.

As noted by the CEQ Guidance, per 40 CFR §§ 1508.7, 1508.8, agencies must consider cumulative (incremental), direct, and indirect effects when analyzing proposed actions.[116] The guidance clarifies that acting agencies should account for "emissions from activities that have a reasonably close causal relationship to the Federal action" including emissions predicate to the agency action (upstream emissions) and emissions that occur as consequence of the agency action (downstream emissions).[117] Emissions from the operation of facilities built for the two proposals should also be quantified. Additionally, as previously mentioned, Dr. Gunton's report found that the Sandpiper and L3R pipelines will increase the pace of extraction in the Williston Basin by decreasing transportation costs for producers.[118] This increase in extraction and production will produce further causally related downstream emissions that the EIS must quantify.

Midwestern Extreme Storms. The Rocky Mountain Climate Organization and the Natural Resources Defense Council.

[111] Ex. 21 (Council on Environmental Quality, *NEPA Revised Draft GFG Guidance*, 2 (Dec. 2014)).

[112] *See supra* note 80.

[113] *Id.* at 3.

[114] *Id.* at 8.

[115] *Id.* at 1, 8.

[116] *Id.* at 10; 40 CFR §§ 1508.7, 40 CFR §§ 1508.8.

[117] *Id.* at 11*; see also* 40 CFR § 1508.8.

[118] Ex. 1 at 8 (Expert Report of Dr. Gunton).

The guidance also acknowledges that climate change "can increase the vulnerability of a resource, ecosystem, human community, or structure, which would then be more susceptible to climate change and other effects and result in a proposed action's effects being more environmentally damaging."[119] This makes the consideration of both climate change adaptation[120] and resilience[121] especially critical when coupled with the considerations of environments already vulnerable to the specific effects of climate change.[122] In addition to the previously mentioned impacts on wetlands the EIS must analyze, the EIS should analyze how climate change may directly affect wetlands and other vulnerable ecosystems or exacerbate other impacts resulting from the Sandpiper and L3R proposals. Such effects should be incorporated into the oil spill modeling results, so that the interaction between climate change and spill impacts may be more fully understood. Similarly, the EIS should incorporate the effects of climate change into its analysis of the Proposal's impact on aquatic life.

SECTION 4: EIS FORMAT AND APPROACH

4.1 Cooperation With the Army Corps of Engineers

State law requires agencies to cooperate for the purposes of environmental review as much as possible. Under MEPA, the Commission "shall, to the extent practicable, avoid duplication and ensure coordination between state and federal environmental review and between environmental review and environmental permitting."[123] State agencies "shall…seek to strengthen relationships between state, regional, local and federal-state environmental planning, development and management programs."[124]

In this case, it appears that the Army Corps of Engineers will conduct environmental review as well, but NDPC has asked Army Corps to refrain from notifying the public at this time. The applicant should not be permitted to limit cooperation between state and federal agencies merely by requesting a delay in the federal agency's processes. For all their concern about efficiency and timing, NDPC appears to be actively preventing cooperation between state and federal agencies that would "avoid duplication and ensure coordination." Moreover, assuming that the Department and the Commission will be conducting additional pipeline EISs that also fall under Army Corps jurisdiction in the future, this would also appear to be a prime opportunity to "strengthen relationships" between state and federal agencies with overlapping jurisdiction. The Draft EIS should be performed in conjunction with the Army Corps of Engineers' review under NEPA, or it should explain why such cooperation is not practicable.

4.2 Combining Sandpiper and L3R into a Single EIS

There should be a single EIS completed for the Sandpiper pipeline, Line 3, and all related actions, including associated facilities and transmission lines. It is not clear why the Department chose to scope Line 3 and Sandpiper separately, especially since the documents are duplicative, but there should not be a separate EIS for each project.

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[119] Ex. 21 at 22 (CEQ *NEPA Revised Draft GFG Guidance*).
[120] *Id.* at 23 n.52.
[121] *Id.* at 23 n.53.
[122] *Id.* at 24.
[123] Minn. Stat. § 116D.04, subp. 2a(d).
[124] Minn. Stat. § 116D.03.

First, the Commission ordered an EIS that covers both Line 3 and Sandpiper, not two separate EISs. In its order in the Line 3 docket, the Commission authorized the Department to "prepare a combined EIS to address issues related to both dockets in accordance with Minn. Stat. ch. 116D and Minn. R. ch 4410." The Commission further clarified that it was authorizing a "combined environmental review of the need and routing dockets that considers the cumulative impact of the Sandpiper Pipeline Project and the Line 3 Project."[125] Thus, the most natural reading of the Commission's order is that the Department complete a single EIS for both projects, not two EISs.

Second, MEPA requires that the EIS for each project address the other project as a "phased and connected action."[126] "Multiple projects and multiple stages of a single project that are connected actions or phased actions must be considered in total when determining the need for an EIS and in preparing the EIS."[127] A "phased action" is defined as "two or more projects to be undertaken by the same proposer that a RGU determines…will have the same environmental effects on the same geographic area; and are substantially certain to be undertaken sequentially over a limited period of time."[128] Two projects are "connected actions" if "one project would directly induce the other; one project is a prerequisite for the other and the prerequisite project is not justified by itself; or neither project is justified by itself."[129] The proposed Sandpiper Pipeline and Line 3 are certainly phased actions. The record is not sufficiently developed to determine whether they are connected actions. In any event, in preparing the EIS, they should be treated as a single project under MEPA.

Third, a single EIS will avoid confusion and unnecessary burden on the public. When the public is asked to comment on two draft EISs for two pipelines proposed for a single corridor, it should be permitted to submit a single comment for both pipelines. The public should not be asked to comment separately on two pipelines as part of two different EISs.

Fourth, a single EIS will reduce the burden on the Department. If Sandpiper and Line 3 EISs are prepared separately, each EIS will need to address the other pipeline entirely.[130] MEPA requires that any project be analyzed in conjunction with other reasonably foreseeable actions.[131] If each pipeline is analyzed separately, the EISs will still significantly overlap due to this requirement. It would be much more efficient simply to analyze them in a single document. Moreover, the Department will find itself responsible for sorting out which public comments should be applied to Sandpiper and which ones apply to Line 3. This process would

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[125] Order Joining Need and Routing Dockets, *In the matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border*, Docket No. PL-9/CN-14-916; *In the matter of the Application of Enbridge Energy, Limited Partnership for a Routing Permit for the Line 3 Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border*, Docket No. PL-9/PPL-15-137, at 3.
[126] Minn. R. 4410.2000, subp. 4.
[127] *Id.*
[128] Minn. R. 4410.0200, subp. 60.
[129] Minn. R. 4410.0200, subp. 9c.
[130] Minn. R. 4410.2300(H) ("there shall be a thorough but succinct discussion of potentially significant adverse or beneficial effects generated, be they direct, indirect, or cumulative."); Minn. R. 4410.2000, subp. 4 (connected actions and phased actions); Minn. R. 4410.0200, subp. 9c (defining "connected actions"); Minn. R. 4410.0200, subp. 60 (defining "phased action"); Minn. R. 4410.0200, subp. 11 (defining "cumulative impact").
[131] *Id.*

be both burdensome and fraught, as any comments incorrectly assigned (and therefore not addressed as the commenter intended) could form the basis for legal challenge.

Fifth, even if the Commission disagrees that it is required by law to order a single EIS, it has the discretion to do so, and it should exercise its discretion. An RGU may order a "related action EIS" – a "single EIS for independent projects with potential cumulative environmental impacts on the same geographic area if the RGU determines that review can be accomplished in a more effective or efficient manner through a related actions EIS."[132] Such an approach is certainly warranted here for the above-stated reasons.

4.3 Conducting a Tiered EIS

Where an agency must make consecutive decisions on a project, MEPA regulations permit an agency to conduct a tiered EIS:

> An RGU may use a series of tiered EISs to fulfill environmental review requirements for an action where decisions on which alternative to select must be made in stages, progressing from the general to the specific. Prior to each decision which would eliminate from further consideration any alternatives under consideration, a tiered EIS must be completed which addresses the issues and alternatives relevant to the decisions to be made in that tier, at a level of detail appropriate to that tier. The level of detail in earlier tiers need not be as great as that in later tiers, provided that it is sufficient to reasonably inform decision makers of the significant environmental, economic, employment, and sociological impacts of the choices made in that tier.[133]

A tiered EIS allows an agency to conduct an EIS on a limited number of alternatives relevant to a particular decision, then conduct a second process, more narrow, to a subsequent decision. The second stage may be "tiered" to the first stage, such that any analysis of environmental impacts conducted in the first stage need not be duplicated.[134]

In this case, the first tier could address system alternatives - I.e., the location of the pipeline - and the second stage could address routing concerns. At the conclusion of the first tier, the Commission would make a determination on the preferred system alternative based on the criteria in MEPA. At the conclusion of the second tier, the commission would make a determination on the best route alternative(s) based on the criteria within MEPA.

This structure would avoid a host of potential issues. First, it would avoid the problem where the EIS analyzes 54 potential route alternatives for the applicant's preferred system alternative, but no route alternatives for other system alternatives. Not only would this be a lot of wasted work if the applicant's preferred route is not selected, it creates the appearance of bias because the agency has worked to refine the applicant's preferred alternative but not the other system alternatives.

Second, it avoids confusion to the public. Already this is expected to be a large EIS; encouraging public comment on particular alternatives at different stages will focus public comment and increase the quality of public participation. It allows the public to digest the proposal in smaller pieces.

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[132] Minn. R. 4410.2000, subp. 5.
[133] Minn. R. 4410.4000.
[134] *Id.* ("A tiered EIS may incorporate by reference material developed in an earlier tier.").

Third, it fulfills the mandate of the Court of Appeals. The Court of Appeals was concerned, at least in part, about timing. MEPA specifically prohibits state agencies from granting permits or other approvals prior to completion of the EIS. Conducting the first tier of the EIS on system alternatives, then the certificate of need proceedings, complies with the timing requirements of the Court and is consistent with the provision permitted "tiered" EISs.[135]

Finally, it is permissible under MEPA at the scoping stage. The RGU may change the form of an EIS "if circumstances indicate the need or appropriateness of an alternative form."[136]

Although this model seems ideally suited for the situation at hand, there are few, if any, examples of tiered EISs in Minnesota. FOH and MCEA suggest that if the Commission chooses this option, it should allow an additional comment period to allow the public and agencies assist in determining how to split up issues between the tiers.

4.4 Cardno/Entrix as Contractor

FOH and MCEA understand that the Department has hired Cardno/Entrix as its consultant for the EIS. Cardno Entrix has a direct conflict because it has worked for Enbridge Energy. Moreover, Cardno has a public record of preparing EISs for pipelines that underestimate environmental impacts.

While agencies are empowered to hire consultants to assist with preparation of an EAW or EIS under MEPA, any consultants hired should be independent and neutral. The primary purpose of MEPA is to provide usable information to the project proposer, governmental decision makers and the public concerning the primary environmental effects of a proposed project.[137] An EIS cannot serve that purpose if it is not prepared by an objective party.

Additionally, this Public Utilities Commission is responsible under MEPA for "verifying the accuracy of environmental documents."[138] The Commission has made its own job much harder if it intends to rely on a contractor who has a conflict of interest.

Cardno Entrix has a history of working for government agencies while concealing a conflict of interest. Even worse, Cardno has a history of preparing documents that reveal its conflict of interest by failing to adequately evaluate the risks of the project. In 2010, Cardno Entrix was hired to prepare the EIS for the proposed Keystone XL pipeline. Notably, Cardno was hired at TransCanada's recommendation.[139] The EIS was prepared and it appeared, as President Obama began his first term, that the pipeline was on the brink of approval:

> Then the real bomb dropped: Cardno Entrix, the Houston (Tex.) company [the] State [Department] had contracted with to complete an environmental impact statement on Keystone—the substance of the evaluation Obama referred to—turned out to be a preexisting client of TransCanada and, as such, appeared to have a blatant conflict of interest. After several members of Congress requested a

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[135] Minn. R. 4410.
[136] Minn. R. 4410.2100, subp. 7.
[137] Minn. R. 4410.0300, subp. 3.
[138] Minn. R. 4410.0400, subp. 1.
[139] "Pipeline Review Is Faced with Question of Conflict," *New York Times*, Oct. 7, 2011, available at http://www.nytimes.com/2011/10/08/science/earth/08pipeline.html?_r=0, last accessed May 24, 2016.

> review of the process, the inspector general was brought in to investigate and to establish new conflict of interest guidelines.[140]

Although the inspector general ultimately concluded that Cardno was not unduly influenced by its association with TransCanada, the State Department hired a new contractor to conduct a supplemental EIS that was considered superior by many.

Ironically, one of the major failings of the Keystone XL Pipeline EIS prepared by Cardno was that it failed to address the potential impacts of a spill of diluted bitumen, the particular crude oil being shipped from Canada on the pipeline.[141] But Cardno was one of the contractors hired to clean up the spill in Kalamazoo, so it should have had unique knowledge of the challenges.

And herein lies the problem for the Sandpiper and Line 3 EIS. Even a quick google search reveals that Cardno Entrix has recently or is currently working for Enbridge on the Kalamazoo River cleanup.[142] FOH has requested documents from Department regarding Cardno Entrix and the search for conflicts that the Department may or may not have undertaken. We have not yet received the requested documents. But as one NEPA expert put it:

> "Cardno Entrix should never have been selected to perform the environmental study on Keystone XL because of its relationship with TransCanada and the potential to garner more work involving the pipeline. The company provides a wide range of services, including assisting in oil spill response."
>
> Cardno Entrix had a "financial interest in the outcome of the project," Mr. Houck said, adding, "Their primary loyalty is getting this project through, in the way the client wants."[143]

In any event, the Commission should be extremely wary of a contractor with a blatant conflict of interest who has already been exposed once for preparing an inadequate EIS in favor of the industry it serves.

5.0 SPECIAL STUDIES OR RESEARCH

5.1 Socioeconomic and Environmental Impacts on Homeowners From the Use of Eminent Domain and the Construction of Pipelines and Related Facilities on Private Property

When a pipeline is permitted by the Public Utilities Commission, the pipeline company has virtually limitless ability to install the pipeline and associated facilities on private property. Minnesota law states that transporting crude oil via pipeline is "declared to be in the public interest and necessary to the public welfare, and the taking of private property therefore is declared to be for a public use and purpose."[144] The legislature

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[140] "Secrets, Lies, and Missing Data: New Twists in the Keystone XL Pipeline," *Bloomberg Businessweek*, July 12, 2013, available at http://www.bloomberg.com/news/articles/2013-07-11/secrets-lies-and-missing-data-new-twists-in-the-keystone-xl-pipeline, last accessed May 24, 2016.
[141] "Pipeline Review is Faced with Question of Conflict," *supra* note 112.
[142] The project is discussed on Cardno's website at http://www.cardno.com/en-au/Projects/Pages/Projects-Kalamazoo-River-and-Talmadge-Creek-Restoration.aspx, last accessed May 24, 2016.
[143] "Pipeline Review is Faced with Question of Conflict," *supra* note 112.
[144] Minn. Stat. § 117.48.

has further declared that any pipeline company "shall have and enjoy the power of eminent domain to be exercised in accordance with this chapter."[145]

Some of the risks posed by pipelines on private property are different than on public property. The following is a non-exhaustive list of potential impacts on private property:

- Loss of value of land from pipeline easements
- Cumulative loss of value of land from multiple pipeline easements (i.e. multiple pipelines, or pipelines plus transmission lines)
- Impacts on crop production and quality of farm land
- Displacement of buildings, including homes

While NDPC may argue that they are compensating landowners for these impacts, the EIS should investigate whether landowners are adequately compensated. In addition, impacts on farmland production and value have a public as well as a private cost that must be analyzed.

If there are questions about landowner compensation raised by the EIS, the PUC may wish to consider restrictions on the use of eminent domain as well as alternate strategies for compensation of crop damage.

CONCLUSION

For the foregoing reasons and in accordance with state and federal law, FOH and MCEA respectfully request that the final scoping documents for the Sandpiper Pipeline and the Line 3 Replacement Project incorporate the suggestions contained herein.

[145] *Id.*; *see also* Minn. R. 7852.3200 ("After an applicant is issued a pipeline routing permit…the permittee may exercise the power of eminent domain as provided by Minnesota Statutes, section 117.48.").

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENT "M"

M-1 Michigan official calls for shutting down oil pipeline - ABC News

ABC News Report on Enbridge Line 5 pipeline issue in Michigan and Mackinac Straits

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Michigan's attorney general on Thursday called for shutting down twin oil pipelines beneath the waterway where Lakes Huron and Michigan meet, as the state released a consultant's report outlining alternative scenarios for the future of oil transport in the ecologically sensitive tourist destination.

Republican Bill Schuette said a "specific and definite timetable" should be established for decommissioning the nearly 5-mile-long (8-kilometer-long) section of Enbridge Inc.'s Line 5 in the Straits of Mackinac, which environmental groups want removed but the Canadian pipeline company insists is in good shape.

"The safety and security of our Great Lakes is etched in the DNA of every Michigan resident," Schuette said, adding that "the final decision on Line 5 needs to include a discussion with those that rely on propane for heating their homes, and depend on the pipeline for employment."

The segment is part of Enbridge's sprawling Lakehead pipeline network, which transports oil and liquid natural gas to markets in the U.S. Midwest, East Coast and eastern Canada. Line 5 runs underground from Superior, Wisconsin, across Michigan's Upper Peninsula to the straits area, where it divides into two 20-inch pipes that rest on the lake floor. It continues south through the state's Lower Peninsula to Sarnia, Ontario, carrying about 23 million gallons (87 million liters) of light crude oil and liquid natural gas daily.

Enbridge, based in Calgary, Alberta, says the pipeline delivers crucial supplies of oil for gasoline, propane and other refined products and is closely monitored.

"After more than 60 years in service, Line 5 is in outstanding operating condition because the rigorous maintenance done through the decades," said John Gauderman, director of operations for the Great Lakes region. "We intend to keep it that way."

Critics say the underwater section of Line 5, in place since 1953, has been buffeted by strong currents and shows signs of wear. They note that Enbridge offered similar assurances before another of its pipelines ruptured in southern Michigan in 2010, fouling the Kalamazoo River in one of the nation's largest inland oil spills.

Schuette said in a news release that he "strongly disagrees" with a suggestion in the report by the engineering consulting firm Dynamic Risk Assessment Systems Inc. that Line 5 could operate indefinitely.

Environmental activists said the attorney general, who is expected to run for governor next year and has said previously that Line 5's "days are certainly numbered," should prove he means business by ordering a shutdown. Although the federal government regulates oil pipelines, Michigan owns the straits area Great Lakes

bottomlands and could revoke an easement it granted to Enbridge when Line 5 was installed, said Liz Kirkwood, executive director of a group called For Love of Water.

"He has the authority to act now and we want him to act now," said David Holtz, chairman of the Sierra Club's Michigan chapter.

The Michigan League of Conservation Voters dismissed Schuette's statement as "hollow posturing" and urged Republican Gov. Rick Snyder to "finally put Line 5 out of service." The Michigan Chamber of Commerce said the pipeline was important to the state's economy and its fate shouldn't be determined by "bumper stickers or emotional political appeals."

State agencies considering what to do about Line 5 commissioned two reports from separate consulting firms, one analyzing risks posed by the existing situation and the other focusing on future option. Enbridge covered the more than $3 million cost. Officials announced last week that the state had canceled the nearly-finished risk analysis after discovering a conflict of interest involving one of the firm's employees.

The Dynamic Risk Assessment Systems report released Thursday lists six alternatives, including continuing the Line 5 segment's current operations or shutting it down. Others include building a new pipeline through Wisconsin, Illinois, Indiana and Michigan that wouldn't cross open Great Lakes waters; moving Line 5's oil through other existing pipelines; using surface oil transport methods such as rail cars, trucks or barges; and putting new pipelines in the straits that would run through a trench or tunnel.

The report doesn't endorse a particular alternative but analyzes each for technical and cost feasibility. It also assesses the condition of the existing pipelines and possible outcomes of oil spills in the area.

Enbridge said it needed more time to study the 337-page report before commenting, while environmental groups said it was too friendly toward the company's position.

It describes truck and ship transport as impractical and says a more southerly pipeline would cost around $2 billion while posing

significant environmental and economic hazards. The tunnel or trench options would be much less expensive, it says, and simply shutting down Line 5 would boost gasoline and propane prices statewide.

A final version will be issued this fall after several public information and comment sessions.

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Comments

Trump 'pressed' Putin on election meddling but he denied it, Rex Tillerson says

By VERONICA STRACQUALURSI and DAKSHAYANI SHANKAR · Jul 7, 2017, 2:50 PM ET

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WATCH | **Trump: Meeting with Putin 'going well'**

President Trump today pressed Vladimir Putin on Russian interference in the 2016 U.S. elections at their face-to-face meeting during the G-20 summit meeting, which the Russian president denied, U.S. Secretary of State Rex Tillerson said.

"The president opened the meeting by raising the concerns of the American people regarding Russian interference in 2016 election. Putin denied such involvement, as he has done in the past," Tillerson said during an off-camera briefing today in Hamburg, Germany.

"The two leaders agreed this is of substantial hindrance. They agreed to exchange further work regarding commitments of noninterference in the affairs of the U.S. and our democratic process as well as other countries."

Tillerson also added that both presidents acknowledged the "challenges of cyberthreats and interference in the democratic processes" in the United States and other countries and that they would work together to "create a framework" to deal with these cyberthreats, in terms of how they are used to hack into the "internal affairs of countries," terrorism and how they also threaten "infrastructure."

Russian Foreign Minister Sergey Lavrov also noted during a televised news conference that Trump raised the issue of election interference, though adding that the president accepted Putin's "clear statements" that "Russian leadership hadn't interfered."

Lavrov pointed out that Trump noted the Russian interference had been “mentioned in several U.S. circles” but “the [U.S] can’t prove it.”

“President Trump, I’m sure either he himself or Rex Tillerson, will talk about this, said that this campaign [accusing Russia of interfering] is already acquiring quite a strange character because for months when accusations have been voiced not a single fact has come out,” Lavrov said.

But another senior White House official, when asked by ABC News whether Lavrov's description of Trump’s accepting the Putin denial of election interference is true, said, “No,” without providing further information.

Putin and Trump's meeting lasted about two hours and 15 minutes -- far longer than the planned 30-minute duration -- and Tillerson said the meeting was "very constructive" with both leaders possessing a "positive chemistry" and not "relegating" often to one another.

First lady Melania Trump came into the meeting after the first-hour mark but "couldn't get through" to both leaders, Tillerson said.

Both presidents exchanged views on the nature of U.S.-Russia relations and the future.

"It's an honor to be with you," Trump had said to President Putin at the beginning of their meeting, which began shortly after 10 a.m. ET.

"President Putin and I have been discussing various things. I think it’s going very well, we’ve had some very, very good talks," Trump told reporters who were allowed into the room briefly.

Trump added, “We look forward to a lot of very positive things happening for Russia, for the United States, and for everybody concerned."

Trump insists 'nobody really knows' who meddled in election, points the finger again at Obama

Sen. Lankford: Trump needs to 'apply pain' to Putin regime to deter meddling

Trump says he 'absolutely' still wants Mexico to pay for wall

Trump and Putin were joined at their more formal meeting by Tillerson, Russian Foreign Minister Sergey Lavrov and two translators.

Putin said beforehand that he was "delighted" to meet with Trump personally and hoped their meeting would “yield positive results," according to the translator.

The Russian president said while he and Trump have spoken over the phone -- three times since Trump took office – such calls are "never enough."

Trump did not answer questions from the media on whether they would discuss Russia's alleged interference in the 2016 U.S. election.

Before their high-stakes sit-down, the two leaders had a casual run-in this morning where they exchanged a handshake.

ABC News' Jordyn Phelps contributed to this report.

Comments

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENT "N"

N-1 DOC Letter PUC re FEIS

Minnesota Department of Commerce's Response to the Minnesota Public Utilities Commission regarding the Line 3 Final EIS and Determination of "Adequacy"

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION
SUITE 350
121 SEVENTH PLACE EAST
ST. PAUL, MINNESOTA 55101-2147

Nancy Lange	Chair
Dan Lipschultz	Commissioner
Matthew Schuerger	Commissioner
Katie Sieben	Commissioner
John Tuma	Commissioner

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Routing Permit for the Line 3 Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border	MPUC Docket No. PL-9/PPL-15-137 OAH Docket No. 65-2500-33377
In the Matter of the Application of Enbridge Energy, Limited Partnership, for a Certificate of Need for the Line 3 Replacement Project in Minnesota From the North Dakota Border to the Wisconsin Border	MPUC Docket No. PL-9/CN-14-916 OAH Docket No. 65-2500-32764

REPLY COMMENTS OF THE MINNESOTA DEPARTMENT OF COMMERCE

On June 6, 2017 the Minnesota Public Utilities Commission (Commission) issued a Notice Requesting Comments of the parties to the above dockets on the appropriate process to use to bring the Final Environmental Impact Statement (FEIS) for Enbridge's proposed Line 3 pipeline project before the Commission to make a timely determination on the FEIS's adequacy. Several parties filed comments on June 20, 2017. The Minnesota Department of Commerce (Department) provides the following reply comments to assist the Commission.

1. CLARIFICATION REGARDING THE DATE FOR ISSUANCE OF THE FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS)

All parties have known that the end of the 250-day period for the anticipated issuance of the FEIS has been August 10, 2017. The Sierra Club and Honor the Earth (HTE) comments of June 20 misstated certain facts regarding issuance of the final environmental impact statement,

and appeared to imply that the date for issuance of the FEIS was postponed at the request of the Department. This is incorrect. The Sierra Club Comment incorrectly stated that:

> [o]n May 31, 2017, *pursuant to a request from the Department*, the Administrative Law Judge ("ALJ") *pushed the FEIS issuance date to August 10, 2017* to account for the six week delay in the Department's issuance of the draft EIS ("DEIS").

Sierra Club Comment, June 20, 2017 at p. 1 (emphasis added)[1]. Similarly, the HTE Comment incorrectly stated:

> …the Department of Commerce's ("Department") Environmental Impact Statement Preparation Notice for the Line 3 Pipeline Replacement Project of December 5, 2016, ("EIS Preparation Notice")… identified July 10, 2017, as the date on which the Department would issue a FEIS. *Instead, pursuant to request by the Department,* the Administrative Law Judge ("ALJ") issued her Fourth Prehearing Order on May 31, 2017, which order set forth a revised schedule that required issuance of a FEIS on August 10, 2017, *a date that was necessitated by the fact that the Department did not issue a Draft Final Environmental Impact Statement ("DEIS") on April 3, 2017,* in accordance with the EIS Preparation Notice, but instead issued it on May 15, 2017 – six weeks later than scheduled.
> . . .
> *In essence, the six-week delay in the Department's issuance of the DEIS necessitated pushing back the date of issuance of the FEIS by 31 days to August 10, 2017. This schedule change significantly truncated the time available to the Commission in which to make an adequacy determination*.

(HTE Comment, p. 2 of 11)(emphasis added). The italicized statements are incorrect.

Throughout the EIS preparation process, the Department, the ALJ, Enbridge, and other parties knew that a period of 250 days was anticipated between the issuance of the EIS Preparation Notice (which is the start of a 280-day EIS process) and the completion and issuance of the FEIS. While it is true that the EIS Preparation Notice of December 5, 2016 erroneously identified July 10, 2017 (approximately day 220) rather than August 10, 2017 (day 250) as the

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[1] *See also*, Sierra Club Comment at p. 2 (Sierra Club incorrectly stated that *"[e]ven though the ALJ allowed an additional month* for the issuance of the FEIS….the Commission should anticipate that the Department will need at least an additional two weeks *beyond the one month extension granted by the ALJ* to complete and issue the FEIS.")

anticipated date for issuance of the FEIS, this date was mistakenly based on an incorrect count of days. At no time in the EIS preparation process did the Department or any other party indicate that it anticipated a period of less than 250 days should be required between the issuance of the EIS Preparation Notice on December 5, 2016 and issuance of the FEIS on August 10, 2017.

For example, Enbridge understood that 250 days were required for FEIS issuance, as was shown in its various scheduling proposals to the ALJ. One set of such proposals was provided in May, 2016 to the Administrative Law Judge (ALJ) and parties. In its May, 2016 proposals, Enbridge stated that the "Final EIS" was anticipated to be "Issued on Day 250". The ALJ attached these Enbridge scheduling proposals to the June 3, 2016 Second Prehearing Order.[2]

Enbridge subsequently provided to the ALJ and parties additional scheduling proposals on September 27, 2016. These subsequent proposals continued to identify August 10, 2017, which is day 250, for issuance of the Final EIS, and stated that the "Final EIS [is to be] Issued 8/10/2017". Enbridge's September 27, 2016 proposals are exhibits to the Third Prehearing Order.[3]

Similarly, the Second Amended Third Prehearing Order, filed October 31, 2016 and the Fourth Prehearing Order dated May 31, 2017 identified August 10, 2016 for FEIS issuance. To the best knowledge of the Department, all parties have been aware of, and did not object to, the

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[2] Second Prehearing Order, filed June 7, 2016 as document no. 20166-122067-01, Ex. A, pp. 2-3 of 3 (stating "Final EIS Issued on Day 251") and Ex. B, pp. 2-3 of 3)(stating "Final EIS Issued on Day 250").

[3] Third Prehearing Order, filed October 12, 2016 as document no. 201610-125629-01(Ex. A, pp. 2-3 of 3 ("Enbridge stated "Final EIS Issued 8/10/2017") and as Ex. B, pp. 2-3 of 3 (Enbridge stated "Final EIS Issued 8/10/2017"). *See also,* Amended Third Prehearing Order, filed October 14, 2016 as document no. 201610-125715-01, Exs. A and B. (The Department notes that the ALJ's Second Amended Third Prehearing Order, filed October 31, 2016 as document no. 201610-126100-02 appears inadvertently to have omitted these Exhibits A and B.)

anticipated period of 250 days, ending August 10, 2017, for issuance of the FEIS. The ALJ's May 31, 2017 Order did not identify a changed date for the anticipated issuance of the FEIS.

2. CLARIFICATION REGARDING THE PERIOD FOR PUBLIC COMMENT ON THE FEIS

Various parties filed comments that discussed the minimum period of time during which the public may comment on the adequacy of the FEIS. Some parties incorrectly stated that the period could be concluded as early as August 20, 2017. For example, the Enbridge Comment stated that the public comment period could end on August 24, 2017 ("the FEIS comment period …would begin upon the release of the FEIS on August 10, 2017, and continue for the required ten days.")[4] Similarly, the Laborers District Council of Minnesota and North Dakota, (LDC) Comment stated that the comment period could end on August 20, 2017. The LDC stated:

> …interested parties will have 10 days to submit comments for the Commission's consideration in its adequacy determination. There is no question in our mind that that the three weeks between August 20 and September 11 provides ample time for Commission and the parties to the case to review public comments on the FEIS, and for the Commission to make a determination regarding its adequacy.

LDC Comment at p. 1.

These statements on the opportunity of the public to comment are incorrect. Under the MEPA rules, if the FEIS is available on August 10, 2017, the period for public written comment may not end before August 28, 2017. The minimum written comment period is set out Minn. Rules Ch. 4410.

> "Interested persons may submit written comments on the adequacy of the final EIS to the RGU or the EQB, if applicable, for *a period of not less than ten days following publication in the EQB Monitor* of the notice of availability of the final EIS."

[4] Enbridge Comment at p. 3. The Enbridge Comment at fn. 5 correctly noted that Minn. R. 4410.0200, subp. 12 defines the term "day" and specifies that "When the period of time prescribed or allowed is 15 days or less, intermediate Saturdays, Sundays, and legal holidays shall be excluded in the counting of days.

Minn. Rule 4410.2800 subp. 2 (emphasis added).[5] The *EQB Monitor* is published weekly on Mondays. If an FEIS was issued August 10, 2017, the first date when a notice of availability of the FEIS could be published in the *EQB Monitor* is Monday, August 14, 2017. Minn. R. 4410.0200, subp. 12 specifies that the term "days" means business days: "[w]hen the period of time prescribed or allowed is 15 days or less, intermediate Saturdays, Sundays, and legal holidays shall be excluded in the counting of days." For these reasons, if the Line 3 FEIS is issued August 10, 2017, the minimum period for comment on the FEIS would continue to Monday, August 28, 2017.[6]

This means that parties now urging the Commission to complete its adequacy assessment of the FEIS by September 11, 2017 knew at least since the ALJ's Third Prehearing Order of October 12, 2016 that the FEIS was anticipated to be issued on August 10, 2017[7] and are now proposing that the Commission commence and conclude its assessment of the adequacy of the FEIS during the eight working days between August 28, 2017 and September 11, 2017.

3. CLARIFICATION OF WHAT CONSTITUTES THE ISSUANCE OF AN EFFECTIVE COMMISSION ORDER ON THE ADEQUACY OF AN FEIS.

Various parties suggested that the Commission may discharge its obligation to address the adequacy of the FEIS by oral vote at a Commission agenda meeting. This is incorrect. To be in force and effective, a Commission order must be written, signed, filed and served.

Enbridge, for example, stated that the Commission could "determine adequacy of FEIS within 280-day timeframe" by convening a "Commission Meeting" on September 7, 2017.

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[5] See also Minn. Rule 4410.2800 subp. 3. (The determination of adequacy of the final EIS shall be made at least ten days *after publication in the EQB Monitor* of the notice of availability of the final EIS.)(emphasis added).

[6] Neither Minn. Rule 4410.2800 subp. 2, nor the related statute, Minn. Stat. § 116D.04, specifically limit the Commission's discretion to require a longer time for public comment.

[7] Enbridge's scheduling proposals show that it contemplated as early as May, 2016 that 250 days were anticipated for issuance of the FEIS.

Enbridge Comment at p. 3. The Mille Lacs Band of Ojibwe filed comments that appear to imply that a decision at a meeting may be sufficient to address the question of adequacy, stating: "[i]n order to allow a fully informed decision, the Commission should schedule its meeting to address the adequacy of the FEIS on a date that allows sufficient time for the public to review and comment…." Mille Lacs Band of Ojibwe Comment at 1-2.

An oral vote at a Commission Agenda Meeting is not sufficient by itself to address adequacy of an FEIS. To the contrary, "[e]very order … issued or approved by the commission under this chapter must be in writing.… Minn. Stat. § 216B.33. Moreover, "[a]ll … orders in proceedings before the commission must be signed by the secretary." Minn. Stat. § 216.17 subd. 1. Further, the Commission's written orders, to be in force and effective, must also be duly filed and served:

> Every decision made by the commission constituting an order or determination is *in force and effective 20 days after it has been filed and has been served* by personal delivery, electronic service as provided in section 216.17, or by mailing a copy thereof to all parties to the proceeding in which the decision was made or to their attorneys, unless the commission specifies a different date upon which the order becomes effective.

Minn. Stat. § 216B.26 (emphasis added). Although the statute permits the Commission to vary the date an order becomes effective,[8] it does not give the Commission discretion to waive the requirement that its orders be filed and duly served to be "in force and effective." Together,

[8] The Commission typically does not vary the 20 days because Minn. Stat. § 216B.27, subd. 1 provides that within 20 days after the service by the commission of any decision constituting an order, any party to the proceeding and any other person aggrieved by the decision and directly affected thereby, may apply to the commission for a rehearing in respect to any matters determined in the decision. Minn. Stat. § 216B.27, subd. 3 provides that "[n]o order of the commission shall become effective while an application for a rehearing or a rehearing is pending and until ten days after the application for a rehearing is either denied, expressly or by implication, or the commission has announced its final determination on rehearing.

these statutes mandate that a Commission order addressing adequacy of the FEIS must be, at minimum, written, signed, filed and served.

This means that parties now urging the Commission to issue its order on the adequacy of the FEIS by September 11, 2017 are effectively proposing not only that the Commission commence and conclude its assessment of the adequacy of the FEIS, but that it also issue, file, and serve a defensible written order thereon during the eight working days between August 28, 2017 and September 11, 2017.

4. CLARIFICATION THAT DETAILED FINDINGS AND CONCLUSIONS ARE REQUIRED IN AN FEIS ADEQUACY DETERMINATION.

Various parties suggested that it is reasonable for the Commission to issue an order by September 11, 2017 on the adequacy of the FEIS. LDC, for example, provided the following short statement:

> There is no question in our mind that that the three weeks between August 20 and September 11 provides ample time for Commission and the parties to the case to review public comments on the FEIS, and for the Commission to make a determination regarding its adequacy.

LDC Comment at p. 1. Enbridge proposed the following:

> Upon the conclusion of the FEIS comment period, Commission Staff would review the adequacy comments submitted and provide a summary of the comments in Staff's Briefing Papers; Briefing Papers would also include a review and summary of the adequacy conditions in Minn. R. 4410.2800, subp. 4. The Commission would have the benefit of the Briefing Papers at its September 7, 2017, meeting; Enbridge further anticipates that the Commission will take statements from the parties at this meeting.
> In the alternative, the Commission could request the assistance of an ALJ in summarizing the comments received during the FEIS comment period and request that the ALJ provide the Commission with a report in advance of the September 7, 2017, meeting. Given the procedural nature of the adequacy factors, it seems Staff is well suited to summarize these issues for the Commission.

Enbridge Comment at 3-4, fn. 6.

The Commission, however, will need to make many specific factual findings and conclusions in its order on adequacy. It must determine that the FEIS:

A. Addresses the potentially significant issues and alternatives raised in scoping so that all significant issues for which information can be reasonably obtained have been analyzed in conformance with part 4410.2300, items G and H;[9]

B. Provides responses to the substantive comments received during the draft EIS review concerning issues raised in scoping; and

C. Was prepared in compliance with the procedures of the act and parts 4410.0200 to 4410.6500.

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[9] Minn. Rule 4410.2300 G requires the RGU to consider the following:
"Alternatives: the EIS shall compare the potentially significant impacts of the proposal with those of other reasonable alternatives to the proposed project. The EIS must address one or more alternatives of each of the following types of alternatives or provide a concise explanation of why no alternative of a particular type is included in the EIS: alternative sites, alternative technologies, modified designs or layouts, modified scale or magnitude, and alternatives incorporating reasonable mitigation measures identified through comments received during the comment periods for EIS scoping or for the draft EIS. An alternative may be excluded from analysis in the EIS if it would not meet the underlying need for or purpose of the project, it would likely not have any significant environmental benefit compared to the project as proposed, or another alternative, of any type, that will be analyzed in the EIS would likely have similar environmental benefits but substantially less adverse economic, employment, or sociological impacts. Alternatives included in the scope of the EIS as established under part 4410.2100 that were considered but eliminated based on information developed through the EIS analysis shall be discussed briefly and the reasons for their elimination shall be stated. The alternative of no action shall be addressed."
Minn. Rule 4410.2300 H requires the RGU to consider the following:
"Environmental, economic, employment, and sociological impacts: for the proposed project and each major alternative there shall be a thorough but succinct discussion of potentially significant adverse or beneficial effects generated, be they direct, indirect, or cumulative. Data and analyses shall be commensurate with the importance of the impact and the relevance of the information to a reasoned choice among alternatives and to the consideration of the need for mitigation measures; the RGU shall consider the relationship between the cost of data and analyses and the relevance and importance of the information in determining the level of detail of information to be prepared for the EIS. Less important material may be summarized, consolidated, or simply referenced. The EIS shall identify and briefly discuss any major differences of opinion concerning significant impacts of the proposed project on the environment."

Minn. Rule 4410.2800 subp. 4. In addition, the Commission will need to address the concerns raised in written comments received after August 10, 2017 regarding the FEIS.

This means that, in the Commission's written order on adequacy, a significant volume of factual information must be assessed and addressed in the findings, and conclusions drawn from those facts. Although the FEIS has not yet been issued, the Commission may wish to know that the Draft EIS consists of approximately 3,500 pages, approximately fifteen percent of the pages are maps, and the remaining pages are text. At this writing, the scoping for Line 3 is complete, and information-gathering on the DEIS is in process. There generally is a correlation between the number of comments received in scoping and the number of comments likely to be received in later stages of EIS preparation. During the scoping period,[10] commenters provided 217 oral comments, and 2322 written comments.

During the public information meetings on the draft EIS, approximately 46 volumes of transcripts have been generated and approximately 350 written comments have been received by the Department to date. Written comments are arriving, via USPS mail and e-mail, at a rate of approximately 85 per week, and it is anticipated that, as the period for comment on the DEIS comes to a close, there will be a substantial increase in the rate and complexity of these comments. The Department believes that it is reasonable to anticipate several hundred written comments will be received after August 10, 2017 regarding the adequacy of the FEIS.

For comparison purposes, the Commission may wish to know information about FEIS adequacy determinations in other similar cases. The Department has reviewed the adequacy determinations made in recent years by the Commission and other Minnesota State agencies, and believes that the Polymet FEIS, the adequacy of which was assessed by the Minnesota

[10] The scoping on the project included a combined Sandpiper/Line 3 scoping.

Department of Natural Resources (DNR),[11] is the case of an FEIS adequacy determination (albeit, by another Minnesota State agency,) that is most akin to the present docket, with respect to the level of effort that will be required to evaluate and document FEIS adequacy.[12]

In the Polymet case, approximately five months was required from issuance of the FEIS to issuance of the DNR's order on the adequacy of the FEIS. The Polymet FEIS was released for public review on November 9, 2015, and the comment period on the adequacy of the FEIS ended on December 14, 2015, during which time 792 unique comments were received. The adequacy decision was issued on March 3, 2016. The over 80-page Findings of Fact, Conclusions and Order (Polymet Order) documented the DNR's consideration of comments on FEIS adequacy; the DNR did not respond to each comment individually, but grouped comments "thematically." A copy of the Polymet Order is attached hereto for the convenience of the Commission as Attachment A. More information on the DNR's process for evaluating adequacy of the Polymet FEIS is at *http://files.dnr.state.mn.us/input/environmentalreview/polymet/polymet-eis-rod-030316-final.pdf*.

The below chart illustrates the amount of time typically required from issuance of an FEIS to issuance of an Order on the adequacy of the FEIS.

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[11] *In re Final Environmental Impact Statement for the PolyMet Mining, Inc., NorthMet Mining Project and Land Exchange, St. Louis County, Minnesota, Pursuant to Minnesota Rules, Parts 4410.0200 to 4410.6500*, Findings of Fact, Conclusions and Order, DNR, March 3, 2016.

[12] It should be noted, however, that in the case of Polymet, the DNR was not only the RGU, but was also the agency that prepared the EIS, and so it had an advantage that is not available to the Commission, in terms of understanding the nuances in the EIS process. For this reason, the Commission will have a more difficult task to perform than did the DNR in Polymet, which, it is reasonable to expect, could take a longer period of time than was required in the Polymet case.

RGU[13]	Project	# of Days for DEIS comment	# of days between end of DEIS comment & FEIS release	# of days between FEIS release & FEIS adequacy order or final Order
MPUC	Great Northern Transmission Line (Docket 14-21)	52	81	164
MPUC	ITC Midwest Transmission Line (Docket 12-1337)	48	64	137
MPUC	Mesaba Energy (Docket 06-668)	64	675	161
MPUC	MERC (CEA) (Docket 15-858)	21	18	149
DNR	PolyMet	455	241	115
DNR	Fargo Moorhead Flood Risk Mgmt	44	201	44
MPCA	Elk River Landfill	38	46	73
MnDOT	Hwy 53 relocation	45	137	80

5. OTHER CONCERNS THE COMMISSION MAY WISH TO CONSIDER

Other concerns that the Commission may wish to consider in establishing its procedure for making an adequacy decision on the Line 3 FEIS include the following:

(A.) The Commission may wish to consider seeking the assistance of an ALJ and to consider, among other things: whether the assistance of an ALJ might provide the Commission

[13] Although MPUC EISs for HVTLs and power plants are the closest "match" in terms of procedure to the instant docket, important caveats about these illustrative examples are: (1) in each of the MPUC dockets, the Commission relied on an ALJ recommendation; (2) the instant docket, involving a pipeline with an EIS review, is unique; the additional comment period on FEIS adequacy under Minn. Rules Ch. 4410 is not part of Minn. Rules Ch. 7850, so these examples omit any scope of work required to respond to comments on adequacy of the FEIS; and (3) the Department included here the MERC Rochester Pipeline (Docket 15-858), which is a CEA example, and observes that, even with the (theoretically less arduous) CEA process, the Commission decision timeline was several months.

with an independent evaluation of the adequacy of the EIS,[14] whether an ALJ might speed or delay the Commission's receipt of a comprehensive recommendation on adequacy; whether an ALJ or Commission staff would have greater expertise in assessing large volumes of factual material and recommending findings of fact and conclusions; and, whether the Commission, as the RGU, is limited in any way by statute or rule from seeking the assistance of an ALJ.

(B.) The requirement in Minn. Stat. § 116D.04, subd. 2a (h), that adequacy of FEIS be determined within a 280-day timeframe, is "directory", not "mandatory."[15] While a decision-maker should comply with timelines in directory statutes, the outcome of a failure to issue a timely order is unlike the outcome of a failure to issue a timely order in, for example, a rate case or other tariff proceeding, where a statute specifies that an application or request is deemed granted during the period of time between the statutory end-date and the date when the decision-maker is able, eventually, to issue its order.

(C.) The Commission should consider how to provide sufficient notice of a Commission meeting on FEIS adequacy, and allow a reasonable time to elapse between issuance of briefing papers and commencement of an agenda meeting to consider the adequacy of the FEIS. If the Commission decides on a process that includes the issuance of an order by September 11, 2017, it will need to issue notice of such a meeting as required by rule, and,

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[14] In this way, the Commission is unlike most RGUs, who both prepare the EIS and evaluate the adequacy of its own work, in that the Commission typically refers contested factual matters to an ALJ, including dockets in which an EIS is prepared and evaluated, and the ALJ provides an independent recommendation to the Commission.

[15] *See e.g.*, *Sullivan v. Credit River Township*, 299 Minn. 170, 176–77, 217 N.W.2d 502, 507 (1974) (a statute that does not express consequences of failure to comply with its provisions is directory).

consistent with Commission practice, may wish to ensure that staff briefing papers are issued sufficiently in advance of the agenda meeting to afford parties and interested persons adequate opportunity to review and consider the briefing papers.

The Department is available to address any questions the Commission may have.

Dated: June 27, 2017

Respectfully submitted,

/s/ *Linda S. Jensen*

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In the Matter of the Application of Enbridge Energy, Limited Partnership for a Routing Permit for the Line 3 Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border
MPUC Docket No. PL-9/PPL-15-137
OAH Docket No. 65-2500-33377

In the Matter of the Application of Enbridge Energy, Limited Partnership, for a Certificate of Need for the Line 3 Replacement Project in Minnesota From the North Dakota Border to the Wisconsin Border
MPUC Docket No. PL-9/CN-14-916
OAH Docket No. 65-2500-32764

Attachment A: Polymet Findings of Fact, Conclusions and Order

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENT "O"

O-1 TransCanada - Keystone Corrosion

Study of Root Cause and Contributing Factors, Keystone Pipeline, Corrosion Anomaly Investigation

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TransCanada
In business to deliver

Study of Root Cause and Contributing Factors
Keystone Pipeline
Corrosion Anomaly Investigation
Final Report
2/13/2013

Prepared for:

TransCanada

Prepared by:

Mears Group, Inc.

mears

Prepared by:

2/13/13

Kevin C. Garrity, P.E.
Sr. Vice President,
Mears Group, Inc.

Date

Accepted by:

2/13/13

James Card
Manager Pipe Integrity Corrosion Prevention,
TransCanada

Date

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Executive summary

TransCanada operates the Keystone Pipeline which is a 3,460-kilometre (2,150 miles) pipeline that transports crude oil from Hardisty, Alberta to markets in the American Midwest at Wood River and Patoka in Illinois, and at Cushing, Oklahoma. The Canadian portion of the pipeline runs from Hardisty, Alberta east into Manitoba where it turns south and crosses the border into North Dakota. From North Dakota, the pipeline runs south through South Dakota and Nebraska. At Steele City, Nebraska, one arm of the pipeline runs east through Missouri for deliveries into Wood River and Patoka, Illinois; another arm runs south through Oklahoma for deliveries into Cushing, Oklahoma.

TransCanada identified a segment of the 30-inch liquids transmission line which had significant In Line Inspection (ILI) external corrosion indications in the Salisbury to Patoka segment in the area of Mile Post 995 to Mile Post 1000 in St. Charles County, Lincoln County and Audrain County, Missouri.

The ILI run that was completed in September, 2012 identified several joints with external metal loss anomalies; some reported to be greater than 50% of the nominal pipe wall. TransCanada completed several direct examinations of the identified anomalies in response to the ILI results and retained Mears Group, Inc. (Mears) to assess the Root Cause and contributing factors to the observed corrosion.

The 30-inch Keystone Pipeline experienced localized external corrosion wall loss due to D-C stray current interference[1]. The corrosion induced wall loss occurred at an accelerated rate that can only be attributable to D-C stray current interference, microbiologically influenced corrosion (MIC), or Induced A-C corrosion. MIC may have played a role in some of the observed corrosion however it was not the primary cause. Induced A-C corrosion did not play a role in the observed corrosion.

It is recommended that TransCanada complete a thorough interference and cathodic protection analysis to ensure that appropriate mitigation strategies can be developed and implemented.

[1] Stray current corrosion may occur during construction as the pipeline is being installed, but has not been provided protection. PHMSA has issued an advisory bulletin to Operators offering guidance on this subject.

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1.0 INTRODUCTION

TransCanada identified a segment of the 30-inch liquids transmission line, designated as the Keystone Pipeline, which had significant In Line Inspection (ILI) external corrosion indications in the Salisbury to Patoka segment in the area of Mile Post 995 to Mile Post 1000 in St. Charles County, Lincoln County and Audrain County, Missouri.

The ILI run that was completed in September, 2012 identified several joints with external metal loss anomalies; some reported to be greater than 50% of the nominal pipe wall. TransCanada completed several direct examinations of the identified anomalies in response to the ILI results and retained Mears Group, Inc. (Mears) to assess the Root Cause and contributing factors to the observed corrosion. This report presents the findings and opinions regarding causation and contributing factors along with recommendations as deemed appropriate. All relevant supporting information is included along with results of testing performed on samples obtained by TransCanada at select direct examination sites.

The information, material and documentation reviewed and relied upon in the formation of the opinions expressed include:

- Pipeline Alignment Sheets,
- Google Earth Imagery,
- Cathodic Protection annual Survey results,
- Close Interval Survey Results,
- Foreign Pipeline Rectifier Information,
- Baker Hughes ILI Reports,
- RTD Dig Reports,
- Kiefner KAPA Analysis Reports,
- Photographic Documentation,
- Direct Examination Sample Testing Results, and
- TransCanada Repair Summary.

For the purpose of this analysis, direct examination data were considered for Dig Sites #1-8, 16 and 17.

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2.0 BACKGROUND

TransCanada operates the Keystone Pipeline which is a 3,460-kilometre (2,150 miles) pipeline that transports crude oil from Hardisty, Alberta to markets in the American Midwest at Wood River and Patoka in Illinois, and at Cushing, Oklahoma. The Canadian portion of the pipeline runs from Hardisty, Alberta east into Manitoba where it turns south and crosses the border into North Dakota. From North Dakota, the pipeline runs south through South Dakota and Nebraska. At Steele City, Nebraska, one arm of the pipeline runs east through Missouri for deliveries into Wood River and Patoka, Illinois; another arm runs south through Oklahoma for deliveries into Cushing, Oklahoma. Deliveries to Wood River and Patoka began in the summer of 2010, and deliveries to Cushing began in February of 2011. A Map of the existing system is shown in Figure 1.

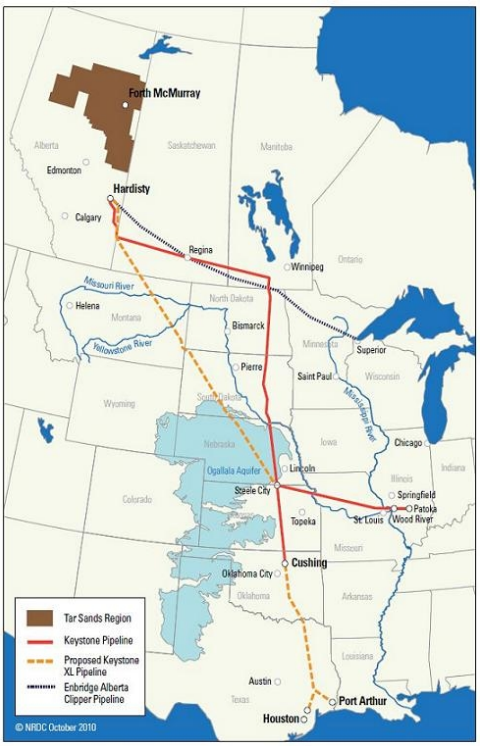

Figure 1. Keystone Pipeline System

The carbon steel pipeline was manufactured to API 5L X70 grade and is 30-inch diameter by 0.386 nominal wall. The pipeline has a Fusion Bonded Epoxy (FBE) external corrosion coating and utilizes a two part liquid epoxy girth weld coating. Cathodic Protection (CP) is afforded through impressed current ground beds. The pipeline is reported to have been constructed in 2009.

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3.0 ROOT CAUSE ANALYSIS PROCESS

Although the pipeline did not experience a "failure" an adapted typical failure action sequence was used for the purposes of performing the Root Cause Analysis.

The basic role of a root cause analysis is as follows:

- Collect information.
- Understand what happened.
- Identify the problems that caused the incident.
- Analyze each problem's root causes.
- Look beyond root causes for systemic, cultural, and organizational factors.
- Develop recommendations for remediation to improve performance and prevent repeat incidents.

Since root cause analyses are normally associated with incidents or accidents, much of the existing terminology in use refers to "incidents". In this case, an accident did not occur and any reference to incident and incidents is a term of art and simply refers to the discovery of external metal loss corrosion anomalies.

A typical Failure Action Response Sequence adapted from Guidance for Plant Personnel on Gathering Data and Samples for Materials Failure Analysis MTI catalog MTI 9539 is shown in Figure 2.

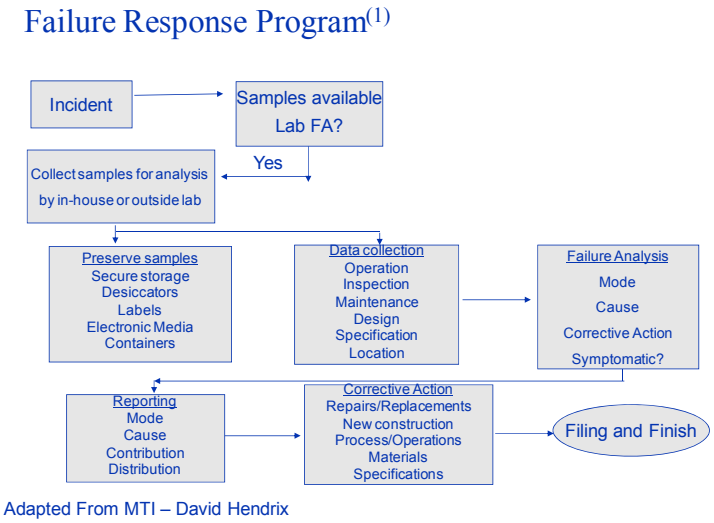

Figure 2. Failure Response Sequence

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The root cause analysis focused on identifying the root cause(s) of the observed external corrosion and the contributing factors. Recommendations and guidance are provided with the goal of remediating the cause of the corrosion and monitoring the effectiveness of the recommended remedial measures.

4.0 DESCRIPTION OF INVESTIGATIVE PROCESS

The investigation into the cause and contributing factors to the observed external corrosion on the Keystone Pipeline has been undertaken through a review of available documents and information associated with the design, specification, construction, operation and maintenance of the pipeline infrastructure. Various dig site reports generated after the completion of the direct examinations were also reviewed.

Testing was performed on samples of pipe deposits in corroded areas on the pipe and soil samples obtained at previously mentioned Dig Sites. The data and information obtained from ten (10) ILI anomaly investigative digs was analyzed along with testing results for an assessment of microbial activity and elemental analysis of pipe deposits and soil samples in an effort to establish the root cause and contributing factors of the observed corrosion. Corrosion can often be characterized by the chemical, biological, and metallurgical features associated with the site. The type and form of corrosion is distinctively associated with morphology and supporting tests of elemental composition of pipe deposits.

The products and deposits obtained from areas of external corrosion at each of the dig sites along with soil samples were analyzed using a serial dilution MICKit V to assess for the presence and count (bacterium/ml) of five types of viable bacteria:

- Sulfate reducing bacterial (BIO-SRB),
- Acid producing bacteria (BIO-APB),
- Aerobic bacteria (BIO-AERO),
- Iron-related (depositing) bacteria (BIO-IRB), and
- Low-nutrient bacteria (BIO-LNB).

Supporting Analyses of deposits on the pipe was performed to assist in interpretation of MIC and other corrosion, or cathodic protection products using the MICkit IV. This kit is used to qualitatively analyze for the presence of carbonate (CO_3^{+2}), sulfide (S^{-2}), ferrous iron (Fe^{+2}),

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ferric iron (Fe^{+3}), calcium (Ca^{+2}), and hydrogen (H^{+1}, pH) ions. The details of the testing undertaken and the data obtained are included in this report.

5.0 DISCUSSION OF CORROSION RATES

A summary of the peak measured external wall loss at the 10 dig sites is shown in Table 1.

Table 1. Keystone Pipeline ILI Repair Summary

Site #	Type	MP	Feature	ILI Depth* %	Repair
1	Immediate	995.95	Corrosion	95	Plidco Clamp
2	Immediate	996.33	Corrosion	78	Armour plate
3	Immediate	1000.08	Corrosion	79	Armour plate
4	Immediate	1000.38	Corrosion	83	Armour plate
5	180-day	997.67	Corrosion	58	Armour plate
6	60-day	968.85	Dent with metal loss	2.5	Dec-12
7	180-day	925.81	Corrosion	42	Recoat
8	180-day	925.89	Corrosion	41	Recoat
16	180-day	999.97	Corrosion	42	Armour plate
17	Proximity to Site 4	1000.32	Corrosion	49	Recoat

* Indicates Tool Peak Measured Corrosion Depth

Excluding Dig Site #6, which was determined to be a dent with metal loss, the measured peak corrosion depth ranges from 30% (3mm) (116mils[2]) to 97% (9.5mm) (374mils). In the absence of specific data, linear growth rates[3] can be used to estimate the annual corrosion growth of external corrosion anomalies based on the peak metal loss depth divided by the years of exposure (Years since installation).

Using a linear corrosion growth rate and assuming corrosion initiated at the time of pipe installation, the external corrosion growth rate approached 4.75mm/yr (125mpy[4]). Absent accelerating factors, corrosion rates for carbon steel buried in soils are typically less than .25mm/yr (10mpy).

[2] A mil is equivalent to 1/1000th of an inch.
[3] Uncertainty as to when corrosion initiated, the effect of seasonal variation and CP effectiveness may contribute to errors in this approach however it can provide an approximation of growth rates.
[4] MPY is a mil/year and is equivalent to 1/1000 of an inch/year.

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Data compiled in Table 2 from Uhlig's Corrosion Handbook lists corrosion rate data for carbon steel samples buried in soils of varying resistivity values and drainage conditions. Maximum general corrosion rates ranged from .022 to .064mm/yr (0.9 to 2.5mpy) while maximum pitting corrosion rates ranged from 0.18 to 0.45mm/yr (7.1 to 17.7mpy). Pitting rate data, although higher than general corrosion rates are still considerably lower than the rate experienced on the Keystone Pipeline.

Table 2. Corrosion Rate for Steel in Soil According to Soil Resistivity and Drainage

Environmental Factors	General Corrosion Rates, mpy			Pitting Corrosion Rates, mpy		
	Maximum	Minimum	Average	Maximum	Minimum	Average
Soil Resistivity						
Less Than 1,000	2.5	0.7	1.3	12.2	4.3	7.9
1,000 to 5,000	2.3	0.2	0.7	17.7	2.0	5.5
5,000 to 12,000	1.3	0.2	0.7	9.1	2.4	5.5
Greater Than 12,000	1.4	0.1	0.6	10.2	1.2	4.3
Drainage						
Very Poor	2.3	1.5	1.8	17.7	6.3	11.0
Poor	1.5	0.4	0.9	9.1	2.0	5.5
Fair	2.5	0.7	0.9	12.2	3.1	6.3
Good	0.9	0.1	0.4	7.1	1.2	4.3

One of the most comprehensive sources of corrosion data is contained in the US National Bureau of Standards Circular's C401 (Stray Current Electrolysis), C450 (Underground Corrosion) and C579 (Underground Corrosion). A recent publication by NIST (the National Institute of Science and Technology), the successor to National Bureau of Standards, republished the compiled corrosion rate data in a statistical manner. For the purposes of this analysis the data have been reproduced in Figure 3. These data clearly show that corrosion rates for carbon steel buried in soils do not approach the rates experienced on the Keystone Pipeline. These rates are even more surprising since they occurred in the presence of cathodic protection which is intended to control corrosion.

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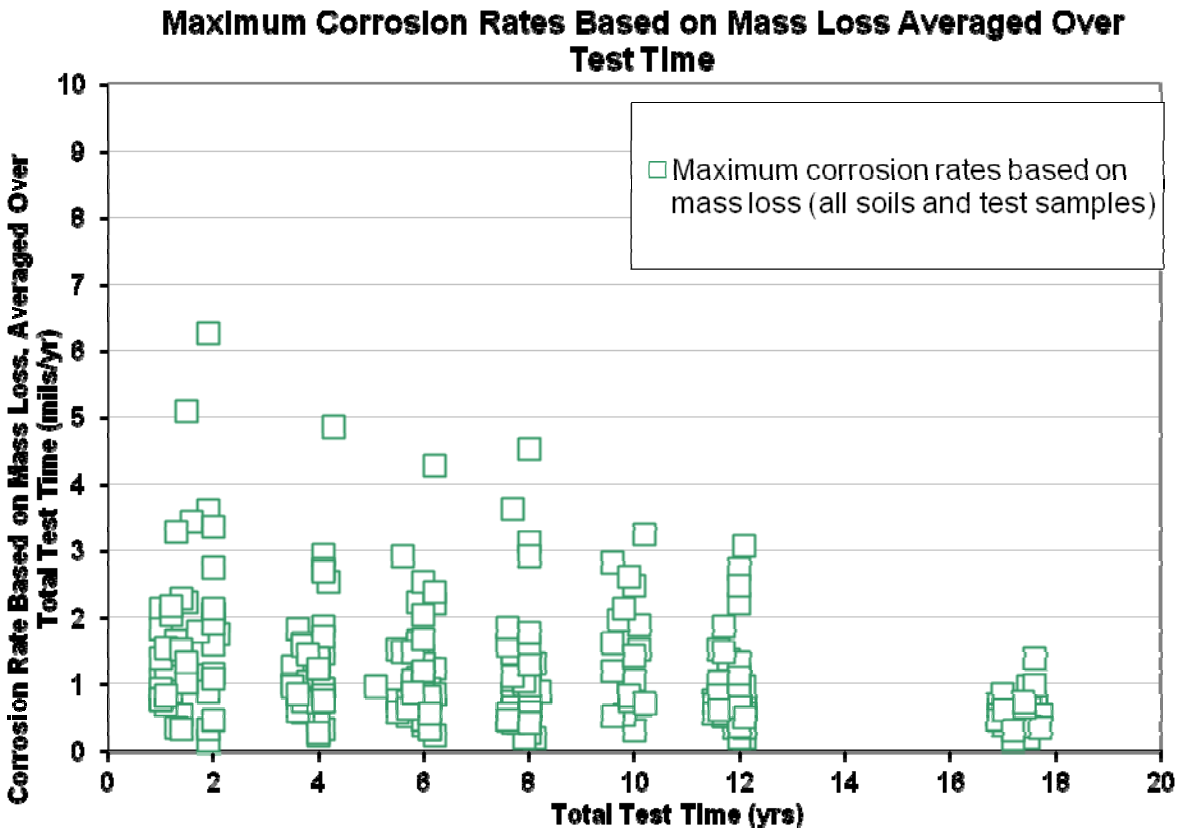

Figure 3. NIST Corrosion Rate Data

Establishing a reasonably conservative estimate of corrosion rates requires consideration for unique circumstances where corrosion of underground and submerged structures may be greatly accelerated. Mechanisms that can produce highly accelerated rates of corrosion on buried pipelines include:

- Microbially Influenced Corrosion (MIC),
- Stray Direct Current (D-C) Interference, and
- Stray Alternating Current (A-C) Interference.

MIC in soils has been documented to occur at rates approaching 4mm/yr (150mpy)). An example of the corrosion morphology associated with MIC is shown in Figure 4.

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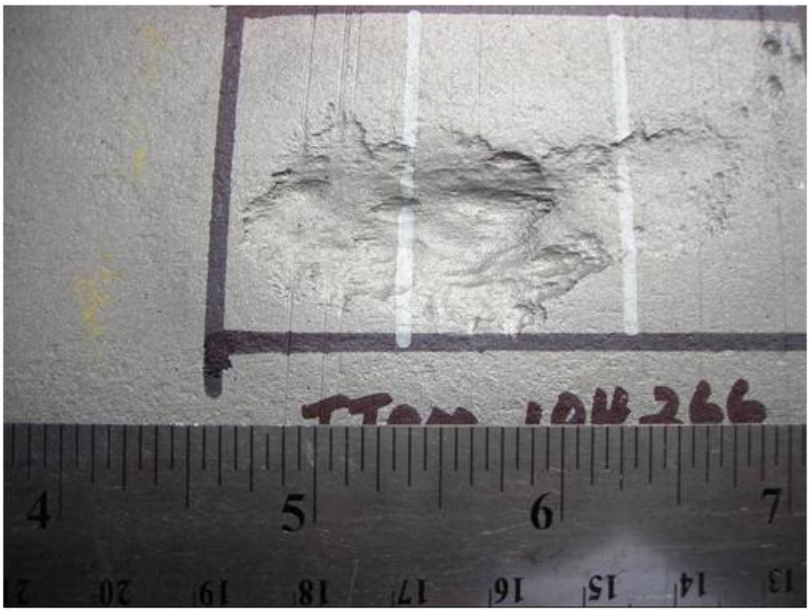

Figure 4. Typical MIC Morphology

The effects of stray direct current (D-C) on established corrosion rates cannot be readily quantified due to the significant metal removal power of D-C currents. Rates of 10mm/yr (250mpy) are expected. An example of the corrosion morphology associated with D-C interference current is shown in Figure 5.

Figure 5. Typical D-C Stray Current Corrosion Morphology

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In recent years corrosion of carbon steel structures has been documented as a result of induced A-C caused by electromagnetic interference in collocated right-of-ways. Corrosion rates of 2.4mm/yr (60mpy) have been documented on pipelines with high quality dielectric coatings. Critical current densities of >20 amperes/m^2 are necessary for A-C assisted corrosion requiring pinhole defects in coatings to concentrate the current density. An example of the corrosion morphology associated with A-C interference current is shown in Figure 6.

Figure 6. Typical A-C Corrosion Morphology

5.1 Distinctive Features of Accelerated Corrosion Mechanisms

In addition to distinctive corrosion morphologies, accelerated corrosion mechanisms such as MIC, Stray D-C and Stray A-C interference have some notable characteristic features.

5.1.1 Microbially Influenced Corrosion (MIC)

MIC is characterized by “Dish Shaped” hemispherical pitting and the formation of corrosion products that can form tightly adherent nodules or tubercles above the pitted area. Ferrous corrosion occupies 6-10 times the volume of material lost in corrosion and therefore there is a characteristic build-up of corrosion product in the area due to the insolubility of iron oxides at the expected pH range of 3-5. Upon removal of the corrosion deposits, the pitted surface is characterized by the appearance of pits within pits and upon magnification; striations (linear

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indications) can be seen in the pitted area. The striations follow the rolling direction of the steel made into the pipe and is believed to be a result of preferential attack of the steel microstructural components. Active corrosion caused by MIC will produce pH values in the pitted areas of 3-5 and the appearance of the metal substrate will be clean and may be shiny.

5.1.2 Stray Direct Current (D-C) Interference

Stray D-C Interference also produces "Dish Shaped" hemispherical pitting, however, corrosion caused by Stray D-C is characterized by an absence of tubercles. Typical pH ranges are less than 2 and thus iron oxides are soluble in these ph environments. The effects of Stray D-C interference corrosion can be seen in the metallographic section shown in Figure 7. This metallographic section obtained from a corrosion leak site on a 4-inch diameter FBE coated pipeline subjected to Stray D-C shows characteristic "undercutting" of the coating to the left.

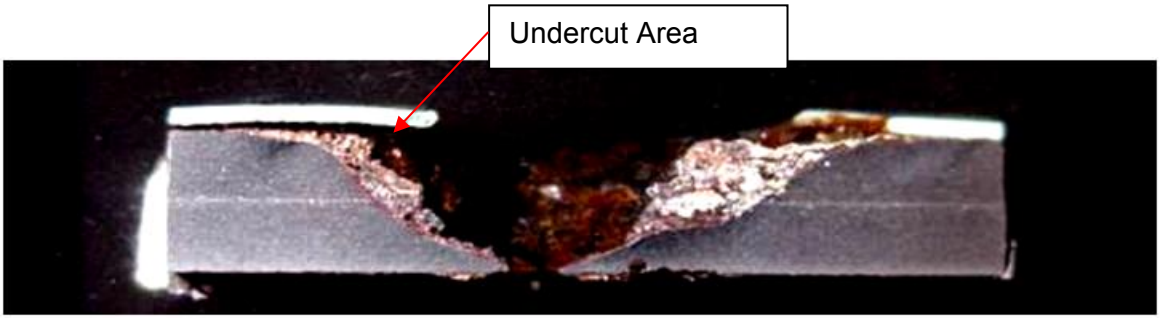

Figure 7. Metallographic Cross Section – Stray D-C Interference Corrosion (4-inch FBE Coated CS Pipeline)

5.1.3 Stray Alternating Current (A-C) Interference

Stray Alternating Current (A-C) corrosion is characterized by oval corrosion features and the build-up of corrosion products at small coating flaws coincident with the pitted area. The growth of the corrosion products typically causes the coating to separate and tent up ("lift-off') from the pipe substrate and is accompanied by cracks in the coating due to the expansive forces of the growth of the corrosion product as shown in Figure 8. The pH values in the pitted are typically range from 6-12 in the presence of cathodic protection which raises the pH, but does not control the corrosion.

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Figure 8. A-C Corrosion – FBE Coating “lift-off” and Cracking

6.0 DISCUSSION OF SAMPLING TEST RESULTS

A total of 23 samples were received from the 10 ILI investigative dig sites that form the basis of the findings and opinions expressed in this report. As previously mentioned, the samples were subjected to MICKit IV and V analyses. A summary of the samples received is shown in Table 3.

Table 3. Samples Received

Sample	Asset Owner	Pipeline	Location	Client Cataloged As	Date Collected	Time Collected	Clock Position	DMA	RGW	CLS	Chainage	Sample Type	Containment
1	TransCanada	Keystone	Salisbury to Potoka	Dig 01 Soil Sample	10/19/2012	17:00	8:37	204496				Soil	Ziplock bag
2	TransCanada	Keystone	Salisbury to Potoka	Dig 01 Deposit Sample 1	10/19/2012	17:00	8:37	204496				Deposit	One of two vials in Ziplock bag
3	TransCanada	Keystone	Salisbury to Potoka	Dig 01 Deposit Sample 2	10/19/2012	17:00	7:30	204496				Deposit	Two of two vials in Ziplock bag
4	TransCanada	Keystone	Salisbury to Potoka	Dig 02 Soil Sample	10/20/2012	16:30	11:30	205022				Soil	Ziplock bag
5	TransCanada	Keystone	Salisbury to Potoka	Dig 02 Deposit Sample	10/20/2012	16:30	11:30	205022				Deposit	Small food jar in Ziplock bag
6	TransCanada	Keystone	Salisbury to Potoka	Dig 03 Soil Sample	10/20/2012	21:00	1:14			30000		Soil (Rock)	Ziplock bags doubled (outer bag was open)
7	TransCanada	Keystone	Salisbury to Potoka	Dig 04 Soil Sample	10/20/2012	14:30	6:48	210611				Soil	Ziplock bag
8	TransCanada	Keystone	Salisbury to Potoka	Dig 04 Deposit Sample	10/20/2012	14:30	6:48	210611				Deposit	Small food jar in Ziplock bag
9	TransCanada	Keystone	Salisbury to Potoka	Dig 05 Soil Sample	10/22/2012	17:30	12:00	207013		25000		Soil	Ziplock bag
10	TransCanada	Keystone	Salisbury to Potoka	Dig 05 Deposit Sample	10/24/2012	17:00	12:26	206998	187100		6755+32	Deposit	Small food jar in Ziplock bag
11	TransCanada	Keystone	Salisbury to Potoka	Dig 07 Soil Sample	11/9/2012	13:00	12:00			1		Soil	Ziplock bag
12	TransCanada	Keystone	Salisbury to Potoka	Dig 07 Deposit Sample	11/9/2012	13:00	12:30			1		Deposit	Small food jar in Ziplock bag
13	TransCanada	Keystone	Salisbury to Potoka	Dig 08 Soil Sample 1	11/8/2012	14:30	6:00			1		Soil	Ziplock bag
14	TransCanada	Keystone	Salisbury to Potoka	Dig 08 Soil Sample 2	11/7/2012	13:30	12:00	92591				Soil	Ziplock bag
15	TransCanada	Keystone	Salisbury to Potoka	Dig 08 Deposit Sample 1	11/8/2012	15:30	6:00			1		Deposit	Small food jar in Ziplock bag
16	TransCanada	Keystone	Salisbury to Potoka	Dig 08 Deposit Sample 2	11/8/2012	15:30	11:30	92591				Deposit	Small food jar in Ziplock bag
17	TransCanada	Keystone	Salisbury to Potoka	Dig 16 Soil Sample	11/6/2012	15:00	6:00			1		Soil	Ziplock bag
18	TransCanada	Keystone	Salisbury to Potoka	Dig 16 Deposit Sample	11/6/2012	16:30	6:15			1		Deposit	Small food jar in Ziplock bag
19	TransCanada	Keystone	Salisbury to Potoka	Dig 17 Soil Sample	11/3/2012	14:00	8:30	210553				Soil	Ziplock bag
20	TransCanada	Keystone	Salisbury to Potoka	Dig 17 Deposit Sample	11/5/2012	9:00	8:30	210553				Deposit	Small food jar in Ziplock bag
21	TransCanada	Keystone	Salisbury to Potoka	Dig 06 Soil Sample	12/14/2012	16:30	6:00					Soil (with rock)	Ziplock bag
22	TransCanada	Keystone	Salisbury to Potoka	Dig 06 Deposit Sample	12/14/2012	18:40	6:00					Deposit	Small food jar in Ziplock bag
23	TransCanada	Keystone	Salisbury to Potoka	Dig 18 Soil Sample	12/14/2012	16:00	8:00					Soil	Ziplock bags doubled

The results of the MICkit V testing are shown in Table 4 and indicate that microbially influenced corrosion may have played a role in the observed corrosion, although MIC was not deemed to be the root cause.

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Table 4. MICkit V Test Results

Sample	Client Cataloged As	Date Collected	Time Collected	Clock Position	Inoculation Date	Inoculation Time	11-5-2012, 15:30					11-8-2012, 9:00					11-15-2012, 10:00				
							BTI-LNB (Purple)	BTI-IRB (White)	BTI-ANA (Blue)	BTI-APB (Red)	BTI-SRB (Green)	BTI-LNB (Purple)	BTI-IRB (White)	BTI-ANA (Blue)	BTI-APB (Red)	BTI-SRB (Green)	BTI-LNB (Purple)	BTI-IRB (White)	BTI-ANA (Blue)	BTI-APB (Red)	BTI-SRB (Green)
1	Dig 01 Soil Sample	10/19/2012	17:00	8:37	11/2/2012	15:00	2	NR	3	2	NR	2	NR	3	2	1	3	NR	3	2	2
2	Dig 01 Deposit Sample 1	10/19/2012	17:00	8:37	11/1/2012	15:00	2	NR	3	1	1	2	NR	3	1	1	3	NR	4	1	2
3	Dig 01 Deposit Sample 2	10/19/2012	17:00	7:30	11/1/2012	15:30	2	NR	2	1	2	2	NR	2	1	1	3	NR	2	1	2
4	Dig 02 Soil Sample	10/20/2012	16:30	11:30	11/2/2012	15:30	3	NR	3	2	1	4	NR	3	4	2	4	2	4	4	2
5	Dig 02 Deposit Sample	10/20/2012	16:30	11:30	11/1/2012	14:00	3	NR	2	NR	2	3	NR	2	NR	2	4	2	4	1	2
6	Dig 03 Soil Sample	10/20/2012	21:00	1:14	11/2/2012	16:00	3	NR	2	3	1	4	2	4	4	2	4	2	4	4	3
7	Dig 04 Soil Sample	10/20/2012	14:30	6:48	11/2/2012	17:00	3	NR	2	NR	1	4	NR	2	1	2	4	2	2	1	2
8	Dig 04 Deposit Sample	10/20/2012	14:30	6:48	11/1/2012	14:30	4	NR	1	2	2	4	2	2	2	2	4	2	4	2	2
9	Dig 05 Soil Sample	10/22/2012	17:30	12:00	11/2/2012	17:30	4	NR	4	4	2	4	2	4	4	3	4	2	4	4	4
10	Dig 05 Deposit Sample	10/24/2012	17:00	12:26	11/1/2012	15:00	2	NR	1	2	1	2	2	2	2	1	2	2	2	3	2

Sample	Client Cataloged As	Date Collected	Time Collected	Clock Position	Inoculation Date	Inoculation Time	11-30-2012, 15:30					12-6-2012, 10:00					12-14-2012, 15:00				
							BTI-LNB (Purple)	BTI-IRB (White)	BTI-ANA (Blue)	BTI-APB (Red)	BTI-SRB (Green)	BTI-LNB (Purple)	BTI-IRB (White)	BTI-ANA (Blue)	BTI-APB (Red)	BTI-SRB (Green)	BTI-LNB (Purple)	BTI-IRB (White)	BTI-ANA (Blue)	BTI-APB (Red)	BTI-SRB (Green)
11	Dig 07 Soil Sample	11/9/2012	13:00	12:00	11/27/2012	14:20	2	NR	3	3	NR	4	2	3	4	2	4	2	3	4	3
12	Dig 07 Deposit Sample	11/9/2012	13:00	12:30	11/27/2012	14:50	3	NR	2	4	NR	3	1	4	4	1	3	2	4	4	2
13	Dig 08 Soil Sample 1	11/8/2012	14:30	6:00	11/27/2012	16:30	4	NR	4	4	NR	4	1	4	4	1	4	2	4	4	2
14	Dig 08 Soil Sample 2	11/7/2012	13:30	12:00	11/28/2012	8:40	4	NR	3	2	1	4	2	4	3	2	4	2	4	3	3
15	Dig 08 Deposit Sample 1	11/8/2012	15:30	6:00	11/27/2012	15:15	2	NR	2	2	NR	3	NR	4	3	NR	3	1	4	3	2
16	Dig 08 Deposit Sample 2	11/8/2012	15:30	11:30	11/28/2012	9:10	3	NR	2	3	1	4	1	4	4	2	3	1	4	4	2
17	Dig 16 Soil Sample	11/6/2012	15:00	6:00	11/28/2012	10:15	4	NR	2	2	1	4	4	4	4	1	4	4	4	4	2
18	Dig 16 Deposit Sample	11/6/2012	16:30	6:15	11/28/2012	10:00	1	NR	1	1	NR	2	NR	2	2	1	2	NR	2	2	1
19	Dig 17 Soil Sample	11/3/2012	14:00	8:30	11/28/2012	15:50	2	NR	2	1	NR	3	NR	3	2	1	4	1	3	3	1
20	Dig 17 Deposit Sample	11/5/2012	9:00	8:30	11/28/2012	15:45	NR	NR	NR	NR	NR	1	NR	1	NR	NR	2	NR	2	1	NR

Sample	Client Cataloged As	Date Collected	Time Collected	Clock Position	Inoculation Date	Inoculation Time	1-5-2013, 16:00					1-10-2013, 19:50					1/20/2013				
							BTI-LNB (Purple)	BTI-IRB (White)	BTI-ANA (Blue)	BTI-APB (Red)	BTI-SRB (Green)	BTI-LNB (Purple)	BTI-IRB (White)	BTI-ANA (Blue)	BTI-APB (Red)	BTI-SRB (Green)	BTI-LNB (Purple)	BTI-IRB (White)	BTI-ANA (Blue)	BTI-APB (Red)	BTI-SRB (Green)
21	Dig 06 Soil Sample	12/14/2012	16:30	6:00	1/3/2013	12:00	4	N/R	2	3	1	4	2	4	3	2					
22	Dig 06 Deposit Sample	12/14/2012	18:40	8:00	1/3/2013	13:00	3	N/R	3	3	1	3	N/R	3	3	3					
23	Dig 18 Soil Sample	12/14/2012	16:00	6:00	1/3/2013	13:30	4	N/R	3	2	1	4	1	3	3	2					

The MICKit V testing identified viable colonies of the following bacteria in both soil samples and deposits obtained from pitted areas:

- Low Nutrient Bacteria (LNB)
- Anaerobic Bacteria (ANA)
- Acid Producing Bacteria (APB)
- Sulfate Reducing Bacteria (SRB)

LNB thrive in oxygenated environments and do not require an abundance of nutrients to sustain metabolic processes. LNB's can initiate the development of films that contribute to establishing a corrosive environment at the pipe surface.

ANA thrive in oxygen starved environments and can crest acid environments at the pipe surfaces which accelerate corrosion. Facultative anaerobes can thrive in oxygenated environments.

APB is anaerobic bacteria but also can thrive in the presence of oxygen. They derive nutrients from organic material and create localized acid conditions.

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SRB are anaerobic bacteria and convert sulfate to sulfide. A byproduct of the corrosion process from SRB's is the formation of Iron Sulfide (FeS).

The serial dilution bacterial culturing identified moderate to high concentrations of viable species of bacterium ranging from 10^2 to 10^4 colonies per milliliter for the above listed species. These concentrations were identified in soil samples from the excavation sites and in deposits and products obtained from the pitted areas. It is unlikely the SRB's were a contributing factor to the observed corrosion since MICkit IV sampling did not show positive results for Sulfide which is normally detected in corrosion deposits when SRB's are mechanistically involved. Furthermore, it is considered unlikely that MIC is the root cause of the observed corrosion since the observed corrosion morphology does not appear to be consistent with MIC.

The results of the MICkit IV testing of soil samples and corrosion deposits are shown in Table 5. The testing showed positive indications for Ferrous Iron (Fe^{+2}) and Ferric iron (Fe^{+3}) in most corrosion products although some corrosion products tested positive for Ferric Iron. All samples tested positive for Calcium and negative for Carbonate, which along with pH values ranging from 7.0 to 7.5 for the corrosion deposits raises questions about the efficacy of CP in the pitted areas. All samples tested negative for Sulfide likely excluding SRB's as a contributing factor to the corrosion.

Table 5. MICKit IV Results

Sample #	Sample Description	pH	Carbonate ($CO_3^=$) Bubbles = (+) for $CO_3^=$ No Bubbles = (-) for $CO_3^=$	Sulfide ($S^=$) Black/brown color = (+) for $S^=$	Ferrous Iron (Fe^{+2}) Ferrozine Reaction: Purple color = (+) for Fe^{+2}	Ferric Iron (Fe+3) Reducing Solution Reaction: Purple color = (+) for Fe^{+3}	Calcium (Ca+2) Red color = (+) for Ca^{+2} Blue color = (-) for Ca^{+2}
1	Dig 01, Dep 1	6.0	-	-	+	+	+
2	Dig 01, Dep 2	6.5	-	-	+	+	+
3	Dig 02, Deposit	7.5	-	-	-	+	+
4	Dig 04, Deposit	7.0	-	-	+	+	+
5	Dig 05, Deposit	7.5	-	-	+	+	+
6	Dig 01, Soil	6.0	-	-	+	+	+
7	Dig 02, Soil	5.0	-	-	-	+	+
8	Dig 03, Soil	6.0	-	-	+	+	+
9	Dig 04, Soil	7.0	-	-	-	+	+
10	Dig 05, Soil	7.0	-	-	+	+	+
11	Dig 07, Soil Sample	6.5	-	-	+	+	+
12	Dig 07, Deposit Sample	7.5	-	-	+	+	+
13	Dig 08, Soil Sample 1	7.0	-	-	-	+	+
14	Dig 08, Soil Sample 2	6.0	-	-	-	+	+
15	Dig 08, Deposit Sample 1	7.0	-	-	+	+	+
16	Dig 08, Deposit Sample 2	7.0	-	-	+	+	+
17	Dig 16, Soil Sample	7.0	-	-	+	+	+
18	Dig 16, Deposit Sample	7.5	-	-	+	+	+
19	Dig 17, Soil Sample	7.0	-	-	+	+	+
20	Dig 17, Deposit Sample	7.5	-	-	-	+	+
21	Dig 06, Soil Sample	6.5	-	-	-	+	+
22	Dig 06, Deposit Sample	7.5	-	-	-	+	+
23	Dig 18, Soil Sample	7.0	-	-	-	+	+

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7.0 DISCUSSION OF ANOMALY INVESTIGATIVE DIGS

The data and photographic documentation from each of the 10 ILI investigative digs covered by this report were reviewed and analyzed.

Dig Site #1 – MP 995.95 Investigated 10/19/12

This anomaly was classified as an immediate indication and was found to have six (6) anomalies caused by external corrosion with a peak depth of corrosion reported to be 96.8%. Approximately 9.0 feet of pipe was exposed from Station 597+20.0 to 597+29.0. The deepest corrosion anomaly is dish shaped and developed in an overlap area of a liquid epoxy repair. The reported CP potentials documented in the RTD Dig report ranged from -0.685 v to -0.710 v (CSE). Soil pH was reported to be between 5.5 and 6.0. The corrosion anomalies can be seen in Figures 9, 10 and 11.

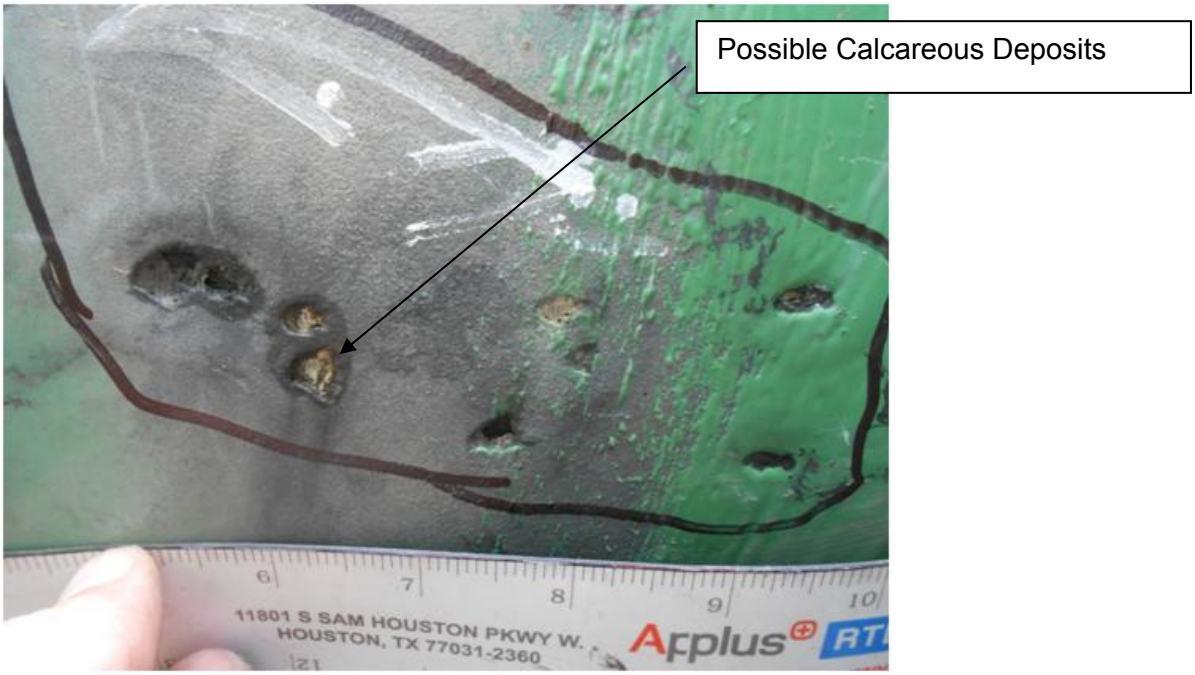

Figure 9. MP 995.95 External Corrosion Pitting

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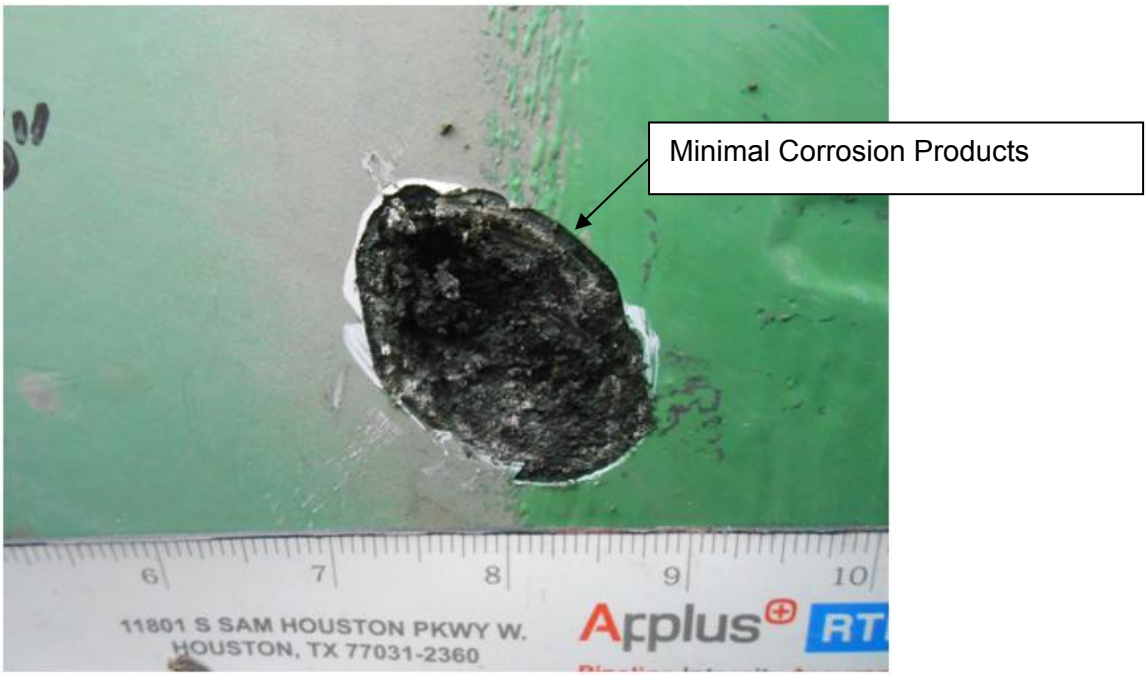

Figure 10. MP 995.95 –External Corrosion Pitting

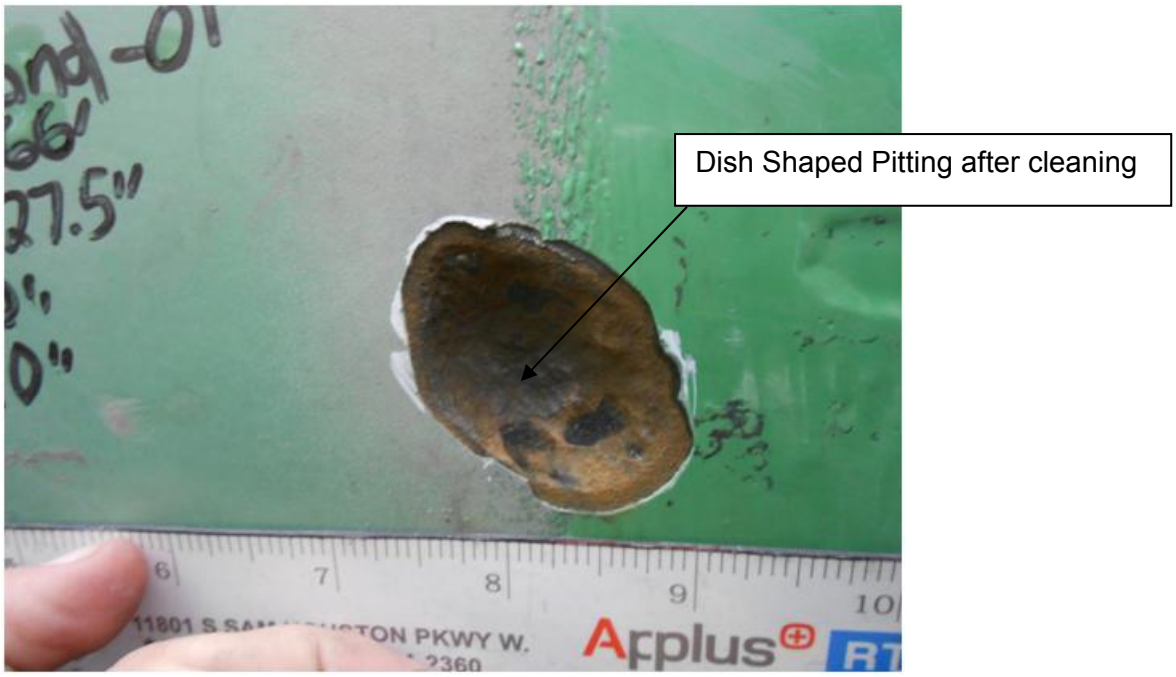

Figure 11. MP 995.95 –External Corrosion Pitting

The accelerated rate of corrosion and the observed corrosion morphology along with an absence of tubercles is consistent with D-C Stray Current Corrosion. The possibility of calcareous deposits in some pits that appear in Figure 9 suggest that CP current may have

reached this site after corrosion initiated perhaps due to modifications to the CP system operating characteristics.

Dig Site #2 – MP 996.33 Investigated 10/20/12

This anomaly was classified as an immediate indication and was found to have one (1) anomaly caused by external corrosion with a peak depth of corrosion reported to be 73.9%. Approximately 9.5 feet of pipe was exposed from Station 617+30.5 to 617+40.0. The corrosion anomaly is dish shaped. The reported CP potentials documented in the RTD Dig report ranged from -0.660 v to -0.840 v (CSE). Soil pH was reported to be between 5.5 and 6.0. The corrosion anomalies can be seen in Figures 12 and 13.

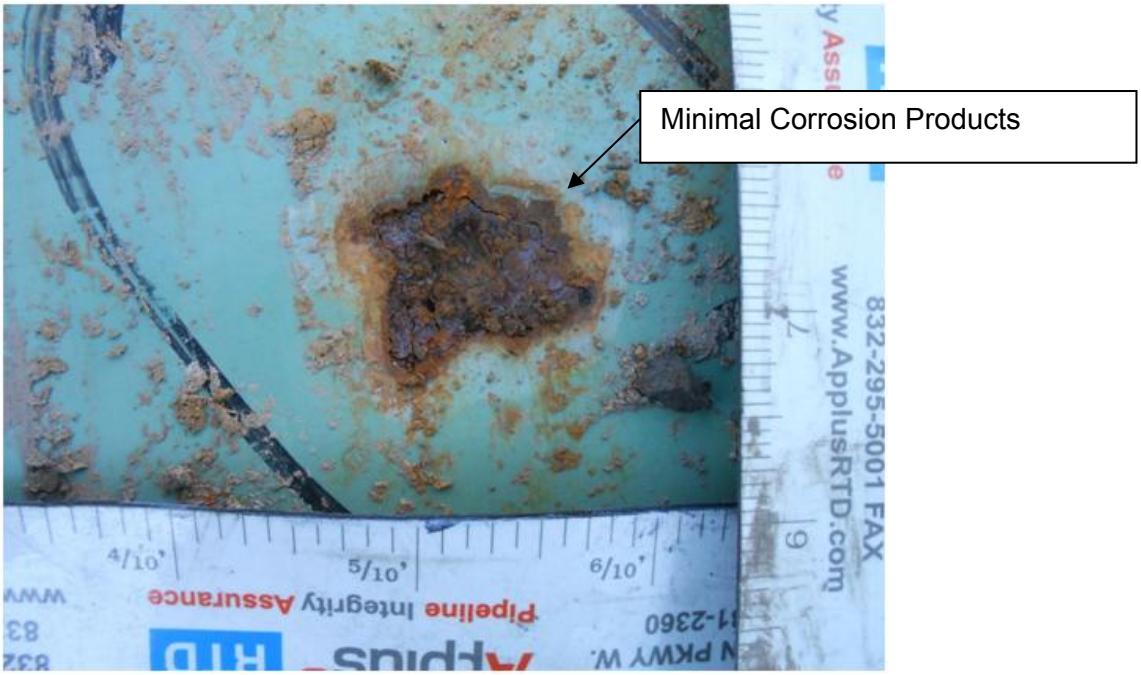

Figure 12. MP 996.33 –External Corrosion Pitting

Figure 13. MP 996.33 –External Corrosion Pitting

Dig Site #3 – MP 1000.08 Investigated 10/21/12

This anomaly was classified as an immediate indication and was found to have three (3) anomalies caused by external corrosion with a peak depth of corrosion reported to be 59.9%. Approximately 11.0 feet of pipe was exposed from Station 815+72.0 to 815+83.0. The corrosion anomaly is dish shaped. The reported CP potentials documented in the RTD Dig report ranged from -0.846 v to -0.870 v (CSE). Soil pH was reported to be 6.0. The corrosion anomalies can be seen in Figures 14 and 15.

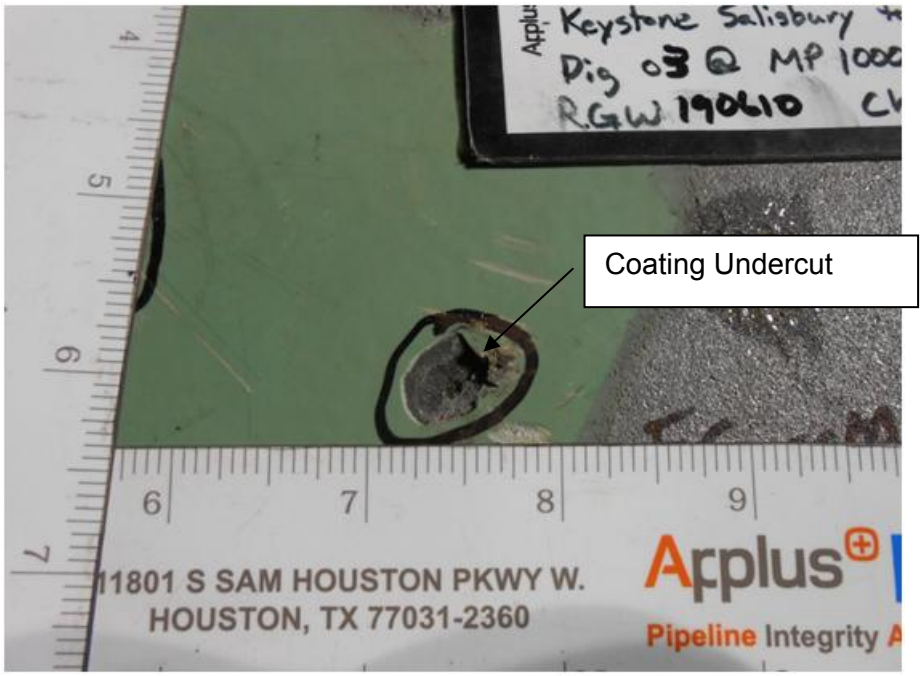

Figure 14. MP 1000.08 –External Corrosion Pitting

Figure 15. MP 1000.08 –External Corrosion Pitting

The accelerated rate of corrosion and the observed corrosion morphology along with undercutting of the FBE coating is consistent with D-C Stray Current Corrosion.

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Dig Site #4 – MP 1000.38 Investigated 10/21/12

This anomaly was classified as an immediate indication and was found to have one (1) anomaly caused by external corrosion with a peak depth of corrosion reported to be 61.07%. Approximately 7.0 feet of pipe was exposed from Station 831+38.0 to 831+45.0. The corrosion anomaly is dish shaped. The reported CP potentials documented in the RTD Dig report ranged range from -0.918 v to -0.935 v (CSE). Soil pH was reported to be 6.0. The corrosion anomaly can be seen in Figure 16.

Figure 16. MP 1000.38 –External Corrosion Pitting

The available photographic documentation is not sufficient to draw conclusion regarding root cause at this site.

Dig Site #5 – MP 997.67 Investigated 10/23/12

This anomaly was classified as a 180 day indication and was reported to have eight (8) anomalies caused by external corrosion with a peak depth of corrosion reported to be 55.6%. The pipe was exposed from Station 688+18.5 to 689+30.5. Corrosion anomalies appear to be axially oriented along a length of coating damage that appears to have been caused by construction damage or third party damage. Discrete dish shaped pitting was also detected in areas related to construction damage to the coating. The reported CP potentials documented in the RTD Dig report ranged from -0.918 v to -0.935 v (CSE). Soil pH was reported to be 6.0. The corrosion anomalies can be seen in Figures 17 and 18.

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Figure 17. MP 997.67 –External Corrosion at Areas of Coating Damage

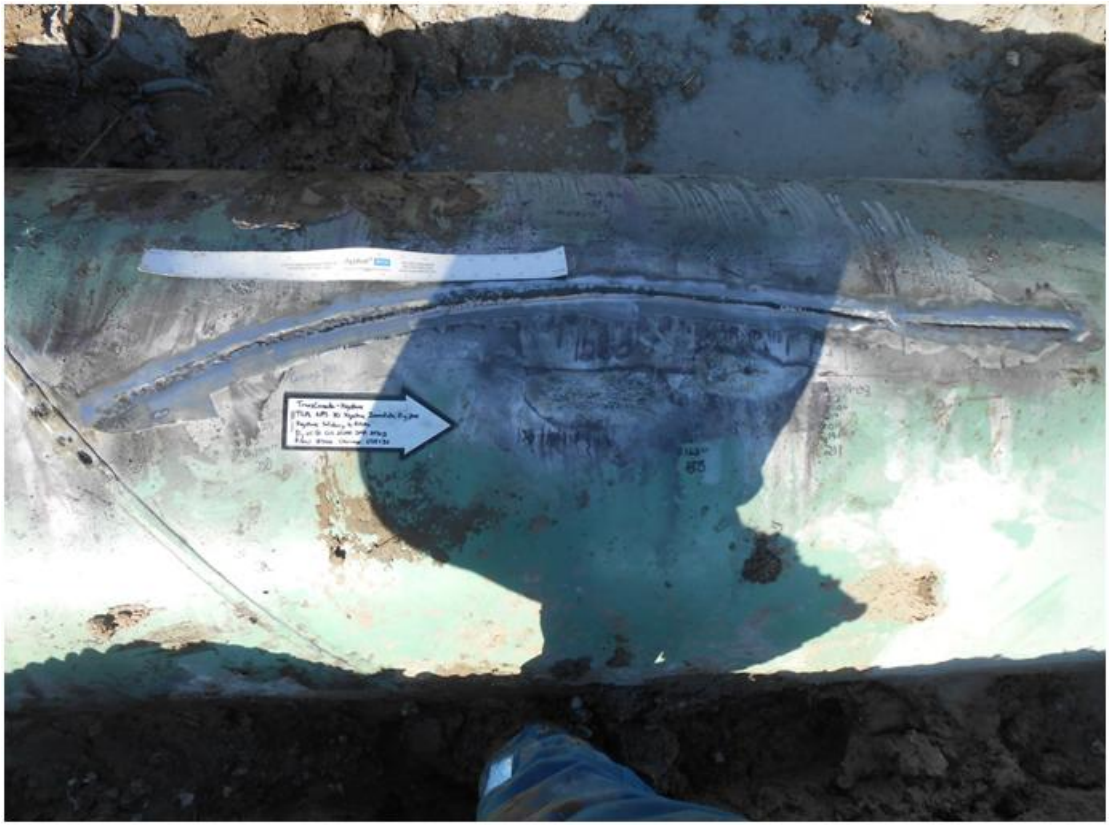

Figure 18. MP 997.67 – Axially Oriented External Corrosion at Areas of Coating Damage

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The observed corrosion has an accelerating factor, but the available photographic documentation is not sufficient to draw conclusion regarding root cause at this site.

Dig Site #6 – MP 968.85 Investigated 10/21/12

This anomaly was classified as a 60 day indication and is reported as a dent with corrosion. This site investigation was not considered in the overall root cause analysis.

Dig Site #7 – MP 925.81 Investigated 11/09/12

This anomaly was classified as a 180 day indication and was found to have two (2) anomalies caused by external corrosion with a peak depth of corrosion reported to be 30.05%. Approximately 5.0 feet of pipe was exposed from Station 1153+13.4 to 1153.18.3. The corrosion anomalies are dish shaped. The reported CP potentials documented in the RTD Dig report ranged from -0.600 v to -0.666 v (CSE). Soil pH was reported to be ranging from 4.5 to 5.5. The corrosion anomalies can be seen in Figures 19 and 20.

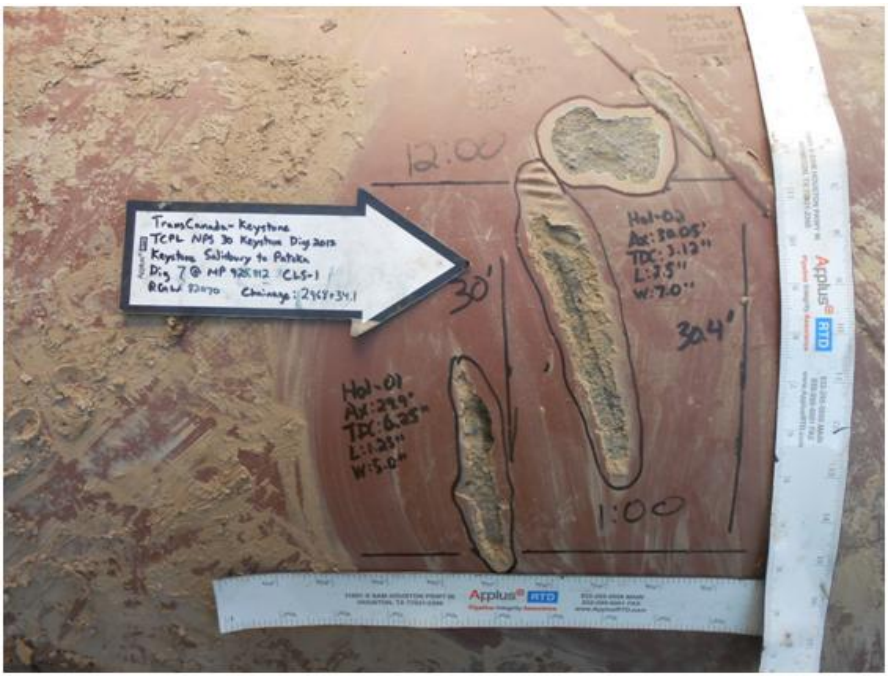

Figure 19. MP 921.81 – External Corrosion

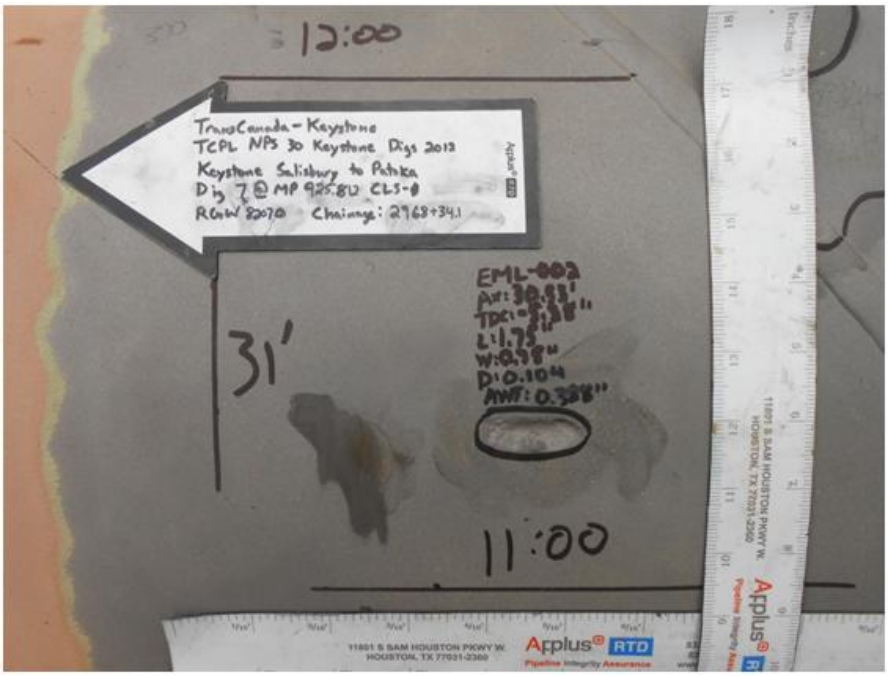

Figure 20. MP 921.81 – External Corrosion

The observed corrosion is consistent with an accelerated rate of corrosion and may be associated with D-C Stray Current Corrosion.

Dig Site #8 – MP 925.89 Investigated 11/08/12

This anomaly was classified as a 180 day indication and was found to have five (5) anomalies caused by external corrosion with a peak depth of corrosion reported to be 30.75%. Approximately 6.0 feet of pipe was exposed from Station 1156+98.8 to 1157+04.8. The corrosion anomalies are dish shaped. The reported CP potentials documented in the RTD Dig report ranged from -0.735 v to -0.745 v (CSE). Soil pH was reported to be ranging from 5.0 to 5.5. The corrosion anomalies can be seen in Figures 21 and 22.

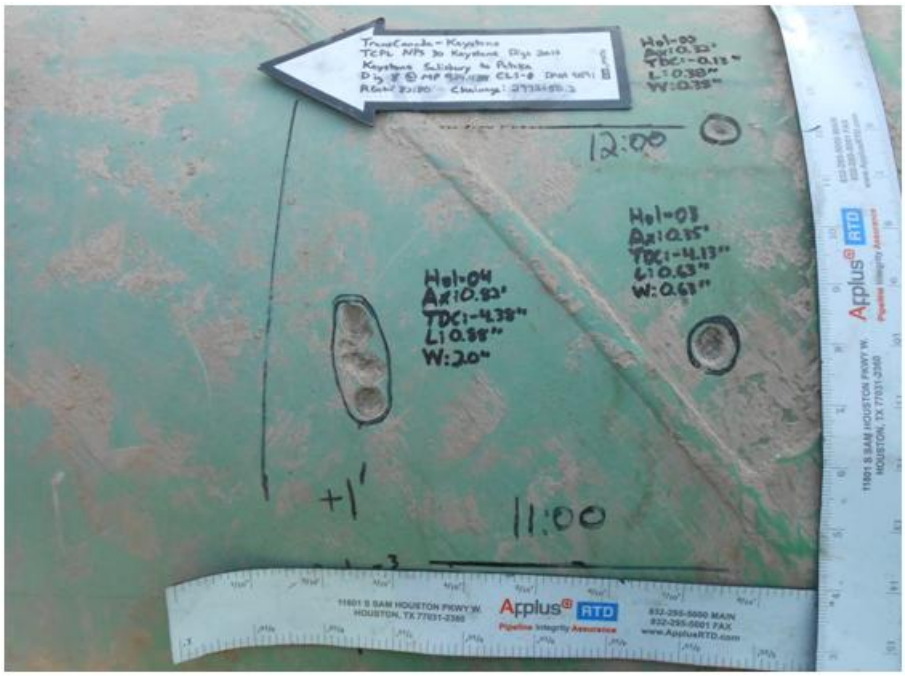

Figure 21. MP 925.89 – External Corrosion

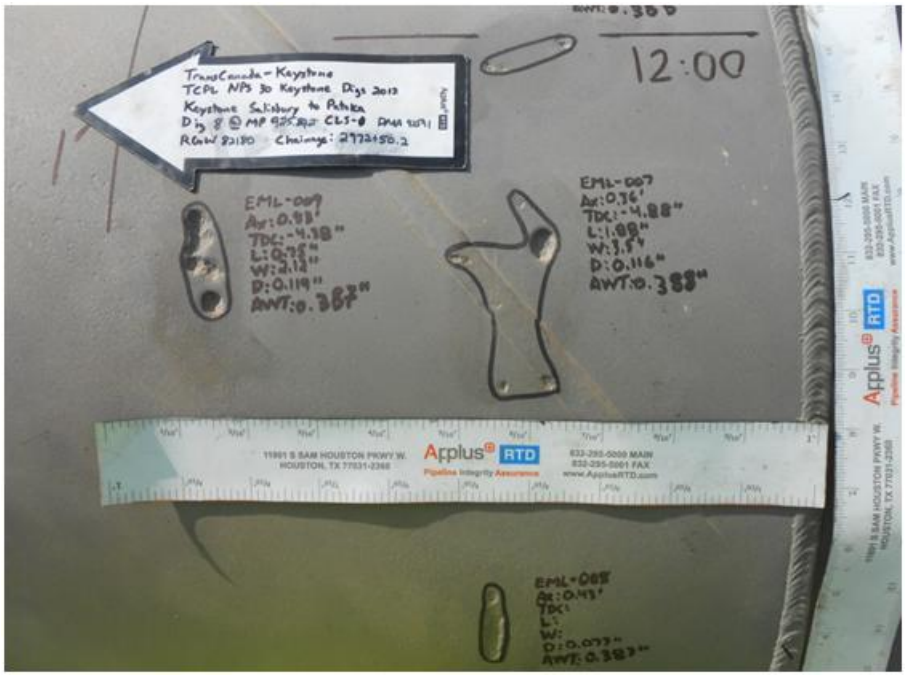

Figure 22. MP 925.89 – External Corrosion

The accelerated rate of corrosion and the observed corrosion morphology along with an absence of tubercles is consistent with D-C Stray Current Corrosion.

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Dig Site #16 – MP 999.97 Investigated 11/06/12

This anomaly was classified as a 180 day indication and was found to have one (1) anomaly caused by external corrosion with a peak depth of corrosion reported to be 46.45%. Approximately 5.0 feet of pipe was exposed from Station 809+97.1 to 810+02.1. The corrosion anomalies (one large commingled area and some discrete areas of metal loss) are dish shaped and occurred in a girth weld coating area. The reported CP potentials documented in the RTD Dig report ranged from -1.489 v to -1.523 v (CSE). Soil pH was reported to be ranging from 5.0 to 6.5. The corrosion anomalies can be seen in Figures 23 and 24.

Figure 23. MP 999.97 – Coating Damage

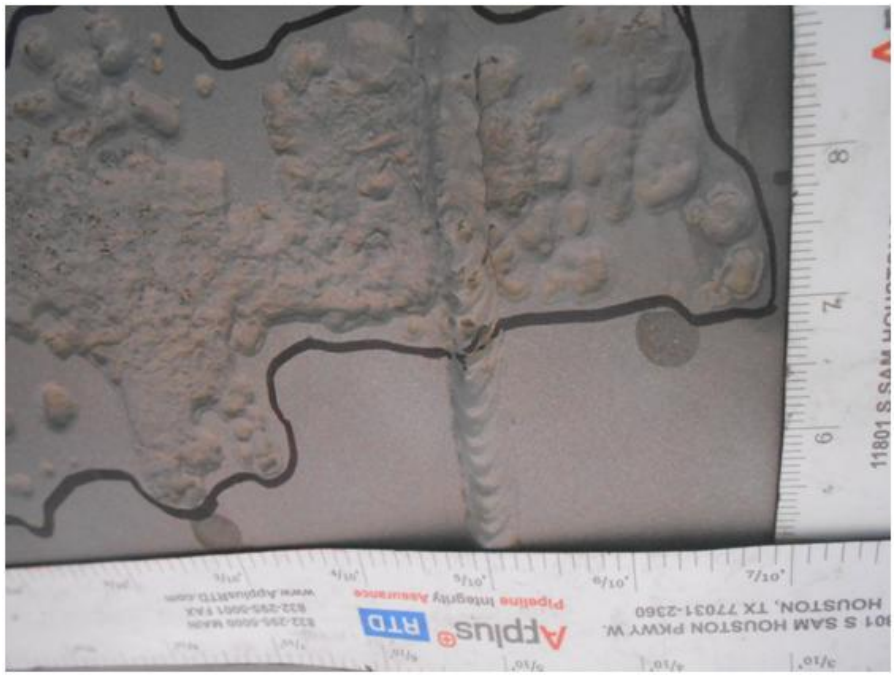

Figure 24. MP 999.97 – External Corrosion

The corrosion damage at this location occurred at an accelerated rate and the morphology is consistent with stray current corrosion due to the absence of tubercles in the corroded area. MIC may also have contributed to the observed corrosion damage.

Dig Site #17 – MP 1000.32 Investigated 11/06/12

This anomaly was a Site #4 proximity examination and was found to have three (3) anomalies caused by external corrosion with a peak depth of corrosion reported to be 41.81%. Approximately 12.0 feet of pipe was exposed from Station 828+25.3 to 828+37.3. The corrosion anomalies (one large commingled area and some discrete areas of metal loss) are dish shaped. The reported CP potentials documented in the RTD Dig report ranged from -0.830 v to -0.840 v (CSE). Soil pH was reported to be ranging from 4.5 to 5.5. The corrosion anomalies can be seen in Figures 25 and 26.

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Figure 25. MP1000.32 – External Corrosion Pitting

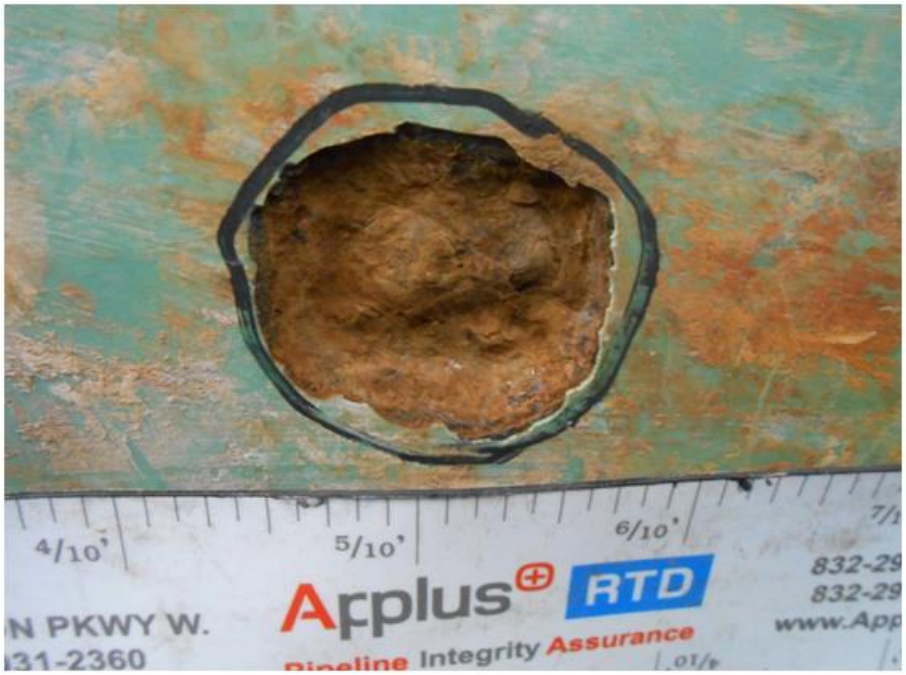

Figure 26. MP1000.32 – External Corrosion Pitting

The corrosion damage at this location occurred at an accelerated rate and the morphology is consistent with stray current corrosion.

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8.0 ASSESSMENT OF CATHODIC PROTECTION ON THE KEYSTONE PIPELINE

In the area of where the external metal loss anomalies developed along the Keystone Pipeline system cathodic protection has been provided through Impressed Current ground beds. The ground beds were installed at pump stations along the system due to the availability of AC Power and in an effort to minimize stray current interference on existing operating pipelines in the shared right-of-way with the Keystone pipeline. The systems have been supplemented and operating characteristics have been modified since the ILI results became available.

A review of operating data obtained prior to and subsequent to the discovery of the external corrosion reveals areas where the pipeline was likely not meeting industry accepted criteria for effective CP. Moreover, a review of a Close Interval Survey results has identified possible stray current interference conditions at several locations. A listing of likely sub-criterion areas and areas of possible stay current interference is shown in Table 6[5].

Table 6. Summary of Likely Sub-Criterion Areas and Possible Interference Areas

File Description				Potentials more Positive than -0.850 volts by 100mV[6]		Reversed Potentials		Least Negative OFF Potential
File #	Begin MP	End MP	Location	Start	Stop	Start	Stop	
1000	901.99	905.91	Centralia to CR 737					
1010	905.91	907.72	Centralia to CR 737					
1015	907.72	909.02	Centralia to CR 737			47927+35	47954+63	-0.447
2002	909.02	912.00	Centralia to CR 737					
2012	912.00	915.37	Centralia to CR 737	48715+68	48718+08			-0.731
				48720+68	48723+18			-0.734
				48725+93	48727+20			-0.744
				48754+25	48759+03			-0.657
1001	920.40	923.53	Centralia to CR 737	48715+68	48718+08			-0.731
				48719+55	18719+70			-0.749
				48720+68	48723+18			-0.734
				48725+78	48727+20			-0.744
				48728+48	48728+60			-0.736
				48753+45	48759+03			-0.657
1011	923.53	926.61	Centralia to CR 737	48762+27	48813+73			-0.269
				48821+63	48830+05			-0.667
				48842+35	48859+80			-0.669
				48896+30	48902+55			-0.667
1050	950.75	955.94	Middletown to Saint Paul	50230+85	50239+75			-0.680
				50240+23	50240+45			-0.745

[5] Data developed from a review of CIS profiles.
[6] Pipe-to-soil potential values less negative than -0.850v by 100 mV or more were chosen for reporting purposes since values between -0.750v and -0.850v CSE are likely experiencing beneficial CP polarization and not indicative of detrimental stray current discharge.

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File Description				Potentials more Positive than -0.850 volts by 100mV[6]		Reversed Potentials		Least Negative OFF Potential
File #	Begin MP	End MP	Location	Start	Stop	Start	Stop	
				50241+20	50241+25			-0.746
				50247+75	50248+03			-0.738
				50248+50	50253+35			-0.679
				50361+75	50361+80			-0.748
				50364+32	50364+82			-0.745
				50403+60	50407+18			-0.684
1060	955.94	960.39	Middletown to Saint Paul	50481+60	50485+85			-0.684
				50489+85	50489+93			-0.748
				50490+35	50492+73			-0.723
				50493+20	50493+80			-0.740
				50541+30	50541+33			-0.748
				50541+73	50542+68			-0.735
				50543+38	50543+63			-0.746
				50544+08	50544+40			-0.748
				50545+23	50545+53			-0.746
				50546+30	50547+58			-0.744
				50548+08	50555+53			-0.714
				50562+00	50565+45			-0.726
				50595+08	50595+60			-0.740
				50596+10	50597+95			-0.720
				50599+53	50600+18			-0.726
				50600+73	50602+25			-0.742
1070	960.39	964.81	Middletown to Saint Paul	50862+68	50864+53			-0.724
				50879+08	50889+38			-0.701
				50901+20	50901+30			-0.743
				50901+95	50902+00			-0.749
				50904+80	50940+33			-0.657
				50941+00	50941+58			-0.740
1080	964.81	966.33	Middletown to Saint Paul	50977+88	50978+23			-0.741
				50980+90	50987+43			-0.712
				51008+13	51008+50			-0.724
				51010+13	51021+48			-0.662
				51022+23	51022+28			-0.749
				51022+83	51040+53			-0.663
1090	966.88	972.42	Middletown to Saint Paul	51052+28	51056+55			-0.726
				51060+65	51071+73			-0.691
				51101+50	51101+75			-0.746
				51102+35	51107+90			-0.723
				51108+85	51108+90			-0.739
				51111+30	51111+43			-0.746
				51113+95	51114+45			-0.734
				51115+90	51115+98			-0.749
				51281+85	51319+68			-0.576
				51323+13	51323+15			-0.743
				51328+68	51328+73			-0.748
				51331+13	51331+18			-0.741
				51331+70	51331+75			-0.749
				51334+13	51334+20			-0.749

FOIA CONFIDENTIAL TREATMENT REQUESTED BY TC OIL PIPELINE OPERATIONS INC – Do Not Copy or Distribute

File Description				Potentials more Positive than -0.850 volts by 100mV[6]		Reversed Potentials		Least Negative OFF Potential
File #	Begin MP	End MP	Location	Start	Stop	Start	Stop	
				51336+18	51336+23			-0.731
				51336+80	51343+65			-0.535
6000	972.41	974.33	Middletown to Saint Paul	51343+64	51354+60			-0.570
				51401+43	51403+70			-0.733
6010	975.62	979.49	Middletown to Saint Paul	51661+95	51717+00			-0.587
6020	979.49	981.38	Middletown to Saint Paul	51717+00	51752+73			-0.641
				51756+88	51816+56			-0.567
6025	972.41	974.33	Middletown to Saint Paul	51816+62	51831+38			-0.603
				51833+10	51833+15			-0.603
2010	1068.50	1072.05	Pierron to Patoka			56523+13	56527+55	-1.036
						56538+68	56543+83	-0.956
						56550+95	56558+60	-0.921
2020	1072.05	1074.79	Pierron to Patoka			56611+13	56611+23	-0.996
						56611+78	56611+83	-0.980
						56612+63	53312+95	-0.973
						56618+68	56632+28	-0.981
						56637+38	56643+23	-0.956
						56644+03	56644+08	-0.997
						56660+65	56664+18	-0.983
2025	1076.64	1077.79	Pierron to Patoka			56889+40	56900+43	-0.964
2030	1077.79	1080.36	Pierron to Patoka			56927+15	56930+45	-1.004
						56952+25	57041+00	-0.944
2040	1080.34	1083.45	Pierron to Patoka			57041+92	57203+85	-0.792
1000	867.57	871.84	Salisbury to Centalia	45902+50	45907+20			-0.690
				45915+93	45915+98			-0.745
1035	889.81	891.58	Salisbury to Centalia	46988+75	46992+18			-0.664
1036	990.07	992.03	St. Paul to Hartford			52344+67	52358+17	-0.913

No data was available from which to determine if locations not satisfying a -0.850 volt (CSE) Polarized Criterion were satisfying alternative criteria, but several locations showed evidence of "Instant-Off" potentials near or below the expected free corrosion potential for carbon steel raising the possibility that the Cathodic Protection in some areas was inadequate and/or interference conditions were rendering the CP system ineffective and likely accelerating corrosion.

An excerpt of a Mainline Annual Survey report is shown in Figure 27 and shows evidence of potential reversals at a crossing with Platte Pipeline.

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FOIA CONFIDENTIAL TREATMENT REQUESTED BY TC OIL PIPELINE OPERATIONS INC. (KEYSTONE)

Name	Chainage	Date	Purpose	Ref	Type	Connection	Comment	On	Off	For. On	For. Off
1185200+992.041-TS - Dalbow Rd											
2010											
	50,659.829	11/7/2010 08:00:35 PM		CuSO4	VDC	P1	P1 BLK	2701	857		
		11/7/2010 08:00:19 PM		CuSO4	VAC	P1	P1 BLK	877	824		
2011											
		9/27/2011 11:26:11 PM		CuSO4	VDC	P1	P1 BLK	3185	1114		
		9/27/2011 11:26:43 PM		CuSO4	VAC	P1	P1 BLK	0	0		
2012											
		9/15/2012 09:19:15 PM		CuSO4	VDC	P1	P1 BLK	3033	997		
		9/15/2012 09:18:59 PM		CuSO4	VAC	P1	P1 BLK	896	862		
		9/15/2012 09:22:11 PM		CuSO4	VDC		ANODE BLUE			1756	1824
1185200+994.711-TS - platte line xing											
2010											
	64,830.423	11/8/2010 06:56:15 PM	Pipe Crossing	CuSO4	VDC	P1	P1 BLK	657	777		
		11/8/2010 06:56:55 PM	Pipe Crossing	CuSO4	VDC	P1	F1 WHITE	1426	1141		
		11/8/2010 06:57:39 PM	Pipe Crossing	CuSO4	VAC	P1	P1 BLK	1385	1331		
2011											
		9/27/2011 10:40:51 PM	Pipe Crossing	CuSO4	VDC	P1	P1 VDC	1080	876		
		9/27/2011 10:38:23 PM	Pipe Crossing	CuSO4	VAC	P1	P1 VAC	0	0		
		9/27/2011 10:37:27 PM	Pipe Crossing	CuSO4	VDC	P1	F1			1327	863
2012											
		9/17/2012 03:01:23 PM	Pipe Crossing	CuSO4	VDC	P1	P1 VDC	1024	802		
		9/17/2012 03:00:55 PM	Pipe Crossing	CuSO4	VAC	P1	P1 VAC	374	271		
		9/17/2012 03:00:19 PM	Pipe Crossing	CuSO4	VDC	P1	F1			1453	882
1195200+994.894-TS - anode test station by pond											
2010											
	65,732.569	11/8/2010 07:13:03 PM		CuSO4	VAC	1	P1 AC			1381	1358
		11/8/2010 07:12:07 PM		CuSO4	VDC	1	P1 DC			788	819
		11/8/2010 07:12:27 PM		CuSO4	VDC	1	P2 DC			801	825
		11/8/2010 07:13:47 PM		CuSO4	VDC	1	ANODE DC			1734	1742
2011											
		9/27/2011 10:32:15 PM		CuSO4	VDC	P1	P1 VDC	1357	1016		
		9/27/2011 10:31:51 PM		CuSO4	VAC	P1	P1 VAC	0	0		
		9/27/2011 10:32:27 PM		CuSO4	VDC	Output Anode1	ANODE	1713	1708		
2012											
		9/17/2012 02:51:47 PM		CuSO4	VDC	P1	P1 VDC	1199	971		
		9/17/2012 02:51:27 PM		CuSO4	VAC	P1	P1 VAC	343	248		
		9/17/2012 02:52:19 PM		CuSO4	VDC	Output Anode1	ANODE	1710	1709		

Figure 27. Annual Survey Results

A CIS profile is shown in Figure 28. where there is evidence of reversed potentials indicative of a possible interference condition. This graph shows about 5000 lineal feet of reversed potentials. TransCanada reported that they had implemented interference bonds with foreign operators that may be influencing the Keystone system, but those bonds may not have been properly sized to achieve optimum results.

Additional examples of possible issues with the CP system performance exist in the data collected at the ILI investigative dig sites.

The location of Foreign CP ground beds in relationship to the ILI anomaly digs is shown in Figures 29-31. These figures demonstrate the close proximity of possible sources of Interference.

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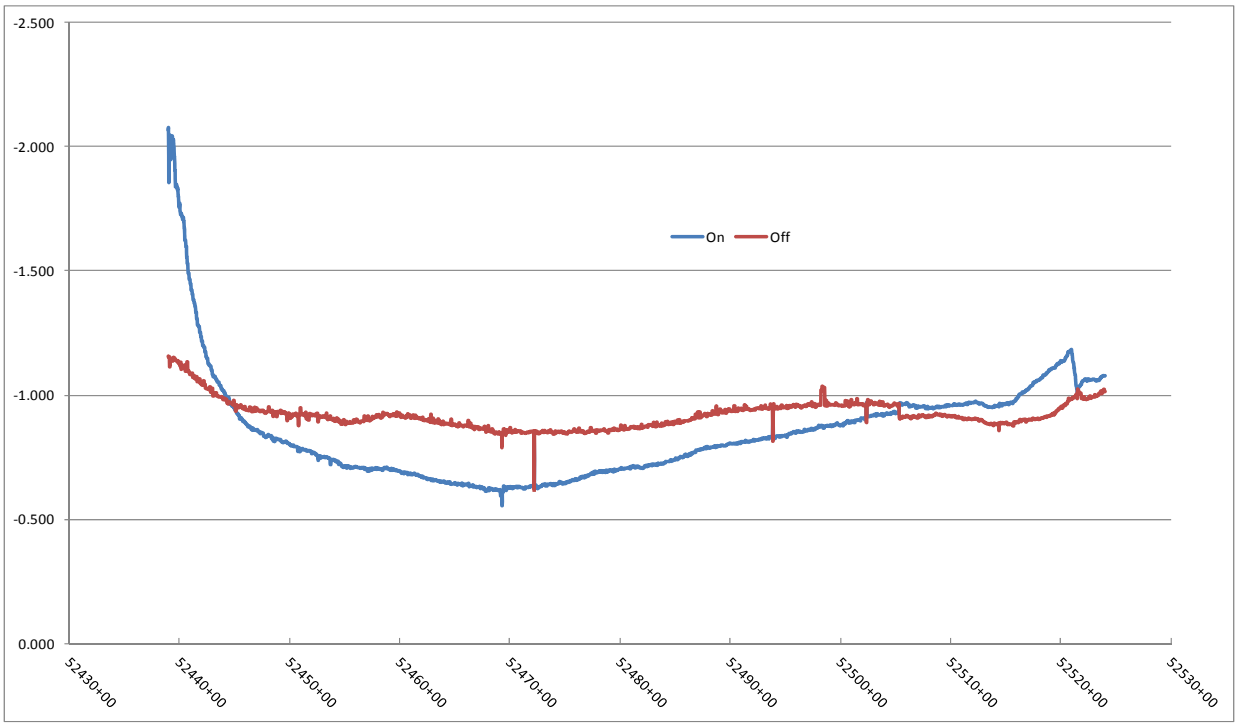

Figure 28. CIS Profile in the Area of External Metal Loss Anomalies MP 992.03-995.46[7]

Figure 29. ILI Investigative Digs 1, 2 and 5.

[7] This graph represents only a portion of the Survey

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Figure 30. ILI Investigative Digs 3, 4, 16 and 17.

Figure 31. ILI Investigative Digs 7 and 8.

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9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

Based upon the combined analysis of the documentation and material reviewed and the results testing of dig site samples, the findings of this study regarding root cause and contributing factors are:

9.1.1 Root Cause

The 30-inch Keystone Pipeline experienced localized external corrosion wall loss due to D-C stray current interference[8]. The corrosion induced wall loss occurred at an accelerated rate that can only be attributable to D-C stray current interference, microbiologically influenced corrosion (MIC), or Induced A-C corrosion. MIC may have played a role in some of the observed corrosion however it was not the primary cause. Induced A-C corrosion did not play a role in the observed corrosion. The primary supporting evidence is as follows:

1. Using a linear corrosion growth rate, the corrosion rate experienced ranged from 40 -125 mpy. Absent accelerating factors, corrosion of carbon steel in soils occurs at 2-10 mpy. The accelerated rates experienced can only be attributable to stray D-C interference, MIC or Induced A-C.
2. While the results of testing performed on soil samples and corrosion deposits showed moderate to high concentrations of viable bacteria that can contribute to MIC, the pitting morphology is not completely consistent with MIC. In most cases the pitting morphology is consistent with D-C Stray Current Interference corrosion. MIC cannot be dismissed as a contributing factor to the observed corrosion.
3. Induced A-C Corrosion can produce accelerated rates of corrosion, but because the Keystone line is not collocated with or near a source of Induced A-C, nor is the pitting morphology consistent with A-C corrosion, it is not the root cause.

9.1.2 Contributing Factors

Extensive analysis has identified problems with the application and operation of cathodic protection on the Keystone line that contributed to the observed corrosion. The primary supporting evidence is as follows:

[8] Stray current corrosion may occur during construction as the pipeline is being installed, but has not been provided protection. PHMSA has issued an advisory bulletin to Operators offering guidance on this subject.

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1. The application of CP through the installation of Impressed current ground beds at the pump stations that were electrically continuous with the mainline piping, created a condition where the applied CP current could preferentially distribute to the pump station infrastructure that represented a lower cathode to earth resistance than the mainline pipe. Piping, grounding, reinforced concrete and ancillary equipment that is electrically continuous with the mainline pipe would have more bare surface area and may have resulted in inadequate distribution of protective current to the Keystone Pipeline.

2. Analysis of the shared right-of-way configuration, the proximity to foreign CP sources in the areas of corrosion damage and the Annual Survey and Close Interval Survey data has identified locations of suspected interference and possibly inadequate CP. The primary supporting information is as follows:

    1. A review of the Annual survey data shows areas of depressed potentials and some reversals in potentials. This is also apparent in reviewing CIS survey results.
    2. Interference bonds installed to mitigate possible interference may not have been sized to achieve optimum results.

9.2 Recommendations

Based upon the findings and conclusions of the Root Cause and Contributing Factors study, we offer the following recommendations:

1. Conduct a thorough Cooperative Interference analysis along the Keystone Pipeline system to determine where there may be detrimental interference conditions that require mitigation.
    a. Evaluate all existing bonds to ensure that they are properly sized and located and necessary to mitigate harmful interference effects. This is important because the quality of protective coatings on pipelines in a shared right-of-way may not be sufficiently effective to preclude sacrificing significant amounts of protective current to foreign pipelines, which may adversely affect CP current distribution to the Keystone line.

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b. If practical, consider relocating existing foreign CP sources that are deemed to be detrimental to the stray current mitigation strategy for the Keystone pipeline.

2. Consider the installation of Coupon test stations at locations of identified interference to assist in assessing the impact of interference and the success of mitigation and protection methods. The coupon stations should be utilized for future monitoring to ensure that the impact of changing environmental and operational conditions can be assessed and mitigation strategies modified accordingly. The coupons should be monitored to assess the polarized potential of the coupon in under the influence of stray current and the coupon current should be monitored to ensure that protective current is collecting on the coupon.
3. Consider a coating fault survey to identify locations where corrosion may have initiated, but may be below the ILI tool tolerance detection limit. A select number of these locations may be considered for examination to assess the success of efforts to optimize CP and interference mitigation strategies in controlling future corrosion growth.
4. Consider examining a select number of unrepaired ILI external metal loss anomalies six (6) months after implementing any necessary remedial measures to ensure that corrosion growth has been successfully controlled. Although based on a small data set, the unity plot shown in Figure 32 shows reasonable agreement with the ILI tool predicted peak depth and field measured peak depth with the ILI tool appearing slightly conservative. On that basis it would be reasonable to examine a select number of unrepaired ILI detected features to ensure a reduction in corrosion growth.

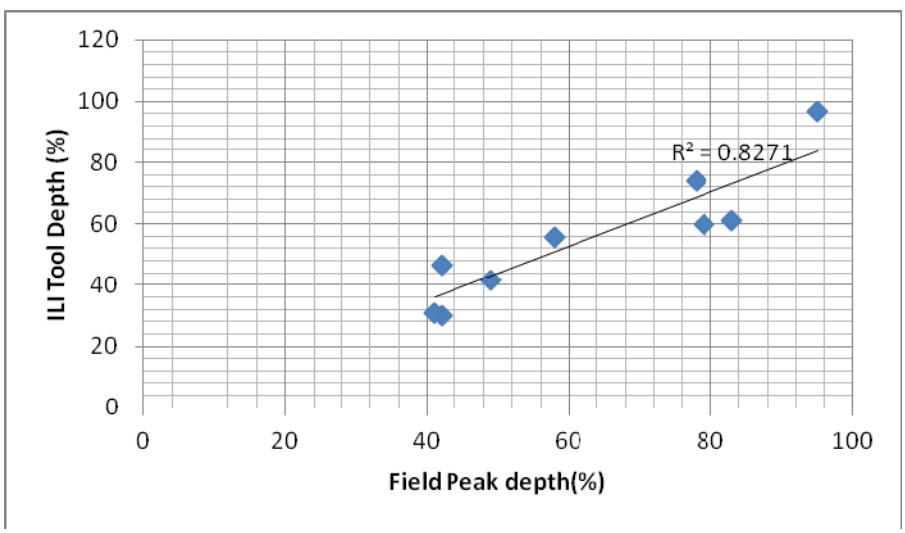

Figure 32. Unity Plot

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENTS "R"

R-1 Enbridge Wisconsin Landowner News

Enbridge PR Newsletter to Wisconsin Landowners indicating early survey work for Line 61 "Twin", also referred as Line 66, proposed from Superior, WI to Chicago area

R-2 PressPub.com "Enbridge Announces Plan to "twin" Line 61

Online news story published by PressPub.com/News

For more than 65 years, Enbridge has been committed to the safe delivery of energy that fuels our lives.

Every hour of every day, Enbridge pipelines transport the energy American consumers need to fuel their vehicles, heat their homes, power manufacturing, and create jobs. This commitment to safety goes into everything we do, including the design, installation, and ongoing operations of our pipeline systems.

Enbridge is a leader in energy transportation in North America and has proudly served the state of Wisconsin and this region since 1949.

Enbridge operations help Wisconsin meet 100% of its refinery capacity needs and 70% of Midwest refinery capacity needs through the transportation of oil and natural gas liquids to refineries in the Great Lakes region. This energy is used locally and regionally every day to fuel communities and grow local economies.

A Special Thank You

Dear Landowner,

In February 2014 Enbridge informed landowners it was commencing field surveys along the existing Line 61 corridor between Superior, Wis. and Pontiac, Ill. The surveys were part of Enbridge's evaluation of a potential expansion to its system. Survey work began in April, continued throughout 2015 and is now mostly complete. 98% of landowners granted permission for crews to perform surveys. Enbridge wants to thank you and all of our landowners for your cooperation during this effort.

We want to hear from you.

Enbridge is committed to the relationships it has with landowners along its right-of-way. If you have any questions or comments about this letter, or any other matter pertaining to Enbridge and its operations, please contact us at **866-331-3493** or **EnbridgeinWI@enbridge.com**. We will do our best to return your call or email message in a timely manner.

To learn more about Enbridge in Wisconsin, visit: **enbridge.com/wisconsin**

In 2015, Enbridge paid more than $28,870,000 to Wisconsin in property taxes.

Enbridge has undertaken the most extensive maintenance, integrity and inspection program in the history of the North American pipeline industry.

Enbridge meets 100 percent of Wisconsin refinery capacity needs.

4.36 million barrels per day of refined petroleum products are consumed in the Midwest every day.

More than 50 grants totaling $59,000 were awarded to emergency response organizations in Wisconsin in 2015.

More than 500 construction jobs created during recent expansion projects.

The Wisconsin Assembly passes resolution declaring April 2016 as Safe Digging Month

Damage from third-party activities is a leading cause of pipeline incidents. To protect people and the environment, and to reduce the risk of pipeline damage, federal and state laws require anyone planning to excavate near a pipeline right-of-way (ROW) to call their local toll-free one-call number in advance of any ground disturbance activity.

811 is the free, FCC-designated national one-call number that connects a caller from anywhere in the country to the appropriate local one-call center. Anyone conducting soil-disturbing activities should call 811.

Even though underground pipelines are identified above-ground by pipeline markers, the marker may not necessarily be directly over the pipeline. Also, as the depth of pipelines and other underground utilities can change over the years due to erosion, previous digging projects or uneven surfaces, there are varying depths to underground systems. That's why it's important to contact Enbridge directly at least three days before you do any type of excavation in any area that you believe might be on or near an Enbridge ROW, including:

- **Fixing or improving an existing ditch, drain tile or fence**
- **Building a berm**
- **Constructing roads, paving, parking, driveways, ditches, railways, overhead or underground utilities**
- **Installing fence posts**
- **Altering the grade or deep tilling the soil**
- **Operating non-agricultural equipment or vehicles on or over the ROW**
- **Encroaching on the ROW with services or other utilities**

The construction of buildings, foundations or stockpiling of materials is prohibited on the ROW. Enbridge representatives must be on-site to supervise any excavation near the ROW.

For installations across the ROW, written permission from Enbridge is required. Depending on the installation, approval could take up to 10 days. We can help you avoid problems and delays by:

- **Helping you obtain written permission for construction/excavation over Enbridge pipelines**
- **Locating and marking Enbridge pipelines**
- **Providing guidelines for excavation and blasting**
- **Ensuring an Enbridge field representative is on-site**

811 Know what's **below.** **Call** before you dig.

4½ minutes
The approximate time it takes to call 811

OR

4½ days
The average work delay due to hitting a pipeline while digging

$0
The cost of calling 811 before digging

99%
The percentage of time work is completed without damage when the 811 system is used prior to digging

A nationwide number that can save money and lives

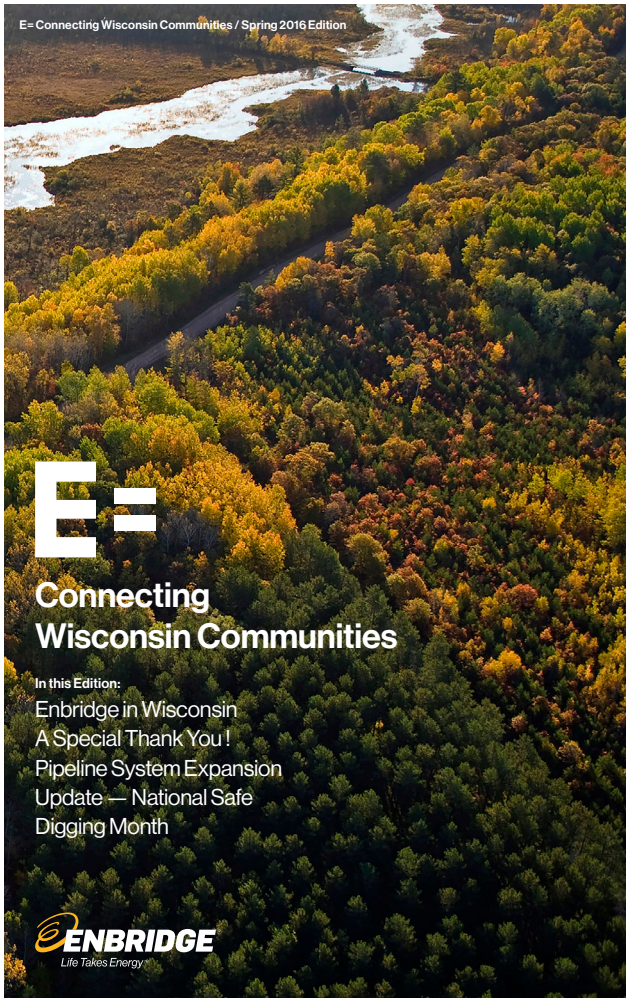

ENBRIDGE
Life Takes Energy

E=

Connecting Wisconsin Communities — Spring 2016 Edition

Pipeline System Expansion Update

Looking to the Future

In order to increase access to safe, reliable and secure supplies of North American produced crude oil, and to better meet the needs of refineries in the U.S. and in Canada, Enbridge continues to evaluate a potential expansion of its pipeline system in Wisconsin and Illinois. The expansion would involve a new pipeline from Superior, Wis. to Pontiac, Ill. which would transport a combination of light and heavy crude oil. The diameter and associated capacity of the new potential pipeline project have not yet been determined. The estimated capital investment would be $3-4 billion.

At this time, no expansion project has been approved. Enbridge will only move forward with a project if and when sufficient customer support exists and regulatory approval is received. If a project were to be approved, Enbridge would publicly announce its plans and begin discussions with landowners and other stakeholders.

As we've conducted our evaluation, a number of questions have been raised and we've provided the answers to them below.

Does the fuel I use every day come from crude oil transported in Enbridge's pipelines?
By supplying 100% of crude oil to Wisconsin's only refinery in Superior and much of the crude oil to Midwest refinery hubs in Minnesota and in Illinois, there is a high likelihood that the fuel in your tank—whether for your vehicle or for your farm equipment—was originally transported as crude oil in an Enbridge pipeline. Additionally, the many products you rely on every day—from fertilizers to plastics—may have been produced using crude oil transported in our pipelines.

How does Enbridge work with landowners to obtain easement agreements?
Whenever a new pipeline project is proposed, Enbridge representatives begin by meeting with landowners to discuss project impacts, identify special considerations, begin easement negotiations, and communicate project schedule. The representatives then work with landowners to reach a mutual agreement that reasonably compensates landowners for the easement and temporary construction working space necessary for the pipeline route across their property. In some cases, some additional temporary workspace is required during construction. The size of this area varies depending on the proximity of other pipelines and constructability issues. If temporary workspace is needed, the representatives discuss the various provisions with affected landowners and answer their questions. Historically, Enbridge has reached agreements with the vast majority of landowners. Recent projects in the Midwest have shown an agreement rate at or above 95%.

How much right-of-way would be required for a new pipeline?
Along most of the Line 61 corridor in Wisconsin, the right-of-way is 80 feet wide and contains either two or four pipelines within it. If a new pipeline project were to be proposed, additional right-of-way would be required. The actual amount required would vary.

The surveys that were performed over the past two years in support of a potential system expansion required a 300-foot-wide corridor in most cases. This width was necessary for two reasons: First, it allowed surveyors to thoroughly identify and document all features and environmental sensitivities in the area. Second, it provided the design flexibility needed to route the pipeline around and away from these features and sensitivities. The width of the corridor was only for survey purposes; the additional permanent right-of-way needed for a new project would be considerably less.

If a new pipeline project were to be proposed, what is the process for developing the route and getting regulatory approval?
In developing the proposed route, the objective is to identify a route that both maximizes opportunities for collocating within existing utility corridors (such as the Line 61 corridor) and minimizes negative impacts to humans and the environment. Route alternatives from established utility corridors may be utilized to avoid areas of population congestion, environmental features or constructability issues. Other factors may include land use, or operations and maintenance issues. Enbridge will work with landowners to identify any special considerations. The final route is ultimately determined by the federal and state agencies that conduct various reviews of the project. The requirements for environmental review are prescribed by the regulatory agency.

Is Enbridge insured to pay for clean-up costs after a release?
Yes. Enbridge carries more than $860 million in Commercial General Liability Insurance, including Sudden and Accidental Pollution Liability insurance which provides coverage in the event of a release. No taxpayer or landowner funds have ever been required to clean up and remediate any Enbridge oil release in Wisconsin, or anywhere else for that matter. Enbridge has always invested in, and will continue to invest in, the resources necessary to demonstrate its commitment to safety and the environment in the communities where it operates. We are in compliance with all state and federal pipeline safety regulations, and we are committed to our industry leading safety and pipeline integrity programs.

What is Enbridge's safety record in Wisconsin?
Enbridge operates 1,552 miles of pipelines in Wisconsin. In 2015, we transported 2.8 billion barrels of crude oil in these pipelines. In 2015, we had five reportable releases in Wisconsin totaling 26 barrels. All of the releases were located at Enbridge's Superior Terminal, which is designed and built to contain releases and limit impact to the environment. All of the spilled oil was recovered. Safety will always be our number one priority. Ensuring the safety of communities and the environment is our most important duty — and everything we do is based on this foundation.

Our goal – simply, unequivocally – will always be zero incidents.

Does the presence of a pipeline affect property values?
Studies conducted over the last two decades have found that property values are unaffected by the presence of pipelines. A just-released study by the Interstate Natural Gas Association of America (INGAA) determined that the presence of underground natural gas transmission pipelines does not affect the sales, prices or value of residential properties. The study, conducted by a third party, backed the findings of a previous study conducted in 2001 which concluded that neither the size of the pipeline nor the product it carried has a significant impact on the sales price of a home. A similar study conducted in 2013 could not identify a systematic relationship between proximity to the pipeline and sale price or value.

More information about the recent INGAA study can be found at: www.ingaa.org/Foundation/Foundation-Reports/PropertyValues.aspx.

Is the product transported in Line 61 more corrosive than other forms of crude oil?
No. One of the types of crude oil currently transported on Line 61 is called dilbit. The properties of dilbit, which is bitumen from western Canada mixed with a diluent such as condensate for pipeline transportation, are no different than other forms of crude oil. In 2013 the National Research Council of the Washington, D.C.-based National Academies released a study entitled "Effects of Diluted Bitumen on Crude Oil Transmission Pipelines." The findings of the study, commissioned by the U.S. Department of Transportation, were unequivocal — and confirm the results of other scientific work regarding dilbit:

- "The (NRC's study) committee does not find any causes of pipeline failure unique to the transportation of diluted bitumen."
- "Furthermore, the committee does not find evidence of chemical or physical properties of diluted bitumen that are outside the range of other crude oils — or any other aspect of its transportation by transmission pipeline that would make diluted bitumen more likely than other crude oils to cause releases."
- "Diluted bitumen does not have unique or extreme properties that make it more likely than other crude oils to cause internal damage to transmission pipelines from corrosion or erosion," reads the study.

Recent Expansions

Line 61 Upgrade Project
The Line 61 Upgrade Project does not require pipeline construction outside of the pump station facilities. This project does include construction of new pump stations and modifications to existing pump stations, and will increase the pipeline's average annual capacity to 1.2 million barrels per day (bpd) which is the pipeline's designed full operating capacity. The first phase of the project increased capacity to 560,000 bpd, generated 60 construction jobs, and was completed in late 2014 at a cost of $151 million. The second phase, a $635 million investment for a series of 13 new or modified pump stations in Wisconsin, has created approximately 275 highly skilled construction jobs. Construction on pump stations is expected to be completed later this year.

Superior Terminal
Enbridge crude oil tank facilities temporarily store crude oil as it moves through our pipeline system to be delivered to refineries serving consumers.

Crude oil tank facilities—also called terminals—are integral parts of our interstate transportation system and serve important operational functions.

Currently, more than 2.5 million bpd of crude oil are transported into the Superior Terminal, which has 45 storage tanks and 10 million barrels of breakout, or temporary, storage capacity. The Superior Terminal Project included the addition of three new tanks along with additions and modifications to facility piping infrastructure within the terminal facility. The new tanks are 286 feet in diameter and nearly 56 feet tall. The $330 million project added approximately 1.5 million barrels of storage capacity and created 250 construction jobs. A $155 million upgrade project, which added two storage tanks with one million barrels of additional storage, was completed in late 2014.

http://www.presspubs.com/messenger/news/article_d62d4c7a-774a-11e5-b45a-ab693e0cf14a.html

Enbridge announces plan to 'twin' Line 61

By Greg Seitz StCroix360.com Oct 20, 2015

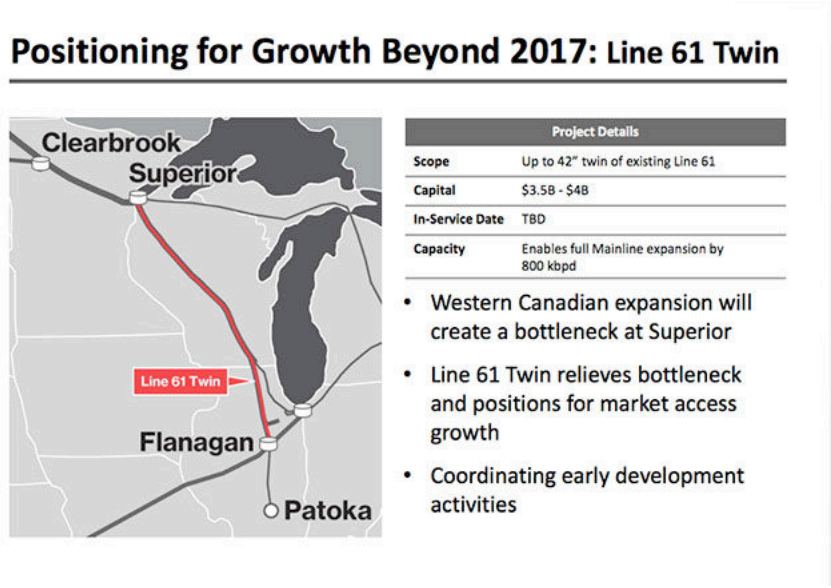

A slide from a presentation delivered to investors on Oct. 7, 2015, by Enbridge's president of liquid pipelines, Guy Jarvis.

The company that owns and operates a controversial oil pipeline across four rivers in the St. Croix's headwaters announced last week that it is planning to build a second pipeline along the same route. Senior leadership at Enbridge say the "Line 61 Twin" project is in the early stages of development.

The new pipeline has been a rumor since Enbridge sent a letter to landowners along the route in the winter of 2014 informing them of upcoming survey work. In February 2015, Enbridge spokeswoman Rebecca Haase told members of the public that she had no knowledge of more pipelines the company was planning to build across the St. Croix River watershed. Haase repeated the denial to the Sawyer County Record in May.

Then, at its annual investment conference this week, Enbridge's president of liquid pipelines Guy Jarvis said the second pipeline would be an approximately $3 billion investment necessary to keep up with carrying capacity that will soon be available from the Canadian oil sands region to Superior, Wisconsin. There will be a bottleneck from there if expansion in Minnesota is not matched by a second pipe from Superior to terminals in Illinois.

Enbridge documents show the company anticipates it could transport about 23 million gallons of oil per day through the new pipeline.

"To unlock the potential of the entire reach of Mainline expansion opportunities we would need additional capacity from Superior to Flanagan which could conceivably come in the form of a twin of our Southern Access pipeline. The scope could again be up to a 42-inch pipeline… We are conducting early development work to assess the opportunity and industry interest because we think it is a compelling set

of solutions in the current environment," Jarvis said.

Line 61's existing route has already been cause for concern and controversy. Built in 2007-2008 and expanded this year to 50 million gallons per day, the pipeline carries heavy crude under the upper St. Croix, Eau Claire, Totogatic, and Namekagon rivers. It was subject to several lawsuits when it was built, and the company received record fines for damage caused by construction. Enbridge also was responsible for the largest inland oil spill in United States history when one of its pipelines ruptured and dumped more than 800,000 gallons of oil into Michigan's Kalamazoo River in 2010.

The recent project to triple Line 61's capacity with new pump stations was done with almost no public input, no environmental review, and no analysis performed to ensure the pipeline is buried deep enough under the rivers to survive flooding. Running a second pipe next to Line 61 (and three older Enbridge pipelines in the corridor) could once again help Enbridge avoid oversight.

"Twinning projects have even fewer handles to influence them than new lines, simply because they sometimes don't need any new easements at all," said Rebecca Craven of the Pipeline Safety Trust.

This spring, Wisconsin made it easier for Enbridge to cross land without the property-owner's permission. The legislature passed and Governor Scott Walker signed a bill in May that Enbridge helped write which ensures the company can use eminent domain.

Expansion of the pipeline system from Canada to refineries on the Gulf Coast could benefit the future export of oil to foreign markets.

Such trade has been banned since the 1970s, but the U.S. House of Representatives passed a bill last Friday that would lift restrictions. The legislation was supported by the American Petroleum Institute, which Enbridge is a member of. President Obama has said he would veto the bill.

When St. Croix 360 first reported about Line 61 route and risks last October, the pipeline expansion was almost done and there was little opportunity for citizen input.

A new pipeline should require extensive review and public participation, and St. Croix 360 will follow the issue closely and continue to report on developments. Stay tuned.

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENTS "S"

S-1 Accufacts Report on Line 3 DEIS.

Review of the DEIS for the Line 3 Pipeline Project Prepared for the Minnesota Department of Commerce.

S-2 Accufacts Kuprewicz CV

Accufacts Richard Kuprewicz Curriculum Vitae

Accufacts Inc.
"Clear Knowledge in the Over Information Age"

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Date: July 9, 2017

To: Richard Smith
President
Friends of the Headwaters

To be filed electronically to: Pipeline.Comments@state.mn.us
Docket Nos. CN-14-916 & PPL-15-137

Re: Accufacts Review of the Draft Environmental Impact Statement for the Line 3 Pipeline Project Prepared for the Minnesota Department of Commerce

Accufacts Inc. ("Accufacts") was asked to perform a technical review of the Draft Environmental Impact Statement for the Line 3 Pipeline Project ("Draft EIS") prepared for the Minnesota Department of Commerce with a primary emphasis on Chapters 10 and 12 dealing with accidental crude oil releases and cumulative potential effects, respectively.[1] The Draft EIS attempts to analyze a proposed new 36-inch pipeline route to transport both conventional and dilbit crude oils. A new pipeline would replace the existing 34-inch Enbridge pipeline which is to be abandoned. The 34-inch pipeline is currently operating under a pressure reduction limitation because of numerous serious anomalies on that line that could lead to rupture if not remediated. U.S. federal minimum pipeline safety regulations do not permit permanent pipeline pressure reduction as an acceptable approach toward assuring pipeline integrity to avoid rupture, for various good reasons.[2] As outlined in further detail below, Accufacts finds the Draft EIS pipeline route analyses and comparisons woefully inadequate. Among other things, the Draft EIS fails to provide clear oil pipeline information needed for a complete release engineering analysis reflecting true oil pipeline hydraulics and release dynamics, especially pipeline rupture, for the presented possible pipeline routes. Such release volumes and their associated consequences can be instrumental in prudently selecting a new pipeline route. An attached CV outlines some of my extensive experience to comment on this pipeline matter.

In reviewing the Draft EIS, Accufacts has the following major observations:

1. **Critical pipeline technical information is missing concerning the various presented pipeline route options.**

[1] Posted at website https://mn.gov/commerce/energyfacilities/resource.html?id=34695.
[2] 49CFR§195.452(h)(1)(i) *Temporary pressure reduction*.

In determining route options for a liquid pipeline, certain basic information is needed to evaluate the suitability of possible routes. The Draft EIS is missing this important critical technical information. Such critical pipeline route information is missing in the Draft EIS and should not be excluded from public review. For various route options an EIS should, for example, incorporate:

1. the pipeline elevation profile (approximate elevation vs approximate milepost, or "MP"),

2. a line indicating the Maximum Operating Pressure(s), or MOP(s), on the elevation profile,

3. a hydraulic profile at the design rate case for the control crude oil case (various additional rates may be included as well for large elevation changes) on the elevation profile,

4. location of mainline valves and their type of operation (e.g., manual, remote, automatic), as well as specific safety design if warranted,

5. general location/type of critical leak detection monitoring devices by milepost, and

6. identification by milepost range of High Consequence Areas, or HCAs.

With the exception of HCAs, the above noted information is often made public in Canadian pipeline filings to the National Energy Board, or NEB, the agency chartered with approval of interprovincial liquid transmission pipelines.[3] The above information is essential to permit an independent validation/determination of pipeline hydraulics, safety margins, and oil release volumes along the pipeline routes, and the pipeline's potential to influence sensitive receptors. None of the above information is provided for the route alternatives mentioned in the Draft EIS. The above technical information concerning route selection are details that many pipeline operators don't grasp, so it can be understandable if non-pipeline operators or engineers may not realize their importance in pipeline routing decisions. The incomplete Draft EIS as presented will most likely result in an uninformed decision concerning pipeline routing that will significantly increase the risks to the public and the environment.

[3] Canadian pipeline integrity management approaches differ from U.S. pipeline integrity management regulatory approaches. For example, in Canada HCAs are not utilized nor defined in their pipeline safety regulations or standards.

2. **Based on extensive pipeline rupture investigations, the consequence assessment simplifications, attempting to deal with a large oil release, in all probability are understating the oil release consequences for various Line 3 route proposals.**

The Draft EIS identifies seven specific release locations that were investigated and claims that these sites along with 42 representative release scenarios can be used to characterize risk assessment for potential large oil releases and their fate, or affects for the possible Line 3 preferred or alternate routes.[4] The study apparently is trying to avoid modeling a wide range of water body types/situations should oil be spilled into them. One of the critical factors that can affect new pipeline route selection, relates to the amount of oil that can be released into the sensitive waters, which can vary considerably by route. The technical parameters identified in Section 1 above are critical to verifying if the claimed pipeline potential release volumes are reasonable. It should be noted that the oil release volumes have not been made public in the Draft EIS so no verification can be made as to the oil spill "simplification" assertions claimed in the Draft EIS documents. Without the additional technical details identified in Section 1, in my opinion, an EIS concerning an oil pipeline route selection is highly incomplete, even negligent.

I also need to comment on the attempt to characterize that new pipelines are somehow better than older more vintage pipelines. Even new modern steel pipelines are not invincible to introduction of various anomalies or imperfections that can grow and fail as a rupture at a later time. The explanation that pipeline threats fall into three major categories can be misleading and set up pipeline operators for a rupture failure.[5] One has to be very careful when using or applying industry standards as such standards require application of certain experiences that may not be identified in such references, even for those standards where only certain sections are incorporated by reference into federal pipeline safety regulation. For example, some of the most insidious pipeline threats are related to a family of so-called "third party damage" type threats that fail, usually as a rupture at a later date. One does not have to hit a pipeline to introduce such threats to a pipeline. The point being if pipeline operators start to believe their own stories about new pipelines being invincible, they avoid or shortcut the management processes intended to prevent pipeline failure. Even on new pipelines, especially on large pipeline projects involving billions of dollars, the pipeline management can lose control of their quality administration/quality control ("QA/QC") processes through the many lifecycle stages of a pipeline, that can render QA/QC ineffective

[4] Stantec Consulting Services Inc., RPS/ASA, Dynamic Risk Assessment Systems Inc. ("Stantec Report"), "Line 3 Replacement Project: Assessment of Accidental Releases: Technical Report," January 13, 2017, p. 1.10.
[5] Draft EIS, Chapter 10.1.2.1, "Threats to Crude Oil Transportation by Pipeline Systems," May 15, 2017, p. 10-6.

at avoiding introduction of anomalies to the pipeline, even new pipelines. Numerous failures have served as the initiator for U.S. integrity management regulatory development after too many pipeline rupture tragedies and the regulatory focus was not on just older more vintage pipelines for very good reasons.

3. **The portrayal that a pipeline failure "full bore rupture is an unlikely event" is extremely misleading.**[6]

I often see the argument that developing an oil release case as a full bore rupture is a "conservative" approach as it creates the misimpression that a full bore failure releases the greatest amount of oil that can be released on a pipeline. In reality, a rupture is a high rate pipeline release from a pipeline that has failed because of pipeline fracture mechanics forming a large opening in the pipe, usually fishmouth shaped for liquid pipelines, that have failed from anomalies in the pipe that have grown to defect size. Ruptures are high rate releases that can be very difficult to remotely identify depending on many factors associated with liquid compressibility, the systems hydraulic and elevation profiles, as well as mainline valve selection and placement. Liquid pipeline rupture releases usually lower the pressure curve of the pipeline segment, increasing the rate of oil release fed from both sides of the failure point, well above pump design pumping limits. These transient changes, as well as the impact of compressible hydrocarbon liquid unpacking in the mainline, make timely remote rupture identification very challenging. A liquid pipeline rupture can quickly release large volumes of oil depending on many factors. It is disingenuous to convey that rupture release volumes are bounded by full bore pipeline failure events. Liquid pipeline ruptures are not that uncommon and only a minority of ruptures are full bore, or guillotine like failures. Technically the statement may not be false, but it conveys a false level of safety.

For example, the July 1, 2011 ExxonMobil operated Silvertip Pipeline failed as a full bore or guillotine-like rupture caused by the Yellowstone River at flood stage uncovering the buried pipeline in an area of previously known river scouring (other nearby pipelines in the general area had previously ruptured from river forces). The uncovered thick pipe then failed from excessive vortex vibration created by the flowing floodwaters over a girth weld heat affected zone, or HAZ, resulting in a 360 degree circumferential crack failure and full bore release. The Silvertip Pipeline is basically an approximately 50-mile long pipeline flowing downhill, with the Yellowstone River crossing the pipeline's low point. Specially designed remote operated quick acting valves installed on the pipeline on either side of the Yellowstone River crossing were not commanded closed until considerable amounts of conventional crude oil

[6] Stantec Report., "Section 5.2.1 Full Bore Rupture is an Unlikely Event" January 13, 2017, p. 5.149.

had been released. This conventional oil spread over 80 miles downstream, and spill response plans were highly ineffective at oil containment during the flood stage. At that time the Silvertip Pipeline was known to also move dilbit. Had dilbit been in that pipeline river crossing at the time of the rupture, the spill cleanup would have, in all probability, replaced the Enbridge Line 6B Marshall, MI pipeline rupture as one of the most expensive onshore pipeline rupture oil spill cleanups in the U.S. In March 2013, ExxonMobil did experience a pipeline rupture on their Pegasus Pipeline in Mayflower, AR that released dilbit. That line remains down to this day.

4. **Failure probability or risk assessment analysis based on Canadian or U.S. federal pipeline safety reporting databases are fatally flawed for various reasons.**

I often see risk assessment approaches trying to utilize Canadian or U.S. pipeline safety databases to predict or assess the probability of future failure on a specific pipeline. Often such analyses utilize a normalization approach such as probability per mile of pipeline from a certain threat category. There are problems with such a simplistic approach. For one, there are considerable errors in the reported databases that even the regulator cannot correct. More importantly, the databases are not auditable, subject to independent verification that the files are truly accurate. For many reasons, historical PHMSA/OPS as well as Canadian pipeline database files can be inadequate and incomplete so as to make their use in assigning risk probability inappropriate or inadequate, for a specific pipeline operation, even with "normalization" attempts such as releases per pipeline mile. While PHMSA has made considerable attempts to make pipeline incident/accident information reported to the agency public, reports are often filed before sufficient information can be supplied to accurately complete a pipeline failure report. It is well known that numerous initial reports are not accurately updated. This can be especially problematic as to actual cause, or released volumes, which historically have been found to be inaccurate or misleading. In my experience, I have seen probability analysis abuses based on such databases on both sides of the fence, usually to drive false agendas or preordained conclusions about pipelines. These databases should be applied with great caution.

More importantly, it is not an incident database frequency that is relevant to a specific pipeline and its location, but the management approach utilized in the pipeline's siting, design, construction, operation, and maintenance of the system through its long lifecycle. This is one reason why in the early 2000s, U.S. federal integrity management pipeline safety regulation was implemented, after several pipeline rupture tragedies, to address major regulatory deficiencies observed from too many pipeline rupture failures. Canadian regulations in this area, developed after U.S. efforts, do not emulate the U.S. regulations concerning integrity management approaches. While not specifically identified, U.S. federal pipeline integrity management regulation is especially focused on utilizing management

practices intended to prevent pipeline ruptures. Pipeline integrity management implementation in the U.S. is not an overly complex matter, but over the past fifteen years since its implementation it has met with mixed success in preventing pipeline ruptures.

While I can appreciate the allure to use probability risk analysis, such an approach is inappropriate in determining a pipeline route. Historical pipeline database files do not predict nor represent future risk probabilities on a specific pipeline system in a specific location. Other more important considerations should be utilized in routing decisions, and an EIS should incorporate these additional considerations such as those identified in Section 1 that are clearly missing in the Draft EIS.

5. **Routing pipelines to avoid HCAs misses the intent of such integrity management efforts in U.S. federal minimum pipeline safety regulations.**

There are currently over 200,000 miles of liquid transmission pipeline in the U.S. Over forty percent of this mileage involves pipelines that could affect HCAs as defined by that regulation. Although HCAs should be easily identified in possible pipeline routing decisions, the intent of HCAs was not to avoid such potential high consequence areas, but to ensure that multiple management processes were in play to prevent pipeline failure in such locations. Integrity management regulation mimics process safety management approaches on many fronts in that possible threats to pipeline integrity need to be identified, assessed in a timely/frequent manner, and addressed well before such threats or multiple threats that can interact, result in a pipeline failure, especially pipeline rupture. These various threats will be pipeline specific and depend on many factors such as location and environment and, importantly, the pipeline management approach.

6. **Dilbit oil spill risk and cleanup are not adequately addressed in the Draft EIS.**

The proposed new pipeline will be designed to move conventional crude oil as well as Canadian diluted bitumen or "dilbit." Such batch movement will complicate the remote monitoring and identification of possible pipeline releases, especially pipeline rupture. Pipeline route selection can play an important role in the ability of a pipeline operator to design a pipeline for more rapid rupture release detection. Despite attempts to misconvey the impression, dilbits are not likely to act like conventional heavy crude oil when spilled from a pipeline. The Stantec Report does not resolve whether a dilbit oil spill will sink or float, in a particular environment. This is an important consideration when addressing the risks and effectiveness of proposed oil spill response plans in/near sensitive waters. Dilbits can experience a wide range of compositions, even varying throughout the year, as the pipeline tariff specification are usually driven by viscosity maximums in which a gravity tariff specification plays a much lesser role on pipeline operation. Prudence would dictate that in

the absence of such clear demonstrable public agreement, a worst case oil spill scenario and response plan should be assumed for a dilbit release (that some dilbit will sink and other oil constituents will float on water, as demonstrated by the Enbridge Line 6B Marshall, MI rupture release). It should be mentioned that the worst case approach defined in federal pipeline oil spill response regulation (49CFR§194.105) does not adequately capture a worst case release from a pipeline rupture, and its associated transient release dynamics that substantially increase release rates well above pumping design rates.

7. The Draft EIS fails to address the major pipeline route alternatives to the proper level of analysis and review.

The Draft EIS presents six possible major pipeline route alternatives (Applicant's preferred, RA-03, SA-04, RA-06, RA-07, & RA-08) as well as a series of minor possible reroutes.[7] While these figures attempt to identify sensitive HCA receptors that might be near the various proposed major routes, the figures do not adequately present all the major routes (i.e., SA-04) to permit a full comparison. None of the route descriptions provide the information identified in Section 1 above which are needed to make an informed pipeline routing decision. Pipeline routing decisions should be based on a more complete EIS, not the incomplete Draft EIS.

8. Pinhole releases.

Because the Draft EIS mentions "pinhole" releases, Accufacts has been asked to briefly comment on such release events.[8] Pinhole releases are usually slow rate oil leaks that can still cause great environmental damage depending on their location and time to eventually detect. Such pipeline releases have been getting more attention in pipeline operation because:

1) such releases through minor holes or small cracks are almost impossible to remotely detect via internal (SCADA) leak detection systems,
2) external leak detection currently applied on limited pipeline mileage in highly sensitive areas has a very mixed bag of success,
3) the released oil doesn't always rise to the surface of the pipeline right-of-way, making identification by patrol surveillance unreliable, and

[7] Draft EIS, Chapter 10, "Figures 10.4-2 through 10.4-9," May 15, 2017.
[8] Draft EIS, Chapter 10.2.4.2.2, "Pinhole Leak Analysis for the Applicant's Preferred Route and Certificate of Need Pipeline Alternatives," May 15, 2017, p. 10-20.

4) such pinhole anomalies aren't always identifiable by current inline inspection technology ("ILI" or smart pigs), or other means of technical detection such as sound balls that are passed internally in a pipeline, or pressure loss.

As discussed in Section 4 above, the probability of a pipeline system incurring pinhole leaks is very pipeline specific, with a lower probability more likely in new pipelines that have incorporated certain protocols such as: welding QA/QC procedures and radiological inspection into their new pipeline construction, implementing hydrotesting protocols not spelled out in current U.S. hydrotesting regulations, and avoiding, as required in federal regulations, stray current interactions that can cause pipeline metal loss. Such protocols, in excess of federal regulations and industry standards, may not be implemented by a pipeline management focused on getting a new multibillion dollar pipeline project quickly into operation. With such protocols in play, however, a new pipeline is more likely not to develop pinhole leaks.

Conclusion

It is very important to recognize that risks assessment approaches provided in the Draft EIS are not codified in U.S pipeline federal safety regulations for very good reasons. The attempts to characterize or quantify pipeline risks as low risks can be very reckless, especially if such attempts are based on databases that don't represent a particular pipeline's management approaches or location. The introduction of various threats that can result in a release can be very pipeline specific even for new pipelines. Attempts to normalize pipeline risks per year, per mile, etc., on such systems may not adequately capture risks that can vary considerably through a pipeline's long life cycle or the very long life of the project. Pipeline project life can easily exceed many decades, well beyond 50 years, if not indefinitely.

A previous Accufacts report discussing the various life cycle stages of a pipeline, while focused on gas transmission pipelines, also applies to liquid transmission pipelines.[9] This referenced report illustrates how the various stages of a pipeline's lifecycle can introduce different threats that can result in failure over its long life if mismanaged. Such threats can be especially critical if attempts to characterize pipeline risks as low risk miss or ignore that inappropriate management approaches can prove unsuccessful at addressing various risks at different stages. The cracking risks on the existing current Line 3 that have resulted in significant reduction in maximum operating pressure, or MOP, illustrate this point. Such shortcutting can be particularly problematic if decision makers and management start to believe their own story of low risks and

[9] Accufacts Inc., "Increasing MAOP on Gas Transmission Pipelines," March 31, 2006 at http://www.pstrust.org.

fail to effectively implement management processes intended to prevent such threat introductions to a particular pipeline. Another classical example I am seeing in way too many pipeline rupture failure investigations is the over use or over reliance on ILI assessment tools to deal with pipeline threats that can result in pipeline failure, when the tool's technical capabilities have not adequately advanced, been publicly demonstrated with field verification digs, or used wisely to justify such dependence.

I have also observed, especially on multibillion dollar projects, all too often a focus to cut corners to rush such projects to operation to generate cash flow, which can result in understatement of risk that the public and the environment might ultimate have to bear for such shortsightedness. Even in such costly projects, the pipeline operator should be able to readily demonstrate to the public that they have the project under control during all its life cycle stages. In the case of a new Line 3, as presented in Section 1, the elevation and hydraulic profiles are at the core foundation of a prudent siting determination. From the above, it should be obvious that, concerning a new Line 3 pipeline routing selection, the Draft EIS is incomplete. Additional very critical information is needed and should be required for public review before the Minnesota Department of Commence proceeds with a pipeline route decision if it is determined a new Line 3 pipeline is warranted.

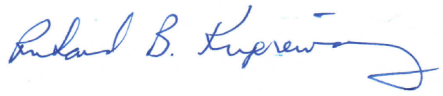

Richard B. Kuprewicz,
President,
Accufacts Inc.

Curriculum Vitae.

Richard B. Kuprewicz

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Profile:

As president of Accufacts Inc., I specialize in gas and liquid pipeline investigation, auditing, risk management, siting, construction, design, operation, maintenance, training, SCADA, leak detection, management review, emergency response, and regulatory development and compliance. I have consulted for various local, state and federal agencies, NGOs, the public, and pipeline industry members on pipeline regulation, operation and design, with particular emphasis on operation in unusually sensitive areas of high population density or environmental sensitivity.

Employment:

Accufacts Inc. **1999 – Present**

Pipeline regulatory advisor, incident investigator, and expert witness on all matters related to gas and liquid pipeline siting, design, operation, maintenance, risk analysis, and management.

Position: President
Duties:
> Full business responsibility
> Technical Expert

Alaska Anvil Inc. **1993 – 1999**

Engineering, procurement, and construction (EPC) oversight for various clients on oil production facilities, refining, and transportation pipeline design/operations in Alaska.

Position: Process Team Leader
Duties:
> Led process engineers group
> Review process designs
> Perform hazard analysis
> HAZOP Team leader
> Assure regulatory compliance in pipeline and process safety management

ARCO Transportation Alaska, Inc. **1991 - 1993**

Oversight of Trans Alaska Pipeline System (TAPS) and other Alaska pipeline assets for Arco after the Exxon Valdez event.

Position: Senior Technical Advisor
Duties:
> Access to all Alaska operations with partial Arco ownership
> Review, analysis of major Alaska pipeline projects

ARCO Transportation Co. **1989 – 1991**

Responsible for strategic planning, design, government interface, and construction of new gas pipeline projects, as well as gas pipeline acquisition/conversions.

Position: Manager Gas Pipeline Projects
Duties:
> Project management
> Oil pipeline conversion to gas transmission
> New distribution pipeline installation
> Full turnkey responsibility for new gas transmission pipeline, including FERC filing

Four Corners Pipeline Co. **1985 – 1989**

Managed operations of crude oil and product pipelines/terminals/berths/tank farms operating in western U.S., including regulatory compliance, emergency and spill response, and telecommunications and SCADA organizations supporting operations.

Position: Vice President and Manager of Operations
Duties:
> Full operational responsibility
> Major ship berth operations
> New acquisitions
> Several thousand miles of common carrier and private pipelines

Arco Product CQC Kiln **1985**

Operations manager of new plant acquisition, including major cogeneration power generation, with full profit center responsibility.

Position: Plant Manager
Duties:
> Team building of new facility that had been failing
> Plant design modifications and troubleshooting
> Setting expense and capital budgets, including key gas supply negotiations
> Modification of steam plant, power generation, and environmental controls

Arco Products Co. **1981 - 1985**

Operated Refined Product Blending, Storage and Handling Tank Farms, as well as Utility and Waste Water Treatment Operations for the third largest refinery on the west coast.

Position: Operations Manager of Process Services
Duties:
> Modernize refinery utilities and storage/blending operations
> Develop hydrocarbon product blends, including RFGs
> Modification of steam plants, power generation, and environmental controls
> Coordinate new major cogeneration installation, 400 MW plus

Arco Products Co. **1977 - 1981**

Coordinated short and long-range operational and capital planning, and major expansion for two west coast refineries.

Position: Manager of Refinery Planning and Evaluation
Duties:
> Establish monthly refinery volumetric plans
> Develop 5-year refinery long range plans
> Perform economic analysis for refinery enhancements
> Issue authorization for capital/expense major expenditures

Arco Products Co. **1973 - 1977**

Operating Supervisor and Process Engineer for various major refinery complexes.

Position: Operations Supervisor/Process Engineer
Duties:
> FCC Complex Supervisor
> Hydrocracker Complex Supervisor
> Process engineer throughout major integrated refinery improving process yield and energy efficiency

Qualifications:

Currently serving as a member representing the public on the federal Technical Hazardous Liquid Pipeline Safety Standards Committee (THLPSSC), a technical committee established by Congress to advise PHMSA on pipeline safety regulations.

Committee members are appointed by the Secretary of Transportation.

Served seven years, including position as its chairman, on the Washington State Citizens Committee on Pipeline Safety (CCOPS).

Positions are appointed by the governor of the state to advise federal, state, and local governments on regulatory matters related to pipeline safety, routing, construction, operation and maintenance.

Served on Executive subcommittee advising Congress and PHMSA on a report that culminated in new federal rules concerning Distribution Integrity Management Program (DIMP) gas distribution pipeline safety regulations.

As a representative of the public, advised the Office of Pipeline Safety on proposed new liquid and gas transmission pipeline integrity management rulemaking following the pipeline tragedies in Bellingham, Washington (1999) and Carlsbad, New Mexico (2000).

Member of Control Room Management committee assisting PHMSA on development of pipeline safety Control Room Management (CRM) regulations.

Certified and experienced HAZOP Team Leader associated with process safety management and application.

Education:

MBA (1976)	Pepperdine University, Los Angeles, CA
BS Chemical Engineering (1973)	University of California, Davis, CA
BS Chemistry (1973)	University of California, Davis, CA

Publications in the Public Domain:

1. "An Assessment of First Responder Readiness for Pipeline Emergencies in the State of Washington," prepared for the Office of the State Fire Marshall, by Hanson Engineers Inc., Elway Research Inc., and Accufacts Inc., and dated June 26, 2001.

2. "Preventing Pipeline Failures," prepared for the State of Washington Joint Legislative Audit and Review Committee ("JLARC"), by Richard B. Kuprewicz, President of Accufacts Inc., dated December 30, 2002.

3. "Pipelines - National Security and the Public's Right-to-Know," prepared for the Washington City and County Pipeline Safety Consortium, by Richard B. Kuprewicz, dated May 14, 2003.

4. "Preventing Pipeline Releases," prepared for the Washington City and County Pipeline Safety Consortium, by Richard B. Kuprewicz, dated July 22, 2003.

5. "Pipeline Integrity and Direct Assessment, A Layman's Perspective," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated November 18, 2004.

6. "Public Safety and FERC's LNG Spin, What Citizens Aren't Being Told," jointly authored by Richard B. Kuprewicz, President of Accufacts Inc., Clifford A. Goudey, Outreach Coordinator MIT Sea Grant College Program, and Carl M. Weimer, Executive Director Pipeline Safety Trust, dated May 14, 2005.

7. "A Simple Perspective on Excess Flow Valve Effectiveness in Gas Distribution System Service Lines," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated July 18, 2005.

8. "Observations on the Application of Smart Pigging on Transmission Pipelines," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated September 5, 2005.

9. "The Proposed Corrib Onshore System - An Independent Analysis," prepared for the Centre for Public Inquiry by Richard B. Kuprewicz, dated October 24, 2005.

10. "Observations on Sakhalin II Transmission Pipelines," prepared for The Wild Salmon Center by Richard B. Kuprewicz, dated February 24, 2006.

11. "Increasing MAOP on U.S. Gas Transmission Pipelines," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated March 31, 2006. This paper was also published in the June 26 and July 1, 2006 issues of the Oil & Gas Journal and in the December 2006 issue of the UK Global Pipeline Monthly magazines.

12. "An Independent Analysis of the Proposed Brunswick Pipeline Routes in Saint John, New Brunswick," prepared for the Friends of Rockwood Park, by Richard B. Kuprewicz, dated September 16, 2006.

13. "Commentary on the Risk Analysis for the Proposed Emera Brunswick Pipeline Through Saint John, NB," by Richard B. Kuprewicz, dated October 18, 2006.

14. "General Observations On the Myth of a Best International Pipeline Standard," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated March 31, 2007.

15. "Observations on Practical Leak Detection for Transmission Pipelines – An Experienced Perspective," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated August 30, 2007.

16. "Recommended Leak Detection Methods for the Keystone Pipeline in the Vicinity of the Fordville Aquifer," prepared for TransCanada Keystone L.P. by Richard B. Kuprewicz, President of Accufacts Inc., dated September 26, 2007.

17. "Increasing MOP on the Proposed Keystone XL 36-Inch Liquid Transmission Pipeline," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated February 6, 2009.

18. "Observations on Unified Command Drift River Fact Sheet No 1: Water Usage Options for the current Mt.

Redoubt Volcano threat to the Drift River Oil Terminal," prepared for Cook Inletkeeper by Richard B. Kuprewicz, dated April 3, 2009.

19. "Observations on the Keystone XL Oil Pipeline DEIS," prepared for Plains Justice by Richard B. Kuprewicz, dated April 10, 2010.

20. "PADD III & PADD II Refinery Options for Canadian Bitumen Oil and the Keystone XL Pipeline," prepared for the Natural Resources Defense Council (NRDC), by Richard B. Kuprewicz, dated June 29, 2010.

21. "The State of Natural Gas Pipelines in Fort Worth," prepared for the Fort Worth League of Neighborhoods by Richard B. Kuprewicz, President of Accufacts Inc., and Carl M. Weimer, Executive Director Pipeline Safety Trust, dated October, 2010.

22. "Accufacts' Independent Observations on the Chevron No. 2 Crude Oil Pipeline," prepared for the City of Salt Lake, Utah, by Richard B. Kuprewicz, dated January 30, 2011.

23. "Accufacts' Independent Analysis of New Proposed School Sites and Risks Associated with a Nearby HVL Pipeline," prepared for the Sylvania, Ohio School District, by Richard B. Kuprewicz, dated February 9, 2011.

24. "Accufacts' Report Concerning Issues Related to the 36-inch Natural Gas Pipeline and the Application of Appleview, LLC Premises: 7009 and 7010 River Road, North Bergen, NJ," prepared for the Galaxy Towers Condominium Association Inc., by Richard B. Kuprewicz, dated February 28, 2011.

25. "Prepared Testimony of Richard B. Kuprewicz Evaluating PG&E's Pipeline Safety Enhancement Plan," submitted on behalf of The Utility Reform Network (TURN), by Richard B. Kuprewicz, Accufacts Inc., dated January 31, 2012.

26. "Evaluation of the Valve Automation Component of PG&E's Safety Enhancement Plan," extracted from full testimony submitted on behalf of The Utility Reform Network (TURN), by Richard B. Kuprewicz, Accufacts Inc., dated January 31, 2012, Extracted Report issued February 20, 2012.

27. "Accufacts' Perspective on Enbridge Filing to NEB for Modifications on Line 9 Reversal Phase I Project," prepared for Equiterre Canada, by Richard B. Kuprewicz, Accufacts Inc., dated April 23, 2012.

28. "Accufacts' Evaluation of Tennessee Gas Pipeline 300 Line Expansion Projects in PA & NJ," prepared for the Delaware RiverKeeper Network, by Richard B. Kuprewicz, Accufacts Inc., dated June 27, 2012.

29. "Impact of an ONEOK NGL Pipeline Release in At-Risk Landslide and/or Sinkhole Karst Areas of Crook County, Wyoming," prepared for landowners, by Richard B. Kuprewicz, Accufacts Inc., and submitted to Crook County Commissioners, dated July 16, 2012.

30. "Impact of Processing Dilbit on the Proposed NPDES Permit for the BP Cherry Point Washington Refinery," prepared for the Puget Soundkeeper Alliance, by Richard B. Kuprewicz, Accufacts Inc., dated July 31, 2012.

31. "Analysis of SWG's Proposed Accelerated EVPP and P70VSP Replacement Plans, Public Utilities Commission of Nevada Docket Nos. 12-02019 and 12-04005," prepared for the State of Nevada Bureau of Consumer Protection, by Richard B. Kuprewicz, Accufacts Inc., dated August 17, 2012.

32. "Accufacts Inc. Most Probable Cause Findings of Three Oil Spills in Nigeria," prepared for Bohler Advocaten, by Richard B. Kuprewicz, Accufacts Inc., dated September 3, 2012.

33. "Observations on Proposed 12-inch NGL ONEOK Pipeline Route in Crook County Sensitive or Unstable Land Areas," prepared by Richard B. Kuprewicz, Accufacts Inc., dated September 13, 2012.

34. "Findings from Analysis of CEII Confidential Data Supplied to Accufacts Concerning the Millennium Pipeline Company L.L.C. Minisink Compressor Project Application to FERC, Docket No. CP11-515-000," prepared by Richard B. Kuprewicz, Accufacts Inc., for Minisink Residents for Environmental Preservation and Safety (MREPS), dated November 25, 2012.

35. "Supplemental Observations from Analysis of CEII Confidential Data Supplied to Accufacts Concerning Tennessee Gas Pipeline's Northeast Upgrade Project," prepared by Richard B. Kuprewicz, Accufacts Inc., for Delaware RiverKeeper Network, dated December 19, 2012.

36. "Report on Pipeline Safety for Enbridge's Line 9B Application to NEB," prepared by Richard B. Kuprewicz, Accufacts Inc., for Equiterre, dated August 5, 2013.

37. "Accufacts' Evaluation of Oil Spill Joint Investigation Visit Field Reporting Process for the Niger Delta Region of Nigeria," prepared by Richard B. Kuprewicz for Amnesty International, September 30, 2013.

38. "Accufacts' Expert Report on ExxonMobil Pipeline Company Silvertip Pipeline Rupture of July 1, 2011 into the Yellowstone River at the Laurel Crossing," prepared by Richard B. Kuprewicz, November 25, 2013.

39. "Accufacts Inc. Evaluation of Transco's 42-inch Skillman Loop submissions to FERC concerning the Princeton Ridge, NJ segment," prepared by Richard B. Kuprewicz for the Princeton Ridge Coalition, dated June 26, 2014, and submitted to FERC Docket No. CP13-551.

40. Accufacts report "DTI Myersville Compressor Station and Dominion Cove Point Project Interlinks," prepared by Richard B. Kuprewicz for Earthjustice, dated August 13, 2014, and submitted to FERC Docket No. CP13-113-000.

41. "Accufacts Inc. Report on EA Concerning the Princeton Ridge, NJ Segment of Transco's Leidy Southeast Expansion Project," prepared by Richard B. Kuprewicz for the Princeton Ridge Coalition, dated September 3, 2014, and submitted to FERC Docket No. CP13-551.

42. Accufacts' "Evaluation of Actual Velocity Critical Issues Related to Transco's Leidy Expansion Project," prepared by Richard B. Kuprewicz for Delaware Riverkeeper Network, dated September 8, 2014, and submitted to FERC Docket No. CP13-551.

43. "Accufacts' Report to Portland Water District on the Portland – Montreal Pipeline," with Appendix, prepared by Richard B. Kuprewicz for the Portland, ME Water District, dated July 28, 1014.

44. "Accufacts Inc. Report on EA Concerning the Princeton Ridge, NJ Segment of Transco's Leidy Southeast Expansion Project," prepared by Richard B. Kuprewicz and submitted to FERC Docket No. CP13-551.

45. Review of Algonquin Gas Transmission LLC's Algonquin Incremental Market ("AIM Project"), Impacting the Town of Cortlandt, NY, FERC Docket No. CP14-96-0000, Increasing System Capacity from 2.6 Billion Cubic Feet (Bcf/d) to 2.93 Bcf/d," prepared by Richard B. Kuprewicz, and dated Nov, 3, 2014.

46. Accufacts' Key Observations dated January 6, 2015 on Spectra's Recent Responses to FERC Staff's Data Request on the Algonquin Gas Transmission Proposal (aka "AIM Project"), FERC Docket No. CP 14-96-000) related to Accufacts' Nov. 3, 2014 Report and prepared by Richard B. Kuprewicz.

47. Accufacts' Report on Mariner East Project Affecting West Goshen Township, dated March 6, 2015, to Township Manager of West Goshen Township, PA, and prepared by Richard B. Kuprewicz.

48. Accufacts' Report on Atmos Energy Corporation ("Atmos") filing on the Proposed System Integrity Projects ("SIP") to the Mississippi Public Service Commission ("MPSC") under Docket No. 15-UN-049 ("Docket"), prepared by Richard B. Kuprewicz,

dated June 12, 2015.

49. Accufacts' Report to the Shwx'owhamel First Nations and the Peters Band ("First Nations") on the Trans Mountain Expansion Project ("TMEP") filing to the Canadian NEB, prepared by Richard B. Kuprewicz, dated April 24, 2015.

50. Accufacts Report Concerning Review of Siting of Transco New Compressor and Metering Station, and Possible New Jersey Intrastate Transmission Pipeline Within the Township of Chesterfield, NJ ("Township"), to the Township of Chesterfield, NJ, dated February 18, 2016.

51. Accufacts Report, "Accufacts Expert Analysis of Humberplex Developments Inc. v. TransCanada Pipelines Limited and Enbridge Gas Distribution Inc.; Application under Section 112 of the National Energy Board Act, R.S.C. 1985, c. N-7," dated April 26, 2016, filed with the Canadian Nation Energy Board (NEB).

52. Accufacts Report, " A Review, Analysis and Comments on Engineering Critical Assessments as proposed in PHMSA's Proposed Rule on Safety of Gas Transmission and Gathering Pipelines," prepared for Pipeline Safety Trust by Richard B. Kuprewicz, dated May 16, 2016.

53. Accufacts' Report on Atmos Energy Corporation ("Atmos") filing to the Mississippi Public Utilities Staff, "Accufacts Review of Atmos Spending Proposal 2017 – 2021 (Docket N. 2015-UN-049)," prepared by Richard B. Kuprewicz, dated August 15, 2016.

54. Accufacts Report, "Accufacts Review of the U.S. Army Corps of Engineers (USACE) Environmental Assessment (EA) for the Dakota Access Pipeline ("DAPL")," prepared for Earthjustice by Richard B. Kuprewicz, dated October 28, 2016.

55. Accufacts' Report on Mariner East 2 Expansion Project Affecting West Goshen Township, dated January 6, 2017, to Township Manager of West Goshen Township, PA, and prepared by Richard B. Kuprewicz.

FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENT "T"

T-1 LaSalle Creek and Lakes Area Line 3 Map

Map of LaSalle Valley, LaSalle State Recreation and Scientific Natural Areas and Mississippi River region marked with proposed pipeline route

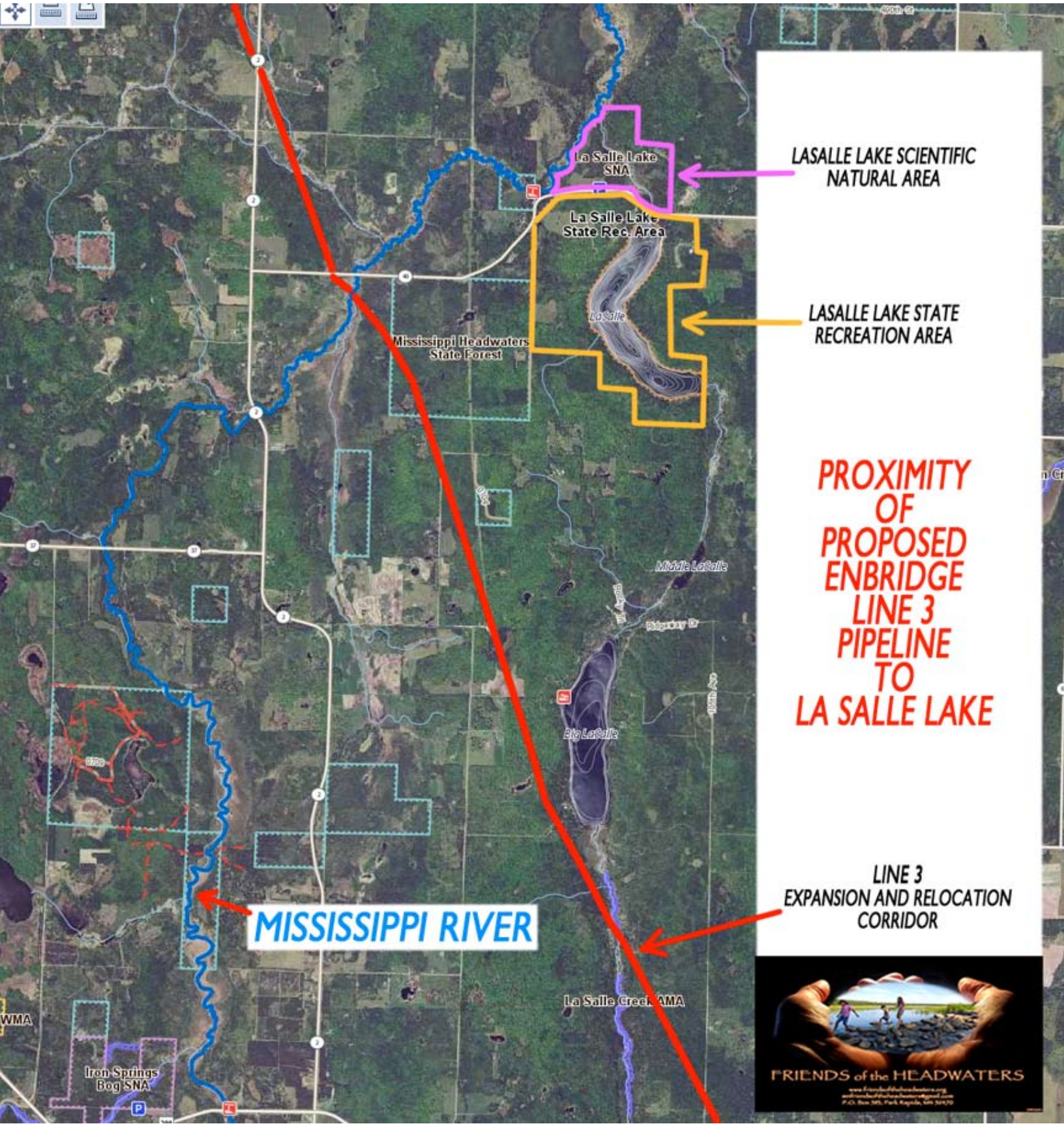
LASALLE LAKE SCIENTIFIC NATURAL AREA
LASALLE LAKE STATE RECREATION AREA
PROXIMITY OF PROPOSED ENBRIDGE LINE 3 PIPELINE TO LA SALLE LAKE
LINE 3 EXPANSION AND RELOCATION CORRIDOR
MISSISSIPPI RIVER
La Salle Lake SNA
La Salle Lake State Rec. Area
Mississippi Headwaters State Forest
Middle LaSalle
Big LaSalle
La Salle Creek WMA
Iron Springs Bog SNA
WMA
FRIENDS of the HEADWATERS

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RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENT "U"

U-1 Paul Stolen Curriculum Vitae

Summary of Experience, Friends of the Headwaters Consultant, Paul Stolen

SUMMARY OF EXPERIENCE OF FRIENDS OF THE HEADWATERS CONSULTANT PAUL STOLEN

Scientific and policy training. MS degree, fisheries and wildlife management. Published papers in major peer-reviewed journals prior to working in government. One year at the Walter Reed Army Institute of Research in Washington DC studying diseases under supervision of a civilian scientist, and one year doing medical diagnostic work at the US Army 9th Medical Laboratory in Vietnam.

Public policy experience.

•Studied EIS, NEPA, and MEPA policy at the HH Humphrey School of Public Affairs, University of Minnesota while also attending the University of Minnesota School of Journalism
•Staff assistant, Minnesota Citizens Advisory Committee on Power Plant Siting, which examining Minnesota's energy facility siting process.
•Staff work at the Minnesota Legislature Science and Technology Project, including staff for a Joint Committee on Solid and Hazardous Waste, general staff work, and writing a program review of that project.
•In charge of a major re-write of the environmental portion of rules implementing the Montana Major Facility Siting Act. These rules, administered by the Montana Department of Natural Resources and Conservation (Montana DNRC), covered energy impact and permitting for energy facilities, linear facilities such as oil pipelines and HVTL lines. As part of this re-write, I surveyed all US states and Canadian provinces that had EIS rules and siting rules for linear and fixed locations facilities to incorporate measures into the new rules.
•Developing policy about pipelines and studying impacts of pipelines for the State of Montana,
•Developing scientific basis for adoption of a Montana regulation setting the setback distance for residences from large HVTL lines.
•Providing technical testimony in court and in legal depositions concerning impacts to natural resources.

Direct experience with about 15 pipeline projects as a private citizen and while working for the Montana Department of Natural Resources and Conservation and Minnesota Department of Natural Resources.

•Union laborer on the bending crew during construction of when a segment of Line 3 was built in 1963.
•Assistant Project Manager , then Project Manager, responsible for preparing an EIS on the Northern Border Gas Pipeline, a 42 inch pipeline crossing 180 miles of NE Montana
•Author, air quality and noise sections of the Northern Border EIS
•Assistant Project Manager of the Montana Interagency Pipeline Task Force (IPTF). A task force created by the Governor of Montana to address the construction of the Northern Border and Northern Tier pipelines.
•Montana Environmental Inspector during construction of the Northern Border pipeline.
•Author, IPTF report entitled "*Construction of the Northern Board Pipeline in Montana.*" This report was a response to the large underestimation by the company of the land requirements for the pipeline.
•Supervisor and primary author of an EIS on a Great Falls to Butte 16 inch gas pipeline.
•Project manager of the initial stages of preparing an EIS on an Exxon carbon dioxide pipeline from Wyoming to North Dakota
•Responsible for writing portion of rules of Major Facility Siting Act concerning pipeline siting and impacts
•Involvement in several water diversion projects that partially involved water pipelines.
•Montana state contact for in-state and out-of-state business and policy questions on pipelines.
•Primary reviewer of several pipeline projects in Minnesota during 1990s regarding ecological and fisheries and wildlife impacts. These included a 24 inch Viking natural gas pipeline and an Enbridge looping project in its Mainline Corridor. (Minnesota DNR)
•Primary reviewer of the Alliance Pipeline in 1999, a large gas pipeline.
•Staff role of providing training for MDNR staff reviewing pipelines out of my work area.

•Primary reviewer of a 110 miles long new 36-inch Enbridge pipeline between Clearbrook, Minnesota, and Superior, Wisconsin, the Terrace pipeline expansion project.
•Lead reviewer for ecological, fish and wildlife, and wetland impacts during the permitting process for the MinnCan pipeline, a Koch company pipeline from Clearbrook to the refineries south of St. Paul. During the regulatory review, I was the primary author of MDNR comments to the PUC regarding the CEA. During construction, I was the environmental inspector reporting to DNR officials in charge of those subjects.
•Lead reviewer for ecological, fish and wildlife, wetlands, and rare species topics during the regulatory review of Enbridge's Alberta Clipper and Southern Lights projects.
•Environmental inspector during construction of about six pipeline projects in Montana and Minnesota.
•Review of Enbridge's Sandpiper and Line 3 projects, as a retired citizen prior to becoming an advisor to Friends of the Headwaters. These activities started in 2014.

Work experience in environmental review or government policy positions aside from work in the MN Legislature and State Planning Agency.

•Special Project's Manager for Montana DRNC. Aside from pipelines, this was primarily focused on environmental review topics and projects. Types of projects reviewed included water diversions, HVTL siting and impact reviews, wind projects, water diversions for irrigation, hydroelectric and irrigation dams, and coal-fired power plants. It also involved close coordination with other state and federal agencies, Native American tribes, and the Bonneville Power Administration
•Employee, BRW, Inc. transportation and architectural firm in Minneapolis. I worked in the environmental section reviewing various development projects such as roads, and large housing and business developments. Lead person on a contract with the White Earth Tribal Council to prepare a report on high level nuclear waste.
•Environmental Planner, MDNR, St. Paul, MN. This position in the Ecological Services Division involved legislative coordination with DNR leaders, re-working a budget system for the Wildlife Division, and preparation of strategic, long range, and species plans.
•Environmental review lead for 19 years in the NW Region of the DNR responsible for 24 counties. Projects reviewed were wide ranging, such as large lakeshore urban developments, highways, flood control storage dams and projects, wind projects, interstate water diversions, release of genetically modified organisms, wetland drainage and other projects damaging wetlands, proposals to control urban runoff, sites with hazardous waste and toxic chemicals, large gravel pits, wetland restoration projects, dam removal projects, hydro dams, large irrigation projects using wells potentially affecting trout stream habitat, and so forth.

Examples of special studies and large projects participated in or supervised that involved some form of environmental review.

•Supervisor of two large studies of the biological effects of electromagnetic fields of High Voltage Transmission Lines, including developing scopes of work, finding a scientist to conduct the study, and integrating into energy regulations in Montana. (Montana DNRC)
•Field review and preparation of an analysis of impacts of a large proposed irrigation diversion of the Marais River in Montana.
•As noted elsewhere, the IPTF review of pipeline construction in Montana.
•Preparation of a special report on a US Department of Energy a site search to locate a high-level nuclear waste repository in Minnesota. The client was the White Earth Indian Reservation
•Lead contact for the Minnesota DNR for certain topics during a large generic joint federal/state EIS on flood control impoundment projects.
•Report on effects of boat traffic and other impacts from a large housing development on a highly sensitive portion of Dead Lake, Ottertail County. (MDNR)
•Preparation of a methodology for addressing potential impact and risk from invasive biota escaping from the Devils Lake Basin into Canadian waters. This was used by the COE during preparation of it EIS on the Devils Lake outlet project. (MDNR)

•Lead for the DNR and Minnesota on the Technical Committee formed by the US Bureau of Reclamation to do an EIS on a proposal to divert a large amount of Missouri River water into the Hudson Bay drainage. Minnesota and Canadian concerns are, among others, a significant risk of damaging biota reaching Minnesota and Canadian waters. My responsibilities covered a ten year period, and included writing a number of extensive analyses for the MDNR, coordinating with the Manitoba and Canadian federal government, Canadian Consulate in Minneapolis, US Embassy y in Washington, several federal agencies, and the state of Missouri. In this role I conducted included a critique of the USGA biota risk assessment. (MDNR)
•Preparation of a 60 page report concerning potential methyl mercury impacts of the Polymet mine proposal as a review of the Draft EIS on the project (Done as a private citizen after retirement.)

Past involvement in past professional and non-profit organizations.

•Past president and board member of the Fish and Wildlife Employees Association, a professional organization within the Minnesota Department of Natural Resources.
•Past president and board member of the Minnesota Association of Conservation Professionals.
•Founding board member of the Minnesota Appropriate Technology Association, an NGO.
•President of the Helena Public Radio Association, Montana, an NGO.
•Board member of the People Connection, an NGO in Fosston MN

Paul Stolen, Retired
37603 370th Av. SE
Fosston, MN 56542, USA

Levi, Andrew (COMM)

From: rh smith <grizrs615@gmail.com>
Sent: Monday, July 10, 2017 2:19 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 DEIS Comments
Attachments: FOH DEIS Accufacts.pdf

Your attention to the attached is appreciated.

--
Richard Smith
President, Friends of the Headwaters (FOH)
218-699-3737 O
612-708-0908 C

https://www.friendsoftheheadwaters.org
https://www.facebook.com/savemississippiheadwaters

FRIENDS OF THE HEADWATERS

RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

Ms. Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Dear Ms. MacAlister,

The attached report was prepared at the request of Friends of the Headwaters.

"Accufacts Review of the Draft Environmental Impact Statement
For the Line 3 Pipeline Project Prepared
for the Minnesota Department of Commerce"

Richard Kuprewicz
President
Accufacts, Inc.
(CV attached)

Sincerely,

Richard Smith
President, FOH

Friends of the Headwaters
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Park Rapids, MN 56470
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www.facebook.com/savemississippiheadwaters

Accufacts Inc.
"Clear Knowledge in the Over Information Age"

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Date: July 9, 2017

To: Richard Smith
President
Friends of the Headwaters

To be filed electronically to: Pipeline.Comments@state.mn.us
Docket Nos. CN-14-916 & PPL-15-137

Re: Accufacts Review of the Draft Environmental Impact Statement for the Line 3 Pipeline Project Prepared for the Minnesota Department of Commerce

Accufacts Inc. ("Accufacts") was asked to perform a technical review of the Draft Environmental Impact Statement for the Line 3 Pipeline Project ("Draft EIS") prepared for the Minnesota Department of Commerce with a primary emphasis on Chapters 10 and 12 dealing with accidental crude oil releases and cumulative potential effects, respectively.[1] The Draft EIS attempts to analyze a proposed new 36-inch pipeline route to transport both conventional and dilbit crude oils. A new pipeline would replace the existing 34-inch Enbridge pipeline which is to be abandoned. The 34-inch pipeline is currently operating under a pressure reduction limitation because of numerous serious anomalies on that line that could lead to rupture if not remediated. U.S. federal minimum pipeline safety regulations do not permit permanent pipeline pressure reduction as an acceptable approach toward assuring pipeline integrity to avoid rupture, for various good reasons.[2] As outlined in further detail below, Accufacts finds the Draft EIS pipeline route analyses and comparisons woefully inadequate. Among other things, the Draft EIS fails to provide clear oil pipeline information needed for a complete release engineering analysis reflecting true oil pipeline hydraulics and release dynamics, especially pipeline rupture, for the presented possible pipeline routes. Such release volumes and their associated consequences can be instrumental in prudently selecting a new pipeline route. An attached CV outlines some of my extensive experience to comment on this pipeline matter.

In reviewing the Draft EIS, Accufacts has the following major observations:

1. **Critical pipeline technical information is missing concerning the various presented pipeline route options.**

[1] Posted at website https://mn.gov/commerce/energyfacilities/resource.html?id=34695.
[2] 49CFR§195.452(h)(1)(i) *Temporary pressure reduction*.

2622-1

In determining route options for a liquid pipeline, certain basic information is needed to evaluate the suitability of possible routes. The Draft EIS is missing this important critical technical information. Such critical pipeline route information is missing in the Draft EIS and should not be excluded from public review. For various route options an EIS should, for example, incorporate:

1. the pipeline elevation profile (approximate elevation vs approximate milepost, or "MP"),

2. a line indicating the Maximum Operating Pressure(s), or MOP(s), on the elevation profile,

3. a hydraulic profile at the design rate case for the control crude oil case (various additional rates may be included as well for large elevation changes) on the elevation profile,

4. location of mainline valves and their type of operation (e.g., manual, remote, automatic), as well as specific safety design if warranted,

5. general location/type of critical leak detection monitoring devices by milepost, and

6. identification by milepost range of High Consequence Areas, or HCAs.

With the exception of HCAs, the above noted information is often made public in Canadian pipeline filings to the National Energy Board, or NEB, the agency chartered with approval of interprovincial liquid transmission pipelines.[3] The above information is essential to permit an independent validation/determination of pipeline hydraulics, safety margins, and oil release volumes along the pipeline routes, and the pipeline's potential to influence sensitive receptors. None of the above information is provided for the route alternatives mentioned in the Draft EIS. The above technical information concerning route selection are details that many pipeline operators don't grasp, so it can be understandable if non-pipeline operators or engineers may not realize their importance in pipeline routing decisions. The incomplete Draft EIS as presented will most likely result in an uninformed decision concerning pipeline routing that will significantly increase the risks to the public and the environment.

[3] Canadian pipeline integrity management approaches differ from U.S. pipeline integrity management regulatory approaches. For example, in Canada HCAs are not utilized nor defined in their pipeline safety regulations or standards.

2622-2

2. **Based on extensive pipeline rupture investigations, the consequence assessment simplifications, attempting to deal with a large oil release, in all probability are understating the oil release consequences for various Line 3 route proposals.**

The Draft EIS identifies seven specific release locations that were investigated and claims that these sites along with 42 representative release scenarios can be used to characterize risk assessment for potential large oil releases and their fate, or affects for the possible Line 3 preferred or alternate routes.[4] The study apparently is trying to avoid modeling a wide range of water body types/situations should oil be spilled into them. One of the critical factors that can affect new pipeline route selection, relates to the amount of oil that can be released into the sensitive waters, which can vary considerably by route. The technical parameters identified in Section 1 above are critical to verifying if the claimed pipeline potential release volumes are reasonable. It should be noted that the oil release volumes have not been made public in the Draft EIS so no verification can be made as to the oil spill "simplification" assertions claimed in the Draft EIS documents. Without the additional technical details identified in Section 1, in my opinion, an EIS concerning an oil pipeline route selection is highly incomplete, even negligent.

2622-3

I also need to comment on the attempt to characterize that new pipelines are somehow better than older more vintage pipelines. Even new modern steel pipelines are not invincible to introduction of various anomalies or imperfections that can grow and fail as a rupture at a later time. The explanation that pipeline threats fall into three major categories can be misleading and set up pipeline operators for a rupture failure.[5] One has to be very careful when using or applying industry standards as such standards require application of certain experiences that may not be identified in such references, even for those standards where only certain sections are incorporated by reference into federal pipeline safety regulation. For example, some of the most insidious pipeline threats are related to a family of so-called "third party damage" type threats that fail, usually as a rupture at a later date. One does not have to hit a pipeline to introduce such threats to a pipeline. The point being if pipeline operators start to believe their own stories about new pipelines being invincible, they avoid or shortcut the management processes intended to prevent pipeline failure. Even on new pipelines, especially on large pipeline projects involving billions of dollars, the pipeline management can lose control of their quality administration/quality control ("QA/QC") processes through the many lifecycle stages of a pipeline, that can render QA/QC ineffective

[4] Stantec Consulting Services Inc., RPS/ASA, Dynamic Risk Assessment Systems Inc. ("Stantec Report"), "Line 3 Replacement Project: Assessment of Accidental Releases: Technical Report," January 13, 2017, p. 1.10.

[5] Draft EIS, Chapter 10.1.2.1, "Threats to Crude Oil Transportation by Pipeline Systems," May 15, 2017, p. 10-6.

2622-3 Cont'd

at avoiding introduction of anomalies to the pipeline, even new pipelines. Numerous failures have served as the initiator for U.S. integrity management regulatory development after too many pipeline rupture tragedies and the regulatory focus was not on just older more vintage pipelines for very good reasons.

2622-4

3. The portrayal that a pipeline failure "full bore rupture is an unlikely event" is extremely misleading.[6]

I often see the argument that developing an oil release case as a full bore rupture is a "conservative" approach as it creates the misimpression that a full bore failure releases the greatest amount of oil that can be released on a pipeline. In reality, a rupture is a high rate pipeline release from a pipeline that has failed because of pipeline fracture mechanics forming a large opening in the pipe, usually fishmouth shaped for liquid pipelines, that have failed from anomalies in the pipe that have grown to defect size. Ruptures are high rate releases that can be very difficult to remotely identify depending on many factors associated with liquid compressibility, the systems hydraulic and elevation profiles, as well as mainline valve selection and placement. Liquid pipeline rupture releases usually lower the pressure curve of the pipeline segment, increasing the rate of oil release fed from both sides of the failure point, well above pump design pumping limits. These transient changes, as well as the impact of compressible hydrocarbon liquid unpacking in the mainline, make timely remote rupture identification very challenging. A liquid pipeline rupture can quickly release large volumes of oil depending on many factors. It is disingenuous to convey that rupture release volumes are bounded by full bore pipeline failure events. Liquid pipeline ruptures are not that uncommon and only a minority of ruptures are full bore, or guillotine like failures. Technically the statement may not be false, but it conveys a false level of safety.

For example, the July 1, 2011 ExxonMobil operated Silvertip Pipeline failed as a full bore or guillotine-like rupture caused by the Yellowstone River at flood stage uncovering the buried pipeline in an area of previously known river scouring (other nearby pipelines in the general area had previously ruptured from river forces). The uncovered thick pipe then failed from excessive vortex vibration created by the flowing floodwaters over a girth weld heat affected zone, or HAZ, resulting in a 360 degree circumferential crack failure and full bore release. The Silvertip Pipeline is basically an approximately 50-mile long pipeline flowing downhill, with the Yellowstone River crossing the pipeline's low point. Specially designed remote operated quick acting valves installed on the pipeline on either side of the Yellowstone River crossing were not commanded closed until considerable amounts of conventional crude oil

[6] Stantec Report., "Section 5.2.1 Full Bore Rupture is an Unlikely Event" January 13, 2017, p. 5.149.

2622-4 Cont'd

had been released. This conventional oil spread over 80 miles downstream, and spill response plans were highly ineffective at oil containment during the flood stage. At that time the Silvertip Pipeline was known to also move dilbit. Had dilbit been in that pipeline river crossing at the time of the rupture, the spill cleanup would have, in all probability, replaced the Enbridge Line 6B Marshall, MI pipeline rupture as one of the most expensive onshore pipeline rupture oil spill cleanups in the U.S. In March 2013, ExxonMobil did experience a pipeline rupture on their Pegasus Pipeline in Mayflower, AR that released dilbit. That line remains down to this day.

2622-5

4. Failure probability or risk assessment analysis based on Canadian or U.S. federal pipeline safety reporting databases are fatally flawed for various reasons.

I often see risk assessment approaches trying to utilize Canadian or U.S. pipeline safety databases to predict or assess the probability of future failure on a specific pipeline. Often such analyses utilize a normalization approach such as probability per mile of pipeline from a certain threat category. There are problems with such a simplistic approach. For one, there are considerable errors in the reported databases that even the regulator cannot correct. More importantly, the databases are not auditable, subject to independent verification that the files are truly accurate. For many reasons, historical PHMSA/OPS as well as Canadian pipeline database files can be inadequate and incomplete so as to make their use in assigning risk probability inappropriate or inadequate, for a specific pipeline operation, even with "normalization" attempts such as releases per pipeline mile. While PHMSA has made considerable attempts to make pipeline incident/accident information reported to the agency public, reports are often filed before sufficient information can be supplied to accurately complete a pipeline failure report. It is well known that numerous initial reports are not accurately updated. This can be especially problematic as to actual cause, or released volumes, which historically have been found to be inaccurate or misleading. In my experience, I have seen probability analysis abuses based on such databases on both sides of the fence, usually to drive false agendas or preordained conclusions about pipelines. These databases should be applied with great caution.

More importantly, it is not an incident database frequency that is relevant to a specific pipeline and its location, but the management approach utilized in the pipeline's siting, design, construction, operation, and maintenance of the system through its long lifecycle. This is one reason why in the early 2000s, U.S. federal integrity management pipeline safety regulation was implemented, after several pipeline rupture tragedies, to address major regulatory deficiencies observed from too many pipeline rupture failures. Canadian regulations in this area, developed after U.S. efforts, do not emulate the U.S. regulations concerning integrity management approaches. While not specifically identified, U.S. federal pipeline integrity management regulation is especially focused on utilizing management

2622-5 Cont'd

practices intended to prevent pipeline ruptures. Pipeline integrity management implementation in the U.S. is not an overly complex matter, but over the past fifteen years since its implementation it has met with mixed success in preventing pipeline ruptures.

While I can appreciate the allure to use probability risk analysis, such an approach is inappropriate in determining a pipeline route. Historical pipeline database files do not predict nor represent future risk probabilities on a specific pipeline system in a specific location. Other more important considerations should be utilized in routing decisions, and an EIS should incorporate these additional considerations such as those identified in Section 1 that are clearly missing in the Draft EIS.

5. Routing pipelines to avoid HCAs misses the intent of such integrity management efforts in U.S. federal minimum pipeline safety regulations. 2622-6

There are currently over 200,000 miles of liquid transmission pipeline in the U.S. Over forty percent of this mileage involves pipelines that could affect HCAs as defined by that regulation. Although HCAs should be easily identified in possible pipeline routing decisions, the intent of HCAs was not to avoid such potential high consequence areas, but to ensure that multiple management processes were in play to prevent pipeline failure in such locations. Integrity management regulation mimics process safety management approaches on many fronts in that possible threats to pipeline integrity need to be identified, assessed in a timely/frequent manner, and addressed well before such threats or multiple threats that can interact, result in a pipeline failure, especially pipeline rupture. These various threats will be pipeline specific and depend on many factors such as location and environment and, importantly, the pipeline management approach.

6. Dilbit oil spill risk and cleanup are not adequately addressed in the Draft EIS.

2622-7

The proposed new pipeline will be designed to move conventional crude oil as well as Canadian diluted bitumen or "dilbit." Such batch movement will complicate the remote monitoring and identification of possible pipeline releases, especially pipeline rupture. Pipeline route selection can play an important role in the ability of a pipeline operator to design a pipeline for more rapid rupture release detection. Despite attempts to misconvey the impression, dilbits are not likely to act like conventional heavy crude oil when spilled from a pipeline. The Stantec Report does not resolve whether a dilbit oil spill will sink or float, in a particular environment. This is an important consideration when addressing the risks and effectiveness of proposed oil spill response plans in/near sensitive waters. Dilbits can experience a wide range of compositions, even varying throughout the year, as the pipeline tariff specification are usually driven by viscosity maximums in which a gravity tariff specification plays a much lesser role on pipeline operation. Prudence would dictate that in

2622-7
Cont'd

the absence of such clear demonstrable public agreement, a worst case oil spill scenario and response plan should be assumed for a dilbit release (that some dilbit will sink and other oil constituents will float on water, as demonstrated by the Enbridge Line 6B Marshall, MI rupture release). It should be mentioned that the worst case approach defined in federal pipeline oil spill response regulation (49CFR§194.105) does not adequately capture a worst case release from a pipeline rupture, and its associated transient release dynamics that substantially increase release rates well above pumping design rates.

7. The Draft EIS fails to address the major pipeline route alternatives to the proper level of analysis and review.

The Draft EIS presents six possible major pipeline route alternatives (Applicant's preferred, RA-03, SA-04, RA-06, RA-07, & RA-08) as well as a series of minor possible reroutes.[7] While these figures attempt to identify sensitive HCA receptors that might be near the various proposed major routes, the figures do not adequately present all the major routes (i.e., SA-04) to permit a full comparison. None of the route descriptions provide the information identified in Section 1 above which are needed to make an informed pipeline routing decision. Pipeline routing decisions should be based on a more complete EIS, not the incomplete Draft EIS.

8. Pinhole releases.

2622-8

Because the Draft EIS mentions "pinhole" releases, Accufacts has been asked to briefly comment on such release events.[8] Pinhole releases are usually slow rate oil leaks that can still cause great environmental damage depending on their location and time to eventually detect. Such pipeline releases have been getting more attention in pipeline operation because:

1) such releases through minor holes or small cracks are almost impossible to remotely detect via internal (SCADA) leak detection systems,
2) external leak detection currently applied on limited pipeline mileage in highly sensitive areas has a very mixed bag of success,
3) the released oil doesn't always rise to the surface of the pipeline right-of-way, making identification by patrol surveillance unreliable, and

[7] Draft EIS, Chapter 10, "Figures 10.4-2 through 10.4-9," May 15, 2017.
[8] Draft EIS, Chapter 10.2.4.2.2, "Pinhole Leak Analysis for the Applicant's Preferred Route and Certificate of Need Pipeline Alternatives," May 15, 2017, p. 10-20.

2622-8
Cont'd

4) such pinhole anomalies aren't always identifiable by current inline inspection technology ("ILI" or smart pigs), or other means of technical detection such as sound balls that are passed internally in a pipeline, or pressure loss.

As discussed in Section 4 above, the probability of a pipeline system incurring pinhole leaks is very pipeline specific, with a lower probability more likely in new pipelines that have incorporated certain protocols such as: welding QA/QC procedures and radiological inspection into their new pipeline construction, implementing hydrotesting protocols not spelled out in current U.S. hydrotesting regulations, and avoiding, as required in federal regulations, stray current interactions that can cause pipeline metal loss. Such protocols, in excess of federal regulations and industry standards, may not be implemented by a pipeline management focused on getting a new multibillion dollar pipeline project quickly into operation. With such protocols in play, however, a new pipeline is more likely not to develop pinhole leaks.

Conclusion

It is very important to recognize that risks assessment approaches provided in the Draft EIS are not codified in U.S pipeline federal safety regulations for very good reasons. The attempts to characterize or quantify pipeline risks as low risks can be very reckless, especially if such attempts are based on databases that don't represent a particular pipeline's management approaches or location. The introduction of various threats that can result in a release can be very pipeline specific even for new pipelines. Attempts to normalize pipeline risks per year, per mile, etc., on such systems may not adequately capture risks that can vary considerably through a pipeline's long life cycle or the very long life of the project. Pipeline project life can easily exceed many decades, well beyond 50 years, if not indefinitely.

A previous Accufacts report discussing the various life cycle stages of a pipeline, while focused on gas transmission pipelines, also applies to liquid transmission pipelines.[9] This referenced report illustrates how the various stages of a pipeline's lifecycle can introduce different threats that can result in failure over its long life if mismanaged. Such threats can be especially critical if attempts to characterize pipeline risks as low risk miss or ignore that inappropriate management approaches can prove unsuccessful at addressing various risks at different stages. The cracking risks on the existing current Line 3 that have resulted in significant reduction in maximum operating pressure, or MOP, illustrate this point. Such shortcutting can be particularly problematic if decision makers and management start to believe their own story of low risks and

[9] Accufacts Inc., "Increasing MAOP on Gas Transmission Pipelines," March 31, 2006 at http://www.pstrust.org.

fail to effectively implement management processes intended to prevent such threat introductions to a particular pipeline. Another classical example I am seeing in way too many pipeline rupture failure investigations is the over use or over reliance on ILI assessment tools to deal with pipeline threats that can result in pipeline failure, when the tool's technical capabilities have not adequately advanced, been publicly demonstrated with field verification digs, or used wisely to justify such dependence.

I have also observed, especially on multibillion dollar projects, all too often a focus to cut corners to rush such projects to operation to generate cash flow, which can result in understatement of risk that the public and the environment might ultimate have to bear for such shortsightedness. Even in such costly projects, the pipeline operator should be able to readily demonstrate to the public that they have the project under control during all its life cycle stages. In the case of a new Line 3, as presented in Section 1, the elevation and hydraulic profiles are at the core foundation of a prudent siting determination. From the above, it should be obvious that, concerning a new Line 3 pipeline routing selection, the Draft EIS is incomplete. Additional very critical information is needed and should be required for public review before the Minnesota Department of Commence proceeds with a pipeline route decision if it is determined a new Line 3 pipeline is warranted.

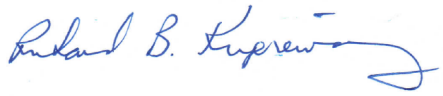

Richard B. Kuprewicz,
President,
Accufacts Inc.

Curriculum Vitae.

Richard B. Kuprewicz

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Profile: As president of Accufacts Inc., I specialize in gas and liquid pipeline investigation, auditing, risk management, siting, construction, design, operation, maintenance, training, SCADA, leak detection, management review, emergency response, and regulatory development and compliance. I have consulted for various local, state and federal agencies, NGOs, the public, and pipeline industry members on pipeline regulation, operation and design, with particular emphasis on operation in unusually sensitive areas of high population density or environmental sensitivity.

Employment:

Accufacts Inc. **1999 – Present**

Pipeline regulatory advisor, incident investigator, and expert witness on all matters related to gas and liquid pipeline siting, design, operation, maintenance, risk analysis, and management.

Position: President
Duties:
> Full business responsibility
> Technical Expert

Alaska Anvil Inc. **1993 – 1999**

Engineering, procurement, and construction (EPC) oversight for various clients on oil production facilities, refining, and transportation pipeline design/operations in Alaska.

Position: Process Team Leader
Duties:
> Led process engineers group
> Review process designs
> Perform hazard analysis
> HAZOP Team leader
> Assure regulatory compliance in pipeline and process safety management

ARCO Transportation Alaska, Inc. **1991 - 1993**

Oversight of Trans Alaska Pipeline System (TAPS) and other Alaska pipeline assets for Arco after the Exxon Valdez event.

Position: Senior Technical Advisor
Duties:
> Access to all Alaska operations with partial Arco ownership
> Review, analysis of major Alaska pipeline projects

ARCO Transportation Co. **1989 – 1991**

Responsible for strategic planning, design, government interface, and construction of new gas pipeline projects, as well as gas pipeline acquisition/conversions.

Position: Manager Gas Pipeline Projects
Duties:
> Project management
> Oil pipeline conversion to gas transmission
> New distribution pipeline installation
> Full turnkey responsibility for new gas transmission pipeline, including FERC filing

Four Corners Pipeline Co. **1985 – 1989**

Managed operations of crude oil and product pipelines/terminals/berths/tank farms operating in western U.S., including regulatory compliance, emergency and spill response, and telecommunications and SCADA organizations supporting operations.

Position: Vice President and Manager of Operations
Duties:
> Full operational responsibility
> Major ship berth operations
> New acquisitions
> Several thousand miles of common carrier and private pipelines

Arco Product CQC Kiln **1985**

Operations manager of new plant acquisition, including major cogeneration power generation, with full profit center responsibility.

Position: Plant Manager
Duties:
> Team building of new facility that had been failing
> Plant design modifications and troubleshooting
> Setting expense and capital budgets, including key gas supply negotiations
> Modification of steam plant, power generation, and environmental controls

Arco Products Co. **1981 - 1985**

Operated Refined Product Blending, Storage and Handling Tank Farms, as well as Utility and Waste Water Treatment Operations for the third largest refinery on the west coast.

Position: Operations Manager of Process Services
Duties:
> Modernize refinery utilities and storage/blending operations
> Develop hydrocarbon product blends, including RFGs
> Modification of steam plants, power generation, and environmental controls
> Coordinate new major cogeneration installation, 400 MW plus

Arco Products Co. **1977 - 1981**

Coordinated short and long-range operational and capital planning, and major expansion for two west coast refineries.

Position: Manager of Refinery Planning and Evaluation
Duties:
> Establish monthly refinery volumetric plans
> Develop 5-year refinery long range plans
> Perform economic analysis for refinery enhancements
> Issue authorization for capital/expense major expenditures

Arco Products Co. **1973 - 1977**

Operating Supervisor and Process Engineer for various major refinery complexes.

Position: Operations Supervisor/Process Engineer
Duties:
> FCC Complex Supervisor
> Hydrocracker Complex Supervisor
> Process engineer throughout major integrated refinery improving process yield and energy efficiency

Qualifications:

Currently serving as a member representing the public on the federal Technical Hazardous Liquid Pipeline Safety Standards Committee (THLPSSC), a technical committee established by Congress to advise PHMSA on pipeline safety regulations.

Committee members are appointed by the Secretary of Transportation.

Served seven years, including position as its chairman, on the Washington State Citizens Committee on Pipeline Safety (CCOPS).

Positions are appointed by the governor of the state to advise federal, state, and local governments on regulatory matters related to pipeline safety, routing, construction, operation and maintenance.

Served on Executive subcommittee advising Congress and PHMSA on a report that culminated in new federal rules concerning Distribution Integrity Management Program (DIMP) gas distribution pipeline safety regulations.

As a representative of the public, advised the Office of Pipeline Safety on proposed new liquid and gas transmission pipeline integrity management rulemaking following the pipeline tragedies in Bellingham, Washington (1999) and Carlsbad, New Mexico (2000).

Member of Control Room Management committee assisting PHMSA on development of pipeline safety Control Room Management (CRM) regulations.

Certified and experienced HAZOP Team Leader associated with process safety management and application.

Education:

MBA (1976)	Pepperdine University, Los Angeles, CA
BS Chemical Engineering (1973)	University of California, Davis, CA
BS Chemistry (1973)	University of California, Davis, CA

Publications in the Public Domain:

1. "An Assessment of First Responder Readiness for Pipeline Emergencies in the State of Washington," prepared for the Office of the State Fire Marshall, by Hanson Engineers Inc., Elway Research Inc., and Accufacts Inc., and dated June 26, 2001.

2. "Preventing Pipeline Failures," prepared for the State of Washington Joint Legislative Audit and Review Committee ("JLARC"), by Richard B. Kuprewicz, President of Accufacts Inc., dated December 30, 2002.

3. "Pipelines - National Security and the Public's Right-to-Know," prepared for the Washington City and County Pipeline Safety Consortium, by Richard B. Kuprewicz, dated May 14, 2003.

4. "Preventing Pipeline Releases," prepared for the Washington City and County Pipeline Safety Consortium, by Richard B. Kuprewicz, dated July 22, 2003.

5. "Pipeline Integrity and Direct Assessment, A Layman's Perspective," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated November 18, 2004.

6. "Public Safety and FERC's LNG Spin, What Citizens Aren't Being Told," jointly authored by Richard B. Kuprewicz, President of Accufacts Inc., Clifford A. Goudey, Outreach Coordinator MIT Sea Grant College Program, and Carl M. Weimer, Executive Director Pipeline Safety Trust, dated May 14, 2005.

7. "A Simple Perspective on Excess Flow Valve Effectiveness in Gas Distribution System Service Lines," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated July 18, 2005.

8. "Observations on the Application of Smart Pigging on Transmission Pipelines," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated September 5, 2005.

9. "The Proposed Corrib Onshore System - An Independent Analysis," prepared for the Centre for Public Inquiry by Richard B. Kuprewicz, dated October 24, 2005.

10. "Observations on Sakhalin II Transmission Pipelines," prepared for The Wild Salmon Center by Richard B. Kuprewicz, dated February 24, 2006.

11. "Increasing MAOP on U.S. Gas Transmission Pipelines," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated March 31, 2006. This paper was also published in the June 26 and July 1, 2006 issues of the Oil & Gas Journal and in the December 2006 issue of the UK Global Pipeline Monthly magazines.

12. "An Independent Analysis of the Proposed Brunswick Pipeline Routes in Saint John, New Brunswick," prepared for the Friends of Rockwood Park, by Richard B. Kuprewicz, dated September 16, 2006.

13. "Commentary on the Risk Analysis for the Proposed Emera Brunswick Pipeline Through Saint John, NB," by Richard B. Kuprewicz, dated October 18, 2006.

14. "General Observations On the Myth of a Best International Pipeline Standard," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated March 31, 2007.

15. "Observations on Practical Leak Detection for Transmission Pipelines – An Experienced Perspective," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated August 30, 2007.

16. "Recommended Leak Detection Methods for the Keystone Pipeline in the Vicinity of the Fordville Aquifer," prepared for TransCanada Keystone L.P. by Richard B. Kuprewicz, President of Accufacts Inc., dated September 26, 2007.

17. "Increasing MOP on the Proposed Keystone XL 36-Inch Liquid Transmission Pipeline," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated February 6, 2009.

18. "Observations on Unified Command Drift River Fact Sheet No 1: Water Usage Options for the current Mt.

Redoubt Volcano threat to the Drift River Oil Terminal," prepared for Cook Inletkeeper by Richard B. Kuprewicz, dated April 3, 2009.

19. "Observations on the Keystone XL Oil Pipeline DEIS," prepared for Plains Justice by Richard B. Kuprewicz, dated April 10, 2010.

20. "PADD III & PADD II Refinery Options for Canadian Bitumen Oil and the Keystone XL Pipeline," prepared for the Natural Resources Defense Council (NRDC), by Richard B. Kuprewicz, dated June 29, 2010.

21. "The State of Natural Gas Pipelines in Fort Worth," prepared for the Fort Worth League of Neighborhoods by Richard B. Kuprewicz, President of Accufacts Inc., and Carl M. Weimer, Executive Director Pipeline Safety Trust, dated October, 2010.

22. "Accufacts' Independent Observations on the Chevron No. 2 Crude Oil Pipeline," prepared for the City of Salt Lake, Utah, by Richard B. Kuprewicz, dated January 30, 2011.

23. "Accufacts' Independent Analysis of New Proposed School Sites and Risks Associated with a Nearby HVL Pipeline," prepared for the Sylvania, Ohio School District, by Richard B. Kuprewicz, dated February 9, 2011.

24. "Accufacts' Report Concerning Issues Related to the 36-inch Natural Gas Pipeline and the Application of Appleview, LLC Premises: 7009 and 7010 River Road, North Bergen, NJ," prepared for the Galaxy Towers Condominium Association Inc., by Richard B. Kuprewicz, dated February 28, 2011.

25. "Prepared Testimony of Richard B. Kuprewicz Evaluating PG&E's Pipeline Safety Enhancement Plan," submitted on behalf of The Utility Reform Network (TURN), by Richard B. Kuprewicz, Accufacts Inc., dated January 31, 2012.

26. "Evaluation of the Valve Automation Component of PG&E's Safety Enhancement Plan," extracted from full testimony submitted on behalf of The Utility Reform Network (TURN), by Richard B. Kuprewicz, Accufacts Inc., dated January 31, 2012, Extracted Report issued February 20, 2012.

27. "Accufacts' Perspective on Enbridge Filing to NEB for Modifications on Line 9 Reversal Phase I Project," prepared for Equiterre Canada, by Richard B. Kuprewicz, Accufacts Inc., dated April 23, 2012.

28. "Accufacts' Evaluation of Tennessee Gas Pipeline 300 Line Expansion Projects in PA & NJ," prepared for the Delaware RiverKeeper Network, by Richard B. Kuprewicz, Accufacts Inc., dated June 27, 2012.

29. "Impact of an ONEOK NGL Pipeline Release in At-Risk Landslide and/or Sinkhole Karst Areas of Crook County, Wyoming," prepared for landowners, by Richard B. Kuprewicz, Accufacts Inc., and submitted to Crook County Commissioners, dated July 16, 2012.

30. "Impact of Processing Dilbit on the Proposed NPDES Permit for the BP Cherry Point Washington Refinery," prepared for the Puget Soundkeeper Alliance, by Richard B. Kuprewicz, Accufacts Inc., dated July 31, 2012.

31. "Analysis of SWG's Proposed Accelerated EVPP and P70VSP Replacement Plans, Public Utilities Commission of Nevada Docket Nos. 12-02019 and 12-04005," prepared for the State of Nevada Bureau of Consumer Protection, by Richard B. Kuprewicz, Accufacts Inc., dated August 17, 2012.

32. "Accufacts Inc. Most Probable Cause Findings of Three Oil Spills in Nigeria," prepared for Bohler Advocaten, by Richard B. Kuprewicz, Accufacts Inc., dated September 3, 2012.

33. "Observations on Proposed 12-inch NGL ONEOK Pipeline Route in Crook County Sensitive or Unstable Land Areas," prepared by Richard B. Kuprewicz, Accufacts Inc., dated September 13, 2012.

34. "Findings from Analysis of CEII Confidential Data Supplied to Accufacts Concerning the Millennium Pipeline Company L.L.C. Minisink Compressor Project Application to FERC, Docket No. CP11-515-000," prepared by Richard B. Kuprewicz, Accufacts Inc., for Minisink Residents for Environmental Preservation and Safety (MREPS), dated November 25, 2012.

35. "Supplemental Observations from Analysis of CEII Confidential Data Supplied to Accufacts Concerning Tennessee Gas Pipeline's Northeast Upgrade Project," prepared by Richard B. Kuprewicz, Accufacts Inc., for Delaware RiverKeeper Network, dated December 19, 2012.

36. "Report on Pipeline Safety for Enbridge's Line 9B Application to NEB," prepared by Richard B. Kuprewicz, Accufacts Inc., for Equiterre, dated August 5, 2013.

37. "Accufacts' Evaluation of Oil Spill Joint Investigation Visit Field Reporting Process for the Niger Delta Region of Nigeria," prepared by Richard B. Kuprewicz for Amnesty International, September 30, 2013.

38. "Accufacts' Expert Report on ExxonMobil Pipeline Company Silvertip Pipeline Rupture of July 1, 2011 into the Yellowstone River at the Laurel Crossing," prepared by Richard B. Kuprewicz, November 25, 2013.

39. "Accufacts Inc. Evaluation of Transco's 42-inch Skillman Loop submissions to FERC concerning the Princeton Ridge, NJ segment," prepared by Richard B. Kuprewicz for the Princeton Ridge Coalition, dated June 26, 2014, and submitted to FERC Docket No. CP13-551.

40. Accufacts report "DTI Myersville Compressor Station and Dominion Cove Point Project Interlinks," prepared by Richard B. Kuprewicz for Earthjustice, dated August 13, 2014, and submitted to FERC Docket No. CP13-113-000.

41. "Accufacts Inc. Report on EA Concerning the Princeton Ridge, NJ Segment of Transco's Leidy Southeast Expansion Project," prepared by Richard B. Kuprewicz for the Princeton Ridge Coalition, dated September 3, 2014, and submitted to FERC Docket No. CP13-551.

42. Accufacts' "Evaluation of Actual Velocity Critical Issues Related to Transco's Leidy Expansion Project," prepared by Richard B. Kuprewicz for Delaware Riverkeeper Network, dated September 8, 2014, and submitted to FERC Docket No. CP13-551.

43. "Accufacts' Report to Portland Water District on the Portland – Montreal Pipeline," with Appendix, prepared by Richard B. Kuprewicz for the Portland, ME Water District, dated July 28, 1014.

44. "Accufacts Inc. Report on EA Concerning the Princeton Ridge, NJ Segment of Transco's Leidy Southeast Expansion Project," prepared by Richard B. Kuprewicz and submitted to FERC Docket No. CP13-551.

45. Review of Algonquin Gas Transmission LLC's Algonquin Incremental Market ("AIM Project"), Impacting the Town of Cortlandt, NY, FERC Docket No. CP14-96-0000, Increasing System Capacity from 2.6 Billion Cubic Feet (Bcf/d) to 2.93 Bcf/d," prepared by Richard B. Kuprewicz, and dated Nov, 3, 2014.

46. Accufacts' Key Observations dated January 6, 2015 on Spectra's Recent Responses to FERC Staff's Data Request on the Algonquin Gas Transmission Proposal (aka "AIM Project"), FERC Docket No. CP 14-96-000) related to Accufacts' Nov. 3, 2014 Report and prepared by Richard B. Kuprewicz.

47. Accufacts' Report on Mariner East Project Affecting West Goshen Township, dated March 6, 2015, to Township Manager of West Goshen Township, PA, and prepared by Richard B. Kuprewicz.

48. Accufacts' Report on Atmos Energy Corporation ("Atmos") filing on the Proposed System Integrity Projects ("SIP") to the Mississippi Public Service Commission ("MPSC") under Docket No. 15-UN-049 ("Docket"), prepared by Richard B. Kuprewicz,

dated June 12, 2015.

49. Accufacts' Report to the Shwx'owhamel First Nations and the Peters Band ("First Nations") on the Trans Mountain Expansion Project ("TMEP") filing to the Canadian NEB, prepared by Richard B. Kuprewicz, dated April 24, 2015.

50. Accufacts Report Concerning Review of Siting of Transco New Compressor and Metering Station, and Possible New Jersey Intrastate Transmission Pipeline Within the Township of Chesterfield, NJ ("Township"), to the Township of Chesterfield, NJ, dated February 18, 2016.

51. Accufacts Report, "Accufacts Expert Analysis of Humberplex Developments Inc. v. TransCanada Pipelines Limited and Enbridge Gas Distribution Inc.; Application under Section 112 of the National Energy Board Act, R.S.C. 1985, c. N-7," dated April 26, 2016, filed with the Canadian Nation Energy Board (NEB).

52. Accufacts Report, " A Review, Analysis and Comments on Engineering Critical Assessments as proposed in PHMSA's Proposed Rule on Safety of Gas Transmission and Gathering Pipelines," prepared for Pipeline Safety Trust by Richard B. Kuprewicz, dated May 16, 2016.

53. Accufacts' Report on Atmos Energy Corporation ("Atmos") filing to the Mississippi Public Utilities Staff, "Accufacts Review of Atmos Spending Proposal 2017 – 2021 (Docket N. 2015-UN-049)," prepared by Richard B. Kuprewicz, dated August 15, 2016.

54. Accufacts Report, "Accufacts Review of the U.S. Army Corps of Engineers (USACE) Environmental Assessment (EA) for the Dakota Access Pipeline ("DAPL")," prepared for Earthjustice by Richard B. Kuprewicz, dated October 28, 2016.

55. Accufacts' Report on Mariner East 2 Expansion Project Affecting West Goshen Township, dated January 6, 2017, to Township Manager of West Goshen Township, PA, and prepared by Richard B. Kuprewicz.

Levi, Andrew (COMM)

From: Jami Gaither <na112792@gmail.com>
Sent: Sunday, July 02, 2017 3:02 PM
To: MN_COMM_Pipeline Comments
Cc: Daniel Lee Gaither Husband
Subject: DEIS Public Comment - Jami Gaither

I was offended that the DEIS sounded in large part like a very cheery presentation from the conscientious, safety focused, public utility giant… Enbridge. Yes, there were statements and commentary from various groups that appeared to be concerned more with Mother Earth than the profits of a large corporation. But these were largely in the Appendices. In addition, when I asked Department of Commerce representative Jamie MacAlister whether Tribal Resources were being given priority consideration in the matter, I was assured they were NOT. WHAT?!? The right of people to live by their ways with regard to their food, water and spirituality took no bigger place in the decision than a company's desire to make some money? It does not seem to me that the needs of the citizens of Minnesota (and anyone downstream of us) are being given due consideration.

There is an ability to see where Enbridge concerns lie if you look at this passage (Appendix P, Volume 1, page 253). 1012-1

Environmental Justice Concerns:

During hearing before an Administrative Law Judge at St. Paul, Minnesota in January, 2015, Enb staff provide testimony and were questioned about the development of this pipeline and pipeline c is part of the public record, yet transcripts are not available. Specifically, the company considered alternate route of the pipeline going down Interstate 94 as too dangerous because of the possibilit failure and crude oil flooding the highway, causing accidents and it's routing through populated are Enbridge's preferred route place the pipeline is very close in proximity to two tribal communities: R Community in Clearwater County and East Lake/Sandy Lake Community in Aitkin County. These t communities are being told they should shoulder the entire risk of the pipeline (which was too dan place along Interstate 94 or larger, non□Indian communities).[8]. At a June 30th Environmental meeting sponsored by Minnesota PCA, the staff identified that Minnesota had subjected its population to environmental justice issues and they have born a disproportion of the envi issues[9]. This process must not continue that discrimination. We believe that this issue sh resolved long before any permits are added.

The main concerns are with infrastructure and inconvenience, not less dense human populations, food foraging environments, or birthing grounds of our migratory birds. In fact, they are more concerned about "crude oil flooding the highway, causing accidents" than how that crude oil flooding might affect the way of life for those of us who rely on wild rice and fresh fish as part of our diets.

While Enbridge calls this a Line 3 Replacement, it's in actuality a Dumping of the old Line 3 and an Addition of a new, bigger Line 3 through a new corridor. Did you know that while you can't leave a fuel tank buried in the ground long-term, we currently have no policy requiring the removal of an oil pipeline once it is no longer actively used? Why would we NOT require this dirty infrastructure be removed rather than leaving it for the

next generation to clean up? Again the main concerns are with infrastructure issues rather than clean water or wildlife and human impacts. (Appendix B, pg 14)

3.1 Risks Associated with Pipe Removal

Pipeline removal would create impacts to the environment, land use, and public
a new pipeline project. Environmental hazards associated with pipe removal a
disturbance of the soil, potential impacts to the groundwater, and potential im
activities, natural wildlife and vegetation. Reduced soil stability during and afte
also be a concern, as it can lead to increased localized erosion and destabilize
hazards may cause considerable disruption to ongoing and future land manag
These risks increase significantly during a large scale removal project.

Excavation of the Permanently Deactivated Line 3 will cause significar
landowners and the general public. Construction activities would restrict access
adjacent works areas. Removal operations at crossings would not onl
interruptions and restrictions, but soil stability issues caused by pipe removal cc
roads, bridges and crossings. These issues introduce risk to existing infrast
roadways, railways, and other utilities.

One of the greatest risks of removing a Permanently Deactivated pipeline
damaging adjacent pipelines or infrastructure, which can lead to significant publ
and operational impacts. The existing Line 3 currently shares a congested ROW
or six additional pipelines. Line 3 is located in the third position in roughly 75%
ROW corridor in Minnesota. In the U.S., the majority of Line 3 is within 7 to 18 fe
from the nearest adjacent, active pipeline. Given the proximity of Line 3 to
pipelines, removal increases the chance of a release from adjacent operational
either a line strike or by their fatigue due to the use of heavy equipment
activities.

Enbridge assures us that, if abandoned, the old line will be purged and cleaned. If it's done in any way similarly to the "clean-up" done in Kalamazoo, reason would predict low expectations of a thorough job. The inadequate work done by Enbridge to clean up oil spills should be considered when evaluating their proposed methodology for cleaning up their abandoned pipeline. Their integrity leaves much to be desired, so much so that to work with this corporation should be seen as illogical and foolish.

When you consider Enbridge's track record, it is just a matter of time before Minnesota has to deal with ANOTHER spill. We (Minnesota AND Enbridge) already hold the record for the largest inland spill in US History. http://www.grandrapidsmn.com/opinion/happy-anniversary-the-largest-inland-oil-spill-in-u-s/article_2ade2706-004f-11e7-9023-2b31a01741a6.html Now Enbridge is looking at running pipeline that carries substances they can't even reveal the nature of to us in the public. In addition, they want to run it in places where no pipeline has gone before, including many wetlands, creeks, and large rivers. I'm hopeful the powers that be in Minnesota come to their senses and refuse to allow this to happen.

Enbridge reports in the DEIS that they have all kinds of safety programs in place to prevent "accidental releases", their euphemism for oil spills. The report says there would be a 10- minute response time to stopping a leak. (Chapter 10, pg
98)

Chapter 10
Accidental Crude Oil Releases

10.5.2.3 Pipeline Spill Response Planning

Control of the Applicant's preferred route (or any of the pipeline alternative routes) would be incorporated into the existing Enbridge Supervisory Control and Data Acquisition system, which can automatically initiate pump station shutdowns to maintain safe operating pressures. Pipeline control operators also can manually initiate pipeline shutdown if abnormal conditions are suspected or observed. Enbridge enforces a "10-minute rule" that requires operators to shut down a pipeline within 10 minutes of observation of an abnormal condition that cannot be attributed to normal fluctuations in pressures and operating conditions.

In light of Enbridge's safety record, we need to not only consider what they propose to do but how they have done things in the past. How long did it take to respond to the leak alert on the Kalamazoo River oil spill, AKA The Dilbit Disaster? Ten minutes? Ah, no. It was slightly longer.

The first alert came on Sunday, July 25, 2010, at about 5:58 p.m. Eastern time when there was a rupture in Line 6B near Talmadge Creek, a tributary of the Kalamazoo River and a little more than a half mile downstream of the Marshall, Michigan pumping station. At first Enbridge ignored the alarm. Then the operators assumed it was a "bubble" in the line so they increased pressure (resulting in more oil spilling faster) for hours. So when did they finally believe the alarms and shut down the line? More than 17 hours later.

Yeah, let's just let that sink in for a moment. 17 HOURS. That's a LOT longer than 10 minutes. Regardless of what Enbridge claims they "will do", we know what they HAVE DONE and that needs a full review in the DEIS. A review for EVERY SINGLE SPILL. Enbridge has a worse track record than their competitors and this should be considered as we decide whether or not to grant a Certificate of Need to THIS corporation.

Also, knowing that it's only a matter of time before there is a release of Dilbit into our environment, should the State of MN decide to grant a Certificate of Need and/or Routing Permit on this project, we need to know exactly WHAT is in this Dilbit. It is illogical that a proper evaluation of the environmental impact of installing this line can be done if there is not full disclosure of the products that will be coursing through the pipeline and, should there be a failure, spreading into our natural world contaminating both land and water, animals and people. The National Science Foundation has already warned of the use of dilbit in areas with high moisture content (i.e., wetlands). Yes, much of the new proposed path lies in areas of wetlands. In addition, it's been 1012-2

noted that the density of dilbit means it will sink in water, not rise, so how are we to know when there is a release if it all stays at the bottom of the wetlands, creek or river?

If the MN Department of Commerce agrees that Enbridge has a need and allows the pipeline to be installed, the accountability for all spills will land on this Department. All lawsuits, all cleanup, all injuries and deaths, including those of plants and wildlife, would be the result of the Department of Commerce decision. When the pipeline leaks, and it will as all pipelines eventually leak, the State of Minnesota will hold all accountability.

It is far wiser to err on the side of caution, especially as the world has already reached peak oil - the hypothetical point in time when the global production of oil reaches its maximum rate, after which production will gradually decline. We are at the end of the fossil fuel era and any attempt to continue the pursuit of fossil fuels only prolongs the time until we make a transition to renewable energy. There will come a day when there is NO MORE to suck from the Earth and we humans will have to finally come to terms with the development of cleaner, safer sources of energy. We will either do it in a way that is planned or in a crisis, but we will eventually convert to renewables.

Minnesota needs to be a leader in this process. We need to show that hemp is another way to meet our energy needs. We've started that with recent legislation. If oil spills ruin our farmland, that will be a dead end. Not to mention the effect on our tourism industry. We need to continue the path of innovation and energy conservation and abandon the path of dirty oil. I say that Minnesota must, if morality is to brought to bear, act in the interest of clean water, healthy people, and safe environments. We need to say NO to another pipeline coming through our state. And we need to tell Enbridge it's time to remove the old Line 3 from the ground to assure we prevent ongoing and long-term contamination possibilities.

Thank you for your consideration.

Jami Gaither
25288 County 2
Shevlin, MN 56676

Levi, Andrew (COMM)

From: Daniel Gaither <na72687@gmail.com>
Sent: Sunday, July 09, 2017 2:39 PM
To: MN_COMM_Pipeline Comments
Subject: Comment on DEIS (docket numbers CN-14-916 and PPL-15-137)

7/7/17

To whom it may concern,

I am submitting the following comments regarding the Enbridge Line 3 DEIS (docket numbers CN-14-916 and PPL-15-137) in opposition to approval of the Enbridge Line 3 Replacement Tar Sands Pipeline Project. I feel that the current DEIS has fallen short in several key areas and believe the citizens of Minnesota deserve a higher level of professionalism from all state employees involved in this effort. The following paragraphs describe in detail the numerous flaws present within the current DEIS.

The citations throughout the DEIS are inconsistent in format, contain broken links, and cite non-existent sources such as "historicaltrauma.com" (Chapter 9 and Executive Summary). The citations are wholly unprofessional and inspire little confidence in the data presented, as well as obfuscating the legitimacy of the actual source material. On page 4 of Chapter 7, the DEIS lists the current Line 67 (Alberta Clipper) flow rate to be 570,000 bpd, which is incorrect. Line 67 has been operating at close to 800,000 bpd since 2014, which draws into question many of the subsequent calculations in the DEIS. The Environmental Justice and Tribal Resources chapters (11 and 9, respectively) are poorly cross-referenced and show a clear lack of cohesive analysis. 1332-1 1332-2

The spill analysis on pages 13-14 of Chapter 10 look at the probability of annual spills, when it would be more comprehensive and relevant to analyze the spill probability over the entire lifetime of the pipe. Page 18 of Chapter 10 claims that increased pressure as a result of higher flow rates in a pipeline has no effect on spill rates. This claim has no citation, and is highly disputable. The DEIS even states that corrosion is a primary cause of accidental release incidents (page 18, Chapter 10), without acknowledging that increased pressure and flow through a pipeline could contribute to corrosion. Chapter 10 contains no significant analysis of the increase to spill potential as pipelines become exposed over time (many of Enbridge's lines are currently above ground). Enbridge has designated the "worst-case" scenario spill data trade secret, so the public cannot review it (table 10.3-1 on page 36 of Chapter 12). The public should have access to information pertaining to serious releases of large quantities of oil into the waterways on which they rely, and be able to respond to that data. On page 45 of Chapter 10, the terrestrial wildlife at risk excludes pollinator species such as bees. Minnesota supports a significant number of pollinator species, whose populations are already stressed under multiple other environmental factors, and should therefore get additional scientific analysis - not be excluded. The description of effects on aquatic life (page 48 of Chapter 10) should include a more robust analysis of the impacts on algae, and the subsequent effects throughout an aquatic ecosystem. 1332-3

The rail alternative described on page 10 of Chapter 4 is unrealistic, economically infeasible, and not logically sound. It describes maintaining the pipeline on either side of the Minnesota border, and constructing brand new rail lines to transport the oil within the state. The analysis of rail as an alternative on page 13 of Chapter 4 does not account for the percentage of diluent needed to transport oil by pipeline, but not in rail cars, which would significantly change the volume of product to be moved. The trucking alternative described on page 17 of Chapter 4 outlines purchasing a new fleet of trucks (and replacing the entire fleet every five years) to make 4,000 trips per day in order to transport the oil across the state of Minnesota, while maintaining pipeline transportation outside Minnesota. This is absurdly unrealistic, poorly thought out, and not a serious alternative to pipeline transportation of oil. The DEIS does not consider the possibility of shutting down the current Line 3 pipeline and constructing no alternative, instead transporting the oil on other existing pipelines or phasing it down entirely. This option has been advocated by thousands of citizens and must be studied. It is also the most consistent with Minnesota's climate change mitigation goals. When the Keystone XL pipeline was denied, no oil by rail terminal was built at the international border. Today's oil prices are too low to sustain growth in the tar sands region of Canada. Exxon Mobil has admitted they have $3.4 billion dollars in tar sands oil fields that are not economically viable assets on their books in the current low price environment (below $50/barrel).

The DEIS states that the "social cost of carbon" -- an estimate of the financial burden on society due to increased climate change impacts -- of building the pipeline could be as high as $287 billion over a 30- year timespan (Chapter 5, page 443). This number is shockingly high, but a 30-year timeline is actually the shortest estimated lifespan of the pipe according to the DEIS, and many pipelines operate for over 60 years. In addition, people who are young adults right now will only be middle-aged in 30 years. The state must update the DEIS to include climate and cost modeling that assumes a 60-year lifespan or greater for the pipeline. (And obviously, we shouldn't even consider building something so costly to society!) The climate modeling does not contain a "partial displacement" scenario in which the new Line 3 takes on the old Line 3's oil while expanding by the proposed 370,000 additional barrels per day (bpd). It contains only "no displacement" and "full displacement" scenarios where the oil in the new line is either entirely in addition to existing flows or entirely offset by corresponding reductions on other pipelines (Chapter 5, page 442). 1332-4

The DEIS accepts Enbridge's word that the abandoned pipe would be monitored "indefinitely" by the company, 1332-5
without seeking further clarity on how long indefinitely means in this case or what the consequences would be for the state, private landowners, or tribal nations when Enbridge eventually stops maintaining the pipe (Chapter 8, page 3). The entire chapter on abandonment is only 13 pages out of a 5,547- page document, a surprisingly cursory overview given that pipeline abandonment is a major concern for many private landowners as well as the Leech Lake and Fond du Lac nations. The DEIS states concern on page 7 of Chapter 8 that Enbridge's cleaning method has only been proven successful on a 12-mile stretch of pipe, while the existing Line 3 in Minnesota is 282 miles long. "It is currently unknown whether Enbridge's protocol works on a longer length of 1332-6
pipeline." This seems like a critical piece of data to be included in the EIS, and the document will be incomplete without a better analysis. Page 8 of Chapter 10 states "Costs for future site-specific mitigation measures (e.g. to mitigate subsidence or loss of buoyancy control) are uncertain and would depend on the nature of the mitigation measures." While the immediate abandonment costs and annual monitoring costs are quantified, there is no estimate or commitment here for what Enbridge could be held responsible for in future mitigation and clean-up.

Enbridge is asking for a 750 foot wide "route width" across Minnesota. This width is equal to the length of two 1332-7
football fields! The DEIS (Chapter 2, page 1) is not clear on the difference between the terms "construction right-of-way and "construction workspace" and "ATWS (additional temporary work space)" and "construction

work area", so it's difficult to know how much land will be cleared. There is no way to really compare the SA-04 (southern alignment, proposed by citizens) or other alternatives, the DEIS says: "Construction for system alternative SA-04 would result in impacts of the same type, magnitude, and duration as discussed above for the Applicant's preferred route."

1332-8

Chapter 11 on "Environmental Justice" contains a GIS analysis based in poor methodology. Utilizing census tracts as the basis for the analysis is inconsistent with analyzing the actual movement of water within a watershed, which may extend to multiple census tracts. It also ignores that many people travel to utilize the potentially-impacted resources (such as wild rice), and negates the disproportionate use of certain resources by minority populations. The analysis of sex trafficking on page 10 of Chapter 11 is offensively inadequate and shows a lack of research or collaboration with impacted communities. The accompanying proposed solution is limited to "Enbridge can prepare and implement an education plan or awareness campaign around this issue with the companies and subcontractors that construct, restore, and operate the pipeline, as well as by working with local communities and tribal communities to raise awareness and provide resources to address the issue." This is clearly insufficient and lacks any systematic analysis of the problem. (Page 7 of Chapter 11 states) "In addition to the individual land use categories that would be affected by the routes, various waterbodies and streams would be crossed." However, there is no additional analysis of potential downstream environmental justice impacts.

If Enbridge's preferred route is permitted without our state agencies actually performing an independent analysis of the Environmental Impact (i.e. not just accepting the data drafted by Enbridge as valid); I submit that all individuals involved in this process be held liable and responsible for any subsequent damages to our great state due to negligence of their responsibilities as state employees.

Best regards,

Daniel L. Gaither

Shevlin, MN

--

"A frog in a well cannot be talked to about the sea." ~Chuang Tzu

Levi, Andrew (COMM)

From: Grant Garriott <glgarriott@outlook.com>
Sent: Tuesday, July 04, 2017 3:18 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

We are writing to comment about the draft Environmental Impact Statement for Enbridge's Line 3 pipeline.

We own property on both Big Sandy Lake and the Mississippi River. The proposed pipeline represents a clear danger to us in light of the horrible pipeline leakage record of the Enbridge Corporation.

The draft EIS is missing information about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the multi-billion-dollar fishing, tourism, and recreation (and related) industries in Minnesota? Does Enbridge's pipeline provide enough benefits for Minnesota to balance the risk? We don't see anything about this in the DEIS. There must be an economic analysis for the EIS to be complete. 1013-1

Related to this question, we understand that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state need* (not a national need). According to statistics about the national need, U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply needed oil. (http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf). The final EIS needs to address this.

Thank you,

Grant & Kathy Garriott

51130 207th PL

McGregor, MN 55760

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Mae Gibson Wall

Street Address: 4229 44th Ave. S.

City: Minneapolis State: MN Zip Code: 55406

Phone or Email: mae.gibson@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

- The EIS only analyzes impact on the environment for the next 30 years, when, if built, it would exist indefinitely. 0680-1
- There is no spill analysis for multiple rivers (including St. Louis River) that will be impacted & which could also impact the Mississippi River & Lake Superior. 0680-2 (& Nemadji River)
- The EIS does not address the impact on our vulnerable Native communities who would be adversely affected. The EIS neglects to address the structural and environmental racism that it would perpetuate.
- The section on effects on aquatic life does not include the impact on algae & other significant microorganisms.
- The EIS does not explicitly and sufficiently address global environmental impacts and greenhouse gas emissions.
- The EIS does not address the impact on the bee population, including risk to important pollinators.
- The EIS does not include analysis of cleaner energy alternatives.
- Chapter 9 - the EIS avoids drawing conclusions about the impacts on tribal people.

If including additional pages please number them and tell us how many you are providing: ___ *pages*

(1 additional page)

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Mae Gibson Wall, (continued)

Street Address: 4229 44th Ave. S.

City: Minneapolis State: MN Zip Code: 55406

Phone or Email: mae.gibson@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

11.4.1 • While the EIS acknowledges that "the addition of a temporary, cash-rich workforce increases the likelihood that sex trafficking or sexual abuse will occur," it DOES not state how it would address the significant problem beyond preparing "an education plan or awareness campaign." This is absolutely not a sufficient response to this problem.

• The "No Build" alternative is not sufficiently analyzed & considered. There is no discussion of renewable energy or conservation.

• The 7 sites chosen for spill modeling are not representative of the locations & resources put at risk along the entire corridor, including Lake Superior. 0680-3

• The risks of pipeline abandonment are not adequately assessed

• There is no discussion of exposed pipe, how fast it will corrode or how much currently buried pipe will become exposed once it is emptied.

• The DEIS does not discuss the unprecedented challenges of human casualty, displacement, conflict, natural disaster, & biodiversity loss that climate change is causing and how this will further the risk of Line 3.

If including additional pages please number them and tell us how many you are providing:_____ pages

MS. DAWN GOODWIN:

(indiscernible). My name is Dawn Goodwin. My Anishinaabe name is Gaagige yaashiik, G-A-A-G-I-G-E Y-A-A-S-H-I-I-K.

I stand before you today, I speak for many people, and I thank all of you that came here today. This is very important. I don't even know where to begin. I'm going to start with the Draft Environmental Impact Statement that was put out. I agree that it doesn't even barely -- it barely touches the surface of who we are as a people.

There's some part that stuck out with me as I was reading chapter 9 dedicated to the tribal resources. And as I was reading that, I come to one and it says, "Historically birch bark, cedar was used." I'm telling you, we are here. We're not a was. We are is. We use birch bark for our lodges, for our canoes,

0833-1

0833-2

for food serving, for whittling our wild rice in the traditional way. We use these things. We pick our medicines. We go out and harvest our foods.

Granted, right now I'm not doing that as much as I would really like to. On Sunday I could have been out picking birch bark, I could have went to the pow wow to celebrate life and each other.

But no, I was at home. I was reading the DEIS. I was reading this federal Indian law book, Federal Indian law, our 1855 treaty. Our treaties are the supreme law of the land. And it needs to be respected. Our people are hurting. We're tired of being stepped on. Look at when these first pipelines were put through, 1949, we're talking. We have two corridors of pipelines.

Where were our people then? Does anybody know? Other than the native people, we know. We know what was happening to our people then. We were being relocated.

So we're tired of this. These pipelines got to go through during that time. Our people couldn't defend themselves. They

didn't know that they are putting these pipelines through. My mom was eight years old in 1949. Did she have much of a voice? Probably not. She grew up in Bagley. I grew up in Bagley.

I want you to take -- look, we are in Clearwater County. Doesn't that resonate anything to you? Clearwater County. Three rivers start here. We have the Wild Rice River that flows south and west. That would mean crossed under by Enbridge pipeline.

We already worry about what are there from the Koch brothers.

There are spills there that haven't been cleaned up. We know this. There is a lady that had a spill back in 1980. It was never properly cleaned. And she may have settled out of court with the Koch brothers. We'll find out. I know it was up two years ago.

So we have Wild Rice River, which flows, and then to Mahnomen's source of drinking water. It goes through all our communities. Our children fish and swim in the river. We rice this in the fall. We pick

berries in July, right down from the Mississippi River where Enbridge would cross again. 0833-3

So here's another river that starts in Clearwater County; the Mississippi. That's considered the heart of Turtle Island. And you want to put a pipeline under that and also underneath the Clearwater River, which starts over -- was it First Lake or Third Lake there?

So we got three major rivers starting in Clearwater County, which would all be in danger of pipeline. Not to mention all the streams and creeks, not to mention the Continental Divide. So we got water going this way, water going that way.

We have rights. We have water rights. This book here tells us all about it, the rights we have. In Arizona they just won a water rights trial -- a case.

So as we gather, no, I'm not for this pipeline. It needs to be -- the old one needs to be taken out, and the new one does not need to exist. It's full of tar sand, which other people have said is very

carcinogenic.

I made lots of notes here. I looked at the Draft EIS, too, and I seen in there -- it was a misprint -- it said the Land of 1,000 lakes, so we need to make a change in that. We are the Land of 10,000 lakes. 0833-4

And I believe that the Certificate of Need should be denied because it would adversely affect us. The consequences to our society is less favorable.

And to also address, does the project comply with other laws? Well, like I said, 1855 treaty, the Clean Water Act. How about sulfate levels? Well, I guess we'll change the laws and try to irradicate those, or change the sulfide levels in the midst of all of this. It's wrong.

So we learn the rules of the game and then you change the rules while we're playing the game. That doesn't make sense.

I want to know how many -- how much oil is really used per day in our country. How much domestic oil do we use daily, how much imported oil is used on a daily basis, and what is this oil used for,

other than fuel for cars and buildings?

Are the alternatives to plastic being produced? Of course they're there. Are we using alternatives to plastic? 0833-5

We need to change as a people what we're choosing to do. And we need to figure out how to reduce the use of oil, not perpetuate the dependency upon it.

I want to speak about the section about climate change. Locally, we have noticed a drop in our water levels, and I'm going to mention the Buckboard Hills. The Buckboard Hills are on the eastern border of this pipeline.

Very important area, I don't know. It's considered a geologic anomaly, the Buckboard Hills. Do people know that? I don't know if they know that, but it is.

And a geological anomaly is considered because the glacier didn't scrape it away and pushed it up and stopped there and began to recede.

So in our Buckboard Hills, where many people still practice the traditional ways of gathering, hunting, they've noticed a

ten-feet drop in water in some of their lakes.

So speaking to climate change, we're seeing it. We've seen it as harvesters, the fluctuation and change. There's been years where we have bumper crops, various, and then the very next year, very few.

We talked also about -- also carbon trading credits. Canada doesn't have to do anything about their tar sand oil. They don't need to address it. It's dirty, very dirty oil, extreme extraction. Puts a lot of extra CO2 in the air. They don't have to because of carbon trading credits.

So I really encourage people to take the time to really understand the whole picture here. For instance, when I talk about the carbon trading credits, because Canada can say, "Well, we're doing this hydroelectric," so they're trading -- "so then we're cutting down on carbon."

So -- which makes it easy for them just to continue on with their tar sand project.

And another thing I want to mention is climate change. In the climate

change there was mention of some electromagnetic storms that take place, and this is a concern.

Also, we are a major flyway for birds, so the majority of our migratory bird population, they're born here in this area.

I also noticed what was missing, too, is there's no mention of endeavors for prairie restoration, wildlife habitat and water restoration.

Just down the river from where it crossed over by County 2 it says, "Save the Stream"; Coffee Pot Landing, "Save the Stream." I said, "Okay. I will save the stream."

All right, and thank you everyone for listening. I will -- I guess I promise I will write a statement, and I plan to attend other meetings. Thank you.

MS. DAWN GOODWIN: (Speaking Ojibwe.) My name is Dawn Goodwin, my English name. I come from White Earth. Yes, I come from that way. It doesn't mean that this isn't my home also. This is the 1855 Treaty area. My family lives here. My sister lives a mile away from the pipeline. My mother lives a mile away from the pipeline in Bagley.

So one concern that came to me that I did not address yesterday at our Rice Lake meeting was, if there was a spill, what about the exposure? What would my loved ones and my community people be exposed to that's lacking in this? It looks great, looks really thorough, whatnot; but it's a bunch of fluff.

And like Irene said, the chapter on tribal resources really -- it went in length about our history and treaties and whatnot, but -- and then it just got really loose at the end and thrown together and, oh, well, yeah, yeah, whatever. But from what I got out of that, at the end it says --

just kind of thrown together there that, oh, yeah, the natives think this way and they all think that way, and they don't really have much to say about this or that or whatnot, don't want to address, they're outside of the scope, blah, blah, blah.

And what I come from out of that is, yes, us native people, we're standing together. We have one voice, as we know we want to protect our environment and our people and our water, the animals, the air. We want to protect that. That's one voice, and we want you to hear that here.

Sure, you might not see a lot of our tribal members here. There wasn't a lot of tribal members at ours. And it makes me wonder, makes me worry. But whoever's supposed to be here tonight is here. And I want to explain a little bit maybe why they aren't here.

And there's a section there in the DEIS talking about the historical trauma. And I met this gentleman when we challenged the state on our ricing rights, which we did win. And he was talking about -- to a reporter about historical trauma. And he said what, historical trauma; that don't exist. And I looked at him, and I'm like what? He's like, no, it's not historical; we're still living it. So

now I'm calling that contemporary trauma.

We talked about this a little bit yesterday, that this is traumatizing to us. A lot of the people that I know that I want to come and be heard can't come here. It's too much. It's too emotional. So much anger. And to me this is traumatizing.

I vow to learn my language. I wanted to just put everything into learning my language. And then I started learning about tar sands and trade secrets and loopholes and whatnot. So I just had to combat that with doing my homework here about Line 3 and tar sands and combining that with my Anishinabe. That's the only way I could cope.

So, yeah, I'm being traumatized. I've been traumatized for many years now, just completely out of my mind. I have important work to do with my community. We have people dying from heroin overdoses, suicides. We just had a young girl two nights ago commit suicide. I can't be worried and so entrenched in trying to figure out how we're going to beat Enbridge and Line 3 when I have so much more important work to do. And it's really sad that my love and care for my people is being taken away because I have to concentrate on this.

So I say I'm speaking for many people. I'm part of a group called Anishinabe Nago. It's the gatherers, the berry pickers. We're gathering to save what we have left. So I represent them. I represent the gatherers, the harvesters. We're trying to continue our way of life, but this is impeding on it. And we don't want to stand for it anymore. We're not going to stand for it anymore. And I take solace in knowing that there are many people out there that have our backs. They know what's important in life. 0835-1

I'll talk a little bit more about some of the DEIS. Yeah, there -- it was lacking in information about tar sands and what kind of fumes and whatnot are coming from that. So I worry about my family members that live close by. But one thing I do notice, all the way from Clearbrook to Bagley to Bemidji, Cass Lake, BugONayGeShig School -- and I don't know if the schools further on -- they're all in the path of the pipeline. They're all next to it. Our children, if there's any spills, are going to be exposed to that.

And I felt also it was lacking the scientific knowledge of what bitumen is, what dilbit is, what's in it. And as I looked up some -- you

can't really find too much information as you're just generally going on the Internet about what is in tar sands because of trade secrets. But what I did find, it was like emulsifiers and -- which are probably chemicals, I imagine. And then they put water in there. Then it's an electric charge just to get the tar sands to flow through the line. So it's lacking some of that very important information.

Also, Enbridge, I believe that the certificate of need should not be granted. It should be denied because Enbridge cannot 100 percent guarantee that a major or minor dilbit spill will not happen. Now, I read that awhile back, when I was reading some criteria for certificates of need, and I couldn't find that. But I did notice at one time. And then when I went back to look for it, I couldn't find that. But, yeah, you can't 100 percent guarantee that there's not going to be a spill. So I believe that the certificate of need should be denied upon that.

And along with that, the failure of technology and human error has caused spills, and those are on fairly new pipelines. So I do not trust the technology.

Another thing I would like to mention is the Clearbrook hub. Not a very good idea, I don't think. And I hope a lot of other people agree with me.

I want to create an animal for you. Especially the Anishinaabemowin people, you'll get a vision in your head. This animal I created, it starts in Clearbrook. It's the Ezigaaginebigowi. That's a wood tick snake. Scary sounding, a wood tick snake. 0835-2

So with all that being said, a lot of people covered very many different facets here. We know that it's very poisonous. We know that it's going to harm the people in this region; not just the native people, but the people that live here. Here, you don't want to leave it in the ground.

We're asking for a full environmental impact study and removal of the old Line 3 in the 1855 area. We'd like an impact study done to the earth below that line. We want to know what's been going on there.

We also want a complete environmental impact study of the -- I'm not going to say replacement; I would say that would be a -- I lose my words sometimes -- a relocation of Line 3. It's

not a replacement. It's a relocation and a rebound.

MS. DAWN GOODWIN: All right. Just like yesterday, I like to talk. Surprisingly, I don't -- I'm not a talker. I don't like to be up here, but I need to be.

So directly or indirectly you'll be committing genocide, and it's negligent.

And for one last comment here, I want to talk about the Minnesota Pollution Control Agency. There's a mission here: Protect and improve the environment and enhance human health.

This is MPCA's mission statement, so you might want to listen. Their vision: Clean water, air, and land, support healthy communities and Eco systems and a strong economy in Minnesota.

Core values: Number one, people. We value and support a motivated, talented, and diverse workforce. Hashtag, PCA people.

Leadership: We set a vision of environmental and human health protection in an open, ethical, and accountable manner. Hashtag, PCA leads.

And then the next one is

collaboration -- I'm not going to go through -- and then outcomes: We measure our success by our environment and public health outcomes achieved. Hashtag PCA outcomes.

Then there's -- they're data driven and a learning organization.

DNR, their mission is to work with citizens to conserve and manage the state's natural resources in a way that creates a substantial quality of life. Same goes to Army Corps of Engineers.

If you support this DEIS, you're going against your mission and your vision and your core values.

So with that being said, I want you to think about water and how you've used it and even the role water plays. And I want you to look, when you're watching an important meeting somewhere, what's the star of the evening? Water out on the tables.

So I want you to think about what's in your body. What percentage of water are you? 66 percent of your cells are water.

So with that being said, (speaking Ojibwe).

Levi, Andrew (COMM)

From: Ken Graeve <kmgraeve@yahoo.com>
Sent: Monday, July 10, 2017 6:07 AM
To: MN_COMM_Pipeline Comments
Subject: Invasive Species impacts of the Line 3 Project, Draft Environmental Impact Statement, Docket Numbers PPL-15-137 / CN-14-916

Noxious weeds and invasive plants impacts of the Line 3 Project as described in the Draft Environmental Impact Statement, Docket Numbers PPL-15-137 / CN-14-916

My professional experience lies in the fields of ecological restoration, environmental compliance on construction projects, and invasive species control and prevention. This includes ten years of involvement in the management of invasive species on the construction and operation of linear infrastructure projects. My work has included hands-on control and monitoring efforts, providing training and technical support, developing contractual requirements and policies, and sitting on statewide advisory and regulatory committees. Based on this experience I have noticed serious flaws in the analysis provided by the DEIS on the potential impacts of invasive species.

The DEIS fails to provide an adequate assessment of the possible impacts from noxious weeds and invasive plants and does not even mention invasive earthworms, a serious threat to northern Minnesota forest ecosystems. The document downplays the risks and potential impacts of spreading invasive species as a result of this proposed project. The document predicts that impacts from invasive species will be short term and minor. This assessment is not founded in an honest view of the resources through which the proposed pipeline would be built, nor does it show a complete understanding of the impacts of invasive species. 2630-1

At one point the document states that impacts from invasive plants are difficult to quantify. While this is true, there are estimates of the economic impacts. An analysis published in 2005 estimates that non-native invasive plants cause $34.5 billion in economic impact to agriculture and forestry in the United States every year (1). Agriculture and forestry are two industries critical to the regions of Northern Minnesota that would be crossed by this proposed pipeline, and the threats posed by invasive species need a detailed analysis in this review. More difficult to quantify are the impacts of invasive species on ecosystems and biodiversity, but they are widely recognized as one of the leading causes of species extinctions worldwide. Once invasive species become established in an ecosystem, they are nearly impossible to eradicate. The result is a permanently altered ecosystem, an impact which cannot possibly be classified as “short-term.” 2630-2

Given the high quality natural areas through which this pipeline is proposed to travel, ecological threats posed by invasive species deserve detailed analysis. According to Table 5.2.5-17, there will be 215,882 acres of Sites of Biodiversity Significance within a half mile of the preferred route. By definition, these acres are ecologically intact and therefore highly vulnerable to invasive species that could be spread by construction and operations of a new pipeline. Two of the primary types of ecosystems that represent these ecologically significant areas are forests and wetlands, and both are at risk from invasive species in the ways described below. Impacts to this many acres of land cannot objectively be considered “minor”. 2630-3

Invasive species that threaten forest ecosystems in Minnesota include common buckthorn, garlic mustard, and invasive earthworms. Buckthorn and garlic mustard invade woodlands and shade out understory species. They dramatically reduce biodiversity by crowding out native understory vegetation through shading and allelopathy. Invasive earthworms dramatically change the soil of infested forests by compacting soils, accelerating nutrient leaching, removing leaf litter, and decimating the soil fungal. All of these impacts harm native vegetation, including rare species of wildflowers and economically important species of trees.

Minnesota wetlands are threatened by invasive species such as purple loosestrife, hybrid cattail, reed canary grass and non-native subspecies of common reed. All of these species can invade healthy wetland ecosystems and crowd out native plants through aggressive growth and alterations in nutrient cycling and surface hydrology. Types of wetlands threatened by these species include ecologically rich wet meadows and shrub swamps as well as economically and culturally important wild rice waters.

Table 5.2.5-13 lists occurrences of several threatened and endangered species native to forests and wetlands that are avoided by the APR, but the spread of invasive species into these “avoided” areas would result in catastrophic impacts to those rare species. By failing to fully consider invasive species, that table gives a deeply flawed analysis of the true impacts of the project.

The likelihood of invasive species being spread by this project and causing such impacts is not accurately depicted by this DEIS. There is ample evidence of the degree to which linear infrastructure such as transportation and utility corridors serve as vectors

for invasive species (2,3,4,5,6). Much of the research is in regards to roadsides but also applies to utility corridors. The corridor creates an altered, disturbed vegetation regime that favors the growth and spread of invasive species. Invasive species are introduced into and spread along the corridor by construction and maintenance equipment. Seed and other propagules are spread in soil attached to tires and tracks of all types of work vehicles as well as in clippings that land on mowers. Having been spread along the corridor, the invasive species are able to move off of the right of way into any favorable habitat. These adjacent favorable habitats could be crop fields, pastures, forests, wetlands, and meadows. The damage that can be caused by such infestations can often be severe and irreparable, and can extend well beyond the immediate vicinity of the corridor to affect vast landscapes.

2630-4

The DEIS claims that impacts from invasive species would be short term and minor because "invasive plant management measures would be in place during and after construction, as identified in the Applicant's Environmental Protection Plan…" This analysis is flawed in two important ways. First, it fails to distinguish between risk and consequences in its analysis. Regardless of how effective is the Environmental Protection Plan at preventing the spread of invasive species (and thus reducing the risk), the potential consequences of an invasive species infestation remain the same. Second, the DEIS places a profound faith on the infallibility of the Environmental Protection Plan to prevent invasive species spread. On a major project like the one proposed, vegetation management is usually one of the lowest priorities. This increases the likelihood of mistakes in the prevention of invasive species. Furthermore, assuming that the plan will be implemented perfectly over 340 miles of construction is reckless hubris. Invasive species can be spread along a construction project in many different ways, such as in soil, equipment, mulch, shoes, clothing, and seed (even with regulatory oversight, as evidenced by the introduction of Palmer amaranth into MN in 2016). It would be nearly impossible to ensure that all of those potential sources of spread are perfectly controlled on a 340 mile construction project. Once introduced, it only takes a single infestation of invasive species to spread out over and impact hundreds of acres. When (not if) these impacts occur, they will be permanent and major.

2630-5

Page 5-199 inaccurately downplays the risk of spreading invasive species by saying that the "project would be required to manage all noxious weeds for which federal, state, or local…regulations exist…" This statement demonstrates a poor understanding of the Minnesota noxious weed law, both in how species are listed and in how it is enforced. The organization of the noxious weed list prioritizes control of species that can cause harm but are not yet widespread. The intent is to focus resources on the prevention of future harm. The result is that there are many species that are ecologically very harmful but are so widespread that they are not on the noxious weed list or are listed in lower categories. The reasoning is that any requirement to control such species would divert all available resources away from less common species upon which control efforts would have a much greater relative impact. A prime example is common buckthorn, a species for which control is not required under the noxious weed law because it is on the "restricted" noxious weed list. The restricted list prohibits sale or spread but does not require control. Non-native subspecies of common reed also pose a severe threat to multiple wetland types. As with buckthorn, common reed is not required to be controlled by the MN Noxious Weed Law because it appears on the restricted list. Two other examples are hybrid cattail and reed canary grass, both of which can completely alter shallow marsh and wet meadow wetlands, respectively. These species do not appear on the noxious weed list at all because they are so widespread. Despite being widespread, none of these species would be present in the high quality ecosystems traversed by this project but they could all very likely be spread into those ecosystems by the construction or operation of this pipeline. Therefore, the commitment to manage all species for which control is required would do nothing to prevent spread and impacts of these and other species, all of which pose severe threats to the forest and wetland ecosystems in the project area. The DEIS assertion that the Applicant's management of weeds based on the noxious weed law would render the impacts short term and minor is either completely disingenuous or reflects a deep mis-understanding of the regulatory and ecological milieu of invasive species in Minnesota. The other misunderstanding of the noxious weed law is in how it is enforced. Noxious weed enforcement is handled by the Minnesota Department of Agriculture and is delegated to counties and townships. At the state level, there are approximately three FTE employees who work on noxious weed control, which is hardly sufficient for effective statewide enforcement even without responsibility for overseeing effective prevention and control along a 340 mile pipeline. At the county and township level, enforcement is handled in an inconsistent manner from one jurisdiction to the next. The requirement for these local governments to enforce the noxious weed law is an unfunded mandate, and many county agricultural inspectors and township weed inspectors bear that responsibility in addition to numerous other duties. Some counties do not even have an active agricultural inspector. The result is an enforcement system that is completely inadequate for ensuring the complete prevention and control of invasive species upon which the DEIS bases its claim that impacts will be "short-term and minor". The EIS needs to re-examine its estimate of invasive species impacts with a more accurate understanding of the species that could be spread along the pipeline, the impact they would cause if they were spread along the pipeline and into adjacent natural areas, and the regulatory context of invasive species control in Minnesota.

Based on the reasons described above, the DEIS presents a deeply flawed analysis of the true impacts of invasive species that could result from this project. Such impacts need to be re-assessed with a more realistic understanding of the ecosystems at risk, the vast harm that can be caused by invasive species, the propensity for linear infrastructure to spread invasive species, the true difficulty of preventing spread on linear projects, and the limited reach and enforcement of the noxious weed law in Minnesota.

References:

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2. Christen, D., and G. Matlack. 2006. The Role of Roadsides in Plant Invasions: A Demographic Approach. Conservation Biology. Volume 20, No 2, 385-391.
3. Mortensen, D.A., E.S.J. Rauschert, A.N. Nord and B.P. Jones. 2009. Forest Roads Facilitate the Spread of Invasive Plants. Invasive Plant Science and Management. 2: 191-199.
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Sincerely,
Ken Graeve
Saint Paul, MN

Levi, Andrew (COMM)

From: Ken Graeve <kmgraeve@yahoo.com>
Sent: Monday, July 10, 2017 5:14 AM
To: MN_COMM_Pipeline Comments
Subject: Wetland Impacts of Line 3 Project DEIS, Docket # PPL-15-137 & CN-14-916

Surface water and wetlands Impacts of the Line 3 Project as described in the Draft Environmental Impact Statement, Docket Numbers PPL-15-137 / CN-14-916

My professional experience lies in the fields of ecological restoration, environmental compliance on construction projects, and invasive species control and prevention. This includes several years of experience with wetland restoration, including design, planting, monitoring, and maintenance. Based on this experience I have noticed serious flaws in the analysis provided by the DEIS on the potential impacts to wetlands.

Inconsistent impact estimates

The DEIS shows inconsistencies in its estimates of the number of acres of wetlands impacted by the project. Table 5.2.1.3-1 estimates the number of acres of wetlands crossed by the APR in all states would be 313 acres. Table 5.2.1.3-6 estimates that the APR would cause long-term to permanent and major impacts to 440 acres. These discrepancies need to be cleared up so that regulators and the public can effectively analyze the impacts of the proposed project. 2632-1

Alternatives comparison

The DEIS admits that "The Applicant's preferred route has the largest total wetland impact from construction and operation of all CN alternatives." (p 5-130). Table 5.2.1.3-6 bears this out, showing an estimated 440 acres of construction-related impacts from the APR compared to 34 acres from SA-04.

On page 5-119 the Applicant makes numerous commitments to minimizing wetland impacts. One of these commitments is "Designing and planning Project pipeline routes and infrastructure sites to reduce impacts on sensitive wetland resources…" However, the Applicant's preference for a route that impacts far more wetlands than other alternatives demonstrates that it is already breaking this commitment. The analysis needs to be revised to include a clear explanation as to why the Applicant prefers the route with far greater wetlands impacts than any other proposed alternative.

Hydrologic connectivity

Northern Minnesota, including the area that would be crossed by the applicant's preferred route (APR), includes vast wetlands. Table 5.2.1.3-6 estimates that the APR will impact 440 acres of wetlands. However, many of the wetlands in Northern Minnesota, such as peatlands, tamarack bogs, and wet meadows have very narrow hydrologic requirements. Slight changes to hydrology can drastically change these ecosystems. Slight changes over significant distances, such as those seen by linear infrastructure projects, can cause drastic changes to vast acreages of these ecosystems. This often happens on road projects, where the compaction and fill for the road bed cause slight flooding on one side of the road and slight drying on the other side. These slight changes extend for hundreds of feet and cause significant changes in wetland type over many acres in both directions. Similarly, hydrologic connectivity is bound to be impacted by the trenching and filling involved in a pipeline project. For example, page 5-167 states that 51% of the APR occurs on hydric and compaction-prone soils. It is highly unlikely that a 340 mile project will completely avoid compaction. Any soil compaction in wetlands such as those described above may disrupt hydrologic connectivity. The lateral effects of such hydrologic alterations could result in wetland impacts well beyond the immediate footprint of the construction corridor. Similarly, pages 5-75 and 5-76 claim that impacts to hydrologic connectivity from access roads would be permanent and minor. This section fails to mention that minor hydrologic changes can result in major changes to wetland types. Therefore, the estimates of wetland impacts provided in Table 5.2.1.3-6 may be well below actual impacts and must be re-evaluated. This environmental impact statement needs to re-assess wetland impacts to fully account for the possible effects on hydrologic connectivity of equipment traffic within the corridor, trenching and backfilling, and access road construction. 2632-2

Construction Stormwater

The DEIS repeatedly assumes that impacts to surface waters would be minor because of requirements of the NPDES Construction Stormwater Permit. This is stated in relation to stormwater runoff and erosion (p 5-66), total suspended solids and sedimentation (p 5-67), changes in stream flows (p 5-68), and surface water quality (p 5-69). These statements rely on false assumptions about contractor behavior, the scale of this project, and Construction Stormwater Permit enforcement in Minnesota. Mistakes in erosion control and stormwater management are common on construction projects. Enforcement of the NPDES Construction Stormwater Permit in Minnesota is handled by the Minnesota Pollution Control Agency, which assigns enforcement for almost the entire northern half of Minnesota to two employees (https://www.pca.state.mn.us/water/construction-stormwater-contacts). Inevitable human error and strained enforcement capability will likely result in numerous mistakes. Even if these mistakes are minor, the amount of minor mistakes that could occur on a 340 mile project would add up to overall impacts on wetland and other surface waters that are anything

but minor. This EIS needs to provide a more honest assessment of the types of erosion control and stormwater management impacts that are typical on construction projects rather than the perfect scenario portrayed in the current DEIS.

In summary, this Environmental impact Statement needs to more fully address impacts to wetlands and other surface waters as follows: Discrepancies in estimated acres of wetland impacts need to be cleared up so that regulators and the public can effectively analyze the impacts of the proposed project. The analysis needs to be revised to include a clear explanation as to why the Applicant prefers the route with far greater wetlands impacts than any other proposed alternative. The analysis needs to re-assess wetland impacts to fully account for the possible effects on hydrologic connectivity of equipment traffic within the corridor, trenching and backfilling, and access road construction. This EIS needs to provide a more honest assessment of the types of erosion control and stormwater management impacts that are typical on construction projects rather than the perfect scenario portrayed in the current DEIS.

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Cedrik Gustafson

Street Address: 200 Robert St.

City: Clearbrook State: MN Zip Code: 56634

Phone or Email: Cedrik.gustafson@mnlimited.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I would like to comment on the draft EIS statement 0397-1
that says there is no local construction jobs added with
the Pipeline. This is false, the local communities in the
area are relied on heavily for the construction and
Maintenance of the pipeline. I am from Clearbrook
and atleast a quarter of the People work directly for the
pipeline. Gustafson + Coodge, Chrps, and Minnesota Limited have
lots of quality workers that work on the pipeline every day.
I myself am a Foreman/Sup. for Minnesota Limited,
On My Crew I have 12 workers from Clearbrook, Gonvick,
Thief River and Viking. I really support the pipeline
and hope it passes.

Thanks!

If including additional pages please number them and tell us how many you are providing:_____ pages

MS. SARAH HARPER: Okay. Hello, my name is Sarah Harper. That is S-A-R-A-H, H-A-R-P-E-R.

I would first like to thank you for allowing me to comment today. The pipeline and the considerations being made for its proposed construction are a big deal to me. I spend every summer up north at my family farm, enjoying the spectacular lakes our state has to offer. And I would love to share these traditions with others. But with the new Line 3 breathing through regulatory

approval and our bordering states and Canada, I'm worried this may not be possible.

The current state of this DEIS reflects what will be taken into account for something far less potentially detrimental to our state, priceless land, lakes, rivers, and wetlands. It is clearly rushed and inconsistent.

As previously mentioned, the possibility of permanently decommissioning Line 3 for good with no alternative was not considered in any of the sections. This is a huge problem. The false trichotomy of either relying on the old Line 3, building a new one, or implementing poorly-thought-out and even infeasible alternatives,indicates an unmistakable preference for Enbridge's profitability over any other concern.

I would hope that all the decision makers know that there is an option to shut down Line 3 entirely by gradually diminishing the use of economically, ill-advised tar sands oil. But they won't know what benefits or downsize there are to this unmeasured alternative if it isn't analyzed sufficiently or at all. Lately this dirty oil is about as difficult to make a profit off of as it is to clean up, and much of it is selling at a loss.

It is stated in Section 3.1.1C that the Commission must determine whether or not the consequences to society of granting a certificate are more favorable than the consequences of denying it. And how can they accurately decide without being given the full range of options?

I see that in Section 4.2.2 it states that the Applicant should reasonably be expected to meet shipper demand through other means, but I don't see any comprehensive analysis of projected demand relating specifically to this project.

The scoping document promised much more. In fact, what I do see in Section 5.2.7.3 regarding overall energy consumption in the U.S. remaining relatively flat through 2040 would lead me to believe that upping the capacity is not a critical need. If this is the case, how do we know if it even is necessary to approve Line 3, which will be the largest project in Enbridge history? 1535-1

It also states in this section that approval or denial of any one crude oil transfer project is unlikely to significantly impact the rate of extraction in the oil sands. This is inconsistent with what the executive summary says, which is that the project will have an increase in

1535-1 Cont'd

extraction over what would have occurred if demand was met instead with light crude oil. This is misleading and --

FACILITATOR: Thank you.

MS. SARAH HARPER: -- makes me wonder how carefully this document was put together.

Levi, Andrew (COMM)

From: Patricia Hauser <phau2015@gmail.com>
Sent: Monday, July 10, 2017 3:09 AM
To: MN_COMM_Pipeline Comments
Subject: Docket numbers CN-14-916 and PPL 15-137 Re: DEIS proposed ENBRIDGE Line 3

Dear Jamie MacAlister, Environmental Review Manager,

I am writing to comment on and ask questions regarding the draft Environmental Impact Statement for Enbridge's proposed Line 3 Project, docket numbers CN-14-916 and PPL 15-137.

I was born in and grew up in Winona, MN which is on the Mississippi River. I have an MS degree.

As a life long resident of Minnesota I have enjoyed the beauty of Minnesota's rivers, lakes, and streams since the 1950s when I was a child. I have swam, fished, canoed, and boated in these precious waters. For years I've been going to my friend's cabin on Lake Superior. She and her (now adult) children still swim in the Lake Superior.

In addition to the water recreation, my family, friends, and I have all enjoyed the food these waters have provided…from the delicious variety of fish to the unique wild rice! Minnesota's lakes, rivers, streams are each such invaluable and irreplaceable resources!

i've been learning about oil pipelines for about 10 years. I've heard many talks on oil pipeline, one being a talk given by the League of Women voters on Enbridge oil pipelines in particular. I've attended oil pipeline meetings, I've read about pipelines, and I have personal friends that follow pipeline happenings.

Regarding the Draft Environmental Impact Statement (EIS) for the proposed Line 3 Project...It is flawed and needs to be rewritten so regular citizens can read and understand it. For starters it would be wise to shorten the 5,500 page document and it is imperative that you fix some of the graphs.

I went to the Line 3 Project Public Meeting in St. Paul, MN and got a copy of the Guide to the Draft Environmental Impact Statement (DEIS) for the proposed Line 3 which I have read. The document lacks clear, concise, plain language and accurate tables/figures that regular MN citizens (who will be deeply impacted) can quickly and easily grasp.

Why is there no acronym guide in the paper? One of the problems was that the DEIS was lacking an acronym guide in the beginning (or anywhere) to refer to. So I would be reading along, an acronym would be introduced, I'd understand it and then several pages later there would be only the acronym with no guide to refer to in order to refresh my memory. So I'd go back through what I had read, find the acronym, and continue reading. finally I started making my own guide to the acronyms used. An acronym guide, on one page, is needed. Regular citizens are not going to have the time to shift back and forth looking for the introduction of the acronym being used. Professional works that are meant to encourage reading and communication have this embedded in their papers. Will you please fix this in the rewriting? 2653-1

I have other questions regarding the draft EIS.

2653-2

Why, in 'Table ES-1 Certificate of Need Alternatives,' is there not consistency of colors in the table? When color coding the eight "Yes" responses you used a consistent lime green (LG) on only six of the "Yes" responses. Of the two "No" responses you used "dull pink" (DP) on four boxes, when only two boxes said "No." So another question with regard to this table is, did you mean for the two boxes saying "Yes" (that you colored "dull pink" the apparent "No" color, instead of the "Yes" color of "lime green") are really meant to say "No" and not "Yes?" In other words, does LG indicate "Yes"? Does DP indicate "No"? If so, then will you fix this table to have consistent colors? If not, then will you just drop the use of colors? The color on this page is confusing and possibly misleading.

2653-3

Why, in 'Figure ES-2 Certificate of Need Alternatives' does the Legend at the bottom indicate that "Major Rivers" will be marked with a — (blue line) yet, none of them are? Why is the Minnesota River written in huge letters (clearly named) and the Mississippi River's name written in super tiny, faded letters, and only in one spot instead of clearly marking it the entire section shown on the map? This is significant because it doesn't show that the 'Systems Alternative SA-04' dark violet line crosses both the Minnesota River AND the Mississippi River. This is a significant omission.

Under the section "Major Issues for the Certificate of Need Decision," regarding continued use of existing Line 3 it says, "Since 1990, Line 3 has experienced 15 failures that released more than 50 barrels of oil during each incident, with seven of these failures occurring in Minnesota." Are there more incidents of failures that have less than 50 barrels of oil released and if so, how many incidents were in Minnesota? How much oil per incident? What were the consequences environmentally and monetarily? Have there ever been any oil spills on this Line 3 that were *not* found by Enbridge employees, but found by regular citizens and missed by Enbridge? Are all of the oil spill incidents cleaned up and what is the change to the land, water, animals, and communities because of all of these spills? I have been reading about Enbridge and their pipelines for a number of years. And I question, why you are willing to work with this company that has a history of oil spills?

In this same section it was stated, "Existing Line 3 goes through both the Leech Lake and Fond du Lac reservations…Tribal members who submitted comments during this EIS process and provided input for this Draft EIS reported that all of the proposed routes, including either keeping the current Line 3 in place or abandoning it, would add to the negative mental, spiritual, and physical health impacts already disproportionately suffered by American Indian populations." Why are *any* of these routes, from a foreign country (in this case, Canada) even considered in any areas that Impact American Indian reservations? how is this not a form of racism and environmental injustice?

In this same section it was stated, "The program has required substantial investment, with no feasible technology or operational changes that can arrest or reverse the external corrosion on Line 3…Maintenance and repair activities and disturbance from successive integrity digs would continue to increase over time." If this is true, then why is continuing to keep Line 3 operational even an option?

2653-4

In 'Figure ES-4 Annual Average Number of Incidents of Hazardous Materials Transport and Average Incident Size' the bar chart doesn't match the written words. Part of the problem is that the scale on the two edges of the vertical lines are different from each other, so it looks as though the blue bar is at "462" but that matches the "average number of accidental release incidents per year" which is scaled on the left side of the chart, written vertically above the gray box. The blue line should match the vertical words above the blue box on the right side of the bar chart which says, "Average size of accidental release (barrels)." This would put it above the 800 number on the left side. This table needs to be redone. Perhaps the information should be in two different bar graphs. As is, this figure is confusing and inaccurate. How will you address this in the next EIS?

2653-5

Why, in "Figure ES-5 High-Quality Surface Waters Crossed by Certificate of Need Alternatives" aren't the Minnesota River and the Mississippi River considered? The *Minnesota River* is a tributary of the *Mississippi River*. Therefore, it feeds into the Mississippi River which supplies tens of thousands of people with drinking

water, to say nothing of it's role in the fishing and farming industries. These are 'high-quality water resources' yet they aren't even mentioned. 2653-5 Cont'd

Also, in addition to including both rivers on this 'Figure ES-5 High-Quality Surface Waters Crossed by Certificate of Need Alternatives' could you re-position the Legend so it isn't parallel with the y axis of the bar graph regarding SA-04? My eyes went from the Legend straight to the "Transport by Rail" and skipped the diminutively named SA-04 which ironically had the *least* impact on Minnesota's high-quality water resources! It is curious that this alternative route for an oil pipeline that won't impact American Indian's wild rice lakes is almost hidden in this bar graph. 2653-6

Why, in 'Figure ES-6 Impacts on Prime Farmland and Forests' is the yellow horizontal bar for SA-04 listed as over 4,000 miles? The 4,000 miles must be referring to the entire length of the pipeline. If you look back at 'Figure ES-2 Certificate of Need Alternatives' where the purple line of SA-04 pipeline enters Minnesota from North Dakota and exits Minnesota at Austin, MN, you can visually see that length is not 4,000 miles! That distance is therefore inaccurate and the orange bar for SA-04 should only reflect the pipeline as it crosses the state of Minnesota, not the distance of the entire pipeline. Can this be fixed in the next draft EIS? 2653-7

There needs to be *real* alternatives to the proposed action of pipelines that eventually leak and need to be mended or removed. Allowing Enbridge to "abandon" the old decaying pipeline is ridiculous, if not criminal, since it will eventually collapse and causing sinkholes in various places which will then cause who knows what other kind of damage to land, water, and/or animals, Who is to pay for that damage and is it even possible to repair and restore the damage caused? Will Enbridge agree to pay for future removals of future aging oil pipelines by agreeing to give a substantial sum of money up-front to our state of MN, before a single oil pipeline is laid in the ground for when it eventually wears out or leaks?

Speaking of leaks, calling the transporting of oil by a new pipeline, or truck, or train or various combinations of them is a false alternative because they ALL have caused and will cause enormous environmental damage either by oils spills or when they wear out and even in the construction phase. These so-called alternatives don't reduce the harm, they just take the enormous harm to different locations, to different ecosystems, to different animals, different communities. These different modes of transportation just shift who and what gets impacted. That gives the illusion of an alternative, but is NOT a real alternative.

I ask you to consider that this draft EIS needs to be re-written to fix mistakes and inconsistencies that I pointed out; provide reasonable alternatives that protect the water, land, ecosystems, and all citizens of the state of Minnesota; stop forcing American Indians living on reservations to have yet another oil pipeline go through their land causing more harm; and make the document more readable for all MN citizens.

Patricia Hauser

Russell, just as a reminder, say your name and spell it.

MR. RUSSELL HESS: My name is Russell, R-U-S-S-E-L-L, Hess, H-E-S-S.

First, I want to emphasize how thorough and complete we feel the DEIS is. We also want to thank the Department of Commerce for keeping the process on schedule so far.

Second, we see in a few areas where the DEIS could be improved.

First, employment impacts based on an assumption that zero workers will be local is way off base. My union and others have agreements in place that will ensure local workers will be working on this project.

All along the route we have guys and gals from Minnesota that are working in other states now. They want to be in Minnesota, working on pipeline projects. This will help them come home and work close to

their families.

We also feel that the DEIS should take into account other benefits of high quality union jobs and career pathways other than just working on the pipeline directly, and we believe that the lack of discussion of the risks of moving crude oil on rails, including the very present accident risks, should also be more fully addressed in the DEIS.

Finally, we would like to note that proposed Line 3 replacement reduces estimated spill risks by 40 percent, and that the proposed route exposes fewer high consequence areas to spill risk than any of the alternatives. Thanks.

From: Jenny Hill
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137
Date: Sunday, June 11, 2017 9:10:15 PM

I appreciate the opportunity to comment on the draft Environmental Impact Statement for the Line 3 Replacement project. I am against the addition of a new pipeline as well as the abandonment of Line 3 as I believe transporting Canadian tar sands oil is not worth the environmental risks

0126-1

My main concern with the draft EIS is the lack of details around mitigation and clean-up of the old pipeline beyond the initial abandonment. The EIS should spell out at least a minimum responsibility for Enbridge if mitigation is needed at any point in the future.

The last paragraph of section 8.3.1.3, "Long-Term Effects Could Be Significant and Would Require Site-Specific Mitigation Measures," has great potential for spelling out such responsibility. The paragraph states,

".. impacts on human and natural resources due to potential subsidence of the ground above the abandoned Line 3 are anticipated to be minimal in the near term but could be significant in the longer term, absent effective monitoring, adaptive management, and the timely introduction of mitigation measures."

What is the definition of "timely" when it comes to mitigation measures? Who would be responsible for seeing adaptive management takes place? Who would pay for mitigation measures and management?

The paragraph concludes: "Because of the length of Line 3 and the variety of resources crossed, mitigation measures would be site specific and would need to be designed in collaboration with those agencies and authorities responsible for the resources in question." I would like to see much mores specific language about who would be responsible for instigating and financing the mitigation measures as well as seeing that collaboration does take place.

Thank you for this opportunity to comment.

Jenny Hill
6704 Northumbria Dr
Pine River, MN 56474

MS. JANET HILL: It's Janet Hill. J-A-N-E-T. H-I-L-L. I'd like to cover some specific parts of the draft EIS.

Page 2-38 discusses the merits of the SCADA system, a computer system that will monitor Line 3 to detect leaks. There are lots of assurances about this computer system in the EIS, but nothing about what happens when it's compromised or hacked. 1982-1

1982-1 Cont'd

A quick Google search brings up all kinds of information on how attacks on the SCADA systems are on the rise, and there should be a section in the EIS on what measures are in place to deal with hacking.

1982-2

On page 2-41 are assurances that Enbridge inspects and monitors its pipelines. And that's really great; but, again, we need to know what they do to fix those problems when they find them.

Just two weeks ago it was reported that Enbridge had been in noncompliance with Michigan law for years for insufficient supports along their Line 5 pipeline running under the Mackinac Straits of the Great Lakes. In northwest Minnesota on the Tamarack River, erosion has exposed a 100-foot section of pipe, leaving it vulnerable to whatever comes floating down the river. To fix the problem, Enbridge simply added legs to the pipe to stabilize it. This kind of duct tape solution is a real problem.

In twenty -- a 2013 study by the Pipeline and Hazardous Materials Safety Administration found that depletion of cover, which is what happened at the Tamarack River, was a factor

in 16 significant pipeline spills at river crossings in the past 25 years. The two examples I just gave underscore why Enbridge's assurances mean little. Given their history, they need to do more work to assure us that they'll fix problems properly, before we should entrust them with our lakes and rivers.

1982-3

The EIS also requires more information on the effects of peat acidity on pipes. In Aitkin County much of the pipeline would lie in peat bogs -- apparently forever -- and this could be a big problem for this area. The pipeline lies in the watershed of the Big Sandy Lake, a ten-mile square of lake that's the backbone of our local economy.

Enbridge claims that the oil from Line 3 will benefit of U.S. But as long as any part of this oil is being used to shore up the U.S. oil reserves, which in turn enables companies to sell surplus oil to foreign markets for a profit, then Enbridge's claim is untrue, and their main reason for needing this Line 3 is false.

Then I have one last comment. Today half of Norway's auto sales are electric cars. India has a goal to have all electric cars by 2030. And that's the direction we're headed in the United States.

One of Minnesota's electric utilities, Xcel, already has the technology to borrow electricity from cars being charged on the grid. That's the state of green energy technology right now, one of the fastest-growing job sectors in the country.

Enbridge's temporary Line 3 jobs pale in comparison to the good-paying, permanent jobs we can create if we focus on infrastructure of renewable -- of renewable clean energy. If we allow Pipeline 3 to be built through Minnesota, we'll be stuck with a permanent aging pipeline running through the best parts of our state and slowly leaking oil into our water for years to come. The EIS needs to include the option to close Line 3 and not rebuild it.

Thank you.

Levi, Andrew (COMM)

From: Janet Hill <janethillnew@gmail.com>
Sent: Monday, July 10, 2017 4:25 PM
To: MN_COMM_Pipeline Comments
Subject: Comment for Enbridge Line 3 Project: CN-14-916 and PPL-15-137
Attachments: JanetHillComment.pdf

Dear Environmental Review Manager,

Attached is my comment in pdf format for the Enbridge Line 3 project.

pipeline.Comments@state.mn.us

Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

I live in northern Aitkin County, on Big Sandy Lake, and am submitting the following comments (with a focus on Chapter 10) for the Line 3 Draft Environmental Impact Statement.

- In section 10, the first two words in the introduction to 10.2.1.1.1 (below) reveal a lot about the reliability of the information provided by the DEIS:

  > "Enbridge funded two studies on failure probabilities related to potential pinhole leaks and large-volume releases (Stantec and Barr Engineering 2017; Stantec et al. 2017, respectively)."

  The final EIS needs to include independent analysis of the findings provided by private contractors such as Stantec and Barr Engineering, as the state of Minnesota otherwise has no way of verifying whether Enbridge may have influenced these firms to produce findings that would skew results in Enbridge's favor.

- 10.2.4.1.3 System Alternative SA-04 states, "The route of SA-04 is 795 miles long, and it is therefore the longest of the CN pipeline alternative route." The final EIS needs to clear up confusion as to how the comparative alternatives are measured, as SA-04 doesn't appear to be any longer — and in fact looks shorter (and straighter) — than the applicant's preferred route. The final EIS needs to measure the various pipelines consistently. 2662-1

- 10.3.1.1 Physicochemical Characteristics of Crude Oil. This section states, "Bitumen is mostly composed of larger heavy hydrocarbons, while diluents are composed of light hydrocarbons such as natural gas condensate and naphtha," *utterly failing to mention* that naptha often contains benzene, which is carcinogenic, and also *failing to mention* all of the other ingredients comprising diluents, which Enbridge considers proprietary information. This kind of omission occurs throughout the DEIS, and calls into question the integrity of the DEIS. Furthermore, Enbridge's decision to not disclose the nature of its dilbit ingredients should raise a red flag to the permitting agency about a decision to permit a a pipeline carrying "secret" ingredients in Minnesota waters. The final EIS must list what diluents are composed of, and identify the carcinogens by name. 2662-2

- The same section goes on to state, "In general, the toxic properties of both bitumen and diluents are similar to those of other crude oil products, including conventional heavy crude; however, *little research has been conducted on the toxicity of dilbit to organisms*. The components of the diluents are commonly found in other crude oils; however, *bitumen additionally contains several potentially toxic metals*, stable and persistent resins, and asphaltenes." 2662-3

It's alarming that a study on the toxicity of dilbit to organisms hasn't been conducted, and that it is stated as a fact in the EIS without any further analysis, or even a suggestion that more study should be done. The final EIS *must* address toxicity of dilbit to organisms before an adequately informed decision can be made to permit a pipeline carrying dilbit in Minnesota waters. 2662-3 Cont'd

- This section also states, "Dilbit has been shown to lose between 11.7 and 15.9 percent of its mass within the first 6 hours of a release (Environment Canada 2013)." However, *no mention is made of where the rest of the dilbit goes*. It's another convenient omission, biased toward Enbridge. A properly done DEIS would note the *FACT* that the remaining dilbit is transported in the water flow, threatening the health of anyone living downstream. If there is a release in the Big Sandy watershed, for instance, the remaining dilbit will be carried in the water flow to Big Sandy Lake and then into the Mississippi River. The final EIS must provide an analysis about *everything* that happens to dilbit and bitumen in a tar sands spill, not just what disappears into the air. This analysis must include data on how far downstream toxins can travel and still affect the human health. This point alone should make Minnesota decision-makers think long and hard before deciding whether to grant a permit for Line 3, as it crosses the Mississippi River relatively close and upriver from the Twin Cities. 2662-4

Aside from Chapter 10, I have the following observations:

- There should be information in the final EIS about the worst-case scenario of a cyber-attack on Enbridge's SCADA computer system.

- Enbridge's preferred route has been modified to avoid things like certain wild rice lakes, organic farms, and landowner requests. The alternative routes, such as SA-04 should have the same kinds of modifications considered, if the routes go through environmentally sensitive areas and are being dismissed without similar modifications. Route SA-04 was given short shrift all through the DEIS, which makes it appear that the DEIS is written to produce a specific outcome (i.e., Enbridge's preferred route). 2662-5

- The final EIS should include an economic analysis for the impact of the pipeline on communities along the route that depend on tourism. Big Sandy Lake, where I live, for instance, is a popular fishing lake in Aitkin County, and one of the foundations of our local economy. If the public learns that a leak occurred and that toxic dilbit has entered Big Sandy Lake, the effect would be devastating not only for our local businesses, but for all of Aitkin County. 2662-6

- There is nothing in the DEIS about taxes generated by fishing in Minnesota. Enbridge's proposed route runs through an area rich in fishing lakes. A simple Google search will reveal that fishing and hunting licenses in Minnesota in 2015 (the latest data reported) brought the state over *$60 million* that year in license fees alone for fishing and hunting. This doesn't include money spent on lodging and food, the same expenditures Enbridge claims is one of

Line 3's "benefits" to the state of Minnesota (they claim that pipeline workers will spend money in various communities during construction, and that this is one of Line 3's benefits, in addition to taxes). This Enbridge "benefit" ends when Line 3 is complete, but income from fishing is constant and may even increase, if our lakes remain clean and desirable to visit. If Minnesota's reputation as a fishing destination is compromised by a new pipeline corridor, approval of Enbridge's preferred route would be a multi-billion dollar mistake that would compound each year, as we lose more and more revenue from fishing and tourism. Enbridge's $25 million annual tax payment pales in comparison. The final EIS must have an analysis of the state economy with and without Line 3 to show a complete picture.

- There is nothing in the DEIS about the effect of induced charge from high-voltage power lines on pipelines in wetlands. The pipeline will be co-located along power lines in much of Aitkin County, which is mostly wetland. The final EIS must address this issue with an independent study (i.e., not an Enbridge-funded one).

- Recently, Volvo announced a move toward electric engines, and with higher standards in Europe, other auto makers will soon follow suit. The affordable Tesla Model 3 is now in production in the U.S., with a forecast of 20,000 cars produced monthly by December 2017. India plans to go to all electric cars by 2030, and currently half of Norway's car sales are electric cars. Unlike a few years ago, consumers now have affordable choices between electric and internal combustion engines. As a result, the need for oil will diminish over time, not increase. The final EIS needs to address the energy transition that's currently underway, and assess — without bias toward Enbridge — the need for Minnesota to permanently sacrifice its lakes to transport oil we likely will not need ten or twenty years from now.

- I understand that some of the firms who contributed to this DEIS (Barr and Cardno, for instance) have a history of working with Enbridge. This is a conflict of interest, and it's surprising that their input was considered to adequate information. I would like to see this addressed in the final EIS.

- The original Line 3 is 34 inches in diameter. The new Line 3 is proposed to be 36 inches diameter. Why is larger diameter pipe necessary to achieve same volume flow as the original Line 3? Does Enbridge plan to increase the barrels per day pumped through Line 3? If so, where did they get permission for this? This needs to be addressed in the final EIS.

- The rail and truck transport data doesn't make sense. They wouldn't run rail and truck routes along the preferred route; they would ship it on existing tracks and roads that would lead more directly to markets, not drive through Clearbrook and Superior. The final EIS needs to redo the truck and train data to reflect reality, not an unrealistic scenario as presented in the DEIS. (To be entirely honest, this kind of thing, which runs through the entire DEIS, makes the DEIS look like it was slapped together with very little thought: it's wholly inadequate considering the potential impacts of this project across northern Minnesota.)

- In Chapter 5 the methodology used for analyzing construction impacts to groundwater is different for different routes. The “Region Of Interest” for the Enbridge’s preferred route was a 1000 ft buffer on either side of the center line of the route. For route SA04, a 2500 ft buffer was considered on either side of the center line. The distances need to be consistent in the final EIS, obviously, or the impacts will be biased toward Enbridge's preferred route. 2662-7

- Reuters reported on July 8, 2017, that the Canadian lender Desjardins is considering no longer funding energy pipelines, citing concerns about the impact such projects may have on the environment. Desjardins is the largest association of credit unions in North America, and has temporarily suspended lending for such projects and may make the decision permanent (decision to be made in September). Reuters reported: “If it makes the decision permanent, that would likely mean Desjardins would not help finance other major Canadian pipelines projects, including TransCanada Corp's Keystone XL and Energy East and Enbridge Inc's Line 3. Such a move would follow that of Dutch lender ING Groep NV, which has a long-standing policy of not funding projects directly related to oil sands, and is the latest sign that pipelines could have a harder time getting funding as banks face increasing pressure to back away.” The final EIS needs to take these kinds of fundamental changes in the tar sands industry into consideration. Things are changing fast as the effects of climate change become more obvious, and the Paris Climate Agreement starts to take effect.

- The comments that citizens, organizations, and government agencies submitted for Sandpiper must be incorporated in the final EIS, as the preferred route for Line 3 is the same as the Sandpiper route. We’ve covered much of this before.

Thank you for the opportunity to comment on the inadequacy of the DEIS.

Sincerely,
Janet Hill
50569 218th Place
McGregor, MN 55760

MS. WINONA LADUKE:

(Indiscernible). My name is Winona LaDuke, and I'm from the White Earth Reservation, and I'm a

traditional harvester, and I'm also the executive director of a national organization called Honor the Earth, and I'm an economist by training.

0858-1

I was asked to kind of give that description a little bit more clearly. And I'm with everybody here. This is our territory, and I'd like to make sure that the -- I can still have good water here a long time from now.

So what I wanted to say is a couple of things.

First, I have to ask the Department of Commerce why we don't matter. That's what I have to ask. I have to ask that, although all of the study and all of the discussion and all the testimony and all the crying we presented about the duress in our communities, you acknowledged it, and you said, "We understand that you guys are in really rough shape. We understand that your people are dying at really 44 years of age. We understand you all have diabetes. We understand that you can't get out on your land. We understand that you have health stressors,

and we understand that this project is going to stress out the people of White Earth."

It's going to add more stress to all of our communities, Leech Lake, Fond Du Lac and Mille Lacs, East Lake.

"But we don't think that that is enough of a reason to stop the project."

So I want to ask the State of Minnesota why we don't matter. That's what I want to say, is, why don't we matter, because this is the only land we have. And it is really -- you know, it's disheartening to see that you would not just say, "This is too tough."

This is the part that hits the most wild rice lakes. It will take our most precious territory.

So that's the first thing I have as a comment on the DEIS.

The second thing is, what about abandonment?

You know, we all know that Line 3 is in a weeping state. We all know that. Enbridge says that it's in a state of deterioration. I know that that's because it's

a really old pipe, and I know there's a bunch of other really old pipes there.

What I'm trying to understand is why we don't have a full EIS on abandonment.

What I want to know is why there's only 14 pages on abandonment. And I want to know how we're going to deal with this problem, because this is not just a Minnesota problem, it's a national problem.

And what I know is that cleaning up the mess of hydrocarbons weeping for 50 years into our ecosystem is a big mess.

I know there are leaks all along this line. Ten thousand anomalies is what they are talking about, and I drive over here and there's like burping substations and all kinds of stuff.

So what we're saying is we'd like a cleanup.

If you got an underground tank in the state of Minnesota, you gotta clean it up. How come you don't gotta clean up your pipeline? How come the liability is left for all of us?

And then what's the plan for the

other four lines, or five lines, and what's the plan for the next corridor?

We need some pipeline abandonment regulations. We need to be sure that things are cleaned up. And there are five times as many jobs in that than in just throwing down new pipe.

That's what we should be talking about, is infrastructure that's going to protect our water and protect our people.

The third thing I want to talk about is the cumulative impact assessment. Our staff and I reviewed a lot of this.

It's a very long report, you know, and I know people worked really hard on this report. There is no question.

We have a lot of comments on things that were a little short in it, but I really feel like -- you know, I'm looking at this and this is an eagle feather, and this eagle feather is from Lake Athabasca, which is in the middle of the tar sands.

What I know is the people up in that territory are dying from the tar sands. Their water is contaminated. Their food

systems are contaminated. Their animals are dying, and they have bile duct cancer. These people are dying at a very fast rate.

And I know that corporations are not investing in more and more tar sands production for a lot of reasons.

But what I want to know is what's fair about tar sands? What's fair about the dirtiest oil in the world coming our way? What's fair about all the health effects on poor communities upstream, and what's fair about the people that live, whether they're in Detroit or whether they living down there in New Orleans, around that area, next to refineries that are dirty?

Don't tell me it's because we need the oil, because we all drive around. I got that. I've lived in the fossil fuel era my whole life, but what I want is a graceful transition out of it. I don't want to choke on it. I don't want everything contaminated. This is our chance. This is our chance to change that.

I want a full assessment of the cumulative impact. We did a little bit of math

on the carbon. You know, how are you going to pay for $262 billion, you know? How you going to do that, Enbridge? Who's going to pay for the carbon impact of all this on our environment? So I want a full assessment.

And the last thing is, really, this no-build option. I think you are very weak on the no-build option. You act as if it was like, well, it's just going to like fall apart. I'm like, Enbridge got a brand new line in a few years ago. You guys worked really hard to build that line, and that line is probably pretty tight and pretty good, as pipelines go.

I know people worked really hard. I get that Line 3 is not the same thing as the clipper, but all I want to say is, look, they twisted the regulatory process to get in that line. You got in a brand new line.

I'm saying the no-build option is close down the leaking line. Close down the leaking line. No new corridor. Just close down the line, because the fact is is that between Canada and the United States, Trump and Trudeau, they have approved 2.4 million barrels

a day, more pipeline capacity than there are pipelines.

That's between TransCanada, the Keystone Excel, Energy East, and Line 3. Globe and Mail, Toronto Globe and Mail says pipeline capacity approved is 2.4 million barrels a day more than they're ever going to get. That oil is not going to come out of the tar sands, and there is no reason to put us all in jeopardy for that. That's it.

Thank you. Miigwech.

MS. WINONA LADUKE:

(indiscernible). My name is Winona LaDuke, W-I-N-O-N-A, L-A-D-U-K-E.

You know what, I just want to start by saying I'm really proud of the people from our territory for coming out. It takes a lot of courage to stand up to big corporations and to say it's not right what they want to do.

And you know, even discussing this whole process, I think it is a really fair criticism to say that we are operating

under the guidelines and the timetables set by a corporation, and I don't think that's fair to us. I don't think it's fair to drop an EIS that's so long on people and ask them to comment a week later.

We're the people who live here, all of us. And we're the people who know these lakes and we value this land and this water, and I think it's an unfair process.

And I think there's a lot of things missing in the DEIS that we're talking about here, and I think the process should be extended significantly to address those issues, because rushing through is not fair.

It's too significant of a decision. People have spoken really well. I was really heartened to hear what everybody said, and I understand a lot of these pieces.

I was asked by someone yesterday to explain -- I'm an economist by training. I went to Harvard. I direct a national organization. But I live here. This is where I live, and this is the land that my ancestors are from. This is the land all my children and descendents will be from, just like all of

you.

So the first thing that I have to ask is why we don't matter? Why you could do a full DEIS and say tribal people are already in tough shape, you're dying at 44 years of age. I'm one of the few grandmothers around. I'm 57.

I'm the same age as a lot of you, but we're dying, we're under duress, we aren't eating right, we're stressed out, we've got every disease you don't want to have.

It's very clear this pipeline runs through the heart of Anishinaabe territory. The DEIS says that we are the most impacted. It says that this is where all the rice lakes are, and that's the heart of our people. There's no rice anywhere else in the world, and we have no place else to go.

What I don't understand is that although the DEIS concludes that the disproportionate and adverse impacts would occur on American Indian populations, it is not a reason to deny the permit.

So I really don't get why we don't count.

You know, I feel like, don't question my patriotism. We just want good decisions to be made, and we feel that we should be fairly treated, and this is not fair.

And the rest of the people who live here, you're going to be treated just like Indians in this one. We're all in the same place. This is where we live.

The second thing I want to talk about, you know, just spoken to last night. This is a feather from Lake Athabasca, in the middle of the tar sands. It's from an eagle. It was given to me by the people up there because they understand that what we are doing here affects them. They are already dying from tar sands mines. They're dying.

Those people didn't ask for that. They're Cree people that are just trying to live the same life as their ancestors, and they're victims of the tar sands industry. They're poisoned all around them.

It's not just the people that are dying. It's all of the animals that are

dying up there and all of the birds that are dying. It's a death zone. It's a national sacrifice area.

For the life of me, I can't see why we are trying to justify that and to make sure to figure out how to get that oil down here.

You know, as an economist, what I'm going to tell you -- and a lot of people in here know this -- is that the writing is on the wall that it's the end of tar sands time.

We're in extreme extraction. That's when you get to the bottom of the barrel and you keep scraping, rather than trying to figure out the solution.

And the bottom of the barrel is the tar sands, and the bottom of the barrel was the fracking proposal that we all defeated last time. You know, when you blow up the bedrock of Mother Earth, put 602 chemicals in there and pretend it's going to work out for you all. It's not going to work out for anybody.

Up there, those people, it is not included in the DEIS the destruction of

people, the destruction of ecosystems in the tar sands area. It is super destructive oil, and those people also have a right to live.

And so when you talk about the cumulative impact of the pipeline, everybody in this room knows that it is not from one border of Minnesota to the other border. It comes from someplace that they are turning into hell, and it goes to someplace that they are turning into hell.

The last round of hearings, we brought in people from Detroit tar sands communities who are dying, black community right next to the Marathon refinery. They are dying.

So what I want to understand is, you know, people here talked about the cumulative impact. We already got widespread agricultural contamination. Our water is already in danger.

I also want to say, as an economist, I don't understand, and I think a lot of people here don't understand, is why the no-build option is not considered in this proposal. It's super dismissive.

And the reason that you would have a no-build option is, one, because of the economics of it. The fact is that, you know, tar sands capacity is projected to diminish, and they are projecting to overbuild pipelines, between Trump and Trudeau, by a factor of 2.4 million barrels a day. They've approved more permits than there are a need for pipelines.

So the no-build option would be leave that guy, start cleaning it up. Clean up the abandoned pipeline. You know, they already got that pipeline through them, the Alberta Clipper. They could use that one for now. It's a new line.

So I just want to say we really feel that the no-build option should be rigorously reviewed. The cumulative impact should be expanded to both ends.

There is no way to justify the destruction of our people. There is no way to justify that.

And finally, as I look to the future, the stranded asset that this is going to be a liability for our communities, when

they bring five more lines down here, or whatever they're going to do, and then they abandon them. That's a huge economic disaster for all of us.

I just want to thank everybody for coming. I'm really proud to be from this area. Thank you.

MR. THANE MAXWELL: Hi, I'm Thane Maxwell, T-H-A-N-E, M-A-X-W-E-L-L. Thank you for the opportunity to speak.

I live in Minneapolis, and I work with Honor the Earth. I have basically given my life to stopping these projects, not because I don't want any of you to have a job, but because we don't need them and because they hurt people.

I've been reading through the EIS for the last few weeks. 5,000 pages is a lot to get through in three weeks, but we did our best. We do have some highlights over here, if

anybody wants to come check them out, you can see what we're interpreting in the data.

I wanted to point out a few questions that we're going to comment on -- or that I'm going to comment on in my written comments, but I wish there were a forum here to ask questions and get answers to these.

You know, I realize people worked really hard on this document, spent a lot of time on it, and there's a lot of improvement to the past few years of the process, I really appreciate that, but there's, you know, of course, in 5,000 pages you're going to have holes.

So, for example -- I'll just throw out a few examples.

In all of the impact calculations, the assumption for the life span of the pipeline is 30 years. And that's really confusing to me because Enbridge has a number of pipelines running right through this town that have been here for 50 or 60 years, sometimes 65 years, so I'm wondering where that calculation comes from.

Another question I had is why is

there no spill analysis at all for the St. Louis or Nemadji rivers, which dump right into Lake Superior as the pipeline reaches the Twin Ports there.

Why is there no discussion of what the impact would be on Lake Superior? The Great Lakes hold 20 percent of the world's fresh water, and we're not even looking at that. We're not even looking at the impact on the harbor in the Twin Ports and what the impact would be, what it would really look like to clean up a tar sands spill in that harbor.

It's confusing there's no meeting in Duluth for folks in that community to talk about that.

Another question I had is in the spill section, this one over here, "Accidental Releases." Some of the numbers are confusing to me. It says -- it gives annual probabilities of spills in Minnesota, so it calculates what the chances are each year of a spill, and it breaks them down by size.

And it says, "The chance of a small spill is 107 percent in one year." So basically, we can expect more than one small

0867-2

spill or about one small spill a year.

It then gives a separate number for just the overall chance of any kind of spill, any size, and it says, "25 percent a year." So we can expect one every four years.

I don't understand how that makes sense. How could the chance of a small spill be 107 percent and the chance of a spill of any size be 25 percent?

So I think there's some math wrong there that we need to look at.

The other thing that I find very confusing or problematic in the EIS is the alternatives that are considered.

For example, the rail alternative that is considered involves building a rail terminal at the border of Canada and the United States and bringing the oil from the partial pipeline that Enbridge would build by rail to Superior.

Now we all know that Enbridge would never do that, so I don't think that's a reasonable alternative to consider.

Similarly, the truck option looks at trucking the oil from the border from a new

truck terminal to Superior, and we know Enbridge would never do that.

So we need to have realistic alternatives if we're genuinely considering alternatives.

Another alternative that someone has mentioned before me is the no build alternative. The no build alternative is defined in the EIS as, "Continued use of Line 3."

But that -- that's a distorted way of framing the question, because there are other ways of not building it, right, and the question really is about need, and there is no discussion of need.

I find this sign over here, the Certificate of Need Alternatives very problematic because it outlines the considerations that the PUC will go through to determine whether to grant the Certificate of Need or not. It list two out of three. There are actually three.

The two that are listed over there, it says they will consider the economic need, which by the way, there's no analysis of

in the EIS.

And two, they will consider alternatives. The one that's missing is the most important. The one that's missing is that the PUC also must consider, by Minnesota statute, also must consider whether the pipeline is in the best interests of society. So I think you should add that to that sign.

Similarly, on the impacts boards over here, you have two different impact boards; one for the Certificate of Need and one for the routes. And both of them have a socioeconomic section, but neither of them mention that there will be zero permanent jobs created by the project.

That's a big question that you see in the media a lot and the decision makers really want to know. I think that should be included there.

The other thing not included there is there's no discussion of the property tax that counties would lose when the existing Line 3 is abandoned. It states that counties that have the new line put in would receive property tax benefits, but it doesn't discuss

the loss.

My last point is also about abandonment. There's a lot of people in this community really concerned about abandonment, and I agree, it is a really huge deal.

A couple things that I just wanted to pick up on that other people were saying and just clarify a little bit, in case you didn't get it. 0867-3

The DEIS says that when you stop flowing oil through a pipe, you don't have that weight in it anymore, it starts to rot. Okay. So, what, 300 miles of pipe around here is going to start to lift itself out of the ground. A lot of it is already exposed, as people are saying. I've seen it. I've walked on it.

There should be more than 14 pages on abandonment. There should be an analysis of how fast that's going to happen, where is that going to happen, what is it going to cost.

Similarly, there should be a discussion of the effect on people's property values, and there should be a discussion of the

liability. What happens if some of the risks --

FACILITATOR: Can you wrap up soon? It's been about six minutes, so if you could wrap up soon.

MR. THANE MAXWELL: I'm almost done. Thank you. 0867-4

What happens when one of the things that's listed as a possibility over here, like contamination or the flooding of a farm field, when that pipe breaks down and serves as a conduit and drains a lake? Who pays for that? What protection is there for landowners? The PUC has the power to do something about that and ensure that.

The other thing I really think needs to be included in the abandonment section is an economic analysis. What kind of jobs could we create? Maybe we could partner on that with some of the unions here.

Maybe we could look at the numbers here and see what kind of jobs we would create if we clean up the old mess before we make a new one.

MR. THANE MAXWELL: All right. Thank you for the opportunity to speak. My name is Thane Maxwell, T-H-A-N-E, M-A-X-W-E-L-L.

UNIDENTIFIED: Pull the mic close, please.

MR. THANE MAXWELL: Okay, thank you. Is that good?

I gave some comments yesterday in Grand Rapids. Don't worry, I'm not going to comment at all 22 meetings, I promise.

But I just really wanted to say a few things today because I'm really moved by how many people from the community came out here today, I can see you are very concerned about this, and I wanted to support you as you stand up and protect your community here.

So I've been looking at the EIS for the past few weeks, ever since it was released, and I wanted to share some of the things that I've seen and share some of my interpretations of it.

You know, as you notice, I feel it is really unfair to you all to ask you to comment on a

document that doesn't have some of the most important things in it. That doesn't have the economic need analysis in it. That doesn't have spill modeling information in it. That doesn't have the contamination plan that Enbridge promises to give us later for the contamination that they find when they abandon Line 3 or remove it. Hopefully remove it.

So, you know, here's something that is also not in the EIS that you can say. When someone stands up here and tells you that it's a fact that pipelines are safer than rail, okay, well, when someone stands up and tells you that, that is actually not a fact. There is no way to compare two different kinds of violence like that. Pipelines spill less frequently, but they spill more volume each time they spill, okay. So pipelines are more likely to spill in a rural area where you're going to affect someone's water sources, the aquifers, the lakes, the rivers, the farmland, that sort of thing. The places where people are more immediately dependent on the health of their natural resources. Rail is more likely to spill in an urban area and blow up and kill somebody. How do you compare those two things? You cannot. That's not in the EIS and

I think it should be.

The other thing I wanted to point out in the EIS is understanding the probabilities of spills. There's two different numbers in there. One gives the annual probability of a spill in Minnesota on Enbridge's preferred route that says 25 percent. So every four years we're going to have spills in Minnesota on Enbridge's lines. But then it gives a different set of stats and it breaks it down by the size of the spill and it gives totally different numbers which to me seem mathematically incompatible. I'm confused about the data and we need check on them. 0868-1

But those numbers are the following: The chance of a small spill each year in Minnesota is 107 percent. So at least one a year, a small spill. The chance of a medium size spill, 8 percent. The chance of a large spill is 6 percent. And the chance of a catastrophic spill is 1.1 percent. So I did a little math. If this pipeline runs 50 years, and keep in mind that some of these old ones are running 60, 65 years already. Let's say it runs 50 years. We can expect 14 pinhole leaks, 54 small leaks, four mediums, three larges, and one catastrophic spill. So that's what we're

signing up for. And that's the risk you're asked to assume.

When they say on the tribal resources map over there that tribal communities will be disproportionately impacted, and the tribal resources that are essential to the survival of these people will be disproportionately impacted. That's what we're talking about. That's the risk we're talking about.

And we talk about the risk of the headwaters, that's what we're looking at, 76 spills in the lifetime of this pipeline. And that's according to their data, which I was just getting at. When we look at the data of Enbridge's history we find much higher numbers.

The other question I'm really thinking needs to be answered. And we're in Grand Rapids, there are a lot of people who are very concerned about this abandonment question. A lot of people really don't feel that Enbridge should be able to leave that in the ground and walk away.

So we commented a lot last night about all of those things that actually should be in the EIS, the impact of that and assess the risk, but one thing that I think is really important for this

community here is what are they going to do with the other three ancient lines they have in that pipeline corridor? There is absolutely no mention of that. And it's not like Enbridge hasn't thought of it and doesn't have a plan. Those three lines are also just about done. They all in a state of deterioration. Are those three lines coming over here, too? Are you being asked to accept one pipeline or four? I think that needs to be in there.

The other thing, I want to encourage you to question and look at more closely is the alternatives that are offered and compared to Enbridge's preferred route. So in the certificate of need permit decision, which is what this is all about, the PUC decides whether Enbridge gets the pipeline, the certificate of need.

They compare the preferred route to several alternatives. Seven of them, actually. And some of them, quite frankly, are absurd. The rail option assumes that they would build a new rail terminal at the border.

I'll wrap up in a second.

They would do a new rail terminal at the border and ship everything by rail from the

partial new pipeline that they built through Canada. They would never do that. Similar for the truck option, they would never do that. And the no-build option, which we've mentioned already, is defined as continued use of Line 3. You can't let them distort your options that way. They don't get to decide what the options are based on Enbridge's ability to sell something. That's just unreasonable.

So I encourage you to push back on that. What we want is we want the no-build option and shut down Line 3 'cause it's poisoning people right now. That's what we're asking for. And the way that we do that is we call them the third certificate of need consideration, which is very conveniently not listed on the sign over there. The sign over there says when they consider the certificate of need that they think about two things. One, the need of the pipeline; and two, the alternatives, the alternative routes. The third thing that by Minnesota statute they have to consider, is the pipeline in the best interest of society. They left that out.

And that's what we're looking for here. No build. Shutdown of Line 3. It's in the best interest of society.

Thank you very much.

(Meeting concluded.)

MS. NICOLETTE SLAGLE:

Nicolette, N-I-C-O-L-E-T-T-E, Slagle, S-L-A-G-L-E. My name is Nicolette Slagle, and I'm the research director for Honor the Earth.

I'm not really going to talk too much about our stance on the pipeline. I'm sure everybody knows that. I'm sure the DOC has heard that already from us.

I do have some specific

comments, specific on the DEIS, but I did want to address something that I heard numerous time here and Grand Rapids and other places, which is what a great neighbor Enbridge is. And I sometimes wonder if it's a completely different Enbridge than the one that I know of, because the one that I know of has numerous safety violations. They have one of the worst spill records, one of the highest incidences of spills.

The industry average is about three spills per thousand miles of pipeline per year. Enbridge's average is 3.19 spills per thousand miles of pipeline. Enbridge has about 8,009 miles of pipeline in Minnesota, which means that there's an average of 25 spills in Minnesota every year.

Now, these vary in sizes and these are reportable spills, but this is the average.

Over in our little display area, we also have this corporate research project profile on Enbridge. It's their corporate rap sheet, and it's a little out of date. We're working on trying to update it and do a better

summation, but it has a record of their various violations and spills.

Just two that I want to pull out for you guys, and then I'll get on my comments on the DEIS, is, "In 2004, the US Pipeline and Hazardous Material Safety Administration, PHMSA, proposed a fine of $11,500 against Enbridge Energy for safety violations found during inspections of pipelines in Illinois, Indiana, and Michigan. The penalty was later reduced to $5,000.

"In a parallel case involving Enbridge pipeline operations in Minnesota, an initial penalty of $30,000 was revised to $25,000."

And I'm sure this didn't have to do with the reanalysis of the impacts of this bill. I'm sure it had something to do with some back-door dealings.

Another one, this is more recent. "In 2008, the Wisconsin Department of Natural Resources charged Enbridge Energy with more than 100 environmental violations relating to the construction of a 320-mile pipeline across much of the state.

"The agency said that Enbridge workers illegally cleared and disrupted wooded wetlands and were responsible for other actions that resulted in discharging sediments into waterways.

"In January 2009, the company settled the charges by agreeing to pay $1.1 million in penalties.

"In March 2010, the PHMSA proposed a fine of $28,800 against Enbridge Energy Pipelines, LLC for safety violations in Oklahoma."

So I'm just wondering, is this Enbridge that's such a great neighbor, a different Enbridge, or are these the ones that have numerous safety violations and numerous fines across this country?

Specifically related to the DEIS and some of its weaknesses, I did notice in there that in the abandonment section they have a price tag at $120 billion to remove the pipeline. There's no indication of where that number came from, other than an estimate of Enbridge at $855 per foot as the removal cost.

But there's no breakdown of what

0909-1

those costs entail, how much of it is for removal of the pipeline, how much of it is for sediment cleanup, how much of it is for putting in new clean fill, how much of it is for restoration of the environment.

And in Canada, Enbridge was required to complete a full abandonment assessment for part of Line 3. We have no idea how the numbers from what they've told Canada it would cost versus what they told the DOC, because we don't have any of that record, so we can't compare that.

Another question is, again, on to the jobs. So we're saying that everybody needs jobs. It's going to cost $120 billion to clean up this pipeline. If Enbridge isn't going to pay for that, who is going to pay for that?

We also know the restoration economy jobs, for every million dollars invested, 10 to 39 jobs are created. So if you're investing $120 billion, how many jobs are you going to create into the restoration economy? It's going to create a whole new industry for Minnesota and for the region.

Enbridge also says that there's going to be a 30-year life span for this new pipeline. What's their abandonment plan for that pipeline?

I have a question for the DOC and the PUC. Through this whole process, you've gotten a lot of comments from people. Is there any analysis of those comments, like how many are for, how many against. The ones that are against, why are they against it? The ones that are for it, why are they for it? You know, I think that would kind of help all of us to kind of see where we're all kind of falling on this, and if there is some kind of shared ground that we can come to an understanding of, what is the best way to move forward.

Which brings me to the next comment, that in the beginning of this document it says that this document is not here to talk about policy implications of renewable versus fossil fuels; this, that, and the other thing.

But the question is, when is that time to make those decision? We're right

here on this precipice of investing into a dying industry.

Yes, we need oil. Yes, we're all using oil, but saying that if we build a pipeline, we're going to have oil for our grandchildren? We're probably going to run out of it in 20 to 30 years. And I know most of the youth that I know don't want to be relying on fossil fuels, and we want to transition to clean energy. We also know that there's ways to make all of the plastics and all of the fuels that we currently use out of hemp and other materials.

FACILITATOR: Wrap up if you can. Thank you.

MS. NICOLETTE SLAGLE: Another thing, like we've talked about this before, is kind of the lack of response information. I've tried myself to get Enbridge's integrated regional response plan or whatever they call it, but they only give it out to emergency first responders.

So we can't even look at that and see how much they rely on local first responders to respond to these spills, which

history has shown that's how it goes.

So what Enbridge does is they come into these communities, give communities grants so they can buy response equipment, and then Enbridge uses that equipment in their response plan, saying, "Oh, well, we've got it covered. This local fire department just bought this huge truck or whatever, and they'll all be able to respond to this, no problem."

FACILITATOR: Can you wrap up in the next few minutes.

MS. NICOLETTE SLAGLE: I guess the last thing I have to say is the projections of the needed demand for this pipeline. A lot of these projections have been shown to be inflated, and a lot of the projections are based off of growing global demand.

And what we've seen is that a lot of the countries that they're saying the demand is going to come from are leapfrogging over fossil fuels and going right to renewable energy, so we really need to take that into account.

Thank you.

MS. NICOLETTE SLAGLE: Nicolette Slagle, N-I-C-O-L-E-T-T-E, S-L-A-G-L-E. I'm with Honor the Earth. I'm their research director. And I'm originally from Pennsylvania, and I tell you that is a place that we have let industry run roughshod over.

It's been clear-cut, two or three times, the birthplace of oil industry, birthplace of coal industry. Now fracking is out of control there. Our water is not drinkable in much of the state.

And we shouldn't let that happen here. We shouldn't let that happen anywhere.

I want to talk a little bit about a couple of things specifically related to some of the analysis that I've been trying to do on this project and its potential impacts.

Just this weekend I ran a little analysis on potentially impacted wild rice beds, and in the state's DEIS they have indicated 17 wild rice lakes directly impacted by potential Line 3 routes for the preferred route, Enbridge's preferred route, 17. 2030-1

That's actually the highest of any of the routes. I went a step further and looked at wild rice watersheds, because we know wild rice is a very sensitive plant and it changes even the levels of water, the amounts of silt, climate can all impact it.

So I think that looking at the wild rice watersheds is a more reasonable metric to see how many potential impacts there are.

What I got was 41 watersheds that would be potentially -- wild rice watersheds that would be potentially impacted by Enbridge's proposed route.

While I, of course, respect everybody's need to have a job and respect the union immensely, I also really respect the right for tribal communities to exist and survive. If we destroy these wild rice beds, they won't be able to.

Along with -- again, I know that this process isn't necessarily the process for talking about these large scale, long-term energy infrastructure needs.

But again, I've asked this before, like if this isn't the time, when and where will that be? How often are we going to be in a room with employees from the MPCA, the DNR union guys, tribal people, nonprofits, both us and MN350.

I mean, if any of us tried to set up something like this, it would be a very one-sided conversation.

We do know that there are alternatives to oil. There's hemp, which Henry Ford built a car completely made out of hemp which ran on hemp fuel. There's numerous renewable ways to develop electrical cars.

Public transportation, that is a

major issue that we are missing in the United States. A lot of the oil, if you look at the charts of who consumes the oil and where and for what, a lot of it's consumed in the south, in urban areas, because they don't have public transportation.

Why should we be allowing this pipeline to come through, full of the dirtiest oil on the planet, to fuel people's vehicles in the South because they don't have public transportation or they don't want to take a bus.

I'm not going to talk about the abandonment cost and how many potential jobs there are with that. It's well known within the oil and gas industry that they have like max 30 years left of economically viable extracted oil. And I don't consider the tar sands economically viable.

So what that means is in 30 years we have to be ready to be off of oil.

So are we going to build another pipeline and push the time that we start that transition until the next 15 years, the next 20 years, so that in 30 years, when we're

completely out of oil, everybody is going to be like, "Oh, what are we going to do now?"

Our vehicles are going to stopping running. We need to prepare for that now.

That is a major lacking in the EIS, that there's no addressing the issues for future generations.

There's all of this talk about potential impacts and potential benefits, but it's all for now. It's not what is this going to create for the long term?

Real quick, I've also been doing some calculations on what are the environmental impacts of this potential line and the oil industry as a whole.

And, you know, of course, yes, it's going to create some jobs, but it also creates at least $41 billion in social costs from the carbon. We've estimated at $170 billion for the removal of the carbon from the atmosphere.

So those two numbers are different. One is about the impacts that increasing carbon will have on people,

including climate change and things like that.

The other one is the cost to remove the carbon from the atmosphere. Because not only do we have to stop our carbon emissions, but we need to get the carbon out. It's impacting the environment now.

Annual cost, Boreal Forest lost 315 million wetlands in the right-of-way, $3 million, and those are ecosystems services cost.

So wetlands provide a number of services, including water filtration, flood control, biodiversity. And so we would lose $3 million annually from the right-of-way and $315 million from the loss of Boreal Forest.

And I can talk to people more about that later because I'm running low on time.

Just to close, I want to also say that I know you've been trying to do a much better job with consulting with the tribes. But consultation is not consent. Thank you.

MS. NICOLETTE SLAGLE: Hi, Nicolette Slagle. N-I-C-O-L-E-T-T-E. S-L-A-G-L-E. I'm Honor the Earth's research director. I'm not going to talk about oil use or the need to transition off of it or anything of that. I'm going to speak specifically about a

couple of issues with the Draft Environmental Impact Statement.

One of them is the issue of cathodic protection along the pipeline, and this is a -- it's like a charge or a current that's applied to -- and I could be describing it wrong, but it's basically a charge or current that's applied to the pipeline to counteract both microbial activity that causes corrosion on the pipelines and also helps like ground the current that can be created between a pipeline and high-voltage transmission lines when they share the same corridor, which it does. The proposed -- the Applicant's proposed preferred route, for at least a segment of it, shares the same corridor with a high-voltage power line. 2053-1

And in the impact statement it states that this cathodic protection isn't going to be installed for a year after the pipeline is put in the ground. And there's really no examination of what can happen when it's sitting underneath power lines for that long without this protection being put in.

When part of the original Keystone Xcel was put in the ground through an area that it shared a corridor as a power line with, they started

to get a lot of pinhole -- pinholes. They didn't actually put the oil through it, so it didn't get to the leaking point. But they did get pinhole corrosion pits from having the pipeline in the ground in the same corridor as the power lines, without having the cathodic protection in place. 2053-1 Cont'd

Also, along with that, I don't know -- I don't think they started to do it down here as much. I know that over by Cloquet, up by Lake George, a couple of places up by Lake George, they have already started stockpiling pipes. They've had those pipes in those yards for several years now. And there is research out there about the fact that UV rays can corrode pipes when they sit out for that long, because they're not designed to be exposed to UV rays; they're designed to be under the ground. And there's no analysis in the impact statement about what is the potential impact of UV pipes that have been stockpiled for years. 2053-2

Also, with the cathodic protection is the abandonment of the existing Line 3. And, again, you know, they say that they're going to maintain the right-of-way and they're going to keep monitoring it and they're going to keep the cathodic protection in place so that it won't -- you know, if

they shut it off, then that will allow the pipeline to crumble quicker, which could lead to ground subsidence or water conduits being created. But a lot of the issues with this existing line is from the coating that they used on it. And in places that coating has disbonded from the pipeline, so it's not attached to it anymore. And that cathodic protection is now also removed from the pipeline.

So if you already have a system that isn't working and you're not going to go in there and fix the system, how would that system keep working after you stop using that pipeline?

So, yeah, I think that's all that I have on the cathodic protection. But I'd also like to see in the DEIS international standards used for some of this analysis, especially where it comes to tribal and indigenous people's rights and consultation.

So there's a few different international standards. The International Labor Organization passed the convention C169 that addresses indigenous rights when it comes to planning and siting and implementing new projects. There is the UN Declaration of Indigenous Rights, and there's also the equator principle, which is

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used by financial institutes for examining the impacts of projects. And all of these different standards use the standard of free prior informed consent, which means that indigenous need to be -- need to have free prior informed consent, which basically means that indigenous communities are consulted before a project is planned and permits are applied for, not consulted afterwards.

And just along with that, like I'd like to remind everybody that consultation does not equal consent.

Thank you.

MS. NICOLETTE SLAGLE: I'm Nicolette Slagle, N-I-C-O-L-E-T-T-E,

S-L-A-G-L-E.

I'm with Honor the Earth. I am their research director, and I wanted to thank you for bringing up the issues of the oil sand or the tar sands up in Alberta, because as our stance with Honor the Earth, we are wholly opposed to anymore expansion of the tar sands industry for a number of reasons. And so I really appreciate you also stating some facts about how terrible of an industry it is.

One of the things that I've been working on, researching a lot in the last two years is this issue of abandonment. And as you may know, that this line is coming from Canada, and the Canadian National Energy Board is also facing the abandonment of the existing Line 3 up in Canada. So a lot of the information that I have learned about what the potential impacts of abandonment is comes from the research that the NEB has done.

A few interesting things about that is that I was able to speak yesterday with some representatives from the Canadian Association of Energy and Pipeline Landowner Association. So this is a group that was

started by a Canadian landowner that had a pipeline running through their yard that was concerned about what would happen if that pipeline was abandoned.

And what I learned is that back in 1985, the National Energy Board actually had on their books seven different regulations related to pipeline abandonment, and their preferred method for dealing with abandonment was complete removal.

Now, some politics changed up there, a lot of those regulations got removed from the books, but the CAEPLA organization is working to get some of those back on there, including landowners' choice of what happens to pipelines that run through their yards.

So it is possible to completely remove pipelines and it is an expense that most likely somebody will bear. And we want to make sure that it is the company that is bearing those costs and not society.

Now, as it relates back to this, the issues here in Minnesota, and this document in particular, I'm going to read a couple of things and I will tie them together. This is

from the CAEPLA's summer 2016 magazine. It's an article about aging pipelines, what are the risks. And it's an article about independent research that is co-sponsored between Enbridge and CAEPLA.

"Enbridge has acknowledged that the extensive disbonding of the Line 3 polyethylene tape pipe coating will render cathodic protection ineffective to prevent corrosion and has estimated time to through wall penetration at 25 to 50 years.

"Progressively greater agricultural surface loads increase the potential for pipeline collapse and ground subsidence. In addition to health and safety concerns and related costs and liabilities, topsoil loss upon ground subsidence will result in permanent long term production losses."

So I read that and I was thinking back to myself, okay, I don't really remember that being stated as clearly in the DEIS. I have tried to read as much of it as possible, and I did manage to read the entire section on abandonment because it was about 14 pages.

So in here, in section 8.3.1.2,

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"Existing Line 3 as a Water Conduit," so this is one of the issues that if there is through wall corrosion, water can get into the pipeline and it can move through the pipeline into different areas.

So yeah, basically says that this could happen but cathodic protection in cementing the pipeline would minimize the effects on water resources. And it says here that -- yeah, over time -- well, basically it says cathodic protection is going to limit that from happening.

And so I was interested to see -- again, they didn't give any numbers, just that the cathodic protection is going to stop that from happening.

But if you then go into appendix B, which is the appendix to the abandonment section, so it has more of the technical documents and additional information that were used to -- I'm assuming, used to create the section on abandonment.

So from that, on page 26 of appendix B, Line 3 is externally coated with polyethylene tape. A Gas Research Institute

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report published in 1992, provides information that, "The most common problem reported by the pipeline operators who had used tape coating on their pipeline systems were poor field application, failure of adhesive, poor resistance to soil stress and high susceptibility to shielding the current of the cathodic protection system."

There's some more talk about what's happened over the years. The end of the second paragraph, "Once the wrinkles form, water is able to seep under the disbonded coating and is carried along the pipeline's steel surface by capillary action. Permeation of the CP current is limited due to high dielectric strength of the polyethylene tape shielding the current."

Which, long story short, basically they're saying that, well, the cathodic protection is already disbonding from the pipeline. So again, I really want to understand how their cathodic protection is going to protect this pipeline when it's not even functioning now.

So then they have a lot of

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assessments, of corrosion rates, and some charts here, how long it may take.

Page 29, and so there's a graph, "Based on this information, the worst case time to failure from the original installation is estimated at 51 years. Based on this, it would be assumed that the pipeline is already penetrated or is likely to be within the next five years considering an in-service date of 1968."

Now, it does say, "This demonstrates the over-conservative nature of the corrosion rates presented in the PTAC Model when compared to the corrosion rates experienced on Line 3."

Okay. So what -- based on the existing corrosion rates, what time frame are we looking at? "Figure 4.8, yields estimates of time to through wall penetration based on the PTAC Model between 25 to 50 years from 2011."

So finally, after digging through all of that, we see that, yes, actually 25 to 50 years is how long we could have through wall corrosion because of the limited functioning of

2062-1
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the cathodic protection system.

FACILITATOR: Been about seven minutes.

MS. NICOLETTE SLAGLE: Okay. So I just would like the abandonment section to be a lot more clear about the fact that these issues are not going to happen sometime in the far away future, they're going to happen within people's lifetimes. And I really do think that the State needs to complete an entirely separate Environmental Impact Statement on the issue of abandonment, because, as Allen said, this is not the first -- well, it is the first major pipeline, but it is not going to be last.

Thank you.

Levi, Andrew (COMM)

From: MacAlister, Jamie (COMM)
Sent: Tuesday, July 11, 2017 10:14 AM
To: MN_COMM_Pipeline Comments
Subject: FW: DEIS Comments
Attachments: Comments_NS.pdf

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
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From: Nicolette Slagle [mailto:nicolette.slagle@gmail.com]
Sent: Monday, July 10, 2017 11:41 PM
To: MacAlister, Jamie (COMM) <jamie.macalister@state.mn.us>
Subject: DEIS Comments

Hi Jamie,

Please see my attached comments.

Scan Jul 9, 17.pdf

pipeline risks scan nicolette.pdf

Bob Merrit_Addendum.pdf

Grand Rapids_Ltr_ Line 3 Draft EIS Comment.pdf

Barbara Harper_Line 3 Review.pdf

Leah_critique of DEIS_EJ.pdf

CJ_COMMENTS ON THE DIRECT TESTIMONY OF RAY WUOL...

CJ_STANTEC PINHOLE RELEASE CRITIQUE.pdf

Nicolette Slagle

Only after the Last Tree has been cut down,
Only after the Last River has been poisoned,
Only after the Last Fish has been caught,
Only then will you find that
Money Cannot Be Eaten.

Indigenous Science and Traditional Ecological Knowledge (TEK)

Traditional Ecological Knowledge has been developed over centuries of living in the landscape, developed through a methodology known as Indigenous science. Indigenous science is just as methodological and empirical as Western science, but is defined by several important distinctions. First, Indigenous scientists, and cultures see time a cyclical. Second, Indigenous science is holistic and systems based. Third, Indigenous scientists utilize a sixth sense that is not understood by Western scientists. Finally, Indigenous science structures Indigenous societies in a much more fundamental way than Western science does.

The recognition of the inseparability, reciprocity, and responsibility between humans and the rest of creation, particularly land and place, serves to create an ethical code of conduct in interacting and being in the world. TEK emphasizes that all aspects of physical space are considered part of a connected, interrelated community (humans, animals, plants, land), shifting the Western emphasis from the human to the ecological community of which humans are an integral part. According to Pierotti and Wildcat (2000), a core component of TEK is that non-humans and nature exist on their own terms independent of human interpretation. Additionally, TEK acknowledges that IP are native to a place and live with nature – following an ethical code of conduct that exists in relation with ecosystems – in contrast to dominant Western worldviews (e.g., Manifest Destiny), which assumes humans are superior to, separated from (e.g., going "into nature"), or in opposition to – where nature needs to be tamed or conquered primarily for the benefit of humans (Pierotti and Wildcat 2000).

Many of the principles of western science are based on a type of logic and mindset which require hierarchical thinking. Non-reciprocal causality, for instance, requires that one think of phenomena in the following way, according to Marayama as cited by Cajete:

> **"'***That for every effect there is one single cause which can be objectively observed and described given the proper tools, the correct hypothesis and appropriate experimentation.' Non reciprocal, or what has been popularly termed 'linear thinking' conditions for 'mono-polarization' in both thinking and personality development . 'Mono explanation' is defined as a 'psychological need to believe that there is one universal truth, and to seek out, find secret in, and hang onto one authority, one theory , uniformity, homogeneity, and standardization'"***.**[1]

In TEK systems, there is a more holistic understanding of cause and effect. There is an understanding that cause A and effect B cannot be isolated from cause B and effect B in a system. This is known as "mutualistic logic" and "reciprocal causality".[2] **In practical terms, this is the difference between examining the increase of GHG from a pipeline project (by direct emission, replacement increases, etc) and examining the impact increased investment in fossil fuel infrastructure will have on future**

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[1] Cajete, A. Gregory. Igniting the Sparkle: An Indigenous Science Education Model. Michigan: Kivaki Press, 1999.
[2] IBID.

generations.

As TEK system recognize a mutual relations between all things in the natural world… animals, plants, humans, celestial bodies, spirits and natural forces, they strive to maintain a balance in this system. Instructions for maintaining this balance are handed down, generation to generation through rituals, storytelling, and other means. Often, these rituals and knowledge-transfer activities are directly tied to the place the knowledge relates to.

Ways of knowing

In addition to linear thinking, western science also emphases knowledge developed through experimentation and repetition. These processes form the basis of logical/mathematical and spatial intelligence, however, there are more domains of intelligence than these two. These include; linguistic, kinesthetic, musical, interpersonal (understanding of people), and intrapersonal (understanding of self)".[3] Indigenous scholars also recognize the existence of additional domains- spiritual intelligence and interspecies intelligence as well. Simply stated, this is an ability to communicate with the spiritual world, a plane which exists in the Anishinaabe world as a parallel world, and is accessed through prayer, ceremony, or may manifest when it decides to do so.

Anishinaabe Akiing: The Land to Which the People Belong

The very definition of "indigenous" intimates a sacred thread or reciprocal tie to land, place, and identity (King 2009). Cajete (1999: 6) notes that the word "indigenous" "is derived from the Latin root indu or endo, which is related to the Greek word endina, which means 'entrails.' Indigenous literally means being so completely identified with a place that you reflect its entrails, its insides, its soul." Any disruption in indigenous land, place, or culture clearly has a potentially harmful effect on indigenous health and wellness, which may then persist for generations to come (Walters et al. 2002: 166)

IP have unique attachments to original lands, and we carry these attachments, or sacred threads, wherever we go. These attachments are linked not only to special or sacred ritual sites but also to the whole of land and creation. In fact, the boundaries between "sacred sites" and secular sites are often difficult to define or even nonexistent as all land and locations are viewed as sacred (Zarsky 2006). AIAN belief systems and emotional intelligence descend from these attachments. While typical mainstream conceptualizations of place often have a unidirectional and temporal order, indigenous conceptualizations do not. In her research exploring the role of healing landscapes with the Amuzgo Indians of Oaxaca, Mexico, Elizabeth Cartwright (2007: 10) cites Casey's (1993) description of place to illustrate the idea that "who we are is based on where we are": Place ushers us into what already is: namely, the environing subsoil of our embodiment, the bedrock of our being-in-the-world. If imagination projects us out beyond ourselves while memory takes us back behind ourselves, place subtends and enfolds us, lying perpetually under and around us. In imagining and remembering, we go into the ethereal and the thick respectively. By being in a place, we find ourselves in what is subsistent

[3]IBID.

and enveloping. This description illustrates a more complex comprehension of place by appreciating the past and future sensory experiences along with the enveloping and alive process of the present. It brings alive the possibility of place as not occurring at a particular instance but something that happens dynamically in all directions over time.

> *The Anishinaabe person is inseparable from the land; identity, sense of place and history is intimately related to the land. We originated here. The North American Indigenous person did not migrate from anywhere else, nor originate from any other peoples. The Creator took four parts of Earth and molded the form of the first human person. Since then, all of humankind has been related to the Earth in a very intimate way -- the Earth, in fact, is our Mother. The human person is a relative to all other persons of the Earth, and, along with all creatures call the Earth, Mother. "*[4]
>
> **James Dumont (Foushee and Senogles)**

> *"At the time of first European contact, the Anishinaabe Nation extended from the East Coast to the Red River Valley here in the West, from the Hudson's Bay in the North and South to about the Ohio River Valley. These are all people who spoke Algonquin-based language, although different dialects. They were all related through the language. The language is a very important and sacred means of communication. Ten to twelve thousand years ago, where we are living now, was covered with ice. Our oral history goes back that far when our ancestors lived on the Atlantic Coast. ..."*
>
> *Earl Hoagland (Foushee and Senogles)*

> *We are place, we are. Not those who occupy that place. We do not exist, we are. We only are.*
>
> **Comandante David and Subcomandante Marcos**

> *Our story is in the land. It is written in those sacred places. My children will look after those places. That's the law.*
>
> **Ggudju elder (indigenous Australian): Cited in (Burgess et al. 2005: 118).**

> *"Native American intellectual tradition still continues to express the North American landscape in intellectual and spiritual reciprocity, where the more-than-human grants qualities of mind to the human"*
>
> **Sheridan and Longboat 2006**

In TEK, "place" is not given meaning by the human mind, rather, it is understood places express their meaning to IP through the intimate relationship they share. IP converse with places, as though they are relatives. This is demonstrated in the indigenous constructs of place and beings that inhabit place or space as "relatives" or "relations" as revealed in common references to "mother earth" or to rocks as "grandfathers."

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[4] Foushee, Lea, and Renee Gurneau. Sacred Water: Water for Life. Lake Elmo, MN: North American Water Office, 2010. Pg. 37.

Gregory Cajete, a Tewa scholar (2000: 186) notes Native people express a relationship to the natural world that could only be called 'ensoulment'…which for Native people represents the deepest level of psychological involvement with their land and which provides a kind of a map of the soul. The psychology and spiritual qualities of Indigenous peoples' behavior…are thoroughly 'in-formed' by the depth and power of their participation… with the Earth as a living soul. It was from this orientation that Indigenous peoples develop 'responsibilities', and maintain those. This is also referred to as a covenant with the Creator and all that is created- the land, water and all living things. As Cajete notes, "' In the Native mind, spirit and matter are not separate: They are one and the same….

Place is part of our ancestral heritage, our present, and our future. It links us in immediate and visceral ways to our past, present, and future. In this sense, IP emerge from the place and have a bidirectional relationship of caring with place – place cares for us and we care for it. In a study investigating the connections between culture, health, and place in First Nations people, Wilson (2003: 88) asked First Nations (Anishinabek) individuals about their views on the influence of the land on spiritual, physical, mental, and emotional health.

> **"***I believe that we came from the earth – just like everything is alive, potatoes, plants, anything comes alive and flourishes with flowers. The earth provides everything, wild animals, insects. The earth provides for us. The earth provides strength, that's why we call it mother. She provides life…helps us live. Without her we would not live.***"**

In Anishinabeg worldviews, the earth is seen as a feminine being and is regarded as the source of all life-sustaining things (Wilson 2003). Another description from an elder expresses similar sentiments (Wilson 2003: 88):

> *"Mother Earth is everything that you see. You look everywhere on earth and you see Mother Earth. The way you raise your children, the way people do things together, the way we live among our people. She is in everything we do."*

As Wilson (2003: 88) notes, "the relationship Anishinabek have with the land cannot be captured by the simplified notion of being 'close to nature.' The land is not just seen as shaping or influencing identity, but being an actual part of it."

We live in a world of inter-relationship and responsibilities to other parts of reality. As such, we can not limit our assessment to just our treaty areas, or just Anishinabeg Akiing. The reality is that these projects, the pipelines and the tar sand extraction they support, have massive impacts both upstream and downstream. In the case of the pipeline, that includes the communities near the extraction of the tar sands and the downstream communities around refineries (and ultimately, the communities where the oil is combusted). As well, the pipeline requires significant energy to move a million barrels of oil. Power lines are proposed throughout our territory, and the power for these lines must be sourced. We will review some of the impact of these infrastructure additions. The downstream communities of this project are both the Anishinaabe tribal communities, and the multitude of communities impacted directly by the tar sands refineries.

The extraction communities:

As described above, this would include the communities around the tar sands projects in Alberta. The Lakehead system also carries Bakken oil and these communities should be included in this assessment as well. These communities are all facing increasing pollution burdens, serious environmental justice issues and increasing sexual assaults.

Alberta

The beginning of this energy corridor, is the Alberta Tar Sands, home of the Mikisew Cree First Nation, Athabasca Chipewyan First Nation, Fort McMurray First Nation, Fort McKay Cree Nation, Beaver Lake Cree First Nation Chipewyan Prairie First Nation, and the Metis. Their lands and health have been destroyed by the tar sands industry.

The Bakkens

The Lakehead system also carries Bakken oil, produced through hydrological fracturing the shale that underlays the lands of the Mandan, Arika and Hidatsa in North Dakota.

The refinery communities:

While there is indication that much of new pipeline capacity will be bound for international markets, either as crude or refined products, Enbridge's system (of which Line 3 is a major component of) feeds into several refineries across Turtle Island. As the refining of the oil will increase the pollution burden of these communities, we will examine few case examples and develop a profile of their pollution burden.

Aamjaning

A destination for much of the oil that comes through the Lakehead system ends up at the refineries around Sarnia, the homelands of the Aamjaning community.

Detroit

A major partner in Enbridge's Bakken oil investment is Marathon. They run a refinery in Detroit. This refinery has also recently been upgraded to handle Tar Sands crude.

Flint Hills

Just south of Minneapolis is Flint Hills. This is the final destination of the Koch Brother's pipeline, which the Lakehead system feeds directly into.

The Global Community

All these projects will increase global greenhouse gases and persistent organic pollutants and toxic heavy metals. Additional carbon and other emissions should be explored for these projects. Specific cases study examples will be explored: Indigenous Climate Refugees in Louisiana, Alaska and Manitoba

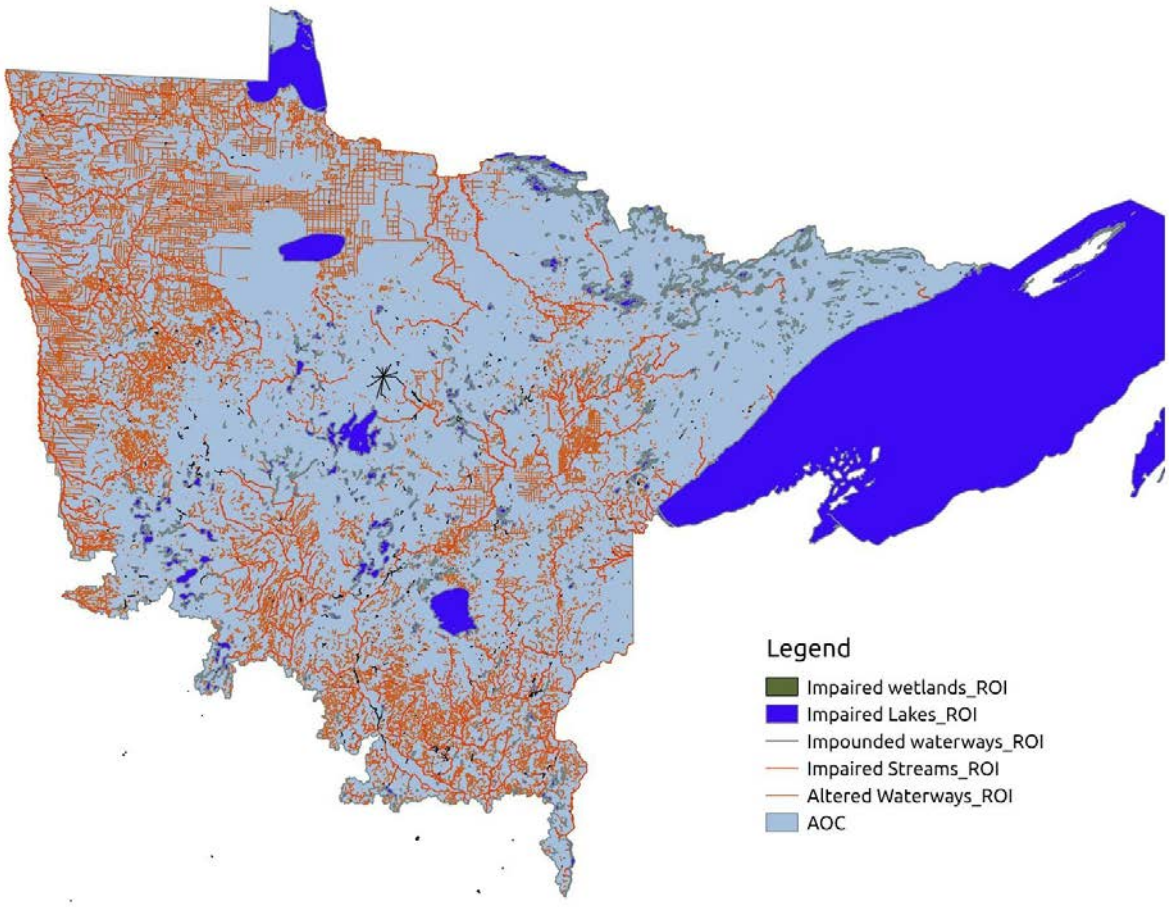

HISTORIC THEFT AND ECOLOGICAL DAMAGES

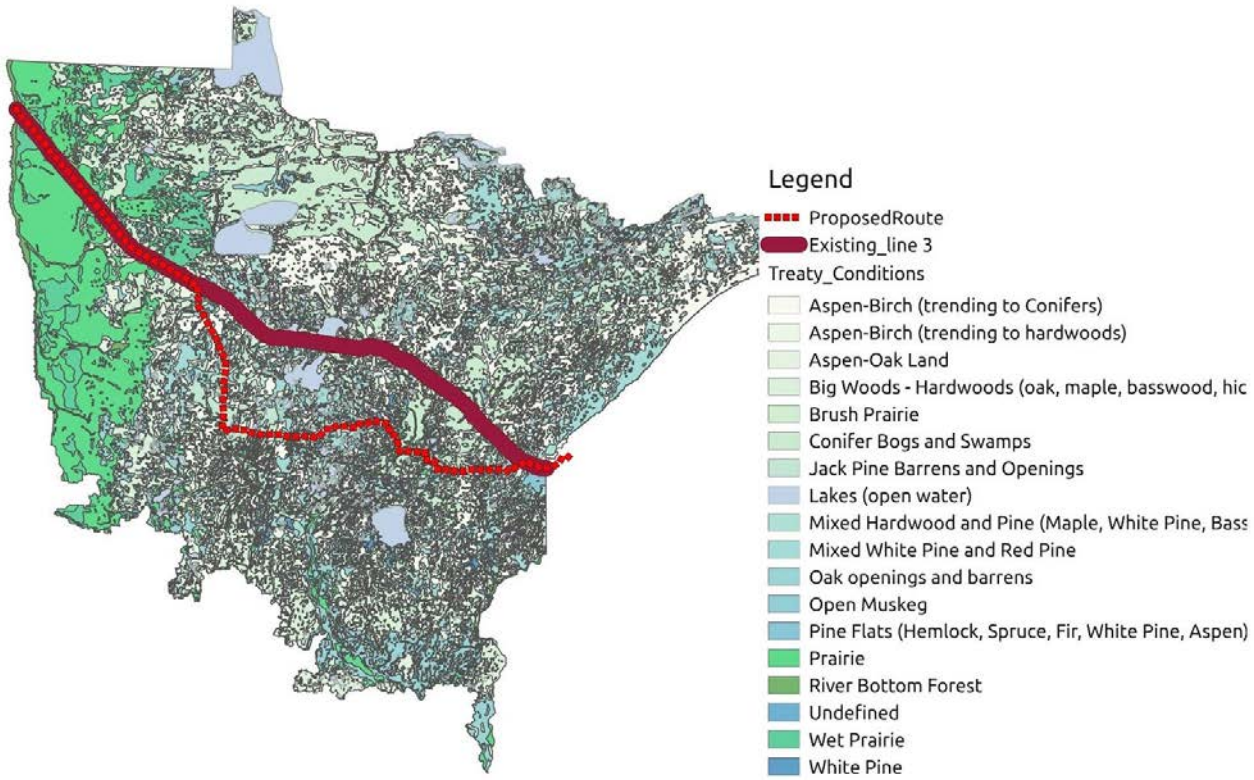

The Anishinaabeg do not possess ecological amnesia. An intergenerational transfer of knowledge and a reaffirmation of the Anishinaabeg in the world ensures that nothing is forgotten.

While the present EIS of the state of Minnesota includes baseline analysis of some ecosystems and watersheds of the region which will be impacted by the proposed pipeline project , we believe that the baseline is inadequate. Since the signing of the treaties of l827, 1842, 1855 and l867, amongst others, which reflect the territory of the Anishinaabeg and treaty protected resources, there has been significant loss of environmental and ecosystem wealth due to state management practices and decisions made, which caused significant impact to Anishinaabeg communities. This is not referred to as loss, that would imply that Anishinaabeg people lost these things- water, land, forests, copper; we will refer to this as theft:

As the 19th Century gave way to the 20th, more and more problems came to the fore with the deforestation and pollution of the ceded land, as well as the pollution and destruction of the valuable waterways. This colonial destruction of land would greatly harm the Anishinaabeg ability to relate to the land and its inhabitants in ways that are culturally recognizable. The ability for Anishinaabeg and other American Indian peoples to effectively reproduce their worldview and respective ideologies would become strained. Considering the intentionality and the violence with which this strain was implemented in the form of deforestation, pollution of land and water, as well as the policies of

boarding schools, termination and relocation, this strain is best understood as genocidal.[5]

Minerals Access and Loss

The US government has never claimed to hold or control Anishinaabeg land "by right of conquest". Rather it claims to have legally acquired Anishinaabeg and other lands by mutual agreement. Some of the first incursions on to Anishinaabeg land were to secure access to iron and copper deposits. By l800, representative of both the Queen of England and the emerging US had "discovered" a 2500 pound boulder of naturally occurring copper called the "Ontonogan Boulder" resting on the south shore of Lake superior in Anishinaabeg territory, in what is now known as the Kewanee Peninsula. In the l820s, the federal government had decided to do a comprehensive study of the "mineral assets" of the Lake Superior area and study of Indian title to the land therein. Within a very short period, four treaties were signed, each providing for access to and mining in Anishinaabeg territory. These treaties covered both the Kewanee Peninsula and the Mesabi "Sleeping Giant" iron ore belt in northern Minnesota.

By mid century, more than 100 copper companies had been incorporated in Minnesota , Wisconsin and Michigan territories. As early as l849, copper production at Kewanee Peninsula ceded by the Anishinaabeg in the treaty of l842, led the world. Similarly beginning in l890 and continuing for nearly fifty years, mining at Mesabi accounted for 75 percent of all US iron ore production.

Mining, and mining proposals continue today, representing a major impact on Anishinaabe Akiing. More on these in later sections.

Forest Loss

After the mining rush, came the timber rush, focused on the northern woods full of valuable white pine.

Great White Pine Forests:

In the summer of 1837, Governor Dodge of the Wisconsin Territory signed a treaty with the Anishinaabeg to secure the beginning of the pine lands in the St. Croix Valley. With that treaty, lumber interests secured the last outpost of the great white pine forests that had once extended from Maine to Minnesota. Within fifty years of the signing of that treaty, 75 million acres of forest had been clearcut.

Not content to that which remained off the Chippewa reservations, the lumber companies secured

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[5] Here it is useful to think of genocide as defined by the United Nations in its Convention on the Prevention and Punishment of the Crime of Genocide. Article II states that "genocide means any of the following acts committed with intent to destroy, in whole or in part, a national, ethnical, racial or religious group, as such: a) Killing members of the group; b) Causing serious bodily or mental harm to members of the group; c) Deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part; d) Imposing measures intended to prevent births within the group; e) Forcibly transferring children of the group to another group." Online text, available at https://treaties.un.org/doc/Publication/UNTS/Volume%2078/volume-78-I-1021-English.pdf. Accessed on January 10, 2015 11:21 pm. While it has been argued that the wording of "intentionality" is not necessarily present in the actions taken by the United States Government, the boarding school teachers, nor the doctors performing forcible sterilizations of American Indian women in the mid-20th Century, there is no doubt that these actions have effectively perpetrated the crime of genocide against American Indian peoples. The removals to reservations and the subsequent loss of land and the inability to effectively feed your community from your homeland because of its destruction by means of deforestation and pollution is also part of this genocidal process.

through laws forwarded by Minnesota Senator Nelson and Representative Steenerson, to open up what remained of Anishinaabeg territory.

"Cruisers of lumber companies also made their examinations and notes. As there were still standing on White Earth reservation some three hundred million feet of pine, as roughly estimated, it was worth their while…" **(Folwell: :267)**

In 1889, Minnesota ranked second in the country in logging, with the northwestern section leading the state's production. In l889-l890, 11 million board-feet of lumber was taken from the White Earth reservation. In the next year, 15 million board-feet were cut, followed by another 18 million in 1891-92 season.

By 1895, Frederick Weyerhauser of Little Falls, Minnesota, owned more acres of timber than anyone else in the world. The Little Falls Daily Transcript would write in 1893:

"Weyerhauser's Pine Tree Lumber company "... is eating a big hole in the forests of northern Minnesota , as it runs steadily, rarely meeting an accident ... The Weyerhausers have secured a monopoly of the Mississippi River so far as the driving of logs is concerned …"

*In 1893, Weyerhauser and other lumber interests secured funding from public and other sources to build a railroad from Little Falls into Leech Lake reservation , where Weyerhauser had access to 800,000 board feet of standing timber. But in October of 1898, when the Anishinaabeg people on nearby Leech Lake reservation resisted further encroachment, the military came to the defense of lumber companies. Later private Oscar Buckhard was awarded a medal of honor for ' distinguished bravery in action against hostile Indians.***"**

The largest log jam in the world occurred in Little Falls, Minnesota, in 1894, a time of the logging of northern Ojibwe reservations. The log jam (according to Theodor Mattson, in the Sister Bernard Coleman et al book, Old Crow Wing) was six-and-a-half miles long north and one-half mile wide and 60 feet deep in most places. Estimated to contain four billion five hundred feet of lumber, it took 150 men, five teams of horses, and one steam engine six months to break it up.

The White Earth reservation was perhaps hit the hardest in terms of ecological damages, and taking of trees. As it continued, in 1897, 50 permits were issued for 70 million board- feet of timber from the reservation. By l898, in excess of 76 million board-feet were being cut annually. " (LaDuke 117-118) (Folwell) .

White Earth: The Appropriation of a Homeland

Not content to take just the great pines, the lumber companies and land speculators set their eyes upon the land itself. Mechanisms were set in place to pry land from children at boarding school, blind women living in overcrowded housing, veterans, and those who could not read or write English. A common saying describing what happened sprung up in nearby Detroit Lakes: "Fleec[ing] the Indian."[6]

A quarter of a million acres of White Earth land were taken by the state of Minnesota as tax payments. In other cases, minors were persuaded to sell their lands illegally.

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[6] Folwell, pp. 263-64.

Through almost every conceivable mechanism, the land changed hands. As one Anishinaabe elder, Fred Weaver, recalls, "We used to have a lot of them lands here around Pine Point. We had eight 80s [80-acre allotments]. Them land speculators came and tricked us out of them lands. My mother had an 80 on Many Point Lake. They tricked her out of that for $50. Now that's a Boy Scout camp. And my father-in-law, Jim Jugg, he had land too. The County says it owns them lands, too. All of them. We lived poor a long time, and we should've had all of them lands."[7]

By 1904, 99.5 percent of the remaining reservation lands were allotted, and ten years later, just 14 percent of the original White Earth land was still in Indian hands.

The newly acquired land was a bonanza to the border towns and the timber industry. Land companies emerged overnight, fly-by-night mortgage outfits held deeds for thousands of acres of lands, and timber companies closed in on leases to clearcut almost a third of the reservation.

"There is a myth, which was created at that time," Bob Shimek, a local Native harvester turned forest activist, reminds me. "It was this Paul Bunyan myth, Paul and Babe, and their ability to change the landscape. That myth is in the center of America, and that myth is what we are dealing with today."[8]

The stripping of the great forests of White Earth began a process that would be devastating to the Anishinaabeg forest culture. Great maple trees and maple sugarbushes moved horizontally toward logging mills, clearcuts replaced biodiverse groves of medicinal plants and trees, basket-makers searched for materials, and birchbark canoe-makers couldn't find the huge trees for the great Anishinaabeg canoes. The Anishinaabeg had become "painfully aware of the mortality of wealth which nature bestows and imperialism appropriates," as Latin American scholar Eduardo Galeano wrote in 1973.[9] "There was quite a forest when I left, before the war started," recalls Bill Gagnon, a White Earth elder, "and when I came back on furlough, there was just a desert. There was no timber left."[10]

Another notes how "the clearcut logging just hurts everything… I have a place I like to pick strong woods medicines. The medicine I pick in the jackpine forest, it's a lifesaver. The jackpines, they've been butchered. Where they've been butchered, the medicine's gone."[11]

In the beginning, the Anishinaabeg people simply crowded together in the remaining houses, as one family was pushed off the land into another family's house. This adaptation was not without consequences, as the recently traumatized refugee population was susceptible to illness. From 1910 to 1920, epidemics of trachoma and tuberculosis swept through the villages on White Earth. Every family was affected, and some families disappeared altogether. As Minnesota historian William Folwell reports, "The principal conditions of the Indians at White Earth the inspectors found to be 'very bad.' Fully 60 percent of the people were infected with tuberculosis, from 30 to 35 percent with trachoma, and from 15 to 20 percent with syphilis; and the diseases were on the increase.[12]

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[7] Meyer, pp. 168-70.
[8] Interview with Robert Shimek, March 15, 1998.
[9] Eduardo H. Galeano, *Open Veins of Latin America*, New York: Monthly Review Press, 1973, p. 13.
[10] Interview with Bill Gagnon, June 1983.
[11] Laura McLeod interview with Sunfish Oppegard, August 1997, in White Earth Land Recovery Project harvester study.
[12] Folwell, p. 283.

After a few years, the federal government came to view the social experiment of White Earth as a failure and sought to relocate the White Earth people. This was perceived as the final assimilation and the end of a long road for the White Earth people. By 1930, of the total enrolled population of 8,584 persons, only 4,628 remained on the reservation, slightly more than half. In the mid-1930s, more White Earth land was annexed to form the northern half of the Tamarac National Wildlife Refuge, which ostensibly became a hunting area for non-Indians from the South. By 1934, only 7,890 acres, or less than 10 percent of the reservation was in tribal trust, and Indians were being arrested for traditional harvesting on White Earth land that was now considered "private property" requiring permits. In a harvesting economy that had existed for eons, this was a strange transformation.[13]

Removals continued under the so-called Relocation Act of the 1950s, under which tribal members (and native people across the country) were offered one-way bus tickets to major urban areas.

The Land Struggle Continues

In 1966, as a result of mounting criticism of its management of the estate of Native peoples, the "wards of the federal government", Congress decided to look at the problem of loss of land and other assets in Native America. It had become clear to the public that in spite of the supposedly vast Native landholdings, Indian people were not doing very well. Every economic, social, and health indicator showed Native people at the bottom.

Title VIII of the U.S. Code, section 2415, mandated a federal investigation into land and trespass issues since the turn of the century on some 40 reservations in the United States. It wasn't until 1978 that what became known as the "2415 investigation" came to White Earth, and it was 1981 when federal investigators began to interview elders on the reservation, who had first-hand knowledge of how the land had been plied, stolen, or taken.

However, the investigation did reveal the tangled mess that each title to Anishinaabeg land had become. For over 60 years, the Bureau of Indian Affairs hadn't properly recorded the many complex transactions that had occurred during the great transfer of land from Indian to non-Indian hands. Ultimately, it was revealed that the state of Minnesota's claim to White Earth lands and their subsequent sales and transfers of those lands were, in fact, illegal. Further damning the state's Native land transactions, the Minnesota Supreme Court ruled, in the 1977 case *State of Minnesota v. Zah Zah*, **that the tax forfeitures that removed the Indians from the lands in the late 1800s were also illegal. According to the court, "the removal of the U.S. government's trust responsibility under the 1889 Nelson Act should not have occurred unless the allottee applied for such removal."[14]**

In 1982, with less than a third of its research complete, the 2415 investigation team published a preliminary list of several hundred land parcels with questionable title transactions. The title to such parcels was "clouded", they wrote, and thus could not be legally sold or transferred until the title was cleared. This meant that thousands of acres of Minnesota's land, much of which was owned by farmers, could not be used by their erstwhile owners as collateral to secure mortgages or other sorts of loans.

We are attempting to complete a comprehensive assessment of what was lost in this timber rush, both

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[13] LaDuke.
[14] Meyer, p. 230.

in land, ecosystems and board-feet.

What is clear is that the value of the ecosystems and the services they provide throughout Anishinabeg Akiing and the 1855 Treaty Area has vastly diminished since the formation of the United States of America.

Both Native and Non-Native populations are increasing in these areas. Either the primary consumers need to cut back on consumption, or primary wasters need to cut back consumption.

Tribal communities can be seen as primary consumers as they live closest to the land, both culturally and economically. Across the seven tribes in Northern Minnesota, manoomin and other wild harvested or gathered foods and products make up the backbone of the communities' economies. Among ricers, this is amply evident as demonstrated by the years of comments and testimonies by traditional ricers.

Ricing season is short, about one month. During this time, ricers plan to gather enough to support their family for as much of the year as they can. Basically- *they earn their entire year's income in a one month period.*

This pipeline proposal- all elements of it (abandonment, expansion, the tar sands), threaten this lifestyle. Honor the Earth will in no way condone the approval of this project.

The primary wasters can be seen as the urban communities whose development and expansion were funded by the resources from the treaty areas. This includes the city of Minneapolis.

The Mississippi River headwaters area not only provides drinking water for the city of Minneapolis, but also is extensively dammed for flood control.

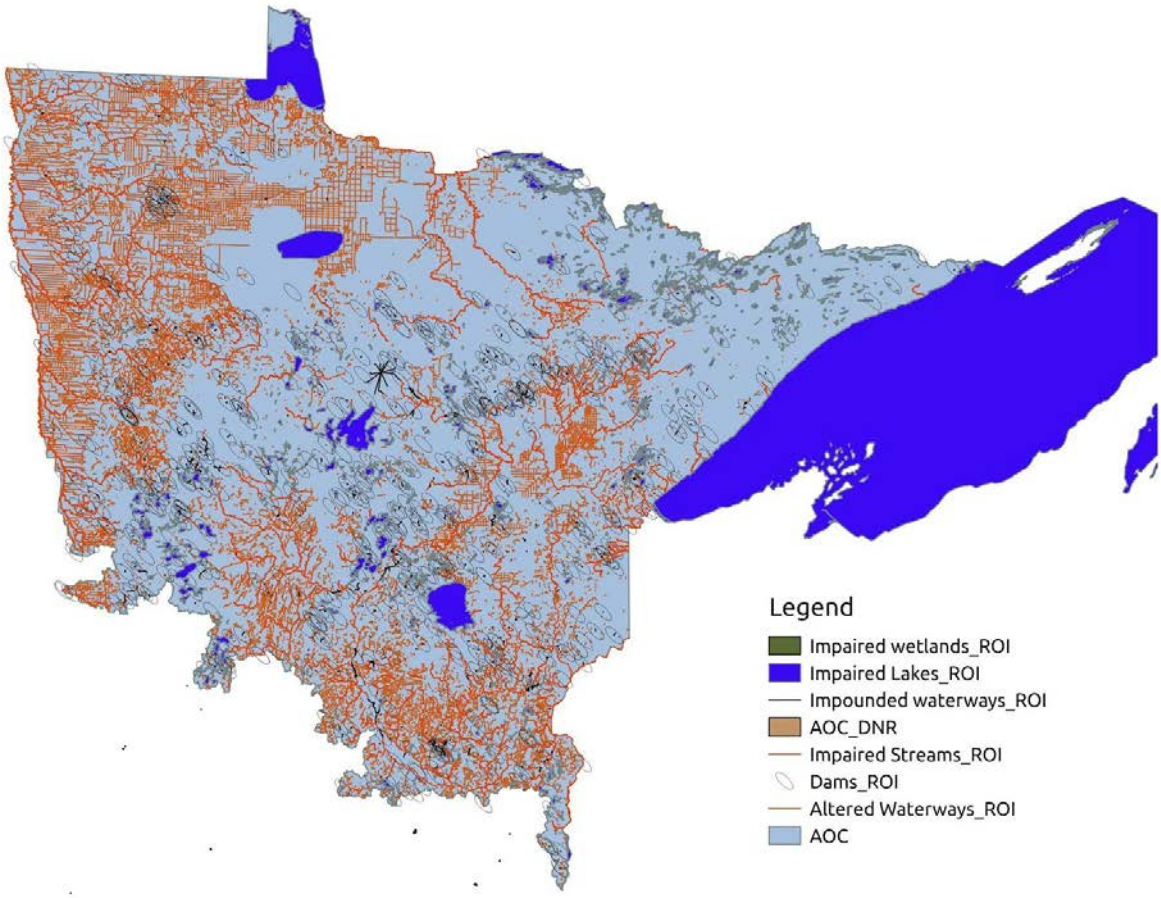

Voices of the Future

The investment in this project, or a future that remains dependent on fossil fuels is not a future we want to leave for our children.

Throughout this process we have seen youth standing up and saying "NO". From the Youth Climate Intervenors to the youth that have made public comments which ended in tears at the public meetings. In a time when critical decisions need to be made about the shared future we are working towards, toxic projects such as tar sands infrastructure can not be permitted. Not by State Agencies, nor by the communities they would impact. We have seen the opposition to these projects across the globally, and locally in our backyard in North Dakota.

The future we want to leave for our children is fueled by renewable resources, is efficient, does not waste, and restores.

Between you and I, we do not need more fossil fuel extraction.

100% MINNESOTA

Transition to 100% wind, water, and solar (WWS) for all purposes
(electricity, transportation, heating/cooling, industry)

2050
PROJECTED ENERGY MIX

- Residential rooftop PV **2.5%**
- Solar PV plants **9.9%**
- CSP plants **2%**
- Onshore wind **60%**
- Offshore wind **19%**
- Commercial/govt rooftop PV **3%**
- Wave devices **0%**
- Geothermal **0%**
- Hydroelectric **3.6%**
- Tidal turbines **0%**

40-Year Jobs Created
Number of jobs where a person is employed for 40 consecutive years

Operation jobs: **29,767**

Construction jobs: **46,025**

=10,000

Using WWS electricity for everything, instead of burning fuel, and improving energy efficiency means you need much less energy.

VISIT THESOLUTIONSPROJECT.ORG
TO LEARN MORE AND 100.ORG TO JOIN THE MOVEMENT

THE SOLUTIONS PROJECT

Data from Stanford University - For more information, visit http://go100.me/50StateTargets

FOLLOW US ON 100isNow SolutionsProj

100% MINNESOTA

Transition to 100% wind, water, and solar (WWS) for all purposes
(electricity, transportation, heating/cooling, industry)

Avoided Mortality and Illness Costs

Avoided health costs per year:

$6.2B

1% of State GDP

Air pollution deaths avoided every year: **692**

=100

Plan pays for itself in as little as **3** years from air pollution and climate cost savings alone

Percentage of Minnesota Land Needed for All New WWS Generators

0.10% Footprint area

2.58% Spacing area

Future Energy Costs 2050

BAU (Business as usual)

WWS (Wind, water, solar)

U.S. average fossil-fuel energy costs*

9.3 c/kWh

*Health and climate external costs of fossil fuels are another 5.7c/kWh

State average WWS electricity costs

9.8 c/kWh

Money in Your Pocket

= $2,000

Annual energy, health, and climate cost savings per person in 2050: **$9,134**

Annual energy cost savings per person in 2050: **$98**

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TO LEARN MORE AND 100.ORG TO JOIN THE MOVEMENT

THE SOLUTIONS PROJECT

Data from Stanford University - For more information, visit http://go100.me/50StateTargets

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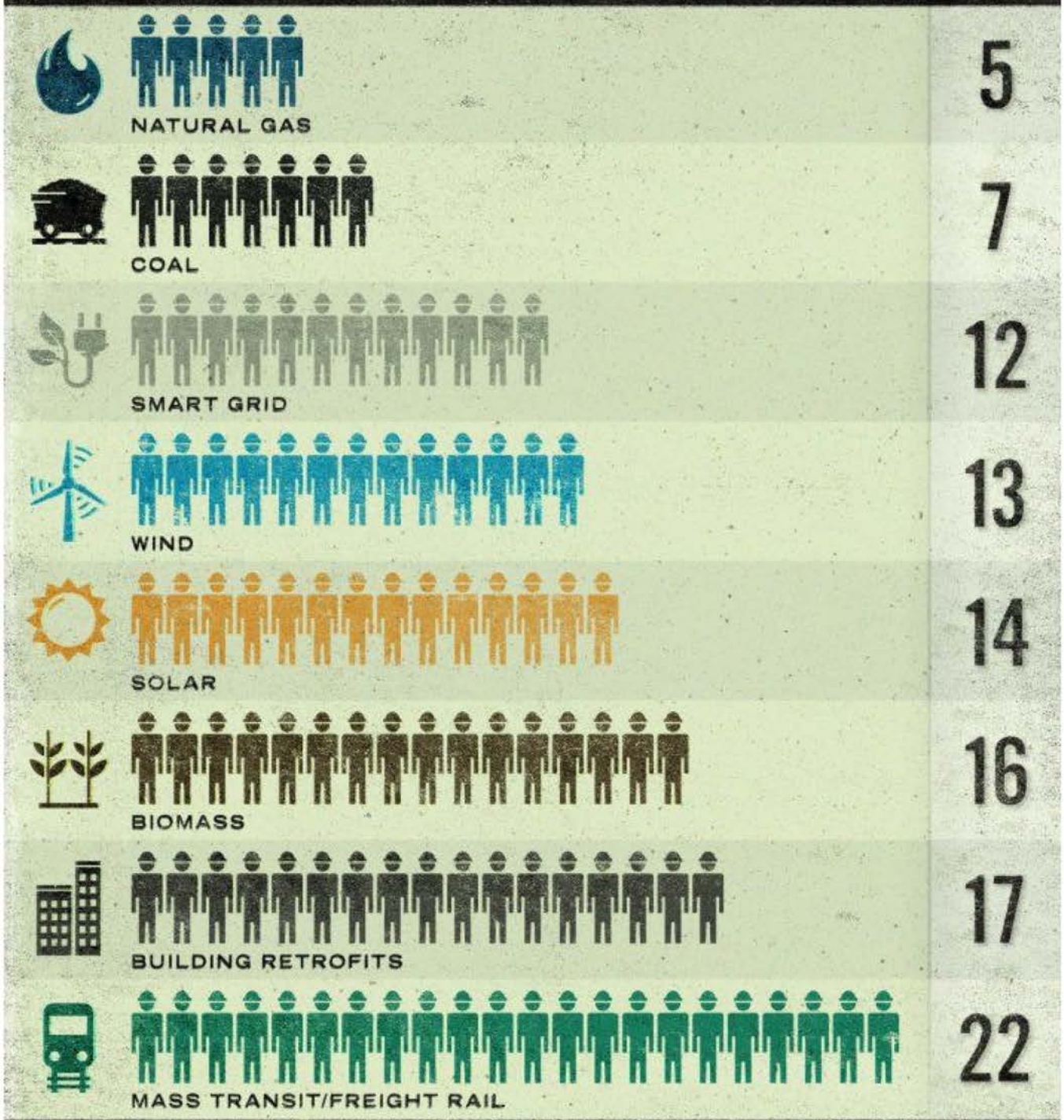

SOURCE: Political Economy Research Institute at the University of Massachusetts

Enbridge and other large oil companies have been allowed to develop a (mostly) unregulated expansive network of pipelines and refineries across the country over the last 50-60 years. This is about the life span of most of that infrastructure. That is part of the "need" for this most recent round of pipeline projects. Not that demand has gone up, but that infrastructure has decayed and markets have shifted. While domestically, urban areas are still the largest consumers of fossil fuels, there has finally been substantial movement towards investment in sustainable urban development. A major component of this is investment in public transportation. Often these vehicles do not rely on fossil fuels. Why should we invest in an infrastructure our grandchildren will not need? Long story short, if Enbridge was run by intelligent, thoughtful people, we would be discussing the expansion of a regional public transportation network.

Additionally, with the Chinese markets (and potentially European) opening to North American oil, corporations with investment in oil extraction projects are desperately seeking routes to coastal refineries and shipping channels. With the blocking of KXL and the Gateway project, Enbridge has looked towards eastern ports and refineries as transmission spots. With the growing public objection to bomb trains, terminals and pipelines in general, it is questionable that further major development of eastern ports and refineries will occur.

In their public utility commission submissions, Enbridge repeatedly states the vast need for the pipeline due to rising production rates and the petroleum consuming public's need for more oil. Unfortunately for Enbridge, the reality is that production is decreasing. As for the petroleum consuming public? What they really need is strong government leadership in the areas of public transportation, fuel efficiency, and investments in renewable energy infrastructure. To permit the development of this fossil fuel energy corridor would achieve short-term goals to the disadvantage of long-term goals.

most products from the refinery will not be consumed by reservation communities.. In the Clipper ROD, there was mention of the "need' for the crude so people can keep consuming gas. Highest user of gasoline is urban areas. Stop and go driving less efficient.

In reality, however, there are numerous ways to replace the petrochemicals we currently use. Vehicles can be made more efficient, mass transportation systems can be improved, plant-based plastics are already being developed. The use of pharmaceuticals could be decreased by proper nutrition, exercise, and community health programs. Recent studies have shown that the investment in these types of projects result in economic benefits that far outweigh the economic benefits resulting from the oil industry.

Enbridge claims the need for the pipeline is the need for access to cheap and reliable oil. Oil is not an infinite resource, and we are running low. We do not need to invest in another generation of oil infrastructure that will not be needed in the very near future. What we need is investment in infrastructure that will move us away from this dirty, inefficient energy source and towards a future developed on ecological principles. This investment will not harm the economy, rather it will strengthen it by creating jobs, new industries and protect future generations well being.

ALBERTA'S NEW CLIMATE PLAN: the global leadership failing in addressing climate change.

Shortly before the Paris climate negotiations, Alberta Premier Rachel Notley announced her province's climate leadership plan, which includes a cap on emissions from tar sands production of 100 Megatonnes per year.[109]

This cap corresponds to approximately 3 million barrels per day, up from some 2.2 million barrels per day today. That means that there is a limited amount of Canadian tar sands oil that will ever be produced, and if all of Enbridge's plans go forward, there is a real possibility that there will be pipeline over capacity.

Another major issue that has been brought up doing this whole process is how unresponsive the PUC and other regulators are to the concerns of the public. We are supposed to be living in a democracy that values public input and works to protect human health. This process does neither thing. It is time to end corporate control of government and put the power back where it belongs- in the hands of the public. What we need are participatory planning processes for large energy projects, transparent government processes- public-private partnerships where corporations work with regulatory agencies and public stakeholders to design the best possible projects that address the LONG TERM needs of communities, rather than the quarterly profit margins of private corporations.

Enbridge and other proponents of the "free market" say that government should not be regulating the industry so much, that they should let the market work on its own. What we have seen in recent years is an increasing segment of consumers standing up and saying "no more dirty oil". The market has spoken. We want a clean future. We will no longer bear the brunt of your externalities.

Numerous state agencies and politicians have submitted letters against this proposed project. They include the MPCA, the MN DNR, Minnesota Senators Steve Dribble, John Marty and Representatives Frank Hornstein and Jean Wagenius. The National American Indian Congress also recently released a statement against the project.

On July 1, 2015, the National Congress of American Indians adopted a formal resolution calling for a full Environmental Impact Statement (EIS) on Enbridge Energy's proposed Sandpiper/Line 3 oil pipeline corridor across treaty-ceded territory in Northern Minnesota. The NCAI is the oldest and largest national organization of American Indian and Alaska Native tribal governments.[15]

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15 http://www.ncai.org/resources/resolutions/calling-for-environmental-justice-and-a-full-environmental-impact-statement-on-enbridge-energy-s-proposed-tar-sands-oil-pipeline-across-treaty-ceded-territory-in-minnesota

This move was part of a larger coordination and agreements between Tribes to oppose fossil fuels. Across Turtle Island, 122 First Nations and Tribes have signed the Treaty Alliance Against Tar Sands Expansion stating their official opposition to the expansion of the Alberta tar sands and barring the passage of proposed tar sands pipeline and rail projects, including associated tanker traffic. The signatories are working collectively to enforce the ban which covers the following pipeline projects, which threaten our water and our coasts and which would fuel catastrophic climate change effects (by making further tar sands expansion possible): Kinder Morgan, Line 3, Keystone XL, Energy East and Northern Gateway, which our members stopped long ago.[16]

Tribal Interventions: Tribes have been actively engaged in the opposition to the Enbridge expansion on a number of fronts. They have been filing as intervenors in state processes and have engaged in their own internal processes of review. White Earth, Mille Lacs, and Leech Lake Bands have all held hearings on the Enbridge proposals. Public opinion is unanimous. These projects are not wanted and not consented to.

Tribal Impact Assessments:

*"Cumulative impacts to tribal cultures are a combination of pre-existing stressors (existing conditions or co-risk factors) and any other contamination or new activity that affects environmental quality. Characterizing risks or impacts … entails telling the cumulative story about risks to trust resources and a cultural way of life. Equity assessments could also be performed in a way that describes these systems-level cumulative risks/impacts. This requires improvements in metrics based on an understanding of the unbreakable ties between people, their cultures, and their resources.***"**[17]

The reality of what life is for Tribal communities is not represented in the US state or federal processes.

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[16] http://www.ubcic.bc.ca/treatyalliance_neb_012717

[17] **"Environmental Justice in Indian Country: Using Equity Assessments to Evaluate Impacts to Trust Resources, Watersheds and Eco-cultural Landscapes"** Harris, S and Harper, B. Presented at *Environmental Justice: Strengthening the Bridge Between Tribal Governments and Indigenous Communities, Economic Development and Sustainable Communities"* Conference sponsored by EPA and Medical University of South Carolina, June 11, 1999.

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It has been recorded in judicial proceedings that these activities (cultural and subsistence practices) are no less important to Native Americans than the air they breathe (United States v. Winans, 1905, 198 U.S. 371, 381, 1905).

Risk management question of which people and lifestyle to protect

A tribe's natural resource base is a source of cultural identity and religion, a nutritional and medicinal buffer against poverty, and a reservoir of environmental knowledge and biodiversity.

Only tribal cultural experts can explain the magnitude of impact to traditional lifestyles and Trust resources that pollution or other environmental stressors causes. Only these cultural experts can place the proper value on their natural or cultural resources, on songs or place names associated with a particular location or landform, or on an individual resource and its role in the ecological processes that comprise the web of life

Mapping and Assessing Connections

Dependency webs are relational descriptions or influence diagrams composed of the resources,uses, functions, and services at specific locations where contamination and impacts are likely to occur. The webs are intended to describe what is 'at risk' and what is at stake if different locations become contaminated.[19]

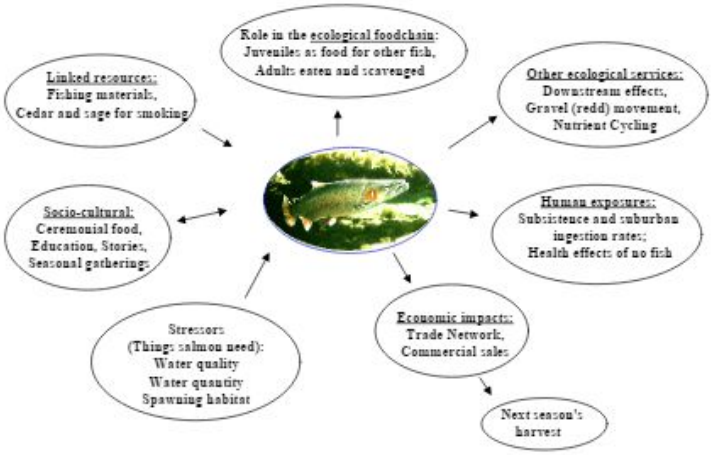

Fig. 1: A Salmon Dependency Web. This is a resource-based dependency web showing one key eco-cultural resource.

[19] **"Using Eco-Cultural Dependency Webs in Risk Assessment and Characterization of Risks to Tribal Health and Culture"** Harris, S and Harper, B. *Environ. Sci & Pollut. Res.* Special Issue 2 (2000)

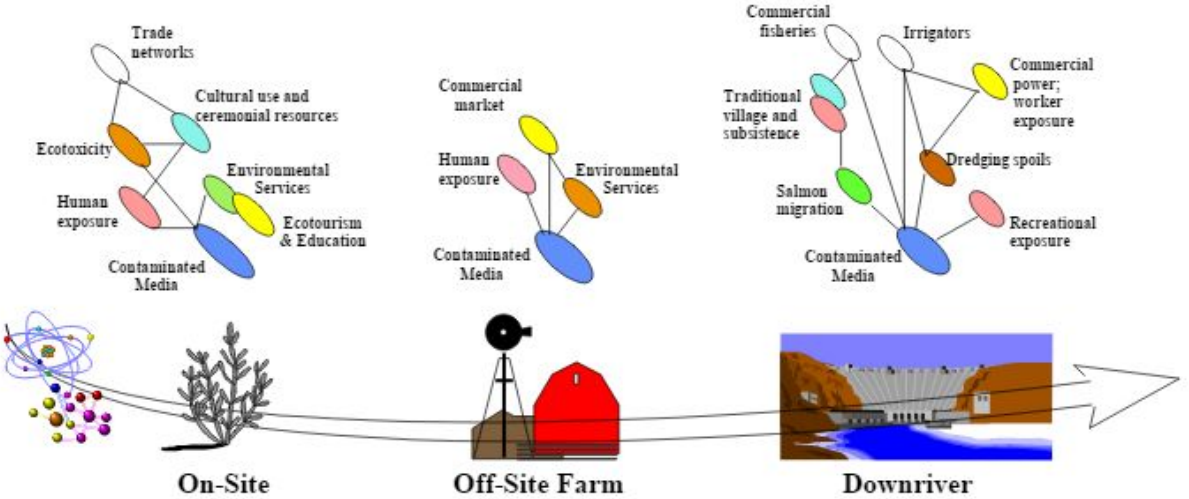

Fig. 2: Dependency Resource/Use Webs. As contamination moves through different areas, different resources are affected, different impacts happen, and different people will be concerned. Dependency webs help tell the whole story about what will happen if different locations are contaminated, and provide a way to organize the metrics that will be included in the risk analysis.

A healthy ethno-habitat or eco-cultural system is one that supports its natural plant and animal communities and also sustains the biophysical and spiritual health of its native peoples. These are living systems that serve to help sustain modern Native American peoples' way of life, cultural integrity, social cohesion, and socio-economic well-being. Larger ethno-habitats can include multiple interconnected watersheds, discrete geographies, seasonal use areas, and access corridors.

Three or four components to the risk assessment process: human health (using appropriate exposure scenarios), ecological health, and socio-cultural/socio-economic health, all of which are elements of the overall eco-cultural system.

Risk is the product of both exposure and sensitivity, pre-existing stressors or co-risk factors should be identified for each type of effect.

Risk assessments should be undertaken not only protect current subsistence and cultural practices, but also promote and enhance the restoration of those tribal practices and values that are protected by treaties between tribes and the United States.

In 2013, half of Canadian oil output came from oil sands, also called tar sands.16 The sands, mostly in Alberta, are permeated with bitumen, an extra-heavy form of petroleum that is semi-solid at room temperatures. In its natural state, oil sands bitumen will not flow in a pipeline. It also contains sand (no surprise), clay, and water and is "sour," meaning it has a high sulfur content. These processing challenges are beyond the capabilities of ordinary oil refineries. Alberta's five bitumen upgraders can produce petroleum products ranging from an intermediate refinery feedstock to synthetic crudes (called syncrudes) and even diesel. But together they can process only about half the bitumen mined; moreover, facilities are so costly and economics so dependent on market conditions that Canada has to send the rest to refineries in the United States.

Canada does not project its upgrading capacity to keep pace with bitumen production, which is expected to triple by 2030.11 The cheaper alternative is to transport the bitumen to certain U.S. refineries that can process heavy sour crudes, especially those on the Gulf Coast that can handle large volumes. Currently, two pipelines transport 118,000 barrels per day between Western Canada and the Gulf Coast, but CAPP projects that by 2020

supply could reach 709,000 barrels per day.11 Hence, the scramble by TransCanada to build the Keystone XL as well as Enbridge, Kinder Morgan, and other companies to build other pipelines.

To get bitumen to flow in a pipeline, it is diluted with a lighter-viscosity solvent called a diluent. If mixed with upgraded light crude at roughly 50:50, the result is synthetic bitumen or "synbit"; if mixed 70:30 bitumen with a naphtha-based oily condensate recovered from processing natural gas, the result is diluted bitumen or "dilbit." Both are categorized as "oil sands heavy crude."

The 2010 Enbridge pipeline rupture in Michigan revealed that once dilbit was exposed to the ambient air, the diluent evaporated, leaving a heavy sludge, much of which still floated but some of which partially submerged or sank to the river bottom. The evaporation of the diluent created two hazards. The evaporating diluent released high levels of benzene (a known carcinogen) and other unknown toxic gases that sickened 331 residents and caused the issuance of a voluntary evacuation order. And because conventional oil-spill recovery equipment is designed to collect floating oil, the submerged fraction has posed technical challenges for removal. Dredging and other remediation, still ongoing in 2017, has so far topped $1 billion.

Few have studied both dilbit's behavior in freshwater and technologies for detecting and recovering submerged or sunken oil sands products. That is of concern because proposed pipelines carrying dilbit would pass over or under major U.S. rivers including the Missouri and Mississippi. Moreover, Enbridge is now expanding its existing Lakehead pipeline system to carry Alberta tar sands heavy crude, including through Line 5B: twin 20-inch pipelines installed in 1953 lying on the bottom of the Straits of Mackinac between Lake Michigan and Lake Huron. Should one of those 62-year-old pipes leak, strong and rapid currents could swiftly disperse crude widely throughout both these major sources of drinking water, and 150-foot depths could further complicate cleanup.

In the event of an oil sands spill, the U.S. National Oceanic and Atmospheric Administration (NOAA) recently identified two appalling regulatory shortcomings: 1) Oil sands products are exempted from the excise tax that provides funds for cleaning up spills in the U.S., and 2) Specific product information is unavailable from oil sands facilities and transporters for what was in the pipeline at the time of the spill.

The industry average of 0.34 to 0.5 incident per 1,000 miles per year translates to 170 to 250 incidents per year somewhere in the nation—a number actually about half of what is observed. Statistically, the record shows that several per year are catastrophic. PHMSA data from 2001 to 2011 compelled KAI to conclude: "The 'average' pipeline therefore has a 57% probability of experiencing a major leak, with consequences over the $1 million range, in a ten-year period."

If past industry averages and practices hold, as pipeline mileage increases, so will accidents—including ones involving fatalities or dilbit in major waterways. (I haven't even mentioned ExxonMobil's 200,000-gallon dilbit spill in Mayflower, AR, in March 2013.) For at least three years running, because of aging pipelines and SCADA vulnerabilities, enhancing pipeline safety has made the NTSB's top ten

"Most Wanted" list of critical transportation changes needed to reduce transportation accidents and save lives.

The American Society of Civil Engineers (ASCE) in its 2013 Report Card for America's Infrastructure for energy—including oil and natural gas pipelines—kept its previous grade of D+, in part because of aging pipelines and SCADA vulnerabilities.

Because of the more viscous makeup of dilbit, it must be pumped at higher pressure and at higher temperatures than conventional crude oil. Additional toxic chemicals are added to allow the product flow. Some sand remains in dilbit. A combination of these attributes has led some engineers to compare dilbit to "fast, hot, and toxic liquid sandpaper." Add this to the fact that 41 percent of the pipelines were built to carry conventional crude oil in the 1950's and 1960's. The alarming speed at which tar sands are being added to this pipeline network raises legitimate questions about the likelihood of many more accidents. The environmental group Natural Resources Defense Council (NRDC) notes that pipelines in the upper Midwest that routinely carry oil from tar sands have spilled 3.6 times more oil per pipeline mile than the U.S. average.[20]

The chemistry of the tar sands oil could contribute to corrosion as well. In processing, the tar sands are boiled to separate the bitumen from the surrounding sand and water, and then mixed with diluent—light hydrocarbons produced along with natural gas—to make the oil less viscous and able to flow. But even so, the resulting dilbit is among the lowest in hydrogen as well as the most viscous, sulfurous and acidic form of oil produced today.[21]

From: http://onlinepubs.trb.org/onlinepubs/dilbit/Dettman102312.pdf

What is Diluent?
An example of diluent is called CRW condensate

- **"Naptha"- based oil which can include natural gas condensate**
  - **Natural gas condensate is the "liquid" that is produced with natural gas where the lowest boiling component is butane which boils at -0.5 degree C/31.9 degree F**
- **Approximately 75wt% of the condensate boils at temperatures less than 204 degrees C/399.2 degrees F**
- **Final boiling point is approximately 524 degree C/975.2 degree F**

What Is Dilbit?

- **Dilbit is the mixture of diluent and bitumen that meets pipeline specifications for density and viscosity**
  - **Approximately 30vol% of diluent is used in the mixture**
  - **Consists of componets that boil over the full range of both oils, from -0.5 degree C/31.9 degree F to over 750 degree C/1382 degree F**

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[20] http://www.oilandwaterdontmix.org/the_bigger_picture
[21] https://www.scientificamerican.com/article/tar-sand-oil-and-pipeline-spill-risk/

- Characteristics of dilbit include:
  - TAN value in the range of 1.6mg KOH/g
  - Sulfur content of 3.9wt%

What Is Bitumen?

- Bitumen is the "extra heavy" crude oil that remains after the biodegradation of oil in Northern Alberta
  - Initial boiling point is 204°C/399.2°F
  - Approximately 50wt% of the oil boils at temperatures below 524°C/975.2°F
  - Biodegradation has resulted in organic acids being left behind in the oil
    - Total acid number (TAN) is 3mg KOH/g which corresponds to an organic acid content of 3wt% in the oil
      - Organic acid species in bitumen are relatively large molecules with 70wt% boiling above 524°C/975.2°F
    - [By comparison, vinegar for our salads is 5wt% acetic acid which corresponds to a TAN of 47mg KOH/g (by calculation)]

When Can Organic Acids in Crudes Cause Corrosion?

- Organic acids (also called "naphthenic acids") in crude oils can cause corrosion if they get concentrated
  - This can occur in a refinery during distillation at temperatures above their boiling points which are generally temperatures greater than 200°C/392°F
    - For bitumen, initial boiling point of its organic acids is 280°C/536°F
- Global crude corrosivity in refineries also depends upon organic acid size and structure
  - Bitumen has been found to have relatively low corrosivity under refinery conditions despite its high TAN value [Dettman *et.al.* CORROSION/2012, paper no. 01326 (Houston, TX:NACE 2012, pp.1-15]

What about Sulfur?

- Acidic sulfides like hydrogen sulfide (H_2S) and mercaptans can interact with iron to form iron sulfides
  - Iron sulfides are insoluble in the oil so under low shear conditions, a protective film can form on the metal to prevent further corrosion
- Similar to most crudes, diluent and thermally-treated bitumen (i.e. SAGD production) can contain H_2S
- Remaining sulfur in dilbit is bound in hydrocarbon structures that require refinery processes including heat (over 350°C/662°F), high pressure hydrogen, and catalysts to remove it

SECTION 1 – MATERIAL IDENTIFICATION

Material Name:	HEAVY CRUDE OIL/DILUENT MIX
Synonyms:	Bow River (BR); Cold Lake Blend (CLB); Christina Lake Dil-bit Blend (CDB), Christina Lake Blend (CSB); Western Canadian Blend (WCB); Western Canadian Select (WCS); Wabasca Heavy (WH)
Use:	Process stream, fuels and lubricants production
WHMIS Classification:	Class B, Div. 2, Class D, Div. 2, Sub-Div. A and B
NFPA:	**Fire**: 2 **Reactivity**: 0 **Health**: 3
TDG Shipping Name:	Petroleum Crude Oil
TDG Class:	3 **UN**: 1267
TDG Packing Group:	II (boiling point 35 deg. C or above, and flash point less than 23 deg. C)
Manufacturer/Supplier:	CENOVUS ENERGY INC. 500 Centre Street SE, PO Box 766 Calgary, AB T2P 0M5
Emergency Telephone:	1-877-458-8080, CANUTEC 1-613-996-6666 (Canada)
Chemical Description:	A naturally occurring mixture of paraffins, naphthalenes, aromatic hydrocarbons and small amounts of sulphur and nitrogen compounds mixed with condensate

SECTION 2 – HAZARDOUS INGREDIENTS OF MATERIAL

Hazardous Ingredients	Approximate Concentrations (%)	C.A.S. Nos.	LD50/LC50 Specify Species & Route	Exposure Limits
Bitumen	50 – 90	8052-42-4		5 mg/m^3 (OEL, PEL oil mist)
Hydrocarbon Diluent	10 – 50	N.Av.	N.Av.	900 mg/m^3 (OEL)*
Benzene	0.03 - 0.3	71-43-2	LD50, rat, oral, 930 mg/kg LC50, rat, 4 hr, 13200 ppm	0.5 ppm (OEL, TLV) 10 ppm (PEL)
Hydrogen Sulphide§	<0.1	7783-06-04	LC50, rat, 4 hrs, 444 ppm	10 ppm (OEL), 1 ppm (TLV), 20 ppm (PEL-C)

OEL = AB Occupational Exposure Limit; TLV = ACGIH Threshold Limit Value; PEL = OSHA Permissible Exposure Limit; C = Ceiling; *OEL for gasoline; §Hydrogen Sulfide in liquid, vapour phase may contain higher concentrations

Water and Tailings

The total amount of freshwater used by tar sands mining operators has grown at a rate of 5.2 per cent per year since 2005, reaching 167.0 million m^3 in 2013.[206] Total freshwater use in all tar sands operations (including mining, in situ and upgrading) has grown at a rate of 4.6 per cent per year since 2005, reaching 185 million m^3 in 2013.[207] The 2013 total is the equivalent to filling 200 Olympic-sized swimming pools with freshwater every day. Total freshwater use in 2022 is projected to reach 282 million m^3.[208]

The Athabasca River is subject to declining long-term flow rates due to the implications of climate change and reduced glacial flow. It is expected that runoff below Fort McMurray will decrease by 30 per cent by 2050.[209] Under these conditions stricter regulations governing withdrawals during low-flow periods will be imperative. Companies will need to invest in onsite water storage facilities or, in a worst case scenario, may have to shut down if there is a string of years during which the river is drier than normal.[210] It is also possible that a new transboundary agreement with the Northwest Territories government, currently underway and nearing completion, will require additional action not only on monitoring but in limiting impacts to downstream territorial communities.[211]

Tailings are stored in large settling basins, referred to as tailings lakes, which currently cover approximately 176 square kilometres of the landscape.[212] Typically, tailings lakes, which contain liquid toxic waste from the tar sands, account for between 30 to 50 per cent of a mine's total footprint.[213] The current volume held in these lakes is approximately 830 million cubic meters.[214] For each barrel of bitumen produced, 1.5 barrels of tailings waste will be added to the landscape.[215]

For more than 40 years, tailings management in Alberta was voluntary. In 2009, the Energy Resources Conservation Board (ERCB) announced *Directive 074: Tailings Performance Criteria and Requirements for Tar sands Mining Schemes*. Directive 074 requires tar sands companies to capture and dry a minimum proportion of their new tailings waste, and to continue to reduce the rate of liquid tailings stored on the landscape each year.[216] No tar sands company has met tailings requirements under Directive 074,[217] Despite this, the province has yet to issue any fines or penalties for the tar sands companies. Furthermore, there are no regulations in place or in development that would halt the generation of toxic tailings for mining operations. The legacy of toxic waste is growing, creating legal liability for the industry.

Table 3: ERCB 2012 Tailings Management Assessment Report data, June 2013

	Project tailings capture requirements	Accepted tailings captured
Suncor	30.0 per cent	8.5 per cent
Syncrude (Mildred Lake)	12.0 per cent	8.8 per cent
Shell (Muskeg River)	23.5 per cent	8.8 per cent
Shell (Jackpine)	15.0 per cent	0.0 per cent

Despite significant capital investments in research and development, new tailings technologies have not advanced at the rate that industry and government had expected. While avoiding questions around the impact of tailings on the environment, Alberta justified its lack of enforcement by saying its targets were "too optimistic" and that companies appear to be "doing what they can" to meet the directive.[218] The Alberta government is currently drafting a Tailings Management Framework, which will require companies to reduce tailings, but allow for existence of tailing ponds beyond a mind's operational life.[219]

Energy Return on Investment

Energy Return on Investment (or EROI) is a way to calculate the ratio between energy units used to produce energy. The higher EROI means the more bang for your buck. Globally, EROIs have been declining, as remaining fossil fuel resources have become harder to find and extract. *"Alternatives to traditional fossil fuels such as tar sands and oil shale (Lambert et al., 2012) deliver a lower EROI, having a mean EROI of 4:1 (n of 4 from 4 publications) and 7:1 (n of 15 from 15 publication)."* [22]

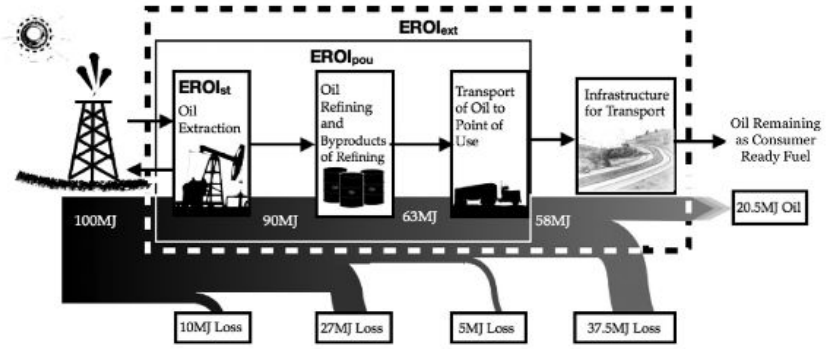

Fig. 1. Boundaries of various types of EROI analyses and energy loss associated with the processing of oil as it is transformed from "oil at the well-head" to consumer ready fuels (figure from Lambert and Lambert (in preparation) based on calculations by Hall et al. (2009)).

Other reports have the ratios lower, noting that the lower EROI also results in higher releases of GHGs:

> *"The considerable uncertainty surrounding the technological characterization, resource characterization, and choice of the system boundary for oil shale operations indicate that*

[22] From C.A.S. Hall et al. EROI of different fuels and the implications for society. Energy Policy 64 (2014) 141–152

oil shale is only a minor net energy producer if one includes internal energy (energy in the shale that is used during the process) as an energy cost. The energy return on investment (EROI) for either of these methods is roughly 1.5:1 for the final fuel product. The inclusions or omission of internal energy is a critical question. If only external energy (energy diverted from the economy to produce the fuel) is considered, EROI appears to be much higher. In comparison, fuels produced from conventional petroleum show overall EROI of approximately 4.5:1. "At the wellhead" EROI is approximately 2:1 for shale oil (again, considering internal energy) and 20:1 for petroleum. The low EROI for oil shale leads to a significant release of greenhouse gases. The large quantities of energy needed to process oil shale, combined with the thermochemistry of the retorting process, produce carbon dioxide and other greenhouse gas emissions. Oil shale unambiguously emits more greenhouse gases than conventional liquid fuels from crude oil feedstocks by a factor of 1.2 to 1.75. Much of the discussion regarding the EROI for oil shale should be regarded as preliminary or speculative due to the very small number of operating facilities that can be assessed."[23]

It is important to note that these estimates do not include the energy required to remediate and restore extraction points.

Jobs related to ecological conservation, restoration, and mitigation represent an emerging sector with promising prospects, and offer an alternative path to ecologically destructive development. According to existing literature on this sector, the restoration industry creates 10.4 to 39.7 jobs per $1 million invested, in comparison to the oil and gas industry, which produces 5.3 jobs per $1 million invested. Additionally, jobs associated with this sector tend to be better paying jobs.

There have been an increasing number of studies conducted on the emerging green economy, in relation to renewable energy and energy efficiency. According to Bureau of Labor Statistics Green Goods and Services 2011 survey, the green economy supported 3.4 million jobs nationally. The outdoor industry can be considered part of this sector, and supports 118,000 jobs in Minnesota.

On June 10, 2015 over 100 leading scientists called for a moratorium on new oil sands development[24]. They have cited the following ten reasons as evidence for the need of a moratorium:

1. **Continued expansion of oil sands and similar unconventional fuels in Canada and beyond is incompatible with limiting climate warming to a level that society can handle without widespread harm.**

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[23] From Energy Return on Investment (EROI) of Oil Shale Cutler J. Cleveland * and Peter A. O'Connor, Sustainability 2011, 3, 2307-2322; doi:10.3390/su3112307

[24] **http://www.oilsandsmoratorium.org/**

2. **Oil sands should be one of the first fuel sources we avoid using as society moves to non-polluting forms of energy, not the next carbon-intensive source we exploit. Extracting, refining, transporting, and burning oil-sands energy produces among the most greenhouse gases of any transport fuel per unit energy delivered (Brandt 2011, Gordon et al. 2015). Expansion of oil sands production will exacerbate the problem of carbon pollution and slow the transition to cleaner energy (Unruh 2000).**
3. **Current oil sands environmental protections and baseline data are largely lacking, and protections that exist are too seldom enforced. Too often, the development of the oil sands is presented as inevitable, while protections for human health and the environment are treated as optional.**
4. **Contaminants from oil sands development permeate the land, water and air of the Canadian boreal landscape, and many of these impacts are difficult to mitigate. Independent studies have demonstrated that mining and processing Albertan oil sands releases carcinogenic and toxic pollutants (e.g., heavy metals, polycyclic aromatic compounds) to the atmosphere from smoke stacks and evaporation, and to groundwater from leaching of tailings ponds. This pollution harms terrestrial and aquatic ecosystems and the species within them (Pollet and Bendell-Young 2000, Gurney et al. 2005, Nero et al. 2006, Gentes et al. 2007, Kelly et al. 2009, Kelly et al. 2010, Landis et al. 2012, Rooney et al. 2012, Kurek et al. 2013, Andrishak and Hicks 2011, Hebert et al. 2013, Galarneau et al. 2014, Parajulee and Wania 2014, Schindler 2014, Schwalb et al. 2015).**
5. **Less than 0.2% of the area affected by Canadian oil sands mining has been reclaimed, and none restored to its original state (Government of Alberta 2014).**
6. **Development and transport of oil sands is inconsistent with the title and rights of many Aboriginal Peoples of North America. Rapid expansion of the oil sands in Canada violates or puts at risk nation-to-nation agreements with Aboriginal peoples. In Alberta, oil sands mining is contributing to the degradation and erosion of treaty and constitutionally protected rights by disrupting ecological landscapes critical to the survival of Aboriginal culture, activities, livelihoods, and lifeways (Passelac-Ross and Potes 2007, Foote 2012, ACFN). In the US, proposed infrastructure projects threaten to undermine Treaty agreements between the federal government and Native American tribes (Mufson 2012, Hart 2014). In both countries, contamination of sacred lands and waters, disruption of cultural sites, lack of consultation, and long-term effects of climate change undermine sustainable social, ecological, and economic initiatives involving Aboriginal peoples across the continent and constitute violations of Native sovereignty (Passelac-Ross and Potes 2007, Foote 2012, Mufson 2012, Hart 2014, Irvine et al. 2014, McLachlan 2014, Wohlberg 2014, Athabasca Chipewyan First Nation, Tsleil-Waututh Nation).**
7. **What happens in North America will set a precedent for efforts to reduce carbon pollution and address climate warming elsewhere. The choices we make about the oil sands will reverberate globally, as other countries decide whether or how to develop their own large unconventional**

oil deposits (Balouga 2012). Strong North American leadership is needed now, because the impacts of current decisions will be felt for decades and centuries.

8. **Controlling carbon pollution will not derail the economy. Most leading economists now agree that limits on carbon pollution – using mechanisms such as carbon taxes, cap-and-trade systems, or regulations – can facilitate a transition over several decades to low-emission energy without a dramatic reduction in global economic growth (Global Energy Assessment 2012, IPCC 2014, Nordhaus 2014).**
9. **Debates about individual pipeline proposals underestimate the full social costs of the oil sands, and existing policies ignore cumulative impacts. These are not simply business decisions. Responsible policies should address the interwoven, system-wide impacts of oil sands development, from mines and refineries, to pipelines, rail and tanker traffic, to impacts on economies and the global climate system. Current laws, regulations, and policies are not designed to assess cumulative impacts (Johnson and Miyanishi 2008, Office of the Auditor General of Canada 2011). When oil sands development is viewed as an integrated whole, the costs and benefits of individual decisions can be evaluated responsibly (Chan et al. 2014). Land use and regulatory decisions are considered lease-by-lease with no single agency responsible for oversight, accounting of cumulative impacts, or information flow. For example, decisions regarding mineral rights are made by Alberta Energy, those for timber by Alberta Sustainable Resource Development, while Alberta Environment decides on water and air impacts, and the National Energy Board decides on pipeline and rail transport of oil sands products (Johnson and Miyanishi 2008).**
10. **A majority of North Americans want their leaders to address climate change, and they are willing to pay more for energy to help make that happen.**

Because of high extraction costs and low oil prices, the mining of the Alberta Tar Sands is a rapidly dying industry. Many companies are withdrawing their investments. Those that remain are borrowing against our children's future, taking on massive amounts of debt to pay false dividends to shareholders and prevent them from fleeing. Despite an overly optimistic industry forecast of increased production that justifies 1 new pipeline carrying tar sands out of Canada in the next 4-5 years, a total of 4 new pipelines are currently proposed. Every one of them must cross tribal lands, and every one of them faces bold resistance. At the same time, Enbridge's proposal to simply abandon its old, crumbling Line 3 pipeline risks setting dangerous precedent, and raises serious questions about who will be left holding the bill for this industry's slow painful death, toxic legacy and stranded assets. Now is the time for tribal governments to come together and take bold action to protect our territories and the natural and cultural resources our future generations will depend on.

A Dying Industry:

Compared to conventional oil, tar sands crude is a lot more expensive to extract. New oil development in the tar sands costs over $80/barrel(bbl). But since the end of 2014, oil prices have only ranged between $30 and $60/bbl, with current prices around $50/bbl. So tar sands extraction is simply not economically viable in the long term. If gasoline prices don't return to $3.00-$3.50/gal (equivalent to crude oil at $70-$85/bbl), the oil industry will go bankrupt - it's that simple. And tar sands producers will go first.

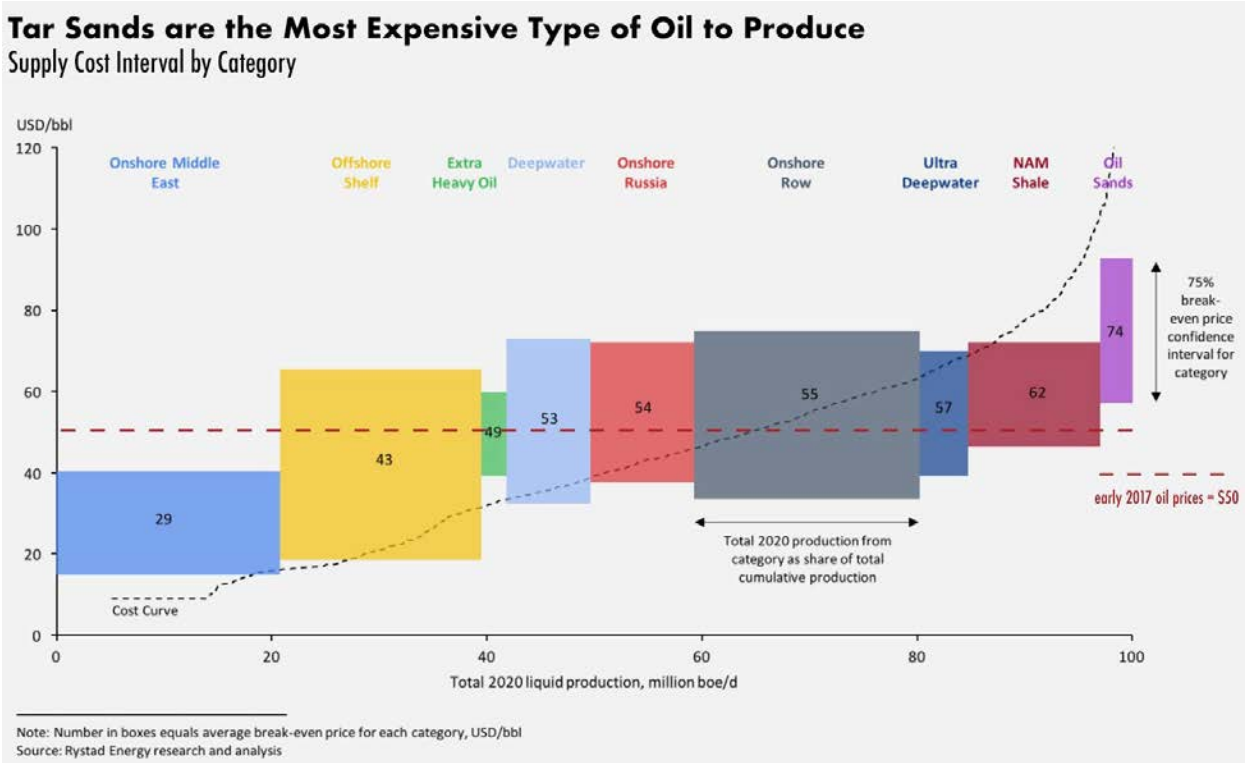

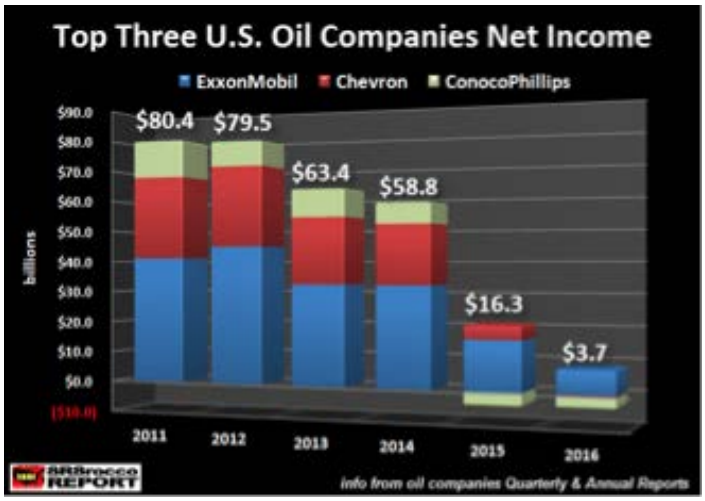

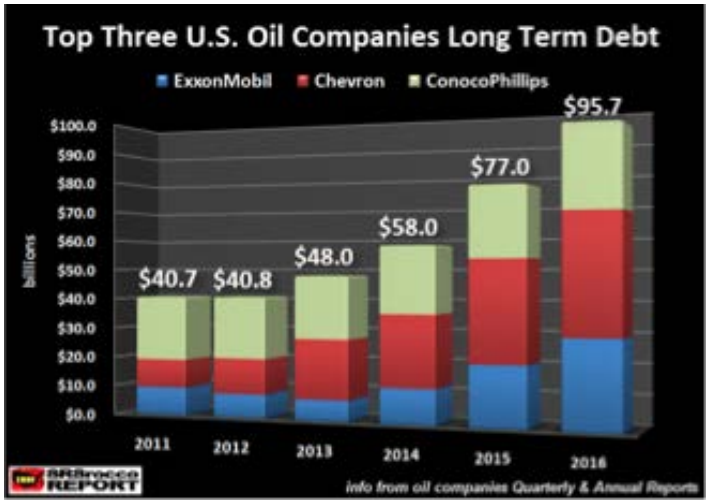

As a result, major oil companies have been withdrawing investments from the tar sands steadily over the past two years. Many tar sands companies have gone bankrupt, and an early 2016 Deloitte report estimated that about one third of all oil producers were at risk of bankruptcy. The 3 largest in the US - Exxon, Chevron, and Conoco/Phillips - have posted dramatic declines in income, and dramatic increases in long-term debt. In other words, Big Oil is borrowing in order to pay its shareholders and keep them from running away. This is speculation against our children's and grandchildren's futures.

No End In Sight:

These companies cannot keep piling up debt forever, and the price jump they need to stay afloat doesn't seem likely. Market demand is dropping in the United States, down 6% from a 2007 peak (and dropping rapidly in Minnesota, down 19% from a 2004 peak). The largest emerging markets in the world - India, China, Brazil, etc - are developing renewables and electric cars at accelerating rates. Meanwhile, working people continue to get relatively poorer, and many economists forecast an economic recession soon. All of these factors decrease demand, which in the short term keeps prices low. Also, OPEC producers can manipulate oil prices in order to maintain their market dominance by pricing out higher cost shale and tar sands producers.

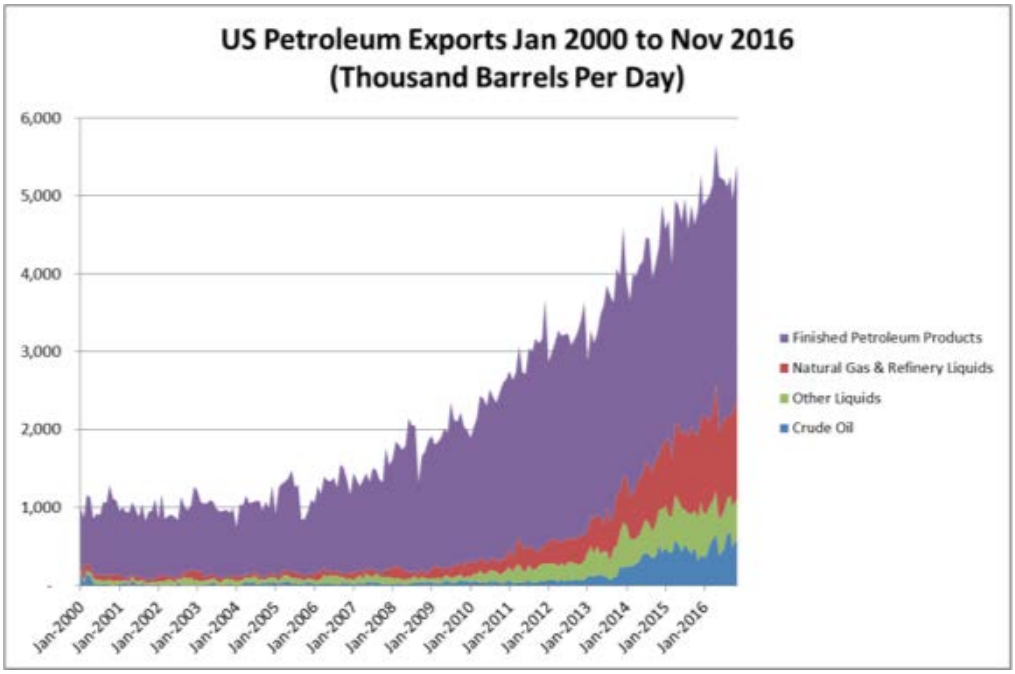

So if US demand is declining, then where is all this North American oil going? It's being exported overseas. The mining of the Alberta Tar Sands has nothing to do with energy independence. In fact, it was this steep rise in exports that flooded global markets with a glut of oil, which is part of what is keeping prices so low.

Why Build 4 Pipelines When One Is Enough?

Despite the bad economics, four new pipelines are proposed to transport tar sands oil out of Canada by 2019-2020, with a total additional capacity of over 3.4 million barrels per day:

- **Line 3 "Replacement" (Enbridge) – from 390,000 to 915,000 bpd**
- **Trans Mountain Expansion (Kinder Morgan) – from 300,000 to 900,000 bpd**
- **Keystone XL (TransCanada) – up to 900,000 bpd**
- **Energy East (TransCanada) – 1,200,000 bpd**

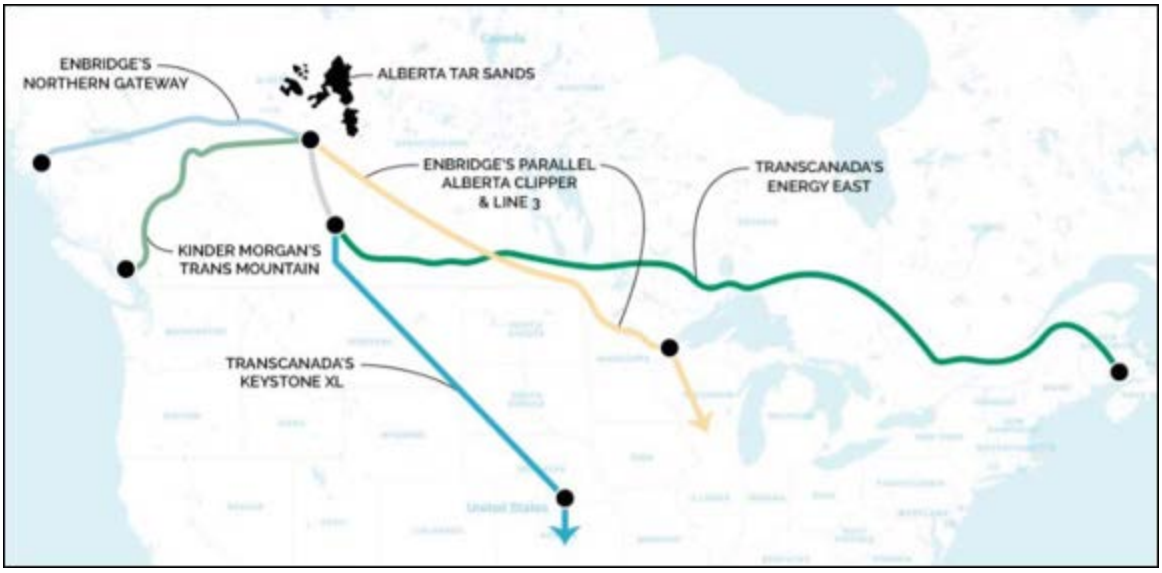

However, the Canadian Association of Petroleum Producers forecast only a 644,000 barrel per day increase in production by 2020, a small fraction of the proposed 3.4 million bpd of additional pipeline capacity. This means that the customers for these projects themselves only see economic justification for one of these 4 proposed new pipelines, even after ignoring all the social and ecological costs. Indeed, Enbridge CEO Al Monaco admitted last week that only 2 of the pipelines are needed through the middle of the 2020s (the Trans Mountain Expansion is scheduled to start construction before Line 3).

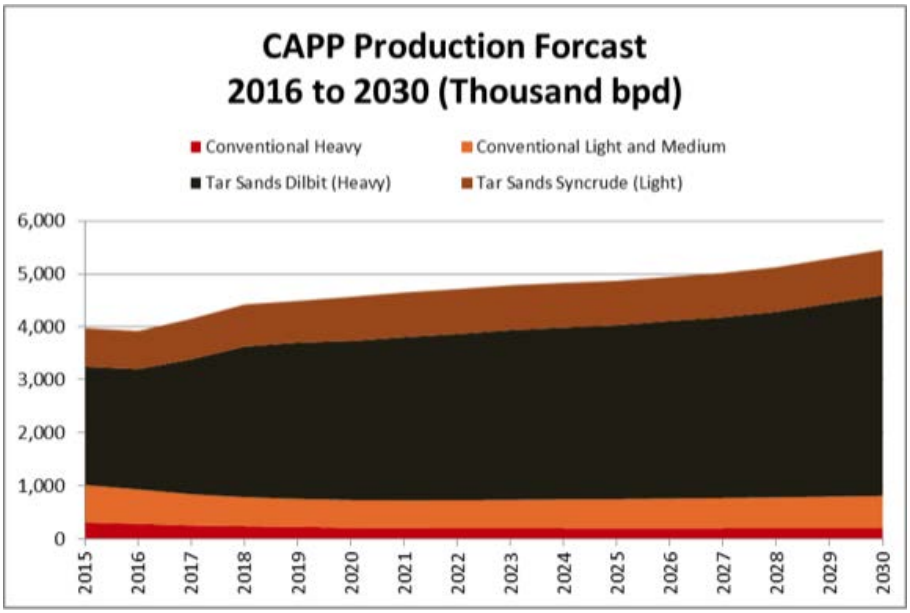

True Cost of Oil
Accounting for the True Cost of Oil

In full-cost accounting, the negative impacts an activity has on the environment and society is included in cost/benefit analysis. The oil industry has repeated claimed to be a major economic driver, but we know that

internationally, the industry receives $775 billion to $1 trillion in subsidies annually.[25] We also know that fossil fuels are a finite resource and are getting harder and harder to extract. We must start investing in sustainable infrastructure, and further investments in fossil fuels threatens our survival.

Carbon Costs

The most widely recognized cost of the oil industry is carbon costs. The DOC's DEIS acknowledges this, but only uses one measurement of cost. We have reviewed the literature and have determined at least two cost factors. While the DOC utilizes a "best case" scenario to calculate the amount of carbon released from these projects, we utilize a "worst case" scenario. This is a decision made based on our level of acceptable risk. The first cost is the removal of carbon from the atmosphere. This is currently trending at $1,000.00/metric ton[26].

The second cost is the social cost of carbon. Again, while the DOC acknowledges this is a potential impact, they use a smaller cost. Our cost is $210/ton[27]. To reach the carbon measurements for the two projects, we converted the capacity of the lines into carbon production. Running the numbers gives us a cost of over $396 billion, annually.

Ecosystem costs

Atmospheric carbon production is not the only negative externality of the oil industry. The extraction, refining, transportation, and combustion all have landscape level impacts. Through the destruction of boreal forests and wetlands through tar sands mining and pipeline corridor creation, humanity is losing valuable ecosystem services. These services can vary and include such benefits as water filtration, flood protection, food source, carbon storage, and recreational benefits. There is also the spiritual value of land and functioning ecosystems, but it is inappropriate to put a monetary value on this aspect. The numbers we use for calculating the value of the lost ecosystem services come from Earth Economics report: "The Value of Nature's Benefits in the St. Louis River Watershed" and the Pembina Institute's "Counting Canada's Natural Capital" report.

To get the size of ecosystem destroyed, we calculated the land area lost to tailing ponds. Each barrel of oil creates approximately 16.9 barrels of tailings. These tailings are stored in pits for at least 40 years while they settle and compact. The volume of these tailings, converted to area represent the annual area of boreal forest lost from tar sands extraction. We multiply this by the proposed volume in the pipelines, and convert it to hectares. We also estimate the total area of wetlands destroyed during the construction of the new corridor, which Enbridge has no plan to restore. The total cost of the loss of ecosystem services for these pipelines is over $595 million, annually. As we develop our methods, we will include the loss of services from other ecosystems to give a fuller picture of the cost of oil.

An Incomplete Total

Adding these costs together give us a full cost of over $397 billion annually. Since there are currently no real plans to remove the carbon or restore the forests and wetlands, we have applied an annual interest rate of 26%. This rate is based off Enbridge's spill rate (3.19 per/1000 ft of pipeline). This gives us a $499 billion annual cost

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[25] http://priceofoil.org/fossil-fuel-subsidies/

[26] House, K. Z.; Baclig, A. C.; Ranjan, M.; A, v. N. E.; Wilcox, J.;Herzog, H. J. Economic and Energetic Analysis of Capturing CO2from Ambient Air.Proc. Natl. Acad. Sci.2011,108(51), 20428−20433

[27] https://www.greenbiz.com/article/governments-social-cost-carbon-could-be-increased

from Enbridge's proposed Line 3 Expansion. As we develop our methods, we will refine the way we compound our interest based on the needs of the future generations.

Specific comments related to the DEIS document

1. **It seems to be more of a review document rather than a document of critical thought. In the environmental impacts section, it is basically cut and paste from Enbridge's proposal without a real consideration that maybe, just maybe Enbridge won't actually follow the requirements of the permits they will be required to get (such as NPDES/CWA construction permits). History shows that they continually violate the terms of these permits.**
    a. https://insideclimatenews.org/news/20131202/enbridge-could-be-forced-boost-pipeline-safety-mich-after-water-violations
    b. https://www.desmogblog.com/2016/07/19/former-inspectors-describe-dangerous-flaws-construction-major-east-coast-gas-pipeline
    c. http://grangehallpress.com/Enbridgeblog/2013/01/20/the-latest-construction-violation/
    d. http://archive.jsonline.com/news/wisconsin/37009324.html
    e. http://michiganradio.org/post/enbridge-energy-could-face-fines-after-incident-pipeline-thats-under-construction
    f. http://oxfordleader.com/enbridge-sub-contractor-ticketed/
    g. http://www.freep.com/story/news/local/michigan/2016/08/03/ag-bill-schuette-enbridge-violating-straits-pipeline-easement/88039662/
    h. https://insideclimatenews.org/news/20130709/mich-officials-step-scrutiny-enbridge-after-water-law-violations
    i. https://www.dnr.illinois.gov/programs/NRDA/Pages/Lakehead.aspx

All true independent analysis of this document and project has said it is a bad idea. Not one person that spoke approvingly of the project at the public meetings was not paid, or otherwise compensated by Enbridge, or completely unaware of any real details of the DEIS.

Enbridge.

Where to start.

We could begin at Line 5, the aging, deteriorating line that runs under the Straits of Mackinac and directly threatens ⅕ of the world's freshwater. Enbridge keeps insisting it can run safely, indefinitely. Yet their internal documents show the outer coating is flaking off.

We could talk about Line 6b, the one that ruptured in Michigan. This is one where Enbridge's handling of the response was described as "keystone cop-like".

At fault in the 2010 Kalamazoo spill was a faulty detection system and response procedure that Enbridge states will remedy the issues that resulted in the catastrophic spill. Critics contend the entire US pipeline system is still riddled with faulty leak detection.[28]

An independent review of Enbridge's policies and procedures should be conducted to verify the needed changes have been made. A review should also be done regarding the in-place monitoring to ensure it is sufficient and if proposed system are sufficient to a Tribally determined level.

Response

According to the Wall Street Journal, an estimated 80% of spills are actually detected by civilians, despite pipeline companies enormous investments in state of the art detection systems.[29]

A federal audit of Enbridge's 2010 spill in Marshall, MI, showed that Enbridge was unable to stop leaks on aging pipelines, and still does not know the best way to completely clean up after a catastrophic spill. The audit showed that Enbridge could not prove that it knew how to monitor and repair pipeline cracks forming from corrosion - the key factor that had led to two major Enbridge oil spill disasters in 2007 and 2010 in Glenavon, Saskatchewan and Marshall, Michigan.[30] As it were, Enbridge lobbied hard to demand the NEB remove the most incriminating parts of that report, and covered up two secret environmental documents.

In fact, Enbridge has lobbied aggressively against responsible spill response regulations in Minnesota. In an October 2014 letter to the Environmental Quality Board, a number of Minnesota legislators pointed out Enbridge's resistance and determination to thwart any safety regulations by the state of Minnesota. The letter, from Minnesota Senators Steve Dribble, John Marty and Representatives Frank Hornstein and Jean Wagenius, stated:

"Enbridge and the pipeline industry were unwilling to agree to:

- *Provide a qualified company employee to advise public sector incident commander by telephone within one hour of a major pipeline oil discharge;*
- *Provide monitoring equipment within three hours of a discharge, or to develop an annual plan to deliver monitoring equipment to a discharge site to comply with the provision;*
- *Provide qualified personnel to advise incident commanders at the discharge site within three hours of a major spill;*
- *Provide containment booms from land across sewer outfalls, creeks, ditches and other places where oil and other hazardous substances may drain in order to contain leaked material before it reaches those resources;*
- *To have capability to deliver containment booms, boats, oil recovery equipment and trained staff within eight hours of a confirmed discharge to recover 10% of a worst case discharge,*

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[28] http://www.wsj.com/articles/SB1000142405270
[29] http://thinkprogress.org/climate/2014/01/21/3186261/pipeline-spills-discovered-people/
[30] http://www.nationalobserver.com/2016/05/02/news/heres-how-enbridge-edited-federal-pipeline-audit

including protection of listed sensitive areas and potable water intakes within one mile of a discharge site

- *Deliver equipment to protect sensitive environmental areas and drinking water intakes, within 60 hours of a major spill*
- *Provide updated disaster prevention and response plans to the Pollution Control Agency every three years…"*

We could talk about how they've been dragging their feet on fixing this line for years.

In 2003, both the Minnesota Pollution Control Agency (MPCA) and the Minnesota Office of Pipeline Safety (MN OPS) wrote letters to the Pipeline and Hazardous Materials Safety Administration (PHMS) stating their concern over Line 3. The MPCA's letter included these facts:

- **MPCA has records of nearly three dozen non-third-party spills, leaks, or ruptures of Line 3 between 1972 and 2003**
- **About 87% of the pipeline petroleum spills in Minnesota in the period of 1991-2002 were from Line 3.**
- **About 48% of all petroleum spilled from all sources in Minnesota was from Line 3**

Line 3 was responsible for the 1.7 million gallon spill in 1991 in Grand Rapids and the 2002 250,000 rupture in Cohasset. The Grand Rapids spill was between a college and an apartment building. But for incredible luck an inferno could have resulted. 300,000 gallons of the Grand Rapids spill flowed to a river. Luck with the timing of the spill; river-ice conditions; and an aggressive and organized recovery by the company kept hundreds of thousands of gallon of crude oil from entering the Mississippi River. Oil in the Mississippi would likely have fouled St. Cloud, St. Paul, and Minneapolis drinking water intakes for months. Likewise, the Cohasset spill could have easily entered the Mississippi River it had happened in a different segment of Line 3.

2007-2008, a focus group within Enbridge recommended that segments of Line 3 be replaced because of the high density of identified anomalies. At that time, the optimal maintenance approach was determined to be lowering the pressure on the pipeline in successive steps, which deferred the immediate need for pipeline replacement. In 2008, Line 3's capacity was 503,000 bpd of mixed service, and by 2010, it had been lowered to a capacity of 390,000 bpd of light crude oil. This lowered pressure maintained a safety factor on the line, deferred some of the maintenance work on the anomalies, and still allowed the pipeline to function, albeit at a much reduced rate.

In the U.S. alone, approximately 4,000 integrity digs were forecast during the following 15 years to maintain Line 3 at its reduced level of operation. Dig and repair costs were forecasted to exceed $6 billion through the year 2026, and replacing the segments in the worst integrity condition would only lower the forecasted cost to $4.3 billion. Further pressure reductions could not be implemented because the pipeline was already operating at the lowest operable pressures.

We could also talk about the number of spills, or fines they've recieved.

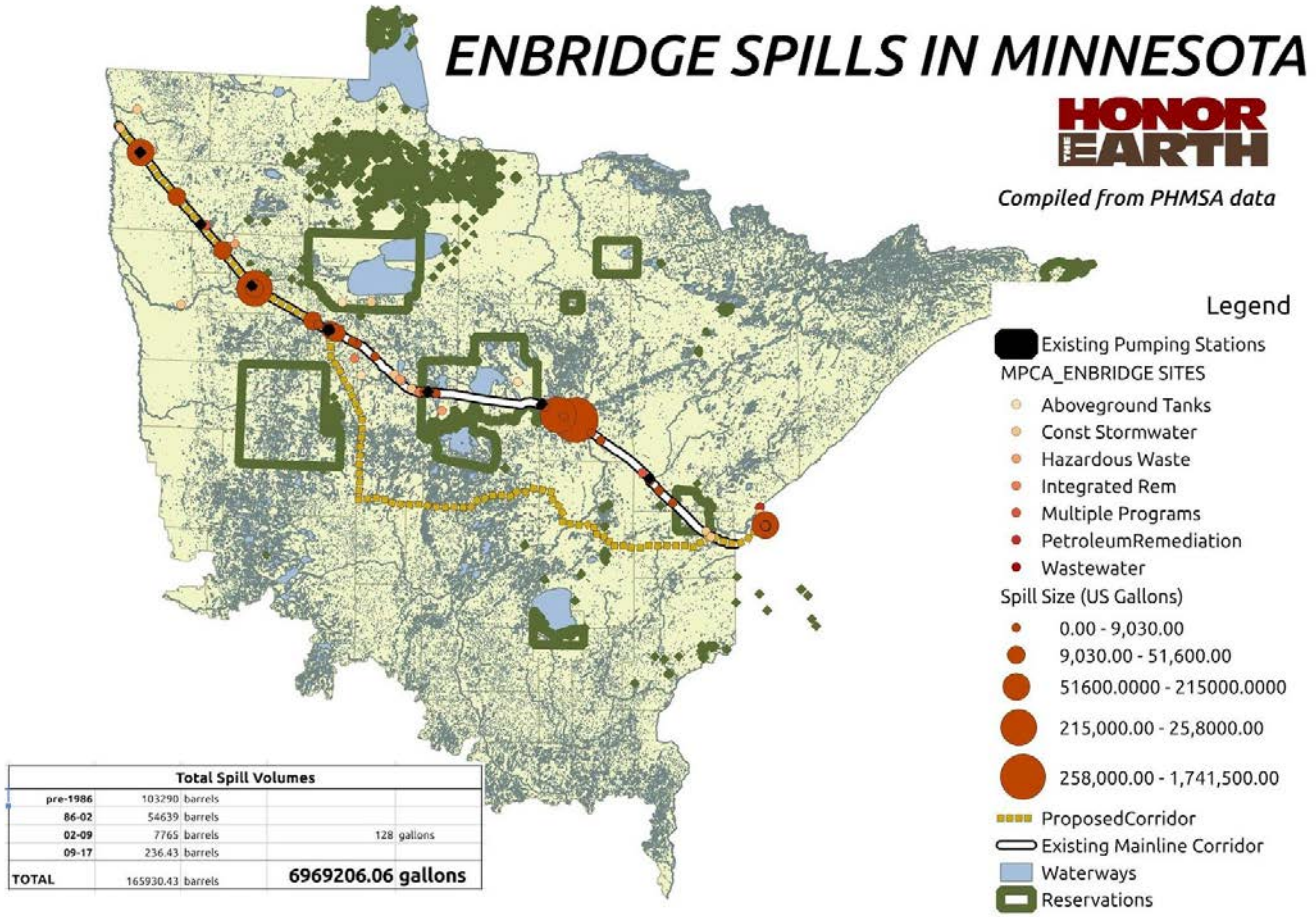

Total Spill Volumes				
pre-1986	103290	barrels		
86-02	54639	barrels		
02-09	7765	barrels	128	gallons
09-17	236.43	barrels		
TOTAL	165930.43	barrels	6969206.06	gallons

2010 Duluth New Tribune article
http://www.duluthnewstribune.com/content/state-records-show-many-minnesota-pipeline-ruptures

The News Tribune found that over the past 30 years, nearly 1.5 million gallons of oil have spilled out of the Enbridge/Lakehead pipes in northern Minnesota -- much of it into wetlands and some of it close to the Mississippi River.

In one case, tens of thousands of spilled gallons were set on fire to avoid causing more serious environmental damage.

The PCA data shows 145 of those spills occurred since the company became Enbridge, though only 10 were greater than 1,000 gallons.

One of the Enbridge lines has been a particular problem -- a 34-inch pipe that has been the source of most of the state's major oil spills in recent years. It's the line that exploded in 2007, killing two workers near Clearbrook, and it's the pipe that caused one of the state's largest-ever spills in 1991 near Grand Rapids.

"The record of Enbridge's (older) 34-inch line is not good; it is responsible for more than half of the oil spilled in Minnesota," said Sam Brungardt, a spokesman for the PCA.

In a memo to the National Transportation Safety Board, the PCA warned as early as 2003, four years before the deadly explosion, that the 34-inch line had problems when operated at full-capacity pressure. PCA officials say

many pipes apparently were damaged in transit before being laid in the 1960s, and that those "micro fractures" were still causing problems.

"The 34-inch line between North Dakota and Superior passes under or near the Mississippi River, past a number of large and very important resource lakes, through bogs and wetlands, and through or near very many other sensitive features," Steve Lee, manager of the PCA's emergency response section, said in the memo to the NTSB. "There are frightening potential consequences of another 34-inch line failure if it occurs at or near the Mississippi River, within a tribal boundary, within a neighborhood or city, or under or near one of the major lakes."

Spill timeline (Minnesota)

Enbridge spills have occurred as recently as June 9, 2009, when five gallons of crude spilled near Floodwood, and March 13, 2009, when 50 gallons of crude spilled near Clearbrook.

Date	Location	Line/material	Amount	Notes
March 13, 2009	Clearbrook		50 gallons	
Nov. 28th 2007	Clearbrook		15,000 gallons	Two Superior men died in explosion. $2.4 million fine, had to reduce pressure.
July 4th, 2002	Near Cohasset		250,000 gallons	
July 22, 2000	Near Leonard		20,000 gallons	
September 16, 1998	Plummer		147,000 gallons	Town was temporarily evacuated
August 4, 1996	Donaldson		420,000 gallons	
March 3, 1991	Grand Rapids		630,000 gallons	Video footage

Cass Lake Pumping Station

FROM LLBO's webiste:
http://www.llojibwe.org/drm/environmental/brownsfield.html

Enbridge South Cass Lake Pumping Station: Sec 17, R31W, T145N Cass Lake, MN 56633. This site has been contaminated by a pipeline leak. Over site of cleanup activities and enforcement is been conducted on this site. DRM has had several meetings and participated in the annual monitoring of this site. Two additional monitor wells have been installed. Feasibility studies are still being developed and not finalized yet.
Reports: http://www.llojibwe.org/drm/environmental/content/enbridge2003Report.pdf
http://www.llojibwe.org/drm/environmental/content/enbridge2004Report.pdf

http://www.llojibwe.org/drm/environmental/content/enbridge2005Report.pdf

Enbridge North Cass Lake Pump Station: yearly sampling completed in November, Embridge Pipeline mile marker 953.3 Cass Lake, MN 56633. Several sampling wells in place, removed contaminated crude oil spill in July 2010 but still have indication there is still crude oil in soils and ground water, still monitoring the wells every August and November, no clean up and ongoing.

10-25-2005 Release (updated 9-10-07)

The Brownfields Program, through the Division of Resource Management, is providing public awareness concerning an approximate 48,000 gallon crude oil spill. The site is located south of US highway 2 west of the City of Cass Lake near the railroad tracks. Crude oil was detected in 2001 and currently can be found in the groundwater aquifer through on-site monitoring wells. The spill is a result of a leak from the Enbridge Energy Company South Cass Lake Pumping Station.

Since the spill has occurred several events have taken place to remediate the situation:

Remediation technologies being addressed
Risk factors are being addressed
Several studies have been generated
Two additional monitoring wells have been installed
Oil recovery will begin on October 27, 2005
Cooperative working relationship between Enbridge and Leech Lake Reservation

The USGS has proposed a series of investigations to assist the LLBO DRM in charaterizing the 3-dimensional plume distribution, the redox zone and microbial populations in relation to their attenuation capacity, and in estimating groundwater recharge to evaluate the possible effects of focused recharge on enhanced biodegradation of petroleum hydrocarbon. The proposed USGS studies will extend and supplement results from previous data collection studies conducted by the Enbridge Energy company and its consultants. The study will provide unbiased scientific information and tools that can be used by DRM and Enbridge to better manage the Cass Lake Site.

The Leech Lake Environmental Department was given the mission to "protect and preserve the Reservation's land, water, and atmospheric resources from degradation of any kind which threatens the health, welfare, traditional customs or development of the Leech Lake Band within their homeland."

Cohasset Spill

In July 2002, a 34-inch-diameter pipeline (Line 3)...ruptured in northern Minnesota, contaminated five acres of wetland with about 250,000 gallons of crude oil.

DOI site:
https://www.cerc.usgs.gov/orda_docs/CaseDetails?ID=1019

Fish & Wildlife spill response page:
https://www.fws.gov/midwest/es/ec/SpillResponse/index.html

UFWS National Resources Damage Assesments
https://www.fws.gov/midwest/es/ec/nrda/index.html
https://www.fws.gov/midwest/TwinCities/enbridge.htm
https://www.cerc.usgs.gov/nrdar/Test_page3.htm

https://www.cerc.usgs.gov/nrdar/NRDA_Restoration_Table.htm

Fines

From the Corporate Research Project page on Enbridge:

- **In 2004, the U.S. Pipeline and Hazardous Materials Safety Administartion (PHMSA) proposed a fine of $11,500 against Enbridge Energy for safety violations found during inspection of pipelines in Illinois, Indian and Michigan. The penalty was later reduced to $5,000. In a parallel case involving Enbridge Pipeline operations in Minnesota, an initial penalty of $30,000 was revised to $25,000.**
- **In November, 2007 two workers were killed in an explosion that occured at an Enbridge pipeline in Clearbrook, Minnesota. The PHMSA later fined the company $2.4 million for safety violation connected to the incident.**
- **In 2008, the Wisconsin Department of Natural Resources charged Enbridge Energy with more than 100 environmental violations relating to the construction of a 320-mile pipeline across much of the state (Line 61). The agency said Enbridge workers illegally cleared and disrupted wooded wetlands and were responsible for other actions that resulated in discharing sediment into waterways. In January 2009, the company settled the charges by agreeing to pay $1.1 million in penalties.**

Enbridge To Pay Wis. $1M Over Pipeline Project[31]

By Melissa Lipman

Law360, New York (January 5, 2009, 12:00 AM EST) -- Enbridge Energy LP has agreed to pay the state of Wisconsin $1.1 million to settle claims that the company violated state laws governing waterway and wetlands protection during its construction of two 321-mile-long oil pipelines across the state in 2007 and 2008.

The state sued Enbridge in December over a number of alleged violations related to flooding and erosion while the company built the Wisconsin portion of a $2 billion project to extend pipelines carrying crude oil from Canada to Illinois refineries.

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[31] https://www.law360.com/articles/81678

"While some of the individual violations were likely of limited direct impact, the incidents of violation were numerous and widespread, and resulted in impacts to the streams and wetlands throughout the various watersheds," Wisconsin Attorney General J.B. Van Hollen said announcing the settlement Friday.

Van Hollen added that the settlement would "encourage the proactive protective measures" for similar projects in the future.

The dispute centered around permits the Wisconsin Department of Natural Resources issued Enbridge in November 2006, including several allowing the energy transportation company to set up temporary bridges in certain waterways, remove material from streams and riverbeds and discharge the fill into the state's wetlands.

The complaint listed a bevy of violations based on compliance status reports filed by independent environmental monitors Enbridge hired in order to receive its construction permits.

Enbridge spokeswoman Denise Hamsher said the majority of the issues the state cited related to two "horrendous" widespread flooding events in the state in the spring and summer of 2007 that were not "unique to the project."

Hamsher said that in some cases the company's "erosion control methods weren't sufficient, and there were some instances of contractor error," including an incident where a contractor drove through a stream instead of using a bridge.

Calling the 321-mile-long pipeline "one of the largest projects in Wisconsin history," Hamsher said Enbridge had "agreed that a settlement would be better than a protracted challenge."

The settlement payment includes $730,000 for the bulk of the violations as well as several surcharge fines. The stipulation also provides for Enbridge to pay WDNR $85,000 for its investigation and to give Wisconsin's DOJ $15,000 for attorneys' fees and other expenses.

Enbridge has learned from the problems with its flooding controls on the pipeline, and completed two additional projects in 2008 without any problems, according to Hamsher.

Enbridge dealt with the problems "within days," and the issues the state cited had "no lasting impact on the environment," Hamsher said, adding that WDNR "has already signed off on successful restoration for the majority of the 1,489 wetlands that were crossed." The 80 restorations yet to be approved are waiting for snow to melt in order to allow a visual inspection of the land, according to Hamsher.

The stipulation requires Enbridge to retain its independent environmental monitors until the company has completely restored the wetlands to comply with its construction permits.

The Wisconsin project is part of Enbridge's larger expansion and extension of pipelines carrying crude oil from western Canada to refineries in Chicago and southern Illinois. Enbridge expects the entire project, with more than 600 miles of new pipeline, to begin operating by 2011 and has spent $2.6 billion on construction since 2006.

Enbridge was represented by in-house counsel and Whyte Hirschboeck Dudek SC.

The case is State of Wisconsin v. Enbridge Energy LP, case number 2008-cx-24, in the State of Wisconsin Circuit Court, Dane County Branch.

What do we know about the integrity of Line 3?
According to their most recent publicly disclosed inspection records:

- **Over 70 percent of the 140,000 pipe sections between welds (referred to as "pipe joints") are experiencing external corrosion;**
- **Corrosion deeper than 50 percent of the pipe wall thickness would increase to affect over 3,000 of the pipe joints in 2016 – an increase from approximately 900 pipe joints in 2012; and**
- **Over 25,500 pipe joints will have a corrosion depth of 50 percent or greater by 2030 – an increase from approximately 18,000 pipe joints forecast for 2027**
- **Ten times as many corrosion anomalies per mile (with a depth of more than 20 percent of the pipe wall thickness) than any other Enbridge pipeline in the same corridor.**
- **SCC affecting over 15 percent of the pipe joints, and five times as many SCC anomalies per mile (with a depth of more than 10 percent of the pipe wall thickness) than any other Enbridge pipeline in the same corridor.**

Why is this pipeline in such bad condition?
Line 3 in the U.S. was built in 1962/1963 with two characteristics that make this pipeline particularly susceptible to three integrity threats. First, on Line 3 in Minnesota, 84 percent of the coating is Polyethylene ("PE") tape, which has been found to disbond from the pipe, making the pipeline more susceptible to both external corrosion and SCC. Second, 53 percent of the longitudinal welds are flash welded ("FW"), which was a pipe manufacturing process that has an inherently higher susceptibility to the formation of defects along the long seam of the pipe. Although not all FW pipe contain manufacturing defects, there are FW segments of Line 3 where the combination of these defects and internal pipeline pressure developed into long-seam cracking and contributed to some of the historical failures, including the *1991 1,700,000 gallon Grand Rapids Spill- the largest inland spill in U.S. history.*

It's also what caused the Kalamazoo rupture, the largest inland spill in US history (replacing the previous record holder, the 1979 Bemidji spill).[32] It has been 6 years and $1.2 billion has been spent, and that spill is still not cleaned up. The community near the spill has been suffering negative health effects, and it has been shown that Enbridge knew about the crack, but did nothing about it. We do not want this risk in our pristine waterways and

[32] http://www.ntsb.gov/investigations/AccidentReports/Pages/PAR1201.aspx

sacred rice beds. These lines are catastrophes waiting to happen. Allowing Enbridge to abandon Line 3 without a sufficient review process will set a dangerous precedent.

Management Systems[33]

Pipeline operators are not required to have electronic leak detection systems. Instead, they use a system of weights and balances to determine if their system is losing volume. Part of these management systems include the "smart pigs" that inspect the pipelines from the inside out. Currently, regulations do not govern a standard response time for leak detection. Small leaks are the most difficult to detect; "Even the best leak detection systems may not be able to detect small leaks under 3% of the volume of the flow through the pipeline".

Integrity Management is the set of rules that operators follow regarding the identification and assessment of all threats to a particular pipeline segment, be they from internal or external corrosion, flooding, landslides, excavation damage, weld or construction defects, etc. As part of this set of rules, they must also produce a specific Integrity Management plan designed to routinely assess those threats. This plan must also cover the undertaking of any necessary repairs or replacements, the improvement of cathodic protection, and outline other actions necessary to maintain the pipeline's safety.

These Integrity Management rules, however, are not applicable toward all pipelines. The rules are only implemented for pipelines that could affect a "High Consequence Area" (HCA) in the event of a spill. For liquid lines, HCAs include defined densities of populated "Unusually Sensitive Areas" (USAs) such as: drinking water sources, commercial or recreational fishing areas, and commercially navigable waterways. Each HCA pipeline segment must be re-assessed at least every five years. About 44% of all hazardous liquid pipelines fall within HCAs.

Limitations of Smart Pigs[34]

Despite the industry's reliance and touting of smart pigs, there are several limitations associated with the process. Every five years may not be frequent enough. The data that is collected by the pigs are not analyzed in real time and can take up to nine months for staff to go through. Even with a detection rate of 90% pigs can, and do, miss things. For example, corrosion and tiny cracks that follow a welded seam are commonly missed. This data gap has been indicated as a primary cause of the 2012 ExxonMobil Pegasus pipeline rupture, when one hundred and thirty-four million gallons of oil were released into a neighborhood in Mayflower, AR.

"Damage was so extensive that many people opted never to return home."

- (PST White Paper)

Another limitation of the pigs is that depth of corrosion can be misreported. After the San Bruno spill of 2015[35], it was discovered that a recent pigging had underrepresented the depth of corrosion by 35%. It is also worth noting that not all pipelines are piggable. Narrow diameters, tight turns, or changes in diameters can all restrict the usability of pigs. Lastly, even in the best possible conditions, operators still need to respond to results in a timely manner. This has not always been the case with Enbridge.

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[33] From Pipeline Safety Trust's Pipeline Safety New Voices Project, Briefing Paper #3 - Hazardous Liquid Pipelines- Basics and Issues and Pipeline Safety Trust's White Paper on Pigging

[34] From: Bell, Trudy E. "Pipelines Safety and Security: Is It No More Than a Pipe Dream?" copyright 2014.

[35] From "The Trouble with Inspection Tools for Oil Pipelines". The Wall Street Journal. https://www.wsj.com/articles/pipeline-inspection-tools-are-far-from-perfect-1435875737

Leak Detection Systems

Supervisory Control And Data Acquisition systems (SCADA) are often used as leak detection systems, though they were not originally designed for that purpose. They collect and display real-time data and sound alarms if pressure drops, or metered-out quantities do not match metered-in. They also allow operators to remotely control pump stations and valves.

The most reliable leak detection systems include acoustic and pressure wave analysis, fiber optic cables, hydrocarbon sensors, and thermal imaging. Unfortunately, when these systems are not utilized, it is often because they do not offer a 1 to 5 year return on investment (ROI). The industry also does not weigh the avoidance of costs for cleanup and fines in their ROI equations. From an engineering standpoint, the best process would be to implement at least two methods that rely on entirely separate physical principles. Utilizing a ten-year horizon, these detection systems would yield a valuable ROI.

Human Error[36]

As pointed out above, even with the best leak detection systems, there is still room for human error and mismanagement. This room includes the selection of the testing tools, interpreting test results, and response to detected issues. In a report by Richard Kuprewicz of AccuFacts, Inc, he stated:

"In 40 years of doing this, I've yet to run across a true accident- a random event the pipeline operator had no real control over… Even when a test highlights a problem with a pipeline, executives have to be willing to sign off on fixes instead of delaying expensive repairs…. You can have a smart pig, smart people, and dumb management."

Risk

Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "would have a long-term detrimental effect on tribal members and tribal resources" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3).

Why are the Tribal communities being asked to assume all the risk?

Risk is the product of both exposure and sensitivity, pre-existing stressors or co-risk factors should be identified for each type of effect. This risk assessment is being undertaken not only protect current subsistence and cultural practices, but also promote and enhance the restoration of those tribal practices and values that are protected by treaties between tribes and the United States.

In addition to the dependency webs, we will use a number of methods to assess these potential impacts. For ecosystem-level impacts, the Invest GIS modeling tool should be used, along with the UCONN Landscape fracture tool. This will give an estimation of ecosystems impacted. Utilizing ecosystem services valuation will give an economic impact of the loss of these ecosystems services.

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[36] IBID

The communities of Rice Lake and East Lake, which are most directly impacted by the prefered route, are already at risk. These projects are placing significant additional stress on these communities, which will only increase health inequities and cause additional harm. At both the Rice Lake and McGregor meetings, emotional verbal comments addressed the community address associated with the prospect of these projects. In the case of Rice Lake and East Lake, the larger territory would be impacted by the proposed pipeline project, and in the case of East Lake, the community has not only the prospect of a pipeline, but also the proposed Tamarac Copper mine.

Native American youth 15-24 suicide rate more than 3 times more than national average
Suicide leading cause of death for those 10-34
Reservations among the poorest places in the nation
Rates of depression twice national average
Alcoholism 5.5 times national rates
Heart disease twice national average[37]

On both White Earth and Mille Lacs reservation, suicides are already much higher than the state average, along with many other health conditions. Reservations across North America are also suffering from major drug and suicide epidemics. The health impacts of the proposed Line 3 damage to Ojibwe communities will be significant, and the full, cumulative human consequences must be considered. These consequences are not limited to the populous Twin Cities, but are spread across Native communities from Alberta, North Dakota, and here in Minnesota. As we have stated before, the front line communities in Alberta and North Dakota are suffering from increased sexual violence, exposure to toxic chemicals, and a loss of community and ecology.

These two tribal (Rice Lake and East Lake) communities are already under stress of socio-economic conditions which places them at higher health risks. This is placing significant additional stress on these communities, which will only increase these health inequities and cause additional harm. The tribal community members testified at the Bands' pipeline hearing that this pipeline will cause them additional harm through environmental degradation and potential spills. This feeling will increase stress which causes tribal members additional health issues, psychological and potentially physical. The pipeline is opposed in the tribal community, which values the way of life, and the cultural and spiritual connections to the wild rice beds.

Exposure Risks

.. the combined effects of an environmental stressor on health and well-being can permeate both individual and the collective community levels whereby an entire community may be impacted by exposure (e.g. McGee 1999, Elliott et al. 1999, Luginaah et al. 2002)[38]**.**

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[37] McLeigh JD. 2014. What are the policy issues related to the mental health of Native Americans? PsycINFO.
[38] Luginaah I, Smith K & Lockridge A. 2010. Surrounded by Chemical Valley and 'living in a bubble': the case of the Aamjiwnaang First Nation, Ontario. Jrnl of Enviro Plan and Mana. 53: 353-370.

Cultural Impacts

Through the Native American Graves Protection and Repatriation Act ("NAGPRA"), Congress has recognized the obligation of federal agencies to ensure the repatriation of Native American cultural items – human remains, funerary objects, sacred objects, and objects of cultural patrimony – to lineal descendants and culturally-affiliated tribes.[39] If the pipeline is built along the Proposed Route, there is a near certainty that these types of cultural items will be encountered, as they have during past construction projects in the area.[40] Realistically, only Anishinaabeg – in particular, the Tribal Historic Preservation Officers and related staff – have sufficient historical knowledge and expertise to be able to identify the types of lands that are likely to contain cultural items, and to be able to identify burials, human remains and other cultural resources once uncovered.[41] Even with adequate consultation (but especially without it), the Proposed Route could result in the loss or destruction of these cultural items, whose loss would be considered irreparable by us.

Beyond the physical and the economic, Anishinaabeg exist because of the manoomin. It is an integral part of our creation story and the entire area of the pipeline represents a significant cultural and spiritual area, representing an important example of a major period of Native American history.

Enbridge also has not addressed the physiological impact of the pipeline running through this sacred area in any of their documents or public meetings. It may be safe to say Enbridge does not understand spiritual matters because Enbridge, as a company, has no soul. In the minds and hearts of many Tribal members, it does not matter if the pipeline leaks or not (it will), it's mere existence is damaging to their sacred landscapes. Additionally, Many Tribal members have no reason to believe Enbridge when they say something is "safe" or "clean". This distrust may also extend to governmental regulators, as US Federal agencies do not have the best history with Native Americans. Indeed, *part of the proposed route follows a historical forced removal trail*. **This route presents an important example of a major period of US history.**

Ecologic Health and the Rights of Nature

An important ecological concept for measuring ecosystem health is the indicator species. These species can be used to quickly gage the overall health of an ecosystem. When looking at the global system, and specifically human communities, Indigenous communities need to be understood as humanity's "indicator species". Indigenous communities live in much more intimate connection with the environment. As such, these communities suffer the consequences of environmental degradation first and more severely. As all humanity depends on the environment, Indigenous communities are an indicator of the health of overall human community.

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[39] 25 U.S.C. § 3001 et se
[40] Weyaus Testimony at 146-47.
[41] Testimony of Charles Sam, Transcript at 150-51;Testimony of Commissioner Susan Klapel, Transcript at 150-152.

When it comes to ecosystem valuation, there are several different methodologies used to derive values (Troy and Wilson 2006, Costanza and Folke 1997, Raudsepp-Hearne, Peterson and Bennett 2010, Sutton and Costanza 2002, Zhao, Hong and Zhang 2008). These methods include inferring value based on what people spend to enjoy ecosystem services, deriving values through surveys or participatory approaches and value transfers. When utilizing a value transfer approach, values derived for a geographically similar area are applied to a study area. This is the approach this project will take. Just as there are several techniques for deriving values, there are several uses for the resulting information (Farber et al 2006, Jenerett, Marussich, Newell 2006, Pagiola n/d, Graymore, Sipe, Rickson 2009). These uses included developing prices for natural resources, developing conservation plans, providing compensation for environmental damage and developing payment amounts for ecosystem managers.

The Rights of Nature

Stated in another way, if we naively attach our Indigenous categories of thought to colonial religious and legal language that does not have the ability to understand those concepts, then without a mechanism to keep our traditional understandings of those relationships intact, we are in constant risk of participating in our own cultural genocide[42]

While the global movement to include sustainability principles in development decisions has been growing for decades, there is another movement that has been gaining traction in recent years. This is the "Rights of Nature" movement.

Rights of Nature is the recognition and honoring that natural ecosystems including trees, oceans, animals, mountains have rights just as human beings have rights.

Rather than treating nature as property under the law, the time has come to recognize that nature and all our natural communities have the right to exist, maintain and regenerate their vital cycles.

And we – the people – have the legal authority and responsibility to enforce these rights on behalf of ecosystems. The ecosystem itself can be named as a rights bearing subject with standing in a court of law[43]

Unsurprisingly, this movement started in Indigenous communities in Ecuador. Ecuador officially

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[42] While one could certainly argue that protecting our lands may be worth this stretch and that the U.S. Legal system is the only such vehicle for such protection, there are two glaring problems. First, if we actually were having some success in protecting our lands from eurowestern development (read destruction), then one could certainly argue that participating in these legal cases could be worth the stretch. However, little to no protection has been had thus far. Second, if we negotiated these legal cases from a place of cultural and communal functionality where the colonial mentality could be kept at bay in our own ceremonies and communities, then again, one could say the risk of colonizing our thought would be diminished. However, none of our communities negotiate the world from a place of functional balance where we are consistently in charge of our own children's education, or even our own cultural categories of thought. The constant intergenerational dysfunctionality in our communities makes the colonial mentality all the more dangerous when we begin to translate our languages and concepts around land into eurowestern religious language.Therefore, I believe that it is essential to clearly identify methods of engagement that do not compromise our Indigenous categories of thought and to develop new and better methods of land protection.

[43] http://therightsofnature.org/learn-about-rights-of-nature/

included these rights in their new constitution in 2008.
In 2010, Bolivia hosted the World People's Conference on Climate Change and the Rights of Mother Earth. Held in Cochabamba, Bolivia, at the conference CELDF assisted in drafting the proposed Universal Declaration on the Rights of Mother Earth, which was modeled on the U.N. Universal Declaration on Human Rights. The Declaration on the Rights of Mother Earthhas been presented to the U.N. General Assembly for its consideration.[44]
Since then, a number of other communities (Indigenous and non-Indigenous) have used this principle to protect their lands.

New Zealand
" *Ko au te awa, Ko te awa ko au ~ I am the river and the river is me*" **expresses the special, spiritual relationship the iwi peoples (Maori) hold with the Whanganui river (New Zealand). In a landmark agreement between the Crown government of New Zealand and the Whanganui River iwi, the Whanganui River was granted legal personhood status. The agreement recognizes the river and all its tributaries as a single entity, Te Awa Tupua, and makes it a legal entity with rights and interests, and the owner of its own river bed. Two guardians, one from the Crown and one from a Whanganui River iwi, are given the role of protecting the river (Global Alliance, September 2012)[45].**

India
An Indian court has recognized Himalayan glaciers, lakes and forests as "legal persons" in an effort to curb environmental destruction, weeks after it granted similar status to the country's two most sacred rivers (PRI, April 2017).[46]

Pennsylvania

Grant Township in Pennsylvania, USA, has passed a law legalising direct action to prevent the fracking wastewater injection wells within the township. The law permits non-violent direct action to enforce the provisions of the Grant Township Community Bill of Rights Ordinance which established rights to clean air and water, the right to local community self-government and the rights of Nature. The proposed well would be a violation of those rights.[47]

There are many other communities across the globe that are adopting, or looking at adopting this legal framework. The recognition of the Rights of Mother Earth (Nature) is essential to create a sustainable future for our descendants.

Pipeline Impacts

The ROWs for pipelines clear large swathes of forests, which can impact forest dynamics and open up areas to invasive species. The Proposed Route calls for the clearing of over 1,500 forested acres, creating the potential for short-term and long-term impacts to wildlife from soil runoff, introduction of invasive species, and habitat loss.[48] Their mitigation plan for construction impacted areas seems to

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[44] https://celdf.org/rights/rights-of-nature/
[45] http://therightsofnature.org/tag/new-zealand/
[46] https://www.pri.org/stories/2017-04-01/himalayan-glaciers-are-granted-rights-human-beings-protection
[47] http://therightsofnature.org/tag/grant-township/
[48] Horbacz Testimony at 72.

take a "let nature run it's course" approach. This does not acknowledge the great potential of the corridor to also become a pathway for invasive species. There revegetation time line also seems to be based on hope and not science. Their projects estimate a recovery time of 40 years for sites disturbed by construction activities. Studies from Pennsylvania have shown that pipeline impacted forested areas take over 100 years to return to pre-construction states[49]. Wetland areas may never return to their pre-construction states if there is significant altering of the hydrology. The indirect and cumulative effect of this loss, in addition to direct impact of pipeline construction, operation and potential release, would have a significant and adverse economic, social, medicinal and religious impact on the Band members, other tribal communities and low-income communities. The loss of ecosystem services would also affect a number of downstream communities. The full cost of the loss of ecosystems needs to be addressed in any permitting process. All of these matters are connected to tribal rights, resources and health impacts to the Band, other Ojibwe Tribes or other tribal communities.

Impacts from construction methods

At every stage of construction, there is potential for impact. Construction of access roads can fragment landscape, as can the creation of the ROW. Improper topsoil separation can impact subsoil conditions. In some sensitive ecosystems, the ability to recover from construction impacts is less than others. Revegetation of the corridor can introduce invasive species, as is the case in the existing corridor.

Landscape fragmentation and edge effect

Landscape fragmentation is created by roads, utility corridors and other developments that divide continuous ecosystems into discontinuous pieces. This can impact wildlife, sensitive plants and other ecosystem functions. It also creates an edge effect that has many other repercussions. Among these are loss of core forest, noise, dust, invasive species, etc. These edges are also more susceptible to wind damage and can create wind tunnel effects.

Alteration of wetlands/hydrology

Where pipelines are built in wetlands, they can alter hydrology. This area has a complex hydrology that would be permanently impacted by the development of an energy corridor. The pipeline construction process will compact soils, alter terrain, and hydrological regimes. Some of these impacts will be permanent. A 337 ft, 34' pipeline would permanently displace roughly 43,000,000 cubic feet of soil, not counting soil displaced for footers or other fill material. This displaced soil changes the structure of

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[49] Kiviat E. 2013. Risks to biodiversity from hydraulic fracturing for natural gas in the Marcellus and Utica shales. Ann. N.Y. Acad. Sci 1286: 1-14.

the land near the ROW. In sensitive wetland areas, of which the prefered route crosses some 458[50] of, this displaced soil can change the morphology of the wetland.

The issue which is not discussed by the pipeline company, amongst others, is the impact on a delicate aquatic ecosystem by the installation of the pipes. Studies from Louisiana show pipeline cuts through wetlands can increase in size two fold in five years. This cut is not a static event, it is temporal event, changing the dynamics of wetlands over time. And not for the better.

"Once the oil companies come in and started dredging all the canals, everything just started falling apart," said Joseph Bourgeois, 84, who grew up and still lives in the area[51].

Wetlands are among the most valuable ecosystems on the planet; in terms of their biodiversity, their services provided to humans (such as flood control and provision of clean water), and to the Anishinaabeg for their provision of food, medicine, and spiritual health/wealth. The permitted destruction of these sacred wetlands represents a breach of contract between United State governments and the Anishinaabeg governments.

The baseline data on wetland quantity reveal that Minnesota currently has 10.6 million acres of wetlands. The initial survey on wetland quality, which focused on depressional wetlands such as marshes and ponds, showed that the plant communities in nearly half of the wetlands were in poor condition, while aquatic macroinvertebrates (such as aquatic insects, leeches and snails) fared much better. Certain species of plants and aquatic macroinvertebrates are sensitive to various disturbances, so they are good indicators of a wetland's ecological health or condition[52].

Our wetlands, and the plant communities they support are already in poor condition. Fracturing these sensitive landscapes with pipelines will add more stress, resulting in the loss of plant communities. Including wild rice.

Wild rice is considered to be a bio-sentinel for water quality due to its tendency to thrive under specific conditions[53].

As Commissioner Klapel of the Mille Lacs Band of Ojibwe notes, in her letter to the Public Utilities Commission, the present proposal and analysis provided by Enbridge is entirely inaccurate in the hydrological assessment provided by the company to the Public Utilities Commission, falsely representing the risk.

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[50] From the Minnesota Department of Commerce: Sandpiper Pipeline: Comparison of Environmental Effects of Reasonable Alternatives In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota, Minnesota Public Utilities Commission Docket CN-13-473

[51] From Scientific American (Marshall 2014)

[52] From http://www.savelakesuperior.org/files/15winter.pdf

[53] Kjerland, T. 2015. Wild Rice Monitoring Handbook. The University of Minnesota Sea Grant Program.

Enbridge states: "Ground disturbance associated with pipeline construction is primarily limited to the upper ten feet which is above the water table in most of the region's aquifers…' Enbridge's generalized claim depicting the water table as ten feet deep is not accurate in the Big Sandy or Rice Lake watersheds. Based on NRCS soil data, the depth of the water table in these watersheds is measured in inches , not feet…"

According to the Minnesota Department of Natural Resources, any factor that can affect water quality or water levels can endanger stands of wild rice.[54] In some locations, the quality of surface water is already impacted by sulfates from mining discharges.[55] For these reasons, biologists and engineers have concluded that routing the Pipeline along the Proposed Route poses the potential for significant impacts to the waters of the Ojibwe homelands, the wild rice that depends upon it, the Band, and its members.[56] Vegetation clearing and grading during construction is likely to alter the complex ecosystem and increase sedimentation. Dredging of wetlands and waterways for bridges and equipment also has a significant potential to alter water levels, further affecting wild rice.[57] Operating and maintaining the Pipeline will create further adverse impacts.[58] These impacts rise to a high level of significance, even before consideration of the risk of an oil spill from the Pipeline into the natural environment and the watershed.

A DNR assessment found over 1,200 lakes and rivers in 54 counties that currently contain or historically had wild rice. Over 64,000 acres of wild rice (out of roughly 2 million basin acres) were found on these waters. More than half of the acreage was found in Aitkin, Cass, Crow Wing, Itasca, and St. Louis counties. http://www.dnr.state.mn.us/wildlife/shallowlakes/wildrice.html

Exposed pipes

Exposed pipes run the risk of being damaged, but no law requires companies to rebury them. Risks increase the longer a line is exposed, but determining the level of risk is up to Enbridge, not the Office of Pipeline Safety. Although federal regulations specify how deep pipelines must be buried, the rules only apply during initial construction, and there is absolutely no law to require Enbridge to rebury the pipe.[59] There are exposed pipes all along the Enbridge corridor, and as the plan stands now, they can just walk away from this exposed pipes when they abandon their lines. These exposed pipes can also limit revegetation/reuse of the corridor, and empty pipes may become more buoyant and continue to work their way out of the ground.

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[54] MDNR Wild Rice Report, at 21.
[55] Id.at 25.
[56] Bunting Testimony at 39-45; Rupp Testimony at 45-53; Weiss Testimony at 53-58; Testimony of brownfield coordinator Todd Moilanen at 58-65; Testimony of chemical engineer and chemist Charles Lippert, Transcript at 65-71; Testimony of forester Jacob Horbacz at 71-74; Testimony of wildlife biologist Kelly Applegate, Transcript at 75-78
[57] Weiss Testimony at 55.
[58] Id. at 55-56.
[59] Jon Wolfgram, chief engineer for the Minnesota Office of Pipeline Safety

Exposed pipes at river crossings can also change the dynamics of the river system. River crossing issues will continue to grow as the climate continues to change. Flood events and alterations of waterway dynamics, changes in freeze/thaw cycles are all elements of climate change. The rapidly shifting climate can increase scour in river beds, and increase the likelihood of a spill at river crossings.

In 2014, an MPR report showed that 3 of the 6 Enbridge crude oil pipelines crossing Minnesota's Tamarac River were exposed by floodwater erosion years beforehand, but were still exposed.[60] None of the pipes had failed at that point, but one was being propped up by steel legs.

A study last year by the Pipeline and Hazardous Materials Safety Administration found "depletion of cover" was a factor in 16 significant pipeline spills at river crossings since 1991.[61]

Exposed Enbridge crude oil pipeline in the Tamarac River in Marshall County, MN. (Photo: Dan Gunderson/MPR News)

Enbridge has stated that since the lines 2 and 13 were installed, the Tamarac River has shifted its position. As such, there are now four locations where those pipes are exposed where the river crosses them. They would like to replace the lines and move them parallel to their existing mainline; as illustrated above. They state that: In accordance with Minnesota Statutes 2016G.02, subd 3(c) and Minnesota Rules 7852.0300, subpart 1(D), this Project qualifies as an exclusion from the Commission's rules governing the routing of pipelines under Minnesota Statutes 216.G.02 and the Minnesota Rules

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[60] http://www.mprnews.org/story/2014/07/29/enbridge-pipelines-exposed

61 http://www.phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/Rep_to_Congr_on_Res_of_Haz_Liq_Incid_at_Cert_In_Wat_Cross_Stu_Final_8_27_13.pdf

7852. Enbridge has applied for and received all applicable federal and state environmental permits, and all affected landowners have agreed to the relocation of these pipeline segments.

They say the replacement pipelines would be "like-size". They state this replacement will not change the operating pressure, or capacity.

No mention of if they are going to remove the pipes or leave in place, also no word about how they will address line 3.

Enbridge's Line 9 here in Ontario, which is also exposed where it crosses the Rouge River in Toronto's Rouge Park.[62]

Surface waters

The Proposed Route attempts to thread the needle along a very narrow strip of high ground between the Big Sandy Lake and Rice Lake watersheds. While the watersheds are often described as separate, the divide between the two watersheds is "very narrow."[63] According to the Minnesota Department of Commerce, the surrounding area contains "high flood hazard risk areas." After recent flooding events, evidence indicates that floodwaters combined contamination from different surface waters and impacted groundwater quality.[64]

As noted in the section on the current conditions in Anishinaabeg Akiing, many surface waters are contaminated or otherwise impaired. Below is a chart describing the streams (and watersheds) the proposed route crosses and their status. {working on chart}

Groundwater

Many Anishinaabeg, and other Minnesotans, continue to rely on groundwater as their primary drinking water source.[65] Some reservation homes may even still utilize standpipes, which tap into shallow aquifers that are more susceptible to contamination. In the case of Pine Point, on the White Earth reservation, this aquifer is already contaminated by the spraying activities of RDO.

The area of the Proposed Route is amongst the most susceptible to groundwater contamination in the state.[66] Aquifer sensitivity in the area is considered high because of the local geological setting.[67] Construction and operation of the Pipeline – to say nothing of a potential release – has significant potential to introduce petroleum and other contaminants into proximate aquifers and impact beneficial uses.[68]

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[62] http://grandrivermc.ca/content/daily-grrr-august-4-2014-%E2%80%9Cmonday-morning-edition%E2%80%9D
[63] David Aubid Testimony at 23.
[64] Rupp Testimony at 51; EERA, at 82-83.
[65] Rupp Testimony at 47
[66] Rupp Testimony at 46; Weiss Testimony at 55; EERA, at 68-70, at B-1.
[67] Rupp Testimony 48
[68] Rupp Testimony at 46.

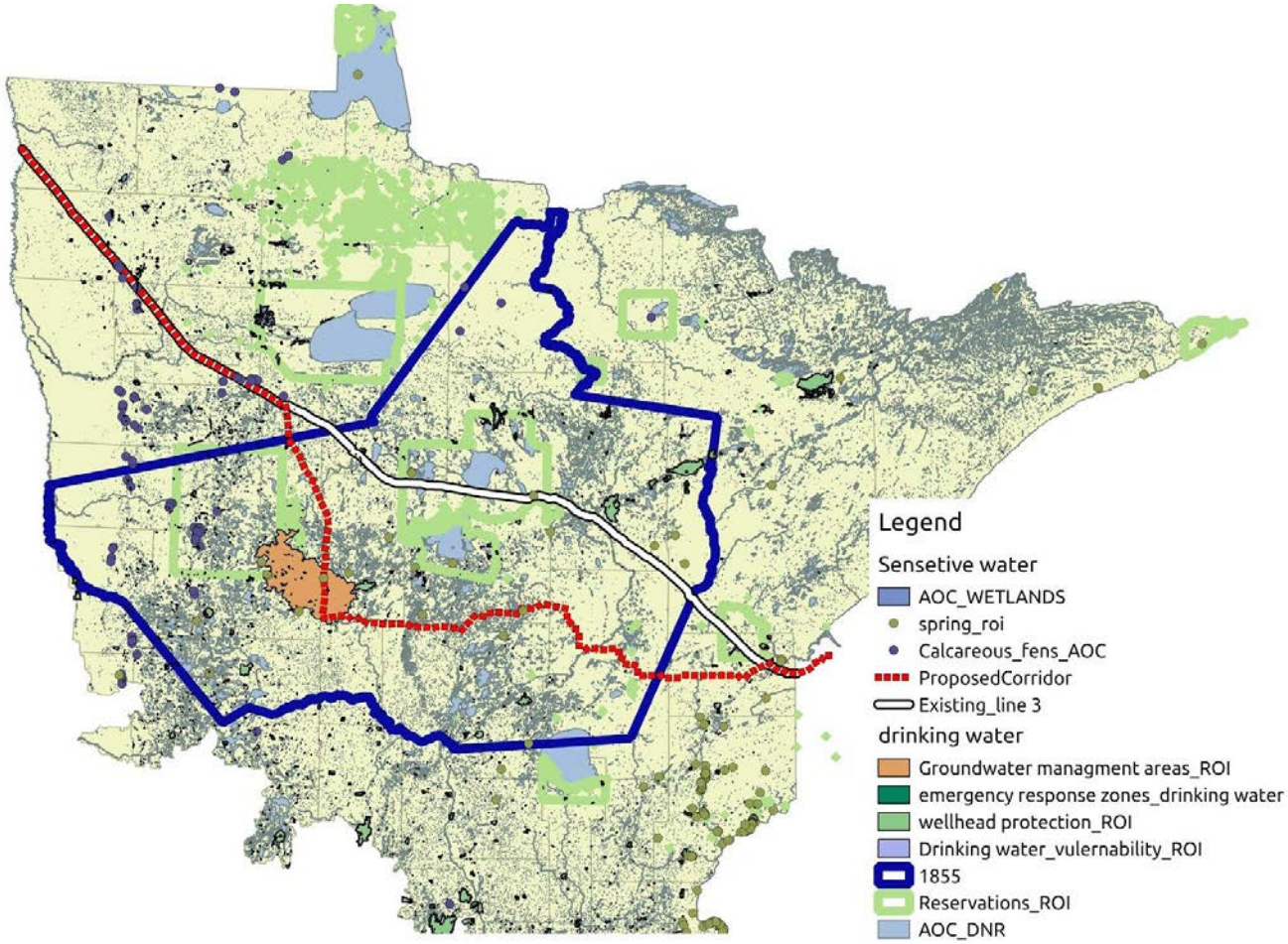

Flora and Fauna (Interspecies Equality)

Interspecies Equality

In Ojibwe culture, as stated by a Band elder, all "beings on this earth. . . got a spirit," and are considered "brothers and sisters."[69] Many Ojibwe who provided testimony expressed their common understanding that the well-being of the natural world is integral to the well-being of self.[70]

The Anishinaabe world undulates between the spiritual and physical planes, and our reality is defined by this recognition. Additionally, in our cosmo-geneology and creation stories, there is an understanding of fluidity and transformation between species. This is demonstrated in our story of how corn first came to the Anishinaabeg as a visitor in human form. this is recognized as our reality. Interspecies intelligence plays a significant role in our Dodaem (clan system). This reality creates a need to maintain interspecies equality, as the other species of creation are seen as relatives.
This broader understanding is reflected in most non-western worldviews, where spiritual practices are essential to all cultural practices, including food production. This is why in an Anishinaabeg world view,

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[69] Testimony of Dale Green, Transcript at 16; Applegate Testimony at 75.
[70] See, e.g., Testimony of Laura Shingobe-Garbow, Transcript at 95 ("Mother Earth . . . [is] everything to me. When I need healing, I go outside. She's our heartbeat").

the practices, for instance of "reciprocity", or making an offering before one harvests, taking only what one needs, and then offering a feast of the first harvest – for the spirits and all to celebrate – displays the practice of spiritual intelligence. As does speaking to relatives who have fins, wings, or roots. The American practice of Thanksgiving is an adaptation of a multi-cultural practice of a harvest feast, resonating with most agriculturally based societies. Indigenous societies have a larger practice of reciprocity for all harvests, which insures sustainability and a balance.

Habitat loss

Among the many wildlife species that dwell in the boreal forest region that the Proposed Route would transverse are Canadian lynx and the northern long-eared bat, both of which are listed as "threatened species" under the Endangered Species Act.[71] Other species that occupy the area, such as gray owls, northern hawk-owls, wolves, deer, bear, and beaver, are culturally significant animals for religious or traditional food purposes.[72] The area also features dancing grounds of the sharp-tailed grouse, where conditions must be ideal for the birds to perform their mating dance.[73]

The Proposed Route would also pass within miles of the Rice Lake National Wildlife Refuge, one of the most important stopping points in the nation for migratory waterfowl.[74]

The Minnesota Biological Survey (MBS) ranks lands of ecological significance based on the number of rare species, the quality of native plant communities, site size and context within the landscape. For aquatic ecosystems, the State of Minnesota has ranked lakes in a similar manner. Combined with data on trout streams, these three data sources provide details on sensitive ecosystems and species on land and in the water.

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[71] Horbacz Testimony at 73; EERA at 75
[72] Applegate Testimony at 76
[73] Id.
[74] Id.at 77("Rice Lake holds the state record for the most waterfowl at a single migratory stopping point of over one million waterfowl in 1994")

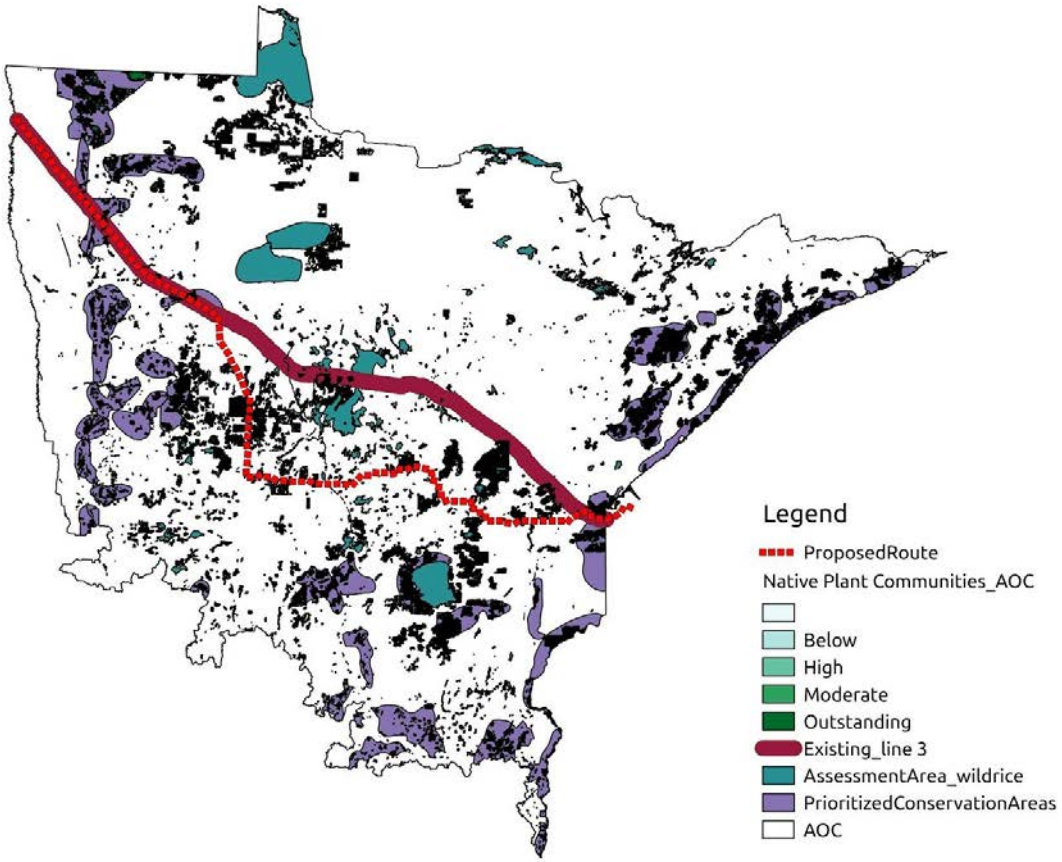

Biological importance, created from MNDNR Native Plant Communities, MN DNR SNA Conservation Opportunity Areas and Marxan Conservation Prioritization, and Wild Rice Lakes Identified by DNR Wildlife.[75]

Construction in or near these areas or spills could have a larger impact on sensitive species than similar impacts outside of these areas. Additionally, species that are federally listed as threatened or endangered are especially sensitive to changes in habitat. The area along the proposed pipeline route with the greatest number of endangered species is located in Polk County.

In addition to wild rice, Anishinaabeg make important use of numerous other native plants.[76] These plants, which have significant medicinal and religious significance, are dependent upon high-quality –uncontaminated– water, soil and wetlands.[77] The Proposed Route has significant potential to endanger these natural resources. To consider just two examples, Labrador tea, an evergreen shrub traditionally used as medicine for a variety of ailments, grows only in wet woods, swamps and sphagnum bogs, and would be adversely affected by the contamination of wetlands and waterways.[78]

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[75] https://gisdata.mn.gov/dataset/biota-dnr-native-plant-comm, https://gisdata.mn.gov/dataset/env-sna-conserv-opportunity-area, https://gisdata.mn.gov/dataset/biota-wild-rice-lakes-dnr-wld

[76] See generally James E. Meeker, Joan E. Elias & John A. Heim, Plants Used by the Great Lakes Ojibwa(1993).

[77] Lippert Testimony at 69.

[78] Lippert Testimony at 71; Meeker et al, at 196.

Northern white cedar, a tree found along wetlands and waterways, is traditionally used as incense in religious ceremonies as well as a medical treatment.[79]

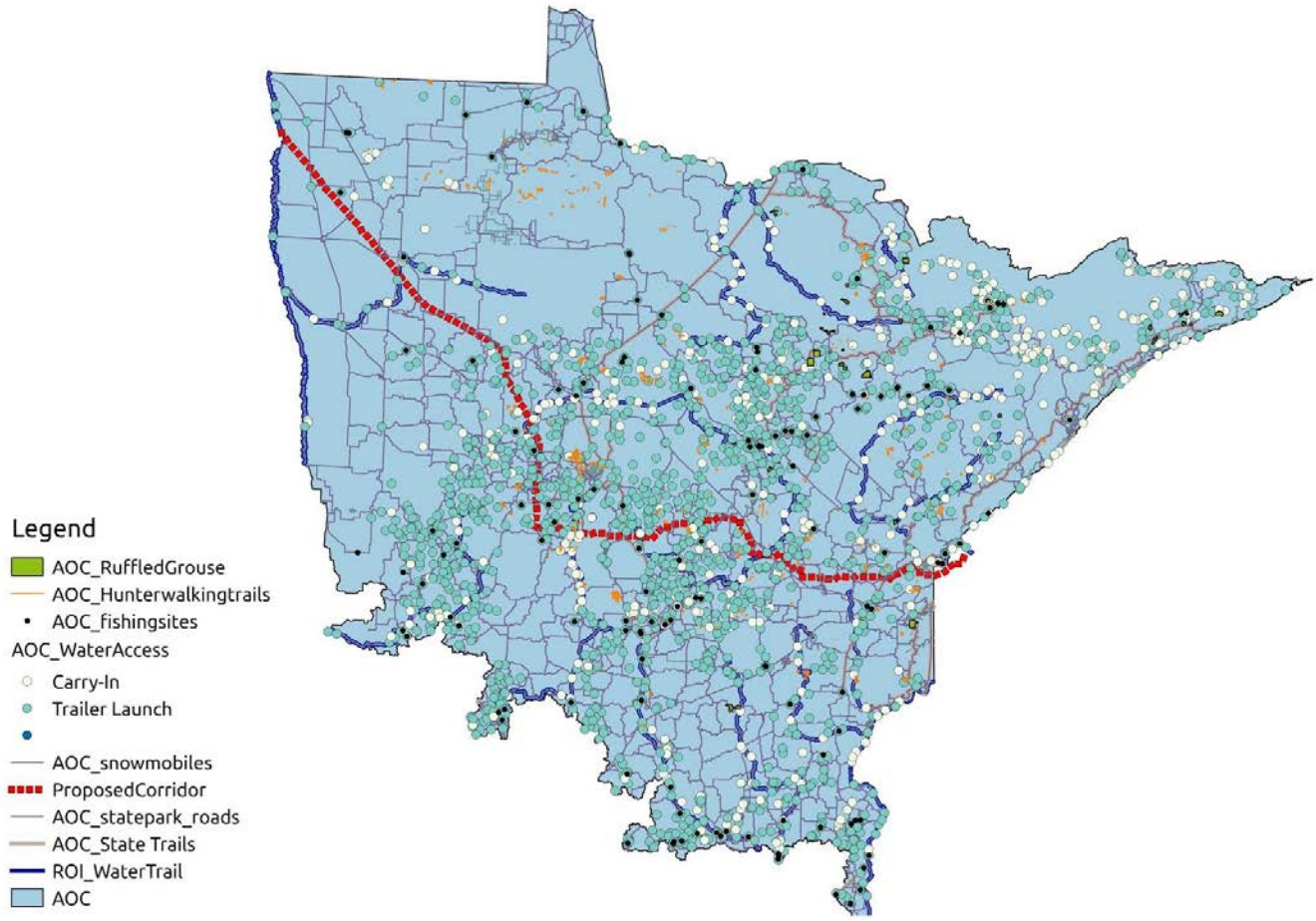

Invasive species

A vegetation management plan needs to be prepared, detailing the existing noxious plants in the project area, prevention, early detection of invasion and control procedures for each species of concern. If infestations already occur, a weed management plan should be developed (including education, prevention, biological, mechanical, chemical management). Plan should focus on non-chemical treatments first. Yearly review and planning activities for the plans, including evaluation of effectiveness to date. Enbridge should revegetate using native plants that are pollinator species friendly when restoring the ROW after construction.

Hunting and fishing areas

The proposed pipeline route cuts through the second and fourth most productive regions for wild turkey hunting in Minnesota. The pipeline would cut through one state designated hunter trail and the buffer would pass alongside another hunter trail and a lake important for waterfowl habitat.

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[79] Testimony of Harvey Goodsky, Transcript at 164-65; Meeker et al, at 387.

Turkey harvest:

Cass, Clearwater, Hubbard and Wadena counties had the second highest turkey harvest in the state in 2013; 8,107 hunters harvested 2,628 turkeys. To the west, the medium-brown region provided 3,868 hunters with 1,170 turkeys, the fourth highest total in the state. Temporary pipeline construction disturbances and any habitat loss might be the most substantial concerns from the proposed pipeline.

Construction during the spring could have the largest direct impacts on harvest because spring turkey harvest tends to be greater than fall harvest. Seasonal restrictions on construction could be beneficial.

Waterfowl habitat:

Though wild rice lakes provide habitat for waterfowl, many of these have not been designated as such by the State of Minnesota. A single lake- Upper Rice Lake- along the pipeline buffer is recognized as primary waterfowl habitat. {Looking for more info on habitats- hopefully will have map}

→ also working on maps of canoe routes, fishing access, etc.

Fish

In the sense of fish, for instance, I am of the Fish Clan, so there are certain species of fish that I cannot eat, because if I do, I won't be here, because I will have eaten myself.

Again, being Clan is another story. But, to us, the leader of the fish of our clan is the Sturgeon.

The Sturgeon and the Catfish are like first cousins. They have a third cousin that is the Bullhead. I am of the Bullhead Clan. So, I cannot eat Sturgeon, I cannot eat Catfish, I cannot eat Bullhead. And turtle, like all people of the water clans, we don't eat turtle.

With each of those fish, there was a gift that was transmitted into humankind via the giving of the Clans.

Like the Bullhead, the Bullhead was given many gifts. You are supposed to know your clan and clan story. If you are Bear Clan, you are supposed to know why the Bear is your Clan. And, what did the Bear give to humankind in that time of need.

Our story relates the chain and reality of relatedness. So, the fish, likewise, came to be in that manner. The fish could not have survived, if they appeared instantly. They could not have survived, in no way.

So, the story about the fish says that the water and the Earth worked together, so that the fish being giigoo, the underwater beings, would also have food, would also have a food chain. Otherwise they would have eliminated themselves by preying on each other, which does happen in that environment. But, there is a natural balance of that".

James Dumont[80]

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[80]Fish evolved over a long period of time. There is not one species that did not come to being in that manner. Through what we know as evolution, they evolved. The evidence of that is right before our very eyes, but we never take the time to observe that, and that is what is called the tadpole.

Fish are the thing from the Great Spirit that would take us to the good life.
Giigoonhyag ningii-miinigoonaan aw Gichi-Manidoo da-izhiwinigooyaang owidi mino-bamaadiziwining.

Fish represent everything that was taken away from us.
Giigoonhyag dibishkooo aawiwag gakina gegoo gaa-makamiggoyaang.

We were able to take it back.
Ningii-gashkitoomin da-azhenimaagooyang.

It is an important part of the cultural mystic that we have.
Gishi-apiitendaagoziwag gidaadizookaaninaanig gashki'esiziwin wii-ayaamang."

Niib Aubid

Well, these days a pregnant woman or a child can eat only one meal a month of walleye (under two feet), bass, catfish or northern, and none of the larger ones. Coal-fired generation will do that. The rest of us can eat once a week before we have to worry about methyl mercury poisoning.

Horizontal Directional Drilling (HDD)

5.2.1.1.3 (page 5-27) - "The potential exists for an inadvertent rupture of the bore hole or "frac-out" and release of the drilling fluid. Such events can occur when pressurization of the drill hole increases beyond the containment capability of the overburden soil material, which allows the drilling fluid to flow to the ground surface. The general risks to groundwater associated with HDD construction methods include loss of drilling mud into surficial aquifers, which could lead to turbidity in nearby aquifers and wells.".... "If a frac-out occurred and went undetected or was not quickly contained, impacts on groundwater quality could be long term and major."
So what is HDD?

"During drilling, fluid (water, bentonite clay, and possible MN PCA approved additives) is circulated through the drilling pipe to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. The potential exists for an inadvertent release or "frac-out" of this drilling fluid to occur when

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If you ever watch that process, from egg, to polliwog to a tadpole that has a tail on it, that eventually becomes a frog. Again, right there is the lesson of how it all came to be. And the word, boodoon, in our language, means that process. Boodoon becomes makakii. Makakii does not become boodoon. Boodoon become makakii. The tadpole becomes frog. So, again, we see that lesson of evolvement. That is in the whole of creation.

Fish came to be in that manner. Again it is emphasized, they could not have survived if not first, before them came their food and their way of survival.

Foushee, Lea, and Renee Gurneau. Sacred Water: Water for Life. Lake Elmo, MN: North American Water Office, 2010. Pg. 106-108.

pressurization of the drill hole is beyond the containment capability of the overburden soil material, which would allow the drilling fluid to flow to the ground or riverbed surface. Although bentonite clay is non-toxic, drilling mud can smother aquatic wildlife and increase turbidity in affected surface waters. Additives may be mixed with the drilling fluids/mud for viscosity or lubricating reasons" 5.2.1.2.4 (Ch 5, pg 71).

<u>Sources:</u>

1. BenDor T., Lester T., Livengood A., Davis A., Yonavjak L. (2015). Estimating the Size and Impact of the Ecological Restoration Economy. PLoS ONE 10(6): e0128339. doi:10.1371/journal.pone.012833 http://www.plosone.org/article/fetchObject.action?uri=info:doi/10.1371/journal.pone.0128339&representation=PDF

2. BenDor T., Lester T., Livengood A., Davis A., Yonavjak L. (2014). Exploring and Understanding the Restoration Economy. University of North Carolina at Chapel Hill. pp 1-30. Retrieved from https://curs.unc.edu/files/2014/01/RestorationEconomy.pdf

3. Yonavjak, L. (2014). Now THIS Is What We Call Green Jobs: The Restoration Industry 'Restores' the Environment and the Economy. Forbes. Retrieved from: http://www.forbes.com/sites/ashoka/2014/01/08/now-this-is-what-we-call-green-jobs-the-restoration-industry-restores-the-environment-and-the-economy/

4. The Outdoor Industry Association. The Outdoor Recreation Economy. Retrieved from: https://outdoorindustry.org/images/ore_reports/MN-minnesota-outdoorrecreationeconomy-oia.pdf

Review of Enbridge Line 3 Draft Environmental Impact Statement

by

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Merritt Hydrologic and Environmental Consulting, LLC

Purpose

This paper is a review of the Draft Environmental Impact Statement (DEIS) for the Enbridge Limited Partnership (Enbridge) Line 3 proposed replacement prepared by Cardno, Inc. for the Minnesota Department of Commerce (DOC). Because of the document's magnitude (approximately 5000 pages) and limited time in which to review the DEIS, this paper will focus on broad inconsistencies and methods with examples from the report. Hydrology and hydrogeology will be the primary focus. It is intended to be a companion to Clarence Johnson's report titled Comments on the Direct Testimony of Ray Wuolo given on January 31, 2017.

Introduction

Enbridge has applied to the DOC for approval to replace its existing Line 3 pipeline. Their preferred route (APR) traverses Northern Minnesota through the most sensitive surface water and groundwater portions of Minnesota. The DEIS alternative route analysis is inconsistent, favoring the applicant's preferred route and incorrectly skews data against the most environmentally suitable southern alternative route. Figure 1 presents the Line 3 replacement alternatives.

Previous Work

Preceding Line 3, Enbridge applied for Sandpiper, a new pipeline with the same preferred route (APR). Extensive review and comments were prepared and presented to the DOC and contained in the Sandpiper dockets CN-13-473 and PPL-13-474. Important information regarding Sandpiper's APR environmental hazards were presented by groups, individuals and agencies such as the Minnesota Pollution Control Agency (PCA) and Minnesota Department of Natural Resources (DNR).

I presented expert testimony March 12, 2014 in Park Rapids; it was submitted in writing to the DOC on March 17, 2014 and filed in docket PPL-13-474 as document number 20144-98433-06. My testimony is attached in Appendix A. It focused on the importance of the Straight River Basin and intensive irrigation within the area. I referenced a number of United States Geological Survey (USGS) and DNR reports describing the aquifer characteristics. Neither my testimony nor any of the documents referenced in my testimony were used in the Sandpiper alternative environmental review. Similarly, none of these documents have been used to discuss APR through the Straight River Basin in the Line 3 DEIS.

Though it was generally understood that Sandpiper information would be incorporated into the Line 3 process, important Sandpiper docket documents were not used in preparation for the Line 3 DEIS. None of the critical DNR and PCA letters to DOC for Sandpiper have been used in the Line 3 DEIS. Appendices B and C contain the DNR and PCA letters, respectively. Many of the comments contained in the PCA and DNR letters regarding environmental concerns and route recommendations remain the issues for the DEIS. Sandpiper environmental concerns have not been referenced nor appear to be utilized in the DEIS. PCA and DNR comments and criticisms in appendices B and C generally support my professional assessment of impacts and alternatives.

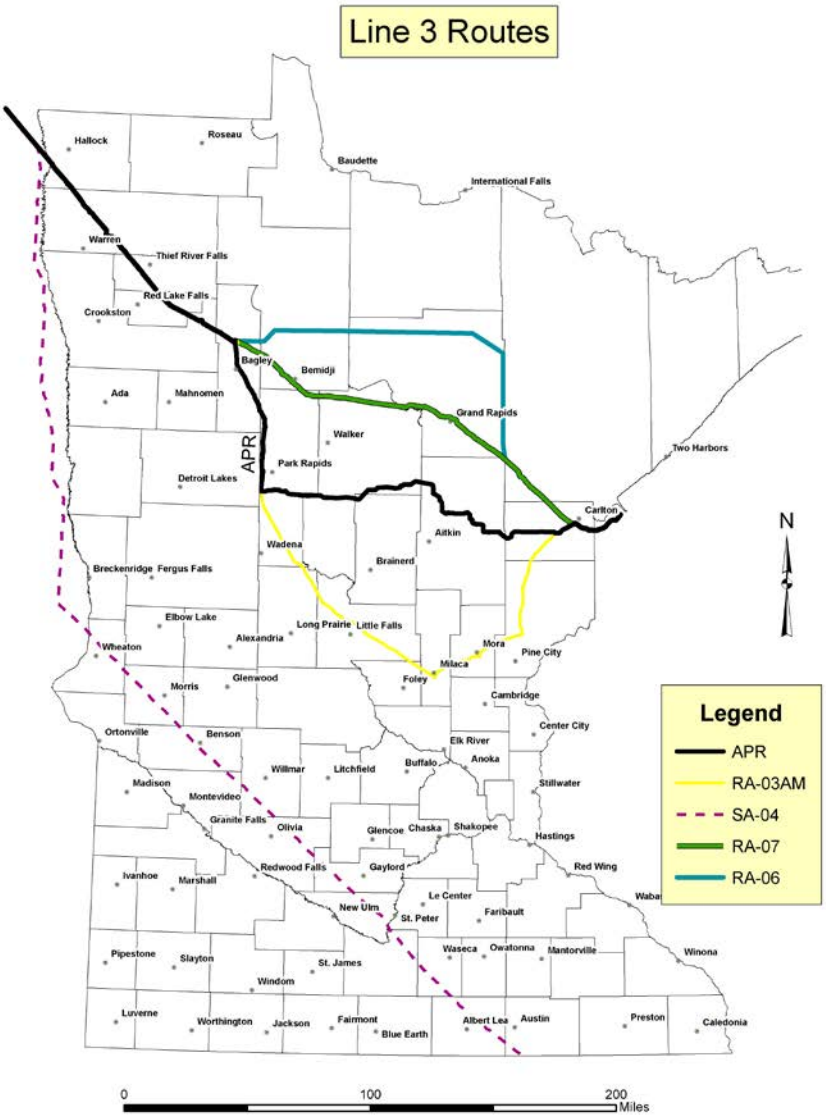

Figure 1: Line 3 Replacement Alternatives

Both the PCA and DNR were critical of the Sandpiper APR environmental impacts in comparison to alternative routes. They urged selection of the southern route (Line 3 SA-04) because it was the least detrimental alternative. The DNR and PCA criticism continued through the January 23, 2015 DNR letter to Administrative Law Judge Lipman and May 12, 2015 PCA letter to the Public Utilities Commission (PUC); the PCA letter addressed Line 3 issues. On March 6, the PCA, DNR and DOC signed a Memorandum of Understanding (MOU) committing the DNR and PCA to assist the DOC in preparation of the DEIS. The DOC was placed in a leadership position over these crucial environmental agencies. Technical review by these vital environmental agencies has not been publicly available since the MOU. Yet many of the problems and concerns expressed by the DNR and PCA persist in the Line 3 DEIS.

Route Alternative Analysis

Though the DEIS examines route SA-04 as a project alternative (along with Truck, Rail and continued use of existing Line 3) for the Certificate of Need (CN) portion of the DEIS, it argues for exclusion of SA-04 for other comparisons of alternative pipeline routes for the DEIS. However, SA-04 will be included in this discussion and compared to the CN approved System and Route Alternatives.

The DEIS alternative analysis was skewed and incorrectly applied as follows:

- SA-04 is the only route the DEIS compiled cumulative impacts east and south of Minnesota. The applicant's proposed route has impacts in several of these same states, including Wisconsin and Illinois.

- Construction impacts were not uniformly calculated. DEIS Chapter 5, pages 5-5 to 5-6 state "*along the SA-04 route, a standard 120-foot-wide construction work area, 60 feet either side of the centerline, was applied to assess the impacts associated with pipeline construction. This allowed quantification of construction and operations impacts on land cover, habitat, and resources along the SA-04 route based on publicly available information on existing conditions. ... the primary shortcoming of the above approach for the environmental analysis is associated with Enbridge's proposal to reduce the width of the construction work area for the Applicant's preferred route in some wetlands and waterbodies (from 120 feet to 95 feet) based on site-specific field investigations and engineering. These refinements have not been incorporated into the general approach for the SA-04 footprint"* This shortcoming should be corrected by using consistent 120 foot construction work area widths for all alternatives.

- No well or water supply analysis was performed east of Minnesota for any RA alternatives. DEIS Chapter 5 pages 5-19 states the SA-04 ROI would encompass… *36 unverified location and 134 verified location domestic wells in Minnesota, 46 permitted private wells and 190 wells included in the private well tracking system in Iowa, and 205 domestic wells in Illinois. Public wells encompassed by the SA-04 ROI are as follows: ... nine verified location public wells in Minnesota; four in Iowa; and one*

in Illinois. Public and domestic wells would be similarly affected along the Superior to Chicago route, but they were not identified or included in the evaluation, calculations and comparison tables. Though it may be argued that construction impacts from Superior to the Chicago area (Chicago) accrued prior to Line 3 replacement, several factors associated with conveyance of product to Superior warrant inclusion of impacts associated with the Superior to Chicago pipeline. They are:

- Operational impacts will intensify east of Superior Wisconsin due to increased pumping volumes made possible by expanded capacity of the proposed project.

- Though no permit applications have been filed for Superior to Chicago pipeline facility expansions, they have been seriously considered in company planning documents.

- A Nov. 28, 2015 Milwaukee Journal Sentinel article titled Wisconsin's Largest Oil Pipeline System May See Major Expansion stated:

  > *"We are highly confident that we will see the heavy production grow as expected," Guy Jarvis, president of liquids pipelines for Enbridge, said at an investment conference in Toronto Oct. 7. ://archive.jsonline.com/news/wisconsin/wisconsins-largest-oil-pipeline-system-may-see-major-expansion-b99622819z1-357334661.html/*

- *A Jan 13, 2017 Milwaukee Journal Sentinel series stated:*

  > *And the company that owns the pipeline network is considering adding a fourth line in Wisconsin — one that could dwarf the rejected Keystone XL. ://projects.jsonline.com/news/2017/1/15/intro/oil-and-water.*

DEIS Figures 10.4-2, 10.4-3 and 10.4-4 display the incongruous analysis which caused skewed values contained in Chapter 5 tables. These illustrations are labeled Fgures 2, 3, and 4, respectively.

Because SA-04 was the only route with analysis comprising areas south and east of Minnesota, impact acreages reported in DEIS Chapter 10 tables for unusual ecological areas, drinking water sources, area of interest, and wetlands are inflated in comparison to APR and RA routes. The skewed comparison is perpetuated in the Executive Summary Table ES-2. PUC Commissioners will most likely rely upon the Executive Summary over wading through 500 pages of DEIS documentation.

Unless specifically identified, all figures following Figure 4 were compiled using GIS layers identified in the DEIS and developed by the author.

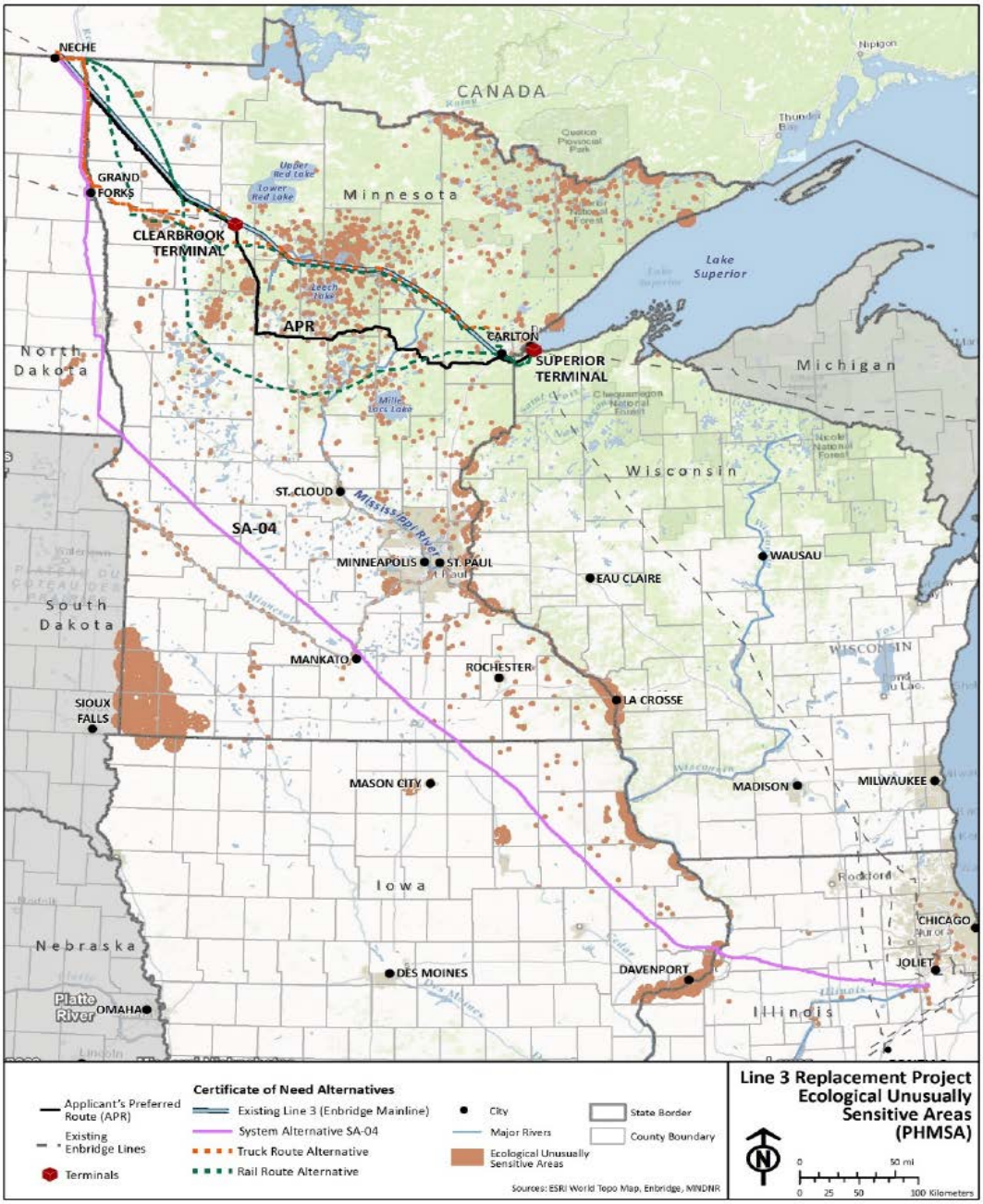

Figure 10.4-2. High Consequence Area Unusually Sensitive Ecological Areas along the Applicant's Preferred Route and Certificate of Need Alternative Routes

Figure 2: High Consequences Area Unusually Ecological Areas Along the Applicant's Preferred Route (APR) and Certificate of Need Alternative Routes (RA) from DEIS Chapter 10

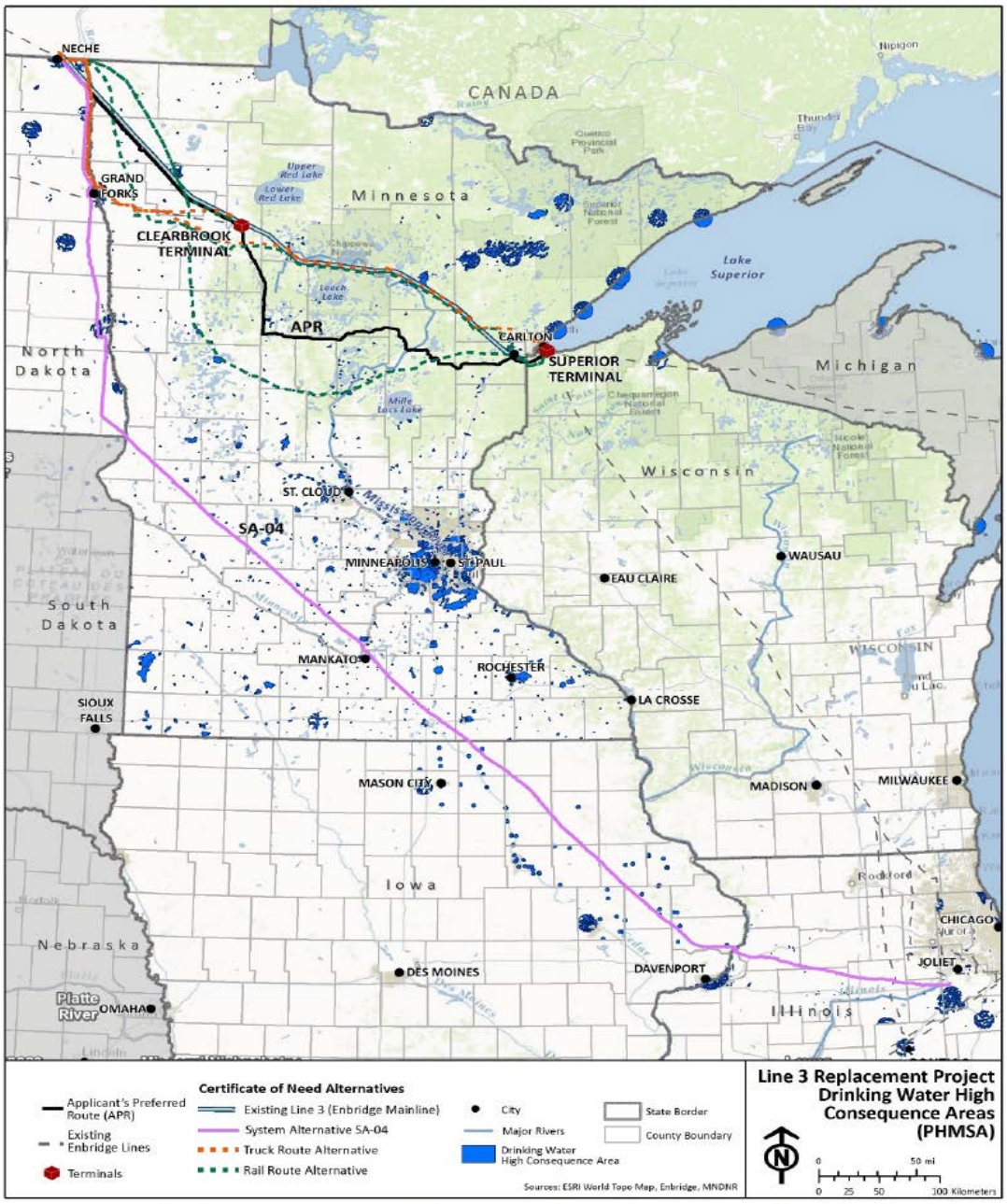

Figure 10.4-3. High Consequence Area Drinking Water Sources along the Applicant's Preferred Route and Certificate of Need Alternative Routes

Figure 3: High Consequences Area Drinking Water Sources Along the APR and RA Routes from DEIS Chapter 10

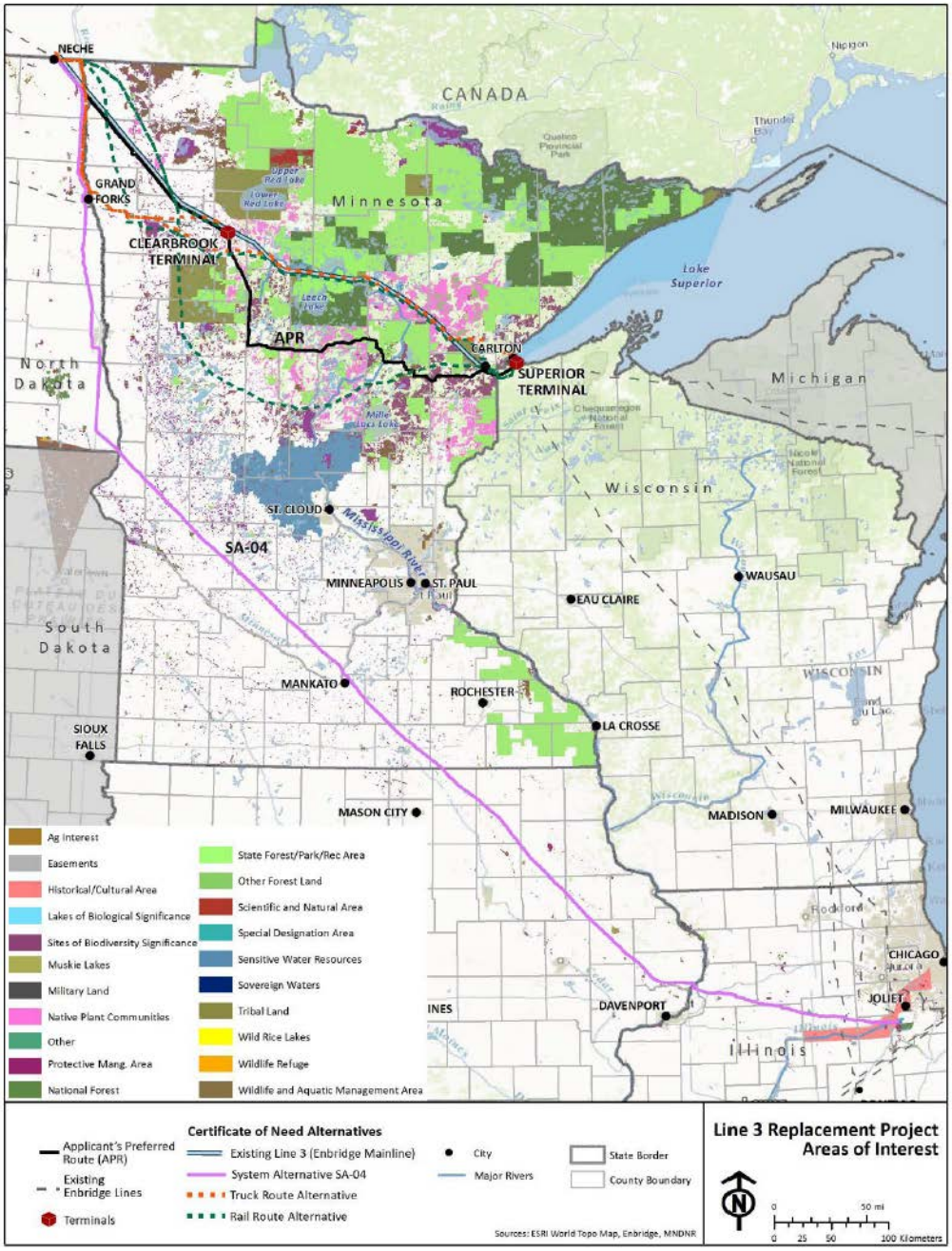

Figure 10.4-4. Areas of Interest along the Applicant's Preferred Route and Certificate of Need Alternative Routes

Figure 4: Areas of Interest Along the APR and RA Routes from DEIS Chapter 10

Karst

DEIS Chapter 5, pages 5-19 and 5-20 state:

> *Karst features are common in bedrock in the extreme southeast of Minnesota.*

> *Conditions vary locally, but generally these aquifers are capable of yielding quantities of groundwater that are sufficient for most purposes. However, these aquifers are highly vulnerable to contamination and structural changes with ground disturbance; including induced sinkhole formation and alteration of groundwater flow.*
> *Karst topography is found in southeastern and eastern Minnesota … Along system alternative SA-04, relatively shallow carbonate bedrock with potential for karst intersects the route across Minnesota, Iowa, and Illinois (none is present in North Dakota). Karst features are present in Minnesota along 8 miles of system alternative SA-04 in Mower County and 3 miles in Le Seur and Blue Earth counties (Minnesota DNR 2016; USGS 2016).*

DEIS Executive Summary page ES-15 states:

> *SA-04 is the only CN Alternative that crosses vulnerable karst topography. A karst aquifer is a type of bedrock aquifer that usually consists of basic rock types that are prone to chemical weathering and dissolution from the slight acidity of precipitation and groundwater. This can result in the formation of fractures, joints, sinkholes, cavities, caves, and void spaces that allow the movement of large volumes of surface water into and through the aquifer. These characteristics also allow contamination to spread rapidly within the aquifer. Karst aquifers are susceptible to collapse of the aquifer matrix, which can be triggered by construction activities on the land surface. This can lead to the formation of sinkholes in unconsolidated sediments that overlie the bedrock.*

This is a crucial statement regarding SA-04 which will give the PUC Commissioners (Commissioners) the wrong perspective of SA-04.

Figures 4 and 5 provide GIS DNR field mapped Karst Features overlying the Pollution Sensitivity of Near Surface Materials GIS layer. Figure 5 is a close-up of Figure 4. As the above description expresses, karst topography is largely in the SE part of Minnesota. Though SA-04 as drawn does touch the western edge of the karst mapped features, a minor alignment refinement of approximately 25 miles westward situates SA-04 out of the karst terrain and avoids sand deposits in Freeborn County; it would eliminate the 8 miles of karst terrain. The applicant's APR alignment has been refined and is proposed to be refined during construction to avoid wetland and other impacts. A move of 25 miles to the west for SA-04 is reasonable and in keeping with APR formulation; it is in line with that afforded the Applicant's preferred route.

Figures 4 and 5 also display that SA-04 traverses some of the least pollution sensitive near surface materials within Minnesota.

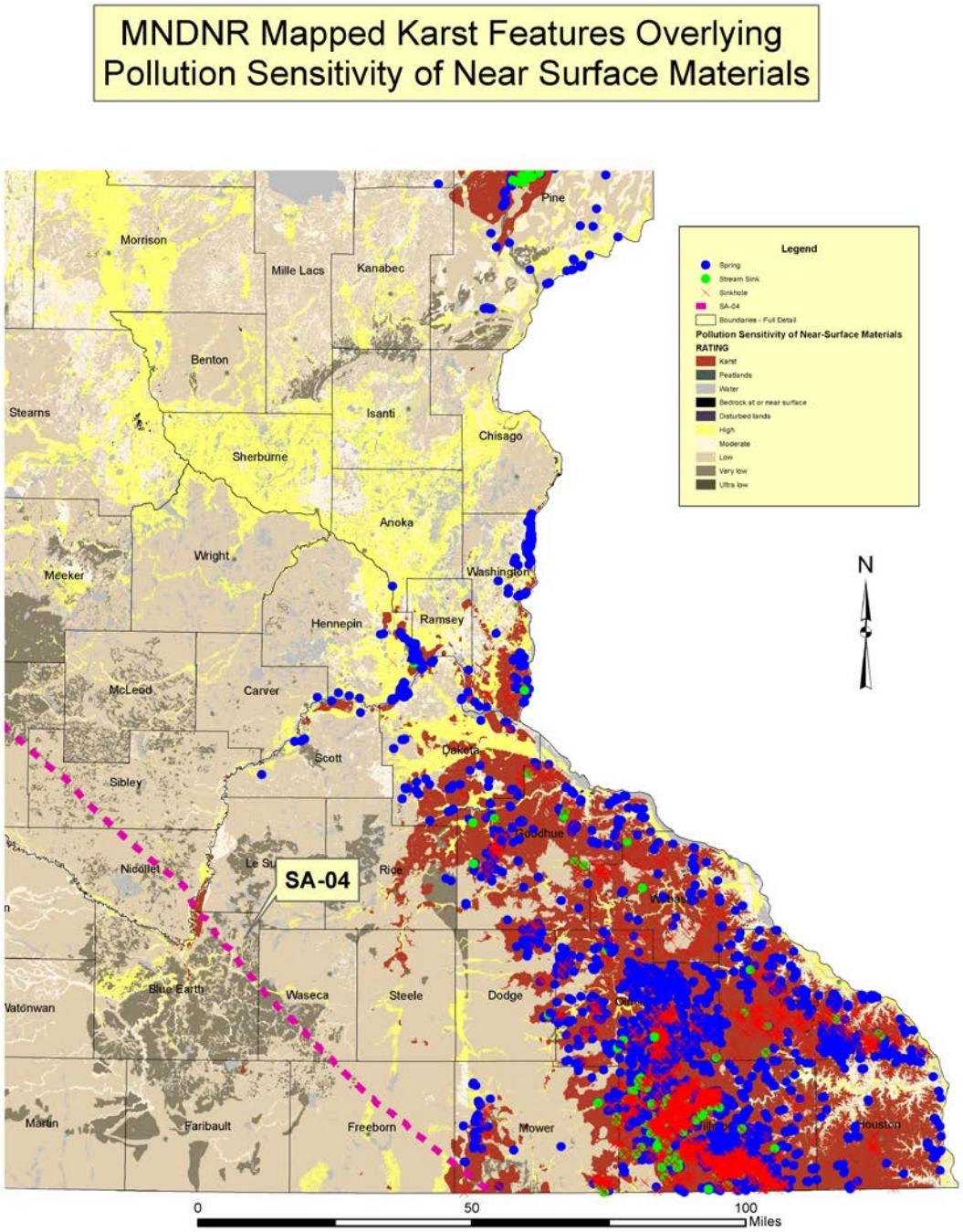

Figure 4: Pollution Sensitivity of Near Surface Materials overlaid by DNR field mapped Karst features.

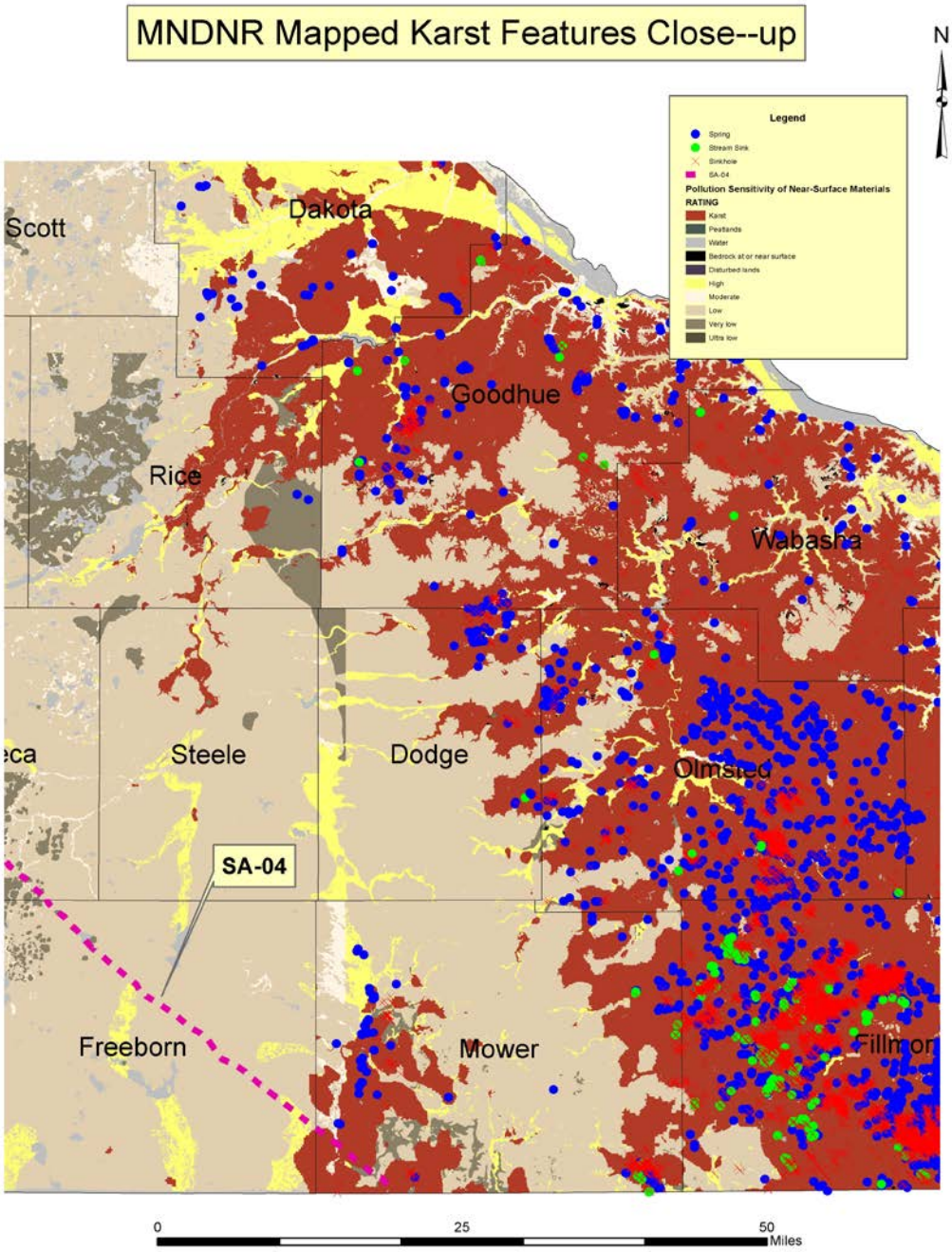

Figure 5: Close-up of Pollution Sensitivity of Near Surface Materials overlaid by DNR field mapped Karst features.

Ecoregions

DEIS Chapter 5, page 5-61 discusses ecoregion health: It states:

> *In general, the north-central and northeast forested portions of Minnesota are the least affected and have the highest quality surface water resources, and areas in the west and south agricultural portions of the state have the most affected surface water resources and are of poorer quality across the state. There are a large number of lakes and streams in north-central and northeast Minnesota and they are of the highest quality when comparing Ecoregion data.*
>
> *Specifically, the data indicate that there are higher quality resources in the NLF Ecoregion of the State. Lower nutrients (mainly phosphorus) and chlorophyll-a (algae) and greater transparency are indicative of lakes in this ecoregion. Streams in this ecoregion exhibit lower nutrients, turbidity, and fecal coliform, as well as lower temperature and biological oxygen demand conditions.*
>
> *In reviewing three selected watersheds throughout the state, that each represent potential pipeline routing areas, the Pine River watershed (north-central), Chippewa River (west) and Le Sueur River (south) ... (t)he Watershed health index scores indicate the best health scores are represented in the Pine River and the worst scores in the Chippewa and Le Sueur River watersheds accordingly. Further, in general, statewide maps indicate better health scores across the north and east and poorer scores across the south and west as depicted by analysis of the five different components: Biology, Connectivity, Geomorphology, Hydrology and Water Quality (Appendix J-1)***.***

Figure 6 displays the alternative routes overlying the DNR designated Public Waters GIS layer. It shows the magnitude of public water, including public water wetlands, through which APR and AR routes would traverse verses SA-04. The northern routes are forced through the highest number of lakes and wetlands within Minnesota. SA-04 traverses through the corridor with the least lakes and wetlands.

Trout Streams

The DEIS, page 5-62 discusses trout streams. It states:

> *Applicant's preferred route passes within ½ mile of 17 designated trout streams or protected tributaries to designated trout streams….. Route SA-04 crosses within two designated trout streams or protected tributaries to designated trout streams Though more streams/ditches are crossed in southern areas, the analysis indicates the quality of the streams crossed in northern routes is greater since many are trout waters.*

Trout streams are merely cataloged. Qualitative analysis of impacts to individual streams was

not undertaken nor did the DEIS groundwater modeling include a trout stream crossing.

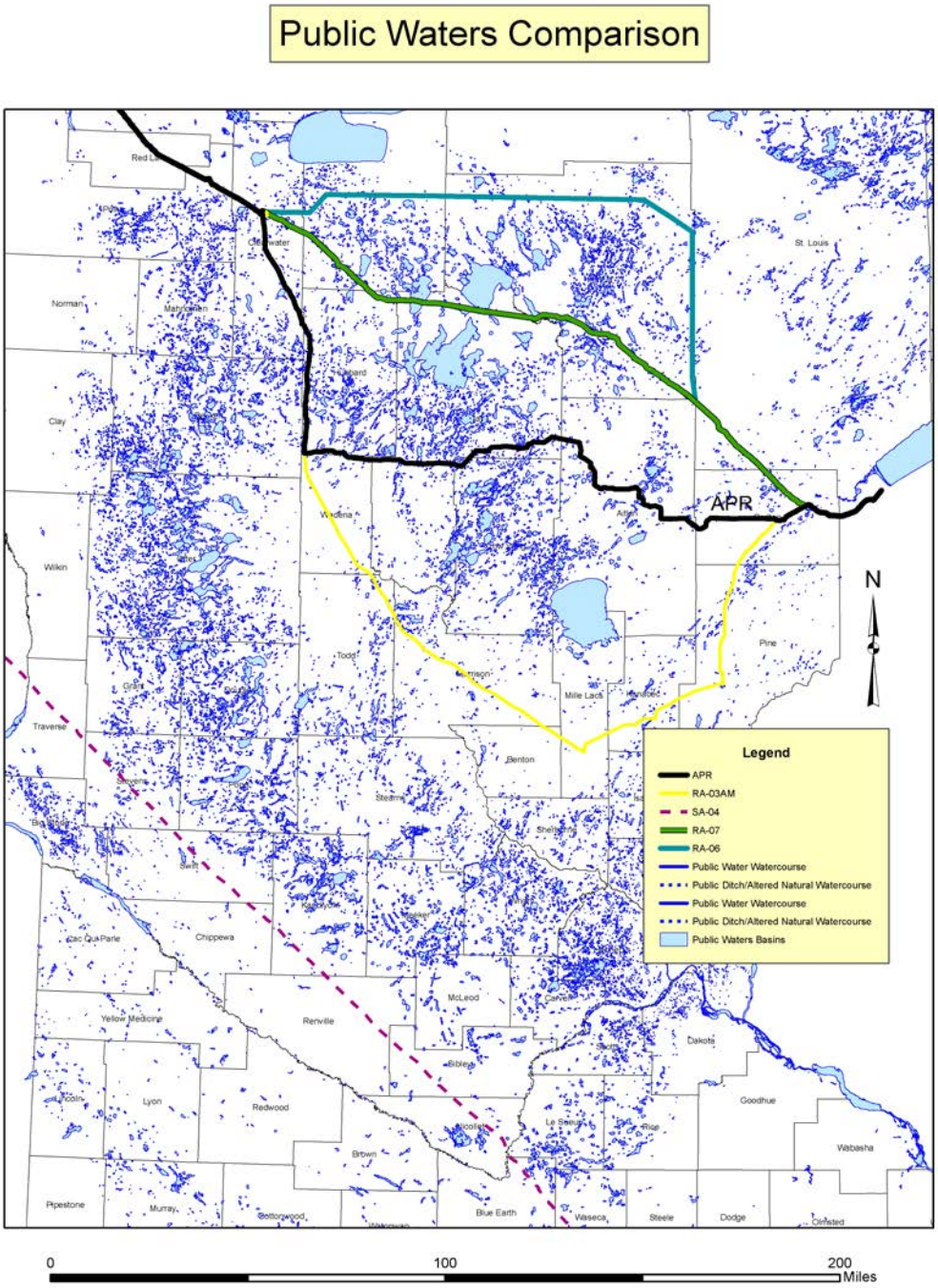

Figure 6: Alternative routes overlying the DNR designated Public Waters Inventory

Figure 7 displays the DNR GIS mapped designated trout streams for all alternatives. SA-04 passes near the trout streams but does not cross them. All other routes cross designated trout streams.

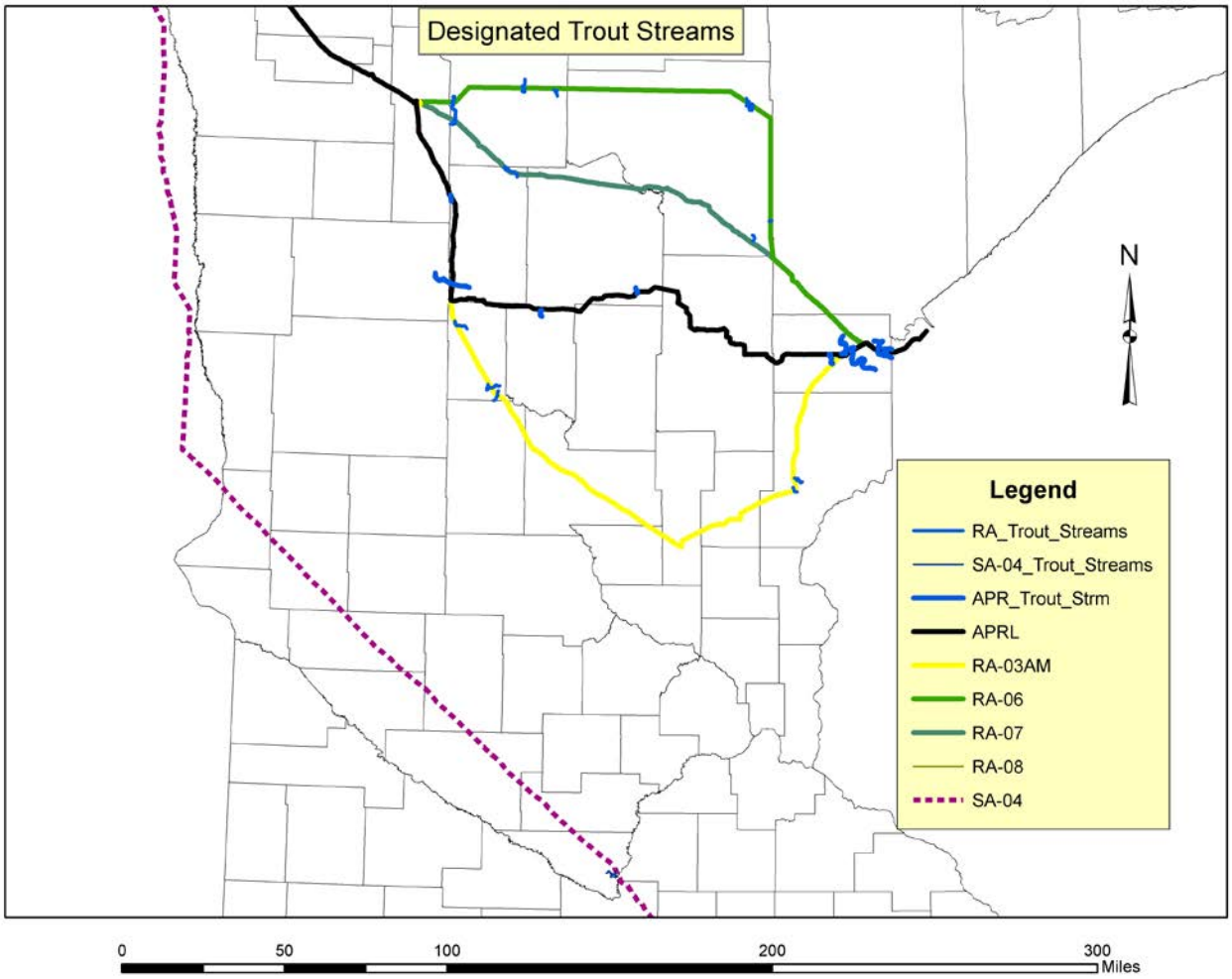

Figure: 7 DNR Designated Trout Streams

The DEIS recognizes that APR and all the CN RA alternatives are routed through the heart of the highest quality lakes and streams in Minnesota whereas SA-04 traverses some of the lowest quality surface water in the state. Trout streams are some the most pristine state rivers. Individual analysis of each stream needs to be conducted to identify actual potential impacts.

Calcareous Fens

Calcareous fens are special wetlands requiring a continual supply of calcium magnesium bicarbonate rich upwelling groundwater. They support a unique assemblage of rare plants and are easily impacted by any activity within and surrounding the fens. Jeannette Leete and

I authored an unpublished DNR report of fen loss and degradation due to gravel mining upgradient of fens in the Felton area. Groundwater is being directed away from the down slope fens, robbing the fens of the requisite groundwater supply. At least one fen was destroyed and another is displaying stress from the diversion of its groundwater source. Any work within and near fens has the potential to degrade and/or eliminate the fen.

The DEIS does not address specific fens, analyze potential impacts including robbing the fens of their requisite groundwater source nor does it identify actions to protect them. It simply categorizes them. Additionally, they are not quantified or even mentioned in the Executive Summary.

Figure 8 displays calcareous fens located along the proposed routes. APR contains the highest number of fens whereas SA-04 contains one. Because APR fens are situated along the Glacial Lake Agassiz beach ridge west of Clearbrook, MN, all northern routes will encompass the same number of fens.

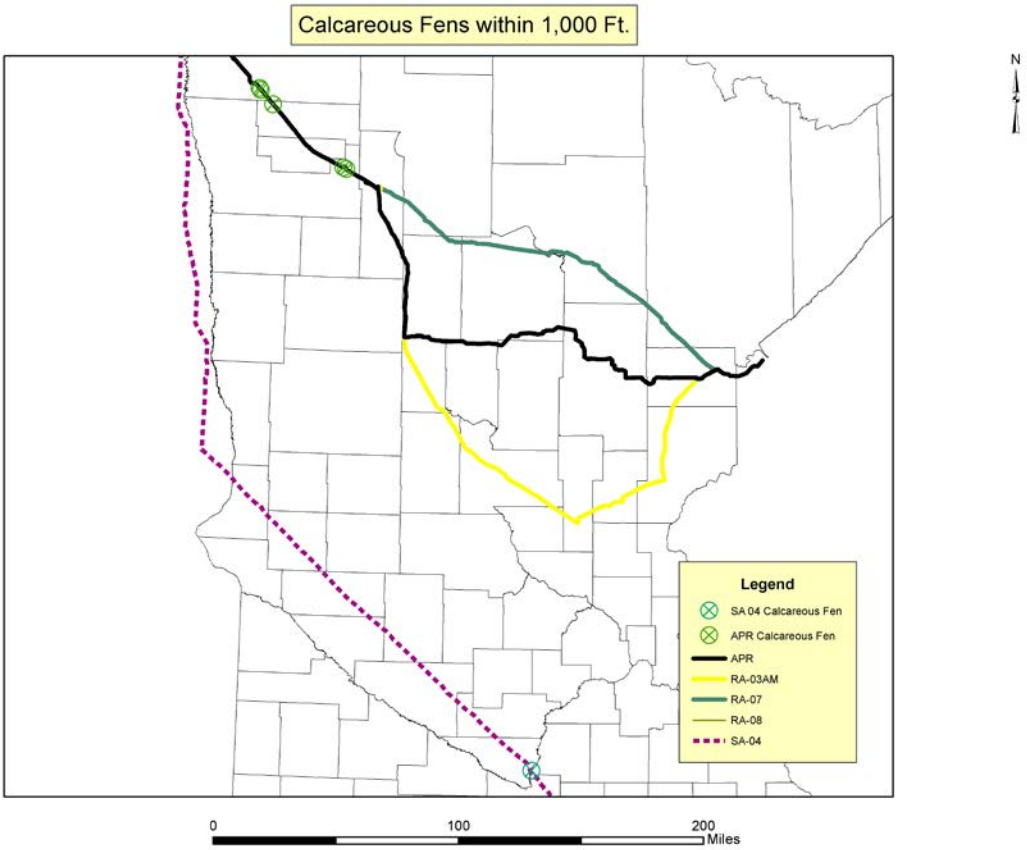

Figure 8 Calcareous Fens Within 1,000 ft. of Alternative Routes

The suggested realignment of SA-04 in the Karst section above would also eliminate the potential of SA-04 impacts to the calcareous fen. Fens could be avoided completely along the SA-04 route. Calcareous fen avoidance is not included in the DEIS comparisons.

Willd Rice

The DEIS, pages 5-44,5-52 and 5-62 state

> *Wild rice beds are very attractive to migrating waterfowl, and many rice areas are traditional waterfowl staging and hunting areas. Because they are an important component of Minnesota's agricultural economy, wild rice waterbodies are specifically protected from destruction and disturbance ... Wild rice is an important social and cultural component for Native American tribes and rural Minnesota communities… All wild rice waterbodies that would be crossed by the Applicant's preferred route occur between Clearbrook and Carlton. Fifteen wild rice waterbodies occur within 0.5 mile of the Applicant's preferred route. Five wild rice waterbodies could be affected by construction and operation of the Applicant's preferred route: Mud Lake, Hay Creek (HDD crossing), Portage Lake, Peterson Lake, and Shell River (HDD crossing).*

Figure 9 contains the DNR wild rice locations. Wild rice beds within ½ mile of APR were identified using a GIS buffer of ½ mile from APR. If a wild rice location was closely connected down stream of the bed within the ½ mile buffer, it was also included in the GIS shapefile. A total of 26 locations were identified along APR; 14 more than reported in the DEIS. No wild rice beds are located within ½ mile of SA-04

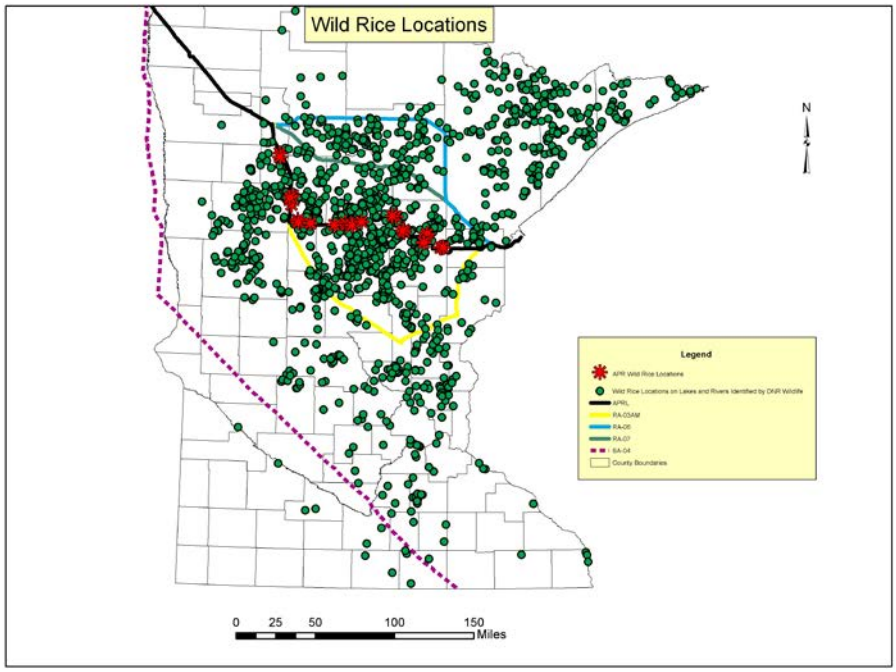

Figure 9: DNR Wild Rice Locations with beds within ½ mile of APR

The DEIS categorizes the locations, but does not address the potential impacts to individual

beds at risk. It does not discuss how the rice will be impacted nor how vastly impacts could spread.

Executive Summary

The Executive Summary is the document upon which the Commissioners will largely base their decisions. As described above computations for the DEIS are skewed against SA-04 and in favor of APR. Figure ES-5 is extremely important to characterize the ecological and overall environmental conditions through which the alternatives would pass. It is merely an insert, difficult to read and easily ignored. Table ES-4 covers an entire page. Figure ES-5 needs to be given sufficient space to make it readily read and understood. It needs to be highlighted to inform the Commissioners and public of the environmental impacts each route will encompass.

Hydrogeology

Several state agencies including the Department of Agriculture (DOA) Department of Health (DOH) PCA and DNR have developed forms of groundwater sensitivity maps. The latest, Hydrogeology Atlas Series HG-02, was published by the DNR in June 2016. It is titled Pollution Sensitivity of Near-Surface Materials by Roberta Adams. Along with this series DNR also published Minnesota Hydrogeology Atlas Series Atlas HG-03 in June 2016 by Adams. Two plates, Water-Table Elevation and Depth to Water Table accompany this report.

In 1979 the Minnesota Geologic Survey published State Map Series S-4 titled Geology Map of Minnesota Quaternary Geology by Goebel and Walton. In 1999, the Minnesota Geological Survey (MGS) published the Regional Hydrogeologic Assessment Quaternary Geology – Otter Tail Area, West-Central Minnesota with two plates titled Surficial Geology by Harris and Knaeble, and Quaternary Stratigraphy by Harris, Knaeble, and Berg. In January 2016 DNR produced a Surficial Sands geographic information system (GIS) layer derived from MGS GIS surficial geology polygons.

GIS layers of the above referenced maps and reports were used to evaluate the alternative routes in Minnesota. Because the DNR pollution sensitivity map is the latest publication, it was used rather than the PCA map referenced in the DEIS.

Figure 10 displays the alternative routes overlying the DNR Pollution Sensitivity of Near Surface Materials. It shows that APR and other CN northern routes traverse through the most pollution sensitive near surface materials within Minnesota; SA-04 is within the least sensitive areas.

Figure 11 displays the alternative routes overlying DNR's Surficial Sand GIS layer. The Central Minnesota Sands through which the CN routes travel are mapped as glacial outwash materials by Harris and others. The outwash materials were formed by meltwaters derived

from receding glacial lobes. Because the outwash materials are composed of sand and granular material, they are porous, allowing rapid infiltration through the unsaturated zone to the groundwater. For that reason, they are mapped as highly sensitive in Figure 10.

Figure 12 displays the routes overlying the sands shown in Figure 11 along with the soils along SA-04 clipped from the Minnesota Soils GIS layer. The soils through which SA-04 travels are predominately clay which are much less permeable than the outwash sands. Because of the clay's impermeability, water is perched creating a shallow, high water table that is unsuitable for water supply. For that reason, Figure 10 depicts the area through which SA-04 is mapped as some of the least pollution sensitive near surface materials in Minnesota.

The Executive Summary page ES-26 states:

> *In general, RA-06 would least affect groundwater resources, including highly vulnerable aquifers and groundwater resources with high contamination sensitivity, high pollution sensitivity, and high to very high bedrock sensitivity. RA-03AM is the only route alternative that crosses vulnerable karst topography.*

As shown in the Karst Section, a refinement of SA-04 would eliminate karst topography. Figure 10 displays that SA-04 is comparable to RA-03AM in near surface material pollution sensitivity.

Similar to the ecoregions conclusions discussed above, APR and the other northern routes (except RA-03AM) traverse the most sensitive surficial groundwater; SA-04 travels through the least sensitive surficial groundwater in the state. The ecoregion and surficial groundwater comparisons substantiate the earlier DNR and PCA support for SA-04 over APR.

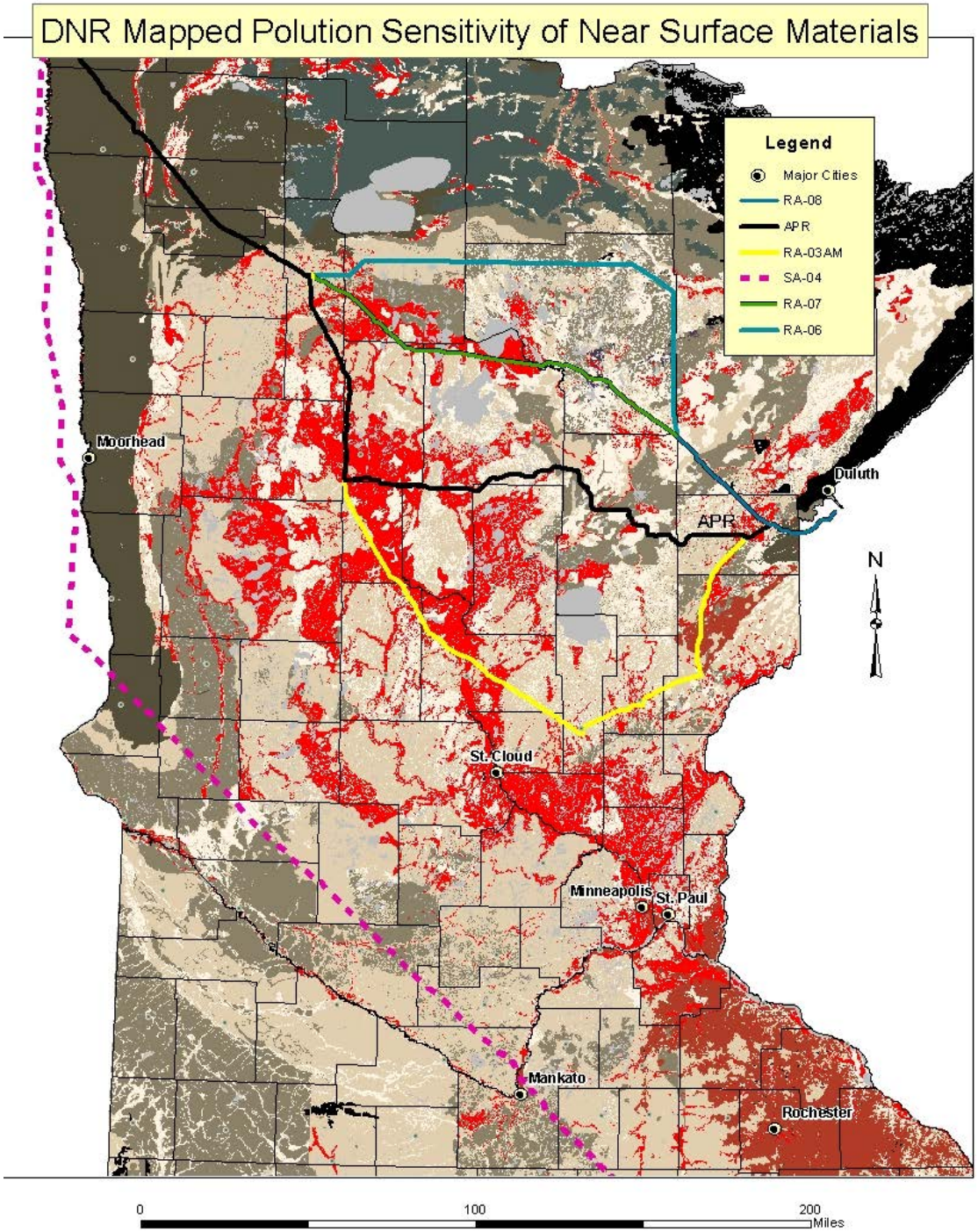

Figure 10: Alternative routes overlying DNR's Pollution Sensitivity of Near Surface Materials

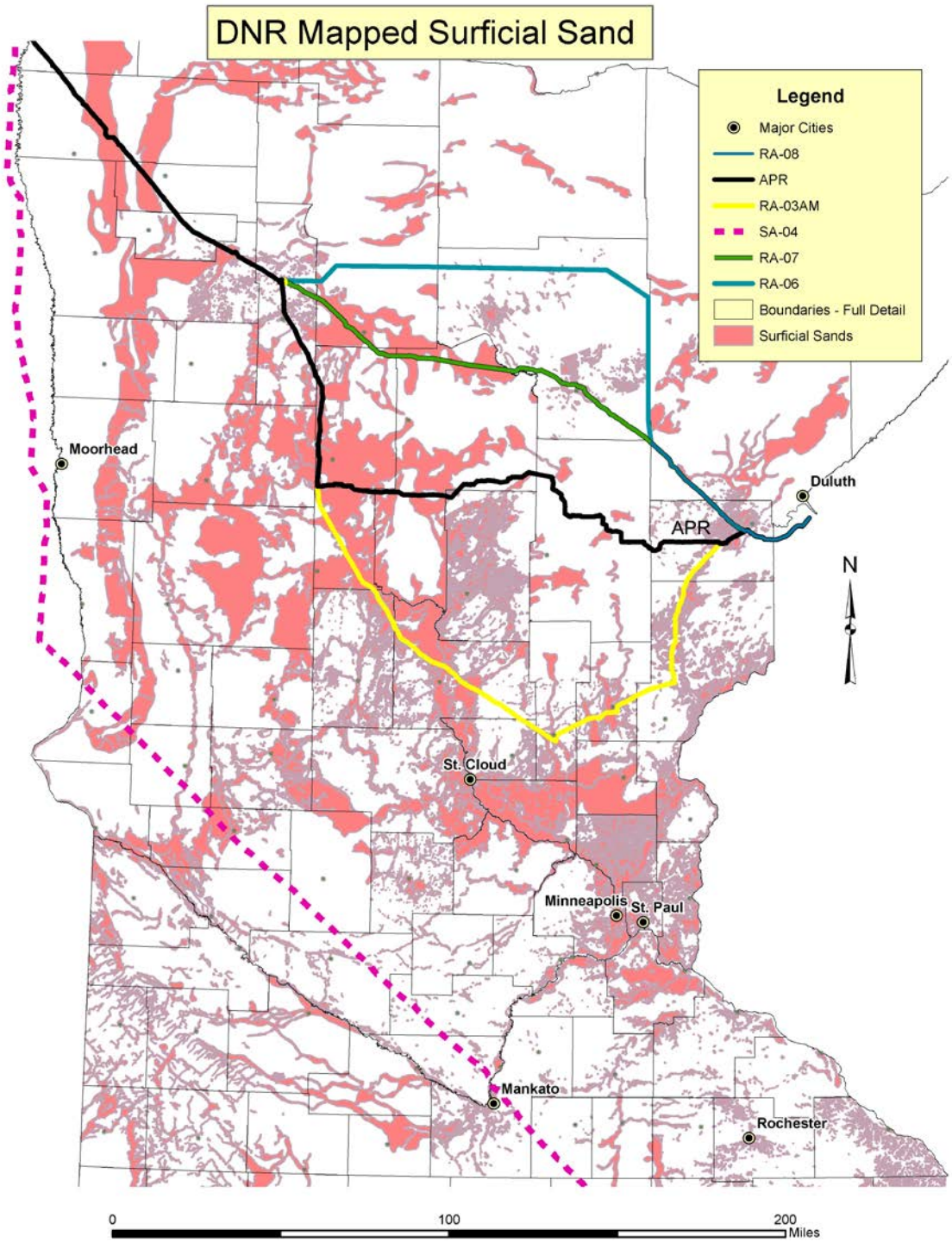

Figure 11: Alternative Routes Overlying DNR's Surficial Sand

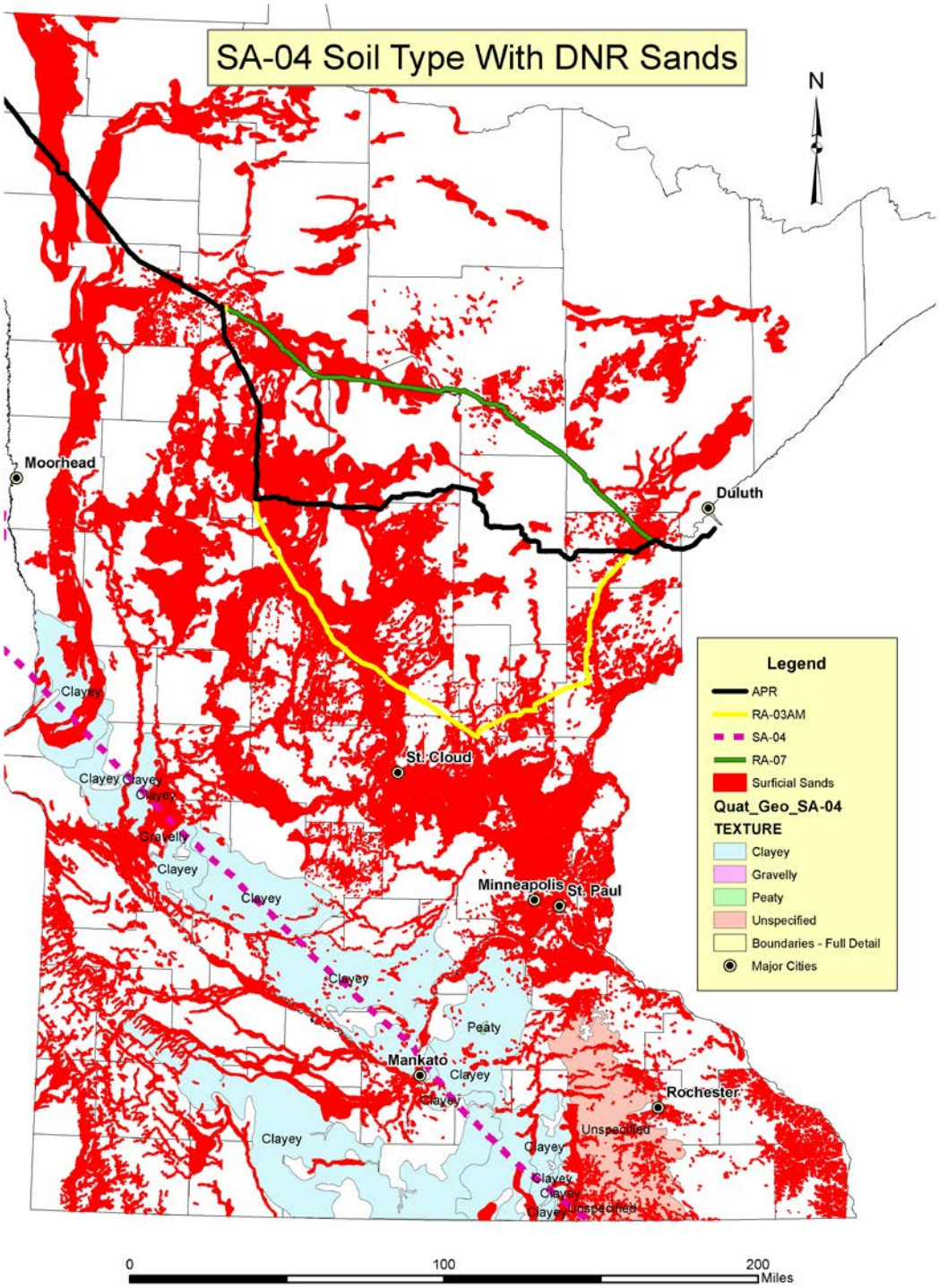

Figure 12: Alternative Routes Overlying DNR's Surficial Sand and SA-04 Soils

Groundwater Analysis

The DEIS does not report individual groundwater analysis beyond hypothetical modeling of selected stream crossings. Discussion regrading groundwater only addresses horizontal flow and ignores vertical migration, an essential groundwater flow component. Like statistics, models can be manipulated to show what the modeler or client wants it to derive.

DEIS Chapter 5, page 5-10 states:

> *The ROI for the analysis of potential impacts on groundwater during construction generally consists of the pipeline, rail, or truck corridor and a 1,000-foot buffer on either side of the centerline of the Applicant's preferred route and the CN Alternatives. …. The ROI for assessment of operations impacts varied according to the configuration of the alternative. Operations impacts for the Applicant's preferred route were estimated based on the footprints for the permanent right-of-way provided by the Applicant. Operations impacts for the existing Line 3 were evaluated based on the existing permanent right-of-way for that pipeline. …. Impacts on groundwater resources were identified based on common construction methods; peer- reviewed literature; agency documents, including permit requirements and guidance manuals; Applicant-submitted documents, including the November 2016 EAW and associated construction BMP plans (Enbridge 2016a); and the experience and professional judgment of the hydrogeologists involved in developing this analysis … Identification of groundwater resources potentially affected by the Project was completed by reviewing reports and data from the U.S. Geological Survey (USGS); the State Geological Surveys of Minnesota, Iowa, and Illinois; the North Dakota State Water Commission and North Dakota Source Water Protection Program; the Minnesota Department of Natural Resources (Minnesota DNR), Minnesota Pollution Control Agency (Minnesota PCA), Minnesota Department of Agriculture (Minnesota DA), and Minnesota Department of Health (Minnesota DH); Iowa Department of Natural Resources (Iowa DNR); and the U.S. Environmental Protection Agency (EPA).*

No individual analysis of known groundwater aquifers was reported in the DEIS. It was argued that data is insufficient to conduct such analysis. Yet, hydrogeologic atlases have been produced by Minnesota along the northern alignments. Along with the studies identified above, a geologic atlas has been published for Carlton County.

Though the DEIS states USGS, MGS, and DNR reports were reviewed, non of the local groundwater reports identified above and in my testimony were referenced nor appear to have been included in the review. This is particularly problematic in the Straight River Basin and a significant missing component in the DEIS.

Straight River Basin

The Straight River Basin is a portion of the Pineland Sands outwash plain. As mentioned in the Previous Work section, I submitted expert witness testimony and referenced a number of reports pertaining specifically to the Straight River Basin. Along with the other studies identified in the Hydrogeology section above, in March, 2017 the DNR designated the Straight River Basin the third Minnesota Groundwater Management Area (GWMA). The document is titled Straight River Groundwater Management Area Plan, March 2017. Along with all of the other Straight River Basin scientific studies, designating it a GWMA signifies the importance the DNR places on this aquifer. The Straight River GWMA document is attached in Appendix D.

In his introduction to the document DNR Commissioner Landwehr states:

> *Minnesota is rich in water resources. With more than 10,000 lakes, thousands of miles of rivers and streams, and many thousands of acres of wetlands, it might be natural to think that our water is essentially unlimited. But in some parts of the state, the unseen, underground aquifers that make up our groundwater resources are under pressure to meet growing needs for domestic water supplies, irrigation, industrial and other uses. These groundwater resources also are interconnected with lakes, streams and wetlands that we value for commerce, recreation, and water supplies. Those surface waters also provide the habitat needed by many animals and plants. If we are not careful in how we use water, both economic development and ecosystems could be put at risk.*

The GWMA plan (Plan) page 1-1 states:

> *Groundwater can be at risk of overuse and contamination anywhere in the state, and in some areas this risk is more urgent. To address concerns about long term sustainable use of groundwater in three of these areas, the DNR is establishing Groundwater Management Areas (GWMA) and developing management plans*.

Sustainability is defined by the DNR as follows:

> *Sustainability means that groundwater and surface water levels, water quality, and ecosystems are not harmed and that present and future generations will be able to meet their need for water.*

The Plan page 1-2 states:

> *As part of a statewide analysis of groundwater resources, the DNR identified the Straight River area as an area of specific concern where groundwater resources are at risk of overuse and degraded quality.*

The Plan identifies one of the concerns to be "*contamination reduction in the availability of clean groundwater.".* Though a sufficient supply of water may be available, it needs to be

suitable for human consumption and other uses such as agricultural food production. The GWMA relies upon information compiled from completed studies, many of them the same I cited in my testimony.

Beginning on page 2-2 the Plan describes the Straight River hydrogeology. It states:

> *Hydrogeology defines the natural conditions and boundaries of the groundwater system. Groundwater moves through the geologic system both laterally (side to side) and vertically (up and down).*
>
> *In three dimensions, the geologic formations found in the Straight River GWMA form a complex groundwater system that is interrelated with the surface water in the area. The surface water resources in this area are streams, lakes, and wetlands. The primary stream is the Straight River, a designated trout stream .. Analyses by Stark et al (1994), Helgesen (1977), LaBaugh et al (1981), Siegel (1980) and Walker et al (2009) have shown that groundwater and surface water in this area is interconnected and heavily dependent on recharge from precipitation.*

The Plan describes the Straight River stratigraphy and hydrogeology as follows:

> *Two main aquifer types are found in the Straight River GWMA: water table aquifers (Quaternary Water Table Aquifers, or QWTA), which are the uppermost aquifers; and buried aquifers (Quaternary Buried drift Artesian Aquifers, or QBAA), which are found at various depths below the water table aquifer.*
>
> *The QWTA is a laterally extensive unconfined aquifer and is part of the Pinelands Sands aquifer (Helgesen, 1977) that extends through Becker, Cass, Hubbard, and Wadena counties. This outwash formation was deposited by flowing water during the melting of ice at the end of the most recent glacial event approximately 10,000 to 12,000 years ago.*
>
> *Groundwater from both the QWTA and QBAA aquifers is the source of groundwater supply in the Straight River area. The water table aquifer and deeper buried drift aquifers occur in the Straight River GWMA and share a hydraulic relationship. This relationship has been understood through various scientific studies that include analysis of climate, aquifer testing and long term water level measurement collected from observation wells. A County Geologic Atlas does not yet exist for this area but is in process. When complete, the atlas should provide more information on the connectivity of these aquifers.*

The basin is the result of a number of glacial ice advances and retreats. During warming, the glacial lobes would stagnate and melt, receding as they melted. As the glacial sheets melted and receded, meltwater would run off the glacier carrying sediments which were deposited in front of the glaciers. Figure 13 shows how modern day glacial meltwater can transport sediments. One of geology's axioms is *the present is the key to the past*. Figure 13 represents one of the scenarios that transpired approximately 10,000 years ago when the Straight River outwash basin was formed.

Figure 13: Braided river: the Slims River in Kluane National Park, Yukon, Canada (photo by H.J.A. Berendsen).

Stream channels fluctuate back and forth by weather changes even over short periods of time, from day to day and diurnally (day to night). The geologic phenomena is termed anastomosis. Channels cut through previous sediments, causing inhomogeneous stratigraphy, resulting in channels of more granular material within the finer sands.. At times, outlets were blocked and proglacial lakes would form, depositing clay sediments. The sequence of anastomosis would again begin once the proglacial lake drained.

When channels containing higher hydraulic conductivity such as gravel are within an aquifer, they become conduits, forming flow paths and creating gradient sinks to which the surrounding groundwater flows. The channels may also erode through the previously deposited clay layer, creating windows though the clay confining layer, connecting the upper and lower aquifers. Because of the multiple glacial advances, melting and the anastomosic phenomena, the Pineland Sands outwash aquifer system is highly complex.

Harris, Knaeble, and Berg (1999) maped some of the buried channels in the Pineland Sands and Straight River outwash. They show an intricate system of buried stream channels.

In Minnesota with similar conditions, expected contamination plume migrations have become missing. (Tracy Lund, personal communication, June 27, 2017). It is possible in places that a plume migrated to one of these high hydraulic conductivity channels and traveled in a direction different than expected.

Ignoring this highly complex hydrogeologic setting was a major omission in the DEIS.

Agricultural irrigation is the predominant water use within the GWMA . The Plan documents that permitted water use grew 85% over the last 25 years. The majority of the expansion came from agricultural irrigation. In comparison, the statewide water demand increase during the same period was 35%.

The Stark study was initiated in response to an increases in irrigation from 1974 to 1988. In 1974, the Straight River Basin contained 5 irrigation wells. By 1988, forty eight wells were installed, an approximately 9 fold increase over 14 years.

The past increases in irrigation are expected to continue. In response to R.D.Offut's planned irrigation expansion in the Pineland Sands area, DNR Commissioner Landwehr ordered a discretionary environmental impact worksheet. (EAW) on June 15, 2015. Because Offut reduced his number of applications, the EAW was vacated on September 2015. ://www.dnr.state.mn.us/input/environmentalreview/pinelands/index.html.

Offut's reduction in applications does not suggest a reduction in their expansion goals. It was in response to the EAW; Offut reduced the applications to curtail the EAW.

The GWMA Plan identifies actions DNR intends to take to ensure the groundwater, surface water and ecosystems are not harmed. Substantial financial and staff resources will be required to reach the objectives.

Though the GWMA identifies the Straight River Basin as one of the most important Minnesota aquifers and significant scientific studies have been completed for the area, the DEIS ignores its importance. The APR is designed to travel through the heart of this highly sensitive and irrigated basin. How were the studies referenced in my documents, the discretionary EAW, and the GWMA ignored? The DEIS must conduct a complete groundwater analysis of the potential impact from a spill within this highly irrigated Pineland Sands outwash aquifer.

The DEIS uses a 1,000 foot corridor to identify irrigation wells along APR to represent potential operational impacts. This is an incorrect assumption in the Straight River Basin for several reasons:

- It only considers lateral (horizontal) migration and excludes the vertical component.
- Because of the highly permeable soils and his extensive DNR hydrogeology field work, including multiple pump tests and water level monitoring, Jay Frischman stated irrigation well cones of depression can be expected to result in groundwater level drawdowns ¼ mile from the pumping well. If multiple nearby wells are pumping at one time, overlapping cones of depression will occur. Under these circumstances, effects can result in groundwater level declines ½ mile from the wells (Jay Frischman, personal communication, June 23, 2017).
- Historic increases in irrigation pumping and irrigated acres will continue to increase.

Figure 14 depicts a well cone of depression. Once a well begins pumping, the groundwater level drops, generally causing the surrounding water level to form a conical shape. Most

people think well water is supplied by the pump sucking water from the surrounding formation. In actuality, the water level drawdown causes a gradient much like a hill. The water cascades towards the pump down the cone and flows to the well as show in Figure 14.

Figure 15 depicts overlapping cones of depression from multiple wells operating at one time. The figure illustrates multiple cones of depression causing an increased water level drawdown. Both Figures 14 and 15 are from the Oregon State Water Well Program (http://wellwater.oregonstate.edu/groundwater-and-wells)

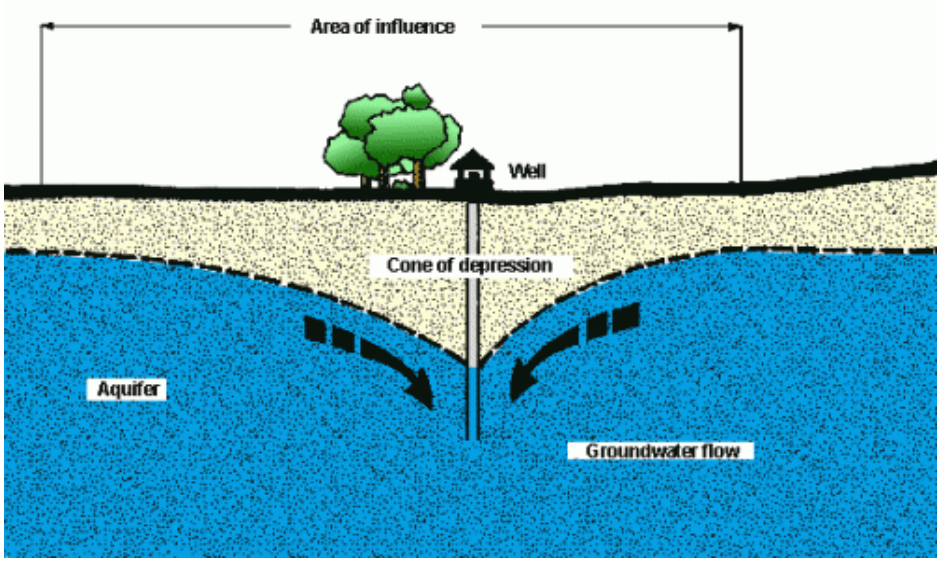

Figure 14: Well Cone of Depression

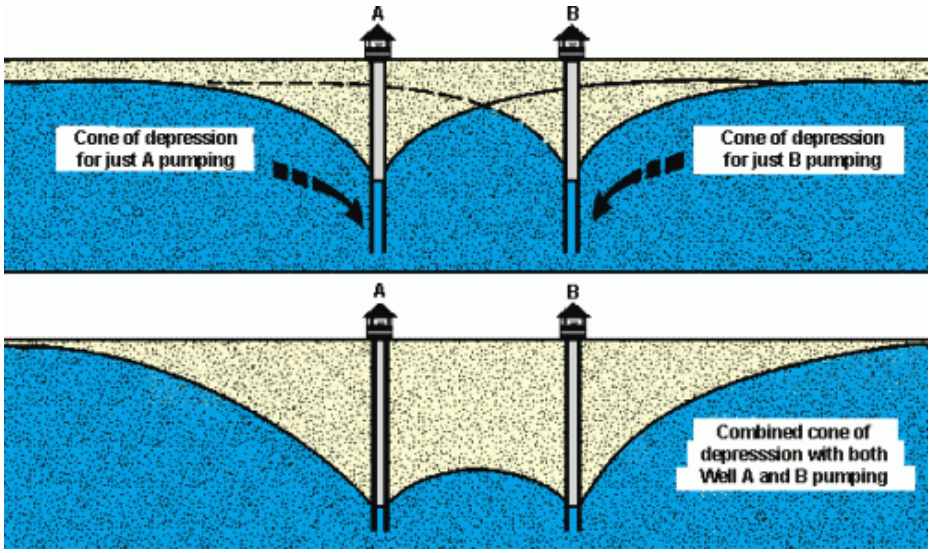

Figure 15 Overlapping Cones of Depression

Figure 16 contains a pair of Google Earth photos looking north from south of the Straight River along the APR alignment; the lower photo is a zoomed-in version of the upper photo. The circular shapes are irrigated 40 acre parcels containing circle pivot irrigation systems. Each circle pivot requires a high capacity well capable of pumping up to 1,0000 gallons per minute (gpm).

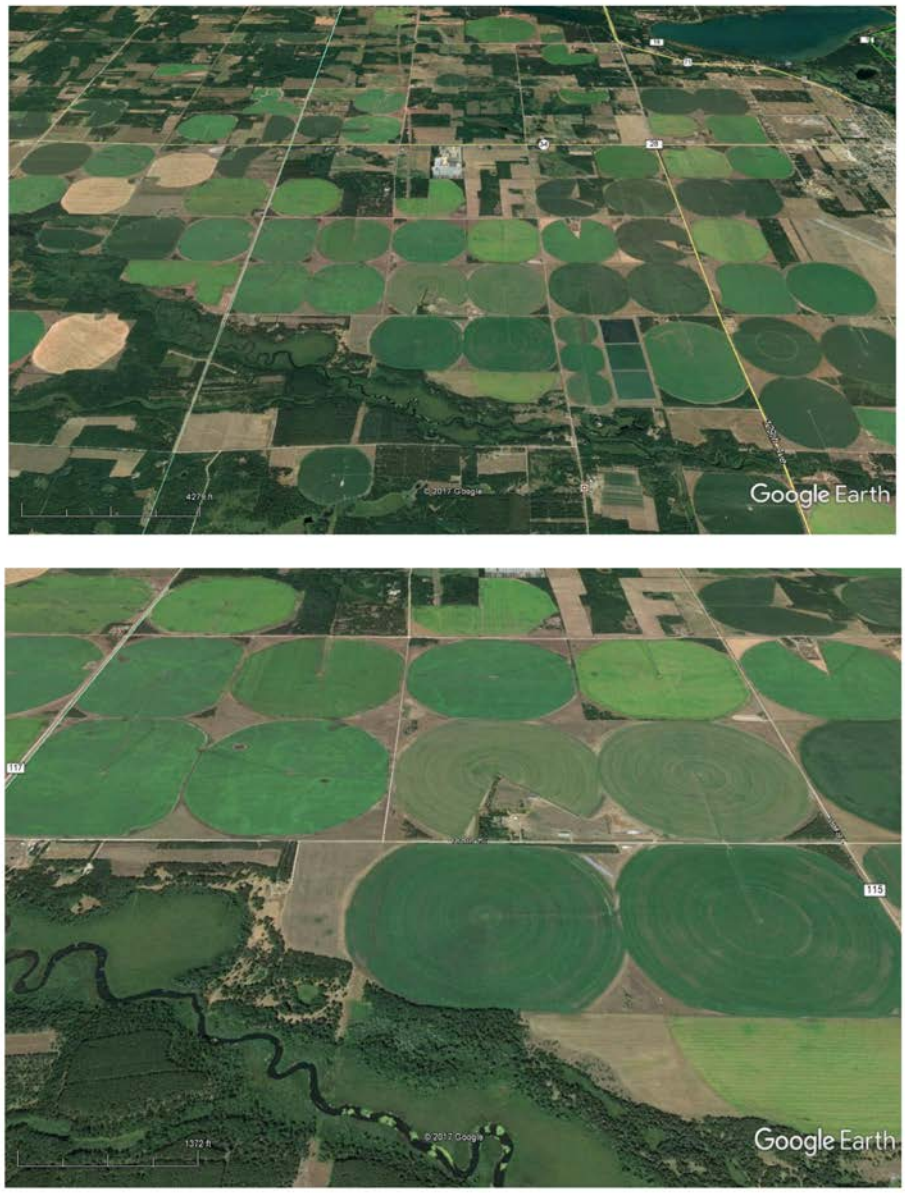

Figure 16 Google Earth Photos Along APR Looking North From South of Straight River

Figure 17 displays the irrigation wells and center pivot systems within ¼ mile of APR.

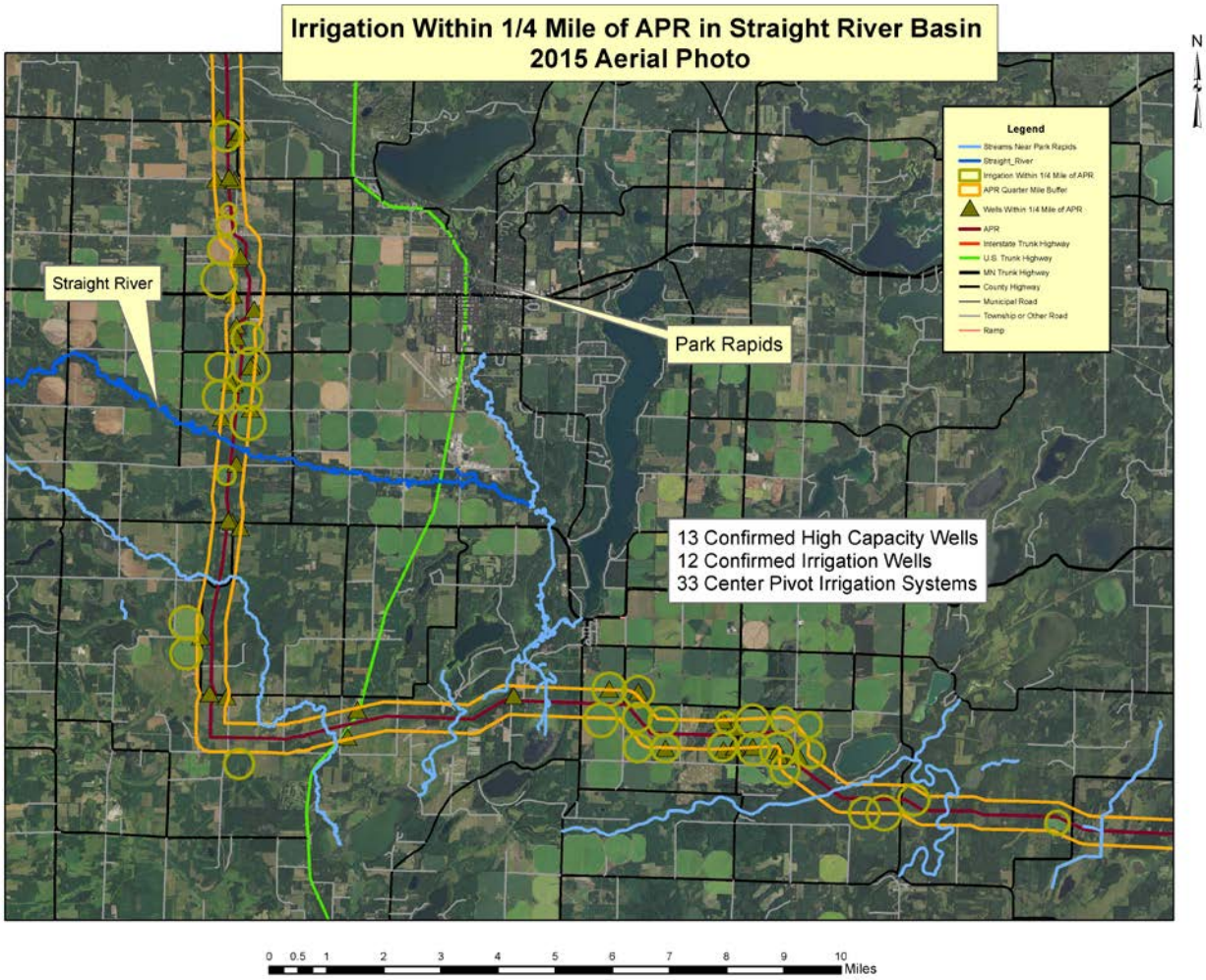

Figure 17: Irrigation Wells and Center Pivot Systems Within ¼ mile of APR

Figure 18 displays the irrigation wells and center pivot systems within 1/2 mile of APR.

Rather than 5 irrigation wells along the APR alignment as reported by the DEIS, the Park Rapids area (Pineland Sands) contains 12 irrigation wells and 33 center pivot systems, respectively within ¼ mile of APR. Additionally, 24 irrigation wells and 33 center pivot systems are situated within ½ mile of APR in the Park Rapids vicinity.

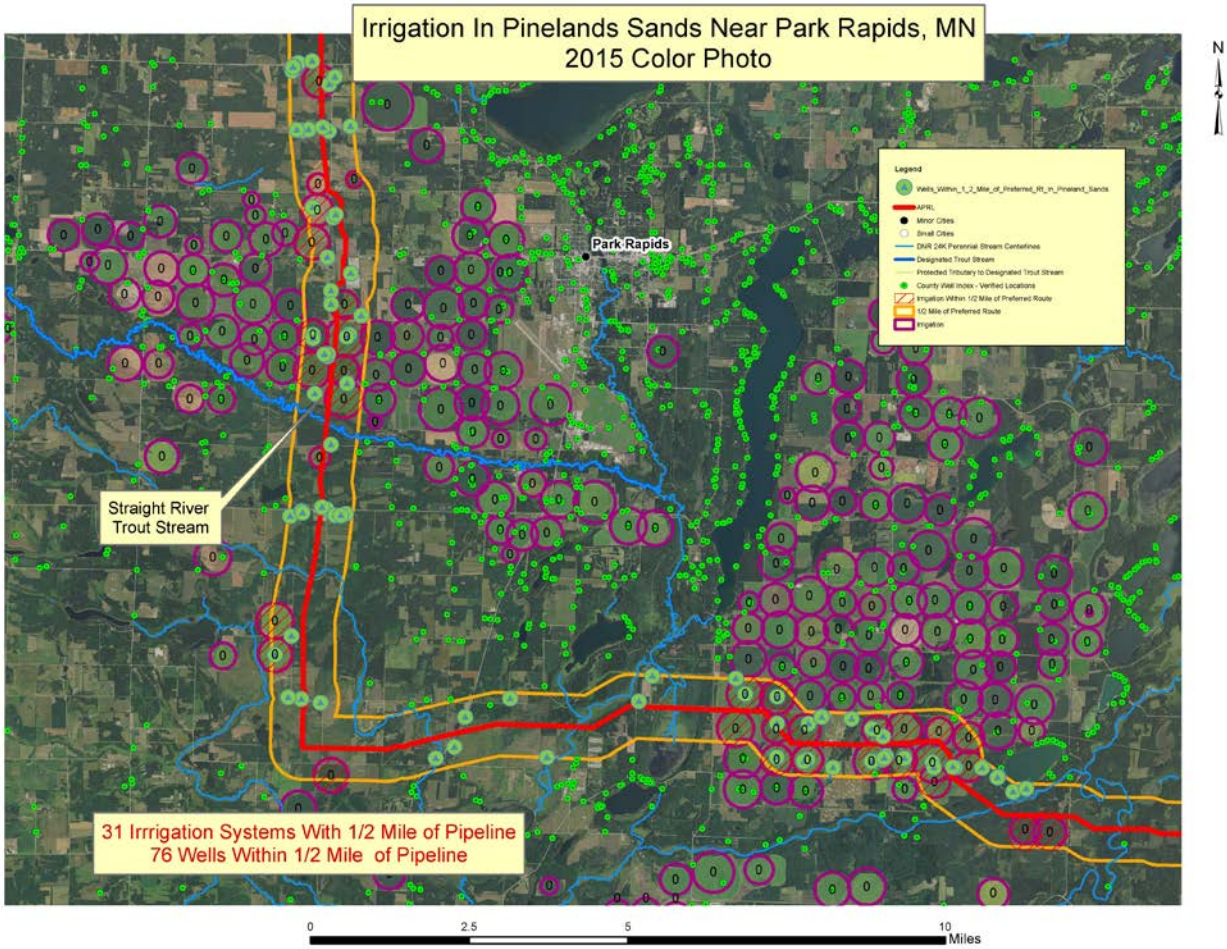

Figure 18: Irrigation Wells and Center Pivot Irrigation Systems within 1/2 mile of APR.

Because of the highly permeable soils and irrigation well cones of depression which cause create steep gradients, groundwater movement is significantly altered. If a pinhole leak occurs along any stretch of the APR within the Pineland Sands, contaminant may rapidly move vertically to the groundwater table and horizontally away from the pipeline due to the altered groundwater table conditions. If pipeline contaminant reaches the groundwater surface, it can be incorporated into the irrigation water, contaminating the irrigated crops and transporting the product further from the pipeline. When the product is spread onto the porous field, it moves downward through the soils, eventually reaching the water table farther down gradient of the pipeline. The transport of the pollutant from one system to another is possible, contaminating more soil, and dispersing the pollutant away from the pipeline.

Irrigation wells cycle on and off, causing a surging effect on the water table. When the well is shut off, water levels with a contaminant on its surface rebounds. This contaminates the soils within the cone of depression. When the irrigation is again begun, the pollutant is further incorporated into the water column causing mixing and greater contamination of the groundwater, expanding the plume.

The DEIS did not consider the potential of intensive irrigation within the Straight River area. The dog leg created by the applicant to avoid the Leech Lake Reservation contains:

- Highly permeable soils with high infiltration rates and potential for rapid vertical movement of pollutant to the water table.
- 23 high capacity irrigation wells within ½ mile of the pipeline which can greatly influence plume movement and dispersal.
- Straight River, the highest quality trout stream in NW Minnesota.

Despite my Sandpiper expert testimony, numerous scientific studies documenting the Pineland Sands and Straight River Basin sensitivity, the discretionary DNR EAW, and the GWMA designation, the DEIS ignored the area. This is a fatal flaw in the DEIS. It is representative of the shortsighted approach to groundwater in the DEIS.

The document uses a 1,000 foot band to calculate acreage as a measure of operational impacts to the groundwater. It does not consider vertical movement nor does it factor external forces like irrigation that will impact groundwater movement. Because the entire norther portion of Minnesota has been altered by successive glacial episodes, it is geologically complex and inhomogeneous along the entire length of the proposed pipeline. A broad brush approach to groundwater impact evaluation is flawed and unscientific.

All scientific information needs to be utilized to properly evaluate the potential groundwater contamination of pipeline operation. This is particular true for USGS, DNR, DOH, DOA and PCA localized reports that zero in on aquifer characteristics of individual aquifer systems. History has shown that it is not a matter of if, but rather when a leak will occur. The choice is to place the pipeline in impermeable soils such as those along SA-04 to contain a spill or into the most highly sensitive and permeable soils in the state.

Conclusions

The Line 3 DEIS is deficient as follows:

- SA-04 is the only route the DEIS compiled cumulative impacts east and south of Minnesota. This skews the DEIS tables and Executive Summary.
- Construction impacts were not uniformly calculated. SA-04 quantities are inflated in comparison to APR
- No well or water supply analysis was performed east of Minnesota for any RA alternatives. Thus SA-04 water supply impacts are inflated in comparison to all other alternatives.
- Though SA-04, a citizen proposed route, travels through the western edge of karst topography and a wellhead protection zone, a refinement of the route by moving it 25 miles to the west would eliminate both factors. The Executive Summary as it stands is inflammatory against SA-04 because of the perceived karst contamination potential.
- Wild Rice beds were compiled but quantitative analysis of impacts were not performed for the beds at risk.
- Though scientific data is available, no in depth groundwater analysis was conducted.
- Vertical movement of groundwater was not considered.
- Important information supplied during the Sandpiper review was not included in the

Line 3 DEIS

- The Executive Summary Figure ES-5 comparing ecological and water resources impacted is unreadable and needs to be highlighted. It is the only source of comparison between the routes when water and ecological quality is discussed.
- Individual impact analysis of trout stream impacts was not performed. Since they are the most sensitive stream environment, quantification of potential impacts is required to properly understand and evaluate proposed alternative routes.
- The report compiles calcareous fens along the alternative routes, but does not quantify the potential impacts of these rare protected wetlands. Calcareous fens are omitted in the Executive Summary.
- APR and northern route alternatives (except RA-03AM) pass through areas of the highest pollution sensitivity of near surface materials whereas SA-04 is in some of the lowest pollution sensitive near surface materials in the state.
- The Straight River Basin GWMA designation was not considered in evaluation of APR.
- The June DNR discretionary Straight River irrigation EAW was not considered.
- The highly complex Straight River and Pineland Sands hydrogeologic and geologic conditions were ignored.

Addendum To
Review of Enbridge Line 3 Draft Environmental Impact Statement
By Robert Merritt
Merritt Hydrologic and Environmental Consulting, LLC

Since writing Review of Enbridge Line 3 Draft Environmental Impact Statement (RDEIS) I examined a portion of the Minnesota Departments of Agriculture (DOA) Commerce (DOC) Natural Resources (DNR) and Pollution Control Agency (PCA) Data Practices Act Request (DPA) documents. I also read the Stantec Pinhole Release Critique by CJE. This is to document substantive materials I identified in the DPA and CJE report. It is an addition to RDEIS. I will use the same acronyms from the RDEIS.

As discussed in RDEIS, the MOU between DNR and PCA effectively masked DNR and PCA Line 3 DEIS critiques from the public. I included all of the PCA and DNR letters from the Sandpiper Docket (RDEIS Appendicies B and C) and stated that many of their concerns remained in the DEIS.

The following Draft DEIS and DOC peer reviews by the DNR and PCA corroborates my RDEIS critiques. I will identify the DPA document, location and relevant discussion.

2017 0210 DNR comments_Line 3 PDEIS.
This peer review was contained in a spreadsheet. Relevant comments are as follows:

Section 5.2.1.1.1, Page 5.2.1-4 DNR's HL states:

> *ROI for Groundwater should extend beyond a 1000 foot buffer. It should be at least 1 mile.*

Section 6.3.1.1.3, Page 6.3.1-6 DNR's MW states:

> *Need to evaluate each route alternative for groundwater vulnerability. I recommend using the pollution sensitivity map. Water table aquifers are most vulnerable to contamination because of their lack of confining layers and direct connection to the landsurface. https://gisdata.mn.gov/dataset/water-aquifer-vulnerability*

Section 5.2..1.1.3, Page 5.2.1-8 DNR's MW states:

> *There is a new pollution sensitivity map for MN. The Watershed Health Assessment Framework uses the 1989 MPCA model. MN DNR has an updated model available at: https://gisdata.mn.gov/dataset/geos-hydrogeology-atlas-hg02*

Although I am unsure, it is possible that MW stands for Michele Walker, the DNR Region 1 Hydrogeologist. Despite the DNR professional's advises to employ a 1 mile groundwater

impact corridor, DOC and Cardno continued to use 1,000 feet This is a crucial groundwater related error.

My RDEIS analysis employed a ½ mile buffer to identify the irrigation wells within the Straight River Basin. Using HL's suggested 1 mile metric, 50 center pivot irrigation systems, 30 irrigation wells, and 87 domestic wells exist in the Straight River Basin/Pineland Sand Aquifer one mile groundwater corridor.

Despite the fact that DNR advised DOC a new, updated pollution sensitivity map was available, DOC persisted in using the outdated version. Additionally, analysis of groundwater sensitivity assessment based upon MW's recommendation was not performed correctly. The updated DNR GIS pollution sensitivity layer was used in the RDEIS figures and discussion.

The two above examples display the degree to which DOC ignored DNR professional advise and peer review; it supports the concern I expressed in RDEIS. They demonstrate the DOC's cloaking of Minnesota environmental agency critique.

DNR Chapt 5 Water Resources MW Re-write -final

5.2.1 Water Resources Page 1 MW

Commented [MW1]: *Wisconsin is not evaluated. The route from Superior to Jolliet also needs to be evaluated.*

5.2.1.1.2 Existing Conditions Page 11 Aquifers

Commented [MW7]: *Need to check Illinois and Wisconsin. Wisconsin GIS data on unconfined glacial aquifers is available by county at: http://wgnhs.uwex.edu/maps-data/gis-data/ Statewide Illinois data is also available at: https://clearinghouse.isgs.illinois.edu/data*
These could be used to determine water table aquifer vulnerability. They have a map of potential of agricultural chemical contamination of aquifers which would be an aquifer sensitivity map.

5.1 Master Into_MPCA

Page 27 (5-3) Sec 5.1.3

Commented [CD(1]: Global comment and flaw in analysis:

My comment - For quantitative construction and operation impact assessment on land cover, habitat and resources along SA-04, was the analysis done from the Canada/US.Boarder to Pontiac IL? If so, that should be clearly stated in terms of what the boundary conditions were for analysis. However, how can SA-04 be directly

comparable to analyses done for other RA's contained only within MN? As is stated on page 5.2.1-7, "It is expected that alternatives that cross longer distances of sensitive or high-susceptibility areas or that are located near larger numbers of potable supply wells and contamination sites have the potential to have greater construction impacts than alternatives that cover shorter distances or that are near fewer numbers of wells or contamination sites." Lastly, it is stated on page 5.2.1-16, "However, if impacts were determined for the entire 803-mile length of the SA-04 route in Minnesota and the other states it crosses and compared to the impacts for the 380 miles of the Applicant's preferred route, the SA-04 route would certainly have more impacts." Therefore, either SA-04 analysis must be contained within MN only, or the connecting pipe network from Superior through WI and IL to Pontiac (shown as a dashed line on all figures throughout) must be considered in the analysis for all RAs and RSAs so that a true "apples to apples" comparison can be made to SA-04.

Cardno Response - No change to EIS. Geographic extent of SA- 04 defined in Section 4.2.5 (Neche, North Dakota to Joliet, Illinois) and associated ROI defined in each resource section in Chapter 5.

5.2 Master Water Resources Section_MPCA

Page 1 (5-9)

Commented [KL(1]: *This chapter appears flawed in its analysis. I question (again) the decision to discuss potential impacts of SA-04 outside of MN in the EIS. Given that the EIS is a state document, Minnesota citizens need to be able to compare potential impacts of all alternatives within MN only since we have no jurisdiction or authority beyond our own borders.*

Commented [SK(6]: *The waters outside of Minnesota should be irrelevant to this document. Minnesota agencies can only make decisions on Minnesota waters.*

10 Master Accidental Releases_MPCA

Page 1

Commented [KL(2]: *Again, this chapter is flawed in that it includes potential environmental impacts from SA-04 in other states outside of MN. This is a Minnesota environmental review process. Therefore, only those potential impacts within MN boundaries should be compared. Otherwise we are comparing apples to oranges.*

RDEIS identified that SA-04 is the only route containing potential impacts east of Minnesota, skewing the data in favor of APR and RA routes. The analysis was biased and unevenly applied. The above comments recognize the same DEIS problem by DNR and

PCA professionals; DOC ignored DNR and PCA admonitions.

> *Sole Source Aquifers*
> *The Applicant's preferred route would not cross any aquifers designated by EPA as sole source aquifers.*
>
> ***Commented [T9]:*** *This is a very narrow designation that is only based on nomination of aquifers as sole source. The MPCA Petroleum Remediation Program has a definition of sole source aquifers which there are many in the central part of the state.*

The DEIS retained the EPA sole source discussion and ignored the above PCA sole source aquifer definition. Using only the EPA definition and ignoring the PCA Minnesota definition at the very least suggests to the public and PUC that no sole source aquifers exist along APR. It is deceptive in the face of PCA advise; it ignores and censures the PCA to the benefit of APR.

APR travels through many Minnesota sole source aquifers. As stated above, 87 domestic supply wells exist within 1 mile of the APR Pineland Sand Aquifer alignment alone.

Page 9 (5-17)

> *Minnesota DWSMAs*
> *The Applicant's preferred route would cross 450 acres of DWSMAs in Minnesota.*
> *DWSMA data do not exist for other states.*
>
> ***Commented [SK(12]:*** *I stopped here in removing the non-MN text for the Groundwater section…there are probably more below that I haven't highlighted.*

Page 17 (5-25)

> *Degradation of Shallow Groundwater Quality from Blasting, Spills, or Contamination*
>
> ***Commented [KL(13]:*** *It seems that this document should not only have addressed the potential impacts of blasting, spills or contamination from construction to groundwater, but also from long-term operation of the pipeline.*
>
> *For example: Nationwide, have any aquifers been contaminated with oil from pin-hole leaks or other pipeline failures? We get no real sense of that from this analysis. People living near the pipeline route will care about this issue from a source water protection and public water supply perspective*

The RDEIS identified the groundwater analysis deficiency. It also showed that the DEIS ignored DNR's GWMA Straight River Basin designation, a major drinking water source. The PCA advised DOC regarding this crucial component and were ignored. Besides stream crossings focused analysis, the DEIS contains no in-depth investigation of the potential impact to groundwater and aquifers.

In the CJE report titled Comments on the Stantec Pinhole Release Assessment, Clarence Johnson states:

> *Stantec does not appear to consider lateral migration within the trench. The trench is to be backfilled with natural materials. Unless extraordinary measures are taken to compact the soil around the pipe, a permeable pathway will exist along the sides and bottom of the pipe. I am unable to find any description of the backfilling operations in the EIS or in Appendix E to the EIS which suggests that any extraordinary backfilling measures will be undertaken. The lateral migration along the pipeline will increase the volume that will remain underground and also increase the area available for infiltration at the bottom of the trench. Finally, Stantec does not include lateral migration of the oil through the trench walls in their evaluation. Migration through the trench walls will also serve to delay the daylighting of a release of crude oil.*

The lateral migration is a particularly important factor in sloping conditions such as the Straight River Valley. Figure 1 displays the topography along the APR alignment at the Straight River crossing. The 2 foot topographic contours are produced from the GIS Lidar data. (http://www.mngeo.state.mn.us/chouse/elevation/lidar.html)

Figure 2 is taken from the Helgesen report titled Groundwater Appraisal of the Pineland Sands Area, Central Minnesota, USGS Water Resources Investigations Report (1977) referenced in my Sandpiper testimony (RDEIS Appendix A).

The APR alignment is near the Hubbard and Becker County boarder. Helgesen's figure shows that groundwater flows towards the river along much of the river and the APR alignment in particular. Stark (1977) also displayed similar conditions. Stark's map is included in Appendix A. Combined with the slopes from the sand plain top to the river shown in Figure 1, contaminate would migrate to the Straight River from a much broader area than simply a leak or rupture at the stream crossing. Lateral migration near the Straight River would also expand the potential suppression of petroleum daylighting by migrating the contaminant downhill to the Straight River. The pipeline trench migration would encompass a broader area from which the trout stream could potentially be impacted. A similar scenario would occur at many stream crossing along APR.

Conclusions

The DEIS contains misleading information and ignores critical factors identified by PCA and DNR professionals, the experts upon which DOC was supposed to rely. DNR and PCA are the agencies tasked with environmental protection by the legislature. Their expertise in natural resources includes pollution sensitivity, wildlife, fisheries, biology, ecology, geology, hydrogeology and hydrology. DOC does not have the breath of these expertise. Yet the DOC deliberately ignored important critique by DNR and PCA staff. The result of this censorship was biased and skewed data that support APR over SA-04, a less environmentally detrimental route. Additionally, because of the MOU, the DNR and PCA concerns were masked from the public and not included in the DEIS. The DNR and PCA strongly supported the southern route during the Sandpiper review. PCA and DNR criticisms were available to the public and PUC Board members (RDEIS Appendices B and C).

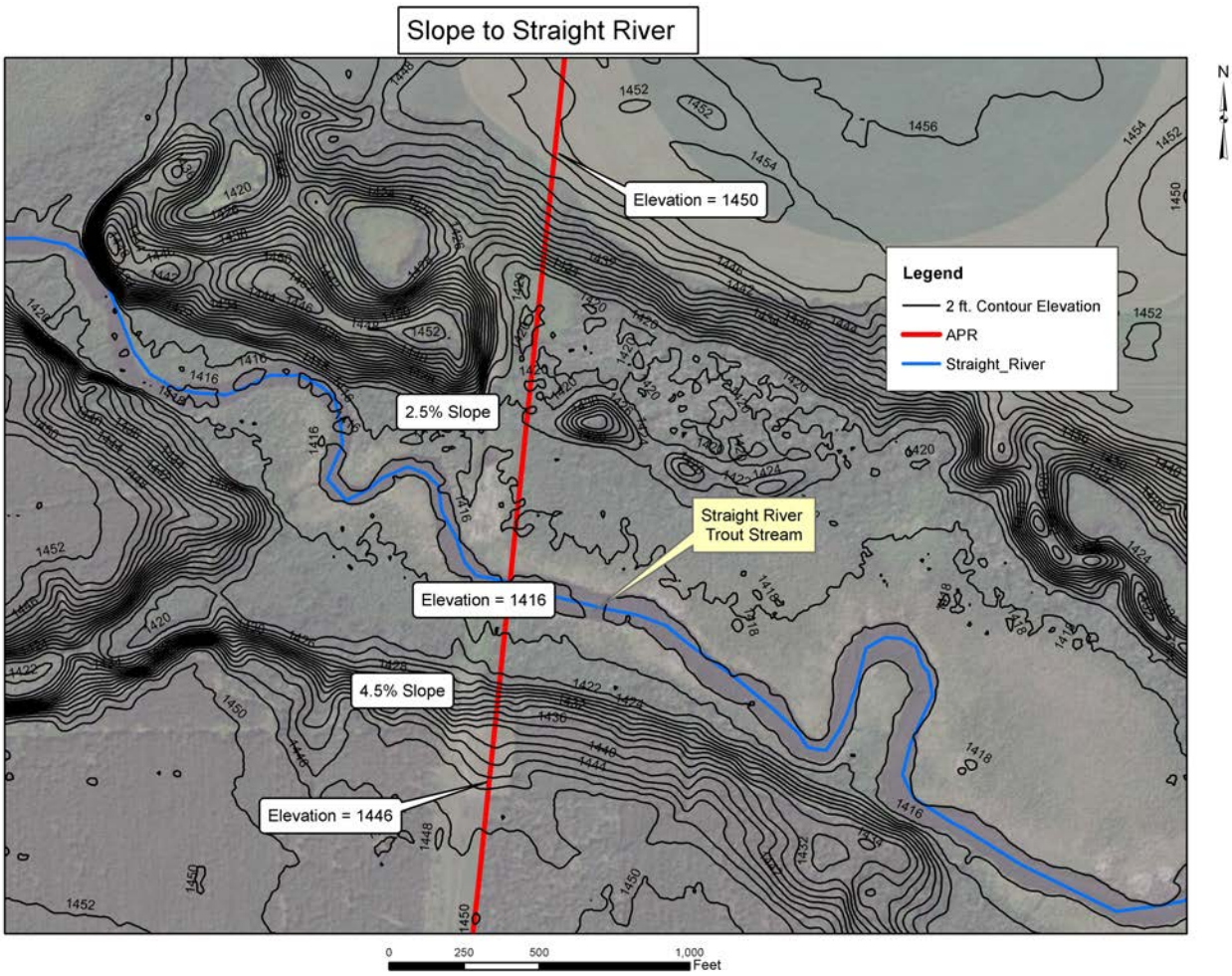

Figure 1: Slope to the Straight River Along the APR Alignment

The DNR and PCA Sandpiper concerns were similar during their Line 3 review. However, the MOU placed DNR and PCA under DOC's control, effectively seizing substantive DNR and PCA staff DEIS critical appraisal. The MOU rendered DNR and PCA comments unavailable for public consumption and PUC board members while slanting the DEIS in favor of APR over SA-04.

Because the information contained in my limited review of Data Practices Act documents display strong criticism of the DEIS and because these criticisms are not readily available to the public and PUC, all DNR and PCA discussions and criticisms during the DEIS formulation must be made a part of the DEIS and included in the docket.

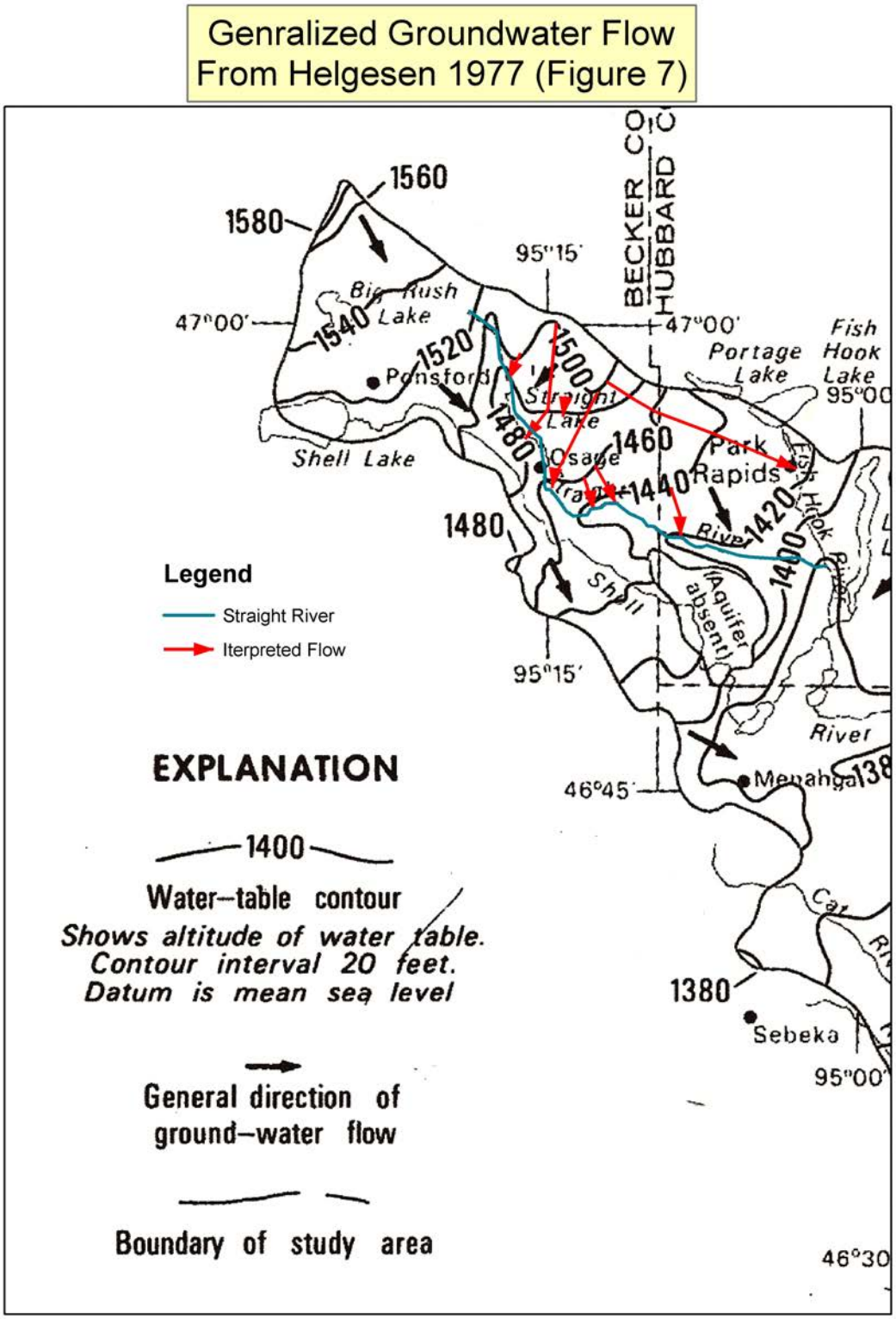

Figure 2: Groundwater Elevations and Flow from Helgesen (1977)

COMMENTS ON THE DIRECT TESTIMONY OF RAY WUOLO GIVEN ON JANUARY 31, 2017

PREPARED BY

CJE
57 AMBERWOOD COURT
MORAGA, CALIFORNIA

JUNE 26, 2017

INTRODUCTION

Mr. Ray Wuolo, on January 31, 2017, offered testimony on possible releases of petroleum hydrocarbons from the proposed Enbridge Energy Partners (Enbridge) Line 3 Replacement in northern Minnesota (MPUC DOCKET NOs. PL9/CN-14-916 and PPL-15-137, OAH Docket Nos. 65-2500-32764 and 65-2500-33377). The testimony was apparently offered in support of the reports prepared for the Draft Environmental Impact Statement (DEIS) by Barr Engineering Company (Barr). Mr. Wuolo is employed by Barr.

Mr. Wuolo's testimony is irrelevant in that it does not address the impact of any release. The purpose of a DEIS is, as the name clearly states, to assess the impact of possible releases of petroleum hydrocarbons to the environment. Mr. Wuolo does not address the impact of possible releases. Mr. Wuolo's testimony is simply a recital of the possible migration paths of a release. Examples of Mr. Wuolo's failure to accurately address the impacts of a release of petroleum hydrocarbons are given below.

SECTION IV - LAKES REPORT

Several of the questions posed to Mr. Wuolo, in this section as well as the other sections, begin with "In the unlikely event of an accidental release of crude oil from the pipeline…" Mr. Wuolo at no time corrects the questioner. Releases from a pipeline are not "unlikely." For example, the reason to replace the existing pipeline is because of the number of releases from the pipeline. The Keystone 1 pipeline, recently built by Enbridge, had 35 releases in the first year of operation. Mr. Wuolo did not, at any time, challenge the incorrect assertion that a release from a pipeline was unlikely which calls into question the objectivity of his testimony.

The failure of the Barr report and Mr. Wuolo's testimony on the Barr report to assess site specific conditions is shown by Mr. Wuolo's testimony beginning on the bottom of Page 3 where Mr. Wuolo states that the Barr report did not consider "…the broader set of factors such as site-specific conditions, seasonality, crude oil type and volume, or response time." If these site specific conditions are not part of the evaluation, the impact of a release cannot be assessed. Therefore, the Barr report and Mr. Wuolo's testimony are irrelevant.

Mr. Wuolo's testimony on the impact on lakes continues with a discussion of migration of a release of crude oil. At no time does Mr. Wuolo actually address the impacts of a release on a lake or associated wetlands. As such, Mr. Wuolo's narrative is simply a statement that liquids flow downhill and he provides no information on the environmental or human health impacts of the release.

Mr. Wuolo's conclusion in this section is that less than two percent "… of the lakes in the watersheds in the pipeline corridor are susceptible to the effects [sic] of a potential release from the pipeline." Mr. Wuolo apparently presupposes that polluting a lake is acceptable if only a few lakes are polluted. His lack of concern is difficult to properly assess because the impacts of a release are not identified or quantified in any way in his testimony. However, Mr. Wuolo's dismissal of crude oil contamination of only a "few" lakes is not acceptable public policy or environmental stewardship.

SECTION V – GROUNDWATER REPORT

Again, this is a section filled with general statements about the possible pathways a release of crude oil could follow to impact the ground water. This section is completely devoid of any discussion of the possible impacts to ground water. In this respect, the entire section has no value in evaluating the potential impacts of a release. Site-specific conditions are not addressed and the site-specific affects of a release are not addressed.

Mr. Wuolo presumes to assess the susceptibility of the water-table aquifers along the preferred pipeline route. For this evaluation he relies on the Minnesota Department of Health (MDH) Water Table Susceptibility Map published in 2015. However, Mr. Wuolo omits an important fact. MDH classified lacustrine sediments as having medium susceptibility. Barr arbitrarily reclassified these sediments as having low susceptibility. No scientific explanation, nor any other explanation, is given for this reclassification. Further, Barr and Mr. Wuolo do not state how many pipeline sites were reclassified. It appears that this arbitrary reclassification was made only to reduce, without justification, the threat posed by releases from the pipeline.

The evaluation of the susceptibility of the aquifers to pollution was made using arbitrary data points. Barr divided the pipeline into one-mile segments and determined the susceptibility at the midpoint of each segment. If this type of sampling is to be used, it must be demonstrated statistically that the use of the midpoint is valid. No such statistical analysis appears to have been undertaken. Therefore, any conclusions Barr and Mr. Wuolo make with regard to aquifer susceptibility are strictly speculation.

Mr. Wuolo and Barr cite a release of contamination from an Enbridge pipeline in Bemidji to show that migration of released crude oil is contained by natural attenuation. Neither the Barr report nor Mr. Wuolo's testimony demonstrate that the environmental conditions at the Bemidji release are equivalent to the environmental conditions at any place along the proposed pipeline route. Further, the environmental conditions along the proposed pipeline route are highly variable, and the Bemidji release cannot be used to estimate the affects of a release for the entire pipeline.

The information on which Barr and Mr. Wuolo base their speculative statement that any release would be contained by natural attenuation is incomplete. Although Mr. Wuolo and Barr rely heavily on the Bemidji study, they ignore the data published by the United Stated Geological Survey (USGS) in 2015 which shows the release at the Bemidji site has non-volatile dissolved organic compounds (NVDOC) which have migrated further than the volatile compound plume and are not contained by natural attenuation. Because the Bemidji release is from an Enbridge pipeline, it is difficult to understand how Enbridge and its consultants could be unaware of the USGS report. It is even more difficult to understand how this information could be ignored in the Enbridge/Barr/Wuolo documents addressing groundwater contamination.

Mr. Wuolo states that "…natural attenuation would limit the maximum movement of a plume of dissolved crude oil byproducts to a distance on the order of a few hundred feet." This statement is unsupported by any site-specific data. In fact, this speculative statement is refuted by the USGS 2015 publication, which addresses the migration of contamination at the Bemidji site.

Mr. Wuolo states that the "…water quality of the higher permeability water table aquifers tends to be already degraded by fertilizers, herbicides, and pesticides from agricultural operations. Mr. Wuolo does not compare the relative toxicity of the contaminants to the toxicity of crude oil, he does not cite the concentrations of these contaminants, and he does not provide locations of the contaminants. His statement on the pollutants is, at best, incomplete and has no relevance to the pipeline issue. Adding pollutants to an aquifer is always unacceptable and can only increase the impact to the aquifer. Mr. Wuolo offers no analysis of the potential impact to the aquifer or justification for ignoring the added pollution.

VI – WILD RICE REPORT

Mr. Wuolo presents an inventory of the wild rice lakes in the project area. Mr. Wuolo, however, does not discuss the impacts of a release; he seeks only to minimize any concerns by stating that only a few areas could be affected. This is not an analysis of the possible impacts. This is a justification for permitting the pipeline to cross sensitive areas.

CONCLUSIONS

The testimony of Mr. Wuolo consists only of speculation and an enumeration of areas of concern. At no point does Mr. Wuolo discuss the possible impacts of the project on human health or the environment. As such, this document deals only in generalities. An Environmental Impact Statement must address the potential impacts to human health and the environment. Because Mr. Wuolo does not address any impacts, his testimony is not germane to the project and should be dismissed as irrelevant.

CITY OF
GRAND RAPIDS
IT'S IN MINNESOTA'S NATURE

ADMINISTRATION DEPARTMENT

420 NORTH POKEGAMA AVENUE, GRAND RAPIDS MINNESOTA 55744-2662

June 26th, 2017

Jamie Macalister
Environmental Review Manager
MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

Re: Line 3 Project Draft EIS Comment, specifically regarding Chapter 8 "Existing Line 3 Abandonment and Removal"

Dear Ms. Macalister,

We understand that Enbridge has filed a proposed abandonment plan per PHMSA regulations. We also understand, per the D-EIS, that Enbridge has filed with the Minnesota PUC a draft of the required plan that specifically show how the PHMSA abandonment regulations will be achieved. According to Enbridge, abandonment will include: removing the oil, cleaning the pipeline, disconnecting the pipeline, segmenting the pipeline, and monitoring and maintaining the pipeline, indefinitely. As Grand Rapids City Council Members, we would like you to consider how the proposed existing Line 3 abandonment will affect our City based on information provided in the Line 3 Project D-EIS. From 8.3.1 of the D-EIS, ***Potential Impacts and Mitigation Measures***: *Leaving Existing Line 3 in Place Could Have Potentially Significant Effects*:

> There are, however, some potentially significant impacts associated with abandoning the existing Line 3. These longer term impacts are caused by the continued presence of undiscovered legacy contamination that may exist surrounding the existing pipeline, as well as the potential hazards associated with the aging of the abandoned pipe. These impacts include soil and water contamination, the ability of the pipeline to serve as a water conduit, subsidence due to the failure over time of the pipeline, and loss of buoyancy control for the pipeline. (8.4)

The existing Line 3 runs through the NW part of Grand Rapids' Wellhead Protection Area (WHPA). A Wellhead Protection Area (WHPA) is the Minnesota Department of Health (MDH) approved surface and subsurface area that surrounds a public water supply well (or well field) that supplies a public water system, through which contaminants are likely to move toward and reach the well or well field. According to the D-EIS, "Soils and waters near the abandoned Line 3 could also be adversely affected where undiscovered contamination along the existing pipeline (from lubricants, process chemicals, and oil spills) are left behind.

Potential impacts on soil and water resources are highly uncertain; however, as they depend on the extent of the existing undiscovered contamination." (8.6)

We understand from the D-EIS that the current Line 3 is in grave condition and the concerns of accidental release having "the most exposure" is in keeping the existing Line 3 in place. It remains unclear as to how a deteriorated Line 3 would handle the removal of the oil, cleaning, disconnecting, and segmenting of the pipeline, as proposed. There is no specific plan within the D-EIS that states how Enbridge will manage a contaminated site other than "Enbridge has indicated that it would...." (8.12).

The City of Grand Rapids has 11,000+ residents who rely on the WHPA to provide them with a safe public water source to supply our public water system. Our community brand is: Grand Rapids, It's in Minnesota's Nature. We pride ourselves on the precious resource that is our water. From 8.3.1 of the D-EIS, ***Potential Impacts and Mitigation Measures****: Long-Term Effects Could Be Significant and Would Require Site-Specific Mitigation Measures:*

> In sum, impacts on human and natural resources due to potential subsidence of the ground above the abandoned Line 3 are anticipated to be minimal in the near term but could be significant in the longer term, absent effective monitoring, adaptive management, and the timely introduction of mitigation measures. Because of the length of Line 3 and the variety of resources crossed, mitigation measures would be site specific and would need to be designed in collaboration with those agencies and authorities responsible for the resources in question. (8.4)

The resource in question for our community is our public water supply and we cannot support the abandonment of Line 3 knowing that the impact "could be significant in the long-term." According to the D-EIS, "The Longer the Pipe Is in the Ground, the More Likely It Is to Fail" (8-8). If Line 3 is not removed, and when it fails and/or buoyancy is lost; it is generally expected that Cities and its residents are responsible for the clean-up. Since Line 3 runs directly through our Well Head Protection Area (WHPA), which is the sole source of municipal water for two cities (Grand Rapids and LaPrairie), the City is requesting that you require the total removal of Line 3 within the WHPA. In addition, the City requests that any contaminated soils within the WHPA be removed. Lastly, we request that Line 3 be removed in any urban developed areas. Please find attached the Line 3 replacement project detailed map set (23A and 23B), aerial and topographic.

Sincerely,

Dale Adams, Mayor

Tasha Connelly, Council Member

Dale Christy, Council Member

Rick Blake, Council Member

Bill Zeige, Council Member

CC: Tom Pagel, City Administrator, Denny Doyle, Grand Rapids Public Utilities

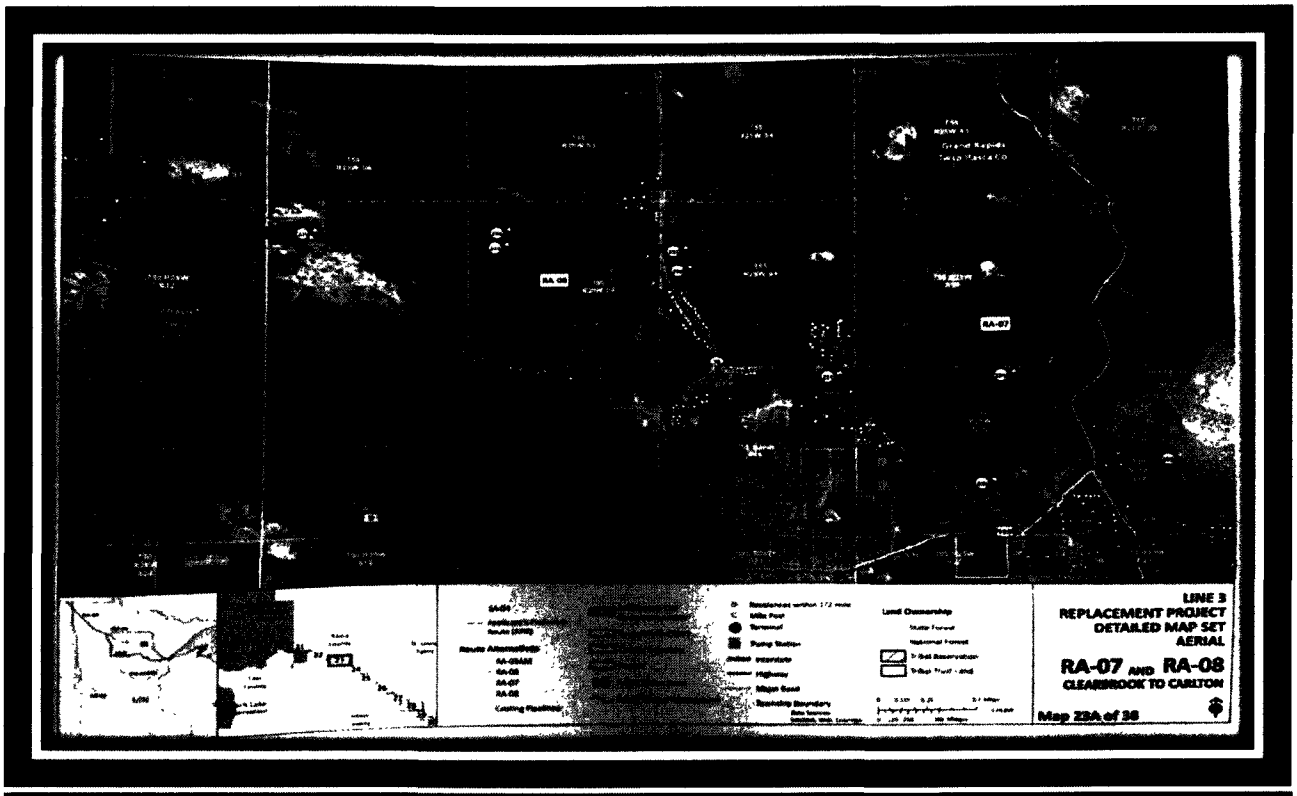
LINE 3
REPLACEMENT PROJECT
DETAILED MAP SET
AERIAL
RA-07 AND RA-08
CLEARBROOK TO CARLTON
Map 23A of 38

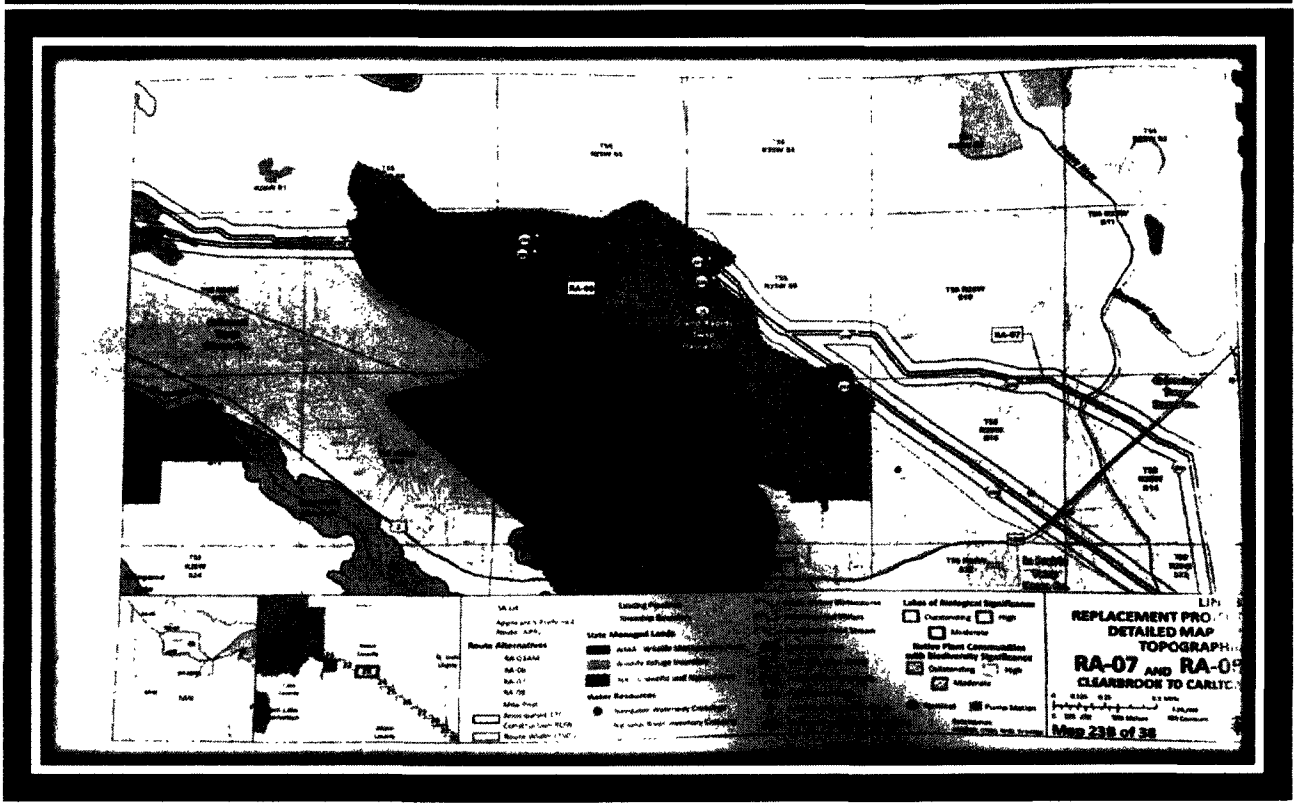
Map 23B of 38

Hello all,

For those who don't know me, I am a member of 350 Madison and my professional background is in communities' (primarily Indigenous peoples) engagements with industrial expansion, from academic, activist, and applied standpoints. Thank you very much for the opportunity to comment on the DEIS as I am very interested in what's happening around Line 3 and hope my perspective may be of use.

I am assuming that the plan going forward is a) to provide feedback to the Department of Commerce on how the document should be improved, and b) to see how the information it contains - or doesn't contain – can be used to argue that Line 3 should be removed, cleaned up, and not replaced. Please correct me if I am mistaken in either assumption.

Here is my critique of the DEIS:

I can only critique the social aspects of the document as this is my area. It is heartening that social impacts were considered and tribes consulted, but it is of course best practice to have such research conducted by someone who has training in and experience with SIA (Social Impact Assessment), and associated methodologies. (It saddens me that in this day & age, the assumption is still that "anyone" can do social science research.) Indeed, it is baffling that the Dept. of Commerce was charged with the EIS. It would be interesting (and probably revealing!) to find out why this choice was made.

Here are some gaps in the current SIA, based on the latest thinking in this field.

1) Identifying stakeholder groups. There has clearly been an extensive effort to identify tribes living nearby as well as those with treaty rights, which is laudable. However, an SIA also should solicit input from local NGOs with an interest in the area, including conservationist groups.

2) The task of an SI is to establish a "baseline" with data on where the community is right now, before the project, and then construct a "forward scenario" – what is likely to happen in the absence of any project. This should then be compared to projections of what is likely to happen under various project alternatives. The way to do this involves collecting data on socioeconomic indicators. This can be done through household surveys (asking families about their income sources & amount, typical household structure, assets, home ownership vs. rental, etc.), as well as through assessment of the community infrastructure (community centers, social services, main employers, proximity to hospitals, education levels & access to education, etc.).

3) There should also be an opinion survey with a large enough sample to be statistically significant. The survey should be designed and conducted by trained and experienced social scientists.

4) There is a need to recognize diversity within stakeholder groups – e.g. young vs. old, women vs. men. For the communities, this could be captured in a survey that separates responses and analyses them by gender, age group, socio-economic status, etc.

5) It would be interesting to include, as part of the survey, a "risk rating" – essentially, a table in which people list the risks they foresee and rate them according to both likelihood and severity.

6) The SIA needs to consider, separately, both the construction and the operations phases.

7) The construction phase should consider the following issues:

a. Will there be local recruitment or will the company temporarily bring workers from outside? If local recruitment, what skills/education are needed? What communities are workers likely to be recruited from?
b. If external recruitment, where will construction workers be housed? How will the company address a potential increase in sexual violence and trafficking associated with the "man camps" that come with construction?

8) Construction could also impact archeological sites. So, there should be an archeological survey conducted by trained professionals in collaboration with local knowledgeable community members. This has been called for on several occasions, as documented in Appendix P:
   a. A Traditional Cultural Places inventory was called for by Jim Jones, Cultural Resources Director of MIAC in a letter to DoC on 3/31/17.
   b. A letter from Honor the Earth states that at least 280 "significant areas of traditional cultural use and sacred sites" were identified through an EPA Technical Assistance for Communities contract. This letter also calls for an evaluation by MIA archeologists.
   c. A letter from the Mille Lacs Band calls for the EIS to describe how cultural items, if discovered during construction, will be preserved and repatriated as per the Native American Graves Protection and Repatriation Act.

9) For the operations phase, the main concern is potential impacts from a spill, particularly:
   a. human health consequences of a spill;
   b. who would pay for treatment;
   c. an inventory of locally accessible health care facilities and their capacity to treat health issues stemming from exposure to, e.g., benzene from a spill;
   d. impacts on fish & wild rice & hunting of a spill – this should involve an inventory of how much of people's diet those wild resources compose (there are ethnographic techniques to measure this);
   e. projection of economic impacts of a spill, e.g. on fishing, hunting, tourism, agriculture.

10) For both phases, an important way to project impacts is to look at other, similar projects. This information can be hard to find, but can come from a thorough review of published and, to the extent accessible, unpublished literature.

11) Many of the tribes brought up climate change as an associated issue of concern. One way to factor this in is through an estimation of the social cost of the carbon the pipeline would generate. Currently, the estimate is about $40 / ton (although this is widely seen as an underestimate).

12) The SIA mentions, but does not fully account for, cumulative impacts. For instance, wild rice beds could be examined for current levels of various pollutants, which would allow for a projection of whether the release of additional pollutants, such as through construction or a spill, would cause those levels to surpass acceptable thresholds.

13) The SIA should not be thought of as a one-off but as an ongoing process, continually revisited and re-assessed periodically. As part of that process, the communities should help to develop a Participatory Monitoring Plan. Apparently this is being negotiated for Line 3 in Canada, so there is no reason not to do so here as well. There should also be a Social Impact Management Plan in which tribal members and other community members help to decide how, whether from construction or in the event of a spill, the resultant social impacts would be managed.

14) There should also be consideration given to community grievance mechanisms. In other words, if there is a dispute between company and community, how will this be addressed? How will the

company address complaints, and how will third-party arbitration be carried out? What are communities' option for legal recourse?

15) It would be good to see some consideration of the concept of Free, Prior, and Informed Consent in the SIA, given that this is an internationally recognized (and UN-endorsed) best-practice approach when working with Indigenous communities.

16) There should also be some consideration given to the possibility of the community negotiating an Impact & Benefit Agreement with the company. There is a lot of precedent for this, too much to go into here. I can send guidance documents if people are interested.

17) Having an explicit Environmental Justice component to an SIA per se is, to my knowledge, rather unusual. I am checking with a colleague who is an expert in EJ and will hopefully be able to get more information on this soon.

Additional thoughts:

1) The EIA should consider ways that risks/impacts could be mitigated through project design, in addition to different routing options – such as, perhaps, though pipe thickness, choice of materials, etc. (If it does this in another section and I missed it, please let me know.)

2) It would be good to know what sort of financial assurance the company will be obliged to provide, such as insurance in case of a spill.

3) It will be important to liaise with other stakeholder groups to get their take on the DEIS. These include (but are not limited to) GLIFWC, tribal leadership, tribal legal counsel. I wonder whether the EPA's Environmental Justice division would be willing to comment on the DEIS. I have some contacts over there (although from a few years ago) that I could try and get in touch with if that would be useful.

4) RA-06, 07, and 08 would cross reservations and therefore require tribal authorizations and an environmental review from the BIA. This is why Enbridge does not want to use those routes.

I hope this critique is useful. Please let me know if you have any further questions I might help address.

Best,
Leah

BY PAUL VOGEL

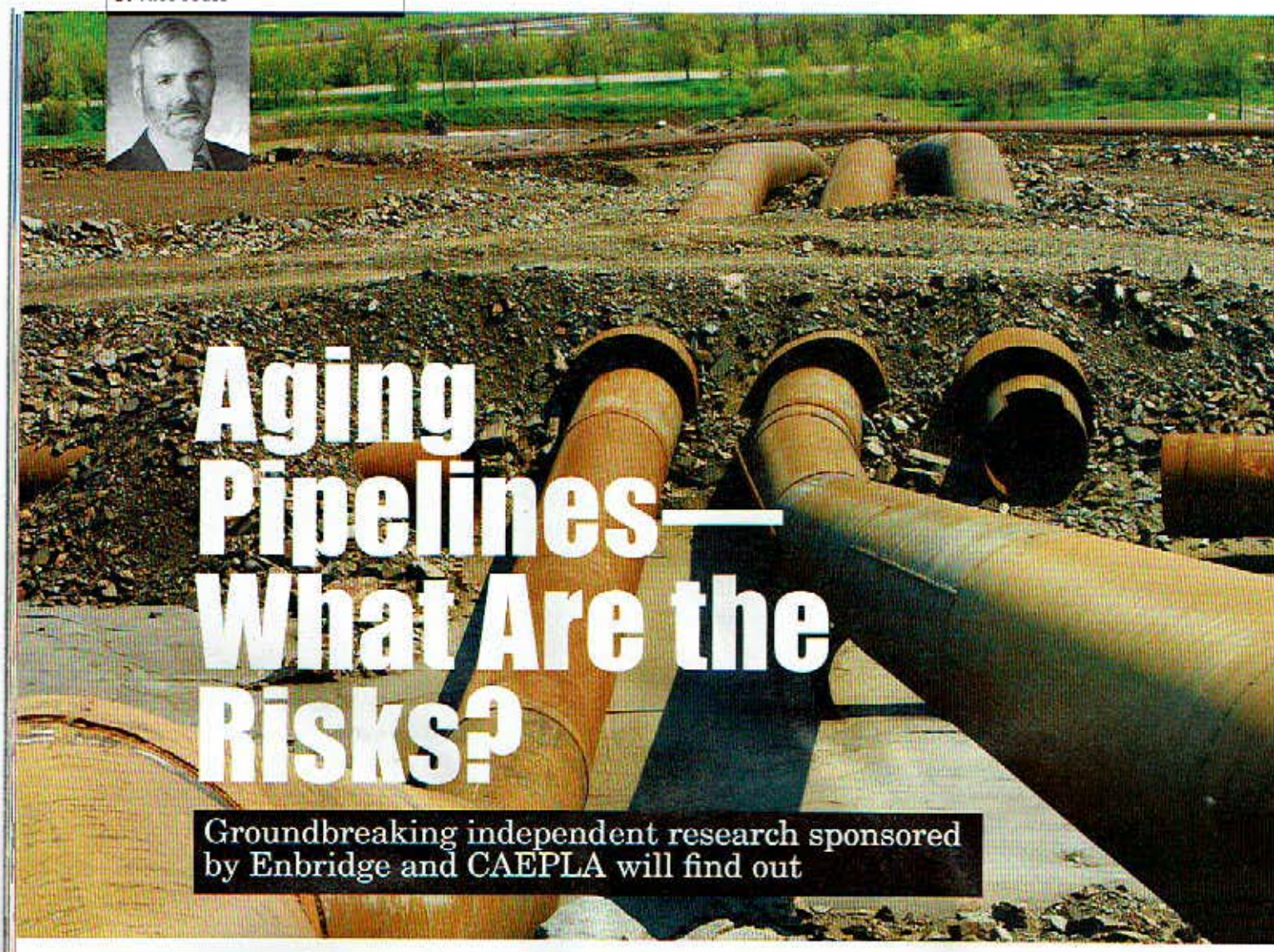

Aging Pipelines—What Are the Risks?

Groundbreaking independent research sponsored by Enbridge and CAEPLA will find out

Canada's nationally regulated oil and gas pipelines were originally constructed more than 50 or 60 years ago. Many of these pipelines are reaching the end of their useful economic life. The National Energy Board (NEB) has the regulatory authority to authorize pipeline companies to decommission or abandon these pipelines.

While the NEB has implemented a toll surcharge to generate funds for this purpose, the abandonment funding currently being generated will be sufficient only to accomplish removal of approximately 20 per cent of this pipeline infrastructure. Landowners across Canada who may be left with the remaining pipelines buried in their lands are becoming increasingly concerned about resulting interference with their agricultural operations, human and livestock health and safety risks, and potential future costs and liabilities.

In a decision released April 25, 2016, the NEB granted Enbridge Pipelines Inc.'s application for authorization to decommission its aging Line 3 pipeline in Western Canada and to replace it with a new Line 3 pipeline in an adjacent easement.

CAEPLA, the Manitoba Pipeline Landowners Association (MPLA) and the Saskatchewan Association of Pipeline Landowners (SAPL) jointly intervened in this proceeding to represent their landowner member interests with respect to Line 3 decommissioning. Enbridge's Line 3 decommissioning plan contemplates leaving the decommissioned Line 3 pipeline in place after internal cleaning while continuing cathodic protection to reduce corrosion rates as well as periodic monitoring for ground subsidence.

In responding to Enbridge's proposal, CAEPLA/MPLA/SAPL raised landowner concerns including definition of appropriate cleaning criteria; development of segmentation methodology to prevent the pipeline becoming a conduit for ground water and contaminants; and hazards

for agricultural equipment, people, machinery and livestock that could result from pipe collapse and ground subsidence.

Enbridge has acknowledged that the extensive disbonding of the Line 3 polyethylene tape pipe coating will render cathodic protection ineffective to prevent corrosion, and has estimated time to through-wall penetration at 25 to 50 years. Progressively greater agricultural surface loads increase the potential for pipeline collapse and ground subsidence. In addition to health and safety concerns and related costs and liabilities, topsoil loss upon ground subsidence would result in permanent long-term production losses.

In the negotiated settlement resolving landowner concerns with respect to the new Line 3 construction in March 2015, CAEPLA/MPLA/SAPL and Enbridge agreed to continue consultation on how to resolve these Line 3 decommissioning issues. CAEPLA/MPLA/SAPL and Enbridge subsequently concluded and filed with the NEB a further Settlement Agreement addressing Line 3 decommissioning.

Under the terms of this agreement, Enbridge acknowledges its liability with respect to decommissioned or abandoned pipelines and agrees to implement measures similar to active pipelines to maintain depth of cover, facilitate crossing with agricultural equipment and address subsidence/drainage issues.

Recognizing the considerable uncertainties related to anticipated Line 3 corrosion rates, pipe collapse potential and resulting implications for landowners, CAEPLA/MPLA/SAPL and Enbridge agreed to jointly commission and direct independent, third-party research at a Canadian university to study the impacts of decommissioning and abandoning pipelines in place, with a view to further defining the associated risks and consideration of alternative decommissioning/abandonment methodologies.

Enbridge is responsible both for the funding of this research project and for the costs of CAEPLA's participation, including CAEPLA's own independent consultants. As part of this agreement, Enbridge has also provided to landowners a prepayment to be applied on account of possible future decommissioning or abandonment damages.

In its decision granting Enbridge's application for Line 3 decommissioning, the Board references the CAEPLA/MPLA/SAPL – Enbridge Settlement Agreement:

"The Board views this Agreement as a positive initiative and found it to be a persuasive factor in favour of the reasonableness of Enbridge's decommissioning plan... The Board expects Enbridge to continue to consult with affected... landowners during the Decommissioning Activities and the Decommissioning Period and periodically reassess the constraints and hazards that limit pipeline removal to arrive at a solution that is agreeable to all parties, based on site-specific circumstances."

While authorizing Enbridge's Line 3 decommissioning, the Board expressly states:

"However, this does not mean that the Board will not order pipeline removal in a future case, should the evidence support it. It also does not mean that the Board will not order the removal of the Decommissioned Line 3 Pipeline in the future if circumstances change. This may occur where the benefits of removing certain segments of the Existing line 3 Pipeline outweigh the risks of the pipeline remaining in-place."

The CAEPLA/MPLA/SAPL – Enbridge jointly commissioned study represents part of Enbridge's required Line 3 decommissioning continuing landowner consultation. This research is now underway at the University of Calgary. It is an important first step to better defining the risks and liabilities of pipelines decommissioned and abandoned in place, and to developing acceptable methodologies to reduce these risks for landowners.

The final report that results from this research will assist landowners, the industry, and regulators in addressing these issues as Canada's aging energy pipeline infrastructure is removed from use. It is anticipated that this report will be filed with the NEB prior to Line 3 decommissioning and will then form the basis for regulatory approval for possible required changes to Enbridge's current Line 3 decommissioning plan. ●

First steps

The CAEPLA – Enbridge jointly commissioned study is now underway at the University of Calgary. It is an important first step to better defining the risks and liabilities of pipelines decommissioned and abandoned in place and to developing acceptable methodologies to reduce risks for landowners.

— Paul G. Vogel is a partner in the London, Ont., law firm of Cohen Highley LLP. He practises in the area of commercial litigation and environmental law.

2681

HISTORICAL SOCIETY

Farmers Independent

BAGLEY MINNESOTA

CLEARWATER COUNTY

VOLUME 76 NUMBER 38

FARMERS INDEPENDENT, BAGLEY, MINNESOTA 56621

THURSDAY, JULY 18, 1974

Equipment Damaged In Fire At Lakehead Pipeline Co.

A fire at Lakehead Pipeline Company at Clearbrook was purposely set by company officials to prevent the spread of gas from a leak.

A company spokesman said this was the safest way to deal with the situation as it kept the gas confined to the company property and posed no danger to the community. There was some damage to equipment, he said.

Company personnel and the Clearbrook Fire Department were on the scene. Sheriff's Deputies set up a road-block and no unauthorized persons were allowed on the site.

Gonvick and Bagley Fire Departments were put on standby alert but were not called to the scene.

Farmers Independent

BAGLEY, MINNESOTA (USPS 187-720) CLEARWATER COUNTY

VOLUME 83 NUMBER 9 FARMERS INDEPENDENT, BAGLEY, MINNESOTA 56621 THURSDAY, JANUARY 14, 1982

Pipeline Break Spills Oil On Farm Near Leonard

Raymond Ehlers farm two miles east of Leonard, was the scene of the latest pipeline break for Lakehead Pipeline Co. The break occurred Friday afternoon and spilled between 168,000 and 210,000 gallons of Canadian crude oil in a wooded and pasture area. The flow of oil was stopped quickly and Lakehead crews from Thief River Falls, Bemidji and Superior rushed to the scene to build dikes to contain the oil. The oil was confined to a small area and did not reach two small lakes in the area, it was later pumped into tankers and hauled to the Clearbrook station.

Pollution Control personnel also rushed to the scene to observe clean-up proceedures. The PCA also obtained the 40 foot section of pipe where the rupture occurred for testing to determine what caused the 34 inch pipe to burst. According to the PCA the line is now almost 20 years old and may be defective or damaged.

A new section of pipe was quickly installed to repair the break in the 34 inch line. The Pollution Control Agency will make tests on the broken section to try to find the cause of the rupture.

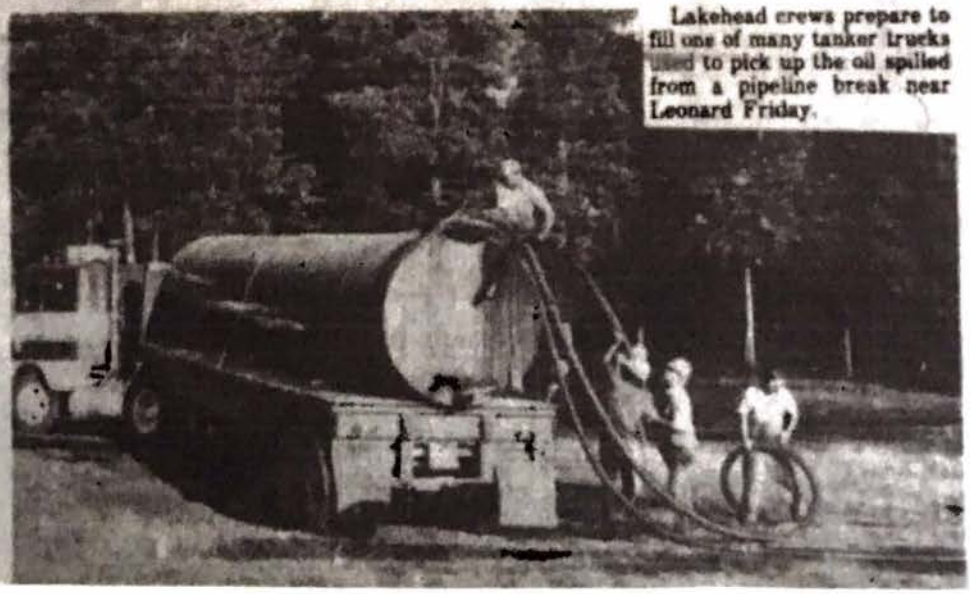

Lakehead crews prepare to fill one of many tanker trucks used to pick up the oil spilled from a pipeline break near Leonard Friday.

(U.S.P.S. 307-620)

25¢

The Leader-Record

CONTINUING THE GONVICK RECORD AND CLEARBROOK LEADER

Serving the Communities of Clearbrook, Gonvick, Gully, Leonard and Trail

Vol. 74 Number 40

Thursday, January 21, 1982

Lakehead Pipeline Pumping Again After Last Week's Rupture

With the roar of a low-flying jet that didn't fly away, the 34 inch crude pipeline ruptured about five miles east of Clearbrook Wednesday evening, July 21. The high pressure Lakehead line burst and blew a hole 15 feet wide and 20 feet deep in the roadside and sprayed oil high in the air covering nearby trees and brush with the black crude which eventually flowed into the pasture on the Lawrence Westrum property and into nearby Ruffy Brook.

Mrs. Devona Westrum was taking clothes from the line in the farm yard about one-eighth mile away when the break occurred. "There was no explosion, it sounded more like a jet plane that just didn't fly away," she said. "I looked up and could see oil spurting 100 feet or more in the air."

Lawrence Westrum said there were ten head of cattle and a horse in the pasture near where the break occurred. Telling about it in the farm house that evening, he said, "Those cattle took off and I haven't been able to find them."

The cattle and the horse were found the next day in a

A small group of spectators inspected the hole blasted in the county road when the oil line ruptured. The hole is nearly 20 feet wide and 16 to 18 feet deep. The hole was still full of oil and flowing slightly when the picture was taken Wednesday evening. Notice the flattened vegetation caused by the heavy flow of oil.

Gas leak at Clearbrook

A leak developed in a natural gas pipeline at the Lakehead Pipeline Co. at Clearbrook on Tuesday night.

The accident was reported to the Clearwater County Sheriff's Dept. and the Clearbrook Fire Department at 8:58 p.m.

Roads leading to the station were blocked off to the public and the Clearbrook Fire Department responded to the call.

Natural gas is a liquid when under pressure (in the pipeline), but turns to a gas when released into the air. When this happens the escaping gasses were ignited by the pipeline crew to burn off the leaking gas and prevent it from drifting off of the premises.

The Clearbrook Fire Dept. was standing by at the sight of the fire but was not called upon as the burning of the escaping gas was controlled by the Lakehead staff.

Lakehad Station Manager, Tom Gray, stated on Wednesday morning that they had not yet determined the cause or exact location of the leak. He also stated that the gas pipeline was shut down and that they had lost some pumping units and equipment in the fire.

Neighboring fire departments in Bagley and Gonvick were called to stand by but were not called out.

Overview given

Farmers Independent

BAGLEY, MINNESOTA

CLEARWATER COUNTY

VOLUME 83 NUMBER 36

FARMERS INDEPENDENT, BAGLEY, MINNESOTA 56621

THURSDAY, JULY 29, 1982

2681

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This is the rupture in the 34 inch line that blew the hole in the roadside and spewed oil over nearby trees and pasture land.

July 1982

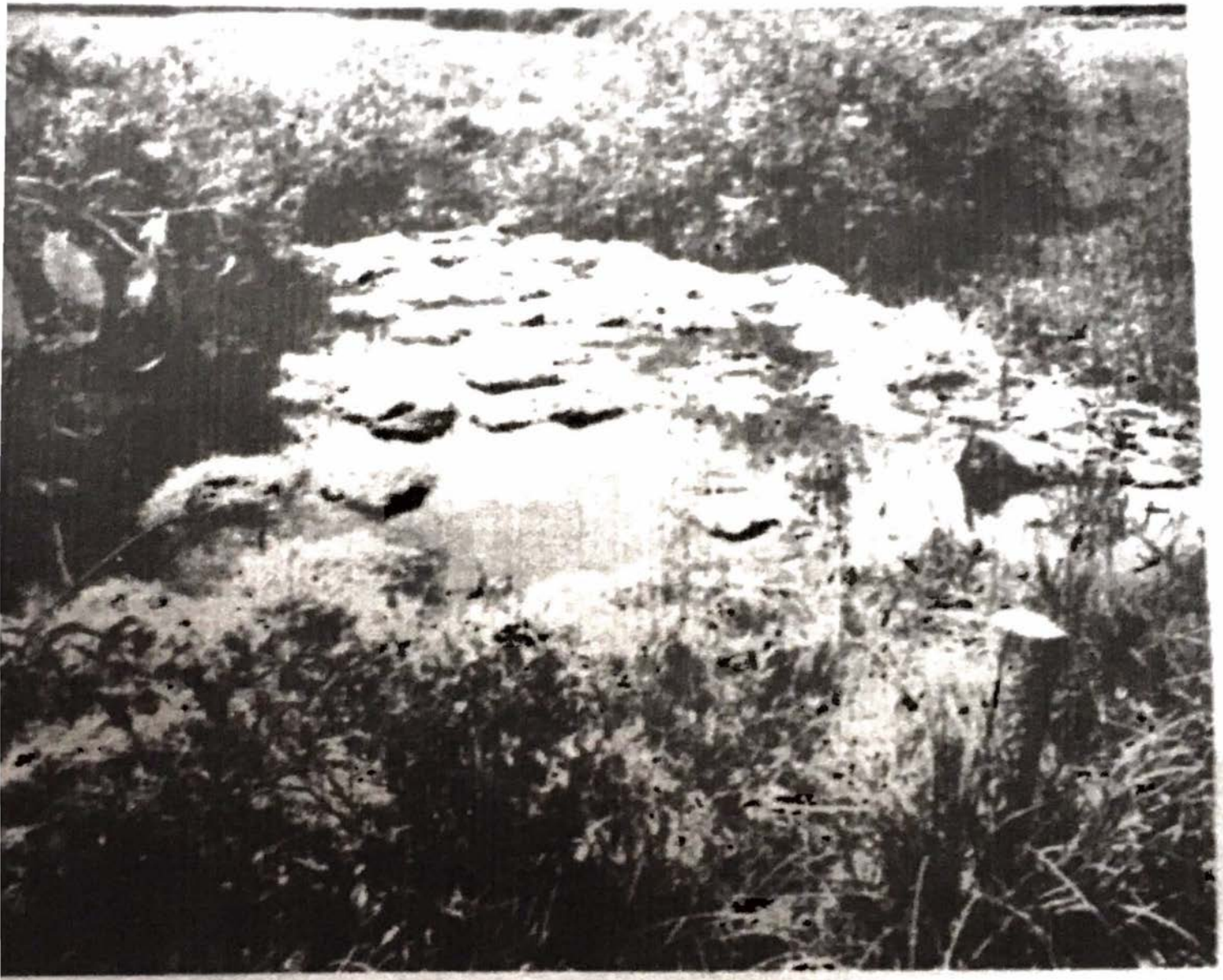

Pipeline crews and Pollution ontrol agents constructed raw and wire mesh dams at nearby Ruffy Brook to prevent oil flowing further down the stream into Clearwater River.

Pipeline Break

(Continued From Page One)

tinue to watch the clean-up

Pipeline Break

(Continued From Page One)

tinue to watch the clean-up efforts and monitor progress. The PCA role will continue for some time, according to Newton.

Newton added that there are still some small patches of oil along Ruffy Brook and that these will be soaked up, but that no oil was reported to have reached the Clearwater River. He added that lakes and streams can absorb small amounts of oil without any harm.

Lind said that Lakehead would continue the clean-up not only at the main spill area but at the Westrum farm yard as well. "We at Lakehead are all Minnesotans too," he said. "We don't want to see the mess any more than the area people and we always seem to get bad publicity after a line break or spill. Then he added with a laugh, "Nobody mentions the millions of mosquitos that were killed."

Levi, Andrew (COMM)

From: MacAlister, Jamie (COMM)
Sent: Tuesday, July 11, 2017 10:14 AM
To: MN_COMM_Pipeline Comments
Subject: FW: More comments
Attachments: Bob Merrit Appendix D.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280, Saint Paul, MN 55101
P: 651-539-1775

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From: Nicolette Slagle [mailto:nicolette.slagle@gmail.com]
Sent: Monday, July 10, 2017 11:43 PM
To: MacAlister, Jamie (COMM) <jamie.macalister@state.mn.us>
Subject: More comments

Hi Jamie,

Please see the rest of my comments.

Nicolette Slagle

Only after the Last Tree has been cut down,
Only after the Last River has been poisoned,
Only after the Last Fish has been caught,
Only then will you find that
Money Cannot Be Eaten.

Appendix A
Robert Merritt Sandpiper
Testimony

From: Bob Merritt [mailto:bob.merritt7160@gmail.com]
Sent: Monday, March 17, 2014 6:59 PM
To: Hartman, Larry (COMM)
Cc: Willis Mattison
Subject: Sandpiper Pipleline

Mr. Hartman:

Were you able to obtain a complete copy of my Park Rapids testimony and all of the supporting documents? I was a bit confused during the presentation. I am used to a different format and assumed the persons behind the table were PUC Commissioners. That is why I provided my copies to them. It would be helpful in the future to explain when no PUC Commissioners are in attendance. Little did know that I was speaking to the pipeline officials. No wonder they appeared uninterested in my testimony and did not look at the figures to which I referred.

If you did not receive a complete copy of my information including yellow highlighted sections of the reports I referenced, please advise me. I would also like to know if you do have a complete copy.

I have updated my map to identify most of the irrigated parcels and highlighted locations of Park Rapids and Lamb Weston wells. I also increased its resolution; it is attached. All of Park Rapids and Lamb Weston wells are down gradient of any spill within the watershed. Spills will mobilize rapidly because of the vast number of high capacity irrigation wells between Park Rapids and the proposed pipeline.

During your opening remarks you identified a number of items that are used to determine suitability of an alignment. If I recall correctly, two of them were natural resources and proximity to towns. The proposed Sandpiper Pipeline has the potential of significant impacts to both. A spill like Embridge's in Bemidji will have greater consequences. It could greatly impact or even destroy a premium trout stream (Straight River) and it could reach the public water supplies of Park Rapids. Additionally, the high capacity irrigation could greatly exacerbate the situation, mobilizing the spill flow speed and area of influence. The attached map also identifies a major number of other wells near or down gradient of the proposed alignment. These are mostly in the surficial aquifer and are individual or small corporate supplies. A spill in these soils could have dire consequences to those individuals.

Alternative routes should be identified that do not contain such highly sensitive geologic conditions. Soils should be primarily till based which contain a substantial amount of clay; clay soils will slow and absorb a spill before disastrous affects will occur. The Pineland Sands Aquifer system clearly does not meet these criteria.

Please include this email and attached map to the Sandpiper docket information. If I have to take other actions to ensure that can transpire, please advise me.

Bob Merritt, P. G.
My address is 1241 Minnesota Avenue My
phone number is 218 850 7160

Sandpiper Pipeline Hearing
Park Rapids, MN
March 12, 2014

Testimony by Bob Merritt
B.S. and B.A. Geology
M.S. Hydrology
Minnesota Licensed Professional Geologist
MN DNR Area Hydrologist 32+ years`
Work Area Included Pineland Sands/Straight River Basin Outwash Aquifer in Becker and Hubbard Counties

First, I want to identify a problem I encountered while trying to review this project. I requested a GIS (Geographic Information Systems) layer of the pipeline alignment from the PUC. The PUC informed me that this information was Embridge work product which is exempt from the Freedom of Information Act. I assume the exemption was intended to protect public facilities from attack. Yet all existing pipelines are identified in paper and digital form on USGS topographic maps and Minnesota county maps. Additionally, with the GPS units available today, it is quite easy to map public utilities such as pipelines and processing plants. To withhold crucial information for my review hampered my analysis. I am still unsure of the exact proposed alignment and had to approximate it in one of my maps.

To me, it is ludicrous for a foreign company to invoke protection via exemption of the Freedom of Information Act under these circumstances; they are withholding crucial information for review with no real reason other than to hamper public review.

There have been 3 Major Studies of the glacial outwash plain comprising the Straight River basin and surrounding area:

- Helgsen, J.O., 1977. Ground water Appraisal of the Pineland Sands Area, Central Minnesota, USGS Water Resources Investigations Report.

- Stark, J.R., Armstrong, D.S, and Zwilling, D.R.. 1994, Stream – Aquifer Interactions in the Straight River Area, Becker and Hubbard Counties, Minnesota, USGS Water Resources Investigations Report 94-4009.

- Kruse, G and Frischman, J, 2002, Surface Water And Ground Water Interaction And Thermal Changes In The Straight River In North Central Minnesota, Minnesota Department of Natural Resources.

I was the main DNR person who identified the initial concerns leading to the Stark study, and I participated in both Stark's and the MN DNR investigations.

Helgsen and Stark described the geology of the area. Basically it is the intersection of at least 3 glacial lobes that ended in the area (Stark Figure 3). Glacial outwash is the result of glacial materials running off during glacial melting and retreat, forming sand and gravel fans interspaced with lake clay materials formed when lakes existed within

the area. The outcome is a series of 3 primary aquifers (Stark Figure 2). Stark's figure is generalized and does not entirely represent the aquifer configurations. The top aquifer is surficial and open to the atmosphere. The two lower aquifers are separated by clayey layers, but the layers thin and aquifers interfinger causing interchange between them. There is substantial evidence that the aquifers are hydraulically connected and water moves both upward and downward.

Because of their high degree of permeability, allowing rapid infiltration and movement, glacial outwash aquifers are some of the geologic environments most susceptible to contamination.

Helgesen estimated the aquifer groundwater hydraulic conductivities, a measure of ground water movement, between 320 and 630 ft/day. This is a rapid degree of ground water movement. Stark postulated that this area's groundwater movement is even greater than other similar aquifers within the state.

The area is covered with high capacity irrigation wells, which cause cones of depression, altering flow paths and moving substantial water towards the systems. (GIS 2010 Aerial Map).

Helgsen and Stark published potentiometric maps of the surficial aquifer (Helgsen Figure 7 and Stark Figure 15). I supplemented Helgsen's map and interpreted Stark's map to identify flow paths (red arrows). Water rapidly flows from the aquifer to the Straight River. The river gains at least ½ its flow from the aquifer. The hills to the north of the sand plain, the Itasca Lobe End Moraine, and the ground moraine provide about 25% of the aquifer's recharge. This is likely an even greater percentage closer to the Itasca End Moraine in the Park Rapids area. A pipeline leak in the Itasca End Moraine will end up flowing to Park Rapids. (Stark Figure 3)

Leaks within the aquifer will either end up in the Straight River or move towards the Park Rapids and the Potato Plant locations. High capacity pumping of these facilities along with irrigation wells near and down gradient of a spill or leakage has significant potential to incorporate petroleum products into the aquifer. Irrigation of the contaminated water will result in agriculture field contamination.

A leak along any portion of the pipeline from the Itasca Moraine north of the outwash sand plan through the entire plain has the potential to rapidly and permanently contaminate the aquifer. The surficial aquifer has the highest potential, but as noted earlier, all of the aquifers are interconnected. As a result, contamination of all the aquifers is a possibility. Once petroleum attaches to the sand and gravel grains, it is virtually impossible to remove the product. Each time rain, snowmelt or irrigation infiltrates through the aquifer, petroleum will be mobilized, causing ongoing contamination.

The surficial aquifer is used for irrigation and water supply. Surrounding wells already have high nitrates from the irrigation because of the high infiltration rates. Though

nitrate application through irrigation systems has been greatly improved by application only during the time plants require the nutrient, a Department of Agriculture study showed that approximately 60% of the nitrate is lost because of rapid infiltration. Once the nitrate passes through the root zone, it ends up in the surficial aquifer.

Because of nitrate contamination, Park Rapids will have to replace water supply wells. Osage had to in the past. Perham has had similar problems; it has the same geologic conditions. Petroleum will be even more damaging, causing loss of water supplies to individuals and communities down gradient of the leak. Straight River, the most important trout stream in Northwestern Minnesota, could also be severely affected due to petroleum contamination.

I urge you to reconsider this alignment and restrict pipelines within this highly sensitive geologic area. At the very least, I urge delay of your decision to allow further analysis with accurate data freely supplied by Embridge.

Sandpiper Pipeline Park Rapids Area
2010 Aerial Photo

2680

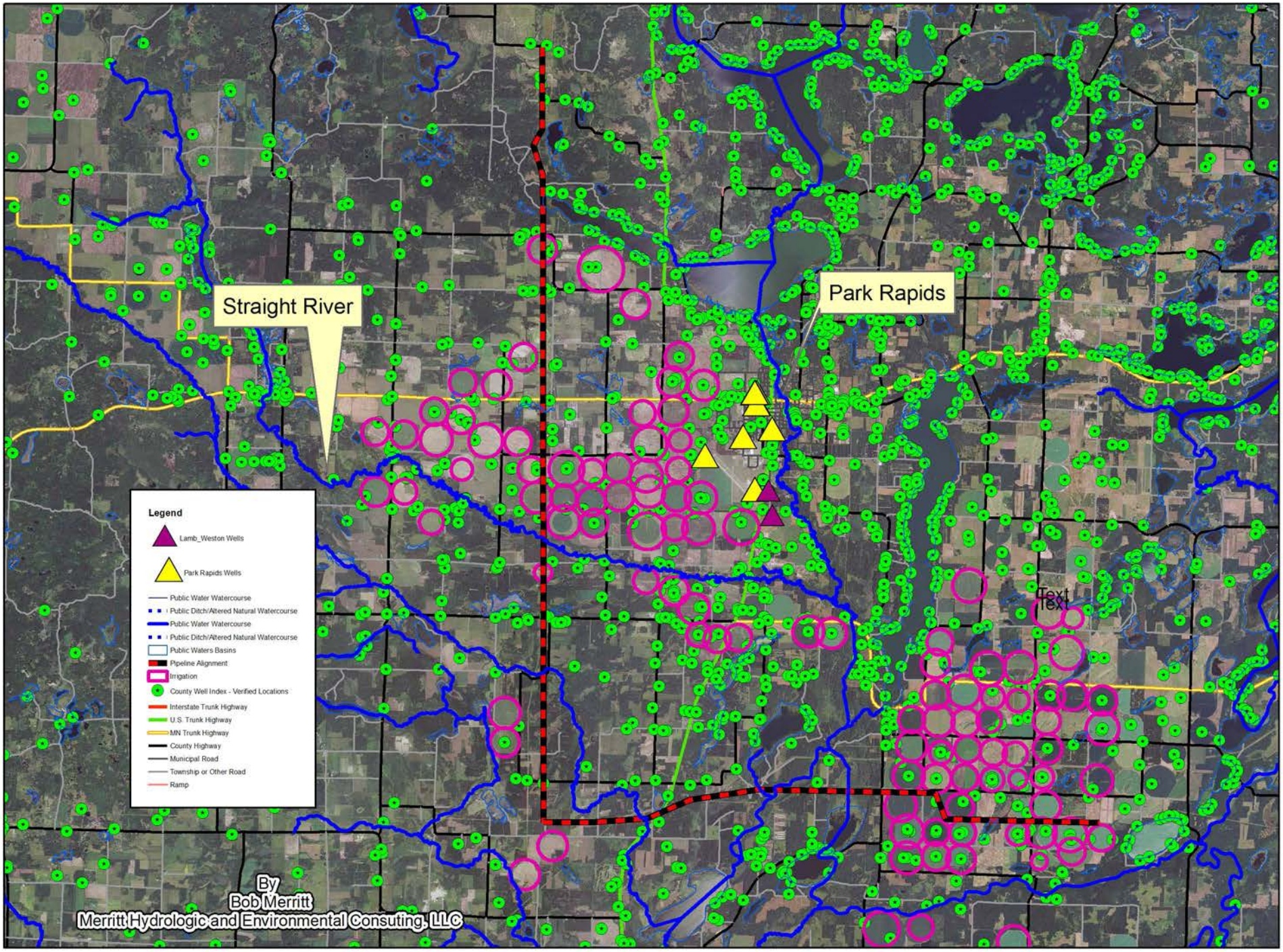

0 0.5 1 2 3 4 5 6 7 8 9 10 Miles

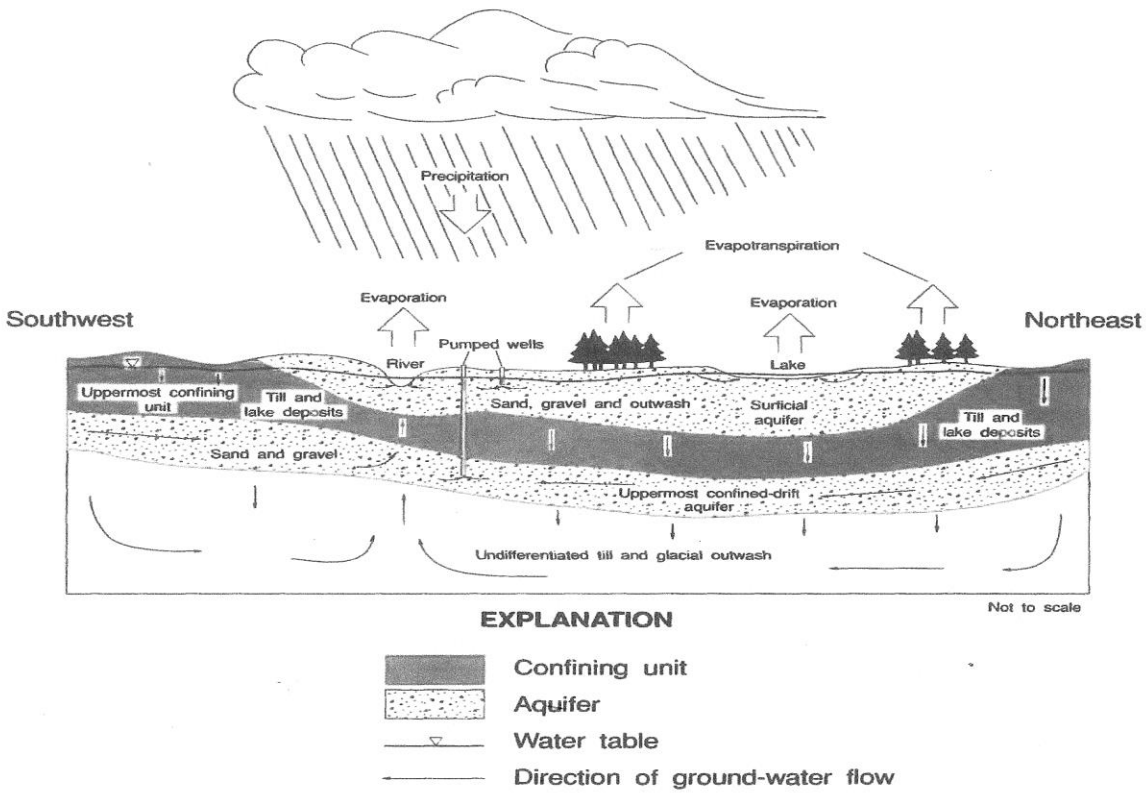

Figure 2.--Generalized hydrologic system of the Straight River investigation area.

From Stark 1994

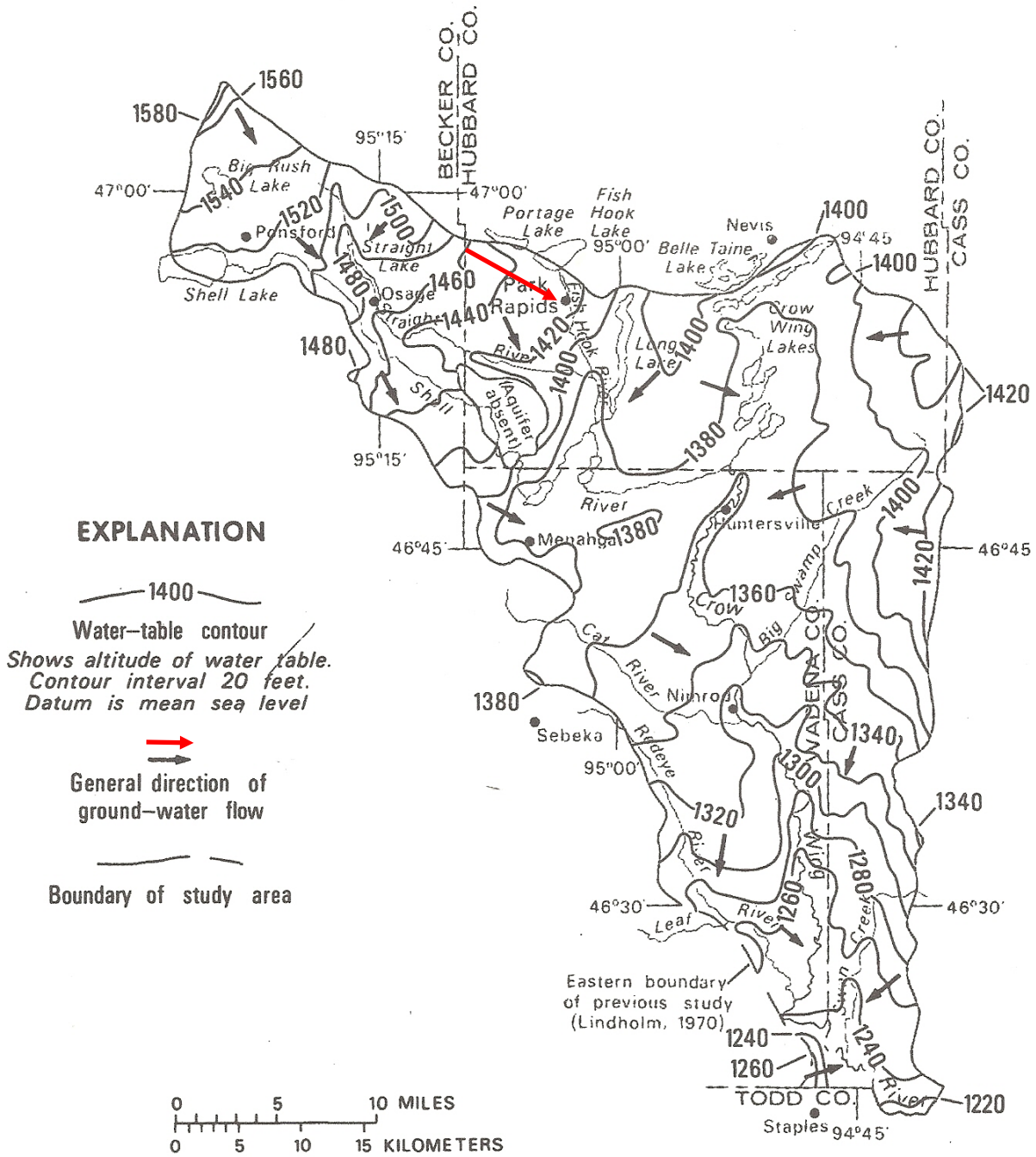

Figure 7.--Water-table configuration and general direction of ground-water movement.

From Helgsen 1977

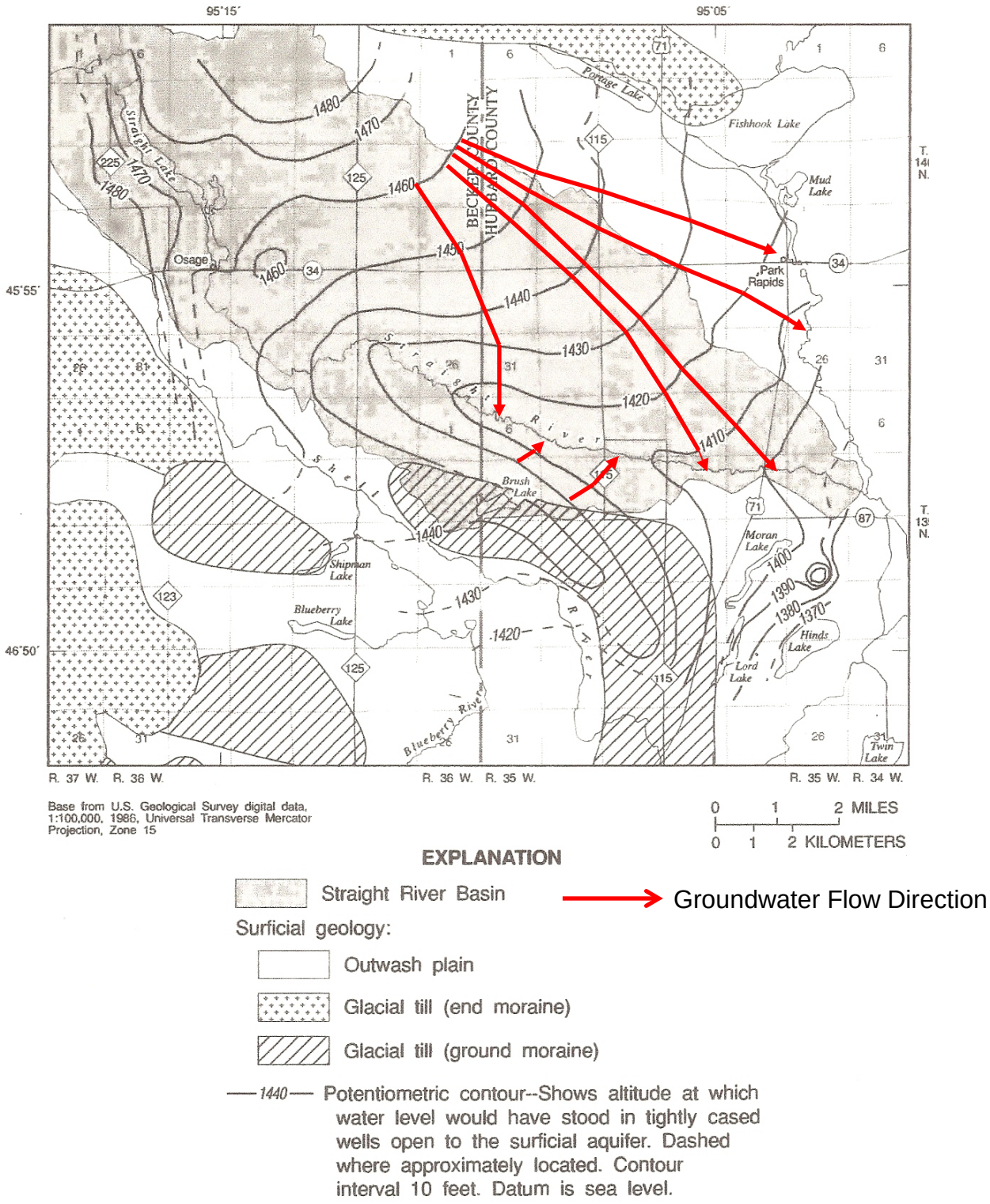

Figure 15.--Altitude of potentiometric surface (water table) of surficial aquifer during August 1988.

From Stark 1994

Sandpiper Pipeline Hearing
Park Rapids, MN
March 12, 2014

Testimony by Bob Merritt
B.S. and B.A. Geology
M.S. Hydrology
Minnesota Licensed Professional Geologist
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Appendix B
DNR Sandpiper Letters

2680

Minnesota Department of Natural Resources
500 Lafayette Road • St. Paul, MN • 55155-40_

Minnesota DEPARTMENT OF NATURAL RESOURCES

August 21, 2014

Burl Haar, Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul MN 55101-2147

Re: Sandpiper Pipeline Project – System Alternatives
PUC Docket Numbers: PL-6668/CN-13-473 (Certificate of Need)
PL-6668/PPL-13-474 (Route Permit)

The Minnesota Department of Natural Resources (DNR) previously provided input regarding the Pipeline Routing Permit Application and scoping for the Comparative Environmental Assessment (CEA) for the Sandpiper Pipeline Project. During the comment periods ending April 4, 2014 and May 30, 2014, the DNR requested further analysis of a number of routes and route segments in the relative vicinity of the Preferred Route proposed by the North Dakota Pipeline Company. The DNR also attended the August 7, 2014 PUC Agenda Meeting regarding routing alternatives. We appreciate the Public Utilities Commission (PUC) determination that routes identified in DNR letters will be further analyzed in the CEA. The following comments are submitted regarding the topic of "system alternatives," generally defined as routes that do not share one or both of the Preferred Route Clearbrook, Minnesota and Superior, Wisconsin terminals.

Though the DNR review did not focus on system alternatives, our previous letter stated that the DNR "supports the efforts of state and federal resource agencies to encourage analysis of topics including various routes in the event of a leak, leak risk analysis, and reducing impacts to wetlands, lakes and streams." The Preferred Route for the Sandpiper Project is proposed in a region of the state that contains a concentration of important lakes for fisheries, trout streams, sensitive aquifers, pubic conservation lands, and mineral and forestry resources. The DNR is also concerned about "greenfield" routing along areas without previous disturbance.

Considering the current demand for transportation of oil from North Dakota and the Enbridge Line 3 project proposed to follow the Sandpiper Pipeline route, the Sandpiper route could become a new corridor for multiple pipelines. Therefore, the DNR encourages the PUC to strongly consider analysis of one or more system alternatives having fewer environmental and natural resource impacts than the Preferred Route in addition to route alternatives approved for inclusion in the CEA. Environmental review of one or more system alternatives should be equivalent to the analysis conducted for route alternatives. If a system alternative is included in the scope of an environmental review document, the DNR encourages interagency coordination so that the DNR can provide data regarding a new corridor prior to environmental review document publication.

Thank you for the opportunity to provide these additional comments regarding system alternatives.

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Sincerely,

Jamie Schrenzel
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cc: Larry Hartman, Minnesota Department of Commerce
Patrice Jensen, Minnesota Pollution Control Agency
Sara Ploetz, Enbridge

Minnesota Department of Natural Resources
500 Lafayette Road • St. Paul, MN • 55155-40_

January 23, 2015

The Honorable Eric Lipman
Administrative Law Judge
600 North Robert Street
P.O. Box 64620
St. Paul, MN 55164-0620

Re: Certificate of Need for the Sandpiper Pipeline Project
Public Utilities Commission (PUC) Docket Number: PL-6668/CN-13-473
Office of Administrative Hearings (OAH) Docket Number: 8-2500-31260

Dear Judge Lipman:

The Minnesota Department of Natural Resources (DNR) has reviewed the Sandpiper Pipeline Comparison of Environmental Effects of Reasonable Alternatives submitted by the Department of Commerce Energy Environmental Review and Analysis (EERA) unit in December 2014. The DNR has also reviewed the Rebuttal Testimony of Adam J. Heinen submitted by the Minnesota Department of Commerce Division of Energy Resources (DER) January 6, 2015 and the conclusions of the Surrebuttal Testimony submitted by Adam J. Heinen January 21, 2015. The following comments are submitted regarding these documents and DNR review of the possible natural resource impacts of System Alternatives for the Sandpiper Pipeline Project. A comment summary is given followed by additional supporting information.

Comment Summary

- The EERA prepared the Comparison of Environmental Effects of Reasonable Alternatives, covering a multi-state geographic area, addressing complicated questions with a limited amount of preparation time. The EERA also carefully followed the direction of the Public Utilities Commission (PUC) Order requesting the document. The DNR recognizes that the current comparison of System Alternatives is a somewhat unique situation and that the PUC requested analysis of environmental impacts through this Certificate of Need process to further inform the record. Further analysis of System Alternatives helped address DNR comments regarding System Alternatives. The DNR also met with EERA and submitted data sources to provide assistance with preparation. We appreciate the opportunity to provide data and input.

- In general, due to the limited scope requested for this document, the broad geographic area, and challenges related to the type of data and analysis used, DNR was not able to use this document alone to identify the least environmentally impacting System Alternatives. Examples will be provided below of the type of information that would further inform the Certificate of Need decision for context when considering the most reasonable and prudent System Alternative.

- Using the report in combination with DNR resources and professional judgment, with a limited amount of review time, the DNR is able to provide input regarding the least environmentally impacting System Alternatives.

- Within Minnesota, more southern routes (south of I-94 corridor) have less concentration of natural resources (regardless of length) within the 2-mile corridor. Therefore, there is a greater opportunity for avoidance of resources with the more southern System Alternatives. While the DNR lacks the expertise to undertake a market or economic analysis of the southern routes. From a natural resource perspective, the more southern routes appear to be feasible and prudent System Alternatives that merit consideration.

- MN Rules 7853.0130, Subpart B requires consideration of reasonable and prudent alternatives to proposed facilities as part of certificate of need decisions. Testimony of Adam J. Heinen submitted by the Minnesota Department of Commerce Division of Energy Resources (DER) January 6, 2015 and January 21, 2015 state that only System Alternative – 03 (SA-03) and System Alternative – Applicant (SA-Applicant) are reasonable based on the focus of the DER review. Note that Modified System Alternative – 03 is also discussed, but is understood to be addressed in the routing docket and will not be further discussed in this comment letter.

- The DNR conducted a focused review of SA-03 and SA-Applicant. When only comparing the two routes found reasonable by DER, SA-03 and SA-Applicant, SA-03 appears to impact less natural resources than SA-Applicant. SA-Applicant features that would incur impacts greater than those identified for SA-03 are: forest and wetland acreage, river and stream segment crossings, and crossings of public lands. Cultivated lands and occurrence of already-impaired waters are greater along SA-03, indicating the developed state of lands along this route. Our analysis is described further in the Supporting Information section of this letter.

- Minnesota Statutes 116D.04, Subdivision 6 prohibits state actions that are likely to cause pollution, impairment or destruction of natural resources as long as there is a feasible and prudent alternative. The statute also clarifies that economic considerations along shall not justify such an action. As SA-Applicant and SA-03 are both considered reasonable, environmental impacts of routing from a natural resource perspective would be a key criterion in the decision regarding the most reasonable and prudent System Alternative.

- Testimony submitted by Adam J. Heinen with the DER January 21, 2015 suggests analysis of SA-03 and SA-Applicant in the routing docket. The routing docket would include a level of environmental data helpful in comparing these two routes, along with Route Alternatives already scoped into the routing process such as Modified SA-03. For example, a Comparative Environmental Analysis (CEA) would likely include an estimated alignment within a larger route. If further analysis is completed, the DNR requests the opportunity to provide input and review a draft of the environmental analysis document.

- The DNR suggests that the Sandpiper Pipeline Project Certificate of Need and/or Routing dockets include consideration of financial assurance. The state requires financial assurance for large projects to mitigate impacts to the state and environment in the event of an accident, unplanned closure, or at the end of life of the project. Projects such as large mines and landfills must provide financial assurance to protect against the potential for expenditure of public funds. Large crude oil pipelines may arguably have some of the same environmental and financial risks and may benefit from some form of financial assurance for pipeline construction, operation and maintenance, spill response and decommissioning. The DNR can provide additional background regarding examples from regulation of mines in Minnesota.

Supporting Information

The following section provides these categories of supporting information:

- Additional Natural Resource Topics for Consideration
- Comparison of Environmental Effects of Reasonable Alternatives Section Specific Comments
- Full Length Comparison of SA-03 and SA-Applicant
- Minnesota-Specific Comparison of SA-03 and SA-Applicant

Additional Natural Resource Topics for Consideration

The DNR's review indicates that there are additional natural resource topics that have not yet been addressed but should be to provide a more thorough comparative analysis of System Alternatives. The discussion below provides input and context for the Certificate of Need in addition to the Comparison of Environmental Effects of Reasonable Alternatives record regarding natural resource impacts and System Alternatives:

Impacts of Previously Disturbed vs. Undisturbed Areas

The amount of impacts to undisturbed lands was not reviewed in the Comparison of Environmental Effects of Reasonable Alternatives. Natural resource impacts in existing corridors and cultivated lands will be significantly less than impacts to intact forests, grasslands and wetlands. Existing corridors and cultivated lands are already disturbed by the mixing and compaction of soils, application of pesticide treatments, removal of natural vegetation, and introduction of invasive species. New pipeline corridors through intact landscapes will introduce negative impacts to the existing hydrology, plant communities, and wildlife.

Forests are especially susceptible to fragmentation. A pipeline corridor would create a long, linear break in the forest canopy. Fragmentation results in changes to environmental conditions (light, wind, moisture) that alter the plants and animals using the area. The new plant communities of grass and shrubs will alter the species composition and population of birds, small mammals and large mammals.

Area sensitive avian species that require large un-fragmented blocks of forest for nesting will avoid the deforested corridors. The end result is a loss of nesting habitat that, depending on species, includes the direct forest loss and adjacent habitat that extends a considerable distance from the deforested corridor. Construction corridors also create paths for the introduction of invasive species that reach far into formerly protected forest and wetland interiors.

The Comparison of Environmental Effects of Reasonable Alternatives does not acknowledge that construction through undisturbed areas will result in habitat loss, conversion, degradation, and fragmentation. Rather, the document focuses more on construction impacts to agriculture than on impacts to undisturbed or less-disturbed habitat. The document suggests that, while agricultural activities can resume after pipeline construction, impacts (e.g., soil compaction, soil mixing, impact to prime and unique farmland) can be long lasting and permanent in those areas. This is an important consideration, particularly for social and economic reasons. However, the report should also recognize that agricultural use - by its very nature- has already introduced soil impacts. Further, the report should acknowledge that these impacts are even more environmentally significant when introduced in previously undisturbed natural areas. Best management practices (BMPs) such as topsoil stripping and soil ripping to loosen compaction are measures commonly used in disturbed areas. However, these BMPs are not considered standard, and often are not practical, in undisturbed areas. If these practices are not applied with equal diligence in natural areas, the natural areas become more susceptible to degradation such as compaction, erosion, and colonization by invasive plants.

System Alternative Length and Scope of Analysis

Readers may misunderstand the relationship between the System Alternatives' total length of the pipeline and total impacts. For example, readers may mistakenly conclude that more length of pipeline necessarily means more potential impact. If oil is transported to Joliet, Illinois, there is a greater System Alternative distance than transporting oil to Superior, Wisconsin. Routing to Joliet could be understood as therefore resulting in more natural resource impact. However, it would be reasonable to assume that there is potential for other environmental impacts (leak risk) or cumulative impacts resulting from transportation of oil from Superior, Wisconsin on to other locations from the increased delivery of oil.

Recently the DNR has participated in a comment period to the Great Lakes Commission regarding the potential delivery of oil resources through the Great Lakes and St. Lawrence River Region. Consideration of how oil is transported (currently and in the future) out of Superior, Wisconsin is important context for review of the Comparison of Environmental Effects of Reasonable Alternatives document. The DNR recognizes that quantifying this analysis would likely be challenging.

Changes in Topography

Topographic relief comparisons have not been completed. Topographic relief comparisons between the various system alternatives are important to understating potential impacts between systems alternatives for the following reasons:

1. In hilly terrain, groundwater generally travels laterally more than on flat terrain, has higher potential for surface discharge sites/springs, and creates more soil texture stratification. Changes in topography are also commonly associated with river/stream valleys. Under these conditions, oil spills can spread faster than on flatter terrain and have a high risk of affecting streams, rivers, wetland, terrestrial habitats and associated landscape functions.
2. Areas with more relief/topography will involve additional disturbances. Construction of one or more pipelines through these areas will require rights-of-way (ROWs) and workspaces that are much wider than those used in other areas. Erosion concerns, maintenance needs, and risk of invasive species introduction would also be greater.

Water Resources

SA-Applicant parallels and crosses many streams, rivers, flowages, lakes and wetlands within the northern lakes and forested ecoregions. These are generally some of the highest quality recreational and habitat water resources in the state. The DNR has a number of concerns regarding pipeline impacts and would prefer alternative routes or system alternatives that avoid these valuable waters.

The unimpaired waters along the more northern routes are highly vulnerable to degradation by impacts of construction and potential spills. This becomes a greater concern if additional emergency shut-off valves are not located near these sensitive resources. It is also noted in the document that the most sensitive locations for potential spills include those areas that are proximate to surface waters such as lakes, wetlands or streams or where groundwater is near the surface. The remoteness of the pipeline route in some areas in northern Minnesota exacerbates this problem, should a spill or leak occur.

Though more streams are crossed in southern areas, the analysis does not consider the quality of the streams crossed as compared to the other alternatives. SA-Applicant crosses a large number of lakes, streams and wetlands within the northern lakes and forested ecoregions. These are generally some of the highest quality recreational water resources in the state. This can be observed within MPCA's ecoregion concept for evaluating nutrient and trophic condition criteria for surface waters as well as other aquatic habitats that have been evaluated by the MPCA and DNR statewide for transparency, floristic quality, aquatic plant richness and fish (index of biological integrity) IBI scores (see Figures 1-5).

SA-Applicant parallels and crosses significantly important habitat of the several important smaller streams, rivers, flowages, lakes and wetlands. Because of these concerns, The DNR would prefer alternative routes or system alternatives to avoid these areas.

Minerals

SA-Applicant presents a concern regarding mineral resources in the Tamarack area, near the Aitkin-Carlton County border due to significant potential for metallic mineral resources. However, several Route Alternatives being carried forward by PUC for comparative analysis in the routing process could alleviate risk associated with metallic mineral resource/pipeline conflict. Over the rest of the SA-Applicant preferred route and other System Alternatives, presence of metallic mineral resources is highly uncertain and mineral resource information is insufficiently detailed to suggest that one of the System alternatives has more or less merit from a metallic mineral resource perspective.

For aggregate, crushed stone and peat resources, compensation would be required for any encumbrance that precludes extraction activities due to the presence of the pipeline. For comparative purposes, the value of metallic minerals is potentially order(s) of magnitude greater than nonmetallic resources.

In accordance with MN Rules 6125.07, the state and county may grant surface leases, permits and licensed to any portion of the surface under state metallic mineral lease, after consultation with the lessee. However, the surface leases, permits, or licenses shall not unduly interfere with exploration or mining operations conducted on the mining unit.

In addition, in selecting a route for the pipeline, the PUC is guided by the criteria specified in Minnesota Rules, part 7852.1900, Subp. 3. The principal relevant criteria in this situation include: existing and planned future land use, economies within the route, *including industrial and mining operations*, natural resources, and relevant policies and rules of other state agencies. The state mineral lease in the Tamarack area was in effect prior to this Project application and must be considered in any route determination.

The Department also has safety concerns with the possibility of having both future crude oil pipeline and mining operations on the same state-owned lands.

Co-location and "Corridor Fatigue"

Generally, there is an opportunity for reduction of many natural resource impacts, such as habitat clearing, fragmentation, and introduction of invasive species when utility corridors are co-located. The DNR often recommends co-location rather than routing through a less disturbed "greenfield" area. However, it is also important to consider the possible drawbacks related to co-location in an environmental analysis. New pipelines within existing pipeline corridors can exacerbate or introduce the following symptoms of "corridor fatigue": cumulative environmental impacts of multiple pipelines, increased numbers of cross-over's and route deviations, as well as creation of "pinch points" when there are conflicting land uses. Some existing pipelines were constructed prior to more modern regulations (which provide greater consideration of impacts associated with construction, operation, and maintenance) which increases cumulative environmental impacts associated with multiple pipelines. An example of cumulative impacts with Sandpiper would be the intended co-location of Sandpiper and the Line 3 Re-build/Maintenance project also currently proposed by Enbridge.

Pipeline Leak Risk

The Comparison of Environmental Effects of Reasonable Alternatives focuses primarily on construction related impacts and less on potential environmental damage as a result of leaks or ruptures. This is in contrast to the Exponent study of the Keystone XL Project Risk Assessment, which concluded that the potential damage as a result of an oil leak was the single most important consideration when conducting a risk assessment for oil pipelines.

Corridor Width

A 2-mile wide corridor was used for analysis of System Alternatives. Use of wider or narrower corridor widths affects the assessment as the ability to avoid sensitive areas within a specific zone is dependent upon the density of resources within that zone as well as acreage or number of sensitive areas. The existence of resources at low densities may not necessarily indicate that the route has more potential for impact if more avoidance opportunities are present. Conversely, there may be resources at high densities that are harder to avoid within a 2-mile corridor. The LaSalle Creek area north of Itasca is a good example: a 2 mile wide corridor still restricts alignment choices to areas with high resource densities.

State-Listed Rare Species and Sites of Biodiversity Significance

It is notable that Minnesota state-listed threatened and endangered species and Minnesota Sites of Biodiversity Significance were not addressed in the comparative section of the Comparison of Environmental Effects of Reasonable Alternatives. At this scale of analysis, one could consider Minnesota Sites of Biodiversity Significance as areas tending to concentrate rare species. See the DNR comparison of these sites specifically for SA-03 and SA-Applicant below.

Contaminated Sites

It should be noted that using contaminated sites as a comparison factor is debatable. It could be argued that contaminated sites are either more or less suitable for development, depending on the specifics of a site and measures used to lessen or avoid impacts.

<u>Comparison of Environmental Effects of Reasonable Alternatives Section Specific Comments</u>

Section 4.1.2 Geology /Soils/Groundwater

Soils: This section (page 49) indicates that impacts to soils are of particular concern to agricultural areas. It is important to point out that standard measures commonly used to prevent mixing of topsoil with subsoil and other impacts such as compaction and rolling topography can be effective in addressing the concerns raised for agricultural areas. This section should indicate that soil related impacts are an important concern in undisturbed or less disturbed areas, where fewer best management practices are typically available.

Hydraulic Conductivity: This section of the report is correct in stating that hydraulic conductivity information is important to assess because it is a measure of how quickly oil can move through the soil. Unfortunately the methods used in the assessment are best suited as a screening tool only as they use surficial hydraulic conductivity values rather than at depth values. Since pipelines are constructed at a fairly consistent depth, inclusion of hydraulic conductivity ratings at or below those depths will need to be used to determine potential risk to contaminant migration.

Section 4.1.6 Public Resource and Recreation Lands (Map A-14 and 15)

Upon review of these maps it is clear that they do not include all public lands. Specifically, state lands administered by DNR Division of Forestry outside of state forests and county administered state lands are not included. These lands are important to the impact assessment as they provide various services to the public, animal, plants, and industry. These areas also occupy a significant part of the landholdings in the northern part of the state and omitting them from the assessment would likely result in inaccurate assessment of impacts on public lands.

Also, from reviewing the comparison document and table 4-9 there is no distinction between State Forests and State Lands Administered by DNR Forestry, other DNR Divisions or County tax forfeit. The text makes note to only named State Forests. Therefore the analysis does not appear to compare the total amount of public forest lands. The DNR is aware that there is a higher occurrence of state public owned lands in the applicants preferred route than in all other alternatives.

Without knowing the final centerline of the proposed pipeline route, fully accessing forestry concerns is difficult. However, in general with more acres and crossings, one can reasonably conclude that there would be more potential impacts to forestry from the applicant's preferred route than from the other southern alternatives. Routes in the forested region of the state will permanently convert forested uplands and wetlands to open habitats. Impacts of new or wider fragmented areas include: decreased habitat value for wildlife and fisheries, reduction of core habitat in adjacent forests due to edge effects, conversion of habitat (i.e., changes from forested wetlands to open or shrub wetlands), and increased risk of invasive species. The pipeline will result in the permanent loss of income from timber harvests or other income producing activities on the parcels. Compensation is required for impacts to both School Trust and Acquired lands.

There are concerns regarding the potential for severing access to state parcels for land management activities. This concern would apply to both legal access across licensed/leased (or purchased) lands and the ability to run fully loaded semi-trucks carrying logs across the pipeline. This is a concern even if the pipeline runs across private property. DNR works with private owners to gain the shortest and most efficient access to state land across private land. The main concerns are Forestry lands in several sections in the Applicant's preferred route. There is also a concern for fire suppression activities anywhere the pipeline might be constructed.

Section 4.1.4 Water Resources (Maps A-10, 11 and 12)

We agree with the types of impacts that could occur as described in the report however the methods used do not allow for a comparison of those potential environmental effects among the system alternatives. Two considerations missing from the assessment are:

1. Water sensitivity – Water quality and functions of water resources vary across the state and so will potential impacts.
2. Downstream river miles and connectivity to resources and other sensitive receptors vary across the state and so will potential impacts. An analysis of flow paths for significant releases would add to this type of assessment.

Full Length Comparison of SA-03 and SA-Applicant

While the high level of analysis presented in the Comparison of Environmental Effects of Reasonable Alternatives did not provide the DNR enough information for a full comparison of system alternative impacts, we believe it provides valuable screening information in combination with professional judgment for the DNR to provide input regarding SA-03 and SA-Applicant. After a review of the data and consideration of factors and context described above, it is the opinion of the DNR that route Sa-03 has fewer natural resource impacts when compared to SA-Applicant.

SA-Applicant features that would incur impacts greater than those identified for SA-03 are: forest and wetland acreage, river and stream segment crossings, and crossings of public lands. Cultivated lands and occurrence of already-impaired waters are greater along SA-03, indicating the developed state of lands along this route. The following table represents a preliminary comparison of natural resource impacts between SA-Applicant and SA-03, using information from the Comparison of Environmental Effects of Reasonable Alternatives. These are full route comparisons, encompassing the states of North Dakota, Minnesota, and Wisconsin.

Full length System Alternative Analysis (ND, MN, WI):
Comparison of SA-Applicant and SA-03

Feature	**SA-Applicant**	**SA-03**	**Notes [The comment reflects the preferable option from a natural resource perspective]**
Total miles	615 miles	700 miles	SA-App is shorter
Acres (from landcover)	769,145	862,053	SA-App covers fewer acres
Landcover (acres)			
Forest	144,315 (18.8%)	86,195 (10%)	SA-03 covers fewer forested acres, and less by percent. This represents a reduction in forest fragmentation.
Herbaceous/grassland	86,505 (11.2%)	90,945 (10.5%)	SA-App covers fewer grassland acres, and less by percent. This is a reduction in grassland impacts.
Cultivated	363,381 (47.20%)	512,407 (59.4%)	SA-03 covers more cultivated acres and more by percent. This represents re-working of already disturbed lands.
Wetlands	107,367 (13.9%)	90,832 (10.5%)	SA-03 covers fewer wetland acres and less by percent. This is a reduction of wetland impacts.
Water Resources			
River + stream crossings	2,049 segments	895 segments	SA-03 crosses fewer water segments
Crossings with water impairments	50	98	SA-03 has a greater number of crossings over impaired waters.

			Fewer crossings of non-impaired waters is desirable.
Miss R crossings	2: 30' + 250'	1:1,000'	No advantage: both represent dangers specific to flow volume and local river and bankside conditions.
Lakes	3,397	3,777	SA-App has fewer lake crossings. A more accurate comparison would take into account the existing water quality conditions and impairments of these lakes.
Wetlands (acres)			
Forested/shrub	57,769 (7.3%)	60,210 (6.8%)	These are similar. A more accurate comparison would take into account the biological quality ranking of these communities, taking into account such things as hydrologic continuity, species diversity, disease, regeneration, and presence of invasives.
Emergent	47,010 (6%)	39,415 (4.5%)	See above
Public Resource Lands			
Acres	47,691	11,885	SA-03 crosses fewer acres of public lands.
Count	66	148	While SA-App encounters fewer public lands, this is due to the larger size of public lands along the northern route. A better comparison is made by the acres crossed.

Note that the EERA analysis of SA-Applicant and SA-03 did not compare the acreage of developed lands (existing corridors to be followed, acres under cultivation) to new land disturbance (forests, grasslands and wetlands). The analysis also did not include water quality indicators for the water bodies to be crossed by both system alternatives (rivers, streams and lakes).

Minnesota-Specific Comparison of SA-03 and SA-Applicant

The environmental analysis document also presented Appendix B – Tables and Maps for Minnesota. The DNR interprets this data to show that while SA-applicant covers less total acreage, it has the potential to adversely impact natural resources to a greater extent.

SA-Applicant encounters greater acreage and/or numbers for Sites of Biodiversity Significance (SBS), School Trust Lands, public water bodies, NWI wetlands, wild rice lakes, and trout streams. SA-03

contains a higher number of karst features and calcareous fens, more crossings of public waters (streams and rivers) and public water wetlands, and significantly more acres of native prairie than SA-Applicant.

These features reflect the difference in route lengths, as well as the changing nature of the landscape between ecoregions of the state. SA-Applicant follows the northern-most route, the majority of which passes through the Laurentian Mixed Forest ecoregion, the Northern Minnesota Drift and Lake Plains section with expanses of intact forests and wetlands. SA-03 follows a route farther to the south through the Prairie Parkland and Eastern Broadleaf Forest ecoregions, where agriculture and urban centers have become established.

Following are a few points of discussion regarding these comparisons:

- SA-Applicant crosses greater acreage of Sites of Biodiversity Significance (SBS). SBS indicate areas of intact functional landscapes that provide natural resource values such as hydrologic continuity, habitat connectivity, native plant communities, and rare plant and animal species. Not all counties crossed by SA-Applicant have been evaluated for SBS. However, those that have been evaluated contain the largest areas of SBS to be found in the state.
- SA-Applicant crosses a higher amount of state lands, particularly state forests and state wildlife management areas. The route passes through a significant amount of the forest stand inventory of the state of Minnesota.
- SA-03 crosses fewer state lands, smaller SBS due to fragmentation of natural landscapes, and a higher number of the waters crossed (rivers, streams, wetlands and lakes) are already impaired due to agricultural and urban development.
- Fragmentation of natural landscapes due to farming and urban development is significantly higher in SA-03. It would be easier to avoid important natural resources within a two mile corridor in this route.

Following is a table comparison of the two system alternatives under review within Minnesota using data from the Comparison of Environmental Effects of Reasonable Alternatives:

Minnesota System Alternative Analysis: Comparison of SA-App and SA-03

Feature	**SA-Applicant**	**SA-03**
Total acres	382,670	476,346
Karst features	0	7
Calcareous fen	1	2
Sites of Biological Diversity*		
Below	7,291	13,891
Moderate	52,117	26,320
High	6,883	5,828
Outstanding	2,459	1,914
Total	68,750	47,954
Native Prairie		
Complex	440 (57%)	279 (13.1%)
Upland	118 (15.3%)	882 (41.3%)
Wetland	213 (27.6%)	973 (45.6%)
Total	772	2,135
School Trust Land (acres)	7,880	2,004
State Trails	8	11
NWI (acres)	76,597	67,541
Public water wetland	2,372	2,792
Water Basins		
Public water basin	10,220	10,047
Water Courses		
Count	112	240
Miles	197	407
Trout Streams		
Count	46	32
Miles	54	42
Wild Rice Lakes		
Count	29	11
Acres	3,621	1,182

*The DNR assumes values provided by EERA for Sites of Biological Diversity are acres of Sites of Biodiversity Significance (SBS).

Thank you for the opportunity to provide comments regarding the Certificate of Need for the Sandpiper Pipeline Project. Please contact me with any questions.

Sincerely,

Jamie Schrenzel
Principal Planner
Environmental Review Unit
(651) 259-5115

Enclosures: 5

cc: Larry Hartman, Minnesota Department of Commerce
Scott Ek, Minnesota Public Utilities Commission
Sara Ploetz, Enbridge

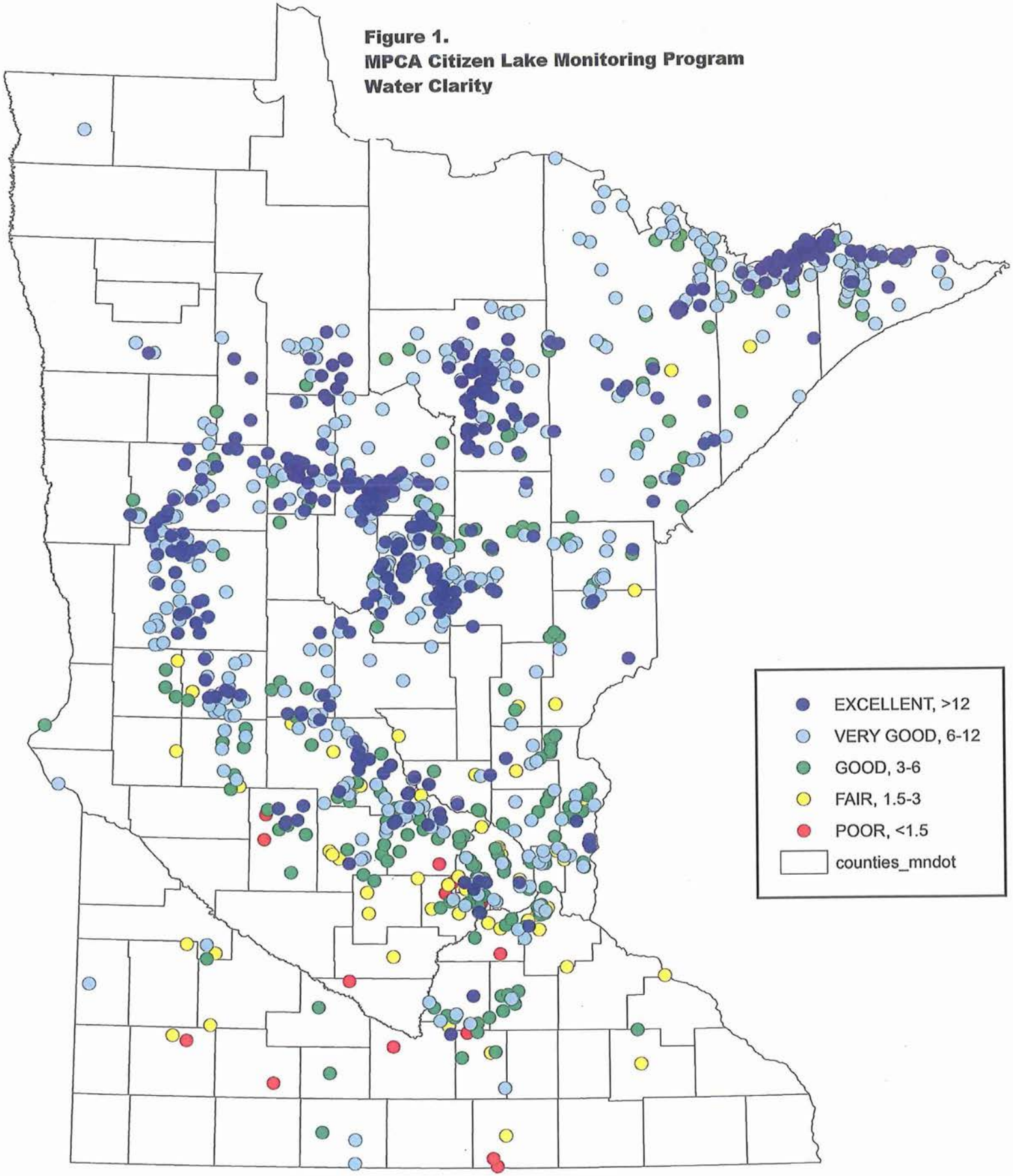

Figure 1.
MPCA Citizen Lake Monitoring Program
Water Clarity

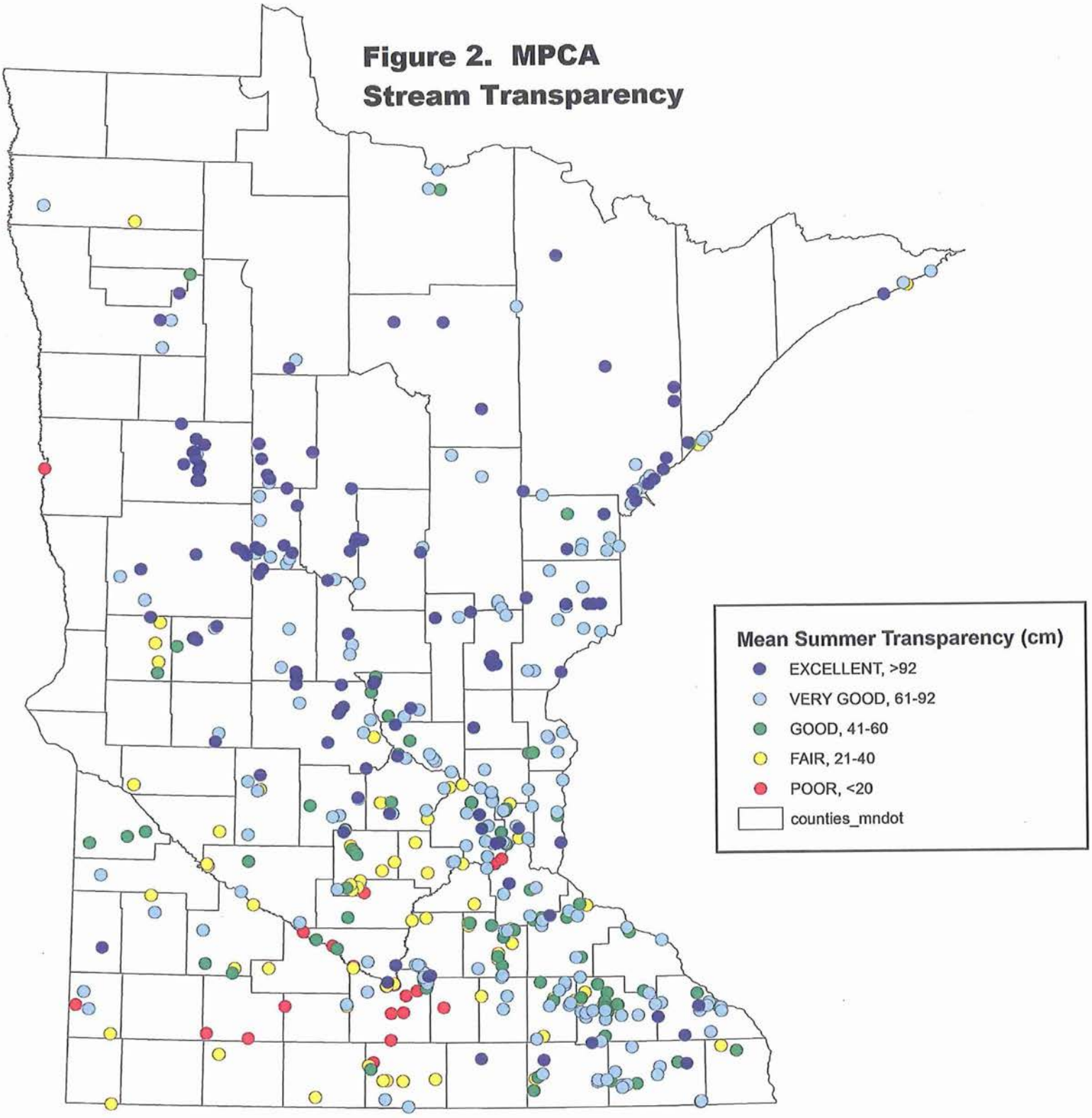
Figure 2. MPCA
Stream Transparency
Mean Summer Transparency (cm)
EXCELLENT, >92
VERY GOOD, 61-92
GOOD, 41-60
FAIR, 21-40
POOR, <20
counties_mndot

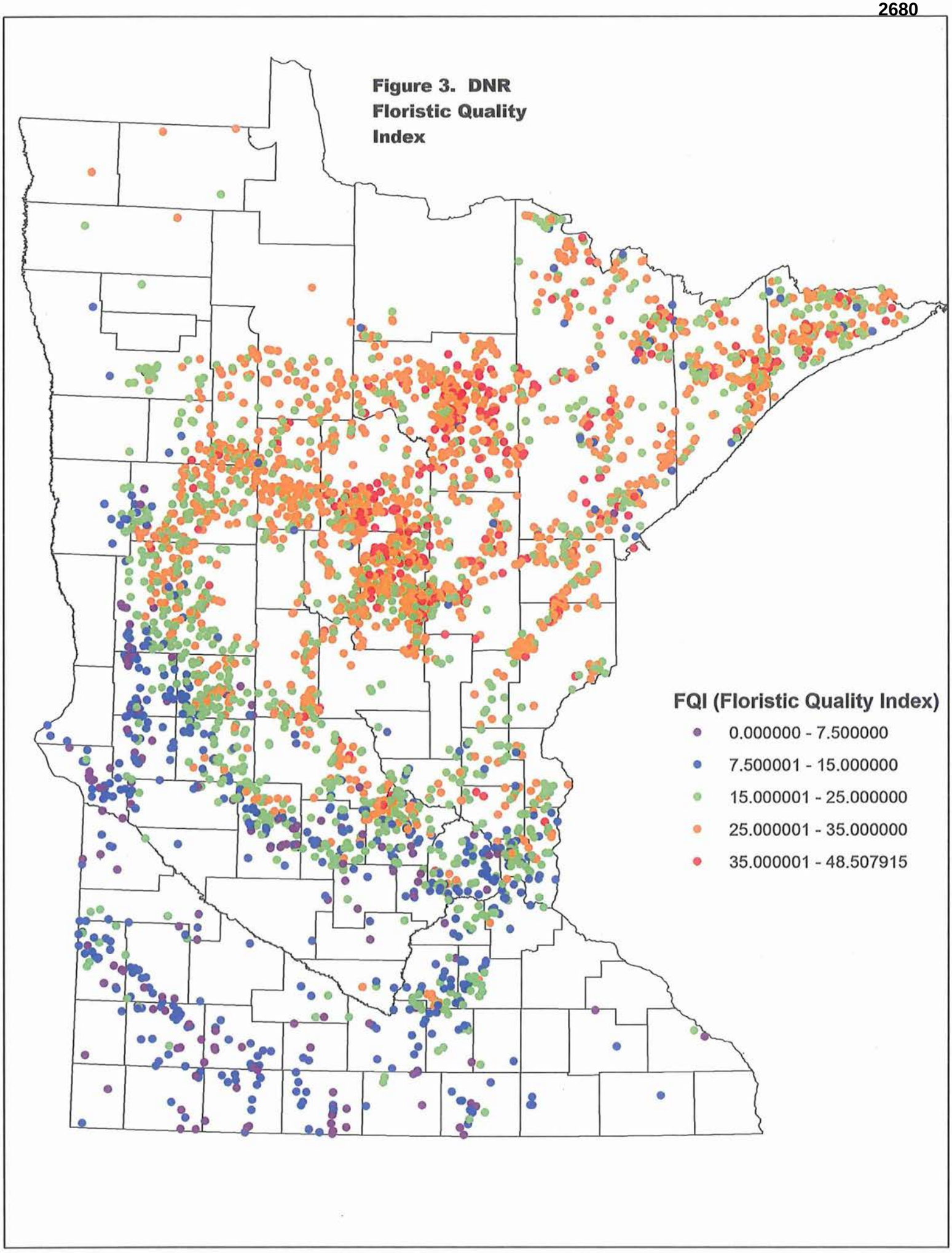

Figure 3. DNR Floristic Quality Index

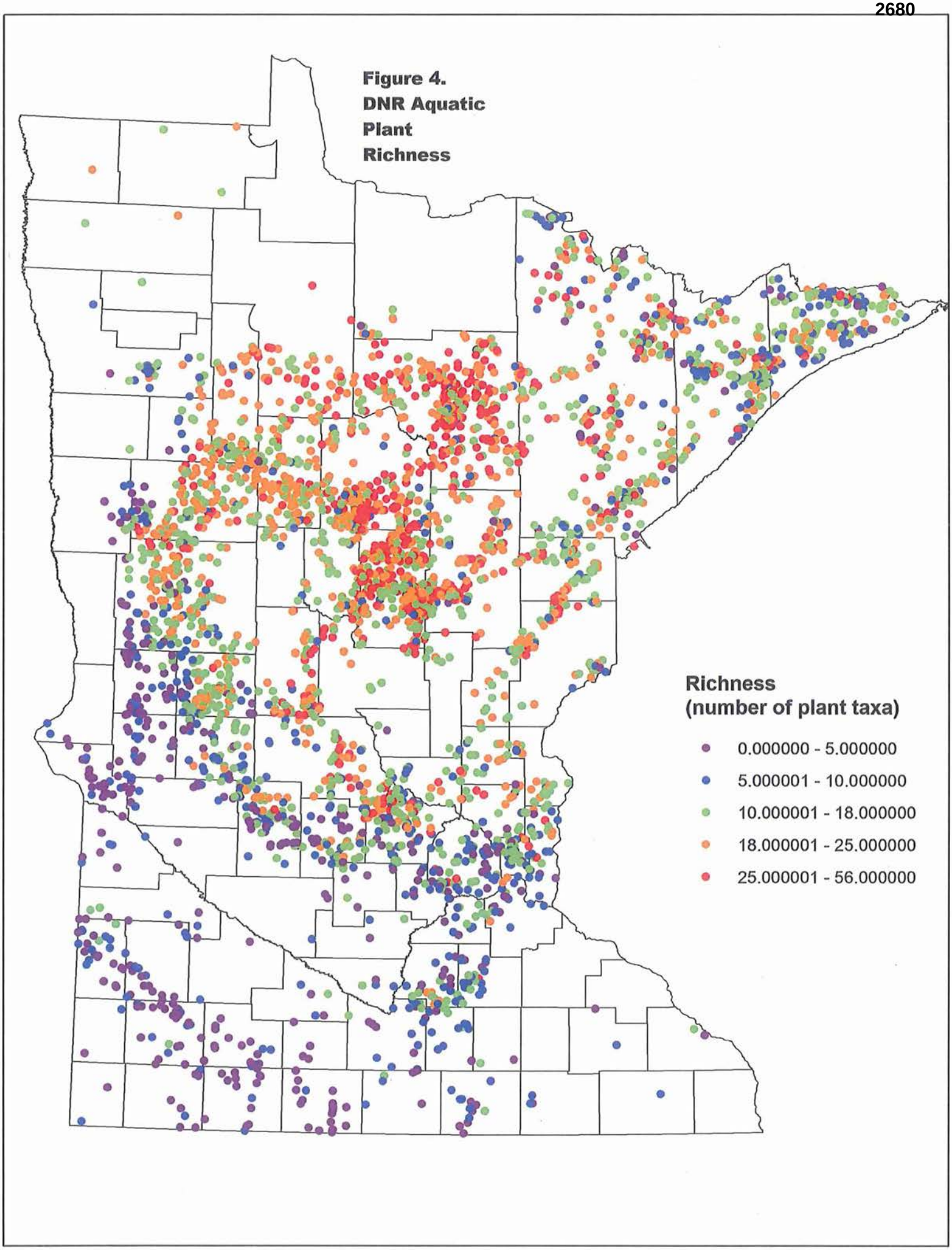
Figure 4.
DNR Aquatic
Plant
Richness
Richness
(number of plant taxa)
0.000000 - 5.000000
5.000001 - 10.000000
10.000001 - 18.000000
18.000001 - 25.000000
25.000001 - 56.000000

Figure 5.

Fish IBI Scores through 2014

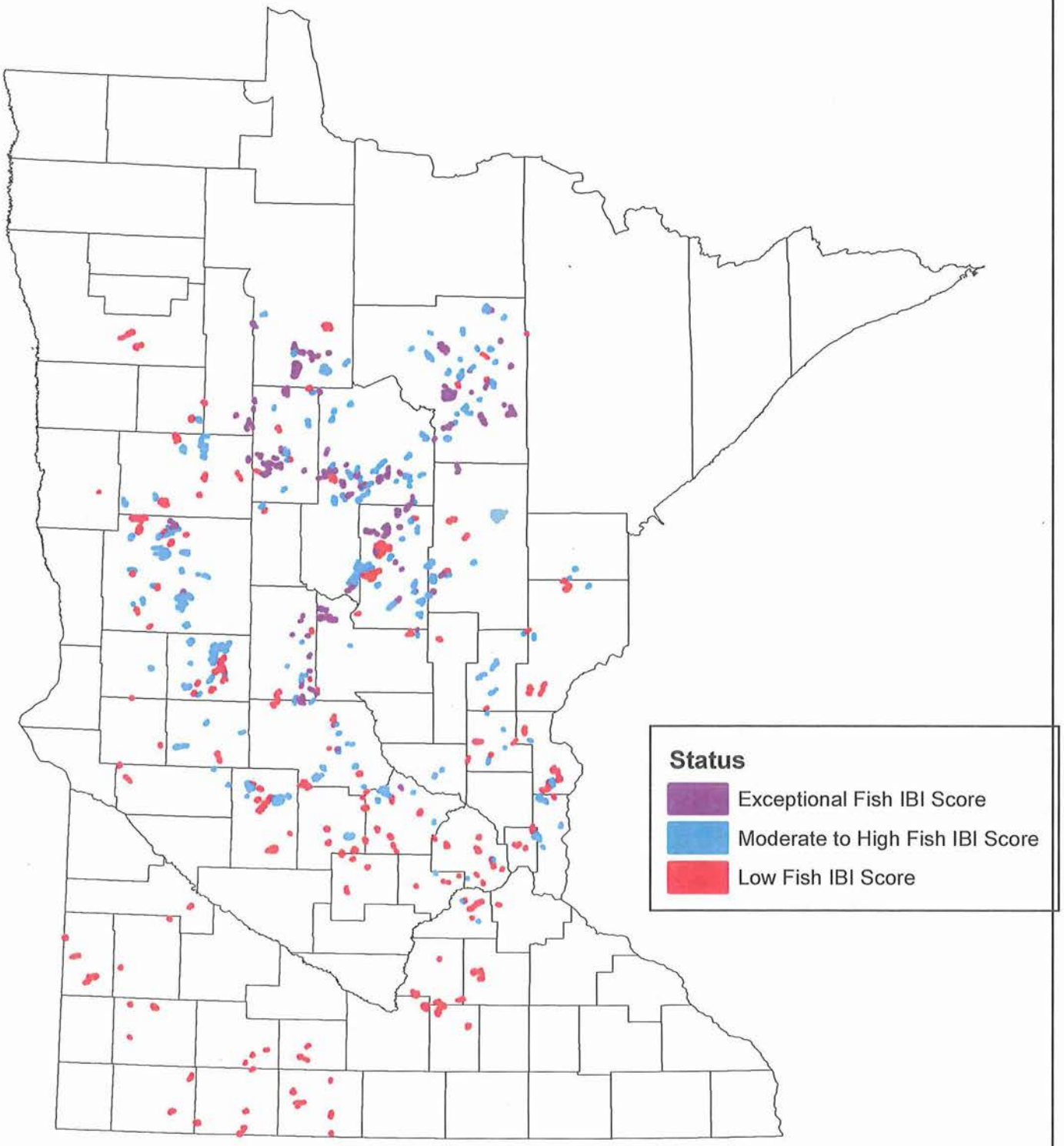

Minnesota DNR Fisheries, Jan. 2015, Contact Jacquelyn Bacigalupi, MN DNR Fisheries IBI Coordinator for more information

Appendix C
PCA Sandpiper Letters

January 23, 2015

The Honorable Eric Lipman
Minnesota Office of Administrative Hearings
600 North Robert Street
P.O. Box 64620
St. Paul, MN 55164-0620

RE: In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota
MPUC Docket No. PL6668/CN-13-473
OAH Docket No. 8-2500-31260

Dear Judge Lipman:

The Minnesota Pollution Control Agency (MPCA) submits the following comments for consideration by the Administrative Law Judge (Judge) in making recommendations to the Public Utilities Commission (Commission) in this matter. The MPCA's comments provide information addressing several of the criteria set forth in Minn. Rule 7853.0130 for making a determination on a certificate of need for the Sandpiper Pipeline Project (SA-Applicant) proposed by North Dakota Pipeline Company ("NDPC" or "Applicant"). The MPCA respectfully requests that if a determination of need is reached in this proceeding, the certificate of need be conditionally granted contingent upon suitable modification of SA-Applicant to protect and avoid high quality natural and environmental resources, and the inclusion in the Route Proceeding, Docket No. CN-13-474, of SA-03 and any other System Alternative that meets the identified need, pursuant to the Commission's authority under Minn. Rule 7853.0800. The MPCA will gladly provide additional information or comments that the Judge may find helpful in the course of this proceeding.

A. The MPCA's comments address four of the criteria required under Minn. Rule 7853.0130 for a determination on a certificate of need.

Minn. Rule 7853.0100 requires evaluation of all applicable and pertinent factors listed under each of the criteria set forth in Rule 7853.0130 and a specific written finding with respect to each of the criteria. Minn. Rule 7853.0130 states that a certificate of need shall be granted if all the listed determinations can be made. However, if one or more of those determinations cannot be met, a certificate of need may be denied, or conditionally granted subject to modification, under Minn. Rule 7853.0800.

The MPCA is providing comments that address the determinations required under Rule 7853.0130.B (2); 7835.0130.B (3); 7853.0130.C (2); and 7853.0130.C (3), which state:

- 7853.0130.B. a more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record by parties or persons other than the applicant, considering: . . .
  (2) the cost of the proposed facility and the cost of energy to be supplied by the proposed facility compared to the costs of reasonable alternatives and the cost of energy that would be supplied by reasonable alternatives;
  (3) the effect of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives; and . . . .

- 7853.0130.C. the consequences to society of granting the certificate of need are more favorable than the consequences of denying the certificate, considering: . . .
  (2) the effects of the proposed facility, or a suitable modification of it, upon the natural and socioeconomic environments compared to the effect of not building the facility;
  (3) the effects of the proposed facility or a suitable modification of it, in inducing future development.

The MPCA comments will address each of the criteria mentioned above and associated listed factors.

B. SA-03 is a reasonable and prudent alternative to the Applicant's facility (SA-Applicant), since the respective costs of SA-Applicant and SA-03 and of oil to be supplied by SA-Applicant and by SA-03 are not significantly different. Minn. Rule 7853.0130.B(2).

Financial impacts and comparative costs are among the factors to be evaluated in determining whether the criteria in Minn. Rule 7853.0130.B are met. Since MPCA submitted its comments dated August 21, 2014 to the Public Utilities Commission,[1] additional relevant testimony have been submitted in this docket. This included the direct testimony of economist Adam Heinen of the Department of Commerce (Doc. ID 201411-104761-03 ("Heinen Direct"). Mr. Heinen stated his expert opinion that System Alternative SA-03, as proposed by the MPCA, would meet the need of the project if as also proposed by MPCA, the Clearbrook terminal location was moved westward to the Crookston area or another location closer to the North Dakota border. (Heinen Direct, p. 75,) Mr. Heinen also indicated that moving the terminal location could increase the cost of constructing the pipeline, and discussed Applicant's estimate of the cost increase. (Heinen Direct, 75-76). Mr. Heinen then stated in his opinion that any apparent higher costs of SA-03 based on Applicant's analysis were insignificant and unlikely to impact retail prices and that the Applicant had not shown that SA-03 was an unreasonable alternative to meet the need of the proposed project. (Heinen Direct, pp. 77-78)

[1] See PUC Docket Filing 20148-102458-02 and 20148-102458-04

Mr. Heinen reinforced his direct testimony when he filed rebuttal testimony addressing SA-03. Mr. Heinen affirmed that SA-03 appeared to be a reasonable alternative to meet the need for this project. (Heinen Rebuttal, p. 7) (Doc. No. 20151-105968-01). This testimony supports the finding that under Minn. Rule 7853.0130.B(2), based on comparative cost, SA-03 is at least a reasonable and prudent alternative. However, comparative effects on natural environments, i.e., potential environmental and natural resource impacts as discussed in the following sections, appear to make SA-03 "a more reasonable and prudent alternative" under Minn. Rule 7853.0130.B(3).

In addition to direct costs of construction and operation, the costs considered under Rule 7853.0130.B(2) should include an evaluation of whether a system alternative such as SA-03 is a more reasonable alternative to SA-Applicant because of a reduced risk of a costly spill to a sensitive environmental area. An Alternative that avoids or impacts fewer sensitive ecosystems and water bodies than SA-Applicant will have a smaller likelihood of incurring significant response costs. As documented by the U.S. Environmental Agency (USEPA), it costs considerably more to restore or rehabilitate water quality than to protect it.[2] The areas of the state traversed by the SA-Applicant have waters and watersheds that are currently subject to protection in the state's "Watershed Restoration and Protection Strategy" program, [3] financed through the Clean Water Fund and aided by significant volunteer participation of Minnesota citizens. By keeping these waters as clean as possible before they become impaired, extensive costs of restoring waters to state standards can be avoided. Location of oil pipelines in these areas place their pristine waters at risk, and also place potentially millions of dollars in state and federal funds allocated for protection of these areas at risk.

When evaluating spill response costs, the following factors would make one corridor a better choice than another in minimizing the potential for costly spills or accidental discharges: fewer crossings of flowing water; fewer adjacent water bodies; quality of those waters; presence of especially sensitive areas or habitats or species or uses; better access to downstream oiled areas; tighter soils; and closer and more equipped and prepared responders. The MPCA applies these factors in comparing SA-Applicant with SA-03 and other alternatives in the next section of our comments.

C. SA-Applicant presents significantly greater risks of potential environmental impacts and encroaches on higher quality natural resources than SA- 03 and several other system alternatives. Minn. Rule 7853.0130.B(3). The effects of SA-Applicant on the natural environment support a determination in favor of other alternatives. Minn. Rule 7853.0130.C(2) and C(3).

[2] See http://water.epa.gov/polwaste/nps/watershed/upload/economic_benefits_factsheet3.pdf (incorporated by reference) .

[3] See (http://www.pca.state.mn.us/index.php/water/water-types-and-programs/surface-water/watershed-approach/index.html)

Environmental risks are posed by all aspects of pipeline construction and operation, including post-spill recovery and restoration activities. The primary and most significant risks are associated with the long-term effects upon environmental and natural features that will be permanently altered, eliminated, or otherwise impacted by the presence of a pipeline, as well as the potential impacts of the release of crude oil as the result of a spill event during the potential 40 years or more that the pipeline will be operational. Those risks include environmental damages such as loss of wildlife, contamination of drinking water, destruction of fisheries, loss of habitat, and alteration of ecological systems. (For a discussion of the behavior and cleanup of oil spilled to surface water, soil, and groundwater, see Appendix A to the MPCA's comments.)

During these proceedings, the MPCA has commented extensively on the environmental concerns regarding the route proposed by Applicant in comparison to alternative routes and system alternatives. MPCA's prior comments can be found in Document Nos. 20146-100780-01, 20148-102458-02 and 20148-102458-04, each incorporated by reference. These prior comments have addressed such specific items as access to potential release sites in surface waters, potential to impact ground water, wild rice, the state's highest-quality surface water systems, wildlife habitat, low income populations, watersheds currently being assessed for restoration and protection strategies, fisheries, economies, and numerous other parameters.

In these comments, the MPCA concluded that with respect to protection of the highest-quality natural resources in the state, the SA-Applicant route presents significantly greater risks of potential impacts to environment and natural resources than several of the system alternatives, including SA-03. Although all proposed routes and system alternatives have the potential to impact some natural resources, the Applicant's proposed route encroaches on higher quality resources, superior wildlife habitat, more vulnerable ground water, and more resources unique to the state of Minnesota than do many of the proposed system alternatives. Several examples of the greater potential for harmful environmental impacts of SA-Applicant compared to other alternatives are highlighted in the following pages.

The relevance of other system alternatives depends upon whether the need for the project is determined based upon a narrower and more localized view or upon a larger regional view. While SA-03 has been identified as a reasonable and prudent project alternative as a general matter, it serves as such an alternative from both a localized and regional view. However, if need is determined based on a larger regional view of need, several other system alternatives may also be reasonable and prudent alternatives to meet that regional need. Consequently, the MPCA also addresses the comparative impacts of other System Alternatives and SA-Applicant to inform a determination of need from a regional perspective.

The broader objective of the proposed project is transporting oil to markets in the Midwest and along the eastern and gulf coasts, not to transport oil through the state of Minnesota

with termination in Superior Wisconsin. [4] Oil that is to be transported to Superior, Wisconsin through the proposed pipeline will continue through Wisconsin to Chicago (or Wisconsin and Michigan if routed to Sarnia, Ontario). Oil that would be transported via one of the southern system alternatives, such as SA-04, and on to the Chicago area would have to be transported through Iowa before reaching Illinois. In either case, Chicago appears to be a common destination for most if not all of the oil that is proposed to be moved through Minnesota.

Information regarding the existence of contractual agreements obtained when Applicant held an "open season" has been offered as the underlying basis for a determination of need.[5] The Applicant has suggested that the facility as proposed (SA-Applicant) is necessary in order to assure those contractual agreements are filled and that alternatives such as SA-03 would negatively affect the cost of fulfilling those agreements. This proceeding will determine whether the Applicant's open season agreements establish the need for siting a pipeline through Northern Minnesota instead of along a southern alternate route. If the underlying actual and predominate need of the project is to get Bakken oil to Midwest regional markets in Wisconsin, Michigan, or Illinois, that need can be achieved by several of the system alternatives. The foregoing is generally and specifically supported by the direct and rebuttal testimony of Applicant's witness Neil Earnest (Document ID Nos. 20148-102134-03, Earnest Direct Testimony, and 20151-105934-01, Earnest Rebuttal Testimony). See Figure 1, which is an overview of Applicant's regional infrastructure and corresponding destinations.

[4] Applicant testimony acknowledges that the project's intended destination is not Superior, Wisconsin but refineries in the Midwest. Applicant witness Earnest, in rebuttal, indicates that oil from this project is not only competing with alternative modes of transportation to refineries in Chicago, Patoka, and Cushing. The oil is also competing with all of the other crude oil choices available to the refineries in the Midwest. Enbridge rebuttal at pp 5-6. "Accordingly, all else equal, higher Sandpiper transportation costs to the Midwestern markets acts to decrease the volume of Bakken crude oil that can be expected to be processed in the Midwest, and to lower the utilization of the pipeline." (Earnest Rebuttal, 6) 20151-105934-01

[5] Heinen Direct, pp. 6-7. The nature and content of these open season transportation service agreements are confidential. The MPCA has not examined the nature or substance of these agreements or their duration. Mr. Heinen also indicates in his testimony that he does not know the ultimate destination of that oil.

Figure 1

ENBRIDGE
Enbridge Liquid Pipeline Assets
Legend
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
MINNESOTA
WISCONSIN
MICHIGAN
IOWA
ILLINOIS
INDIANA
OHIO
MISSOURI
KANSAS
NEBRASKA
SOUTH DAKOTA
KENTUCKY
TENNESSEE
ARKANSAS
MISSISSIPPI
LOUISIANA
OKLAHOMA
TEXAS
UNITED STATES
ONTARIO
Chicago
Toronto
Dallas
Houston
Austin
San Antonio
Oklahoma City
Saint Louis
Indianapolis
Nashville
Memphis
Minneapolis
Milwaukee
Kansas City
Wichita
Lubbock
Amarillo
Midland
Odessa
Fort Worth
Little Rock
Jackson
Baton Rouge
New Orleans
Columbus
Cincinnati
Knoxville
Charlotte
Greensboro
Pittsburgh
Buffalo
Duluth
Fargo
Grand Forks
Winnipeg
Regina
Sioux Falls
Lincoln
Omaha
Des Moines
Springfield
Madison
Grand Rapids
Detroit
Toledo
Cleveland
Louisville
Tulsa
Norman
Enbridge Bakken Expansion Project
Enbridge Bakken Pipeline
Enbridge Southern Lights Pipeline
Enbridge Steel Pipeline
Enbridge Mainline Pipeline
Enbridge Southern Access Pipeline
Enbridge Spearhead Pipeline
Enbridge Southern Lines Pipeline
Enbridge Ozark Pipeline
Enbridge Southern Pipeline
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Comparative Evaluation of Environmental Effects

The comparative long term environmental and eco-system impacts and the potential impact of spills must be carefully evaluated for each system alternative in determining the need for a pipeline project. Permanent harm to sensitive eco-systems, habitats, and species may occur following construction of a new pipeline. In addition, long-term impacts from a spill can be much more damaging in areas containing features such as environmentally sensitive areas and those with limited access. As discussed below, these long-term environmental and eco-system impacts should be accorded great weight in the determination of need for a pipeline project. Further, in associated routing proceedings, these impacts must be subjected to even more rigorous and detailed environmental review when evaluating alternative routes. It is not sufficient under Rule 7853.0130 to determine that the location for the proposed project is suitable or reasonable. Rather, the location should be one that best minimizes the risk to human populations and environmental and natural resources.

1. Adverse Impacts to High Quality Surface waters are Greater under SA-Applicant.

SA-Applicant traverses a greater number of high quality water bodies than does SA-03 and presents higher risk of environmental impacts from a spill or release of crude oil along its route corridor. Based on watershed health scores as determined by the Minnesota Department of Natural Resources in its Watershed Health Assessment Framework, MPCA documented that the adverse impacts to overall water quality from construction and operation, as well as spill cleanup and response, of Applicant's Alternative were more harmful than alternatives including SA-03, SA-04, and SA-05. See MPCA Comment letter dated August 21, 2014 , Document ID Nos. 20148-102458-02 and 20148-102458-0420148-04, page 5).

The MPCA provides these additional comments to assist in proper interpretation of the information on surface waters in the Department of Commerce environmental analysis "Comparison of Environmental Effects of Reasonable Alternatives" (DOC study) submitted on December 19, 2014, (ID 201412-105567-01) and in evaluating the criteria and factors based on that information. For example, on its face, the DOC study may be misinterpreted as indicating that SA-03 is a worse alternative than SA-Applicant in affecting impaired waters. The DOC study concluded that there were 50 impaired waters crossed by the Sandpiper route, and 98 impaired waters crossed by SA-03 (DOC Study, 72, 90). Under the Clean Water Act ("CWA"), an impaired water is any water body (e.g., lakes, rivers, streams, wetlands) that is too polluted or otherwise degraded to meet the applicable water quality standards set by states, territories, or authorized tribes. Water quality and water quality standards will vary throughout the state depending on the region of the state in which the waters reside. "Impaired" waters are not the same across the state. For a water body to be deemed impaired in southern or western Minnesota (western corn belt plains or Red River valley ecoregions), it typically will have a greater degree of contamination or degradation than would be required for a water body in the central

hardwood forest ecoregion of Minnesota traversed by the applicant's preferred route (Sandpiper) to be deemed impaired. Thus, waters that are listed as impaired along the SA-Applicant route are likely to be higher quality (having a lower contamination level) than a water listed as impaired in the southern part of the state, and might not be listed as impaired at all along the SA-03 route. Waters in northern Minnesota are generally of better water quality or more pristine.

2. Significant Environmental Damage Would Occur From a Release at or near a Water Crossing Extending up to at least a Distance of 10 Miles from the Point of Release. SA-Applicant Has Many Areas of Limited Access, Increasing the Risk of Extended Impact to Surface Waters.

The most significant potential impact to a surface water from a crude oil pipeline crossing is the environmental destruction that would occur in the event of a release at or near the water crossing. According to a third party risk assessment document developed as part of the Keystone XL EIS[6], Exponent states: "A distance of at least 10 miles downstream from the proposed centerline of the pipeline should be used for the identification of sensitive areas and for identifying CPSs(contributory pipeline segments) during the final design phase of the Project." The 10 mile estimate is fair, given the potential for flowing water to carry a release of oil, especially in remote areas such as those found throughout the proposed Sandpiper route. Considering that the 2010 Enbridge spill into Talmadge Creek and the Kalamazoo River caused significant damage approximately 35 miles from the spill site, a ten mile estimate of damages is conservative and reasonable. See Stolen testimony, Document ID 201411-104748-02, page 24.

Damage to aquatic systems from an oil release can occur either as a result of physical effects such as smothering of organisms, or toxic contamination due to the chemical compositions of the oil. An oil spill in an aquatic ecosystem could cause, among numerous other impacts, death of waterfowl, other bird species, amphibians, reptiles, aquatic mammals, microorganisms, plankton, fish, pets and livestock living adjacent to waters, stunted growth of surviving species, loss of vegetation, destruction of soils, long-term reduction of dissolved oxygen, human health damage, damage to air quality, property value loss, and destruction of drinking water resources. This does not include damages that would occur during the cleanup process, especially in areas with limited, restricted or no access.

3. Potential Damages During Pipeline Construction and Testing Are Greater for SA-Applicant than other Alternatives.

Damages to surface waters as a result of construction activities can and do occur. Flowing water can also carry these effects a long distance from their origin, as noted above. MPCA has observed and documented significant sediment discharges to surface water on pipeline

[6] See http://keystonepipeline-xl.state.gov/documents/organization/221278.pdf, page XV, "Recommendations",

projects as a result of failing to install sufficient sediment and erosion controls on hillsides adjacent to surface waters. The failure to account for spring time subsidence of soils as a result of winter construction is common; frozen soils that are dug up and replaced into trenches thaw and subside in warmer spring temperatures, causing the soils to sink over the pipeline and form a ditch. These ditches act as conduits for melt water or rain water, and as they do not have sediment controls installed, tend to erode significantly as water runs through them. It is common for these subsidence ditches to terminate in water bodies, causing sedimentation and habitat damage (MPCA Comment Letter dated April 4, 2014, -Document ID 20144-98170-01, page 8).

Damage to surface water resources during hydrostatic testing discharges has occurred recently in the state. During these tests, segments of pipeline are filled with a significant volume of pressurized water, often millions of gallons, to test the integrity of the pipe. The water is then released in a manner that should minimize environmental impact. During the Alberta Clipper/Southern lights diluent project, Enbridge exceeded agreed-upon maximum discharge rates on 15 of its hydrostatic testing discharge operations. At two of these sites (adjacent to the Mississippi River and adjacent to the Clearwater River), the exceedances were enough to cause significant erosion and sediment discharge to surface waters. These cases were referred to the U.S. Environmental Protection Agency and eventually settled by the U.S. Department of Justice in 2013 with Enbridge paying a $425,000 penalty. During these hydrostatic testing operations, as much as 4,000 gallons of water per minute can be discharged from valves. This water is general required to be discharged to an upland area or a dewatering device, but when discharged rates are exceeded, or sometimes even when they are not, the pressurized water can erode soils and carry those eroded soils to surface waters, causing turbidity or smothering of aquatic habitat.

The placement of the new terminal construction west of the proposed Clearbrook location as suggested by MPCA in SA-03 will assure that future pipelines are located west and south of these pristine areas, thus avoiding the resources that the state is spending millions of dollars to protect. Meanwhile, the continued expansion of the Clearbrook facility that will coincide with construction in the SA-Applicant location will mean continued impact and potential impact to the highest value (pristine) waters in our state as a result of future pipeline construction.

4. Threats to Groundwater and Potential Drinking Water Supplies from SA-Applicant are Difficult to Assess, but Appear to Pose More Significant Risks than the System Alternatives, including SA-03.

Highly detailed topographical data for the state of Minnesota (called “LIDAR” data)) illustrates that the Sandpiper route (SA-Applicant) traverses territory with greater topographical contrast than does the SA-03 route. Much of the topography along the SA-Applicant route in Minnesota is the result of the deposit of glacial till from thousands of years ago. The composition of this till is often dependent on how the till was deposited. A

term used to describe these soils is “moraine,” or a mass of rocks and sediment carried down and deposited by a glacier, typically as ridges at its edges or extremity.

What is most important to understand about the soils along the SA-Applicant route is that the complexity of moraines in the area creates a significant degree of localized changes in groundwater movement that are very difficult to predict, as opposed to some of the flatter lands to the west and south, such as those traversed by SA-03, SA-04, or SA-05. Typically, ground water through this till along the SA-Applicant route will move laterally and toward a water body, so it is important that significantly more data is gathered from this route before the possible movement of oil in the event of a release can be predicted and response plans developed. It would be very difficult, if not impossible, to accurately assess the potential for ground water contamination based solely on the examination of GIS layers. However, it can be predicted that the damage to groundwater, potentially used as a source of drinking water, as well as the connected soils could take decades to repair, if the damage could be repaired at all. Additional impacts could include damage to agricultural areas (inability to grow crops) and damage to surface waters, wildlife and habitat from oil carried through underground conduits to those areas.

The LIDAR data strongly suggests an increased potential for impacts to drinking water from SA-Applicant than from SA-03 and some other system alternatives. However, more in-depth study will need to be done in the routing phase in order to make an informed comparison and either confirm or negate what the LIDAR data suggests as a factual conclusion.

5. SA-Applicant Threatens a Greater Percentage of Wild Rice and Native Forests than any of the Proposed Alternatives, including SA-03.

Wild rice, in addition to being an important economic consideration in Minnesota, is also an extremely important cultural resource, as well as an essential food source for humans and wildlife. It requires very specific conditions and good water quality, both of which are provided by north central Minnesota lakes. The Sandpiper pipeline would encroach on some of the richest wild rice territory in the state of Minnesota. Further, MPCA staff has identified 10 wild rice locations along the Sandpiper route for which there is no access from pipeline to the location of the wild rice. By comparison, SA-03 has two such areas. As shown in Figure 2, SA-Applicant (in green) would threaten significantly more of the state wild rice crop than any system alternative.

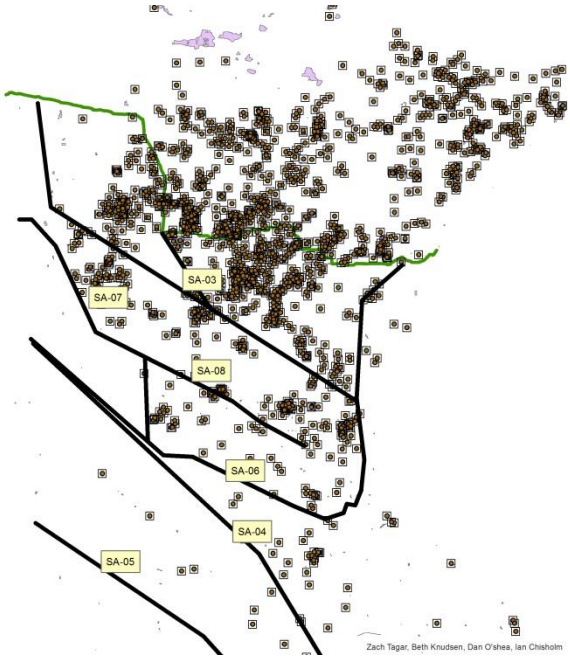

FIGURE 2 -- Wild Rice stands in Minnesota. The Sandpiper route (in green) would threaten more of the state's wild rice stands than any of the proposed system alternatives.

6. SA-Applicant Has a Greater Potential for Impact on Ecoregions than other Alternatives, including SA-03.

As accurately indicated in the DOC study, the majority of SA-03 crosses land that has been converted to agriculture or developed; this is true even when one considers only the portion of the system alternative within the state of Minnesota. Analysis of a GIS map of land cover in Minnesota (Figure 3 below) is helpful to indicate the land cover that would be crossed by SA-Applicant and the Alternatives. When the location of SA-Applicant, and other Alternatives are superimposed on Figure 3, it demonstrates that SA-03 skirts large areas of hay, grassland, pasture, and cultivated crop with infrequent passes through forested areas and wetland. By contrast, the SA-Applicant route crosses a significant amount of forested lands and wetlands, encroaching on significant agricultural land only west of Clearbrook and in the Park Rapids area. SA-Applicant can be seen to skirt far more forest and wetland areas than either system alternative SA-03, SA-04, or more southern alternatives.

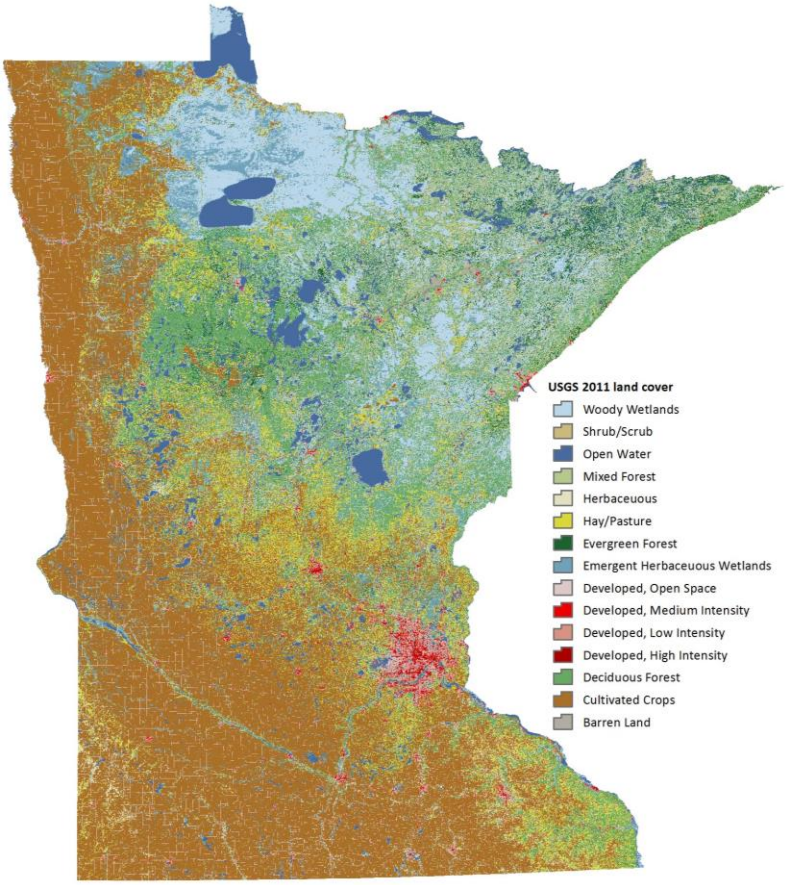

FIGURE 3-- The legend on the left indicates what land cover types are represented by what colors.

Forested areas, particularly larger, unfragmented expanses of forest, are necessary for a number of species of wildlife to survive. Many species of song birds, for example, need deep woods for nesting to avoid "edge species," or species that are more tolerant of human disturbance, because certain edge species such as cowbirds can parasitize their nests and cause mortality to their young. Other species, such as certain reptiles and amphibians, are very habitat specific and cannot easily disperse if that habitat is damaged, such as when a pipeline is placed through that habitat, altering vegetation, soils, and hydrology. Sensitive species of animals and plants require very specific, balanced conditions which can be permanently altered when a pipeline corridor is opened. Long term disturbance and fragmentation of these areas as a result of pipeline construction and siting will have negative impacts on these ecosystems and the wildlife dependent on these conditions.

In addition, an oil spill or release in these areas could result in toxic conditions in soils and vegetation which could kill wildlife. Vegetation would die off either as a result of direct exposure to oil, as a result of altering corridor topography or soil composition during construction activities or clean up after a spill. It is important to note that Enbridge has promised to separate topsoil only if asked to do so by landowners. It is equally important to separate and replace topsoil in forested, remote environments to maintain the integrity of those systems and mitigate some of the potential long-term impacts of pipeline construction.

Impacts to agriculture and pastureland can also occur, and have. However, farms typically do not provide habitat for large numbers of sensitive species or plants or animals that cannot exist elsewhere, and oil movement is likely to be reduced to some extent in flatter terrains with less water movement. Although financial impacts to the landowner and company responsible for the oil release may be greater than in some natural areas, actual environmental damage is apt to be less, and more easily mitigated.

7. SA-Applicant Has More Locations with Poor Access in the Event of a Release than SA-03 or other Alternatives.

As indicated in the June 24, 2014 letter by the MPCA (Document ID 20146-100780-01), access to potential leak sites in the State of Minnesota is of significantly greater concern along the SA-Applicant route than on any of the proposed system alternatives. MPCA staff identified 28 sites along the Sandpiper route for which access would be difficult or impossible within 250 feet of a 2000 foot downstream flow if oil were to be released in certain water bodies. By comparison, seven such areas were located on the SA-03 route, and none on SA-04.

A primary rule of thumb when planning for response to an oil leak is that a release in soil is better than a release in water, and a release in stagnant water is better than a release in flowing water. (For a more detailed discussion of the factors involved in oil spills and responses, see Appendix A to the MPCA comments.) In the Enbridge 2010 Kalamazoo River oil spill, oil caused environmental damage a reported 35 miles downstream from the original release site. The MPCA analysis was limited in scope and only took into account access within 2000 feet of a possible spill. The agency has not evaluated or assessed how much farther oil could travel in some of the identified locations along SA-Applicant's route before containment of a spill could be implemented if the leak were discovered in a timely manner. According to the aforementioned Exponent risk assessment for the Keystone XL pipeline, a small leak from a hole of 1/32 inch in diameter in a pipeline could remain undetected for several months, even with the most up-to-date leak detection technology in place. The same leak could release up to 28 barrels of oil per day, at 42 gallons per barrel. Thus, even a very small, virtually undetectable leak in a remote area, such as those located along much of the proposed Sandpiper route, could cause significant environmental damage such as that described under heading C.3 of this letter without being detected in remote areas, and limited access may also reduce the chance that a citizen may observe and report a leak too small for detection by technology.

The creation of access in remote locations where none exists can create its own problems, including damage to habitat, creation of a source of long-term erosion, fragmentation, aesthetic issues, alteration of hydrology, and other issues. The best way to avoid these concerns is to avoid or reduce the number of crossings of flowing water bodies, or those where access is limited.

From a perspective of minimizing risk of major environmental incidents due to inability to access potential leak sites in Minnesota, the proposed Sandpiper route fares more poorly than any of the proposed system alternatives.

8. SA-03 and Other System Alternatives Follow Existing Corridors to a Greater Extent than does SA-Applicant.

System Alternatives SA-03, SA-04, and SA-05 all follow specific, already existing pipeline corridors. Assuming that all have already passed at least some degree of environmental scrutiny and have been adjusted in critical areas to avoid key resources, a route in these corridors can also likely avoid critical areas and resources. It is important to consider that for these routes, there is no need to "estimate" possible impacts by using an inclusive buffer of a random width to determine quantities of resources that "might" be impacted if one imagines the width of the pipeline corridor to be several miles wide. Instead, one can make a fairly accurate determination of what the impacts or potential impacts of these routes would be based on a width of a few hundred feet. These proposed routes are not "crayon drawings" on a map, but represent actual in-the-ground infrastructure. Precise numbers of water body crossings, mineral extraction sites, forests, wetlands, population densities, cultural resources sites, access areas, and potential downstream carry of released oil all can be determined with relatively little effort by state agencies with access to the required location data. What cannot be determined without more detailed study because of limitations in ArcMap(GIS) capabilities is the quality of those resources. MPCA and Minnesota Department of Natural Resources (DNR) staff can provide general overviews of how the resources in those areas compare to the resources in the northern or forested parts of the state, but on the ground site-by-site analysis is required.

Some of the proposed system alternatives follow highway corridors to some extent, and thus specific placement of the lines is more difficult to guarantee and resource data would be difficult to assess at this stage without more specific information. However, a required consideration for pipeline routing as stated in MN. R. 7852.1900, subp. 3. F., is the use of existing rights-of-way and right-of-way sharing or paralleling. With that in mind, since SA-03, SA-04, and SA-05 all follow specific existing corridors, while SA-Applicant does not in its entirety, then all three system alternatives could be brought forward for further review if they are determined to meet the need for the project, provided that this criteria is considered worthy of sufficient weight in the process.

Conclusion.

SA-03 is a reasonable and prudent alternative to meet the need that may be demonstrated in this proceeding with fewer potential impacts to the highest quality surface waters and other natural resources in the state of Minnesota than SA-Applicant. Further, if the project need is to transport oil from the Bakken fields of North Dakota to markets in the Midwest, system alternatives SA-04 and SA-05 must also be considered as candidates to meet that

need, as they present fewer potential impacts to the natural environment of Minnesota and surrounding states than SA-Applicant.

If a determination of need is reached in this proceeding, the MPCA respectfully requests that the certificate of need be conditionally granted contingent upon suitable modification of SA-Applicant as necessary to protect and avoid high quality natural and environmental resource and the inclusion in the Route Proceeding, Docket No. CN-13-474, of SA-03 along with any other System Alternative that meets the identified need, pursuant to the Commission's authority under Minn. Rule 7853.0800.

Thank you for consideration of these comments.

Sincerely,

William Sierks

William Sierks
Manager, Energy and Environment Section
Minnesota Pollution Control Agency

APPENDIX A

BEHAVIOR AND CLEANUP OF OIL SPILLED TO SURFACE WATER, SOIL, AND GROUNDWATER

Presented below is general description of behavior and cleanup of oil spilled to surface water, soil, and groundwater.

Behavior of Oil in Surface Water

Many factors contribute to the spread and spill response efforts of an oil spill to surface waters, including weather, wave action and the chemical and physical properties of the oil. Oil that reaches surface water spreads on the surface of the water. If the water is flowing, the oil will be carried along. Additionally, wind will spread oil on water. By these forces thick layers of oil will spread and become thinner, more extensive layers. Oil spills may range from thickness measured in feet to a micron-thick rainbow of oil.

Some of the oil on water will evaporate. For example, Bakken oil is more volatile than many other crude oils. The evaporation of the “light end” portion of the oil increases the risk of ignition and exposure of responders to the toxic volatile components in the oil. Some of the oil on the water’s surface will sink, especially as it mixes with sediment and as it loses the light ends through evaporation. Alberta oil sands crude is more prone to sinking than are many other crude oils. Sunken oil may move with water and/or may sink into bottom sediment. It may later release from bottom sediment if disturbed or with changes in temperature or current. Oil that sinks is especially challenging and tactics for finding and recovering sunken deposits of oil are not well developed. Removal of oiled sediment creates significant damage on its own. Some of the oil on water will dissolve into the water. Benzene, a toxic component of all crude oil, is among the most soluble components of crude and refined oils. Oil in moving waters will form emulsifications, called oil mousse, which is difficult to recover. Crude oils and refined oils will also have varying levels of hydrogen sulfide and other gases and constituents that are potentially toxic to humans and water life. In addition, oil spilled in surface water will coat and kill emergent vegetation, wildlife, shoreline, structures, and vessels.

Most aspects of response to an oil spill to surface water are made more difficult and less effective in winter ice and snow conditions. This is especially so if oil gets under ice, or if

the ice is not safe for holding up responders and equipment. Sometimes oil on frozen ground or oil on top of competent ice makes for easier oil recovery.

Often a point is reached where the environmental damage caused by attempting to recover spread out and dispersed oil outweighs the damage of the oil. Consequently, oil spill response strategy is to contain spilled oil before it gets away.

Spill Response to Protect Surface Water

Every oil spill recovery tactic requires speedy deployment of specialized equipment by specially trained responders. The tactics of recovery of oil from surface water include:

- Reaching the location of the spill, and reaching downstream oiled or potentially oiled locations. Access along a railroad track or pipeline right-of-way to the spill site sometimes is easy. But getting access to oil that has gotten away from the spill site down river or into fringing wetlands is often very difficult.
- Stopping the flow of oil from the land into the water. Each tactic requires access, and much equipment and specialized training.
- Capturing and containing oil downstream of the spill site. This is usually attempted with floating "containment booms" (floating 50 foot long plastic tubes chained together) to hold the oil. Placing containment booms require access and boats, booms and ropes, anchors, buoys, and specialized training. This equipment is seldom nearby. Containment booms are limited in the amount of oil they will hold back. Containment booms lose effectiveness in water with currents or shallow water. Containment also typically becomes less effective the further downstream oil travels and the more dispersed oil has become. Downstream capture and containment depends on the currents, weather, shoreline type, and access. The best-prepared companies have examined and prioritized potential down-stream containment sites in their response planning before the spill.
- Skimming, sorbing, or pumping oil from the water's surface. A skimmer is a vacuum or sorbing device that pulls the floating oil layer off of the water. Sorbents are natural or man-made materials that absorb oil but not water. The oiled sorbent must then be recovered from the water for disposal. Vacuum trucks can pump oil from oil pools or thick layers of oil on water. Skimming, sorbing, and pumping oil requires access to the oil location and equipment and tanks to store recovered oil for eventual disposal.
- Down-stream, ahead-of-oil protection of shorelines and sensitive features. Containment boom can be deployed at some sensitive locations before the oil arrives to deflect oil further down-stream. Protection measures require careful selection of sites to be protected, since equipment and time does not allow

protection of all areas. In the best of cases, sensitive areas have been examined and prioritized in response planning before the spill.

- Mopping up oil that has been stranded on shorelines, wetlands, marinas, structures, etc. This can be done with sorbents, power washers, oil-lifting chemicals, excavation, etc. This is very labor-intensive work requiring equipment, access, and specialized training. Some mopping-up methods can damage or destroy environmental features, for example excavating beaches, steam cleaning rocky shores, or moving people and boats through wetlands.
- Sampling water, sediment, shoreline, vegetation, etc. to assess where oil or oil components remain in the environment and whether additional recovery is possible and warranted.
- Recovering residual oil from sediments, shorelines, wetlands, and other places as possible.
- Monitoring the ongoing effects of residual oil and of recovery operations.

Even a very aggressive and effective spill response will not recover all spilled oil from a surface water.

Behavior of Oil on the Ground, And In Groundwater

As oil spilled onto the ground sinks into the ground, some oil will be retained by soil. So a small spill may be absorbed into soil and may never reach groundwater directly. But whether or not oil reaches groundwater, the oil retained on or in the soil will serve as a continuing source of groundwater contamination as infiltrating precipitation passes through it. Some soils such as clay have small or non-connected pore spaces such that oil will not readily pass through it, while soils like sands and gravels have large interconnected pore spaces through which oil will pass readily and quickly. The speed of travel is also dependent on the viscosity of the substance. Some oils are very “liquid,” passing through soil quickly; other oils are thick, and those thick oils move through soil pores slowly.

“Groundwater” happens at the depth below the surface when the pore spaces between soil particles are filled with water instead of air. The depth of groundwater is highly variable in Minnesota from a few feet to one hundred or more feet. Groundwater moves, typically slowly, towards connections with surface water, wells, or other discharge points. Some fractured rock formations will allow oil plumes to move very quickly and very far.

When oil meets groundwater, the oil will mostly float near the surface of the groundwater, smearing the soils in that interface. The floating oil is termed “free product.” It will spread out in a floating layer in the direction of groundwater flow. Some of this floating oil will

dissolve into groundwater forming a "plume." Some will evaporate and rise towards the surface. Some will remain sorbed onto soil.

Spill Response to Protect Groundwater

Once groundwater has become contaminated, the response strategies include understanding the direction, speed, and other characteristics of the groundwater. These response strategies use a variety of tools, including pre-existing information, soil borings, groundwater monitoring wells and geophysical methods. Classic physical strategies to protect groundwater from spills include:

- Pumping spilled oil from the ground's surface before it sinks into the soil;
- Digging oil-saturated soils so that the oil won't continue sinking into groundwater;
- Using high capacity blowers into the soil to suck the oil off the soil or groundwater as a vapor;
- Installing skimmers and pumps into the free product oil floating on the groundwater surface to pump out free product, and;
- Pumping groundwater to draw floating and dissolved oil to the surface for treatment.

Unfortunately, even a very aggressive and effective spill response will not recover all spilled oil from the ground. In those cases, if oil reaches groundwater, strategies for mitigating contaminated groundwater include:

- Ongoing groundwater pumping and treatment;
- Well replacement or treatment of a contaminated well;
- Adding restrictions on drilling new wells in the area;
- Adding oxygen and other materials to enhance natural degradation of oil;
- Ongoing monitoring to track contaminated groundwater behavior, and;
- Monitoring natural attenuation and biodegradation.

So, a spill of oil onto tight soils, with prompt recovery of oil from the ground's surface, and prompt excavation of contaminated soils is more effectively cleaned up and less damaging than is a spill of oil onto permeable soils, or areas with shallow groundwater. Especially concerning are spills of large volumes of oil on permeable soils near wellheads.

Biodegradation of Oil

It is well understood that oil that cannot be retrieved after a spill will eventually biodegrade over a period of years or decades. The rate at which biodegradation occurs in surface water, ground water, or soil is variable and contingent on many factors including oil concentration, soil types, temperatures, adequate oxygen and moisture. Oil-specific

chemical and physical properties influence biodegradation. Some refined oils have additives or other non-biodegradable components.

Dissolved oil at the front and side of the plume will typically be attacked by indigenous microbes. A steady-state will eventually be reached as the microbial biodegradation at the forward edge of the plume keeps up with the oncoming oil in the oncoming groundwater. As oil content of the plume is exhausted, this biodegradation consumes the most or all of the spilled oil and the plume shrinks. This process is called natural attenuation. Understanding natural attenuation is important in a spill response, but natural attenuation is never accepted as the sole response to any spill. Plumes of oil contamination in groundwater are typically measured in hundreds of feet or fractions of a mile from the spill. A plume's life may be only some years, or may be very long.

Synopsis of A Few Oil Pipeline Spills in Minnesota

The largest pipeline spill in Minnesota in recent decades was a 1.7 million gallon crude oil spill from Lakehead (now called Enbridge pipeline number 3 in Grand Rapids in March of 1991. Pumping and extensive excavations of wetland was done to recover most of the oil. About 300,000 gallons escaped to the Prairie River. Luckily, most of that oil flowed onto the river's ice surface, and was recovered by an aggressive and effective company response. If the spill had gone beneath the ice, or had it been in a different season, it would have been far more challenging to recover and would have caused much surface water and downstream damage.

In 2002, the Lakehead (now called Enbridge) pipeline number 3 leaked approximately 250,000 gallons of crude oil into wet land near Cohasset in 2002. An oil burn was done because of concern with impending rain pushing oil to the nearby Mississippi River. Remaining oil was pumped and excavated from the wet land and extensive land restoration done over several years.

In 2009 near Staples, Minnesota Pipe Line Company was reinforcing or replacing sections of pipe. A device placed on the line to temporarily reroute the line failed during the night, and approximately 210,000 gallons of crude oil was lost. It pooled at the surface and no surface water was nearby. An aggressive excavation was immediately begun. Many thousands of cubic yards of soil were removed and disposed off-site. A passive sump system was left in place for a few years at the deepest point of impact. The contamination did not migrate off site due to the significant excavation effort.

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Minnesota Pollution Control Agency

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January 23, 2015

The Honorable Eric Lipman
Minnesota Office of Administrative Hearings
600 North Robert Street
P.O. Box 64620
St. Paul, MN 55164-0620

RE: In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota
MPUC Docket No. PL6668/CN-13-473
OAH Docket No. 8-2500-31260

Dear Judge Lipman:

The Minnesota Pollution Control Agency (MPCA) submits the following comments for consideration by the Administrative Law Judge (Judge) in making recommendations to the Public Utilities Commission (Commission) in this matter. The MPCA's comments provide information addressing several of the criteria set forth in Minn. Rule 7853.0130 for making a determination on a certificate of need for the Sandpiper Pipeline Project (SA-Applicant) proposed by North Dakota Pipeline Company ("NDPC" or "Applicant"). The MPCA respectfully requests that if a determination of need is reached in this proceeding, the certificate of need be conditionally granted contingent upon suitable modification of SA-Applicant to protect and avoid high quality natural and environmental resources, and the inclusion in the Route Proceeding, Docket No. CN-13-474, of SA-03 and any other System Alternative that meets the identified need, pursuant to the Commission's authority under Minn. Rule 7853.0800. The MPCA will gladly provide additional information or comments that the Judge may find helpful in the course of this proceeding.

A. The MPCA's comments address four of the criteria required under Minn. Rule 7853.0130 for a determination on a certificate of need.

Minn. Rule 7853.0100 requires evaluation of all applicable and pertinent factors listed under each of the criteria set forth in Rule 7853.0130 and a specific written finding with respect to each of the criteria. Minn. Rule 7853.0130 states that a certificate of need shall be granted if all the listed determinations can be made. However, if one or more of those determinations cannot be met, a certificate of need may be denied, or conditionally granted subject to modification, under Minn. Rule 7853.0800.

The MPCA is providing comments that address the determinations required under Rule 7853.0130.B (2); 7835.0130.B (3); 7853.0130.C (2); and 7853.0130.C (3), which state:

- 7853.0130.B. a more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record by parties or persons other than the applicant, considering: . . .
  (2) the cost of the proposed facility and the cost of energy to be supplied by the proposed facility compared to the costs of reasonable alternatives and the cost of energy that would be supplied by reasonable alternatives;
  (3) the effect of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives; and . . . .

- 7853.0130.C. the consequences to society of granting the certificate of need are more favorable than the consequences of denying the certificate, considering: . . .
  (2) the effects of the proposed facility, or a suitable modification of it, upon the natural and socioeconomic environments compared to the effect of not building the facility;
  (3) the effects of the proposed facility or a suitable modification of it, in inducing future development.

The MPCA comments will address each of the criteria mentioned above and associated listed factors.

B. SA-03 is a reasonable and prudent alternative to the Applicant's facility (SA-Applicant), since the respective costs of SA-Applicant and SA-03 and of oil to be supplied by SA-Applicant and by SA-03 are not significantly different. Minn. Rule 7853.0130.B(2).

Financial impacts and comparative costs are among the factors to be evaluated in determining whether the criteria in Minn. Rule 7853.0130.B are met. Since MPCA submitted its comments dated August 21, 2014 to the Public Utilities Commission,[1] additional relevant testimony have been submitted in this docket. This included the direct testimony of economist Adam Heinen of the Department of Commerce (Doc. ID 201411-104761-03 ("Heinen Direct"). Mr. Heinen stated his expert opinion that System Alternative SA-03, as proposed by the MPCA, would meet the need of the project if as also proposed by MPCA, the Clearbrook terminal location was moved westward to the Crookston area or another location closer to the North Dakota border. (Heinen Direct, p. 75,) Mr. Heinen also indicated that moving the terminal location could increase the cost of constructing the pipeline, and discussed Applicant's estimate of the cost increase. (Heinen Direct, 75-76). Mr. Heinen then stated in his opinion that any apparent higher costs of SA-03 based on Applicant's analysis were insignificant and unlikely to impact retail prices and that the Applicant had not shown that SA-03 was an unreasonable alternative to meet the need of the proposed project. (Heinen Direct, pp. 77-78)

[1] See PUC Docket Filing _20148-102458-02 and 20148-102458-04

Mr. Heinen reinforced his direct testimony when he filed rebuttal testimony addressing SA-03. Mr. Heinen affirmed that SA-03 appeared to be a reasonable alternative to meet the need for this project. (Heinen Rebuttal, p. 7) (Doc. No. 20151-105968-01). This testimony supports the finding that under Minn. Rule 7853.0130.B(2), based on comparative cost, SA-03 is at least a reasonable and prudent alternative. However, comparative effects on natural environments, i.e., potential environmental and natural resource impacts as discussed in the following sections, appear to make SA-03 "a more reasonable and prudent alternative" under Minn. Rule 7853.0130.B(3).

In addition to direct costs of construction and operation, the costs considered under Rule 7853.0130.B(2) should include an evaluation of whether a system alternative such as SA-03 is a more reasonable alternative to SA-Applicant because of a reduced risk of a costly spill to a sensitive environmental area. An Alternative that avoids or impacts fewer sensitive ecosystems and water bodies than SA-Applicant will have a smaller likelihood of incurring significant response costs. As documented by the U.S. Environmental Agency (USEPA), it costs considerably more to restore or rehabilitate water quality than to protect it.[2] The areas of the state traversed by the SA-Applicant have waters and watersheds that are currently subject to protection in the state's "Watershed Restoration and Protection Strategy" program,[3] financed through the Clean Water Fund and aided by significant volunteer participation of Minnesota citizens. By keeping these waters as clean as possible before they become impaired, extensive costs of restoring waters to state standards can be avoided. Location of oil pipelines in these areas place their pristine waters at risk, and also place potentially millions of dollars in state and federal funds allocated for protection of these areas at risk.

When evaluating spill response costs, the following factors would make one corridor a better choice than another in minimizing the potential for costly spills or accidental discharges: fewer crossings of flowing water; fewer adjacent water bodies; quality of those waters; presence of especially sensitive areas or habitats or species or uses; better access to downstream oiled areas; tighter soils; and closer and more equipped and prepared responders. The MPCA applies these factors in comparing SA-Applicant with SA-03 and other alternatives in the next section of our comments.

C. SA-Applicant presents significantly greater risks of potential environmental impacts and encroaches on higher quality natural resources than SA- 03 and several other system alternatives. Minn. Rule 7853.0130.B(3). The effects of SA-Applicant on the natural environment support a determination in favor of other alternatives. Minn. Rule 7853.0130.C(2) and C(3).

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[2] See http://water.epa.gov/polwaste/nps/watershed/upload/economic_benefits_factsheet3.pdf (incorporated by reference) .

[3] See (http://www.pca.state.mn.us/index.php/water/water-types-and-programs/surface-water/watershed-approach/index.html)

Environmental risks are posed by all aspects of pipeline construction and operation, including post-spill recovery and restoration activities. The primary and most significant risks are associated with the long-term effects upon environmental and natural features that will be permanently altered, eliminated, or otherwise impacted by the presence of a pipeline, as well as the potential impacts of the release of crude oil as the result of a spill event during the potential 40 years or more that the pipeline will be operational. Those risks include environmental damages such as loss of wildlife, contamination of drinking water, destruction of fisheries, loss of habitat, and alteration of ecological systems. (For a discussion of the behavior and cleanup of oil spilled to surface water, soil, and groundwater, see Appendix A to the MPCA's comments.)

During these proceedings, the MPCA has commented extensively on the environmental concerns regarding the route proposed by Applicant in comparison to alternative routes and system alternatives. MPCA's prior comments can be found in Document Nos. 20146-100780-01, 20148-102458-02 and 20148-102458-04, each incorporated by reference. These prior comments have addressed such specific items as access to potential release sites in surface waters, potential to impact ground water, wild rice, the state's highest-quality surface water systems, wildlife habitat, low income populations, watersheds currently being assessed for restoration and protection strategies, fisheries, economies, and numerous other parameters.

In these comments, the MPCA concluded that with respect to protection of the highest-quality natural resources in the state, the SA-Applicant route presents significantly greater risks of potential impacts to environment and natural resources than several of the system alternatives, including SA-03. Although all proposed routes and system alternatives have the potential to impact some natural resources, the Applicant's proposed route encroaches on higher quality resources, superior wildlife habitat, more vulnerable ground water, and more resources unique to the state of Minnesota than do many of the proposed system alternatives. Several examples of the greater potential for harmful environmental impacts of SA-Applicant compared to other alternatives are highlighted in the following pages.

The relevance of other system alternatives depends upon whether the need for the project is determined based upon a narrower and more localized view or upon a larger regional view. While SA-03 has been identified as a reasonable and prudent project alternative as a general matter, it serves as such an alternative from both a localized and regional view. However, if need is determined based on a larger regional view of need, several other system alternatives may also be reasonable and prudent alternatives to meet that regional need. Consequently, the MPCA also addresses the comparative impacts of other System Alternatives and SA-Applicant to inform a determination of need from a regional perspective.

The broader objective of the proposed project is transporting oil to markets in the Midwest and along the eastern and gulf coasts, not to transport oil through the state of Minnesota

with termination in Superior Wisconsin.[4] Oil that is to be transported to Superior, Wisconsin through the proposed pipeline will continue through Wisconsin to Chicago (or Wisconsin and Michigan if routed to Sarnia, Ontario). Oil that would be transported via one of the southern system alternatives, such as SA-04, and on to the Chicago area would have to be transported through Iowa before reaching Illinois. In either case, Chicago appears to be a common destination for most if not all of the oil that is proposed to be moved through Minnesota.

Information regarding the existence of contractual agreements obtained when Applicant held an "open season" has been offered as the underlying basis for a determination of need.[5] The Applicant has suggested that the facility as proposed (SA-Applicant) is necessary in order to assure those contractual agreements are filled and that alternatives such as SA-03 would negatively affect the cost of fulfilling those agreements. This proceeding will determine whether the Applicant's open season agreements establish the need for siting a pipeline through Northern Minnesota instead of along a southern alternate route. If the underlying actual and predominate need of the project is to get Bakken oil to Midwest regional markets in Wisconsin, Michigan, or Illinois, that need can be achieved by several of the system alternatives. The foregoing is generally and specifically supported by the direct and rebuttal testimony of Applicant's witness Neil Earnest (Document ID Nos. 20148-102134-03, Earnest Direct Testimony, and 20151-105934-01, Earnest Rebuttal Testimony). See Figure 1, which is an overview of Applicant's regional infrastructure and corresponding destinations.

[4] Applicant testimony acknowledges that the project's intended destination is not Superior, Wisconsin but refineries in the Midwest. Applicant witness Earnest, in rebuttal, indicates that oil from this project is not only competing with alternative modes of transportation to refineries in Chicago, Patoka, and Cushing. The oil is also competing with all of the other crude oil choices available to the refineries in the Midwest. Enbridge rebuttal at pp 5-6. "Accordingly, all else equal, higher Sandpiper transportation costs to the Midwestern markets acts to decrease the volume of Bakken crude oil that can be expected to be processed in the Midwest, and to lower the utilization of the pipeline." (Earnest Rebuttal, 6) 20151-105934-01

[5] Heinen Direct, pp. 6-7. The nature and content of these open season transportation service agreements are confidential. The MPCA has not examined the nature or substance of these agreements or their duration. Mr. Heinen also indicates in his testimony that he does not know the ultimate destination of that oil.

Figure 1

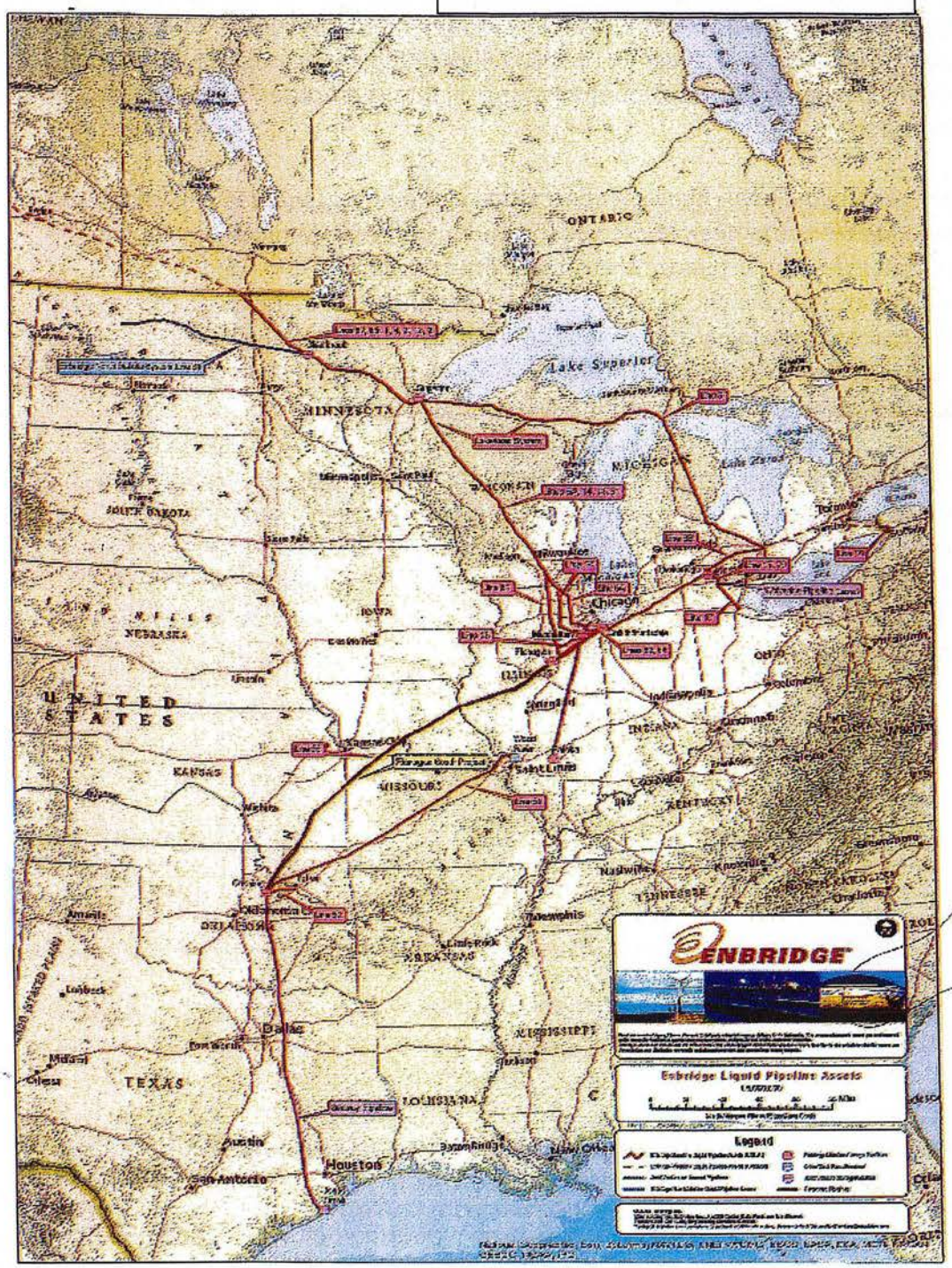
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Enbridge Liquid Pipeline Assets
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Lake Superior
Chicago
Houston
Dallas
Austin
San Antonio
Tulsa
Edmonton
Toronto
Detroit
Cleveland
Cincinnati
Nashville
Memphis
Little Rock
Saint Louis
Kansas City
Omaha
Minneapolis
Milwaukee
Indianapolis
Columbus
Knoxville
Greensboro
Charlotte
Amarillo
Lubbock
Midland
Glasgow
Minot
Regina
Saskatoon
Winnipeg
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Pristina
Nicosia
Tel Aviv
Cairo

Comparative Evaluation of Environmental Effects

The comparative long term environmental and eco-system impacts and the potential impact of spills must be carefully evaluated for each system alternative in determining the need for a pipeline project. Permanent harm to sensitive eco-systems, habitats, and species may occur following construction of a new pipeline. In addition, long-term impacts from a spill can be much more damaging in areas containing features such as environmentally sensitive areas and those with limited access. As discussed below, these long-term environmental and eco-system impacts should be accorded great weight in the determination of need for a pipeline project. Further, in associated routing proceedings, these impacts must be subjected to even more rigorous and detailed environmental review when evaluating alternative routes. It is not sufficient under Rule 7853.0130 to determine that the location for the proposed project is suitable or reasonable. Rather, the location should be one that best minimizes the risk to human populations and environmental and natural resources.

1. **Adverse Impacts to High Quality Surface waters are Greater under SA-Applicant.**

SA-Applicant traverses a greater number of high quality water bodies than does SA-03 and presents higher risk of environmental impacts from a spill or release of crude oil along its route corridor. Based on watershed health scores as determined by the Minnesota Department of Natural Resources in its Watershed Health Assessment Framework, MPCA documented that the adverse impacts to overall water quality from construction and operation, as well as spill cleanup and response, of Applicant's Alternative were more harmful than alternatives including SA-03, SA-04, and SA-05. See MPCA Comment letter dated August 21, 2014 , Document ID Nos. 20148-102458-02 and 20148-102458-0420148-04, page 5).

The MPCA provides these additional comments to assist in proper interpretation of the information on surface waters in the Department of Commerce environmental analysis "Comparison of Environmental Effects of Reasonable Alternatives" (DOC study) submitted on December 19, 2014, (ID 201412-105567-01) and in evaluating the criteria and factors based on that information. For example, on its face, the DOC study may be misinterpreted as indicating that SA-03 is a worse alternative than SA-Applicant in affecting impaired waters. The DOC study concluded that there were 50 impaired waters crossed by the Sandpiper route, and 98 impaired waters crossed by SA-03 (DOC Study, 72, 90). Under the Clean Water Act ("CWA"), an impaired water is any water body (e.g., lakes, rivers, streams, wetlands) that is too polluted or otherwise degraded to meet the applicable water quality standards set by states, territories, or authorized tribes. Water quality and water quality standards will vary throughout the state depending on the region of the state in which the waters reside. "Impaired" waters are not the same across the state. For a water body to be deemed impaired in southern or western Minnesota (western corn belt plains or Red River valley ecoregions), it typically will have a greater degree of contamination or degradation than would be required for a water body in the central

hardwood forest ecoregion of Minnesota traversed by the applicant's preferred route (Sandpiper) to be deemed impaired. Thus, waters that are listed as impaired along the SA-Applicant route are likely to be higher quality (having a lower contamination level) than a water listed as impaired in the southern part of the state, and might not be listed as impaired at all along the SA-03 route. Waters in northern Minnesota are generally of better water quality or more pristine.

2. Significant Environmental Damage Would Occur From a Release at or near a Water Crossing Extending up to at least a Distance of 10 Miles from the Point of Release. SA-Applicant Has Many Areas of Limited Access, Increasing the Risk of Extended Impact to Surface Waters.

The most significant potential impact to a surface water from a crude oil pipeline crossing is the environmental destruction that would occur in the event of a release at or near the water crossing. According to a third party risk assessment document developed as part of the Keystone XL EIS[6], Exponent states: "A distance of at least 10 miles downstream from the proposed centerline of the pipeline should be used for the identification of sensitive areas and for identifying CPSs(contributory pipeline segments) during the final design phase of the Project." The 10 mile estimate is fair, given the potential for flowing water to carry a release of oil, especially in remote areas such as those found throughout the proposed Sandpiper route. Considering that the 2010 Enbridge spill into Talmadge Creek and the Kalamazoo River caused significant damage approximately 35 miles from the spill site, a ten mile estimate of damages is conservative and reasonable. See Stolen testimony, Document ID 201411-104748-02, page 24.

Damage to aquatic systems from an oil release can occur either as a result of physical effects such as smothering of organisms, or toxic contamination due to the chemical compositions of the oil. An oil spill in an aquatic ecosystem could cause, among numerous other impacts, death of waterfowl, other bird species, amphibians, reptiles, aquatic mammals, microorganisms, plankton, fish, pets and livestock living adjacent to waters, stunted growth of surviving species, loss of vegetation, destruction of soils, long-term reduction of dissolved oxygen, human health damage, damage to air quality, property value loss, and destruction of drinking water resources. This does not include damages that would occur during the cleanup process, especially in areas with limited, restricted or no access.

3. Potential Damages During Pipeline Construction and Testing Are Greater for SA-Applicant than other Alternatives.

Damages to surface waters as a result of construction activities can and do occur. Flowing water can also carry these effects a long distance from their origin, as noted above. MPCA has observed and documented significant sediment discharges to surface water on pipeline

[6] See http://keystonepipeline-xl.state.gov/documents/organization/221278.pdf, page XV, "Recommendations",

projects as a result of failing to install sufficient sediment and erosion controls on hillsides adjacent to surface waters. The failure to account for spring time subsidence of soils as a result of winter construction is common; frozen soils that are dug up and replaced into trenches thaw and subside in warmer spring temperatures, causing the soils to sink over the pipeline and form a ditch. These ditches act as conduits for melt water or rain water, and as they do not have sediment controls installed, tend to erode significantly as water runs through them. It is common for these subsidence ditches to terminate in water bodies, causing sedimentation and habitat damage (MPCA Comment Letter dated April 4, 2014, -Document ID 20144-98170-01, page 8).

Damage to surface water resources during hydrostatic testing discharges has occurred recently in the state. During these tests, segments of pipeline are filled with a significant volume of pressurized water, often millions of gallons, to test the integrity of the pipe. The water is then released in a manner that should minimize environmental impact. During the Alberta Clipper/Southern lights diluent project, Enbridge exceeded agreed-upon maximum discharge rates on 15 of its hydrostatic testing discharge operations. At two of these sites (adjacent to the Mississippi River and adjacent to the Clearwater River), the exceedances were enough to cause significant erosion and sediment discharge to surface waters. These cases were referred to the U.S. Environmental Protection Agency and eventually settled by the U.S. Department of Justice in 2013 with Enbridge paying a $425,000 penalty. During these hydrostatic testing operations, as much as 4,000 gallons of water per minute can be discharged from valves. This water is general required to be discharged to an upland area or a dewatering device, but when discharged rates are exceeded, or sometimes even when they are not, the pressurized water can erode soils and carry those eroded soils to surface waters, causing turbidity or smothering of aquatic habitat.

The placement of the new terminal construction west of the proposed Clearbrook location as suggested by MPCA in SA-03 will assure that future pipelines are located west and south of these pristine areas, thus avoiding the resources that the state is spending millions of dollars to protect. Meanwhile, the continued expansion of the Clearbrook facility that will coincide with construction in the SA-Applicant location will mean continued impact and potential impact to the highest value (pristine) waters in our state as a result of future pipeline construction.

4. Threats to Groundwater and Potential Drinking Water Supplies from SA-Applicant are Difficult to Assess, but Appear to Pose More Significant Risks than the System Alternatives, including SA-03.

Highly detailed topographical data for the state of Minnesota (called "LIDAR" data)) illustrates that the Sandpiper route (SA-Applicant) traverses territory with greater topographical contrast than does the SA-03 route. Much of the topography along the SA-Applicant route in Minnesota is the result of the deposit of glacial till from thousands of years ago. The composition of this till is often dependent on how the till was deposited. A

term used to describe these soils is "moraine," or a mass of rocks and sediment carried down and deposited by a glacier, typically as ridges at its edges or extremity.

What is most important to understand about the soils along the SA-Applicant route is that the complexity of moraines in the area creates a significant degree of localized changes in groundwater movement that are very difficult to predict, as opposed to some of the flatter lands to the west and south, such as those traversed by SA-03, SA-04, or SA-05. Typically, ground water through this till along the SA-Applicant route will move laterally and toward a water body, so it is important that significantly more data is gathered from this route before the possible movement of oil in the event of a release can be predicted and response plans developed. It would be very difficult, if not impossible, to accurately assess the potential for ground water contamination based solely on the examination of GIS layers. However, it can be predicted that the damage to groundwater, potentially used as a source of drinking water, as well as the connected soils could take decades to repair, if the damage could be repaired at all. Additional impacts could include damage to agricultural areas (inability to grow crops) and damage to surface waters, wildlife and habitat from oil carried through underground conduits to those areas.

The LIDAR data strongly suggests an increased potential for impacts to drinking water from SA-Applicant than from SA-03 and some other system alternatives. However, more in-depth study will need to be done in the routing phase in order to make an informed comparison and either confirm or negate what the LIDAR data suggests as a factual conclusion.

5. SA-Applicant Threatens a Greater Percentage of Wild Rice and Native Forests than any of the Proposed Alternatives, including SA-03.

Wild rice, in addition to being an important economic consideration in Minnesota, is also an extremely important cultural resource, as well as an essential food source for humans and wildlife. It requires very specific conditions and good water quality, both of which are provided by north central Minnesota lakes. The Sandpiper pipeline would encroach on some of the richest wild rice territory in the state of Minnesota. Further, MPCA staff has identified 10 wild rice locations along the Sandpiper route for which there is no access from pipeline to the location of the wild rice. By comparison, SA-03 has two such areas. As shown in Figure 2, SA-Applicant (in green) would threaten significantly more of the state wild rice crop than any system alternative.

Minnesota Pollution Control Agency

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April 4, 2014

Mr. Larry B. Hartman
Environmental Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

RE: Enbridge Sandpiper Pipeline Project - North Dakota Pipeline Company LLC
Pipeline Routing Permit Application, MPUC Docket No. PL-6668/PPL-13-474

Dear Mr. Hartman:

Thank you for the opportunity to review and comment on the Pipeline Routing Permit Application (Application) for the proposed Sandpiper Pipeline Project (the Project), prepared by Enbridge, doing business as Enbridge Pipelines (North Dakota) LLC (EPND). The Minnesota Pollution Control Agency (MPCA) has significant concerns regarding the lack of information for the proposed Project route. The supporting documentation for the preferred route does not adequately demonstrate avoidance and minimization of environmental impacts in areas where the existing conditions or resources may be vulnerable to disturbance and degradation (e.g., high quality waters and impaired waters, wetland crossings with limited access, slopes greater than five percent, areas of erodible soils and accessibility). We do note that the route avoids a calcareous fen present in the northern route; however, other sensitive areas including habitats, drinking water intakes and well head protection areas have not been identified. Additional information is needed to adequately consider alternative routes and the potential environmental effects associated with the preferred route.

Concerns also arise based on MPCA's experience with regard to pipeline construction, spills and remediation efforts, as well as Enbridge's apparent disregard of much of the information needed during the review and approval of the Alberta Clipper Crude Oil and Southern Lights Diluent Pipeline project in 2009-2010 (Alberta Clipper). The MPCA expects to receive the same level of information about this Project to enable the analysis of potential environmental impacts and the development of protective conditions in any issued permits. Due to the lack of detail provided regarding existing environmental conditions along the preferred route, MPCA cannot conclude or support the presumption that EPND has chosen the least environmentally impacting route or that the proposed actions are adequate to minimize environmental impacts that will result from the project.

MPCA's initial concerns and comments on the Application and Project include the following topics: future access to potential release sites; construction and operation of the break-out tanks; cumulative impacts from construction of additional pipelines and infrastructure in the area; emergency responsiveness and spill prevention; inspections and monitoring conducted during construction; proposed water body crossing methods and time frames; wastewater issues; and water quality, watershed and wetland issues.

ACCESS TO THE PROJECT

Obtaining access to a remote area of the Project in the event of a release to the environment is of significant concern. Numerous segments of the proposed Project route extend through large expanses of bog or open water wetland that have limited or no access under seasonal conditions. When vehicles cannot access a potential leak location under seasonal conditions, the risk of large-scale environmental damage and costly clean-up increases.

The LaSalle Creek crossing is a good example of an area in which it would be extremely difficult, if not impossible, to access downstream impacts and deploy equipment necessary to contain and clean up a spill. Large expanses of bog and some forest are located between the proposed crossing of La Salle Creek and Big La Salle Lake; consequently, there are no existing locations to access the water that could potentially be carrying leaked oil until after it has entered Big La Salle Lake. The environmental damage that would occur as a result of a leak at this location could be massive, and the obstacles to containing the leak or performing clean-up activities could be insurmountable. The MPCA strongly recommends that alternate routes around the LaSalle Creek and LaSalle Lake areas be considered. A suggested route could include constructing the Project parallel to Highway 108 located west of LaSalle Lake, extending southward along Highway 200 until Highway 200 intersects with 400th Street. At 400th Street, the Project would extend eastward until it rejoins with the proposed route.

BREAK-OUT TANKS

As you aware, the MPCA is a potential responsible governmental unit for the environmental review of projects involving the construction of hazardous material storage capacity (ref. Minn. R. 4410.4300, subp. 10(B)). Further, it is understood that the break-out tanks proposed to be constructed in Clearbrook will be addressed in the Comparative Environmental Analysis (CEA) prepared by the Department of Commerce. The assessment of impacts related to the tanks should, therefore, be evaluated to ensure adequate prevention and containment measures are incorporated into the Project design and operations, in order to prevent future releases and remediation. A secondary permeability assessment should be included in the CEA and construction and operation of the Project and break-out tanks should be completed in compliance with the Minnesota Office of Pipeline Safety and in accordance with Minnesota secondary containment standards.

CUMULATIVE IMPACTS

In addition to the Project proposal, a second effort has been proposed to upgrade Enbridge's Line 3 from Neche, North Dakota, to Superior, Wisconsin. The Great Northern Transmission power line, which will transport energy from Manitoba to Grand Rapids, is also in the planning process. These three projects, and any additional future energy infrastructure in the area, will have the potential to fragment and impact ecosystems. Under these circumstances, serious consideration should be given to an evaluation of the potential cumulative effects of past, present and future projects with respect to the disruption of the habitat and the continuity of natural, relatively undisturbed landscapes that remain in Minnesota. This could include planning of common corridors, considering risk assessment, access and the minimization of impacts while meeting the needs of electrical, natural gas and oil transmission. Past pipeline routes have followed corridors that were created when a power transmission line was put in place. While there are benefits to following an existing corridor, power lines and pipelines are different types of projects that present different potential impacts. There are points on the Project route, such as the LaSalle Creek area, where a power line crossing has a relatively low risk of harming natural resources in the event of an accident. However, a pipeline accident, such as a large drilling mud release (frac-out) or an oil leak in the same location would be devastating to the pristine natural areas downstream from the crossing site.

EMERGENCY RESPONSE/SPILL PREVENTION/REMEDIATION

The CEA should identify the locations of the shut off valves for the Project's new line and describe how these will be installed strategically to prevent and/or minimize flow or backflow of the line contents into sensitive areas in the event of a line break. Procedures and time frames for activating shut off valves should be described. The CEA should also identify the worst-case discharge for the response zones of the Project per Section 194.105 of the Department of Transportation Pipeline and Hazardous Materials Safety Administration regulations, including the worst-case volume, maximum release time in hours, shutdown response time and line drainage volume.

If EPND's contractor generates a hazardous waste from materials brought on-site (e.g., paint clean-up solvents, waste paints, etc.), then the contractor is responsible for proper waste collection, storage and disposal in accordance with all applicable regulations. Any release of the hazardous waste as a result of the improper handling, storage or disposal by the contractor in this instance is the responsibility of the contractor to rectify to the satisfaction of EPND and all applicable regulatory agencies. The CEA should address how EPND will ensure that proper responsibility is taken for hazardous waste generated.

Additionally, EPND's contractor is to report spills to the Minnesota State Duty Officer and appropriate federal, state and local agencies as soon as possible. A listing of federal, state and local agencies including reporting thresholds and timeframes is provided in Appendix G of the Application. The contractor, in coordination with EPND and the appropriate federal, state and local agencies will ensure that additional parties or agencies are properly notified and that all cleanup activities are satisfactorily completed and documented. Again, the CEA should address how EPND will ensure that this occurs.

INSPECTION AND MONITORING

EPND must ensure that workings are well-inspected for compliance and should describe how this will occur. Eventually, EPND must provide assurances that inspections will occur. The MPCA believes that construction should not take place without a third-party inspector present and on-site, and that a minimum of one third-party inspector will be required for every "spread" of construction (the spread distance will be determined in the Clean Water Act Section 401 Certification for the U.S. Army Corps of Engineers Permit). Additional spreads must be authorized in advance with additional third-party inspectors. The MPCA seeks a significant commitment to third-party inspectors from EPND and with MPCA oversight to ensure compliance with all permit conditions.

Some hydrostatic test discharges associated with Enbridge's Alberta Clipper project exceeded permitted discharge rates and caused damage to the environment, MPCA will be requiring additional, concrete assurances that discharge rates are complied with, including round-the-clock inspectors to monitor the discharges and/or additional Best Management Practices (BMPs). This may be addressed in MPCA permits for the Project which will be in development during the environmental review of the Project.

PROPOSED WATER BODY CROSSING METHODS AND TIME FRAMES

All waters of the state that may be impacted by the proposed Project need to be identified in relevant plans, as was required during construction of the Alberta Clipper project. The Application and related documents prepared for this Project (e.g., the Environmental Protection Plan dated October 13, 2013) do not contain this information, and will need to be revised accordingly.

Further, EPND is proposing to use an "open cut" method for installing the pipeline in the majority of streams and water bodies. This method was determined to be unacceptable for the previous project.

Consequently, the CEA should clearly identify that water bodies with stable banks in mineral soil and with any noticeable flow at the time of construction will be crossed using a Dry Crossing Construction method, including horizontal directional drilling (HDD), guided bore, dam and pump, or flume. Only water bodies that are dry during construction and selected water bodies, such as ditches in peat lands with no banks or impoundments, can be allowed to be crossed using an open cut and/or push pull methods.

In addition to the identification of waters (both impaired and unimpaired) that are being crossed by the proposed Project, waters downstream (and upstream in lentic waters) of the crossing points must also be identified. Identification includes the name and type of the water body, its impairment status, and the distance from the crossing point. It is imperative to MPCA's review and permitting that these features are clearly identified on maps to ensure adequate mitigation measures are in place to protect water bodies during the construction of the Project. Map features required for MPCA's review are included in Appendix A.

Many of the crossing points of the proposed Project are upstream from very high quality surface waters which must be protected or impaired waters which must be improved in order to meet water quality standards. Examples of this include the La Salle Creek crossing (less than 1,000 yards upstream of Big LaSalle Lake and also upstream from the La Salle Lake Aquatic Management Area), or Jail Lake in Crow Wing County, a lake impaired by excess nutrients. The potential impacts from an oil leak may go far beyond the water body being crossed. In many cases the proposed route threatens not only one but several lakes or rivers downstream from the proposed route.

The Twin Lakes, east of a line between Park Rapids and Hubbard, are listed as impaired by excess nutrients and mercury in fish tissue. The Twin Lakes contain significant wild rice beds and both basins are identified as wild rice lakes by the Department of Natural Resources (DNR). In addition to this, the area between the lakes and the proposed Project crossing is inaccessible by any type of equipment that would be needed for clean-up efforts and is buffered by hundreds of acres of several types of wetlands. To further compound the environmental risk of this location, the Twin Lakes empty to the Shell River, a tributary of the Crow Wing River. The MPCA strongly recommends that alternate routes around the Twin Lakes area be considered. A suggested route could include constructing the Project eastward along Highway 14 (located west of Hubbard); Highway 14 then junctions with Highway 87. Before Highway 87 junctions with Highway 6, there is a transmission line easement that runs southward, somewhat parallel to Highway 87/6. The Project could be constructed along the transmission line southward where it intersects Arbor Road, heading eastward to where it intersects Highway 6. Here, the Project could parallel Highway 6 south until it intersects the current proposed route.

In any instance where pipelines cross sensitive aquatic environments, such as those described above, an assessment of the risk of doing so, relative to other available routes, needs to be provided. Such an assessment is needed in order to understand potential impacts that may result from a leak, including costly and environmentally destructive cleanups. The connectivity of water bodies, soil types, access to potential spill sites and the potential of destruction of other critical habitat downstream of a crossing location must be the subject of more risk assessment prior to approving a proposed route. Cost or time factors to the proposer should be subordinate to the prevention of environmental destruction and the proper assessment of the risks to humans and the natural environment.

WASTEWATER, STORMWATER AND HYDROSTATIC TESTING

The CEA should clearly address the management methods and BMP's needed to ensure compliance by EPND's contractors and employees as these relate to: hydrostatic testing (especially allowable discharge exceedance/dispersal methods/discharge rates); erosion control; sediment transportation control; and, scouring control at sites/results from hydrostatic/trench dewatering discharges activities.

For handling erosion and sediment, stabilization of a spread should be conducted within two days. Additionally, the CEA should clearly describe the roles for EPND and its contractors so that it is clearly understood who has the responsibility for what permit requirements out in the field.

Hydrostatic testing needs to be conducted after the pipeline is moved and in place in the trench. It may be necessary to construct temporary sediment basins to reduce flows prior to discharging hydrostatic test water into wetlands or lakes. During the Alberta Clipper project, flows directed overland near steep slopes, even when the straw bale dewatering device was in use, occasionally caused serious erosion, particularly when the sites had steep slopes nearby or significant disturbed soils.

The appropriation of large amounts of water from under the ice of smaller lakes can be dangerous. Appropriation of several million gallons of water from a small lake can drop water levels below the ice by an inch or more, thus creating conditions that may be unsafe for human activity. Hydrostatic testing of pipes, when appropriating from smaller lakes, should be done in ice-out conditions if possible.

WATER QUALITY, WETLANDS, AND WATERSHEDS

Controlling potential environmental issues in or near wetlands and in water bodies is another important area. Additional precautions may need to be taken in these areas. The Project will need various water permits from the MPCA. Impacts authorized under a U.S. Army Corps of Engineers Section 404 permit will need a Section 401 Certification from the MPCA. An Individual NPDES Construction Stormwater (CSW) permit will also be needed. To facilitate the MPCA's review and development of these certifications and permits, the CEA will need to provide certain information as described below.

Frac-Out Consideration, Discharges and Spill Control

Areas where soils covering pipelines are largely peat or silt are much more likely to experience frac-outs during HDD activities, or allow oil discharges from leaks to reach the surface and spread. If an oil release were to occur, clean-up would be extremely challenging (if not impossible). This may result in "in situ" burning, as was conducted near Cohasset, Minnesota in 2002. Burning, of course, may entail significant environmental impacts of its own.

The CEA should provide any available information about soil types and the history of past frac-outs along the route, as frac-outs are likely to re-occur. This information will allow the MPCA to determine if there are areas along the route that are of high concern for frac-outs, requiring the certification to restrict or eliminate the use of drilling mud additives where frac-out contamination of the water body is more likely.

The CEA should describe how initial containment of frac-outs will be conducted, for instance, by having containment booms on site that are easily accessible and located in close proximity to water bodies. In addition, it should describe the actions to be taken to safely navigate the water in difficult locations, such as a peat bog, where access to parts of the water body is not available.

On past pipeline projects, workers have endangered themselves attempting to wade out into peat bogs or very silty wetlands to isolate frac-outs in the water body. Effective and safe ways of traversing the system, such as a barge, need to be in place.

It should also be described in the CEA how EPND plans to minimize the potential for frac-outs discharging drilling mud into sensitive resource areas, such as water bodies crossed via the HDD construction methods, and areas immediately adjacent to wetlands and water bodies. In past projects, specific conditions to prevent these discharges have included:

- A Drilling Mud Containment, Response and Notification Plan. EPND should describe the site-specific locations relative to the water bodies that will be crossed, where all equipment and supplies (e.g., silt/turbidity curtains, boats, etc.) will be stored and ready for immediate deployment prior to commencing any HDD activities. At a minimum, the plan must contain: I) maps showing the specific locations with sufficient access to each water body; 2) supporting text detailing how EPND will transport equipment, supplies and adequate staff to each location prior to starting the HDD crossing; and, 3) a Flocculent Use Contingency Plan, which identifies specific products and the methodology to be used, if necessary, to contain a drilling mud release.
- Requirements that if containment and cleanup equipment is deployed, sediment and/or bentonite collected by the silt/turbidity curtains shall be carefully removed and disposed of in an upland disposal location in compliance with all applicable rules and regulations.
- Each spread team is trained in spill response, containment and clean-up, and the required response equipment will be available at the location of the HDD with the spread team on-site.
- Other requirements for containment and recovery measures include adjusting drill pressures, pump volume rates and drill profiles to minimize the release, and suspending drilling operations if containment measures do not effectively control the release.

Certain specific conditions will likely need to be developed for spills that occur near or into a wetland or water body. EPND needs to provide information as to how they can ensure that wetlands and water bodies are protected in the case of spill. Example conditions include:

- If a spill occurs during refueling operations, the operation needs to be stopped until the spill can be controlled and the situation corrected.
- Use of sorbent booms and pads to contain and recover released materials in standing water.
- If necessary, for large spills in water bodies, the use of an Emergency Response Contractor to further contain and clean up the spill will be required.
- Excavation of contaminated soils in wetlands may be necessary, depending on the severity of the release. Excavated soils will need to be placed temporarily on plastic sheeting in a bermed area and covered with plastic sheeting, and secured. This should be conducted a minimum distance of 100 feet away from the wetland.

It should be explained in the CEA how EPND should meet these conditions or other effective procedures that would be used in these situations. Procedures for evaluating and consulting on options for wetland and water body spill response should be described.

Concrete wash water, grindings and slurry, must not be discharged to wetlands, water bodies, and storm sewer systems or allowed to drain onto adjacent properties. Methods should be described by which EPND will ensure that there is no discharge of these materials.

This could include limiting disposal to a defined area of the site within a lined containment area sufficient to contain the wash water and residual cement, and ensuring that contractors hired to provide concrete products will provide equipment capable of reclaiming wash water during wash out. Concrete slurry must be contained in a lined pit, washout container or other device.

Stabilization and Erosion Control

The CEA should also discuss the measures that will be taken to protect soil and soil erosion, including how EPND will prevent unforeseen weather events from possibly causing significant erosion and potential discharges to water bodies. This could include performing the authorized work in spreads, and limiting the amount of excavated open trench within a spread to no more than two days of anticipated welding production. EPND will also need to describe how each spread will be restored (backfilled and BMPs in place) as the leading edge of the spread is opened and the work progresses.

Other measures to protect soil and soil erosion that should be discussed in the CEA include how EPND will segregate topsoil from subsoil in a manner that will prevent mixing when:

- constructing the Project in cropland, hay fields, pasture, residential areas and other areas as requested by the landowner where soil productivity is an important consideration;
- to the extent practicable in forested areas, standing water wetlands, and non-agricultural open areas with steep slopes adjacent to wetlands and water bodies; and,
- in wetland areas without standing water.

The CEA should also address how the soil and reserved topsoil will be replaced to the trench during backfilling.

The CEA also needs to describe how EPND will address areas of unusually steep slopes along the Project's proposed construction route that are adjacent to waters of the state, and measures that will be used to prevent topsoil erosion and loss after construction. Measures should include those taken when cutting into parent material (as defined in Figures 1, 2, 3 in the Environmental Protection Plan) for trenching, construction of the level work area or any other such cutting on the hillsides, and during backfilling. Options include removing the topsoil and storing it separately from the underlying subsoil and then replacing it in the trench in the opposite order removed. Measures should also be included for areas where there is not sufficient top soil separation for vegetation to be re-established, such as supplying suitable topsoil to ensure rapid re-vegetation and slope stabilization occurs in these sensitive areas.

The CEA should describe how EPND will implement and ensure compliance with intended requirements in the Individual NPDES CSW permit. This would include, but not be limited to:

- As a general rule, use of straw bales for sediment control should only be used in mucky, wetland soils. When used in upland situations, straw bales are as likely to increase soil erosion and transport, by increasing flow velocities in gaps between or outside of the bales as they are to decrease it.
- Remedying sediment-buried silt fences; removal of sediment from silt fences will not suffice. Once the silt fence has been plugged with excess sediment, it will no longer function properly and should be replaced with a new layer of silt fence.
- Stabilization procedures within 24 hours of ceasing construction in an area if the earth moving activity is expected to cease for at least 14 days. On a pipeline project, this should be easy to predict and stabilization procedures should begin almost immediately after the pipeline trench has been backfilled.

- On steep slopes, or slopes draining to surface waters (ditches, wetlands, streams, lakes), ditch checks should be installed over backfilled pipe trenches that were opened and closed during frozen soil conditions, as subsidence of thawing soils (frozen soils backfill in chunks) will create stormwater and snowmelt conveyances that could impact surface waters. Preparation for this phenomenon would include treating those backfilled trenches as ditches before they become ditches.
- Mulch or other erosion control will be required on all exposed upland soils, regardless of slope. Seeding in and of itself is not considered stabilization. Hydromulch with liquid tackifier or hydraulic soil stabilizers are preferred to standard mulch on steeper slopes or prior to snowfall, as mulch will not be effective throughout the winter in most conditions.
- Straw bales should not be used as slope breakers or as sediment control on upland slopes. Straw mulch should be applied at a minimum rate of two tons per acre, but ground coverage for straw mulch to be effective should be at least 90 percent, not 75 percent. Stabilized earthen berms have worked well in the past, although biologs or wattles may be effective in some areas. Gaps between spoil piles must be stabilized with blankets or other effective erosion control.
- Additional information is required as to the composition and manufacturer's recommendation on the foam pillows.
- Clean construction mats that are used by heavy equipment to enter streams are unlikely to remain clean for long. If mats or temporary bridges are used, it will be necessary to install some type of sediment control, such as triangular silt dikes, along each edge of the bridge or mat to ensure that sediment stays on the bridge or mat until the work is complete. At that time, the sediment may be removed by whatever means are necessary to keep it out of the receiving waters.
- Vegetation used to restore stream banks should be similar in species composition to the vegetation growing on the site prior to disturbance.

Subsidence of Soils Due to Winter Construction

A considerable amount of the excavation work that EPND will perform will occur during frozen soil conditions. When these frozen chunks of soil are excavated and then replaced over the trench, large gaps of air are included with the soils. During spring thaw, the ice in these soils melt and "subsidence" occurs; the soils sinks over the trench area, often forming what is essentially a ditch. On slopes that drain to surface water, these ditches act as conveyances which accelerate movement of water and sediment transport toward the water bodies. To prevent this, all trenches that are excavated during frozen soil conditions, and that drain toward surface waters (wetlands, streams, lakes, ditches), must have ditch checks installed as the trenches are buried. These can be in the form of triangular silt dikes, biorolls, silt fence, rock checks, or subterranean rocks, but some type of ditch checks must be installed, with spacing dependent on the degree of slope, in anticipation of subsidence in the spring.

Wetland Mitigation

The CEA should describe the compensatory mitigation that EPND will provide for the permanent loss of waters and wetlands.

CONCLUSION

The MPCA is aware that Enbridge has not fully complied with applicable water quality rules and regulations when constructing or expanding pipelines. The Alberta Clipper project brought about enforcement action to settle federal allegations that the project resulted in fifteen instances of illegal discharges into Minnesota wetlands and rivers while testing two of the newly constructed pipelines. The discharge of test water from a 36-inch pipeline at a site just north of Bemidji eroded a hillside and created a gully 50 to 60 feet long, 15 feet wide and 10 feet deep, leaving up to a foot of sediment in a wetland and sending rust-colored water into the Mississippi River. In view of this history, it will be necessary to provide additional assurances to the MPCA concerning the additional efforts and resources which will be employed to ensure this Project will not result in similar non-compliance.

We anticipate additional comments as the development of future project-related documents, such as the Draft CEA, unfolds. Comments provided in this letter are intended to be addressed and incorporated into the Draft CEA.

We look forward to assisting the Department of Commerce, as desired, during the preparation of the CEA for this project and its subsequent review upon its release. Through this process, the MPCA seeks to obtain further additional information to facilitate the MPCA staff review of the Project, well in advance of the time a favorable determination on the required MPCA authorizations is needed to commence construction. Ultimately, it is the responsibility of EPND to secure any required permits and to comply with any requisite permit conditions. If you have any questions, please contact me at 651-757-2465.

Sincerely,

Chuck Peterson

Patrice Jensen
Planner Principal
Environmental Review

PJ:ld

cc: Jamie Schrenzel, DNR
Desiree Morningstar, U.S. Army Corps of Engineers
Reed Larson, MPCA
Bill Sierks, MPCA
Steve Lee, MPCA
Catherine Neuschler, MPCA
Craig Affeldt, MPCA

APPENDIX A
MAP REQUIREMENTS
Enbridge Sandpiper Pipeline Project - North Dakota Pipeline Company LLC
Pipeline Routing Permit Application, MPUC Docket No. PL-6668/PPL-13-474

MPCA is requesting that an aerial map book of the Project in Minnesota be prepared that contains the following features:

- locations of all water bodies (including wetlands) proposed to be crossed by the Project
- identification of all delineated wetland types and locations at or near the Project route
- precise mile post locations of all water body crossings by the Project
- Department of Natural Resources public water status of water bodies crossed by the Project
- proposed crossing methods of all water bodies, with alternative proposed crossing methods by the Project
- date restrictions when construction will not allowed
- depiction and identification of environmentally sensitive areas crossed by the Project
- depiction of all existing access roads and proposed to be constructed access roads in the Project area
- width and bank height of streams or rivers being crossed by the Project
- water bodies within 1 mile downstream of the proposed stream/river/wetland crossings of the Project and the distances to these waters
- impairment status of water bodies downstream of the Project crossings
- Special Waters (ORVW) within 1 mile downstream of the Project crossings
- soil erodibility along the Project route weighted by slope

Minnesota Pollution Control Agency

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May 12, 2015

Mr. Scott Ek
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

Re: In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need and a Pipeline Routing Permit for the Line 3 Pipeline Replacement Project in Minnesota
PUC Docket No. PL-9/CN-14-916 (Certificate of Need)
PL-9/PPL-15-137 (Pipeline Routing Permit)

Dear Mr. Ek:

The Minnesota Pollution Control Agency (MPCA) offers these comments on the Certificate of Need (CON) application and the Pipeline Routing Permit application filed by the Enbridge Energy, Limited Partnership (Enbridge) in these dockets ("Line 3 Replacement" project).

The Minnesota Public Utilities Commission (PUC) has requested comments on three topics concerning the completeness of the Enbridge Line 3 Replacement applications:

1. Does the CON application contain the information required under Minn. R. 7853.0220 to 7853.0260 and Minn. R. 7853.0500 to 7853.0640?
2. Does the pipeline route permit application contain the information required under Minn. R. 7852.2100 to 7852.3100?
3. Are there any contested issues of fact with respect to the representations made in the applications?

The MPCA understands that Enbridge's preferred route is proposed to co-locate the Line 3 Replacement on the same route as its proposed Sandpiper pipeline project. Although the MPCA's environmental concerns with the Sandpiper project are known, it must be noted here that the discussion of alternatives in the Line 3 Replacement applications does not address those concerns or consider any system or route alternatives that were brought forward in the Sandpiper proceedings. Nor do the applications appear to provide adequate basis for selection of a southern route alternative over a northern route alternative, such as rebuilding of the Line 3 Replacement in its current location.

The MPCA contests both the adequacy of the environmental analysis and the lack of consideration of reasonable alternatives in the applications. [1]

Failure to address alternatives and evaluate environmental impacts. Enbridge intends to locate the Line 3 Replacement pipeline adjacent to the Sandpiper pipeline between Clearbrook and Superior. The MPCA has filed comments raising environmental concerns with this route in the Sandpiper dockets (see Dockets 13-473 and 13-474). Since the Line 3 Replacement project follows the same proposed route, it raises substantially the same concerns that the MPCA expressed in Sandpiper, but the applications do not address those concerns.

It does not appear that Enbridge evaluated any system alternatives or route alternatives that have been included in the Sandpiper docket. Sandpiper System Alternative 3 and System Alternative 3 Modified (a route alternative included by the Commission in the Sandpiper route proceeding) are given minimal to no consideration.[2] Despite Enbridge's awareness of the significant environmental concerns expressed by state agencies and interested parties in the Sandpiper proceedings, and the alternatives offered in those dockets, the Line 3 Replacement applications do not address these alternatives.

The applications discuss three options, the preferred route and two alternatives involving replacement along or parallel to the existing Line 3, i.e., rebuilding Line 3 in place. However, the applications do not adequately discuss the alternatives for rebuilding Line 3 in place or the resulting impacts to environmental values of all three options. The applications also do not provide sufficient information for comparison and informed consideration of the options.

Need for comprehensive environmental analysis of cumulative environmental effects. The proposal to place Line 3 next to Sandpiper increases the potential to impact some of Minnesota's most pristine natural resources. The Commission has authority and responsibility under the Minnesota Environmental Policy Act, Minn. Stat. ch. 116D, to make a detailed evaluation of the potentially significant environmental effects, including cumulative potential effects, alternatives, and measures that would avoid or mitigate the potential environmental harm from this project. The possibility of simultaneous construction is not addressed, nor is the effect of continuous construction of two pipelines over extended construction seasons.

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[1] The MPCA comments are generally directed to: the adequacy of Enbridge's CON application under Minn. R. 7853.0250.A (relating to the socially beneficial uses of the output of the project, including "its uses to protect or enhance environmental quality"); Rule 7853.0540 Alternatives; Rule 7853.0600 Information Required (environmental data); Rule 7853.0630, subp. 3 and 4 (safeguards); Rule 7852.2600, (route alternatives and description of environment); Rule 7852.2700 (environmental impact of preferred route); Rule 7852.3100 (consideration of alternative routes); and the sufficiency of the application for purposes of a detailed evaluation of the potentially significant environmental effects under the Minnesota Environmental Policy Act, Minn. Stat. Ch. 116D.

[2] The MPCA and MDNR have provided extensive environmental information on SA-3M as an alternative to the Applicant's route. (See MPCA's Oct. 29, 2014 comment identifying a specific route for SA-3M, and MDNR's Jan. 23, 2014 comment letter).

Section 7.1.3 of the route application (Impact Calculations) states that calculations are based on an assumption that the Sandpiper pipeline will be constructed first. Timing of the construction of both projects is important. Construction of both lines could begin in 2016, yet the possibility and consequences of simultaneous construction are not addressed. Construction of the two projects in the same corridor may well result in greater impacts to surrounding terrain and water bodies than would occur if one project were built after another, because staging, spoils placement, and work space could not fully use the corridor. The discussion of project impacts should address the potential of concurrent construction impacts and the effects of extended construction of two projects in the same corridor on human, natural and environmental resources. The absence of that analysis in this section contributes to an inadequate analysis of likely site conditions and of the anticipated construction activity sequence.

Response on spill analysis. The applications do not have a sufficiently detailed analysis of the effects of a potentially catastrophic failure. In the introduction to section 7.0 of the route application, addressing the environmental impact of the preferred route, Enbridge makes the following statement:

> The Minnesota Pollution Control Agency (MPCA) and Minnesota Department of Natural Resources (MNDNR) have expressed concern with regard to the potential impacts of a catastrophic oil spill from the Project on environmental resources. An overall incident frequency was developed for the Keystone XL Project[3], which is also designed of x70 steel pipe. Based on these statistics, it is highly unlikely that a spill or leak will occur along any given small section of the pipeline. Therefore potential impacts from a theoretical oil release are not identified in Section 7.0 due to the extremely low frequency and many assumptions that would first be necessary to adequately quantify how a leak would affect the environment. Enbridge will continue to work with the applicable agencies regarding leak prevention measures and emergency response.

While the MPCA agrees that it may be unlikely for a spill to occur at "any given small section of the pipeline," the applications do not adequately discuss potential environmental impacts such as what would occur to surface water, drinking water, human health, terrestrial wildlife, aquatic wildlife, vegetation, soils, and other resources in the event of a spill, as required by Rule 7852.2700. It is reasonable to anticipate that a leak or spill will occur at some point during the operational life of the pipeline. The applications should address the potential impacts that a significant spill would have on the various types of terrain and aquatic resources along the project route.

To summarize, the MPCA believes that information minimally necessary for any meaningful assessment and comparison of potential environmental impacts under the criteria of PUC rules and MEPA are missing from Enbridge's current applications.

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[3] The MPCA notes that the Executive Summary of the Final Supplemental Environmental Impact Statement for the Keystone XL project (Page 30), states that the risk of spills and leaks represents the "greatest potential threat to water and aquatic resources."

Thank you for consideration of these comments.

Sincerely,

William Sierks, Manager
Environment & Energy Section
Resource Management & Assistance Division

WS:bt

Minnesota Pollution Control Agency

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300

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June 24, 2014

Mr. Larry B. Hartman
Environmental Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

RE: Enbridge Sandpiper Pipeline Project - North Dakota Pipeline Company LLC
Pipeline Routing Permit Application, MPUC Docket No. PL-6668/PPL-13-474
Replacement May 30, 2014 Letter with Maps

Dear Mr. Hartman:

On April 14, 2014, the Minnesota Public Utilities Commission (PUC) extended the comment period in the matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project (Sandpiper) in Minnesota. This letter appends the Minnesota Pollution Control Agency (MPCA) letter on this subject, which was submitted to you on April 4, 2014.

We understand the topics open for comment include alternate routes, human and environmental impacts to be studied in the Comparative Environmental Analysis (CEA), and whether any specific methods or mitigation exist to address these impacts that should be studied in the CEA. MPCA's additional comments on these topics include:

- Inspection and monitoring
- Additional items for evaluation in the CEA
- Watershed Restoration and Protection Strategy
- Carbon footprint
- Environmental justice
- Alternate route analysis
- Cumulative impacts

Inspection and Monitoring

On April 16, 2014, Enbridge, doing business as North Dakota Pipeline Company LLC, submitted a proposal to the MPCA regarding independent/third-party environmental monitors for the proposed Sandpiper project. MPCA does not agree that Enbridge should be hiring and directing these inspectors/monitors, but rather that they report directly to a state agency with jurisdiction over the project. The MPCA requests that the PUC require that another agency directly hire independent inspection and monitoring contractors and/or temporary staff to conduct this work under MPCA oversight to be funded by Enbridge.

The structure, work plan, and cost of a monitoring and inspection plan should be determined while the CEA is being prepared. The MPCA and Minnesota Department of Natural Resources (MDNR) staff, who have been working collaboratively on the Sandpiper project, are willing to participate with Enbridge and

participating agencies to develop the appropriate information and mechanism. The mechanisms for this would be worked out among the parties. The payment of the state's reasonable costs should be a provision of the PUC's route permit issued to Enbridge.

Additional Items for Evaluation in the CEA

The MPCA requests that Enbridge complete a Phase I Environmental Assessment (Phase I) of the selected pipeline construction corridor in accordance with the All Appropriate Inquiry (AAI) standard as per the National Environmental Policy Act (NEPA), Title 40, Code of Federal Regulations Part 312. The Phase I is conducted to research and review potential locations of existing/historic dumps, hazardous waste sites, and other environmental concerns. If areas of environmental concern are identified in association with construction of the pipeline, Enbridge should be required to prepare work plans to describe how solid/hazardous waste/contaminated soil and groundwater will be investigated prior to construction, and how impacted areas will be dealt with in accordance with state and local regulations.

MPCA requests that the CEA include a detailed risk assessment regarding the potential for leaks to occur, how much oil might be released, and how this could affect groundwater, surface water, aquatic life, and others. The hydrogeology of the pipeline corridor area should be studied to determine potential fate and transport of a release, and potential vapor intrusion issues if a release occurs in close proximity to human habitation.

Watershed Restoration and Protection Strategy

In 2006, the Minnesota Legislature passed the Clean Water Legacy Act, which required the MPCA to develop an approach to comprehensively monitor and assess the waters of the state every 10 years, and provided one-time funding for that effort. In order to provide long term, consistent funding for Minnesota's clean water efforts, on November 4, 2008, Minnesota's voters passed the Clean Water Land and Legacy Amendment (Legacy Amendment) to the Minnesota Constitution to, in part, protect and restore lakes, rivers, streams, and groundwater. The Amendment imposed three-eighths of one percent sales tax to fund the effort for 25 years. Subsequently, in 2013, the Clean Water Accountability Act was passed by the Minnesota Legislature. This new law requires the MPCA to develop watershed restoration and protection strategies (WRAPS) for each of the state's 81 major watershed units, which correspond to the 8-digit hydrologic unit codes (HUCs). WRAPS include the monitoring and assessment information, as well as land use-based models that demonstrate the source of the highest contributors of pollutants in each watershed. This information is then used to develop strategies to either protect waters that meet water quality standards or restore waters that do not meet standards.

The WRAPS is a collaborative effort that involves the MPCA, the MDNR, the Board of Water and Soil Resources, the Department of Health, the Department of Agriculture, local soil and water conservation districts, watershed districts, the University of Minnesota, industry and business organizations, and the private citizens of Minnesota. WRAPS components are: monitoring and assessment of hydrology and the chemical and biological constituents of water quality, a stressor identification process, total maximum daily loads (TMDLs) and restoration plans for impaired waters, protection strategies for waters that currently meet standards, and a civic engagement process to assist stakeholders with implementing protection and restoration strategies.

While not yet completed, WRAPS are in process in the following major watersheds that the Sandpiper proposal will cross, also identified by the corresponding eight-digit HUCs:

- Grand Marais Creek HUC 09020306
- Red Lake River HUC 09020303
- Clearwater River HUC 09020305
- Mississippi – Headwaters HUC 07010101
- Crow Wing River HUC 07010106
- Pine River HUC 07010105
- Mississippi – Grand Rapids HUC 07010103
- Kettle River HUC 07030003
- St. Louis River HUC 04010201
- Nemadji River HUC 04010301

One of the first tenets of any protection strategy is to avoid impacts where possible. The Sandpiper proposal is not consistent with the protection strategies that are currently in development for these WRAPS, due to the large number of high quality surface waters that lie along the path of the proposed route. Enbridge should participate in stakeholder groups for these WRAPS. Stakeholder groups provide a forum for engaged citizens and interested groups to develop implementation strategies to restore and protect each watershed. The CEA should review and consider how to integrate the strategies into the proposal, or find alternate routes that have less potential for impacting surface and groundwater.

Carbon Footprint – Greenhouse Gas Emissions

The MPCA is concerned about the carbon footprint of a project. The Minnesota Legislature established greenhouse gas (GHG) reduction goals in the Next Generation Energy Act (Minn. Stat. 216H.02). The goals of the Next Generation Energy Act are to reduce greenhouse gas emissions by 15 percent below 2005 levels by 2015, and 80 percent by 2050. Greenhouse gases, upon release to the atmosphere, warm the atmosphere and surface of the planet, and lead to alterations in the earth's climate. The GHG emissions measured and reported in Minnesota include carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), sulfur hexafluoride (SF_6), and two classes of compounds known collectively as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). These GHG emissions result from fuel combustion, the calcination of limestone, the degradation of organic (peats) and mineral soils, permanent land clearing and forest harvesting, and a variety of other sources. Pertaining to this project, source types include stationary and mobile source combustion from construction equipment, emissions from venting, and wetland and forest disruptions.

To track progress with the Next Generation Energy Act reduction goals, the CEA should evaluate the GHG emissions from the project and the impact these emissions may have on the attainment of the state's GHG reduction goals. Alternatives and options to reduce GHG emissions or to offset/mitigate GHG emissions should also be identified in the CEA. In addition, the CEA should evaluate the GHG impacts if this project is not built – specifically, if oil is transported by rail or truck instead of by pipeline.

Environmental Justice

The MPCA works to incorporate environmental justice principles into its projects. Environmental Justice (EJ) involves assuring the fair treatment and meaningful involvement of all persons, regardless of race or income when making environmental decisions. Fair treatment means that no group of people should

bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies. Meaningful involvement means: people have an opportunity to participate in decisions about activities that may affect their health and the environment in which they live; the public's contribution can influence the regulatory agency's decision; their concerns will be considered in the decision making process; and, decision makers seek out and facilitate the involvement of those potentially affected.

The proposed route of the Sandpiper Pipeline and other alternate routes may directly affect low income and minority populations. If a pipeline leak or break occurs, adverse impacts could occur in both surface and subsurface drinking water supplies, areas with stands of wild rice important to local Tribes and tribal members, cropland areas, impaired waters, and wildlife management areas among other types of environmental, social and economic impacts. If the Northern route or other alternate routes are chosen, the Sandpiper Pipeline may affect tribal lands.

The CEA should include consideration of EJ issues. The CEA should look at how pipeline construction and operation, and potential problems during each of these phases, may cause disproportionate impacts on low-income or minority populations. In addition, local, state, and federal agencies should engage residents to assure that they are aware of opportunities to participate in the process and understand how their comments and concerns are incorporated into the final draft CEA.

Alternate Route Analysis

The MPCA staff's analysis of the proposed Sandpiper route shows many water body crossings for which there would be very difficult or no access downstream of the crossing to clean up spills in the event of a crude oil release. The lack of possible access to these areas by people and equipment necessary to clean up spills increases the likelihood that an incident could result in significant long-term environmental damage. A failure to account for these possibilities is considered to be a substantial flaw with the currently proposed Sandpiper route.

There are many variables that could be examined when considering the potential for environmental damage in the event of a release. These include: soil types, wetland types, sensitive or endangered species, proximity to aquifers, hydrology, forest types, state park boundaries, proximity to human populations, proximity to areas with stands of wild rice, connectivity of surface waters, and others. However, for purposes of providing a simpler and effective comparison between alternative route proposals that is both visual and quantifiable (within certain limitations that will be discussed in this letter), MPCA staff has elected to compare the routes based on access to potential leak sites for purposes of containment of spills and possible clean up.

To minimize variables and subjectivity for this analysis, MPCA staff opted to identify, using ArcGIS technology, water body crossings that had neither road or traversable upland features within 250 feet of flowages of water (heavily forested areas are not considered for this purpose to be traversable, as trees would have to be removed before equipment could be brought in), or portions of larger wetland complexes that fell within a 2,000 foot buffer of the point where the proposed pipeline route was to cross a stream, lake, or wetland. The 250-foot distance from access point to flowage is somewhat arbitrary. MPCA staff conferred with contractors and engineers who specialize in road construction, and most felt that in a best-case scenario, with aggregate and equipment available, a 250-foot road into a bog or wetland would be constructed within 24 hours. Thus, for purposes of this analysis ,MPCA staff

assumed that it is possible to build an access road to reach areas where containment of a spill might be accomplished before the spilled product covers an area large enough that cleanup would be highly destructive to a sensitive environment, or impossible. Similarly, there is no regulatory basis for choosing the 2,000 foot buffer distance, other than it is a significant distance for oil impacts to occur over any surface water and easy to apply consistently statewide. It is a distance that for most people would be easy to visualize, yet small enough to create a fair comparison between routes. These numbers provide a basis for comparisons between routes and have little significance beyond that. However, if these criteria are used consistently for all proposed routes, it does provide a basis to compare the potential for each route to cause considerable environmental damage in the event of a release.

There are some factors to consider that fall beyond the scope of this comparison. For example, the water crossings proposed for the Sandpiper route are frequently streams or flowages with connectivity to other water bodies downstream. By contrast, water body crossings on the Northern route frequently involve very large wetland complexes rather than smaller, faster moving flowages. The area needed to access might be much greater, but the oil may move more slowly in such areas. Counting becomes a bit more difficult here as well, because it is difficult to establish criteria for counting “crossings” that is comparable to the different features observed in the Sandpiper route. In most cases, MDNR catchment flow lines were used to distinguish one crossing point from another.

In any case, the method used as a basis for comparison by MPCA staff does provide quantifiable data to analyze the proposed routes from a meaningful perspective: Which route proposals pose the greatest risk to create destructive and expensive containment and cleanup operations in the event of a spill?

MPCA staff compared four proposed routes in their entirety (see Figure A below). The four proposed routes that were compared were (1) The currently proposed Sandpiper route; (2) The “Northern” route, used by Enbridge for previous projects and which has been suggested as an alternative by other entities; (3) The “Alternative 3” route which was identified as a possible alternative by MPCA staff; and (4) The southern “Alternative 4” route which exits the state at the Iowa border and would be required to tie into the Enbridge infrastructure either in another state, or to circle around outside of Minnesota to end at the Superior Terminal. The fourth route was suggested as an alternative by a citizen group.

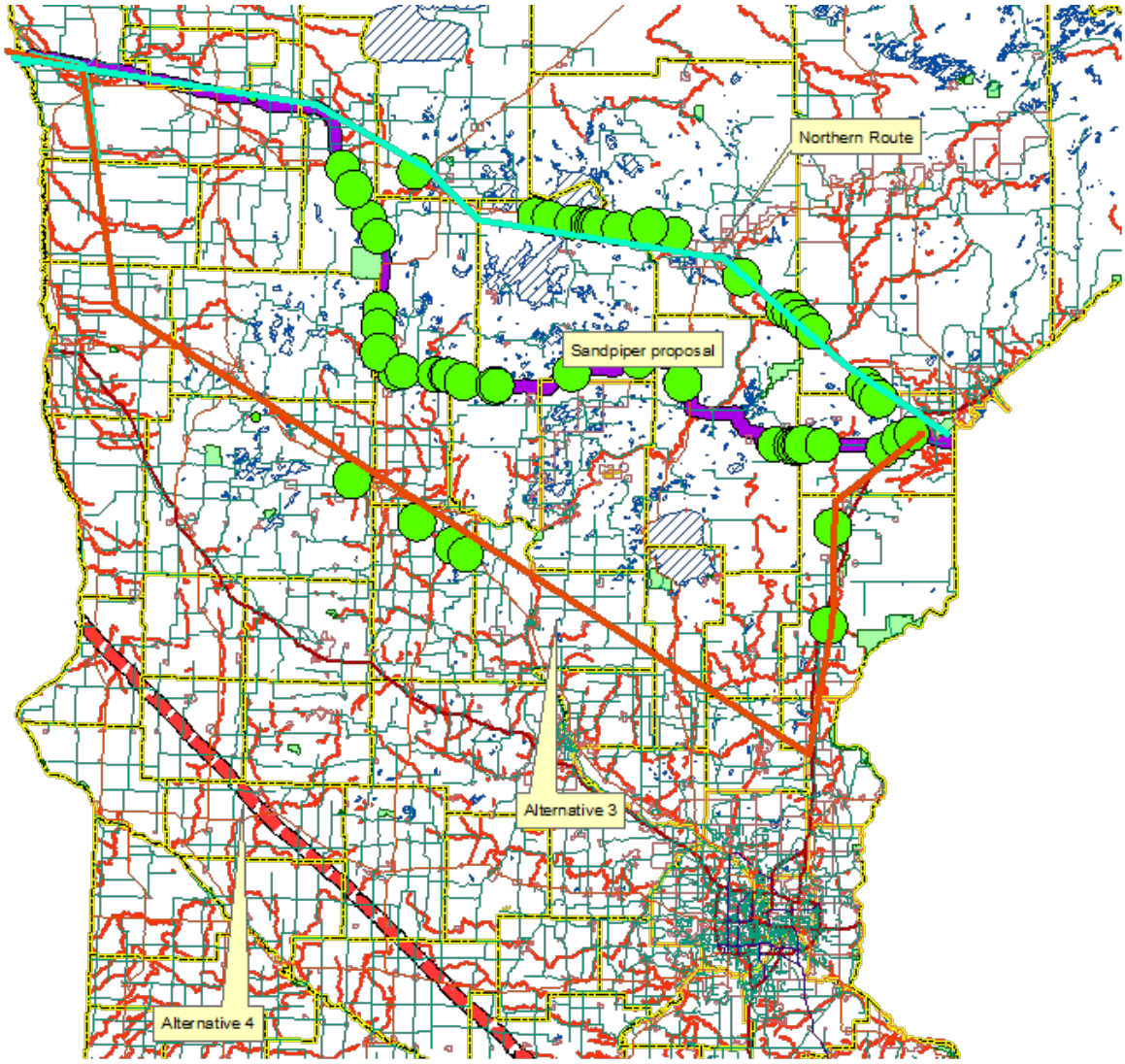

Figure A-The green circles mark points where MPCA staff have identified access concerns. Approximate locations of the four primarily examined proposals are also identified.

Any water body crossing, especially streams, rivers, or flowages of any kind that can carry oil downstream, pose the risk of creating large scale environmental damage in the event of a release. If possible, it is best to avoid crossing surface waters altogether with oil pipelines in order to minimize this risk. However, if a water body, bog or otherwise sensitive area is to be crossed, then serious consideration should be given to whether the site can be accessed quickly in the event of a release to contain the product, minimize migration of product into surface waters, soils and groundwater, and perform clean-up operations. In situations where roads have to be constructed to access a spill, the act of constructing the road, excavating and clearing vegetation can all exacerbate the damage that the spill itself created. Additionally, placement of flow control valves in strategic locations along/near sensitive areas may help to minimize backflow of product out of a fractured line into those areas.

A difficulty with aerial photograph analysis as opposed to field surveying of water crossings is that it is difficult to determine whether a stream or wetland is permanently, seasonally, or intermittently flooded. MPCA staff relied on National Wetland Inventory maps to identify wetland types, which will to

some extent help to determine the likelihood of the wetland having open water at the time of a leak, which would allow transport of released oil to occur more quickly, or merely be in a state of saturated soil, which would result in easier and faster containment and cleanup of a spill. The results of the MPCA staff analysis are as follows:

Sandpiper Route

The proposed Sandpiper route crosses 28 water bodies for which there is no access for possible containment within 2,000 linear feet downstream of the proposed pipe crossing. Of these 28 water body crossings, one is a stream to lake system, 12 are wetland complexes, 10 are streams that flow to wetland systems, and five are streams that flow to areas with stands of wild rice. Below is a list of the water body crossings for this route option, followed by example Figures B and C:

NAME of ROUTE	TOWNSHIP NAME	LOCATION (TWP/RNG/SEC)	LOCATION of AREA
Sandpiper Route	Mahtowa	T47 R18W S8	Moose Horn River
Sandpiper Route	Salo	T47 R22W S1	Headwaters Sandy River
Sandpiper Route	Salo	T47 R22W S2	Headwaters Sandy River
Sandpiper Route	Automba	T47 R21W S6	West Branch River
Sandpiper Route	Salo	T47 R22W S6	Headwaters Sandy River
Sandpiper Route	Automba	T47 R21W S6	West Branch River
Sandpiper Route	Automba	T47 R21W S1	Heikkila Creek-Kettle River
Sandpiper Route	Atkinson	T48 R18W S36	Blackhoof River
Sandpiper Route	Copley	T147 R37W S34	Walker Brook
Sandpiper Route	Moose Creek	T146 R36W S29	Upper Rice Lake-Wild Rice River
Sandpiper Route	Bull Moose	T138 R31W S12	Headwaters South Fork Pine River
Sandpiper Route	Bull Moose	T138 R31W S11	Headwaters South Fork Pine River
Sandpiper Route	Bull Moose	T138 R31W S11	Headwaters South Fork Pine River
Sandpiper Route	Arago	T141 R35W S17	Hay Creek
Sandpiper Route	Northwest Aitkin	T50 R26W S22	White Elk Creek
Sandpiper Route	McKinley	T138 R32W S3	Goose Lake-Big Swamp Creek
Sandpiper Route	McKinley	T138 R32W S4	Goose Lake-Big Swamp Creek
Sandpiper Route	Crow Wing Lake	T139 R33W S36	Burgen Lake
Sandpiper Route	Crow Wing Lake	T139 R33W S36	Burgen Lake
Sandpiper Route	Crow Wing Lake	T139 R33W S33	Town of Huntersville-Crow Wing River
Sandpiper Route	Straight River	T139 R35W S36	Blueberry Lake-Shell River
Sandpiper Route	Blind Lake	T139 R28W S26	Arrowhead Lake
Sandpiper Route	Hubbard	T139 R34W S31	Shell River
Sandpiper Route	Beulah	T139 R25W S9	Moose River
Sandpiper Route	Straight River	T139 R35W S6	Straight River
Sandpiper Route	Bear Creek	T145 R36W S35	Gill Lake-Mississippi River
Sandpiper Route	Todd	T140 R35W S6	Fishhook Lake
Sandpiper Route	Lake Hattie	T144 R35W S19	LaSalle Lake-Mississippi River

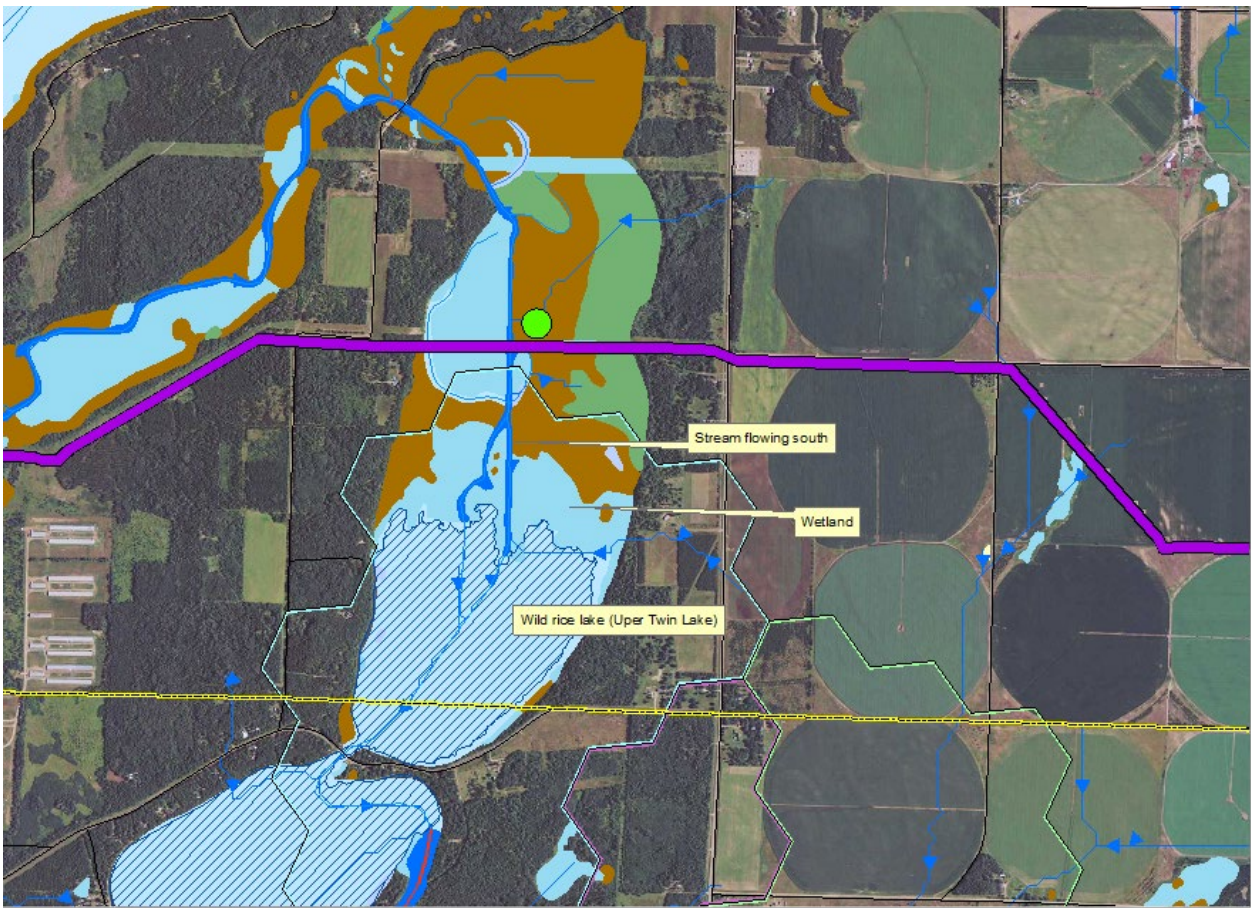

Figure B - This shows an example of a proposed crossing point over surface water that flows south (see arrows on dark blue flowage line) through a wetland complex and into a wild rice lake (the Twin Lakes near Menahga and Park Rapids, MN). However, to determine accessibility, the wetland identification layer must be turned off so that land features can be examined as in Figure C below. The purple line is the proposed Sandpiper route. (Scale 1:24,001)

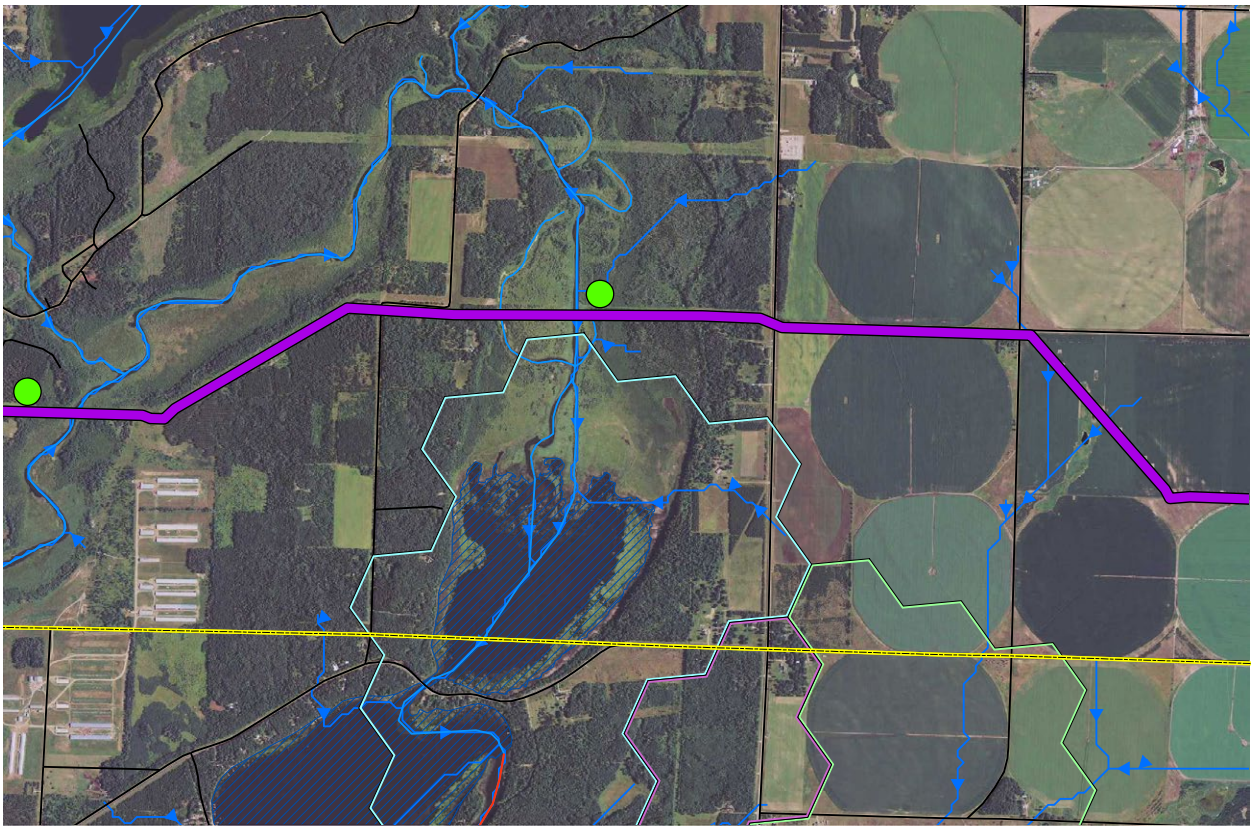

Figure C-Here, the wetland layer is turned off so that the landscape can be examined for accessibility. In this instance, there are no roads or open farmland to bring containment or clean-up equipment within 1,500 feet of the flowage that would potentially deliver leaked crude oil into the upper most of the Twin Lakes. The curvy black line between the lakes is a road, and the first good point of access. This road is 6,700 feet from the pipeline crossing, although it is possible that boats or barges could access the lake from the farm fields to the right (east) or the road (black line) to the left and contain a spill within the lake. (Scale 1:24,001)

Hill Route

The "Hill route alternative," suggested by the MDNR as a way to avoid features of concern, would not differ from the proposed Sandpiper route based on the criteria discussed here.

Northern Route

The Northern route, which parallels the path of the Alberta Clipper project, crosses 20 water bodies for which there is no access within 2,000 feet downstream of the location where crossings would occur if the route were followed. Along the Northern route, water bodies without access to potential leak sites within 2,000 feet include one stream that flows to a lake, 14 wetland complexes, five stream/wetland systems, and two streams or wetlands that flow to areas with stands of wild rice or wetlands. Below is a list of the water body crossings for this route option, followed by example Figures D and E:

NAME of ROUTE	TOWNSHIP NAME	LOCATION (TWP/RNG/SEC)	LOCATION of AREA
Northern Route	Pot Shot Lake	T52 R21W S8	Floodwood River
Northern Route	Northeast Aitkin	T52 R22W S1	West Branch Floodwood River
Northern Route	Wawina	T53 R22W S27	West Branch Floodwood River
Northern Route	Deer Lake	T56 R26W S29	Mississippi River
Northern Route	Bowstring Lake	T144 R26W S3	Little Winnibigoshish Lake-Miss. River
Northern Route	Morse	T145 R25W S35	White Oak Lake-Mississippi River
Northern Route	North Cass	T145 R27W S35	Sixmile Brook
Northern Route	North Cass	T145 R27W S34	Sixmile Brook
Northern Route	North Cass	T145 R27W S34	Sixmile Brook
Northern Route	North Cass	T145 R27W S33	Sixmile Brook
Northern Route	North Cass	T145 R28W S26	Sixmile Brook
Northern Route	Wawina	T53 R22W S28	West Branch Floodwood River
Northern Route	Blackberry	T54 R24W S13	Blueberry Lake-Mississippi River
Northern Route	North Cass	T145 R29W S24	Portage Creek
Northern Route	North Cass	T145 R29W S20	Portage Creek
Northern Route	Wilton	T147 R34W S34	Grant Creek
Northern Route	Pot Shot Lake	T52 R21W S22	Floodwood River
Northern Route	Perch Lake	T49 R18W S7	Perch Lake
Northern Route	North Carlton	T49 R19W S1	Stoney Brook
Northern Route	Arrowhead	T50 R19W S27	Bog Lake

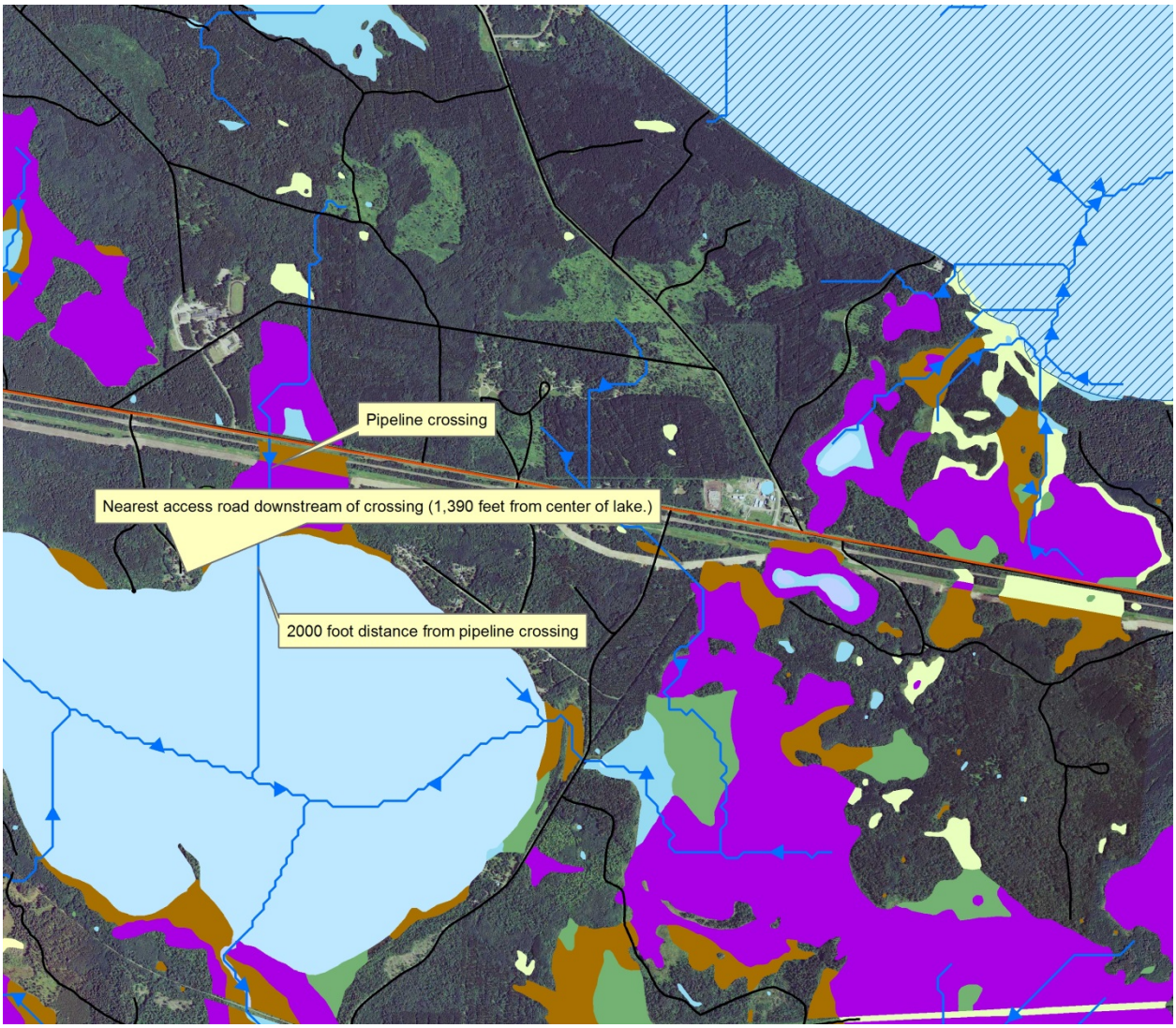

Figure D-With NWI wetland layer turned on, one can see wetland extending well beyond the 2,000 foot buffer at this crossing along the "Northern" route. The purple is bog, the green is forested wetland. In Figure E below the wetland layer is turned off so that accessibility to a potential leak here can be determined. (Scale 1:24,001)

Figure E- With the wetland identifying layers turned off, one can see that there are no roads or upland areas from which to access potential leak sites at this crossing. There is a possible access point identified to the southwest of the pipeline crossing, but containment equipment would have to be strung across over 3,000 feet of wetland as it flows into the lake to contain all of a release as it flows to the south. (Scale 1:24,001)

Alternative 3 Route

The Alternative 3 route corridor, which was referenced earlier in the letter, begins at the same western point that both the Sandpiper and Northern routes do; however, roughly 20 miles west of the North Dakota border it veers south and follows an existing (possibly abandoned) pipeline south and then southwest to roughly five miles west of North Branch, Minnesota, where it then follows another corridor in a northerly direction, where it eventually intersects with the proposed Sandpiper route just west of Superior, Wisconsin. This route has 7water body crossings with no access within 2,000 feet downstream of the pipe crossing; however, these water bodies are often smaller wetland complexes than are seen on either the Sandpiper route or the Northern route. These crossings without access within 2,000 feet

include two wetland complexes, four stream/wetland systems, and one area with stands of wild rice. Below is a list of the water body crossings for this route option, followed by example Figures F and G:

NAME of ROUTE	TOWNSHIP NAME	LOCATION (TWP/RNG/SEC)	LOCATION of AREA
Alternate Route 3	Mission Creek	T40 R21W S12	Mission Creek
Alternate Route 3	Fawn Lake	T132 R32W S34	Lower Turtle Creek
Alternate Route 3	Fawn Lake	T132 R32W S19	Fish Trap Creek
Alternate Route 3	Kettle River	T44 R20W S8	City of Willow River-Kettle River
Alternate Route 3	Bartlett	T133 R34W S23	Moran Creek
Alternate Route 3	Compton	T134 R36W S5	Deer Creek-Leaf River
Alternate Route 3	Twin Lakes	T48 R17W S21	Blackhoof River

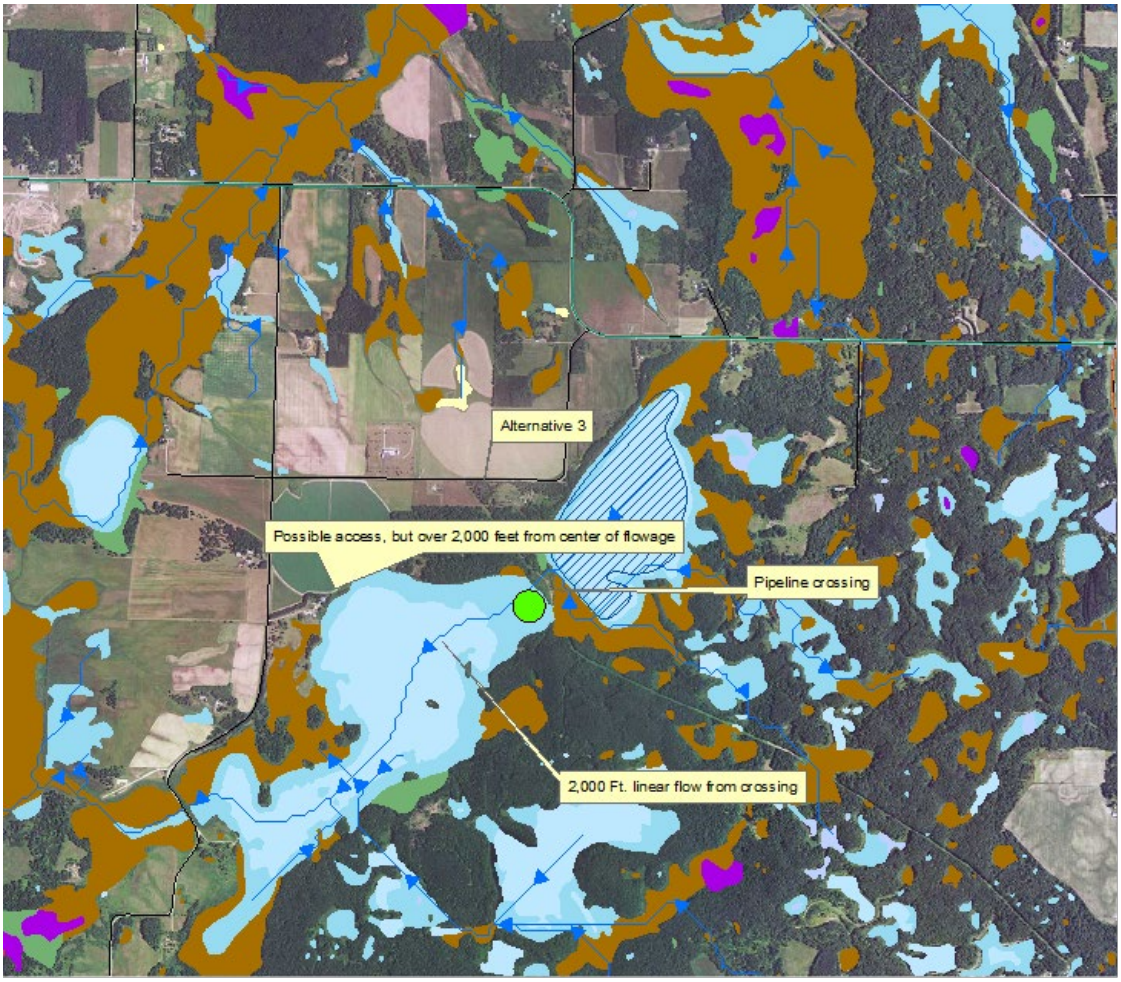

Figure F - Wetland layer identifies an open water wetland south of the pipe crossing that would likely receive oil from a leak. Wetland layer turned off in Figure G below. (Scale 1:24,001)

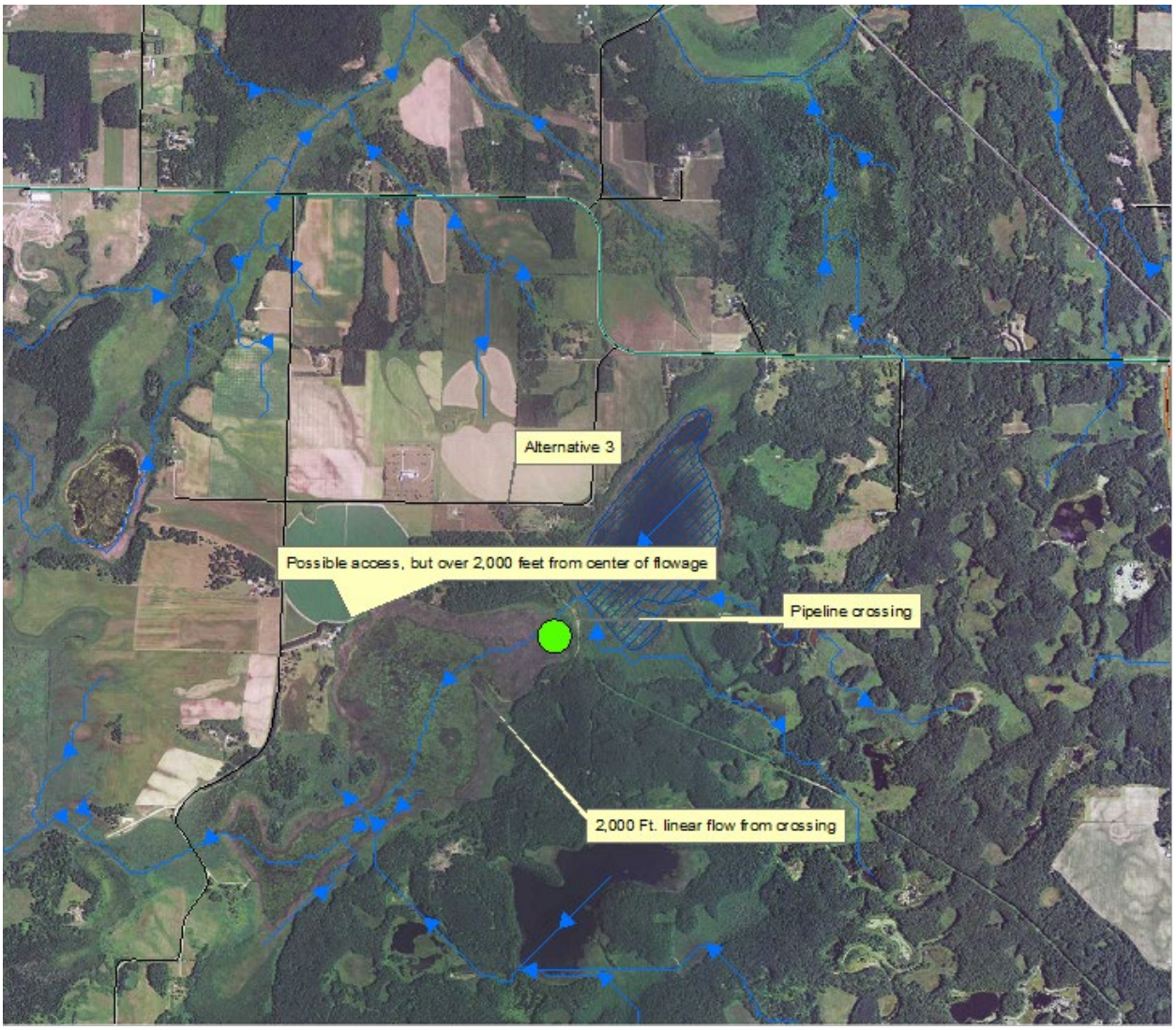

Figure G-With wetland layer turned off, one can see that the nearest access to the main stem of the flowage is roughly 2,000 feet to the west. If the wetland is traversable by boat or barge, which is possible given the wetland type (Type 3/5 shallow marsh and open water) then it is possible that access to material could be gained within the 2,000 foot buffer here. (Scale 1:24,001)

Alternative 4 Route

The Alternative 4 corridor enters the state in Traverse County just west of Wheaton, Minnesota, and runs to a southeast bearing until it exits the state south of Austin, Minnesota. A pipeline along this route would cross no water bodies lacking access within 2,000 feet of a potential leak site in surface water. There are very few water bodies crossed by this route in general over the proposed route.

National Hydrography Dataset

Even if access issues are taken out of the equation, the proposed Sandpiper route does not fare well in comparisons with alternative proposals based on examination of the National Hydrography Dataset

(NHD) layer. Using the NHD layer, the proposed Sandpiper route would cross 20 water bodies, the Northern route would cross 10, the Alternative 3 route would cross 12, and the Alternative 4 route would cross 1 water body within the state of Minnesota. The NHD layer obviously does not identify all water bodies that are being crossed; however, it does identify water bodies that are part of a connected network of surface waters which may also be a good gauge of potential environmental impact if an incident were to occur.

Notably, the two routes in this analysis that crossed the fewest water bodies and put water resources at the lowest risk for environmental damage both aligned away from the Clearbrook terminal. Perhaps the most problematic aspect of the design of this proposed route is the continued expansion of terminal capacity at the Clearbrook location. Any pipelines that are built to transport material out of the Clearbrook terminal are forced to enter the largest concentration of lakes, streams, and open-water wetlands in the state. Any route proposed out of Clearbrook, either south or east will cross dense expanses of open waters. A northern to eastern route from Clearbrook would cross massive wetland complexes and areas with stands of wild rice. If future, new terminals, were to be constructed in western Polk (could collect from Canada or North Dakota), Kittson (could collect from Canada or North Dakota) or even Clay counties (North Dakota) the creation a route proposal that avoids the greatest concentration of surface waters becomes feasible.

Summary of Route Analysis

There are numerous pipeline corridors that currently exist in Minnesota. Of those, there are several that cross far fewer water bodies and have better potential for access in the event of a release than the current Sandpiper proposal. MPCA staff examined three existing corridors in addition to the proposed Sandpiper route. While performing risk assessment, the current use of the corridors in question should also be considered, as much of the proposed Sandpiper route follows a corridor in which three other oil pipelines currently exist. Thus, not just one pipeline would be crossing sensitive water bodies with limited access, but four. The likelihood of an incident in which crude oil product is released is thus greater than what a single pipeline would entail. This is also true of the Northern route, in which numerous pipelines carrying crude oil exist. What has happened in the past with regard to location of pipeline routes is from this perspective unfortunate; MPCA staff believes that past routes have crossed too many water bodies in inaccessible areas, and the risk of large-scale impact as a result of a release incident is significant and ongoing. As this analysis shows, options posing a lesser risk to surface waters may be available.

Of the four possible routes that MPCA staff has examined, the proposed Sandpiper route and the previously followed Northern route show a significantly higher potential for environmental damage than either the Alternative 3 or Alternative 4 routes. It is also possible that an as-yet unexplored route could also score well relative to the Sandpiper proposal. The analysis of the Alternative 4 route is incomplete in that possible impacts outside of the Minnesota state boundaries were not looked at, so the surface waters avoided or protected by this route are only located in Minnesota per this analysis. It is also acknowledged that the MPCA staff analysis focused on the potential water quality and natural resource aspects of the project and not on other types of resources or land uses.

Nevertheless, the criteria adopted for this analysis show a clear difference in potential risk to surface waters between the Sandpiper proposal and other possible routes, and that in the event of a significant

oil release, the Sandpiper route proposal has a significantly greater potential for large-scale environmental damage than other route proposals.

It is important to note that the construction of accesses through sensitive "no access" areas as a preventative measure can also create environmental hazards and damages and cannot be assumed to be an acceptable remedy. Rather, route proposals put forth now and in the future should take these factors into consideration and avoid continuing to cross surface waters at these locations. The minimization of surface water crossings in any location should become a priority for consideration when planning a route to construct a pipeline.

Cumulative Impacts

The NEPA, Title 40, C.F.R. 1508.7, defines cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

The cumulative impacts review in the CEA should include current and proposed transmission line corridors, highway construction, water delivery systems, landfills, railroads, power generations plants, feedlots, and mine and mineral extraction sites which have the potential to interact with the proposed project. The CEA should also review the potential for significant cumulative effects related to past, present and future projects in the Duluth/Superior area involving increased transmission, storage, processing or refining activities, including the expansion of the Calumet Superior Refining facility in Superior, Wisconsin, or transportation of oil, fuels or products refined or manufactured from oil. Areas in which such impacts could occur include air quality in Duluth and the surrounding area in Minnesota, water quality as related to new or increased discharges or shipping activities, and transportation whether by truck, rail or ships.

The CEA should identify the impacts of past incidents associated with pipeline construction and operation, past incidents involving two or more associated utility lines, accidents or emergencies which may arise due to an unforeseen chain of events during the operational life of the pipeline, and effects within the project limits, and local and regional effects. Cumulative impacts may occur to:

- Human activities, such as recreation, agriculture and loss of prime farmland
- Wildlife including migratory birds and aquatic species
- Habitat and alterations to terrestrial vegetation
- Endangered species
- Air quality, including dust (particulate matter) and visual impacts
- Land values
- Watersheds
- Local and state socioeconomics

According to data provided by the Pipeline and Hazardous Materials Safety Administration (PHMSA), to date, there are 2,408 miles of crude oil pipeline in the state of Minnesota. More are planned within the next few years. Much of this infrastructure exists in corridors shared by several other pipelines carrying liquefied petroleum gas, natural gas, diluent for tar sands oil, refined petroleum product and other

hazardous materials. In total, there are 10,475 miles of pipeline through the state. According to PHMSA, over the last 20 years, there has been an average of 14 spills from pipelines per year in Minnesota, an average of 1,812 barrels of hazardous liquids spilled per year in Minnesota, an average of 1,093 net barrels lost per year in Minnesota, and an average of $3,135,572 of property damage annually in Minnesota. Five lives have been lost as a result of pipeline incidents.

The MPCA has numerous concerns about the number of pipelines planned to use the same corridors. With each water body crossed by a pipeline carrying crude oil, the risk of a major incident increases. A cursory review of the PHMSA web site identifies apparent causes of pipeline failure to include: incorrect operation, equipment failure, internal and external corrosion, third party damage (excavation), construction damage, material failure (pipe, fitting, weld), weld leak, and other unknown causes. For example, at the site of the Enbridge pipeline release in Marshall, Michigan, the National Transportation Safety Board found "that deficiencies in Enbridge's integrity management (IM) program contributed to the release of hazardous liquid…" (Federal Register, Volume 79, No. 87, Tuesday, May 6, 2014 (25990 – 25994). See also Enbridge Incorporated Hazardous Liquid Pipeline Rupture and Release, Marshall, Michigan, July 25, 2010 (NTSB/PAR-12/01, PB2012-916501). Ultimately, the perspective should not be if a pipeline fails, but how will a release be mitigated when a failure occurs and at any given location (and the environmental susceptibility of that area to a release).

As explained above, MPCA examination of the proposed Sandpiper route and the previously used Northern route (Alberta Clipper) shows that significantly more open water bodies are crossed by the pipelines in these corridors than alternative routes. Far more of these crossings have no available access within a 2,000 foot buffer, meaning that release incidents are more likely to impact surface waters within that 2,000 buffer. Both the Sandpiper and Alberta Clipper routes are corridors for numerous crude oil pipelines; consequently, these routes are more vulnerable and less able to properly mitigate damage to aquatic environments. Whereas oil does travel through soils and overland, it travels significantly farther in aquatic environments.

Pipeline construction will involve soil excavation, vegetation removal, the crossing of water bodies, and the alteration or loss of wildlife habitat. These activities and the creation of new corridors can result in forest fragmentation affecting numerous species of wildlife that require expanses of undisturbed forest. Wetland perches may be broken causing alteration of natural hydrology in wetland areas, and stream geomorphology can be altered by damaging banks or stirring up stream bottoms. Herbicides used to control vegetation in pipeline corridors may adversely affect pollinators, particularly honeybees, resulting in hidden impacts that are difficult to trace, but nonetheless exist.

The construction, operation, maintenance, incidents and repairs associated with crude oil pipelines have been accompanied by significant environmental impacts. With more proposals in the works, more cumulative impacts can be expected to occur. Therefore, concerted effort is needed to take a close look at and carefully analyze the creation of common routes and corridors for pipeline projects where the risks of impacts to the environmental and human health can be minimized. The routes that have been used in the past pose substantial risks as noted above. Continuing to open more corridors will increase these risks and impacts. The MPCA would support and participate in a joint effort by state agencies to begin examining the feasibility of such a corridor, both for the purpose of expediting approval of future proposals and minimizing the potential for environmental impacts. A fresh look at the routing of energy transportation projects from a larger and more comprehensive perspective has the potential to make a

significant contribution to streamlining the review and permitting processes as well as preventing and minimizing cumulative impacts.

Conclusion

It is requested that the comments provided in this letter and MPCA's letter dated April 4, 2014, be entered into the record to be addressed in the Draft CEA. We continue to look forward to assisting the Department of Commerce, as desired, during the preparation of the CEA for this project and its subsequent review upon its release. Through this process, the MPCA seeks to obtain further additional information to facilitate the MPCA staff review of the Project, well in advance of the time a decisions on the required MPCA authorizations are needed to commence construction. Ultimately, it is the responsibility of North Dakota Pipeline Company LLC to secure any required permits and to comply with any requisite permit conditions. If you have any questions, please contact me at 651-757-2465.

Sincerely,

Patrice Jensen
Planner Principal
Environmental Review
Resource Management and Assistance Division

PJ:bt

cc: Jamie Schrenzel, MDNR
Desiree Morningstar, U.S. Army Corps of Engineers
Sara Ploetz, Enbridge
Reed Larson, MPCA
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August 6, 2014

Mr. Burl Haar, Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

Dear Mr. Haar:

RE: Enbridge Sandpiper Pipeline Project, Docket No PL 6668/PPL-13-474

The Minnesota Pollution Control Agency (MPCA) has reviewed the comments and recommendations submitted by the Department of Commerce (DOC) on July 16, 2014, which will be considered by the Public Utilities Commission (Commission) at the August 7, 2014, hearing for the Enbridge Sandpiper Pipeline project. The MPCA offers the following comments on the project and the DOC's July 16, 2014, recommendations.

The recent boom in the production of oil and gas in North Dakota and surrounding areas has brought about an increase in the number of planned and proposed projects in Minnesota for the transportation, storage, and processing of these resources and their related products and uses. This activity has increased citizen and Agency interest in the amount and quality of information available to adequately assess the individual and cumulative environmental impacts of these projects and to fully inform decision-making processes.

Many alternatives to the proposed Sandpiper project and route have been suggested in the routing (PPL-13-474) and certificate of need (CN-13-473) proceedings, including rail transport, trucking, and numerous pipeline routes. The Commission will determine which alternatives are to be addressed in greater detail as the environmental review, certificate of need, and permitting processes move forward.

Given the high potential of additional pipelines and replacement or upgrading of existing pipelines in the near future, and within the same corridors, it is critical that the current effort consider multiple alternatives, including both route and system alternatives. For the reasons outlined below, limiting the alternatives to route options alone at this stage would unnecessarily narrow the scope of project options to reduce environmental and public health risks.

In our comments, the MPCA has suggested both route and system alternatives; these are discussed in the DOC's July 16, 2014, filing. I am concerned that the system alternative recommended for consideration by the MPCA may not be evaluated in these proceedings, since it does not include the Clearbrook terminal. The DOC evaluated the MPCA's system alternative, SA-03, and developed a connector segment to Clearbrook that would convert SA-03 into a route alternative. The MPCA supports inclusion of the SA-03 route with the connector segment developed by DOC as a less environmentally harmful route alternative than the proposer's route.

The MPCA's view is that the environmental impacts of system alternatives need to be considered as well as route alternatives. A system alternative that will transport oil to an alternative terminal with significantly less environmental harm should be evaluated in these proceedings.

My understanding is that system alternatives are considered in the Certificate of Need (CN) proceeding for this project. I also understand that DOC conducts environmental review of system alternatives in High Voltage Transmission Line certificate of need proceedings in the form of an Environmental Report (ER), but that this review is not conducted for pipeline certificate of need proceedings. The MPCA respectfully requests that the Commission request the DOC to prepare an ER-type review of alternatives to the project, including SA-03 as originally proposed by the MPCA without the connector segment to Clearbrook, for introduction into the CN proceeding. This position is based on MPCA's understanding as follows:

1. The project purpose can be met without constructing new storage capacity in Clearbrook. If the new terminal were to be built at a more westerly location, such as Crookston, a 75-mile long pipeline to Clearbrook could be constructed for the purpose of sending the oil that Enbridge is contractually obligated to send through Clearbrook (for transport to St. Paul refineries), while the remainder of the Bakken crude could be sent via a less environmentally harmful route well to the south of the sensitive water resources, and then on to the Superior, Wisconsin terminal.

2. Locating terminal facilities near Crookston, or at another site closer to the border of North Dakota, could offer other pipeline routes as viable alternatives, such as the proposed "System Alternatives" identified in the July 16, 2014, DOC recommendations. A terminal closer to the Minnesota/North Dakota border could be the point of origination for future pipelines that would travel to the south and avoid the potential threat to sensitive water resources that the MPCA has identified as being associated with the currently proposed Sandpiper route.

Thank you for consideration of our request.

Sincerely,

John Linc Stine
Commissioner

JLS:bt

Minnesota Pollution Control Agency

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August 21, 2014

Mr. Burl Haar, Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

RE: Enbridge Sandpiper Pipeline Project
Docket Nos. PL-6668/CN-13-473 (Certificate of Need) and PL-6668/PPL-13-474 (Route Permit)

Dear Mr. Haar:

This is the response of the Minnesota Pollution Control Agency (MPCA) to the Notice of Comment Period issued by the Minnesota Public Utilities Commission (Commission) on August 12, 2014, for the Enbridge Sandpiper Pipeline project (Sandpiper). The Sandpiper project includes a Route Permit and Certificate of Need proceeding. It is our understanding that the Certificate of Need decision will likely not be made for several months.

The Commission identified three topics open for comment in its August 12, 2014 Notice:

- *What, if any, of the eight system alternatives identified in the Department of Commerce Alternative Routes Summary Report should be considered further in these proceedings?*

  The MPCA evaluated system alternatives SA-03, SA-04, SA-05, SA-06, SA-07, and SA-08 using a number of criteria described below. All these system alternatives have fewer potential environmental effects than the Sandpiper proposal. At a minimum, we recommend system alternatives SA-03, SA-04 and SA-05 for further consideration in these proceedings.

- *What is the legal basis for determining whether a system alternative should be considered in the certificate of need proceeding?*

  The legal basis supporting our position is discussed on page 2 of our response.

- *What is the legal basis for determining whether a system alternative should be considered in the route permit proceeding?*

  See above.

The MPCA is the state agency with responsibilities and authorities related to the issuance of various permits that may be required for the project, including permits and regulations administered under state and/or federal programs for construction stormwater, industrial stormwater, wastewater, and spill and emergency response. A part of our mission is to protect and improve the environment. The MPCA submitted earlier comment letters and provided remarks at the August 7, 2014 prehearing meeting describing our concerns about the potential for adverse environmental effects from the proposed Sandpiper project route. Comments provided by the MPCA included system alternatives that it believes have lesser potential environmental effects.

The MPCA appreciates that the Route Permit and Certificate of Need parts of the Sandpiper proceeding are separate approval processes, each with its own requirements. Our offer of system alternatives was not intended to conflate the Route Permit process with the Certificate of Need process. The MPCA defers to the Commission regarding matters of interpretation and implementation of the Commission's specific statutory authorities and regulations, and of practice and procedure before the Commission. The MPCA's comments, in furtherance of its mission, are intended to provide information regarding the potential environmental effects from the Sandpiper route and to encourage the Commission to obtain additional environmental analysis on system alternatives to inform its Certificate of Need decision. We believe that the Commission has discretion under the Minnesota Environmental Policy Act (MEPA), Minnesota Statutes ch. 116D, to gather information it needs to include in the administrative record and to decide how to gather such information, including soliciting such analysis.

In addition, as the Department of Commerce Division of Energy Resources (DOC-DER) indicates in its August 18, 2014 letter filed in these proceedings, the Commission has authority under Minnesota Rule 7853.0130 to consider system alternatives that can better achieve the claimed need. That rule requires the applicant to meet four separate criteria before the Commission shall grant a Certificate of Need. Analysis of alternatives is governed by Subpart B of this Rule, which states in relevant part:

> A more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record by parties or persons other than the applicant...

As the DOC-DER states in its August 18 letter, this subpart allows a party, or individual, who proposes an alternative to provide evidence showing that its alternative can better achieve the claimed need as stated by the applicant or that the claimed need is not reasonable.

Below we provide comment with respect to the need for additional information and assessment of environmental effects to inform your decision-making on the Certificate of Need and with respect to the potential adverse environmental effects of the proposed Sandpiper route for consideration in the Route Permit process as appropriate.

Analysis of Environmental Effects - Certificate of Need

While no environmental report is expressly required by Commission enabling laws or its regulations, the Commission as a governmental entity has discretion under MEPA to investigate environmental effects. Minnesota Stat. § 116D.03. A comparative analysis of system alternatives would provide valuable information to the Commission to be weighed along with other information of record when making the need decision. Conducting environmental analysis of system alternatives in this need decision is similar to what is done in non-pipeline need decisions. The MPCA believes that certain system alternatives present lesser potential for adverse environmental effects than does the proposed Sandpiper route and that they represent more prudent and environmentally protective options. Given the potential for environmental harm from the proposed Sandpiper route noted in the MPCA's previous comments and in this letter, it is reasonable to investigate the potential environmental effects of system alternatives as part of the need decision. The MPCA respectfully requests that the Commission exercise its discretion under MEPA to ensure that environmental values are given equal consideration along with economic and technical considerations.

The MPCA agrees with the comments filed by the Department of Commerce Energy Environmental Review and Analysis (EERA) unit on August 21, 2014 concerning the Commission's authority to consider environmental impacts of system alternatives in these proceedings. EERA emphasized that MEPA requires all departments and agencies to consider environmental impacts and alternatives in their decision making. MEPA further notes in 116D.06, subdivision 2, that the requirements and goals of the act are supplementary to those set forth in an agencies' existing authorizations. MPCA supports EERA's conclusion that the Commission has the ability to determine what it needs to insure that the record

developed in the Certificate of Need proceeding, or any proceeding, is adequate for its decision making, be it through testimony from parties, supplemental reports from the applicant or an Environmental Report-like (ER-like) document prepared by EERA, as was requested in the Xcel Competitive Resource Acquisition proceeding (12-1240).

Environmental Effects - Proposed Routing Project

The MPCA seeks to provide additional comment regarding the potential for negative environmental effects and a scoring analysis of six system alternatives, known as SA-03, SA-04, SA-05, SA-06, SA-07, SA-08, and the Enbridge's Sandpiper route in the context of the criteria set forth in Minnesota Rule 7852.1900 subp. 3 and 7853.0130 as these criteria pertain to the MPCA's regulatory authority. Please note that proposed system alternative SA-02 is not addressed in the following comments because previous examination of this route showed that it did not merit further consideration based on the risk to natural resources that MPCA believes must be considered. SA-01 was also not entered in the following comparison because it would require crossing the border into Canada. This would appear to change the jurisdiction and authority over the project from the state level to federal, and would thus no longer be under Commission authority.

The MPCA's comments are intended to demonstrate the importance and the utility of the Commission developing an environmental effects analysis of the various system alternatives in the Certificate of Need part of this combined proceeding.

Minnesota Rule 7852.1900 Subp. 3, B, D, E, F, G, H, I and J Criteria

MPCA has considered the criteria in Minnesota Rule 7852.1900 Subp. 3 to compare the proposed system alternatives and the Sandpiper route by identifying corresponding Geographic Information System (GIS) layers to these criteria, and then visually examining the resulting maps. Without having access to specific locations of the proposed system alternatives, a detailed quantification is not possible; however, the MPCA presents this high level approach to help identify the system alternatives which seem to meet the required considerations most effectively. A more detailed analysis of the environmental impacts of system alternatives would be performed in an ER-like document suggested by MPCA and EERA. In the information below, lower numbers represent greater potential environmental effects, while higher numbers represent lesser environmental effects. The information is meant to illustrate one way of roughly comparing one alignment to another.

Minnesota Rule 7852.1900 Subp. 3.B. The natural environment, public and designated lands, including but not limited to natural areas, wildlife habitat, water and recreational lands.

Several layers were used to depict these criteria, including Cumulative Disturbance Index (a score showing how human activity has affected the environment which could be used as an indicator of the quality of wildlife habitat), a map showing Water Quality mean score (the score for overall water quality within a watershed), and another map identifying public land ownership, state parks, and wildlife management areas.

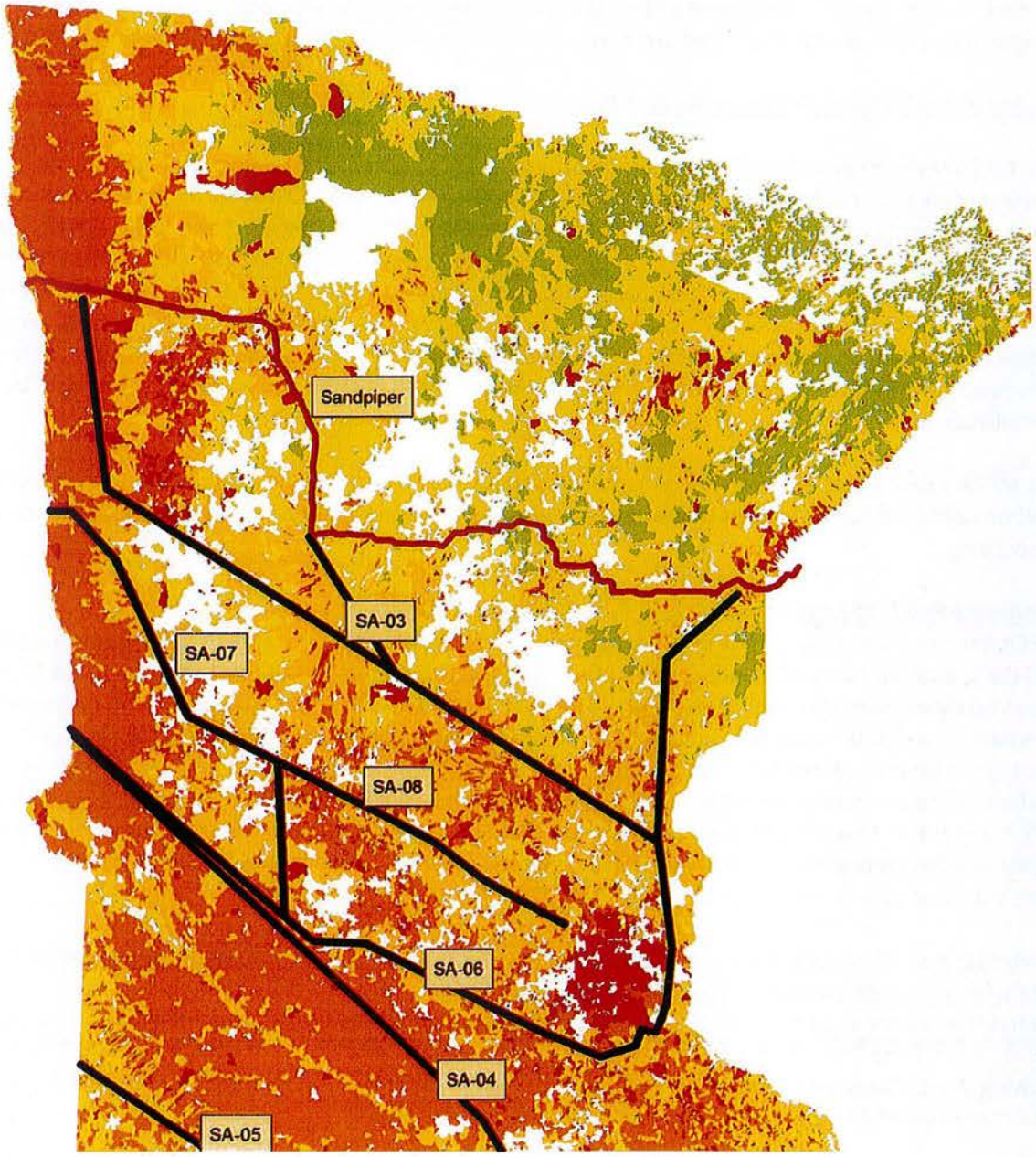

The above map shows Cumulative Disturbance Index scores for the state. The green areas are undisturbed or minimally disturbed areas. The yellow and darker orange to red indicate areas of increasingly heavy human impact, and likely have poor habitat for wildlife; the areas in white have not been assessed. Based on this illustration, it appears that the proposed Sandpiper route has the greatest potential to impact pristine areas of the state and/or areas that have high habitat scores, while the potential for impact decreases with system alternatives located further south in the state.

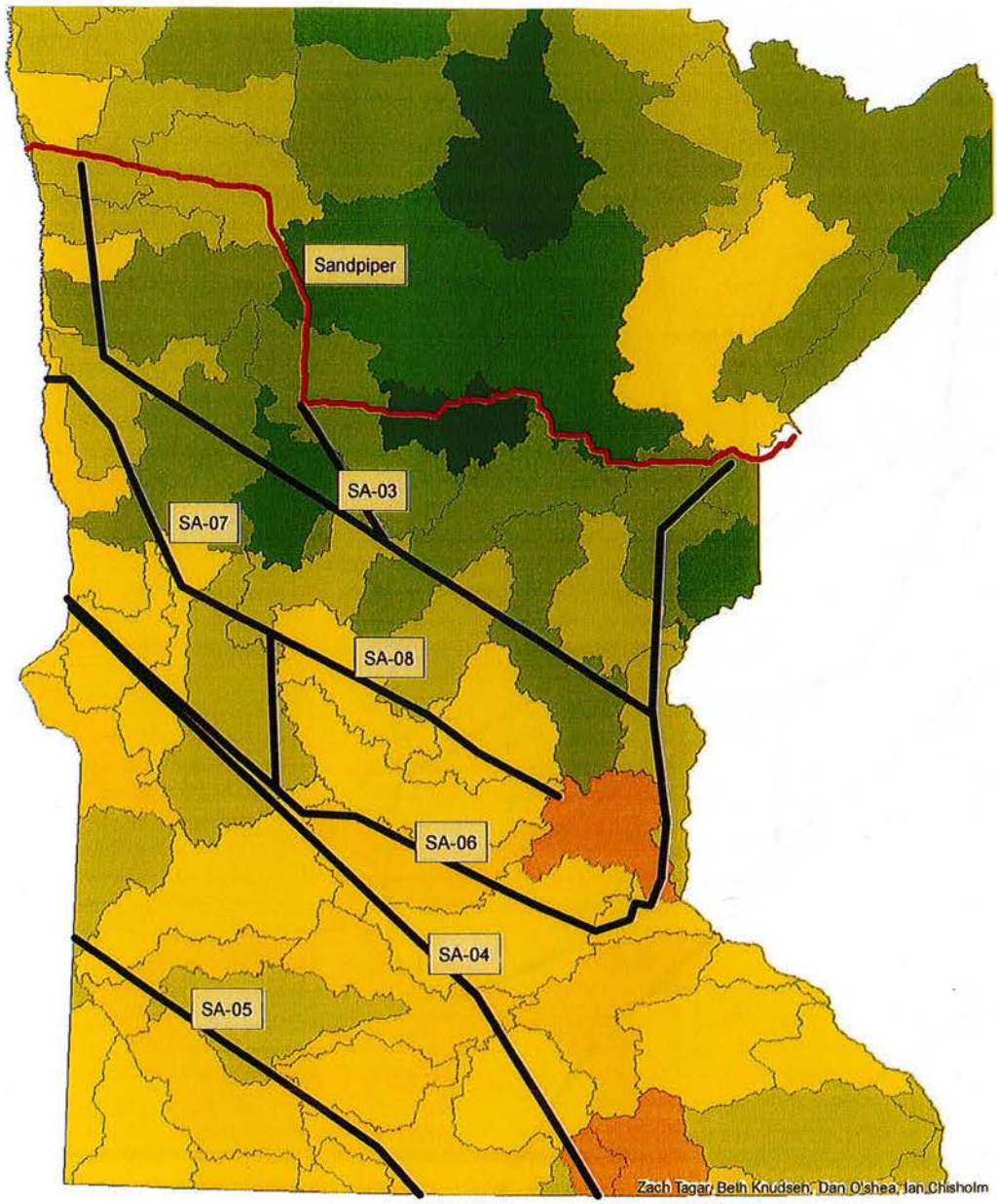

This map shows mean scores for water quality in the state watersheds. Dark green identifies the best water quality in the state; yellow and orange identify areas of lesser water quality. In this depiction, the proposed Sandpiper route has the greatest potential to impact the areas of the state with the best water quality, while system alternatives SA-04, SA-05, and SA-06 traverse areas of fewer surface waters and lower water quality.

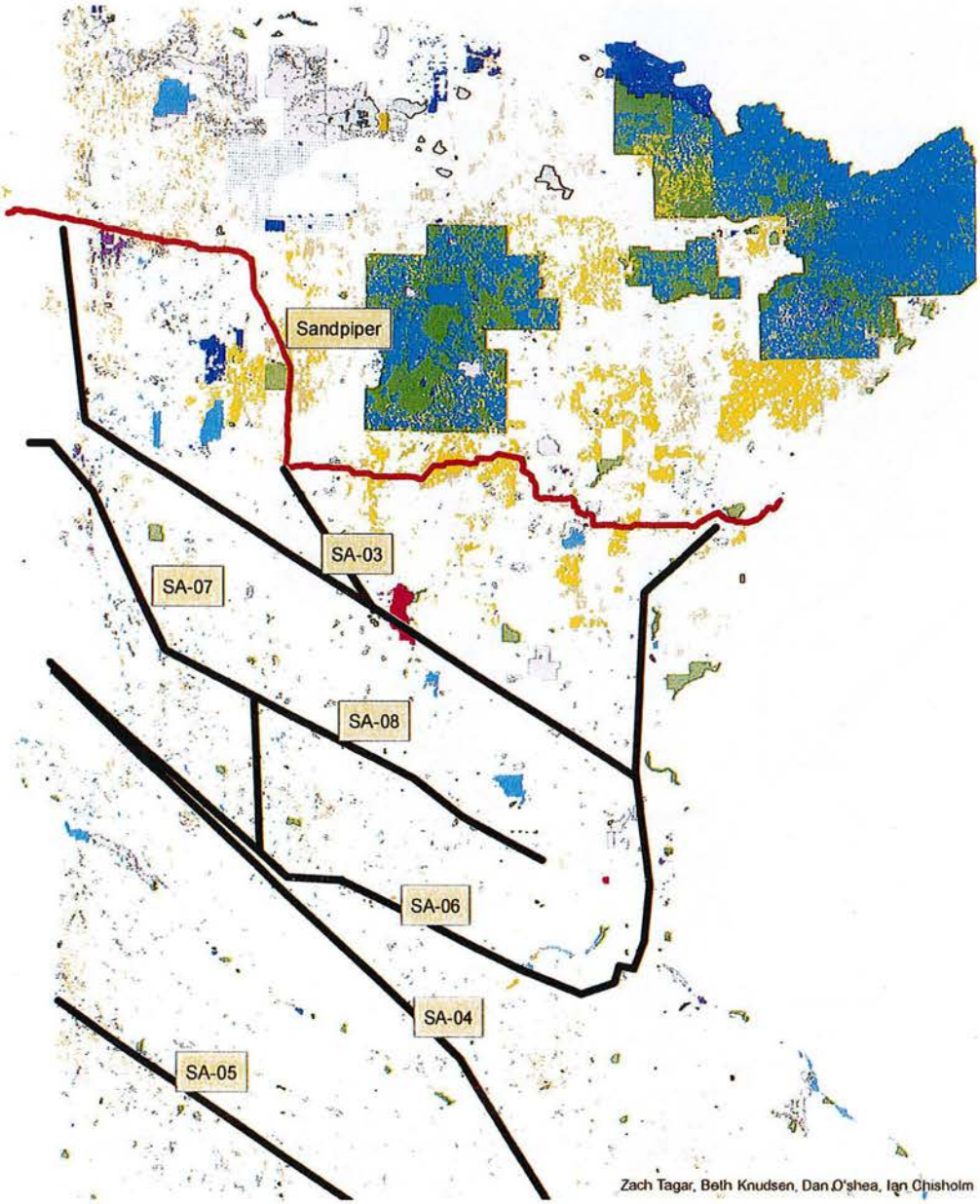

The map above identifies state and federal ownership of lands, state forests, state parks, wildlife management areas, and areas under conservation easements (Nature Conservancy). Wildlife management areas on the map are identified as light pink, darker purple areas are conservation lands, light green are state parks, dark green are national forests, yellow areas are state forests, and bright blue areas are U.S. Forest service land. Notable on this map is that the proposed Sandpiper route borders or crosses a substantial amount of state forest land, and borders several wildlife management areas and one area of nature conservancy land near the North Dakota border. SA-03 crosses near Camp Ripley. All of the proposed system alternatives encroach on some state land, but it appears from this context that the proposed Sandpiper route poses a greater risk to state forests, state parks, and wildlife management areas than any of the system alternatives.

Environmental and natural resource protection and the prevention of impacts tend to be less costly and more effective than restoration; therefore, scoring in this instance is based on preventing impacts to higher quality areas. Scoring of the proposed system alternatives based on criteria in Minnestoa Rule 7852.1900 Subp. 3.B. is as follows:

- 5 points (small potential impact to criteria): SA-04, SA-05, SA-06
- 3 points- (moderate potential impact to criteria): SA-03, SA-07, SA-08
- 1 point (stronger potential to impact criteria): Sandpiper

Minnesota Rule 7852.1900 Subp. 3.D. Economies within the route, including agricultural, commercial or industrial, forestry, recreational, and mining operations.

It is noted that an Enbridge pipeline would help the Minnesota economy by creating temporary jobs and also paying property taxes; however, for the purpose of this comparison, these economic benefits would occur regardless of where the pipeline is located. Therefore, this analysis addresses other economies that may be impacted based on where the Sandpiper pipeline is located.

The following map identifies both major industrial lands (paper company lands, potato farms, mining lands, etc. in gray), major non-industrial lands (livestock operations, miscellaneous trusts, sugar beet operations, etc. in tan).

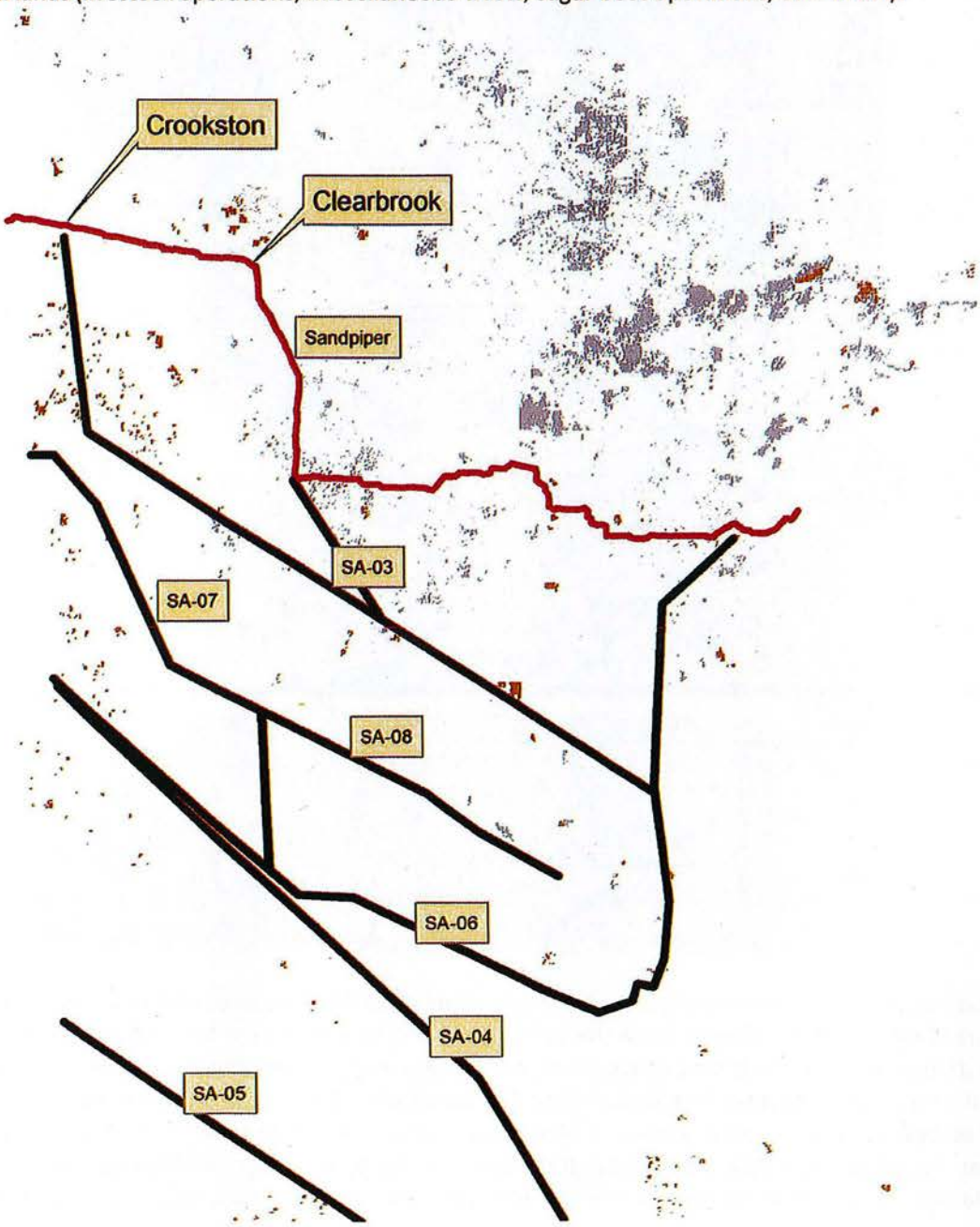

In this example, the proposed Sandpiper route encroaches on relatively few industrial-related facilities compared to SA-06 or SA-08, but the Sandpiper comes closest to or directly encroaches on a number of major industrial lands, particularly potato farms and paper company forests. SA-03 also comes near to several livestock operations. In this view, it appears that SA-04 poses the least potential impact to any of the facilities or lands depicted in this layer.

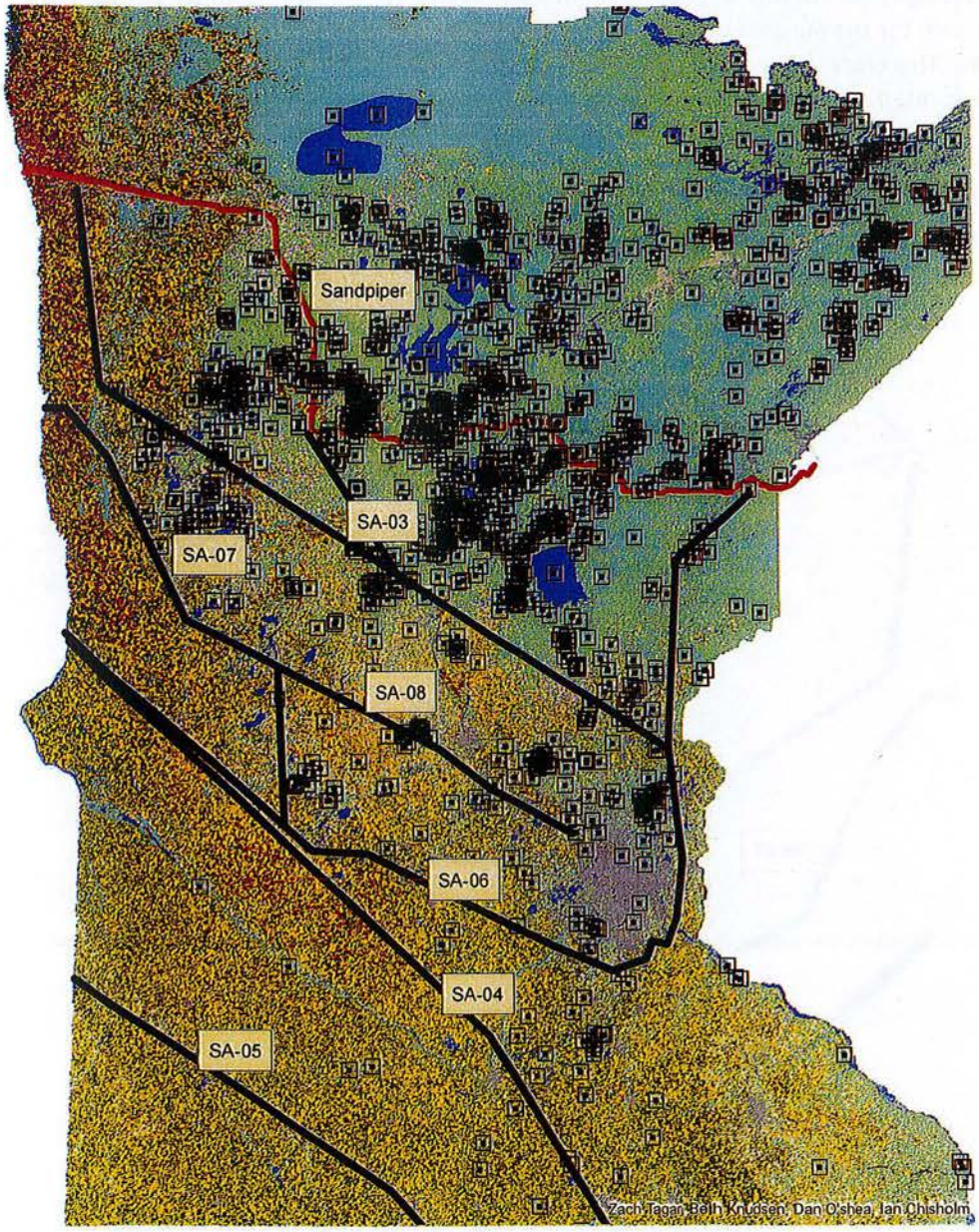

This map identifies cropland in Minnesota, and also stands of wild rice (black squares with black dots). The yellow or dark green areas are corn and soybeans, while the lighter green and blue-green are forested areas. The state appears fairly evenly divided between forest land above SA-03, and heavily cropped land (mostly corn and soybeans) below SA-03. Of special note on this map is the high concentration of stands of wild rice around the proposed Sandpiper route. Unlike corn, soybeans or other exports, stands of wild rice are uniquely sensitive to water quality and disturbance of its native habitat. Therefore, the MPCA concluded that the proposed Sandpiper route would pose a higher threat to the stands of wild rice economy than the system alternatives would pose to other crops. Other Minnesota economic

sectors, such as tourism, resorts, and recreation, are also heavily dependent on water quality; thus with consideration toward potential impacts to the economic sectors that significantly depend on water quality, the MPCA scored the proposed system alternatives as follows:

- 5 points (small potential impact to criteria) SA-04, SA-05, SA-07
- 3 points- (moderate potential impact to criteria) SA-03, SA-06, SA-08
- 1 point (stronger potential to impact criteria) Sandpiper

Minnesota Rule 7852.1900 Subp. 3.E. Pipeline cost and accessibility.

It was not clear whether this criterion applies to the Enbridge's cost and accessibility to route locations, or to potential cost to the State of Minnesota to access the pipeline route, especially in sensitive areas. However, as accessibility to the proposed system alternatives was a major concern of the MPCA's June 24, 2014 letter, it is worth reviewing the result of that analysis as it does apply to accessibility of the proposed Sandpiper route and two of the system alternatives.

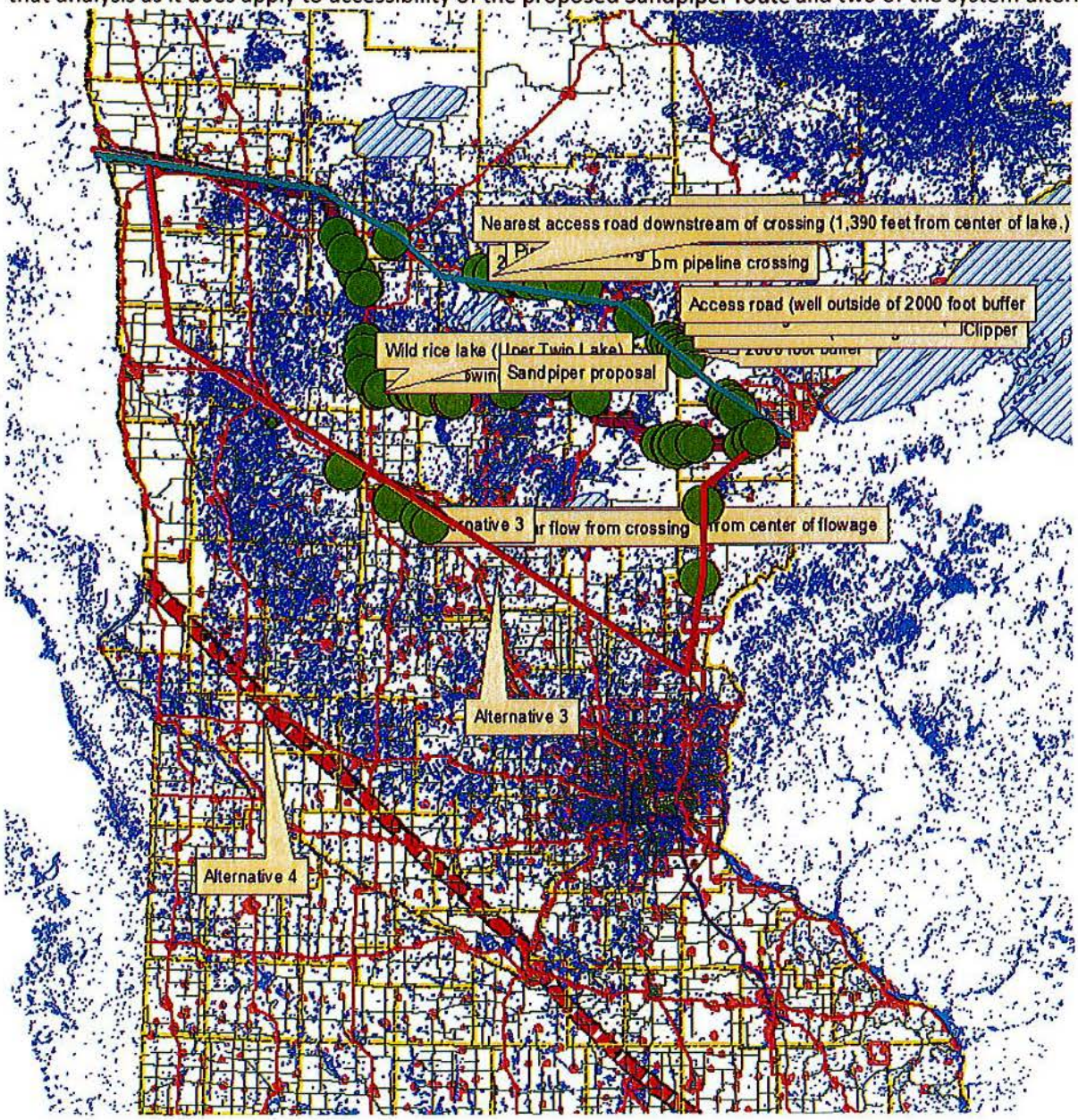

As described in the MPCA's June 24, 2014 letter, the MPCA studied the Sandpiper route proposal, SA-03, and SA-04 for accessibility downstream of water crossings. The criteria set for this study involved road access to water crossing areas within 250 feet of the center of a flowage or water body for a distance of 2,000 linear feet downstream of the crossing. One of the objectives of the analysis was to identify areas with poor or no access to water bodies being crossed by each of the proposed system alternatives, with the above described criteria used to measure this objective. The analysis indicated that SA-03 had seven water crossings with poor or no access as described, SA-04 had zero such access issues, and the proposed Sandpiper route has 28 water crossings with no access within 2000 linear feet.

Based simply on this data and without further analysis, the scoring for SA-03, SA-04 and the proposed Sandpiper route is as follows:

- 5 points (small potential impact to criteria) SA-04
- 3 points (moderate potential impact to criteria) SA-03
- 1 point (stronger potential to impact criteria) Sandpiper

Minneosta Rule 7852.1900 Subp. 3.F. Use of existing rights-of-way and right-of-way sharing or paralleling.
All of the system alternatives follow existing pipeline corridors except for one. The proposed Sandpiper route follows MinnCan pipeline from Clearbrook south, but does not follow any existing pipeline corridor (although some of it follows power line corridor) once it turns east near Park Rapids. Note the area circled on the following map, where the Sandpiper follows either power line corridor, or no corridor:

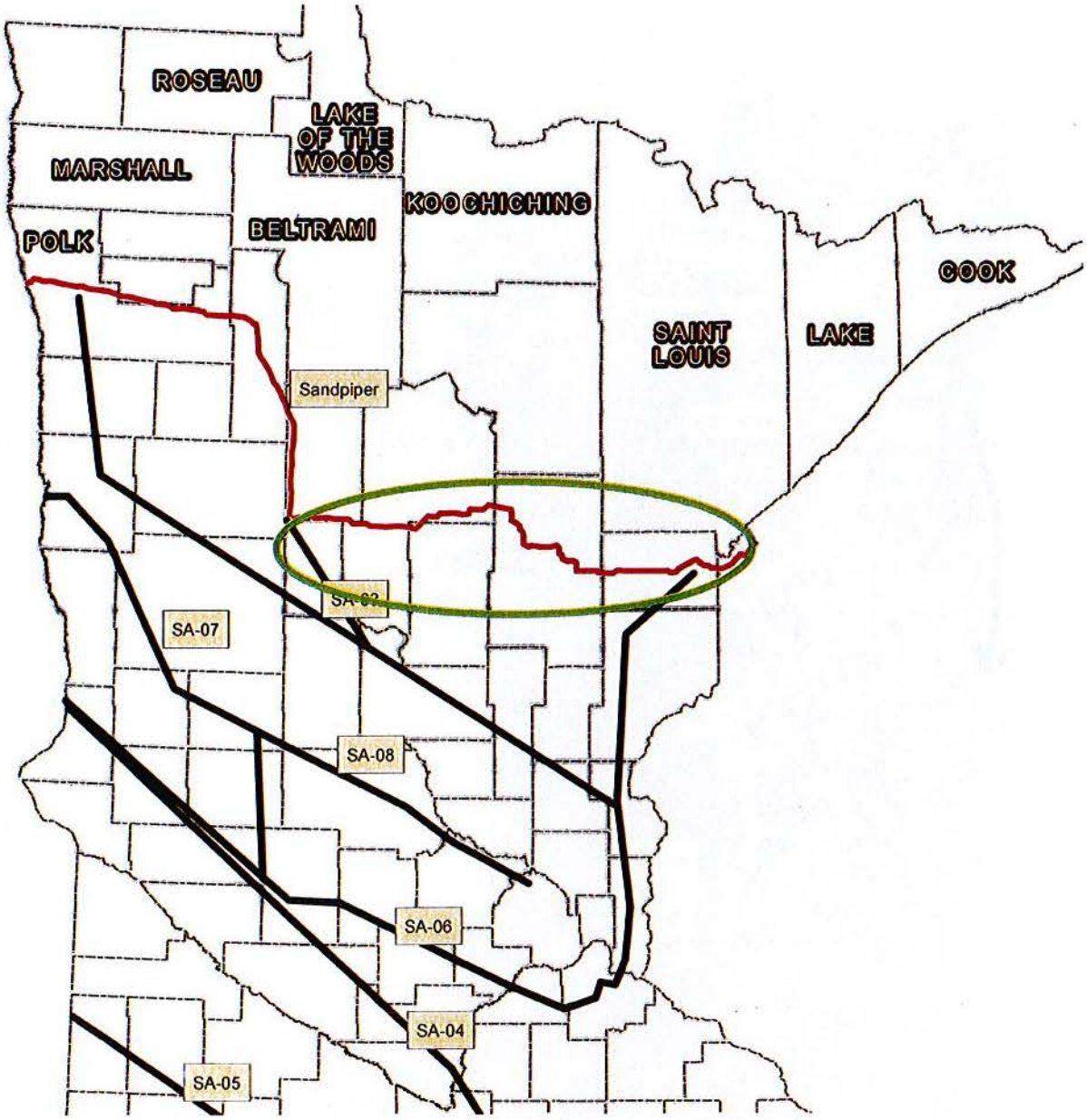

Through much of Aitkin County, and small areas of Carlton County, the Sandpiper proposal does not appear to follow any existing corridors at all. Thus, based on these criteria, the Sandpiper route and system alternatives would score as follows:

- 5 points (small or no variance from criteria) SA-03, SA-04, SA-05, SA-06, SA-07, SA-08
- 3 points- (moderate potential impact to criteria) Sandpiper
- 1 point (significant variance from criteria) not applicable

Minnesota Rule 7852.1900 Subp. 3.G. Natural resources and features.

The map below was put together by combined efforts of Minnesota State and federal agencies. It identifies ground water susceptibility to contamination based on a number of criteria. On this map, the color red identifies the highest potential for groundwater contamination, dark orange is second highest, the lighter greens are low susceptibility, and the lightest green being the least susceptible. The dark greens represent lakes.

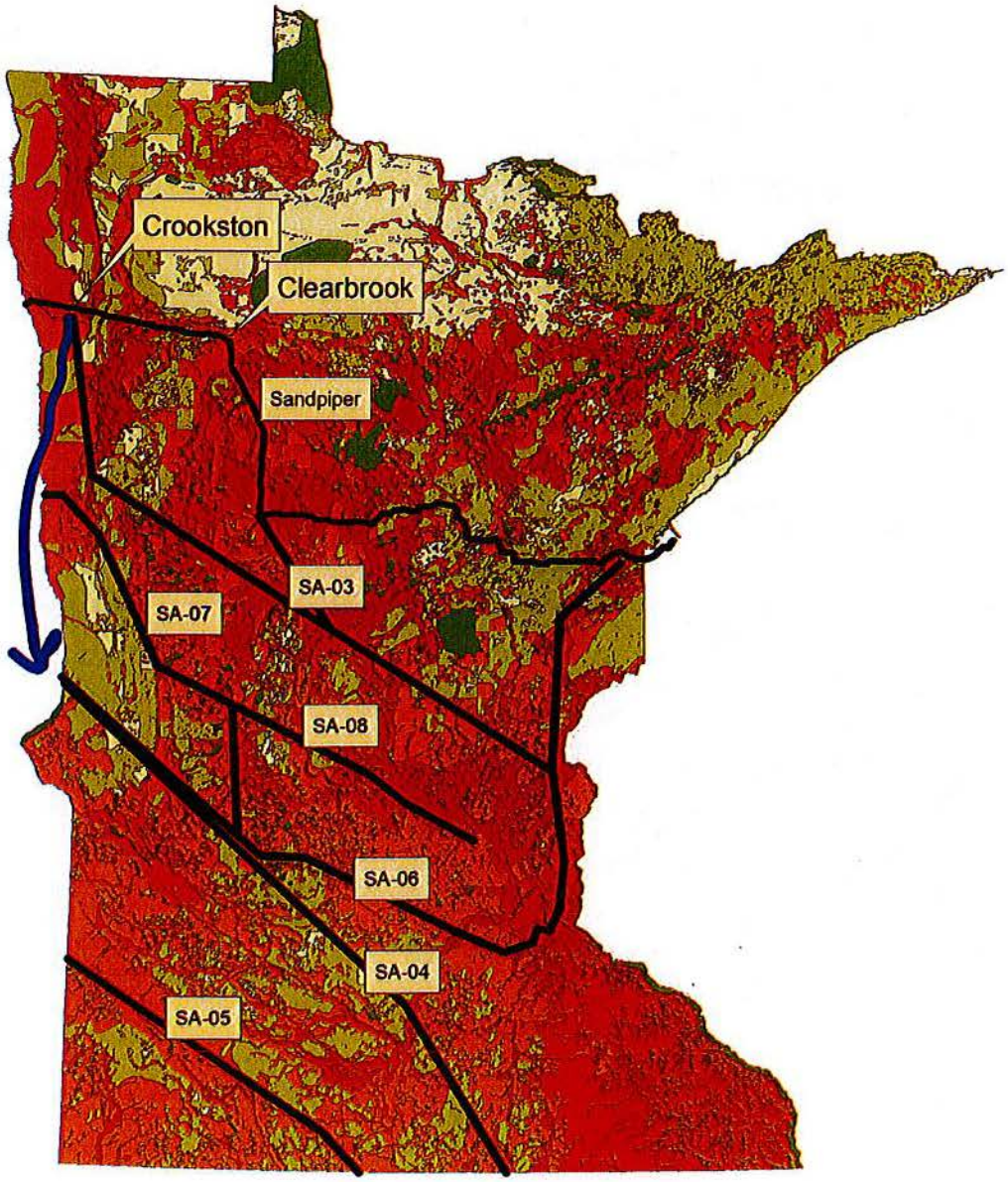

As seen on this map, the proposed Sandpiper route crosses some of the areas of the state that are most susceptible to contamination of groundwater, especially around the Park Rapids area. SA-03 also crosses significant sensitive areas, while the system alternative that crosses the least susceptible ground water is the SA-04 proposal. Of all the proposals, the Sandpiper route appears to cover the most linear miles of susceptible groundwater, from Red Lake Falls to Clearwater, then down to Park Rapids, and east to Fifty Lakes. SA-03 appears to be a close second in terms of potential to impact susceptible groundwater areas.

The map below identifies state surface waters, including lakes and wetlands. Although all of the proposed alternatives cross some water bodies, or encroach on some, the Sandpiper again crosses or encroaches on more surface waters than does any proposed system alternative. There is also more diversity of surface water types along the proposed Sandpiper route than any system alternative.

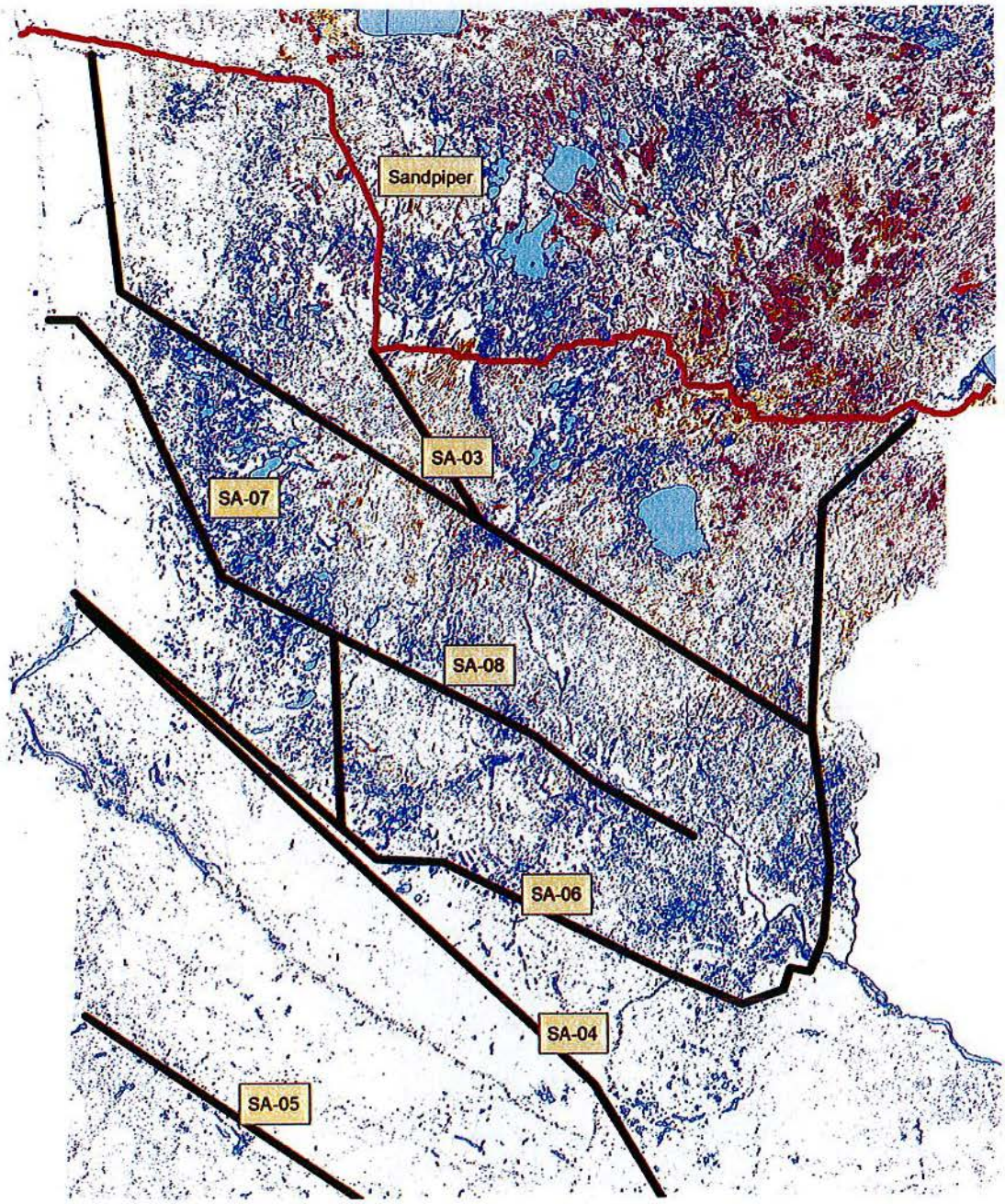

Although the proposed Sandpiper route was comparable to SA-03 with regard to potential for groundwater contamination, the Sandpiper route appears to encroach on a much higher density of surface waters. SA-07 and SA-08 also encroach on a significant concentration of surface water, although without as much diversity (i.e. rivers, lakes, streams, wetlands, etc.) as the Sandpiper route, nor as much overall surface water area. When combining the potential for impact to surface water and ground water, the proposed system alternatives average out in this manner:

- 5 points (small potential impact to criteria) SA-04, SA-05
- 3 points- (moderate potential impact to criteria) SA-03, SA-06, SA-07, SA-08
- 1 point (stronger potential to impact criteria) Sandpiper

Minnesota Rule 7852.1900 Subp. 3.H. The extent to which human or environmental effects are subject to mitigation by regulatory control and by application of the permit conditions contained in 7852.3400 for pipeline right-of-way preparation, construction, cleanup, and restoration practices.

Although MPCA staff has not identified a GIS layer to correlate with these criteria, exposed sections of Enbridge pipeline in the Tamarac River have raised serious questions regarding regulatory authority to require re-burying of exposed pipe when erosion has uncovered existing infrastructure. Exposed pipe creates a greater risk of spills or injuries to people. The significant number of water crossings along the proposed Sandpiper route would appear to increase the likelihood that similar pipe exposures with their attendant risks will occur in the future.

Minnesota Rule 7852.1900 Subp. 3.I. Cumulative potential effects of related or anticipated future pipeline construction.

A significant component of the Sandpiper proposal is the construction of a new terminal at the Clearbrook location. MPCA has expressed concern that with each terminal constructed at Clearbrook, the likelihood of additional or future pipeline infrastructure that will be built will come through Clearbrook. This, in turn, increases the potential for new pipeline to impact the large concentration of sensitive surface and groundwater that lies immediately to the east of Clearbrook, as demonstrated in the map below. The blue color on the map typically identifies open water, with green and purple, etc. indicating various other types of wetlands. The brownish/pink octagons represent cities.

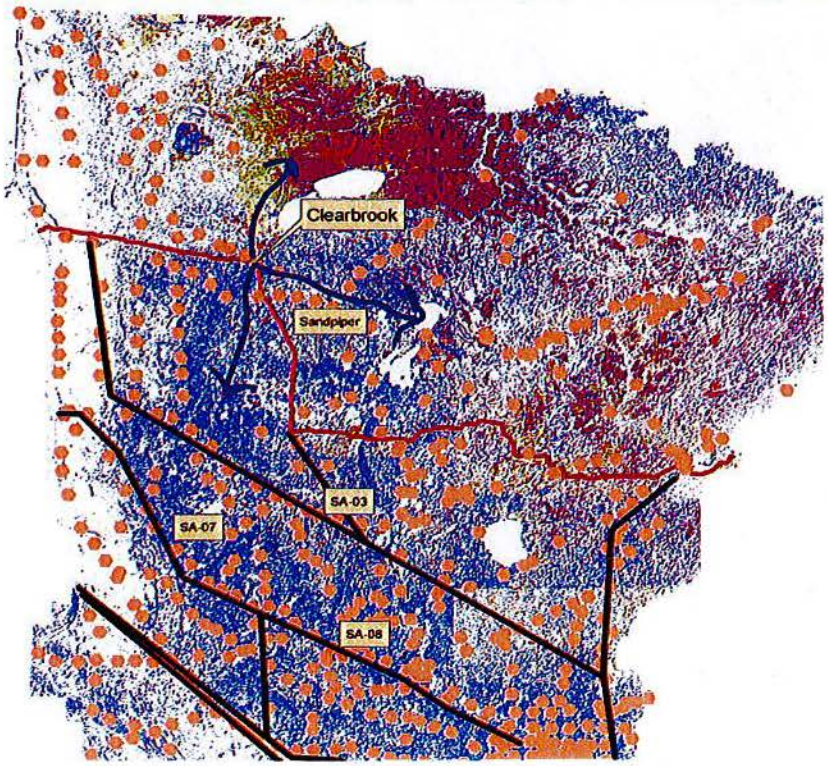

Due to the fact that pipelines are often placed in the same corridors, it is MPCA's concern that by continuing to allow pipelines through Clearbrook, the state will enable expansion of future pipeline infrastructure expansion in areas of the state that will have an increasingly concentrated impact on the state's most valuable surface and groundwater resources. This increases the potential for natural resource impacts and degradation due to spills or releases.

The MPCA believes that cumulative potential effects associated with high-risk crude oil routes can be reduced or avoided if future terminal facilities were constructed at a location west of Clearbrook. Such facilities could be constructed along the old line 3 corridor, or near Crookston as shown on the following map. The possible benefits to reducing potential impact to our state's valuable resources are depicted below:

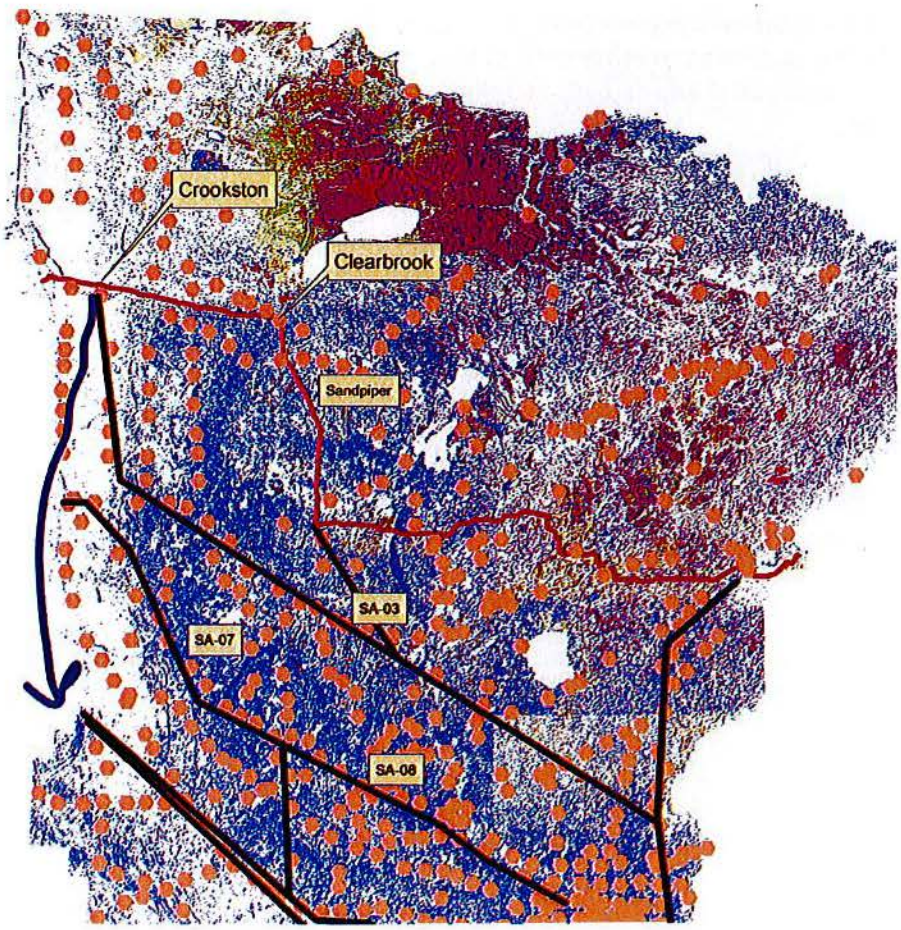

By relocating new terminal facilities west of Clearbrook, a corridor can be created in which potential resource impacts can be minimized, and a number of possibly less environmentally hazardous routes opened up. The Sandpiper route as currently proposed, as well as future pipelines that may use this same corridor, increase cumulative risk with consideration of most of the criteria from 7852.1900 as described above.

Minnesota Rule 7852.1900 Subp. 3.J. The relevant applicable policies, rules, and regulations of other state and federal agencies, and local government land use laws including ordinances adopted under Minnesota Statutes, section 299J.05, relating to the location, design, construction, or operation of the proposed pipeline and associated facilities.
Minnesota Statute 116.04D, Subd. 6 states: "No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct."

In summary, all the currently proposed system alternatives evaluated by the MPCA here are worthy of further consideration, especially when compared with the Sandpiper proposal. The MPCA recommends that at a minimum, the Commission approve SA-03, SA-04, and SA-05 for further consideration in these proceedings. Further, the MPCA urges the Commission to gather additional environmental effects information on the system alternatives through preparation of an ER-like document and is willing to assist EERA by providing additional data, comments, and review for the document that both agencies recommend here.

The MPCA thanks the Commission for the opportunity to comment upon these issues. The agency continues to emphasize that the environmental effects of system alternatives need to be considered in the Certificate of Need process. System alternatives that will transport oil to an alternative terminal with significantly less environmental harm should be evaluated in these proceedings.

Sincerely,

Craig Affeldt, for

Bill Sierks,
Manager, Environment and Energy Section
Minnesota Pollution Control Agency

BS:bt
cc: Deborah Pile, Department of Commerce
Larry Hartman, Department of Commerce
Sara Ploetz, Enbridge

Minnesota Pollution Control Agency

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November 12, 2015

Ms. Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul MN 55101

RE: Draft Impact Analysis Methodology for the Proposed Sandpiper and Line 3 Pipeline Projects
Sandpiper Docket Numbers: 13-473 and 13-474
Line 3 Docket Numbers: 14-916 and 15-137

Dear Ms. MacAlister:

The Minnesota Pollution Control Agency (MPCA) has reviewed the draft impact analysis methodology (IAM) for the proposed Sandpiper and Line 3 pipeline projects. We understand the draft IAM will inform the scope of environmental review for each pipeline project and can be applied to either a comparative environmental analysis (CEA) or environmental impact statement (EIS) when the Public Utilities Commission (Commission) makes that determination.

We offer the following comments on scoping content and analysis, applicable whether the Commission orders an EIS or CEA.

Scope of Analysis

The scoping document should indicate that the analysis will identify which resources actually have the potential to be impacted, and discuss what those impacts might be. As Minn. Stat. § 116D.04, subd. 2a, states, an environmental impact statement must be "analytical rather than encyclopedic"; merely counting resources or features that fall in the area of the described routes is not sufficient. For example, a wetland one half mile upstream from a proposed route would have a much smaller chance to be impacted during construction or during a release than a wetland that is hydrologically connected several miles downstream of a pipeline water crossing. Any resource analysis should identify whether the feature is downstream or downslope of a proposed route, or whether the feature is up-gradient, uphill or otherwise separated from the pipeline route by roads, railroad tracks, or other physical conditions that might protect the feature from impacts.

Alternatives

A scoping document should identify at least one alternative of each of the following types, or provide an explanation of why no alternative is identified for inclusion in the EIS/CEA: alternative sites; alternative technologies; modified designs or layouts; modified scale or magnitude; no action/no build; and alternatives incorporating reasonable mitigation measures identified through comments received during the EIS scoping or draft EIS comment periods. (Minn. Rules 4410.2300.G). For any alternative identified, the scoping document should indicate that the analysis in the EIS/CEA will include a discussion of potentially significant direct or indirect, and adverse or beneficial, effects associated with that alternative.

Project Magnitude
The scoping document should identify that the project magnitude discussion will include topics such as the width of the easements required, the additional land required for material and equipment temporary storage, the land required for the pump stations, eminent domain, and any public displacement.

Environmental Impacts
The scoping document should identify that the EIS/CEA will evaluate and analyze the following additional topics:

- Wildlife in addition to endangered or threatened species
- Water use
    - Locations to private and public water supply sources, depths of the wells, aquifers, etc. Drinking Water Source Management Area (DWSMA) data can be used to help assess risk to public drinking water wells.
- Wastewater
- On-site generation of solid waste, hazardous waste, and storage tanks
- Vehicle-related air emissions
- Stationary sources of air emissions and odors from the pump stations and above ground storage tanks
- Soil conductivity and permeability
- Aquifer hydraulic properties
- Data sources
    - "Counts of areas and acres within each alternative route will be developed using spatial analysis tools within ArcGIS." Again, while this is useful information, it should be accompanied by discussion about how relevant the data is. An explanation of how oil moves underground, and how it might affect the identified resources, will be necessary.
- Multi species assemblage areas should be added to the list of High Consequence Areas (HCAs) to be identified and assessed for potential impacts. Also, we suggest that HCAs are identified for a minimum distance of ten miles downstream of any water crossing.
- Above ground storage tanks (Note: the MPCA prepared an Environmental Assessment Worksheet for the construction of above ground storage tanks at the Minnesota Pipeline facility in Clearbrook.)
- Odors
- Dust
- Noise
    - From construction and pump stations
    - Possible impacts on natural systems (see the following for reference: http://rspb.royalsocietypublishing.org/content/early/2012/03/15/rspb.2012.0230.short?rss=1)
- Prime farmland, organic farming, and other land uses that may not be compatible
- Ecologically sensitive resources

- Groundwater
- Mitigation measures for catastrophic releases, smaller spills and pinhole releases
    - The scoping document should identify that the analysis of pinhole leaks will include an evaluation of how the applicable ground water regulations and cleanup standards will be achieved in the event of a spill, as well as soils and hydrogeological conditions as depicted in sensitivity maps along preferred and alternative routes. Include the potential impacts as a result of a pinhole leak on surface water as well as ground water.
- Wetlands
    - Explain how the potential direct and indirect impacts on wetlands will be evaluated.
- Water resources
    - Identify applicable regulations and standards specific to the potentially affected water resources and evaluate how those standards will be met in the event of a spill.
    - It is unclear whether "Impaired waters for which state and federal monies are being spent" refers to currently funded projects or an assumption that state or federal monies will be spent on all waters listed as impaired. Minnesota state and local agencies are currently developing detailed Watershed Restoration and Protection Strategies (WRAPS) for all 80 major watersheds in the state. As part of this analysis, the MPCA and its partners identify water bodies that are impaired (requiring a TMDL), as well as high quality water bodies that are deemed to be at risk or that require protection to maintain their high quality. This list of waters (includes TMDL waters as well as waters requiring additional protection) is more appropriate for the proposed pipeline environmental review efforts.

Project Design

- Discuss cathodic protection, how joints will be welded, pipeline integrity, and appropriate placement of shut-off valves.

Financial Assurance

- The scoping document should identify that the EIS/CEA will discuss financial assurance to address pipeline restoration, closure, and/or spills if Enbridge is unable to cover those costs.

Economic and Sociological Impacts

- Direct and indirect costs to local and regional economic
- Sociological impacts
- Effects on property values, tax base, and sociological conditions should a release occur
- Projections for expansion of residential or industrial areas over the anticipated lifetime of the proposed project should be analyzed.

Cumulative Effects

The scoping document should identify that the EIS/CEA will evaluate related or connected activities such as power lines that would need to be constructed to power pump stations, access roads that might need to be built, and additional pipelines or refineries that may need to be constructed to add "reliability" to existing shipping routes, or to replace older infrastructure that may be overloaded as volumes increase as a result of the activation of Line 3 or Sandpiper (older Wisconsin lines, for example that will be

receiving additional oil as a result of the increase of volumes through Minnesota). If a new corridor is established, the EIS/CEA should also evaluate the potential impacts that may occur if additional lines are added to that corridor in the future (Line 2 for example, which is currently being tested for integrity with hydrostatic testing and is several decades old).

Impacts of Routine Construction and Operations

The scoping document should identify that the EIS/CEA will evaluate impacts as a result of topographical alterations of landscape, loss of topsoil in forested areas (topsoil is typically separated in agricultural areas but not in natural areas), and subsidence of soils which can create water conveyances (typically resulting from replacement of frozen soils in trenches during winter construction).

Thank you for the opportunity to provide comments regarding scoping for the EIS/CEA for the proposed Sandpiper and Line 3 pipelines. If you have any questions, please contact me.

Sincerely,

Bill Sierks

Bill Sierks, Manager
Environment and Energy Section
Resource Management and Assistance Division

BS/PJ:ld

cc: Jamie Schrenzel, MDNR

Appendix D
Straight River Groundwater Management Area

Straight River Groundwater Management Area Plan

March 2017

DEPARTMENT OF NATURAL RESOURCES

Funding for this project was provided, in part, by the following:

The Clean Water Fund, which receives 33 percent of the sales tax revenue from the Clean Water, Land and Legacy Amendment, approved by voters in November 2008. The Clean Water Fund's purpose is to protect, enhance and restore water quality in lakes, rivers, streams and groundwater.

At least 5 percent of the money is targeted for the protection of drinking water sources. The Legislature allocates funds for water quality work and drinking water protection based on recommendations from the Clean Water Council.

Office of the Commissioner
500 Lafayette Road, St. Paul MN 55155-4037
651-259-5555

March 2017

Straight River Groundwater Management Area: Designation and Plan

Minnesota is rich in water resources. With more than 10,000 lakes, thousands of miles of rivers and streams, and many thousands of acres of wetlands, it might be natural to think that our water is essentially unlimited. But in some parts of the state, the unseen, underground aquifers that make up our groundwater resources are under pressure to meet growing needs for domestic water supplies, irrigation, industrial and other uses. These groundwater resources also are interconnected with lakes, streams and wetlands that we value for commerce, recreation, and water supplies. Those surface waters also provide the habitat needed by many animals and plants. If we are not careful in how we use water, both economic development and ecosystems could be put at risk.

These concerns led the Minnesota Department of Natural Resources to explore a different approach to groundwater management in three areas around the state where trends suggest groundwater use might be or become unsustainable. After working with an advisory team of 21 people representing agriculture, local government, and other agencies since February 2014, the DNR is establishing the Straight River Groundwater Management Area, which is hereby designated to include parts of southern Clearwater, northeast Becker, southwest Hubbard and northwest Wadena counties. We have created this five-year plan to guide our work in this area to ensure that groundwater supplies remain adequate to meet human needs while protecting lakes, streams and wetlands.

I believe this plan is a very positive step for Minnesota. It draws upon a wealth of technical expertise across a variety of sectors. It has been informed and improved by extensive input and feedback from major water users, local government, concerned citizens and other interests. The plan is comprehensive, yet achievable. It lays out clear objectives and specific actions the DNR will take to ensure sustainable use of groundwater. It also acknowledges that DNR cannot be successful alone and describes the important roles of water users and other agencies.

I want to thank the volunteers who served on the Project Advisory Team and the people who actively participated in meetings throughout the process. The many hours you dedicated are very much appreciated. This plan provides a good starting point, but working to maintain the Straight River water resources will require many more people, agencies and interests continuing to work together in the years to come. I'm confident that will happen, because Minnesotans have shown their commitment to natural resource conservation and stewardship.

Tom Landwehr
Commissioner

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1. Introduction

The Minnesota Department of Natural Resources (DNR) works with citizens to conserve and manage the state's natural resources, to provide outdoor recreation opportunities, and to provide for commercial uses of natural resources in a way that creates a sustainable quality of life. The DNR works to integrate and sustain a healthy environment, a sustainable economy, and livable communities. The DNR shares stewardship responsibility with citizens and partners to manage for multiple interests.

The DNR is responsible for managing the state's water resources to sustain healthy streams, lakes, wetlands and groundwater resources. The DNR plays an important role in supporting sustainable groundwater use through its permit programs, information collection and analysis activities, education, technical assistance opportunities and law enforcement responsibilities.

The DNR is one of several state and local agencies and organizations with responsibility to develop, protect and manage our water resources. The following briefly describes some of the key roles of state agencies in water:

- Department of Natural Resources: collects and analyzes information on water, regulates water use and riparian land use activities, manages public land, and approves water supply plans.
- Department of Agriculture (MDA): responsible for fertilizer and pesticide regulation and management, including implementing the state Nitrogen Fertilizer and Pesticide Management Plans to protect groundwater; developing voluntary best management practices; monitoring groundwater in agricultural settings; product registration; and applicator training and licensing.
- Department of Health (MDH): ensures public drinking water systems protect sources and meet federal drinking water standards, regulates water well construction and sealing to protect groundwater, assesses drinking water contaminant risks to public health, licenses professions impacting drinking water and approves water supply plans.
- Pollution Control Agency (MPCA): develops water quality standards, monitors surface water and groundwater quality, and regulates discharges of pollutants to public waters.
- Board of Water and Soil Resources (BWSR): provides resources and technical assistance to local governments, manages conservation easements, and provides oversight to local water management entities.
- Public Facilities Authority: manages municipal financing programs to help communities build and upgrade drinking water, wastewater and storm water infrastructure.

Groundwater can be at risk of overuse and contamination anywhere in the state, and in some areas this risk is more urgent. To address concerns about long term sustainable use of groundwater in three of these areas, the DNR is establishing Groundwater Management Areas (GWMA) and developing management plans. The purpose of the GWMA Plan (Plan) is to guide DNR actions in managing the appropriation and use of groundwater within the GWMA over five years following adoption of the Plan. The Plan will be updated as needed to allow it to continue guiding sustainable groundwater use. The DNR will form stakeholder advisory committees for each GWMA as prescribed in statute.

The GWMA represents a geographic area within which groundwater users share a distinct aquifer system or groundwater resource. Users include both those who are required to have appropriation permits (high volume users - more than 10,000 gallons a day or 1 million gallons a year) and those who do not require permits to use groundwater (low volume users - less than 10,000 gallons a day or 1 million gallons a year).

Problem

As part of a statewide analysis of groundwater resources, the DNR identified the Straight River area as an area of specific concern where groundwater resources are at risk of overuse and degraded quality. Multiple permit holders (groundwater users) are connected through their use of groundwater and their effect on water resources.

The DNR manages water resources to assure an adequate supply through permitting and tracking water appropriation and use. The Water Appropriation Permit Program balances competing management objectives that include development and protection of Minnesota's water resources. Key challenges for the DNR in managing groundwater appropriations and use in the Straight River GWMA include the following:

- Demand: past and projected growth in water demand, particularly for agricultural irrigation
- Natural Resources: potential for negative effects on groundwater-dependent natural resources such as wetlands, lakes, and streams
- Conservation: a need for improved and expanded application of water conservation and improved water use efficiency
- Contamination: reduction in the availability of clean groundwater
- Information: gaps in the information needed to determine the sustainability of groundwater use

Purpose

The purpose of the GWMA Plan is to guide DNR actions in managing the appropriation and use of groundwater within the GWMA over the next five years. The following points help summarize the purpose of the GWMA Plan by identifying what it is and what it is not:

- The Plan directs the actions of the DNR and is not a plan for others to implement.
- The Plan establishes actions to guide the improvement of the DNR's appropriation permitting process to ensure sustainable groundwater use.
- The Plan calls for the development of sustainability thresholds for groundwater use in the GWMA.
- The Plan covers a five year period with the expectation that actions will be revised to continue the work beyond the initial 5-year period.
- The Plan directs actions to improve communication for stakeholders within the GWMA.
- The Plan calls for regular review of progress by a GWMA Advisory Group comprised of stakeholders.
- The Plan is not a comprehensive study of the area, but instead uses information from completed studies and suggests future studies to inform the plan and process.
- The Plan does not establish any new or broader regulatory authority. The actions proposed in the Plan are based on existing regulatory authority.
- The Plan itself is not an individual or a collective water supply plan for individual permit holders, industries, or municipalities.

The GWMA is intended to be in place for the long term, which will require updating and renewing the Plan after the first five-year implementation period. During the initial five year implementation period, the Plan, actions and progress will be reviewed annually, evaluated, and revised with the help of a standing GWMA Advisory Group and other stakeholders.

The Plan identifies actions for the DNR to take, in collaboration with other agencies, organizations and individuals active in the GWMA. Other state agencies and organizations have an important role in supporting the DNR's actions in the Plan. The Minnesota Pollution Control Agency (MPCA), the Minnesota Department of Health (MDH), the Minnesota Department of Agriculture (MDA), and the

Board of Water and Soil Resources (BWSR) have provided specific commitments and actions in support of the DNR's Straight River GWMA. Those commitments are included in Appendix A.

Many of the actions described in Section 5 will develop information, tools, and processes that will form the foundation for better decisions. The Plan does not establish or include a total allocation limit. Rather, it lays the path for determining sustainable thresholds, now and in the future, and managing appropriations to stay within the sustainability thresholds in a planned and transparent framework. Actions oriented toward all five Plan objectives are integral to this process.

Process

The Plan lays out a framework for addressing the groundwater management goal and objectives of the DNR Groundwater Management Program (from the Strategic Plan) in light of the particular challenges within the area. In order to gain insight into specific interests of the diverse groundwater users in the area, the DNR established a Project Advisory Team (PAT) to provide feedback and advice. The PAT was comprised of stakeholders from private businesses (e.g., farmers, food processors, well drillers), state agencies, county and city/township governments, a watershed district, industry, and the federal government (Table 1-1). In response to legislative changes made in 2014 (Minn. Stat., sec. 103G.287, subd. 4) the DNR expanded the membership of the PAT during the planning process to increase the number of team members holding water appropriation permits.

A project team of DNR staff wrote the plan based on feedback from the PAT and other stakeholders. Members of the project team came from the divisions of Ecological and Water Resources, Fish and Wildlife, Enforcement, Operations Services, and Regional Leadership.

The role of the PAT has been to provide advice and feedback on the Plan during development. DNR asked PAT members to be two-way conduits of information about the Plan to other stakeholders. The PAT was not established to generate unanimous agreement with the Plan. Participation on the PAT does not imply agreement with the Plan or specific elements of the Plan. The DNR will establish a new advisory team for implementation of the Plan with a formal charter to match the needs of the GWMA going forward.

Twelve PAT meetings were held from February 2014 through June 2015. Following development of the draft Plan with input from the PAT, DNR sought wider stakeholder review and comment.

At the end of the five year initial implementation period, the DNR will conduct a comprehensive review of the process, actions and results for the GWMA Plan, determine future actions, and if needed, revise the Plan. The new GWMA Advisory Group will be an important part of the comprehensive review.

Table 1.1 Project Advisory Team (PAT)

Last Name	First Name	Affiliation	Water Appropriation Permit Holder (Y/N)
Becker	Todd	Becker Farms	Yes
Becker	Troy	Property Owner - Ag. Irrigator	Yes
Bishop	Alex	Agricultural Irrigator	Yes
Burlingame	Scott	City of Park Rapids	Yes
Christofferson	Dean	City of Park Rapids	Yes
Collins	David	Hubbard Regional EDC	No
Crocker	Tim	MN DNR	No
David	Nick	R.D. Offutt Company	Yes
Dotta	Matt	Hubbard County	No
Elsner	Kelly	Elsner Well Drilling, Inc.	No
Finnerty	Bonnie	MN PCA	No
Flynn	Brian	ConAgra (Lamb Weston)	Yes
Kingsley	Julie	Hubbard SWCD	No
Kluthe	Beth	MN Department of Health	No
Marcussen	Morgan	Park Rapids School District	Yes
Maves	Gene	Agricultural Irrigator	Yes
Monico	Larry	Property Owner	Yes
Parson	Charlie	Trout Unlimited, Bemidji Headquarters	No
Pike	Nate	Agricultural Irrigator	Yes
Stuewe	Luke	MN Department of Agriculture	No
Traut	Steve	Traut Wells, Inc.	No
DNR Staff Support to the Project Advisory Team			
Walker	Michele	MN DNR	No
Miersch	Janell	MN DNR	No
Kingsley	Doug	MN DNR	No
Hoverson	Darrin	MN DNR	No

Plan Structure

The remainder of the Plan is divided into five additional sections.

SECTION 2 - DESCRIPTION OF THE BOUNDARY AND THE GWMA summarizes background information on groundwater connected natural resources, water use, and governance that were used to select the GWMA boundaries. The information also sets the stage for identifying groundwater management challenges in the area.

SECTION 3 - THE GOAL AND OBJECTIVES states the Plan goal and describes five objectives that the DNR will pursue to achieve the overall goal of long term, sustainable groundwater use in the GWMA. Together, the five objectives describe sustainable groundwater appropriation and use based on directives given in Minnesota Statutes.

SECTION 4 – STATUS OF THE GWMA IN TERMS OF THE OBJECTIVES provides additional information about conditions within the GWMA that relate specifically to the five objectives. This information includes a summary of current understanding of the status of each objective within the GWMA, discussion of gaps in knowledge or activities, and recommendations for how to fill those gaps.

SECTION 5 – DNR ACTIONS states the actions that DNR will take over the next five years toward achieving the five objectives. These actions address the highest priority needs identified from the evaluations described in Section 4.

SECTION 6 – IMPLEMENTATION SCHEDULE provides a time frame for implementing the actions.

SECTION 7 - GLOSSARY of terms used in the Plan.

SECTION 8 - REFERENCES

APPENDIX – APPENDICES A-D provide agency statements and additional information.

2. Description of the Boundary and the GWMA

The boundary for the Straight River GWMA includes parts of southern Clearwater, northeast Becker, southwest Hubbard and northwest Wadena counties. Cities within the boundary include Park Rapids, Osage and Ponsford (Figure 2-1).

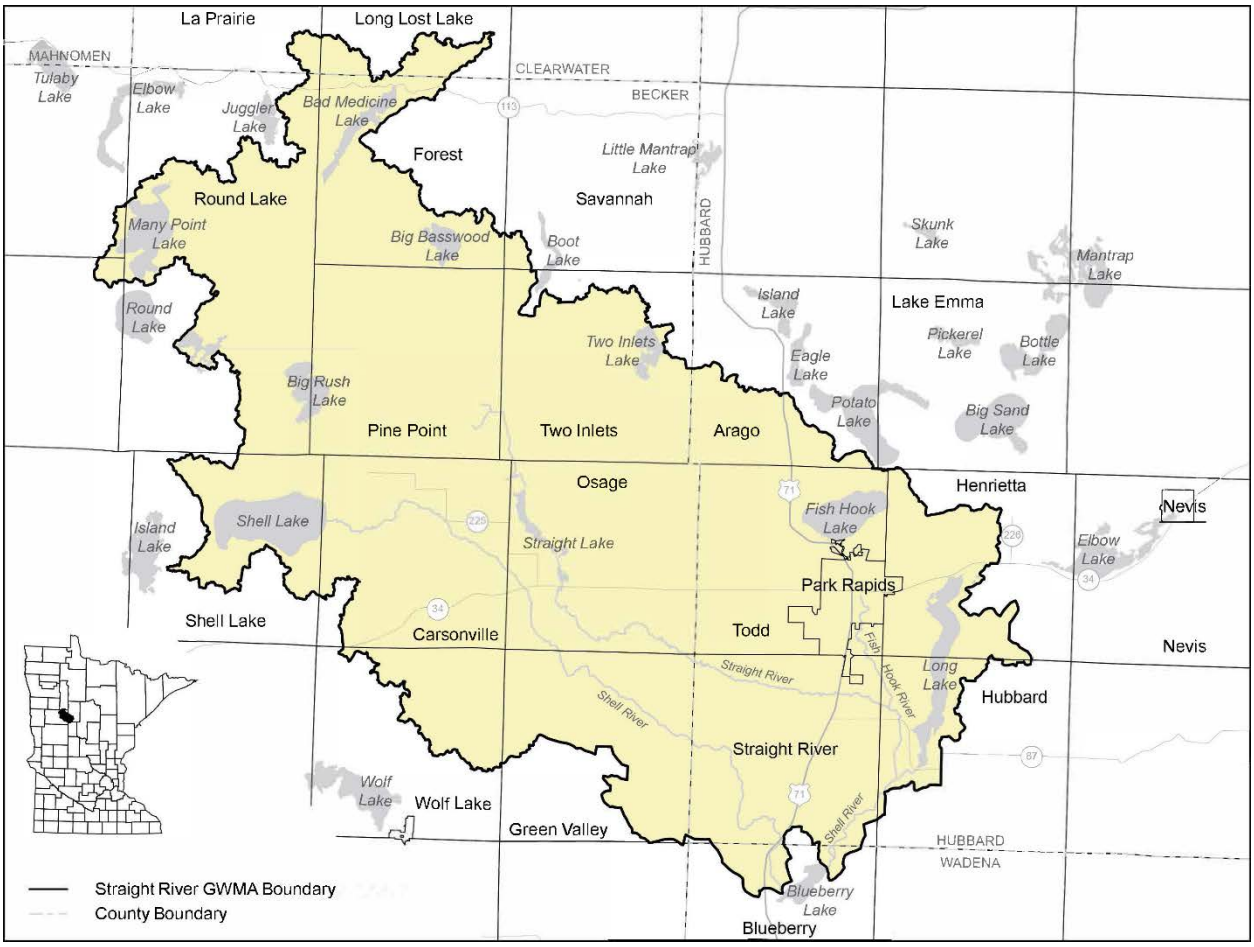

Figure 2-1 Boundary of the Straight River GWMA

Watershed Boundaries

The Straight River GWMA is contained primarily within one major watershed: the Crow Wing River. The area also includes a small part of the Ottertail watershed, specifically the Many Point Lake and Round Lake sub-watersheds. The boundary for the Straight River GWMA includes approximately 236,142 acres, or 369 square miles. As of December 30, 2014, the total acreage under irrigation permits within the boundary was 25,535 acres (Figure 2-2).

Rain, snow and other precipitation are the major sources of water that replenish lakes, rivers and groundwater in the Straight River GWMA. Water can leave the area by way of streams, groundwater flow, and evapotranspiration.

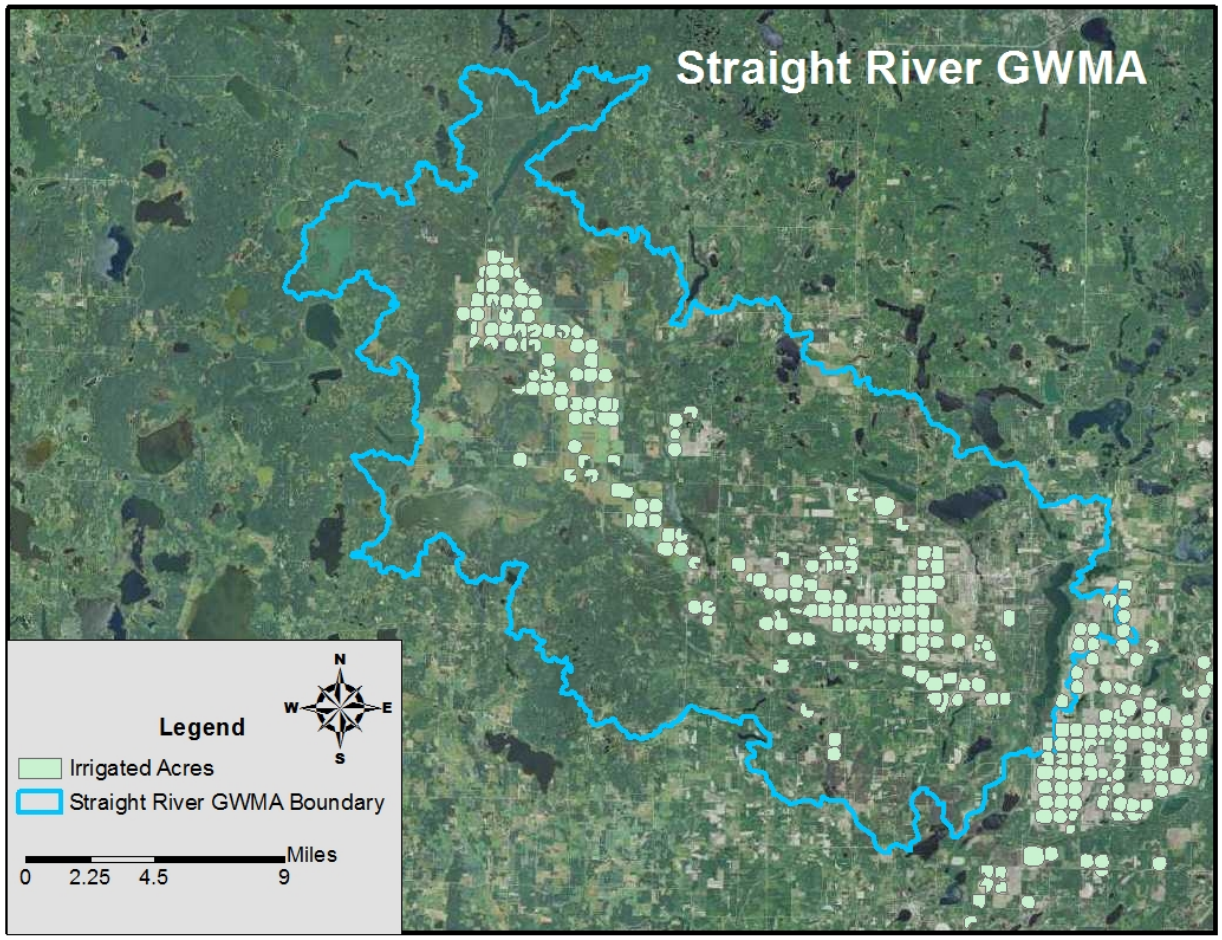

Figure 2-2 2014 Irrigated acreage in the Straight River GWMA

Hydrogeology, Soils and Topography

Hydrogeology defines the natural conditions and boundaries of the groundwater system. Groundwater moves through the geologic system both laterally (side to side) and vertically (up and down).

In three dimensions, the geologic formations found in the Straight River GWMA form a complex groundwater system that is interrelated with the surface water in the area. The surface water resources in this area are streams, lakes, and wetlands. The primary stream is the Straight River, a designated trout stream. Analyses by Stark et al (1994), Helgesen (1977), LaBaugh et al (1981), Siegel (1980) and Walker et al (2009) have shown that groundwater and surface water in this area is interconnected and heavily dependent on recharge from precipitation.

The landscape in the boundary area is generally flat or gently rolling terrain. The area was formed during the last glaciation event and consists of outwash (sands and gravels) and glacial till (sand, clays and silts). This area is part of a region referred to as the Pineland Sands (Figure 2-3). The soils in this region are primarily sandy loams and loams that are coarse textured and rapidly permeable (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx USDA, 2000).

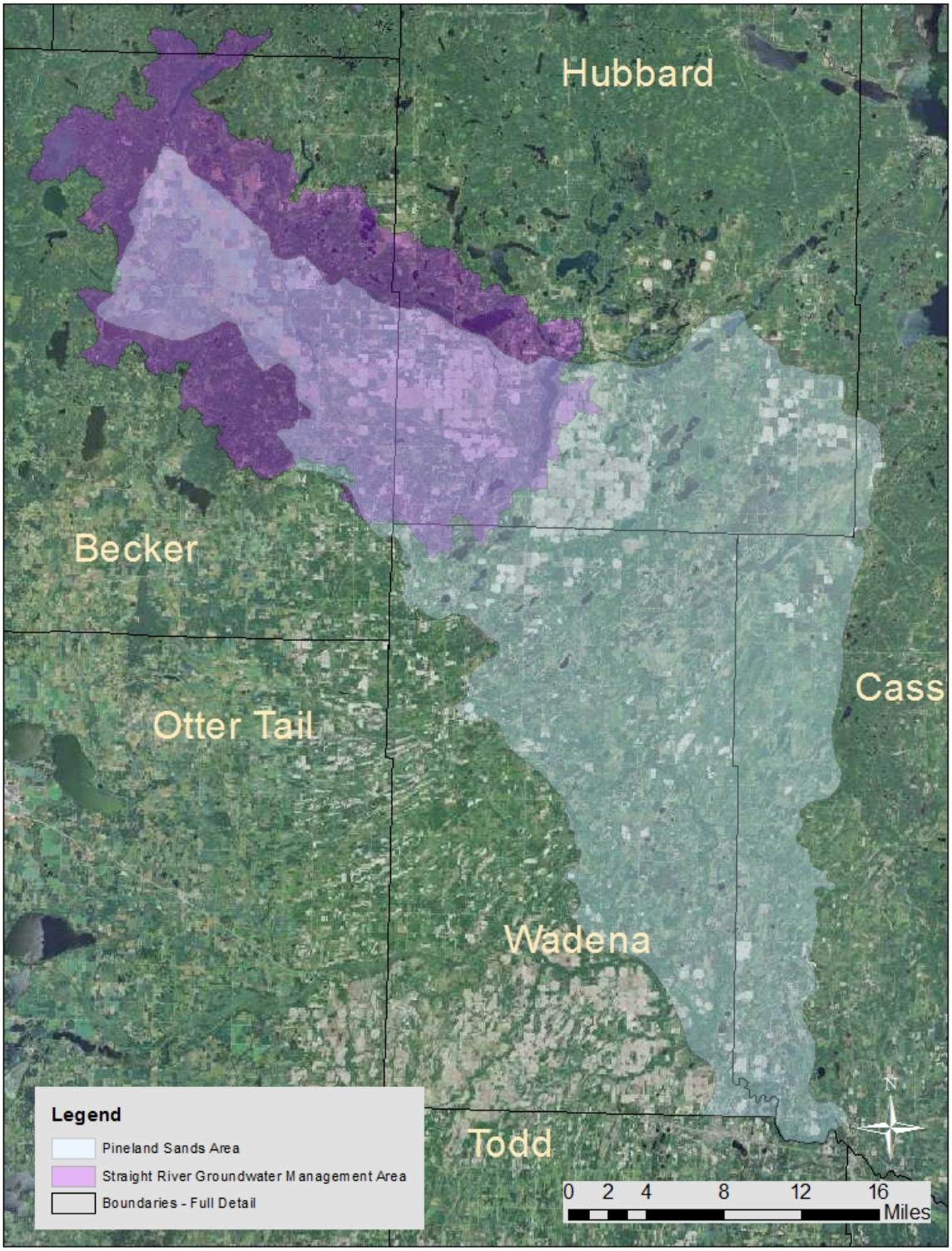

Figure 2-3 Straight River GWMA within context of the Pineland Sands

Two main aquifer types are found in the Straight River GWMA: water table aquifers (Quaternary Water Table Aquifers, or QWTA), which are the uppermost aquifers; and buried aquifers (Quaternary Buried drift Artesian Aquifers, or QBAA), which are found at various depths below the water table aquifer. The QWTA is a laterally extensive unconfined aquifer and is part of the Pinelands Sands aquifer (Helgesen, 1977) that extends through Becker, Cass, Hubbard, and Wadena counties. This outwash formation was deposited by flowing water during the melting of ice at the end of the most recent glacial event approximately 10,000 to 12,000 years ago.

Groundwater from both the QWTA and QBAA aquifers is the source of groundwater supply in the Straight River area. The water table aquifer and deeper buried drift aquifers occur in the Straight River GWMA and share a hydraulic relationship. This relationship has been understood through various scientific studies that include analysis of climate, aquifer testing and long term water level measurement collected from observation wells. A County Geologic Atlas does not yet exist for this area but is in process. When complete, the atlas should provide more information on the connectivity of these aquifers.

Water Use

Agricultural irrigation is the dominant water use within the Straight River GWMA (Figure 2-4). The 2013 permitted water use indicated substantial growth (85%) in water demands in the last 25 years, with most of the growth coming from agricultural irrigation. The statewide increase in water demands over this same period was 35%.

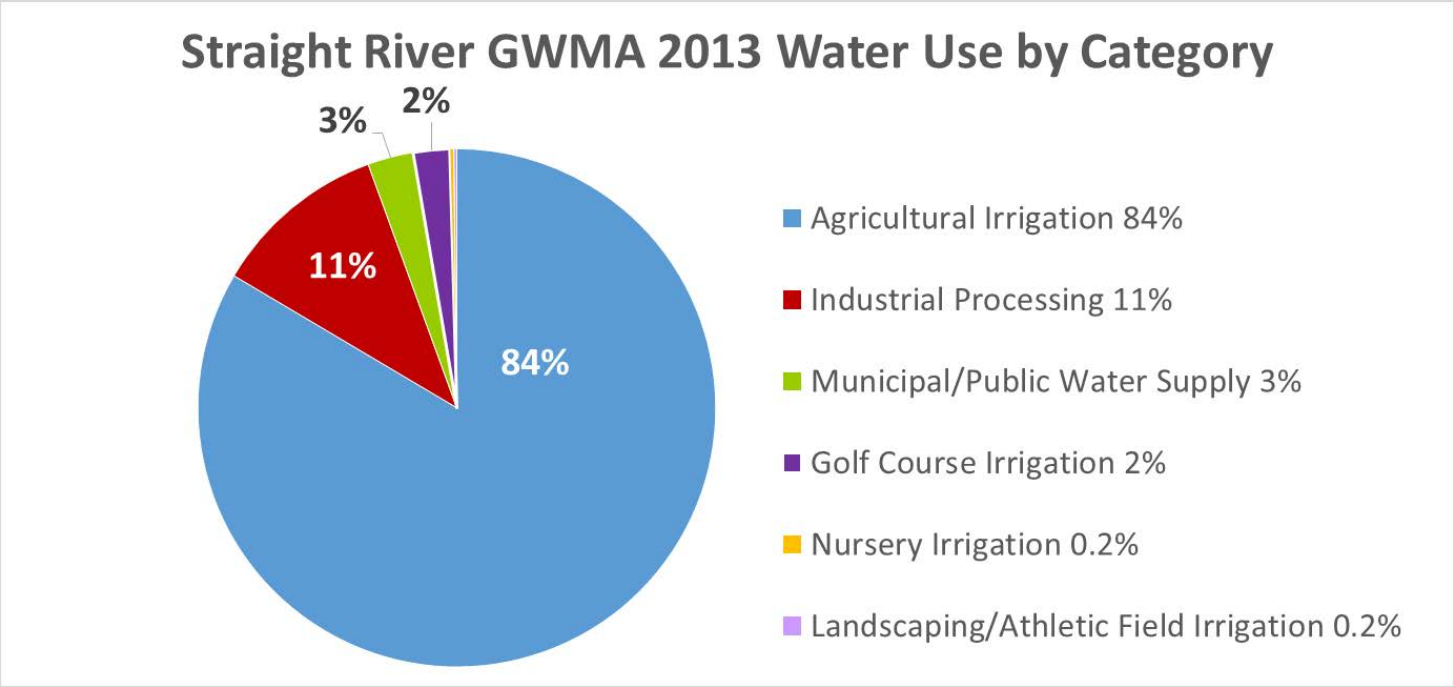

Figure 2-4 - Water use in the Straight River GWMA in 2013 by category

Groundwater appropriations and use

There were 214 active permits to appropriate groundwater in the Straight River GWMA at the beginning of 2014. As of December 2014, there were 252 active water appropriation permits (an 18% increase). There were also 75 inactive groundwater appropriation permits on file at the end of 2014. The DNR uses the Minnesota Permit and Reporting System (MPARS) to keep track of groundwater permit information.

The total number of domestic wells that have been installed in the Straight River GWMA is 2,357. Information on domestic wells is maintained by the Minnesota Department of Health and county governments, not the DNR.

Reported groundwater use for agricultural irrigation in the Straight River GWMA was 5.288 billion gallons in 2013 (Figure 2-5). Not all active permits are pumping or using water, so Figure 2-5 displays only those "permits with use".

Of the reported agricultural groundwater use in 2013, 84% was used for major crop irrigation. Agricultural irrigation has increased water use by an average of 77 million gallons of water per year since 1988.

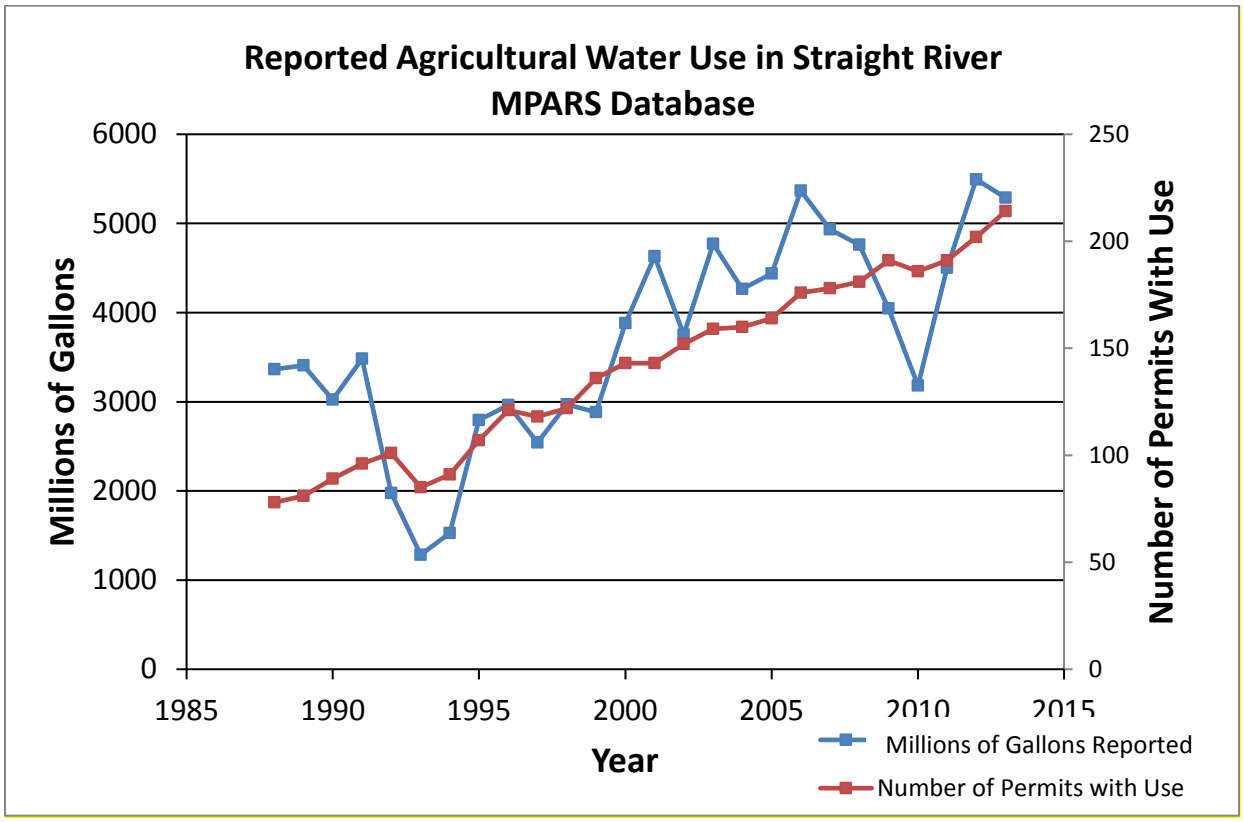

Figure 2-5 Agricultural groundwater use (1998 to 2013)

Groundwater use can change the amount of groundwater flowing toward and discharging into surface water features. The ecology of surface water features such as trout streams, calcareous fens, other wetlands, and springs can be sensitive to groundwater flow variations. Permit holders in the GWMA have helped develop important information to understand groundwater pumping impacts on surface water features through aquifer testing and water monitoring.

Water appropriation permits are designed to ensure that permitted volumes are reasonable, for a beneficial use, incorporate water conservation principles and help protect water quality. The DNR may require specific conservation practices as explicit conditions on some water appropriation permits. For example, some permits for golf course irrigation include conservation requirements.

Municipal Water Supply

Public water supply systems serving more than 1,000 people must have a water supply plan that is approved by DNR (Minn. Stat., 103G.291). In the Straight River GWMA, the City of Park Rapids is the

only city required to have such a plan. Water supply plans must address projected demands, adequacy of the water supply system and planned improvements, existing and future water sources, natural resource impacts or limitations, emergency preparedness, water conservation, supply and demand reduction measures, and allocation priorities that are consistent with MN Statutes section 103G.261. Public water suppliers must update their plan and, upon notification, submit it to the commissioner for approval every ten years.

Water supply planning provides an opportunity for DNR to engage with public water suppliers on conservation issues. Public water suppliers set goals for residential per capita demand, maximum- to average-day demand, and unaccounted for water in these plans. These goals may be updated when suppliers renew their plans. Water supply plans may include other conservation measures such as ordinances that set odd/even sprinkling restrictions to reduce peak demand.

Water Dependent Natural Resources

The GWMA boundary was defined in part based on natural resource considerations, particularly the surface water features that are most influenced by changes in groundwater levels. The boundary includes unique ecological features that are directly connected to the hydrogeology of the GWMA. Understanding and managing groundwater appropriations will have a direct impact on the health of these natural resources. The following features exist within the Straight River GWMA:

- Three designated trout streams (the Straight River, Upper Straight Creek, Straight Lake Creek)
- Other streams that are sustained by lesser groundwater contributions
- Lakes that may be influenced by changing aquifer levels
- Wetland complexes across the entire area
- 19 types of groundwater-associated native plant communities
- 14 State-listed rare plant and animal species associated with groundwater
- Numerous additional plant and animal species that inhabit streams, lakes, and wetlands associated with groundwater

Trout Streams

The Department of Natural Resources has authority to designate trout streams, which provides increased protection from alterations and appropriations. In addition, the Minnesota Pollution Control Agency (MPCA) maintains higher water quality standards for cold water streams to protect these sensitive systems.

Three designated trout streams are found within the GWMA boundary: the Straight River, Upper Straight Creek and Straight Lake Creek. Upper Straight Creek and Straight Lake Creek are north of Straight Lake and are considered the headwaters of the Straight River.

The flows in the Straight River and its headwaters are strongly influenced by groundwater contributions, and the health of this stream is dependent upon a steady supply of groundwater. These streams provide habitat for a unique community of animals, including invertebrate groups such as midges, caddis flies, stoneflies, and mayflies, several mussel species, and several fish species including trout. Changes in groundwater flow to these trout streams due to pumping are an important consideration in determining whether use is remaining sustainable.

Streams, Lakes and Wetlands

The Straight River Ground Water Management Area is rich in surface water features – streams, lakes and wetlands (Figure 2-6). Water levels and/or chemistries of many of the lakes, streams and wetlands are strongly influenced by groundwater or have at least some hydraulic connection to the regional

groundwater system. Many lakes, streams and wetlands, therefore, may be affected by changes in groundwater elevations.

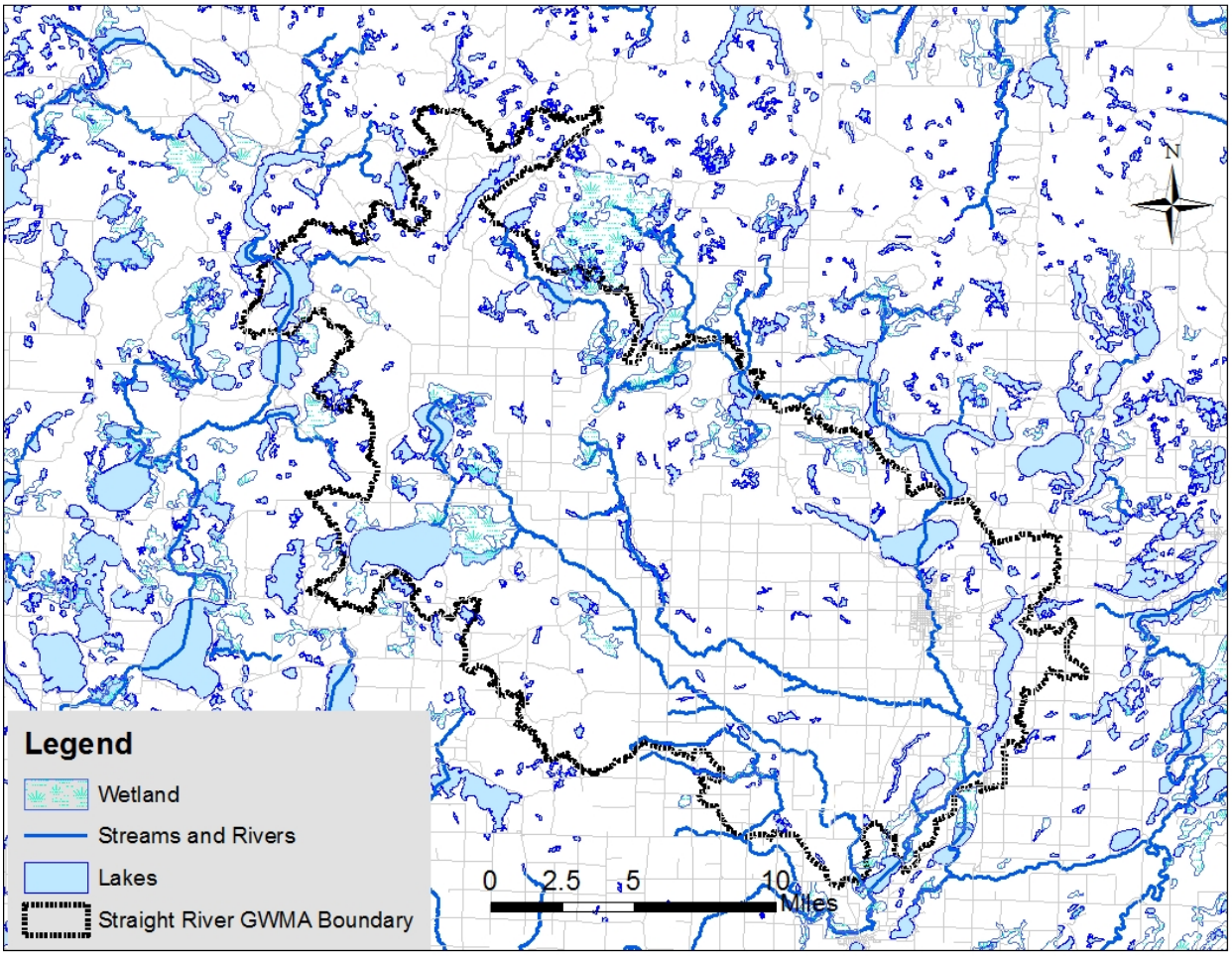

Figure 2-6 Surface water features within and around the Straight River GWMA

There are an estimated 28 public watercourses (streams) and 172 public water basins (lakes and wetlands) within the GWMA**.** All public waters are subject to regulation under MN Statute 103G. Many public water basins and wetlands are small and very shallow and are strongly influenced by fluctuations in groundwater levels.

The presence of cold water fish species like brook and brown trout and cold/cool water dependent aquatic insect species in some of the other streams in the GWMA (not designated as trout streams) indicates the contribution of groundwater to their flow. The presence of several sensitive fish species and species of aquatic insects in many streams in the area indicate good to excellent water quality. A few stream reaches in the GWMA have aquatic insect assemblages lacking cold water taxa and a diversity of functional feeding groups due to a lack of coarse substrate or poorer stream morphological characteristics. Biological impairments in a few stream reaches, particularly in the upper Shell River sub-watershed, may be due to natural factors like wetlands or beaver impoundments, but are more likely due to dams, poor road crossing structures, land use changes, or other anthropogenic causes. Over time and space, many factors may limit a biological population. Often habitat quantity and quality are found to limit populations, and hydrologic conditions are considered the primary determinant of habitat conditions in streams.

Lakes in the GWMA are varied. Large, deep lakes like Bad Medicine, Many Point, Straight, Long and Fish Hook are oligotrophic or mesotrophic, have good to excellent water quality, and support cold water fish species like trout or tullibee (cisco). Shallower, sometimes smaller basins like Shell, Big Rush, Portage, or Moran are often mesotrophic to eutrophic and may experience periodic winter fish kills. Despite that, all the larger lakes in the GWMA support good to excellent populations of game fish and are heavily used for angling, other recreation, and are often heavily developed with lake homes or seasonal cabins.

The smaller, shallower lakes and wetlands are difficult environments for native game fish to overwinter and sustain their populations. In some basins, particularly deeper ones or those with flowage connections to rivers and tributaries, populations of fish species like northern pike, bullheads, or other non-game fish or minnow species may be supported. These basins are important for catching runoff, filtering nutrients and groundwater recharge, and can provide excellent wildlife habitat.

Rare Natural Features of the Straight River Watershed

Rare natural features contribute to the health of the habitat and environment that surrounds us. Some even contribute directly to local economies in the form of outdoor recreation, such as wildlife viewing, camping, hunting and fishing. Rare features can include species of unique plants and animals, as well as native plant communities.

There are many rare and uncommon plants, animals and plant communities in the Straight River Watershed (Figure 2-7). The majority of the rare vegetative features are concentrated in two distinct areas. One surrounds Big Rush Lake in Becker County and the other one is along the headwaters of the Straight River in Becker County.

The communities associated with groundwater and seepages are dominated by large forested rich peatland complexes, consisting of four different plant communities. One of these, the white cedar swamp, is vulnerable to extirpation while the other three are considered fairly secure. There are five different open peatlands, one imperiled, one vulnerable to extirpation, and the rest considered fairly secure. There are two wet forest communities, one vulnerable to extirpation while the other is considered relatively secure. There are two wet meadow communities, both considered secure. Additionally, there is a wet-mesic to mesic northern hardwood forest that is vulnerable to extirpation.

Straight River Headwaters Area

Intermixed through the area surrounding the headwaters of the Straight River are the majority of state-listed rare orchid flora and other special concern plants and animals. Included in this group are the bog adder's mouth orchid (an endangered plant), the white adder's mouth (a special concern species), and the limestone oak fern (a state special concern species). All three of these are threatened by changes in the hydrologic regime of their habitat and damage to the soil and tree cover. Also found here are a variety of birds, including the Virginia rail, the swamp sparrow, the trumpeter swan and the common loon, all of which are special concern species or species of greatest conservation need threatened by habitat degradation and loss.

The majority of state forest land in this area is designated as a high conservation value forest, named Straight River Headwaters (aka Belden Swamp). The site is described as a large forested, rich peatland complex that contains the headwaters of the Straight River, with a diverse and rare orchid flora. There is subsurface water movement beneath the swamp conifers, and the site is home to one of the two cedar swamp sites in the county that are identified as candidate old growth sites. Upland areas contain significant acreage of two native plant communities designated as critically imperiled to vulnerable.

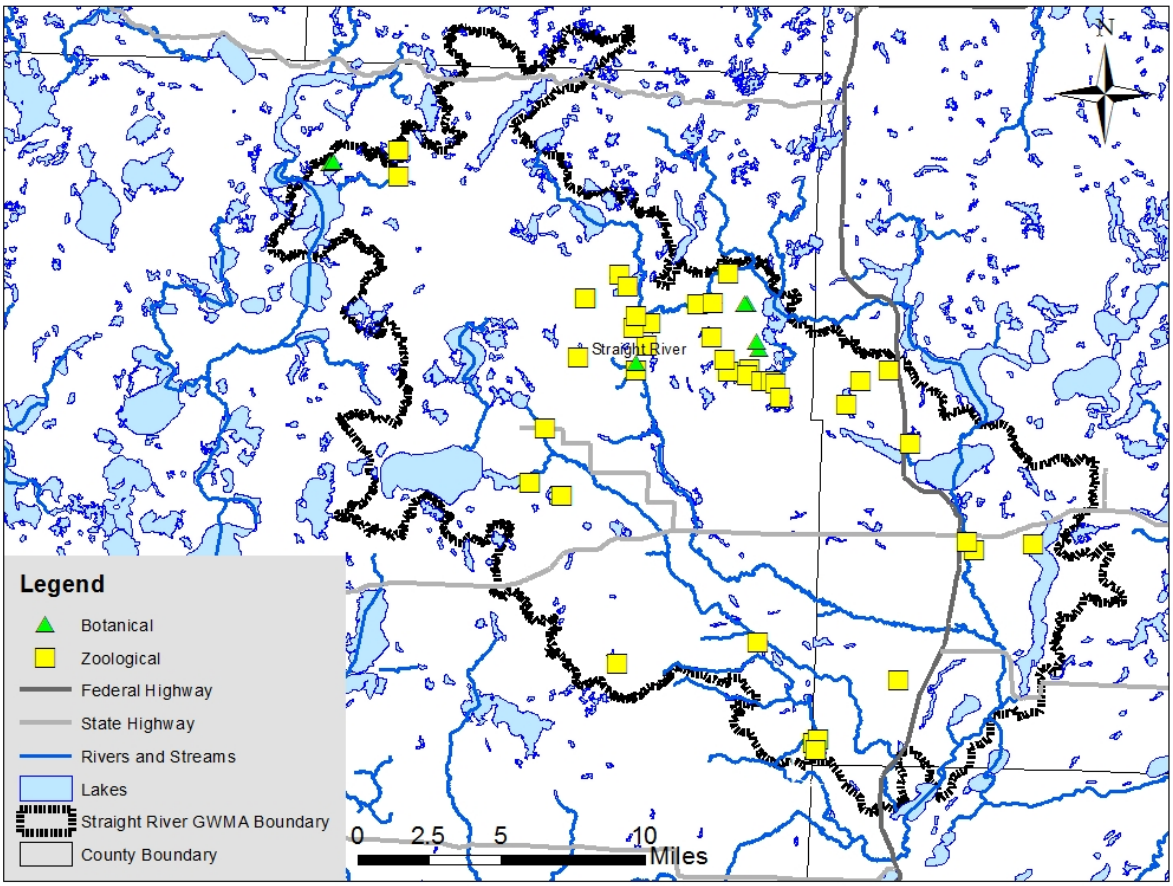

Figure 2-7 Straight River rare and natural features associated with groundwater

Fish Hook River

Along the Fish Hook and Straight Rivers in Hubbard County, there is another fairly large assemblage of rare species. These include the creek heelsplitter and black sandshell (both special concern mussels threatened by degradation of the stream habitat), the least darter (a special concern fish threatened by habitat loss and stream degradation), and a variety of birds, including the trumpeter swan, threatened by habitat degradation and loss.

Groundwater Associated Native Plant Communities of the Straight River Watershed

All of the following rare or vulnerable communities are directly dependent upon the water table for their health and stability. Thus they are highly susceptible to any disturbance to the groundwater system. As Figure 2-7 shows, they are all mapped associated with groundwater and seep areas. Associated with these areas are many additional examples of communities that were too small to have been mapped by the Minnesota Biological Survey.

The Spring Fen: this community is typically found in the vast peat bogs to the north, and is extremely rare this far south. It is only found where highly calcium-rich groundwater is discharged from underlying calcareous mineral soil and is forced up through artesian pressure. These communities are characterized by high pH (>7.0), high Ca++ concentrations, cold water temperatures, low dissolved oxygen content and high water levels. This combination of hydrologic conditions favors the development of specialized and

unique plants and plant communities and is very rare. This community is typically dominated by fine-leaved sedges and rushes with little or no shrub or tree cover.

Graminoid Rich Fen: this community is typically found in the vast peat bogs to the north, and is extremely rare this far south. It is only found in peatlands where there is significant lateral subsurface water flow. This lateral flowing groundwater is mineral-rich resulting in a surface water chemistry that is nutrient poor but with sufficient mineral concentration to maintain a pH >5.5. This mineral-rich groundwater typically emanates from areas of calcareous glacial till and flows beneath dense clayey sediments, until it reaches lenses of sand or coarse-textured material and percolates to the surface. This community is typically dominated by fine-leaved grasses and sedges with scattered, stunted, thick-leaved, shrubs.

White Cedar Forest: this community is typically found north and east of this region and is quite uncommon here. It is found where saturated soils are present throughout most of the growing season, typically in small closed depressions, along the borders of large wetlands, on gently sloping drains or at the toes of slopes in areas of groundwater discharge. This community is typically dominated by white cedar, with the understory relatively open.

Aspen-Birch-Fir Forest: this community is typically found north and east of this region and is generally not found this far south and west. It is found on the concave lower portion of slopes with a fine-textured calcareous till and locally high water table. The clayey soil tends to perch snow and rainwater creating a moist to very moist soil. The community is typically dominated by mesic to wet-mesic hardwood and hardwood-conifer forests, such as quaking aspen, balsam fir and paper birch.

White Cedar Swamp: this community is typically found NE of this area. It is found on wet peat in small basins associated with stream channels or near lakes. It grows where there is access to mineral-rich subsurface water flow. It has a varied micro-topography which contributes to structural complexity and relatively high species diversity. This community is typically dominated by white cedar.

No calcareous fens have been identified to date in the Straight River GWMA.

Table 2.1 Native plant communities closely associated with groundwater in the Straight River GWMA

Native Plant Community Code	NPC Name	Conservation Status Rank *	*Closely* Associated with groundwater/ seepage	*Often* Associated with groundwater/ seepage
FPn63b	White Cedar Swamp (N Central)	S3	X - not seepage	X
FPn73a	Alder - (Maple - loosestrife) Swamp	S5	X - not seepage	X
FPn82	White Cedar Swamp (N Central) Western Basin)		X - not seepage	
FPn82a	Rich Tamarack - (Alder) Swamp	S5	X - not seepage	
FPn82b	Extremely Rich Tamarack Swamp	S4	X - not seepage	
MHn44d	Aspen - Birch - Fir Forest	S3		X
OPn81a	Bog Birch - Alder Shore Fen	S5	X - seepage	
OPn92	Northern Rich Fen (Basin)		X - seepage	
OPn92a	Graminoid Rich Fen (Basin)	S4	X - seepage	
OPn92b	Graminoid - Sphagnum Rich Fen (Basin)	S4	X - seepage	
OPn93a	Spring Fen	S2	X - seepage	
WFn53b	Lowland White Cedar Forest (Northern)	S3	X - seepage	
WFn55	Northern Wet Ash Swamp		X - seepage	
WFn55c	Black Ash - Mountain Maple Swamp (Northern)	S4	X - seepage	
WFn64c	Northern Black Ash - Alder Swamp	S4	X - not seepage	
WMn82	Northern Wet Meadow/Carr			X
WMn82a	Willow - Dogwood Shrub Swamp	S5		X
WMn82b	Sedge Meadow	S4 S5		X

*S2 = State Imperiled; S3 = State Vulnerable to Extirpation; S4 = State Apparently Secure, Uncommon but Not Rare; S5 = State Secure, Common, Widespread, and Abundant

Table 2.2 Rare species closely associated with groundwater in the Straight River GWMA

Rare Plants				
Scientific name	**Common Name**	**State Ranking***	**General Habitat Type**	**Associated with Water**
Astragalus neglectus	Cooper's Milk-vetch	Watchlist	Woodland-prairie ecotone	
Carex hookerana	Hooker Sedge	SPC	Fire-dependent Forest	
Carex obtusata	Blunt Sedge	SPC	Upland Prairie; Savanna	
Cirsium pumilum var. hillii	Hill's Thistle	SPC	Upland Prairie; Savanna	
Cypripedium arietinum	Ram's-head Lady's-slipper	THR	Fire-dependent Forest and Forested Rich Peatland	X
Gymnocarpium robertianum	Limestone Oak Fern	SPC	Forested Rich Peatland	X
Malaxis monophyllos var. brachypoda	White Adder's-mouth	SPC	Forested Rich Peatland	X
Malaxis paludosa	Bog Adder's-mouth	END	Forested Rich Peatland	X
Najas gracillima	Thread-like Naiad	SPC	Aquatic- Lake	X
Scirpus pedicellatus	Woolgrass	Watchlist	Meadows, swamp openings	X
Sparganium glomeratum	Clustered Bur-reed	Watchlist	Marsh, Forested peatlands	X
Stuckenia vaginata	Sheathed Pondweed	END	Aquatic- Lake	X

Rare Animals				
Scientific name	**Common Name**	**State Ranking***	**General Habitat Type**	**Associated with Water**
Botaurus lentiginosus	American Bittern	Watchlist	Marsh; Lake Littoral Zone	X
Buteo lineatus	Red-shouldered Hawk	SPC	Mature deciduous forest	
Cygnus buccinator	Trumpeter Swan	SPC	Marsh; Lake Littoral Zone	X
Etheostoma microperca	Least Darter	SPC	Small Rivers/Streams; Lake Littoral Zone	X
Haliaeetus leucocephalus	Bald Eagle	Watchlist	Forested to wet areas; throughout	X
Lasmigona compressa	Creek Heelsplitter	SPC	Small Rivers/Streams	X
Ligumia recta	Black Sandshell	SPC	Medium/Large Rivers/Streams	X

* END = Endangered; THR = Threatened; SPC = Special Concern; Watchlist = Watchlist

Water Quality

Water quality affects the availability and cost of groundwater in the GWMA. Contaminated groundwater may not be available for use by individuals, industry or cities unless it undergoes treatment. Consumers may have to use deeper aquifers or rely on surface water sources. Contaminated groundwater also presents a risk to the connected ecosystems (lakes, streams and wetlands), impacting the species that live there and the people who use these water bodies to live, work, and recreate.

Minnesota Statute 103G.287 directs the DNR to consider the effects of water quality in water appropriations. Management activities in the Straight River GWMA will require continued coordination between the existing state agencies that are responsible for groundwater and surface water quality, including: Minnesota Department of Agriculture (MDA), the Minnesota Department of Health (MDH), the Minnesota Pollution Control Agency (MPCA), Board of Water and Soil Resources (BWSR) and the DNR.

Jurisdictions, Governance and Planning

Cities, counties, watershed districts and other local units of government play a critical role in planning and managing for long term water supply and water sustainability. Implementing practices to improve water quality and quantity relies heavily on local plans such as comprehensive local water management plans, watershed district plans, county comprehensive plans and city comprehensive plans. These plans are authorized by Minnesota Statute.

The Straight River GWMA encompasses parts of:

- 4 counties
- 15 townships
- 3 cities
- 2 Minnesota House of Representative Districts
- 1 Minnesota Senate Districts, and
- 3 Soil and Water Conservation Districts (Hubbard, Becker and a small part of Wadena Counties).

Local water governance in the Straight River GWMA is guided by the City of Park Rapids and the counties where the majority of the GWMA lays, i.e., Hubbard, Becker and Wadena Counties.

Comprehensive local water management is guided by local water management plans whose adoption and implementation are based on local priorities. As a general-purpose unit of government, counties, with their planning and land-use authorities, are uniquely positioned to link many land-use decisions with local goals for surface and groundwater protection and management. BWSR has oversight responsibilities to ensure that local water plans are prepared and coordinated with existing local and state efforts and that plans are implemented effectively. All parts of Minnesota have locally adopted and state-approved plans in place.

State of Minnesota jurisdiction for the Straight River GWMA is guided, in part, by Minnesota Statutes, section 103G.287, which states, “The commissioner may designate groundwater management areas and limit total annual water appropriations and uses within a designated area to ensure sustainable use of groundwater that protects ecosystems, water quality, and the ability of future generations to meet their own needs. Water appropriations and uses within a designated management area must be consistent with a plan approved by the commissioner that addresses water conservation requirements and water allocation priorities established in section 103G.261.”

3. The Goal and Objectives

Section 3 of the plan describes the goal and objectives for groundwater management, including supporting statutes and rules. The goal for the GWMA expresses a future desired condition for the area. The goal for the GWMA is:

> *In the Straight River Groundwater Management Area, the use of groundwater will be sustainable and therefore will not harm ecosystems, water quality, or the ability of present and future generations to meet their needs.*

The goal is drawn directly from the Minnesota Statutes for groundwater appropriations, Minn. Stat. sec. 103G.287, subd. 3, 4 and 5. These statutes describe protection of groundwater supplies, designation of groundwater management areas, and a standard of sustainability.

Groundwater use is defined as sustainable if that use:

- Does not harm aquifers and ecosystems
- Does not negatively impact surface waters
- Is reasonable, efficient and meets water conservation requirements
- Does not degrade water quality
- Does not create unresolved well interferences or water use conflicts

To attain the goal for the GWMA, this Plan sets five management objectives that define how these statutory requirements can be met. All of the management objectives must be achieved to ensure that use of groundwater is sustainable.

These objectives are:

I. *Groundwater use in the GWMA does not harm aquifers and ecosystems, and does not negatively impact surface waters.*
II. *Groundwater use in the GWMA is reasonable, efficient, and complies with water conservation requirements.*
III. *Groundwater use in the GWMA does not degrade water quality.*
IV. *Groundwater use in the GWMA does not create unresolved well interferences or water use conflicts.*
V. *All groundwater users in the GWMA have the necessary permits to use groundwater.*

The remainder of Section 3 describes each of the objectives in more detail.

Objective I. Groundwater use in the GWMA does not harm aquifers and ecosystems, and does not negatively impact surface waters.

Groundwater and surface waters together make up a connected hydrologic system that is affected by climate, geology and soils, land use and land cover, water use, and water quality changes. Therefore, impacts to aquifers, ecosystems, and surface waters resulting from water appropriations are related under this objective.

Aquifer Sustainability

The first part of this objective deals with preventing harm to aquifers. The purpose is to ensure that groundwater continues to be available for use in the future while protecting ecosystems and surface waters (described below). Groundwater use always reduces aquifer storage unless there is an equivalent increase in recharge through surface-water infiltration. Limits on appropriations can help ensure aquifer sustainability.

In Minnesota Rules, parts 6115.0630 and 6115.0670, the concept of *safe yield* is used as the measure of limits on allowable groundwater use. The concept looks at the impact that water withdrawals from an aquifer have on aquifer water quality levels, and pressure (sometimes referred to as 'heads'). It does not address potential impacts to other resources such as surface waters. Safe yield is defined separately for water-table aquifers and for artesian (confined) aquifers (see Section 7 for glossary of terms).

For confined aquifers, a water elevation level in an observation well (obwell) may be set as a threshold for aquifer protection that ensures compliance with safe yield (Figure 3-1). To protect the aquifer from being drawn down too far, 25 percent of the 'available' head (water height above the top of the aquifer, before pumping) must remain in an observation well. A warning threshold of 50 percent of the available head may be established to allow time for contingency plans to be put in effect if water levels decline.

For water-table aquifers, safe yield is a total use rate that does not exceed the long-term average recharge rate (Minn. Rules 6115.0630). In short, output (pumping) for the aquifer does not exceed input (recharge) over the long term. Again, this does not account for impacts to surface waters, which are addressed in the next section. Pumping from confined aquifers typically causes water from the water table aquifer to flow down into the confined aquifers. Therefore, safe yield should be determined based on both direct and indirect withdrawals from water-table aquifers.

Water levels that have stabilized to a pattern of variations above the threshold indicate compliance with safe yield. Understanding pumping history and measured water levels is important when evaluating compliance with safe yield.

Declining water levels that remain above the threshold are expected in some situations, even while use remains within the safe yield. This occurs if pumping rates gradually increase over time, the system has not come into equilibrium with recent pumping rates, or natural fluctuations create a temporary downward trend.

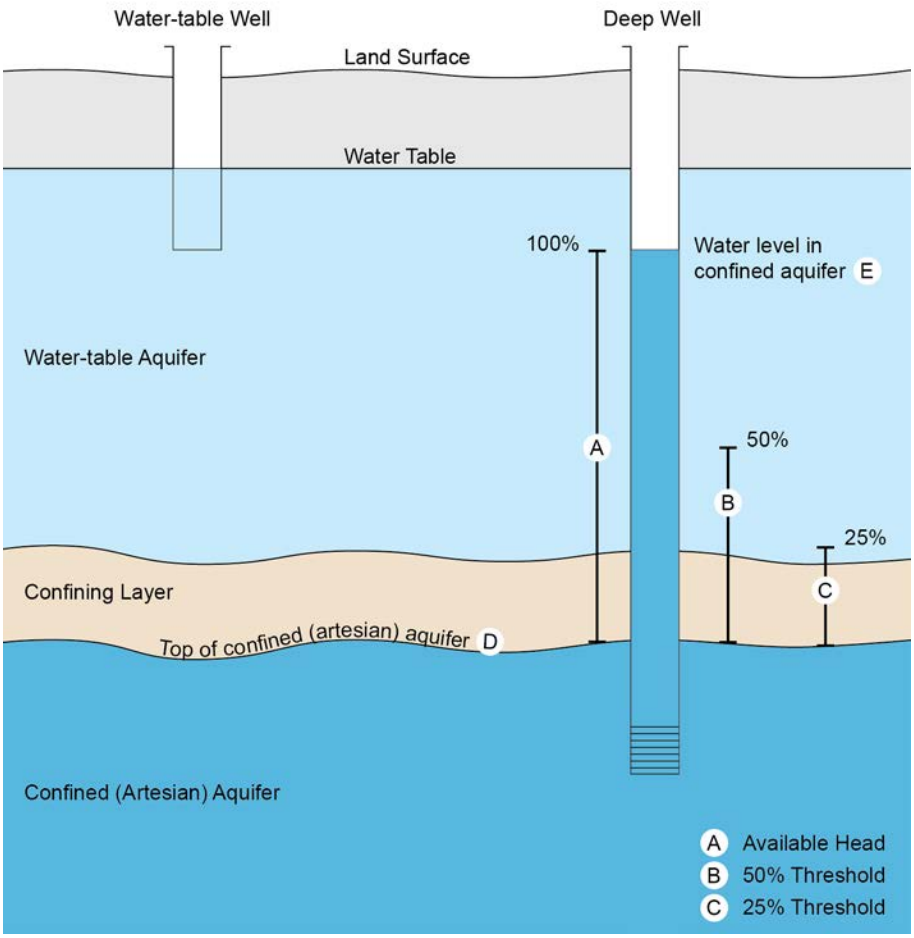

Figure 3-1 Safe yield thresholds

Schematic showing water-table and confined (artesian) aquifer conditions in relation to safe yield thresholds. The available head in the confined (artesian) aquifer is the distance (A) between the top of the confined aquifer (D) and the water level (E) in the deep well when not affected by pumping. The 50% threshold (B) is halfway between the top of the confined aquifer and the current water level in the deep well. The 25% threshold (C) is one-fourth of the way between the top of the confined aquifer and the current water level in deep well. Water levels in a confined aquifer must not stabilize below the 25% safe yield threshold.

Ecosystems and Surface Waters

The second part of Objective I deals with harm to ecosystems and negative impacts to surface waters when groundwater is overused. The groundwater system is part of the water cycle, eventually destined to discharge to surface waters such as rivers, lakes, wetlands, or springs. Taking groundwater from water table aquifers can divert water from streams, lakes, and wetlands. Overuse of groundwater can significantly alter surface water features and the biological communities, recreation, and other uses that those waters support.

Surface water appropriations are governed by Minn. Stat., sec. 103G.285. Groundwater appropriations are governed by Minn. Stat., sec. 103G.287. Groundwater appropriations may also be subject to additional limits based on their surface water impacts as follows (Minn. Stat, sec. 103G.287, subd. 2):

Groundwater appropriations that will have negative impacts to surface waters are subject to applicable provisions in section 103G.285.

Surface-water pumping (appropriation) has a direct and immediate effect on flow or water level in the surface water features from which the water is withdrawn. The same is not true for groundwater appropriations. Determining whether groundwater appropriations have negative impacts to surface waters is complex. Generally, the effect on connected surface water features is both delayed and spread out or 'flattened' in time and is typically distributed among multiple water features.

Several statutes frame the determination of negative impacts to surface waters:

1. Appropriations from lakes listed in Bulletin 25[1] are limited to a total annual volume of water amounting to 1/2 acre-foot per acre of water basin (6 inches over the surface area of the water body) (Minn. Stat., sec. 103G.285, subd. 3). Statute also calls for the setting of protective elevations that consider aquatic vegetation, fish and wildlife, recreation, existing uses, and slope of the littoral zone. Appropriations from small lakes (< 500 acres) must be discouraged because of their greater vulnerability (Minn. Stat., sec. 103G.261, item d).
2. Appropriations taken directly from surface water bodies are limited according to the requirements establishing and enforcing *protected flows* for streams and rivers or *protective elevations* for lakes and wetlands (Minn. Stat., sec. 103G.285). These are intended to accommodate the range of needs and uses of water bodies. For surface-water appropriations, consumptive appropriations may not be made from watercourses during periods of specified low flows (i.e. protected flows) or from lakes and wetlands when water levels are below the protective elevation (Minn. Stat., sec. 103G.285, subd. 2 and 3).
3. Minnesota Statutes protect trout streams from surface water appropriations (Minn. Stat., sec. 103G.285, subd. 5) because they are particularly dependent on steady flow, stable cold water temperatures, and sufficient oxygen levels. These conditions depend on a steady supply of groundwater from springs or diffuse seepage. The goal is to limit stream depletion due to groundwater pumping.
4. Public water wetlands may not be drained unless replaced (Minn. Stat., sec. 103G.221), and temporary drawdown is only allowed if certain conditions are met, including: improving navigation and recreational uses, improving fish or wildlife habitat, exposing sediments in order to remove nutrients or contaminants, to alleviating flooding of agricultural land or allowing mining of metals (Minn. Rules, part 6115.0270).
5. Public water wetlands may not be drained unless replaced (Minn. Stat., sec. 103G.221), and temporary drawdown is only allowed if certain conditions are met, including: improving navigation and recreational uses, improving fish or wildlife habitat, exposing sediments in order to remove nutrients or contaminants, to alleviating flooding of agricultural land or allowing mining of metals (Minn. Rules, part 6115.0270).

The 2015 Minnesota Legislature directed the DNR (Laws of Minnesota 2015, First Special Session, chapter 4, article 4, section 143), to take the following actions concerning sustainability thresholds: "the commissioner of natural resources shall consult with interested stakeholders and submit a report to the Legislative Water Commission and the chairs and ranking minority members of the house of representatives and senate committees and divisions with jurisdiction over the environment and natural

[1] DNR Staff, 1968. An Inventory of Minnesota Lakes. Division of Water, Soils and Minerals, Minnesota Conservation Department. Bulletin 25, 498 p.

resources policy and finance on recommendations for statutory or rule definitions and thresholds for negative impacts to surface waters as described in Minnesota Statutes, sections 103G.285 and 103G.287, subdivision 2. Stakeholders must include but are not limited to agricultural interests; environmental interests; businesses; community water suppliers; state, federal, and local agencies; universities; and other interested stakeholders.

In January 2016, the DNR submitted a report entitled: "Report to the Minnesota State Legislature: Definitions and Thresholds for Negative Impacts to Surface Waters." The DNR will use the approach described in this report to determine if negative impacts to streams, lakes, or wetlands are occurring due to groundwater appropriation within the GWMA. (The report is available on the DNR website. The executive summary of the report provides a succinct description of the approach, and it is included in this plan as Appendix D.)

Section 5 of the GWMA Plan provides a set of actions to meet Objective I.

Objective II. Groundwater use in the GWMA is reasonable, efficient, and complies with water conservation requirements.

Water conservation is a key component of ensuring sustainability and an important objective within the GWMA. Efficient use increases the water available for current and future uses and can help reduce stress on the water resource. Explicit conditions may be placed on appropriation permits that require conservation practices appropriate to a specific use.

Conservation Requirements for Municipal Systems

Minnesota Statute, sec. 103G.291 requires public water suppliers serving more than 1,000 people to implement demand reduction measures by January 1, 2015. The City of Park Rapids is the only municipality within the GWMA that serves more than 1,000 people.

The measures must include a rate structure or outline a program that achieves demand reduction. Minnesota Statute, sec. 103G.291 also requires public water suppliers to adopt and enforce water-use restrictions when the governor declares a critical water deficiency. The restrictions must limit watering lawns, washing vehicles, irrigating golf courses and parks, and other nonessential uses.

Demand reduction measures reduce water use and must include a conservation rate structure or a conservation program. Demand reduction measures have been incorporated into the City of Park Rapids Water Supply Plan. The City of Park Rapids' new water supply plan is due in 2017.

Agricultural Irrigation

New water use permit applications for agricultural irrigation include a check box to indicate if a soil and water conservation plan has been approved by the local SWCD. Conservation conditions can also limit the amount of water reasonably needed for a particular agricultural situation (soil types, climate, and crop type).

Other Appropriation Categories

Although specific data are not tracked for other categories of water use, there are conservation-related conditions on some other permits. Conservation requirements have been developed for golf courses

and apply to newer permits or permit amendments. Typical permit language requires that the permitees shall, whenever practical and feasible, employ water conservation techniques and practices.

Non-permitted water users across the GWMA should also practice water conservation. The DNR supports conservation requirements for private and non-permitted use established through local jurisdictions such as watershed districts and municipal governments.

Section 5 of the GWMA Plan provides a set of actions to meet Objective II.

Objective III. Groundwater use in the GWMA does not degrade water quality.

Minnesota Statute 103G.287, directs the DNR to consider the effects of water quality in water appropriations. Management activities in the Straight River GWMA will require continued coordination between the existing state agencies that are responsible for groundwater and surface water quality, including: Minnesota Department of Agriculture (MDA), the Minnesota Department of Health (MDH), the Minnesota Pollution Control Agency (MPCA), Board of Water and Soil Resources (BWSR) and the DNR.

Pumping groundwater does not directly degrade the quality of the water in the aquifer in most circumstances, unless too much water is applied and nutrients are flushed out of the rooting zone. However, excessive pumping can cause water levels in wells to fall below the top of a buried aquifer, resulting in conversion to a water-table condition. In some circumstances this can lead to changes in water chemistry and degradation of water quality. Compliance with safe yield for buried aquifers prevents this situation from occurring as described under Objective I.

The effects of groundwater pumping on existing contamination must be considered when evaluating groundwater appropriation permits. Groundwater pumping can cause existing groundwater pollution to move or spread. Changes in groundwater levels and pressures can increase the movement of pollutants between aquifers or increase the spreading of pollutants within the same aquifer.

In some cases, pollution containment wells are used to limit movement of contaminated groundwater into less or uncontaminated areas of the aquifers. The MPCA, in cooperation with the responsible parties, determines duration and volume of pumping to contain pollution plumes and limit the movement or spreading of groundwater contamination.

Finally, water quality considerations in surface-water features must be incorporated into groundwater appropriation thresholds for surface-waters. Changes to the amount of groundwater flow into surface-water features can affect elements of water quality such as temperature, oxygen levels and contaminants.

Section 5 of the GWMA Plan provides a set of actions to meet Objective III.

Objective IV. Groundwater use in the GWMA does not create unresolved well interferences or water use conflicts.

The purpose of this objective is to manage water appropriations in accordance with the allocation priorities in Minn. Stat., sec. 103G.261. Domestic water use is the first priority for allocation of waters.

> (1) first priority, domestic water supply, excluding industrial and commercial uses of municipal water supply, and use for power production that meets the contingency planning provisions of section 103G.285, subdivision 6;
> (2) second priority, a use of water that involves consumption of less than 10,000 gallons of water per day;
> (3) third priority, agricultural irrigation, and processing of agricultural products involving consumption in excess of 10,000 gallons per day;
> (4) fourth priority, power production in excess of the use provided for in the contingency plan developed under section 103G.285, subdivision 6;
> (5) fifth priority, uses, other than agricultural irrigation, processing of agricultural products, and power production, involving consumption in excess of 10,000 gallons per day; and
> (6) sixth priority, nonessential uses.

A *well interference* problem occurs when groundwater appropriation causes the water level in public water supply well(s) or private, domestic well(s) to fall below the reach of those wells (Minn. Stat., sec. 103G.287 subd. 5 and Minn. Rules, part 6115.0730). According to Minn. Stat., sec. 103G.287, subd. 5, this applies to public water supply and private domestic wells constructed according to the state well code (Minn. Rules, part 4725). An interference complaint can only be valid for a domestic well if that well was constructed before appropriation permits allegedly causing the interference were issued and there are adequate water supplies available.

An interference problem may be resolved by modifying the affected well, replacing the well with a deeper well, replacing the well with an alternate water supply (e.g. connection to a public system), or modifying permitted pumping rates or schedules. Potential for well interference is considered when evaluating new water appropriation permits or amendment applications. The DNR follows procedures described in Minn. Rules, part 6115.0730 to mitigate potential interference that may be caused by new or increased appropriations and to respond to interference complaints.

Well interference is almost always a local issue. Groundwater information from the site of the well interference will continue to be needed, collected, and evaluated to weigh the risk for well interference due to new or amended appropriations. These evaluations will continue to require pumping tests and/or local aquifer monitoring.

A *water use conflict* occurs when water demands among existing and proposed users exceed the available waters. A water use conflict can only be resolved by limiting or restricting the rate, volume, and/or timing of water appropriations. The available waters must first be determined based on resource sustainability (Objectives I and II) before allocating the available waters among users. The DNR follows procedures described in Minn. Rules, part 6115.0740 to resolve water use conflicts. (See Appendix C.)

Section 5 of the GWMA Plan provides a set of actions to meet Objective IV.

Objective V. All groundwater users in the GWMA have the necessary permits to use groundwater.

Objectives I, II, III and IV (above) can only be tracked and achieved with an effective permitting system. Permits provide key data on groundwater use and the means to limit use if necessary to meet sustainability objectives. To be in compliance with current state requirements, individuals and organizations must, at a minimum, do the following if requesting 10,000 gallons of water per day or one million gallons of water per year:

- Obtain a water appropriation permit
- Pay annual fees
- Report annual water use according to permit conditions

Each groundwater appropriation permit holder is required to report the volume of water use on an annual basis. The reported volume must be accurate to within 10%. The use of water flow meters for reporting volumes is required. However, the commissioner may approve alternate methods of measuring water volume. As a result, the use of timing devices has become a method for reporting annual water use.

Permit holders must also comply with special conditions placed on their permits that are designed to ensure sustainability and/or monitor resource conditions. Some permits may include special conditions, such as groundwater-level monitoring from wells specifically constructed for that purpose.

The DNR commissioner can modify water appropriation permits in a manner consistent with Minnesota statute and rule. These modifications can be in response to water use conflicts as noted above or, more broadly, to assure permitted water use is sustainable. For more information see Appendix B.

Objective V is meant to emphasize the importance of permitting and permit compliance to meet the sustainability goals of the Straight River GWMA.

Section 5 of the GWMA Plan provides a set of actions to meet Objective V.

4. Status of the GWMA in Terms of the Objectives

This section describes our current understanding of the status of the Straight River GWMA with respect to the five objectives described in Section 3. Based on the five objectives, the definition of sustainability with respect to groundwater is that use:

- Does not harm aquifers and ecosystems
- Does not negatively impact surface waters
- Is reasonable, efficient and meets water conservation requirements
- Does not degrade water quality
- Does not create unresolved well interferences or water use conflicts

All of the sustainability objectives must be achieved to attain overall sustainability of groundwater use in the GWMA.

Status of Objective I. Aquifers, Ecosystems and Surface Waters

Objective I: Groundwater use in the GWMA does not harm aquifers and ecosystems and does not negatively impact surface waters

Groundwater, surface waters and groundwater-dependent ecosystems are interrelated. Groundwater levels fluctuate in response to a number of influences including climate, land use, and groundwater use. Managing for sustainable use of groundwater requires quantitative knowledge of the influences on groundwater and its connection to surface water.

Two types of information are needed to make water-appropriation permitting decisions that protect aquifers, surface water resources, and associated biological communities. First, acceptable levels of hydrological impacts must be determined for each type of feature. General considerations are discussed in Section 3, but site specific thresholds may be needed for particular surface-water features. Second, an estimate of how and the degree to which existing or proposed water appropriations may change the hydrological regime must be made. The projected or interpreted impacts may then be compared to the specific thresholds.

Aquifers

Substantial growth (85%) in water demand in the Straight River GWMA has occurred in the last 25 years. Continued growth in groundwater demand is expected for parts of the GWMA. There is sufficient data available to evaluate compliance with safe yields in the GWMA. Although further work is needed to evaluate the risk of exceeding safe yield under potential future scenarios, practical assessments are achievable.

Observations reflect impacts of current and historical climate and land-use changes in addition to pumping history. Continued growth in groundwater demand is expected for parts of the GWMA

To determine safe yield and understand trends we need to review information on

- Climate data and trends (how much water is entering and exiting the system)
- Groundwater-level data and trends (to show relationship between use and natural climate fluctuations)
- Groundwater model results (to better understand the interrelated system)

Climate Data and Trends

The main driver of groundwater recharge is climate. The climate in the Straight River GWMA is characterized by variable weather. The 'normal' condition is for substantial ups and downs in precipitation, evaporation, and other climatic factors that affect hydrology.

Precipitation and other climatic factors affect groundwater recharge and groundwater levels. Relatively small changes in precipitation over large areas can have a significant effect on groundwater recharge and groundwater levels. The current climate monitoring network may be inadequate for determining this important part of the water balance in the GWMA. The network should be evaluated and expanded to fill data gaps.

In addition to changes in the amount of annual precipitation, the timing (e.g., wetter springs), nature (e.g., larger rain events over shorter periods), and distribution of precipitation also is important. Rainfall, temperature, relative humidity and other weather conditions are important for predicting the amount of water present in the Straight River GWMA.

Based on precipitation data from the Minnesota Climatology Working Group (State Climatology Office), the long term average annual precipitation in Park Rapids from 1885-2014 is 25.23 inches. The yearly precipitation data is shown in Figure 4-1.

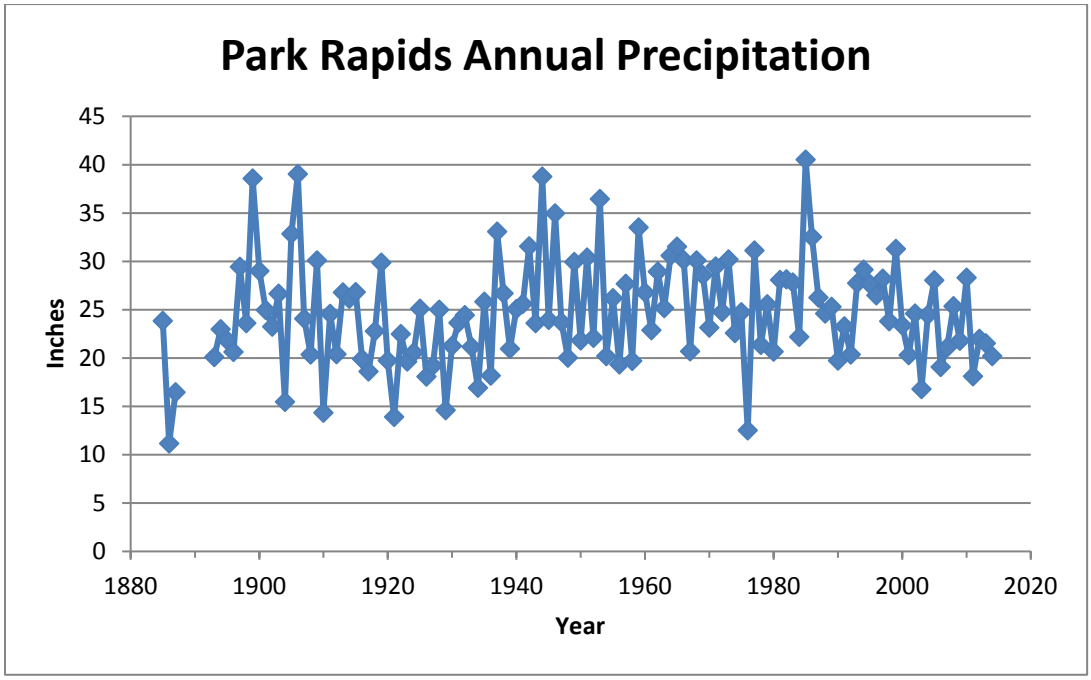

Figure 4-1 Historic precipitation patterns for Park Rapids, Minnesota

There are 5 locations where precipitation is recorded through DNR's MNGage system of volunteers, reported on a monthly basis, and coordinated by Soil and Water Conservation Districts. There is one automated station that provides real time climate data at the airport in Park Rapids. These can be a good source of a wider range of weather information in the Straight River. The Community Collaborative Rain, Hail and Snow Network, or CoCoRaHS, is a network of volunteer weather observers in the United States and Canada who take daily readings of precipitation and report them to a central

data store over the internet. There are no CoCoRaHS sites in the GWMA, but there is one located near the town of Menahga.

There is one cooperative DNR stream gaging station in this GWMA. In addition, DNR has installed 11 additional gaging sites. The cooperative site is fitted with real time weather data including precipitation, wind speed and relative humidity. The remaining 11 sites are manually downloaded. Figure 4-2 shows all the precipitation and gaging monitoring stations.

The University of Minnesota has developed a method of improving irrigation water management, resulting in more effective use of water in above ground irrigation systems using current weather conditions. This is known as the Checkbook Method. Increasing the number of sites within the Straight River GWMA at which detailed weather conditions are recorded and disseminated in real time would allow more accurate information upon which to base irrigation efficiency decisions.

Four new weather stations were installed for the Todd, Wadena and Hubbard Irrigation Scheduler Program and the information is available on the program's website (http://www.hubbardswcd.org/). The program just completed its third year (2015) and covers parts of the Straight River GWMA. Through the process of irrigation water scheduling, an irrigation technician is able to help producers determine how much water is needed to keep their crop healthy throughout the growing season by calculating the evapotranspiration rates for each of the major crops grown in the area. Each weather station contains information such as high and low temperatures, growing degree days, and evapotranspiration. There is a gap in precipitation monitoring in the Becker county portion of the GWMA.

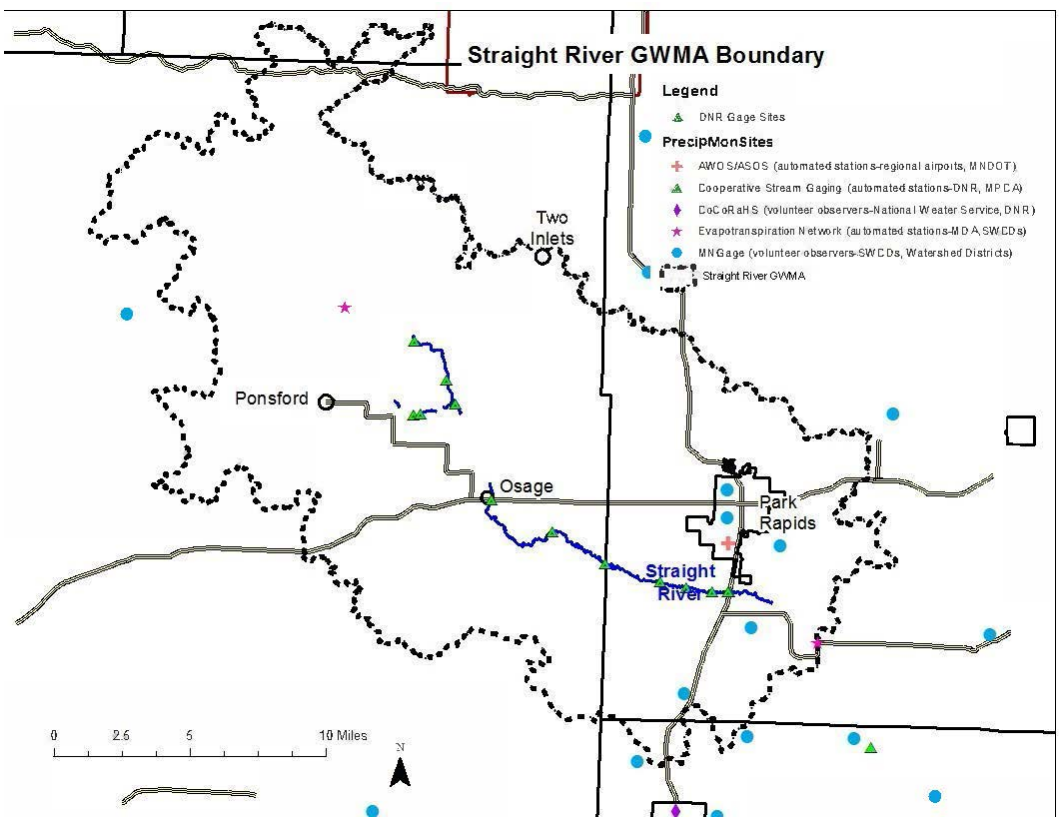

Figure 4-2 Precipitation and gaging sites in and around the GWMA

Groundwater Recharge

Aquifers are recharged by water from precipitation moving downward through the soil. The amount of groundwater recharge is affected by:

- the amount of precipitation
- the amount of precipitation that runs off the soil and into streams, lakes or wetlands
- the amount of precipitation that evaporates directly from the soil or is taken up by plants and transpired

The United States Geological Survey reports groundwater recharge for Straight River GWMA ranges between 5.15 and 6 inches. The majority of the sand and gravel aquifer is reported to have a recharge rate of 5.34 inches per year.

Groundwater-Level Data

Monitoring

Monitoring groundwater levels is an important element of groundwater management and ensuring compliance with safe yield. Monitored groundwater levels must be viewed in the context of natural climate fluctuations and groundwater pumping history.

Since 1944, DNR has managed a statewide network of water-level observation wells. Water-level readings are available via the DNR web page (http://www.dnr.state.mn.us/waters/cgm/index.html). There are 56 actively measured DNR observation wells within the GWMA boundary area.

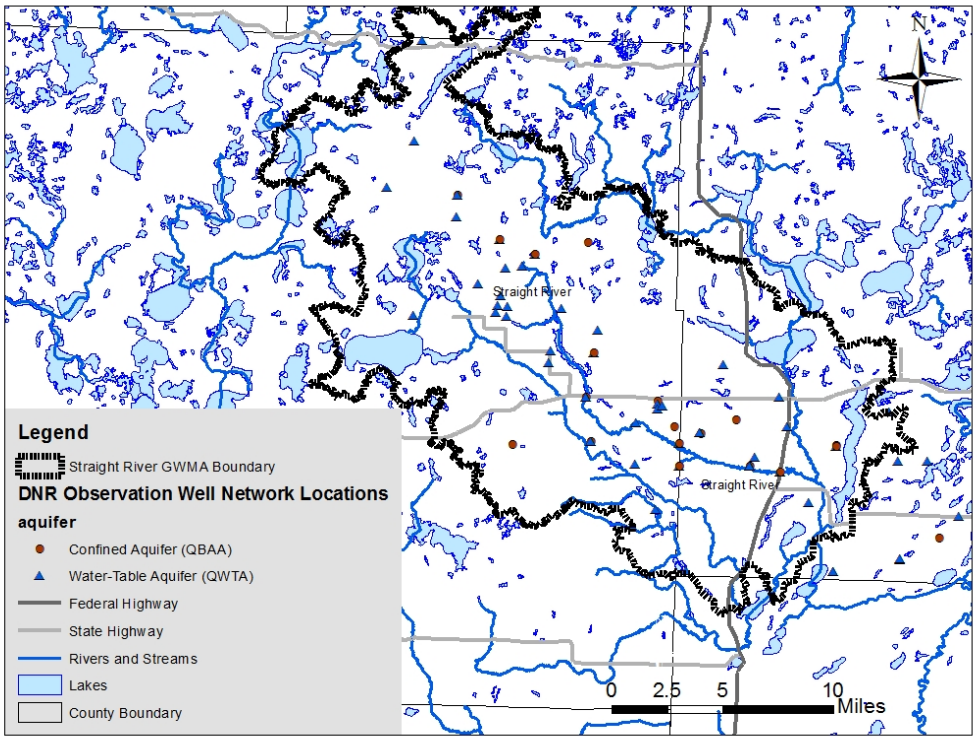

Figure 4-3 DNR observation wells in the Straight River GWMA

Figure 4-3 shows the location of the DNR instrumented observation wells within the GWMA boundary area. Forty one wells are constructed in the water table aquifer and fifteen are constructed into buried artesian aquifers.

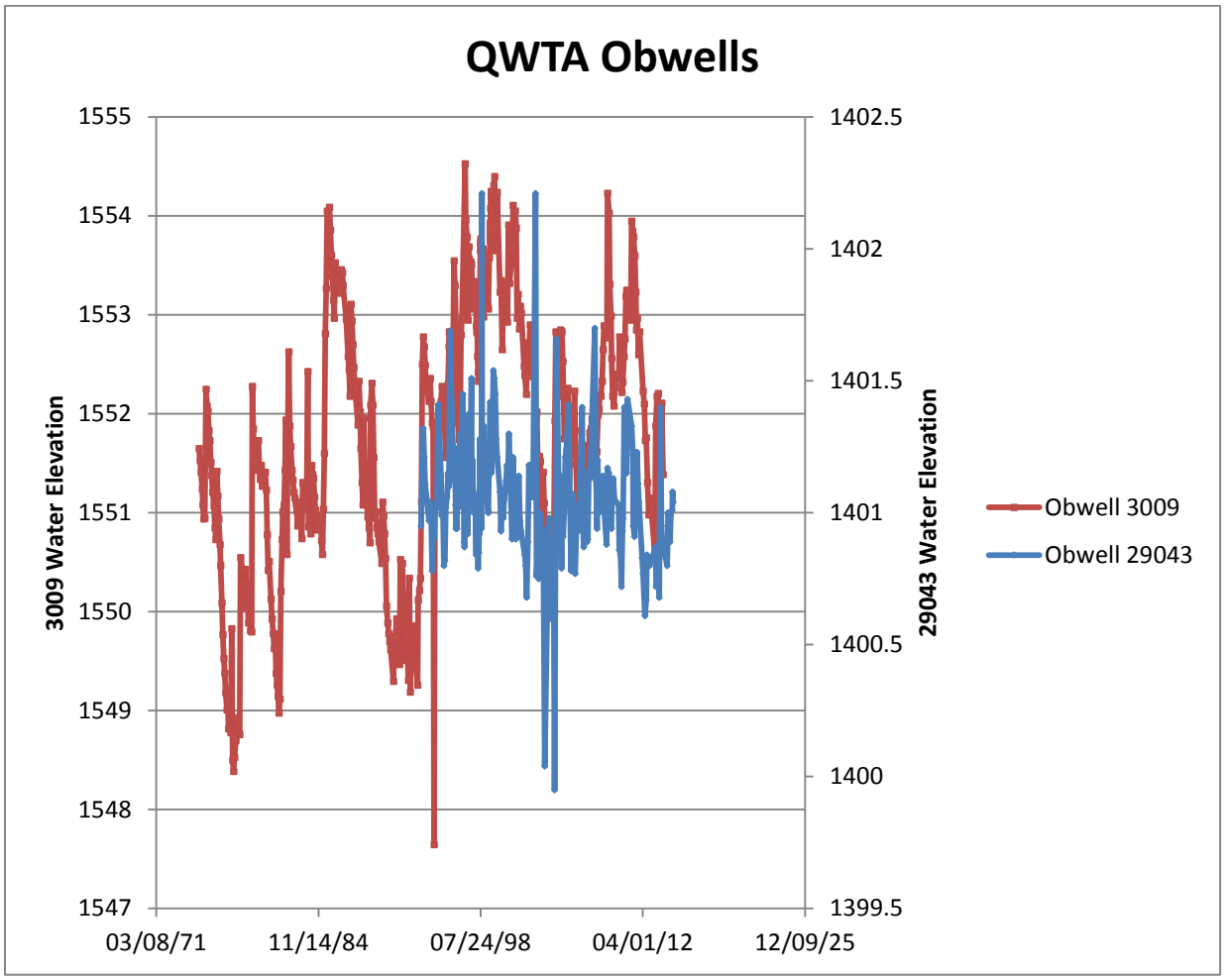

Figure 4-4 Observation well hydrographs water table aquifer (obwells 3009 and 29043)

The water elevation histories shown on Figure 4-4 are from two water table aquifer wells and demonstrate the range of historic water level highs and lows. Observation well 3009 is located nineteen miles northwest of observation well 29043. The location of these wells is highlighted in Figure 4-3. The water levels are shown as water elevation or feet above sea level datum. The difference in level elevation (approximately 150 ft.) gives an indication of the horizontal groundwater gradient between the locations.

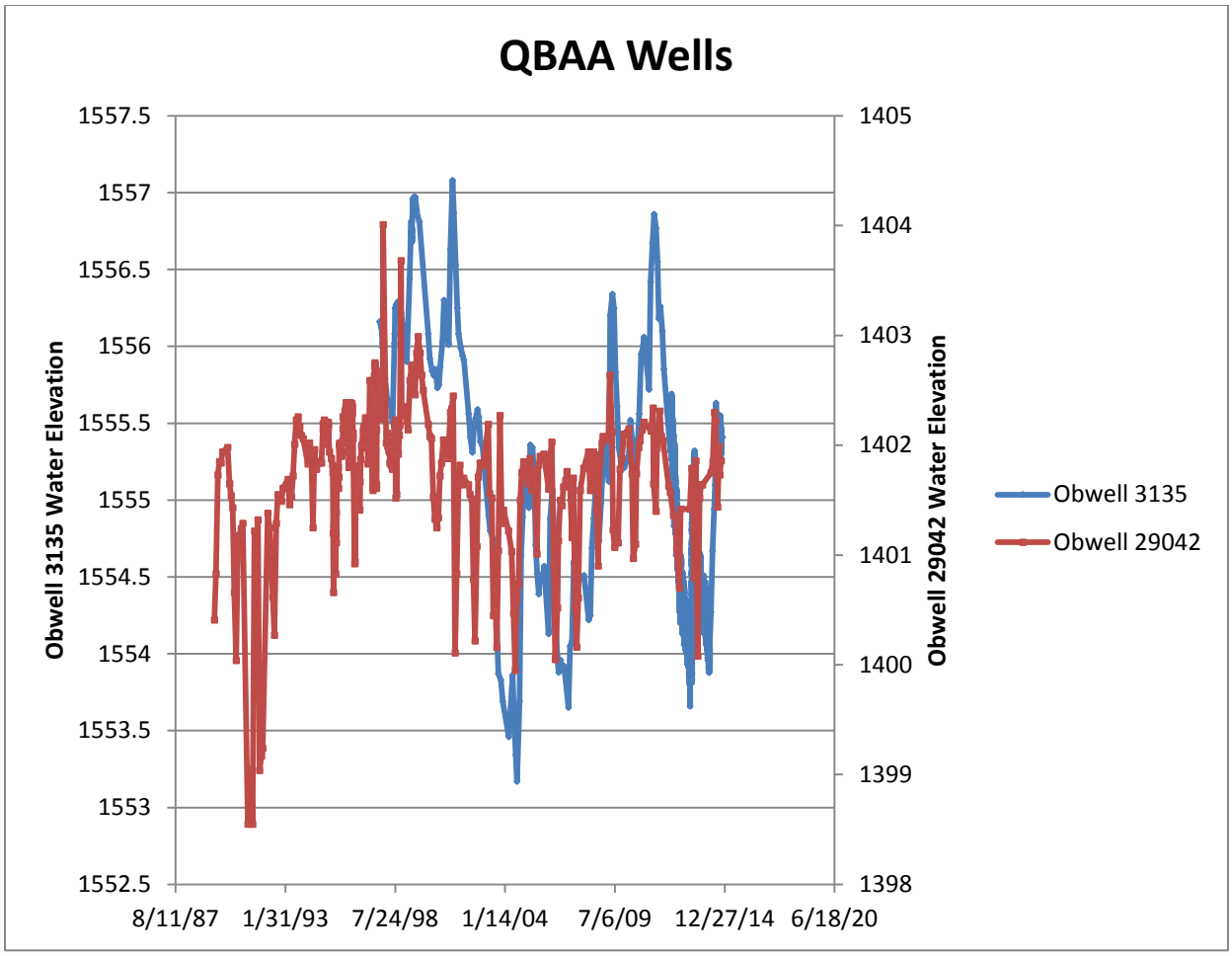

Figure 4-5 Observation well hydrographs buried drift artesian aquifer (obwells 3135 and 29042)

The water level hydrograph in Figure 4-5 shows the water elevation history for two DNR observation wells that are constructed into buried drift artesian aquifers. Observation well 3135 is located nineteen miles northwest of observation well 29042. The location of these wells is highlighted in Figure 4-3. The water levels are shown as water elevation or feet above sea level datum. The difference in level elevation (approximately 150 ft.) gives an indication of the horizontal groundwater gradient between the two locations. Multiple water level decline events demonstrate that water level declines are caused by water use**.** A similar relationship exists for the water-table aquifer, where groundwater levels will fluctuate in response to seasonal groundwater pumping.

Using data for groundwater models

Groundwater levels are measured in groundwater level obwells. Observation well data is necessary to calibrate computer models that can be used to predict water levels in areas where no groundwater measurements exist. The more observation well data that can be applied to the computer model, the more accurate the model becomes.

A groundwater model was developed by the consulting firm Camp Dresser and McKee during the late 1980s. The results can be reviewed in their December 1999 report, "Development of a Modflow Model of the Straight River Basin". Since this model was completed, both the number of wells and annual

pumping volumes have increased beyond the modeled estimates. Computer groundwater model technology, capabilities and the understanding of the input variables have also changed. Portions of this model may serve as a useful framework or starting point for a new and updated groundwater model. An assessment of what may be required to update the model is needed.

Groundwater Recharge

Recharge cannot be directly measured, but recharge can be estimated using climate, soils, and groundwater data.

A particular area of high uncertainty is evaporation. Monitoring data gaps exist for evaporation and groundwater recharge. Only two evaporation network sites are sited within the GWMA (Figure 4-6). Additional sites would be needed to evaluate the entire GWMA.

Surface Waters

Evaluating groundwater-surface water interactions is more complex than evaluating aquifer levels. Determining thresholds of negative impact on surface waters from groundwater pumping is also complex. Therefore, the DNR proposes establishing specific thresholds for specific watercourses, water basins, watersheds, or hydrologic areas in those parts of the state where water use is at risk of causing negative impacts. (Please read Appendix D for more information on negative thresholds for surface waters.)

Monitoring data are the foundation for impact assessment. There is a relatively dense network of precipitation gauges, observation wells, lake gauges, in the Straight River GWMA. There are five stream gauges; however, only the downstream gauge by Hwy. 71 has a long period of record (about 30 years). Monitoring gaps are likely to be identified, as improved impacts assessment methods are implemented.

Several previous studies have documented impacts to the Straight River that were attributed to groundwater appropriations.

A study by the United States Geological Survey (USGS) in 1988-1990 concluded that groundwater appropriations may impact the Straight River by reducing flows up to 34 percent during the irrigation season, and stream temperature may be affected by 0.5^{o} C to 1.5^{o} C if groundwater appropriation rates continued at the levels observed during that particularly hot, dry summer of 1988 (Stark et. al., 1994).

A study by MN DNR, Division of Waters in 1996-1998 documented an atypical increase in winter stream flow along the river reach between Becker CR 125 and Hubbard CR 115 and concluded that stream flow is likely impacted from water appropriations by at least 2 cfs to 4 cfs within that reach, or approximately 4% to 8% of the average July – August stream flow. Additional flow losses occur naturally in the river between CR 115 and TH 71. These natural losses are exacerbated by groundwater appropriations during extremely low flows as documented in 1988-89. The study also used modeling to evaluate the effects of groundwater appropriations on stream water temperatures by assuming that all groundwater appropriations affect the stream flow equally, which is a simplification of the real variability of impact. If all groundwater appropriations were added to the stream flow, then the resultant flows would increase from 5% to 50% above the existing modeled conditions, and the exceedance value of the lethal limit temperature for brown trout (25° C) was lowered a maximum of 10% and averaged 2% less when compared to existing conditions. The river reach between CR 115 and TH 71 had the most consistent

reductions in temperatures using this simplified analysis (approximately 1.0° C). These reductions were significant when compared to the associated modeling errors (MNDNR Waters, 2002). This suggests that reductions in water use through improved efficiency and other conservation practices may provide benefits to the stream environment and water temperature-dependent aquatic organisms that reside in the Straight River.

Annual stream water temperature monitoring from June through September by MN DNR Fisheries has documented significant increasing trends. Average daily stream temperatures at Becker CR 125 increased 1.01° C during the ten year period from 2003 to 2013. Nearby air temperatures also increased, but at a lower rate. Average daily air temperatures increased 0.61° C during that same period. Maximum daily stream temperatures increased 1.42° C, while maximum daily air temperatures increased only 1.01° C. Minimum daily stream temperatures increased 1.01° C, but minimum daily air temperatures increased only 0.001° C.

Limited dissolved oxygen within the Straight River from Straight Lake to the confluence with the Fish Hook River was the listed stressor for the river's various life forms as determined by the MPCA in its 2010 listing of impaired Minnesota waters. Since 2002, water-quality sample results indicate that low dissolved oxygen levels in the Straight River have persisted to the detriment of stream life. The Crow Wing River Watershed Total Maximum Daily Load (TMDL) report that was prepared to address the impairment listing described water temperature as the primary stressor to low dissolved oxygen levels in the Straight River. Additional data collected by MPCA as part of the Crow Wing River Watershed Monitoring and Assessment in 2010-2011 confirmed the 2010 impairment listing. The Monitoring and Assessment Report stated: "This portion of the Straight River flows through an agricultural area with high groundwater withdrawals. Further investigation is needed to determine if groundwater withdrawals are influencing the dissolved oxygen levels within the Straight River." A Watershed Restoration and Protection Strategy report was prepared by MPCA in 2015 as the final phase of the Crow Wing River watershed assessment process. The report notes that "changes in the groundwater and surface water interactions in the streams, particularly near Park Rapids, are resulting in altered stream hydrology that is stressing fish communities."

Straight River, Upper Straight Creek and Straight Lake Creek support naturally reproducing populations of trout. Straight Lake Creek was stocked with Brook Trout from 1946-1978 and with Brown Trout in 1961, 1985 and 1986. Both species are now naturally reproducing in this stream. Upper Straight Creek was stocked with Brown Trout from 1948-1966 and with Brook Trout since 1967. Enough natural reproduction has occurred since switching to the Minnesota Wild strain of Brook Trout in 2010 that stocking may be discontinued in Upper Straight Creek. A 1930 fishing contest in the Park Rapids area recorded both Brook and Brown Trout, while an earlier contest registered only Brook Trout. During the first fisheries survey of the Straight River in 1947, both Brook and Brown Trout were sampled. The first record of Brown Trout stocking was in 1947 but since they are not native, they were obviously introduced prior to that. The second fisheries survey in 1961 recorded both Brown Trout and Rainbow Trout, which were also stocked periodically between 1955 and 1978. Only Brown Trout were sampled in 1976 and 1981 fisheries surveys and in annual sampling since 1986 on the Straight River. No Brook Trout have been sampled in any fisheries survey since 1947 on the Straight River. The disappearance of Brook Trout from the Straight River is likely due to warmer temperatures. Although exact causes are unknown, it is likely that land use changes from predominately forest to agriculture and poor road crossings have contributed to the warmer temperatures and the shift from Brook Trout to Brown Trout. Brown Trout stocking continued through 1990, when they were discontinued, because natural reproduction was sufficient to maintain a high quality trout fishery.

Ideally, stream flow impacts should be re-evaluated with existing appropriation amounts and the longer period of record for stream flow data. Stream flow impacts should be re-evaluated (compared) using re-created natural flow conditions. Temperature impacts and resulting dissolved oxygen level impacts as a result of appropriations need to be evaluated further.

Status of Objective II. Water Conservation

Objective II. Groundwater use in the GWMA is reasonable, efficient and complies with water conservation requirements.

Municipal Water Supply and Water Conservation

Public water supply systems serving more than 1,000 people must also have a water supply plan approved by the DNR. In the Straight River GWMA, the city of Park Rapids serves over 1,000 people and must have a water supply plan (Minn. Stat., sec. 473.859). The plan lays out future challenges and options for a community's water supply and the community commits to certain water use and conservation goals. Through its ongoing replacement of leaking water lines, audits, implementation of a conservation rate structure and other measures, the City of Park Rapids continues to reduce per capita water demand.

Agricultural Irrigation and Water Conservation

Permits for agricultural irrigation may include "conditions" that become part of the permit, such as a requirement that the permitee develop a conservation plan with help from the Soil and Water Conservation District. These conservation plans may include irrigation water conservation, as well as following Best Management Practices for nitrogen management.

Status of Objective III. Water Quality

Objective III. Groundwater use in the GWMA does not degrade water quality

The quality of groundwater in the Straight River GWMA is very important. Nitrates and other chemicals have been found in groundwater in the Straight River GWMA. In some areas, nitrate levels exceed health risk limits. Poor groundwater quality may limit the use of groundwater. In public meetings and in written comments submitted to the DNR, people have expressed concern about how land-use practices and extensive groundwater pumping for agricultural irrigation may affect both the availability of water to support the ecosystem and the quality of drinking water, particularly for private wells located within the Straight River GWMA.

Nitrate

Nitrate in drinking water is a public health concern. The health risk limit is set by the Minnesota Department of Health (MDH) and is 10 mg/l in drinking water. Within the Straight River GWMA, this concentration has been exceeded in some private domestic wells and municipal wells in the water-table aquifer (QWTA). Nitrate in groundwater can occur naturally in low concentrations, and in some areas, concentrations can increase due to land use practices. Nitrogen is an essential plant nutrient critical for crop production. Nitrate-nitrogen is a constituent in some fertilizers, can be derived from other forms of

nitrogen fertilizer, or is produced in the soil by microorganisms from organic and inorganic nitrogen sources.

In the Straight River GWMA, municipal drinking water sources that take water from shallow unconfined aquifers show nitrate-nitrogen contamination that in places exceed the health risk limit set by MDH. Confined aquifers in the GWMA generally have lower levels of nitrate-nitrogen contamination. The presence of nitrate-nitrogen can also be an indicator of other water contaminants. Nitrate-related issues in the GWMA require further study.

Water temperature is a measure of water quality, particularly for cold-water streams like the Straight River and its tributaries. Water temperatures in the Straight River have sometimes exceeded lethal thresholds for Brown Trout. Water temperature is the primary stressor for low dissolved oxygen levels that led to an impairment listing for the Straight River in 2010.

Status of Objective IV. Well Interferences and Water-Use Conflicts

Objective IV. Groundwater use in the GWMA does not create unresolved well interferences or water use conflicts.

Well Interferences

There have been no formal well interference complaints in the Straight River GWMA. DNR considers potential for well interference when evaluating new water-appropriation permit or amendment applications.

Water-Use Conflicts

There are no standing water-use conflicts in the Straight River GWMA. It is possible that water-use conflicts could arise from cumulative impacts of multiple users. Improved methods for evaluating surface-water impacts could reveal water-use conflicts not previously identified.

Status of Objective V. Permits

Objective V. All groundwater users in the GWMA have the necessary permits to use groundwater.

Compliance

There are no identified groundwater users in the GWMA operating without a required permit. It is possible, however, that there are unidentified groundwater uses that require a permit. A thorough audit of water wells has not been conducted for the GWMA. Beginning in July 2013, new wells requiring a water-appropriation permit must receive preliminary approval from the DNR prior to construction. This will help the DNR monitor compliance.

DNR staff obtains compliance reports from the Minnesota Permitting and Reporting System (MPARS) electronic permits database. When pumping volume exceeds the appropriation permit amount (overuse), the DNR investigates and takes appropriate action. In general, compliance with permitted volumes is high in the Straight River GWMA. Special circumstances may lead to actual use exceeding permitted volume in a given year, such as waterline breaks, other system problems, or one-time uses. In addition to the limits on annual volume and maximum pumping rate, some permits may include special conditions, such as groundwater-level monitoring. DNR will follow the established statute and

rule processes for permit changes. For further information on water appropriation permit modifications, please see Appendix B.

5. DNR Actions

Prior sections of the Straight River GWMA Plan have described the area; introduced the sustainability goals, objectives and aquifer sustainability thresholds for the area; and presented the DNR's current understanding of natural resources and appropriations with respect to the sustainability thresholds. Section 4 described some of the information and data gaps that need to be addressed to continue to manage groundwater sustainably. This section restates the sustainability goal for the GWMA, and introduces the specific actions by each objective that DNR plans to take to meet the sustainability goal.

The GWMA GOAL:

In the Straight River Groundwater Management Area (GWMA), the use of groundwater will be sustainable, and therefore, will not harm ecosystems, water quality, or the ability of present and future generations to meet their needs.

Objective I. Groundwater use in the GWMA does not harm aquifers and ecosystems, and does not negatively impact surface waters.

1. The DNR will improve monitoring of groundwater levels, basin water levels, stream flows, climate, groundwater-associated biological communities and water use within the GWMA to inform DNR permit decisions.
   a. The DNR will continue to build a comprehensive hydrological and climate monitoring system for the GWMA. DNR will coordinate with federal, state, and local agencies in these efforts. The following are some initial efforts that may be adjusted over time:
      i. Stream flow monitoring - Re-establish 2 Straight River stream-flow monitoring sites at former sites on County Roads 125 and 115.
      ii. Wetland Monitoring - Install 2 gages per basin at wetland basins (public water basins 29-0550, 03-01400, and 03-0700).
      iii. Lake Level Monitoring - Install at least 2 additional lake (possibly Long and Straight Lakes) gages to the existing gages.
      iv. Groundwater level Monitoring - Install 4 new monitoring wells in addition to the existing 30 wells in close proximity to the Straight River stream gage sites to determine pumping impacts on surface and groundwater.
      v. Investigate whether there are opportunities to coordinate monitoring wells to be used by multiple permitees.
      vi. Identify additional climate monitoring requirements for more precise evapotranspiration estimates.
      vii. Increase the amount of citizen precipitation and weather reporting through recruitment to the Minnesota Volunteer Precipitation Observing Program and the Community Collaborative Rain, Hail & Snow Network (real-time).
   b. The DNR will continue to enhance water use information within the GWMA.
      i. Partner with LGUs and Con Agra Foods/Lamb Weston/RDO Frozen Foods and other businesses in the use of Supervisory Control and Data Acquisition (SCADA) or similar technologies for data collection and communication.
   c. DNR will develop and use the most appropriate groundwater models and methods to predict volumes, rates and water level impacts from groundwater appropriations, as well as describe the current groundwater conditions and characterize the nature and extent of the primary aquifers and the relationship of surface water and groundwater.

d. Develop additional information on groundwater associated biological communities to inform water appropriation decisions.
e. Conduct a baseline inventory of existing water use practices within the GWMA.

2. The DNR will develop and apply sustainability thresholds for aquifers, ecosystems and surface waters in the GWMA[2].
   a. The DNR will use safe yield for aquifers to determine limits to appropriation permits in the GWMA[3].
   b. The 2015 Minnesota Legislature directed the DNR (Laws of Minnesota 2015, First Special Session, chapter 4, article 4, section 143), to take the following actions concerning sustainability thresholds: "the commissioner of natural resources shall consult with interested stakeholders and submit a report to the Legislative Water Commission and the chairs and ranking minority members of the house of representatives and senate committees and divisions with jurisdiction over the environment and natural resources policy and finance on recommendations for statutory or rule definitions and thresholds for negative impacts to surface waters as described in Minnesota Statutes, sections 103G.285 and 103G.287, subdivision 2. Stakeholders must include but are not limited to agricultural interests; environmental interests; businesses; community water suppliers; state, federal, and local agencies; universities; and other interested stakeholders." In January 2016, the DNR submitted a report entitled: "Report to the Minnesota State Legislature: Definitions and Thresholds for Negative Impacts to Surface Waters." The DNR will use the approach described in this report to determine if negative impacts to streams, lakes, or wetlands are occurring due to groundwater appropriation within the GWMA. (The report is available on the DNR website. The executive summary of the report provides a succinct description of the approach, and it is included in this plan as Appendix D.)

3. The DNR groundwater appropriation permits will integrate sustainability limits, individual and cumulative permit analysis, and will include evaluation of existing permits within the GWMA.
   a. The DNR will evaluate each new permit application individually, as well as in conjunction with other permits in the related aquifer systems to address issues associated with the cumulative impacts of appropriations across the aquifer.
   b. The DNR will complete a review of all existing permits in the GWMA within 5 years, and if necessary, adjust permits to achieve sustainable groundwater use (DNR will follow the established statute and rule processes for permit changes – see Appendix B). [4]
   c. Where needed and in accordance with statutory requirements, DNR will limit current and future appropriations.

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[2] Sustainability means that groundwater and surface water levels, water quality, and ecosystems are not harmed and that present and future generations will be able to meet their need for water.

[3] Safe yield for artesian conditions means the amount of groundwater that can be withdrawn without degrading water quality or causing a continual decline in groundwater levels that results in a change from artesian to water table condition. Safe yield for water table conditions means the amount of water that can be withdrawn without degrading the quality of the water in the aquifer and without allowing the long term average withdrawal to exceed the available long term average recharge to the aquifer system based on representative climatic conditions.

[4] The DNR has not determined the detailed steps and timeline for how we will evaluate and implement any necessary changes to existing permits. However, we recognize that this is a vital component of GWMA planning, and we are committed to working with permitees as we develop that process.

d. Improve communication tools that will allow the public to more clearly understand the permitting process including modifying the language in the preliminary well notification letter.

4. DNR will improve communication on the status of Objective 1 (aquifers, ecosystems, surface waters) in the GWMA.
   a. The DNR will create a new GWMA reporting system that will be understandable by the public, and it will include results of data collection and analysis in the GWMA.
   b. The DNR will hold at least two GWMA Advisory Team meetings per year. They will be open to the public.
   c. The DNR will increase education and outreach to the public about sustainable use of groundwater in the GWMA.

5. The DNR will improve access to data collected and analyzed by other organizations in the GWMA.
   a. The DNR will actively support and participate in the development of a more comprehensive and accessible data management system within the GWMA, including website improvements.
   b. The DNR will work with Minnesota Pollution Control Agency (MPCA), Minnesota Department of Agriculture (MDA), Minnesota Department of Health (MDH), Con Agra/Lamb/Weston/RDO, etc., to improve access to data collected and analyzed by other organizations in the GWMA.

6. The DNR will ensure that the City of Park Rapid's Water Supply Plan includes actions that must be taken if cumulative aquifer withdrawals exceed thresholds or if negative impacts on surface waters are occurring due to groundwater withdrawals in the GWMA.

7. The DNR will promote groundwater recharge in the GWMA, consistent with sound water quality management.
   a. The DNR will work with other organizations and agencies including watershed districts, counties and local units of government to identify important groundwater recharge areas and opportunities to enhance recharge.
   b. The DNR will support local government efforts to protect important groundwater recharge areas through zoning and land use planning.
   c. The DNR will update the groundwater sensitivity maps for the GWMA within 5 years.

Objective II. Groundwater use in the GWMA is reasonable, efficient, and complies with water conservation requirements.

1. The DNR will ensure that groundwater users are complying with water conservation requirements in their water supply plans and permits.
   a. The DNR will include water conservation requirements in appropriate permits as framed by statute, rule and public water supply plans.
   b. The DNR will evaluate compliance with water conservation requirements on permits that include them. (DNR will be in contact with permit holders, as we do these reviews.)
   c. When considering a permit transfer request or amendment request to increase appropriations in this GWMA, DNR will evaluate a permit holder's performance in meeting conservation requirements in their permit and the conservation goals contained in applicable water supply plans.
   d. The DNR will partner with local units of government, such as Soil and Water Conservation Districts (SWCDs), to assist in developing and complying with conservation requirements in water appropriation permits.

e. The DNR will update the information it uses to develop water conservation requirements specific to each water use category.

2. The DNR will improve communication about and promote the values of water conservation in the GWMA.
   a. DNR will promote lessons learned about water conservation from working farms, municipalities, industries, and other water users in the GWMA.
   b. DNR will include descriptions and evaluations of water conservation practices in the GWMA in the new GWMA reporting system.
   c. DNR will update its website to include links to organizations with water conservation information (e.g., SWCDs, United States Department of Agriculture, and University of Minnesota Technical Assistance Program).

3. The DNR will work with other organizations to promote appropriate water storage and aquifer recharge in the GWMA.

4. The DNR will promote the use of water conservation strategies, such as re-use of water in the City of Park Rapids community water supply planning, in the GWMA.

Objective III. Groundwater use in the GWMA does not degrade water quality.

1. The DNR will include compliance with local, state, and federal water quality regulations as permit conditions.
   a. The DNR will coordinate with local, state, and federal agencies to identify water quality regulations that apply to groundwater use and clarify how best to assure compliance.

2. The DNR will ensure that permitted appropriations do not degrade water quality by moving known contaminants.
   a. The DNR will work with PCA, MDH and MDA to determine the most suitable methods to evaluate the risk of moving known contaminants for new and existing permits.[5]

3. The DNR will ensure that the City of Park Rapids Water Supply Plan takes into account contaminant management.

4. The DNR will improve communication about known contaminants and pollution management in the GWMA.
   a. The DNR will use a new reporting system to describe and evaluate status of contamination and pollution plume management in the GWMA.
   b. The DNR will work with MDA, MDH, MPCA and others to share data about water quality among agencies.
   c. The DNR will work with MDA, MDH, MPCA and others to better interpret water quality data.

[5] The DNR has not determined the detailed steps and timeline for how we will evaluate and implement any necessary changes to existing permits. However, we recognize that this is a vital component of GWMA planning, and we are committed to working with permitees as we develop that process. We also recognize that water conservation can be an important tool to reduce contaminant movement.

5. The DNR will ensure the permitted appropriations do not increase known water quality contamination of a surface water feature.

Objective IV. Groundwater use in the GWMA does not create unresolved well interferences or water use conflicts.

1. The DNR will continue to review permit applications to identify and reduce the likelihood of well interferences and water use conflicts.

2. The DNR will resolve well interferences and water use conflicts applying the framework outlined in statute and rule.

3. The DNR will improve information on aquifer characteristics in the GWMA to improve its ability to identify and reduce the likelihood of interferences and conflicts prior to permit approval.

4. The DNR will increase education and awareness about resolving well interferences and water use conflicts.

Objective V. All groundwater users in the GWMA have the necessary permits to use groundwater.

1. The DNR will improve its capacity to detect unpermitted groundwater use.
   a. The DNR will complete periodic analyses to identify potential unpermitted groundwater use in the GWMA and take appropriate action.
   b. The DNR will conduct follow-up reviews of preliminary well approval actions to determine compliance with permit requirements.
   c. The DNR will provide updated information to well drillers and consultants on existing laws and the water appropriation permit application process.
   d. The DNR will facilitate the public's ability to identify and report unpermitted use.

2. The DNR will ensure that permitted volumes reflect actual use and that actual use does not exceed permitted volumes.
   a. The DNR will evaluate water use reports and will contact permit holders whose reports indicate inaccuracies.
   b. The DNR will monitor water use and bring permitees into compliance whose reported use is higher than permitted.
   c. The DNR will help permit holders adjust permitted volume to better match actual use and need, consistent with other plan objectives.

3. The DNR will ensure that water users comply with conditions on appropriation permits.
   a. The DNR will help bring permit holders into compliance with their permit conditions.
   b. The DNR will focus on permits that have been reviewed to address challenges of cumulative impacts and sustainability thresholds (Objective 1, action 3).

6. Implementation Schedule

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
Objective I. Groundwater use in the GWMA does not harm aquifers and ecosystems, and does not negatively impact surface waters.					
I.1	DNR will improve monitoring of groundwater levels, basin water levels, stream flows, climate and water use within the GWMA to inform DNR permit decisions.				
I.1.a.	DNR will continue to build a comprehensive hydrological and climate monitoring system for the GWMA. DNR will coordinate with federal, state, and local agencies in these efforts. The following are some initial efforts that may be adjusted over time:				
I.1.a.i.	Stream flow monitoring - By 2018, reestablish 2 Straight River stream-flow monitoring sites at former sites on County Roads 115 and 125.	**DNR Ecological and Water Resources (EWR) Water Monitoring and Surveys Unit**, EWR Regional Appropriations staff	New	1	
I.1.a.ii.	Wetland Monitoring - By 2018, install 2 gages per basin at wetland basins (public water basins 29-0550, 03-01400, and 03-0700).	**EWR Water Monitoring and Surveys Unit** with input from EWR Hydrogeology and Groundwater Unit.	Existing but enhance	1	
I.1.a.iii.	Lake Level Monitoring - By 2018, install at least 2 additional lake (possibly Long and Straight Lakes) gages to the existing gages.	**EWR Water Monitoring and Surveys Unit** with input from EWR Hydrogeology and Groundwater Unit. Coordinate with DNR Fish and Wildlife (FAW).	Existing but enhance	1	
I.1.a.iv.	Groundwater level Monitoring - Install 4 new monitoring wells in addition to the existing 30 wells in close proximity to the Straight River stream gage sites to determine pumping impacts on surface and groundwater.	**EWR Water Monitoring and Surveys Unit** with input from EWR Hydrogeology and Groundwater Unit	Existing but enhanced	1-2	

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
I.1.a.v.	Investigate whether there are opportunities to coordinate monitoring wells to be used by multiple permitees.	**EWR Hydrogeology and Groundwater Unit** with input from EWR Water Monitoring and Surveys Unit, EWR Regional Appropriations staff, and EWR Water Regulations Unit	New	1-2	
I.1.a.vi.	Identify additional climate monitoring requirements and wind speed for more precise evapotranspiration estimates.	**EWR Water Monitoring and Surveys Unit - State Climatology Office** with input from EWR Hydrogeology and Groundwater Unit	New	3-4	
I.1.a.vii.	Increase the amount of citizen precipitation and weather reporting through recruitment to the Minnesota Volunteer Precipitation Observing Program and the Community Collaborative Rain, Hail & Snow Network (real-time).	**EWR Water Monitoring and Surveys Unit, State Climatology Office, and University of Minnesota** with input from EWR Hydrogeology and Groundwater Unit	Existing but enhance	3-4	
I.1.b.	DNR will continue to enhance water use information within the GWMA.	**EWR Hydrogeology and Groundwater Unit,** EWR Regional Appropriations staff	Existing but enhance	2-3	
I.1.c.	DNR will develop and use standard groundwater models and methods to predict volumes, rates and water level impacts from groundwater appropriations.	**EWR Hydrogeology and Groundwater Unit,** EWR Regional Appropriations staff	New	1-2	
I.1.d.	Develop additional information on groundwater associated biological communities to inform water appropriation decisions.	**EWR Regional Plant Ecologist**	New	2-3	

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
I.1.e.	Conduct a baseline inventory of existing water use practices within the GWMA.	**EWR Hydrogeology and Groundwater Unit,** EWR Regional Appropriations staff	New	1-2	
I.2	DNR will develop and apply sustainability thresholds for aquifers, ecosystems and surface waters in the GWMA[i].				
I.2.a.	DNR will use safe yield for aquifers to determine limits to appropriation permits in the GWMA[ii].	**EWR Regional Appropriations staff**, EWR Hydrogeology and Groundwater Unit	New	1	
I.2.b.	The DNR will determine negative impacts to surface water features (streams, lakes, wetlands) using the approach that is described in the 2016 "Report to the Minnesota State Legislature: Definitions and Thresholds for Negative Impacts to Surface Waters."	**EWR Regional Appropriations staff,** EWR Information, Monitoring and Assessment section, EWR Conservation Assistance and Regulation Section	New	1-3	
I.3	DNR groundwater appropriation permits will integrate sustainability limits, individual and cumulative use analysis, and will include evaluation of existing permits within the GWMA.				
I.3.a.	DNR will evaluate each new permit application individually and in conjunction with other appropriation permits in the related aquifer systems to address issues associated with the cumulative impact of appropriations across the aquifer.	**EWR Regional Appropriations staff**, EWR Hydrogeology and Groundwater Unit, EWR Water Monitoring and Surveys Unit	Existing but enhance	3	I.1.c
I.3.b.	DNR will review all existing permits in the GWMA within 5 years, and if necessary, adjust permits to achieve sustainable groundwater use. [iii]	**EWR Regional Appropriations staff**, EWR Hydrogeology and Groundwater Unit	New	1-5	I.1.c I.2.a.b.c
I.3.c.	DNR will limit current and future appropriations where needed and in accordance with statutory procedural requirements."	**EWR Regional Appropriations staff**, EWR Hydrogeology and Groundwater Unit, EWR Water Monitoring and Surveys Unit	Existing but enhance	1-5	I.2.a.b.c

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
I.3.d.	Improve communication tools that will allow the public to more clearly understand the permitting process (e.g. press releases, daily notices during drought periods, etc.).	**EWR Water Regulations Unit,** EWR Comm. and Planning Unit	Existing but enhance	2	
I.4	DNR will improve communication on the status of Objective 1- aquifers, ecosystems and surface waters in the GWMA.				
I.4.a.	DNR will create a new GWMA reporting system that is understandable by the public and will include results of data collection and analysis within the GWMA.	**EWR Comm. and Planning Unit,** EWR Regional Appropriations staff	New	1-3	
I.4.b.	DNR will hold two Straight River GWMA Advisory Team meetings per year that are open to the public.	**EWR Regional Appropriations staff**, EWR Hydrogeology and Groundwater Unit, EWR Water Monitoring and Surveys Unit	Existing but enhance	1-5	
I.4.c.	DNR will increase education and outreach to the public about sustainable use of groundwater in the GWMA.	**EWR Water Regulations Unit,** EWR Comm. and Planning Unit	Existing but enhance	1-2	
I.5	DNR will improve access to data collected and analyzed by other organizations in the GWMA.				
I.5.a.	DNR will actively support and participate in the development of a more comprehensive and accessible data management system within the GWMA, including website improvements.	**EWR Comm. And Planning Unit,** EWR Regional Appropriations staff	New	2-3	
I.5.b.	DNR will work with Minnesota Pollution Control Agency (MPCA), Minnesota Department of Agriculture (MDA), Minnesota Department of Health (MDH), Con Agra/Lamb/Weston/RDO, etc., to improve access to data collected and analyzed by other organizations in the GWMA.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	2-3	

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
I.6	DNR will ensure that the City of Park Rapids Water Supply Plan includes actions that must be taken if cumulative aquifer withdrawals exceed limits or results in negative impacts to surface waters.				
I.7	DNR will promote groundwater recharge in the GWMA, consistent with sound water quality management.				
I.7.a.	DNR will work with other organizations and agencies including watershed districts, counties, and other local units of government to identify groundwater recharge areas and opportunities to enhance groundwater recharge.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	2-3	
I.7.b.	DNR will support local government efforts to protect important groundwater recharge areas through zoning and land use planning.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	2-3	
I.7.c.	DNR will update the groundwater sensitivity map for the GWMA within 5 years.	**EWR Regional Appropriations staff**, EWR Hydrogeology and Groundwater Unit, EWR Water Monitoring and Surveys Unit	Existing but enhance	3	
Objective II. Groundwater use in the GWMA is reasonable, efficient, and complies with water conservation requirements.					
II.1	DNR will ensure that groundwater users are complying with water conservation requirements in their water supply plan and permits.				
II.1.a.	DNR will include water conservation requirements in all appropriate permits as framed by statute, rule and public water supply plans.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	Existing but enhance	1-3	
II.1.b.	DNR will evaluate compliance with water conservation requirements for all permits that include them (DNR will be in contact with permit holders as we do these reviews).	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	Existing but enhance	1-2	

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
II.1.c.	When considering permit transfer requests or amendment requests to increase appropriations in the GWMA, DNR will evaluate permit holders' performance in meeting conservation requirements in their permit and the conservation goals contained in applicable water supply plans.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	1-2	
II.1.d.	DNR will partner with local units of government such as Soil and Water Districts (SWCDs) to assist in developing and complying with conservation requirements in water appropriation permits.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	1-2	
II.1.e.	DNR will update the information it uses to develop water conservation requirements by water use category.	**EWR Water Regulations Unit,** EWR Regional Appropriations staff	Existing but enhance	2-3	
II.2	DNR will improve communication about and promote the values of water conservation in the GWMA.				
II.2.a.	DNR will promote lessons learned about water conservation by municipalities, industries, and other water users in the GWMA.	**EWR Hydrogeology and Groundwater Unit,** EWR Regional Appropriations staff	New	1-2	
II.2.b.	DNR will include descriptions and evaluations of water conservation practices in the GWMA in a new GWMA reporting system.	**EWR Comm. And Planning Unit,** EWR Regional Appropriations staff	New	3-4	I.4.a
II.2.c.	DNR will update its website to include links to organizations with water conservation information (e.g., SWCD's, United States Department of Agriculture, University of Minnesota Technical Assistance Program, etc.).	**EWR Comm. And Planning Unit,** EWR Regional Appropriations staff	New	1-2	
II.3	DNR will work with other organizations to promote appropriate water storage and aquifer recharge in the GWMA.				
II.4	DNR will promote the use of water conservation strategies in the City of Park Rapids water supply planning in the GWMA..				
Objective III. Groundwater use in the GWMA does not degrade water quality.					

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
III.1	DNR will include compliance with local, state, and federal water quality regulations as permit conditions.				
III.1.a.	DNR will coordinate with local, state, and federal agencies to identify water quality regulations that apply to groundwater use and clarify how best to assure compliance.	**EWR Regional Appropriations staff,** EWR Water Regulations Unit	New	2-3	
III.2	DNR will ensure that permitted appropriations do not degrade water quality by moving known contaminants.				
III.2.a.	DNR will evaluate all new permits to address their role in the moving known contaminants.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	Existing	1-2	
III.2.b.	DNR will evaluate all existing permits in the GWMA for their role in moving known contaminants. [iv]	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	3-4	
III.3	DNR will ensure that the City of Park Rapids Water Supply Plan takes into account contaminant management.				
III.4	DNR will improve communication about known contaminants and pollution management in the GWMA.				
III.4.a.	DNR will create and use a new reporting system to describe and evaluate status of contamination and pollution plume management in the GWMA.	**EWR Regional Appropriations staff,** EWR Comm. And Planning Unit	New	2-3	
Objective IV. Groundwater use in the GWMA does not create well interferences or water use conflicts.					
IV.1	DNR will continue to review permit applications to identify and reduce the likelihood of well interferences and water use conflicts.				
IV.2	DNR will resolve well interferences and water use conflicts applying the framework outlined in statute and rule.				
IV.3	DNR will improve information on aquifer characteristics in the GWMA to improve its ability to identify and reduce the likelihood of potential interferences and conflicts prior to permit approval.				
IV.4	DNR will increase education and awareness about resolving well interferences and water use conflicts.				

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
Objective V. All groundwater users in the GWMA have the necessary permits to use groundwater.					
V.1	DNR will improve its capacity to detect unpermitted groundwater use.				
V.1.a.	DNR will complete an annual analysis to identify potential unpermitted groundwater use in the GWMA and take appropriate action.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	1-5	
V.1.b.	DNR will conduct follow-up reviews of preliminary well approval actions to determine compliance with permit requirements.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	2-3	
V.1.c.	DNR will provide information to well drillers and consultants on existing laws and the water appropriation permit application process.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	1-5	
V.1.d.	DNR will facilitate the publics' ability to identify and report unpermitted use.	**EWR – Water Regulations Unit,** EWR Regional Appropriations staff.	New	1-5	
V.2	DNR will ensure that permitted volumes reflect actual use and that actual use does not exceed permitted volumes based on established limits.				
V.2.a.	DNR will evaluate water use reports and will contact permit holders whose reports indicate inaccuracies.	**EWR Water Regulations Unit,** EWR Regional Appropriations staff	Existing but enhance	1-2	
V.2.b.	DNR will monitor permitted versus reported use and bring permitees whose reported use is higher than permitted use into compliance.	**EWR Regional Appropriations staff,** EWR Water Regulations Unit	Existing	1-3	
V.2.c.	DNR will work with permit holders to adjust permitted volume to better match actual use and need, consistent with other plan objectives.	**EWR Regional Appropriations staff**	Exisiting	1-3	
V.3	DNR will ensure that water users comply with conditions on appropriation permits.				

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
V.3.a.	DNR will work with permit holders to bring them into compliance with their permit conditions.	**EWR Regional Appropriations staff**	Existing but enhance	1-5	
V.3.b.	DNR will focus on permits that have been reviewed to address challenges of cumulative impacts and sustainability thresholds (Objective 1, action 3).	**EWR Regional Appropriations staff**	New	3-5	

7. Glossary

Aquifer – any water-bearing bed or stratum of earth or rock capable of yielding groundwater in sufficient quantities that can be extracted (Minn. Rule, part 6115.0630, subp. 2)

Appropriating – withdrawal, removal, or transfer of water from its source regardless of how the water is used (M.S. 103G.001, Subd.4)

Artesian aquifer or confined aquifer – a water body or aquifer overlain by a layer of material of less permeability than the aquifer. The water is under sufficient pressure so that when it is penetrated by a well, the water will rise above the top of the aquifer. A flowing artesian condition exists when the water flow is at or above the land surface (Minn. Rule, part 6115.0630, subp. 4).

Basin – a depression capable of containing water which may be filled or partly filled with waters of the state. It may be a natural, altered, or artificial depression (Minn. Rule, part 6115.0630, subp. 5)

Buried artesian – an aquifer composed of glacially associated sands and/or gravels, over which a confining layer of clay or till was deposited

Conservation rate – a water fee (rate) structure that encourages conservation and may include increasing block fees, seasonal rates, time of use rates, individualized goal rates, or excess use rates (Minn. Stat., sec. 103G.291, subd. 4(a))

Demand reduction measures – actions that reduce water demand, water losses, peak water demands, and nonessential water uses. Demand reduction measures must include a conservation rate structure, or a uniform rate structure with a conservation program that achieves demand reduction (Minn. Stat., sec. 103G.291, Subd. 4(a)).

Evapotranspiration – the process by which water is transferred from the land to the atmosphere by evaporation from the soil and other surfaces and by transpiration from plants.

Groundwater – subsurface water in the saturated zone. The saturated zone may contain water under atmospheric pressure (water table condition), or greater than atmospheric pressure (artesian condition) (Minn. Rule, part 6115.0630, subp. 11)

Native plant community – a group of plants that interact with each other and with their environment in ways not greatly altered by modern human activity or by introduced organisms

Negative Impact – refers to the relationship of groundwater use to surface waters. See Minn. Stat., section 103G.287, subd. 2 which states "Groundwater appropriations that will have negative impacts to surface waters are subject to applicable provisions in section 103G.285" (this affects altered and natural watercourses, which includes trout streams and basins).

Nested Obwells – Two or more adjacent water-level observation wells completed in different aquifers, or different depths within the same aquifer. Used to determine vertical differences in groundwater levels or heads.

Normal (climate) – the average of a climate variable such as precipitation or temperature over a standard 30-year period (e.g. 1981–2010)

Obwell – a water-level observation well in the DNR network

Potential evaporation or free water surface evaporation – evaporation from a thin film of water having no appreciable heat storage (Farnsworth et al., 1982).

Protected flow – the amount of water required in the watercourse to accommodate instream needs such as water-based recreation, navigation, aesthetics, fish and wildlife habitat, water quality, and needs by downstream higher priority users located in reasonable proximity to the site of appropriation (Minn. Rule, part 6115.0630, subp. 12)

Protective elevation – the water level of the basin necessary to maintain fish and wildlife habitat, existing uses of the surface of the basin by the public and riparian landowners, and other values which must be preserved in the public interest (Minn. Rule, part 6115.0630, subp. 13)

Recharge – the addition of water to the groundwater system

Safe yield – *water table condition:* the amount of groundwater that can be withdrawn from an aquifer system without degrading the quality of water in the aquifer and without allowing the long term average withdrawal to exceed the available long term average recharge to the aquifer system based on representative climatic conditions (Minn. Rule, part 6115.0630, subp. 15)

artesian condition: the amount of groundwater that can be withdrawn from an aquifer system without degrading the quality of water in the aquifer and without the progressive decline in water pressures and levels to a degree that will result in a change from artesian condition to water table condition (Minn. Rule, part 6115.0630, subp. 15)

Transpiration – the process of transport of water from plant roots to above ground parts where it is released to the atmosphere as vapor

Water table aquifer or unconfined aquifer – an aquifer where groundwater is under atmospheric pressure (Minn. Rule, part 6115.0630, subp. 17)

Water-use conflict – A situation where the available supply of waters of the state in a given area is limited to the extent that there are competing demands among existing and proposed users which exceed the reasonably available waters (Minn. Rule, part 6115.0740. subp. 1).

Well interference – A situation where an appropriation reduces water levels beyond the reach of public water supply and private domestic wells constructed according to Minn. Rules, part 4725 (Minn. Stat., sec. 103G.287, subd. 5; Minn. Rules, part 6115.0730).

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9. Appendix A

Minnesota Executive Agency Commitments to the Straight River GWMA Plan

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Minnesota Department of Agriculture

The Minnesota Department of Agriculture (MDA) supports the Minnesota Department of Natural Resources (MDNR) led approach to managing groundwater through the development of Groundwater Management Areas (GWMA). The MDNR is the lead agency for managing groundwater appropriations consistent with statutory requirements for sustainability including providing for ecosystem needs. The MDA has statutory responsibilities and expertise in addressing agricultural contributions to water quality concerns. The MDA will provide support in our areas of responsibility and expertise to the MDNR and local communities in GWMAs.

Overview of the MDA Role

The MDA is the lead state agency for addressing pesticides and nitrate from fertilizer in groundwater. MDA also has related regulatory and non-regulatory responsibilities for pesticide and fertilizer management including storage, handling and cleanup of contaminated facilities. The primary statutory authority for these activities comes from the Groundwater Protection Act [MN Statutes (MS) Chapter 103H], the Pesticide Control Law (MS 18B), and the Fertilizer, Soil Amendment, and Plant Amendment Law (MS 18C). The MDA coordinates with University of Minnesota Extension, soil and water conservation districts, farmers, agronomists and other interested parties to promote and support the most current science based best management practices to reduce potential agricultural contaminants in groundwater and for irrigation management.

The MDA has developed a Pesticide Management Plan (PMP) and a Nitrogen Fertilizer Management Plan (NFMP) which outline a formal approach to addressing pesticide and nitrate contamination in groundwater. The MDA will provide assistance to the MDNR within GWMAs primarily through the implementation of the NFMP and the PMP. The MDA will provide technical support for evaluating levels of pesticide and nitrate contamination, identifying potential sources and protective actions for nitrate and pesticides in groundwater, and other related work within a GWMA. The MDA approach emphasizes review of existing data on local agricultural practices and identifying appropriate voluntary best management practices (BMPs) to ensure that the best available science is used for addressing local problems, and on working closely with local farmers, crop advisors, local government, other agencies, and other interested parties to address nitrate or pesticide issues.

Nitrogen Fertilizer

The Nitrogen Fertilizer Management Plan (NFMP) is the state's blueprint for prevention, evaluation and mitigation of the impacts of nitrogen fertilizer on groundwater. Within GWMAs, MDA will participate in issues related to nitrate in groundwater using the processes identified in the NFMP. This includes monitoring and assessment, development and implementation of BMPs, and other prevention and mitigation activities. Some specific activities are provided below.

Where nitrates in groundwater may be of concern within GWMAs, MDA assistance will be guided by the NFMP and could include:

- Conduct monitoring and assessment of groundwater for nitrates;
- Evaluate nitrate data;
- Engage with the agricultural community, U of M Extension and other local stakeholders to provide information and solicit feedback;
- Provide advice on appropriate nitrogen fertilizer BMPs and other practices;
- Survey of current adoption of BMPs and agricultural practices;
- Assist agricultural community through information and education activities such as farmer meetings, on farm demonstration, technical assistance on nitrogen management practices;
- Follow-up evaluation to determine BMP effectiveness and adoption; and,
- Evaluation of other practices that should be considered.

Pesticides

The Pesticide Management Plan (PMP) is the state's blueprint for prevention, evaluation and mitigation of occurrences of pesticides or pesticide breakdown products in groundwater and surface waters of the state. The PMP includes components promoting prevention, developing appropriate responses to the detection of pesticides or pesticide breakdown products in groundwater and surface waters, and providing responses to reduce or eliminate continued pesticide movement to groundwater and surface water.

If pesticides in groundwater are a concern within GWMAs, the MDA will provide assistance using the processes identified in the PMP. This assistance may include:

- Collection and analysis of data on the presence of pesticides and pesticide degradates in groundwater;
- Evaluation of monitoring data for common detection determinations in groundwater;
- Evaluation of BMPs;
- Engaging the agricultural community, U of M Extension and other stakeholders in evaluating and implementing BMPs;
- Evaluating actions to mitigate the effects of specific pesticides in common detection for groundwater;
- Development of voluntary pesticide-specific BMPs; and,
- Evaluation of BMP use and effectiveness.

MDA Point Source Authority

In addition to non-point source activities shown above, MDA has responsibilities and regulatory authority for overseeing agriculture chemicals from point sources as directed in MS 18C (fertilizer storage, handling, distribution, use and disposal), MS 18D (agricultural chemical liability) and MS 18E (agricultural chemical response and reimbursement). As provided in these statutes, MDA will exercise these authorities as needed to address potential point sources of contamination such as releases from bulk storage facilities within GWMAs.

Irrigation

MDA, in cooperation with the University of Minnesota Extension, will provide technical support for irrigation water management to reduce the potential for impacts from nitrogen fertilizer and pesticides to groundwater. MDA will promote current irrigation practices that use the best available science. This

could include practices such as increasing water use efficiency, irrigation scheduling, fertigation, and other irrigation management practices.

Variation based on unique circumstances for each GWMA:
The above outlines the general approach of MDA involvement within GWMAs. This approach will be modified as appropriate to address the unique circumstances of each GWMA.

Minnesota Department of Health

Objective I. Groundwater use in the GWMA does not harm aquifers and ecosystems, and does not negatively impact surface waters.

1. MDH will act to implement the federal Safe Drinking Water Act by focusing on a 'source to tap' strategy of multiple protections to ensure the delivery of safe drinking water to all Minnesotans connected to a public water system.
2. MDH will enforce the Minnesota Well Code to ensure wells meet current construction and maintenance standards.
3. MDH will focus Wellhead Protection plan development and implementation efforts that protect drinking water resources and public health.
4. MDH will coordinate with state agency efforts to evaluate and improve local (e.g., LUGs, NGOs) capacity to manage groundwater and drinking water issues.
5. MDH will support and prioritize activities that protect both public and private groundwater resources that are used as a source of drinking water.

Objective II. Groundwater use in the GWMA is reasonable, efficient, and complies with water conservation requirements.

1. MDH will focus Wellhead Protection plan development and implementation efforts to encourage sustainable land and water uses.
2. MDH will assist public water systems in identifying conservation activities when developing wellhead protection plans, especially activities that align with regional efforts within groundwater management areas.
3. MDH will continue to advise on storm-water infiltration practices in vulnerable wellhead protection areas.
4. Subject to legislative funding, MDH will conduct a thorough review of state rules, regulations, and policies relative to water reuse.
5. MDH will evaluate and encourage the adoption of conservation practices where multiple benefits can be achieved that conserve groundwater resources and improve the quality of drinking water in GWMAs.

Objective III. Groundwater use in the GWMA does not degrade water quality.

1. MDH will coordinate with state agency efforts to evaluate and improve local (e.g., LUGs, NGOs) capacity to manage groundwater and drinking water resources.

2. MDH will focus Wellhead Protection plan development and implementation efforts that encourage sustainable land uses and the adoption of conservation practices that result in reduced nutrient loss and other anthropogenic impacts that degrade drinking water quality and may impact human health.
3. MDH will assist public water systems in developing water monitoring networks, especially unconfined aquifer settings where drinking water sources are vulnerable.
4. MDH will promote the use of groundwater and land use modeling to demonstrate both the costs and benefits associated with changes in land use on both water quantity and quality.
5. MDH will coordinate with DNR, MPCA, MDA, USGS and others on monitoring, regulation, and prevention efforts for contaminants of emerging concern, including the development of health-based guidance, if appropriate.
6. MDH will coordinate with DNR and others to examine if regional aquifer management approaches might be of value to public water systems, local units of government, and other stakeholders concerned with drinking water protection.

Objective IV. Groundwater use in the GWMA does not create unresolved well interferences or water use conflicts.

1. MDH will share with DNR staff the data and groundwater models developed for wellhead protection purposes. These may assist in evaluation of hydraulic impacts of potential new high capacity wells that are located in close proximity to drinking water supply management areas.

Objective V. All groundwater users in the GWMA have the necessary permits to use groundwater.

1. MDH will assist the DNR technical staff with the coordination and evaluation of compliance issues/impacts on the public water systems.
2. MDH will coordinate with DNR on data exchange for new potential high-capacity wells in groundwater management areas.

Minnesota Pollution Control Agency

The Minnesota Pollution Control Agency has reviewed the Straight River Groundwater Management Area Plan and determined that the agency can support the DNR's goals for the GWMA through the following actions organized by Plan objectives:

Objective I. Groundwater use in the GWMA does not harm aquifers and ecosystems, and does not negatively impact surface waters.

A. MPCA - Monitor the waters of the state within the GWMA to assess their quality, using a systematic intensive watershed approach to determine physical, chemical and biological integrity.
B. MPCA - Identify and investigate groundwater – surface water interactions
C. Work with local government units to promote and implement best management practices to protect surface and groundwater quality
D. MPCA – Support development of shared data system with DNR, MDH, MDA and other organizations

Objective II. Groundwater use in the GWMA is reasonable, efficient, and complies with water conservation requirements.

A. MPCA - Identify and investigate groundwater – surface water interactions with in the GWMA
B. MPCA - Pollution Prevention and MnTAP consultations for water conservation
C. MPCA - Participate with other agencies to encourage water re-use where appropriate
D. MPCA – participate in development of new groundwater models to better understand flows, recharge rates and water balances within the GWMA.

Objective III. Groundwater use in the GWMA does not degrade water quality.

A. MPCA - Monitor the waters of the state to assess their quality, using a systematic intensive watershed approach to determine physical, chemical and biological integrity.
B. MPCA – continue to monitor statewide ambient well network as an early warning system identifying contaminant threats to shallow and vulnerable aquifers in GWMAs and elsewhere. MPCA will make data/results available to interested parties via EQuIS or MPCA website. MPCA will consider installing additional wells if in GWMAs if needed, in conjunction with partner agencies who oversee groundwater monitoring (MDA, MDNR, and MDH).
C. MPCA - Minimize and regulate, with local partners pollutant discharges via permits, technical/financial assistance, and enforcement. E.g. septic systems, feedlots, spray irrigation permits, landfills.
D. MPCA (w/MDH, MDA, USGS) –adapt monitoring, prevention, regulation and remediation efforts for contaminants of new/emerging concern
E. MPCA - Work with local government units to promote and implement best management practices to protect surface and groundwater quality, including storm-water management

Objective IV. Groundwater use in the GWMA does not create unresolved well interferences or water use conflicts.

A. MPCA - Identify and investigate groundwater – surface water interactions

B. MPCA – help develop new groundwater models to better understand flows, recharge rates and water balances

Objective V. All groundwater users in the GWMA have the necessary permits to use groundwater.

A. MPCA – Support DNR efforts to identify all appropriate permit conditions related to MPCA regulatory authority.

Board of Water and Soil Resources

The Minnesota Board of Water and Soil Resources has reviewed the Straight River Groundwater Management Area Plan and determined that the agency can support the DNR's goals for the GWMA through the following actions, organized by Plan objectives:

DNR Objective I. Groundwater use in the GWMA does not harm aquifers and ecosystems, and does not negatively impact surface waters.

A. *BWSR will encourage local government units (Counties, Soil and Water Conservation Districts and others) to consult with the DNR to obtain groundwater management information relevant to their plan updates.*
B. *BWSR will support local governments' efforts to incorporate groundwater management objectives in their plans and to incorporate groundwater protection provisions in their regulatory programs. BWSR will develop guidance to help these local governments to adopt plans, policies and actions that are consistent with DNR objectives for management and protection of groundwater resources.*
C. *BWSR will encourage the participation of Soil and Water Conservation Districts in the DNR Observation Well program.*
D. *Consistent with BWSR's responsibility to administer the Wetland Conservation Act (WCA), BWSR will:*
    a. *support DNR's effort to develop tools to better estimate the effects of groundwater withdrawals on the quantity, quality and biological diversity of wetlands, and*
    b. *as requested, on a case-by-case basis, review and comment on applications for groundwater withdrawals that have the potential to affect wetlands.*
E. *BWSR will attend future GWMA Advisory Team meetings to maintain communication with DNR and provide a link to LGUs*.

DNR Objective II. Groundwater use in the GWMA is reasonable, efficient, and complies with water conservation requirements.

A. *BWSR will continue to encourage the development of groundwater management activities (e.g., irrigation scheduling program and pivot uniformity tests) within their existing and future grant programs.*
B. *BWSR will support local units of government in their development of local plans to address groundwater protections.*

DNR Objective III. Groundwater use in the GWMA does not degrade water quality.

A. *BWSR will support local governments' efforts to incorporate groundwater management objectives in their plans and to incorporate groundwater protection provisions in their regulatory programs.*
B. *BWSR will encourage local governments to consult with the DNR to obtain groundwater management information relevant to their plan updates.*

DNR Objective IV. Groundwater use in the GWMA does not create unresolved well interferences or water use conflicts.

This objective does not relate to BWSR programs and responsibilities.

DNR Objective V. All groundwater users in the GWMA have the necessary permits to use groundwater.

This objective does not relate to BWSR programs and responsibilities.

Appendix B

Process Summary: Preliminary Well Construction, Water Appropriation Permitting and Permitting for Municipal Water Supply Plan

Well Construction – Preliminary Assessment

The following provides a high-level summary of steps for a water appropriations permit applicant and the DNR will take to obtain a preliminary assessment of proposed well.

1. Applicant logs into MPARS to obtain approval for a new well.
2. The Appropriation Hydrologist reviews the approval request.
3. The approval request may be sent to the Groundwater Specialist for review.
4. The approval request may be sent to management for review in very complex cases.
5. A letter is sent to the applicant that may describe the resources of concern in the area (if any) and whether the anticipated appropriation is likely to meet the applicable requirements for obtaining a permit to pump water.
6. The applicant may be informed of the need to gather additional information, conduct aquifer tests, or install observation wells before applying for a DNR Water Appropriation Permit.
7. The DNR may follow up to ascertain if the applicant constructed of the well.

Appropriation Permit Actions

The following provides a high-level summary of steps to obtain a water appropriations permit.

1. Applicant completes the preliminary assessment for well construction.
2. Applicant logs into MPARS to request a DNR Water Appropriation Permit or to amend an existing Water Appropriation Permit.
3. The DNR Appropriation Hydrologist reviews the request and may send the initial request to the Groundwater Specialist for review at this point.
4. Additional information may be requested from the applicant to form a complete application, or to provide enough information with which to make a sound decision. The applicant may be informed of the need to conduct an aquifer test.
5. Meetings may be held with the applicant.
6. The Appropriation Hydrologist will generate the invoice for the permit application fee, or amendment application fee and it will be sent to the applicant using MPARS.
7. The applicant uses MPARS to pay the invoice.
8. When the application is complete and the fee is paid the application is forwarded to the County, SWCD, Watershed District, other relevant parties and other DNR staff for review. They are allowed 30 days to review the proposal and submit comments to the DNR.
9. If concerns exist, the applicant will be notified of the concerns and allowed to address those concerns. DNR staff is available for discussion regarding any issues related to the permit application or natural resource concerns. Additional actions may need to be taken by the applicant to address the concerns. An aquifer test may need to be conducted by the applicant.
10. If the issues are addressed, the Appropriation Hydrologist will draft the Permit in MPARS. The appropriate conditions will be added to the permit to address the need for water level monitoring, or other actions, by the applicant.
11. A DNR representative will issue the DNR Appropriation Permit using MPARS.

High-Level Process for Community Public Water Supplies

The following provides a high-level summary of steps for a municipal water appropriations permit applicant and the DNR will take to obtain a high capacity well permit within the scope of an approved water supply plan.

1. City develops local Water Supply Plan, receives DNR approval & city adopts (approved WSP identifies future water needs & source water(s))
2. City submits Well Construction Preliminary Assessment to DNR prior to drilling well
3. DNR provides site-specific WCPA information to city
4. City drills well (MDH notification)
5. City submits permit amendment or application
6. DNR & city coordinate with other agencies (MDH, MPCA, Met Council, watershed districts, counties) and engage in comment period
7. DNR determines if aquifer testing is needed; if so,
    a. City prepares and submits aquifer test plan; DNR must approve
    b. City conducts aquifer tests with monitoring (input from DNR)
    c. DNR reviews aquifer test results
8. DNR makes permit decision
9. Issued permits have applicable permit conditions

Water Appropriation Permit Modifications

Consistent with Minnesota Statute and Rule, the DNR Commissioner can modify water appropriation permits. However, statute and rule also protect the permit holder.

For instance, water appropriation permit holders are afforded due process through Minnesota Statute and Rule. If the permit holder does not agree with a permit decision, they may request a contested case hearing.

Contested case hearings are used in many states. They are informal court proceedings governed by state law that can be used to protect rights, duties and privileges of the affected parties. The purpose of contested case hearings is to provide decision makers with the highest quality information available to render permit decisions, and to provide third party review of an appeal made to a state agency decision.

Modifications to water appropriation permits are described very specifically by Minnesota Statute and Rule:

- The DNR is prohibited from modifying or restricting the authorized amount of groundwater that is used for agricultural irrigation between May 1 and September 30, unless the DNR determines that the authorized amount of appropriation endangers a domestic water supply. [1] This is designed to provide some assurance of a water source to bring the crop through to harvest.
- Whenever a permit is proposed to be modified, there is an opportunity for the permit holder to demand a contested case hearing.
- From the initial decision whether to issue or deny a permit, to the proposed modification of an existing permit due to the establishment of a protected flow or protected elevation in a nearby surface water feature, the applicant or permit holder has the opportunity to a public hearing.[2]

[2] Minn. Rules, 6115.0670, Subp. 3.

- If there is a water use conflict, where there is limited water availability, resulting in the commissioner proposing adjustments to permits in an area that are competing for the same inadequate water source, the action is taken by the DNR only after the permit holders or applicants are notified and given the opportunity for a hearing.[3]
- Most terminations are subject to advanced notice and opportunity for a hearing. An exception would be, for example, when a permittee requests termination.[4]
- The public hearings that can be requested are conducted as contested case hearings under Minn. Stat. Chapter 14, and are conducted by the Office of Administrative Hearings.[5]
- Permits that authorize appropriation from surface water sources may be temporarily suspended as a result of periods of extremely low rainfall. This is defined as when the flows measured in their watersheds fall below a certain point, typically the Q90 flow. Applicants for surface water appropriations are required to have a feasible contingency plan for these situations or agree to withstand the results of not being able to appropriate water (after suspension).[6]

It should be extremely rare for a permit holder to face a permit modification without significant advance warning. However, if a permit modification is necessary and the permit holder or applicant disagrees with the permit decision, Minnesota Statute and Rules provide for a hearing.

If the DNR found the existing authorized water use in an area to be unsustainable, DNR would provide advanced notice and involve permit holders in finding a solution.

[3] Minn. Rules, 6115.0740, Subp. 3.
[4] Minn. Rules, 6115.0750, Subp. 8.
[5] Minn. Stat., 103G.311
[6] Minn. Stat., 103G.285, Subd. 6.

Appendix C
Minnesota Rule Guiding Water Use Conflicts

MINNESOTA RULE 6115.0740 WATER USE CONFLICTS (www.revisor.leg.state.mn.us)

Subpart 1. **Conflict defined**.
For the purpose of these rules a conflict occurs where the available supply of waters of the state in a given area is limited to the extent that there are competing demands among existing and proposed users which exceed the reasonably available waters. Existing and proposed appropriations could in this situation endanger the supply of waters of the state so that the public health, safety, and welfare would be impaired.
Subp. 2. **Procedure**.
Whenever the total withdrawals and uses of ground or surface waters would exceed the available supply based on established resource protection limits, including protection elevations and protected flows for surface water and safe yields for groundwater, resulting in a conflict among proposed users and existing legal users the following shall apply:

A. In no case shall a permitees be considered to have established a right of use or appropriation by obtaining a permit.

B. The commissioner shall analyze and evaluate the following:

(1) the reasonableness for use of water by the proposed and existing users;

(2) the water use practices by the proposed and existing users to determine if the proposed and existing users are or would be using water in the most efficient manner in order to reduce the amount of water required;

(3) the possible alternative sources of water supply available to determine if there are feasible and practical means to provide water to satisfy the reasonable needs of proposed and existing users.

C. If conflicts can be resolved by modifying the appropriation of the proposed and existing users, the commissioner shall do so.

D. If conflicts cannot be resolved through modification of proposed and existing permits the commissioner shall base the decision regarding issuance of new applications and retention, modification, or termination of existing permits on the basis of existing priorities of use established by the legislature as follows:

(1) If the unresolved conflict involves users who are or would be in the same priority class, the commissioner shall require the proposed users and existing permitted users to develop and submit a plan which will provide for proportionate distribution of the limited water available among all users in the same priority class. The commissioner shall withhold consideration of new applications and shall, if the existing permitted appropriations endanger the supply of waters of the state, suspend or limit existing permits until a plan is approved by the commissioner.

The plan must include proposals for allocating the water which address the following: possible reduction in the amounts of appropriation so that each user would receive a proportionate amount of water for use; and possible restrictions in the timing of withdrawals so that each user would be allowed to withdraw a proportionate share of water for use over certain periods of time.

If the commissioner approves the proposed plan, new permits will be issued and existing permits will be amended in accordance with that plan.

If the commissioner determines that the proposed plan is not practical or reasonable, the commissioner shall develop a new plan or modify the proposed plan to provide proportionate share of water among the users involved. The commissioner shall issue new permits and amend existing permits based on that plan.

(2) If the unresolved conflict involves users who are or would be in a different priority class the available water supply shall be allocated to existing and proposed users based on the relative priority of use. Highest priority users shall be satisfied first. Any remaining available water supply shall be allocated to the next succeeding priority users, until no further water is available. Users in the same priority class shall be offered the same options as provided in subitem (1).

Subp. 3. **Notice and hearing**.

All actions by the commissioner shall be made after notice and opportunity for public hearing.

Statutory Authority: MS s 103G.315; 105.415

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Appendix D

Executive Summary of the Report to the Minnesota State Legislature: Definitions and Thresholds for Negative Impacts to Surface Waters

Background and purpose

This report was prepared in response to Laws 2015, chapter 4, article 4, which directed the Department of Natural Resources (DNR) to consult with interested stakeholders and develop recommendations for statutory or rule definitions and thresholds for negative impacts to surface waters.

The DNR is charged with *managing* water resources to assure an adequate and sustainable supply for multiple uses. Minnesota has a modified riparian water law system, in which landowners have the right to make reasonable use of the abutting surface waters or the groundwater beneath their land, as defined and regulated by the water appropriation permitting program. The water itself is a public trust resource, and the state grants the right to water beyond personal use – above 10,000 gallons per day or one million gallons per year – through water appropriation permits. In recent years, it has become increasingly clear that Minnesota's water resources, while abundant in many areas, are not unlimited. In some areas, increasing water withdrawals are using more groundwater than is naturally being recharged. In other areas, groundwater supplies are limited due to the underlying geology. Groundwater contamination is also a limiting factor in many areas.

The variability of Minnesota's climate and geography mean that rainfall is not always available in the quantities we need at the times when it is most needed. Increasing demands on both surface water and groundwater supplies can cause negative impacts to the ecosystems and riparian uses of streams, lakes, and wetlands. While water levels fluctuate naturally throughout the year and across multiple years, water appropriations can push low levels lower, significantly reducing stream flows and more frequently putting fish, wildlife, plant communities and riparian uses at risk.

This report examines the effects of groundwater use on rivers and streams, lakes, and wetlands. DNR's analysis and recommendations are based on the fact that surface water bodies go through seasonal and multi-year cycles of high and low water levels. The seasonal patterns, known as the seasonal hydrograph, are primary drivers in creating and maintaining the unique ecology and associated aquatic and riparian habitats of each water body. To preserve the seasonal hydrograph, protected flows must be established for streams, and protection elevations for lakes and some wetlands. These protection levels can then be translated into a quantity of water that can be sustainably withdrawn. Multi-year dry cycles and extreme droughts also serve important ecological functions, but may require a different approach to determining sustainable water use—e.g., water use that is ecologically sustainable under the normal seasonal hydrograph may need to be reduced during extreme drought.

This report was prepared with input from a broad range of stakeholders, as described in the Introduction and Appendix A. This report also incorporates and summarizes scientific studies, including an examination of approaches used in other states and countries. The recommendations in this report represent the DNR's suggestions to further define and describe methods of determining protected flows and protection elevations. These recommendations are based on the DNR's assessment of available information, analytical tools and the practicality of applying them in Minnesota.

Recommendations

The recommendations in this report fall into three categories: 1) definitions to be added in statute; 2) integration of statutory provisions dealing with surface water and groundwater; and 3) approaches to determining the thresholds for streams, lakes, and wetlands.

Definitions

The following definitions are recommended to be added in statute:

- Negative impact to surface waters – in relation to water appropriations, a change in hydrology sufficient to cause ecosystem harm or alter riparian uses long-term.
- Ecosystem harm – in relation to water appropriations, to change the biological community and ecology in a manner that results in a less desirable and degraded condition.
- Sustainable diversion limit – in relation to water appropriations, a maximum amount of water that can be removed directly or indirectly from a surface water body in a defined geographic area on an annual basis without causing a negative impact to the surface water body.

Statutory changes

The DNR also recommends combining many of the provisions in section 103G.285, which deals with surface water appropriations, and 103G.287, which deals with groundwater, into a single "Water Appropriations" section. This revision would recognize the interconnected and interdependent nature of surface and groundwater resources while removing the circular references between the two sections of statute that make it difficult to identify and assess 'negative impacts.'

Approach to determining thresholds

A "threshold" is essentially the point at which negative impacts occur. Thresholds can be estimated based on data and scientific literature. Calculating thresholds at a statewide scale is not appropriate or practical, however, given the number of variables involved – e.g., which species or which riparian uses are negatively impacted. The diversity of Minnesota's surface water and groundwater resources, land use, and climatic factors would make a single number misleading and inappropriate for many locations and conditions. The precautionary principle would require that any such statewide threshold be set to be protective of the most vulnerable resource, thereby unnecessarily restricting water use in many areas. Therefore, the DNR proposes establishing specific thresholds for specific watercourses, water basins, watersheds, or hydrologic areas in those parts of the state where water use is at risk of causing negative impacts.

Streams: The DNR's research and a review of scientific literature indicate that a 20% change in hydrologic regime (relative to the August median base flow) will negatively affect the ecosystem, while a change less than 10% is not likely to be detectable. Setting a diversion limit of no more than 10% of the August median base flow will preserve the seasonal variability of the natural hydrology under all but the most extreme drought conditions. A 15% diversion limit would preserve much of the seasonal variability, but is not adequate to protect ecosystems during periods of drought. We recommend a 10% limit in most circumstances, but recognize a diversion limit of up to 15% may be appropriate in some areas where water uses are less dependent on a consistent supply.

Lakes: The DNR recommends an approach that establishes sustainable diversion limits for two categories of lakes.

Lakes connected to stream systems that outflow most of the time. For these lakes, the outflowing stream's diversion limit would be applied to the lake and a separate protection elevation for the lake would not be necessary.

Lakes with infrequent surface outflow. For these lakes, protection elevations specific to the lake could be established based on key considerations related to hydrology, ecology, and riparian uses. Water levels at and above the protection elevation are expected to maintain the characteristic hydrology, ecology, and riparian uses of the lake most of the time. Water levels below the protection elevation put one or more of the water body's resources or uses at risk. The protection elevation is used to establish the sustainable diversion limit.

Wetlands: Different types of wetlands have distinct and characteristic seasonal water levels that maintain their characteristic plant and animal communities. Most wetland types in Minnesota depend to some extent on groundwater for at least some part of the growing season. Some wetland types, such as fens, are highly connected to and dependent on groundwater, while others, such as floodplain forests, are more directly influenced by surface-water. However, as yet there is no systematic method for evaluating potential negative impacts on wetlands due to groundwater appropriations, due to limited wetland-related hydrologic data.

The DNR is proposing to establish a comprehensive wetland hydrology characterization and monitoring program statewide. An initial step in this process is to begin testing the feasibility of establishing target hydrographs for the various wetland types, with a particular focus on areas of the state experiencing a heavy demand for groundwater appropriation. A target hydrograph is a range of acceptable water levels throughout the year for each various wetland types, extending from "normal" levels to infrequent or rare low levels that stress the characteristic plant and animal communities. The target hydrograph would be used as a guide for developing allowable diversion limits throughout the growing season to maintain the characteristic hydrologic regime.

Impacts to wetlands are also regulated under other authorities, primarily the Minnesota Wetland Conservation Act and the Public Waters Permit Program. The DNR's goal under this approach would be to avoid wetland drainage that would trigger regulation under those programs.

Methodology

The DNR would focus its efforts to set thresholds for negative impacts primarily in those areas of the state where the intensity of groundwater use and/or scarcity of groundwater supplies is causing concern, such as the groundwater management areas or individual water bodies known to be negatively affected by groundwater use. In these areas, the DNR will implement the following steps:

1) establish negative impact thresholds for surface water bodies;
2) establish sustainable diversion limits that will maintain protected flows and protection elevations of those water bodies;
3) conduct groundwater modeling to determine the effects of groundwater withdrawals on the surface water bodies; and
4) assess to what degree individual groundwater withdrawals may need to be adjusted.

Applying this approach to water use permitting

Water users, whether they are public suppliers, agricultural irrigators, industry, businesses or golf courses, need reliability and predictability. Establishing negative impact thresholds and sustainable

diversion limits should ultimately improve the predictability and consistency of water appropriation decisions. It should also reduce the need to modify permits during drought and thus allow water users to rely on a fixed quantity in most years, although extreme drought conditions extending over multiple years may still call for emergency water use restrictions.

Establishing negative impact thresholds and sustainable diversion limits is the first step in the process of allocating water resources among individual appropriators. Further discussion is needed as to how best to engage current and prospective water users in allocation decisions once we have determined the amount of available water in a given hydrologic area.

Minnesota's water appropriation statutes were formulated in an era when groundwater resources were viewed as essentially unlimited. Allocating water resources in an environment where those resources may in fact be limited calls for additional research and discussion. Our statutes and rules may need to be revised to provide better guidance. The DNR is currently researching potential models of water allocation systems used in other states and regions as part of this larger discussion.

Local governments also play a significant role in the water allocation process through their planning and land use controls, which help to determine the number and nature of residential, commercial, and industrial water users in a given community. In planning for future development, local governments should carefully consider the sustainability of their water supplies and the extent to which new water-intensive uses should be allowed or encouraged. A planning process that considers the needs of all water users, future needs, and opportunities for water conservation can help to sustainably manage existing and proposed water use.

Conclusions

- **Minnesota is in the "urgency room," not the "emergency room," in terms of water use management.**
- **The state's water management policies, statutes, and rules are strong and conceptually sound. However, the state's water management statutes could be improved by clarifying terminology and better recognizing the interconnected nature of surface water and groundwater.**
- **There is a strong scientific basis for maintaining the natural dynamic patterns of surface water bodies by establishing protected flows for individual streams, protection elevations for individual basins, and target hydrographs for wetlands.**
- **Over the next five years, the DNR intends to set protected flows, protection elevations, and target hydrographs for water bodies in places where demand for water may be exceeding sustainable supplies. The changes to statute recommended in this report would help support that work.**

Levi, Andrew (COMM)

From: Paul Blackburn <paul@paulblackburn.net>
Sent: Monday, July 10, 2017 11:23 PM
To: MN_COMM_Pipeline Comments
Cc: 'Winona Laduke'; frankbibeau@gmail.com
Subject: Honor the Earth Comments on DEIS For CN-14-916 and PPL-15-137
Attachments: 2017-07-10 Honor the Earth Comments on DEIS.pdf; Honor the Earth Att A - Highlights.pdf; Honor the Earth Att B - Comments on Pinhole Release Analysis.pdf

Hi Jamie –
Please find attached Honor the Earth's Comments on the Line 3 "Replacement" Project DEIS, CN-14-916 and PPL-15-137, and Attachment A and B to them. Attachment C will come in one or more additional emails.
Thank you!
Paul Blackburn

Attachments for Honor the Earth Comment Letter #2667 included as H 5 and H 6.

Levi, Andrew (COMM)

From: Paul Blackburn <paul@paulblackburn.net>
Sent: Monday, July 10, 2017 11:41 PM
To: MN_COMM_Pipeline Comments
Cc: 'Winona Laduke'; frankbibeau@gmail.com
Subject: Honor the Earth Comments on DEIS For CN-14-916 and PPL-15-137 Attachment C
Attachments: Honor the Earth Att C - Bob Merritt Line 3 DEIS Review.pdf; Honor the Earth Att C - Bob Merritt Appendix A.pdf; Honor the Earth Att C - Bob Merritt Appendix B.pdf; Honor the Earth Att C - Bob Merritt Appendix C.pdf; Honor the Earth Att C - Bob Merritt Appendix D.pdf

Hi Jamie –
Please find attached Honor the Earth's Attachment C and its four Appendices A, B, C, and D, to our Comments on the Line 3 "Replacement" Project DEIS, CN-14-916 and PPL-15-137.
Thanks again –
Paul Blackburn

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VIA EMAIL

July 10, 2017

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Re: In the Matter of the Application of Enbridge Energy, Limited Partnership, for a Certificate of Need for the Line 3 Replacement Project in Minnesota From the North Dakota Border to the Wisconsin Border, OAH 65-2500-32764, MPUC PL-9/CN-14-916

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Routing Permit for the Line 3 Replacement Project in Minnesota From the North Dakota Border to the Wisconsin Border, OAH 65-2500-33377 MPUC PL-9/PPL-15-137

Dear Ms. MacAlister:

Honor the Earth hereby submits the following comments on the Draft Environmental Impact Statement ("DEIS") prepared as per the requirements of the Minnesota Environmental Policy Act, Minn. Stat. Ch. 116D ("MEPA") for the Line 3 "Replacement" Project ("Project") in response to the Minnesota Department of Commerce ("Department") Revised Notice Of Availability Of Draft Environmental Impact Statement and Public Information Meetings for the Proposed Line 3 Pipeline Project, issued on May 15, 2017, which notice established a comment period ending on July 10, 2017, in the above captioned dockets. In turn, the Department has prepared the DEIS on behalf of the Minnesota Public Utilities Commission ("Commission"), which is the responsible governmental unit ("RGU") that is ultimately responsible for compliance with MEPA.

Enbridge Energy, Limited Partnership, in cooperation with its affiliates ("Enbridge"), has submitted Applications for a Certificate of Need and Routing permit to the Commission. The Project would include the construction of a new 36-inch diameter crude oil pipeline that would have an initial capacity of 760,000 bpd but would be constructed with steel pipes and other components that would allow it to transport up to 915,000 bpd of crude oil from the Tar Sands Region in Alberta via Minnesota to Enbridge's terminal in Superior, Wisconsin.

Honor the Earth appreciates this opportunity to improve the DEIS. This being said, there is much more that we would like to comment on, but given the length of this DEIS and our limited resources, we are unable to submit comments that are as complete as we would have liked.

Honor the Earth is deeply concerned about a number of significant deficiencies in the DEIS, including the following:

- the statement of purpose and need is overly narrow and based entirely on Enbridge's purpose and need, without consideration of the underlying purpose and need, such that it does not comply with MEPA;
- due to the legal inadequacy of the statement of purpose and need; the DEIS fails to include reasonable alternatives instead includes patently unreasonable alternatives, such as trucking, making the DEIS alternatives analysis wholly defective;
- the defects in selection of alternatives means that all of the comparisons of alternatives in Chapters 5, 6, 7 and 12 are fatally flawed;
- the tribal resources and environmental justice analyses are wholly inadequate;
- the abandonment analysis fails to include any reasonable data on contamination, fails to include a contamination plan for review by the Commission, and fails to outline any role for private landowners in determination of the mitigation that is appropriate for their land;
- the DEIS fails to include Enbridge's proposed expansion of the Project to 915,000 bpd, which is a phased action the impacts of which must be considered; and
- the DEIS fail to include any description of a new pipeline from the Superior Terminal to Illinois, which pipeline is necessary to utilize 72% of the capacity of the Project, such that a Wisconsin to Illinois pipeline is a connected action under MEPA.

The foregoing deficiencies are so significant that Honor the Earth requests that the Department revise the DEIS and provide for additional public comment on it.

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COMMENTS ON THE EXECUTIVE SUMMARY

In response to the Executive Summary, Honor the Earth has attached its "Line 3 DEIS Highlight Reel" as its summary comments on the DEIS. Attachment A.

We are concerned that the DEIS is excessively encyclopedic rather than analytical as required by Minn. Stat. § 116D.04. Also, it appears that the Department cut and pasted a substantial proportion of the material in the DEIS from Enbridge documents without critical analysis and often without updating the material. 2667-1

Further, we are concerned that the DEIS assumes that Enbridge will comply with statutory and regulatory requirements, when the record shows that it has regularly fails to comply with the law, including, for example, the following instances: 2667-2

- https://insideclimatenews.org/news/20131202/enbridge-could-be-forced-boost-pipeline-safety-mich-after-water-violations
- https://www.desmogblog.com/2016/07/19/former-inspectors-describe-dangerous-flaws-construction-major-east-coast-gas-pipeline
- http://grangehallpress.com/Enbridgeblog/2013/01/20/the-latest-construction-violation/
- http://archive.jsonline.com/news/wisconsin/37009324.html
- http://michiganradio.org/post/enbridge-energy-could-face-fines-after-incident-pipeline-thats-under-construction
- http://oxfordleader.com/enbridge-sub-contractor-ticketed/
- http://www.freep.com/story/news/local/michigan/2016/08/03/ag-bill-schuette-enbridge-violating-straits-pipeline-easement/88039662/
- https://insideclimatenews.org/news/20130709/mich-officials-step-scrutiny-enbridge-after-water-law-violations
- https://www.dnr.illinois.gov/programs/NRDA/Pages/Lakehead.aspx

We suggest that the Commission and Department be less trusting than they appear to be.

COMMENTS ON DEIS CHAPTER 2 – PROJECT DESCRIPTION

Comments on DEIS Section 2.1

Although the Project would be initially limited to operation at 760,000 bpd, according to page 8-3 of Enbridge's CON Application, it would have an ultimate capacity of 915,000 bpd:

> Pursuant to the requirement of Minn. R. 7853.0530, Enbridge is providing for the Commission's information the ultimate design capacity for the pipeline considering its diameter, wall thickness, steel grade, and crude slate (irrespective of the number of pump stations proposed for the Project), which is 1,016 kbpd. This figure in turn, yields an ultimate annual average capacity of 915 kbpd. Further engineering design studies would be required to determine the number of pump stations needed to achieve the ultimate design capacity level, but that is not the level sought in this Appliction [stet.].

Operation of the Project at its ultimate capacity represents a net capacity expansion of 525,000 bpd over the capacity of the existing Line 3 Pipeline, and an expansion over the Project of 155,000 bpd, which is itself a substantial volume of oil. Expansion of the Project from 760,000 bpd to 915,000 bpd would increase its capacity by 20.4%.

The DEIS does not describe the physical changes that would be required to increase capacity of the Project from 760,000 bpd to 915,000 bpd. Therefore, it is not possible to know whether such subsequent changes would require any substantial environmental review. It could be that the expansion would require only the installation of new pumps without the construction of any new pump stations or other construction impacts. In contrast, the vast majority of the construction activity needed to allow operation at 915,000 bpd would likely be performed as part of the initial construction of the Project, including installation of higher capacity pipe. Yet, the DEIS does not evaluate the construction that would be undertaken following the initial phase of construction, and then compare this to the construction that would be undertaken as part of the first phase of the Project that is necessary to allow the expansion. 2667-3

Construction of the Project with pipe that is sufficient to transport up to 915,000 bpd, requires that the pipe be constructed now using thicker steel. Page 8-5 of the CON Application contains Table 8.1.E.2-1:

Table 8.1.E.2-1 Mainline Pipe Design Parameters	
Design Parameter	**Specification**
Pipe Size (Diameter)	36-inch outside diameter (NPS 36)
Estimated Length	337 miles
Wall Thickness	
Nominal	0.515 inch
Road Bore	0.600 inch
Cased Railroad	0.600 inch
Uncased Railroad	0.750 inch
Horizontal Directional Drill (HDD)	0.750 inch
Coating, mainline	14 mils Epoxy Bonding
Coating, trenchless	40 mils Epoxy Bonding ABR
Grade (Pipe Type)	X70 carbon steel pipe manufactured according to API Specifications 5L PS2
Maximum Operating Pressure[3]	1440 psig

Thus, the steel wall thickness will range from 0.515 inch to 0.750 inch. This page also states that the Project will be constructed from X70 carbon steel manufactured according to API Specifications 5L PS2.

In contrast, the existing Line 3 Pipeline is a 34-inch diameter pipe comprised of steel with a thickness of 0.375 inches.[1] Enbridge's original application letter for a Presidential Permit for Line 3 states:

> The facilities in respect of the proposed 34 inch pipe line at the international boundary are as follows:
>
> A pipe line of the pipe manufactured to American Petroleum Institute specification 5LX, with an outside diameter of 34 inches, a wall thickness of .375 inches, minimum yield strength of 52,000 pounds per square inch, proposed test pressure after installation of 1028 pounds per square inch . . . .

Thus, construction of a pipeline to move just 760,000 bpd would require a smaller diameter pipe with thinner steel.

[1] Letter, Lakehead Pipe Line Company to U.S. Secretary of State (August 31, 1967) (application for a Presidential Permit for Line 3 Pipeline).

In comparison, the Line 67 Project approved by the Commission in 2008[2] has an ultimate capacity of 800,000 bpd[3] and Enbridge's application for that pipeline contains the following pipe specification[4]:

> Pipe will be 36-inch outside diameter, 0.375 to 0.469 inch wall thickness, API 5L Grade X70, double submerged are (DSAW) steel pipe. The maximum allowable operating pressure will be 1050 to 1313 psig.

This means that the Project will be constructed from pipe with a pipe wall thickness greater than necessary to transport 760,000 bpd. Both the existing Line 3 and Line 67 pipe were constructed using pipe that is 73% thinner than the Project. Put another way, based on pipe wall thickness alone, the Project will be built using at least 27% more steel than is necessary to transport 760,000 bpd. But, this percentage does not account for the greater amount of steel needed to fabric a 36-inch diameter pipe as compared to a 34-inch diameter pipe. Therefore, construction of the Project as designed will require significantly greater amounts of steel than required to transport 760,000 bpd, which is the purported purpose of the Project contained in DEIS Section 2.1.

Construction of the Project with pipe that is larger diameter and has thicker pipe walls than required to transport the capacity proposed by the Project means that each pipe segment's weight is greater than necessary for the Project and will result in greater road wear, energy consumption, and pollution impacts to transport and construct the pipeline than is required for the Project's capacity. Further, the use of thicker steel also results in thicker welds and greater use of welding materials and greater air impacts resulting from welding activities. Consequently, some of the impacts of expanding capacity to 915,000 bpd will be created during construction of the Project and should be considered as part of the DEIS.

Should the Project be built, it is entirely foreseeable that Enbridge would ultimately increase the pipeline's capacity to 915,000 bpd. Therefore, operation at 915,000 bpd is a "reasonably foreseeable future project" and is a cumulative impact as defined by Minn. R. 4410.0200, Subp. 11.

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[2] In the Matter of the Application of Enbridge Energy, Limited Partnership, and Enbridge Pipelines (Southern Lights) LLC for a Certificate of Need for the Alberta Clipper Pipeline Project and the Southern Lights Diluent Project, DOCKET NO. PL-9/CN-07-465, Order Granting Certificate of Need (Dec. 29, 2008).

[3] In the Matter of the Application of Enbridge Energy, Limited Partnership For a Certificate of Need for the Line 67 Station Upgrade Project – Phase 2, MPUC Docket No. PL9/CN-13-153, Application for a Certificate of Need
for a Crude Oil Pipeline, Section 7853.0230, Page 12.

[4] Application for Certificate of Need for a Crude Oil Pipeline, Docket No. PL9/CN-07-465, Alberta Clipper and Southern Lights Diluent Projects, June, 2007Section 7853.0530, Page 5.

Further, construction of the Project to allow future expansion to 915,000 bpd and future operation at such capacity would have "cumulative potential effects," as this term is defined by Minn. R. 4410.0200, Subp. 11a, which includes consideration of the effects of "future projects actually planned or for which a basis of expectation has been laid." With regard to whether an expectation has been laid, this definition states:

> In determining if a basis of expectation has been laid for a project, an RGU must determine whether a project is reasonably likely to occur and, if so, whether sufficiently detailed information is available about the project to contribute to the understanding of cumulative potential effects. In making these determinations, the RGU must consider: whether any applications for permits have been filed with any units of government; whether detailed plans and specifications have been prepared for the project; whether future development is indicated by adopted comprehensive plans or zoning or other ordinances; whether future development is indicated by historic or forecasted trends; and any other factors determined to be relevant by the RGU.

Minn. R. 4410.2300(H) requires that "for the proposed project and each major alternative there shall be a thorough but succinct discussion of potentially significant adverse or beneficial effects generated, be they direct, indirect, or cumulative." Since design of the pipe in the Project to transport up to 915,000 bpd creates an expectation of a future expansion of the Project, the effects of operating a future expansion at up to 915,000 bpd are cumulative potential effects and must be analyzed by the DEIS.

Expansion of the Project to a capacity of 915,000 bpd is a phased action pursuant to Minn. R. 4410.0200, Subp. 60, because expansion of the Project would have "environmental effects on the same geographic area" and would be "substantially certain to be undertaken sequentially over a limited period of time." As a phased project, the expansion "must be considered in total when determining the need for an EIS <u>and in preparing an EIS</u>." Minn. R. 4410.2100, Subp. 4 (emphasis added). Although this subpart also allows the Commission to "treat the present proposal as the total proposal," it may also "select only some of the future elements for present consideration in the threshold determination <u>and EIS</u>."

With regard to its exercise of discretion of this phased action under Minn. R. 4410.0200, the DEIS contains no information about the potential scope of construction required for this subsequent phase. As such, it is impossible for the Commission to rationally evaluate whether this expansion will create significant independent impacts, or whether instead the impacts of the subsequent phase would be *de minimis*. For example, expansion of capacity to 915,000 bpd

could include only the installation of additional pumps at existing pump stations, and not include any new impacts to land or the construction of any new facilities. Should the impacts of the subsequent phase be *de minimis*, it would be irrational for the Commission to evaluate such impacts as a later phased action because doing so would be inefficient and result in unnecessary segmentation of environmental review. In any case, the EIS should contain sufficient information for the Commission to make a rational decision on whether or not to treat the Project as the "total proposal" or to exercise its discretion to "select only some of the future elements for present consideration in the . . . EIS", but at present the DEIS is completely silent about the potential for a subsequent phase. 2667-4

The Commission should consider the 915,000 bpd ultimate capacity with regard to those elements of construction that would be impacted now by virtue of use of thicker steel, because these impacts will occur during construction and would be a moot point in any subsequent environmental review. For example, the use of 27% heavier pipe for the same segment length would have a correspondingly greater impact on road wear and tear during transport of the pipe to construction sites. Use of thicker pipe steel would also irretrievably commit substantially greater amounts of iron and other metals (27% more) to the Project than are necessary to transport 760,000 bpd. It would also commit greater amount of fuel to the project to transport the steel to Minnesota and then to construction sites. It would also commit greater amounts of fuel to construction of the project, due to the greater power need to lift and place the steel in the ground. It would also result in greater air impacts caused by welding thicker steel. Such impacts must be evaluated before approval of use of the thicker steel pipe to be used in the Project.

Unlike expansion of a road project either in terms of distance or lanes, creating the potential to expand the capacity of an existing crude oil pipeline segment in the future requires an irretrievable commitment of resources now. Further, most of the impacts of building a higher capacity pipeline occur before its expansion. This means that the Commission must make a reasoned judgement about which elements of a proposed future phase must be evaluated in the initial phase. It would be irrational to ignore the impacts related to construction of a higher capacity pipeline when such impacts occur during initial construction of the pipeline. It would also not be rational to fail to evaluate whether the impacts of a subsequent expansion of a pipeline would be *de minimis* relative to the impacts of constructing the pipeline so that it could be expanded, so that a rational decision can be made on whether to simply evaluate the impacts of an expansion in an initial environmental review. Where some or all of the "future elements" of a phased project relate closely to construction activities that would be analyzed in an initial environmental review, an RGU must consider which elements of the subsequent phase must be considered in the initial environmental review.

The Commission should also use the Project's ultimate capacity with regard to consideration of alternatives, because it would be unreasonable to not consider alternatives in light of the Project's ultimate capacity. The use of thicker steel increases the future utility of the pipeline relative to alternatives, because expansion through the use of additional pumping horsepower might require fewer resources and have lower impacts that expansion of alternatives. Moreover, consideration of a lower capacity alternative to the Project would result in the use of thinner steel, and this should be compared to the use of Enbridge's proposed steel thickness of the Project.

The Commission should also evaluate the potential impacts of oil spills from the Project based on its ultimate capacity, because it is likely that the Commission will not conduct new spill modeling and oil spill impact analysis in any subsequent application for expansion of the Project to 915,000 bpd. Also, the Commission, the parties, and Minnesota's citizens should know now what the likely spill impacts would be from operation at 915,000 bpd, because this is the likely foreseeable capacity for the majority of the life of the Project, such that construction of the Project would likely result in foreseeable oil spills larger than those that would result from operation at 760,000 bpd.

With regard to right of way width, Enbridge has requested that the Commission permit a 750-foot route width (375 feet on each side of the Project's centerline). The 50-foot permanent right-of-way would be located within this 750-foot corridor. The 750-foot route width would encompass construction workspace for the pipeline and associated facilities, and would allow Enbridge to make small-scale refinements of the pipeline centerline within the corridor, as needed, prior to and during construction. However, it appears that Enbridge is acquiring an easement that is sufficiently wide for additional pipelines. The DEIS should determine if such additional pipelines are possible and describe how many additional pipelines could be included in this corridor.

Comments on DEIS Section 2.2

Minn. R. 4410.2300.E requires that each EIS contain a statement that allows "the public to identify the purpose of the project." This being said, Minn. R. 4410.2300.G requires that an RGU also determine the "the underlying need for or purpose of the project," because doing so is necessary to determine whether or not an alternative should be excluded from analysis in the EIS. Thus, an EIS must have a clear statement not only of a project's underlying purpose, but also of the need that underlies it. The EIS statement of purpose has a profound effect on the scope and analytical integrity of the EIS, because it determines the scope of alternatives to the Project that will be considered in the EIS, as well as the factors that the DEIS considers in the evaluation of an Alternative's ability to accomplish the Project purpose. 2667-5

Providing a clear statement of the underlying purpose and need for the Project is particularly critical here, because the purpose of the Final EIS is to support the Commission's determination of need pursuant to Minn. Stat. § 216B.243 and Minn. R. Ch. 7853, which allows broad consideration of the purpose and need for a proposed project. With regard to the purpose of the MEPA analysis, Minn. R. 4410.0300, Subp. 3 states: "Environmental documents shall be used as guides in issuing, amending, and denying permits and carrying out other responsibilities of governmental units to avoid or minimize adverse environmental effects and to restore and enhance environmental quality." Also, Minn. R. 4410.2000, Subp. 1, states: 2667-5 cont

> The purpose of an EIS is to provide information for governmental units, the proposer of the project, and other persons to evaluate proposed projects which have the potential for significant environmental effects, to consider alternatives to the proposed projects, and to explore methods for reducing adverse environmental effects.

Thus, a failure by a Final EIS to provide information on the potential environmental impacts of alternatives that are considered by the Commission pursuant to is broad mandate under Minn. Stat. § 216B.243 and Minn. R. Ch. 7853 would mean that such impact statement would fail to accomplish the purposes of MEPA. Further, such failure also means that the Final EIS would not adequately explore ways of reducing environmental effect.

In particular, the DEIS may not itself predefine the Project's purpose and need because this will be defined by the Commission through its Certificate of Need hearing. Adopting a narrow definition of purpose and need in the EIS essentially pre-determines the ultimate issue in this hearing and means that the Commission's evaluation of alternatives will be broader than the EIS's evaluation of alternatives. The result will be that the FEIS will not fully inform the Commission about the environmental impacts of all of the alternatives it must consider under Minn. R. Ch. 7853. Even worse, by limiting information about available alternatives, an excessively narrow statement of purpose and need would steer the Commission's certificate of need analysis away from consideration of a broad selection of possible alternatives and towards Enbridge's preferred alternative – which is contrary to the fundamental purpose of MEPA. When a MEPA analysis is intended to support a determination of need, the RGU must be particularly careful to define the purpose and need for a project broadly to ensure that MEPA's purpose is fully accomplished.

DEIS Section 2.2 fails to include a clear statement of the underlying purpose and need for the Project. Also, Section 2.2 defines project purpose and need overly narrowly and in accordance with Enbridge's narrow and self-serving definition of Project purpose. In fact, DEIS Section 2.2's statements related to purpose are comprised entirely of Enbridge's allegations, and

therefore this section is entirely aligned with Enbridge's purpose for the Project. Moreover, this section contains no analysis of the scope of purpose and need or the merits of Enbridge's allegations, which instead are taken at face value. This failure to comply with MInn. R. 4410.2300.G's requirement for a definition of the "underlying" purpose and need for the Project based on independent judgment means that the subsequent analysis in the DEIS related to selection of possible alternatives for further analysis and possible way to limit adverse environmental effects fails to investigate and select from among available alternatives in accordance with MEPA. 2667-5 cont

Section 2.2 does not discuss Project purpose and need in broad terms related to the underlying markets and potential customers for the crude oil that the Project would transport. Further, this section contains no critical analysis or discussion of the appropriate range of Project purpose in this particular circumstance. Instead, Section 2.2 defines purpose and need strictly in accordance with Enbridge's narrow definition of it. In fact, all of the statements about purpose in Section 2.2 are based on Enbridge allegations. The subheadings related to purpose include the following:

- Corrosion and Cracking of the Existing Pipeline Have Reduced Performance;
- Enbridge Believes Replacing the Existing Pipeline Is Less Expensive and Avoids Extensive Inspections;
- Enbridge States that Demand for Canadian Crude Oil Exceeds Current Capacity;
- Enbridge has Indicated that Expanded Capacity Would Reduce Curtailment and Improve Operational Flexibility;
- Expanded Capacity Would Improve Energy Efficiency on Enbridge's System.

Thus three of the five subheadings are simply restatements of Enbridge's purpose for the Project. The first merely states that the capacity of the existing pipeline has been reduced due to weakness in its pipe and notes that the pipe is subject to a consent decree that includes requirements for heightened safety conditions.[5] This is not a statement of purpose, but rather a description of the current situation. The fourth subheading restates Enbridge's allegations about energy efficiency.

The DEIS attempts to create the appearance that it is avoiding predefining project purpose and need in accordance with Enbridge's definition through the artifice of attributing statements to Enbridge. This is mere wordplay. What is important is how DEIS Section 2.2 defines the Project's purpose and need. Attribution of the adopted purpose and need to Enbridge

[5] The Consent Decree in *United States v. Enbridge Energy, Limited Partnership, et al.*, C.A. No. 1:16-cv-914 was approved by the U.S. District Court for the Western District of Michigan on May 23, 2017. This consent decree is evidence that rigorous compliance with the Pipeline Safety Act, 49 U.S.C § 60101 *et seq.* ("PSA") is intended to ensure the continued safe operation of the existing Line 3 Pipeline until it is no longer needed.

does not change the fact that DEIS Section 2.2 defines project purpose entirely with regard to Enbridge's definition of it. Moreover, attributing statement of purpose to Enbridge cannot cure a failure by DEIS Section 2.2 to properly define the "underlying" purpose and need of the Project. 2667-5 cont

All of the substantive statements in DEIS Section 2.2 related to the purpose and need for the Project uncritically accept Enbridge allegations:

- With regard to Project expense and inspections, the DEIS uncritically repeats Enbridge allegations regarding the required number of integrity digs, the relative cost of the Project in comparison to maintaining the existing pipeline, the invasiveness of the Project relative to maintaining the existing pipeline, and the annual cost of maintaining the existing pipeline in comparison to maintaining the Project. The DEIS contains absolutely no critical analysis of any of Enbridge's allegation or information relate to the financial merits of the Project relative to the existing pipeline.
- With regard to demand for Canadian crude oil, DEIS Section 2.2 says only, "Enbridge maintains the demand for crude oil feedstock from western Canada is currently greater than the capacity of the Enbridge pipeline system." DEIS Section 2.2 contain zero critical analysis of this statement. The DEIS should include information about project need sufficient to define a range of possible need, including the data that supports the Enbridge assertion about demand.
- With regard to curtailment and operational flexibility, DEIS Section 2.2 uncritically accepts Enbridge's allegations with regard to apportionment, future demand for transportation services, and operational flexibility.
- With regard to improvements in efficiency, DEIS Section 2.2 states that "According to Enbridge" the Project would increase efficiency relative to the new pipeline. The DEIS contains no critical analysis of the relative efficiency of pipelines.

Honor the Earth notes that all of the foregoing allegations are subjects that will be scrutinized by the Commission in the Certificate of Need hearing. Therefore, the DEIS should not simply assume that these allegations are correct. Since DEIS Section 2.2 states that all of the descriptions of purpose are those of Enbridge, this section in fact expressly adopts Enbridge's definition of Project purpose. Moreover, it does so without any critical analysis. Thus, the DEIS has in effect adopted Enbridge's purpose for the Project. The DEIS could have simply stated that it adopts Enbridge's purpose for the Project and produced the same result. By adopting Enbridge's purpose for the Project, the DEIS has pre-defined the purpose exactly as does Enbridge and thereby fundamentally limits the scope of the EIS analysis required by MEPA. Moreover, adoption of Enbridge's purpose also limits the scope of the DEIS more narrowly than must be considered by the Commission pursuant to pursuant to Minn. Stat. § 216B.243 and

Minn. R. Ch. 7853, such that a Final EIS will not fully support the Commission's required analysis. 2667-5 cont

The analytical role of DEIS Section 2.2 is to define the scope of the underlying purpose of the Project, but it must do so in a way that allows the Commission to analyze Project purpose as broadly as required by Minn. Stat. § 216B.243 and Minn. R. Ch. 7853. DEIS Section 2.2 could have discussed the customers, markets, and refineries that would be served by the proposed Project as a means of better understanding its commercial benefits and limitations and the underlying need for the Project. This type of analysis would not predetermine the outcome of the Certificate of Need hearing, because DEIS Section 2.2 could then have used such analysis to define the Project's purpose and need in broad terms rather than in Enbridge's narrow terms. Then, the Commission would be in a position to consider a broad range of environmental impact evidence, rather than only evidence for alternatives that fall within the DEIS's current narrow definition of purpose and need.

In this regard, the DEIS should discuss a range of possible future Canadian crude oil supply scenarios, not for the purpose of determining need, but rather to define the possible range of need for the Project. The effect of the continuing low price of oil on opening new wells or mines in Canada or the worldwide glut of oil on the market was not evaluated. Canadian oil is more expensive-to-extract and transport to the Gulf Coast market than other sources of oil in the world. Electric transportation options are further reducing demand for oil are not viewed as an alternative. Since 2012, the write-downs from Statoil ASA, Royal Dutch Shell PLC and Total companies and other Canadian producers have exceeded $20 billion, and oil price has fallen from more than $100 a barrel in 2014 to less than $50 today. Exxon Mobil has announced $3.4 billion in Canadian tar sands assets will be stranded assets if the price of oil does not go above $60. The economics of the Canadian oil industry are not favorable for growth. It would be inappropriate for the DEIS to simply assume that Enbridge's demand forecasts are correct, because the Commission itself will evaluate them and other forecasts to determine if they are reasonable.

By adopting a narrow definition of purpose and need, the DEIS limits the alternatives selected to a narrow set that, with the exception of SA-04, are entirely defined in terms of Enbridge's purpose and need. Such narrow definition is illegal. Therefore, the Commission must adopt a legally permissible definition of purpose that is broad enough to encompass the full scope of alternatives allowed by Minn. Stat. § 216B.243 and Minn. R. Ch. 7853.

Because the DEIS relies entirely on statements of purpose provided by Enbridge without any critical analysis of these statements, DEIS Section 2.2 does not a clear statement of purpose and need. Taking DEIS Section 2.2 at face value, it defines the purpose and need of the project as:

1) Reducing Enbridge's cost of operation;
2) Reducing maintenance and the impact of maintenance on current easement holders of the existing Line 3 Pipeline;
3) Meeting current and possibly future demand for crude oil transportation services for Canadian crude oil by refineries apparently in Petroleum Area Defense District II (the Midwest region), which demand is assumed to be greater now and in the future than the current capacity of the Enbridge Mainline System;
4) Allowing Enbridge's customers access to crude oil transportation service capacity that exceeds customer demand;
5) Restoring the capability of Line 3 to transport heavy crude oil and to increase its capacity in order to reduce limits on customer access to crude oil transportation services and increase the operational flexibility of the Mainline System; and
6) Increasing the energy efficiency of transporting crude oil of Enbridge's Mainline System.

2667-5 cont

The foregoing definition entirely fails to address the "underlying" purpose and need for the Project, and instead defines purpose and need entirely in terms of Enbridge's needs. Enbridge's purpose and need for the Project is not the "underlying" purpose and need for the Project. Most of the foregoing elements are specific to Enbridge and cannot logically be applied when evaluating reasonable alternatives. For example, reducing Enbridge's costs of operation, providing additional service to Enbridge's customers on the Mainline System, and increasing Enbridge's operational flexibility and energy efficiency, could not be accomplished by alternatives other than those that modify Enbridge's pipeline system. Those elements that could arguably relate to other alternatives, such as the alleged greater demand and restrictions on customer access to crude oil transportation services, are based entirely on allegations made by Enbridge without any critical analysis of how such statements relate to the "underlying" purpose and need for the Project. Thus, the DEIS entirely fails to describe the "underlying" purpose and need for the Project, and instead defines purpose and need with regard only to Enbridge's purpose and need for the Project. This failing has significant implications for all subsequent analysis contained in the DEIS.

Comments on DEIS Section 2.5

2667-6

The DEIS fails to consider the costs of expansion of pipelines downstream from the Superior Terminal. The following table shows that it is physically impossible to use all of the net Mainline System capacity increase that would be provided by the Project without constructing additional pipeline capacity from the Superior Terminal through Wisconsin.

2667-6 cont

Capacity Into Superior Terminal		Capacity Out of Superior Terminal		Capacity in minus Capacity Out (bpd)
Pipeline	**Capacity In (bpd)**	**Pipeline**	**Capacity Out (bpd)**	
Line 1	237,000	Line 5	540,000	
Line 2B	442,000	Line 6	667,000	
Line 3	390,000	Line 14	318,000	
Line 4	796,000	Line 61	1,200,000[6]	
Line 67	800,000	Calumet Refinery[7]	45,000	
Total Pipeline Capacity Into Superior Terminal	2,665,000	Total Pipeline Capacity Out of Superior Terminal	2,770,000	-105,000
Line 3 Replacement Project Initial Capacity Net Increase	370,000	Assume No Additional Capacity Constructed Out of Superior Terminal	0	+370,000
Mainline Capacity Into Superior Terminal With Line 3 Replacement Project at Initial Capacity	3,035,000	Total Pipeline Capacity Out of Superior Terminal	2,770,000	+265,000
Line 3 Replacement Project Ultimate Capacity Net Increase above Initial	155,000	Assume No Additional Capacity Constructed Out of Superior Terminal	0	+155,000
Mainline Capacity Into Superior Terminal With Line 3 Replacement Project at Ultimate Capacity	3,190,000	Total Pipeline Capacity Out of Superior Terminal	2,770,000	+420,000

There is currently up to 105,000 bpd more capacity out of Superior Terminal than there is into it; therefore, it would be possible to use the Project's capacity up to this amount without constructing a pipeline in Wisconsin. This would still leave up to 265,000 bpd of the Project's capacity stranded at the Superior Terminal. Thus, absent construction of a pipeline in Wisconsin, it would be impossible for Enbridge to use 72% of the Project's initial net capacity increase. It is irrational to expect that Enbridge would build the Project for the purpose of

[6] Since the pump stations in Wisconsin have received all permits, and it is Honor the Earth's understanding that their construction is essentially complete, it is reasonable to assume that Enbridge will expand Line 61's capacity to 1,200,000.

[7] The Calumet Refinery does not operate at 100% of its capacity on a sustained basis, so its average demand would be less than 45,000 bpd.

increasing the capacity of the Mainline System and not build sufficient downstream capacity to transport the full volume of crude oil that could be transported by the Project. 2667-6 cont

Since Section 2.5 considers the cost of building a pipeline in Canada and North Dakota that would connect to the pipeline built in Minnesota, it must also consider the cost of constructing a pipeline that would be needed in Wisconsin and Illinois. Such cost is relevant and necessary when comparing the cost of the Project to System Alternative SA-04, which would deliver crude oil to Illinois. Absent such cost estimate, it would not be possible to compare the socioeconomic impacts of SA-04 to the Project and logically required pipeline capacity in Wisconsin. Enbridge has provided a cost estimate of $3.5 to $4 billion, as discussed below.

The DEIS must also consider construction of additional pipeline capacity in Wisconsin to be a connected project under Minn. R. 4410.0200, Subp. 9c, which defines a "connected action" as follows:

> Two projects are "connected actions" if a responsible governmental unit determines they are related in any of the following ways:
>
> A. one project would directly induce the other;
>
> B. one project is a prerequisite for the other and the prerequisite project is not justified by itself; or
>
> C. neither project is justified by itself.

Since it would be impossible for Enbridge to use all of the net increase in the Mainline System capacity that would be provided by the Project without constructing additional pipeline capacity out of the Superior Terminal, the Project would: (a) directly induce construction of an additional pipeline in Wisconsin; (b) be a prerequisite for an additional pipeline in Wisconsin; and (c) not be justified without construction of additional pipeline capacity in Wisconsin. As regards potential impacts, MEPA does not distinguish between impacts that would be caused by a connected project within the State of Minnesota versus the impacts to State interests that would be caused by a connected action located outside of Minnesota. Therefore, a pipeline in Wisconsin is a connected action as defined by Minn. R. 4410.0200, Subp. 9c.

Minn. R. 4410.2100, Subp. 4, states: "Multiple projects and multiple stages of a single project that are connected actions . . . must be considered in total . . . in preparing the EIS." Although construction of a pipeline in Wisconsin would obviously not be within Minnesota's permitting jurisdiction, such construction would nonetheless impact Minnesota's environment because it would create a greater risk of oil spills into the Nemadji River and Lake Superior,

which could threaten Minnesota's interests in Lake Superior aquatic resources. Also, a pipeline out of the Superior Terminal would cross the St. Croix River watershed and thereby threaten Minnesota's interests in this river's aquatic resources. Therefore, construction of a pipeline in Wisconsin would be a reasonably foreseeable future project that would have impacts on Minnesota's environment, such that its direct impacts on Minnesota must be evaluated by the DEIS. 2667-6 cont

Further, a pipeline in Wisconsin would have cumulative potential effects as this term is defined by Minn. R. 4410.0200, Subp. 11a, because it is a project that would affect the some of the same environmental resources as the Project and a reasonable expectation has been laid for an additional Wisconsin pipeline, because it would be impossible to use 72% of the Project's capacity absent construction of an additional pipeline in Wisconsin, such that construction of a pipeline in Wisconsin is reasonably likely to occur. Further, it is Honor the Earth's understanding that Enbridge has conducted significant right of way analysis for a new pipeline corridor in Wisconsin, as well as engineering related to a new pipeline in this corridor. Thus, Enbridge has available to it "sufficiently detailed information . . . about the project to contribute to the understanding of cumulative potential effects." Moreover, the Commission may not simply ignore construction of a pipeline in Wisconsin without investigating:

> whether any applications for permits have been filed with any units of government; whether detailed plans and specifications have been prepared for the project; whether future development is indicated by adopted comprehensive plans or zoning or other ordinances; whether future development is indicated by historic or forecasted trends; and any other factors determined to be relevant by the RGU.

Enbridge has called a proposed pipeline through Wisconsin " the Line 61 Twin." For example, Enbridge presented the following slide to its investors in its Fourth Quarter 2014 Earnings & 2015 Financial Guidance Presentation on February 19, 2015, showing that it planned to construct a "Line 61 Twin" pipeline from Superior, Wisconsin, to Flanagan, Illinois, which would have an initial capacity of 550,000 bpd:

2667-6 cont

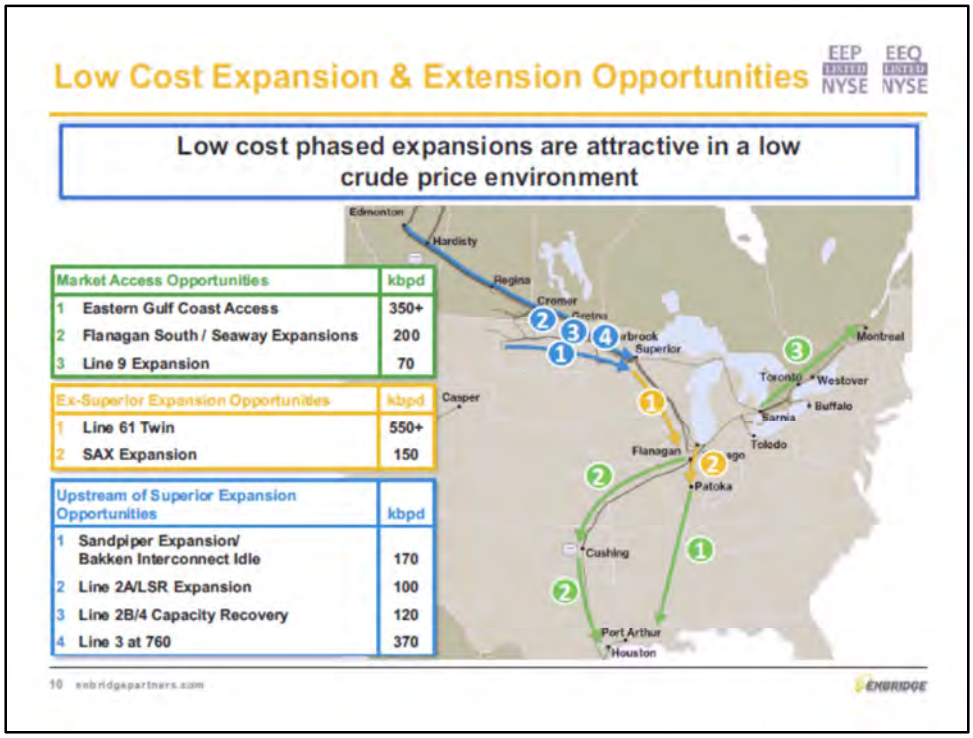

Enbridge presented this same slide in the following presentations:

- March 2015 Investment Community Presentation;
- June 23-24, 2015, Credit Suisse MLP & Energy Logistics Conference; and
- December 2015 Investment Community Presentation.

Similarly, Enbridge included the following slide on page 30 of its July 2016 Investment Community Presentation, which for the "Line 61 Twin" project provides:

- a capital cost estimate of $3.5 to $4 billion;
- an estimated capacity of 800,000 bpd; and
- an admission that the "Line 61 Twin" will be necessary to relieve a bottleneck at Superior caused by Enbridge's planned western Canadian pipeline expansion, which includes the Project as well as other system expansions.

2667-6 cont

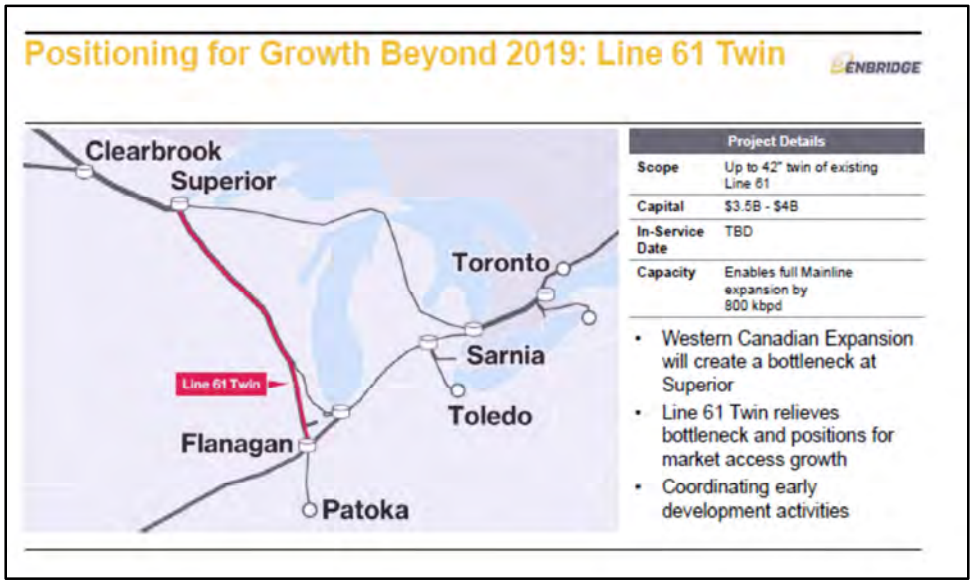

Enbridge included the following slides on page 31 of its September 2016 Investment Community Presentation, on pages 39 and 40 of its November 2016 Investment Community Presentation, and on pages 40 and 41 of its January 2017 Investment Community Presentation, which continue to show a commitment to build the "Line 61 Twin" project:

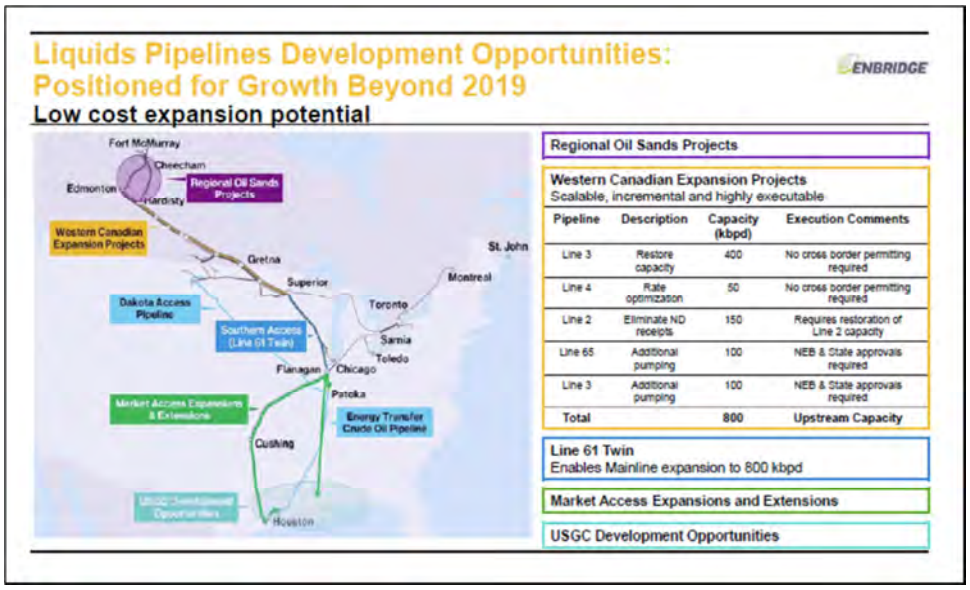

2667-6 cont

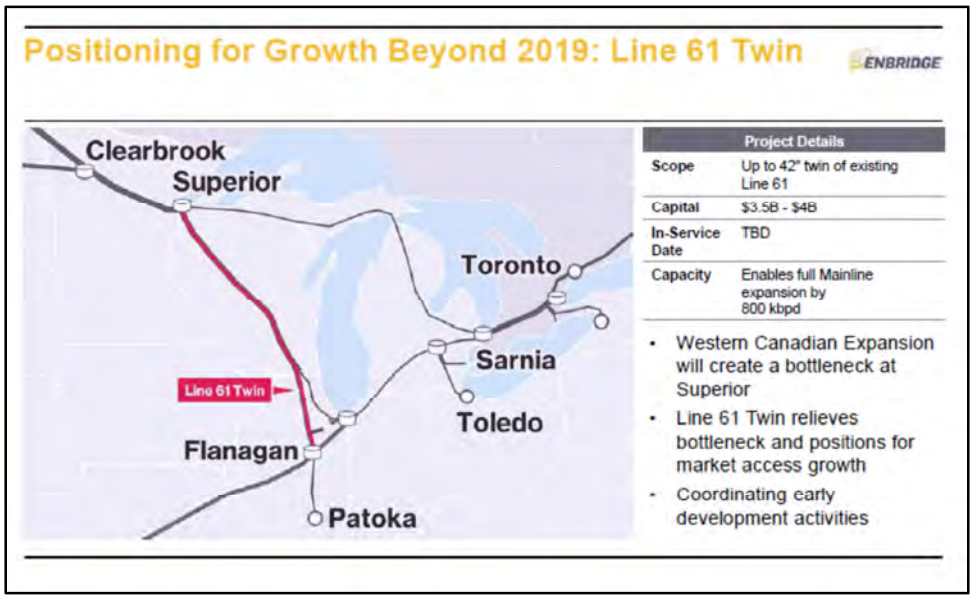

Since January of 2017, Enbridge's presentations have avoided any mention of the additional capacity needed to fully utilize the Project's capacity. Instead, Enbridge has claimed that full expansion of Line 61 "connects restored Line 3 volumes to Market Access pipelines," which is possible for up to 105,000 bpd (28%) of the Project's initial capacity, but not possible for the remaining 72% of the Project's capacity. Enbridge's obfuscation aside, the foregoing slides provide ample evidence that the Project is inextricably linked to construction of the Line 61 Twin pipeline in Wisconsin, because otherwise a bottleneck will exist that would prevent use of 72% of the capacity that would be provided by the Project.

Comments on DEIA Section 2.7.1.1

The DEIS states: "Enbridge proposes a two-tiered program for monitoring and inspecting construction: (1) a direct program of Environmental Inspectors (EIs); and (2) an independent third-party system of monitors to be implemented by state agencies." The DEIS should recommend that this mitigation term be improved by requiring that third-party monitors have stop-work authority.

Comments on DEIS Section 2.7.2.3

This section describes the construction methods in wetland areas bit fails to describe when and how the pipeline would be anchored to prevent buoyancy.

Comments on DEIS Section 2.7.2.4

This section states: "Disturbed wetlands would be seeded with oats or a temporary seed mix (unless standing water is prevalent), or as otherwise directed by landowners or regulatory agencies. Enbridge Chapter 2 Project Description Line 3 Replacement Project Draft Environmental Impact Statement 2-31 would otherwise allow the wetlands to revegetate naturally from the seeds and rhizomes present in the topsoil and natural recruitment." The DEIS should describe methods and likely outcomes for restoration and regeneration of wild rice beds.

Comments on DEIS Section 2.7.2.6

With regard to winter construction the DEIS states: "However, Enbridge could be required to use winter construction procedures at locations where the approach to saturated areas is lengthy or the length of the saturated areas themselves is long." The DEIS should identify these winter construction areas, and state who will select them and how the will be selected.

Comments on DEIS Section 2.7.2.9

With regard to urban areas the DEIS states: "Approximately 8 acres of the total area of the proposed Line 3 Replacement Project construction work area would include "developed land," defined as land consisting of more than 30 percent asphalt, concrete, and buildings. Approximately 124 residences would be within 300 feet of the Project's construction work area, and 19 residences would be within 50 feet, including seven within the construction workspace and one within the permanent right-of-way." The DEIS should describe the potential impacts to these residences in more detail, including as statement about whether or not any homes will be taken and the rights of homeowners to protect themselves and their families during construction. The DEIS should also assess the risk of damage to these homes and their families from a catastrophic rupture of the Project.

Comments on DEIS Section 2.10 Potentially Connected Actions

DEIS Section 2.10 fails to identify construction of a pipeline in Wisconsin as a potential connected action. The evidence for the necessity and inevitability of constructing this pipeline is contained in our comments on DEIS Section 2.5. The Line 61 Twin project in Wisconsin is a connected action within the meaning of Minn. R. 4410.0200, Subp. 9c, such that the DEIS must consider its environmental and socioeconomic impacts and costs. 2667-7

Section 2.10 also fails to discuss the impacts of expansion of the Project to 915,000 bpd. Instead, it states: 2667-8

2667-8 cont

> Any future actions associated with additional increases in throughput on the proposed Line 3 Replacement would require a new application for a Certificate of Need from the Commission and a review of the need for the requested increase. Enbridge has not indicated any plans for future increases in throughput at this time and hypothetical future increases in throughput have not been evaluated as part of this EIS.

The fact that an expansion of capacity of the Project beyond 760,000 bpd would require a certificate of need from the Commission is irrelevant to the need for the DEIS to analyze the cumulative impacts and cumulative potential effects of such expansion.

According to page 8-3 of Enbridge's CON Application, the Project has an ultimate capacity of 915,000 bpd:

> Pursuant to the requirement of Minn. R. 7853.0530, Enbridge is providing for the Commission's information the ultimate design capacity for the pipeline considering its diameter, wall thickness, steel grade, and crude slate (irrespective of the number of pump stations proposed for the Project), which is 1,016 kbpd. This figure in turn, yields an ultimate annual average capacity of 915 kbpd. Further engineering design studies would be required to determine the number of pump stations needed to achieve the ultimate design capacity level, but that is not the level sought in this Appliction [stet.].

Operation of the Project at its ultimate capacity represents a net capacity expansion of 525,000 bpd over the capacity of the existing Line 3 Pipeline, and an expansion over the Project of 155,000 bpd, which is itself a substantial volume of oil. Expansion of the Project from 760,000 bpd to 915,000 bpd would increase its capacity by 20.4%.

The DEIS does not describe the physical changes that would be required to increase capacity of the Project from 760,000 bpd to 915,000 bpd. Therefore, it is not possible to know whether such subsequent changes would require any substantial construction effort or environmental review. It could be that the expansion would require only the installation of new pumps without the construction of any new pump stations or construction of other facilities. This could limit the impacts of an expansion below the threshold where the Commission would conduct any substantial environmental review.

2667-8 cont

In contrast, the vast majority of the construction activity and resource commitment needed to allow operation at 915,000 bpd would be performed as part of the initial construction of the Project, including installation of higher capacity pipe and construction of all other pressurized components of the pipeline, including valve, PIG launchers, manifolds, etc. to allow operation of the Project at 915,000 bpd. Such construction represents a massive initial investment of resources and money, and constructing the Project with higher pressure components would increase the environmental impacts of construction now. Yet, the DEIS does not evaluate the construction that would be undertaken following the initial phase of construction, and then compare this to the construction that would be undertaken as part of the first phase of the Project that is necessary to allow the expansion. Instead, DEIS Section 2.10 merely states: "Enbridge has not indicated any plans for future increases in throughput at this time and hypothetical future increases in throughput have not been evaluated as part of this EIS." This statement is specious. It is irrational to conclude that Enbridge would invest at least hundreds of millions of dollars now in substantially thicker pipe and higher pressure pipeline components to allow operation of Line 3 at 915,000 bpd and state that Enbridge has no plans future increases in throughput at this time. Such statement is contradicted by all available evidence. Enbridge may not have chosen an exact date when it would increase the capacity of the Project, but the great weight of evidence shows that it is almost certain that Enbridge will expand the capacity of the Project during the timeframe of impacts considered by the DEIS. It is reversible error for the DEIS to accept a bald-faced statement about the likelihood of future expansions that is contradicted by Enbridge's own design, commitment of physical and financial resources, and statements to investors.

Construction of the Project with pipe that is sufficient to transport up to 915,000 bpd, requires that the pipe be constructed now using thicker steel. Page 8-5 of the CON Application contains Table 8.1.E.2-1:

2667-8 cont

Table 8.1.E.2-1 Mainline Pipe Design Parameters	
Design Parameter	**Specification**
Pipe Size (Diameter)	36-inch outside diameter (NPS 36)
Estimated Length	337 miles
Wall Thickness	
Nominal	0.515 inch
Road Bore	0.600 inch
Cased Railroad	0.600 inch
Uncased Railroad	0.750 inch
Horizontal Directional Drill (HDD)	0.750 inch
Coating, mainline	14 mils Epoxy Bonding
Coating, trenchless	40 mils Epoxy Bonding ABR
Grade (Pipe Type)	X70 carbon steel pipe manufactured according to API Specifications 5L PS2
Maximum Operating Pressure[3]	1440 psig

Thus, the steel wall thickness will range from 0.515 inch to 0.750 inch. This page also states that the Project will be constructed from X70 carbon steel manufactured according to API Specifications 5L PS2.

In contrast, the existing Line 3 Pipeline is a 34-inch diameter pipe comprised of steel with a thickness of 0.375 inches.[8] Enbridge's original application letter for a Presidential Permit for Line 3 states:

> The facilities in respect of the proposed 34 inch pipe line at the international boundary are as follows:
>
> A pipe line of the pipe manufactured to American Petroleum Institute specification 5LX, with an outside diameter of 34 inches, a wall thickness of .375 inches, minimum yield strength of 52,000 pounds per square inch, proposed test pressure after installation of 1028 pounds per square inch . . . .

Thus, construction of a pipeline to move just 760,000 bpd would require a smaller diameter pipe with thinner steel.

In comparison, the Line 67 Project approved by the Commission in 2008[9] has an ultimate capacity of 800,000 bpd[10] and Enbridge's application for that pipeline contains the following pipe specification[11]:

[8] Letter, Lakehead Pipe Line Company to U.S. Secretary of State (August 31, 1967) (application for a Presidential Permit for Line 3 Pipeline).

2667-8 cont

> Pipe will be 36-inch outside diameter, 0.375 to 0.469 inch wall thickness, API 5L Grade X70, double submerged are (DSAW) steel pipe. The maximum allowable operating pressure will be 1050 to 1313 psig.

This means that the Project will be constructed from pipe with a pipe wall thickness greater than necessary to transport 760,000 bpd. Both the existing Line 3 and Line 67 pipe were constructed using pipe that is 73% thinner than the Project. Put another way, based on pipe wall thickness alone, the Project will be built using at least 27% more steel than is necessary to transport 760,000 bpd. But, this percentage does not account for the greater amount of steel needed to fabric a 36-inch diameter pipe as compared to a 34-inch diameter pipe. Further, all other pressurized components would also be constructed using greater amounts of steel than for a pipeline designed to transport up to 760,000 bpd. Therefore, construction of the Project as designed will require significantly greater amounts of steel than required to transport 760,000 bpd, which is the purported purpose of the Project contained in DEIS Section 2.1.

Construction of the Project with pipe that is larger diameter and has thicker pipe walls than required to transport the capacity proposed by the Project means that each pipe segment's weight is greater than necessary for the Project and will result in greater road wear, energy consumption, and pollution impacts to transport and construct the pipeline than is required for the Project's capacity. Further, the use of thicker steel also results in thicker welds and greater use of welding materials and greater air impacts resulting from welding activities. In contrast, it is likely that the only major equipment remaining to be installed to allow operation at 915,000 bpd would be additional pumps, which may be installed only in the pump stations that would be modified or constructed for the Project.

Enbridge states: "Further engineering design studies would be required to determine the number of pump stations needed to achieve the ultimate design capacity level . . . ." It seems doubtful that Enbridge is clueless about the likely number and locations of new pumps. The fact that additional engineering studies would be needed does not mean that an expansion is not possible or difficult, it just means that Enbridge would need to confirm the engineering for an expansion given operational data. Even if a limited number of pump stations are needed, their

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[9] In the Matter of the Application of Enbridge Energy, Limited Partnership, and Enbridge Pipelines (Southern Lights) LLC for a Certificate of Need for the Alberta Clipper Pipeline Project and the Southern Lights Diluent Project, DOCKET NO. PL-9/CN-07-465, Order Granting Certificate of Need (Dec. 29, 2008).

[10] In the Matter of the Application of Enbridge Energy, Limited Partnership For a Certificate of Need for the Line 67 Station Upgrade Project – Phase 2, MPUC Docket No. PL9/CN-13-153, Application for a Certificate of Need
for a Crude Oil Pipeline, Section 7853.0230, Page 12.

[11] Application for Certificate of Need for a Crude Oil Pipeline, Docket No. PL9/CN-07-465, Alberta Clipper and Southern Lights Diluent Projects, June, 2007Section 7853.0530, Page 5.

construction and the impacts of their construction would not be substantial relative to the impacts of constructing the Project now to allow higher capacity operation. Likely, even the foundations and locations for the additional pumps are included in the designs for the Project's pump stations, such that the only remaining work to increase the capacity of the Project at these pump stations would be to ship the pumps to the pump stations and install them. Compared to the costs, effort, and impacts associated with constructing the Project to operate at higher pressure, the costs, effort, and impacts of installing the pumps would *de minimis*. Consequently, most of the impacts of expanding capacity to 915,000 bpd will be created during construction of the Project, such that the expansion must be seen as being reasonably foreseeable, if not inevitable. 2667-8 cont

Should the Project be built, it is entirely foreseeable that Enbridge would ultimately increase the pipeline's capacity to 915,000 bpd. Therefore, operation at 915,000 bpd is a "reasonably foreseeable future project" and is a cumulative impact as defined by Minn. R. 4410.0200, Subp. 11.

Further, construction of the Project to allow future expansion to 915,000 bpd and future operation at such capacity would have "cumulative potential effects," as this term is defined by Minn. R. 4410.0200, Subp. 11a, which includes consideration of the effects of "future projects actually planned or for which a basis of expectation has been laid." With regard to whether an expectation has been laid, this definition states:

> In determining if a basis of expectation has been laid for a project, an RGU must determine whether a project is reasonably likely to occur and, if so, whether sufficiently detailed information is available about the project to contribute to the understanding of cumulative potential effects. In making these determinations, the RGU must consider: whether any applications for permits have been filed with any units of government; whether detailed plans and specifications have been prepared for the project; whether future development is indicated by adopted comprehensive plans or zoning or other ordinances; whether future development is indicated by historic or forecasted trends; and any other factors determined to be relevant by the RGU.

A review of available facts demonstrates that the Commission must find that expansion of Project capacity to 915,000 bpd is reasonably likely to occur and that sufficient detailed information about the expansion is available.

With regard to whether sufficiently detailed information is available, Enbridge does in fact have detailed plans and specification for expansion of the Project, an example of which is

the specification for thicker walled, higher pressure steel pipe. Other examples include the specifications for all other pressurized components, such as valves, which specifications are matched to the pipe steel specification. Likely, the specifications for the pump stations have reserved locations for the installation of additional pumps. Together, all of these specifications provide enough information to confirm that the Project could be made to operate at 915,000 bpd.

2667-8 cont

With regard to whether Enbridge plans to expand Project capacity, it has stated in multiple investor presentations that it plans to do. In its July, September, and November 2016 and January 2017 Investor Presentation Enbridge provided the following slide that shows that Enbridge has told its investors that it intends to expand the Project sometime after 2019. Since Enbridge plans to start operation of the Project in 2019, this means that expansion of the Project within the timeframe analyzed by the DEIS is foreseeable and very likely to occur. With regard to the fact that Enbridge notes that this expansion would be only 100,000 bpd, instead of the 155,000 bpd expansion noted in its CON Application, this slide also states that the net capacity increase provided by the Project would be 400,000 bpd instead of 390,000 bpd, even though Enbridge submitted the CON Application long before it issued this investor presentation. Similar slides are included in Enbridge's September 2016, November 2016, and January 2017 investor presentations. The fact that Enbridge is identifying the expansion of Line 3 to its ultimate capacity to its investors is also evidence that the expansion project is "substantially certain to be undertaken sequentially over a limited period of time." Minn. R. 4410.0200, Subp. 60.

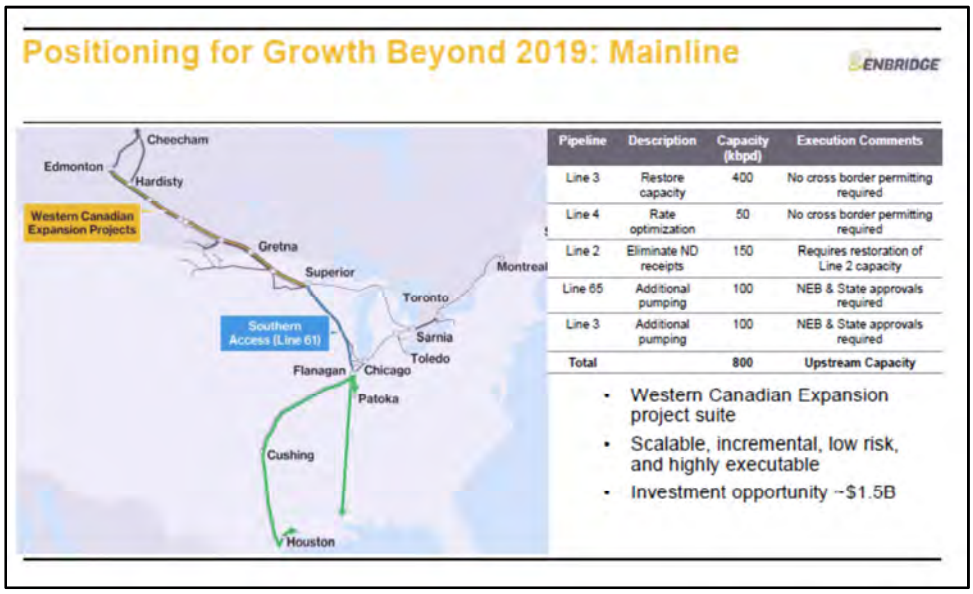

With regard to "whether future development is indicated by historic or forecasted trends," Enbridge's forecast of demand for crude oil transportation services assumes that future capacity

expansion of the Mainline System will be necessary. Further, Enbridge took a similar approach of incremental expansion with regard to the Line 67 (Alberta Clipper) Pipeline, which had an initial capacity of 450,000 bpd and was expanded in two phases to 800,000 bpd of operation in Minnesota. Thus, historic examples and Enbridge's own forecasted trends make expansion of the Project "reasonably likely to occur." 2667-8 cont

The law does not require that a "phased action" have a date certain for when it would be constructed. Instead, it requires only that a project be "substantially certain" to happen. Enbridge's significant commitment of material and financial resources to allow expansion of the Project, in combination with its statements to its investors that it is planning to expand the Project, make the expansion "substantially certain" to happen. In light of the evidence, the DEIS Section 2.10 statement that "Enbridge has not indicated any plans for future increases in throughput at this time" is false, because it has in fact indicated plans for future increases.

Minn. R. 4410.2300(H) requires that "for the proposed project and each major alternative there shall be a thorough but succinct discussion of potentially significant adverse or beneficial effects generated, be they direct, indirect, or cumulative." Since design of the pipe in the Project to transport up to 915,000 bpd creates an expectation of a future expansion of the Project, the effects of operating a future expansion at up to 915,000 bpd are cumulative potential effects and must be analyzed by the DEIS.

Expansion of the Project to a capacity of 915,000 bpd is a phased action pursuant to Minn. R. 4410.0200, Subp. 60, because expansion of the Project would have "environmental effects on the same geographic area" and would be "substantially certain to be undertaken sequentially over a limited period of time." As a phased project, the expansion "must be considered in total when determining the need for an EIS <u>and in preparing an EIS</u>." Minn. R. 4410.2100, Subp. 4 (emphasis added). Although this subpart also allows the Commission to "treat the present proposal as the total proposal," it may also "select only some of the future elements for present consideration in the threshold determination <u>and EIS</u>."

With regard to its exercise of discretion of this phased action under Minn. R. 4410.0200, the DEIS contains no information about the potential scope of construction required for this subsequent phase. As such, it is impossible for the Commission to rationally evaluate whether this expansion will create significant independent impacts, or whether instead the impacts of the subsequent phase would be *de minimis*. For example, expansion of capacity to 915,000 bpd could include only the installation of additional pumps at existing pump stations, and not include any new impacts to land or the construction of any new facilities. Should the impacts of the subsequent phase be *de minimis*, it would be irrational for the Commission to evaluate such impacts as a later phased action because doing so would be inefficient and result in unnecessary segmentation of environmental review. In any case, the EIS should contain sufficient

information for the Commission to make a rational decision on whether or not to treat the Project as the "total proposal" or to exercise its discretion to "select only some of the future elements for present consideration in the . . . EIS", but at present the DEIS is completely silent about the potential for a subsequent phase. 2667-8 cont

The Commission should consider the 915,000 bpd ultimate capacity with regard to those elements of construction that would be impacted now by virtue of use of thicker steel, because these impacts will occur during construction and would be a moot point in any subsequent environmental review. For example, the use of 27% heavier pipe for the same segment length would have a correspondingly greater impact on road wear and tear during transport of the pipe to construction sites. Use of thicker pipe steel would also irretrievably commit substantially greater amounts of iron and other metals (27% more) to the Project than are necessary to transport 760,000 bpd. It would also commit greater amount of fuel to the project to transport the steel to Minnesota and then to construction sites. It would also commit greater amounts of fuel to construction of the project, due to the greater power need to lift and place the steel in the ground. It would also result in greater air impacts caused by welding thicker steel. Such impacts must be evaluated before approval of use of the thicker steel pipe to be used in the Project.

Unlike expansion of a road project either in terms of distance or lanes, creating the potential to expand the capacity of an existing crude oil pipeline segment in the future requires an irretrievable commitment of physical and financial resources now. Further, most of the impacts of building a higher capacity pipeline occur before its expansion. The Commission must make a reasoned judgement about which elements of a proposed future phase must be evaluated in the initial phase. It would be irrational to ignore the impacts related to construction of a higher capacity pipeline when such impacts occur during the initial construction of the pipeline. It would also not be rational to fail to evaluate whether the impacts of a subsequent expansion of a pipeline would be *de minimis* relative to the impacts of constructing the pipeline so that it could be expanded, so that a rational decision can be made on whether to simply evaluate the impacts of an expansion in an initial environmental review. Where some or all of the "future elements" of a phased project relate closely to construction activities that would be analyzed in an initial environmental review, an RGU must consider which elements of the subsequent phase must be considered in the initial environmental review. The fact that Enbridge intends to commit substantial resources and effort in its construction of the Project to allow its expansion is evidence that the expansion project is "substantially certain to be undertaken sequentially over a limited period of time." Minn. R. 4410.0200, Subp. 60.

The Commission should also use the Project's ultimate capacity with regard to consideration of alternatives, because it would be unreasonable to not consider alternatives in light of the Project's ultimate capacity. The use of thicker steel increases the future utility of the

pipeline relative to alternatives, because expansion through the use of additional pumping horsepower might require fewer resources and have lower impacts that expansion of alternatives. Moreover, consideration of a lower capacity alternative to the Project would result in the use of thinner steel, and this should be compared to the use of Enbridge's proposed steel thickness of the Project. 2667-8 cont

The Commission should also evaluate the potential impacts of oil spills from the Project based on its ultimate capacity, because it is likely that the Commission will not conduct new spill modeling and oil spill impact analysis in any subsequent application for expansion of the Project to 915,000 bpd. Also, the Commission, the parties, and Minnesota's citizens should know now what the likely spill impacts would be from operation at 915,000 bpd, because this is the likely foreseeable capacity for the majority of the life of the Project, such that construction of the Project would likely result in foreseeable oil spills larger than those that would result from operation at 760,000 bpd.

Further, the expansion of the Project is not "hypothetical." The word "hypothetical" is defined as: "involving or being based on a suggested idea or theory : being or involving a hypothesis : conjectural." Mirriam-Webster Online Dictionary. The expansion of the Project is not based on mere conjecture and not a mere whimsical idea or theoretical. Instead, the evidence available to the Commission shows that the expansion is "substantially certain" to happen. Minn. R. 4410.0200, Subp. 60.

The expansion is also not "hypothetical" because Enbridge has described the expansion of the Project to its investors. Enbridge does not describe its future expansion plans to its investors as "hypothetical" plans. Instead, they are plans presented to investors that attempt to show that Enbridge will take actions in the future that would increase the value of investments. The information provided to investors about the expansion of Line 3 is provided to aid them in decisions about committing financial resources to Enbridge. Accordingly, even though the information is about Enbridge's future plans, it is clear that Enbridge intends that its plan to expand the Project be relied upon in real-world financial decisions. Enbridge's statements about its plans to expand the capacity of the Project in combination with its proposed commitment to construct the project with thicker and stronger steel pipe and other components, make the expansion project a phased action that is "substantially" certain to happen. Accordingly, the Commission must also evaluate the potential cumulative impacts and potential cumulative effects of the expansion of the Project to 915,000 bpd.

COMMENTS ON DEIS CHAPTER 4 – ALTERNATIVES TO THE PROJECT

DEIS Chapter 4 is fundamentally flawed for a variety of reasons. At a fundamental level, Chapter 4's discussion of alternatives is deeply biased toward Enbridge's definition of purpose,

because DEIS Section 2.2 merely apes Enbridge's definition of the purpose for the Project. In fact, DEIS Section 2.2's statements related to purpose are comprised entirely of Enbridge's allegations, and therefore this section is entirely aligned with Enbridge's purpose for the Project. 2667-9

Minn. R. 4410.2300.E requires that each EIS contain a statement that allows "the public to identify the purpose of the project." This being said, Minn. R. 4410.2300.G requires that an RGU also determine the "the underlying need for or purpose of the project," because doing so is necessary to determine whether or not an alternative should be excluded from analysis in the EIS. Thus, an EIS must have a clear statement not only of a project's underlying purpose, but also of the need that underlies it. The EIS statement of purpose has a profound effect on the scope and analytical integrity of the EIS, because it determines the scope of alternatives to the Project that will be considered in the EIS, as well as the factors that the DEIS considers in the evaluation of an Alternative's ability to accomplish the Project purpose.

Providing a clear statement of the underlying purpose and need for the Project is particularly critical here, because the purpose of the Final EIS is to support the Commission's determination of need pursuant to Minn. Stat. § 216B.243 and Minn. R. Ch. 7853, which allows broad consideration of the purpose and need for a proposed project. The certificate of need statute and regulations do not restrict consideration of alternatives to only those route alternatives that start and end at the points proposed by Enbridge. Instead, Minn. Stat. § 216B.243, Subd. 3(6), requires that the Commission consider:

> possible alternatives for satisfying the energy demand or transmission needs including but not limited to potential for increased efficiency and upgrading of existing energy generation and transmission facilities, load-management programs, and distributed generation . . . .

Thus, this statute expressly requires that the Commission consider "upgrading of existing . . . transmission facilities . . . ." Also, Minn. R. 7853.120 states that the Commission "shall consider only those alternatives proposed before the close of the public hearing and for which there exists substantial evidence on the record with respect to each of the criteria listed in part 7853.0130." Thus, the law expressly allows intervenors to propose – and mandates that the Commission consider – a broad range of alternatives, subject only to the condition that they be supported with "substantial evidence." The other limitation on the range of alternatives is found in Minn. R. 7853.0130(B), which limits the Commission's consideration to "reasonable" and "prudent" alternatives. Still, this limitation must be understood in light of the broad statutory language.

With regard to the purpose of the MEPA analysis, Minn. R. 4410.0300, Subp. 3 states: "Environmental documents shall be used as guides in issuing, amending, and denying permits

and carrying out other responsibilities of governmental units to avoid or minimize adverse environmental effects and to restore and enhance environmental quality." Also, Minn. R. 4410.2000, Subp. 1, states: 2667-9 cont

> The purpose of an EIS is to provide information for governmental units, the proposer of the project, and other persons to evaluate proposed projects which have the potential for significant environmental effects, to consider alternatives to the proposed projects, and to explore methods for reducing adverse environmental effects.

Thus, a failure by a Final EIS to provide information on the potential environmental impacts of alternatives that are considered by the Commission pursuant to is broad mandate under Minn. Stat. § 216B.243 and Minn. R. Ch. 7853 would mean that such impact statement would fail to accomplish the purposes of MEPA. Further, such failure also means that the Final EIS would not adequately explore ways of reducing environmental effect.

In particular, the DEIS may not itself predefine the Project's purpose and need because this will be defined by the Commission through its Certificate of Need hearing. Adopting a narrow definition of purpose and need in the EIS essentially pre-determines the ultimate issue in this hearing and means that the Commission's evaluation of alternatives will be broader than the EIS's evaluation of alternatives. The result will be that the FEIS will not fully inform the Commission about the environmental impacts of all of the alternatives it must consider under Minn. R. Ch. 7853. Even worse, by limiting information about available alternatives, an excessively narrow statement of purpose and need would steer the Commission's certificate of need analysis away from consideration of a broad selection of possible alternatives and towards Enbridge's preferred alternative – which is contrary to the fundamental purpose of MEPA. When a MEPA analysis is intended to support a determination of need, the RGU must be particularly careful to define the purpose and need for a project broadly to ensure that MEPA's purpose is fully accomplished.

DEIS Section 2.2 fails to include a clear statement of the underlying purpose and need for the Project. Also, Section 2.2 defines project purpose and need overly narrowly and in accordance with Enbridge's narrow and self-serving definition of Project purpose. In fact, DEIS Section 2.2's statements related to purpose are comprised entirely of Enbridge's allegations, and therefore this section is entirely aligned with Enbridge's purpose for the Project. Moreover, this section contains no analysis of the scope of purpose and need or the merits of Enbridge's allegations, which instead are taken at face value. This failure to comply with Minn. R. 4410.2300.G's requirement for a definition of the "underlying" purpose and need for the Project based on independent judgment means that the subsequent analysis in the DEIS related to

selection of possible alternatives for further analysis and possible way to limit adverse environmental effects fails to investigate and select from among available alternatives in accordance with MEPA. 2667-9 cont

Section 2.2 does not discuss Project purpose and need in broad terms related to the underlying markets and potential customers for the crude oil that the Project would transport. Further, this section contains no critical analysis or discussion of the appropriate range of Project purpose in this particular circumstance. Instead, Section 2.2 defines purpose and need strictly in accordance with Enbridge's narrow definition of it. In fact, all of the statements about purpose in Section 2.2 are based on Enbridge allegations. The subheadings related to purpose include the following:

- Corrosion and Cracking of the Existing Pipeline Have Reduced Performance;
- Enbridge Believes Replacing the Existing Pipeline Is Less Expensive and Avoids Extensive Inspections;
- Enbridge States that Demand for Canadian Crude Oil Exceeds Current Capacity;
- Enbridge has Indicated that Expanded Capacity Would Reduce Curtailment and Improve Operational Flexibility;
- Expanded Capacity Would Improve Energy Efficiency on Enbridge's System.

Thus three of the five subheadings are simply restatements of Enbridge's purpose for the Project. The first merely states that the capacity of the existing pipeline has been reduced due to weakness in its pipe and notes that the pipe is subject to a consent decree that includes requirements for heightened safety conditions.[12] This is not a statement of purpose, but rather a description of the current situation. The fourth subheading restates Enbridge's allegations about energy efficiency.

The DEIS attempts to create the appearance that it is avoiding predefining project purpose and need in accordance with Enbridge's definition through the artifice of attributing statements to Enbridge. This is mere wordplay. What is important is how DEIS Section 2.2 defines the Project's purpose and need. Attribution of the adopted purpose and need to Enbridge does not change the fact that DEIS Section 2.2 defines project purpose entirely with regard to Enbridge's definition of it. Moreover, attributing statement of purpose to Enbridge cannot cure a failure by DEIS Section 2.2 to properly define the "underlying" purpose and need of the Project.

[12] The Consent Decree in *United States v. Enbridge Energy, Limited Partnership, et al.*, C.A. No. 1:16-cv-914 was approved by the U.S. District Court for the Western District of Michigan on May 23, 2017. This consent decree is evidence that rigorous compliance with the Pipeline Safety Act, 49 U.S.C § 60101 *et seq.* ("PSA") is intended to ensure the continued safe operation of the existing Line 3 Pipeline until it is no longer needed.

All of the substantive statements in DEIS Section 2.2 related to the purpose and need for the Project uncritically accept Enbridge allegations: 2667-9 cont

- With regard to Project expense and inspections, the DEIS uncritically repeats Enbridge allegations regarding the required number of integrity digs, the relative cost of the Project in comparison to maintaining the existing pipeline, the invasiveness of the Project relative to maintaining the existing pipeline, and the annual cost of maintaining the existing pipeline in comparison to maintaining the Project. The DEIS contains absolutely no critical analysis of any of Enbridge's allegation or information relate to the financial merits of the Project relative to the existing pipeline.
- With regard to demand for Canadian crude oil, DEIS Section 2.2 says only, "Enbridge maintains the demand for crude oil feedstock from western Canada is currently greater than the capacity of the Enbridge pipeline system." DEIS Section 2.2 contain zero critical analysis of this statement.
- With regard to curtailment and operational flexibility, DEIS Section 2.2 uncritically accepts Enbridge's allegations with regard to apportionment, future demand for transportation services, and operational flexibility.
- With regard to improvements in efficiency, DEIS Section 2.2 states that "According to Enbridge" the Project would increase efficiency relative to the new pipeline. The DEIS contains no critical analysis of the relative efficiency of pipelines.

Honor the Earth notes that all of the foregoing allegations are subjects that will be scrutinized by the Commission in the Certificate of Need hearing. Therefore, the DEIS should not simply assume that these allegations are correct. Since DEIS Section 2.2 states that all of the descriptions of purpose are those of Enbridge, this section in fact expressly adopts Enbridge's definition of Project purpose. Moreover, it does so without any critical analysis. Thus, the DEIS has in effect adopted Enbridge's purpose for the Project. The DEIS could have simply stated that it adopts Enbridge's purpose for the Project and produced the same result. By adopting Enbridge's purpose for the Project, the DEIS has pre-defined the purpose exactly as does Enbridge and thereby fundamentally limits the scope of the EIS analysis required by MEPA. Moreover, adoption of Enbridge's purpose also limits the scope of the DEIS more narrowly than must be considered by the Commission pursuant to pursuant to Minn. Stat. § 216B.243 and Minn. R. Ch. 7853, such that a Final EIS will not fully support the Commission's required analysis.

The analytical role of DEIS Section 2.2 is to define the scope of the underlying purpose of the Project, but it must do so in a way that allows the Commission to analyze Project purpose as broadly as required by Minn. Stat. § 216B.243 and Minn. R. Ch. 7853. DEIS Section 2.2 could have discussed the customers, markets, and refineries that would be served by the

proposed Project as a means of better understanding its commercial benefits and limitations and the underlying need for the Project. This type of analysis would not predetermine the outcome of the Certificate of Need hearing, because DEIS Section 2.2 could then have used such analysis to define the Project's purpose and need in broad terms rather than in Enbridge's narrow terms. Then, the Commission would be in a position to consider a broad range of environmental impact evidence, rather than only evidence for alternatives that fall within the DEIS's current narrow definition of purpose and need. 2667-9 cont

By adopting a narrow definition of purpose and need, the DEIS limits the alternatives selected to a narrow set that, with the exception of SA-04, are entirely defined in terms of Enbridge's purpose and need. Such narrow definition is illegal. Therefore, the Commission must adopt a legally permissible definition of purpose that is broad enough to encompass the full scope of alternatives allowed by Minn. Stat. § 216B.243 and Minn. R. Ch. 7853.

Because the DEIS relies entirely on statements of purpose provided by Enbridge without any critical analysis of these statements, DEIS Section 2.2 does not a clear statement of purpose and need. Taking DEIS Section 2.2 at face value, it defines the purpose and need of the project as:

- Reducing Enbridge's cost of operation;
- Reducing maintenance and the impact of maintenance on current easement holders of the existing Line 3 Pipeline;
- Meeting current and possibly future demand for crude oil transportation services for Canadian crude oil by refineries apparently in Petroleum Area Defense District II (the Midwest region), which demand is assumed to be greater now and in the future than the current capacity of the Enbridge Mainline System;
- Allowing Enbridge's customers access to crude oil transportation service capacity that exceeds customer demand;
- Restoring the capability of Line 3 to transport heavy crude oil and to increase its capacity in order to reduce limits on customer access to crude oil transportation services and increase the operational flexibility of the Mainline System; and
- Increasing the energy efficiency of transporting crude oil of Enbridge's Mainline System.

The foregoing definition entirely fails to address the "underlying" purpose and need for the Project, and instead defines purpose and need entirely in terms of Enbridge's needs. Enbridge's purpose and need for the Project is not the "underlying" purpose and need for the Project. Most of the foregoing elements are specific to Enbridge and cannot logically be applied when evaluating reasonable alternatives. For example, reducing Enbridge's costs of operation,

providing additional service to Enbridge's customers on the Mainline System, and increasing Enbridge's operational flexibility and energy efficiency, could not be accomplished by alternatives other than those that modify Enbridge's pipeline system. Those elements that could arguably relate to other alternatives, such as the alleged greater demand and restrictions on customer access to crude oil transportation services, are based entirely on allegations made by Enbridge without any critical analysis of how such statements relate to the "underlying" purpose and need for the Project.

2667-9 cont

Thus, the DEIS entirely fails to describe the "underlying" purpose and need for the Project, and instead defines purpose and need with regard only to Enbridge's purpose and need for the Project. This failing has significant implications for all subsequent analysis contained in DEIS Section 4, because it determines the scope of alternatives to the Project that are analyzed in the EIS, as well as the factors that the DEIS considers in the evaluation of an Alternative's ability to accomplish the Project purpose.

By adopting Enbridge's narrow definition of purpose and need, the DEIS fails to provide a clear statement of the underlying purpose and need for the Project. This means that the DEIS fails to provide meaningful analysis of whether or not a proposed alternative could fulfil the underlying purpose and need, and results in selection of only a very narrow range of alternatives.

DEIS Chapter 4 preliminarily considers the following alternatives:

1) The no-action alternative (DEIS Section 4.2.3);
2) Expansion of the existing Line 3 (DEIS Section 4.2.3);
3) Use of other pipelines including the Keystone XL Pipeline, the Energy East Pipeline, the Wood River Pipeline, the Minnesota Pipeline, and existing pipelines in the Enbridge Mainline System including Lines 1, 2A/B, Line 4, and Line 67 (DEIS Section 4.2.4);
4) SA-04 (DEIS Section 4.2.5);
5) Transportation by rail either for the full initial capacity of the Project or the incremental capacity that would be provided by the Project (DEIS Sections 4.2.6 and 4.2.8);
6) Transportation by truck either for the full initial capacity of the Project or the incremental capacity that would be provided by the Project (DEIS Section 4.2.7 and 4.2.9); and
7) Use of a smaller diameter pipeline (DEIS Section 4.2.10).

Of these, Chapter 4 rejects alternatives 2, 3, and 7. As discussed below, rejection of these alternatives is based on flawed reasoning and is biased by the DEIS's adoption of Enbridge's narrow definition of purpose for the Project. In effect, the rejection of these proposed alternatives resulted in the consideration of just four alternatives: the no action alternative, SA-04, transportation by rail, and transportation by truck. As described below, the rail and truck alternatives are patently unreasonable, inappropriate, and specious, such that their consideration

violates the Minn. R. 4410.2300.G requirement that alternatives be "reasonable." The trucking and rail alternatives are nothing more than strawmen set up to be knocked down. This means that the DEIS considered only two reasonable and appropriate alternatives: the no-action alternative, as required by law, and SA-04. This list of alternatives is entirely too limited to fully inform the Commission of the environmental impacts of possible alternatives to the Project that it must consider under the broad alternatives analysis mandated by Minn. Stat. § 216B.243 and Minn. R. Ch. 7853.

Comments on DEIS Section 4.2.3 – No Action Alternative

DEIS Section 4.2.3 starts its analysis by assuming that the purpose of the project is to transport 760,000 bpd of crude oil. It does not evaluate any range of need for capacity that may be needed by the market. It then states that "Because Enbridge has already determined that upgrading the existing line is not feasible, upgrading the existing line to a higher capacity was not considered in the CN evaluation." However, DEIS Section 4.2.3 does not offer any evidence that Enbridge's assertion is correct, nor does it acknowledge that the Commission may consider evidence indicating that upgrading the existing Line 3 to a higher capacity is feasible. This unquestioning adoption of Enbridge's assertions related to feasibility of an alternative is consistent with the unquestioning adoption of Enbridge's allegations of purpose that form the basis for DEIS Section 2.2. It is further evidence that the DEIS fails to contain an independent analysis of alternative selection. 2667-10

It is inappropriate for the DEIS to summarily dismiss an alternative from environmental review based on an unanalyzed statement by a project applicant, without offering any information and data on this alternative whatsoever, particularly when the alternative could eliminate the need for an entirely new pipeline route. For example, the DEIS fails to consider and offers no data on the feasibility and cost of upgrading Line 3 only between the Clearbrook and Superior Terminals, versus upgrading the entire pipeline. Since the DEIS fails to provide any analysis of the feasibility of this alternative, it is not known whether Enbridge's statement regarding feasibility related to the entire pipeline or just the segment between the Clearbrook and Superior Terminals. Also, the DEIS says nothing about <u>why</u> this alternative is not feasible. Enbridge's allegation of infeasibility could be based on engineering grounds or financial grounds, or its assertion could prove to be entirely false. The DEIS provides no reasoned decision for rejecting the possibility of increasing the capacity of the existing Line 3 above 390,000 bpd, and thereby rejects a potentially reasonable alternative without a reasoned basis. Since the Commission will ultimately determine the feasibility of expanding the capacity of existing Line 3, it is inappropriate for the DEIS to summarily dismiss this possible alternative based on a bald-faced allegation by Enbridge. In order for the Commission to fully analyze the possibility of expanding the capacity of the existing Line 3, particularly with regard to its 2667-11

environmental impacts, the DEIS must include expansion of capacity of Line 3, at least between the Clearbrook and Superior Terminals, as an alternative. 2667-11 cont

Also, DEIS Section 4.2.3 – without critical analysis – accepts Enbridge's assertions about the cost of maintenance of existing Line 3, the required number of integrity digs to maintain Line 3's capacity at 390,000 bpd, and the comparative cost of future maintenance of a new pipeline, which would change over time. The DEIS essentially frames the no-action alternative as nonviable, but does so without considering the costs and impacts of constructing an entirely new pipeline. This comparison of the no-action alternative to Enbridge's purposes for the Project, as defined by DEIS Section 2.2, rather than to its underlying purpose and need, results in an obvious bias toward Enbridge's Project.

Comments on DEIS Section 4.2.4 – Use of Other Pipelines

DEIS Section 4.2.4 considers whether other pipelines are reasonable and could accomplish the underlying purpose and need. This section identifies the following pipelines: 2667-12

- TransCanada's existing Keystone Pipeline;
- TransCanada's proposed Keystone XL Pipeline;
- TransCanada's Proposed Energy East Pipeline;
- Koch Industries' existing Wood River Pipeline;
- Koch Industries' existing Minnesota Pipeline; and
- Enbridge's existing Mainline System pipelines, which "consists of Line 3 and other pipelines, including Line 1 (237,000 bpd), Line 2A (442,000 bpd), Line 2B (442,000 bpd), Line 4 (796,000 bpd), and Line 67 (570,000 bpd)."

This being said, Table 4.2-3 does not include the existing Keystone Pipeline, though it is mentioned in the text. Moreover, given that this list includes both existing and proposed pipelines that currently or could in the future transport Canadian crude oil, it is incomplete. Additional existing and proposed pipelines that logically should be part of this list also include:

- Enbridge's existing Express-Platte Pipeline System (recently acquired via the Enbridge-Spectra merger), which runs from Alberta to Wood River, Illinois;
- Kinder Morgan's existing Trans Mountain Pipeline;
- Kinder Morgan's proposed Trans Mountain Expansion Project; and
- Plains Midstream's Rangeland-Glacier Pipeline System that crosses in the US in western Montana.

The DEIS dismisses all of these pipelines as alternatives without individual consideration. It states:

2667-12 cont

> Other existing and potential future pipelines with available capacity were considered as alternatives to the Project if they (1) interconnected in the crude oil supply region near Edmonton, Alberta; and (2) served the same Clearbrook and Superior destinations.
>
> * * *
>
> The EIS is not evaluating these alternatives based on whether they meet the need for this proposed Project. Their environmental impacts have been (or would be) evaluated in other jurisdictions. Therefore, the "other pipeline" CN Alternatives are not evaluated in the EIS.

These statements are in accordance with the illegally narrow definition of purpose and need found in DEIS Section 2.2.

DEIS Section 4.2.4 is legally deficient in a number of ways:

- fails to properly identify and individually consider each pipeline as an alternative;
- provides a blanket rejection with no reasoned discussion and instead essentially asserts without explanation that none of these other pipelines could meet the Project's purpose and need;
- falsely claims that the environmental impacts of use of the Wood River Pipeline have been "evaluated in other jurisdictions;"
- fails to consider unused capacity on the Minnesota and Wood River Pipelines as elements of an alternative;
- fails to consider proposed incremental expansions of the existing Mainline System pipelines as an alternative;
- fails to consider the potential impact of these pipelines on the need for the Project apart from whether or not they serve its underlying purpose.

The lack of reasoned analysis in DEIS Section 2.2 related to the underlying purpose and need means that it does not provide any conceptual framework in which to consider the potential impact of these other pipelines on meeting the purpose and need of the Project. For example, existing and proposed pipelines that serve other markets, such as those owned and proposed by Kinder Morgan, would not serve the same purpose but could impact the need for the Project.

Regardless, it is appropriate and reasonable to consider the purpose and need for the Project in the context of other existing and proposed pipelines. 2667-12 cont

DEIS Section 4.2.4 does not adequately consider the potential to upgrade Enbridge's existing Mainline System pipelines, which Enbridge has already proposed to do since 2015 on multiple occasions. In February of 2015, Enbridge provided the following slide in its Fourth Quarter 2014 Earnings & 2015 Financial Guidance Presentation, which shows a set of "low cost phased expansions that are attractive in a low crude price environment."

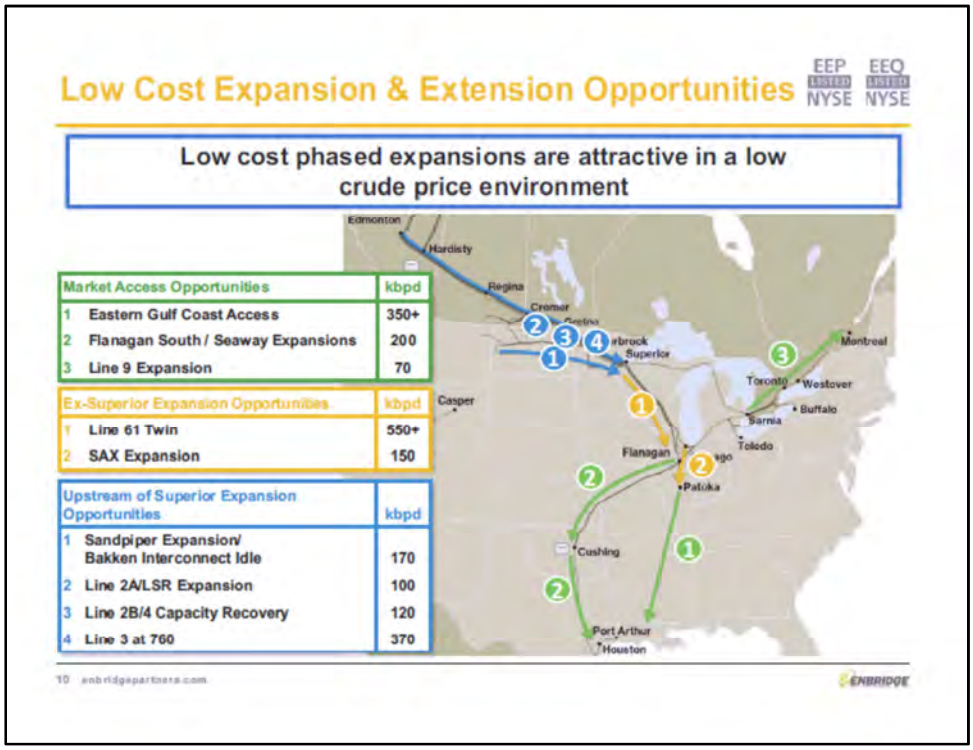

This slide shows that Enbridge identified the following Mainline System projects, other than the Line 3 project.

Expansion Project	**Kbpd**
Sandpiper Expansion/Bakken Interconnect Idle	170
Line 2A/LSR Expansion	100
Line 2B/4 Capacity Recovery	120
Total	**390**

2667-12 cont

Apart from the capacity added by the Line 3 project, these proposed enhancements would increase capacity by 390,000 bpd – more than the proposed Project. Enbridge included this list of projects in investor presentations from March 2015, June 2015, and December 2015, except the December presentation increased the capacity of the "Line 2B/4 Capacity Recovery" project to 150,000 bpd, making the total expansion, apart from Line 3, up to 440,000 bpd.

In July of 2016, Enbridge provided the following slide to its investors:

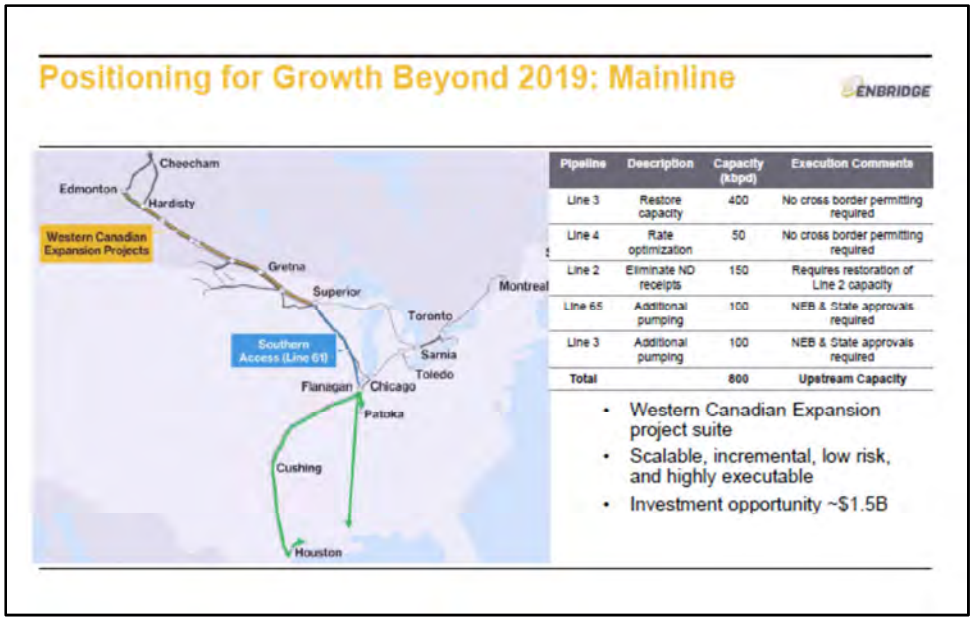

This slide was also included in Enbridge's September and November 2016, and January 2017 investor presentations. It shows that Enbridge identified the following projects as feasible expansions of the Mainline System that would provide up to an additional 300,000 bpd of capacity.

Expansion Project	**Kbpd**
Line 4	50
Line 2	150
Line 65	100
Total	**300**

Enbridge's February 17, 2017, presentation to the New York Stock Exchange includes the following slide, showing that Enbridge plans to conduct an "Enbridge System Optimization" that would expand the capacity of the Mainline System in both 2017 and 2018 by an amount that appears nearly as large as the Project.

2667-12 cont

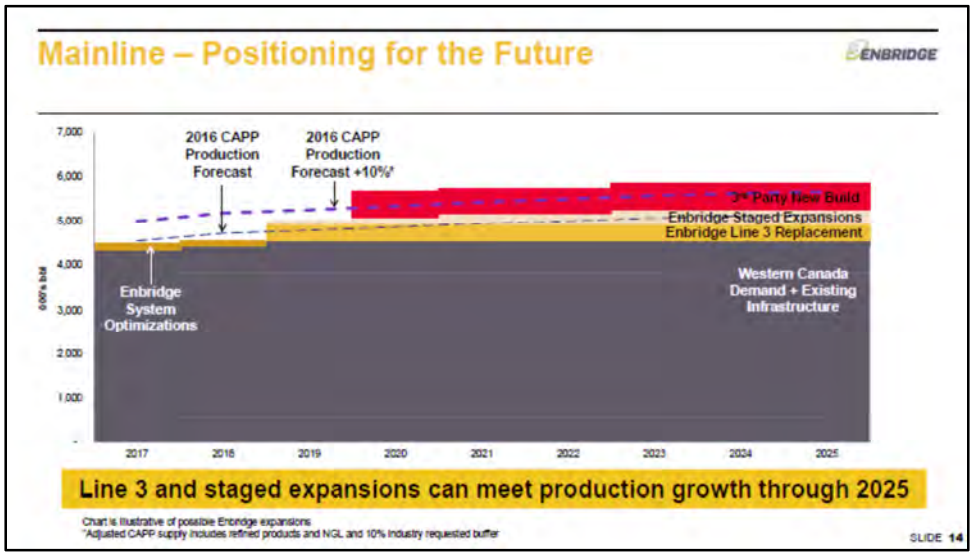

Enbridge's June 2017 investor Presentation includes the following slides, showing a different set of "low cost, highly executable, staged expansions" that total 500,000 bpd in capacity, some of which Enbridge plans to construct in 2019 – the same year in which it hopes to begin operation of the Project.

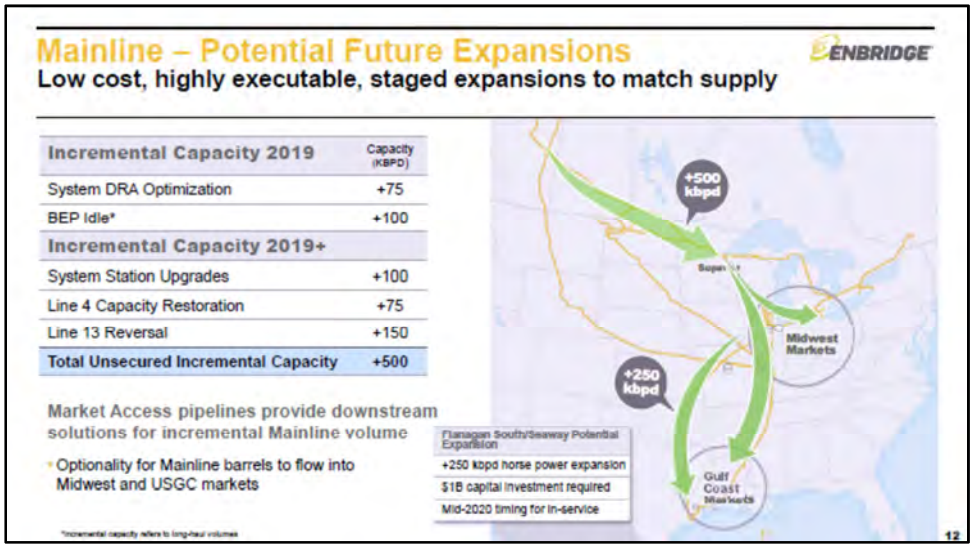

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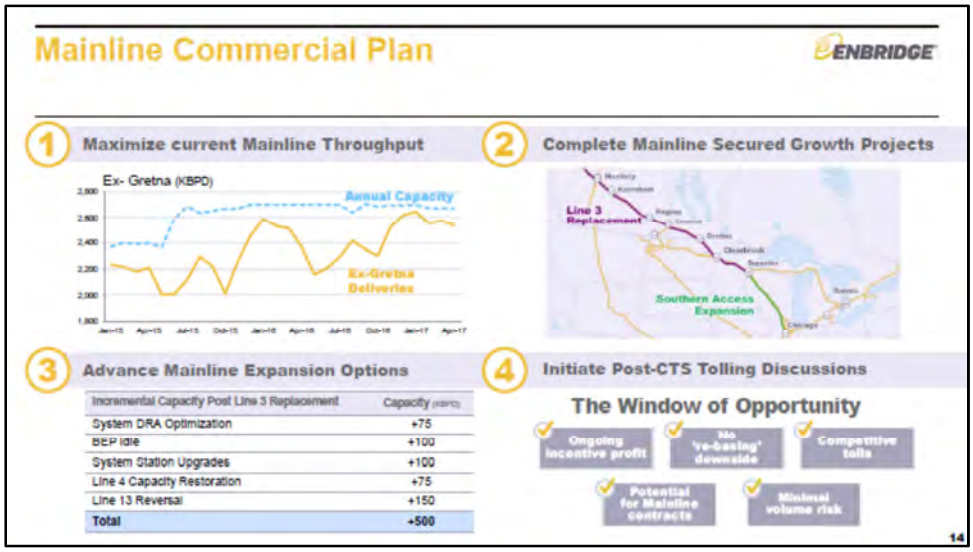

The expansions identify are described as follows:

Expansion Project	**Kbpd**
System DRA[13] Optimization	75
BEP Idle	100
System Station Upgrades	100
Line 4 Capacity Restoration	150
Line 13 Reversal	150
Total	**500**

It should be noted that Enbridge now proposes to reverse the flow of Line 13 (Southern Lights), which currently transports diluent from Illinois to Alberta. In addition, the following slide shows that Enbridge has proposed to expand the Express Pipeline that it now owns, but it does not provide a figure for the amount. Since the Express Pipeline connects to the Platte Pipeline that terminates in Wood River, Illinois, this expansion would serve many of the same markets as the Project.

[13] "DRA" is an acronym for drag reducing agent. Enbridge has not released further information about the other proposed expansion projects.

2667-12 cont

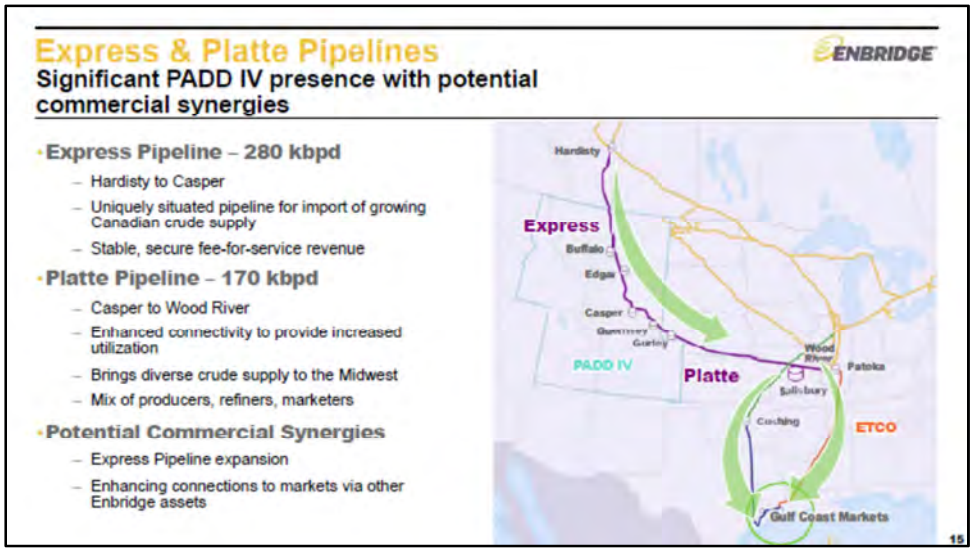

What is remarkable is that the DEIS does not identify much less consider any of these Mainline System expansions as an alternative to the Project, even though Enbridge itself has promoted these expansion projects on multiple occasions and described them as "low cost phased expansions that are attractive in a low crude price environment" and "low cost, highly executable, staged expansions." Yet, the existence of these incremental expansion projects has been repeatedly brought to the Department's attention in scoping. Further, it appears that Enbridge has accelerated the timeframe for some of these projects to be online in 2019, the same year that it hopes to bring the Project online.

What is even more remarkable is that since these expansion projects all relate to existing pipelines, implementing them would have significantly lower environmental impacts than the Project, yet the Department has determined that they should not be considered as alternatives in an environmental impact statement – without explanation as required by Minn. R. 4410.2300.G.

More remarkable still is that the DEIS deems the patently specious trucking and railroad alternatives to be "reasonable," yet ignores the obviously feasible and "highly executable" Mainline System incremental expansions that could increase import capacity on the Mainline System to a greater degree than the Project.

It appears that the DEIS adopts such a narrow definition of purpose and need that obviously viable Mainline System expansion projects serving the same terminals as the proposed Project are not within the Project's purpose and need and are deemed to be "unreasonable." The DEIS's rejection of Mainline System expansions also appears to be in conflict with the statement in DEIS Section 4.2.4 that "Other existing and potential future pipelines with available capacity were considered as alternatives to the Project if they: (1) interconnected in the crude oil supply region near Edmonton, Alberta; and (2) served the same Clearbrook and Superior destinations."

Since Mainline System expansions would interconnect with crude oil supply near Edmonton and would serve the Clearbrook and Superior Terminals, the DEIS by its own terms should consider these expansions as an alternative to the Project. 2667-12 cont

The incremental expansions fall squarely within the scope of Minn. Stat. § 216B.243, Subd. 3(6), which expressly mandates that the Commission consider alternatives that would "upgrading of existing . . . transmission facilities . . . ." Moreover, the range of total capacity additions described to investors since February 2015 (between 300,000 bpd and 500,000 bpd) have been approximately the same size as the capacity addition that would be provided by the Project. Enbridge might argue that it has timed these system expansions to come online after the Project, but Minn. R. 7853.0130(B)(1) requires that the Commission consider the "size, the type, and the timing of the proposed facility compared to those of reasonable alternatives." Thus, the DEIS must evaluate the timing and size of the Project relative to the timing of these alternative expansion projects. It is clear that Minn. Stat. § 216B.243 and Minn. R. 7853.0130(B) require that the Commission consider meeting claimed forecast increases in oil transportation service demand through alternatives based on upgrades and more efficient use of existing infrastructure. A failure to consider such alternatives would therefore violate state law. If state law requires such consideration in the evidentiary hearing, then the DEIS must include an assessment of the environmental impacts of a Mainline System expansion alternative. Otherwise, the Commission would not be able to assess the environmental merits of such expansions relative to the Project.

The DEIS's failure to consider expansion of capacity of other Mainline System pipelines is therefore a violation MEPA and must be redressed.

Another possible alternative that is not adequately described yet summarily dismissed is the alternative that would follow the existing Mainline System corridor to Clearbrook, and from there either use unused capacity on the Koch Industries-owned Minnesota Pipeline, or at least follow this pipeline's corridor, to a connection with the Wood River Pipeline, at currently mothballed 250,000 bpd pipeline also owned by Koch Industries that terminate in Wood River, Illinois (the entire route is herein referred to as the "Wood River Alternative"). DEIS Section 4.2.4 fails to adequately describe this alternative. Although it lists the Wood River and Minnesota Pipelines in Table 4.2-3, this table does not connect the dots of the Wood River Alternative Route. Yet, this route was expressly provided to the Commission as an alternative during scoping.

DEIS Section 4.2.4 does not provide an explanation for why the Wood River Alternative was rejected, except that it can be inferred that it was rejected because it did not serve the Superior Terminal. But then, neither does SA-04, yet SA-04 is considered a reasonable alternative. Since the Wood River Alternative would include construction of a new pipeline from Alberta to the Clearbrook Terminal, it both interconnects with crude oil supply in Alberta

and the Clearbrook Terminal. Rejection of the Wood River Pipeline Alternative because it does not connect with the Superior Terminal while allowing consideration of SA-04 is internally inconsistent. The DEIS cannot simply ignore possible alternatives and then reject them without providing any alternative-specific reason. 2667-12 cont

The requirement that all MEPA alternatives (except SA-04) must pass through both the Clearbrook and Superior Terminals is based on the illegally narrow definition of purpose and need contained in DEIS Section 2.2. This section merely adopts Enbridge's definition with regard to starting and ending points and fails to consider the underlying need for the Project, which is ultimately to increase oil transportation services to northern Illinois for subsequent transportation on Enbridge's downstream market access pipelines, including but not limited to the Flanagan South Pipeline, Line 78, and the Southern Access Extension Pipeline. The Wood River Alternative would serve the same or very similar markets.

As recently as 2013, Koch Pipeline Company investigated the possibility of incorporating this Pipeline into a project that would ship 250,000 bpd from North Dakota to Illinois via Clearbrook.[14] Now, FERC records indicate that the Koch Pipeline Company stopped paying taxes on it in Minnesota in 2014, such that this pipeline is just a liability to the state and the landowners who host it. The Commission should not allow a regulated utility to mothball this major asset without explanation. Further, since use of the Wood River Pipeline would require no new construction except at pump stations to allow reversal of its flow, the reuse of the Wood River Pipeline would result in significantly few adverse environmental impacts.

Similarly, there is almost certainly substantial unused capacity on the pipelines between Clearbrook and the Twin Cities. Prior to the operation of the MinnCan Pipeline, the two 16-inch pipelines plus additional segments of 16-inch looping pipeline between Clearbrook and the Twin Cities transported an average of about 280,000 bpd.[15] The MinnCan Pipeline, with a total maximum capacity of 350,000 bpd, started operation in the fourth quarter of 2008. The following chart of data reported to FERC by the Minnesota Pipe Line Company[16] shows the average barrels of oil moved in each quarter from the first quarter of 2004 until the second quarter of 2016.

[14] Reuters, Koch Pipeline seeks shipper Interest in Bakken pipeline (Jun. 18, 2013) http://www.reuters.com/article/2013/06/18/koch-pipeline-bakken-idUSL2N0EU0OK20130618
[15] Data available at https://www.ferc.gov/docs-filing/elibrary.asp.
[16] *Id*.

2667-12 cont

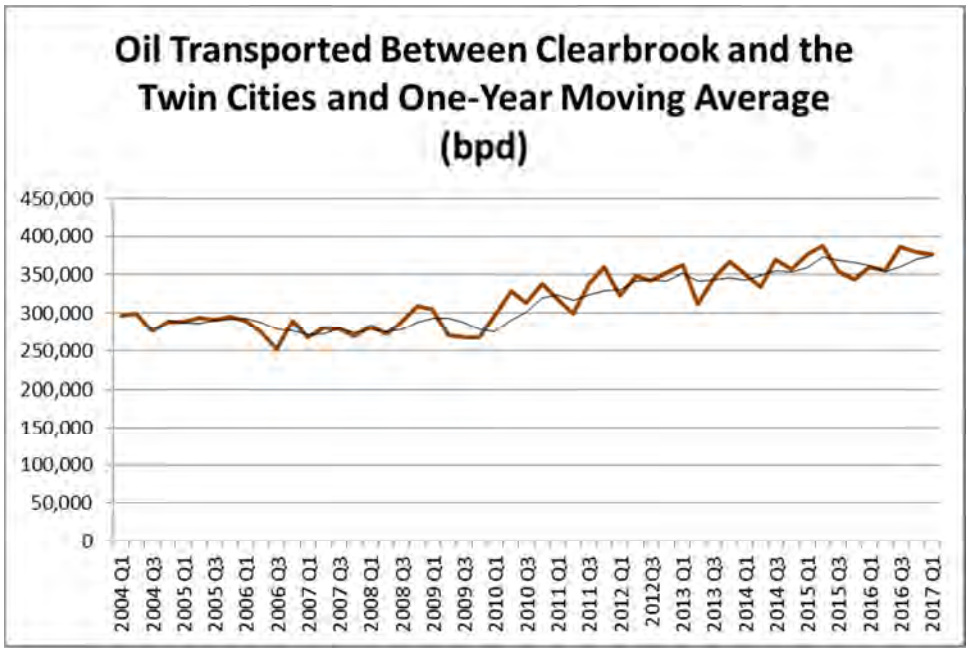

Recent utilization of the pipelines between Clearbrook and the Twin Cities has been just under 380,000 bpd,[17] or about 100,000 bpd more oil than before the start of operation of MinnCan, and less than 30,000 bpd than the maximum capacity of the MinnCan Pipeline. Thus, unless one or more of the older 16-inch pipelines have been abandoned, the pipelines between Clearbrook and the Twin Cities have the capacity to move at least an additional 250,000 bpd, which is line with the Koch Industries 2013 proposal.

This means that the oil industry has the capacity to move about 250,000 bpd oil from Clearbrook all the way to Wood River, Illinois, but refuses to utilize this capacity. The fact that the industry cannot seem to cooperate with amongst themselves is not reason to ignore the possible benefits of using mothballed pipeline capacity. Both Minn. Stat. § 216B.243 and MEPA are intended to explore efficient use of existing resources as an alternative to building new infrastructure. It could be argued that this alternative is not reasonable because it would not transport either 760,000 bpd or the incremental amount of 370,000 bpd. Such argument fails because an alternative under MEPA does not need to be the same size, particularly if it could be combined with other incremental expansions of existing infrastructure to meet a significant amount or even all of proven need. The DEIS must not limit consideration of alternatives to only those that all by themselves can transport at least 370,000 bpd. Instead, <u>the DEIS should carefully investigate whether more efficient use of a combination of existing infrastructure can meet an underlying need</u>.

[17] *Id.*

The fact that the Wood River and Minnesota Pipelines are not owned by Enbridge is not sufficient reason to reject them from analysis in the DEIS, because ownership of infrastructure is not a valid reason under MEPA to refuse to analyze its possible use. Minn. R. 4410.2300.G states, in relevant part: 2667-12 cont

> An alternative may be excluded from analysis in the EIS if it would not meet the underlying need for or purpose of the project, it would likely not have any significant environmental benefit compared to the project as proposed, or another alternative, of any type, that will be analyzed in the EIS would likely have similar environmental benefits but substantially less adverse economic, employment, or sociological impacts.

Since the Wood River Alternative would meet the underlying purpose and need for the project, would have significant environmental benefits compared to the Project, and would have less adverse impact on Native American communities in northern Minnesota, it must be considered by the DEIS,

Therefore, the Wood River Alternative is a viable reasonable alternative such that the DEIS must consider it as an alternative to the Project.

Comments on DEIS Section 4.2.6 – Transportation by Rail

DEIS Section 4.2-5 contains the rail transportation alternative for 760,000 bpd. It assumes that rail would be used to deliver 360,000 bpd to Clearbrook, which it asserts is the approximate capacity of the Twin Cities refineries, and 400,000 bpd to Superior, which is the remaining balance. It calculates that these deliveries would require 10 unit trains of 110 cars each per day from Gretna, the last pump station in Canada, to Clearbrook and Superior. 2667-13

The rail transportation alternative is patently unreasonable and should be removed from the DEIS. It appears to be an artifact of the DEIS's legally defective definition of purpose and need in DEIS Section 2.2. Due to the adoption of a statement of purpose and need based completely on Enbridge's allegations, the DEIS requires that all alternatives (except SA04) pass through Clearbrook and Superior. This requirement summarily eliminated a substantial portion of potential alternatives from consideration and leaves the DEIS with alternatives, such as the rail alternative, that are obviously not viable. Thus, the rail alternative can be seen only as being a strawmen.

It is also unreasonable to consider only this "rail bridge" from Gretna to the Clearbrook and Superior Terminals, rather than rail transportation from Alberta directly to refineries, which is how rail transportation actually functions. 2667-13 cont

In addition, the math in this alternative is out of date and the assumptions are incorrect. This is not to say that correcting the math and assumption would result in a reasonable alternative. Instead, the errors are pointed out to show how little effort and critical analysis was committed to the development of this alternative.

Actual deliveries on the Minnesota Pipeline are readily available on the FERC website in the eLibrary (www.ferc.gov). The following chart show total crude oil deliveries to the Minnesota refineries.

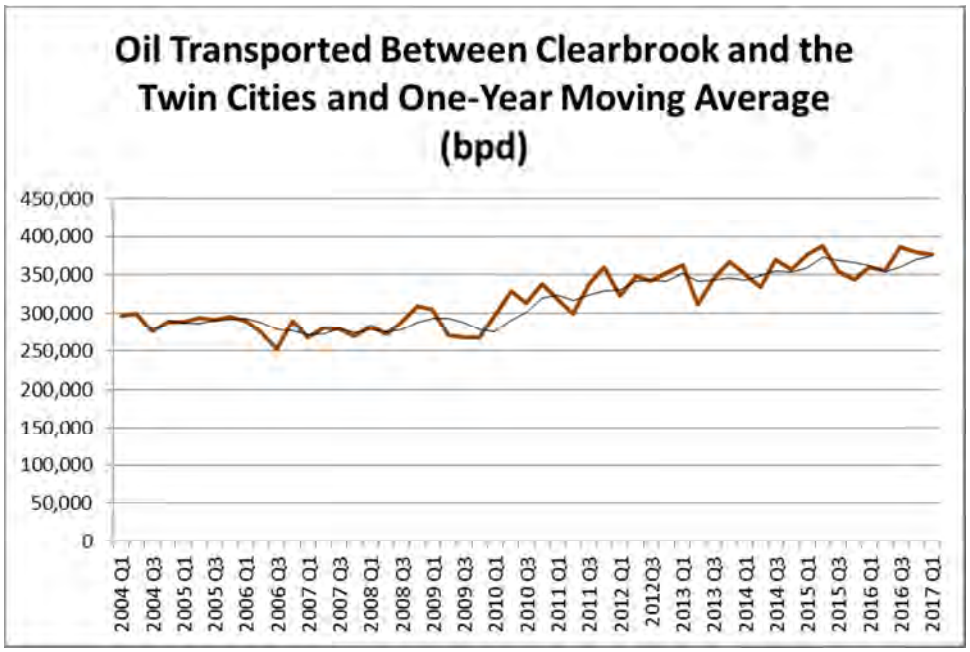

Deliveries to the Minnesota refineries averaged 369,679 bpd in 2016 and 365,406 bpd in 2015. The peak quarterly average in the past two years was 387,621 bpd in the second quarter of 2016. Thus, the DEIS's estimate of needed deliveries to the Twin Cities refineries is low. This being said, since the beginning of 2015, Minnesota's refineries have sourced an average of 19% of their oil, or 71,689 bpd, from Bakken suppliers via Line 81, which delivers into the Minnesota Pipeline. Thus, the Twin Cities refineries have on average sourced 81%, or 295,858 bpd, of their oil demand from Canadian suppliers via the Mainline System.

2667-13 cont

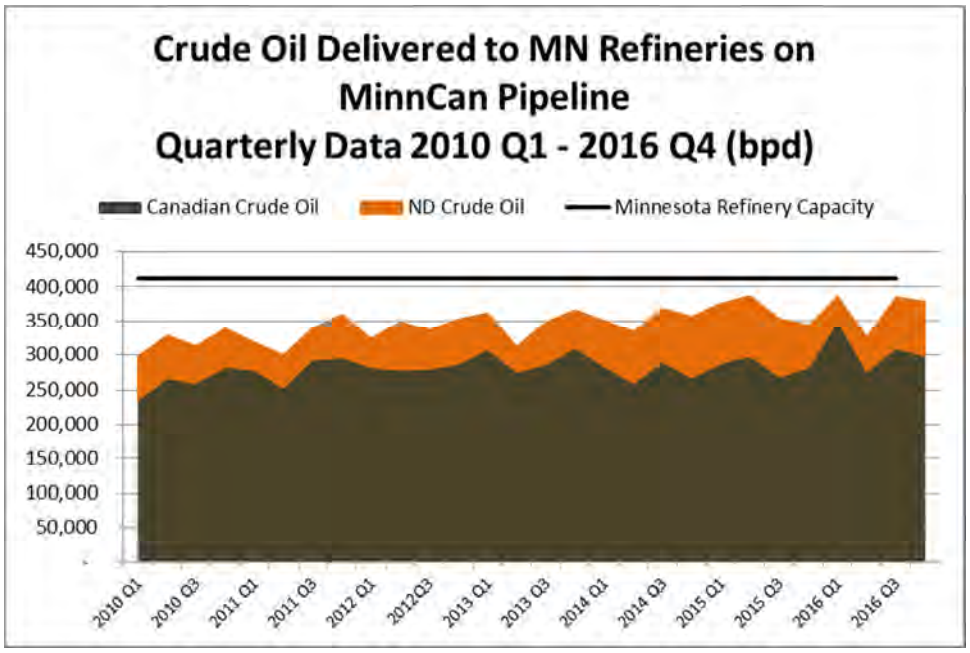

Also, USEIA company level import data from www.eia.gov shows that in 2016 heavy crude oil imports from Canada to Minnesota averaged 258,203 bpd, whereas light crude oil imports from Canada to Minnesota averaged 22,134 bpd. Since Line 3 currently transports light crude oil, as do Lines 1 and 2A/B, it is likely that relatively little oil refined in Minnesota is transported by the existing Line 3 pipeline. Likely, the heavy crude oil delivered to Minnesota is transported on Line 4. Although the Project is intended to operate in mixed service, there is no reason to believe that it would be the only Mainline system pipeline to serve Minnesota refineries.

The assumption that all of the oil supplied to the Twin Cities would be provided by rail is completely unexplained and merely adds to the absurdity of this alternative. Assuming for the sake of argument that Enbridge would build a rail link between Gretna (the most southerly Mainline System pump station in Canada) and Clearbrook and Superior, there would be no reason to assume that all of the Twin Cities refinery demand would be provided by such link, except perhaps as a form of fearmongering to create an argument that Minnesota fuel prices would rise.

The DEIS's estimate of tank car prices is out-of-date because it assumes that new tank cars would be purchased. The following chart shows that total crude oil shipments by rail in the US have dropped from approximately 1.1 million bpd to approximately 0.4 million bpd, a decrease of 59% between 2014 and 2017. This means that over half of all rail tank cars have been idled, such that their acquisition would likely be less than for new rail cars. This is another example of sloppy dated analysis for this specious alternative.

2667-13 cont

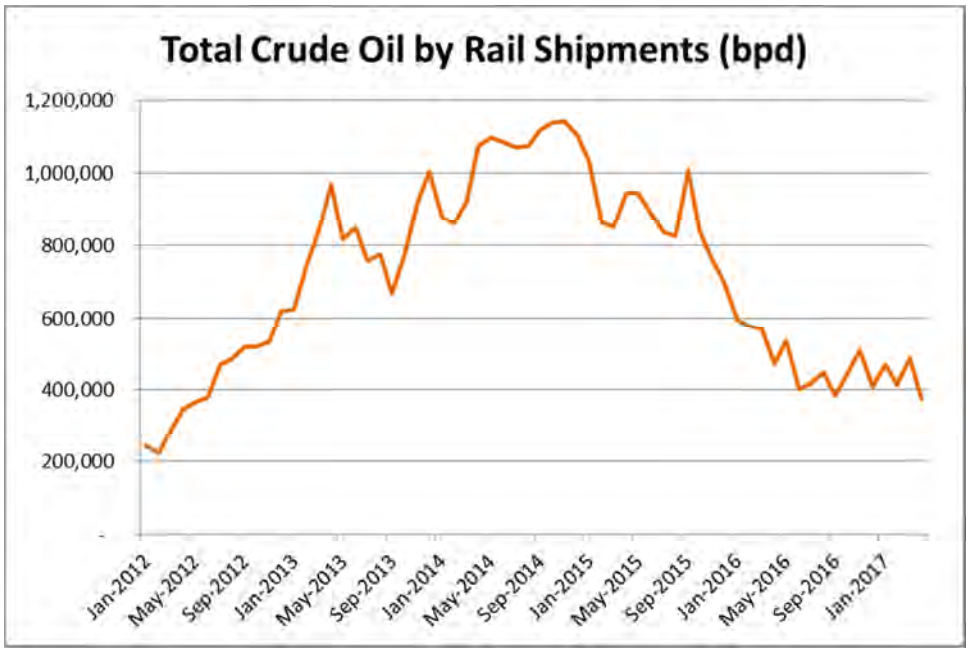

It is abundantly clear that the rail alternative described in DEIS Section 4.2.6 is not reasonable, and apparently it is based on out-of-date information, probably provided by Enbridge in 2015. It represents the worst sort of useless page-filling exercise that is intended to create an appearance of meaningful analysis. Since it is an unreasonable alternative, it must be stricken from the DEIS.

Comments on DEIS Section 4.2.7 – Transportation by Truck

The transportation by truck alternative is even more unreasonable that the rail alternative. It assumes that it is feasible to transport 4,000 tank trucks of crude oil each day between Greta and Clearbrook and Superior. It is a ridiculous and cynical paper exercise undertaken in an effort to create the appearance that the DEIS is has an adequate alternatives analysis. As with the rail analysis, its selection as an alternative is a direct result of the unlawful definition of purpose and need contained in DEIS Section 2.2. Since it is an unreasonable alternative, it must be stricken from the DEIS.

Comments on DEIS Section 4.2.8 – Existing Line 3 Supplemented by Rail

The analysis of the Line 3 supplemented by rail is no less unreasonable than the 100% rail option, and it suffers from the same outdated data and analytical shortcomings. It, too, is a direct product of the DEIS's failure to provide a purpose and need analysis that complies with MEPA. Since it is an unreasonable alternative, it must be stricken from the DEIS.

Comments on DEIS Section 4.2.9 – Existing Line 3 Supplemented by Truck

The analysis of the Line 3 supplemented by truck is no less unreasonable than the 100% truck option. It, too, is a direct product of the DEIS's failure to provide a purpose and need analysis that complies with MEPA. Since it is an unreasonable alternative, it must be stricken from the DEIS. 2667-13 cont

Comments on DEIS Section 4.2.10 – Smaller Diameter Pipeline

DEIS Section 4.2.10 considers whether a smaller diameter pipeline should be used. The DEIS's analysis of this alternative is remarkably one-sided in that if focuses almost exclusively on the similar construction impacts of a different sized pipes, without consideration of their different climate change impacts and different oil spill risks. It concludes: "Because the impacts are generally the same, a smaller diameter pipeline configuration was not evaluated in detail as a Project configuration alternative." This statement is false because (a) the impacts would not be the same; and (b) it is a gross oversimplification of the differing impacts to draw such a generalized conclusion. A compact car and an SUV are both vehicles made in factors that burn gasoline, but it is incorrect to say that they have the same impacts. The same is true of different sized pipelines.

With regard to oil spills, this section states: "The probability of an incident leading to a crude oil release would also be similar for a smaller diameter pipeline." Yet, the analysis completely ignores the fact that the worst case discharge from a smaller diameter pipe would be less. The pumping volume of a spill from a lower capacity pipe would be less in proportion to its lower capacity. For example, the now-defunct Sandpiper Pipeline had an ultimate annual capacity of 365,000 – less than 40% of the ultimate capacity of the Project (915,000 bpd). Thus, the pumping rate for a 24-inch diameter pipeline would be just 40% of that of the Project. The drain down volume would drop by the square of the radius of the pipes, such that a 24-inch pipe would have less than half of the drain down volume as that of a 36-inch diameter pipe. Thus, the maximum spill size from a 24-inch diameter pipe would likely be approximately half as large as that for a 36-inch diameter pipe. As a consequence, the damage from a complete rupture of a 24-inch diameter pipeline would be significantly less than for the Project.

Also, DEIS Section 4.2.10 fails to consider the significantly lower commitment of resources required for a smaller diameter pipe. A 24-inch diameter pipe would be comprised of significantly less steel, would require significantly less energy to transport to construction sites, and would require proportionally smaller ancillary equipment such as valves, PIG launchers, etc. This means that the overall environmental impacts of air emissions required for fabrication, delivery, and construction of a 24-inch pipeline would be much less than for a 36-inch diameter pipe.

Although the DEIS admits that a smaller volume of earth would need to be excavated to bury a 24-inch pipe, since the 288 mile trench would for a 24-inch diameter pipe generally be 1 foot less deep, and since trenching safety requires significantly more excavation as trenches deepen to prevent trench collapse, the volume of earth removed during construction would likely be substantially less than for a 36-inch pipe, such that the soil berms created during construction would be significantly smaller.

As DEIS Section 4.2.10 admits, a smaller diameter pipe would require less pumping horse power and consume less energy than a larger diameter pipe, but the DEIS provides no analysis of the significance of this reduction. It also admits that indirect air emissions from electrical generation would be less, but again makes no effort to quantify this. Similarly, the DEIS says nothing about the relatively smaller direct and indirect climate change emissions associated with a smaller diameter pipe.

The DEIS assumes that the impacts of constructing a 24-inch diameter pipe would be "generally the same" based on cherry picking certain impacts that might be similar while discounting impacts that would clearly be substantially less. To have integrity, the DEIS must provide a more searching analysis of this alternative before dismissing it. Likely, such analysis would find that the environmental footprint of a 24-inch diameter pipe would be less and that its impacts would differ. MEPA does not allow dismissal of an alternative based on sweeping generalizations, nor must alternatives differ dramatically and obviously to justify inclusion of an alternative. The purpose of the EIS is to investigate precisely these sorts of differences, rather than to serve as a platform for sweeping generalizations.

Moreover, the purpose for consideration of a smaller diameter pipe is in the event that the Commission finds that Canadian crude oil supply and/or US crude oil demand is not sufficient to merit a 36-inch diameter pipe. In addition, Minn. R. 7853.0130(B)(1) requires that the Commission compare the Project to alternatives with regard to: "the appropriateness of the size, the type, and the timing . . . ." Therefore, the Commission should be provided with an environmental analysis of the differing impacts of a smaller sized pipeline. Thus, the DEIS should provide an analysis of the impacts of a smaller diameter pipe in order to support such Commission analysis. A failure to consider smaller diameter pipe as an alternative within the DEIS means that the Commission will not be able to fully evaluate the merits of a smaller diameter pipe in the Certificate of Need hearing. If the available evidence supports a need for crude oil transportation capacity that is less than alleged by Enbridge, such that a smaller diameter pipe is justified, in the absence of an EIS analysis of a smaller diameter pipeline the Commission likely could not select this certificate of need alternative without subjecting itself to legal action, because without a MEPA analysis of such alternative the record would be incomplete as regards it.

Therefore, the DEIS must include a smaller diameter pipeline as an alternative.

Comments on DEIS Section 4.3 Description of Alternatives – Route Permit

The routes selected by the scoping process and included in the DEIS fail to comply with the MEPA requirements for selection of alternatives, because the DEIS relies on an illegal definition of purpose and need. The route alternatives analysis is equally distorted by adoption of a unduly narrow definition of alternatives that is excessively based on Enbridge's purpose for the Project, rather than the underlying purpose and need for the Project. Accordingly, the DEIS must provide a proper definition of the underlying purpose and need for the Project and then reevaluate the alternatives chosen for inclusion in the DEIS.

COMMENTS ON DEIS CHAPTER 5 – CERTIFICATE OF NEED EXISTING CONDITIONS, IMPACTS AND MITIGATION

Honor the Earth requests that the DEIS include a table of contents at the beginning of very long chapters, such as this one. Reference back to the overall table of contents is awkward.

Comments on DEIS Section 5.2.1.1.3

The DEIS states: "The potential exists for an inadvertent rupture of the bore hole or "frac-out" and release of the drilling fluid. Such events can occur when pressurization of the drill hole increases beyond the containment capability of the overburden soil material, which allows the drilling fluid to flow to the ground surface. The general risks to groundwater associated with HDD construction methods include loss of drilling mud into surficial aquifers, which could lead to turbidity in nearby aquifers and wells.".... "If a frac-out occurred and went undetected or was not quickly contained, impacts on groundwater quality could be long term and major." The DEIS should describe the probability of frac-out, provide an example of where it has happened, as well as a statement about Enbridge's history of frac-outs, and describe the potential impacts of frac-out in more detail

Comments on DEIS Section 5.2.4.3

Enbridge stated that the existing operations staff would be able to operate the Project and that few additional employees would be hired to assist the staff. As a result, operation of the pipeline would have no measureable impact on local employment, per capita household income, median household income, or unemployment in the ROI. The DEIS should clarify the impact of the Project on permanent long-term employment.

Comments on DEIS Section 5.3.4.1.2

It appears that the potential direct and indirect impacts on the economic baselines in the ROI were determined using employment numbers and construction related expenditures provided by Enbridge without independent critical analysis. The DEIS should provide an independent report on employment and direct and indirect economic impacts. Such report should compare Enbridge's estimates to those prepared by independent analysts for other projects. Further, the DEIS should estimate the number of Minnesotans that would likely be employed in construction as well as the number from other states.

With regard to property tax payments, the DEIS should note that Enbridge has appealed its property tax assessments for the Mainline System back to 2012. The DEIS should evaluate the likely taxes going forward in the event that Enbridge is successful with this appeal, and any liability that is imposed on Minnesota's counties should be offset against future estimated tax payments.

The DEIS should also include a per-county tax estimate for the existing Line 3 since it is already in place, and information about the current level of income taxes generated by the pipeline are not readily available to the public. This is necessary because the property tax estimates must offset the loss of tax payments should Line 3 be abandoned.

Comments on DEIS Section 5.3.4.3.1

Enbridge estimates that the material costs for construction of its preferred route in Minnesota to be $438.9 million. These expenditures during construction would result in temporary and negligible to minor indirect, positive impacts on those industries, particularly within the counties along the route, but the magnitude of the impact on the industries would depend on the size of the industries and the portion of the expenditures. The DEIS should estimate the proportion of the $438.9 that would go to Minnesota suppliers.

The DEIS fails to discuss the potential economic benefits to Minnesota of abandonment, which would be labor intensive. Although it would be difficult to determine the total length of pipe that would be subject to different levels of mitigation, it is possible to estimate the labor hours and therefore jobs required to perform the various forms of mitigation (removal, grouting, etc.) on a per mile basis.

Comments on DEIS Section 5.4.

The DEIS should fully account for all cultural resources including archaeological resources (e.g., sites and isolated finds), historic resources (*e.g.*, buildings and structures), and sacred places (including traditional cultural properties and traditional cultural landscapes). Cultural resources also include tribal, usufructuary rights resources both within reservation

boundaries and ceded lands by treaty (*e.g.,* traditional hunting and fishing areas) and treaty areas, which are discussed in detail in Chapter 9. The cultural resources addressed in this section are limited to direct and indirect impacts on archaeological and historic resources. This section should integrate tribal resources information from the tribal resources discussion.

Comments on DEIS Section 5.4.1.2

The DEIS says that DOC-EERA's consultation with SHPOs is ongoing, and the results of the consultation concerning determinations of eligibility, Project's effects, and any necessary treatment for impacts are not yet available. The results of DOC-EERA's consultation with Minnesota's SHPO should be included in a supplemented DEIS rather than wait until the FEIS. Otherwise, tribal peoples and tribal governments will not have an opportunity to correct any description of this consultation and to supplement missing information.

Comments on Section 5.4.2.1

The DEIS should recognize that all federally recognized tribes have a Tribal Historic Preservation Officer (THPO). The THPOs have assumed Section 106 responsibilities for archaeological sites and TCPs, as well as other duties; however, the state SHPO has retained Section 106 responsibility for buildings, structures, and landscapes within these reservations. Thus, Minnesota's agencies and contractors need to consult both the THPOs and the SHPO about federal undertakings within these reservations. The DEIS should include information from the THPOs. Also, the DEIS does not identify any TCPs and does not discuss the MIAC archeological regulations.

COMMENTS ON DEIS CHAPTER 8 – ABANDONMENT AND REMOVAL

As an initial observation, the DEIS contains no discussion of the roles and rights of landowners with regard to the mitigation required for abandonment of Line 3, nor does it address potential impacts to property values resulting from the risks of abandonment over time. The DEIS should recognize that landowners should have the primary determination in what happens on their lands – not the state and certainly not Enbridge. Although there would be circumstances in which mitigation activities on a property would impact neighboring properties such that these mitigation activities should be coordinated, as a general rule landowners should have the final say in what happens to abandoned pipes on their land. Otherwise, the determination will be left to Enbridge, which can be expected to serve its own interests. It would be imprudent and create a conflict of interest to allow Enbridge to decide mitigation conditions for any property not owned by it. Enbridge should not be placed in the position of deciding the mitigation decisions for landowners.

Comments on DEIS Section 8.2

DEIS Section 8.2 incorrectly describes federal law. All federal regulations related to the abandonment of interstate hazardous liquids pipelines, including crude oil pipelines, are provided below.

> 49 C.F.R. § 195.2 Definitions.
>
> As used in this part—
>
> Abandoned means permanently removed from service.
>
> 49 C.F.R. § 195.59 Abandonment or deactivation of facilities.
>
> For each abandoned offshore pipeline facility or each abandoned onshore pipeline facility that crosses over, under or through a commercially navigable waterway, the last operator of that facility must file a report upon abandonment of that facility.
>
> (a) The preferred method to submit data on pipeline facilities abandoned after October 10, 2000 is to the National Pipeline Mapping System (NPMS) in accordance with the NPMS ''Standards for Pipeline and Liquefied Natural Gas Operator Submissions.'' To obtain a copy of the NPMS Standards, please refer to the NPMS homepage at http:// www.npms.phmsa.dot.gov or contact the NPMS National Repository at 703–317– 3073. A digital data format is preferred, but hard copy submissions are acceptable if they comply with the NPMS Standards. In addition to the NPMS-required attributes, operators must submit the date of abandonment, diameter, method of abandonment, and certification that, to the best of the operator's knowledge, all of the reasonably available information requested was provided and, to the best of the operator's knowledge, the abandonment was completed in accordance with applicable laws. Refer to the NPMS Standards for details in preparing your data for submission. The NPMS Standards also include details of how to submit data. Alternatively, operators may submit reports by mail, fax or e-mail to the Office of Pipeline Safety, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, Information Resources Manager, PHP–10, 1200 New Jersey Avenue, SE.,

> Washington, DC 20590-0001; fax (202) 366–4566; e-mail, ‘‘InformationResourcesManager@phmsa. dot.gov. The information in the report must contain all reasonably available information related to the facility, including information in the possession of a third party. The report must contain the location, size, date, method of abandonment, and a certification that the facility has been abandoned in accordance with all applicable laws.
>
> (b) [Reserved]
>
> * * *
>
> 49 C.F.R. § 195.402
>
> Procedural manual for operations, maintenance, and emergencies.
>
> * * *
>
> (c) Maintenance and normal operations. The manual required by paragraph (a) of this section must include procedures for the following to provide safety during maintenance and normal operations:
>
> (10) Abandoning pipeline facilities, including safe disconnection from an operating pipeline system, purging of combustibles, and sealing abandoned facilities left in place to minimize safety and environmental hazards. For each abandoned offshore pipeline facility or each abandoned onshore pipeline facility that crosses over, under or through commercially navigable waterways the last operator of that facility must file a report upon abandonment of that facility in accordance with § 195.59 of this part.

These regulations do not contain any requirements for what happens to a pipeline after it has been abandoned. Since the federal Pipeline Safety Act (PSA)applies only to operating pipelines, the abandonment requirements in federal law are intended to define when a pipeline ceases operation and therefore is no longer subject to the PSA. Put another way, the abandonment requirements in 49 C.F.R Part 195 describe the events which once accomplished determine the time that PSA no longer applies to a pipeline.

The PSA regulates the existing Line 3 because it is a “hazardous liquid pipeline facility” as defined by 49 U.S.C. § 60101(a)(5): “’hazardous liquid pipeline facility’ includes a pipeline, a

right of way, a facility, a building, or equipment used or intended to be used in transporting hazardous liquid." In turn, the term "transporting hazardous liquid" is defined by 49 U.S.C. § 60101(a)(22) as follows:

> ``transporting hazardous liquid"--
>
> (A) means the movement of hazardous liquid by pipeline, or the storage of hazardous liquid incidental to the movement of hazardous liquid by pipeline, in or affecting interstate or foreign commerce; but
>
> (B) does not include moving hazardous liquid through--
>
> (i) gathering lines in a rural area;
>
> (ii) onshore production, refining, or manufacturing facilities; or
>
> (iii) storage or in-plant piping systems associated with onshore production, refining, or manufacturing facilities;

A "hazardous liquid pipeline facility" is one type of "pipeline facility," as defined by 49 U.S.C. § 60101(a)(18): "'pipeline facility' means a gas pipeline facility and a hazardous liquid pipeline facility." Also, 49 U.S.C. § 60101(a)(19) defines "pipeline transportation" as follows: "'pipeline transportation' means transporting gas and transporting hazardous liquid." In turn, the PSA's purpose statement in 49 U.S.C. § 60102(a) authorizes the establishment of safety standards that apply only to "pipeline transportation and pipeline facilities,' meaning facilities that are used or intended to be used to move hazardous liquids. Once a facility is no longer used or intended to be used to move hazardous liquid, it is no longer a "hazardous liquid pipeline facility" subject to regulation under the PSA or its regulations in 49 CFR Part 195. Accordingly, the PSA give the federal government no power to regulate a pipeline once it is abandoned. As such, federal law does not and cannot require that Enbridge prepare a plan for what happens to a pipeline after it ceases operation, because Congress has not authorized any federal agency to do so under the PSA. This being said, the federal government does regulate the disposition of abandoned pipelines on federal lands pursuant to its granting of federal rights of way permits, but no law authorizes a federal agency to regulate the disposition of an abandoned pipeline on private or state land.

Also, Enbridge is not required to submit an abandonment report for the existing Line 3 under federal law, because it does not cross a "commercially navigable waterway." "Commercially navigable waterways" are shown at the National Pipeline Mapping System website, which is maintained by the Pipeline and Hazardous Materials Safety Administration

(PHMSA): https://www.npms.phmsa.dot.gov/CNWData.aspx. This website references the Bureau of Transportation Statistics National Waterways Network database at: https://www.bts.gov/, which in turn provides GIS shape files for the locations of commercially navigable waterways in the US. More easily accessible is a map of the commercially navigable waters in a Minnesota provided by a 2001 Minnesota Department of Transportation report entitled River Transportation in Minnesota.[18]

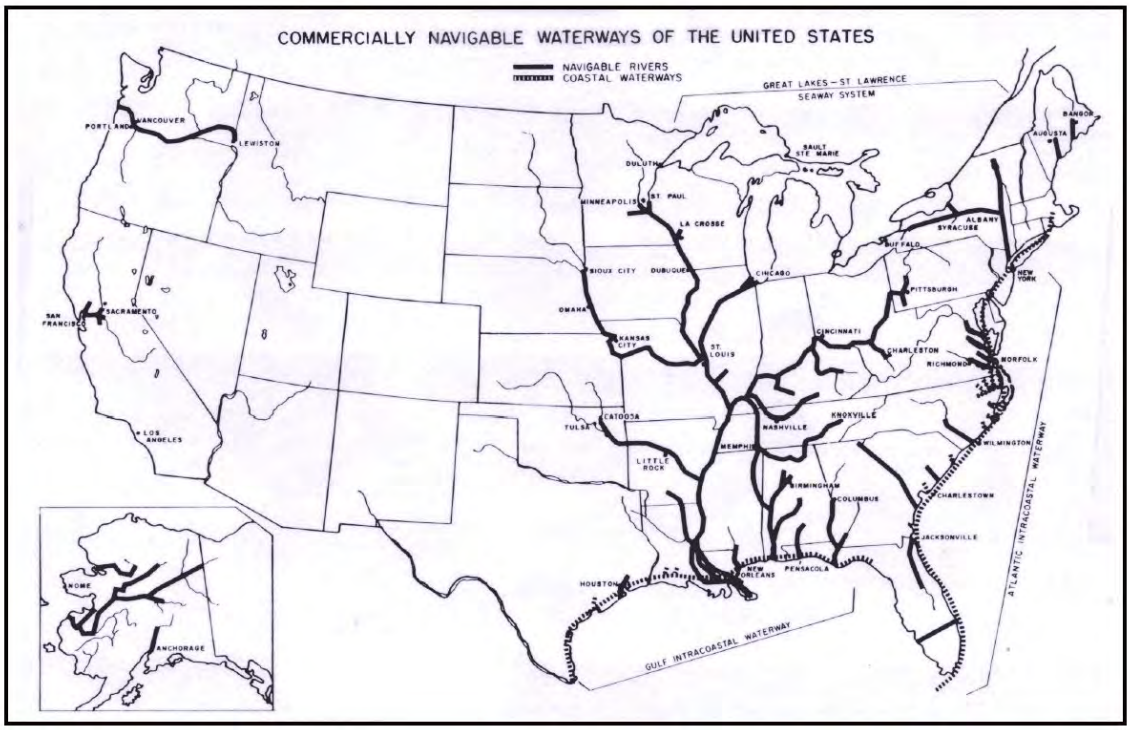

Map 2.1 Commercially Navigable Waterways of the United States

The federal data and state map show that the Mississippi River north of the Twin Cities is not a "commercially navigable waterway."

In addition, 49 C.F.R. § 195.450 includes the following definition of "commercially navigable waterway" as it relates to the definition of high consequence areas:

> A commercially navigable waterway, which means a waterway <u>where</u> a substantial likelihood of commercial navigation exists . . .

[18] Report available at: http://www.dot.state.mn.us/ofrw/PDF/2001RiverTransportationMN.pdf

(Emhasis added.) Thus, "commerically navigable waterways does not mean the entire extent of a waterway on which navigation exists, but rather only those parts of a waterway on which commercial navigation occurs.

Since the Mississippi River north of Minneapolis north of the Twin Cities is not commercially navigable, the existing Line 3 Pipeline does not cross "over, under or through a commercially navigable waterway." Therefore, the requirements in 195.59 related to reporting do not apply to abandonment of Line 3. The DEIS should be corrected to reflect that § 195.59 does not apply to the abandonment of existing Line 3.

The federal regulations do not "require that the pipeline owner prepare a plan that details how the basic requirements of the regulation will be met." The regulations contain no mention of a "plan." Instead, they require that Enbridge have a procedural manual for operations, maintenance, and emergencies. 49 C.F.R. § 195.402. This operations manual does not apply to a pipeline once it has been abandoned.

Accordingly, the following sentence in 49 C.F.R. § 195.402(c)(10) contains the <u>sum total</u> of all federal regulations in 49 C.F.R. Part 195 related to abandonment that apply to the existing Line 3 Pipeline:

> (c) Maintenance and normal operations. The manual required by paragraph (a) of this section must include procedures for the following to provide safety during maintenance and normal operations:
>
> * * *
>
> (1) Abandoning pipeline facilities, including safe disconnection from an operating pipeline system, purging of combustibles, and sealing abandoned facilities left in place to minimize safety and environmental hazards.

This sentence describes the steps that must be taken to convert an operating "hazardous liquid pipeline facility" from being a facility that is moving or intended to move hazardous liquids, and therefore subject to federal regulation, to a facility that is no longer moving oil or intended to move oil in the future, such that it is not subject to the PSA or any of its requirements. This regulation contains no mention of an abandonment plan. That idea appears to be an effort by Enbridge to make it appear that regulation of abandoned pipeline is controlled by federal law, when it is not. It contains no specific requirements related to the disposition of a facility once the above steps are taken.

Therefore, all statements in the DEIS that indicate that federal law contains any requirement related to the disposition of an abandoned pipeline are legally incorrect, misleading, and must be stricken.

DEIS Section 8.2 contains the following statements that are incorrect and must be amended or removed:

- "These regulations prescribe certain steps for formal abandonment of oil pipelines, including the disconnection, purging, and sealing of abandoned pipelines left in place,3 but require that the pipeline owner prepare a plan that details how the basic requirements of the regulation will be met." –This statement should be modified to state that federal law applies only to operating pipelines, such that it does not apply to the disposition of a pipeline once it is no longer in operation. Also, footnote 3 references 49 C.F.R. Part 192, but this part applies only to natural gas pipelines.
- "In addition, federal regulations require operators to file an abandonment report for each abandoned facility that crosses a navigable waterway." – The regulations require such report on for pipelines that cross a "commercially navigable waterway." This is a different legal status from a "navigable waterway." Thus, this sentence must be amended to reflect the correct federal term.

DEIS Section 8.3 contains the following statements that are incorrect and must be amended or removed:

- "Enbridge Has Filed a Proposed Abandonment Plan per PHMSA Regulations" and "Subsequently, Enbridge filed with the Minnesota Public Utilities Commission (Commission) a draft of the required plan that details how the basic requirements of the PHMSA abandonment regulations will be met (Appendix B)." – PHMSA regulations do not require an abandonment plan, but rather only that Enbridge's operations manual contain procedures for how it will disconnect Line 3 from an operating pipeline system, purge Line 3 of combustibles, and seal Line 3 to limit hazards. Characterizing this as a "plan" is misleading. Implying that the entire plan provided in Appendix B is required by federal law is misleading and incorrect. Appendix B contains many more terms and requirements than disconnection, purging, and sealing Line 3. Everything else in Appendix B , such as segmenting Line 3 , maintaining cathodic protection for Line 3, and monitoring Line 3,is not required by federal law, nor could PHMSA approve such terms because it has no legal authority to do so and no federal standards to apply to such plan components.
- "Enbridge would continue to monitor and maintain the abandoned Line 3 right-of-way in accordance with PHMSA regulations indefinitely." – Nothing in federal law requires that

Enbridge monitor and maintain Line 3 itself indefinitely. Since the right of way is used by other pipelines, then the right of way would need to be maintained to allow monitoring of the existing pipelines until they are also abandoned, at which time Enbridge or its successors would have no obligation under federal law to maintain the right of way.

Comments on DEIS Section 8.3.1

The DEIS states that leaving the pipeline in place would minimize the risk to operating pipelines. While there may be some risk, Enbridge conducts integrity digs and other maintenance activities on a regular basis. Federal law and Enbridge's own construction standards are sufficient to minimize the risk of harm to other pipelines.

Comments on DEIS Section 8.2.1.1.1

The DEIS fails to contain any data about the extent of existing contaminants outside of the existing Line 3 pipeline, such that the actual impact of such contamination is not assessed or known. Merely stating that such contamination might exist does not in any way assess the extent or amount of contamination, such that the DEIS does not in fact contain any information on the extent of this environmental impact. Merely noting that an impact could exist is not the same thing as describing the actual extent of the impact. Therefore, the DEIS should include a survey for existing contamination from Line 3. This section states that Enbridge "would develop a contaminated sites management plan to identify, manage, and mitigate historically contaminated soils and waters. Such a plan would require them to identify potential contamination sources along abandoned Line 3 and coordinate with resource agencies and authorities to determine appropriate mitigation measures." Such plan should be included in the DEIS as a mitigation measure so that it may be commented on by interested persons, and so that the Commission may approve it as modified by the Commission as a mitigation measure. It is disrespectful and condescending to landowners to allow development of this plan only between Enbridge and "resource agencies and authorities," particularly because the vast majority of such plan would apply to private property. As a mitigation measure, such plan must be included in the DEIS. Enbridge has the resources to prepare this plan now and should not be allowed to delay its development and approval until after a Commission decision.

The DEIS notes that Enbridge by itself has determined that segmentation is appropriate at 47 location and three other locations requiring study. Since the existing Line 3 is comprised of 282 miles of pipeline, this means that Enbridge intends to segment it into 6 miles segments (282/47=6.0). Appendix B provides a list of Enbridge's proposed segmentation locations, but it does not identify the parcels that would be impacted. The DEIS should contain enough information that property owners are aware of this potential impact.

Comments on Appendix B

Enbridge has submitted a "Line 3 Permanent Deactivation Plan". This plan has many deficiencies, including the following.

The plan fails to let landowners have any say in what happens to the pipe after abandonment – The plan says that, except with regard to road, rail, and waterbody crossings controlled by railroad companies and government entities, Enbridge will consult with landowners only where and when Line 3 starts to emerge from the ground. Plan at Section 4.3.2.3.1, Exposed Pipe, page 56. Even then, it does not give landowners any rights, and instead discusses Enbridge's internal decision making process. Otherwise, the Plan completely ignores landowner rights. Enbridge states a number of times that what's best for landowners is to leave the pipeline in the ground, but nowhere does the plan propose a process for Enbridge to even discuss what happens to the pipe much less allow landowners to decide what happens on their land. This "pipeline company knows best" approach is controlling and dismissive of landowners. The plan must grant landowners the right to determine what happens to an abandoned pipeline on their land.

The Plan presents false choice between complete removal and complete abandonment in place – Enbridge presents the straw man of complete removal on page 1: "Removing the 282 miles of existing Line 3 would create a significant risk to other operating pipelines and additional impacts to the environment, land use, and public safety similar to and exceeding those related to constructing a new pipeline project." Honor the Earth does not propose that the pipe should be completely removed, because this decision should be primarily determined by landowners. In some places removal may cause more damage, and in other places it would be appropriate. When a landowner decides that leaving a pipe in the ground is appropriate, then Enbridge should discuss options other than segmentation, such as filling a pipeline with grout to keep it submerged and prevent water transportation. By framing the decision as one of complete removal versus complete abandonment, Enbridge fails to acknowledge that there are a number of mitigation techniques and frames the options available to landowners and the Commission in inappropriately absolute terms. Mitigation should be determined on a property-by-property basis, which is how Enbridge acquired easements, engineered and constructed Line 3 in the first place.

The Plan does not consider potential for existing contamination or address how to mitigate it – The Plan considers contamination only from oil left in the pipe after deactivation and not the possibility of existing contamination caused during active operation of the pipeline. Plan Section 4.1 is entitled "Minimizing the Risk of Soil and Water Contamination" and states: "One identified risk is that soil and water contamination could occur from hydrocarbons remaining in the pipeline after it is removed from service. In order to minimize this risk,

Enbridge will purge the pipeline of crude oil and implement a cleaning program to remove remaining hydrocarbons from the pipeline." The plan says nothing about surveying the route for existing contamination. Thus, in this plan Enbridge does not even admit that existing contamination might exist, much less propose a plan to survey for it or remove it. Although Enbridge has made representations to the Department that it would develop a contaminated sites management plan to identify, manage, and mitigate historically contaminated soils and waters, and this possible future action is included in the DEIS (see, e.g., DEIS Section 8.4.1), the DEIS must actually include such plan. Since Enbridge has the resources to prepare its Line 3 Permanent Deactivation Plan, it also has the resources to prepare and submit into the record a contaminated sites management plan, so that the Commission can know and approve or modify such plan, and so that the landowners who are affected most by it have an opportunity to comment on it.

The Plan assumes that Enbridge maintain its electrical cathodic protection system for Line 3 for many decades and even hundreds of years – The plan proposes that Enbridge maintain the pipeline using cathodic protection ("CP" - an electric current that slows the corrosion process) "until such time that it is ineffective or otherwise detrimental." But, the Plan does not say what happens next. Table 1-1 of the Plan (page 2) states "With the application of CP, the first single points of through wall corrosion are not expected to occur for 25 to 50 years. Note that a single point of through wall corrosion would not cause the pipe to collapse. The structural integrity of the pipe is expected to remain intact for hundreds of years. Given these estimates, it is anticipated that the pipe will likely be filled with soil by the time it has corroded to a point of collapse, which will minimize subsidence." It should not be assumed that Enbridge or its successor and assigns will properly maintain such system. Instead, the DEIS should propose that the Commission require a financial assurance mechanism that would require funding sufficient to ensure continued maintenance should Enbridge, its successors or assigns fail to do so. Plan Section 4.3.2.4.2, Monitoring of CP System, makes clear that substantial effort is required to monitor the components of a CP system. This section does not describe the ongoing maintenance required to keep CP systems in operation. Should Enbridge fail to maintain its CP system, Figure 4-8 indicates that National Association of Corrosion Engineers (NACE) assumptions indicate that the pipeline could corrode through in less than 20 years. In this same table, Enbridge also states: "This ROW monitoring program will inspect for any signs of subsidence on the ROW and develop plans to address the issue if it arises." The Plan does not address what will happen after Enbridge leaves and terminates its ROW monitoring program. Enbridge claims it will maintain cathodic protection for abandoned Line 3 to slow its corrosion for decades and even centuries, when there is a very great risk that it will not do so or even will not exist over this period.

The plan fails to provide any financial commitment (bonding, state fund, etc.) to ensure that resources will be available should Enbridge cease to exist or transfer its interests to an underfunding successor – The plan assumes that Enbridge and its potential successor and assigns will maintain the CP system and monitor Line 3 for many decades if not hundreds of years, and generally asserts that Enbridge will address problems as they arise, including contamination. However, Enbridge does not propose any financial assurance mechanism that would protect landowners in the event that it ceases to exist or transfers its interest in the Mainline System to a company without the financial resources needed to redress problems caused by the abandoned pipeline. Honor the Earth note that the Canadian government after a lengthy regulator process determined that there is a significant risk that pipeline owners and operator would not follow through on their financial commitments, such that the Canadian government did establish a financial assurance mechanism to ensure that funding is available. There is a risk that Enbridge will be able to offload its liability onto landowners when doing so becomes financially necessary. This is the exact type of risk that is recognized by leaking underground storage tank laws and the federal Superfund law, both of which exempt crude oil pipelines from coverage. Enbridge essentially asks that landowners and the state simply trust that it will do the right thing for decades and centuries into the future, when in fact it should be expected to minimize its liabilities and maximize its return to its investors.

The Plan overstates Risk of Pipe Removal – Plan Section 3.1 states: "One of the greatest risks of removing a Permanently Deactivated pipeline is the risk of damaging adjacent pipelines or infrastructure, which can lead to significant public, environment, and operational impacts." Yet, Enbridge regularly undertakes integrity digs and other maintenance and has constructed entirely new pipelines adjacent to existing pipelines, in some places very closely adjacent to each other (and even over/under each other) apparently without incident. Therefore, it should be assumed that Enbridge has the capacity to safely remove the old pipe. Enbridge describes a number of construction challenges, but assumes the worst at all locations rather than acknowledge that construction challenges will be site-specific and can be considered by individual landowners on a property-by-property basis. Further, Enbridge assumes that removing the pipe would require the exact opposite process as installing it, including lifting the entire pipeline out of the trench and then cutting it apart (Figure 3-1), when it is obvious that the pipe could be cut apart in the trench. Since removal of a major pipeline has never happened, it seems likely that new demolition techniques and machinery may be required, just as specialized machinery is required for the construction of a new pipeline. The industry, including Enbridge, would appear to prefer to give the impression that removing a pipeline is too difficult and walk away without taking a hard look at how this can be done efficiently and safely.

COMMENTS ON DEIS CHAPTER 9 – TRIBAL RESOURCES

The summary of the Draft Environmental Impact ("DEIS") section addressing tribal resources begins with the assertion that it is not possible to "determine which alternative is better when each alternative affects tribal resources, tribal identity, and tribal health." This assertion does not account for a no build alternative, nor does it provide a detailed table outlining differences between the two, despite numerous tables throughout the document.

Numerous tribal concerns are identified in the DEIS, which the drafters placed in the Appendices, instead of in the body of the document. Impacts to tribal resources are not clearly defined under the "Cumulative Impacts" section, It is unclear how much substantive weight and consideration is being given to tribal nations that will be directly and irreparably impacted by the proposed Line 3 corridor.

Like many extractive industry projects, Line 3's preferred route carefully avoids existing tribal reservations, while sending the project as close as possible to reservation boundaries and often through ceded treaty territory that directly impacts tribal treaty rights.

The DEIS concludes its assessment of tribal resources by stating that any construction would have an unquantifiable impacts on tribal members and tribal resources. It makes no attempt to substantively compare the tribal-specific concerns associated with each alternative, instead stating it is "not possible to determine which alternative is better when each alternative affects tribal resources, tribal identity, and tribal health." Tribal members, tribal governments, organizations, and Minnesota citizens have provided extensive commentary as to the concerns of tribal nations, going so far as to provide a supplemental impact statement to inform the approval or denial of the preferred route.

While the DEIS quickly summarizes tribal resources into just a few categories, it is clear that tribal concerns go beyond archaeological resources (e.g., sites and isolated finds), historic resources (e.g., buildings and structures), and brief mention of sacred places (including traditional cultural properties and traditional cultural landscapes). 'Sacred places' are not included or examined anywhere in the DEIS aside from the tribal resources section. These are irreplaceable sites that hold deep significance to tribal nations and must be fully evaluated in coordination with a Tribal Historic Preservation Officer ("THPO") and impacted tribal members. While the state has recognized the need to include this information in the Final Environmental Impact Statement, it is concerning that none of these resources are being considered in the initial document put forth by the state. No data provided by THPO's is included in this massive document, despite ready access to such information. Federal law acknowledges and codifies consideration of culture, sacred sites, and traditional tribal resources in the National Historic Preservation Act as well as the National Environmental Policy Act.

Other resources listed by the DEIS include usufructuary rights resources both within reservation boundaries and ceded lands by treaty (e.g., traditional hunting and fishing rights). Cultural knowledge and resources such as the critically important practice of harvesting wild rice and traditional medicines must also be examined, documented, and studied for impacts to meet the requirements of an Environmental Impact Statement.

The federal and state governments have a long history of disregarding and disrespecting the rights of tribal nations that have been in North America prior to the formation of the United States. Simply disregarding tribal interests as unquantifiable rather than careful examination and development of appropriate mechanisms to weigh tribal interests continues this sordid legacy. Westernized systems of legal process can be adapted or amended to better consider the concerns of indigenous peoples.

The proposed project holds serious risks of potentially obliterating tribal culture and practices, particularly around the harvesting of wild rice -- it is therefore morally reprehensible to not collaborate and work with tribal nations, scholars, and minds to ensure that the state's regulatory system fully incorporates tribal interests and does not perpetuate the structural racism that systematically ignores, discards, and compounds the many struggles faced by Native American communities.

Further, the DEIS fails to consider the effect of a no build alternative on tribal members and resources. Instead, the tribal resources disregards complex testimony and concerns by stating no construction is the only tribally approved alternative, without fully examining what a no build option would mean.

COMMENTS ON DEIS CHAPTER 10 – ACCIDENTAL CRUDE OIL RELEASE

Honor the Earth has attached the "Comments on the Stantec Pinhole Release Assessment" prepared by CJE Consulting. Attachment B.

COMMENTS ON DEIS CHAPTER 11 – ENVIRONMENTAL JUSTICE

This chapter is wholly inadequate. It is inappropriately narrow in scope, methodologically unsound, and analytically shallow. Specific problems include the following topics, each of which is discussed in detail below. In addition, Honor the Earth provides the comments of

- Incorrect and unjustified use of county-level data as unit of benchmark comparison to define and identify minority communities

- Incorrect and unjustified use of county-level data as unit of benchmark comparison to define and identify low-income communities
- Inappropriate definition of a "region of interest" for the analysis, including the lack of a "regional setting"
- Lack of consideration of Health Professional Shortage Areas and Medically Underserved Areas/Populations
- Lack of consideration of exposure to existing contamination
- Inadequate assessment of the specific resources to be impacted
- Incorrect and unjustified use of county-level data as unit of benchmark comparison to define and identify minority communities
- inadequate assessment of the community's characteristics that shape potential impacts on them
- Inadequate consideration of the distribution of impacts within affected communities
- Lack of integration of traditional ecological knowledge
- Lack of consideration of Free, Prior, and Informed Consent or the United Nations Declaration on the Rights of Indigenous Peoples
- Inadequate analysis of human trafficking and associated impacts
- Lack of analysis of drug trafficking
- Inadequate discussion of spill impacts
- Inadequate analysis of health impacts
- Inappropriate attribution of facts to "an Ojibwe perspective" in order to discount them
- Disproportionate impact on Native populations is concluded but not documented or analyzed
- Lack of analytical depth allows for inaccurate conclusion that any of the alternatives would be equally bad
- Inadequate consideration of potential mitigation measures or process for selecting and implementing them
- Inadequate social impact assessment

Incorrect and unjustified use of county-level data as unit of benchmark comparison to define and identify minority communities

The DOC defines a minority area in the following way: "Low-income and minority populations were determined to be present in an area when the percentage of minority group or low-income population exceeded 50 percent of the county population, or was "meaningfully greater" than the general population of the county," and goes on to define *meaningfully greater* in the following way: "A difference of 10 percentage points or more was used to determine

whether the percentage of a minority or low-income group in a census tract in the ROI was "meaningfully greater" than that group's percentage in the respective county" (DEIS 11-2).

However, the DOC provides no justification for the methodological choice to aggregate benchmark data at the county level in order to identify EJ communities. The DOC explains in plain language why it thinks a statewide benchmark is not appropriate but it does not cite any policy guidance document, case law, regulatory precedent, or credible statistician or other academic source to justify that opinion:

"The metric used to identify EJ populations in this EIS is the comparison of census tracts to the whole of a county, which allows comparison of population groups within the same general vicinity. This provides the best comparison of proportional impact. The EIS uses a comparison against county data rather than statewide data because the statewide data combine data from widely varying areas and are not representative of any particular area. Additionally, the state is a dichotomy of urban and rural communities. In general, urban areas have higher percentages of minority populations, while rural areas have lower average incomes. Combining those data does not provide a clear comparison to establish levels of economic justice at a local level" (DEIS 11-2).

Honor the Earth disagrees with the methodological choice to aggregate benchmark data at the county level. The goal is to identify the existence of population groups that may be disproportionately impacted. The question is not whether one rural census tract contains concentrations of Native or low-income people relative to the other tracts in its rural county. That is a very twisted way of defining the research question. Benchmark aggregation at county level may be an effective method in an urban context, but not in this rural one. Nor is it effective with regard to Native American populations, which have unfortunately suffered drastic population loss from the well-concerted effort to systematically and structurally eradicate this demographic. Native American populations holding land bases are often located in rural areas, with checkerboarded lands that There is no law requiring that energy infrastructure be located in rural areas, and no justification for the implied premise that the level of risk to which the project would subject all rural people is somehow an acceptable baseline to which we can compare disproportionate impact.

The CEQ Guidance on Environmental Justice provides the following insight: "Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. In identifying minority communities, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a geographically dispersed/transient set of individuals (such as migrant workers or Native

American), where either type of group experiences common conditions of environmental exposure or effect. The selection of the appropriate unit of geographic analysis may be a governing body's jurisdiction, a neighborhood, census tract, or other similar unit that is to be chosen so as to not artificially dilute or inflate the affected minority population. A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds" (CEQ 25).[19]

It is worth noting that the CEQ Guidance document goes out of its way here to authorize and encourage agencies conducting environmental review not to restrict themselves to geographic definitions of "communities," especially Native American communities. It also goes out of its way to warn against and prevent *exactly* the kind of analytical error that the DOC is guilty of here, by choosing a unit of comparative analysis that "artificially dilutes" the affected minority population. Unsurprisingly, the DOC's method fails to identify the concentrations of Native and low-income people that indeed live in close proximity to the corridor. The only thing the analysis does show us is that in rural areas, there are typically not dramatic demographic differences between census tracts. But this is neither an interesting finding, nor is it relevant to the question at hand. The DEIS acknowledges that "13 of the 21 counties [along the APR] have a greater percentage of Native American populations than at the state level" (DEIS 11-4), but that simple truth is excluded from the methodological basis and therefore avoided in the analysis. In other words, the chapter acknowledges that the APR is home to concentrations of Native people, but manipulates the scale of geospatial data analysis in order to understate the problem.

In contrast, the US State Department's Supplemental EIS for the Alberta Clipper Expansion project carefully explains its "either or" approach to the use of state or county level benchmark comparisons, so as to always err on the side of inclusion: "The use of a conservative approach ensured that the analysis did not artificially dilute or inflate minority and low-income populations identified in respective small geographic areas. This SEIS identifies a block group or census tract as subject to environmental justice if, when compared to the state compositions, it has a meaningfully greater percentage of minority or low-income population, even if the percentage is not meaningfully greater than in the respective county. This SEIS also identifies a block group or census tract as subject to environmental justice if, when compared to the composition in the respective county, it has a meaningfully greater percentage of minority or

[19] Council of Environmental Quality (CEQ). 1997. Environmental Justice, Guidance under the National Environmental Policy Act. Executive Office of the President. Washington, DC.

low-income population, even if the percentages are not meaningfully greater than in the state" (SEIS 3.7-5).[20]

Incorrect and unjustified use of county-level data as unit of benchmark comparison to define and identify low-income communities

The DOC makes the same error when defining the threshold for a *low-income* area: "Based on recommendations from Minnesota PCA, low-income populations are those individuals with income below 185 percent of the poverty level. While Minnesota PCA generally uses a metric of 40 percent of population below 185 percent of poverty to establish EJ status, this analysis uses a difference of 10 percentage points or more to establish the 'meaningfully greater' measure consistent with the comparison of minority populations. As outlined above, the metric used to identify EJ populations in this EIS is the comparison of census tracts to the whole of a county..." (DEIS 11-2).

In this case, the DOC even acknowledges that the choice to compare to county statistics is a significant deviation from the standard methodology outlined in the MPCA's 2017 Environmental Justice Framework Implementation Report, which is the closest thing Minnesota has to an Environmental Justice policy or relevant guidance document: "The MPCA considers a census tract to be an area of concern for environmental justice if...more than 40% of the households have a household income of less than 185% of the federal poverty level" (MPCA 2017 13).[21]

As rationale for this methodological deviation, the DOC merely states the need for "consistency" with the way minority population is being defined. While the logic of staying consistent with one's previous mistakes may make intuitive sense to an agency that's never been asked to conduct an EIS before, unfortunately it fails to hold water as a scientifically acceptable methodological choice, and again the DOC provides no reference to a policy guidance document, case law, regulatory precedent, or credible statistician or other academic source to justify that choice.

The end result is a similar distortion of the truth. The DEIS acknowledges that "in 20 of those 21 counties [along the APR], the percentage of the population below 185 percent of the poverty level is greater than for the state as a whole" (DEIS 11-4). But once again, that simple truth is excluded from the methodological basis and therefore avoided in the analysis. The conclusion of the low-income area identification process is simply that "None of the census

[20] US State Department, Draft Supplemental EIS for the Line 67 Expansion Project, https://www.state.gov/documents/organization/267747.pdf
[21] MPCA Environmental Justice Framework Implementation Report, April 26, 2017. https://www.pca.state mn.us/sites/default/files/p-gen5-32.pdf

tracts crossed by Enbridge's preferred route has a meaningfully greater proportion of the population with income less than 185 percent of the poverty level compared to their respective county level" (DEIS 11-7).

Once again, the concentration of low-income people along the APR is both acknowledged and promptly dismissed in the same 16 page chapter!

Inappropriate definition of a "region of interest" for the analysis, including the lack of a "regional setting"

The ROI for this analysis is defined incorrectly: "The region of interest (ROI) for this analysis includes the census tracts within the counties crossed by Enbridge's preferred route and the route alternatives. The census tracts intersected by the right-of-way for Enbridge's preferred route and route alternatives constitute the geographic area within which potential disproportionate adverse impacts from the proposed Project are likely to occur. Data for the counties and the remaining census tracts within the counties were also compiled to provide a representation of the general population in the area surrounding the proposed Project, against which demographic and poverty data can be compared" (DEIS 11-2).

This is an inappropriately narrow and methodologically lazy definition of the project ROI. Why would we use county lines to define a region of interest for a linear project whose impacts follow ecological logics and not political ones? If a concentration of minority people lives near the pipeline but just across a county line, do we not want to include them in this analysis?

In contrast, the US State Department's Supplemental EIS for the Alberta Clipper Expansion project defined its geographic scope for environmental justice analysis very differently: "The regional setting, which includes the area within 10 miles of the pipeline, encompasses the Line 67 setting. The regional setting also includes the areas that directly border the extended distance (i.e., 40 river-miles downstream) along certain waterways to support the analysis of potential impacts from an accidental release of crude oil" (SEIS 3.7-1).

That SEIS identified 40/280 block groups and 40/109 tracts in the Regional Setting that qualify as "enviro justice" areas (SEIS 3.7-6). For context, through a combination of bad methodology and narrow geographic scope, the DEIS for Line 3 identified just ONE SINGLE census tract along the entire APR that meets the definition of an environmental justice area: "Enbridge's preferred route bisects and RA-03AM crosses the edge of Census Tract 002 in Clearwater County, where the minority population of 25.3 percent exceeds the county level by more than 10 percentage points" (DEIS 11-4).

Lack of consideration of Health Professional Shortage Areas and Medically Underserved Areas/Populations

The DEIS does not identify Health Professional Shortage Areas and Medically Underserved Areas/Populations in order to more accurately assess disproportionate human health impacts. The US State Department's SEIS for the Alberta Clipper Expansion Project identified these areas: "many of the designated Health Professional Shortage Areas and Medically Underserved Areas/Populations include low-income populations, tribal populations and Indian Health Service facilities" (SEIS 3.6-9).

Lack of consideration of exposure to existing contamination

The DEIS does not consider exposure to existing contamination and how that will affect the cumulative impacts to which the project would contribute. Many other environmental justice studies include this analysis. Many studies use the USEPA's EJSCREEN model. "The EJSCREEN model serves as a screening-level tool to identify areas that may have a higher susceptibility to environmental justice impacts because of their demographic composition and existing exposure to contaminants or proximity to facilities. The model uses environmental indicators to quantify susceptibility to exposure, including data related to proximity to hazardous chemical facilities or waste sites (e.g., National Priorities List sites), traffic volume, ambient levels of air pollution and lead paint prevalence" (SEIS 3.7-5).

The US State Department's SEIS for the Alberta Clipper Expansion Project used EJSCREEN to identify 2 sites of existing contamination along the Enbridge mainline corridor: "The Department used the U.S. Environmental Protection Agency's (USEPA's) EJSCREEN model to evaluate potential cumulative impacts to environmental justice populations from National Priorities List sites. The USEPA has identified uncontrolled hazardous waste sites throughout the country that pose the greatest risk to human health and the environment; these sites are placed on the National Priorities List, and the USEPA works with state and local agencies to establish and implement appropriate cleanup plans for the sites. This includes the U.S. Steel Superfund Site and the St. Louis River/Interlake/Duluth Tar Site (USEPA ID# MND039045430) located at the mouth of the St. Louis River, near Duluth, Minnesota" (SEIS 6-29).

The SEIS then integrates this information into its environmental justice conclusions: "An accidental release affecting these census tracts could have adverse cumulative human health impacts on environmental justice populations given existing exposure to environmental contaminants" (SEIS 6-29).

The MPCA Environmental Justice Framework confirms this as one of its recommended strategies: "Develop data-driven screening methodology. Identify data sources and procedures to provide information about possible environmental justice concerns in a geographical area using demographic and environmental variables. Variables provide information on race and income levels, potential environmental exposures, number of facilities and contamination sites in the surrounding area, and other factors to characterize the potential burdens and vulnerabilities faced by residents. Data sources should include other state agency data, county and city data, and EPA-developed tools such as EJSCREEN" (MPCA 12).

Inadequate assessment of the specific resources to be impacted

Chapter 11 provides no comprehensive list or account of the specific resources threatened in tribal communities that will face "disproportionate and adverse impacts." This list should be added. The separate chapter on "Tribal Resources" should be integrated into this Chapter on Environmental Justice in order to outline exactly what is at stake. By quarantining the tribal impacts into their own silo, and repeatedly qualifying that chapter as written "from an Ojibwe perspective," the DEIS is structured to allow those tribal impacts to be ignored. They are not incorporated into the MEPA-required analyses and used to inform conclusions in the main chapters on Impact and Environmental Justice. They are isolated and excluded. It's similar to a university offering a few Black History and Ethnic Studies elective classes as a way of checking the racial equity box without having to meaningfully incorporate Black history and ethnic studies in the primary curriculum. The chapter on environental justice should discuss the tribal resources that are threatened.

The section on Tribal Lands provides a partial list of the critical tribal resources on ceded territory and potentially impacted by the pipeline: "All routes, including Enbridge's preferred route, would cross treaty lands that are off-reservation; these lands may be used for traditional tribal uses such as fishing, hunting and trapping, and/or agricultural activities (as described in Chapter 9). Reserved treaty rights include access to traditional fishing areas. Tribal resources include walleye and trout fisheries, which are predominately used for subsistence. Traditional terrestrial game and waterfowl hunting grounds are habitat for a variety of subsistence resources, including deer, elk, ducks, geese, and turkey. Several federal treaties have reserved wild rice lakes for use by Indian tribes, some of which are also considered Traditional Cultural Properties (Technical Assistance Services for Communities 2016). Wild rice is both a source of income and subsistence for the tribes in the area. These treaty rights and tribal resources are important to the Indian tribes as both natural and cultural resources and reinforce their cultural identity. Additionally, the mental well-being of Indian tribal members is linked to their tribal resources and access to their treaty rights"(11-7).

What about ceremonial uses of land? What about ceremonial uses of plants and animals? What about plant medicines? What about other types of fish? What about leeches sold for bait? What about mushrooms? What about timber resources? What about sacred sites? What exactly are the potential impacts on mental health? How would an oil spill affect these things differently?

The "Health Impacts" section talks about wild parsnip (DEIS 11-10) but no other health impacts. The "Operations Impacts" section talks about the importance of walleyed pike (DEIS 11-10) but no other animals. Who is writing this stuff? The document is encyclopedic and overwhelmingly long and yet not analytically substantive in any way. Please make one centralized, comprehensive list and assess the resources and potential impacts systematically.

Inadequate assessment of the community's characteristics that shape potential impacts on them

An environmental justice analysis cannot simply identify minority and low-income populations and then guess the impacts on them. It must also collect data about characteristics of the community itself that shape the ways in which they will be impacted. For example, one of the most important empirical questions unanswered in the DEIS in this regard is, "what are the levels and patterns of consumption and use of potentially impacted resources in tribal communities?

Not once does this chapter mention the primary federal law on Environmental Justice, without which, the chapter would likely not exist, but is it President Clinton's 1994 Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." This EO should be referenced in the document. The EO explicitly provides for agencies to "collect, maintain, and analyze information on patterns of subsistence consumption of fish, vegetation, or wildlife. Where an agency 8 action may affect fish, vegetation, or wildlife, that agency action may also affect subsistence patterns of consumption and indicate the potential for disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, and Indian tribes."

The CEQ Guidance document also encourages this inquiry: "Agencies should recognize that the impacts within minority populations, low-income populations, or Indian tribes may be different from impacts on the general population due to a community's distinct cultural practices. For example, data on different patterns of living, such as subsistence fish, vegetation, or wildlife consumption and the use of well water in rural communities may be relevant to the analysis" (CEQ 14).

The US State Department's Supplemental EIS for the Alberta Clipper Expansion project demonstrates this deeper, more nuanced approach in its Environmental Justice analysis:

"Although it is not possible to predict the location of an accidental release, if a release of crude oil were to occur on lands used for hunting, fishing and harvesting of wild rice, a disproportionately high and adverse impacts to tribal populations may occur as these heritage resources are important aspects of the traditional way of life for local Indian tribes...The remoteness of tribal lands, the more limited local response capabilities and the difficulty of access to the ROW, particularly in wetland areas, would compound the potential for adverse impacts...In addition, because members of Indian tribes living on reservations are culturally tied to these geographically and politically discrete areas, a significant release incident on tribal lands could have disproportionately high and adverse effects compared to a release on non-tribal lands. Such an incident that would require the temporary or permanent relocation of Indian tribal members away from a reservation would affect these minority populations adversely and more substantially when compared to relocation of residents not living on Indian tribal reservations" (SEIS 5-80).

That study also takes into account that the community's barriers to health care will intensify the health impacts of the project on them: "Depending on the location and extent of a spill or incident, minority or low income populations could be more vulnerable to health impacts associated with a crude oil release because of reduced access to health care services. This factor could result in disproportionately high and adverse impacts to minority and low-income populations in the event of a significant release" (SEIS 5-80). In contrast, DEIS Chapter 11 acknowledges that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (DEIS 11-11), but does not use this information to better describe the impacts or inform potential mitigation efforts. And by defining project impacts as simply an "additional health stressor," it denies the truth of the concept highlighted in the Clipper SEIS above - that existing disparities will make the new impacts worse.

Inadequate consideration of the distribution of impacts within affected communities

Very little information is offered about the distribution of impacts the project will have on the low-income tribal communities along the corridor.

The CEQ Guidance document explains: "When a disproportionately high and adverse human health or environmental effect on a low-income population, minority population, or Indian tribe has been identified, agencies should analyze how environmental and health effects are distributed within the affected community...the distribution as well as the magnitude of the disproportionate impacts in these communities should be a factor in determining the environmentally preferable alternative. In weighing this factor, the agency should consider the views it has received from the affected communities, and the magnitude of environmental

impacts associated with alternatives that have a less disproportionate and adverse effect on low-income populations, minority populations, or Indian tribes" (CEQ 14-15).

Lack of integration of traditional ecological knowledge

This chapter includes no reference to the US EPA Policy on Environmental Justice for Working with Federally Recognized Tribes and Indigenous Peoples. That document provides guidelines that would be useful to the DOC's efforts in this EIS. For example, it calls for integration of traditional ecological knowledge into all aspects of the review process: "The EPA encourages, as appropriate and to the extent practicable and permitted by law, the integration of Traditional Ecological Knowledge into the Agency's environmental science, policy, and decision-making processes, to understand and address environmental justice concerns and facilitate program implementation" (EPA 3).[22] Some of this knowledge is captured in Chapter 9, Tribal Resources, but is siloed off and not integrated into the analysis.

The MPCA Environmental Justice Framework affirms this as recommended strategy: "include community engagement in the screening process to gather community knowledge. Seek out information from community members about conditions in their community, including nonchemical stressors. Use this information to verify and supplement data-driven sources. Discuss what additional sources of information could help to characterize the community" (MPCA 12).

Lack of consideration of Free, Prior, and Informed Consent or the United Nations Declaration on the Rights of Indigenous Peoples

This chapter includes no reference to the international standard framework for Indigenous rights considerations, the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).

In its Policy on Environmental Justice for Working with Federally Recognized Tribes and Indigenous Peoples, the EPA explicitly "recognizes the importance of the United Nations Declaration on the Rights of Indigenous Peoples" and cites the Announcement of U.S. Support of the Declaration in 2010.[23]

The key principle outlined by UNDRIP and relative to this project, yet ignored by this DEIS, is the need to obtain the Free, Prior, and Informed Consent (FPIC) of the Indigenous communities impacted by the project. In some ways, this is a very simple concept - No Means

[22] https://www.epa.gov/sites/production/files/2015-02/documents/ej-indigenous-policy.pdf
[23] UNDRIP, Announcement of U.S. Support on December 16, 2010, U.S. Department of State. http://www.state.gov/documents/organization/184099.pdf

No. The impacted Ojibwe bands are united in opposition to the Project, with support and solidarity from hundreds of other tribes and First Nations, as well as the association of tribal governments, the National Congress of American Indians. Nowhere is this mentioned in the DEIS. This omission supports and perpetuates centuries of dispossession, violence, and attempted genocide of Indigenous people.

Inadequate analysis of human trafficking and associated impacts

"Other concerns during construction are the influx of temporary workers and associated impacts, such as sex trafficking and sexual abuse in local communities. Increases in sex trafficking, particularly among Native populations, are well documented (National Congress of American Indians Policy Research Center 2016). American Indian and minority populations are often at higher risk if they are low-income, homeless, have a lack of resources, addiction, and other factors often found in tribal communities (Minnesota Department of Health [Minnesota DH] 2014). The addition of a temporary, cash-rich workforce increases the likelihood that sex trafficking or sexual abuse will occur. Additionally, rural areas often do not have the resources necessary to detect and prevent these activities. However, Enbridge can prepare and implement an education plan or awareness campaign around this issue with the companies and subcontractors that construct, restore, and operate the pipeline, as well as by working with local communities and tribal communities to raise awareness and provide resources to address the issue" (DEIS 11-10).

It is outrageous that this very serious concern is immediately dismissed with an easy solution. Why is this problem not analyzed in any way? How much trafficking? What kind? Who is responsible? Who are the victims and survivors? How are they abducted or introduced? What is their experience? What have others done in other places to respond? Whas has worked and what hasn't worked?

Where is the data showing the effectiveness of such an education campaign in the past? What resources will they provide to address the issue? Did the local communities consent to working with Enbridge to address the issue together? Have you considered that maybe they would refuse to do so?

Lack of analysis of drug trafficking

Where is the analysis of drug trafficking caused and increased by the temporary influx of workers? These man camps will bring more drugs into communities already devastated by drug epidemics and losing lives weekly. What will happen? How does it happen? How much? Who will be impacted? How are they impacted? What is their experience? What have others done in other places to respond? What has worked and what hasn't worked?

Inadequate discussion of spill impacts

"The largest potential impact on low-income and minority populations, particularly those within the reservations that would be crossed, is from a pipeline failure incident that resulted in the accidental release of oil. For a detailed discussion of accidental releases, refer to Chapter 10. In the event of an accidental release of oil, the severity of impacts would depend on the location and type of resources within the area of the release. However, an accidental release of oil within the boundary of the Leech Lake Reservation or the Fond du Lac Reservation, or a release affecting resources used by the tribes, would disproportionately adversely affect these communities and could affect culturally significant resources depending on the location and magnitude of the release" (DEIS 11-11).

The purpose of this paragraph is unclear, except perhaps to reiterate the point that the route alternatives would pass through reservations, and punt any genuine discussion of disproportionate spill impacts on tribal people by referencing a separate chapter, which discusses spill impacts but not their disproportionate concentration on tribal people. It says that impacts would depend on location and magnitude, but then does not discuss what different impacts would be in different locations and at different magnitudes of release. It is a scoping sentence outlining the need for an EIS chapter on Environmental Justice, rather than part of an EIS chapter on Environmental Justice.

Inadequate analysis of health impacts

The DEIS states that "American Indian communities and individuals have unique health issues associated with historical trauma and structural racism. Data from the Minnesota DH indicate that American Indians in Minnesota have greater health disparities and poorer health outcomes compared to other racial and ethnic groups in Minnesota" (DEIS 11-11). But the DEIS does not even provide a list of these health disparities and outcomes, or an analysis of the magnitude of the disparities, or a description of how the poor outcomes will compound or be compounded by any impacts from the pipeline.

Inappropriate attribution of facts to "an Ojibwe perspective" in order to discount them

"From an Ojibwe perspective, waterbodies at risk from the proposed pipeline include any water directly downstream from a pipeline crossing. Pollution of these waters from a petroleum spill would create a significant hardship to traditional lifeways and spiritual and religious needs of the people" (11.4.2).

Why is the fact that downstream waterbodies are potentially impacted by the pipeline, qualified as being "from an Ojibwe perspective?" What Ojibwe perspective is this from? Did an

Ojibwe person tell the DOC this fact? What is that person's name and what are their credentials? Because no name is included, the fact is presented as hearsay or folklore instead of fact, as if it were a cultural belief and not a hydrological law.

Disproportionate impact on Native populations is concluded but not documented or analyzed

The chapter summary concludes that "Disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project." But it is unclear where in the data this conclusion is coming from. Honor the Earth does not dispute its truth, as indeed we have been providing oral and written testimony to document it for several years now. But it is a puzzling conclusion to draw from the chapter's elaborate analysis of census data that, by incorrectly comparing each census tract to its county, only identifies one census tract with a meaningful population of Native people.

It appears that this conclusion is offered not because it was revealed analytically in the Environmental Justice research, but because of its power, as a sweeping unsubstantiated generalization, to allow the corresponding conclusion that any of the alternatives would be just as bad. The DEIS asks the reader to simply toss up their hands and admit the futility of the whole EJ effort, as "any of the routes, route segments, and system alternatives would have a long-term detrimental effect on tribal members as a result of crossing treaty lands," and "any of the routes selected would negatively affect tribal resources and tribal members" (DEIS 11-13).

The conclusion of the EJ chapter should stem directly from the data provided in the EJ chapter and the analysis of that data. The CEQ Guidance provides a very clear framework for defining disproportionate impact so that it may be scientifically identified. This chapter should follow these guidelines and build an empirical record that shows how the answers to these questions are derived from the data chosen and methods used to analyze it:

"When determining whether human health effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable: (a) Whether the health effects, which may be measured in risks and rates, are significant (as employed by NEPA), or above generally accepted norms. Adverse health effects may include bodily impairment, infirmity, illness, or death; and (b) Whether the risk or rate of hazard exposure by a minority population, low-income population, or Indian tribe to an environmental hazard is significant (as employed by NEPA) and appreciably exceeds or is likely to appreciably exceed the risk or rate to the general population or other appropriate comparison group; and (c) Whether health effects occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards" (CEQ 26).

"When determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable: (a) Whether there is or will be an impact on the natural or physical environment that significantly (as employed by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment; and (b) Whether environmental effects are significant (as employed by NEPA) and are or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group; and (c) Whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards" (CEQ 26).

Lack of analytical depth allows for inaccurate conclusion that any of the alternatives would be equally bad

This chapter's unsound methodology and lack of analytical depth allow "Based on the discussion of tribal resources in Chapter 9, any of the routes, route segments, and system alternatives would have a long-term detrimental effect on tribal members as a result of crossing treaty lands. As summarized in Chapter 9, from a tribal perspective, the impacts cannot be categorized by duration (short term or permanent) or by extent (ROI, construction work area, permanent right-of-way). It is also not possible to determine which route alternative is better from an EJ perspective when each alternative affects tribal resources, tribal identity, and tribal health. Any of the routes selected would negatively affect tribal resources and tribal members"

Inadequate consideration of potential mitigation measures or process for selecting and implementing them

The DEIS is quick to point out that "a finding of disproportionate and adverse impacts does not preclude selection of any given alternative" (DEIS 11-13) and offers a list of potential mitigation strategies (DEIS 11-14). However, in doing so, it does not incorporate the views of the impacted communities or reflect their needs and preferences. It cites the CEQ's Guidance Document outlining the need to do so, but it does not do it:

"The CEQ recommends evaluating mitigation options by eliciting "the views of the affected populations on measures to mitigate a disproportionately high and adverse human health or environmental effect on a low-income population, minority population, or Indian Tribe and should carefully consider community views in developing and implementing mitigation

strategies." Furthermore, mitigation measures Chapter 11 Environmental Justice 11-14 Line 3 Replacement Project Draft Environmental Impact Statement identified in an EIS "should reflect the needs and preferences of affected low-income populations, minority populations, or Indian tribes to the extent practicable" (DEIS 11-14).

Instead, the DEIS merely deflects responsibility onto the PUC: "these measures can be evaluated in the final Certificate of Need or route permit decision. This provides an additional avenue for public notice and involvement" (DEIS 11-14).

Inadequate Social Impact Assessment (SIA)

The DEIS's social impacts assessment (SIA) should be improved in the following ways:

- Identifying stakeholder groups. There has clearly been an extensive effort to identify tribes living nearby as well as those with treaty rights, which is laudable. However, an SIA also should solicit input from local NGOs with an interest in the area, including conservationist groups.
- The task of an SI is to establish a "baseline" with data on where the community is right now, before the project, and then construct a "forward scenario" – what is likely to happen in the absence of any project. This should then be compared to projections of what is likely to happen under various project alternatives. The way to do this involves collecting data on socioeconomic indicators. This can be done through household surveys (asking families about their income sources & amount, typical household structure, assets, home ownership vs. rental, etc.), as well as through assessment of the community infrastructure (community centers, social services, main employers, proximity to hospitals, education levels & access to education, etc.).
- There should also be an opinion survey with a large enough sample to be statistically significant. The survey should be designed and conducted by trained and experienced social scientists.
- There is a need to recognize diversity within stakeholder groups – e.g. young vs. old, women vs. men. For the communities, this could be captured in a survey that separates responses and analyses them by gender, age group, socio-economic status, etc.
- It would be interesting to include, as part of the survey, a "risk rating" – essentially, a table in which people list the risks they foresee and rate them according to both likelihood and severity.
- The SIA needs to consider, separately, both the construction and the operations phases.
- The construction phase should consider the following issues:

    - Will there be local recruitment or will the company temporarily bring workers from outside? If local recruitment, what skills/education are needed? What communities are workers likely to be recruited from?
    - If external recruitment, where will construction workers be housed? How will the company address a potential increase in sexual violence and trafficking associated with the "man camps" that come with construction?
- Construction could also impact archeological sites. So, there should be an archeological survey conducted by trained professionals in collaboration with local knowledgeable community members. This has been called for on several occasions, as documented in Appendix P:
    - A Traditional Cultural Places inventory was called for by Jim Jones, Cultural Resources Director of MIAC in a letter to DoC on 3/31/17.
    - A letter from Honor the Earth states that at least 280 "significant areas of traditional cultural use and sacred sites" were identified through an EPA Technical Assistance for Communities contract. This letter also calls for an evaluation by MIA archeologists.
    - A letter from the Mille Lacs Band calls for the EIS to describe how cultural items, if discovered during construction, will be preserved and repatriated as per the Native American Graves Protection and Repatriation Act.
- For the operations phase, the main concern is potential impacts from a spill, particularly:
    - human health consequences of a spill;
    - who would pay for treatment;
    - an inventory of locally accessible health care facilities and their capacity to treat health issues stemming from exposure to, e.g., benzene from a spill;
    - impacts on fish & wild rice & hunting of a spill – this should involve an inventory of how much of people's diet those wild resources compose (there are ethnographic techniques to measure this);
    - projection of economic impacts of a spill, e.g. on fishing, hunting, tourism, agriculture.
- For both phases, an important way to project impacts is to look at other, similar projects. This information can be hard to find, but can come from a thorough review of published and, to the extent accessible, unpublished literature.
- Many of the tribes brought up climate change as an associated issue of concern. One way to factor this in is through an estimation of the social cost of the carbon the pipeline would generate. Currently, the estimate is about $40 / ton (although this is widely seen as an underestimate).
- The SIA mentions, but does not fully account for, cumulative impacts. For instance, wild rice beds could be examined for current levels of various pollutants, which would allow

for a projection of whether the release of additional pollutants, such as through construction or a spill, would cause those levels to surpass acceptable thresholds.

- The SIA should not be thought of as a one-off but as an ongoing process, continually revisited and re-assessed periodically. As part of that process, the communities should help to develop a Participatory Monitoring Plan. Apparently this is being negotiated for Line 3 in Canada, so there is no reason not to do so here as well. There should also be a Social Impact Management Plan in which tribal members and other community members help to decide how, whether from construction or in the event of a spill, the resultant social impacts would be managed.
- There should also be consideration given to community grievance mechanisms. In other words, if there is a dispute between company and community, how will this be addressed? How will the company address complaints, and how will third-party arbitration be carried out? What is the community's option for legal recourse?
- It would be good to see some consideration of the concept of Free, Prior, and Informed Consent in the SIA, given that this is an internationally recognized (and UN-endorsed) best-practice approach when working with Indigenous communities.
- There should also be some consideration given to the possibility of the community negotiating an Impact & Benefit Agreement with the company. There is a lot of precedent for this, too much to go into here. I can send guidance documents if people are interested.
- Having an explicit Environmental Justice component to an SIA per se is, to my knowledge, rather unusual. I am checking with a colleague who is an expert in EJ and will hopefully be able to get more information on this soon.

COMMENTS ON DEIS CHAPTER 12 – CUMULATIVE POTENTIAL EFFECTS

DEIS Chapter 12 excludes the two most obvious sources of cumulative potential effects related to the Project:

- the likely expansion of the Project to a capacity 915,000 bpd; and
- the need for additional pipeline capacity downstream from the Superior Terminal.

Both the expansion of the Project and the need for additional downstream pipeline capacity in Wisconsin are reasonably foreseeable, and should be regarded as inevitable.

Expansion of Project Capacity to 915,000 bpd

DEIS Chapter 12 fails to discuss the cumulative potential effects of expansion of the Project to 915,000 bpd. This error appears to be consistent with the following statement in DEIS Section 2.10, which states:

> Any future actions associated with additional increases in throughput on the proposed Line 3 Replacement would require a new application for a Certificate of Need from the Commission and a review of the need for the requested increase. Enbridge has not indicated any plans for future increases in throughput at this time and hypothetical future increases in throughput have not been evaluated as part of this EIS.

The fact that an expansion of capacity of the Project beyond 760,000 bpd would require a certificate of need from the Commission is irrelevant to the need for the DEIS to analyze the cumulative potential effects of such expansion.

According to page 8-3 of Enbridge's CON Application, the Project has an ultimate capacity of 915,000 bpd:

> Pursuant to the requirement of Minn. R. 7853.0530, Enbridge is providing for the Commission's information the ultimate design capacity for the pipeline considering its diameter, wall thickness, steel grade, and crude slate (irrespective of the number of pump stations proposed for the Project), which is 1,016 kbpd. This figure in turn, yields an ultimate annual average capacity of 915 kbpd. Further engineering design studies would be required to determine the number of pump stations needed to achieve the ultimate design capacity level, but that is not the level sought in this Appliction [stet.].

Operation of the Project at its ultimate capacity represents a net capacity expansion of 525,000 bpd over the capacity of the existing Line 3 Pipeline, and an expansion over the Project of 155,000 bpd, which is itself a substantial volume of oil. Expansion of the Project from 760,000 bpd to 915,000 bpd would increase its capacity by 20.4%.

The DEIS does not describe the physical changes that would be required to increase capacity of the Project from 760,000 bpd to 915,000 bpd. Therefore, it is not possible to know whether such subsequent changes would require any substantial construction effort or environmental review. It could be that the expansion would require only the installation of new pumps without the construction of any new pump stations or construction of other facilities. This

could limit the impacts of an expansion below the threshold where the Commission would conduct any substantial future environmental review.

In contrast, the vast majority of the construction activity and resource commitment needed to allow operation at 915,000 bpd would be performed as part of the initial construction of the Project, including installation of higher capacity pipe and construction of all other pressurized components of the pipeline, including valve, PIG launchers, manifolds, etc. to allow operation of the Project at 915,000 bpd. Such construction represents a massive initial investment of resources and money, and constructing the Project with higher pressure components would increase the environmental impacts of construction now. Yet, the DEIS does not evaluate the construction that would be undertaken following the initial phase of construction, and then compare this to the construction that would be undertaken as part of the first phase of the Project that is necessary to allow the expansion. Instead, DEIS Section 2.10 merely states: "Enbridge has not indicated any plans for future increases in throughput at this time and hypothetical future increases in throughput have not been evaluated as part of this EIS." This statement is specious. It is irrational to conclude that Enbridge would invest at least hundreds of millions of dollars now in substantially thicker pipe and higher pressure pipeline components to allow operation of Line 3 at 915,000 bpd and state that Enbridge has no plans future increases in throughput at this time. Such statement is contradicted by all available evidence. Enbridge may not have chosen an exact date when it would increase the capacity of the Project, but the great weight of evidence shows that it is almost certain that Enbridge will expand the capacity of the Project during the timeframe of impacts considered by the DEIS. It is reversible error for the DEIS to accept a bald-faced statement about the likelihood of future expansions that is contradicted by a project applicant's own design, commitment of physical and financial resources, and statements to investors.

Construction of the Project with pipe that is sufficient to transport up to 915,000 bpd, requires that the pipe be constructed now using thicker steel. Page 8-5 of the CON Application contains Table 8.1.E.2-1:

Table 8.1.E.2-1 Mainline Pipe Design Parameters	
Design Parameter	**Specification**
Pipe Size (Diameter)	36-inch outside diameter (NPS 36)
Estimated Length	337 miles
Wall Thickness	
Nominal	0.515 inch
Road Bore	0.600 inch
Cased Railroad	0.600 inch
Uncased Railroad	0.750 inch
Horizontal Directional Drill (HDD)	0.750 inch
Coating, mainline	14 mils Epoxy Bonding
Coating, trenchless	40 mils Epoxy Bonding ABR
Grade (Pipe Type)	X70 carbon steel pipe manufactured according to API Specifications 5L PS2
Maximum Operating Pressure[3]	1440 psig

Thus, the steel wall thickness will range from 0.515 inch to 0.750 inch. This page also states that the Project will be constructed from X70 carbon steel manufactured according to API Specifications 5L PS2.

In contrast, the existing Line 3 Pipeline is a 34-inch diameter pipe comprised of steel with a thickness of 0.375 inches.[24] Enbridge's original application letter for a Presidential Permit for Line 3 states:

> The facilities in respect of the proposed 34 inch pipe line at the international boundary are as follows:
>
> A pipe line of the pipe manufactured to American Petroleum Institute specification 5LX, with an outside diameter of 34 inches, a wall thickness of .375 inches, minimum yield strength of 52,000 pounds per square inch, proposed test pressure after installation of 1028 pounds per square inch . . . .

Thus, construction of a pipeline to move just 760,000 bpd would require a smaller diameter pipe with thinner steel.

[24] Letter, Lakehead Pipe Line Company to U.S. Secretary of State (August 31, 1967) (application for a Presidential Permit for Line 3 Pipeline).

In comparison, the Line 67 Project approved by the Commission in 2008[25] has an ultimate capacity of 800,000 bpd[26] and Enbridge's application for that pipeline contains the following pipe specification[27]:

> Pipe will be 36-inch outside diameter, 0.375 to 0.469 inch wall thickness, API 5L Grade X70, double submerged are (DSAW) steel pipe. The maximum allowable operating pressure will be 1050 to 1313 psig.

This means that the Project will be constructed from pipe with a pipe wall thickness greater than necessary to transport 760,000 bpd. Both the existing Line 3 and Line 67 pipe were constructed using pipe that is 73% thinner than the Project. Put another way, based on pipe wall thickness alone, the Project will be built using at least 27% more steel than is necessary to transport 760,000 bpd. But, this percentage does not account for the greater amount of steel needed to fabric a 36-inch diameter pipe as compared to a 34-inch diameter pipe. Further, all other pressurized components would also be constructed using greater amounts of steel than for a pipeline designed to transport up to 760,000 bpd. Therefore, construction of the Project as designed will require significantly greater amounts of steel than required to transport 760,000 bpd, which is the purported purpose of the Project contained in DEIS Section 2.1.

Construction of the Project with pipe that is larger diameter and has thicker pipe walls than required to transport the capacity proposed by the Project means that each pipe segment's weight is greater than necessary for the Project and will result in greater road wear, energy consumption, and pollution impacts to transport and construct the pipeline than is required for the Project's capacity. Further, the use of thicker steel also results in thicker welds and greater use of welding materials and greater air impacts resulting from welding activities. In contrast, it is likely that the only major equipment remaining to be installed to allow operation at 915,000 bpd would be additional pumps, which may be installed only in the pump stations that would be modified or constructed for the Project.

Enbridge states: "Further engineering design studies would be required to determine the number of pump stations needed to achieve the ultimate design capacity level . . . ." It seems

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[25] In the Matter of the Application of Enbridge Energy, Limited Partnership, and Enbridge Pipelines (Southern Lights) LLC for a Certificate of Need for the Alberta Clipper Pipeline Project and the Southern Lights Diluent Project, DOCKET NO. PL-9/CN-07-465, Order Granting Certificate of Need (Dec. 29, 2008).

[26] In the Matter of the Application of Enbridge Energy, Limited Partnership For a Certificate of Need for the Line 67 Station Upgrade Project – Phase 2, MPUC Docket No. PL9/CN-13-153, Application for a Certificate of Need
for a Crude Oil Pipeline, Section 7853.0230, Page 12.

[27] Application for Certificate of Need for a Crude Oil Pipeline, Docket No. PL9/CN-07-465, Alberta Clipper and Southern Lights Diluent Projects, June, 2007Section 7853.0530, Page 5.

doubtful that Enbridge is clueless about the likely number and locations of new pumps. The fact that additional engineering studies would be needed does not mean that an expansion is not possible or difficult, it just means that Enbridge would need to confirm the engineering for an expansion given operational data. Even if a limited number of pump stations are needed, their construction and the impacts of their construction would not be substantial relative to the impacts of constructing the Project now to allow higher capacity operation. Likely, even the foundations and locations for the additional pumps are included in the designs for the Project's pump stations, such that the only remaining work to increase the capacity of the Project at these pump stations would be to ship the pumps to the pump stations and install them. Compared to the costs, effort, and impacts associated with constructing the Project to operate at higher pressure, the costs, effort, and impacts of installing the pumps would *de minimis*. Consequently, most of the impacts of expanding capacity to 915,000 bpd will be created during construction of the Project, such that the expansion must be seen as being reasonably foreseeable, if not inevitable.

Construction of the Project to allow future expansion to 915,000 bpd and future operation at such capacity would have "cumulative potential effects," as this term is defined by Minn. R. 4410.0200, Subp. 11a, which includes consideration of the effects of "future projects actually planned or for which a basis of expectation has been laid." With regard to whether an expectation has been laid, this definition states:

> In determining if a basis of expectation has been laid for a project, an RGU must determine whether a project is reasonably likely to occur and, if so, whether sufficiently detailed information is available about the project to contribute to the understanding of cumulative potential effects. In making these determinations, the RGU must consider: whether any applications for permits have been filed with any units of government; whether detailed plans and specifications have been prepared for the project; whether future development is indicated by adopted comprehensive plans or zoning or other ordinances; whether future development is indicated by historic or forecasted trends; and any other factors determined to be relevant by the RGU.

A review of available facts demonstrates that the Commission must find that expansion of Project capacity to 915,000 bpd is reasonably likely to occur and that sufficient detailed information about the expansion is available.

With regard to whether sufficiently detailed information is available, Enbridge does in fact have detailed plans and specification for expansion of the Project, an example of which is the specification for thicker walled, higher pressure steel pipe. Other examples include the

specifications for all other pressurized components, such as valves, which specifications are matched to the pipe steel specification. Likely, the specifications for the pump stations have reserved locations for the installation of additional pumps. Together, all of these specifications provide enough information to confirm that the Project could be made to operate at 915,000 bpd.

With regard to whether Enbridge plans to expand Project capacity, it has stated in multiple investor presentations that it plans to do. In its July, September, and November 2016 and January 2017 Investor Presentation Enbridge provided the following slide that shows that Enbridge has told its investors that it intends to expand the Project sometime after 2019. Since Enbridge plans to start operation of the Project in 2019, this means that expansion of the Project within the timeframe analyzed by the DEIS is foreseeable and very likely to occur. With regard to the fact that Enbridge notes that this expansion would be only 100,000 bpd, instead of the 155,000 bpd expansion noted in its CON Application, this slide also states that the net capacity increase provided by the Project would be 400,000 bpd instead of 390,000 bpd, even though Enbridge submitted the CON Application long before it issued this investor presentation. Similar slides are included in Enbridge's September 2016, November 2016, and January 2017 investor presentations. The fact that Enbridge is identifying the expansion of Line 3 to its ultimate capacity to its investors is also evidence that the expansion project is "substantially certain to be undertaken sequentially over a limited period of time." Minn. R. 4410.0200, Subp. 60.

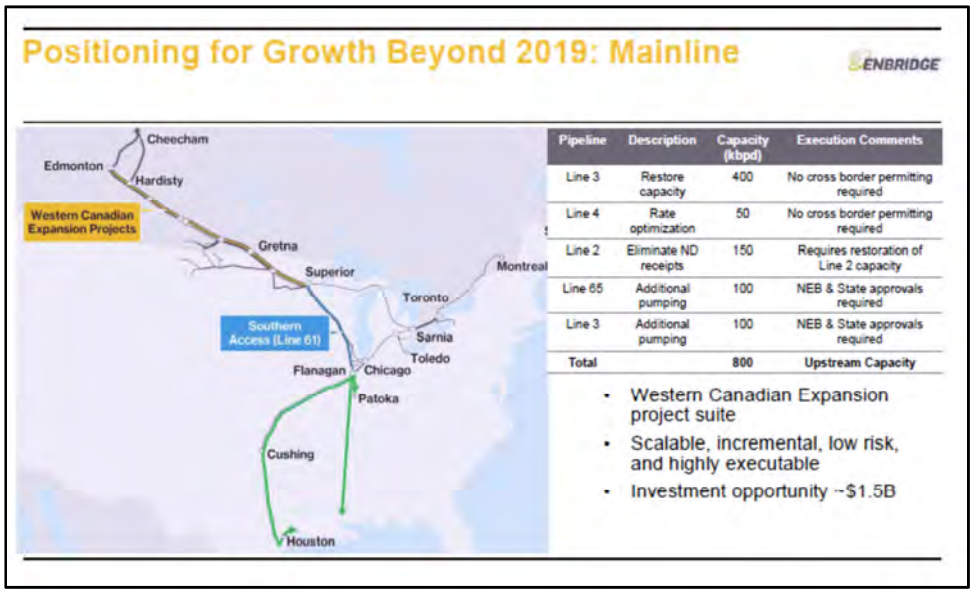

With regard to "whether future development is indicated by historic or forecasted trends," Enbridge's forecast of demand for crude oil transportation services assumes that future capacity expansion of the Mainline System will be necessary. Further, Enbridge took a similar approach

of incremental expansion with regard to the Line 67 (Alberta Clipper) Pipeline, which had an initial capacity of 450,000 bpd and was expanded in two phases to 800,000 bpd of operation in Minnesota. Thus, historic examples and Enbridge's own forecasted trends make expansion of the Project "reasonably likely to occur."

Expansion of the Project is a phased action under MEPA. The law does not require that a "phased action" have a date certain for when it would be constructed. Instead, it requires only that a project be "substantially certain" to happen. Enbridge's significant commitment of material and financial resources to allow expansion of the Project, in combination with its statements to its investors that it is planning to expand the Project, make the expansion "substantially certain" to happen. In light of the evidence, the DEIS Section 2.10 statement that "Enbridge has not indicated any plans for future increases in throughput at this time" is false, because it has in fact indicated plans for future increases.

Minn. R. 4410.2300(H) requires that "for the proposed project and each major alternative there shall be a thorough but succinct discussion of potentially significant adverse or beneficial effects generated, be they direct, indirect, or cumulative." Since design of the pipe in the Project to transport up to 915,000 bpd creates an expectation of a future expansion of the Project, the effects of operating a future expansion at up to 915,000 bpd are cumulative potential effects and must be analyzed by the DEIS.

Expansion of the Project to a capacity of 915,000 bpd is a phased action pursuant to Minn. R. 4410.0200, Subp. 60, because expansion of the Project would have "environmental effects on the same geographic area" and would be "substantially certain to be undertaken sequentially over a limited period of time." As a phased project, the expansion "must be considered in total when determining the need for an EIS <u>and in preparing an EIS</u>." Minn. R. 4410.2100, Subp. 4 (emphasis added). Although this subpart also allows the Commission to "treat the present proposal as the total proposal," it may also "select only some of the future elements for present consideration in the threshold determination <u>and EIS</u>."

With regard to its exercise of discretion of this phased action under Minn. R. 4410.0200, the DEIS contains no information about the potential scope of construction required for this subsequent phase. As such, it is impossible for the Commission to rationally evaluate whether this expansion will create significant independent impacts, or whether instead the impacts of the subsequent phase would be *de minimis*. For example, expansion of capacity to 915,000 bpd could include only the installation of additional pumps at existing pump stations, and not include any new impacts to land or the construction of any new facilities. Should the impacts of the subsequent phase be *de minimis*, it would be irrational for the Commission to evaluate such impacts as a later phased action because doing so would be inefficient and result in unnecessary segmentation of environmental review. In any case, the EIS should contain sufficient

information for the Commission to make a rational decision on whether or not to treat the Project as the "total proposal" or to exercise its discretion to "select only some of the future elements for present consideration in the . . . EIS", but at present the DEIS is completely silent about the potential for a subsequent phase.

The Commission should consider the 915,000 bpd ultimate capacity with regard to those elements of construction that would be impacted now by virtue of use of thicker steel, because these impacts will occur during construction and would be a moot point in any subsequent environmental review. For example, the use of 27% heavier pipe for the same segment length would have a correspondingly greater impact on road wear and tear during transport of the pipe to construction sites. Use of thicker pipe steel would also irretrievably commit substantially greater amounts of iron and other metals (27% more) to the Project than are necessary to transport 760,000 bpd. It would also commit greater amount of fuel to the project to transport the steel to Minnesota and then to construction sites. It would also commit greater amounts of fuel to construction of the project, due to the greater power need to lift and place the steel in the ground. It would also result in greater air impacts caused by welding thicker steel. Such impacts must be evaluated before approval of use of the thicker steel pipe to be used in the Project.

Unlike expansion of a road project either in terms of distance or lanes, creating the potential to expand the capacity of an existing crude oil pipeline segment in the future requires an irretrievable commitment of physical and financial resources now. Further, most of the impacts of building a higher capacity pipeline occur before its expansion. The Commission must make a reasoned judgement about which elements of a proposed future phase must be evaluated in the initial phase. It would be irrational to ignore the impacts related to construction of a higher capacity pipeline when such impacts occur during the initial construction of the pipeline. It would also not be rational to fail to evaluate whether the impacts of a subsequent expansion of a pipeline would be *de minimis* relative to the impacts of constructing the pipeline so that it could be expanded, so that a rational decision can be made on whether to simply evaluate the impacts of an expansion in an initial environmental review. Where some or all of the "future elements" of a phased project relate closely to construction activities that would be analyzed in an initial environmental review, an RGU must consider which elements of the subsequent phase must be considered in the initial environmental review. The fact that Enbridge intends to commit substantial resources and effort in its construction of the Project to allow its expansion is evidence that the expansion project is "substantially certain to be undertaken sequentially over a limited period of time." Minn. R. 4410.0200, Subp. 60.

The Commission should also use the Project's ultimate capacity with regard to consideration of alternatives, because it would be unreasonable to not consider alternatives in light of the Project's ultimate capacity. The use of thicker steel increases the future utility of the

pipeline relative to alternatives, because expansion through the use of additional pumping horsepower might require fewer resources and have lower impacts that expansion of alternatives. Moreover, consideration of a lower capacity alternative to the Project would result in the use of thinner steel, and this should be compared to the use of Enbridge's proposed steel thickness of the Project.

The Commission should also evaluate the potential impacts of oil spills from the Project based on its ultimate capacity, because it is likely that the Commission will not conduct new spill modeling and oil spill impact analysis in any subsequent application for expansion of the Project to 915,000 bpd. Also, the Commission, the parties, and Minnesota's citizens should know now what the likely spill impacts would be from operation at 915,000 bpd, because this is the likely foreseeable capacity for the majority of the life of the Project, such that construction of the Project would likely result in foreseeable oil spills larger than those that would result from operation at 760,000 bpd.

Further, the expansion of the Project is not "hypothetical." The word "hypothetical" is defined as: "involving or being based on a suggested idea or theory : being or involving a hypothesis : conjectural." Mirriam-Webster Online Dictionary. The expansion of the Project is not based on mere conjecture and not a mere whimsical idea or theoretical. Instead, the evidence available to the Commission shows that the expansion is "substantially certain" to happen. Minn. R. 4410,0200, Subp. 60.

The expansion is also not "hypothetical" because Enbridge has described the expansion of the Project to its investors. Enbridge does not describe its future expansion plans to its investors as "hypothetical" plans. Instead, they are plans presented to investors that attempt to show that Enbridge will take actions in the future that would increase the value of investments. The information provided to investors about the expansion of Line 3 is provided to aid them in decisions about committing financial resources to Enbridge. Accordingly, even though the information is about Enbridge's future plans, it is clear that <u>Enbridge intends that this information be relied upon in real-world financial decisions</u>. Enbridge's statements aobut its plans to expand the capacity of the Project in combination with its proposed commitment to construct the project with thicker and stronger steel pipe and other components, make the expansion project a phased action that is "substantially" certain to happen. Accordingly, the Commission must evaluate the potential cumulative effects of the expansion of the Project to 915,000 bpd.

Construction of a Downstream Pipeline in Wisconsin and Illinois

DEIS Chapter 12 fails to identify construction of a pipeline in Wisconsin as a potential connected action that would have cumulative potential effects. The following table shows that it

is physically impossible to use all of the net Mainline System capacity increase that would be provided by the Project without constructing additional pipeline capacity from the Superior Terminal through Wisconsin.

Capacity Into Superior Terminal		**Capacity Out of Superior Terminal**		**Capacity in minus Capacity Out (bpd)**
Pipeline	**Capacity In (bpd)**	**Pipeline**	**Capacity Out (bpd)**	
Line 1	237,000	Line 5	540,000	
Line2B	442,000	Line 6	667,000	
Line 3	390,000	Line 14	318,000	
Line 4	796,000	Line 61	1,200,000[28]	
Line 67	800,000	Calumet Refinery[29]	45,000	
Total Pipeline Capacity Into Superior Terminal	2,665,000	Total Pipeline Capacity Out of Superior Terminal	2,770,000	-105,000
Line 3 Replacement Project Initial Capacity Net Increase	370,000	Assume No Additional Capacity Constructed Out of Superior Terminal	0	+370,000
Mainline Capacity Into Superior Terminal With Line 3 Replacement Project at Initial Capacity	3,035,000	Total Pipeline Capacity Out of Superior Terminal	2,770,000	+265,000
Line 3 Replacement Project Ultimate Capacity Net Increase above Initial	155,000	Assume No Additional Capacity Constructed Out of Superior Terminal	0	+155,000
Mainline Capacity Into Superior Terminal With Line 3 Replacement Project at Ultimate Capacity	3,190,000	Total Pipeline Capacity Out of Superior Terminal	2,770,000	+420,000

There is currently up to 105,000 bpd more capacity out of Superior Terminal than there is into it; therefore, it would be possible to use the Project's capacity up to this amount without

[28] Since the pump stations in Wisconsin have received all permits, and it is Honor the Earth's understanding that their construction is essentially complete, it is reasonable to assume that Enbridge will expand Line 61's capacity to 1,200,000.

[29] The Calumet Refinery does not operate at 100% of its capacity on a sustained basis, so its average demand would be less than 45,000 bpd.

constructing a pipeline in Wisconsin. This would still leave up to 265,000 bpd of the Project's capacity stranded at the Superior Terminal. Thus, absent construction of a pipeline in Wisconsin, it would be impossible for Enbridge to use 72% of the Project's initial net capacity increase. It is irrational to expect that Enbridge would build the Project for the purpose of increasing the capacity of the Mainline System and not build sufficient downstream capacity to transport the full volume of crude oil that could be transported by the Project.

Since Section 2.5 considers the cost of building a pipeline in Canada and North Dakota that would connect to the pipeline built in Minnesota, it must also consider the cost of constructing a pipeline that would be needed in Wisconsin and Illinois. Such cost is relevant and necessary when comparing the cost of the Project to System Alternative SA-04, which would deliver crude oil to Illinois. Absent such cost estimate, it would not be possible to compare the socioeconomic impacts of SA-04 to the Project and logically required pipeline capacity in Wisconsin. Enbridge has provided a cost estimate of $3.5 to $4 billion, as discussed below.

The DEIS must also consider construction of additional pipeline capacity in Wisconsin to be a connected project under Minn. R. 4410.0200, Subp. 9c, which defines a "connected action" as follows:

> Two projects are "connected actions" if a responsible governmental unit determines they are related in any of the following ways:
>
> A. one project would directly induce the other;
>
> B. one project is a prerequisite for the other and the prerequisite project is not justified by itself; or
>
> C. neither project is justified by itself.

Since it would be impossible for Enbridge to use all of the net increase in the Mainline System capacity that would be provided by the Project without constructing additional pipeline capacity out of the Superior Terminal, the Project would: (a) directly induce construction of an additional pipeline in Wisconsin; (b) be a prerequisite for an additional pipeline in Wisconsin; and (c) not be justified without construction of additional pipeline capacity in Wisconsin. As regards potential impacts, MEPA does not distinguish between impacts that would be caused by a connected project within the State of Minnesota versus the impacts to State interests that would be caused by a connected action located outside of Minnesota. Therefore, a pipeline in Wisconsin is a connected action as defined by Minn. R. 4410.0200, Subp. 9c.

Minn. R. 4410.2100, Subp. 4, states: "Multiple projects and multiple stages of a single project that are connected actions . . . must be considered in total . . . in preparing the EIS." Although construction of a pipeline in Wisconsin would obviously not be within Minnesota's permitting jurisdiction, such construction would nonetheless impact and have cumulative potential effects related to Minnesota's environment because it would create a greater risk of oil spills into the Nemadji River and Lake Superior, which could threaten Minnesota's interests in Lake Superior aquatic resources. Also, a pipeline out of the Superior Terminal would cross the St. Croix River watershed and thereby threaten Minnesota's interests in this river's aquatic resources. Therefore, construction of a pipeline in Wisconsin would be a reasonably foreseeable future project that would have cumulative potential effects on Minnesota's environment, such that its cumulative potential effects on Minnesota must be evaluated by the DEIS.

A pipeline in Wisconsin would have cumulative potential effects as this term is defined by Minn. R. 4410.0200, Subp. 11a, because it is a project that would affect the some of the same environmental resources as the Project and a reasonable expectation has been laid for an additional Wisconsin pipeline, because it would be impossible to use 72% of the Project's capacity absent construction of an additional pipeline in Wisconsin, such that construction of a pipeline in Wisconsin is reasonably likely to occur. Further, it is Honor the Earth's understanding that Enbridge has conducted significant right of way analysis for a new pipeline corridor in Wisconsin, as well as engineering related to a new pipeline in this corridor. Thus, Enbridge has available to it "sufficiently detailed information . . . about the project to contribute to the understanding of cumulative potential effects."

Moreover, the Commission may not simply ignore construction of a pipeline in Wisconsin without investigating:

> whether any applications for permits have been filed with any units of government; whether detailed plans and specifications have been prepared for the project; whether future development is indicated by adopted comprehensive plans or zoning or other ordinances; whether future development is indicated by historic or forecasted trends; and any other factors determined to be relevant by the RGU.

Enbridge has proposed to construct a pipeline through Wisconsin called the "Line 61 Twin." For example, Enbridge presented the following slide to its investors in its Fourth Quarter 2014 Earnings & 2015 Financial Guidance Presentation on February 19, 2015, showing that it planned to construct a "Line 61 Twin" pipeline from Superior, Wisconsin, to Flanagan, Illinois, which would have an initial capacity of 550,000 bpd:

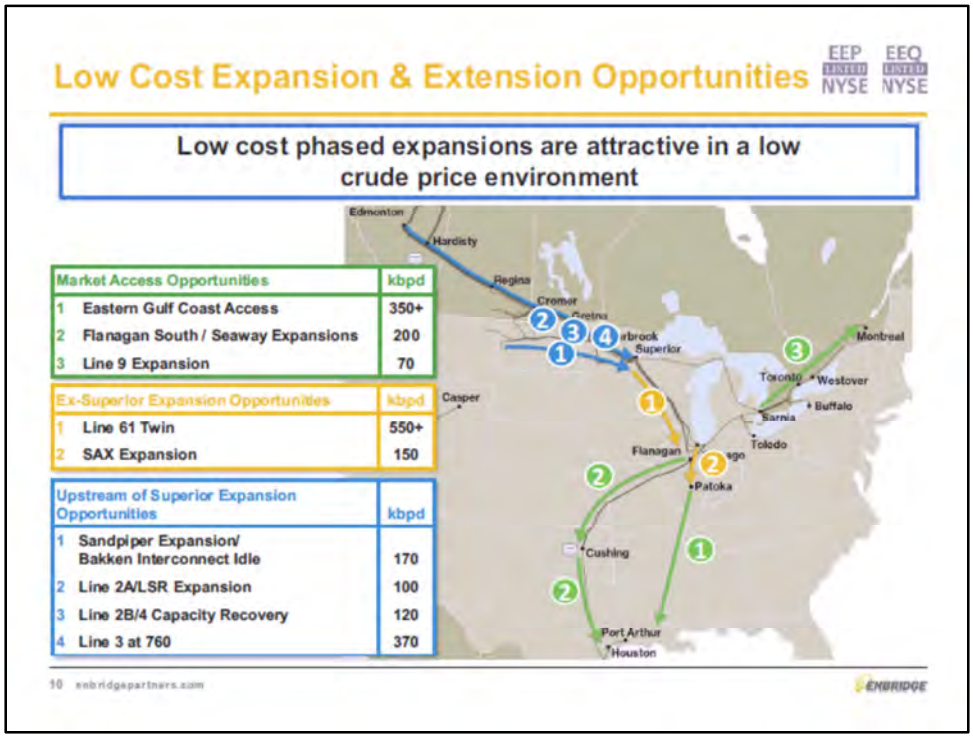

Enbridge presented this same slide in the following presentations:

- March 2015 Investment Community Presentation;
- June 23-24, 2015, Credit Suisse MLP & Energy Logistics Conference; and
- December 2015 Investment Community Presentation.

Similarly, Enbridge included the following slide on page 30 of its July 2016 Investment Community Presentation, which for the "Line 61 Twin" project provides:

- a capital cost estimate of $3.5 to $4 billion;
- an estimated capacity of 800,000 bpd; and
- an admission that the "Line 61 Twin" will be necessary to relieve a bottleneck at Superior caused by Enbridge's planned western Canadian pipeline expansion, which includes the Project as well as other system expansions.

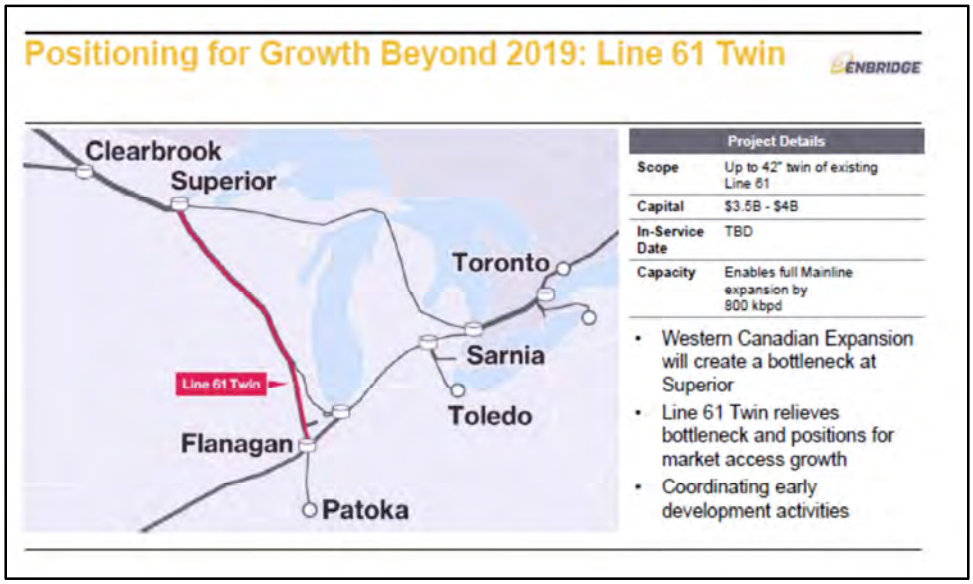

Enbridge included the following slides on page 31 of its September 2016 Investment Community Presentation, on pages 39 and 40 of its November 2016 Investment Community Presentation, and on pages 40 and 41 of its January 2017 Investment Community Presentation, which continue to show a commitment to build the "Line 61 Twin" project:

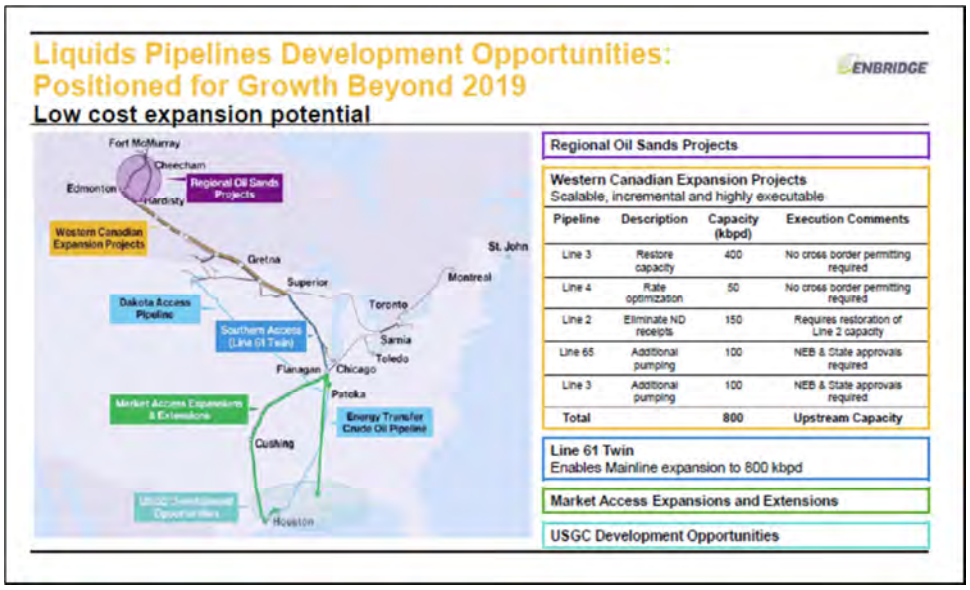

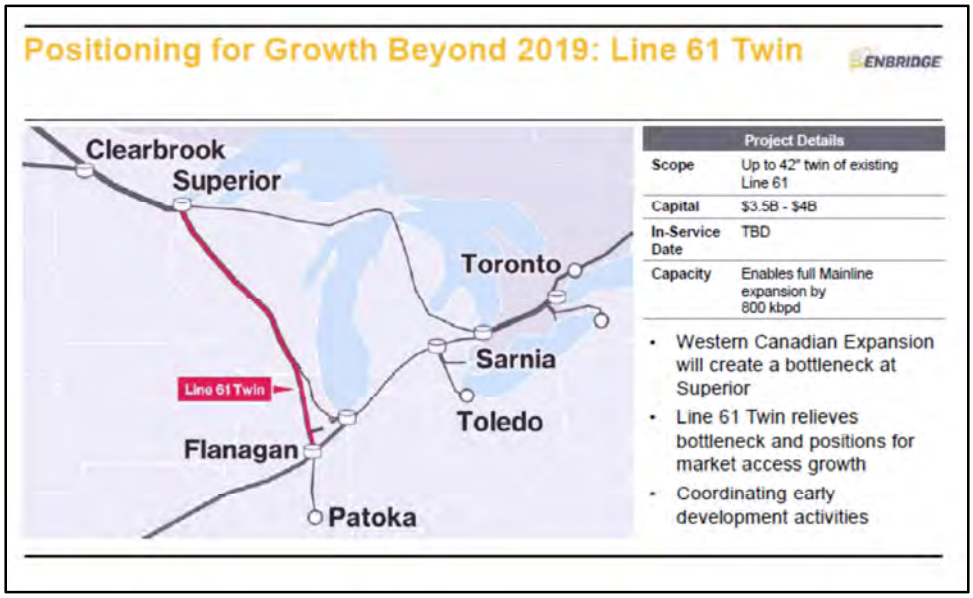

Since January of 2017, Enbridge's presentations have avoided any mention of the additional capacity needed to fully utilize the Project's capacity. Instead, Enbridge has claimed that full expansion of Line 61 "connects restored Line 3 volumes to Market Access pipelines," which is possible for up to 105,000 bpd (28%) of the Project's initial capacity, but not possible for the remaining 72% of the Project's capacity. Enbridge's obfuscation aside, the foregoing slides provide ample evidence that Enbridge plans to construct the Line 61 Twin Project and that the Project is inextricably linked to construction of a pipeline in Wisconsin, because otherwise a bottleneck will exist that would prevent use of 72% of the capacity that would be provided by the Project.

Thus, the DEIS must evaluate the cumulative potential effects of constructing the downstream pipeline (Line 61 Twin) needed to allow utilization of the net capacity increase that would be provided by the Project to the Mainline System and its customers.

OTHER COMMENTS

Honor the Earth also provides the attached documents as comments:

- "Review of Enbridge Line 3 Draft Environmental Impact Statement" by Robert Merritt, P.G. Attachment C.

SUMMARY

Honor the Earth believes that the DEIS is fundamentally and illegally flawed. Further, many of these flaws may only be redressed through a substantial re-write of the DEIS, which

new material must be the subject of a subsequent public comment period. Therefore, the Department must prepare a supplemental DEIS that complies fully with MEPA and provide for a public comment period on it.

Thank you for providing this opportunity to comment on the DEIS. We look forward to reviewing a revised DEIS.

Very truly yours,

/s Winona LaDuke
Executive Director
Honor the Earth

Attachment A

To

Honor the Earth

Comments on Line 3 Replacement Project

DEIS

CN-14-916 and PPL-15-137

The Line 3 DEIS Highlight Reel

June 2017

The public was given 3 weeks to read and analyze the 5000+ pages of the Draft Environmental Impact Statement for Line 3. This is our list of highlights and comments so far:

Tribal Impacts

- The United Nations international standard for projects that impact Indigenous Peoples is Free, Prior and Informed consent. Tribal consultancy after the project is already proposed and designed is not free, prior, and informed consent.

- Most of the issues specific to tribal people and tribal resources are confined to a separate chapter that attempts to provide "an American Indian perspective." They are excluded from the main chapters that assess potential impacts. This allows the EIS to avoid drawing conclusions about the impacts on tribal people**.** (Chapter 9)

- Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "would have a **long-term detrimental effect on tribal members and tribal resources**" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members.

- Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "are part of a larger pattern of structural racism" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the impacts associated with the proposed Project and its alternatives would be an **additional health stressor on tribal communities** that already face overwhelming health disparities and inequities" (11.4.3).

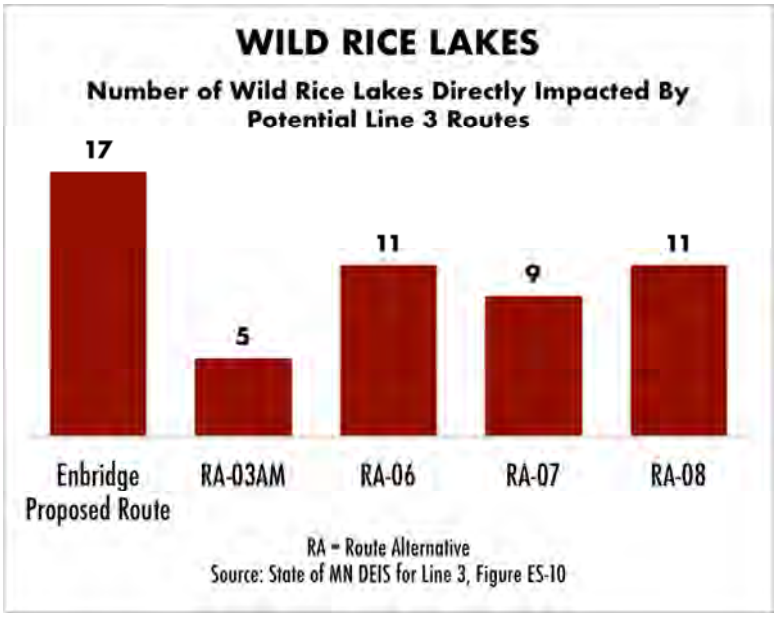

- The DEIS concludes that "disproportionate and adverse

impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) But it also states that this is NOT a reason to deny the project!

- Chapter 6 states that Enbridge's preferred route **would impact more wild rice lakes and areas rich in biodiversity** than any of the proposed alternative routes (Figure ES-10).

- Most of the analysis of archaeological resources in the path of the pipeline rely on Enbridge's surveys. For some reason, only 3 of their 8 surveys are available, and the 5 missing are the most recent! In those, Enbridge found 63 sites, but claims that only 3 are eligible for protection under the National Register of Historic Places. (5.4.2.6.1). Honor the Earth has had the studies we have been able to see reviewed, and there are numerous flaws in their methodology.

- The DEIS acknowledges that "The addition of a temporary, cash-rich workforce **increases the likelihood that sex trafficking or sexual abuse will occur,**" and that these challenges hit Native communities the hardest. But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). What experience does Enbridge have planning and implementing an anti-sex trafficking program?

Big Picture Problems

- Many of the environmental impacts and plans for minimizing them are drawn directly from Enbridge's permit application ("Enbridge would do this" and "Enbridge would do that") without any evidence of compliance or genuine consideration that maybe, just maybe, Enbridge won't follow all the rules. History shows that they continually violate permit conditions - we are working on compiling an enormous record of these violations. The DEIS should analyze the likelihood of compliance.

- The Alternatives chosen for comparison to the pipeline proposal are absurd -- for example, the only rail alternative assumes the construction of a new rail terminal at the US border, and thousands of new railcars to transport oil to Clearbrook and Superior. Enbridge would never do that. The only reasonable rail option would begin in Alberta. The truck alternatives are similarly unreasonable.

- The "No Build" Alternative is not genuinely considered. It is framed as "Continued Use of Existing Line 3" (Chapters 3 and 4), but **nowhere is the "Shut Line 3 Down" option considered**. There is no discussion of renewable energy, conservation, or the rapid development of electric car infrastructure. There is no assessment of the decline in oil demand. The entire study assumes that society needs X amount of oil, simply because Enbridge says they can sell it. That assumption ignores the massive fossil fuel subsidies and debts that make Enbridge's profits possible, and avoids the moral question of what is good for people and the planet. We know we must stop burning fossil fuels yesterday.

- There is zero discussion of how all this extra oil will go once it leaves Superior, Wisconsin. With 370,000 bpd of additional capacity, Enbridge will need a new pipeline departing its terminal in Superior. We know that they plan to build Line 66 through Ojibwe territories in Wisconsin, but they continue to deny this. Why isn't MN asking?

- The DEIS contains **no spill analysis for tributaries of the St. Louis River or Nemadji River**, where spills could decimate Lake Superior and the harbors of the Twin Ports.

- For calculations of impact, the lifespan of the new Line 3 is estimated at 30 years. But Lines 1-4 are 55-65 years old! And hasn't the technology improved? The lifespan should be at least 50 years, a shorter lifespan is a clear indication that Enbridge themselves know that the fossil fuel era is coming to an end. In Honor the Earth's analysis, we have attempted to predict the impacts of this pipeline on the next 7 generations.

- This project is a further investment in a dying Tar Sands industry. Numerous international oil companies and financing institutions are divesting from the tar sands. Why should Minnesota invest in this industry? Why should our Nation be forced to deal with a bad idea in perpetuity.

- The DEIS assumes that the Koch pipelines to MN refineries get all their oil from Line 3, but the current Line 3 does not supply enough capacity for this (390,000 barrels per day), and we know that some of it comes from Line 81, which brings oil from the Bakken in North Dakota.

Spill Risk

- The 7 sites chosen for spill modeling are not representative of the locations and resources put at risk along the entire corridor. A more thorough analysis of different locations is needed - for example, what about Lake Superior?

- There is no analysis on Enbridge's leak detection system, or their inability to respond quickly to major emergencies.

- Enbridge's response plans are highly guarded, and Honor the Earth's attempts to receive and review these documents has been blocked. What we can infer is that Enbridge relies on local first responders for their emergencies. They attempt to use the money they donate to communities along their corridors as proof that they have an integrated emergency response program.

- From the State Department's Supplemental Environmental Impact Statement on the Alberta Clipper:

Table S-6. Incident Rate Summary

Pipeline Operator	Annual Incident Rate Per 1,000 Miles of Pipeline				Total Volume Spilled (bbl)
	Small Spills	Medium Spills	Large Spills	Cata-strophic Spills	
Industry Average	2.75	0.55	0.07	0.01	182,672
Enbridge	2.80	0.20	0.16	0.03	39,637

Source: PHMSA 2016a, 2016c
Note: This table presents a summary of incident rates for the period 2010 to 2015.

From these numbers, we can expect nearly 25 spills in Minnesota from the Enbridge Mainline system (8,009 miles of pipeline in Minnesota* 3.19 average spills per year/1,000 miles).

- The DEIS estimates the annual probability of different kinds of spills on the proposed route in MN:
  - Pinhole leak = 27% (once every 3.7 years)
  - Small Spill = 107% (once every 11 months), Medium = 7.6%, Large = 6.1%
  - Catastrophic = 1.1% (once every 87 years)

So in 50 years, we can expect 14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic!

Abandonment (Chapter 8)

- The risks of pipeline abandonment are not adequately assessed. For example, there is no discussion of landowner property values and the effect that an abandoned pipe could have on them, especially if there is indeed "legacy contamination" on people's land.

- Impacts on human and natural resources due to the abandoned Line 3 are anticipated to be minimal in the near term but **could be significant in the longer term**, absent effective monitoring, adaptive management, and the timely introduction of mitigation measures. There is not much information on what these mitigation and management plans are.

- Whether subsidence occurs...depends on the structural integrity of the pipe and on the loads applied to the pipe that could cause it to deform and fail. In general, loads at the pipe level (underground) are less than live loads at the surface (like those from a heavy truck), because part of the load is shared with the surrounding soil. **If there is a dearth of surrounding soil, or if the cover for the pipeline is relatively shallow, the pipeline bears more of the load and, all things being equal, is more likely to fail.** We know from experience that there are numerous areas where the pipes are exposed and near the surface.

- There is also no discussion of exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied. "When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high" (8.3.1).

- We know that the abandonment of the existing line 3 is bad. But there is also no mention of the abandonment of the other 3 ancient pipelines in Enbridge's existing mainline corridor (Lines 1, 2, and 4), which we expect Enbridge will very soon attempt to abandon. Nor is there any discussion of the abandonment of the NEW Line 3 in the future.

- The DEIS states that it will be very risky to remove and clean up the existing Line 3 because the pipelines are very close together. "The distance between pipelines within this corridor varies, but they are generally 10 to 15 feet apart" (8.3.1). This is not consistent with our extensive observations and physical measurements on the land. Also, don't they dig up pieces of pipe for maintenance purposes all the time? Why is it suddenly risky?

- The DEIS simply states that "Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage,and mitigate historically contaminated soils and waters" found during the abandonment or removal of the existing Line 3 (8.3.1.1.1). We want to see that plan.

Construction and Restoration

- Chapter 2, "Project Description" states that Enbridge has requested a 750-foot route width (375 feet on each side of the Line 3 Replacement pipeline centerline). They claim only 50 of the 750 feet would remain a permanent right-of-way (2.1) All of this width should be included in an impact analysis because Enbridge's environmental protection plan and record is abysmal.

- Their "restoration" plans for restoring the landscape around the corridor after installation is laughable. Enbridge's process for restoring wetlands includes dumping the now compacted (and probably de-watered) soil back in the trench, sowing some oats and "letting nature take it's course". This is not how you re-establish a wetland. Studies have shown that even with proper restoration practices, it can take decades to get back to the biological functioning it was at prior to disturbance. When Enbridge stores the soil, they will also be driving equipment over it- which compacts it, they also plan to compact the soil after refilling the trenches. This is not good for the soil.

- Cathodic protection, which applies electric current to the pipeline in order to protect it from corrosion caused by nearby utility lines, **will not be installed for up to 1 year after pipeline construction** (2.3.2.3). Lack of cathodic protection is what caused many pinhole leaks in the Keystone pipeline, almost immediately after construction. The proposed route for Line 3 follows a utility corridor for much of its length - this is a recipe for disaster. Even the US Army Corps's rubber-stamp approval of the Dakota Access pipeline required the cathodic protection system to be installed within 6 months!

Economic Impacts

- Chapter 5, "Existing Conditions, Impacts, and Mitigation" states that **Line 3 will create ZERO permanent jobs**. Enbridge's application states that "existing operations staff would be able to operate the [pipeline] and that few additional employees would be hired to assist the staff" (5.3.4).

- Also in Chapter 5, the DOC assumes "all workers would re-locate to the area" and **ZERO construction jobs will go to Minnesotans**. The pipeline would have "no measureable impact on local employment, per capita household income, median household income, or unemployment" (5.3.4).

- The DEIS does not acknowledge that when the existing Line 3 shuts down, **Enbridge will stop paying taxes to the MN counties along the mainline corridor**. For many of these poor counties in the north, revenue from Enbridge's property tax makes up a significant portion of the county budget. There is also the issue that Enbridge is now in the process of appealing years of back taxes, burdening two of the poorest counties in Minnesota with over $10 million due.

Climate Change

- The DEIS acknowledges that Line 3 would contribute to climate change. It analyses 3 different types of emissions - direct, indirect, and lifecycle. Direct emissions are those that the pipeline infrastructure itself emits, and these are very small. Indirect emissions are those created by the power plants that provide electricity for the pipeline's pumping stations, and these are significant. Lifecycle emissions are those caused by the refinement and eventual use of the oil, and these are massive. Line 3's direct and indirect emissions alone would be 453,000 tons of CO_2 per year. Over a 50-year lifespan, that would cost society an estimated $1.1 billion. (Executive Summary p.18).

- The lifecycle emissions of Line 3 would be 193 million tons of CO_2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3)

- The DEIS does not discuss the unprecedented challenges of human casualty, displacement, conflict, natural disaster, biodiversity loss, etc, that climate change is causing, or the consensus from the scientific community that we must leave fossil fuels in the ground. It also fails to acknowledge that across the planet, Indigenous people are disproportionately impacted.

The DEIS affirms that the MN PUC can only grant the permit if "the consequences to society of granting are more favorable than the consequences of denying the certificate."
Regardless of whether or not Enbridge can find customers, the DEIS shows that the negative impacts far outweigh the benefits. So our position remains:
No Permit. Shut down Line 3 and develop renewable energy infrastructure.

Learn more at StopLine3.org

STOP LINE 3

Attachment B

To

Honor the Earth

Comments on Line 3 Replacement Project

DEIS

CN-14-916 and PPL-15-137

COMMENTS ON THE STANTEC

PINHOLE RELEASE ASSESSMENT

PREPARED BY:

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JULY 5, 2017

EVALUATION OF:
LINE 3 REPLACEMENT PROJECT: ASSESSMENT OF POTENTIAL PINHOLE RELEASE

Stantec was retained by Enbridge Energy Partners (Enbridge) to evaluate the affects of a pinhole release from the proposed Line 3 Replacement Project (L3RP). The purpose was to assess the potential for environmental damage from a release that is not detected by the automated sensors. The Stantec report includes general discussions of issues related to pipelines, but does not discuss issues and concerns as they specifically apply to L3PR and the several environmental settings along the pipeline route. Further, the report relies on assumptions with no attempt to show that the assumptions are valid for the conditions found along the L3PR route. Therefore, the report is not a valid evaluation of the affects of pinhole leaks along the Line 3 replacement route. Examples of the shortcomings of this report are given below.

SECTION 2.3 – RATE OF RELEASE

In Section 2.1, Stantec gives the following definition of a pinhole release.

> For the purposes of this document, a pinhole release is defined "as a slow and small leak of crude oil from the proposed pipeline, or its remote facilities (e.g., pump station valves) that might not be immediately detected by the leak detection systems".

In Section 2.3, Stantec claims that the sensors to be used for the pipeline are capable of detecting a release of one percent of the flow through the pipeline. At the maximum flow rate of 760,000 barrels per day, a release of less than 7,600 barrels per day (bpd) would not be detected. Yet they select a release rate of 28 bpd to assess pinhole leaks, which is 0.37 percent of the smallest release detectable by the automated sensors. No justification is given for the release rate selected. To accurately evaluate the affects of a release, it would be necessary to use a range of release rates that are below the leak detection capabilities of the instrumentation on the pipeline. It would further be necessary to evaluate the potential environmental damage for the range of release rates for each of the environmental settings along the pipeline route. The Stantec report did not evaluate a range of releases nor does the report evaluate each of the environmental settings along the route.

Stantec uses the arbitrarily-selected leak rate to estimate the infiltration of the oil into the soil along the L3RP route. The Stantec estimation is based on a computer simulation done for the Keystone XL project. Stantec does not provide any of the assumptions used in the Keystone XL study except for the leak rate and the soil infiltration rate making it impossible to determine the accuracy of the computer simulation. There is no description of the environmental setting used in the Keystone XL study nor is any attempt made to establish that the assumptions made and the environmental settings are applicable to the L3RP pipeline route. Further, only one computer simulation is cited. To properly assess the impacts of a release, a computer simulation would have to be done for every environmental setting along the L3RP route.

Using the data from the Keystone XL study, Stantec determined the infiltration rate of an oil spill from a pinhole release of crude oil. The assumption is made that a release from a 36-inch diameter pipe will spread out over a 36-inch-diameter circle under the pipe. This appears to be

another arbitrarily-selected number as there is no correlation between the diameter of the pipe and the area under and lateral to the pipe impacted by a release. The trench dimensions are better used to estimate the impacts.

Stantec used an infiltration rate of 0.21 gallons per day per square foot which they state is typical for "permeable sand." This equates to an infiltration rate of 0.014 inches per hour as shown below.

0.21 gallons per day = 0.028 cubic feet per day
The height of 0.028 cubic feet of liquid in an area of one square foot is 0.028 feet.
An infiltration rate of 0.028 feet per day = 0.34 inches per day = 0.014 inches per hour

The source of the infiltration rate used for "permeable sand" is not cited. However, the Minnesota Pollution Control Agency Stormwater Manual shows that an infiltration rate of 0.014 inches per hour is typical of a clayey soil and that a sandy soil would have an infiltration rate of approximately 0.8 inches per hour or 57 times greater than the number used by Stantec. Again, Stantec does not provide a source for the estimated infiltration rate of 0.21 gallons per day per square foot. Unless Stantec can justify their estimate of infiltration, the entire discussion of infiltration rates is invalid.

Stantec uses their infiltration rate to determine that any release from a pinhole leak would "quickly" daylight. The term "quickly" is not defined. The use of such inexact and subjective terms is not appropriate in an EIS.

Stantec does not appear to consider lateral migration within the trench. The trench is to be backfilled with natural materials. Unless extraordinary measures are taken to compact the soil around the pipe, a permeable pathway will exist along the sides and bottom of the pipe. I am unable to find any description of the backfilling operations in the EIS or in Appendix E to the EIS which suggests that any extraordinary backfilling measures will be undertaken. The lateral migration along the pipeline will increase the volume that will remain underground and also increase the area available for infiltration at the bottom of the trench. Finally, Stantec does not include lateral migration of the oil through the trench walls in their evaluation. Migration through the trench walls will also serve to delay the daylighting of a release of crude oil.

In Figure 2.1, Stantec uses a graph which purports to show the length of time a release will be active until it is discovered. The graph is taken from the Keystone XL project. Stantec does not show that the environmental conditions along the Keystone XL project are equivalent to the environmental conditions along the L3RP route. The graph also assumes an infiltration rate which does not apply to the most sensitive areas of the L3RP route and further assumes that only a three-foot-diameter circle will be available for infiltration; no consideration is given to the lateral migration of the oil which will occur. Therefore, the graph is invalid as are any conclusions drawn from the information in the graph.

SECTION 2.4 – ESTIMATED RELEASE VOLUME

In Table 2-2, Stantec purports to show the volume of crude oil released prior to detection of the leak. The times cited for inception of the leak to detection of the leak appear to be arbitrarily selected. If numerical data is used in an EIS, the justification for the data must be included in the EIS. Stantec does not justify use of the times in the table. Further, the table cites data for the volume of oil which will infiltrate the soil. The Stantec assumptions used in estimating the infiltration volume were shown to be invalid in the discussion on Section 2.3. Therefore the information in the table is moot.

Table 2-2 gives a release volume of 1,760 bpd for a release rate of 0.5 percent of the throughput. Based on the information given by Stantec, the actual volume would be 3,800 bpd and the amount released using the Stantec estimate would be 7,600 barrels, not 3,500 barrels.

In the text following the table, an attempt is made to justify the detection times presented in Table 2-2. No studies are cited to justify the detection times and a single figure is used for the times rather than a range. Stantec asserts that the detection times are "conservative" with no data presented to verify the times.

Stantec also uses the incorrect infiltration rates to justify a detection time of 28 days for "small" releases. The infiltration rates are much higher for areas where the soil has a high sand content. The conclusions drawn with regard to detection time cannot be justified or verified using the extremely low infiltration rates estimated by Stantec.

The Stantec report cites a Pipeline and Hazardous Materials Safety Administration (PHMSA) study to support the information given in Table 2-2 and the following text which estimates the time from the start of a release to detection of a release. The PHMSA report does not support the Stantec justification of those times in any conceivable manner. The Stantec report estimates the time beginning at the start of the release and ending at the time the release is detected. The PHMSA gives the time beginning at detection of the release and ending at the time that the pipeline is shut down. The PHMSA report, as cited in the Stantec report, makes no effort to define the time between the onset of the release and the detection of the release. The PHMSA report is not germane to the Stantec discussion in any way.

SECTION 2.5 – FREQUENCY

The purpose of this section is unclear unless it is to show that while pipelines are designed not to leak, they do, in fact, have releases. This section, by extension, also shows that pipelines should be built along the route with the least sensitivity to releases, which is not the case with L3RP.

SECTION 3.1 – INTRODUCTION

Stantec makes the following statement:

> "Field investigations at over 600 petroleum hydrocarbon release sites indicate that the migration of dissolved constituents typically stabilize within tens to hundreds of feet from the source area for the crude oil."

However, Stantec does not demonstrate that any of these sites are comparable to the L3RP route in terms of geology, biology, groundwater use, agricultural use, sensitive environments, soil chemistry, or microbe population. Unless equivalence is proven, the Stantec statement has no value in assessing the environmental concerns along the L3RP route.

SECTION 3.2 – FUNDAMENTAL CONCEPTS OF CRUDE OIL TRANSPORT

This section is a general discussion of crude oil movement in the subsurface. However, while the general statements are correct, the general discussion is not an assessment of the site specific conditions along the L3RP route. The flow of liquids in the subsurface is not uniform along the L3RP route and the variations in the flow must be identified and addressed to properly assess the impact of a release of crude oil. Generalities are not a substitute for site specific data.

One part of the Stantec discussion calls into question the validity of statements made in Sections 2.3 and 2.4. In these sections, a circle three feet in diameter was used as the limit of infiltration. The discussion in these sections ignores the possibility of lateral migration of the crude oil in the trench. The discussion quoted below from Section 3.2 demonstrates that lateral migration of the crude oil should have been considered.

> "Typically the principal direction of transport is downward in permeable sediments under the force of gravity; however, in a pinhole release within a pipeline trench where the native soils are less permeable then the trench fill material, oil may preferentially follow the path of least resistance filling the relatively higher permeability materials within the trench. For a buried pipe, this could result in filling of the pipe trench and ultimately surface expression of the oil. Lateral migration of the oil along the length of the pipeline could occur within the trench, which could extend the time until surface expression of the leaking oil occurs."

It is obvious that Stantec recognizes that lateral flow of the oil will occur, but failed to include this in the discussions in Sections 2.3 and 2.4.

SECTION 3.4.1 - VOLATILIZATION

Stantec cites Fingas (2011) to show that 20 percent of crude oil will volatilize within a few hours and 30 percent will volatilize within a day. However, they do not state the conditions under which the volatilization will occur and do not show that the numbers are reflective of the volatilization which would occur along the L3RP route. Until equivalence is shown, the statement is not relevant to the EIS.

SECTION 3.4.2 - DISSOLUTION

Stantec again makes the following statement:

> "Field investigations at over 600 petroleum hydrocarbon release sites indicate that the migration of dissolved constituents typically stabilize within tens to hundreds of feet from the source area for the crude oil."

However, Stantec does not demonstrate that any of these sites are comparable to the L3RP route in terms of geology, biology, groundwater use, agricultural use, sensitive environments, soil chemistry, or microbe population. Stantec also fails to assess what environmental receptors may lay within the "few hundred feet." What is in the plume may be more important than the plume length. Unless equivalence is proven, the Stantec statement has no value in assessing the environmental concerns along the L3RP route.

Stantec makes the following statement:

> "Vertical migration of contamination into groundwater is extremely limited, and is much less than horizontal migration."

Unsupported statements such as this should not be used in an EIS. To be considered in the evaluation of a release of crude oil, it is necessary to quantify the vertical extent of contamination for each of the aquifer types along the L3RP route.

Stantec makes the following statement:

> "Over a relatively short distance, the dissolved hydrocarbon plume will reach an equilibrium state and expand no farther as the flux of dissolved components from the remaining oil is balanced by the mass removed through attenuation processes in the aquifer (Section 3.4.4)."

The term "relatively short distance" must be quantified for each aquifer type along the L3RP route.

SECTION 3.4.4 – NATURAL ATTENUATION OF DISSOLVED PLUMES

Stantec makes the following statement:

> "Preferential dissolution of the more soluble and volatile components of the crude oil will lead to plumes that are often dominated by BTEX components (Bowers and Smith 2014; Thornton et al. 2013). However, the less soluble and typically more biodegradable aromatic hydrocarbons such as toluene, ethylbenzene and xylenes often develop dissolved-phase plumes that are restricted to the source area."

It is unclear what is meant by this statement. Stantec first states that "…the more soluble and volatile components of the crude oil will lead to plumes that are often dominated by BTEX components…" Stantec then states that the "less soluble" toluene, ethylbenzene, and xylenes "…develop dissolved-phase plumes that are restricted to the source area. Toluene, ethylbenzene, and xylenes are the TEX in BTEX. It defies logic to suggest that they can be both less soluble

and more soluble at the same time and restricted to the source area while not being restricted to the source area.

Stantec makes the following statement:

> "Numerous multi-site studies conducted since the 1990s have presented results that indicate dissolved-phase hydrocarbon plumes stabilize at relatively short distances from the source area and are unlikely to be greater than a few hundred feet in length (Newell and Connor 1998; Connor et al. 2015)."

Stantec again fails to show that the environmental conditions at the sites in the studies are comparable to the L3RP route. Stantec also fails to assess what environmental receptors may lay within the "few hundred feet." What is in the plume may be more important than the plume length.

5.1.2 – GROUNDWATER SUSCEPTIBILITY EVALUATION METHODS

Stantec makes the following statement:

> "Based on professional judgment, lacustrine materials were considered low vulnerability in this analysis. Lacustrine deposits are typically composed of fine-grained sediments and such deposits have low permeability."

Stantec used the Minnesota Department of Natural Resources (MDNR) Pollution Sensitivity of Near-Surface Materials to assess the sensitivity of the land along the L3RP route. However, based on "professional judgment", lacustrine materials were changed from medium vulnerability to low vulnerability. This was based on the Stantec determination that lacustrine deposits are typically fine grained and have low permeability. Unless Stantec has collected site specific samples to obtain data to prove their hypothesis, it is problematic that they have arbitrarily assumed that they are more qualified than the DNR scientists to evaluate the vulnerability of lacustrine sediments. Further, lacustrine sediments can show a wide variation in grain size. The assertion that lacustrine sediments are typically fine grained is unsupported speculation.

Stantec also arbitrarily choose to classify a one-mile segment as having low vulnerability if the depth to ground water is greater than 40 feet. There is no data which supports this speculative statement and any reference to a 40-foot standard for low vulnerability should be removed from the report.

To evaluate the vulnerability, Stantec divided the route into one-mile segments. The midpoint of each segment was used to assign the vulnerability rating for the entire one-mile segment. This means that one small hill 50 feet long can incorrectly cause a one-mile segment to be classified as low vulnerability because of the depth to ground water is 41 feet at the top of the hill when the remaining 5,230 feet of the mile have a depth to groundwater of less than 40 feet. It is also possible that a segment can be improperly classified as having low vulnerability if a few feet in the middle are lacustrine sediments and the remaining part of the segment is composed of sand and gravel. If the midpoint method is to be used, it must be established statistically that it will

yield the same result as measuring the exact length of each classification along the route. Stantec did not do a statistical analysis (or did not report it if they did) and the evaluation method is not acceptable.

The error of arbitrarily defining the classifications and using the midpoint method is compounded by the failure to report how many of the segments were changed to a low vulnerability classification based on the Stantec changes to the DNR classifications. It is obvious that the data are skewed by the changes, but the extent to which they were skewed cannot be determined without knowing how many segments had the susceptibility rating changed. Such skewing of the data will not facilitate a fair and unbiased evaluation of the EIS and the results presented in Table 5-1 are of questionable value.

SECTION 5.2 – SURFACE WATER SUSCEPTABILITY

This section is little more than a general statement of the impact of a release to water and does not consider any site specific issues. As such, it is not an adequate assessment of the impacts of a crude oil release along the L3RP route.

SECTION 5.3 – WETLANDS, FENS, AND PEATLANDS SUSCEPTIBILITY

As with Section 5.2, this is little more than a general statement of the impact of a release to sensitive wetlands, fens, and peatlands. These areas would have difficulty recovering from a crude oil release, in part because of the difficulty of remediating and restoring these lands. Because this section does not address the specific sites, it is not an adequate assessment of the impacts of a crude oil release.

SECTION 6.1.1 – EX-*SITU* TECHNOLOGY

There are several shortcomings in this section. While some possible remediation technologies are discussed, there are several topics related to remediation which were not discussed. These topics are addressed below.

Initial Response. Stantec does not describe the actions which would form the initial response to a release. The actions include preventing or minimizing the impact to surface water, preventing or minimizing the impact to sensitive areas such as fens, protecting wildlife, protecting wellheads, protecting drinking water intakes, and preventing or limiting human exposure to harmful chemicals.

Logistics. No discussion was included on the methods to be used to transport equipment, personnel, and materials to the release areas. Prior planning is especially important for remote areas.

Power Supplies. Several of the remedial techniques proposed require power to operate the equipment. The method(s) of supplying the required power was not discussed.

Waste Management. The methods to be used to secure wastes stored at the release point and to dispose of the wastes were not covered.

Freeze Protection. All of the remediation techniques that recover air or water from the subsurface will require burial to a depth of at least four feet below grade or heat tracing and insulation of the pipes.

Extracted Groundwater Disposal. The disposal of extracted ground water was not discussed. Groundwater extraction can generate large amounts of water which makes hauling the water uneconomic. Discharging the water to streams can cause erosion in small streams. Getting a permit to inject the water is difficult. The difficultly is increased if there is any residual contamination. Complete removal of the contamination can be expensive and technically difficult.

SECTION 6.1.2 – IN-*SITU* TECHNOLOGY

In-*situ* technologies have the advantage of not requiring a lot of machinery. They do, however, usually require closely-spaced injection wells which increase the impact to the environment as the plume size increases. Also, multiple injections are usually required. The methods of mitigating the impact of multiple injection wells were not discussed.

SECTION 6.1.3 – PHYSICAL BARRIERS AND HYDRAULIC CONTAINMENT

Sheet Piling and Slurry Walls. These methods require heavy equipment and large stocks of materials. They also tend to redirect rather than contain contamination.

Extraction Wells for Hydraulic Containment. Containment wells can generate a large amount of contaminated water which must be treated prior to disposal.

Reactive Barriers. This method is also material and equipment intensive. The reactive materials are subject to surface fouling which reduces the effectiveness of the barrier.

SECTION 7.0 – CASE STUDIES

While the studies in this section discuss the causes, size, and cleanup of releases, there is no discussion of the environmental impact of the releases, any measures taken to minimize the impact, or the actions taken to restore the impacted area to the original condition. That discussion is central to the purpose of the Stantec report but has been omitted.

The main point of this section appears to be to reinforce the Stantec position that natural attenuation will resolve the negative impacts of any release. To that end, it is worthwhile discussing the spill cleanup in Bemidji.

SECTION 7.1 – ENBRIDGE ENERGY LIMITED PARTNERSHIP LINE 3, BEMIDJI

Stantec touts the success of natural attenuation at this site. In particular, they note the stabilization of the plume of contamination at 650 feet downgradient from the point of release. They do not discuss, however, the extent to which the limit of the migration of the plume is due to the removal of over 75 percent of the release of crude oil. It is possible that the plume would have extended much further had the biggest part of the release not been removed.

While it has been postulated that the plume of contamination is stable, this reflects only the BTEX compounds (benzene, toluene, ethylbenzene, and xylenes) and diesel range organics (DRO) that have been found in the plume. There is also evidence that the BTEX and DRO plume is still slowly expanding. Sampling has also been undertaken for nonvolatile dissolved organic carbon (NVDOC) by B. A. Bekins, et al. (Groundwater, 2016) of the United States Geological Survey (USGS). NVDOC includes the metabolites of crude oil biodegradation. Analyses for NVDOC are not routinely carried out because of the lack of knowledge about the NVDOC compounds and the lack of governmental requirements to conduct NVDOC analyses at release sites. The NVDOC plume in Bemidji has been shown to be expanding at a rate faster than the BTEX plume and is found in concentrations 10 times higher than benzene and two to three times higher than DROs. While the toxicity of these compounds is not well understood, there is evidence that NVDOCs are toxic to aquatic life and mammals. Given that an Enbridge pipeline was the source of the release of the crude oil at Bemidji, it is somewhat puzzling that Stantec did not include this information in their report.

SECTION 8.0 – CONCLUSIONS

The conclusions start with a list of the improved materials, construction methods and operating procedures which are designed to prevent leaks. The Dakota Access Pipeline segment of Keystone 1, which was completed in 2010, presumably used all of the modern improvements and had 12 releases in the first year of operation.

The second paragraph uses the data from studies on the Keystone XL project to show that a release of crude oil would quickly rise to the surface where it would quickly be discovered. However, the Stantec analysis gave little weight to the lateral movement of crude oil in the pipeline trench and used an infiltration rate for clayey soils. The releases of greatest concern would be in sandy soil. That possibility was not discussed in the Stantec report. This combination of errors grossly underestimates the volume of crude oil that would infiltrate the soil and gives an unreasonably short time for discovery of the leak through surface observations.

The third paragraph in the conclusions again states that:

> "Field investigations at over 600 petroleum hydrocarbon release sites indicate the migration of dissolved constituents typically stabilize within tens to hundreds of feet from the source area."

Stantec has made no attempt to show that any of the sites have environmental settings comparable to the conditions found along the L3RP route. If the sites are not comparable, the

studies at those 600 sites have no value in assessing the potential impacts of the L3RP pipeline. Stantec also fails to show that these studies considered NVDOC. NVDOC is a relatively new concern which migrates faster than the BTEX and DRO plumes and is present at higher concentrations than BTEX and DRO. Without using the NVDOC data, the Stantec report is deficient.

In the fourth paragraph, Stantec states:

> "After emergency response and remediation activities remove contaminated soil, natural attenuation would reduce the maximum movement of a plume of dissolved hydrocarbons to a distance on the order of a few hundred feet."

Stantec presents no site specific data to show that this is the case for all sections of the pipeline and the speculative statement should not be in the EIS.

In the next paragraph, Stantec states that 62 percent of the pipeline crosses low-vulnerability aquifers. This statement is based on changing the MDNR classifications without supporting data, inventing a new classification using an arbitrary and unsupported criterion of a depth to ground water of greater than 40 feet, and assigning classifications based on the midpoints of one mile segments along the L3RP route. The use of a midpoint classification has not been shown to be statistically valid and is therefore not an acceptable method of assigning classifications. Stantec has not provided any information on the number of segments that were assigned a lower susceptibility rating. The apparent reason for this is that Stantec does not want to reveal the extent to which their arbitrary classifications skew the data.

In the next to last paragraph, Stantec states that a variety of techniques are available to remediate the release. In the report, Stantec described the remedial methods, but there is no evaluation of the impact of a release on any of the several environmental settings along the pipeline route, no evaluation of the impact of moving and operating equipment at the release site, and no evaluation of the effectiveness of the remedial methods in restoring the land to the original condition, particularly in sensitive areas such as fens, wetlands, and peatlands. The conclusion in this paragraph is that natural attenuation will resolve all pollution problems. However, studies by the USGS show that the understanding of the effectiveness of natural attenuation is not fully understood. Stantec also assumes that by limiting the extent of the plume of contamination, all problems associated with the release are eliminated. Stantec fails, however, to assess the impact of the release on receptors inside the plume of contamination. The affected population is more important than the extent of the plume.

In the last paragraph of the conclusions, Stantec concludes:

> "Given the generally low-susceptibility of surficial aquifers along the Project route and its alternatives and the ability of release response, remediation, and natural attenuation to limit the movement of dissolved hydrocarbons in groundwater, the Project is expected to result in no effects or localized effects on groundwater if a small release of crude oil were to occur."

This conclusion is not supported by the Stantec report. The Stantec report is based primarily on:

- studies done for other sites which have not been shown to be equivalent to any of the environmental settings along the L3RP route,
- reclassification of the vulnerability of the land along the route without any supporting data,
- a suspect "midpoint" method for determining the percentage of each classification,
- an inaccurate determination of the time required for a spill release to reach the surface,
- a misinterpretation of PHMSA data which address the time from detection to shutting the pipeline down rather than the time from onset of the leak to detection of the leak,
- an inaccurate infiltration rate,
- an incomplete discussion of the processes involved in natural attenuation, and
- and avoidance of the specific impacts which will occur when the pipeline has a release of crude oil.

Attachment C

To

Honor the Earth

Comments on Line 3 Replacement Project

DEIS

CN-14-916 and PPL-15-137

Review of Enbridge Line 3 Draft Environmental Impact Statement

by

Robert Merritt, P.G

Merritt Hydrologic and Environmental Consulting, LLC

Purpose

This paper is a review of the Draft Environmental Impact Statement (DEIS) for the Enbridge Limited Partnership (Enbridge) Line 3 proposed replacement prepared by Cardno, Inc. for the Minnesota Department of Commerce (DOC). Because of the document's magnitude (approximately 5000 pages) and limited time in which to review the DEIS, this paper will focus on broad inconsistencies and methods with examples from the report. Hydrology and hydrogeology will be the primary focus. It is intended to be a companion to Clarence Johnson's report titled Comments on the Direct Testimony of Ray Wuolo given on January 31, 2017.

Introduction

Enbridge has applied to the DOC for approval to replace its existing Line 3 pipeline. Their preferred route (APR) traverses Northern Minnesota through the most sensitive surface water and groundwater portions of Minnesota. The DEIS alternative route analysis is inconsistent, favoring the applicant's preferred route and incorrectly skews data against the most environmentally suitable southern alternative route. Figure 1 presents the Line 3 replacement alternatives.

Previous Work

Preceding Line 3, Enbridge applied for Sandpiper, a new pipeline with the same preferred route (APR). Extensive review and comments were prepared and presented to the DOC and contained in the Sandpiper dockets CN-13-473 and PPL-13-474. Important information regarding Sandpiper's APR environmental hazards were presented by groups, individuals and agencies such as the Minnesota Pollution Control Agency (PCA) and Minnesota Department of Natural Resources (DNR).

I presented expert testimony March 12, 2014 in Park Rapids; it was submitted in writing to the DOC on March 17, 2014 and filed in docket PPL-13-474 as document number 20144-98433-06. My testimony is attached in Appendix A. It focused on the importance of the Straight River Basin and intensive irrigation within the area. I referenced a number of United States Geological Survey (USGS) and DNR reports describing the aquifer characteristics. Neither my testimony nor any of the documents referenced in my testimony were used in the Sandpiper alternative environmental review. Similarly, none of these documents have been used to discuss APR through the Straight River Basin in the Line 3 DEIS.

Though it was generally understood that Sandpiper information would be incorporated into the Line 3 process, important Sandpiper docket documents were not used in preparation for the Line 3 DEIS. None of the critical DNR and PCA letters to DOC for Sandpiper have been used in the Line 3 DEIS. Appendices B and C contain the DNR and PCA letters, respectively. Many of the comments contained in the PCA and DNR letters regarding environmental concerns and route recommendations remain the issues for the DEIS. Sandpiper environmental concerns have not been referenced nor appear to be utilized in the DEIS. PCA and DNR comments and criticisms in appendices B and C generally support my professional assessment of impacts and alternatives.

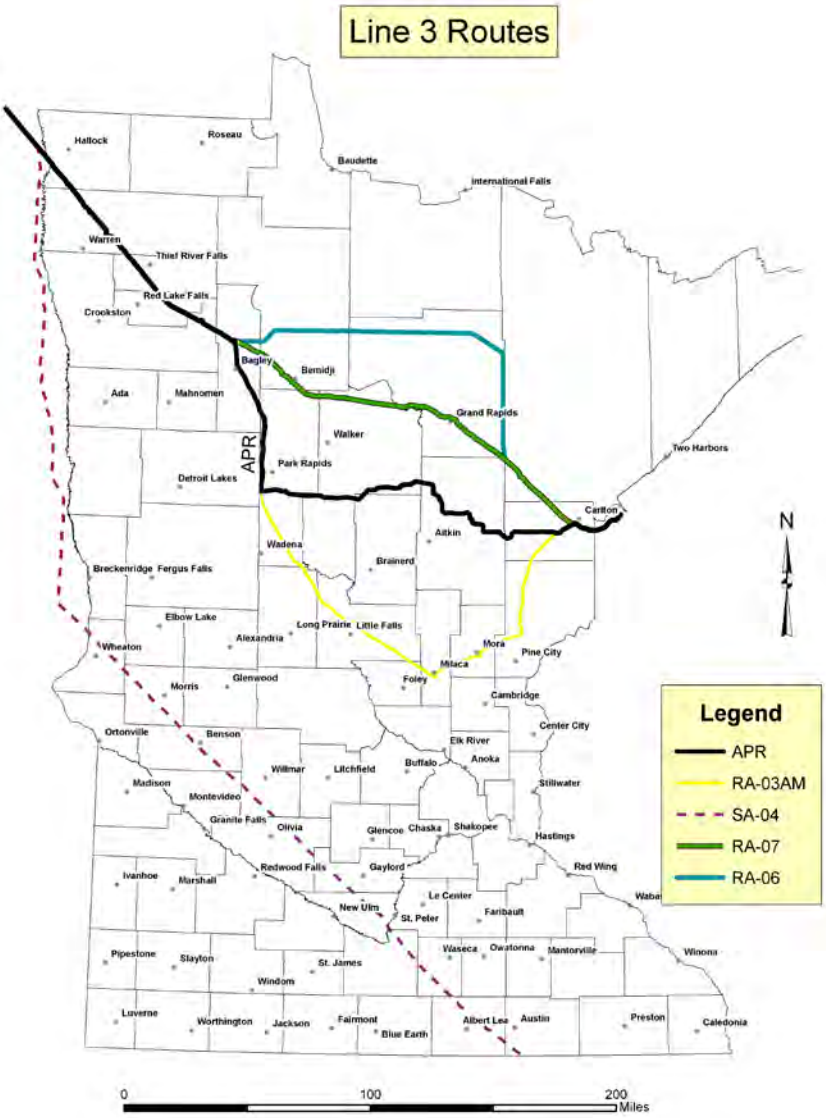

Figure 1: Line 3 Replacement Alternatives

Both the PCA and DNR were critical of the Sandpiper APR environmental impacts in comparison to alternative routes. They urged selection of the southern route (Line 3 SA-04) because it was the least detrimental alternative. The DNR and PCA criticism continued through the January 23, 2015 DNR letter to Administrative Law Judge Lipman and May 12, 2015 PCA letter to the Public Utilities Commission (PUC); the PCA letter addressed Line 3 issues. On March 6, the PCA, DNR and DOC signed a Memorandum of Understanding (MOU) committing the DNR and PCA to assist the DOC in preparation of the DEIS. The DOC was placed in a leadership position over these crucial environmental agencies. Technical review by these vital environmental agencies has not been publicly available since the MOU. Yet many of the problems and concerns expressed by the DNR and PCA persist in the Line 3 DEIS.

Route Alternative Analysis

Though the DEIS examines route SA-04 as a project alternative (along with Truck, Rail and continued use of existing Line 3) for the Certificate of Need (CN) portion of the DEIS, it argues for exclusion of SA-04 for other comparisons of alternative pipeline routes for the DEIS. However, SA-04 will be included in this discussion and compared to the CN approved System and Route Alternatives.

The DEIS alternative analysis was skewed and incorrectly applied as follows:

- SA-04 is the only route the DEIS compiled cumulative impacts east and south of Minnesota. The applicant's proposed route has impacts in several of these same states, including Wisconsin and Illinois.

- Construction impacts were not uniformly calculated. DEIS Chapter 5, pages 5-5 to 5-6 state "*along the SA-04 route, a standard 120-foot-wide construction work area, 60 feet either side of the centerline, was applied to assess the impacts associated with pipeline construction. This allowed quantification of construction and operations impacts on land cover, habitat, and resources along the SA-04 route based on publicly available information on existing conditions. ... the primary shortcoming of the above approach for the environmental analysis is associated with Enbridge's proposal to reduce the width of the construction work area for the Applicant's preferred route in some wetlands and waterbodies (from 120 feet to 95 feet) based on site-specific field investigations and engineering. These refinements have not been incorporated into the general approach for the SA-04 footprint"* This shortcoming should be corrected by using consistent 120 foot construction work area widths for all alternatives.

- No well or water supply analysis was performed east of Minnesota for any RA alternatives. DEIS Chapter 5 pages 5-19 states the SA-04 ROI would encompass… *36 unverified location and 134 verified location domestic wells in Minnesota, 46 permitted private wells and 190 wells included in the private well tracking system in Iowa, and 205 domestic wells in Illinois. Public wells encompassed by the SA-04 ROI are as follows: ... nine verified location public wells in Minnesota; four in Iowa; and one*

in Illinois. Public and domestic wells would be similarly affected along the Superior to Chicago route, but they were not identified or included in the evaluation, calculations and comparison tables. Though it may be argued that construction impacts from Superior to the Chicago area (Chicago) accrued prior to Line 3 replacement, several factors associated with conveyance of product to Superior warrant inclusion of impacts associated with the Superior to Chicago pipeline. They are:

- Operational impacts will intensify east of Superior Wisconsin due to increased pumping volumes made possible by expanded capacity of the proposed project.

- Though no permit applications have been filed for Superior to Chicago pipeline facility expansions, they have been seriously considered in company planning documents.

- A Nov. 28, 2015 Milwaukee Journal Sentinel article titled Wisconsin's Largest Oil Pipeline System May See Major Expansion stated:

  > *"We are highly confident that we will see the heavy production grow as expected," Guy Jarvis, president of liquids pipelines for Enbridge, said at an investment conference in Toronto Oct. 7. ://archive.jsonline.com/news/wisconsin/wisconsins-largest-oil-pipeline-system-may-see-major-expansion-b99622819z1-357334661.html/*

- *A Jan 13, 2017 Milwaukee Journal Sentinel series stated:*

  > *And the company that owns the pipeline network is considering adding a fourth line in Wisconsin — one that could dwarf the rejected Keystone XL. ://projects.jsonline.com/news/2017/1/15/intro/oil-and-water.*

DEIS Figures 10.4-2, 10.4-3 and 10.4-4 display the incongruous analysis which caused skewed values contained in Chapter 5 tables. These illustrations are labeled Fgures 2, 3, and 4, respectively.

Because SA-04 was the only route with analysis comprising areas south and east of Minnesota, impact acreages reported in DEIS Chapter 10 tables for unusual ecological areas, drinking water sources, area of interest, and wetlands are inflated in comparison to APR and RA routes. The skewed comparison is perpetuated in the Executive Summary Table ES-2. PUC Commissioners will most likely rely upon the Executive Summary over wading through 500 pages of DEIS documentation.

Unless specifically identified, all figures following Figure 4 were compiled using GIS layers identified in the DEIS and developed by the author.

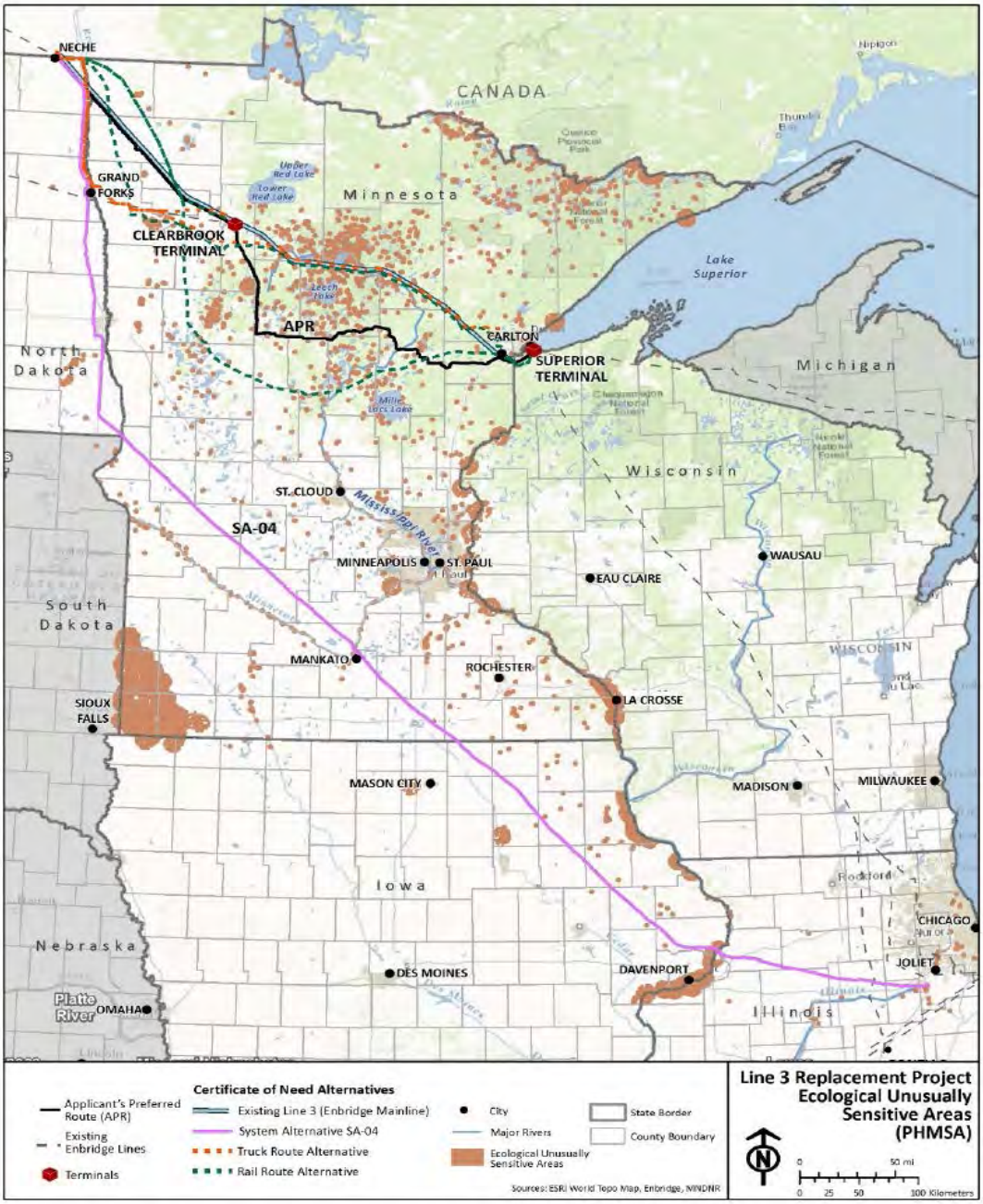

Figure 10.4-2. High Consequence Area Unusually Sensitive Ecological Areas along the Applicant's Preferred Route and Certificate of Need Alternative Routes

Figure 2: High Consequences Area Unusually Ecological Areas Along the Applicant's Preferred Route (APR) and Certificate of Need Alternative Routes (RA) from DEIS Chapter 10

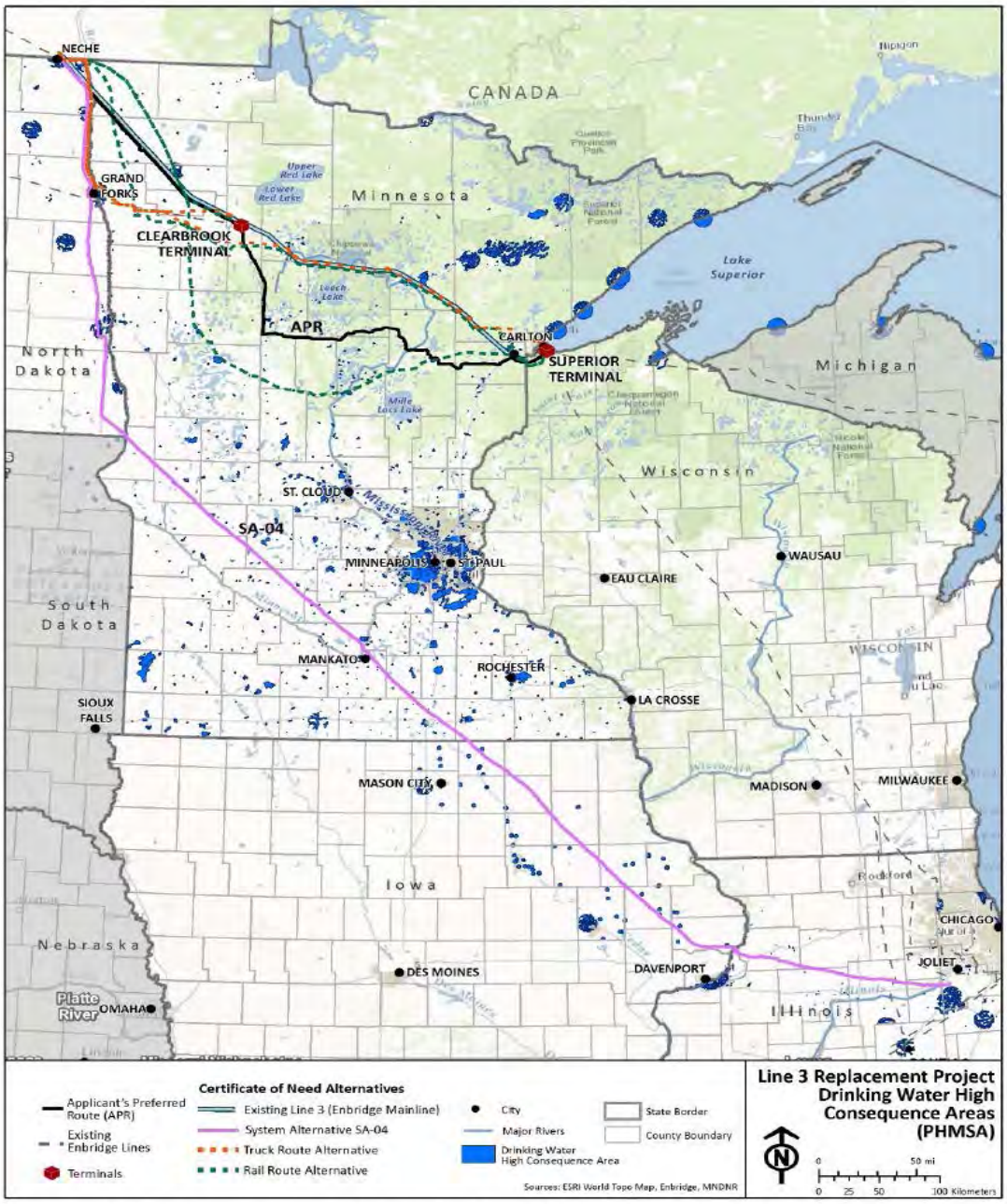

Figure 10.4-3. High Consequence Area Drinking Water Sources along the Applicant's Preferred Route and Certificate of Need Alternative Routes

Figure 3: High Consequences Area Drinking Water Sources Along the APR and RA Routes from DEIS Chapter 10

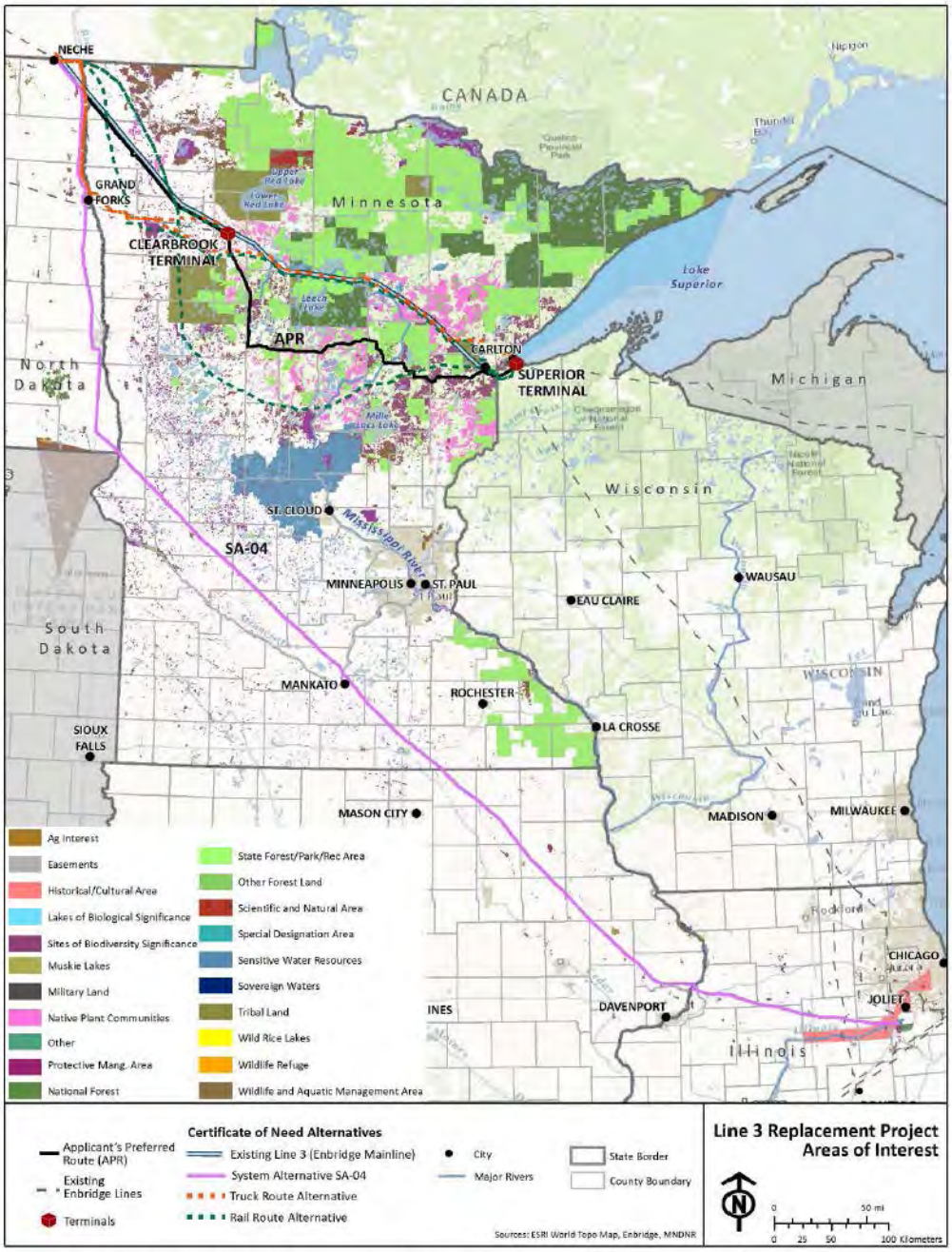

Figure 10.4-4. Areas of Interest along the Applicant's Preferred Route and Certificate of Need Alternative Routes

Figure 4: Areas of Interest Along the APR and RA Routes from DEIS Chapter 10

Karst

DEIS Chapter 5, pages 5-19 and 5-20 state:

> *Karst features are common in bedrock in the extreme southeast of Minnesota.*

Conditions vary locally, but generally these aquifers are capable of yielding quantities of groundwater that are sufficient for most purposes. However, these aquifers are highly vulnerable to contamination and structural changes with ground disturbance; including induced sinkhole formation and alteration of groundwater flow.
Karst topography is found in southeastern and eastern Minnesota … Along system alternative SA-04, relatively shallow carbonate bedrock with potential for karst intersects the route across Minnesota, Iowa, and Illinois (none is present in North Dakota). Karst features are present in Minnesota along 8 miles of system alternative SA-04 in Mower County and 3 miles in Le Seur and Blue Earth counties (Minnesota DNR 2016; USGS 2016).

DEIS Executive Summary page ES-15 states:

> *SA-04 is the only CN Alternative that crosses vulnerable karst topography. A karst aquifer is a type of bedrock aquifer that usually consists of basic rock types that are prone to chemical weathering and dissolution from the slight acidity of precipitation and groundwater. This can result in the formation of fractures, joints, sinkholes, cavities, caves, and void spaces that allow the movement of large volumes of surface water into and through the aquifer. These characteristics also allow contamination to spread rapidly within the aquifer. Karst aquifers are susceptible to collapse of the aquifer matrix, which can be triggered by construction activities on the land surface. This can lead to the formation of sinkholes in unconsolidated sediments that overlie the bedrock.*

This is a crucial statement regarding SA-04 which will give the PUC Commissioners (Commissioners) the wrong perspective of SA-04.

Figures 4 and 5 provide GIS DNR field mapped Karst Features overlying the Pollution Sensitivity of Near Surface Materials GIS layer. Figure 5 is a close-up of Figure 4. As the above description expresses, karst topography is largely in the SE part of Minnesota. Though SA-04 as drawn does touch the western edge of the karst mapped features, a minor alignment refinement of approximately 25 miles westward situates SA-04 out of the karst terrain and avoids sand deposits in Freeborn County; it would eliminate the 8 miles of karst terrain. The applicant's APR alignment has been refined and is proposed to be refined during construction to avoid wetland and other impacts. A move of 25 miles to the west for SA-04 is reasonable and in keeping with APR formulation; it is in line with that afforded the Applicant's preferred route.

Figures 4 and 5 also display that SA-04 traverses some of the least pollution sensitive near surface materials within Minnesota.

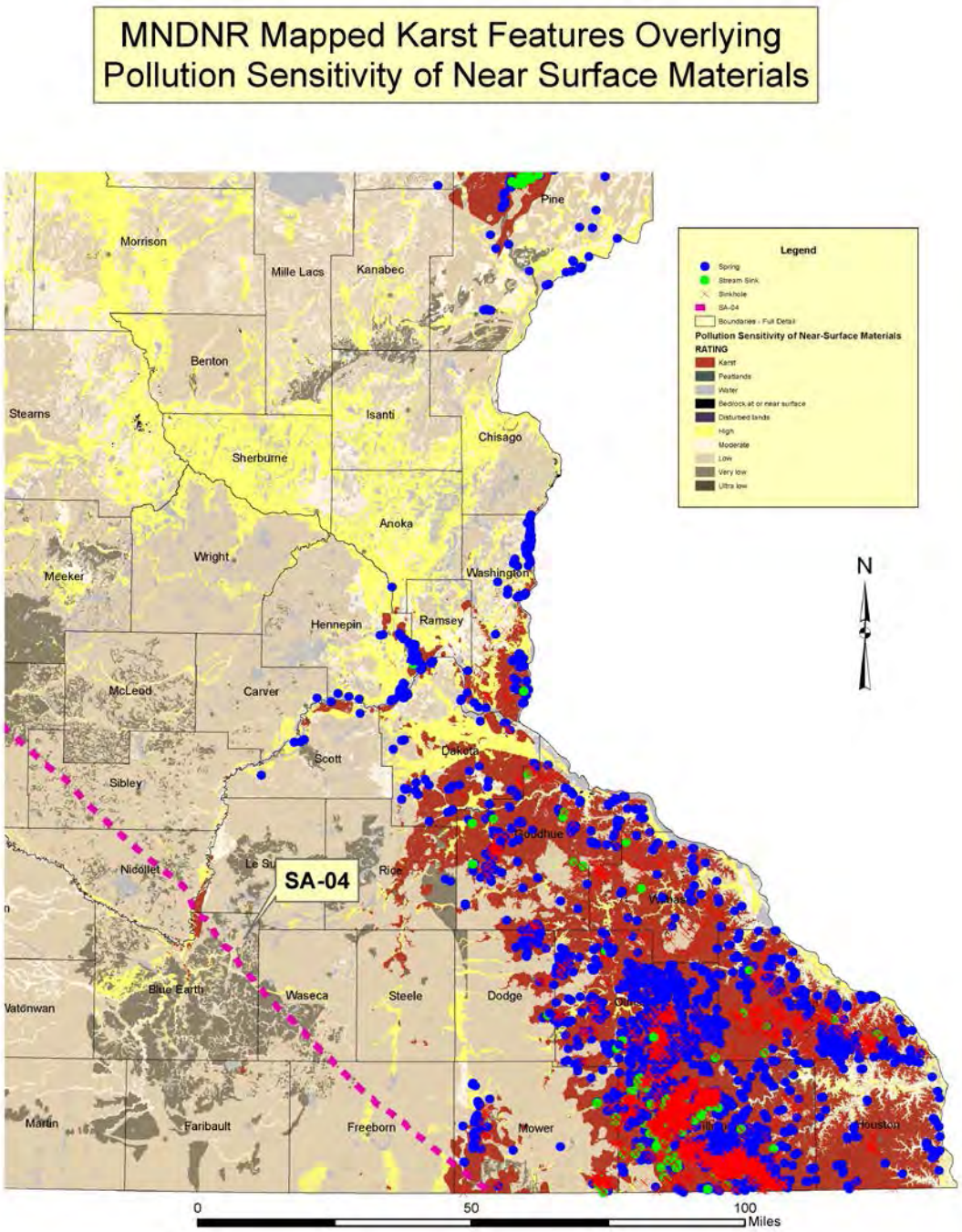

Figure 4: Pollution Sensitivity of Near Surface Materials overlaid by DNR field mapped Karst features.

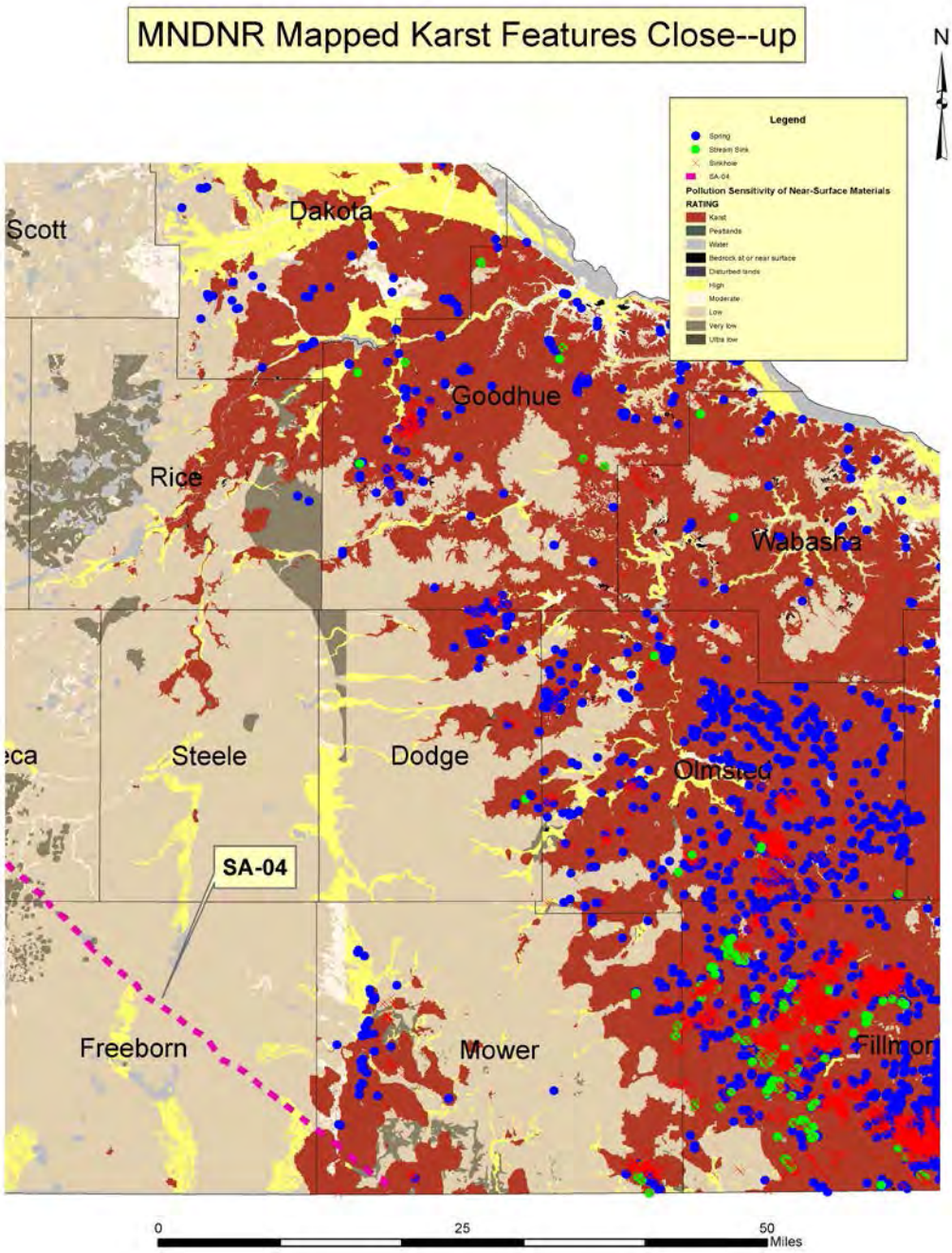

Figure 5: Close-up of Pollution Sensitivity of Near Surface Materials overlaid by DNR field mapped Karst features.

Ecoregions

DEIS Chapter 5, page 5-61 discusses ecoregion health: It states:

> *In general, the north-central and northeast forested portions of Minnesota are the least affected and have the highest quality surface water resources, and areas in the west and south agricultural portions of the state have the most affected surface water resources and are of poorer quality across the state. There are a large number of lakes and streams in north-central and northeast Minnesota and they are of the highest quality when comparing Ecoregion data.*
>
> *Specifically, the data indicate that there are higher quality resources in the NLF Ecoregion of the State. Lower nutrients (mainly phosphorus) and chlorophyll-a (algae) and greater transparency are indicative of lakes in this ecoregion. Streams in this ecoregion exhibit lower nutrients, turbidity, and fecal coliform, as well as lower temperature and biological oxygen demand conditions.*
>
> *In reviewing three selected watersheds throughout the state, that each represent potential pipeline routing areas, the Pine River watershed (north-central), Chippewa River (west) and Le Sueur River (south) ... (t)he Watershed health index scores indicate the best health scores are represented in the Pine River and the worst scores in the Chippewa and Le Sueur River watersheds accordingly. Further, in general, statewide maps indicate better health scores across the north and east and poorer scores across the south and west as depicted by analysis of the five different components: Biology, Connectivity, Geomorphology, Hydrology and Water Quality (Appendix J-1).*

Figure 6 displays the alternative routes overlying the DNR designated Public Waters GIS layer. It shows the magnitude of public water, including public water wetlands, through which APR and AR routes would traverse verses SA-04. The northern routes are forced through the highest number of lakes and wetlands within Minnesota. SA-04 traverses through the corridor with the least lakes and wetlands.

Trout Streams

The DEIS, page 5-62 discusses trout streams. It states:

> *Applicant's preferred route passes within ½ mile of 17 designated trout streams or protected tributaries to designated trout streams….. Route SA-04 crosses within two designated trout streams or protected tributaries to designated trout streams Though more streams/ditches are crossed in southern areas, the analysis indicates the quality of the streams crossed in northern routes is greater since many are trout waters.*

Trout streams are merely cataloged. Qualitative analysis of impacts to individual streams was

not undertaken nor did the DEIS groundwater modeling include a trout stream crossing.

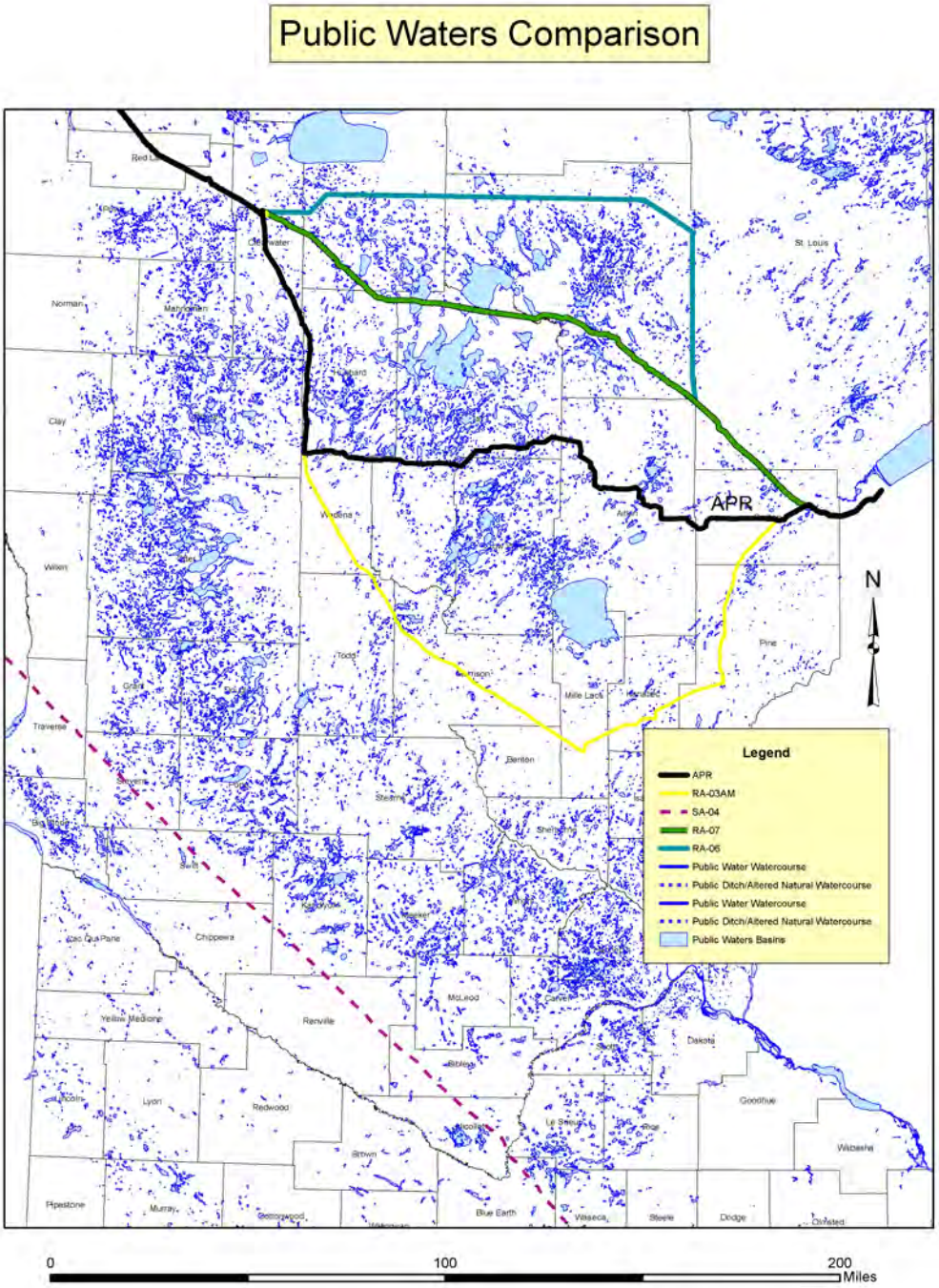

Figure 6: Alternative routes overlying the DNR designated Public Waters Inventory

Figure 7 displays the DNR GIS mapped designated trout streams for all alternatives. SA-04 passes near the trout streams but does not cross them. All other routes cross designated trout streams.

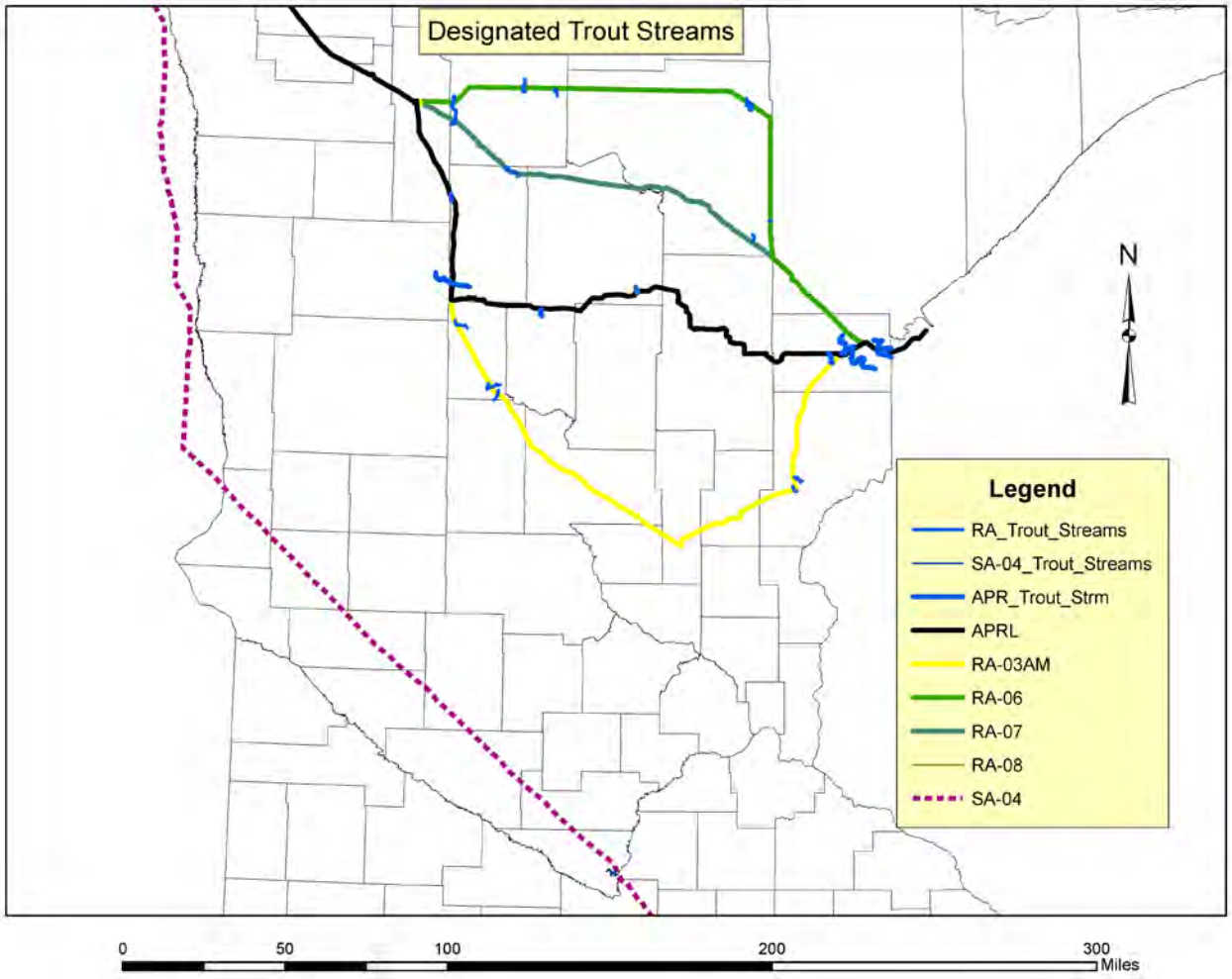

Figure: 7 DNR Designated Trout Streams

The DEIS recognizes that APR and all the CN RA alternatives are routed through the heart of the highest quality lakes and streams in Minnesota whereas SA-04 traverses some of the lowest quality surface water in the state. Trout streams are some the most pristine state rivers. Individual analysis of each stream needs to be conducted to identify actual potential impacts.

Calcareous Fens

Calcareous fens are special wetlands requiring a continual supply of calcium magnesium bicarbonate rich upwelling groundwater. They support a unique assemblage of rare plants and are easily impacted by any activity within and surrounding the fens. Jeannette Leete and

I authored an unpublished DNR report of fen loss and degradation due to gravel mining upgradient of fens in the Felton area. Groundwater is being directed away from the down slope fens, robbing the fens of the requisite groundwater supply. At least one fen was destroyed and another is displaying stress from the diversion of its groundwater source. Any work within and near fens has the potential to degrade and/or eliminate the fen.

The DEIS does not address specific fens, analyze potential impacts including robbing the fens of their requisite groundwater source nor does it identify actions to protect them. It simply categorizes them. Additionally, they are not quantified or even mentioned in the Executive Summary.

Figure 8 displays calcareous fens located along the proposed routes. APR contains the highest number of fens whereas SA-04 contains one. Because APR fens are situated along the Glacial Lake Agassiz beach ridge west of Clearbrook, MN, all northern routes will encompass the same number of fens.

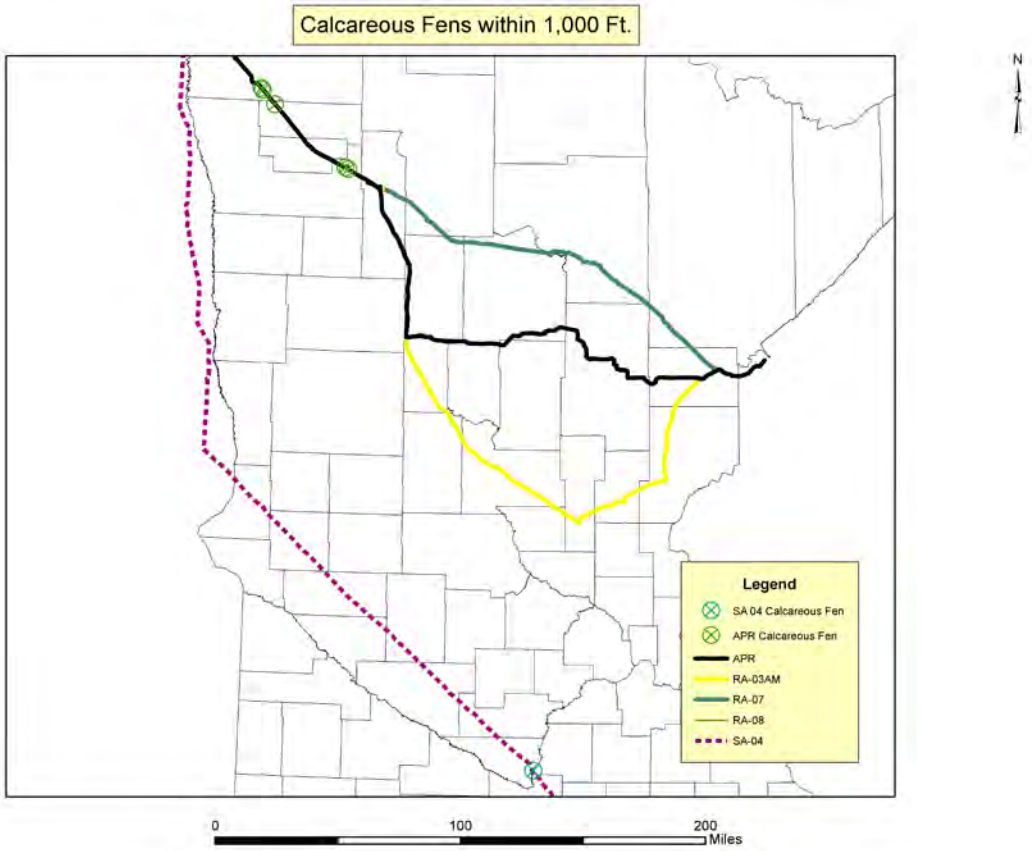

Figure 8 Calcareous Fens Within 1,000 ft. of Alternative Routes

The suggested realignment of SA-04 in the Karst section above would also eliminate the potential of SA-04 impacts to the calcareous fen. Fens could be avoided completely along the SA-04 route. Calcareous fen avoidance is not included in the DEIS comparisons.

Willd Rice

The DEIS, pages 5-44,5-52 and 5-62 state

> *Wild rice beds are very attractive to migrating waterfowl, and many rice areas are traditional waterfowl staging and hunting areas. Because they are an important component of Minnesota's agricultural economy, wild rice waterbodies are specifically protected from destruction and disturbance … Wild rice is an important social and cultural component for Native American tribes and rural Minnesota communities… All wild rice waterbodies that would be crossed by the Applicant's preferred route occur between Clearbrook and Carlton. Fifteen wild rice waterbodies occur within 0.5 mile of the Applicant's preferred route. Five wild rice waterbodies could be affected by construction and operation of the Applicant's preferred route: Mud Lake, Hay Creek (HDD crossing), Portage Lake, Peterson Lake, and Shell River (HDD crossing).*

Figure 9 contains the DNR wild rice locations. Wild rice beds within ½ mile of APR were identified using a GIS buffer of ½ mile from APR. If a wild rice location was closely connected down stream of the bed within the ½ mile buffer, it was also included in the GIS shapefile. A total of 26 locations were identified along APR; 14 more than reported in the DEIS. No wild rice beds are located within ½ mile of SA-04

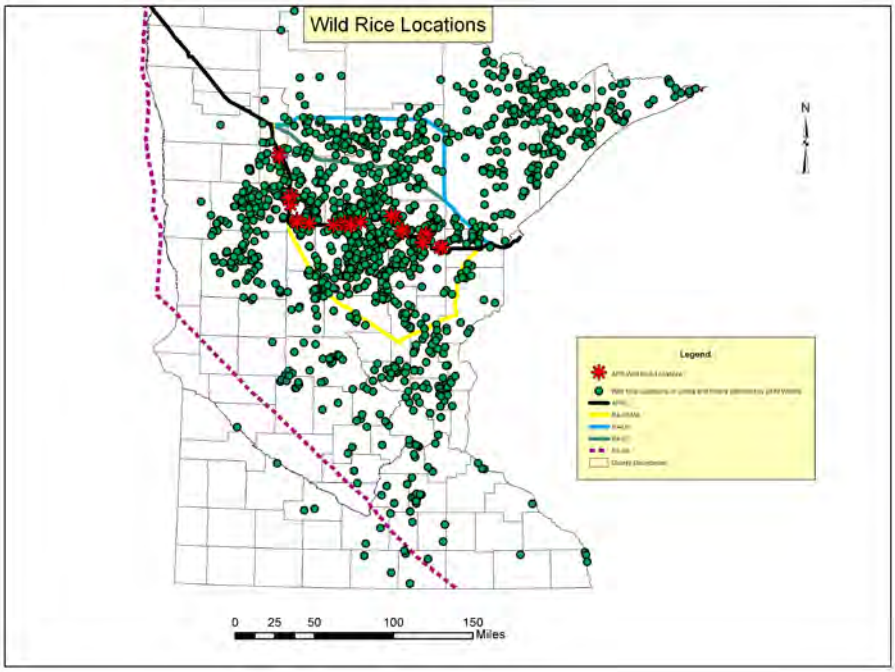

Figure 9: DNR Wild Rice Locations with beds within ½ mile of APR

The DEIS categorizes the locations, but does not address the potential impacts to individual

beds at risk. It does not discuss how the rice will be impacted nor how vastly impacts could spread.

Executive Summary

The Executive Summary is the document upon which the Commissioners will largely base their decisions. As described above computations for the DEIS are skewed against SA-04 and in favor of APR. Figure ES-5 is extremely important to characterize the ecological and overall environmental conditions through which the alternatives would pass. It is merely an insert, difficult to read and easily ignored. Table ES-4 covers an entire page. Figure ES-5 needs to be given sufficient space to make it readily read and understood. It needs to be highlighted to inform the Commissioners and public of the environmental impacts each route will encompass.

Hydrogeology

Several state agencies including the Department of Agriculture (DOA) Department of Health (DOH) PCA and DNR have developed forms of groundwater sensitivity maps. The latest, Hydrogeology Atlas Series HG-02, was published by the DNR in June 2016. It is titled Pollution Sensitivity of Near-Surface Materials by Roberta Adams. Along with this series DNR also published Minnesota Hydrogeology Atlas Series Atlas HG-03 in June 2016 by Adams. Two plates, Water-Table Elevation and Depth to Water Table accompany this report.

In 1979 the Minnesota Geologic Survey published State Map Series S-4 titled Geology Map of Minnesota Quaternary Geology by Goebel and Walton. In 1999, the Minnesota Geological Survey (MGS) published the Regional Hydrogeologic Assessment Quaternary Geology – Otter Tail Area, West-Central Minnesota with two plates titled Surficial Geology by Harris and Knaeble, and Quaternary Stratigraphy by Harris, Knaeble, and Berg. In January 2016 DNR produced a Surficial Sands geographic information system (GIS) layer derived from MGS GIS surficial geology polygons.

GIS layers of the above referenced maps and reports were used to evaluate the alternative routes in Minnesota. Because the DNR pollution sensitivity map is the latest publication, it was used rather than the PCA map referenced in the DEIS.

Figure 10 displays the alternative routes overlying the DNR Pollution Sensitivity of Near Surface Materials. It shows that APR and other CN northern routes traverse through the most pollution sensitive near surface materials within Minnesota; SA-04 is within the least sensitive areas.

Figure 11 displays the alternative routes overlying DNR's Surficial Sand GIS layer. The Central Minnesota Sands through which the CN routes travel are mapped as glacial outwash materials by Harris and others. The outwash materials were formed by meltwaters derived

from receding glacial lobes. Because the outwash materials are composed of sand and granular material, they are porous, allowing rapid infiltration through the unsaturated zone to the groundwater. For that reason, they are mapped as highly sensitive in Figure 10.

Figure 12 displays the routes overlying the sands shown in Figure 11 along with the soils along SA-04 clipped from the Minnesota Soils GIS layer. The soils through which SA-04 travels are predominately clay which are much less permeable than the outwash sands. Because of the clay's impermeability, water is perched creating a shallow, high water table that is unsuitable for water supply. For that reason, Figure 10 depicts the area through which SA-04 is mapped as some of the least pollution sensitive near surface materials in Minnesota.

The Executive Summary page ES-26 states:

> *In general, RA-06 would least affect groundwater resources, including highly vulnerable aquifers and groundwater resources with high contamination sensitivity, high pollution sensitivity, and high to very high bedrock sensitivity. RA-03AM is the only route alternative that crosses vulnerable karst topography.*

As shown in the Karst Section, a refinement of SA-04 would eliminate karst topography. Figure 10 displays that SA-04 is comparable to RA-03AM in near surface material pollution sensitivity.

Similar to the ecoregions conclusions discussed above, APR and the other northern routes (except RA-03AM) traverse the most sensitive surficial groundwater; SA-04 travels through the least sensitive surficial groundwater in the state. The ecoregion and surficial groundwater comparisons substantiate the earlier DNR and PCA support for SA-04 over APR.

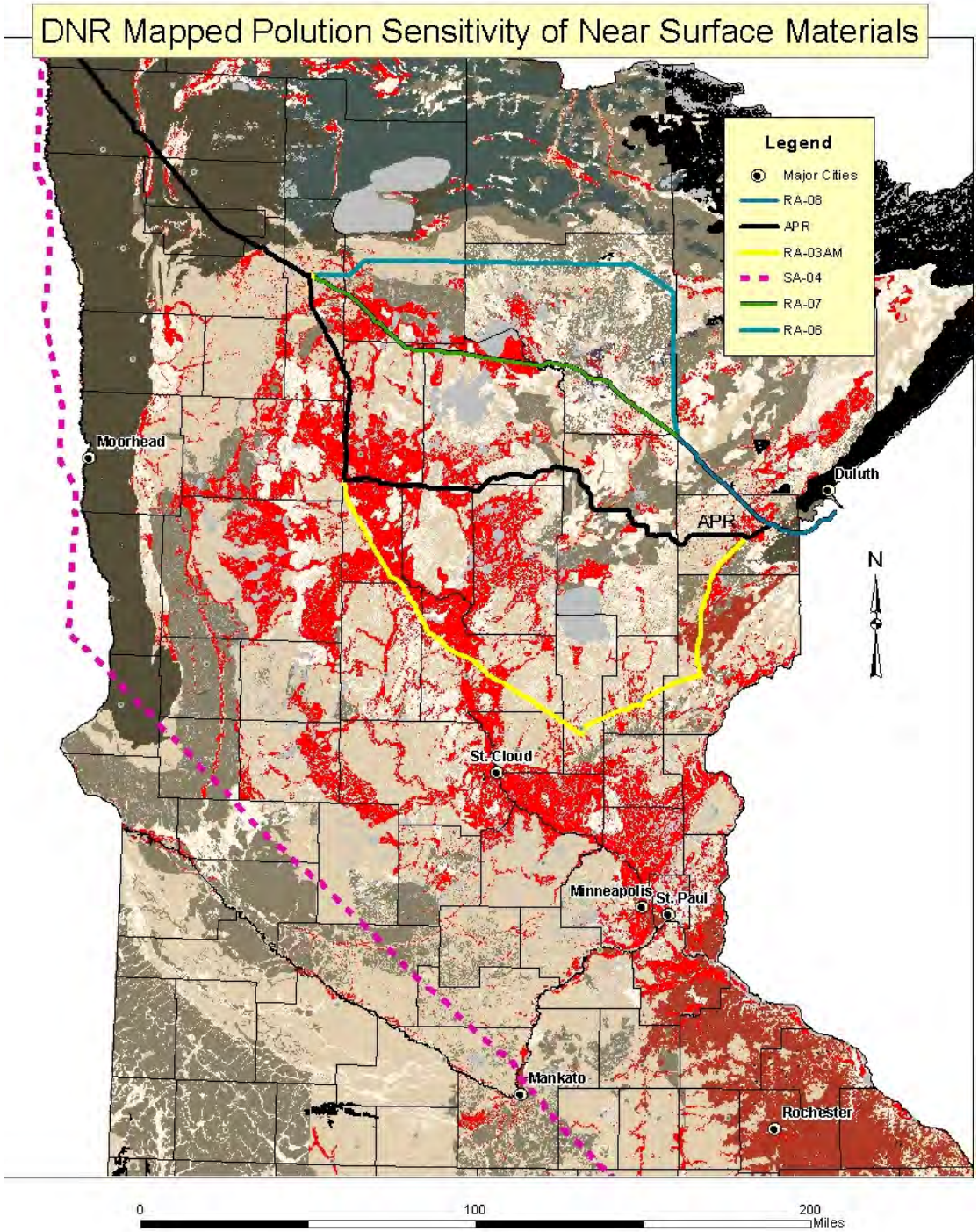

Figure 10: Alternative routes overlying DNR's Pollution Sensitivity of Near Surface Materials

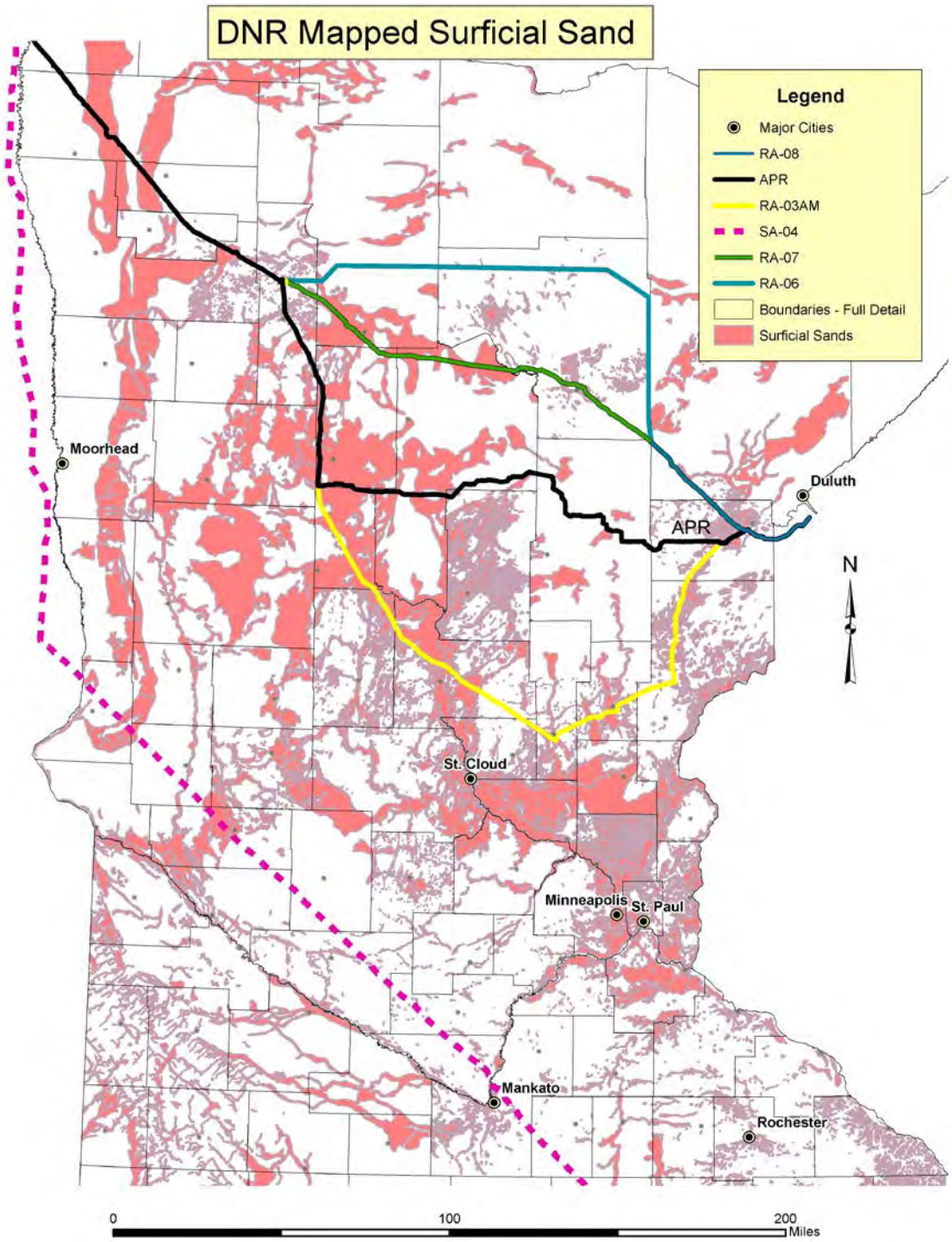

Figure 11: Alternative Routes Overlying DNR's Surficial Sand

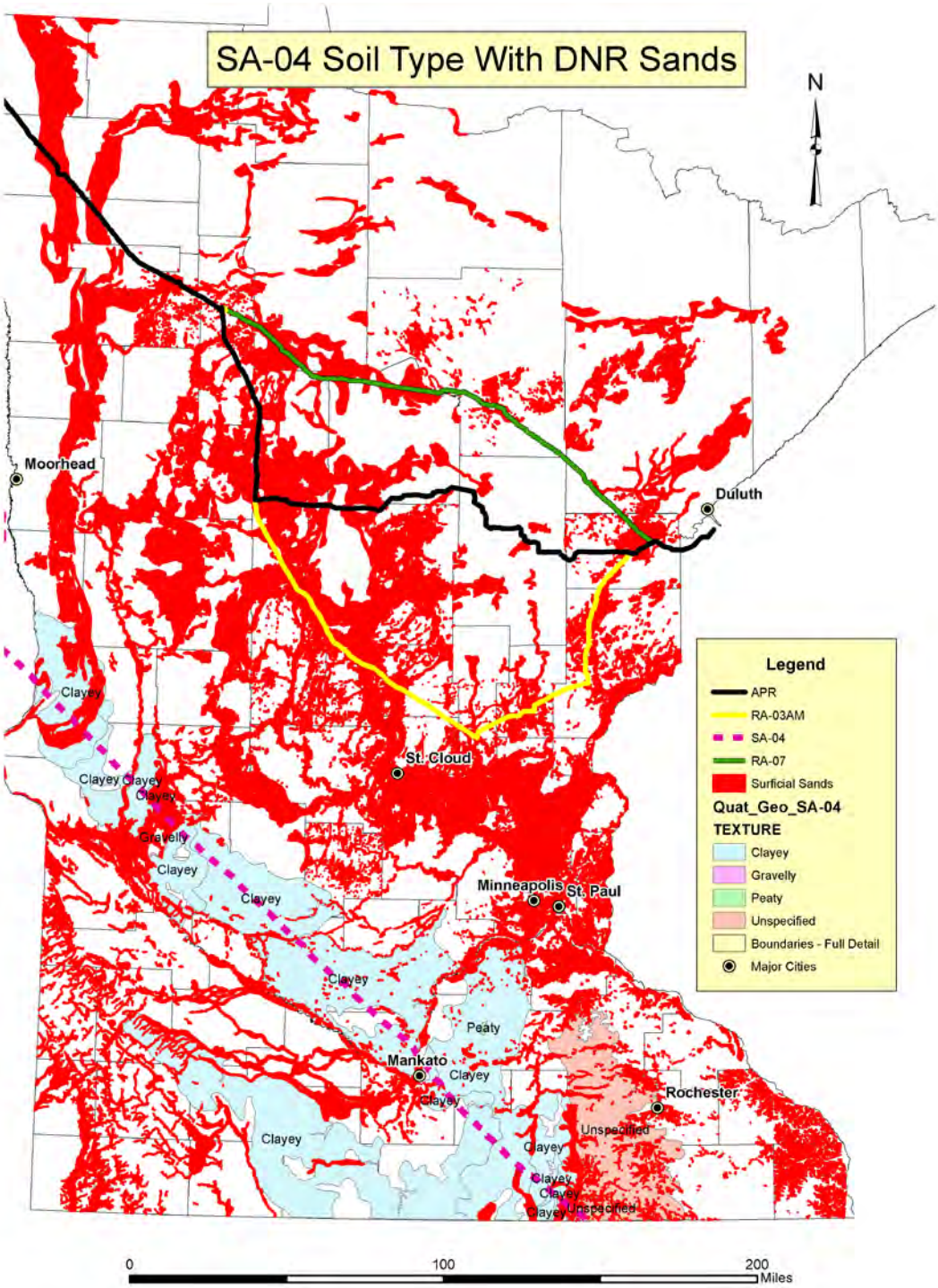

Figure 12: Alternative Routes Overlying DNR's Surficial Sand and SA-04 Soils

Groundwater Analysis

The DEIS does not report individual groundwater analysis beyond hypothetical modeling of selected stream crossings. Discussion regrading groundwater only addresses horizontal flow and ignores vertical migration, an essential groundwater flow component. Like statistics, models can be manipulated to show what the modeler or client wants it to derive.

DEIS Chapter 5, page 5-10 states:

> *The ROI for the analysis of potential impacts on groundwater during construction generally consists of the pipeline, rail, or truck corridor and a 1,000-foot buffer on either side of the centerline of the Applicant's preferred route and the CN Alternatives. …. The ROI for assessment of operations impacts varied according to the configuration of the alternative. Operations impacts for the Applicant's preferred route were estimated based on the footprints for the permanent right-of-way provided by the Applicant. Operations impacts for the existing Line 3 were evaluated based on the existing permanent right-of-way for that pipeline. …. Impacts on groundwater resources were identified based on common construction methods; peer- reviewed literature; agency documents, including permit requirements and guidance manuals; Applicant-submitted documents, including the November 2016 EAW and associated construction BMP plans (Enbridge 2016a); and the experience and professional judgment of the hydrogeologists involved in developing this analysis … Identification of groundwater resources potentially affected by the Project was completed by reviewing reports and data from the U.S. Geological Survey (USGS); the State Geological Surveys of Minnesota, Iowa, and Illinois; the North Dakota State Water Commission and North Dakota Source Water Protection Program; the Minnesota Department of Natural Resources (Minnesota DNR), Minnesota Pollution Control Agency (Minnesota PCA), Minnesota Department of Agriculture (Minnesota DA), and Minnesota Department of Health (Minnesota DH); Iowa Department of Natural Resources (Iowa DNR); and the U.S. Environmental Protection Agency (EPA).*

No individual analysis of known groundwater aquifers was reported in the DEIS. It was argued that data is insufficient to conduct such analysis. Yet, hydrogeologic atlases have been produced by Minnesota along the northern alignments. Along with the studies identified above, a geologic atlas has been published for Carlton County.

Though the DEIS states USGS, MGS, and DNR reports were reviewed, non of the local groundwater reports identified above and in my testimony were referenced nor appear to have been included in the review. This is particularly problematic in the Straight River Basin and a significant missing component in the DEIS.

Straight River Basin

The Straight River Basin is a portion of the Pineland Sands outwash plain. As mentioned in the Previous Work section, I submitted expert witness testimony and referenced a number of reports pertaining specifically to the Straight River Basin. Along with the other studies identified in the Hydrogeology section above, in March, 2017 the DNR designated the Straight River Basin the third Minnesota Groundwater Management Area (GWMA). The document is titled Straight River Groundwater Management Area Plan, March 2017. Along with all of the other Straight River Basin scientific studies, designating it a GWMA signifies the importance the DNR places on this aquifer. The Straight River GWMA document is attached in Appendix D.

In his introduction to the document DNR Commissioner Landwehr states:

> *Minnesota is rich in water resources. With more than 10,000 lakes, thousands of miles of rivers and streams, and many thousands of acres of wetlands, it might be natural to think that our water is essentially unlimited. But in some parts of the state, the unseen, underground aquifers that make up our groundwater resources are under pressure to meet growing needs for domestic water supplies, irrigation, industrial and other uses. These groundwater resources also are interconnected with lakes, streams and wetlands that we value for commerce, recreation, and water supplies. Those surface waters also provide the habitat needed by many animals and plants. If we are not careful in how we use water, both economic development and ecosystems could be put at risk.*

The GWMA plan (Plan) page 1-1 states:

> *Groundwater can be at risk of overuse and contamination anywhere in the state, and in some areas this risk is more urgent. To address concerns about long term sustainable use of groundwater in three of these areas, the DNR is establishing Groundwater Management Areas (GWMA) and developing management plans*.

Sustainability is defined by the DNR as follows:

> *Sustainability means that groundwater and surface water levels, water quality, and ecosystems are not harmed and that present and future generations will be able to meet their need for water.*

The Plan page 1-2 states:

> *As part of a statewide analysis of groundwater resources, the DNR identified the Straight River area as an area of specific concern where groundwater resources are at risk of overuse and degraded quality.*

The Plan identifies one of the concerns to be "*contamination reduction in the availability of clean groundwater.".* Though a sufficient supply of water may be available, it needs to be

suitable for human consumption and other uses such as agricultural food production. The GWMA relies upon information compiled from completed studies, many of them the same I cited in my testimony.

Beginning on page 2-2 the Plan describes the Straight River hydrogeology. It states:

> *Hydrogeology defines the natural conditions and boundaries of the groundwater system. Groundwater moves through the geologic system both laterally (side to side) and vertically (up and down).*
>
> *In three dimensions, the geologic formations found in the Straight River GWMA form a complex groundwater system that is interrelated with the surface water in the area. The surface water resources in this area are streams, lakes, and wetlands. The primary stream is the Straight River, a designated trout stream .. Analyses by Stark et al (1994), Helgesen (1977), LaBaugh et al (1981), Siegel (1980) and Walker et al (2009) have shown that groundwater and surface water in this area is interconnected and heavily dependent on recharge from precipitation.*

The Plan describes the Straight River stratigraphy and hydrogeology as follows:

> *Two main aquifer types are found in the Straight River GWMA: water table aquifers (Quaternary Water Table Aquifers, or QWTA), which are the uppermost aquifers; and buried aquifers (Quaternary Buried drift Artesian Aquifers, or QBAA), which are found at various depths below the water table aquifer.*
>
> *The QWTA is a laterally extensive unconfined aquifer and is part of the Pinelands Sands aquifer (Helgesen, 1977) that extends through Becker, Cass, Hubbard, and Wadena counties. This outwash formation was deposited by flowing water during the melting of ice at the end of the most recent glacial event approximately 10,000 to 12,000 years ago.*
>
> *Groundwater from both the QWTA and QBAA aquifers is the source of groundwater supply in the Straight River area. The water table aquifer and deeper buried drift aquifers occur in the Straight River GWMA and share a hydraulic relationship. This relationship has been understood through various scientific studies that include analysis of climate, aquifer testing and long term water level measurement collected from observation wells. A County Geologic Atlas does not yet exist for this area but is in process. When complete, the atlas should provide more information on the connectivity of these aquifers.*

The basin is the result of a number of glacial ice advances and retreats. During warming, the glacial lobes would stagnate and melt, receding as they melted. As the glacial sheets melted and receded, meltwater would run off the glacier carrying sediments which were deposited in front of the glaciers. Figure 13 shows how modern day glacial meltwater can transport sediments. One of geology's axioms is *the present is the key to the past*. Figure 13 represents one of the scenarios that transpired approximately 10,000 years ago when the Straight River outwash basin was formed.

Figure 13: Braided river: the Slims River in Kluane National Park, Yukon, Canada (photo by H.J.A. Berendsen).

Stream channels fluctuate back and forth by weather changes even over short periods of time, from day to day and diurnally (day to night). The geologic phenomena is termed anastomosis. Channels cut through previous sediments, causing inhomogeneous stratigraphy, resulting in channels of more granular material within the finer sands.. At times, outlets were blocked and proglacial lakes would form, depositing clay sediments. The sequence of anastomosis would again begin once the proglacial lake drained.

When channels containing higher hydraulic conductivity such as gravel are within an aquifer, they become conduits, forming flow paths and creating gradient sinks to which the surrounding groundwater flows. The channels may also erode through the previously deposited clay layer, creating windows though the clay confining layer, connecting the upper and lower aquifers. Because of the multiple glacial advances, melting and the anastomosic phenomena, the Pineland Sands outwash aquifer system is highly complex.

Harris, Knaeble, and Berg (1999) maped some of the buried channels in the Pineland Sands and Straight River outwash. They show an intricate system of buried stream channels.

In Minnesota with similar conditions, expected contamination plume migrations have become missing. (Tracy Lund, personal communication, June 27, 2017). It is possible in places that a plume migrated to one of these high hydraulic conductivity channels and traveled in a direction different than expected.

Ignoring this highly complex hydrogeologic setting was a major omission in the DEIS.

Agricultural irrigation is the predominant water use within the GWMA . The Plan documents that permitted water use grew 85% over the last 25 years. The majority of the expansion came from agricultural irrigation. In comparison, the statewide water demand increase during the same period was 35%.

The Stark study was initiated in response to an increases in irrigation from 1974 to 1988. In 1974, the Straight River Basin contained 5 irrigation wells. By 1988, forty eight wells were installed, an approximately 9 fold increase over 14 years.

The past increases in irrigation are expected to continue. In response to R.D.Offut's planned irrigation expansion in the Pineland Sands area, DNR Commissioner Landwehr ordered a discretionary environmental impact worksheet. (EAW) on June 15, 2015. Because Offut reduced his number of applications, the EAW was vacated on September 2015. ://www.dnr.state.mn.us/input/environmentalreview/pinelands/index.html.

Offut's reduction in applications does not suggest a reduction in their expansion goals. It was in response to the EAW; Offut reduced the applications to curtail the EAW.

The GWMA Plan identifies actions DNR intends to take to ensure the groundwater, surface water and ecosystems are not harmed. Substantial financial and staff resources will be required to reach the objectives.

Though the GWMA identifies the Straight River Basin as one of the most important Minnesota aquifers and significant scientific studies have been completed for the area, the DEIS ignores its importance. The APR is designed to travel through the heart of this highly sensitive and irrigated basin. How were the studies referenced in my documents, the discretionary EAW, and the GWMA ignored? The DEIS must conduct a complete groundwater analysis of the potential impact from a spill within this highly irrigated Pineland Sands outwash aquifer.

The DEIS uses a 1,000 foot corridor to identify irrigation wells along APR to represent potential operational impacts. This is an incorrect assumption in the Straight River Basin for several reasons:

- It only considers lateral (horizontal) migration and excludes the vertical component.
- Because of the highly permeable soils and his extensive DNR hydrogeology field work, including multiple pump tests and water level monitoring, Jay Frischman stated irrigation well cones of depression can be expected to result in groundwater level drawdowns ¼ mile from the pumping well. If multiple nearby wells are pumping at one time, overlapping cones of depression will occur. Under these circumstances, effects can result in groundwater level declines ½ mile from the wells (Jay Frischman, personal communication, June 23, 2017).
- Historic increases in irrigation pumping and irrigated acres will continue to increase.

Figure 14 depicts a well cone of depression. Once a well begins pumping, the groundwater level drops, generally causing the surrounding water level to form a conical shape. Most

people think well water is supplied by the pump sucking water from the surrounding formation. In actuality, the water level drawdown causes a gradient much like a hill. The water cascades towards the pump down the cone and flows to the well as show in Figure 14.

Figure 15 depicts overlapping cones of depression from multiple wells operating at one time. The figure illustrates multiple cones of depression causing an increased water level drawdown. Both Figures 14 and 15 are from the Oregon State Water Well Program (http://wellwater.oregonstate.edu/groundwater-and-wells)

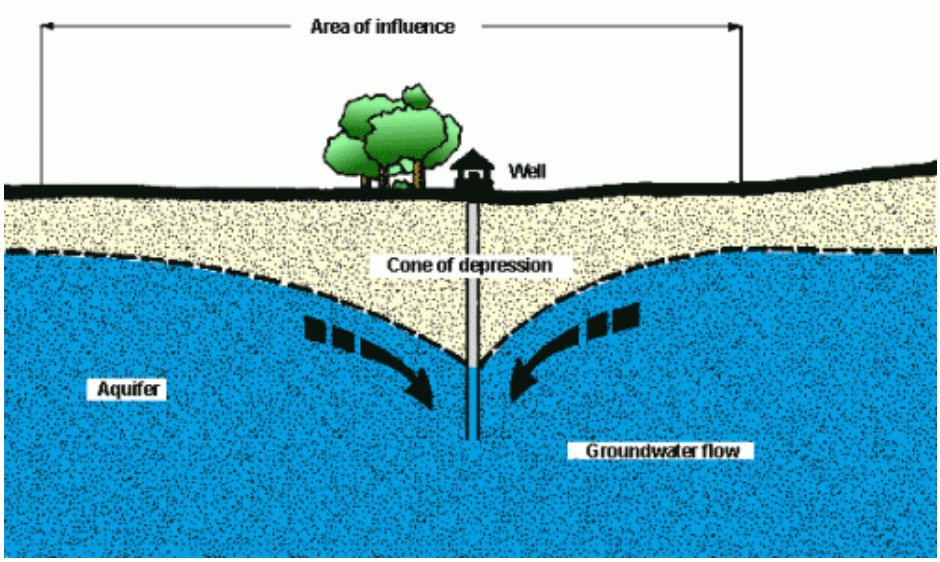

Figure 14: Well Cone of Depression

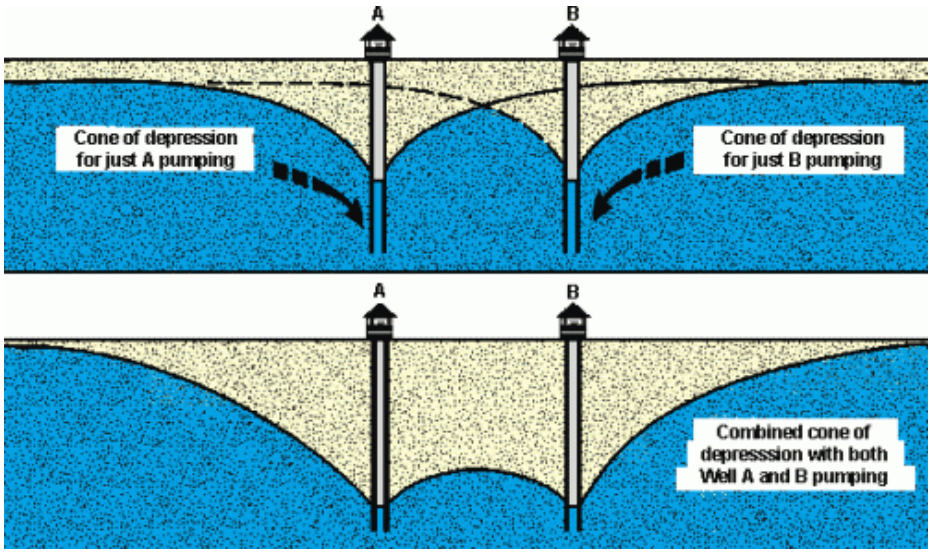

Figure 15 Overlapping Cones of Depression

Figure 16 contains a pair of Google Earth photos looking north from south of the Straight River along the APR alignment; the lower photo is a zoomed-in version of the upper photo. The circular shapes are irrigated 40 acre parcels containing circle pivot irrigation systems. Each circle pivot requires a high capacity well capable of pumping up to 1,0000 gallons per minute (gpm).

Figure 16 Google Earth Photos Along APR Looking North From South of Straight River

Figure 17 displays the irrigation wells and center pivot systems within ¼ mile of APR.

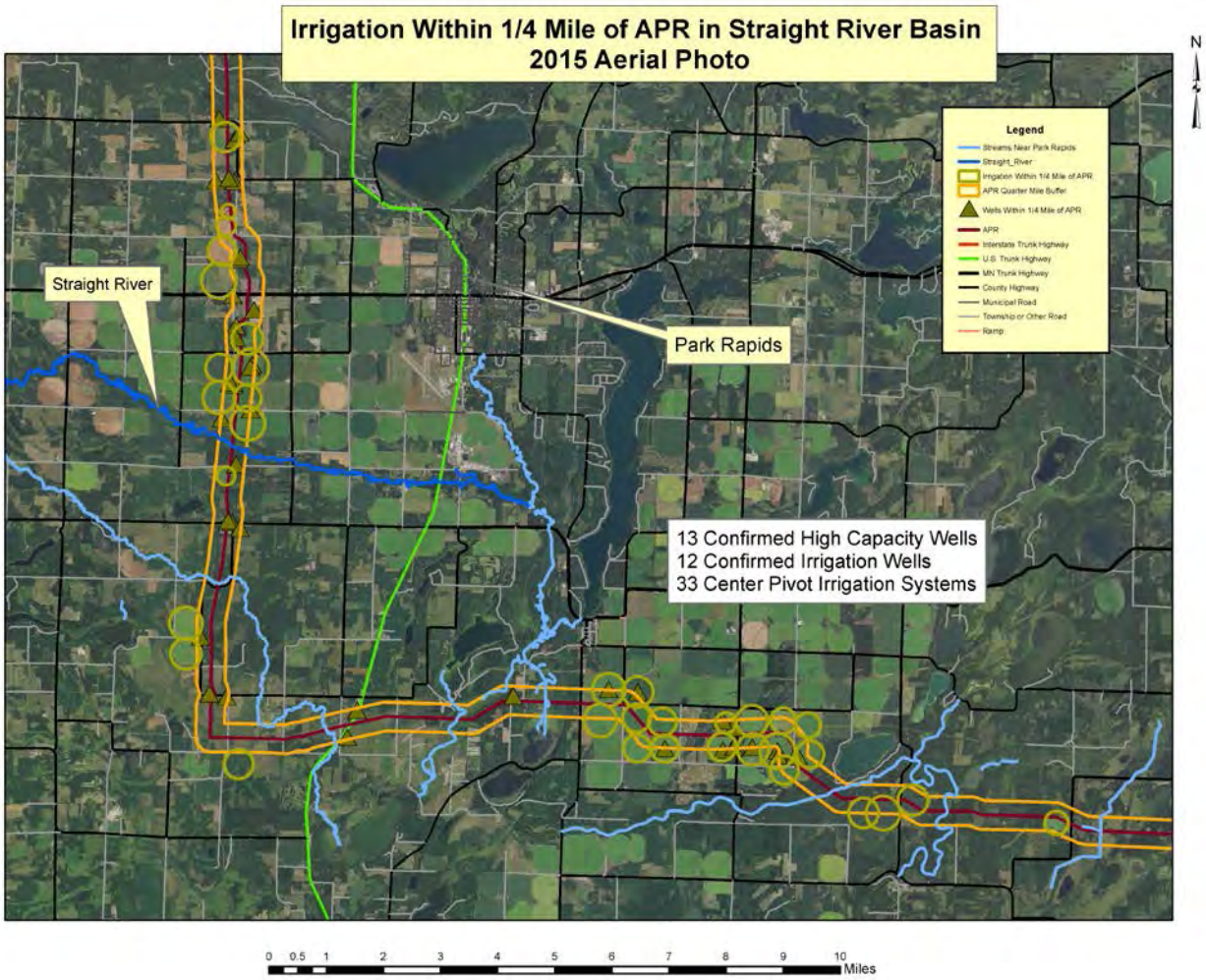

Figure 17: Irrigation Wells and Center Pivot Systems Within ¼ mile of APR

Figure 18 displays the irrigation wells and center pivot systems within 1/2 mile of APR.

Rather than 5 irrigation wells along the APR alignment as reported by the DEIS, the Park Rapids area (Pineland Sands) contains 12 irrigation wells and 33 center pivot systems, respectively within ¼ mile of APR. Additionally, 24 irrigation wells and 33 center pivot systems are situated within ½ mile of APR in the Park Rapids vicinity.

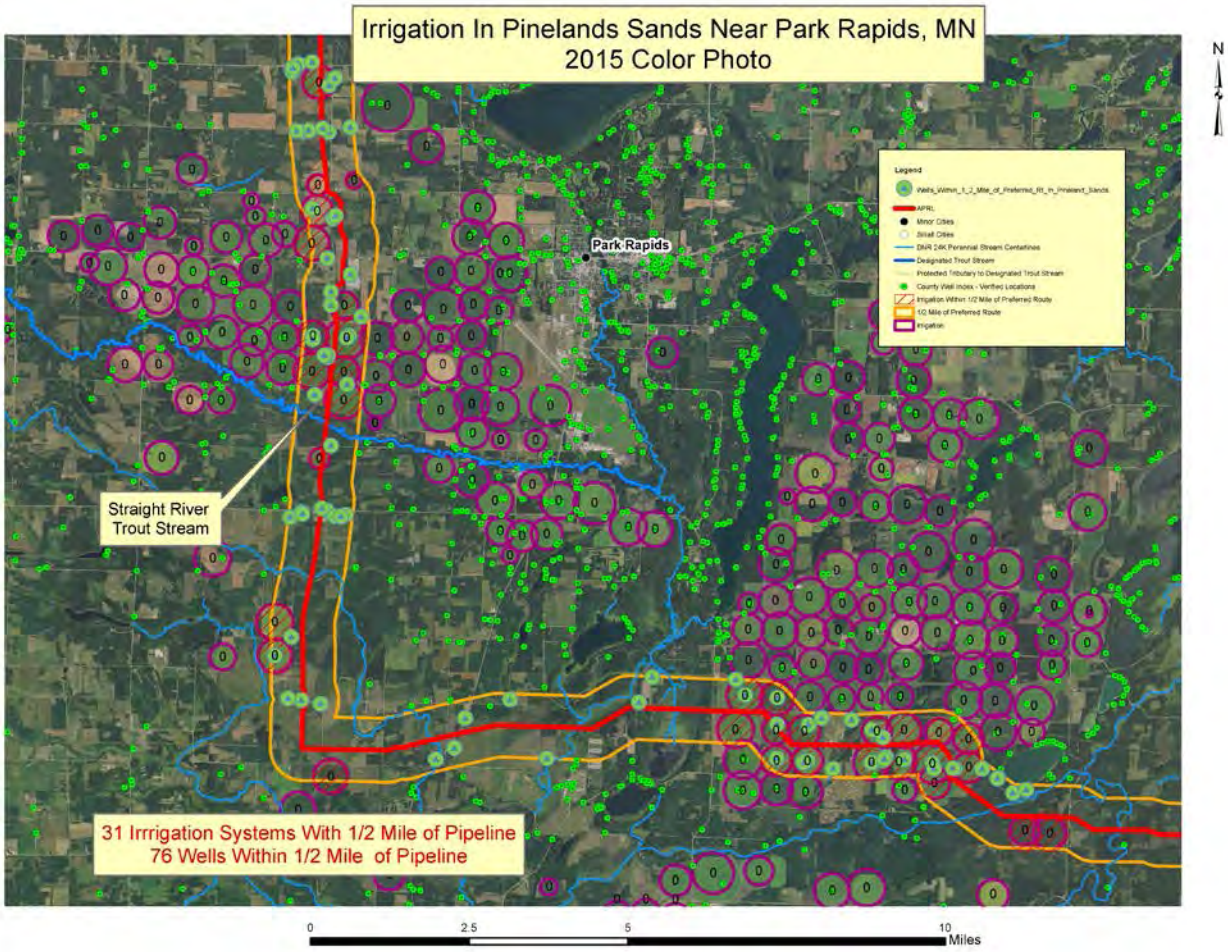

Figure 18: Irrigation Wells and Center Pivot Irrigation Systems within 1/2 mile of APR.

Because of the highly permeable soils and irrigation well cones of depression which cause create steep gradients, groundwater movement is significantly altered. If a pinhole leak occurs along any stretch of the APR within the Pineland Sands, contaminant may rapidly move vertically to the groundwater table and horizontally away from the pipeline due to the altered groundwater table conditions. If pipeline contaminant reaches the groundwater surface, it can be incorporated into the irrigation water, contaminating the irrigated crops and transporting the product further from the pipeline. When the product is spread onto the porous field, it moves downward through the soils, eventually reaching the water table farther down gradient of the pipeline. The transport of the pollutant from one system to another is possible, contaminating more soil, and dispersing the pollutant away from the pipeline.

Irrigation wells cycle on and off, causing a surging effect on the water table. When the well is shut off, water levels with a contaminant on its surface rebounds. This contaminates the soils within the cone of depression. When the irrigation is again begun, the pollutant is further incorporated into the water column causing mixing and greater contamination of the groundwater, expanding the plume.

The DEIS did not consider the potential of intensive irrigation within the Straight River area. The dog leg created by the applicant to avoid the Leech Lake Reservation contains:

- Highly permeable soils with high infiltration rates and potential for rapid vertical movement of pollutant to the water table.
- 23 high capacity irrigation wells within ½ mile of the pipeline which can greatly influence plume movement and dispersal.
- Straight River, the highest quality trout stream in NW Minnesota.

Despite my Sandpiper expert testimony, numerous scientific studies documenting the Pineland Sands and Straight River Basin sensitivity, the discretionary DNR EAW, and the GWMA designation, the DEIS ignored the area. This is a fatal flaw in the DEIS. It is representative of the shortsighted approach to groundwater in the DEIS.

The document uses a 1,000 foot band to calculate acreage as a measure of operational impacts to the groundwater. It does not consider vertical movement nor does it factor external forces like irrigation that will impact groundwater movement. Because the entire norther portion of Minnesota has been altered by successive glacial episodes, it is geologically complex and inhomogeneous along the entire length of the proposed pipeline. A broad brush approach to groundwater impact evaluation is flawed and unscientific.

All scientific information needs to be utilized to properly evaluate the potential groundwater contamination of pipeline operation. This is particular true for USGS, DNR, DOH, DOA and PCA localized reports that zero in on aquifer characteristics of individual aquifer systems. History has shown that it is not a matter of if, but rather when a leak will occur. The choice is to place the pipeline in impermeable soils such as those along SA-04 to contain a spill or into the most highly sensitive and permeable soils in the state.

Conclusions

The Line 3 DEIS is deficient as follows:

- SA-04 is the only route the DEIS compiled cumulative impacts east and south of Minnesota. This skews the DEIS tables and Executive Summary.
- Construction impacts were not uniformly calculated. SA-04 quantities are inflated in comparison to APR
- No well or water supply analysis was performed east of Minnesota for any RA alternatives. Thus SA-04 water supply impacts are inflated in comparison to all other alternatives.
- Though SA-04, a citizen proposed route, travels through the western edge of karst topography and a wellhead protection zone, a refinement of the route by moving it 25 miles to the west would eliminate both factors. The Executive Summary as it stands is inflammatory against SA-04 because of the perceived karst contamination potential.
- Wild Rice beds were compiled but quantitative analysis of impacts were not performed for the beds at risk.
- Though scientific data is available, no in depth groundwater analysis was conducted.
- Vertical movement of groundwater was not considered.
- Important information supplied during the Sandpiper review was not included in the

Line 3 DEIS

- The Executive Summary Figure ES-5 comparing ecological and water resources impacted is unreadable and needs to be highlighted. It is the only source of comparison between the routes when water and ecological quality is discussed.
- Individual impact analysis of trout stream impacts was not performed. Since they are the most sensitive stream environment, quantification of potential impacts is required to properly understand and evaluate proposed alternative routes.
- The report compiles calcareous fens along the alternative routes, but does not quantify the potential impacts of these rare protected wetlands. Calcareous fens are omitted in the Executive Summary.
- APR and northern route alternatives (except RA-03AM) pass through areas of the highest pollution sensitivity of near surface materials whereas SA-04 is in some of the lowest pollution sensitive near surface materials in the state.
- The Straight River Basin GWMA designation was not considered in evaluation of APR.
- The June DNR discretionary Straight River irrigation EAW was not considered.
- The highly complex Straight River and Pineland Sands hydrogeologic and geologic conditions were ignored.

Appendix A to Attachment C

To

Honor the Earth

Comments on Line 3 Replacement Project

DEIS

CN-14-916 and PPL-15-137

Appendix A
Robert Merritt Sandpiper
Testimony

From: Bob Merritt [mailto:bob.merritt7160@gmail.com]
Sent: Monday, March 17, 2014 6:59 PM
To: Hartman, Larry (COMM)
Cc: Willis Mattison
Subject: Sandpiper Pipleline

Mr. Hartman:

Were you able to obtain a complete copy of my Park Rapids testimony and all of the supporting documents? I was a bit confused during the presentation. I am used to a different format and assumed the persons behind the table were PUC Commissioners. That is why I provided my copies to them. It would be helpful in the future to explain when no PUC Commissioners are in attendance. Little did know that I was speaking to the pipeline officials. No wonder they appeared uninterested in my testimony and did not look at the figures to which I referred.

If you did not receive a complete copy of my information including yellow highlighted sections of the reports I referenced, please advise me. I would also like to know if you do have a complete copy.

I have updated my map to identify most of the irrigated parcels and highlighted locations of Park Rapids and Lamb Weston wells. I also increased its resolution; it is attached. All of Park Rapids and Lamb Weston wells are down gradient of any spill within the watershed. Spills will mobilize rapidly because of the vast number of high capacity irrigation wells between Park Rapids and the proposed pipeline.

During your opening remarks you identified a number of items that are used to determine suitability of an alignment. If I recall correctly, two of them were natural resources and proximity to towns. The proposed Sandpiper Pipeline has the potential of significant impacts to both. A spill like Embridge's in Bemidji will have greater consequences. It could greatly impact or even destroy a premium trout stream (Straight River) and it could reach the public water supplies of Park Rapids. Additionally, the high capacity irrigation could greatly exacerbate the situation, mobilizing the spill flow speed and area of influence. The attached map also identifies a major number of other wells near or down gradient of the proposed alignment. These are mostly in the surficial aquifer and are individual or small corporate supplies. A spill in these soils could have dire consequences to those individuals.

Alternative routes should be identified that do not contain such highly sensitive geologic conditions. Soils should be primarily till based which contain a substantial amount of clay; clay soils will slow and absorb a spill before disastrous affects will occur. The Pineland Sands Aquifer system clearly does not meet these criteria.

Please include this email and attached map to the Sandpiper docket information. If I have to take other actions to ensure that can transpire, please advise me.

Bob Merritt, P. G.
My address is 1241 Minnesota Avenue My
phone number is 218 850 7160

Sandpiper Pipeline Hearing
Park Rapids, MN
March 12, 2014

Testimony by Bob Merritt
B.S. and B.A. Geology
M.S. Hydrology
Minnesota Licensed Professional Geologist
MN DNR Area Hydrologist 32+ years`
Work Area Included Pineland Sands/Straight River Basin Outwash Aquifer in Becker and Hubbard Counties

First, I want to identify a problem I encountered while trying to review this project. I requested a GIS (Geographic Information Systems) layer of the pipeline alignment from the PUC. The PUC informed me that this information was Embridge work product which is exempt from the Freedom of Information Act. I assume the exemption was intended to protect public facilities from attack. Yet all existing pipelines are identified in paper and digital form on USGS topographic maps and Minnesota county maps. Additionally, with the GPS units available today, it is quite easy to map public utilities such as pipelines and processing plants. To withhold crucial information for my review hampered my analysis. I am still unsure of the exact proposed alignment and had to approximate it in one of my maps.

To me, it is ludicrous for a foreign company to invoke protection via exemption of the Freedom of Information Act under these circumstances; they are withholding crucial information for review with no real reason other than to hamper public review.

There have been 3 Major Studies of the glacial outwash plain comprising the Straight River basin and surrounding area:

- Helgsen, J.O., 1977. Ground water Appraisal of the Pineland Sands Area, Central Minnesota, USGS Water Resources Investigations Report.

- Stark, J.R., Armstrong, D.S, and Zwilling, D.R.. 1994, Stream – Aquifer Interactions in the Straight River Area, Becker and Hubbard Counties, Minnesota, USGS Water Resources Investigations Report 94-4009.

- Kruse, G and Frischman, J, 2002, Surface Water And Ground Water Interaction And Thermal Changes In The Straight River In North Central Minnesota, Minnesota Department of Natural Resources.

I was the main DNR person who identified the initial concerns leading to the Stark study, and I participated in both Stark's and the MN DNR investigations.

Helgsen and Stark described the geology of the area. Basically it is the intersection of at least 3 glacial lobes that ended in the area (Stark Figure 3). Glacial outwash is the result of glacial materials running off during glacial melting and retreat, forming sand and gravel fans interspaced with lake clay materials formed when lakes existed within

the area. The outcome is a series of 3 primary aquifers (Stark Figure 2). Stark's figure is generalized and does not entirely represent the aquifer configurations. The top aquifer is surficial and open to the atmosphere. The two lower aquifers are separated by clayey layers, but the layers thin and aquifers interfinger causing interchange between them. There is substantial evidence that the aquifers are hydraulically connected and water moves both upward and downward.

Because of their high degree of permeability, allowing rapid infiltration and movement, glacial outwash aquifers are some of the geologic environments most susceptible to contamination.

Helgesen estimated the aquifer groundwater hydraulic conductivities, a measure of ground water movement, between 320 and 630 ft/day. This is a rapid degree of ground water movement. Stark postulated that this area's groundwater movement is even greater than other similar aquifers within the state.

The area is covered with high capacity irrigation wells, which cause cones of depression, altering flow paths and moving substantial water towards the systems. (GIS 2010 Aerial Map).

Helgsen and Stark published potentiometric maps of the surficial aquifer (Helgsen Figure 7 and Stark Figure 15). I supplemented Helgsen's map and interpreted Stark's map to identify flow paths (red arrows). Water rapidly flows from the aquifer to the Straight River. The river gains at least ½ its flow from the aquifer. The hills to the north of the sand plain, the Itasca Lobe End Moraine, and the ground moraine provide about 25% of the aquifer's recharge. This is likely an even greater percentage closer to the Itasca End Moraine in the Park Rapids area. A pipeline leak in the Itasca End Moraine will end up flowing to Park Rapids. (Stark Figure 3)

Leaks within the aquifer will either end up in the Straight River or move towards the Park Rapids and the Potato Plant locations. High capacity pumping of these facilities along with irrigation wells near and down gradient of a spill or leakage has significant potential to incorporate petroleum products into the aquifer. Irrigation of the contaminated water will result in agriculture field contamination.

A leak along any portion of the pipeline from the Itasca Moraine north of the outwash sand plan through the entire plain has the potential to rapidly and permanently contaminate the aquifer. The surficial aquifer has the highest potential, but as noted earlier, all of the aquifers are interconnected. As a result, contamination of all the aquifers is a possibility. Once petroleum attaches to the sand and gravel grains, it is virtually impossible to remove the product. Each time rain, snowmelt or irrigation infiltrates through the aquifer, petroleum will be mobilized, causing ongoing contamination.

The surficial aquifer is used for irrigation and water supply. Surrounding wells already have high nitrates from the irrigation because of the high infiltration rates. Though

nitrate application through irrigation systems has been greatly improved by application only during the time plants require the nutrient, a Department of Agriculture study showed that approximately 60% of the nitrate is lost because of rapid infiltration. Once the nitrate passes through the root zone, it ends up in the surficial aquifer.

Because of nitrate contamination, Park Rapids will have to replace water supply wells. Osage had to in the past. Perham has had similar problems; it has the same geologic conditions. Petroleum will be even more damaging, causing loss of water supplies to individuals and communities down gradient of the leak. Straight River, the most important trout stream in Northwestern Minnesota, could also be severely affected due to petroleum contamination.

I urge you to reconsider this alignment and restrict pipelines within this highly sensitive geologic area. At the very least, I urge delay of your decision to allow further analysis with accurate data freely supplied by Embridge.

Sandpiper Pipeline Park Rapids Area
2010 Aerial Photo

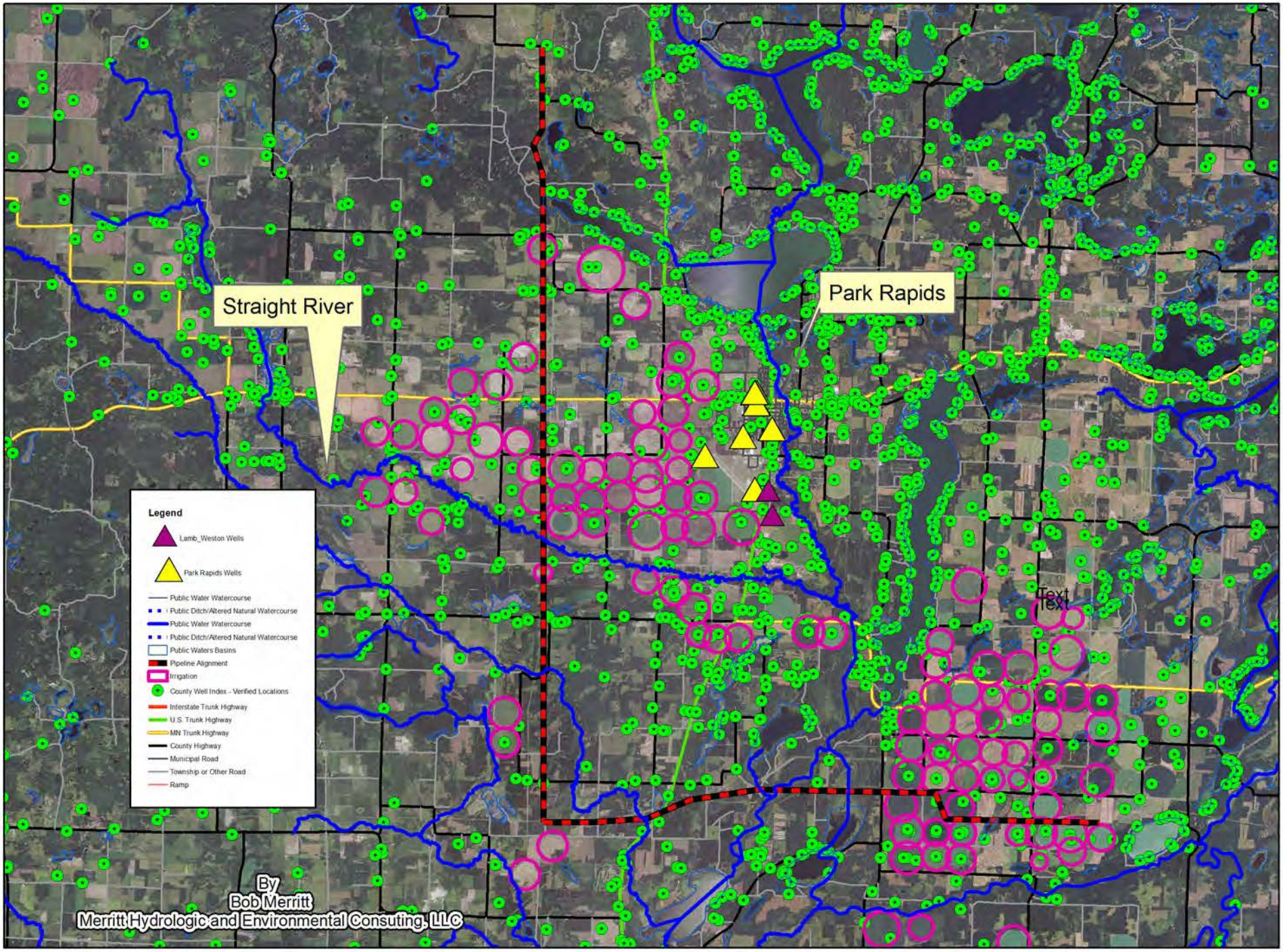

N

0 0.5 1 2 3 4 5 6 7 8 9 10 Miles

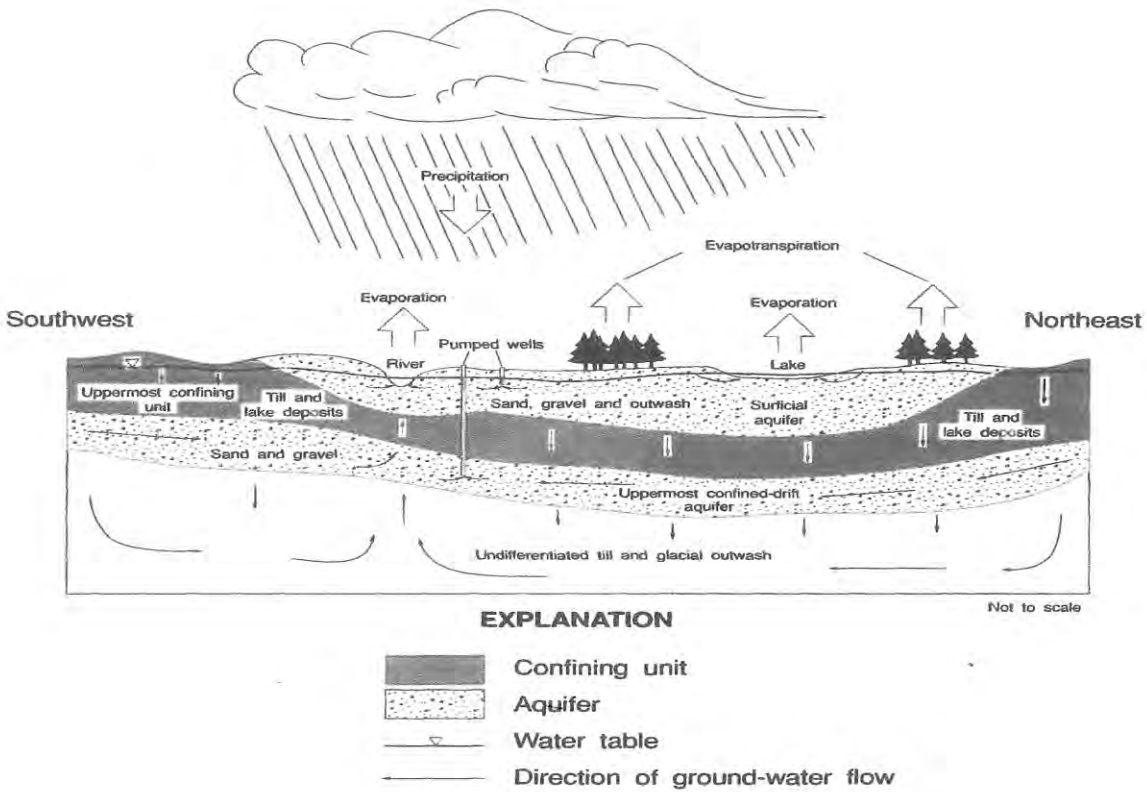

Figure 2.--Generalized hydrologic system of the Straight River investigation area.

From Stark 1994

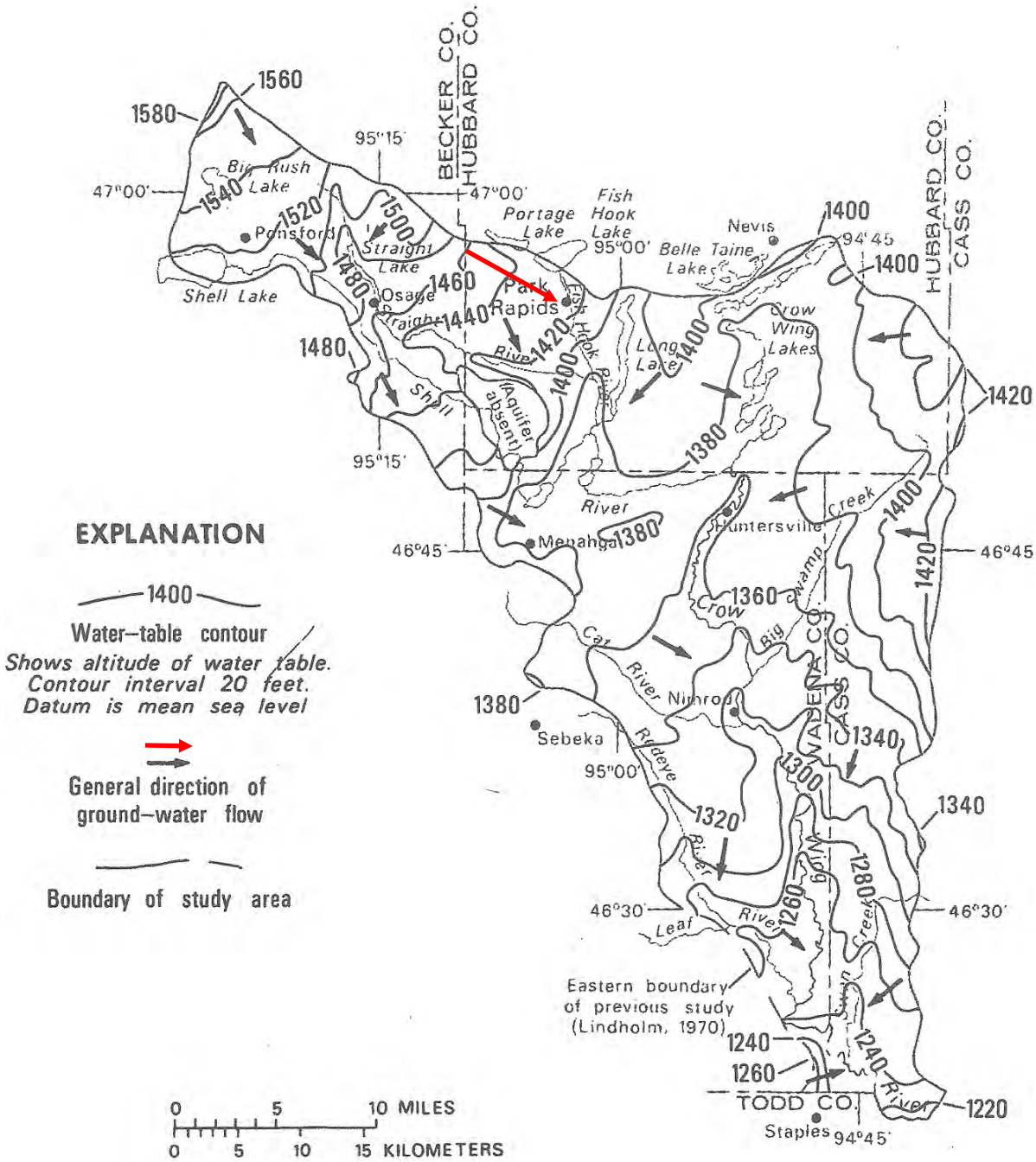

Figure 7.--Water-table configuration and general direction of ground-water movement.

From Helgsen 1977

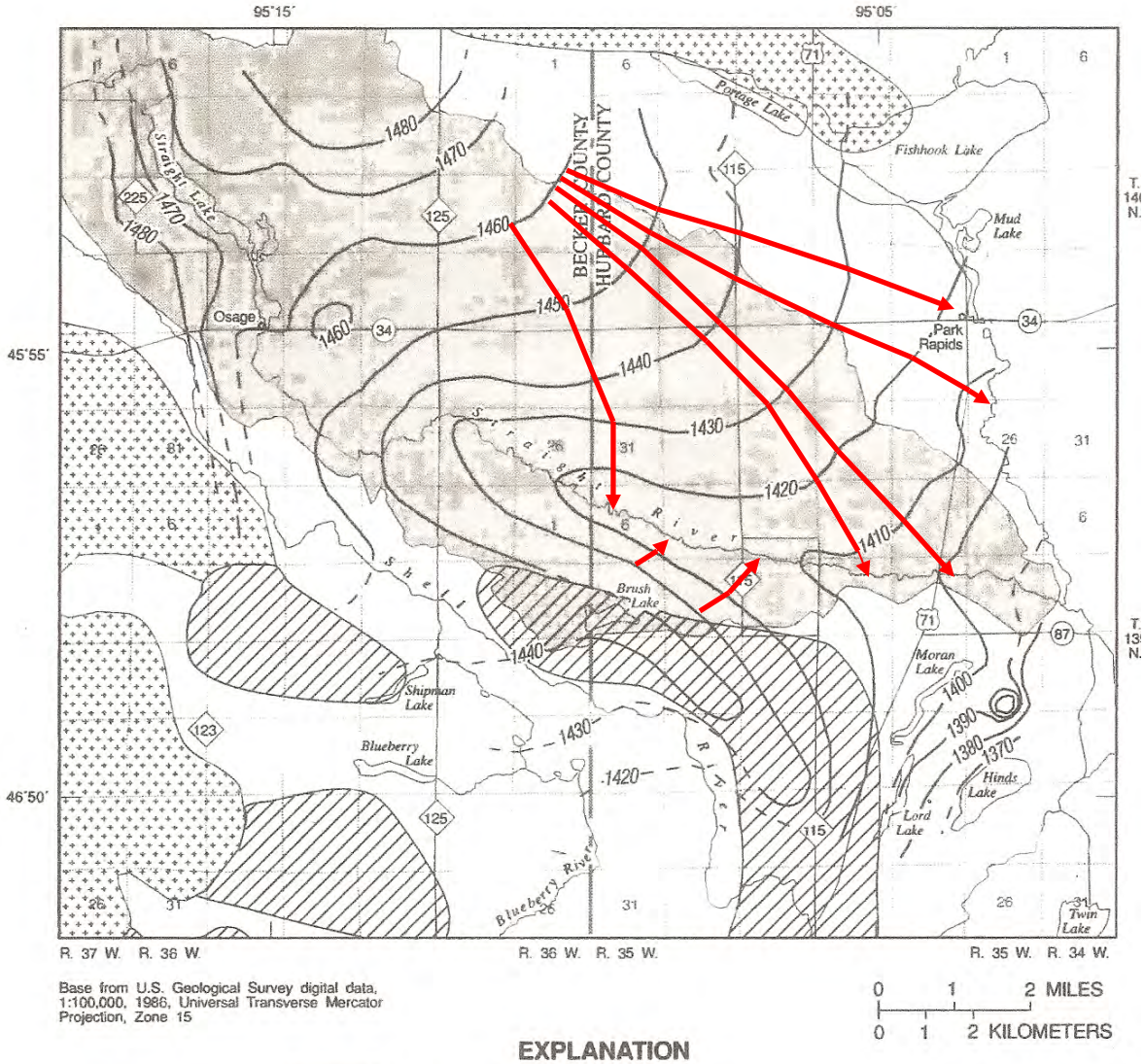

EXPLANATION

Straight River Basin

Groundwater Flow Direction

Surficial geology:

Outwash plain

Glacial till (end moraine)

Glacial till (ground moraine)

—1440— Potentiometric contour--Shows altitude at which water level would have stood in tightly cased wells open to the surficial aquifer. Dashed where approximately located. Contour interval 10 feet. Datum is sea level.

Figure 15.--Altitude of potentiometric surface (water table) of surficial aquifer during August 1988.

From Stark 1994

Sandpiper Pipeline Hearing
Park Rapids, MN
March 12, 2014

Testimony by Bob Merritt
B.S. and B.A. Geology
M.S. Hydrology
Minnesota Licensed Professional Geologist
MN DNR Area Hydrologist 32+ years`
Work Area Included Pineland Sands/Straight River Basin Outwash Aquifer in Becker and Hubbard Counties

First, I want to identify a problem I encountered while trying to review this project. I requested a GIS (Geographic Information Systems) layer of the pipeline alignment from the PUC. The PUC informed me that this information was Embridge work product which is exempt from the Freedom of Information Act. I assume the exemption was intended to protect public facilities from attack. Yet all existing pipelines are identified in paper and digital form on USGS topographic maps and Minnesota county maps. Additionally, with the GPS units available today, it is quite easy to map public utilities such as pipelines and processing plants. To withhold crucial information for my review hampered my analysis. I am still unsure of the exact proposed alignment and had to approximate it in one of my maps.

To me, it is ludicrous for a foreign company to invoke protection via exemption of the Freedom of Information Act under these circumstances; they are withholding crucial information for review with no real reason other than to hamper public review.

There have been 3 Major Studies of the glacial outwash plain comprising the Straight River basin and surrounding area:

- Helgsen, J.O., 1977. Ground water Appraisal of the Pineland Sands Area, Central Minnesota, USGS Water Resources Investigations Report.

- Stark, J.R., Armstrong, D.S, and Zwilling, D.R.. 1994, Stream – Aquifer Interactions in the Straight River Area, Becker and Hubbard Counties, Minnesota, USGS Water Resources Investigations Report 94-4009.

- Kruse, G and Frischman, J, 2002, Surface Water And Ground Water Interaction And Thermal Changes In The Straight River In North Central Minnesota, Minnesota Department of Natural Resources.

I was the main DNR person who identified the initial concerns leading to the Stark study, and I participated in both Stark's and the MN DNR investigations.

Helgsen and Stark described the geology of the area. Basically it is the intersection of at least 3 glacial lobes that ended in the area (Stark Figure 3). Glacial outwash is the result of glacial materials running off during glacial melting and retreat, forming sand and gravel fans interspaced with lake clay materials formed when lakes existed within

the area. The outcome is a series of 3 primary aquifers (Stark Figure 2). Stark's figure is generalized and does not entirely represent the aquifer configurations. The top aquifer is surficial and open to the atmosphere. The two lower aquifers are separated by clayey layers, but the layers thin and aquifers interfinger causing interchange between them. There is substantial evidence that the aquifers are hydraulically connected and water moves both upward and downward.

Because of their high degree of permeability, allowing rapid infiltration and movement, glacial outwash aquifers are some of the geologic environments most susceptible to contamination.

Helgesen estimated the aquifer groundwater hydraulic conductivities, a measure of ground water movement, between 320 and 630 ft/day. This is a rapid degree of ground water movement. Stark postulated that this area's groundwater movement is even greater than other similar aquifers within the state.

The area is covered with high capacity irrigation wells, which cause cones of depression, altering flow paths and moving substantial water towards the systems. (GIS 2010 Aerial Map).

Helgsen and Stark published potentiometric maps of the surficial aquifer (Helgsen Figure 7 and Stark Figure 15). I supplemented Helgsen's map and interpreted Stark's map to identify flow paths (red arrows). Water rapidly flows from the aquifer to the Straight River. The river gains at least ½ its flow from the aquifer. The hills to the north of the sand plain, the Itasca Lobe End Moraine, and the ground moraine provide about 25% of the aquifer's recharge. This is likely an even greater percentage closer to the Itasca End Moraine in the Park Rapids area. A pipeline leak in the Itasca End Moraine will end up flowing to Park Rapids. (Stark Figure 3)

Leaks within the aquifer will either end up in the Straight River or move towards the Park Rapids and the Potato Plant locations. High capacity pumping of these facilities along with irrigation wells near and down gradient of a spill or leakage has significant potential to incorporate petroleum products into the aquifer. Irrigation of the contaminated water will result in agriculture field contamination.

A leak along any portion of the pipeline from the Itasca Moraine north of the outwash sand plan through the entire plain has the potential to rapidly and permanently contaminate the aquifer. The surficial aquifer has the highest potential, but as noted earlier, all of the aquifers are interconnected. As a result, contamination of all the aquifers is a possibility. Once petroleum attaches to the sand and gravel grains, it is virtually impossible to remove the product. Each time rain, snowmelt or irrigation infiltrates through the aquifer, petroleum will be mobilized, causing ongoing contamination.

The surficial aquifer is used for irrigation and water supply. Surrounding wells already have high nitrates from the irrigation because of the high infiltration rates. Though

nitrate application through irrigation systems has been greatly improved by application only during the time plants require the nutrient, a Department of Agriculture study showed that approximately 60% of the nitrate is lost because of rapid infiltration. Once the nitrate passes through the root zone, it ends up in the surficial aquifer.

Because of nitrate contamination, Park Rapids will have to replace water supply wells. Osage had to in the past. Perham has had similar problems; it has the same geologic conditions. Petroleum will be even more damaging, causing loss of water supplies to individuals and communities down gradient of the leak. Straight River, the most important trout stream in Northwestern Minnesota, could also be severely affected due to petroleum contamination.

I urge you to reconsider this alignment and restrict pipelines within this highly sensitive geologic area. At the very least, I urge delay of your decision to allow further analysis with accurate data freely supplied by Embridge.

Appendix B to Attachment C

To

Honor the Earth

Comments on Line 3 Replacement Project

DEIS

CN-14-916 and PPL-15-137

Appendix B
DNR Sandpiper Letters

Minnesota Department of Natural Resources
500 Lafayette Road • St. Paul, MN • 55155-40_

August 21, 2014

Burl Haar, Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul MN 55101-2147

Re: Sandpiper Pipeline Project – System Alternatives
PUC Docket Numbers: PL-6668/CN-13-473 (Certificate of Need)
PL-6668/PPL-13-474 (Route Permit)

The Minnesota Department of Natural Resources (DNR) previously provided input regarding the Pipeline Routing Permit Application and scoping for the Comparative Environmental Assessment (CEA) for the Sandpiper Pipeline Project. During the comment periods ending April 4, 2014 and May 30, 2014, the DNR requested further analysis of a number of routes and route segments in the relative vicinity of the Preferred Route proposed by the North Dakota Pipeline Company. The DNR also attended the August 7, 2014 PUC Agenda Meeting regarding routing alternatives. We appreciate the Public Utilities Commission (PUC) determination that routes identified in DNR letters will be further analyzed in the CEA. The following comments are submitted regarding the topic of "system alternatives," generally defined as routes that do not share one or both of the Preferred Route Clearbrook, Minnesota and Superior, Wisconsin terminals.

Though the DNR review did not focus on system alternatives, our previous letter stated that the DNR "supports the efforts of state and federal resource agencies to encourage analysis of topics including various routes in the event of a leak, leak risk analysis, and reducing impacts to wetlands, lakes and streams." The Preferred Route for the Sandpiper Project is proposed in a region of the state that contains a concentration of important lakes for fisheries, trout streams, sensitive aquifers, pubic conservation lands, and mineral and forestry resources. The DNR is also concerned about "greenfield" routing along areas without previous disturbance.

Considering the current demand for transportation of oil from North Dakota and the Enbridge Line 3 project proposed to follow the Sandpiper Pipeline route, the Sandpiper route could become a new corridor for multiple pipelines. Therefore, the DNR encourages the PUC to strongly consider analysis of one or more system alternatives having fewer environmental and natural resource impacts than the Preferred Route in addition to route alternatives approved for inclusion in the CEA. Environmental review of one or more system alternatives should be equivalent to the analysis conducted for route alternatives. If a system alternative is included in the scope of an environmental review document, the DNR encourages interagency coordination so that the DNR can provide data regarding a new corridor prior to environmental review document publication.

Thank you for the opportunity to provide these additional comments regarding system alternatives.

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Sincerely,

Jamie Schrenzel
Principal Planner
Environmental Review Unit
(651) 259-5115

cc: Larry Hartman, Minnesota Department of Commerce
Patrice Jensen, Minnesota Pollution Control Agency
Sara Ploetz, Enbridge

Minnesota Department of Natural Resources
500 Lafayette Road • St. Paul, MN • 55155-40_

January 23, 2015

The Honorable Eric Lipman
Administrative Law Judge
600 North Robert Street
P.O. Box 64620
St. Paul, MN 55164-0620

Re: Certificate of Need for the Sandpiper Pipeline Project
Public Utilities Commission (PUC) Docket Number: PL-6668/CN-13-473
Office of Administrative Hearings (OAH) Docket Number: 8-2500-31260

Dear Judge Lipman:

The Minnesota Department of Natural Resources (DNR) has reviewed the Sandpiper Pipeline Comparison of Environmental Effects of Reasonable Alternatives submitted by the Department of Commerce Energy Environmental Review and Analysis (EERA) unit in December 2014. The DNR has also reviewed the Rebuttal Testimony of Adam J. Heinen submitted by the Minnesota Department of Commerce Division of Energy Resources (DER) January 6, 2015 and the conclusions of the Surrebuttal Testimony submitted by Adam J. Heinen January 21, 2015. The following comments are submitted regarding these documents and DNR review of the possible natural resource impacts of System Alternatives for the Sandpiper Pipeline Project. A comment summary is given followed by additional supporting information.

Comment Summary

- The EERA prepared the Comparison of Environmental Effects of Reasonable Alternatives, covering a multi-state geographic area, addressing complicated questions with a limited amount of preparation time. The EERA also carefully followed the direction of the Public Utilities Commission (PUC) Order requesting the document. The DNR recognizes that the current comparison of System Alternatives is a somewhat unique situation and that the PUC requested analysis of environmental impacts through this Certificate of Need process to further inform the record. Further analysis of System Alternatives helped address DNR comments regarding System Alternatives. The DNR also met with EERA and submitted data sources to provide assistance with preparation. We appreciate the opportunity to provide data and input.

- In general, due to the limited scope requested for this document, the broad geographic area, and challenges related to the type of data and analysis used, DNR was not able to use this document alone to identify the least environmentally impacting System Alternatives. Examples will be provided below of the type of information that would further inform the Certificate of Need decision for context when considering the most reasonable and prudent System Alternative.

- Using the report in combination with DNR resources and professional judgment, with a limited amount of review time, the DNR is able to provide input regarding the least environmentally impacting System Alternatives.

- Within Minnesota, more southern routes (south of I-94 corridor) have less concentration of natural resources (regardless of length) within the 2-mile corridor. Therefore, there is a greater opportunity for avoidance of resources with the more southern System Alternatives. While the DNR lacks the expertise to undertake a market or economic analysis of the southern routes. From a natural resource perspective, the more southern routes appear to be feasible and prudent System Alternatives that merit consideration.

- MN Rules 7853.0130, Subpart B requires consideration of reasonable and prudent alternatives to proposed facilities as part of certificate of need decisions. Testimony of Adam J. Heinen submitted by the Minnesota Department of Commerce Division of Energy Resources (DER) January 6, 2015 and January 21, 2015 state that only System Alternative – 03 (SA-03) and System Alternative – Applicant (SA-Applicant) are reasonable based on the focus of the DER review. Note that Modified System Alternative – 03 is also discussed, but is understood to be addressed in the routing docket and will not be further discussed in this comment letter.

- The DNR conducted a focused review of SA-03 and SA-Applicant. When only comparing the two routes found reasonable by DER, SA-03 and SA-Applicant, SA-03 appears to impact less natural resources than SA-Applicant. SA-Applicant features that would incur impacts greater than those identified for SA-03 are: forest and wetland acreage, river and stream segment crossings, and crossings of public lands. Cultivated lands and occurrence of already-impaired waters are greater along SA-03, indicating the developed state of lands along this route. Our analysis is described further in the Supporting Information section of this letter.

- Minnesota Statutes 116D.04, Subdivision 6 prohibits state actions that are likely to cause pollution, impairment or destruction of natural resources as long as there is a feasible and prudent alternative. The statute also clarifies that economic considerations along shall not justify such an action. As SA-Applicant and SA-03 are both considered reasonable, environmental impacts of routing from a natural resource perspective would be a key criterion in the decision regarding the most reasonable and prudent System Alternative.

- Testimony submitted by Adam J. Heinen with the DER January 21, 2015 suggests analysis of SA-03 and SA-Applicant in the routing docket. The routing docket would include a level of environmental data helpful in comparing these two routes, along with Route Alternatives already scoped into the routing process such as Modified SA-03. For example, a Comparative Environmental Analysis (CEA) would likely include an estimated alignment within a larger route. If further analysis is completed, the DNR requests the opportunity to provide input and review a draft of the environmental analysis document.

- The DNR suggests that the Sandpiper Pipeline Project Certificate of Need and/or Routing dockets include consideration of financial assurance. The state requires financial assurance for large projects to mitigate impacts to the state and environment in the event of an accident, unplanned closure, or at the end of life of the project. Projects such as large mines and landfills must provide financial assurance to protect against the potential for expenditure of public funds. Large crude oil pipelines may arguably have some of the same environmental and financial risks and may benefit from some form of financial assurance for pipeline construction, operation and maintenance, spill response and decommissioning. The DNR can provide additional background regarding examples from regulation of mines in Minnesota.

Supporting Information

The following section provides these categories of supporting information:

- Additional Natural Resource Topics for Consideration
- Comparison of Environmental Effects of Reasonable Alternatives Section Specific Comments
- Full Length Comparison of SA-03 and SA-Applicant
- Minnesota-Specific Comparison of SA-03 and SA-Applicant

Additional Natural Resource Topics for Consideration

The DNR's review indicates that there are additional natural resource topics that have not yet been addressed but should be to provide a more thorough comparative analysis of System Alternatives. The discussion below provides input and context for the Certificate of Need in addition to the Comparison of Environmental Effects of Reasonable Alternatives record regarding natural resource impacts and System Alternatives:

Impacts of Previously Disturbed vs. Undisturbed Areas

The amount of impacts to undisturbed lands was not reviewed in the Comparison of Environmental Effects of Reasonable Alternatives. Natural resource impacts in existing corridors and cultivated lands will be significantly less than impacts to intact forests, grasslands and wetlands. Existing corridors and cultivated lands are already disturbed by the mixing and compaction of soils, application of pesticide treatments, removal of natural vegetation, and introduction of invasive species. New pipeline corridors through intact landscapes will introduce negative impacts to the existing hydrology, plant communities, and wildlife.

Forests are especially susceptible to fragmentation. A pipeline corridor would create a long, linear break in the forest canopy. Fragmentation results in changes to environmental conditions (light, wind, moisture) that alter the plants and animals using the area. The new plant communities of grass and shrubs will alter the species composition and population of birds, small mammals and large mammals.

Area sensitive avian species that require large un-fragmented blocks of forest for nesting will avoid the deforested corridors. The end result is a loss of nesting habitat that, depending on species, includes the direct forest loss and adjacent habitat that extends a considerable distance from the deforested corridor. Construction corridors also create paths for the introduction of invasive species that reach far into formerly protected forest and wetland interiors.

The Comparison of Environmental Effects of Reasonable Alternatives does not acknowledge that construction through undisturbed areas will result in habitat loss, conversion, degradation, and fragmentation. Rather, the document focuses more on construction impacts to agriculture than on impacts to undisturbed or less-disturbed habitat. The document suggests that, while agricultural activities can resume after pipeline construction, impacts (e.g., soil compaction, soil mixing, impact to prime and unique farmland) can be long lasting and permanent in those areas. This is an important consideration, particularly for social and economic reasons. However, the report should also recognize that agricultural use - by its very nature- has already introduced soil impacts. Further, the report should acknowledge that these impacts are even more environmentally significant when introduced in previously undisturbed natural areas. Best management practices (BMPs) such as topsoil stripping and soil ripping to loosen compaction are measures commonly used in disturbed areas. However, these BMPs are not considered standard, and often are not practical, in undisturbed areas. If these practices are not applied with equal diligence in natural areas, the natural areas become more susceptible to degradation such as compaction, erosion, and colonization by invasive plants.

System Alternative Length and Scope of Analysis

Readers may misunderstand the relationship between the System Alternatives' total length of the pipeline and total impacts. For example, readers may mistakenly conclude that more length of pipeline necessarily means more potential impact. If oil is transported to Joliet, Illinois, there is a greater System Alternative distance than transporting oil to Superior, Wisconsin. Routing to Joliet could be understood as therefore resulting in more natural resource impact. However, it would be reasonable to assume that there is potential for other environmental impacts (leak risk) or cumulative impacts resulting from transportation of oil from Superior, Wisconsin on to other locations from the increased delivery of oil.

Recently the DNR has participated in a comment period to the Great Lakes Commission regarding the potential delivery of oil resources through the Great Lakes and St. Lawrence River Region. Consideration of how oil is transported (currently and in the future) out of Superior, Wisconsin is important context for review of the Comparison of Environmental Effects of Reasonable Alternatives document. The DNR recognizes that quantifying this analysis would likely be challenging.

Changes in Topography

Topographic relief comparisons have not been completed. Topographic relief comparisons between the various system alternatives are important to understating potential impacts between systems alternatives for the following reasons:

1. In hilly terrain, groundwater generally travels laterally more than on flat terrain, has higher potential for surface discharge sites/springs, and creates more soil texture stratification. Changes in topography are also commonly associated with river/stream valleys. Under these conditions, oil spills can spread faster than on flatter terrain and have a high risk of affecting streams, rivers, wetland, terrestrial habitats and associated landscape functions.
2. Areas with more relief/topography will involve additional disturbances. Construction of one or more pipelines through these areas will require rights-of-way (ROWs) and workspaces that are much wider than those used in other areas. Erosion concerns, maintenance needs, and risk of invasive species introduction would also be greater.

Water Resources

SA-Applicant parallels and crosses many streams, rivers, flowages, lakes and wetlands within the northern lakes and forested ecoregions. These are generally some of the highest quality recreational and habitat water resources in the state. The DNR has a number of concerns regarding pipeline impacts and would prefer alternative routes or system alternatives that avoid these valuable waters.

The unimpaired waters along the more northern routes are highly vulnerable to degradation by impacts of construction and potential spills. This becomes a greater concern if additional emergency shut-off valves are not located near these sensitive resources. It is also noted in the document that the most sensitive locations for potential spills include those areas that are proximate to surface waters such as lakes, wetlands or streams or where groundwater is near the surface. The remoteness of the pipeline route in some areas in northern Minnesota exacerbates this problem, should a spill or leak occur.

Though more streams are crossed in southern areas, the analysis does not consider the quality of the streams crossed as compared to the other alternatives. SA-Applicant crosses a large number of lakes, streams and wetlands within the northern lakes and forested ecoregions. These are generally some of the highest quality recreational water resources in the state. This can be observed within MPCA's ecoregion concept for evaluating nutrient and trophic condition criteria for surface waters as well as other aquatic habitats that have been evaluated by the MPCA and DNR statewide for transparency, floristic quality, aquatic plant richness and fish (index of biological integrity) IBI scores (see Figures 1-5).

SA-Applicant parallels and crosses significantly important habitat of the several important smaller streams, rivers, flowages, lakes and wetlands. Because of these concerns, The DNR would prefer alternative routes or system alternatives to avoid these areas.

Minerals

SA-Applicant presents a concern regarding mineral resources in the Tamarack area, near the Aitkin-Carlton County border due to significant potential for metallic mineral resources. However, several Route Alternatives being carried forward by PUC for comparative analysis in the routing process could alleviate risk associated with metallic mineral resource/pipeline conflict. Over the rest of the SA-Applicant preferred route and other System Alternatives, presence of metallic mineral resources is highly uncertain and mineral resource information is insufficiently detailed to suggest that one of the System alternatives has more or less merit from a metallic mineral resource perspective.

For aggregate, crushed stone and peat resources, compensation would be required for any encumbrance that precludes extraction activities due to the presence of the pipeline. For comparative purposes, the value of metallic minerals is potentially order(s) of magnitude greater than nonmetallic resources.

In accordance with MN Rules 6125.07, the state and county may grant surface leases, permits and licensed to any portion of the surface under state metallic mineral lease, after consultation with the lessee. However, the surface leases, permits, or licenses shall not unduly interfere with exploration or mining operations conducted on the mining unit.

In addition, in selecting a route for the pipeline, the PUC is guided by the criteria specified in Minnesota Rules, part 7852.1900, Subp. 3. The principal relevant criteria in this situation include: existing and planned future land use, economies within the route, *including industrial and mining operations*, natural resources, and relevant policies and rules of other state agencies. The state mineral lease in the Tamarack area was in effect prior to this Project application and must be considered in any route determination.

The Department also has safety concerns with the possibility of having both future crude oil pipeline and mining operations on the same state-owned lands.

Co-location and "Corridor Fatigue"

Generally, there is an opportunity for reduction of many natural resource impacts, such as habitat clearing, fragmentation, and introduction of invasive species when utility corridors are co-located. The DNR often recommends co-location rather than routing through a less disturbed "greenfield" area. However, it is also important to consider the possible drawbacks related to co-location in an environmental analysis. New pipelines within existing pipeline corridors can exacerbate or introduce the following symptoms of "corridor fatigue": cumulative environmental impacts of multiple pipelines, increased numbers of cross-over's and route deviations, as well as creation of "pinch points" when there are conflicting land uses. Some existing pipelines were constructed prior to more modern regulations (which provide greater consideration of impacts associated with construction, operation, and maintenance) which increases cumulative environmental impacts associated with multiple pipelines. An example of cumulative impacts with Sandpiper would be the intended co-location of Sandpiper and the Line 3 Re-build/Maintenance project also currently proposed by Enbridge.

Pipeline Leak Risk

The Comparison of Environmental Effects of Reasonable Alternatives focuses primarily on construction related impacts and less on potential environmental damage as a result of leaks or ruptures. This is in contrast to the Exponent study of the Keystone XL Project Risk Assessment, which concluded that the potential damage as a result of an oil leak was the single most important consideration when conducting a risk assessment for oil pipelines.

Corridor Width

A 2-mile wide corridor was used for analysis of System Alternatives. Use of wider or narrower corridor widths affects the assessment as the ability to avoid sensitive areas within a specific zone is dependent upon the density of resources within that zone as well as acreage or number of sensitive areas. The existence of resources at low densities may not necessarily indicate that the route has more potential for impact if more avoidance opportunities are present. Conversely, there may be resources at high densities that are harder to avoid within a 2-mile corridor. The LaSalle Creek area north of Itasca is a good example: a 2 mile wide corridor still restricts alignment choices to areas with high resource densities.

State-Listed Rare Species and Sites of Biodiversity Significance

It is notable that Minnesota state-listed threatened and endangered species and Minnesota Sites of Biodiversity Significance were not addressed in the comparative section of the Comparison of Environmental Effects of Reasonable Alternatives. At this scale of analysis, one could consider Minnesota Sites of Biodiversity Significance as areas tending to concentrate rare species. See the DNR comparison of these sites specifically for SA-03 and SA-Applicant below.

Contaminated Sites

It should be noted that using contaminated sites as a comparison factor is debatable. It could be argued that contaminated sites are either more or less suitable for development, depending on the specifics of a site and measures used to lessen or avoid impacts.

<u>Comparison of Environmental Effects of Reasonable Alternatives Section Specific Comments</u>

Section 4.1.2 Geology /Soils/Groundwater

Soils: This section (page 49) indicates that impacts to soils are of particular concern to agricultural areas. It is important to point out that standard measures commonly used to prevent mixing of topsoil with subsoil and other impacts such as compaction and rolling topography can be effective in addressing the concerns raised for agricultural areas. This section should indicate that soil related impacts are an important concern in undisturbed or less disturbed areas, where fewer best management practices are typically available.

Hydraulic Conductivity: This section of the report is correct in stating that hydraulic conductivity information is important to assess because it is a measure of how quickly oil can move through the soil. Unfortunately the methods used in the assessment are best suited as a screening tool only as they use surficial hydraulic conductivity values rather than at depth values. Since pipelines are constructed at a fairly consistent depth, inclusion of hydraulic conductivity ratings at or below those depths will need to be used to determine potential risk to contaminant migration.

Section 4.1.6 Public Resource and Recreation Lands (Map A-14 and 15)

Upon review of these maps it is clear that they do not include all public lands. Specifically, state lands administered by DNR Division of Forestry outside of state forests and county administered state lands are not included. These lands are important to the impact assessment as they provide various services to the public, animal, plants, and industry. These areas also occupy a significant part of the landholdings in the northern part of the state and omitting them from the assessment would likely result in inaccurate assessment of impacts on public lands.

Also, from reviewing the comparison document and table 4-9 there is no distinction between State Forests and State Lands Administered by DNR Forestry, other DNR Divisions or County tax forfeit. The text makes note to only named State Forests. Therefore the analysis does not appear to compare the total amount of public forest lands. The DNR is aware that there is a higher occurrence of state public owned lands in the applicants preferred route than in all other alternatives.

Without knowing the final centerline of the proposed pipeline route, fully accessing forestry concerns is difficult. However, in general with more acres and crossings, one can reasonably conclude that there would be more potential impacts to forestry from the applicant's preferred route than from the other southern alternatives. Routes in the forested region of the state will permanently convert forested uplands and wetlands to open habitats. Impacts of new or wider fragmented areas include: decreased habitat value for wildlife and fisheries, reduction of core habitat in adjacent forests due to edge effects, conversion of habitat (i.e., changes from forested wetlands to open or shrub wetlands), and increased risk of invasive species. The pipeline will result in the permanent loss of income from timber harvests or other income producing activities on the parcels. Compensation is required for impacts to both School Trust and Acquired lands.

There are concerns regarding the potential for severing access to state parcels for land management activities. This concern would apply to both legal access across licensed/leased (or purchased) lands and the ability to run fully loaded semi-trucks carrying logs across the pipeline. This is a concern even if the pipeline runs across private property. DNR works with private owners to gain the shortest and most efficient access to state land across private land. The main concerns are Forestry lands in several sections in the Applicant's preferred route. There is also a concern for fire suppression activities anywhere the pipeline might be constructed.

Section 4.1.4 Water Resources (Maps A-10, 11 and 12)

We agree with the types of impacts that could occur as described in the report however the methods used do not allow for a comparison of those potential environmental effects among the system alternatives. Two considerations missing from the assessment are:

1. Water sensitivity – Water quality and functions of water resources vary across the state and so will potential impacts.
2. Downstream river miles and connectivity to resources and other sensitive receptors vary across the state and so will potential impacts. An analysis of flow paths for significant releases would add to this type of assessment.

Full Length Comparison of SA-03 and SA-Applicant

While the high level of analysis presented in the Comparison of Environmental Effects of Reasonable Alternatives did not provide the DNR enough information for a full comparison of system alternative impacts, we believe it provides valuable screening information in combination with professional judgment for the DNR to provide input regarding SA-03 and SA-Applicant. After a review of the data and consideration of factors and context described above, it is the opinion of the DNR that route Sa-03 has fewer natural resource impacts when compared to SA-Applicant.

SA-Applicant features that would incur impacts greater than those identified for SA-03 are: forest and wetland acreage, river and stream segment crossings, and crossings of public lands. Cultivated lands and occurrence of already-impaired waters are greater along SA-03, indicating the developed state of lands along this route. The following table represents a preliminary comparison of natural resource impacts between SA-Applicant and SA-03, using information from the Comparison of Environmental Effects of Reasonable Alternatives. These are full route comparisons, encompassing the states of North Dakota, Minnesota, and Wisconsin.

Full length System Alternative Analysis (ND, MN, WI):
Comparison of SA-Applicant and SA-03

Feature	**SA-Applicant**	**SA-03**	**Notes** **[The comment reflects the preferable option from a natural resource perspective]**
Total miles	615 miles	700 miles	SA-App is shorter
Acres (from landcover)	769,145	862,053	SA-App covers fewer acres
Landcover (acres)			
Forest	144,315 (18.8%)	86,195 (10%)	SA-03 covers fewer forested acres, and less by percent. This represents a reduction in forest fragmentation.
Herbaceous/grassland	86,505 (11.2%)	90,945 (10.5%)	SA-App covers fewer grassland acres, and less by percent. This is a reduction in grassland impacts.
Cultivated	363,381 (47.20%)	512,407 (59.4%)	SA-03 covers more cultivated acres and more by percent. This represents re-working of already disturbed lands.
Wetlands	107,367 (13.9%)	90,832 (10.5%)	SA-03 covers fewer wetland acres and less by percent. This is a reduction of wetland impacts.
Water Resources			
River + stream crossings	2,049 segments	895 segments	SA-03 crosses fewer water segments
Crossings with water impairments	50	98	SA-03 has a greater number of crossings over impaired waters.

			Fewer crossings of non-impaired waters is desirable.
Miss R crossings	2: 30' + 250'	1:1,000'	No advantage: both represent dangers specific to flow volume and local river and bankside conditions.
Lakes	3,397	3,777	SA-App has fewer lake crossings. A more accurate comparison would take into account the existing water quality conditions and impairments of these lakes.
Wetlands (acres)			
Forested/shrub	57,769 (7.3%)	60,210 (6.8%)	These are similar. A more accurate comparison would take into account the biological quality ranking of these communities, taking into account such things as hydrologic continuity, species diversity, disease, regeneration, and presence of invasives.
Emergent	47,010 (6%)	39,415 (4.5%)	See above
Public Resource Lands			
Acres	47,691	11,885	SA-03 crosses fewer acres of public lands.
Count	66	148	While SA-App encounters fewer public lands, this is due to the larger size of public lands along the northern route. A better comparison is made by the acres crossed.

Note that the EERA analysis of SA-Applicant and SA-03 did not compare the acreage of developed lands (existing corridors to be followed, acres under cultivation) to new land disturbance (forests, grasslands and wetlands). The analysis also did not include water quality indicators for the water bodies to be crossed by both system alternatives (rivers, streams and lakes).

Minnesota-Specific Comparison of SA-03 and SA-Applicant

The environmental analysis document also presented Appendix B – Tables and Maps for Minnesota. The DNR interprets this data to show that while SA-applicant covers less total acreage, it has the potential to adversely impact natural resources to a greater extent.

SA-Applicant encounters greater acreage and/or numbers for Sites of Biodiversity Significance (SBS), School Trust Lands, public water bodies, NWI wetlands, wild rice lakes, and trout streams. SA-03

contains a higher number of karst features and calcareous fens, more crossings of public waters (streams and rivers) and public water wetlands, and significantly more acres of native prairie than SA-Applicant.

These features reflect the difference in route lengths, as well as the changing nature of the landscape between ecoregions of the state. SA-Applicant follows the northern-most route, the majority of which passes through the Laurentian Mixed Forest ecoregion, the Northern Minnesota Drift and Lake Plains section with expanses of intact forests and wetlands. SA-03 follows a route farther to the south through the Prairie Parkland and Eastern Broadleaf Forest ecoregions, where agriculture and urban centers have become established.

Following are a few points of discussion regarding these comparisons:

- SA-Applicant crosses greater acreage of Sites of Biodiversity Significance (SBS). SBS indicate areas of intact functional landscapes that provide natural resource values such as hydrologic continuity, habitat connectivity, native plant communities, and rare plant and animal species. Not all counties crossed by SA-Applicant have been evaluated for SBS. However, those that have been evaluated contain the largest areas of SBS to be found in the state.
- SA-Applicant crosses a higher amount of state lands, particularly state forests and state wildlife management areas. The route passes through a significant amount of the forest stand inventory of the state of Minnesota.
- SA-03 crosses fewer state lands, smaller SBS due to fragmentation of natural landscapes, and a higher number of the waters crossed (rivers, streams, wetlands and lakes) are already impaired due to agricultural and urban development.
- Fragmentation of natural landscapes due to farming and urban development is significantly higher in SA-03. It would be easier to avoid important natural resources within a two mile corridor in this route.

Following is a table comparison of the two system alternatives under review within Minnesota using data from the Comparison of Environmental Effects of Reasonable Alternatives:

Minnesota System Alternative Analysis: Comparison of SA-App and SA-03

Feature	SA-Applicant	SA-03
Total acres	382,670	476,346
Karst features	0	7
Calcareous fen	1	2
Sites of Biological Diversity*		
Below	7,291	13,891
Moderate	52,117	26,320
High	6,883	5,828
Outstanding	2,459	1,914
Total	68,750	47,954
Native Prairie		
Complex	440 (57%)	279 (13.1%)
Upland	118 (15.3%)	882 (41.3%)
Wetland	213 (27.6%)	973 (45.6%)
Total	772	2,135
School Trust Land (acres)	7,880	2,004
State Trails	8	11
NWI (acres)	76,597	67,541
Public water wetland	2,372	2,792
Water Basins		
Public water basin	10,220	10,047
Water Courses		
Count	112	240
Miles	197	407
Trout Streams		
Count	46	32
Miles	54	42
Wild Rice Lakes		
Count	29	11
Acres	3,621	1,182

*The DNR assumes values provided by EERA for Sites of Biological Diversity are acres of Sites of Biodiversity Significance (SBS).

Thank you for the opportunity to provide comments regarding the Certificate of Need for the Sandpiper Pipeline Project. Please contact me with any questions.

Sincerely,

Jamie Schrenzel
Principal Planner
Environmental Review Unit
(651) 259-5115

Enclosures: 5

cc: Larry Hartman, Minnesota Department of Commerce
Scott Ek, Minnesota Public Utilities Commission
Sara Ploetz, Enbridge

Figure 1.
MPCA Citizen Lake Monitoring Program
Water Clarity

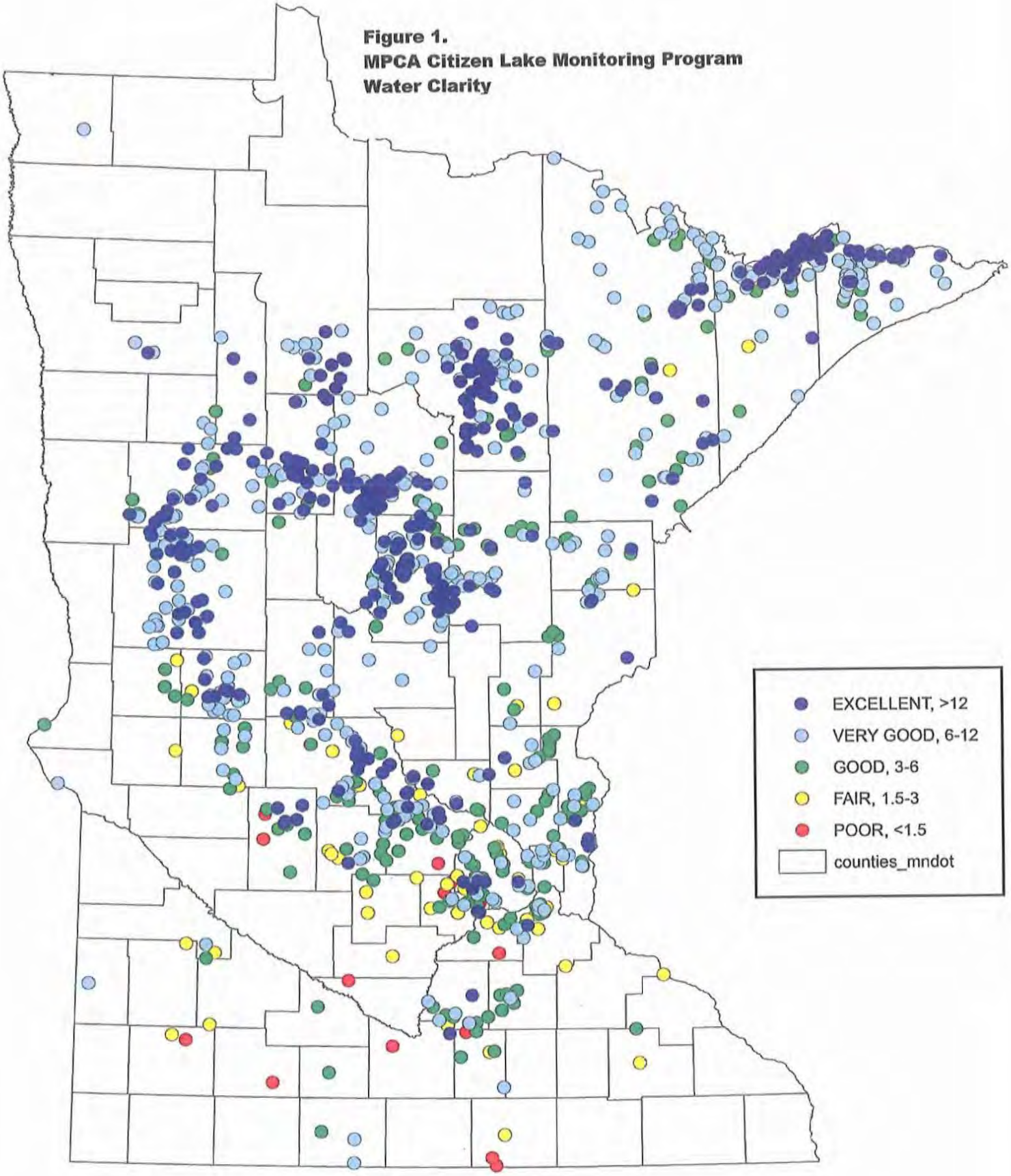

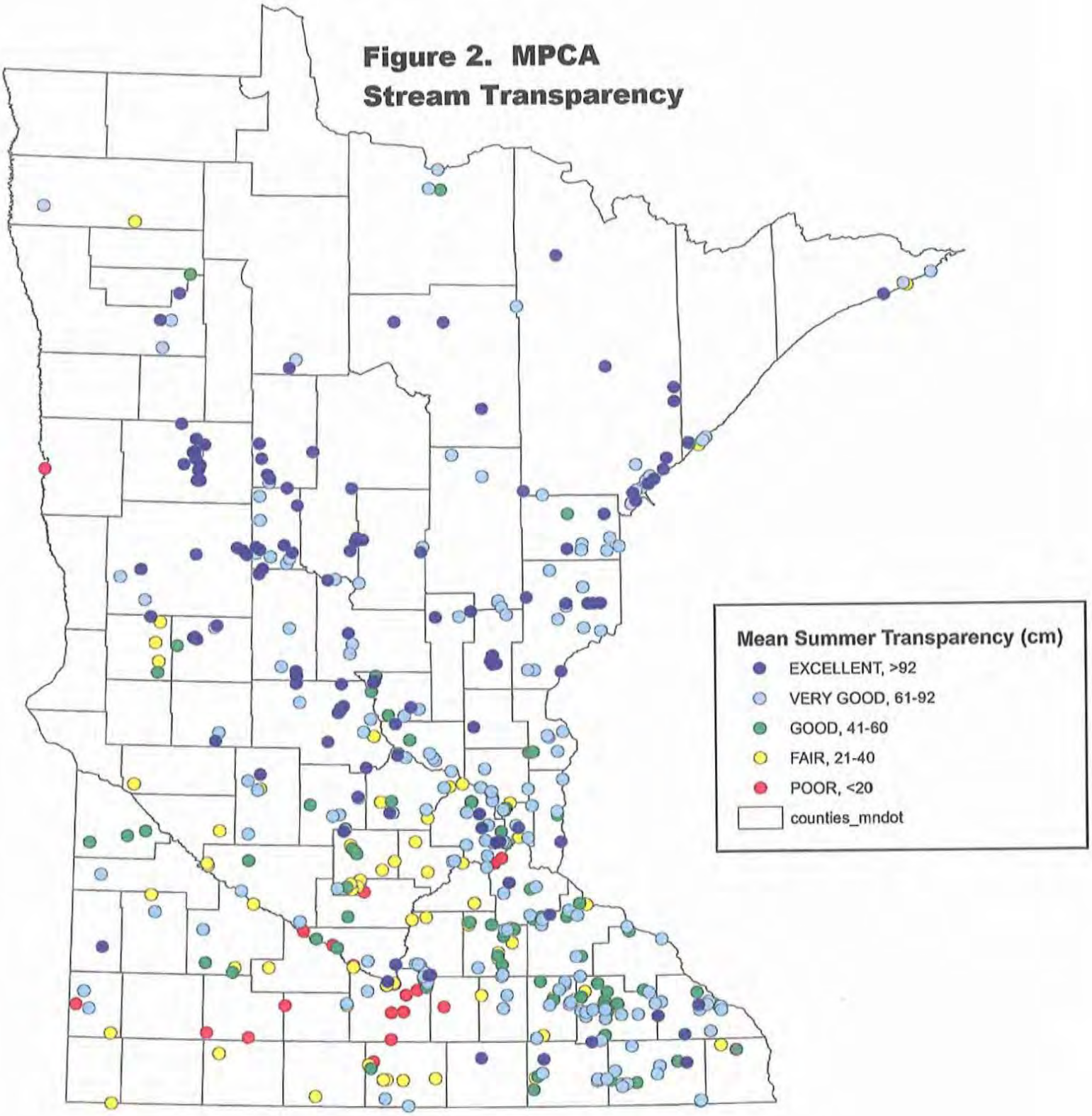
Figure 2. MPCA
Stream Transparency
Mean Summer Transparency (cm)
EXCELLENT, >92
VERY GOOD, 61-92
GOOD, 41-60
FAIR, 21-40
POOR, <20
counties_mndot

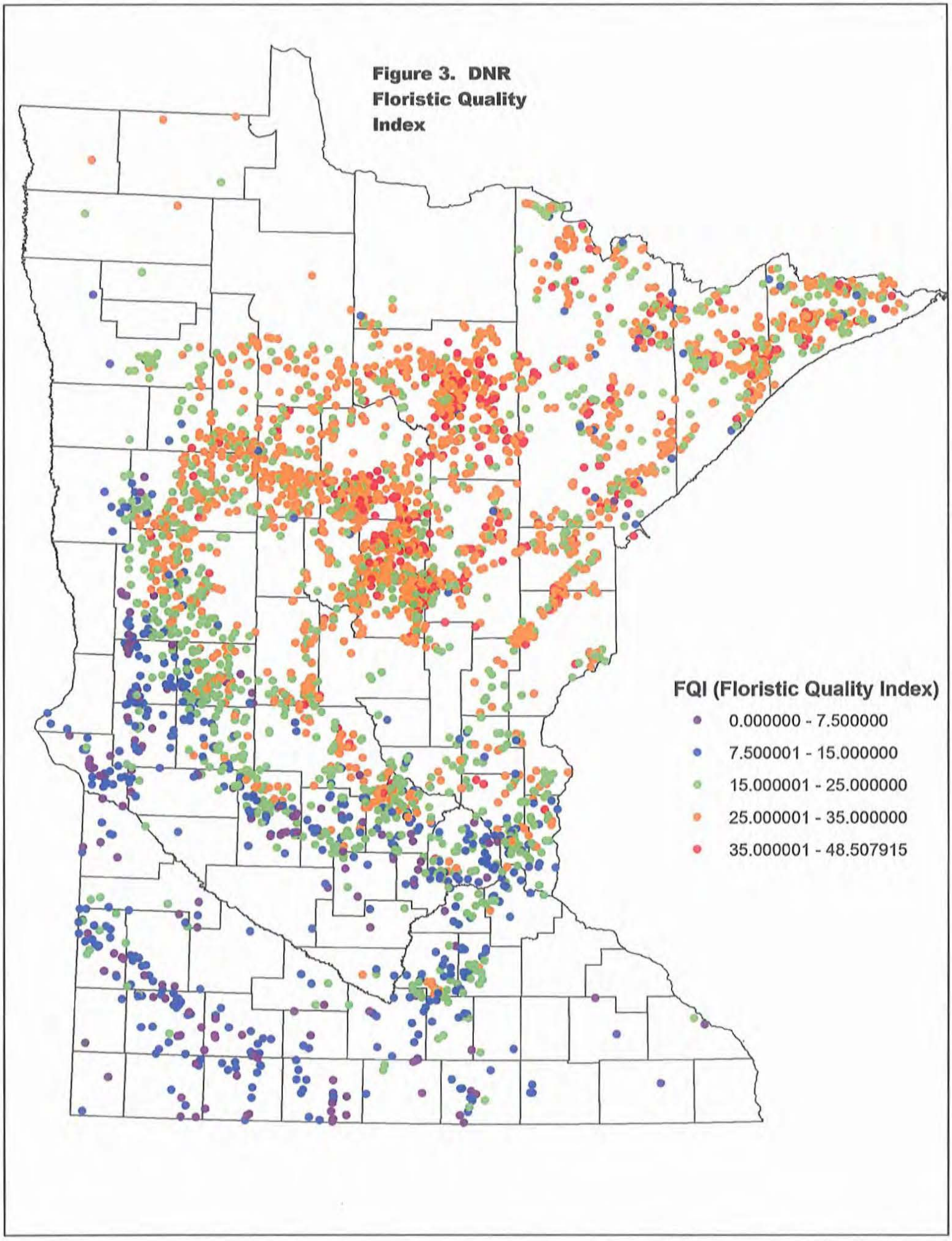

Figure 3. DNR Floristic Quality Index

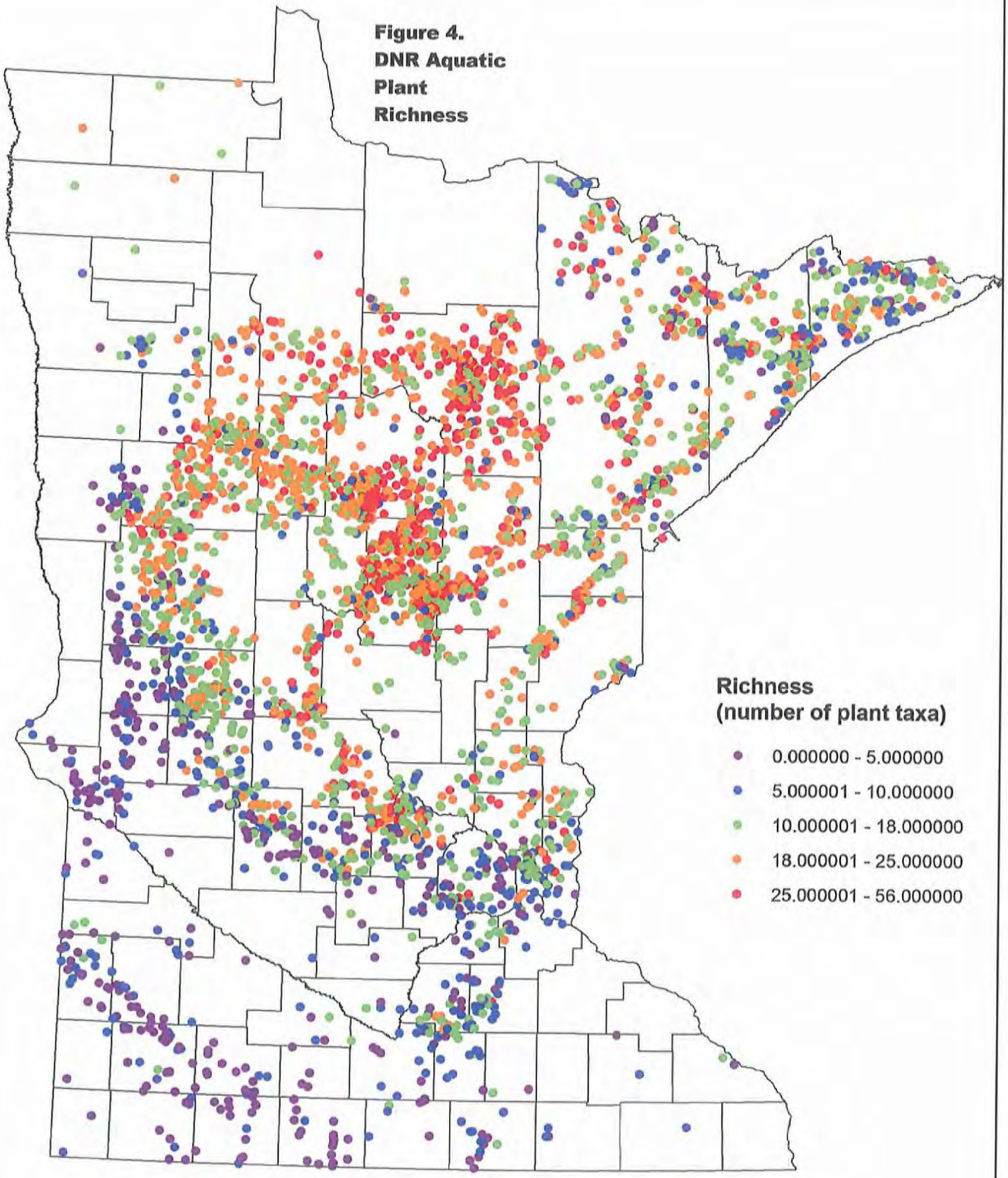
Figure 4.
DNR Aquatic
Plant
Richness
Richness
(number of plant taxa)
0.000000 - 5.000000
5.000001 - 10.000000
10.000001 - 18.000000
18.000001 - 25.000000
25.000001 - 56.000000

Figure 5.

Fish IBI Scores through 2014

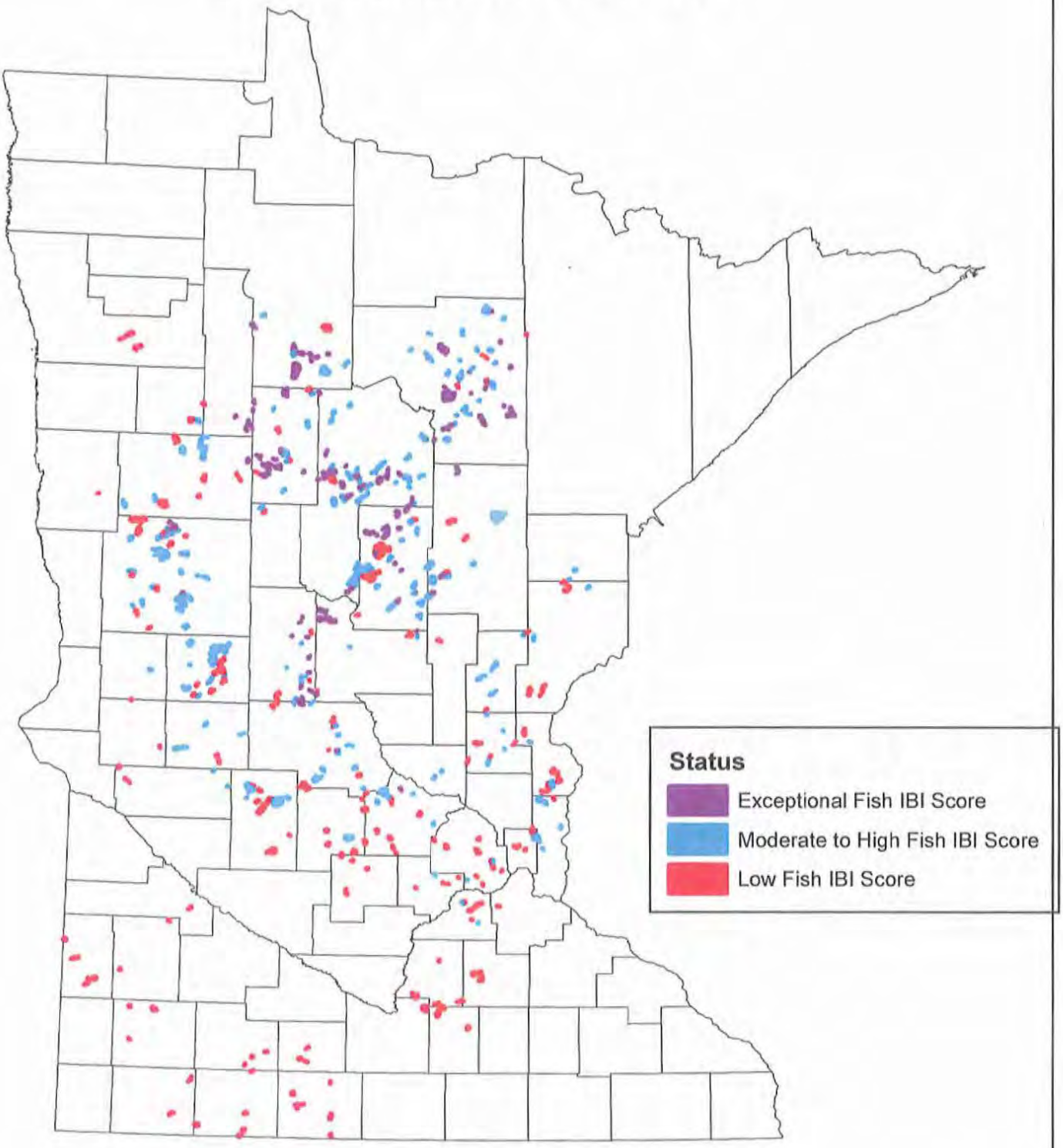

Minnesota DNR Fisheries, Jan. 2015, Contact Jacquelyn Bacigalupi, MN DNR Fisheries IBI Coordinator for more information

Appendix C to Attachment C

To

Honor the Earth

Comments on Line 3 Replacement Project

DEIS

CN-14-916 and PPL-15-137

Appendix C
PCA Sandpiper Letters

January 23, 2015

The Honorable Eric Lipman
Minnesota Office of Administrative Hearings
600 North Robert Street
P.O. Box 64620
St. Paul, MN 55164-0620

RE: In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota
MPUC Docket No. PL6668/CN-13-473
OAH Docket No. 8-2500-31260

Dear Judge Lipman:

The Minnesota Pollution Control Agency (MPCA) submits the following comments for consideration by the Administrative Law Judge (Judge) in making recommendations to the Public Utilities Commission (Commission) in this matter. The MPCA's comments provide information addressing several of the criteria set forth in Minn. Rule 7853.0130 for making a determination on a certificate of need for the Sandpiper Pipeline Project (SA-Applicant) proposed by North Dakota Pipeline Company ("NDPC" or "Applicant"). The MPCA respectfully requests that if a determination of need is reached in this proceeding, the certificate of need be conditionally granted contingent upon suitable modification of SA-Applicant to protect and avoid high quality natural and environmental resources, and the inclusion in the Route Proceeding, Docket No. CN-13-474, of SA-03 and any other System Alternative that meets the identified need, pursuant to the Commission's authority under Minn. Rule 7853.0800. The MPCA will gladly provide additional information or comments that the Judge may find helpful in the course of this proceeding.

A. The MPCA's comments address four of the criteria required under Minn. Rule 7853.0130 for a determination on a certificate of need.

Minn. Rule 7853.0100 requires evaluation of all applicable and pertinent factors listed under each of the criteria set forth in Rule 7853.0130 and a specific written finding with respect to each of the criteria. Minn. Rule 7853.0130 states that a certificate of need shall be granted if all the listed determinations can be made. However, if one or more of those determinations cannot be met, a certificate of need may be denied, or conditionally granted subject to modification, under Minn. Rule 7853.0800.

The MPCA is providing comments that address the determinations required under Rule 7853.0130.B (2); 7835.0130.B (3); 7853.0130.C (2); and 7853.0130.C (3), which state:

- 7853.0130.B. a more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record by parties or persons other than the applicant, considering: . . .
  (2) the cost of the proposed facility and the cost of energy to be supplied by the proposed facility compared to the costs of reasonable alternatives and the cost of energy that would be supplied by reasonable alternatives;
  (3) the effect of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives; and . . . .

- 7853.0130.C. the consequences to society of granting the certificate of need are more favorable than the consequences of denying the certificate, considering: . . .
  (2) the effects of the proposed facility, or a suitable modification of it, upon the natural and socioeconomic environments compared to the effect of not building the facility;
  (3) the effects of the proposed facility or a suitable modification of it, in inducing future development.

The MPCA comments will address each of the criteria mentioned above and associated listed factors.

B. SA-03 is a reasonable and prudent alternative to the Applicant's facility (SA-Applicant), since the respective costs of SA-Applicant and SA-03 and of oil to be supplied by SA-Applicant and by SA-03 are not significantly different. Minn. Rule 7853.0130.B(2).

Financial impacts and comparative costs are among the factors to be evaluated in determining whether the criteria in Minn. Rule 7853.0130.B are met. Since MPCA submitted its comments dated August 21, 2014 to the Public Utilities Commission,[1] additional relevant testimony have been submitted in this docket. This included the direct testimony of economist Adam Heinen of the Department of Commerce (Doc. ID 201411-104761-03 ("Heinen Direct"). Mr. Heinen stated his expert opinion that System Alternative SA-03, as proposed by the MPCA, would meet the need of the project if as also proposed by MPCA, the Clearbrook terminal location was moved westward to the Crookston area or another location closer to the North Dakota border. (Heinen Direct, p. 75,) Mr. Heinen also indicated that moving the terminal location could increase the cost of constructing the pipeline, and discussed Applicant's estimate of the cost increase. (Heinen Direct, 75-76). Mr. Heinen then stated in his opinion that any apparent higher costs of SA-03 based on Applicant's analysis were insignificant and unlikely to impact retail prices and that the Applicant had not shown that SA-03 was an unreasonable alternative to meet the need of the proposed project. (Heinen Direct, pp. 77-78)

[1] See PUC Docket Filing 20148-102458-02 and 20148-102458-04

Mr. Heinen reinforced his direct testimony when he filed rebuttal testimony addressing SA-03. Mr. Heinen affirmed that SA-03 appeared to be a reasonable alternative to meet the need for this project. (Heinen Rebuttal, p. 7) (Doc. No. 20151-105968-01). This testimony supports the finding that under Minn. Rule 7853.0130.B(2), based on comparative cost, SA-03 is at least a reasonable and prudent alternative. However, comparative effects on natural environments, i.e., potential environmental and natural resource impacts as discussed in the following sections, appear to make SA-03 "a more reasonable and prudent alternative" under Minn. Rule 7853.0130.B(3).

In addition to direct costs of construction and operation, the costs considered under Rule 7853.0130.B(2) should include an evaluation of whether a system alternative such as SA-03 is a more reasonable alternative to SA-Applicant because of a reduced risk of a costly spill to a sensitive environmental area. An Alternative that avoids or impacts fewer sensitive ecosystems and water bodies than SA-Applicant will have a smaller likelihood of incurring significant response costs. As documented by the U.S. Environmental Agency (USEPA), it costs considerably more to restore or rehabilitate water quality than to protect it.[2] The areas of the state traversed by the SA-Applicant have waters and watersheds that are currently subject to protection in the state's "Watershed Restoration and Protection Strategy" program, [3] financed through the Clean Water Fund and aided by significant volunteer participation of Minnesota citizens. By keeping these waters as clean as possible before they become impaired, extensive costs of restoring waters to state standards can be avoided. Location of oil pipelines in these areas place their pristine waters at risk, and also place potentially millions of dollars in state and federal funds allocated for protection of these areas at risk.

When evaluating spill response costs, the following factors would make one corridor a better choice than another in minimizing the potential for costly spills or accidental discharges: fewer crossings of flowing water; fewer adjacent water bodies; quality of those waters; presence of especially sensitive areas or habitats or species or uses; better access to downstream oiled areas; tighter soils; and closer and more equipped and prepared responders. The MPCA applies these factors in comparing SA-Applicant with SA-03 and other alternatives in the next section of our comments.

C. SA-Applicant presents significantly greater risks of potential environmental impacts and encroaches on higher quality natural resources than SA- 03 and several other system alternatives. Minn. Rule 7853.0130.B(3). The effects of SA-Applicant on the natural environment support a determination in favor of other alternatives. Minn. Rule 7853.0130.C(2) and C(3).

[2] See http://water.epa.gov/polwaste/nps/watershed/upload/economic_benefits_factsheet3.pdf (incorporated by reference) .

[3] See (http://www.pca.state.mn.us/index.php/water/water-types-and-programs/surface-water/watershed-approach/index.html)

Environmental risks are posed by all aspects of pipeline construction and operation, including post-spill recovery and restoration activities. The primary and most significant risks are associated with the long-term effects upon environmental and natural features that will be permanently altered, eliminated, or otherwise impacted by the presence of a pipeline, as well as the potential impacts of the release of crude oil as the result of a spill event during the potential 40 years or more that the pipeline will be operational. Those risks include environmental damages such as loss of wildlife, contamination of drinking water, destruction of fisheries, loss of habitat, and alteration of ecological systems. (For a discussion of the behavior and cleanup of oil spilled to surface water, soil, and groundwater, see Appendix A to the MPCA's comments.)

During these proceedings, the MPCA has commented extensively on the environmental concerns regarding the route proposed by Applicant in comparison to alternative routes and system alternatives. MPCA's prior comments can be found in Document Nos. 20146-100780-01, 20148-102458-02 and 20148-102458-04, each incorporated by reference. These prior comments have addressed such specific items as access to potential release sites in surface waters, potential to impact ground water, wild rice, the state's highest-quality surface water systems, wildlife habitat, low income populations, watersheds currently being assessed for restoration and protection strategies, fisheries, economies, and numerous other parameters.

In these comments, the MPCA concluded that with respect to protection of the highest-quality natural resources in the state, the SA-Applicant route presents significantly greater risks of potential impacts to environment and natural resources than several of the system alternatives, including SA-03. Although all proposed routes and system alternatives have the potential to impact some natural resources, the Applicant's proposed route encroaches on higher quality resources, superior wildlife habitat, more vulnerable ground water, and more resources unique to the state of Minnesota than do many of the proposed system alternatives. Several examples of the greater potential for harmful environmental impacts of SA-Applicant compared to other alternatives are highlighted in the following pages.

The relevance of other system alternatives depends upon whether the need for the project is determined based upon a narrower and more localized view or upon a larger regional view. While SA-03 has been identified as a reasonable and prudent project alternative as a general matter, it serves as such an alternative from both a localized and regional view. However, if need is determined based on a larger regional view of need, several other system alternatives may also be reasonable and prudent alternatives to meet that regional need. Consequently, the MPCA also addresses the comparative impacts of other System Alternatives and SA-Applicant to inform a determination of need from a regional perspective.

The broader objective of the proposed project is transporting oil to markets in the Midwest and along the eastern and gulf coasts, not to transport oil through the state of Minnesota

with termination in Superior Wisconsin. [4] Oil that is to be transported to Superior, Wisconsin through the proposed pipeline will continue through Wisconsin to Chicago (or Wisconsin and Michigan if routed to Sarnia, Ontario). Oil that would be transported via one of the southern system alternatives, such as SA-04, and on to the Chicago area would have to be transported through Iowa before reaching Illinois. In either case, Chicago appears to be a common destination for most if not all of the oil that is proposed to be moved through Minnesota.

Information regarding the existence of contractual agreements obtained when Applicant held an "open season" has been offered as the underlying basis for a determination of need.[5] The Applicant has suggested that the facility as proposed (SA-Applicant) is necessary in order to assure those contractual agreements are filled and that alternatives such as SA-03 would negatively affect the cost of fulfilling those agreements. This proceeding will determine whether the Applicant's open season agreements establish the need for siting a pipeline through Northern Minnesota instead of along a southern alternate route. If the underlying actual and predominate need of the project is to get Bakken oil to Midwest regional markets in Wisconsin, Michigan, or Illinois, that need can be achieved by several of the system alternatives. The foregoing is generally and specifically supported by the direct and rebuttal testimony of Applicant's witness Neil Earnest (Document ID Nos. 20148-102134-03, Earnest Direct Testimony, and 20151-105934-01, Earnest Rebuttal Testimony). See Figure 1, which is an overview of Applicant's regional infrastructure and corresponding destinations.

[4] Applicant testimony acknowledges that the project's intended destination is not Superior, Wisconsin but refineries in the Midwest. Applicant witness Earnest, in rebuttal, indicates that oil from this project is not only competing with alternative modes of transportation to refineries in Chicago, Patoka, and Cushing. The oil is also competing with all of the other crude oil choices available to the refineries in the Midwest. Enbridge rebuttal at pp 5-6. "Accordingly, all else equal, higher Sandpiper transportation costs to the Midwestern markets acts to decrease the volume of Bakken crude oil that can be expected to be processed in the Midwest, and to lower the utilization of the pipeline." (Earnest Rebuttal, 6) 20151-105934-01

[5] Heinen Direct, pp. 6-7. The nature and content of these open season transportation service agreements are confidential. The MPCA has not examined the nature or substance of these agreements or their duration. Mr. Heinen also indicates in his testimony that he does not know the ultimate destination of that oil.

Figure 1

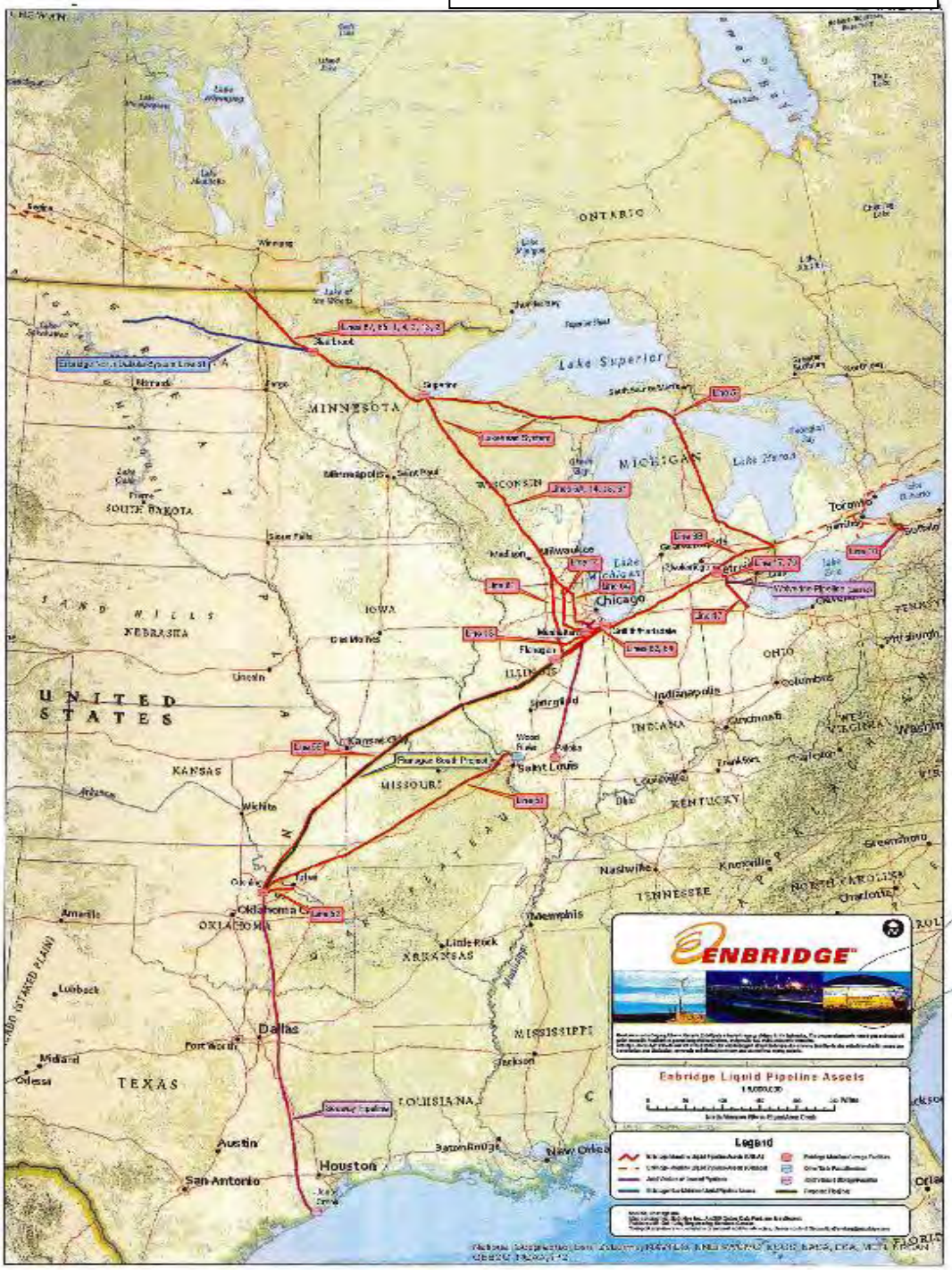
ENBRIDGE
Enbridge Liquid Pipeline Assets
Legend
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
ONTARIO
MINNESOTA
WISCONSIN
MICHIGAN
SOUTH DAKOTA
IOWA
NEBRASKA
ILLINOIS
INDIANA
OHIO
KANSAS
MISSOURI
KENTUCKY
TENNESSEE
ARKANSAS
MISSISSIPPI
LOUISIANA
TEXAS
OKLAHOMA
UNITED STATES
Chicago
Toronto
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Milwaukee
Indianapolis
Cincinnati
Saint Louis
Kansas City
Oklahoma City
Dallas
Fort Worth
Houston
San Antonio
Austin
New Orleans
Memphis
Nashville
Knoxville
Lubbock
Amarillo
Midland
Odessa
Wichita
Lincoln
Des Moines
Fargo
Duluth
Superior
Sault Ste Marie
Thunder Bay
Winnipeg
Regina
Calgary
Edmonton
Buffalo
Pittsburgh
Columbus
Charlotte
Greensboro
Little Rock
Jackson
Baton Rouge
Springfield
Madison
Flint
Grand Rapids
Sioux Falls
Pierre
Norman
Tulsa
Wichita Falls
Abilene
Midland
Odessa
Lake Michigan
Lake Erie
Lake Ontario
Lake Superior
Lake Huron
Lake Winnipeg
Lake Manitoba
Lake Dauphin
Lake Nipigon
Lake Simcoe
Lake Ontario
Lake Erie
Lake Michigan
Lake Huron
Lake Superior

Comparative Evaluation of Environmental Effects

The comparative long term environmental and eco-system impacts and the potential impact of spills must be carefully evaluated for each system alternative in determining the need for a pipeline project. Permanent harm to sensitive eco-systems, habitats, and species may occur following construction of a new pipeline. In addition, long-term impacts from a spill can be much more damaging in areas containing features such as environmentally sensitive areas and those with limited access. As discussed below, these long-term environmental and eco-system impacts should be accorded great weight in the determination of need for a pipeline project. Further, in associated routing proceedings, these impacts must be subjected to even more rigorous and detailed environmental review when evaluating alternative routes. It is not sufficient under Rule 7853.0130 to determine that the location for the proposed project is suitable or reasonable. Rather, the location should be one that best minimizes the risk to human populations and environmental and natural resources.

1. Adverse Impacts to High Quality Surface waters are Greater under SA-Applicant.

SA-Applicant traverses a greater number of high quality water bodies than does SA-03 and presents higher risk of environmental impacts from a spill or release of crude oil along its route corridor. Based on watershed health scores as determined by the Minnesota Department of Natural Resources in its Watershed Health Assessment Framework, MPCA documented that the adverse impacts to overall water quality from construction and operation, as well as spill cleanup and response, of Applicant's Alternative were more harmful than alternatives including SA-03, SA-04, and SA-05. See MPCA Comment letter dated August 21, 2014 , Document ID Nos. 20148-102458-02 and 20148-102458-0420148-04, page 5).

The MPCA provides these additional comments to assist in proper interpretation of the information on surface waters in the Department of Commerce environmental analysis "Comparison of Environmental Effects of Reasonable Alternatives" (DOC study) submitted on December 19, 2014, (ID 201412-105567-01) and in evaluating the criteria and factors based on that information. For example, on its face, the DOC study may be misinterpreted as indicating that SA-03 is a worse alternative than SA-Applicant in affecting impaired waters. The DOC study concluded that there were 50 impaired waters crossed by the Sandpiper route, and 98 impaired waters crossed by SA-03 (DOC Study, 72, 90). Under the Clean Water Act ("CWA"), an impaired water is any water body (e.g., lakes, rivers, streams, wetlands) that is too polluted or otherwise degraded to meet the applicable water quality standards set by states, territories, or authorized tribes. Water quality and water quality standards will vary throughout the state depending on the region of the state in which the waters reside. "Impaired" waters are not the same across the state. For a water body to be deemed impaired in southern or western Minnesota (western corn belt plains or Red River valley ecoregions), it typically will have a greater degree of contamination or degradation than would be required for a water body in the central

hardwood forest ecoregion of Minnesota traversed by the applicant's preferred route (Sandpiper) to be deemed impaired. Thus, waters that are listed as impaired along the SA-Applicant route are likely to be higher quality (having a lower contamination level) than a water listed as impaired in the southern part of the state, and might not be listed as impaired at all along the SA-03 route. Waters in northern Minnesota are generally of better water quality or more pristine.

2. Significant Environmental Damage Would Occur From a Release at or near a Water Crossing Extending up to at least a Distance of 10 Miles from the Point of Release. SA-Applicant Has Many Areas of Limited Access, Increasing the Risk of Extended Impact to Surface Waters.

The most significant potential impact to a surface water from a crude oil pipeline crossing is the environmental destruction that would occur in the event of a release at or near the water crossing. According to a third party risk assessment document developed as part of the Keystone XL EIS[6], Exponent states: "A distance of at least 10 miles downstream from the proposed centerline of the pipeline should be used for the identification of sensitive areas and for identifying CPSs(contributory pipeline segments) during the final design phase of the Project." The 10 mile estimate is fair, given the potential for flowing water to carry a release of oil, especially in remote areas such as those found throughout the proposed Sandpiper route. Considering that the 2010 Enbridge spill into Talmadge Creek and the Kalamazoo River caused significant damage approximately 35 miles from the spill site, a ten mile estimate of damages is conservative and reasonable. See Stolen testimony, Document ID 201411-104748-02, page 24.

Damage to aquatic systems from an oil release can occur either as a result of physical effects such as smothering of organisms, or toxic contamination due to the chemical compositions of the oil. An oil spill in an aquatic ecosystem could cause, among numerous other impacts, death of waterfowl, other bird species, amphibians, reptiles, aquatic mammals, microorganisms, plankton, fish, pets and livestock living adjacent to waters, stunted growth of surviving species, loss of vegetation, destruction of soils, long-term reduction of dissolved oxygen, human health damage, damage to air quality, property value loss, and destruction of drinking water resources. This does not include damages that would occur during the cleanup process, especially in areas with limited, restricted or no access.

3. Potential Damages During Pipeline Construction and Testing Are Greater for SA-Applicant than other Alternatives.

Damages to surface waters as a result of construction activities can and do occur. Flowing water can also carry these effects a long distance from their origin, as noted above. MPCA has observed and documented significant sediment discharges to surface water on pipeline

[6] See http://keystonepipeline-xl.state.gov/documents/organization/221278.pdf, page XV, "Recommendations",

projects as a result of failing to install sufficient sediment and erosion controls on hillsides adjacent to surface waters. The failure to account for spring time subsidence of soils as a result of winter construction is common; frozen soils that are dug up and replaced into trenches thaw and subside in warmer spring temperatures, causing the soils to sink over the pipeline and form a ditch. These ditches act as conduits for melt water or rain water, and as they do not have sediment controls installed, tend to erode significantly as water runs through them. It is common for these subsidence ditches to terminate in water bodies, causing sedimentation and habitat damage (MPCA Comment Letter dated April 4, 2014, -Document ID 20144-98170-01, page 8).

Damage to surface water resources during hydrostatic testing discharges has occurred recently in the state. During these tests, segments of pipeline are filled with a significant volume of pressurized water, often millions of gallons, to test the integrity of the pipe. The water is then released in a manner that should minimize environmental impact. During the Alberta Clipper/Southern lights diluent project, Enbridge exceeded agreed-upon maximum discharge rates on 15 of its hydrostatic testing discharge operations. At two of these sites (adjacent to the Mississippi River and adjacent to the Clearwater River), the exceedances were enough to cause significant erosion and sediment discharge to surface waters. These cases were referred to the U.S. Environmental Protection Agency and eventually settled by the U.S. Department of Justice in 2013 with Enbridge paying a $425,000 penalty. During these hydrostatic testing operations, as much as 4,000 gallons of water per minute can be discharged from valves. This water is general required to be discharged to an upland area or a dewatering device, but when discharged rates are exceeded, or sometimes even when they are not, the pressurized water can erode soils and carry those eroded soils to surface waters, causing turbidity or smothering of aquatic habitat.

The placement of the new terminal construction west of the proposed Clearbrook location as suggested by MPCA in SA-03 will assure that future pipelines are located west and south of these pristine areas, thus avoiding the resources that the state is spending millions of dollars to protect. Meanwhile, the continued expansion of the Clearbrook facility that will coincide with construction in the SA-Applicant location will mean continued impact and potential impact to the highest value (pristine) waters in our state as a result of future pipeline construction.

4. Threats to Groundwater and Potential Drinking Water Supplies from SA-Applicant are Difficult to Assess, but Appear to Pose More Significant Risks than the System Alternatives, including SA-03.

Highly detailed topographical data for the state of Minnesota (called “LIDAR” data)) illustrates that the Sandpiper route (SA-Applicant) traverses territory with greater topographical contrast than does the SA-03 route. Much of the topography along the SA-Applicant route in Minnesota is the result of the deposit of glacial till from thousands of years ago. The composition of this till is often dependent on how the till was deposited. A

term used to describe these soils is “moraine,” or a mass of rocks and sediment carried down and deposited by a glacier, typically as ridges at its edges or extremity.

What is most important to understand about the soils along the SA-Applicant route is that the complexity of moraines in the area creates a significant degree of localized changes in groundwater movement that are very difficult to predict, as opposed to some of the flatter lands to the west and south, such as those traversed by SA-03, SA-04, or SA-05. Typically, ground water through this till along the SA-Applicant route will move laterally and toward a water body, so it is important that significantly more data is gathered from this route before the possible movement of oil in the event of a release can be predicted and response plans developed. It would be very difficult, if not impossible, to accurately assess the potential for ground water contamination based solely on the examination of GIS layers. However, it can be predicted that the damage to groundwater, potentially used as a source of drinking water, as well as the connected soils could take decades to repair, if the damage could be repaired at all. Additional impacts could include damage to agricultural areas (inability to grow crops) and damage to surface waters, wildlife and habitat from oil carried through underground conduits to those areas.

The LIDAR data strongly suggests an increased potential for impacts to drinking water from SA-Applicant than from SA-03 and some other system alternatives. However, more in-depth study will need to be done in the routing phase in order to make an informed comparison and either confirm or negate what the LIDAR data suggests as a factual conclusion.

5. SA-Applicant Threatens a Greater Percentage of Wild Rice and Native Forests than any of the Proposed Alternatives, including SA-03.

Wild rice, in addition to being an important economic consideration in Minnesota, is also an extremely important cultural resource, as well as an essential food source for humans and wildlife. It requires very specific conditions and good water quality, both of which are provided by north central Minnesota lakes. The Sandpiper pipeline would encroach on some of the richest wild rice territory in the state of Minnesota. Further, MPCA staff has identified 10 wild rice locations along the Sandpiper route for which there is no access from pipeline to the location of the wild rice. By comparison, SA-03 has two such areas. As shown in Figure 2, SA-Applicant (in green) would threaten significantly more of the state wild rice crop than any system alternative.

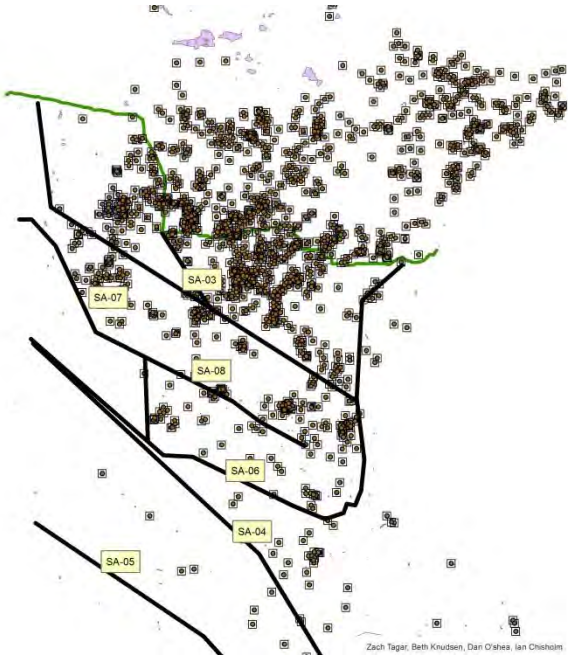

FIGURE 2 -- Wild Rice stands in Minnesota. The Sandpiper route (in green) would threaten more of the state's wild rice stands than any of the proposed system alternatives.

6. SA-Applicant Has a Greater Potential for Impact on Ecoregions than other Alternatives, including SA-03.

As accurately indicated in the DOC study, the majority of SA-03 crosses land that has been converted to agriculture or developed; this is true even when one considers only the portion of the system alternative within the state of Minnesota. Analysis of a GIS map of land cover in Minnesota (Figure 3 below) is helpful to indicate the land cover that would be crossed by SA-Applicant and the Alternatives. When the location of SA-Applicant, and other Alternatives are superimposed on Figure 3, it demonstrates that SA-03 skirts large areas of hay, grassland, pasture, and cultivated crop with infrequent passes through forested areas and wetland. By contrast, the SA-Applicant route crosses a significant amount of forested lands and wetlands, encroaching on significant agricultural land only west of Clearbrook and in the Park Rapids area. SA-Applicant can be seen to skirt far more forest and wetland areas than either system alternative SA-03, SA-04, or more southern alternatives.

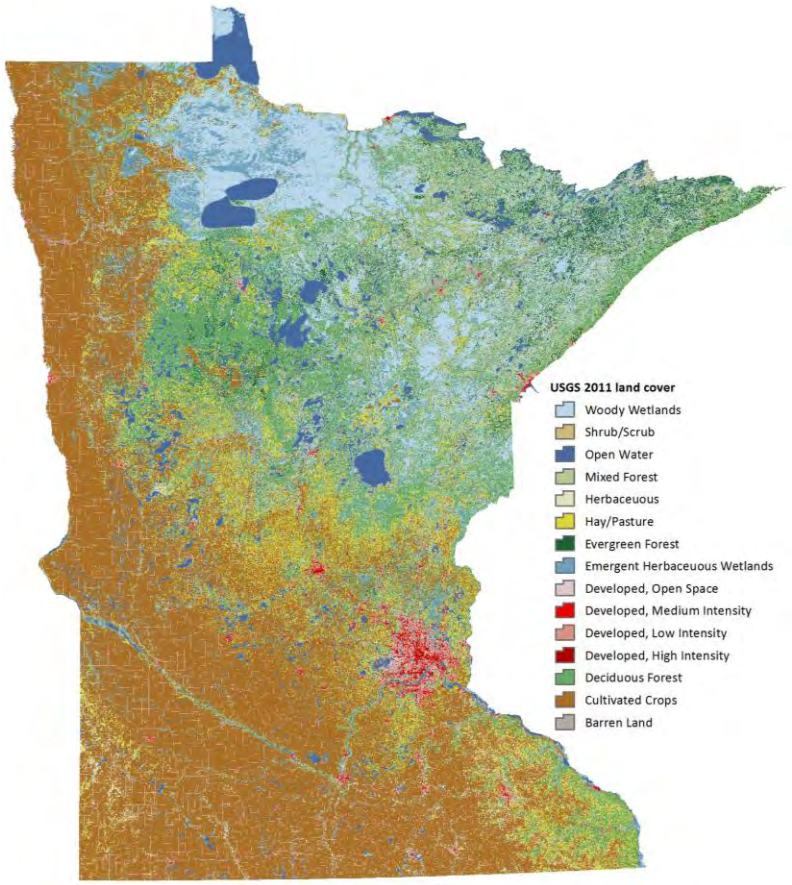

FIGURE 3-- The legend on the left indicates what land cover types are represented by what colors.

Forested areas, particularly larger, unfragmented expanses of forest, are necessary for a number of species of wildlife to survive. Many species of song birds, for example, need deep woods for nesting to avoid "edge species," or species that are more tolerant of human disturbance, because certain edge species such as cowbirds can parasitize their nests and cause mortality to their young. Other species, such as certain reptiles and amphibians, are very habitat specific and cannot easily disperse if that habitat is damaged, such as when a pipeline is placed through that habitat, altering vegetation, soils, and hydrology. Sensitive species of animals and plants require very specific, balanced conditions which can be permanently altered when a pipeline corridor is opened. Long term disturbance and fragmentation of these areas as a result of pipeline construction and siting will have negative impacts on these ecosystems and the wildlife dependent on these conditions.

In addition, an oil spill or release in these areas could result in toxic conditions in soils and vegetation which could kill wildlife. Vegetation would die off either as a result of direct exposure to oil, as a result of altering corridor topography or soil composition during construction activities or clean up after a spill. It is important to note that Enbridge has promised to separate topsoil only if asked to do so by landowners. It is equally important to separate and replace topsoil in forested, remote environments to maintain the integrity of those systems and mitigate some of the potential long-term impacts of pipeline construction.

Impacts to agriculture and pastureland can also occur, and have. However, farms typically do not provide habitat for large numbers of sensitive species or plants or animals that cannot exist elsewhere, and oil movement is likely to be reduced to some extent in flatter terrains with less water movement. Although financial impacts to the landowner and company responsible for the oil release may be greater than in some natural areas, actual environmental damage is apt to be less, and more easily mitigated.

7. SA-Applicant Has More Locations with Poor Access in the Event of a Release than SA-03 or other Alternatives.

As indicated in the June 24, 2014 letter by the MPCA (Document ID 20146-100780-01), access to potential leak sites in the State of Minnesota is of significantly greater concern along the SA-Applicant route than on any of the proposed system alternatives. MPCA staff identified 28 sites along the Sandpiper route for which access would be difficult or impossible within 250 feet of a 2000 foot downstream flow if oil were to be released in certain water bodies. By comparison, seven such areas were located on the SA-03 route, and none on SA-04.

A primary rule of thumb when planning for response to an oil leak is that a release in soil is better than a release in water, and a release in stagnant water is better than a release in flowing water. (For a more detailed discussion of the factors involved in oil spills and responses, see Appendix A to the MPCA comments.) In the Enbridge 2010 Kalamazoo River oil spill, oil caused environmental damage a reported 35 miles downstream from the original release site. The MPCA analysis was limited in scope and only took into account access within 2000 feet of a possible spill. The agency has not evaluated or assessed how much farther oil could travel in some of the identified locations along SA-Applicant's route before containment of a spill could be implemented if the leak were discovered in a timely manner. According to the aforementioned Exponent risk assessment for the Keystone XL pipeline, a small leak from a hole of 1/32 inch in diameter in a pipeline could remain undetected for several months, even with the most up-to-date leak detection technology in place. The same leak could release up to 28 barrels of oil per day, at 42 gallons per barrel. Thus, even a very small, virtually undetectable leak in a remote area, such as those located along much of the proposed Sandpiper route, could cause significant environmental damage such as that described under heading C.3 of this letter without being detected in remote areas, and limited access may also reduce the chance that a citizen may observe and report a leak too small for detection by technology.

The creation of access in remote locations where none exists can create its own problems, including damage to habitat, creation of a source of long-term erosion, fragmentation, aesthetic issues, alteration of hydrology, and other issues. The best way to avoid these concerns is to avoid or reduce the number of crossings of flowing water bodies, or those where access is limited.

From a perspective of minimizing risk of major environmental incidents due to inability to access potential leak sites in Minnesota, the proposed Sandpiper route fares more poorly than any of the proposed system alternatives.

8. SA-03 and Other System Alternatives Follow Existing Corridors to a Greater Extent than does SA-Applicant.

System Alternatives SA-03, SA-04, and SA-05 all follow specific, already existing pipeline corridors. Assuming that all have already passed at least some degree of environmental scrutiny and have been adjusted in critical areas to avoid key resources, a route in these corridors can also likely avoid critical areas and resources. It is important to consider that for these routes, there is no need to "estimate" possible impacts by using an inclusive buffer of a random width to determine quantities of resources that "might" be impacted if one imagines the width of the pipeline corridor to be several miles wide. Instead, one can make a fairly accurate determination of what the impacts or potential impacts of these routes would be based on a width of a few hundred feet. These proposed routes are not "crayon drawings" on a map, but represent actual in-the-ground infrastructure. Precise numbers of water body crossings, mineral extraction sites, forests, wetlands, population densities, cultural resources sites, access areas, and potential downstream carry of released oil all can be determined with relatively little effort by state agencies with access to the required location data. What cannot be determined without more detailed study because of limitations in ArcMap(GIS) capabilities is the quality of those resources. MPCA and Minnesota Department of Natural Resources (DNR) staff can provide general overviews of how the resources in those areas compare to the resources in the northern or forested parts of the state, but on the ground site-by-site analysis is required.

Some of the proposed system alternatives follow highway corridors to some extent, and thus specific placement of the lines is more difficult to guarantee and resource data would be difficult to assess at this stage without more specific information. However, a required consideration for pipeline routing as stated in MN. R. 7852.1900, subp. 3. F., is the use of existing rights-of-way and right-of-way sharing or paralleling. With that in mind, since SA-03, SA-04, and SA-05 all follow specific existing corridors, while SA-Applicant does not in its entirety, then all three system alternatives could be brought forward for further review if they are determined to meet the need for the project, provided that this criteria is considered worthy of sufficient weight in the process.

Conclusion.

SA-03 is a reasonable and prudent alternative to meet the need that may be demonstrated in this proceeding with fewer potential impacts to the highest quality surface waters and other natural resources in the state of Minnesota than SA-Applicant. Further, if the project need is to transport oil from the Bakken fields of North Dakota to markets in the Midwest, system alternatives SA-04 and SA-05 must also be considered as candidates to meet that

need, as they present fewer potential impacts to the natural environment of Minnesota and surrounding states than SA-Applicant.

If a determination of need is reached in this proceeding, the MPCA respectfully requests that the certificate of need be conditionally granted contingent upon suitable modification of SA-Applicant as necessary to protect and avoid high quality natural and environmental resource and the inclusion in the Route Proceeding, Docket No. CN-13-474, of SA-03 along with any other System Alternative that meets the identified need, pursuant to the Commission's authority under Minn. Rule 7853.0800.

Thank you for consideration of these comments.

Sincerely,

William Sierks

William Sierks
Manager, Energy and Environment Section
Minnesota Pollution Control Agency

APPENDIX A

BEHAVIOR AND CLEANUP OF OIL SPILLED TO SURFACE WATER, SOIL, AND GROUNDWATER

Presented below is general description of behavior and cleanup of oil spilled to surface water, soil, and groundwater.

Behavior of Oil in Surface Water

Many factors contribute to the spread and spill response efforts of an oil spill to surface waters, including weather, wave action and the chemical and physical properties of the oil. Oil that reaches surface water spreads on the surface of the water. If the water is flowing, the oil will be carried along. Additionally, wind will spread oil on water. By these forces thick layers of oil will spread and become thinner, more extensive layers. Oil spills may range from thickness measured in feet to a micron-thick rainbow of oil.

Some of the oil on water will evaporate. For example, Bakken oil is more volatile than many other crude oils. The evaporation of the "light end" portion of the oil increases the risk of ignition and exposure of responders to the toxic volatile components in the oil. Some of the oil on the water's surface will sink, especially as it mixes with sediment and as it loses the light ends through evaporation. Alberta oil sands crude is more prone to sinking than are many other crude oils. Sunken oil may move with water and/or may sink into bottom sediment. It may later release from bottom sediment if disturbed or with changes in temperature or current. Oil that sinks is especially challenging and tactics for finding and recovering sunken deposits of oil are not well developed. Removal of oiled sediment creates significant damage on its own. Some of the oil on water will dissolve into the water. Benzene, a toxic component of all crude oil, is among the most soluble components of crude and refined oils. Oil in moving waters will form emulsifications, called oil mousse, which is difficult to recover. Crude oils and refined oils will also have varying levels of hydrogen sulfide and other gases and constituents that are potentially toxic to humans and water life. In addition, oil spilled in surface water will coat and kill emergent vegetation, wildlife, shoreline, structures, and vessels.

Most aspects of response to an oil spill to surface water are made more difficult and less effective in winter ice and snow conditions. This is especially so if oil gets under ice, or if

the ice is not safe for holding up responders and equipment. Sometimes oil on frozen ground or oil on top of competent ice makes for easier oil recovery.

Often a point is reached where the environmental damage caused by attempting to recover spread out and dispersed oil outweighs the damage of the oil. Consequently, oil spill response strategy is to contain spilled oil before it gets away.

Spill Response to Protect Surface Water

Every oil spill recovery tactic requires speedy deployment of specialized equipment by specially trained responders. The tactics of recovery of oil from surface water include:

- Reaching the location of the spill, and reaching downstream oiled or potentially oiled locations. Access along a railroad track or pipeline right-of-way to the spill site sometimes is easy. But getting access to oil that has gotten away from the spill site down river or into fringing wetlands is often very difficult.
- Stopping the flow of oil from the land into the water. Each tactic requires access, and much equipment and specialized training.
- Capturing and containing oil downstream of the spill site. This is usually attempted with floating "containment booms" (floating 50 foot long plastic tubes chained together) to hold the oil. Placing containment booms require access and boats, booms and ropes, anchors, buoys, and specialized training. This equipment is seldom nearby. Containment booms are limited in the amount of oil they will hold back. Containment booms lose effectiveness in water with currents or shallow water. Containment also typically becomes less effective the further downstream oil travels and the more dispersed oil has become. Downstream capture and containment depends on the currents, weather, shoreline type, and access. The best-prepared companies have examined and prioritized potential down-stream containment sites in their response planning before the spill.
- Skimming, sorbing, or pumping oil from the water's surface. A skimmer is a vacuum or sorbing device that pulls the floating oil layer off of the water. Sorbents are natural or man-made materials that absorb oil but not water. The oiled sorbent must then be recovered from the water for disposal. Vacuum trucks can pump oil from oil pools or thick layers of oil on water. Skimming, sorbing, and pumping oil requires access to the oil location and equipment and tanks to store recovered oil for eventual disposal.
- Down-stream, ahead-of-oil protection of shorelines and sensitive features. Containment boom can be deployed at some sensitive locations before the oil arrives to deflect oil further down-stream. Protection measures require careful selection of sites to be protected, since equipment and time does not allow

protection of all areas. In the best of cases, sensitive areas have been examined and prioritized in response planning before the spill.

- Mopping up oil that has been stranded on shorelines, wetlands, marinas, structures, etc. This can be done with sorbents, power washers, oil-lifting chemicals, excavation, etc. This is very labor-intensive work requiring equipment, access, and specialized training. Some mopping-up methods can damage or destroy environmental features, for example excavating beaches, steam cleaning rocky shores, or moving people and boats through wetlands.
- Sampling water, sediment, shoreline, vegetation, etc. to assess where oil or oil components remain in the environment and whether additional recovery is possible and warranted.
- Recovering residual oil from sediments, shorelines, wetlands, and other places as possible.
- Monitoring the ongoing effects of residual oil and of recovery operations.

Even a very aggressive and effective spill response will not recover all spilled oil from a surface water.

Behavior of Oil on the Ground, And In Groundwater

As oil spilled onto the ground sinks into the ground, some oil will be retained by soil. So a small spill may be absorbed into soil and may never reach groundwater directly. But whether or not oil reaches groundwater, the oil retained on or in the soil will serve as a continuing source of groundwater contamination as infiltrating precipitation passes through it. Some soils such as clay have small or non-connected pore spaces such that oil will not readily pass through it, while soils like sands and gravels have large interconnected pore spaces through which oil will pass readily and quickly. The speed of travel is also dependent on the viscosity of the substance. Some oils are very “liquid,” passing through soil quickly; other oils are thick, and those thick oils move through soil pores slowly.

“Groundwater” happens at the depth below the surface when the pore spaces between soil particles are filled with water instead of air. The depth of groundwater is highly variable in Minnesota from a few feet to one hundred or more feet. Groundwater moves, typically slowly, towards connections with surface water, wells, or other discharge points. Some fractured rock formations will allow oil plumes to move very quickly and very far.

When oil meets groundwater, the oil will mostly float near the surface of the groundwater, smearing the soils in that interface. The floating oil is termed “free product.” It will spread out in a floating layer in the direction of groundwater flow. Some of this floating oil will

dissolve into groundwater forming a "plume." Some will evaporate and rise towards the surface. Some will remain sorbed onto soil.

Spill Response to Protect Groundwater

Once groundwater has become contaminated, the response strategies include understanding the direction, speed, and other characteristics of the groundwater. These response strategies use a variety of tools, including pre-existing information, soil borings, groundwater monitoring wells and geophysical methods. Classic physical strategies to protect groundwater from spills include:

- Pumping spilled oil from the ground's surface before it sinks into the soil;
- Digging oil-saturated soils so that the oil won't continue sinking into groundwater;
- Using high capacity blowers into the soil to suck the oil off the soil or groundwater as a vapor;
- Installing skimmers and pumps into the free product oil floating on the groundwater surface to pump out free product, and;
- Pumping groundwater to draw floating and dissolved oil to the surface for treatment.

Unfortunately, even a very aggressive and effective spill response will not recover all spilled oil from the ground. In those cases, if oil reaches groundwater, strategies for mitigating contaminated groundwater include:

- Ongoing groundwater pumping and treatment;
- Well replacement or treatment of a contaminated well;
- Adding restrictions on drilling new wells in the area;
- Adding oxygen and other materials to enhance natural degradation of oil;
- Ongoing monitoring to track contaminated groundwater behavior, and;
- Monitoring natural attenuation and biodegradation.

So, a spill of oil onto tight soils, with prompt recovery of oil from the ground's surface, and prompt excavation of contaminated soils is more effectively cleaned up and less damaging than is a spill of oil onto permeable soils, or areas with shallow groundwater. Especially concerning are spills of large volumes of oil on permeable soils near wellheads.

Biodegradation of Oil

It is well understood that oil that cannot be retrieved after a spill will eventually biodegrade over a period of years or decades. The rate at which biodegradation occurs in surface water, ground water, or soil is variable and contingent on many factors including oil concentration, soil types, temperatures, adequate oxygen and moisture. Oil-specific

chemical and physical properties influence biodegradation. Some refined oils have additives or other non-biodegradable components.

Dissolved oil at the front and side of the plume will typically be attacked by indigenous microbes. A steady-state will eventually be reached as the microbial biodegradation at the forward edge of the plume keeps up with the oncoming oil in the oncoming groundwater. As oil content of the plume is exhausted, this biodegradation consumes the most or all of the spilled oil and the plume shrinks. This process is called natural attenuation. Understanding natural attenuation is important in a spill response, but natural attenuation is never accepted as the sole response to any spill. Plumes of oil contamination in groundwater are typically measured in hundreds of feet or fractions of a mile from the spill. A plume's life may be only some years, or may be very long.

Synopsis of A Few Oil Pipeline Spills in Minnesota

The largest pipeline spill in Minnesota in recent decades was a 1.7 million gallon crude oil spill from Lakehead (now called Enbridge pipeline number 3 in Grand Rapids in March of 1991. Pumping and extensive excavations of wetland was done to recover most of the oil. About 300,000 gallons escaped to the Prairie River. Luckily, most of that oil flowed onto the river's ice surface, and was recovered by an aggressive and effective company response. If the spill had gone beneath the ice, or had it been in a different season, it would have been far more challenging to recover and would have caused much surface water and downstream damage.

In 2002, the Lakehead (now called Enbridge) pipeline number 3 leaked approximately 250,000 gallons of crude oil into wet land near Cohasset in 2002. An oil burn was done because of concern with impending rain pushing oil to the nearby Mississippi River. Remaining oil was pumped and excavated from the wet land and extensive land restoration done over several years.

In 2009 near Staples, Minnesota Pipe Line Company was reinforcing or replacing sections of pipe. A device placed on the line to temporarily reroute the line failed during the night, and approximately 210,000 gallons of crude oil was lost. It pooled at the surface and no surface water was nearby. An aggressive excavation was immediately begun. Many thousands of cubic yards of soil were removed and disposed off-site. A passive sump system was left in place for a few years at the deepest point of impact. The contamination did not migrate off site due to the significant excavation effort.

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Minnesota Pollution Control Agency

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January 23, 2015

The Honorable Eric Lipman
Minnesota Office of Administrative Hearings
600 North Robert Street
P.O. Box 64620
St. Paul, MN 55164-0620

RE: In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota
MPUC Docket No. PL6668/CN-13-473
OAH Docket No. 8-2500-31260

Dear Judge Lipman:

The Minnesota Pollution Control Agency (MPCA) submits the following comments for consideration by the Administrative Law Judge (Judge) in making recommendations to the Public Utilities Commission (Commission) in this matter. The MPCA's comments provide information addressing several of the criteria set forth in Minn. Rule 7853.0130 for making a determination on a certificate of need for the Sandpiper Pipeline Project (SA-Applicant) proposed by North Dakota Pipeline Company ("NDPC" or "Applicant"). The MPCA respectfully requests that if a determination of need is reached in this proceeding, the certificate of need be conditionally granted contingent upon suitable modification of SA-Applicant to protect and avoid high quality natural and environmental resources, and the inclusion in the Route Proceeding, Docket No. CN-13-474, of SA-03 and any other System Alternative that meets the identified need, pursuant to the Commission's authority under Minn. Rule 7853.0800. The MPCA will gladly provide additional information or comments that the Judge may find helpful in the course of this proceeding.

A. The MPCA's comments address four of the criteria required under Minn. Rule 7853.0130 for a determination on a certificate of need.

Minn. Rule 7853.0100 requires evaluation of all applicable and pertinent factors listed under each of the criteria set forth in Rule 7853.0130 and a specific written finding with respect to each of the criteria. Minn. Rule 7853.0130 states that a certificate of need shall be granted if all the listed determinations can be made. However, if one or more of those determinations cannot be met, a certificate of need may be denied, or conditionally granted subject to modification, under Minn. Rule 7853.0800.

The MPCA is providing comments that address the determinations required under Rule 7853.0130.B (2); 7835.0130.B (3); 7853.0130.C (2); and 7853.0130.C (3), which state:

- 7853.0130.B. a more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record by parties or persons other than the applicant, considering: . . .
  (2) the cost of the proposed facility and the cost of energy to be supplied by the proposed facility compared to the costs of reasonable alternatives and the cost of energy that would be supplied by reasonable alternatives;
  (3) the effect of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives; and . . . .

- 7853.0130.C. the consequences to society of granting the certificate of need are more favorable than the consequences of denying the certificate, considering: . . .
  (2) the effects of the proposed facility, or a suitable modification of it, upon the natural and socioeconomic environments compared to the effect of not building the facility;
  (3) the effects of the proposed facility or a suitable modification of it, in inducing future development.

The MPCA comments will address each of the criteria mentioned above and associated listed factors.

B. SA-03 is a reasonable and prudent alternative to the Applicant's facility (SA-Applicant), since the respective costs of SA-Applicant and SA-03 and of oil to be supplied by SA-Applicant and by SA-03 are not significantly different. Minn. Rule 7853.0130.B(2).

Financial impacts and comparative costs are among the factors to be evaluated in determining whether the criteria in Minn. Rule 7853.0130.B are met. Since MPCA submitted its comments dated August 21, 2014 to the Public Utilities Commission,[1] additional relevant testimony have been submitted in this docket. This included the direct testimony of economist Adam Heinen of the Department of Commerce (Doc. ID 201411-104761-03 ("Heinen Direct"). Mr. Heinen stated his expert opinion that System Alternative SA-03, as proposed by the MPCA, would meet the need of the project if as also proposed by MPCA, the Clearbrook terminal location was moved westward to the Crookston area or another location closer to the North Dakota border. (Heinen Direct, p. 75,) Mr. Heinen also indicated that moving the terminal location could increase the cost of constructing the pipeline, and discussed Applicant's estimate of the cost increase. (Heinen Direct, 75-76). Mr. Heinen then stated in his opinion that any apparent higher costs of SA-03 based on Applicant's analysis were insignificant and unlikely to impact retail prices and that the Applicant had not shown that SA-03 was an unreasonable alternative to meet the need of the proposed project. (Heinen Direct, pp. 77-78)

[1] See PUC Docket Filing _20148-102458-02 and 20148-102458-04

Mr. Heinen reinforced his direct testimony when he filed rebuttal testimony addressing SA-03. Mr. Heinen affirmed that SA-03 appeared to be a reasonable alternative to meet the need for this project. (Heinen Rebuttal, p. 7) (Doc. No. 20151-105968-01). This testimony supports the finding that under Minn. Rule 7853.0130.B(2), based on comparative cost, SA-03 is at least a reasonable and prudent alternative. However, comparative effects on natural environments, i.e., potential environmental and natural resource impacts as discussed in the following sections, appear to make SA-03 "a more reasonable and prudent alternative" under Minn. Rule 7853.0130.B(3).

In addition to direct costs of construction and operation, the costs considered under Rule 7853.0130.B(2) should include an evaluation of whether a system alternative such as SA-03 is a more reasonable alternative to SA-Applicant because of a reduced risk of a costly spill to a sensitive environmental area. An Alternative that avoids or impacts fewer sensitive ecosystems and water bodies than SA-Applicant will have a smaller likelihood of incurring significant response costs. As documented by the U.S. Environmental Agency (USEPA), it costs considerably more to restore or rehabilitate water quality than to protect it.[2] The areas of the state traversed by the SA-Applicant have waters and watersheds that are currently subject to protection in the state's "Watershed Restoration and Protection Strategy" program, [3] financed through the Clean Water Fund and aided by significant volunteer participation of Minnesota citizens. By keeping these waters as clean as possible before they become impaired, extensive costs of restoring waters to state standards can be avoided. Location of oil pipelines in these areas place their pristine waters at risk, and also place potentially millions of dollars in state and federal funds allocated for protection of these areas at risk.

When evaluating spill response costs, the following factors would make one corridor a better choice than another in minimizing the potential for costly spills or accidental discharges: fewer crossings of flowing water; fewer adjacent water bodies; quality of those waters; presence of especially sensitive areas or habitats or species or uses; better access to downstream oiled areas; tighter soils; and closer and more equipped and prepared responders. The MPCA applies these factors in comparing SA-Applicant with SA-03 and other alternatives in the next section of our comments.

C. SA-Applicant presents significantly greater risks of potential environmental impacts and encroaches on higher quality natural resources than SA- 03 and several other system alternatives. Minn. Rule 7853.0130.B(3). The effects of SA-Applicant on the natural environment support a determination in favor of other alternatives. Minn. Rule 7853.0130.C(2) and C(3).

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[2] See http://water.epa.gov/polwaste/nps/watershed/upload/economic_benefits_factsheet3.pdf (incorporated by reference) .

[3] See (http://www.pca.state.mn.us/index.php/water/water-types-and-programs/surface-water/watershed-approach/index.html)

Environmental risks are posed by all aspects of pipeline construction and operation, including post-spill recovery and restoration activities. The primary and most significant risks are associated with the long-term effects upon environmental and natural features that will be permanently altered, eliminated, or otherwise impacted by the presence of a pipeline, as well as the potential impacts of the release of crude oil as the result of a spill event during the potential 40 years or more that the pipeline will be operational. Those risks include environmental damages such as loss of wildlife, contamination of drinking water, destruction of fisheries, loss of habitat, and alteration of ecological systems. (For a discussion of the behavior and cleanup of oil spilled to surface water, soil, and groundwater, see Appendix A to the MPCA's comments.)

During these proceedings, the MPCA has commented extensively on the environmental concerns regarding the route proposed by Applicant in comparison to alternative routes and system alternatives. MPCA's prior comments can be found in Document Nos. 20146-100780-01, 20148-102458-02 and 20148-102458-04, each incorporated by reference. These prior comments have addressed such specific items as access to potential release sites in surface waters, potential to impact ground water, wild rice, the state's highest-quality surface water systems, wildlife habitat, low income populations, watersheds currently being assessed for restoration and protection strategies, fisheries, economies, and numerous other parameters.

In these comments, the MPCA concluded that with respect to protection of the highest-quality natural resources in the state, the SA-Applicant route presents significantly greater risks of potential impacts to environment and natural resources than several of the system alternatives, including SA-03. Although all proposed routes and system alternatives have the potential to impact some natural resources, the Applicant's proposed route encroaches on higher quality resources, superior wildlife habitat, more vulnerable ground water, and more resources unique to the state of Minnesota than do many of the proposed system alternatives. Several examples of the greater potential for harmful environmental impacts of SA-Applicant compared to other alternatives are highlighted in the following pages.

The relevance of other system alternatives depends upon whether the need for the project is determined based upon a narrower and more localized view or upon a larger regional view. While SA-03 has been identified as a reasonable and prudent project alternative as a general matter, it serves as such an alternative from both a localized and regional view. However, if need is determined based on a larger regional view of need, several other system alternatives may also be reasonable and prudent alternatives to meet that regional need. Consequently, the MPCA also addresses the comparative impacts of other System Alternatives and SA-Applicant to inform a determination of need from a regional perspective.

The broader objective of the proposed project is transporting oil to markets in the Midwest and along the eastern and gulf coasts, not to transport oil through the state of Minnesota

with termination in Superior Wisconsin.[4] Oil that is to be transported to Superior, Wisconsin through the proposed pipeline will continue through Wisconsin to Chicago (or Wisconsin and Michigan if routed to Sarnia, Ontario). Oil that would be transported via one of the southern system alternatives, such as SA-04, and on to the Chicago area would have to be transported through Iowa before reaching Illinois. In either case, Chicago appears to be a common destination for most if not all of the oil that is proposed to be moved through Minnesota.

Information regarding the existence of contractual agreements obtained when Applicant held an "open season" has been offered as the underlying basis for a determination of need.[5] The Applicant has suggested that the facility as proposed (SA-Applicant) is necessary in order to assure those contractual agreements are filled and that alternatives such as SA-03 would negatively affect the cost of fulfilling those agreements. This proceeding will determine whether the Applicant's open season agreements establish the need for siting a pipeline through Northern Minnesota instead of along a southern alternate route. If the underlying actual and predominate need of the project is to get Bakken oil to Midwest regional markets in Wisconsin, Michigan, or Illinois, that need can be achieved by several of the system alternatives. The foregoing is generally and specifically supported by the direct and rebuttal testimony of Applicant's witness Neil Earnest (Document ID Nos. 20148-102134-03, Earnest Direct Testimony, and 20151-105934-01, Earnest Rebuttal Testimony). See Figure 1, which is an overview of Applicant's regional infrastructure and corresponding destinations.

[4] Applicant testimony acknowledges that the project's intended destination is not Superior, Wisconsin but refineries in the Midwest. Applicant witness Earnest, in rebuttal, indicates that oil from this project is not only competing with alternative modes of transportation to refineries in Chicago, Patoka, and Cushing. The oil is also competing with all of the other crude oil choices available to the refineries in the Midwest. Enbridge rebuttal at pp 5-6. "Accordingly, all else equal, higher Sandpiper transportation costs to the Midwestern markets acts to decrease the volume of Bakken crude oil that can be expected to be processed in the Midwest, and to lower the utilization of the pipeline." (Earnest Rebuttal, 6) 20151-105934-01

[5] Heinen Direct, pp. 6-7. The nature and content of these open season transportation service agreements are confidential. The MPCA has not examined the nature or substance of these agreements or their duration. Mr. Heinen also indicates in his testimony that he does not know the ultimate destination of that oil.

Figure 1

ENBRIDGE
Enbridge Liquid Pipeline Assets
Legend
Lake Superior
Chicago
Houston
Dallas
Austin
San Antonio
Nashville
Knoxville
Memphis
Little Rock
Saint Louis
Omaha
Minneapolis
Milwaukee
Detroit
Toronto
Cleveland
Columbus
Cincinnati
Indianapolis
Lubbock
Amarillo
Midland
Corpus Christi
New Orleans
Baton Rouge
Shreveport
Tulsa
Oklahoma City
Wichita
Kansas City
Des Moines
Lincoln
Sioux Falls
Fargo
Bismarck
Duluth
Green Bay
Madison
Flagler
Sarnia
Ottawa
Kingston
Buffalo
Pittsburgh
Charleston
Lexington
Louisville
Indianapolis
Cincinnati
Columbus
Cleveland
Detroit
Toledo
Milwaukee
Chicago
Minneapolis
Duluth
Fargo
Bismarck
Sioux Falls
Omaha
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Comparative Evaluation of Environmental Effects

The comparative long term environmental and eco-system impacts and the potential impact of spills must be carefully evaluated for each system alternative in determining the need for a pipeline project. Permanent harm to sensitive eco-systems, habitats, and species may occur following construction of a new pipeline. In addition, long-term impacts from a spill can be much more damaging in areas containing features such as environmentally sensitive areas and those with limited access. As discussed below, these long-term environmental and eco-system impacts should be accorded great weight in the determination of need for a pipeline project. Further, in associated routing proceedings, these impacts must be subjected to even more rigorous and detailed environmental review when evaluating alternative routes. It is not sufficient under Rule 7853.0130 to determine that the location for the proposed project is suitable or reasonable. Rather, the location should be one that best minimizes the risk to human populations and environmental and natural resources.

1. Adverse Impacts to High Quality Surface waters are Greater under SA-Applicant.

SA-Applicant traverses a greater number of high quality water bodies than does SA-03 and presents higher risk of environmental impacts from a spill or release of crude oil along its route corridor. Based on watershed health scores as determined by the Minnesota Department of Natural Resources in its Watershed Health Assessment Framework, MPCA documented that the adverse impacts to overall water quality from construction and operation, as well as spill cleanup and response, of Applicant's Alternative were more harmful than alternatives including SA-03, SA-04, and SA-05. See MPCA Comment letter dated August 21, 2014 , Document ID Nos. 20148-102458-02 and 20148-102458-0420148-04, page 5).

The MPCA provides these additional comments to assist in proper interpretation of the information on surface waters in the Department of Commerce environmental analysis "Comparison of Environmental Effects of Reasonable Alternatives" (DOC study) submitted on December 19, 2014, (ID 201412-105567-01) and in evaluating the criteria and factors based on that information. For example, on its face, the DOC study may be misinterpreted as indicating that SA-03 is a worse alternative than SA-Applicant in affecting impaired waters. The DOC study concluded that there were 50 impaired waters crossed by the Sandpiper route, and 98 impaired waters crossed by SA-03 (DOC Study, 72, 90). Under the Clean Water Act ("CWA"), an impaired water is any water body (e.g., lakes, rivers, streams, wetlands) that is too polluted or otherwise degraded to meet the applicable water quality standards set by states, territories, or authorized tribes. Water quality and water quality standards will vary throughout the state depending on the region of the state in which the waters reside. "Impaired" waters are not the same across the state. For a water body to be deemed impaired in southern or western Minnesota (western corn belt plains or Red River valley ecoregions), it typically will have a greater degree of contamination or degradation than would be required for a water body in the central

hardwood forest ecoregion of Minnesota traversed by the applicant's preferred route (Sandpiper) to be deemed impaired. Thus, waters that are listed as impaired along the SA-Applicant route are likely to be higher quality (having a lower contamination level) than a water listed as impaired in the southern part of the state, and might not be listed as impaired at all along the SA-03 route. Waters in northern Minnesota are generally of better water quality or more pristine.

2. Significant Environmental Damage Would Occur From a Release at or near a Water Crossing Extending up to at least a Distance of 10 Miles from the Point of Release. SA-Applicant Has Many Areas of Limited Access, Increasing the Risk of Extended Impact to Surface Waters.

The most significant potential impact to a surface water from a crude oil pipeline crossing is the environmental destruction that would occur in the event of a release at or near the water crossing. According to a third party risk assessment document developed as part of the Keystone XL EIS[6], Exponent states: "A distance of at least 10 miles downstream from the proposed centerline of the pipeline should be used for the identification of sensitive areas and for identifying CPSs(contributory pipeline segments) during the final design phase of the Project." The 10 mile estimate is fair, given the potential for flowing water to carry a release of oil, especially in remote areas such as those found throughout the proposed Sandpiper route. Considering that the 2010 Enbridge spill into Talmadge Creek and the Kalamazoo River caused significant damage approximately 35 miles from the spill site, a ten mile estimate of damages is conservative and reasonable. See Stolen testimony, Document ID 201411-104748-02, page 24.

Damage to aquatic systems from an oil release can occur either as a result of physical effects such as smothering of organisms, or toxic contamination due to the chemical compositions of the oil. An oil spill in an aquatic ecosystem could cause, among numerous other impacts, death of waterfowl, other bird species, amphibians, reptiles, aquatic mammals, microorganisms, plankton, fish, pets and livestock living adjacent to waters, stunted growth of surviving species, loss of vegetation, destruction of soils, long-term reduction of dissolved oxygen, human health damage, damage to air quality, property value loss, and destruction of drinking water resources. This does not include damages that would occur during the cleanup process, especially in areas with limited, restricted or no access.

3. Potential Damages During Pipeline Construction and Testing Are Greater for SA-Applicant than other Alternatives.

Damages to surface waters as a result of construction activities can and do occur. Flowing water can also carry these effects a long distance from their origin, as noted above. MPCA has observed and documented significant sediment discharges to surface water on pipeline

[6] See http://keystonepipeline-xl.state.gov/documents/organization/221278.pdf, page XV, "Recommendations",

projects as a result of failing to install sufficient sediment and erosion controls on hillsides adjacent to surface waters. The failure to account for spring time subsidence of soils as a result of winter construction is common; frozen soils that are dug up and replaced into trenches thaw and subside in warmer spring temperatures, causing the soils to sink over the pipeline and form a ditch. These ditches act as conduits for melt water or rain water, and as they do not have sediment controls installed, tend to erode significantly as water runs through them. It is common for these subsidence ditches to terminate in water bodies, causing sedimentation and habitat damage (MPCA Comment Letter dated April 4, 2014, -Document ID 20144-98170-01, page 8).

Damage to surface water resources during hydrostatic testing discharges has occurred recently in the state. During these tests, segments of pipeline are filled with a significant volume of pressurized water, often millions of gallons, to test the integrity of the pipe. The water is then released in a manner that should minimize environmental impact. During the Alberta Clipper/Southern lights diluent project, Enbridge exceeded agreed-upon maximum discharge rates on 15 of its hydrostatic testing discharge operations. At two of these sites (adjacent to the Mississippi River and adjacent to the Clearwater River), the exceedances were enough to cause significant erosion and sediment discharge to surface waters. These cases were referred to the U.S. Environmental Protection Agency and eventually settled by the U.S. Department of Justice in 2013 with Enbridge paying a $425,000 penalty. During these hydrostatic testing operations, as much as 4,000 gallons of water per minute can be discharged from valves. This water is general required to be discharged to an upland area or a dewatering device, but when discharged rates are exceeded, or sometimes even when they are not, the pressurized water can erode soils and carry those eroded soils to surface waters, causing turbidity or smothering of aquatic habitat.

The placement of the new terminal construction west of the proposed Clearbrook location as suggested by MPCA in SA-03 will assure that future pipelines are located west and south of these pristine areas, thus avoiding the resources that the state is spending millions of dollars to protect. Meanwhile, the continued expansion of the Clearbrook facility that will coincide with construction in the SA-Applicant location will mean continued impact and potential impact to the highest value (pristine) waters in our state as a result of future pipeline construction.

4. Threats to Groundwater and Potential Drinking Water Supplies from SA-Applicant are Difficult to Assess, but Appear to Pose More Significant Risks than the System Alternatives, including SA-03.

Highly detailed topographical data for the state of Minnesota (called "LIDAR" data)) illustrates that the Sandpiper route (SA-Applicant) traverses territory with greater topographical contrast than does the SA-03 route. Much of the topography along the SA-Applicant route in Minnesota is the result of the deposit of glacial till from thousands of years ago. The composition of this till is often dependent on how the till was deposited. A

term used to describe these soils is "moraine," or a mass of rocks and sediment carried down and deposited by a glacier, typically as ridges at its edges or extremity.

What is most important to understand about the soils along the SA-Applicant route is that the complexity of moraines in the area creates a significant degree of localized changes in groundwater movement that are very difficult to predict, as opposed to some of the flatter lands to the west and south, such as those traversed by SA-03, SA-04, or SA-05. Typically, ground water through this till along the SA-Applicant route will move laterally and toward a water body, so it is important that significantly more data is gathered from this route before the possible movement of oil in the event of a release can be predicted and response plans developed. It would be very difficult, if not impossible, to accurately assess the potential for ground water contamination based solely on the examination of GIS layers. However, it can be predicted that the damage to groundwater, potentially used as a source of drinking water, as well as the connected soils could take decades to repair, if the damage could be repaired at all. Additional impacts could include damage to agricultural areas (inability to grow crops) and damage to surface waters, wildlife and habitat from oil carried through underground conduits to those areas.

The LIDAR data strongly suggests an increased potential for impacts to drinking water from SA-Applicant than from SA-03 and some other system alternatives. However, more in-depth study will need to be done in the routing phase in order to make an informed comparison and either confirm or negate what the LIDAR data suggests as a factual conclusion.

5. SA-Applicant Threatens a Greater Percentage of Wild Rice and Native Forests than any of the Proposed Alternatives, including SA-03.

Wild rice, in addition to being an important economic consideration in Minnesota, is also an extremely important cultural resource, as well as an essential food source for humans and wildlife. It requires very specific conditions and good water quality, both of which are provided by north central Minnesota lakes. The Sandpiper pipeline would encroach on some of the richest wild rice territory in the state of Minnesota. Further, MPCA staff has identified 10 wild rice locations along the Sandpiper route for which there is no access from pipeline to the location of the wild rice. By comparison, SA-03 has two such areas. As shown in Figure 2, SA-Applicant (in green) would threaten significantly more of the state wild rice crop than any system alternative.

Minnesota Pollution Control Agency

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April 4, 2014

Mr. Larry B. Hartman
Environmental Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

RE: Enbridge Sandpiper Pipeline Project - North Dakota Pipeline Company LLC
Pipeline Routing Permit Application, MPUC Docket No. PL-6668/PPL-13-474

Dear Mr. Hartman:

Thank you for the opportunity to review and comment on the Pipeline Routing Permit Application (Application) for the proposed Sandpiper Pipeline Project (the Project), prepared by Enbridge, doing business as Enbridge Pipelines (North Dakota) LLC (EPND). The Minnesota Pollution Control Agency (MPCA) has significant concerns regarding the lack of information for the proposed Project route. The supporting documentation for the preferred route does not adequately demonstrate avoidance and minimization of environmental impacts in areas where the existing conditions or resources may be vulnerable to disturbance and degradation (e.g., high quality waters and impaired waters, wetland crossings with limited access, slopes greater than five percent, areas of erodible soils and accessibility). We do note that the route avoids a calcareous fen present in the northern route; however, other sensitive areas including habitats, drinking water intakes and well head protection areas have not been identified. Additional information is needed to adequately consider alternative routes and the potential environmental effects associated with the preferred route.

Concerns also arise based on MPCA's experience with regard to pipeline construction, spills and remediation efforts, as well as Enbridge's apparent disregard of much of the information needed during the review and approval of the Alberta Clipper Crude Oil and Southern Lights Diluent Pipeline project in 2009-2010 (Alberta Clipper). The MPCA expects to receive the same level of information about this Project to enable the analysis of potential environmental impacts and the development of protective conditions in any issued permits. Due to the lack of detail provided regarding existing environmental conditions along the preferred route, MPCA cannot conclude or support the presumption that EPND has chosen the least environmentally impacting route or that the proposed actions are adequate to minimize environmental impacts that will result from the project.

MPCA's initial concerns and comments on the Application and Project include the following topics: future access to potential release sites; construction and operation of the break-out tanks; cumulative impacts from construction of additional pipelines and infrastructure in the area; emergency responsiveness and spill prevention; inspections and monitoring conducted during construction; proposed water body crossing methods and time frames; wastewater issues; and water quality, watershed and wetland issues.

ACCESS TO THE PROJECT

Obtaining access to a remote area of the Project in the event of a release to the environment is of significant concern. Numerous segments of the proposed Project route extend through large expanses of bog or open water wetland that have limited or no access under seasonal conditions. When vehicles cannot access a potential leak location under seasonal conditions, the risk of large-scale environmental damage and costly clean-up increases.

The LaSalle Creek crossing is a good example of an area in which it would be extremely difficult, if not impossible, to access downstream impacts and deploy equipment necessary to contain and clean up a spill. Large expanses of bog and some forest are located between the proposed crossing of La Salle Creek and Big La Salle Lake; consequently, there are no existing locations to access the water that could potentially be carrying leaked oil until after it has entered Big La Salle Lake. The environmental damage that would occur as a result of a leak at this location could be massive, and the obstacles to containing the leak or performing clean-up activities could be insurmountable. The MPCA strongly recommends that alternate routes around the LaSalle Creek and LaSalle Lake areas be considered. A suggested route could include constructing the Project parallel to Highway 108 located west of LaSalle Lake, extending southward along Highway 200 until Highway 200 intersects with 400th Street. At 400th Street, the Project would extend eastward until it rejoins with the proposed route.

BREAK-OUT TANKS

As you aware, the MPCA is a potential responsible governmental unit for the environmental review of projects involving the construction of hazardous material storage capacity (ref. Minn. R. 4410.4300, subp. 10(B)). Further, it is understood that the break-out tanks proposed to be constructed in Clearbrook will be addressed in the Comparative Environmental Analysis (CEA) prepared by the Department of Commerce. The assessment of impacts related to the tanks should, therefore, be evaluated to ensure adequate prevention and containment measures are incorporated into the Project design and operations, in order to prevent future releases and remediation. A secondary permeability assessment should be included in the CEA and construction and operation of the Project and break-out tanks should be completed in compliance with the Minnesota Office of Pipeline Safety and in accordance with Minnesota secondary containment standards.

CUMULATIVE IMPACTS

In addition to the Project proposal, a second effort has been proposed to upgrade Enbridge's Line 3 from Neche, North Dakota, to Superior, Wisconsin. The Great Northern Transmission power line, which will transport energy from Manitoba to Grand Rapids, is also in the planning process. These three projects, and any additional future energy infrastructure in the area, will have the potential to fragment and impact ecosystems. Under these circumstances, serious consideration should be given to an evaluation of the potential cumulative effects of past, present and future projects with respect to the disruption of the habitat and the continuity of natural, relatively undisturbed landscapes that remain in Minnesota. This could include planning of common corridors, considering risk assessment, access and the minimization of impacts while meeting the needs of electrical, natural gas and oil transmission. Past pipeline routes have followed corridors that were created when a power transmission line was put in place. While there are benefits to following an existing corridor, power lines and pipelines are different types of projects that present different potential impacts. There are points on the Project route, such as the LaSalle Creek area, where a power line crossing has a relatively low risk of harming natural resources in the event of an accident. However, a pipeline accident, such as a large drilling mud release (frac-out) or an oil leak in the same location would be devastating to the pristine natural areas downstream from the crossing site.

EMERGENCY RESPONSE/SPILL PREVENTION/REMEDIATION

The CEA should identify the locations of the shut off valves for the Project's new line and describe how these will be installed strategically to prevent and/or minimize flow or backflow of the line contents into sensitive areas in the event of a line break. Procedures and time frames for activating shut off valves should be described. The CEA should also identify the worst-case discharge for the response zones of the Project per Section 194.105 of the Department of Transportation Pipeline and Hazardous Materials Safety Administration regulations, including the worst-case volume, maximum release time in hours, shutdown response time and line drainage volume.

If EPND's contractor generates a hazardous waste from materials brought on-site (e.g., paint clean-up solvents, waste paints, etc.), then the contractor is responsible for proper waste collection, storage and disposal in accordance with all applicable regulations. Any release of the hazardous waste as a result of the improper handling, storage or disposal by the contractor in this instance is the responsibility of the contractor to rectify to the satisfaction of EPND and all applicable regulatory agencies. The CEA should address how EPND will ensure that proper responsibility is taken for hazardous waste generated.

Additionally, EPND's contractor is to report spills to the Minnesota State Duty Officer and appropriate federal, state and local agencies as soon as possible. A listing of federal, state and local agencies including reporting thresholds and timeframes is provided in Appendix G of the Application. The contractor, in coordination with EPND and the appropriate federal, state and local agencies will ensure that additional parties or agencies are properly notified and that all cleanup activities are satisfactorily completed and documented. Again, the CEA should address how EPND will ensure that this occurs.

INSPECTION AND MONITORING

EPND must ensure that workings are well-inspected for compliance and should describe how this will occur. Eventually, EPND must provide assurances that inspections will occur. The MPCA believes that construction should not take place without a third-party inspector present and on-site, and that a minimum of one third-party inspector will be required for every "spread" of construction (the spread distance will be determined in the Clean Water Act Section 401 Certification for the U.S. Army Corps of Engineers Permit). Additional spreads must be authorized in advance with additional third-party inspectors. The MPCA seeks a significant commitment to third-party inspectors from EPND and with MPCA oversight to ensure compliance with all permit conditions.

Some hydrostatic test discharges associated with Enbridge's Alberta Clipper project exceeded permitted discharge rates and caused damage to the environment, MPCA will be requiring additional, concrete assurances that discharge rates are complied with, including round-the-clock inspectors to monitor the discharges and/or additional Best Management Practices (BMPs). This may be addressed in MPCA permits for the Project which will be in development during the environmental review of the Project.

PROPOSED WATER BODY CROSSING METHODS AND TIME FRAMES

All waters of the state that may be impacted by the proposed Project need to be identified in relevant plans, as was required during construction of the Alberta Clipper project. The Application and related documents prepared for this Project (e.g., the Environmental Protection Plan dated October 13, 2013) do not contain this information, and will need to be revised accordingly.

Further, EPND is proposing to use an "open cut" method for installing the pipeline in the majority of streams and water bodies. This method was determined to be unacceptable for the previous project.

Consequently, the CEA should clearly identify that water bodies with stable banks in mineral soil and with any noticeable flow at the time of construction will be crossed using a Dry Crossing Construction method, including horizontal directional drilling (HDD), guided bore, dam and pump, or flume. Only water bodies that are dry during construction and selected water bodies, such as ditches in peat lands with no banks or impoundments, can be allowed to be crossed using an open cut and/or push pull methods.

In addition to the identification of waters (both impaired and unimpaired) that are being crossed by the proposed Project, waters downstream (and upstream in lentic waters) of the crossing points must also be identified. Identification includes the name and type of the water body, its impairment status, and the distance from the crossing point. It is imperative to MPCA's review and permitting that these features are clearly identified on maps to ensure adequate mitigation measures are in place to protect water bodies during the construction of the Project. Map features required for MPCA's review are included in Appendix A.

Many of the crossing points of the proposed Project are upstream from very high quality surface waters which must be protected or impaired waters which must be improved in order to meet water quality standards. Examples of this include the La Salle Creek crossing (less than 1,000 yards upstream of Big LaSalle Lake and also upstream from the La Salle Lake Aquatic Management Area), or Jail Lake in Crow Wing County, a lake impaired by excess nutrients. The potential impacts from an oil leak may go far beyond the water body being crossed. In many cases the proposed route threatens not only one but several lakes or rivers downstream from the proposed route.

The Twin Lakes, east of a line between Park Rapids and Hubbard, are listed as impaired by excess nutrients and mercury in fish tissue. The Twin Lakes contain significant wild rice beds and both basins are identified as wild rice lakes by the Department of Natural Resources (DNR). In addition to this, the area between the lakes and the proposed Project crossing is inaccessible by any type of equipment that would be needed for clean-up efforts and is buffered by hundreds of acres of several types of wetlands. To further compound the environmental risk of this location, the Twin Lakes empty to the Shell River, a tributary of the Crow Wing River. The MPCA strongly recommends that alternate routes around the Twin Lakes area be considered. A suggested route could include constructing the Project eastward along Highway 14 (located west of Hubbard); Highway 14 then junctions with Highway 87. Before Highway 87 junctions with Highway 6, there is a transmission line easement that runs southward, somewhat parallel to Highway 87/6. The Project could be constructed along the transmission line southward where it intersects Arbor Road, heading eastward to where it intersects Highway 6. Here, the Project could parallel Highway 6 south until it intersects the current proposed route.

In any instance where pipelines cross sensitive aquatic environments, such as those described above, an assessment of the risk of doing so, relative to other available routes, needs to be provided. Such an assessment is needed in order to understand potential impacts that may result from a leak, including costly and environmentally destructive cleanups. The connectivity of water bodies, soil types, access to potential spill sites and the potential of destruction of other critical habitat downstream of a crossing location must be the subject of more risk assessment prior to approving a proposed route. Cost or time factors to the proposer should be subordinate to the prevention of environmental destruction and the proper assessment of the risks to humans and the natural environment.

WASTEWATER, STORMWATER AND HYDROSTATIC TESTING

The CEA should clearly address the management methods and BMP's needed to ensure compliance by EPND's contractors and employees as these relate to: hydrostatic testing (especially allowable discharge exceedance/dispersal methods/discharge rates); erosion control; sediment transportation control; and, scouring control at sites/results from hydrostatic/trench dewatering discharges activities.

For handling erosion and sediment, stabilization of a spread should be conducted within two days. Additionally, the CEA should clearly describe the roles for EPND and its contractors so that it is clearly understood who has the responsibility for what permit requirements out in the field.

Hydrostatic testing needs to be conducted after the pipeline is moved and in place in the trench. It may be necessary to construct temporary sediment basins to reduce flows prior to discharging hydrostatic test water into wetlands or lakes. During the Alberta Clipper project, flows directed overland near steep slopes, even when the straw bale dewatering device was in use, occasionally caused serious erosion, particularly when the sites had steep slopes nearby or significant disturbed soils.

The appropriation of large amounts of water from under the ice of smaller lakes can be dangerous. Appropriation of several million gallons of water from a small lake can drop water levels below the ice by an inch or more, thus creating conditions that may be unsafe for human activity. Hydrostatic testing of pipes, when appropriating from smaller lakes, should be done in ice-out conditions if possible.

WATER QUALITY, WETLANDS, AND WATERSHEDS

Controlling potential environmental issues in or near wetlands and in water bodies is another important area. Additional precautions may need to be taken in these areas. The Project will need various water permits from the MPCA. Impacts authorized under a U.S. Army Corps of Engineers Section 404 permit will need a Section 401 Certification from the MPCA. An Individual NPDES Construction Stormwater (CSW) permit will also be needed. To facilitate the MPCA's review and development of these certifications and permits, the CEA will need to provide certain information as described below.

Frac-Out Consideration, Discharges and Spill Control

Areas where soils covering pipelines are largely peat or silt are much more likely to experience frac-outs during HDD activities, or allow oil discharges from leaks to reach the surface and spread. If an oil release were to occur, clean-up would be extremely challenging (if not impossible). This may result in "in situ" burning, as was conducted near Cohasset, Minnesota in 2002. Burning, of course, may entail significant environmental impacts of its own.

The CEA should provide any available information about soil types and the history of past frac-outs along the route, as frac-outs are likely to re-occur. This information will allow the MPCA to determine if there are areas along the route that are of high concern for frac-outs, requiring the certification to restrict or eliminate the use of drilling mud additives where frac-out contamination of the water body is more likely.

The CEA should describe how initial containment of frac-outs will be conducted, for instance, by having containment booms on site that are easily accessible and located in close proximity to water bodies. In addition, it should describe the actions to be taken to safely navigate the water in difficult locations, such as a peat bog, where access to parts of the water body is not available.

On past pipeline projects, workers have endangered themselves attempting to wade out into peat bogs or very silty wetlands to isolate frac-outs in the water body. Effective and safe ways of traversing the system, such as a barge, need to be in place.

It should also be described in the CEA how EPND plans to minimize the potential for frac-outs discharging drilling mud into sensitive resource areas, such as water bodies crossed via the HDD construction methods, and areas immediately adjacent to wetlands and water bodies. In past projects, specific conditions to prevent these discharges have included:

- A Drilling Mud Containment, Response and Notification Plan. EPND should describe the site-specific locations relative to the water bodies that will be crossed, where all equipment and supplies (e.g., silt/turbidity curtains, boats, etc.) will be stored and ready for immediate deployment prior to commencing any HDD activities. At a minimum, the plan must contain: I) maps showing the specific locations with sufficient access to each water body; 2) supporting text detailing how EPND will transport equipment, supplies and adequate staff to each location prior to starting the HDD crossing; and, 3) a Flocculent Use Contingency Plan, which identifies specific products and the methodology to be used, if necessary, to contain a drilling mud release.
- Requirements that if containment and cleanup equipment is deployed, sediment and/or bentonite collected by the silt/turbidity curtains shall be carefully removed and disposed of in an upland disposal location in compliance with all applicable rules and regulations.
- Each spread team is trained in spill response, containment and clean-up, and the required response equipment will be available at the location of the HDD with the spread team on-site.
- Other requirements for containment and recovery measures include adjusting drill pressures, pump volume rates and drill profiles to minimize the release, and suspending drilling operations if containment measures do not effectively control the release.

Certain specific conditions will likely need to be developed for spills that occur near or into a wetland or water body. EPND needs to provide information as to how they can ensure that wetlands and water bodies are protected in the case of spill. Example conditions include:

- If a spill occurs during refueling operations, the operation needs to be stopped until the spill can be controlled and the situation corrected.
- Use of sorbent booms and pads to contain and recover released materials in standing water.
- If necessary, for large spills in water bodies, the use of an Emergency Response Contractor to further contain and clean up the spill will be required.
- Excavation of contaminated soils in wetlands may be necessary, depending on the severity of the release. Excavated soils will need to be placed temporarily on plastic sheeting in a bermed area and covered with plastic sheeting, and secured. This should be conducted a minimum distance of 100 feet away from the wetland.

It should be explained in the CEA how EPND should meet these conditions or other effective procedures that would be used in these situations. Procedures for evaluating and consulting on options for wetland and water body spill response should be described.

Concrete wash water, grindings and slurry, must not be discharged to wetlands, water bodies, and storm sewer systems or allowed to drain onto adjacent properties. Methods should be described by which EPND will ensure that there is no discharge of these materials.

This could include limiting disposal to a defined area of the site within a lined containment area sufficient to contain the wash water and residual cement, and ensuring that contractors hired to provide concrete products will provide equipment capable of reclaiming wash water during wash out. Concrete slurry must be contained in a lined pit, washout container or other device.

Stabilization and Erosion Control

The CEA should also discuss the measures that will be taken to protect soil and soil erosion, including how EPND will prevent unforeseen weather events from possibly causing significant erosion and potential discharges to water bodies. This could include performing the authorized work in spreads, and limiting the amount of excavated open trench within a spread to no more than two days of anticipated welding production. EPND will also need to describe how each spread will be restored (backfilled and BMPs in place) as the leading edge of the spread is opened and the work progresses.

Other measures to protect soil and soil erosion that should be discussed in the CEA include how EPND will segregate topsoil from subsoil in a manner that will prevent mixing when:

- constructing the Project in cropland, hay fields, pasture, residential areas and other areas as requested by the landowner where soil productivity is an important consideration;
- to the extent practicable in forested areas, standing water wetlands, and non-agricultural open areas with steep slopes adjacent to wetlands and water bodies; and,
- in wetland areas without standing water.

The CEA should also address how the soil and reserved topsoil will be replaced to the trench during backfilling.

The CEA also needs to describe how EPND will address areas of unusually steep slopes along the Project's proposed construction route that are adjacent to waters of the state, and measures that will be used to prevent topsoil erosion and loss after construction. Measures should include those taken when cutting into parent material (as defined in Figures 1, 2, 3 in the Environmental Protection Plan) for trenching, construction of the level work area or any other such cutting on the hillsides, and during backfilling. Options include removing the topsoil and storing it separately from the underlying subsoil and then replacing it in the trench in the opposite order removed. Measures should also be included for areas where there is not sufficient top soil separation for vegetation to be re-established, such as supplying suitable topsoil to ensure rapid re-vegetation and slope stabilization occurs in these sensitive areas.

The CEA should describe how EPND will implement and ensure compliance with intended requirements in the Individual NPDES CSW permit. This would include, but not be limited to:

- As a general rule, use of straw bales for sediment control should only be used in mucky, wetland soils. When used in upland situations, straw bales are as likely to increase soil erosion and transport, by increasing flow velocities in gaps between or outside of the bales as they are to decrease it.
- Remedying sediment-buried silt fences; removal of sediment from silt fences will not suffice. Once the silt fence has been plugged with excess sediment, it will no longer function properly and should be replaced with a new layer of silt fence.
- Stabilization procedures within 24 hours of ceasing construction in an area if the earth moving activity is expected to cease for at least 14 days. On a pipeline project, this should be easy to predict and stabilization procedures should begin almost immediately after the pipeline trench has been backfilled.

- On steep slopes, or slopes draining to surface waters (ditches, wetlands, streams, lakes), ditch checks should be installed over backfilled pipe trenches that were opened and closed during frozen soil conditions, as subsidence of thawing soils (frozen soils backfill in chunks) will create stormwater and snowmelt conveyances that could impact surface waters. Preparation for this phenomenon would include treating those backfilled trenches as ditches before they become ditches.
- Mulch or other erosion control will be required on all exposed upland soils, regardless of slope. Seeding in and of itself is not considered stabilization. Hydromulch with liquid tackifier or hydraulic soil stabilizers are preferred to standard mulch on steeper slopes or prior to snowfall, as mulch will not be effective throughout the winter in most conditions.
- Straw bales should not be used as slope breakers or as sediment control on upland slopes. Straw mulch should be applied at a minimum rate of two tons per acre, but ground coverage for straw mulch to be effective should be at least 90 percent, not 75 percent. Stabilized earthen berms have worked well in the past, although biologs or wattles may be effective in some areas. Gaps between spoil piles must be stabilized with blankets or other effective erosion control.
- Additional information is required as to the composition and manufacturer's recommendation on the foam pillows.
- Clean construction mats that are used by heavy equipment to enter streams are unlikely to remain clean for long. If mats or temporary bridges are used, it will be necessary to install some type of sediment control, such as triangular silt dikes, along each edge of the bridge or mat to ensure that sediment stays on the bridge or mat until the work is complete. At that time, the sediment may be removed by whatever means are necessary to keep it out of the receiving waters.
- Vegetation used to restore stream banks should be similar in species composition to the vegetation growing on the site prior to disturbance.

Subsidence of Soils Due to Winter Construction

A considerable amount of the excavation work that EPND will perform will occur during frozen soil conditions. When these frozen chunks of soil are excavated and then replaced over the trench, large gaps of air are included with the soils. During spring thaw, the ice in these soils melt and "subsidence" occurs; the soils sinks over the trench area, often forming what is essentially a ditch. On slopes that drain to surface water, these ditches act as conveyances which accelerate movement of water and sediment transport toward the water bodies. To prevent this, all trenches that are excavated during frozen soil conditions, and that drain toward surface waters (wetlands, streams, lakes, ditches), must have ditch checks installed as the trenches are buried. These can be in the form of triangular silt dikes, biorolls, silt fence, rock checks, or subterranean rocks, but some type of ditch checks must be installed, with spacing dependent on the degree of slope, in anticipation of subsidence in the spring.

Wetland Mitigation

The CEA should describe the compensatory mitigation that EPND will provide for the permanent loss of waters and wetlands.

CONCLUSION

The MPCA is aware that Enbridge has not fully complied with applicable water quality rules and regulations when constructing or expanding pipelines. The Alberta Clipper project brought about enforcement action to settle federal allegations that the project resulted in fifteen instances of illegal discharges into Minnesota wetlands and rivers while testing two of the newly constructed pipelines. The discharge of test water from a 36-inch pipeline at a site just north of Bemidji eroded a hillside and created a gully 50 to 60 feet long, 15 feet wide and 10 feet deep, leaving up to a foot of sediment in a wetland and sending rust-colored water into the Mississippi River. In view of this history, it will be necessary to provide additional assurances to the MPCA concerning the additional efforts and resources which will be employed to ensure this Project will not result in similar non-compliance.

We anticipate additional comments as the development of future project-related documents, such as the Draft CEA, unfolds. Comments provided in this letter are intended to be addressed and incorporated into the Draft CEA.

We look forward to assisting the Department of Commerce, as desired, during the preparation of the CEA for this project and its subsequent review upon its release. Through this process, the MPCA seeks to obtain further additional information to facilitate the MPCA staff review of the Project, well in advance of the time a favorable determination on the required MPCA authorizations is needed to commence construction. Ultimately, it is the responsibility of EPND to secure any required permits and to comply with any requisite permit conditions. If you have any questions, please contact me at 651-757-2465.

Sincerely,

Chuck Peterson

Patrice Jensen
Planner Principal
Environmental Review

PJ:ld

cc: Jamie Schrenzel, DNR
Desiree Morningstar, U.S. Army Corps of Engineers
Reed Larson, MPCA
Bill Sierks, MPCA
Steve Lee, MPCA
Catherine Neuschler, MPCA
Craig Affeldt, MPCA

APPENDIX A
MAP REQUIREMENTS
Enbridge Sandpiper Pipeline Project - North Dakota Pipeline Company LLC
Pipeline Routing Permit Application, MPUC Docket No. PL-6668/PPL-13-474

MPCA is requesting that an aerial map book of the Project in Minnesota be prepared that contains the following features:

- locations of all water bodies (including wetlands) proposed to be crossed by the Project
- identification of all delineated wetland types and locations at or near the Project route
- precise mile post locations of all water body crossings by the Project
- Department of Natural Resources public water status of water bodies crossed by the Project
- proposed crossing methods of all water bodies, with alternative proposed crossing methods by the Project
- date restrictions when construction will not allowed
- depiction and identification of environmentally sensitive areas crossed by the Project
- depiction of all existing access roads and proposed to be constructed access roads in the Project area
- width and bank height of streams or rivers being crossed by the Project
- water bodies within 1 mile downstream of the proposed stream/river/wetland crossings of the Project and the distances to these waters
- impairment status of water bodies downstream of the Project crossings
- Special Waters (ORVW) within 1 mile downstream of the Project crossings
- soil erodibility along the Project route weighted by slope

Minnesota Pollution Control Agency

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May 12, 2015

Mr. Scott Ek
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

Re: In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need and a Pipeline Routing Permit for the Line 3 Pipeline Replacement Project in Minnesota
PUC Docket No. PL-9/CN-14-916 (Certificate of Need)
PL-9/PPL-15-137 (Pipeline Routing Permit)

Dear Mr. Ek:

The Minnesota Pollution Control Agency (MPCA) offers these comments on the Certificate of Need (CON) application and the Pipeline Routing Permit application filed by the Enbridge Energy, Limited Partnership (Enbridge) in these dockets ("Line 3 Replacement" project).

The Minnesota Public Utilities Commission (PUC) has requested comments on three topics concerning the completeness of the Enbridge Line 3 Replacement applications:

1. Does the CON application contain the information required under Minn. R. 7853.0220 to 7853.0260 and Minn. R. 7853.0500 to 7853.0640?
2. Does the pipeline route permit application contain the information required under Minn. R. 7852.2100 to 7852.3100?
3. Are there any contested issues of fact with respect to the representations made in the applications?

The MPCA understands that Enbridge's preferred route is proposed to co-locate the Line 3 Replacement on the same route as its proposed Sandpiper pipeline project. Although the MPCA's environmental concerns with the Sandpiper project are known, it must be noted here that the discussion of alternatives in the Line 3 Replacement applications does not address those concerns or consider any system or route alternatives that were brought forward in the Sandpiper proceedings. Nor do the applications appear to provide adequate basis for selection of a southern route alternative over a northern route alternative, such as rebuilding of the Line 3 Replacement in its current location.

The MPCA contests both the adequacy of the environmental analysis and the lack of consideration of reasonable alternatives in the applications. [1]

Failure to address alternatives and evaluate environmental impacts. Enbridge intends to locate the Line 3 Replacement pipeline adjacent to the Sandpiper pipeline between Clearbrook and Superior. The MPCA has filed comments raising environmental concerns with this route in the Sandpiper dockets (see Dockets 13-473 and 13-474). Since the Line 3 Replacement project follows the same proposed route, it raises substantially the same concerns that the MPCA expressed in Sandpiper, but the applications do not address those concerns.

It does not appear that Enbridge evaluated any system alternatives or route alternatives that have been included in the Sandpiper docket. Sandpiper System Alternative 3 and System Alternative 3 Modified (a route alternative included by the Commission in the Sandpiper route proceeding) are given minimal to no consideration.[2] Despite Enbridge's awareness of the significant environmental concerns expressed by state agencies and interested parties in the Sandpiper proceedings, and the alternatives offered in those dockets, the Line 3 Replacement applications do not address these alternatives.

The applications discuss three options, the preferred route and two alternatives involving replacement along or parallel to the existing Line 3, i.e., rebuilding Line 3 in place. However, the applications do not adequately discuss the alternatives for rebuilding Line 3 in place or the resulting impacts to environmental values of all three options. The applications also do not provide sufficient information for comparison and informed consideration of the options.

Need for comprehensive environmental analysis of cumulative environmental effects. The proposal to place Line 3 next to Sandpiper increases the potential to impact some of Minnesota's most pristine natural resources. The Commission has authority and responsibility under the Minnesota Environmental Policy Act, Minn. Stat. ch. 116D, to make a detailed evaluation of the potentially significant environmental effects, including cumulative potential effects, alternatives, and measures that would avoid or mitigate the potential environmental harm from this project. The possibility of simultaneous construction is not addressed, nor is the effect of continuous construction of two pipelines over extended construction seasons.

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[1] The MPCA comments are generally directed to: the adequacy of Enbridge's CON application under Minn. R. 7853.0250.A (relating to the socially beneficial uses of the output of the project, including "its uses to protect or enhance environmental quality"); Rule 7853.0540 Alternatives; Rule 7853.0600 Information Required (environmental data); Rule 7853.0630, subp. 3 and 4 (safeguards); Rule 7852.2600, (route alternatives and description of environment); Rule 7852.2700 (environmental impact of preferred route); Rule 7852.3100 (consideration of alternative routes); and the sufficiency of the application for purposes of a detailed evaluation of the potentially significant environmental effects under the Minnesota Environmental Policy Act, Minn. Stat. Ch. 116D.

[2] The MPCA and MDNR have provided extensive environmental information on SA-3M as an alternative to the Applicant's route. (See MPCA's Oct. 29, 2014 comment identifying a specific route for SA-3M, and MDNR's Jan. 23, 2014 comment letter).

Section 7.1.3 of the route application (Impact Calculations) states that calculations are based on an assumption that the Sandpiper pipeline will be constructed first. Timing of the construction of both projects is important. Construction of both lines could begin in 2016, yet the possibility and consequences of simultaneous construction are not addressed. Construction of the two projects in the same corridor may well result in greater impacts to surrounding terrain and water bodies than would occur if one project were built after another, because staging, spoils placement, and work space could not fully use the corridor. The discussion of project impacts should address the potential of concurrent construction impacts and the effects of extended construction of two projects in the same corridor on human, natural and environmental resources. The absence of that analysis in this section contributes to an inadequate analysis of likely site conditions and of the anticipated construction activity sequence.

Response on spill analysis. The applications do not have a sufficiently detailed analysis of the effects of a potentially catastrophic failure. In the introduction to section 7.0 of the route application, addressing the environmental impact of the preferred route, Enbridge makes the following statement:

> The Minnesota Pollution Control Agency (MPCA) and Minnesota Department of Natural Resources (MNDNR) have expressed concern with regard to the potential impacts of a catastrophic oil spill from the Project on environmental resources. An overall incident frequency was developed for the Keystone XL Project[3], which is also designed of x70 steel pipe. Based on these statistics, it is highly unlikely that a spill or leak will occur along any given small section of the pipeline. Therefore potential impacts from a theoretical oil release are not identified in Section 7.0 due to the extremely low frequency and many assumptions that would first be necessary to adequately quantify how a leak would affect the environment. Enbridge will continue to work with the applicable agencies regarding leak prevention measures and emergency response.

While the MPCA agrees that it may be unlikely for a spill to occur at "any given small section of the pipeline," the applications do not adequately discuss potential environmental impacts such as what would occur to surface water, drinking water, human health, terrestrial wildlife, aquatic wildlife, vegetation, soils, and other resources in the event of a spill, as required by Rule 7852.2700. It is reasonable to anticipate that a leak or spill will occur at some point during the operational life of the pipeline. The applications should address the potential impacts that a significant spill would have on the various types of terrain and aquatic resources along the project route.

To summarize, the MPCA believes that information minimally necessary for any meaningful assessment and comparison of potential environmental impacts under the criteria of PUC rules and MEPA are missing from Enbridge's current applications.

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[3] The MPCA notes that the Executive Summary of the Final Supplemental Environmental Impact Statement for the Keystone XL project (Page 30), states that the risk of spills and leaks represents the "greatest potential threat to water and aquatic resources."

Thank you for consideration of these comments.

Sincerely,

William Sierks, Manager
Environment & Energy Section
Resource Management & Assistance Division

WS:bt

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June 24, 2014

Mr. Larry B. Hartman
Environmental Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

RE: Enbridge Sandpiper Pipeline Project - North Dakota Pipeline Company LLC
Pipeline Routing Permit Application, MPUC Docket No. PL-6668/PPL-13-474
Replacement May 30, 2014 Letter with Maps

Dear Mr. Hartman:

On April 14, 2014, the Minnesota Public Utilities Commission (PUC) extended the comment period in the matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project (Sandpiper) in Minnesota. This letter appends the Minnesota Pollution Control Agency (MPCA) letter on this subject, which was submitted to you on April 4, 2014.

We understand the topics open for comment include alternate routes, human and environmental impacts to be studied in the Comparative Environmental Analysis (CEA), and whether any specific methods or mitigation exist to address these impacts that should be studied in the CEA. MPCA's additional comments on these topics include:

- Inspection and monitoring
- Additional items for evaluation in the CEA
- Watershed Restoration and Protection Strategy
- Carbon footprint
- Environmental justice
- Alternate route analysis
- Cumulative impacts

Inspection and Monitoring

On April 16, 2014, Enbridge, doing business as North Dakota Pipeline Company LLC, submitted a proposal to the MPCA regarding independent/third-party environmental monitors for the proposed Sandpiper project. MPCA does not agree that Enbridge should be hiring and directing these inspectors/monitors, but rather that they report directly to a state agency with jurisdiction over the project. The MPCA requests that the PUC require that another agency directly hire independent inspection and monitoring contractors and/or temporary staff to conduct this work under MPCA oversight to be funded by Enbridge.

The structure, work plan, and cost of a monitoring and inspection plan should be determined while the CEA is being prepared. The MPCA and Minnesota Department of Natural Resources (MDNR) staff, who have been working collaboratively on the Sandpiper project, are willing to participate with Enbridge and

participating agencies to develop the appropriate information and mechanism. The mechanisms for this would be worked out among the parties. The payment of the state's reasonable costs should be a provision of the PUC's route permit issued to Enbridge.

Additional Items for Evaluation in the CEA

The MPCA requests that Enbridge complete a Phase I Environmental Assessment (Phase I) of the selected pipeline construction corridor in accordance with the All Appropriate Inquiry (AAI) standard as per the National Environmental Policy Act (NEPA), Title 40, Code of Federal Regulations Part 312. The Phase I is conducted to research and review potential locations of existing/historic dumps, hazardous waste sites, and other environmental concerns. If areas of environmental concern are identified in association with construction of the pipeline, Enbridge should be required to prepare work plans to describe how solid/hazardous waste/contaminated soil and groundwater will be investigated prior to construction, and how impacted areas will be dealt with in accordance with state and local regulations.

MPCA requests that the CEA include a detailed risk assessment regarding the potential for leaks to occur, how much oil might be released, and how this could affect groundwater, surface water, aquatic life, and others. The hydrogeology of the pipeline corridor area should be studied to determine potential fate and transport of a release, and potential vapor intrusion issues if a release occurs in close proximity to human habitation.

Watershed Restoration and Protection Strategy

In 2006, the Minnesota Legislature passed the Clean Water Legacy Act, which required the MPCA to develop an approach to comprehensively monitor and assess the waters of the state every 10 years, and provided one-time funding for that effort. In order to provide long term, consistent funding for Minnesota's clean water efforts, on November 4, 2008, Minnesota's voters passed the Clean Water Land and Legacy Amendment (Legacy Amendment) to the Minnesota Constitution to, in part, protect and restore lakes, rivers, streams, and groundwater. The Amendment imposed three-eighths of one percent sales tax to fund the effort for 25 years. Subsequently, in 2013, the Clean Water Accountability Act was passed by the Minnesota Legislature. This new law requires the MPCA to develop watershed restoration and protection strategies (WRAPS) for each of the state's 81 major watershed units, which correspond to the 8-digit hydrologic unit codes (HUCs). WRAPS include the monitoring and assessment information, as well as land use-based models that demonstrate the source of the highest contributors of pollutants in each watershed. This information is then used to develop strategies to either protect waters that meet water quality standards or restore waters that do not meet standards.

The WRAPS is a collaborative effort that involves the MPCA, the MDNR, the Board of Water and Soil Resources, the Department of Health, the Department of Agriculture, local soil and water conservation districts, watershed districts, the University of Minnesota, industry and business organizations, and the private citizens of Minnesota. WRAPS components are: monitoring and assessment of hydrology and the chemical and biological constituents of water quality, a stressor identification process, total maximum daily loads (TMDLs) and restoration plans for impaired waters, protection strategies for waters that currently meet standards, and a civic engagement process to assist stakeholders with implementing protection and restoration strategies.

While not yet completed, WRAPS are in process in the following major watersheds that the Sandpiper proposal will cross, also identified by the corresponding eight-digit HUCs:

- Grand Marais Creek HUC 09020306
- Red Lake River HUC 09020303
- Clearwater River HUC 09020305
- Mississippi – Headwaters HUC 07010101
- Crow Wing River HUC 07010106
- Pine River HUC 07010105
- Mississippi – Grand Rapids HUC 07010103
- Kettle River HUC 07030003
- St. Louis River HUC 04010201
- Nemadji River HUC 04010301

One of the first tenets of any protection strategy is to avoid impacts where possible. The Sandpiper proposal is not consistent with the protection strategies that are currently in development for these WRAPS, due to the large number of high quality surface waters that lie along the path of the proposed route. Enbridge should participate in stakeholder groups for these WRAPS. Stakeholder groups provide a forum for engaged citizens and interested groups to develop implementation strategies to restore and protect each watershed. The CEA should review and consider how to integrate the strategies into the proposal, or find alternate routes that have less potential for impacting surface and groundwater.

Carbon Footprint – Greenhouse Gas Emissions

The MPCA is concerned about the carbon footprint of a project. The Minnesota Legislature established greenhouse gas (GHG) reduction goals in the Next Generation Energy Act (Minn. Stat. 216H.02). The goals of the Next Generation Energy Act are to reduce greenhouse gas emissions by 15 percent below 2005 levels by 2015, and 80 percent by 2050. Greenhouse gases, upon release to the atmosphere, warm the atmosphere and surface of the planet, and lead to alterations in the earth's climate. The GHG emissions measured and reported in Minnesota include carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), sulfur hexafluoride (SF_6), and two classes of compounds known collectively as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). These GHG emissions result from fuel combustion, the calcination of limestone, the degradation of organic (peats) and mineral soils, permanent land clearing and forest harvesting, and a variety of other sources. Pertaining to this project, source types include stationary and mobile source combustion from construction equipment, emissions from venting, and wetland and forest disruptions.

To track progress with the Next Generation Energy Act reduction goals, the CEA should evaluate the GHG emissions from the project and the impact these emissions may have on the attainment of the state's GHG reduction goals. Alternatives and options to reduce GHG emissions or to offset/mitigate GHG emissions should also be identified in the CEA. In addition, the CEA should evaluate the GHG impacts if this project is not built – specifically, if oil is transported by rail or truck instead of by pipeline.

Environmental Justice

The MPCA works to incorporate environmental justice principles into its projects. Environmental Justice (EJ) involves assuring the fair treatment and meaningful involvement of all persons, regardless of race or income when making environmental decisions. Fair treatment means that no group of people should

bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies. Meaningful involvement means: people have an opportunity to participate in decisions about activities that may affect their health and the environment in which they live; the public's contribution can influence the regulatory agency's decision; their concerns will be considered in the decision making process; and, decision makers seek out and facilitate the involvement of those potentially affected.

The proposed route of the Sandpiper Pipeline and other alternate routes may directly affect low income and minority populations. If a pipeline leak or break occurs, adverse impacts could occur in both surface and subsurface drinking water supplies, areas with stands of wild rice important to local Tribes and tribal members, cropland areas, impaired waters, and wildlife management areas among other types of environmental, social and economic impacts. If the Northern route or other alternate routes are chosen, the Sandpiper Pipeline may affect tribal lands.

The CEA should include consideration of EJ issues. The CEA should look at how pipeline construction and operation, and potential problems during each of these phases, may cause disproportionate impacts on low-income or minority populations. In addition, local, state, and federal agencies should engage residents to assure that they are aware of opportunities to participate in the process and understand how their comments and concerns are incorporated into the final draft CEA.

Alternate Route Analysis

The MPCA staff's analysis of the proposed Sandpiper route shows many water body crossings for which there would be very difficult or no access downstream of the crossing to clean up spills in the event of a crude oil release. The lack of possible access to these areas by people and equipment necessary to clean up spills increases the likelihood that an incident could result in significant long-term environmental damage. A failure to account for these possibilities is considered to be a substantial flaw with the currently proposed Sandpiper route.

There are many variables that could be examined when considering the potential for environmental damage in the event of a release. These include: soil types, wetland types, sensitive or endangered species, proximity to aquifers, hydrology, forest types, state park boundaries, proximity to human populations, proximity to areas with stands of wild rice, connectivity of surface waters, and others. However, for purposes of providing a simpler and effective comparison between alternative route proposals that is both visual and quantifiable (within certain limitations that will be discussed in this letter), MPCA staff has elected to compare the routes based on access to potential leak sites for purposes of containment of spills and possible clean up.

To minimize variables and subjectivity for this analysis, MPCA staff opted to identify, using ArcGIS technology, water body crossings that had neither road or traversable upland features within 250 feet of flowages of water (heavily forested areas are not considered for this purpose to be traversable, as trees would have to be removed before equipment could be brought in), or portions of larger wetland complexes that fell within a 2,000 foot buffer of the point where the proposed pipeline route was to cross a stream, lake, or wetland. The 250-foot distance from access point to flowage is somewhat arbitrary. MPCA staff conferred with contractors and engineers who specialize in road construction, and most felt that in a best-case scenario, with aggregate and equipment available, a 250-foot road into a bog or wetland would be constructed within 24 hours. Thus, for purposes of this analysis ,MPCA staff

assumed that it is possible to build an access road to reach areas where containment of a spill might be accomplished before the spilled product covers an area large enough that cleanup would be highly destructive to a sensitive environment, or impossible. Similarly, there is no regulatory basis for choosing the 2,000 foot buffer distance, other than it is a significant distance for oil impacts to occur over any surface water and easy to apply consistently statewide. It is a distance that for most people would be easy to visualize, yet small enough to create a fair comparison between routes. These numbers provide a basis for comparisons between routes and have little significance beyond that. However, if these criteria are used consistently for all proposed routes, it does provide a basis to compare the potential for each route to cause considerable environmental damage in the event of a release.

There are some factors to consider that fall beyond the scope of this comparison. For example, the water crossings proposed for the Sandpiper route are frequently streams or flowages with connectivity to other water bodies downstream. By contrast, water body crossings on the Northern route frequently involve very large wetland complexes rather than smaller, faster moving flowages. The area needed to access might be much greater, but the oil may move more slowly in such areas. Counting becomes a bit more difficult here as well, because it is difficult to establish criteria for counting "crossings" that is comparable to the different features observed in the Sandpiper route. In most cases, MDNR catchment flow lines were used to distinguish one crossing point from another.

In any case, the method used as a basis for comparison by MPCA staff does provide quantifiable data to analyze the proposed routes from a meaningful perspective: Which route proposals pose the greatest risk to create destructive and expensive containment and cleanup operations in the event of a spill?

MPCA staff compared four proposed routes in their entirety (see Figure A below). The four proposed routes that were compared were (1) The currently proposed Sandpiper route; (2) The "Northern" route, used by Enbridge for previous projects and which has been suggested as an alternative by other entities; (3) The "Alternative 3" route which was identified as a possible alternative by MPCA staff; and (4) The southern "Alternative 4" route which exits the state at the Iowa border and would be required to tie into the Enbridge infrastructure either in another state, or to circle around outside of Minnesota to end at the Superior Terminal. The fourth route was suggested as an alternative by a citizen group.

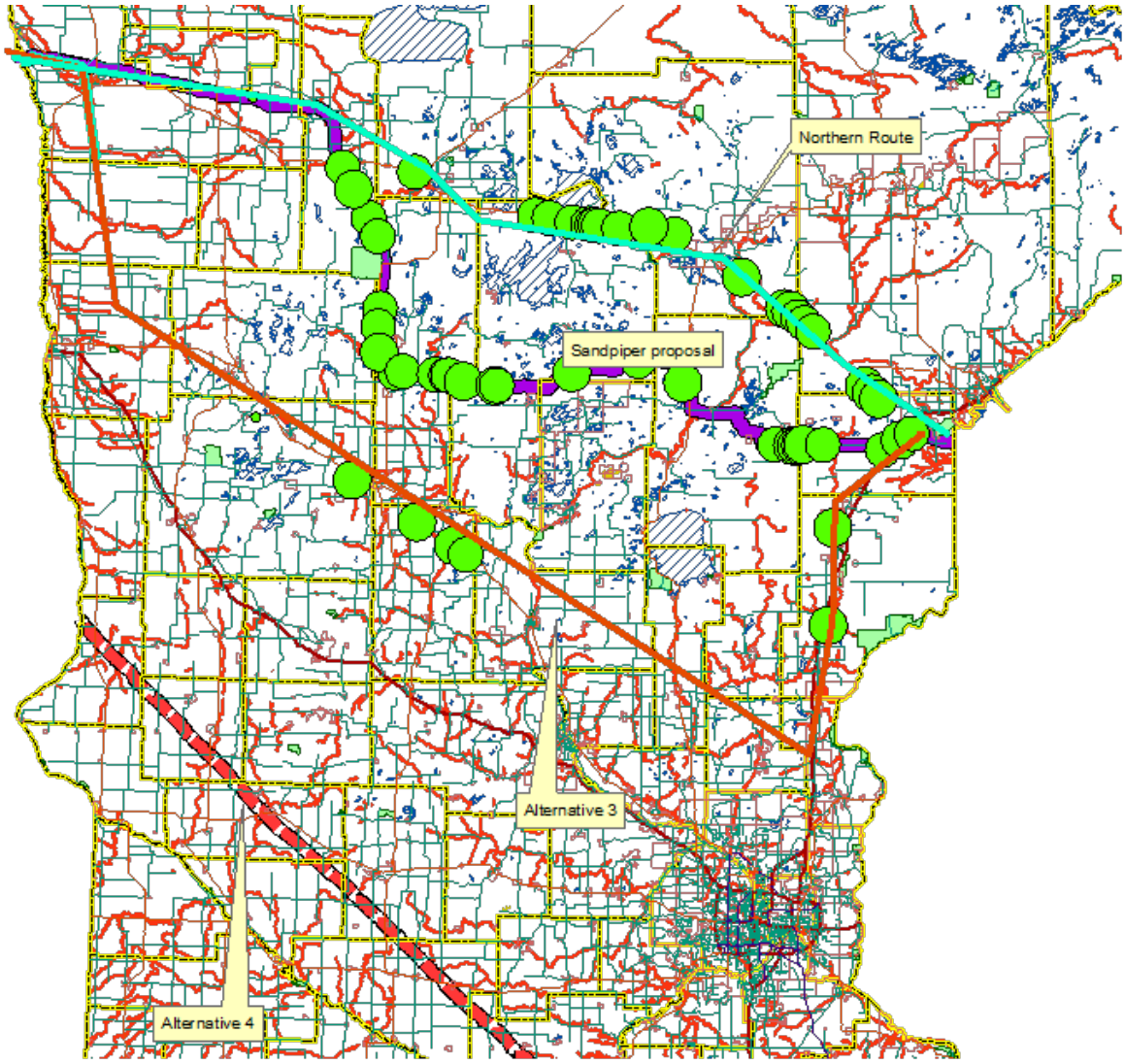

Figure A-The green circles mark points where MPCA staff have identified access concerns. Approximate locations of the four primarily examined proposals are also identified.

Any water body crossing, especially streams, rivers, or flowages of any kind that can carry oil downstream, pose the risk of creating large scale environmental damage in the event of a release. If possible, it is best to avoid crossing surface waters altogether with oil pipelines in order to minimize this risk. However, if a water body, bog or otherwise sensitive area is to be crossed, then serious consideration should be given to whether the site can be accessed quickly in the event of a release to contain the product, minimize migration of product into surface waters, soils and groundwater, and perform clean-up operations. In situations where roads have to be constructed to access a spill, the act of constructing the road, excavating and clearing vegetation can all exacerbate the damage that the spill itself created. Additionally, placement of flow control valves in strategic locations along/near sensitive areas may help to minimize backflow of product out of a fractured line into those areas.

A difficulty with aerial photograph analysis as opposed to field surveying of water crossings is that it is difficult to determine whether a stream or wetland is permanently, seasonally, or intermittently flooded. MPCA staff relied on National Wetland Inventory maps to identify wetland types, which will to

some extent help to determine the likelihood of the wetland having open water at the time of a leak, which would allow transport of released oil to occur more quickly, or merely be in a state of saturated soil, which would result in easier and faster containment and cleanup of a spill. The results of the MPCA staff analysis are as follows:

Sandpiper Route

The proposed Sandpiper route crosses 28 water bodies for which there is no access for possible containment within 2,000 linear feet downstream of the proposed pipe crossing. Of these 28 water body crossings, one is a stream to lake system, 12 are wetland complexes, 10 are streams that flow to wetland systems, and five are streams that flow to areas with stands of wild rice. Below is a list of the water body crossings for this route option, followed by example Figures B and C:

NAME of ROUTE	TOWNSHIP NAME	LOCATION (TWP/RNG/SEC)	LOCATION of AREA
Sandpiper Route	Mahtowa	T47 R18W S8	Moose Horn River
Sandpiper Route	Salo	T47 R22W S1	Headwaters Sandy River
Sandpiper Route	Salo	T47 R22W S2	Headwaters Sandy River
Sandpiper Route	Automba	T47 R21W S6	West Branch River
Sandpiper Route	Salo	T47 R22W S6	Headwaters Sandy River
Sandpiper Route	Automba	T47 R21W S6	West Branch River
Sandpiper Route	Automba	T47 R21W S1	Heikkila Creek-Kettle River
Sandpiper Route	Atkinson	T48 R18W S36	Blackhoof River
Sandpiper Route	Copley	T147 R37W S34	Walker Brook
Sandpiper Route	Moose Creek	T146 R36W S29	Upper Rice Lake-Wild Rice River
Sandpiper Route	Bull Moose	T138 R31W S12	Headwaters South Fork Pine River
Sandpiper Route	Bull Moose	T138 R31W S11	Headwaters South Fork Pine River
Sandpiper Route	Bull Moose	T138 R31W S11	Headwaters South Fork Pine River
Sandpiper Route	Arago	T141 R35W S17	Hay Creek
Sandpiper Route	Northwest Aitkin	T50 R26W S22	White Elk Creek
Sandpiper Route	McKinley	T138 R32W S3	Goose Lake-Big Swamp Creek
Sandpiper Route	McKinley	T138 R32W S4	Goose Lake-Big Swamp Creek
Sandpiper Route	Crow Wing Lake	T139 R33W S36	Burgen Lake
Sandpiper Route	Crow Wing Lake	T139 R33W S36	Burgen Lake
Sandpiper Route	Crow Wing Lake	T139 R33W S33	Town of Huntersville-Crow Wing River
Sandpiper Route	Straight River	T139 R35W S36	Blueberry Lake-Shell River
Sandpiper Route	Blind Lake	T139 R28W S26	Arrowhead Lake
Sandpiper Route	Hubbard	T139 R34W S31	Shell River
Sandpiper Route	Beulah	T139 R25W S9	Moose River
Sandpiper Route	Straight River	T139 R35W S6	Straight River
Sandpiper Route	Bear Creek	T145 R36W S35	Gill Lake-Mississippi River
Sandpiper Route	Todd	T140 R35W S6	Fishhook Lake
Sandpiper Route	Lake Hattie	T144 R35W S19	LaSalle Lake-Mississippi River

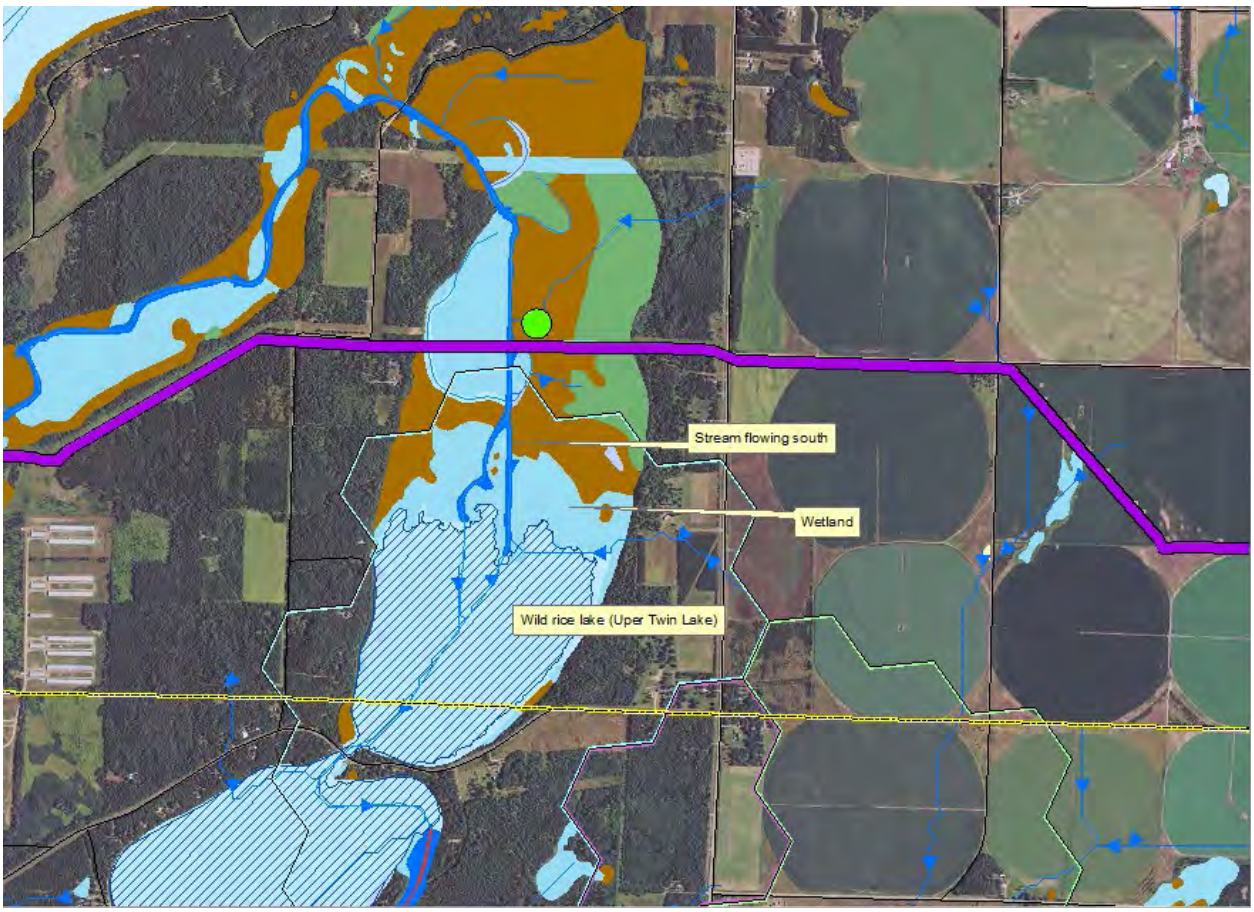

Figure B - This shows an example of a proposed crossing point over surface water that flows south (see arrows on dark blue flowage line) through a wetland complex and into a wild rice lake (the Twin Lakes near Menahga and Park Rapids, MN). However, to determine accessibility, the wetland identification layer must be turned off so that land features can be examined as in Figure C below. The purple line is the proposed Sandpiper route. (Scale 1:24,001)

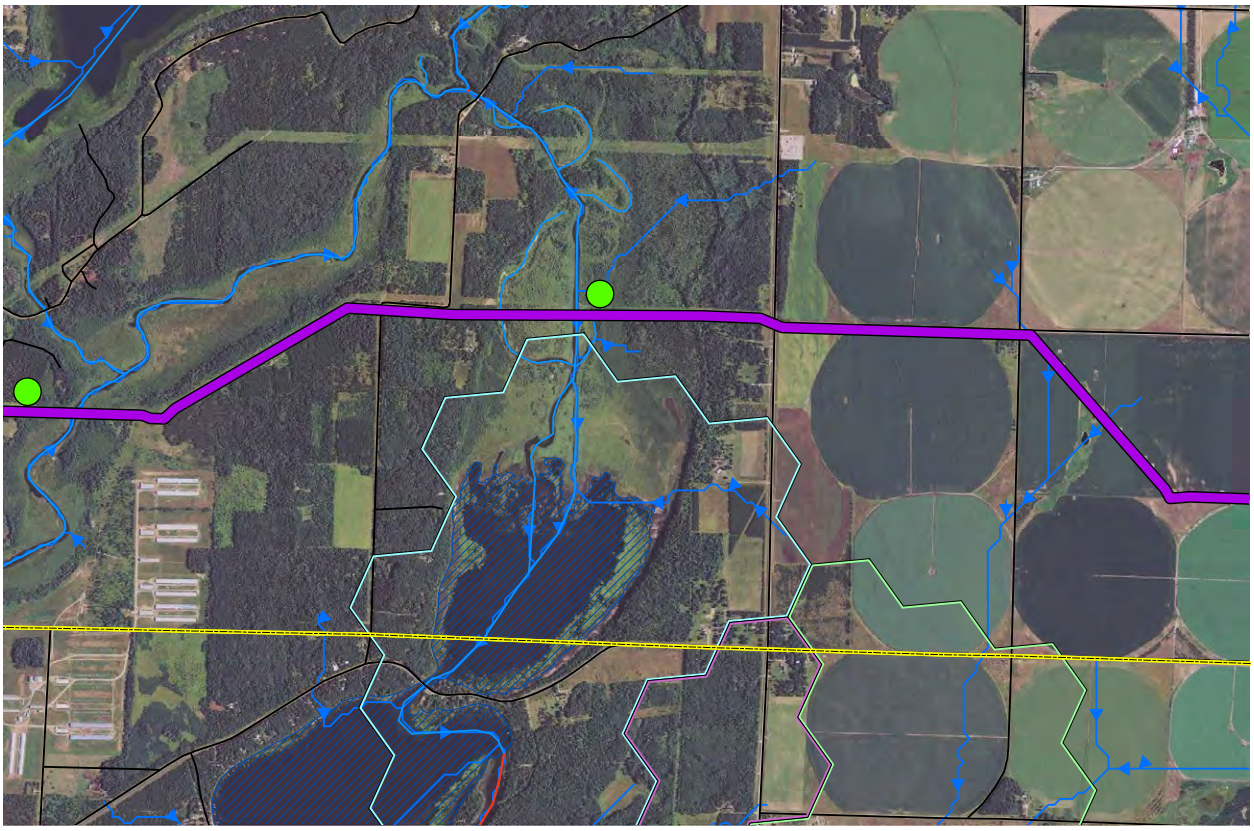

Figure C-Here, the wetland layer is turned off so that the landscape can be examined for accessibility. In this instance, there are no roads or open farmland to bring containment or clean-up equipment within 1,500 feet of the flowage that would potentially deliver leaked crude oil into the upper most of the Twin Lakes. The curvy black line between the lakes is a road, and the first good point of access. This road is 6,700 feet from the pipeline crossing, although it is possible that boats or barges could access the lake from the farm fields to the right (east) or the road (black line) to the left and contain a spill within the lake. (Scale 1:24,001)

Hill Route

The "Hill route alternative," suggested by the MDNR as a way to avoid features of concern, would not differ from the proposed Sandpiper route based on the criteria discussed here.

Northern Route

The Northern route, which parallels the path of the Alberta Clipper project, crosses 20 water bodies for which there is no access within 2,000 feet downstream of the location where crossings would occur if the route were followed. Along the Northern route, water bodies without access to potential leak sites within 2,000 feet include one stream that flows to a lake, 14 wetland complexes, five stream/wetland systems, and two streams or wetlands that flow to areas with stands of wild rice or wetlands. Below is a list of the water body crossings for this route option, followed by example Figures D and E:

NAME of ROUTE	TOWNSHIP NAME	LOCATION (TWP/RNG/SEC)	LOCATION of AREA
Northern Route	Pot Shot Lake	T52 R21W S8	Floodwood River
Northern Route	Northeast Aitkin	T52 R22W S1	West Branch Floodwood River
Northern Route	Wawina	T53 R22W S27	West Branch Floodwood River
Northern Route	Deer Lake	T56 R26W S29	Mississippi River
Northern Route	Bowstring Lake	T144 R26W S3	Little Winnibigoshish Lake-Miss. River
Northern Route	Morse	T145 R25W S35	White Oak Lake-Mississippi River
Northern Route	North Cass	T145 R27W S35	Sixmile Brook
Northern Route	North Cass	T145 R27W S34	Sixmile Brook
Northern Route	North Cass	T145 R27W S34	Sixmile Brook
Northern Route	North Cass	T145 R27W S33	Sixmile Brook
Northern Route	North Cass	T145 R28W S26	Sixmile Brook
Northern Route	Wawina	T53 R22W S28	West Branch Floodwood River
Northern Route	Blackberry	T54 R24W S13	Blueberry Lake-Mississippi River
Northern Route	North Cass	T145 R29W S24	Portage Creek
Northern Route	North Cass	T145 R29W S20	Portage Creek
Northern Route	Wilton	T147 R34W S34	Grant Creek
Northern Route	Pot Shot Lake	T52 R21W S22	Floodwood River
Northern Route	Perch Lake	T49 R18W S7	Perch Lake
Northern Route	North Carlton	T49 R19W S1	Stoney Brook
Northern Route	Arrowhead	T50 R19W S27	Bog Lake

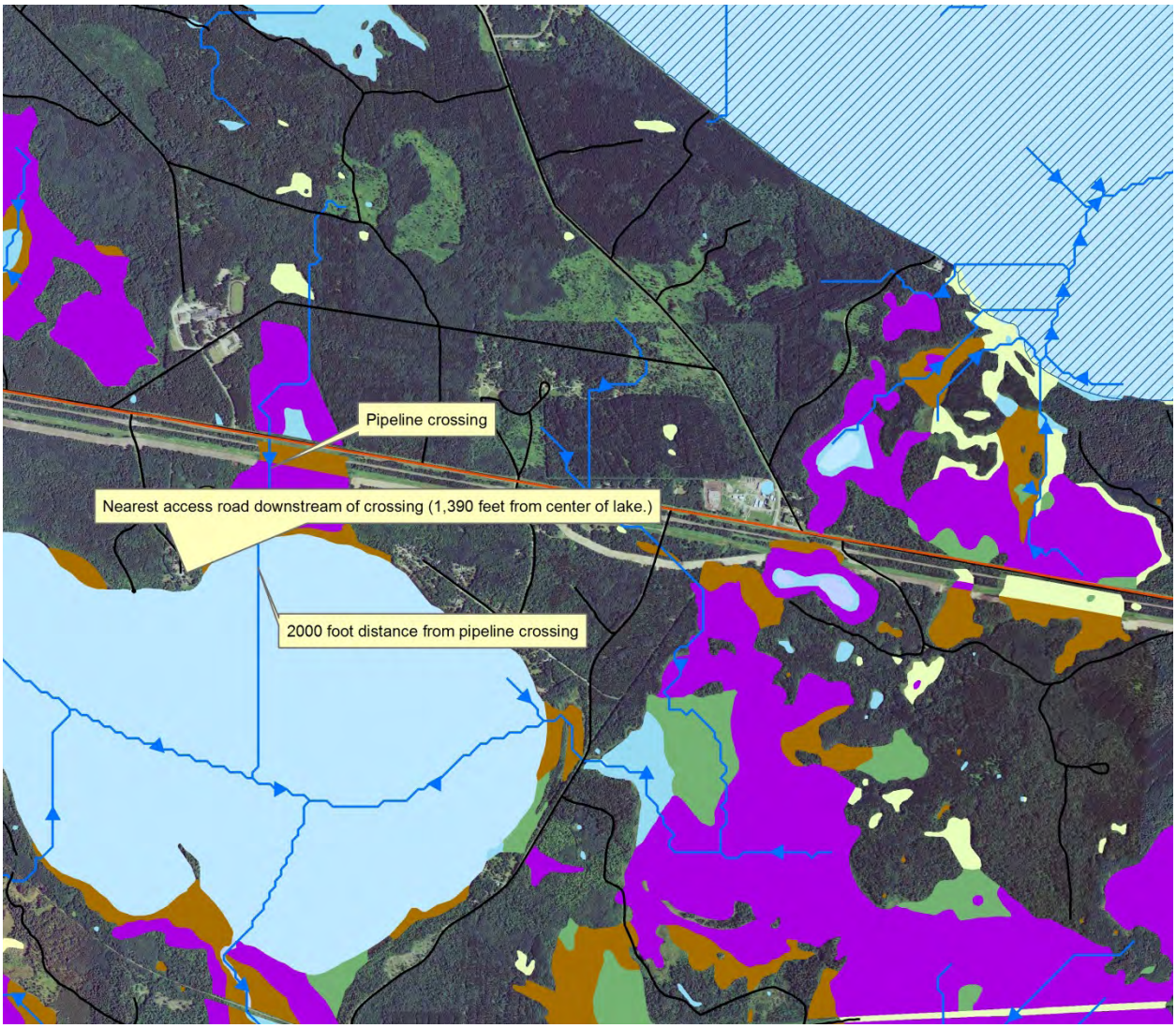

Figure D-With NWI wetland layer turned on, one can see wetland extending well beyond the 2,000 foot buffer at this crossing along the "Northern" route. The purple is bog, the green is forested wetland. In Figure E below the wetland layer is turned off so that accessibility to a potential leak here can be determined. (Scale 1:24,001)

Figure E- With the wetland identifying layers turned off, one can see that there are no roads or upland areas from which to access potential leak sites at this crossing. There is a possible access point identified to the southwest of the pipeline crossing, but containment equipment would have to be strung across over 3,000 feet of wetland as it flows into the lake to contain all of a release as it flows to the south. (Scale 1:24,001)

Alternative 3 Route

The Alternative 3 route corridor, which was referenced earlier in the letter, begins at the same western point that both the Sandpiper and Northern routes do; however, roughly 20 miles west of the North Dakota border it veers south and follows an existing (possibly abandoned) pipeline south and then southwest to roughly five miles west of North Branch, Minnesota, where it then follows another corridor in a northerly direction, where it eventually intersects with the proposed Sandpiper route just west of Superior, Wisconsin. This route has 7water body crossings with no access within 2,000 feet downstream of the pipe crossing; however, these water bodies are often smaller wetland complexes than are seen on either the Sandpiper route or the Northern route. These crossings without access within 2,000 feet

include two wetland complexes, four stream/wetland systems, and one area with stands of wild rice. Below is a list of the water body crossings for this route option, followed by example Figures F and G:

NAME of ROUTE	TOWNSHIP NAME	LOCATION (TWP/RNG/SEC)	LOCATION of AREA
Alternate Route 3	Mission Creek	T40 R21W S12	Mission Creek
Alternate Route 3	Fawn Lake	T132 R32W S34	Lower Turtle Creek
Alternate Route 3	Fawn Lake	T132 R32W S19	Fish Trap Creek
Alternate Route 3	Kettle River	T44 R20W S8	City of Willow River-Kettle River
Alternate Route 3	Bartlett	T133 R34W S23	Moran Creek
Alternate Route 3	Compton	T134 R36W S5	Deer Creek-Leaf River
Alternate Route 3	Twin Lakes	T48 R17W S21	Blackhoof River

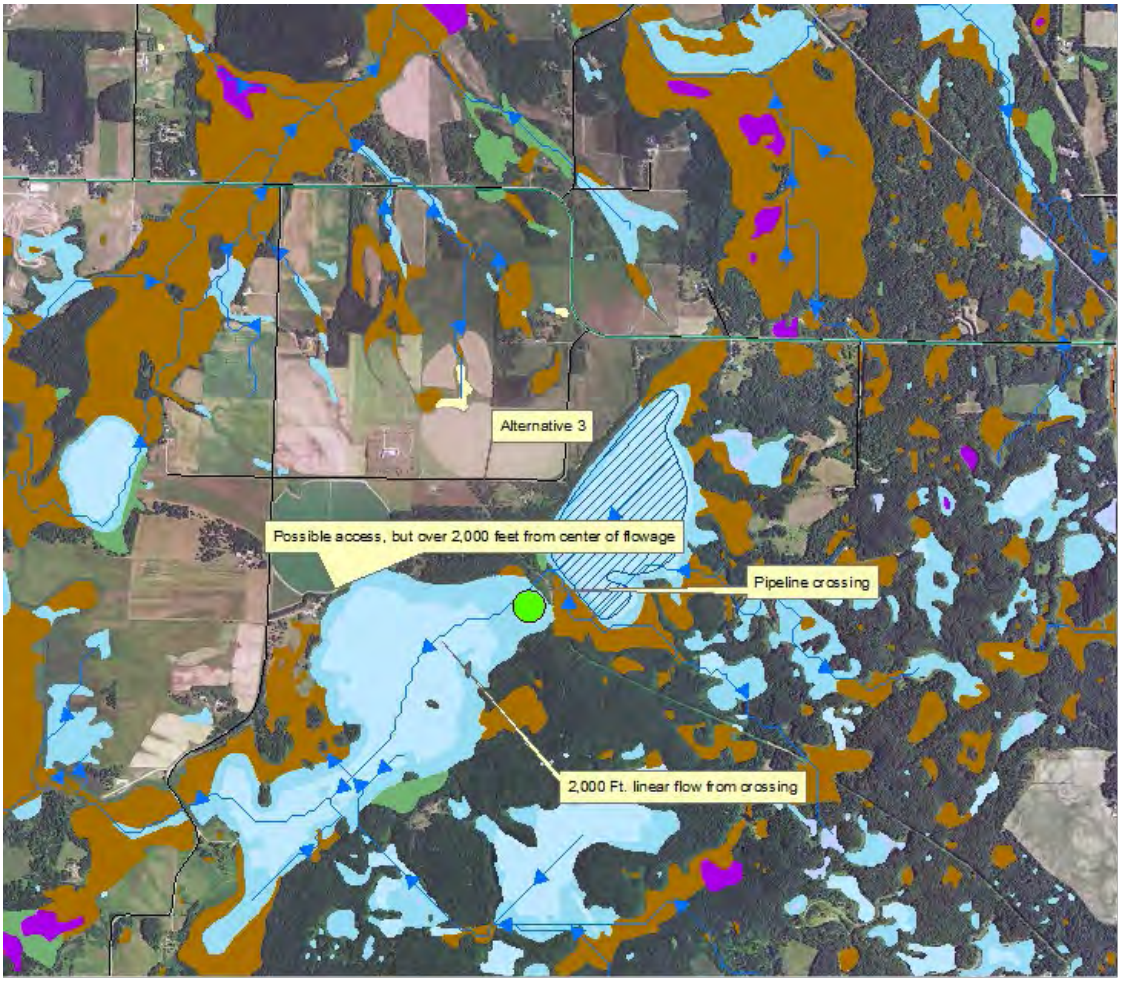

Figure F - Wetland layer identifies an open water wetland south of the pipe crossing that would likely receive oil from a leak. Wetland layer turned off in Figure G below. (Scale 1:24,001)

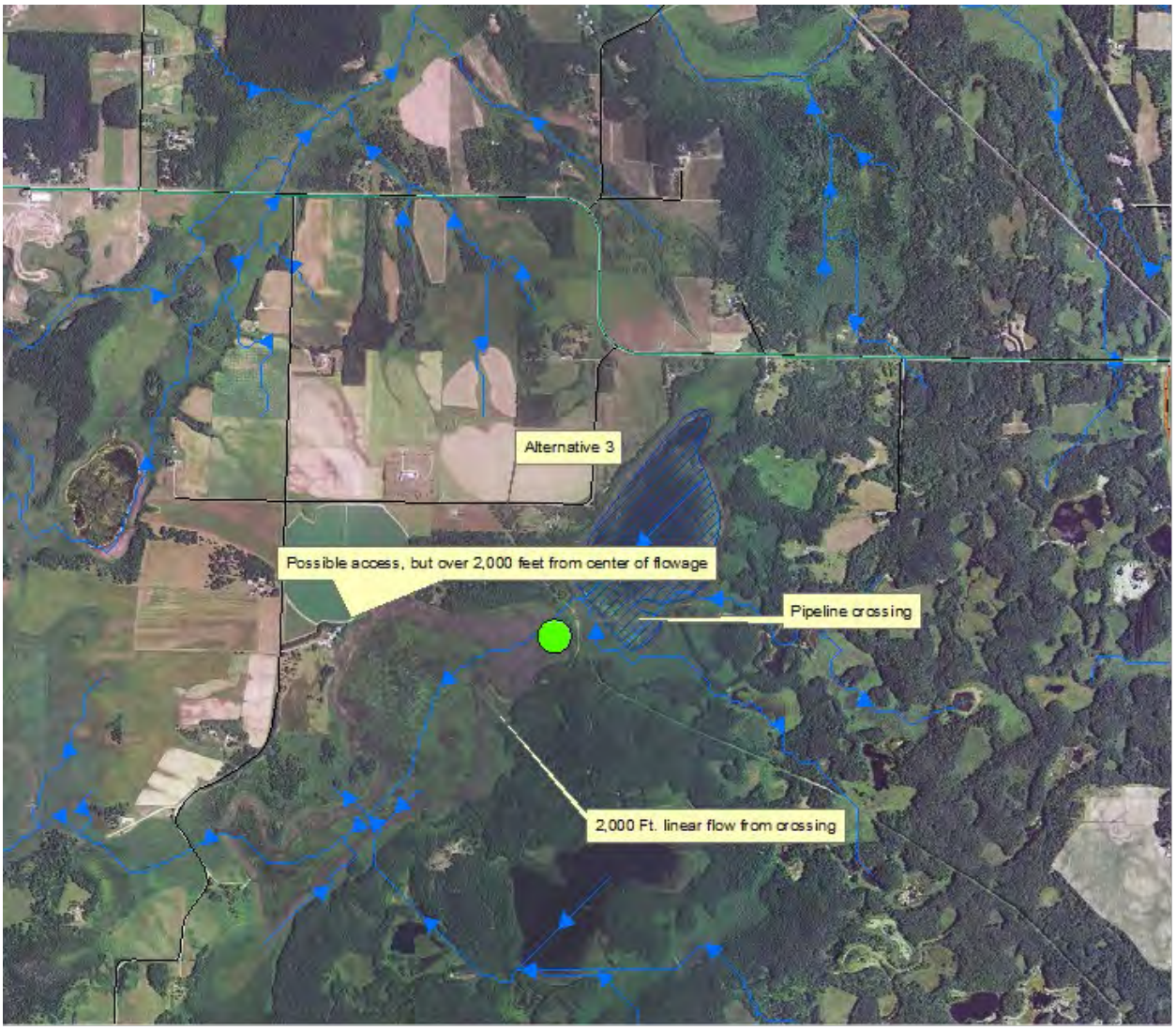

Figure G-With wetland layer turned off, one can see that the nearest access to the main stem of the flowage is roughly 2,000 feet to the west. If the wetland is traversable by boat or barge, which is possible given the wetland type (Type 3/5 shallow marsh and open water) then it is possible that access to material could be gained within the 2,000 foot buffer here. (Scale 1:24,001)

Alternative 4 Route

The Alternative 4 corridor enters the state in Traverse County just west of Wheaton, Minnesota, and runs to a southeast bearing until it exits the state south of Austin, Minnesota. A pipeline along this route would cross no water bodies lacking access within 2,000 feet of a potential leak site in surface water. There are very few water bodies crossed by this route in general over the proposed route.

National Hydrography Dataset

Even if access issues are taken out of the equation, the proposed Sandpiper route does not fare well in comparisons with alternative proposals based on examination of the National Hydrography Dataset

(NHD) layer. Using the NHD layer, the proposed Sandpiper route would cross 20 water bodies, the Northern route would cross 10, the Alternative 3 route would cross 12, and the Alternative 4 route would cross 1 water body within the state of Minnesota. The NHD layer obviously does not identify all water bodies that are being crossed; however, it does identify water bodies that are part of a connected network of surface waters which may also be a good gauge of potential environmental impact if an incident were to occur.

Notably, the two routes in this analysis that crossed the fewest water bodies and put water resources at the lowest risk for environmental damage both aligned away from the Clearbrook terminal. Perhaps the most problematic aspect of the design of this proposed route is the continued expansion of terminal capacity at the Clearbrook location. Any pipelines that are built to transport material out of the Clearbrook terminal are forced to enter the largest concentration of lakes, streams, and open-water wetlands in the state. Any route proposed out of Clearbrook, either south or east will cross dense expanses of open waters. A northern to eastern route from Clearbrook would cross massive wetland complexes and areas with stands of wild rice. If future, new terminals, were to be constructed in western Polk (could collect from Canada or North Dakota), Kittson (could collect from Canada or North Dakota) or even Clay counties (North Dakota) the creation a route proposal that avoids the greatest concentration of surface waters becomes feasible.

Summary of Route Analysis

There are numerous pipeline corridors that currently exist in Minnesota. Of those, there are several that cross far fewer water bodies and have better potential for access in the event of a release than the current Sandpiper proposal. MPCA staff examined three existing corridors in addition to the proposed Sandpiper route. While performing risk assessment, the current use of the corridors in question should also be considered, as much of the proposed Sandpiper route follows a corridor in which three other oil pipelines currently exist. Thus, not just one pipeline would be crossing sensitive water bodies with limited access, but four. The likelihood of an incident in which crude oil product is released is thus greater than what a single pipeline would entail. This is also true of the Northern route, in which numerous pipelines carrying crude oil exist. What has happened in the past with regard to location of pipeline routes is from this perspective unfortunate; MPCA staff believes that past routes have crossed too many water bodies in inaccessible areas, and the risk of large-scale impact as a result of a release incident is significant and ongoing. As this analysis shows, options posing a lesser risk to surface waters may be available.

Of the four possible routes that MPCA staff has examined, the proposed Sandpiper route and the previously followed Northern route show a significantly higher potential for environmental damage than either the Alternative 3 or Alternative 4 routes. It is also possible that an as-yet unexplored route could also score well relative to the Sandpiper proposal. The analysis of the Alternative 4 route is incomplete in that possible impacts outside of the Minnesota state boundaries were not looked at, so the surface waters avoided or protected by this route are only located in Minnesota per this analysis. It is also acknowledged that the MPCA staff analysis focused on the potential water quality and natural resource aspects of the project and not on other types of resources or land uses.

Nevertheless, the criteria adopted for this analysis show a clear difference in potential risk to surface waters between the Sandpiper proposal and other possible routes, and that in the event of a significant

oil release, the Sandpiper route proposal has a significantly greater potential for large-scale environmental damage than other route proposals.

It is important to note that the construction of accesses through sensitive "no access" areas as a preventative measure can also create environmental hazards and damages and cannot be assumed to be an acceptable remedy. Rather, route proposals put forth now and in the future should take these factors into consideration and avoid continuing to cross surface waters at these locations. The minimization of surface water crossings in any location should become a priority for consideration when planning a route to construct a pipeline.

Cumulative Impacts

The NEPA, Title 40, C.F.R. 1508.7, defines cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

The cumulative impacts review in the CEA should include current and proposed transmission line corridors, highway construction, water delivery systems, landfills, railroads, power generations plants, feedlots, and mine and mineral extraction sites which have the potential to interact with the proposed project. The CEA should also review the potential for significant cumulative effects related to past, present and future projects in the Duluth/Superior area involving increased transmission, storage, processing or refining activities, including the expansion of the Calumet Superior Refining facility in Superior, Wisconsin, or transportation of oil, fuels or products refined or manufactured from oil. Areas in which such impacts could occur include air quality in Duluth and the surrounding area in Minnesota, water quality as related to new or increased discharges or shipping activities, and transportation whether by truck, rail or ships.

The CEA should identify the impacts of past incidents associated with pipeline construction and operation, past incidents involving two or more associated utility lines, accidents or emergencies which may arise due to an unforeseen chain of events during the operational life of the pipeline, and effects within the project limits, and local and regional effects. Cumulative impacts may occur to:

- Human activities, such as recreation, agriculture and loss of prime farmland
- Wildlife including migratory birds and aquatic species
- Habitat and alterations to terrestrial vegetation
- Endangered species
- Air quality, including dust (particulate matter) and visual impacts
- Land values
- Watersheds
- Local and state socioeconomics

According to data provided by the Pipeline and Hazardous Materials Safety Administration (PHMSA), to date, there are 2,408 miles of crude oil pipeline in the state of Minnesota. More are planned within the next few years. Much of this infrastructure exists in corridors shared by several other pipelines carrying liquefied petroleum gas, natural gas, diluent for tar sands oil, refined petroleum product and other

hazardous materials. In total, there are 10,475 miles of pipeline through the state. According to PHMSA, over the last 20 years, there has been an average of 14 spills from pipelines per year in Minnesota, an average of 1,812 barrels of hazardous liquids spilled per year in Minnesota, an average of 1,093 net barrels lost per year in Minnesota, and an average of $3,135,572 of property damage annually in Minnesota. Five lives have been lost as a result of pipeline incidents.

The MPCA has numerous concerns about the number of pipelines planned to use the same corridors. With each water body crossed by a pipeline carrying crude oil, the risk of a major incident increases. A cursory review of the PHMSA web site identifies apparent causes of pipeline failure to include: incorrect operation, equipment failure, internal and external corrosion, third party damage (excavation), construction damage, material failure (pipe, fitting, weld), weld leak, and other unknown causes. For example, at the site of the Enbridge pipeline release in Marshall, Michigan, the National Transportation Safety Board found "that deficiencies in Enbridge's integrity management (IM) program contributed to the release of hazardous liquid…" (Federal Register, Volume 79, No. 87, Tuesday, May 6, 2014 (25990 – 25994). See also Enbridge Incorporated Hazardous Liquid Pipeline Rupture and Release, Marshall, Michigan, July 25, 2010 (NTSB/PAR-12/01, PB2012-916501). Ultimately, the perspective should not be if a pipeline fails, but how will a release be mitigated when a failure occurs and at any given location (and the environmental susceptibility of that area to a release).

As explained above, MPCA examination of the proposed Sandpiper route and the previously used Northern route (Alberta Clipper) shows that significantly more open water bodies are crossed by the pipelines in these corridors than alternative routes. Far more of these crossings have no available access within a 2,000 foot buffer, meaning that release incidents are more likely to impact surface waters within that 2,000 buffer. Both the Sandpiper and Alberta Clipper routes are corridors for numerous crude oil pipelines; consequently, these routes are more vulnerable and less able to properly mitigate damage to aquatic environments. Whereas oil does travel through soils and overland, it travels significantly farther in aquatic environments.

Pipeline construction will involve soil excavation, vegetation removal, the crossing of water bodies, and the alteration or loss of wildlife habitat. These activities and the creation of new corridors can result in forest fragmentation affecting numerous species of wildlife that require expanses of undisturbed forest. Wetland perches may be broken causing alteration of natural hydrology in wetland areas, and stream geomorphology can be altered by damaging banks or stirring up stream bottoms. Herbicides used to control vegetation in pipeline corridors may adversely affect pollinators, particularly honeybees, resulting in hidden impacts that are difficult to trace, but nonetheless exist.

The construction, operation, maintenance, incidents and repairs associated with crude oil pipelines have been accompanied by significant environmental impacts. With more proposals in the works, more cumulative impacts can be expected to occur. Therefore, concerted effort is needed to take a close look at and carefully analyze the creation of common routes and corridors for pipeline projects where the risks of impacts to the environmental and human health can be minimized. The routes that have been used in the past pose substantial risks as noted above. Continuing to open more corridors will increase these risks and impacts. The MPCA would support and participate in a joint effort by state agencies to begin examining the feasibility of such a corridor, both for the purpose of expediting approval of future proposals and minimizing the potential for environmental impacts. A fresh look at the routing of energy transportation projects from a larger and more comprehensive perspective has the potential to make a

significant contribution to streamlining the review and permitting processes as well as preventing and minimizing cumulative impacts.

Conclusion

It is requested that the comments provided in this letter and MPCA's letter dated April 4, 2014, be entered into the record to be addressed in the Draft CEA. We continue to look forward to assisting the Department of Commerce, as desired, during the preparation of the CEA for this project and its subsequent review upon its release. Through this process, the MPCA seeks to obtain further additional information to facilitate the MPCA staff review of the Project, well in advance of the time a decisions on the required MPCA authorizations are needed to commence construction. Ultimately, it is the responsibility of North Dakota Pipeline Company LLC to secure any required permits and to comply with any requisite permit conditions. If you have any questions, please contact me at 651-757-2465.

Sincerely,

Patrice Jensen
Planner Principal
Environmental Review
Resource Management and Assistance Division

PJ:bt

cc: Jamie Schrenzel, MDNR
Desiree Morningstar, U.S. Army Corps of Engineers
Sara Ploetz, Enbridge
Reed Larson, MPCA
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August 6, 2014

Mr. Burl Haar, Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

Dear Mr. Haar:

RE: Enbridge Sandpiper Pipeline Project, Docket No PL 6668/PPL-13-474

The Minnesota Pollution Control Agency (MPCA) has reviewed the comments and recommendations submitted by the Department of Commerce (DOC) on July 16, 2014, which will be considered by the Public Utilities Commission (Commission) at the August 7, 2014, hearing for the Enbridge Sandpiper Pipeline project. The MPCA offers the following comments on the project and the DOC's July 16, 2014, recommendations.

The recent boom in the production of oil and gas in North Dakota and surrounding areas has brought about an increase in the number of planned and proposed projects in Minnesota for the transportation, storage, and processing of these resources and their related products and uses. This activity has increased citizen and Agency interest in the amount and quality of information available to adequately assess the individual and cumulative environmental impacts of these projects and to fully inform decision-making processes.

Many alternatives to the proposed Sandpiper project and route have been suggested in the routing (PPL-13-474) and certificate of need (CN-13-473) proceedings, including rail transport, trucking, and numerous pipeline routes. The Commission will determine which alternatives are to be addressed in greater detail as the environmental review, certificate of need, and permitting processes move forward.

Given the high potential of additional pipelines and replacement or upgrading of existing pipelines in the near future, and within the same corridors, it is critical that the current effort consider multiple alternatives, including both route and system alternatives. For the reasons outlined below, limiting the alternatives to route options alone at this stage would unnecessarily narrow the scope of project options to reduce environmental and public health risks.

In our comments, the MPCA has suggested both route and system alternatives; these are discussed in the DOC's July 16, 2014, filing. I am concerned that the system alternative recommended for consideration by the MPCA may not be evaluated in these proceedings, since it does not include the Clearbrook terminal. The DOC evaluated the MPCA's system alternative, SA-03, and developed a connector segment to Clearbrook that would convert SA-03 into a route alternative. The MPCA supports inclusion of the SA-03 route with the connector segment developed by DOC as a less environmentally harmful route alternative than the proposer's route.

The MPCA's view is that the environmental impacts of system alternatives need to be considered as well as route alternatives. A system alternative that will transport oil to an alternative terminal with significantly less environmental harm should be evaluated in these proceedings.

My understanding is that system alternatives are considered in the Certificate of Need (CN) proceeding for this project. I also understand that DOC conducts environmental review of system alternatives in High Voltage Transmission Line certificate of need proceedings in the form of an Environmental Report (ER), but that this review is not conducted for pipeline certificate of need proceedings. The MPCA respectfully requests that the Commission request the DOC to prepare an ER-type review of alternatives to the project, including SA-03 as originally proposed by the MPCA without the connector segment to Clearbrook, for introduction into the CN proceeding. This position is based on MPCA's understanding as follows:

1. The project purpose can be met without constructing new storage capacity in Clearbrook. If the new terminal were to be built at a more westerly location, such as Crookston, a 75-mile long pipeline to Clearbrook could be constructed for the purpose of sending the oil that Enbridge is contractually obligated to send through Clearbrook (for transport to St. Paul refineries), while the remainder of the Bakken crude could be sent via a less environmentally harmful route well to the south of the sensitive water resources, and then on to the Superior, Wisconsin terminal.

2. Locating terminal facilities near Crookston, or at another site closer to the border of North Dakota, could offer other pipeline routes as viable alternatives, such as the proposed "System Alternatives" identified in the July 16, 2014, DOC recommendations. A terminal closer to the Minnesota/North Dakota border could be the point of origination for future pipelines that would travel to the south and avoid the potential threat to sensitive water resources that the MPCA has identified as being associated with the currently proposed Sandpiper route.

Thank you for consideration of our request.

Sincerely,

John Linc Stine
Commissioner

JLS:bt

Minnesota Pollution Control Agency

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August 21, 2014

Mr. Burl Haar, Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

RE: Enbridge Sandpiper Pipeline Project
Docket Nos. PL-6668/CN-13-473 (Certificate of Need) and PL-6668/PPL-13-474 (Route Permit)

Dear Mr. Haar:

This is the response of the Minnesota Pollution Control Agency (MPCA) to the Notice of Comment Period issued by the Minnesota Public Utilities Commission (Commission) on August 12, 2014, for the Enbridge Sandpiper Pipeline project (Sandpiper). The Sandpiper project includes a Route Permit and Certificate of Need proceeding. It is our understanding that the Certificate of Need decision will likely not be made for several months.

The Commission identified three topics open for comment in its August 12, 2014 Notice:

- *What, if any, of the eight system alternatives identified in the Department of Commerce Alternative Routes Summary Report should be considered further in these proceedings?*

  The MPCA evaluated system alternatives SA-03, SA-04, SA-05, SA-06, SA-07, and SA-08 using a number of criteria described below. All these system alternatives have fewer potential environmental effects than the Sandpiper proposal. At a minimum, we recommend system alternatives SA-03, SA-04 and SA-05 for further consideration in these proceedings.

- *What is the legal basis for determining whether a system alternative should be considered in the certificate of need proceeding?*

  The legal basis supporting our position is discussed on page 2 of our response.

- *What is the legal basis for determining whether a system alternative should be considered in the route permit proceeding?*

  See above.

The MPCA is the state agency with responsibilities and authorities related to the issuance of various permits that may be required for the project, including permits and regulations administered under state and/or federal programs for construction stormwater, industrial stormwater, wastewater, and spill and emergency response. A part of our mission is to protect and improve the environment. The MPCA submitted earlier comment letters and provided remarks at the August 7, 2014 prehearing meeting describing our concerns about the potential for adverse environmental effects from the proposed Sandpiper project route. Comments provided by the MPCA included system alternatives that it believes have lesser potential environmental effects.

The MPCA appreciates that the Route Permit and Certificate of Need parts of the Sandpiper proceeding are separate approval processes, each with its own requirements. Our offer of system alternatives was not intended to conflate the Route Permit process with the Certificate of Need process. The MPCA defers to the Commission regarding matters of interpretation and implementation of the Commission's specific statutory authorities and regulations, and of practice and procedure before the Commission. The MPCA's comments, in furtherance of its mission, are intended to provide information regarding the potential environmental effects from the Sandpiper route and to encourage the Commission to obtain additional environmental analysis on system alternatives to inform its Certificate of Need decision. We believe that the Commission has discretion under the Minnesota Environmental Policy Act (MEPA), Minnesota Statutes ch. 116D, to gather information it needs to include in the administrative record and to decide how to gather such information, including soliciting such analysis.

In addition, as the Department of Commerce Division of Energy Resources (DOC-DER) indicates in its August 18, 2014 letter filed in these proceedings, the Commission has authority under Minnesota Rule 7853.0130 to consider system alternatives that can better achieve the claimed need. That rule requires the applicant to meet four separate criteria before the Commission shall grant a Certificate of Need. Analysis of alternatives is governed by Subpart B of this Rule, which states in relevant part:

> A more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record by parties or persons other than the applicant...

As the DOC-DER states in its August 18 letter, this subpart allows a party, or individual, who proposes an alternative to provide evidence showing that its alternative can better achieve the claimed need as stated by the applicant or that the claimed need is not reasonable.

Below we provide comment with respect to the need for additional information and assessment of environmental effects to inform your decision-making on the Certificate of Need and with respect to the potential adverse environmental effects of the proposed Sandpiper route for consideration in the Route Permit process as appropriate.

Analysis of Environmental Effects - Certificate of Need

While no environmental report is expressly required by Commission enabling laws or its regulations, the Commission as a governmental entity has discretion under MEPA to investigate environmental effects. Minnesota Stat. § 116D.03. A comparative analysis of system alternatives would provide valuable information to the Commission to be weighed along with other information of record when making the need decision. Conducting environmental analysis of system alternatives in this need decision is similar to what is done in non-pipeline need decisions. The MPCA believes that certain system alternatives present lesser potential for adverse environmental effects than does the proposed Sandpiper route and that they represent more prudent and environmentally protective options. Given the potential for environmental harm from the proposed Sandpiper route noted in the MPCA's previous comments and in this letter, it is reasonable to investigate the potential environmental effects of system alternatives as part of the need decision. The MPCA respectfully requests that the Commission exercise its discretion under MEPA to ensure that environmental values are given equal consideration along with economic and technical considerations.

The MPCA agrees with the comments filed by the Department of Commerce Energy Environmental Review and Analysis (EERA) unit on August 21, 2014 concerning the Commission's authority to consider environmental impacts of system alternatives in these proceedings. EERA emphasized that MEPA requires all departments and agencies to consider environmental impacts and alternatives in their decision making. MEPA further notes in 116D.06, subdivision 2, that the requirements and goals of the act are supplementary to those set forth in an agencies' existing authorizations. MPCA supports EERA's conclusion that the Commission has the ability to determine what it needs to insure that the record

developed in the Certificate of Need proceeding, or any proceeding, is adequate for its decision making, be it through testimony from parties, supplemental reports from the applicant or an Environmental Report-like (ER-like) document prepared by EERA, as was requested in the Xcel Competitive Resource Acquisition proceeding (12-1240).

Environmental Effects - Proposed Routing Project

The MPCA seeks to provide additional comment regarding the potential for negative environmental effects and a scoring analysis of six system alternatives, known as SA-03, SA-04, SA-05, SA-06, SA-07, SA-08, and the Enbridge's Sandpiper route in the context of the criteria set forth in Minnesota Rule 7852.1900 subp. 3 and 7853.0130 as these criteria pertain to the MPCA's regulatory authority. Please note that proposed system alternative SA-02 is not addressed in the following comments because previous examination of this route showed that it did not merit further consideration based on the risk to natural resources that MPCA believes must be considered. SA-01 was also not entered in the following comparison because it would require crossing the border into Canada. This would appear to change the jurisdiction and authority over the project from the state level to federal, and would thus no longer be under Commission authority.

The MPCA's comments are intended to demonstrate the importance and the utility of the Commission developing an environmental effects analysis of the various system alternatives in the Certificate of Need part of this combined proceeding.

Minnesota Rule 7852.1900 Subp. 3, B, D, E, F, G, H, I and J Criteria

MPCA has considered the criteria in Minnesota Rule 7852.1900 Subp. 3 to compare the proposed system alternatives and the Sandpiper route by identifying corresponding Geographic Information System (GIS) layers to these criteria, and then visually examining the resulting maps. Without having access to specific locations of the proposed system alternatives, a detailed quantification is not possible; however, the MPCA presents this high level approach to help identify the system alternatives which seem to meet the required considerations most effectively. A more detailed analysis of the environmental impacts of system alternatives would be performed in an ER-like document suggested by MPCA and EERA. In the information below, lower numbers represent greater potential environmental effects, while higher numbers represent lesser environmental effects. The information is meant to illustrate one way of roughly comparing one alignment to another.

Minnesota Rule 7852.1900 Subp. 3.B. The natural environment, public and designated lands, including but not limited to natural areas, wildlife habitat, water and recreational lands.

Several layers were used to depict these criteria, including Cumulative Disturbance Index (a score showing how human activity has affected the environment which could be used as an indicator of the quality of wildlife habitat), a map showing Water Quality mean score (the score for overall water quality within a watershed), and another map identifying public land ownership, state parks, and wildlife management areas.

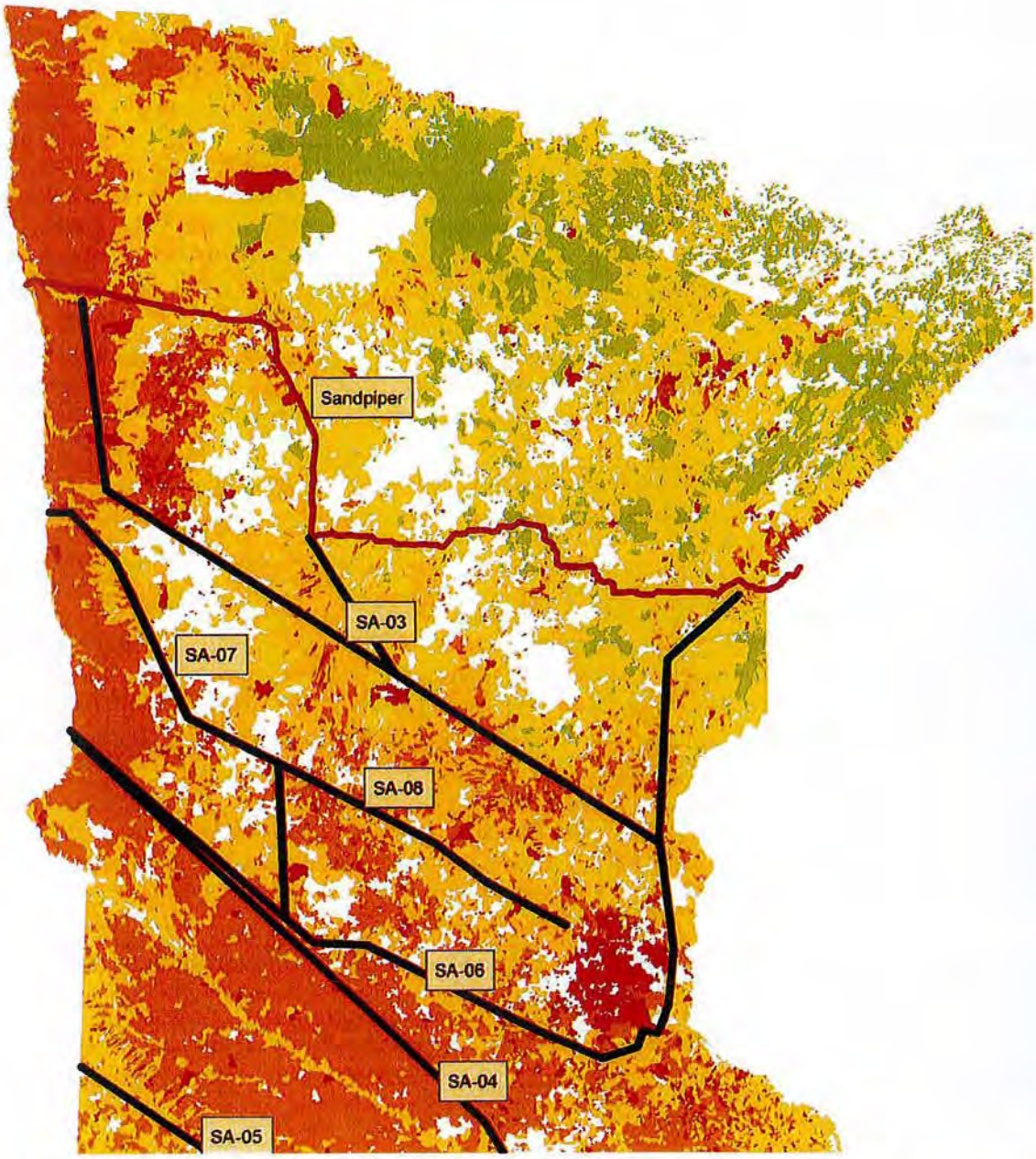

The above map shows Cumulative Disturbance Index scores for the state. The green areas are undisturbed or minimally disturbed areas. The yellow and darker orange to red indicate areas of increasingly heavy human impact, and likely have poor habitat for wildlife; the areas in white have not been assessed. Based on this illustration, it appears that the proposed Sandpiper route has the greatest potential to impact pristine areas of the state and/or areas that have high habitat scores, while the potential for impact decreases with system alternatives located further south in the state.

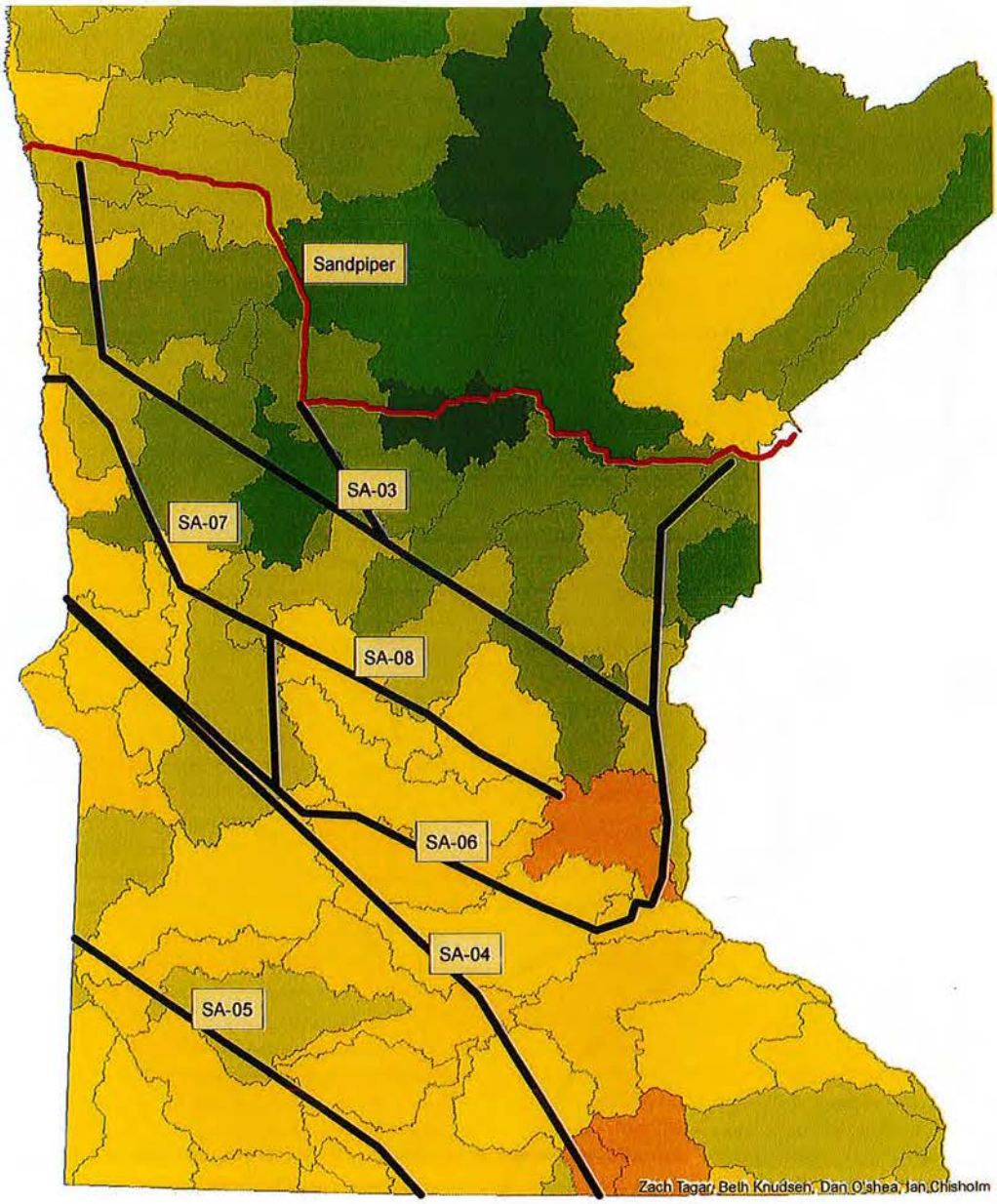

This map shows mean scores for water quality in the state watersheds. Dark green identifies the best water quality in the state; yellow and orange identify areas of lesser water quality. In this depiction, the proposed Sandpiper route has the greatest potential to impact the areas of the state with the best water quality, while system alternatives SA-04, SA-05, and SA-06 traverse areas of fewer surface waters and lower water quality.

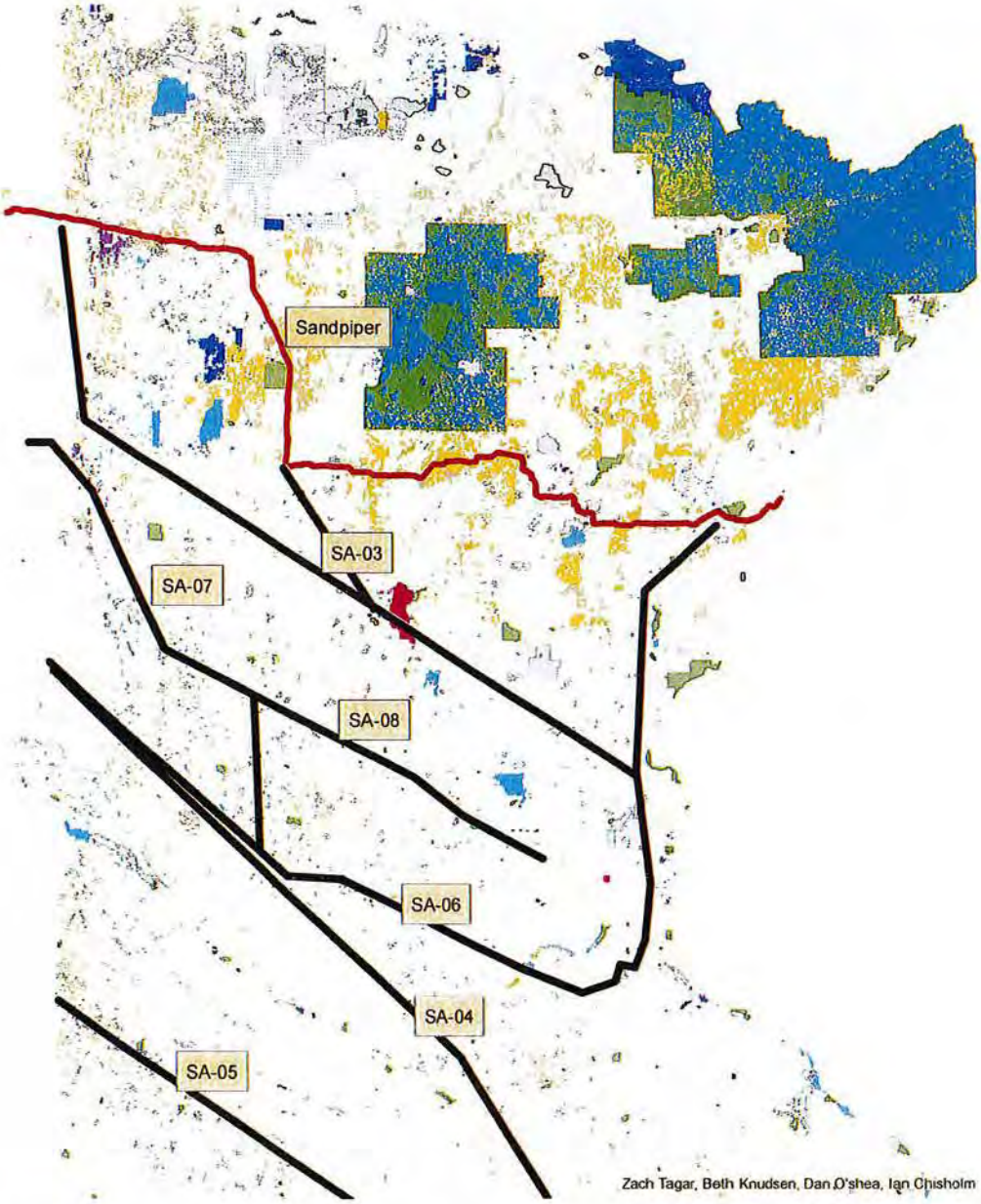

The map above identifies state and federal ownership of lands, state forests, state parks, wildlife management areas, and areas under conservation easements (Nature Conservancy). Wildlife management areas on the map are identified as light pink, darker purple areas are conservation lands, light green are state parks, dark green are national forests, yellow areas are state forests, and bright blue areas are U.S. Forest service land. Notable on this map is that the proposed Sandpiper route borders or crosses a substantial amount of state forest land, and borders several wildlife management areas and one area of nature conservancy land near the North Dakota border. SA-03 crosses near Camp Ripley. All of the proposed system alternatives encroach on some state land, but it appears from this context that the proposed Sandpiper route poses a greater risk to state forests, state parks, and wildlife management areas than any of the system alternatives.

Environmental and natural resource protection and the prevention of impacts tend to be less costly and more effective than restoration; therefore, scoring in this instance is based on preventing impacts to higher quality areas. Scoring of the proposed system alternatives based on criteria in Minnestoa Rule 7852.1900 Subp. 3.B. is as follows:

- 5 points (small potential impact to criteria): SA-04, SA-05, SA-06
- 3 points- (moderate potential impact to criteria): SA-03, SA-07, SA-08
- 1 point (stronger potential to impact criteria): Sandpiper

Minnesota Rule 7852.1900 Subp. 3.D. Economies within the route, including agricultural, commercial or industrial, forestry, recreational, and mining operations.

It is noted that an Enbridge pipeline would help the Minnesota economy by creating temporary jobs and also paying property taxes; however, for the purpose of this comparison, these economic benefits would occur regardless of where the pipeline is located. Therefore, this analysis addresses other economies that may be impacted based on where the Sandpiper pipeline is located.

The following map identifies both major industrial lands (paper company lands, potato farms, mining lands, etc. in gray), major non-industrial lands (livestock operations, miscellaneous trusts, sugar beet operations, etc. in tan).

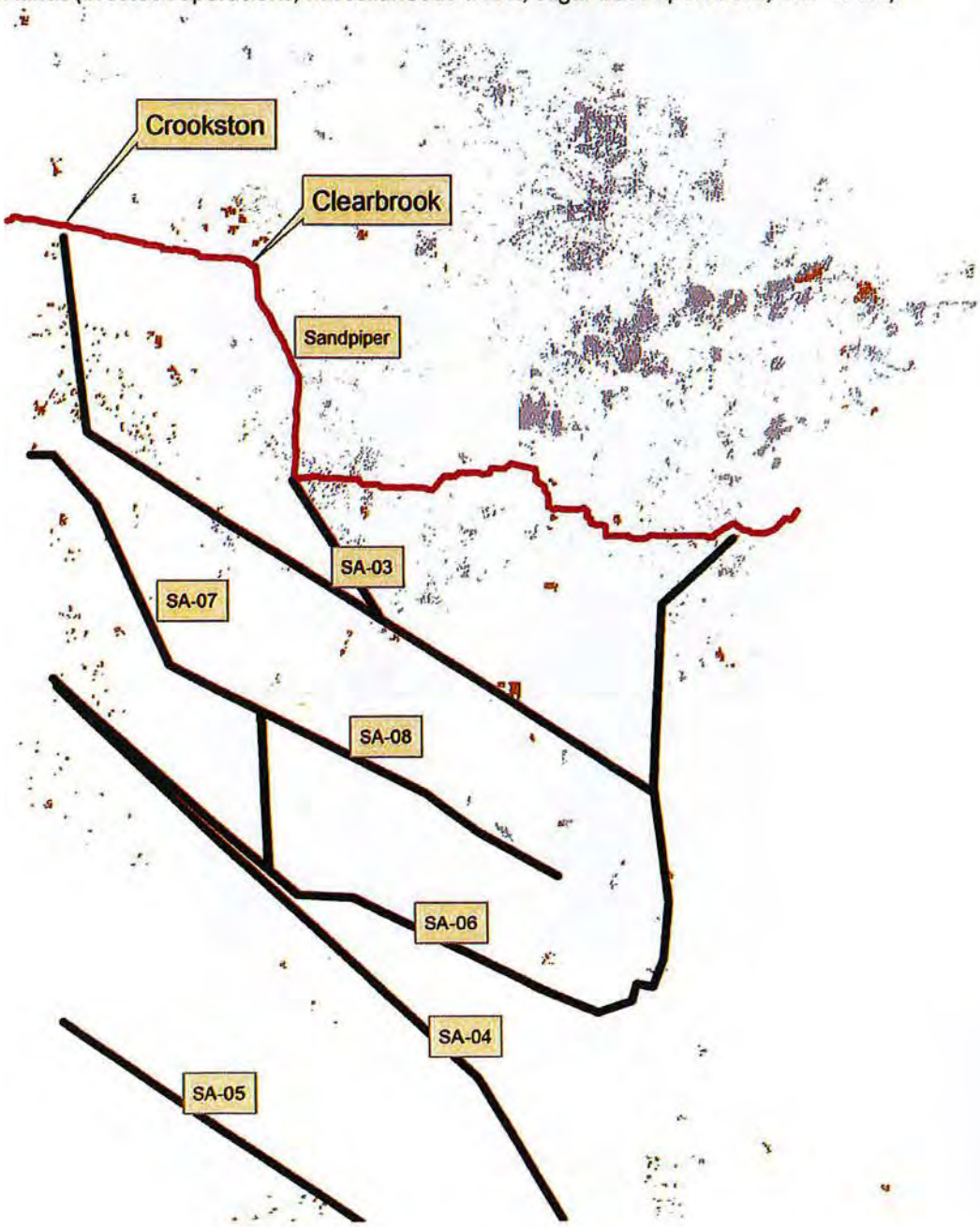

In this example, the proposed Sandpiper route encroaches on relatively few industrial-related facilities compared to SA-06 or SA-08, but the Sandpiper comes closest to or directly encroaches on a number of major industrial lands, particularly potato farms and paper company forests. SA-03 also comes near to several livestock operations. In this view, it appears that SA-04 poses the least potential impact to any of the facilities or lands depicted in this layer.

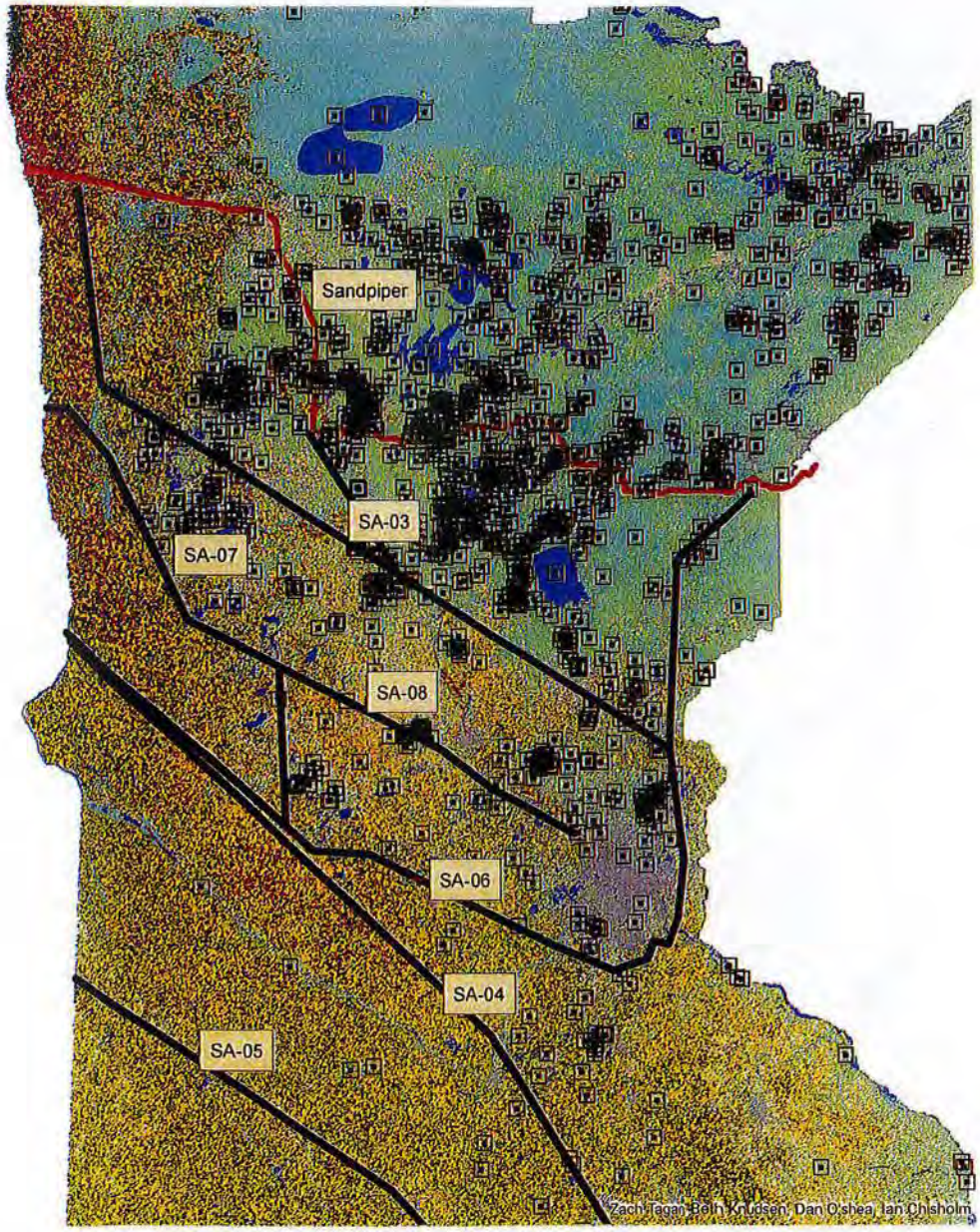

This map identifies cropland in Minnesota, and also stands of wild rice (black squares with black dots). The yellow or dark green areas are corn and soybeans, while the lighter green and blue-green are forested areas. The state appears fairly evenly divided between forest land above SA-03, and heavily cropped land (mostly corn and soybeans) below SA-03. Of special note on this map is the high concentration of stands of wild rice around the proposed Sandpiper route. Unlike corn, soybeans or other exports, stands of wild rice are uniquely sensitive to water quality and disturbance of its native habitat. Therefore, the MPCA concluded that the proposed Sandpiper route would pose a higher threat to the stands of wild rice economy than the system alternatives would pose to other crops. Other Minnesota economic

sectors, such as tourism, resorts, and recreation, are also heavily dependent on water quality; thus with consideration toward potential impacts to the economic sectors that significantly depend on water quality, the MPCA scored the proposed system alternatives as follows:

- 5 points (small potential impact to criteria) SA-04, SA-05, SA-07
- 3 points- (moderate potential impact to criteria) SA-03, SA-06, SA-08
- 1 point (stronger potential to impact criteria) Sandpiper

Minnesota Rule 7852.1900 Subp. 3.E. Pipeline cost and accessibility.

It was not clear whether this criterion applies to the Enbridge's cost and accessibility to route locations, or to potential cost to the State of Minnesota to access the pipeline route, especially in sensitive areas. However, as accessibility to the proposed system alternatives was a major concern of the MPCA's June 24, 2014 letter, it is worth reviewing the result of that analysis as it does apply to accessibility of the proposed Sandpiper route and two of the system alternatives.

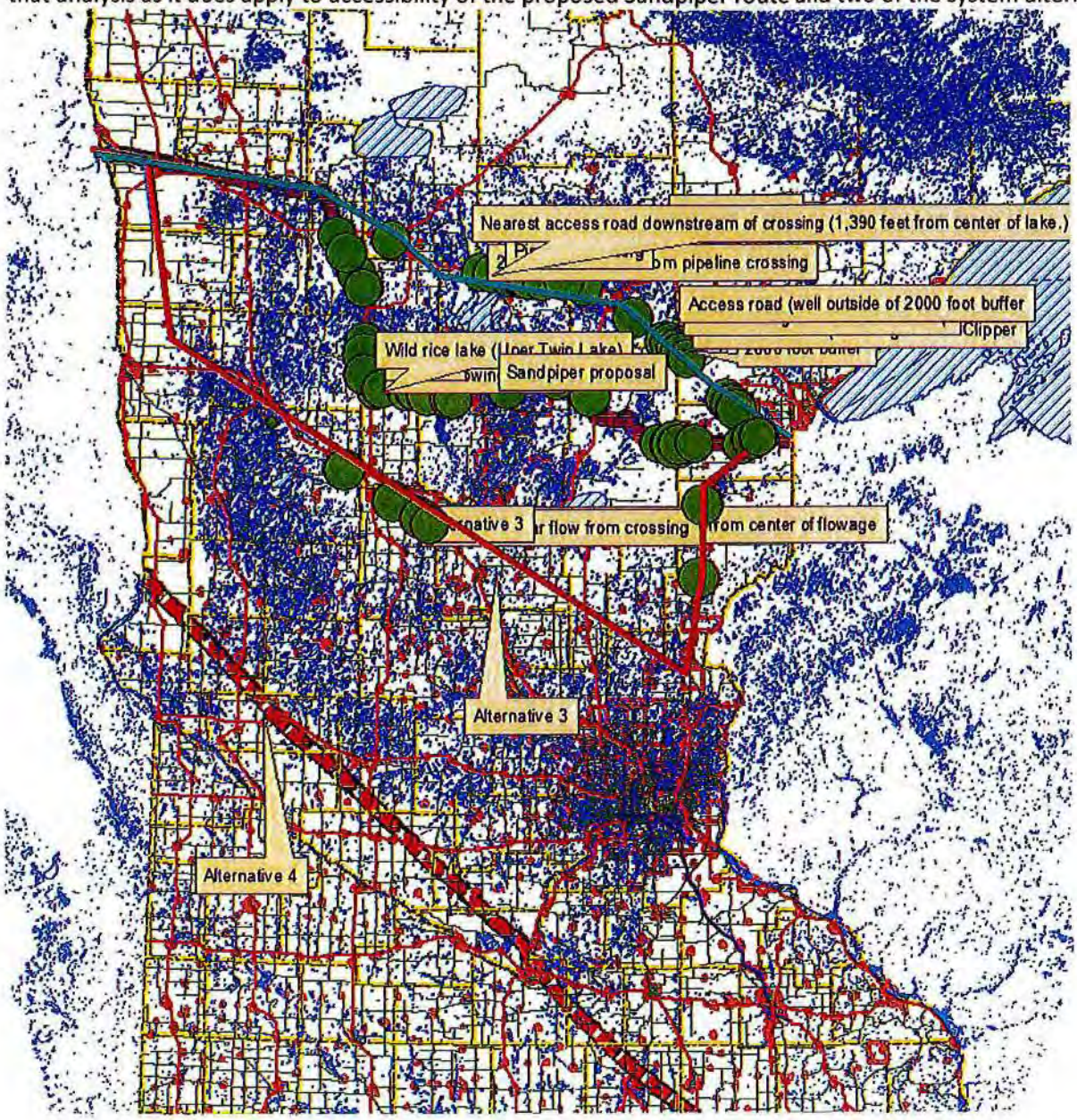

As described in the MPCA's June 24, 2014 letter, the MPCA studied the Sandpiper route proposal, SA-03, and SA-04 for accessibility downstream of water crossings. The criteria set for this study involved road access to water crossing areas within 250 feet of the center of a flowage or water body for a distance of 2,000 linear feet downstream of the crossing. One of the objectives of the analysis was to identify areas with poor or no access to water bodies being crossed by each of the proposed system alternatives, with the above described criteria used to measure this objective. The analysis indicated that SA-03 had seven water crossings with poor or no access as described, SA-04 had zero such access issues, and the proposed Sandpiper route has 28 water crossings with no access within 2000 linear feet.

Based simply on this data and without further analysis, the scoring for SA-03, SA-04 and the proposed Sandpiper route is as follows:

- 5 points (small potential impact to criteria) SA-04
- 3 points (moderate potential impact to criteria) SA-03
- 1 point (stronger potential to impact criteria) Sandpiper

Minnesota Rule 7852.1900 Subp. 3.F. Use of existing rights-of-way and right-of-way sharing or paralleling.
All of the system alternatives follow existing pipeline corridors except for one. The proposed Sandpiper route follows MinnCan pipeline from Clearbrook south, but does not follow any existing pipeline corridor (although some of it follows power line corridor) once it turns east near Park Rapids. Note the area circled on the following map, where the Sandpiper follows either power line corridor, or no corridor:

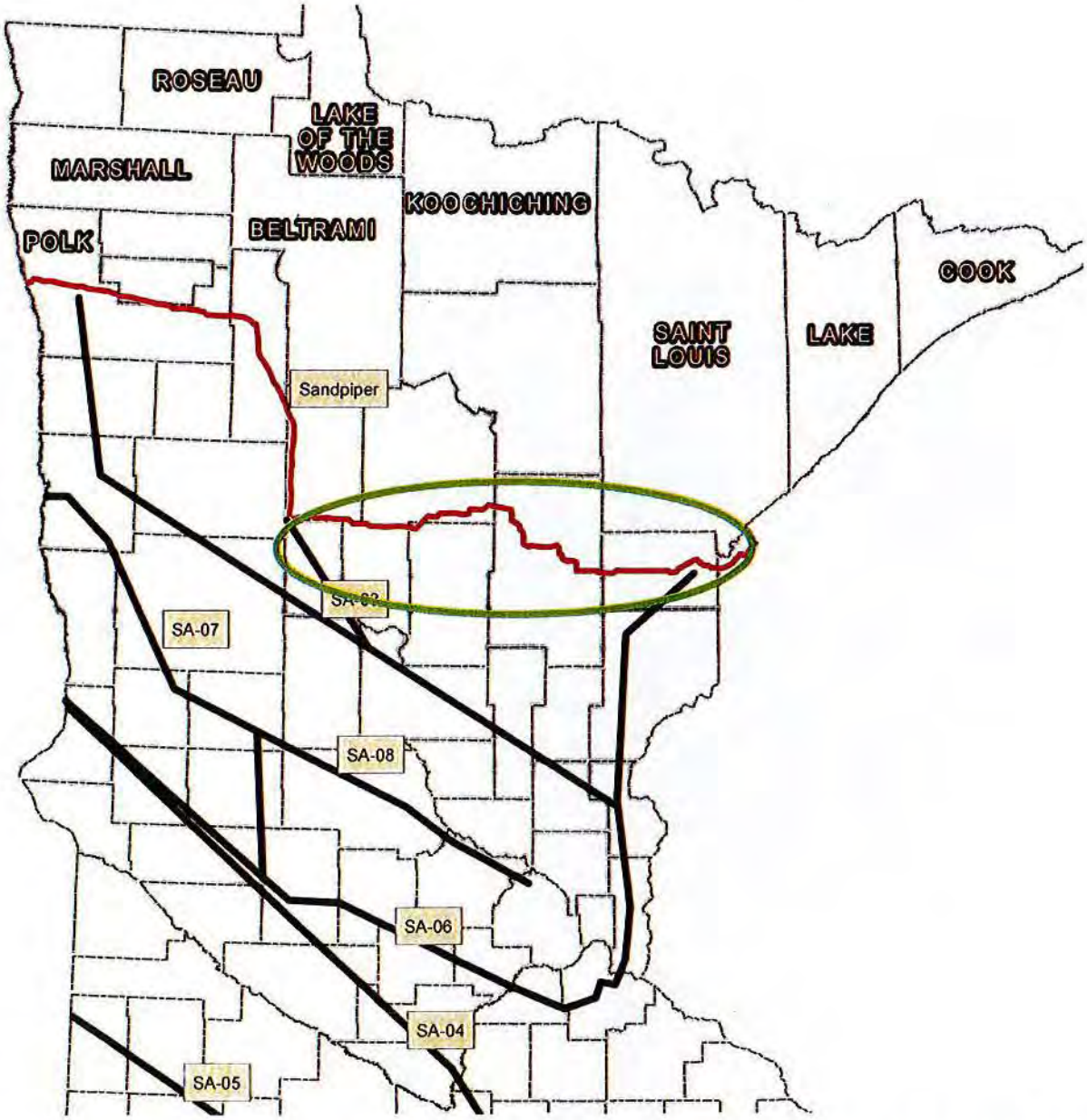

Through much of Aitkin County, and small areas of Carlton County, the Sandpiper proposal does not appear to follow any existing corridors at all. Thus, based on these criteria, the Sandpiper route and system alternatives would score as follows:

- 5 points (small or no variance from criteria) SA-03, SA-04, SA-05, SA-06, SA-07, SA-08
- 3 points- (moderate potential impact to criteria) Sandpiper
- 1 point (significant variance from criteria) not applicable

Minnesota Rule 7852.1900 Subp. 3.G. Natural resources and features.

The map below was put together by combined efforts of Minnesota State and federal agencies. It identifies ground water susceptibility to contamination based on a number of criteria. On this map, the color red identifies the highest potential for groundwater contamination, dark orange is second highest, the lighter greens are low susceptibility, and the lightest green being the least susceptible. The dark greens represent lakes.

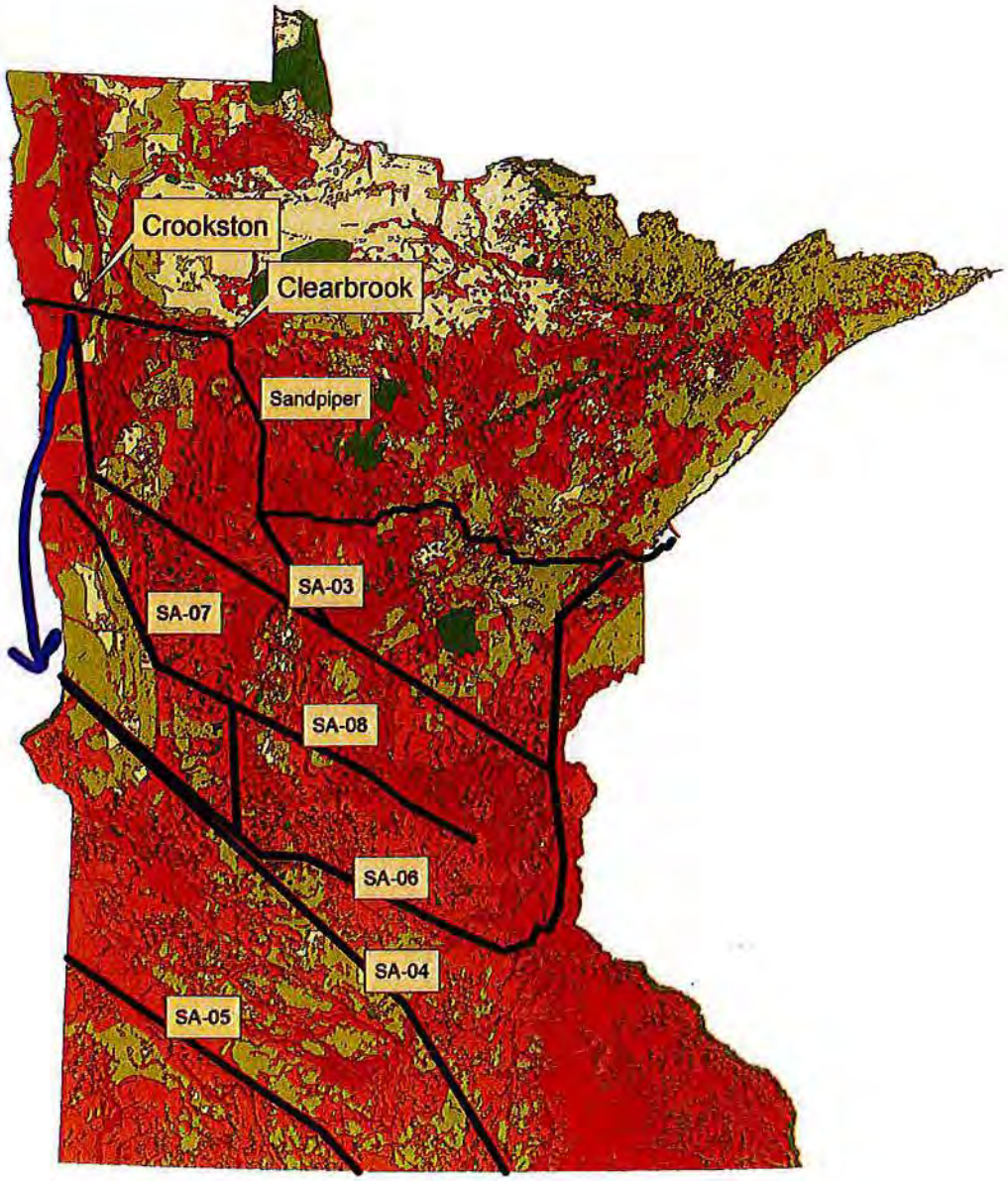

As seen on this map, the proposed Sandpiper route crosses some of the areas of the state that are most susceptible to contamination of groundwater, especially around the Park Rapids area. SA-03 also crosses significant sensitive areas, while the system alternative that crosses the least susceptible ground water is the SA-04 proposal. Of all the proposals, the Sandpiper route appears to cover the most linear miles of susceptible groundwater, from Red Lake Falls to Clearwater, then down to Park Rapids, and east to Fifty Lakes. SA-03 appears to be a close second in terms of potential to impact susceptible groundwater areas.

The map below identifies state surface waters, including lakes and wetlands. Although all of the proposed alternatives cross some water bodies, or encroach on some, the Sandpiper again crosses or encroaches on more surface waters than does any proposed system alternative. There is also more diversity of surface water types along the proposed Sandpiper route than any system alternative.

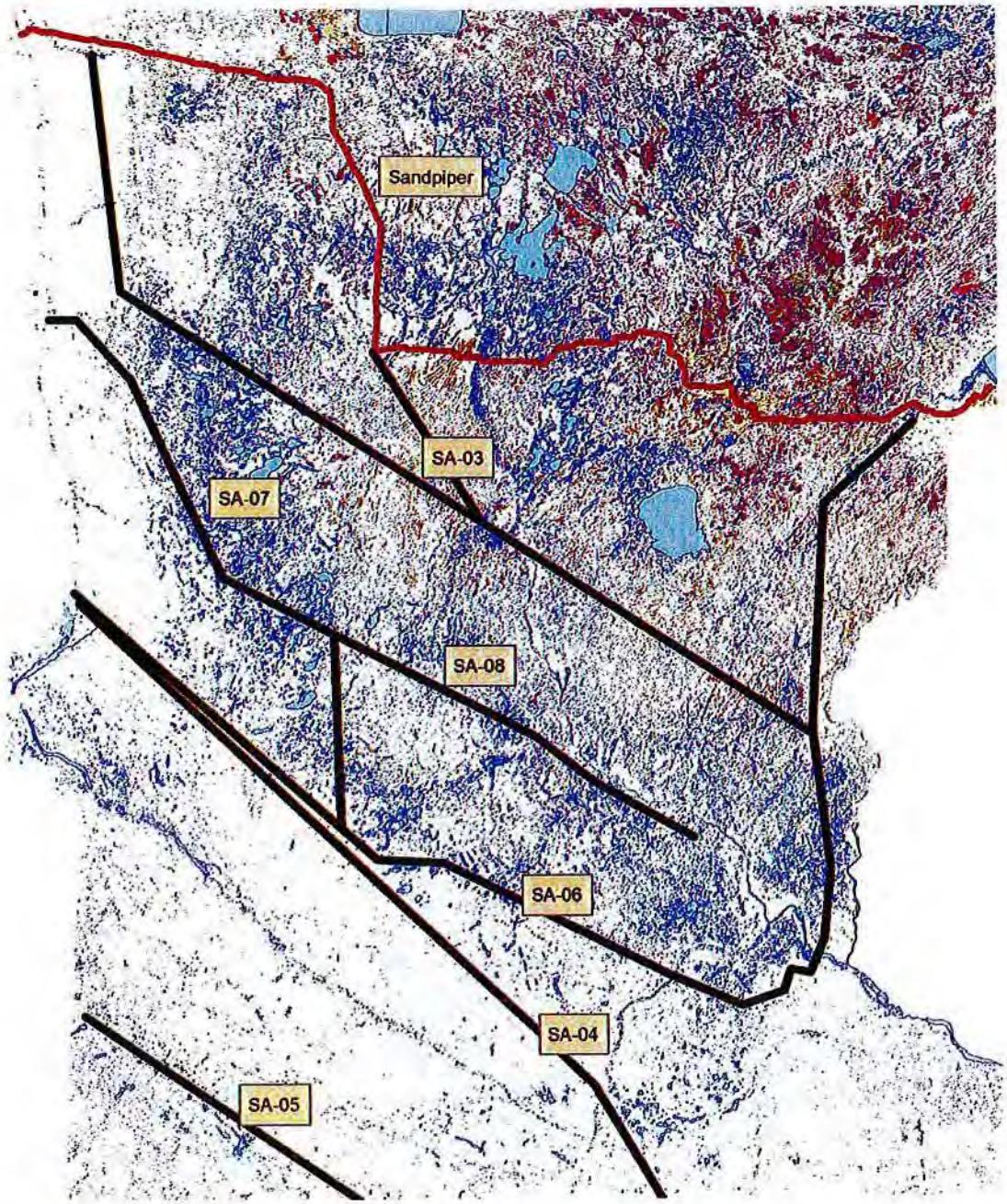

Although the proposed Sandpiper route was comparable to SA-03 with regard to potential for groundwater contamination, the Sandpiper route appears to encroach on a much higher density of surface waters. SA-07 and SA-08 also encroach on a significant concentration of surface water, although without as much diversity (i.e. rivers, lakes, streams, wetlands, etc.) as the Sandpiper route, nor as much overall surface water area. When combining the potential for impact to surface water and ground water, the proposed system alternatives average out in this manner:

- 5 points (small potential impact to criteria) SA-04, SA-05
- 3 points- (moderate potential impact to criteria) SA-03, SA-06, SA-07, SA-08
- 1 point (stronger potential to impact criteria) Sandpiper

Minnesota Rule 7852.1900 Subp. 3.H. The extent to which human or environmental effects are subject to mitigation by regulatory control and by application of the permit conditions contained in 7852.3400 for pipeline right-of-way preparation, construction, cleanup, and restoration practices.

Although MPCA staff has not identified a GIS layer to correlate with these criteria, exposed sections of Enbridge pipeline in the Tamarac River have raised serious questions regarding regulatory authority to require re-burying of exposed pipe when erosion has uncovered existing infrastructure. Exposed pipe creates a greater risk of spills or injuries to people. The significant number of water crossings along the proposed Sandpiper route would appear to increase the likelihood that similar pipe exposures with their attendant risks will occur in the future.

Minnesota Rule 7852.1900 Subp. 3.I. Cumulative potential effects of related or anticipated future pipeline construction.

A significant component of the Sandpiper proposal is the construction of a new terminal at the Clearbrook location. MPCA has expressed concern that with each terminal constructed at Clearbrook, the likelihood of additional or future pipeline infrastructure that will be built will come through Clearbrook. This, in turn, increases the potential for new pipeline to impact the large concentration of sensitive surface and groundwater that lies immediately to the east of Clearbrook, as demonstrated in the map below. The blue color on the map typically identifies open water, with green and purple, etc. indicating various other types of wetlands. The brownish/pink octagons represent cities.

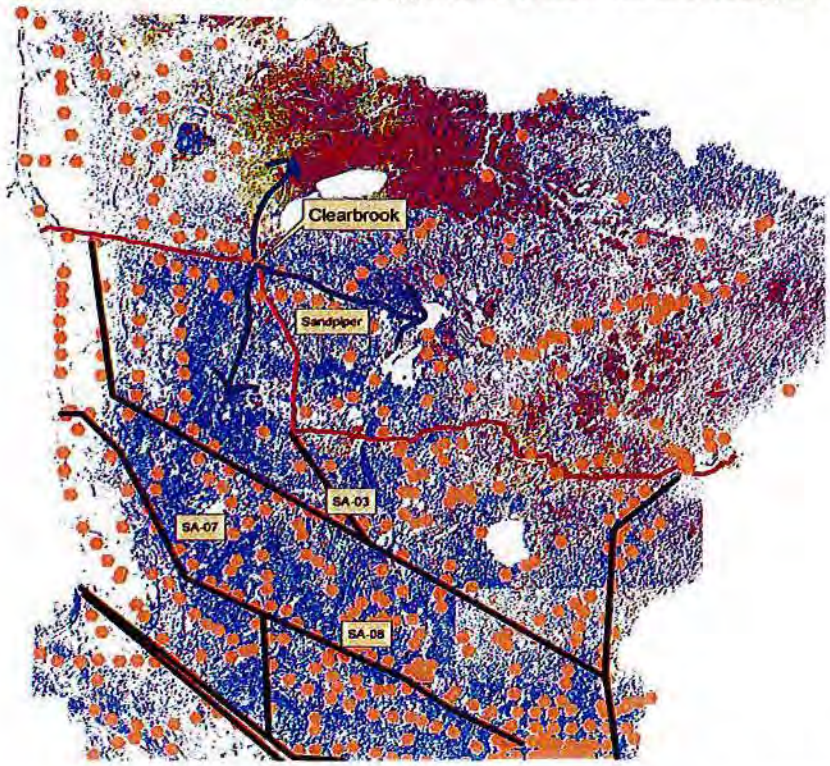

Due to the fact that pipelines are often placed in the same corridors, it is MPCA's concern that by continuing to allow pipelines through Clearbrook, the state will enable expansion of future pipeline infrastructure expansion in areas of the state that will have an increasingly concentrated impact on the state's most valuable surface and groundwater resources. This increases the potential for natural resource impacts and degradation due to spills or releases.

The MPCA believes that cumulative potential effects associated with high-risk crude oil routes can be reduced or avoided if future terminal facilities were constructed at a location west of Clearbrook. Such facilities could be constructed along the old line 3 corridor, or near Crookston as shown on the following map. The possible benefits to reducing potential impact to our state's valuable resources are depicted below:

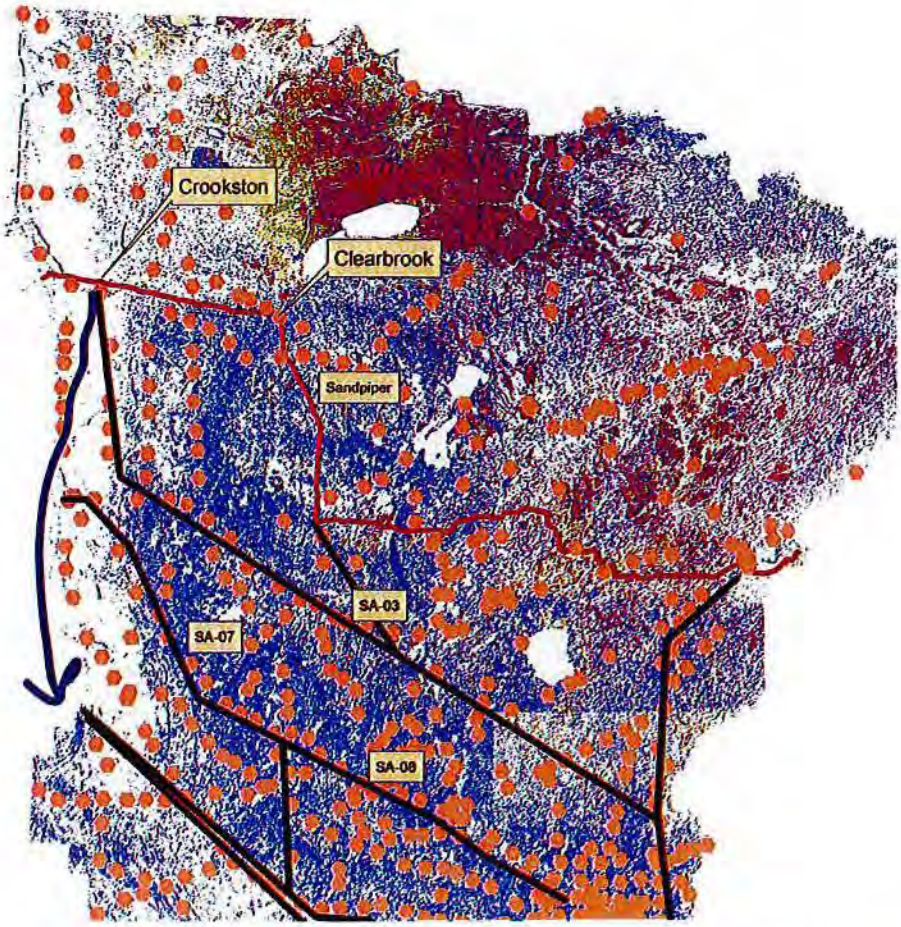

By relocating new terminal facilities west of Clearbrook, a corridor can be created in which potential resource impacts can be minimized, and a number of possibly less environmentally hazardous routes opened up. The Sandpiper route as currently proposed, as well as future pipelines that may use this same corridor, increase cumulative risk with consideration of most of the criteria from 7852.1900 as described above.

Minnesota Rule 7852.1900 Subp. 3.J. The relevant applicable policies, rules, and regulations of other state and federal agencies, and local government land use laws including ordinances adopted under Minnesota Statutes, section 299J.05, relating to the location, design, construction, or operation of the proposed pipeline and associated facilities.
Minnesota Statute 116.04D, Subd. 6 states: "No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct."

In summary, all the currently proposed system alternatives evaluated by the MPCA here are worthy of further consideration, especially when compared with the Sandpiper proposal. The MPCA recommends that at a minimum, the Commission approve SA-03, SA-04, and SA-05 for further consideration in these proceedings. Further, the MPCA urges the Commission to gather additional environmental effects information on the system alternatives through preparation of an ER-like document and is willing to assist EERA by providing additional data, comments, and review for the document that both agencies recommend here.

The MPCA thanks the Commission for the opportunity to comment upon these issues. The agency continues to emphasize that the environmental effects of system alternatives need to be considered in the Certificate of Need process. System alternatives that will transport oil to an alternative terminal with significantly less environmental harm should be evaluated in these proceedings.

Sincerely,

Craig Affeldt, for

Bill Sierks,
Manager, Environment and Energy Section
Minnesota Pollution Control Agency

BS:bt

cc: Deborah Pile, Department of Commerce
Larry Hartman, Department of Commerce
Sara Ploetz, Enbridge

Minnesota Pollution Control Agency

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800-657-3864 | 651-282-5332 TTY | www.pca.state.mn.us | Equal Opportunity Employer

November 12, 2015

Ms. Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul MN 55101

RE: Draft Impact Analysis Methodology for the Proposed Sandpiper and Line 3 Pipeline Projects
Sandpiper Docket Numbers: 13-473 and 13-474
Line 3 Docket Numbers: 14-916 and 15-137

Dear Ms. MacAlister:

The Minnesota Pollution Control Agency (MPCA) has reviewed the draft impact analysis methodology (IAM) for the proposed Sandpiper and Line 3 pipeline projects. We understand the draft IAM will inform the scope of environmental review for each pipeline project and can be applied to either a comparative environmental analysis (CEA) or environmental impact statement (EIS) when the Public Utilities Commission (Commission) makes that determination.

We offer the following comments on scoping content and analysis, applicable whether the Commission orders an EIS or CEA.

Scope of Analysis

The scoping document should indicate that the analysis will identify which resources actually have the potential to be impacted, and discuss what those impacts might be. As Minn. Stat. § 116D.04, subd. 2a, states, an environmental impact statement must be "analytical rather than encyclopedic"; merely counting resources or features that fall in the area of the described routes is not sufficient. For example, a wetland one half mile upstream from a proposed route would have a much smaller chance to be impacted during construction or during a release than a wetland that is hydrologically connected several miles downstream of a pipeline water crossing. Any resource analysis should identify whether the feature is downstream or downslope of a proposed route, or whether the feature is up-gradient, uphill or otherwise separated from the pipeline route by roads, railroad tracks, or other physical conditions that might protect the feature from impacts.

Alternatives

A scoping document should identify at least one alternative of each of the following types, or provide an explanation of why no alternative is identified for inclusion in the EIS/CEA: alternative sites; alternative technologies; modified designs or layouts; modified scale or magnitude; no action/no build; and alternatives incorporating reasonable mitigation measures identified through comments received during the EIS scoping or draft EIS comment periods. (Minn. Rules 4410.2300.G). For any alternative identified, the scoping document should indicate that the analysis in the EIS/CEA will include a discussion of potentially significant direct or indirect, and adverse or beneficial, effects associated with that alternative.

Project Magnitude
The scoping document should identify that the project magnitude discussion will include topics such as the width of the easements required, the additional land required for material and equipment temporary storage, the land required for the pump stations, eminent domain, and any public displacement.

Environmental Impacts
The scoping document should identify that the EIS/CEA will evaluate and analyze the following additional topics:

- Wildlife in addition to endangered or threatened species
- Water use
    - Locations to private and public water supply sources, depths of the wells, aquifers, etc. Drinking Water Source Management Area (DWSMA) data can be used to help assess risk to public drinking water wells.
- Wastewater
- On-site generation of solid waste, hazardous waste, and storage tanks
- Vehicle-related air emissions
- Stationary sources of air emissions and odors from the pump stations and above ground storage tanks
- Soil conductivity and permeability
- Aquifer hydraulic properties
- Data sources
    - "Counts of areas and acres within each alternative route will be developed using spatial analysis tools within ArcGIS." Again, while this is useful information, it should be accompanied by discussion about how relevant the data is. An explanation of how oil moves underground, and how it might affect the identified resources, will be necessary.
- Multi species assemblage areas should be added to the list of High Consequence Areas (HCAs) to be identified and assessed for potential impacts. Also, we suggest that HCAs are identified for a minimum distance of ten miles downstream of any water crossing.
- Above ground storage tanks (Note: the MPCA prepared an Environmental Assessment Worksheet for the construction of above ground storage tanks at the Minnesota Pipeline facility in Clearbrook.)
- Odors
- Dust
- Noise
    - From construction and pump stations
    - Possible impacts on natural systems (see the following for reference: http://rspb.royalsocietypublishing.org/content/early/2012/03/15/rspb.2012.0230.short?rss=1)
- Prime farmland, organic farming, and other land uses that may not be compatible
- Ecologically sensitive resources

- Groundwater
- Mitigation measures for catastrophic releases, smaller spills and pinhole releases
    - The scoping document should identify that the analysis of pinhole leaks will include an evaluation of how the applicable ground water regulations and cleanup standards will be achieved in the event of a spill, as well as soils and hydrogeological conditions as depicted in sensitivity maps along preferred and alternative routes. Include the potential impacts as a result of a pinhole leak on surface water as well as ground water.
- Wetlands
    - Explain how the potential direct and indirect impacts on wetlands will be evaluated.
- Water resources
    - Identify applicable regulations and standards specific to the potentially affected water resources and evaluate how those standards will be met in the event of a spill.
    - It is unclear whether "Impaired waters for which state and federal monies are being spent" refers to currently funded projects or an assumption that state or federal monies will be spent on all waters listed as impaired. Minnesota state and local agencies are currently developing detailed Watershed Restoration and Protection Strategies (WRAPS) for all 80 major watersheds in the state. As part of this analysis, the MPCA and its partners identify water bodies that are impaired (requiring a TMDL), as well as high quality water bodies that are deemed to be at risk or that require protection to maintain their high quality. This list of waters (includes TMDL waters as well as waters requiring additional protection) is more appropriate for the proposed pipeline environmental review efforts.

Project Design

- Discuss cathodic protection, how joints will be welded, pipeline integrity, and appropriate placement of shut-off valves.

Financial Assurance

- The scoping document should identify that the EIS/CEA will discuss financial assurance to address pipeline restoration, closure, and/or spills if Enbridge is unable to cover those costs.

Economic and Sociological Impacts

- Direct and indirect costs to local and regional economic
- Sociological impacts
- Effects on property values, tax base, and sociological conditions should a release occur
- Projections for expansion of residential or industrial areas over the anticipated lifetime of the proposed project should be analyzed.

Cumulative Effects

The scoping document should identify that the EIS/CEA will evaluate related or connected activities such as power lines that would need to be constructed to power pump stations, access roads that might need to be built, and additional pipelines or refineries that may need to be constructed to add "reliability" to existing shipping routes, or to replace older infrastructure that may be overloaded as volumes increase as a result of the activation of Line 3 or Sandpiper (older Wisconsin lines, for example that will be

receiving additional oil as a result of the increase of volumes through Minnesota). If a new corridor is established, the EIS/CEA should also evaluate the potential impacts that may occur if additional lines are added to that corridor in the future (Line 2 for example, which is currently being tested for integrity with hydrostatic testing and is several decades old).

Impacts of Routine Construction and Operations
The scoping document should identify that the EIS/CEA will evaluate impacts as a result of topographical alterations of landscape, loss of topsoil in forested areas (topsoil is typically separated in agricultural areas but not in natural areas), and subsidence of soils which can create water conveyances (typically resulting from replacement of frozen soils in trenches during winter construction).

Thank you for the opportunity to provide comments regarding scoping for the EIS/CEA for the proposed Sandpiper and Line 3 pipelines. If you have any questions, please contact me.

Sincerely,

Bill Sierks

Bill Sierks, Manager
Environment and Energy Section
Resource Management and Assistance Division

BS/PJ:ld

cc: Jamie Schrenzel, MDNR

Appendix D to Attachment C

To

Honor the Earth

Comments on Line 3 Replacement Project

DEIS

CN-14-916 and PPL-15-137

Appendix D
Straight River Groundwater Management Area

Straight River Groundwater Management Area Plan

March 2017

DEPARTMENT OF NATURAL RESOURCES

Funding for this project was provided, in part, by the following:

The Clean Water Fund, which receives 33 percent of the sales tax revenue from the Clean Water, Land and Legacy Amendment, approved by voters in November 2008. The Clean Water Fund's purpose is to protect, enhance and restore water quality in lakes, rivers, streams and groundwater.

At least 5 percent of the money is targeted for the protection of drinking water sources. The Legislature allocates funds for water quality work and drinking water protection based on recommendations from the Clean Water Council.

Office of the Commissioner
500 Lafayette Road, St. Paul MN 55155-4037
651-259-5555

March 2017

Straight River Groundwater Management Area: Designation and Plan

Minnesota is rich in water resources. With more than 10,000 lakes, thousands of miles of rivers and streams, and many thousands of acres of wetlands, it might be natural to think that our water is essentially unlimited. But in some parts of the state, the unseen, underground aquifers that make up our groundwater resources are under pressure to meet growing needs for domestic water supplies, irrigation, industrial and other uses. These groundwater resources also are interconnected with lakes, streams and wetlands that we value for commerce, recreation, and water supplies. Those surface waters also provide the habitat needed by many animals and plants. If we are not careful in how we use water, both economic development and ecosystems could be put at risk.

These concerns led the Minnesota Department of Natural Resources to explore a different approach to groundwater management in three areas around the state where trends suggest groundwater use might be or become unsustainable. After working with an advisory team of 21 people representing agriculture, local government, and other agencies since February 2014, the DNR is establishing the Straight River Groundwater Management Area, which is hereby designated to include parts of southern Clearwater, northeast Becker, southwest Hubbard and northwest Wadena counties. We have created this five-year plan to guide our work in this area to ensure that groundwater supplies remain adequate to meet human needs while protecting lakes, streams and wetlands.

I believe this plan is a very positive step for Minnesota. It draws upon a wealth of technical expertise across a variety of sectors. It has been informed and improved by extensive input and feedback from major water users, local government, concerned citizens and other interests. The plan is comprehensive, yet achievable. It lays out clear objectives and specific actions the DNR will take to ensure sustainable use of groundwater. It also acknowledges that DNR cannot be successful alone and describes the important roles of water users and other agencies.

I want to thank the volunteers who served on the Project Advisory Team and the people who actively participated in meetings throughout the process. The many hours you dedicated are very much appreciated. This plan provides a good starting point, but working to maintain the Straight River water resources will require many more people, agencies and interests continuing to work together in the years to come. I'm confident that will happen, because Minnesotans have shown their commitment to natural resource conservation and stewardship.

Tom Landwehr
Commissioner

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1. Introduction

The Minnesota Department of Natural Resources (DNR) works with citizens to conserve and manage the state's natural resources, to provide outdoor recreation opportunities, and to provide for commercial uses of natural resources in a way that creates a sustainable quality of life. The DNR works to integrate and sustain a healthy environment, a sustainable economy, and livable communities. The DNR shares stewardship responsibility with citizens and partners to manage for multiple interests.

The DNR is responsible for managing the state's water resources to sustain healthy streams, lakes, wetlands and groundwater resources. The DNR plays an important role in supporting sustainable groundwater use through its permit programs, information collection and analysis activities, education, technical assistance opportunities and law enforcement responsibilities.

The DNR is one of several state and local agencies and organizations with responsibility to develop, protect and manage our water resources. The following briefly describes some of the key roles of state agencies in water:

- Department of Natural Resources: collects and analyzes information on water, regulates water use and riparian land use activities, manages public land, and approves water supply plans.
- Department of Agriculture (MDA): responsible for fertilizer and pesticide regulation and management, including implementing the state Nitrogen Fertilizer and Pesticide Management Plans to protect groundwater; developing voluntary best management practices; monitoring groundwater in agricultural settings; product registration; and applicator training and licensing.
- Department of Health (MDH): ensures public drinking water systems protect sources and meet federal drinking water standards, regulates water well construction and sealing to protect groundwater, assesses drinking water contaminant risks to public health, licenses professions impacting drinking water and approves water supply plans.
- Pollution Control Agency (MPCA): develops water quality standards, monitors surface water and groundwater quality, and regulates discharges of pollutants to public waters.
- Board of Water and Soil Resources (BWSR): provides resources and technical assistance to local governments, manages conservation easements, and provides oversight to local water management entities.
- Public Facilities Authority: manages municipal financing programs to help communities build and upgrade drinking water, wastewater and storm water infrastructure.

Groundwater can be at risk of overuse and contamination anywhere in the state, and in some areas this risk is more urgent. To address concerns about long term sustainable use of groundwater in three of these areas, the DNR is establishing Groundwater Management Areas (GWMA) and developing management plans. The purpose of the GWMA Plan (Plan) is to guide DNR actions in managing the appropriation and use of groundwater within the GWMA over five years following adoption of the Plan. The Plan will be updated as needed to allow it to continue guiding sustainable groundwater use. The DNR will form stakeholder advisory committees for each GWMA as prescribed in statute.

The GWMA represents a geographic area within which groundwater users share a distinct aquifer system or groundwater resource. Users include both those who are required to have appropriation permits (high volume users - more than 10,000 gallons a day or 1 million gallons a year) and those who do not require permits to use groundwater (low volume users - less than 10,000 gallons a day or 1 million gallons a year).

Problem

As part of a statewide analysis of groundwater resources, the DNR identified the Straight River area as an area of specific concern where groundwater resources are at risk of overuse and degraded quality. Multiple permit holders (groundwater users) are connected through their use of groundwater and their effect on water resources.

The DNR manages water resources to assure an adequate supply through permitting and tracking water appropriation and use. The Water Appropriation Permit Program balances competing management objectives that include development and protection of Minnesota's water resources. Key challenges for the DNR in managing groundwater appropriations and use in the Straight River GWMA include the following:

- Demand: past and projected growth in water demand, particularly for agricultural irrigation
- Natural Resources: potential for negative effects on groundwater-dependent natural resources such as wetlands, lakes, and streams
- Conservation: a need for improved and expanded application of water conservation and improved water use efficiency
- Contamination: reduction in the availability of clean groundwater
- Information: gaps in the information needed to determine the sustainability of groundwater use

Purpose

The purpose of the GWMA Plan is to guide DNR actions in managing the appropriation and use of groundwater within the GWMA over the next five years. The following points help summarize the purpose of the GWMA Plan by identifying what it is and what it is not:

- The Plan directs the actions of the DNR and is not a plan for others to implement.
- The Plan establishes actions to guide the improvement of the DNR's appropriation permitting process to ensure sustainable groundwater use.
- The Plan calls for the development of sustainability thresholds for groundwater use in the GWMA.
- The Plan covers a five year period with the expectation that actions will be revised to continue the work beyond the initial 5-year period.
- The Plan directs actions to improve communication for stakeholders within the GWMA.
- The Plan calls for regular review of progress by a GWMA Advisory Group comprised of stakeholders.
- The Plan is not a comprehensive study of the area, but instead uses information from completed studies and suggests future studies to inform the plan and process.
- The Plan does not establish any new or broader regulatory authority. The actions proposed in the Plan are based on existing regulatory authority.
- The Plan itself is not an individual or a collective water supply plan for individual permit holders, industries, or municipalities.

The GWMA is intended to be in place for the long term, which will require updating and renewing the Plan after the first five-year implementation period. During the initial five year implementation period, the Plan, actions and progress will be reviewed annually, evaluated, and revised with the help of a standing GWMA Advisory Group and other stakeholders.

The Plan identifies actions for the DNR to take, in collaboration with other agencies, organizations and individuals active in the GWMA. Other state agencies and organizations have an important role in supporting the DNR's actions in the Plan. The Minnesota Pollution Control Agency (MPCA), the Minnesota Department of Health (MDH), the Minnesota Department of Agriculture (MDA), and the

Board of Water and Soil Resources (BWSR) have provided specific commitments and actions in support of the DNR's Straight River GWMA. Those commitments are included in Appendix A.

Many of the actions described in Section 5 will develop information, tools, and processes that will form the foundation for better decisions. The Plan does not establish or include a total allocation limit. Rather, it lays the path for determining sustainable thresholds, now and in the future, and managing appropriations to stay within the sustainability thresholds in a planned and transparent framework. Actions oriented toward all five Plan objectives are integral to this process.

Process

The Plan lays out a framework for addressing the groundwater management goal and objectives of the DNR Groundwater Management Program (from the Strategic Plan) in light of the particular challenges within the area. In order to gain insight into specific interests of the diverse groundwater users in the area, the DNR established a Project Advisory Team (PAT) to provide feedback and advice. The PAT was comprised of stakeholders from private businesses (e.g., farmers, food processors, well drillers), state agencies, county and city/township governments, a watershed district, industry, and the federal government (Table 1-1). In response to legislative changes made in 2014 (Minn. Stat., sec. 103G.287, subd. 4) the DNR expanded the membership of the PAT during the planning process to increase the number of team members holding water appropriation permits.

A project team of DNR staff wrote the plan based on feedback from the PAT and other stakeholders. Members of the project team came from the divisions of Ecological and Water Resources, Fish and Wildlife, Enforcement, Operations Services, and Regional Leadership.

The role of the PAT has been to provide advice and feedback on the Plan during development. DNR asked PAT members to be two-way conduits of information about the Plan to other stakeholders. The PAT was not established to generate unanimous agreement with the Plan. Participation on the PAT does not imply agreement with the Plan or specific elements of the Plan. The DNR will establish a new advisory team for implementation of the Plan with a formal charter to match the needs of the GWMA going forward.

Twelve PAT meetings were held from February 2014 through June 2015. Following development of the draft Plan with input from the PAT, DNR sought wider stakeholder review and comment.

At the end of the five year initial implementation period, the DNR will conduct a comprehensive review of the process, actions and results for the GWMA Plan, determine future actions, and if needed, revise the Plan. The new GWMA Advisory Group will be an important part of the comprehensive review.

Table 1.1 Project Advisory Team (PAT)

Last Name	First Name	Affiliation	Water Appropriation Permit Holder (Y/N)
Becker	Todd	Becker Farms	Yes
Becker	Troy	Property Owner - Ag. Irrigator	Yes
Bishop	Alex	Agricultural Irrigator	Yes
Burlingame	Scott	City of Park Rapids	Yes
Christofferson	Dean	City of Park Rapids	Yes
Collins	David	Hubbard Regional EDC	No
Crocker	Tim	MN DNR	No
David	Nick	R.D. Offutt Company	Yes
Dotta	Matt	Hubbard County	No
Elsner	Kelly	Elsner Well Drilling, Inc.	No
Finnerty	Bonnie	MN PCA	No
Flynn	Brian	ConAgra (Lamb Weston)	Yes
Kingsley	Julie	Hubbard SWCD	No
Kluthe	Beth	MN Department of Health	No
Marcussen	Morgan	Park Rapids School District	Yes
Maves	Gene	Agricultural Irrigator	Yes
Monico	Larry	Property Owner	Yes
Parson	Charlie	Trout Unlimited, Bemidji Headquarters	No
Pike	Nate	Agricultural Irrigator	Yes
Stuewe	Luke	MN Department of Agriculture	No
Traut	Steve	Traut Wells, Inc.	No
DNR Staff Support to the Project Advisory Team			
Walker	Michele	MN DNR	No
Miersch	Janell	MN DNR	No
Kingsley	Doug	MN DNR	No
Hoverson	Darrin	MN DNR	No

Plan Structure

The remainder of the Plan is divided into five additional sections.

SECTION 2 - DESCRIPTION OF THE BOUNDARY AND THE GWMA summarizes background information on groundwater connected natural resources, water use, and governance that were used to select the GWMA boundaries. The information also sets the stage for identifying groundwater management challenges in the area.

SECTION 3 - THE GOAL AND OBJECTIVES states the Plan goal and describes five objectives that the DNR will pursue to achieve the overall goal of long term, sustainable groundwater use in the GWMA. Together, the five objectives describe sustainable groundwater appropriation and use based on directives given in Minnesota Statutes.

SECTION 4 – STATUS OF THE GWMA IN TERMS OF THE OBJECTIVES provides additional information about conditions within the GWMA that relate specifically to the five objectives. This information includes a summary of current understanding of the status of each objective within the GWMA, discussion of gaps in knowledge or activities, and recommendations for how to fill those gaps.

SECTION 5 – DNR ACTIONS states the actions that DNR will take over the next five years toward achieving the five objectives. These actions address the highest priority needs identified from the evaluations described in Section 4.

SECTION 6 – IMPLEMENTATION SCHEDULE provides a time frame for implementing the actions.

SECTION 7 - GLOSSARY of terms used in the Plan.

SECTION 8 - REFERENCES

APPENDIX – APPENDICES A-D provide agency statements and additional information.

2. Description of the Boundary and the GWMA

The boundary for the Straight River GWMA includes parts of southern Clearwater, northeast Becker, southwest Hubbard and northwest Wadena counties. Cities within the boundary include Park Rapids, Osage and Ponsford (Figure 2-1).

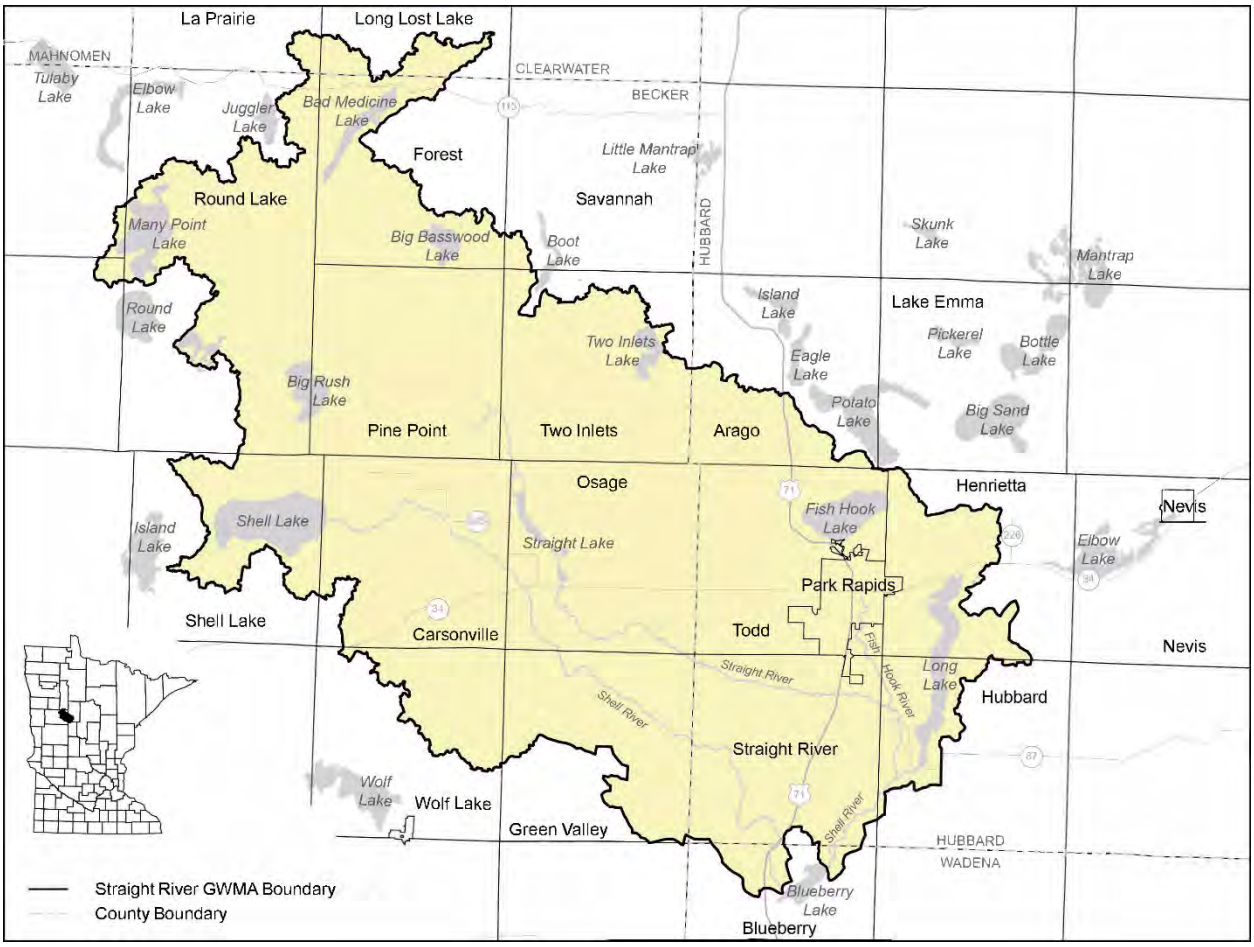

Figure 2-1 Boundary of the Straight River GWMA

Watershed Boundaries

The Straight River GWMA is contained primarily within one major watershed: the Crow Wing River. The area also includes a small part of the Ottertail watershed, specifically the Many Point Lake and Round Lake sub-watersheds. The boundary for the Straight River GWMA includes approximately 236,142 acres, or 369 square miles. As of December 30, 2014, the total acreage under irrigation permits within the boundary was 25,535 acres (Figure 2-2).

Rain, snow and other precipitation are the major sources of water that replenish lakes, rivers and groundwater in the Straight River GWMA. Water can leave the area by way of streams, groundwater flow, and evapotranspiration.

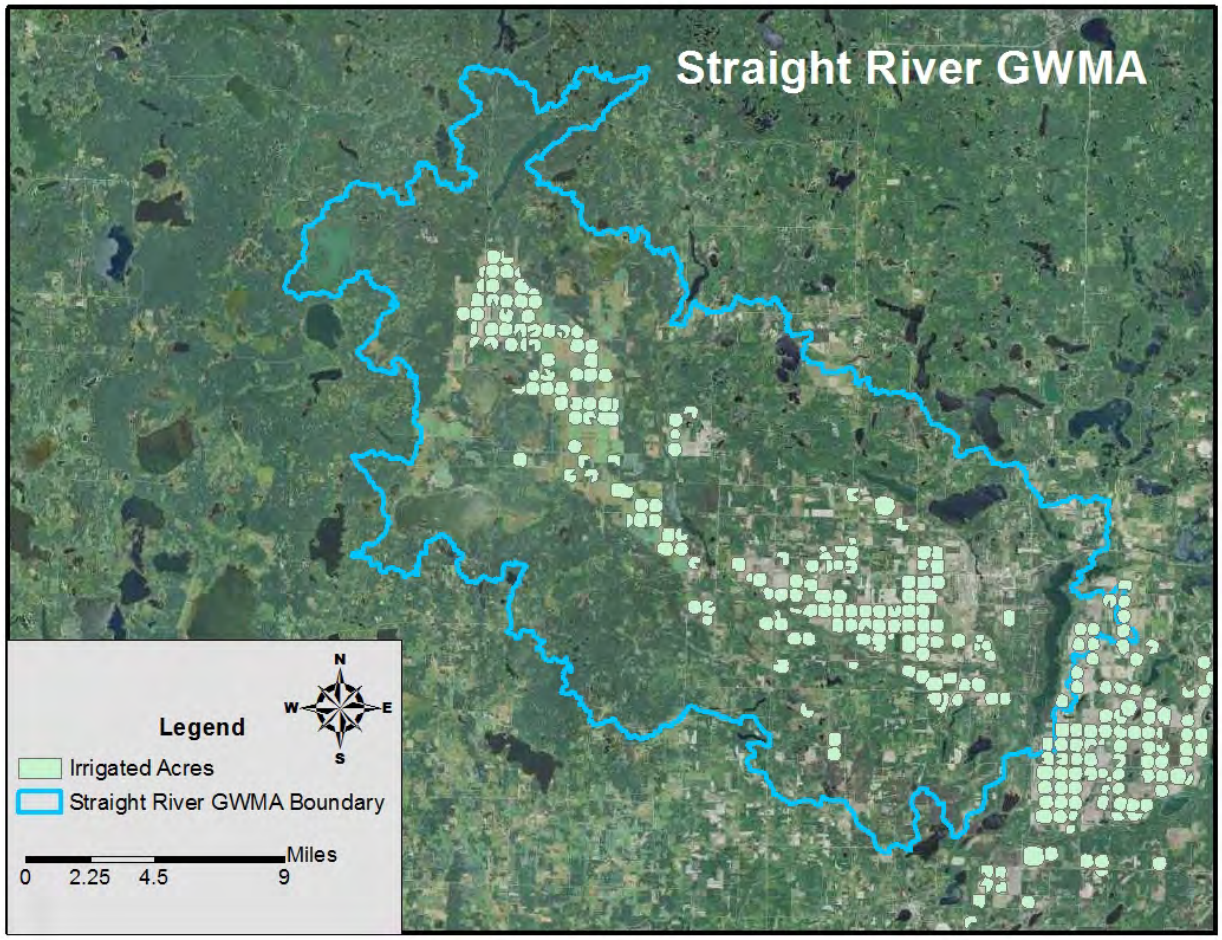

Figure 2-2 2014 Irrigated acreage in the Straight River GWMA

Hydrogeology, Soils and Topography

Hydrogeology defines the natural conditions and boundaries of the groundwater system. Groundwater moves through the geologic system both laterally (side to side) and vertically (up and down).

In three dimensions, the geologic formations found in the Straight River GWMA form a complex groundwater system that is interrelated with the surface water in the area. The surface water resources in this area are streams, lakes, and wetlands. The primary stream is the Straight River, a designated trout stream. Analyses by Stark et al (1994), Helgesen (1977), LaBaugh et al (1981), Siegel (1980) and Walker et al (2009) have shown that groundwater and surface water in this area is interconnected and heavily dependent on recharge from precipitation.

The landscape in the boundary area is generally flat or gently rolling terrain. The area was formed during the last glaciation event and consists of outwash (sands and gravels) and glacial till (sand, clays and silts). This area is part of a region referred to as the Pineland Sands (Figure 2-3). The soils in this region are primarily sandy loams and loams that are coarse textured and rapidly permeable (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx USDA, 2000).

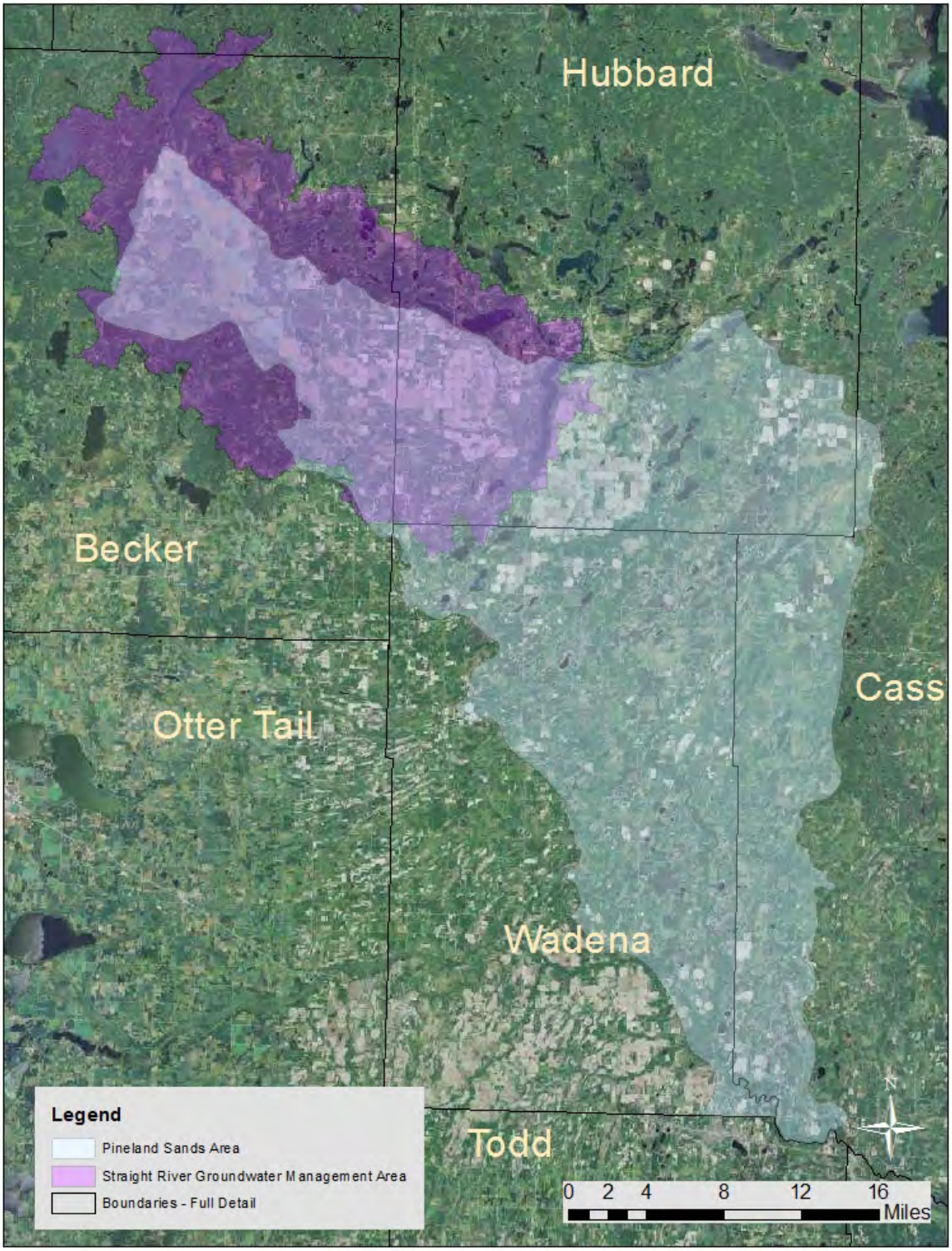

Figure 2-3 Straight River GWMA within context of the Pineland Sands

Two main aquifer types are found in the Straight River GWMA: water table aquifers (Quaternary Water Table Aquifers, or QWTA), which are the uppermost aquifers; and buried aquifers (Quaternary Buried drift Artesian Aquifers, or QBAA), which are found at various depths below the water table aquifer. The QWTA is a laterally extensive unconfined aquifer and is part of the Pinelands Sands aquifer (Helgesen, 1977) that extends through Becker, Cass, Hubbard, and Wadena counties. This outwash formation was deposited by flowing water during the melting of ice at the end of the most recent glacial event approximately 10,000 to 12,000 years ago.

Groundwater from both the QWTA and QBAA aquifers is the source of groundwater supply in the Straight River area. The water table aquifer and deeper buried drift aquifers occur in the Straight River GWMA and share a hydraulic relationship. This relationship has been understood through various scientific studies that include analysis of climate, aquifer testing and long term water level measurement collected from observation wells. A County Geologic Atlas does not yet exist for this area but is in process. When complete, the atlas should provide more information on the connectivity of these aquifers.

Water Use

Agricultural irrigation is the dominant water use within the Straight River GWMA (Figure 2-4). The 2013 permitted water use indicated substantial growth (85%) in water demands in the last 25 years, with most of the growth coming from agricultural irrigation. The statewide increase in water demands over this same period was 35%.

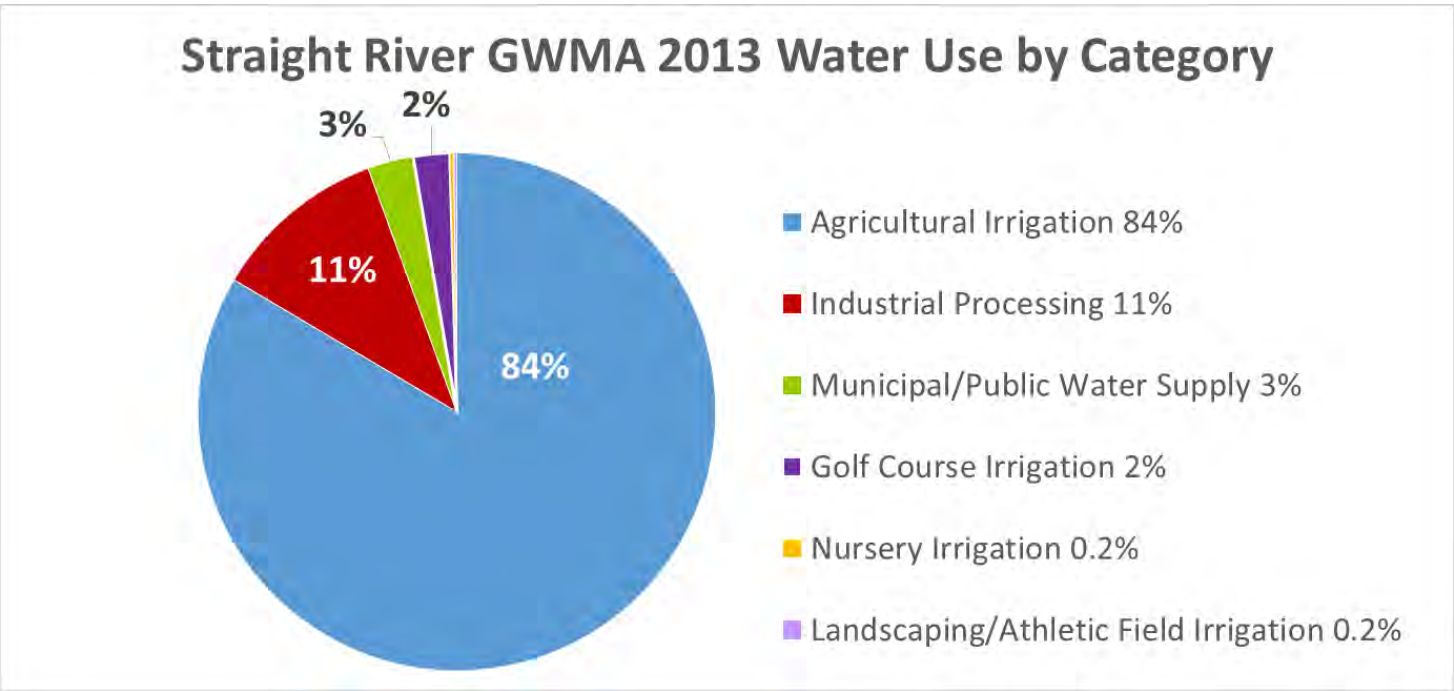

Figure 2-4 - Water use in the Straight River GWMA in 2013 by category

Groundwater appropriations and use

There were 214 active permits to appropriate groundwater in the Straight River GWMA at the beginning of 2014. As of December 2014, there were 252 active water appropriation permits (an 18% increase). There were also 75 inactive groundwater appropriation permits on file at the end of 2014. The DNR uses the Minnesota Permit and Reporting System (MPARS) to keep track of groundwater permit information.

The total number of domestic wells that have been installed in the Straight River GWMA is 2,357. Information on domestic wells is maintained by the Minnesota Department of Health and county governments, not the DNR.

Reported groundwater use for agricultural irrigation in the Straight River GWMA was 5.288 billion gallons in 2013 (Figure 2-5). Not all active permits are pumping or using water, so Figure 2-5 displays only those "permits with use".

Of the reported agricultural groundwater use in 2013, 84% was used for major crop irrigation. Agricultural irrigation has increased water use by an average of 77 million gallons of water per year since 1988.

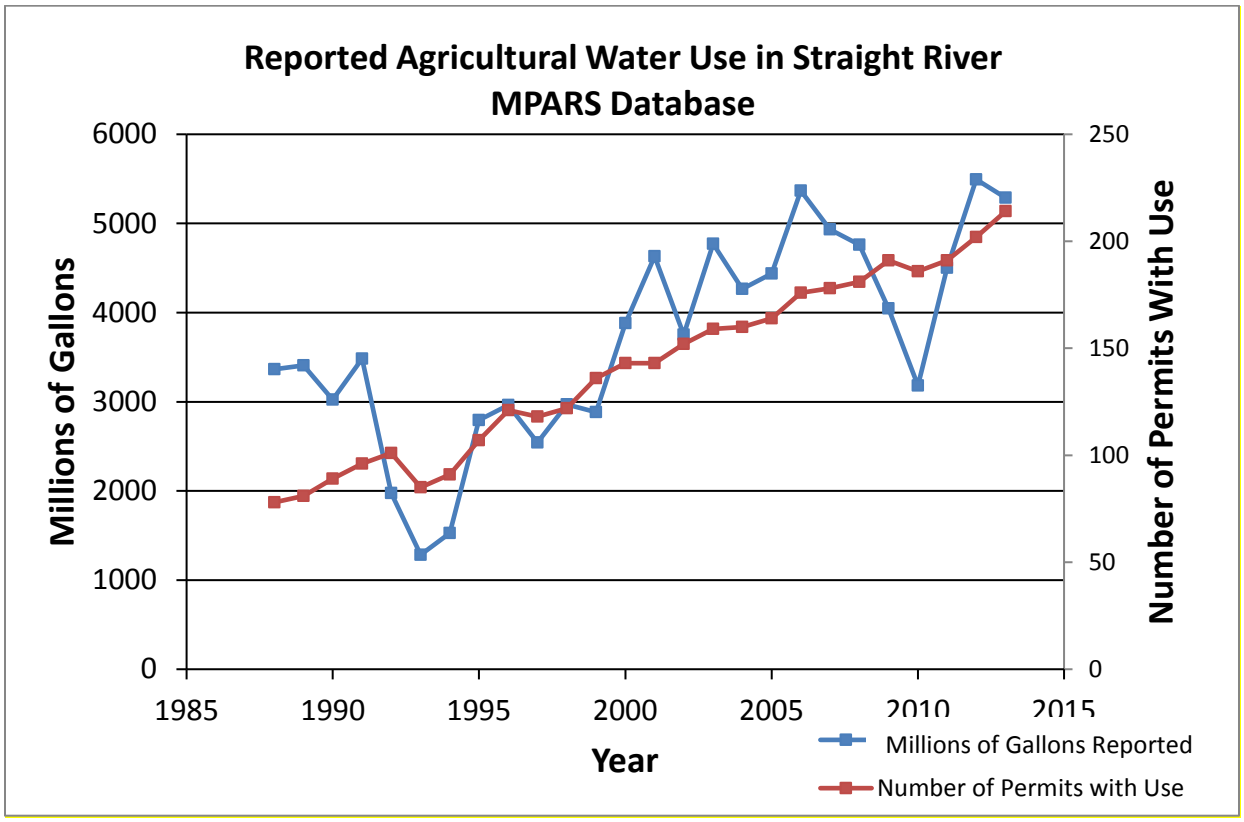

Figure 2-5 Agricultural groundwater use (1998 to 2013)

Groundwater use can change the amount of groundwater flowing toward and discharging into surface water features. The ecology of surface water features such as trout streams, calcareous fens, other wetlands, and springs can be sensitive to groundwater flow variations. Permit holders in the GWMA have helped develop important information to understand groundwater pumping impacts on surface water features through aquifer testing and water monitoring.

Water appropriation permits are designed to ensure that permitted volumes are reasonable, for a beneficial use, incorporate water conservation principles and help protect water quality. The DNR may require specific conservation practices as explicit conditions on some water appropriation permits. For example, some permits for golf course irrigation include conservation requirements.

Municipal Water Supply

Public water supply systems serving more than 1,000 people must have a water supply plan that is approved by DNR (Minn. Stat., 103G.291). In the Straight River GWMA, the City of Park Rapids is the

only city required to have such a plan. Water supply plans must address projected demands, adequacy of the water supply system and planned improvements, existing and future water sources, natural resource impacts or limitations, emergency preparedness, water conservation, supply and demand reduction measures, and allocation priorities that are consistent with MN Statutes section 103G.261. Public water suppliers must update their plan and, upon notification, submit it to the commissioner for approval every ten years.

Water supply planning provides an opportunity for DNR to engage with public water suppliers on conservation issues. Public water suppliers set goals for residential per capita demand, maximum- to average-day demand, and unaccounted for water in these plans. These goals may be updated when suppliers renew their plans. Water supply plans may include other conservation measures such as ordinances that set odd/even sprinkling restrictions to reduce peak demand.

Water Dependent Natural Resources

The GWMA boundary was defined in part based on natural resource considerations, particularly the surface water features that are most influenced by changes in groundwater levels. The boundary includes unique ecological features that are directly connected to the hydrogeology of the GWMA. Understanding and managing groundwater appropriations will have a direct impact on the health of these natural resources. The following features exist within the Straight River GWMA:

- Three designated trout streams (the Straight River, Upper Straight Creek, Straight Lake Creek)
- Other streams that are sustained by lesser groundwater contributions
- Lakes that may be influenced by changing aquifer levels
- Wetland complexes across the entire area
- 19 types of groundwater-associated native plant communities
- 14 State-listed rare plant and animal species associated with groundwater
- Numerous additional plant and animal species that inhabit streams, lakes, and wetlands associated with groundwater

Trout Streams

The Department of Natural Resources has authority to designate trout streams, which provides increased protection from alterations and appropriations. In addition, the Minnesota Pollution Control Agency (MPCA) maintains higher water quality standards for cold water streams to protect these sensitive systems.

Three designated trout streams are found within the GWMA boundary: the Straight River, Upper Straight Creek and Straight Lake Creek. Upper Straight Creek and Straight Lake Creek are north of Straight Lake and are considered the headwaters of the Straight River.

The flows in the Straight River and its headwaters are strongly influenced by groundwater contributions, and the health of this stream is dependent upon a steady supply of groundwater. These streams provide habitat for a unique community of animals, including invertebrate groups such as midges, caddis flies, stoneflies, and mayflies, several mussel species, and several fish species including trout. Changes in groundwater flow to these trout streams due to pumping are an important consideration in determining whether use is remaining sustainable.

Streams, Lakes and Wetlands

The Straight River Ground Water Management Area is rich in surface water features – streams, lakes and wetlands (Figure 2-6). Water levels and/or chemistries of many of the lakes, streams and wetlands are strongly influenced by groundwater or have at least some hydraulic connection to the regional

groundwater system. Many lakes, streams and wetlands, therefore, may be affected by changes in groundwater elevations.

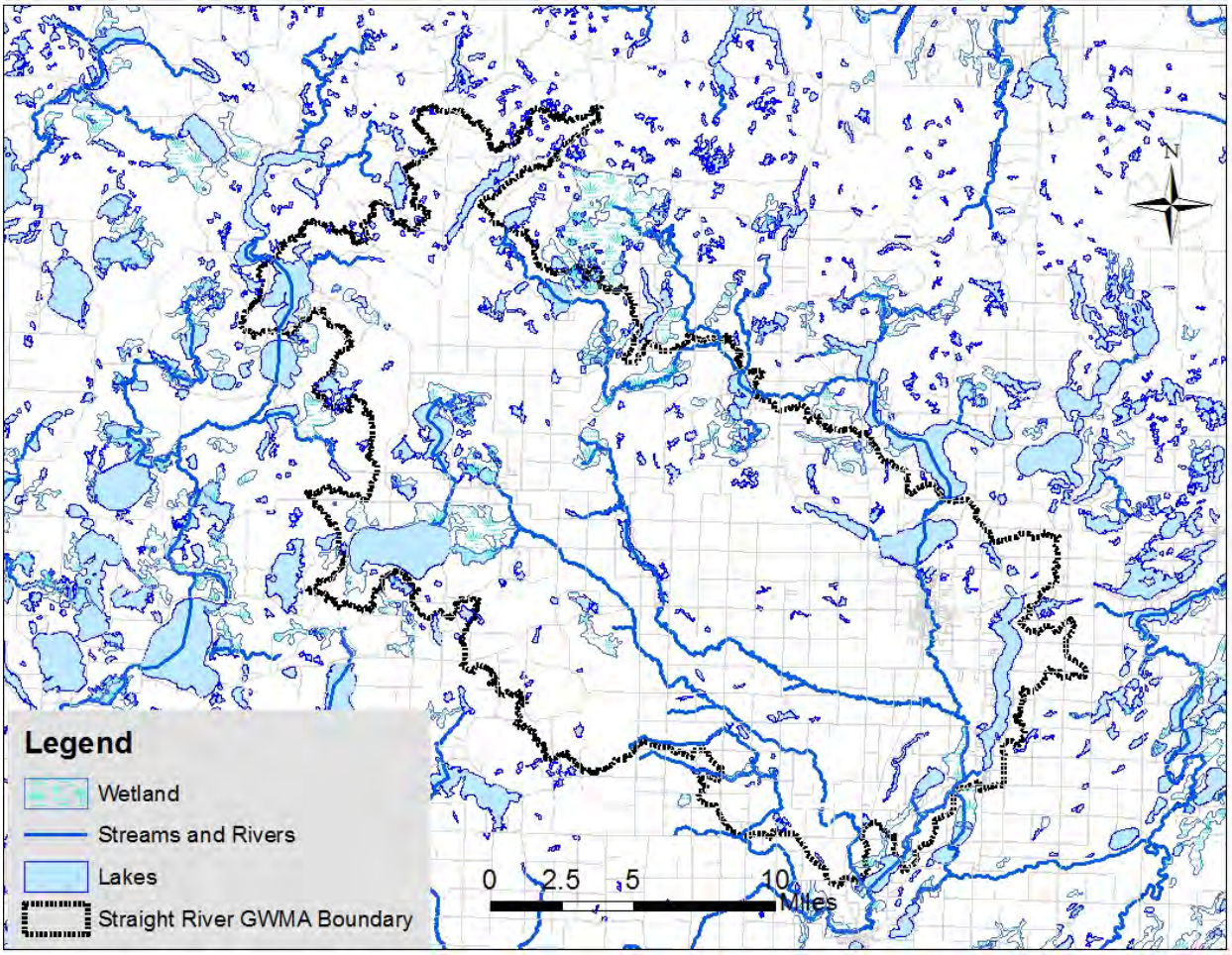

Figure 2-6 Surface water features within and around the Straight River GWMA

There are an estimated 28 public watercourses (streams) and 172 public water basins (lakes and wetlands) within the GWMA**.** All public waters are subject to regulation under MN Statute 103G. Many public water basins and wetlands are small and very shallow and are strongly influenced by fluctuations in groundwater levels.

The presence of cold water fish species like brook and brown trout and cold/cool water dependent aquatic insect species in some of the other streams in the GWMA (not designated as trout streams) indicates the contribution of groundwater to their flow. The presence of several sensitive fish species and species of aquatic insects in many streams in the area indicate good to excellent water quality. A few stream reaches in the GWMA have aquatic insect assemblages lacking cold water taxa and a diversity of functional feeding groups due to a lack of coarse substrate or poorer stream morphological characteristics. Biological impairments in a few stream reaches, particularly in the upper Shell River sub-watershed, may be due to natural factors like wetlands or beaver impoundments, but are more likely due to dams, poor road crossing structures, land use changes, or other anthropogenic causes. Over time and space, many factors may limit a biological population. Often habitat quantity and quality are found to limit populations, and hydrologic conditions are considered the primary determinant of habitat conditions in streams.

Lakes in the GWMA are varied. Large, deep lakes like Bad Medicine, Many Point, Straight, Long and Fish Hook are oligotrophic or mesotrophic, have good to excellent water quality, and support cold water fish species like trout or tullibee (cisco). Shallower, sometimes smaller basins like Shell, Big Rush, Portage, or Moran are often mesotrophic to eutrophic and may experience periodic winter fish kills. Despite that, all the larger lakes in the GWMA support good to excellent populations of game fish and are heavily used for angling, other recreation, and are often heavily developed with lake homes or seasonal cabins.

The smaller, shallower lakes and wetlands are difficult environments for native game fish to overwinter and sustain their populations. In some basins, particularly deeper ones or those with flowage connections to rivers and tributaries, populations of fish species like northern pike, bullheads, or other non-game fish or minnow species may be supported. These basins are important for catching runoff, filtering nutrients and groundwater recharge, and can provide excellent wildlife habitat.

Rare Natural Features of the Straight River Watershed

Rare natural features contribute to the health of the habitat and environment that surrounds us. Some even contribute directly to local economies in the form of outdoor recreation, such as wildlife viewing, camping, hunting and fishing. Rare features can include species of unique plants and animals, as well as native plant communities.

There are many rare and uncommon plants, animals and plant communities in the Straight River Watershed (Figure 2-7). The majority of the rare vegetative features are concentrated in two distinct areas. One surrounds Big Rush Lake in Becker County and the other one is along the headwaters of the Straight River in Becker County.

The communities associated with groundwater and seepages are dominated by large forested rich peatland complexes, consisting of four different plant communities. One of these, the white cedar swamp, is vulnerable to extirpation while the other three are considered fairly secure. There are five different open peatlands, one imperiled, one vulnerable to extirpation, and the rest considered fairly secure. There are two wet forest communities, one vulnerable to extirpation while the other is considered relatively secure. There are two wet meadow communities, both considered secure. Additionally, there is a wet-mesic to mesic northern hardwood forest that is vulnerable to extirpation.

Straight River Headwaters Area

Intermixed through the area surrounding the headwaters of the Straight River are the majority of state-listed rare orchid flora and other special concern plants and animals. Included in this group are the bog adder's mouth orchid (an endangered plant), the white adder's mouth (a special concern species), and the limestone oak fern (a state special concern species). All three of these are threatened by changes in the hydrologic regime of their habitat and damage to the soil and tree cover. Also found here are a variety of birds, including the Virginia rail, the swamp sparrow, the trumpeter swan and the common loon, all of which are special concern species or species of greatest conservation need threatened by habitat degradation and loss.

The majority of state forest land in this area is designated as a high conservation value forest, named Straight River Headwaters (aka Belden Swamp). The site is described as a large forested, rich peatland complex that contains the headwaters of the Straight River, with a diverse and rare orchid flora. There is subsurface water movement beneath the swamp conifers, and the site is home to one of the two cedar swamp sites in the county that are identified as candidate old growth sites. Upland areas contain significant acreage of two native plant communities designated as critically imperiled to vulnerable.

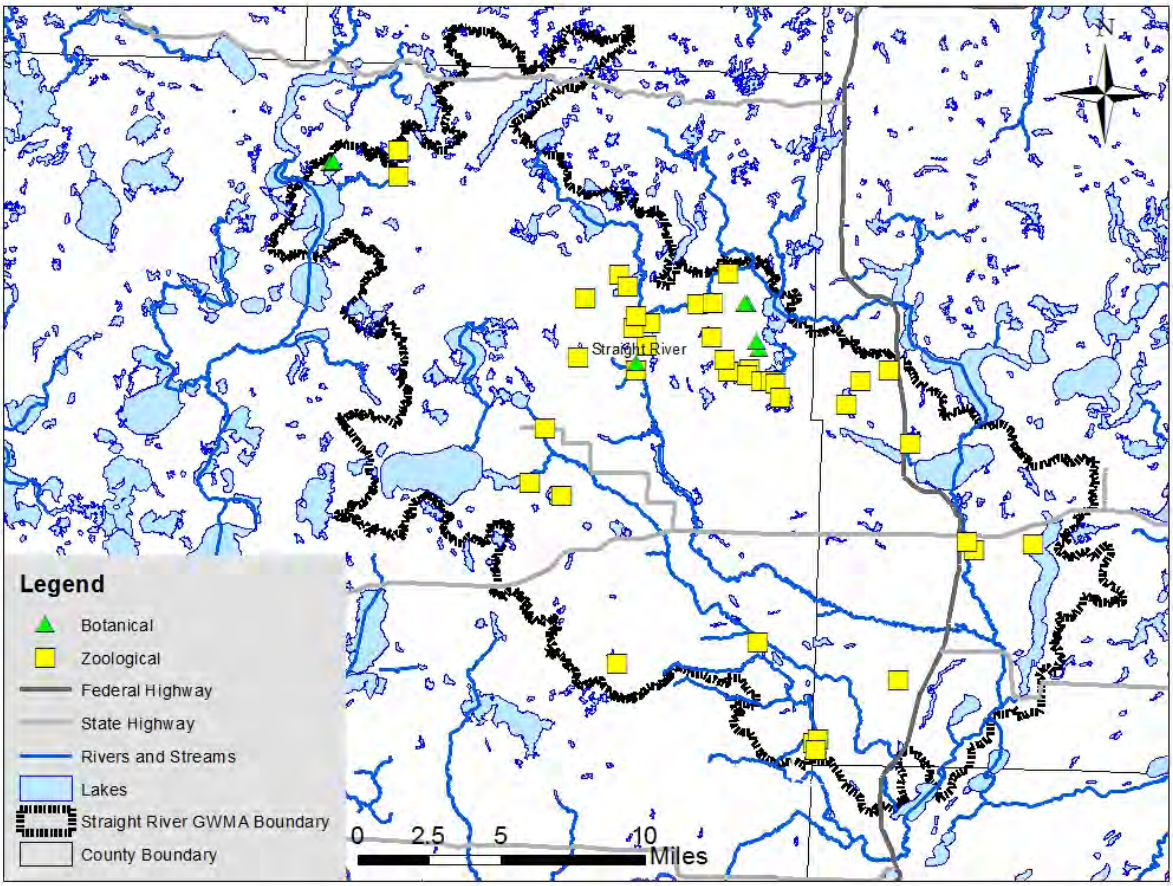

Figure 2-7 Straight River rare and natural features associated with groundwater

Fish Hook River

Along the Fish Hook and Straight Rivers in Hubbard County, there is another fairly large assemblage of rare species. These include the creek heelsplitter and black sandshell (both special concern mussels threatened by degradation of the stream habitat), the least darter (a special concern fish threatened by habitat loss and stream degradation), and a variety of birds, including the trumpeter swan, threatened by habitat degradation and loss.

Groundwater Associated Native Plant Communities of the Straight River Watershed

All of the following rare or vulnerable communities are directly dependent upon the water table for their health and stability. Thus they are highly susceptible to any disturbance to the groundwater system. As Figure 2-7 shows, they are all mapped associated with groundwater and seep areas. Associated with these areas are many additional examples of communities that were too small to have been mapped by the Minnesota Biological Survey.

The Spring Fen: this community is typically found in the vast peat bogs to the north, and is extremely rare this far south. It is only found where highly calcium-rich groundwater is discharged from underlying calcareous mineral soil and is forced up through artesian pressure. These communities are characterized by high pH (>7.0), high Ca++ concentrations, cold water temperatures, low dissolved oxygen content and high water levels. This combination of hydrologic conditions favors the development of specialized and

unique plants and plant communities and is very rare. This community is typically dominated by fine-leaved sedges and rushes with little or no shrub or tree cover.

Graminoid Rich Fen: this community is typically found in the vast peat bogs to the north, and is extremely rare this far south. It is only found in peatlands where there is significant lateral subsurface water flow. This lateral flowing groundwater is mineral-rich resulting in a surface water chemistry that is nutrient poor but with sufficient mineral concentration to maintain a pH >5.5. This mineral-rich groundwater typically emanates from areas of calcareous glacial till and flows beneath dense clayey sediments, until it reaches lenses of sand or coarse-textured material and percolates to the surface. This community is typically dominated by fine-leaved grasses and sedges with scattered, stunted, thick-leaved, shrubs.

White Cedar Forest: this community is typically found north and east of this region and is quite uncommon here. It is found where saturated soils are present throughout most of the growing season, typically in small closed depressions, along the borders of large wetlands, on gently sloping drains or at the toes of slopes in areas of groundwater discharge. This community is typically dominated by white cedar, with the understory relatively open.

Aspen-Birch-Fir Forest: this community is typically found north and east of this region and is generally not found this far south and west. It is found on the concave lower portion of slopes with a fine-textured calcareous till and locally high water table. The clayey soil tends to perch snow and rainwater creating a moist to very moist soil. The community is typically dominated by mesic to wet-mesic hardwood and hardwood-conifer forests, such as quaking aspen, balsam fir and paper birch.

White Cedar Swamp: this community is typically found NE of this area. It is found on wet peat in small basins associated with stream channels or near lakes. It grows where there is access to mineral-rich subsurface water flow. It has a varied micro-topography which contributes to structural complexity and relatively high species diversity. This community is typically dominated by white cedar.

No calcareous fens have been identified to date in the Straight River GWMA.

Table 2.1 Native plant communities closely associated with groundwater in the Straight River GWMA

Native Plant Community Code	NPC Name	Conservation Status Rank *	*Closely* Associated with groundwater/ seepage	*Often* Associated with groundwater/ seepage
FPn63b	White Cedar Swamp (N Central)	S3	X - not seepage	X
FPn73a	Alder - (Maple - loosestrife) Swamp	S5	X - not seepage	X
FPn82	White Cedar Swamp (N Central) Western Basin)		X - not seepage	
FPn82a	Rich Tamarack - (Alder) Swamp	S5	X - not seepage	
FPn82b	Extremely Rich Tamarack Swamp	S4	X - not seepage	
MHn44d	Aspen - Birch - Fir Forest	S3		X
OPn81a	Bog Birch - Alder Shore Fen	S5	X - seepage	
OPn92	Northern Rich Fen (Basin)		X - seepage	
OPn92a	Graminoid Rich Fen (Basin)	S4	X - seepage	
OPn92b	Graminoid - Sphagnum Rich Fen (Basin)	S4	X - seepage	
OPn93a	Spring Fen	S2	X - seepage	
WFn53b	Lowland White Cedar Forest (Northern)	S3	X - seepage	
WFn55	Northern Wet Ash Swamp		X - seepage	
WFn55c	Black Ash - Mountain Maple Swamp (Northern)	S4	X - seepage	
WFn64c	Northern Black Ash - Alder Swamp	S4	X - not seepage	
WMn82	Northern Wet Meadow/Carr			X
WMn82a	Willow - Dogwood Shrub Swamp	S5		X
WMn82b	Sedge Meadow	S4 S5		X

*S2 = State Imperiled; S3 = State Vulnerable to Extirpation; S4 = State Apparently Secure, Uncommon but Not Rare; S5 = State Secure, Common, Widespread, and Abundant

Table 2.2 Rare species closely associated with groundwater in the Straight River GWMA

Rare Plants				
Scientific name	**Common Name**	**State Ranking***	**General Habitat Type**	**Associated with Water**
Astragalus neglectus	Cooper's Milk-vetch	Watchlist	Woodland-prairie ecotone	
Carex hookerana	Hooker Sedge	SPC	Fire-dependent Forest	
Carex obtusata	Blunt Sedge	SPC	Upland Prairie; Savanna	
Cirsium pumilum var. hillii	Hill's Thistle	SPC	Upland Prairie; Savanna	
Cypripedium arietinum	Ram's-head Lady's-slipper	THR	Fire-dependent Forest and Forested Rich Peatland	X
Gymnocarpium robertianum	Limestone Oak Fern	SPC	Forested Rich Peatland	X
Malaxis monophyllos var. brachypoda	White Adder's-mouth	SPC	Forested Rich Peatland	X
Malaxis paludosa	Bog Adder's-mouth	END	Forested Rich Peatland	X
Najas gracillima	Thread-like Naiad	SPC	Aquatic- Lake	X
Scirpus pedicellatus	Woolgrass	Watchlist	Meadows, swamp openings	X
Sparganium glomeratum	Clustered Bur-reed	Watchlist	Marsh, Forested peatlands	X
Stuckenia vaginata	Sheathed Pondweed	END	Aquatic- Lake	X

Rare Animals				
Scientific name	**Common Name**	**State Ranking***	**General Habitat Type**	**Associated with Water**
Botaurus lentiginosus	American Bittern	Watchlist	Marsh; Lake Littoral Zone	X
Buteo lineatus	Red-shouldered Hawk	SPC	Mature deciduous forest	
Cygnus buccinator	Trumpeter Swan	SPC	Marsh; Lake Littoral Zone	X
Etheostoma microperca	Least Darter	SPC	Small Rivers/Streams; Lake Littoral Zone	X
Haliaeetus leucocephalus	Bald Eagle	Watchlist	Forested to wet areas; throughout	X
Lasmigona compressa	Creek Heelsplitter	SPC	Small Rivers/Streams	X
Ligumia recta	Black Sandshell	SPC	Medium/Large Rivers/Streams	X

* END = Endangered; THR = Threatened; SPC = Special Concern; Watchlist = Watchlist

Water Quality

Water quality affects the availability and cost of groundwater in the GWMA. Contaminated groundwater may not be available for use by individuals, industry or cities unless it undergoes treatment. Consumers may have to use deeper aquifers or rely on surface water sources. Contaminated groundwater also presents a risk to the connected ecosystems (lakes, streams and wetlands), impacting the species that live there and the people who use these water bodies to live, work, and recreate.

Minnesota Statute 103G.287 directs the DNR to consider the effects of water quality in water appropriations. Management activities in the Straight River GWMA will require continued coordination between the existing state agencies that are responsible for groundwater and surface water quality, including: Minnesota Department of Agriculture (MDA), the Minnesota Department of Health (MDH), the Minnesota Pollution Control Agency (MPCA), Board of Water and Soil Resources (BWSR) and the DNR.

Jurisdictions, Governance and Planning

Cities, counties, watershed districts and other local units of government play a critical role in planning and managing for long term water supply and water sustainability. Implementing practices to improve water quality and quantity relies heavily on local plans such as comprehensive local water management plans, watershed district plans, county comprehensive plans and city comprehensive plans. These plans are authorized by Minnesota Statute.

The Straight River GWMA encompasses parts of:

- 4 counties
- 15 townships
- 3 cities
- 2 Minnesota House of Representative Districts
- 1 Minnesota Senate Districts, and
- 3 Soil and Water Conservation Districts (Hubbard, Becker and a small part of Wadena Counties).

Local water governance in the Straight River GWMA is guided by the City of Park Rapids and the counties where the majority of the GWMA lays, i.e., Hubbard, Becker and Wadena Counties.

Comprehensive local water management is guided by local water management plans whose adoption and implementation are based on local priorities. As a general-purpose unit of government, counties, with their planning and land-use authorities, are uniquely positioned to link many land-use decisions with local goals for surface and groundwater protection and management. BWSR has oversight responsibilities to ensure that local water plans are prepared and coordinated with existing local and state efforts and that plans are implemented effectively. All parts of Minnesota have locally adopted and state-approved plans in place.

State of Minnesota jurisdiction for the Straight River GWMA is guided, in part, by Minnesota Statutes, section 103G.287, which states, “The commissioner may designate groundwater management areas and limit total annual water appropriations and uses within a designated area to ensure sustainable use of groundwater that protects ecosystems, water quality, and the ability of future generations to meet their own needs. Water appropriations and uses within a designated management area must be consistent with a plan approved by the commissioner that addresses water conservation requirements and water allocation priorities established in section 103G.261.”

3. The Goal and Objectives

Section 3 of the plan describes the goal and objectives for groundwater management, including supporting statutes and rules. The goal for the GWMA expresses a future desired condition for the area. The goal for the GWMA is:

> *In the Straight River Groundwater Management Area, the use of groundwater will be sustainable and therefore will not harm ecosystems, water quality, or the ability of present and future generations to meet their needs.*

The goal is drawn directly from the Minnesota Statutes for groundwater appropriations, Minn. Stat. sec. 103G.287, subd. 3, 4 and 5. These statutes describe protection of groundwater supplies, designation of groundwater management areas, and a standard of sustainability.

Groundwater use is defined as sustainable if that use:

- Does not harm aquifers and ecosystems
- Does not negatively impact surface waters
- Is reasonable, efficient and meets water conservation requirements
- Does not degrade water quality
- Does not create unresolved well interferences or water use conflicts

To attain the goal for the GWMA, this Plan sets five management objectives that define how these statutory requirements can be met. All of the management objectives must be achieved to ensure that use of groundwater is sustainable.

These objectives are:

I. *Groundwater use in the GWMA does not harm aquifers and ecosystems, and does not negatively impact surface waters.*
II. *Groundwater use in the GWMA is reasonable, efficient, and complies with water conservation requirements.*
III. *Groundwater use in the GWMA does not degrade water quality.*
IV. *Groundwater use in the GWMA does not create unresolved well interferences or water use conflicts.*
V. *All groundwater users in the GWMA have the necessary permits to use groundwater.*

The remainder of Section 3 describes each of the objectives in more detail.

Objective I. Groundwater use in the GWMA does not harm aquifers and ecosystems, and does not negatively impact surface waters.

Groundwater and surface waters together make up a connected hydrologic system that is affected by climate, geology and soils, land use and land cover, water use, and water quality changes. Therefore, impacts to aquifers, ecosystems, and surface waters resulting from water appropriations are related under this objective.

Aquifer Sustainability

The first part of this objective deals with preventing harm to aquifers. The purpose is to ensure that groundwater continues to be available for use in the future while protecting ecosystems and surface waters (described below). Groundwater use always reduces aquifer storage unless there is an equivalent increase in recharge through surface-water infiltration. Limits on appropriations can help ensure aquifer sustainability.

In Minnesota Rules, parts 6115.0630 and 6115.0670, the concept of *safe yield* is used as the measure of limits on allowable groundwater use. The concept looks at the impact that water withdrawals from an aquifer have on aquifer water quality levels, and pressure (sometimes referred to as 'heads'). It does not address potential impacts to other resources such as surface waters. Safe yield is defined separately for water-table aquifers and for artesian (confined) aquifers (see Section 7 for glossary of terms).

For confined aquifers, a water elevation level in an observation well (obwell) may be set as a threshold for aquifer protection that ensures compliance with safe yield (Figure 3-1). To protect the aquifer from being drawn down too far, 25 percent of the 'available' head (water height above the top of the aquifer, before pumping) must remain in an observation well. A warning threshold of 50 percent of the available head may be established to allow time for contingency plans to be put in effect if water levels decline.

For water-table aquifers, safe yield is a total use rate that does not exceed the long-term average recharge rate (Minn. Rules 6115.0630). In short, output (pumping) for the aquifer does not exceed input (recharge) over the long term. Again, this does not account for impacts to surface waters, which are addressed in the next section. Pumping from confined aquifers typically causes water from the water table aquifer to flow down into the confined aquifers. Therefore, safe yield should be determined based on both direct and indirect withdrawals from water-table aquifers.

Water levels that have stabilized to a pattern of variations above the threshold indicate compliance with safe yield. Understanding pumping history and measured water levels is important when evaluating compliance with safe yield.

Declining water levels that remain above the threshold are expected in some situations, even while use remains within the safe yield. This occurs if pumping rates gradually increase over time, the system has not come into equilibrium with recent pumping rates, or natural fluctuations create a temporary downward trend.

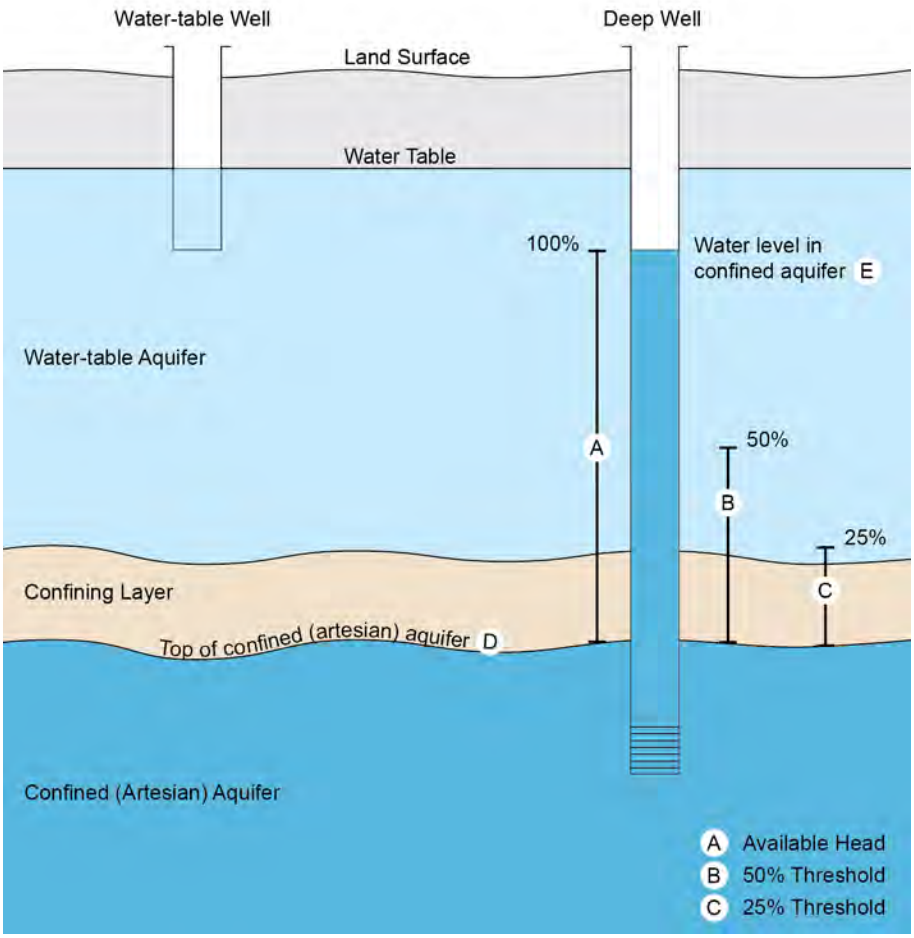

Figure 3-1 Safe yield thresholds

Schematic showing water-table and confined (artesian) aquifer conditions in relation to safe yield thresholds. The available head in the confined (artesian) aquifer is the distance (A) between the top of the confined aquifer (D) and the water level (E) in the deep well when not affected by pumping. The 50% threshold (B) is halfway between the top of the confined aquifer and the current water level in the deep well. The 25% threshold (C) is one-fourth of the way between the top of the confined aquifer and the current water level in deep well. Water levels in a confined aquifer must not stabilize below the 25% safe yield threshold.

Ecosystems and Surface Waters

The second part of Objective I deals with harm to ecosystems and negative impacts to surface waters when groundwater is overused. The groundwater system is part of the water cycle, eventually destined to discharge to surface waters such as rivers, lakes, wetlands, or springs. Taking groundwater from water table aquifers can divert water from streams, lakes, and wetlands. Overuse of groundwater can significantly alter surface water features and the biological communities, recreation, and other uses that those waters support.

Surface water appropriations are governed by Minn. Stat., sec. 103G.285. Groundwater appropriations are governed by Minn. Stat., sec. 103G.287. Groundwater appropriations may also be subject to additional limits based on their surface water impacts as follows (Minn. Stat, sec. 103G.287, subd. 2):

Groundwater appropriations that will have negative impacts to surface waters are subject to applicable provisions in section 103G.285.

Surface-water pumping (appropriation) has a direct and immediate effect on flow or water level in the surface water features from which the water is withdrawn. The same is not true for groundwater appropriations. Determining whether groundwater appropriations have negative impacts to surface waters is complex. Generally, the effect on connected surface water features is both delayed and spread out or 'flattened' in time and is typically distributed among multiple water features.

Several statutes frame the determination of negative impacts to surface waters:

1. Appropriations from lakes listed in Bulletin 25[1] are limited to a total annual volume of water amounting to 1/2 acre-foot per acre of water basin (6 inches over the surface area of the water body) (Minn. Stat., sec. 103G.285, subd. 3). Statute also calls for the setting of protective elevations that consider aquatic vegetation, fish and wildlife, recreation, existing uses, and slope of the littoral zone. Appropriations from small lakes (< 500 acres) must be discouraged because of their greater vulnerability (Minn. Stat., sec. 103G.261, item d).
2. Appropriations taken directly from surface water bodies are limited according to the requirements establishing and enforcing *protected flows* for streams and rivers or *protective elevations* for lakes and wetlands (Minn. Stat., sec. 103G.285). These are intended to accommodate the range of needs and uses of water bodies. For surface-water appropriations, consumptive appropriations may not be made from watercourses during periods of specified low flows (i.e. protected flows) or from lakes and wetlands when water levels are below the protective elevation (Minn. Stat., sec. 103G.285, subd. 2 and 3).
3. Minnesota Statutes protect trout streams from surface water appropriations (Minn. Stat., sec. 103G.285, subd. 5) because they are particularly dependent on steady flow, stable cold water temperatures, and sufficient oxygen levels. These conditions depend on a steady supply of groundwater from springs or diffuse seepage. The goal is to limit stream depletion due to groundwater pumping.
4. Public water wetlands may not be drained unless replaced (Minn. Stat., sec. 103G.221), and temporary drawdown is only allowed if certain conditions are met, including: improving navigation and recreational uses, improving fish or wildlife habitat, exposing sediments in order to remove nutrients or contaminants, to alleviating flooding of agricultural land or allowing mining of metals (Minn. Rules, part 6115.0270).
5. Public water wetlands may not be drained unless replaced (Minn. Stat., sec. 103G.221), and temporary drawdown is only allowed if certain conditions are met, including: improving navigation and recreational uses, improving fish or wildlife habitat, exposing sediments in order to remove nutrients or contaminants, to alleviating flooding of agricultural land or allowing mining of metals (Minn. Rules, part 6115.0270).

The 2015 Minnesota Legislature directed the DNR (Laws of Minnesota 2015, First Special Session, chapter 4, article 4, section 143), to take the following actions concerning sustainability thresholds: "the commissioner of natural resources shall consult with interested stakeholders and submit a report to the Legislative Water Commission and the chairs and ranking minority members of the house of representatives and senate committees and divisions with jurisdiction over the environment and natural

[1] DNR Staff, 1968. An Inventory of Minnesota Lakes. Division of Water, Soils and Minerals, Minnesota Conservation Department. Bulletin 25, 498 p.

resources policy and finance on recommendations for statutory or rule definitions and thresholds for negative impacts to surface waters as described in Minnesota Statutes, sections 103G.285 and 103G.287, subdivision 2. Stakeholders must include but are not limited to agricultural interests; environmental interests; businesses; community water suppliers; state, federal, and local agencies; universities; and other interested stakeholders.

In January 2016, the DNR submitted a report entitled: "Report to the Minnesota State Legislature: Definitions and Thresholds for Negative Impacts to Surface Waters." The DNR will use the approach described in this report to determine if negative impacts to streams, lakes, or wetlands are occurring due to groundwater appropriation within the GWMA. (The report is available on the DNR website. The executive summary of the report provides a succinct description of the approach, and it is included in this plan as Appendix D.)

Section 5 of the GWMA Plan provides a set of actions to meet Objective I.

Objective II. Groundwater use in the GWMA is reasonable, efficient, and complies with water conservation requirements.

Water conservation is a key component of ensuring sustainability and an important objective within the GWMA. Efficient use increases the water available for current and future uses and can help reduce stress on the water resource. Explicit conditions may be placed on appropriation permits that require conservation practices appropriate to a specific use.

Conservation Requirements for Municipal Systems

Minnesota Statute, sec. 103G.291 requires public water suppliers serving more than 1,000 people to implement demand reduction measures by January 1, 2015. The City of Park Rapids is the only municipality within the GWMA that serves more than 1,000 people.

The measures must include a rate structure or outline a program that achieves demand reduction. Minnesota Statute, sec. 103G.291 also requires public water suppliers to adopt and enforce water-use restrictions when the governor declares a critical water deficiency. The restrictions must limit watering lawns, washing vehicles, irrigating golf courses and parks, and other nonessential uses.

Demand reduction measures reduce water use and must include a conservation rate structure or a conservation program. Demand reduction measures have been incorporated into the City of Park Rapids Water Supply Plan. The City of Park Rapids' new water supply plan is due in 2017.

Agricultural Irrigation

New water use permit applications for agricultural irrigation include a check box to indicate if a soil and water conservation plan has been approved by the local SWCD. Conservation conditions can also limit the amount of water reasonably needed for a particular agricultural situation (soil types, climate, and crop type).

Other Appropriation Categories

Although specific data are not tracked for other categories of water use, there are conservation-related conditions on some other permits. Conservation requirements have been developed for golf courses

and apply to newer permits or permit amendments. Typical permit language requires that the permitees shall, whenever practical and feasible, employ water conservation techniques and practices.

Non-permitted water users across the GWMA should also practice water conservation. The DNR supports conservation requirements for private and non-permitted use established through local jurisdictions such as watershed districts and municipal governments.

Section 5 of the GWMA Plan provides a set of actions to meet Objective II.

Objective III. Groundwater use in the GWMA does not degrade water quality.

Minnesota Statute 103G.287, directs the DNR to consider the effects of water quality in water appropriations. Management activities in the Straight River GWMA will require continued coordination between the existing state agencies that are responsible for groundwater and surface water quality, including: Minnesota Department of Agriculture (MDA), the Minnesota Department of Health (MDH), the Minnesota Pollution Control Agency (MPCA), Board of Water and Soil Resources (BWSR) and the DNR.

Pumping groundwater does not directly degrade the quality of the water in the aquifer in most circumstances, unless too much water is applied and nutrients are flushed out of the rooting zone. However, excessive pumping can cause water levels in wells to fall below the top of a buried aquifer, resulting in conversion to a water-table condition. In some circumstances this can lead to changes in water chemistry and degradation of water quality. Compliance with safe yield for buried aquifers prevents this situation from occurring as described under Objective I.

The effects of groundwater pumping on existing contamination must be considered when evaluating groundwater appropriation permits. Groundwater pumping can cause existing groundwater pollution to move or spread. Changes in groundwater levels and pressures can increase the movement of pollutants between aquifers or increase the spreading of pollutants within the same aquifer.

In some cases, pollution containment wells are used to limit movement of contaminated groundwater into less or uncontaminated areas of the aquifers. The MPCA, in cooperation with the responsible parties, determines duration and volume of pumping to contain pollution plumes and limit the movement or spreading of groundwater contamination.

Finally, water quality considerations in surface-water features must be incorporated into groundwater appropriation thresholds for surface-waters. Changes to the amount of groundwater flow into surface-water features can affect elements of water quality such as temperature, oxygen levels and contaminants.

Section 5 of the GWMA Plan provides a set of actions to meet Objective III.

Objective IV. Groundwater use in the GWMA does not create unresolved well interferences or water use conflicts.

The purpose of this objective is to manage water appropriations in accordance with the allocation priorities in Minn. Stat., sec. 103G.261. Domestic water use is the first priority for allocation of waters.

> (1) first priority, domestic water supply, excluding industrial and commercial uses of municipal water supply, and use for power production that meets the contingency planning provisions of section 103G.285, subdivision 6;
> (2) second priority, a use of water that involves consumption of less than 10,000 gallons of water per day;
> (3) third priority, agricultural irrigation, and processing of agricultural products involving consumption in excess of 10,000 gallons per day;
> (4) fourth priority, power production in excess of the use provided for in the contingency plan developed under section 103G.285, subdivision 6;
> (5) fifth priority, uses, other than agricultural irrigation, processing of agricultural products, and power production, involving consumption in excess of 10,000 gallons per day; and
> (6) sixth priority, nonessential uses.

A *well interference* problem occurs when groundwater appropriation causes the water level in public water supply well(s) or private, domestic well(s) to fall below the reach of those wells (Minn. Stat., sec. 103G.287 subd. 5 and Minn. Rules, part 6115.0730). According to Minn. Stat., sec. 103G.287, subd. 5, this applies to public water supply and private domestic wells constructed according to the state well code (Minn. Rules, part 4725). An interference complaint can only be valid for a domestic well if that well was constructed before appropriation permits allegedly causing the interference were issued and there are adequate water supplies available.

An interference problem may be resolved by modifying the affected well, replacing the well with a deeper well, replacing the well with an alternate water supply (e.g. connection to a public system), or modifying permitted pumping rates or schedules. Potential for well interference is considered when evaluating new water appropriation permits or amendment applications. The DNR follows procedures described in Minn. Rules, part 6115.0730 to mitigate potential interference that may be caused by new or increased appropriations and to respond to interference complaints.

Well interference is almost always a local issue. Groundwater information from the site of the well interference will continue to be needed, collected, and evaluated to weigh the risk for well interference due to new or amended appropriations. These evaluations will continue to require pumping tests and/or local aquifer monitoring.

A *water use conflict* occurs when water demands among existing and proposed users exceed the available waters. A water use conflict can only be resolved by limiting or restricting the rate, volume, and/or timing of water appropriations. The available waters must first be determined based on resource sustainability (Objectives I and II) before allocating the available waters among users. The DNR follows procedures described in Minn. Rules, part 6115.0740 to resolve water use conflicts. (See Appendix C.)

Section 5 of the GWMA Plan provides a set of actions to meet Objective IV.

Objective V. All groundwater users in the GWMA have the necessary permits to use groundwater.

Objectives I, II, III and IV (above) can only be tracked and achieved with an effective permitting system. Permits provide key data on groundwater use and the means to limit use if necessary to meet sustainability objectives. To be in compliance with current state requirements, individuals and organizations must, at a minimum, do the following if requesting 10,000 gallons of water per day or one million gallons of water per year:

- Obtain a water appropriation permit
- Pay annual fees
- Report annual water use according to permit conditions

Each groundwater appropriation permit holder is required to report the volume of water use on an annual basis. The reported volume must be accurate to within 10%. The use of water flow meters for reporting volumes is required. However, the commissioner may approve alternate methods of measuring water volume. As a result, the use of timing devices has become a method for reporting annual water use.

Permit holders must also comply with special conditions placed on their permits that are designed to ensure sustainability and/or monitor resource conditions. Some permits may include special conditions, such as groundwater-level monitoring from wells specifically constructed for that purpose.

The DNR commissioner can modify water appropriation permits in a manner consistent with Minnesota statute and rule. These modifications can be in response to water use conflicts as noted above or, more broadly, to assure permitted water use is sustainable. For more information see Appendix B.

Objective V is meant to emphasize the importance of permitting and permit compliance to meet the sustainability goals of the Straight River GWMA.

Section 5 of the GWMA Plan provides a set of actions to meet Objective V.

4. Status of the GWMA in Terms of the Objectives

This section describes our current understanding of the status of the Straight River GWMA with respect to the five objectives described in Section 3. Based on the five objectives, the definition of sustainability with respect to groundwater is that use:

- Does not harm aquifers and ecosystems
- Does not negatively impact surface waters
- Is reasonable, efficient and meets water conservation requirements
- Does not degrade water quality
- Does not create unresolved well interferences or water use conflicts

All of the sustainability objectives must be achieved to attain overall sustainability of groundwater use in the GWMA.

Status of Objective I. Aquifers, Ecosystems and Surface Waters

Objective I: Groundwater use in the GWMA does not harm aquifers and ecosystems and does not negatively impact surface waters

Groundwater, surface waters and groundwater-dependent ecosystems are interrelated. Groundwater levels fluctuate in response to a number of influences including climate, land use, and groundwater use. Managing for sustainable use of groundwater requires quantitative knowledge of the influences on groundwater and its connection to surface water.

Two types of information are needed to make water-appropriation permitting decisions that protect aquifers, surface water resources, and associated biological communities. First, acceptable levels of hydrological impacts must be determined for each type of feature. General considerations are discussed in Section 3, but site specific thresholds may be needed for particular surface-water features. Second, an estimate of how and the degree to which existing or proposed water appropriations may change the hydrological regime must be made. The projected or interpreted impacts may then be compared to the specific thresholds.

Aquifers

Substantial growth (85%) in water demand in the Straight River GWMA has occurred in the last 25 years. Continued growth in groundwater demand is expected for parts of the GWMA. There is sufficient data available to evaluate compliance with safe yields in the GWMA. Although further work is needed to evaluate the risk of exceeding safe yield under potential future scenarios, practical assessments are achievable.

Observations reflect impacts of current and historical climate and land-use changes in addition to pumping history. Continued growth in groundwater demand is expected for parts of the GWMA

To determine safe yield and understand trends we need to review information on

- Climate data and trends (how much water is entering and exiting the system)
- Groundwater-level data and trends (to show relationship between use and natural climate fluctuations)
- Groundwater model results (to better understand the interrelated system)

Climate Data and Trends

The main driver of groundwater recharge is climate. The climate in the Straight River GWMA is characterized by variable weather. The 'normal' condition is for substantial ups and downs in precipitation, evaporation, and other climatic factors that affect hydrology.

Precipitation and other climatic factors affect groundwater recharge and groundwater levels. Relatively small changes in precipitation over large areas can have a significant effect on groundwater recharge and groundwater levels. The current climate monitoring network may be inadequate for determining this important part of the water balance in the GWMA. The network should be evaluated and expanded to fill data gaps.

In addition to changes in the amount of annual precipitation, the timing (e.g., wetter springs), nature (e.g., larger rain events over shorter periods), and distribution of precipitation also is important. Rainfall, temperature, relative humidity and other weather conditions are important for predicting the amount of water present in the Straight River GWMA.

Based on precipitation data from the Minnesota Climatology Working Group (State Climatology Office), the long term average annual precipitation in Park Rapids from 1885-2014 is 25.23 inches. The yearly precipitation data is shown in Figure 4-1.

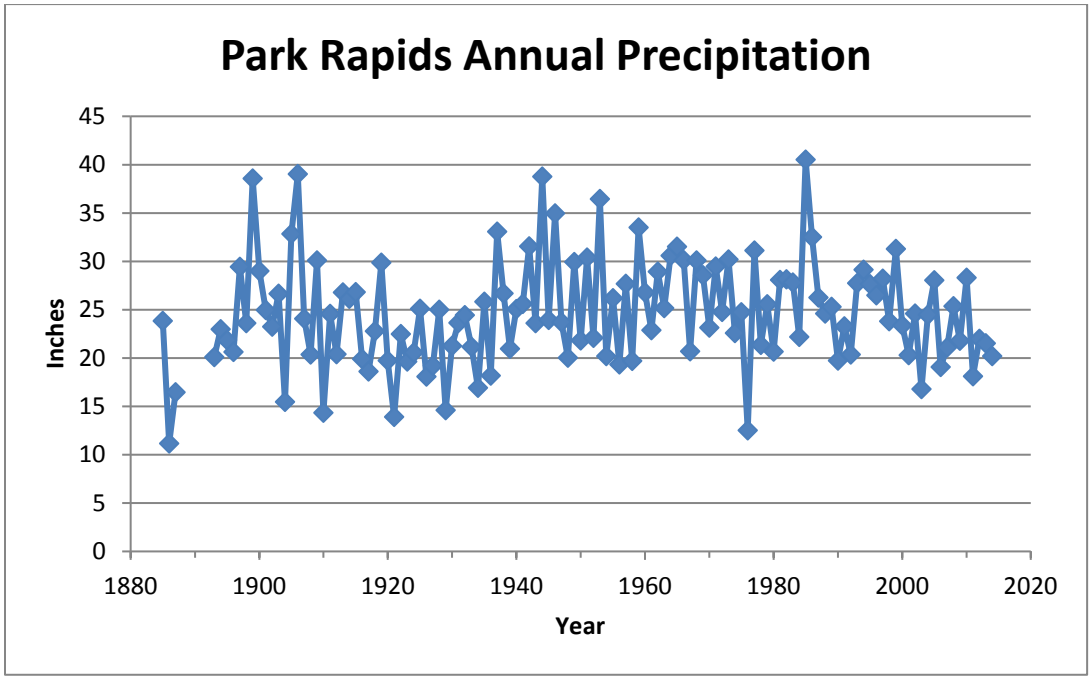

Figure 4-1 Historic precipitation patterns for Park Rapids, Minnesota

There are 5 locations where precipitation is recorded through DNR's MNGage system of volunteers, reported on a monthly basis, and coordinated by Soil and Water Conservation Districts. There is one automated station that provides real time climate data at the airport in Park Rapids. These can be a good source of a wider range of weather information in the Straight River. The Community Collaborative Rain, Hail and Snow Network, or CoCoRaHS, is a network of volunteer weather observers in the United States and Canada who take daily readings of precipitation and report them to a central

data store over the internet. There are no CoCoRaHS sites in the GWMA, but there is one located near the town of Menahga.

There is one cooperative DNR stream gaging station in this GWMA. In addition, DNR has installed 11 additional gaging sites. The cooperative site is fitted with real time weather data including precipitation, wind speed and relative humidity. The remaining 11 sites are manually downloaded. Figure 4-2 shows all the precipitation and gaging monitoring stations.

The University of Minnesota has developed a method of improving irrigation water management, resulting in more effective use of water in above ground irrigation systems using current weather conditions. This is known as the Checkbook Method. Increasing the number of sites within the Straight River GWMA at which detailed weather conditions are recorded and disseminated in real time would allow more accurate information upon which to base irrigation efficiency decisions.

Four new weather stations were installed for the Todd, Wadena and Hubbard Irrigation Scheduler Program and the information is available on the program's website (http://www.hubbardswcd.org/). The program just completed its third year (2015) and covers parts of the Straight River GWMA. Through the process of irrigation water scheduling, an irrigation technician is able to help producers determine how much water is needed to keep their crop healthy throughout the growing season by calculating the evapotranspiration rates for each of the major crops grown in the area. Each weather station contains information such as high and low temperatures, growing degree days, and evapotranspiration. There is a gap in precipitation monitoring in the Becker county portion of the GWMA.

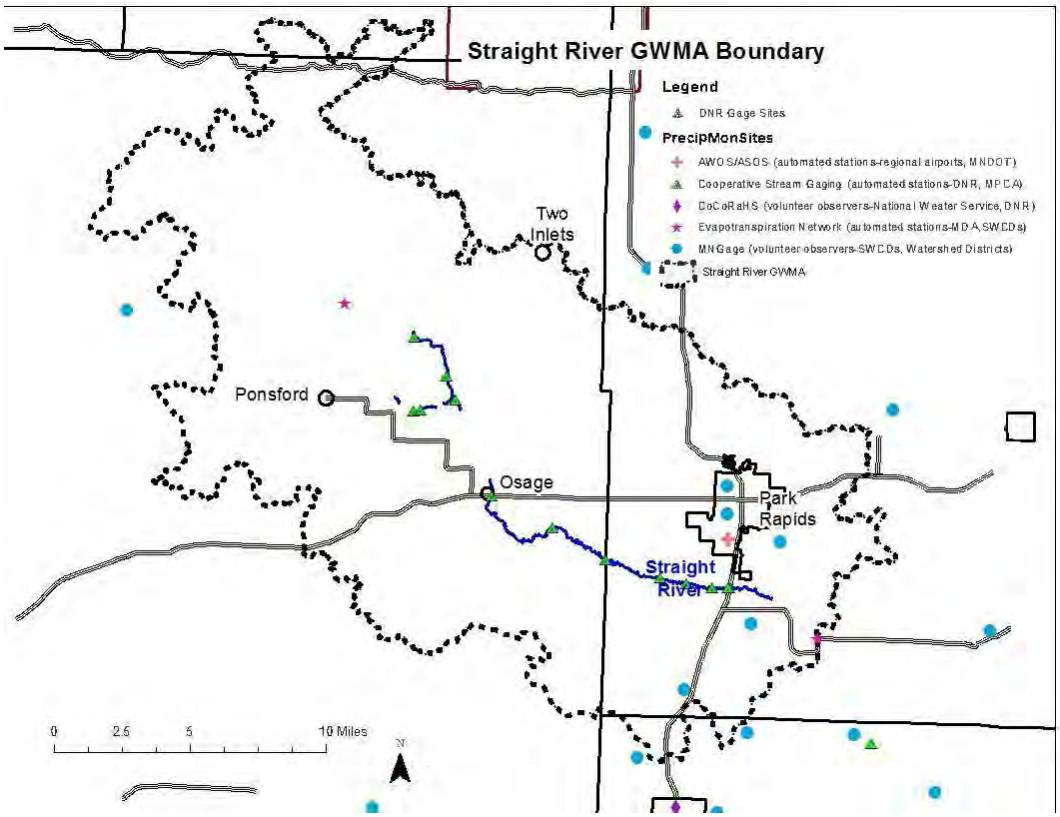

Figure 4-2 Precipitation and gaging sites in and around the GWMA

Groundwater Recharge

Aquifers are recharged by water from precipitation moving downward through the soil. The amount of groundwater recharge is affected by:

- the amount of precipitation
- the amount of precipitation that runs off the soil and into streams, lakes or wetlands
- the amount of precipitation that evaporates directly from the soil or is taken up by plants and transpired

The United States Geological Survey reports groundwater recharge for Straight River GWMA ranges between 5.15 and 6 inches. The majority of the sand and gravel aquifer is reported to have a recharge rate of 5.34 inches per year.

Groundwater-Level Data

Monitoring

Monitoring groundwater levels is an important element of groundwater management and ensuring compliance with safe yield. Monitored groundwater levels must be viewed in the context of natural climate fluctuations and groundwater pumping history.

Since 1944, DNR has managed a statewide network of water-level observation wells. Water-level readings are available via the DNR web page (http://www.dnr.state.mn.us/waters/cgm/index.html). There are 56 actively measured DNR observation wells within the GWMA boundary area.

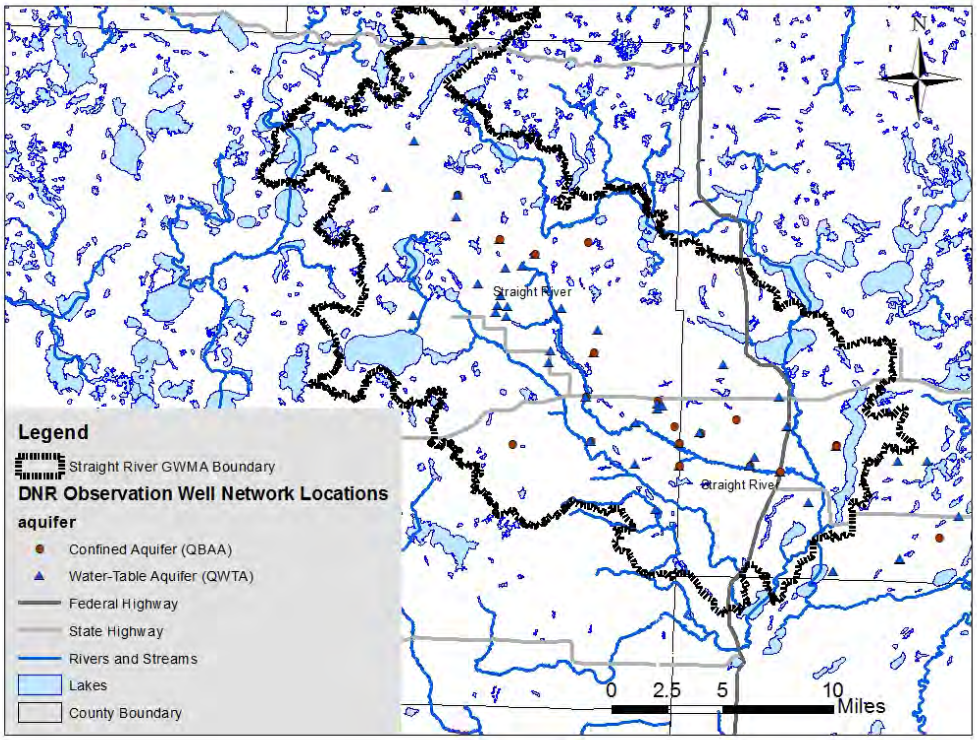

Figure 4-3 DNR observation wells in the Straight River GWMA

Figure 4-3 shows the location of the DNR instrumented observation wells within the GWMA boundary area. Forty one wells are constructed in the water table aquifer and fifteen are constructed into buried artesian aquifers.

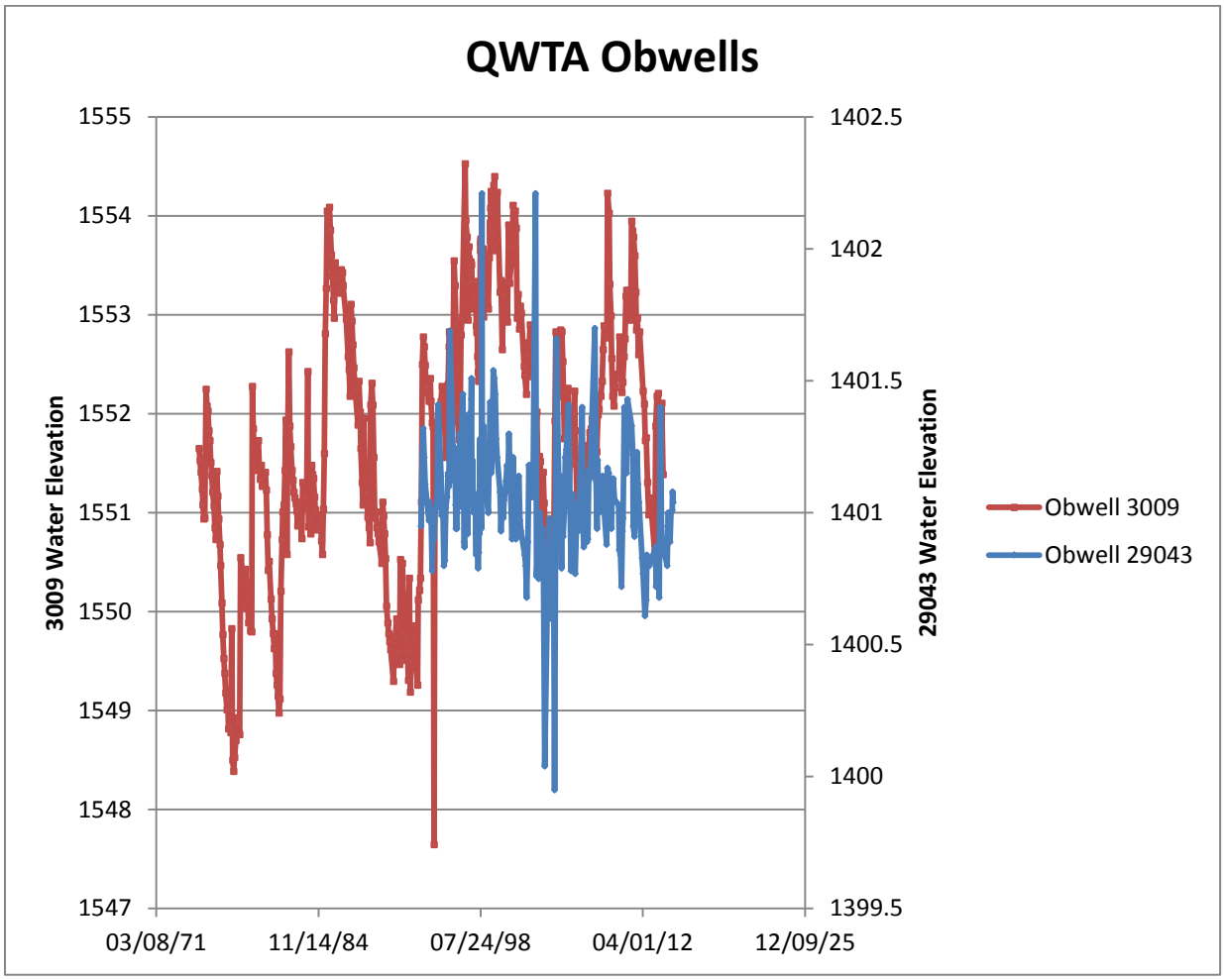

Figure 4-4 Observation well hydrographs water table aquifer (obwells 3009 and 29043)

The water elevation histories shown on Figure 4-4 are from two water table aquifer wells and demonstrate the range of historic water level highs and lows. Observation well 3009 is located nineteen miles northwest of observation well 29043. The location of these wells is highlighted in Figure 4-3. The water levels are shown as water elevation or feet above sea level datum. The difference in level elevation (approximately 150 ft.) gives an indication of the horizontal groundwater gradient between the locations.

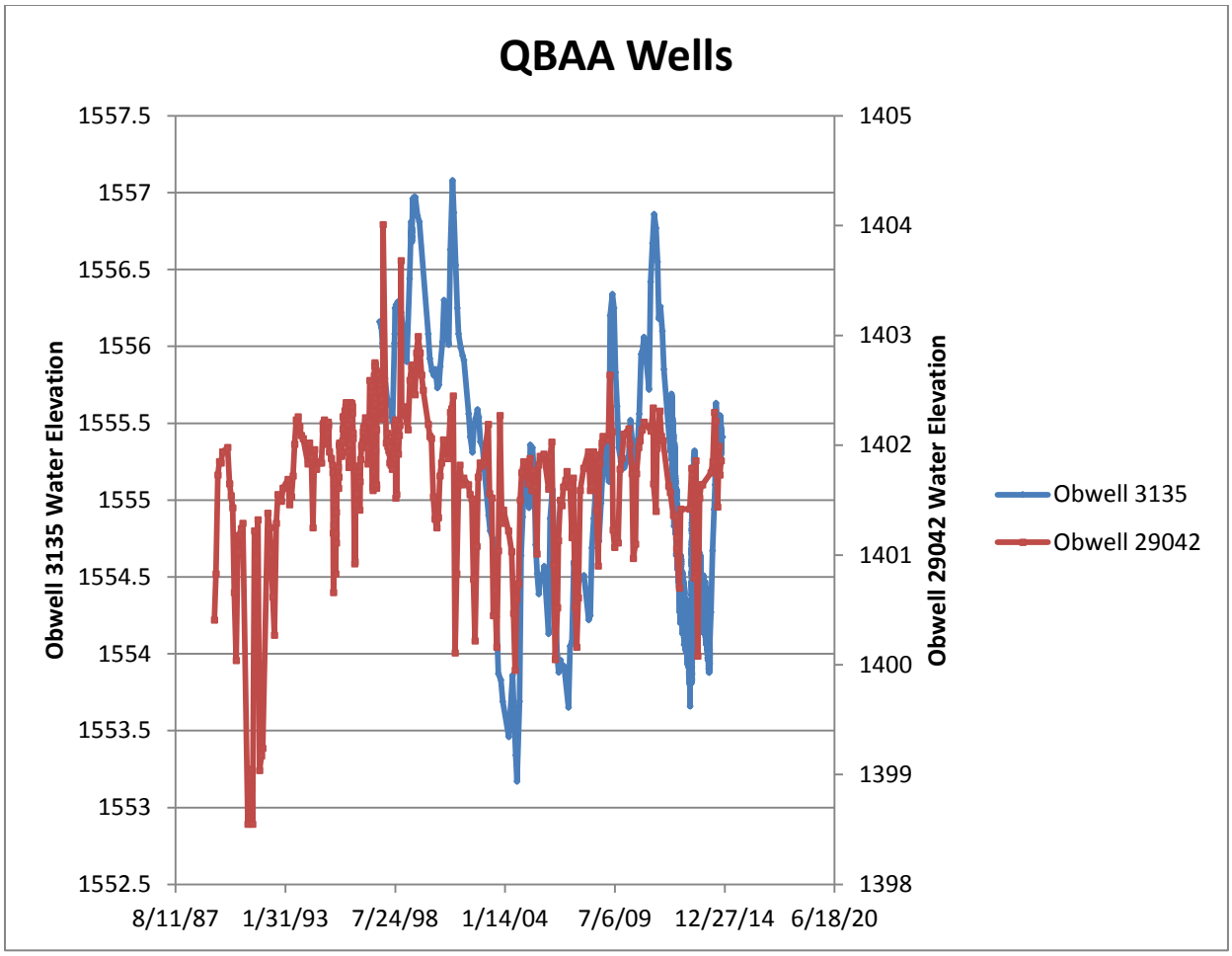

Figure 4-5 Observation well hydrographs buried drift artesian aquifer (obwells 3135 and 29042)

The water level hydrograph in Figure 4-5 shows the water elevation history for two DNR observation wells that are constructed into buried drift artesian aquifers. Observation well 3135 is located nineteen miles northwest of observation well 29042. The location of these wells is highlighted in Figure 4-3. The water levels are shown as water elevation or feet above sea level datum. The difference in level elevation (approximately 150 ft.) gives an indication of the horizontal groundwater gradient between the two locations. Multiple water level decline events demonstrate that water level declines are caused by water use**.** A similar relationship exists for the water-table aquifer, where groundwater levels will fluctuate in response to seasonal groundwater pumping.

Using data for groundwater models

Groundwater levels are measured in groundwater level obwells. Observation well data is necessary to calibrate computer models that can be used to predict water levels in areas where no groundwater measurements exist. The more observation well data that can be applied to the computer model, the more accurate the model becomes.

A groundwater model was developed by the consulting firm Camp Dresser and McKee during the late 1980s. The results can be reviewed in their December 1999 report, "Development of a Modflow Model of the Straight River Basin". Since this model was completed, both the number of wells and annual

pumping volumes have increased beyond the modeled estimates. Computer groundwater model technology, capabilities and the understanding of the input variables have also changed. Portions of this model may serve as a useful framework or starting point for a new and updated groundwater model. An assessment of what may be required to update the model is needed.

Groundwater Recharge

Recharge cannot be directly measured, but recharge can be estimated using climate, soils, and groundwater data.

A particular area of high uncertainty is evaporation. Monitoring data gaps exist for evaporation and groundwater recharge. Only two evaporation network sites are sited within the GWMA (Figure 4-6). Additional sites would be needed to evaluate the entire GWMA.

Surface Waters

Evaluating groundwater-surface water interactions is more complex than evaluating aquifer levels. Determining thresholds of negative impact on surface waters from groundwater pumping is also complex. Therefore, the DNR proposes establishing specific thresholds for specific watercourses, water basins, watersheds, or hydrologic areas in those parts of the state where water use is at risk of causing negative impacts. (Please read Appendix D for more information on negative thresholds for surface waters.)

Monitoring data are the foundation for impact assessment. There is a relatively dense network of precipitation gauges, observation wells, lake gauges, in the Straight River GWMA. There are five stream gauges; however, only the downstream gauge by Hwy. 71 has a long period of record (about 30 years). Monitoring gaps are likely to be identified, as improved impacts assessment methods are implemented.

Several previous studies have documented impacts to the Straight River that were attributed to groundwater appropriations.

A study by the United States Geological Survey (USGS) in 1988-1990 concluded that groundwater appropriations may impact the Straight River by reducing flows up to 34 percent during the irrigation season, and stream temperature may be affected by 0.5^{o} C to 1.5^{o} C if groundwater appropriation rates continued at the levels observed during that particularly hot, dry summer of 1988 (Stark et. al., 1994).

A study by MN DNR, Division of Waters in 1996-1998 documented an atypical increase in winter stream flow along the river reach between Becker CR 125 and Hubbard CR 115 and concluded that stream flow is likely impacted from water appropriations by at least 2 cfs to 4 cfs within that reach, or approximately 4% to 8% of the average July – August stream flow. Additional flow losses occur naturally in the river between CR 115 and TH 71. These natural losses are exacerbated by groundwater appropriations during extremely low flows as documented in 1988-89. The study also used modeling to evaluate the effects of groundwater appropriations on stream water temperatures by assuming that all groundwater appropriations affect the stream flow equally, which is a simplification of the real variability of impact. If all groundwater appropriations were added to the stream flow, then the resultant flows would increase from 5% to 50% above the existing modeled conditions, and the exceedance value of the lethal limit temperature for brown trout (25° C) was lowered a maximum of 10% and averaged 2% less when compared to existing conditions. The river reach between CR 115 and TH 71 had the most consistent

reductions in temperatures using this simplified analysis (approximately 1.0° C). These reductions were significant when compared to the associated modeling errors (MNDNR Waters, 2002). This suggests that reductions in water use through improved efficiency and other conservation practices may provide benefits to the stream environment and water temperature-dependent aquatic organisms that reside in the Straight River.

Annual stream water temperature monitoring from June through September by MN DNR Fisheries has documented significant increasing trends. Average daily stream temperatures at Becker CR 125 increased 1.01° C during the ten year period from 2003 to 2013. Nearby air temperatures also increased, but at a lower rate. Average daily air temperatures increased 0.61° C during that same period. Maximum daily stream temperatures increased 1.42° C, while maximum daily air temperatures increased only 1.01° C. Minimum daily stream temperatures increased 1.01° C, but minimum daily air temperatures increased only 0.001° C.

Limited dissolved oxygen within the Straight River from Straight Lake to the confluence with the Fish Hook River was the listed stressor for the river's various life forms as determined by the MPCA in its 2010 listing of impaired Minnesota waters. Since 2002, water-quality sample results indicate that low dissolved oxygen levels in the Straight River have persisted to the detriment of stream life. The Crow Wing River Watershed Total Maximum Daily Load (TMDL) report that was prepared to address the impairment listing described water temperature as the primary stressor to low dissolved oxygen levels in the Straight River. Additional data collected by MPCA as part of the Crow Wing River Watershed Monitoring and Assessment in 2010-2011 confirmed the 2010 impairment listing. The Monitoring and Assessment Report stated: "This portion of the Straight River flows through an agricultural area with high groundwater withdrawals. Further investigation is needed to determine if groundwater withdrawals are influencing the dissolved oxygen levels within the Straight River." A Watershed Restoration and Protection Strategy report was prepared by MPCA in 2015 as the final phase of the Crow Wing River watershed assessment process. The report notes that "changes in the groundwater and surface water interactions in the streams, particularly near Park Rapids, are resulting in altered stream hydrology that is stressing fish communities."

Straight River, Upper Straight Creek and Straight Lake Creek support naturally reproducing populations of trout. Straight Lake Creek was stocked with Brook Trout from 1946-1978 and with Brown Trout in 1961, 1985 and 1986. Both species are now naturally reproducing in this stream. Upper Straight Creek was stocked with Brown Trout from 1948-1966 and with Brook Trout since 1967. Enough natural reproduction has occurred since switching to the Minnesota Wild strain of Brook Trout in 2010 that stocking may be discontinued in Upper Straight Creek. A 1930 fishing contest in the Park Rapids area recorded both Brook and Brown Trout, while an earlier contest registered only Brook Trout. During the first fisheries survey of the Straight River in 1947, both Brook and Brown Trout were sampled. The first record of Brown Trout stocking was in 1947 but since they are not native, they were obviously introduced prior to that. The second fisheries survey in 1961 recorded both Brown Trout and Rainbow Trout, which were also stocked periodically between 1955 and 1978. Only Brown Trout were sampled in 1976 and 1981 fisheries surveys and in annual sampling since 1986 on the Straight River. No Brook Trout have been sampled in any fisheries survey since 1947 on the Straight River. The disappearance of Brook Trout from the Straight River is likely due to warmer temperatures. Although exact causes are unknown, it is likely that land use changes from predominately forest to agriculture and poor road crossings have contributed to the warmer temperatures and the shift from Brook Trout to Brown Trout. Brown Trout stocking continued through 1990, when they were discontinued, because natural reproduction was sufficient to maintain a high quality trout fishery.

Ideally, stream flow impacts should be re-evaluated with existing appropriation amounts and the longer period of record for stream flow data. Stream flow impacts should be re-evaluated (compared) using re-created natural flow conditions. Temperature impacts and resulting dissolved oxygen level impacts as a result of appropriations need to be evaluated further.

Status of Objective II. Water Conservation

Objective II. Groundwater use in the GWMA is reasonable, efficient and complies with water conservation requirements.

Municipal Water Supply and Water Conservation

Public water supply systems serving more than 1,000 people must also have a water supply plan approved by the DNR. In the Straight River GWMA, the city of Park Rapids serves over 1,000 people and must have a water supply plan (Minn. Stat., sec. 473.859). The plan lays out future challenges and options for a community's water supply and the community commits to certain water use and conservation goals. Through its ongoing replacement of leaking water lines, audits, implementation of a conservation rate structure and other measures, the City of Park Rapids continues to reduce per capita water demand.

Agricultural Irrigation and Water Conservation

Permits for agricultural irrigation may include "conditions" that become part of the permit, such as a requirement that the permitee develop a conservation plan with help from the Soil and Water Conservation District. These conservation plans may include irrigation water conservation, as well as following Best Management Practices for nitrogen management.

Status of Objective III. Water Quality

Objective III. Groundwater use in the GWMA does not degrade water quality

The quality of groundwater in the Straight River GWMA is very important. Nitrates and other chemicals have been found in groundwater in the Straight River GWMA. In some areas, nitrate levels exceed health risk limits. Poor groundwater quality may limit the use of groundwater. In public meetings and in written comments submitted to the DNR, people have expressed concern about how land-use practices and extensive groundwater pumping for agricultural irrigation may affect both the availability of water to support the ecosystem and the quality of drinking water, particularly for private wells located within the Straight River GWMA.

Nitrate

Nitrate in drinking water is a public health concern. The health risk limit is set by the Minnesota Department of Health (MDH) and is 10 mg/l in drinking water. Within the Straight River GWMA, this concentration has been exceeded in some private domestic wells and municipal wells in the water-table aquifer (QWTA). Nitrate in groundwater can occur naturally in low concentrations, and in some areas, concentrations can increase due to land use practices. Nitrogen is an essential plant nutrient critical for crop production. Nitrate-nitrogen is a constituent in some fertilizers, can be derived from other forms of

nitrogen fertilizer, or is produced in the soil by microorganisms from organic and inorganic nitrogen sources.

In the Straight River GWMA, municipal drinking water sources that take water from shallow unconfined aquifers show nitrate-nitrogen contamination that in places exceed the health risk limit set by MDH. Confined aquifers in the GWMA generally have lower levels of nitrate-nitrogen contamination. The presence of nitrate-nitrogen can also be an indicator of other water contaminants. Nitrate-related issues in the GWMA require further study.

Water temperature is a measure of water quality, particularly for cold-water streams like the Straight River and its tributaries. Water temperatures in the Straight River have sometimes exceeded lethal thresholds for Brown Trout. Water temperature is the primary stressor for low dissolved oxygen levels that led to an impairment listing for the Straight River in 2010.

Status of Objective IV. Well Interferences and Water-Use Conflicts

Objective IV. Groundwater use in the GWMA does not create unresolved well interferences or water use conflicts.

Well Interferences

There have been no formal well interference complaints in the Straight River GWMA. DNR considers potential for well interference when evaluating new water-appropriation permit or amendment applications.

Water-Use Conflicts

There are no standing water-use conflicts in the Straight River GWMA. It is possible that water-use conflicts could arise from cumulative impacts of multiple users. Improved methods for evaluating surface-water impacts could reveal water-use conflicts not previously identified.

Status of Objective V. Permits

Objective V. All groundwater users in the GWMA have the necessary permits to use groundwater.

Compliance

There are no identified groundwater users in the GWMA operating without a required permit. It is possible, however, that there are unidentified groundwater uses that require a permit. A thorough audit of water wells has not been conducted for the GWMA. Beginning in July 2013, new wells requiring a water-appropriation permit must receive preliminary approval from the DNR prior to construction. This will help the DNR monitor compliance.

DNR staff obtains compliance reports from the Minnesota Permitting and Reporting System (MPARS) electronic permits database. When pumping volume exceeds the appropriation permit amount (overuse), the DNR investigates and takes appropriate action. In general, compliance with permitted volumes is high in the Straight River GWMA. Special circumstances may lead to actual use exceeding permitted volume in a given year, such as waterline breaks, other system problems, or one-time uses. In addition to the limits on annual volume and maximum pumping rate, some permits may include special conditions, such as groundwater-level monitoring. DNR will follow the established statute and

rule processes for permit changes. For further information on water appropriation permit modifications, please see Appendix B.

5. DNR Actions

Prior sections of the Straight River GWMA Plan have described the area; introduced the sustainability goals, objectives and aquifer sustainability thresholds for the area; and presented the DNR's current understanding of natural resources and appropriations with respect to the sustainability thresholds. Section 4 described some of the information and data gaps that need to be addressed to continue to manage groundwater sustainably. This section restates the sustainability goal for the GWMA, and introduces the specific actions by each objective that DNR plans to take to meet the sustainability goal.

The GWMA GOAL:

In the Straight River Groundwater Management Area (GWMA), the use of groundwater will be sustainable, and therefore, will not harm ecosystems, water quality, or the ability of present and future generations to meet their needs.

Objective I. Groundwater use in the GWMA does not harm aquifers and ecosystems, and does not negatively impact surface waters.

1. The DNR will improve monitoring of groundwater levels, basin water levels, stream flows, climate, groundwater-associated biological communities and water use within the GWMA to inform DNR permit decisions.
   a. The DNR will continue to build a comprehensive hydrological and climate monitoring system for the GWMA. DNR will coordinate with federal, state, and local agencies in these efforts. The following are some initial efforts that may be adjusted over time:
      i. Stream flow monitoring - Re-establish 2 Straight River stream-flow monitoring sites at former sites on County Roads 125 and 115.
      ii. Wetland Monitoring - Install 2 gages per basin at wetland basins (public water basins 29-0550, 03-01400, and 03-0700).
      iii. Lake Level Monitoring - Install at least 2 additional lake (possibly Long and Straight Lakes) gages to the existing gages.
      iv. Groundwater level Monitoring - Install 4 new monitoring wells in addition to the existing 30 wells in close proximity to the Straight River stream gage sites to determine pumping impacts on surface and groundwater.
      v. Investigate whether there are opportunities to coordinate monitoring wells to be used by multiple permitees.
      vi. Identify additional climate monitoring requirements for more precise evapotranspiration estimates.
      vii. Increase the amount of citizen precipitation and weather reporting through recruitment to the Minnesota Volunteer Precipitation Observing Program and the Community Collaborative Rain, Hail & Snow Network (real-time).
   b. The DNR will continue to enhance water use information within the GWMA.
      i. Partner with LGUs and Con Agra Foods/Lamb Weston/RDO Frozen Foods and other businesses in the use of Supervisory Control and Data Acquisition (SCADA) or similar technologies for data collection and communication.
   c. DNR will develop and use the most appropriate groundwater models and methods to predict volumes, rates and water level impacts from groundwater appropriations, as well as describe the current groundwater conditions and characterize the nature and extent of the primary aquifers and the relationship of surface water and groundwater.

d. Develop additional information on groundwater associated biological communities to inform water appropriation decisions.
e. Conduct a baseline inventory of existing water use practices within the GWMA.

2. The DNR will develop and apply sustainability thresholds for aquifers, ecosystems and surface waters in the GWMA[2].
   a. The DNR will use safe yield for aquifers to determine limits to appropriation permits in the GWMA[3].
   b. The 2015 Minnesota Legislature directed the DNR (Laws of Minnesota 2015, First Special Session, chapter 4, article 4, section 143), to take the following actions concerning sustainability thresholds: "the commissioner of natural resources shall consult with interested stakeholders and submit a report to the Legislative Water Commission and the chairs and ranking minority members of the house of representatives and senate committees and divisions with jurisdiction over the environment and natural resources policy and finance on recommendations for statutory or rule definitions and thresholds for negative impacts to surface waters as described in Minnesota Statutes, sections 103G.285 and 103G.287, subdivision 2. Stakeholders must include but are not limited to agricultural interests; environmental interests; businesses; community water suppliers; state, federal, and local agencies; universities; and other interested stakeholders." In January 2016, the DNR submitted a report entitled: "Report to the Minnesota State Legislature: Definitions and Thresholds for Negative Impacts to Surface Waters." The DNR will use the approach described in this report to determine if negative impacts to streams, lakes, or wetlands are occurring due to groundwater appropriation within the GWMA. (The report is available on the DNR website. The executive summary of the report provides a succinct description of the approach, and it is included in this plan as Appendix D.)

3. The DNR groundwater appropriation permits will integrate sustainability limits, individual and cumulative permit analysis, and will include evaluation of existing permits within the GWMA.
   a. The DNR will evaluate each new permit application individually, as well as in conjunction with other permits in the related aquifer systems to address issues associated with the cumulative impacts of appropriations across the aquifer.
   b. The DNR will complete a review of all existing permits in the GWMA within 5 years, and if necessary, adjust permits to achieve sustainable groundwater use (DNR will follow the established statute and rule processes for permit changes – see Appendix B). [4]
   c. Where needed and in accordance with statutory requirements, DNR will limit current and future appropriations.

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[2] Sustainability means that groundwater and surface water levels, water quality, and ecosystems are not harmed and that present and future generations will be able to meet their need for water.

[3] Safe yield for artesian conditions means the amount of groundwater that can be withdrawn without degrading water quality or causing a continual decline in groundwater levels that results in a change from artesian to water table condition. Safe yield for water table conditions means the amount of water that can be withdrawn without degrading the quality of the water in the aquifer and without allowing the long term average withdrawal to exceed the available long term average recharge to the aquifer system based on representative climatic conditions.

[4] The DNR has not determined the detailed steps and timeline for how we will evaluate and implement any necessary changes to existing permits. However, we recognize that this is a vital component of GWMA planning, and we are committed to working with permitees as we develop that process.

   d. Improve communication tools that will allow the public to more clearly understand the permitting process including modifying the language in the preliminary well notification letter.

4. DNR will improve communication on the status of Objective 1 (aquifers, ecosystems, surface waters) in the GWMA.
   a. The DNR will create a new GWMA reporting system that will be understandable by the public, and it will include results of data collection and analysis in the GWMA.
   b. The DNR will hold at least two GWMA Advisory Team meetings per year. They will be open to the public.
   c. The DNR will increase education and outreach to the public about sustainable use of groundwater in the GWMA.

5. The DNR will improve access to data collected and analyzed by other organizations in the GWMA.
   a. The DNR will actively support and participate in the development of a more comprehensive and accessible data management system within the GWMA, including website improvements.
   b. The DNR will work with Minnesota Pollution Control Agency (MPCA), Minnesota Department of Agriculture (MDA), Minnesota Department of Health (MDH), Con Agra/Lamb/Weston/RDO, etc., to improve access to data collected and analyzed by other organizations in the GWMA.

6. The DNR will ensure that the City of Park Rapid's Water Supply Plan includes actions that must be taken if cumulative aquifer withdrawals exceed thresholds or if negative impacts on surface waters are occurring due to groundwater withdrawals in the GWMA.

7. The DNR will promote groundwater recharge in the GWMA, consistent with sound water quality management.
   a. The DNR will work with other organizations and agencies including watershed districts, counties and local units of government to identify important groundwater recharge areas and opportunities to enhance recharge.
   b. The DNR will support local government efforts to protect important groundwater recharge areas through zoning and land use planning.
   c. The DNR will update the groundwater sensitivity maps for the GWMA within 5 years.

Objective II. Groundwater use in the GWMA is reasonable, efficient, and complies with water conservation requirements.

1. The DNR will ensure that groundwater users are complying with water conservation requirements in their water supply plans and permits.
   a. The DNR will include water conservation requirements in appropriate permits as framed by statute, rule and public water supply plans.
   b. The DNR will evaluate compliance with water conservation requirements on permits that include them. (DNR will be in contact with permit holders, as we do these reviews.)
   c. When considering a permit transfer request or amendment request to increase appropriations in this GWMA, DNR will evaluate a permit holder's performance in meeting conservation requirements in their permit and the conservation goals contained in applicable water supply plans.
   d. The DNR will partner with local units of government, such as Soil and Water Conservation Districts (SWCDs), to assist in developing and complying with conservation requirements in water appropriation permits.

   e. The DNR will update the information it uses to develop water conservation requirements specific to each water use category.

2. The DNR will improve communication about and promote the values of water conservation in the GWMA.
   a. DNR will promote lessons learned about water conservation from working farms, municipalities, industries, and other water users in the GWMA.
   b. DNR will include descriptions and evaluations of water conservation practices in the GWMA in the new GWMA reporting system.
   c. DNR will update its website to include links to organizations with water conservation information (e.g., SWCDs, United States Department of Agriculture, and University of Minnesota Technical Assistance Program).

3. The DNR will work with other organizations to promote appropriate water storage and aquifer recharge in the GWMA.

4. The DNR will promote the use of water conservation strategies, such as re-use of water in the City of Park Rapids community water supply planning, in the GWMA.

Objective III. Groundwater use in the GWMA does not degrade water quality.

1. The DNR will include compliance with local, state, and federal water quality regulations as permit conditions.
   a. The DNR will coordinate with local, state, and federal agencies to identify water quality regulations that apply to groundwater use and clarify how best to assure compliance.

2. The DNR will ensure that permitted appropriations do not degrade water quality by moving known contaminants.
   a. The DNR will work with PCA, MDH and MDA to determine the most suitable methods to evaluate the risk of moving known contaminants for new and existing permits.[5]

3. The DNR will ensure that the City of Park Rapids Water Supply Plan takes into account contaminant management.

4. The DNR will improve communication about known contaminants and pollution management in the GWMA.
   a. The DNR will use a new reporting system to describe and evaluate status of contamination and pollution plume management in the GWMA.
   b. The DNR will work with MDA, MDH, MPCA and others to share data about water quality among agencies.
   c. The DNR will work with MDA, MDH, MPCA and others to better interpret water quality data.

[5] The DNR has not determined the detailed steps and timeline for how we will evaluate and implement any necessary changes to existing permits. However, we recognize that this is a vital component of GWMA planning, and we are committed to working with permitees as we develop that process. We also recognize that water conservation can be an important tool to reduce contaminant movement.

5. The DNR will ensure the permitted appropriations do not increase known water quality contamination of a surface water feature.

Objective IV. Groundwater use in the GWMA does not create unresolved well interferences or water use conflicts.

1. The DNR will continue to review permit applications to identify and reduce the likelihood of well interferences and water use conflicts.

2. The DNR will resolve well interferences and water use conflicts applying the framework outlined in statute and rule.

3. The DNR will improve information on aquifer characteristics in the GWMA to improve its ability to identify and reduce the likelihood of interferences and conflicts prior to permit approval.

4. The DNR will increase education and awareness about resolving well interferences and water use conflicts.

Objective V. All groundwater users in the GWMA have the necessary permits to use groundwater.

1. The DNR will improve its capacity to detect unpermitted groundwater use.
   a. The DNR will complete periodic analyses to identify potential unpermitted groundwater use in the GWMA and take appropriate action.
   b. The DNR will conduct follow-up reviews of preliminary well approval actions to determine compliance with permit requirements.
   c. The DNR will provide updated information to well drillers and consultants on existing laws and the water appropriation permit application process.
   d. The DNR will facilitate the public's ability to identify and report unpermitted use.

2. The DNR will ensure that permitted volumes reflect actual use and that actual use does not exceed permitted volumes.
   a. The DNR will evaluate water use reports and will contact permit holders whose reports indicate inaccuracies.
   b. The DNR will monitor water use and bring permitees into compliance whose reported use is higher than permitted.
   c. The DNR will help permit holders adjust permitted volume to better match actual use and need, consistent with other plan objectives.

3. The DNR will ensure that water users comply with conditions on appropriation permits.
   a. The DNR will help bring permit holders into compliance with their permit conditions.
   b. The DNR will focus on permits that have been reviewed to address challenges of cumulative impacts and sustainability thresholds (Objective 1, action 3).

6. Implementation Schedule

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
Objective I. Groundwater use in the GWMA does not harm aquifers and ecosystems, and does not negatively impact surface waters.					
I.1	DNR will improve monitoring of groundwater levels, basin water levels, stream flows, climate and water use within the GWMA to inform DNR permit decisions.				
I.1.a.	DNR will continue to build a comprehensive hydrological and climate monitoring system for the GWMA. DNR will coordinate with federal, state, and local agencies in these efforts. The following are some initial efforts that may be adjusted over time:				
I.1.a.i.	Stream flow monitoring - By 2018, reestablish 2 Straight River stream-flow monitoring sites at former sites on County Roads 115 and 125.	**DNR Ecological and Water Resources (EWR) Water Monitoring and Surveys Unit**, EWR Regional Appropriations staff	New	1	
I.1.a.ii.	Wetland Monitoring - By 2018, install 2 gages per basin at wetland basins (public water basins 29-0550, 03-01400, and 03-0700).	**EWR Water Monitoring and Surveys Unit** with input from EWR Hydrogeology and Groundwater Unit.	Existing but enhance	1	
I.1.a.iii.	Lake Level Monitoring - By 2018, install at least 2 additional lake (possibly Long and Straight Lakes) gages to the existing gages.	**EWR Water Monitoring and Surveys Unit** with input from EWR Hydrogeology and Groundwater Unit. Coordinate with DNR Fish and Wildlife (FAW).	Existing but enhance	1	
I.1.a.iv.	Groundwater level Monitoring - Install 4 new monitoring wells in addition to the existing 30 wells in close proximity to the Straight River stream gage sites to determine pumping impacts on surface and groundwater.	**EWR Water Monitoring and Surveys Unit** with input from EWR Hydrogeology and Groundwater Unit	Existing but enhanced	1-2	

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
I.1.a.v.	Investigate whether there are opportunities to coordinate monitoring wells to be used by multiple permitees.	**EWR Hydrogeology and Groundwater Unit** with input from EWR Water Monitoring and Surveys Unit, EWR Regional Appropriations staff, and EWR Water Regulations Unit	New	1-2	
I.1.a.vi.	Identify additional climate monitoring requirements and wind speed for more precise evapotranspiration estimates.	**EWR Water Monitoring and Surveys Unit - State Climatology Office** with input from EWR Hydrogeology and Groundwater Unit	New	3-4	
I.1.a.vii.	Increase the amount of citizen precipitation and weather reporting through recruitment to the Minnesota Volunteer Precipitation Observing Program and the Community Collaborative Rain, Hail & Snow Network (real-time).	**EWR Water Monitoring and Surveys Unit, State Climatology Office, and University of Minnesota** with input from EWR Hydrogeology and Groundwater Unit	Existing but enhance	3-4	
I.1.b.	DNR will continue to enhance water use information within the GWMA.	**EWR Hydrogeology and Groundwater Unit,** EWR Regional Appropriations staff	Existing but enhance	2-3	
I.1.c.	DNR will develop and use standard groundwater models and methods to predict volumes, rates and water level impacts from groundwater appropriations.	**EWR Hydrogeology and Groundwater Unit,** EWR Regional Appropriations staff	New	1-2	
I.1.d.	Develop additional information on groundwater associated biological communities to inform water appropriation decisions.	**EWR Regional Plant Ecologist**	New	2-3	

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
I.1.e.	Conduct a baseline inventory of existing water use practices within the GWMA.	**EWR Hydrogeology and Groundwater Unit,** EWR Regional Appropriations staff	New	1-2	
I.2	DNR will develop and apply sustainability thresholds for aquifers, ecosystems and surface waters in the GWMA[i].				
I.2.a.	DNR will use safe yield for aquifers to determine limits to appropriation permits in the GWMA[ii].	**EWR Regional Appropriations staff**, EWR Hydrogeology and Groundwater Unit	New	1	
I.2.b.	The DNR will determine negative impacts to surface water features (streams, lakes, wetlands) using the approach that is described in the 2016 "Report to the Minnesota State Legislature: Definitions and Thresholds for Negative Impacts to Surface Waters."	**EWR Regional Appropriations staff,** EWR Information, Monitoring and Assessment section, EWR Conservation Assistance and Regulation Section	New	1-3	
I.3	DNR groundwater appropriation permits will integrate sustainability limits, individual and cumulative use analysis, and will include evaluation of existing permits within the GWMA.				
I.3.a.	DNR will evaluate each new permit application individually and in conjunction with other appropriation permits in the related aquifer systems to address issues associated with the cumulative impact of appropriations across the aquifer.	**EWR Regional Appropriations staff**, EWR Hydrogeology and Groundwater Unit, EWR Water Monitoring and Surveys Unit	Existing but enhance	3	I.1.c
I.3.b.	DNR will review all existing permits in the GWMA within 5 years, and if necessary, adjust permits to achieve sustainable groundwater use. [iii]	**EWR Regional Appropriations staff**, EWR Hydrogeology and Groundwater Unit	New	1-5	I.1.c I.2.a.b.c
I.3.c.	DNR will limit current and future appropriations where needed and in accordance with statutory procedural requirements."	**EWR Regional Appropriations staff**, EWR Hydrogeology and Groundwater Unit, EWR Water Monitoring and Surveys Unit	Existing but enhance	1-5	I.2.a.b.c

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
I.3.d.	Improve communication tools that will allow the public to more clearly understand the permitting process (e.g. press releases, daily notices during drought periods, etc.).	**EWR Water Regulations Unit,** EWR Comm. and Planning Unit	Existing but enhance	2	
I.4	DNR will improve communication on the status of Objective 1- aquifers, ecosystems and surface waters in the GWMA.				
I.4.a.	DNR will create a new GWMA reporting system that is understandable by the public and will include results of data collection and analysis within the GWMA.	**EWR Comm. and Planning Unit,** EWR Regional Appropriations staff	New	1-3	
I.4.b.	DNR will hold two Straight River GWMA Advisory Team meetings per year that are open to the public.	**EWR Regional Appropriations staff**, EWR Hydrogeology and Groundwater Unit, EWR Water Monitoring and Surveys Unit	Existing but enhance	1-5	
I.4.c.	DNR will increase education and outreach to the public about sustainable use of groundwater in the GWMA.	**EWR Water Regulations Unit,** EWR Comm. and Planning Unit	Existing but enhance	1-2	
I.5	DNR will improve access to data collected and analyzed by other organizations in the GWMA.				
I.5.a.	DNR will actively support and participate in the development of a more comprehensive and accessible data management system within the GWMA, including website improvements.	**EWR Comm. And Planning Unit,** EWR Regional Appropriations staff	New	2-3	
I.5.b.	DNR will work with Minnesota Pollution Control Agency (MPCA), Minnesota Department of Agriculture (MDA), Minnesota Department of Health (MDH), Con Agra/Lamb/Weston/RDO, etc., to improve access to data collected and analyzed by other organizations in the GWMA.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	2-3	

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
I.6	DNR will ensure that the City of Park Rapids Water Supply Plan includes actions that must be taken if cumulative aquifer withdrawals exceed limits or results in negative impacts to surface waters.				
I.7	DNR will promote groundwater recharge in the GWMA, consistent with sound water quality management.				
I.7.a.	DNR will work with other organizations and agencies including watershed districts, counties, and other local units of government to identify groundwater recharge areas and opportunities to enhance groundwater recharge.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	2-3	
I.7.b.	DNR will support local government efforts to protect important groundwater recharge areas through zoning and land use planning.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	2-3	
I.7.c.	DNR will update the groundwater sensitivity map for the GWMA within 5 years.	**EWR Regional Appropriations staff**, EWR Hydrogeology and Groundwater Unit, EWR Water Monitoring and Surveys Unit	Existing but enhance	3	
Objective II. Groundwater use in the GWMA is reasonable, efficient, and complies with water conservation requirements.					
II.1	DNR will ensure that groundwater users are complying with water conservation requirements in their water supply plan and permits.				
II.1.a.	DNR will include water conservation requirements in all appropriate permits as framed by statute, rule and public water supply plans.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	Existing but enhance	1-3	
II.1.b.	DNR will evaluate compliance with water conservation requirements for all permits that include them (DNR will be in contact with permit holders as we do these reviews).	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	Existing but enhance	1-2	

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
II.1.c.	When considering permit transfer requests or amendment requests to increase appropriations in the GWMA, DNR will evaluate permit holders' performance in meeting conservation requirements in their permit and the conservation goals contained in applicable water supply plans.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	1-2	
II.1.d.	DNR will partner with local units of government such as Soil and Water Districts (SWCDs) to assist in developing and complying with conservation requirements in water appropriation permits.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	1-2	
II.1.e.	DNR will update the information it uses to develop water conservation requirements by water use category.	**EWR Water Regulations Unit,** EWR Regional Appropriations staff	Existing but enhance	2-3	
II.2	DNR will improve communication about and promote the values of water conservation in the GWMA.				
II.2.a.	DNR will promote lessons learned about water conservation by municipalities, industries, and other water users in the GWMA.	**EWR Hydrogeology and Groundwater Unit,** EWR Regional Appropriations staff	New	1-2	
II.2.b.	DNR will include descriptions and evaluations of water conservation practices in the GWMA in a new GWMA reporting system.	**EWR Comm. And Planning Unit,** EWR Regional Appropriations staff	New	3-4	I.4.a
II.2.c.	DNR will update its website to include links to organizations with water conservation information (e.g., SWCD's, United States Department of Agriculture, University of Minnesota Technical Assistance Program, etc.).	**EWR Comm. And Planning Unit,** EWR Regional Appropriations staff	New	1-2	
II.3	DNR will work with other organizations to promote appropriate water storage and aquifer recharge in the GWMA.				
II.4	DNR will promote the use of water conservation strategies in the City of Park Rapids water supply planning in the GWMA..				
Objective III. Groundwater use in the GWMA does not degrade water quality.					

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
III.1	DNR will include compliance with local, state, and federal water quality regulations as permit conditions.				
III.1.a.	DNR will coordinate with local, state, and federal agencies to identify water quality regulations that apply to groundwater use and clarify how best to assure compliance.	**EWR Regional Appropriations staff,** EWR Water Regulations Unit	New	2-3	
III.2	DNR will ensure that permitted appropriations do not degrade water quality by moving known contaminants.				
III.2.a.	DNR will evaluate all new permits to address their role in the moving known contaminants.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	Existing	1-2	
III.2.b.	DNR will evaluate all existing permits in the GWMA for their role in moving known contaminants. [iv]	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	3-4	
III.3	DNR will ensure that the City of Park Rapids Water Supply Plan takes into account contaminant management.				
III.4	DNR will improve communication about known contaminants and pollution management in the GWMA.				
III.4.a.	DNR will create and use a new reporting system to describe and evaluate status of contamination and pollution plume management in the GWMA.	**EWR Regional Appropriations staff,** EWR Comm. And Planning Unit	New	2-3	
Objective IV. Groundwater use in the GWMA does not create well interferences or water use conflicts.					
IV.1	DNR will continue to review permit applications to identify and reduce the likelihood of well interferences and water use conflicts.				
IV.2	DNR will resolve well interferences and water use conflicts applying the framework outlined in statute and rule.				
IV.3	DNR will improve information on aquifer characteristics in the GWMA to improve its ability to identify and reduce the likelihood of potential interferences and conflicts prior to permit approval.				
IV.4	DNR will increase education and awareness about resolving well interferences and water use conflicts.				

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
Objective V. All groundwater users in the GWMA have the necessary permits to use groundwater.					
V.1	DNR will improve its capacity to detect unpermitted groundwater use.				
V.1.a.	DNR will complete an annual analysis to identify potential unpermitted groundwater use in the GWMA and take appropriate action.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	1-5	
V.1.b.	DNR will conduct follow-up reviews of preliminary well approval actions to determine compliance with permit requirements.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	2-3	
V.1.c.	DNR will provide information to well drillers and consultants on existing laws and the water appropriation permit application process.	**EWR Regional Appropriations staff,** EWR Hydrogeology and Groundwater Unit	New	1-5	
V.1.d.	DNR will facilitate the publics' ability to identify and report unpermitted use.	**EWR – Water Regulations Unit,** EWR Regional Appropriations staff.	New	1-5	
V.2	DNR will ensure that permitted volumes reflect actual use and that actual use does not exceed permitted volumes based on established limits.				
V.2.a.	DNR will evaluate water use reports and will contact permit holders whose reports indicate inaccuracies.	**EWR Water Regulations Unit,** EWR Regional Appropriations staff	Existing but enhance	1-2	
V.2.b.	DNR will monitor permitted versus reported use and bring permitees whose reported use is higher than permitted use into compliance.	**EWR Regional Appropriations staff,** EWR Water Regulations Unit	Existing	1-3	
V.2.c.	DNR will work with permit holders to adjust permitted volume to better match actual use and need, consistent with other plan objectives.	**EWR Regional Appropriations staff**	Exisiting	1-3	
V.3	DNR will ensure that water users comply with conditions on appropriation permits.				

Action ID	Action	Responsible Organization, DNR Unit or Individual (Primary in Bold)	Existing or New	Plan Year	Notes
V.3.a.	DNR will work with permit holders to bring them into compliance with their permit conditions.	**EWR Regional Appropriations staff**	Existing but enhance	1-5	
V.3.b.	DNR will focus on permits that have been reviewed to address challenges of cumulative impacts and sustainability thresholds (Objective 1, action 3).	**EWR Regional Appropriations staff**	New	3-5	

7. Glossary

Aquifer – any water-bearing bed or stratum of earth or rock capable of yielding groundwater in sufficient quantities that can be extracted (Minn. Rule, part 6115.0630, subp. 2)

Appropriating – withdrawal, removal, or transfer of water from its source regardless of how the water is used (M.S. 103G.001, Subd.4)

Artesian aquifer or confined aquifer – a water body or aquifer overlain by a layer of material of less permeability than the aquifer. The water is under sufficient pressure so that when it is penetrated by a well, the water will rise above the top of the aquifer. A flowing artesian condition exists when the water flow is at or above the land surface (Minn. Rule, part 6115.0630, subp. 4).

Basin – a depression capable of containing water which may be filled or partly filled with waters of the state. It may be a natural, altered, or artificial depression (Minn. Rule, part 6115.0630, subp. 5)

Buried artesian – an aquifer composed of glacially associated sands and/or gravels, over which a confining layer of clay or till was deposited

Conservation rate – a water fee (rate) structure that encourages conservation and may include increasing block fees, seasonal rates, time of use rates, individualized goal rates, or excess use rates (Minn. Stat., sec. 103G.291, subd. 4(a))

Demand reduction measures – actions that reduce water demand, water losses, peak water demands, and nonessential water uses. Demand reduction measures must include a conservation rate structure, or a uniform rate structure with a conservation program that achieves demand reduction (Minn. Stat., sec. 103G.291, Subd. 4(a)).

Evapotranspiration – the process by which water is transferred from the land to the atmosphere by evaporation from the soil and other surfaces and by transpiration from plants.

Groundwater – subsurface water in the saturated zone. The saturated zone may contain water under atmospheric pressure (water table condition), or greater than atmospheric pressure (artesian condition) (Minn. Rule, part 6115.0630, subp. 11)

Native plant community – a group of plants that interact with each other and with their environment in ways not greatly altered by modern human activity or by introduced organisms

Negative Impact – refers to the relationship of groundwater use to surface waters. See Minn. Stat., section 103G.287, subd. 2 which states "Groundwater appropriations that will have negative impacts to surface waters are subject to applicable provisions in section 103G.285" (this affects altered and natural watercourses, which includes trout streams and basins).

Nested Obwells – Two or more adjacent water-level observation wells completed in different aquifers, or different depths within the same aquifer. Used to determine vertical differences in groundwater levels or heads.

Normal (climate) – the average of a climate variable such as precipitation or temperature over a standard 30-year period (e.g. 1981–2010)

Obwell – a water-level observation well in the DNR network

Potential evaporation or free water surface evaporation – evaporation from a thin film of water having no appreciable heat storage (Farnsworth et al., 1982).

Protected flow – the amount of water required in the watercourse to accommodate instream needs such as water-based recreation, navigation, aesthetics, fish and wildlife habitat, water quality, and needs by downstream higher priority users located in reasonable proximity to the site of appropriation (Minn. Rule, part 6115.0630, subp. 12)

Protective elevation – the water level of the basin necessary to maintain fish and wildlife habitat, existing uses of the surface of the basin by the public and riparian landowners, and other values which must be preserved in the public interest (Minn. Rule, part 6115.0630, subp. 13)

Recharge – the addition of water to the groundwater system

Safe yield – *water table condition:* the amount of groundwater that can be withdrawn from an aquifer system without degrading the quality of water in the aquifer and without allowing the long term average withdrawal to exceed the available long term average recharge to the aquifer system based on representative climatic conditions (Minn. Rule, part 6115.0630, subp. 15)

artesian condition: the amount of groundwater that can be withdrawn from an aquifer system without degrading the quality of water in the aquifer and without the progressive decline in water pressures and levels to a degree that will result in a change from artesian condition to water table condition (Minn. Rule, part 6115.0630, subp. 15)

Transpiration – the process of transport of water from plant roots to above ground parts where it is released to the atmosphere as vapor

Water table aquifer or unconfined aquifer – an aquifer where groundwater is under atmospheric pressure (Minn. Rule, part 6115.0630, subp. 17)

Water-use conflict – A situation where the available supply of waters of the state in a given area is limited to the extent that there are competing demands among existing and proposed users which exceed the reasonably available waters (Minn. Rule, part 6115.0740. subp. 1).

Well interference – A situation where an appropriation reduces water levels beyond the reach of public water supply and private domestic wells constructed according to Minn. Rules, part 4725 (Minn. Stat., sec. 103G.287, subd. 5; Minn. Rules, part 6115.0730).

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9. Appendix A

Minnesota Executive Agency Commitments to the Straight River GWMA Plan

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Minnesota Department of Agriculture

The Minnesota Department of Agriculture (MDA) supports the Minnesota Department of Natural Resources (MDNR) led approach to managing groundwater through the development of Groundwater Management Areas (GWMA). The MDNR is the lead agency for managing groundwater appropriations consistent with statutory requirements for sustainability including providing for ecosystem needs. The MDA has statutory responsibilities and expertise in addressing agricultural contributions to water quality concerns. The MDA will provide support in our areas of responsibility and expertise to the MDNR and local communities in GWMAs.

Overview of the MDA Role

The MDA is the lead state agency for addressing pesticides and nitrate from fertilizer in groundwater. MDA also has related regulatory and non-regulatory responsibilities for pesticide and fertilizer management including storage, handling and cleanup of contaminated facilities. The primary statutory authority for these activities comes from the Groundwater Protection Act [MN Statutes (MS) Chapter 103H], the Pesticide Control Law (MS 18B), and the Fertilizer, Soil Amendment, and Plant Amendment Law (MS 18C). The MDA coordinates with University of Minnesota Extension, soil and water conservation districts, farmers, agronomists and other interested parties to promote and support the most current science based best management practices to reduce potential agricultural contaminants in groundwater and for irrigation management.

The MDA has developed a Pesticide Management Plan (PMP) and a Nitrogen Fertilizer Management Plan (NFMP) which outline a formal approach to addressing pesticide and nitrate contamination in groundwater. The MDA will provide assistance to the MDNR within GWMAs primarily through the implementation of the NFMP and the PMP. The MDA will provide technical support for evaluating levels of pesticide and nitrate contamination, identifying potential sources and protective actions for nitrate and pesticides in groundwater, and other related work within a GWMA. The MDA approach emphasizes review of existing data on local agricultural practices and identifying appropriate voluntary best management practices (BMPs) to ensure that the best available science is used for addressing local problems, and on working closely with local farmers, crop advisors, local government, other agencies, and other interested parties to address nitrate or pesticide issues.

Nitrogen Fertilizer

The Nitrogen Fertilizer Management Plan (NFMP) is the state's blueprint for prevention, evaluation and mitigation of the impacts of nitrogen fertilizer on groundwater. Within GWMAs, MDA will participate in issues related to nitrate in groundwater using the processes identified in the NFMP. This includes monitoring and assessment, development and implementation of BMPs, and other prevention and mitigation activities. Some specific activities are provided below.

Where nitrates in groundwater may be of concern within GWMAs, MDA assistance will be guided by the NFMP and could include:

- Conduct monitoring and assessment of groundwater for nitrates;
- Evaluate nitrate data;
- Engage with the agricultural community, U of M Extension and other local stakeholders to provide information and solicit feedback;
- Provide advice on appropriate nitrogen fertilizer BMPs and other practices;
- Survey of current adoption of BMPs and agricultural practices;
- Assist agricultural community through information and education activities such as farmer meetings, on farm demonstration, technical assistance on nitrogen management practices;
- Follow-up evaluation to determine BMP effectiveness and adoption; and,
- Evaluation of other practices that should be considered.

Pesticides

The Pesticide Management Plan (PMP) is the state's blueprint for prevention, evaluation and mitigation of occurrences of pesticides or pesticide breakdown products in groundwater and surface waters of the state. The PMP includes components promoting prevention, developing appropriate responses to the detection of pesticides or pesticide breakdown products in groundwater and surface waters, and providing responses to reduce or eliminate continued pesticide movement to groundwater and surface water.

If pesticides in groundwater are a concern within GWMAs, the MDA will provide assistance using the processes identified in the PMP. This assistance may include:

- Collection and analysis of data on the presence of pesticides and pesticide degradates in groundwater;
- Evaluation of monitoring data for common detection determinations in groundwater;
- Evaluation of BMPs;
- Engaging the agricultural community, U of M Extension and other stakeholders in evaluating and implementing BMPs;
- Evaluating actions to mitigate the effects of specific pesticides in common detection for groundwater;
- Development of voluntary pesticide-specific BMPs; and,
- Evaluation of BMP use and effectiveness.

MDA Point Source Authority

In addition to non-point source activities shown above, MDA has responsibilities and regulatory authority for overseeing agriculture chemicals from point sources as directed in MS 18C (fertilizer storage, handling, distribution, use and disposal), MS 18D (agricultural chemical liability) and MS 18E (agricultural chemical response and reimbursement). As provided in these statutes, MDA will exercise these authorities as needed to address potential point sources of contamination such as releases from bulk storage facilities within GWMAs.

Irrigation

MDA, in cooperation with the University of Minnesota Extension, will provide technical support for irrigation water management to reduce the potential for impacts from nitrogen fertilizer and pesticides to groundwater. MDA will promote current irrigation practices that use the best available science. This

could include practices such as increasing water use efficiency, irrigation scheduling, fertigation, and other irrigation management practices.

Variation based on unique circumstances for each GWMA:
The above outlines the general approach of MDA involvement within GWMAs. This approach will be modified as appropriate to address the unique circumstances of each GWMA.

Minnesota Department of Health

Objective I. Groundwater use in the GWMA does not harm aquifers and ecosystems, and does not negatively impact surface waters.

1. MDH will act to implement the federal Safe Drinking Water Act by focusing on a 'source to tap' strategy of multiple protections to ensure the delivery of safe drinking water to all Minnesotans connected to a public water system.
2. MDH will enforce the Minnesota Well Code to ensure wells meet current construction and maintenance standards.
3. MDH will focus Wellhead Protection plan development and implementation efforts that protect drinking water resources and public health.
4. MDH will coordinate with state agency efforts to evaluate and improve local (e.g., LUGs, NGOs) capacity to manage groundwater and drinking water issues.
5. MDH will support and prioritize activities that protect both public and private groundwater resources that are used as a source of drinking water.

Objective II. Groundwater use in the GWMA is reasonable, efficient, and complies with water conservation requirements.

1. MDH will focus Wellhead Protection plan development and implementation efforts to encourage sustainable land and water uses.
2. MDH will assist public water systems in identifying conservation activities when developing wellhead protection plans, especially activities that align with regional efforts within groundwater management areas.
3. MDH will continue to advise on storm-water infiltration practices in vulnerable wellhead protection areas.
4. Subject to legislative funding, MDH will conduct a thorough review of state rules, regulations, and policies relative to water reuse.
5. MDH will evaluate and encourage the adoption of conservation practices where multiple benefits can be achieved that conserve groundwater resources and improve the quality of drinking water in GWMAs.

Objective III. Groundwater use in the GWMA does not degrade water quality.

1. MDH will coordinate with state agency efforts to evaluate and improve local (e.g., LUGs, NGOs) capacity to manage groundwater and drinking water resources.

2. MDH will focus Wellhead Protection plan development and implementation efforts that encourage sustainable land uses and the adoption of conservation practices that result in reduced nutrient loss and other anthropogenic impacts that degrade drinking water quality and may impact human health.
3. MDH will assist public water systems in developing water monitoring networks, especially unconfined aquifer settings where drinking water sources are vulnerable.
4. MDH will promote the use of groundwater and land use modeling to demonstrate both the costs and benefits associated with changes in land use on both water quantity and quality.
5. MDH will coordinate with DNR, MPCA, MDA, USGS and others on monitoring, regulation, and prevention efforts for contaminants of emerging concern, including the development of health-based guidance, if appropriate.
6. MDH will coordinate with DNR and others to examine if regional aquifer management approaches might be of value to public water systems, local units of government, and other stakeholders concerned with drinking water protection.

Objective IV. Groundwater use in the GWMA does not create unresolved well interferences or water use conflicts.

1. MDH will share with DNR staff the data and groundwater models developed for wellhead protection purposes. These may assist in evaluation of hydraulic impacts of potential new high capacity wells that are located in close proximity to drinking water supply management areas.

Objective V. All groundwater users in the GWMA have the necessary permits to use groundwater.

1. MDH will assist the DNR technical staff with the coordination and evaluation of compliance issues/impacts on the public water systems.
2. MDH will coordinate with DNR on data exchange for new potential high-capacity wells in groundwater management areas.

Minnesota Pollution Control Agency

The Minnesota Pollution Control Agency has reviewed the Straight River Groundwater Management Area Plan and determined that the agency can support the DNR's goals for the GWMA through the following actions organized by Plan objectives:

Objective I. Groundwater use in the GWMA does not harm aquifers and ecosystems, and does not negatively impact surface waters.

A. MPCA - Monitor the waters of the state within the GWMA to assess their quality, using a systematic intensive watershed approach to determine physical, chemical and biological integrity.
B. MPCA - Identify and investigate groundwater – surface water interactions
C. Work with local government units to promote and implement best management practices to protect surface and groundwater quality
D. MPCA – Support development of shared data system with DNR, MDH, MDA and other organizations

Objective II. Groundwater use in the GWMA is reasonable, efficient, and complies with water conservation requirements.

A. MPCA - Identify and investigate groundwater – surface water interactions with in the GWMA
B. MPCA - Pollution Prevention and MnTAP consultations for water conservation
C. MPCA - Participate with other agencies to encourage water re-use where appropriate
D. MPCA – participate in development of new groundwater models to better understand flows, recharge rates and water balances within the GWMA.

Objective III. Groundwater use in the GWMA does not degrade water quality.

A. MPCA - Monitor the waters of the state to assess their quality, using a systematic intensive watershed approach to determine physical, chemical and biological integrity.
B. MPCA – continue to monitor statewide ambient well network as an early warning system identifying contaminant threats to shallow and vulnerable aquifers in GWMAs and elsewhere. MPCA will make data/results available to interested parties via EQuIS or MPCA website. MPCA will consider installing additional wells if in GWMAs if needed, in conjunction with partner agencies who oversee groundwater monitoring (MDA, MDNR, and MDH).
C. MPCA - Minimize and regulate, with local partners pollutant discharges via permits, technical/financial assistance, and enforcement. E.g. septic systems, feedlots, spray irrigation permits, landfills.
D. MPCA (w/MDH, MDA, USGS) –adapt monitoring, prevention, regulation and remediation efforts for contaminants of new/emerging concern
E. MPCA - Work with local government units to promote and implement best management practices to protect surface and groundwater quality, including storm-water management

Objective IV. Groundwater use in the GWMA does not create unresolved well interferences or water use conflicts.

A. MPCA - Identify and investigate groundwater – surface water interactions

B. MPCA – help develop new groundwater models to better understand flows, recharge rates and water balances

Objective V. All groundwater users in the GWMA have the necessary permits to use groundwater.

A. MPCA – Support DNR efforts to identify all appropriate permit conditions related to MPCA regulatory authority.

Board of Water and Soil Resources

The Minnesota Board of Water and Soil Resources has reviewed the Straight River Groundwater Management Area Plan and determined that the agency can support the DNR's goals for the GWMA through the following actions, organized by Plan objectives:

DNR Objective I. Groundwater use in the GWMA does not harm aquifers and ecosystems, and does not negatively impact surface waters.

A. *BWSR will encourage local government units (Counties, Soil and Water Conservation Districts and others) to consult with the DNR to obtain groundwater management information relevant to their plan updates.*
B. *BWSR will support local governments' efforts to incorporate groundwater management objectives in their plans and to incorporate groundwater protection provisions in their regulatory programs. BWSR will develop guidance to help these local governments to adopt plans, policies and actions that are consistent with DNR objectives for management and protection of groundwater resources.*
C. *BWSR will encourage the participation of Soil and Water Conservation Districts in the DNR Observation Well program.*
D. *Consistent with BWSR's responsibility to administer the Wetland Conservation Act (WCA), BWSR will:*
    a. *support DNR's effort to develop tools to better estimate the effects of groundwater withdrawals on the quantity, quality and biological diversity of wetlands, and*
    b. *as requested, on a case-by-case basis, review and comment on applications for groundwater withdrawals that have the potential to affect wetlands.*
E. *BWSR will attend future GWMA Advisory Team meetings to maintain communication with DNR and provide a link to LGUs*.

DNR Objective II. Groundwater use in the GWMA is reasonable, efficient, and complies with water conservation requirements.

A. *BWSR will continue to encourage the development of groundwater management activities (e.g., irrigation scheduling program and pivot uniformity tests) within their existing and future grant programs.*
B. *BWSR will support local units of government in their development of local plans to address groundwater protections.*

DNR Objective III. Groundwater use in the GWMA does not degrade water quality.

A. *BWSR will support local governments' efforts to incorporate groundwater management objectives in their plans and to incorporate groundwater protection provisions in their regulatory programs.*
B. *BWSR will encourage local governments to consult with the DNR to obtain groundwater management information relevant to their plan updates.*

DNR Objective IV. Groundwater use in the GWMA does not create unresolved well interferences or water use conflicts.

This objective does not relate to BWSR programs and responsibilities.

DNR Objective V. All groundwater users in the GWMA have the necessary permits to use groundwater.

This objective does not relate to BWSR programs and responsibilities.

Appendix B

Process Summary: Preliminary Well Construction, Water Appropriation Permitting and Permitting for Municipal Water Supply Plan

Well Construction – Preliminary Assessment

The following provides a high-level summary of steps for a water appropriations permit applicant and the DNR will take to obtain a preliminary assessment of proposed well.

1. Applicant logs into MPARS to obtain approval for a new well.
2. The Appropriation Hydrologist reviews the approval request.
3. The approval request may be sent to the Groundwater Specialist for review.
4. The approval request may be sent to management for review in very complex cases.
5. A letter is sent to the applicant that may describe the resources of concern in the area (if any) and whether the anticipated appropriation is likely to meet the applicable requirements for obtaining a permit to pump water.
6. The applicant may be informed of the need to gather additional information, conduct aquifer tests, or install observation wells before applying for a DNR Water Appropriation Permit.
7. The DNR may follow up to ascertain if the applicant constructed of the well.

Appropriation Permit Actions

The following provides a high-level summary of steps to obtain a water appropriations permit.

1. Applicant completes the preliminary assessment for well construction.
2. Applicant logs into MPARS to request a DNR Water Appropriation Permit or to amend an existing Water Appropriation Permit.
3. The DNR Appropriation Hydrologist reviews the request and may send the initial request to the Groundwater Specialist for review at this point.
4. Additional information may be requested from the applicant to form a complete application, or to provide enough information with which to make a sound decision. The applicant may be informed of the need to conduct an aquifer test.
5. Meetings may be held with the applicant.
6. The Appropriation Hydrologist will generate the invoice for the permit application fee, or amendment application fee and it will be sent to the applicant using MPARS.
7. The applicant uses MPARS to pay the invoice.
8. When the application is complete and the fee is paid the application is forwarded to the County, SWCD, Watershed District, other relevant parties and other DNR staff for review. They are allowed 30 days to review the proposal and submit comments to the DNR.
9. If concerns exist, the applicant will be notified of the concerns and allowed to address those concerns. DNR staff is available for discussion regarding any issues related to the permit application or natural resource concerns. Additional actions may need to be taken by the applicant to address the concerns. An aquifer test may need to be conducted by the applicant.
10. If the issues are addressed, the Appropriation Hydrologist will draft the Permit in MPARS. The appropriate conditions will be added to the permit to address the need for water level monitoring, or other actions, by the applicant.
11. A DNR representative will issue the DNR Appropriation Permit using MPARS.

High-Level Process for Community Public Water Supplies

The following provides a high-level summary of steps for a municipal water appropriations permit applicant and the DNR will take to obtain a high capacity well permit within the scope of an approved water supply plan.

1. City develops local Water Supply Plan, receives DNR approval & city adopts (approved WSP identifies future water needs & source water(s))
2. City submits Well Construction Preliminary Assessment to DNR prior to drilling well
3. DNR provides site-specific WCPA information to city
4. City drills well (MDH notification)
5. City submits permit amendment or application
6. DNR & city coordinate with other agencies (MDH, MPCA, Met Council, watershed districts, counties) and engage in comment period
7. DNR determines if aquifer testing is needed; if so,
    a. City prepares and submits aquifer test plan; DNR must approve
    b. City conducts aquifer tests with monitoring (input from DNR)
    c. DNR reviews aquifer test results
8. DNR makes permit decision
9. Issued permits have applicable permit conditions

Water Appropriation Permit Modifications

Consistent with Minnesota Statute and Rule, the DNR Commissioner can modify water appropriation permits. However, statute and rule also protect the permit holder.

For instance, water appropriation permit holders are afforded due process through Minnesota Statute and Rule. If the permit holder does not agree with a permit decision, they may request a contested case hearing.

Contested case hearings are used in many states. They are informal court proceedings governed by state law that can be used to protect rights, duties and privileges of the affected parties. The purpose of contested case hearings is to provide decision makers with the highest quality information available to render permit decisions, and to provide third party review of an appeal made to a state agency decision.

Modifications to water appropriation permits are described very specifically by Minnesota Statute and Rule:

- The DNR is prohibited from modifying or restricting the authorized amount of groundwater that is used for agricultural irrigation between May 1 and September 30, unless the DNR determines that the authorized amount of appropriation endangers a domestic water supply. [1] This is designed to provide some assurance of a water source to bring the crop through to harvest.
- Whenever a permit is proposed to be modified, there is an opportunity for the permit holder to demand a contested case hearing.
- From the initial decision whether to issue or deny a permit, to the proposed modification of an existing permit due to the establishment of a protected flow or protected elevation in a nearby surface water feature, the applicant or permit holder has the opportunity to a public hearing.[2]

[2] Minn. Rules, 6115.0670, Subp. 3.

- If there is a water use conflict, where there is limited water availability, resulting in the commissioner proposing adjustments to permits in an area that are competing for the same inadequate water source, the action is taken by the DNR only after the permit holders or applicants are notified and given the opportunity for a hearing.[3]
- Most terminations are subject to advanced notice and opportunity for a hearing. An exception would be, for example, when a permittee requests termination.[4]
- The public hearings that can be requested are conducted as contested case hearings under Minn. Stat. Chapter 14, and are conducted by the Office of Administrative Hearings.[5]
- Permits that authorize appropriation from surface water sources may be temporarily suspended as a result of periods of extremely low rainfall. This is defined as when the flows measured in their watersheds fall below a certain point, typically the Q90 flow. Applicants for surface water appropriations are required to have a feasible contingency plan for these situations or agree to withstand the results of not being able to appropriate water (after suspension).[6]

It should be extremely rare for a permit holder to face a permit modification without significant advance warning. However, if a permit modification is necessary and the permit holder or applicant disagrees with the permit decision, Minnesota Statute and Rules provide for a hearing.

If the DNR found the existing authorized water use in an area to be unsustainable, DNR would provide advanced notice and involve permit holders in finding a solution.

[3] Minn. Rules, 6115.0740, Subp. 3.
[4] Minn. Rules, 6115.0750, Subp. 8.
[5] Minn. Stat., 103G.311
[6] Minn. Stat., 103G.285, Subd. 6.

Appendix C
Minnesota Rule Guiding Water Use Conflicts

MINNESOTA RULE 6115.0740 WATER USE CONFLICTS (www.revisor.leg.state.mn.us)

Subpart 1. **Conflict defined**.
For the purpose of these rules a conflict occurs where the available supply of waters of the state in a given area is limited to the extent that there are competing demands among existing and proposed users which exceed the reasonably available waters. Existing and proposed appropriations could in this situation endanger the supply of waters of the state so that the public health, safety, and welfare would be impaired.
Subp. 2. **Procedure**.
Whenever the total withdrawals and uses of ground or surface waters would exceed the available supply based on established resource protection limits, including protection elevations and protected flows for surface water and safe yields for groundwater, resulting in a conflict among proposed users and existing legal users the following shall apply:

A. In no case shall a permitees be considered to have established a right of use or appropriation by obtaining a permit.

B. The commissioner shall analyze and evaluate the following:

(1) the reasonableness for use of water by the proposed and existing users;

(2) the water use practices by the proposed and existing users to determine if the proposed and existing users are or would be using water in the most efficient manner in order to reduce the amount of water required;

(3) the possible alternative sources of water supply available to determine if there are feasible and practical means to provide water to satisfy the reasonable needs of proposed and existing users.

C. If conflicts can be resolved by modifying the appropriation of the proposed and existing users, the commissioner shall do so.

D. If conflicts cannot be resolved through modification of proposed and existing permits the commissioner shall base the decision regarding issuance of new applications and retention, modification, or termination of existing permits on the basis of existing priorities of use established by the legislature as follows:

(1) If the unresolved conflict involves users who are or would be in the same priority class, the commissioner shall require the proposed users and existing permitted users to develop and submit a plan which will provide for proportionate distribution of the limited water available among all users in the same priority class. The commissioner shall withhold consideration of new applications and shall, if the existing permitted appropriations endanger the supply of waters of the state, suspend or limit existing permits until a plan is approved by the commissioner.

The plan must include proposals for allocating the water which address the following: possible reduction in the amounts of appropriation so that each user would receive a proportionate amount of water for use; and possible restrictions in the timing of withdrawals so that each user would be allowed to withdraw a proportionate share of water for use over certain periods of time.

If the commissioner approves the proposed plan, new permits will be issued and existing permits will be amended in accordance with that plan.

If the commissioner determines that the proposed plan is not practical or reasonable, the commissioner shall develop a new plan or modify the proposed plan to provide proportionate share of water among the users involved. The commissioner shall issue new permits and amend existing permits based on that plan.

(2) If the unresolved conflict involves users who are or would be in a different priority class the available water supply shall be allocated to existing and proposed users based on the relative priority of use. Highest priority users shall be satisfied first. Any remaining available water supply shall be allocated to the next succeeding priority users, until no further water is available. Users in the same priority class shall be offered the same options as provided in subitem (1).

Subp. 3. **Notice and hearing**.

All actions by the commissioner shall be made after notice and opportunity for public hearing.

Statutory Authority: MS s 103G.315; 105.415

Published Electronically: June 11, 2008

Appendix D

Executive Summary of the Report to the Minnesota State Legislature: Definitions and Thresholds for Negative Impacts to Surface Waters

Background and purpose

This report was prepared in response to Laws 2015, chapter 4, article 4, which directed the Department of Natural Resources (DNR) to consult with interested stakeholders and develop recommendations for statutory or rule definitions and thresholds for negative impacts to surface waters.

The DNR is charged with *managing* water resources to assure an adequate and sustainable supply for multiple uses. Minnesota has a modified riparian water law system, in which landowners have the right to make reasonable use of the abutting surface waters or the groundwater beneath their land, as defined and regulated by the water appropriation permitting program. The water itself is a public trust resource, and the state grants the right to water beyond personal use – above 10,000 gallons per day or one million gallons per year – through water appropriation permits. In recent years, it has become increasingly clear that Minnesota's water resources, while abundant in many areas, are not unlimited. In some areas, increasing water withdrawals are using more groundwater than is naturally being recharged. In other areas, groundwater supplies are limited due to the underlying geology. Groundwater contamination is also a limiting factor in many areas.

The variability of Minnesota's climate and geography mean that rainfall is not always available in the quantities we need at the times when it is most needed. Increasing demands on both surface water and groundwater supplies can cause negative impacts to the ecosystems and riparian uses of streams, lakes, and wetlands. While water levels fluctuate naturally throughout the year and across multiple years, water appropriations can push low levels lower, significantly reducing stream flows and more frequently putting fish, wildlife, plant communities and riparian uses at risk.

This report examines the effects of groundwater use on rivers and streams, lakes, and wetlands. DNR's analysis and recommendations are based on the fact that surface water bodies go through seasonal and multi-year cycles of high and low water levels. The seasonal patterns, known as the seasonal hydrograph, are primary drivers in creating and maintaining the unique ecology and associated aquatic and riparian habitats of each water body. To preserve the seasonal hydrograph, protected flows must be established for streams, and protection elevations for lakes and some wetlands. These protection levels can then be translated into a quantity of water that can be sustainably withdrawn. Multi-year dry cycles and extreme droughts also serve important ecological functions, but may require a different approach to determining sustainable water use—e.g., water use that is ecologically sustainable under the normal seasonal hydrograph may need to be reduced during extreme drought.

This report was prepared with input from a broad range of stakeholders, as described in the Introduction and Appendix A. This report also incorporates and summarizes scientific studies, including an examination of approaches used in other states and countries. The recommendations in this report represent the DNR's suggestions to further define and describe methods of determining protected flows and protection elevations. These recommendations are based on the DNR's assessment of available information, analytical tools and the practicality of applying them in Minnesota.

Recommendations

The recommendations in this report fall into three categories: 1) definitions to be added in statute; 2) integration of statutory provisions dealing with surface water and groundwater; and 3) approaches to determining the thresholds for streams, lakes, and wetlands.

Definitions

The following definitions are recommended to be added in statute:

- Negative impact to surface waters – in relation to water appropriations, a change in hydrology sufficient to cause ecosystem harm or alter riparian uses long-term.
- Ecosystem harm – in relation to water appropriations, to change the biological community and ecology in a manner that results in a less desirable and degraded condition.
- Sustainable diversion limit – in relation to water appropriations, a maximum amount of water that can be removed directly or indirectly from a surface water body in a defined geographic area on an annual basis without causing a negative impact to the surface water body.

Statutory changes

The DNR also recommends combining many of the provisions in section 103G.285, which deals with surface water appropriations, and 103G.287, which deals with groundwater, into a single "Water Appropriations" section. This revision would recognize the interconnected and interdependent nature of surface and groundwater resources while removing the circular references between the two sections of statute that make it difficult to identify and assess 'negative impacts.'

Approach to determining thresholds

A "threshold" is essentially the point at which negative impacts occur. Thresholds can be estimated based on data and scientific literature. Calculating thresholds at a statewide scale is not appropriate or practical, however, given the number of variables involved – e.g., which species or which riparian uses are negatively impacted. The diversity of Minnesota's surface water and groundwater resources, land use, and climatic factors would make a single number misleading and inappropriate for many locations and conditions. The precautionary principle would require that any such statewide threshold be set to be protective of the most vulnerable resource, thereby unnecessarily restricting water use in many areas. Therefore, the DNR proposes establishing specific thresholds for specific watercourses, water basins, watersheds, or hydrologic areas in those parts of the state where water use is at risk of causing negative impacts.

Streams: The DNR's research and a review of scientific literature indicate that a 20% change in hydrologic regime (relative to the August median base flow) will negatively affect the ecosystem, while a change less than 10% is not likely to be detectable. Setting a diversion limit of no more than 10% of the August median base flow will preserve the seasonal variability of the natural hydrology under all but the most extreme drought conditions. A 15% diversion limit would preserve much of the seasonal variability, but is not adequate to protect ecosystems during periods of drought. We recommend a 10% limit in most circumstances, but recognize a diversion limit of up to 15% may be appropriate in some areas where water uses are less dependent on a consistent supply.

Lakes: The DNR recommends an approach that establishes sustainable diversion limits for two categories of lakes.

Lakes connected to stream systems that outflow most of the time. For these lakes, the outflowing stream's diversion limit would be applied to the lake and a separate protection elevation for the lake would not be necessary.

Lakes with infrequent surface outflow. For these lakes, protection elevations specific to the lake could be established based on key considerations related to hydrology, ecology, and riparian uses. Water levels at and above the protection elevation are expected to maintain the characteristic hydrology, ecology, and riparian uses of the lake most of the time. Water levels below the protection elevation put one or more of the water body's resources or uses at risk. The protection elevation is used to establish the sustainable diversion limit.

Wetlands: Different types of wetlands have distinct and characteristic seasonal water levels that maintain their characteristic plant and animal communities. Most wetland types in Minnesota depend to some extent on groundwater for at least some part of the growing season. Some wetland types, such as fens, are highly connected to and dependent on groundwater, while others, such as floodplain forests, are more directly influenced by surface-water. However, as yet there is no systematic method for evaluating potential negative impacts on wetlands due to groundwater appropriations, due to limited wetland-related hydrologic data.

The DNR is proposing to establish a comprehensive wetland hydrology characterization and monitoring program statewide. An initial step in this process is to begin testing the feasibility of establishing target hydrographs for the various wetland types, with a particular focus on areas of the state experiencing a heavy demand for groundwater appropriation. A target hydrograph is a range of acceptable water levels throughout the year for each various wetland types, extending from "normal" levels to infrequent or rare low levels that stress the characteristic plant and animal communities. The target hydrograph would be used as a guide for developing allowable diversion limits throughout the growing season to maintain the characteristic hydrologic regime.

Impacts to wetlands are also regulated under other authorities, primarily the Minnesota Wetland Conservation Act and the Public Waters Permit Program. The DNR's goal under this approach would be to avoid wetland drainage that would trigger regulation under those programs.

Methodology

The DNR would focus its efforts to set thresholds for negative impacts primarily in those areas of the state where the intensity of groundwater use and/or scarcity of groundwater supplies is causing concern, such as the groundwater management areas or individual water bodies known to be negatively affected by groundwater use. In these areas, the DNR will implement the following steps:

1) establish negative impact thresholds for surface water bodies;
2) establish sustainable diversion limits that will maintain protected flows and protection elevations of those water bodies;
3) conduct groundwater modeling to determine the effects of groundwater withdrawals on the surface water bodies; and
4) assess to what degree individual groundwater withdrawals may need to be adjusted.

Applying this approach to water use permitting

Water users, whether they are public suppliers, agricultural irrigators, industry, businesses or golf courses, need reliability and predictability. Establishing negative impact thresholds and sustainable

diversion limits should ultimately improve the predictability and consistency of water appropriation decisions. It should also reduce the need to modify permits during drought and thus allow water users to rely on a fixed quantity in most years, although extreme drought conditions extending over multiple years may still call for emergency water use restrictions.

Establishing negative impact thresholds and sustainable diversion limits is the first step in the process of allocating water resources among individual appropriators. Further discussion is needed as to how best to engage current and prospective water users in allocation decisions once we have determined the amount of available water in a given hydrologic area.

Minnesota's water appropriation statutes were formulated in an era when groundwater resources were viewed as essentially unlimited. Allocating water resources in an environment where those resources may in fact be limited calls for additional research and discussion. Our statutes and rules may need to be revised to provide better guidance. The DNR is currently researching potential models of water allocation systems used in other states and regions as part of this larger discussion.

Local governments also play a significant role in the water allocation process through their planning and land use controls, which help to determine the number and nature of residential, commercial, and industrial water users in a given community. In planning for future development, local governments should carefully consider the sustainability of their water supplies and the extent to which new water-intensive uses should be allowed or encouraged. A planning process that considers the needs of all water users, future needs, and opportunities for water conservation can help to sustainably manage existing and proposed water use.

Conclusions

- **Minnesota is in the "urgency room," not the "emergency room," in terms of water use management.**
- **The state's water management policies, statutes, and rules are strong and conceptually sound. However, the state's water management statutes could be improved by clarifying terminology and better recognizing the interconnected nature of surface water and groundwater.**
- **There is a strong scientific basis for maintaining the natural dynamic patterns of surface water bodies by establishing protected flows for individual streams, protection elevations for individual basins, and target hydrographs for wetlands.**
- **Over the next five years, the DNR intends to set protected flows, protection elevations, and target hydrographs for water bodies in places where demand for water may be exceeding sustainable supplies. The changes to statute recommended in this report would help support that work.**

Levi, Andrew (COMM)

From: Tim Horyza <Timothy.Horyza@enbridge.com>
Sent: Monday, June 19, 2017 12:08 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge L-3 Replacement

I have 32 years of experience in pipeline construction and operation and Enbridge is the best in the business about caring for the natural resources around the right of way. I can attest that the mitigation measures discussed in Enbridge's Environmental Protection Plan and summarized in the DEIS reflect the best practices in the industry and effectively minimize construction-related impacts. Enbridge works hard to minimize construction impacts and restore the land. Enbridge has worked hard to address specific concerns raised by landowners along the Preferred Route. More than 95% of the private landowners have signed voluntary easements with Enbridge, and Enbridge has modified the Preferred Route based on public comments/landowner feedback. These efforts to minimize impacts and address landowner feedback should be better reflected in the FEIS. I am a Minnesotan and want to see the environment protected like most others. To me, there's no greater demonstration to the environment than the $7.5 billion in private investment Enbridge has committed to replacing existing Line 3. The DEIS should acknowledge the environmental benefits of replacing aging infrastructure with a new pipeline built using modern materials, designs and construction techniques. Modern-day preventive maintenance and inspection technology make accidents, especially large releases, highly unlikely. In the event of a leak or other incident, Enbridge has robust and tested emergency response equipment, training and expertise to ensure a quick and effective response. Enbridge is an active participant in leak detection research and development programs. Enbridge employs industry leading leak detection programs on all of its systems today, and continually invests in technology development so that the company can improve leak detection thresholds in the future. 0525-1

Tim Horyza
Duluth MN

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Levi, Andrew (COMM)

From: Jennifer Houston <womanway@gmail.com>
Sent: Friday, June 30, 2017 7:40 PM
To: MN_COMM_Pipeline Comments
Subject: Comments re: line 3 Pipeline

RE: LINE 3 PIPELINE AND IT'S NEGATIVE EFFECTS:

TRIBAL IMPACTS

- The United Nations international standard for projects that impact Indigenous Peoples is **Free, Prior and Informed consent**. Tribal consultancy after the project is already proposed and designed is not free, prior, and informed consent.
- Most of the issues specific to tribal people and tribal resources are **confined to a separate chapter** that attempts to provide "an American Indian perspective." They are excluded from the main chapters that assess potential impacts. This allows the EIS to **avoid drawing conclusions** about the impacts on tribal people. (Chapter 9) 1027-1
- Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "**would have a long-term detrimental effect on tribal members and tribal resources**" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). **This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members**. 1027-2
- Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "**are part of a larger pattern of structural racism**" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3).
- The DEIS concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) **But it also states that this is NOT a reason to deny the project**!
- Chapter 6 states that Enbridge's preferred route would impact **more wild rice lakes and areas rich in biodiversity** than any of the proposed alternative routes (Figure ES-10).
- Most of the analysis of archaeological resources in the path of the pipeline rely on **Enbridge's surveys**. For some reason, only 3 of their 8 surveys are available, and the 5 missing are the most recent! In those, Enbridge found 63 sites, but claims that only 3 are eligible for protection under the National Register of Historic Places. (5.4.2.6.1). Honor the Earth has had the studies we have been able to see reviewed, and there are numerous flaws in their methodology. 1027-3
- The DEIS acknowledges that "The addition of a temporary, cash-rich workforce **increases the likelihood that sex trafficking or sexual abuse will occur**," and that these challenges

1027-4

hit Native communities the hardest. But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). What experience does Enbridge have planning and implementing an anti-sex trafficking program? 1027-4 Cont'd

BIG PICTURE PROBLEMS

- Many of the environmental impacts and "plans" for minimizing them are drawn directly from Enbridge's permit application ("Enbridge would do this" and "Enbridge would do that") without any evidence of compliance or genuine consideration that maybe, just maybe, Enbridge won't follow all the rules. History shows that they continually violate permit conditions - we are working on compiling an enormous record of these violations. The DEIS should analyze the likelihood of compliance.
- **The Alternatives chosen for comparison to the pipeline proposal are absurd** -- for example, the only rail alternative assumes the construction of a new rail terminal at the US border, and thousands of new railcars to transport oil to Clearbrook and Superior. Enbridge would never do that. The only reasonable rail option would begin in Alberta. The truck alternatives are similarly unreasonable.
- **The "No Build" Alternative is not genuinely considered.** It is framed as "Continued Use of Existing Line 3" (Chapters 3 and 4), but nowhere is the "Shut Line 3 Down" option considered. There is no discussion of renewable energy, conservation, or the rapid development of electric car infrastructure. There is no assessment of the decline in oil demand. The entire study assumes that society needs X amount of oil, simply because Enbridge says they can sell it. That assumption ignores the massive fossil fuel subsidies and debts that make Enbridge's profits possible, and avoids the moral question of what is good for people and the planet. We know we must stop burning fossil fuels yesterday.
- There is zero discussion of how all this extra oil will go once it leaves Superior, Wisconsin. With 370,000 bpd of additional capacity, Enbridge will need a new pipeline departing its terminal in Superior. We know that they plan to build Line 66 through Ojibwe territories in Wisconsin, but they continue to deny this. Why isn't MN asking?
- The DEIS contains **no spill analysis for tributaries of the St. Louis River or Nemadji River**, where spills could decimate **Lake Superior** and the harbors of the Twin Ports. 1027-5
- For calculations of impact, the lifespan of the new Line 3 is estimated at *30 years*. But Lines 1-4 are 55-65 years old! And hasn't the technology improved? The lifespan should be at least 50 years, a shorter lifespan is a clear indication that Enbridge themselves know that the fossil fuel era is coming to an end. In Honor the Earth's analysis, we have attempted to predict the impacts of this pipeline on the next 7 generations. 1027-6
- This project is a further investment in a dying Tar Sands industry. Numerous international oil companies and financing institutions are divesting from the tar sands. Why should Minnesota invest in this industry? Why should our Nation be forced to deal with a bad idea in perpetuity.
- The DEIS assumes that the Koch pipelines to MN refineries get all their oil from Line 3, but the current Line 3 does not supply enough capacity for this (390,000 barrels per day), and we know that some of it comes from Line 81, which brings oil from the Bakken in North Dakota.

SPILL RISK

- The 7 sites chosen for spill modeling are not representative of the locations and resources put at risk along the entire corridor. A more thorough analysis of different locations is needed - for example, what about Lake Superior? 1027-7
- There is no analysis on Enbridge's leak detection system, or their inability to respond quickly to major emergencies. 1027-8
- Enbridge's response plans are highly guarded, and Honor the Earth's attempts to receive and review these documents has been blocked. What we can infer is that Enbridge relies on local first responders for their emergencies. They attempt to use the money they donate to communities along their corridors as proof that they have an integrated emergency response program.

The DEIS estimates the annual probability of different kinds of spills on the proposed route in MN:

- Pinhole leak = 27%
- Catastrophic = 1.1%
- Small Spill = 107%, Medium = 7.6%, Large = 6.1%

So in 50 years, we can expect **14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic**!

ABANDONMENT

- The risks of pipeline abandonment are not adequately assessed. For example, there is no discussion of landowner property values and the effect that an abandoned pipe could have on them, especially if there is indeed "**legacy contamination**" on people's land. 1027-9
- Impacts on human and natural resources due to the abandoned Line 3 are anticipated to be minimal in the near term but could be significant in the longer term, absent effective monitoring, adaptive management, and the timely introduction of mitigation measures. There is not much information on what these mitigation and management plans are. 1027-10
- If there is a dearth of surrounding soil, or if the cover for the pipeline is relatively shallow, the pipeline bears more of the load and, all things being equal, is more likely to fail. We know from experience that there are numerous areas where the pipes are exposed and near the surface. 1027-11
- There is also no discussion of **exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied**. "When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high" (8.3.1). 1027-12
- We know that the abandonment of the existing line 3 is bad. But there is also no mention of **the abandonment of the other 3 ancient pipelines in Enbridge's existing mainline corridor (Lines 1, 2, and 4)**, which we expect Enbridge will very soon attempt to abandon. Nor is there any discussion of the **abandonment of the NEW Line 3** in the future. 1027-13

- The DEIS states that it will be very risky to remove and clean up the existing Line 3 because the pipelines are very close together. "The distance between pipelines within this corridor varies, but they are generally 10 to 15 feet apart" (8.3.1). This is not consistent with our extensive observations and physical measurements on the land. Also, don't they dig up pieces of pipe for maintenance purposes all the time? **Why is it suddenly risky?** 1027-14
- The DEIS simply states that "Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage,and mitigate historically contaminated soils and waters" found during the abandonment or removal of the existing Line 3 (8.3.1.1.1). **We want to see that plan**. 1027-15

CONSTRUCTION AND RESTORATION

- Chapter 2, "Project Description" states that Enbridge has requested a 750-foot route width (375 feet on each side of the Line 3 Replacement pipeline centerline). They claim only 50 of the 750 feet would remain a permanent right-of-way (2.1) All of this width should be included in an impact analysis because Enbridge's environmental protection plan and record is abysmal. 1027-16
- Their "restoration" plans for restoring the landscape around the corridor after installation is laughable. Enbridge's process for restoring wetlands includes dumping the now compacted (and probably de-watered) soil back in the trench, sowing some oats and "letting nature take it's course". This is not how you re-establish a wetland. Studies have shown that even with proper restoration practices, it can take decades to get back to the biological functioning it was at prior to disturbance. When Enbridge stores the soil, they will also be driving equipment over it- which compacts it, they also plan to compact the soil after refilling the trenches. This is not good for the soil. 1027-17
- Cathodic protection, which applies electric current to the pipeline in order to protect it from corrosion caused by nearby utility lines, **will not be installed for up to 1 year after pipeline construction** (2.3.2.3). Lack of cathodic protection is what caused many pinhole leaks in the Keystone pipeline, almost immediately after construction. The proposed route for Line 3 follows a utility corridor for much of its length - this is a recipe for disaster. Even the US Army Corps's rubber-stamp approval of the Dakota Access pipeline required the cathodic protection system to be installed within 6 months! 1027-18

ECONOMIC IMPACTS

- Chapter 5, "Existing Conditions, Impacts, and Mitigation" states that Line 3 will create ZERO permanent jobs. Enbridge's application states that "existing operations staff would be able to operate the [pipeline] and that few additional employees would be hired to assist the staff" (5.3.4).
- Also in Chapter 5, the DOC assumes "all workers would re-locate to the area" and ZERO construction jobs will go to Minnesotans. The pipeline would have "no measureable impact on local employment, per capita household income, median household income, or unemployment" (5.3.4).
- The DEIS does not acknowledge that when the existing Line 3 shuts down, Enbridge will stop paying taxes to the MN counties along the mainline corridor. For many of these poor counties in the north, revenue from Enbridge's property tax makes up a significant portion of 1027-18 Cont'd

the county budget. There is also the issue that Enbridge is now in the process of appealing years of back taxes, burdening two of the poorest counties in Minnesota with over $10 million due.

CLIMATE CHANGE

- The DEIS acknowledges that Line 3 would contribute to climate change. It analyses 3 different types of emissions - direct, indirect, and lifecycle. Direct emissions are those that the pipeline infrastructure itself emits, and these are very small. Indirect emissions are those created by the power plants that provide electricity for the pipeline's pumping stations, and these are significant. Lifecycle emissions are those caused by the refinement and eventual use of the oil, and these are massive. Line 3's direct and indirect emissions alone would be 453,000 tons of CO2 per year. Over a 50-year lifespan, that would cost society an estimated $1.1 billion. (Executive Summary p.18).
- The lifecycle emissions of Line 3 would be 193 million tons of CO2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3)
- The DEIS does not discuss the unprecedented challenges of human casualty, displacement, conflict, natural disaster, biodiversity loss, etc, that climate change is causing, or the consensus from the scientific community that we must leave fossil fuels in the ground. It also fails to acknowledge that across the planet, Indigenous people are disproportionately impacted.

The DEIS affirms that the MN PUC can only grant the permit if "the consequences to society of granting are more favorable than the consequences of denying the certificate." Regardless of whether or not Enbridge can find customers, the DEIS shows that the negative impacts far outweigh the benefits. So our position remains:

NO PERMIT. SHUT DOWN LINE 3 AND DEVELOP RENEWABLE ENERGY INFRASTRUCTURE.

Levi, Andrew (COMM)

From: Arthur Howe <arthurkatyhowe@comcast.net>
Sent: Monday, July 10, 2017 7:12 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916

CN-14-916 and PPL -15-137

Comment for the Draft Environmental Impact Survey relating to the above dockets:

1. The greater the volume of a spill, the greater the possible environmental impact. Experience has shown that the methods for detecting spills proposed by Enbridge have not prevented large volumes of oil from spilling. Reference numerous photos of visible oil spills covering acres. Enbridge claims that high tech sensors and monitoring procedures would prevent this. However, this is clearly a false claim. I wish to make several comments on this topic: 2669-1
    a. I do not see any description of improved monitoring and spill detection technology in the DEIS. Examples might be more pressure, flow sensors and shut off valves along the pipeline.
    b. I do not see a commitment to improve operator training and the number of operators. I note that the Kalamazoo leak was actually exacerbated when the operator did exactly the opposite of what should have been done viz, they confused an air bubble with a leak and INCREASED the pipeline pressure rather than closing it off.
    c. I do not see the use of drones proposed to quickly inspect sections of the pipeline giving indications of leaks.
    d. I do not see consideration of oil sensing cables laid along underneath the pipeline, to detect oil leaks.
    e. I do not see consideration of drones to fly over the pipeline daily to record changes in the temperature apron or to record visual changes. There are companies which use drones to monitor oil and gas pipelines. Have these companies been asked to make bids for such surveillance?

2. The DEIS repeatedly glosses over the details of a cleanup procedure for spilled tar sands oil. For instance, in the description of the cleanup of a hypothetical tar sands leak into the Shell river near Park rapids, the DEIS repeatedly says that the contaminated shoreline would be cleaned up with standard procedures. In a report of this detail, it is a serious omission not to spell out what these procedures would be. This is not for lack of experience from previous spills. For instance, the Kalamazoo spill cost millions, if not billions to clean up. Are these procedures now referred to as "standard" procedures? Heavy oil residing in the wetlands along the banks of Twin lakes is not easily removed. Direct dredging and removal would destroy the wetland vegetation, and backfilled earth would take a long time to be covered with regrown vegetation. Chemical treatment with soap would not seem a viable option. Just leaving the oil there for natural degradation would probably take decades. These issues directly concern the environmental impact of a spill. It is clear that this report has not been vetted by anybody from an environmental department. 2669-2

I Trust the EIS can be modified for the final version

Truly,

Arthur Howe

Park Rapids,
MN

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Nora Howley

Street Address: 2440 34th Ave S

City: Mpls State: MN Zip Code: 55406

Phone or Email:

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I believe that the EIS should include plans for more than the next 30 years. I am 16 and I will only be 46 when the EIS' plans will end. If the pipeline leaks after that time it will not be covered by the EIS and Enbrige. I do not think that it is OK to pose a longlasting threat on the people and land in Minnesota and not agree to be held acountable for it. 0693-1

I also believe that the proposed rout infringes on the Anishanaabe people's treaty rights. It goes through land that has been promised that they can always live of off. I is very close to their wild rice fields and any leaks will polute their water. This is unnacceptable. Time after time in the history of the United States, white people have broken treaties with Native nations and pipelines like this one and the DAPL add insult to injury. The EIS should have many more pages on enviromental justice and the negative effects on Native people should be one of the most important factors in planning the pipeline.

If including additional pages please number them and tell us how many you are providing:_____ pages

HUBBARD COUNTY HC COLA
P.O. BOX 746
PARK RAPIDS, MN 56470
www.HubbardCOLAmn.org HCCOLAmn@gmail.com

July 7, 2017

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Re: PUC Docket Numbers CN-14-916 and PPL-15-137; Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Ms. MacAlister:

Hubbard County Coalition of Lake Associations ("HC COLA") is a coalition of 29 lake associations and their approximate 2,100 members that represent 37 lakes in Hubbard County. HC COLA's mission is to protect and enhance the quality of our lakes and rivers, preserve the economic, recreational and natural environmental values of our shore lands and promote the responsible use of our waters and related habitats. HC COLA's mission enhances, promotes and protects the interests of lakeshore property owners, lake associations, local government, the general public and future generations.

Our goal in commenting is to ensure that the EIS for the Line 3 Replacement oil pipeline crossing Minnesota fully complies with all State laws and provides for the highest level of protection of its natural resources.

Hubbard County is blessed with an abundance of natural resources, and is especially noted for its clean lakes and rivers. The proposed route of the new Line 3 Replacement pipeline, if approved, would be exposed to 760,000 barrels of Canadian heavy crude oil per day for the project lifetime. A spill of diluted bitumen which sinks in water demonstrated by the 2010 Enbridge spill in Kalamazoo, MI would be catastrophic to this pristine environment, its waters, wildlife, land, and inhabitants.

On May 15th, 2016, HC COLA requested the following as part our EIS scoping comments:

1. The Memo of Understanding (MOU) with the MN Department of Natural Resources (DNR) and the MN Pollution Control Agency (PCA) should be strengthened by the inclusion of specific provisions and tasks that turn potential assistance and oversight into actual assistance and oversight. Currently marginalized by the Department of Commerce, scientists, specialists and managers at the MPCA and the MN DNR should have active opportunities to monitor and supervise the EIS.

2. As authorized by MEPA, we request the establishment of an expert panel to provide oversight and assistance with the scientific, economic, technical and procedural aspects of EIS scoping.

3. Any outside consultant contracts used in the EIS scoping should be awarded based on an open, unbiased bid procedure.

4. All "system alternative routes" submitted for this pipeline corridor should be included and compared in the EIS analysis.

After reviewing the draft EIS, it is evident that our scoping EIS comments / recommendations were not heeded. The Draft EIS of the potential environmental, human and economic impacts of the Line 3 Project and its proposed routes is inadequate due to the following issues directly affecting water resources:

1. Chapter 10 Accidental Crude Oil Releases comments 2764-1
   a) The oil release (spill) analysis was supplied by Enbridge, and their paid contractors who were also hired by the State to formulate the EIS. This is an obvious conflict of interest. The spill analysis was done without an independent 3rd party analysis.
   b) The numbers used to calculate the spill scenarios were redacted; limiting the public to incomplete analysis and understanding.
   c) The oil spill analysis was limited to only 7 sites, all along Enbridge's proposed route. This is insufficient as it does not represent all of the topographical features found on their proposed route nor features found on route alternatives.
   d) The long term risk assessment for the life of the project is missing; this project life is at least 50 years based on the current age of Line 3.
   e) There is no long term risk assessment of leaving the pipe in the ground indefinitely.
   f) Missing winter spill analysis with the complexities of cleaning a river or lake covered by ice.
   g) Missing the effect on a spill site where first response personnel are hampered from accessing the site of a spill where there are no existing roads.

2. Chapters 5, 6, 7, 9, and 11 in addition to 10 above - - Economics-related comments 2764-2
   a) The oil release (spill) analysis is missing the economic analysis of the damage to our natural resources:
      i. Tourism
      ii. Itasca State Park
      iii. Property Values
   b) Post construction impacts and costs to our natural resources

3. Chapters 5, 6, 7, 9, and 11 - - Environmental-related comments
   a) Considering there are 192 water crossings in Minnesota via the proposed route, there appears to be no apparent usage of the MN PCA comprehensive water crossings report done for the Sandpiper, which follows the same proposed route in Minnesota. This is a gap. 2764-3
   b) There is no disclosure (or analysis) of hydraulic drilling fluids used to tunnel under streams, but which are known to be toxic to aquatic life.
   c) Water body analysis appears only quantitative, not qualitative – resulting in shallow lakes being equated with water-filled ditches.
   d) In addition we found insufficient analysis of pipeline construction impact regarding the potential spread of invasive species. 2764-4

4. Chapters 4, 5, 6, 7, and 9 – System Alternative SA04 and Line 3 comments 2764-5
   a) The System Alternative SA04 that bypasses the Mississippi River and the clean lakes region of Northern Minnesota was not adequately considered.
   b) Minor route alternatives which resulted in reduced impacts of proposed Line 3R were not considered in SA04 like bypass karst areas
   c) The construction impact on ground water discrepancy of 1000 ft Line 3R versus 2500 ft for SA04

Thank you for considering our Hubbard County Coalition of Lake Associations comments on the Draft Environmental Impact Statement. If you have any questions or want to discuss these matters further, please contact our current HC COLA President, Sharon Natzel, at email address hccolamn@gmail.com.

Sincerely,

The Hubbard County Coalition of Lake Associations Board of Directors SN

The Hubbard County Coalition of Lake Associations Board of Directors

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Charlotte Hughes

Street Address: 31446 E Round Lake Rd (White Earth Reservation)

City: Ponsford State: MN Zip Code: 56575

Phone or Email: 612-387-9768

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

As a young Minnesotan resident, I am worried about the state of the future environment in Minnesota that I will be dependent on for my life and the lives of future generations. Because of this, I am shocked and offended that the DEIS only calculates the cost of the pipeline for the next 30 years. Assuming this pipeline could be used for another 60 years, this is STILL not enough time recognized to adequately measure the environmental, economic, and social costs of a pipeline that (according to the probabilities created by the DEIS) will spill many times from small to catastrophic. I and those from my generation, demand that the DEIS calculate and address the LONG TERM impacts over many generations - until the oil itself would naturally decompose because it has been shown that Enbridge does not adequately clean up spills!

I also need more transparency in the EIS on how the information was incorporated and whose data was used. From what is presented in the DEIS, it is clear that data from Enbridge is prominent as the main data source, rather than a clear outside source. I demand that if data from Enbridge is used, alternate data from environmental researchers are used to compare. This is a biased and flawed DEIS and needs to be clear, accessible, and comprehensive.

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Joan Hughes

Street Address: 4088 Utica Ave S

City: St Louis Park State: MN Zip Code: 55416

Phone or Email: joanhughes03@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

EIS - - should include costs of cleaning up old pipeline - company should not be allowed to just abandon the old pipeline

- should also look at environmental impact longer than 30 years - the old pipelines have carried tar sands oil / oil much longer than 30 years. 0694-1

Certificate of need should also evaluate use of alternate forms of energy beyond alt. pipeline routes or RAIL routes. Look at cost / analysis of using solar, wind, etc. cost should include environmental costs of each. as well as costs to public via use.

does EIS look at effect / impacts on ground water, aquifers. - not just surface water

It seems any spills - even small should be seen as harmful to the our H2O supply

If including additional pages please number them and tell us how many you are providing:_____ pages

MS. KAREN HULSTRAND: My name is Karen Hulstrand, H-U-L-S-T-R-A-N-D.

I live on the St. Croix River, which at first look you might not think is on this pipeline. But this pipeline crosses the Kettle River, which goes into the St. Croix River, which goes to my house -- near where my house is, and then the St. Croix River goes into the Mississippi, and the pipeline actually crosses the Mississippi.

So one of my points is that we are all really in the watershed. The water is universal. I am a physician. So my concern after learning from all these people in the Environmental Impact Statement is about the chemistry and the chemicals.

I found out that there are a hundred different chemicals in crude oil, and we know that tar sands oil is much dirtier and thicker and more problematic than regular oil. And so because of that, they have to dilute

the oil with more chemicals.

So there's a big chemical mixture going down these pipelines, and I wanted to know what chemicals are in there. Because as a physician, I want specifics.

Well, they couldn't tell me, so I think the Environmental Impact Statement needs to list all the chemicals, and then I want to see the research on what happens if those chemicals get into the water, into the wildlife, into the plants.

And as people, we're sort of at the top of the food chain and chemicals actually accumulate in our bodies. And the people that suffer the most are pregnant women and children.

So we really need to think about our future generations, and is this a risk we want to take, to room Canada in the tar sands area, which is an environmental disaster, to ship oil across our state so it can go to refineries elsewhere.

Are a few jobs worth that? I say no.

1985-1

0831-1

MR. JASON GEORGE: Jason George, J-A-S-O-N, G-E-O-R-G-E.

I work for the International Union of Operating Engineers, Local 49. Just a couple of comments. One in particular, it's been said, but I think it's worth reiterating. The jobs estimates that are in the EIS are just woefully wrong. To say that there's going to be zero jobs created locally in the building of this pipeline is just, quite frankly, a joke.

There's -- I know personally hundreds of 49ers that built the Clipper. Personally, I know them. These are the same people that are going to build Line 3 when it gets permitted. They live around here. So to say that there's no impact is just not at all

accurate. There's people in the room that built the Alberta Clipper here tonight.

Just wanted to put that on the record, make sure you get that right. That needs to be changed immediately.

The second point is more of a process point. There is a statutory process timeline. I'm not talking about whether you're for the pipeline, against the pipeline. I'm just talking about the process. There are laws on the books that outline how long this is supposed to take. They were not followed for the Sandpiper project. I would strongly encourage the Department of Commerce, the PUC, to stick to the law. Follow the science. Whether or not you're going to determine this project is good or bad, at least the people in this room and all around the state deserve a timely answer.

So I really would encourage folks to -- the department, PUC, to follow the law, the statutory timeline, stick to the process.

When -- I believe the company will show that this project meets the requirements, and when it does, the Department

of Commerce should recommend a permit, and the people in this room should get to work.

Thank you very much.

Levi, Andrew (COMM)

From: Jason George <jgeorge@local49.org>
Sent: Thursday, June 29, 2017 2:23 PM
To: MN_COMM_Pipeline Comments
Subject: Comments for Line 3 Replacement DEIS
Attachments: Local 49 Comments on Line 3 DEIS.pdf

Comments for the record are attached

Docket #'s CN-14-916 and PPL-15-137

Jason George
Director of Special Projects
International Union of Operating Engineers, Local 49
Cell: 612-791-2585

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International Union of Operating Engineers

LOCAL NO. 49, 49A, 49B, 49C, 49D, AND 49E
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6/29/17

Comments related to Enbridge Line 3 Replacement Project DEIS

Docket numbers: CN-14-916 and PPL-15-137

To Whom It May Concern:

I write on the behalf of the International Union of Operating Engineers Local 49. We represent close to 14,000 heavy equipment operators, hundreds of whom make their living building and maintaining pipelines. The Draft Environmental Impact Statement (DEIS) for the Enbridge Line 3 Replacement Project has some deficiencies that we wish to comment on. There are two specific issues that stand out.

The first relates to job creation for local workers. The DEIS claims that no local jobs will be created by this project. This is absolutely wrong. We offer two specific points of evidence that clearly demonstrate the inaccuracy of the local jobs claim in the DEIS. When the Albert Clipper (Line 67) project was built in 2008-2009 in northern Minnesota hundreds of Local 49 members, Minnesota residents, worked on that project. When Line 3 is constructed, the number of local construction workers building the project will be at least this amount if not greater. 1030-1

In addition, we would like to point out that trades collective bargaining agreements guarantee at MINIMUM 50% of the labor force building the project will be members of the areas local unions. Enbridge has committed to using union contractors to build Line 3, meaning that these agreements will be in effect, and therefore ensuring local workers will perform work on this project. It is also worth noting that in our experience, because Minnesota has the most skilled tradesmen and women in the nation, when pipelines are built in Minnesota, far more than 50% of the workers are local residents. 1030-2

The other glaring inaccuracy of the DEIS, and an accusation that has been repeatedly made by pipeline opponents, is the assertion that pipeline projects bring with them an increase in drug and sex trafficking activity to local communities. This is simply not true in Minnesota, and is very offensive to the men and women that work in the pipeline industry here. 1030-3

We looked at and analyzed the arrest records for the time period before, during, and after the most recent major pipeline project that was built in Minnesota, the Alberta Clipper Line 67 project. We specifically analyzed the arrest records in the counties where the pipeline was built, and documented the number of arrests for narcotics and prostitution in these counties for the two year period before, the two years during, and the two years after construction of the project which was in 2008-09. 1030-3 Cont'd

The facts clearly show there was not a significant increase in arrests for prostitution or narcotics during construction of the Alberta Clipper project in the areas where it was constructed. In fact, narcotics arrests went down during the two year period of construction compared to the two years before construction in these counties. Arrests for prostitution were lower during the construction of the Alberta Clipper project than they were for the two year period after the project was completed.

We encourage staff to look at the statistics from the MN Department of Public Safety, Bureau of Criminal Apprehension. These facts clearly indicate the narratives put forward in the DEIS and by pipeline opponents about increased criminal activity related to pipeline construction are completely false. We expect pipeline opponents to lie to instill fear, that's what they do, and they do it well. We don't expect state funded reports to make very serious claims that are so easily proven false. We hope you will correct the record on this point.

Other than the inaccuracies that we have commented on, the overall DEIS is solid. The process put in place by the Department of Commerce has been sufficient, and we are pleased that so far the timelines have been largely followed. On this point, we would like to encourage the Commerce Department, and the MN Public Utilities Commission to continue to follow the statutory timelines for pipeline permitting. The timelines were largely ignored during the Sandpiper Pipeline process, resulting in great uncertainty, and ultimately an abandonment of the project.

This can't happen on Line 3 Replacement. The current Line 3 is decades old, in need of constant repair and maintenance, and simply must be replaced. The federal government has mandated its replacement as part of the Kalamazoo settlement. Beyond the facts, common sense dictates that it will be far better for the state of Minnesota and the safety of local residents to have a new pipeline with the latest technology move the oil currently being moved through a pipeline built in the 1960's.

Thank you for thoughtfully considering our comments, and for the work of the analysts that are putting together this public record. Like the workers building pipelines and other infrastructure projects that are critically important to our state, the work of staff that prepare these reports and help guide the process is often thankless and increasingly filled with tension. We applaud the public servants that are dedicated to a fair permitting process. We are confident that after all the evidence is weighed, if the process remains fair, that our members will be building the Line 3 replacement project next year. We look forward to doing this safely, and delivering a great project for the state of Minnesota.

Sincerely,

Jason George
Legislative and Special Projects Director
International Union of Operating Engineers Local 49

MS. LYZ JAAKOLA: Lyz Jaakola.

So listening to everybody talk, I've been trying to gather my thoughts. So I'm just going to read them and then hand them to you.

The Tribal perspective has not been

2874-1

adequately represented in the draft EIS. All and each tribe in Minnesota has sovereign rights to say what happens in ceded territories. The proposed routes are through multiple treaty territories. So where in this DEIS do we see acknowledgment of tribal treaty rights? There's a lot of statements from tribes in there and a lot of consultation, but not consent. 2874-1 cont.

So given the state's negligence in regard to the MnDOT catastrophe at Highway 23, it stands to reason that there would be heightened attention to tribal perspective. And a few pages of the 5,000-page document is not enough to fully address the concerns of the sovereign nations.

It's not just rhetoric nor nostalgic prose, but Indigenous sovereign rights and life ways that predate the state of Minnesota. We have non-negotiable rights, inherent rights, human rights. And so until the tribal rights are the starting point of an environmental impact statement, it's going to be flawed, because we're the keepers of the land. And the maps and the resources, that I had a chance to look at some of them, they neglect to show where tribal cultural resources or sites are located. None of that is documented on any of those 2874-2

maps. How can the PUC see that if it's not presented to them? 2874-2 cont.

There are written statements, you know, from each of the tribes, but those, the content gathered from those meetings, I don't see represented visually. I don't see them having equal weight as the other hundreds of pages that are given to other entities. So this type of a study and the information, that cultural resource information is held in tribal communities. Just like other people have stated, that there is a way to get that information to the PUC and that the way that it has thus far happened is not satisfactory and it takes a different approach. So the DEIS needs to reflect that knowledge and it doesn't.

And those cultural resources, if this is the game we're playing, need to be quantified in order to balance out that value. And I guarantee when that study is done, it will show that it is an immense value that cannot be outdone by any corporate value on a pipeline or oil. How do you value life? There's no way to really do that. 2874-3

The current DEIS does not offer or support the do-not-build option. That should be the first choice offered and supported.

And I guess last, my thought last is where is the tribal input and participation on the Public Utilities Commission? Why is there not a tribal seat on the PUC? That baffles me. When we are -- we have a relationship with the federal government, so the state, all of those state boards should have a tribal voice. It should be a given.

MS. LYZ JAAKOLA: I have a question. 2868-1
So a number of us have gone to a number of meetings. So how are our statements made? Like every time I attend a meeting and fill something out or speak, is that entered in the same, like, if I do that all 22 meetings or whatever, would there be 22 messages from me?

MS. JAMIE MACALISTER: Yes, there will be. If your 22 messages all say the same thing, they'll count just one.

And partially that is -- it is not uncommon for organizations to send thousands of postcards in. And those postcards all have the same message and those thousand post cards do not carry any more weight than anyone else's comments.

So the point being, all comments are treated individually and weighted equally, it's not that we get a thousand postcards from this group and five thousand postcards from this group. But all of your comments that you've provided at any other meeting will be available, they all go into the record, and we will look at each one of them

individually.

MS. LYZ JAAKOLA: So who decides whether it's the same thing or not? 2868-1 cont.

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Susu Jeffrey

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Phone or Email: info@friendsofColdwater.org

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Where is the "No Build" alternative? 0696-1
That specific language is important.

#

Also missing is/are the numerical threat(s) of cancers expected with Line 3 construction. 0696-2

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Kelley Jewett

Street Address: 3128 35th Ave. S.

City: Mpls State: MN Zip Code: 55406

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Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

The EIS is missing information about the impact of the low income rural people who would be directly affected by Line 3. My ancestors immigrated to Aitkin County 125 years ago and my family has lived there since, living off what we fished, hunted, trapped and raised on our farm. Line 3 would go through areas with some of the highest levels of poverty in MN, promising people jobs. Where will those jobs be after the pipeline is built? How will the area residents feed their families if the wetlands that feed the rivers and lakes are so damaged that the fish do not survive? How will the area residents get clean water to drink if (when) the pipeline leaks, either with big leaks or microleaks that often go undetected for long periods of time. 0697-1

What will farmers do if their lands are affected by the pipeline, which affects their crops, their livestock and their livelihoods?

The EIS does not address the human health consequences of oil spills and the chemicals that oil workers are exposed to in the building and maintainance of tar sands pipelines.

Who will pay the 276 billion $ price that the EIS has determined will be the social costs of this project?

If including additional pages please number them and tell us how many you are providing:_____ pages

MS. DEANNA JOHNSON: 0851-1
D-E-A-N-N-A, J-O-H-N-S-O-N.
My comment is kind of based on questions, and there's nobody here to answer questions. So it kind of complicated it a little bit. 0851-2
I want to know what the approximate percentage of the DEIS is developed from information provided by Enbridge, Cardinal, and BAR Engineering. Is anybody able to answer that question for me?
FACILITATOR: During this comment period, it's only comments, but we're taking them closely, and there are folks afterwards that you may be able to informally ask as well.
MS. DEANNA JOHNSON: What are Cardinal and BAR Engineer's previous connections to Enbridge? Was there an independent review of their work? What is the nature of participation in the development of this document by the Minnesota Pollution

Control Agency and the Minnesota DNR?

This document bears no resemblance to their work on such issues in the past. Itasca State Park and Mississippi headwaters are given little attention in this EIS.

Itasca Park is not listed as a Minnesota historic resource in the document. What entity made the decision to not list Itasca as historically significant, despite the fact that it is Minnesota's oldest state park established in 1891.

It's a source of one of the world's largest rivers. It has a bison kill site, which is 8,000 years old, and the area hosts prehistoric site from early native American Elk Lake culture.

Given that the Upper Mississippi River Monitoring and Assessment Study by the MPCA, in January 2017, found the Mississippi headwaters to be a largely healthy river in its northern reaches, and the river is in great shape, and the study states, "The headwaters are an exceptional resource that should be protected."

Why is there no assessment of the upper Mississippi watershed in the DEIS?

What entity made the choice of which watersheds would be evaluated? What entity made the decision to list the Mississippi waterway crossing near the headwaters as impaired water?

This is found on table G2, page 21. Where was the information found? It is not listed on the 2016 list of impaired waters.

I find it very disturbing that Enbridge, BAR Engineering, and Cardinal are driving the information provided in this document. How would we as citizens expect these entities will have our natural resources and our local economy as a priority, as this document is prepared? Where is there evidence provided that unbiased evaluation of their work is provided?

Both of these companies have worked for Enbridge in the past, and both have provided remediation services to Enbridge, which, if they're assisting with the preparation of the DEIS, and they have had --

do work for remediation, they could also find more work if there's a leak or a spill into our resources after it's all said and done. 0851-5

Would both these -- I guess I'm going to repeat this. Would both these companies quite possibly be hired in the event of a rupture, spill, or leaks to assist Enbridge if the pipeline were constructed?

It is absolutely unconscionable that the MPCA and the DNR agencies, who protect Minnesota's environment, are apparently pushed aside in the major development of this document.

Instead, Enbridge, Cardinal, and BAR are heavily involved in providing information for this document; corporations who come to the table with prospects of huge financial gains.

Levi, Andrew (COMM)

From: nanakay@unitelc.com
Sent: Monday, July 10, 2017 12:46 PM
To: MN_COMM_Pipeline Comments
Subject: Comment Line 3 Project- (CN-14-916 and PPL -15-137)
Attachments: Line 3 Comment.rtf

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I submitted this comment on Friday July , 7, but realize I forgot to include docket numbers so am resubmitting.

July 7, 2017

Jamie MacAlister, Environmental Review Manager

Minnesota Department of Commerce

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St. Paul, MN 55101-2198

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PUBLIC COMMENT ON LINE 3 PROJECT (CN -14-916 and PPL-15-137)

Dear MS. MacAlister:

I write to provide comment on the Enbridge Line 3 Replacement DEIS. This proposed project is of potential great consequence to Minnesota's environment and to our citizens.

2375-1

In part, the Appeals Court decision states, "In this case, the completion of an EIS at the CN stage satisfies the imperative identified by ensuring decision makers are fully informed regarding the environmental consequences of the pipeline, before determining whether there is a need for it." Does the information provided in the preparation of this DEIS support an unbiased, environmental assessment of the Proposed Project the PUC requires to make their decision or does the information primarily back up the ultimate goal of the company to obtain the CN and Route Permit for the Proposed Project?

2375-2

After the Appeals Court decision to order an EIS for the Enbridge Project, it was hoped that a comprehensive and unbiased EIS would be produced. The discussion of the possibility of having the the DOC, MPCA and the DNR work as equal partners in the develpment of the EIS spoke to good intentions during the beginning discussions of how to proceed with the EIS. But, the DOC advocated to take the lead role with the MPCA and DNR being assisting agencies the DOC would direct. In the PUC Jan. 11, 2016 order, this is unfortunately the plan that emerged. The DOC stated it would enter into an agreement with the MPCA and DNR to ensure completion of an EIS that fulfils the legal requirements set

2375-2 Cont'd

forth in the Environmental Policy Act, but did that happen? After that point, the EIS process appeared to move forward with a document that would largely speak to Enbridge's stated goals for this project and often what I would consider deceptively speak to environmental concerns. Does the methodology follow CEA statutes rather than EIS Law? It appears so as I look at the document.

2375-3

Chapter 13 of the DEIS is the list of preparers. It states that the DOC is the lead agency and the MPCA and DNR acted as assisting agencies throughout the process, but no information on the extent of assistance they were able to provide. On Feb. 12, 2016, The DOC (Lead Agency) in an Memorandum of Understanding stated, "Lead Agency will enter into a separate arrangement with the project proposer to cover the cost of environmental review for proposed project. Costs assessed to project proposer shall include the costs necessary to reimburse the assisting agencies for all costs incurred by assisting agencies in accomplishing purpose of the MOU." Did the DOC ever follow through with this and if so, how much did Enbridge pay for assistance from the MPCA and DNR? Or, did Enbridge to the largest extent use Cardno's information in addition to information provided by Barr Engineering or other Enbridge affiliates in this process?

Chapter 13 goes on to state, "DOC-EERA supported by Cardno, INC in preparing EIS. Cardno's team included project management, a range of resource specialists, technical writers, and geographic information system analysts." So, Yes, the process was largely given over to Enbridge and Cardno to provide the the information for completion of this document. The role of the MPCA and DNR was left, I believe, intentionally vague. The document bears no resemblance to work the MPCA and DNR have completed on the pipeline cooridor in the past. The voice of our state's environmental guardians, the MPCA and DNR, is not evident in this document, instead replaced by Enbridge and Cardno, both corporations who would gain financially from this project. What percentage of this document did the MPCA and DNR work on and what percentage was done by Enbridge, Cardno and Enbridge affiliates?

The DEIS Executive Summary on page ES-3 under Question, " Who prepared the EIS", The Summary states, "The Commission has ordered an EIS for the CN and route permit applications to be prepared by the MN DOC-EERA in consultation with Commission's Executive Secretary and with assistance of MN DNR and MNPCA." There is no mention here of Cardno in preparing the EIS. A citizen relying on the Executive Summary for information would be left with the impression the EIS was prepared by the aforementioned state staff. They would not be informed of Cardno's influence in this process. I believe this is deceptive.

Cardno is a company that assists in remediation after oil spills. The New York Times, Oct. 7, 2011, article, "Pipeline Review Faced with Questions of Conflict", by Elizabeth Rosenthal and Dan Frosch, reports that Cardno had a relationship with Enbridge in the Kalamazoo clean up. The article quotes Oliver. A. Houck, a law professor at Tulane University and an expert on NEPA as saying, "Cardno Entrix should never have been selected on the Keystone XL because of its relationship with TransCanada and the potential to garner more work involving the pipeline. The company provides a wide range of services assisting in oil spill response. Cardno Entrix had a "financial interest" in the outcome of the project. " Mr. Houck added, "Their primary loyalty is getting this project through, in a way the client wants." The article reports that the impact report completed by Cardno for the Keystone XL project indicated that, "

response to a spill from the proposed pipeline would not require unique cleanup procedures." We know from the National Academy of Science Dilbit Study that tar sands clean up is unique and much more difficult, especially in water environment. The New York Times article reports that the Enbridge Kalamazoo spill was only mentioned briefly in the addendums, and, Cardno Entrix would have been aware of the challenges in Michigan; it was hired by Enbridge to assess the damage to natural resources caused by the spill." So, why would Cardno have a buy in to produce the best product in a comprehensive and honest EIS for Line 3, when they could turn around and cash in if there were an oil spill here? Afterall, they have experience working with Enbridge on the Kalamazoo spill remediation.

Barr Engineering worked with Enbridge on the original corridor plan for the Sandpiper route, which is now planned to be used by Line 3? We know Barr was involved in the analysis. In an article by MPR News, "Critics Object to Pumping Oil Through Minnesota Lake Country" by Dan Kraker, Enbridge project Director, Paul Eberth, states, "The company worked hard to avoid lakes in designing the pipeline route. According to an analysis conducted by Barr Engineering, only 3% of the lakes in the watersheds that we cross have a hydrological connection to the pipeline." With regard to Barr Engineering, should we trust their input for environmental analysis of the Sandpiper corridor which will be the same corridor used for Line 3. Barr's website states, "Barr has worked with Enbridge and other Enbridge affiliates on nearly 300 projects, assisting with mainline expansion efforts as well as general operations. Our work with Enbridge ranges from environmental compliance assistance to project engineering support, from wetland mitigation and restoration to site assessment and remediation." On Barr's web site, there is a quote from Kristen Benson, Sr. Environmental Analyst, Enbridge Energy Partners, " If I get notice of an incident, I contact Barr directly and often they beat me to the site. Leak sites can be out in the middle of nowhere, but they will go out ...and fill in where needed. They are dedicated to our company." So we know from this quote that Barr is dedicated to Enbridge, but what does that mean for their trustworthiness in assessing the environmental concerns this route would mean to our pristine environment? We also know from this quote Enbridge calls on them to deal with spills and the quote refers to their work in the middle of nowhere with a picture on the page of this quote of an area that looks like the Mississippi River near the Headwaters, where they want to lay this pipe. So, Barr, who was heavily involved in the original corridor design, would likely be able to gain finanically if there were a spill.

There is plenty of evidence in the DEIS, that suggests in my opinion that the document sways in favor of the Project Proposers goals, by leaving out information, and providing evaluations that do not appear to be unbiased including these examples and I have emphasized Itasca State Park:

1) Most of the information on the technical report regarding accidental releases are non-public. "Worse case spills" volumes are protected information in the DEIS. There is also no third party analysis. Citizen's have been told the effects of leaks, spills and yes - catastrophic spills are none of our business. Yet, the ramifications of such incidents would be devastating to our water resources and our economy. It is not compliant with MEPA Law to deny citizen imput on this most important topic. I could not find an economic cost analysis of an oil spill. Is there one?

There is potential for conflict of interest in the spill analysis. Contractors were hired by Enbridge.

Stantic completed the 7 site spill analysis for the DEIS. Benign locations were used. They used, "representative" release locations in their assessment to serve as proxy for other similar sites, without actually specifically evaluating other locations along the preferred route or alternative routes. Citizens are then expected to use a table to look for an example to represent a particular water body they are concerned about. How can this assessment be considered to be valid and how can a citizen be expected to use the information and comment on it? Stantec has a very significant work history and involvment with Enbridge. Stantec is involved in the Enbridge Alabasca Project, The Enbridge Energy Southern Access Pipeline and a Stantec Website sites it's relationship with Enbridge. On the website under "View our Work- Enbridge Integrity Team", the website indicates that around 2012, Cimarron Engineering was acquired by Stantec, so with the addition of Edmonton offices and new skill sets in the Stantec Integrity Team, the program support role was created and Stantec resources became more embedded within the Enbridge team structure.

Now, in Enbridge's Revision Requests for the DEIS, they wish to go farther in this denial of citizen's rights for concerns regarding spills. In Enbridge's revision request, Chapter 10-1-8,, they ask that the DEIS eliminate the term, "catastrophic" to describe spills. In the revision request they state, "catastrophic is not a description of relative volume, but rather imports an emotional component. A descriptor more closely tied to volume, such as "very large" should be used in place of catastrophic." In terms of what a major rupture or a spill such as happened at Kalamazoo, in our Headwaters, our pristine lake country or our wild rice lakes and streams, the term "very large" does not aptly describe such an event and Enbridge hopes to by using this term to delegitimize public sentiment with regard to our intrinsic and valuable resources. But, at the same time, they are keeping accidental release information non-public, so the public has no information on actual volume for such spills.

2) There is very scant information in the document regarding Itasca State Park. Why was our state's crown jewel state park given little attention in the discussion? In the DEIS, the Natural Resource and Water Summary Tables and Figures indicate the Proposed Project centerline would cross Mississippi River three times, twice in the area of the Headwaters and LaSalle Creek would be crossed by the centerline one time. Line 3 would be laid at the east boundary of Itasca. Itasca receives over a half million tourists per year and is a site of international importance, with visitors from all over the country and the globe visiting our park. It is also of great significance to Minnesotans. The pipeline crossing the Mississippi two times in the Headwaters area and LaSalle one time, puts the park in peril and a spill in the Headwaters would be **catastrophic**! But, Enbridge wishes to proceed with the plan for this pipeline by pretending Itasca State Park almost doesn't exist. 2375-4

3) The Mississippi River at the Headwaters where the pipeline would cross was listed as impaired waters in the document. This is found on Table G-2, page 21. Impairment would be due to naturally occuring oxygen levels caused by marsh and wetlands in the area . " Our Upper Mississippi River Monitoring and Assessment Study" by the MPCA in January 2017, "found the Mississippi Headwaters to be a largely healthy river in it's northern reaches and that the river is in great shape and the study states the Headwaters are an exceptional resource that should be protected." Is this assessment of the river included in the DEIS? 2375-5

3) There is no evaluation of the Upper Mississippi Watershed in the DEIS, despite the fact that this is a high consequence area due to it's pristine nature, inaccessibility if there are oil releases, and very high volume of tourism due to Itasca State Park, . 2375-6

4) There is no mention of Itasca State Park as being a Historic Resource. Though the pipeline borders Itasca State Park, Minnesota's Oldest Park established in 1891, and crosses the Mississippi two times in the Headwaters area and crosses at LaSalle which is home to the prehistoric site of early Native American Elk Lake Culture, this information is not brought out in the DEIS. Itasca was established to preserve the Headwaters of the Mississippi River. The entire park and an individual archaelogical site are on the National Register of Historic Places. Itasca was designated a National Natural Landmark by the National Park Service under the Historic Sites Act. This program recognizes and encourages the conservation of outstanding examples of the natural history of the United States. 2375-7

Again, we see in Enbridge's revision request minimization of the value of the Headwaters area. The original text of the DEIS Chapter 5 page 585 reads in part, "Surveys were not completed for historic resources in Minnesota." I ask, "Why not?" Enbridge enlarges on this issue in it's revision suggestion. It reads, "Enbridge recently completed historic structures surveys and will submit the final to the DOC when complete. Revise the statement to clarify that historic structures surveys have been completed and results and recommendations are forthcoming." So here Enbridge is conveniently only referring to structures and not mentioning natural sites which are of historic significance. The entire park (Itasca) and an archaelogical site are on the National Register of Historic Places, not limited to buildings, but the site of the park itself is of historic significance. And, the designation of Itasca as a National Natural Landmark is ignored. Enbridge is ignoring Minnesota's natural heritage and instead only focusing on buildings which the pipeline would not pose threats to as it does to the natural environment. 2375-8

The DEIS document states that there would be negligible impacts on historic resources. I feel this is a cavalier attitude toward these treasured important historical sites.

5) There is what I consider offensive testimony in the docket offered by Jeffrey Lee, Barr Engineering Company on Wild Rice. The testimony speaks of it as if it were a crop which could be replanted and sites could be restored after a spill, by removing sediment from a spill site, then adding lake sediment and reseeding. The National Academy of Science's Dilbit Study would surely discuss the great difficulty of accomplishing what Mr. Lee proposes. We know that wild rice is a gift from the creator which cannot be destroyed by tar- sands contamination, and then restored and made whole again by man-made efforts. 2375-9

It is deceptive in my opinion to promote this project as a replacement. It is a new pipeline which will have the capacity to more than double barrels per day currently carried by Line 3 from 390,00 bpd to a design capacity of 844,00 bpd and they are upgrading their request to 990,000 bpd which substantially more than doubles their current capacity in Line 3. Enbridge states in chapter 2.2 the project would meet demand for refining industry in eastern Canada, the gulf coast and the midwest. How much of this oil they ask for a certificate need for, is going to refineries that will ship to other countries?

As Enbridge would gain capacity from a Line 3 Replacement, they also gained capacity from Line 6. So,

was the Kalamazoo spill actually and great net gain for Enbridge? The Kalamazoo Oil spill which was a devastating environmental catastrophy actually in the end allowed Enbridge to argue for a brand new replacement pipeline in that state. Same as with Line 3, they were able to replace with a new pipe which gives them increased capacity. After the Kalamazoo spill, Enbridge was able to argue for a new pipeline which they stated would be safer, but being a larger diameter pipeline it greatly added to Line 6 capacity. Capacity was increased from 240,000 bpd to 570,000 bpd, which more than doubled the capacity of Line 6. Even considering the cost of the clean up, the cost of Consent Decree agreement, with a pipeline of such increased capacity, I would like to know just how long it took for Enbridge to actually come out ahead and actually gain financially after the spill with the new Line 6 infrastructure.

At the heart project and the DEIS lies a false choice which cancels, in my opinion, real choices for this route which would provide safer and more reasonable alternatives and an honest assessment of need. The fact that the company is able to demand the start and end points of it's proposed route, from Clearbrook to Superior, is wholly unfair and allows the company to demand what is best for profit margin rather than what is best for Minnesota's Natural Heritage and our long term economic well-being. From this ability for the company to demand it's start and end points, flow a process that is inherently flawed and which has not been corrected in this DEIS.

In their August 21, 2014, comments on the Sandpiper, which was the same corridor as Line 3, the MPCA evaluation of the Enbridge Preferred Route and the system alternative routes concluded the Enbridge Preferred Route scored the worse in categories affecting the environment compared to system alternative routes. The MPCA evaluation of the routes concluded the companies Preferred Route would have the greatest potential impact in the following categories; pristine areas of the state, areas in the state with the best water quality, greater risk to state forests, state parks, and WMAs, stands of wild rice, economics dependent on water quality, and of all the routes appears to cover the most linear miles of susceptible ground water, and a much higher density of surface water encroachment. The MPCA's evaluation stated, "Environmental and natural resources protection and the prevention of impacts tend to be less costly and more effective than restoration, therefore, scoring in this instance is based on preventing impacts to high quality areas. 2375-10

In the evaluation the MPCA stated, "MPCA believes cumulative effects associated with high risk crude oil routes can be reduced or avoided if future terminal facilities were constructed at a location west of Clearbrook with possible benefits to reducing potential impact to our states valuable resources. " 2375-11

On August 21, 2014 the DNR also commented on the Projects proposted route in the letter to the MN PUC. The letter states, "The Preferred Route for the Sandpiper Project is proposed in a region of the state that contains a concentration of important lakes for fisheries, trout streams, sensitive aquifers, public conservation lands, and mineral and forestry resources. The DNR is also concerned about "greenfield" routing along areas without previous disturbance." The letter expresses concern that the route could become a new corridor for multiple pipelines. The letter states, "The DNR encourages the PUC to strongly consider analysis of one or more system alternatives having fewer environmental and natural resource impacts than the Preferred Route." 2375-12

2375-13

Table 12.2-1 - "Reasonably Forseeable Actions Considered in Analysis" states under item 9, " If a new pipeline is permitted for this project outside of the existing Enbridge Mainline, the new corridor creates an opportunity for future corridor sharing that could ultimately result in accummulation of multiple pipelines within the corridor chosen for the Line 3 Replacment Project. This analysis considers the future addition of another pipeline to a new pipeline corridor. As noted above in highlighted comments, both the MPCA and DNR had very serious concerns with regard to this issue of cummulative effects of multiple pipelines in the watery Preferred Route chosen by Enbridge and requested a safer route.

This DEIS supports Enbridge being allowed to insist on it's Preferred Route start and end points and does not even consider moving the Clearbrook connection upstream to the west to a safer location for our environment to Crookston, makes prominant it's stated project goals, therefore elevating it's profit margin as the most important consideration, while, very seriously jeopardizing Minnesota's environment and the economic livelihood of citizens dependent on our clean water economy.

2375-14

Right now we see the western US burning up in excessive heat and pending severe water shortages in the west. Why would this particular company's profit margin eclipse the protection of our precious water resources in this state? The company is bent on delivering huge supplies of oil to Superior, Wisconsin. We should all be **alarmed** at the possibilty that next they will want to ship oil in the Great Lakes which holds 21% of the worlds fresh water. Lake Superior is the largest fresh water lake in the world. Minnesota Sea Grant site indicates that Lake Superior holds 10% of the worlds fresh water that is not frozen, it holds 3 quadrillion gallons of water, water retention time is 191 years, is remarkable clean and cold and underwater visibility is superb, sometimes exceeding 75 feet. It is profoundly beyond my imagination that we would put this invaluable, life sustaining resource as risk of being exploited and contaminated by encouraging oil pipelines to continue to route to the shores of Lake Superior!

I find the DEIS discussion of oil demands in the US to be lacking of honesty and devoid of important consideration of other pipeline alternatives ability to meet supply. Who made the decision to frame the discussion in this way?

2375-15

In chapter 4. (4.2.4) In discussing Certificate of Need, the DEIS states, "Other existing and potential future pipelines were considered as alternatives to the project , 1) if they interconnected in the crude oil supply region near Edmonton, Alberta, and 2) served the same Clearbrook and Superior destinations. The EIS is not evaluating these alternatives based on whether they meet the need for the project." As I look at the document, the DEIS document appears to go so far as to discount the proposed Keystone and the TransCanada Energy East pipelines, which are projects by other companies, as not being relavant for evaluation of meeting US oil demands because they do not interconnect with Clearbrook and Superior. These companies are operating away from the proposed Line 3 route, but with the same desired endpoints as Enbridge's system. Maps of the Keystone system indicates the system when complete would provide lines from Hardisty, Alberta to Cushing to Port Arthur and Houston, Texas and there is an existing branch to Patoka. A completed Trans Canada Energy East Pipeline would connect Hardisty, Alberta to Monreal and from there to St. John, N.B. If Line 3 were approved, the increased oil capacity in the line would provide transport options to Line 5 in Michigan and Line 6 in Wisconsin to Montreal , Petoka and on to Cushing. It is easy to clearly see that the Keystone and Energy East routes

not being the same as Enbridge's Line 3 with respect to connecting between Clearbrook and Superior should have anything to do with available oil supply or crude oil need for this nation. 2375-15 Cont'd

Chapter 1.4, of the DEIS, "Result of denial adversly affects future adequacy of oil supply." Why then does the DEIS not evaluate the potential of Keystone and Energy East pipeline as they would affect oil supply? We saw with Sandpiper, the Dakota Access pipeline changed the demand and need for the Sandpiper. The possible implementation of the Keystone XL or the Energy East pipelines should be considered as to affect on demand and need for Line 3. Europe and other nations are moving away from fossil fuels and moving toward clean energy, along with investors around the globe considering divestment from fossil fuels. It should be stongly considered as to how much capacity is really needed out of the Alberta Tar Sands. 2375-16

When it comes to analysis of SA-04, comparative data is compiled in the DEIS which not only includes miles crossed in Minnesota, but inclues all the other state's miles that SA-04 would go through, thus when compared to the applicant's route, SA-04 environmental impacts will be greatly unfairly scewed to the applicant's route's favor. Oil from the applicant's Preferred Route will also be impacting other states as it goes beyond Superior and this is not considered in the DEIS as is the SA-04 route. 2.8.1 in the DEIS describes the project this way, " Crude oil from Hardisty terminal in Alberta, Canada would be transported in the Line 3 Replacement pipeline to Clearbrook and Superior terminals. From these locations, oil would be distributed into existing pipelines, for delivery from Clearbrook terminal to Minnesota refineries and from Superior terminals to refineries in the Midwest, the Gulf of Mexico and eastern Canada." The refinery in Superior processes 45,000 bpd leaving the majority of the oil in Line 3 to move beyond Superior. From Superior, with the Line 3 Replacement, Enbridge will have the ability to increase volume to Line 5, which goes under the Straits of Mackinaw and thus adding more danger to 21% of the world's fresh water than Enbridge is currently responsible for maintaining a pipeline in that fragile site. Enbridge will also be able to transfer additional oil from Superior that will cross the St. Croix River, endangering that water source and water resources beyond in Wisconsin. It is unfair not to evaluate these very serious and significant threats as oil leaves our state, as they do evaluate effects after SA-04 leaves the state. 2375-17

When we think of entrusting Enbridge with our precious pristine waters, think of this. In the evaluation of the safety of Line 5 going under the Strait of Makenaw, the State of Michigan, found that there was a person conducting the evaluation who was also working for Enbridge at the same time. The State of Minnesota cannot accept an EIS that is brought forth by the hand of Enbridge and it's affiliates. We need an unbiased EIS completed by an entity who cannot gain financially by the placement of this pipeline.

I attended the Line 3 informational public meeting in Bemidji on June 22, 2017. There I saw unmasked a glaring example of the company's attitude toward our precious natural resources. John Swanson, Vice President U.S. Major Projects Execution, spokesperson for Enbridge frequently promotes the company line as he did in a commentary in the Park Rapids Enterprise before the April and May public meetings. In the commentary he stated, "Protecting the environment is important to all of us, and numerous factors went into develping a route that balanced sensitive environmental considerations." But, at the

public meeting in Bemidji on June 22, 2017, in his testimony he said that in regards to the Kalamazoo Spill, the environment of the spill site was better after they cleaned it up than it was before the spill happened. This was an ignorant statement made in front of a people who treasure our resources and many native americans there to speak for protection the Mississippi Headwaters. The statement exposes an attitude of no respect and understanding of "natural resources" and really a hostile dismissive attitude toward creation and the natural world. Does he believe that here too, if there is a massive spill in the Mississippi Headwaters, our pristine lake country or our wild rice lakes and streams , the company could just dig it all out and it could be better than before?

In her book, Nature's Trust, Mary Christina Wood states, "Humanity cannot hope for a livable planet if government agencies continue to license industries to pollute and destroy the remaining natural resource."

Thank you for this opportunity to comment.

Sincerely,

Deanna Johnson

15559 Explorer Circle

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6 July 2017

JAMIE MACALISTER
ENVIRONMENTAL
REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Re: Public Comment Line 3 (CN-14-916 and PPL-15-137): Wetland Hydrology

Dear Ms. Macalister,

The Applicant's preferred route crosses some of the States best water and has large areas of undisturbed wetlands. From my review of the DEIS these wetlands are not given the consideration they deserve. Those in the Pine River watershed are critical to the health of the watershed and provide critical habitat in the watershed.

We have already lost 90% of Minnesota's original wetlands and replacement programs do not duplicate the quality and function of the original wetland. The Line 3 route will open a new corridor and additional pipelines will further disrupt the function of these wetlands. In my review of the DEIS I could not find information on the hydrology of these wetlands, i.e. what is the flow rate and direction of flow? What would the impact of compaction and remediation be for specific areas? Where is the information on pipeline failure in wetlands for both winter and summer events? How would small leaks, such as a pin hole leak, be discovered? The XL pipeline review by Exponent predicted downward movement in shallow aquifers with long periods possible before surface evidence of the leak was visible. The DEIS assumes surface evidence nearly at the time of the leak.

The DEIS has explanations for construction in the wetlands, but does not assess the impact of the weirs and other construction techniques on hydrology after refilling the excavation. This is critical, especially when considering multiple pipelines in a corridor. Disrupted flow could have a negative impact on water quality for the Pine River watershed and particularly the Whitefish Chain of Lakes. 2767-1

This portion of the DEIS seems to be deficient and should be reviewed by outside hydrology experts before allowing any construction to begin.

Sincerely,

Gregory L. Johnson

Gregory L. Johnson

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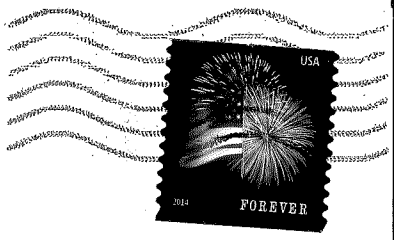

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RE: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137): SA-04 Route

Dear Ms. Macalister

The DEIS seems to be deficient in the analysis of SA-04 as an alternative route to the preferred route as only the Minnesota portion of the preferred route is considered. Since it is a given that almost all of oil proposed for the line will travel through Wisconsin and Illinois from Superior, this mileage and all its features should be a part of the analysis to be an honest comparison of the two routes. This would place SA-04 in a much more favorable position in terms of actual miles of pipeline and add considerably to the water crossing and critical habitat associated with the preferred route for Line 3. 2768-1

When comparing these two routes the entirety of both from Canada to Illinois should be evaluated for distance, water crossings, wet lands, access, and all other criteria critical to the CON and routing approval. The DEIS basically negates SA-04 on distance using the full 783 miles from the Canadian border to Illinois. At the same time, the DEIS uses only the Minnesota portion of the preferred route, 395 miles from Clearbook to Superior. SA-04 Minnesota mileage is 251 miles. The distance from Superior to Illinois is not given or considered, which is a major flaw in the DEIS. What are the comparative features of both routes in just the Minnesota portion? I could not find this information in the DEIS. 2768-2

Please consider an independent evaluator to compare these two routes before release of the final EIS.

Sincerely,

Gregory L. Johnson

Gregory L. Johnson

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RE: Public Comment:Line 3 Project(CN-14-916 and PPL-15-137)

Dear Ms. Macalister:

The following section of the DEIS is referenced because of concern for adequate cathodic protection in the proposed route for line 3.

"2.3.2.3 Cathodic Protection Systems

Cathodic Protection Would Be Installed Within a Year After Construction

The buried pipeline would be protected from external corrosion by application of a coating to the pipeline and by installation and operation of a cathodic protection system. A cathodic protection system must be constructed and operated in accordance with the requirements of 49 CFR Subpart H – Corrosion Control (Section 195.563 and Sections 195.567 through 195.577). The cathodic protection system electrically connects the pipeline to anodes buried in ground beds adjacent to the pipeline and located along the pipeline route. The cathodic protection system would be located within the right-of-way disturbed for construction. 2769-1

The area necessary for the cathodic protection system anode beds would range between 0.2 and 0.6 acre per system, and the only aboveground features at each

site would be a junction box and small-diameter vent pipe installed above the deep well beds. 2769-1 Cont'd

Enbridge also would install alternating current/direct current mitigation to protect the pipeline and cathodic protection system from electromagnetic-induced voltage and stray current from co-located electric transmission lines. Enbridge would assess the electric transmission lines (that the Line 3 Replacement pipeline would be co-located with) to determine the extent of cathodic protection necessary for the Project. Section 195.563 of 49 CFR Subpart H – Corrosion Control states that cathodic protection must be in operation no later than 1 year after the pipeline is constructed. "

I am enclosing a copy of the public comments made in Little Falls on Sandpiper and Line 3. Many miles of Enbridge's preferred route go through remote wetlands with difficult access throughout the year. These soils are high conductivity soils. According to the independent study done by The INGAA Foundation, Inc. Criteria for Pipelines Co-Existing with Electric Power Lines, Oct., 2015, cathodic protection is at high risk in this type of soil. Has Enbridge or the DOC had an independent review of the cathodic protection based on this study and the results they put forward? If start-up of the line would be in less than a year, would they be allowed to proceed before adequate cathodic protection is in place?

A copy of the study was entered into evidence when I gave my testimony, so I am not including the study with this letter. For a through and independent DEIS, the reliance on Enbridge data seems far too pervasive and needs a competent independent review.

Sincerely,

Gregory L. Johnson

enc. : Public Comments made in Little Falls

COMMENTS FOR PUBLIC HEARINGS ON SCOPING FOR THE ENVIRONMENTAL IMPACT STATEMENT FOR SANDPIPER AND LINE 3

My name is Gregory Johnson and I live north of the City of Pine River. I am a board member of the Pine River Watershed Alliance and serve on the Conservation Committee of the Leech Lake Area Watershed Foundation to coordinate the activities of the two groups for land preservation and watershed protection. We are in the final stages of preparation of the WRAP for the watershed.

The Pine River Watershed has been designated the No. 1 watershed in the state for water quality and for protection of both source and drinking water for Minnesota citizens. The groups mentioned plus the National Forest Service, The Nature Conservancy, the MN Board of Water and Soil Resources, Lake Associations and other public and citizen's groups are seeking ways to protect and preserve this watershed.

I have two complaints about the DOC process before us tonight. With the importance of this critical watershed I strongly feel that a public meeting should have been held in the watershed in Brainerd or nearby city. The locations selected for these meetings limits public input. Second, during the certificate of need and routing process, many people have written letters to the PUC and DOC. Very few of the letters critical of Enbridge's choice of pipeline routing and questioning the pro Enbridge bias of the process thus far have been included in the public record published on your website. None of the letters I have written have appeared on this record. Letters written by those who favor the proposed pipeline route, like Chambers of Commerce or Unions are quickly posted, even if received outside the comment period.

With regard to the Scoping EAW and DSDD I have a number of comments to make. First, I must say that I am not opposed to pipelines. Because of my involvement and the knowledge I have of the watershed and the fact that Enbridge's proposed route crosses the entire watershed, I am strongly opposed to the route selected by Enbridge. Your scoping documents do not state that a complete and thorough EIS was mandated by court action and I think that should be an essential part of the documents.

This Enbridge pipeline corridor is not a Minnesota project. It is a multi-state project and according to Minnesota statue 4410.2100, Sub. 4., "Connected actions and phased actions. Multiple projects and multiple stages of a single project that are connected actions or phased action must be considered in total when determining the need for an EIS and in preparing the EIS." This pipeline project includes Canada, North Dakota, Wisconsin, and potentially South Dakota, Nebraska, Iowa and states further south to the Gulf Coast, perhaps with export beyond that. Therefore it needs to be completed with all appropriate state and federal authorities involved as required by NEPA and MEPA.

The scoping document needs to be clear about the purpose of the project. What is the public purpose of this project? We know the private purpose and the economic incentive for Enbridge to site the project in the corridor they proposed, but EQB states clearly that "in applying exclusion criteria, the RGU must not be overly restrictive in defining the project's purpose and need. Occasionally an RGU will claim desirable but nonessential elements as part of the project's purpose and need, thus eliminating alternatives that should be included. In many cases these are cost-related factors and, while important, they cannot overrule environmental considerations."

The scoping DSDD states on page 15, 4.3, "no field data will be collected and that the applicant's field data will be used." Has this data been scientifically verified and validated by an outside, independent reputable organization or is this again pro Enbridge bias? Does the applicant's field data include all five alternate routes that have been proposed by other public entities? Does Enbridge's data meet the criteria necessary for a complete and scientifically sound EIS that delineates risks, including long-term health of this critical watershed? I think not, due to the overwhelming self-interest (not public interest) of a private company. The RGU for this project should be an agency with the scientific knowledge and with experience in doing a comprehensive EIS. I do not think that the DOC qualifies as such an agency.

On page 13 the scoping document states, "the Pine River Facility will be improved." To my knowledge there are no pipelines currently in the Pine River area. Was this facility recently constructed by Enbridge and if so, did it have prior approval from the DOC or PUC?

The scoping document gives one brief mention of colocation of the pipeline with overhead high voltage transmission lines. I would like to submit for the record The INGAA Foundation, Inc. Criteria for Pipelines Co-Existing with Electric Power Lines, as the data in this report would put Enbridge's proposed route in the high risk category. This report was published in October of 2015.

Much has been said concerning the job creation of this corridor. If a corridor is approved for a Minnesota location, how many of the construction jobs will actually be given to Minnesota residents? How many union pipeline workers from out-of-state will be on the project? If we are truly concerned about Minnesota employment, we should require that the pipeline be built with US produced pipe secured from Minnesota produced iron ore. Perhaps then the legislature would not have needed to extend unemployment benefits for Minnesota miners.

In conclusion, you are being tasked with evaluation of a new pipeline corridor which may or may not need to be located in Minnesota. The EIS scoping should be done in conjunction with all appropriately qualified authorities in the route selection and should also be done with Federal help and coordination. This is too important a decision, with long-term consequences to clean water for the citizens of Minnesota, to be fragmented and considered in isolation, or scoping it to meet the narrow interests of one Canadian company.

Submitted to the DOC Public Hearing on April 26, 2016 at Little Falls, MN by:

Gregory L. Johnson
2089 Lake Hattie Dr SW
Backus, MN 56435
218/316-0560

Encl: The INGAA Foundation, Inc. Criteria for Pipelines Co-Existing with Electric Power Lines, Oct., 2015

Levi, Andrew (COMM)

From: Misa Joo <misa@misajoo.com>
Sent: Monday, July 10, 2017 3:31 AM
To: MN_COMM_Pipeline Comments
Subject: Docket # CN-14-916 and PPL-15-137 to James MacAllistar, Environmental Review Manager, MN Dept of Commerce

To James MacAllister:
I am very much concerned about the effect of the Enbridge Pipeline on Minnesota's environment, the health of the people, tribes, climate. I will list the DEIS sections which are inaccurate, biased, incomplete or unfair.

Impacts on Tribes: 2381-1
1) Tribes were consulted only after the project was designed. It was not free, prior and informed consent as is the international standard of the UN for projects that impact tribes.

2) Much of the issues specific to tribes and tribal resources are excluded from the main chapters assessing impacts. We are not comfortable with that because it lets the EIS avoid drawing conclusions about impacts on tribes (Chapter 9) 2381-2

3) Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "would have a long-term detrimental effect on tribal members and tribal resources" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members. 2381-3

4) Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "are part of a larger pattern of structural racism" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3). 2381-4

5) The DEIS concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) But it also states that this is not a reason to deny the project!

6)Chapter 6 states that Enbridge's preferred route would impact more wild rice lakes and areas rich in biodiversity than any of the proposed alternative routes (Figure ES-10). Very big concern.

7) Most of the analysis of archaeological resources in the path of the pipeline rely on Enbridge's surveys. For some reason, only three of their eight surveys are available, and the five missing are the most recent! In those, Enbridge found 63 sites, but claims that only three are eligible for protection under the National Register of Historic Places. (5.4.2.6.1). Honor the Earth has had the studies we have been able to see reviewed, and there are numerous flaws in their methodology. 2381-5

8) The DEIS acknowledges that "The addition of a temporary, cash-rich workforce increases the likelihood that sex trafficking or sexual abuse will occur," and that these challenges hit Native communities the hardest. But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). I agree with the question posed "What experience does Enbridge have planning and implementing an anti-sex trafficking program?" I want to add that there is real

concern, the number of sexual abuse and trafficking and pipeline workforce. Very concerning and a huge impact on tribes.

Big Picture Concerns

!) Enbridge has a history of not following rules violating permit conditions. Please analyze the likelihood of compliance from Honor the Earth's compilation of the record of violations. Too many of the environmental impact and plans for minimizing them come directly from Enbridge's permit application without any evidence of compliance or any consideration of Enbridge's non-compliance

2) The Alternatives chosen for comparison to the pipeline proposal are absurd -- for example, the only rail alternative assumes the construction of a new rail terminal at the US border, and thousands of new railcars to transport oil to Clearbrook and Superior. Enbridge would never do that. The only reasonable rail option would begin in Alberta. The truck alternatives are similarly unreasonable.

3) The "No Build" Alternative is not genuinely considered**.** It is framed as "Continued Use of Existing Line 3" (Chapters 3 and 4), but nowhere is the "Shut Line 3 Down" option considered. There is no discussion of renewable energy, conservation, or the rapid development of electric car infrastructure. There is no assessment of the decline in oil demand. The entire study assumes that society needs X amount of oil, simply because Enbridge says they can sell it. That assumption ignores the massive fossil fuel subsidies and debts that make Enbridge's profits possible, and avoids the moral question of what is good for people and the planet. We know we must stop burning fossil fuels yesterday.

4) There has been no discussion of how all this extra oil will go once it leaves Superior, Wisconsin. With 370,000 bpd of additional capacity, Enbridge will need a new pipeline departing its terminal in Superior. We know that they plan to build Line 66 through Ojibwe territories in Wisconsin, but they continue to deny this. Minnesota must ask this!

5) The DEIS contains no spill analysis for tributaries of the St. Louis River or Nemadji River, where spills could decimate Lake Superior and the harbors of the Twin Ports. 2381-6

6) For calculations of impact, the lifespan of the new Line 3 is estimated at *30 years*. But Lines 1-4 are 55-65 years old! And hasn't the technology improved? The lifespan should be at least 50 years, a shorter lifespan is a clear indication that Enbridge themselves know that the fossil fuel era is coming to an end. In Honor the Earth's analysis, we have attempted to predict the impacts of this pipeline on the next 7 generations.

7) This project is a further investment in a dying Tar Sands industry. Numerous international oil companies and financing institutions are divesting from the tar sands. Why should Minnesota invest in this industry? Why should our Nation be forced to deal with a bad idea in perpetuity.

8) The DEIS assumes that the Koch pipelines to MN refineries get all their oil from Line 3, but the current Line 3 does not supply enough capacity for this (390,000 barrels per day), and we know that some of it comes from Line 81, which brings oil from the Bakken in North Dakota.

Risks, Oil Spills

1) The seven sites chosen for spill modeling are not representative of the locations and resources put at risk along the entire corridor. A more thorough analysis of different locations is needed - for example, what about Lake Superior? 2381-7

2) There is no analysis on Enbridge's leak detection system, or their inability to respond quickly to major emergencies.

3) Enbridge's response plans are highly guarded, and Honor the Earth's attempts to receive and review these documents has been blocked. What we can infer is that Enbridge relies on local first responders for their emergencies. They attempt to use the money they donate to communities along their corridors as proof that they have an integrated emergency response program.

The DEIS estimates the annual probability of different kinds of spills on the proposed route in MN:

- Pinhole leak = 27%
- Catastrophic = 1.1%
- Small Spill = 107%, Medium = 7.6%, Large = 6.1%

So in 50 years, we can expect 14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic!

Abandonment

2381-8

1) The risks of pipeline abandonment are not adequately assessed. For example, there is no discussion of landowner property values and the effect that an abandoned pipe could have on them, especially if there is indeed "legacy contamination" on people's land.

2) Impacts on human and natural resources due to the abandoned Line 3 are anticipated to be minimal in the near term but could be significant in the longer term, absent effective monitoring, adaptive management, and the timely introduction of mitigation measures. There is not much information on what these mitigation and management plans are.

3) If there is a dearth of surrounding soil, or if the cover for the pipeline is relatively shallow, the pipeline bears more of the load and, all things being equal, is more likely to fail. We know from experience that there are numerous areas where the pipes are exposed and near the surface.

2381-9

4) There is also no discussion of exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied. "When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high" (8.3.1).

5) We know that the abandonment of the existing line 3 is bad. But there is also no mention of the abandonment of the other 3 ancient pipelines in Enbridge's existing mainline corridor (Lines 1, 2, and 4), which we expect Enbridge will very soon attempt to abandon. Nor is there any discussion of the abandonment of the NEW Line 3 in the future.

2381-10

6) The DEIS states that it will be very risky to remove and clean up the existing Line 3 because the pipelines are very close together. "The distance between pipelines within this corridor varies, but they are generally 10 to 15 feet apart" (8.3.1). This is not consistent with our extensive observations and physical measurements on the land. Also, don't they dig up pieces of pipe for maintenance purposes all the time? Why is it suddenly risky?

7) The DEIS simply states that "Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage,and mitigate historically contaminated soils and waters" found during the abandonment

or removal of the existing Line 3 (8.3.1.1.1). We want to see that plan. We want Honor the Earth and the people to see the plan.

Construction and Restoration

1) Chapter 2, "Project Description" states that Enbridge has requested a 750-foot route width (375 feet on each side of the Line 3 Replacement pipeline centerline). They claim only 50 of the 750 feet would remain a permanent right-of-way (2.1) All of this width should be included in an impact analysis because Enbridge's environmental protection plan and record is abysmal.

2) Their "restoration" plans for restoring the landscape around the corridor after installation is laughable. Enbridge's process for restoring wetlands includes dumping the now compacted (and probably de-watered) soil back in the trench, sowing some oats and "letting nature take it's course". This is not how you re-establish a wetland. Studies have shown that even with proper restoration practices, it can take decades to get back to the biological functioning it was at prior to disturbance. When Enbridge stores the soil, they will also be driving equipment over it- which compacts it, they also plan to compact the soil after refilling the trenches. This is not good for the soil. 2381-11

3) Cathodic protection, which applies electric current to the pipeline in order to protect it from corrosion caused by nearby utility lines, will not be installed for up to 1 year after pipeline construction (2.3.2.3). Lack of cathodic protection is what caused many pinhole leaks in the Keystone pipeline, almost immediately after construction. The proposed route for Line 3 follows a utility corridor for much of its length - this is a recipe for disaster. Even the US Army Corps's rubber-stamp approval of the Dakota Access pipeline required the cathodic protection system to be installed within 6 months! 2381-12

Economic Impacts Please take this seriously!

1) Chapter 5, "Existing Conditions, Impacts, and Mitigation" states that Line 3 will create ZERO permanent jobs. Enbridge's application states that "existing operations staff would be able to operate the [pipeline] and that few additional employees would be hired to assist the staff" (5.3.4).

2) Also in Chapter 5, the DOC assumes "all workers would re-locate to the area" and ZERO construction jobs will go to Minnesotans. The pipeline would have "no measureable impact on local employment, per capita household income, median household income, or unemployment" (5.3.4).

3) The DEIS does not acknowledge that when the existing Line 3 shuts down, Enbridge will stop paying taxes to the MN counties along the mainline corridor. For many of these poor counties in the north, revenue from Enbridge's property tax makes up a significant portion of the county budget. There is also the issue that Enbridge is now in the process of appealing years of back taxes, burdening two of the poorest counties in Minnesota with over $10 million due.

Climate Change is real

1) The DEIS acknowledges that Line 3 would contribute to climate change. It analyses 3 different types of emissions - direct, indirect, and lifecycle. Direct emissions are those that the pipeline infrastructure itself emits, and these are very small. Indirect emissions are those created by the power plants that provide electricity for the pipeline's pumping stations, and these are significant. Lifecycle emissions are those caused by the refinement and eventual use of the oil, and these are massive. Line 3's direct and indirect emissions alone would be 453,000 tons of CO_2 per year. Over a 50-year lifespan, that would cost society an estimated $1.1 billion. (Executive Summary p.18). 2381-13

2) The lifecycle emissions of Line 3 would be 193 million tons of CO_2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3)

3) The DEIS does not discuss the unprecedented challenges of human casualty, displacement, conflict, natural disaster, biodiversity loss, etc, that climate change is causing, or the consensus from the scientific community that we must leave fossil fuels in the ground. It also fails to acknowledge that across the planet, Indigenous people are disproportionately impacted.

4) The DEIS affirms that the MN PUC can only grant the permit if "the consequences to society of granting are more favorable than the consequences of denying the certificate." Regardless of whether or not Enbridge can find customers, the DEIS shows that the negative impacts far outweigh the benefits. 2381-14

I completely support Honor the Earth's position and have read their critique. I ask you to issue NO PERMIT. I ask you to stand up for your people and future generations and SHUT DOWN LINE 3 AND DEVELOP RENEWABLE ENERGY INFRASTRUCTURE. Your people take the lead in protecting their state. Please take leadership to do so. Protect the health, the treaties, the resources of your beautiful state. We care, from all over this country, and we are watching and praying. Thank you for your attention. Sincerely, Misa Joo, 2327 Jefferson Street, Eugene, Oregon, 97405

Levi, Andrew (COMM)

From: Erin Jordahl Redlin <ejr0904@gmail.com>
Sent: Monday, July 10, 2017 10:54 AM
To: MN_COMM_Pipeline Comments
Subject: Comments on Line 3 DEIS CN-14-916 and PPL-15-137

Minnesota Department of Commerce:

I find the Enbridge Line 3 Draft Environmental Impact Statement (CN-14-916 and PPL-15-137) to be unacceptable for several reasons.

1. DEIS Chapter 5.2.1.2.4
Horizontal Directional Drilling (HDD) will be used to cross under our most pristine, most sensitive waters, and anywhere there is flowing water, which describes most of the route. The potential exists for contamination through release of drilling fluid to the ground and/or water, termed a “frac-out." The DEIS cites a 35 mile section of Enbridge pipeline in Michigan where there were 11 HDD crossings, multiple minor releases and 2 major frac-outs. MN will not accept the risk of a frac-out every 5.5 river crossings.

2349-1

2. DEIS Chapter 10.4.1
Regarding river oil spills, the DEIS uses a 10 mile Region of Interest (ROI), when we know that an oil spill can pollute more than 35 miles downstream (Enbridge's oil spill in the Kalamazoo was 35 miles). The ROI in the EIS should include at least 35 miles of impact.

2349-2

3. The risk from Line 3 is in conflict with several of our Minnesota Statutes:
1. MN Statute 103F.305 Scenic River Protection Policy
https://www.revisor.mn.gov/statutes/?id=103F.305

2. MN Statute 116D.02 Declaration of State Environmental Policy
https://www.revisor.mn.gov/statutes/?id=116d.02

I was raised in Holyoke, in Carlton County. I have a special place in my heart for the Kettle River, a beautiful waterway in that part of the state. And a waterway that would be crossed twice by the proposed Line 3 pipeline.

The Kettle River is a tributary of the Wild and Scenic St. Croix River, a river that is very important to my family. We gather there during good and bad times.

The day before I married my husband, our families rode up and down the St. Croix together, celebrating our soon-to-be joined lives.

And when my grandfather died five years ago, his family - his children, grandchildren, and great-grandchildren - gathered on the banks of the St. Croix, to remember and mourn the man who helped teach us to love being on the river.

It is clear that the DEIS for Enbridge's Line 3 preferred route does not adequately protect Minnesota's lakes, rivers, streams, and wild rice beds.

When, not if, the pipeline breaks, how will we explain the ensuing destruction to our kids? How will we justify to future Minnesotans the decision to endanger the heart of what makes our state so special? How will we make them understand that we put oil and money ahead of water, something we can't live without?

When the pipeline breaks, and tar sands oil spills into our lakes, rivers, streams, and wild rice beds, some of that damage will be forever. We won't get back the special places that we hold in our hearts, the waters that make this state so amazing.

I don't want to imagine celebrating future milestones in my family's life without the St. Croix River being part of those moments.

I don't want to imagine a Minnesota in which Native people can't harvest wild rice because the rice beds are polluted by pipeline construction contamination or oil spills.

The DEIS highlights some of the risks of running a tar sands oil pipeline through a place filled with water. It is our responsibility to avoid that risk. The DEIS must be redone, to more accurately account for the risks inherent in siting a tar sands pipeline. And to pay greater attention to the impact on Native peoples and concerns of environmental justice.

Erin Jordahl Redlin
St. Anthony Village, MN

Levi, Andrew (COMM)

From: JOHN KENNEDY <lucynjohn@msn.com>
Sent: Monday, July 10, 2017 11:32 PM
To: MN_COMM_Pipeline Comments
Subject: DEIS Enbridge Line 3 Docket numbers CN-14-916 and PPL-15-137

To: Jamie MacAlister

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I am from West St. Paul, Minnesota

The Line 3 Pipeline concerns me because of the way tribal impacts are treated in the DEIS. The United Nations international standard for projects that impact Indigenous Peoples is Free, Prior, and Informed consent. Tribal consultancy after the project is already proposed and designed is not free or prior or informed consent.

Most of the issues specific to tribal people and tribal resources are confined to a separate chapter that attempts to provide "an American Indian perspective." They are excluded from the main chapters that assess potential impacts. This allows the EIS to avoid drawing conclusions about the impacts on tribal people. ((Chapter 9)

Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "would have a long-term detrimental effect on tribal members and tribal resources" that cannot be accurately categorized, quantified, or compared (9.6). It also states that "traditional resources are essential to the maintenance and realization of tribal life ways, and their destruction or damage can have profound cultural consequences" (9.4.3). This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members. 2387-1

Other tribal impacts that are not adequately addressed include the destruction of wild rice waters, the likelihood of sex trafficking in Native communities during construction of the pipeline, and destruction of Native artifacts. (See Chapters 9 and 11) 2387-2

There is not enough analysis of spill risk. There needs to be more analysis of Enbridge's leak detection system and their ability to respond quickly to emergencies. 2387-3

In the DEIS, there is not a sufficient assessment of the risks of pipeline abandonment. More information is needed in regard to landowner property values. What are the actual management and mitigation plans? 2387-4

We need to see the plan which Enbridge says it has to identify , manage , and mitigate historically contaminated soils and waters found during abandonment or removal of the existing Line 3 (8.3.1.1.1). 2387-5

It is very troubling that no Minnesotans would be hired for the construction of the pipeline. ((5.3.4).

It is also troubling that Enbridge would cease paying taxes to the MN counties along the mainline corridor when the existing Line 3 shuts down, and that Enbridge is in the process of appealing years of back taxes in two of the poorest counties in MN (over $10 million due). This is an unacceptable burden on these communities.

The climate change costs of Line 3 acknowledged in the DEIS are simply unacceptable: the lifecycle emissions of Line 3 would be 193 million tons of CO2 each year, costing society an estimated 478 billion over a 50-year lifespan. (5.2.7.3.) 2387-6

My recommendation is: NO PERMIT. SHUT DOWN LINE 3 AND DEVELOP RENEWABLE ENERGY INFRASTRUCTURE.

Thank you for taking my comments.

Sincerely,
Lucille Allison Kennedy
West ST. Paul, MN

MR. BUSTER KILLSFIRST: Buster Killsfirst.

And I just want to know how much money will be going, potentially, or actually towards the type of mercenaries that we seen over in Standing Rock? And where exactly do you intend to bring law enforcement officers to protect the pipeline for a corporation against the American people?

MS. JAMIE MACALISTER: All right. Well, first, let's make a clarification. Our job here is to evaluate the environmental impacts of Enbridge's projects. We are not here on behalf of Enbridge. We don't work for Enbridge. We're here on behalf of the State of Minnesota and our job is to evaluate the impacts of the project that Enbridge has proposed, as well as to evaluate the impacts of any of the other alternatives that have been proposed throughout this project.

So that means that roughly a year ago there were several scoping meetings and there were a

number of alternatives that were proposed. Those can be seen on the map that we brought here. You can also see them fairly clearly in the map books that go with the draft EIS.

So that's our role. Our role is to evaluate the impacts. We don't do anything else beyond that.

MR. BUSTER KILLSFIRST: That would have an impact on the community.

MS. JAMIE MACALISTER: Which?

MR. BUSTER KILLSFIRST: Just bringing the pipeline in and dealing with all the consequences and not just eliminating some of the consequences because you don't want to think about them.

MS. JAMIE MACALISTER: Well, if your suggestion is that that is something that's missing in the draft EIS, then that would be good for you to make a comment directed more towards the EIS.

MR. BUSTER KILLSFIRST: I'd like to see that in the EIS.

MS. JAMIE MACALISTER: Restate that and say clearly what you think the DEIS is lacking.

MR. BUSTER KILLSFIRST: I'd like to see in the DEIS figures on potential and actual 2869-1

impacts. And to law enforcement and corporate mercenaries on the community financially and otherwise. 2869-1 (cont)

Thank you.

Levi, Andrew (COMM)

From: Julie Kilpatrick <jkilpatrick@me.com>
Sent: Friday, June 30, 2017 10:52 AM
To: MN_COMM_Pipeline Comments
Subject: Re: CN-14-916 and PPL-15-137

I meant add our addresses. See below.

On Jun 30, 2017, at 10:41 AM, Julie Kilpatrick <jkilpatrick@me.com> wrote:

These are our comments related to dockets CN-14-916 and PPL-15-137.

We are concerned about the proposed pipeline Line 3 and impacts on Tribes and other concerns outlined below.

The UN International standard for projects that impact Indigeous People is free, prior and informed consent. Consulting tribes after the project is proposed and designed is not free, prior or informed consent.

Chapter 9.6 Tribal Resources states that ANY of the possible routes for Line 3 "would have a long-term detrimental effect on tribal members and tribal resources" that cannot be accurately categorized, quantified, or compared (9.6).

Chapter 11 "Environmental Justice" concludes that the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3)

The DEIS concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) This alone would be enough reason to deny the project.

Chapter 6 states that Enbridge's preferred route would impact more wild rice lakes and areas **rich in biodiversity** than any of the proposed alternative routes (Figure ES-10). This is a big concern.

History shows that Enbridge violates permit conditions. The DEIS should analyze the likelihood of compliance for environmental impacts.

The " no build" alternative is not genuinely considered. There is no discussion of renewable energy, conservation or the rapid development of electric car infrastructure. The entire study assumes that society needs a certain amt of oil. That assumption avoids the moral question of what is good for people and the planet.

There is no spill analysis for tributaries of the St Louis or Nemadji rivers. There is no analysis on Enbridge's leak detection system or their ability to respond to major emergencies. 1034-1

The Tar Sands industry is dying. Many oil companies are divesting from tar sands. Given that knowledge, why should MN invest in this industry.

The DEIS estimates the probability of different kinds of spills on the proposed route. Based on the estimates in 50 years we can expect 14 pinhole leaks, 54 small spills, 4 medium, 3 large and 1 catastrophic spill. This is not acceptable.

There is no discussion of exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied. "When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high" (8.3.1) 1034-2

The DEIS states that "Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage,and mitigate historically contaminated soils and waters" found during the abandonment or removal of the existing Line 3 (8.3.1.1.1). We need to see that plan.

The lifecycle emissions of Line 3 would be 193 million tons of CO2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3)

These are just some of my concerns. The DEIS about Line 3 shows that the negative impacts greatly outweigh the benefits.

We strongly urge no permting. Shut down line 3 and develop renewable energy infrastructure.

Julie Kilpatrick Stillwater MN
Andrew Jenks Stillwater
John Heselton Woodbury MN

Levi, Andrew (COMM)

From: Julie Kilpatrick <jkilpatrick@me.com>
Sent: Friday, June 30, 2017 10:42 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

These are our comments related to dockets CN-14-916 and PPL-15-137.

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History shows that Enbridge violates permit conditions. The DEIS should analyze the likelihood of compliance for environmental impacts.

The " no build" alternative is not genuinely considered. There is no discussion of renewable energy, conservation or the rapid development of electric car infrastructure. The entire study assumes that society needs a certain amt of oil. That assumption avoids the moral question of what is good for people and the planet. 1035-1

There is no spill analysis for tributaries of the St Louis or Nemadji rivers. There is no analysis on Enbridge's leak detection system or their ability to respond to major emergencies. 1035-2

The Tar Sands industry is dying. Many oil companies are divesting from tar sands. Given that knowledge, why should MN invest in this industry.

The DEIS estimates the probability of different kinds of spills on the proposed route. Based on the estimates in 50 years we can expect 14 pinhole leaks, 54 small spills, 4 medium, 3 large and 1 catastrophic spill. This is not acceptable.

There is no discussion of exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied. "When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high" (8.3.1) 1035-3

The DEIS states that "Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage,and mitigate historically contaminated soils and waters" found during the abandonment or removal of the existing Line 3 (8.3.1.1.1). We need to see that plan.

The lifecycle emissions of Line 3 would be 193 million tons of CO_2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3)

These are just some of my concerns. The DEIS about Line 3 shows that the negative impacts greatly outweigh the benefits.

We strongly urge no permting. Shut down line 3 and develop renewable energy infrastructure.

Julie Kilpatrick

Andrew Jenks
John Heselton

Levi, Andrew (COMM)

From: Ackroeger@aol.com
Sent: Monday, July 10, 2017 8:51 AM
To: MN_COMM_Pipeline Comments
Subject: Dockets CN-14-916 and PPL 15-137

Amelia Kroeger
10720 Toledo Court
Bloomington MN 55437
952-884-3406

To: Jamie MacAlister, Environmental Review Manager

I have been aware of and followed the Enbridge pipeline issue for quite a few years. In the past year my interest was rekindled by the Dakota Access Pipeline revolt on the edge of The Standiing Rock Reservation, very near Cannon Ball. Our family lived in Cannon Ball for four years in the 1970s. We were VISTA volunteers working on what was called the Inyan Wakagapi Human Development Project. Among many other observations, it was in Cannon Ball that we first began to grasp that water was more than a taken for granted convenience. After we relocated to Minnesota in 1980, due in no small part to outreach efforts of the Minnesota Pollution Control Agency, our consciousness grew toward water quality and safety.

Therefore, I have numerous questions pertaining primarily to water quality and safety in the Environmental Impact Statement for the proposed Enbridge Line 3 Pipeline. Here are but a few:

1.) Are the groundwater hydrogeology assessment firms known to have a close relationship to Enbridge? Are those companies the sole authority drawn on? Who hired and contracted with the companies, Enbridge or the State?

2.) In the Executive Summary, page 14, it is written - "There is no one way to measure the general region-wide or state-wide differences in surface water resource quality across Minnesota." Just what were the measures or procedures used? If not MPCA, should I now understand that the water's trophic state index is not dependable? 2400-1

3.) Enbridge is proposing to horizontally drill under streams and rivers, not unlike the Dakota Access Pipeline drilling under the Missouri River near Cannon Ball, ND. It is my understanding that those drilling processes contain potentially hazardous to wildlife and plant life additives. Shouldn't the public be made aware of those additives since there is always the possibility for a fracture - wasn't there a fracture about a decade ago during the MinnCan Line 4 venture? 2400-2

4.) Enbridge Line 3 would pass under the Mississippi near the headwaters in Itasca State Park. Is it wise to allow any potentially hazardous pipeline in any state park?

5.) Finally, SA-04 indicates that no wild rice waterbodies would be impacted. However there appears to be a contradiction - the applicant's preferred route would result in impacts on about 5 acres of wild rice waterbodies. Yet the table reads 3 acres. Which is it? And, is there any justification whatsoever to potentially negatively impact any wild rice waterbody? 2400-3

Thank you most kindly,

Amelia Kroeger

The climate modeling in the DEIS covers a time horizon of 30 years. This timeline corresponds with the estimated operating life of the pipeline. This timeline is much too short. Most directly, 30 years is a low estimate for the operating life of the pipeline, as many pipelines operate for 60 years or more. More importantly, the impacts of GHG emissions are long-lived and will not simply stop when the pipeline stops operating. I have two young daughters, and I am very concerned about the type of world they will be living their adult lives in if climate change is not checked. Under a scenario in which this project and others like it go forward now, in 30 years they will just be starting their careers and families in the environment wrought by climate change. We must account for the costs they will face throughout their lives as a consequence of fossil fuel development now. The climate change modeling timeframe should be extended to at least 60 years to more fully account for these costs.

Alternative scenario with no Line 3

One of the most concerning aspects of the DEIS is the underlying assumption that the oil that would be transported by Line 3 must be transported. All of the alternatives proposed in Chapter 4 are simply different ways of moving the oil that would be transported by the rerouted Line 3. But the first criterion for the Certificate of Need is, “The probable result of denial would adversely affect the future adequacy, reliability, or efficiency of energy supply to the Applicant, to the Applicant’s customers, or to the people of Minnesota and neighboring states.” There are sources of energy other than the oil transported by Line 3, and the EIS should be expanded to consider those alternatives. It need not delve into all sources of alternative energy in detail, but should present the possibility that, if the current Line 3 were to be shut down and no alternative constructed, Minnesotans and others could meet their energy needs in other ways. Some basic analysis of how much energy capacity would be required and how many solar panels and/or wind turbines would be required to meet the demand would be welcome. Such an alternative should recognize the differences in the various environmental impacts enumerated for the new Line 3 (most notably GHG emissions and water quality impacts, particularly in the case of an “accidental release”) and an alternative energy scenario.

Making these changes will result in a more complete assessment of the environmental consequences of approving the Line 3 proposal and the alternatives available to the people of Minnesota, which will enable a more informed decision as to whether the "consequences to society of granting the CN are more favorable than the consequences of denying the certificate."

Sincerely,
Dr. Tracy Kugler

--
Tracy Kugler, PhD takugler@umn.edu
Research Project Manager - IPUMS Terra

612-626-3933
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Institute for Social Research and Data Innovation
50 Willey Hall, 225 19th Ave. S
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17305 Madison Ave Apt 1
Lakewood, Ohio 44107
June 8, 2017

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Re: Docket Numbers CN-14-916 and PPL-15-137

The Draft Environmental Impact Statement (DEIS) for Enbridge's proposed new Line 3 pipeline makes a fair beginning, but many crucial points remain inadequately addressed. For example:

Chapter 8 states that "In the near term, impacts on socioeconomics are anticipated to be minimal." Long-term impacts should be evaluated as well. 0335-1

The DEIS states that "Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage, and mitigate historically contaminated soils and waters" found during the abandonment or removal of the existing Line 3 (8.3.1.1.1). The environmental impact statement should assess the credibility of any plan for this important issue, not simply report that Enbridge will develop one later. 0335-2

The DEIS conclusion that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" of sex trafficking, and sexual abuse, is wholly insufficient. Analysis here must include studying any such plan or campaign in detail, and determining whether or not they will be *effective*, rather than simply prepared and implemented. 0335-3

Issues impacting Native Americans should be included in the main chapters, rather than segregated as a peripheral "perspective."

Finally, in general the DEIS skims over climate change and its impacts. Overwhelming scientific consensus forecasts that continued fossil fuel exploitation will not only alter the climate, but contribute to biodiversity loss, increased geopolitical conflict, and population displacement; all of these must be factored into a proper assessment of whether or not "The consequences to society of granting the CN are more favorable than the consequences of denying the certificate."

Sincerely,

Matt Kuhns

RECEIVED
JUN 14 2017
MAILROOM

Levi, Andrew (COMM)

From: Kathy LaBerge <labergeonthelake@yahoo.com>
Sent: Friday, June 30, 2017 4:47 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. We have heard that Enbridge removed those numbers from the public version of the draft enviornmental impact statement. Without them, there is no reliable way to verify their results. 1039-1

We believe that in order for Minnesota citizens and agencies to make an educated decision about Line 3, we must have that information and would like to know why Enbridge won't release it. Please insist that Enbridge provide data on oil releases and spills in Minnesota.

If Enbridge objects due to security reasons, then we would like to know why they have failed to cover the exposed pipes in the Tamarack River in northwest Minnesota,and whey they allow people to joyride over exposed pipes south of Clearwater. This is surely a security issue as well. For Enbridge to pick and choose what issues warrant 'security," is unacceptable.

Sincerely,
Kathy LaBerge
50597 Long Point Place
McGregor,MN. 55750

MS. SHEILA LAMB: Sheila, S-H-E-I-L-A, Lamb, L-A-M-B. I'm going to check my notes here for a few things.

The first item on the list is, to the best of my knowledge, there's nothing written into the DEIS in regards to damage done to our infrastructure, our roadways, from the trucks and equipment. That means our taxpayers have to foot the bill for it. 2871-1

Trucks have been running up 210 hot and heavy at a high rate of speed, definitely going over the speed limit, those types of things. When they're on two-lane roads they're going to do more damage. If they're on 35, they're on roads that are recently paved. So that's something that is neglected in the DEIS. Enbridge needs to foot the bill for that one. That is item number one.

Number two, the DEIS is set for November. In Carlton County there are hundreds of pipes, hundreds on any given day that you can see. I've got about 500 pictures and I've been asked to go public with this. 2871-2

There are staging areas already. The newest one is between Kettle River and Rice. It is

a huge fenced area with barbed wire on top, the whole nine yards, where they're taking the pipes to. We're talking trucks running every 10 to 15 minutes carrying in pipes. As of yesterday there were 35 carloads of pipes just that we could count sitting right in Carlton. 2871-2 (cont)

Who's paying for the police? Both the state police and Carlton County Sheriff's Department are doing traffic control. Why is there no mention of things like that either in the DEIS and why should that be on the taxpayers' backs? It's also creating road hazards because, again, they're not obeying the speed limits, they're flying with these heavy loads down rural roads. So that impact needs to be taken into account as well.

Fond du Lac Reservation in Cloquet are all on well water. So these pipelines going through anything that is affecting our watershed directly affects our well water. With Enbridge's history of leaks, well over 800 in, I believe it's the last eight years, something to that effect, they can sit in and use their rhetoric that it's two to three little spills per year. Well, even a cup full is too much, in my opinion. But that is not their record. And that's just reported spills, that's not

those that they don't have to report. One of the worst spills of all times was right here in Minnesota.

There is another component that we know that the bonds do not fully cover. Their cleanup costs. There needs to be a protection put in there because they are going to leak. They're going to leak. Whether it's the old Line 3 or the new, they're both going to have a problem. And are the reservations going to have to clean it up? Because the old Line 3 goes through most of them. Are we going to have to clean it up? Where does that come from? That needs to be spelled out very, very clearly in the DEIS. 2871-3

And when you look at overall economic impact, the cost of cleanup and road wear and tear along pretty much states they should be null and void. It does not quantify this supposed jobs, especially when we're seeing them directly come in from Texas and Oklahoma.

Our union workers can gain $1.20 billion, roughly, to take Line 3 out and clean it up. You want to make jobs for Minnesota? There's where we do it, while cleaning our environment up. And then going to renewable energy. Be in the

forefront like Minnesota and the Duluth region usually are.

They've admitted themselves, including Enbridge, that fossil fuel is on its way out. So instead of milking it all, instead of putting our waterways, especially Lake Superior in danger, we need to stop this and we need to stop it now. What's best for Minnesota is not to put our environment, our watershed, our beautiful, pristine areas in danger on any level.

We already have the highest cancer rates of any people on our reservations here. Introducing more carcinogens, allowing the old Line 3 to stay in place releasing toxins and so forth is a detriment to our health but, more importantly, to the future generations' health as well. 2871-4

So, you know, we need to see a lot more in there regarding the health impact on those that would be in or around any of these pipelines. The old and the new.

Also, the next generation is in effect and exists here in Minnesota. And that law requires that we continue to reduce our emissions for future generations. Putting this pipeline in and leaving

that old one in there to disintegrate is not going to help us to meet that next generation law.

MS. JOYCE LAPORTE: Yeah. So it isn't just plants, it's the turtle eggs. I mean, you know, we know enough to just take like ten of them and leave the rest so they can go and get into the water and do what they do and live on. But, I mean, we as people gather those eggs and we eat them. You

know, we gather every plant that's out there. We gather.

So I don't -- I don't see, without somebody there to constantly be a representative to the people, every step, every shovel that they dig into the ground is disturbing my place that I live and gather.

MS. DEBRA TOPPING: With the recent upheaval of the burial grounds on 23, that has been on everybody's minds and so who, if anybody, native person would be on hand when and if they just are digging? On hand, not just available. 2878-1

MS. JOYCE LAPORTE: Every step of the way.

MS. DEBRA TOPPING: Yeah. I think that, absolutely. Hopefully it won't get that far, but that's what I'm saying.

MS. JOYCE LAPORTE: Can't the Minnesota Indian Affairs Commission designate a person to do that like they do now but only when something happens?

MS. JAMIE MACALISTER: If Enbridge were to receive a permit, that would be something that definitely belongs in the permit condition, that they have to have someone on hand. For

MR. PAUL LARSON: Good morning. Yes, I'm Paul Larson. I live in this community in the county, and I presently am the chairman of the Mora Housing and Redevelopment here in Mora. So I'm interested in the routing that is being proposed.

I'm not really opposed to the pipeline, but I do want to bring attention to the location, especially as it -- as I review the map over here on the right side of the building.

The location of that pipeline is about a quarter mile away from our present

Eastwood campus. This campus is located on the east side of Mora. Presently we have about three or four buildings there -- a low rent senior housing building, an Eastwood senior healthcare facility, which has approximately 30 rooms that house assisted living and memory care, and we have another building that's going to be coming up starting this fall.

I'm a little bit concerned about the nearness of the location of that proposed pipeline to our campus.

So I would like to suggest, and I will put some of this in writing when I have an opportunity to do so, along with a map, to point out that if there's flexibility in the location of that pipeline that will come through here, that it be located further east.

And maybe that's about all I need to say about that, I guess.

I have a concern. To relocate people in the case of a major event, wherever that might be, would be very difficult, especially with assisted living people.

I had one other concern that I

already visited with a gentleman about, over here in the corner, that talks about the aquifer. The sandstone aquifer that's located east in Mora, I think needs some consideration as well.

But I don't have a lot of facts on that so I'll just let that go by for now.

So that's really all I want to say.

Levi, Andrew (COMM)

From: MacAlister, Jamie (COMM)
Sent: Monday, July 10, 2017 1:42 PM
To: MN_COMM_Pipeline Comments
Subject: FW: Comments Line 3 DEIS General Weakness
Attachments: Line 3 Replacement DEIS General Weakness.pdf

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280, Saint Paul, MN 55101
P: 651-539-1775

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-----Original Message-----
From: dlearmon@2z.net [mailto:dlearmon@2z.net]
Sent: Monday, July 10, 2017 1:34 PM
To: MacAlister, Jamie (COMM) <jamie.macalister@state.mn.us>
Subject: Comments Line 3 DEIS General Weakness

R. D. Learmont
PO Box 2756
Warba, Minnesota 55793
July 10, 2017

Ms. Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, Minnesota 55101

By e-mail

Re: Comments on Draft Environmental Impact Statement
General Weakness of the DEIS, Reliance Upon Enbridge Commitments and Statements
Proposed Enbridge Line 3 Replacement Project
Dockets 14-916 and 15-137

Dear Ms. MacAlister:

Thank you for keeping me informed of proceedings regarding Enbridge's proposed replacement of their Line 3, most recently the Draft Environmental Impact Statement issued for review and comment. In addition to being technically knowledgeable on many of the issues covered in the draft FEIS and also many issues not covered by the DEIS, I am also owner of property through which Enbridge's Mainline passes, such land owned by me including close to 6 miles of Enbridge pipeline, including Enbridge's Line 3 but also including Enbridge lines 1, 2, 4, 13, and 67, in addition to other high pressure pipelines not owned/operated by Enbridge. Having long experience with Enbridge and its predecessor; having some familiarity with pipeline construction and operations practices including being present when Line 3 was constructed and has subsequently been repaired; and having substantial financial and other interest in land that Enbridge mainline pipelines traverse, I respectfully request your attention to points that I make in this and other letters with comments that I submit.

A factor that DOC and PUC will be weighing will be the ability to physically remove the existing Line 3 pipe, or the extent to which removal of the existing Line 3 is not possible. This is discussed, among other places in, Chapter 8 of the DEIS, and it appears that both state and federal regulations regarding in situ abandonment are minimal and weak on this subject. 2406-1

Discussion of Line 3 removal options in the DEIS appears to rely quite heavily on statements and plans developed by Enbridge. However, the DEIS should also include significant input from and review by knowledgeable sources other than simply Enbridge, 2406-2

which is, after all, the project proponent who wants to leave Line 3 in place and will reasonably be expected to present information which favors its position. This needed third party review and input seems to be sorely lacking. As just a few examples of what the DEIS says: 2406-2 Cont'd

8.3 bullet 2, cleaning the pipeline: "…Enbridge had indicated…"
8.3 bullet 4, segmenting: "…engineers for Enbridge would…"
8.3 bullet 5, monitoring: "Enbridge would continue to monitor…"
8.4 Table 8.3-1 Cost: "Enbridge estimates…"

and so forth. Good decision-making relies upon correct information and evaluations to inform the decision-making so it is important that information within the EIS is correct, compete, accurate, and correctly presented in an objective manner.

Inclusion of more complete and unbiased information and analysis becomes especially important because the EIS is used as a document informing a CN, routing permit, and with it, the power of eminent domain, to wit: 2406-3

a. There is already a question as to whether the power of eminent domain should accompany the CN and routing permit for the Line 3 project, whether it includes or excludes removal of the existing Line 3. The power of eminent domain is normally used in cases of serving a public purpose, for example, highways, airports, or common-carrier transportation such as railroads. This does not appear to be the case for Line 3, which is a private interest having a fixed terminal on either end and does not appear to serve a purpose as a common carrier, but I will not address that question here.
b. A question that I will address here is the question of enforcement and fulfillment by a permittee of it obligations. In that regard, my experience with Enbridge and with its power of eminent domain granted by DOC/PUC has been highly problematic and in my opinion should be enough to prevent DOC/PUC from granting a CN or any permits to Enbridge for any purpose, including Line 3, until it has cleaned up and taken care of problems from its former performances. For example, Enbridge added two major pipelines across my property in 2008-2010 as part of their Alberta Clipper project, which involved them using existing right of way and also expanding that right of way both with a long term easement and with temporary work areas. Of note: 2406-4
    * Enbridge and/or its contractors entered my non-easement property in trespass resulting in damage and hazards to my property and potentially to the safety of me and my equipment, with neither apology nor compensation;
    * Enbridge and/or its contractors did a very poor job of excavating and backfilling their trenches, leading to subsidence and repeated backfilling over two or more years before subsidence was finally controlled;
    * Enbridge and its contractors, without permission, hauled material from a wide area to my property, dug a pit, and burned such material on my property, without my permission or agreement, written or oral;

2406-4
Cont'd

* There is still a part of my property, dating back, as I recall, to the late 1960's on which Enbridge's predecessor operated which, almost 50 years later, still can not even grow a planted pine tree;
* 2009-2010 remediation work by Enbridge and/or its contractors was so poor that a crop field was turned into a cattail swamp due to poor remediation work, taking a further 1-2 years for them to correct;
* Various other problems have also occurred and there are other open issues, ranging from seeding of weeds to current areas of subsidence that I can not farm to unfulfilled requests from 2009 so that to this date, 8 years later, Enbridge has not yet been released with an indication that their 2008-2010 work on my property is completed.

To my opinion, as a landowner and as a citizen, this is and should be considered unacceptable from a CN and route permit applicant and, if the process to continue, there should be solid assurance of complete fulfillment of past commitments and guarantees as to future performance. These problems are weaknesses that need to be solidly addressed in the DEIS before it can be considered adequate.

Thank you.

Levi, Andrew (COMM)

From: MacAlister, Jamie (COMM)
Sent: Monday, July 10, 2017 1:42 PM
To: MN_COMM_Pipeline Comments
Subject: FW: Comments on Line 3 DEIS Map Sets
Attachments: Line 3 Replacement DEIS Map Sets.pdf

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280, Saint Paul, MN 55101
P: 651-539-1775

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-----Original Message-----
From: dlearmon@2z.net [mailto:dlearmon@2z.net]
Sent: Monday, July 10, 2017 1:32 PM
To: MacAlister, Jamie (COMM) <jamie.macalister@state.mn.us>
Subject: Comments on Line 3 DEIS Map Sets

R. D. Learmont
PO Box 2756
Warba, Minnesota 55793
July 7, 2017

Ms. Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, Minnesota 55101

By e-mail

Re: Comments on Draft Environmental Impact Statement
Serious Detailed Map Set Appendices Issues
Proposed Enbridge Line 3 Replacement Project
Dockets 14-916 and 15-137

Dear Ms. MacAlister:

Thank you for keeping me informed of proceedings regarding Enbridge's proposed replacement of their Line 3, most recently the Draft Environmental Impact Statement that was issued for review and comment. In addition to being technically knowledgeable on many of the issues covered in the draft FEIS and also many issues not covered by the DEIS, I am also owner of property through which Enbridge's Mainline passes, such land owned by me including close to 6 miles of Enbridge pipeline, including Enbridge's Line 3 but also including Enbridge lines 1, 2, 4, 13, and 67, in addition to other high pressure pipelines not owned/operated by Enbridge. Having long experience with Enbridge and its predecessor; having some familiarity with pipeline construction and operations practices including being present when Line 3 was constructed and has subsequently been repaired; and having substantial financial and other interest in land that Enbridge mainline pipelines traverse, I respectfully request your attention to points that I make in this and other letters with comments that I submit.

DOC and PUC will be evaluating many factors in making CN and routing decisions and many alternatives are being considered. Correct decision-making relies upon correct information and evaluations to inform the decision-making so it is important that information within the EIS is correct, compete, accurate, and correctly presented in an objective manner. In this letter, I specifically refer to the Map Set appendices to the DEIS. In spot checking maps in the map set with an eye to adequacy of the submittal, I find serious issues. Among them: 2407-1

a. The name on a major project map of a major lake that borders all except the project proponent's preferred route is incorrect and a name that applies to many other lakes in

2407-1 Cont'd

the region is instead assigned; this error is significant problem that, for various reasons, can result in highly incorrect conclusions and projections;

2407-2

b. Significant missteps are also taken on the individual detail maps. For example, on map 27A of 38 on the map set for RA-07 and RA-08, the route for RA-08 is shown as going right through a lake considered to be of outstanding biological significance, when both the existing route RA-07 goes around that lake, as any reasonable person would also locate RA-08, and the map does not even refer to or recognize that there are other major non-Enbridge hydrocarbon transportation lines in the same limited area.

This was only a limited check of maps and it yielded significantly problematic information. In both of the mentioned cases, data or information from the map sets is compiled and used to draw conclusions that are critical to routing decisions. Major incorrect information or omissions such as these examples, whether due to DEIS preparer incompetence, negligence, time constraints, inexperience, or other reason, discredits or eliminates validity or legitimacy of the DEIS and can lead to incorrect or even fatal conclusions and recommendations by decisionmakers, both because of the maps themselves as well as when the incorrect data is compiled and carried through the balance of individual sections and the overall document which the DEIS is developed to inform. Based upon these findings, I respectfully recommend that the DEIS be returned to the preparer for major review and correction, with a better quality DEIS to be developed and issued for public review and comment, and that the current DEIS not be accepted as adequate for the CN and routing decisions for which it was originally intended.

Thank you.

Levi, Andrew (COMM)

From: MacAlister, Jamie (COMM)
Sent: Monday, July 10, 2017 1:42 PM
To: MN_COMM_Pipeline Comments
Subject: FW: Comments on Line 3 DEIS Unanticipated Releases
Attachments: Line 3 Replacement DEIS Unanticipated Releases.pdf

Jamie MacAlister
Environmental Review Manager
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85 7th Place East, Suite 280, Saint Paul, MN 55101
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-----Original Message-----
From: dlearmon@2z.net [mailto:dlearmon@2z.net]
Sent: Monday, July 10, 2017 1:28 PM
To: MacAlister, Jamie (COMM) <jamie.macalister@state.mn.us>
Subject: Comments on Line 3 DEIS Unanticipated Releases

R. D. Learmont
PO Box 2756
Warba, Minnesota 55793
July 7, 2017

Ms. Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, Minnesota 55101

By e-mail

Re: Comments on Draft Environmental Impact Statement
Consideration of Unanticipated Releases of Crude Oil
Proposed Enbridge Line 3 Replacement Project
Dockets 14-916 and 15-137

Dear Ms. MacAlister:

Thank you for keeping me informed of proceedings regarding Enbridge's proposed replacement of their Line 3, most recently the Draft Environmental Impact Statement that was issued for review and comment. In addition to being technically knowledgeable on many of the issues covered in the draft FEIS and also many issues not covered by the DEIS, I am also owner of property through which Enbridge's Mainline passes, such land owned by me including close to 6 miles of Enbridge pipeline, including Enbridge's Line 3 but also including Enbridge lines 1, 2, 4, 13, and 67, in addition to other high pressure pipelines not owned/operated by Enbridge. Having long experience with Enbridge and its predecessor; having some familiarity with pipeline construction and operations practices including being present when Line 3 was constructed and has subsequently been repaired; and having substantial financial and other interest in land that Enbridge mainline pipelines traverse, I respectfully request your attention to points that I make in this and other letters with comments that I submit.

DOC and PUC will be evaluating many factors in making CN and routing decisions and many alternatives are being considered. Correct decision-making relies upon correct information and evaluations to inform the decision-making so it is important that information within the EIS is correct, compete, accurate, and correctly presented in an objective manner. In this letter, I specifically refer to Table ES-2, in which is presented a "Summary of Potentially Exposed Resources of Concern from an Unanticipated Release of Crude Oil . . . " and relates to other parts within the main body of the DEIS, all of which should be taken into consideration when reading these comments. If the purpose of Table ES-2 (and related greater detail and discussion within the main body of the DEIS) is to present comparative information for each option about the risks and potential damages to listed Resources of Concern, it does a very poor, incomplete job of doing so.

2408-1

Table ES-2 lists only total “acreages” for each alternative, which makes the table close to meaningless for purposes of decision-making, because in its present form the table and discussion relating to the table does not present and assess the risk of a release of crude oil for each of the seven mentioned alternatives. The risk will depend not only on “acreage” that someone has derived for each of the “Resources of Concern”, as in ES-2, but the risk will also depend on factors such as the quantity of crude oil that is released from an individual spill (being potentially much different for a large pipeline spill that lasts for 5 to 30 minutes before pumping is stopped versus even the maximum amount that could be released from a truck or a railcar spill). The quantity that is spilled can also greatly impact the extent to which a spill can migrate or be transmitted. An arbitrary “acreage” number is, by itself, meaningless. This may be a significant inadequacy of the DEIS that was submitted for review.

I respectfully suggest that Table ES-2 be re-done to take into account the other major factors needed to assess risk from an unanticipated spill. Alternatively, retain Table ES-2 but add a new table that shows the estimated risk for each of the 56 boxes in the table, and then reissue both tables for public review and comment. Because Table ES-2 and a related table that actually assesses risk that should be added, and both are based upon the relevant portions of the main body of the DEIS, those portions of the main body of the DEIS should also be rewritten and presented for review and comment.

Thank you.

Levi, Andrew (COMM)

From: MacAlister, Jamie (COMM)
Sent: Monday, July 10, 2017 1:42 PM
To: MN_COMM_Pipeline Comments
Subject: FW: Comments Line 3 DEIS Missing Impacts
Attachments: Line 3 Replacement DEIS Missing Signficant Impacts.pdf

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280, Saint Paul, MN 55101
P: 651-539-1775

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-----Original Message-----
From: dlearmon@2z.net [mailto:dlearmon@2z.net]
Sent: Monday, July 10, 2017 1:39 PM
To: MacAlister, Jamie (COMM) <jamie.macalister@state.mn.us>
Subject: Comments Line 3 DEIS Missing Impacts

R. D. Learmont
PO Box 2756
Warba, Minnesota 55793
July 9, 2017

Ms. Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, Minnesota 55101

By e-mail

Re: Comments on Draft Environmental Impact Statement
Missing Significant Potential Impacts
Proposed Enbridge Line 3 Replacement Project
Dockets 14-916 and 15-137

Dear Ms. MacAlister:

Thank you for keeping me informed of proceedings regarding Enbridge's proposed replacement of their Line 3, most recently the Draft Environmental Impact Statement that was recently issued for review and comment. In addition to being technically knowledgeable on many of the issues covered in the draft FEIS and also many issues not covered by the DEIS, I am also owner of property through which Enbridge's Mainline passes, such land owned by me including close to 6 miles of Enbridge pipeline, including Enbridge's Line 3 but also including Enbridge lines 1, 2, 4, 13, and 67, in addition to other high pressure pipelines not owned/operated by Enbridge. Having long experience with Enbridge and its predecessor; having some familiarity with pipeline construction and operations practices including being present when Line 3 was constructed and has subsequently been repaired; and having substantial financial and other interest in land that Enbridge mainline pipelines traverse, I respectfully request your attention to points that I make in this and other letters with comments that I submit.

Chapter 8 Addresses Existing Line 3 Abandonment and Removal. This section seems not to include an issue that was previously (letter to you May 26, 2016) brought to your attention for inclusion in the EIS. DEIS Table 8.3-1 summarizes Potential Impacts of Line 3 Abandonment:

a. Under Human Settlements, "…impacts on human settlement are anticipated to be minimal…" and "…could be avoided and mitigated through long term monitoring…"
b. Under Natural Resources, " …impacts on natural resources are anticipated to be minimal…"
c. Under Socioeconomics, "…impacts on socioeconomics are expected to be minimal…"

d. Under Cost, "Enbridge estimates the short term cost of deactivating…"

These are fine only in so far as they go. Unfortunately, some major concerns and liabilities are totally ignored. One of them, with multiple parts, is:

a. There is no consideration whatsoever in the DEIS of the cost (socioeconomic, natural resource, etc) to landowners, public or private, of the cost of a permanent impairment and encumbrance of land by an abandoned but unremoved Line 3. In the case of my land, for example, every inch of abandoned pipeline that remains buried on my land poses a burden on me - I have to pay the taxes on that land including land used by Enbridge, I have to pay the costs of maintaining that land including land used by Enbridge for its purposes, and due to the pipeline being present, whether in service or not, the pipeline impairs my land and imposes a cost on me due to my not being able to utilize the land through which Enbridge pipe, whether active or inactive, passes. Nowhere has this cost of a long term impairment or encumbrance to me or to any other private landowner been recognized or factored into the DEIS, nor has this similar type of cost of long term impairment or encumbrance of land to governmental/public (federal, state, county, municipal, tribal) property been factored into the DEIS considerations. 2410-1
b. The presumption in the DEIS appears to be that all decisions are made by government at the state, federal, or local level. However, there appears to be no consideration to the terms of existing right of way/easement agreements. The agreements that I have with Enbridge, which I expect are similar on this subject with regard to agreements between Enbridge and with state and tribal entities, provide for the location and operation of Enbridge pipelines in the mainline corridor for the purpose of transporting hydrocarbons. However, they do not provide for Enbridge pipelines that do not transport hydrocarbons, which is what they become if, as proposed for Line 3, they are permanently removed from service, so there is no allowance for them to continue to exist in the mainline corridor. 2410-2
c. Further to (b), there seems to be no provision in statute or regulation for eventual removal of any abandoned pipeline, including the cost therefor. Other major industries that deal with hazardous and toxic waste or permanent impairment of a similar nature, mining for example, are required to secure and present financial assurance prior to obtaining permits for physical activity or entering into irrevocable agreements; this provides a means to ensure that long term mitigation or site remediation will be performed even if the project proponent fails or departs without fulfilling its commitments. I see no such provision, or even discussion of such, within the current DEIS. 2410-3

I feel that lack of coverage of this significant subject in the current DEIS is a major flaw that indicates the major inadequacy of the DEIS, and respectfully request that the current DEIS be deemed inadequate and be returned to the preparer for repair and reissue to include those significant elements.

Thank you.

Levi, Andrew (COMM)

From: microdepartment <llawf@tds.net>
Sent: Monday, July 10, 2017 5:59 PM
To: MN_COMM_Pipeline Comments
Subject: See Attached DEIS Comments - CN-14-916 and PLL - 15 -137
Attachments: DEIS - Line 3 Leech Lake Area Watershed.pdf

Jamie

See attached - Thanks for your consideration

Lindsey Ketchel

Leech Lake Area Watershed Foundation
PO Box 455
Hackensack, MN 56452
218-675-5773
www.leechlakewatershed.org

Tax ID # 41-1887906

Jamie MacAlister, Environmental Review Manger
Minnesota Dept. of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198
Docket CN-14-916 and PLL-15-137

Dear Jamie:

The Leech Lake Area Watershed Foundation (LLAWF) is dedicated to preserving and sustaining the natural resources in the Leech Lake Watershed and neighboring region of North Central Minnesota, including Hubbard, Cass, Crow Wing, and Aitkin counties for the use and enjoyment of current and future generations. Since 1997, we have permanently protected over 22 miles of critical shorelands and 3,400 acres of critical habitat lands.

We are writing to provide comments on the Draft EIS and express our concerns regarding the SCOPING, Draft EIS methodology and lack of sincere interest in engaging and involving all residents regarding this proposed development. While we appreciate the importance of adequate energy resources for the country, the proposed Line 3 expansion and relocation on the Applicant Preferred Route would include a segment through the sensitive natural resources of north central Minnesota's premier lake country where a potential pipeline leak could do serious harm to the ecosystem and regional economy. We also want to note that the current Line 3 is in such terrible condition that its posing a real threat to our Leech Lake region's economy.

The methodology used to compare natural resource impacts of the various routes had numerus flaws and we suggest the reviewers use an "Optimal Path Analysis and Corridor Routing: Infusing Stakeholder Perspective in Calibration and Weighting of Model Criteria". Using incorrect data set points like total impact area is not acceptable. It is clear the drafters of the document are trying to use false figures to give off a false understanding of the acres that could be impacted by the proposed development. It's clear they used a flawed mythology that would lead reader to determine that their preferred route would be seen in a more positive light, verses a thoughtful methodology that would accurately compare the various routing options. 2390-1
Additionally, we request that an Ecological Risk Assessment be done according to EPA guidelines. After a very quick review of the Stantec assessment, it became very apparent it was very poor quality in respect to the ecological information being presented. 2390-2

Understanding the surface and slope of the terrain you will be disturbing provides an important dataset when comparing various routes and impacts. It was unscientific to see that an average 15% slope was used to evaluate alternatives in the Dept. of Commerce screening report. The selected slope should be based on what happens when you build a pipeline through various landscapes. The DEIS must be redone to include slope maps depicting 3, 5, 7, 9, and 12+ slopes on all alternatives. 2390-3

In the North Central Region of Minnesota, our lakes represent our economy. Understanding the full impact of a worst-case scenario is essential to making an informed opinion. It was shocking to see that most of this data is being held in secret, keeping all Minnesotans in the dark regarding our ability to understand the pipeline impacts. It feels like the company is going to great lengths to conceal this critical input. It is essential that we understand that if a major spill did occur, we have a clear understanding (model) what those impacts would be, level of damage and impact to the economy. Additionally, this report referenced the Bemidji spill site and tried to extrapolate its impacts data along the entire report. While it is a good long-term study, it is on flat terrain with little lateral groundwater movement, so it has clear limitations. The report needs to take spill impacts seriously, be transparent with the results and stop minimizing the potential short term and long-term impacts. 2390-4

In the United States, there is a long history of companies leaving their environmental spills and clean-up to the hard-working tax payers. It is critical that this EIS address adequacy of liability insurance for accidents and long term financial assurance policies to cover any remaining contamination issues should Enbridge Energy walk away or go bankrupt when the pipes are no longer financially viable given the clear uncertainty in the North American oil Industry. While in some regions in the United States a spill can occur and the economic impact is fairly minimal, but it regions that are tourist and fisheries dependent the impacts to the economy are devastating. 2390-5

Given the cultural importance of our water resources mean to the State of Minnesota, it was troubling to see such important input like "waterbody crossings" seen to be rank low regarding the route evaluation. The number of perennial lake/pond and perennial stream/river pipeline crossings in Minnesota are many more for the Applicant Preferred Route than for SA-04, and the total 'waterbody crossings' are about 10-12% more for Applicant Preferred Route as well, but somehow this data is seen as irrelevant. This data needs to weigh heavily into the route evaluation. There seems to be no thought given to gaining access to the areas that are downstream of waterbody crossings. It appears as if an easement itself provides a means of access to the waterbody crossings. The real concern is how to gain access to remote areas downstream of waterbody crossings. In the case of stream crossings, the opportunity for transport of spilled oil by the stream greatly complicates the process of access for cleanup. Flowing water crossings then represent a much greater concern and should be part of the calculation of risk and that does not appear to be included in the DEIS or even a concern of the applicant. 2390-6 2390-7

When the proposed new corridor included both Sandpiper and Line 3 expansion and relocation, many Minnesota citizens worked diligently to come up with a thoughtful alternative that would allow the pipeline to be development, ship the product to market and protect critical water resources. Somehow the system alternative (SA-04) was determined invalid due to it not linked to the Superior connection. This is a major flaw. During the Sandpiper EA, Enbridge stated repeatedly that the oil had to be shipped through Superior. Within two years, they postponed the Sandpiper Pipeline and invested in a different corridor that does not go the Superior. The purpose of the EIS to determine the best route and that should be open to the system alternative SA-04. It's clear to many involved this would have a dramatic impact of the final analysis. During the EIS scoping we include SA-04 as a reasonable alternative after Sandpiper was tabled. I found it inappropriate that the PDEIS analyzed construction and operation impacts for the full length of SA-04 to termination at the refinery, but for the Applicant Preferred Route impact analysis terminates at Superior. This is an Apples and Orange comparison. There is no analysis of operational impacts during the life of the Applicant Preferred Route of the oil traveling down Enbridge mainline to the SA-04 termination point. There is a very brief mention that Enbridge is significantly upgrading its Wisconsin mainline capacity, but no mention that the Applicant Preferred Route oil will travel that mainline or analysis of potential impacts during the operation life of the project. The comparison of Applicant Preferred Route and SA-04 is largely dependent on the large difference in length; while this is largely valid for construction, the operational phase for Applicant Preferred Route oil going down the Wisconsin mainline is missing and needs to be included. 2390-8

2390-9

For the past two years Leech Lake Area Watershed Foundation has strongly advocated for the shutdown of Line 3. The current line is in terrible condition and is a significant risk to this region's economy and water resources. The DEIS is not comprehensive and needs to include a No Action alternative that includes the decommissioning of Line 3. The DEIS does not provide information that indicates or concluded if crude oil transfer capacity is needed by the larger society or economy and is socially optimal. Based on the info we have reviewed; this project is not in the best interest of Minnesotans.

2390-10

During our review of the DEIS, I noticed a theme of downplaying water resources issues, conflicts, access in case of spills along the Applicant Preferred Route. Having commented on the Sandpiper EA in 2015, it's obvious that concerned outlined during that review process from the MNDN and MPCA have somehow become almost no existent in the Line 3 DEIS. The EIS process should be transparent, inclusive and work to seek the best route to mitigate negative environmental impacts. The current DEIS seems to be written to justify the Applicant Preferred Route. For example, when an issue was raised related to an alternative route like the karst geography, which is only 11 miles and could be circumnavigated just like many exceptions that were made by the Applicant Preferred Route, but instead the issue becomes a fatal component that is used to justify the irrelevancy of the entire route. The entire DEIS is full of these examples and leaves the reader feeling uncomfortable with both the process and product.

2390-11

For example, in Cass County we have been working diligently to avoid the spread of aquatic invasive species. And while the DEIS attempts to mitigate endangered species, in the DESI there is no evaluation on the projects potential impacts to the spread of aquatic invasive species. The DEIS did not indicate if the Applicant Preferred Route would impact contaminated lakes and or outline ways the applicant could mitigate the spread of aquatic invasive species.

2390-12

It is very odd and inappropriate to compare wells on farmland in SA-04 to the water-rich un-fragmented forest of the Applicant Preferred Route. Like many Natural Resource professional, it is not appropriate to consider a water supply well to be a groundwater discharge point. It is a groundwater extraction point. The DEIS keeps trying to compare apples with oranges with is skewing the results. This comparison needs to be converted so we are comparing apples with apples. For over twenty years my organization has been fighting to protect this unique water-rich un-fragmented forest and it deserves to be recognized for its unique conservation values. What the applicant has determined is that they cannot avoid all the flowing water resources in the glacial moraine topography so the DESI has tried to minimize these issues. For example, I had to search to find important data sets like number of crossings of MN River Inventory rivers. Somehow the fact that the Applicant Preferred Route will 6 crossings of MN River Inventory rivers, while SA-04 makes 2 crossings of such rivers in MN did not influence the DEIS makes you feel other critical water resource impacts have been greatly minimized.

2390-13

2390-14

One of the major functions of the DEIS is to help the reviewer understand risk. It is imperative that the EIS conduct a worst-case scenario for emergency response to a spill along the various routes include SA-04. I believe SA-04 was intentionally omitted because it would show that SA-04 is a much more accessible since it is along established roads. Secondly, spills would be much more visible to the local populace for a quicker response time. While the applicant states publicly that they prefer rural areas and they rely on pressure shut off values to detect leaks and reduce spill impacts. What occurs in practice are resident living or working near the pipelines that detect the spills and allow for quick clean up that reduces environmental impacts. For example, a pinhole spill was discovered in North Dakota that was leaking for weeks but in this DEIS indicates that a pinhole release would become visible in several hours to a few days. This DEIS should avoid using misleading statements. Spill response needs to be in criteria for route choice in the EIS. In an interagency memo during the drafting of the DEIS it stated that "A comparative analysis should be made that looks at the feasibility of addressing a catastrophic failure for each of the route alternatives including SA-

04. How easy would it be to access a pipeline break along each of these potential alignments? In each case, how long would it take to get appropriate oil spill equipment to the most remote areas of these proposed corridors? How easy or difficult would it be to address a large spill given their proximity to roads, etc." It's disheartening to think that thoughtful input like the above was disregarded. A pipeline in a road-less area has both leak detection and leak response challenges and they need to be taken into consideration. 2390-14 Cont'd

What is very clear is that strategic economic and environmental data is currently being gathered that is highly relevant to both the DEIS and to the FEIS which the public will not be granted access. Since this information is not in the DEIS, it will not be in the FEIS. It appears only the lawyers in the contested case hearing will debate the merit of this data. Ironically public attending the Public Hearings around Minnesota will still have not be granted access to the data. This is a terrible public process and could result in fewer residents engaging in the process. 2390-15

Of particular concern to LLAWF are the approximately 100 miles of the Applicant Preferred Route that goes from Park Rapids, Pine River and through Aitken County. In 2014 LLAWF in partnership with Minnesota Land Trust and MNDNR Fisheries launched our Clean Water Critical Habitat protection campaign. This effort has numerous partners include Lake Associations, Conservation Districts and BWSR. The focus of our program is to sustaining a strong angling heritage that revolves largely around protecting fisheries habitat. Resurging shoreland development pressures, looming climate change are direct threats to Minnesota lakes' ecology. This project focuses on fisheries habitat protection on lakes that have the best biological integrity for a sustained sport fishery and many of these lakes are in close proximity to the Applicant Preferred Route. Our protection efforts are focused on tullibee (aka cisco) a preferred forage fish of walleye, northern pike, muskellunge and lake trout. They require cold, well oxygenated waters, a condition most common in lakes with deep water and healthy watersheds. Minnesota DNR Fisheries researchers studied tullibee lakes and designated 68 lakes in Minnesota as the primary "refuge lakes" for tullibee that need protection. Our program targets thirty (30) of these lakes located in Hubbard, Crow Wing, Cass, and Aitkin counties. Many are Minnesota's premier recreational lakes. Fisheries research has shown that healthy watersheds with intact forests are fundamental to good fish habitat. To date through Legacy Funds (2008 amendment that taxes residents and utilizes these funds for habitat and water protection) that are directed by the Lessard Sams Outdoor Heritage Council, has resulted in over 5 Million dollar investment to date in the purchase of Fee Title lands and Conservation Easements. For example LLAWF recently purchased an $850,000 parcel on Roosevelt Lake that will be donated to MDNR and managed as an Aquatic Management Area.

Timothy Cross and Peter Jacobson "Landscape factors influencing lake phosphorus concentrations across Minnesota" white paper determined coldwater fish communities are especially vulnerable to eutrophication from increased phosphorus concentrations. Decreases in hypolimnetic oxygen concentrations have direct negative effects on fish that physiologically require (Tullibee) oxygenated cold water to survive, grow and reproduce. Protection is viewed as the most cost effective strategy when applied to watersheds where human activities have not already significantly elevated phosphorus levels. Since these lakes have already been identified as critical to protect, LLAWF request that these lakes be given a protection designation and every attempt to avoid conflict should occur. It makes no sense to have the tax payers in MN invest their dollars to protect important lakes but not expect these investments to be protected through the EIS process. 2390-16

MN DNR staff Peter Jacobson and Mike Duval drafted - "Protecting Watershed of Minnesota Lakes with Private Forest Conservation Easements: A Suggested Strategy". It states that protecting the forests in these watersheds from development is critical for maintaining water quality in these lakes. While large areas of land in forested portions are under public ownership, a considerable amount is also owned by private individuals in some of our most critical lake watersheds. These parcels are increasingly important and need to stay undeveloped. Working forest easements allow sustainable timber harvest, but protect the land from further development. Modeling by MN DNR Fisheries research unit suggests that total phosphorus concentrations

remain near natural background levels when less than 25% of the lakes watershed is disturbed. The tullibee "refuge" lakes have watersheds with less then 25% disturbed land uses and are good candidates for protection. We should be investing in complementary industry like the timber industry that could support good, year round jobs not allowing a major threat like the Line 3 pipeline to be built in the Applicant Prefer Route. 2390-16 Cont'd

Climate Change needs to be integral to the EIS, not just the evaluation of the additional CO2 released into the atmosphere from the product transported, but also at the end point of consumption, and on the production end. There was a news release from the Minnesota Pollution Control Agency dated June 14th of this year which cites a new report by the State's Interagency Climate Adaptation Agency (ICAT): " For several decades Minnesota has seen substantial warming during the winter and at night, with increased precipitation throughout the year, particularly from larger and more frequent rainstorms. These two effects will continue to be the leading symptoms of climate change. These changes have damaged buildings and infrastructure, limited recreational opportunities, changed our growing seasons, and affected the quality of our lakes, rivers, and drinking water." (Italics added for emphasis) For the full report, contact: Risikat Adesaogun, 651-757-2056. This report should be considered in the final EIS. At present, there is no evaluation of changes in construction and specifications regarding construction and severe weather events. 2390-17

Tar sand oil cleanup methodology; none currently exists for cleanup on water and analysis of risk based upon water crossings and water proximity should become part of the EIS Scope. Information is provided regarding the specific gravity of the dilbit stating it is lighter than water and therefore floats. While the NSF study does state that the oil initially floats, it does so only until the diluent evaporates or is floated off; the the tar sands sink. This should be corrected and the NSF study should be references. 2390-18

Evaluation of the cost of carbon mitigation of the proposed trans-shipped oil in light of climate change and atmospheric carbon reduction goals; both statewide, nationally, and also those targets committed to by the US in the 2015 Paris Climate Summit should be included within the EIS. Nothing done in Minnesota impacts only Minnesota. Carbon impacts should be considered from point of extraction to final consumption. 2390-19

What will become of stranded assets? Current estimates on Bakken and Williston Basin Oil is that they will be depleted in 20 years. The Canadian Government is saying 80 to 90% of the tar sand oils in Alberta should remain in the ground, negating, except for the short term, any need for a new Line 3. What's to become of the infrastructure? Removal? Abandonment? Other proposed uses by the applicant? 2390-20

Most major players in the Alberta Tar Sands have either delayed, put on hold, and in some cases, such as Statoil, have pulled out of Tar Sand Oil. Need for additional oil should be included within the EIS. This should be based upon current industry data, not government projections which overestimate demand in light of the changing world dynamics.

Impacts on both natural and human resources: including but not limited to those natural and human resources of importance to the Native Bands and including their retained rights under the 1837, 1854, and 1855 Treaty Areas. The statement of dismissal that native groups would be unfairly impacted by the proposed route but it is not a reason for denial appears racist, whether that was the intent or not. The issue of the exploitation of women was dismissed with the statement that the applicant would provide educational training around the issue for its contractors. This is not acceptable. 2390-21

The current State Department EIS review of the Alberta Clipper should be included within the scope of the EIS. Presently, the Alberta Clipper is operating at a capacity for which the lie has yet to be approved through the sleight of hand Line 3 / Alberta Clipper bypass at the Canadian Border. The currently underway EIS was a condition of the original approval of the Alberta Clipper. The inclusion would enhance the evaluation of the 2390-22

Sandpiper ? Line 3 Energy Corridor proposals. One example: it is our understanding that the spill modeling in the current DEIS only analyzes 10 mile downstream while the Alberta Clipper review models 20 mile downstream. No explanation is given for the change in criteria and then the information is closely held "for security reasons". 2390-22 Cont'd 2390-23

The EIS should include the entirety of the project from beginning to end; i.e.: from the Tar Sands of Alberta or the Bakken and Williston Basin fields in North Dakota to the Gulf Coast. 2390-24

The EIS should not assume that the criteria for route evaluation include any intermediate through-points (Clearbrook or Superior) . In the public input sessions conducted by the Department of Commerce, it was unclear as to how system alternatives and route alternatives would be evaluated within the EIS. To be fair to both the applicant and the citizens of Minnesota, both system alternatives and route alternatives should be included within the EIS. If there is a need for an additional 300,000+ BBD of dilbit from Alberta or any combination of oil types, it is currently being accommodated by other transportation methods. To imply greater risk to large urban areas if the proposal is not built ignores both the market place and restrictions (or lack thereof) of hauling liquids of greater hazard. These options should be stricken from the final EIS or at a minimum refined so that they make sense. Isn't the inclusion of rail and truck transport of oil to Superior a false equivalence in the preparation of this EIS? With the exception of a small refinery in Superior, 45,000BPD, everyone knows this oil is destined for markets further south in the United States. 2390-25
In that case rail and truck traffic to Superior does not make sense. Shippers would use rail routes currently in operation. What is purpose of "false equivalence" of rail and truck transportation to Superior especially when we know nearly all rail oil transport went south to Illinois and elsewhere, not Superior?

Additionally, I would like response to the following questions. The fact that these questions need to be asked is worrisome.

Who are the private contract firms used to compile the EIS? Do they have previous work histories with the Applicant? If so, was "conflict of interest" considered in their employment? Who hired them? 2390-26

Please explain this statement in the Executive Summary, Page 14 *"There is no one way to measure the general region-wide or state-wide differences in surface water resource quality across Minnesota."* 2390-27
So what measures/methodologies were used? Are you implying that the TSI used by the MPCA in measuring eutrophication is not a reliable way to measure water quality?

Why is there no examination of corrosion from co-location of pipelines with high voltage transmission lines? A 4 yr old pipeline, Keystone 1, suffered leaks from accelerated corrosion due to stray voltage from powerlines. 2390-28

Original Line 3 is 34 inches in diameter. New Line 3 proposed at 36 inches diameter. Why is larger diameter pipe necessary to achieve same barrels per day volume flow as the original Line 3? Will Applicant be re-applying to increase BPD flow to 990,000 as proposed in original Line 3 application? 2390-29

Route alternative RA-08 is between Clearbrook and Superior. In the EIS Enbridge has stated RA08 could require 2 new pump stations west of Clearbrook. Why? Isn't that an error in the EIS? Can the public be confident they are receiving accurate information in the EIS? 2390-30

In Chapter 5 the methodology used for analyzing construction impacts to groundwater is inconsistent and biased to the Applicant's preferred route. The ROI, Region of Interest, for the Applicant's route was a 1000 ft buffer on either side of the centerline of the route. For system alternative, SA04, a 2500 ft buffer was 2390-31

considered on either side of centerline. Potential impacts to groundwater are biased towards Enbridge's proposed route. Why is this?? 2390-31 Cont'd

Please provide contractor firms and names responsible for the groundwater hydrogeology assessments. Do these firms have a previous working relationship with Enbridge? 2390-32

System Alternative SA-04 is proposed to be in an existing pipeline corridor in Minnesota. This corridor was built in 2000. Did the EIS utilize any existing environmental review and/or assessments prepared for that project? 2390-33

Enbridge is proposed to horizontally drill under certain stream and river beds. The drilling fluids used for that process contain additives. These additives are toxic to aquatic wildlife and vegetation if a frac-out occurs. The Straight River, a nationally known brown trout stream, suffered a large frac-out during construction of the MinnCan Line 4 project. A drilling materials list should be provided to the public. The public cannot adequately comment without knowledge of these materials. What are those additives? 2390-34

Why isn't Itasca State Park considered a Minnesota historic resource? 2390-35

Construction of SA-04 would not affect any wild rice waterbodies. Construction of the Applicant's preferred route would result in impacts on approximately 5 acres of wild rice waterbodies. On the table provided the Applicant's route reads as impacting 3 acres. Which number is accurate? Please justify how this number was determined. What about Tullibee / Cisco Lakes, Lakes of Biological Interest comparison? 2390-36

On this subject there are discrepancies within the EIS in the numbers for construction "spreads" and workers per route alternatives. Please describe how these numbers were produced. In earlier Sandpiper testimony the company stated a much lower number of construction workers for that project and that these workers would be moving from one spread to another as construction was completed in one spread. Language in the EIS implies construction will be conducted across the proposed route all at once. 2390-37

The data obtained to describe the existing economic conditions in the ROI counties included county- level employment, income, and tax revenues *(where available)*. Potential direct and indirect impacts on the economic baselines in the ROI were determined using employment numbers and construction- related expenditures provided by the Applicant and estimates from other sources for other CN applications. This information was used to develop a qualitative analysis of the relative magnitude and expected changes to county-level employment and income levels, and to estimate the potential increase in income tax revenue by county." How can the public trust the qualitative analysis noted above if some information was NOT available? 2390-38

I hope the review team will notice a disturbing trend that the water resource section of this DESI is not complete and lacks professional analysis. I'm glad this project has many folks watching the process very closely and I hope the Dept. Of Commerce is able to transform this DEIS into a detailed and thoughtful EIS. This region and this state deserve that level of analysis.

Sincerely,

Lindsey Ketchel

MR. STEVE LELCHUK: My first name is Steve, S-T-E-V-E, Lelchuk, L-E-L-C-H-U-K.

1738-1

So I want to address chapter 10, section 5, which is Spill Prevention Preparedness and Response, and my question is, to what extent will this pipeline be vulnerable to cyber attack, which could cause a catastrophic accident.

Number one, pipelines are industrial scale systems run in large part by sophisticated hardware and software technology. I specifically have in mind in this case, something called supervisory control and data acquisition or SCADA.

According to Wikipedia, and I quote, "Supervisory control and data acquisition is a controlled system architecture that uses computers, network data communications, and graphical user interfaces for high level process supervisory management, but uses other peripheral devices, such as programmable logic controllers and discrete" -- and this is all caps -- "PID controllers to interface to the process plant or machinery.

"Stuxnet" -- that's spelled S-T-U-X-N-E-T -- "the cyber attack on Iran's nuclear enrichment systems, that came to the world's attention in 2010,

was directed exactly against their SCADA system.

"Many of the components of that malware have since escaped into the wilds of the Internet, available to any reasonable savvy computer user."

And in fact according to a 2016 article on the website, security intelligence, and I quote, "Attacks targeting industrial control systems increased over 110 percent in 2016, over last year's numbers as of November 30th.

"Furthermore, in March of 2017, on the website, cbr online, Eugene Kaspersky, the founder of Kaspersky Lab, noted that of 13,000 industrial control systems connected to the Internet, 90 percent have known vulnerabilities and 30 percent of these are in the U.S."

Now, in the Draft EIS, section 10.5.2.3, there is a reference to, "The existing Enbridge supervisory control and data acquisition system, which can automatically initiate pump station shutdowns to maintain safe operating pressures."

So we know Enbridge is using these industrial control systems and we know they are vulnerable to attack.

It seems to me that the Draft EIS needs to directly address this serious potential threat to

the pipeline's integrity. No doubt Enbridge is working hard to plug any holes in its cyber security, as are we all.

However, we all know this is somewhat of an ongoing slug fest between cyber good guys and cyber bad guys.

I find myself quoting Dirty Harry, "Do you feel lucky."

MS. KYLIE LEMLEY: Hi, my name is Kylie Lemley, K-Y-L-I-E, L-E-M-L-E-Y. For once, I actually just wanted to comment on the DEIS.

So the impact statement as it sits does not seem to place any particular weight on any actual alternatives to building the pipeline or options and just to the preferred route as listed by the applicant.

It strikes one as more of a reiteration of the proposal by Enbridge instead of an actual critical assessment of what will occur in any case aside from the line being built on the preferred route and never having any major issues.

A couple of issues I have with it 1806-1
is the restoration section. I'm sorry, I know somebody must have tried, but it's laughable. The plan to seed disturbed wetlands with just oats, why oats? Unless otherwise directed by landowners or regulatory agencies, it's just

1806-1
Cont'd

ridiculous. I mean, there are so many reasons why.

But anyway, wetlands are extremely sensitive and tenuous areas, and the Final EIS should much, much more thoroughly cover a plan to restore these areas, if it's even possible, and explain in detail what will be lost if the wetlands are not properly restored.

So I'm, once again, going to mention the section on abandonment. It's woefully inadequate, 14 pages out 6,000 is just not enough to cover the entire issue.

To name just a few unexplored topics, there's no talk of landowner property values and what will happen if one of the pipelines is abandoned on their land. No talk of the exposed pipe, because there's a lot of it already, and how fast it will degrade or what will happen when it does. It doesn't discuss buoyancy in any detail. It doesn't explore the possibility of the industry that could be created out of pipeline removal.

While it does say the impact on human and natural resources are anticipated to

be minimal in the near term, it doesn't explore that they absolutely could be significant in the long term. This is just, again, super inadequate.

Because of these, and like many other unmentioned issues, we need to demand an entirely separate impact statement, a whole new one for the topic of abandonment. Minnesotans deserve to know the risks they're accepting for Line 3, if it's allowed to be abandoned in place, and they can't do that with the very small amount of information provided.

Another thing, the DEIS states that, "The addition of a temporary cash rich workforce increases the likelihood that sex trafficking or sexual abuse will occur. Increases in sex trafficking, particularly among native populations, is well-documented."

This is all in the DEIS, but don't worry, everybody, Enbridge will take care of everything. They always do. They'll prepare and implement an education plan around this issue and consider it taken care of. They're just going to talk to people and say, "Hey, maybe don't sex traffic other people,"

all right, problem solved.

1806-2

There is obviously a really serious concern. Why is it dismissed with such a simple solution? Where is the data showing the effectiveness of their education plan? Enbridge is not an expert in the field of mitigation of sexual abuse. Why are they the ones to prepare an awareness campaign. This is, again, woefully inadequate.

And the last thing, real quick, it doesn't explore -- the DEIS does not explore what will happen if, as proposed, the (indiscernible) protection isn't installed until a year after construction.

First of all, I'd like to know why, why it's not going to be installed until a year later or what they're going to do with it. It's been shown that a lack of protection near high voltage lines can cause pinhole leaks, and can cause pinhole leaks. None of this is explored and I'd like to know why. I think that information should be in the final DEIS.

I think that's it.

Levi, Andrew (COMM)

From: Bruce Levi <BLevi@aan.com>
Sent: Sunday, July 09, 2017 9:41 PM
To: MN_COMM_Pipeline Comments
Cc: 'kblevi@comcast.net'
Subject: Public Comments Docket CN-14-916 and PPL-15-137
Attachments: Comments.docx

Dear Ms. MacAlister,
Attached are our written comments regarding the Draft Environmental Impact Statement (DEIS) for Enbridge Energy's proposed Line 3 Pipeline Project. Our comments relate specifically to the proposed Two Inlets pump station. If possible, please confirm receipt of these comments. Thank you,

Bruce T. and Kathy J. Levi
kblevi@comcast.net

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July 9, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 Seventh Place East, Suite 280
Saint Paul, MN 55101-2198

RE: Docket CN-14-916 and PPL-15-137; Comments of Bruce and Kathleen Levi, 36545 Wilderness Bay Drive, Park Rapids, MN

Dear Ms. MacAlister,

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for the Line 3 Replacement Project (Line 3). Much like our scoping comments which we submitted to you on September 30, 2015, our concerns focus on impacts resulting from construction and operation of the Two Inlets Pump Station which would be near our home at 36545 Wilderness Bay Drive on Little Mantrap Lake. The DEIS concludes that "*noise from pump station operations, although permanent, is expected to be negligible for all routes and is not expected to result in noise levels above the Minnesota Noise Standards or to affect any noise-sensitive receptor for any route*" (page 6-72). We argue that the DEIS and the record do not provide adequate information to make such a conclusory assessment. 1380-1

Pump Station Noise Not Identified

Despite that "*noise impacts from operation of the pipeline primarily would originate from the pump stations*" (page 6-65), Section 6.2.2 does not identify noise levels for the different pump stations—the document simply doesn't say how loud they will be. Rather, the DEIS "*identifies the noise levels at the closest sensitive receptor from operation of pump stations*" (page 6-67), presumably with mitigation applied. 1380-2

How can the DEIS purport to "*inform the Commission's decisions by evaluating the potential human and environmental effects of permitting the proposed Line 3 pipeline project, considering reasonable alternatives, and exploring methods for reducing adverse effects*" (page 1-1) if the document can't tell us how loud the pump stations will be or discuss mitigation for noise-related impacts from pump stations?

The Final EIS must identify pump station noise levels at the source, property boundary, and then incrementally thereafter—with and without mitigation applied. Moreover, the Final EIS should discuss available mitigation to reduce pump station noise above and beyond simply providing an incomplete listing of options (page 6-67). Other options are available, such as vegetation screening with large coniferous trees which would not only reduce noise impacts, but also reduce aesthetic impacts as well.

As Prepared Applicant Determines Noise Impacts, Not Commission

The DEIS states: "*The Applicant's design measures restrict the noise levels around neighboring dwellings and industrial facilities to 40 dBA, measured at a distance of 50 feet from the affected structure, unless state regulations allow higher noise levels. If noise is determined to be above the Minnesota Noise Standards, the Applicant would be required to implement design measures to come into compliance with those standards, such as placement of pumps and motors inside a building. Additional noise measures proposed by the Applicant may include insulation, acoustic louvers, and acoustic silencers*" (page 6-67). 1380-3

1380-3 Cont'd

This paragraph is misleading. State nighttime noise standards require that 50 dBA not be exceeded greater than 50 percent of the time. Therefore, state regulations do allow for higher noise levels about 40 dBA. The Final EIS must clearly state the standard: Is it 40 dBA or 50 dBA 50 percent of the time (or rather, 49 dBA 100 percent of the time)? Whatever the noise standard, it will still cause impacts and those impacts should be clearly addressed in the Final EIS with clear measures identified to mitigate those impacts.

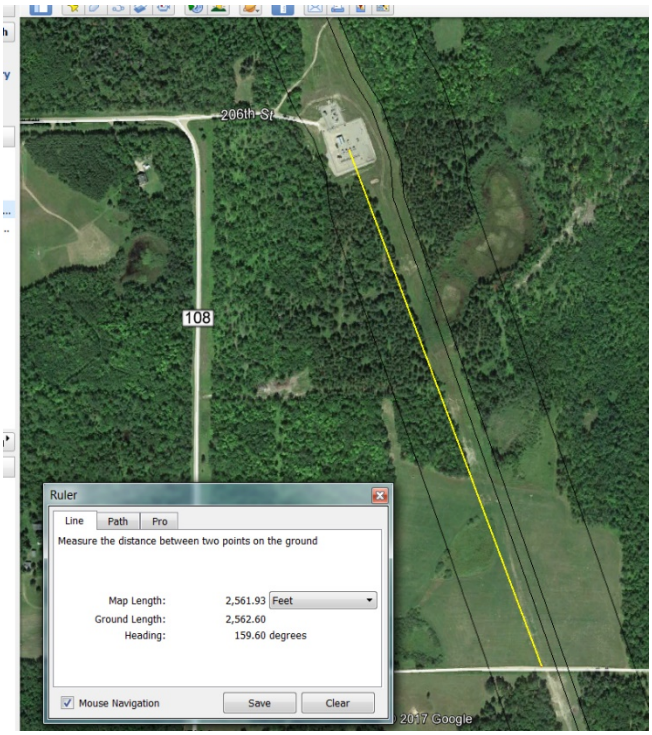

A standard that focuses, not on the noise coming from the pump station, but rather on the noise at the closest receptor is flawed. What if a sensitive receptor is commonly upwind or surrounded by vegetative cover? The picture at right demonstrates our concern. This existing pump station is several miles north of our home on Little Mantrap Lake. To familiarize ourselves with potential impacts from pump stations, we visited this area on July 2, 2017. While audible, the pump station is muted near the receptor to the west, the receptor being upwind, surrounded by vegetation, and lower in elevation. However, noise impacts were clearly audible over 2,500 feet away on the road that cuts the pipeline corridor. This example clearly demonstrates why the Final EIS must indicate noise impacts as measured from the source. The Commission and Final EIS must take a proactive approach and limit noise impacts as measured from the pump station.

Ambient Noise Reports Not Available

1380-4

The DEIS indicates that "*existing ambient (preconstruction) noise levels were determined by surveys completed by the Applicant (Enbridge 2016a)*" (page 6-63). The source for this information is *Enbridge Energy, Limited Partnership. 2016a. response to Data Request 2 (submitted on November 18, 2016). Received on December 1*. These noise reports are not available on the eDockets system; therefore, the information is not accessible to the public to review or verify.

Noise surveys should be publicly available, and, at a minimum, the Final EIS should discuss the time, date, location, and duration of the different noise surveys.

Post-Construction Noise Surveys to be Conducted During Winter Months

1380-5

We appreciate the Applicant's commitment to conduct post-construction noise surveys. We submit that the Final EIS indicate that these surveys will be required, and conducted during winter months over a week-day period. We would also expect that these surveys be made publicly available.

Nighttime Lighting at Pump Stations Not Discussed

1380-6

Our scoping comments also requested consideration of nighttime lighting information and impacts. Section 6.2.3 does not discuss nighttime lighting at the pump stations. The Final EIS must provide a description of how the pump stations will be lighted, and nighttime light pollution must be discussed for an adequate discussion regarding aesthetics and potential mitigation options.

Page Specific Comments

Page 2-44, Section 2.10.1. The DEIS indicates that a "*7-mile-long, 115-kilovolt (kV) line connecting the Two Inlets pump station to the existing Great River IM-MPT Line within Arago and Clover townships in Hubbard County. The transmission line would be supported by 70- to 80-foot-tall single-pole structures with horizontal post insulators and 350- to 400-foot spans between them. It would follow the Line 3 Replacement pipeline route for approximately 5 miles but would not be co-located with any other pipeline or utility corridor for the remaining 2 miles. The transmission line would be constructed within a 100-foot-wide right-of-way.*" 1380-7

An environmental review document has been prepared for this project; it is available at http://mn.gov/library/. We are unaware if a permit has been issued. Unlike the environmental review documents for the Backus and Palisade pump stations, cumulative impacts are not discussed. The environmental review document must be included in the public record as a connected action. Moreover, it is our understanding that the cumulative impacts of these connected actions must be discussed.

Page 6-63, Table 6.2.2-6. This table indicates the nearest sensitive receptor to the Two Inlets pump station is 1,000 feet away; however, the closest receptor is less than 500 feet from the proposed pump station location. Appendix I from the Scoping EAW indicates a residence at milepost 956.6 approximately 365 feet east of the construction workspace. This home is marked on Map 45a of the detailed map set. This error calls into question the entire analysis pertaining to pump station noise, and further reiterates the need for noise surveys to be made publicly available and results adequately discussed in the Final EIS. 1380-8

From Google Earth:

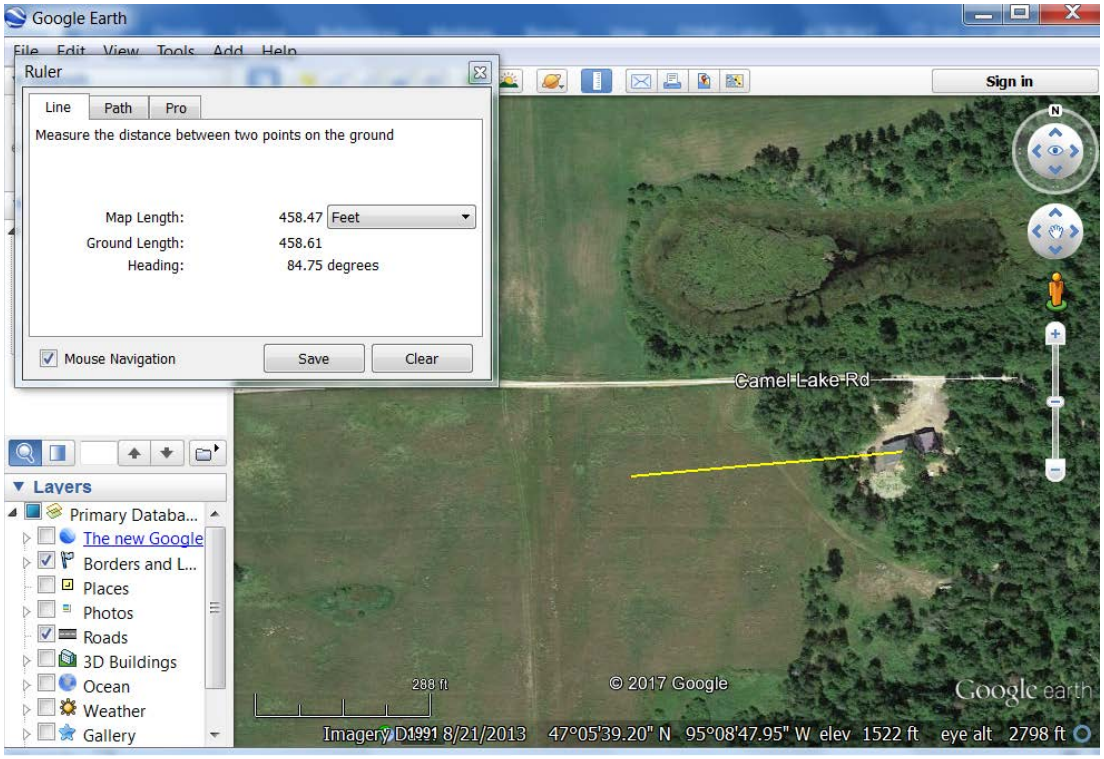

Page 6-86, last paragraph. "The Two Inlets pump station would be within 0.2 mile of two residences, each with a partial view of the permanent structure. For each of these residences, this would be a permanent 1380-9

1380-9
Cont'd

minor impact on the viewshed." This pump station will very likely be visible from U.S. Highway 71. It will create a permanent industrial feature on the landscape. We submit that this impact will be permanent and major. It will also affect many more than two residences or individuals, especially considering Highway 71 is the southern access point to Itasca State Park. The proposed location so near Highway 71 will create much more than a "minor impact on the viewshed," as suggested in conclusory fashion by the DEIS.

While we agree with the proposed mitigation that requires the Applicant "to develop a visual screening plan in order to minimize visual impacts on residents with views of the pump stations, regardless of the route option that is selected" (page 6-93), this step should be expanded to minimize visual impacts on roads, highways, and other travel corridors such as trails. We recommend the following revisions:

> *Require Enbridge to develop a visual screening plan in order to minimize visual impacts from ~~on residents with views of~~ the pump stations, regardless of the route option that is selected. This includes residents with views of the pump stations, as well as travel corridors such as roads, highways, and trails.*

Thank you for the opportunity to submit comments. We are hopeful the Final EIS will address with clarity the various pump station concerns we have identified in our scoping comments and these comments.

Respectfully submitted,

Bruce T. Levi, JD and Kathleen J. Levi
kblevi@comcast.net

MS. RUTH LINDH: R-U-T-H. L-I-N-D-H. There are numerous flaws in this draft of the EIS. Start with the document title. This is not a replacement for Line 3; it is a mostly new and different route pumped up and supersized. It endangers Minnesota waters, lands, and wildlife. 1810-1

This EIS is a huge document, but the troubling part is what is missing. First, to abandon the old crumbling pipe in place with only the vague reassurance that it will be monitored indefinitely is not sufficient. We need specifics: Dollars, time frame, guarantees. What if Enbridge has gone out of business or morphed into a new entity, who pays then?

Second, we know that the heavier tar sand oil, when leaked or spilled into bodies of water, have never been successfully cleaned up once it has sunk. What would happen if a spill made its

way into Lake Superior?

Minnesota should be very uncomfortable with the fact that Enbridge classifies their worst-case scenario spill data as trade secret, so it cannot be reviewed by the public.

Third, we are in the brink of enormous changes in this 21st Century economy. How can any 30-year projection of costs not include consideration of rapid advances and demands for renewable energy, declining oil prices, and the growing scarcity and value of clean water?

Here are three snippets from the news this past week, and I cited the sources in my written testimony. Coal is dead and oil faces peak demands, says Jim Barry, the global head of BlackRock Infrastructure Investment Group, the world's largest, with 5 trillion in assets. The thing that has changed fundamentally is that renewables have gotten so cheap. In short, the smart money is headed away from fossil fuels and towards clean energy.

(Cheering.)

FACILITATOR: Please do not interrupt.

MS. RUTH LINDH: Headlines: Minnesota steps up to the plate on climate. Now more than

ever Minnesota needs to continue to make the case that moving away from fossil fuels is not just a moral imperative, but is also politically feasible and economically advantageous.

Headline: Water shortage looms. UN Secretary General warned that by 2050 global demand for fresh water is projected to grow by 40 percent. Strains on water access are already rising in all regions.

It is fool hearty to grant this permit without consideration of these issues.

FACILITATOR: We need you to finish. Thank you.

MS. RUTH LINDH: A legitimate option of not building a new pipeline must be but carefully maintaining the Line 3 --

FACILITATOR: Thank you. We need you to finish now.

MS. RUTH LINDH: -- most prudent choice.

LONGLAKELIVING.ORG

Long Lake Area Association
P.O. Box 808
Park Rapids, MN 56470

Long Lake Area
ASSOCIATION

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July 7, 2017

Jamie MacAlister
Environmental Review Manager
MN Department of Commerce
85 7th Place East. Suite 280
St. Paul, MN 55101-2198

Subject: Docket Numbers CN-14-916 and PPL-15-137; Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Ms. MacAlister,

When the Board of Directors for the Long Lake Area Association (Hubbard County) Inc. met in May and June, 2017, we discussed the MN Department of Commerce's Draft Environmental Impact Statement (DEIS) for Line 3 Project CN-14-916 and PPL-15-137. Our comments relate to human and environmental impacts in the DEIS.

The Long Lake Area Association (Hubbard County) Inc. Board of Directors is very concerned regarding the proximity of the proposed Line 3 Replacement Route Segment Alternative RSA-15 to Long Lake, 29-0161-00, in Hubbard County between Hubbard, MN and Park Rapids, MN. The MN Department of Commerce Figure ES-3 map shows RSA-15 being very close to Long Lake and Chapter 7 pg 14, figure 7.3-3 (see attached). The DOC description of RSA-15 does not mention Long Lake which has 500 unique lakeshore parcel owners based on 2013 Hubbard County GIS and Assessor information on Long Lake below. The south end of the lake is in the town of Hubbard MN also. Therefore, we request that the MN Department of Commerce, the MPCA and MN DNR working together through the Memo of Understanding be cognizant of, document in the EIS and consider the sensitive and valuable resource that Long Lake is as route segment alternatives are compared and spill scenarios are analyzed. 2772-1

We are disappointed that the DEIS did not take into account these considerations because on 5-20-16 we provided this information for the DOC's scoping. 2772-2

Details on Long Lake 29-0161-00 based on 2013 Hubbard County GIS and Assessor information:

> Based on 2013 Hubbard County GIS data, Long Lake has 500 unique lakeshore parcel owners. There are 622 parcels on this 1926.07 acre lake. There are 136 residential parcels (full homestead) and 364 non-homestead or "seasonal" residents. There are 5 resorts and 1 campground plus 2 public accesses with parking. Long Lake is the largest of 3 lakes in Hubbard Township. This township is the 4th most valuable (tax base wise) in Hubbard County. It has a taxable market value (TMV) for water-related properties of about $166M. This is 70% of the TMV of all property in the township. These properties provide almost 71% of the tax revenue. Long Lake is the most valuable lake in the county based on the county assessor data from 2013. The agricultural lands are part of the other 30% of the TMV in Hubbard Township.

2772-2 Cont'd

[Page 2 - Long Lake Area Association (Hubbard County) Inc. comments continued.]

Long Lake is part of the MN DNR's Straight River Groundwater Management Area, which was designated in 2017. The Minnesota Legislature created groundwater management areas as a tool for the DNR to address difficult groundwater-related resource challenges. The goal of the Groundwater Program is to ensure that use of groundwater is sustainable and does not harm ecosystems, water quality, or the ability of future generations to meet their needs.

2772-3

The MPCA 1989 Ground Water Contamination Susceptibility Map depicts this area with the highest susceptibility to groundwater contamination. Private wells surround Long Lake and would be highly susceptible to contamination therefore. Irrigation pivots also dot the landscape as potato crops are raised in part for the largest employer in the area. These crops are rotated over seasons with corn, beans and peas. If this aquifer becomes polluted, the ability to grow these food products will be destroyed and many jobs lost. Long Lake is "downstream" in the watershed from the proposed pipeline corridor.

2772-4

Some of these private drinking wells around Long Lake currently have nitrate problems causing the water to be above the acceptable level for drinking water. The Department of Agriculture has a two-year drinking water study in progress in southern Hubbard County townships including Henrietta and Hubbard Townships (2016 and 2017) for nitrates and pesticides / fungicides. This further illustrates the high susceptibility to contamination.

A spill or a leak would affect Long Lake, its residents, tourists, the groundwater and sandy soil of the area with a ripple effect on the townships and county. Please be cognizant of these important environmental and pipeline safety concerns in the EIS and assess the risks in the EIS.

If the Long Lake Area Association (Hubbard County) Inc. can be of assistance, please let us know. Thank you.

Sincerely,
The Board of Directors, Long Lake Area Association (Hubbard County) Inc. sm

The Board of Directors, Long Lake Area Association (Hubbard County), Inc.

Attachment: MN DOC Fig ES-3 map shows RSA-15 being very close to Long Lake & Chapter 7 pg 14, fig 7.3-3

CC: Hubbard County Commissioners, Henrietta and Hubbard Township Supervisors

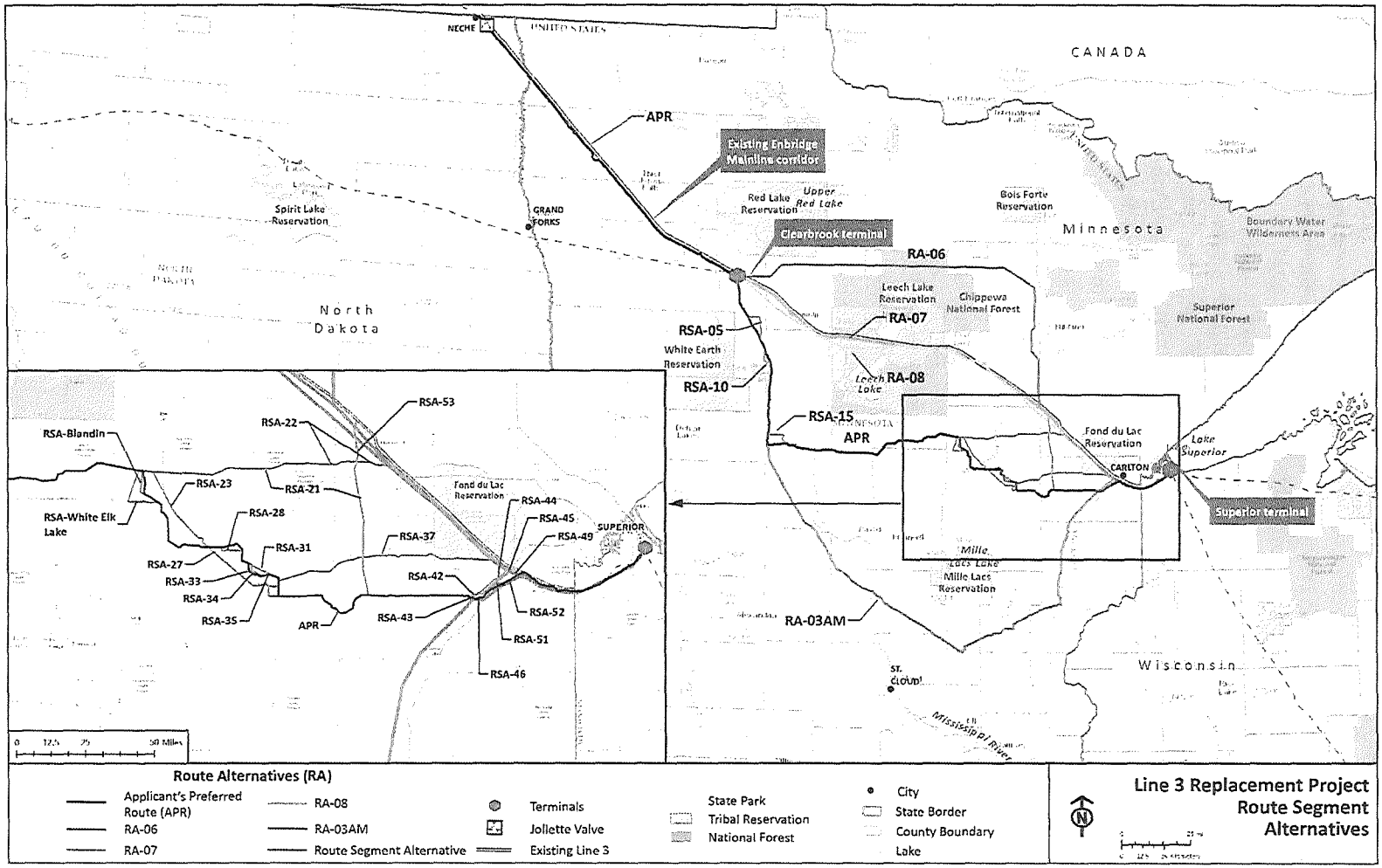

Figure ES-3. General Location of Route Alternatives and Route Segment Alternatives

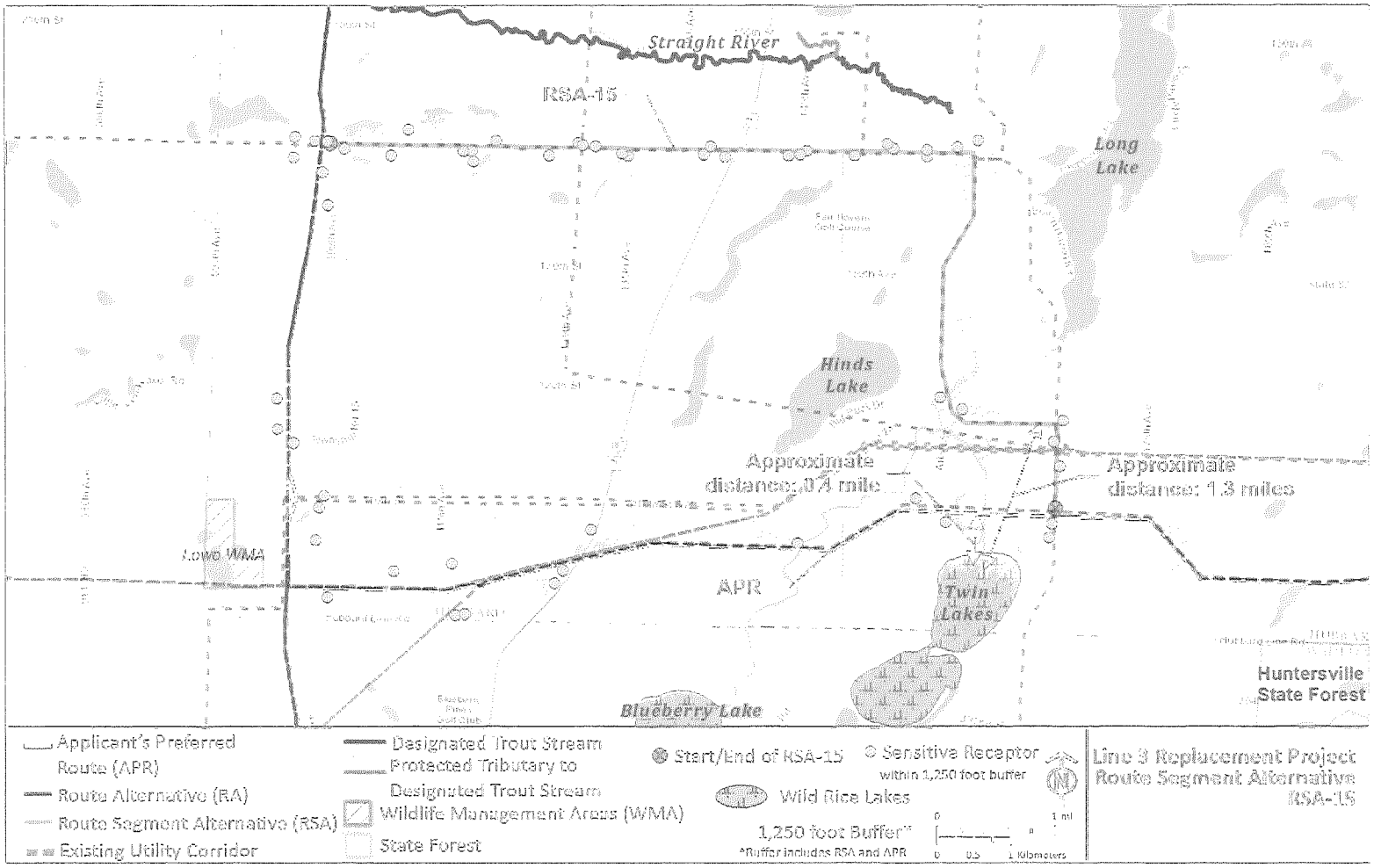

Chptr 7, pg 14
Fig 7.3-3

3rd comment form

0706

MINNESOTA

Comment Form

Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Katy (Kathryn) Lowery — NOTE this is my third comment

Street Address: 134 Winifred St W.

City: St Paul State: MN Zip Code: 55107

Phone or Email: katy.lowery@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

An additional comment:

The EIS is inadequate in that the safety record of the pipeline company Enbridge, is not thoroughly documented nor considered. 0706-1

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Mary Ludington <maryeludington@gmail.com>
Sent: Monday, July 10, 2017 6:28 PM
To: MN_COMM_Pipeline Comments
Subject: Docket CN-14-916 and PPL-15-137

Jamie MacAlister

Environmental Review Manager Minnesota Department of Commerce

85 7th Place East, Suite 280

St. Paul, MN 55101-2198

Dear Mr. MacAlister,

Following are my questions re: the DEIS for the proposed L3R project in Minnesota, Docket CN-14-916 and PPL-15-137

1) Who are the private contract firms used to compile the EIS? Do they have previous work histories with the Applicant? If so, was "conflict of interest" considered in their employment?
Who hired them? The state or Enbridge?

2) Please provide contractor firms and names responsible for the groundwater hydrogeology assessments. Do these firms have a previous working relationship with Enbridge?

3) The Applicant's preferred route has numerous minor route alternatives to avoid significant features in the environment. Why were "minor route alternatives" not considered in the overall SA-04 route analysis?

4) A recent Enbridge direct mail promotion states 13,600 jobs will be created by the Applicant's project, but in the draft EIS the maximum number of jobs created is 4800, 600 local workers and 4200 non-local workers. Which is the correct figure? Explain the discrepancy. Who provided the information for calculating those numbers?

5) Original Line 3 is 34 inches in diameter. New Line 3 proposed at 36 inches diameter. Why is larger diameter pipe necessary to achieve same barrels per day volume flow as the original Line 3? Will Applicant be re-applying to increase BPD flow to 990,000 as proposed in original Line 3 application?

Sincerely,
Mary Ludington
4240 Garfield Ave.
Minneapolis, MN 55409

11. In Chapter 5 the methodology used for analyzing construction impacts to groundwater is inconsistent and biased to the Applicant's preferred route. The ROI, Region Of Interest, for the Applicant's route was a 1000 ft buffer on either side of the centerline of the route. For system alternative, SA04, a 2500 ft buffer was considered on either side of centerline. Potential impacts to groundwater are biased towards Enbridge's proposed route.

12. Please provide contractor firms and names responsible for the groundwater hydrogeology assessments. Do these firms have a previous working relationship with Enbridge? 2423-1

13.System Alternative SA-04 is proposed to be in an existing pipeline corridor in Minnesota. This corridor was built in 2000. Did the EIS utilize any existing environmental review and/or assessments prepared for that project?

14. Enbridge is proposed to horizontally drill under certain stream and river beds. The drilling fluids used for that process contain additives. These additives are toxic to aquatic wildlife and vegetation if a frac-out occurs. The Straight River, a nationally known brown trout stream, suffered a large frac-out during construction of the MinnCan Line 4 project.

A drilling materials list should be provided to the public. The public cannot adequately comment without knowledge of these materials. What are those additives?

2423-2

15. Construction of SA-04 would not affect any wild rice waterbodies. Construction of the Applicant’s preferred route would result in impacts on approximately 5 acres of wild rice waterbodies. On the table provided the Applicant's route reads as impacting 3 acres. Which number is accurate? Please justify how this number was determined.

16. A recent Enbridge direct mail promotion states 13,600 jobs will be created by the Applicant's project, but in the draft EIS the maximum number of jobs created is 4800, 600 local workers and 4200 non-local workers. Which is the correct figure? Explain the discrepancy. Who provided the information for calculating those numbers?

17. On this subject there are discrepancies within the EIS in the numbers for construction "spreads" and workers per route alternatives. Please describe how these numbers were produced. In earlier Sandpiper testimony the company stated a much lower number of construction workers for that project and that these workers would be moving from one spread to another as construction was completed in one spread. Language in the EIS implies construction will be conducted across the proposed route all at once.

18. "The data obtained to describe the existing economic conditions in the ROI counties included county- level employment, income, and tax revenues *(where available)*. Potential direct and indirect impacts on the economic baselines in the ROI were determined using employment numbers and construction- related expenditures provided by the Applicant and estimates from other sources for other CN applications. This information was used to develop a qualitative analysis of the relative magnitude and expected changes to county-level employment and income levels, and to estimate the potential increase in income tax revenue by county.” How can the public trust the qualitative analysis noted above if some information was NOT available?

19. Why isn't Itasca State Park considered a Minnesota historic resource?

Levi, Andrew (COMM)

From: Lisa Lund <llund.blue@yahoo.com>
Sent: Sunday, July 09, 2017 7:15 PM
To: MN_COMM_Pipeline Comments
Subject: Public Commentson Draft EIS Enbridge Line 3, docket numbers CN-14-916 and PPL-15-137

To Jamie MacAlister, Environmental Review Manager, MN Dept. of Commerce:

I am a lifelong citizen of Minnesota, a scientist with training and experience in the physical and natural sciences including chemistry, biology, botany, ecology and ornithology, and a physician with expertise in pediatrics, pathology and laboratory science. I have owned and operated a medical laboratory for many years, and thus am well aware of the regulatory environment as well as the ways businesses work with public and governmental agencies and the various levels of regulations to ensure public safety. I am well versed in reading, analyzing and critiquing scientific publications and research. I have the following comments regarding the Draft Environmental Impact Statement on the proposed Enbridge line 3 pipeline:

1. **The draft EIS demonstrates poor use or lack of awareness of basic scientific principles.**
-Data is used from sources that are clearly biased or have a high likelihood of bias (Enbridge appears to have provided some data, and Stantec is cited as a source for data. Stantec has profited by working with Enbridge on previous pipeline projects). Commercial entities that benefit financially from the construction of oil pipelines should not be relied upon for data on the environmental impact of an oil pipeline. Removal of bias is standard scientific procedure, critical to producing honest and accurate results. And, any possible biases or financial interests should be clearly indicated in a written statement that is part of the EIS, and placed in a prominent location. Transparency is also standard scientific procedure. The use of data from biased sources compromises the integrity of the entire EIS, and the overall lack of transparency suggests scientists were not appropriately involved in the overall EIS process.

-A significant error is present in Figure ES-4 (p.ES-12, incorrect bar graph for average size of a pipeline spill). This could impact public perception, and suggests draft EIS data was not carefully compiled or reviewed before publication. 1386-1

- Statements are made without corresponding documentation of data upon which they are based. For example alternative transportation assumptions. 1386-2
-Table 4.2.1p. 4-4 Certificate of Need Alternatives and Criteria does not address an option for No Certificate Granted, No Line 3 Use. This suggests either carelessness or bias. If alternative transport scenarios are not reliable, much of EIS data is not pertinent. Predetermining any part of a process under study does not constitute good science.

-Overall conclusions of the draft EIS are inapparent. A clear summation of the data, the interpretation of this data, and the overall conclusions derived from the data are standard scientific procedure. The conclusions should indicate either a decision or the need for additional study.

2. **The draft EIS does not include a careful and thorough analysis of the economic need for a pipeline.**
-The draft EIS contains no hard data on the long term economic viability of tar sands oil production, current U.S. oil stockpiles, projected U.S. demand for oil, current and future U.S. oil imports versus exports, or changing methods of oil extraction and their costs and benefits.

1386-3

-Scenarios for alternative transportation of oil are based on assumptions without accompanying data validating these assumptions. Table 4.2.1 Certificate of Need Alternatives and Criteria uses a major criterion of "would denial adversely affect future adequacy, reliability or efficiency of energy supply?" and then essentially assumes that the future adequacy, reliability and efficiency of Minnesotans' energy supply is based solely on tar sands oil produced and transported across Minnesota by Enbridge at exactly the volume and flow rate desired by Enbridge.

3. **The draft EIS contains insufficient detail and lacks specific data on the management of the old pipeline.** 1386-4

-Chapter 8 is a general overview with statements by Enbridge about cleaning. How will compliance be monitored?

-No specific information is present regarding who will have long term responsibility for costs associated with an abandoned pipeline, including environmental issues that arise and require mitigation. Section 8 p7 indicates further study is needed. If additional costs arise, who is responsible? What is the timeline for undertaking the additional study? Can any part of the project be approved if further study is needed to answer questions?

-What are the environmental and financial risks to landowners if the existing pipeline is not removed? 1386-5

-Few regulations are in place for pipeline abandonment in the U.S. How will Minnesota ensure Enbridge continues to bear the responsibility for their pipelines once they are no longer used? A failure to carefully dictate the fate of the old pipeline 3 could leave Minnesotans at risk and set a national precedent for oil companies to abandon aging or unused pipeline without further responsibility.

4. **The draft EIS contains minimal data about the impact on species of special concern that reside in areas of planned pipeline construction or in areas with existing degrading pipeline.** 1386-6

-Migratory bird species depend heavily on Minnesota flyways and wetlands, and on northern Minnesota nesting areas. Populations of many species are in decline, and Minnesota hosts a number of avian species particularly at risk. Degradation of habitat and loss of species affects the entire food chain, which ultimately impacts humans in many negative ways. This same scenario is true for plants, insects including pollinators, and many other animals. As a biologist and ornithologist I would like to see more specific data on species already at risk, how they would be impacted by the proposed new pipeline and by removal or abandonment of the existing pipeline 3.

5.T**he draft EIS contains insufficient unbiased data on spill risks.**

-Independent third party spill modeling does not appear to be present, casting doubt on the validity of all of the spill data. For example, 10.2.4.3.2 Pinhole Leak Analysis data appears to be based on a 2017 analysis by Stantec and Barr Engineering, a company with financial ties to Enbridge. The Stantec website states *"For more than 20 years, we've worked with clients like Enbridge… In fact, moving and storing oil and gas is one of our specialities"* 1386-7

-Only seven sites were chosen for spill modeling, and these do not adequately represent all of the sensitive ecosystems and specific resources at risk in the event of a spill. Evaluation of additional sites, including Lake Superior, is needed. 1386-8

-A single catastrophic spill event at Marshall Michigan cost more than 1.2 billion dollars, and long term effects are still being evaluated. (DOT's Federal Pipeline Safety Program:Background and Key Issues for Congress, July 2016, NTSB Accident Report Marshall Michigan Spill)

6. **The draft EIS contains insufficient specific information on Enbridge leak prevention and detection systems. Enbridge has a well documented history of inadequate leak prevention and detection.** 1386-9

1386-9 Cont'd

-Previous Enbridge spills in MN include the Grand Rapids spill, when "*pipeline personnel did not recognize supervisory control and data acquisitions alarms as a spill or a cause for action*" (U.S. State Dep. Supplemental DEIS Jan 2017, Section 5 p.7)

--After the Marshall Michigan spill the NTSB determined Enbridge's leak detection system did not work as Enbridge had indicated. Enbridge had previously enacted a "10 minute rule" after employees did not recognize SCADA alarms as a spill or cause for action in the Grand Rapids MN 1991 spill. (US State Dept. Supplemental DEIS Line 67 expansion, January 2017) . Rather than the 10 minute identification Enbridge outlined in their spill management plan, the Marshall Michigan spill in 2010 was not detected for over 17 hours, after multiple alarms were ignored and additional oil pumped into the line. The spill was in fact identified by a local resident. The Enbridge leak detection process was cited by the NTSB as ***"prone to misinterpretation and differing expectations of control center analysts and operators"***

--Enbridge was cited by the NTSB as having "***pervasive organizational failures "*** after the Marshall Michigan spill. Evidence revealed Enbridge knew about and ignored serious problems in the pipeline for years.

-The Supplemental DEIS for Line 67 expansion produced by the U.S. State Department indicates Unbridle has had more small, large and catastrophic oil spills than the industry average (Section 5 p.7). The failure of Enbridge to appropriately monitor pipelines, manage issues, and respond to spills in a timely and efficient manner is also specifically identified in a federal document (NTSB Accident Report Par-12/01 PB2012-916501 7-25-2010).

-Enbridge is cited as having a ***"culture that accepted not adhering to procedures"*** after the Marshall Michigan spill (NTSB accident report 2.6.4 p101)

-Enbridge participated in only 2 of 26 government initiated oil spill response drills in the 10 years prior to the Marshall Michigan spill. (p.106 NTSB Accident Report), suggesting company interest in safety and prevention is low.

7. **The draft EIS contains insufficient data on Enbridge Rapid Response Plans. Enbridge has a history of inadequate spill responses and a corporate culture which does not emphasize safety.** 1386-10

- Enbridge specifics on response plans are not provided to the public. Past events indicate Enbridge has been underprepared (see U.S. State Dept. Supplemental DEIS Line 67 Expansion 5.3.1.2).

-Enbridge has demonstrated a corporate culture that does not emphasize safety for employees, the public, or the environment. Enbridge was found to have multiple violations of federal pipeline safety regulations and was cited by the PMHSA as having a ***"lack of a safety culture"*** after the Marshall Michigan spill, despite years of previous spills, warnings, fines, and citations, and despite regulations intended to improve safety and spill prevention/recognition (see Statement from Pipeline and Hazardous Materials Safety Administration on NTSB Enbridge 2010 Oil Spill Findings, US Dept. of Transportation, 7-10-2012)

-Enbridge ***"consistently chose a less-than-conservative approach to pipeline safety margins" and "had multiple opportunities to identify and to address safety hazards"*** before the Michigan spill, but failed to do so, even after the deaths of workers in Clearbrook MN in a 2007 accident (NTSB accident report 2.9 P114-115). Enbridge was cited for "***failing to safely and adequately perform maintenance and repair activities, and for failure to hire properly trained and qualified workers"*** (PHMSA Accident Report Enbridge Energy Partners L.P. Clearwater County MN, and public record

1386-10 Cont'd

-Enbridge has previously demonstrated inadequate resources committed to a response plan. (See NTSB Accident Report 7-25-2010 section 1.12.4 for a lengthy discussion of the inadequate planning for and response to the worst case scenario spill at Marshall, Michigan by Enbridge.) Enbridge was cited for numerous safety issues including inadequate leak detection and awareness, environmental response, integrity management programs, facility response plans, and adherence to Federal Pipeline Safety Regulations (NTSB Accident Report Analysis Section 2.1).

-Enbridge had inadequate containment methods and tools for containment of the Marshall Michigan spill (NTSB accident report 2.8.1 p106)

-Enbridge had inadequate response planning at the time of the Marshall Michigan spill. (NTSB Accident report2.8.2.1 p110, p112)

-The PHMSA rarely issues Corrective Action Orders, and appears to have done so only four times in the past 15 years. All four of these Corrective Action Orders were issued to Enbridge, three since 2010. A 2010 Corrective Action Order indicated that unless specific corrective action was taken, the continued operation of the Line 6B pipeline from Indiana to the Canadian border would be ***"hazardous to life, property, and the environment"*** (US DOT PHMSA Pipeline Safety Stakeholder Communications 2017)

8. **Timing of the draft EIS release and citizen response period.** 1386-12

-The draft EIS is a complicated and lengthy document, with more than 5000 pages of statements, data, charts, and graphs requiring significant time and further research to understand and verify. A formal Preparation Notice of the EIS project was published by the MN Dept. of Commerce on 12-05-2016, and the draft EIS was published May 15th 2017, a 6 month process involving multiple state departments and employees. However, individual citizens were given only until July 10th 2017, less than 2 months, to review the draft EIS and respond with formal comments, and significantly less time to comment at public forums. This suggests motivations other than accurate fact finding, clear communication of accurate and reliable scientific facts to citizens, and a sincere interest in public reaction and opinion.

L. Lund M.D. Bemidji, MN 56601

Levi, Andrew (COMM)

From: martina@midco.net
Sent: Thursday, June 29, 2017 8:03 PM
To: MN_COMM_Pipeline Comments
Subject: Docket numbers: CN-14-916 and PL-15-137
Attachments: Pipeline letter June 2017 for DOC.docx

Dear Ms. MacAlister:

Attached and below are my comments on the DEIS for the Line 3 Pipeline.

Respectfully,

Martha Lundin
4320 Elliot Road NE
Bemidji MN 56601
(218) 444-7623
martina@midco.net

Docket numbers: CN-14-916 and PL-15-137

I noticed some disparities at the hearing on the Draft Environmental Impact Statement on Line 3 in Bemidji on June 22nd. Most of the speakers for the pipeline were male union workers engaged in or hoping for temporary employment. Most of the speakers against the environmental destruction that the pipeline would cause to our and future generations were mothers, grandmothers, environmental stewards, and Native American protectors of their lands.

One would think economic arguments should be irrelevant to a debate on environmental impact, but since they provide the foundation for supporters of the project, opposition provided testimony on the greater number of jobs that would be provided under a pipeline clean-up scenario or by production of safe energy alternatives. SA-04, an alternative to Enbridge's preferred route that does not cross sensitive watersheds, would traverse more land and provide more jobs! And finally, an excellent point was made by an older gentleman from Iowa-- how insane we Minnesotans would be to put our water resources at risk (for the profit of a Canadian oil company). Imagine the loss of tourism dollars if our Northern Minnesota waters were polluted with oil and our wildlife poisoned by oil!

What is known: Oil is a limited resource that is running out. Consumption of oil is declining, with a glut of oil already in storage. Spills are inevitable, spread more rapidly in water areas, and are more difficult to clean up in water. Most important is water: no one can guarantee safe, clean water under proposed routes that pass by our pristine natural resources.

What is not known: Is any of this oil that puts our water at risk going to benefit Minnesotans? Who are the end consumers? How much is being exported? I posed this question to a couple of Dept. of Commerce employees who provided route information but could not answer this question.

1049-1

Flaws in the Draft EIS: While we're increasingly transitioning to energy alternatives, hazardous incidents of materials transport by pipeline, rail and truck, need to be considered. The chart on page 16 of the Executive Summary of the guide to the DEIS charts such incidents, with a glaring error as pointed out in testimony in Bemidji. "The average release of crude oil from a truck incident is 16 barrels; from a train incident, 40 barrels; and from a pipeline incident, 462 barrels." The bar on the graph showing release in barrels is only about half as high as it should be.

I don't understand why environmental concerns are the responsibility of the Dept. of Commerce. It seems that you do not take this responsibility too seriously as evidenced by flaws in the draft EIS and the fact that employees responsible for gathering comments were in the hallway chatting and laughing rather than listening to testimony. You have heard these comments before? Maybe you have not heard enough from Bemidji. Our area is unique, as it's surrounded by three Indian reservations and due to its proximity to the headwaters of the Mississippi. According to Chapter 9 as contained in this summary "American Indian communities have unique health issues associated with historical trauma and structural racism. . . Tribal impacts are magnified because impacts would be associated with abandonment or removal of the existing Line 3 and additional impacts would be association with replacement of Line 3 in a new location. Chapter 11 contains an analysis of the potential for disproportionate and adverse impact to American Indian and low-income populations in the project area." Shouldn't those impacts alone be enough argument to stop the proposed project?

Profits vs. Health- the same dilemma our country is currently facing. I hope you weight these comments from an ethical perspective.

Martha Lundin

Bemidji MN

Docket numbers: CN-14-916 and PL-15-137

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Marti Lundin

Bemidji MN

Levi, Andrew (COMM)

From: Alice Madden <alimarmadden@gmail.com>
Sent: Monday, July 03, 2017 5:46 PM
To: MN_COMM_Pipeline Comments
Subject: Comment on docket numbers CN-14-916 and PPL-15-137

Dear Jamie MacAlister, Environmental Review Manager, and others whom it may concern -

This is a comment on **docket numbers CN-14-916 and PPL-15-137.**

This EIS is very incomplete and should only be considered appropriate to make decisions about the pipeline project AFTER the following things are addressed, added, or corrected:

- The individuals who wrote the report are not named, NOR are their backgrounds, affiliations, etc disclosed in order to make necessary determinations about potential conflicts of interest.
- The required statement on the necessity of the project is vague and inadequate. That its need will be determined based on "market forces" does not have a compelling, nor fact/numbers-based analysis of why THIS project is needed HERE and NOW. This must be corrected to sufficiently fulfill requirements. Furthermore while economics should certainly be foundational to decision-making - economics themselves are not economics unless you consider their context...environmental and social realities. Communities may have jobs, but if they don't have safe drinking water and the jobs are short-term in a shrinking industry rather than short/med/long-term jobs on projects that are part of a growing economy...what's the point or justification in that kind of economics?
- Relatedly to the point immediately above - if the purpose of the project is to supply both affordable energy and jobs, then what also must be included is an analysis of significant alternatives, which is this case is distributed renewable energy. This is "significant" because the price per kwh for renewables is not on par or below that of natural gas, coal, oil, and nuclear. The technologies are here, ready, and more than sufficient in terms of scale and ability to provide a reliable energy source. This **must** be included to ensure the pipeline is not only providing what it says it will (energy and jobs) but that it is indeed the most cost effective and net beneficial option. This is too expensive (in terms of land, health, and money) to be done simply because it has been done and can be done. If the purpose is profits rather than providing a needed service, that should be stated and the project thrown out. That is not what an EIS is for, nor big infrastructure projects.
- This project is in opposition to both state and local policy on climate and energy goals. That is part of an EIS to evaluate if a project is in violation of either.
- No analysis was done on downstream effects of potential (and, statistically speaking, eventual) leaks, only groundwater. 1050-1
- No analysis was done on whether or not this violates previous and standing treaty rights and tribal sovereignty. That is not a bonus issue. That is also a must. 1050-2

Sincerely,
Alice Madden
2063728471
Minneapolis, MN 55407

Levi, Andrew (COMM)

From: jerry and Shirlee maertens <maertens@paulbunyan.net>
Sent: Thursday, July 06, 2017 7:07 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137 DEIS comments on Enbridge line 3 replacement and crude oil capacity doubling

This DEIS is by far the biggest crock I have ever seen come out of a governmental agency. To supposedly address the Certificate of Need on almost every page is beyond belief. Had the Certificate of Need been first addressed and then went into the route review, I would estimate the document could have been reduced by 1500 pages. Another thing – the colored tables of red, yellow, and green in the DEIS are geared for nothing more than to manipulate the viewers brain into thinking that the applicants "preferred route" is the best option. The "preferred route" cells are almost all green with very few "beware" red cells. Deceiving as hell.

1.4.1.1 The DEIS states that the project need is not assessed in this document yet MN 216b.243 talks in terms of present needs and long range anticipated needs in determining the certificate of need. Not assessing these these needs seems contradictory to law and rule, please address. In actuality, if there is not a need and all indications are there is not a need, one does not need to determine environmental impacts nor discuss a route. In other words do nothing.

2.2 Enbridge States that Demand for Canadian Crude Oil Exceeds Current Capacity. This is highly debatable as is the statement that 74% of this crude is used here in the area. Enbridge's own information elsewhere states that within this Enbridge corridor 2.9 million barrels of oil is transported daily. Of this 0.4 million barrels go from Clearbrook to the Twin Cities and 2.5 million barrels go from Clearbrook to Superior. In checking on the ability of these refineries to process this crude, it appears that the two refineries in the St. Paul Metro area process about .4 million barrels daily – the same as being shipped by Enbridge. The Superior refinery has a capacity of 0.04 million barrels, that leaves 2.45 million barrels going elsewhere – Illinois, Oklahoma and the gulf coast. In other words 85% of the daily oil flow through Enbridge's 6 pipelines is **excess to our needs**. Where is the **need** to double line 3 transmission? This needs to be address in the Certification of Need. Also we need to see information on how many barrels of those 2.45 excess barrels to "our needs" are exported, since the oil industry was successful in getting U.S. government removal of export limits. What are our U. S. daily import and export figures?

2.9 Enbridge proposes to leave line 3 in the ground if line 3 alternative is completed. Canadian environmental information seems to indicate that abandoned lines need to be removed and everything restored. Why would Minnesota OK something that appears to be environmentally less than satisfactory?

5.1.3 All the comparisons in Chapter 5 of the Enbridge proposed route (Neche ND to Superior Wisconsin) with SA–04 9 (Neche ND to Jolliet, Ill.) are absolutely absurd and have no relevance. It is understandable that all routes from Neche to Superior could be reviewed and evaluated for all the possible impacts, but compare the proposed route ending in Superior to SA-04 which goes to Illinois is an absolute idiotic attempt. Since 85% of Enbridge oil that crosses MN and hits Superior is shipped to other sites most of which reaches Illinois prior to going to the east coast or gulf coast for exportation, a more appropriate comparison would be the Enbridge preferred route of Neche to Superior to Illinois vs the direct route from Neche to Illinois which is SA-04. 1388-1

1388-2

10.2.4.1.1 The DEIS states that “Length is a key component in calculating failure probability” and goes on to state that the preferred route is 380 miles long. As we stated in 5.1.3, 85% of the oil crossing MN does not stop in Superior, rather flows through pipelines to Joliet Ill before going to the east or gulf coast for exportation adding in excess of over 400 miles, making the preferred route the longest route being considered. This would more than double the proposed route and would further reduce the attractiveness of other routes over SA-04. Information also indicates that Enbridge is planning another pipeline from Superior to Joliet to handle all this excess oil.

1388-3

10.2.4.1.3 SA-04 is stated to be 795 miles in length from Neche to Joliet. Obviously SA-04 is slightly less than the 800+ miles for Enbridge to get the oil to Joliet via their preferred route, making the preferred route longer than SA-04. Looks like the data incidents per year need recalculating.

1388-4

10.4.2.1.2 Why is table 10.4.8 not in color? Is it because SA-04 would be green, the best choice, and others with some green, yellow, and primarily red. There are big fat goose eggs in entire column below SA-04.

1388-5

10.7.2 Again the data presented in tables 10.7.3 and 10.7.4 are not comparable. SA-04 figures are for Neche to Joliet while the others are for Neche to Superior. The coloring of the table again is obviously to sway readers thinking. Rather than colors why was the data presented such that the lowest column totals were to the left and the highest column total to the right. This way one could look and see which had the least impact? The the first column would be System Alternative SA-04 rather than Applicants preferred route.

Obviously a document in support of Enbridge. But then why would one expect anything different from the Department of Commerce.

Gerald Maertens
885 Bootleg Lake Rd Sw
Bemidji MN 56601
maertens@paulbunyan.net

Virus-free. www.avast.com

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Kara Marine-Rietmann

Street Address: 1401 Knoll Drive

City: Shoreview State: MN Zip Code: 55126

Phone or Email: zarkar@yahoo.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

My concern is that the fiduciary responsibility of any accidents, leaks, and spills will not be covered by Enbridge. There is no outline of Insurance carriers or funding of the risk that Enbridge takes on with all of their lines. There was a spill in 7/2002 Cohasset, MN there are still issues! There is no Federal Standard to Address pipeline Safety. There may be training but if they are not trained there will be damage to people, environment, and water. I understand that people want jobs but to put our water at risk, which is a more important natural resource for every human, is not worth the risk to the environment. MN takes on a lot of risk and I would ask that why take on this risk? If you do take on this risk, I ask that you require a large substantial amount of money to cover damages to water, ponds, environments, animals, humans, and future damages to animals and humans.

Also— "The cleaning up" makes no sense. You are going to allow high pressure through the pipes that has been admittedly corroded. IS there a camera down every inch of the pipe to see the damage? How do they know when there is a leak? 0713-1

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Willis Mattison <mattison@arvig.net>
Sent: Monday, July 10, 2017 10:37 PM
To: MN_COMM_Pipeline Comments
Cc: MacAlister, Jamie (COMM)
Subject: Comments by Willis Mattison on Line 3 DEIS - Docket numbers CN-14-916 and PPL-15-137
Attachments: Dybdahl Report (2).pdf; Perspectives_for_the_Energy_Transition_2017.pdf; Willis Mattison comments PUC.pdf; Final Version- Willis Mattison Line 3 DEIS Comments w Cover letter.doc

July 10, 2017

Ms. Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

(Transmitted via email to: Pipeline.Comments@state.mn.us)

Re: Public Comments of Willis Mattison on the DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR ENBRIDGE PROPOSED LINE 3 PIPELINE PROJECT Docket numbers CN-14-916 and PPL-15-137

Dear Ms MacAlister,

Enclosed (attached) are my comments on the subject Draft Environmental Impact Statement (DEIS). Thank you for the opportunity to review and submit comments on the DEIS. I look forward to your and your Department's consideration of my suggested changes and additions to the document.

I respectfully request that the Draft Final EIS acknowledge each of these comments and provide responses and indication of their ultimate disposition.

I trust that you will find my suggestions helpful in making the final EIS a more comprehensive but concise and informative document for the Public Utilities Commission's and other permitting decisions on this project in the broader and long range public interest.

Sincerely,

Willis Mattison, Volunteer Citizen Advocate/Advisor
42516 State Highway 34
Osage, Minnesota 56570

This email has been checked for viruses by Avast antivirus software.
www.avast.com

Final Version

July 10, 2017

Ms. Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

(Transmitted via email at: Pipeline.Comments@state.mn.us).

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42516 State Highway 34
Osage, Minnesota 56570

Public Comments on the
DRAFT ENVIRONMENTAL IMPACT
STATEMENT FOR ENBRIDGE PROPOSED LINE 3 PIPELINE PROJECT
Minnesota Public Utilities Commission Docket numbers:
CN-14-916 and PPL-15-137
by

Willis Mattison
42516 State Highway 34
Osage, Minnesota 5570
July 10, 2017

Introduction

My education and professional career experience and qualifications for making the observations, criticisms and recommendations in these comments can be found in Appendix A of this document. I will only summarize those qualifications here by stating that I am presently retired but remain a practicing natural scientist (ecologist) and an experienced environmental review practitioner of over forty years.

A significant portion of my 28 year career with the MPCA involved reviewing and preparing official agency critiques and comments on dozens of environmental assessments and impact statements at the local, state and federal levels. I have continued to regularly review and prepare detailed comments on major local, state and federal environmental review documents.

I take special pains to summarize my qualifications in the paragraph above and to provide a more complete version in Appendix A to clearly establish my credentials for make the comments I do here in this document. I believe it is important to demonstrate that I have exceptional knowledge, skill and experience at natural resource condition assessment and have applied resource management methods to large tracts of land in order to achieving certain eco-function goals.

And I am quite familiar with both the aspirational policies and goals of the Minnesota Environmental Policy Act as well as the intricacies of the Rules and guidance used to administer that Act. I have considerable experience

Accordingly, I encourage the responders to my comments to view my critique of the DEIS in light of my professional credentials to do so, especially with regard to my criticisms of the data sets selected and the methods of analysis used as they reflect on the validity of conclusions reached in the DEIS

Purpose and Conclusion of this Review

By order of the Minnesota Court of Appeals, the Line 3 pipeline project was found to have significant potential to cause pollution, impairment and destruction of Minnesota's human and natural environment. Therefore, by law the project must undergo the extraordinary high level of scrutiny required in an environmental impact statement (EIS).

For over forty years now, environmental review has performed a vitally important function for Minnesotans. Environmental review is required to help Minnesotans answer a simple rather straight forward question about this project: "Are the benefits to society from a proposed project worth the harm the project is likely to cause? The EIS itself does not answer that question but it is the instrument used to gather and analyze the all the information necessary to find that answer.

To do this the EIS must clearly describe all the various types and places this project is likely to cause "pollution, impairment and destruction" and also establish the significance of this environmental harm in plain objective terms ordinary citizens can understand

In turn, public review and comment is intended to help determine if a draft EIS actually accomplishes this task and if it does so clearly, completely and in plain language. If not, the DEIS is unacceptable must be revised sufficiently to adequately accomplish this task.

My review of the draft environmental impact statement led to the conclusion that this DEIS fails to accomplish this vital task and must be significantly amended and revised for the following reasons:

1. The DEIS is far too long and complicated for citizens or policy makers to fully understand and the executive summary is far to brief and shallow to serve its purpose;

2. The benefits to be derived from the project in terms of what important societal need would be met was not described at all but instead was deferred to a later "needs" process.

3. The purpose of the project was defined in narrow terms that were self-serving to the project proposer and that prematurely eliminated less polluting or less harmful alternatives;

4. The information used and the analysis performed was incomplete and/or inappropriate;

5. The significance of potential harm to the environment caused by the project or its alternatives could not be established because the assignment of relative resource values, an essential element for determining significance of impacts is missing.

The detailed review and comments below are offered in support of these conclusions.

Overarching Issues That Altered Normal Approach to Review & Comment

The DEIS was far too lengthy, too complicated, too repetitious and was largely based on several broad assumptions that were weak, unwarranted or unsupported. Consequently that I found a complete reading and preparation of a point by point critique of the DEIS not only impossible but unnecessary.

For time constraint and other reasons developed later in these comments, I necessarily truncated the more complete review I had originally had intended for this document. A complete review would have involved developing detailed comments on a page by page, section by section basis. Normally, this has been my preferred method for providing complete and thorough review and comment on a DEIS.

So first off, the DEIS fails to meet one of the first essential tests for MEPA adequacy in EQB Rules 4410.2300.

> **4410.2300 CONTENT OF EIS.** *An EIS shall be written in plain and objective language. An RGU shall use a format for an EIS that will encourage good analysis and clear presentation of the proposed action including alternatives to the project*

One parenthetical point is pertinent here that will help explain my decision to go into far greater detail providing arguments and references in support of comments made here. Because the opportunities for meaningful public participation in the EIS process were severely limited by the meeting formats offered the public has not had full access to important information. The robust dialogue and debate that could have provided the necessary technical foundations for many of these comments was not allowed to happen in a public forum.

So the, more expansive comments are provided here to make some of this background information available to the public when they review these comments and the responses the RUG provides in the DFEIS.

As my review progressed through the document it became increasingly apparent that the criticisms I was developing were consistently traceable to a list of persistent underlying assumptions, assumptions that were either weak, unsupported or unsupportable. Therefore I shifted my primary comments to focus on these root sources of problems in the DEIS and relate them to the myriad other issues that cascade from these core assumptions throughout the document.

These are major foundational deficiencies in the DEIS that I contend must be better supported or corrected before the DEIS can be scientifically and functionally adequate.

Moreover, it is standard practice in environmental review as it is for practicing science in general to identify what assumptions are made, why the assumption made and the effect the assumption had on the reliability of the analysis being performed. And not all

assumptions are equal in strength or are they universally accepted. Professional scientists often disagree.. Finally, in cases where there was significant differences of professional opinion on team or with other contributing agencies the implications of applying the particular assumption should be reflected in any conclusions that are reached based on the assumption.

This is vitally important to the overall credibility of this particular DEIS because the recent public record on pipeline projects is replete with significant differences of opinion and critical comments from various state agencies and from the public. On a highly controversial project such as this, the authors of the DEIS cannot afford to ignore these criticisms. A key way the authors can strengthen the FDEIS is to fully acknowledge catalogue and respond to these substantive critiques in a transparent way.

More specifically, the public is well aware of major recommendations for use of various data sets and specific methodologies for use in the DEIS as well as substantive criticisms of made in MPCA and MDNR letters to the Department of Commerce. Most of these letters are posted in the eDocket system either for the Sandpiper or the Line 3 project so are already in the public record. There were additional letters from other agencies like the Departments of Health and Agriculture that were not as publically available. Reference is made later in these comments to several of the state agency recommendations and criticisms that do not appear to have been resolved in the draft.

Revision of the DEIS should include a special section devoted to dealing with the substantive issue raised and recommendations made in these agency comment letters. This section should include discussion of how the issues were resolved.

<u>Core Assumptions Requiring Full Disclosure, Re-examination, or Revision</u>

The core assumptions found in the DEIS that have major implications for conclusions reached in the DEIS and need to be clearly acknowledge, better supported or more fully addressed in the DFEIS include:

1. Assumption that major relevant government policies can be excluded from consideration throughout the DEIS in spite of Statutes and Rules requiring consideration and that some relevant policies can be can be expressly excluded by caveat including climate change policy, green house gas reduction policy, civic engagement policy and environmental justice policy.

2. Assumption that the PUC's Certificate Need process necessarily proceeds on a "project by project" basis which some how excuses the EIS from addressing the broader policy level issues of future fossil fuel use and how degree of society's reliance on fossil fuels may be impacted by this or other energy projects.

3. Assumption that while future pipeline corridor implications of this project are real these implications not need to be addressed in this document as a reasonably foreseeable future impact of this project.

4. Assumption that project purpose can be stated or assessed only in terms of applicant's needs and that this industry need can only be met by a limited number of project design options;

5. Assumption that the issues of project need are separable from issues suitable to be addressed by environmental review. And that issues of need could only be addressed by the PUC in a separate decision making process, a process based not only on the information not available for inclusion in the EIS;

6. Assumption that because the need for the project could not be "determined" by the EIS, project need did not have to be addressed at all in the DEIS;

7. Assumption that comparisons of route alternatives that do not have the same start and end points can objectively reflect route impact differences and that simply acknowledging the bias resolves the problem and does not adversely affect the outcome of the analysis.

8. Assumption that the term "energy type" as used in Certificate of Need Criterion must be narrowly interpreted as meaning only crude oil excluding consideration of other types of energy such as renewables;

9. Assumption that MEPA does not require a project benefit analysis on the broader basis of what pubic need is served or public benefit is provided by a project. This assumption prevents the informed balancing of public benefit against potential loss or damage to resources that may result from the project.

10. Assumption that information necessary to fulfill requirements of Certificate of Need Criteria cannot be fully developed in the DEIS and that trade secret information alone determines project need;

11. The assumption that shipment of crude oil either by rail or by truck from new terminals at the Canadian border and near Superior were actually reasonable and prudent alternatives to the proposed project.

12. Assumption that a proper significance of impacts can be made without establishing weighted values for potentially impacted resources;

13. Assumption that micro scale assessment methods can credibly capture macro level (ecosystem level) impacts and that a simple summing of acres potentially impacted is the appropriate metric of significance for many those impacts.

14. Assumption that issues of climate change, was an issue too large to factor into final decisions on project;

15. Assumption that the quantity and distribution of public meetings are the appropriate metric for expressing the quality of public participation and involvement in the EIS process.

16. Assumption that System Alternative SA-04 as proposed by citizens should be treated as an inflexible centerline rather than represent a broader initial search corridor within which refinements could and should be made;

17. The assumption is made that the narrower construction zone width used for the applicant's preferred route through wetlands and certain water bodies was equal to and therefore offset by wetland areas omitted from footprint of SA-04.

It is requested here that each of these assumptions be individually addressed and greater support for them be provided in the DFEIS.

Names and Qualifications of DEIS Authors and Contributors 2432-1

The education and professional experience qualifications of the DEIS authors is not properly disclosed in the DEIS. This information is essential to the credibility of the DEIS.

So essential is this information to the integrity and public acceptance of environmental review that it is actually required by rule. Minnesota Administrative Rules 4410.2300 part D. requires inclusion of the names and qualifications of the persons responsible for preparing the EIS itself or for those preparing significant background papers.

This requirement would include the list of all contributing consultants, their qualifications and previous work experiences on projects of this nature and the clients for which this work was prepared. This is important information, not only to assure the quality of expertise that went into the DEIS but also to disclose potential conflicts of interest and sources of potential bias that may be reflected in the draft document.

To be fair it is acknowledged that conflicts of interest and other sources of bias on the part of the authors and consulting contributors can never be completely avoided or eliminated. But the influence of these sources of bias can be managed. To do this the full disclosure of these potential sources of bias that can influence the integrity of the DEIS and the measures taken to counteract these influences must be transparent to the reviewing public. This is also an important consideration for the decision-makers who ultimately rely on the EIS.

This information must be provided in the DFEIS indicating which persons or consultant firms prepared each portion of the DFEIS.

Loss of Public Confidence and Trust in Government

This is a discussion section that must be added to the DEIS in some detail given the history, the contentiousness and controversy surrounding pipeline projects nationally and

here in Minnesota given the growing levels of citizen distrust for government institutions in general and for pipeline projects in particular.

The public, the applicant and the Public Utility Commissioners (PUC) themselves are well aware of this troubled history. This DEIS does not emerge into an historical vacuum. Therefore, for purposes of full disclosure the DEIS should be amended to recount the path by which the Sandpiper pipeline project was reviewed by Department of Commerce (DOC) staff and how that review culminated in the Department's recommending Sandpiper, as proposed by the applicant for PUC approval.

This discussion should discuss the history of how the Sandpiper pipeline was a predecessor to the Line 3 project proposed by the same applicant for the same exact corridor and in the very same environmental setting. The DOC, acting as agent for the PUC was the lead agency that prepared the high level environmental report for the Sandpiper pipeline certificate of need. It was that high level review that determined there were no significant differences in impact between the applicant's preferred route (APR) and any of the other alternative routes considered in the review including the alternative route SA-04, a route that is now an alternative route for Line 3 as well.

The DOC's original finding of no significant difference between these alternative routes prevailed through the Certificate of Need (CON) process for Sandpiper and led to the PUC's ultimate decision to approve it. While that decision was overturned by a court the original findings in the Sandpiper review now stand as potential source of prejudice that must be properly addressed in this document to assure there is no biasing influences carried over into review of Line 3.

It is fully understandable and significantly worrisome to skeptical outside observers that the DOC is once again in charge of comparing the merits of the same alternative routes for this project as it did for Sandpiper.

This request for disclosure is not made to embarrass the Department but to encourage them to exhibit the degree professional integrity required of any other RGU that found themselves in a similar situation. The acknowledgment of a previous analytical study and report by a researcher on the same subject would not be accepted for publication by any reputable journal without an accounting and review of all previous works. The conclusions of the previous work should also be presented along with the methods used to reach those conclusions. Critical reviews of previous work should be disclosed and how those criticisms were taken into account in subsequent work of the same nature.

Methodologies used by other researchers to assess and analyze impacts from similar projects should also be reviewed (possibly in an appendix to the DEIS) to demonstrate what methods were considered and either accepted, rejected or modified. The rationale for choosing or not choosing historically used methods should follow.

<u>Citizen Efforts to Neutralize, Minimize Sources of Professional Bias or Prejudice</u>

The following history is offered here as suggested topic to be considered for amending into the DFIES and that is written from the perspective of citizens who participated in the process outlined here.

In response to citizen lawsuit the Minnesota Court of Appeals found that the CON environmental review process as administered by the DOC for Sandpiper was inappropriate and the court ordered the preparation of the current full EIS instead. Many citizens believe there existed obvious cause for, if not evidence of, corporate agency regret and resentment for the judicial rebuke of their alternative environmental review efforts. What was even more apparent in the Sandpiper process was the loss of public trust for the DOC's ability to fairly and objectively prepare a new environmental review document for Line 3 that was not pre-destined to confirm the original findings of the previous CON analysis for Sandpiper.

For this very reason this author, supported by numerous citizen and Tribal organizations appealed to the Environmental Quality Board (under EQB rules allowing such appeals) to reassign RGU responsibilities for the Line 3 EIS to the Minnesota Pollution Control Agency(MPCA) and the Department of Natural Resources (MDNR). Appellants asserted these agencies were more capable, and objective because they were less likely to affected by the adverse Court Ruling. While the citizen appeal was ultimately denied on split vote the informal finding of the EQB Chairperson was that the Department of Commerce had obviously lost the public trust and that the Department was well advised to take special measures during preparation of the Line 3 DEIS to reestablish this public trust.

This author along other willing groups and individuals formed an ad hoc group of citizens and Tribal members who volunteered to work with the Department of Commerce, to find fair and effective ways to alleviate the public-trust problem. Over the next fifteen months through a series of email exchanges, telephone conversations and direct meetings with agency representatives citizens proposed a wide array of methods for doing so. (The full file and records of these exchanges is available to anyone upon request made to this author).

The shared goals, operating principles and group norms were set out and memorialized in the following document prepared for the first meeting of the group.

RESTORING PUBLIC TRUST IN MINNESOTA'S PIPELINE EIS PROCESS

SHARED GOALS, PRINCIPLES, ASSUMPTIONS, STRATEGIES AND NORMS

Goal: To Identify, develop and implement plans and strategies to restore the public's trust in Minnesota's current and future environmental review and permitting of petroleum pipeline projects.

Guiding Principle: Citizens have a fundamental right to be meaningfully involved in important government decisions that affect their lives.

Shared Assumptions:

Public Trust has been lost and once lost extraordinary measures are required to restore it; simple adherence to minimums of required public involvement process will be inadequate.

Participation in this meeting by all parties indicates a willingness and capacity to take extraordinary measures to restore the public trust through mutual cooperation affirmative actions and open communications.

Primary Strategic Categories:

1. Effective Methods for Improving Meaningful Public Participation
2. Employing Proven Methods for Ensuring Scientific Integrity of Process and Final Products

Operational Norms:

At all times we conduct our selves in a manner of mutual respect, dignity and cooperation focusing on strategic principles while avoiding other personal agendas.

Because our shared goal is to restore the public trust by improving the EIS *process*, we focus our attention on those strategic process elements thus avoiding discussion of project specific issues. (Possible exceptions allow for citing anecdotes but only to better define certain procedural issues not to debate the issue.)

(End of document)

The ad hoc citizen group and representatives of DOC, MPCA, and MDNR attempted several trust-building strategies in several subject areas focusing on EIS preparation procedures while avoiding project specific issues. Discussions focused on the traditional government accountability strategies of accessibility, transparency and civil engagement and accountability.

Published studies which were shared with the participants consistently show that participatory governance and social accountability require two key elements:

1. Capacity to monitor government and service providers (access and transparency); and

2. An communication system which acts as an effective 'feedback mechanism' between government and its citizens (usually facilitated dialogue).

(Sources: *International Association for Public Participation* and *"Accountability and Responsiveness of the State and Society* –GSDRC Applied Knowledge Services at:

http://www.gsdrc.org/topic-guides/voice-empowerment-and-accountability/supplements/accountability-and-responsiveness-of-the-state-and-society).

Specifically, citizens presented DOC with a number of mechanisms by which the EIS process would be more transparent, where citizens have access to the information and be afforded feedback mechanisms to the EIS drafting process. These proposals are listed below with the ultimate outcome for each proposal shown in parenthesis:

1. Reasonable level of access to meetings and communications with DEIS writing team including MDNR and MPCA staff contributions; (rejected)

2. Early disclosure of selected data and methodologies to be used for EIS; (promised but not delivered until DEIS released);

3. Disclosure of names and qualifications of EIS writing team; (Some team names but no qualifications ever revealed);

4. List of potential conflicts of interest and other bias sources; (promised but not delivered then nor are they in the DEIS)

5. Mechanisms to be used for neutralizing conflicts of interest and bias in the DEIS; (None provided then, none are shown in DEIS);

6. Feedback mechanisms on effectiveness of Tribal Consultations; (not acknowledged or provided);

7. Provisions for internal and external peer review; (No external peer review, public access to MPCA and MDNR staff input to EIS eliminated by Interagency MOU);

8. Effective feedback mechanisms including special EIS Issue forums; (None were accomplished);

9. Access to meetings and other documentation about State/Federal Coordination; (Not granted nor were subjects or minutes of joint meetings or correspondence disclosed.);

10. Appointment of a Citizen's Advocate, a person who would be proactive disseminating information rather than simple reactive to requests; (Reactive Ombudsman appointed in place of usual Citizen Advisor; not a pro-active position);

11. Professionally facilitated civic engagement format be used for all public information and comment meetings rather than using Open House or traditional timed-testimony formats. (Open houses were held instead, followed by a limited amount of "moderated" timed-speaker sessions);

12. Column to be added spreadsheet in Final Scoping Document listing all comments tracking final disposition of substantive comments through to the DEIS; (Citizens were aware this spreadsheet had been prepared but it was not made available to them);

13. A more detailed explanation of how the issue of “need” would be defined for purposes of the DEIS (Citizens were informed that “need” would not be addressed in the EIS.)

There were only two positive outcomes from this trust-building effort and each was of minimal benefit for achieving the stated goals:

1. DOC’s designation of an “ombudsman” position (a substitute title for Public Advisor a position routinely established for CON projects) to respond to citizen EIS inquiries and.

2. DOC’s creation of a new Line 3 DEIS website for posting preparation status and a Q & A page.

None of the other requested EIS citizen monitoring, communications, documentation or other integrity assuring mechanisms listed above was meaningfully granted by DOC.

The trust-building process was formally abandoned early in 2017 on the finding that little more was likely to be gained by further efforts.

Conclusions on Public Trust-Building Effort

In spite of respectful, persistent and sincere efforts on the part of this ad hoc citizen committee public for meaningful civic engagement in the EIS process public trust remains a major unresolved issue and in some ways the trust issue may have actually worsened.

DOC’s unwillingness to employ civic engagement methods especially facilitated dialogue for public meetings on the DEIS is especially noteworthy in light of Governor Dayton’s Executive Order for all agencies employ civic engagement strategies in state government. The 2016 State Civic Engagement Plan lays out specific goals for more effective engagement of citizens in state government and the Environmental Quality Board’s expressed intent and special meeting to promote civic engagement in environmental review activities.

Many of the disputes that may arise again now at the eleventh hour in the EIS process might have been avoided or significantly ameliorated with meaningful civic engagement.

The revised DEIS must contain a detailed explanation as to why the citizen’s good-faith trust-building and civic engagement requests could not or would not be honored in any meaningful way. This response in the DFEIS should take special note of the Governor’s

and EQB Civic Engagement Policies and also make reference to the applicable provisions of Minnesota Civic Engagement Plan in responding to this comment.

Environmental review is a participatory exercise designed to serve the greater public good. The public cannot meaningfully participate when they are treated like mere spectators cheering from the sidelines hoping someone will notice.

Why is this so important now? Because citizens, the RGU (PUC and DOC), the applicant, state legislators, Governor Dayton and possibly the courts may now find themselves in a predicament that might well have been avoided had legitimate civic engagement been embraced by DOC staff. The applicant has a right to expect due process, the citizens have a right to participate meaningfully, legislators have rights to expect the executive branch to function efficiently and the Governor can expect state agencies to perform with integrity and dispatch, all this to serve the greater public interest.

However, good efficient decision-making serving the broader public interest seldom flow from poor quality or incomplete environmental review.

After the lawsuit citizens entered into the EIS process with far greater hopes for open and meaningful dialogue with key agency officials but, as is outlined above, nearly all these efforts failed rather badly.

Now, it remains to be seen whether the process can be salvaged through revisions the DFEIS or in subsequent proceedings before the PUC. If not, each of the entities listed above may feel obliged to mete out various remedies within their power to do so.

This author remains gravely concerned for the potential outcome of those remedies.

Independent Internal and External Peer Review

Citizen's early and persistent requests for outside, independent peer review of the data sets selected and analytical methods applied during the DEIS preparation were steadfastly denied by the DOC raising suspicions that scientific integrity issues were going remain problem areas for the DEIS. Now, review by this author and other qualified professional scientists have found significant reason to challenge the fundamental scientific methodologies in the DEIS. The basis for some of these challenges is outlined in the list of assumptions above and others will be developed further in comments below.

Basically, citizens were concerned that the very same flawed assessment methods used in DOC's analysis of the Sandpiper project would also be used in the Line 3 DEIS. These methods were highly and credibly criticized as flawed and unreliable by professional scientists and experienced practitioners of environmental review.

For example, in open comment letters to the DOC other more effective methods of analysis and more appropriate data sets or sources were offered by the MDNR and MPCA were rejected or ignored by the DOC for the Sandpiper CON review. No more than

passing acknowledgement these agency recommended data and methods appear in the Line 3 EIS and few if any were actually used.

Many of citizen's doubts about the scientific integrity of the Sandpiper high level CON review were born out by these MDNR and MPCA letters of comment. But, the public no longer has access to MPCA or MDNR staff inputs or critiques of the Line 3 DEIS as it did for Sandpiper. A memorandum of understanding (MOU) entered into by these state agencies with DOC has thrown a cloak of secrecy on the one remaining transparent peer review mechanism that had been so useful to citizens.

It was citizen's understanding of the PUC's recommendation for more direct involvement in the DEIS by these agencies through negotiations of a memorandum of understanding (MOU) was to ensure adequate funding would be available for the extra staff time needed for more substantial contributions by sister these agencies. We do not believe the PUC's is aware that the MOU has effectively subsumed the MPCA and MDNR technical staff making their role in the Line 3 DEIS secret and out of sight and unavailable to the public.

To restore the previous level of transparency and instill some semblance of internal peer review to the DEIS, the complete record of interagency correspondence, documents exchanged and records of team meetings be disclosed as an appendix to the DFEIS in an organized fashion to subject if possible. If that is not possible, a chronological ordering of these documents would be helpful to the reviewers.

Where significant differences of opinion and professional judgment developed between DOC and the MPCA or MDNR the outcome of any such differences should be described and the rationale for the final choice of outcome provided in the appropriate sections of the DFEIS.

External Peer Review

The need and urgency for independent and objective peer review of this document is clear and growing. Many of the questionable assumptions listed earlier in these comments and raised by other professional commenters could be effectively and efficiently vetted by external peer review. DOC's rejection of early requests to incorporate outside peer review on the basis they lack the time and resources rang hollow then and ring even more hollow now. Citizens are concerned that substantive comments criticizing the scientific integrity of the DEIS, even from the most credible and objectives sources will once-again be ignored or preemptively rejected as irrelevant. Other critical comments may be simply dismissed as partisan opposition to the project.

Reputable scientists acknowledge blindness to their own bias and how, while still imperfect, they utilize multiple and sophisticated techniques to combat it. Peer review, replication and double blind studies are common place in scientific work. The example of seeking an independent second opinion for serious medical diagnosis is helpful to point out that even the public understands the value of peer review and uses it frequently in important health crises.

The DOC is challenged here to expose their data selection and analytical methods in this DIES to independent peer review and make improvements recommended by such review. Citizen review and comment does not substitute for expert, outside peer review as all public comments can be seen as partisan.

No scientist can hope to have their work published in reputable journals without proper vetting of their work by their peers. DOC's steadfast and persistent resistance to outside objective review of their work draws only more and more reason for citizens to be skeptical and demand accountability. As outlined in comments above and throughout the process, the potential long-term consequences of possibly approving project are far too grave for DOC to get it wrong in this EIS.

Coordination with Federal and Neighboring States

MEPA Statute and Rule require RGU's to "the fullest extent possible" coordinate environmental review with other entities that have jurisdiction, sources of information and expertise for reviewing a project. Yet it is apparent in the DEIS that this coordination, if it occurred, was not transparent or effective. The fact that certain Federal and state protected species data and reviews were not complete and therefore not considered in this DEIS is a matter of concern. The fact that vital information on the environmental setting for alternative routes in North Dakota, Iowa and Illinois or extensions of existing pipeline routes beyond Superior Wisconsin was not available for use in this DEIS is regrettable and was avoidable. Valid route comparisons cannot be made with out consistent and uniform sets of data.

An interagency and interstate data gathering and assessment team should have been assembled at the outset of this effort to assure adequate quantity and data of uniform quality were used.

Federal permits requiring federal environmental assessments will be required for any pipeline projects that move into permitting phase following this review. Because DOC did not perform this interagency coordination the applicant and the public will have to maintain their vigilance protecting their interests through the subsequent federal review process. This could have been avoided had there been joint state/federal review.

The revisions to the DEIS should expand on the nature and substance of federal or other neighboring state involvement in the EIS process. Summaries of their interactions with the EIS team should be inserted in a new section of the DFEIS and all correspondence with these other government agencies and documents they submitted should be appended to the DFIES for public review.

Methodology and Metric for Independent Risk Assessment

Human, property and natural resource risks are quite difficult to assess and quantify. Recently some insurance industry tools have become available that can shed light on and even quantify environmental risks in terms the general pubic can readily grasp, risk

insurance. The attached April 8, 2015 report entitled: *"An Insurance and Risk Management Report On the Proposed Enbridge Pumping Station*", was prepared for The Dane County Wisconsin Zoning and Land Regulation Committee by: David J. Dybdahl Jr, CPCU American Risk Management Resources Network LLC. In this report Mr. Dybdahl describes the distinct difference between the types of insurance needed to cover the unique nature of incidents that are associated with crude oil pipelines.

The DEIS should be revised to include consideration of these concerns insofar as pertains to the Line 3 here in Minnesota. Hazard Insurance Premium rate differentials present a useful metric for assessing risks and comparing relative risks of various energy types and various pipeline routes.

This risk assessment by insurance standards performed by independent experts would illuminate discussions of long-term financial assurances necessary to protect public interests should any of the facilities become stranded assets of bankrupt owners. These socio-economic aspects of pipelines would seem very appropriate for exploration in revisions to the DEIS. If other assessment tools are more suitable for hazard insurance and financial assurance proposes in the DIES they should be identified and the appropriate assessments made.

Need for Fossil Fuel

The DEIS author's attempt to absolve the EIS process of any responsibility for assessing this project relationship to society's long range need fossil fuels or alternative types of energy is baffling. There would seem no better instrument that this EIS in which to expose these relationships between the public's need to break its addiction to fossil fuel and seriously examine alternative types of energy sources.

The DEIS should clearly outline all the pertinent international, national and state policies and goals for reducing the climate change impacts of greenhouse gases and fossil fuels. Broad policy statements from Minnesota's Next Generation Policy Act; Minnesota's 2025 Energy Action Plan, the Global Climate Leadership Memorandum of Understanding (MOU) recently signed by Governor Dayton and the Governor's formal commitment to goals of the Paris Climate Accord and any other polices should be quoted in this section. The contribution to greenhouse gases from the operation of Line 3 and from the consumption of the fossil fuel it will deliver to the world are quantified in the DEIS.

A clear analysis of whether and how this project or alternative to this project would conform to or conflict with the goals of these important and relevant policies is extremely important in the DEIS. What's more, it is clearly a requirement of this EIS under MEPA statute and rule.

This project and other pipelines proposed to ship tar sands to domestic or foreign market should be cumulatively assessed in context with projections for society's need to reduce it consumption of fossil fuel and green house gas emissions.

A simple graphic should be added to the DEIS showing the declining slope of Minnesota, the United States and World fossil fuel use necessary to conform to projected green house gas reductions needed over the next fifty years (the life of this project). The graphic should reflect the green house gas reduction goals in each of these climate change policies mentioned above. Superimposed on that graph should be the projected growth in crude oil shipping capacities represented by each of these new pipelines.

The attached Joint Report by the International Energy Agencies and International Renewable Energy Agency entitled; **"***PERSPECTIVES FOR THE ENERGY TRANSITION - Investment Needs for a Low-Carbon Energy System*", (electronic PDF copy attached) includes similar graphics projecting fossil fuel use declines necessary to meet greenhouse gas reduction goals. These reports go on to describe the potential economic drag on regional and world economies represented by existing and planned future fossil fuel infrastructure when these facilities become stranded assets.

The Joint IEA/IRENA report one of the first widely accepted and highly reputable reports published that attempt to capture and put into perspective the levels of world investments needed (and investments not needed) if society has any hope of reaching the safe, clean energy future Minnesota and the planet needs.

With simple graphic representations like this Minnesota's potential role for becoming a major fossil fuel addiction enabler to the world by approving this pipeline project would come into stark relief. And the real question before the PUC would be entirely reframed to ask: "How is it in the public interest of the citizens of Minnesota to enable the increasing global glut of one of the dirtiest fossil fuels on the planet by approving this project?" Since individual states have primary (and singular) up or down approval authority over pipeline projects such as this, the Public Utilities Commission must have the project assessed from this global perspective in the final EIS.

Minnesotans and the PUC, acting on their behalf cannot be lulled or deceived into thinking that this "single pipeline" project doesn't matter in the national or global level. All the little fossil fuel parts matter. Like rivets falling out of an airplane wing, one rivet at time. No single rivet's can be said to be responsible for the ultimate and dire outcome but collectively and cumulatively every individual rivet mattered. This pipeline matters.

This DEIS would be extremely inadequate to achieving its assigned task under MEPA if this important issue were to be arbitrarily swept aside by the discretionary proclamation of the DOC. This is one of the major issues that both NEPA and MEPA require RGU's to take that long hard look at and project the significant implications for each of the alternative courses of action facing the PUC. This fossil fuel and climate change topic should be included for thorough review under cumulative potential effects.

<u>Overall Scale of Review and Analysis</u>

Large linear infrastructure projects crossing international and multi-state boundaries require a high level landscape or macro perspective to grasp some of the most important

potential impacts and determine their significance. These overarching ecosystem level impacts can be lost if a close-up micro examination of individual impacts is used without a method for aggregating these individual effects.

In Minnesota alone the proposed project and its alternative routes cross at three major global ecosystems (larger ecosystems called biomes). We sometime are aware of differences between prairie, hardwood forests and boreal forests. But, we may not be so aware of the various subdivisions of these major ecosystems and how they may differ from one another. Because we live here and see them all the time we are often not aware of their distinctive features, how their boundaries merge into one another and how different groups or communities of organisms perform what ecologist call trophic level functions transforming energy in and out and transporting water and nutrients through endless looping cycles.

Ecologists study how each organism or group of organisms each play vital roles in larger communities and ecosystem level functions and how these groups rely on one another to each perform their functions well. They know from study and experience that if any one group is stressed by forces from within or forces from with, all the vital functions will be influenced to some degree whether measurable to human beings or not. The science of ecosystem stressor identification and significance assessment is a complex and complicated one, a field of science requiring a high level of expertise. But ecologists have appropriate tools for aggregating impacts on landscape, natural community or ecosystem levels

A thorough reading of the methods used in the DEIS reveal little or no ecosystem level assessment was performed. This is just one of many reasons why it is important to disclose the professional qualifications of the EIS contributors. If there were no qualified professional ecologists on the team or if their work was not included in the DEIS that fact could explain the absence of this level of analysis.

It is a fundamental principle of impact assessment to use a systematic approach appropriate to the scale of the project under review and the scale of impacts involved.

Ecosystem stressor impact magnitude must be described in terms of intensity, duration, frequency (if repetitive) area impacted and the sensitivity and resilience of the target resource to this specific stressor. This characteristic of the stressor can be aggregated and ranked relative to all other stressors assessed and assigned numerical impact ranking scores. Then the natural community or ecosystem potentially under stress is ranked in terms of is value (rarity or use importance for example) when compared to other communities or ecosystems under examination. Significance of various impacts on the several target resources becomes the product of stressor magnitude when multiplied by relative target resource value. (Note to reader: Please excuse my attempt to write this outline strictly by recall in a matter of minutes, there are plenty of reference manuals for doing this to fact check my representation of the principles here.). 2432-2

2432-2
Cont'd

In the DEIS, beginning with the description of the natural setting for the project and its alternatives in Chapter 5, natural resources are segregated into convenient subsections (boxes) such as of wetlands, surface waters, groundwater, fish and wildlife etc. and placed into a matrix of repetitive and serial qualitative impact descriptions. For the most part the mechanisms of impact quite well sourced and seem fairly accurate. But because impacts are not grouped into levels of significance (area, intensity, duration, and sensitivity etc. multiplied by ranked resource value) the aggregate impacts are lost in organizational maize in the DEIA that confounds even the most experience reviewer.

The summary charts for each resource impact attempt to collate all these qualitative impacts but minor, moderate and high impacts all get lost. No credible attempt is made in the DEIS to integrate these individual resource impacts into ecosystem levels of significance.

The matrix developed in the DIES would be far more useful as a first level screening for impacts needing further analysis, and inventory of impacts rather than as a final assessment. In fact that is what the DEIS actually appears to be. It is as though time ran out and the team had to publish the first level inventory of impacts and resources without full assessments being completed. That is understandable and an unfortunate consequence of political compression of time frames for performing adequate reviews of large scale projects such as this one, but I digress.

The impacts from this first level screening inventory should then be combined with others in a new list of potentially significant impacts to be carried forward into the second level. At this second level these impacts on specific ecological areas or sub areas (targets) could than be converted to a scale (based on intensity, duration, and target sensitivity) which could be multiplied by a value ranking of the ecological target area potentially impacted. Cumulative scores derived by this method would begin to aggregate into significance of impact system level impact rather than accumulate as “acres” of impact as is attempted in the DEIS. Additional details of this method are developed later in thes comments.

Habitat (or Ecosystem) Fragmentation

With large scale linear projects such as pipelines, power lines, roads and highways one of the primary stressors needing assessment is fragmentation not only of local habits but for entire ecosystems. The DEIS mentions the mechanism of fragmentation in discussing certain wildlife populations but, as was described above, without assessing this stressor on the larger landscape the significance of this large scale fragmentation is lost.

A discussion of the broader ecosystem level impacts from fragmentation can easily be found in literature readily available on the topic and can used for amending into the DEIS. A newer and important aspect of fragmentation should also be included in this discussion, and that is the phenomenon of ecosystem migration, the slow collective movement (In Minnesota this is a retreat north and east) for entire ecosystems in response to climate change. Linear facilities can present continuous migration barriers to certain species

communities that are unable to bridge the gap. This applies to many species of animals but is of growing importance to the plant communities that support animal communities. Animals may be physically able to cross the barrier but unless the plant community that forms their habitat can migrate with them, the animal migration is also blocked.

The natural settings for the pipeline alterative routes differ in dramatic ways that make contrasting and comparing fragmentation impact assessment of the project at ecosystem level impact more straight forward than for some other impacts. From various data sets the RUG can assemble and construct an inventory of fragmenting facilities in the region of interest. The density of individual facilities can be expressed in a common ratio or indicator indeces (used by the U. S. Forest Service and the Fish and Wildlife Service among others) in terms of miles of linear fragmentation per square mile. There are more steps needed here but the concept is quite clear. This type of analysis should be completed and included in the DFIES and applied as a GIS data layer (see description of GIS later in these comments).

Degree of road saturation is additional component in fragmentation assessment can be used to compare alternative routes as an indicator of accessibilty to leak or spill sites by response crews. The MPCA developed a route comparison criterion based on access to streams below pipeline crossing points which works for spills that may reach streams. This criterion could augmented to gauge ease of access to any spill site along a route whether the spill to place on land or near water. Road density indices could be developed as a data layer also for use in GIS Route Optimization described elsewhere in these comments.

Other Broad Landscape Characteristics Useful for Route Optimization Assessment

In comment letters from the MDNR (and possibly the MPCA) as well as from the general public pointed out contrasts between landscape settings for the APR and SA-04 that are rather obvious but these criteria were not developed or used in the DEIS. The Red River Basin is flat, with tight clay soils and has its natural ecosystems highly altered by agriculture and development (cities, roads, etc.). There are few natural native plant or animal communities remaining that have not been highly altered. The Upper Mississippi Basin is quite the opposite, characterized by greater slopes, courser soils, and a much less altered native plant and animal community and large ecosystems are largely still relatively intact. 2432-3

SA-04 would cross a large number of the rivers encountered in their lower reaches where they are highly impacted by hydraulic destabilization due to agricultural and urban drainage and replacement of natural vegetative cover with cultivated crops. Using either MDNR or MPCA biotic integrity scores to contrast upper and lower reaches of these streams reveal how impacted and altered these aquatic ecosystems are. A relevant biotic integrity pattern emerges that would be useful when comparing routes. (see more on that below). It would be reasonable to infer that this pattern holds true for tributary streams both sides of the Red River and for streams in Southwest and even Southern Minnesota as well even were biotic assessments may not have been performed.

2432-3
Cont'd

Highly altered crop and urban lands support a relatively simple ecosystem with few available niches and many niches occupied by cultivated species, urban plantings or invasive species. Such an ecosystem is highly manipulated and natural succession is in a constant state of reset which encourages and sustains ecosystems at the pioneer species level. Trophic level hierarchies are rather simple with a narrow list of primary producers consisting of uniform monocultures of cropped species. Large expanses of cultivated lands are occasionally interrupted by corridor forest or prairie like ecosystems along rivers, streams and roads. Other important landscape characteristics like these should be developed further into GIS data layers for analysis the revised DEIS.

The relatively unaltered landscape that characterizes the APR is quite diverse especially forest and wetland types found there and the wide diversity of associated plant and animal communities that exist there. The DEIS describes the existence and locations of many of these natural landscapes but the method of analysis used on the mirco level fails to describe the significance of large, intact ecosystems such as these and the potential impacts a pipeline can have on these ecosystems by disrupting the normal flow of energy and the cycling of water and nutrients throughout the system including ecosystem migration describe above.

Major streams in this part of the state, most of which are tributaries to the Mississippi River, including the Mississippi River itself have their headwaters in these fully functioning forest and wetland ecosystems. High biotic integrity scores extend much farther down stream than is documented for Red River Basin and Western Minnesota streams. The route of the proposed pipeline crosses many of these streams in these zones of high biotic integrity that indicate fully functioning aquatic ecosystems are in place.

Many more useful indicators of the full extent of the ecosystem settings for each of the two routes can be developed by ecology experts than can be listed and described here. But this needs to be done for the DEIS revisions to fairly and accurately assess impacts that exhibit at this higher ecosystem level that objectively characterize the significant difference between the alternative routes.

Consequences of DOC's Improper Framing of the Project Must be Corrected

My preference for using the term "large energy project" rather than "a crude oil transportation project" is reflective my strong objection to the biased framing used throughout this process and the serious consequences of this framing. When framed as a pipeline project ostensibly "needed" by the proposer to transport crude oil, it automatically and powerfully shifts the public and regulatory focus and debate into a question of how to perform the transportation of crude oil function rather than posing the question: "Is this project providing the type and quantities of energy *society* needs. Thus, the prejudicial framing of the project as a crude oil transportation project has a powerful slight of hand effect that leaps over the initial decision points and prematurely limits the array of available alternatives considered. The fact is that by improper framing of the

project purpose the debate has leapfrogged over the first and primary choices of “energy type” that should be considered first.

This subtle but powerful re-framing of the project purpose alternative ways for transporting crude oil from point “A” to point “B” rather than choices of alternative form of “energy” is crippling to the EIS process. However, framing the project as a large energy facility project has a distinct functional advantage for administrative and environmental review because this framing would allow for proper application of the PUC’s CON criteria for determining “need”.

Fossil fuel projects like pipelines facilitate and create certain consumer incentives for fossil fuel “type” of energy as opposed to other “alternative” types of energy sources.

Renewal and expansion of a major component of the world’s fossil fuel transportation infrastructure constitutes a major long-term commitment of resources (public, private and natural resources) to a fossil fuel “type” of energy that has been proven not to serve society’s need for cleaner energy. Influence of this long term infrastructure commitment must be included in the DEIS revisions

This demonstrates the awesome and coercive power of “framing” and how improper framing has detracting from the larger public policy questions that are actually at issue. Framing can create powerful bias of perspective that not only shapes public’s and elected officials opinion but can influence and even bias the many discretionary options regulatory agencies have to make on energy projects.

My comments below will show that the public, our political leaders, and government decision-makers, and most importantly the Public Utilities Commission in particular are precariously close to being misled as a result of this improper framing of this project. In the DEIS and throughout the remaining certificate of “need” deliberations on this project. State agencies, especially RGU’s (or agents of RGU’s) have moral as well as policy and regulatory obligations to properly frame the project as an energy project rather than a crude oil transportation project.

Environmental review documents are the perfect instrument to perform this “re-framing” exercise but this reframing must be done by the, authors of the EIS (the RGU). To do this requires fierce and objective independence on the part of the Responsible Government Unit (RGU) charged with preparing the EIS. The RGU must not be encumbered by past practice or so heavily influenced by other energy projects like power lines and other pipelines that they do not see new opportunities and bold alternatives where none were thought to exist before.

As EQB staff point out in their guidelines on this topic project proposers and supporters will (for obvious reasons) try to frame the project and its purpose in self-serving terms to intentionally eliminate further consideration of alternatives. That’s understandable and even predictable. And it is self-serving on the part of the proposer.

But these attempts at improper framing must be successfully overcome for environmental review to be successful. In fact, the improper framing of the purpose for proposed projects is so common and yet so pivotal to proper environmental review that the EQB staff devotes several paragraphs to this topic in it guidance to RGU's.

> One of the main purposes of an EIS is to examine potential impacts of project alternatives. Unlike with an EAW, the impacts analyzed are not limited to environmental impacts. The statute calls for the EIS to evaluate "*economic*, employment and sociological impacts" as well. The RGU should observe the following when selecting an appropriate range of alternatives.
>
> ***Alternatives may be excluded only if they meet one (or more) of the following criteria:***
>
> *a) underlying need for or purpose of the project is not met;*
>
> *b) significant environmental benefit over the proposed project is not provided; or*
>
> *c) another alternative is likely to be similar in environmental benefits but will have less socioeconomic impact.*

The EQB staff expands on the proper application of the exclusion criteria in their guidance to RGU's by stating:

> "In applying exclusion criteria, the RGU must not be overly restrictive in defining the project's purpose and need. Occasionally, an RGU will claim desirable but nonessential elements as part of the project's purpose or need, thus eliminating alternatives that should be included. In many cases, these are cost-related factors and, while important, they cannot overrule environmental considerations."
>
> "The RGU must take a hard look at the basis for prior decisions to make sure that environmentally superior alternatives were not eliminated without sufficient justification based on the rule's three criteria. Eliminated alternatives should be discussed in the EIS and noted in the scoping decision document. Prior decisions to eliminate options may need to be revisited in the EIS if insufficient consideration was given to environmental impacts." -

(Excerpts above from Guide to Minnesota Environmental Review Rules May 2010 by EQB)

Framing the purpose or need for a product or service is a subtle but powerful and persuasive art of marketing that plays on the human psyche. Because the importance of this framing exercise can not be over emphasized and out of concern EIS writers will not take it seriously I offer the following classic example:

> *Henry Ford Quote: "Any customer can have a car painted any color that he wants so long as it is black."*

Henry Ford issued this statement in 1909. He did so, not because he thought people shouldn't have a choice of color. He had something else in mind. He made this decision at the same time he decided that his plant would only produce one model of car, the "Model T."

*Ford's reason for making these decisions was profound. Ford wanted to greatly expand car ownership. To do so, he needed to make the car as affordable and reliable as possible. He did this by **limiting variation** in the production of cars. Lots of people objected, particularly his sales force who wanted lots of models with lots of variety. They predicted he would go out of business. In the end, he achieved his objective.*

Henry Ford's motivation for limiting his Model "T" color "variations" (aka alternatives) was obvious but by stating it in a humorous quip, he was able to mask his ulterior motive which was his desire for a profoundly greater profit margin. He successfully "framed" the narrowing of public choices in self-serving terms that benefitted him financially. In this case, the general public also enjoyed the collateral benefit of Ford making private transportation more affordable.

This analogy is especially useful in the current "energy project" situation because it also illuminates and differentiates between a corporate "purpose and need" and the public's "purpose and need".

The analogy helps understand how framing the need for the Line 3 project in alternative limiting terms like Henry Ford did it comes out sounding like this: *"Society can have any type of energy you want so long as its fossil fuel".*

It also helps identify how private industry needs can be balanced against public interest needs in mutually beneficial terms that are measurable but this balancing must be explicitly described for purposes environmental review.

The public comments in the record for both the Sandpiper and the Line 3 dockets time and time again ask the Commerce Department to make a clear re-statement of the purpose and need for this energy project within the plain meaning of MEPA, EQB rules.

Early Notices of Public meetings and hearings published by the DOC repeatedly used the applicant's framing of the purpose and need for this project in self-serving language supplied by the applicant. When confronted at one public meeting in Park Rapids held for

scoping both the Sandpiper and Line 3 EIS, DOC staff conceded that the language used was inappropriate, they promptly rescinded it, revised it and reprinted the Public Meeting information documents on the spot. Public statements at subsequent public EIS scoping meetings (as transcripts of these meetings would show) included a specific announcement that the purpose and need statement that were being used were "drafts", subject to change in the DEIS scoping document based on public input. No such clear statement of public "purpose and need" has appeared in subsequent DOC or other scoping documents or in this DEIS.

Now, in Chapter 1 of the DEIS the Department of Commerce proposes to make the "need" determination for this energy project on the basis of "market forces" as judged by the validity of "shipper demand" for crude oil. In so doing a public agency places itself (and the potentially the PUC) in Henry Ford's "corporate need" frame of mind primarily considering the corporate profit motives and whatever competitive advantages the company might gain by routing a pipeline in one location or another between predetermined Points A and Point B (*any color so long as its black*).

Once again, and the purpose and need statement reverts to the old paradigm using only self-serving and private profit motivated language. Paraphrasing (and reframing with italicizing) for clarification the project purpose statement from page 2-4 in Chapter 2 of the DEIS. This (think **black** Model "T") particular project's purpose is:

1. To replace *their* failing Line 3
2. To save *them* money (repair and inspections)
3. To meet a demand for *their* type of energy *they* claim *exceeds* their current capacity;
4. To reduce *their* "curtailment" of service to *their* shippers and improve *their* operational flexibility;
5. To improve the energy efficiency of *their* pipeline system.

The applicant's purpose of the project is clearly described here but it is very significant that the word "need" does not appear here. The definition and determination of "need" are precluded from further discussion in the DEIS with this misleading declaration in Section 1.4.1.1; under the heading *Need for This Project*): "The EIS Does Not **Determine** the Need for **THIS** project." (bold emphasis added)

This is quite true but misleading. An EIS it is supposed to describe evidence whether a project will provide a needed socio-economic benefit that would somehow balance the actual environmental harm (or threat of future harm) predicted to occur if the project moves forward. As EQB staff explains the MEPA process:

> "One of the main purposes of an EIS is to examine potential impacts of project alternatives. Unlike with an EAW, the impacts analyzed are not limited to environmental impacts. The statute calls for the EIS to evaluate "***economic***, employment and sociological impacts" as well.

In the case of the current pipeline project if there is a beneficial economic and sociological need for the "type" of energy this pipeline facility will deliver it is the RGU's responsibility to clearly identify and quantify that need in the DEIS.

And this must be done within the arena of a MEPA compliant EIS rather than transfer and delay that debate for some other arena such as the contested case hearing on the CON as is apparently proposed in the DEIS. It is this reviewer's contention that the EIS process can be used to fully inform that other CON arena of deliberation. As will be shown below, each of the Certificate of Need Criteria are genuine fodder for and fall well within the scope of the EIS process.

The CON arena cannot be allowed, as DOC suggests, to claim special preemptive jurisdiction or to assemble a different body of facts or in any other way constrain the definition of "purpose and need" that would interfere the functions of the MEPA process by hobbling the EIS.

There are certain aspects of shipper demand for the type of energy (tar sands crude oil) that are declared proprietary information (trade secret) and the strict procedural confines of a contested case hearing may be where this information is properly taken into account. But this cloak of legal protection cannot be thrown over the entire body of socio-economic need information necessary for weighing these benefits against potential public harm in the DEIS. Societies obviously need energy and the project proposes to deliver fossil fuel type energy. And that energy need and the optional ways society can get that or any other type of energy can be fully developed in the DEIS without disclosing any of this trade-secret information.

When closely examined the PUC's Certificate of Need Criteria are quite consistent with the type and scope of information required under MEPA. And the PUC criteria for pipeline routing pipelines are not inconsistent with MEPA requirements.

<u>Compatibility of PUC Certificate of Need Criteria with MEPA</u>

A review of PUC Certificate of Need Criteria for large energy projects cast in the frame of society's purpose needs rather than the applicant's purpose and need stated in the DEIS is shown below with the author's comments in blue font enclosed in parenthesis.

PUC Need Criteria: 7853.0130 CRITERIA.

A certificate of need shall be granted to the applicant if it is determined that:

A. the probable result of denial would adversely affect the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states, considering: (The term energy is used here, not crude oil. The applicant's customers need not, in fact should not, be defined as "shippers" because these shippers are simply partners in transporting or processing (refining) crude

oil before it reaches its ultimate consumer. To lump other shippers or refiners into the same category as energy users consumers in Minnesota and neighboring states is a stretch because it lumps transporters and processors with end user of th energy. The ultimate customers are the consumers of the energy, not other transporters or processors who actually don't actually use the energy, they represent the middle men. It is also important to note that energy demands of foreign countries are not included in this need criterion. If "customer demand" is defined by shipper demand foreign based consumers are hidden but actually counted as legitimate customers along with Minnesota and neighboring states.)

(1) the accuracy of the applicant's forecast of demand for the type of energy that would be supplied by the proposed facility; (Again, crude oil shipper demand is not ultimate consumer energy demand and again masks export with domestic demand. This criterion requires the applicant to make a showing that this "type" of energy (fossil fuel) will continue to be in demand as energy type of choice for domestic customers. And this future demand should be extended through the expected life of the proposed project - 50 yrs or more.)

(2) the effects of the applicant's existing or expected conservation programs and state and federal conservation programs; (Enbridge claims to have reduced its energy needs for operating its pipeline system through conservation measures and has made significant shifts securing renewable types of energy for powering its pumping stations thus reducing the applicant's demand for fossil fuel type energy. State and Federal energy conservation programs have also significantly reduced fossil fuel type energy demands in Minnesota and in neighboring states. This is an important indicator of a decreasing need for fossil fuels regionally that is driven by the applicant and its customer's conservation programs and shifts to alternative energy types.)

(3) the effects of the applicant's promotional practices that may have given rise to the increase in the energy demand, particularly promotional practices that have occurred since 1974; (Big oil companies have lobbied Congress for years and finally succeeded in lifting the ban on exporting crude oil from the U.S. thus increasing the world market opportunities, especially for heavy tar sands type crude. Domestic refineries are tooled for lighter crude so it seems will likely serve emerging foreign rather than domestic energy demand where fossil fuels may still be the energy type of choice.

(4) the ability of current facilities and planned facilities not requiring certificates of need, and to which the applicant has access, to meet the future demand; and (The applicant has access to renewable energy sources within the state and in other states, specifically North Dakota wind energy that do not require certificates of need. Other renewable sources not requiring certificates of need could be assessed for capacity to meet future demand with energy types that conform to global, national and state energy policy.)

(5) the effect of the proposed facility, or a suitable modification of it, in making efficient use of resources; (The effect of a pipeline project for making efficient use of resources can be addressed in the EIS.)

B. a more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record by parties or persons other than the applicant, considering: (The existing record is replete with proposals for alternative renewable energy facilities and the DEIS could be used to develop these in detail meeting all the subsections below)

(1) the appropriateness of the size, the type, and the timing of the proposed facility compared to those of reasonable alternatives;

(2) the cost of the proposed facility and the cost of energy to be supplied by the proposed facility compared to the costs of reasonable alternatives and the cost of energy that would be supplied by reasonable alternatives;

(3) the effect of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives; and (The EIS process is particularly well suited for gauging impacts and comparing fossil fuel type energy to renewable types)

(4) the expected reliability of the proposed facility compared to the expected reliability of reasonable alternatives; (The EIS can be used to compare reliability of renewables to fossil fuel type energy)

C. the consequences to society of granting the certificate of need are more favorable than the consequences of denying the certificate, considering:

(1) the relationship of the proposed facility, or a suitable modification of it, to overall state energy needs; (State policy declares that its

citizens must reduce its energy needs and switch to renewables reducing use of fossil fuel types. The relationship of the proposed fossil fuel energy project to the state's needs as determined by policy can be developed in the EIS.

(2) the effect of the proposed facility, or a suitable modification of it, upon the natural and socioeconomic environments compared to the effect of not building the facility; (This no-action alternative is also required under MEPA rules and the effects of not expanding Line 3 or abandoning it altogether can be assessed in the EIS)

(3) the effects of the proposed facility or a suitable modification of it, in inducing future development; and (Since the market for fossil fuel energy is not "developing" domestically but foreign markets apparently are developing the EIS could be used to assess the global effects this project would have for inducing greater dependencies of these foreign consumers on fossil fuels.)

(4) socially beneficial uses of the output of the proposed facility, or a suitable modification of it, including its uses to protect or enhance environmental quality; and (This is one of the most important criteria that defines project need in social terms, rather than in the applicant's terms. The "output" of the proposed project is crude oil and using this crude oil has few if any environmental protecting or enhancing prospects. The ones that do exist could be placed in direct contrast to the negative environmental effects from using fossil fuels in the EIS.)

D. it has not been demonstrated on the record that the design, construction, or operation of the proposed facility will fail to comply with those relevant policies, rules, and regulations of other state and federal agencies and local governments. (Since the EIS must not only include ultimate use of the fossil fuel the pipeline transports the amount of green house gases release must be compared to rates established in all other state policies including MEPA, the Next Generation Energy Act, the State Climate Action Plan, and the Governor's commitments to the Paris Climate Accord, the Global Climate Leadership Memorandum (The Under 2 MOU) and all other applicable policy statements on climate change.

If DOC found any other conflict between MEPA requirements and PUC Need Criteria for addressing energy need from the societal perspective there is clear guidance from the Legislature in MEPA on what statutes and rules are to take precedence and guide state

agencies caught in this kind of dilemma. The language here is clear and needs no further explanation.

Minnesota Statutes 116D.03 - ACTION BY STATE AGENCIES.

Subdivision 1. **Requirement.** The legislature authorizes and directs that, to the fullest extent practicable the policies, rules and public laws of the state shall be interpreted and administered in accordance with the policies set forth in sections 116D.01 to 116D.06.

Subd. 2. **Duties.** All departments and agencies of the state government shall:

(1) on a continuous basis, seek to strengthen relationships between state, regional, local and federal-state environmental planning, development and management programs;

(2) utilize a systematic, interdisciplinary approach that will insure the integrated use of the natural and social sciences and the environmental arts in planning and in decision making which may have an impact on the environment; as an aid in accomplishing this purpose there shall be established advisory councils or other forums for consultation with persons in appropriate fields of specialization so as to ensure that the latest and most authoritative findings will be considered in administrative and regulatory decision making as quickly and as amply as possible;

(3) identify and develop methods and procedures that will ensure that environmental amenities and values, whether quantified or not, will be given at least equal consideration in decision making along with economic and technical considerations;

4) study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources;

(5) recognize the worldwide and long range character of environmental problems and, where consistent with the policy of the state, lend appropriate support to initiatives, resolutions, and programs designed to maximize interstate, national and international cooperation in anticipating and preventing a decline in the quality of the world environment;

(6) make available to the federal government, counties, municipalities, institutions and individuals, in-formation useful in restoring, maintaining, and enhancing the quality of the environment, and in meeting the policies of the state as set forth in Laws 1973, chapter 412;

(7) initiate the gathering and utilization of ecological information in the planning and development of resource oriented projects; and

Conclusion: It seems clear that project need can and must be addressed in revisions of the DEIS in light of the CON criteria interpretations above. For convenience of the reviewer these revisions can be organized the fashion of CON need criteria as shown above. There may little or no need to consider shipper contracts or shipper demand when developing the need information sufficient to satisfy both MEPA and PUC CON criterion. Shipper market forces are simply the wrong indicator of societies needs for alternative types of energy and therefore are irrelevant to the current review.

<u>Extraneous Alternatives Unnecessarily Complicate the DEIS</u>

EQB guidance on selection of alternatives also warns RGU's against a common practice of intentional complicating an EIS by including exhaustive consideration of illogical and extraneous alternatives. This admonition is vitally important for a numbers of reasons. First an EIS is intended to consider only "reasonable and prudent" alternatives. And, secondly an EIS, in order to be "adequate" for its intended purpose, must be concise and tease out only issues that are really significant. To do otherwise is to weaken and underming some of the most useful purposes of an EIS, to aid and inform government decisions intended to serve the greater public interest. EQB guidance states:

> "At the same time, the RGU should not examine extraneous alternatives just to make an EIS more complicated."

Earlier in these comments it was observed that reviewing rail and truck transport of crude oils certainly made the DEIS more (and unnecessarily complicated. The request to remove these impractical and unreasonable alternatives from the DFIES is renewed here.

BIASED AND PREJUDIAL FRAMING OF ALTERNATIVE ROUTE SA-04

Throughout the DEIS the assessment of route SA-04 is significantly skewed in consistently negative ways. This methodology is inconsistent in unjustifiable ways and produces biased results.

Comparing Apples to Apples

SA-04 is routed to deliver crude oil over the entire distance of approximately 1,550 miles from Neche, N.D. directly to Joliette, Illinois the ultimate destination hub for the bulk the oil proposed for shipping in Line 3. This alternative is said to suffer greater aggregation of potential adverse impacts simply by virtue of it being significantly longer than the Applicant's preferred route (APR).

APR would also deliver crude oil some 1,550 miles also to Joliet Illinois from Neche, N.D. via Superior Wisconsin but does so by connecting with existing pipelines at Superior that extend to Joliet. Construction impacts of the Superior to Joliet leg of the APR have already taken place along the Superior to Joliet leg of this route the operations, maintenance and potential for leaks and spill impacts continue along this leg and are similar to that SA-04. Some temporary impacts will have dissipated over time as construction scars on the landscape heal. But even those impacts are still considered potential cumulative impacts of the APR must be counted in present terms when comparing alternatives, these are past impacts added to present, and reasonably foreseeable future impacts.

But some of the more significant ecosystem level impacts are ongoing along the Superior to Joliet leg such as the habitat fragmentation and ecosystem migration barrier effects. Invasive species distribution, predator prey relationship changes still exist and increased public access to remote natural areas along the pipeline corridor are also on-going.

For consistency purposes the impacts of two routes for delivering the same amount of oil from the same point of origin to the same destination must be assessed equally.

Another potentially cumulative impact must also be added to the APR side of the ledger and that is the prospect for having to expand pipeline capacity between Superior Wisconsin and Joliet to accommodate increased volume demands caused by expansion of Line 3 or other pipelines to Superior.

And, the recent order by the Michigan Attorney General possibly shutting down Enbridge's line 5 out of Superior to Canadian refineries may also result in crude oil being diverted to the Superior to Joliet leg of the extended APR. This may qualify as a reasonably foreseeable future impact and therefore potentially cumulative.

Unequal Opportunity for Center Line Refinements

APR's centerline has undergone several years of refinement weaving side to side avoiding higher value resources and areas of greater sensitivity which undoubtedly lowered the aggregate resource impact score by the method used in the DEIS. No such refinement of SA-04 was conducted in spite of alterative routes selection rules (Administrative Rule 7852.1900 for pipeline route selection) that require refinement to ensure all potential impacts proposed routes are minimized before final route selection is made. Several of the major impacts identified along SA-04 including areas of kasrt topography may well have been greatly reduced if not eliminated altogether had the route been adjusted (refined). 2432-4

7852.1900 CRITERIA FOR PIPELINE ROUTE SELECTION.

> *Subp. 2.Standard. In determining the route of a proposed pipeline, the commission shall consider the characteristics, the potential impacts, and methods to minimize or mitigate the potential impacts of all proposed routes so that it may select a route that minimizes human and environmental impact.*

The DEIS seems to assert that the route selection rule cited above does not apply until after the CON process is complete insofar SA-O4 is considered unless it emerges as the preferred alternative after the CON phase. In this case the DEIS acknowledge that the route SA-04 could be "refined" to circumvent sensitive resources but would be refined only if Enbridge applies for permitting of that route.

Under MEPA that sequential application of routing criteria rule after CON screening is not allowed. If a superior alternative route exists, the RGU must evaluate that alternative at its finest level of refinement. It cannot be presented at a disadvantaged level of refinement for one level of review and than at higher level of refinement later.

In this first ever attempt MEPA and PUC criterion must be allowed to reasonably merge constructively and fairly in the spirit and letter of MEPA when identifying the best available alternatives that would allow for the least adverse impacts.

Mitigation Prematurely Factored into APR Reducing Wetland Impacts

2432-5

In Chapter 5 wetland impact methodologies on p. 5-110 the DEIS explains that APR incorporates measures to avoid or minimize wetland impacts but that these impact mitigations were not similarly applied to SA-04. This is a highly unusual method because mitigation is normally not factored into original impact assessment. If it is, it is done equally to avoid biasing of results.

There also appears to be a discrepancy in construction and/or operation zone width for the two routes for wetland crossings that is not clearly explained or justified. Unequal application of wetland impact mitigation measures or unequal foot print width for wetland impact would seem to skews the results in favor of APR.

If this unequal application of impact mitigation or wetland foot print width was intended to counter balance lack of estimated wetland impacts for additional temporary work areas, roads pipe yards etc thought to be needed along SA-4 it is not made clear. The FDIES should further explain if, why and to what overall extent this counter-balancing was done and compare totals derived with and without these adjustments.

If these adjustment cannot be justified the wetland impacts should be recalculated.

Conclusion: The overall analysis of resource and oil release impacts for APR and SA-04 should be redone comparing these routes on more equal unbiased basis in the DFEIS.

Pipeline Route Optimization Methodologies

In preparing the comments below, an internet search of alternative routing methods was conducted. No examples of the unique method used in the DIES were found. However, many examples of Optimum Route Selection by GIS, the very method suggested in previous public comments were found in the search and all of the sites that included method evaluations affirm its superior characteristics, its practical utility for intial routing and for route comparisons. Most articles also describe just how universal this method has become in the industry. A comparison of the standard GIS Route Optimization for Pipeline methods found in this search to the unconventional method used in the DEIS is presented in the following two sections of thes comments.

The DEIS does not name the special method used but for convenience of discussion here, I have assigned a descriptive title to it: “Impact Assessment by Proximity to Selected Resources of Unranked Value” or IAPSRUV.

GIS Route Optimization

With the advent of computerized data base mapping (geographic information systems or GIS), invented by Dr. George Tomlinson for the Canadian government in the 1960's land use decision making was revolutionized. With this tool, that could be used to store and analyze information, private and public land use and natural resource management decision making entered the computer age. Its very first application in Canada was to help determine *"land use capability"* of a specific geographic study area to withstand certain potential environmental and cultural stresses introduced by a proposed development or project. This is the very same question that is at the very heart of pipeline routing issue in the DEIS.

And in this very first application of this method assessment of "land use capability" depended on certain social value judgments, a factor for rating relative resource value considerations was added.

See the history, the evolution and innovative applications GIS and geospatial analysis can be found on Wikipedia at:

https://en.m.wikipedia.org/wiki/Geographic_information_system

And one very important point needs emphasis here for reasons discussed in further detail in the section that follows comparing this conventional method to the DOC's selected IAPSRUV method.

That point is that from its very first application in the 1960's its inventor found it necessary to add a rating classification system to various soils, agriculture, recreation, wildlife, waterfowl, forestry and land use parameters to assist decision-makers in making ranked value based judgment comparisons between various types of land use options and alternative locations. Below is an excerpt from the GIS history page on the Wiki site above describing the very first application of the technology to government land use problems:

> **"The year 1960 saw the development of the world's first true operational GIS in Ottawa, Ontario, Canada by the federal Department of Forestry and Rural Development. Developed by Dr. Roger Tomlinson, it was called the Canada Geographic Information System (CGIS) and was used to store, analyze, and manipulate data collected for the Canada Land Inventory – an effort to determine the land capability for rural Canada by mapping information about soils, agriculture, recreation, wildlife, waterfowl, forestry and land use at a scale of 1:50,000. A rating classification factor was also added to permit analysis." (Highlighting added to emphasis earliest application of ranking)**

So powerful, so flexible and convenient is this technology that this GIS optimization system is now considered the gold standard of available technology for land use decision-making.

Furthermore, the method produces maps that are readily understandable by the lay public because the maps synthesize and compress so much useful but highly technical information into a map picture that nearly everyone can relate to. The numerical social values assigned to various land, water, cultural or other resources are easily displayed and available for critical reviewers to see and adjust if the general consensus so

dictates. Adjustment to value weighting criteria can be applied to see if lowest cost routes by one set of criteria differ significantly if other weights are applied.

In the literature this is often called the “Least Cost Path” method, a term that will be used again in another cited paper to explain the essential steps in the process.

This consensus building attribute of this methodology is one of its strongest selling points for helping to resolve contentious land use issues. So much so that it is now the “go-to” technology for routing pipelines of all kinds and for other linear utility facilities like highways, internet cable service and even something as simple as a walking path or sidewalk.

A simple Google or Yahoo search on “methods for routing pipelines” yields a large number of theoretical and practical applications of the technology and critiques of it use and misuse as well. Here are the first three pages (in screen-shots) of my search results that serve as evidence of the methods wide acceptance in the industry.

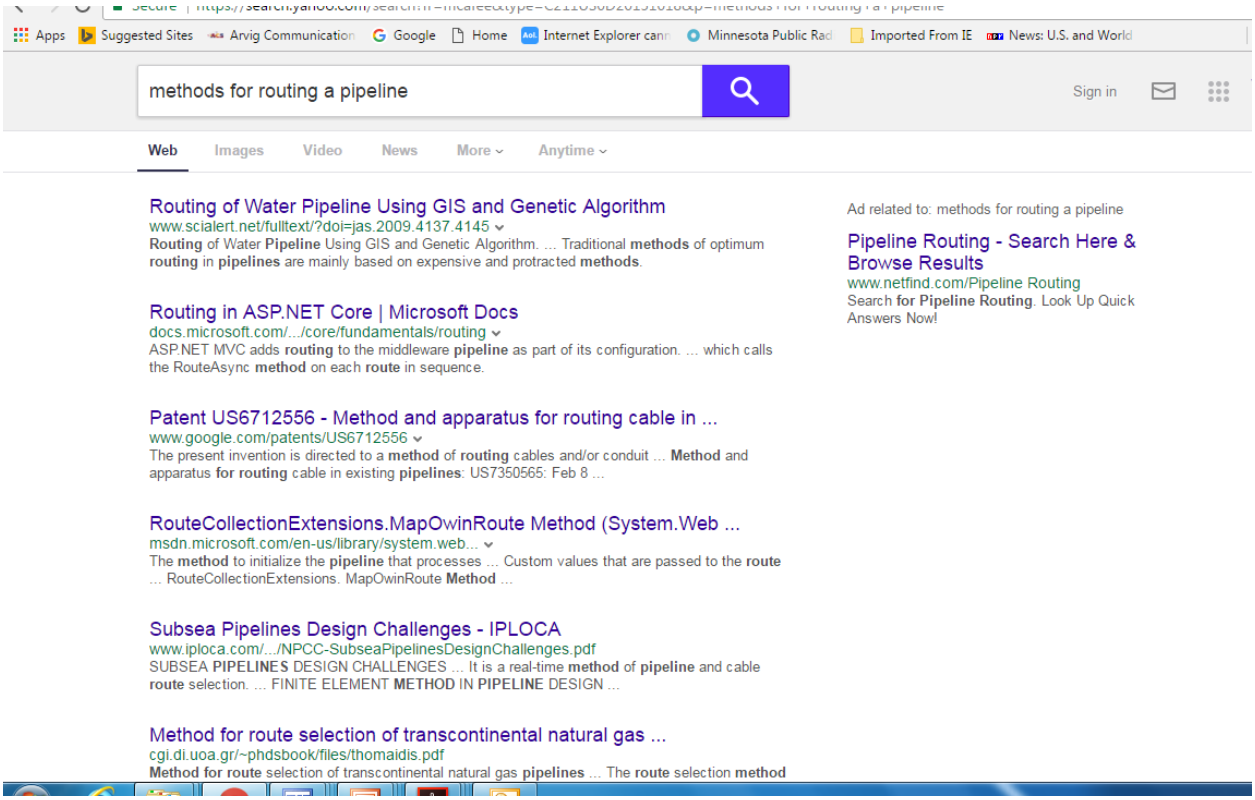

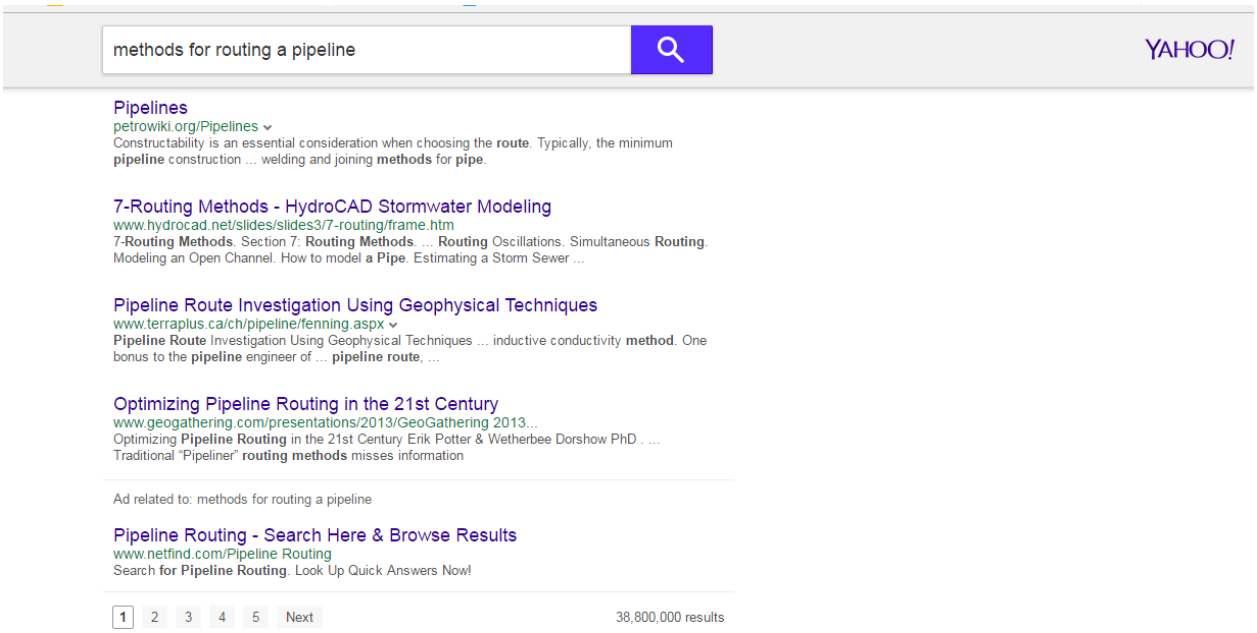

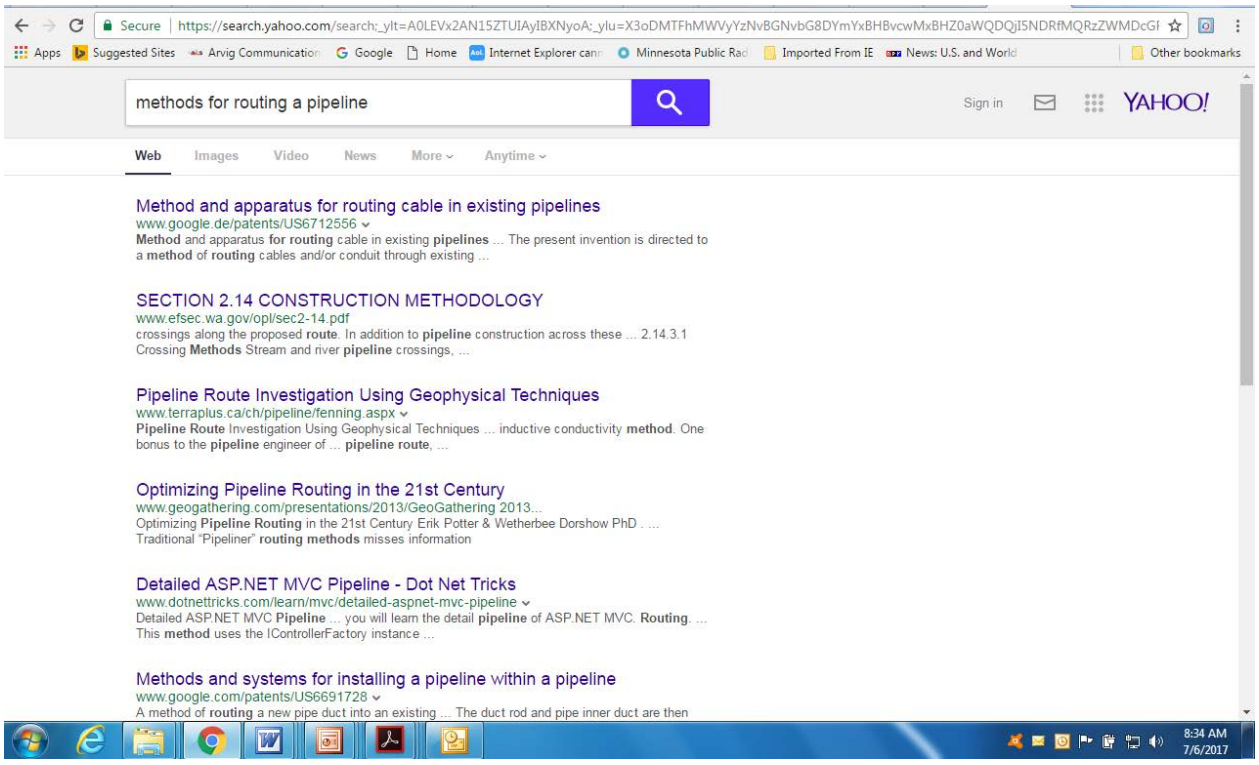

One of these search results sites: "*Optimizing Pipeline Routing in the 21st Century*" at:

http://www.geogathering.com/presentations/2013/GeoGathering%202013%20Pipeline%20Routing_M3Midstream.pdf

has a graphic that is virtually self-explanatory insofar as how useful, understandable and flexible this technology can be for analyzing broad landscape level impact from large projects and their alternative locations.

Cost Surface Creation

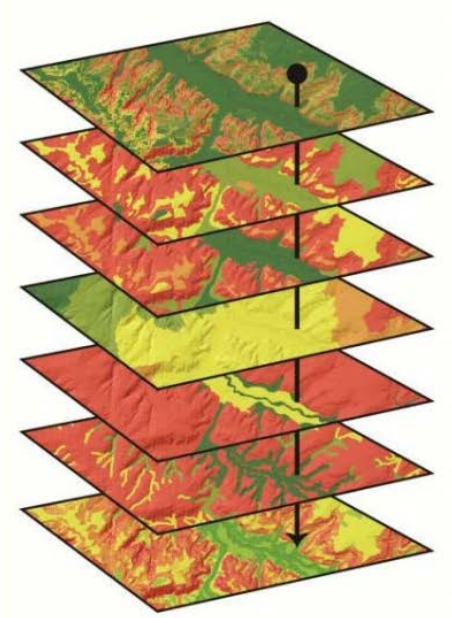

Rank	Criteria	Weight
1	Side Slope Avoidance	10%
2	Slope	10%
3	RTE and Cultural Resources	8%
4	Surficial Geology	8%
5	Protected Areas	8%
6	Leases (No Data)	0%
7	Proximity to Proposed Wells (No Data)	0%
8	Existing ROW Proximity	7%
9	Existing Pipeline Corridor (no Data)	0%
10	Wetlands	5%
11	Parcel Size	4%
12	Dwelling Density	5%
13	Transportation	2%
14; Partially Restricted	Landowner Issue Avoidance	2%
15	Hydrology Avoidance	6%
16; Restricted	Rooftop Presence	9%
17; Partially Restricted	Mining	8%
Total		100%
*Restricted cells will not be traversed by SmartFootprint Route		

SmartFootprint cost surface rasters have pixel values ranging from zero to five, where a score of zero indicates the absence of constraints on pipeline project implementation success and a score of 5 indicates the presence of a very significant constraint on pipeline project implementation success.

One of the most essential consensus building components common to all standard GIS route optimization methods is the application addition of “pixel values” to determine the “significance” of any individual and collective impacts based on the relative value of the resource potentially impacted. And finding and using an analytical method for determining “significance” of impacts of a pipeline project is the essential element of any environmental impact statement

Assignment of a *“rating classification factor to permit analysis”* was recognized as one of the most important attribute of Dr. George Tomlinson’s original application of this technique over 50 years ago.

It is readily apparent that assignment of different level of importance (significance) to various human or natural resource assets along a pipeline or any other linear facility can be quite contentious. And unless consensus of the interested parties is achieved, the outcome of any analysis will likely be even more contentious as it as become with pipelines here in Minnesota and across the entire nation.

But this need not be so because this problem has also had a long-standing and consensus-building solution that is well documented in the literature. And, to be consensus building the method must be participatory for stakeholders.

In his paper entitled: "*Optimal Path Analysis and Corridor Routing: Infusing Stakeholder Perspective in Calibration and Weighting of Model Criteria*" available on line at:

http://www.innovativegis.com/basis/present/geotec04/gis04_routing.htm

Joseph K. Berry, University of Denver's Geography Department states:

> *"The use of the Least Cost Path (LCP) procedure for identifying an optimal route based on user-defined criteria has been used extensively in GIS applications for siting linear features and corridors. Whether applications involve movement of elk herds, herds of shoppers, or locating highways, pipelines or electric transmission lines, the procedure is fundamentally the same— 1) develop a discrete cost surface that indicates the relative preference for routing at every location in a project area, 2) generate an accumulated cost surface characterizing the optimal connectivity from a starting location (point, line or area) to all other locations based on the intervening relative preferences, and 3) identify the path of least resistance (steepest downhill path) from a desired end location along the accumulated surface."*
>
> *"The ability to infuse different perspectives into the routing process is critical in gaining stakeholder involvement and identifying siting sensitivity. It acts at the front end of the routing process to explicitly identify routing corridors that contain constructible routes reflecting different perspectives that guide siting engineer deliberations. Also, the explicit nature of the methodology tends to de-mystify the routing process by clearly identifying the criteria and how it is evaluated."*

And Mr. Berry goes on to explain:

> *"In addition, the participatory process 1) encourages interaction among various perspectives, 2) provides a clear and structured procedure for comparing decision elements, 3) involves quantitative summary of group interaction and dialog, 4) identifies the degree of group consensus for each decision element, 5) documents the range of interpretations, values and considerations surrounding decision criteria, and 6) generates consistent, objective and defendable parameterization of GIS models."*

The paper goes on to describes the use of modified Delphi and Analytical Hierarchical Process (AHP) techniques for quantitatively establishing calibration ratings and data layer weights similar to that displayed in the graphic above from the Optimizing Pipeline Routing in the 21st Century" on-line article.

Critique of Method Selected by RGU for Route Analysis

For this discussion the method applied in the DEIS to compare alternative routes has been titled: “Impact Assessment by Proximity to Selected Resources of Unranked Value” or IAPSRUV. The internet search for “methods for routing a pipeline” described above revealed no methods similar to the IAPSRUC method as having been published in industry literature, scientific journals or as having applied to the routing or comparative routing analysis for a specific pipeline project. It appears to be an entirely new creation developed for this DEIS.

To be fair, there are circumstances under which available more conventional methods such as Route Optimization or Least Cost Path methods are inappropriate for a given task and these conventional methods are either modified as needed to fit the new more challenging situation or an entirely new method must be developed as was done for the DEIS.

However, there is a professional obligation on the part of the authors of any technical report such as this DEIS to explain why a non-conventional method was thought necessary for this particular application. The source of this non-conventional method should be provided and why this alternate method was thought better than the available conventional methods. This explanation is normally presented the methodology section of a report but no such acknowledgment or explanation is presented in the DIES.

The selected IAPSRUV method used in the DEIS suffers from several important weaknesses of assumption which will be assessed later in these comments. But the primary failing of the methods used throughout Chapter 5 and elsewhere in the DEIS is that it actually fails to “analyze” significance of impacts. As stated above, determination of “significance” is the primary function of environmental review.

Without serving this essential function of describing for decision-makers the significance of impacts from this projects and comparing these impacts to those of project alternatives the DEIS fails to perform its intended purpose under MEPA and therefore DEIS condemns itself by admitting its own inadequacy.

The principle authors (DOC staff) of the DEIS not only refuse to use appropriate analytical tools in the DEIS for determining relative impact significance the authors even refuse to acknowledge these tool actually exist.

It should be noted here that this author and others recommended these or very similar methods during public comment periods for Sandpiper (nearly three years ago) and again more recently for the Line 3 process (copies of those comments are attached to and made part of these comments PDF Willis Mattison Comments to PUC, prepared for FOH).

Then the authors actually declare their abdication and turn that responsibility back to the PUC, the very entity that delegated the burden of responsibility to the DOC in the first place.

In section 1.4.2.2 Resource Prioritization DEIS provides this astonishing explanation for "only presenting facts" in the EIS but then excuses itself from actually analyzing the significance of these facts through the normal process of "prioritizing the value of one resource over another".

> *1.4.2.2 Resource Prioritization*
> *The EIS Establishes Facts and Does Not Prioritize Some Resources over Others*
>
> *"The EIS assesses potential impacts on a wide range of resources and provides quantitative and qualitative descriptions of the nature, magnitude, and duration of these impacts. In addition, the EIS compares the nature, magnitude, and duration of impacts on a given resource across various alternatives. While the presentation of impact data in the EIS highlights tradeoffs across the differential alternatives so that decision-makers and other stakeholders can work from a common set of facts, the EIS does not prioritize one resource over another, nor does it prescribe how impacts on different types of resources should be weighted. The analysis in the EIS may show, for example, that some alternatives would result in greater impacts on human settlement and fewer impacts on natural resources, or more impacts on pristine waters and fewer impacts on waters that already are stressed by pollution. Decisions about whether and how to prioritize avoiding populated areas over undisturbed natural areas, and whether to concentrate infrastructure in already disturbed watersheds or spread the burden to other areas are part of the Commission's charge and are not prescribed by the EIS."(Highlights added for emphasis)*

In the DEIS, DOC acknowledges that the Pubic Utilities Commission has the "charge" of deciding "whether or how to prioritize" resource values, but seems to imply that this prioritization will be done later by the Public Utilities Commissioners themselves and possibly by some other unnamed method. The DOC by preparing the DEIS is acting as the technical agent for the PUC. A finding of significance impact is a technical process, using proven methods with input of value weighting judgments from stakeholders in a transparent and iterative way. Prioritizing Resources is just such a value judgment, a necessary stop on the road to finding significance.

In making this statement in the DEIS the Department of Commerce staff seems to display a fundamental misunderstanding of the MEPA process and for the gravity of the Appeals Court Order calling for preparing this EIS in the first place. The EIS was ordered on the Certificate of Need portion of pipeline review.

It also appears to reflect a willing abdication of the responsibility the PUC Commissioners delegated to DOC with for performing the heavy analytical lifting required in any environmental review process. Both the MEPA statute and EQB

Administrative Rules explain the very purpose of an EIS is to perform the necessary analysis in order to find the significance of impacts, and should such methods no be readily available to for explore (and find) appropriated methods for doing so. In MEPA (Minn Statues 116D) we find:

> **116D.03 ACTION BY STATE AGENCIES.**
>
> Subd. 2. **Duties.** All departments and agencies of the state government shall:
>
> (3) identify and develop methods and procedures that will ensure that environmental amenities and values, whether quantified or not, will be given at least equal consideration in decision making along with economic and technical considerations;

And in EQB Administrative Rules we find:

> **4410.2000 PROJECTS REQUIRING AN EIS.**
> Subpart 1. **Purpose of EIS.** The purpose of an EIS is to provide information for governmental units, the proposer of the project, and other persons to evaluate proposed projects which have the potential for **significant** environmental effects, to consider alternatives to the proposed projects, and to explore methods for reducing adverse environmental effects.

If the Commerce Department staff felt unqualified or unauthorized to perform the analysis required for environmental review they had many reasonable courses of action available to resolve this problem in a timely and efficient manner including:

1. Hiring of a consultant that had the expertise and experience in applying the necessary analytical methods;

2. Requesting PUC Commissioners perform the appropriately modified Delphi and Analytical Hierarchical Process (AHP) described in the Berry and Tomlinson papers cited above;

3. Establishing "*advisory councils or other forums for consultation with persons in appropriate fields of specialization so as to ensure that the latest and most authoritative findings will be considered"* as provided for in the MEPA cite above;

4. Proposing a set of resource weighting criteria based on the modified Delphi and Analytical Hierarchical Process (AHP) as part of the Draft Scoping process for the DEIS for public comment. This approach would have had obvious public and applicant consensus advantages.

5. Advising the PUC and the public of they lacked the necessary skills or resources to prepare the EIS and requested to be excused from this environmental review burden;

2432-6

Conclusion: The sections of the EIS that fail to assign the weighting values to potentially impacted resources and derive objective levels of significance for these impacts must be completely revised to include this essential step. Without this final determination of significance the analysis is incomplete and comparisons of alternative routes produced by this incomplete assessment process cannot be used in the DFEIS.

The pipeline route optimization method described earlier in these comments is highly recommended for completing the route comparisons. The modified Delphi and Analytical Hierarchical Process (AHP) techniques for quantitatively establishing calibration ratings and data layer weights should be utilized to determine significant differences in cumulative scores for each alternative route.

Crude Oil Leaks and Spills

2432-7

Chapter 10 on this subject needs a thorough revision to include realistic worst case leak and spill scenarios in high value resource areas. The spill scenarios provided are far too limited by model boundaries such as downstream travel in 24 hrs. The lack of crude oil release volumes which were withheld by the applicant as trade secret prevent critical peer review of spill scenarios presented including revelation of what other limiting or biasing assumptions were used in the model runs.

Several worst case sites along SA-04 should be modeled for use in comparing routes assessed in the DEIS.

And the leak/rupture scenarios should be more fully developed for the DFIES in terms of:

1. Exposure – the physical mechanisms by which aquatic organisms would become exposed to the spilled product;

2. Transport and fate – the distance down stream the toxic components would travel down stream before dissipating, degrading or diluting below applicable water quality standards for each or most important chemical constituent of the product spilled;

3. Exposure - Response – A full analysis of the product for all toxic components, list of state and federal water quality standards for these chemicals and laboratory methods used to simulate water column concentrations of each chemical of concern;

4. A review of analogous spills into likely receiving water types including isolated lakes, lake chains, high or low quality streams, wetlands of different types should be used to ground truth model results;

5. Risk Characterization –comparing exposure levels to toxicological benchmark levels, duration of risks, actual spill histories including

2432-7 Cont'd

potential for remediation and recovery of spilled product, site specific factors and overall weight of evidence; and

6. The Range of Uncertainties in each of these pieces of evidence.

A long term pin-hole leak scenario should be modeled for a major unconfined shallow sand aquifer such the Straight River aquifer in Hubbard County. This aquifer has been studied extensively so data needed to perform the model run should be readily available. This site may appear similar to the USGS Pinewood Study site but it represents a similar aquifer under influence of high rate pumping wells that would significantly increase groundwater velocities and flow directions. The number of municipal drinking water supply wells, industrial water supply wells and irrigation water supply wells is high and the aquifer is vertically complex with inter aquifer leakage common.

The significance of a major volume leak or spill on this site could then be compared to the most sensitive high value aquifer found along SA-04.

Need to Edit Entire DEIS Text to Eliminate Biased Language

2432-8

Need to cleanse the DEIS of self-serving, project justifying language. There are many instances where statements are qualified or nullified causing them to lose objectivity. Many instances where potential for significant impacts are described the DEIS has sentences or whole paragraphs describing the applicant's intentions to minimize or mitigate a potential impact. Minimizing word like "only" or "seldom" or "minimal" should be used appropriately. .

In several locations in the DEIS the applicant promises to seek advice from certain other sources, usually some government agency, on how some impacts could or should be mitigated. Fracking fluid additives, for example are to be none other than MPCA approved additives with no indication whether MPCA makes or has authority for such approval or that they would grant approval for any of the available fluid additives.

The most common example is where paragraphs describing mitigation measures are misplaced in the discussion of impacts on a particular resource, especially if the section was describing an impact from the proposed project or APR. All such descriptions of mitigation should be moved to the section reserved for that information.

An independent copy editor may have to be retained to scour and cleanse the entire document for this biased language.

Need for Extended Review of a Revised DEIS Before a Draft Final is Prepared

Due to the extensive revisions that will be necessary to correct the major errors, deficiencies and omissions in the current DEIS and the that the summary will have to be

changed dramatically as a result it is suggested that the DOC approach the PUC requesting a major time extension during which a revised DRAFT EIS can once again be put out for public review and comment rather than a draft FINAL EIS. Such major revisions can not be made in the short time period normally allowed. The PUC has already been put on notice that extended time will be needed just to review and respond the comments on this version. The pubic will need a similar extended time in which to review major revisions that result.

End of Comments-

APPENDIX A
Qualifications of the Author

Willis Mattison
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Education and Special Qualifications for performing this review:
I earned a Biology and Broad Science Degree from Bemidji State University with a minor in Chemistry and Master's of Science Degree with course emphasis and Master's Thesis in Ecology from St. Mary's University in Winona.

Career Experience
I have spent professional career time in the four major regions of greater Minnesota beginning with a career performing as a research biochemist at the Mayo Clinic, teaching Biology, Chemistry and Environmental Science in Tracy Minnesota, and as MPCA Regional Director for a twenty three county area in Southeast Minnesota while stationed in Rochester and for 28 counties in Northwestern Minnesota as MPCA Regional Director in Detroit Lakes and for seven counties in Northeastern Minnesota on a temporary mobility assignment as Regional Director Duluth.

Experience Performing and Reviewing Environmental Assessments and Impact Statements
I am a presently retired but remain a practicing natural scientist (ecologist) an experienced environmental review practitioner of many years. A significant portion of my 28 year career with the MPCA involved reviewing and preparing official agency critiques and comments on dozens of environmental assessments and impact statements at the local, state and federal levels.

I have continued to practice the applied ecological sciences in both my private life and public life staying current in the advancing methodologies used to address the ever increasing complexities and challenges involved in environmental issues and natural resource management. I own and have managed several hundred acres of forested land in Minnesota's Central Hardwood Forest in eastern Becker County. My private forest

management goals, developed in accordance with provisions of the Minnesota Sustainable Forest Incentive Act and approved by the Minnesota Department of Natural Resources Forestry Division include protecting, restoring and enhancing the native plant communities on my private property. I also have a U.S. Department of Agriculture; Natural Resources Conservation Service approved Conservation Stewardship Plan with approved practices for forest wildlife habitat restoration and enhancement with a special focus on pollinator habitat. I have taken Department of Natural Resources courses for identifying and classifying Native Plant Communities and for applying these criteria toward achieving forest management goals. I've also taken University of Minnesota Extension classes in identification and control measures for terrestrial invasive species. Each of these subject areas, Native Plant Communities and Terrestrial Invasive Species are pertinent in this DEIS.

I was a principle author on several highly controversial environmental review documents such as for the U.S. Army Corp of Engineers Upper Mississippi Navigation Channel Maintenance (dredging) program, a major Mississippi River Lock and Dam Environmental Impact Study, several major hog feedlots in S.E. Minnesota, Red River Flood Control Impoundments in NW Minnesota and citizen petitioned EAW's for proposed potato irrigation projects in north central Minnesota.

I received U.S. Environmental Protection Agency and Corps of Engineer's in-service training on various complex aspects of the National Environmental Policy Act including proper methods for assessing cumulative environmental impacts and for effective civic engagement & group dynamics and facilitation for environmental review. I have provided testimony at public and legislative hearings on environmental issues in general and on specific projects with emphasis on various aspects of environmental impact. In my official capacity with the MPCA and in my private life since retirement I have served as an expert witness with regard to scientific data and analytical methods for environmental review.

My career assignments in four major outstate regions of Minnesota provided me with extensive opportunities to familiarize myself with the ecological conditions and assess the overall impacts of human development in the major biomes of the state and employ a number of ecological assessment criteria for both terrestrial and aquatic ecosystems. The specific ecosystem assessment methodologies I've worked with having direct applicable to the current Line 3 Pipeline include Index of Biotic Integrity (IBI for fish and macroinvertebrate and Native Plant Community Assessment.

I currently serve on a special EQB Advisory Panel assigned the task of modernizing the state's environmental review program including the making recommendations for improving the administrative rules for environmental review and the guidance documents designed to assist Responsible Government Units in preparing MEPA compliant assessments and impact statements.

<u>Experience With Accidental Pollutant Release Incidents (ruptures, leaks and spills)</u>
During my career with the MPCA I served as first responder and performed as incident remediation oversight manager role for several large pipeline leaks and ruptures including

the 1979 Enbridge (then Lakehead) pipeline rupture near Pinewood just east of Bemidji. A leak site used as a reference in this DEIS. I am familiar with various studies done on the Pinewood spill site by the U.S. Geological Survey and other researchers examining the ultimate fate and transport of the large amount of unrecovered crude oil that remains on and in the groundwater beneath this site.

I also served as MPCA project manager for dozens of leaking underground storage tank (LUST) sites. I was first responder and lead project manager for system failure analysis following a large anhydrous ammonia storage tank release in Barnesville Minnesota that caused significant human health effects and damage to natural resources in the vicinity.

Familiarity and Experience with Optimal Site Analysis & Linear Path Analysis for Corridor Routing

As a volunteer with the North Country National Scenic Trail Association I have practical experience applying the preferred U. S. Park Service's Optimum Location Review (OLR) methodology for routing of this hiking trail, a linear facility routing procedure employing methods similar to those least-cost corridor routing software programs applicable to pipelines. I also have lead project manager experience applying the principles of "Limits of Acceptable Change" (LAC) to the Round Lake Wild Forest Recreation Area proposed for Becker County. LAC a well established planning system adopted by the U.S. Forest Service and designed to limit human impacts on natural resource protection areas to sustainable levels with the goal of protecting the essential ecological functions and aesthetic values of the planning area.

2432

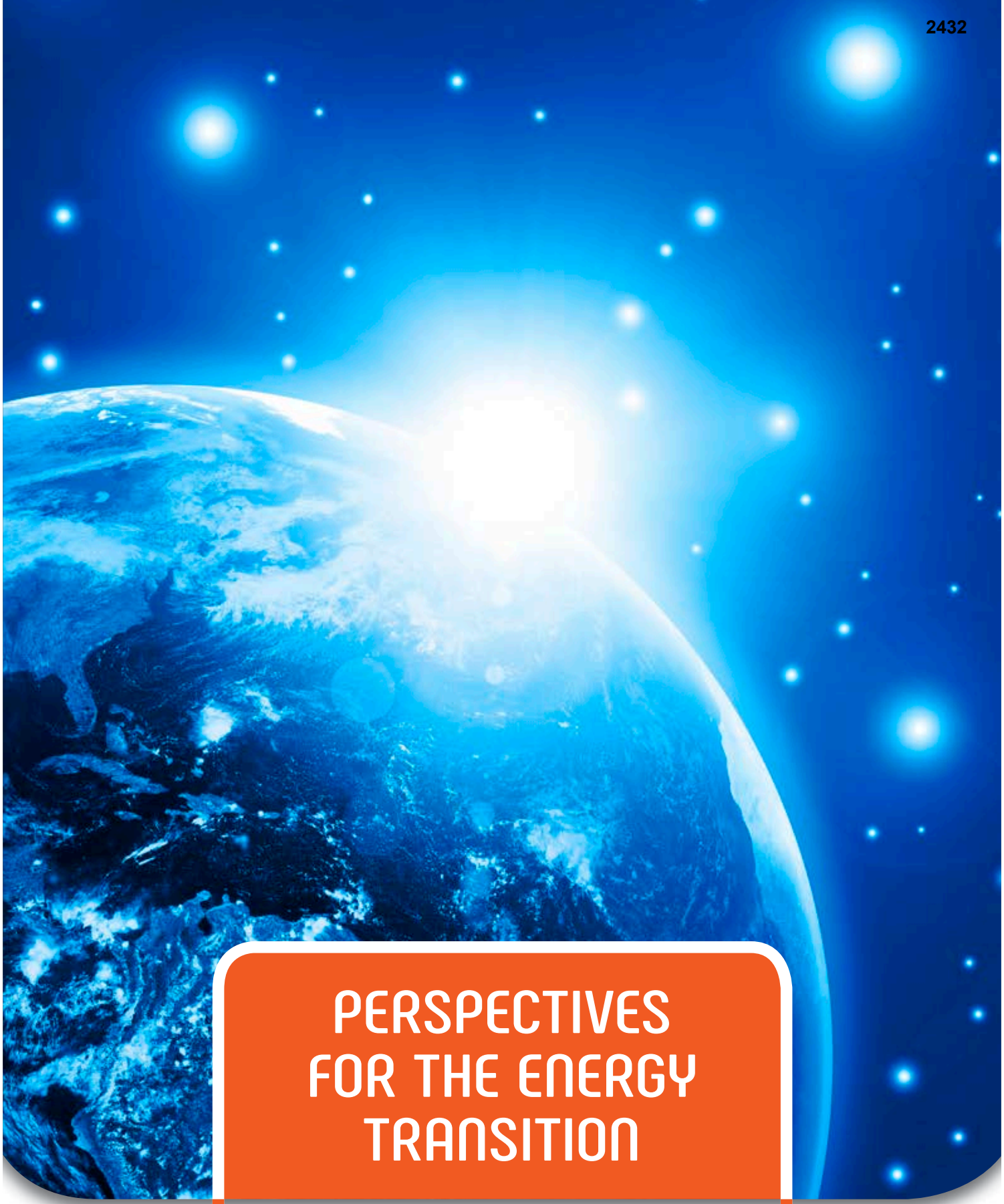

PERSPECTIVES FOR THE ENERGY TRANSITION

Investment Needs for a Low-Carbon Energy System

About the IEA

The International Energy Agency (IEA), an autonomous agency, was established in November 1974. Its primary mandate was – and is – two-fold: to promote energy security amongst its member countries through collective response to physical disruptions in oil supply, and provide authoritative research and analysis on ways to ensure reliable, affordable and clean energy for its 29 member countries and beyond. The IEA carries out a comprehensive programme of energy co-operation among its member countries, each of which is obliged to hold oil stocks equivalent to 90 days of its net imports. The Agency's aims include the following objectives:

- Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse gas emissions that contribute to climate change.
- Improve transparency of international markets through collection and analysis of energy data.
- Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies.
- Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations and other stakeholders.

About IRENA

The International Renewable Energy Agency (IRENA) is an intergovernmental organisation that supports countries in their transition to a sustainable energy future, and serves as the principal platform for international co-operation, a centre of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy. IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydropower, ocean, solar and wind energy, in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity. www.irena.org

This report presents the perspectives on a low-carbon energy sector of the International Energy Agency (**IEA**) and the International Renewable Energy Agency (**IRENA**). The Executive Summary and Chapters 1 and 4 reflect the findings of both the IEA and IRENA Secretariats (unless certain findings are expressed by one of them only), Chapter 2 reflects the IEA's findings only, and Chapter 3 reflects IRENA's findings only. The chapters do not necessarily reflect the views of the IEA's nor IRENA's respective individual members. The IEA, IRENA and their officials, agents, and data or other third-party content providers make no representation or warranty, express or implied, in respect to the report's contents (including its completeness or accuracy) and shall not be responsible or liable for any consequence of use of, or reliance on, the report and its content.

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The individuals and organisations that contributed to this study are not responsible for any opinions or judgments it contains. All errors and omissions are solely the responsibility of the IEA and IRENA.

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Executive Summary

Authors: International Energy Agency and International Renewable Energy Agency

Scope of the study

Investment is the lifeblood of the global energy system. Individual decisions about how to direct capital to various energy projects – related to the collection, conversion, transport and consumption of energy resources – combine to shape global patterns of energy use and related emissions for decades to come. Government energy and climate policies seek to influence the scale and nature of investments across the economy, and long-term climate goals depend on their success. Understanding the energy investment landscape today and how it can evolve to meet decarbonisation goals are central elements of the energy transition. Around two-thirds of global greenhouse gas (GHG) emissions stem from energy production and use, which puts the energy sector at the core of efforts to combat climate change.

Against this backdrop, the German government has requested the International Energy Agency (IEA) and the International Renewable Energy Agency (IRENA) to shed light on the essential elements of an energy sector transition that would be consistent with limiting the rise in global temperature to well below two degrees Celisius (2°C), as set out in the Paris Agreement. The overarching objective of this study is to analyse the scale and scope of investments in low-carbon technologies in power generation, transport, buildings and industry (including heating and cooling) that are needed to facilitate such a transition in a cost-effective manner, while also working towards other policy goals. The findings of this report will inform G20 work on energy and climate in the context of the 2017 German G20 presidency.

The analyses in this report are framed by several key questions which include:

- How can the energy sector achieve a transition to a decarbonised, reliable and secure energy sector at reasonable costs?
- What are the investment needs associated with the energy sector transition and how do investment patterns need to change to reach a low-carbon energy system?
- What are the co-benefits for other energy policy objectives that could result from an energy sector transformation?
- Assuming a timely and effective low-carbon energy sector transition, what is the outlook for stranded assets? What is the impact for stranded assets if action is delayed and the transition is sharper?
- How does the trend of declining costs for renewables and other low-carbon energy technologies, as well as acceleration of efficiency gains, support the decarbonisation? How can policy accelerate this development?
- What are the roles of carbon pricing and the phase-out of fossil fuel subsidies in ensuring a cost-effective decarbonisation of energy systems?
- What are the roles of more stringent regulations, better market design and/or higher carbon prices for the energy sector transition?
- What is the role of research, development and demonstration, and how can early deployment of a broad array of low-carbon technologies support an efficient and effective energy sector transition?

In order to address these questions, the IEA and IRENA separately have examined the investment needs for energy sector pathways that would foster putting the world on track towards a

significant reduction in energy-related GHG emissions until the middle of this century. Each institution has developed one core scenario that would be compatible with limiting the rise in global mean temperature to 2°C by 2100 with a probability of 66%, as a way of contributing to the "well below 2°C" target of the Paris Agreement. Both the IEA and IRENA analyses start with the same carbon budget for the energy sector. But the pathways to reaching the goal differ between the two analyses: the modelling analysis conducted by the IEA aims at laying out a pathway towards energy sector decarbonisation that is technology-neutral and includes all low-carbon technologies, taking into account each country's particular circumstances. The analysis conducted by IRENA maps out an energy transition that stresses the potential of energy efficiency and renewable energy sources to achieving the climate goal, while also taking into consideration all other low-carbon technologies.

While IEA and IRENA base their energy sector analyses on different approaches and use different models and/or tools, there are similarities in high-level outcomes that support the relevance for a pathway and framework for a timely transition of the global energy sector. In the following sections, key findings from the analyses of each organisation are presented.

Carbon budget

The average global surface temperature rise has an almost linear relationship with the cumulative emissions of carbon dioxide (CO_2). This useful relationship has resulted in the concept of a remaining global "CO_2 budget" (the cumulative amount of CO_2 emitted over a given timeframe) that can be associated with a probability of remaining below a chosen temperature target.

The Paris Agreement makes reference to keeping temperature rises to "well below 2°C" and pursuing efforts to limit the temperature increase to 1.5°C. However it offers no clear guidance on what "well below 2°C" means in practice, or what probabilities should be attached to the temperature goals.For the purpose of this report, it was chosen to focus on a scenario with a 66% probability of keeping the average global surface temperature rise throughout the 21st century to below 2°C, without any temporary overshoot. Understanding the associated CO_2 budget consistent with this definition is a critical consideration for modelling the pace and extent of the energy sector transition (Table ES.1). To generate an estimate of CO_2 budget for a 66% chance of staying below 2°C, it is necessary to estimate levels and rates of non-CO_2 emissions. For the purpose of this study, non-CO_2 emissions originating from non-energy sectors rely on the scenarios from the database of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). With these assumptions, for the purpose of this study, we estimate that the CO_2 budget between 2015 and 2100 is 880 gigatonnes (Gt). This lies towards the middle of the 590 – 1 240 Gt CO_2 range from a study discussing CO_2 budgets commensurate with a 66% chance of staying below 2°C.

Table ES.1 • Energy sector CO_2 budget in the decarbonisation scenarios developed by the IEA and IRENA in this study

(Gt CO_2)	2015 - 2100
Total CO_2	880
Industry processes	-90
Land use, land- use change and forestry	0
Energy sector CO_2 budget	790

It is important to recognise that the 66% 2°C scenarios explored in this report keep the temperature rise below 2°C not just in 2100 but also over the course of the 21st century. It does not permit any temporary overshooting of this temperature in any year. The main reason for this working assumption is that permitting a temporary overshoot of a specific temperature rise before falling back to this level in 2100 would imply relying on negative-CO_2 technologies (such as direct air capture, enhanced rock weathering, afforestation, biochar and bioenergy with carbon capture and storage) at scale sometime in the future. The assessment of the implications of widespread adoption of bioenergy with carbon capture and storage (BECCS) for land-use requirements or the potential uptake of non-energy technologies for CO_2 removal is outside the scope of this report.

Nevertheless, many of the scenarios assessed by the IPCC in its Fifth Assessment Report that aim to limit the specific temperature rise in 2100 to 2°C rely heavily upon BECCS such that the global energy sector as a whole absorbs CO_2 emissions from the atmosphere by the end of the century. The scenarios developed in this study are therefore ambitious in terms of the timing and scope of required energy emissions reductions for meeting the 2°C goal as they offer no possibility to delay CO_2 emissions reduction until negative-emissions technologies are available at scale. Nevertheless, the scenarios offer the possibility for achieving more stringent climate targets in the future, should negative-emissions technologies become available.

To arrive at an *energy sector only* CO_2 budget for the 66% 2°C scenario it is necessary to subtract from the total CO_2 budget those CO_2 emissions not related to fossil fuel combustion in the energy sector. These emissions predominantly arise from two sources: industrial processes and from land use, land-use change and forestry (LULUCF). For the latter, the outlook for CO_2 emissions from LULUCF used in this study are based on the median of 36 unique decarbonisation scenarios analysed by the IPCC. For this study, the assumption is that CO_2 emissions from LULUCF fall from 3.3 Gt in 2015 to zero by mid-century. LULUCF subsequently becomes a net absorber of CO_2 over the remainder of the 21st century, and, as a result, cumulative CO_2 emissions from LULUCF between 2015 and 2100 are close to zero.

The net effect of these two factors is to reduce the total CO_2 budget from 880 Gt to an energy sector only budget of 790 Gt. The challenge is stark: by means of comparison, current Nationally Determined Contributions (NDCs) imply that, until 2050, the energy sector would emit almost 1 260 Gt, i.e. nearly 60% more than the allowed budget.

IEA findings

Limiting the global mean temperature rise to below 2°C with a probability of 66% would require an energy transition of exceptional scope, depth and speed. Energy-related CO_2 emissions would need to peak before 2020 and fall by more than 70% from today's levels by 2050. The share of fossil fuels in primary energy demand would halve between 2014 and 2050 while the share of low-carbon sources, including renewables, nuclear and fossil fuel with carbon capture and stoage (CCS), would more than triple worldwide to comprise 70% of energy demand in 2050.

The 66% 2°C Scenario would require an unparalleled ramp up of all low-carbon technologies in all countries. An ambitious set of policy measures, including the rapid phase out of fossil fuel subsidies, CO_2 prices rising to unprecedented levels, extensive energy market reforms, and stringent low-carbon and energy efficiency mandates would be needed to achieve this transition. Such policies would need to be introduced immediately and comprehensively across all countries in order to achieve the 66% 2°C Scenario, with CO_2 prices reaching up to US dollars (USD) 190 per

tonne of CO_2. The scenario also requires broader and deeper global efforts on technology collaboration to facilitate low-carbon technology development and deployment.

Improvements to energy and material efficiency, and higher deployment of renewable energy are essential components of any global low-carbon transition. In the 66% 2°C Scenario, aggressive efficiency measures would be needed to lower the energy intensity of the global economy by 2.5% per year on average between 2014 and 2050 (three-and-a-half times greater than the rate of improvement seen over the past 15 years); wind and solar combined would become the largest source of electricity by 2030. This would need to be accompanied by a major effort to redesign electricity markets to integrate large shares of variable renewables, alongside rules and technologies to ensure flexibility.

Figure ES.1 • Global emissions abatement by technology and region in the 66% 2°C Scenario relative to the New Policies Scenario

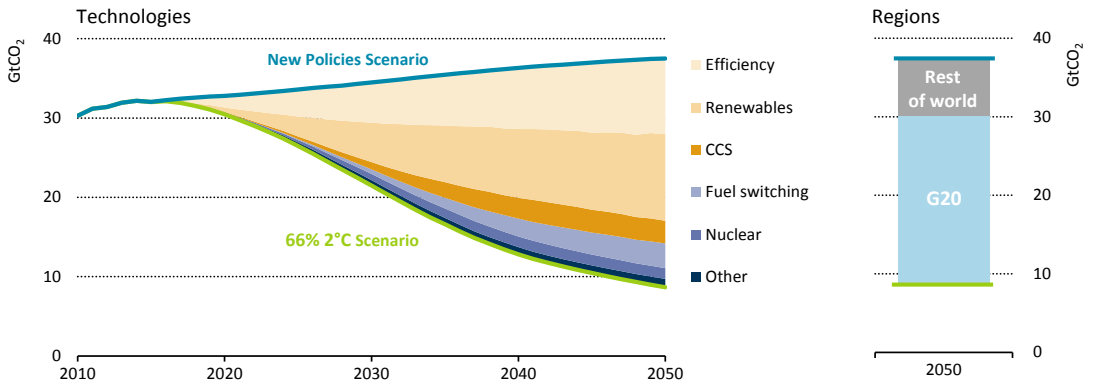

Note: The New Policies Scenario reflects the implications for the energy sector of the NDCs of the Paris Agreement.

Key message • G20 countries provide almost three-quarters of the emissions reductions in 2050 between the 66% 2°C and New Policies Scenarios.

A deep transformation of the way we produce and use energy would need to occur to achieve the 66% 2°C Scenario. By 2050, nearly 95% of electricity would be low-carbon, 70% of new cars would be electric, the entire existing building stock would have been retrofitted, and the CO2 intensity of the industrial sector would be 80% lower than today.

A fundamental reorientation of energy supply investments and a rapid escalation in low-carbon demand-side investments would be necessary to achieve the 66% 2°C Scenario. Around USD 3.5 trillion in energy sector investments would be required on average each year between 2016 and 2050, compared to USD 1.8 trillion in 2015. Fossil fuel investment would decline, but would be largely offset by a 150% increase in renewable energy supply investment between 2015 and 2050. Total demand-side investment into low-carbon technologies would need to surge by a factor of ten over the same period. The additional net total investment, relative to the trends that emerge from current climate pledges, would be equivalent to 0.3% of global gross domestic product (GDP) in 2050.

Figure ES.2 • Average annual global energy supply- and demand-side investment in the 66% 2°C Scenario

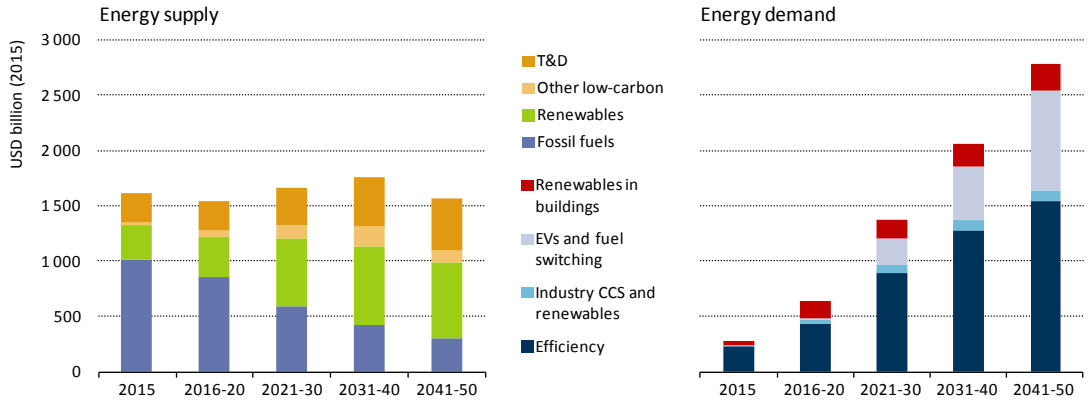

Note: T&D = transmission and distribution; EVs = electric vehicles; CCS = carbon capture and storage.

Key message • The level of supply-side investment remains broadly constant, but shifts away from fossil fuels. Demand-side investment in efficiency and low-carbon technologies ramps up to almost USD 3 trillion in the 2040s.

Fossil fuels remain an important part of the energy system in the 66% 2°C Scenario, but the various fuels fare differently. Coal use would decline most rapidly. Oil consumption would also fall but its substitution is challenging in several sectors. Investment in new oil supply will be needed as the decline in currently producing fields is greater than the decline in demand. Natural gas plays an important role in the transition across several sectors.

Early, concerted and consistent policy action would be imperative to facilitate the energy transition. Energy markets bear the risk for all types of technologies that some capital cannot be recovered ("stranded assets"); climate policy adds an additional consideration. In the 66% 2°C Scenario, in the power sector, the majority of the additional risk from climate policy would lie with coal-fired power plants. Gas-fired power plants would be far less affected, partly as they are critical providers of flexibility for many years to come, and partly because they are less capital-intensive than coal-fired power plants. The fossil fuel upstream sector may, besides the power sector, also carry risk not to recover investments. Delaying the transition by a decade while keeping the same carbon budget would more than triple the amount of investment that risks not to be fully recovered. Deployment of CCS offers an important way to help fossil fuel assets recover their investments and minimise stranded assets in a low-carbon transition.

With well-designed policies, drastic improvements in air pollution, as well as cuts in fossil fuel import bills and household energy expenditures, would complement the decarbonisation achieved in the 66% 2°C Scenario. Achieving universal access to energy for all is a key policy goal; its achievement would not jeopardise reaching climate goals. The pursuit of climate goals can have co-benefits for increasing energy access, but climate policy alone will not help achieve universal access.

Figure ES.3 • Trends for selected key indicators in the 66% 2°C Scenario

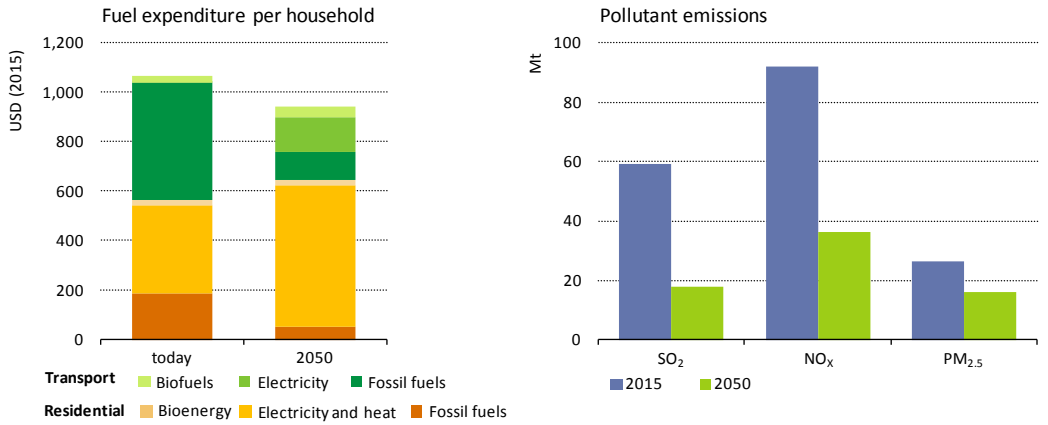

Key message • The transition to a low-carbon energy sector could help achieve other key energy policy goals, such as reducing air pollution and household fuel expenditures.

IRENA findings

Accelerated deployment of renewable energy and energy efficiency measures are the key elements of the energy transition. By 2050, renewables and energy efficiency would meet the vast majority of emission reduction needs (90%), with some 10% achieved by fossil fuel switching and CCS. In the REmap decarbonisation case nuclear power stays at the 2016 level and CCS is deployed exclusively in the industry sector.

The share of renewable energy needs to increase from around 15% of the primary energy supply in 2015 to 65% in 2050. Energy intensity improvements must double to around 2.5% per year by 2030, and continue at this level until 2050. Energy demand in 2050 would remain around today's level due to extensive energy intensity improvements. Around half of the improvements could be attributed to renewable energy from heating, cooling, transport and electrification based on cost-effective renewable power.

The energy supply mix in 2050 would be significantly different. Total fossil fuel use in 2050 would stand at a third of today's level. The use of coal would decline the most, while oil demand would be at 45% of today's level. Resources that have high production costs would no longer be exploited. While natural gas can be a "bridge" to greater use of renewable energy, its role should be limited unless it is coupled with high levels of CCS. There is a risk of path dependency and future stranded assets if natural gas deployment expands significantly without long-term emissions reduction goals in mind.

The energy transition is affordable, but it will require additional investments in low-carbon technologies. Further significant cost reductions across the range of renewables and enabling technologies will be major drivers for increased investment, but **cumulative additional investment would still need to amount to USD 29 trillion over the period to 2050.** This is in addition to the investment of USD 116 trillion already envisaged in the Reference Case. Reducing the impact on human health and mitigating climate change would save between two- and six-times more than the costs of decarbonisation.

Figure ES.4 • Global total primary energy supply, 2015-2050

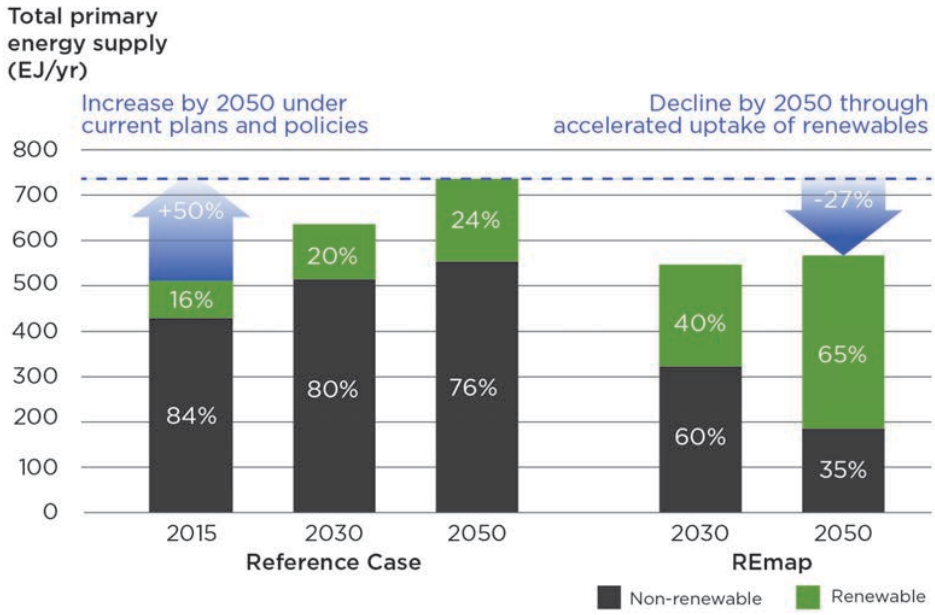

Key message • Renewable energy would be the largest source of energy supply under REmap in 2050, representing two-thirds of the energy mix. This requires an increase of renewables' share of about 1.2% per year, a seven-fold acceleration compared to recent years.

Early action is critical in order to limit the planet's temperature rise to 2°C and to maximise the benefits of this energy transition, while reducing the risk of stranded assets. Taking action early is also critical for feasibly maintaining the option of limiting the global temperature rise to 1.5°C. Delaying decarbonisation of the energy sector would cause the investments to rise and would double stranded assets. In addition, delaying action would require the use of costly technologies to remove carbon from the atmosphere.

Figure ES.5 • Additional investment needs in REmap compared to the Reference Case, 2015-2050

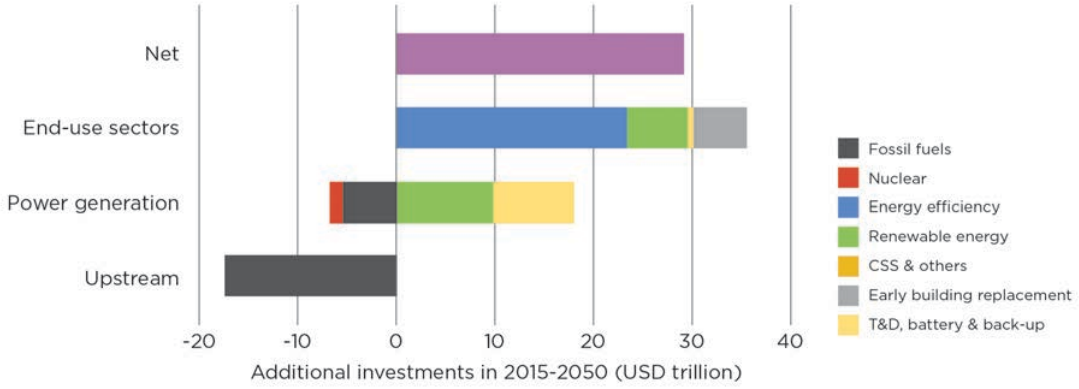

Key message • Meeting the 2°C target requires investing an additional USD 29 trillion between 2015 and 2050 compared to the Reference Case.

The energy transition can fuel economic growth and create new employment opportunities. Global GDP will be boosted around 0.8% in 2050 (USD 1.6 trillion). The cumulative gain through increased GDP from now to 2050 will amount to USD 19 trillion. Increased economic growth is driven by the investment stimulus and by enhanced pro-growth policies, in particular the use of carbon pricing and recycling of proceeds to lower income taxes. In a worst-case scenario (full crowding out of capital), GDP impacts are smalller but still positive (0.6%) since the effect of pro-growth policies remains favourable. Important structural economic changes will take place. While fossil fuel industries will incur the largest reductions in sectoral output, those related to capital goods, services and bioenergy will experience the highest increases. The energy sector (including energy efficiency) will create around six million additional jobs in 2050. Job losses in fossil fuel industry would be fully offset by new jobs in renewables, with more jobs being created by energy efficiency activities. The overall GDP improvement will induce further job creation in other economic sectors.

Figure ES.6 • Global GDP impacts in different cases of crowding out of capital

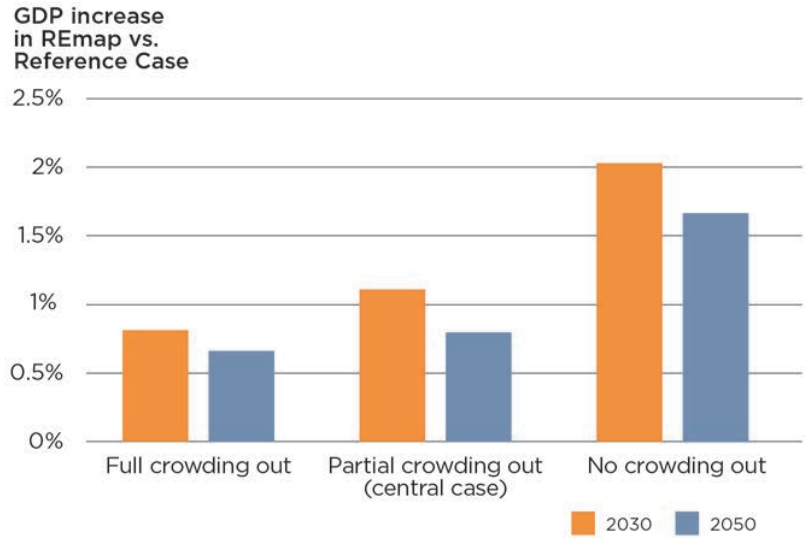

Notes: Partial crowding out is modelled by forcing savings to be at least 50% of investment. Full crowding out imposes savings to be equal to investment. Null crowding out does not impose any relation between savings and investment.

Key message • Global GDP will be boosted by around 0.8% in 2050 (USD 1.6 trillion). In a worst-case scenario (full crowding out of capital), GDP impacts are smalller but still positive (0.6%) since the effect of pro-growth policies is still favourable.

Improvements in human welfare, including economic, social and environmental aspects, will generate benefits far beyond those captured by GDP. Around 20% of the decarbonisation options identified are economically viable without consideration of welfare benefits. The remaining 80% are economically viable if benefits such as reduced climate impacts, improved public health, and improved comfort and performance are considered. However, today's markets are distorted – fossil fuels are still subsidised in many countries and the true cost of burning fossil fuel, in the absence of a carbon price, is not accounted for. To unlock these benefits, the private sector needs clear and credible long-term policy frameworks that provide the right incentives.

Deep emission cuts in the power sector are a key opportunity and should be implemented as a priority. Sectoral approaches must be broadened to system-wide perspectives, to address the main challenge of reducing fossil fuel use in end-use sectors. The power sector is currently on track to achieving the necessary emissions reductions, and its ongoing efforts must be sustained, including a greater focus on power systems integration and coupling with the end-use sectors. In

transport, the number of electric vehicles needs to grow and new solutions will need to be developed for freight and aviation. It is critical that new buildings are of the highest efficiency standards and that existing buildings are rapidly renovated. Buildings and city designs should facilitate renewable energy integration.

Increased investment in innovation needs to start now to allow sufficient time for developing the new solutions needed for multiple sectors and processes, many of which have long investment cycles. Technology innovation efforts will need to be complemented by new market designs, new policies and by new financing and business models, as well as technology transfer.

Figure ES.7 • Final renewable energy use by sector and technology in REmap, 2050

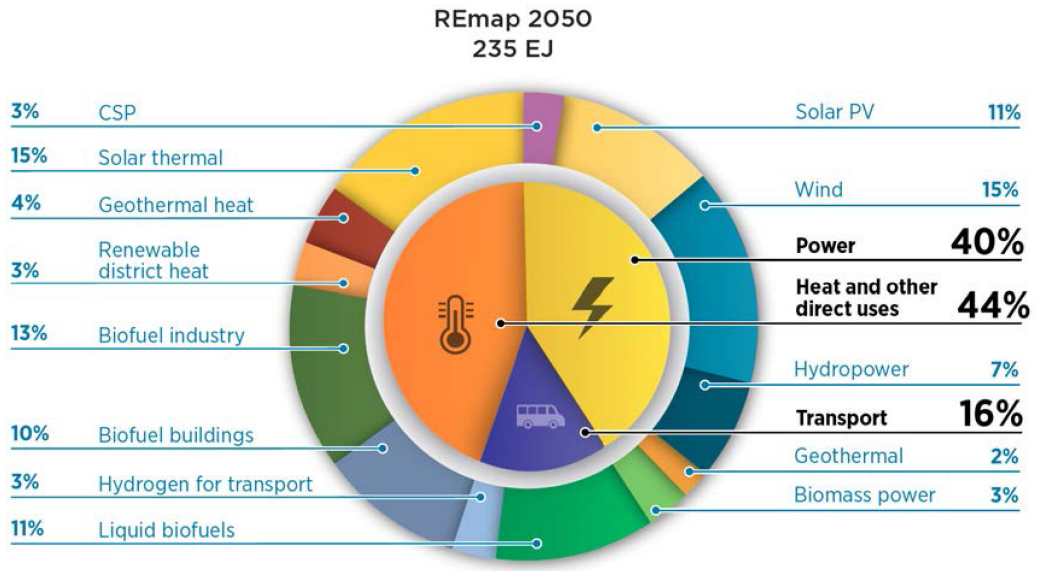

Key message • Under REmap, final renewable energy use is four-times higher in 2050 than it is today. Power and heat consume about 40% and 44% of the total renewable energy, respectively.

Key messages

1. Transformation of the energy system in line with the "well below 2°C" objective of the Paris Agreement is technically possible but will require significant policy reforms, aggressive carbon pricing and additional technological innovation. Around 70% of the global energy supply mix in 2050 would need to be low-carbon. The largest share of the emissions reduction potential up to 2050 comes from renewables and energy efficiency, but all low-carbon technologies (including nuclear and carbon capture and storage [CCS]) play a role.
2. The energy transition will require significant additional policy interventions.
   - Renewables will assume a dominant role in power generation. Skillful integration of variable renewables at very high levels becomes a key pillar of a cost-effective energy sector transition.
   - Power market reform will be essential to ensure that the flexibility needs of rising shares of variable renewables can be accommodated.
   - Ensuring access to modern energy services for those currently deprived remains a high priority, alongside improved air quality through deployment of clean energy technologies.

3. Total investment in energy supply would not need to rise over today's level to achieve climate targets, while there is significant additional investment needed in end-use sectors.
   - Investment needs in energy supply would not exceed the level of investment undertaken by the energy sector today. It requires appropriate and significant policy signals to ensure that investment in low-carbon technologies compatible with the "well below 2°C" objective becomes the market norm.
   - The additional investment needs in industry and households for more efficient appliances, building renovations, renewables and electrification (including electric vehicles and heat pumps) are significant. In order for energy consumers to reap the potential benefits of lower energy expenditure offered by the use of more efficient technologies, policy would need to ensure that the higher upfront investment needs could be mobilised.
4. Fossil fuels are still needed through 2050.
   - Among fossil fuel types, the use of coal would decline the most to meet climate targets.
   - Natural gas would continue to play an important role in the energy transition to ensure system flexibility in the power sector and to substitute for fuels with higher carbon emissions for heating purposes and in transport.
   - The use of oil would fall as it is replaced by less carbon-intensive sources, but its substitution is challenging in several sectors, such as petrochemicals.
   - CCS plays an important role in the power and industry sectors in the IEA analysis while only in the industry sector in the IRENA analysis.
5. A dramatic energy sector transition would require steady, long-term price signals to be economically efficient, to allow timely adoption of low-carbon technologies and to minimise the amount of stranded energy assets. Delayed action would increase stranded assets and investment needs significantly.
6. Renewable energy and energy efficiency are essential for all countries for a successful global low-carbon transition, but they will need to be complemented by other low-carbon technologies according to each country's circumstances, including energy sector potentials, and policy and technology priorities.
7. The energy sector transition would need to span both the power and end-use sectors.
   - Electric vehicles would account for a dominant share of passenger and freight road transport.
   - Renewables deployment would need to move beyond the power sector into heat supply and transport.
   - Affordable, reliable and sustainable bioenergy supply would be a priority especially in light of limited substitution options in particular end-use sectors
8. Technology innovation lies at the core of the long-term transition to a sustainable energy sector.
   - Near-term, scaled-up research, development, demonstration and deployment (RDD&D)spending for technological innovation would help to ensure the availability of crucial technologies and to further bring down their costs.
   - Not all of the needed emission reductions can be achieved with existing technology alone. Additional low-carbon technologies that are not yet available to the market at significant scale, such as electric trucks or battery storage, will be required to complement existing options.

- Technology innovation must be complemented with supportive policy and regulatory designs, new business models and affordable financing.

9. Stronger price signals from phasing out inefficient fossil fuel subsidies and carbon pricing would help to provide a level playing field, but would need to be complemented by other measures to meet the well below 2°C objective.

- Price signals are critical for the energy sector to ensure climate considerations are taken into account in investment decisions.
- It is important to ensure that the energy needs of the poorest members of society are considered and adequately taken into account.

10. The IEA and IRENA analyses presented here find that the energy sector transition could bring about important co-benefits, such as less air pollution, lower fossil fuel bills for importing countries and lower household energy expenditures. Both analyses also show that while overall energy investment requirements are substantial, the incremental needs associated with the transition to a low-carbon energy sector amount to a small share of world gross domestic product (GDP). According to IEA, additional investment needs associated with the transition would not exceed 0.3% of global GDP in 2050.[1] According to IRENA, the additional investment required would be 0.4% of global GDP in 2050 with net positive impacts on employment and economic growth.

1 The Organisation for Economic Co-operation and Development (OECD) analysis of how the IEA scenarios play out in the broader macroeconomic policy context will be presented in a forthcoming publication titled *Investing in Climate, Investing in Growth*.

Introduction

Around two-thirds of global greenhouse gas (GHG) emissions stem from energy production and use, which puts the energy sector at the core of efforts to combat climate change. The transition to a cleaner, more efficient energy system is a key policy goal, and the Paris Agreement, which entered into force in November 2016, provides a unique international framework for collective action towards holding the increase in the global average temperature to well below 2 degrees Celsius (°C) above pre-industrial levels. In addition, the importance of the energy sector for policy makers extends well beyond climate change mitigation: reliable, sustainable and affordable energy supply is critical to economic activity, social development and poverty reduction in order to provide all people with access to modern energy services.

Each country therefore faces the challenge of meeting climate goals while also ensuring that other vital social and economic functions of the energy sector are met in parallel. Circumstances can vary widely across countries, depending on levels of development, resource endowments and policy priorities. This is well illustrated by the countries of the Group of 20 (G20)[2]: home to more than 60% of the world's population and responsible for around 80% of global gross domestic product (GDP), G20 countries are collectively responsible for more than 80% of global energy-related CO_2 emissions. This means that efforts made by this group of countries to reduce energy-related GHG emissions are crucial for the prospects of meeting the climate targets set out in the Paris Agreement. Yet, at the same time, the G20 region is very diverse: energy demand per capita varies by a factor of 12 between countries, as energy access is still a major concern for example in Indonesia, India and South Africa. And while some of the countries are net exporters of fossil fuels, others rely heavily on imports.

The energy sector is diverse and spans a wide range of different assets in power generation, heating and cooling, industry, transport and buildings. All have in common that investment cycles tend to be long, which means that investment decisions taken today have long-term implications for the achievement of climate and other energy policy goals. G20 economies have played, and will continue to play, a leading role in the transformation of the energy sector. The challenges vary according to each country's own circumstances. In emerging economies and developing countries, substantial energy investment will have to be committed to support economic growth and alleviate energy poverty. Mature economies, meanwhile, are faced with the need to replace an ageing capital stock. A smooth and cost-effective transition towards a low-carbon energy sector, while meeting the other multiple energy policy goals, will require long-term oriented policy guidance.

In light of these needs, the German government has requested the International Energy Agency (IEA) and the International Renewable Energy Agency (IRENA) to shed light on the essential elements of an energy sector transition that would be consistent with limiting the rise in global temperature rise to well below 2°C, as set out in the Paris Agreement. The overarching objective of the study is to analyse the scale and scope of investments in low-carbon technologies in power generation, transport, buildings and industry (including heating and cooling) that are needed to facilitate such a transition in a cost-effective manner, while working towards other policy goals. The analysis in this report is framed by several key questions which include:

- How can the energy sector achieve a transition to a decarbonised, reliable and secure energy sector at reasonable costs?

2 The G20 is an international forum that includes 19 countries (Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, South Korea, Mexico, Russian Federation, Saudi Arabia, South Africa, Turkey, United Kingdom, United States) and the European Union.

- What are the investment needs associated with the energy sector transition and how do investment patterns need to change to reach a low-carbon energy system?
- What are the co-benefits for other energy policy objectives that could result from an energy sector transformation?
- Assuming a timely and effective low-carbon energy sector transition, what is the outlook for stranded assets? What is the impact for stranded assets if action is delayed and the transition is sharper?
- How does the trend of declining costs for renewables and other low-carbon energy technologies, as well as acceleration of efficiency gains, support the decarbonisation? How can policy accelerate this development?
- What are the roles of carbon pricing and the phase-out of fossil-fuel subsidies in ensuring a cost-effective decarbonisation of energy systems?
- What are the roles of more stringent regulations, better market design and/or higher carbon prices for the energy sector transition?
- What is the role of research, development and demonstration, and how can early deployment of a broad array of low-carbon technologies support an efficient and effective energy sector transition?

The findings of this report will inform G20 work on energy and climate in the context of the 2017 German G20 Presidency.

The focus of this study is on the energy sector and its long-term evolution towards meeting climate goals. Its analysis is embedded in the wider context of a report entitled "*Investing in Climate, Investing in Growth",* being conducted by the Organisation for Economic Co-operation and Development (OECD). The OECD study aims to bring together the growth, development and climate agendas to better understand the economic and investment implications of the transition to a low-carbon, climate-resilient economy. Building on the analysis of energy sector decarbonisation of this study, the OECD project takes a broader perspective on the development pathways and investment flows needed to achieve the goals of the Paris Agreement. It provides a new macroeconomic assessment of the growth and structural implications of these pathways, underlining how ambitious climate policies can be positive for growth provided they are co-ordinated with pro-growth reforms and a well-aligned policy environment. Supported by the German Ministry for the Environment, Nature Conservation, Building and Nuclear Safety in the context of the German G20 Presidency, the study will be released in conjunction with the Petersberg Climate Dialogue in May 2017 and the results of the analysis will be provided to the G20 process during the German G20 Presidency.

Report Structure

In order to address the questions presented above, the IEA and IRENA have examined separately the investment needs for energy sector pathways that would foster putting the world on track towards a significant reduction in energy-related GHG emissions until the middle of this century. Each institution has developed one core scenario that would be compatible with limiting the rise in global mean temperature to 2°C by 2100 with a probability of 66%, as a way of contributing to the "well below 2°C" target of the Paris Agreement. Both the IEA and IRENA analyses start with the same carbon budget for the energy sector. But the pathways to reaching the goal differ between the two analyses: the modelling analysis conducted by the IEA aims at laying out a pathway towards energy sector decarbonisation that is technology-neutral and includes all low-carbon technologies, taking into account each country's own circumstances. The analysis conducted by IRENA maps out an energy transition that stresses the potential of energy

efficiency and renewable energy sources to achieving the climate goal, while also taking into consideration all other technologies.

This report has four chapters, of which two have jointly been formulated by the IEA and IRENA (Chapters 1 and 4), while the other two have been developed by each institution separately (Chapters 2 and 3), using their respective analytical tools.

- **Chapter 1 *Energy and climate change* (authors IEA and IRENA):** This chapter provides an overview of the international climate change framework, highlights the important role of investment for the energy sector and describes the present investment landscape. It spotlights the significant role of energy for climate change, with particular attention to the situation in G20 countries. It also defines the carbon budget used for the analysis in the subsequent chapters.
- **Chapter 2 *Energy sector investments to meet climate goals* (author IEA):** This chapter provides a full IEA analysis of the investment challenge associated with a 66% chance of staying below a long-term global mean temperature rise of 2°C, focusing on G20 countries and putting their investment needs into a global context. It analyses – sector-by-sector – the investments, technologies and policies needed to meet the well below 2°C goal compared with already announced policy targets and quantifies co-benefits on air pollution, energy access and energy expenditures.
- **Chapter 3 *Global energy transition prospects and the role of renewables* (author IRENA):** This chapter assesses the technology options for emission reductions associated with a 66% chance of staying below 2°C with a focus on renewable energy and energy efficiency. It discusses what this would entail in terms of costs, investment requirements, benefits and other implications, both for the world as well as for G20 countries. Additional attention is given to the economic growth and employment impacts of the energy transition.
- **Chapter 4 *Key insights for policy makers* (authors IEA and IRENA):** This chapter summarises high-level policy insights that can be drawn from the findings in Chapters 2 and 3.

Methodology

For the purpose of this study, IEA and IRENA used their respective analytical tools to provide insights into the energy sector transition.

For the IEA, the scenarios in this study were developed from the IEA World Energy Model (WEM), benchmarked against the IEA *Energy Technology Perspectives* model to allow for a high-level extension of projections out to 2050. The IEA WEM has been providing medium- to long-term energy projections since 1993. It is a large-scale technology- and data-rich simulation model, designed to replicate how energy markets function. It is the principal tool used to generate detailed sector-by-sector and region-by-region projections for the annual IEA flagship publication, the *World Energy Outlook*. It is updated, expanded and further improved every year. The model consists of three main modules: final energy consumption (covering residential, services, agriculture, industry, transport sectors and non-energy use); energy transformation (including power generation and heat, refinery and other transformation); and energy supply (covering oil, natural gas, coal and bioenergy). Among the main outputs from the model are the energy flows by fuel, investment needs and costs, carbon dioxide (CO_2) and other energy-related GHG emissions, and end-user prices. The WEM embodies a variety of modelling techniques. Technology choices, for example, are generally conducted on a least-cost basis, while taking into account policy targets (for example, energy efficiency and renewables policies, and climate

goals). Technology cost evolutions are a function of cumulative technology additions, using learning rates from literature. Technology cost reductions vary by scenario as different levels of policy ambition trigger different levels of technology deployment and, hence, different levels of cost reductions. In the power sector, WEM is complemented by an additional hourly model for selected regions that quantifies the challenge arising from the integration of high shares of variable renewables and assesses the measures to minimise curtailment, providing additional insights into the operation of power systems.[3]

In order to derive insights into other aspects of possible future energy sector developments, the WEM benefits from coupling with other well-known models. For example, WEM has been coupled with several macroeconomic models from the OECD (ENV-Linkages and YODA), which allows the assessment of the macroeconomic impacts of different energy sector developments.[4] Similarly, an active link exists with the the Greenhouse Gas and Air Pollution Interactions and Synergies (GAINS) model of the International Institute for Applied Systems Analysis (IIASA),[5] which allows for the assessment of future prospects for energy-related air pollutants and the impact on human health.

For IRENA, the scenarios are developed based on IRENA's REmap (Renewable Energy Roadmap[6]) tool. The REmap approach is a techno-economic assessment of energy system developments on a country level, for all G20 countries, assessing energy supply and demand by sector and energy carrier. The REmap tool allows for assessment of the accelerated potential of decarbonisation technologies, and subsequent effects on costs, externalities, investments, CO_2 emissions and air pollution. REmap has been previously deployed as part of the G20 toolkit of voluntary options for renewable energy deployment.[7] The country level perspective is combined with global sector and sub-sector analysis in order to strengthen the consistency of assumptions such as cost and potential of decarbonisation technologies across the power generation, district heating, buildings, industry and transport sectors.

Additional modelling is undertaken to assess the macroeconomic effects on GDP growth and employment, feeding the REmap energy mixes into a global macro-econometric model, the E3ME[8] model that covers the global economy. This allows consideration of the linkages between the energy system and the world's economies within a single and consistent quantitative framework.

The IRENA analysis of the potentials for the energy sector transition draws on input provided by a pool of technology experts, including the Institute of Sustainable Futures, University of Technology Sydney. REmap is supplemented with the PLEXOS dispatch model to assess the technical feasibility of the power sector transformation. Air pollution and human health effects are calculated using a method developed by IRENA and the Basque Centre for Climate Change.[9]

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3 For further details, see Annex A or the WEM manual at: www.worldenergyoutlook.org/media/weowebsite/2016/WEM_Documentation_WEO2016.pdf.

4 The assessment of the possible macroeconomic implications of the energy sector pathways as projected by the IEA is not subject to this study, but will be subject to a report entitled "Investing in Climate, Investing in Growth", currently undertaken by the OECD under the German G20 Presidency. Therefore, the results of such analysis are not presented here. For details on ENV-Linkages, see Chateau, J., Dellink, R. and E. Lanzi (2014), "An Overview of the OECD ENV-Linkages Model: Version 3", OECD Environment Working Papers, No. 65, OECD Publishing, Paris, http://dx.doi.org/10.1787/5jz2qck2b2vd-en.

5 For further information, see www.iiasa.ac.at/web/home/research/modelsData/GAINS/GAINS.en.html.

6 For more information about the REmap tool and approach, key assumptions, data sources and related information, see Annex B and www.irena.org/remap.

7 See www.irena.org/remap/IRENA_REmap_G20_background_paper_2016.pdf.

8 Developed by Cambridge Econometrics. More information can be found below in Annex B, and the full description is in www.e3me.com. An application of this model to measure the macroeconomic impacts of renewable energy deployment can be found here: http://www.irena.org/DocumentDownloads/Publications/IRENA_Measuring-the-Economics_2016.pdf.

9 See http://www.irena.org/DocumentDownloads/Publications/IRENA_REmap_externality_brief_2016.pdf

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The analysis of stranded assets uses an approach developed by IRENA together with the Environmental Change Institute at the University of Oxford. Documentation regarding these in-depth studies is available from the REmap website.[10]

10 www.irena.org/remap.

Chapter 1: Energy and Climate Change

Authors: International Energy Agency and International Renewable Energy Agency

Climate change and a changing energy investment landscape

Investment is the lifeblood of the global energy system. Individual decisions about how to direct capital to various energy projects – related to the collection, conversion, transport and consumption of energy resources – combine to shape global patterns of energy use and emissions for decades to come. Government energy and climate policies seek to influence the scale or nature of investments across the economy, and long-term climate goals depend on their success. Understanding the energy investment landscape today and how it can evolve to meet decarbonisation goals are central elements of the energy transition.

This transition has been given additional impetus and direction by the signature and entry into force of the Paris Agreement. Under the Agreement, countries aim to achieve a peak in global emissions as soon as possible and reach net-zero emissions in the second-half of this century. The Agreement also sets the objective of keeping the global average temperature rise "well below 2 degrees Celsius (°C) and pursuing efforts to limit this to 1.5°C". Although the precise temperature threshold implied in the Paris Agreement to limit temperature rise to "well below 2°C" is currently uncertain, it is clear that achieving the goal in a cost-effective manner will be a complex and unprecedented effort.

A key mechanism to achieve these objectives is via Nationally Determined Contributions (NDCs), which were submitted by countries under the Agreement and in most cases include coverage of energy sector greenhouse gas emissions (GHG). Their aim to reduce GHG emissions and to accelerate the transition to a lower carbon energy system, coupled with rapidly declining costs and increased deployment of clean and energy-efficient technologies, will have significant implications for future energy investment flows, creating both new opportunities and risks.

The impact of the current pledges on future investments in the energy sector was examined in detail in the IEA's *World Energy Outlook 2016*.[11] It found that countries are generally on track to achieve, and even exceed in some cases, many of their stated targets. It also found that reaching the targets of the NDCs is sufficient to slow the projected rise in global energy-related CO_2 emissions, compared with historical trends since 2000. In line with the review-and-revise every five-year approach incorporated into the Paris Agreement, these pledges should become more ambitious with time. For the moment, however, their cumulative impact, while significant, is not nearly enough to reach a peak in global energy-related emissions and to limit the temperature rise to less than 2°C (IEA, 2016a; IRENA, 2016a). The pledges represent an important step in the right direction, but more effort is needed. So despite some encouraging signs, an accelerated reallocation of capital flows in the energy sector in favour of efficient and low-carbon technologies is essential.[12]

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11 International Energy Agency (2016a), *World Energy Outlook 2016*.

12 IEA and IRENA both investigate possible pathways towards reducing energy sector emissions in line with the 2°C target. For the IEA, the analysis includes its 450 Scenario and the 66% 2°C Scenario, which aim to illustrate pathways towards energy sector decarbonisation that are technology-neutral and include all low-carbon technologies, taking into account each country's own circumstances. For IRENA, the REmap analysis maps out an energy transition that stresses the potential of energy efficiency and renewable energy to achieve the climate goal, while also taking into consideration all other technologies.

Energy investment today

Global energy investment in 2015 amounted to US dollars (USD) 1.8 trillion[13] (IEA, 2016), across the entire energy sector from oil and gas exploration to energy efficiency (Figure 1.7).[14] Half of all investment was directed to oil, gas and coal supply. Fossil fuel spending was dominated by upstream oil and gas exploration, despite capital spending in this sector falling 25% compared to the previous year on the back of an oil price collapse. However, total investment in low-carbon energy, energy efficiency and electricity networks has been growing, up 6% in 2015, and increasing from 39% of total energy investment in 2014 to 45% in 2015. Its share has been boosted in particular by the decline in fossil fuel investment and current indications are that this share grew again in 2016 (Table 1.1).

Figure 1.6 • Global energy investment in 2015 (USD)

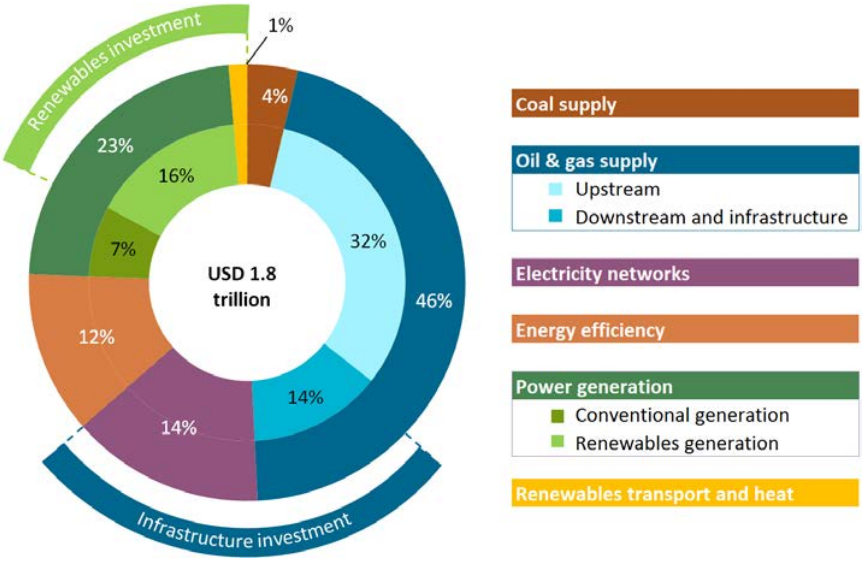

Note: Coal supply here includes mining and transport infrastructure; electricity networks include transmission and distribution lines, and grid-scale storage.
Source: IEA (2016b).

Key message • Half of energy investments today are in fossil fuel supply, having declined from 60% in 2014.

In the power sector, wind and solar power, representing nearly USD 110 billion and USD 100 billion of investment, respectively, are now the major components of investment. Overall renewable energy capacity additions in the power sector have been growing rapidly and are now larger than that of any other source (Figure 1.8). G20 countries accounted for around 85% of the USD 288 billion of global renewables investment in 2015, a share that has risen from 75% a decade ago. Hydro, at around USD 60 billion, was the third-largest component of renewables investment in 2015.

13 A detailed analysis of energy sector investments is available in *World Energy Investment Outlook 2016* (IEA, 2016g).

14 Measured in terms of overnight capital expenditures on new assets that became operational in 2015. (2015 is the most recent t year for which there is reliable such data for all sectors.)

Table 1.1 • Selected 2015 energy investments and trends in 2016 and beyond

Energy resource or technology	Investment in 2015(USD)	Recent investment and financing trends
Oil and gas upstream	583 billion	Investment fell by 26% in 2016 and is likely to rebound only modestly in 2017 despite oil majors and the US unconventional sector being in healthier cash flow positions. Many of these companies have shed personnel and substantially increased debt, but are far from abandoning oil and gas investment.
Wind	107 billion	Asset financing for onshore wind was lower in 2016 than the previous year, largely due to the impacts of policy changes. Offshore wind financing edged up to an all-time high in 2016, but due to long-lead times, the impacts on investment may be spread out over several years.
Solar photovoltaic (PV)	98 billion	Solar PV capacity additions may have increased by as much as 50% in 2016 compared with 2015, but asset financing for solar PV was significantly lower, largely because of cost declines, policy changes and integration concerns in specific markets, such as China and Japan.
Hydro	59 billion	The project pipeline for new hydro plants has been in decline since 2013. Investment in 2016 is expected to have fallen compared to 2015, as costs remained relatively stable and the market looks towards technology improvements for existing plants.
Nuclear	21 billion	The amount of new nuclear capacity connected to the grid in 2016 was almost the same as the 10 gigawatts (GW) registered in 2015, but investments likely rose slightly, according to IEA methodology. New construction starts in 2016 were noticeably lower than 2015, however.
Grid- scale electricity storage	10 billion	Whereas pumped hydro storage represented 90% of storage investment in 2015, lithium ion batteries (1% in 2015) are growing most rapidly in terms of market share, with indications that around one-fifth more grid-connected batteries were added in 2016 than in 2015.
Biofuels	3 billion	Investment is estimated to have rebounded slightly in 2016 but remains considerably lower than levels achieved pre-2010. Investment in Asia led the way, while the projection for Europe is limited given that the medium-term outlook for policy support has weakened.
Carbon capture and storage	0.7 million	2016 was a quiet year for CCS, but with five large-scale assets coming online soon, more CO_2 capture capacity will be added worldwide in 2017 than during the fifteen preceding years. New investment decisions, especially in industrial applications, remain well below decarbonisation needs.

Source: IEA analysis.

Coal and gas power plant investments totalled just USD 78 billion and USD 31 billion in 2015, respectively. In fact, the estimated new low-carbon generation – renewables and nuclear – that will be produced from capacity that was scheduled to come online in 2015 exceeds the entire growth of global power demand in that year. Regionally, China's share of total energy supply investment grew from 18% in 2014 to 20% in 2015, largely the result of spending on coal-fired power and electricity networks, which together accounted for 77% of the increase in power sector spending in China. The United States' share of total energy supply investment dropped from 20% in 2014 to 18% in 2015 as oil and gas companies spent less and fewer coal-fired power plants were commissioned. Outside China, the only region that did not see a drop in energy supply investment in 2015 was Europe, while the overall shares of the Middle East and Southeast Asia were unchanged.

Figure 1.7 • Renewable power generation capacity and annual growth rate

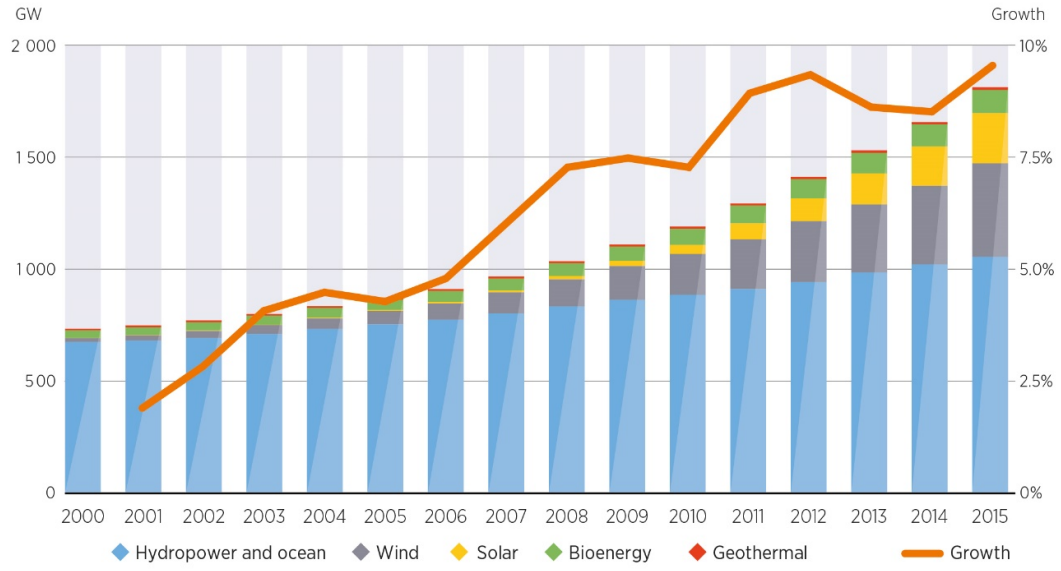

Source: IRENA (2016b).

Key message • Renewable energy capacity in the power sector has been growing rapidly over the last decade with record growth in 2015.

Energy efficiency and electricity networks are two other significant areas of investment. Electricity networks represent nearly 40% of all power sector investment, and grew by over USD 30 billion to USD 260 billion in 2015 as China improved its distribution grids and ageing infrastructure was upgraded in North America. Energy efficiency investments were around USD 220 billion in 2015, mostly in buildings and transport, and have been largely resilient to falls in fuel prices due to the increase in the coverage of energy efficiency standards around the world.

Factors affecting energy investments

While trends may indicate that a reorientation of energy investment is underway, more consideration of three contextual elements is needed (Figure 1.9). These are:

- macroeconomic conditions,
- cost trends in all sectors, from upstream oil and gas to wind turbines to downstream such as energy-using consumer goods,
- government policies.

Investment trends are heavily influenced by the macroeconomic environment. One reason for the increased share of clean energy investment in 2015 was not only higher spending in this area (which reached a new record in 2015 also in absolute terms); but the 25% drop in investment in upstream oil and gas as oil prices collapsed by over 60% between mid-2014 and the end of 2015. IEA estimates that, in 2016, spending in the upstream oil and gas sector declined by a further quarter. In many major markets, prices for oil, natural gas, coal and wholesale electricity reached multi-year lows despite continued global economic expansion – in the power sector in particular, low prices reflect the deployment of low-carbon technologies in support of the energy transition. In addition, consistent downgrading of gross domestic product (GDP) growth outlooks over recent years has generated macroeconomic uncertainty that discourages investment in capital-

intensive projects with long payback periods. On the other hand, macroeconomic policies have, for now at least, enabled access to low cost capital in many parts of the energy system.

Figure 1.8 • Global investment in energy supply

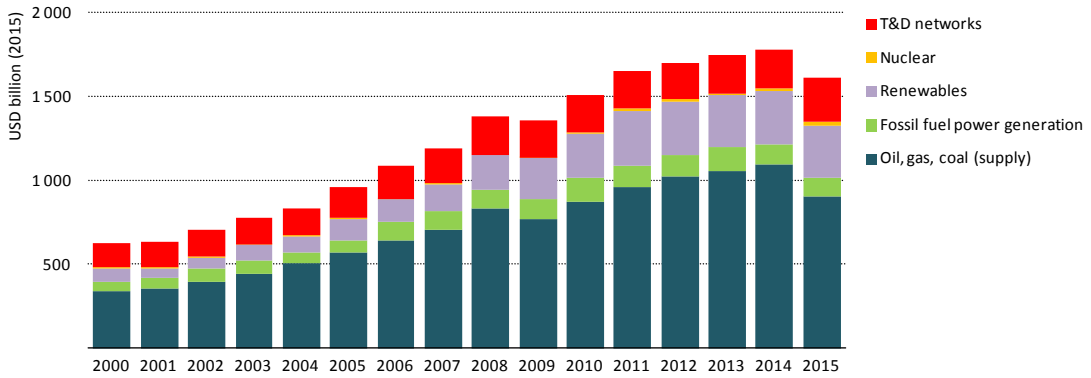

Source: IEA data and analysis.

Key message • Investment in renewable energy supply increased to around USD 290 billion in 2015: its share in overall energy supply investment rising faster than fossil fuel investment.

Renewable energy investments are affected in different ways by macroeconomic conditions. Investments in renewables have traditionally been dependent on government policies and weaker macroeconomic prospects and fiscal pressures have resulted in countries paring back certain support schemes such as feed-in tariffs. On the other hand, weak economic growth and monetary policy have combined to benefit renewables in many regions by keeping interest rates low. In some countries, government guaranteed revenues for renewables served to boost the attractiveness of wind and solar projects by lowering the cost of capital.

Costs play an important role in determining investment levels across the energy system. The fall in costs of solar photovoltaics (PV), wind, batteries and light-emitting diodes (LEDs) as a result of their rapidly increasing deployment is well-documented, and helps to explain why the headline dollar figure for investment in renewable electricity was essentially flat between 2011 and 2015 despite annual capacity additions rising by 40% according to IEA data. IRENA analysis shows that since the end of 2009, solar PV module prices have fallen by around 80% and those of wind turbines by 30-40%. Biomass for power, hydropower, geothermal and onshore wind can all now provide electricity competitively compared to fossil fuel-fired electricity generation (Figure 1.10). The levelised cost of electricity of solar PV has fallen by more than 60% between 2010 and 2016 based on preliminary data, so that solar PV is also increasingly competitive at utility scale.

Figure 1.9 • Levelised cost of electricity from utility-scale renewable technologies (ranges and average)**, 2016**

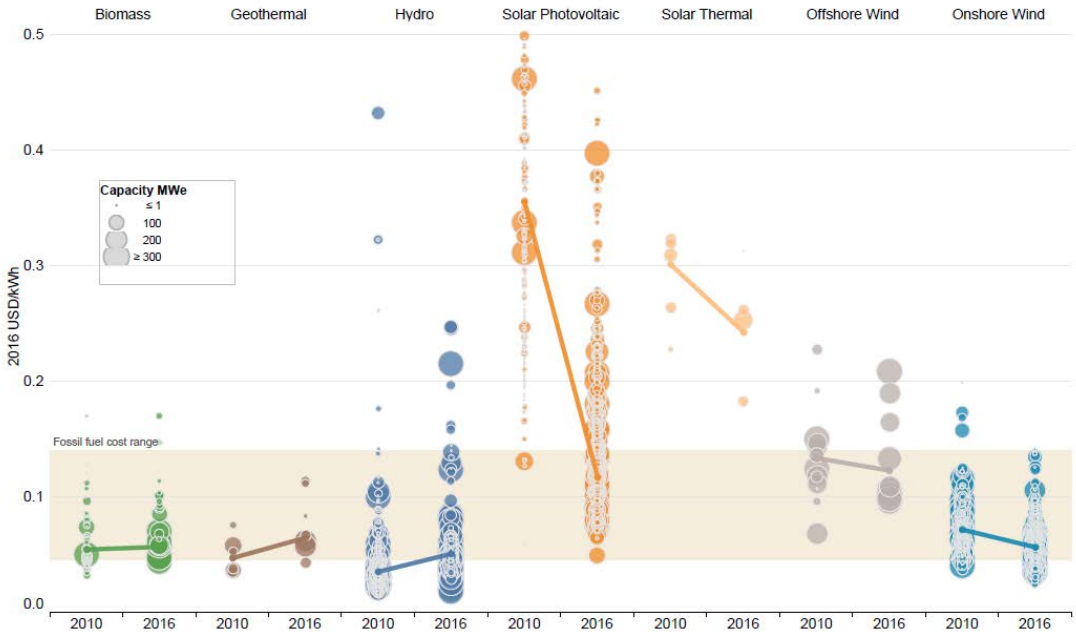

Sources: IRENA (2017a).

Key message • Weighted average costs of many renewable power technologies are at or below the range of estimated fossil fuel-fired power generation costs. Solar PV costs also increasingly fall within that range.

Such cost declines change the relative attractiveness of investment in different energy sources. For example, in Europe, the investment case for new gas-fired plants has been undercut by the falling costs of onshore wind generation, alongside continued government support for renewables and depressed wholesale power prices (pushed lower in large part also by the growth of renewable-based generation with low operational costs). Some reprieve from competition has been provided by natural gas prices remaining at relatively low levels, without which onshore wind generation costs in more locations would likely have fallen below those from a combined-cycle gas plant in the past two years. In North America, the inter-fuel dynamic is different and coal is the fuel being squeezed by the ample availability of inexpensive shale gas and the rise of renewables. In many parts of Asia, however, where natural gas prices are higher and existing gas networks at an earlier stage of development, the relative costs of gas and coal infrastructure also make investments in gas-fired power plants harder to justify than their levelised costs would suggest (Box 1.1).

Costs play a hugely influential role in the upstream oil and gas sector and the outlook for these fuels. After oil prices collapsed in mid-2014, spending by oil and gas companies was curtailed as revenues fell and higher cost new projects became uneconomic. Since then, spending has also declined as a result of cost-cutting and average upstream costs in the oil and gas sector have fallen by about 30% since 2014.[15] In terms of costs, oil is therefore in a more competitive position in 2017 than it has been for many years. If prolonged, an expansion of lower cost oil supply could impede the growth of more efficient technologies and of alternatives to oil in the transport sector. However, the longevity of these cost reductions is an area of some uncertainty; while

15 In the case of the US shale industry, the IEA estimates that upstream costs declined up to 50% between 2014 and 2016.

there is a structural component – notably with the efficiency and technology gains in North American shale production – there are also cyclical elements that are likely to be reversed as markets for upstream services and supplies tighten.

Improvements in vehicle efficiency and in the costs and availability of electric mobility options are major factors in the outlook for global oil demand. As of today, three-out-of-four passenger cars being sold on global markets are already subject to fuel-economy standards, constraining total market growth. The electric vehicle (EV) market is growing rapidly. In 2015, USD 4 billion was invested in EV sales and charging stations, and global registrations of EVs further rose by more than 50% in 2016. Battery and manufacturing cost reductions are now firmly on the horizon, as vehicles that can travel further per battery charge enter mass market price ranges in 2017. Yet, despite recent growth, EVs account for a very small share of the car market (0.1% of the total fleet) (IEA, 2016b). Wider market uptake will require additional battery cost reductions beyond those already achieved, and policy efforts to ensure existing deployment hurdles such as limited charging infrastructure are overcome (IEA, 2016a).

However, a focus on the outlook for passenger vehicles (where alternatives to oil are gaining momentum) should not ignore the importance of other transport mode that rely on oil where alternative fuels or technologies are less readily available and efficiency standards or related measures are much less widespread. In the absence of further policy changes, IEA analysis points to the large potential for continued growth in oil use for heavy-duty vehicles, aviation, shipping and as feedstock for petrochemicals; these provide powerful impetus for continued rises in overall oil consumption, albeit at a lower rate than in the past (IEA, 2016a).

Policy is the third key element of context for the discussion about energy investment. In the electricity sector, the IEA estimates that in 2015 most power generation investment, worldwide and across all technologies, was based on regulated prices, long-term contracts or support policies, which implies that they were not exposed to the same revenue risks associated with wholesale pricing. This share of investment is increasing despite moves in some countries to liberalise electricity markets. Policy ambition and commitment by an increasing number of governments has consistently raised investment levels and expectations for renewables, creating a virtuous cycle of improvement; deployment of wind and solar technologies that benefit from mass manufacturing techniques as a result of policy support has accelerated cost reductions, leading to rising policy support in an increasing number of countries and further investment. This dynamic has not previously been typical in the electricity sector, which has traditionally been dominated by large engineering projects commissioned to particular specifications. The adoption of such enabling policies, the emergence of new markets and growing competitiveness all contributed to increased global investment in renewable-based power, which saw a three-fold rise over the past decade and reached a record high in 2014. Investment in new renewable-based power capacity has exceeded investment in additional fossil fuel capacity for at least three consecutive years. The difference was largest in 2015, despite the sharp decline in fossil fuel prices.

Government policies to support renewable energy are expected to continue to underpin investments in wind and solar capacity. To date, 173 countries have established renewable energy targets at the national, state or provincial level (REN21, 2016). Over 150 countries have adopted specific policies for renewables-based power, 75 have policies for renewables-based heat and 72 for renewables in transport (IEA, 2016a). High capital intensities make wind and solar especially sensitive to costs of capital, and policy measures can provide confidence to investors of stable remuneration thereby significantly lowering the cost of capital. Low contract clearing prices for solar and wind auctions in countries such as the United Arab Emirates (solar), Morocco (onshore wind) and Denmark (offshore wind) therefore reflect a combination of good resources and technology improvements, but also policy measures that help to reduce the cost of capital. In

Jordan (solar PV), the government established a direct proposal (auction) process for renewable energy that standardised terms of reference and contracts, which enabled aggregation of small-size projects and in turn lowered transaction costs. Government guarantees targeted at mitigating off-taker risk was crucial for geothermal projects in Indonesia to access finance and move the project forward (IRENA, 2016c). In the United States, tax credits coupled with high predictability of electricity off-take prices from wind and solar projects make renewables contracting highly attractive to corporate buyers. In 2015, 3 GW of solar and wind were installed in North America compared with 1 GW in 2014.

Box 1.1 • Challenges of shifting towards natural gas investments in Asia

Investment in gas-fired power generation in many developing Asian countries has remained modest compared with investment in coal-fired capacity despite recent falls in liquefied natural gas (LNG) prices and the environmental and flexibility benefits of gas-fired generation. In many cases, preference is still given to coal-fired plants, which emit double the CO_2 per megawatt-hour (MWh) of gas-fired plants. This is mainly because economic and energy security considerations are the dominant decision criterion: coal is still much cheaper than gas and generally abundant in the region. Another reason is the much larger investment needs associated with gas-fired power when the outlays required for the full supply chain are taken into account. Midstream infrastructure, in the form of pipelines, liquefaction and regasification terminals, typically represents 40% of the capital costs of developing gas-fired power generation capacity in Asia, compared with only 10% for coal-based power (Figure 1.11). The upstream component for gas, at 25% of total investment needs, is almost double that for coal power. As such, gas, more so than coal, requires greater co-ordination in terms of matching upstream development with contracted gas off-takers in the power sector as well as an appropriate market framework and financing for infrastructure development. These factors have been generally most supportive in the United States and the Middle East, the two largest destinations for gas power investment in 2015.

Figure 1.10 • Investment needs related to new gas- and coal-fired power generation by component in importing Asian countries

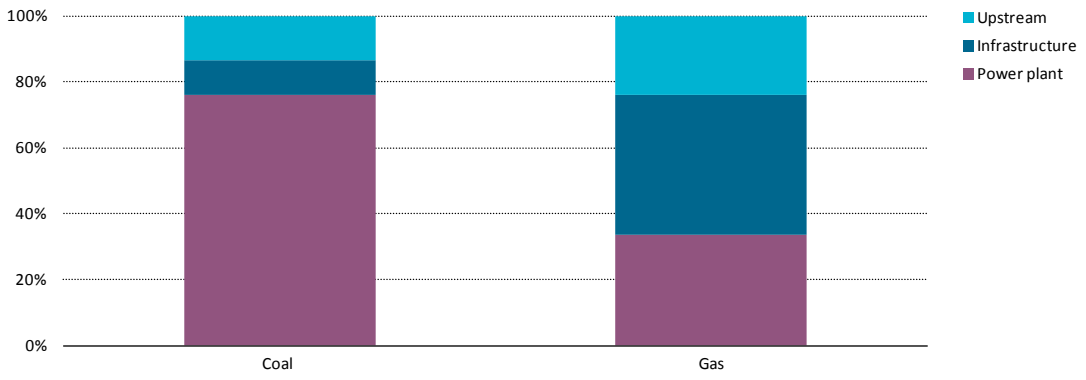

Note: Calculation assumes a 1 GW power plant in Asia running on imported coal and LNG.
Source: IEA analysis.

Key message • Transportation infrastructure is key to understanding the relative economics of coal- and gas-fired power generation investment.

The benefits of renewables are increasingly featuring prominently in the policy debate. The sector has become a significant source of new employment in many markets around the world (Figure 1.12). IRENA estimates that the number of jobs in renewable energy rose by 5% in 2015 to an estimated 8.1 million, plus an additional 1.3 million in large-scale hydropower (IRENA,

2016d). Solar PV was the largest single renewable energy employer, supporting 2.8 million jobs, up 11% from 2014. There were similar employment figures in bioenergy (including liquid biofuels, biomass and biogas), but these contracted slightly in 2015. Meanwhile, wind power experienced significant growth, rising 5% in 2015 to 1.1 million. Asia provides 60% of renewable energy employment, largely due to the solar industry in China, where a major share of the world's PV and solar thermal heating technologies are manufactured and installed (IRENA, 2016d).

While renewable energy job numbers continue to rise, trends vary by country and region (IRENA, 2016d). Countervailing effects of increased labour productivity, as well as automation and mechanisation of production, contributed to slower growth in 2015 compared to previous years. However, according to IRENA, the continuing growth in renewables employment contrasts starkly with the depressed labour market in the broader energy sector (excluding energy effriciency) (IRENA, 2016d).

Figure 1.11 • Global employment in renewable energy

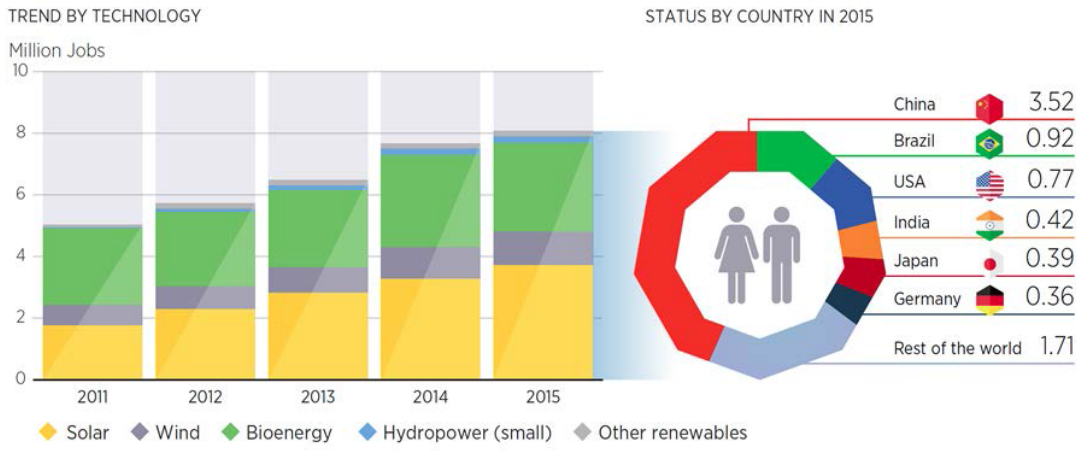

Note: excludes large hydropower
Source: IRENA (2016d).

Key message • The total number of jobs in renewables worldwide continues to rise and is becoming a major source of employment particularly in solar PV and bioenergy technologies.

For energy efficiency too, policy has been vitally important to securing investment, via standards, loans and market-based instruments such as efficiency obligations. Spending on energy efficiency has risen as standards for buildings, appliances and vehicles have been implemented and their further tightening has been signalled by governments. However, much of this is indirect consumer spending on efficiency as manufacturers pass on the costs of complying with standards. This cost pass-through is often hard to distinguish among the price differentiation of other characteristics of appliances and vehicles, but is usually expected to be outweighed by fuel cost savings. Investment in road freight efficiency lags behind that for passenger vehicles, partly due to much more limited coverage of fuel-economy standards.

Through policies such as obligations for utilities to reduce demand for electricity, direct policy-induced efficiency investments have risen. IEA analysis shows that utilities worldwide spend more than USD 11 billion per year on such programmes, more than half of it in the United States. These types of measures in the buildings and industrial sectors, as well as policy tools such as government loans, tax credits and auctions have increased efficiency investments by drawing on the large balance sheets of electricity suppliers and governments who spread costs among ratepayers and taxpayers. Policy has so far been less successful in increasing the role of third-party finance, for which revenue based on future cost savings is generally required. Government

policies can help address key challenges – which include the relatively small size of projects, uncertainties regarding the value of future savings and a limited project pipeline – but only through concerted effort and tailored approaches.

Policy lessons and future challenges for low-carbon energy investment

Policies have played a fundamental role in attracting low-carbon energy investments, increasing deployment and driving cost reductions as described. Learning the lessons from past policy efforts to accelerate the uptake of low-carbon technologies (such as renewables for power generation) and applying them to other emerging, yet crucial, low-carbon technologies (such as EVs vehicles or carbon capture and storage) would facilitate the transition to a low-carbon energy sector in a cost-effective manner. A wide range of different policy tools have been – and are currently being – deployed around the world with the intention of stimulating and supporting investment in low-carbon energy technologies (Table 1.2). The types of measures have typically varied between countries in line with their institutional characteristics and capacities. IRENA suggests that they must support stable, transparent and predictable market conditions while being flexible enough to adjust to changing circumstances (IRENA, 2014a).

As technologies have matured and costs have been reduced and become more transparent, policy instruments have evolved and in some cases consolidated around standard models. An example is the evolution of renewable electricity support schemes in a number of countries from portfolio standards and feed-in-tariffs to auctions. The growing interest in auctions is due largely to their ability to achieve deployment of renewable technologies in a planned, cost-efficient and transparent manner (IRENA and CEM, 2015). In other sectors, initiatives that provide grants to new technology projects have given way to minimum performance standards when confidence in the new technology has been assured.

Financial support for low-carbon technologies can raise cost concerns. While it is often essential to stimulate early deployment of novel technologies, the level of support that is appropriate for projects in a nascent sector will be too expensive once higher levels of adoption are reached. Unless policy measures adapt to the increasing volumes and decreasing costs of maturing markets, costs can be a serious burden on government budgets or consumers. To address this, several governments are adopting new policy design features (such as degression mechanisms for feed-in tariffs) and a new generation of support policies that acknowledge the growing competitiveness of renewable energy technologies, such as auctions (IRENA, 2014a). In many countries with high (and growing) shares of variable renewable energy technologies, the policy focus is increasingly shifting away from financial incentives alone. Instead, new challenges have emerged for renewable energy and the entire power sector, and new policy frameworks are needed to facilitate the transition to smarter, more decentralised, more resilient and more flexible power systems (IEA, 2016a; IEA, 2016b; IRENA, 2017b). Measures to enhance flexibility – including policies to advance demand-side management and storage, and changes in market design – are at the centre of attention. They look to ensure adequate, reliable and safe electricity services at reasonable prices, while sharing system costs and benefits among stakeholders. Cross-technology and cross-sector market-based measures will be needed to deliver more efficient outcomes. While likely not sufficient by itself, carbon pricing is expected to play a growing role in this regard as it reaches more jurisdictions, sectors and as markets become linked.

From an investment perspective, shifting the share of new assets further towards energy efficiency, low-carbon technologies and electricity networks, demands that particular policy challenges be effectively addressed.[16] These challenges are emerging more clearly as the

16 See, for example, *20 Years of Carbon Capture and Storage - Accelerating Future Deployment* (IEA, 2016c)

business models for widespread deployment of low-carbon technologies are becoming better understood. Scaling up the investment volume requires expanding the investor base to large-scale investors (such as institutional investors), who can be attracted to sizable investment portfolios (IRENA, 2016c). Examples in some countries suggest that standardised documentation and due diligence processes (e.g. United Kingdom and Jordan) can enable aggregation of assets and projects to capture scale and efficiency. Furthermore, by securitising a portfolio of solar leases (as in the United States) or off-grid solar receivables in the pay-as-you-go model (Kenya and Rwanda), projects can gain access to capital markets for larger sums of debt capital.

Table 1.2 • Selected policy tools for a reorientation of energy investment

Type of project	Typical policy tools that facilitate investment	Other measures that can affect future investment decisions
Utility- scale renewables	Auctions for long-term power purchase agreements; portfolio standards; tradable certificates.	Carbon pricing; long-term arrangements with modulated market premiums.
Distributed generation (e.g. rooftop solar)	Feed-in-tariffs and net metering.	Carbon pricing; retail electricity tariff design; minimum performance building standards.
Coal- to- gas switch and biomass power	Carbon pricing; minimum performance standards.	Rules for export credits and multilateral financing; financial disclosure rules.
CCS in industry and power	Grants to cover additional costs of CO_2 capture and storage; CO_2 storage tax credits.	Carbon pricing; CO_2 infrastructure deployment; minimum performance standards.
Industrial energy efficiency	Utility obligations; energy efficiency auctions; mandatory efficiency opportunity audits.	Carbon pricing; minimum performance standards; elimination of energy subsidies.
Buildings and appliances efficiency	Minimum performance standards; utility obligations; property tax repayment schemes; public procurement; tradable certificates; revolving funds.	Energy performance certificates; performance data transparency; energy services companies.
Vehicle efficiency	Fuel-economy standards; fuel and vehicle taxation.	Differential road pricing and congestion policies; elimination of consumer fuel subsidies.
Electric vehicles	Purchase subsidies; charging infrastructure deployment; tradable credits; fleet average fuel-economy standards; exemptions from traffic fees.	Differential road pricing; parking restrictions; minimum performance standards.
Electricity storage	Regulated rates of return; purchase subsidies; utility obligations.	Market design to support flexible resources; deferred network investment strategies; electric vehicle policies that reduce battery costs.

Source: IEA analysis.

One issue to be tackled in power generation is how to mobilise capital for flexible assets that can complement variable renewable technologies. Assets including gas turbines, biomass power plants, electricity storage (including pumped storage hydropower), interconnectors and smart controls for flexible demand are expected to be vital at times of scarcity of renewable-based power generation. However, given the low marginal prices in electricity markets with wholesale pricing and high shares of solar and wind, the business case for investing in assets that provide the flexibility to capture infrequent high scarcity prices is likely to remain risky. Long-term price signals are needed to provide confidence that these investments will provide adequate financial returns without weakening the efficiencies of competitive markets. Combinations of carbon pricing, more dynamic and locational pricing, integration with other system services will play a role, but will rely fundamentally on careful forward-looking policy and market design. Without

these investments, the system value of renewable generation will be more difficult to secure at growing shares and the expansion of renewable assets will be harder to finance.

Table 1.3 • Typical sources of financing for various types of energy projects by region

Types of projects	Mature market economies	Emerging markets with a strong role for state- directed investment	Lower- income developing markets
Oil and gas upstream	Corporate balance sheet; corporate bonds.	Government and state-owned enterprise balance sheet.	Corporate balance sheet; corporate bonds.
Electricity networks; oil and gas pipelines	Corporate balance sheet.	Government and state-owned enterprise balance sheet.	Government and state-owned enterprise balance sheet; development banks.
Conventional power generation	Corporate balance sheet; corporate bonds; project finance.	Government and state-owned enterprise balance sheet; public bank loans.	Government, state-owned enterprise and private conglomerate balance sheet; development banks; export credit agencies.
Utility- scale PV and wind	Project finance; Corporate balance sheet.	Government and state-owned enterprise balance sheet; corporate balance sheet.	Development banks; project finance; export credit agencies; government and state-owned enterprise balance sheet.
Residential solar PV; efficient cars and appliances	Third-party financing; household balance sheet; private bank loans.	Household balance sheet; public and private bank loans.	Household balance sheet; third-party finance.
Electric vehicles; energy efficiency programmes for buildings	Government balance sheet, via tax credits or conditional grants; private bank loans; corporate bonds.	Government balance sheet; public and private bank loans.	Development banks; public and private bank loans.
Early stage and pre- commercial low- carbon technologies	Angel investors; venture capital; corporate balance sheet; government balance sheet via R&D grants.	Government and state-owned enterprise balance sheet.	

Source: IEA analysis.

Another consideration lies in ensuring that market designs attract capital from different sources efficiently. There is a variety of capital sources currently at play in the energy sector (Table 1.3). Consequently, the various projects that made up the USD 1.8 trillion of energy investments in 2015 were not made with the same expectation of risks, returns and payback periods. Some sources of debt or equity are not well-suited to certain energy projects. For example, project finance is not well matched to the size and nature of energy efficiency measures. This has implications for ensuring a smooth transition to a low-carbon economy if some capital sources need to grow in importance and others need to be reallocated outside the energy sector. Policies such as regulations, standards, taxes and deregulation influence risks and returns and can explain why some efficiency opportunities are not currently financed despite being lower cost than new energy supply from a system perspective. Unlocking large-scale private capital further requires mitigation of risks, both perceived and real, and mobilisation of capital markets through the standardisation, aggregation and, potentially, securitisation of assets. Based on an analysis of

best practice and recent case studies, IRENA has elaborated five action areas for government and financers that, if addressed, would help scale up renewable energy investment (IRENA, 2016c):

- Advance projects from initiation to full investment maturity through capacity building, dedicated grants and networking platforms.
- Engage local financial institutions in renewable energy finance through capacity building with local financial institutions and on-lending facilities.
- Mitigate risks to attract private investors through instruments that reduce off-taker risk and emerging market currency risk.
- Mobilise more capital market investment through standardisation of project processes and green bond guidelines, as well as project aggregation.
- Create facilities dedicated to scaling up renewable energy investment by covering transaction fees, supporting design of structured finance mechanisms and providing funds.

Energy-efficient building refurbishments present a particular challenge in terms of mobilising new sources of finance that have lower costs of capital but seek more certain returns. One example of how progress in aggregating small projects, managing risks and monitoring performance is already helping to broaden this space into the secondary market is the Warehouse for Energy Efficiency Loans (WHEEL) in the United States. In 2015, WHEEL became the first asset-backed security transaction for efficiency, totalling USD 13 million, comprising unsecured home energy efficiency loans each up to USD 20 000. Another growing area that is bringing transparency and interest to secondary markets is green bonds, of which 20% of the USD 42 billion of issuances in 2015 was for energy efficiency, with the rest going mostly to renewable energies.

Role of G20 countries in energy and climate change

Energy production and use account for more than two-thirds of all anthropogenic greenhouse gas emissions, mostly in the form of CO_2. This reflects the energy sector's heavy reliance on the combustion of fossil fuels, meaning that increasing demand for energy over the past decades has consistently been accompanied by rising CO_2 emissions. Reducing greenhouse gas emissions therefore depends, to a large extent, on changes and developments in the energy sector. The members of the G20 are central to this challenge. As a group, the G20 accounts for around 80% of the world's total primary energy demand (including almost 95% of its coal demand and nearly three-quarters of its gas and oil demand) and is responsible for more than 80% of total CO_2 emissions (Figure 1.13).

Figure 1.12 • Share of G20 members in key global indicators, 2014

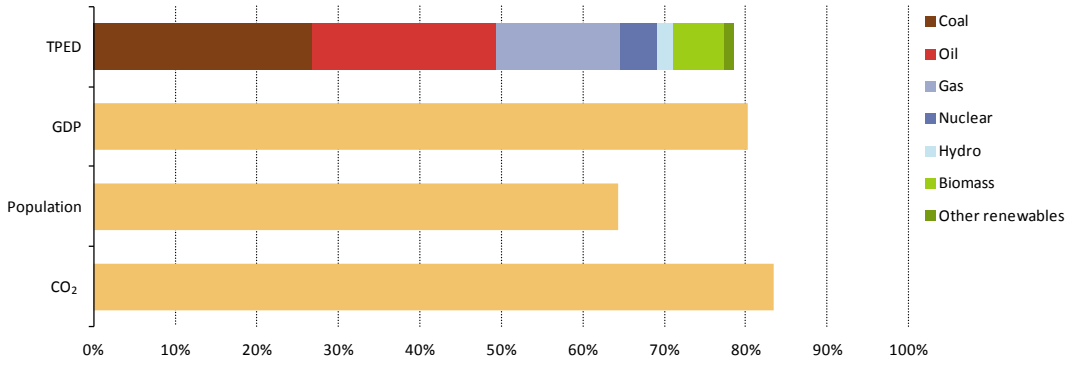

Note: TPED = total primary energy demand.
Source: IEA data and analysis.

Key message • G20 countries as a group account for the majority of global energy demand and energy-related CO_2 emissions.

The energy mix of the G20 group as a whole today depends largely on the use of coal (34%), oil (29%) and gas (19%); nuclear represents a share of 6% and renewables the rest, with bioenergy being the largest at 8% (of which, almost half is the traditional use of solid biomass) (Figure 1.14). But the G20 group is a very diverse set of countries and individual energy consumption patterns reflect factors that are unique to each. Resource endowments, for example, help to explain why coal is the backbone of the energy mix in China and South Africa (at around two-thirds of the total), while 70% of Saudi Arabia's energy demand is met by oil (the remainder being gas). Another important criterion is the level of access to modern sources of energy: for India and Indonesia, bioenergy is an integral part of the energy mix (at around one-quarter of total energy demand), mostly in the form of solid biomass. Achieving their quest to ensure access to modern energy services should reduce the share of solid biomass in the mix. Brazil has the highest share of low-carbon fuels in the total primary energy mix among G20 countries, at around 40%.

The power sector is the largest single sector consuming energy in G20 countries. With more than 60% of total coal and nearly 40% of total gas demand, the power sector is also the largest source of CO_2 emissions in G20 countries as a whole. Among end-use energy sectors, the industry sector is the largest energy consumer in the G20. More than one-third of industrial energy demand is met by coal and its use has increased rapidly since 2000, mostly linked to the rapid expansion of infrastructure and manufacturing output in China. Electricity has overtaken oil as the second-largest fuel consumed in the industry sector after coal, but oil remains prominent. The industrial sector is the second-largest consumer of oil after transport. The energy mix in the buildings sector is diversified, reflecting the varied circumstances across the G20.[17] Electricity and gas, the mainstay of consumption in the more affluent countries, together account for around 55% of energy consumption in buildings, but are closely followed by solid biomass, which is widely used for cooking and heat in India and Indonesia. The transport sector is dominated by oil, although gas plays a significant supporting role in a number of large markets, including Russia and Argentina, and biofuels provide a meaningful contribution in Brazil, Argentina and the United States.

17 The buildings sector includes energy used in residential, commercial and institutional buildings, and non-specified other.

Figure 1.13 • Electricity generation, energy demand by fuel and CO_2 emissions in selected sectors in the G20 and rest of the world, 2014

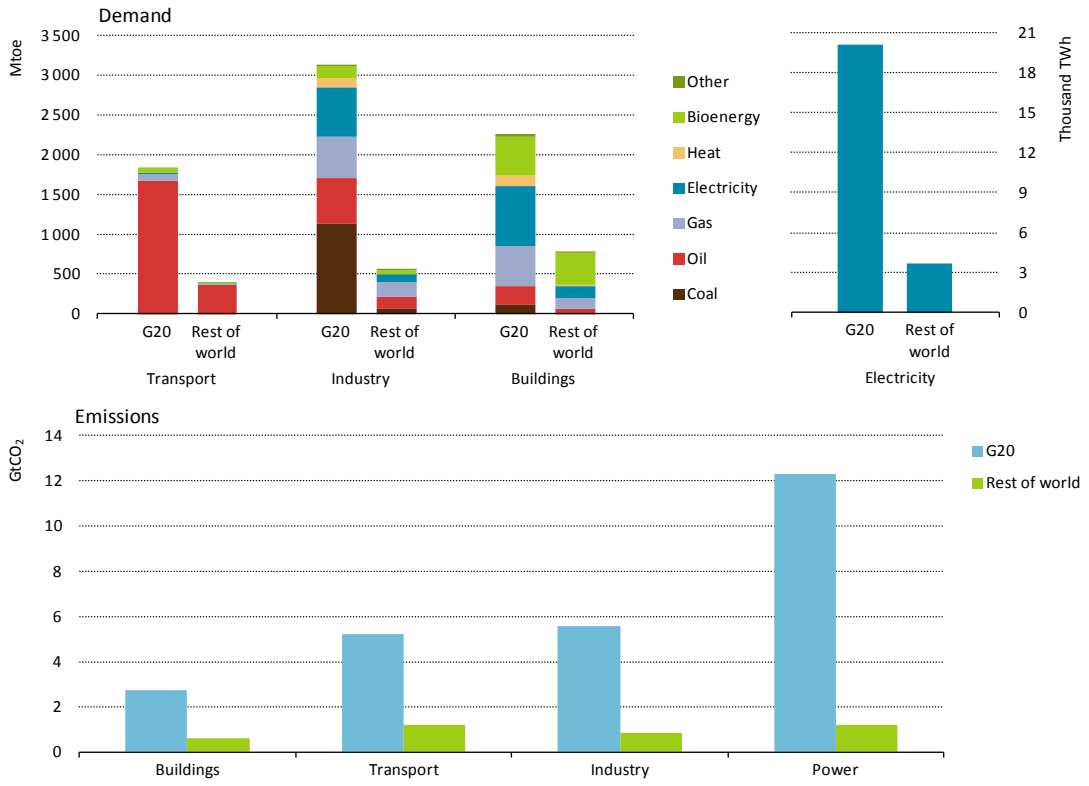

Source: IEA data and analysis.

Key message • The G20 accounts for the bulk of global energy demand and CO_2 emissions.

While the G20 group is a major source of energy demand and energy-related GHG emissions, it also plays an integral role in combatting climate change. Collectively, G20 countries are the key driver of low-carbon technology deployment: the G20 holds 98% of global installed wind power generation, 96% of solar PV and 94% of nuclear power capacity, while its passenger vehicle fleet represents almost 95% of all electric vehicles worldwide (Figure 1.15).

Energy intensity (measured as total energy use per unit of GDP) is a key indicator of movement towards a low-carbon energy sector, reflecting structural economic shifts but also efforts to improve energy efficiency. Recent trends give cause for optimism: since 2000, the energy intensity of global economic output has fallen by 10% (in market exchange rate terms). This overall trend belies some significant regional differences (Figure 1.16). In parts of the G20, growth in GDP was at times associated with a slight decline in primary energy demand, reflecting shifts in economic structure, saturation effects and efficiency gains. This has led to peaks in primary energy demand in Japan (2004) and in Europe (2006), where demand has since fallen by around 15%, while demand in the United States today is 5% below its 2007 peak. For countries outside the G20, the link between economic growth and energy consumption remains strong; in the period from 2000 to 2014 every one percentage point increase in economic growth was accompanied by a 0.6% point increase in energy demand.

Figure 1.14 • Share of G20 in global low-carbon technology deployment in the power and transport sectors, 2015

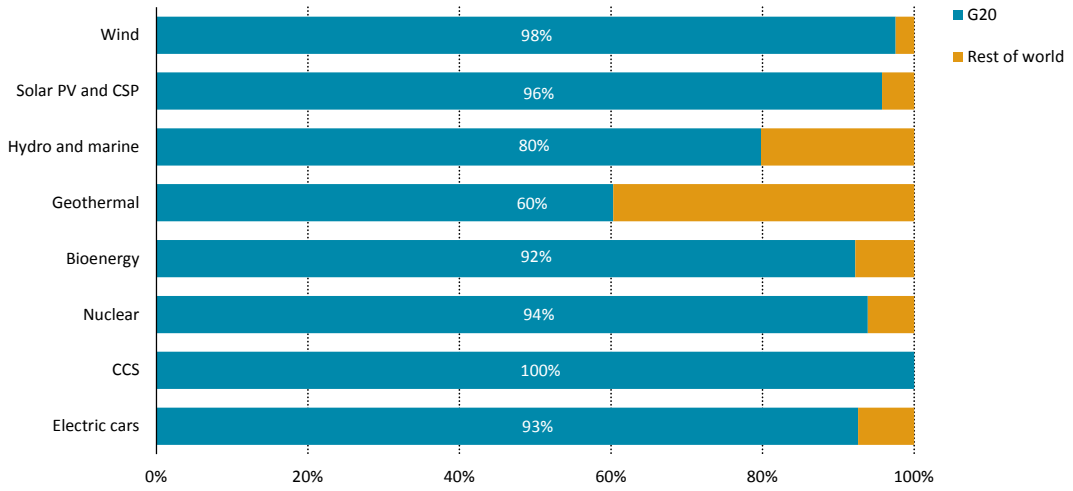

Note: For power generation, shares are by capacity; for electric cars, shares are of stock.
Source: IEA data and analysis.

Key message • The G20 accounts for all but a small proportion of low-carbon technology uptake to date.

Improvements in the energy intensity of the global economy, together with the expanded use of cleaner energy worldwide, have supported a slowdown in energy-related CO_2 emissions: on a global basis, the growth in emissions stalled over 2014 and 2015, amid economic expansion. In previous instances in which emissions stood still or fell compared to the previous year, they were typically associated with global economic weakness.

Figure 1.15 • Changes in GDP and energy demand in selected countries and regions, 2000-14

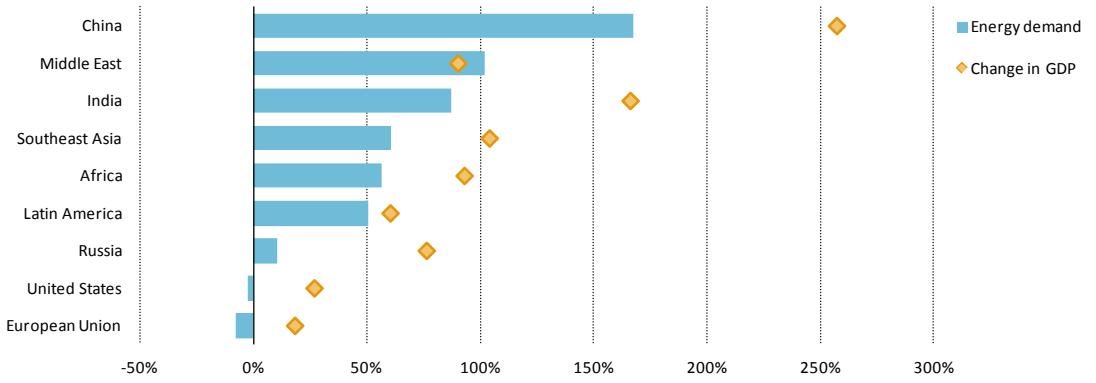

Note: GDP = gross domestic product expressed in year-2015 dollars in purchasing power parity (PPP) terms.
Source: IEA data and analysis.

Key message • Comparing the pace of economic growth from 2000 to 2014 with energy demand growth over the same period shows wide country and regional variations.

Power sector

CO_2 emissions from the power sector worldwide have grown by more than 45% since 2000 (and at a similar rate in the G20), while electricity demand increased by more than 50%, signifying a marginal 3% decrease in the emissions intensity of generation. The modesty of this overall

decrease reflects two counterbalancing factors: on the one hand, the effect of the increasing momentum of renewable energy technologies and the deployment of more efficient combustion technologies; and on the other, the growth of coal-fired electricity generation was equivalent to 44% of the global increase in the total electricity supply. In total, emissions from the power sector accounted for around 45% of all energy-related CO_2 emissions in 2014.

As described previously in this chapter, the pace of investment in renewable sources of power has accelerated in recent years, pushed by increasing policy support and lower costs. The majority of countries in the world now have policies promoting the deployment of renewables in place, in particular for power generation. This support and falling costs have shifted the balance of capacity additions in their favour. In 2015, renewables-based generation technologies accounted for more than half of total power plant capacity additions, outpacing the combined total of fossil-fuelled and nuclear power plants (Figure 1.17).

In the power sector more than any other, the variations in emission intensities between members of the G20 group are especially large. These variations reflect a variety of regional conditions, including the availability of domestic resources, access to international energy markets, as well as the degree of industrial and economic development. Energy policy priorities are also an important factor that is reflected in emission intensities in the power sector. China and India, facing the imperative to provide access to hundreds of millions of people while securing affordable energy for fast growing economies, are the two countries that have accounted for almost three-quarters of the increase in electricity demand in the G20 since 2000 (and 60% of the world's increase). But, over the same period, they managed successfully to bring access to 720 million people (with 600 million people gaining access in India alone and China achieving universal access by end-2015). Both countries are facing significant local air pollution issues, but are pursuing ambitious efforts to increase the penetration of renewables-based generation in their power systems.[18] China alone accounted for one-third of the total global investment in renewables-based capacity in 2015, and has seen the growth in its emissions from power generation slow in recent years. India, meanwhile, where 245 million people still lack access to electricity, is increasingly looking towards solar and wind as part of its efforts to increase its renewables-based generation capacity (excluding large hydropower) to 175 GW by 2022.

Figure 1.16 • Recent power generation capacity additions

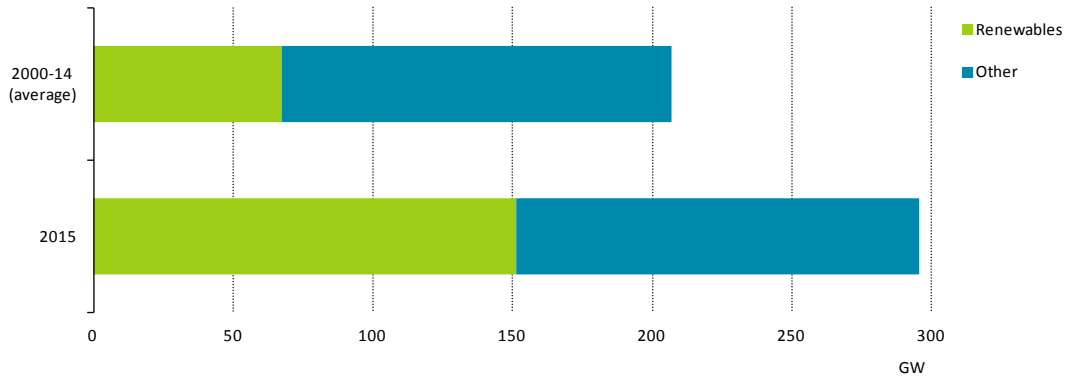

Source: IEA data and analysis.

Key message • Renewables accounted for more than half of total power capacity additions in 2015.

18 See Energy and *Air Pollution: World Energy Outlook Special Report* (IEA, 2016d).

In the United States, the rapid increase in shale gas production has served to reduce natural gas prices and increase the competitiveness of gas-fired generation versus coal, which had been a mainstay of the system. In addition, there has been a strong push for power generation from renewables, with yearly net renewables-based capacity additions over 10 GW in several years since 2009, mainly in wind power and more recently solar PV. The impact on the power mix (and therefore the overall carbon intensity of power generation) has been significant. From 2000 to 2014, the share of coal in the US power generation mix has fallen from over half to 40%, while that of gas-fired generation has increased from 16% to 27% and the share of renewables has risen by nearly five percentage points. Over the period, the overall carbon intensity of power fell by almost 20% (Figure 1.18). Preliminary data for 2015 suggests that the US power mix has continued to move in this direction, with less coal, more gas and a greater contribution from renewables. The United States is one of only two countries in the world where plans for carbon capture in power generation have materialised, with the facility at the Petra Nova coal-fired power plant now in operation and capturing 1.6 million tonnes of CO_2 per year. (The Boundary Dam facility in Saskatchewan, Canada, is the world's only other operational power plant equipped with CCS). A second facility, at the Kemper power plant in the United States, is due to become operational in early 2017, with a power generation capacity greater than the two existing CCS-equipped plants combined.

The switch from oil-fired to gas-fired and renewables generation features prominently in a number of countries among the G20. In Mexico, the availability of relatively cheap natural gas imports from the southern United States has accelerated a significant shift away from oil (the share of oil in generation has fallen from almost half in 2000 to just over 10% in 2014), delivering a 23% decrease in the CO_2 emissions intensity of power generation. Recently, power market reform has created new incentives to tap Mexico's considerable potential for wind and solar power, including through the establishment of a clean energy certificate system designed to provide an additional source of income for investors in low-carbon power. In 2016, two auctions awarded contracts for almost 5 GW of clean power generation capacity to private investors.

In Saudi Arabia, oil and gas had been the sole providers of electricity until solar started to make in-roads in 2012. The country has recently taken steps to reform fossil fuel subsidies and announced a substantial investment programme in renewables, both of which will serve to reduce domestic fossil fuel use. Japan has also taken steps to minimise the use of oil in the power sector for many years; the share of oil in total power generation steadily declined from over 30% in 1990 to 16% in 2000 and less than 10% in 2010. The Fukushima Daiichi nuclear accident in 2011 led to an increase in the use of oil and other fossil fuels in the power sector, temporarily raising the overall carbon intensity of power generation. Since then, aggressive energy efficiency measures and the increased use of renewables (mostly solar PV) helped to return the share of oil in the power mix to near 10% in 2014. As of mid-September 2016, three nuclear reactors had restarted, with others approved in principle but delayed by local opposition or judicial proceedings.

Figure 1.17 • CO_2 intensity of power generation in selected countries and regions

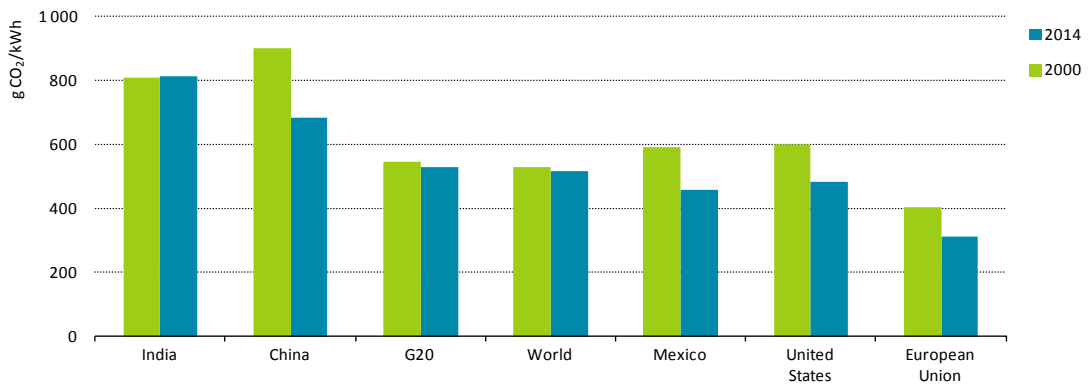

Source: IEA data and analysis.

Key message • The carbon intensity of power generation has been in decline in most regions, but large variations remain.

Transport sector

The global transport sector accounts for 20% of energy-related greenhouse gas emissions, composed almost entirely of CO_2 from the combustion of oil. Emissions have increased by over 30% since 2000, largely as a result of an increase in the vehicle stock by 300 million over this period (Figure 1.19). Over half of the increase in CO_2 emissions came from the G20, with China and India, where growing demand for mobility for the burgeoning middle classes has resulted in 130 million vehicles being added to the automotive stock, leading the way.

The increase in transport-related CO_2 emissions is almost entirely in line with the increase in energy demand in transport, given the sector's heavy reliance on oil-based fuels, with every percentage point increase in transport energy demand bringing about a commensurate rise in emissions. In the G20, the CO_2 emissions intensity of the vehicle stock has increased since 2000, reflecting growth in the average size of the vehicle fleet. This though does not tell the full story. The CO_2 emissions intensity of new cars sold in Europe, for example, has fallen by nearly 30% since 2000, with the rate of improvement accelerating after 2009, when the first emissions standard was introduced. Increasingly stringent standards have since been announced, the latest of which limits emissions to 130 grammes of CO_2 per kilometre (g/km) (with a further target of reducing this to 95 g/km by 2021). Similarly, in the United States, the gradual tightening of the Corporate Average Fuel Economy (CAFE) standards has helped reduce the average CO_2 emissions per kilometre of new passenger vehicles by around 22% since 2000. In Canada, the passage in 2010 of mandatory regulations (setting a target of 98 g/km by 2025) has helped reduce the average CO_2 emissions for new cars sold by over 15%. In Japan, amendments of the Energy Conservation Law since 1999 to introduce ever-increasing fuel-economy standards have helped reduce the CO_2 emissions intensity of new vehicles by more than 35%. Globally, mandatory fuel-economy standards now cover around 80% of passenger vehicles sold. Without these measures, global oil demand would have been 2.3 million barrels per day (mb/d) higher in 2015 (IEA, 2016e). One area in which progress has been slower is the fast growing freight fleet. Only four countries (Canada, China, Japan and the United States) have introduced efficiency standards for heavy-duty freight vehicles. Facilitating the introduction of such standards in other G20 countries, through international collaboration, would yield important climate, local air pollution and health benefits. As an example, worldwide adoption of new emission and fuel standards

could, by some estimates, help avoid 210 000 premature deaths in urban areas annually by 2030 (ICCT, 2013).

In some cities, modal shifts in transport have also played a prominent and increasing role in reducing private car use. In Paris, for example, the introduction of Velib' and Autolib' programmes, which make available shared bicycles and electric-powered cars, and the development of bus and bicycle lanes, has contributed to a 25% reduction in car use (IEA, 2016d).

Figure 1.18 • CO_2 emissions in the transport sector and contributions by region

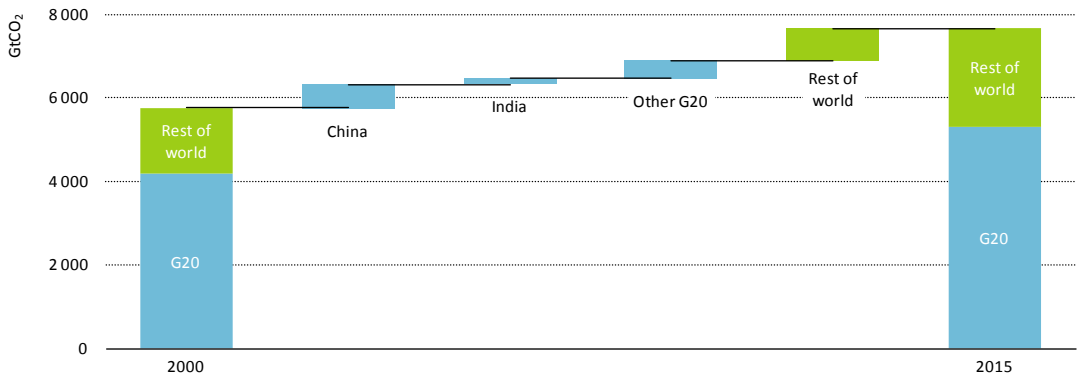

Source: IEA data and analysis.

Key message • Countries outside the G20 account for a growing share of CO_2 emissions from the transport sector.

China, the world's largest market for automotive sales, has seen its stock of passenger vehicles, trucks and buses, more than double in the last five years. The potential for further growth, particularly for personal mobility, is tremendous. At around 100 cars per 1 000 people, ownership rates in China are currently low when compared to the United States (700) and Europe (510) (Figure 1.20). While the emissions profile is currently lower than that of the United States, this mostly reflects the abundance of small cars in China's stock. This makes concerted efforts to increase fuel economy a vital measure to avoid deterioration in environmental indicators as well as a rapid increase in reliance on imported fuels. China introduced fuel-economy standards in 2005, helping to reduce average emissions per kilometre for new cars by around 15%, and has been gradually tightening these since, with the latest Phase IV standards, which came into effect in 2016, setting a standard for light-duty vehicles of 5 litres per 100 kilometres by 2020.

Energy demand for aviation and shipping has grown robustly since 2000 (by 1.4% per year and 1.8% per year respectively), and accounts for around one-fifth of both energy demand and CO_2 emissions in transport. Energy efficiency has mitigated further rises in aviation emissions as engines and air traffic management have improved. Regulations for both aviation and shipping still lag behind those for passenger vehicles, but efforts are now being made. For example, the Energy Efficiency Design Index introduced by the International Maritime Organisation, which entered into force in 2013, is the first globally binding energy efficiency standard for shipping; it mandates a minimum 10% improvement in the energy efficiency per tonne-km of new ship designs from 2015, 20% from 2020 and 30% from 2025.[19] In aviation, many airlines, aircraft manufacturers and industry associations have committed to voluntary, aspirational targets that

19 One policy under discussion in the European Union is the establishment of a Maritime Climate Fund under the current Emissions Trading System, which among other aims, would facilitate investment in technologies to reduce the sector's CO_2 emissions.

would collectively achieve carbon neutral growth by 2020 and a 50% reduction in GHG emissions by 2050 (relative to 2005 levels) (IRENA 2017c).

Figure 1.19 • Passenger vehicle ownership per 1 000 people in selected countries and regions, 2014

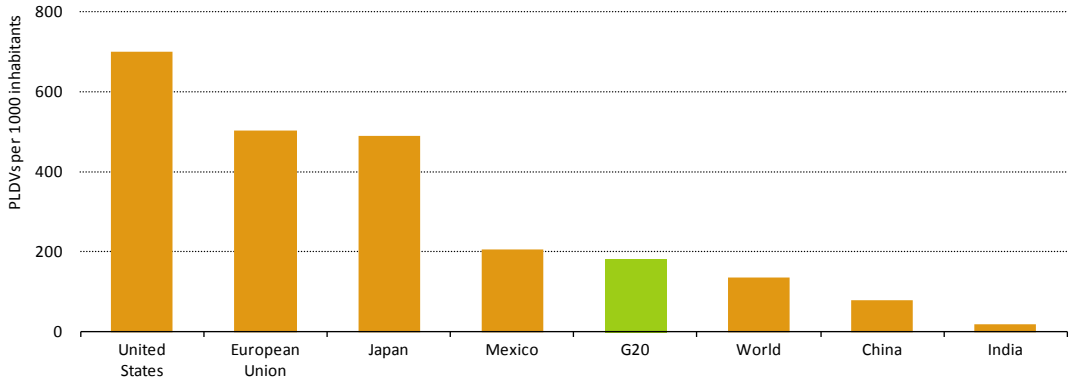

Source: IEA data and analysis.

Key message • Notable discrepancies between G20 countries suggest that there is large scope for increasing vehicle ownership.

Industry sector

The global industry sector accounts for almost 40% of final energy demand and is responsible for one-fifth of global energy-related CO_2 emissions.[20] The G20 accounts for 85% of industrial energy demand and is responsible for three-quarters of industrial natural gas demand, and more than 90% of industrial coal use (China consumes around 65% of all coal used in industry). Three industries (iron and steel, chemicals and cement) account for almost 60% of total industrial demand in the G20 and are responsible for more than 60% of industrial CO_2 energy emissions. Process emissions, which are not energy-related but are generated through chemical processes in the formation of intermediary inputs, are also significant in a number of industries: CO_2 emissions related to the production of clinker, an intermediary input for cement production, are almost twice the energy-related CO_2 emissions in the cement industry globally. In absolute terms, energy-related CO_2 emissions have grown by more than 60% since 2000, with more than four-fifths of this increase from China alone (Figure 1.21), whose consumption of energy in industry is now larger than that of the combined industrial consumption of the OECD countries as a whole.

So far, efforts to mitigate the increase in energy use and emissions in industry have focused on improving energy efficiency, including through the introduction of regulation: in the last 15 years, the share of global final energy consumption in industry that is covered by mandatory energy efficiency regulation has increased to 37% (from virtually nothing), led by efficiency policy in China, which alone accounts for around three-quarters of the global industry consumption that is covered by such regulations. While mandatory energy efficiency regulation is not the only instrument available to policy makers, it becomes particularly important in times when energy prices are low: low prices lengthen the payback period of energy efficiency investments that might otherwise be made on commercial grounds. To date, renewable energy use in manufacturing has received little attention. Yet, renewable energy technologies can be suitable alternatives for process heat generation and as a carbon source for the production of chemical and plastics (IRENA, 2014b).

20 The industry sector includes blast furnaces, coke ovens and petrochemical feedstocks.

Figure 1.20 • Growth in energy-related CO_2 emissions in the industry sector in the G20 and the rest of the world

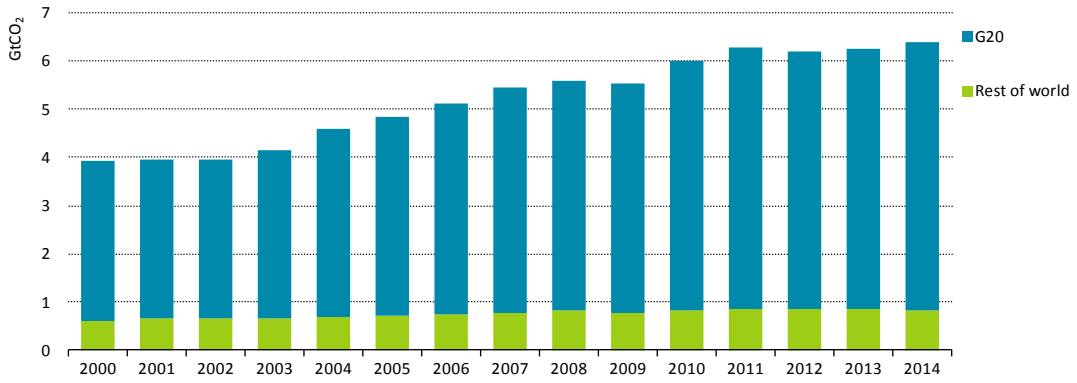

Source: IEA data and analysis.

Key message • The G20 accounts for virtually all of the net increase in CO_2 emissions from industry since 2000.

Buildings sector

Energy consumption in buildings accounts for around a third of final energy consumption, and less than 10% of energy-related CO_2 emissions, meaning that the emissions intensity per unit of energy used in the buildings sector is two-to-three times lower than that of other sectors. However, this does not tell the whole story. It is important to take into account that buildings are also responsible for around half the global demand for electricity and for district heating and cooling; indirect emissions from these sources, at 5.6 Gt, are equivalent to almost twice the direct emissions from buildings (Figure 1.22).

Direct emissions in buildings come from the on-site generation of heat for space and water heating and cooking. The need for space heating has grown at only a moderate pace in the last 15 years, with the greatest increase in energy demand instead coming from the increasing use of appliances and cooling systems, and higher demand for hot water. This is partly a result of the geography of demand: developing countries were responsible for 90% of population growth and 75% of global economic growth (leading to increased access to modern energy services – such as water heating – but also greater numbers of appliances and cooling systems). Direct emissions have stalled over the last three decades, as growth in heat demand was partly mitigated by increasing efficiency in buildings, due in large part to more stringent buildings code. The composition and efficiency of energy provision in this sector has also been affected by other shifts: the switch away from coal towards gas and electricity for heating (globally, the share of coal in the energy mix of buildings has fallen by seven percentage points since 1990, to just 4%); and, particularly in more affluent countries, a shift from oil to gas as a source of heat has occurred. Consumption of district heat has also doubled in the same period, providing heat in dense urban areas and shifting even more direct emissions towards indirect emissions, with most district heating currently produced through fossil fuels in combined heat and power processes or heat plants. Currently, district heating and cooling mainly relies on fossil fuels, and only a few countries have taken advantage of their renewable resource potential or put in place policies that can promote further uptake of renewables. As electrification and electricity use have increased, so too have indirect emissions in the buildings sector, which have increased by 40% since 2000. The emissions profile here mirrors changes in the broader electricity sector (see above). The current use of district cooling in dense urban areas is very low: only a few cities in Europe rely on

district systems to satisfy cooling needs of non-residential buildings (offices, malls, government buildings, etc.).[21]

The emissions intensity of energy use in the buildings sector has been on an upward trend despite more efficient production of energy and efforts to promote energy efficiency (mandatory regulations now cover more than 30% of final energy consumption in the buildings sector). This is attributable to several factors. First, around 2.7 billion people still rely on solid biomass for cooking. Among the many associated health downsides, the traditional use of biomass is inefficient and polluting. A further driver for increased global emissions from buildings is the rising wealth and energy consumption in developing countries, particularly through the acquisition and use of household appliances. In India, the number of people without access to electricity has decreased by 360 million and air conditioning ownership has more than doubled, while in China, refrigerator ownership has also almost doubled.

Figure 1.21 • Direct vs indirect CO_2 emissions in the buildings sector

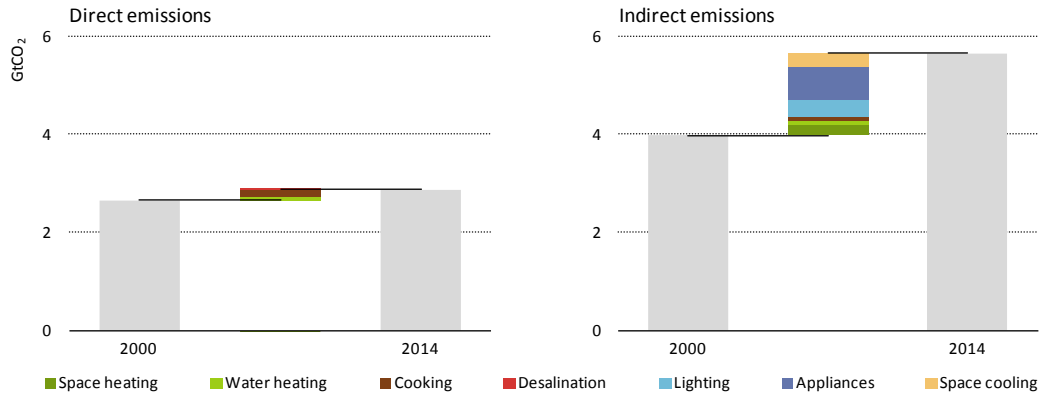

Source: IEA data and analysis.

Key message • Over the last 15 years, indirect CO_2 emissions in the buildings sector increased by 40%, while direct emissions stalled.

Carbon budget

The important role of the energy sector for global GHG emissions, and particularly CO_2 emissions, puts energy into the limelight of climate change. But how much do energy-related GHG emissions have to be reduced to be compatible with climate targets? Recent climate studies have indicated that the average global surface temperature rise has an almost linear relationship with the cumulative emissions of CO_2. This useful relationship has resulted in the concept of a remaining global "CO_2 budget" (the cumulative amount of CO_2 emitted over a given timeframe) that can be associated with a probability of remaining below a chosen temperature target (IPCC, 2014). Despite its importance for climate change, CO_2 is not the only agent to affect global mean temperature. Emissions of non-CO_2 forcers, such as methane (CH_4), nitrous oxide (N_2O) and aerosols, mean that the CO_2 budget must be reduced in order to achieve the same probability of a given temperature rise. While most non-CO_2 emissions originate from non-energy sectors (in particular from agriculture and waste), variations in the projections from these sectors affect the necessary rates of transformation of the energy sector. To allow for this, publications such as the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report associate a range of

21 See IEA, *Energy Technology Perspectives 2016 - Towards Sustainable Urban Energy Systems* (IEA, 2016f)

CO_2 budgets with a given probability of staying below a defined temperature rise: higher non-CO_2 emissions mean a lower CO_2 budget and vice versa (Figure 1.23).

Figure 1.22 • Relationship between temperature rise and CO_2 budgets

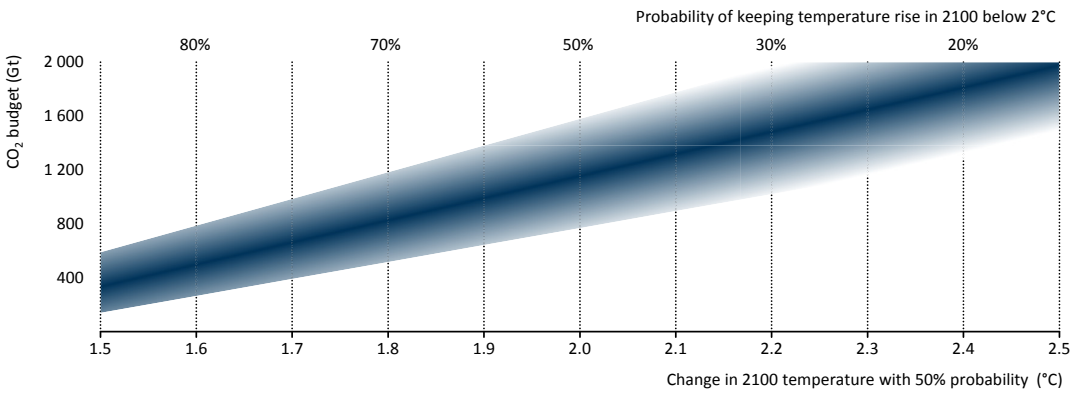

Source: IEA (2016a).

Key message • Remaining CO_2 budgets are very sensitive to small changes in target temperature thresholds and probabilities.

Long-term temperature targets and probabilities often refer only to the temperature rise in 2100. But it is also important to consider the temperature rise over the course of the 21st century. The average global surface temperature rise could temporarily exceed, or overshoot, a given threshold (such as 2°C), before returning to this level in 2100. One key consideration for this is whether or not it might be possible for CO_2 emissions to turn negative in the future. This is possible only if technologies are available that can remove CO_2 from the atmosphere, examples of which include direct air capture, enhanced rock weathering, afforestation and biochar (see Chapter 3). Another example, which is relied upon heavily in deep decarbonisation scenarios assessed by the IPCC, is bioenergy with carbon capture and storage (BECCS). This technology uses bioenergy, produced by photosynthesis that removed CO_2 from the atmosphere when it was growing, to produce electricity, biofuels, hydrogen or heat. With BECCS, the CO_2 emissions that occur during the transformation process are captured and stored, and are therefore prevented from being remitted to the atmosphere. If BECCS were to be deployed on a wide enough scale, and accompanied by decarbonisation of all energy sub-sectors, it is theoretically possible for the entire energy sector to absorb CO_2 emissions from the atmosphere.

Deriving an energy sector CO_2 budget for limiting global warming to 2°C

The Paris Agreement makes reference to keeping temperature rises to "well below 2°C" and pursuing efforts to limit the temperature increase to 1.5°C. However it offers no clear guidance on what "well below 2°C" means in practice, or what probabilities should be attached to the temperature goals.

For the purpose of this report, it was chosen to focus on a scenario with a 66% probability of keeping the average global surface temperature rise throughout the 21st century to below 2°C. Understanding the CO_2 budget consistent with this definition is a critical consideration for modelling the pace and extent of the energy sector transition (Table 1.4).

To generate an estimate of CO_2 budget for a 66% chance of staying below 2°C, it is necessary to estimate levels and rates of non-CO_2 emissions. The IPCC Fifth Assessment Report scenario database, which contains projections of non-CO_2 emissions over the 21st century under a wide

range of scenarios provides a measure of the level of non-CO_2 emissions mitigation that is possible under deep decarbonisation pathways.

Table 1.4 • Energy sector CO_2 budget in the decarbonisation scenarios developed by IEA and IRENA

($GtCO_2$)	2015 - 2100
Total CO_2	880
Industry processes	-90
Land use, land- use change and forestry	0
Energy sector CO_2 budget	790

The analytical tools used in this study directly project all energy-related GHG emissions, both CO_2 and non-CO_2. But for the decarbonisation scenarios developed by IEA and IRENA in the subsequent chapters, non-CO_2 emissions originating from non-energy sectors rely on the scenarios from the IPCC database. Using the climate model MAGICC[22], widely employed in studies assessed in the IPCC reports, the distribution over the non-CO_2 contribution to the temperature rise in 2100 from scenarios in this database that have a reasonable chance of keeping the temperature rise in 2100 below 2°C suggest that non-CO_2 forcers are likely to contribute between around 0.4°C and 0.7°C of warming. In the scenarios developed in this study that have a 66% chance of keeping the temperature rise in 2100 to below 2°C, it was assumed that the contribution of non-CO_2 emissions to the temperature rise in 2100 will be around 0.5°C.

It is important to recognise that the 66% 2°C Scenarios explored in this report keep the temperature rise below 2°C not just in 2100 but also over the course of the 21st century. It does not permit any temporary overshooting of this temperature in any year. The main reason for this working assumption is that permitting a temporary overshoot of a specific temperature rise before falling back to this level in 2100 would imply relying on negative-CO_2 technologies at scale sometime in the future. This is technically feasible, but the assessment of the implications of widespread adoption of BECCS for land-use requirements or the potential uptake of non-energy technologies for CO_2 removal is outside the scope of this report. This means that one unique assumption as to how much CO_2 can be removed in the future cannot be taken. In addition, there are also questions surrounding whether bioenergy can truly be considered to be a low- or zero-carbon fuel (see Chapter 2).

With these assumptions, for the purpose of this study, we estimate that the CO_2 budget between 2015 and 2100 is 880 gigatonnes (Gt). This lies towards the middle of the 590 – 1 240 $GtCO_2$ range from a study discussing CO_2 budgets commensurate with a 66% chance of staying below 2 °C (Rogelj et al., 2016). Nevertheless, as discussed above, many of the scenarios assessed by the IPCC in its Fifth Assessment Report that aim to limit the specific temperature rise in 2100 to 2°C rely heavily upon BECCS such that the global energy sector as a whole absorbs CO_2 emissions from the atmosphere by the end of the century.

The scenarios developed in this study are therefore ambitious in terms of the timing and scope of required energy emissions reductions for meeting the 2°C goal as they offer no possibility to delay CO_2 emissions reduction until negative-emissions technologies are available at scale. Nevertheless, the scenarios offer the possibility for achieving more stringent climate targets in the future, should negative-emissions technologies become available.

To arrive at an *energy sector only* CO_2 budget for the 66% 2°C scenario it is necessary to subtract from the total CO_2 budget those CO_2 emissions not related to fossil fuel combustion in the energy

22 MAGICC = Model for the Assessment of Greenhouse-Gas Induced Climate Change.

sector. These emissions predominantly arise from two sources: industrial processes and from land use, land-use change and forestry (LULUCF).

Annual industrial process emissions are currently around 2 Gt, about 70% of which arises from cement production. With material efficiency and the use of CCS becoming more widespread in a stringent decarbonisation scenario, projections suggest that these emissions would rise marginally to the mid-2020s before declining over the remainder of the century: in 2050, process emissions therefore fall to around 1 Gt. This assumption is used by both institutions in this study in developing decarbonisation scenarios for the energy sector.

Estimates of LULUCF emissions are uncertain. One estimate for 2013 indicated emissions were around 3.3 Gt, but could range from 1.5 $GtCO_2$ to 5.1 $GtCO_2$ (Le Quéré et al., 2015). The high degree of uncertainty arises from the differing methods that can be used to generate LULUCF estimates, the poor quality of land-use change data in some key regions and the difficulty in attributing emissions to human activities or to natural processes. As per agreement by the participating institutions, the outlook for CO_2 emissions from LULUCF used in this study are based on the median of 36 unique decarbonisation scenarios analysed by the IPCC. For this study, the assumption is that CO_2 emissions from LULUCF fall from 3.3 Gt in 2015 to zero by mid-century. LULUCF subsequently becomes a net absorber of CO_2 over the remainder of the 21st century, and, as a result, cumulative CO_2 emissions from LULUCF between 2015 and 2100 are close to zero.

The net effect of these two factors is to reduce the total CO_2 budget from 880 Gt to an energy sector only budget of 790 Gt. This study analyses in detail the transformation of the energy sector between 2015 and 2050, but also takes into account the emissions that might occur thereafter. The challenge is stark: by means of comparison, current NDCs imply that, until 2050, the energy sector would emit almost 1 260 Gt, i.e. nearly 60% more than the allowed budget.

Pursuing efforts to stay below a temperature rise of 1.5°C present unchartered territories. The IPCC indicated that to have a 50% chance of keeping global warming to 1.5°C, the remaining CO_2 budget from 2015 ranges between 400 and 450 $GtCO_2$ (IPCC, 2014). But more recent reports have suggested it could be as low as 50 $GtCO_2$ (Rogelj et al., 2015). Even if the CO_2 budget is at the upper end of this range, at around 400 $GtCO_2$, energy sector emissions would need to fall to net-zero by around 2040, if global energy-related CO_2 emissions cannot turn net-negative at any point (IEA, 2016a).

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Chapter 2: Energy Sector Investment to Meet Climate Goals

Author: International Energy Agency

Key messages

Limiting the global mean temperature rise to below 2°C with a probability of 66% would require an energy transition of exceptional scope, depth and speed. Energy-related CO_2 emissions would need to peak before 2020 and fall by more than 70% from today's levels by 2050. The share of fossil fuels in primary energy demand would halve between 2014 and 2050 while the share of low-carbon sources, including renewables, nuclear and fossil fuel with CCS, would more than triple globally to comprise 70% of energy demand in 2050.

The 66% 2°C Scenario would require an unparalleled ramp up of all low-carbon technologies in all countries. An ambitious set of policy measures, including the rapid phase out of fossil-fuel subsidies, CO_2 prices rising to unprecedented levels, extensive energy market reforms, and stringent low-carbon and energy efficiency mandates would be needed to achieve this transition. Such policies would need to be introduced immediately and comprehensively across all countries for achieving the 66% 2°C Scenario, with CO_2 prices reaching up to USD 190 per tonne of CO_2. The scenario also requires broader and deeper global efforts on technology collaboration to facilitate low-carbon technology development and deployment.

Improvements to energy and material efficiency, and higher deployment of renewable energy are essential components of any global low-carbon transition. In the 66% 2°C Scenario, aggressive efficiency measures would be needed to lower the energy intensity of the global economy by 2.5% per year on average between 2014 and 2050 (three-and-a-half times greater than the rate of improvement seen over the past 15 years); wind and solar combined would become the largest source of electricity by 2030. This would need to be accompanied by a major effort to redesign electricity markets to integrate the large shares of variable renewables, alongside rules and technologies to ensure flexibility.

A deep transformation of the way we produce and use energy would need to occur to achieve the 66% 2°C Scenario. By 2050, nearly 95% of electricity would be low-carbon, 70% of new cars would be electric, the entire existing building stock would have been retrofitted, and the CO_2 intensity of the industrial sector would be 80% lower than today.

A fundamental reorientation of energy-supply investments and a rapid escalation in low-carbon demand side investments would be necessary to achieve the 66% 2°C Scenario. Around USD 3.5 trillion in energy-sector investments would be required on average each year between 2016 and 2050, compared to USD 1.8 trillion in 2015. Fossil fuel investment would decline, but would be largely offset by a 150% increase in renewable energy supply investment between 2015 and 2050. Total demand-side investment into low-carbon technologies would need to surge by a factor of ten over the same period. The additional net total investment, relative to the trends that emerge from current climate pledges, would be equivalent to 0.3% of global GDP in 2050.

Fossil fuels remain an important part of the energy system in the 66% 2°C Scenario, but the various fuels fare differently. Coal use would decline most rapidly. Oil consumption would also fall but its substitution is challenging in several sectors. Investment in new oil supply will be needed as the decline in currently-producing fields is greater than the decline in demand. Natural gas plays an important role in the transition across several sectors.

Early, concerted and consistent policy action would be imperative to facilitate the energy transition. Energy markets bear the risk for all types of technologies that some capital cannot be recovered ("stranded assets"); climate policy adds an additional consideration. In the 66% 2°C Scenario, in the power sector, the majority of the additional risk from climate policy would lie with coal-fired power plants. Gas-fired power plants would be far less affected, partly as they are critical providers of flexibility for many years to come, and partly because they are less capital-intensive than coal-fired power plants. The fossil fuel upstream sector may, besides the power sector, also carry risk not to recover investments. Delaying the transition by a decade while keeping the same carbon budget would more than triple the amount of investment that risks not to be fully recovered. Deployment of CCS offers an important way to help fossil fuel assets recover their investments and minimise stranded assets in a low-carbon transition.

With well-designed policies, drastic improvements in air pollution, as well as cuts in fossil-fuel import bills and household energy expenditures, could complement the decarbonisation achieved in the 66% 2°C Scenario. Achieving universal access to energy for all is a key policy goal; its achievement would not jeopardise reaching climate goals. The pursuit of climate goals can have co-benefits for increasing energy access, but climate policy alone will not help achieve universal access to all.

Introduction

This chapter presents detailed new International Energy Agency (IEA) analysis of the energy sector transformation through 2050 that would be needed if the world is to limit the global mean temperature rise to below 2°C with a probability of 66%, as well as the major reallocation of investment capital that would be required to do so. This assessment uses scenarios to illustrate the degree of difference in policies required and their consequences on energy markets, investment requirements and energy-related emission trajectories. It is one possible interpretation of the "well below 2°C" objective of the Paris Agreement.

Two main scenarios, varying in their assumptions about the evolution of government policies are presented: the New Policies Scenario and the 66% 2°C Scenario. The New Policies Scenario reflects the implications for the energy sector of the climate pledges, known as Nationally Determined Contributions (NDCs), which were made as part of the Paris Agreement. This scenario reflects the result of a detailed quantitative evaluation of the implications of the energy-related components of these pledges, as well as extensive consultation with country representatives and other stakeholders. This assessment was first published in the *World Energy Outlook 2016* (IEA, 2016a), but for the purpose of this report the analysis has been extended to the 2050 time horizon.[23] The other main scenario takes a different approach, describing a trajectory for energy-related emissions consistent with a 66% probability of limiting the long-term rise in global temperatures to less than 2 degrees Celsius (°C), illustrating the scale and speed of the transition that this would necessitate in the energy sector. In addition, we include a comparison with the *World Energy Outlook's* 450 Scenario, the widely used reference for the low-carbon energy sector transition, which maps out an energy future consistent with a 50% chance of staying within a 2°C limit.[24] This scenario was introduced in 2007 and has since been updated on a yearly basis to take account of policy progress, market dynamics, technology cost declines and countries' priorities.

The modelling and analysis incorporates the most recent information available on an array of factors including energy markets, prices and technology costs. On this basis, the analysis

23 The modelling time horizon of the *World Energy Outlook 2016* is 2040.

24 The probability of the temperature increase refers to the end of this century.

determines energy supply and demand outlooks, emissions abatement and investment needs in the energy supply, power generation and end-use sectors (industry, transport and buildings) in the two main scenarios. It also examines the co-benefits for local pollution, energy access and energy security in a transition to a low-carbon energy system and its implications for the energy industry.

Defining the scenarios

The scenarios discussed in this chapter are generated using the IEA's large-scale World Energy Model (WEM). Developed over a period of around 30 years, the WEM generates comprehensive sector-by-sector and region-by-region projections covering the whole energy system from primary energy production to transformation through to final energy consumption (Annex A). The starting year for the projections is 2014, as reliable official market data for all countries were, in most instances, available only up to the end of 2014. For technology costs (such as renewables) and fuels (such as oil) for which more recent data were available, those were fully taken into account in the analysis.

Global gross domestic product (GDP) is assumed to grow at an average annual rate of 3.1% between 2014 and 2050 (measured in terms of purchasing power parity [PPP]), based on economic forecasts by the International Monetary Fund (IMF, 2016), the World Bank and the OECD.[25] The world's population is projected to grow at a slower rate of 0.8%,[26] although there is a high degree of variation between regions. These assumptions remain the same across the various scenarios examined in this chapter.[27] Our analysis here focuses on trends at the global or regional (G20 versus "rest of world") level, although modelling within the WEM is carried out with much greater granularity.

The direction that policy ambitions, as stated in the NDCs, will take the energy sector is illustrated in the **New Policies Scenario**. It assesses the impact on the evolution of the energy system of all the policies and measures that had been adopted as of mid-2016. It also takes account of the targets and policy measures that countries have announced, even if these have yet to be enacted into legislation or the means for their implementation are still taking shape. The energy-related components of the NDCs form a key component of this scenario. The pledges are assessed on an individual country-by-country basis, and, where policies exist to support them and the implementing measures are clearly defined, incorporated into the New Policies Scenario. However, where political, regulatory, market, infrastructure or financing constraints exist, the announced targets may be met later than officially anticipated or not at all. Conversely, there may also be cases in which energy demand, macroeconomic conditions and/or cost trends lead countries to go further and faster than their declared objectives. But the New Policies Scenario incorporates policies beyond NDCs, ranging from policies to increase energy security, fight local pollution and to provide energy access. Nearly 1.2 billion people still lacked access to electricity (25% of which are in G20 countries) in 2014 and over 2.7 billion did not have access to clean cooking facilities and so rely on the traditional use of biomass (50% of which are in G20 countries). Providing modern forms of energy to the world's poorest people occupies a priority place in national policy making in countries without universal energy access and forms a crucial backdrop to the growth in energy demand looking forwards.

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25 Based on the scenarios examined in this chapter, the Organisation for Economic Co-operation and Development (OECD) is conducting a study examining the implications of the energy sector transition for global economic growth (OECD, forthcoming).

26 Based on United Nations Population Division forecast with medium fertility (UNPD, 2015).

27 For further details, see www.worldenergyoutlook.org.

While the New Policies Scenario gives policy makers, investors, consumers and other stakeholders an indication of how policy ambitions as of mid-2016 are likely to shape the energy sector, it should not be considered a forecast. The New Policies Scenario is not an attempt to predict shifts in policy, beyond those already announced, that affect energy supply and use in response to uncertainties such as the pace of economic growth and technology advances. Our analysis shows that the New Policies Scenario does not meet the Paris Agreement temperature limiting objectives, but it provides a sound basis for expectations about developments in the energy sector and their implications for the future, and serves as a guidepost for policies and other factors that need to change in order to meet goals related to economic development, energy security and sustainability (IEA, 2016a).

The **66% 2°C Scenario** – the main focus of this chapter – describes an energy transition of exceptional scope, depth and speed. This is based on the assumption that policies are implemented to follow a trajectory of greenhouse gas (GHG) emissions from the energy sector consistent with the international target "to limit the rise in global average temperature to well below 2°C from pre-industrial levels". The interpretation of this target in this scenario is that energy-related carbon dioxide (CO_2) emissions (from all sources and sectors) are bound by a tight CO_2 budget: as described in Chapter 1, the cumulative amount of energy-related CO_2 emissions between 2015 and 2100 consistent with this carbon budget is 790 gigatonnes (Gt). If energy-related CO_2 emissions were to follow the New Policies Scenario, the entire energy sector CO_2 budget for the 66% 2°C Scenario would be depleted in just over 20 years.

An array of ambitious policies and approaches, and unprecedented deployment of an array of low-carbon technologies would be required to stay within this CO_2 budget and to channel the types of investment that dramatically accelerate the transition to a low-carbon energy sector. CO_2 prices in the industry and power sectors are an essential component and would be introduced across all countries by 2020 in the 66% 2°C Scenario. Staying within the CO_2 budget of the 66% 2°C Scenario would require a price of US dollars (USD) 190 per tonne of CO_2 (t/CO_2) by 2050 in all developed countries, more than three-times the level in the New Policies Scenario, in which the CO_2 price is less than USD 60/tonne in 2050 (where it exists at all).[28] In addition, to facilitate the rapid and transformative worldwide changes across the energy sector in the 66% 2°C Scenario, CO_2 prices would also be necessary in *all* other countries, albeit at lower levels and with a more progressive implementation (Table 2.1).

Table 2.1 • Summary of CO_2 prices in the 66% 2°C Scenario (USD/tCO_2)

	2020	2030	2040	2050
OECD countries	20	120	170	190
Major emerging economies*	10	90	150	170
Other regions	5	30	60	80

* includes People's Republic of China (hereafter "China"), the Russian Federation (hereafter "Russia"), Brazil and South Africa.

Yet even at these unprecedented levels, CO_2 prices alone would be insufficient to stimulate the required pace and extent of energy sector transformation and would need to be accompanied by the phase out of fossil fuel subsidies and additional fuel taxation In addition, the co-ordinated enforcement of mandates, standards, energy market reforms, research, development and deployment (RD&D) and other emissions reduction policies would also be required. These additional measures would be essential across all sectors, and, as with CO_2 prices, go well beyond those enacted to date.

28 For further details on assumptions in the New Policies Scenario, see IEA, (2016a).

Table 2.2 • Selected key policy assumptions in the New Policies Scenario and additional measures in the 66% 2°C Scenario

Sector	New Policies Scenario	66% 2°C Scenario
Cross-cutting measures	• CO_2 prices in specific countries in the power and industry sectors implemented with a variety of delays ranging from USD 25 to USD 60 per tonne in 2050. • Cautious implementation of announced NDCs as part of the Paris Agreement. • All net-importing countries and regions phase out fossil fuel subsidies completely within ten years.	• CO_2 prices in all countries ranging from USD 80 to USD 190 per tonne in 2050 in the power and industry sectors. • Fossil fuel subsidies removed by 2025 in all countries.
Power	• Implementation of GHG emission performance standards, renewable energy mandates and nuclear power development in accordance with NDC targets and national/regional policies.	• Widespread market reforms, including toreflect the value of flexibility. • Introduction of measures to integrate high shares of variable renewables, including RD&D for storage and support for demand-side responses. • Comprehensive GHG emission performance standards. • Widespread renewable energy mandates. • Expansion of nuclear power deployment (where acceptable). • Widespread deployment of CCS for both fossil fuels and bioenergy.
Industry	• Existing energy efficiency mandates and policies extended to 2050. • Standards and financial support for efficient and low-carbon technologies.	• Stringent mandates to realise energy efficiency potentials. • Widespread industrial use of material efficiency. • Widespread deployment of CCS for both fossil fuels and bioenergy. • Extensive support for electrification to meet low-temperature heat demand, especially through the deployment of heat pumps. • Measures to stimulate widespread deployment of direct low-carbon heat (including bioenergy, solar thermal and geothermal)
Transport	• Fuel economy targets for passenger vehicles and light-duty trucks (and heavy-duty trucks in some countries). • Biofuel blending mandates. • Targets for the share of sales for next-generation vehicles. • Realisation of goals for improvements in aviation efficiency. • Sulfur dioxide emission standards for shipping.	• Stringent fuel economy and emissions standards. • Extensive support for electrification of road vehicles and necessary infrastructure including catenary lines for trucks. • Increased taxation of oil-based fuels. • Strong efforts to improve urban planning and increase low-carbon public transport. • International fuel efficiency standards for aviation and shipping, and incentives for biofuels.
Buildings	• Partial implementation of energy efficiency mandates. • Strengthening efficiency standards for appliances and lighting (including full phase out of incandescent light bulbs).	• Mandates to maximise insulation and retrofits for new and existing buildings. • Prioritising the construction of zero-energy buildings. • Phase out of coal and kerosene for cooking. • Enforced phase out of fossil fuel boiler sales by 2025 in all regions, with exceptions. • Extensive support and mandates for electrification including the use of heat pumps, solar thermal and biomass. • Ban of all light bulb sales other than LEDs by 2025.

Notes: The precise policy instruments introduced in each of the scenarios varies across different countries/regions. NDCs = Nationally Determined Contributions; RD&D = research, development and demonstration; CCS = carbon capture and storage; LEDs = light-emitting diodes.

Selected key policy assumptions, for the New Policies and 66% 2°C Scenarios are highlighted in Table 2.2. Additional approaches in the 66% 2°C Scenario include widespread deployment of carbon capture and storage (CCS) in both the power and industry sectors, including initial uses of CCS with bioenergy as a feedstock (which removes CO_2 from the atmosphere) (Box 2.1), a much larger push to electrify end-use sectors, particularly for transport, along with the needed infrastructure, and the direct use of renewables for heat generation and as transport fuels. Given the need for dynamic development to move beyond existing technologies across all sectors, an intensified effort to innovate is also a necessary component of the energy sector transition in the 66% 2°C Scenario to continue meeting rising demand for energy services. This would require both increased private and public investment into RD&D to lower the cost of technologies that would otherwise entail a huge cost to deploy on a widespread basis (IEA, 2016b).

The analysis included in the next section focuses on the main aggregate and sector trends in the period to 2050, with projections for the 66% 2°C Scenario compared with and benchmarked against the New Policies Scenario. The intention is to highlight the differences between the policies and implementing measures that would be required to meet the well below 2°C target on the one hand, and the policies and measures that were actually pledged in the NDCs on the other. The differences in policies encompassed in the two scenarios have a major impact on the projection for carbon-intensive fuels and consequently the outlook for fossil fuel prices diverges markedly (Table 2.3). Oil and gas prices would initially rise from 2015 levels in the 66% 2°C Scenario, given the need to ensure ongoing investments in oil and gas supply to offset the observed declines in current sources of production (see Implications of the 66% 2°C Scenario section). The lower international fossil fuel price levels in the 66% 2°C Scenario relative to the New Policies Scenario would not translate into lower prices for end-use consumers since the decarbonisation policies (fossil fuel subsidies removal, taxation for road fuels, market reforms in the power sector, CO_2 prices, etc.) implemented in the 66% 2°C Scenario would offset these reductions to varying degrees across difference sectors and countries.

Table 2.3 • Fossil fuel import prices by scenario

		New Policies Scenario				66% 2°C Scenario			
	2015	2020	2030	2040	2050	2020	2030	2040	2050
IEA crude oil (USD/barrel)	51	79	111	124	137	73	66	64	61
Natural gas (USD/MBtu)									
United States	2.6	4.1	5.4	6.9	8.9	3.8	4.3	4.2	4.2
European Union	6.9	7.1	10.3	11.5	12.2	6.7	8.3	7.9	7.5
Japan	10.5	9.6	11.9	12.4	12.8	8.9	10.0	9.3	8.9
OECD steam coal (USD/tonne)	64	72	83	87	90	66	63	55	53

Notes: All prices are in real USD (2015) terms. MBtu = million British thermal units. Natural gas prices are weighted averages expressed on a gross calorific-value basis. All prices are for bulk supplies exclusive of tax. The US price reflects the wholesale price prevailing on the domestic market. The European Union gas import prices reflect a balance of liquefied natural gas (LNG) and pipeline imports, while the Japan import price is solely LNG.

Overview of trends in the 66% 2°C Scenario

Energy demand

In the 66% 2°C Scenario, global primary energy demand would be 4% higher in 2050 than in 2014, while fuelling a global economy that is three-times larger (Table 2.4).[29] Indeed, between 2020

29 Primary energy is measured using the physical energy content method (see www.iea.org/statistics).

and 2030, primary energy demand would fall marginally, even though there is robust economic growth of around 3.7% per year. This would represent a profound break with previous historical trends, when economic growth has typically been accompanied by steady growth in energy consumption: for example, annual global economic growth averaged 3.8% per year between 2000 and 2010, while primary energy demand grew by 2.6% on average over the same period.

The key reason for this trend break in the 66% 2°C Scenario would be the comprehensive, systematic, immediate and ubiquitous implementation of strict energy and material efficiency measures. These measures mean that energy would be used much more productively, reducing the overall energy intensity of the economy.[30] A large portion of these measures are assumed to be implemented over the next 15 years and would result in huge changes in the levels and manner of energy consumption across the end-use sectors: for example, about one in three existing buildings would be retrofitted by 2030 and conventional trucks would use 40% less fuel than today, bending an historically flat trend for the first time.

Table 2.4 • Global primary energy mix by fuel in the 66% 2°C Scenario (Mtoe)

	2014	2020	2030	2040	2050	CAAGR* 2014- 50	Difference in 2050 to NPS**
Coal	3 926	3 421	2 032	1 475	1 318	-3.0%	-68%
Oil	4 266	4 260	3 474	2 534	1 760	-2.4%	-63%
Gas	2 892	3 255	3 325	2 789	2 426	-0.5%	-50%
Nuclear	662	816	1 272	1 807	2 021	3.1%	56%
Hydro	335	381	516	639	733	2.2%	25%
Bioenergy***	1 421	1 574	2 038	2 543	2 928	2.0%	48%
Other renewables	181	395	1 228	2 277	3 018	8.1%	120%
Total	**13 683**	**14 102**	**13 885**	**14 064**	**14 204**	**0.1%**	**- 26%**
Fossil fuel share	*81%*	*78%*	*64%*	*48%*	*39%*	*n.a.*	*-47%*
Renewables share	*14%*	*17%*	*27%*	*39%*	*47%*	*n.a.*	*128%*
*Low-carbon share****	*19%*	*23%*	*39%*	*59%*	*70%*	*n.a.*	*153%*

*Compound average annual growth rate. **New Policies Scenario. *** Includes traditional and modern biomass use and bioenergy from waste. **** Includes nuclear, hydro, bioenergy, other renewables and fossil fuel use with CCS.

After 2030, there would be a slight increase in primary energy demand in the 66% 2°C Scenario. In parallel with this massive deployment of energy and material efficiency measures in the earlier part of the projection period, there would need to be a concurrent scaling up of electrification in a number of end uses, particularly in the transportation sector, and a massive infrastructure build-up to accommodate the new electric car and electric truck fleets. However, because much of this increase is building from a low base (e.g. less than 0.1% of the global vehicle fleet in 2015 was electric), this growth takes time to have a significant impact on overall energy demand. After 2030, underpinned by this growth in electrification, primary energy demand therefore would rise marginally.

Outlook by fuel

The share of fossil fuels in the overall primary energy fuel mix would plunge from 81% today to 39% in 2050 in the 66% 2°C Scenario (compared with around 73% by 2050 in the New Policies Scenario). Coal would fall throughout the 66% 2°C Scenario at a particularly rapid rate to less

30 Energy intensity is measured as total primary energy demand per unit of gross domestic product expressed in market exchange rates.

than half of today's level just after 2030 and to two-thirds lower by 2050, levels not seen since the 1960s. Most significant is the decline of coal in the power sector, which by 2050 would be nearly 80% below today's level. Over 65% of the remaining coal consumption in 2050, most of which is in the power and industry sectors, would be in conjunction with CCS.

Oil use would peak around 2020 in the 66% 2°C Scenario, with the decline in demand accelerating over the course of the subsequent decade. Throughout the 2030s, oil demand falls by around 2 million barrels per day (mb/d) every year, such that in 2050 demand would be 60% below today's level at less than 40 mb/d – also a level not seen since the 1960s. The sole sector in which oil demand would increase is the chemical industry, due to the difficulty of finding alternatives to oil as a petrochemical feedstock. By 2050 the use of oil as a feedstock would account for around 30% of total oil consumption, up from just over 10% today. Such a drastic shift for oil demand represents a huge challenge both to the oil industry and to those countries heavily reliant upon oil exports for fiscal revenue (see Implications of the 66% 2°C Scenario section).

Natural gas would fare best among the fossil fuels in the 66% 2°C Scenario: demand increases through to the mid-2020s. Over 70% of this initial increase is related to fuel switching in the power sector as natural gas displaces coal-fired generation over the next decade in countries that have or can mobilise the necessary resources and infrastructure. After 2025, however, natural gas-fired generation would be displaced by lower carbon sources of electricity and therefore gas demand in the power sector falls, on average, by 2.5% each year between 2025 and 2050.

Natural gas demand in the buildings sector would fall by 400 billion cubic metres (bcm) in the period to 2050, a drop of more than 50% as efficiency measures and low-carbon alternatives are widely adopted. This would be offset to some extent by an increase in natural gas demand in a number of other areas, most notably road transportation, as a bunker fuel and petrochemical feedstock. But this growth would be insufficient to offset the lower demand in the power and buildings sectors (alongside smaller changes elsewhere). As a result, natural gas demand would decline after 2025.

All low-carbon sources of energy exhibit rapid growth in the 66% 2°C Scenario. There is a particularly quick uptake of CCS after 2025. In 2025 there would be nearly 15 gigawatts (GW) of power generation capacity equipped with CCS (compared with less than 0.2 GW today), which would expand to almost 130 GW by 2030 and then further swell by a factor of four over the next ten years. By 2050, CCS-equipped generation capacity is over 600 GW and accounts for just under 10% of total electricity generation. The use of bioenergy would more than double in the period to 2050, and, by 2030, exceed coal demand. Biofuels would play an increasingly important role in decarbonising the transportation sector, in particular road freight, aviation and shipping: shortly before 2050, more biofuels are consumed in the transportation sector than gasoline and by 2050, consumption of biofuels would reach almost 12 mboe/d. The use of bioenergy with CCS (BECCS), offers an important opportunity to generate net-negative CO_2 emissions in the energy sector. By 2050, power generation capacity equipped with BECCS would be nearly 50 GW and some industrial sub-sectors (e.g. paper and cement) would also be employing BECCS technologies.

The most rapid growth would be in renewable sources of energy other than hydropower and bioenergy, particularly wind, solar photovoltaic (PV) and concentrated solar power. Collectively, they increase by a factor of 15 between 2014 and 2050 and just before 2050 become the largest component of primary energy demand, overtaking bioenergy. Annual increases in electricity generation from wind would be more than 12% and from solar by 18% over the next 15 years: together, they would account for the largest source of electricity by 2030.

Box 2.1 • Bioenergy – a precious commodity in a low-carbon world

Today, bioenergy is mainly used in two distinct manners. The "traditional" method is solid biomass for cooking, typically using inefficient stoves in poorly ventilated spaces. In 2014, over 2.7 billion people – nearly 40% of the world's population – did not have access to clean cooking facilities and so around 770 million tonnes of oil equivalent (Mtoe) of bioenergy was consumed in traditional uses. The noxious particles emitted by burning biomass are linked to more than three million premature deaths a year, mostly women and children (IEA, 2016c). More "modern" methods use bioenergy as a feedstock for the production of synthetic fuels or electricity, as a substitute for petrochemicals or to be combusted directly for heat. In 2014, modern bioenergy consumption was around 650 Mtoe.

The cultivation of bioenergy is based on processes of photosynthesis which remove CO_2 from the atmosphere. The CO_2 is returned to the atmosphere when the bioenergy is consumed. In our analysis, bioenergy is considered to be a zero-carbon fuel (although it is important to recognise that for this to be the case there must have been only a negligible amount of CO_2 emitted during cultivation and conversion of the land to be suitable for growing bioenergy). However, with modern bioenergy uses, it is also possible to capture and store the CO_2 that is emitted when the bioenergy is consumed. The life-cycle emissions of this process, called bioenergy with carbon capture and storage (BECCS), can therefore be negative. In other words, the use of BECCS technologies in the supply of electricity, heat or liquid fuels represents a net sink of CO_2, which is removed from the atmosphere and sequestered permanently.

In decarbonisation pathways, bioenergy, both with and without CCS, typically becomes an important mechanism to lessen reliance on fossil fuels and so to reduce CO_2 emissions in a number of end-use sectors. However, the amount of bioenergy available in a given year is not unlimited. The land required to produce bioenergy is multi-functional and can be used for a variety of purposes including food, feed, timber and fibre production, as well nature conservation. The level of bioenergy that can be produced in a sustainable manner, which takes into account competing uses and minimises local factors such as water stress, is therefore a key consideration in assessing its potential to help in the low-carbon energy transition. While there is a high degree of uncertainty in the amount of sustainable bioenergy that can be supplied for energy purposes, a commonly quoted figure for the global potential is around 100 exajoules (EJ) or 2 400 Mtoe (for use in modern technologies only) (Rose et al., 2013).

As a result of such availability constraints, bioenergy becomes an increasingly valuable commodity in the 66% 2°C scenario. In addition, when working to a strict trajectory for decarbonisation, it becomes increasingly important to ensure that bioenergy is used, wherever possible, by technologies with higher shares of CO_2 that can be captured. When using BECCS, only CO_2 produced when the bioenergy is converted can be captured: the various conversion processes for bioenergy therefore result in different potential levels of CO_2 removal. For example, when bioenergy is transformed into electricity or heat, it is possible to capture nearly all of the CO_2 during the transformation process at a point source. Conversely, biofuels for use in transport, even if produced using BECCS, will produce CO_2 that cannot be captured when the fuel is combusted. While biofuels may offer an attractive option to decarbonise some end-use sectors, there may be greater benefit in producing electricity or heat with BECCS since this will remove a greater level of CO_2 from the atmosphere. Allocating bioenergy most effectively across the different end-use sectors becomes an increasingly important consideration when pursuing an ambitious decarbonisation agenda. In the 66% 2°C Scenario, biofuels play a key role in decarbonising transport, particularly in aviation and shipping. But, in 2050, the transport sector would account for less than 25% of total modern bioenergy consumption while the power sector would consume around 40%, given the higher share of CO_2 that it can remove from the atmosphere.

Regional trends

All regions would need to undertake a prolonged and dramatic drop in energy intensity in the 66% 2°C Scenario, as energy and material efficiency measures take effect. The energy intensity of the G20 group would need to fall by more than 60% in the period to 2050 (Figure 2.1) and total primary energy demand to peak around 2020. From 2020 to 2050, energy demand in G20 countries would fall by around 0.2% per year even with economic growth of nearly 3% per year. There are similarly significant improvements elsewhere. Energy intensity in the 66% 2°C Scenario falls by a similar percentage in the non-G20 countries even though their total energy demand continues to grow, led by Africa and the Middle East. Nevertheless, energy demand in the G20 group would still remain more than twice the level of the rest of the world even by 2050. The increase in energy demand of less than 40% between 2014 and 2050 in countries outside the G20 is even more striking when considered alongside the other demographic changes that occur during this period. For example, three-quarters of the increase in the global population occurs in countries outside the G20 (an expansion of 1.8 billion people), while the percentage of people without access to electricity drops from one-third in 2014 to 10% in 2050. Many of these countries also have an expanding wealthy middle class increasingly seeking access to mobility and other energy services.

Figure 2.1 • Primary energy demand by fuel and energy intensity by region in the 66% 2°C Scenario

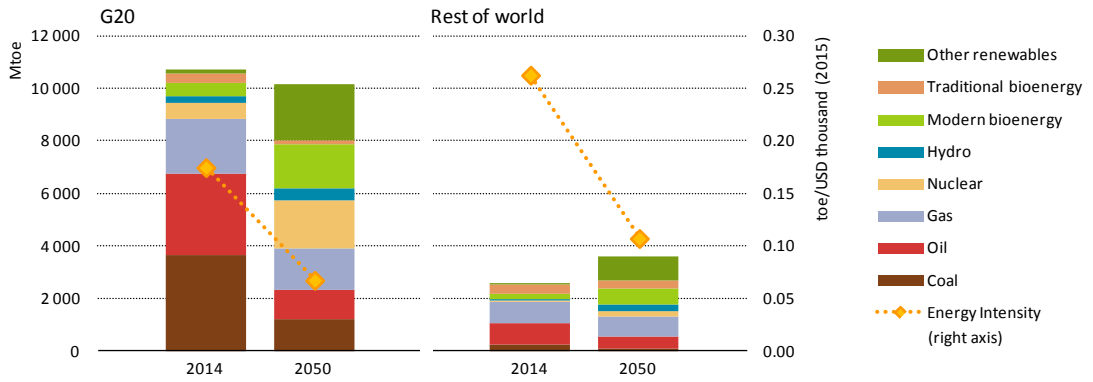

Notes: Mtoe = million tonnes of oil equivalent; toe = tonne of oil equivalent; MER = market exchange rate.

Key message • Energy intensity decreases 60% and there is a substantial shift away from fossil fuels in the G20 countries.

The use of bioenergy would need to expand substantially over the period in the G20 and elsewhere. By 2050 in the G20, the largest portion (over 700 Mtoe) is for use in the power sector (increasingly with CCS to mitigate GHG emissions) while demand in the industry, transport and buildings sectors each accounts for about 350 Mtoe. The use of solid biomass for cooking falls in the G20 countries in the 66% 2°C Scenario. Decarbonisation policies help improve access to clean cooking facilities as renewable sources of electricity in urban areas displace the use of liquefied petroleum gas (LPG). This means that additional levels of LPG would be available to be used in modern cookstoves in rural locations. However in the absence of specific policies to address access to clean cooking facilities, the energy transition may make switching to cleaner fuels and technologies more difficult for the poorest people. In the absence of dedicated policies in the 66% 2°C Scenario, more than 1.3 billion people, mostly outside G20 countries, would still lack access to clean cooking facilities in 2050. While this is a significant improvement over today's level of 2.7 billion people, lack of energy access nonetheless remains a significant contributor to premature deaths and poverty.

Energy trends in the 66% 2°C Scenario relative to the New Policies Scenario

Effective implementation of the measures assumed in the 66% 2°C Scenario would have profound implications for global energy demand and GHG emissions. The striking differences from the trends in the New Policies Scenario are highlighted in Figure 2.2, starting with the overall projection for primary energy demand. While overall global demand would flatten in the 66% 2°C scenario, a less dramatic policy push for energy and material efficiency in the New Policies Scenario means that world primary energy demand expands by nearly 40% between 2014 and 2050.

The contrasts are particularly sharp in relation to the trajectories for fossil fuels. In the 66% 2°C Scenario, demand for all types of fossil fuels would decline in the period to 2050; in the New Policies Scenario, demand for all fossil fuels increases. Coal and oil exhibit the largest difference between the two scenarios: in the case of oil, demand in 2050 in the 66% 2°C Scenario is some 65 mb/d lower than in the New Policies Scenario. Oil demand in 2050 would be at least 50% lower across all regions, with the largest absolute differences occurring in major G20 countries. Natural gas would initially grow to 2025 but by 2050 consumption would be 16% below current levels in the 66% 2°C Scenario, compared with a nearly 70% increase between 2014 and 2050 in the New Policies Scenario. Natural gas demand increases by nearly 50% in the G20 countries in the New Policies Scenario between 2014 and 2050 (but falls by almost 25% in the 66% 2°C Scenario) and by 110% in the rest of the world (but would largely stay flat in the 66% 2°C Scenario). Wind and solar are the energy sources that grow most rapidly in both scenarios, but the rate of growth over the period to 2050 in the New Policies Scenario is less than half that in the 66% 2°C Scenario.

Figure 2.2 • Global primary energy demand by fuel in the New Policies and 66% 2°C Scenarios

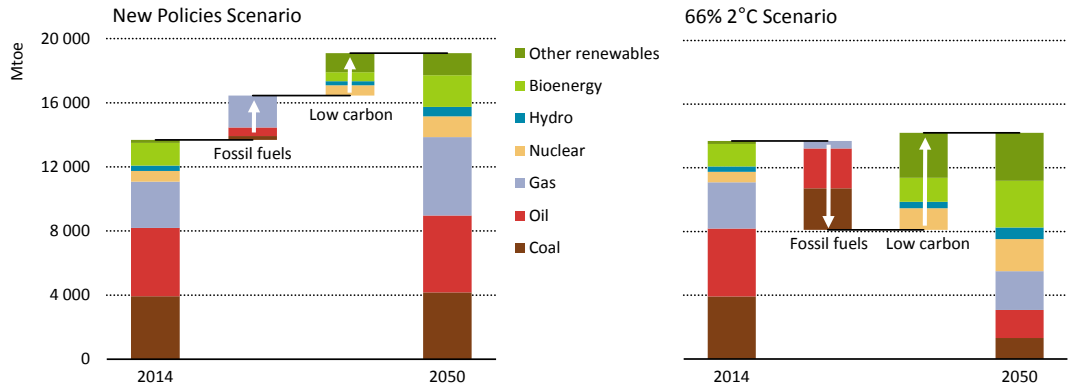

Key message • All energy sources increase to meet demand growth in the New Policies Scenario, while the growth in low-carbon sources offsets the declines in fossil fuels in the 66% 2°C Scenario.

On a sectoral level the largest difference is in the transport sector, where nearly 1 500 Mtoe less fuel would be consumed in the 66% 2°C Scenario than in the New Policies Scenario, partly as a result of increased energy efficiency and partly because of a shift to electric vehicles and bioenergy. There are also sizeable shifts in both the industry and buildings sectors, which each would consume around 1 000 Mtoe less energy in 2050 in the 66% 2°C Scenario. Differences in fossil fuel use account for the majority of this reduction (particularly coal in industry and natural gas in buildings), but electricity consumption is also markedly lower in the 66% 2°C Scenario in both sectors given the substantial effort to use energy more efficiently. Some of the difference is offset by a greater direct use of renewables in both sectors in the 66% 2°C Scenario, which is driven mainly by solar thermal with a smaller contribution from geothermal. This change is most

notable in the industry sector. Direct use of renewables currently plays an increasing but modest role in the industry sector and their growth in the New Policies Scenario remains limited. In contrast, in the 66% 2°C Scenario, they would grow rapidly (at over 17% per year on average) to contribute nearly 7% of total industrial energy demand by 2050, an order of magnitude greater than in the New Policies Scenario.

Energy-related CO_2 emissions

The reduction in energy-related CO_2 emissions in the 66% 2°C Scenario would be much more pronounced than the changes projected in energy demand. Emissions would peak before 2020 in this scenario and exhibit an accelerating decline to the 2030s, when annual emissions would fall by just over 1 gigatonne per year (Gt/year). Between 2014 and 2050, the rate of decline in global CO_2 emissions would average just over 3.5% per year, and, by 2050, these emissions would be less than 9 Gt, more than 70% below current levels. This is a hugely ambitious pace of decline that would require robust policy support. To place it in context, global CO_2 emissions over the past 40 years grew at less than 2% per year and the fastest rate of growth sustained over a ten-year period was less than 3% (during the 2000s). In other words, the rate of emissions decline in the 66% 2°C Scenario would surpass the fastest rate of growth ever seen over an extended period and sustain this pace of decline over a period of 35 years.

All regions would need to contribute to CO_2 emissions reductions in the 66% 2°C Scenario, although there is a large degree of variation between them depending on their current level of emissions and the anticipated pace of economic growth over the next 35 years (Figure 2.3). Average CO_2 emissions per capita on a global basis would fall below 1 tonne per person just before 2050 (from around 4.4 tonnes per person today).

Figure 2.3 • Energy-related CO_2 emissions by region in the 66% 2°C Scenario

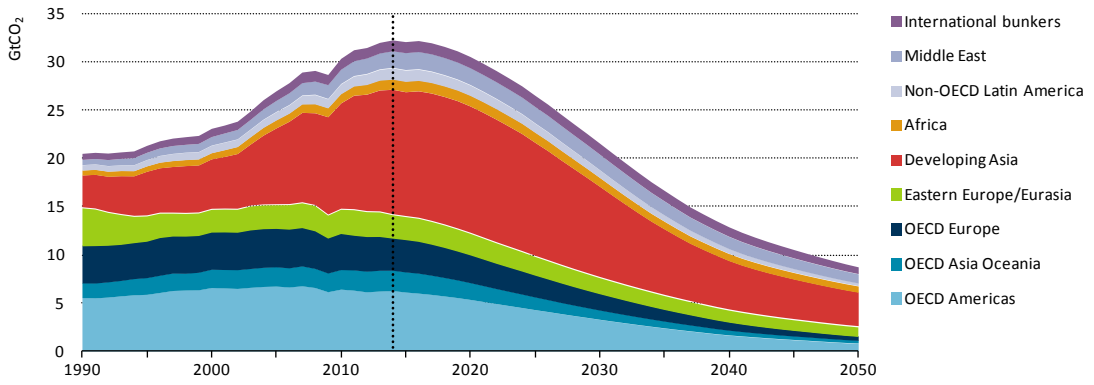

Key message • Global CO_2 emissions fall to less than 9 Gt in 2050, with all regions contributing.

As discussed in Chapter 1, the 66% 2°C scenario is formulated on the need to keep within a tight cap on CO_2 emissions. But this does not mean that, in order to stay within the temperature threshold, efforts are required only to reduce CO_2 while emissions of other greenhouse gases such as methane (CH_4) and nitrous oxide (N_2O) can continue to grow. The opposite is true: the 66% 2°C Scenario includes a dramatic reduction in all major sources of non-CO_2 gases both within and outside the energy sector. In the energy sector, on a CO_2 equivalent basis,[31] global GHG emissions fall by 35% between 2014 and 2030 (compared with CO_2 emissions that fall by just over

31 There are different ways to evaluate the effects of methane on global warming. CO_2 equivalent figures are generated on the basis of the 100-year global warming potential of fossil CH4 and N2O of 30 and 265 respectively.

30% in the same period), with early action targeting CH_4 emissions released during fossil fuel production.[32] Without determined action on reducing energy sector non-CO_2 forcers, the CO_2 budget available to the energy sector would be reduced markedly, amplifying the required pace of reduction in CO_2 emissions and thus further complicating the energy sector transition.

Emissions trends in the 66% 2°C Scenario relative to the New Policies Scenario

The outlook for CO_2 emissions in the 66% 2°C Scenario represents a very sharp contrast with that of the New Policies Scenario. In the New Policies Scenario, which takes into account countries' pledges in their NDCs to the Paris Agreement, CO_2 emissions continue to increase to reach slightly more than 37 Gt by 2050. Cumulative energy-related CO_2 emissions between 2015 and 2050 in the New Policies Scenario are around 1 250 Gt, about 75% higher than the carbon budget consistent with a 66% chance of keeping the temperature rise below 2°C.

An unprecedented effort to mitigate CO_2 emissions would be required to remain within the carbon budget of the 66% 2°C Scenario. In absolute terms, much of the required savings would need to come from the countries with the highest levels of CO_2 emissions in the New Policies Scenario. For example, the G20 countries collectively account for around three-quarters of the cumulative emissions in the New Policies Scenario to 2050. The G20 therefore also accounts for around three-quarters of the 540 Gt reduction in cumulative emissions between the 66% 2°C Scenario and New Policies Scenario (Figure 2.4).

Figure 2.4 • Global CO_2 emissions abatement by technology and region in the 66% 2°C Scenario relative to the New Policies Scenario

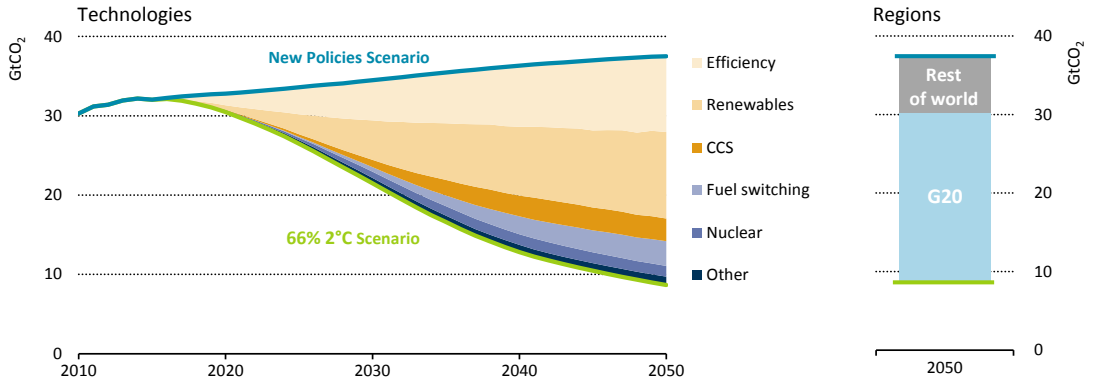

Key message • G20 countries provide almost three-quarters of the emissions reductions in 2050 between the 66% 2°C and New Policies Scenarios.

The largest contributions to global energy-related CO_2 emissions abatement come from two sources: energy and material efficiency, which reduces both material and energy use;[33] and in the use of renewables in power generation, heat, and transport (i.e. biofuels). Both areas would be responsible for around one-third of the CO_2 savings in 2050 in the 66% 2°C Scenario, relative to the New Policies Scenario. Energy and material efficiency efforts would provide the largest contribution to emissions savings up to 2030. There are numerous additional energy efficiency

32 The World Energy Outlook 2017 will contain an analysis of the level of methane emissions, and the scope and costs of efforts to reduce them.

33 The emission reductions from efficiency measures include direct savings from lower fossil fuel demand and indirect savings as a result of lower electricity demand which reduces GHG emissions from power generation. The results take into account direct rebound effects as modelled in the IEA's World Energy Model. Direct rebound effects are those in which energy efficiency increases the energy service gained from each unit of final energy, reducing the price of the service and eventually leading to higher consumption.

measures, e.g. for appliances and lighting in buildings, boilers in industry and buildings, and fuel economy standards in transport, that are deployed in the near term in the 66% 2°C Scenario, but which are not adopted in the New Policies Scenario as existing policies are not sufficient to support their deployment. Supported by extensive new policy measures, the 66% 2°C Scenario also contains an array of ambitious improvements in material efficiency, none of which are implemented in the New Policies Scenario. These measures include light-weighting of products such as plastic bottles, paper and cars, and increased recycling and re-use of materials. While it would remain a challenge to mobilise stringent efficiency measures in such a short period of time, doing so has an immediate impact on emissions reduction in this scenario.

There has been an impressive scaling up of renewable energy options in recent years. In 2015, renewables, for the first time, accounted for more than half of all new electricity generating capacity installed worldwide. This momentum is maintained in the New Policies Scenario based on existing and planned policies for renewable energy. In the 66% 2°C Scenario, the deployment of renewables accelerates out to the end of the 2020s (and deployment maintains robust thereafter). Nevertheless, it takes a longer period for there to be a sizeable difference between the two scenarios in renewable energy supply (and consequently a longer period until there is a substantial difference in related emission reductions). Electricity generation from renewables increases on average by 7% per year over the next 15 years in the 66% 2°C Scenario, compared with 4.4% per year in the New Policies Scenario (which is similar to the average rate of growth of 4.5% seen over the past 15 years). Coupled with some degree of scale-up of negative emissions technologies in the power sector in the 66% 2°C Scenario, the contribution to emissions reduction from renewables therefore would become more pronounced over time.

Carbon capture and storage would become increasingly vital for reducing energy-related emissions in the power and industry sectors. CCS accounts for just over 10% of global CO_2 savings in 2050 in the 66% 2°C Scenario relative to the New Policies Scenario. Worldwide electricity generation from nuclear power nearly doubles in the New Policies Scenario over the period to 2050, while its contribution would triple in the 66% 2°C Scenario with nuclear providing 6% of the emissions savings in 2050. There is also a notable contribution from fuel switching (15% of the savings in 2050), which includes shifts from coal in the power sector and from oil in transport.

Figure 2.5 • Global CO_2 emission reductions by sector in the 66% 2°C Scenario relative to the New Policies Scenario

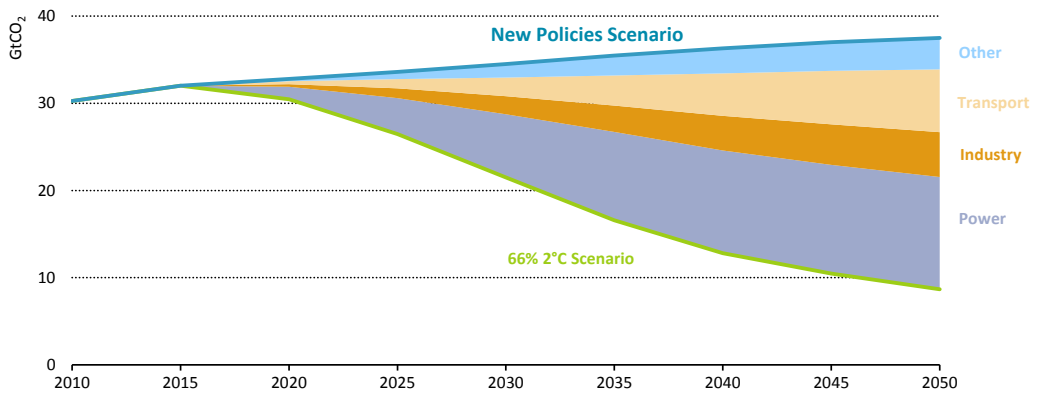

Key message • The power sector accounts for around half of the emissions savings in 2050.

The power sector provides the largest contribution to global CO_2 abatement, accounting for around half of the cumulative abatement relative to the New Policies Scenario between 2014 and 2050 (Figure 2.5). The rapid phase out of unabated coal plants (i.e. those not equipped with CCS),

particularly older plants with lower conversion efficiencies, is very effective in curbing global CO_2 emissions in the early period, while in later periods, an increasingly large part of the additional CO_2 savings come from increased investment in renewable sources for power generation as electricity demand increases. By 2050, several G20 countries would have close to zero CO_2 electricty in the 66% 2°C Scenario, and the global average CO_2 intensity of electricity generation would be one-tenth of that in the New Policies Scenario.

The transport sector would provide the second-largest contribution to CO_2 savings, accounting for around 20% of the cumulative savings between 2014 and 2050 in the 66% 2°C Scenario. Transport makes less of a contribution in the early part of the projection period. While policies would underpin accelerated deployment of electric vehicles, it would take time – given their current low numbers on the road and the need for infrastructure build-up – to have a sizeable impact on oil demand and emissions reduction. Nevertheless, by 2030 there would be more than 750 million electric vehicles (motorbikes, passenger cars, trucks and buses) on the road and nearly 3 billion by 2050 – a twenty-fold increase from today's level. Nearly 60% of electric vehicles would be passenger cars, but electrification also extends to freight transport in the 66% 2°C Scenario. By 2050 nearly 50% of trucks would be electric and a large number of motorways would be equipped with electrified overhead (catenary) lines since batteries alone do not support long-haul journeys. Fuel efficiency standards and biofuel mandates in aviation and maritime transport also provide increasing contributions to emissions reductions over time and the use of biofuels would expand to nearly 12 mboe/d by 2050, a seven-fold increase on today's level.

The industry sector would provide around 17% of the cumulative emissions savings in the period to 2050. The introduction of CO_2 prices across all regions, alongside the use of wide ranging decarbonisation and efficiency mandates, results in the full realisation of material and energy efficiency potentials, a 40% increase in the use of electricity (especially for low-temperature heat), an unprecedented increase in the use of renewable heat, and the extensive deployment of CCS across a range of industrial processes.

Investment needs

From an investment perspective, the energy sector transition in the 66% 2°C Scenario would require not only more capital expenditure, but also a fundamental reallocation of capital compared with today's portfolio. Compared with current trends and those projected in the New Policies Scenario, a large, sustained increase in the capital flows for low-carbon energy options and efficiency measures would be an essential prerequisite. Meanwhile, continued investment in fossil fuel extraction (albeit at a lower level) would still be needed.

Over USD 120 trillion of energy-related investment worldwide in the period to 2050 would be required in the 66% 2°C Scenario (Table 2.5).[34] Around half of this investment is for supply-side technologies including fossil fuels, biofuels and electricity (generation, and transmission and distribution). The other half is for demand-side low-carbon technologies, including investment into more efficient technologies that moderate energy and material use in end-use sectors, which accounts for around one-third of total investment in the 66% 2°C Scenario. The remaining investment is for technologies that help to reduce direct energy-related emissions in the end-use sectors. In the transport sector, this includes the additional capital spent on electric or natural gas vehicles and trucks that displace the use of conventional vehicles, excluding the infrastructure investment needs related to this electrification. In the industry and buildings sectors, it includes investment for the use of renewable sources that can generate heat for direct

34 Cumulative investment numbers are undiscounted.

use, e.g. solar thermal, geothermal and biomass, as well as expenditure to install CCS in energy-intensive industries.

Table 2.5 • Cumulative global supply- and low-carbon demand-side investment in the 66% 2°C Scenario, 2016 – 2050

	Supply- side investment					Demand- side investment		Total
USD billion (2015)	Oil	Gas	Coal	Electricity	Biofuels	Efficiency	Other**	
World*	**7 346**	**7 456**	**731**	**39 576**	**2 221**	**39 071**	**26 207**	**122 607**
Of which: G20	4 853	4 708	641	28 944	1 963	30 509	22 449	94 066

*Includes inter-regional transport. **Includes investment in road transportation, CCS and direct renewables in industry and buildings but excludes investment in infrastructure.

Of the total level of investment in the 66% 2°C Scenario, around 13% would be required for the supply of fossil fuels. Most of this is needed for oil and gas extraction, despite the rapid reduction in oil demand in this scenario (averaging over 2% per year between 2014 and 2050). This is because the natural decline from producing oil fields is generally much higher than the decline of demand. The reduction in demand for natural gas is less pronounced than for oil in the 66% 2°C Scenario and continued investment in its development remains essential. In the New Policies Scenario, around 85% of oil and gas upstream investment is required simply to compensate for declines at existing fields. This provides a natural hedge against the risk of stranded assets in the upstream sector (see Implications of the 66% 2°C Scenario section). Continued investment in fossil fuel supply remains a necessary feature of the low-carbon transition in the 66% 2°C Scenario.

The largest portion of supply-side investment would be for power generation, the vast majority of which is focused on low-carbon technologies. Effectively no new unabated coal-fired power plants (i.e. those without CCS) would be built in the 66% 2°C Scenario, other than those currently under construction and the least-efficient coal-fired power plants would be phased out by 2030 in most regions and in all regions by 2035. Renewables would account for half of the near USD 40 trillion spent in the power sector, with a similar level of investment (just under USD 7 trillion) each spent on wind and solar (both solar PV and concentrated solar power) generation. G20 countries would account for the majority of the investment in low-carbon electricity.

On the demand-side, a cumulative USD 39 trillion would be spent on energy efficiency measures up to 2050. There are also impressive cost reductions anticipated in more efficient technologies in the 66% 2°C Scenario, but an average annual spending of over USD 1 trillion per year would still be required in order to ensure that primary energy demand remains broadly constant between 2016 and 2050. The level of investment into direct emissions reduction technologies in the end-use sectors is USD 26 trillion. The transport sector (principally the additional investment into electric vehicles for displacing conventional vehicles) would account for 65% of this cumulative total: the stock of electric passenger cars would need to grow by nearly 50% per year over the next 15 years to achieve the targets of the 66% 2°C Scenario. By 2050, there would be over 1.7 billion electric passenger cars on the road, compared with around 1.2 million today. The number of electric trucks would also need to expand rapidly, in particular after 2025. By 2050, almost 50% of trucks on the road are plug-in hybrid or full battery electric vehicles in the 66% 2°C Scenario.

Box 2.2 • Defining energy investment in IEA analysis

Investment figures in this chapter are generally split between supply- and demand-side investments. Supply-side investment covers capital expenditure to construct or refurbish assets that extract, process, transform or transport fossil fuels, bioenergy and power. It excludes the operating expenditure incurred in the daily functioning of these assets. The main items covered by these capital investments are the costs of engineering, procurement and construction, including all the equipment and other material required, as well as the labour costs associated with installing a device, machine or plant, or drilling a development well. They also include costs, such as planning, feasibility studies, external advisory services and all licensing and approvals (including environmental approvals), as well as acquiring the land for the project. They do not include research and development costs, or the costs of abandonment or decommissioning. The investments are booked in the year in which new energy supply commences; for a power plant, this is the first year of operation, while for upstream oil and gas projects, this can be over a period of years as production from a new source ramps up.

Demand-side investments include both energy efficiency measures and direct emissions reduction technologies such as CCS in industry, renewable technologies (e.g. solar thermal, bioenergy, geothermal) in the buildings and industry sectors, and alternative fuel vehicles (e.g. natural gas, electricity, hydrogen). In the industry and buildings sectors, costs cover similar elements to supply-side investments. However investments for energy efficiency and alternative fuel vehicles are more difficult to quantify. For efficiency, we analyse procurement capital, i.e. the money spent by end-users on energy-consuming products. However not all of this spending is included: only the amount that is spent to procure equipment that is more efficient than a given baseline. This baseline is established as the 2014 average efficiency of different products and sectors. In other words, this calculation reflects the additional amount that consumers have to pay for higher energy efficiency over the period to 2050. In a similar way, the investment in alternative fuel vehicles represents the additional cost for a vehicle over an equivalent 2014 conventional vehicle.

The volume of annual supply-side investments would be broadly constant over the period to 2050 in the 66% 2°C Scenario (Figure 2.6). There is a major shift, however, with expenditure related to fossil fuels (including both extraction and investment in fossil fuel plants without CCS) being reallocated to renewables and other low-carbon technologies (nuclear and CCS). In 2015, fossil fuels comprised almost 60% of supply-side investment, a share that would drop to less than 20% by 2050 in the 66% 2°C Scenario. Indeed, by 2025, investment in renewables exceeds total investment into fossil fuels in the 66% 2°C Scenario.

Investment in end-use sectors would need to see an even more radical transformation over the period to 2050. Total demand-side investment into low-carbon technologies grows by a factor of ten from less than USD 300 billion per year today to around USD 3 trillion by 2050 in the 66% 2°C Scenario. Demand-side investment to 2020 in the 66% 2°C Scenario would be dominated by the need to enhance energy efficiency and to deploy low-carbon options in buildings, using technologies that are commercially available today. Between 2016 and 2020 investment into energy efficient technologies is on average twice the level of 2015, and within five years, the level of investment in energy efficiency measures exceeds the total level of spending on fossil fuel extraction in 2015. An array of policies and measures drives this boost in the 66% 2°C Scenario, such as tighter minimum energy performance standards for a range of equipment, more stringent fuel efficiency standards and a widespread push for near zero-energy buildings. The level of investment in demand-side technologies that directly reduce emissions also surges over the period to 2050, growing by around 10% on average per year between 2015 and 2050 to more than USD 1.4 trillion.

Figure 2.6 • Average annual global energy supply- and demand-side investment in the 66% 2°C Scenario

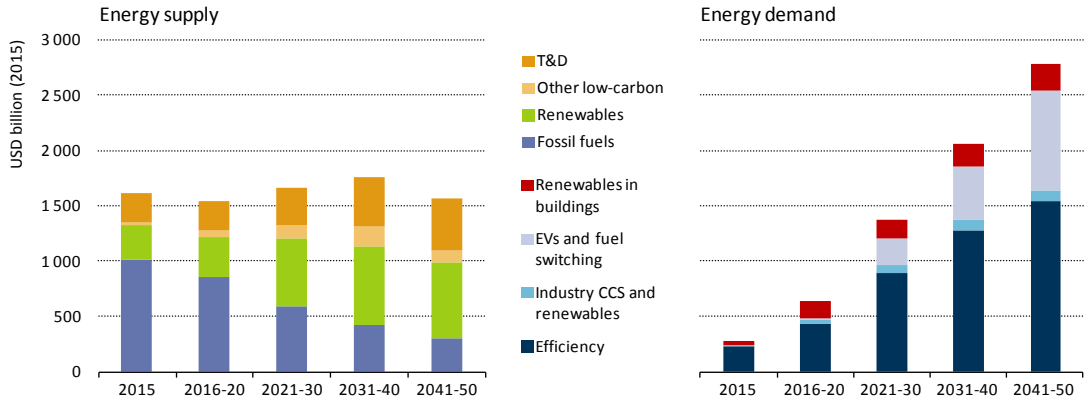

Note: T&D = transmission and distribution; EVs = electric vehicles; CCS = carbon capture and storage.

Key message • The level of supply-side investment remains broadly constant, but shifts away from fossil fuels. Demand-side investment in efficiency and low-carbon technologies ramps up to almost USD 3 trillion in the 2040s.

Investment trends in the 66% 2°C Scenario relative to the New Policies Scenario

Cumulative energy supply- and demand-side investment in the 66% 2°C Scenario is over USD 120 trillion, 25% more than the USD 99 trillion needed in the New Policies Scenario. There is also a marked difference in the destination of this capital between the two scenarios: in the New Policies Scenario, 65% of the total is spent on energy supply, compared with less than 50% in the 66% 2°C Scenario, largely because energy is used more efficiently in the 66% 2°C Scenario. Furthermore, in the New Policies Scenario, nearly 45% of total energy supply investment is spent on fossil fuel extraction. In the 66% 2°C Scenario, less than 20% of total energy supply investment would be for fossil fuel extraction. The contrary situation would be reflected for investment in electricity supply given the higher demand levels for electrification (even with ambitious energy and material efficiency adoption) in the 66% 2°C Scenario: nearly USD 40 trillion would be needed for electricity generation, transmission and distribution, 40% more than in the New Policies Scenario.

In the 66% 2°C Scenario, cumulative investment in power plants to 2050 would be USD 26 trillion, 50% higher than in the New Policies Scenario. In large part, this reflects the transition from fossil-fuelled power plants to low-carbon technologies, which are initially more expensive to build though generally are less expensive to maintain and operate. Wind power and solar PV exemplify this relationship, with higher upfront capital costs per unit of electricity generated than fossil-fuelled power plants, but zero fuel costs. Nuclear and CCS-equipped power plants are also more capital-intensive than unabated fossil-fuelled power plants. The underlying assumption is that, to facilitate the proliferation of more capital-intensive technologies in this scenario, market designs would need to be conducive for such investment. Overall, the increase in total investment is partially offset by the reduced expenditure for fuel, but, despite significant cost reductions in renewables-based electricity generation, the cumulative cost of the global power system (including transmission and distribution) to 2050 would be around 15% higher in the 66% 2°C Scenario.

Total energy supply investment in the 66% 2°C Scenario would be 10% lower than in the New Policies Scenario. This is partly because energy demand is lower and partly because of the more significant cost reductions for low-carbon technologies in the 66% 2°C Scenario (Figure 2.7). The array of ambitious policies and approaches enacted in the 66% 2°C Scenario accelerates the

deployment of low-carbon technologies, and greater deployment means economies of scale and technology learning, pushing down costs especially through 2030 as many low-carbon technologies still offer vast potential for cost reductions. Thereafter, the pace of cost reductions levels off for many low-carbon technologies in the 66% 2°C Scenario, as the technologies mature. The cost of traditional fossil fuel supply technologies experience little, if any, reduction in either of the scenarios given their state of maturity, and because the effects of depletion (i.e. seeking to produce small and harder-to-access resource deposits) offset the technology learning that continues to occur.

Figure 2.7 • Cost reductions for selected low-carbon technologies in 2030 relative to 2015 in the 66% 2°C and New Policies Scenarios

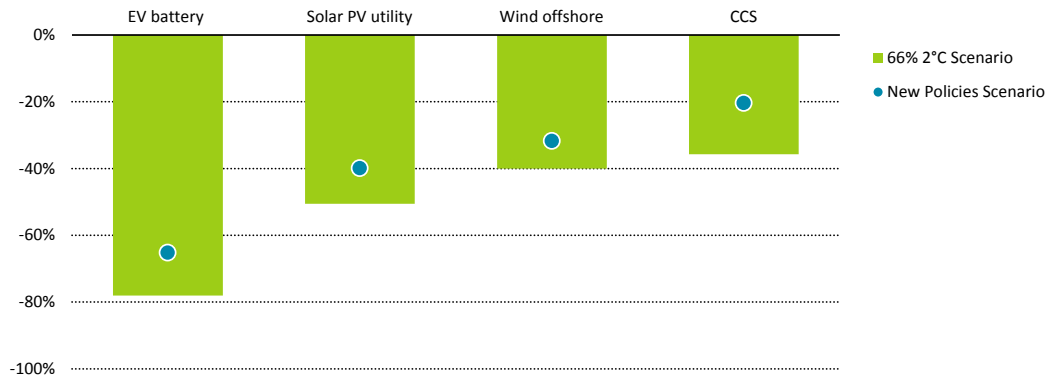

Key message • Enhanced policy efforts in the 66% 2°C Scenario would accelerate deployment of key low-carbon technologies which yields faster cost reductions.

While investment in energy supply would be lower in the 66% 2°C Scenario, investment in low-carbon demand-side technologies is over 90% higher (Figure 2.8). Much of the notable reduction in energy demand in the 66% 2°C Scenario compared with the New Policies Scenario is achieved by higher investment in more energy efficient technologies. Cumulative investment in energy efficiency in the 66% 2°C Scenario is therefore some 50% higher than the USD 26 trillion in the New Policies Scenario. Investment in energy efficiency in buildings is nearly 140% higher in the 66% 2°C Scenario, as a result of the need to curtail space heating and cooling demand in both new and existing buildings. This is achieved through the stringent enforcement of minimum energy performance standards and stringent building codes alongside rigorous retrofitting and deep renovation of existing buildings to yield a reduction in energy demand well beyond the levels seen in the New Policies Scenario.

In contrast, there is a slight decrease in the level of efficiency investment in the transport sector in the 66% 2°C Scenario relative to the New Policies Scenario, since improvements in efficiency are insufficient to generate the rapid and comprehensive emissions reductions required across the vehicle fleet in the 66% 2°C Scenario. But the lower investment in energy efficiency in transport is more than compensated for by a five-fold increase in the level of investment in direct emissions reduction technologies in the end-use sectors. In 2050, there are over 250 million electric cars on the road in the New Policies Scenario; in the 66% 2°C Scenario, there are over 1.7 billion. The early uptake of electric vehicles in the 66% 2°C Scenario accelerates technology improvements and mass production, and electric car battery costs fall to USD 80 per kilowatt-hour (kWh) in the early 2030s, a level not seen in the New Policies Scenario before 2050. Nevertheless, this is insufficient to offset the additional cost of an electric car compared with its equivalent conventional vehicle, and therefore results in an increased overall level of investment in transport. Similarly, investment in direct renewables both for the buildings and industry

sectors in the 66% 2°C Scenario is around 80% higher than the New Policies Scenario, while there is an additional USD 0.7 trillion for CCS in the industrial sector.

Figure 2.8 • Global energy sector investment in the 66% 2°C and the New Policies Scenarios

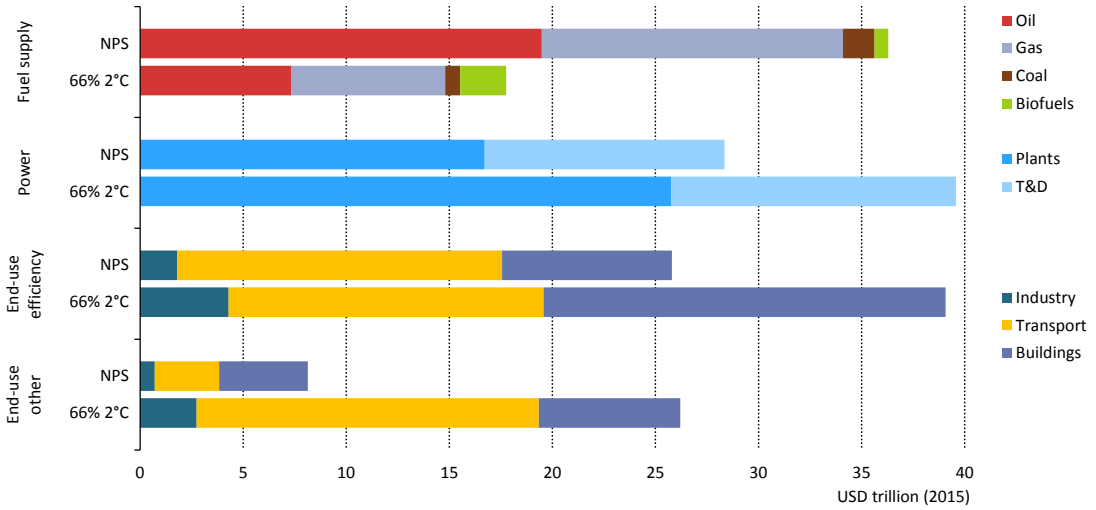

Notes: NPS = New Policies Scenario; T&D = transmission and distribution. "End-use other" includes investment in road transportation, CCS and direct renewables in industry and buildings.

Key message • Investment shifts significantly from supply to demand-side in the 66% 2°C Scenario.

Box 2.3 • Raising the probability of reaching 2°C: a different energy world?

The IEA has for many years looked into the transition to a low-carbon energy sector that would be compatible with achieving the 2°C temperature rise limitation target using its 450 Scenario. This scenario was first developed for the *World Energy Outlook 2007*. Since then, it has been updated every year to illustrate the technology and investment requirements as well as the opportunities and challenges that lie ahead, serving as a means to track progress towards achievement of the 2°C temperature goal. The 450 Scenario is designed to achieve the 2°C temperature limitation objective by 2100 with a probability of 50%.

In the context of this study, the IEA for the first time explores a more ambitious pathway for reducing energy-related GHG emissions. The 66% 2°C Scenario, developed for the purpose of this study, aims to illustrate one energy sector development pathway that could be compatible with the goal of the Paris Agreement to limit the global mean temperature rise to "well below 2°C". It does so via analysis of a scenario with a 66% probability of limiting the temperature rise to below 2°C by 2100. Here we highlight the key differences between the 450 Scenario and the 66% 2°C Scenario in order to illustrate the additional energy sector challenges that arise from the different pathways.

The increase in probability from 50% to 66% implies a deep cut in the CO_2 budget that is allocated to the energy sector: the CO_2 emissions budget for the achievement of the 450 Scenario amounts to 1 080 Gt, 290 Gt above the budget that is available to the 66% 2°C Scenario, or roughly nine years at current emission levels. This variance is significant. The transition to a 450 Scenario would require energy-related CO_2 emissions to become net-zero by around 2100. To realise the 66% 2°C Scenario, CO_2 emissions would need to fall to net-zero by around 2060, i.e. 40 years earlier, unless negative emissions technologies could be deployed at scale (IEA, forthcoming).

Clearly, the emissions trajectory to 2050 in the 66% 2°C Scenario is a significant departure from that of the 450 Scenario. For the achievement of the 66% 2°C Scenario, energy-related CO_2 emissions need to drop to less than 9 Gt in 2050, which is 8 Gt below the level achieved in the 450 Scenario. Already by 2030, emissions need to be nearly 15% (3.7 Gt) below the level of the 450 Scenario for the more ambitious scenario to be achieved (Figure 2.9).

Figure 2.9 • World energy-related CO_2 emissions trends by scenario

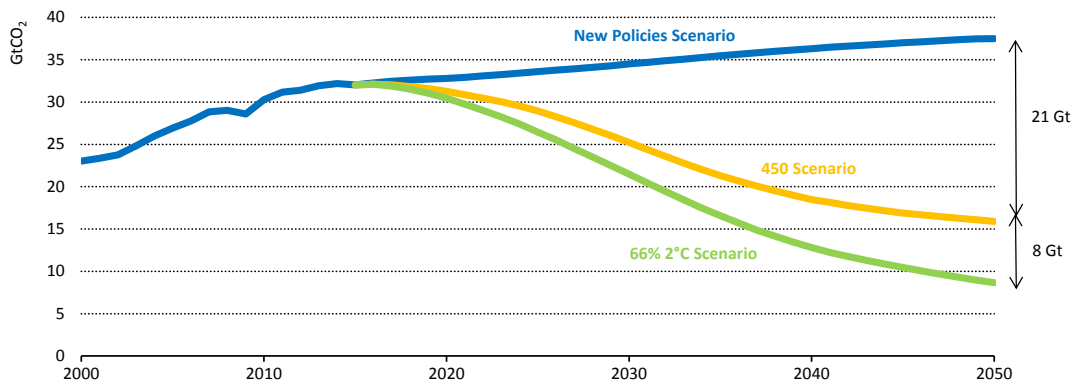

Key message • Staying within the emissions budget of the 66% 2°C Scenario would require an additional CO_2 emissions savings of around 8 Gt by 2050 relative to the 450 Scenario.

The energy sector transformation associated with the 66% 2°C Scenario is significantly deeper than that of the 450 Scenario and the pace at which it has to be put in practice is faster (Table 2.6). Yet, the world of the 66% 2°C Scenario is not one of just more robust efforts with the same policy and technology levers of the 450 Scenario. To illustrate, we examine two key indicators of the energy transition. The first indicator is the energy intensity of economic activity (measured as energy use per unit of GDP), which is an important (yet imperfect) indicator for the efficiency of global energy use. The drop in energy intensity to 2050, relative to today, is very similar between the two scenarios, at 2.8% per year in the 450 Scenario and 2.9% per year in the 66% 2°C Scenario. The main reason is that much of the economic energy efficiency potential as it is known today is already being used as a cost-effective measure to meet the decarbonisation target of the 450 Scenario; the additional reduction in energy intensity of the 66% 2°C Scenario is therefore largely achieved through improving material efficiency in the industry sector.

The second indicator is the carbon intensity of energy use (measured as CO_2 emissions per unit of energy use), which is a key measure for assessing progress for the transition. It is this indicator that reflects most closely on the additional energy sector challenge of raising ambition from a 50% probability to a 66% probability of reaching the 2°C target: the pace at which the energy sector would need to decarbonise for the achievement of the 66% 2°C Scenario is one-third above that of the 450 Scenario. By 2050, the carbon intensity of energy use in the 66% 2°C Scenario would need to be around half of the level of an energy sector emissions pathway compatible with the 450 Scenario.

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Table 2.6 • Key indicators of the global energy sector transition in the 450 and 66% 2°C Scenarios

Indicator			450 Scenario		66% 2°C Scenario	
		2014	2030	2050	2030	2050
Primary energy demand	Energy intensity (toe/1 000 USD,MER)	0.192	0.125	0.082	0.120	0.077
	Carbon intensity (tonne CO_2/toe)	0.292	0.129	0.050	0.110	0.026
Power sector	Carbon intensity (gCO_2/kWh)	516	227	69	175	30
	Wind and solar PV capacity (GW)	527	2 850	5 366	3 761	7 131
Total final energy demand	Energy intensity (toe/1 000 USD,MER)	0.132	0.090	0.059	0.086	0.052
	Carbon intensity (tonne CO_2/toe)	1.81	1.53	1.12	1.38	0.65
	Share of electricity in energy demand	18%	21%	27%	23%	35%
Industry sector*	Carbon intensity (tonne CO_2/value added)	0.28	0.17	0.09	0.14	0.05
	Share of low-carbon fuels **	12%	24%	41%	29%	54%
Transport sector	Share of electric cars in car stock	0.1%	15%	47%	27%	69%
	Share of electric trucks in truck stock	0.0%	0%	0%	8%	46%
Buildings sector	Fossil fuel share in heat production***	69%	59%	47%	49%	20%
	Carbon intensity service sector (tCO_2/1 000 USD value added)	0.022	0.012	0.006	0.009	0.003

* Includes blast furnaces, coke ovens and petrochemical feedstock. ** Includes low-carbon electricity and heat and fossil fuels covered by CCS; *** Excludes traditional use of solid biomass.
Notes: MER = market exchange rate; gCO_2/kWh = grammes of carbon dioxide per kilowatt-hour.

The combination of the limited additional potential for energy efficiency, and the requirement to accelerate and deepen the reduction of carbon intensity, requires structural energy sector changes in the 66% 2°C Scenario that go well beyond those of the 450 Scenario. In the power sector, for the achievement of the 66% 2°C Scenario, the carbon intensity of electricity generation in 2050 would need to drop to less than half of the level of the 450 Scenario. This would require nearly 1 800 GW of additional wind and solar PV capacity, both for reducing the emissions intensity of electricity generation and for meeting higher electricity demand from increased electrification in end-use sectors. Much higher electrification of road transport is a key driver of higher electricity demand in the 66% 2°C Scenario, with levels for passenger vehicles considerably above those in the 450 Scenario. In addition, there would also be a need to electrify nearly half of all road freight trucks and to build the associated infrastructure including the catenary (overhead) lines needed in the 66% 2°C Scenario – a measure not required for the achievement of the 450 Scenario. Similarly, in the industry sector, the share of low-carbon fuels in total energy use would need to rise by one-third above the level of the 450 Scenario. In the buildings sector, the share of fossil fuels for residential heat supply would need to drop by almost 60% below the level of the 450 Scenario.

Achievement of the 66% 2°C Scenario requires energy sector investment of over USD 120 trillion over the period 2016 to 2050, which is around USD 14 trillion (or 13%) greater than the level of the 450 Scenario (Figure 2.10). The majority of the additional investment is required to increase the uptake of low-carbon technologies in end-use sectors above the level of the 450 Scenario, including electric cars and trucks, CCS in industry, and solar and geothermal heat supplies in the buildings sector. The rise in investment for electric cars and trucks is partially offset by lower investment needs to raise efficiency of conventional combustion engine passenger vehicles, which all but disappear by 2050 in the 66% 2°C Scenario. The second-largest additional investment is needed to accommodate a larger amount of low-carbon generation in the power sector.

Figure 2.10 • Global cumulative additional investment needs by type in the 66% 2°C Scenario relative to the 450 Scenario, 2016-50

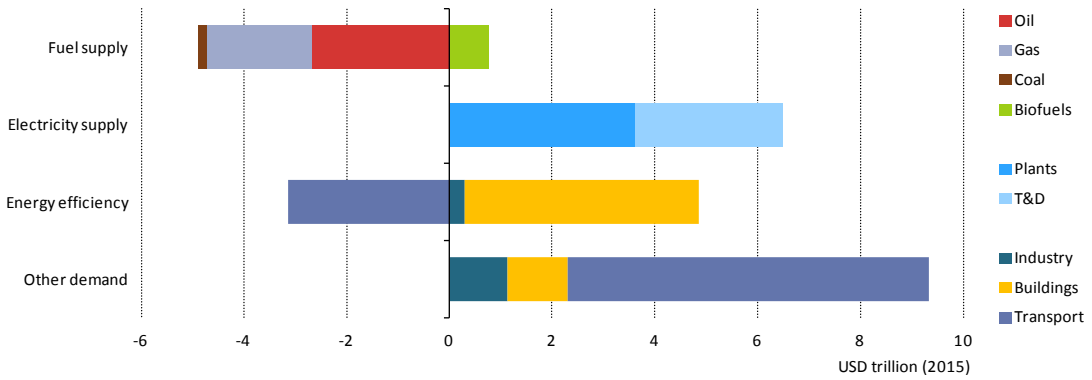

Key message • Net investment needs in the 66% 2°C Scenario are USD 14 trillion above the 450 Scenario; the largest additional investment would be needed for low-carbon electricity supply and decarbonising end-uses.

Power sector in the 66% 2°C Scenario

The power sector is in the vanguard of the drive for decarbonisation; profound changes are already underway in many countries and this burgeoning transformation is reflected in the power system that we project in 2050 in the New Policies Scenario. Low-carbon technologies increase their share in the power mix from one-third in 2014 to more than half in 2050, led by solar and wind, and the least-efficient and often most polluting fossil-fuelled power plants are retired. The CO_2 emissions intensity of global power generation is 305 grammes of CO_2 per kilowatt-hour (gCO_2/kWh) in 2050 in the New Policies Scenario, down from 515 gCO_2/kWh today. Although electricity generation increases by more than 20 000 terawatt-hours (TWh) to meet rising demand in this scenario, annual CO_2 emissions from the power sector are only slightly higher than today, 14.6 Gt in 2050 versus the current 13.5 Gt.

While the pace of change engendered by current and announced policies is noteworthy, it is not sufficient to achieve the level of emissions reduction required to meet climate goals. A much more ambitious track is presented in the 66% 2°C Scenario. For its achievement, the emissions intensity in the power sector would need to fall much faster and further, halved by the mid-2020s and down 95% in 2050, to around 30 gCO_2/kWh. CO_2 emissions from power generation would then decline to 1.7 Gt in 2050, delivering about 45% of the required global CO_2 emissions reduction, relative to the New Policies Scenario. The reductions in emissions and intensity in the 66% 2°C Scenario are largely driven by increasing carbon prices and strengthened policy support for low-carbon generation. But a major effort to redesign markets would also be needed, alongside rules and technologies to ensure the flexibility needed to accommodate large shares of variables renewables.

It will be imperative for electricity market designs and regulatory frameworks to evolve and assist the energy transition, particularly to enable the level of investment needed in low-carbon technologies and network infrastructure. Reforms would need to provide for the full participation of low-carbon generators in electricity markets, reflecting the value of various low-carbon technologies to the system to ensure a cost-effective transition, while also providing a degree of long-term revenue visibility to attract sufficient investment. The reliability of the power supply

cannot be overlooked during the energy transition and may require market reform to ensure the adequacy of the power system (see Use of flexibility options section). The intelligent design and use of electricity network infrastructure would also be critical to managing the evolving relationship between electricity demand and supply, requiring regulatory frameworks to support the needed investment.[35]

Reshaping the power mix

Power generation capacity would take on an entirely new profile in the 66% 2°C Scenario, as policies and measures support a rapid increase in the deployment of renewables and other low-carbon technologies, reducing the need for electricity from fossil-fuelled power plants that are not equipped with CCS. To achieve the stringent targets of the 66% 2°C Scenario, by 2050, low-carbon options would need to reach more than 80% of installed capacity, with renewables making up almost 90% of total low-carbon capacity. Wind power and solar PV become the two leading technologies in terms of installed capacity in the 66% 2°C Scenario, both reaching roughly twice the level in 2050 of the New Policies Scenario (Figure 2.11). Global installed capacity of fossil-fuelled power plants without CCS plunges from 63% of the total in 2015 to 17% in 2050, as their role transitions from the foundation of the power system (as it is presently the case at a global level) to one focused on supporting the stability and reliability of the power supply.

Figure 2.11 • Global installed capacity by technology in the New Policies and 66% 2°C Scenarios

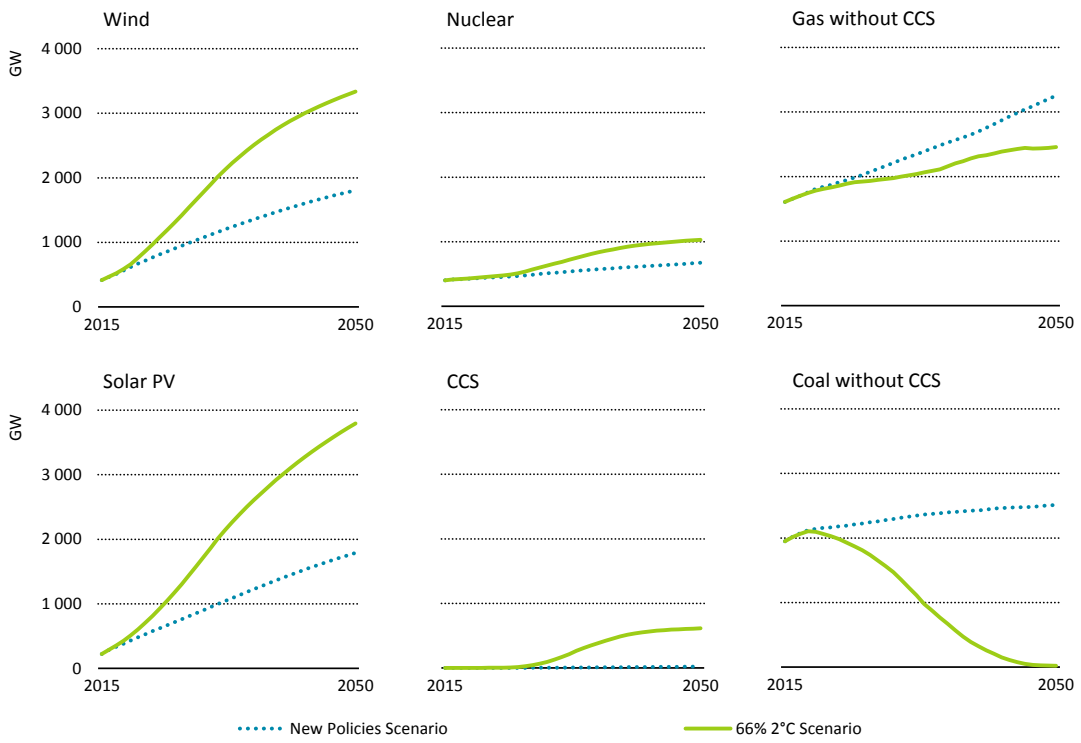

Key message • Wind and solar PV capacity would expand dramatically in the 66% 2°C Scenario, leading the decarbonisation push and replacing fossil-fuelled capacity as the foundation of the global power supply.

35 For more information on electricity market designs that support the energy transition, see the IEA's Re-powering Markets (IEA, 2016d).

Related to the evolving power plant fleet, the contribution of each source to the overall electricity supply reveals the full extent of the transition. By 2050, nearly 95% of global electricity generation in the 66% 2°C Scenario would need to come from low-carbon sources, rising rapidly from one-third today to almost 70% by 2030 (Figure 2.12). The share of renewables would need to accelerate rapidly to nearly 70% of generation in 2050, compared with 23% today. Wind and solar PV together steadily would make up an increasing share of power supply, reaching 35% by 2050. Nuclear generation would increase its share of global generation from 11% today to 17% in 2050, largely reflecting support for the technology in specific countries such as China, Korea, Russia and Japan as well as in India and the United States. This support more than offsets the reductions in other markets, including Canada and several countries in Europe. Generation from fossil fuel plants that are not abated with CCS would be substantially reduced: it is cut in half prior to 2035 and by more than 80% by 2050.

To keep pace with the overall emissions targets of the 66% 2°C Scenario, unabated coal-fired power plants, i.e. those without CCS, would need to be phased out as soon as possible. The least-efficient coal-fired power plants are phased out by 2030 in most regions, and by 2035 in all regions. In many cases, these plants are retired prior to reaching the end of their technical lifetime and, depending on the market conditions, can result in stranding a portion of the original capital investment (see Implications for stranded assets section). Existing highly efficient coal-fired plants continue to generate electricity for somewhat longer, but are almost completely eliminated by 2040 in the 66% 2°C Scenario. The required phase out of coal also means that effectively no new unabated coal-fired power plants would be built in the 66% 2°C Scenario beyond those that are already under construction today. Bridge technologies, such as efficient combined-cycle gas-fired power plants, would play an important role to drive down emissions through fuel switching from coal-fired power plants over the next decade, before falling back as the contribution from low-carbon technologies rapidly increases.

Figure 2.12 • Global electricity generation by source in the 66% 2°C Scenario

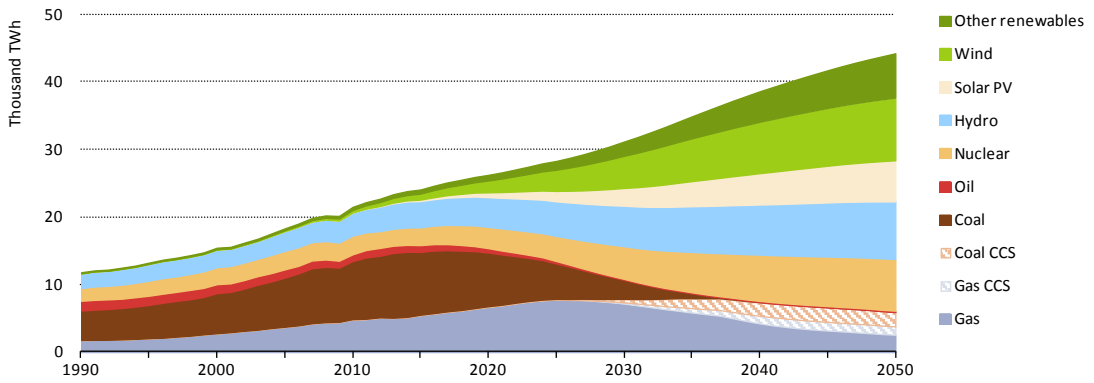

Note: TWh = terawatt-hours; CCS = carbon capture and storage.

Key message • The power generation mix undergoes a dramatic transformation to one based on renewables, nuclear and CCS, with unabated coal phased out and natural gas on the decline.

The massive build-out of renewables is critical to the low-carbon transition in the 66% 2°C Scenario and would need to occur at an unprecedented pace – going well beyond the historic rates of capacity additions and those projected based on Paris Agreement pledges (Figure 2.13). Overall, the pace of renewables-based capacity additions in the 66% 2°C Scenario would continue robustly through 2050, surpassing 400 GW per year towards the end of the period. This level is four-times the average of new capacity additions worldwide over the past ten years and close to double the average level of additions reached in the New Policies Scenario. Compared with

record installations in 2015, the pace of solar PV capacity additions would need to double by 2020 and triple by 2030, reaching nearly 150 GW per year. This would also require the solar panel manufacturing capacity to dramatically increase. Alongside solar, wind power capacity additions would increase steadily to nearly 140 GW in 2030, well above the peak of 90 GW reached in 2040 in the New Policies Scenario. Beyond 2030, re-powering existing wind and solar PV projects drives continued market growth for both technologies. Hydropower also sees higher capacity additions, about 40% more than announced in the Paris pledges, helping to mitigate emissions and providing operational flexibility in electricity systems.

Figure 2.13 • Global average annual capacity additions by technology by scenario

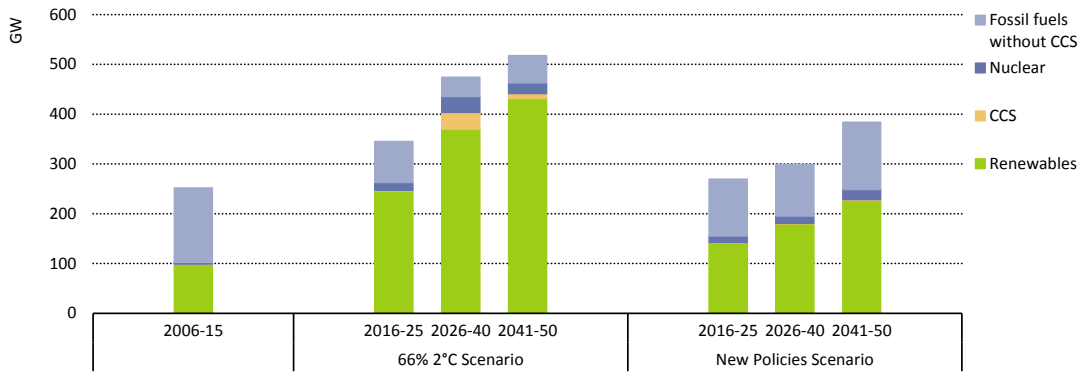

Key message • The strong decarbonisation of the power supply requires an unprecedented build-out of renewables and other low-carbon technologies that must be sustained through 2050.

In order to achieve the emissions reductions in the 66% 2°C Scenario, nuclear and CCS technologies also would get a boost. Capacity additions of nuclear power would average 24 GW per year to 2050, similar to the average annual capacity additions during the 1980s, but 50% higher than in the New Policies Scenario. The additional growth in the 66% 2°C Scenario is led by stronger development in China, which had more than 20 GW under construction as of mid-2016, and India pursuing its goals as laid out in its NDC. Other long-time leaders in nuclear power generation also expand their fleets in this scenario, as part of their low-carbon strategies.

The achievement of the 66% 2°C Scenario would require some degree of development and deployment of CCS technologies in the power sector, which make up 8% of global electricity generation in 2050. At that point, CCS-equipped power plants would account for effectively all the remaining electricity generated from coal and one-third of the electricity from natural gas. Capacity additions of CCS-equipped power plants would average over 30 GW per year from 2026 to 2040, split between retrofits and new builds. The expansion of CCS in the 66% 2°C Scenario would be an important avenue to reduce CO_2 emissions in those countries that have a sizeable fleet of coal-fired power plants. In such cases, retrofitting coal-fired power plants with CCS equipment helps to reduce stranded assets in the power sector. The projected roll-out comes against the background of a limited number of large-scale CCS projects to date (15 across all applications as of 2016) and would also require the development of CO_2 storage resources.[36] But the development of CCS technologies for coal- and gas-fired power plants has important long-term benefits as it lays the groundwork for net-negative power plants, namely bioenergy with CCS (BECCS). This opens up the possibility of reaching more stringent climate targets beyond the level of the 66% 2°C Scenario, if sustainable biomass is available at sufficient scale (see Box 2.1

36 For more information on the current state of the industry, priorities and opportunities for CCS, see 20 Years of Carbon Capture and Storage (IEA, 2016e).

and Chapter 1). In the 66% 2°C Scenario, BECCS would start to gain momentum around 2040, in part to offset the remaining emissions from CCS-equipped fossil-fuelled power plants, on the path to net-zero emissions in the power sector. Nearly all of the build-out of CCS technologies is beyond that in the New Policies Scenario, as current and proposed policies are far less aggressive in terms of targeted CO_2 emissions reductions and available policy instruments.

CO_2 emissions abatement

Ambitious actions in the power sector would need to be ramped up right away to keep the overall climate target in sight. In the 66% 2°C Scenario, CO_2 emissions from the power sector worldwide would be less than half of current levels by 2030 and less than 15% of current levels by 2050, on the way towards zero. The G20 group, taken together, accounts for the vast majority of the emissions reductions compared with the New Policies Scenario, with many individual countries approaching net-zero emissions in the power sector by 2050.

In the 66% 2°C Scenario, renewable energy technologies taken together would account for about 60% of CO_2 emissions reduction to 2050 relative to the New Policies Scenario in the power sector (Figure 2.14). Solar PV and wind power, in particular, extend well beyond the New Policies Scenario, each accounting for about one-fifth of the total CO_2 emissions reduction from the power sector. The projections of the 66% 2°C Scenario build on recent momentum for solar PV and wind power technologies, namely driven by policy support and related cost reductions, but also due to their modular nature and short installation periods, which facilitate a rapid uptake. Additional use of hydropower, bioenergy, geothermal and concentrated solar power (CSP) contributes further to emissions reductions. Nuclear and CCS-equipped power plants account for the remaining one-quarter of emissions reduction by 2050 in the 66% 2°C Scenario, compared with the New Policies Scenario.

Figure 2.14 • Global CO_2 savings in the power sector in the 66% 2°C Scenario relative to the New Policies Scenario and the contribution of G20 group in 2050

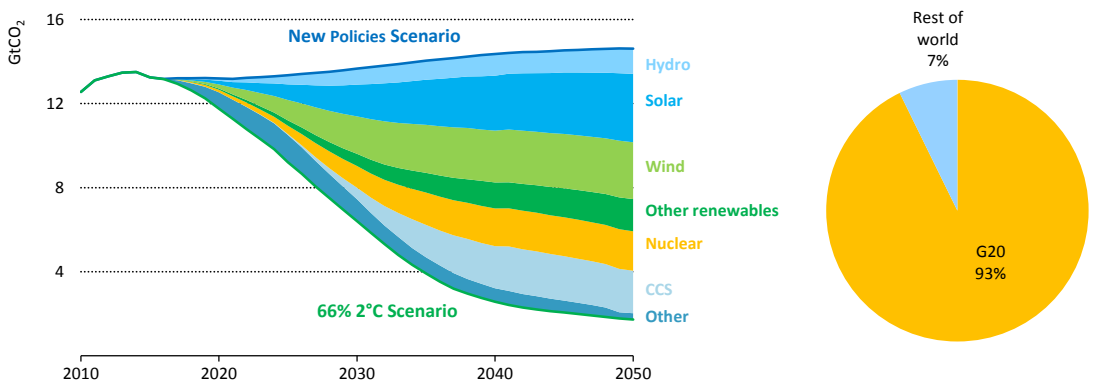

Key message • By 2050, the power sector nears full decarbonisation, with renewables taking the lead in the 66% 2°C Scenario. G20 countries would contribute the vast majority of the global CO_2 emission reductions.

Power sector investment

Cumulative investment through 2050 in the power sector would be USD 39.6 trillion in the 66% 2°C Scenario, 40% higher than in the New Policies Scenario (USD 28.4 trillion) (Figure 2.15). The majority of this increase stems from increased investment in new power generation capacity, which totals USD 25.8 trillion in the 66% 2°C Scenario, more than 50% higher than in the New

Policies Scenario. Renewables, led by wind power and solar PV, account for the largest share of the increase, with almost USD 20 trillion spent on their rapid deployment over the period to 2050. Beyond the USD 11.6 trillion spent in the New Policies Scenario, an additional USD 2.2 trillion would be needed for the necessary extensions and reinforcement of the electricity network during the energy transition, with more than 90% of the increase spent in support of the expanded use of renewables. Nuclear and CCS technologies would receive an additional USD 2.2 trillion in investment in the accelerated transition, in addition to the USD 2.2 trillion of investment in the New Policies Scenario.

Figure 2.15 • Cumulative investment worldwide in the power sector in the New Policies and 66% 2°C Scenarios, 2016-2050

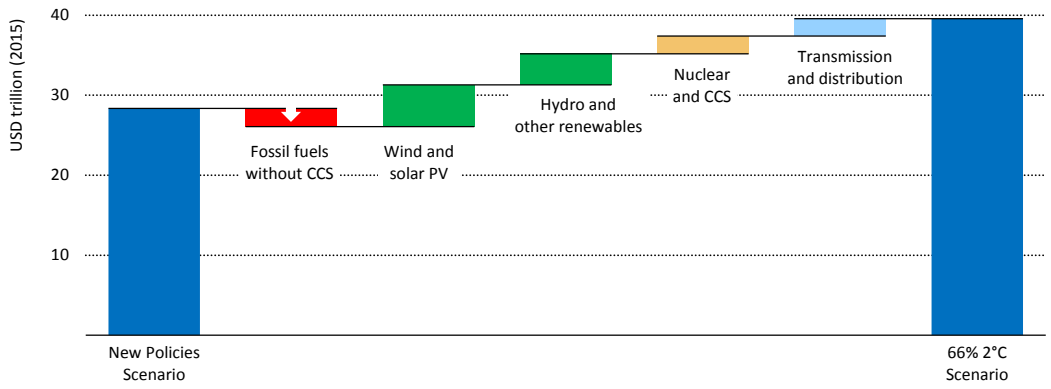

Key message • Cumulative power sector investment would need to increase by 40% in the 66% 2°C Scenario, with most additional investment going to build renewables and reinforce the grid to support them.

In the 66% 2°C Scenario, annual investment in new generation capacity peaks at about USD 900 billion in 2030, about twice the level of 2015 and USD 300 billion more than at any point in the New Policies Scenario. After 2030, annual investment steadily declines, as most systems start to approach a low-carbon power supply. The amount invested in renewables, on an average annual basis, is double the level experienced in recent years, which fuelled rapid deployment of wind and solar PV generation facilities (Figure 2.16). Annual expenditure for renewables peaks in 2030 at close to USD 700 billion. The investment represents a massive expansion of the renewable energy industry from manufacturing the equipment, e.g. wind turbine blades, PV panels and their related system components, to the sales and installation of new projects. Additional investment beyond that for new power plants will also be needed to build the industrial and manufacturing capacity for the supply of the technologies required to continue and expand their widespread deployment to decarbonise power generation.

While nuclear power and fossil-fuelled power plants equipped with CCS are important low-carbon technologies, they are less widely deployed and would need less investment than renewables in the 66% 2°C Scenario. Annual investment in new nuclear power capacity, at about USD 95 billion, is six-times more than in the past five years and 50% higher than in the New Policies Scenario. While CCS is a key technology for eventual net-negative emissions, the amount of investment required pales in comparison to that for renewables. The cumulative investment in CCS to 2050 is about equivalent to two years of average annual investment in renewables. Cumulative investment in fossil-fuelled power plants without CCS is about USD 1.6 trillion to 2050 in the 66% 2°C Scenario, 60% lower than in the New Policies Scenario. On an annual basis, this is about 40% of the average investment over the past five years (USD 130 billion).

Figure 2.16 • Recent and projected global annual average investment to 2050 in power plants by type in the New Policies and 66% 2°C Scenarios

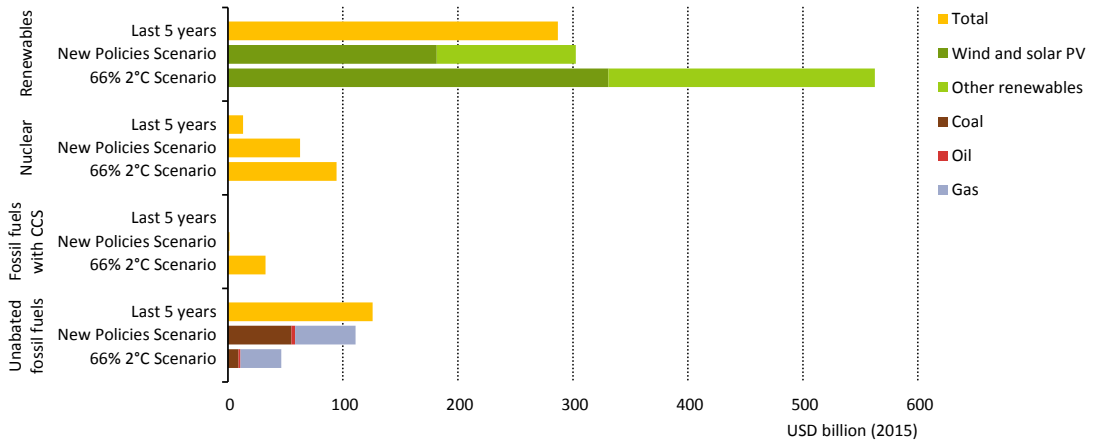

Key message • In the 66% 2°C Scenario, average annual investment in renewables to 2050 would need to double compared with recent levels, along with increased investment in nuclear and CCS technologies.

Renewables cost and competitiveness

The unprecedented level of deployment of renewables in the 66% 2°C Scenario spurs technology improvements and process gains that enable several technologies to achieve low cost levels decades ahead of the pace set in the New Policies Scenario. Solar PV is one of the biggest benefactors of the accelerated transition and moves quickly down the cost curve. The global average capital costs of utility-scale solar PV fall by 50% by 2030 and reach an average cost level of USD 800 per kilowatt (kW), which is 20 years earlier than in the New Policies Scenario (Figure 2.17).[37] These reductions are in addition to the 40-75% cost declines seen in major markets since 2010. Cost reductions are also accelerated for other renewable energy technologies that are not yet fully mature, including offshore wind power and CSP. Both technologies achieve cost reductions of 40% by 2030, relative to today, two decades prior to reaching similar cost levels in the New Policies Scenario. The use of CCS technologies is stepped up in the 66% 2°C Scenario, supported by strong cost reductions through targeted research, development, demonstration and deployment.

The rapidly falling costs of renewables improve their competitiveness with fossil fuels, especially in the 66% 2°C Scenario, where CO_2 prices are on the rise. Comparing the levelised cost of electricity (LCOE) from new power plants[38] indicates that the balance currently still tilts in favour of fossil fuels (Figure 2.18). However, recent auction bids in several markets suggest that renewables, particularly solar PV, are rapidly closing the gap with fossil fuels. By 2030, in the 66% 2°C Scenario, the balance for new projects clearly shifts towards renewables, helped by regional CO_2 prices that range from 50 to 150 USD per tonne of CO_2 emissions (USD/tCO_2). Beyond 2030, CO_2 prices continue to rise, further widening the gap of LCOEs between renewables and fossil fuels. The widening gap also helps new renewable energy projects to displace output from

37 For information on power plant cost assumptions, renewable energy technology learning rates and projected costs, see the Investment costs section of the World Energy Outlook website: www.worldenergyoutlook.org.

38 The LCOE is an indicator of the average cost per unit of electricity generated by a power plant, representing the minimum average price at which electricity must be sold for a project to "break even", providing for the recovery of all related costs over the economic lifetime of the project. The LCOEs presented reflect the full technology costs, based on a consistent set of assumptions designed to enable technology cost comparisons and contribute to the evaluation of competitiveness (when combined with value estimates).

existing coal- and gas-fired power plants, essential to achieving the deep power sector emissions reductions.

Figure 2.17 • Global average capital cost of utility-scale solar PV relative to installed capacity in the New Policies and 66% 2°C Scenarios

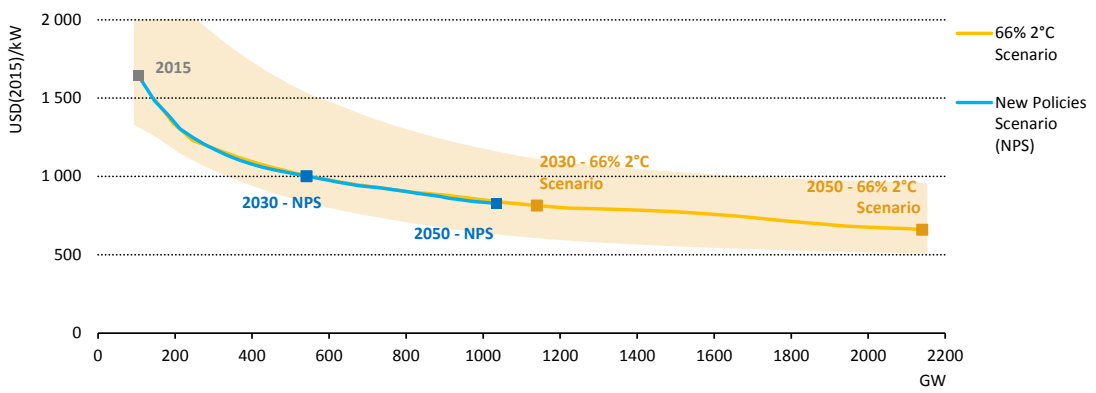

Key message • The accelerated deployment of solar PV in the 66% 2°C Scenario helps to achieve strong cost reductions by 2030, 20 years ahead of the schedule set in the New Policies Scenario.

While relative costs are an important consideration, the extent to which market forces contribute to the energy transition depends on the ability of renewables and other low-carbon technologies to attract investment without direct support. Gaining this fuller picture of competitiveness requires consideration of both the costs and value of technologies. In practice, this means that variable renewables – mainly wind power and solar PV – may need to reach lower LCOEs than fossil fuelled power plants in order to attract investment without government support. In addition, competitiveness can be a moving target, due to the fact that the market value of variable renewables declines as their share of the power mix increases.[39] In the presence of a rising CO_2 price, a declining market value also signals a lessening ability to mitigate CO_2 emissions, a motivating purpose for their deployment in the first place. Among low-carbon technologies, consideration of value tends to lead to more technology diversity. Some renewable energy technologies – including some forms of hydropower, bioenergy and CSP – are well-suited to shifting their output when it is most needed, a trait that becomes increasingly valuable over time in the 66% 2°C Scenario. As a result, while important, cost comparisons alone are insufficient to inform a cost-effective path to reduce emissions. The continued appeal of variable renewables therefore hinges critically on the flexibility of the electricity system, including demand-side response. These measures help make the best use of the varying output of wind and solar PV installations, aligning electricity demand with the available supply of electricity in real-time, which is the opposite of the conventional practices in the power sector today.

39 For more in-depth discussion of the competitiveness of renewables, see the special focus on renewable energy in *World Energy Outlook 2016* (IEA, 2016a).

Figure 2.18 • Global average levelised cost of electricity in the 66% 2°C Scenario

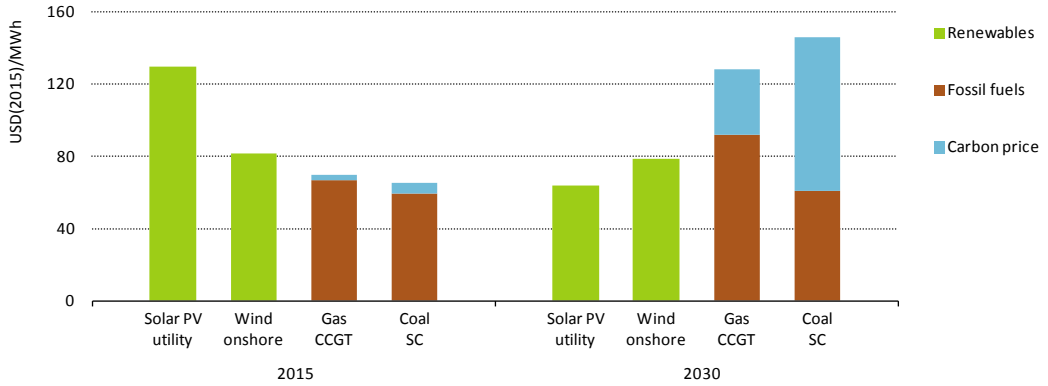

Notes: CCGT = combined-cycle gas turbine; SC = supercritical. Fossil fuel and carbon prices vary by region – the midpoint was taken as the basis for the LCOE calculations.

Key message • Renewable energy technologies beat fossil fuels on costs alone prior to 2030, as their costs fall and fossil-fuelled power plants become more expensive due largely to increasing CO_2 prices.

Use of flexibility options

The security and reliability of power systems depend to a high degree on the real-time balance of the demand and supply of electricity. Achieving this match and keeping the lights on requires the supply or demand of electricity, or both, to be flexible. To date, flexibility has almost exclusively been provided on the supply-side through the adjustable output of power plants. Fossil-fuelled power plants and hydropower have historically provided the bulk of flexibility in systems, with additional contributions from other technologies such as bioenergy-based and nuclear power plants (in specific markets).

In the 66% 2°C Scenario, demand-side technologies and energy storage become increasingly crucial to ensuring the security and reliability of the electricity supply. Hydropower continues to provide flexibility throughout the period to 2050, but as emissions get significantly reduced, the operations of fossil-fuelled power plants would need to be reduced to the maximum extent possible. In their place, demand-side response options and energy storage technologies would be needed to effectively balance supply and demand, while integrating increasing amounts of electricity generated from variable renewable energy technologies. By 2050, solar PV and wind power represent 35% of global power generation, with higher shares in many regions, including the United States, European Union and India. To integrate such large shares of variable renewables, we estimate that more than 990 GW of flexibility would be needed from demand-side response measures and energy storage. In particular, G20 countries rely heavily on these flexibility measures (representing 680 GW) in the 66% 2°C Scenario to integrate higher shares of variable renewables and limit the use and related emissions from fossil-fuelled peaking power plants (Figure 2.19).[40]

40 For more in-depth discussion of the integration of variable renewables and the role of flexibility options in the outlook, see the special focus on renewable energy in *World Energy Outlook 2016* (IEA, 2016a).

Figure 2.19 • Flexibility options to ensure the reliability of electricity supply in the 66% 2°C Scenario, 2050

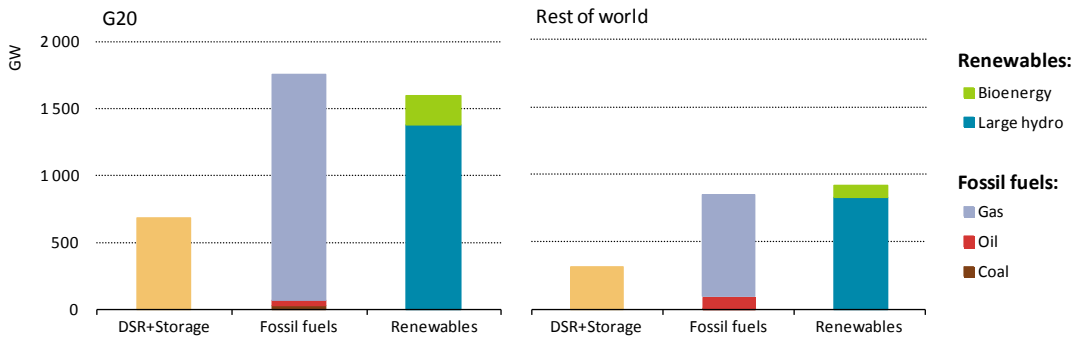

Key message • Demand-side response options and energy storage are required alongside flexible power plants to successfully integrate rising shares of variable renewables, especially in G20 countries

Electricity market designs, in addition to enabling investment in low-carbon technologies and the network, will be critical to supporting an expanding suite of flexibility options, including demand-side response measures and energy storage. One area for reform is to allow market participation for all forms of flexibility, enabling wider competition across technologies that span both the supply- and demand-sides of the power system. Another critical element is the potential for additional revenue streams to supplement revenues for energy sold to the grid, reflecting the value of flexibility and contributions to the reliability of the system. Doing so would support the deployment of all forms of flexibility, including demand-side response measures and energy storage, as well as preventing important providers of flexibility (such as gas-fired power plants) from retiring early and potentially increasing the cost of the transition due to stranded assets. This transition has already started in some wholesale electricity markets, where methods to provide additional revenue streams, including capacity mechanisms, are being tested as a means of incentivising essential investment. Without market access and additional revenue streams, the necessary investments in the flexibility of the power system may not be forthcoming and, in turn, threaten the overall security of the electricity supply.

End-use sectors in the 66% 2°C Scenario

Overview

The world's need for energy is driven by demand for energy services across the various end-use sectors, the main ones being industry, transport and buildings.[41] The industry sector is an important engine of economic growth and is responsible for almost 40% of final energy demand today. The transport sector encompasses personal as well as commercial activities by roads, airplanes, ships and rail, and requires energy, in particular oil, for doing so. Transport accounts for 27% of final energy demand today, and, notably for the topic of this analysis, for almost 40% of direct fossil fuel use in end-use sectors. The buildings sector encompasses residential, commercial and public buildings and is responsible for nearly one-third of final energy demand today, and, importantly, for over half of global electricity demand.

41 Energy end use is the sum of consumption by the various end-use sectors: industry (including manufacturing and mining, blast furnaces and coke ovens, and petrochemical feedstocks); transport (including for individual and commercial purposes); buildings (including residential and services) and other (including agriculture and non-energy use).

With rising economic and population growth, demand for energy services from all end-use sectors is expected to continue to grow through 2050 (Figure 2.20). [42] Economic growth implies rising industrial output in monetary terms at an aggregated level, although deep structural changes are expected to occur over the next decades. Demand for mobility is also set to rise, both for individual and commercial activities, particularly in developing countries. Rising population and income are also expected to continue to push up demand for modern energy services in the buildings sector, such as water heating, lighting, air conditioning and the electricity required to power an increasing range and number of appliances.

Figure 2.20 • Outlook for socio-economic (left) **and economic** (right) **drivers in the 66% 2°C Scenario**

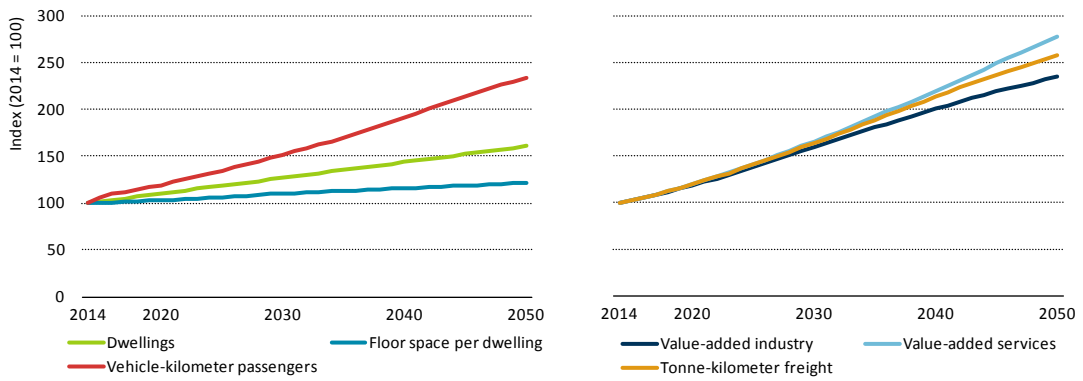

Key message • Activity levels across all end-uses are expected to rise steadily, pointing to rising demand for energy services.

In all of these respects, G20 countries will continue to play a key role in setting global trends. With an expected share of 75% in global GDP growth, this diverse set of countries will also see some of the strongest increase for energy services. Over the period to 2050, 60% of growth in global floor space in residential buildings is projected to be in G20 countries; around three-quarters for growth in demand for personal mobility[43] and in value added from the industry sector.

Table 2.7 • Energy intensity improvement by sector and region in theNew Policies and 66% 2°C Scenarios

Sector	New Policies Scenario		66% 2°C Scenario	
	G20	Rest of World	G20	Rest of World
Industry	-54%	-36%	-66%	-55%
Transport	-57%	-52%	-74%	-72%
Buildings	-58%	-54%	-70%	-62%

Note: Energy intensity refers to the total sectoral energy consumption divided by GDP in PPP terms.

Policy efforts to curb the growth in energy demand in end-use sectors have been ramping up in recent years. Recent IEA analysis shows that efficiency-regulated energy use in 2015 covered 30% of global final consumption and that the average stringency of regulation has increased by 23% since 2005 (IEA, 2016f). This is notable and energy efficiency measures, together with structural effects within the industry sector and across the economy as a whole, continue to constrain the

42 Assumptions for economic and population growth are the same across the IEA scenarios in this study. For further analysis of the macroeconomic implications of the IEA scenarios, see OECD (forthcoming).

43 Measured in vehicle-kilometres driven by passenger cars.

level of growth projected in the New Policies Scenario, bringing down the energy intensity of the various sectors (Table 2.7). Nonetheless, energy demand across end-use sectors still increases by around 40% by 2050 in the New Policies Scenario and the improvement in energy intensity falls short of what would be required to achieve the 66% 2°C Scenario.

The intensity with which we use energy, relative to economic growth or other activity variables is a useful yet imperfect aggregate measure of efficiency. The intensity with which we emit carbon, relative to energy consumption, is another critically important indicator of the energy transition. Today, on a global level, energy use in final consumption is associated with around 3 tonnes of CO_2 per tonne of oil equivalent use (directly or indirectly), reflecting the current high dependency on fossil fuels in all end-use sectors: coal (particularly in industry), oil (particularly in transport) and natural gas (particularly in buildings) and the generally carbon-intensive nature of fuels used to generate electricity and heat in most countries (Figure 2.21). Existing and planned policies, as considered in the New Policies Scenario, point to important improvements. The carbon intensity of final consumption in the New Policies Scenario drops by around 15% to 2050, to which the projected shifts in the fuel mix towards lower carbon fuels for power and heat production also contribute.

But much more would be needed in the 66% 2°C Scenario: by 2050, the carbon intensity of the buildings sector would need to be reduced by another 80% below the level of the New Policies Scenario; by two-thirds in the industry sector; by half in transport and by more than 70% in agriculture. In the 66% 2°C Scenario, such improvements would bring down the direct CO_2 emissions of all end-use sectors combined dramatically: by 2050, emissions would be three-times lower than today. Indirect CO_2 emissions would also drop, by a factor of seven, as the CO_2 content of electricity generation falls by a factor of more than 15 on a global average, relative to today.

Figure 2.21 • Global carbon intensity by sector in the New Policies and 66% 2°C Scenarios

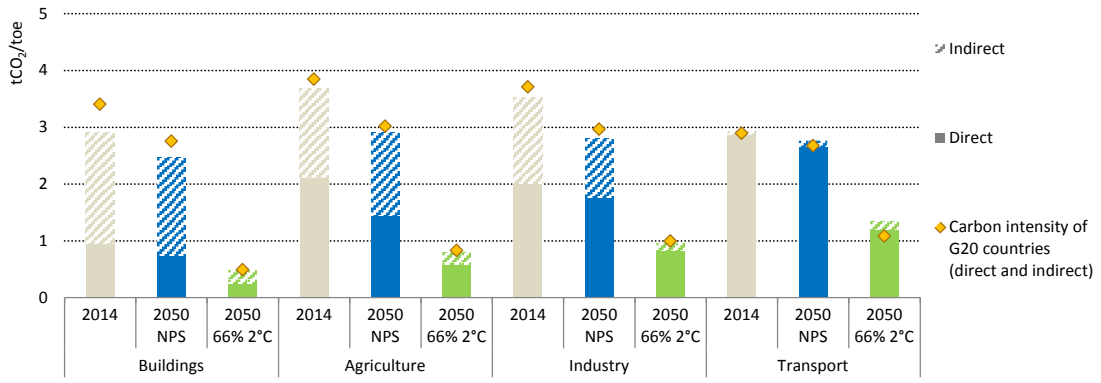

Notes: toe = tonnes of oil equivalent; NPS = New Policies Scenario.

Key message • Existing and planned policies lead to a drop in carbon intensity, but much more radical improvements would be needed to achieve the 66% 2°C Scenario.

A drop in carbon intensity of the scale needed for the 66% 2°C Scenario would require a deep transformation in the way demand for energy services is met across all end-use sectors. Radical energy efficiency improvements (e.g. drastically raising the retrofit rates of buildings, better electric motors in industry, appliances in buildings, boilers in industry and buildings, and fuel economy standards in transport) are critical in the short term. These would need to be accompanied by major structural changes in the way industrial processes are designed in order to improve material efficiency (e.g. through the re-use of post-consumer scrap in iron and steel

production, increased recycling and light-weighting in chemicals, petrochemical, and pulp and paper). In combination, these measures would essentially stabilise global final energy consumption (compared with a 2.2% annual growth since 2000) in the 66% 2°C Scenario. In aggregate, G20 countries would register a decline in final energy consumption, so that, by 2050, this returns to the level seen in 2009.

Achieving the emissions reductions required in the 66% 2°C Scenario would require not only efforts to curb demand, but also profound changes in the way that demand is met. In practice, this means major efforts to reduce the direct use of fossil fuels, notably by increasing the use of renewable technologies, where relevant and possible (e.g. biomass boilers in industry, solar water heaters in buildings, biofuels in transport), and by increasing the electrification of heat supply and road transport vehicles (e.g. replacing boilers by heat pumps, increasing the penetration of electric passenger and freight vehicles).[44]

Such transformative actions would fundamentally change the fuel mix: in the 66% 2°C Scenario, the share of coal in final energy demand would drop from 14% today to 6% in 2050 and the share of oil from 38% today to 17% (Table 2.8). Only natural gas retains about its current share, reflecting its importance in the industry sector and potential role to reduce emissions from international shipping. In addition, reducing the carbon intensity of the industry sector requires large-scale deployment of CCS in the 66% 2°C Scenario.

Table 2.8 • Global final energy demand by fuel in the 66% 2°C Scenario

Mtoe	2014	2020	2030	2040	2050	CAAGR* 2015- 50	Difference in 2050 to NPS**
Coal	1 407	1 347	1 064	770	601	-2.3%	-869
Oil	3 740	3 843	3 264	2 404	1 687	-2.2%	-2 839
Gas	1 423	1 536	1 527	1 435	1 383	-0.1%	-1 138
Electricity	1 710	1903	2 319	2 917	3 366	1.9%	99
Heat	274	295	290	277	266	-0.1%	-45
Bioenergy***	1 157	1 237	1 497	1 705	1 855	1.3%	494
Other renewables	37	78	242	433	563	7.9%	340
Hydrogen	0	0	4	13	21	n.a.	20
Total	**9 747**	**10 240**	**10 208**	**9 955**	**9 741**	**0.0%**	**- 3 938**
% fossil fuels in TFC	*67%*	*66%*	*57%*	*46%*	*38%*		*-25%*
% renewables in TFC+	*8%*	*11%*	*22%*	*34%*	*44%*		*27%*
% low-carbon heat demand++	*9%*	*12%*	*25%*	*43%*	*55%*		*37%*
Memo: % low-carbon electricity supply	*33%*	*41%*	*68%*	*89%*	*94%*		*43%*

*Compound average annual growth rate. **New Policies Scenario. *** Includes traditional and modern use of solid biomass. + Includes indirect renewables contributions, excludes traditional use of solid biomass. ++ Includes indirect renewables contributions and fossil fuels covered by CCS, excludes traditional use of solid biomass. Note: TFC = total final consumption.

At a sectoral level, the transformation of final energy use in the 66% 2°C Scenario requires success in overcoming two major policy and technology challenges that remain unresolved in the

44 Activity levels could also be part of policy actions. For example more public transport could move demand for mobility from private to public (IEA, forthcoming).

New Policies Scenario: decarbonising the transport sector and heat production. Transport accounts for less than 30% of final energy demand today, but contributes a disproportionally high share of direct CO_2 emissions (around 45%). This reflects the continued reliance on oil-based fuels in most transport modes, such as road, aviation and shipping; the exception being rail where electricity constitutes nearly 40% of energy demand. Alongside a near-term push to dramatically reduce the fuel consumption of conventional vehicles across all transport modes, the main means to decarbonise transport in the 66% 2°C Scenario are a deep electrification of road transport (including passenger and freight vehicles) and a substantial uptake of advanced biofuels in aviation and shipping. By 2050, nearly 60% of all fuels in the transport sector would need to be low carbon (from 3% today).

Box 2.4 • Smart Cities: Opportunities to start from scratch

The world's population will grow by one-third by 2050, mostly in emerging and developing countries and will be concentrated in cities. The United Nations estimates that an additional 2.5 billion people will live in urban areas by 2050, 6.4 billion in total. This has enormous implications for the long-term outlook for energy, as the rapid socio-economic development in urban areas affects people's lifestyles: demand for personal mobility, appliances and space cooling equipment rises, among others. If trends continue along historic patterns, it risks amplification of common urban problems such as congestion, accidents and air pollution. But increasing urbanisation also creates opportunities for policy makers in developing countries to foster improved urban conditions with effective efficiency standards for buildings and more efficient ways to satisfy mobility demand by establishing "smart cities".

Smart cities can improve services such as energy, water and waste management through the installation of smart meters and using waste to produce energy. Through digitalisation of the energy sector, they can also contribute to efficiently managing energy services in buildings, as well as mobility. Planning for smart cities is also a good opportunity to compare options to meet heating and cooling demand in buildings. For example, with sufficient density of demand, district heating and cooling can be a viable option. However, district systems have high capital costs and long payback periods, meaning that their design as a component of urban planning needs to be effectively integrated. District cooling using ice storage is an additional storage option for the power sector as a flexible means to integrate high shares of variable renewables.

Effective urban planning also can help to curb transport energy demand growth by facilitating "smart mobility". Early co-ordination between urban and traffic planners is important, in particular where the development of a public transport system is envisaged, but also because it can help to ensure that dedicated spaces for pedestrians and public transit networks are available. Smart mobility goes beyond the use of information and communication technologies to optimise traffic flows. Improving awareness is also vital as smart transport depends on the sharing of best practice behaviours. Innovative transport solutions such as collective taxis, car sharing or car-pooling that show promise and can ease traffic congestion and the need for parking. But smart cities require significantly more effective approaches to shift modes to walking, cycling and public transportation – elements which go beyond the analysis in the 66% 2°C Scenario.

"Smart cities" programmes have already been launched in some countries. For example, in 2015 India set out the "Smart Cities Mission". China has established over 285 pilot "Smart Cities" and Japan has launched its "Future City" programme in 2011.

Heat demand in the buildings and industry sectors represents around half of total final energy consumption today (Figure 2.22). Heat demand is currently linked to 9.7 Gt of direct CO_2 emissions from fuel combustion and 2.7 Gt of indirect CO_2 emissions from electricity and district heating, or almost 40% of total energy sector emissions. In the buildings sector, heat is needed

mainly for space and water heating as well as cooking. In the industry sector, it is used in a large variety of processes. The nature and scale of heat demand varies significantly between countries. These differences relate to climatic conditions; efficiency of the buildings stock and heating equipment; level of economic development and access to modern energy services; and availability of fresh water and industrial structure. Heat demand can directly or indirectly be satisfied by various fuels: fossil fuel combustion in boilers and stoves; the use of electricity and heat from district heating (which are indirectly linked to CO_2 emissions); and renewables (bioenergy, solar thermal, geothermal). In the 66% 2°C Scenario, increasing the share of near zero-energy buildings in new constructions to 40% (from 1% today) and mandates for stringent retrofits of the entire stock by 2050 would be the key means to reduce heat demand in buildings. In addition to further strong improvements to the efficiency of conventional boilers, the wider use of low-carbon technologies (e.g. biomass boilers in industry, solar water heaters in buildings) and the expanded use of electricity to meet heat demand would increase the low-carbon share to more than half of heat demand in 2050 compared to less than 10% today (Figure 2.22). This share would be considerably higher than in the New Policies Scenario, where low-carbon technologies satisfy less than 20% of heat demand by 2050.

Figure 2.22 • Global final energy consumption by end-use and fuel in the New Policies and 66% 2°C Scenarios

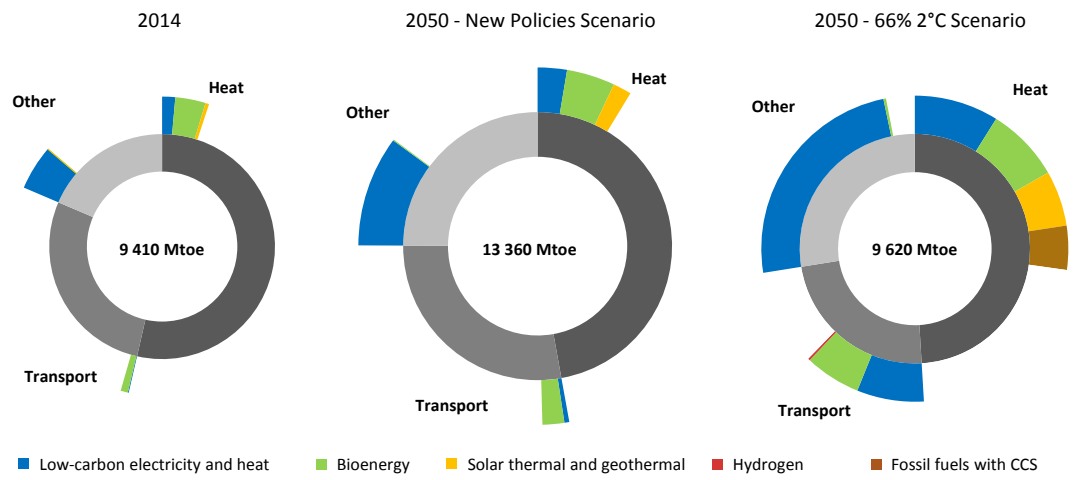

Note: The category "Other" includes final energy consumption in industry, buildings and agriculture excluding heat.

Key message • The uptake of low-carbon technologies across all end-uses would need to rise significantly over existing efforts to meet the challenges of the 66% 2°C Scenario.

Box 2.5 • Hydrogen: Panacea to achieve a broader energy transition?

The fuel mix in global energy supply in the 66% 2°C Scenario in 2050 would differ dramatically from today's mix. Overall the energy sector would switch away from fossil fuels, their share in primary energy demand would fall to less than 40% by 2050, compared with 81% today. But this transition would be more than just a shift from one fuel to another; it would require entirely new ways of making the energy system work. At its essence, a shift from a stock-system to a flow-system would be needed, bringing about challenges to the way energy systems operate. While electricity is the main energy carrier that facilitates the transition in the 66% 2°C Scenario, there could be alternative routes towards a deeply decarbonised energy system, one option being wider hydrogen uptake.

Like electricity, hydrogen needs to be produced from low-carbon fuels to be considered a low-carbon

energy carrier. Hydrogen can serve multiple purposes along the entire energy sector value chain on a pathway to decarbonisation. For example, a high share of variable renewables in the power sector requires development of demand-side response measures and storage at scale for its successful integration. Hydrogen could serve as storage ; it is currently the storage technology with the longest possible duration until full discharge (besides pumped hydropower), which could enable seasonal storage of electricity.

The use of hydrogen as a storage option for electricity could facilitate the energy sector transition towards the use of more renewables in electricity generation. But hydrogen could play a much wider role and support the low-carbon transition also in the end-use sectors, in particular for transport, chemical synthesis (e.g. associated with CCU[45] in methanol production) or heat production in industry (and, to a lesser extent, in buildings). In transport, electrification is the main route assumed in the 66% 2°C Scenario to phase out the use of oil in cars and trucks. But the use of electricity for road transport, in particular for trucks, still faces significant barriers, such as driving range. Hydrogen is not limited in this respect and could be an alternative. In addition, some means of heat production (mainly in the industry sector) cannot switch from fossil fuels to renewables and electricity because of the need for very high temperatures. Hydrogen could play a complementary role here, either by partially substituting for natural gas in the distribution network or by producing a synthetic gas. In addition, in the buildings sector, electricity and low-temperature heat could be supplied in a decentralised way through a combination of an electrolyser with a fuel cell, so that excess heat released by the fuel cell while producing electricity can be used to meet buildings heat demand.

In the 66% 2°C Scenario, hydrogen contributes only around 1% of final energy demand by 2050, mostly in demonstration projects in transport. The immature level of hydrogen technology *vis-à-vis* other low-carbon options, high upfront investment costs and the lack of available infrastructure are key factors for this modest contribution. Significant further technology development would be necessary on the supply and demand-sides for the hydrogen option to become widespread. Cost related to hydrogen technologies (e.g. electrolysers, fuel cells, tanks) have declined over the last decade and technology performance has improved. But much deeper cost cuts and more support for the technology roll-out would be required if the potential benefits of hydrogen are to play a more central role in reaching climate goals.

Recently 13 companies formed the "Hydrogen Council" and are planning to spend around USD 10 billion in the next five years on hydrogen-related technology.[46] But R&D spending would need to be much larger for hydrogen to play a mainstream role in the energy transition. Hydrogen has been part of the IEA Technology Collaboration Programme for the past 40 years, with the aim to accelerate hydrogen implementation and widespread use. In 2016, 29 projects in France were selected to be supported by public funding under the "hydrogen territory" call for proposals process. These projects aim to demonstrate the technical feasibility of hydrogen on a territorial scale and include hydrogen mobility as well as production. Japan's ENE-FARM programme has supported the deployment of around 140 000 residential fuel cell units. Japan aims to deploy 1.4 million residential units by 2020 and 5.3 million by 2030.

Electrification is a key mechanism to accelerate the decarbonisation of end-uses in the 66% 2°C Scenario. Energy efficiency can reduce, but not eliminate energy demand growth, and renewables cannot provide all heat and transport fuel needs due to resource constraints (e.g. bioenergy) and technology limitations (e.g. solar thermal for high temperature industrial applications). As the power sector decarbonises, electricity gradually becomes a low-carbon energy carrier. This makes the use of low-carbon electricity an integral part of the decarbonisation pathway of the 66% 2°C Scenario; the share of electricity in end-use energy demand rises above the level seen in the New Policies Scenario (Table 2.9). The largest change

45 CCU = carbon capture and use using CO_2 as a raw material.

46 http://hydrogeneurope.eu/wp-content/uploads/2017/01/20170109-HYDROGEN-COUNCIL-Vision-document-FINAL-HR.pdf.

occurs in the transport sector, where passenger and freight transport are electrified at scale. Average GDP per capita outside the G20 group is projected to remain around 40% below that the G20 average in 2050. For this reason, the market penetration of new or innovative technologies with higher upfront investment costs (including those that rely on electricity) is expected to be generally faster in the G20 group in the 66% 2°C Scenario.

Table 2.9 • Electrification of end-use sectors in the New Policies and 66% 2°C Scenarios

Sector	Indicator	2014		New Policies Scenario		66% 2°C Scenario	
		G20	Rest of world	G20	Rest of world	G20	Rest of world
Industry	Share of electricity in TFC	20%	18%	24%	19%	26%	22%
	Share of electricity-based heat supply	*3%*	*3%*	*6%*	*4%*	*11%*	*9%*
Transport	Share of electricity in TFC	1%	0.6%	5%	1%	43%	30%
	Share of electric vehicles in total PLDVs	*0.1%*	*<0.1%*	*11%*	*5%*	*72%*	*53%*
Buildings	Share of electricity in TFC	33%	19%	50%	34%	55%	40%
	Share of electricity for space heating	*13%*	*11%*	*18%*	*16%*	*22%*	*28%*

Notes: TFC = total final consumption; PLDVs = passenger light-duty vehicles.

A strong increase of electrification would not necessarily be associated with higher electricity demand. Even if the increased use of heat pumps and electric boilers in the buildings sector leads to higher electricity consumption to meet heat demand in some regions, energy efficiency and electricity savings for other applications mean that electricity use in buildings in the 66% 2°C Scenario would be around 15% lower relative to the New Policies Scenario (see Buildings section). Similarly, in the industry sector, the share of electricity-based heat supply would grow, but overall electricity demand would be lower than in the New Policies Scenario. At a global scale, in 2050 in the 66% 2°C Scenario, electricity demand would be only 3% higher than in the New Policies Scenario, as the reduction in buildings and industry would be offset by increases in the transport sector (Figure 2.23).

Figure 2.23 • Global change in electricity demand by sector in the 66% 2°C Scenario relative to the New Policies Scenario, 2050

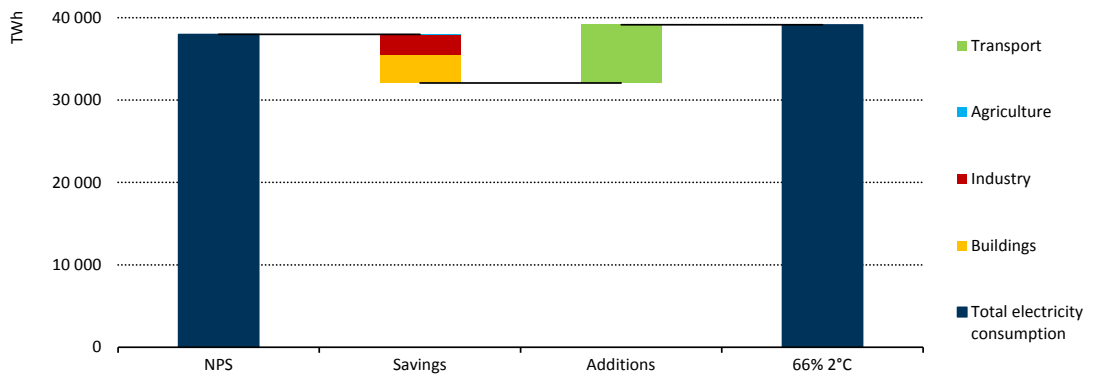

Key message • Electrification in 2050 rises across end-use sectors, but more efficient electricity use in industry and buildings means that additional electricity demand is diluted.

Industry

The decarbonisation challenge of the industry sector in the 66% 2°C Scenario is stark. It would require targeted measures that are integrated and tailored to a multitude of industrial activities. To meet the ambition of the 66% 2°C Scenario, a wide array of low-carbon technologies and processes would need to be adopted at a faster pace and larger scale than ever before, setting industrial production activities globally on a radically different path of development (Table 2.10). The transformation depicted in the 66% 2°C Scenario is spurred by carbon prices in all regions on the order of USD 80 - 190 per tonne of CO_2 in 2050, alongside other policy measures such as mandatory energy management systems, minimum energy performance standards, inter-regional energy intensity targets per sector and policies that support the ambitious early adoption of CCS, which is central to the achievement of the industry sector's decarbonisation goals.

In the 66% 2°C Scenario, energy demand in the G20 region would decouple from the rise in industrial production, with the region's aggregate industrial energy demand starting to decrease by the mid-2020s. This trend is sharply different from the one in the New Policies Scenario, where industrial energy use keeps rising throughout the projection period. In the 66% 2°C Scenario, many G20 economies, including China, would see energy demand from industry peak by 2020, although in others, notably India and Indonesia, it continues to rise through 2050.

The trend in industrial energy demand in the 66% 2°C Scenario reflects a combination of measures: material efficiency, which reduces material needs to provide the same service; energy efficiency, which reduces energy demand; and changes in production routes. Increased material efficiency, a relatively low cost strategy, requires some changes to industrial processes (e.g. light-weighting of products such as plastic bottles, paper and cars) and consumer behaviour (e.g. increased recycling and re-use of materials).[47] The implications of improved material efficiency for energy consumption vary by sector: in the G20 region, in 2050, it has the effect of reducing production levels by approximately 20% in steel, 10% in aluminium, 7% in cement, 3% in paper and 5-15% in high-value chemicals.

Electrification with low-carbon electricity is a key decarbonisation option in the 66% 2°C Scenario. In G20 countries, electricity demand to provide industrial heat would triple by 2050 (Figure 2.24). Heat pumps, to provide low-temperature heat, would be responsible for over 80% of this increase. Most heat pumps are used in the less energy-intensive industries, such as food processing and textiles, and in the chemicals and petrochemicals sector. This would be a considerable change from current patterns of industrial heat provision: today, most low-temperature heat is supplied from fossil fuel boilers, while the use of heat pumps is very limited. Although heat pumps would only account for about 15% of total electricity demand in the industry sector in G20 countries by 2050 in the 66% 2°C Scenario, the electricity consumption of heat pumps at the global scale would nevertheless be twice the level of total electricity demand in Japan in that year. Overall, total electricity demand for heat in industry would be 30% higher in 2050 in the 66% 2°C Scenario than in the New Policies Scenario in the G20, and the uptake of heat pumps three-times higher.

47 A detailed study of the material efficiency in energy-intensive industries is presented in the *World Energy Outlook 2015* (IEA, 2015).

Table 2.10 • Global energy and CO_2 energy intensity reductions and key additional technology levers in the industry sector in the 66% 2°C Scenario relative to the New Policies Scenario

Sub- sector*	Reductions in the 66% 2°C Scenario relative to the New Policies Scenario		Technology levers
	Energy intensity	Carbon intensity	
Cross- cutting	-24%	-66%	Energy efficiency deployment up to its economic potential. Minimum energy performance standards for electric motors by 2025 (min. IE4), including variable speed drives in suitable load systems. System-wide measures in industry systems, such as predictive maintenance and proper systems sizing.
Iron and steel	-26%	-65%	Recycling of all available scrap. Material efficiency improvement through increased manufacturing and semi-manufacturing yields and re-use of post-consumer scrap. Switch of steel production from blast furnace to smelting reduction processes including CCS.
Cement	18%**	-82%	Greater use of alternative fuels in kilns, in some cases above 50% of fuels inputs. Improvement of cement-to-clinker ratio to at least 65% for all regions by 2050. CCS deployment, including for biomass (BECCS).
Chemical and petrochemicals	-3%***	-55%	Material efficiency improvement through increased recycling and light-weighting. Electrification of low-temperature heat demand through the deployment of heat pumps. Direct use of renewable technologies (e.g. solar thermal), mainly to satisfy needs for utilities. CCS deployment in production processes including ammonia, methanol and olefins.
Aluminium	-14%	-17%	Maximum deployment of secondary aluminium production. Material efficiency improvement through increased manufacturing and semi-manufacturing yields and re-use of post-consumer scrap. Fuel switching from coal/oil to gas in some processes, such as alumina refining.
Pulp and paper	-30%	-81%	Material efficiency improvement through increased recycling and light-weighting. Greater integration of bioenergy in the production process. Electrification of low-temperature heat demand through deployment of heat pumps. CCS deployment, including for biomass (BECCS).
Other industries	-27%	-62%	Greater use of bioenergy in new and existing applications and substantial investment in solar thermal and geothermal technologies to supply low-temperature demand. Electrification of low-temperature heat demand through deployment of heat pumps.

* Includes energy consumption and CO_2 emissions from blast furnaces and coke ovens, as well as petrochemical feedstocks. ** Positive value represents an increase in energy intensity in the 66% 2°C Scenario that stems from the additional energy need associated with CCS deployment. *** If petrochemical feedstocks were excluded, the sectoral energy efficiency improvement relative to the New Policies Scenario would be around 10%.

Notes: IE4 = super premium efficiency level according to the International Electrotechnical Commission (IEC) classification. CCS = carbon capture and storage. BECCS = bioenergy with carbon capture and storage. Energy intensity and CO_2 energy intensities refer respectively to the amount of energy divided by the physical production (total high-value chemicals production for the chemical and petrochemical sector) and the total direct CO_2 energy emissions from the industry sector. Intensities are given by unit of total industrial added value for the "other industries" category and at the total industry level in USD 2015 at market exchange rate.

Figure 2.24 • Heat demand energy mix in industry (top) **for the G20 region and related direct CO_2 emissions by sector** (bottom) **in the 66% 2°C Scenario**

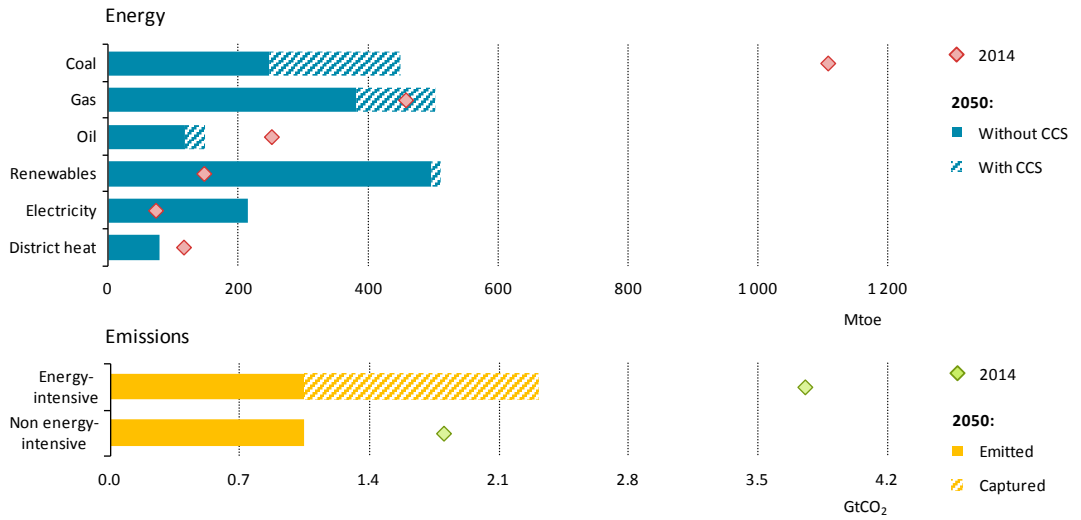

Key message • Besides energy efficiency, renewables, electrification and CCS are all necessary to shift industrial heat demand to low-carbon.

The net result of these changes on energy demand is that global industry-related CO_2 emissions in the 66% 2°C Scenario would fall by almost 60% to 2.7 Gt in 2050. The global trend is broadly mirrored by that of G20 countries, where energy-related emissions from the industry sector would peak at around 5.6 Gt before 2020 and fall by around 60% below today's level by 2050. Relative to the New Policies Scenario (where emissions continue to grow), the industry sectors of G20 countries would save around 75 Gt of cumulative CO_2 emissions over the period to 2050, accounting for about 80% of global savings from the industry sector.

The trends for industry sector emissions in the 66% 2°C Scenario vary considerably by region, depending on the predominant industries and the status and outlook for industrial development. The different pathways can well be illustrated by comparing the outlooks for China and India, which are important countries for achieving the overall emissions reduction relative to the New Policies Scenario. In China, the key challenge would be to decarbonise existing industrial infrastructure; in India, the task in the 66% 2°C Scenario would be to develop new low-carbon industrial facilities. Much of the importance of China and India in reducing industrial emissions to the level projected in the 66% 2°C Scenario is related to their high production base (e.g. China and India make up about 50% of both the world's steel and cement production in 2050).

By sub-sector, the main reductions in industrial CO_2 emissions in G20 countries through to 2050 arise from the manufacturing of iron and steel (44% of emissions reductions), followed by cement (18%) and chemicals (12%). The cement and paper sub-sectors would have to become almost carbon neutral in the G20 region by 2050 in the 66% 2°C Scenario, which underscores the size of the challenge. In iron and steel, emissions reductions stem from a combination of increased recycling through the deployment of electric arc furnaces and large-scale deployment of CCS. In the cement sector, emissions reductions would mainly be achieved from the switch to low-carbon fuels (such as bioenergy) and because CO_2 prices as in the 66% 2°C Scenario would facilitate the integration of CCS into the production process. The decarbonisation routes are similar in pulp and paper, although integrating CCS is not as cost-competitive as in cement, meaning that the deployment rate of CCS is lower. In regions with already significant industrial

production, CCS is mostly an option for retrofit; in regions in which industrial activity is currently expanding, CCS is integrated mostly in greenfield projects.

In the G20 group, energy efficiency plays the largest role towards a low-carbon industrial sector in the 66% 2°C Scenario, followed by fuel switching and CCS (Figure 2.25). In addition, process-related CO_2 emissions in industry would need to decline from above 1 700 million tonnes (Mt) CO_2 today to below 800 Mt CO_2 in 2050. Most of the latter decrease is due to improvements in the cement-to-clinker ratio and favourable penetration rates of CCS in cement making. Process emissions in the aluminium sector would fall by almost half due to advanced technological process change in smelting, starting from the mid-2030s.[48]

Overall, CCS appears to be a key technology enabling otherwise challenging emissions reductions in the industry sector. It would account for around one-fourth of industry's cumulative CO_2 emissions savings, relative to the New Policies Scenario, and would avoid almost half of the coal-related and about a quarter of the gas-related CO_2 emissions in the G20 group in 2050. Its deployment at scale would need to start in earnest around 2020 and span across industrial sectors. In the cement sector, CCS would be responsible for the majority of energy-related CO_2 emissions savings, while it would save around 45% of the emissions in the steel sector. This poses practical challenges with regards to the siting of future industrial activities, which would either need to be located close to sites where CO_2 can be stored, or to be connected to a CO_2 transportation network (which does not yet exist). CCS also forms the basis for potential future development of bioenergy carbon capture and storage (BECCS), which could facilitate negative emissions mainly in the cement sector (and, to some extent, in the pulp and paper sector) as a means to offset remaining emissions elsewhere.

Large-scale deployment of CCS in industry, at the level required in the 66% 2°C Scenario, would require a considerable near-term push to improve its commercialisation prospects, with an immediate need for further research, development, demonstration and deployment. In the 66% 2°C Scenario, China and India play a key role in CCS deployment, contributing around 60% of the global CO_2 emissions captured in industry by 2050, given their importance for global industrial activities.

Figure 2.25 • G20 region energy-related CO_2 emissions reduction in industry by measure

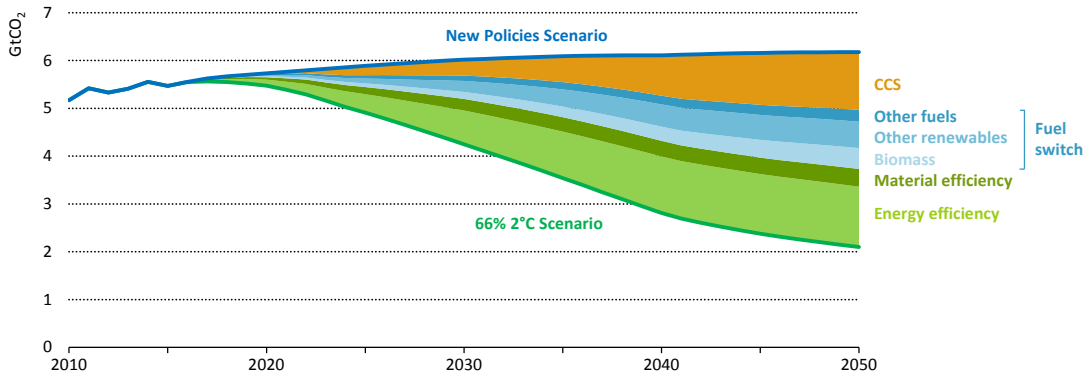

Notes: "Other fuels" mainly refers to the electrification of demand in industry, but in some instances also includes CO_2 abatement of fuel switching from coal/oil to gas. Material efficiency refers to those levers that impact overall raw material production.

Key message • Combined and aggressive deployment of efficiency, fuel switching and CCS would be necessary to reach the emissions reductions of the 66% 2°C Scenario in the industry sector.

48 Advanced process refers to the usage of Hall-Héroult inert anodes for the smelting of aluminium, which would result in considerably decreased CO_2 emissions compared with traditional processes.

In terms of investment, the 66% 2°C Scenario would require an additional USD 3.4 trillion of cumulative investment in the industrial sector in G20 countries to 2050 (three-quarters of the global increment), compared with the level in the New Policies Scenario (Figure 2.26). More than half of the additional investment would be for energy efficiency measures. This would be followed by about USD 1 trillion for renewable energy deployment in industry, mostly for low-temperature heat via solar thermal and geothermal technologies in the less energy-intensive industries. CCS deployment would require an additional USD 0.6 trillion in energy-intensive industries in G20 countries, where most energy-intensive industries are currently located. Since industrial facilities often have long lifetimes (and retrofitting existing high-emitting infrastructure can be difficult and expensive), delaying the transition to a low-carbon pathway in industry risks imposing significant additional costs, if climate targets are to be met.

Under the assumptions of the 66% 2°C Scenario, the measures to improve energy and material efficiency, and boost the use of renewable energy sources to satisfy heat demand in industry, would be largely cost-effective over the lifetime of the investment, facilitated by substantial carbon price signals. Yet, payback periods can be long, and mobilising the high upfront investment is challenging in a sector where investment decisions today typically demand a payback of less than three-to-five years. Even with high carbon prices, targeted policies and measures would therefore be essential to improve the visibility and viability of low-carbon technologies and processes for investment planning. Such measures would include raising awareness and stimulating the adoption of technologies and practices to expand the use of renewables for heat production. Another important avenue would be to promote best practice efficiency options in industry, for example by strengthening incentives and requirements for effective energy assessment and management systems. In addition to cross-border carbon pricing schemes, international sectoral agreements and benchmarking across industries can also help to enable emissions reductions.

Figure 2.26 • Cumulative investment in the industry sector in the G20 region in the New Policies and 66% 2°C Scenarios, 2016-50

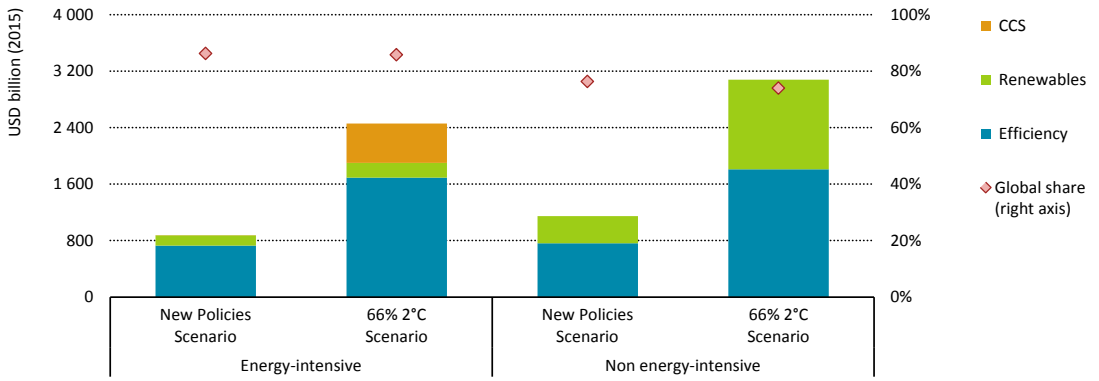

Note: CCS in non energy-intensive industries includes other energy transformation, such as CCS in refineries, oil and gas extraction activities, coal-to-liquids and gas-to-liquids.

Key message • Efficiency measures make up the bulk of investment needs in the industry sector.

Transport

Demand for mobility and freight activity is on a rising trend and the expectation is for further growth. The passenger vehicle stock worldwide is expected to expand two-and-a-half times to reach more than 2.5 billion by 2050, with more than 80% of the increase occurring in the G20

countries. Both aviation and shipping activities are expected to more than triple by 2050 and road freight activity (measured in tonne-kilometres) to rise over two-and-a-half times.

Meeting such demand growth without compromising energy security and environmental goals is a key policy challenge. In the New Policies Scenario, energy demand for transport fuels grows by more than 40% to 2050, to 3 700 Mtoe. More than 50% of the rise in energy demand is met by oil-based fuels, which grow from around 51 mb/d today to nearly 63 mb/d in 2050. Further growth of oil demand is constrained by fuel economy standards, particularly for passenger vehicles. But the limited availability of such standards for other transport modes, notably road freight, and the lack of commercially viable alternatives for oil means that, by 2050, oil demand from transport in the New Policies Scenario is one-quarter above today's level. In this scenario, the contribution of alternative fuels such as natural gas, biofuels and electricity to total transport demand remains just below 20%, even though electric cars make significant in-roads in passenger transport.

Table 2.11 • Global energy and CO_2 intensity reductions and additional policy actions in the transport sector in the 66% 2°C Scenario relative to the New Policies Scenario

Mode	Reductions in the 66% 2°C Scenario relative to the New Policies Scenario		Policy actions
	Energy intensity	Carbon intensity	
All modes			Carbon pricing/taxes to offset the decline in oil prices. Stringent vehicle efficiency and emissions standards. Agricultural and forestry land-use planning.
Passenger vehicles	*-44%*	*-76%*	Purchase rebate or purchase tax exemption*. Differentiated vehicle taxation based on efficiency performance. Free access to toll road and urban centres*. Biofuel blending targets. Incentives for R&D and infrastructure deployment (e.g. electric vehicle charging stations).
Buses and coaches	*-72%*	*-78%*	Right sizing and integrating bus and emerging mobility services to high capacity public transport. Public procurement promoting low-carbon vehicles.
Trucks	*-65%*	*-73%*	Differentiated vehicle taxation based on GHG emission performance. Support to infrastructure deployment (catenary lines). Greening financing, purchase rebate or purchase tax exemption*. Harmonisation and wide diffusion of fuel economy and emissions standards across countries. Biofuel blending targets.
Rail	*-59%*	*-88%*	Support full electrification.
Aviation	*-32%*	*-82%*	Blending mandates and incentives for R&D for advanced biofuels. Optimise routing, minimise flight distances and cut aircraft waiting times through improvements in air traffic management.
Shipping	*-46%*	*-57%*	Incentives to promote the development of advanced biofuel technologies for aircraft and ship engines. Fuel efficiency and emission standards for maritime and air transport at international level.

* For low-carbon vehicles.

To facilitate the transition to a low-carbon transport sector, the 66% 2°C Scenario relies on a strong and integrated policy framework, which takes into account the specificity of each transport mode and goes well beyond existing policy efforts (Table 2.11). Strengthened vehicle efficiency standards, set at an international level, would be crucial to cut emissions from all modes of transport. But standards alone are unlikely to be sufficient to ensure the adequate development of low-carbon transport options. Differentiated vehicle purchase taxes (also known as fee-bates) would complement vehicle efficiency regulations by providing clear pricing signals, rewarding the most efficient technologies. Effective planning and development of the required infrastructure to support the built-up of recharging stations for electric vehicles and Electric Road Systems for electric trucks (such as catenary [overhead] lines), carefully designed public transport networks and an integrated strategy for biomass supply and transformation are all crucial elements of the 66% 2°C Scenario. Additionally, a carbon price (taking the form of a fuel tax) would be required to offset the decline in oil prices and to avoid rebound effects.[49] Multi-modality, which allows taking advantage of the least-emitting transport mode for passengers and freight movement, is also an option that would require policy support (Box 2.4).

Figure 2.27 • Global transport fuel mix and biofuel demand by type in the 66% 2°C Scenario

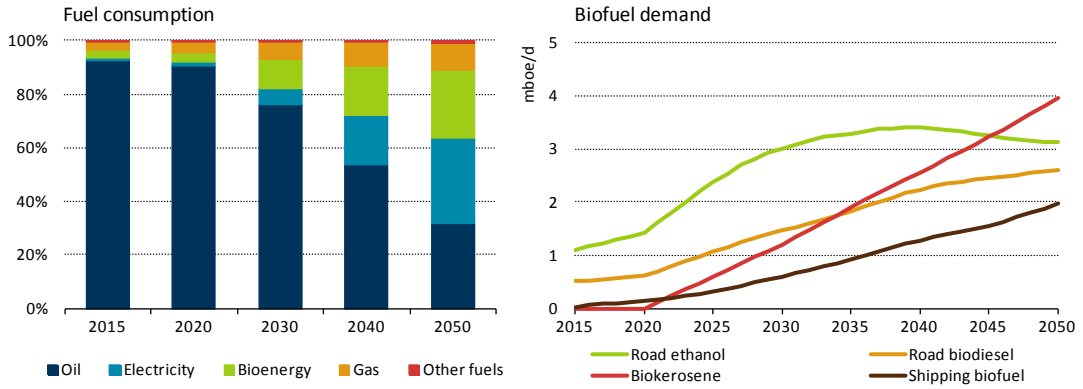

Note: mboe/d = million barrels of oil equivalent per day.

Key message • Transport oil demand would fall drastically in favour of electricity and biofuels in the 66% 2°C Scenario; road ethanol would peak before 2040 as the conventional car fleet declines.

The net impact of such robust strengthening of policy ambition is that, in the 2°C 66% Scenario, transport-related energy demand would peak at around 2 750 Mtoe by the mid-2020s and then fall to 2 250 Mtoe in 2050, almost 15% lower than today. The composition of the transport fuel mix would change entirely: oil demand would decline steeply to a mere 15 mb/d in 2050 and its share in the transport fuel mix would fall to less than one-third (Figure 2.27). Alongside efforts to improve the efficiency of all types of vehicles, the main reason for this drop is a switch towards electricity and biofuels. In 2050, virtually all cars sold worldwide would either be hybrid or electric. Transport electricity use would increase significantly and account for around one-third of global fuel demand by 2050 (from 1% today); electricity would become the main means to satisfy road passenger and road freight demand. The use of biofuels would also expand and reach almost 12 mboe/d in 2050, from 1.6 mboe/d today. Trends differ across biofuel types in the 2°C 66% Scenario. Ethanol is an important transition fuel for passenger vehicles; but its use starts to

49 Rebound effects occur when lower energy prices, due to less energy demand, lead to a reduction of household energy expenditures. The available money can then be spent on other energy-consuming products or activities, such as driving more or flying more often. Supporting the transition to zero emission mobility through taxes may take the form of a fuel tax as in the 66% 2 °C Scenario, but could also take more complex forms, complementing and partly shifting fuel taxes with charges reflecting road usage and other externalities, to offset the decline in oil prices and to avoid rebound effects.

decline by around 2040 as battery costs fall and electric cars and motorbikes accumulate in the vehicle stock, freeing up some of the limited sustainable biomass potential for other uses. Instead, biofuels become the fuel of choice in transport modes where alternatives to oil are scarce, such as aviation and shipping; and in road freight, where the build-up of the required catenary lines is a key bottleneck for deployment of electric trucks.

This major transformation would lead to a cumulative reduction of CO_2 emissions of 112 Gt, relative to the New Policies Scenario, of which two-thirds occurs in G20 countries. The radical decoupling between transport activity growth and CO_2 emissions would require contributions from all transportation modes – passenger cars account for about one-third of the emissions reduction, road freight for one-quarter, aviation for one-fifth and shipping for one-tenth (Figure 2.28). But the means to achieve such a deep and rapid transition to a highly efficient and low-carbon transport system are different by mode and region.

In the 66% 2°C Scenario electrification of the vehicle fleet is the key route assumed to decarbonise road transport for both passenger and freight vehicles, coupled with a switch to biofuels and energy efficiency measures. The share of electricity in road transport demand rises to more than 40% in 2050, up from close to zero today. Electric engines are more than twice as efficient as conventional gasoline engines and electric vehicles can shift transport sector emissions from millions of mobile conventional sources to a much smaller number of stationary sources in the power sector. If the power generation is from low-carbon sources, as in the 66% 2°C Scenario, then electric vehicles could make a major contribution to the reduction of GHG emissions.

Figure 2.28 • Contribution to global CO_2 reductions by transport mode in the 66% 2°C Scenario relative to the New Policies Scenario

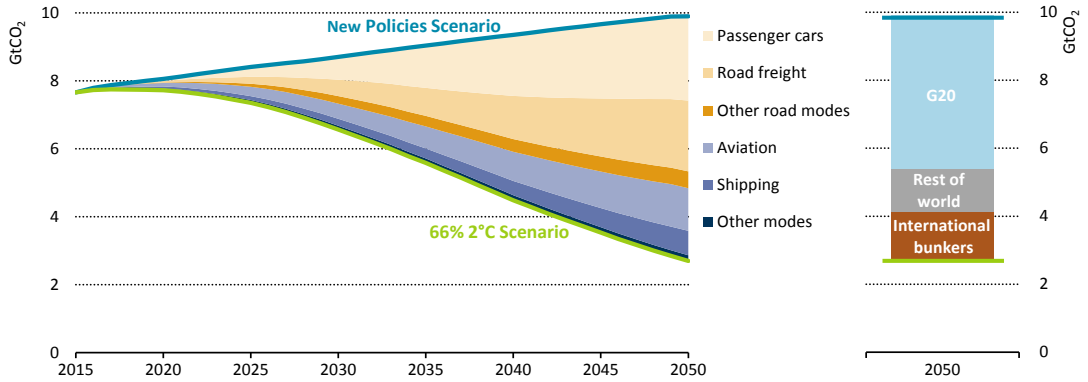

Key message • CO_2 emissions reductions would accelerate after 2030 as sales of electric vehicles rise and biofuels make in-roads in aviation and shipping.

Electrifying road transport at the pace and scale required in the 66% 2°C Scenario is an enormous task: the share of electric cars in passenger car sales would rise from less than 1% today to almost 70% in 2050, more than six-times higher than what is achieved under existing and planned policies in the New Policies Scenario (Figure 2.29). This is primarily a challenge for the G20 group, which hold more than 85% of the global passenger car stock in 2050: the largest increase in electric car sales in the 66% 2°C Scenario occurs in the large vehicle markets such as China, India, the United States and the European Union. The main exception among G20 countries is Brazil, which relies more on a very efficient fleet of flex-fuel and pure ethanol engine cars.

The deep transformation of transport required in the 66% 2°C Scenario would involve electrification beyond passenger cars alone: there are 1 billion electric motorbikes on the world's

roads by 2050 in the 66% 2°C Scenario (from less than 250 million today, most of which are in China) and more than 200 million electric freight vehicles. While the majority of the latter are light commercial vehicles, used for local delivery in cities, the electrification challenge needs to extend to heavy freight traffic operating over longer distances. So the most frequented highway routes would need to be equipped with electrified overhead lines in the 66% 2°C Scenario to fuel plug-in hybrid trucks, as battery ranges otherwise would not permit long-haul journeys.[50] A successful transformation of road freight transport as in the 66% 2°C Scenario would also require improved logistic networks to optimise truck utilisation, e.g. platooning and backhauling, and integrate long-haul delivery with local delivery, e.g. adjust timing to avoid trucks to travel during congestion hours.

Figure 2.29 • Share of electric powertrains in global vehicle stock by type and global electricity demand for transport in the 66% 2°C Scenario

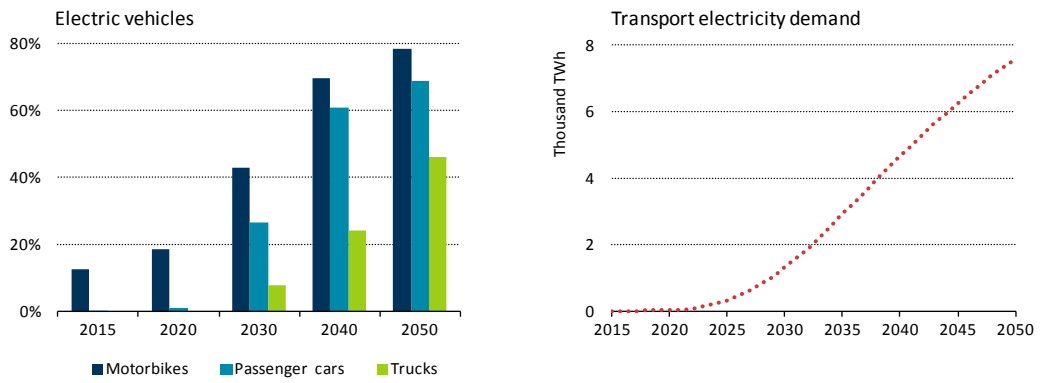

Note: TWh = terawatt-hours.

Key message • Electric engines would make big in-roads in passenger and freight road markets, inducing a sharp increase in electricity demand.

In aviation and shipping, key elements of curbing CO_2 emissions in the 66% 2°C Scenario are fuel efficiency improvements of the fleets and the large-scale use of biofuels. The average fuel consumption of ships and aircraft would fall by around two-thirds in the 66% 2°C Scenario between now and 2050, thanks to the large-scale deployment of technology improvements such as open rotor, geared turbofan and counter-rotating fan, as well as better traffic management in aviation and data-enabled load optimisation in navigation. In addition, drop-in[51] biofuels from non-edible vegetable oil and lignocellulosic material could substitute for almost 4 mb/d of oil in aviation and 2 mb/d in shipping by 2050 in the 66% 2°C Scenario, up from a combined 0.7 mb/d in the New Policies Scenario. Natural gas additionally supports the decarbonisation of shipping, with liquefied natural gas (LNG) replacing more than 1.5 mb/d of oil by 2050.

By enabling behavioural changes, urban planning can also be a cornerstone to reduce emissions from transport in an increasingly urbanising world, e.g. through a dense and interconnected network of cycle lanes, low-carbon public transportation and charging stations. Development of smart mobility might also help to transform traditional transportation patterns. On the one hand,

50 Alternatively, a carefully co-ordinated build-out of a hydrogen supply and fuelling infrastructure in tandem with the rollout of fuel cell trucks could provide a cost-effective alternative to overhead lines, depending on the potential for technology learning in electrolysers, fuel cells and other key hydrogen technologies.

51 Drop-in biofuels are made of the same molecules as conventional fuels, so they can be blended at a high rate in common engines without any modifications.

car sharing and car-pooling could reduce the overall vehicle kilometre; on the other hand, autonomous vehicles and lower fuel consumption could lead to an increase of the activity.[52]

The transformation of the transportation sector in the 66% 2°C Scenario would require a cumulative investment of USD 32 trillion between 2015 and 2050, USD 13 trillion more than in the New Policies Scenario (Figure 2.30). This includes energy efficiency investment in road, aviation and shipping sectors and investment for new powertrains, such as pure electric vehicles. Over half of this investment would be dedicated to new electric vehicles and the remainder to energy efficiency.[53] The lion's share of energy efficiency investment would need to be dedicated to road transport to meet stringent fuel economy and emissions standards, although investment in improving the efficiency of road vehicles would actually be lower than in the New Policies Scenario. The reason is that because of the rise in electric mobility, there are fewer highly efficient conventional vehicles on the road in 2050 in the 66% 2°C Scenario than in the New Policies Scenario. Investment in aviation and shipping would jump by two-thirds in order to improve fuel efficiency, relative to the New Policies Scenario. In addition, biofuels investment would rise sharply to meet the larger demand for biofuels in particular in shipping, aviation and road freight.

Figure 2.30 • Global cumulative transport investment in in the New Policies and 66% 2°C Scenarios, 2016-50

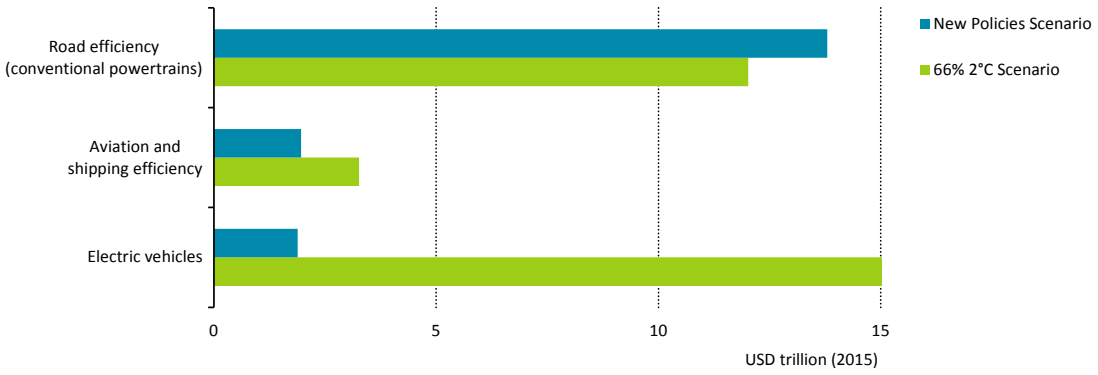

Note: Excludes investment in recharging infrastructure.

Key message • Additional investment needs in the 66% 2°C Scenario stem mainly from the electrification of the fleet.

Electrification of transport accounts for the bulk of the overall investment requirement (of which more than three-quarters of the required investment is for passenger cars, given the substantial shift to electricity, and freight transport captures the remainder with the rise of electric trucks), but this sum is mitigated somewhat by significant reductions in the cost of batteries. Battery cost in the 66% 2°C Scenario falls at a much faster rate than in the New Policies Scenario, with the unit cost reaching the assumed floor cost of USD 80/kWh[54] for battery electric vehicles by the early

52 These effects have not been included in the analysis of the 66% 2 °C Scenario, but are discussed in *Energy Technology Perspectives 2017* (IEA, forthcoming).

53 Represents the additional cost compared with an average combustion engine vehicle today and includes a large set of incremental as well as breakthrough improvements. For road vehicles, examples are hybridisation, higher capacity batteries (e.g. lithium oxygen) and super-fast charging stations. For aviation, examples are light-weighting, drag reduction, engine improvement and new motorisation such as open rotor. In navigation, it includes minimising drag and improving engine operation.

54 This floor cost value is based on a US Department of Energy analysis that assumes overcoming chemistry challenges, favourable systems engineering and high production volumes (Sarkar, 2016). See also the discussion in the *World Energy Outlook 2016* (IEA, 2016a).

2030s, around 20 years earlier than in the New Policies Scenario. The reason is that the policy push to electrification facilitates additional cumulative sales of more than 2 billion electric cars in the 66% 2°C Scenario, relative to the New Policies Scenario. In addition to these investments, the electrification of road transport implies significant investment across the whole chain value, from R&D in battery capacity and robustness, to the upgrade of the grid to meet possible local surplus demand and the deployment of charging stations for cars and catenary lines for trucks. Their quantitative assessment would require a further analysis.

Buildings

Today, the buildings sector accounts for around one-third of global final energy demand; almost 75% of which was in G20 countries.[55] Roughly three-quarters of the global total is required to meet heat demand while the remaining quarter is mainly electricity for lighting, appliances and space cooling. Satisfying heat demand currently accounts for about 4.5 Gt of CO_2 emissions, which represent around half of the total emissions in the buildings sector (including direct and indirect CO_2 emissions). Almost all of the sector's direct CO_2 emissions arise from heat production from coal, oil and natural gas boilers (around 1% of direct CO_2 emissions arise from the use of kerosene for lighting). Today, fossil fuels account for more than one-third of total energy use in buildings.

The outlook for the buildings sector is one of rapid growth. In the period to 2050, the global number of dwellings is expected to swell (by around 60%) and the size of the average individual building also rises. As a result, total floor space area of dwellings is expected to double, pushing up demand for energy services such as space heating and cooling. The increase in floor area is expected to be significant in the G20 group as a whole, at around 80% to 2050, but not as rapid as in non-G20 countries, which include many fast-growing emerging economies. Until 2050, the value added by the services sector, an important driver of consumption, almost triples, and more than 80% of the increase comes from the G20 group.

Such trends are expected to push up energy demand in the buildings sector. In the New Policies Scenario, total global energy demand in this sector rises by one-third, with half of the growth in the G20 group. The intensity of energy demand in the buildings sector falls, but continued reliance on fossil fuels in this scenario means that the sector's carbon intensity barely improves. Further steps to reduce emissions from the buildings sector, to the level required in the 66% 2°C Scenario, would require major additional policy action in three main areas. First, adopting and implementing effective policies that would make end-use appliances as efficient as possible. Second, a push for near zero-energy buildings for new construction (covering around 40% of all new buildings from today to 2050, the other 60% of new buildings by 2050 being compliant with buildings codes), along with deep retrofits of the overall existing buildings stock by 2050 (to reduce space cooling demand). Third, decarbonising the remaining supply of heat to the buildings sector by replacing fossil fuels with electricity, district heating and renewables. These policies are directed to spur the necessary reduction in the energy intensity of each end-use, or their carbon intensity, or both (Table 2.12). Decarbonising power and heat generation are a vital additional step towards achieving net-zero CO_2 emissions in the buildings sector: indirect CO_2 emissions currently represent around two-thirds of the sector's CO_2 emissions.

The net effect of implementing this very ambitious package of policies and measures is that, in the 66% 2°C Scenario, energy consumption from the buildings sector would peak in the early 2020s and just about return to the level of today in 2050. This is the result of some offsetting trends, with lower demand for space heating and lighting being counterbalanced by continued

55 The buildings sector includes energy used in residential, commercial and institutional buildings. Household and services energy use includes space heating and cooling, water heating, lighting, equipment, appliances and cooking equipment.

growth in all other buildings-related end-uses, for which the effect of higher income levels and gradually improving access to modern energy services in developing countries outpaces efficiency and conservation efforts. In G20 countries as a whole, energy demand in the buildings sector drops by around 10% by 2050.

Table 2.12 • Global energy and CO_2 intensity reductions and additional policies in the buildings sector in the 66% 2°C Scenario relative to the New Policies Scenario

End- use	Reductions in the 66% 2°C Scenario relative to the New Policies Scenario		Policy actions
	Energy intensity	Carbon intensity	
Space heating	-33%	-79%	New buildings: increase the share of near zero-energy buildings on average from now to 2040 to 40% (from 1% today) and ensure other new construction complies with building codes. Existing stock: mandate stringent measures to ensure deep retrofit of the entire stock by 2050 (from less than 10% today). Mandates seeking to maximise buildings energy performance for both new and existing buildings. Phase out fossil fuel boiler sales by 2025 in all regions, except where natural gas is a major provider today. Extensive support and mandates for direct use of renewables (solar and geothermal), efficient electrification and efficient district heating in dense urban areas.
Water heating	-16%	-84%	Phase out of fossil fuel boiler sales by 2025 in all regions, except where natural gas is a major provider today. Extensive support and mandates for direct use of renewables (solar and geothermal), efficient electrification and efficient district heating in dense urban areas.
Cooking	-15%	-74%	Phase out fossil fuel stoves sales by 2025 in all regions; exceptions: regions where natural gas is a major provider today; developing countries, where LPG enables more access to modern energy services in rural areas.
Lighting	-40%	-92	Phase out kerosene lamps sales by 2025. Enhance deployment of electricity and clean off-grid technologies, e.g. solar lamps. Require lighting performance at current LED efficacy levels or higher for all lighting sales by 2025.
Appliances	-25%	-90%	Phase out of sales of the least-efficient major appliance by 2025.
Space cooling	-46%	-93%	New buildings: increase the share of near zero-energy buildings to 40% (from 1% today) and ensure other new constructions comply with building codes. Existing stock: mandate stringent retrofits to ensure deep retrofit of the entire stock by 2050 (from less than 10% today). Phase out least-efficient cooling systems sales by 2025.

Notes: NPS = New Policies Scenario; LPG = liquefied petroleum gas. Energy intensity and carbon intensity for the buildings sector refer respectively to the amount of energy divided by the global population and the total CO_2 emissions (direct and indirect) linked to the buildings sector.

Successful decarbonisation of the buildings sector in the 66% 2°C Scenario would also require changes in the fuels and technologies used. The rapid rise in the use of renewables and electricity for heating purposes would precipitate a major revolution in the sector's fuel mix (Figure 2.31). The required level of decarbonisation of the 66% 2°C Scenario would require the share of fossil fuels in the sector to drop to around 10% by 2050, compared with 35% today. Electricity use in the 66% 2°C Scenario would increase by two-thirds to 2050, with heat applications and other electricity end-uses (e.g. appliances and space cooling) each accounting for around half of the increase; about 3% is for desalination purposes. The change in energy demand in the 66% 2°C Scenario is particularly notable for G20 countries, which would see their share in worldwide buildings energy demand shrink from around three-quarters (and almost 85% for electricity) to around 65% (70% for electricity) in 2050. Countries outside G20 have higher projected growth for hot water needs (met either by electricity or solar water heaters) as well as for space cooling and appliances.

Figure 2.31 • Global energy demand by fuel and electricity demand by end-use in the buildings sector in the 66% 2°C Scenario

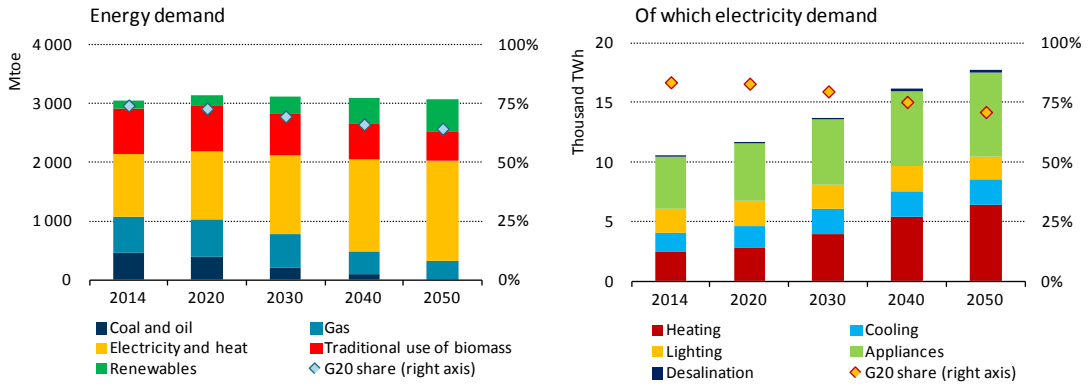

Note: Mtoe = million tonnes of oil equivalent.

Key message • Electricity demand would nearly double and account for half of energy demand in buildings in 2050.

The composition of electricity demand in the buildings sector in the 66% 2°C Scenario reveals some diverging trends. Compared with the New Policies Scenario, there would be electricity savings of 5 400 TWh in 2050 as a result of more robust efficiency measures for lighting, appliances and space cooling, but these would be partially offset by an additional 2 000 TWh of electricity needed to satisfy increasing use of electricity for heating purposes. In some sub-sectors, despite aggressive efficiency efforts, electricity demand would continue to rise. For example, overall average electricity consumption per unit of large appliance would decrease strongly (e.g. refrigerators, freezers, washing machines, dishwashers and dryers). But rising ownership rates and a growing amount of small appliances and equipment would lead to an increase of over 60% of electricity use related to appliances through to 2050 in the 66% 2°C Scenario (compared with a doubling of electricity consumption in the New Policies Scenario). Electricity demand for space cooling would see one of the highest growth among all end-uses, despite efficiency efforts. In India, for example, electricity demand would increase by almost a factor of four to 2050, of which around a quarter is related to space cooling, despite the adoption of aggressive minimum energy performance standards and stringent building codes. The net result is that, at a global level, electricity demand in the 66% 2°C Scenario would be 15% lower than in the New Policies Scenario. Together with a reduction in carbon intensity of power generation, this would reduce indirect CO_2 emissions by 6.1 Gt in 2050.

The strong worldwide push for near zero-energy buildings in new constructions (40% of the additional buildings by 2050) and deep retrofit of the existing buildings stock means that, in the 66% 2°C Scenario, global heat demand (mostly for space and water heating) in the buildings sector would decline by 10% below today's level by 2050. This is a radical reversal of present trends: it compares with an increase by 10% in the New Policies Scenario (Figure 2.32). the G20 group – which today accounts for 70% of the world's dwellings and more than 85% of space heating demand – would be responsible for the entire decline in the 66% 2°C Scenario (countries outside G20 would still have a higher heat demand in 2050, compared with today's level). The overall decline masks different trends: while global energy demand for space heating would decline by one-quarter below today's level in 2050, heat demand for water heating and cooking with modern fuels would increase by over 25%. The latter largely reflects population and economic growth in developing countries: sub-Saharan Africa accounts for a third of the increase.

The fuel mix to satisfy heat demand in the 66% 2°C Scenario in 2050 would be entirely different from today, with bioenergy (including the traditional use of solid biomass), electricity and other renewables (solar thermal and geothermal) supplying three-quarters of total heat demand, and much of the remainder being natural gas. This would bring down the fossil fuel share to 15% from 45% today (compared with 45% by 2050 in the New Policies Scenario). Although the share of bioenergy in heat demand (mainly traditional use of solid biomass for cooking which is particularly inefficient) would be higher than that of electricity, the number of consumers reliant on electricity would actually be higher, as the efficiency of heat pumps is higher than that of other equipment. In 2050, around 40% of households would rely on electricity for space heating, 35% for water heating and 80% for modern forms of cooking.

Direct use of renewables also contributes to meeting heat demand. By 2050, in the 66% 2°C Scenario, 20% of global households would use renewables (mostly bioenergy) for space heating and some 40% solar water heaters. In the 66% 2°C Scenario, many African and Asian countries would move directly to renewable options for water heating purposes.

Figure 2.32 • Heat demand by fuel and end-use in the buildings sector in the New Policies and 66% 2°C Scenarios

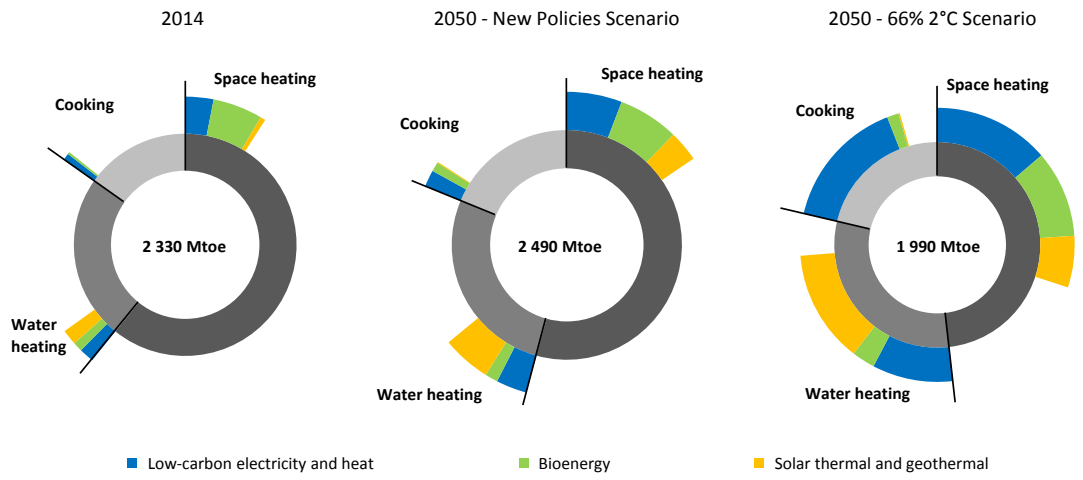

Note: Traditional use of solid biomass is accounted for separately from the three end-uses.

Key message • The use of low-carbon technologies for heat demand in the buildings sector would need to rise significantly over existing efforts, despite lower heat demand from energy efficiency.

Moving to near zero-energy buildings for new construction and deep retrofits of the existing buildings stock is a huge challenge; the required pace of change to 2050 amplifies the scale of what is required. Tight, robustly enforced efficiency standards for equipment, appliances and lighting would be needed to restrain energy demand growth in the residential and services sector, as well as to spur technology advances. Best practice and effective codes to promote energy-wise design and construction of new buildings have proven useful in many parts of the world, but would need to continue to evolve and to be strengthened significantly to put the buildings sector on track to achieve the 66% 2°C Scenario.

Dramatically improving the energy performance of today's stock of buildings poses particular challenges. The required decline of space heating demand by 25% through 2050 in the 66% 2°C Scenario, relative to today, compares with an expected annual growth of 0.35% in the New Policies Scenario. The latter is already below historic growth trends: space heating demand grew by 0.5% per year on average over the last 15 years. The lower growth projected in the New Policies Scenario is mostly due to relatively modest increases in floor area in countries with cold climates. But, given the generally slow turnover of the building stock, this also implies that in these countries, about 70% of today's building stock will still exist in 2050. The absence of long-term incentive schemes for retrofitting in most countries creates a lock-in effect that, unless overcome through robust policy intervention, will continue to deter improvement in the energy performance of existing buildings. Achievement of the 66% 2°C Scenario would therefore require widespread retrofit and insulation measures, supported by financing models to overcome barriers related to the significant capital outlays and long payback periods (more than ten years, albeit in relation to buildings lifetimes that can exceed 100 years).

Figure 2.33 • Total CO_2 emissions reduction (direct and indirect) **by end-use in the buildings sector in the 66% 2°C Scenario relative to the New Policies Scenario and cumulative CO_2 savings by region**

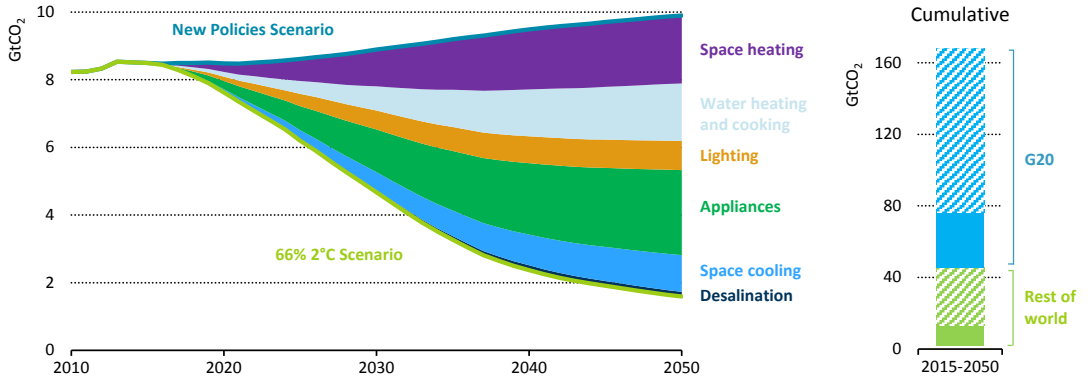

Note: Hatched area in the figure on the right represents indirect CO_2 emissions savings within the region.

Key message • Much greater policy action is needed across all parts of the buildings energy use to put the sector on track to achieve the needs of the 66% 2°C Scenario.

As in other end-use sectors, the picture of the buildings sector that would emerge from our projections in 2050 in the 66% 2°C Scenario is one that is very different from today (Figure 2.33). The contribution of the G20 group towards direct and indirect emissions savings would be particularly large, as their share in these emissions would drop from almost 85% today to around 60% in 2050 in the 66% 2°C Scenario. At less than 1 Gt by 2050, global direct CO_2 emissions would be almost four-times lower than the current level. China would provide the largest contribution to direct CO_2 emissions savings, as coal to meet demand for heat in buildings would be replaced by other fuels. The United States and the European Union today account for 40% of global heat demand met with modern fuels in the buildings sector and, in our projections, would be the

second- and third-largest contributors to direct CO_2 emissions savings. By 2050, the buildings sector would represent around 20% of total CO_2 emissions (including indirect) in the 66% 2°C Scenario. Energy efficiency gains in buildings would contribute to these savings, but a large part of the decline in CO_2 emissions also reflects the reduction in carbon content of the power sector.

Investment in more efficient buildings, equipment (e.g. LED lighting, appliances, induction stoves, heating and cooling systems) and renewables-based heat systems (e.g. bioenergy boilers, solar water heaters) would require investment of more than USD 25 trillion in the 66% 2°C Scenario, over twice the level of the New Policies Scenario (Figure 2.34). About 85% of the cumulative investment is in G20 countries. The bulk of the investment is to improve the efficiency of energy use – including insulation and retrofits as well as more efficient appliances and heating systems – and about a quarter is for expanding the use of renewables to serve heating needs.

Figure 2.34 • Cumulative investment for efficiency and renewables by end-use in the buildings sector in the New Policies and 66% 2°C Scenarios

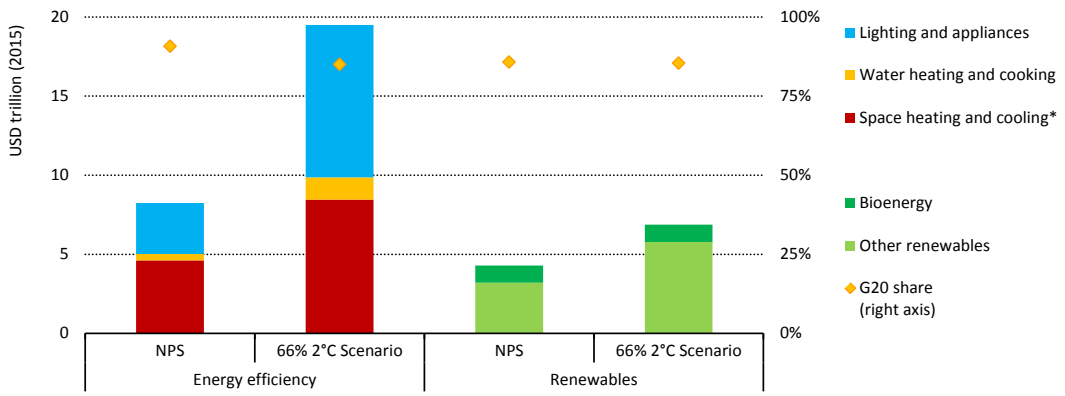

*Space heating and cooling energy efficiency investments include also retrofit and insulation investments.

Key message • The 66% 2°C Scenario would require twice the level of investment in energy efficiency and renewables than the New Policies Scenario.

The investment in renewables is for energy services related to heat production, such as biomass boilers and solar water heaters. Efficiency expenditures for heat-related applications include improvements in the building envelope, high-performance heat pumps, more efficient boilers and heating/cooling equipment. These account for around 60% of the cumulative investment with the rest being for efficiency improvements in end-uses that rely on electricity such as appliances and lighting.

The variety of potential stakeholders making investment decisions related to energy use in the buildings sector is very wide, ranging from the administration of a major city that decides how to equip its schools with water heating systems, to a landlord who buys space heating units for a rental apartment and to a homeowner who selects a new light bulb. Awareness of the energy and GHG emission aspects of their decisions varies, as does their assessment of the costs involved and their potential interest in pursuing such efforts. Where the owner reduces the carbon intensity of a home, the impact will be felt directly: household energy expenditures in 2050 in the 66% 2°C Scenario are lower than in the New Policies Scenario (see next section). But some of the required investment has long payback times, which can be a barrier to consumers and requires improved access to finance. In other cases, where the owner of a building is not the tenant, pursuing efforts to retrofit the building does not necessarily deliver direct benefits to the owner (although the value of the property could rise as a result of the efforts taken), but rather to the tenant whom benefits from lower energy bills. Overcoming such split incentives is a key policy challenge in addition to the adoption of the measures of the 66% 2°C Scenario.

Implications of the 66% 2°C Scenario

The primary objective of the 66% 2°C Scenario is to reduce energy-related GHG emissions to an extent that it would put the world on track towards achieving climate goals. But energy affects the entire economy and multiple stakeholders, which means that any energy policy to tackle climate change has implications for the achievement of other policy goals. In this section, we explore the implications of the 66% 2°C Scenario for the energy industry (with a focus on stranded assets) as well as for selected energy policy goals beyond climate change, in particular for energy security, air pollution and energy access.

Implications for stranded assets

A rapid and profound energy sector transition as required under the 66% 2°C Scenario would have significant consequences for the energy industry. The sizeable expansion of renewables, efficiency and other low-carbon technologies would bring with it many new jobs that support the manufacturing of components, the installation of new projects, retrofits, and maintenance of installations. The renewable energy industry is already a large employer, and this would be expanded along the transition path. Fossil fuel consumption, meanwhile, would fall dramatically in the 66% 2°C Scenario. A key question is whether these reductions would lead to severe losses for companies and investors in the fossil fuel industry, or whether the transition to a low-carbon economy could be managed smoothly with zero or minimum losses. There are multiple strands to this debate that are inter-related but too often conflated, and, partly as a result of loose terminology, there is a high degree of confusion surrounding discussions of the potential value of losses resulting from climate change policy. It is therefore relevant to differentiate between the various impacts and losses that could be incurred by the energy industry, which include:

- The extent of existing fossil fuel reserves that will be left unexploited as a result of climate policy (“reserves left in the ground” or “unburnable fossil fuels”).
- The capital investment in fossil fuel infrastructure which ends up failing to be recovered over the operating lifetime of the asset because of reduced demand or reduced prices resulting from climate policy (“stranded assets”).
- The potential reduction in the future revenue generated by an asset or asset owner assessed at a given point in time because of reduced demand or reduced prices resulting from climate policy (“carbon bubble”).

The carbon bubble, occasionally also referred to as a reduction in the “remaining book value” of assets as a result of climate policy, is an important consideration for understanding the impacts of the low-carbon transition. This calculation has a wide number of moving parts to be considered, many of which are quite subjective. For example, to calculate the losses for assets resulting from climate policy, it is necessary to compare the book value between a scenario that contains climate policy and for one that does not; estimates of losses are very sensitive to the specific “counterfactual” scenario chosen. There is also uncertainty surrounding the possibility that market participants could substantially modify the type and nature of their asset portfolios in response to different climate policies; estimates of losses are therefore not static over time. The calculation also requires a detailed knowledge of prices, demand, costs (including the cost of capital), project-specific discount rates and any potential alternative sources of revenue (such as government support to ensure sufficient capacity is maintained in the system).[56] Without considering all of these elements, any estimate of the carbon bubble for a specific sector is likely to be flawed.

56 The calculation is further complicated when estimating the carbon bubble for assets that do not necessarily generate any obvious revenue streams, such as in the buildings or transport sectors.

Potential losses incurred on invested capital, i.e. stranded assets, pose a critical concern for companies, investors and policy makers. For each asset taken out of service before it has been able to recover the original capital investment, the parent company's total capital is reduced, potentially lowering its ability to make future investments. Here, our analysis therefore focuses on the impacts of climate policy on fossil fuel reserve utilisation and stranded assets (as defined above) in the power, upstream and refining sectors, the sectors in which stranded assets are likely to be largest. While there are also potential risks for stranding of midstream gas infrastructure, including pipelines and LNG terminals, given the increase in natural gas consumption through to the mid-2020s in the 66% 2°C Scenario, this issue appears less pressing than for the other sectors examined.

Unburnable fossil fuels

Current reported fossil fuel reserves worldwide consist of around 1 000 billion tonnes of coal, 1 700 billion barrels of oil and 215 trillion cubic metres of gas.[57] The CO_2 emissions that would result from combusting these reserves total around 2 800 Gt of CO_2, over three-times the remaining CO_2 budget in the 66% 2°C Scenario (880 Gt). This leads to the oft-quoted finding that two-thirds of today's fossil fuel reserves need to be "left in the ground" to avoid dangerous climate change.

Figure 2.35 • Proportion of fossil fuel reserves produced in the 66% 2°C and New Policies Scenarios, 2015 - 2050

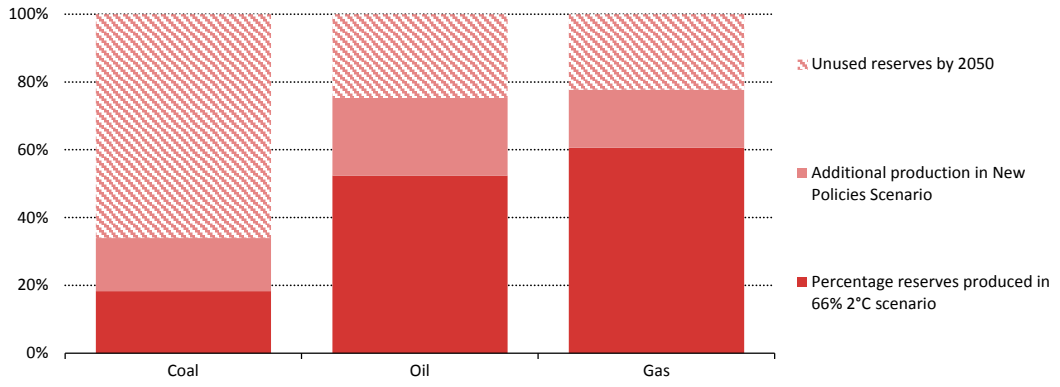

Key message • Close to 80% of remaining coal reserves, 50% oil reserves and 40% gas reserves would not be produced before 2050 in the 66% 2°C Scenario. Remaining reserves would not be fully utilised in the New Policies Scenarios as well.

This is a simplification for a variety of reasons. The outlook for each fossil fuel varies markedly in the 66% 2°C Scenario: coal consumption would drop by over 65% between 2014 and 2050, oil by around 55% and natural gas by less than 20%. This is because the combustion of coal results in significantly more CO_2 emissions than from oil and gas per unit of energy supplied, the energy density of oil is significantly higher than that of coal (hence its widespread use in the transport sector) and the substitutability of the various fossil fuels is decidedly different, depending on the purpose to which they are serving. Comparing cumulative fossil fuel production in the 66% 2°C Scenario up to 2050 with the remaining reserves of each fuel individually, we find that around 40% of gas, 50% of oil and over 80% of steam and coking coal current reserves would be "unburnable" (Figure 2.35). However this calculation overlooks that most of today's proven

57 Here we use "reserves" loosely to mean "published proven reserves", recognising that not all the published numbers should be considered as proven under international classification schemes such as SEC, PRMS or UNFC.

reserves are not produced by 2050 in any scenario even in the absence of stringent climate policies. In the New Policies Scenario, for example, less than 40% of coal reserves and 80% of oil and gas reserves are produced between 2014 and 2050. In other words, over 60% coal reserves and 20% of oil and gas reserves are not produced before 2050 in the New Policies Scenario. The world's proven reserves are not synonymous with those lined up for development, though this is the definition implied by most international classification systems. Continued exploration for and development of new resources remains essential in the 66% 2°C Scenario.

Stranded assets

Stranded assets can occur for a number of reasons related to market conditions, technology and performance risk, as well as changes in regulations or policies. They can occur for all types of technologies, including low-carbon technologies. Low-carbon technologies and, in particular, renewables are often supported by policies that provide consistent revenue streams, such as feed-in tariffs in the power sector. In such cases, retroactive policy changes that reduce these revenue streams could lead some of the initial capital investment to be stranded.

When considering the potential value of stranded assets, it is important to recognise the difference between assets that are prematurely shut down due to adverse demand evolution, and assets that are prematurely shut down and lose part of the capital spent on their development. In other words, it is possible for an asset to be shut before it reaches the end of its technical lifetime, but for it still to have recuperated all of the capital invested into it. The degree of capital recovery when an asset is retired requires a detailed understanding of investment and operating costs, utilisation and production rates, commodity prices and other potential revenue streams that it generated over its lifetime. In this section, we build our analysis of stranded assets on the detailed modelling of all these parameters for the different parts of the energy sector in the IEA's World Energy Model (WEM) (see methodology in Annex A) and focus on those assets that may not recoup their capital due to the additional climate policies put in place in the 66% 2°C Scenario.

In the *power sector*, stranded assets in the 66% 2°C Scenario would total USD 320 billion worldwide over the period to 2050 in terms of fossil fuelled power plants that would need to be retired prior to recovering their capital investment. Coal-fired power plants account for the vast majority of the total (96%), as many of them would be phased out in the 66% 2°C Scenario (Figure 2.36). Gas-fired and oil-fired power plants would be far less affected, partly because they are critical providers of flexibility for many years to come and partly because they are less capital intensive than coal-fired power plants. A detailed analysis underpins these estimates of stranded assets in the power sector, based on simulated costs and revenues for each of the 87 fossil fuelled technologies represented in each region of the IEA's WEM. Each technology was further broken down by the year it was completed. For example, for the subcritical coal-fired power generation capacity that was put into service in 1995 in the United States, market-based revenues were simulated for each year of its operational life, marrying historic data and projected market conditions concerning the mix of technologies in operation, fuel and CO_2 prices. The amount of capital recovered in each year for that capacity could then be calculated (annual revenues less operating costs) and tallied over the 30-40 year operational life.

Three-quarters of the total stranded assets in the power sector are related to plants already in operation today that are retired during the transition before recovering their original investment. The remaining USD 80 billion of stranded capital in the power sector is associated with plants that would be built over the projection period, nearly all of which are already under construction. The level of new power plants that would become stranded is limited by the fact that the 66% 2°C Scenario embodies a well-planned emissions reductions schedule: market players have certainty of the coming transition and invest accordingly. The apparent risk is that stranded

assets become larger with more limited visibility about the policy direction, or an unanticipated switch in policy direction or the intensity of emissions reduction (Box 2.6).

Figure 2.36 • Cumulative stranded assets in the power sector in the 66% 2°C Scenario, 2015-2050

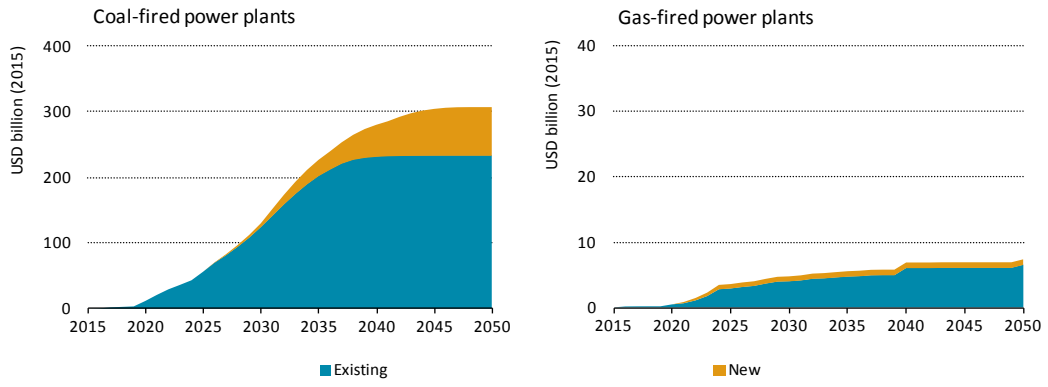

Key message • Global stranded capital would surpass USD 300 billion by 2050 in the 66% 2°C Scenario, most of it related to coal-fired power plants.

In the 66% 2°C Scenario, the installed capacity of the global fleet of coal-fired power plants without CCS would fall from some 1 950 GW today to near-zero by 2050, with the exception of some combined heat and power plants. This is a considerable departure from the path in the New Policies Scenario, where unabated coal-fired power plants remain a fixture of power systems through 2050. However, while the phase out of coal capacity is dramatic, not all retirements indicate stranded capital. Of the total capacity that is phased out by 2050, some 600 GW – about 40% of the total – would have fully recovered its initial capital investment, another 450 GW would have recovered more than 80% of its capital and some 200 GW would have recovered less than 60% (Figure 2.37).

Figure 2.37 • Global coal-fired power plants currently in operation or under construction in the 66% 2°C Scenario

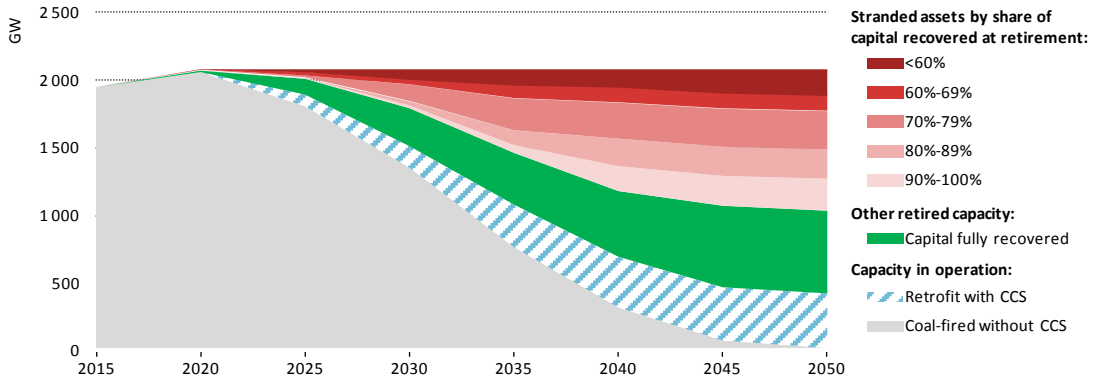

Note: NPS = New Policies Scenario.

Key message • Coal-fired power plants in operation or under construction are either retrofitted with CCS or phased out by 2050 and two-thirds of retired capacity fail to fully recover the initial capital investment.

The development and deployment of CCS technologies provides a level of asset protection for fossil fuelled power plants. Power plants can be designed and built with the option to be

retrofitted with CCS technologies; for example, providing the necessary space to add carbon capture equipment at a later date. Retrofitting fossil fuelled power plants helps to extend the original asset's operational life as CO_2 prices rise and emission limits fall. In doing so, CCS technologies reduce the amount of stranded assets in the power sector and the associated financial strain on energy companies. Where the operations of coal-fired power plants without CCS soon become incompatible with the emissions trajectory of the 66% 2°C Scenario, the continued operation of fossil fuelled power plants equipped with CCS would be fully compatible through to 2050.

The *fossil fuel upstream sector* is, besides the power sector, the one that carries the main risk for stranding assets as a result of climate policy. In our analysis, stranded assets in the upstream sector refer to production facilities, including coal mines, oil and gas wells and processing plants, that fail to recover their capital investment as a result of climate policy.[58] For oil and gas, the relationship between the decline in demand in the 66% 2°C Scenario and production declines from existing fields provides a crucial backdrop to the stranded assets discussion. In the 66% 2°C Scenario, the maximum annual decline for oil demand in any year would be just over 3.5% per year, while the maximum decline in gas demand would be less than 2.5% per year. As examined in *WEO-2016*, the observed decline rate for conventional oil fields that have passed their peak in production is around 6% per year, and if all investment were to cease entirely, this decline rate would accelerate to the natural decline rate, which is closer to 9% per year (IEA, 2016a). The average global decline rates for gas fields are broadly similar. In order to keep oil and gas production at the levels required in the 66% 2°C Scenario, these declines would need to be offset by developing new reserves in known fields, and by discovering and developing new oil and gas resources (Figure 2.38).

Figure 2.38 • Global oil and gas demand, and observed decline in current oil and gas supply in the 66% 2°C Scenario

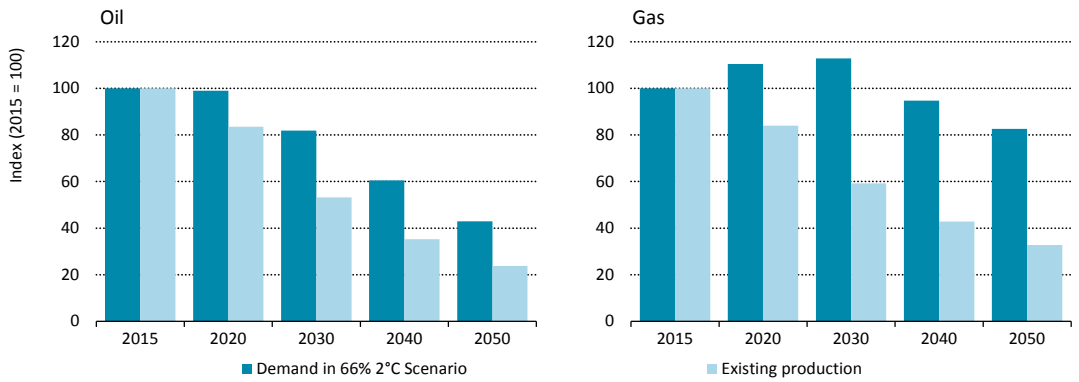

Key message • The decline in currently producing fields is greater than the anticipated decline in oil and gas demand in the 66% 2°C Scenario.

In the 66% 2°C Scenario, between 2014 and 2050, around 350 billion barrels of new oil resources and reserves would need to be developed to ensure a smooth match between supply and demand. Similarly, around 115 trillion cubic metres (tcm) of new gas resources and reserves would need to be developed. In the New Policies Scenario, oil and gas demand grows to 2050 and so around 850 billion barrels of new oil resources and reserves need to be developed and around 180 tcm of gas. The 500 billion barrel and 65 tcm differential between the two scenarios provides some boundaries for the discussion about stranded assets in the upstream sector. It is

58 The upstream sector encompasses oil and gas extraction as well as coal mining.

investment in these volumes that runs the most risk of becoming surplus to requirements. In particular, a portion of the resources that are developed in the New Policies Scenario, but that are not developed in the 66% 2°C Scenario, have already had money spent on their discovery and appraisal. The capital already spent proving up these reserves, i.e. the exploration costs, would not be recovered in the 66% 2°C Scenario and could therefore be considered stranded. Of the 500 billion barrel and 65 tcm differential between the two scenario projections, around 300 billion barrels and 30 tcm consists of proven, but undeveloped, reserves. It is not simple to assign their value, particularly since the costs were incurred many years ago, but we estimate the expenditure incurred to be around USD 400 billion for oil and USD 120 billion for gas.

Beyond these exploration costs, there is no reason why other upstream oil and gas assets should become stranded in the transition, provided the process is one in which a consistent and credible course towards decarbonisation is pursued. As with the power sector, if the path towards the 66% 2°C Scenario is clear and visible to investors, there would be little reason for oil and gas companies to develop new resources in the expectation of a much higher trajectory for demand and prices.

Coal is hit harder than oil or gas in terms of the decline in demand in the 66% 2°C Scenario. Indeed, the decline in demand would be greater than the natural decline in coal production from existing mines. A portion of existing coal mining capacity would therefore need to be shut-in before the mines are fully exhausted – these are at risk of becoming stranded assets. In quantifying this, it is important to recognise that over the lifetime of a mine, the costs of labour and the fuel and power required for the mining equipment far outweigh the capital expenditure necessary. For example, while capital often comprises around 50-75% of the total costs of a new oil project, it can represent less than 15% of total expenditure for a new greenfield coal mine. In the 66% 2°C Scenario, around 1 400 million tonnes of coal equivalent (Mtce) capacity, one-quarter of current production, is closed between 2014 and 2050 before the mines are fully depleted. The value of stranded assets in the upstream coal sector is less than USD 12 billion, significantly lower than stranded capital in the power and oil and gas sectors. This is because the majority of mines that are shut have already recovered their invested capital well before they are closed. Of more concern is the impact that closing this level of mining capacity would have on direct mining jobs. In the 66% 2°C Scenario around one million direct mining jobs would be lost due to the premature closure of assets, around 20% of current global coal mining employment.

Besides stranded assets in the upstream sector, with the drop in oil demand in the 66% 2°C Scenario, there is also a risk that some oil refineries would become stranded assets. However, while there is over 65 mb/d refinery at risk of closing by 2050 in this scenario (around two-thirds of total capacity today), this is unlikely to result in any significant stranded investment. Most of the current refineries that would need to close in the 66% 2°C Scenario in early years are in developed countries: these were largely built some time ago and have already recuperated the capital invested into them. Some refining capacity has been built more recently (within the past ten years), but this is mostly located in the Middle East and Asia. Refineries in these regions remain robust even in the 66% 2°C Scenario thanks to the availability of cheap feedstock or relatively resilient demand. In total, the value of stranded investment in the refining sector in the 66% 2°C Scenario would be around USD 20 billion.

Box 2.6 • Delayed action on climate change and stranded assets

The level of stranded power plant and upstream fossil fuel assets analysed in the 66% 2°C Scenario hinges on the assumptions that the transition starts immediately at the pace and level needed; that all market participants act rationally; and that the policy and market signals related to the low-carbon transition are credible and visible. As investors adjust to lower demand and price levels of the 66% 2°C Scenario, they avoid loss-making investment that could bear the risk of becoming stranded. In the following, we construct a "disjointed transition case", in which we examine the possibility that climate action is delayed until 2025 and an abrupt and unexpected step-change in mitigation policies occurs in 2025, whatever the reason. The assumption is that to 2025, operators invest expecting that prices and demand will continue to rise as in the New Policies Scenario. In 2025, a sudden shift in climate policy is assumed to occur, with policy makers seeking to ensure that cumulative energy sector CO_2 emissions between 2015 and 2100 remain as in the 66% 2°C Scenario (790 Gt). Once these policies are enacted, the pace of the emissions reduction is then faster than in the 66% 2°C scenario to make up for the lack of effort over the preceding ten years. This is a hugely disruptive case for energy markets and the abrupt change in 2025 would pose enormous challenges to the industry. For example, from 2025, oil demand would need to fall by around 4% per year to 2050, one-third greater than the rate seen over the same period in the 66% 2°C Scenario. Gas demand would need to decline 50% faster than in the 66% 2°C Scenario, while the pace of decline for coal would be over twice as fast. For a transition to materialise at such a pace, massive policy intervention would be required, leading to an unprecedented ramp up of capacity for low-carbon infrastructure.

The implication for stranded assets would accordingly be substantial; the combined effect across all sectors would be a rise by a factor of nearly three over the level of the 66% 2°C Scenario. In the power sector, stranded assets would be some USD 80 billion higher to 2050, 25% beyond the level in the 66% 2°C Scenario. The assets most at risk of becoming stranded in the 66% 2°C Scenario would be those currently in operation that were affected by the immediate impact of price reductions from 2015. In the disjointed case, the ten-year period between 2015 and 2025 where prices and demand follow the New Policies Scenario, provides an extended opportunity for these assets to recuperate their capital investment. Over the 2015 to 2025 period, however, some countries would continue to invest in new unabated coal-fired power plants. While these plants can operate normally to 2025, their operations would plunge thereafter, stranding the majority of their invested capital. On balance this latter effect leads to an increase in the overall level of stranded assets in the power sector.

The increase in upstream oil and gas stranded assets in the disjointed case is much larger, given the required pace of decline of demand. While a significant part of the sudden reduction in demand that occurs in 2025 would again be absorbed by declining output from existing fields, two types of stranded assets would still arise (in addition to the stranded exploration capital discussed above). First, as was the case with the power sector, projects developed between 2015 and 2025 that were expecting prices to follow the New Policies Scenario outlook could fail to recover their invested capital. Larger scale and higher cost assets reliant on high and rising oil and gas prices over a prolonged period after 2025 would be most at risk. In addition, part of the prolonged reduction in demand would be absorbed by shutting in fields that have already been developed. The stranded exploration capital would largely be similar to the 66% 2°C Scenario, but total stranded oil investment would be above USD 1 trillion and there would be over USD 300 billion stranded natural gas assets.

Coal assets would again be less affected; indeed the level of stranded assets in the disjointed case is actually lower than in the 66% 2°C Scenario. This is because many of the mines that get stranded in the 66% 2°C Scenario result from investments made between 2008 and 2012, a period when the outlook for the coal market and coal prices appeared to be much more promising than it does today. Many of these mines have relatively high breakeven costs and so the capital at risk is higher than for mines we would assume to come online in the future. A price path following the New Policies Scenario to 2025 covers most of the critical timeframe for these high-cost mines to recoup the capital

invested into them. The disjointed case therefore leads to stranded coal assets of around USD 7 billion, most of which stems from projects that were recently commissioned or are scheduled to come online over the medium term.

Taken together, it is evident that a disjointed energy sector transition would significantly increase the value of cumulative stranded assets, demonstrating the importance of early action on emission reductions to avoid unnecessary losses (Figure 2.39).

Figure 2.39 • Cumulative stranded assets in the 66% 2°C Scenario and the disjointed 66% 2°C transition case

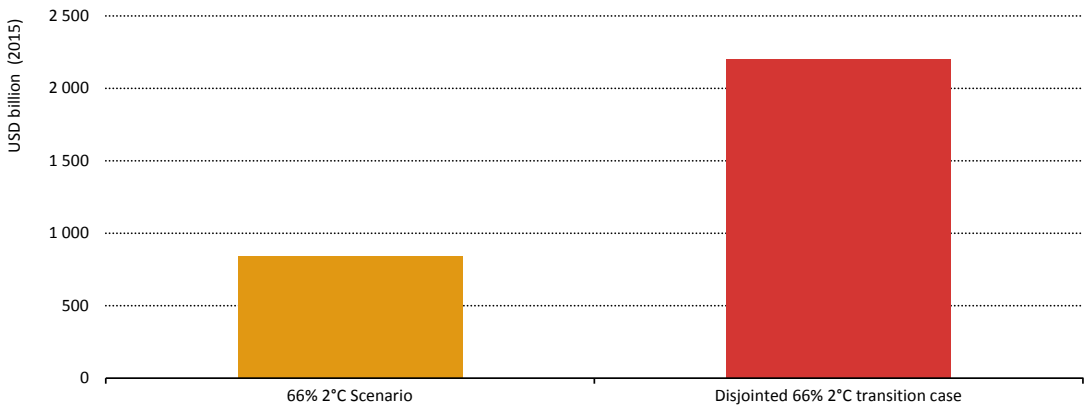

Key message • A disjointed energy sector transition would increase stranded assets by a factor of three, relative to the 66% 2°C Scenario.

Implications for energy security and import bills

The energy security implications of the 66% 2°C Scenario vary by fuel. Security of electricity supply, an issue that often takes a back seat in energy security discussions, becomes a key energy security concern, as electricity becomes the most used energy carrier thoughout the economy and as most of this electricity is produced by variable renewables. This raises the oft-discussed issue of ensuring adequate system reliability by enhancing flexibility in the power system with a combination of improved networks, energy storage, demand-side response measures and flexible power plants (discussed in the power section above and in detail in the *World Energy Outlook 2016*).[59] In the 66% 2°C Scenario, the rising share of variable renewables is accommodated through the effective management of the demand for electricity supply and a rising amount of energy storage at utility or decentralised level, in order to guarantee system reliability. But to facilitate the necessary investments, and to ensure the reliability of power supply at all times, wider reforms to the design and operation of electricity markets will often be necessary. Electrification and the advent of a "smarter", more responsive energy system will also require constant vigilance from policy makers on issues of cybersecurity.

Energy security deliberations span well beyond the power sector, as, for many countries, it relates to their reliance on imports to satisfy domestic energy demand. Such concerns have two main dimensions: the actual physical level of imports dependency and the monetary value that is associated with it. The latter is a particularly important measure, as fossil fuel import bills can be

59 For further details on the integration of variable renewables in the power sector, see *World Energy Outlook 2016* (IEA, 2016a).

a major economic concern. Although the 66% 2°C Scenario is not designed specifically to this end, its aggressive pursuit of a path to facilitate achievement of climate goals helps to achieve the desirable co-benefit of improving the balance of payments of net importers. Within the G20 group, the net-importing countries stand to benefit from reduced import bills, with the value of oil imports falling by over USD 1 600 billion, gas-imports by around USD 300 billion and coal imports by around USD 50 billion (Figure 2.40).

Figure 2.40 • Net savings in imports bills for fossil fuel importing G20 countries in the 66% 2°C Scenario relative to the New Policies Scenario, 2050

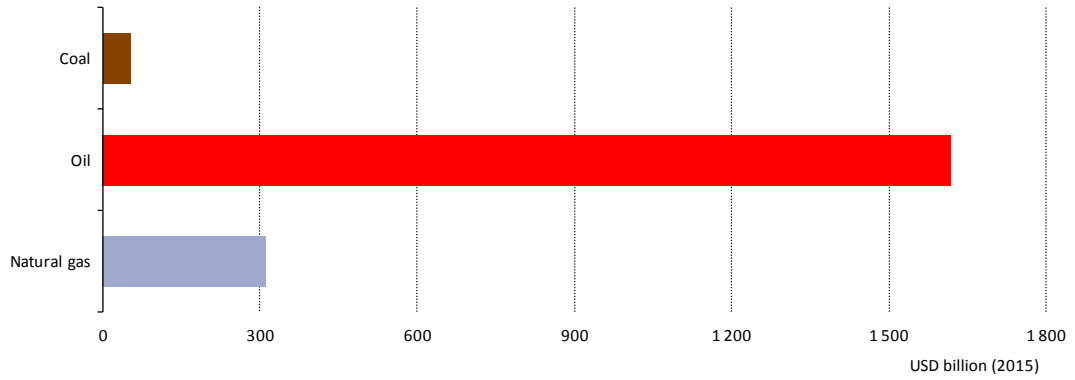

Key message • Fossil fuel import bills would fall in the importing countries of the G20 group in the 66% 2°C Scenario.

Naturally, the other side of this equation is that revenues for fossil fuel producers and exporters are reduced relative to the New Policies Scenario. In the 66% 2°C Scenario, these revenues remains very substantial: net export revenues of fossil fuel exporters in the G20 group amount to a cumulative USD 17.7 trillion for oil and gas over the years to 2050, compared with a cumulative USD 13.4 trillion for the previous 35 years. Revenues at this scale would provide the opportunity for exporters to reduce vulnerabilities by taking steps to limit their dependence on fossil fuel revenue, as Saudi Arabia is doing with its sweeping Vision 2030 reform programme. It is, nevertheless, clear that in the world of a 66% 2°C Scenario, the export market for fossil fuel producers is much smaller than one based on the projections of the New Policies Scenario. Without additional compensating measures, such as through structural reforms, this is likely to result in economic pressure for the countries concerned.[60]

Implications for household energy expenditure

The investment required to reduce emissions in the industry, transport and buildings sectors would be significantly higher in the 66% 2°C Scenario than in the New Policies Scenario. The purchase of more efficient appliances, boilers and other equipment, the insulation of buildings or the purchase of electric cars brings about higher upfront investment needs. The increase of investment limits the ability of households (which are responsible for a large part of the investment made) and firms to invest in other activities. Given that household consumption, in general, is a particularly important driver of economic growth, this is a major policy consideration.

Yet, there is another side to the story. For households, the share of disposable income that is allocated to energy expenditures varies by country, depending, for example, on the level of

60 For more analysis of structural policy reforms, see OECD (forthcoming).

taxation and extent of domestic energy resources. But energy expenditures, in particular for oil-based transport fuels, can be an important burden on household budgets. Aggressive efficiency measures as assumed in the 66% 2°C Scenario offers some important relief. With the deployment of more efficient technologies, as well as low-carbon technologies (such as renewables-based heat or electric cars), energy expenditures for fuel use are generally much lower. In the 66% 2°C Scenario, on a global average, household energy expenditure for fuel consumption drops below the level of the New Policies Scenario during the 2020s, and below today's level during the 2040s, freeing up additional resources (Figure 2.41). However, upfront additional investments would remain still well above the New Policies Scenario, which would require the development of appropriate financing models.

Figure 2.41 • Global average household energy-related fuel expenditures in the New Policies and the 66% 2°C Scenarios

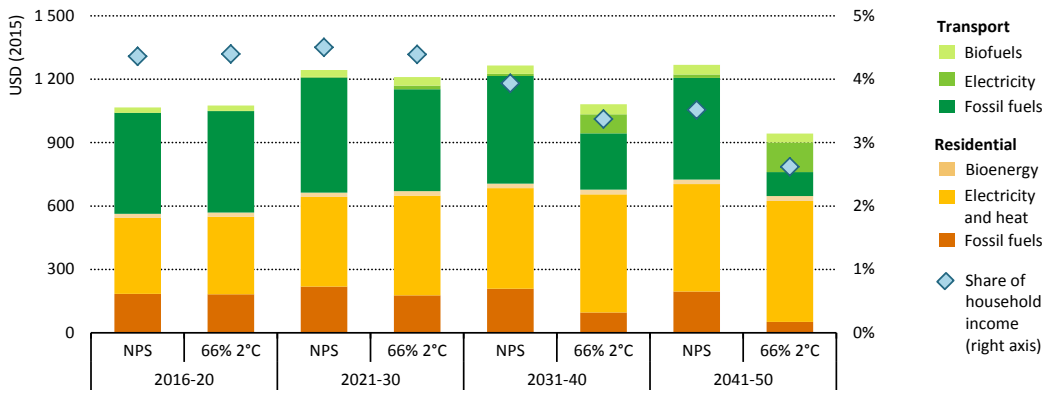

Note: NPS = New Policies Scenario; 66% 2°C = 66% 2°C Scenario.

Key message • After 2030, average household energy expenditures in the 66% 2°C Scenario would be lower than today.

Implications for air pollution

The energy sector is the largest emitter of air pollution, including harmful pollutants such as sulfur dioxide (SO_2), nitrogen oxides (NO_X) and fine particulate matter (smaller than 2.5 micrometres) ($PM_{2.5}$), which are responsible for about 6.5 million premature deaths each year (IEA, 2016c).[61] The pursuit of strategies to reduce GHG emissions from the energy sector can have important co-benefits for mitigating air pollution. For example, at a global level, combustion-related SO_2 emissions mainly relate to the power sector. A power sector strategy to displace unabated coal-fired power generation with non-emitting fuels (such as renewables and nuclear power) can therefore reveal important reductions of SO_2 emissions. In the 66% 2°C Scenario, this could cut energy-related SO_2 emissions by almost 60% in 2050, relative to the level of the New Policies Scenario (Figure 2.42).

Combustion-related NO_X emissions, large parts of which are, at a global level, related to the transport sector, would also be drastically reduced in the 66% 2°C Scenario. The switch to electric cars, both for passenger and road freight applications, is a key means for combustion-related NO_X emissions to drop by 55 % in 2050, relative to the level reached in the New Policies Scenario. This

61 Recognising that air pollutant emissions cannot simply be calculated by applying emissions factors to fuels (as emissions are typically very process dependent), the IEA's assessment of air pollutant emissions is conducted using a link of its World Energy Model with the Greenhouse Gas and Air Pollution Interactions and Synergies (GAINS) model of the International Institute for Applied Systems Analysis (IIASA). Results for air pollutant emissions in this study are based on *Energy and Air Pollution: World Energy Outlook Special Report*, which includes an in-depth discussion of the applied methodology (IEA, 2016c).

reduction is particularly important in urban areas, where traffic is a major source of air pollution and, given proximity of human exposure, is a significant cause of premature deaths.

Fine particulate matter ($PM_{2.5}$) is one of the most harmful substances among the various air pollutants. There are multiple sources: in developing countries, $PM_{2.5}$ emissions are often linked to the traditional use of biomass in inefficient cookstoves; in developed countries, they stem from industrial facilities and power plants, as well as road traffic. While a decarbonisation strategy for the energy sector is a key ingredient for their reduction, an entire phase out of $PM_{2.5}$ emissions would require wider efforts, including energy access policies in developing countries and strategies to avoid traffic in urban areas. In some cases, the pursuit of climate targets can create conflicts with air pollution targets if the latter are not being adequately taken into account. For example, while the use of wood burning stoves for residential heating is a favourable option for the achievement of climate targets, it can contribute to indoor air pollution if appropriate standards are not put in place.

Figure 2.42 • SO_2, NO_X and $PM_{2.5}$ emissions by scenario, 2015 and 2050

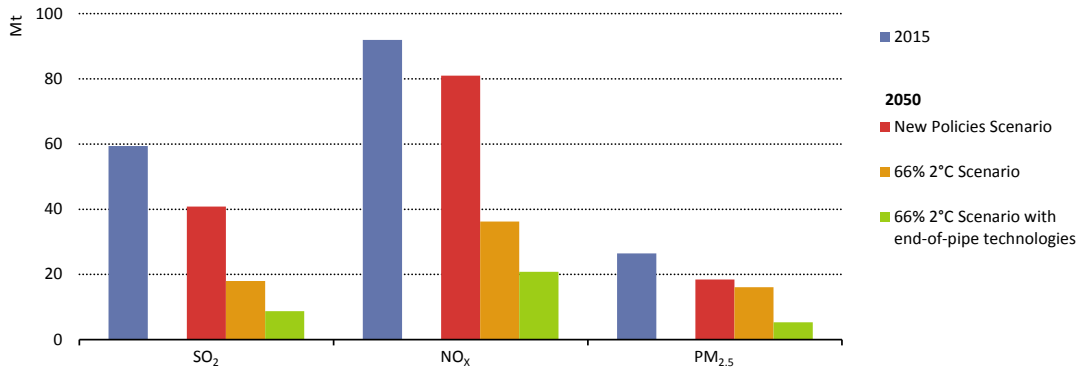

Key message • Large-scale deployment of low-carbon technologies could mitigate not only CO_2 emissions, but also SO_2, NO_X and $PM_{2.5}$ emissions.

While important, the pursuit of a decarbonisation strategy alone is not sufficient to mitigate air pollution. The deep pollutant emissions reductions required to minimise adverse impacts on human health require more stringent pollution control policies to facilitate the uptake of advanced air pollution control technologies. Their adoption would further reduce emissions beyond the level reached in the 66% 2°C Scenario.

Implications for energy access

Access to modern energy services – electricity and clean cooking facilities – is a crucial factor in human development. Every advanced economy has required secure access to modern energy services to underpin its development and foster prosperity. While many countries are focussing on energy security and decarbonising their energy mix, many others are still trying to secure sufficient energy to meet basic human needs. In developing countries, access to affordable and reliable energy services is a building block to reduce poverty, improve health and increase productivity, and is a necessary step to promote economic growth. Today, billions of people lack reliable access to either electricity or clean cooking facilities, or both.

Even among G20 countries, energy access remains a crucial problem: around 300 million people (6% of the population) have no access to electricity today, many of which are in India and Indonesia. This is around a quarter of the global population without access. Maintaining access to electricity for those already with access is also a challenge. For many who currently have access

to an electricity connection, the supply is not reliable and the steady delivery of electricity in many countries is a daily challenge. Major strides have been taken: in 2015, the government of China announced achievement of universal electricity access, culminating the largest national electrification programme in history. In India, the electrification rate reached 81%, almost doubling the 43% rate of access in 2000. But, at a global level, the situation is not expected to improve much further in the next few decades unless more vigorous action is taken, especially outside the G20 group. In the New Policies Scenario, more than 780 million people are projected to remain without access to electricity in 2030 globally, of which 66 million are in G20 countries. By 2040, while G20 countries are almost fully electrified, more than half a billion people still remain without access at a global level.

In addition to the lack of electricity access, there are around 1.4 billion people in G20 countries who still rely on the traditional use of biomass for cooking today, or 30% of the population of the G20 group. This represents around half of the more than 2.7 billion people without modern cooking access in the world. For cooking, the outlook is worse than for electricity access in our projections, with nearly 1.9 billion people still without access in 2040 in the New Policies Scenario. This is largely because in several regions, growth of cooking access solutions does not keep up with population growth. Such trends are already apparent today. In sub-Saharan Africa, for example, the rate of access to modern cooking has been decreasing year-on-year in recent years, and in general, access to electricity is prioritised in national agendas over modern cooking access.

The projections for energy access in the 66% 2°C Scenario are similar to those of the New Policies Scenario – while climate policies can have positive co-benefits for energy access, they are not enough in isolation. Dedicated policies beyond those that decrease GHG emissions will be needed to achieve improvements in modern energy access. Nevertheless, climate policies can complement the challenge of meeting energy access targets. The faster deployment of renewable and distributed technologies as a result of meeting climate objectives is expected to bring down costs of low-carbon technologies worldwide. This would allow a greater deployment of decentralised electricity access solutions in rural areas in particular, which currently account for 83% of the global population without access. Climate policies can also provide co-benefits for modern cooking access. One example is the displacement of LPG for water heating and cooking services in urban areas in developing countries through the use of electricity and renewables. This is a useful measure for reducing GHG emissions in urban areas, but would also help to restrain the tight LPG supply that can be observed in some rural areas (such as in India), where the amount of LPG available is insufficient to meet the needs of the poorest segments of the population. Although there is a risk that climate policies will increase the consumer price of LPG, targeted additional access policies can help to ensure that LPG remains available and affordable as a clean cooking option for those without access in rural areas. There may be further synergies between climate policies and measures to improve modern cooking access. Biomass consumption in the 66% 2°C Scenario would reach twice the level of today in 2050, which would increase competition for biomass and available land (see Box 2.1). Although traditional uses of biomass today are rarely ever in competition with modern uses of biomass, such pressure might increase in the future with the pursuit of climate goals and could act as a spur to incentivise a switch from the traditional use of biomass for cooking and a more efficient use of biomass in general.

Climate policies can be designed to complement energy access objectives. But achieving univeral access to modern energy by 2030 would generally have a negligable impact on global energy demand and GHG emissions. The IEA has been providing in-depth analysis related to access to modern energy services for almost two decades and consistently highlights that even achieving universal access to electricity and clean cooking by 2030 would add less than 1% to overall energy

demand and energy-related CO_2 emissions in that year (IEA, 2013). This means that the additional contribution to climate change from achieving greater access to energy for the under-served is negligible. In some cases, it can even be positive. The IEA has estimated that, to replace kerosene lamps, providing electricity access to the 1.2 billion people (16% of the world's population) that still lack access to electricity could save an estimated 35 Mt of CO_2 per year, in addition to the multiple benefits that such a switch could provide (IEA, 2015). Another example is the traditional use of biomass for cooking. There is much uncertainty about the actual level of GHG emissions from traditional cookstoves using solid biomass, since their efficiency is widely variable. But, typically, their efficiency is low and the combustion process incomplete. Their displacement is a key priority for energy access, given their adverse impacts on human health. But this can reap climate benefits, too, as biomass is a renewable source only if harvested sustainably, while burning biomass in traditional stoves may actually emit more GHG emissions (i.e. including methane and nitrous oxides emissions) than even LPG stoves.

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Chapter 3: Global Energy Transition Prospects and the Role of Renewables

Author: International Renewable Energy Agency

Key messages

The world has entered a period of energy transition. The global imperative to achieve sustainable growth and limit climate change, combined with a rapid decline in costs and rising investment into renewable energy, has put in motion a transition of the way that energy is produced, distributed and consumed. Innovation and the accelerated deployment of low cost renewable energy, energy efficiency, widespread electrification and the use of information and communications technologies are essential to accelerating this energy transition.

The importance of reducing energy-related CO_2 emissions and achieving the goal of limiting climate change is at the heart of this transition. The carbon-dioxide (CO_2) emission intensity of the global economy needs to be reduced by 85% over the next 35 years in order to limit global temperature increases to below 2°C degrees compared to 1990 levels. This means reducing energy CO_2 emissions by 2.6% per year on average, or 0.6 Gt per year on absolute terms. To be in line with the aim of the Paris Agreement to reduce energy-related CO_2 emissions, the global energy transition (or decarbonisation) **must be accelerated over the next 35 years in order to prevent global temperatures from rising more than 2° C.**

Governments have a critical role in accelerating the energy transition. Governments have the responsibility to enact an enabling policy framework that provides long-term certainty for the private sector and ensures a positive environment for the energy transition. Market signals must be put in place that create financial incentives for low-carbon solutions. The governments of the G20 countries play a key role in this regard given that they account for a large share of global greenhouse gas emissions.

A holistic approach to the energy transition should be at the heart of the G20 efforts. The transition is feasible and in line with the Paris Agreement and the UN Sustainable Development Goal as it encompasses all sectors of the energy system and would ensure an affordable, secure and sustainable supply of energy. The transition goes beyond the energy sector, and will have wide-ranging benefits for the economy and for the way societies operate.

Renewable energy and energy efficiency measures can potentially achieve 90% of required carbon reductions. We have a good understanding today of what the energy transition can look like from a technical, policy and business perspective. Accelerated deployment of renewable energy and energy efficiency measures are the key elements of the energy transition. By 2050, the accelerated deployment of renewables and energy efficiency can achieve around 90% of the emissions reductions, while the remainder would be achieved by fossil fuel switching and carbon capture and storage (CCS). In the decarbonisation case presented here, nuclear power stays at today's level until 2050, and CCS is exclusively deployed in the industry sector.

In this decarbonisation case, energy demand in 2050 would remain around today's level due to intensive energy efficiency improvements. Energy intensity improvements must double to 2.5% per year by 2030 and continue at that same level until 2050. **The share of renewable energy must meanwhile rise from around 15% of the primary energy supply in 2015 to around 65% in**

2050. Around half of the incremental energy intensity improvements could be attributed to renewable energy. This includes efficiency gains from renewable energy-based heating, cooling and transport and electrification coupled with renewable power. We have witnessed accelerated deployment of solar and wind power on a global scale in recent years, based on technology innovations and dramatic cost reductions. Electrification of end-use sectors will gather speed, for example in electric vehicles and heat pumps.

The energy supply mix would change substantially. Fossil fuels will continue to play a role in the energy transition. Total fossil fuel use in 2050 would be a third of today's level but the use of coal would decline the most, while oil demand would be at 45% of today's level – roughly equivalent to today's oil production volume of OPEC. The world will not run out of fossil fuels, but it will stop using the most challenging resources that have high production costs, such as oil sands and Arctic oil. While natural gas can be a "bridge" to greater use of renewable energy, its role will be a short-lived one unless it is coupled with high levels of CCS. There is a risk of path dependency and future stranded assets if natural gas deployment expands significantly without long-term emissions reductions goals in mind.

Such an energy transition is affordable – but it will require additional investments in low-carbon technologies compared to the Reference Case or business-as-usual. Further significant cost reductions will be major drivers for increased investments across the range of renewables and enabling technologies, but **cumulative additional investment would still need to amount to USD 29 trillion over the period 2015-2050 to meet decarbonisation targets.** This is in addition to the investments in the Reference Case of USD 116 trillion in the same period. Incremental system costs would amount to USD 1.8 trillion in 2050. However, reducing human health damages (a fundamental driver for energy policy in key G20 countries) and CO_2 emissions from fossil fuels would save between two- and six-times more than the costs of decarbonisation.

From a macroeconomic perspective, the energy transition can fuel economic growth, create new employment opportunities and enhance human health and welfare. GDP will be boosted around 0.8% in 2050 compared to the Reference Case. The cumulative gain through increased GDP from now till 2050 will amount to USD 19 trillion. Increased economic growth is driven by the investment stimulus and enhanced through pro-growth policies, in particular the use of carbon pricing and recycling of proceeds to lower income taxes. Important structural economic changes will take place. While fossil fuel industries will incur the largest reductions in sectoral output, those related to capital goods, services and bioenergy will experience the highest increases. The energy sector (including energy efficiency) will create around six million additional jobs in 2050 compared to the Reference Case. Job losses in fossil fuels would be completely offset by new jobs in renewables, with more jobs being created by energy efficiency activities. The overall GDP improvement will induce further job creation in other economic sectors.

Improvements in human welfare, including economic, social and environmental aspects, would generate benefits far beyond those captured by GDP. Around 20% of the decarbonisation options identified are economically viable without consideration of welfare benefits. Yet renewables improve welfare in ways that are not captured by GDP. The remaining 80% are economically viable if benefits such as reduced climate impacts, improved public health (a key consideration, given the millions of deaths every year due to air pollution), and improved comfort and performance are considered. However, today's markets are distorted - fossil fuel consumption is still subsidised in many countries and the true cost of burning fossil fuels, in the

absence of a carbon price, is not accounted for. To unlock these benefits, the private sector needs clear and credible long-term policy frameworks that provide the right market incentives.

Early action is critical in order to limit the planet's temperature rise to 2°C and to maximise the benefits of this energy transition, while reducing the risk of stranded assets. Taking action early is also critical for feasibly maintaining the option of limiting the global temperature rise to 1.5°C. Delaying decarbonisation of the energy sector would cause the investments to rise and would strand an additional USD 10 trillion in assets. In addition, delaying action would require the use of costly technologies to remove carbon from the atmosphere (known as negative emission technologies, such as bioenergy with CCS) in order to stay below the 2°C target. Also, further development of solutions will be needed for sectors where no significant or economically attractive solutions exist today. Early action is needed in deploying renewables, improving energy efficiency and establishing the enabling infrastructure and supporting technologies.

Sectoral approaches must be coupled with systems wide perspectives to address the main challenge of reducing the direct use of fossil fuels in end-use sectors. Deep emission cuts in the power sector are a key opportunity and should be implemented as a priority. The power sector is currently on track to achieving the necessary emissions reductions, but it must continue ongoing efforts and focus more on power systems integration as the share of variable renewable power rises. In addition, electricity accounts only for about one-fifth of final energy use today. The share of electricity in total final energy consumption needs to increase to 30% by 2050. This means that a broader coupling between the power sector and end-use sectors such as transport, buildings and industry is required. In transport, the number of electric vehicles needs to grow and new solutions will need to be developed for long-range haul trucks, airplanes and shipping. It is critical that new buildings are of the highest efficiency and that existing ones are retrofitted and refurbished at an accelerating rate. Buildings and city designs should facilitate renewable energy integration. There is an important role for governments to facilitate enabling infrastructure such as recharging stations, smart grids and sustainable biomass supply chains.

Carbon emissions from energy use need to fall to zero by 2060 and stay at this level thereafter to achieve targets by the end of the century. In order to limit the global temperature increase to below 2°C with a 66% probability of meeting the target, a significant effort also is required to reduce industrial process and land use emissions to or below zero. Without such progress in non-energy sectors, the climate goal cannot be reached.

Increased investment in innovation needs to start now to allow sufficient time for developing the fundamental new solutions that are needed for multiple sectors and processes, many of which have long investment cycles. Technology transfer will also be part of this transition. For more than one-third of all current energy applications, economically viable technology solutions are limited today, mostly in end-use sectors (buildings, industry and transport). Solutions will also be required to overcome institutional barriers in these sectors, such as addressing carbon leakage in industry, and developing policies for bunker fuel use for aviation and shipping. Technology innovation efforts will need to be complemented by new market designs, new policies and by new financing and business models.

Introduction

This chapter presents the findings from IRENA's analysis that employs its REmap approach to analyse which technologies are required for an energy transition or a decarbonisation of the energy sector in line with the goals of the Paris Agreement and to assess the implications of a 2°C scenario, with a 66% probability of meeting that target. This work builds on the REmap technology options analysis for 2030 and expands the outlook to 2050. Moreover, energy efficiency and renewable energy technology options have been combined for the first time into a full-scale REmap case up to 2050. In the REmap case, while all types of low-carbon technologies are assessed in detail for a decarbonisation of the energy sector, the chapter pays particular attention to the role of renewable energy technologies in realising the transition. This is complemented by a cost-benefit analysis and an assessment of the REmap energy mix macroeconomic impacts, using a version of the E3ME econometric model that takes the REmap findings as the main input.

Box 3.1 • G20 Renewable energy toolkit and REmap

The REmap programme is part of the G20's toolkit of Voluntary Options for Renewable Energy Deployment (G20, 2015). In 2016, the G20 countries, under the Chinese presidency, agreed on a voluntary action plan for renewable energy. It builds on a toolkit with five pillars:

- Analysis of renewable technology costs, cost reduction potentials and best practice exchanges.
- Best practice exchanges on enabling policy framework design and power system integration of high shares of variable renewables.
- Development of a renewable energy specific risk mitigation facility.
- Assessment of country renewable energy technology potentials and development of roadmaps.
- Acceleration of modern bioenergy deployment.

The G20 accounts for 75% of the renewable energy potential worldwide (IRENA 2016a). This is the first time this important body has started an action agenda on renewable energy. Earlier REmap analysis for G20 has shown that use of renewable energy in the global energy mix can double by 2030, compared to the 2015 level (IRENA, 2016a). The results show that in each of the G20 countries, significant renewable energy opportunities remain beyond today's policy plans, and that the benefits exceed the cost. These options can double the global renewable energy share by 2030, a growth rate of more than one percentage point per year. (This does require using "modern" renewable energy sources, replacing any traditional uses of bioenergy, such as for cooking and water heating, that are inefficient or unsustainable.) The potential to accelerate renewable energy deployment varies by country. Some countries may get less than a 10% share of energy from renewable sources in 2030, while others can achieve more than a 90% share. The starting points vary, the state of the policy frameworks vary and the resource endowment and fuel pricing varies. But all countries can accelerate their renewable energy deployment significantly.

Definitions of the Reference Case and REmap

The analysis is based on a sector and technology bottom-up analysis for individual countries, whose output is fed into a global macro-econometric model that assesses the macroeconomic impacts of REmap compared to the Reference Case.

The analysis starts with the Reference Case, which is the most likely case based on current and planned policies and expected market developments for each country's energy sector. IRENA has collected data from the G20 countries about their national energy plans and goals for the period 2015 to 2050.

This Reference Case reflects the Nationally Determined Contribution (NDC) if it is already an integral part of the country's energy plan (which is the case for around 60% of the total global primary energy supply).[62] If there were any data gaps, such as missing years, in preparation of the Reference Case, they have been bridged using credible third-party scenarios (e.g. IEA). Important renewable energy deployments and energy efficiency improvements are already included in the Reference Case since each country has a goal to increase its current renewable energy capacity and improve the energy efficiency of its energy system.

The analysis then examines a low-carbon technology pathway that goes beyond the Reference Case for an energy transition. This is called the REmap case. Technologies covered under REmap include:

- Renewable energy technologies[63] for energy and as feedstock for production of chemicals and polymers (referred to as "RE" in the rest of this chapter).
- Energy efficiency measures ("EE") and widespread electrification that also improves efficiency[64] ("ELEC").
- Carbon capture and storage for industry ("CCS").
- Material efficiency technologies such as recycling ("OTHERS").

REmap explores the energy transition to decarbonise the energy system in line with the goal in the Paris Agreement of limiting global temperature rise to less than 2°C above pre-industrial levels with a 66% probability. Energy CO_2 emissions need to fall from 33 gigatonnes (Gt) in 2015 to below 10 Gt per year in 2050, then drop to zero by 2060 and stay at that level (emissions must drop below zero to limit the increase to 1.5°C). The 2°C target requires energy-related CO_2 emissions to drop to 20-22 Gt per year by 2030. Such a reduction translates to a decrease in the average CO_2 emissions per unit of gross domestic product (GDP) (or the carbon intensity of the global energy supply)[65] by more than 85% between 2015 and 2050 (IRENA, 2016c).

The analysis of the technology potential has been carried out at the sub-sector level for the world as a whole. For example, the analysis looked at iron-making processes in the steel industry.[66] Thirteen sector-specific background summaries as part of an innovation agenda have been prepared by IRENA (IRENA, 2017a).[67] The analysis also estimated the potential for additional

62 This chapter employs the physical energy content method to convert from final to primary energy.

63 All forms of renewable energy have been included, namely bioenergy, geothermal, hydropower, ocean, solar and wind energy.

64 Electrification is covered under energy efficiency as electricity-based technologies are generally much more efficient than those that rely on the combustion of fuels to deliver the same energy service.

65 In this study, carbon emission intensity is expressed in tonnes of CO_2 per USD GDP measured in purchasing power parity (PPP).

66 A detailed overview of the bottom-up methodology can be found online (IRENA, 2017b).

67 Industry: steel (referred to as "STEEL" in this chapter), cement ("CEM"), chemical and petrochemical ("CHEM"), aluminium ("ALUM") and pulp and paper ("PAPER"). Buildings: space heating ("SH"), water heating ("WH"), space cooling ("SC") and

renewable energy and energy efficiency in each G20 country beyond the Reference Case. Country results have been aggregated to assess the developments for the G20 as a whole, and they also have been scaled up to the world level based on global coverage factors by energy carrier and sector.

The energy demand of each end-use sector has been disaggregated to the main energy-consuming applications. Physical level activity (e.g. tonnes of steel production) has been combined with technology options. Each technology option has been characterised by its energy mix and cost. The growth rates of the various physical level activities were estimated for the period between 2015 and 2050. Estimates of the energy consumption for these activities under the Reference Case were also included. For REmap, the potential of increasing the use of low-carbon technologies for each application was estimated based on market growth rates, resource availability and other constraints.[68] Key energy and materials system interactions were taken into account.[69]

The assessment pays special attention to renewable energy-enabling technologies and sector-coupling solutions, such as electric vehicles, district heating and cooling, heat pumps and interconnectors that allow electricity to flow between networks.

The CO_2 emissions in both the Reference Case and REmap have been estimated by country and by sector. The system boundaries of the emission accounting have been provided later in the chapter where relevant. This allows the assessment of the changes in each sector's CO_2 emissions between 2015 and 2050 with the introduction of low-carbon technologies.

Five economic and human welfare indicators have been deployed to characterise the impacts of REmap. These include:

- The investment needed to achieve the REmap technology pathways.
- Macroeconomic impacts of those investments in renewable energy and energy efficiency. Those include impacts on GDP and employment, along with structural effects.
- Additional proxies of welfare, since GDP is a limited measure of human welfare. GDP does not capture important components, such as improved health because of reduced air pollution[70] and climate impacts avoided.
- The additional energy supply cost (i.e. system cost).
- An estimation of stranded assets, including both energy assets (in electricity generation and the upstream fossil fuel supply sector) and assets in the end-use sectors of buildings and industry.

cooking ("COOK"). Transport: passenger cars ("CAR"), other road passenger ("ROAD_OTH"), other passenger transport ("PASS_OTH") and freight ("FRE"). Power ("POWER") and district heating and cooling ("DHC").

68 See (IRENA, 2017a) for details of this assessment.

69 For example, a switch to new iron-making processes reduces availability of blast furnace slag as a clinker substitute. Also biomass scarcity has been accounted for across all possible applications.

70 A detailed description of IRENA REmap costs and externality methodology can be found online (IRENA, 2016d; IRENA, 2014a).

Box 3.2 • Definition of the economic and human welfare indicators used

- Additional investment needs (in USD trillion): These needs are the sum of the differences between investment needs based on the technology mix in REmap and the Reference Case in 2015-50. Investment needs in 2015-50 are estimated by summing the investment in each year in that period. Investment in a given year is estimated as the product of the capital investment cost and the deployment of the technology in that year. These include investments for both energy generation capacity (e.g. power plants, heating equipment, etc.) and for infrastructure (e.g. transmission and distribution lines, energy storage, recharging infrastructure for electric vehicles, and hydrogen and CO_2 pipelines). Investment needs for a Delayed Policy Action scenario have not been estimated as that scenario is not considered as an option in this assessment. Investments related to delayed policy action could be significantly higher than the investment needs for the Reference Case or REmap given the effort that would be required to remain within the same carbon emission budget to realise the decarbonisation of the energy system.

- Macroeconomic impacts of those investments in renewable energy and energy efficiency: These impacts are measured in terms of GDP (total net output[71] produced by all economic sectors in a country in a given year), employment (in the renewable energy sector, in the overall energy sector and in the economy as a whole) and structural effects (i.e. differences in the contribution of different economic sectors to GDP).

- Changes in human welfare in economic, social and environmental terms: There is a broad literature on human welfare and sustainable development indicators, with significant work having been undertaken by institutions such as The World Bank, the Organisation of Economic Co-operation and Development (OECD) and the European Commission. This analysis does not intend to be as comprehensive, focusing only on two proxies to welfare: the reduced externalities from impacts of fossil fuel use on human health and from impacts of climate change (in USD trillion per year). They are calculated as the sum of the differences between the external costs from generation of energy-related to air pollutants and CO_2 emissions based on the energy mix in REmap and the Reference Case in 2050. No aggregation into a single welfare indicator has been done.

- Incremental system costs (expressed in USD trillion per year): These are the sum of the differences between the total capital and operating expenditures of all energy technologies based on their deployment in REmap and the Reference Case in 2050.

- Stranded assets (in USD trillion): The calculated stranded assets are the remaining book value[72] of assets substituted for before the end of their anticipated economic lifetimes and without recovery of any remaining value because of the need for a deep decarbonisation of the energy system in the 2015-2050 period.[73]

Table 3.1 shows the key assumptions used in this assessment for both the Reference Case and REmap. All assumptions have been set exogenously to the analysis.

No differentiation has been made in energy prices between the Reference Case and REmap. The energy prices provided in Table 3.1 are an average of both cases. Depending on region and demand/supply balance, prices would differ. For the macroeconomic analysis, lower future

71 Value of output minus the value of required inputs.

72 Book value is defined here as the cost of an asset, minus accumulated depreciation.

73 A detailed background paper of IRENA's stranded assets assessment can be found online (IRENA, 2017c).

energy prices are assumed in the REmap case, since they represent relevant expenditures and incomes for different economic agents. The prices used are in line with the New Policies Scenario and the 450 Scenario of the *World Energy Outlook 2016* (IEA, 2016).

Moreover, no carbon price has been assumed in this analysis. The approach taken to estimate the incremental system costs, and subsequently the cost of abatement of low-carbon technology options (in USD per tonne of CO_2), follows a government perspective where energy prices exclude all energy taxes and subsidies, and a standard 10% discount rate is applied. This shows the cost of the transition as governments would calculate it. For the macroeconomic analysis, on the contrary, a carbon price is used since it affects the energy costs that companies and households face, and the tax revenue that governments collect. The carbon prices assumed for the Reference and REmap cases are, respectively, based on the New Policies Scenario and the 450-Scenario of the *World Energy Outlook 2016*, differentiated by country and sector (IEA, 2016).

Since for some indicators (e.g. energy prices) there are differences between what were assumed in Chapters 2 and 3 of this study, a sensitivity analysis on the REmap analysis was carried out that uses similar assumptions to quantify the changes in the results. For instance, by making use of higher energy price assumptions, the sensitivity analysis also allows the assessment of the impact of introducing a carbon price to the energy system. The sensitivity analyses are presented at the end of this chapter.

Table 3.1 • Key assumptions

	Unit	2015	2050
Population	millions	7 350	9 700
GDP	%/yr in 2015-2050		2.8
Average energy prices			
Coal	USD/GJ	2.5	3
Crude oil	USD/barrel	50	80
Natural gas	USD/MBtu	7	11
Biomass feedstock	USD/GJ	-	8
Discount rates	%	-	10

Note: All economic data refer to real 2015 USD. GJ=gigajoules, MBtu= million British thermal units.

The aim of REmap is to communicate results to a diverse audience. This includes policy makers to technology developers, academia and the general public. Therefore, REmap employs a unique methodology to assess the potential of low-carbon technologies. The identification of the additional low-carbon technology potential is the most important step of the process. For this purpose, a spreadsheet-based simple accounting framework was developed. The aim is not to apply complex models or sophisticated tools to assess the potential, but to facilitate an open framework with countries to aggregate the national energy plans, and subsequently identify technology options. Deployment of technology options has been chosen independently. The choice of a technology analysis approach instead of a scenarios approach is also deliberate. IRENA's REmap is an exploratory study, and is not meant as a target-setting exercise. Instead, countries can make informed choices as to how to use the identified options. REmap was designed from the start to be practical and to co-operate directly with countries in order to analyse and discuss their specific cases in detail. Such an approach also creates an opportunity to discuss implementation of the options identified with the countries, and to improve the existing analysis continuously over the years. Thus, REmap is an evolving exercise.

Given its nature, the REmap approach also has a number of limitations. For instance, REmap uses a single time step for the years of 2030 and 2050. The time period between 2015 and 2030/50 is

not assessed in detail. For example, the analysis does not take into account interactions, developments and dynamics across technologies or feedbacks in energy prices due to demand and supply changes (e.g. rebound effects). Moreover, inter-temporal dynamics and inertia that determine deployment, system constraints, path dependencies, and competition for resources, etc. also are not explicitly taken into account (Saygin et al., 2015).

An earlier study has compared the findings of REmap with the results of the IEA-ETSAP models at both national and global levels. The premise of this comparative analysis was that the sequence of technology options in REmap's cost-supply curves should be similar to the technology options selected by the ETSAP models as they increase the required share of renewables in their energy system. The comparison suggests that for a number of countries and regions, the results are directly comparable to the REmap country results (Kempener et al., 2015).

For the macroeconomic analysis, the REmap energy mixes are taken as an exogenous, fixed input. The energy mixes are fed into a fully-fledged post-Keynesian global macro-econometric model (E3ME) that takes into account the linkages between the energy system and the world's economies within a single and consistent quantitative framework.[74]

Energy transition to 2050: a key role for renewable energy

Energy CO_2 emissions fall by more than 60% by 2050 while GDP triples

Policy makers are looking for effective approaches to achieve decarbonisation. Renewable energy is a key solution. Reducing CO_2 emission levels by increasing the deployment of renewable energy is already affordable and would result in significant economic benefits. Many NDCs already anticipate deploying more renewables in order to reduce greenhouse gas (GHG) emissions. Those efforts need to be accelerated to reduce emissions quickly enough to limit global temperature increases.

Earlier analysis has indicated that renewable energy technologies, in combination with greater energy efficiency gains, can achieve most of the required emissions reductions by 2030 and 2050 (IRENA, 2016c). Some fossil fuel switching, CCS in industry and nuclear could close any remaining gap.

The Reference Case represents developments in energy-related CO_2 emissions based on policies in place and considers the latest energy policy of each G20 country as indicated in its national energy plan. For countries outside of the G20, the results have been scaled to the global level based on the findings from the G20 countries. In the Reference Case, GDP at purchasing power parity triples and primary energy demand grows by 50% between 2015 and 2050. Emissions will continue to grow, reaching 45.1 Gt by 2050 (+29%) (CO_2 emissions from fossil fuel combustion only grow to 40.2 Gt per year).

It should be noted that the energy plans for 40% of the world's total primary energy supply were not consistent with the corresponding NDCs. If all energy plans matched the NDCs, CO_2 emissions in the Reference Case would be about 3 Gt per year lower in 2030. Fully implementing the NDCs, therefore, is a welcome first step. However, they alone are not enough. If implemented in full, they will reduce emissions by 20% by 2030, far less than the 50% decline that is needed. Revising the NDCs in 2020 to make them more ambitious is a critical step, therefore, even more ambitious plans are needed for 2030 and beyond. Given the urgent need to reduce emissions and the long lead times for deploying low-carbon technologies, early action should be a key part of these plans.

74 See Annex B for details on the methodology.

Energy efficiency measures and renewable energy will deliver the lion's share of the emissions reductions needed to decarbonise the global energy system. Energy and materials efficiency improvements can reduce emissions by about 4 Gt by 2030, about 30% of the emissions reductions needed. Electrification cuts another 1.5 Gt, or 10% of what is needed. Renewable energy options that were identified based on the bottom-up analysis of the G20 countries can reduce emissions by another 10 Gt. As a result of these measures, 2030 emissions would fall to 25.5 Gt in 2030 (with the remaining fossil fuel combustion emitting about 22 Gt of CO_2 emissions per year).

This level is sufficient to put the world on a 2°C pathway in 2030. But to keep the world on this pathway, efforts need to be strengthened further between 2030 and 2050. This would require energy-related CO_2 emissions to drop to below 10 Gt by 2050, which would be 70% lower than 2015 levels and 31 Gt less than in the Reference Case. About half of these reductions would come from renewable energy technologies. Energy efficiency improvements and electrification would account for the bulk of the other half. The remaining 10% of reductions would come from additional measures in industry, notably CCS, material efficiency improvements and structural changes.

Figure 3.1 • Primary CO_2 emission reduction potential by technology in the Reference Case and REmap, 2015-2050

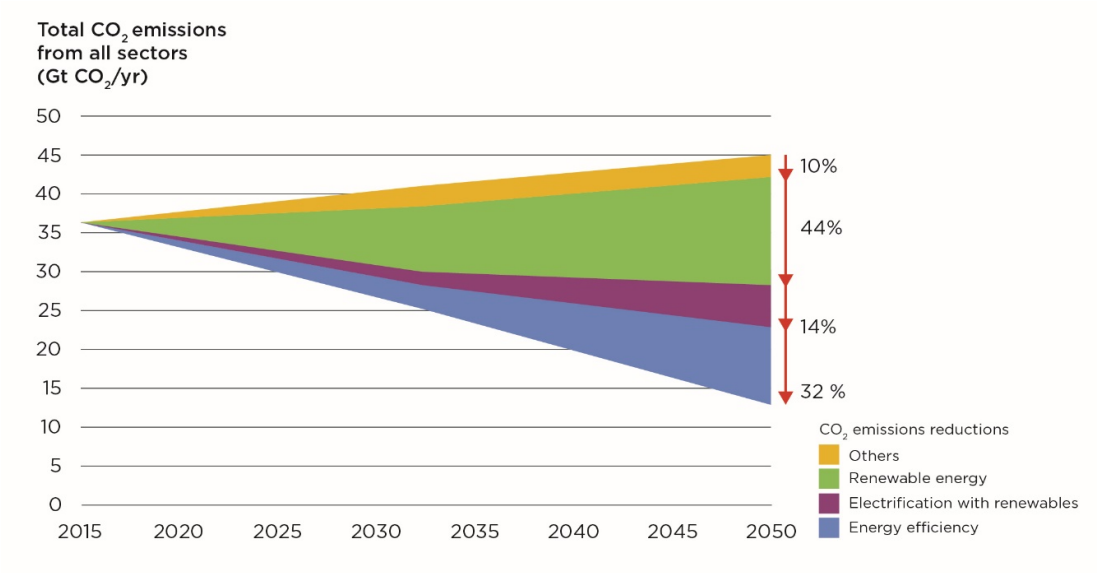

Notes: CO_2 emissions include energy-related emissions (fossil fuel, waste, gas flaring) and process emissions from industry. If only fossil fuel emissions were displayed in this figure, CO_2 emissions would start from 33 Gt in 2015 and would reach 40.5 Gt and 9.5 Gt per year in 2050 in the Reference Case and REmap, respectively.

Key message • Renewables would account for half of total emissions reductions in 2050, with another 45% coming from increased energy efficiency and electrification.

G20 has a key role to play in the energy transition

Meeting the goals of the Paris Agreement requires the world to speed up decarbonisation of the enrgy sector. The UN Sustainable Development Goals (SDG) also call for an accelerated deployment of renewable energy. This means scaling up the deployment of mature renewable technologies such as solar photovoltaic (PV) and onshore wind. It also requires an accelerated rollout of emerging technologies.

This energy transition will not happen by itself. There is a critical role for governments to create an enabling policy frameworks that provide long-term assurance for the private sector and ensures a conducive environment for the energy transition. Market signals must be put in place that create monetary incentives for low-carbon solutions. The G20 will be responsible for making 80% of the global energy-related CO_2 emissions reductions needed to reach the 2050 goals (Figure 3.2). That requires a holistic approach at the heart of the G20 efforts.

Figure 3.2 • CO_2 emission reductions in the G20 and non-G20 groups, 2015-2050

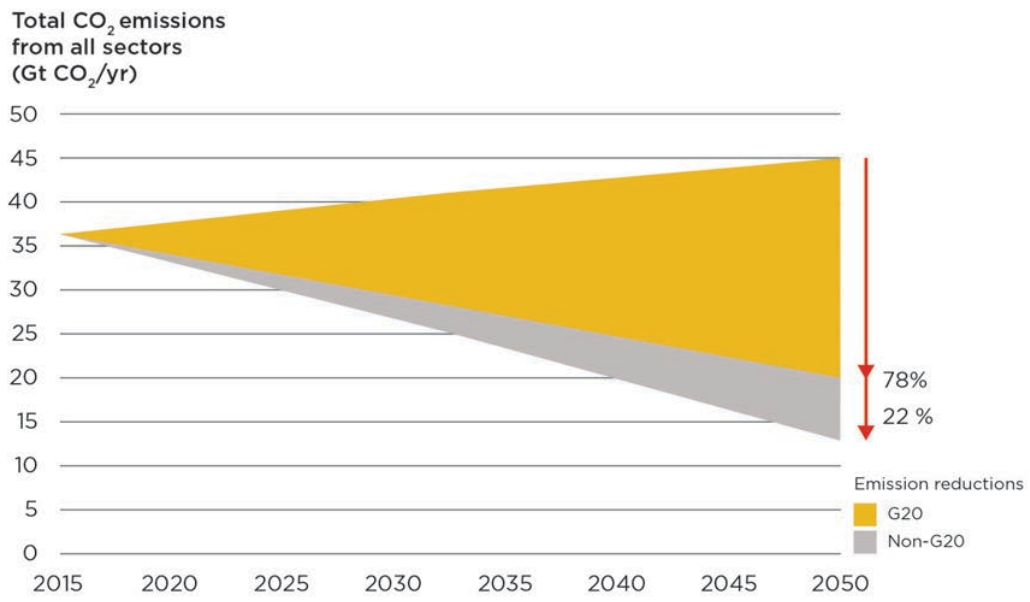

Notes: CO_2 emissions include energy-related emissions (fossil fuel, waste, gas flaring) and process emissions from industry. If only fossil fuel emissions were displayed in this figure, CO_2 emissions would start from 33 Gt in 2015 and would reach 40.5 Gt and 9.5 Gt per year in 2050 in the Reference Case and REmap, respectively.

Key message • CO_2 emissions will increase to 45.1 Gt by 2050 in the Reference Case but need to be reduced by more than 30 Gt. To reach the 2°C target, the vast majority of the needed emissions reductions must be made in G20 countries.

Emissions from all sectors must be cut, with the greatest reductions coming from power generation and buildings

Achieving a global energy transition that limits global temperature change to less than 2°C is technically feasible. We also understand what this energy transition would look like from a technical, policy and business perspective. It would be achieved largely by the accelerated deployment of renewable energy and energy efficiency measures (Figure 3.1)

The largest CO_2-emitting sectors are electricity generation and industry. They are responsible for about 65% of all energy-related CO_2 emissions today. The remaining 35% comes from transport, buildings and district heating. Buildings have a low share, but this increases if indirect emissions related to electricity use are included. The sector breakdown of CO_2 emissions stays roughly constant between 2015 and 2050 under the Reference Case (Figure 3.3).

Under REmap, electricity generation sector emissions would fall to around 2 Gt per year by 2050, a decrease of 85% compared to the 2015 level. This is achieved by an aggressive deployment of renewable energy technologies, especially solar and wind. These renewable technologies would

generate more than 80% of all electricity by 2050. Natural gas and nuclear would generate the remaining 20%. The decrease in power sector emissions is also an outcome of the demand-side measures in industry and buildings to reduce electricity use for heating and cooling.

In the REmap case, emissions in the building sector would decrease by about 70% by 2050. Transport and industry are the two most challenging sectors. Transport's emissions would be halved, while industry would become the largest remaining emitter.

Figure 3.3 • CO_2 emissions by sector in REmap relative to the Reference Case, 2015-2050

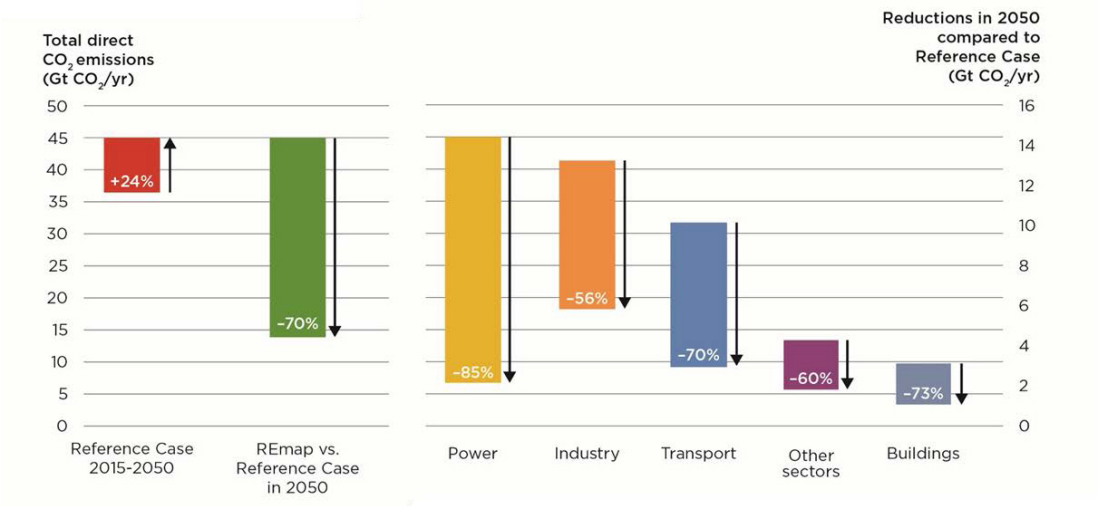

Notes: CO_2 emissions include energy-related emissions (fossil fuel, waste, gas flaring) and process emissions from industry. If only fossil fuel emissions were displayed in this figure, CO_2 emissions would start from 33 Gt in 2015 and would reach 40.5 Gt and 9.5 Gt per year in 2050in the Reference Case and REmap, respectively.

Key message • By 2050, total energy-related CO_2 emissions will need to decrease to below 10 Gt. CO_2 emissions from the power and buildings sectors will be almost eliminated. Industry and transport would be the main sources of emissions in 2050.

The breakdown of CO_2 emission reductions in the Reference Case and in REmap in 2050 are illustrated in Figure 3.4. To put this figure in perspective, it is necessary to understand the magnitude of emissions in each sector and the opportunities to reduce them. Developments in each sector are discussed in the following sections.

Figure 3.4 • CO_2 emissions reductions in REmap compared to Reference Case by technology, 2050

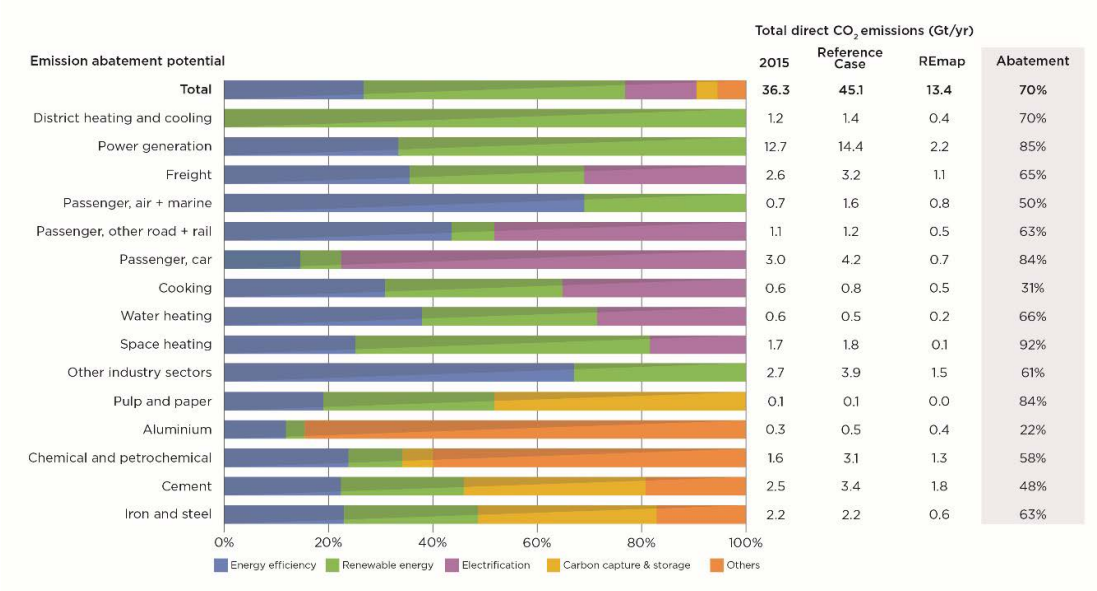

Notes: CO_2 emissions include energy-related emissions (fossil fuel, waste, gas flaring) and process emissions from industry. If only fossil fuel emissions were displayed in this figure, CO_2 emissions would start from 33 Gt in 2015 and would reach 40.5 Gt and 9.5 Gt per year in 2050 in the Reference Case and REmap, respectively.

Key message • While CCS and other low-carbon technologies will play the main role in industry, renewables and efficiency will be the most important for heating and cooling in buildings. The transport sector requires a mix of renewables and electrification.

Electricity generation

Electricity generation is the sector with the largest CO_2 emissions. Worldwide, generation is projected to increase to about 32 000 terawatt-hours (TWh) by 2030 and to around 43 000 TWh per year by 2050. Total electricity generation capacity would reach more than 12 000 gigawatts (GW) by 2050.

In the REmap case, total electricity generation remains just below the level in the Reference Case. That is because improved energy efficiency and demand-side measures would offset any increases in demand from increased electrification.

In the REmap case, renewable energy technologies would generate an increasing share of that electricity. The renewable share would rise from 23% of total electricity generation in 2015 to 59% by 2030 and 82% by 2050. That compares to a 31% share by 2030 in the Reference Case. This assessment is largely based on the country level scenario work carried out by the German Aerospace Centre (DLR) for the fifth energy revolution series (DLR-GPI, 2015).

Renewable sources like wind and solar that substitute for fossil fuels in electricity generation will achieve about a quarter of the more than 31 Gt CO_2 emissions reductions required in 2050 compared to the Reference Case. Additional emissions reductions will come from demand-side measures, such as energy efficiency improvements in appliances used in buildings, or using more efficient industrial motors and implementing better industrial energy management systems. Those reductions are included in the analysis for each end-use sector. If they were also accounted for under electricity generation, the sector would represent one-third of all the CO_2 emissions reductions needed in 2050. As a result of higher shares of renewable energy and more efficiency in end-use applications, overall CO_2 emissions from power generation would decline to

2 Gt per year by 2050 compared to 13 Gt in 2015. In this assessment, the deployment of CCS in the power sector has been excluded. This choice was made because of the additional costs CCS adds to electricity generation. With low energy prices, power plants combined with CCS may continue to be perceived as high-risk and not economically viable.

Industry

Industry is the second-largest CO_2 emitting sector, representing a third of all emissions worldwide. The industry sector as a whole accounts for the largest share 35% of the emission reductions in the REmap analysis. Within the sector, chemical, petrochemical and steel are among the largest energy consumers. However, less energy-intensive sectors, such as food and textile (covered under "other industry") will also have important roles in reducing industrial CO_2 emissions. Cement's share is large because of the process emissions that can be reduced by CCS.[75]

Cement production is the largest individual CO_2-emitting industry. Making cement requires the decomposition of limestone in a process called calcination, which produces large amounts of CO_2. As a result, the industry is responsible for 8% of all global CO_2 emissions. This is one of the few industries where CCS could play a role. In REmap, 35% of all emissions reductions in the entire industry sector come from using CCS in the cement industry. More emissions reductions – 20% of the total from the sector – would come from new cement types and substitutes for clinker.

The iron and steel industry is currently a large coal user and emits about half as much CO_2 as the cement industry. Since the 18th century, coal and coke have been used as chemical reducing agents in blast furnaces to make iron. That process could be replaced by hydrogen-based direct reduced iron or even electrolysis processes similar to the technologies being employed in aluminium making. In REmap, emissions from the industry would decline by 90% to 0.6 Gt in 2050, compared to the Reference Case. One-third of this reduction would be achieved with CCS, 25% would come from renewables (largely biomass) and 40% from energy and material efficiency measures.

Chemical and petrochemical industry emissions are similar in size to those from the iron and steel industry. The industry's total direct CO_2 emissions from production could be cut by 1.8 Gt of CO_2, from 3 Gt to 1.3 Gt, by 2050.[76] About 1.1 Gt of these reductions could come from material efficiency improvements and the remainder, or 0.7 Gt, from energy efficiency measures, renewable energy and CCS.

A unique feature of the chemical and petrochemical sub-sector is that most of the carbon is stored in chemicals and other products and, is released during waste incineration. These emissions do not fall within the modelling boundaries of the chemical and petrochemical industry as they are released in the waste sector. However, if one views these emissions together, more reductions could come from replacing oil and natural gas feedstocks with biomass feedstocks or recycled plastic. Biomass is already used in commercial facilities in Brazil to produce polyethylene-terephtalate (PET) bottles, for example. Avoiding carbon from fossil fuels in plastics and chemicals could cut waste management related emissions by an additional 1.8 Gt in this sub-sector. But bioplastics and recycled plastics are currently more expensive than conventional products. Clear economic incentives are therefore needed to reduce emissions from post-consumer incineration of packaging and other types of waste.

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75 Process emissions are not energy-related CO_2 emissions. These emissions are by-products of chemical reactions that take place in the production of materials. In this chapter, their assessment for certain industries was included as they represent a high share of that industry's total emissions (e.g. cement).

76 These emissions cover those that only come from the production of high value chemicals (ethylene, propylene, butadiene, aromatics), ammonia and methanol.

CCS is a key technology under REmap for the industry sector. However, its prospect is uncertain and realising its potential will depend on location, geology, water resources and other factors. The difficulties of deploying CCS thus pose a major challenge to the successful implementation of the Paris Agreement. In fact, using CCS in industry is even more challenging than in the power sector, because industry plants tend to be process specific, smaller and more scattered than power plants. The CCS process itself may also have to be redesigned for the industry sector. It also reduces plant efficiency, and results in residual emissions because the capture process also requires heat and electricity. These challenges will need to be quickly overcome if the technology is to play a role in industry.

Buildings

The building sector is growing quickly with today's 150 billion square metres (m^2) of residential and commercial floor area projected to increase to 270 billion m^2 by 2050. Most of the growth will be in urban areas. Today, half of the world's population lives in cities, a share that will rise further. Two billion more people will live in cities over the next two decades, which will require building the equivalent of 2 000 new cities of one million inhabitants. This is an unprecedented challenge.

Heating and cooling represents 80% of the building sector's total energy demand. Space heating alone accounts for the largest share of all thermal energy needed in a building, at about 60% of the total. The share for cooling is small today but demand for cooling is expected to increase to more than that of space heating by 2050.

It will be critical that new cities (and in fact, all new buildings in all locations) are built according to the highest energy efficiency standards to minimise energy demand. Using modern building shell insulation technology, heating and cooling demand can drop by one order of magnitude compared to conventional buildings. More attention will need to be paid to retrofit or replace existing inefficient buildings. In developed countries, accelerated renovation and refurbishment offers great potential to improve energy efficiency and reduce emissions.

There are also many renewable technology options for buildings. They include bioenergy, solar PV panels and solar water heaters, geothermal energy and electrification, as well as renewable energy-based district energy networks. Also, buildings design should facilitate renewable energy integration, along with approaches like floor heating or integrated building envelop systems that significantly increase the efficiency of energy use for heating and cooling. The optimal solutions vary by country and by case.

In buildings, appliances account for one-third of all the potential (to reduce indirect emissions related to electricity use), followed by space heating. For emissions reductions in heating, improvements in building shells, such as better insulation, account for 30% of the reduction potential. Electrification of heating and other functions represents another 20%, and the direct use of renewables accounts for 50% (including deployment for cooling). More efficient cooling systems and appliances can also save emissions from electricity generation, but these are not included in the building sector (because the emission reductions occur in the power sector).

Transport

The transport sector accounted for just above 20% of all energy-related CO_2 emissions in 2015, of which passenger cars and freight transport account for 80% and aviation for 10%. The aviation sector alone contributes about 2-3% of total global CO_2 emissions and as demand increases, particularly for long-distance passenger transport, aviation's emissions are projected to continue to increase in the coming years.

In the REmap analysis, the transport sector would contribute about 20% of the total emission reductions in 2050 compared to the Reference Case. Passenger vehicles have the largest contribution followed by freight. Passenger car emissions can be cut by improving fuel economy, switching to electric vehicles (EVs) or replacing oil with liquid or gaseous biofuels or renewables-based hydrogen. The analysis shows that such steps can cut transport emissions by 3.5 Gt CO_2 per year by 2050, which is an 85% reduction compared to the Reference Case.

In the REmap analysis, people travel increasingly by buses and other communal modes within cities and over long distances as well. They also ride two- and three-wheelers. Although the number of trips made by non-car forms of transit is 60% higher than the number of trips in passenger cars, the CO_2 emissions associated with these activities are lower than for cars, representing about 20% of the total.

Electrification is a key solution for the two- and three-wheelers as well as for reducing diesel use in railways. Bus transport can also be partly electrified. Where electrification is not possible, CO_2 emissions can be cut by using more biomethane and other advanced biofuels. Under REmap, biomass is estimated to supply a quarter of all energy for non-car passenger transport (excluding aviation and shipping), with electricity representing nearly 20% of the demand. As a result, non-car passenger transport emissions can be reduced by two-thirds.

Total aviation activity is expected to grow by 3% to 5% in the coming decades, higher than for any other transport mode. Biofuels represent the main alternative to fossil fuels in aviation.

Freight transport – mainly trucks, ships and trains – represents more than 40% of transport's total energy demand. The shipping industry is the backbone of global trade and a lifeline for island communities, transporting about 90% of the tonnage of all traded goods. The freight sector's energy demand is expected to increase in line with economic and population growth.

Under REmap, renewable energy can reduce freight transport's rapidly growing CO_2 emissions. For delivery trucks, electric drive is already an economic option. About 0.6 Gt of CO_2 emissions can be reduced by using biofuels (liquid and gaseous) in heavy duty trucks and ships and another 1.5 Gt of CO_2 emissions can be cut by efficiency measures and electrification across all modes of freight transport. By taking these steps, emissions from freight would decline by two-thirds by 2050.

In addition to these technological changes, the business models in transport will change over time. This is an outcome of a number of factors, such as changing demographics, lifestyles and socio-economic status of populations. As a result of these trends, new approaches, such as car sharing and car-pooling, are gaining popularity. While these trends are excluded from this assessment, they may have impacts on future transport energy demand, depending on the extent of their development.

Renewables could feasibly account for two-thirds of the world's energy supply in 2050

The total energy demand in 2050 under REmap would be similar to today's level. But the supply mix would change substantially, compared to both today and to the Reference Case.

In the Reference Case, the total primary energy supply is estimated to grow by more than 50% between 2015 and 2050. This is equivalent to average annual growth of about 1.2% per year, roughly half of the rate seen in the past two decades. Despite this slowdown, the total primary energy supply would increase to about 835 exajoules (EJ) by 2050 in the Reference Case. Just under 80% of this total would still be supplied by fossil fuels in 2050, down slightly from today's

level of 84%. Under today's national energy plans, renewable energy would bring little change in the supply mix over this time frame, since those plans mainly reflect market trends.

Under REmap, the total global primary energy supply in 2050 would reach 635 EJ per year in 2050, only marginally higher than today's level and 26% less than in the Reference Case. Total non-renewable energy use would be reduced by 67%. The share of renewable energy in the total primary energy supply grows to about 65% by 2050 (Figure 3.5). An overview of all renewable energy technologies deployed between 2015 and 2050 is provided in Table 3.3.

Figure 3.5 • Global total primary energy supply in the Reference Case and REmap, 2015-2050

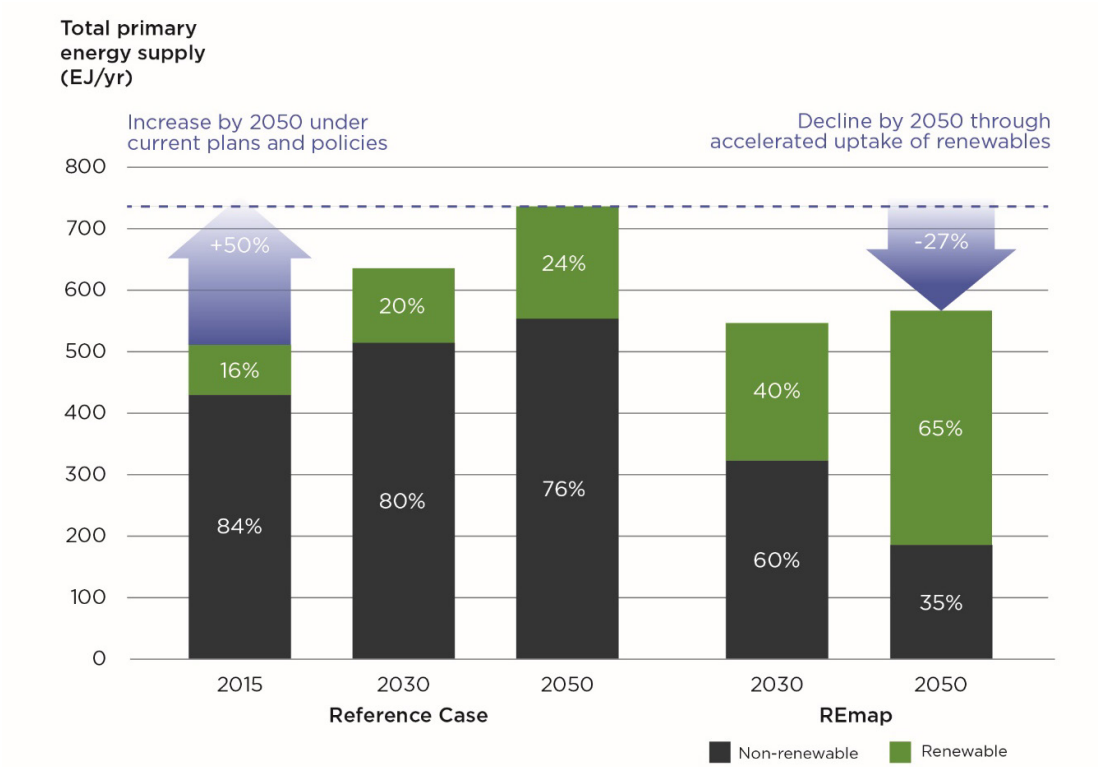

Notes: Data include the energy supply in electricity generation, district heating/cooling, industry, buildings and transport sectors. These sectors accounted for 85% of the global total primary energy supply (TPES) in 2015. Non-energy use of fuels for the production of chemicals and polymers is excluded.

Key message • Renewable energy would be the largest source of energy supply under REmap in 2050, representing two-thirds of the energy mix. This requires an increase in the renewables' share of about 1.2% per year, an eight-fold acceleration compared to recent years.

There is still an important role for fossil fuels in the energy transition. Total fossil fuel use in 2050 would be a third of today's level. Coal use would decline much faster, while oil demand in 2050 would be at 45% of today's level. For comparison, this is roughly today's oil production volume of OPEC. In the REmap case, the world will stop using the most challenging resources with high production costs, such as oil sands and Arctic oil. Even the role of natural gas as a "bridge" to renewables is a short one unless natural gas use is coupled with high levels of CCS. There is a risk of path dependency and future stranded assets (e.g. pipelines, liquefied natural gas [LNG] terminals) if natural gas deployment expands significantly without long-term emissions reductions goals in mind. Because of the need to reduce carbon emissions, most of today's fossil fuel reserves would remain unexploited.

Under REmap, total primary energy supply remains more or less flat between 2015 and 2050. Global GDP, however, triples over this period. As a result, energy intensity drops from about 5 gigajoules (GJ) per USD to 2.1 GJ per USD between 2015 and 2050.[77] This is equivalent to an energy intensity improvement rate of around 2.5% per year, representing nearly a doubling compared to the trends observed between 1990 and 2010. In 2015 the improvement rate was 1.8%, which is still much lower than what is required to reach the 2050 goal.

Figure 3.6 • Improvements in energy intensity in the Reference Case and REmap, 1990-2050

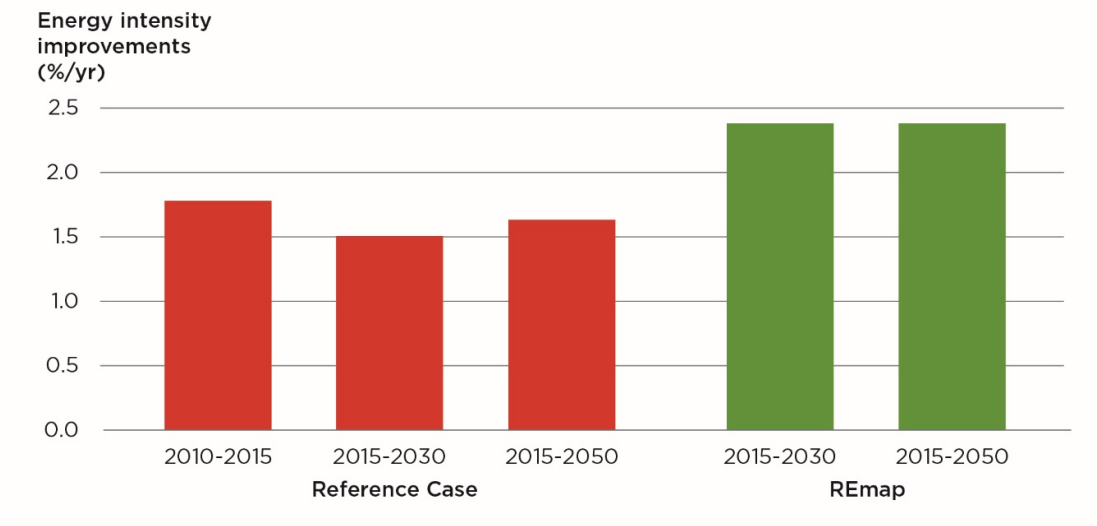

Key message • Energy intensity improved at an annual rate of about 1.8% in recent years and is expected to be maintained in the Reference Case, while it would increase to around 2.5% per year in REmap.

Figure 3.7 shows the factors that influence energy intensity to both decline and increase in 2050 in the REmap case compared to the Reference Case. About half of the decline (53%) is related to energy efficiency improvements in heating. This is followed by accelerated deployment of renewables that can result in a decline on a similar order of magnitude. This includes the net savings in primary energy use of 8% from accelerated deployment of renewable energy technologies. On the other hand, CCS in industry requires heat for solvent regeneration as well as for compression and pumping of CO_2. These processes increase the primary energy demand by 7% in total. The additional demand for energy offsets some of the decline in energy intensity improvements.

77 The reverse of this indicator yields energy productivity where output is divided by energy consumption.

Figure 3.7 • Energy intensity by factor in the Reference Case and REmap, 2050

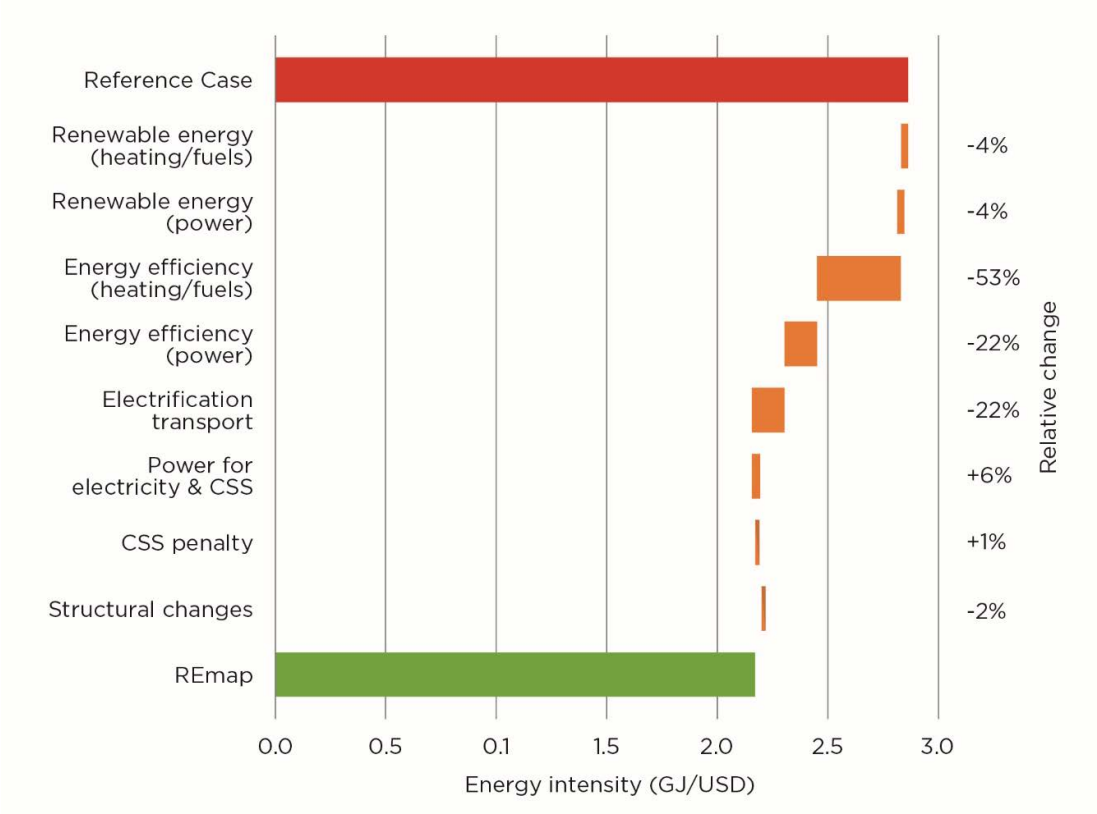

Key message • Renewable energy and energy efficiency contribute equally to energy intensity improvements.

Box 3.3 • The prospect for technologies that remove CO_2 from the air

Limiting the global temperature increase to less than 2° C with a 66% probability requires emitting no more than an additional 575 - 1 125 Gt CO_2. This study assumes a carbon budget of 790 Gt CO_2. At the 2015 level of emissions, this budget would be depleted in just over 20 years. The budget would have to be one-half as large to limit the temperature increase to 1.5°C with a 50% probability.

Given the likelihood of exceeding these emissions budgets as projected in many scenario analyses, technologies that pull carbon from the air may be required to meet the goal of limiting global temperature increases. These "negative emission technologies" have two main advantages. They compensate for emissions that have already been released or could be emitted in the short-term. For example, in a scenario with delayed emissions reductions, it will be harder to reach 2° C without using negative emissions approaches. Negative emission technologies also offset emissions from sectors where abatement will be challenging, such as the manufacturing industry.

There are many negative emission technologies including:

- Direct air capture.
- Cloud treatment to increase alkalinity.
- Enhanced weathering of rock.
- Enhanced ocean productivity.

- Ocean and coastal ecosystem restoration.
- Afforestation and reforestation.
- Biomass combustion with CCS.
- Increased use of biomass-based construction materials.
- Biochar.
- Soil carbon sequestration.

(Carbon Brief, 2016)

BECCS and afforestation are probably the most well-known negative emissions technologies. Most studies that look into BECCS estimate a role in the order of 10 Gt CO_2 per year by 2050 (e.g. (Muratori et al., 2016)). If this level of BECCS were employed in REmap, net energy-related CO_2 emissions would reach zero by 2050. BECCS is in principle not too different than CCS and the implementation challenges are similar. BECCS would increase reliance on biomass, because the capture and storage processes require additional energy. With a post-combustion capture technology that requires about 3 GJ heat per tonne of captured CO_2, additional demand could easily increase to 30 EJ by 2050 if BECCS played a significant role. Depending on the biomass feedstock type and how the feedstocks would be sourced, there could also be additional impacts on land use. However, these impacts could be reduced by using second-generation bioenergy. Storing the captured CO_2 could also be a limitation. The estimated potential contribution of afforestation ranges between 2-4 Gt carbon-dioxide equivalent (CO_2-eq) per year, but afforestation also requires water and land. Direct air capture and enhanced weathering also require additional energy and there are logistical challenges associated with such technologies which may hamper feasibility (van Vuuren, 2017).

While negative emission technologies have not been considered in this study, they may have an important role in the future, even before 2050. The possibility of using negative emissions technologies in the future should not delay action now, because their prospects are uncertain.

The investments needed for the energy transition are affordable

The REmap approach makes it possible to calculate the overall amount of additional investment needed to decarbonise the energy system, compared to the Reference Case. The analysis shows not just the market potential, but also where the investment challenges lie.

In the Reference Case, the total investments in the energy sector would add up to an estimated USD 116 trillion between 2015 and 2050, or USD 3.3 trillion per year on average. The largest share would be in energy efficiency improvements for heating/cooling in buildings and the second-largest share would be investments in fossil fuels, mainly related to supply.

Cumulative renewable energy investments in the Reference Case are estimated at USD 9 trillion, or USD 260 billion per year on average between 2015 and 2050. That represents a continuation of current investment levels for the next 35 years. Investment needs for the power sector would be USD 16 trillion, with about half for renewable energy investments.

Figure 3.8 • Total investment needs by area and value of stranded assets in the Reference Case, 2015-2050

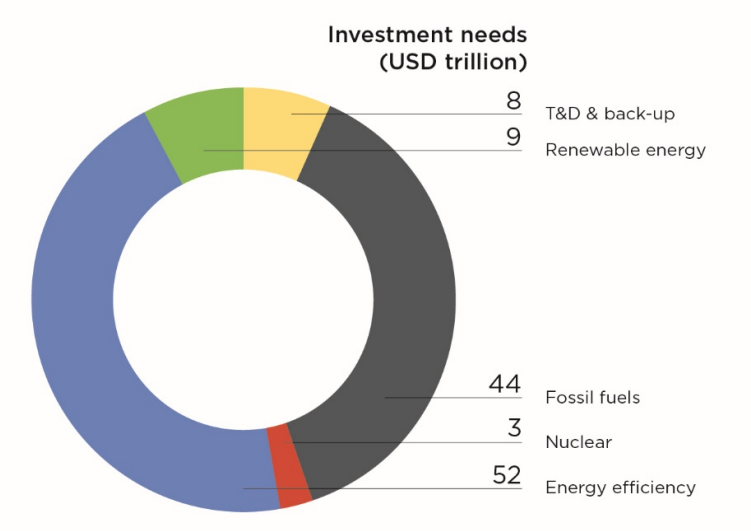

Key message • The Reference Case foresees a cumulative investment need of USD 116 trillion for the energy sector between 2015 and 2050, equalling USD 3.3 trillion per year, or 1.7% of global GDP in 2050.

Making the transition to a decarbonised energy system would require a higher level of investment than in the Reference Case. The added investments, however, are affordable, in part because of expected further significant cost reductions in renewables and other enabling technologies. Depending on the technology, estimated cost reductions between 2015 and 2050 range from 10% (e.g. for energy efficiency) to 65% (e.g. solar PV).

Overall, the REmap case would require additional net investments of USD 29 trillion between 2015 and 2050. This has been estimated for each year between 2015 and 2050 by summing the product of capital costs and deployment potential of each additional low-carbon technology.

The additional investment needs can be split into five components:

- USD 23 trillion for energy efficiency (including electrification) – notably for building renovation.
- USD 16 trillion for renewable energy supply.
- USD 5 trillion for stranded assets that require early replacement (notably in buildings).
- USD 8 trillion for transmission and distribution, back-up and battery storage.
- USD 1 trillion for CCS, material efficiency improvements and nuclear.

These five components add up to additional investments of USD 54 trillion. However, there are also avoided investments on fossil fuels in both fossil fuel and nuclear electricity generation capacity as well as in the upstream sector.[78] Those avoided investments add up to USD 25 trillion. As a result, net additional investment needs are estimated at around USD 29 trillion between 2015 and 2050. This averages USD 0.83 trillion per year between 2015 and 2050, equivalent to 0.4% of global GDP in 2050, and compares with the average annual investments of USD 3.3 trillion per year in the Reference Case. To put these numbers in perspective, the total additional investments needed over 35 years are equivalent to about 10% of the total global GDP in 2050.

78 Upstream sector refers to the exploration and production step in the fossil fuel supply chain.

The total investment in the fuel supply would not need to rise over today's level to achieve climate targets. That is because the bulk of the additional investment needs will be in the end-use sectors (buildings, industry and transport), not in electricity generation. The reason is the good progress that has already been made building renewable energy capacity in the power sector, along with the progress expected in the coming decades as countries implement their national energy plans, as assumed by the Reference Case. More effort in all types of low-carbon technologies will be needed in the end-use sectors, notably energy efficiency in buildings. That effort requires high upfront investment costs, though the investments for energy efficiency measures estimated in this analysis can be interchanged with investments for other low-carbon technologies. For instance, rather than cutting emissions by improving energy efficiency, the same goal can be reached using heat supplied by decentralised renewables-based heating and/or district systems. However, it may be challenging to mobilise significantly more biofuels or install more solar water heaters over limited roof space. Either way the investments required to decarbonise buildings would be high.

Additional investment needs include USD 1.9 trillion for variable renewable technologies (VRE) in the transmission and distribution (T&D) of electricity. That is about half of the additional investment needs of T&D for the entire power system (including high-voltage direct current transmission lines and super grids). An additional investment of USD 0.8 trillion is needed for battery storage (excluding pumped hydro).

It is vitally important that the investments made in energy generation equipment and related infrastructure today and in the coming decades bring deep emission cuts by 2050. This is especially true for long-lived investments, such as in buildings, industrial production facilities, power plants, transport infrastructure, etc. Otherwise, the risks of continued carbon lock-in will be high.

Figure 3.9 • Additional investment needs by sector and technology in REmap relative to the Reference Case, 2015-2050

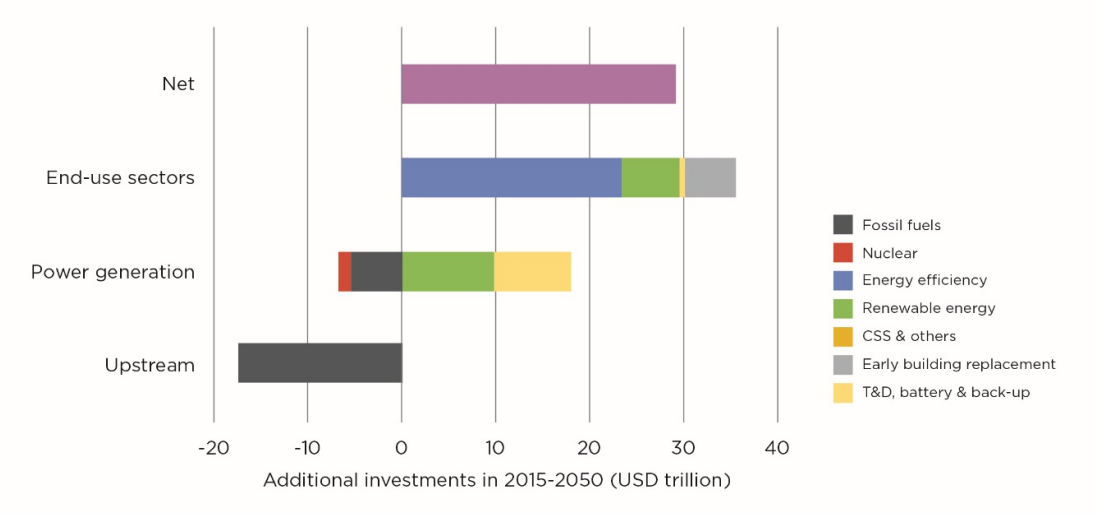

Notes: Electric vehicle charging infrastructure, hydrogen pipelines and refuelling stations are included. Electrification also includes additional costs for electricity generation growth.

Key message • Meeting the 2°C target requires investing an additional USD 29 trillion between 2015 and 2050 compared to the Reference Case. The largest additional investment needs are in energy efficiency, followed by renewables. The total investment cost, however, is reduced by the avoided investments in the upstream sector and in fossil-fuelled power generation.

Early action is critical to minimise the risks of stranded assets and achieve climate targets

It is hard to over emphasize the importance of early action. Early action is needed not only in the deployment of renewables and other enabling infrastructure and supporting technologies, but also in the development of solutions for sectors where no significant or economically attractive solution exists today. If action is delayed, total investment costs will rise, the chances of stranded assets will increase and costly negative emission technologies will be needed to limit planetary warming. These latter technologies also bring their own risks as they have not been fully commercialised and therefore their feasibility and potential are uncertain (IPCC, 2014; Kartha and Dooley, 2016).

In the REmap case, a total value of USD 10 trillion is estimated for stranded assets for the 2015-50 period. To put this in context, USD 10 trillion is approximately 4% of global wealth in 2015 (estimated at USD 250 trillion at current exchange rates) (Credit Suisse, 2015). Figure 3.10 shows the potential for asset stranding in a Delayed Policy Action case, in which the accelerated renewables and energy efficiency deployment that begins immediately in the REmap case is delayed until 2030. Such delayed action would cause significant asset stranding. The total value of the stranded assets in the upstream energy, electricity generation, industry and buildings sectors would be USD 20 trillion.

Figure 3.10 • Stranded assets by sector in Remap and Delayed Action cases, 2015-2050

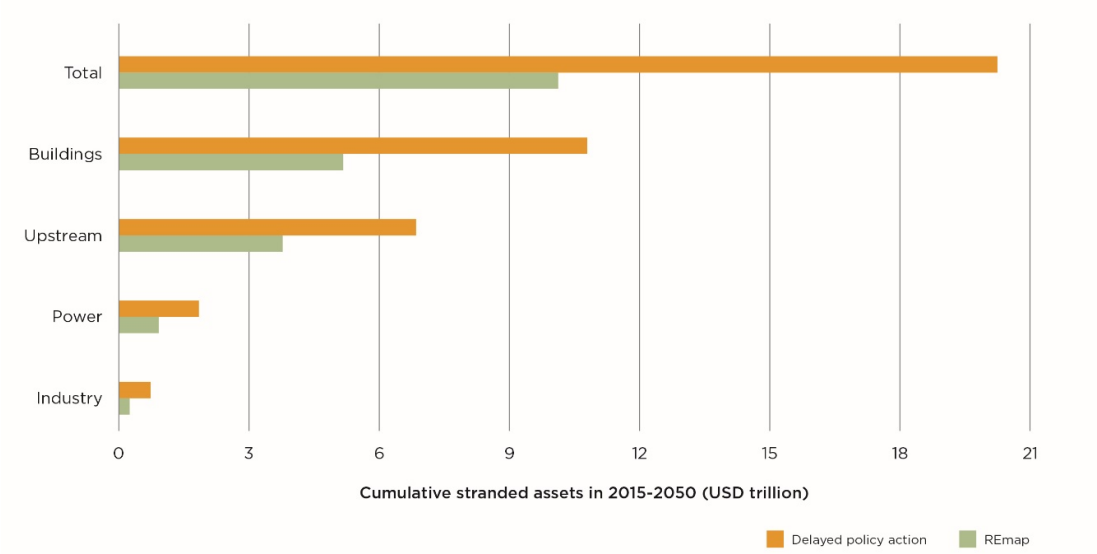

Key message • Delaying policy action will result in an additional USD 10 trillion in stranded assets.

The buildings sector would see the largest amount of asset stranding on a worldwide basis. About USD 12.5 trillion would be stranded in Delayed Policy Action case, more than double the amount in REmap.[79]

Buildings have a low stock turnover. This is especially true in Western Europe and the United States, where the growth in building stock is slow. In Germany, for example, more than 85% of

79 Here, Delayed Policy Action follows the same trend as the Reference Case until 2030, and then emissions start decline to ensure the carbon emission budget between 2015 and 2050 is not exceeded. This requires zero emissions in the end-use sectors by 2050.

the expected residential building stock in 2050 already exists today. As a result, it is difficult to avoid stranding building assets (i.e. buildings with inefficient building envelopes, equipment, etc.), even when all new buildings are constructed to the highest of standards in terms of energy efficiency and renewable energy use.

In REmap, total building stock grows from around 140 billion m^2 to 270 billion m^2 between 2015 and 2050. It is important to distinguish between the share of buildings that will be new and those that will need to be renovated. At a country level, an annual demolition rate that ranges from as low as 0.1% (e.g. European Union countries) to 1% (e.g. China, India, Indonesia) has been assumed. As a result, 184 billion m^2 of all building area in 2050 will be new. This represents about two-thirds of the total stock. In REmap, it is assumed that by 2020, all new buildings will be fossil fuel free. The remainder of the building stock would be from the existing building stock today. Without any additional effort for renovation, around 60% of this existing building stock in 2050 would continue to rely on fossil fuels. A share of this building stock needs to be deeply renovated in order to reduce the demand for fossil fuels in the sector enough to remain within the carbon budget. The construction value that is lost due to renovation of this building stock – or the stranded assets in buildings as defined in this assessment – is estimated to be USD 5 trillion in 2015-2050 under REmap. This includes a depreciation of the investment made before renovation. If depreciation is not included, the stranded asset value would be twice as high.

In this chapter, stranded assets and investment needs in buildings have been estimated separately. An example of stranded assets would be the additional costs of installing single-glazed windows, then replacing them with double-glazed windows, versus installing double-glazed windows in the first place. Similarly, stranded assets would occur through the ambitious deployment of energy efficiency technologies in both new and existing buildings. By comparison, investments refer to energy efficiency measures that either replace building equipment that has reached the end of its lifetime (e.g. efficient light bulbs) or that are implemented as an additional feature to buildings in order to reduce energy demand (e.g. wall insulation).

The second-largest group of stranded assets would be in upstream energy infrastructure, 75% of which would be in oil production. Large capital investments made in this upstream infrastructure from now until 2030 in the Delayed Policy Action case would result in USD 7 trillion worth of assets being stranded after 2030. The stranded assets in upstream oil would represent about 20-40% of the estimated valuation of today's oil upstream producers. In order to assess the upstream stranded assets, existing upstream assets first were valued based on current (estimated) valuation of fossil fuel producers, their share in global production, and the share of company valuation related to upstream operations (as per the share of the upstream sector in total operational income in recent years). In a subsequent step, the valuation was adjusted based on reduced net cash flows due to a reduced production outlook, in both the REmap and the Delayed Policy Action cases.

Electricity generation is the third-largest sector in terms of stranded assets. Under Delayed Policy Action, USD 1.9 trillion would be stranded. For example, the coal power plants now being built in the developing world would have to be stranded after 2030 to meet decarbonisation targets.

In addition, stranded assets in industry are estimated at USD 740 billion. Relatively lower capital expenditures for process heat equipment (compared to electricity generation) explain the lower amount compared to other sectors. The stranded assets in industry between 2015 and 2050 are equivalent to USD 21 billion per year, an amount that could be recouped through lower energy bills if industry achieved a 1.5% per year improvement in energy efficiency. Industry is therefore better placed than other sectors to anticipate and manage the effects of stranded assets.

Box 3.4 • Stranded assets definition

There are a number of definitions of stranded assets in the energy context. The term ”stranded costs” or ”stranded investment” is used by regulators to refer to “the decline in the value of electricity-generating assets due to restructuring of the industry” (Congressional Budget Office, 1998). This was a major topic for utility regulators as power markets were liberalised in the United States and United Kingdom in the 1990s. There is no universally settled view of what stranded assets are. IRENA’s analysis attempts to capture the breadth of views about the definition of stranded assets, and to include a number of issues related to climate and environmental change – from investment risk to the idea of a “just transition”.

Several organisations that work in the field of energy and climate have already examined what stranded assets could mean from their own perspective. The most commonly applied definitions are briefly discussed below:

- The IEA defines stranded assets as “those investments which have already been made but which, at some time prior to the end of their economic life (as assumed at the investment decision point), are no longer able to earn an economic return as a result of changes in the market and regulatory environment brought about by climate policy” (IEA, 2013a and IEA, 2013b). This is focused on asset stranding caused by climate policy in the power sector and is widely recognised in the literature.
- The Carbon Tracker Initiative also uses this definition of economic loss, but says stranded assets are a “result of changes in the market and regulatory environment associated with the transition to a low-carbon economy” (Carbon Tracker Initiative, n.d.).
- The Generation Foundation defines a stranded asset “as an asset which loses economic value well ahead of its anticipated useful life, whether that is a result of changes in legislation, regulation, market forces, disruptive innovation, societal norms, or environmental shocks” (Generation Foundation, 2013).
- The Smith School of Enterprise and the Environment at the University of Oxford employs a “meta” definition to encompass these (and other) definitions: “Stranded assets are assets that have suffered from unanticipated or premature write-downs, devaluations, or conversion to liabilities” (Caldecott et al., 2013).

For this analysis, IRENA defines stranded assets as the remaining book value[80] of assets substituted before the end of their anticipated technical lifetimes, and without recovery of any remaining value, to achieve 2050 decarbonisation targets. This definition emphasises that assets become stranded because of the requirement to reduce fossil fuel use to achieve a deeply decarbonised energy system by mid-century. It should be noted that the purpose of the IRENA analysis is not to propose a universal definition of stranded assets. While different approaches and definitions by sector and asset class are used for the purpose of this analysis, attention is paid to make sure these are sufficiently aligned with the overarching concept of stranded assets (which is fundamentally unanticipated or premature lost value). The purpose of the analysis is to point out the potential magnitude and guide investors towards this, not to claim high degrees of accuracy.

The clear majority of stranded oil assets would occur upstream, rather than in the power, buildings or industry sectors. Oil is primarily used in transport. The increasing use of ultra-low emission and electric vehicles, will cause oil demand and oil prices to drop, reducing the value of oil reserves. Compared to oil demand from transport, the demand for oil from electricity generation, heating in buildings and industry is minor.

80 Book value is defined here as the cost of an asset, minus accumulated depreciation.

Natural gas assets would be stranded across each of the four sectors. Gas T&D systems, including LNG terminals, would be affected because of their long life spans. Although gas has lower GHG emissions than oil and coal, it remains incompatible with required levels of decarbonisation. As a result, there would be significant stranding upstream and in gas-fired power generation.

Coal assets would also be stranded across each of the four sectors, but the power sector would be most affected. Coal-fired electricity generation is currently a major source of direct CO_2 emissions (producing about 25% of the global total). As a result, much of the policy effort has been focused on phasing out coal or limiting its growth. For example, the United Kingdom, France and Canada have recently announced plans to end the use of coal-fired power plants. Given the relatively modest value of stranded coal-fired power assets and the high level of emissions from coal plants, this approach is an economically viable way of achieving decarbonisation.

Box 3.5 • The significance of technology lock-in: power sector case

In calculating the value of stranded power plant assets it was assumed that the economic lifetime of a power plant equals its technical lifetime. If a plant is shut down before it reaches the end of its lifetime, the nominal value (capital expenditure minus accumulated depreciation) is assumed to be lost.

However, some might argue that often the economic lifetime of a plant differs from its technical lifetime. The economic life of a plant ends when marginal costs consistently exceed marginal revenues. This could happen due to market trends that cannot be perfectly foreseen at the start of operation (e.g. rising maintenance or input costs, or lower than anticipated power prices). In practice there also exists a grey zone of old plants that are mothballed or where operating hours are reduced significantly compared to new plants.

To account for the risk of reaching the end of an economic lifetime, companies might depreciate power plants over a shorter period than expected by their technical lifetime. The assumed lifetime has significant implications on the stranded asset calculations in this study. In this study the following technical lifetimes were assumed to be: coal, 50 years; natural gas, 30 years; oil, 50 years.

The resulting value of stranded assets in the REmap analysis is USD 940 billion (or about 3 800 GW) (Figure 3.11). If all companies used these lifetimes to depreciate power plants on their balance sheets, and no asset impairments occurred up to the point of stranding, then this is the value of asset impairments that could be expected up to 2050 because of decarbonisation.

However, given that some companies depreciate power plants over shorter periods of time, or have already witnessed asset impairment in recent years for a variety of reasons, the impact of stranded assets might be more limited. In some cases, the assets that get shut down are those that were already written off and have little value left on the balance sheet.

If one assumed technical lifetimes for coal and oil assets of 50 years and 30 years for gas, but only 25 years for the true economic lifetimes for coal and oil and 15 years for gas, then 2 250 GW of 3 800 GW of total stranded assets in the REmap analysis have economic value left at the point they are shut down. The remaining 1 550 GW (about 40% of the total) are plants that are stranded with no remaining economic value, but that still have remaining technical lifetime. With these assumptions, the value of stranded assets is USD 200 billion.

It is difficult to assess the assumptions that are made on balance sheets across countries and companies to value power plant assets. The shorter economic lifetimes as assumed above come with the risk of underestimating the magnitude of stranded assets. Electricité de France, for example, recently increased its depreciation period for nuclear plants from 50 to 60 years. In some countries, plants even run beyond their technical lifetime (recently a 100 year-old coal-fired power

plant in Peru was decommissioned). It would be advisable for companies/countries to report more transparently about the reported book value of power plant assets and hence their exposure to the risk of stranded assets.

Figure 3.11 • Technology lock-in in power generation assets, 2015-2050

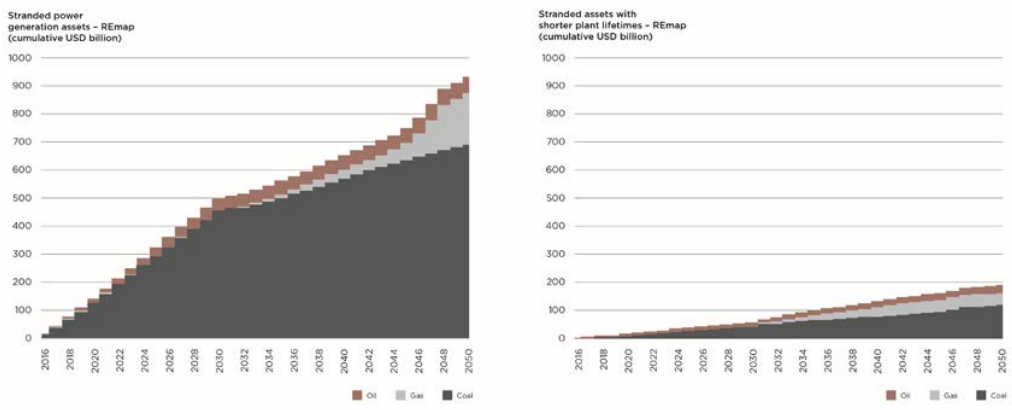

Key message • The power sector could see stranded assets in the range of between USD 200-940 billion by 2050, with most of it being coal-based generation assets.

Renewable energy's share of the global energy mix will need to double by 2030 and more than triple by 2050 from today's level

This analysis finds that supplying two-thirds of global 2050 primary energy with renewable sources is technically and economically feasible. We already have seen accelerated deployment of solar and wind power on a global scale in recent years, in part because of technology innovations and spectacular cost reductions. We also see increasing electrification of end-use sectors coupled with renewable power, for example in the areas of EVs and heat pumps.

This recent acceleration of renewable energy technology has occurred in spite of slow economic growth and low oil prices. It has been driven by the improving cost-competitiveness of solar PV and onshore wind power, as well as other factors such as air pollution policy and regulations.

IRENA's renewable energy statistics show that renewable energy added more capacity than fossil fuels and nuclear combined for the each of the last four years (IRENA, 2016e), and that the total renewable electricity generation capacity reached nearly 2 000 GW in 2015. Solar PV and onshore wind power continue to grow the fastest, while hydro still produces the lion's share of renewable power. For the past five years, the average annual increase in the share of electricity from renewable sources has been 0.7 percentage points. About 24% of all power worldwide was generated from renewable energy sources in 2016.

Yet, when including all non-electricity sectors, the growth in renewable energy amounts to only an annual average of 0.17 percentage points in terms its share of total energy consumption. This is due largely to the fact that consumption of electricity accounts only for one-fifth of total final energy use, and renewable energy use growth is slow in key building and transport sectors. As a result, the share of renewables was 24% in global total electricity generation in 2016, but only 19% in the total final energy mix.

In the Reference Case, current trends continue, yielding only minor changes in the energy mix. Of the total 520 EJ final energy demand in 2050, renewable energy covers only about a quarter of all demand, including the consumption of electricity and district heat sourced from renewables.

Today's renewables share is about 19% of total energy generated. That grows to 21% by 2030 when the national energy plans of all countries are included. That means that the renewable energy share continues to grow close to today's level of around 0.17 percentage points per year for the next 15 years until 2030. This rate drops to 0.05 percentage points in the 2030-2050 period and renewable energy covers only a quarter of the total final energy consumption in 2050. This result shows that existing policy plans for capacity additions and the importance given to renewable energy sources in country energy plans are still insufficient to make a significant change in the total mix.

Box 3.6 • The need for better statistics for solid bioenergy use

Different sources of energy statistics indicate that traditional uses of solid bioenergy for cooking and water heating in the residential sector account for a significant share of renewable energy worldwide, particularly in the non-OECD countries.[81]

Given the challenges involved in assessing how much bioenergy is used today in these parts of the world, it is worth pointing out the potential differences in the available data sets.

According to the energy statistics of the IEA, in 2014, 32.5 EJ of primary solid biofuels were used in the residential sector of the non-OECD countries. This bioenergy was in the form of firewood and charcoal. Data from the Food and Agriculture Organisation of the United Nations (FAO) statistical database (FAOSTAT) on firewood and charcoal production, adjusted for use in the residential sector, show a significantly lower figure of 13.6 EJ. The IEA estimate is more than two-times larger than the FAOSTAT estimate.

The large difference has important implications for policy making. Depending on which data source is used, the estimated current share of renewable energy in the global final energy consumption can range from 13% to 19%. Today, "modern" renewable energy, like solar PV and wind farms, has a 9% share. Using the lower solid biofuels estimate, modern renewables now have a share more than two-times greater than that of traditional uses of bioenergy. But with the higher estimate, the modern and traditional renewables have a more equal share.

Sustainable Energy for All (SEforALL) has set a voluntary target of doubling the share of renewable energy in the global energy mix by 2030 compared to today's level. Depending on which share is taken as a starting point, the doubling target can mean increasing the share of renewables to 26% or to 36% by 2030. Such wide ranges make policy making a challenging task. It also becomes impossible to understand how countries can contribute to such global goals.

Traditional uses of bioenergy also have impacts beyond energy. There are socio-economic impacts, and negative effects on human health and the environment. Without better data, policies to reduce these impacts will not be robust. These problems highlight the need to improve the statistical data on traditional uses of bioenergy and for better policy making.

While the share of oil use remains constant in the entire period in the Reference Case, the natural gas share increases at the expense of coal. The change in the share of electricity use is the largest among all other energy carriers.

81 These are defined according to the IEA as wood, animal dung and agricultural residues that are burned in simple stoves at low rates of efficiency. Their use is most common outside OECD countries (IEA, 2012), and they are an important source of energy for many.

The use of ambitious energy efficiency technologies in REmap reduces the total final energy consumption in the 2015-2050 period compared to the Reference Case, with total energy consumption at about 380 EJ. The share of renewable energy increases to 60% by 2050 (Figure 3.12). This requires a growth in the renewable energy share of 1.2 percentage points per year, equivalent to a more than seven-fold increase over past rates. To achieve this rate, expanding the use of renewable energy technologies in all sectors will be required.

Figure 3.12 • Renewable energy share in global total final energy consumption, 2015-2050

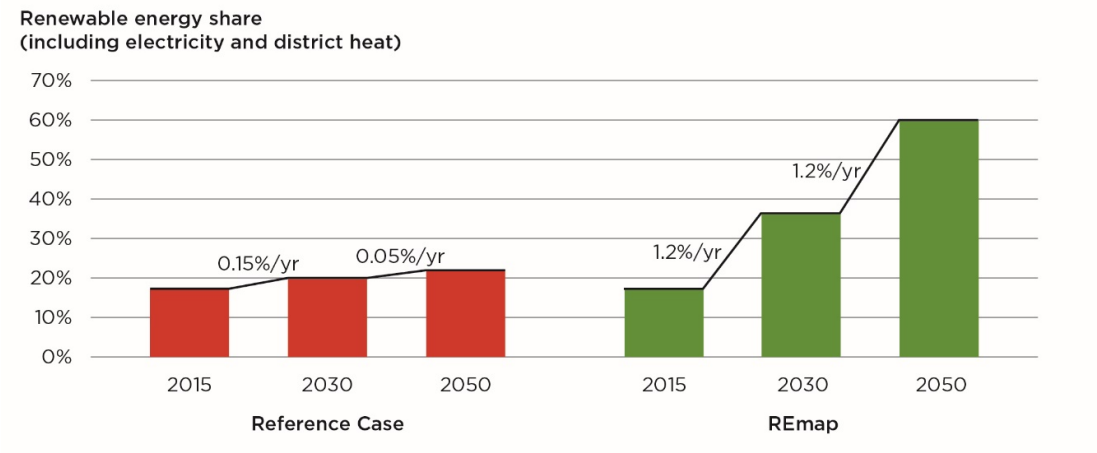

Note: TWh = terawatt-hours; CCS = carbon capture and storage.

Key message • Under REmap, the renewable share of total final energy consumption will rise from 19% to over 60% by 2050, a three-fold increase. The growth rate in terms of renewable share per year will need to increase seven-fold over past rates.

Figure 3.13 shows how total energy demand develops between 2015 and 2050 in both the Reference Case and in REmap. Under REmap, demand is flat in total final energy consumption (TFEC) terms. The share of fossil fuels in TFEC declines from 70% to 30%. Direct uses of renewable energy grow from 10% to 35%. Notably, the share of final bioenergy use in total final energy consumption rises from around 13% today to around 21% in 2050 (from about 50 EJ to 80 EJ). This can be divided into 7% transport biofuels and 14% solid and gaseous biofuels for power generation and heating. Solar water heater use grows for industry and buildings from negligible to about 35 EJ. Oil share decreases significantly, with transport relying more on biofuels and electricity. However, an amount of oil that is half of today's level would be used to meet the demand in non-road passenger transport and freight. Compared to the Reference Case, in final energy terms, there is a major change in oil and its products. In the Reference Case, oil use grows from 123 EJ to 170 EJ, while in REmap, oil demand drops to 55 EJ. Compared to current levels, coal use is more than halved and remains in use only for a few applications in the industry sector. Gas remains as an important fuel in this transition for supplying any heating in industry and buildings that remains unserved by renewables. Electricity's share increases significantly, rising from just below 20% in 2015 to more than 30% by 2050. Coupled with renewable energy supply, renewable power represents 40% of all final renewable energy use in 2050.

Figure 3.13 • Total final energy consumption by energy carrier, 2015-2050

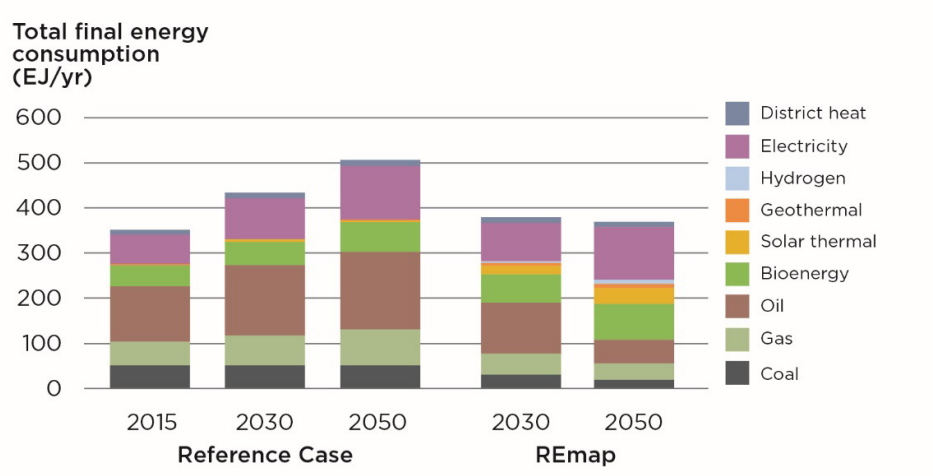

Notes: Includes only buildings, industry and transport. Non-energy use of fuels for the production of chemicals and polymers is excluded.

Key message • Under REmap, renewables direct use and renewable electricity grow from 115 EJ in 2015 to 250 EJ in 2050, representing 65% of TFEC. Coal use dwindles.

Box 3.7 • China 2050 High Renewable Energy Penetration Scenario and roadmap

China has set ambitious emission reduction and non-fossil fuel energy targets for both 2020 and 2030. There is little doubt that these targets can be met on time, or earlier if China continues to cut back on coal consumption to reduce its air pollution problems. Despite these important mid-term targets, however, China needs to give more thought to a long-term strategy for reducing carbon emissions.

In the 2050 High Renewable Energy Penetration Scenario and Roadmap Study, the China National Renewable Energy Center (CNREC) presented enhanced low-carbon scenarios for achieving shares of renewables as high as 61% in total primary energy consumption and 86% in the power mix. In the scenarios, renewables would replace coal as the dominant energy fuel in the energy mix in 2050. According to the study, electricity demand will account for at least 60% of the TFEC, compared to the current 25%. That target requires that the road transport sector be substantially electrified, with 86% of vehicles being electric powered and 100% of trains being electrified by 2050. This would allow renewable electricity to play a major role.

In the scenario, CO_2 emissions would be reduced to 3.3 Gt by 2050 from the 2011 level of 7.3 Gt, largely by reducing coal's share of the total primary energy supply by a factor of five. This means a significant decline in coal use in the industry sector of China, where coal is exclusively used for steel (for about a quarter of all steel production, with the remainder produced from electric arc furnaces) and cement production industries.

Achieving this high-share renewable scenario will require strong political will, consistent policy support, effective institutional reforms in the energy sector (and in particular, in the power sector) and major technological breakthroughs in the next decade or so. Replacing coal with renewables in China is an extremely challenging and long-term task. Yet, as the Chinese proverb says, "the journey of a thousand miles starts with a single step". This study is indeed a step towards a low-carbon energy future for China.

Source: (CNREC, 2016).

Renewables and natural gas will dominate the electricity generation mix

Because electricity generation contributes the single highest sectoral share of CO_2 emissions, decarbonising the sector by 2050 is a top priority. The sector is more on track than are end-use sectors in terms of deploying of renewable energy, but efforts to reduce the use of coal must be strengthened to continue on that path. This is particularly important given the increasing dependence of coal for electricity generation in Asia's fast growing economies. Phasing out coal without CCS in the electricity generation sector, especially in China, India and Indonesia, is a top priority, and no CCS deployment is foreseen in power generation until 2050 under REmap.

Renewable energy's share of electricity generation reaches 31% in the Reference Case in 2030, up from 23% in 2015. Under REmap, the renewable energy share reaches 82% by 2050, more than twice the level of the Reference Case, and nearly four-times higher than the level today. The transition thus requires current efforts to scale up significantly. Today the share of renewable energy in the sector increases by about 0.7 percentage points per year. Meeting the decarbonising goals will require this rate to more than triple to 2.4 percentage points per year until 2030, so that the share of renewables reaches 59% of energy generation. The increase must continue at a rate of at least one percentage point per year until 2050.

Figure 3.14 • Power generation capacity and total electricity generation by technology in the Reference Case and REmap, 2015-2050

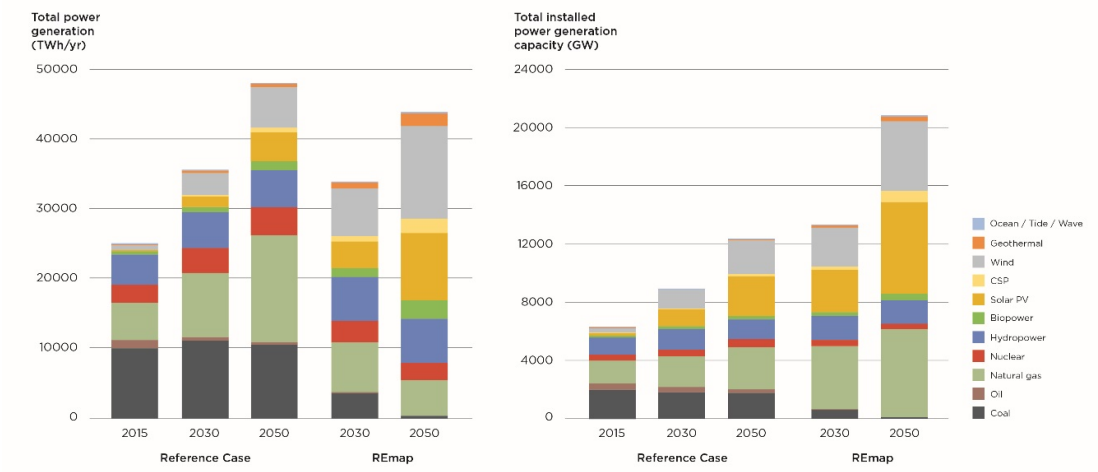

Key message • The power sector will see the highest share of renewables. In REmap by 2050, a diverse mix of renewables will provide more than 80% of electricity, with wind and solar providing the largest shares. Coal and oil in power generation will be eliminated.

Total installed electricity generation capacity at the end of 2015 was about 6 200 GW (Figure 3.14). In the Reference Case, this increases by 180 GW per year to reach 12 400 GW by 2050. The largest additions are in solar PV and wind onshore and offshore power, representing 70-80% of the total. Total installed coal capacity remains same as today in the entire period to 2050. By comparison, gas capacity increases by 1 400 GW, from 1 500 GW to 2 900 GW, representing the largest share in total generation capacity by 2050.

In the REmap case, more renewable power capacity is added than in the Reference Case. Solar PV capacity climbs to 6 000 GW, while wind capacity reaches 4 800 GW. While oil-based capacity drops to zero, total installed nuclear capacity remains same as today. The remaining fossil and nuclear (though typically the least flexible of all options) capacity offer flexible generation, supplemented with a back-up natural gas capacity of around 5 000 GW worldwide by 2050.

A range of renewables, including biomass, concentrating solar power (CSP) and hydropower, also offer flexible generation. With these changes, total installed electricity generation capacity in REmap reaches more than 20 000 GW, a three-fold increase from today.

Renewable energy has the potential to meet more than half of all final energy demand in 2050

While the power sector holds great potential for renewables, electricity accounts only for around 20% of final energy use today. As a result, this analysis points to an essential role for renewable energy technology deployment in end-use sectors. Such a role is especially important because these sectors today account for approximately 80% of all global energy demand.

In the end-use sectors, IRENA's REmap shows that the renewable energy share can grow to 78% in buildings, 39% in industry and 50% in transport by 2050 (Table 3.2). The renewable energy share reaches 61% of TFEC, which includes the use of electricity and district heat sourced from renewables. If these uses are excluded (i.e. by considering the direct uses of energy only), the renewable energy share would reach an estimated 53%, thereby covering more than half of all energy demand by 2050.

Realising the renewable energy potential in the REmap case requires that the renewable energy share in TFEC increases to 36% by 2030 and to 60% by 2050. In 2030, consumption of renewable power would account for around 34% of the total final renewable energy use, with the remaining 65% being renewable energy used in heating and cooling, and the transport sector. Renewable power's share in the total final renewable energy use increases to 40% by 2050.

Table 3.2 • Global total and sector-specific renewable energy shares, 2015-2050

		2015	Reference Case		REmap	
			2030	2050	2030	2050
Industry	(excl. NEU, electricity & DHC)	9%	12%	15%	28%	44%
	(incl. electricity & DHC)	9%	13%	16%	23%	38%
	(incl. NEU, electricity & DHC)	10%	14%	17%	33%	46%
Buildings	(excl. electricity & DHC)	46%	42%	41%	59%	79%
	(incl. electricity & DHC)	37%	36%	38%	57%	78%
Transport	(excl. electricity & DHC)	3%	7%	10%	15%	44%
	(incl. electricity & DHC)	4%	7%	10%	17%	53%
Power generation		23%	31%	37%	59%	82%
District heating and cooling		7%	7%	15%	20%	30%
TFEC	(excl. NEU, electricity & DHC)	18%	18%	19%	32%	54%
	(incl. electricity & DHC)	19%	21%	23%	37%	61%
TFC	(incl. NEU, electricity & DHC)	18%	19%	22%	36%	56%
TPES		16%	20%	24%	40%	65%

Notes: NEU = non-energy use; DHC = district heating and cooling; TFEC = total final energy consumption; TFC = total final consumption; TPES = total primary energy supply.TFC includes the use of fuels for the production of chemicals and polymers.

In the Reference Case, total final renewable energy use would grow from around 65 EJ in 2015 to 88 EJ in 2030 and 125 EJ in 2050. In comparison, under REmap, the figure would reach 145 EJ in 2030 and 235 EJ in 2050 (Figure 3.15). Half of the total final renewable energy use in 2015 was accounted for by traditional uses of bioenergy, so modern renewable energy was about 32 EJ.

In REmap, the use of traditional bioenergy drops to almost zero, so the 145 EJ in 2030 (and 235 EJ in 2050) would come almost entirely from modern renewable energy. Overall, under REmap, modern renewable energy use is seven times higher than today by 2050.

Direct uses of renewable energy for transport, heating and cooling would account for less of the total final renewable energy use in 2030 compared to today, falling from a share of 80% in 2015 to 66%, because of greater efficiencies and the growing share of renewable electricity. The potential in end-use sectors remains equally high in 2050 as well. The share of end-use sectors in total final renewable energy use is high despite the significant decline in traditional uses of bioenergy.

Between today and 2050, the way heat is produced would also change. Solar water heaters would play a greater role under REmap for both industry and buildings, covering around 15% of all final renewable energy use. This is equivalent to 9% of all final energy use worldwide and would mean a huge market for solar heaters. In buildings, total installed solar water heating capacity under REmap reaches 5 540 million m^2 by 2030 and 11 700 million m^2. Industry use would be significantly higher than it is today, with capacities reaching 2 440 million m^2 by 2030 and 3 695 million m^2 by 2050.

The use of heat pumps would increase significantly in many developed markets. Heat pumps would replace fuels for heat generation with renewables-based electricity. In industry bioenergy for to generate process heat from combined heat and power plants would also grow.

In transport, which has the lowest renewable energy share among all sectors today, the share of liquid biofuels and biomethane in total renewable energy use would grow from 4% in 2015 to 12% in 2030 and 26% in 2050. In absolute terms, this represents four-fold growth, from 129 billion litres in 2015 to approximately 500 billion litres per year by 2030. After 2030, the amount would more than double, to 1 120 billion litres per year by 2050. Nearly half of this total amount would come from advanced liquid biofuels in 2050, which are made from a wider variety of feedstocks than are conventional biofuels, but which supply just 1% of biofuels today.

Daunting challenges remain in long-range freight transport, aviation and shipping. These uses account for about half of the global transport sector's total energy demand. The potential for electrification is limited. Biofuels are currently the main solution for these transportation modes. If the aviation sector switches from today's conventional petroleum-derived kerosene to advanced biofuels, it would consume about 40% of the total production of such fuels. But in general, bioenergy in transport will require a careful approach because growing its feedstocks may take land away from growing crops for food production. Possible hydrogen or breakthrough electricity storage solutions could reduce the need for biofuels.

Transport has the lowest share of renewable energy today, but the sector is undergoing fundamental change. EVs are revolutionising the way we move. In combination with information and communication technologies (ICT), the whole transport concept is changing. As performance improves and battery costs fall, sales of EVs, electric buses and electric two- and three-wheelers are growing. In countries such as the Netherlands and Norway, 10-30% of all cars sold today are electric. Many other countries, such as China, are trying to boost the sales of EVs by setting targets or offering incentives. In REmap, the number of four-wheel EVs in use would reach 195 million by 2030 and 830 million in 2050. Carmakers already offer affordable models that can travel more than 380 km on a single charge, reducing drivers' anxiety about being stranded without power, thanks to improvements in battery engineering and recharging options.

The numbers of electric buses and electric two-wheelers are growing as well, especially in China. In the REmap analysis, 11 million electric buses and light-duty vehicles would be on the road in 2030 and 21 million by 2050.

Achieving these numbers will require at least 10% of the total passenger car vehicle stock in 2030 and more than one-third in 2050 to be battery-electric cars or plug-in hybrids. Yearly sales of these cars would need to average around 25 million. Still, total renewable energy use in transport would remain relatively small. To begin with, these vehicles are much more efficient than conventional vehicles, so small amounts of renewable electricity would go a long way. In addition, not all of the electricity cars use would come from renewables, and passenger vehicles account for only half of total transport energy use. As a result, the significant deployment of EVs would increase transport's renewable energy share by only eight percentage points under REmap in 2050, from 42% (including biofuels and hydrogen) to 50%. Electricity use share would climb from 0.6% in 2015 to 21% in 2050. Because of the greater efficiencies of using electricity, this increased share would keep transport's total energy demand relatively constant from 2015 to 2050 in the REmap analysis. In contrast, demand grows 60% over that time period in the Reference Case.

Hydrogen also plays a role in end-use sectors. Under REmap, renewables-based hydrogen use grows to 0.9 EJ by 2050 (1% of all industrial energy demand). Its main use would be to replace gas in the process of direct reduction of iron ore in iron making. It also would be used for the production of ammonia and methanol. In addition, there has been much discussion about possible other applications, such as in fuel cell-powered electric cars or other hydrogen-powered vehicles. The technology remains far from commercialisation, but some countries see a potential for hydrogen as a transport fuel. In the passenger car and freight segments, its use in 2050 would be just below 10% of all energy demand with a total consumption of about 7 EJ. More innovation is needed if hydrogen is to play larger roles and be used in more applications.

Figure 3.15 • Final renewable energy use by sector and technology in REmap, 2030 and 2050

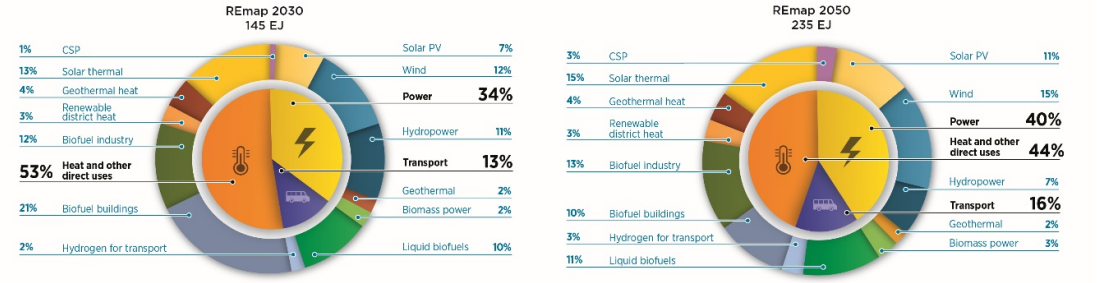

Key message • Under REmap, final renewable energy use is four-times higher in 2050 than it is today. Power and heat consume about 40% and 44% of the total renewable energy, respectively, while transport uses about 16%.

Box 3.8 • Transforming the energy market through regional efforts and corporate sourcing of renewables

Recent years have seen the emergence of actors on a sub-national level committing to significantly scaling up their sourcing and use of renewable energy. Many cities, regional governments, communities and co-operatives have set a goal of getting 100% of their energy from renewables. Most of the time, the goal is to source 100% renewable power, but some projects are also looking to power transport, heating or cooling with renewable energy. The GO100% initiative tracks these projects. As of early 2017, it shows that 256 million people live in areas that have shifted, or are committed to shifting within the next few decades, to 100% renewable energy in at least one of these sectors. The initiative shows that there are currently 166 regions, cities or communities that have projects in place to go to 100% renewables (GO100%, 2017).

Companies are also increasingly seeking to achieve significantly higher levels of renewable power. The RE100 initiative brings together and tracks companies that have committed to sourcing 100% of their electricity from renewable energy. RE100's latest annual report lists 87 companies, including some of the world's leading companies, that have made such commitments (The Climate Group, 2017). These companies collectively consume 107 TWh, the same amount of power consumed in the Netherlands. The list is growing quickly. In the last two years, there has been an increase in interest from heavy industry in the RE100 initiative, as some of the world's largest car manufacturers and cement companies have become members. There are many more companies that also have similar aims but are not formally part of the initiative.

These corporate commitments have benefits that go beyond just the increase in renewable power capacity. The companies' efforts can spur innovation in energy service areas where new technologies are badly needed, such as in heavy industry and transport. The companies can also serve as test beds for innovative technologies and for energy service models that can pave the way for wider adoption of renewables on regional and national levels.

More focus is needed on power systems integration and sector coupling

The growth of solar PV and wind capacity is adding large amounts of variable renewable energy (VRE) to the electricity mix. Indeed, more and more countries already achieve VRE generation shares above 20%. Under REmap, the share of wind and solar increases to 31% by 2030 and to 52% by 2050. In terms of capacity, this changes the balance of dispatchable versus non-dispatchable capacity, with the non-dispatchable capacity rising to around half of the total. This growth, in turn, increases the challenges of integrating the variable power into the electricity system and will require the establishment of new business models.

The influence of VRE already becomes noticeable at shares of just 5-10%. The main technical challenges begin when variable renewables push demand for non-renewable generation below the minimal operating level of a country's dispatchable fleet. When renewable power is abundant, dispatchable power plants must produce less or switch off entirely. As a result, balancing supply and demand is difficult, and steps must be taken to ensure system flexibility. The options for meeting these challenges generally fall into four groups: strengthening the grid and interconnectors, or adding flexible generation, demand-side management and storage.

There are synergies between the end-use sectors and renewable electricity generation. If these synergies are utilised, they provide the means for demand-side management and storage, thereby increasing the flexibility of the power system. They also provide benefits for end-use sectors by increasing the share of renewable energy for heating, cooling and transport. For example, the power and road transport sectors can be coupled by recharging EVs at times of renewable power surpluses, a form of demand-side management. EVs can also provide a storage function, feeding power from plugged-in car batteries back into the grid when more electricity is needed in the system.

The power sector can also be coupled with heating and cooling. Heat pumps that operate on a flexible schedule can adjust their operation to account for peaks or dips in electricity supply in combination with cold or heat storage. For example, they can turn off temporarily when overall system demand jumps, thus reducing peak load. Smart thermal grids (district heating and cooling) offer even more flexibility by adding thermal storage. Surplus renewable electricity could also be used to make liquid fuels. In one plan being considered, abandoned oil and gas platforms in the North Sea off the coast of Europe would be refurbished into units that would convert electricity from offshore wind farms into hydrogen and synthetic gas.

Electricity storage is another key option for integrating higher shares of variable renewables. In the REmap analysis, electricity storage capacity reaches more than 1 000 GW by 2030, when the total installed solar and wind capacity will be 5 000 GW. This storage capacity is split into: 600 GW from electric vehicles, 325 GW from pumped hydro, 125 GW from stationary battery storage and 50 GW from second-hand car batteries.[82] Total storage capacity grows to nearly 3 000 GW by 2050, with EVs in operation accounting for majority of this total. REmap gives a large importance to natural gas back-up capacity as well. Total installed gas capacity for such purposes would reach 5 000 GW by 2050.

Box 3.9 • Energy innovation trends and initiatives

Innovation will continue to be crucial to decarbonising the energy sector. While technical solutions for the power sector already exist, continued innovation will enhance their performance, reduce their costs and help scale up the deployment of the best available technologies.

Non-power sectors have greater innovation challenges than the power sector does. For around one-third of all energy-related CO_2 emissions (primarily from the industry and transport sectors), no economically viable renewable energy supply alternatives exist today.

For example, renewables account for only 3% of the current energy demand for the transport sector. Promising developments in EVs may increase the share of renewables for passenger road transport. But the share of renewables in aviation and freight will not rise unless advanced liquid biofuels quickly become competitive with fossil fuels, which currently looks unlikely. In the industry sector, renewable options for high-temperature heat generation, which typically accounts for a large share of the energy demand in energy-intensive industries like iron, steel and chemicals, have not yet commercially emerged. Alternatives, such as electricity-based iron production (electro-winning), a process similar to that used for non-ferrous metal production, need to be further developed.

Figure 3.16 • R&D spending on renewable energy, 2004-2015

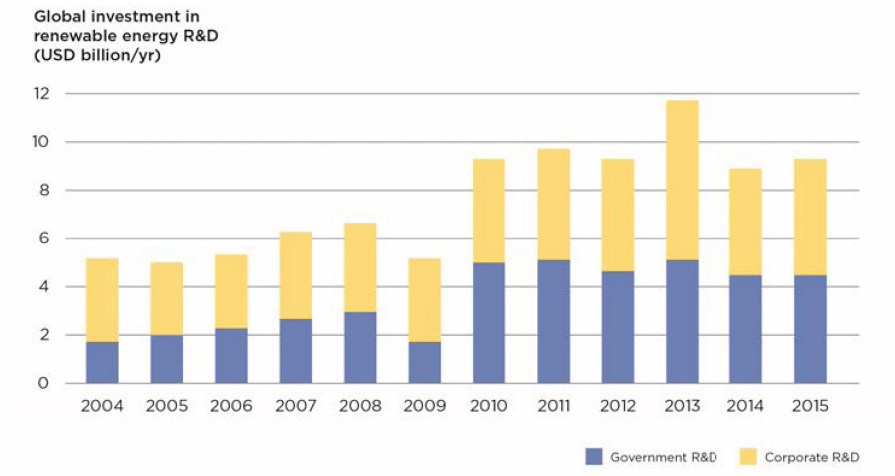

Source: (Frankfurt School-UNEP Centre/BNEF, 2016).

Key message • There is an urgent need to increase R&D investment. R&D for renewables is not currently growing and for end-use sectors R&D investment is miniscule.

82 Battery storage capacity from second-hand car batteries can be higher depending on their usability, which still needs to be determined.

Additional research and development (R&D) efforts in renewables will also further bring down the costs of zero-carbon technologies and decrease the overall costs of decarbonisation. Unfortunately, R&D investment in renewable energy technologies has not grown in the last seven years. Moreover, most R&D investments for renewables continued to be in power sector technologies (such as PV and wind) rather than in technologies for end-use sectors (such as biofuels and biomass), where they are urgently required.

In order to enable this energy transition, therefore, G20 countries should increase their R&D investments to find technology solutions for sectors where more innovation is required.

The magnitude of the challenge means that international collaboration is required. Innovations must be shared, materialised and widely replicated by others. There is a big opportunity for G20 countries to engage, co-ordinate efforts and demonstrate political leadership.

To meet this need for collaboration, several international initiatives aimed at nurturing R&D in clean energy technologies have been created. They include:

- The Mission Innovation initiative in which 22 countries and the European Union have committed to doubling their government R&D investments for clean energy over the next five years.
- IEA's Technology Collaboration Programmes (TCP) support R&D for the energy sector through a collaborative platform that brings experts together to exchange experiences and co-ordinate efforts. The 39 TCPs operating today involve about 6 000 experts from government, industry and research organisations in more than 50 countries.
- The Clean Energy Ministerial seeks the diffusion of clean energy technologies through initiatives focused on specific technologies, including mini-grids, smart grids, PV and wind grid integration, and super-efficient appliances.

Other areas of important innovation for the decarbonisation of the energy sector have often been overlooked. IRENA has several efforts aimed at identifying them including IRENA Innovation Week, which is held every other year. The most recent event, in 2016, focused on the power sector and highlighted the need for innovation in market design, business models, financial instruments and infrastructure. Similarly, the Ministerial Roundtable of the 7th session of the IRENA Assembly, which includes ministers as well as private sector leaders, emphasised that the transformation will not move forward without innovative policy and regulatory frameworks.

While the power sector has a long history of policy frameworks that encourage deployment of renewables, such frameworks are lacking in most countries for end-use sectors. In addition, there are difficult policy choices, including additional market regulations that will need to be made in these sectors to decarbonise their energy systems. Examples include limits on sales or higher taxes for inefficient cars, stricter energy efficiency regulations for existing buildings or requirements to demolish and replace old buildings, or structural changes and relocation of plants in industry. The G20 has the advantage of including developed as well as emerging economies, so it has a comprehensive picture of the different innovation needs and complementary innovative solutions for different constituencies.

As innovations emerge, continuing to share experiences and best practices is crucial. The G20 has a large opportunity to use all these initiatives to accelerate the decarbonisation of the energy sector.

Renewable energy use in G20 countries: contributions by each and all

All countries have opportunities to increase their amounts of renewable energy beyond the Reference Case. However, there are stark differences between countries and regions in their starting points of renewable energy use, renewable resource availability, access to financing, policy frameworks and many other factors. These differences explain why some countries can

achieve a tripling or even a quadrupling of their renewable energy shares, while others are less likely to achieve significant growth.

Figure 3.17 shows the implications for individual countries of the global objective of doubling the share of renewables (to 36%) in the global energy mix by 2030 and increasing that to 60% by 2050. The starting points are the renewable energy shares in 2015. The global average renewable energy share was 19%. While Japan, the Russian Federation, Saudi Arabia, the United Kingdom and others are below 5%, some others, such as Brazil, India and Indonesia are above 20%.

In most countries, the Reference Case foresees modest increases in renewable energy shares based on the countries own long-term plans. For instance, Canada and the United States have rather conservative policy ambitions. In Mexico, the demand for all energy is growing as fast as the uptake of renewable energy technologies, so the renewable energy share remains the same for the entire period. In some countries, however, the renewable energy shares are forecast to decrease between 2015 and 2030. For India and Indonesia, this is explained by reductions in traditional bioenergy use, as more efficient cookstoves that use modern bioenergy or fuels like as liquified petroleum gas/kerosene come into use.

For all countries, REmap identifies additional potential for renewable energy technologies. For countries with high starting points or existing ambitious plans for growth, the additional potential in the REmap case over the Reference Case is rather limited. Many others do not have ambitious plans, however, REmap shows that they have significant extra potential. Canada, India, Turkey and the United States, for instance, all have high levels of renewable resources that remain untapped, both today and in the countries existing plans until 2030/50.

For some countries, the renewable energy potential may be greater than what was identified in REmap. But more work is needed by policy makers and other stakeholders to identify options, especially in countries where fossil fuels play a large role in the economy. The transition for these countries in adopting renewables might take more time.

REmap shows that the G20 as a whole could reach a 63% renewable energy share by 2050, equivalent to around 175 EJ final renewable energy use. This represents 70% of the total global final renewable energy use in 2050 (235 EJ). While each country has the potential for additional renewables beyond the Reference Case, the top-five G20 countries in terms of total renewable energy use – Brazil, China, India, Indonesia and the United States – account for half of the total global renewable energy use in 2050 and 70% of the G20. That means decisions in a few countries are critical for the success of a global renewable energy acceleration. But those countries alone will not be able to put the world on a pathway that limits global temperature increases to 2°C.

Figure 3.17 • Renewable energy share in TFEC in G20 countries in the Reference Case and REmap, 2015-2050

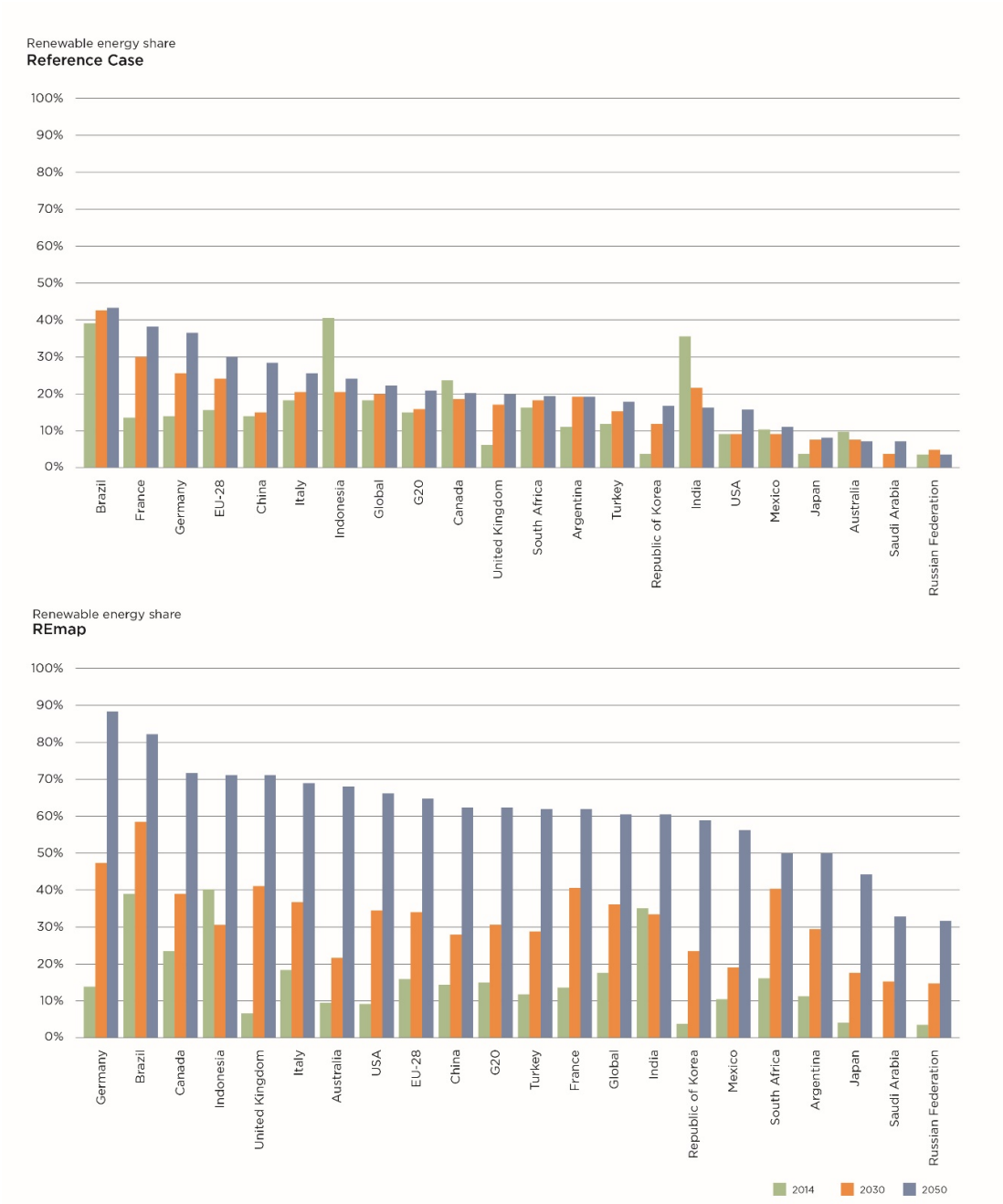

Key message • In the Reference Case, the renewable energy share in G20 countries would range from 5-40% by 2050. As REmap shows, achieving the 2°C target would require that shares increase to between 30-80% in all G20 countries.

Table 3.3 • Summary of Reference Case and REmap results

	Units	2015	Reference Case 2030	REmap 2030	Reference Case 2050	REmap 2050
Renewable energy in electricity generation						
Hydropower	GW	1 208	1 413	1 671	1 391	1 628
Pumped hydro	GW	155	300	325	300	325
Wind	GW	417	1 312	2 665	2 331	4 801
Onshore	GW	405	1 286	2 565	2 243	4 401
Offshore	GW	12	27	100	88	400
Solar PV	GW	219	1 220	2 921	2 703	6 348
CSP	GW	5	47	224	150	719
Biomass	GW	103	166	251	269	415
Geothermal	GW	12	36	126	63	283
Marine	GW	0.5	6	9	12	80
Battery storage	GWh	0.5	1 096	2 980	3 095	10 400
Electric vehicles	GWh	0.4	596	2 080	1 995	8 500
Two- and three-wheelers	GWh	0.1	500	900	1 100	1 900
Renewable energy use in transport						
Electric Vehicles	million vehicles	1.26	60	208	200	851
Passenger vehicles	million vehicles	1.24	59	197	198	830
Buses & Light-duty vehicles	million vehicles	0.02	0.64	11.0	1.5	21.9
2/3 wheelers	million vehicles	200	500	900	1 110	1 940
Bioliquids	billion litres	129	280	500	580	1 120
Ethanol	billion litres	94	195	255	320	635
Biodiesel	billion litres	25	55	135	155	310
Biojet	billion litres		29	111	105	175
Biomethane	billion m^3	0.4	1	24	3	200
Renewable energy use in industry						
Biomass heat (incl. CHP)	EJ/yr	8.0	12.8	16.8	19.6	31.2
Biomass feedstocks	EJ/yr	0.8	2.0	4.0	8.5	16.0
Solar thermal - concentrated	GWth	0.1	0.7	95	9	144
Solar thermal - flat plate, evacuated tube	million m2	1.0	17.1	2 440	221	3 695
Geothermal (direct heat)	EJ/yr	0.02	0.04	2.90	0.54	4.41
Heat Pumps	million units	0.2	2.5	34.2	5.6	79.5
Renewable energy use in buildings						
Biomass – traditional	EJ/yr	28.0	12	0	4	0
Biomass - advanced cooking	EJ/yr	2.5	3.1	13.9	5.6	8.3

Traditional cookstoves	million units	568	252	0	76	0
Modern cookstoves	million units	48	206	1 007	400	813
Biomass heat	EJ/yr	4	17	16.6	18.5	14.3
Solar Thermal	million m^2	622	1 364	5 542	1 962	11 695
Geothermal (direct heat)	EJ/yr	0.3	0.9	2.7	1.4	3.8
Heat Pumps	million units	4	23	102	47	232
Total final renewable energy use						
Total final renewable energy use	EJ/yr	64	88	145	120	235
Renewable energy share in TFEC	%	19	21	37	23	61

The economic case for the energy transition

Renewables offer a wide range of benefits, well beyond those related to energy security, climate and environment. There is growing evidence that they can support economic growth and improve human welfare. Renewables are key to achieving the United Nations' Sustainable Development Goal (SDG) of providing all people with affordable clean energy (Goal 7), while reinforcing other SDGs. They facilitate access to basic services, improve human health, enhance incomes and productivity, and promote gender equality and educational opportunity. Renewables also create new jobs and spawn new local industries, and can contribute to sustainable urban development (IRENA, 2017d). This section discusses the benefits of the REmap energy transition in detail.

Mitigating climate change through renewable energy deployment would yield macroeconomic benefits

The world is faced with an urgent need to decarbonise. At the same time, many major advanced and developing countries are suffering from sluggish economic growth and high unemployment. The traditional view has been that there is a trade-off between economic growth and decarbonisation. Much of the climate change mitigation literature, notably the model comparison exercises compiled in the IPCC's Fifth Assessment Report, has estimated negative economic impacts of decarbonisation (Clarke et al., 2014). However, the literature is now several years old, and its authors admit the significant uncertainties around their estimations, acknowledging the possibility of positive economic impacts, especially if the technologies required for decarbonisation (e.g. renewables) improve in cost and performance (Box 3.10).

Box 3.10 • Existing literature acknowledges the possibility of positive economic impacts

Forecasting the economic impacts of global decarbonisation is a daunting task. The IPCC itself, being the most scientifically sound reference on the topic, admits the uncertainties. The Fifth Assessment Report forecasts negative economic impacts, but allows for positive ones, if certain circumstances take place - circumstances either already existing, or likely to come about.

The role of technology: the past ten years have been a period of outstanding technological advances and cost decreases for renewable energy technology, which the IPCC Fifth Assessment Report was not able to capture. Citing IPCC: "Because technology will underpin the transition to a low-carbon economy, the availability, cost, and performance of technologies will exert an influence on economic costs" (Clarke et al., 2014). The Fifth Assessment Report was published in 2014, with

most model comparisons being done between 2009 and 2014, with model runs done using data that could be even older.

Modelling approach: most of the underlying models are based on neo-classical economics (i.e. computable general equilibrium (CGE) techniques) which assume that markets are perfect, agents fully rational and the economy works at full capacity. This is largely questionable, as postulated by post-Keynesian economics. The IPCC's Fifth Assessment Report admits the large uncertainty around assuming perfect markets. Citing IPCC: "The aggregate economic costs reported (…) assumed (…) in many cases an idealized implementation environment with perfectly functioning economic markets devoid of market failures (…) The reality that assumptions of idealized implementation and idealized implementation environment will not be met in practice means that real-world aggregate mitigation costs could be very different from those reported here" (Clarke et al., 2014). In fact, recent research is trying to relax some of these strict assumptions in several CGE models (e.g. by including unemployment or explicitly representing money supply). Also interestingly, several recent CGE-based analyses are showing positive impacts of more ambitious decarbonisation or renewable energy deployment, such as in the case of Brazil or China (CNREC, 2016; Dai and Liu, 2016; Wills and Grottera, 2015).

The role of the "double-dividend": the IPCC states that climate policy does not happen in an idealised, perfect market environment, and if there are synergies between climate and other policies, economic impacts could be more positive. This is for instance the case of climate and fiscal policy. A "double-dividend effect" could take place if carbon price revenues are used to reduce distortive taxes (such as those on labour). This is very much in line with the literature on "green tax reform", with the findings of OECD's G20 report in the case of "pro-growth policies" being implemented (OECD, forthcoming), and with the environmental taxation initiatives advocated by institutions (e.g. the OECD, the European Commission, the International Monetary Fund (IMF) or the European Environment Agency). Citing the IPCC, "literature has also looked into the use of carbon revenues to reduce pre-existing taxes (generally known as the "double-dividend" literature). This literature indicates that total mitigation costs can be reduced through such recycling of revenues. (…) Climate policies will interact with pre-existing policy structures as well as with other market failures (…) and these interactions can either increase or decrease policy costs. A number of authors have argued that costs could be much lower or even negative [i.e. positive economic impacts] compared to those produced by studies assuming idealized policy and implementation environments" (Clarke et al., 2014).

Rapid technological advancements in renewables are indeed taking place, and in many circumstances renewables are becoming the cheapest source of energy, a trend which is likely to continue in the future (IRENA, 2016f). Such changes can be a driver for the economic impacts of decarbonisation to become positive.

These, among other factors, are beginning to force a rethinking of the traditional view of the trade-off between economic growth and decarbonisation. There is growing evidence that mitigating climate change through renewable energy could actually bring positive economic impacts, stimulating growth and employment worldwide. Some of this evidence is for G20 members: the United States (ICF Resources LLC, 2015; Synapse Energy Economics et al., 2015), China (CNREC, 2016; Dai and Liu, 2016), Japan (Pollitt et al., 2014), Germany (Blazejczak et al., 2011; Lehr et al., 2012), France (Callonnec et al., 2016) or Brazil (Wills and Grottera, 2015). [83]

Overall, a policy intervention that reduces greenhouse gas emissions while simultaneously boosting economic output is particularly compelling, and there is growing evidence that this could be the case. This section explains the impact of the REmap energy transition on GDP at an aggregate level, and then describes the changes in economic structure and the effects on

83 These positive results for Brazil and China are obtained with neo-classical CGE models.

employment. The analysis in this section has been carried out using the global post-Keynesian macro-econometric model E3ME.[84]

Decarbonising the energy sector can yield global GDP growth

Achieving the energy transition in the G20 as outlined by REmap would increase global GDP[85] by 1.1% in 2030 and by 0.8% in 2050[86] compared to the Reference Case (Figure 3.18). The additional economic activity generated between now and 2050[87] would be an estimated USD 19 trillion,[88] which is similar to the total value of all the companies traded on the New York Stock Exchange, the largest stock exchange in the world.[89] In 2050 alone, the additional output would be USD 1.6 trillion, similar to the combined GDP of Indonesia and Turkey today (IRENA, forthcoming a).

The main driver of the global economic surge is the investment boost from the high capital requirements of renewables and energy efficiency. Upfront investment is, for both, a larger share of total lifetime cost than it is for fossil fuel-based technologies.

The additional investment in the REmap case, compared to the Reference Case, is about USD 0.83 trillion per year globally (on average between now and 2050). Of that, 40% is in renewables supply and 60% is in energy efficiency and the electrification of end uses. These investments more than offset the reduced investment in conventional energy sectors, increasing overall investment in the energy sector (as seen in Figure 3.9). These investments take place mainly in the power sector and in the end-use sectors where energy efficiency measures are implemented (e.g. residential or transport sectors), and lead to higher economic activity across the economy (even after accounting for a partial competition for capital across the economy (Box 3.11).[90] It should be noted that there are uncertainties around the estimates of investments required, especially in the case of energy efficiency. Given the key role that these investments play in driving GDP growth, the current economic situation of low interest rates and low growth present an ideal opportunity for such an intervention, as also pointed out in (OECD, forthcoming).

An additional driver increasing GDP is the growth in household expenditure. Such expenditure is caused by a larger real disposable income due to: reduced income taxes as a result of the increased government revenue from carbon pricing (i.e. the double-dividend effect of a green tax reform[91]); and reduced expenditures on energy that can be allocated to other expense categories

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84 For further details, see Annex B.

85 While the GDP measure fails to capture the broader improvements in human well-being (*e.g.* including social and environmental aspects), it would still increase in the energy transition. Estimates of the welfare and broader sustainable development implications of renewable energy deployment are the focus of current and recent IRENA work (IRENA, 2017d, 2016g, 2016h, forthcoming a)

86 Estimates of the impact of renewable deployment on the GDP for the G20 countries alone are slightly higher. As of today, the G20 represents 86% of global GDP, and by 2050 under the Reference Case it would account for 82%.

87 Discounted at a *social* discount rate of 3%.

88 All monetary figures are expressed in constant 2015 prices.

89 Total market capitalisation of all listed companies (NYSE Market Data, 2017). Since the market capitalisation of a company could be interpreted as the discounted value of all future cash flows expected by the market, it is a meaningful comparison for a discounted cumulative additional GDP, even if the discount rates used are arguably different (private versus social).

90 The only investments that are assumed to be financed by debt are those in the power sector. Such debt is assumed to be private and not public, a key difference from the OECD G20 report (OECD, forthcoming). As such, the decarbonisation does not directly increase public debt.

91 The present macroeconomic analysis assumes carbon prices in line with IEA's *World Energy Outlook 2016*, New Policies Scenario and 450 Scenario respectively for the Reference and REmap cases (in terms of value, geographical and sectoral application). The analysis also assumes that carbon pricing is revenue-neutral for the government, by reducing income tax (i.e. "revenue recycling" through reduced income taxes). Such reform is a sort of "green tax reform", and is widely considered by the literature to yield positive GDP impacts, a finding also consistent with the upcoming OECD G20 report (OECD, forthcoming).

(electricity prices fall in many countries where renewables are more cost-competitive,[92] and prices of fossil fuels drop).

Figure 3.18 • Global GDP impacts of the REmap energy transition: additional and absolute GDP values, 2015- 2050

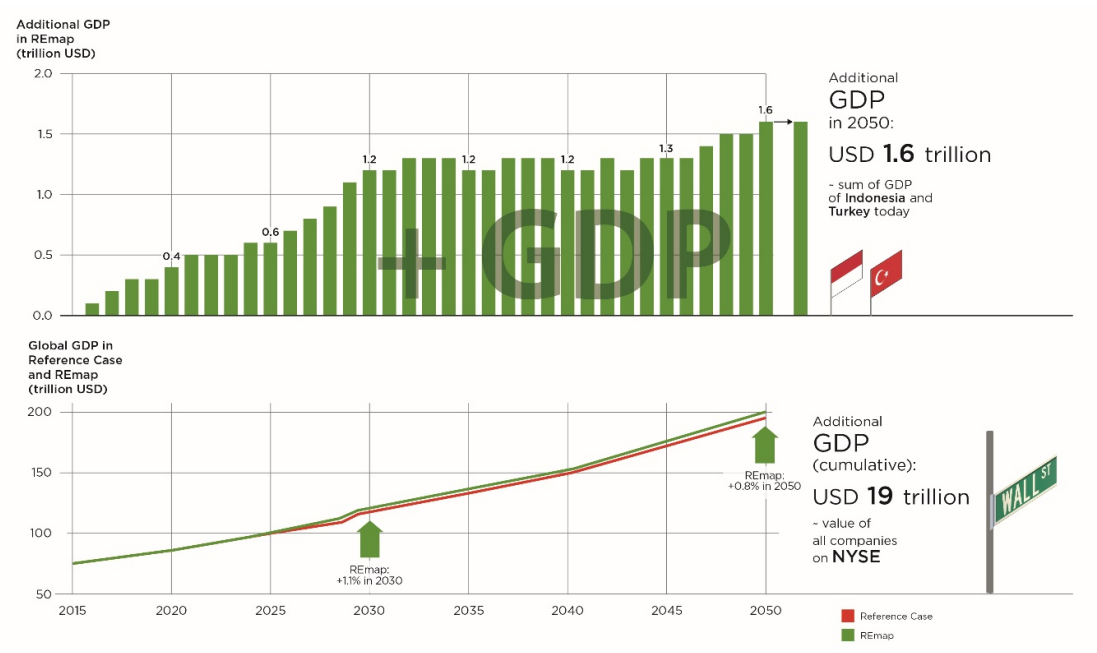

Notes: The top graph illustrates the additional real global GDP in each year (USD 2015 trillion, undiscounted) and is equivalent to the area between the two GDP lines in the bottom graph. The figure of the additional cumulated GDP sums these yearly figures, discounted at a social discount rate of 3%. The bottom graph represents the global GDP in real terms (2015 USD) in each of the two cases. All GDP figures are expressed in market exchange rates.

Key message • Decarbonising the energy sector in line with REmap increases global GDP by around 0.8% by 2050 compared to the Reference Case. In cumulative terms this constitutes almost USD 19 trillion in increased economic activity between today and 2050.

Overall, this analysis suggests that it is possible to carry out a fundamental transition in the energy sector without slowing GDP growth. In fact, the rates of GDP growth may increase. However, important changes in the sectoral contributions to GDP can be expected.

Box 3.11 • GDP impacts in case of full capital crowding out and the double-dividend effect

The investments required in the decarbonisation case (as outlined by REmap) could displace (i.e. "crowd out"[93]) capital available to other productive sectors, having a possibly depressing effect on the economy. There is no clear evidence in the economic literature for whether this happens in reality, with different schools of thought (mainly post-Keynesian versus neo-classical) following very different assumptions. This analysis follows a post-Keynesian approach, which is different than the mostly neo-classical approaches used in the existing literature on the economic impacts of climate

92 The analysis considers the cost of integration of renewables as a mark-up in the price of electricity for each country. The mark-up increases with the share of variable renewables in the country.

93 In the economic literature, the expression "crowding out of capital" is used with two different meanings. In some cases it means that public investment can hinder private investment. In some other cases, it means that investment (either public or private) in a sector reduces capital availability for investment in other sectors. In this report, the second meaning is adopted.

change mitigation, but is still grounded on solid empirical evidence (Anger and Barker, 2015; Arestis and Sawyer, 2011).

One of the main differences between the schools of thought is that pure post-Keynesian approaches assume no crowding out of capital. For the purpose of this analysis, the central scenario assumes a partial crowding out. Furthermore, a sensitivity analysis is carried out under full and null crowding out conditions (see the sensitivity analysis section below). In the full crowding out case (the closest to a neo-classical approach, such as the one used in OECD, forthcoming), GDP impacts are reduced, but remain positive, because the secondary driver increasing GDP (increased expenditure) is not significantly affected.

The main reason for the increased expenditure is the double-dividend effect of recycling the proceeds from carbon pricing to reduce income taxes. The positive economic effect of such recycling method is in line with the: i.) literature on "green tax reform"; ii.) narrative included in the IPCC's Fifth Assessment Report (when it refers to the synergies between climate and other policies); iii.) findings on "pro-growth policies" in OECD's G20 report; and iv.) the environmental taxation initiatives proposed by relevant international institutions such as the OECD, the European Commission, the IMF and the European Environment Agency.

Decarbonisation will bring about a shift in the composition of the economy

The transition towards a decarbonised energy sector will bring structural changes in the economy. Some sectors and industries will see reduced activity, while others will thrive. In a decarbonisation case where investment in capital-intensive renewables and energy efficiency is significantly scaled up, sectors related to capital goods and services would receive a boost, while those related to fossil fuels would see reductions in output. This dynamic is reflected in the GDP impacts experienced by different countries depending on the relative importance of various sectors. Accordingly, countries relying on fossil fuels for a large share of their GDP could face declines in economic activity. This has important strategic, policy and political economy implications for countries and for the global decarbonisation of the energy sector (OECD, forthcoming). Continued policy interventions, including towards economic diversification, could help mitigate the negative economic impacts in fossil fuel exporting countries (OECD, forthcoming). The structural effects of the REmap energy transition are represented in Figure 3.19 in terms of changes in output per sector compared to the Reference Case.

The main negative impacts of decarbonisation would occur in the fossil fuel industry and in utilities. As the demand for fossil fuels falls, related activities, including exploration, production, refining and distribution, would experience slowdowns. Prices would drop as well, combining with lower demand to reduce overall sectoral output. The coal industry would be hit the hardest, with output falling by about 20% in 2030 and close to 30% in 2050 in comparison with the Reference Case. The oil and gas industries would experience smaller reductions due to a lower substitution effect (the carbon content of their products is relatively lower and their products are harder to substitute). The production of the oil and gas sector in real terms would fall by 10% and 20% in 2030 and 2050, respectively, compared to the Reference Case.

Utilities also would experience a slowdown. Despite increased electrification in the economy (the share of electricity in global final energy consumption goes from 24% in the Reference Case to 29% in REmap by 2050), energy efficiency measures would limit final consumption enough to

reduce overall power generation by around 10% compared to the Reference Case. As a result, output from the power sector falls by 4% by 2030 and 7% by 2050.[94]

Within the power sector, however, there are some important differences across technologies that are not evident in the macroeconomic analysis because of methodological limitations.[95] Some power technologies, such as coal power generation, will decrease their output, while others, such as renewables, and other activities such as T&D, smart grids or demand response, will increase. Some light is shed on these aspects in the jobs analysis in the next section, where estimates have been made for employment by technology.[96] Beyond the power sector, other utilities would also experience reductions. Gas and water supply activities decrease by 5% (mainly because of the reduction in gas demand).

94 While generation (in TWh) falls around 10%, sectoral output (in USD) falls around 4-7%. These figures are not directly comparable, since there are significant price effects playing a role. For instance, generation may be falling more (in TWh terms) in a country with cheaper electricity overall, so the effect on global output would be smaller. The difference between generation and output changes does not relate to the different electricity prices between scenarios, as the measure of output is in real terms, so such price effects are stripped out of the calculation.

95 The macroeconomic representation does not include a measure of output for each power generation technology, only showing the sector as a whole. This is a consequence of the available data and the definitions used in national economic accounts. Some academic literature has attempted to split the power sector into different technologies and a similar bottom-up approximation based on employment factors has been used for the jobs analysis in the next section.

96 Indeed, structural impacts can be analysed from the point of view of sectoral output (measured in USD terms) but also from the employment perspective. As such, the employment analysis by technology in the section below can be used as a proxy for structural impacts and changes in output across power generation technologies.

Figure 3.19 • Structural changes of the REmap energy transition, 2030 and 2050

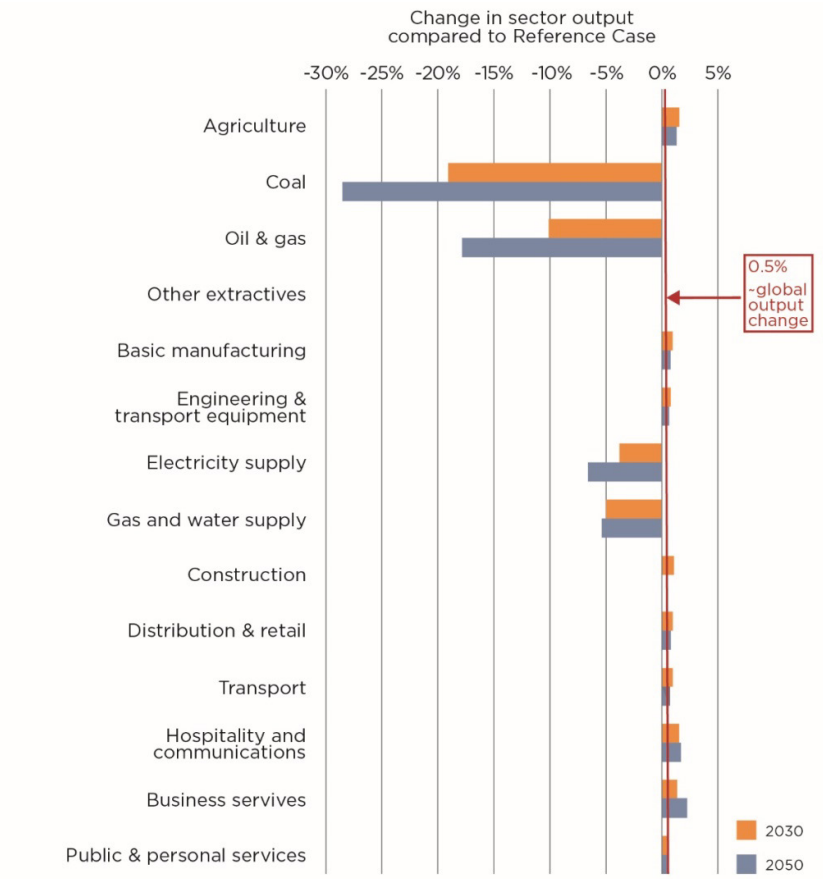

Notes: The vertical red line indicates the global output change (2030 and 2050 average), for comparison with output change per sector. Output and GDP differ since the latter discounts intermediate inputs. Importantly, it should be noted that representing output changes in percentage terms has the drawback of making the impacts in large sectors seem relatively smaller than they are in absolute USD terms.

Key message • Fossil fuel industries see the largest reductions in sectoral output, while the highest increases are in sectors related to capital goods, services and bioenergy.

The activities that stand to gain the most from the energy transition are those that benefit from the capital-intensive nature of renewables and energy efficiency, and from the overall economic improvement (as seen above through GDP increases).

The additional investments in renewables and energy efficiency more than offset the reduced investments both in fossil fuels upstream and in conventional power plants. As a result, the activities supplying capital goods and services increase their overall output. In particular, activities related to construction, engineering and manufacturing of goods required for the transition (such as renewable energy equipment or EVs) will increase their output by around 1%. At the next level of the supply chain, activities providing goods for the construction, engineering and manufacturing sectors would increase their economic output by around 0.5%. Examples include basic metals and non-metallic mineral products (e.g. cement). Going further upstream in the supply chains, activities extracting and delivering raw materials would see an increase, although this is a relatively small sector and the changes in output would be so limited that they do not show up in the analysis.

Output also increases in many areas of the services sector. While some services are part of the supply chains for renewables and energy efficiency activities (e.g. planning or transport), most of the impacts are the result of induced economy-wide effects due to the overall GDP increase. For example, higher household income increases demand for food, education and health services. Distribution and retail, hospitality, ICT and business services would increase their output between 1% and 2%.

In addition, output from the agricultural sector also would increase, mainly due to the rise in bioenergy feedstock production.

Overall, the decarbonisation of the energy sector would bring about a major economic transformation. Sectors related to sustainable energy, including those in the supply chain for the required investment goods and services, increase their participation in the economy. These transformations, and the economy-wide structural changes that will take place, imply a transfer of labour from activities related to fossil fuels to those related to renewable energy or energy efficiency. The next section describes the likely impacts on jobs in the energy sector and across the wider global economy.

The energy transition will increase employment across the energy sector and in the economy as a whole

The energy transition will increase employment levels. This is a key finding, given the fundamental role of jobs in social and economic development, which goes well beyond wage generation (World Bank, 2012).

Global jobs in the overall energy sector

The decarbonisation of the energy sector will bring higher employment levels in energy, since the number of new jobs created in renewables and energy efficiency more than offsets job losses in fossil fuels (Figure 3.20). Global energy sector employment today stands at around 40 million jobs (direct and indirect).[97] Of these, IRENA estimates 9.4 million jobs to be in renewables,[98] a number that has been growing consistently in recent years (IRENA, 2016i).

In the Reference Case, global renewable energy jobs (direct and indirect) would reach 15 million by 2030 and 17 million by 2050. In comparison, in the REmap case, the number of jobs would increase to 24 million by 2030 and 26 million by 2050. Although employment in renewables is higher in the REmap case, these estimates suggest a possible plateau, as increases in renewable energy jobs are limited by a combination of energy efficiency improvements (which reduce total energy demand) and growing labour productivity. In addition, bioenergy, one of the most labour-intensive renewables, would reach a supply limit.[99]

Overall, the increased employment from renewables alone would offset job losses in the fossil fuel sectors (which would be around 7 million in 2030 and 8 million in 2050). Furthermore, when jobs related to the increased rates of energy efficiency are considered (9 million in 2030 and around 5 million in 2050), the overall energy sector (including efficiency) employs significantly more people in the REmap case (Figure 3.20).

However, many individual workers in the fossil fuel sectors may suffer if they cannot easily transfer to renewable and energy efficiency jobs. As a result, the transition requires a consistent

97 All jobs figures include direct and indirect jobs. The 2015 values for fossil and nuclear energy employment are IRENA estimates based on the literature.

98 Including large hydropower.

99 Total primary supply of bioenergy feedstock reaches a maximum of around 150 EJ/year in REmap.

and comprehensive mix of policies, including retraining programmes. For instance, significant job losses will happen in the coal sector. But some coal workers are already shifting to the decarbonised energy sector, taking jobs as solar PV technicians, for example, or as construction workers employed in energy efficiency retrofits (Galgóczi, 2014; Renner, 2016).

Figure 3.20 • Employment in the overall energy sector, 2015, 2030 and 2050[100]

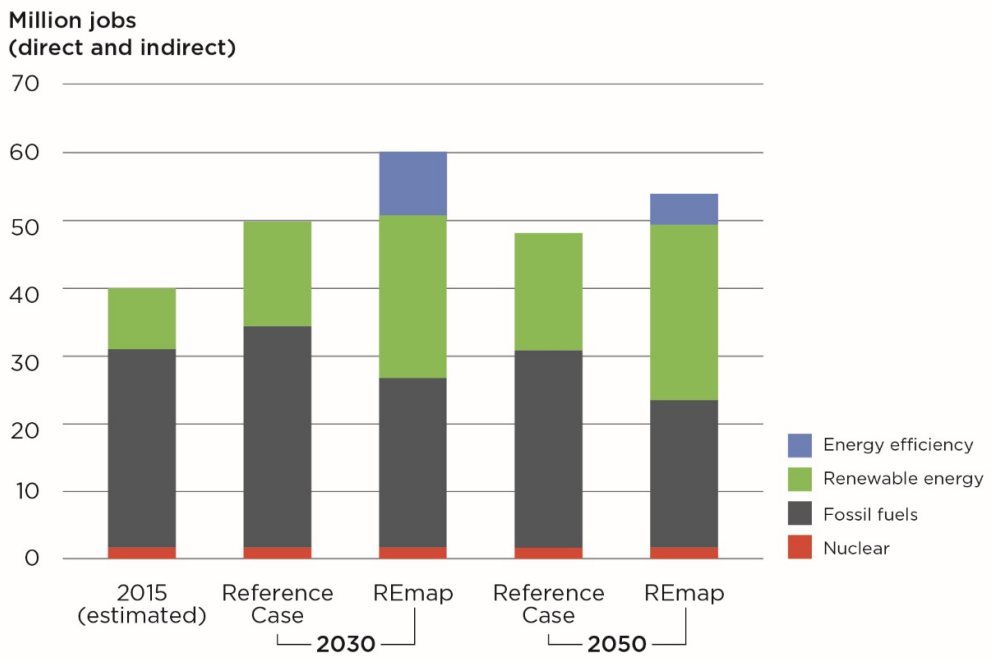

Note: Due to methodological limitations, energy efficiency jobs are only computed for the REmap case based on the additional investments needed in energy efficiency (in REmap vs Reference Case).

Key message • New jobs in renewables and energy efficiency more than offset job losses in fossil fuel sectors.

Renewable energy jobs by technology and country

Most of the renewable energy employment in the REmap case would be in solar (7 million jobs by 2030 and 9 million jobs by 2050), bioenergy (7 and 8 million, respectively), hydropower (6 and 5 million, respectively) and wind (3 and 4 million, respectively).[101] The ranking of technologies remains unchanged from that of today (Figure 3.21). Compared to current levels, global employment increases in all renewable technologies.

100 The level of employment in energy efficiency is not reported for the reference case as no figure is available from current data (energy efficiency is not defined as a separate sector). The results therefore only show the net additions for the REmap case. This limitation does not affect the conclusions, which compare the REmap and reference cases.

101 Solar jobs include all electric and thermal applications. Bioenergy jobs include feedstock and power generation. Hydropower includes large and small hydropower. It should be noted that there are significant data gaps that affect the analysis presented here, due in part to the existing informality in some of the labour markets considered.

Figure 3.21 • Renewable energy employment by technology, 2015, 2030 and 2050

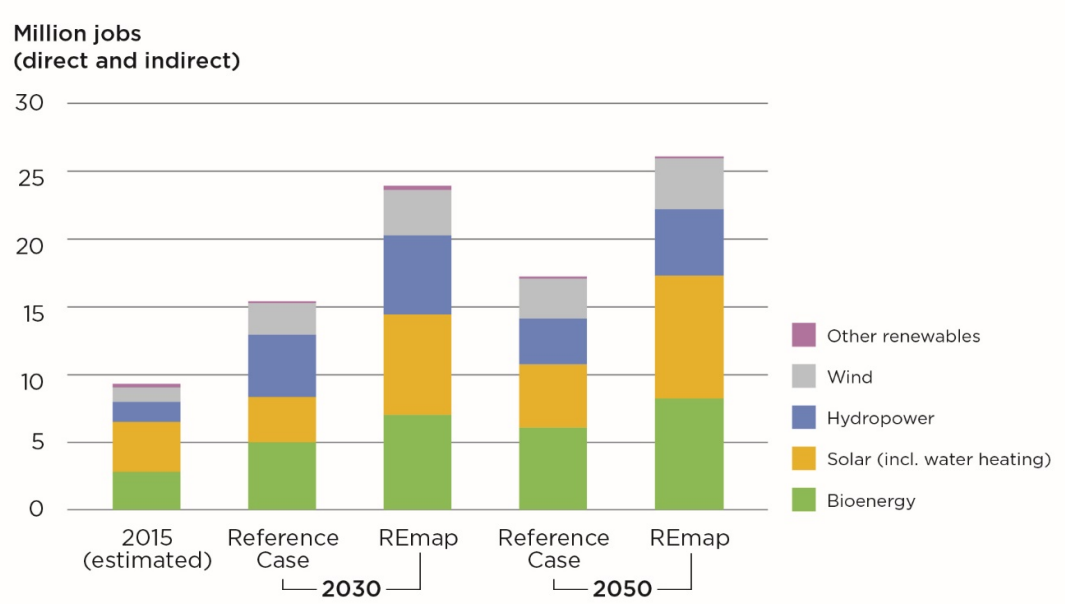

Key message • Renewable energy jobs can reach around 25 million by 2050, with solar and bioenergy being the main employers.

The largest employment in absolute terms will be in the G20 countries (Figure 3.22). Employment in renewables will be dominated by China, India, Brazil and the United States. Large domestic deployment and equipment manufacturing will make China the global leader in terms of renewable energy employment, with seven million jobs by 2030 and close to eight million by 2050. The number of renewable energy jobs in India is expected to grow significantly as the country's already significant ambitions are further scaled up. Meeting India's 2022 target of 100 GW of solar is, alone, expected to create 1.1 million jobs (CEEW and NRDC, 2016) , and there could be about four million jobs in renewables in India by 2050. Brazil also ranks in the top- five employers with close to 2.5 million by 2050, due to its bioenergy sector (consisting mainly of feedstock harvesting and processing). In the United States, a strengthening of policies to encourage emissions reductions could yield two million renewable energy jobs by 2050.

It is also important to note that key fossil fuel-exporting countries like the Russian Federation and Saudi Arabia also gain substantial numbers of jobs in renewables. In Saudi Arabia, many of the jobs are related to the construction and installation of solar energy, while in the Russian Federation there are large numbers of jobs in bioenergy feedstock production (both for domestic use and exports).

Figure 3.22 • Renewable energy jobs in the highest employing countries, 2030 and 2050

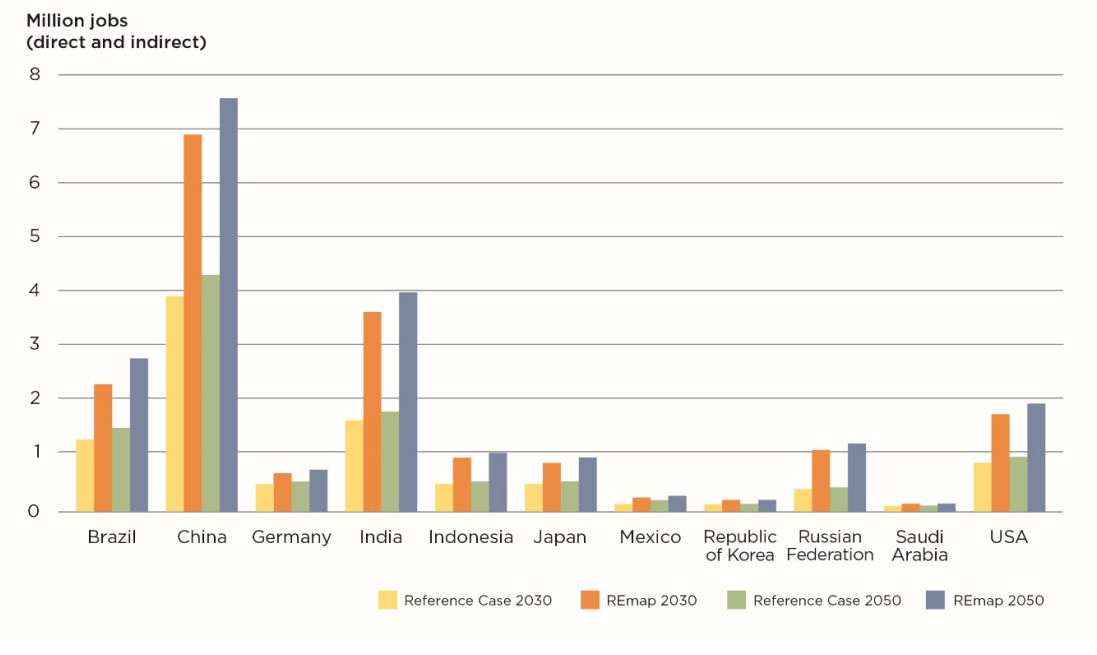

Key message • The largest renewable energy employers are all G20 countries.

Employment impacts in the whole economy

Looking beyond the energy sector and its supply chains, economy-wide (i.e. net) employment is higher in the REmap case than in the Reference Case, due to increased rates of overall economic growth (GDP is higher in the REmap case by 1.1% in 2030 and by 0.8% in 2050). In addition to direct and indirect job creation in sectors like construction and manufacturing, a significant induced job creation takes place in sectors related to services, because of the increase in economic activity described above. Global economy-wide employment increases by around 0.1% by 2030 and 2050. Many of the new jobs are created in labour-intensive sectors like construction and hospitality.

Reaping the benefits depends on implementing coherent energy and economic policies

The analysis in this section shows that the energy transition can fuel economic growth and create new employment opportunities. Thanks to the growing business case for renewable energy, climate change mitigation and economic growth are no longer an “either-or” choice. This is a significant conclusion in the current context of sluggish economic growth.

Job creation in renewables and energy efficiency, for instance, would more than offset job losses in fossil fuel sectors. Millions of new jobs will exist in activities related to deployment and maintenance of renewables, construction, implementation of energy efficiency measures, manufacturing of required equipment and bioenergy supply. Many of these labour requirements could be met with workers from fossil fuel industries, as in many cases the skills are complementary. Active labour and retraining policies will need to underpin such shifts. This highlights the importance of looking beyond energy policy.

Macroeconomic benefits will only be realised if countries implement a coherent mix of economic policies to complement the energy policies underpinning decarbonisation (Figure 3.23).

Therefore, policy makers should place renewable energy policy in the broader context of the energy sector while also considering a range of cross-cutting policies beyond energy, such as industrial, fiscal, trade and labour policies (IRENA, 2016h, 2013, forthcoming b; IRENA and CEM, 2014).

Figure 3.23 • A broad and coherent mix of policies

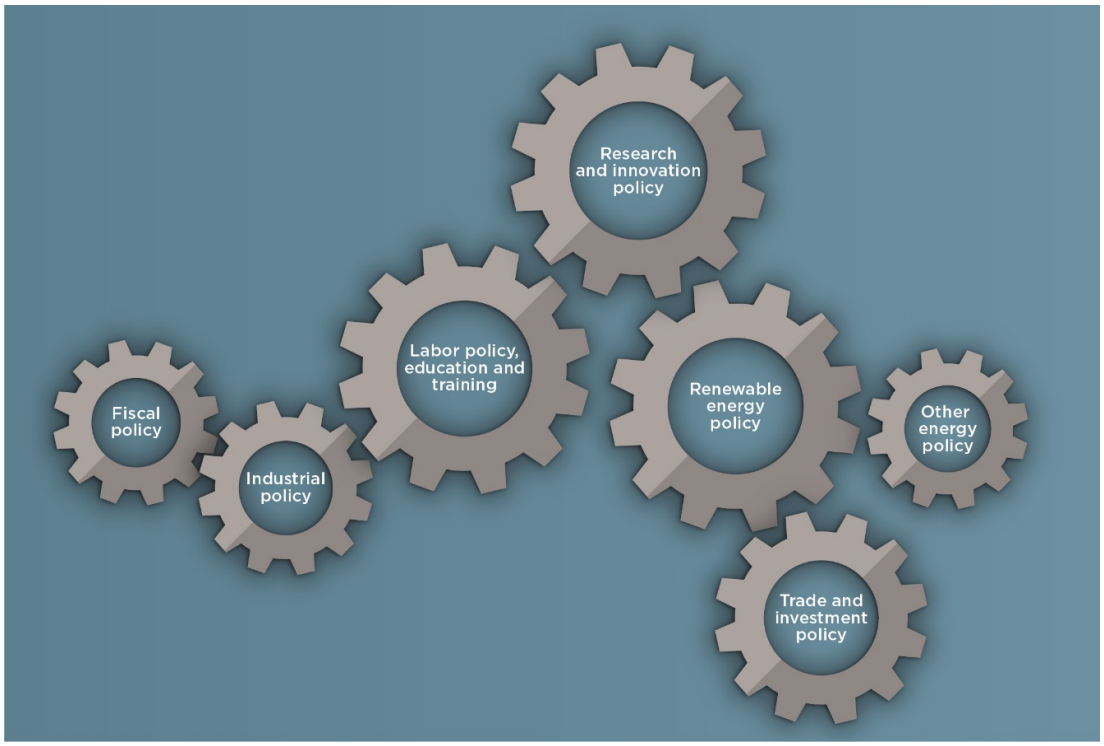

Key message • A broad and coherent mix of policies is needed to reap the positive macroeconomic impacts of the energy transition.

Policies will remain central for decarbonisation, beginning with renewable energy deployment

Within the realm of energy policy, renewable energy policy is a key pillar of decarbonisation. Supportive policies can attract investments, increase deployment and drive cost reductions. Since the early 2000s, a wide variety of measures have been used to promote deployment, starting with national-level frameworks that are translated into specific measures such as regulatory instruments and fiscal incentives. The measures also enable favourable conditions for sector development related to grid access and financial mechanisms (Figure 3.24). By the end of 2015, 146 countries had implemented renewable energy support policies, which cover electricity generation, heating and cooling, and transport. In fact, 114 countries had implemented power policies, 66 countries transport policies, and 21 countries heating and cooling policies (REN21, 2016).

In the power sector, the appropriate policies must be tailored to country priorities and conditions, including the maturity of the country's power markets, the level of development of the renewable energy sector and whether demand is rising, stable or falling. Based on these factors, renewable energy policies should consistently provide transparent, predictable and stable market environments, while allowing enough flexibility to adjust to market changes

(IRENA, 2014b). Among a wide range of instruments, recent trends have seen the gradual evolution of renewable power policies from tariff-based mechanisms to hybrid instruments such as auctions, which are gaining importance as they allow renewable energy to be deployed in an efficient, well-planned and flexible manner (IRENA, 2015).

Figure 3.24 • Overview of the types of renewable energy policies and measures adopted

NATIONAL POLICY	REGULATORY INSTRUMENTS	FISCAL INCENTIVES	GRID ACCESS	ACCESS TO FINANCE	SOCIO-ECONOMIC BENEFITS
• Renewable energy target • Renewable energy law/ strategy • Technology-specific law/ programme	• Feed-in tariff • Feed-in premium • Auction • Quota • Certificate system • Net metering • Mandate (e.g., blending mandate) • Registry	• VAT/ fuel tax/ income tax exemption • Import/ export fiscal benefit • National exemption of local taxes • Carbon tax • Accelerated depreciation • Other fiscal benefits	• Transmission discount/ exemption • Priority/ dedicated transmission • Grid access • Preferential dispatch • Other grid benefits	• Currency hedging • Dedicated fund • Eligible fund • Guarantees • Pre-investment support • Direct funding	• Renewable energy in rural access/ cook stove programmes • Local content requirements • Special environmental regulations • Food and water nexus policy • Social requirements

Up to now, renewable electricity support policies have concentrated primarily on deployment measures to create markets. Falling costs and growing deployment have now brought new challenges to making renewables an even greater component of the power sector. The integration of growing shares of variable renewable generation, in particular, is crucial to a cost-effective energy sector transition. In response, countries are increasingly shifting their policy focus towards the deeper integration of renewables across the broader energy sector.

Policies also need to focus on heating and cooling for buildings and industry, and on the potential of renewables to fuel transport. Renewables-based thermal applications, combined with continued advances in energy efficiency, will play a critical role in the future energy system. More focus should be placed on policies for thermal renewables, which clearly lag behind those for power applications. Renewable heat sources are location-specific and vary in quality and quantity. In addition, each sector has specific characteristics. As such, thermal renewable energy policies will need to be tailored at country- and sector-specific levels. The potential synergies between renewables and energy efficiency require more holistic approaches to energy policy than current ones.

Renewables can contribute to the transport sector in three ways: liquid biofuels used in blends with conventional fuels; gaseous biofuels used in flexi-fuel vehicles; and renewable electricity to power electric and hybrid vehicles. Liquid biofuels currently represent the larger share of renewable energy use in the transport sector. Their use has historically been driven by blending mandates that support biofuels markets. However, investment in new production capacity has declined in recent years, due in large part to lower oil prices. Looking forward, EVs will play a key role in decarbonisation. They introduce high shares of renewables in transport and also facilitate the integration of renewables in power markets. Policies will need to support investments in the required infrastructure, and to provide economic signals that encourage charging at times that take advantage of the profile of variable renewable generation.

A system-level approach to policymaking is needed to accelerate the transition

Not only must renewable energy policy shift from an exclusive focus on deployment to ensuring deeper integration, it must also provide incentives to enhance system flexibility. For example, there is a need for policies that advance demand-side management and storage, as well as electric mobility and industry load shifting. The related changes in market design should be geared towards providing adequate, reliable and affordable electricity services, while sharing system benefits and costs in an equitable manner. Given the larger share of distributed energy sources, the positions of established players and new stakeholders will also need to be balanced. Efforts towards the smooth integration of renewables will also benefit from the coupling of the power sector with heating and cooling, and transport, together with energy efficiency improvements.

Implementing a system-level approach will rely on strong institutional capabilities, central to supporting the energy transition. The pace of the transition will be strongly influenced by the abilities of institutions and individuals, in the energy sector and beyond, to take decisions that are informed, sound and consistent with long-term decarbonisation goals. For instance, energy efficiency improvements require the right decisions to be made by a myriad of actors who face very different, and sometimes conflicting, interests. In many countries, institutional capacities remain weak, affecting awareness, policy design and implementation processes. Where such capacities exist, they are commonly restricted by a lack of resources.

To strengthen and empower institutions, it is crucial to identify, assess and address existing barriers to their operation and development. Cross-sectoral needs assessments should guide the elaboration of national capacity-building programmes for the energy sector. Such initiatives should focus on establishing appropriate steering processes, institutionalising inter-sectoral coordination mechanisms, and creating or strengthening specialised renewable energy and energy efficiency institutions. The transition to a decarbonised energy system also requires strategies that achieve better synergies between different stakeholders in the sector. Targeted capacity-building activities should be provided to stakeholders, including ministries in charge of energy, renewable energy funds or facilities, regulatory authorities, and electricity production, distribution and transmission companies.

The energy transition requires the implementation of appropriate economic policies

Reaping the full benefits of the energy transition requires aligning energy policies with a broader set of economic policies. These include policies related to labour and training, domestic value creation and industry development (IRENA, 2013; IRENA and CEM, 2014).

Labour and training policies will be key enablers

Jobs will be created in all segments of the value chain (construction, installation, feedstock supply, manufacturing and operation and maintenance) and will form a global workforce with an array of skills. Construction and installation of renewable energy plants will be the largest segment by employment numbers followed by feedstock supply (bioenergy), manufacturing and operations, and maintenance. As in any industry, skills required for these jobs will vary by technology, geography and segment of the value chain. Figure 3.25 illustrates an example of labour needs for a solar PV project (IRENA, forthcoming b).

Job creation in renewables and energy efficiency will offset jobs losses in fossil fuel sectors only if a skilled and versatile workforce can easily transfer from fossil fuel sectors to renewable and energy efficiency jobs. Such a transfer could help overcome the skills gap that is already being seen in the renewable energy sector in some countries, posing a key barrier for the development of the industry.

Forward-looking policies have a major role to play in anticipating skills gaps and labour shortages in a timely manner. These policies should consider two aspects. First, shortages of necessary skills in the renewable energy sector could slow down the pace of deployment. Second, education and training policies should facilitate the retraining of workers from other industries in renewable energy technologies. Furthermore, energy sector strategy should take into account the evolution of skill needs in the future in the context of rapid technology changes, in particular to build, manage and operate smart power systems (IRENA, 2013).

Figure 3.25 • Workforce requirements for a 50 MW solar PV plant

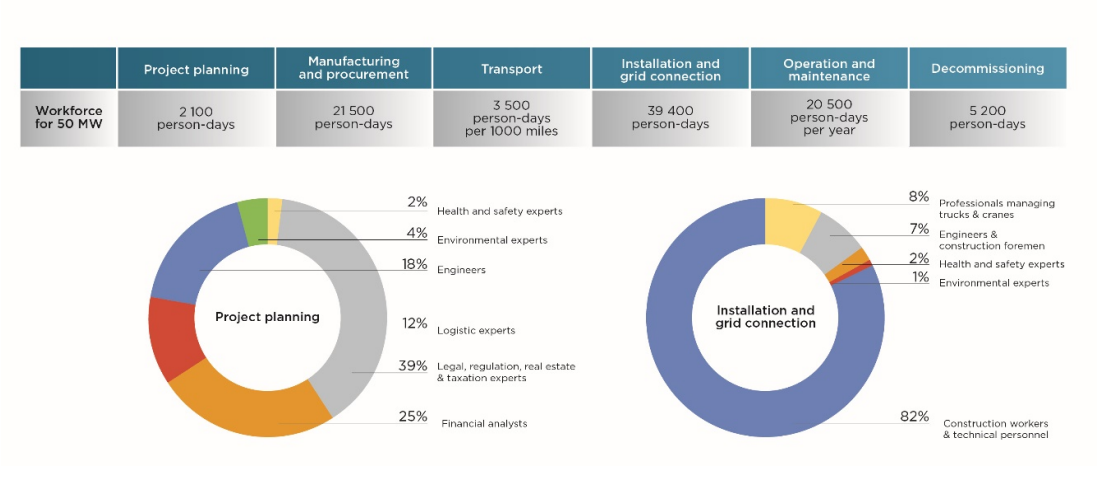

In addition to renewable energy technology-specific skills, training programmes should provide skills that increase workers' employment flexibility. In many countries, the majority of renewable energy jobs will be in installing, operating and maintaining renewable energy production facilities, rather than in manufacturing equipment. Therefore, workers need transferable skills that allow them to be employed flexibly in line with the evolution of technologies and the automation of production. Therefore, it will be crucial to align education and training policies with the respective support policies to allow adequate planning for the long-term energy transition.

Domestic value can be created through industrial policies

The activity increase in sectors related to needed technologies (e.g. renewables and EVs) and other capital goods required for the transition (e.g. metals and cement) will create new markets and trade flows. There will be opportunities for all parts of the economy to take part, including current fossil fuel exporters, who can embrace the energy transition as a contribution to economic diversification. Countries will have the opportunity to localise different segments of the renewable energy value chain, depending on the state and competitiveness of local complementary industries, as well as on the projected long-term demand for goods and services (for which a stable enabling framework is key). Some segments, such as construction materials and services, are more easily localised than others, such as manufacturing of advanced components.

Countries may need active industrial policies to ensure that suitable capacity is in place, a key strategic consideration for the energy transition. Supplier development programmes, industrial upgrades, cluster cultivation, quality standards and specifications, and training could contribute to enhanced industrial competitiveness and production quality. Nascent industries can be further

supported through measures that create demand for local goods and services. However, these measures need to be planned with a target deadline and designed in a way that ensures technology transfer and leverages existing industrial capabilities. Policy makers should keep in mind that these measures could increase the cost of supply and potentially deter some suppliers.

Scaling up investment towards decarbonisation

Targeted use of public funds to cover early-stage financing and to provide guarantees for some of the investment risks associated with capital costs of renewable energy and energy efficiency can have a significant impact on the sector's attractiveness to private investors.

To scale up investments, limited public funds need to be used in a way that maximises the mobilisation of private finance, including from large-scale institutional investors. This entails a shift from traditional public financial instruments (e.g. grants and loans) towards risk mitigation instruments such as guarantees that cover political, currency and power off-take risks. New capital-market instruments, such as green bonds and yieldcos, are increasing available finance by offering new groups of investors access to renewable energy investment opportunities (IRENA, 2016j).

Human welfare benefits offset increased energy system costs

The transition in the energy system provides a unique opportunity to meet decarbonisation goals while also fuelling economic growth, increasing incomes and creating jobs. Looking forward, system-level, adaptable frameworks that take into account the multiple impacts of renewable energy and energy efficiency can tip the balance in favour of low-carbon investments.

Accelerating the decarbonisation of the energy system requires continued focus on the mix of policies covering energy, economic investment and technology frameworks that are driving the transition. Accelerating the transition requires strategies that consider the synergies between renewables and energy efficiency, and promotes deployment across end-use sectors.

Improved human welfare thanks to reduced pollution

IRENA analysis shows that in the case of renewables, a quadrupling of the share of modern renewable energy from 9% to 36% between 2015 and 2030 can create benefits in terms of reduced climate change damage and reduced health impacts from local air pollution that exceed the cost by a factor four to fifteen. Reductions in outdoor and indoor air pollution each contribute 40% to these benefits while 20% is related to avoided CO_2 emissions (IRENA, 2016c). Indeed, the goal of reducing air pollution is currently a fundamental driver of energy policy in a number of G20 countries.

In the context of this study, IRENA has expanded its externality analysis to cover the period until the end of 2050. Comparing costs and reduced externalities for 2050 shows the scale of the savings from increased share of renewables and higher shares of energy efficiency combined with other low-carbon technologies. These technologies would also provide reductions in externalities related to the impact of non-renewable energy use on human health and climate change. When these reduced externalities are considered, total benefits would be between two and six-times greater than the incremental system costs of decarbonisation, which are estimated to be USD 1.8 trillion per year worldwide in 2050 (Figure 3.26). In absolute terms, reduced externalities can bring benefits of up to USD 10 trillion annually by 2050. Outdoor air pollution is a major externality, and it accounts for about two-thirds of this total. CO_2 reductions are also important, but their relative importance depends on the assumed social costs of carbon (here, between USD 50 and USD 110 per tonne CO_2 in 2050).

However, there remain uncertainties in valuing externalities. While developing policies to internalise external costs, it will also be important to enhance the understanding of these uncertain external costs. The analysis in this report merely refers to the impact of renewable energy technologies (pathways with more efficient non-renewable energy uses, for example, have not been considered).

On a sector level, the effect of implementing decarbonisation varies, but in all sectors there are incremental system costs. The largest savings from reduced externalities are found in the power sector, mainly due to the drop in the use of coal. Transport would see the second-highest reduction in externalities, largely because of the higher assessment of air pollution costs stemming from the combustion of fuels in urban environments. In buildings there are some savings from CO_2-related externalities, but overall there is a slight increase in air pollution related externalities as the share of bioenergy for heating increases as gas use decreases. In total, if quantifying the cost and reduced externalities together, all sectors except buildings result in moderate to significant savings when the energy system is decarbonised.

Figure 3.26 • Costs and reduced externalities of decarbonisation, 2050

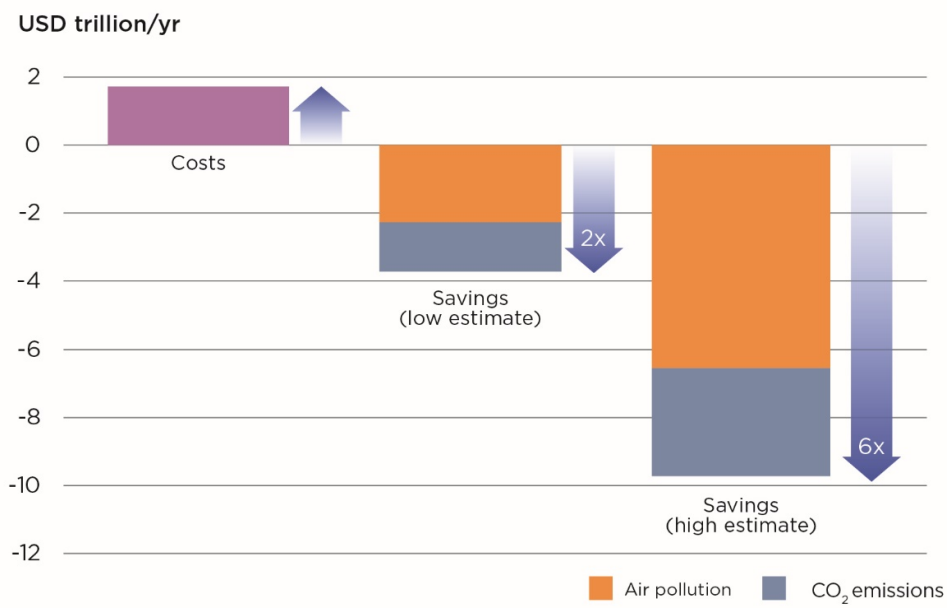

Key message • Benefits from reduced externalities exceed the costs of decarbonisation by a factor between two and six in 2050. Health benefits from reduced air pollution health alone exceed the costs.

The costs of decarbonisation are small compared to improved human welfare through reduced externalities

A dramatic reduction in carbon emissions is not possible without significant additional spending. As noted above, additional investments needs on average amount to USD 0.83 per year between 2015 and 2050.

When these investments are annualised, and any additional operation & maintenance costs of individual low-carbon technologies are included, the portfolio of technologies identified in REmap requires incremental system costs on top of the Reference Case that amount to USD 1.8 trillion per year by 2050 globally. This assumes a crude oil price of USD 80 per barrel, and

a discount rate of 10%. In the REmap analysis, CO_2 emissions are reduced by about 31.5 Gt per year in 2050 compared to the Reference Case. This translates to a cost of USD 60 per tonne of CO_2 emissions eliminated.

Despite significant technological learning that has reduced, and will continue to reduce, renewable energy capital costs, some of the technologies will still be more expensive than their non-renewable counterparts even by 2050. The incremental system costs of renewable energy technologies are calculated to be USD 1.8 trillion per year in 2050. This includes about USD 500 billion per year in incremental system costs related to the costs of integrating variable renewable energy to the power system. It also includes the costs of grid integration measures such as energy storage, flexibility from dispatchable power, national T&D grids and interconnectors, as well as curtailment. However, as Box 3.12 explains, new technologies could unleash new business opportunities and actually bring savings. For instance, if there were no costs associated with integrating variable renewables to the power system, implementing the electricity generation mix under REmap would result in savings of up to USD 300 billion per year in 2050. This is explained by the much lower variable costs (i.e. avoided spending on fossil fuels) of generating electricity with solar, wind and other renewables compared to non-renewable technologies. Electrification in transport and heating/cooling also has incremental system costs, as does CCS.

It is necessary to put these costs in the context of the total CO_2 emissions that would be avoided in 2050. This is indicated with the dots in Figure 3.27 that show the average cost of abatement for each technology. The most expensive technology is CCS for industry, where the abatement cost is USD 120 per tonne of CO_2. Energy efficiency measures, by comparison, have much lower costs: around USD 35 per tonne of CO_2. Abatement costs of electrification (excluding any investments associated with charging infrastructure) and renewable energy are estimated at USD 22 and USD 75 per tonne of CO_2.

Figure 3.27 • Incremental system costs and the average cost of abatement by technology, 2050

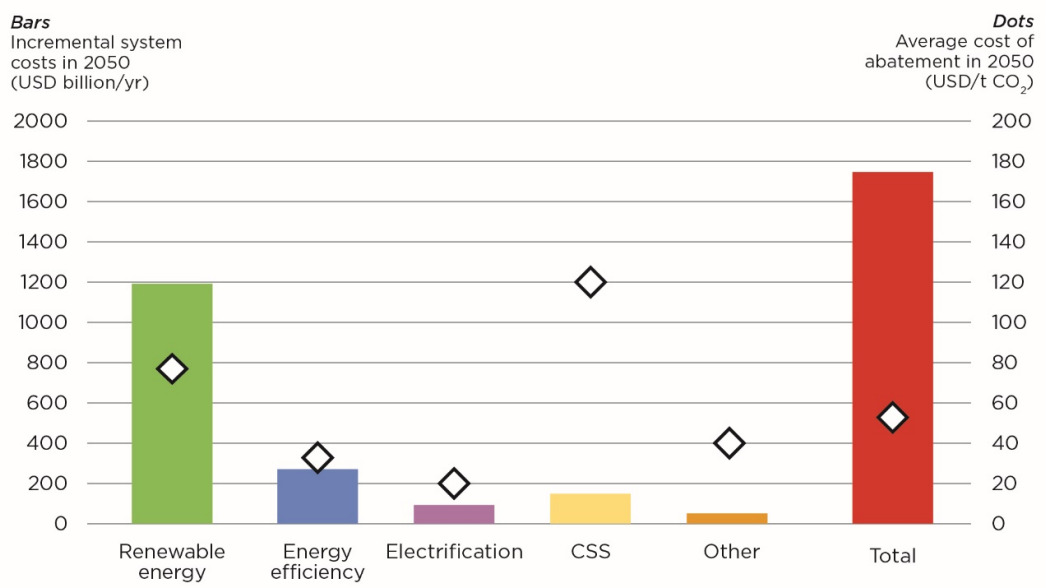

Key message • When abatement cost is viewed in terms of cost per tonne of CO_2, energy efficiency is the most economically viable, followed by renewable energy. The bulk of the system costs lie in renewables and end-use sector electrification technologies.

Box 3.12 • System integration costs of variable renewable power

When assessing the cost of a power system that has integrated variable renewables, the comparison is often made to the costs of a legacy top-down power system, characterised by few large dispatchable thermal generators, synchronously connected to the grid and often centralised. In this power system, vertically integrated utilities with generation, transmission, distribution and sales are the norm.

In contrast, variable renewables are more distributed, usually located where the resources are best. They are typically non-synchronous (i.e. connected to the power system through powered electronics), non-dispatchable, connected to the distribution system rather than to the transmission system, and owned by a variety of entities. This type of power system thus has fundamentally different characteristics. There are reductions in system inertia and in the ability to provide fault-clearing short circuit current. The system requires a faster rate of change of frequency (RoCoF) and an increase in reserve allocation to compensate for generation forecast errors, among other things.

Given the relative novelty of the technologies and the processes to deliver such power system services, the changes associated with variable renewables can be considered sources of additional or incremental cost, when compared to the extension of conventional technology to maintain traditional operational parameters.

However, it is very likely that innovation in technology and institutional design will reduce the additional or incremental cost of a system that can reliability operate in a new, more dynamic and decentralised environment, by reducing both the amount of services required and the cost of providing them.

For example, the increasing use of ICT will enable a faster market that is more responsive to the balancing needs of a power system, with less inertia and faster rates of change. Key technologies and upgrades in this space include improvements in grid monitoring speed and the establishment of standard communication protocols over Power Line Communication. These advances will make it possible to create an “internet of energy”, in which aggregators will be able to compete in providing services to the grid through efficient use of distributed resources such as rooftop PV, distributed and fast-responding electricity and thermal storage, EVs, demand response and other sources that have not yet been invented.

Such developments will significantly reduce the additional costs that are typically associated with the deployment of variable renewables. In theory, new business opportunities unleashed by new market designs and ICT may mean that deploying VRE will no longer be seen as a cost at all.

On the institutional side, as markets move towards joint procurement of energy and services closer and closer to real time, the forecast errors of VRE generation and the associated costs for operational reserves decrease. As variable renewables, demand response and energy storage are allowed to compete in providing services to the grid, the need to commit additional generation units just to ensure that sufficient reserves are available to compensate for (reduced) forecast errors is reduced, as such services will be provided by an optimised mix of “always committed” sources.

The potential for – and uncertainty around – the developments above make it very difficult to estimate a realistic 2050 figure for the incremental cost of global power systems that have successfully integrated variable renewables. The size of that potential, however, suggests that most estimates using the paradigm of the “old grid” are likely to be lower than predicted when compared to real future costs. Examples around the world demonstrate that markets with large shares of variable renewables incurred significantly less integration costs than expected, as a result of technology cost declines and the ability of markets to exploit low cost flexibility options.

The abatement costs of individual technologies can be ranked to show their contributions to the 31.2 Gt of CO_2 emissions avoided in 2050 in the REmap analysis, compared to the Reference Case. The marginal abatement cost curve shown in Figure 3.28 ranks the abatement costs and the relative contributions of each technology at a global level.[102]

The costs of emissions mitigation rise exponentially with the emissions reduction percentage. The total costs are largely determined by the tail end, i.e. the last few percentages of emissions reduction. At this moment, these costs are highly uncertain. Figure 3.28 starts with technologies on the far left that result in savings and ends on the far right with technologies that cost more than the fossil fuel equivalent they substitute for. Costs of technologies range from as low as USD -200 to as high as USD 1 000 per tonne of CO_2. The average cost of abatement is USD 60 per tonne of CO_2 (and USD 40/t CO_2 excluding grid integration costs).

Technologies that bring savings are mostly energy efficiency measures. Those measures include early replacement of condensing gas boilers for water/space heating, smart home systems, efficient industrial motor systems, heat pumps, some insulating measures and renewable electricity generation technologies (excluding the grid integration costs). These technologies represent about 20% of the mix.

Other technologies cost more. When these technologies are ranked, the curve follows a flat line until it reaches about USD 250 per tonne of CO_2.

Many of the industry technologies come with additional costs, such as CCS, biomass-based plastics and some biomass use process heating. In transport, advanced biofuels have high costs compared to their petroleum equivalents at the crude oil prices assumed in this analysis. In buildings, triple-glazed windows and some insulation measures for walls and doors come with additional costs.

Technologies with much higher costs also include those related to demolishing buildings before the end of their normal life spans and replacing them with new buildings, as indicated earlier in the stranded asset discussion. However, such new and efficient buildings offer benefits, such as better comfort and well-being, which have not been included in the estimates shown in Figure 3.28. If these were to be quantified, the costs of abatement would be significantly lower.

The cost-supply curve provides important information about which technologies would require policy support to improve their economic viability. These technologies fall under the area shaded as “costs” in Figure 3.28 and they result in a total incremental system cost of USD 2.1 trillion per year in 2050. To improve the economic viability of these technologies, different measures need to be implemented. One of them is providing subsidies. Some improvements will also happen by learning investments and some will require corrections to the market. One instrument to correct for market distortions is a carbon price. Carbon prices are today typically used in the power generation or the industry sectors. For instance, if one assumes a carbon price of USD 60 per tonne of CO_2 in 2050, all low-carbon technologies for power generation covered in this assessment reach cost-competitiveness. Technologies that remain more expensive are typically located in end-use sectors.

If the same carbon price were applied for technologies identified for the industry sector, only about half of them would be cost-competitive. Likewise in buildings and transport, many renewable energy technologies remain costly by 2050. In transport for instance, national emission policies and regulations are aimed at the local level (e.g. tighter emissions regulations for internal combustion vehicles that encourage deployment of EVs) can improve the cost-competitiveness of some costly technologies. Market instruments, such as correcting for harmful

102 Each dot on the figure refers to a low-carbon technology (e.g. biomass-based boilers to generate industrial process heat).

effects of fossil fuels from air pollution externalities that are not priced, are also important (similar to a carbon price). Subsidies may be necessary for some building sector technologies, as their upfront costs to households are significant. The various required subsidies in different sectors would add up to about USD 500 billion per year.

Figure 3.28 • Marginal abatement cost curve for low-carbon technologies beyond the Reference Case, 2050

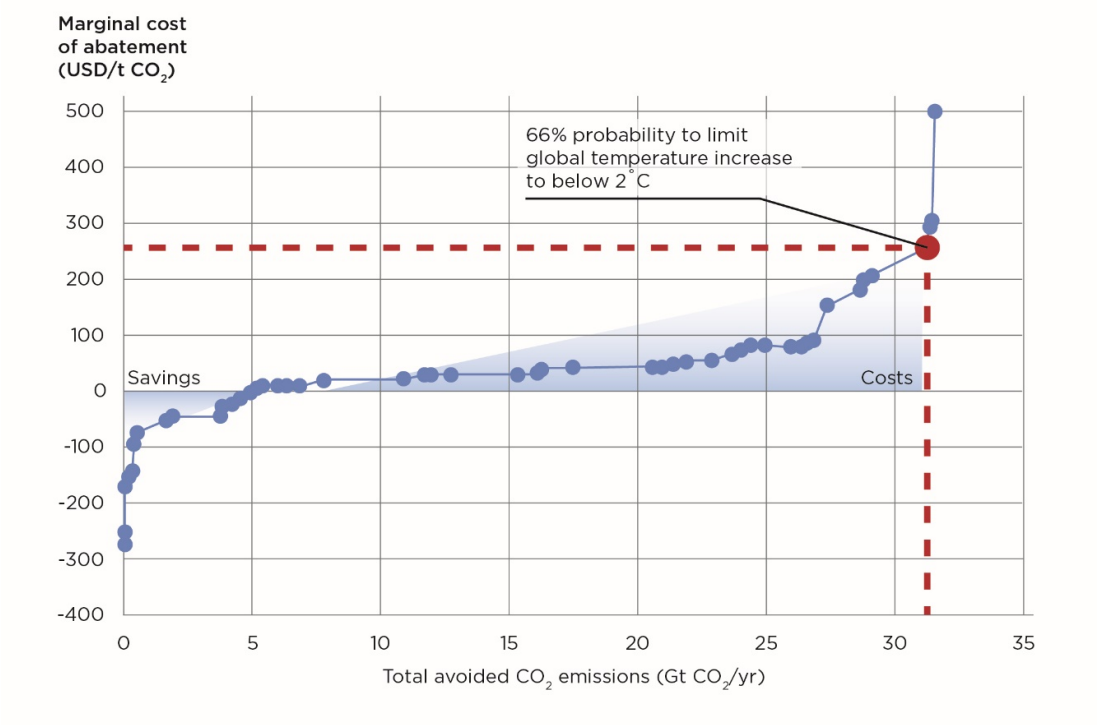

Notes: Each dor on the figure refers to a low-carbon technology (e.g. biomass-based biolers to generate industrial process heat). Prices: Crude oil USD 80/bbl; coal USD 50/tonne; natural gas USD 11/MBtu. Discount rate: 10%. Grid integration costs of renewable energy are excluded from the figure.

Key message • One-fifth of the carbon emissions reductions can be achieved without any additional costs. Average cost of abatement is USD 60/t CO_2, with the marginal cost to reach the 2° C target estimated to be USD 250/t CO_2. Costs rise steeply beyond 32 Gt per year in avoided emissions of CO_2 compared to the Reference Case.

The marginal abatement cost-supply curve presented in Figure 3.28 represents just one possible mix of technologies. There are many other possible models and scenarios. So it would be beneficial to compare the technology and cost findings with the outcomes of other studies. Alternative portfolios also can be generated based on different views of the parameters that constitute a decarbonisation of the global energy sector.

With any given mix of technologies, such as that shown in Figure 3.28, decision makers will be tempted to pick low cost options, from the left end of the curve, and to skip high-cost options on the right side. But the figure gives a global perspective, and not all options are available everywhere. To the right of the cost curve, some technology options have higher costs. This does not, however, mean that the potential for low cost technologies has been exhausted, or that only technologies with high costs remain for implementation. Therefore, the cost curve should not be misinterpreted as a series of steps from left to right, in order of costs that can be chosen in isolation; rather, there are interactions, and all of these options need to be exercised together to

achieve this level of costs and the indicated renewable energy shares. For instance, some options produce savings or improvements in efficiency that help reduce the costs of more expensive options.

While this cost-supply curve is static, the energy system in general (for instance, the process of meeting electricity or heat demand) is dynamic. For example, there are institutional barriers or transaction costs along with technology costs. Incorporating these could change the ranking of technologies. The position of individual technologies on the cost curve can also change, depending on taxes, subsidies and external effects. Macroeconomic effects can change the ranking as well. The focus on the cheapest individual options will not result in the least expensive overall transition. Instead, a holistic approach is required. Only when all of these options are pursued simultaneously can the energy sector be decarbonised.

Key sensitivities and robustness of the findings

This analysis outlines a path for limiting global temperature change by 2100 to 2°C with a 66% probability of meeting the target. But there is still a one-out-of-three chance that temperatures will rise more than 2°C even with this ambitious emissions reduction path. As a result, there is no room for complacency. Policy makers would be well advised to aim for even more ambitious reductions, especially given the limited success of efforts in the last three decades.

The pathway presented in this analysis is consistent with a temperature limit of 2°C (with 66% chance) if:

- Energy-related CO_2 emissions follow the designated path until 2050 and then drop to zero by 2060, and remain at zero thereafter.
- Process-related CO_2 emissions (that today amount to 2 Gt per year) drop and cumulative process emissions from 2015-2100 remain below 60 Gt. This implies a very significant effort to reduce process emissions from cement production, where no immediate solution is available.
- Land use, land-use change and forestry (LULUCF) net emissions for the period 2015-2100 amount to zero. Today these areas are major sources of GHG emissions. These emissions need to drop over time and turn negative in the second-half of the century. That means massive reforestation, restoration of peat bogs and other restoration measures.
- Reduction of energy-related CO_2 emissions must be supplemented with a substantial reduction of all other forms of anthropogenic GHG emissions.
- Modern energy access puts emphasis on renewable energy solutions.

Although the LULUCF and most other non-CO_2 GHG of emissions are outside the scope of traditional energy policy, they will still need be considered in the context of decarbonising the energy sector. For example, land-use changes will be needed to increase the capacity for wind and solar PV. Moreover, many of these measures aimed at reducing emissions, such as reforestation, can take decades to show an effect – and they may turn out to be ineffective. If that is true, the emissions that might have been allowed because of the expectation of future reductions from these measures could not be reversed. As a result, there is a risk that the ambitious energy transition outlined in this analysis will not limit climate change to 2°C, even if it is implemented successfully.

In addition, this chapter proposes only one pathway to decarbonise the energy sector. There are uncertainties around realising this foreseen potential, and alternative pathways should be sought. Therefore as a last step, this study conducted a sensitivity analysis for some of the technology and the key economic parameters (see Table 3.4).

Incremental system costs are sensitive to energy prices, discount rates and the capital costs of technologies. Fossil fuel prices are the most important, followed by finance costs and technology costs. These finance parameters are more or less equally important in terms of CO_2 emissions: a change of +/- 30% from the default value will result in a change of +/- 10% in avoided CO_2 emissions.

If a crude oil price of USD 60 per barrel instead of USD 80 is assumed, CO_2 emissions would be 4 Gt per year *higher* in 2050. As a result, realising the 2°C target will require additional carbon pricing. Lower prices for natural gas and coal would have comparable effects. Similarly, higher discount rates or a slower decline than anticipated in the capital costs of clean energy technologies would make it much harder to meet the target.

The analysis is much less sensitive when it comes to the assumptions on energy efficiency and bioenergy. If improvements in energy intensity are lower than expected or the biomass supply is smaller by 2050, the changes in results are negligible. The reason is that other low-carbon technologies with similar or slightly higher costs of abatement can fill any gaps to meet the same emissions budget.

Table 3.4 • Ranges used for sensitivity analysis of the key parameters and findings

			Analysed impacts					
	Nominal value	Sensitivity (nominal value)	Incremental system costs in 2050 (USD billion/yr)			Avoided CO_2 emissions in 2050 (Gt CO_2/yr)		
			Default	High	Low	Default	High	Low
Fossil fuel prices*	See table 3.1	105–55 USD/barrel (80)	1.8	-0.3	3.8	31.2	33.5	28.3
Cost of finance*	See table 3.1	7-13% (10%)	1.8	2.6	1.0	31.2	29.2	32.9
Renewable energy technology costs*	See: (IRENA, 2016f)	+/- 30%	1.8	3.1	0.4	31.2	28.0	33.4
			Incremental system costs in 2050 (USD billion/yr)			Additional investments in 2015- 2050 (USD trillion)		
			Default	High	Low	Default	High	Low
Energy intensity improvement rates**	2.60%	2%	1.8	-	2.0	39	-	41.5
Biomass supply potential**	150 EJ	100 EJ	1.8	-	1.8	39	-	39.5

Notes : *Impacts on incremental system costs in 2050 and CO_2 emissions reductions were estimated, assuming USD 250/t CO_2 as cut-off criteria for abatement costs.
**Impacts on incremental system costs in 2050 and additional investment needs in 2015-2050 are measured, assuming the deployment of low-carbon technology options other than the tested technology to fulfil the same carbon budget.

A sensitivity analysis has also been done in the macroeconomic analysis on the critical issue of crowding out of capital. The investment requirements for a capital-intensive decarbonisation based on renewables and energy efficiency could displace (i.e. “crowd out”) capital that would normally be available to other productive sectors, having a depressing effect on the economy. If that occurs, the overall GDP increase driven by decarbonisation could be significantly reduced or even turned negative (IRENA, 2016h). This is the case, for instance, if the displaced investments have a larger multiplier effect in the economy than the ones driven by decarbonisation (e.g.

because the needed goods are produced domestically instead of imported), or if they reduce potential GDP growth (e.g. a reduction in productive capacity like railways or factories).

To take this effect into account, our analysis assumes partial crowding out of capital in the central case presented above, while a sensitivity analysis consisting of two additional model runs has been done with full and null crowding out. The results are shown in Figure 3.29 and highlight the same policy conclusion as IRENA's analysis in 2016. The energy transition raises GDP significantly compared to the Reference Case as long as the required investments do not fully compete with investments elsewhere in the economy. If there is such competition, the increase in GDP is smaller, but still positive. In other words, in the worst-case scenario, GDP impacts are small, and if finance is available, GDP impacts are more positive.

Figure 3.29 • Global GDP impacts in different capital crowding out cases

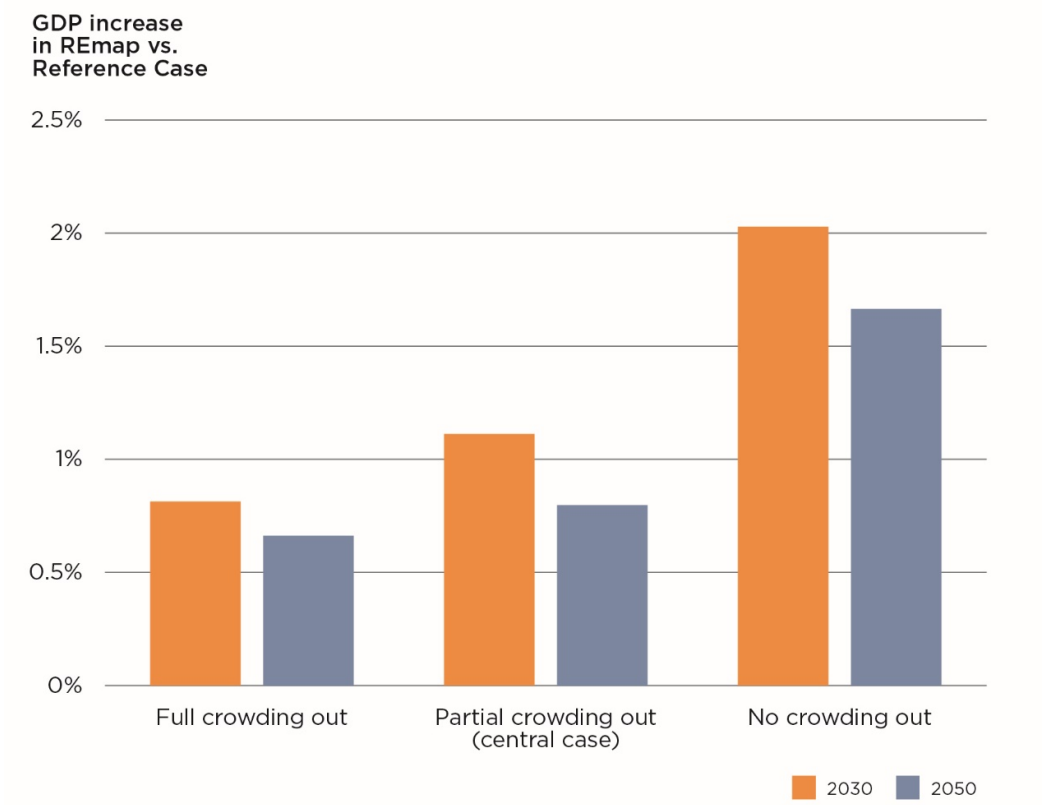

Notes: Partial crowding out is modelled by forcing savings to be at least 50% of investment. Full crowding out imposes savings to be equal to investment. Null crowding out does not impose any relation between savings and investment.

Key message • In the worst-case scenario (full crowding out of capital), GDP impacts are small; otherwise (if dedicated finance is available), GDP impacts are more positive.

The question of whether capital crowding out occurs in reality is a difficult one to address, and it is not something that can easily be tested. Different schools of economic thought suggest different outcomes and all macroeconomic modelling exercises must make assumptions about the degree of crowding out. It is important for the reader to be aware of this issue when interpreting results - this is an important difference between this analysis and the one carried out in the forthcoming OECD G20 report (OECD, forthcoming).

The modelling assumptions relate to the balance between investment and savings in the economy.[103] The difference between the schools of thought is how this balance (which is an accounting identity) is maintained. In strict neo-classical economics, the approach is relatively basic: if investment is to increase (at least at the global level), then there must be an increase in savings to fund it. More savings mean lower expenditures on current consumption, and therefore lower GDP. In contrast, post-Keynesian economics includes the banking system as an intermediary. So when a bank advances a loan, it creates both a liability to the company getting the loan and an asset on its own balance sheet. The balance between investments and savings is thus maintained, but the resulting increase in money supply allows for additional investment without forcing higher volumes of saving elsewhere in the economy.

103 In economic terminology, both terms are different, which can be confusing to a lay reader who is used to thinking in terms of personal finance, wherein putting money in a bank account can be considered an investment, while in economic terminology it is a saving.

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Chapter 4: Key insights for policy makers

Authors: International Energy Agency and International Renewable Energy Agency

1. Transformation of the energy system in line with the "well below 2°C" objective of the Paris Agreement is technically possible but will require significant policy reforms, aggressive carbon pricing and additional technological innovation. Around 70% of the global energy supply mix in 2050 would need to be low-carbon. The largest share of the emissions reduction potential up to 2050 comes from renewables and energy efficiency, but all low-carbon technologies (including nuclear and carbon capture and storage [CCS]) play a role.
2. The energy transition will require significant additional policy interventions.
   - Renewables will assume a dominant role in power generation. Skillful integration of variable renewables at very high levels becomes a key pillar of a cost-effective energy sector transition.
   - Power market reform will be essential to ensure that the flexibility needs of rising shares of variable renewables can be accommodated.
   - Ensuring access to modern energy services for those currently deprived remains a high priority, alongside improved air quality through deployment of clean energy technologies.
3. Total investment in energy supply would not need to rise over today's level to achieve climate targets, while there is significant additional investment needed in end-use sectors.
   - Investment needs in energy supply would not exceed the level of investment undertaken by the energy sector today. It requires appropriate and significant policy signals to ensure that investment in low-carbon technologies compatible with the "well below 2°C" objective becomes the market norm.
   - The additional investment needs in industry and households for more efficient appliances, building renovations, renewables and electrification (including electric vehicles and heat pumps) are significant. In order for energy consumers to reap the potential benefits of lower energy expenditure offered by the use of more efficient technologies, policy would need to ensure that the higher upfront investment needs could be mobilised.
4. Fossil fuels are still needed through 2050.
   - Among fossil fuel types, the use of coal would decline the most to meet climate targets.
   - Natural gas would continue to play an important role in the energy transition to ensure system flexibility in the power sector and to substitute for fuels with higher carbon emissions for heating purposes and in transport.
   - The use of oil would fall as it is replaced by less carbon-intensive sources, but its substitution is challenging in several sectors, such as petrochemicals.
   - CCS plays an important role in the power and industry sectors in the IEA analysis while only in the industry sector in the IRENA analysis.
5. A dramatic energy sector transition would require steady, long-term price signals to be economically efficient, to allow timely adoption of low-carbon technologies and to minimise the amount of stranded energy assets. Delayed action would increase stranded assets and investment needs significantly.
6. Renewable energy and energy efficiency are essential for all countries for a successful global low-carbon transition, but they will need to be complemented by other low-carbon

technologies according to each country's circumstances, including energy sector potentials, and policy and technology priorities.

7. The energy sector transition would need to span both the power and end-use sectors.
   - Electric vehicles would account for a dominant share of passenger and freight road transport.
   - Renewables deployment would need to move beyond the power sector into heat supply and transport.
   - Affordable, reliable and sustainable bioenergy supply would be a priority especially in light of limited substitution options in particular end-use sectors

8. Technology innovation lies at the core of the long-term transition to a sustainable energy sector.
   - Near-term, scaled-up research, development, demonstration and deployment (RDD&D)spending for technological innovation would help to ensure the availability of crucial technologies and to further bring down their costs.
   - Not all of the needed emission reductions can be achieved with existing technology alone. Additional low-carbon technologies that are not yet available to the market at significant scale, such as electric trucks or battery storage, will be required to complement existing options.
   - Technology innovation must be complemented with supportive policy and regulatory designs, new business models and affordable financing.
9. Stronger price signals from phasing out inefficient fossil fuel subsidies and carbon pricing would help to provide a level playing field, but would need to be complemented by other measures to meet the well below 2°C objective.
   - Price signals are critical for the energy sector to ensure climate considerations are taken into account in investment decisions.
   - It is important to ensure that the energy needs of the poorest members of society are considered and adequately taken into account.
10. The IEA and IRENA analyses presented here find that the energy sector transition could bring about important co-benefits, such as less air pollution, lower fossil fuel bills for importing countries and lower household energy expenditures. Both analyses also show that while overall energy investment requirements are substantial, the incremental needs associated with the transition to a low-carbon energy sector amount to a small share of world gross domestic product (GDP). According to IEA, additional investment needs associated with the transition would not exceed 0.3% of global GDP in 2050.[104] According to IRENA, the additional investment required would be 0.4% of global GDP in 2050 with net positive impacts on employment and economic growth.

104 The Organisation for Economic Co-operation and Development (OECD) analysis of how the IEA scenarios play out in the broader macroeconomic policy context will be presented in a forthcoming publication titled *Investing in Climate, Investing in Growth*.

Annex A: IEA Methodology

Author: International Energy Agency

World Energy Model

Since 1993, the IEA has provided medium- to long-term energy projections using the World Energy Model (WEM). The model is a large-scale simulation model designed to replicate how energy markets function and is the principal tool used to generate detailed sector-by-sector and region-by-region projections for the *World Energy Outlook* (*WEO*) scenarios.[105] The model consists of three main modules: final energy consumption (covering residential, services, agriculture, industry, transport and non-energy use); energy transformation including power generation and heat, refinery and other transformation; and energy supply. It is updated every year. Among the main outputs from the model are the energy flows by fuel, investment needs and costs, carbon dioxide (CO_2) and other energy-related greenhouse gas (GHG) emissions, and end-user prices. While the general model framework covers 25 world regions, individual countries are also modelled, depending on the specific module of the WEM: 12 in demand; 101 in oil and gas supply; and 19 in coal supply. The current version of WEM covers energy developments by year to 2040. For the specific purpose of this study, a high-level extension of WEM results out to 2050 was conducted, benchmarked against outputs from the IEA *Energy Technology Perspectives* (*ETP*) model.[106] Therefore, results for the period 2040-50 do not reflect a full modelling analysis.

The WEM is a very data-rich model covering the whole global energy system. Much of the data on energy supply, transformation and demand, as well as energy prices are obtained from IEA databases of energy and economic statistics.[107] Substantial additional data are used to generate projections: for example, all end-use sector modules base their projections on the existing stock of energy infrastructure, including the number of vehicles in transport (by type), production capacity in industry and floor space area in buildings. Such data stem from a variety of sources.[108]

The model embodies a variety of modelling techniques. Technology choices, for example, are generally conducted on a least-cost basis, while taking into account policy targets (for example, including energy efficiency and renewables policies, and climate goals). Technology cost evolutions are a function of cumulative technology additions, using typical learning rates from literature. Technology cost reductions vary by scenario as different levels of policy ambition trigger different levels of technology deployment and, hence, different levels of cost reductions.

The model operates in three steps: first, final energy demand projections are generated by fuel and end-use sector, based on projections of sector-specific activity variables drivers (such as steel production in industry, household size in dwellings, or passenger- and tonnes-kilometres travelled in transport), taking into account expected changes in demand structures. Each end-use sector is split into subsectors,[109] which are generally modelled bottom-up with a detailed

105 For further details on the WEM methodology, see the "WEO Model" section of the World Energy Outlook website: www.worldenergyputlook.org.

106 For details about the *ETP* model, see www.iea.org/etp/etpmodel/.

107 See www.iea.org/statistics.

108 For further details, see the "WEO Model" section of the World Energy Outlook website: www.worldenergyoutlook.org.

109 For example, the industry module comprises the sub-sectors aluminium, iron and steel, chemical and petrochemical, cement, pulp and paper, and other industry. The transport module covers road transport (passenger cars, various truck types, buses and two-/three-wheelers), aviation, rail and navigation. The buildings module separately covers a number of end-uses

representation of technologies that could be deployed to satisfy the energy demand. An additional demand-side response module assesses the amount of electricity demand that could potentially be shifted in time to facilitate higher penetration of variable renewables in power generation.

In a second step, final energy demand is converted to primary energy demand by fuel through transformation modules. The refinery module, for example, projects capacity development and utilisation for 134 individual countries and 11 regions and defines refinery yields, output and trade for the product categories of liquefied petroleum gas, naphtha, gasoline, kerosene, diesel, heavy fuel oil and other products. The power sector module covers 25 regions and ensures that enough electricity is generated to meet the annual volume of demand in each region and that there is enough generating capacity in each region to meet the peak electrical demand, while safeguarding security of supply to cover unforeseen outages. Policies as well as the regional long-run marginal costs of 106 different power plant types determine new capacity additions in each region. The eventual annual level of operation by power plant by region is determined by two modules: a classical merit order module determines a least-cost power mix for each year, differentiating annual electricity demand in four different segments (baseload, low-midload, high-midload and peak load). For selected regions, an additional hourly model (designed as a classical hourly dispatch model, representing every hour of the year) quantifies the challenge arising from the integration of high shares of variable renewables and assesses the measures to minimise curtailment, providing additional insights into the operation of power systems.

In a third step, primary energy demand by fuel is fed into the fossil fuel and biomass supply modules, iterating with demand modules over fuel price assumptions until the level of fuel production from supply models matches demand. The supply models broadly follow a similar methodology across fuels. In the oil supply module, for example, production in each country or group of countries is separately derived, according to the type of asset in which investments are made: existing fields, new fields and non-conventional projects. Standard production profiles are applied to derive the production trend for existing fields and for those new fields (by country and type of field) which are brought into production over the projection period. The profitability of each type of project is based on the capital and operating costs of different types of projects, and the discount rate, representing the cost of capital. The net present value of the cash flows of each type of project is derived from a standard production profile. Projects are prioritised by their net present value and the most potentially profitable projects are developed. Constraints, derived from historical data and industry inputs, on how fast projects can be developed and how fast production can increase in a given country are also applied.

In order to derive insights into other aspects of possible future energy sector developments, the WEM benefits from the coupling with other well-known models. For example, WEM has an active link with the ENV-Linkages model of the Organisation for Economic Co-operation and Development (OECD), which allows the assessment of the macro-economic impacts of different energy sector developments.[110] Similarly, an active link exists with the the Greenhouse Gas and Air Pollution Interactions and Synergies (GAINS) model of the International Institute for Applied

for the residential and services sector including water heating, space heating and cooling, appliances (e.g. refrigerators and washing machines), lighting and cooking.

110 The assessment of the possible macroeconomic implications of different energy sector pathways as projected by WEM is not subject to this report, but will be subject to a study currently undertaken by the OECD under the German G20 presidency. The results of the OECD analysis are not presented here. For details on ENV-Linkages, see Chateau, J., R. Dellink and E. Lanzi (2014), "An Overview of the OECD ENV-Linkages Model: Version 3", OECD Environment Working Papers, No. 65, OECD Publishing, Paris, http://dx.doi.org/10.1787/5jz2qck2b2vd-en.

Systems Analysis (IIASA),[111] which allows for the assessment of future prospects for energy-related air pollutants and the impact on human health.

111 See www.iiasa.ac.at/web/home/research/modelsData/GAINS/GAINS.en.html for details.

Annex B: IRENA Methodology

Author: International Renewable Energy Agency

REmap approach

IRENA has published renewable energy roadmaps for specific countries and regions since 2014 as part of its REmap programme.[112] REmap scenarios represent worldwide renewable energy potential assembled from the bottom-up, starting with separate country analyses done in collaboration with country experts and then aggregating these results to arrive at a global picture. As of early 2017, these analyses cover 70 countries, representing 90% of global energy use.

The REmap approach is an assessment of energy system development, specifically energy supply and demand, the accelerated potential of decarbonisation technologies, and subsequent effects on costs, externalities, investments, CO_2 emissions and air pollution.

The analysis is based on a sector and technology bottom-up approach at the individual country level utilising an internally developed REmap tool. This tool is used to analyse two scenarios:

a) The Reference Case (also called the baseline or business-as-usual), which is based on national energy plans or similar reputable sources that forecast expected developments in energy demand for a country.

b) The REmap Case (also called the decarbonisation case), is an accelerated renewables case based on decarbonisation targets and the REmap technology options assessment approach.

The assessment of both the Reference Case and REmap Case is referred to as the REmap approach, while the additional potentials for accelerating renewable energy, energy efficiency and other decarbonisation options are generally referred to as the REmap Options.

For the purpose of this analysis, the bottom-up approach using the REmap tool for each country is complemented with a top-down global demand assessment done at the sector and sub-sector levels. A combination of both an iterative bottom-up country approach and top-down sector approach allows for a better representation of country plans in energy use forecasts, in addition to a more cohesive global set of technology development assumptions and costs relating to decarbonisation technologies.

To do the top-down assessment, energy demand by energy carrier is grouped into three end-use demand sectors: buildings (including residential, commercial and public), industry (including agriculture) and transport. Two supply sectors are also analysed: power and district heat generation. The REmap scenario has a preference for renewable energy, energy efficiency technologies and sector-coupling solutions, such as electric vehicles, district heating and cooling, and heat pumps, over other decarbonisation approaches such as carbon capture and storage (CCS) and nuclear energy, though these options are also included.

The end-use analysis is carried out at a sub-sector level. Activity level growth rates were estimated for the period between 2015 and 2050. Each end-use sector is divided into the main energy consuming applications. To assess the potential for both energy and materials efficiency, the analysis looks at technology options for reducing energy use for a given level of activity. The technology potential of renewable energy is also analysed at the sub-sector level. The potential

112 For a complete overview of REmap related publications, assessments, datasheets and methodologies, see: www.irena.org/remap.

of the relevant low-carbon technologies for each application is estimated based on market growth rates, resource availability and other constraints.

To assess interactions between the demand and supply sectors, specifically the power sector, additional analysis was carried out. For European Union countries, the PLEXOS dispatch model was used to model capacity requirements in a high renewables scenario (Collins et al. 2016; IRENA, 2017b). For other large regions/countries, the analysis relies on studies and modelling by other institutions (NREL, 2012; CNREC, 2015).

Based on the results of the two scenarios, additional assessments were carried out. The CO_2 emissions have been estimated for both the Reference and Remap scenarios by country, sector and fuel for 2015 and 2050. In addition, the effects on air pollution, and the subsequent benefits for human health, are calculated using a method developed by IRENA with leading experts.[113] The REmap tool also includes a cost and investment assessment[114] and an analysis concerning stranded assets (IRENA, 2017c).

A complete overview of the REmap methodology used in this report, including assumptions used to arrive at the decarbonisation potential, is available in a stand-alone methodology paper (IRENA, 2017a).

The E3ME approach for macroeconomic analysis

The REmap approach does not assess larger, macroeconomic effects. For this purpose, IRENA has conducted an additional macroeconomic modelling exercise. It is carried out by feeding the REmap energy mixes developed for this report into a fully-fledged global macro-econometric model that takes into account the linkages between the energy system and the world's economies within a single and consistent quantitative framework.

The model used, E3ME,[115] covers the complete global economy and is therefore complementary to REmap, which focuses only on the energy sector. E3ME simulates the economy based on post-Keynesian principles, in which behavioural parameters are estimated from historical time series data. Interactions across sectors are based on input/output relations obtained from national economic statistics. The model is flexible and can be tailored to different technological, sectoral and geographical disaggregation. The version used includes 24 different electricity generation technologies, 44 economic sectors and 59 countries/regions globally, which have been selected to be consistent with the REmap G20 analysis.

The model has a proven track record of policy and policy-relevant projects. Those projects include the impact assessments for energy and climate policy carried out by the European Commission; contributions to the Intergovernmental Panel on Climate Change on the economic impacts of climate change mitigation; participation in inter-model comparison exercises in the context of climate change mitigation, both global and regional (e.g. in Latin America); and work on the macroeconomic impacts of energy policy in Japan and in India. In the academic sphere, close to 50 scientific journal and book publications have used the E3ME model.

The basic structure of the version of E3ME used is illustrated in Figure B.1. A full description of the energy sector of each country, derived from the REmap analysis, has been fed into the model (right-hand side of the figure). The left-hand side shows how the main components of E3ME fit together, with arrows showing linkages. For the purposes of this analysis, the links feeding into

113 For details on the methodology, see (IRENA, 2016b).

114 For the complete cost methodology, see (IRENA, 2014).

115 Developed by Cambridge Econometrics and with a full description at: www.e3me.com.

the energy system have been disabled (dotted grey arrows in the figure) to match and fix the energy sector parameters (e.g. installed capacities, energy mixes) obtained from REmap.

Figure B.1 • IRENA's macroeconomic analysis methodology: REmap results feeding into the E3ME model

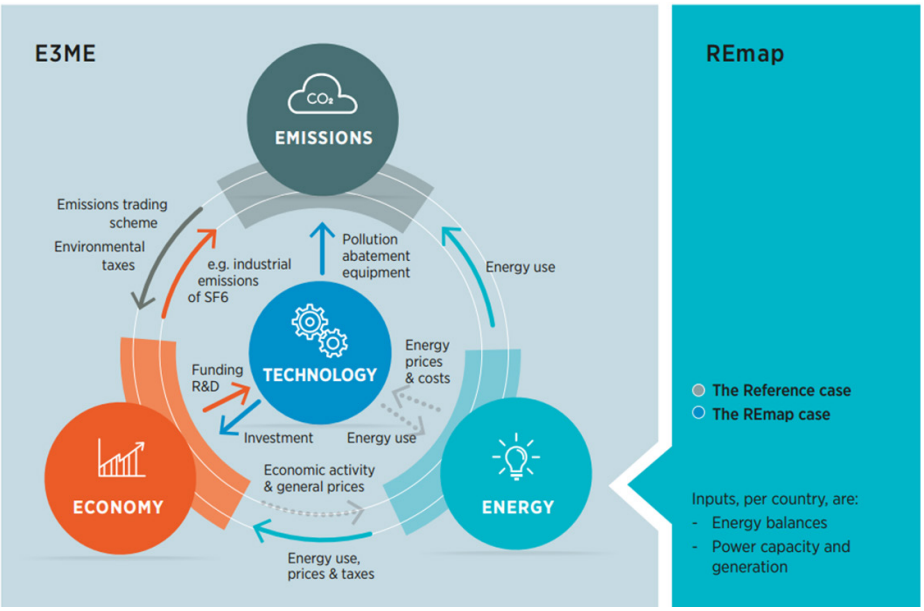

In order to strengthen the analysis, IRENA engaged with a panel of seven internationally renowned experts, independent from the modelling team. The experts were strategically selected from diverse countries (Brazil, China, Germany, India, United Arab Emirates, United Kingdom and United States) and from varied backgrounds, (some are experts in fundamentally different modelling approaches, such as computable general equilibrium models [so they can bring different perspectives]). All the experts were requested to critically assess the key assumptions and approach of the analysis, in a review that took place in December 2016. Close to 350 comments were received. Those comments have been incorporated into the macroeconomic analysis and will also inform future work by IRENA.

Compared to the Reference Case, the macroeconomic analysis assumes lower future international fossil fuel prices than the REmap Case. The values used are, respectively, in line with the New Policies Scenario and the 450 Scenario of the *World Energy Outlook 2016* (IEA, 2016). Carbon prices are used and are set consistently with these scenarios (in terms of value, and geographical and sectoral application). The analysis assumes that carbon pricing is revenue-neutral for the government, by using the proceeds to reduce income taxes, in a sort of "green tax reform".

Importantly, a sensitivity analysis has been carried out for the key assumption of crowding out of capital. This is one of the key differences between post-Keynesian and neo-classical approaches to macroeconomic modelling, and is expected to have meaningful effects on the results. Such expectation is grounded on an extensive expert consultation and on previous IRENA analyses with E3ME. While the analysis assumes partial crowding out in the central case, two additional model runs have been done with total and null crowding out. Further methodological details, from previous IRENA work using E3ME, can be found in *Renewable Energy Benefits: Measuring the Economics* (IRENA, 2016a).

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Re: PUC Docket Number 13-473 and 13-474

Dear Mr. Hartman,

Please consider the comments below the collective and cumulative concerns and recommendation of Friends of the Headwaters (FOH), a local citizen's group organized for the purpose of protecting Minnesota's resources; advocating for citizen's right to fully participate in its government's decisions and ensuring adherence to all local, state and federal laws in all actions taken in regard to Enbridge Pipeline, (now dba North Dakota Pipeline LLC) and their plans to construct and operate the Sandpiper Crude Oil Pipeline in Minnesota. Friends of the Mississippi have over 600 members and supporters who share the concerns, comments and recommendations expressed below.

We have organized our comments into twelve sections under the following broad categories:

1. Concerns, objections, and failure to provide due process;
2. Quality and scope of alternative environmental reviews;
3. Certain time and resource constraints;
4. Unjustified limited scope of environmental review;
5. Pipeline leak/rupture event impact scenario analysis;
6. Need for additional leak/rupture scenarios unique to sandpiper routes;
7. Bakken sweet crude oil volatility/flammability consideration in leak/rupture scenario development;
8. Dept. of Commerce staff commitment to provide FOE assistance in development of alternative route data;
9. Methods of developing and comparing alternative routes;
10. Cumulative impacts;
11. Financial assurance;
12. Transparency, equal access and equal treatment;

1. CONCERNS, OBJECTIONS, AND FAILURE TO PROVIDE DUE PROCESS

Our primary concern is for what appears to be a decoupling and therefore the confusion of the procedures employed by your Department and the Public Utilities Commission in performing the state's responsibilities under the provisions of the various Statutes and Administrative Rules pertaining specifically to both the need for and the routing of petroleum pipelines in Minnesota.

The effect of the apparent decoupling of the Certificate of Need and Routing permit is the perception if not the reality that the applicant's realization of the pipeline project is but a foregone conclusion and that the routing process is relegated to simply comparing the applicant's preferred route to any other route that can possible manage to clear the myriad regulatory hurdles of requirements for complex supporting data and survive the virtually insurmountable maze of procedural requirements. The process has the appearance of being so favorably stacked in favor of the applicant's preferred route as to discourage the public from mounting the effort necessary to have any other route qualify for serious consideration. In fact, the applicant is acting in ways that would readily lead even the most casual observer to believe that the proposed southern route for the Sandpiper pipeline is a "done deal". Why else would Enbridge representatives gamble so much money to secure landowner easements all along their "preferred" route were they not so confident that the "process" will work in their favor?

FOH is requesting affirmative action on the part of the DOC and PUC that demonstrate that the need and associated pipeline routing process are transparent avoiding even the appearance of a process with a pre-determined outcome. The public has a right to expect a meticulously developed, well coordinated and interrelated need and routing process such that all material evidence is adequately weighed and publically well reasoned throughout.

It is very unclear and disturbing to the public that serious social, economic and environmental considerations seem so narrowly defined and constrained by unreasonable time schedules that favor the applicant at the expense of the public interest. It is unclear who develops the environmental impact information required by rule in the Certificate of Need (CON) process and how this environmental information may differ from the "comparative environmental analysis" or CEA prepared by the DOC that has the appearance of being operative only in the pipeline routing process. It is unclear and somewhat disturbing to realize, if it is true, that the narrow constraints imposed on the CEA document may also constrain the quality of the only environmental decision document available for the parallel but still separate CON process.

Furthermore, FOH is particularly concerned for your Department's actions which may violate the Minnesota Environmental Policy Act (MEPA) in the preparation of the CEA, particularly if the CEA is the only environmental review document made available for the CON decision as well.

It is our belief that while the several recent amendments to Minnesota Statutes you have cited at recent public meetings regarding the Sandpiper project provide for an "alternative" environmental review process for pipelines these Statutes and Rules to not allow for "inferior" environmental review for either the CON or the CEA developed for the Routing Permit.

Our reviews of all pertinent Minnesota Statutes and Rules applicable to the either the determinations of need and/or for the selection of routes for crude oil pipelines find

nothing that absolves the applicant or any state agencies from adherence to either the letter or the spirit of certain overarching and vital policy provisions of MEPA. For example, we believe that the applicant and your respective departments as well as commenting state agencies are bound by Subdivision 6, Minnesota Statutes 116D.04 regarding which states:

> **Prohibitions.** No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct.

This provision of MEPA sets a very high standard for making a finding that all "reasonable and prudent alternatives" have indeed been considered before any state action may be taken to permit projects such as a crude oil pipeline.

2. QUALITY AND SCOPE OF ALTERNATIVE ENVIRONMENTAL REVIEW

FOH recognizes that the Departments of Commerce and/or the Public Utilities Commission are empowered by certain Statutes to utilize alternative environmental review for certain crude oil pipelines as authorized by Minnesota Statutes 216G.02 pertaining to Routing of Certain Pipelines and Minnesota Statutes 2004, section 216B.2421 that applies to certain large energy facilities and specifically, subdivision 2, subsection 4. specifies that these provisions apply to pipelines such as the Sandpiper.

FOH further recognizes that Minnesota Statutes 2004, section 216B.2421, Subdivision 5 describing environmental review goes on to state:

> [ENVIRONMENTAL REVIEW.] For the projects identified in subdivision 2 and following these procedures, the commissioner of the Department of Commerce shall prepare for the commission an environmental assessment. The environmental assessment shall contain information on the human and environmental impacts of the proposed project and other sites or routes identified by the commission and shall address mitigating measures for all of the sites or routes considered. The environmental assessment shall be the only state environmental review document required to be prepared on the project.

However, while MEPA specifically, in Subdivision 4a. makes provisions for such forms of exclusive "alternative review" as allowed in Statutes 216B, this section of MEPA also makes the intentions of such alternative review quite clear.

> Subd. 4a. Alternative review. The board shall by rule identify alternative forms of environmental review which will address the same issues and utilize similar procedures as an environmental impact statement in a more timely or more efficient manner to be utilized in lieu of an environmental impact statement.

FOH brings your attention to the fact that while the purpose of "alternative review' as contemplated under Subdivision 4a of MEPA is to allow for "a more timely or more efficient manner to be utilized in lieu of an environmental impact statement, such alternative review is also required to: …"address the same issues and utilize similar procedures as an environmental impact statement…"

3. CERTAIN TIME AND RESOURCE CONSTRAINTS

The expedited time schedules and the omission of certain requirements for publishing of drafts documents and for soliciting public and other agency comments on draft documents are all streamlining of the normal EIS process provided as special privilege for pipelines under MN Statutes 216 G.02. The compression of time-lines and reduction of time and limiting opportunity for public or other agency comments does not excuse the PUC and/or the DOC from preparing robust, thorough and complete environmental review documents for pipelines. If the compressed nine and twelve month schedules provided for in rule and law, respectively for both issuing Certificates of Need (CON) and Routing Permits place constraints on the quality or completeness of the public involvement or the quality and completeness of environmental review portions of these processes it is incumbent on the PUC and DOC to either act to secure the necessary resources to accomplish these tasks within the provided timeframes or grant itself sufficient time extensions to perform the environmental review adequately. Your individual departments have ample provision in rule and law to shift the costs of the accelerated pubic input and environmental review to the applicant as their responsibility in return for the benefits of the streamlined process.

Specifically, in regard to cost constraints, Minnesota Statutes 216G.02 ROUTING OF CERTAIN PIPELINES. Subdivision 3.B Section 6 requires the PUC to:

> (Section 6) provide for the payment of fees by persons proposing to construct pipelines to cover the costs of the commission in implementing this section;

Lacking sufficient resources your departments have little choice, if acting in the better interest of the public than to request additional funding and/or extend the time taken to properly meet these obligations to the citizens of Minnesota.

It is FOH's understanding of these Statutes and Rules that if at any time during CON or Routing Permit process your respective departments become aware that more extensive public involvement will be needed, or that more detailed information must be analyzed or

that more alternative routes than anticipated will have to be evaluated to meet the minimum requirements of MEPA or other applicable rules the Public Utilities Commission on recommendation from the Department of Commerce, in providing such just cause, can extend either of the CON or the Routing Permit schedules. Specifically PUC procedural rules in Section 5 states:

> "(Section 5) provide a procedure that the commission will follow in issuing pipeline routing permits and require the commission to issue the permits within nine months after the permit application is received by the commission, unless the commission extends this deadline for cause;" (emphasis added by FOH)

FOH contends that citizen comments have by appropriate mean requested, sufficiently justified and provided evidence in support to constitute the required "cause" for the commission to extend the several deadlines necessary to allow full and complete public involvement and for expanding the time and resources necessary for preparation of appropriate environmental review documents.

4. UNJUSTIFIED LIMITED SCOPE OF ENVIRONMENTAL REVIEW

FOH finds that the Department of Commerce Environmental Review staff may believe that the Comparative Environmental Analysis for alternative routes and comments from any state or federal agencies or from the general public are necessarily constrained to impacts of pipeline construction only. FOH point out that under PUC Rules 7852.1900 CRITERIA FOR PIPELINE ROUTE SELECTION states in Subpart. 3 Criteria and in section J:

> Criteria. In selecting a route for designation and issuance of a pipeline routing permit, the commission shall consider the impact on the pipeline of the following:
>
> > J. the relevant applicable policies, rules, and regulations of other state and federal agencies, and local government land use laws including ordinances adopted under Minnesota Statutes, section 299J.05, relating to the location, design, construction, or **operation** of the proposed pipeline and associated facilities. (note: bold underlining added by FOH)

Therefore, FOH requests that the Comparative Environmental Review for the preferred route and all alternative routes include all *operational* impacts of the proposed Sandpiper pipeline. Operational aspects of crude oil pipelines over their entire projected life history include the high potential for pipeline failure, rupture, leaks and other releases of product into the environment. Probabilities of these types of releases have been found in other recent pipeline project environmental reviews to be high enough to be considered reasonably predictable impacts of operating crude oil pipelines over their projected lifetimes. These were the findings of a recently published 2014 Federal Environmental Impact Statement (EIS) prepared by the U.S. Environmental Protection Agency (EPA) for the proposed Pebble Mine in Bristol Bay Alaska. The full EIS is available on line at:

http://cfpub.epa.gov/ncea/bristolbay/recordisplay.cfm?deid=253500#Download

In Chapter 11 of the aforementioned EIS the EPA supports this conclusion by statistical analysis of United States, Canadian pipeline operating history as well as data from other countries: The EPA's rather sobering and significant conclusions are shown in two excerpts from the EIS below:

> *"This overall estimate of annual failure probability, coupled with the 113-km length of each pipeline as it runs along the transportation corridor within the Kvichak River watershed, results in an 11% probability of a failure in each of the four pipelines each year. Thus, the probability of a pipeline failure occurring over the duration of the Pebble 2.0 scenario (i.e., approximately 25 years) would be 95% for each pipeline."*
>
> *"The chance of a large rupture in each of the three pipelines over the life of the mine would exceed 25%, 30%, and 67% in the Pebble 0.25, 2.0, and 6.5 scenarios, respectively. In each of the three scenarios, there would be a greater than 99.9% chance that at least one of the three pipelines carrying liquid would fail during the project lifetime".*

The Bristol Bay EIS goes on to discount the likelihood that improved engineering standards for pipeline materials would reduce pipeline failure rates because engineering has little effect on the rate of human errors leading to leaks and ruptures. See this discussion in a following paragraph:

> *"It may be argued that engineering can reduce pipeline failures rates below historical levels, but improved engineering has little effect on the rate of human errors. Many pipeline failures, such as the cyanide water spill at the Fort Knox mine (Fairbanks, Alaska) that resulted from a bulldozer ripper blade hitting the pipeline (ADEC 2012), are due to human errors. Perhaps more important, human error can negate safety systems. For example, on July 25 and 26, 2010, crude oil spilled into the Kalamazoo River, Michigan, from a pipeline operated by Enbridge Energy. A series of in-line inspections had showed multiple corrosion and crack-like anomalies at the river crossing, but no field inspection was performed (Barrett 2012). When the pipeline failed, more than 3 million L (20,000 barrels) of oil spilled over 2 days as operators repeatedly overrode the shut-down system and restarted the line (Barrett 2012). The spill was finally reported by a local gas company employee who happened to witness the leak. The spill may have been prevented if repairs had been made when defects were detected, and the release could have been minimized if operators had promptly shut down the line".*

The following January 27, 2012 article in the Watershed Sentinel, an online British Columbian Newsletter reviews a 10- year spill history of the Enbridge Pipeline System in the U.S. and Canada demonstrating that Enbridge pipeline leak/spill history is consistent with the data analyzed in the Bristol Bay EIS.

A Decade of Enbridge Oil Pipeline Spills
by Joyce Nelson,

2000: 7,513 barrels. Enbridge reported 48 pipeline spills and leaks, including a spill of 1,500 barrels at Innes, Sask.

2001: 25,980 barrels. Enbridge pipelines reported 34 spills and leaks, totalling 25,980 barrels of oil, including a January spill from Enbridge's Energy Transportation North Pipeline that leaked 23,900 barrels of crude oil into a slough near Hardisty, Alberta, and a September spill of 598 barrels in Binbrook, Ont.

2002: 14,683 barrels. Enbridge reported 48 oil spills and leaks, totalling 14,683 barrels, including a leak of 6,133 barrels in Kerrobert, Sask. in January; a seam failure in May that spilled 598 barrels in Glenboro, Man.; and a pipeline rupture into a marsh west of Cohasset, Minn. To prevent 6,000 barrels of crude oil from reaching the Mississippi River, Enbridge set the oil on fire.

2003: 6,410 barrels. Enbridge pipelines had 62 spills and leaks, totalling 6,410 barrels, including a January spill of 4,500 barrels of oil at the company's oil terminal near Superior, Wisc., and a June spill of 452 barrels of oil into Wisconsin's Nemadji River. In April, an Enbridge gas pipeline exploded, levelling a strip mall in Etobicoke, Ont. and killing seven people.

2004: 3,252 barrels. Enbridge pipelines had 69 reported spills, totalling 3,252 barrels of oil, including a February valve failure in Fort McMurray, Alta. that leaked 735 barrels of oil.

2005: 9,825 barrels. Enbridge had 70 reported spills, totalling 9,825 barrels of oil.

2006: 5,363 barrels. Enbridge had 61 reported spills, totalling 5,363 barrels of oil, including a March 613 barrel spill at its Willmar terminal in Saskatchewan and a December spill of 2,000 barrels at a pumping station in Montana.

2007: 13,777 barrels. Enbridge had 65 spills and leaks, totalling 13,777 barrels of oil, including a January pipeline break near Stanley, North Dakota, which spilled 215 barrels of oil; two pipeline incidents in January/February in Clark and Rusk Counties in Wisconsin which spilled 4,200 barrels of oil; and an April spill of approximately 6,227 barrels of oil into a field down-stream of an Enbridge pumping station at Glenavon, Sask. In November, an Enbridge pipeline carrying bitumen to U.S. Midwest markets exploded near Clearbrook, Minn., killing two workers.

2008: 2,682 barrels. Enbridge had 80 reported spills and leaks, totalling 2,682 barrels of oil, including a January incident at an Enbridge pumping station at the

Cromer Terminal in Manitoba that leaked 629 barrels of crude; a February incident in Weyburn, Sask., which leaked 157 barrels; and a March spill of 252 barrels of oil in Fort McMurray, Alberta.

2009: 8,441 barrels. Enbridge had 103 reported oil spills and leaks, totalling 8,441 barrels, including a pipeline incident at the Enbridge Cheecham Terminal tank farm that spilled 5,749 barrels of oil near Anzac, Alberta; a spill of 704 barrels in Kisbey, Sask.; and a spill of 1,100 barrels at Odessa, Sask.

2010: 34,122 barrels. Enbridge had 80 reported pipeline spills, totalling 34,122 barrels, including a January Enbridge pipeline leak near Neche, North Dakota of 3,000 barrels of oil; an April incident near Virden, Man. that leaked 12 barrels of oil into Bosshill Creek; a July pipeline spill in Marshall, Michigan that dumped 20,000 barrels of tar sands crude into the Kalamazoo River, causing the biggest oil spill in U.S. Midwest history; and a September pipeline spill of 6,100 barrels in Romeoville, Ill.

Total: 132,715 barrels of oil, more than half the Exxon Valdez spill of 257,000 barrels

Sources: Prince George Citizen (March 12, 2010); The Polaris Institute (May 2010); The Tyee (31 July 2010); Reuters (Sept. 10, 2010); Enbridge.com 2010; Vancouver Sun (May 10, 2011); The Globe & Mail (June 17, 2011); Dogwood Initiative

- See more at: http://www.watershedsentinel.ca/content/enbridge-spills#sthash.e8U7c4zM.dpuf

FOH asserts that Minnesota Statute and Rule applicable to pipeline route permit review and comparative environmental analysis both permit and justify inclusion and assessments of impact from predictable events during the life history of the pipeline including the high probability for major leaks and/or ruptures releasing large quantities of crude oil into the environment. These predictable releases of oil are very likely to have significant adverse impacts on persons, property and natural resources along and downstream of each of the several route alternatives evaluated. Comparing these predictable impacts for all alternative routes should be a major factor in final route selection of the Sandpiper pipeline.

5. Pipeline Leak/Rupture Event Impact Scenario Analysis

The Bristol Bay EIS continues in Section 11.2 with identification of 64 streams and rivers as potential product spill receiving waters because they were proposed to be crossed by the pipeline. But there were many more watersheds crossed at points near enough to downstream receiving waters to also be within the impact zone of a predicted pipeline leak or rupture.

In sections 11.3 of the EIS pipeline rupture/leak scenarios are described in detail including extensive treatment of probable duration and volumes of spills and flow times

to and extending predictable distances down receiving waters. Impacts are then described for two receiving streams typical of the landscape traversed by the pipeline.

The leak/rupture scenarios are developed fully in terms of:

1. Exposure – the physical mechanisms by which aquatic organisms would become exposed to the spilled product;
2. Transport and fate – the distance down stream the toxic components would travel down stream before dissipating, degrading or diluting below applicable water quality standards for each or most important chemical constituent of the product spilled;
3. Exposure - Response – A full analysis of the product for all toxic components, state and federal water quality standards for these chemicals and laboratory methods used to simulate water column concentrations of each chemical of concern;
4. A review of analogous spills into likely receiving water types including isolated lakes, lake chains, high or low quality streams, wetlands of different types;
5. Risk Characterization –comparing exposure levels to toxicological benchmark levels, duration of risks, actual spill histories including potential for remediation and recovery of spilled product, site specific factors and overall weight of evidence; and
6. The Range of Uncertainties in each of these pieces of evidence.

Scenarios for important Bakken Sweet Crude flowing to receiving rivers, streams, lakes, wetlands or wild rice beds along preferred Sandpiper route (and all accepted alternative routes) could then be developed similar to that developed for diesel fuel spill scenario in the Bristol Bay EIS with similar assumptions and calculations in Table 11-7 from that EIS below:

Table 11-7. Parameters for diesel pipeline spills to Chinkelyes and Knutson Creeks.

Parameter	Spill into Chinkelyes Creek		Spill into Knutson Creek
	Chinkelyes Creek	Iliamna River	Knutson Creek
Water Flow			
Discharge (m^3/s)	1.8	22	3.4
Velocity (m/s)	2.2	2.0	2.2
Channel Length (km)	14	7.6	2.6
Pipeline Drainage and Dilution			
Flow rate while draining (m^3/s)	0.035	-	0.023
Flow rate while pumping (m^3/s)	0.005	-	0.005
Release time—draining (minutes)	13	-	7.9
Release time—pumping (minutes)	5	-	5
Volume—total (m^3)	30	-	12
Volume % diesel to water in stream at spill	2.2%	-	0.83%
Mass of diesel in stream at input (mg/L)	17,000	1,500	6,500
Maximum concentration dissolved diesel (mg/L)	1.9–7.8	1.7–7.2	1.9–7.8
Distance traveled during release (km)	1.7		1.1
Travel time to confluence (minutes)[a]	110	64	19
Pipeline and Diesel Specifications			
Length from top of nearest hill to valve (m)	2100	-	810
Elevation drop (m)	150	-	25
Viscosity of diesel at 15°C (cP)	2		
Density of diesel at 15°C (metric tons/m^3)	0.85		

Notes:
Dashes (-) indicate that spill is not directly into Iliamna River, which receives flow from Chinkelyes Creek.
[a] Confluence with Iliamna River for Chinkelyes Creek; confluence with Iliamna Lake for the Iliamna River and Knutson Creek.

Based on these spill parameters similar predictions could be developed for important aquatic plant and/or animal life in the selected receiving waters along each alternative route in the CEA as shown in the following chart from the Bristol Bay EIS that compares the scenarios developed for Alaskan steams to other case histories of similar spills around the country as a means of “ground truthing” or testing validity of their predictive scenarios

Table 11-9. Cases of diesel spills into streams. For comparison, the diesel pipeline failure scenarios evaluated here would release 30 and 8 m³ of diesel into receiving streamflows of 1.8 and 3.4 m³/s for spills into Chinkelyes Creek and Knutson Creek, respectively.

Case	Diesel Released (m³)	Receiving Streamflow (m³/s)	Observed Effects
Happy Valley Creek, AK	3.7	14	Significant declines in the abundance and species richness of invertebrates
Camas Creek, MT	Unknown	0.42	Low invertebrate abundance and richness
Hayfork Creek, CA	15	4.1	Large kill of vertebrates and invertebrates
Mine Run Creek, VA	240	1.2	Reduced invertebrate abundance and diversity
Reedy River, SC	3,600	6.4	Near-complete fish kill
Cayuga Inlet, NY	26	1.8	Fish kill and reduced abundance, reduced invertebrate abundance and species composition
Westlea Brook, UK	9.8	1.34	Fish kill, invertebrates severely affected
Hemlock Creek, NY	0.5	0.76	No significant effects on invertebrates

Notes:
- Mean flow from NHDPlus v2; others as reported by the authors.

6. NEED FOR ADDITIONAL LEAK/RUPTURE SCENARIOS UNIQUE TO SANDPIPER ROUTES

Sandpiper Leak/Rupture Ground Water Aquifer Contamination Scenario

In the Bristol Bay/Pebble Mine EIS there was no identified need to assess potential for groundwater contamination that might result from a typical leak or spill from the pipelines serving the mines. However, in the case of the preferred route for the Sandpiper crude oil pipeline there are several highly vulnerable aquifers including the Straight River Aquifer near Park Rapids that has been extensively studied.
To fully appreciate the nature and scope of the contamination risk to this important aquifer a set of leak/spill scenarios similar to the surface water impact scenarios used in the Bristol Bay EIS should be developed in the Comparative Environmental Analysis for Sandpiper and any of the alternative routes accepted for consideration in the analysis.

Preparation of groundwater aquifer impact scenarios in susceptible glacial outwash formations that exist along the proposed Sandpiper route are likely to be made significantly more accurate by virtue of extensive study of an historic Enbridge (then dba Lakehead Pipeline Company in Minnesota) pipeline rupture in 1979 west of Bemidji near the small community of Pinewood. The Pinewood study would provide case study calibration data and the equivalent "ground truthing" of predictive groundwater contamination scenarios developed for Sandpiper route alternatives as was recommended in the surface water scenarios above..

A summary of the history and some of the research results applicable and useful in preparation of the Comparative Environmental Analysis for the Sandpiper project is found in a US Geological Survey factsheet found at the website shown below and an excerpt from this factsheet follows:

http://mn.water.usgs.gov/projects/bemidji/results/fact-sheet.pdf

(Excerpt from factsheet)
Description and History of Site
On August 20, 1979 approximately 16 kilometers northwest of Bemidji, Minnesota, the land surface and shallow subsurface were contaminated when a crude-oil pipeline burst, spilling about 1,700,000 L (liters) (about 10,700 barrels) of crude oil onto a glacial outwash deposit (fig. 1). Crude oil also sprayed to the southwest covering an approximately 7,500 m2 (square meter) area of land (spray zone). After cleanup efforts were completed about 400,000 L (about 2,500 barrels) of crude oil remained. Some crude oil percolated through the unsaturated zone to the water table near the rupture site (North oil pool, fig. 1). Some of this sprayed oil flowed over the surface toward a small wetland forming a second area of significant oil infiltration (South oil pool).

The land surface is a glacial outwash plain underlain by stratified glacial outwash deposits. The water table ranges from near land surface to about 11 m below the land surface. About 370 wells and test holes had been installed as of 1998.

Research Results
The fate, transport, and multiphase flow of hydrocarbons depends on geochemical processes and on the processes of volatilization, dissolution, biodegradation, transport, and sorption (fig. 2). An interdisciplinary investigation of these processes is critical to successfully evaluate the migration of hydrocarbons in the subsurface. The investigation at the Bemidji site involved the collection and analysis of crude oil, water, soil, vapor, and sediment samples. The oil phase that occurs as floating product on the water table and as residuum on sediment grains provided a continued source of hydrocarbon to the ground-water and vapor plumes. Knowledge of the geochemistry of a contaminated aquifer is important to understanding the chemical and biological processes controlling the migration of hydrocarbon contaminants in the subsurface. Studies were also conducted to document the concentrations of gases in the unsaturated zone.

Predictable Sandpiper pipeline lead/rupture ground water impact scenarios for susceptible glacial outwash aquifers along the preferred and all alternative routes evaluated could be modeled graphically (as in the figure below from that study) with methods developed in the Pinewood Spill study. Graphics thus developed could be made available in the CEN for the public and regulatory agencies to weigh in making various permit decisions and choices between alternative routes.

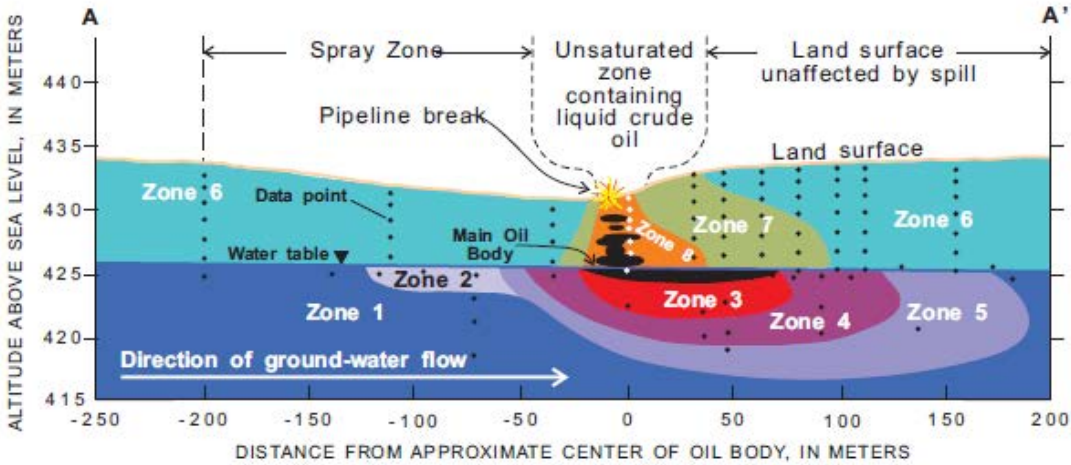

Figure 4. Geochemical zones in the unsaturated and saturated zones at the North oil pool, 1997 (Modified from Baedecker and others, 1993).

Note: Predictive models for groundwater contaminant plumes in leak/rupture scenarios can be used for comparing alternative routes and for setting GIS Spatial Analysis friction parameters discussed elsewhere in these comments.

A brief bibliography of studies of the Bemidji/Pinewood spill site assembled by the U.S. Geological Survey Minnesota Water Science Center that can be used to develop and support groundwater contamination scenarios for selected susceptible glacial outwash aquifers along the proposed Sandpiper route and its alternatives is shown below:

Fact sheet describing results from the Bemidji Toxics project

Toxics Papers:

- "Ground water contamination by crude oil" (146 KB) by Geoffrey Delin and William Herkelrath.
- "Long-term monitoring of unsaturated-zone properties to estimate recharge at the Bemidji crude-oil spill site"(498 KB) by Geoffrey Delin and William Herkelrath.
- "Aromatic and Polyaromatic Hydrocarbon Degradation under Fe (III)-Reducing Conditions" (135 KB) by Robert T. Anderson, et al.
- "Coupled Biogeochemical Modeling of Ground Water Contamination at the Bemidji Minnesota Crude Oil Spill Site" (60 KB) by Gary Curtis, et al.
- "Investigating the Potential for Colloid- and Organic Matter-Facilitated Transport of Polycyclic Aromatic Hydrocarbons in Crude Oil-Contaminated Ground Water" (136 KB) by Joseph Ryan, et al.
- "Determining BTEX Biodegradation Rates Using In Situ Microcosms at the Bemidji site, Minnesota: Trials and Tribulations" (69KB) by E. Michael Godsy, et al.
- "Inhibition of Acetoclastic Methanogenesis by Crude Oil from Bemidji, Minnesota" (143 KB) by Ean Warren, Barbara Bekins, and E. Michael Godsy.

Posters Presented at Technical Conferences:

- "Estimating multiphase hydraulic properties at a crude-oil spill site" by William Herkelrath, Hedeff Essaid, and Leslie Dillard, USGS, Menlo Park CA

  A poster presented at the "International workshop on Characterization and measurement of the hydraulic properties of unsaturated porous media", Riverside, CA, October 22-24, 1997.

Related links that include results from the Bemidji site:

- Fate of Organic Chemicals in Subsurface Environments
- Microbiology and Molecular Ecology studies in Bemidji, MN
- Multiphase flow, transport, reaction and biodegradation
- Comprehensive Organic Analysis of Water
- Transport and Biogeochemical Fate of Organic Substances in Aquatic Environments
- Biogeochemical Controls on Organic Contaminant Degradation in Heterogeneous Near Surface Environments
- Comparative Study of Organic Degradation in Selected Hydrologic Environments

Figures:

- Geochemical zonation (17 KB) diagram.
- Plan view aerial photo from 1991 (85 KB) showing topographic contours and well locations at the site.

7. Bakken Sweet Crude Oil Volatility/Flammability Consideration in Leak/Rupture Scenario Development

Transportation Safety Board of Canada's Operation Service Branch Laboratory Report # LP148/2013 entitled "Analysis of Crude Oil Samples - Montreal, Maine & Atlantic Railway, Train MMA-002 - Date of Occurrence: 06-Jul-2013" which was just released on released on February 6th 2014. The relevance of this report to the Sandpiper routing process Comparative Environmental Analysis is that the train derailment investigated involved a major spill of the same product proposed to be shipped by the Sandpiper, namely Bakken sweet crude oil. The full report is available at:

http://www.tsb.gc.ca/eng/enquetes-investigations/rail/2013/R13D0054/lab/20140306/LP1482013.asp

Excerpts from the report follow:

> "On 06 July 2013, a unit train carrying petroleum crude oil operated by Montreal, Maine & Atlantic Railway derailed in Lac-Mégantic, Quebec. Numerous tank cars ruptured and a fire ensued.
>
> "Conventional oil, which can range from light to medium in grade, is found in reservoir rocks with sufficient permeability to allow the oil to flow through the rock to a well. The petroleum crude oil on the occurrence train originated from suppliers with producing wells in the Bakken Shale formation region of North

> Dakota. The Bakken Shale formation is a tight oil reservoir. Tight oil is a type of conventional oil that is found within reservoirs with very low permeability. Most oil produced from low-permeability reservoirs is of the light to medium variety, with a lower viscosity. "

Elsewhere in this Canadian TSB report Bakken Sweet Crude is compared to the volatility of unleaded gasoline:

> "The Environmental Technology Centre (ETC) Oil Properties Database reports the following properties for unleaded gasoline: [45]
>
> Flash point -30°C
>
> Density at 15°C 750 to 850 kg/m^3
>
> Kinematic viscosity <1 cSt at 38°C
>
> "Comparing these values to the occurrence crude oil results summarized in Table 2, it is apparent that the occurrence crude oil's flash point is similar to that of unleaded gasoline. The density results obtained for the occurrence crude oil samples (see Table 10) are also within the range reported for unleaded gasoline. However, unleaded gasoline has lower viscosity than the occurrence crude oil samples."

The Canadian TSB report includes the following pertinent conclusions that would be important in the development of leak/rupture incident response scenarios in the Sandpiper comparative environmental analysis:

> "4.3 The occurrence crude oil's properties were consistent with those of a light sweet crude oil with volatility comparable to that of a condensate or gasoline product.
>
> 4.6 The large quantities of spilled crude oil, the rapid rate of release, and the oil's high volatility and low viscosity were likely the major contributors to the large post-derailment fireball and pool fire.
>
> 4.7 The occurrence crude oil contained concentrations of BTEX that were comparable to typical values reported for crude oils. This explains why concentrations of benzene and other VOCs well above exposure limits were detected at the derailment site."

8. DEPT OF COMMERCE STAFF COMMITMENT TO PROVIDE FOH ASSISTANCE IN DEVELOPMENT OF ALTERNATIVE ROUTE DATA.

FOH has complained strenuously to Department of Commerce, to the Public Utilities Commission and to the applicant that two factors have severely limited its member's ability to identify and develop reasonable and prudent alternative routes for use in preparation of the planned Comparative Environmental Analysis for Sandpiper. Most important among these limitations has been the very short amount of time allotted for the public to prepare route proposals and the withholding by both Enbridge and the two

Departments of certain techical data in the form of Geographic Information System (GIS) data files called "GIS shapefiles" for the proposed Sandpiper route.

Requests by FOH for extensions of time beyond the established deadline of April 4th 2014 for submitting alternative route proposals have been steadfastly refused by Department staff. These denials of FOH's requests for such time extensions, while provided for in applicable administrative rules with showing of cause, have issued from the Department's staff without their providing justification for denying such requests.

FOH takes very seriously all the considerations as described in Subpart 3. that must be taken into account when selecting suitable alternative routes for transporting such hazardous material as Bakken Crude Oil across Minnesota. As required by the rules as set forth in PUC 7852.1400 great multitude of parameters must be considered simultaneously and repeatedly for what could be endless possible routes. Thankfully, technology has recognized the complexity of the task and the enormity of data that one has to consider to meet the rule and Geographic Information Spatial Analysis is one such technology.

From Enbridge's Minnesota Environmental Information Report on Sandpiper submitted to the PUC as part of the company's application it is apparent that Enbridge used Geographic Information System data analysis method similar to the Spatial Analysis referenced above. The following paragraphs are excerpted in part from that report:

> "EPND assessed the route from Tioga, North Dakota to Superior, Wisconsin, with the intent of maximizing existing right-of-way to the extent practicable while identifying specific areas where co-location may not be practicable. The first step in the environmental review of the route and the selection process consisted of collecting publicly available environmental data to identify routing constraints. The sources of data consisted primarily of: Geographic Information Systems ("GIS") digital information layers, including U.S. Geological Survey ("USGS") topographic maps, USGS land use database, U.S. Department of Agriculture ("USDA") Farm Services Agency aerial photography and GIS data, National Wetlands Inventory ("NWI") maps, Minnesota Department of Natural Resources ("MNDNR") Natural Heritage Information System ("NHIS") data, Minnesota Department of Transportation ("MDOT") highway maps, USDA state soil geographic (State Soil Geographic ["STATSGO2"] and Soil Survey Geographic ["SSURGO"]) databases, and other natural feature databases obtained from the MNDNR website and other state and federal sources. Existing major utility rights-of-way also were identified for potential use in co-location.
>
> 2.3.3 Comparison of Route Alternatives
> EPND conducted a detailed quantitative analysis of environmental impacts along each route alternative identified during the routing process. The analysis used the same sources of publicly available environmental data described in Section 2.3.1 to compare a variety of factors, including proximity to existing rights-of-way,

> wetlands, highly wind erodible soils, bedrock outcrops, prime farmland soils, perennial waterbodies, national forest land, tribal land, state forest land, state Wildlife Management Area ("WMA") land, state Aquatic Management Area ("AMA") land, railroads crossed, roads crossed, and other site-specific matters. No field survey data was used in the alternatives analysis as field surveys were not completed along the alternate routes. EPND identified and analyzed four route alternatives, which are presented in the following subsections and shown in Figure 2.3.2-1. None of the route alternatives were adopted as the Project's preferred route."

Enbridge apparently had submitted the GIS information they developed for their preferred route to the PUC including the GIS shapefile they constructed. FOH had hoped to utilize the GIS Shapefiles Enbridge had applied to their alternative route analysis to explore the applicants preferred southern route to any and all alternative routes considered viable by cursory examination of various maps and other resources. However neither Enbridge nor the Department of Commerce (DOC) staff would release the shapefile claiming it was protected information under both Federal and State statute.

FOH was never granted access to the subject GIS shapefile by either Enbridge or Dept of Commerce but did successfully obtain the shapefile from the Minnesota Department of Natural Resources after finding that the data were not protected by either Federal or State Statute as claimed by Enbridge and DOC. Unfortunately, the release of the GIS shapefile for the Sandpiper preferred route was far too late into the comment period for FOH to make productive use of the data.

Having made its case that FOH was severely hindered in its efforts FOH has appealed to DOC staff for assistance in meeting the rigorous criterion that must be met in 7852.1400 Subp. 3. Requirements for other route sources.

> Subp. 3. A person other than one listed in subpart 2 (the applicant) may propose a route or a route segment according to items A to C. In Subpart 3.B. of this rule it states that: "The pipeline route or route segment proposal must contain the data and analysis required in parts7852.2600, subpart 3, and 7852.2700, unless the information is substantially the same as provided by the applicant."

Department of Commerce staff, in a prehearing scheduling conference call in the presence of all the parties to the Sandpiper project and the Administrative Law Judge, Judge Eric Lipman agreed to assist FOH in developing the necessary detailed information necessary to meet the minimum requirements of MN 7852.1400 cited above such that suggested alternative routes put forth by FOH would not be summarily dismissed from consideration for lack of required supporting data analysis required by that rule. FOH is committed to meeting with DOC staff immediately following the April 4th comment deadline. FOH will, under separate cover be submitting alternative routes for Sandpiper before the comment deadline. It was understood that the alternative routes thus submitted by FOH will require the DOC staff assistance offered to meet the criterion in the rule to

make them viable per this agreement thus it is expected that the DOC will continue to develop FOH alternatives submitted such that the FOH alternatives will be found acceptable by the commission.

9. METHODS OF DEVELOPING AND COMPARING ALTERNATIVE ROUTES

The applicant, the PUC, the DOC and the public are all confronted with the same challenge. That is to develop alternative routes for Sandpiper that meet the criterion established in MN Rules 7852.1900 CRITERIA FOR PIPELINE ROUTE SELECTION while satisfying the requirement in MEPA for having considered all reasonable and prudent alternatives.

The applicant, having already utilized considerable GIS technology should be well positioned to employ computerized route optimization algorithms to evaluate their preferred route against any and all routes that meet PUC criterion. In fact, they may have already done so during their own comparison of routes. Furthermore, it is the understanding of FOH that the DOC is considering hiring an outside consultant for purposes of assisting the DOC in preparing the Comparative Environmental Analysis. There are many private consultants in the United States performing optimization analysis of linear public and private utilities by applying route optimization software. We would be happy to provide such consultant lists to the DOC staff upon their request.

We provide below, for those who may not be familiar with this technology, a brief description of how Geographic Information Spatial Analysis Systems have evolved into a powerful tool for selecting optimal routes for linear facilities like power lines, pipelines, highways and other utilities. FOH strongly encourages the DOC to specifically contract with outside consultants skilled and experienced in linear facility route optimization to more fully satisfy the requirements in applicable rules and statute to find and select the most reasonable and prudent alternative route for the Sandpiper and all future linear facilities of this nature. It is recommended that the DOC exercise its and the PUC's authority under rule to also develop alternative routes for Sanpiper.

Here is a detailed description of how this technology could be used to satisfy the statutory requirement to examine all reasonable and prudent alternative routes for Sandpiper while adhering most closely to the constraints of time frames provided in rule and law.

5.1.1.20 Graphical Information System

5.1.1.20.1 General

Geographic Information Systems (GIS) are scientific and technological tools that enable the integration of data from different sources into a centralized database from which the data is modeled and analyzed based on its spatial component. GIS-based tools and processes have been extensively used to address the challenges of optimizing pipeline route selection and route networks based on the collection, processing and analysis of spatial data such as topography, vegetation, soil type, land use, geology and landslide areas.

Traditional manual pipeline routing uses available paper maps, drawings, aerial photographs, surveys and engineer experience. GIS techniques combine all of these sources of data in a convenient computer-based information system. The key to the GIS is that it has advantages in terms of speed of data processing and analytical capability.

Fig. 2 is a simplified representation of how data is combined and processed in a GIS to produce models and required outputs. Data, such as well locations, surface topography, land use activities, soil conditions and infrastructure features, are combined based on their spatial component. This enables the engineer to test real-world scenarios within the spatial models.

Fig. 2: Process To Optimize Pipeline Routes

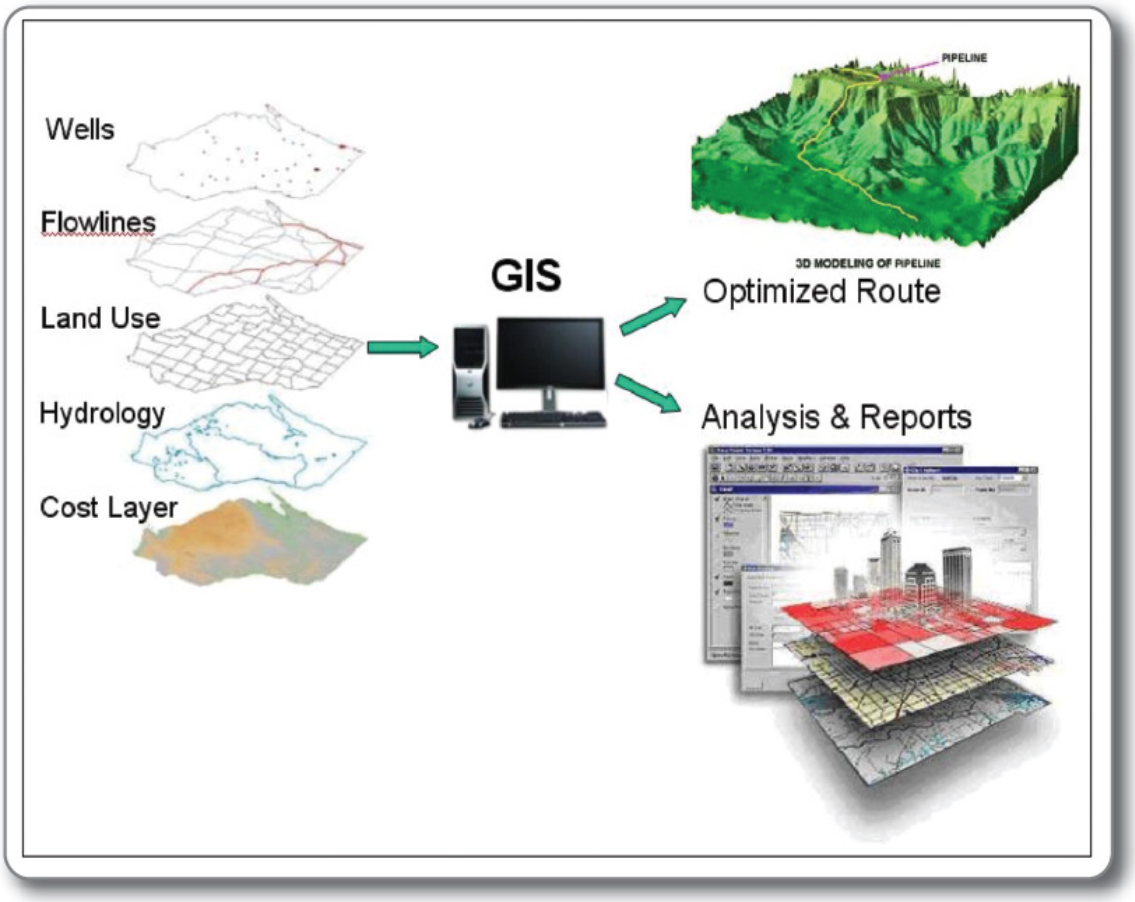

GIS represents an innovative approach to pipeline routing that is both systematic and effective. Optimizing a pipeline route is essentially an optimization between costs of the material and the costs of the construction. Natural and man-made terrain obstructions cause spatial variations in construction cost due to changing features like types of soils, intervals of slope. GIS allows the engineer to use dynamic spatial models to aid in selecting an optimized pipeline route. The GIS software and data enables the processing of a large amount of location-based information to find a least cost path (LCP) between two locations by taking into account natural and manmade obstructions and features.

5.1.1.20.2 GIS Routing Optimization Methodology

The GIS approach to pipeline routing optimization is based on relative rankings and weights assigned to project specific factors that may affect the potential route. The result of this process is a least cost path (LCP) which represents that most economic path between the origin and the destination points of the pipeline.

Fig. 3 is a representation of the methodology flow used to determine the LCP

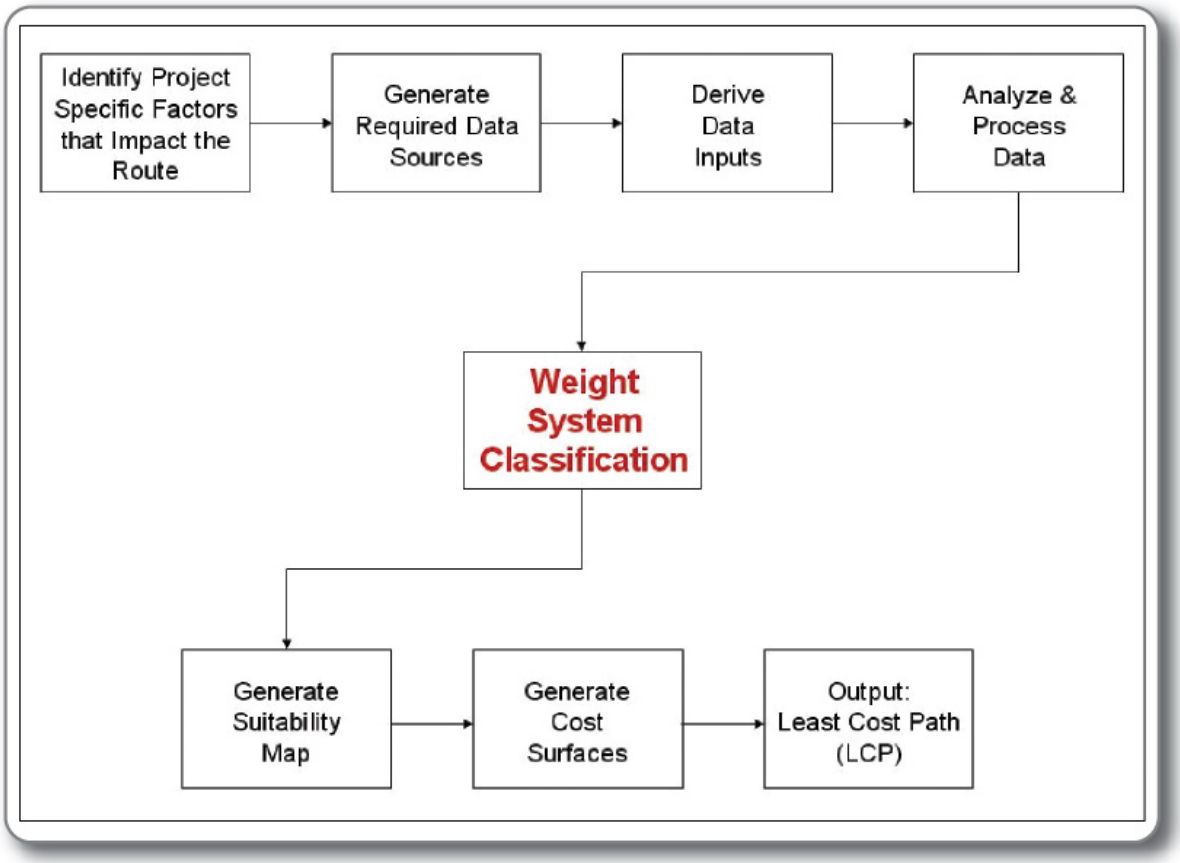

Fig. 3: Pipeline Optimization Methodology

5.1.1.20.3 Identification of Factors Affecting the Route

As mentioned in the previous section on selection criteria the identification of project-specific factors that may constrain or impact on the pipeline is an important step and a vital input to the GIS. Several factors such as geo-hazards, social issues and construction costs impact on the route and need to be taken into account. At this stage a set of rules are determined that will be used in the routing exercise. Input from experienced engineers is required to ensure that the appropriate features are identified and the correct rules established. The accuracy of the subsequent analysis is dependent on the factors being correctly identified as the analysis is only as good as the inputted data. Examples of some factors and rules include:

Factor/Feature	Rule
Roads	• Avoid road crossings • Proximity to roads is important
Railway lines	• Avoid railway line crossings
Rivers	• Avoid river crossings
Urban areas	• Avoid built up/populated areas • Avoid future development areas
Terrain/topography	• Avoid steep slopes • Use flat terrain where possible

Environmental areas	• Avoid highly-sensitive areas
Wetlands	• Avoid wetland crossings
Water bodies	• Avoid water bodies
Surface geology	• Avoid surface/sub-surface rock • Stable soils are important

5.1.1.20.4 GIS Data and Data Sources

Satellite imagery, maps, aerial photography, existing GIS data, LiDAR surveys and traditional geotechnical and topographical surveys are all sources of data that should be gathered and incorporated into the project GIS. The maps, satellite imagery and remote sensed data are scanned and geo-referenced and are then used to derive spatial features such as roads, rivers, urban areas and geological boundaries which form the GIS data to be used in the routing process.

5.1.1.20.5 GIS Data Processing and Analysis

Once the data has been captured it needs to be processed and converted into raster data. The raster data is used to calculate the feature distance cost for each feature – the weighted cost as one moves away from a feature. For example rivers are given a high cost and the further you move away from the river the lower the feature distance cost becomes.

The significance of the effect of a single feature on the pipeline route varies for each feature. For example, it is more important to avoid a deep valley crossing than it is to avoid a road crossing. The analytical hierarchy process (AHP) is one of the structured methods that can be employed to quantitatively rank each of the identified factors. Each factor is assigned a cost value which is benchmarked with typical constructions costs. The input from experienced engineers is vital when it comes to ranking and assigning weights to each layer.

5.1.1.20.6 GIS Suitability Map Generation

After the feature layers have been ranked the data layers are combined together into one single layer based on the numerical value factor derived from the weighting process. The resultant layer is referred to as the suitability layer and this layer forms the basis for the GIS analytical work.

The suitability map is used to create cost maps which related to relative construction costs. The highest costs are in steep mountainous terrain, urban areas, roads and large bodies of water. Moderate costs are associated with wetlands, forests and high slope areas. The lowest costs are to be found in areas of relatively flat bare ground, agricultural land or less dense native vegetation. See Fig. 4 for an example of a cost map.

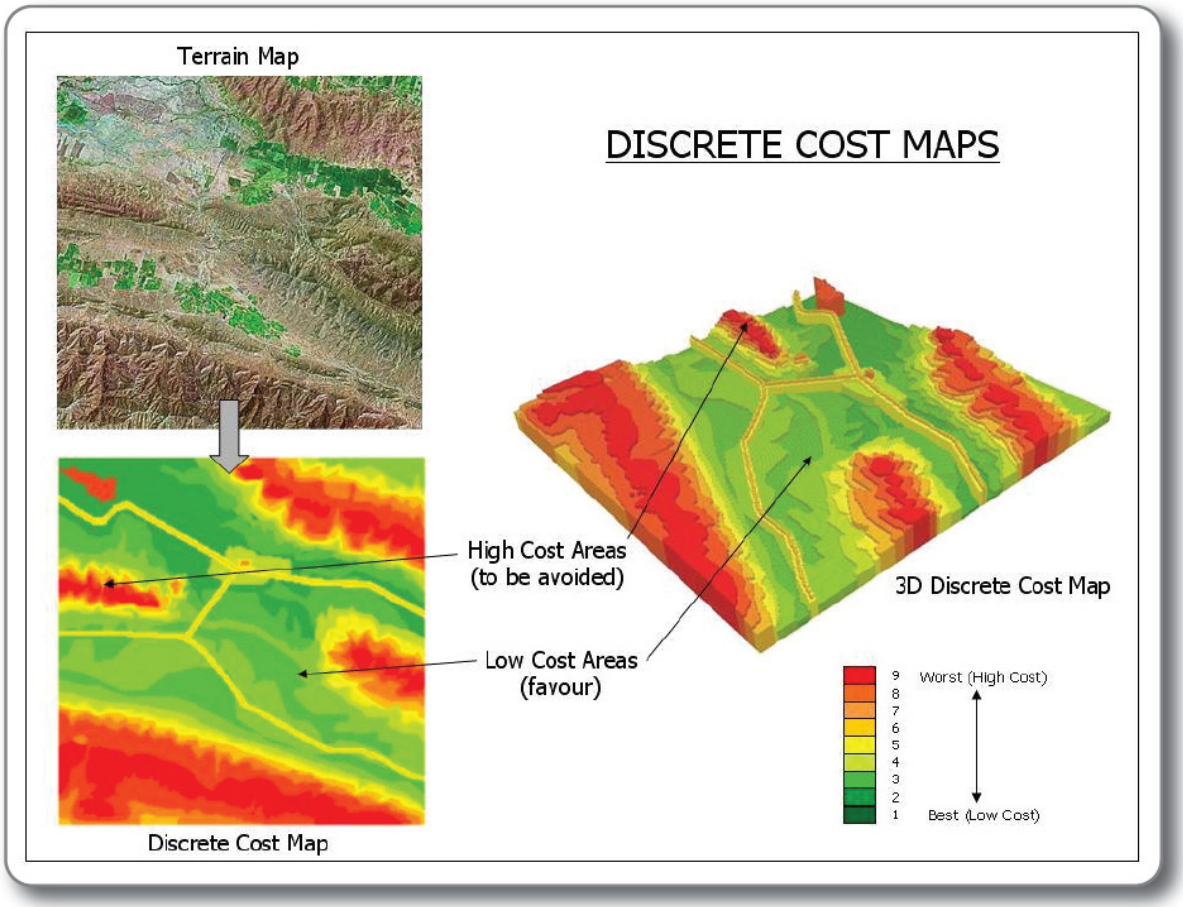

Fig. 4: Discrete Cost Map

The least cost path is the product of the GIS analysis and represents the path of least resistance from the origin of the pipeline along a surface to the destination point.

The strength of the GIS is that re-routes can quickly be incorporated into the system and the implications of the reroutes or alternative routes can be quickly assessed.

The combination of the data layers allows the engineer to test multiple pipeline network design and selection scenarios easily and efficiently. The GIS automatically calculates the lengths of new pipelines or pipeline networks. This allows for rapid total cost calculations and the running of multiple 'what if' scenarios to see the effect of changes to the pipeline design.

A GIS can produce a number of outputs quickly and efficiently in relation to pipeline routing:

- Survey request area delimitation drawings
- Land allocation/permitting drawings
- Pipeline routing drawings
- Alignment sheets (see Fig. 5)
- Tabular outputs (i.e. MTOs)
- Pipeline coordinates

(The GIS Route Optimization shown above is an open source document available on the internet and is not the property of FOH)

It is a vitally important step in employing GIS route optimization methodology that the selection of factors (environmental, demographic, social issues, and others) that are to affect the potential route selected and the weight each of these factors has in the final outcome must be carefully constructed. (See Section 5.1.1.20.2 GIS Routing Optimization Methodology in the method description above). FOH strongly recommends that a Citizen Advisory Committee or other expert panel be assembled to generate a draft set of criterion that includes the mandatory criterion set forth in PUC pipeline routing rules and other factors that may reasonably be considered and suggest a scheme of weighting of these factors to be utilized in identifying the "least cost path" and ranking of all alternative routes being considered for the Sandpiper pipeline.

This draft set of route selection criterion and assigned weights of each factor should be subjected to a full round of public information and comment sessions as required by applicable rules in the routing and/or pipeline need process. After a full public vetting and consensus building process the GIS Route Optimization product or products produced with this final set of weighted criterion would be ready to move forward through the remaining steps of the prescribed permitting process.

Minnesota is fortunate to have had forward looking government agency staff that recognized the importance and utility of providing the public with access to statewide data sets in GIS digital format. The MDNR maintains the state Data Deli system available at: http://deli.dnr.state.mn.us/ and provide links to many other state and federal sources of useful GIS data.

As a special note here, one important criterion that FOH believes has been under represented in past pipeline routing efforts in Minnesota and that must be included here as a heavily weighted routing criterion is groundwater aquifer susceptibility.

10. CUMMULATIVE IMPACTS

A. Reasonably Foreseeable Future Actions

In an investor conference held on April 2nd 2014 Enbridge announced publically and publically published the company's future plans for expanding pipeline infrastructure in Minnesota. Contained in this published document was a map for the replacement of Enbridge's existing line three which was announce earlier this spring. What was not disclosed in the earlier announcement was that Enbridge's preferred route for the line 3 replacement follows the proposed preferred route for the Sandpiper pipeline. This constitutes a "reasonably foreseeable future action" that must be folded in to any environmental review document assessing impacts of the Sandpiper pipeline including the CEA being prepared by the DOC on sandpiper.

See the cover page with date and authors and the map from page 50 of the Enbridge document.

Line 3 Replacement

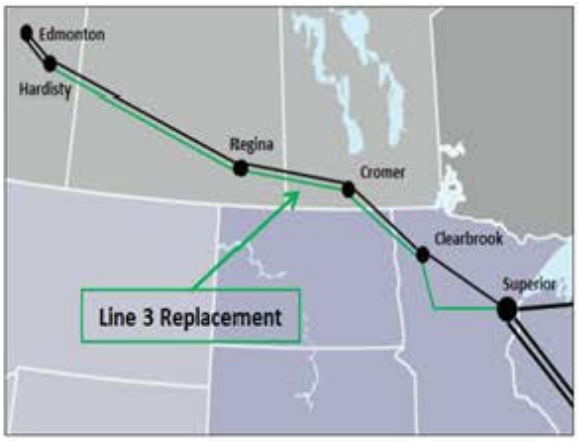

The Project:
•Replace 1,031 miles of 34" pipeline with 36" pipeline

Cost:
•U.S. Portion: $2.6 Billion*

In-service date:
•2017

Status:
•Reassembled successful Alberta Clipper project team
•Securing supply chain
•Known corridor with established relationships

* Project to be jointly funded by ENB and EEP at participation levels to be finalized and approved by a Special Committee of the independent Board of Directors.

B. Impacts of Pipelines on Future Urban or Rural Development

Pipelines become significant impediments to growth and development along their easement corridors. Because of the risk for damage to an operating pipeline, pipeline companies have very strict and complex requirements for granting encroachments into their easements. As a result, it becomes costly and time consuming for local governments to extend roads and underground utilities over a pipeline easement. This has not been factored into the State's process of reviewing proposed pipeline routes because it is outside of their purview. It might prove useful to contact every local jurisdiction along the route to let them know how difficult it will be for them to obtain permission to extend new roads or utilities across pipeline easements and the extra time and expense they can expect. Communities should be alerted to the need for reviewing their comprehensive growth plans and considering future road needs as a relevant issue to evaluate. Areas within orderly annexation districts should consider future private development interests and realize that developers will shy away from parcels with pipeline easements recognizing they are as difficult to deal with as railroads and they can present adverse marketing impacts.

Pipelines have been handled differently by states and larger cities across the country with some establishing conditions and laws to address the above

concerns. Minnesota has not yet done that, leaving the local governments simply adversely impacted without compensation. Developing this information in the comparative environmental analysis could be used to both minimize these impacts on local units of government as well as to alert those along the route finally selected of the need to update comprehensive plans and transportation plans to respond to the presence of the new pipeline.

The impacts of the several alternative routes for sandpiper should include these impediments to development as a cumulative impact.

C. Community Preparedness For Pipeline Rupture/Leak Incidents

Scenario development for highly predictable leak/rupture events logically lead to considerations for disaster preparedness needed by communities near the pipeline route. Special training for first responders that alert communities to the volatility, flammability, explosiveness and human exposure concerns would be essential. Rupture/leak disaster preparedness would involve consideration and possible need to procure special fire fighting, remediation and recovery equipment and training local fire departments would need to be alert to and prepared for extraordinarily difficult fire fighting conditions. Consideration of the consequent new burdens and or risks imposed on local fire/rescue personnel and the need for more or specialized equipment posed by having a pipeline transporting hazardous materials near or through their communities should be included in the CEA. Alternative routes could be evaluated to explore ways to lessen or to mitigate these predictable impacts.

FOH recommends that this socio-economic impact be included in the CEA among the potential cumulative impacts of the project.

11. FINANCIAL ASSURANCE

FOH has serious concerns for the apparent ephemeral nature of a Limited Liability Corporation being created by Enbridge for the sole purpose of constructing and operating the proposed Sandpiper and possibly other crude oil pipelines in Minnesota. This is especially true for pipelines intended to transport the extremely hazardous Bakken Sweet Crude, the nature of which is described earlier in these comments. FOH would urge your Departments, if it has such authority, to seriously examine the financial assurance Minnesota citizens will have that North Dakota Pipeline Company LLC will be financially capable and responsible for appropriate response, remediation, and long term care of any pipeline or pipeline product impacts on people, property and/or the natural environment, whether intended or accidental. If neither the DOC nor the PUC have the authority to impose requirements of special financial instruments that can assure such financial assurance exists, FOH requests that your departments work with such agencies that may have this authority or, lacking any such authority in state or federal government, we request that your respective department's join with FOH to approach the state legislature with draft legislation enabling the appropriate state agency with the necessary

authority to require adequate financial assurance from all pipeline companies doing business in Minnesota.

12. TRANSPARENCY, EQUAL ACCESS AND EQUAL TREATMENT

FOH concludes its comments with some remarks about the PUC and DOC "general responsibilities" as provided in rule and principles of good government and citizen's right to basic freedom of speech. We remind you of one of the applicable rules here.

> 7852.4100 GENERAL RESPONSIBILITIES.
> The commission shall monitor the effectiveness of this chapter and shall take appropriate measures to modify and improve the effectiveness of this chapter. The commission shall assist governmental units and interested persons in understanding the rules.

The overall experience of FOH members throughout their involvement in the matter of the proposed Sandpiper pipeline has ranged from frustration to befuddlement, to confusion, rejection, and exclusion. Having our state government department staffs perform in ways that have been outwardly defiant, defensive, obfuscating and off putting has created a deep sense of distrust, suspicion and at times utter outrage. Our members and organization representative's attempts to fully participate in the decision-making process have been rebuffed on numerous occasions.

When FOH members prepared an information display for the public viewing at the several public meetings Enbridge's attorney and both Commerce Department (DOC) and Public Utilities Commission (PUC) staff rejected us advising us that such a display was not allowed in this public forum. This rejection was in spite of the fact that Enbridge was allowed to use similar visual aids in the form of posters, charts, maps and mounted photographs to not only present the facts of their pipeline proposal but to self-promote and embellish themselves as good corporate citizens claiming the company was a stellar corporate citizen with an excellent record of pipeline operating safety. FOH contends that for our state government to create a public forum for the express purpose of receiving public comment on a pending permit action and then deny the public the opportunity to voice its questions, concerns and to counter misrepresentations of Enbridge's safety record utilizing similar media methods is an infringement of citizen's freedom of speech as protected by the First Amendment of the U.S. Constitution.

FOH was denied access to certain technical data including Geographic Information System (GIS) files submitted to the PUC by Enbridge with their application. And when FOH, many individual citizens, a number of state wide organizations representing these citizens as well as Township and County government units requested extensions of comment deadlines to allow disenfranchised "snowbird" citizens opportunity to participate in the important "routing" phase of the project, DOC staff have summarily rejected these requests. DOC staffs defend their refusal to extend timelines as being firmly based on their unswerving intent to honor the compressed timeline set out in

recently amended statutes and rules that clearly favor pipeline industry interests over those of the public.

And, to add insult to injury, when the DOC and PUC staff established an on-line public record website that is advertised a “full record” of documents and comments received in the matter of the pipeline project they refuse to post the many petitions they received requesting that timelines be extended. This denies the general public the right to know that if they have made a request for comment period extension that they are not alone. This refusal by government agencies to fully and accurately publish the public record in the manner intended acts to discourage citizens from participating believing that their voices are not being heard. This defiance of citizen’s right to be heard on the part of government agencies not only violates First Amendment rights but works to destroy the general public’s trust in fair and equal treatment under the laws that govern us as a people.

Implore you to acknowledge the respective Department’s responsibility to prioritize the citizen’s rights to know fully about and be effectively involved in all decisions of your respective departments in regard to the Sandpiper project. This has not been our experience with your departments to date. We respectfully resubmit our standing request to meet with the Commissioner of the Department of Commerce and the Executive Secretary of the Public Utilities Commission and department staff with the intent to find ways to improve the public’s overall perception of both the process of pipeline permit review and the manner in which the public is allowed to be fully involved in important government decisions the effect their lives.

This concludes the comments and FOH thanks you and the Department of Commerce for considering our concerns, we look forward to opportunities to fully participate in the remainder of the process.

Sincerely,

Richard Smith, President
Friends of the Headwaters

An Insurance and Risk Management Report on the Proposed Enbridge Pumping Station

Prepared for

The Dane County Zoning and Land Regulation Committee

April 8, 2015

Prepared by:
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Executive Summary

Background

This risk management overview was prepared for the Dane County Zoning and Land Regulation Committee to assist in its review of Conditional Use Permit (CUP) application #2291 by Enbridge Energy Partners to upgrade a pumping station on its existing petroleum pipe line (Line 61) between Marshall and Waterloo, WI. Approximately 12 miles of Line 61 currently transects Dane County and carries tar sands oil from Canada to refineries south of Wisconsin.

I have extensive experience in environmental risk management and insurance. I hold bachelors and masters degrees in risk management and insurance from the University of Wisconsin Madison where I have been a guest lecturer on environmental risk management and insurance topics for 34 consecutive years. My work has included advising and providing technical information to the US Department of Defense, the US Environmental Protection Agency and Department of Energy on environmental insurance issues, successfully placing insurance programs on many of the world's toughest environmental risks, including insuring the remediation of Chernobyl for the World Bank in London, and serving as the managing Director of the Global Environmental Practice Group of one of the world's largest insurance brokerage firms. I have been published in numerous journals and textbooks, including the chapter on environmental insurance in the Chartered Property and Casualty Underwriter (CPCU) 4, *Commercial Liability, Risk Management and Insurance* textbook, and also authored and edited the chapter "Environmental Loss Control" in the *Associate in Risk Management* (ARM) textbook.

Purpose

The objective of this risk management overview is to provide The Dane County Zoning and Land Regulation Committee with information on the risk bearing capacity of Enbridge Energy Partners to address the clean-up and other potential damages resulting from an oil spill at the proposed pumping station upgrade on Line 61. Of specific concern to the County Zoning and Land Regulation Committee are these goals.

Dane County seeks assurances that:

- Enbridge, or other reliable sources, have money available to ensure the timely remediation and restoration of the environment in the event of a spill.
- Money will be available to affected citizens of Dane county to pay for the damages they may incur as a result of an oil spill at the pumping station.
- There will be no unfunded potential liability or expenses to the county for granting a Conditional Use Permit or as a result of a spill from the pumping station.

As specified in the scope of services agreement, this report includes the following: an evaluation of Enbridge's existing insurance program, including a review of issues associated with Commercial General Liability insurance policies and a determination of the suitability of such policies to cover costs associated with a spill event; an analysis of Enbridge's offer of indemnity and insurance to Dane County; a summary comparing Enbridge's current liability insurance policy with the policy forms being litigated over the 2010 spill on line 6B in Michigan; a summary of government sponsored oil spill funds; and, recommendations on the appropriate types and amounts of insurance necessary to cover the costs of response, clean up, and environmental remediation associated with a catastrophic spill event.

Summary of Research Findings and Conclusions

Upon review of a summary of the Enbridge liability insurance program, the Enbridge 2014 financial statements and government sponsored oil spill response programs, I find and conclude that:

- Enbridge is strictly liable under US environmental laws to pay to clean up an oil spill at one of their lines;
- Between the General Liability insurance coverage that Enbridge purchases with its modified Pollution Exclusion, the current liquid assets of Enbridge including profits and the funds available in government sponsored oil spill clean-up funds, there are sufficient liquid assets and other financial resources available in 2015 to fund the remediation of a Maximum Probable Loss (MPL) spill from line 61 in Dane County;
- Enbridge has proven in the past to pay for oil spill clean ups in a responsible manner through a combination of partially recoverable General Liability insurance proceeds and profits from ongoing operations;
- The very healthy financial picture of Enbridge today is not necessarily predictive of the future ability of Enbridge to meet the financial obligations associated with an oil spill over the duration of the Conditional Use Permit;
- Enbridge Energy Partners is only partially insured in both "Limits of Liability" and the scope of the insurance coverage for a known potential magnitude oil spill arising from one of their pipe lines;
- The $700 million of General Liability insurance coverage that Enbridge currently purchases is less than the known loss cost of the $1.2 billion Enbridge oil spill in 2010 on Line 6B in Michigan;
- Enbridge purchases a General Liability insurance policy which contains a pollution exclusion and defined exceptions to the pollution exclusion for spills which meet certain time element requirements;
- There is ongoing insurance coverage litigation associated with the Enbridge Line 6B spill in 2010 that highlights the insurance coverage ambiguity inherent in a General Liability insurance policy containing a Pollution Exclusion exceptions to the exclusion instead of genuine Pollution insurance or more accurately Environmental Impairment Insurance;
- Controversy over these missing coverages in the General Liability insurance policies currently purchased by Enbridge lie at the core of the Line 6B insurance coverage litigation involving $103 in unrecovered insurance proceeds for the Line 6 B spill;
- Subject to the Pollution Exclusion, the Enbridge General Liability insurance policies insure "Property Damages" and do not include specific insurance coverages for clean-up costs, restoration costs and natural resources damages normally associated with an oil spill;
- Enbridge does not currently purchase Environmental Impairment Liability (EIL) insurance on Line 61. In contrast to the General Liability insurance policies which only apply to liability arising from "Property Damage", EIL insurance policies contain specific insurance coverage for "Clean-up Costs", "Restoration Costs" and "Natural Resources Damages" associated with an oil spill.

Because the proposed conditional use is of unlimited duration, risk factors which may be encountered decades into the future need to be incorporated into the permitting process today. The county may not be able to add changes to the permit related to risk management issues in the future.
These future risk factors could include;

- The potential (likely) down turn in the use of fossil fuels over time;

- Reduced cash flow and profitability for Enbridge as a result of a general down turn in the throughput of crude oil in pipelines;
- A general down turn in their business would lead to the reduced ability of Enbridge to maintain robust safety and loss control protocols and to upgrade their pipelines over time;
- Over time, the aging pipe line systems would become more prone to spills, and;
- In the above scenario, Enbridge may not have the liquid assets that they have today to pay for a significant spill at the same time they are more likely to have a spill due to aging infrastructure.

Recommendations

In consideration of my research findings and conclusions, and based upon my 30 plus years of experience in the insurance and risk management profession I recommend;

- That Enbridge agree to indemnify and hold harmless Dane County for pollution losses Per the terms as outlined in Enbridge's proposal titled "CONDITIONAL USE PERMIT ("CUP") CONDITIONS";
- That Enbridge procures and maintains liability insurance, including Environmental Impairment Liability insurance, making Dane County an Additional Insured to a level equal to 10% of the Line 6 B loss costs, $125 000,000;
- As part of this overall liability insurance requirement, Enbridge should purchase $25,000,000 of EIL insurance on the proposed pumping station in Dane County
- Technical insurance specifications for General Liability Insurance and Environmental Impairment Liability insurance appear in Appendix A.

There are compelling reasons for requiring Enbridge to obtain environmental insurance as a condition of permit approval. These reasons include;

- Accessing through the insurance underwriting process, an independent and objective evaluation of the environmental risks associated with the Enbridge pumping station in Dane County;
- Back stopping the insurance coverage problems which can arise when a General Liability insurance policy containing a "Pollution" exclusion is relied upon to insure pollution losses from an oil spill. This problem is evidenced by the fact that Enbridge is currently involved in litigation over $103,000,000 in unrecovered General Liability insurance from the 2010 spill on Line 6B. Some lawsuits over the meaning and effect of pollution exclusions in General Liability insurance policies can take 20 years or more to resolve in the courts. Genuine Environmental Impairment Liability insurance is much more reliable than General Liability insurance to pay for pollution losses.

With the exception of the recommended EIL insurance, I believe these insurance recommendations are identical to those previously proffered by Enbridge. The recommendations will not create an undue burden on Enbridge, as the total amount of required insurance on the pumping station would be set at approximately 1/10 the cost of the 2010 Enbridge spill on Line 6B in Michigan which to date has cost $1.2 Billion.

Overview of Risk Management Considerations

Liability insurance as a risk management tool

Insurance is the de facto risk governance mechanism used by parties to gauge the risks of certain endeavors in commerce. A common example of this concept in practice is a banker requiring a borrower to maintain fire insurance on a building the banker is lending money on. By requiring fire insurance on the building the banker does not need to evaluate the relative riskiness of the building being damaged by the fire, the insurance underwriter has already made that determination in the insurance premium charged to insure the building.

If the risk of a fire on the building is low, the insurance premium will be low in relative terms. If the risk is high, the insurance premium for fire insurance will be high. If the risk of fire is so high that it makes the building uninsurable in the informed perspective of the insurance underwriter, the banker will not make the loan. By simply requiring fire insurance the banker accesses the knowledge base of the insurance industry on the relative risk of fires specifically on the building the loan will be made on. As an added benefit, if there is a fire, there will be insurance coverage to pay for the loss. The lender does not need to know anything about fire hazards to manage the fire risk on the building. A simple go or no go on the lending decision relative to the risk that the building will have a fire can be based on the ability of the borrower to obtain fire insurance. Requiring insurance on the building is all the lender has to do to harness the collective wisdom of thousands of fire risk management practitioners in the insurance industry.

In a similar fashion to the banker accessing the insurance industry's vast expertise in fire risks simply by requiring fire insurance on the buildings they lend on, Dane County can harness the knowledge of the insurance underwriting community on the spill risks of pipelines simply by requiring a relatively small amount of EIL insurance on the pumping station.

I am recommending that minimum amounts of liability insurance be maintained by Enbridge over the life of the CUP. Insurance has been utilized in commerce for more than 400 years. Insurance is the one financial mechanism that can be counted on to endure for decades into the future. Insurance is a dynamic financial tool that is able to adapt to new information on risks over time. Simply by requiring insurance be maintained on the pumping station the global knowledge base in the insurance industry on the relevant risks of tar sands oil pumping stations will be accessed by the stakeholders in the pumping station on an annual basis.

Determining the risk - Maximum Probable Loss

It is not the scope of this report to determine the likely costs associated with an oil spill from Line 61 in Dane County, nor am I qualified to make such a determination. However, to accomplish the goals of this report an objective measure of the potential costs resulting from a spill from Line 61 in the county must be made. As a benchmark for a Maximum Probable Loss scenario I used the $1.2 Billion dollar cost already incurred by Enbridge for a spill in 2010 from their Line 6B in Michigan. The spill into a feeder creek at a time of high water ultimately impacted the Kalamazoo River. $1.2 billion is a reasonable Maximum Probable Loss bench mark because the Line 6B spill event actually happened in recent history and it occurred on an Enbridge pipe line in a state with an environment very similar to Wisconsin's. The Enbridge Line 6B spill was the most expensive land based oil spill on record.

Due to the geography of the pumping station in Dane county I have conservatively assumed that the expected loss potential for a spill at the proposed Dane county pumping station will be far less than the $1.2 billion Maximum Probable Loss scenario in today's dollars. In fact the costs associated with on land pipe line spills are likely to be a small fraction of $1.2 billion dollars.

Line 61 with increased pumping capacity will have more oil flowing through it than line 6B did. However, Dane county has considerably less risk than other counties along Line 61 because of the relative distance of the Pumping station to population centers or waterways that have a significant flow rate and the addition of a retaining pit at the pumping station designed to capture 1 hour of pipe line flow as a safety measure. It should be noted that safety measures on pipelines do not always operate as intended. The spill on the Enbridge line 6B lasted 17 hours due to human error in spite of the detection and shut off technologies on the 6B line which were designed to kick in within 5 minutes in the event of a spill. Safety measures at the Dane County pumping station cannot eliminate all risk.

My recommended insurance requirements for the CUP at a total of $125,000,000 in limits of liability are only 10% of the Maximum Probable Loss. This is a very conservative estimate designed to make the recommended insurance coverage on the pump station procurable and affordable for Enbridge, while creating a long term risk management and financial backstop for the county which is unrelated to the future profitability of Enbridge. If the Dane County pumping station was closer to a flowing waterway the suggested limits of liability would be much higher based on the empirical evidence regarding the costs to clean up the Kalamazoo River in Michigan after the Enbridge line 6B spill.

Dane County does not have preplanned financial resources in the form of environmental insurance or other loss reserves to independently respond to a spill event from the pipeline or to defend the county from potential liability in the event the county is vicariously liable for its potential a role in a spill event. However, the way the environmental protection laws have been drafted, the County and local government do not presently have a material statutory role in the remediation process of a pipeline spill. Under the current environmental laws and regulations, oil spill clean-up efforts would be led by the State of Wisconsin with oversight from the Federal government. Government officials in WI also enjoy governmental immunity to relatively low amounts when the damages caused by a pipeline spill are considered.

The available monetary resources to pay for a spill event

To evaluate the risk bearing capacity of Enbridge Energy Partners (EEP) I looked at their available cash flow from ongoing operations (projected $960 million in 2015, see Appendix C), their insurance coverage ($700 million of General Liability insurance with a pollution exclusion and a time element pollution release coverage give back), and potential access to government sponsored petroleum spill response programs ($1 billion per spill plus an inconsequential amount from the State of Wisconsin Spill Fund). These items comprise the liquid assets available for Enbridge today to address the costs associated with a spill from Line 61.

I did not consider the overall net worth of Enbridge in the resources availability evaluation for two reasons. First, these assets are not needed today, and secondly, the valuations of companies change a great deal with the passage of time. The salvage value of buried steel pipes in the face of a general oil pipeline industry wide decline in future decades is highly speculative.

In total there are over $2 Billion dollars in short term funds available today to respond to a spill from Line 61. This amount far exceeds the expected cost of spill in Dane county.

However, this ability to pay for an oil spill through these resources could deteriorate over the life of the proposed conditional use. Profits and access to insurance vary year to year. Spill funds are subject to politics and may not endure over time. For example, the state of Wisconsin is in the process of dismantling its government-sponsored spill program for fertilizer spills in the state. Over a longer time horizon, even federal funds from oil spills may be dismantled. Although access to insurance is not guaranteed over time, insurance does and should play a role in the overall risk management strategy of the stakeholders. The inability to procure insurance is, in itself, a risk management tool. Access to insurance operates as the canary in the coal mine to provide early warning of unusually risky and therefore uninsurable endeavors in commerce to stakeholders in those endeavors.

Future risk factors

A reduction in demand for fossil fuels to address the threat of climate change would change the fundamental business of Enbridge. The core business of Enbridge is essentially to transport fossil fuels through pipelines to processing facilities and markets.

The precipitous decline of the coal industry in the US is a prime example that illustrates this point. Despite the fact that coal has remained unchanged for centuries and powered the industrial revolution for over 100 years, the coal industry has seen over 70% of its valuation evaporate in just 5 years, driven to a great extent over environmental concerns.

All fossil fuel based companies will be subject to the same economic pressures over time if society moves to reduce the green house foot print of energy sources. This trend is already under way as evidenced by the coal industry. Ultimately, that means burning less fossil fuels, which would logically negatively impact the business of crude oil pipeline companies and their future profits.

These factors could adversely change the overall risk picture of a Pumping Station on Line 61 over the course of time;

- A reduction in the amount of oil products shipped through Enbridge pipelines would reduce cash flow and impair the firm's ability to pay for uninsured spill expenses out of profits;

- Reduced profitability would limit the firm's ability to maintain robust safety levels that Enbridge prides its self upon today;

- A reduction in the amount of crude oil which is taxed to fund the Federal oil spill response program would reduce the funding levels for these fail safe contingency plans to pay for oil spill clean ups;

- Changes in the global insurance market place and/or the claims experience of Enbridge in particular could impair the firm's ability to purchase liability insurance to pay for the costs associated with a spill in the future;

- The current and renewal GL insurance policies purchased by Enbridge have the same wording that one of their former insurance companies in the 2010 policy year is using to deny a

$103,000,000 claim made by Enbridge for pollution clean-up costs arising from Line 6B spill in 2010. This insurance coverage dispute is currently being litigated. Lawsuits involving Pollution Exclusions can take decades to resolve. An adverse judgment in this case pertaining to how General Liability insurance policies respond to pollution losses could significantly impair the usefulness of the Enbridge General Liability insurance for future spill events.

- A judge in Alberta, London or New York ruling in insurance coverage litigation over contamination events and pollution exclusions, in a case totally unrelated to Enbridge or even to pipelines specifically, could significantly reduce the insurance available to Enbridge simply by establishing case law precedence that certain environmental damages are not insured by GL policies.

All of these risk factors have the ability to dramatically alter the ability of Enbridge to pay for an oil spill over the extended duration of the proposed conditional use.

As a partial hedge to these changing factors I recommend that the Conditional Use Permit contain insurance requirements for General Liability Insurance and Environmental Impairment Insurance on the pumping station.

Summary and analysis of the current Enbridge general liability insurance program

In lieu of sending over 40+ insurance policies which make up the Enbridge General Liability insurance program, Enbridge sent their senior insurance manager Selina Lim, accompanied by Aaron Madsen of Enbridge and attorney Jeffery Vercauteren of Wythe, Hirschboeck Dudek, S.C. to the American Risk Management Resources Network, LLC offices in Middleton for a meeting with me on March 18th. Ms. Lim came prepared with a summary of their insurance program which included descriptions and references to the items I had requested for the insurance review. We discussed the summarized parameters of the Enbridge General Liability insurance program from her prepared documents.

Enbridge declined to provide the actual insurance policies (42 of them in total) to me for review, claiming that the documents contain trade secrets. Nonetheless, I found their summary of their insurance program to be credible.

I did not read any of the actual liability insurance policies. This amount of detail was not necessary to evaluate the insurance coverage parameters of concern in the Enbridge liability insurance program for a number of reasons, including;

1. Enbridge has a professional insurance manager with more than 12 years of experience and Enbridge utilizes the largest insurance brokerage firm in the world to negotiate their insurance policies. Competent insurance practitioners would purchase insurance exactly as described in the summary documents. In fact, it would be very difficult for Enbridge to do otherwise due to constraints in the insurance market place.

2. The Enbridge General Liability insurance coverage is of the type most commonly used on large companies involved in the oil and gas business. The primary insurance policy is written by a Mutual Insurance company where the policy holders actually own the insurance company. The primary insurance company has a reputation for being liberal with claims payments- a fact that may have created a claims payment problem on a past loss for Enbridge, which is further discussed below. There were no unusual restrictive terms revealed by the insurance manager relative to the pumping station in Dane County, nor would I expect there to be any.

3. The $700,000,000 limits of insurance purchased by Enbridge was confirmed by a certificate of insurance prepared by their insurance broker and is also mentioned in the financial documents from 2014 filed with the SEC.

4. The current insurance policies will expire on May 1st and new insurance policies will be purchased. Where the current insurance policies are a gauge on what insurance Enbridge may have in the future, there are no guarantees that Enbridge will be able to maintain these high levels of insurance in the future. (The recommended insurance levels anticipate this contingency.)

5. It was represented in the March 18th 2015 meeting that Enbridge would renew their insurance on May 1st. It served little purpose to closely review insurance policies that would expire in a few weeks. This highlights the importance of taking a long term view when considering the placement of any insurance conditions on the CUP application.

6. The current Enbridge insurance coverage is largely irrelevant in any decision making of Dane County regarding a long term Conditional Use Permit. Almost all insurance policies only insure for 1 year and must be renewed annually. The insurance market place changes over time and can be subject to considerable variation year to year. Knowing what the insurance coverage is today is not necessarily predictive of what it will be even 2 years from today.

The base General Liability insurance policy that Enbridge purchases follows the usual and customary liability insurance coverage purchased by large companies in the energy sector. The lead insurance company in the Enbridge liability insurance program is AEGIS. AEGIS is a mutual insurance company which is owned by its policy holders. AEGIS is the largest insurer in the energy sector. The other 41 insurance companies "follow form" to the AEGIS base insurance policy language. In essence these "excess" carriers provide their limits of insurance capacity in "Layers" with each layer of insurance mirroring the insurance coverage provided by the primary insurance policy.

In this common structure of building claims paying capacity, the terms of the coverage in the excess layers are determined by the AEGIS primary insurance policy. Therefore, by knowing what the primary insurance policy says, we know what the coverage provided by the Excess insurance policies is as well. This rule holds true as long as no additional exclusions are added to any of the Excess insurance policies in the tower. It was represented by the Enbridge insurance manager that all layers of coverage in their insurance program follow the base AEGIS policy form. This advice is credible because it follows the usual custom and practice in the insurance business.

The current Enbridge primary General Liability policy insures for liability claims arising from;

a. Bodily Injury,
b. Property Damage defined as physical injury to tangible property,
c. Personal injury including libel and slander,
d. In addition to these coverages for claims, the policy insures Defense Costs.

The key coverages in the General liability insurance policy that would come into play in the event of a spill from a pipe line are claims for Bodily Injury, Property Damage and the costs incurred to Defend those claims.

The Enbridge GL policy, like virtually all General Liability insurance policies sold over the past 40 years, has a pollution exclusion. Introduced into the insurance business in 1970, pollution exclusions are the most litigated words in the history of the insurance. Over the past forty years, the legal profession has sent a lot of kids to college by arguing which part of a pollution exclusion, if any, should apply to a loss involving the contamination of things ranging from sandwiches to Superfund hazardous waste sites.

Insurance coverage litigation over the meaning and intent of a pollution exclusion can take decades to sort out in the courts once a claim is denied by the insurance company and the insured sues for coverage under the insurance policy. One prime example of litigation over a pollution exclusion in General Liability insurance policies involved the City of Edgerton, Wisconsin and a Superfund hazardous waste site. The insurance coverage litigation over the meaning and effect of pollution exclusions in the General Liability insurance policies purchased by the city spanned decades in Wisconsin courts. In that case, one of the troublesome clauses was the use of the term "Sudden and Accidental" as an exception to the pollution exclusions in various policy years.

Over decades, teams of lawyers working in hundreds of similar insurance coverage litigation cases were unable to decisively conclude that a sudden pollution even must mean a quick pollution event. To eliminate ambiguity surrounding the term, in 1986 the word "sudden" was dropped from common use as part of the standard exception to Pollution exclusions, in Commercial General Liability insurance policies.

"Sudden and accidental pollution liability" is what Enbridge shows for insurance coverage in their financial statements today. However, the pollution exclusion exemption in the Enbridge policy is not limited to sudden or quick events. A Property Damage or Bodily Injury claim arising from a pollution event that begins and is discovered within 30 days and is reported to the insurance company within 90 days is not excluded by the Pollution Exclusion in the primary Enbridge General Liability insurance policy. Hence the words "sudden and accidental" carry no weight in the current pollution exclusion. A more accurate term to describe the limited coverage for pollution events within the current General liability insurance policy is "Time Element Pollution" coverage.

The "sudden and accidental pollution liability coverage" that Enbridge has today on the General Liability insurance policy is different than the General Liability insurance policies the City of Edgerton had in place during the time the Superfund site was slowly leaching hazardous waste into the ground. However, the reliability of covering a pollution loss through a pollution exclusion is no less complex as evidenced by the $103,000,000 in unrecoverable General Liability insurance as a result of the Enbridge Line 6B spill.

Taking all of this history into account, it is my professional opinion that the county should avoid being completely dependent upon a General Liability Insurance policy containing a Pollution Exclusion as a financial back stop for an oil spill.

How the current Enbridge General Liability insurance policy treats pipeline spills

In the event of a pipe line spill of tar sands oil or other petroleum product, the pollution exclusion on the Enbridge General Liability policy will come into play. The pollution exclusion may not operate to eliminate the insurance coverage for an oil spill, but the exclusion will be one of the determining factors under consideration by the insurance company in their decision to pay a claim or not.

As evidenced by the insurance coverage litigation on the Line 6B spill, insurance companies are not always in harmony on how pollution exclusions should operate. Even insurance companies participating in the same insurance placement can be in disagreement over pollution exclusions.

The pollution exclusion in the Enbridge General Liability insurance applies to all claims arising from the emission, discharge, release, or escape of "Pollutants". In essence a "Pollution exclusion" eliminates the coverage in the insurance policy for Bodily Injury and Property Damage liability claims if the proximate cause of the loss is the release or escape of "Pollutants". The damages caused by an oil spill will definitely fall within multiple parameters of a pollution exclusion.

"Pollutants" is a defined word in the insurance policy which essentially boils down to "contaminates". If a material can contaminate something it can be a pollutant in an insurance policy. In Wisconsin for example, in the Landshire foods case which went to court over the effect of a pollution exclusion,

sandwiches contaminated with bacteria have been denied insurance coverage at the appellate court level because bacteria contamination was deemed by the court to be a “pollutant”.

Although the Enbridge insurance policy is purchased in Canada and Wisconsin laws would not apply to any insurance coverage disputes, if sandwiches can be a “Pollutant” in an insurance policy, tar sand oils in a wetland or on farm field would certainly fall under the definition of an excluded “pollutant” in the event of a pipe line spill.

Sudden and Accidental Pollution Insurance?

As Highlighted in Appendix C, why does Enbridge represent that they have sudden and accidental pollution liability insurance when their only liability insurance on Line 61 is a General Liability insurance policy which contains a pollution exclusion? The topic itself confuses most people. The bulk of the answer can be attributed to marketing hype originating from the sellers of general liability insurance policies using insurance slang dating back to the 1970’s. General Liability insurance policies have not used the terms “sudden and accidental” to define an exception to the pollution exclusion since the 1980’s.

Enbridge is not alone in its use of the term sudden and accidental pollution liability coverage, it is commonly used in the oil and gas business to describe a GL policy with an exception to the pollution exclusion for contamination events happening within certain time frames. There is an exception to the pollution exclusion in the Enbridge General Liability insurance policy for pollution losses that happen in certain time frames. By excluding the exclusion for a certain set of circumstances, a double negative creates positive insurance coverage for contamination events that fit the parameters of the exception to the exclusion.

Technically, General Liability insurance policy with remnant coverage under a pollution exclusion and Pollution Insurance should not be confused; genuine pollution insurance, which is more accurately referred to as Environmental Impairment insurance, has specified coverages that are not specifically provided in General liability insurance policies. Another distinguishing factor in genuine pollution insurance is that the coverage only applies to losses caused by pollution events.

There was a point in time where the statement “we have sudden and accident pollution coverage” on a General Liability policy made more sense than it does today. From 1970 through 1986, General Liability insurance policies had exceptions to the pollution exclusion for sudden and accidental releases of “Pollutants”. In those years, pollution exclusions commonly said that the pollution exclusion in the General Liability policy would not apply if the dispersal, release or escape of pollutants that caused the insured damages was sudden and accidental. The words sudden and accidental were actually incorporated into the insurance industry standard pollution exclusion in those years. The problem was “sudden” was an undefined term in the GL policy and insurance companies were stuck with paying for claims at Superfund Hazardous waste sites where the actual pollution went on for decades.

To clarify the intent of pollution exclusions the words sudden and accidental were eliminated from common use in pollution exclusions in 1986. Today when there is an exception to a pollution exclusion in a General Liability insurance policy, the exception to the exclusion for certain types of pollution events is defined parameters measured in hours or days. Because the coverage give back in the pollution exclusion is driven by specified times, the more accurate way to describe the coverage is “Time Element” pollution coverage.

The Enbridge General Liability insurance policy contains Time Element pollution coverage in the General liability insurance policy. The remnant coverage for a pollution event after the exclusion is not just limited to sudden or quick pollution-- a leak could continue for up to 30 days, and the Pollution exclusion in the General Liability insurance policy would not apply to a loss for Bodily injury or Property Damages.

The Time Element Pollution Exception

The Enbridge General Liability insurance policy contains an exception to the pollution exclusion if the pollution event meets certain "Time Element" parameters.
The Pollution Exclusion in the Enbridge General Liability insurance policy will not apply only if;

1. The pollution release begins and is discovered within 30 days and

2. Enbridge reports the loss to the insurance company within 90 days of discovery.

An obvious gap in Enbridge insurance coverage is if a leak is not detected until the 31st day, in which case the Pollution exclusion on the GL policy would come into play and Enbridge would not have insurance assets to pay for a spill. In contrast a good quality EIL policy does not limit the duration of a contamination event in order for the damages arising from pollution taking place during the coverage period of the policy to be insured losses.

The three Levels of Pollution Exclusions in the Enbridge Liability Insurance Policies

There are three exceptions to the remnant Time Element pollution coverage on the Enbridge General Liability insurance policy, the most significant of these exceptions is there is no coverage for Property Damage to the properties owned or leased by Enbridge. In effect how this works is there are 3 negatives in a row in relation to pollution loss involving the pumping station and right of way on the Enbridge GL policy. The Pollution Exclusion, The Time Element Exception to the Pollution Exclusion and then an exception to the Time Element exception that would reapply the pollution exclusion to any Property Damage to the right of way properties that may be affected by a spill. This example illustrates how nebulous insurance coverage can be when exceptions to exclusions are relied upon for insurance coverage on a pollution event as opposed to purchasing genuine EIL insurance which is designed for this purpose.

The Enbridge GL policy is written on an indemnity basis, meaning the insurance companies agree to reimburse Enbridge for losses after Enbridge has paid for them. This is common practice.

The Enbridge liability insurance protection survives the bankruptcy of the insured which is a good feature for Dane county looking decades into the future to formulate a risk management plan.

Differences between General Liability Insurance and genuine Pollution Insurance

For unknown reasons, the terminology Sudden and Accidental Pollution Liability is still used to describe the remnant liability insurance created by the time element exception to the Pollution Exclusion in the General Liability insurance policies commonly purchased by oil and gas companies. Describing an insurance policy that only addresses coverage for pollution events as an exception to a far reaching pollution exclusion is really not "Pollution Insurance". There are fundamental insurance coverage differences between genuine Pollution Insurance and General Liability insurance which contains an exception to a pollution exclusion. An insurance policy that only addresses coverage for pollution events within the exclusion section of the policy is not genuine pollution Insurance.

A more technically accurate term for "pollution insurance" is Environmental Impairment Liability insurance (EIL) which is sometimes sold under the title Pollution Legal Liability insurance. The sole purpose of EIL insurance is to fill insurance coverage gaps created by the ever present pollution exclusions in property and liability insurance policies. Environmental Impairment Liability insurance has been continuously available in the North America since 1980. The current insurance market capacity for genuine environmental insurance on a pumping station exceeds $100,000,000. That amount of insurance capacity has been available on a newly constructed pipeline pumping station for more than 30 years.

Enbridge does not purchase separate Environmental Impairment Liability insurance. An EIL policy covers Bodily Injury, Property Damages and Defense Costs. The definitions of these terms in EIL policies mirror the definitions commonly used in GL policies. However, the major difference is where a GL policy says there is no coverage for claims arising from pollution, an EIL policy *only* insures claims arising from the release or escape pollution either quickly or over time.

An EIL policy designed specifically to cover claims arising from pollutants provides broader coverage for environmental losses than a GL policy does. A good quality EIL insurance specifically insures Cleanup Costs, Emergency Response Costs, Restoration Costs and Natural Resources Damages within the insuring obligations of the policy. GL polices do not reference these important elements of coverage which will always come into play as a source of damages in a pipeline spill.

Analysis of Enbridge Indemnification and Insurance Proposal to Dane County

Enbridge has offered to indemnify Dane County for any loss the county incurs as a result of the pumping station. Enbridge has also offered to include Dane County as an Additional Insured on the first $100,000,000 of General Liability insurance maintained by Enbridge. Being indemnified by Enbridge is good for Dane County because the indemnity is first dollar protection and makes Dane county eligible to be an Additional Insured on the Enbridge General Liability insurance policy.

Being an "Additional Insured" on the Enbridge General Liability policy is a benefit for Dane County. By being named as an "Additional Insured" the Enbridge liability insurance would defend Dane County in the event Enbridge caused damages to a third party and the third party sued Dane County for the county's contributory role in the Enbridge created loss event.

Being added as an Additional Insured under the Enbridge GL policy should not be confused with being added as a Named Insured to an insurance policy. An Additional Insured cannot make a direct claim for clean-up expenses associated with an oil spill under the General Liability policy. The Additional Insured could make a claim against the Named Insured in which case the named insured may have coverage subject, however, to the effects of the pollution exclusion. But, anyone can make a claim against the Named insured - you do not need to be an Additional Insured to do that.

The main advantage to the county of being an Additional Insured on the Enbridge GL policy is access to Defense Cost insurance coverage and in the event Dane County is held liable for their contributory negligence in a covered GL claim for Enbridge, the Enbridge liability insurance would indemnify Dane County for its stake in that loss. A key point to keep in mind is the breadth of the insurance coverage for the Additional Insured is no broader than the coverage for the named insured with a few possible exceptions unrelated to a pollution loss.

The benefit of the county being an Additional Insured under the Enbridge General Liability insurance assumes that there is no "insured versus insured" exclusion on the Enbridge General Liability insurance policy. If the Enbridge General liability insurance policy contained an "insured vs insured exclusion and the county became an "insured" by being named as an "Additional Insured" if the county made a claim against Enbridge for some reason, the Enbridge insurance policies would not apply to the county claim because one insured is claiming damages from another insured.

The need to avoid an "insured versus insured" exclusion in the Enbridge liability insurance is anticipated in the recommended insurance requirements in Appendix C.

Being an Additional Insured on the Enbridge General Liability insurance policy does not;

- Enable the County to make a direct claims for pollution clean-up under the Enbridge insurance policy;

- Correct for the inherent risk management deficiencies in relying on a General Liability policy to pay for pollution claims as previously discussed.

In reality, Dane County has a very small loss exposure in its zoning role on the pumping station. The county enjoys statutory immunity from liability as a public entity in Wisconsin and is not involved with

the operations of the proposed Enbridge pumping station. It is hard to imagine a scenario where Dane County would ever become part of a claim made against Enbridge. But if it ever did happen, being indemnified by Enbridge and being named as an additional insured on the Enbridge insurance policy would be a good thing.

Review of insurance coverage litigation involving the Enbridge Line 6B spill

Because the matter is in active litigation, Enbridge could not provide the requested details on the $103,000,000 insurance coverage case.

However, I discussed the matter in broad terms with the insurance manager of Enbridge in our face to face meeting. In essence there are two central issues in the Line 6B insurance coverage litigation that relate to Dane County prospectively:

1. The insurance policy language that is in dispute over $103,000,000 in unpaid claims under the Enbridge General Liability insurance policy is unchanged today from the insurance policy language in effect during the 2010 policy year.

2. The insurance company is disputing whether the costs form the Line 6B spill is covered "Property Damage" in a General Liability insurance policy.

One common point of contention in insurance coverage litigation involving pollution claims under General Liability insurance policies over the past 30 years is whether a clean-up order from the government constitutes a claim for "Property Damage" under the definition that term in the GL policy.

Because General Liability insurance policies only insure Property Damages, these insurance policies are inherently deficient in their coverage for government ordered Clean-up costs, Natural Resource Damages and Restoration Costs. This is the major motivation behind my recommendation that the Line 61 pumping station be insured under an environmental insurance policy. A genuine EIL policy specifically insures Clean-Up Costs, Natural Resources Damages and Restoration Costs in addition to Bodily Injury and Property Damage Liability.

Of particular significance in this matter, the insurance companies below and above this $103,000,000 layer paid the Line 6B claim which illustrates how unreliable exceptions to pollution exclusions can be to fund pollution losses.

In our meeting it was revealed that the insurance company that they are in insurance coverage litigation over regarding the Line 6B spill is no longer a participant in the Enbridge insurance program. This was to be expected.

Considering these represented facts there was no reason to evaluate the insurance coverage in effect in 2010 versus the coverage in effect today. I was told that the insurance policy language is essentially unchanged from 2010 to today. Which means the same arguments presented by the insurance company that is refusing to pay Enbridge's claim for $103 million could potentially be presented by another insurance company in the future too deny a claim arising from a pipeline spill.

The inherent danger in relying on exceptions to pollution exclusions to pay for pollution losses

The coverage provided by the Enbridge General Liability insurance for pollution damages could change overnight as determined by legal matters completely outside of the control of Enbridge or their insurance companies.

For example on December 30, 2014 the Wisconsin Supreme court determined that manure and nitrates in ground water as a result of farming operations were excluded by the Pollution Exclusion in General Liability insurance policies. Prior to this decision, the precedent case law in WI was that manure was a "product" and there for not excluded as a "pollutant" under the Pollution exclusion in General Liability insurance policies commonly sold to farms. As a result of that Wisconsin Supreme Court decision on the insurance purchased by one farm, on December 31st 41,000 farms in Wisconsin were left clearly uninsured under the General Liability insurance policies for contamination claims arising from manure spreading operations.

In previous decades under various exceptions to Pollution Exclusions in the liability insurance policies sold to farms, many farmers and their insurance agents believed they had "sudden and accidental" pollution insurance as part of their General Liability insurance policy. The belief survived even though the reference to sudden and accidental pollution events was removed from the General Liability insurance policies sold to farms in 1986. In clearing up the confusion over the effects of the Pollution Exclusion, one Wisconsin Supreme Court Justice commented in the December 30th ruling that a common exception to the Pollution Exclusion for certain defined contamination events on the farmers GL policy was "useless" insurance, much to the surprise of the 41,000 farmers and their insurance agents.

Although Wisconsin case law on pollution exclusions should not have a bearing on an insurance policy purchased in Canada, the current Enbridge insurance coverage litigation over $103,000,000 of GL insurance containing a pollution exclusion on the Line 6B spill in 2010 and the proper operation of a Pollution Exclusion in that policy parallels the Wisconsin farm situation. Even if Enbridge prevails in the collection of the $103,000,000 in liability insurance, another litigated insurance coverage case in Canada, New York or London could eliminate the GL coverage for a pollution event for Enbridge and everyone else in that legal jurisdiction who buys insurance dependent upon an exception to a pollution exclusions containing the same language.

The insurance coverage litigation over $103,000,000 of General liability insurance providing Time Element Pollution coverage for only Property Damage illustrates the need for back up Environmental Impairment Liability insurance on the Line 61 environmental loss exposures in Dane County.

The Enbridge general liability insurance policy is missing essential coverages to clearly insure an oil spill event

The track record of the Enbridge General Liability insurance program is that on Line 6 B, all of the insurance companies with the exception of just one company, paid for the costs of clean up to the maximum limits of liability on the insurance policies they sold to Enbridge. However, for the reasons stated above, this could change over time with the development of insurance coverage case law which could be adverse to Enbridge.

The Enbridge General Liability insurance coverage with its Pollution Exclusion and the exceptions to the exclusion if a spill is discovered within 30 days from the start of the spill is missing separately defined coverage parts for:

- Clean-up Costs
- Natural Resource Damages
- Emergency Response Costs
- Restoration Costs

- Coverage for spills longer than 30 days

All of these insurance coverage elements are provided in a good quality Environmental Impairment Liability insurance policy. Which is why I recommend the purchase of EIL coverage on the pumping station and, optionally, the pipe line in Dane County.

The availability of government-backed oil spill funds

There are actually two sources of Government funded spill response programs for oil spills;

1. The Wisconsin Spills Law which accesses general purpose revenues from the state of Wisconsin with an annual allocation of $3.5 million per year, funds are accessed by the WI DNR and;

2. The Oil Pollution Act with a current balance exceeding over $4 billion in the Oil Spill Liability Trust Fund and taxes of more than $300,000,000 annually. Funds for clean-up costs and other damages are accessed by the Federal Government or the State.

There is no apparent government source of funds for a county to respond to a spill event. However, environmental laws do not create a obligation for counties to respond to pollution events the county did not cause.

Considering the magnitude of the Enbridge Maximum Probable Loss potential, by far the more significant and therefore relevant of these two funds is the Federal Oil Spill Liability Trust fund.

After the crude oil spill in Alaska involving the Exon Valdez, The Oil Pollution Act of 1990 was passed and a federally sponsored fund was created for federal and state trustees to respond to the clean-up costs and victim compensation arising from future oil spills, including spills from pipe lines. The Oil Pollution Act does not anticipate a role for local governments in spill response.

The Oil Spill Liability Trust Fund (OSLTF) will pay for costs incurred from tar sands oil spills arising from pipelines. The spill must only threaten a waterway to be eligible for the fund. Threating a water way will be a certainty on any spill from Line 61 in Dane County.

In essence, the idea of the spill fund is to assure that the federal or state authorities (not the county) have the resources necessary to pay for an oil spill.

Recoverable cost from the Oil Spill Liability Trust Fund include:

- Removal Costs
- Real or Personal Damages
- Loss of Profits and/or Income
- Loss of subsistence
- Lost government revenue
- Increase public services
- Up to $500 million in Natural resource damages compensation.

The trust fund does not distinguish between a sudden or gradual spill events.
The funds also survive the bankruptcy of a responsible party who causes a spill.

The Oil Spill Liability Trust Fund is financed by taxes on certain types of unrefined oils, plus fines and penalties imposed by the government on parties responsible for spills. In something peculiar to the definition of the oil that is taxed, tar sands oil is not paying into the fund through taxes.

The trust fund received a recent major influx of money, over $3 billion, from the fines assessed against BP in the Deep Water Horizon oil spill in the Gulf of Mexico.

Payments from the fund are subject to a limit of $1 Billion per incident. “Incident” means any occurrence or series of occurrences having the same origin, involving one or more vessels, facilities, or any combination thereof, resulting in the discharge or substantial threat of discharge of oil.

The $4 billion dollar fund in 2015 back-stops the responsible party’s ability to fund an oil spill clean-up either through cash or insurance recoveries. The parties responsible for the spill must fully reimburse the Oil Spill Liability Trust Fund for any fund monies utilized by the responders to a spill. The funds are still available to responders in the event of the bankruptcy of the responsible party.

Because of the $1 billion cap per incident there would need to be four un-reimbursable spills of at least a billion dollars each before the current funding would be exhausted. A more probable scenario over time would be the political elimination of the fund all together.

The largest on land oil spill in history was the 2010 Enbridge Line 6B spill in Michigan, which has cost Enbridge $1.2 billion to date without the effects of any potential future fines or penalties resulting from the spill. The $4 billion fund subject to its $1billion dollar per incident cap in the short term and foreseeable future has sufficient funding to address all of the costs associated with a spill at a pump station in Dane county even if Enbridge has no cash or insurance available to reimburse the fund.

However, there is no way to reliably predict the status of future funding of the Oil Spill Liability Trust Fund over the term of a conditional use permit.

For More information on the Oil Pollution Act, tar sand oil, taxes and the Oil Spill Liability Trust Fund see Appendix B.

Insurance Recommendations and Conclusions

A long term view on insurance is needed

The current Enbridge Liability insurance program is not very relevant to the actual risk involved with the construction and operation of a pumping station in Dane County decades into the future. Any risk management strategies used by the county to address potential environmental impacts under the Conditional Use Permit need to anticipate changes in a number of variables, including the future economic viability of a pipe line carrying tar sands oil and changes in the insurance market place taking place over that time horizon. Insurance has been around for over 400 years, it is a good bet that insurance will exist as a financial product for the entire period the CUP is in place. Therefore insurance requirements as a condition for the CUP are highly recommended.

Specified insurances as part of a Conditional Use Permit create numerous risk management advantages to Dane County.

- Insurance can adapt to new information on risk over time.
- The limits of insurance can be adapted to future loss costs due to the effects of inflation.
- Insurance underwriters provide an objective 3rd party evaluation of a risk.
- Insurance underwriters have access to an extremely efficient global knowledge sharing network of hazards.
- By accessing one specialized insurance underwriter the collective best practices of multiple companies in the same business, in this case pipe lines, can be utilized for advance loss control.
- By requiring insurance for a particular activity there is no need for the stakeholders in the activity to have expertise in risk evaluation or risk management. The private insurance industry will efficiently take all risk factors into account when offering to insure the activity. By simply requiring robust insurance, the stakeholders access the collective risk management knowledge of thousands of people working in the insurance business in North America alone. A firm like Enbridge would access the global insurance market place. In which case all of the knowledge and experience held by the people that work with insuring pipe lines on a global scale would be brought to bear on a pumping station in Dane County.

Recommended types and amounts of liability insurance

I recommend that Enbridge procure and maintain the following liability insurance policies over the course of the permit duration:

- $100,000,000 limits in General Liability insurance with a time element exception to the pollution exclusion (currently in place), and;
- Environmental Impairment Liability insurance with a $25,000,000 limit

At a limit of $700 million the Enbridge General Liability insurance program, which insures more than 15,000 miles of pipe lines, does not have enough limits to pay for a known magnitude $1.2 Billion loss exposure. Purchasing insurance equal to 100% of the known loss exposure is common practice in insurance. However, it is very possible that Enbridge is already purchasing all of the General Liability insurance capacity available in the world for their operations. Therefore, I do not recommend the purchase of higher GL limits for the operation of the Line 61 Pumping Station.

I conservatively set the liability insurance recommendations at 1/10 the cost of a previous Enbridge spill on Line 6B in Michigan. Being 90% under a known loss event, with many factors being the same between the Enbridge pipe lines in MI and WI, is a very modest level of insurance to ask for.

To supplement the General Liability insurance coverage maintained by Enbridge, I recommend that Enbridge purchase an Environmental Impairment Liability insurance policy on the pumping station in Dane County with a limit of liability of $25,000,000 per loss. If more than one location is insured under this policy, the policy must have an annual Aggregate Limit of Liability of $50,000,000. The Annual Aggregate provision would come into effect if more than one loss is reported under the policy over the policy term. However, the most that would be paid by the policy for a single loss is $25,000,000.

This EIL insurance policy should provide Excess coverage and "Difference In Conditions Coverage" (DIC) for environmental damages over the primary General Liability insurance currently maintained by Enbridge. DIC coverage fills in coverage gaps that the General Liability policy may have for pollution losses.

It would be acceptable if this EIL insurance covered all of line 61 in Dane County. Although the existing pipe line is not part of the permit application, expanding the insurance coverage to include the existing pipeline in Dane County should have no effect on the premium charged for the EIL insurance policy on the pumping station, and the additional insured locations would benefit both Enbridge and Dane County.

Three risk management objectives in these recommendations

There are three risk management objectives in my recommendation that Enbridge maintain a small amount of environmental insurance on the pumping station in Dane County:

1. Back stop the primary Enbridge insurance program with broader insuring obligations than a General Liability insurance policy which only addresses Property Damage and then only if certain Time Elements are met to get around the Total Pollution exclusion in that insurance policy;

2. Access the independent risk evaluation capability of an environmental insurance underwriter over the life of the proposed conditional use;

3. Create a relatively small genuine environmental insurance to backstop potentially unrecoverable General Liability Insurance, the potential inability of Enbridge to pay for a spill clean-up out of profits in the future, or deficiencies in government sponsored oil spill funds.

The recommended $125,000,000 of liability insurance, which includes $25,000,000 of genuine environmental impairment insurance, is readily available in the insurance market place today, and will be available in the foreseeable future. In the event of an oil spill at the pumping station, the county, the state, the federal government and affected third parties could all make claims against Enbridge. The liability insurance policies do survive as an asset in the event Enbridge is bankrupt, so in that sense, the policies could have some value to the county as an asset of last resort to recover damages that Enbridge has caused.

A detailed insurance specification for General Liability and Environmental Insurance on the Line 61 pump station is shown in Appendix A.

Appendix A: Recommended Liability Insurance Specifications

General Liability Insurance
Commercial General Liability Insurance or the equivalent
Insuring the operations and completed operations of the line 61 pumping station in Dane county.
Coverage shall be provided for Bodily Injury Liability, Property Damage Liability and Defense costs.

The pollution exclusion in this policy shall not apply to the escape or release of pollutants or contaminates that begin and are discovered in no less than 14 days and are reported to the insurer within no less than 30 days.

Insurance must be provided by an insurer with an A.M. Bests rating of at least A, XII.

Coverage shall be extended to Dane County as an Additional Insured.
This insurance shall be Primary and Non-contributory to any insurance Dane County may have available.
Any rights of subrogation against Dane County shall be waived.
The policy cannot contain an "Insured vs. Insured" exclusion applying to Dane County as an Additional Insured

The policy shall obligate the insurer to provide 60 days notices of cancellation or nonrenewal to Dane County

Minimum Limit of Liability $100,000,000

Environmental Insurance Specification
Environmental Impairment Liability Insurance, Site Pollution Liability Insurance or the equivalent

Insured Location: The pumping Station on Line 61 in Dane County (optionally the policy may insure the pipe line in Dane County)

Insurance must be provided by an insurer with an A.M. Bests rating of at least A, XII.

Coverages To Be Included:

- On and off site Clean-up expenses
- Damages to Natural Resources
- Emergency response cost to at least $1,000,000
- Bodily Injury Liability
- Property Damage Liability
- Contractual liability naming Dane County as an Additional Insured
- This policy must be Primary and Noncontributory to any insurance Dane County may have access to.
- The policy cannot contain an "Insured vs. Insured" exclusion applying to Dane County as an additional insured.
- This coverage can be excess over other collectable insurance and the deductible or self-insured retention amounts of the underlying insurances
- This policy shall provide difference in conditions coverage excess of the deductible or self-insured retentions in the primary General Liability insurance program.

- This insurance does not need to drop down below the Self Insured Retention amounts on the coverages provided by the Enbridge master insurance program.
- The policy shall obligate the insurer to provide 60 days notices of cancellation or nonrenewal to Dane County.

Limits of liability
$25,000,000 per loss and in $25,000,000 Annual Aggregate for all losses over the course of the policy term.

The pumping station and the pipe line located in Dane County will be considered a single location for the purpose of determining the aggregate limit of liability required.

If said insurance policy insures more than Dane County properties the policy shall have an Annual Aggregate Limit of $50,000,000.

Self-Insured Retention
The maximum self-insured retention on this policy shall be the underlying insurance including the Self Insured retention in the Enbridge Master General Liability insurance program or $1,000,000.

Evidence Of Insurance
Upon request by Dane County, Enbridge shall furnish a certificate of insurance to the county which accurately reflects that the procured insurances fulfill these insurance requirements.

Appendix B: Federal sources of oil spill clean-up cost and victim compensation funding

This reference material is derived from **http://www.fas.org/sgp/crs/misc/R43128.pdf**
And has been edited for ease of reference in this report.
Oil Sands and the
Oil Spill Liability Trust Fund:
The Definition of "Oil" and
Related Issues for Congress
Jonathan L. Ramseur
Specialist in Environmental Policy
January 22, 2015

"The Oil Spill Liability Trust Fund (OSLTF) provides an immediate source of federal funding to respond to oil spills in a timely manner. Monies from the OSLTF can be used to respond to a wide variety of oil types, including oil sands-derived crude oils.

However, the OSLTF arguably plays a backup role in terms of response funding during many oil spills. The responsible party for an oil spill often provides the primary source of response (i.e., cleanup) funding, and the federal government may recover costs or damages paid from the OSLTF. This was the case with the Enbridge leak in Line 6 B no federal dollars were used Thus, the financial impact to the trust fund could be minimal if the majority of its payments are reimbursed by the responsible parties. Nonetheless, the liability of responsible parties may be limited under certain conditions.
In those situations, the OSLTF could effectively pay—up to a per-incident cap of $1 billion."

Uses of the Fund
"Pursuant to OPA Section 1012, the trust fund may be used for several specific purposes:

- payment of removal costs, including monitoring removal actions, by federal authorities or state officials;

- payment of the costs incurred by the federal and state trustees of natural resources for assessing the injuries to natural resources caused by an oil spill, and developing and implementing the plans to restore or replace the injured natural resources;

- payment of parties' claims for uncompensated removal costs, and for uncompensated damages."

The Oil Spill Liability Trust Fund

Figure 2. Oil Spill Liability Trust Fund

Receipts, Expenditures, and End-of-Year Balances

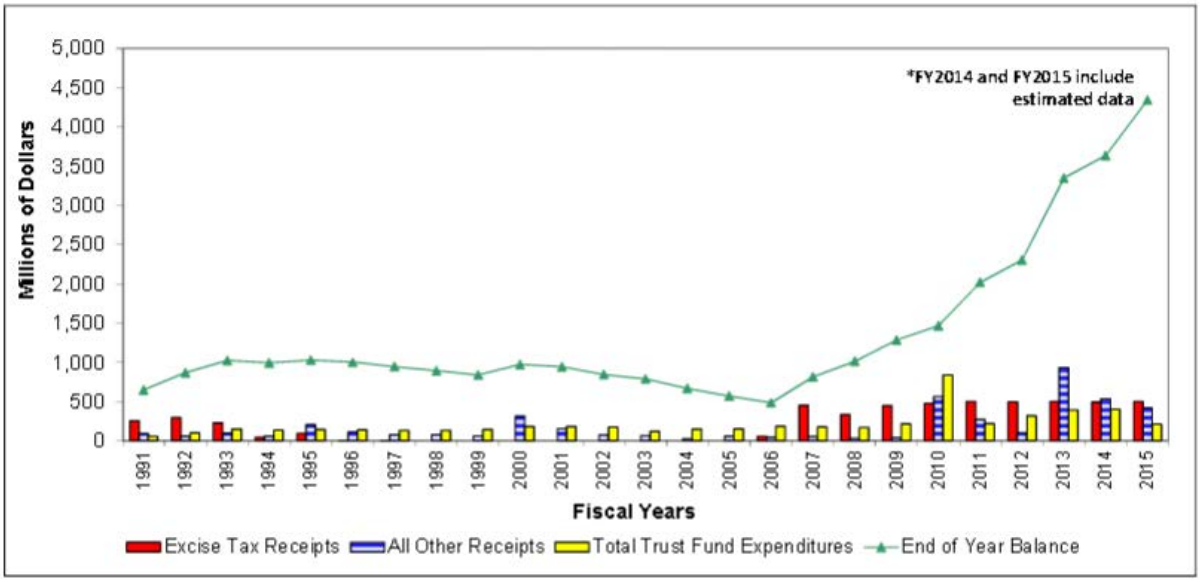

Source: Prepared by CRS; data from annual Office of Management and Budget, Budget of the United States Government, Appendices.

Notes: The initial gap between the end-of-year balance (line) and the receipts-expenditures columns is due to the FY1991 starting balance of $358 million. The relative increases in "other receipts" in 1995 and 2000 are due to transfers from the Trans-Alaska pipeline fund of $119 million and $182 million, respectively. The increases in expenditures and "other receipts" between 2010 and 2013 are related to the 2010 *Deepwater Horizon* oil spill.

As **Figure 2** indicates, the "other receipts" category has contributed a substantial portion of revenues in recent years, the vast majority stemming from the 2010 *Deepwater Horizon* oil spill. Other receipts include earned interest on the unexpended trust fund balance, fees from fines and penalties, and cost recovery from responsible parties. The trust fund is likely to receive additional revenues related to that incident, particularly from anticipated Clean Water Act civil penalties on BP.

Appendix C: Relevant Enbridge Financial Facts

SEC Filings - Form 10-Q

Enbridge Energy Partners LP filed this form on 5/2/2014

Excerpts taken from the Enbridge 2014 annual report

The Partnership expects adjusted EBITDA for 2015 to increase approximately 12 percent, to between $1.68 billion and $1.78 billion, and expects distributable cash flow for 2015 to increase approximately 15 percent, to be between $900 million to $960 million

Page 23 - Legal and Regulatory Proceedings

A majority of the costs incurred for the crude oil release for Line 6B are covered by the insurance policy that expired on April 30, 2011, which had an aggregate limit of $650.0 million for pollution liability. Including our remediation spending through March 31, 2014, we have exceeded the limits of coverage under this insurance policy. As of March 31, 2014, we have recorded total insurance recoveries of $547.0 million for the Line 6B crude oil release, out of the $650.0 million aggregate limit. We expect to record receivables for additional amounts we claim for recovery pursuant to our insurance policies during the period that we deem realization of the claim for recovery to be probable.

In March 2013, we and Enbridge filed a lawsuit against the insurers of our remaining $145.0 million coverage, as one particular insurer is disputing our recovery eligibility for costs related to our claim on the Line 6B crude oil release and the other remaining insurers assert that their payment is predicated on the outcome of our recovery with that insurer. We received a partial recovery payment of $42.0 million from the other remaining insurers.

Of the remaining $103.0 million coverage limit, $85.0 million is the subject matter of the lawsuit Enbridge filed in March 2013 against one particular insurer who is disputing our recovery eligibility for costs related to our claim on the Line 6B oil release. The recovery of the remaining $18.0 million is awaiting resolution of this lawsuit. While we believe those costs are eligible for recovery, there can be no assurance that we will prevail in our lawsuit.

We are pursuing recovery of the costs associated with the Line 6A crude oil release from third parties; however, there can be no assurance that any such recovery will be obtained. Additionally, fines and penalties would not be covered under our existing insurance policy.

Enbridge will renew its comprehensive property and liability insurance programs which will be effective May 1, 2014 through April 30, 2015 having a liability aggregate limit of $700.0 million, including sudden and accidental pollution liability. The deductible applicable to oil pollution events will increase to $30 million per event, from the current $10 million. In the unlikely event that multiple insurable incidents occur which exceed coverage limits within the same insurance period, the total insurance coverage will be allocated among the Enbridge entities on an equitable basis based on an insurance allocation agreement the Partnership has entered into with Enbridge, Midcoast Energy Partners, and other Enbridge subsidiaries.

Environmental

Lakehead Line 6B Crude Oil Release

During 2014, our cash flows were affected by the approximate $141.4 million we paid for environmental remediation, restoration and cleanup activities resulting from the crude oil release that occurred in 2010 on Line 6B of our Lakehead system.

In March 2013, we and Enbridge filed a lawsuit against the insurers of our remaining $145.0 million coverage, as one particular insurer is disputing our recovery eligibility for costs related to our claim on the Line 6B crude oil release and the other remaining insurers assert that their payment is predicated on the outcome of our recovery with that insurer. We received a partial recovery payment of $42.0 million from the other remaining insurers during the third quarter 2013 and have since amended our lawsuit, such that it now includes only one carrier. While we believe that our claims for the remaining $103.0 million are covered under the policy, there can be no assurance that we will prevail in this lawsuit.

MR. DAN MCGOWAN: Dan McGowan, D-A-N, M-C-G-O-W-A-N. I'm with the labor union, and overall, we'd like to thank the Department of Commerce today for putting together an environmentally safe Environmental Impact Statement that on its face goes above and beyond what the law requires.

Five thousand pages of facts and analysis on every aspect of the project makes it the most carefully studied pipeline in state history from an environmental perspective.

We also want to thank the Department for its commitment to keeping the process moving so the Public Utilities Commission has the information it needs to make a decision within the 280-day time period set by state law.

The Draft EIS badly underestimates the positive socioeconomic impacts of the estimated 4,800 construction jobs created by the project, based on the flawed assumption that the project will employ 2002-1

2002-1
Cont'd

zero local workers. That assumption is dead wrong.

The project will be built under labor agreements that require contractors to employ laborers, operators, and teamsters referred by local unions, including both current members and new recruits.

Our union and contract partners have historically put thousands of local residents to work on various pipeline projects.

Minnesota has a plethora of skilled pipeline labor. We have hundreds of members who pipeline across the country that live in northern Minnesota and welcome a chance to work close to home.

For these reasons, locals will likely account between a third and a half of the construction workforce, and a majority will be Minnesota residents.

We recommend that the Department reanalyze the population and impacts of the project based on this more realistic estimate of local construction employment.

We believe that the use of a

more accurate local employment figure will highlight the significant contribution that these high quality jobs make to household incomes, tax received, et cetera.

The Draft EIS also underestimates the positive socioeconomic impact of the estimated 4,800 construction jobs created by the proposed Line 3 replacement by failing to fully account for the value of the jobs and associated benefits, as well as the long-term career building opportunities created by the project. 2002-2

Pipeline projects, on a scale of the Line 3 replacement, create opportunities for locals without prior union construction to pursue family supporting construction careers.

Many current members got their start on similar projects and chose to either continue in pipeline work or branch out into building other civil construction.

The project will also help us to fund the unlimited free skills training available to our members to build their careers.

Union pipeline workers -- union

2002-2 Cont'd

pipeline construction workers receive high quality family health coverage that typically lasts well beyond the length of a project.

Thousands of area union and family members would be covered as a result of the project at no cost to taxpayers.

Union pipeline construction workers also will see pension contributions that help provide financial and retirement security for local union households, in addition to helping sustain local economy.

We would be happy to explain the mechanics of union (indiscernible) to the team working on the Final EIS to ensure that it accurately captures the full impact of the project and the alternatives.

The impacts of construction expenditures for a major pipeline project on area small businesses are anything but minor.

2002-3

The Draft EIS fails to address the public safety impacts of rail alternatives, which include injuries and fatalities at rail crossings as well as the risk of a major fire explosion caused by a derailment.

2002-3 Cont'd

Overloading Minnesota rail lines with oil tanks would expose cities and towns across the state to public hazards.

The Department should incorporate the finding of MNDOT 2014 Crude Oil Safety Reform and the U.S. Department 2014 Keystone XL Analysis. It's estimated that the rail alternative would result in 49 injuries and six deaths versus a single injury for the pipeline.

2002-4

The Draft EIS devotes too much attention to so-called system alternative, which is useless because it wouldn't reach the refineries that rely on Line 3 to refine the fuel that millions of Minnesotans depend on for daily life.

In summary, I would say Line 3 replacement is the best way to protect the environment. Replacing Line 3, as proposed by Enbridge, is estimated to reduce the risk of a spill by nearly 40 percent.

That is a conservative estimate because it's based on the averages for old pipelines, and Line 3 faces above average integrity challenges.

Integrity digs keeps lots of labor employed, but in the case of Line 3 there's no substitute for a pipeline built using modern technology and construction.

Thank you.

Levi, Andrew (COMM)

From: Ugo Mena <ugomena@gmail.com>
Sent: Saturday, July 08, 2017 3:52 PM
To: MN_COMM_Pipeline Comments
Subject: Comment regarding docket numbers CN-14-916 and PPL-15-137

Despite the DOC's vehement objections, Enbridge is so far successfully fighting to withhold spill volume estimates from the public, for "security" reasons.
There is no analysis of the economic need for the pipeline.
There is no plan for addressing the contamination they will inevitably find when they shut down the existing Line 3. Indeed, only 16 of the 5,000+ pages are devoted to the issue of pipeline abandonment — just enough to acknowledge all the liabilities we pass on to our grandchildren if we let Enbridge walk away from its mess. 1401-1
Frankly, this is a public policy crisis for Minnesota, as Enbridge has three more ancient lines waiting to be abandoned and rebuilt in a new corridor.
The entire process prioritizes the corporation's "right" to make profit, and ignores the real questions of public need and purpose. There is a glut of oil supply everywhere, global demand is declining, and so is Minnesota's.
Anyone can see the right thing to do: deny the permit for a new Line 3 and require Enbridge to clean up the old one. But the false assumptions, glaring omissions, and twisted framing of alternatives in the DEIS show that the state's morality and common sense are still blinded by the temptation of temporary construction jobs and tax revenue. I demand better!
Ugo Mena

MR. PAUL MENEGHINI: Thank you for the opportunity to present my comments. My name is Paul Meneghini, P-A-U-L, M-E-N-E-G-H-I-N-I, and I'm an employee of Enbridge.

My following comments are solely my personal views based on my education and professional experience.

I'm a licensed professional

engineer in the state of Minnesota and have earned an MBA with a concentration in environmental management.

Although I'm not currently working on the Line 3 replacement project, my position at Enbridge over the past ten years has primarily been working on other large pipeline expansion projects.

As correctly noted in the DEIS, projects like this, either directly or indirectly, employ thousands of people before, during, and long after construction is completed.

This North American produced oil clearly has the least socioeconomic impacts to the U.S. and Canadian policies on humanitarianism. This could be addressed or noted in the final EIS.

Today I'd like to focus my comments based on my experience prior to being employed by Enbridge. I used to be an environmental consultant and dealt primarily with various clients during Brownsfield's redevelopment and distressed property cleanup.

Most of these sites were

unfortunately impacted by petroleum contamination. Based on a quick search of the MPC's online leak site database, over 20,000 petroleum leaks have been reported in the state of Minnesota since the early 1980s when reporting requirements were implemented.

A large majority of these leaks were at retail gasoline service stations. What many may not know is that gasoline is much more hazardous, more volatile, immobile, in soil and groundwater than crude oil if leaked in the environment.

In addition, most gas stations tend to be located in urban areas, naturally where their customers, you and I, live, which can create additional human exposure pathways.

My point of referencing this information is to request the Final EIS further attempt to explain to the general public that petroleum releases do not mean widespread devastation and loss of land use forever. 1822-1

Below ground impacts from petroleum releases typically travel only a few hundred feet maximum in soil or water. From there, naturally occurring reactions take place

1822-1
Cont'd

and the impacts cease to migrate further and reduction occurs.

In addition, with today's reporting, cleanup standards, and risk-based management approaches, petroleum releases typically cause very little long-term damage to the public or the environment. The notion conveyed by many as part of these comment meetings that even a small crude oil leak threatens water quality and drinking water quality to millions of people downstream is simply false, based on science.

In conclusion, risks are associated with anything we do in our lives. One purpose of the EIS process is to evaluate the potential human and environmental affects of approving the project. In other words, what are the risks?

We all took a risk by coming here tonight, whether driving, biking, or even walking. Something could have happened along the way outside of our control which could have had a bad outcome on our health, the environment or our general wellbeing.

If we had stayed home, we could

have avoided these risks, but in order to live our lives and express our opinions tonight, we successfully managed those risks by using our seat belts, obeying traffic signs, following the speed limit, and even wearing a helmet if we biked.

Pipelines in general, even more specifically, the route proposed by Enbridge as assessed in the DEIS, indicates that it's the best route by balancing and controlling the risks presented.

Levi, Andrew (COMM)

From: Andy Pearson <andy@mn350.org>
Sent: Monday, July 10, 2017 11:56 PM
To: MN_COMM_Pipeline Comments
Cc: Kathy Hollander
Subject: MN350 comments for CN-14-916 and PPL-15-137
Attachments: MN350 L3R DEIS Comments.pdf

Dear Jamie MacAlister,

Attached please find MN350's comments on the DEIS for the Line 3 Replacement proposal.

We appreciate your careful attention.

Thank you,

--
Andy Pearson
Midwest Tar Sands Coordinator, MN350
andy@mn350.org
612-600-5951

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

MN350 Comments on the Draft EIS **July 10, 2017**
Dockets CN-14-916 and PPL-15-137

What is MN350?

MN350 is the state chapter of the worldwide organization 350.org, an organization dedicated to building a people's movement to address climate change and climate justice. We are deeply concerned about the startling rise in CO2 levels in the atmosphere, since we work for a just, sustainable future and a livable planet. Our work is grounded in peer-reviewed climate science and in grassroots organizing supported by staff and volunteers.

Individuals within our organization have learned a great deal about crude oil pipelines over the last five years. We have attended and participated in many meetings and public hearings at the Public Utilities Commission, and were an intervening party with legal representation in the Alberta Clipper Phase II expansion docket.

Some of us have testified and advocated before the State Legislature for stronger pipeline and railroad safety laws, fossil fuel divestment, and more renewable energy. We have defended against attacks on existing policy and advanced and passed new measures into law.

Some of us have traveled to the tar sands fields of northern Alberta, many more have visited the mainline pipeline corridor, the Applicant's preferred route and the Headwaters of the Mississippi. Some of us live on or near the pipeline corridors, both existing and proposed. We have traveled and led bus tours to Standing Rock and the Mainline Corridor.

We care about community safety along rail corridors and organized commemorative events after Lac Magantic. We track the movement of oil by rail through the Energy Information Agency and the National Energy Board of Canada. We have spent time speaking with staff and analyzing data from the Pollution Control Agency and the Minnesota Office of Pipeline Safety.

We communicate with landowners along the mainline corridor and the Applicant's proposed Corridor.

We track the movement of oil through throughout the Midwest region via reports filed at the Federal Energy Regulatory Energy agency and have attended Pipeline Safety Trust Meetings. We stay informed through daily news briefings on oil, crude oil pipelines and climate change.

We are part of a much larger movement resisting crude oil pipelines as we advocate for clean energy for a variety of reasons, from climate change to indigenous rights to protection of Minnesota's most pristine waters. We have been featured on television news reports and in many articles.

We are the embodiment of the Minnesota Environmental Policy Act, which says that "each person has the right to contribute to the protection, preservation and enhancement" of the air, water, land, and other natural resources located within the state."[1] We are exercising our right to protect our state from private economic interests that threaten these resources, and – most importantly of all to us – our threatened and already damaged water resources and worldwide climate.

Our comments on the Draft Environmental Impact Statement (DEIS) are below.

The timeline for this first DEIS on a crude oil pipeline was challenging, as this is massive project and there was no precedent in the state. While it is a first draft, it is not adequate in

1 §Chapter 116B.01

its current form and fails to meet the requirements of Minnesota's Environmental Policy Act. We call upon the Department, the Commission and the Governor to recognize

- the massive nature of this project,
- the fact that this is a first ever EIS for a crude oil pipeline in this state, and this project would establish a new corridor through Minnesota,
- this is the time for the government of Minnesota to have a meaningful role in evaluating and choosing a new pipeline corridor, if one is in fact needed, and
- this is the time for the government of Minnesota to reconcile its stated climate change goals with a Canadian project proposer's economic interests.

Because this DEIS will set a precedent for a crude oil pipeline EIS within Minnesota and potentially set the framework for a new pipeline corridor, we ask for the following serious omissions and flaws to be rectified prior to the issuance of a FEIS in order to protect Minnesota's interest.

Executive Summary comments

The following comments are organized by Executive Summary sections and apply to the text in the PDFs found at https://mn.gov/commerce/energyfacilities/resource.html?Id=34695. The Executive Summary PDF is different than the handout passed out at the Public Meetings; our comments pertain to the online PDF.

What is the Line 3 Project? (pg ES-1)

The Executive Summary is incorrect when it states the Mainline System ships an estimated 2.9 million barrels a day. According to the 2016 Form 6 year-end report Enbridge filed with the Federal Energy Regulatory Commission (FERC),[2] the Mainline 2462-1

2 FERC Financial Report FERC Form No. 6: Annual Report of Oil Pipeline Companies and Supplemental Form 6Q: Quarterly Financial Report, submitted by Enbridge Energy, Limited Partnership End of 2016/Q4, pg 600. The last column in row 1 shows the annual number of barrels transported across the international border in 2016: 881,369,313. Divided by 365 days, that is an average of 2.4 million barrels a day. Column B, line 3 shows the number of barrels received in Minnesota, from the NDPL Line 81 and from storage tanks at Clearbrook. The FERC reports can be accessed at www.ferc.gov. Select Documents and Filings, e-Library, General Search, Select data range of report filing, uncheck issuance box, check oil box, Class=Report/Form, select Form 6 for the Annual Report, Text = "Enbridge Energy, Limited Partnership", uncheck Full Text Box. Similarity, these forms can be accessed for the North Dakota Pipeline Company and the Minnesota Pipeline Company.

system shipped **2.4** million barrels per day across the international border, and our calculations based on several FERC reports from Enbridge, North Dakota Pipeline Company, and Minnesota Pipeline Company show the mainline shipped approximately 2.3 million barrels a day from Clearbrook to Superior WI. The estimate in the DEIS is high by one-half a million barrels a day. The FERC data is readily available to the Department, at www.ferc.gov. 2462-1cont.

The Executive Summary is misleading and high in its estimate when it states "Enbridge" transfers approximately 400,000 barrels per day (bpd) to the Minnesota Pipeline Company, which serves the two refineries near the Minneapolis/St. Paul metro area. On their 2016 Year End FERC report, Enbridge reported approximately 300,000 bpd were transferred from the Enbridge Mainline system (primarily Canadian crude but also some Bakken oil) and 70,000 from the North Dakota Pipeline Company (Bakken oil) to the Minnesota Pipeline Company (MPL). The Executive Summary concerns a pipeline that is part of the Mainline system, so it is important to be clear that only ¾ of what the DOC estimated is actually being transferred from the mainline system to MPL. A reader of the Executive Summary might well infer the 400,000 bpd cited were all transported on the Enbridge Mainline system from Canada.

The Executive Summary is misleading when it states Line 3 is capable of carrying 760,000 bpd, when in fact it will be capable of carrying 915,000 bpd according to Enbridge's Application for Certificate of Need.[3] This is important for worst case spill analysis. 2462-2

The Executive Summary neglects to mention the 1855 treaty that assures the native sovereign rights to hunt fish and gather when it simply states "as well as ceded territory that tribal members ***value*** for wild rice, hunting, and fishing" [emphasis added]. 2462-3

What is the purpose of this Environmental Impact Statement? (pg ES-3)

The Executive Summary is incorrect when it states the "purpose of and need" for this EIS is to help inform only the Commission. There are three end users cited in Administrative 2462-4

3 Enbridge Energy, Limited Partnership Certificate of Need Application April 2015, MPUC Docket No. PL-9/CN-14-916 pg 8-3 .

Rule 4410.0300 and 4410.2000[4]: the project proposer, the Commission, and the public. As members of the public, we emphasize the role the EIS has in providing useable information to the public. We also note Part B of this rule says we have an explicit right to have access to decision makers and an explicit duty to encourage accountability.[5] It is not that we just "can use the information in the EIS" as stated in the EIS but we have a stated right and duty to uphold for the correct functioning of our democracy. 2462-4 cont.

Who prepared the EIS? (pg ES-3)

We request more information as to what portions of the EIS were essentially authored by Enbridge, Cardno, Stantec or other consultants and their background to the oil industry. This is required by Adm. Rule 4410.2300 Part D and furthermore is important and pertinent information in a democracy. It is disingenuous to the public to have to do a word for word comparison to the project proposer's Environmental Assessment Worksheet and guess at the authorship of paragraphs in the EIS. We cite the recent news reports that the state of Michigan terminated its contract with the contractor in charge of analyzing the risks of Enbridge's Line 5, because it became apparent an individual on the team had worked for or still was working for Enbridge. 2462-5

What is a Certificate of Need, and how will "need" be determined? (pg ES-3)

Whether or not the Commission "first considers the underlying economic need" in past CN proceedings, we disagree that this is how the Commission should apply the statutes and Administrative Rules cited. Minnesota Administrative Rule Part 7853.0130 lists four parts, as the Commission is aware, with sub points under each one. No one part is more important under the law; they each have equal weight. In addition, under MEPA, which is

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4 Adm Rule 4410.0300 Part A
A. provide usable information to the project proposer, governmental decision makers and the public concerning the primary environmental effects of a proposed project;

5 Adm Rule 4410.0300 Part B
B. provide the public with systematic access to decision makers, ***which will help to*** maintain public awareness of environmental concerns and ***encourage accountability in public and private decision making***;[emphasis added]

in Minnesota Statutes and hence holds more weight than Administrative Rules, economic considerations alone cannot justify decisions that have potential to harm the environment.

Minnesota Statute §116D.03 Subd. 2 states "All departments and agencies of the state government shall: identify and develop methods and procedures that will ensure ***environmental amenities and values,*** whether quantified or not, ***will be given at least equal consideration in decision making along with economic and technical considerations;"*** [emphasis added]

Minnesota Statute §116D.04 Subd. 6 also states
"**Prohibitions.** No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. ***Economic considerations alone shall not justify such conduct."*** [emphasis added]

What alternatives were considered in the EIS for the Certificate of Need decision? (pg ES-4)

We insist on the option of a truly "No Action" option be included as an alternative to granting a Certificate of Need (CN). This would involve denying a CN and the Commission using the strongest language possible recommending Enbridge cease operation of their failing Line 3 pipeline. 2462-6

We disagree that if this CN is denied, the only option to be realistically considered in this Executive Summary is that the Applicant (or entities other than the Applicant) could be expected to meet shipper demand for the oil through other means, such as other pipeline 2462-7

systems, rail or truck. We have seen shipper demand change, as Marathon Petroleum moved to the Dakota Access pipeline in the recent case of the Sandpiper proposal. Clearly, shipper demand can change once a pipeline is denied. Oil is a fungible commodity, and shipper demand can change based on price, buyers for the product, and transportation costs. The world is in transition to electric fueled transportation options, and we note the article in Star Tribune on July 10, “Will Minnesotans Plug in to the electric car surge?” by Eric Roper. The Chevy Bolt is now available for purchase in Minnesota. Major car companies are producing or announcing production of electric engines powered cars, including Tesla, Nissan, BMW, Audi, and Chevrolet. Volvo recently announced it will build all electric and/or hybrid cars by 2019.

Extraction of and shipping oil from Canada is more expensive than extraction and shipping of most other sources of oil. Shipper demand is not a given if the price of oil remains low. Refineries on the coasts certainly have multiple sources of feedstock. Supply of oil worldwide has exceeded demand for several years and jittery markets react to every oil or refined product inventory shift and OPEC nations’ production cuts. Non-OPEC nations, including the United States, undercut the OPEC production cuts by increasing their output. The supply of and demand for oil market has yet to balance even now during the peak driving season in summer (here we direct the reader to the EIS charts of oil inventory supply) and prices have been volatile. Many firms have pulled out of the tar sands fields (see below) and have reduced capital expenditures. After Keystone XL was originally denied, 24 other projects were canceled, including mines, pipelines, plants, related rail projects and export terminals.[6] No train terminal loading facility was built at the International border. Meanwhile demand has been artificially inflated by the building up of China’s and other nations build-up of strategic and other oil reserves. All of these factors are at play, and to assume that oil will move regardless of new pipeline construction is a risky assumption.

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6 “It's Not Just Dakota Access. Many Other Fossil Fuel Projects Delayed or Canceled, Too”, Zahra Hirji, Inside Climate News, Dec 5, 2016 ,last accessed 7/10/17 at https://insideclimatenews.org/news/06052016/fossil-fuel-projects-cancellations-keystone-xl-pipeline-oil-coal-natural-gas-climate-change-activists

More likely alternatives in the event that the Line 3 project does not proceed include would include more companies in the Canadian tar sands fields cutting production, delaying opening of new mines or wells, and the gradual reduction of the tar sands operations.

With the completion of the five recent sales, about two-thirds of oil sands production[7] will be concentrated in the hands of Canadian companies, according to data compiled by JWN Energy. (JWN's analysis cites a higher figure, but includes production by Imperial Oil, a Canadian company in which ExxonMobil holds a controlling interest.) That means investment likely will shrink, said Jennifer Winter, an energy economist at the University of Calgary's School of Public Policy.

"If there are fewer investors in the oil sands, or there's more concentration with the exit of these multinationals, it means that unless the companies operating in the oil sands are able to attract significant amounts of outside capital, it's probably going to be slower growth than if Shell or ConocoPhillips stayed," she said. "The oil sands are going to continue to be one of the marginal production areas for the near future.""[8]

Both Exxon Mobil[9] and BP[10] have admitted they need the price of oil to rise to $60 barrel before they are again profitable and/or at the breakeven point. Exxon disclosed they have 3.4 billion dollars of stranded assets on their books unless oil prices rise above that level.

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7 "Charts: Canadian companies about to own 80 percent of oilsands production", Deborah Jaremko March 30, 2017, last accessed 7/1/0/17 at :http://www.jwnenergy.com/article/2017/3/charts-canadian-companies-about-own-80-percent-oilsands-production/

8 "Exodus From Canada's Oil Sands Continues as Energy Giants Shed Assets", Nicholas Kusnetz, April 4, 2017 last accessed 7/10/2017 at https://insideclimatenews.org/news/13042017/canadian-oil-sands-tar-sands-climate-change-conocophillips-exxon.

9 Exxon's Big Oil Sands Write-Off Could Help It Dodge SEC Troubles, Fortune Finance, Geoffrey Smith, Feb 23, 2017, last accessed 7/10/2017 at http://fortune.com/2017/02/23/exxon-mobil-oil-sands-sec/

10 As published in the Star Tribune Feb 14, 2017 – a small article ""BP said it needed the price of a barrel of oil to rise to $60 by the end of this year in order for it to break even….The oil company reported a loss of almost $1 billion for the last year."

Reuters is reporting DeJardins is considering stopping funding pipeline projects[11] and US Bank has announced no more pipeline project funding.[12]

We also note Alternative Number 2, "Use of other pipelines" on page ES-4 is not discussed in this EIS, other than the System Alternative SA-04, which is the third point. Enbridge could also come up with other pipeline proposals. This could involve the reversal of Line 13, which now carries diluent back to Canada or purchasing other existing pipelines. 2462-8

We disagree that SA-04 is an alternative pipeline system; it is a route alternative, as the vast majority of the oil, if not all, is designed for refineries beyond Superior, and hence direct transportation to the Illinois Enbridge hubs is a viable option. The large BP Whiting refinery is located in the Chicago area, for example. The PUC has artificially created a new category, named it and treats it as something unusual while their rules have cited such an option (more reasonable, prudent alternative) all along. We object to the use of the dismissive adjective "conceptual" prefacing references to SA-04. 2462-9

Table ES-1 has errors in the third column and bottom two rows, is confusing and unnecessary. Several people within MN350 have spent hours analyzing this confusing table, and it appears even the drafters of the EIS did not understand the matrix table. The drafters also changed the wording of Part B, which lead to the confusion. But as the wording of Part B is written in the Executive Summary, the chart is incorrect. 2462-10

If the premise of the chart is that a failure of any of the parts of 7853.0130 to be met would cause a denial of the Certificate of Need for the Applicant, then the "Yes" in the bottom two rows and the third column (which also is the second green column) should be "No". If this is not the case, the Department is highlighting even if parties, the EIS or the public demonstrate that there is a more reasonable and prudent alternative, a Certificate of Need still could be granted. The table also implies even if parties, the EIS or the public

11 "Canada's Desjardins may stop pipeline loans, cites environment", Ethan Lou, July 8, 2017, last accessed 7/10/2107 at https://www.reuters.com/article/us-desjardines-pipelines-idUSKBN19U00I

12 US Bank Environmental Responsibility Policy, last accessed 7/10/17 at https://drive.google.com/file/d/0BySQDR8NI-yiWEdvNlFuTndNNGs/view "The company does not provide project financing for the construction of oil or natural gas pipelines."

demonstrate there is a more reasonable and prudent alternative, the Commission would still proceed to evaluate the consequences to society, and whether applicable policies and laws were met. Also, why isn't there a separate column for Part D of 7853.0130? It is conceivable that all three parts (A,B and C) of the Rule could be met, but not Part D. 2462-10 cont.

The reader is left totally confused. Administrative Rule 4410.0300 Subp.4 states the information provided in an EIS must be "usable". Who will use this table? The Commission will certainly make their own decision and the table is very confusing for the public.

We request clarity as to what the Commission would do if any of the four parts of Rule 7853.0130, or any of the subparts, for example, were not met. For example, is Table ES-1 stating that <u>if</u> parties can show that the consequences to society of granting the certificate of need are <u>not</u> more favorable than denial, then the CN would be denied even if the other requirements were met? Table ES-1 implies the Department has consulted with the Commission on this issue, and we at MN350 would like verification that the Department can speak for the Commission on this matter.

The table also implies consideration of denial of the CN based on adequacy, reliability or efficiency must come first in the process, whereas it is our understanding that all four parts of the rule are equally weighted.

The use of the green and pale red colors is unclear and unnecessary. Does green subtlety mean the Applicant's project can proceed with a green light and pale red mean the project is on a trajectory to be denied?

Also, the top row, last column is incomplete. "…Evaluated for Environmental" is an incomplete phrase.

<u>What is a route permit and how will the route be determined?</u> <u>(pg ES-7)</u>

The legend and the Figure ES-2 are very difficult to read in the PDF published online. We request use of the landscape format rather than portrait to make it easier to read and create the Figure with high resolution, as you seem to have done in the handout used in the Public Meeting. Also, there is a **noticeable discrepancy in the font** used for the Minnesota river label versus the Mississippi River. Also, the path of the Mississippi river is not clearly marked, especially as it crosses the route alternatives. 2462-11

The first sentence not phrased correctly in the phrase "in addition to deciding whether to issue a CN". The CN must be issued before the Route permit, as the DEIS correctly states in the second paragraph. 2462-12

How do tribal and federal approvals affect the route decision? (pg ES-7)

Elsewhere, the EIS states that Leech Lake has said "no" to any further pipelines. Please state that in the Executive Summary, rather than the much vaguer statement "Enbridge maintains that the ability to obtain limited-term permits and easements is too uncertain". Many members of the public were not aware of the Band's position when they requested consideration of use of the existing mainline route for Line 3. It is also important for the Commission to understand the Band has said no to any additional pipelines on their lands. We reiterate, the purpose of the EIS is to inform. 2462-13

Figure ES-3 Please change to landscape format rather than portrait and enlarge. 2462-14

How is the public involved in preparing the EIS, and how will they be involved in the final decision? (pg 10)

We look forward to the feedback on these comments to the draft EIS and have been assured that a response to each comment received will be prepared. We hope the feedback will be as substantive as the feedback given to the Applicant and that we find out whether our individual suggestions for improvements were implemented.

We object to the one way communication of the Public Comments at the Commission Public Hearing. We have testified many times before many hearings and seldom if ever receive any comments back.

MAJOR ISSUES FOR THE CERTIFICATE OF NEED DECISION (pg ES-10)

What are the advantages and disadvantages of continuing to use existing Line 3? 2462-15
Most if not all of these paragraphs would apply to Lines 1, 2 and 4 as well. Therefore they should be included in cumulative potential effects.

How are the risks of accidental oil release different for pipelines, trains and rail? (ES-12)

Additional risks should be added, such as how much of the oil can be recovered. 2462-16
As was explained to Ms MacAlister at one of the public hearings, **Figure ES-4. Incorrectly graphs** the average size of an accidental release for pipelines. Per the text, the number is 462 barrels for pipelines, and the right axis should have been used. Instead the left axis was used. Also, we note this graph is national pipeline data for 2007-2017; Enbridge specific data was not used and is more relevant to this EIS.

A better way to present this information would be to plot the spill size on the y axis and the spill frequency on the x axis, shading to show total area, because it reveals an additional information point that was frequently asked about in the public meetings: the total quantity of oil per year that each mode of transportation is estimated to spill. In addition, this proposed graph format would be much easier to understand at a quick glance. Here's an example of what this could look like:

2462-16 cont.

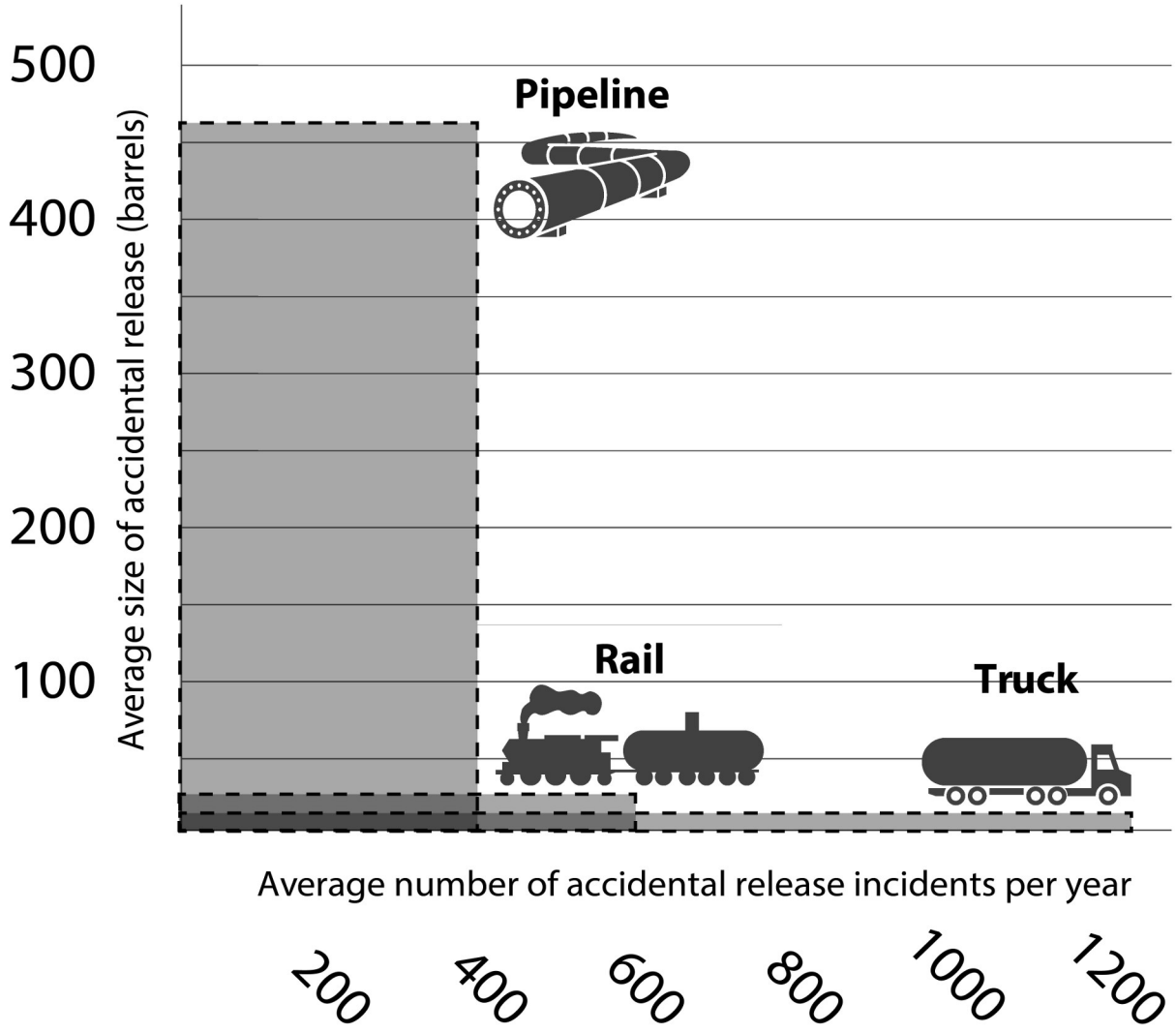

Table ES-2 has a large number of problems and should be deleted.

The table does not list the expected *amount* of released oil expected to contact all resources of concern in each alternative scenario. The DEIS only provides the area (in acres) that contacts each route (within a specified buffer size) But, the amount of oil expected to be spilled from each route is not the same for all alternatives. Thus, the analysis of ‘exposure’ as provided in the DEIS is relatively meaningless in terms of analyzing actual risk to conservation areas and other areas of concern, without knowledge

of the total amount of oil expected to come in contact with resources of concern from each alternative. The total amount of expected oil spilled per unit area is the operative value of concern to reviewers of this document, and needs to be stated clearly and without obfuscation in the Executive Summary, and in the relevant chapters of the full DEIS. 2462-16 cont.

The chart appears with little explanation – for example, the reader may not know what the categories in the left hand column all entail.

The fact that DOC has chosen a four state area acreage for SA-04 versus a single state (with a same amount of North Dakota and Wisconsin) acreage for the Applicant's preferred route is not apparent, misleading and highly biased to show Enbridge's route in the most favorable light. There should be a Minnesota to Minnesota comparison between routes. 2462-17

The chart purports to be acreage potentially exposed to a crude oil release. All acres are not the same for oil spill impacts – cleaning up oil from wetlands, rivers, permeable or clay soils is very different. 2462-18

The reader is left to wonder about construction impacts. Where are they charted? 2462-19

The alternatives chosen are not realistic; no one can imagine shippers using trucks for transporting 400,000 barrels a day of oil, for example, and economics make rail and truck an expensive alternative in today's volatile oil market. 2462-20

What are the advantages and disadvantages of continuing to use the existing Line 3? (pg ES-11)

The Executive Summary acknowledges the Mainline Corridor "was not subject to state or federal environmental review or state procedures for CN and route permitting, and did not consider environmental justice issues." As state decision makers now are faced with this reality, you, Department of Commerce and the Commission, have the choice of either correcting the injustice or repeating it.

The drafters of the EIS acknowledge this in chapter 1, page 1-4 “the environmental review and permitting procedure for the Project presents an opportunity for a full evaluation of environmental and socioeconomic factors that did not necessarily enter into the original routing decisions for Enbridge’s Mainline system.”

Furthermore, the draft EIS states on page ES-1, ”Tribal members who submitted comments during this EIS process and provided input for this Draft EIS reported that all of the proposed routes, including either keeping the current Line 3 in place or abandoning it, would add to the negative mental, spiritual, and physical health impacts already disproportionately suffered by American Indian populations.[13]” We request that you listen to these voices and allow the individual landowners and tribal nations to decide what to do with the wounds on their land – the old leaking pipe. Let them have the choice and request Enbridge to do removal as landowners and tribal nations wish. And we further request that you do not allow Enbridge a route permit on land covered by sovereign nations’ usufructuary treaty rights.

<u>What are the impacts of the CN Alternatives in high-quality water resources?</u> (pg ES-14)

The MPCA”s IBI index is a way to measure the general region wide or state wide differences in surface water quality across Minnesota. It is mentioned in Chapter 5, but not used. 2462-21

Figure ES-5 is too small to read clearly in the published PDF; it is larger in the handout passed out at the Public Meetings. The legend for this figure is placed immediately to the right of SA-04, however, and diverts the eye from the small amounts of high quality surface waters crossed by SA-04. We request you place the legend below the figure. 2462-22

13 See Brave Heart, M.Y.H. (2011). Welcome to Takini’s historical trauma. Historical Trauma. Retrieved from http://historicaltrauma.com/” Historical trauma describes multigenerational trauma experienced by American Indians because of continuous subjection to trauma, poverty, dislocation, war, as cumulative and collective

Will the proposed Project damage forests and wildlife habitat in northern Minnesota far more than any other alternatives? (pg ES-15)

The reader is left to wonder why there isn't a table similar to Table ES-2 for this section. For example, based on the words used in the section: 2462-23

Applicant Preferred Route	SA-04	Rail
Permanently affects more land cover & habitat of all CN alternatives	Would fragment less habitat	
Greatest long term major effects, primarily in forests of all CN alternatives		
Most sensitive vegetation categories of all alternatives		Also most sensitive vegetation categories
Most MN Biological Survey Sites of Biodiversity Significance of all CN alternatives		
Most MN Wildlife Action Network Species in Greatest Conservation Need of all Alternatives		
Half as many construction short term impacts on Ag Land;	Twice as many short term construction impacts on Ag land;	
75% in existing corridors	100% in existing corridors	

But instead of this table there is a figure showing the effect of two routes, and transport by train and truck on prime farmland and forests, showing SA-04 with the highest impact in bright orange! First of all, the question asked in this section is not about prime farmland but forests and wildlife habitat. Secondly, the chart cherry-picks the only data mentioned in this section that legitimately shows SA-04 in a less favorable light and is NOT

representative of the words in this section. The comments on acreage are irrelevant since the DOC choose to analyze SA-04 over four states while the Applicant Preferred Route is only analyzed from a tiny slice of North Dakota to a tiny slice of Wisconsin – basically just the Minnesota acreage. **Figure ES-6 is misleading as it does not represent the majority of the significant impacts in this section.** The legend is difficult to read and the figure does not reflect the majority of the accompanying text in the section. 2462-23 cont.

Will shipping the oil by rail or truck affect the movement of other commodities and pose safety risks? (pg ES-16)

This section fails to cite any analysis of whether the crude oil to be transported on new Line 3 is needed by the Minnesota or Superior refineries. It implies all the oil on Line 3 needs to be transported to, or through Clearbrook and Superior. This section ignores the 70,000 bpd, on average, that are supplied to the Minnesota refineries by a pipeline other than the Mainline Pipelines, according to reports filed by NDPL at FERC. 2462-24

The section fails to cite any analysis of routes that might be taken through the state if needed. The Keystone XL Final EIS cited routes through Rainy River to Superior, for example.

This section assumes all trucks and trains, if any, would go through Minnesota, instead of using more direct routes, especially if the oil was intended for Canadian refineries along the St Lawrence Seaway, or the Gulf Coast. 2462-25

This section fails to acknowledge the extensive capital improvements made by railroad companies operating in Minnesota since 2014 to relieve congestion.

This section fails to mention the amount of oil spilled by rail and truck is much smaller than by pipeline, as would be shown by a corrected Figure ES-4, and that Canadian heavy oil or a mixture called railbit or neatbit is much less flammable than the Bakken train explosions we have all seen and wish to avoid. The Parkers Prairie bitumen spill in 2013 2462-26

was an example of a Canadian oil by rail spill where the oil was so thick, the PCA reported it could be rolled up like carpeting. 2462-26 cont.

This section fails to mention the increased cost of shipping by rail or truck, and the economics of the Canadian oil industry in recovering the costs of extraction and transportation in a highly competitive market. Refineries on the Gulf Coast have a choice of where to purchase their feedstock, and shipments of oil can be sourced from Venezuela, Mexico or other countries. Movement by truck would be prohibitively expensive due to the human labor cost and the cost of all the trucks. This is not a reasonable alternative. 2462-27

This section also fails to mention some shippers will use oil by rail for their own reasons, such as for less complex refineries that need raw bitumen to make asphalt and do not have the facilities to process the diluted bitumen transported by pipeline. In a free market, all forms of transportation will be used, and because rail is faster, more flexible, keeps the oil from intermixing with other oils during transit, and avoids using storage in Superior, Illinois and Cushing, OK, oil by rail has a market niche. Small amounts of crude oil have been transported by rail from Canada for a number of years despite availability on the Enbridge Mainline system; apparently oil by rail is meeting a market need for some shippers.

This section also does not mention the decline in coal rail shipments that would have the effect of reducing congestion on the rails. This decline has occurred as coal plants, such as Black Dog and High Prairie have closed, and the trend will continue with the replacement of Sherco 1 and 2.

<u>What are the implications of greenhouse gases and climate change?</u> (pg ES-17)

The statement “All GHG emissions contribute to cumulative climate change, so all of the alternatives would play a role in global climate change” demonstrates a lack of 2462-28

consideration of potential decommissioning of the existing Line 3 pipeline in the event that a replacement is not built. 2462-28 cont.

Direct and Indirect Emissions

Table ES-3 should either be updated to include lifecycle impacts as a separate column, or clearly note immediately next to the graph that all listed carbon tonnages and social costs are in addition to the lifecycle emissions that the DEIS describes in Chapter 5. Without these lifecycle numbers listed in the Executive Summary (including the potential $287 billion social cost of carbon), it is easy for the reader to mistake the indirect carbon costs for the lifecycle costs. Minnesota has multiple policies in effect that encourage policymakers to weigh the overall carbon impact of projects heavily, and since the lifecycle impacts are part of this total, making an overview of this information available in the Executive Summary is a must. 2462-29

A social cost of carbon with a minimum timeframe of 60 years must be added to all climate categories. Enbridge is currently operating pipelines that are over 60 years old, and the DEIS lists 30 years as the project's minimum expected life. An honest report of impacts for policymakers and the public demands that they be presented with more than just the minimum potential climate costs. 2462-30

Lifecycle Greenhouse Gas Emissions (pg ES-18)

Figure ES-8 is mislabeled, carrying the same title as Figure ES-7. 2462-31

Page ES-18 notes that "An increase in the availability of options for transport via pipeline, for example, could lower the overall cost of transporting crude oil to market, thereby improving its market prospects." This is a critical point that should not be constrained to the climate change analysis section – it is relevant in alternatives analysis and multiple other sections as well. 2462-32

The U.S. State Department EIS for the Keystone XL pipeline, for example, found that tar sands oil was uneconomical to extract without further pipeline capacity when oil prices were under $70/barrel, which they are as of this writing. Since this is a subject for which actual data does exist (both historical extraction relative to market performance as well as several analyses of the viability of tar sands under different oil market scenarios), the speculation here is inappropriate and should be replaced by an analysis of the likelihood of extraction at all under various market conditions. 2462-32 cont.

This analysis must be incorporated into all climate change sections as well as the alternatives analysis.

<u>The Effects of Climate Change on the Project</u> (pg ES-19)

The statement "Primary impacts of climate change on the Project include severe weather, freeze-thaw cycles, and flooding, all of which could damage project facilities." is illogical and immoral to assess these climate impacts on the pipeline project but not the residents of Minnesota. The pipeline's contributions to climate change by facilitating the increased transportation of tar sands oil are of far more importance to society as a whole than the effect of climate change on the pipeline. 2462-33

ABANDONMENT

"Although removing the pipeline is potentially desirable, abandonment is easier and far less risky" is a severe oversimplification when presented with no time component – with abandonment, the balance of risks becomes more severe over time, and this must be clearly described. 2462-34

The distance between Line 3 and other pipelines in the corridor is greater than 10-15 feet in many cases, per Enbridge's own data and measurements conducted by landowners. Often, the spacing is over 30 ft. The number as presented in the DEIS is inaccurate. In addition, it should be noted that the current Line 13 was installed in between Lines 1 & 2 in 2462-35

some places at a distance of 10-15 ft on either side, showing that it is possible to undertake heavy construction activities at that kind of proximity if the company chooses. 2462-35 cont.

What are the advantages of removing the old pipeline from the corridor, abandoning it in place, or removing the old pipeline and installing a new one in the same trench? (pg ES-21)

Landowners and tribal nations should have the option of removing or retaining the pipe on their land.

Which route option would result in the least habitat loss, habitat fragmentation, and loss of timber resources? (pg ES-27)

Habitat Loss

The Executive Summary is blatantly misleading in the answer to the question "Which Route option would result in the least habitat loss, habitat fragmentation and loss of timber resources?" (pg 27) when it states: "The greatest effect would be on 631 acres of previously forested areas within the permanent right-of-way for the Applicant's preferred route." This is apparently taken from Table 6.2.1-2, but the total number 672 should have been used, rather than 631, according to the table, since 631 refers only to the stretch between Clearbrook and Carlton. 2462-36

In any case, the numbers on this chart refer to operational impacts from the pipeline. Nowhere in the Executive Summary are construction impacts listed, which according to Section 5.2.3.3.1 are 1,544 acres deciduous forest and/or 2,202 acres of forested upland and wetland vegetation. Recovery could take up to 50 years for full recovery, according to chapter 5. **The correct answer to loss of timber resources is double what is stated in the Executive Summary.** 2462-37

Chapter 1 Comments

Introduction comments

We repeat our earlier footnoted comment of the misleading use of the number 760,000 in the sentence "Enbridge's proposed new 36-inch-diameter pipeline would be capable of carrying up to 760,000 barrels of Canadian heavy crude oil per day" when the steel that will be used is capable of carrying up to 915,000 barrels of heavy Canadian crude per day, according to Enbridge's own Application for Certificate of Need. This extra carrying capacity would exceed the original design capacity of the existing Line 3. 2462-38

Also in this section, the draft EIS states the Enbridge Proposal is generally referred to as the "Line 3 Project" rather than the "Line 3 Replacement Project", but we note that the Executive Summary contains only two references to the former and multiple references to the latter, in every Footer. Footers throughout the entire EIS used the Enbridge preferred phrasing. We take exception to the idea that this project is mere replacement, since the pipe diameter is larger, it is proposed to be routed in a new corridor for about half its length, and it will facilitate the transportation of a new kind of oil than the line has been carrying for years. We ask that you use the consistent wording "Line 3 Project" rather than the "Line 3 Replacement Project", and not confuse the public with different terminology. 2462-39

Purpose Of and Need for This EIS Is To Inform both Regulators and Citizens

In our comments to the Executive Summary, we noted the purpose of the EIS by Administrative Rules 4410.0300 and 4410.2000 Subp. 1 is threefold: to inform the Commission, the public and the Applicant, rather than as stated "the purpose of and need for this Environmental Impact Statement (EIS) is primarily to help inform the Commission's decisions.."(pg 1-1)

The purpose of an EIS to inform the Applicant is also omitted from the sentence in this section stating "The EIS is a factual document that is designed to inform public deliberations and government decision-making…" (pg 1-1)

EIS Focuses on Information That is Directly Relevant To the CN and Route Decisions

The draft EIS states “During the scoping process for this EIS, commenters raised a number of critical long-term energy-policy and tribal rights issues that do not easily fit within the framework of a project-specific EIS. Some of these issues are too broad to be resolved in this EIS, which is intended to facilitate decision-making on a single, specific pipeline proposal.” We think the long-term energy policy and tribal rights issues are exactly relevant to the decision making on this pipeline, and to exclude these issues from the scope is critically misguided. They are important enough for the drafters of the EIS to mention. To look at projects in isolation with blinders on as to related cumulative effects is against MEPA law and is immoral in this era of rapidly advancing Climate change and acknowledged historical trauma to our native American populations. 2462-40

These blatant omissions of energy policy, even what is currently happing in the industry (bankruptcies, transfer of ownership of the tar sands fields, declaration of stranded assets) and tribal rights issues are not even mentioned the Executive Summary and **we request that the omissions be mentioned there.**

Section 1.1 APPLICANT’S PROPOSAL AND REQUIRED APPROVALS

This section lists the private project proposer’s commercial and economic needs. It fails to list the public purpose for which the right of eminent domain should be allowed by the State of Minnesota. The parent of the Applicant, Enbridge, Inc is not a US Corporation, but a foreign one, and the requests to ship oil are increasingly becoming requests from foreign corporations to ship foreign oil across our state for ultimate export. 2462-41

Section 1.2

We repeat our comments from the Executive Summary that the cited number 2.9 million bpd for transportation of oil is overstated and misleading. According to the 2016 Form 6 year-end report Enbridge filed with the Federal Energy Regulatory Commission (FERC), the Mainline system shipped **2.5** million barrels per day across the international border, 2462-42

and shipped **2.3** million barrels a day from Clearbrook to Superior WI. The FERC data is readily available to the Department, at www.ferc.gov.

Correction: Line 3 is one of seven pipelines, not six, in the Mainline System through Minnesota. 2462-43

It is incorrect to state the Enbridge Mainline System supplies approximately 400,000 barrels of oil per day to Minnesota's petroleum refineries. It would be more accurate to say 300,000 bpd than 400,000. At MN350, we track the FERC Form 6 and Form 6Q filed by Enbridge, North Dakota Pipeline Companies and Minnesota Pipeline Companies. This information is publicly available and would have been available to the drafters of the EIS. 2462-44

On their 2106 Year End FERC report, Enbridge reported approximately 300,000 barrels per day (bpd) were transferred from the Enbridge Mainline system (primarily Canadian but could also be some Bakken oil) and 70,000 from the North Dakota Pipeline Company (Bakken oil) to the Minnesota Pipeline Company (MPL). The Executive Summary concerns a pipeline that is part of the Mainline system, so it is important to be clear that only ¾ of what the DOC estimated is actually being transferred from the mainline system to MPL. A reader of this chapter might well infer the 400,000 bpd cited was all transported on the Enbridge Mainline system from Canada, which is not true.

As noted in this section, there are seven pipelines delivering oil into Clearbrook. There is no supporting evidence that Line 3 specifically delivers any significant quantity of oil to the Minnesota refineries. Instead there is evidence to the contrary. In the Alberta Clipper two capacity increases, the Applicant filed Applications for Certificates of Need and had charts showing the amount of heavy oil delivered to the Minnesota refineries. In the Enbridge Energy, Limited Partnership MN PUC Application dated June 2013, Docket No. PL-9/CN-13-153, Section 7853.0510 Page 3, Table 7853.0510-1-D.1, "Average Daily Volumes delivered in-state" consistently show annual overwhelmingly heavy oil deliveries as opposed to the light crude that Line 3 has been transporting. Enbridge's "Pipeline System Configuration" annual chart, found on their website, lists Line 3 as transporting lightweight petroleum products since 2012. 2462-45

The Enbridge Mainline System Was Constructed between 1950 and 1969

The EIS does not inform decision makers as to whether Line 3 has been looped as well. The EIS does not discuss how much of Line 3 or any connected loops are constructed of new steel. The reader has no way of knowing whether "old Line 3" could be taken out of service and just newer already constructed loops could be used in its place. Also, we have not been given any information on whether Enbridge has other pipeline loop sections, off of other mainline pipelines that could be used to fashion a new line 3 in many sections. Citizens within MN350 have been told of Line 4 loops, for example. 2462-46

1.3 Environmental Review comments

The Commission Must Understand and Consider Impacts of Their CN and Routing Decisions

We take exception to the statement that "The Commission has ordered DOC-EERA to prepare an EIS in accordance with Minnesota Administrative Rules Chapter 4410 to provide this information." (pg 1-4) Actually the Order lists the MEPA Statute as well. "Consequently the Commission will authorize the preparation of an EIS under Minn. Stat. ch. 116D and Minn. R. ch. 4410 that addresses environmental issues pertaining to the need docket as well as the routing docket."[14] 2462-47

This section correctly points out the Commission must make their decision in a framework with adherence to both MEPA and the Administrative Rules (7853.0130). However, this section does not point out that these two are essentially in conflict. MEPA requires utmost protection of the environment while the Administrative Rules are written so that a Certificate of Need shall be granted IF denial will have adverse effects on economic needs, a more reasonable and prudent alternative has not be demonstrated… If consequences to society of granting are not better than denial, and if failure to comply with

14 Commission Order Joining Need and Routing Dockets, February 1, 2016, eDockets Number 20162-117877-01.

rules, policies and regulations cannot be shown (these rules have been paraphrased). MEPA is statute however, and statutes trump Adm Rules. The EIS does not inform the Commission on how to navigate these two seemingly conflicting guidelines.

This EIS Evaluates Impacts and Alternatives for the CN Decision Using Applicable Criteria

We object to the phrase in point 2. “Use of alternative pipeline systems (pg 1-5) , when in the Executive Summary (pg ES-4) “use of other pipelines” and “System Alternative SA – 04 “are distinct, separate alternatives listed, yet they seem to be combined here. 2462-48

The EIS Also Evaluates Proposed and Alternative Routes, Contingent on CN Approval

We agree that a “common set of facts” (pg 1-5) is the goal, and that is why we are submitting our comments.

1.4 OVERARCHING POLICY ISSUES

Larger Energy Policy Issues Are Beyond the Scope of This EIS

This section implies no consultant was hired to help complete this EIS, but we believe Cardno was hired to assist. Also, we would like the sections essentially drafted by Enbridge identified. 2462-49

The EIS Does Not Determine Need for this Project

The system alternative SA-04 relies upon the discussion of the economic need for this project to be routed through Clearbrook and Superior as defined by Enbridge. Also, the consideration of alternative means of transport depends on a need discussion. Is there any purpose in routing trains thru Clearbrook or Superior for example if little to no oil is

needed at that location? The whole alternative scenarios of trains or trucks is all dependent on whether the oil is even needed at those locations.

The quantity of trucks or trains is also assumed to be at the level of the new proposed Line 3 maximum pipeline capacity. If there is no need for this level of oil, these alternatives and all the calculations re emissions, etc are incorrect. 2462-50

1.4.1.2 Need for Fossil Fuels

"Comprehensive Policy-Level Assessment of Fossil Fuels in Our Society and Associated Tribal Rights Issues is Beyond the Scope of an EIS for a Single Pipeline"

We strongly disagree with the position taken by the draft version of the EIS "While the need for the proposed pipeline with the proposed throughput capacity is an issue for the Commission, this EIS will not assess the Project need."[15] Pipelines are normally evaluated by the Commission as single pipelines, yet their effect is cumulative. They enable and facilitate the extraction of new additional carbon resources from the ground while society puts more and more crude and/or refined products into storage. It is the responsibility of our state to "discourage unsound aspects of our population, economic and technological growth, and to develop and implement a policy such that growth occurs only in an environmentally acceptable manner".[16] It is also written into our laws to "practice thrift in the use of energy and maximize the use of energy efficient systems for the utilization of energy, and minimize the environment impact from energy production and use" and to "minimize wasteful and unnecessary depletion of nonrenewable resources." [17]
The same statute notes it is the policy of the state government "to use all practical means and measures" to do these things, and this EIS does not live up to that law. This heavy oil from Canada is a wasteful depletion of water in the Athabasca river, destroys hundreds of acres of forest and carbon sink peat in northern Canada and requires huge amounts of resources to extract. A lot of the oil is so thick it must be thinned to transport by pipeline –

15 DEIS_Line3_Introduction Pg 6
16 § Chapter 116D.02 Subd 2.
17 § Chapter 116D.02 Subd 2.

by diluent which is then returned back to Canada. Or alternatively the thick petroleum coke is removed in Canada. Either way this oil is far more carbon intensive than oil from other sources.

While we appreciate and agree with the Human rights listed, we note that MEPA lists rights as well, right in our Minnesota Laws:
Protection from pollution, impairment, or destruction, preservation and enhancement of

- Air
- Water
- Land
- And other natural resources
- And a right to expect our legislature to create and maintain conditions under which human beings and nature can exist in productive harmony in order for present and future generations[18]

Chapter 2 Project Description Comments

The draft EIS contains no overall indication of the massive size of this project relative to other construction projects in MN. The applicant is requesting the PUC authorize a 750 feet corridor for 340 miles for their preferred corridor. The Applicant indicates this would impact 5,443 acres in MN, and this estimate is likely underestimated. 2462-51

The 750 foot corridor is confusing to the public. This is equivalent to the width of two football fields. It is not clear if tree clearing would take place on this wide swath, or what would happen if they decided to redo the 120 foot wide corridor if they found a nesting eagle or some other resource they wished to avoid. Please clarify what would happen to the 750 foot corridor after the permanent right of way was initially established. It is not clear whether landowners know of this huge corridor. How long would Enbridge remain in possession of this corridor? Until the last pipe is laid or when a section was completed?

18 § Chapter 116B.01

And how would possession of this extra wide corridor affect their ability to expand the corridor in the future? Would it give them some rights over the land in the future? 2462-51 cont.

Section 2.1 Comments

Comments on "The Project Would Replace an Aging Pipeline and Increase Throughput"

We object to the word replace in the draft EIS. The project as proposed would not merely replace an aging pipeline, but build a new larger pipeline in a new location for about half its old route and leave the old one in place. The phrase "Line 3 replacement pipeline" is used 110 times in this chapter. Clearly the Applicant wants to frame it that way, while we request the reality that it is a bigger diameter pipeline that will hold more oil, in a new corridor for over half its route, carrying a much heavier kind of oil and leaving the old line in the ground makes it a new pipeline, not a replacement line. 2462-52

The terminology on page 1 is confusing with all the terms: construction right of way, construction workspace, construction work area, ATWS. A picture would be helpful here rather than just later in the chapter.

We object to the stated 30 year lifetime of the pipeline on pg 5; it should be at least as long as the age of the existing pipelines – 60 years. 2462-53

Figure 2.1-1 has two errors in the yellow insert showing the pipelines coming into Superior – neither Line 65 nor SPP is a pipeline going into Superior. Also we note the Mississippi river and its crossing of the pipeline routes is not drawn on this map while we note the words Minnesota for the Minnesota river are just visible and in a larger font. 2462-54

The DEIS does not mention whether this is the largest (by acreage) construction project ever proposed for Minnesota. The Executive Summary is missing informing the PUC of the extent of this project. 172 new roads is a large impact (pg 13) and will surely affect ground

water movement and spur new home and cabin construction, bringing people into the area. While the area now is relatively unpopulated, that could definitely change in the life of a pipeline, just as the population of the mainline corridor towns changed from 1949 to the present. And yet when the existing corridor is compared to Enbridge's preferred corridor, human population density is compared today – not as it might look 50 years from now – the life of a pipeline. Who will pay for improvements to these new roads 60 years out if they are left in the ground after the pipeline - county taxpayers?

Cathodic protection would be installed up to a year after the construction, which would cause more disturbance for the landowner.

On page 18, the Applicant states in the DEIS that they will have seven simultaneous building sites. Page 20 references unspecified "third party monitors" without authority to stop construction, but they "do submit daily reports … to Enbridge and agencies! (pg 2-20) The independent monitors need the authority to both stop construction if they see improper activity and the ability to communicate to the agencies without first notifying the applicant. And yet when the existing corridor is compared to Enbridge's preferred corridor, human population density is compared today – not as it might look 50 years from now – the life of a pipeline. The MN Office of Pipeline Safety doesn't have enough inspectors to oversee this project. This point should be noted in the Executive Summary.

On page 20, the statement concerns us that only 21 Enbridge inspectors will have authority to stop work due to violations. This is akin to the fox guarding the hen house. Does this mean that our MOPS State employees will have no capacity to stop construction, only levy fines? And the fact that the draft EIS has absolutely no mention of penalties is also a concern. Page 21 states topsoil and trench soil will be segregated only if the permit requires it. Will landowners be notified ahead of time and have the option to request otherwise?

Page 24 has a reference to the use of herbicides that may be used. In this day of declining pollinators, this is not good for our planet. Also we are aware the chipped woody material

that will be put into the top soil without added nitrogen. Decomposition of that material will rob the soil of nitrogen.

We also note Enbridge seeks a waiver of the state law requiring a pipe cover of 54 inches, instead preferring 48 inches. Many landowners are bothered by the heaving of the pipes from the ground in the existing corridor. The DEIS says landowners can request the deeper depth and also have top soil and trench soil segregated. Were they informed of this when they signed the contract? Many details depend on landowner agreements, many of which are already signed; were landowners informed of their choices and our state statutes?

We are concerned about the massive number of trees that will be removed, and the massive amount of soil that will be moved. What is the carbon footprint of the tree loss and the soil removal?

Continuing on Page 24, the EIS states this new pipeline will transport 65% heavy crude oil, including dilbit and heavy tar sands crudes. That would leave 35% or 266,000 bpd for light oil. That is less than is being reported as being transported on the existing Line 3 now. The darft EIS does not address the decline in light oil transport, although the draft EIS implies the Minnesota refineries use Line 3 oil. The EIS should address how such a needed commodity (the light crude being transported now on Line 3) can have such a decreased demand in the future. 2462-55

The DEIS refers to a “Enterprise Emergency Response Team”. Will this team be from Minnesota or out of state? (pg 42)

The draft EIS also cites a huge water impact – 11 to 17 million gallons times seven (120 gallons) needed for hydrostatic testing before the pipeline is used. No commitments are made by the Applicant as to the source of this water. The water will be obtained from public, private wells and surface and ground water – depends on the permit and

discharged somewhere else. Enbridge has had multiple discharge violations in the past – 18 on the Alberta Clipper alone.

Chapter 3 Comments

The statement **"**As a result, states regulate the routing and construction of oil pipelines through a variety of approvals, permits, and licenses…. the route permit determines where it should be located" implies the state has some say in the route location. But the reality is the state has accepted every route submitted by the various pipeline companies. The applicant suggests one route and the PUC has accepted it. This is hardly the state determining where it should be located. This is the time for the state to really analyze the best corridor through our state should one be needed.

The Administrative rules have equal weight. No one is more important than the other, and in fact, MEPA requires a decision to be based not on economic reasons alone. Yet the reality is Administrative Rule 7853.0130 A) is improperly elevated above all others. Yet we see on page 4, "Under these criteria, the Commission would **first** consider the underlying economic drivers for the proposed pipeline. If denying the CN would adversely affect the future adequacy, reliability, or efficiency of energy supply, the Commission would consider the EIS's analysis of the advantages and disadvantages of alternative ways of addressing these issues." [emphasis added]

On Page 6 of the chapter, potential impacted resources are listed: "Human settlement, existence and density of populated areas, existing and planned future land use, and management plans" As the life of a pipeline is 60 years or more, human settlement today cannot be a driver. The four counties of Hubbard, Cass, Aitken, Crow Wing are projected to be the fastest growing in MN in the future.

The Department of Commerce and the PUC continue to ignore the differing starting positions of MEPA (protect the environment) and the administrative Rules 7853.0130 (a Certificate of Need will be granted unless…).

Chapter 4 Comments

The DEIS acknowledges at the top of this chapter that the Minnesota Environmental Policy Act requires that the EIS, the Certificate of Need, and the route permit compare only reasonable alternatives (4.1). The most egregious failure of the DEIS to produce reasonable alternatives to the proposed project is that this analysis neglects an obvious alternative to the proposed route: an alternative called "No Pipeline at All". The DEIS is required to have a "No Action Alternative", and it it is not appropriate that the continued operation of a failing, 55 year-old Line 3 would suffice as the "No-Action" option (4.2.2). A pipeline that is predicted to spill an average of once every four years seems somehow better when pitted against a multi-billion dollar trucking fleet, or thousands of new and combustible rail cars. The option of phasing out Line 3 has been advocated by thousands of citizens and must be studied. It is also the most consistent with Minnesota's climate change mitigation goals. (https://mn.gov/frc/docs/MFRC_presentation_Turner_ClimatePolicy_2011-03-23.pdf) 2462-56

Additionally, renewable energy such as wind and solar was not considered as an alternative. If the premise is that we have to move this oil and these alternatives are just the various ways to do it, the premise is misleading. The economy is currently experiencing a glut of oil. Renewable energy systems are the real alternative.

By Truck and By Rail Are Not Reasonable Alternatives

Some of the route alternatives to the Applicant's Preferred Route seem intentionally unreasonable. These are improbable ideas that will make Enbridge's proposal seem better, and which will give the illusion that alternatives have been explored. But the case of the historic Keystone XL denial should be considered as a precedent for what actually happens when a pipeline does not get approved. When the Keystone XL pipeline was denied, no oil by rail terminal was built at the international border. Today's oil prices are too low to sustain growth in the tar sands region of Canada. Exxon Mobil has admitted that they have $3.4 billion dollars in Tar Sands oil fields that are not economically viable assets on their books in the current low-price environment. Since 2012, the write-downs from Statoil ASA, Royal Dutch Shell PLC, Total SA companies, and other Canadian producers

have exceeded $20 billion. The price of oil has fallen from more than $100 per barrel in 2014 to around $50 per barrel in 2017.

Oil by Rail

Oil by rail is revealed as a completely unviable alternative when the DEIS estimates a cost of one billion dollars for the new tank cars required (4.2.6, page 14). The rail alternative also assumes a Clearbrook to Superior corridor, which assumes all this oil must be transported through those two towns. (4.2.6, page 10). When discussing oil by rail, there is no statement about the percentage of diluents that would be used in that scenario. (Table 4.2-5, Page 13). Rain requires less diluent to transport crude. This could significantly change the volume of product to be moved. The math used to reach that volume in 4.2.6, on page 13, is dubious and strange. Oil would be carried in a train of 110 tank cars, each holding up to 800 barrels. 110 cars x800 barrels=88,000 barrels of oil per train. The text reads that “oil by rail would require 10 loaded unit trains per day”, and 10 trains x 88,000 barrels per train equals 880,000 barrels. However, Table 4.2-5 uses the figure of only 760,000 barrels a day. It is not perfectly clear whether the tank cars would intentionally be filled less than their capacity of 800 barrels, and if so, why. To arrive at a figure of 760,000 barrels per day on 10 loaded unit trains, each tank car would have closer to 690 barrels in it, rather than 800. 2462-56 cont.

By Truck

Oil by truck is revealed as a completely unviable alternative when it is revealed that transporting the oil would require 4,000 truck trips a day, at a cost of $2.4 billion dollars for only five years. That cost would be repeated over the lifespan of the project (4.2.7, page 17). The trucking alternative described in section 4.2.7 outlines purchasing a new fleet of trucks (and then replacing that entire fleet every five years) to make 4,000 trips per day in order to transport the oil across the state of Minnesota, while maintaining pipeline transportation outside Minnesota. This is absurd and unrealistic. It cannot be a serious alternative to pipeline transportation of oil

Apples to Oranges

There are areas throughout the DEIS where the comparisons made between alternatives do not make sense. SA-04 is frequently cited as being longer than the APR, and therefore as having greater negative impact. However, the DEIS does not account for the fact that the oil delivered by the APR will then have to continue from Wisconsin to Illinois. In fact, the distance from the international border to Illinois is the same whether SA-04 is used or the APR and then Line 61 through Wisconsin (about 1,551 miles). The DEIS does not compare apples to apples, which is inappropriate for a fair and accurate analysis. The DEIS should either have a Minnesota-to-Minnesota comparison, or an International border-to-Illinois comparison. 2462-57

We note MEPA's requirements for connected actions, like pipelines downstream of Superior, were consistently ignored in the scoping of this document and now in the DEIS. Administrative rules 4410.0200 Subp. 9c. state:

> **"Connected actions.** Two projects are "connected actions" if a responsible governmental unit determines they are related in any of the following ways:
>
> A. one project would directly induce the other;
>
> B. one project is a prerequisite for the other and the prerequisite project is not justified by itself; or
>
> C. neither project is justified by itself."

The oil transported by Line 3 does not remain in Superior. It is transported south and or east on other pipelines. Increasing the flow of oil in Line 3 will require additional pipeline capacity out of Superior. So following MEPA requirements should have included downstream impacts.

<u>Missing or Inaccurate Information in Chapter 4</u>

1. Line 67 is listed as operating at 570,000 bpd, which has not been accurate for a long time (4.2.4) 2462-58
2. How is it possible that "The probability of an incident leading to a crude oil release would also be similar for a smaller diameter pipeline"? (4.2.10, page 20) A smaller diameter pipeline would presumably mean less oil per day, or at least a different 2462-59

amount of pressure. This assumption comes at the end of the section and reads like an afterthought. 2462-59 cont.

3. The section on pipeline removal and replacement makes the bold claim that Line three is in the middle of a multi-pipeline corridor, “where the pipelines are spaced from 10 to 15 feet apart” (4.3.4.3). There are no qualifiers to suggest that in only *some particular* areas, the pipelines are that close. The wording strongly implies that the pipelines are 10 to 15 feet apart for the whole corridor, which is simply untrue (See comment on Chapter 8: Abandonment, 8.3.1, 8.4.1). 2462-60

Conclusion

In summary of these concerns, each alternative seems intentionally framed to make the APR look best: Transportation by Rail and Transportation by Truck are the red herrings, Continued Use of Existing Line 3 is not an honest No-Build scenario, Existing Line 3 Supplemented by Rail and by Truck are processes not well-described and not reasonable, and route SA-04 is measured as a much longer distance than the Applicant’s Preferred Route, which conveniently does not measure an entire length of the APR from Wisconsin to Illinois. The bulk of this information on route alternatives suggests that they are wild and improbable. All these gross cost and impact assessments become both a filler and a misleading suggestion that the pipeline will be the only viable option. Not all alternatives are investigated equally here. The risk is calculated in miniscule year-to-year numbers, and the assessment describes Enbridge as an upstanding company with state-of-the-art equipment, while not disclosing their history of malfeasance; all to suggest that there is only one real option here.

Broken Links: Chapter 4

Association of American Railroads. 2015. Moving Crude Oil Safely by Rail. July 2015. 8 pp. Available at https://www.aar.org/BackgroundPapers/Moving%20Crude%20Oil%20Safely%20by%20Rail.pdf. 2462-61
Accessed on January 17, 2017

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Chapter 5 Comments:

If ever there were chapters that violated MEPA laws to be analytical and not encyclopedic, Chapters 5 and 6 would take top honors. Chapter §116D.04 states “The environmental impact statement shall be an analytical rather than an encyclopedic document which describes the proposed action in detail, analyzes its significant environmental impacts, discusses appropriate alternatives to the proposed action and their impacts, and explores methods by which adverse environmental impacts of an action could be mitigated.” The inclusion of especially unbelievable alternatives like thousands of trucks crossing through Minnesota didn’t help.

The EIS must eliminate non-viable alternatives and clearly explain in a spreadsheet or a chart the impacts of the Applicant’s Preferred route and SA-04 versus the no build options.

Lack of Consideration of Scoping Comments:

120 million gallons for hydrostatic testing, with water moved from its source to its disposal is a huge amount, with no discussion of wells drying up in parts of Minnesota, the potential spread of aquatic invasive species, and Enbridge’s 18 violations when the Alberta Clipper was constructed. MN350 submitted comments in the scoping document re these violations, but fails to see even a mention of them here. We repeat our comments here:

> Previous Enbridge violations of rules for the discharge of contaminated water used in hydrostatic pressure testing of pipelines, such as occurred during the original Alberta Clipper installation and the Line 6B (Michigan) replacement, must be cited in the EIS and independent monitoring must be proposed to try to ensure such violations do not re-occur. In 2013, Enbridge paid a $425,000 fine to avoid litigation over 15 discharges in 2010 which violated its discharge permit, including one that flowed into the Mississippi. "The reason that it's concerning, I'd say, is the sheer number of violations,"[19] said Kevin Reuther, legal director of St. Paul-based Minnesota Center for Environmental Advocacy..."It's as if Enbridge wasn't even trying to comply with its water discharge permit … that it's cheaper to cause whatever environmental damage they want and pay a fine later."[20] Also in 2013, a similar incident was discovered during Line 6B replacement in Michigan, when self-reporting by Enbridge of violations did not occur.[i]

We also noted the following information regarding the Clearbrook terminal:

> The external floating roof storage tanks at the existing Clearbrook terminal are subject to New Source Performance Standards (NSPS) in 40 CFR 60 Subpart Kb, "Standards of Performance for Volatile Organic Liquid Storage Vessels." Subpart Kb regulates VOC emissions and establishes controls based on the vapor pressure of the stored liquid. The Clearbrook terminal currently operates under a minor source Option A Registration Permit, which is a state of Minnesota permit, solely because an NSPS applies and no federal or state permitting thresholds are exceeded (i.e., applicability to NSPS Subpart Kb requires a State air permit under Minn. R. 7007.0250). The increased throughput associated with the Applicant's preferred route would cause potential emissions of VOCs at the Clearbrook terminal that exceed the 100-tons-per-year major source threshold, triggering a Title V operating

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19 David Shaffer, "Enbridge Pays Fine Over Pipeline Testing Violations", Star Tribune, July 23, 2013, last accessed 9/21/2015 at http://www.startribune.com/enbridge-pays-fine-over-pipeline-testing-problems/217118231/

20 David Hasemyer, "Mich. Officials Step Up Scrutiny of Enbridge After Water Law Violations", InsideClimate News, July 9, 2013 last accessed 9/21/2015 http://insideclimatenews.org/news/20130709/mich-officials-step-scrutiny-enbridge-after-water-law-violations

permit. **The Applicant would obtain a synthetic-minor individual state permit in order to limit VOC emissions and retain status as a minor source** (Enbridge 2016a). {emphasis added] We would like to be informed on how a “minor individual state permit” would limit VOC emissions. It seems like operations would have to be changed to limit emissions and not the mere process of taking out a permit.

Chapter 5.2.7 (Air Quality)

At MN350, we are particularly concerned with the rise in greenhouse gases. “Based on overwhelming scientific evidence, EPA found that GHGs were responsible for contributing to climate change which results in a threat to public health and welfare. Specifically, the impacts of climate change that will cause harm to human health and welfare of current and future generations include but are not limited to increased drought; more heavy downpours and flooding; more frequent and intense heat waves and wildfires; greater sea level rise; more intense storms; and harm to water resources, agriculture, wildlife, and ecosystems (Center for Climate and Energy Solutions 2016).” (pg 432)

We note these sentences in the DEIS: “In 2014, approximately 76 percent of the United States’ GHG emissions were from fossil fuel combustion (EPA 2016e). Furthermore, fossil-fuel-fired power plants are the largest source of emissions, making up 31 percent of U.S. total GHG emissions (EPA 2016f).” (pg 432)

The DEIS found that the “social cost of carbon”-- an estimate of the financial burden on society due to increased climate change impacts -- of building the pipeline could be as high as $287 billion over a 30-year timespan (pg 443). Since 30 years is listed elsewhere in the DEIS as the expected minimum lifespan of the pipe, and Enbridge pipelines are in operation which are over 60 years old, assessing only 30 years of climate impacts is a gross underestimation of the real consequences of this project. The burden here falls especially on young people, who will only be middle-aged 30 years from now.
The EIS must include climate and cost modeling that assumes a 60-year lifespan or greater for the pipeline.

We ask that a “partial displacement” climate modeling scenario be included in the EIS in which the new Line 3 takes on the old Line 3’s oil while expanding by the proposed 370,000 additional barrels per day (bpd). The DEIS contains only “no displacement” and “full displacement” scenarios where the oil in the new line is either entirely in addition to existing flows or entirely offset by corresponding reductions on other pipelines (pg 442).

Given that the State of Minnesota has several existing laws and policies relating to greenhouse gas emissions (including, recently, Minnesota’s commitment to uphold the Paris Climate Agreement at the state level), this chapter should include an analysis of the project’s lifecycle carbon impacts in light of the targets set in these policies.

As noted earlier in these comments, any discussion of climate impacts or potential alternatives must consider the effect that pipeline construction has on development of new tar sands extraction capacity in Canada. For example, the State Department’s EIS for Keystone XL noted that expansion of extraction would not be economically viable without new pipeline capacity if the price of oil was below $70/barrel, which it is currently. Incorporating this analysis throughout the EIS would change this section dramatically, since the same amount of lifecycle impacts would not remain consistent across the project alternatives since some of them would make further extraction uneconomical.

Chapter 7 Comments:

It is somewhat concerning that there were only 2 citations for a 72 page section.

On page 4 of Chapter 7, the DEIS lists the current Line 67 (Alberta Clipper) flow rate to be 570,000 bpd, which is incorrect. Line 67 has been operating at close to 800,000 bpd since 2015, which draws into question many of the subsequent calculations in the DEIS.

Chapter 8 Comments:

Introduction

Chapter 8 of the DEIS is a terribly short 13 pages (out of a 5,547-page document) on the serious problem of whether to abandon, or to remove, the current Line 3. Minnesota does not have established procedures to ensure that Enbridge, rather than private and public landowners, will deal with the issues that result from this decision. The brevity of this chapter is likely in part due to the way it frequently cites other documents (from PHSMA, Chapters 5 and 6, CNEB), as if the decision-makers attempting to read this enormous DEIS will actually read through those documents, too. There are also numerous places where the analysis falls short, indicates a “need for further study”, or “impacts unknown”, and differs to Enbridge for a to-be-decided plan. The chapter provides a surprisingly cursory overview, given that pipeline abandonment is a major concern for many private landowners, as well as for the Leech Lake and Fond du Lac nations. Implicit in this discussion about the current Line 3 will be what to do with the *next* Line 3. Every single pipeline that is built in the United States will have to someday be retired. Knowing this fact, state governments and fossil fuel companies share a responsibility to adequately prepare for a nation veined with dead pipelines. The gravity of this problem should be reflected by a rigorous investigation; not by one chapter the length of a college term paper.

The following comment will address the failure of the DEIS to project into the future at an appropriate timescale, questions left unanswered in regards to abandonment, direct contradictions within the short chapter, and an astonishing amount of copy-and-paste language that indicates sloppy writing.

<u>Option 1: Abandonment</u>

Inappropriate Timescale

The oil is for now, but pipelines are forever. The first inadequacy of Chapter 8 is a neglect to plan for literal eons of pipeline abandonment. Table 8.3-1 is used to summarize, in explicitly hopeful words, the conclusion that there will be minimal impact on environmental resources in the “near term”. Near Term is defined as 40 years or fewer, which is a totally useless figure for this analysis. That table is misleading; we should be looking generations into the future! The impacts of abandonment are evaluated in this analysis based on the

activities of disconnection, purging, sealing and monitoring; and also the available literature on how an abandoned pipe may interact with the surrounding environment. The DEIS repeatedly uses the phrase "*long-term"* in contrast to the "near term" (8.2) but does not ever actually define that length. Is it fifty years? One hundred years? One thousand years? If "indefinitely" really means forever, that raises more questions about how Enbridge will continue to monitor the pipeline "long term". Section 8.3.1.1 acknowledges that given enough time, all the cathodic protection in the world will not stop this pipeline from decaying. So the solution to abandon "safely" is not ultimately feasible. Finally, it is a real challenge to name a single company that existed 1,000 years ago, and it is unlikely that Enbridge will continue business for 1,000 years more. So who will be responsible once they are dissolved or bankrupt? The DEIS seems to just accept Enbridge's word that the pipe will be monitored "indefinitely" by the company, without seeking further clarity on what the consequences would be for the state, private landowners, or tribal nations when Enbridge eventually stops maintaining the pipe. The DEIS does not address these important questions, and instead frames the analysis in a timescale too short to be appropriate for decision-making of this magnitude

Unanswered Questions:

1. Can the pipe be cleaned out safely and effectively?

Next, there are some questions unanswered in the DEIS concerning the procedure for abandonment. Starting from the beginning, let's look at cleaning out the pipe. The DEIS does not list the exact cleaning solutions that will be used to wipeout the abandoned pipeline, nor does it evaluate what will happen if those chemicals leech out into the environment through existing cracks and pinholes (8.3). The DEIS does state concern that Enbridge's cleaning method has only been proven successful on a 12-mile stretch of pipe, while the existing Line 3 in Minnesota is 282 miles long. In direct quote from that section of the DEIS: "It is currently unknown whether Enbridge's protocol works on a longer length of pipeline" (8.3.1.1), and we need to know about a length 23.5 times their tested pipe. This should sound an alarm. It is a critical piece of data to be included in the EIS, and the document will be incomplete without a better analysis. How can any person of the public or of the Minnesota government make a decision about pipeline abandonment, a decision

that will literally be forever, without knowing if effective abandonment protocol is even possible?

Unanswered:

2. How much legacy contamination can we expect around the pipe?

A 2nd question mark is of how much undiscovered contamination exists around the pipeline, and what Enbridge's "Contaminated Sites Management Plan" will be (8.3.1.1.1). Given the fact that the existing Line 3 is acknowledged to be "weeping" oil, it is reasonable to assume that some oil has seeped into the surrounding environment over the decades of this pipeline's operation. The MPCA sites their concerns that the pipe may not be entirely cleaned out, that the coating of the pipeline will degrade into byproducts in the environment, that there may be past oil spills ("Brown Field") in the area that were never properly cleaned, and that there may be polychlorinated biphenyl (PCB) contamination to worry about (MPCA Scoping Comments, MPUC Docket No. PL-9/CN-14-916, PL-9/PPL-15-137, eDockets Docket No. 20159-114431-02, (Sept. 30, 2015)). All the DEIS divulges on this topic is that "Enbridge has indicated that it would develop" such a plan to manage the pollution. In another section on water contamination, the DEIS acknowledges that "additional segmentation locations require further study" (8.3.1.2). This issue needs to be taken more seriously, and needs to be addressed far ahead of time. The Environmental Impact Statement is the appropriate place for Enbridge to describe their plan, and the studies should be done before moving forward at all with a final EIS.

Unanswered:

3. What, exactly, will Enbridge do when pipe becomes exposed?

Third, Which of "a variety of mitigation measures" will Enbridge actually use to address the problem of abandoned pipe buoyancy? The vague promise that, "The primary mitigation measures are monitoring and adaptive management" is used as a blanket statement throughout this chapter. In a conflicting statement, the DEIS later acknowledges that "Enbridge's proposed abandonment plan for Line 3 in Minnesota does not explicitly discuss buoyancy." The section 8.3.1.4 (Page 10) suggests a number of tactics that

Enbridge may use to address exposed pipeline, “including weights or engineered fill, placing additional cover over the pipeline and, in some circumstances, removing segments of the pipeline”. Each of these should have an environmental impact analysis. To start, if they choose to remove a section of the pipe, say, where a pipe has floated up in a body of water, won’t that destroy the ability to conduct cathodic protection on the pipeline? Won’t the rest of the pipe corrode after that? Does engineered fill disrupt the electric current, and what is the “fill” made of, anyway? If that “fill” leaks, what damage will it do on the surrounding environment? This section is astounding in its complete reliance on Enbridge to just come up with a plan later.

Unanswered:

4. What, exactly, will Enbridge do with contaminated sites?

It is laughable how often the impact statement puts trust in the industry: “Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage, and mitigate historically contaminated soils and waters. Any existing contamination discovered (…) could be remediated in accordance with this plan” (8.4.1). What plan, where?? Seriously: What is this plan? It is unacceptable that Enbridge would not have already submitted an action plan for the eventuality of oil, lubricants, and process chemicals left in the ground soil around the pipeline, and that the DEIS lets that slide.

Unanswered:

5. Which mitigation costs will Enbridge be responsible for?

8.3.1.5 admits that, “Costs for future site-specific mitigation measures (e.g. to mitigate subsidence or loss of buoyancy control) are uncertain and would depend on the nature of the mitigation measures.” While the immediate abandonment costs and annual monitoring costs are quantified, there is no estimate or commitment here for what Enbridge could be held responsible for in future mitigation and clean up. A return to the problem of timescale: If Enbridge is dissolved one thousand years from now, and the pipe collapses under a Minnesota highway, who will pay? It is also unclear whether Enbridge will reimburse landowners for plummeting property value, especially where there is exposed “buoyant”

pipe. In fact, there is virtually *no* discussion of landowner rights in Chapter 8! This should be factored into the Human Impact estimates, because even in the “near term” of 40 years or fewer, land resale value can be expected to drop where there is pipeline. That is a mitigation cost, no?

Contradictions

There are multiple direct contradictions, even within such a short chapter, about the anticipated impacts of abandonment on the natural environment. Many of these contradictions seem due to the sharp contrast in accounts of what will happen to the pipeline near-term and long-term. This comment contests that there is no good reason to evaluate the near-term effects; that this analysis should focus on the longer view. The near-term analysis produces hopeful estimates that oppose the more grave possibilities of the future, causing a general confusion of statements. These confusions will be outlined here:

1. *Legacy Contamination.* On the one hand, there is the section titled “Leaving Existing Line 3 in Place Could Have Potentially Significant Effects”, which arouses the concern that as-yet undetected “legacy contamination” immediately around the pipe will continue to harm the soil, as might the aging of the abandoned pipe. However, the Table 8.3.1 immediately following that section claims that the impacts to the natural environment will be “minimal” in the near-term. The near-term is defined as 40 years or fewer (8.3.1.3), which is a length of analysis that is vastly small. The result is that it becomes unclear to the reader whether there will be “potentially significant effects” or “minimal” effects on the environment.

2. *Water Conduits.* The DEIS self-contradicts again on the topic of pipeline-as-water-conduit. While the table claims that segmenting the pipeline will “prevent it from acting as a water conduit” (Table 8.3.1), section 8.3.1.2 acknowledges that over time, the pipeline *will* corrode “such that water could enter the pipeline”. The DEIS should define “Cathodic Protection” for the public and for the state. It should also describe how or if such a mechanism will be maintained literally indefinitely. Again, the DEIS runs into the problem of

timescale: it frequently mentions measures like cathodic protection and segmenting as procedures to minimize corrosion, but if abandonment is forever, then we have to think about what will happen to that pipeline beyond our lifetimes.

3. *Impact on Humans.* There are further contradictions within this table on the topic of stress to human life. “No impacts on cultural resources are anticipated” from the abandonment of the existing Line 3, despite Enbridge’s admission that it is likely the line will become exposed and continue to contaminate the surrounding soil. This claim disregards the fact much of the existing Line 3 runs through Leech Lake reservation, and any impacts from abandonment that occur within that land would have disproportionate impacts on the ecological and cultural resources of the tribe. In fact, the report goes on to contradict itself on the same page by saying “The abandonment of existing Line 3 could negatively impact [environmental justice] communities due to ongoing stress or anxiety related to the presence of the pipeline and ongoing risks related to water flow, soil and water contamination, and subsidence.” The topic of subsidence is divulged further in section 8.3.1.3, which describes a real possibility that the pipeline could collapse suddenly. This could occur at highways or railroads, directly threatening public safety, or it could damage agricultural production. The existing Line 3 crosses under 297 roads and 17 railways, which posses a massive problem if that pipeline were to decay and collapse! (8.3.1.3). It is confusing that the table meant to summarize this chapter indicates “minimal impact” to human settlements, natural, resources, cultural resources, and socioeconomics —given that there is a chance that water could be contaminated, the pipe could collapse, or chemicals could leech into the soil because we don’t even know if Enbridge’s cleaning protocol can work for more than 12 miles. Many of these statements are in direct conflict with one another and merit a more comprehensive review.

Option 2: Removal

The DEIS suggests that it would be dangerous to do work around the old Line 3 when there are now pipelines on either side of it; or that the weight of heavy equipment would be enough to stress these lines. Enbridge’s claim that “abandonment would minimize risk to

other pipelines in the Mainline corridor by limiting the extend of disturbance" (8.3.1) doesn't take into account that Lines 1 and 4 will also need to be retired in the immediate future, and so sets a self-perpetuating precedent of pipeline abandonment in Minnesota. Meaning, if we are going to abandon this pipeline, it is likely that all of our pipelines will remain in the ground forever. A key phrase is, "The longer the pipe is in the ground, the greater the advancement of corrosions such that the pipe may fail" (10.3.1.3, Page 8).

Section 8.3.1 and 8.4.1 make the stunning claim that the pipelines in the corridor are "generally 10 to 15 feet apart". Where, exactly, is this true? The distance between Enbridge pipelines 1, 3, and 4 was measured on May 17, 2017 on public and named thoroughfares between Wawina and Grand Rapids, Minnesota. John Munter recorded these distances. Fifteen samplings found the average distance between Lines 1 and 3 to be 18.5 feet apart. Fourteen samplings were averaged for the distance between lines 3 and 4 at an average of 30.5 ft. In total, only 5 out of thirty samplings were found to fall within that 10-15ft apart claim. In Wawina, Lines 3 and 4 are 46ft apart, 31ft apart in Swan River, 45 and 48ft apart in Warba, 36ft apart in Blackberry, and 28ft apart in Grand Rapids. These variations suggest that it could be reasonable to remove a majority of the pipe where it is safe to do so, or where landowners request it, and to abandon the few segments that are determined to be too close to other lines.

Surely there was ample room to get construction equipment through when those new lines were built, and when there has been maintenance on Line 3. There is no substantive evidence cited here that explains why "it might not be possible to remove Line 3 without damaging existing pipelines" (Table 8.4-1). Enbridge makes the claim that it may not be possible to use excavation equipment at all to excavate Line 3, but again, Line 3 was installed while other pipelines existed in the corridor. They also come up with the estimate that 1.7 million gallons of slurry waste would need to be disposed of in the event removal by hydraulic vacuum, yet the DEIS gives no citation for how they achieved this number. (8.4.1, Page 13). Methodology has to be consistently explained; the reader cannot be expected to just take Enbridge on their word.

Repetitive Language Indicates Sloppy Investigation

In the span of thirteen pages, the DEIS Chapter 8 repeat itself a lot. The first pattern to notice goes like this: “Enbridge has indicated… (insert here a vague promise to just *do the Right Thing*)”.

1. “Enbridge has indicated that all solid waste materials generated as a result of cleaning activities will be handled and disposed of in accordance with all applicable and federal state requirements.” (8.3, Page 3)

2. Enbridge has indicated that abandonment would minimize risk to other pipelines in the Mainline corridor” (8.3.1, Page 4).

3. “Enbridge has indicated that it would develop a contaminated sites management plan to identify, mange, and mitigate historically contaminated soils and waters” (8.3.1.1.1, Page 7)

4. “Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage, and mitigate historically contaminated soils and waters” (8.4.1, Page 12)

Yes, the above two quotations are *exactly* the same. Copied and pasted. “The DEIS has indicated” that it relies heavily on input from Enbridge, and that it will give undue weight to promises made by the company, rather than demand a plan be determined now. Below are more examples that make this DEIS seems as though written the night before the paper was due.

“These potential impacts could be mitigated by monitoring, adaptive management, and site-specific mitigation measures” (Table 8.3-1 Natural Resources)

“These potential impacts could be mitigated by monitoring, adaptive management, and site-specific mitigation measures.” (Table 8.3-1 Socioeconomics)

“These impacts could be avoided and mitigated through long-term monitoring, adaptive management, and site-specific mitigation measures” (Table 8.3-1: Human Settlements)

“Coordinate with resource agencies and authorities to determine appropriate mitigation measures” (8.3.1.1, Page 7)

“The primary mitigation strategy would be effective monitoring and adaptive management” (Page 9, 8.3.1.4)

“Accordingly, the primary mitigation measures are monitoring and adaptive management” (Page 9, 8.3.1.4).

“Would work with relevant agencies and authorities to develop site-specific mitigation measures” (8.3.1.4, Page 10)

“Mitigation measures for buoyancy and exposed segments of the abandoned Line 3 would be site specific and would need to be designed in collaboration with the responsible agencies” (8.3.1.4, Page 10).

Mitigation measures would be site specific and would need to be designed in collaboration with responsible agencies and authorities” (Page 12, 8.4.1)

“The distance between pipelines within this corridor varies, but they are generally 10 to 15 feet apart. Enbridge has indicated that abandonment would minimize risk to other pipelines in the Mainline corridor” (8.3.1, Page 4).

“The distance between pipelines within this corridor varies, but they are generally 10 to 15 feet apart. Enbridge has indicated that there is a significant risk that pipeline removal activities could damage an active pipeline and cause an accidental release” (8.4.1, Page 12).

Conclusion

Chapter 8 of the DEIS is simply short, rather than concise. It partially evaluates based on a too-short timescale of 40 years, and partially on a vague “long term” timescale, which produces conflicts of information. The reader is left with many questions unanswered, including, Can Enbridge effectively clean a 282-mile pipe? What are Enbridge’s plans for contaminated soil management and buoyancy? And, What mitigation will Enbridge actually pay for? Finally, there are an astonishing number of times when the DEIS seems to rely upon a plan to-be-decided. The issue of pipeline abandonment matters so greatly to current and future landowners and native peoples of Minnesota, who will deal with the consequences of corroding or collapsing pipeline generations ahead of us. It is clear that

there was no end-of-life-cycle plan made during the permitting process of the original Line 3. Seeing what pains this causes now that we are determining how to manage our first retired pipeline in Minnesota, it's logical to learn a lesson and implement a strong end-of-life-cycle plan for any future infrastructure project today. It is the job of the Environmental Impact Statement to prepare an adequate estimation of Enbridge's preparedness for these eventualities fifty, one hundred, and two thousand years from now. Abandonment is forever. This is why Chapter 8 of the DEIS is so disappointing; it is a failed opportunity to learn from the past and plan ahead.

Chapter 9: Tribal Resources

Introduction

The Tribal Resources chapter is poorly cross-referenced and shows a clear lack of cohesive analysis. With the recent precedent of Standing Rock and the Dakota Access Pipeline in mind, reviewers should anticipate that the public will demand extreme rigor on the topic of tribal rights. However, Chapter 9 constitutes just 32 pages out of a 5,547-page set of documents. The related Environmental Justice chapter is just 16 pages. At a whopping 64 pages, the Table of Contents for the DEIS is larger than Chapters 9 and 11 *combined!*

Overall, Chapter 9 takes a narrative style and includes first-hand accounts that contrast with the analytical tone of the rest of the DEIS. Inclusion of these accounts is positive, but too often the DEIS stops there without also providing rigorous analysis based in existing law, policy, and historical and potential impacts. Not addressing indigenous concerns with sufficient rigor can be interpreted as a cue to decision-makers that these concerns are less valid or more easily dismissed than issues addressed in other parts of the document. The EIS should add more detailed examination and specificity regarding many of the issues raised in this section. We trust it is not the intent of the DOC that concerns specific to native communities are worth less inquiry than others.

The DEIS has not given adequate weight to the health impacts faced by native communities, nor to their food sources, and the DEIS discounts the impact of this project on tribes for the multi-state multi-country length of the pipeline. We list address eight substantial missing points of information in Chapter 9. The conclusion will list the broken links that were used in citations during this chapter.

Native Resources and Health

Wild Rice Lakes, Fish, Game

The DEIS states that “As sovereign nations, tribes manage natural resources accordingly.” (9.2), In numerous places throughout the chapter, the author underscores of what vital importance natural resources are to native communities: a source of food, identity, history, and independence. The DEIS designates “moral and legally enforceable” responsibilities to the United States in consulting with tribes and protecting their resources (9.2.3). Perhaps in reference to the controversy over DAPL, the chapter even declares that, “Any threat to water is a threat to life” (9.4.4, Page 16). The DEIS talks a good talk. This whole chapter is noticeably different than the others because it includes frequent idealist and opinionated statements like those. But historically, native communities have not been treated as independent peoples when there is money on the line. The proposed Line 3 Project is, in part, a proposal that an oil company should get to manage those tribal resources instead and this potential loss of sovereign control over resources should be noted more clearly in the document. This is a decision about which matters more: the mental and physical health of a community, or the financial prosperity of an industry.

Health and Illness

Under section 9.6.2, “Health Impacts” merely outlines what the evaluation of health impacts in the EIS must include, while not actually divulging them. This is the DEIS, so what is the purpose of outlining what should be in the EIS? The lack of specificity gives the strong impression of an unfinished section, and of an area that demands further study.

Impacts of the Whole Line

The DEIS does not make mention of the fact that this pipeline really begins at the Alberta Tar Sands, where impacts specific to First Nations peoples are substantial and documented. Since the construction of this pipeline will directly impact further tar sands extraction under certain oil price scenarios, this connected impact must be considered in the DEIS.

Missing Information from Chapter 9

Below are eight areas that require immediate attention

1) If MIAC recommends a survey of the proposed route for the interruption of Cultural Corridors, then that survey of tribal communities should not just be conducted sometime after approval and prior to construction: it should be included in the EIS. (9.4.2).
2) "Spiritual practices" is the only category of tribal resource whose impact is not described in the list of potential impacts (9.4.2, Page 14)
3) In addition to the formal resolutions against Line 3, Section 9.2.3.3.3 "Formal Tribal Government Actions on Line 3 Replacement Project" should note that in June 2015, the White Earth and Mille Lacs Bands each held their own public hearings to document public sentiment on the proposed Line 3, and requested from the PUC a stay on the permitting process until tribes could be properly consulted. The EIS should describe more specifically what consultation up to this point has involved. The EIS should also be explicit about whether those who were "consulted with" recognize the legitimacy of those consultations, as it is not yet clear whether they do.
4) Section 9.3.4, "Interview with Tribal Elders and Historians", should include full transcripts from those conversations, in addition to that list of questions asked. How many people were interviewed?
5) Though it may be infeasible to investigate and to project the environmental impact on every species of flora and fauna along the proposed routes, traditional plants (wetland reeds, birch trees, tamarack, white cedar, red maple, and balsam fir), medicinal plants (lily pad roots, sage, sweet grass, iron wood) and

specific traditional plant communities (Northern Rich Tamarack Swamp, Northern Spruce Bog, Northern Open Bog) should be given priority as subjects of study. For each plant and plant community, the EIS should provide specific information how the resource in question will be affected by pipeline construction and in the event of oil spills of varying sizes, as defined in the Accidental Releases section.

6) What, exactly, is the Noxious Weeds and Invasive Species Control Plan, and where could a reviewer find it? When following the directive to "See section 6.3.3" to find the Plan (specifically the Impact Assessment in 6.3.3.3), we could only find further repeats that Enbridge will, eventually, prepare such a plan. The search for this plan in detail became dizzying:

-"The Applicant will prepare a Noxious Weeds and Invasive Species Control Plan to prevent the spread of invasive species and noxious weeds" (9.5.1, Page 25)
-"To minimize the spread of noxious weeds and invasive plants, the Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan" (6.3.3.3, Page 369)
-"As noted above, to minimize the spread of noxious weeds and invasive plants, the Applicant would implement a Noxious Weeds and Invasive Species Control plan that would detail control measures to be implemented during operation" (6.3.3.3, Page 370)
-"The Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan" (6.3.3.3, Page 371)
-"The Applicant would implement measures in a Noxious Weeds and Invasive Species Control Plan" (6.3.3.3, Page 387)
-"Noxious weed and invasive plant management and control would be implemented during construction to minimize the effect of noxious weeds" (6.3.3.4, Page 390)
-As a result of implementation of a Noxious Weed and Invasive Plant Management and Control Plan for the route options…" (6.3.3.4, Page 391).

After 7 or more mentions and between about 30 pages of related text, the only concrete measure found was to clean all equipment prior to bringing it to the site to

prevent the introduction of invasive species. It is not clear whether this is a part of Enbridge's Control Plan. It is also not clear whether deep-cleaning is possible for all equipment, or whether this has been implemented in the past. The risk of an invasive species crowding out medicinal or edible plants will be of great concern and is relevant to this chapter.

7) The DEIS does not include a strong analysis of the socioeconomics present in tribal communities and on reservations. Since there is a correlation between tribal communities and highly concentrated areas of poverty, the inclusion of this type of analysis in the final EIS is important. Socioeconomic factors can serve as multipliers of other threats addressed elsewhere in the DEIS, including the effects of climate change (9.6.1), and these threats should be specifically noted.
8) Sexual Trafficking: Chapter 11 of the DEIS acknowledges the strong correlation between a sudden pipeline workforce and an increase in sexual trafficking in native communities. This should not only be included in Chapter 11, but also in Chapter 9 under 9.6 "Unique Tribal Impacts". The DEIS suggests that Enbridge could "prepare and implement an education plan or awareness campaign around this issue" (11.4.1), which is a vague and unhelpful placeholder. Does Enbridge have any experience in implementing a plan of this nature, and has this been proven successful anywhere? In addition, some of the trafficking impacts historically associated with pipeline projects have taken place at the point of extraction in Alberta. Will Enbridge be able to address these impacts via an education campaign?

Conclusion

The following sentence appears multiple times in Chapter 9: "The Applicant's preferred route as well as any proposed alternative would result in a diminishment of Indian interests" (9.4.1, Page 13) (9.4.2, Page 14), which is close to, "Any pipeline route would affect cultural and natural resources" (9.5, Page 22). If it is fully acknowledged that a historically brutalized, colonized, and impoverished people will have their remaining rights encroached upon if this project proceeds, then the decision to build this pipeline or not is a

moral one, and the EIS should be specific in drawing links between this and the need to consider overall the overall benefit to society when issuing a Certificate of Need.

Broken Links Used as Citations

Brave Heart, M.Y.H. 2011. Welcome to Takini's historical trauma.
http://historicaltrauma.com/
-This website does not exist. "HistoricalTrauma.com" is for sale.

Mille Lacs Band of Ojibwe. 2014. Treaty of 1837: The Facts about the Treaty of 1837.
http://millelacsband.com/mille-lacs-band-ojibwe/economy/businesses-and-economic-impacthome/treaty-of-1837/. Accessed on December 15, 2016.
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Chapter 10: Accidental Crude Oil Releases

The risk of an oil spill in Minnesota, large or small, will be of serious concern for Minnesotans. Correspondingly, they will demand a thorough and unbiased analysis of this risk and of the preparedness to mitigate that risk by responsible agencies. Chapter 10 of the DEIS, titled "Accidental Crude Oil Releases" does not provide adequate assurance. This comment will address the clearly biased language and methodology used for this spill risk analysis, as well as information missing in the document. The conclusion will include broken or inaccessible links used as citations for Chapter 10.

The scope of Office of Pipeline Safety audits and inspections listed in the DEIS do not mention actual oversight of integrity digs, or actual construction monitoring, only accuracy of the records, methodology, procedures, facilities, and so on. (pg 3) The Executive Summary should highlight the lack of state oversight over the day to day operations. On Leech Lake reservation, tribal personnel monitor each integrity and repair operation by requiring Enbridge to allow them to assess the site prior to closing up the trench. The DOC must have learned this in their consultations with the tribes, but it is not reflected in the DEIS. The state has no such comprehensive oversight, and the Commission, and public need to be informed of this. In Chapter 2 (2.7.1.1), there is a reference to independent

third-party system of monitors to be implemented by state agencies but they will not have authority to stop construction. “Enbridge would coordinate with the participating agencies to identify the appropriate qualifications of
the third-party monitors and determine their specific role during construction.” (pg 2-20) Who would pay for these inspectors, and how will the state ensure this happens? How is it in Minnesota’s best interest for the Applicant be in charge of the independent inspectors? This applicant- favored system of construction monitoring needs to be in the Executive Summary for the Commission and the public to be informed.

There are several problems with the oil by rail spill analysis.

1) The Threats to Crude Oil Transport by Rail section does not discuss the management decisions regarding cost savings measures that can affect safety, like reducing the number of conductors on the train, insufficient maintenance staffing, etc. (pg 7) Legislation at the state legislature mandating at least a two person crew per train has failed to pass. There is no discussion of the single conductor on the Lac Megantic train for example, or the brake failure of that train. Cutbacks to track and switch maintenance personnel in winter are another way rail safety is threatened
2) “Each tank car has a capacity of up to 800 barrels (33,600 gallons) of oil.” (pg 8) The amount of oil a given railroad car can carry depends on weight, as well, which is not mentioned.
3) The analysis of the crude by rail scenario assumes rail is carrying the same dilbit ratio as a pipeline; this is an unrealistic assumption, as crude by rail can be loaded with much less valuable diluent, and more bitumen. (pg 15)
4) The whole analysis of barrels transported by alternatives to the pipeline assumes the maximum capacity will be transported by the alternatives, completely discounting the declining demand for oil, the incremental volumes likely to be transported over time.

The DEIS states “Enbridge pipelines constructed before 1980, such as the existing Line 3 employed different coating technologies which do not meet current standards for

corrosion" (pg 14) Enbridge Lines 1, 2 and 4 also were constructed before 1980, then they must also be needing replacement. Why are they not mentioned in Chapter 12?

The primary studies used for the Spill Risk Analysis were conducted by Enbridge-funded Stantec + Barr Engineering (2017) and Stantec et al (2017) (10.2.1.1.1). We have many concerns with the use of these Enbridge funded studies.

1) In the worst-case scenario spill modeling conducted by Stanec et al for seven cites along the proposed route, Enbridge has classified the Predicted Volume Out as "Non-Public Data". If those estimates exist, they must be disclosed so the public may respond to the projected leakage volume at each site. (Table 10.3-

2) Their spill analysis is stated in terms of *annual* spill risk, rather than risk multiplied across the lifetime of a pipeline, which could be 60 years (10.2.1.2) (Table 10.2-2 (10.2.4.2.2). The purpose of the DEIS is to provide information to decision makers, the applicant and to the public of Minnesota, and so framing the risk in valid terms matters a great deal.

3) The DEIS really should have included an algorithmic estimate, compounding the leakage risk each year over the anticipated life of the pipeline, since these old pipes are leaking more.

4)The Spill Risk analysis methodology was not thoroughly described, nor were sources consistently cited. The reader is not informed if the analysis method was the best among available methods, is not told (if anyone) peer-reviewed the study by Stantec et. al, does not know what initial criticisms were made during the review process and how those were resolved, and needs to see a demonstration of independent analysis. Because the Stantec study was commissioned by Enbridge, the reviewer should expect even more transparency.

5) The Spill Risk Analysis in Chapter 10 charts the impact on various resources and areas of interest based only on each route's physical proximity to it. So the charts list how close, say, a pipeline would be to some number of drinking wells (Table 10.4-6). But the importance of a resource varies in a way not captured in these numbers. Water bodies are an example; they may be different based on their current water quality, the ecosystem that

depends on them, the families that enjoy visiting, or even their historical significance. There are data sources available that could be used to determine the value of various Minnesota resources, including the Minnesota Pollution Control Agency's "Stream Use Classification System" and "Index of Biotic Integrity", but they were not used. To just outline impacts based principally on physical distance in terms of acres misses the analysis of how valuable the individual resource is.

6) The authors of the spill risk assessment throughout will repeatedly use the word "*only"* to describe risk statistics associated with the applicant's preferred route (APR), but do not use the qualifier "only" to describe the projections (i.e. number of spills, number of nearby water-bodies) for alternative routes like SA-04.

Figure 10.4-11 We are grateful to see a map with the Mississippi clearly marked, but request the river be also clearly labelled north of RA-03AM. Also, it is widely believed in our state that the river begins in Itasca State Park, and hence there should be a second Mississippi river crossing illustrated on the map by the APR and RA-03AM north of the park.

The language used in the DEIS favorably frames Enbridge as a company while doing little to acknowledge Enbridge's historical failures to work up to its own standards. For example, the document claims that, "Modern crude oil pipeline systems are designed, constructed, and operated with technology to minimize the potential for integrity failures and to rapidly detect and manage unanticipated releases" (10.1.2.1). But on the other hand, we know Enbridge's control room detection mechanisms have failed in the past. Sometimes control room operators have even ignored the detection mechanism warnings, and local residents are the ones to first report a smell or the presence of oil, as happened in Kalamazoo, Michigan.

The PHMSA Leak Detection Study[21] was not cited in the DEIS, and we request that it be cited. The report concluded small leaks are virtually undetectable. "This is one of the main weaknesses of an Internal LDS. It is rare to find flow metering systems that have

21 Final Report: Leak detection Study -DTPH56-11-D-000001,US Department of Transportation, Pipeline and Hazardous Materials Association, Sahw, Phillips, Baker, Munoz, Rehman, Gibson, Mayernik, Dec 10, 2012. Last accessed 7/10/17 at https://www.phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/Press%20Release%20Files/Leak%20Detection%20Study.pdf

cumulative uncertainties better than about~1%".[22] In the permeable soils along the APR, the oil from these leaks could go straight down and not surface.

Enbridge acknowledges Line 3 is "weeping" so the assumption in 10.3.1.4 that once the leaked substance reaches the surface, "visual detection and response would occur" is confusing. This is cited as from Stanec et al 2017; but is there any evidence of a response to a pinhole leak? And if there are no adequately sensitive technological mechanisms to detect a tiny leak, who are we relying on for that visual detection? But the DEIS does not disclose how often visual inspections occur, or how inspection for pinhole leaks are conducted underneath bodies of water. And under ice? Are there any state inspectors, and is there an adequate number of them to cover the hundreds of miles they will need to physically walk? The study warns that "Pinhole releases can remain undetected for long periods of time, ultimately releasing volumes that would be classified as medium or large spills" (10.3.1.4).

The DEIS discloses that between 2002 and 2017, there were seven known pipeline failures in the existing Line 3 (10.2.4.1.2). But the conclusion drawn from that fact is that these spills "underscore the increased risk associated with the older Line 3 technology and pipeline aging compared to the newer technology for the other pipeline alternatives". The emphasis is on the newer and better technology; rather than that Enbridge continues to operate pipelines which are deeply flawed and at risk. It continues: "Enbridge pipelines constructed before 1980, such as the existing Line 3 employed different coating technologies which do not meet current standards for corrosion". (10.2.1.3.1). This would include lines 1, 2, and 4, which, if not up to standard, must *also* require replacement. Line 3 is not their oldest pipeline. Enbridge says that the aging infrastructure still in operation is the reason for building a new pipeline. Enbridge knew years ago that this pipeline was failing, but it waited until economics of repairs drove a request for replacement, while the line continued to leak. The DEIS does not analyze whether the company has a replacement policy that benefits Minnesota's environment versus their economic interests. Their waiting until the last minute to replace a pipeline does not automatically justify a new pipeline.

22 Ibid,pg 4-28

The seven sites used to model the spill risk analysis are not, in fact, the worst-case zones when ranked by relative sensitivity or the importance of their resources. Route alternative SA-04, for example, passes mostly through already-disturbed agricultural lands that are not feasible to restore currently. The Applicant's Preferred Route, however, crosses more virgin territory where ecosystems are as-yet intact. The difference in conditions here is not recognized in the DEIS, suggesting to us that SA-04 was not considered seriously.

Finally, the DEIS claims that increased pressure as a result of higher flow rates in a pipeline will have no effect on the spill rate (10.2.4.1.2). This claim has no citation, and is disputable. The DEIS even states on the same page that corrosion and manufacturing defects are primary causes of accidental release incidents, without acknowledging that increased pressure and flow through a pipeline could accelerate corrosion and exploit defects.

10.3.1.3.1 Acknowledges that "small releases can persist in the environment for long periods of time and can cause localized contamination requiring cleanup and remediation", and that these are the most common spill category. Shouldn't there be more effort to monitor and report pinhole leaks if, when undetected, they can spill an amount equivalent to a medium spill? It is unclear why a pinhole or small leak would not be measured and documented in the spill analysis.

There should be more discussion of how the harsh climate in Minnesota will affect Enbridge's capacity for prompt and full cleanup in the likely event of a spill. There is no description of temperature as it relates to oil viscosity, and no information on whether the underwater cleanup equipment can actually be used in a river where the depth may only be one or two feet. (10.3).

The terrestrial wildlife risk analysis does not include the bee population, which is under threat. The DEIS mentions herbicides may be used around the pipeline. If so, there must be consideration of which herbicides will be used, and what the scientific literature says about how these herbicides will affect the food source for one of our state's most important pollinators. (10.4.2.1.1)

The Effects on Aquatic Life section does not discuss the effect of small, medium, and large spills on algae and other microorganisms in the water, nor the long-term effects for aquatic plants and the food chain of removing oxygen from the water. Doesn't Enbridge have such data from previous spills and if so, why aren't they included in the DEIS? An Aquatic Life impact assessment should extend beyond the likelihood that fish may get sick from eating contaminated algae. (10.4.2.1.1) This section does not currently describe environmental consequences of using bioremediation techniques and chemicals to reduce the spread of oil in water. Even if Enbridge is not expressly permitted to use dispersant chemicals in Minnesota, they have done so against state law in the past, and so these effects still need to be described here. See article: "Did Enbridge Use Toxic Chemicals to Clean Up Their Oil Spill in Kalamazoo?", Michael Toledano, Vice News, December 24, 2013.

In Section 10.4.1 The analysis should consider non-potable water to also be an AOI (Area of Interest). Some water sources not considered a resource for humans will be a resource for wildlife. This relates to the aforementioned need to rank the value of various AOIs.

The DEIS does not consider the amount of pressure required to force that heavy oil through pipe, and the potential to exacerbate weaknesses in the pipe with high pressure and pressure cycling. The list of factors cited in the DEIS that may result in a pipeline "incident" does not include the very threat thought to have been the culprit in some documented Enbridge spills: fatigue damage due to inadequate cradling during the shipping of pipe segments. The amplitude of pressure swings capable of producing fatigue cracks is a consequence of the pump discharge required to force heavy, viscous crude oil through the pipe. (10.2.1.2) To not consider the relationship between high pressure, high volume, and fatigue cracking is an enormous oversight.

Chapter 10 contains no significant analysis of the increase to spill potential as pipelines become exposed over time. Many of Enbridge's lines are currently aboveground in different areas, and are visible to the naked eye. If corrosion is a significant cause of pipe failure, then there should be analysis of how exposure to air, animals, and weather will exacerbate corrosion.

The DEIS acknowledges the risk of this pipeline is largely placed on rural communities, and that those communities won't have easy access to the promised rapid-response tech

and crew. However, a decision to plan for spills preparedness is put off until the "In Minnesota, the Applicant's preferred route and route alternatives generally pass through rural, sparsely populated areas. Rural communities can face challenges regarding emergency preparedness and response, such as proximity to adequate response personnel and equipment, and may lack needed space, supplies, and staff to respond quickly and effectively to emergencies" (See section 10.5.3.2.1 below)

The above passage is a small part of "Potential Spill Response Challenges". When it indicates at the end to see section 10.5.3.2.1 below, titled, "Remote Area Analysis"...the following 4 sentences are the only thing in that section.

> "The magnitude of potential impacts on a resource may be directly related to the response time and response time may be related to the accessibility of the spill. Rapid detection and response can reduce crude oil exposures and impacts on resources. Remote areas may be less accessible to spill response teams and therefore potentially more vulnerable to effects from crude oil spills. <u>When a final route is selected, spill response strategies will be developed for areas with difficult access"</u> (emphasis added) 10.5.3.2.1

At least an *outline* of such response strategies should be detailed in the Environmental Impact Statement.

Section 10.3.1.3.3 (pg 30) on large spills initially mentions large releases in connection with rail cars. That is odd, considering Figure ES-4 in the Executive Summary (with the error in the chart corrected) clearly shows that pipelines spill much more when they spill on average than do railcars. The second sentence lists excavators or earth movement as possible cause of pipeline failures, but that does not match real world experience, such as the Kalamazoo or the Mayflower ruptures. We request these biased examples of possible releases be corrected and pipelines be mentioned first in the large spills paragraph.

Section 10.3.1.3.4 again is unrealistic and not historically accurate in its listing of likely causes of major pipeline spills. The catastrophic Kalamazoo and Mayflower ruptures were caused by none of the listed factors. Again, catastrophic spills from railcars can result from

poor track maintenance, especially in winter and inadequate staffing on trains. These are controllable factors if railroad management staffing decisions are made with safety in mind.

The DEIS notes regarding the Kalmazoo disaster: “Enbridge has paid over $1.2 billion in response, clean-up, and restoration costs as well as fines from state and federal agencies (U.S. Securities and Exchange Commission 2014).” (pg 108) This does not acknowledge the insurance money Enbridge received from their insurer – so in effect they paid far less. They are also allowed to recover all the costs they incurred in the tariff structure at FERC – essentially a spill is an “expense” which they can recoup from the shippers.

Other pipelines proposed to carry oil to market should also be proposed for alternatives; this was not considered.

Section 10.5.1.1.2. fails to mention the increased scrutiny given to spill response laws at the legislature that required railroad companies to pay for additional state railroad track inspectors. The DOC is well aware pipeline companies declined to pay for spill response oversight in that legislation and all funding stopped as of July this year.

This section of the DEIS, like others, is inadequate and incomplete.

Broken Links

2017a. Hazmat Intelligence Portal, U.S. Department of Transportation. Bulk Incidents. https://hip.phmsa.dot.gov/analyticsSOAP/saw.dll?Dashboard. Accessed on January 25, 2017

-This linked cannot be accessed without login credentials

National Oceanic and Atmospheric Administration (NOAA). 2011. Oil and chemical spills FAQs. http://response.restoration.noaa.gov/faq_topic.php?faq_topic_id=1. Accessed on May 25, 2011.

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i David Hasemyer, “Mich. Officials Step Up Scrutiny of Enbridge After Water Law Violations”, InsideClimate News, July 9, 2013 last accessed 9/21/2015 http://insideclimatenews.org/news/20130709/mich-officials-step-scrutiny-enbridge-after-water-law-violations

Levi, Andrew (COMM)

From: Eric Lindberg <elindberg@mncenter.org>
Sent: Monday, July 10, 2017 5:22 PM
To: MN_COMM_Pipeline Comments
Cc: Tim Culver; Leigh Currie
Subject: Comments for Line 3 Replacement DEIS (Docket #s CN-14-916 and PPL-15-137)
Attachments: MCEA Comments on Line 3 Project.pdf

Dear Ms. MacAlister,

Please find the attached comments submitted by Leigh Currie on behalf of MCEA.

Regards,
Eric

Eric Lindberg

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Minnesota Center for Environmental Advocacy

Using law, science, and research to protect Minnesota's environment, its natural resources, and the health of its people.

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July 10, 2017

Minnesota Department of Commerce
Attn: Jamie MacAlister, Environmental Review Manager **VIA EMAIL**
85 7th Place East, Suite 280
St. Paul MN 55101-2198

Re: Public Comment on Line 3 Project (CN-14-916 and PPL-15-137)

Dear Ms. MacAlister,

Thank you for the opportunity to submit comments on behalf of the Minnesota Center for Environmental Advocacy (MCEA) regarding the Draft Environmental Impact Statement (DEIS) for the Line 3 Replacement Project (CN-14-916 and PPL-15-137) ("the Project") proposed by Enbridge, Inc.

MCEA is a Minnesota non-profit environmental organization whose mission is to use law, science, and research to preserve and protect Minnesota's wildlife, natural resources, and the health of its people. MCEA has statewide membership. MCEA has long been concerned about the negative impacts to Minnesota's environment caused or threatened by crude oil pipelines and the need for proper environmental review of those threats. MCEA has participated in several legal and policy matters related to the Project. Indeed, the DEIS now open for public comment is, in part, the result of years of work by MCEA. MCEA was involved in the litigation that helped shaped the environmental review process of the Enbridge's related Sandpiper pipeline project and which directly impacted the review and permitting processes for this Project.

Minnesota's rivers, lakes, streams, wild rice waters and wetlands are uniquely threatened by both the immediate impacts of pipeline construction and the catastrophic impacts of a potential oil spill, which persist throughout and extend beyond the 50 year or more lifespan of the proposed pipeline. MCEA has sought from the beginning of this process to show less harmful options to the Project through proposing various project alternatives to demonstrate its point.

MCEA's concerns with the Project as proposed are not exhaustively provided in these comments. Sufficiently comprehensive comments on the DEIS, which is over 5,000 pages in length, would require more attention than is allowed by this short timeline for comment. As such, MCEA's comments focus here on two

primary issues: First, the purpose and need articulated in the DEIS is overly narrow and relies too heavily on assumptions and information produced solely by Enbridge. Second, the alternatives assessments provided in the DEIS are insufficient and incomplete. These two shortcomings result in one particular, glaring omission, which is the absence of an alternatives assessment for a "shut down, no build" alternative, for which a suitable EIS would consider the impacts of shutting down the Existing Line 3 without the completion of the Project.

Were the DEIS to be finalized without significant amendments and supplementation, MCEA is concerned that the EIS would not meet the standards of the Minnesota Environmental Policy Act (MEPA).[1] In light of these and other DEIS shortcomings, MCEA requests that the subsequent drafts of the EIS include a sufficiently broad statement of purpose of need, based on independent analyses conducted by a responsible government unit (RGU)—not merely by Enbridge—and that all reasonable alternatives that might satisfy such an amended statement of purpose and are fully considered, specifically, a "shut down, no build" alternative. Addressing these and other valid concerns articulated here and in other public comments is required to meet the environmental and public health standards established by MEPA.

I. THE STATEMENT OF PURPOSE AND NEED IS TOO NARROW AND IS NOT BASED ON INDEPENDENT ANALYSIS.

A. An EIS Requires a Sufficiently Clear and Broad Statement of Purpose and Need.

The DEIS' statement of purpose and need fails to properly define the purpose of this project. The purpose and need section the DEIS should address two broad themes: "Do we need this pipeline to transport oil? And if so, where should it go?" Addressing these questions accurately requires a sufficiently broad statement of purpose and need. Because any alternative that does not meet the stated purpose and need of a project may be eliminated from consideration under the EIS, it is crucial that the purpose and need be stated broadly enough.[2] The DEIS does not clearly define the need for the project.

Minnesota law states that "the proposed project shall be described with no more detail than is absolutely necessary to allow the public to identify the purpose of the project, its size, scope, environmental setting, geographic location, and the anticipated phases of development."[3] This requirement mirrors the federal regulation under the National Environmental Policy Act (NEPA) stating, "The statement shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action."[4] The purpose here should be defined as transporting oil from Alberta to Midwest refineries. Articulating this purpose allows the state regulators to answer the question of whether this proposed Project is the best alternative to meet that purpose. But the DEIS never clearly identifies the purpose of the Project. 2371-1

[1] Minn. Stat. § 116D.01 et seq.
[2] Minn. R. 4410.2300 (G).
[3] Minn. R. 4410.2300(E).
[4] 40 C.F.R. § 1502.13.

2371-1 Cont'd

Here, because the DEIS does not clearly identify the Project purpose, the analyses of reasonable alternatives is severely and improperly restricted. The EIS should be amended to provide a clear, broad statement of purpose and need for the Line 3 Replacement, thereby allowing for a more appropriate and thorough alternatives assessment.

B. The DEIS' Statement of Purpose and Need Relies Too Heavily on Information Provided by Enbridge.

In addition to a lack of a clearly defined purpose of the project, the DEIS continues to rely too heavily on Enbridge's own suggestions to frame the need for the Project. MEPA allows the RGU to utilize an applicant's work where appropriate, but once such work becomes a part of the EIS, it is the RGU's responsibility.[5] The stated need for the Project boils down to two assertions: first, that safety and integrity concerns over the the Existing Line 3 pipeline present the need for a replacement, which would be less expensive than addressing the concerns; and second, demand for Canadian heavy crude oil exceeds existing capacity and that it would be best for Enbridge to satisfy this demand with the Project.[6]

These statements are predominantly based on Enbridge's beliefs, statements, or indications, and are not the result of independent analysis by the RGU. A statement of need defined solely by Enbridge does not allow for an EIS that adequately addresses alternatives. In essence, these two assertions stand for the prospect that oil is currently transported in an unsafe manner between Clearbrook, Minnesota and Superior, Wisconsin, and that it will continue to be transported in an unsafe manner absent the approval of its alternative.

The DEIS thus inappropriately frames the choice as between continued operation of an aged pipeline facing significant integrity issues and a new pipeline that is likely to cause adverse environmental effects. The history of the Existing Line 3 pipeline demonstrates that continued operation should no longer remain an option. Even so, the need to shut down the existing Line 3 does not dictate that a replacement must, ought to, or may be built. The DEIS consists primarily of data provided by Enbridge concerning its estimation of the cost and benefits of the Project, and does not contain an RGU's own independent findings as required under MEPA.[7] The EIS, unless supplemented to include a proper discussion of the purpose and need for the Line 3 Replacement project and a satisfactory of all reasonable alternatives—including the alternative of shutting down the Existing Line 3 without construction of the Project—will fail to meet the minimal requirements of MEPA.

In drafting an EIS, an RGU cannot simply rely on statements of what is "desirable from the standpoint of the Applicant."[8] A proper interpretation of MEPA indicates that an administrative

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[5] Minn. R. 4410.0400, subp. 2.
[6] MINN. DEP'T COMMERCE, ENERGY ENVTL. REVIEW & ANALYSIS, DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR LINE 3 REPLACEMENT PROJECT, PPL-15-137/CN-14-916 at 2-4 (May 15, 2017) (hereinafter "L3R DEIS").
[7] Minn. R. 4410.0400, subp. 2.
[8] 46 Fed. Reg. 18,026 (1981).

agency abdicates its responsibility when solely relying on information provided by an applicant to determine the statement of purpose and need for an EIS.[9]

Here, the DEIS manages to fail both of these requirements. In detailing the purpose of the Line 3 Replacement project, the Commission directly cites the Applicant in determining that a higher capacity line reduces pressure and allows for cheaper maintenance costs for a new pipeline.[10] The DEIS claims that the new pipeline would result in better crude oil distribution management to refineries around the country, and would increase the efficiency of Applicant's system; however, only applicant provided this data.[11] If the Final EIS frames the statement of purpose and need solely on Applicant's data and not on an RGU's independent findings, the EIS is likely not to pass MEPA scrutiny. 2371-2

C. The Overly Narrow Statement of Purpose and Need Restricts the Scope of the Alternatives Assessments.

An agency should not "slip past the strictures of environmental review by "contriv[ing] a purpose so slender as to define competing 'reasonable alternatives' out of consideration."[12] If an RGU so constricts the definition of the project's purpose, it runs afoul of the requirements of MEPA.[13] This DEIS' statement of purpose—which first posits that the Existing Line 3 is unsafe, then assumes that crude oil must continue to pass between Clearbrook and Superior—is so narrow that it restricts the alternatives assessment only to options suggested by Enbridge, and encourages the omission of a "shut down, no build" alternative.

In addition, it is problematic that the EIS states as a maxim that "[w]hile pipeline projects are increasingly contributing to public debate over important broader energy policy issues, many of these overarching policy issues are beyond the scope of this EIS because they stretch well beyond the specific decision before the [Minnesota Public Utilities Commission]."[14] This tendency encourages an overly narrow purpose and need for a project, as the "the need for the proposed pipeline with the proposed throughput capacity is an issue for the [PUC, but] this EIS will not assess the Project need."[15] Problematically, DEIS tries to have it both ways: it first states the ultimate decision on need for the project rests in the hands of the PUC when deciding whether to grant a certificate of need (CN), but then sets a purpose and need that presupposes need, while eschewing a discussion of "broader energy policy issues," which is critical to assessment of Enbridge's belief that crude oil must continue to flow between Clearbrook and Superior. The EIS, while willing to address reliance on fossil fuels on a project-by-project basis, "does not provide a policy-level assessment of the societal implications of continued reliance on fossil fuel."[16]

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[9] *No Power Line, Inc. v. Minn. Envtl. Quality Council,* 262 N.W.2d 312, 327 (Minn. 1977).
[10] L3R DEIS, *supra* note 6, at 2-4.
[11] *Id.* at 2-4–5, 2-45.
[12] *Simmons v. United States Army Corps of Eng'rs,* 120 F.3d 664, 666 (7th Cir. 1997).
[13] *Id.*
[14] L3R DEIS, *supra* note 10, at 1-5.
[15] *Id.,* at 1-6.
[16] *Id.*

Without an analysis of the impacts long-term reliance on oil, the dual assumptions that current capacity must be met or expanded to meet demand and that Existing Line 3 safety and integrity issues mandate other conveyance options, the DEIS excludes other viable, safer, and potentially more economically sound alternatives, such as lower capacity pipelines, or a "shut down, no build" alternative. If the Final EIS does not broaden its intended analysis within the statement of purpose and need, then the preparers run the risk of failing to consider a proper scope of possible alternatives, rendering the EIS inadequate. 2371-3

II. THE DEIS INCLUDES AN INSUFFICIENT AND INCOMPLETE ALTERNATIVES ASSESSMENT.

A. MEPA Requires a Higher Standard for the Alternatives Assessments than CN Proceedings and Requires that the RGU, Not the Public, Prove that All Reasonable Alternatives are Assessed.

This Project's EIS is the best available option for considering alternatives to an applicant's proposal. While CN proceedings before the PUC will also consider project alternatives, the CN process does not provide the platform that it should in order to thoroughly investigate best alternatives, because the CN process and EIS process under MEPA require different standards. The limitation under the CN proceedings is that, under the rules, the party presenting the alternative plan has the burden of proof to show that there is a "more reasonable and prudent alternative" to a project proposal.[17] This burden of proof, if interpreted literally under the rule,[18] raises real questions about whether any party could ever propose a "more reasonable and prudent alternative" unless they happen to be a pipeline company willing to build that alternative.

But the EIS process can succeed where the CN process fails, because "alternatives" under MEPA are different than "alternatives" under the CN rule. Under MEPA, the statutory mandate is to consider "appropriate alternatives to the proposed action."[19] MEPA rules clarify that the EIS must "compare the potentially significant impacts of the proposal with those of other reasonable alternatives to the project."[20] The EIS "must address one or more alternatives" from a range of types, including: alternative sites, alternative technologies, modified designs or layouts, modified scale or magnitude, and alternatives incorporating reasonable mitigation measures.[21] If the EIS does not analyze alternatives of any of these types, it must explain why it failed to do so.[22] 2371-4

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[17] Minn. R. 7853.0130(B).
[18] The authorizing law for this rule, Minn. Stat. § 216B.243, does not assign a burden of proof for alternatives, and thus MCEA maintains that the PUC can turn to the statute, and not the rule, when evaluating alternatives in CN proceedings.
[19] Minn. Stat. § 116D.04.
[20] Minn. R. 4410.2300(G).
[21] *Id.*
[22] *Id.*

Therefore, under MEPA, the burden of proof for reasonability lies not with the party presenting an alternative to the option preferred by Enbridge, but with the PUC and its delegate, the Department of Commerce, which must make their own determinations about alternatives to be considered in the EIS, and must themselves engage in the work, without relying solely on the public (or Enbridge) to provide all of the information about potential alternatives.

Once completed, the EIS itself will dictate which alternatives may enter the CN process, at which time, as discussed above, the alternatives burden of proof is likely fall to party's supporting an alternative. At that point the PUC must ultimately select its own preferred alternative as part of its final determination on adequacy.

MEPA also specifically prohibits the PUC from selecting a proposal that:

> is likely to cause pollution, impairment or destruction of the air, water, land or other natural resources located within the state so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction.[23]

In addition, and critically, MEPA requires that the Commission look beyond the Applicant's private financial and business preferences when considering "feasible and prudent alternatives" and that "[e]conomic considerations alone shall not justify such conduct."[24]

The environmental review process only provides sufficient protection to Minnesota's environment and public if an EIS meets the standards of MEPA and reflects the public interest, not the company's private interest. If the Final EIS does not raise and address all reasonable alternatives then the State of Minnesota and its legacy of clean water will be at the mercy not only of Enbridge, but every other pipeline company in the foreseeable future who wishes to utilize eminent domain to cut a swath across the state for a new pipeline. These are the first state-only EIS's on crude oil pipelines in Minnesota history, and so the state stands at a historic crossroads. If the RGUs do not sufficiently raise and analyze all alternatives as required by MEPA, a precedent will be set that a project proposer can end-run environmental review by offering only a narrowed list of alternatives, which may overstate the need or benefits for the project while placing the burden for alternatives assessment on the public instead of on the RGU, as intended and required by the Legislature.

B. A "Shut Down, No Build" Alternative is Reasonable and Must Be Included in the Final EIS.

The no-action alternative for the Line 3 Replacement remains a critical area of analysis because the alternatives analysis is the heart of the environmental impact statement. Also, identifying a no-action alternative informs interested parties on how to proceed in the event the RGU denies the project. A proper no-action alternative considers proposed alternatives within the scope of the

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[23] Minn. Stat. § 116D.04, subd. 6.
[24] *Id.*

purpose and need of a project.[25] The DEIS here fails to properly frame and assess the no-action alternative, considering only that Existing Line 3 would operate if the Project is not completed.[26] The final EIS must broaden the alternatives discussion to consider a "shut down, no build" option, to make clear that Minnesota does not face a forced choice between the Project or the aging, unsafe Existing Line 3. 2371-5

i. The No-Action Alternative Requires Clarification in the Final EIS

Discussion of the Existing Line 3 is central to the reasonable alternatives assessment, but DEIS shortcomings effectively suggest that Minnesotans are stuck with the unsafe Existing Line 3 if the Project does not go ahead. Previously, scoping documents included a presumption that the Existing Line 3 would continue to operate if the Project was not permitted.[27] The DEIS also incorporates this faulty assumption, thereby improperly limiting the range of alternatives assessed. The DEIS explicitly states that a no-action alternative results from the denial of a CN for the proposed project, but fails to adequately determine range of potential responses that could follow a CN denial.[28]

The DEIS states that the Existing Line 3, constructed between 1962 and 1963, is "old and has integrity problems."[29] The existing pipeline contains flash welded metal, making the pipeline increasingly susceptible to defects.[30] The DEIS details the cracking and corrosion present on Existing Line 3, and notes that more than 950 excavations of the pipeline have been required over the past sixteen years.[31] This significant amount of excavations means that Existing Line 3 has experienced at least ten times more integrity issues per mile than any other pipeline operated in Enbridge's Mainline Corridor.[32] Existing Line 3 experienced fifteen failures since 1990, resulting in more than fifty barrels of oil being released; nearly half of these failures occurred in Minnesota.[33] Still, these incidents failed to prevent the signing of a consent decree allowing Existing Line 3 to continue its operations.[34]

Due to the limited no action alternative assessment, the DEIS assumes that "[i]f the [PUC]. . .denies the CN, the Applicant (or entities other than the Applicant) could reasonably be expected to meet shipper demand through other means, such as a different pipeline system, or by

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[25] *City of Alexandria v. Slater,* 198 F.3d 862, 867 (D.C. Cir. 2000).
[26] L3R DEIS, *supra* note 10, chs. 3, 4.
[27] MINN. DEP'T COMMERCE, ENERGY ENVIRONMENTAL REVIEW & ANALYSIS, DRAFT SCOPING DECISION DOCUMENT FOR LINE 3 REPLACEMENT PROJECT, PL-6668/CN-14-916 at 8 (Apr. 8, 2016) (hereinafter "L3R DSDD").
[28] L3R DEIS, *supra* note 10, at 4-3–6.
[29] *Id.*, at ES-11.
[30] *Id.*
[31] *Id.*
[32] *Id.*
[33] *Id.* at ES-11–12.
[34] U.S. ENVTL. PROTECTION AGENCY, REVISED ENBRIDGE CONSENT DECREE, (last visited June 27, 2016), https://www.epa.gov/Enbridge-spill-michigan/revised-enbridge-consent-decree; *see also* L3R DEIS, *supra* note 10, at ES-11, n.2.

train or truck."[35] But the DEIS gives no indication of which specific plan of action the Applicant plans to take if the PUC denies the CN, and decommissioning Existing Line 3 is discussed only in the context of the PUC granting the CN.[36] This improperly narrow discussion of the no-action alternative correlates to the narrow statement of purpose and need discussed in the section above. The Final EIS must acknowledge the numerous integrity issues facing Existing Line 3 and must clarify and assess the full range of no-action alternatives, specifically the "shut down, no build" alternative. 2371-6

ii. The DEIS' Failure to Sufficiently Define and Consider the No-Action Alternatives Results in Understating Environmental and Financial Risks of Existing Line 3 Operations and Leads to an Insufficient Alternatives Assessment with respect to the Options of Abandoning or Replacing the Existing Line 3.

The DEIS contains contradictory statements regarding the viability of continuing to operate the Existing Line 3. It first states that continued operation of the Existing Line 3 would avoid negative consequences attendant with the construction of a pipeline corridor.[37] It then provides that that the Existing Line 3 currently operates at a lowered capacity due to integrity issues, and that maintenance at current capacity could require 4,000 excavations over 15 years.[38] The DEIS estimates the cost for maintaining the Existing Line 3 pipeline at $30–40 million per year, as opposed to the estimated $2 million for a new pipeline.[39] These statistics provided in the DEIS derive overwhelmingly from citation sources and figures provided by Enbridge.[40] The Final EIS should forecast the frequency of integrity digs and the financial cost from an independent analysis conducted by objective preparers. Without such independent analysis, the "shut down, no build" alternative will not be sufficiently considered, and the requisites of MEPA will not be met. 2371-7

The DEIS also makes clear that only "[o]nce the Line 3 Replacement pipeline is placed in service, Enbridge would abandon the existing Line 3 pipeline in accordance with federal, state, and tribal statutes, rules, and regulations."[41] As such, the DEIS only considers abandonment or decommissioning if the PUC grants the CN and the replacement is constructed.[42] Assessing potential costs and benefits of abandonment or removal of Existing Line 3, the DEIS states only one potential benefit— avoiding disturbance of other pipelines that share the same corridor with the Existing Line 3—and only focuses on potential environmental risks associated with the removal of Existing Line 3.[43] The DEIS also states that abandonment of the Existing Line 3 may cause long-term significant effects on the environment, and would require site-specific mitigation measures to reduce impact, yet fails to indicate what such mitigation measures might

[35] L3R DEIS, *supra* note 10, at 4-3.
[36] *Id.*, at 2-43, ch.8.
[37] *Id.*, at ES-11.
[38] *Id.* at 4-6.
[39] *Id.* at 4-7.
[40] *Id.* at 4-7, 4-42.
[41] *Id.* at 2-43.
[42] *Id.* at 8-1, 8-10–13.
[43] *Id.* at 8-1–2.

entail.[44] The Final EIS must also include abandonment of the Existing Line 3 as an option if the Commission denies the CN. 2371-8

Furthermore, the DEIS only considers removal, as opposed to abandonment, of the Existing Line 3 if the Project is placed in the same trench as the current pipeline.[45] The DEIS, as based primarily on Enbridge data, focuses heavily on potential negative implications threatened by the Existing Line 3's removal, providing summaries and details of potential environmental impacts.[46] The Final EIS should incorporate this analysis, but also assess potential positive impacts of removing Existing Line 3. 2371-9

The DEIS projects that abandonment of the Existing Line 3 will cost $85 million, plus $100,000 in annual monitoring costs and an undetermined amount for site specific mitigation efforts.[47] The analysis of the Existing Line 3 removal estimates the cost at $1.28 billion.[48] These estimates are sourced from correspondence and data provided by Enbridge.[49] Reliance on data provided by the Applicant without independent fact-finding by the preparers is grounds for EIS insufficiency.[50]

C. The DEIS Provides Inadequate Explanation on the Exclusion of SA-03 and SA-05 as Alternatives.

2371-10

A proper alternatives assessment would include SA-03, SA-04, and SA-05 as reasonable system alternatives for the Project terminating outside Superior, Wisconsin. Instead, the DEIS analyzes only SA-04 as an alternative, failing to mention SA-03 or SA-05.[51] The PUC determined which alternatives to consider in the DEIS based on an Alternatives Screening Report and Final Scoping Decision Document, but the DEIS only includes these documents in citations with minimal explanation. While a DEIS need not include every possible alternative, an EIS that excludes viable alternatives is inadequate.[52]

Because SA-03 and SA-05 do not appear in the list of alternatives in the DEIS, the Draft Scoping Decision Documents provide the best source of adequate information on these alternatives.[53] Those documents describe SA-03 as following a similar route to the Enbridge's route in the north, but turning south to North Branch, Minnesota, before turning north to Superior, Wisconsin.[54] While not provided on a map, SA-03's description appears to follow a slightly more eastward route compared to SA-04, in addition to staying within Minnesota and

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[44] *Id.* at 8-9.
[45] *Id.* 4-26–28, 8-11.
[46] *Id.* ch.6 (impacts from RA-07), 8-11.
[47] *Id.* at 8-10.
[48] *Id.* at 8-11.
[49] *Id.* at 8-13.
[50] MINN. R. 4410.0400, subp. 2.
[51] L3R DEIS, *supra* note 10, at 4-1.
[52] *Friends of the Boundary Waters Wilderness v. Dombeck,* 164 F.3d 1115, 1128 (8th Cir. 1999).
[53] L3R DSDD, *supra* note 27, at 8.
[54] *Id.*

terminating in Wisconsin.[55] SA-05's description closely mirrors the proposed route for SA-04, except that it utilizes a separate Enbridge pipeline at a transition point in Poweshiek County, Iowa, as opposed to SA-04's reliance on the Alliance pipeline route throughout.[56] These other routes appear to avoid many of the environmental impacts that are listed for the alternatives assessments provided in the DEIS.[57] Without any formal indication or explanation for why these routes were excluded, it is impossible to assess environmental benefits or risks these two alternatives create and whether either is the best alternative.

The Final EIS should include the evaluation and determination process of the Alternatives Screening Report and Final Scoping Decision Documents that led to the exclusion of SA-03 and SA-05 as viable alternatives for the Project.[58] In the alternative, SA-03 and SA-05 should be added and assessed as a reasonable alternative, as allowed after a restatement of a sufficiently broad purpose and need. 2371-11

D. The DEIS Insufficiently Assesses the Rail and Truck Alternatives By Failing to Consider Actual Demand and by Assuming Continued Operation of the Existing Line 3.

An adequate discussion of alternatives should include all reasonable various methods of transporting crude oil to refineries, including those that do not utilize existing pipelines. The DEIS thus ought to include alternative options that do not assume operation of the Existing Line 3, including transport by rail and tanker truck, but the scoping documents failed to explore these options and the alternatives are not assessed in the DEIS.[59]

It is critical also that the rail and trucking alternatives analyses include a request to analyze these alternatives based on the *actual demand* to receive crude oil via these methods, and do not assume that these alternatives would need to transport the same amount of crude oil as the Project seeks to convey. The DEIS assesses potential rail and truck and the various environmental impacts of those actions, but its assessment is incomplete because both alternatives assume a need to convey the full 760,000 barrels per day sought by Enbridge's Project.[60] The consideration of actual demand for crude oil transported by any mechanism receives no mention in the DEIS because the preparers explicitly state energy policy implications, long-term reliance on fossil fuels, and other demand issues are beyond the scope for the Line 3 Replacement EIS.[61]

The DEIS assessments of rail and truck alternatives are also inadequate because they are considered only in conjunction with continued operation of Existing Line 3.[62] The Final EIS should include an analysis of demand for oil transported by rail and truck in the absence of the 2371-12

[55] L3R DEIS, *supra* note 6, at 4-9.
[56] L3R DSDD, *supra* note 27, at 8; *cf. id.*
[57] L3R DEIS, *supra* note 6, at 4-8–10; *see generally id.* at ch.5.
[58] L3R DEIS, *supra* note 6, at 4-1, n.5–6.
[59] L3R DSDD, *supra* note 27, at 7.
[60] L3R DEIS, 4-10–20; ch.5.
[61] L3R DEIS, *supra* note 6, at 1-5–6.
[62] *Id.* at 4-18–20.

should include an analysis of demand for oil transported by rail and truck in the absence of the Existing Line 3, and without assuming that the full capacity sought by Enbridge needs to be transferred. 2371-12 Cont'd

E. The DEIS Fails to Properly Consider Lower Volume Alternatives as Required by Minn. R. 4410.2300 and Fails to Justify the Omission.

Project alternatives assessments have continuously lacked a thorough discussion on transporting lower volumes of crude oil to the destination refineries. Scoping documents indicated that the upcoming DEIS would not evaluate any alternatives regarding the dimensions of the proposed 36-inch diameter pipe but gave no indication of evaluating alternatives transporting lower volumes of crude oil.[63] The EIS should either assess the alternative of a smaller pipeline or provide justification for why the alternative is not considered reasonable.

The DEIS indicates that the alternative of a 24- to 34-inch diameter pipeline for the Project was considered, but provides no justification for why the alternative was determined unreasonable.[64] This despite regulations that require consideration of alternatives of modified scale or magnitude.[65] The DEIS raises only the alternative of utilizing other pipelines to transport the full Project capacity of 760,000 bpd of crude oil in the event the PUC denies the CN.[66] The five alternative pipelines considered present varying routes and volume capacity; however, even in its analysis of these alternatives, the EEIS makes clear that it is "not evaluating these alternatives based on whether they meet the need for this proposed Project."[67] A proper EIS must sufficiently assess conveyance of lower volumes than requested by the project, as required by Minn. R. 4410.2300(G). The Final EIS must include an actual analysis of a smaller volume pipeline with varying metal thickness, in addition to in-depth analysis of utilizing other pipelines at various capacities. The EIS remains inadequate without this analysis. 2371-13

F. The EIS Fails to Sufficiently Consider Oil Spill Impacts and Contrasting Landscapes Analyses for All Reasonable Alternatives.

It is critical that the DEIS analysis considers how varying landscapes react to a release of oil into the environment. Because the Applicant's preferred route for the Line 3 Replacement passes through critical landscape areas such as lakes, rivers, and national forests, while some critical alternatives—such as SA-04—cross flatter terrain, it is imperative the DEIS consider whether oil spills occurring on flatter terrain would be easier to contain. Instead, the DEIS analyzes only potential impacts from oil spills that may occur once the Project begins operations along the preferred route.[68] The DEIS also used two different models to examine oil spill impacts, and the overwhelming majority of the sites were along the preferred route. None of the test sites

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[63] L3R DSDD, *supra* note 27, at 12–13.
[64] L3R DEIS, *supra* note 6, at 4-20.
[65] MINN. R. 4410.2300(G).
[66] L3R DEIS, *supra* note 6, at 4-7–8.
[67] *Id.* at 4-8.
[68] L3R DEIS, *supra* note 6, at ch.10.

considered any area along the SA-04 alternative with flatter terrain.[69] The DEIS fails to properly discuss contrasting landscapes with respect to potential oil spill impacts and containment potential. A sufficient EIS would include comprehensive assessment of the contrasting landscapes corresponding to all reasonable alternatives. 2371-14

CONCLUSION

For the foregoing reasons and in accordance with state and federal law, MCEA requests that the EIS for the Line 3 Replacement Project be redrafted to incorporate the suggestions contained herein.

Please feel free to contact MCEA if you have questions regarding these comments. Thank you for the opportunity to comment on this matter.

Sincerely,

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[69] *Id.* at 10-10, 10-24–37.

MS. IRENE FOLSTROM: I'm Irene Folstrom. I-R-E-N-E. F, as in Frank, O-L-S-T-R-O-M. Is that slow enough? Where is the recorder?

I am actually with the Minnesota Environmental Partnership. I'm the Great Lakes Public coordinator. I'm also a Leech Lake tribal member and was born and raised in Cass Lake. So I guess by some measures I'm a local. I currently live in Duluth.

And I want to touch a little bit on both aspects of the DEIS, as it affects the tribal resources and as it affects the community and our environment.

I guess first I'll start out by saying that -- I actually -- the draft is proposed to go through the 1855 Treaty territory, and it costs us some of our sensitive wild rice and wetlands -- wetland habitat in Minnesota.

I think that whether you are from Grand Rapids or you're a Leech Lake tribal member,

we should all be really concerned about the risks that the project proposes to the water, land, and the climate. 0827-1

Clean water is a way of life in northern Minnesota. The proposed route would threaten some of Minnesota's most important water resources, including the tributaries of rivers that lead into Lake Superior. There is no spill analysis for tributaries of the St. Louis River or the Nemadji River. And considering that most of my work is related to protecting the Great Lakes, and in particular Lake Superior, this is really concerning.

I think somebody mentioned it a little bit earlier -- perhaps it was Thane -- there's no sort of -- there's not even a mention as to what a spill into that harbor would do to that economy either and to -- the devastating effect it would do socially.

The project also presents the risks to the people of north Minnesota along two different -- two separate corridors. First, there are risks to water quality from the new pipeline. And, second, the abandoned pipe poses risks to our water and land that haven't been adequately examined, as we've all pointed out, in the DEIS.

There's not enough analysis presented in the DEIS of the environmental impact of the abandonment. The DEIS states that Enbridge has indicated that it would develop a contaminated site management plan to identify, manage, and mitigate historically-contaminated soils and waters found during abandonment or removal of existing Line 3, but does not include the plan for long-term contaminated site management. 0827-2

And most importantly to me, Line 3 is routed through the heart of the 1855 Treaty territory. The pipe that would be abandoned crosses two reservations. The DEIS recognizes the disproportionate impact the pipeline would have on tribal communities, but then goes on to conclude that this is not a reason to deny the project. Ludicrous. This is an egregious example of environment racism. There's just no way around that. It's racism.

To note the disproportionate impact tribal people face but to still recommend routing a pipeline through the Treaty territory is completely unacceptable.

Thank you.

MS. IRENE FOLSTROM: I'm Irene Folstrom, I-R-E-N-E, F-O-L-S-T-R-O-M, and I am actually with the Minnesota Environmental Partnership. We are an organization out of St. Paul, a coalition umbrella group with about 70 member organizations that primarily do environmental work in Minnesota.

I'm also a Leech Lake tribal member, and I was born and raised here in Cass Lake.

I had to write down my remarks, because I've had difficulty talking about this, I guess, in front of other people, because it's -- unlike other policy issues that I sometimes have remarks on -- I've done environmental policy -- this issue is very close to home. So I'm easily distracted.

I haven't cried yet, though, but those that know me, I'm a big cryer.

So I guess I want to comment, want to comment on the DEIS, I guess, twofold.

The first, I guess, wearing the hat of my title at the Minnesota Environmental Partnership, and our position on the DEIS is

that the environmental justice section, which wasn't even listed as a chapter, it's put at the back of the DEIS as an appendix.

So Commerce didn't even have the balls to put this section as a chapter to have it included in the entire DEIS, which is just degrading, and it's insulting, and it's racist.

And not only is that racist, along with if you read through the environmental justice section, that's not a chapter that is at the back of the DEIS, the citations are incorrect, there's different fonts used. It is so insulting, and it's humiliating, to be quite honest.

So whoever prepared this DEIS, whoever wrote this, and whoever did the environmental justice section, shame on you. Shame on you.

And shame on you, for Commerce, for putting this together and having the balls to bring this to my community and ask us to read it. And when we go through it, we see the section where we're talked about, where our resources are discussed, my culture, my

people, my community, and it looks like crap. It's unprofessional.

It's clear that someone did not -- who didn't know my community and know my people or our ways, wrote it, or tried to write it.

With citations such as historicaltrauma.com listed as a citation, a fact, an apparent fact with an in depth document; Historicaltrauma.com, if you go to that, it says, "This URL website does not exist." It's not even an active website. I mean, you could have got that right.

Maybe I'm being a little hard on you, but -- so that's my position professionally. So personally, it's about the same, and I -- yeah.

I haven't been shy about keeping my professional and personal opinion on this issue melded together, because I don't know how you can separate it.

But I guess I should also say with my professional hat on, work -- I do a lot of the Great Lakes regional policy work based out of Duluth. And I was also really

disturbed, you know, besides the environmental justice section being ridiculous, there was no spill analysis for the Twin Ports area in Duluth. There's no discussion whatsoever, what if something should go haywire, or even a little leak, what happens to Lake Superior? 0828-2

I mean, what happened to Kalamazoo, right, same thing.

That's a huge error, as far as I'm concerned. I'm sure that there are others out there who love Duluth and appreciate our Great Lakes, especially Lake Superior, which is also very spiritual and important to us as a people, but wasn't mentioned in the environmental justice section either.

I think that's -- that's why I usually have to stick to my remarks now. I've kind of been going off. But that is pretty much all I want to say, and I really sincerely hope that the pipeline is not attempted to be put through my community, because it won't happen. We will not allow it to go into the ground, and take the one we have in the ground out. Thanks.

Levi, Andrew (COMM)

From: Jared Yakle <jared@mpirg.org>
Sent: Monday, July 10, 2017 2:42 PM
To: MN_COMM_Pipeline Comments
Subject: MPIRG Line 3 Comment Submission
Attachments: Line3DEISComments.pdf; Line3donorslist.pdf

Please find attached two documents. Document 1 includes our written comment while document 2 is a list of supporting members.

Marlee Crave
Policy Associate
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Date: 7-10-2017

To: The State of Minnesota and Minnesota Department of Commerce:

On Behalf Of: The Minnesota Public Interest Group (MPIRG)
2722 University Ave SE
Minneapolis, MN 55414
info@mpirg.org

Comments on Docket CN-14-916 and PPL-15-137
Draft Environmental Impact Statement for a new Line 3 Pipeline

The Minnesota Public Interest Research Group is a student-run non profit advocating on behalf of grassroots efforts in Minnesota. MPIRG seeks to inform the public of issues happening in Minnesota, specific to those threatening the environmental and social well-being of our state. MPIRG was created by students to protect habitat in Northern Minnesota, creating what is known today as the Boundary Waters Canoe Area. Since 1971, we have been responding to corporate threats on our valuable ecosystems. We represent 117,000 students across 7 campuses in Minnesota. Our submission of comments as an organization and list of supporters are in response to both the things we value locally, as well as the greater implications which can no longer be confined to Minnesota.

We have been speaking with Minnesotans about the Sandpiper, Line 3 pipeline, and Line 3 abandonment since mid 2015. Our method of engagement has been through phone and field canvassing. At this time we have spoken to approximately 9,300 Minnesota residents who have monetarily supported our objective to either stop or reroute Enbridge's Line 3 pipeline. An additional 5,000 and counting individuals have signed on in support of our goals pertaining to Enbridge's expansion and abandonment of Line 3.

Our general message has been that we must look at the history of the applicant and the lasting impacts that their spills and practices have had on people and environments in the Midwest. Drinking water has been at the center of our advocacy, as well as the fact that the Mississippi is not just our river in Minnesota. The choice we make about this pipeline will affect the whole of the United States, particularly those states who rely on the Mississippi for drinking water and industry.

Our supporters have been informed of many of the tribal impacts that the applicant's prefered route and Line 3 abandonment would have. In the wake of undeniable human rights abuses in North Dakota, our members have been in agreement that we must not go down this same path in Minnesota. Honoring the treaties is not optional and it is not negotiable.

The experts and public servants who have put so much time in the DEIS know better than anyone that we are at a pivotal moment in our country's energy future. It must be noted that Governor Dayton recently vowed to uphold Minnesota's part of the Paris Climate Agreement, and whether or not Minnesota chooses to uphold that agreement will be closely linked to the granting or denial of a permit for a new Line 3 pipeline in Minnesota.

In our opposition to the a new Line 3 pipeline, we have not failed to consider the energy demands our world faces, as well as a strong desire for energy independence as a nation. MPIRG is committed to helping Minnesota reach energy demands through more sustainable means, and will continue to do so as long as the students of our state find it an urgent matter for our future. MPIRG is committed to standing with the tribes throughout this process, and will work fervently to prevent any further injustices imposed by the applicant's presence in our state.

Please find attached our list of members who support the denial of a permit for Enbridge's proposed Line 3 pipeline. Our official comments on Docket CN-14-916 and PPL-15-137 are as follows:

1. First and foremost, we must support the argument put forth by many other organizations and individuals: that a 30 year assessment of impact of a new Line 3 pipeline is insufficient. The EIS for a new Line 3 must be comprised of all impacts that are foreseeable for the pipelines lifetime.

2. MPIRG supports the public need for a separate and complete Environmental Impact Statement solely for abandonment of the existing Line 3 pipeline.

3. P. ES-12: The spill size comparison is measuring the risk for train spills based on data from 2007-2017. The EIS should more accurately measure the comparative risk of the these three methods of oil transportation by considering improvements in rail technology, safety and regulation that will inevitably precede the lifetime of a new pipeline. Assumed risk of train transportation is likely to change. In addition, spill data for pipelines should include data specific to the applicant's history. 2373-1

4. Ch. 4.2.2: The DEIS can only minimally predict the actual need for a new pipeline based on demand for oil in the future. Oil transportation through non-pipeline methods can adjust to demand without a massive infrastructural project and all of the risks addressed and not addressed in the DEIS for Line 3. Shipper demands are not the same as economic or global energy demands as they are treated in this section. 2373-2

5. Minnesota's Renewable Energy Standard is not considered in the DEIS. Minnesota has made a bipartisan agreement to reach a renewable energy standard of 25 percent by 2025. The RES is likely to increase in coming years with the advancement of renewable technologies and public demand for cleaner energy, as well as for demand and training for jobs in the renewable field. The applicant is not a Minnesota company, but has 2373-3

2373-3 Cont'd

tremendous power among Minnesota utilities. The state must consider the impact that a new pipeline could have on Minnesota's ability to meet our RES goals, as well as to have equal and amicable access to utilities legislation should we choose to provide permits that have large impacts on the energy industry.

6. Table ES-2 and ES-4, P ES-13 and ES-26: The Summary of Potentially Exposed Resources of Concern - the applicant's prefered route does not include the resources exposed to the existing Line 3 and abandonment. P ES-20 notes that the route permit decision addresses the abandonment of the existing Line 3 versus the removal. Neither is included in this table, although resources along the existing Line 3 are undoubtedly exposed elements in the scenario of the Applicant's prefered route. Since the DEIS is treating the abandonment as as an effect of building a new Line 3, the cumulative figures of the potential exposed resources should be included in this section. A new column including the Line 3 abandonment would more accurately assess total impact on resources compared to Certificate of Need alternatives. 2373-4

7. Chapter 2 section 8.3.3 in regards to spill response training. The DEIS states that "Enbridge has indicated that their training programs exceed this standard." We recommend that this statement be stricken from the EIS, as it is partial to the Applicant, or, that if statement remains, more details and reference to examples be given. In addition, this section of the EIS should look at previous spills in the applicant's pipelines, and the correlating response statistics. 2373-5 2373-6
    a. All scenarios for spills or other environmental or community impacts include multiple clauses for Enbridge in addressing damages (questionably also offering the choice not to act on damages?) rather than offering the same considerations from an environmental stance, where the possibilities of an oil spill, implications of large wetland loss, habitation and wildlife are just as possible.

8. Chapter 2 Section 7.2.3 Discusses the degree of soil restoration that Enbridge will undertake in the pipeline construction which includes topsoil and sublayer removal from large to small wetland areas in need of soil filling. The EIS should include more specific data in this section. 2373-7

9. All scenarios for spills or other environmental or community impacts that include an "Enbridge could choose to" clause in order to measure potential damages should equally access the impact if Enbridge should choose not to make said hypothetical choice; or remove it entirely if both impacts cannot be accessed equally. 2373-8

10. 5.2.4.2.1 Applicant's Preferred Route Fisheries and Aquatic Habitat 2373-9
    a. There is insufficient research conducted on the effects of tar sands on zooplankton communities in MN. The DEIS should reference the Sustaining Lakes in a Changing Environment (SLICE) Sentinel Lakes Program to expand the considered impacts that an oil spill, new pipeline construction, and increased

2373-9 Cont'd

temperatures due to aiding and abetting global climate change on the Sentinel Lakes in Minnesota, as well as to factor in the value and importance of these lakes in MN.

i. Rising temperatures due to climate change will have a dramatic impact on aquatic systems in MN in coming years. The construction of this pipeline will contribute to carbon emissions globally. The DEIS needs to consider the impact that this pipeline will have on global temperature rise, and the consequent impact on our own lakes and other natural habitats.

ii. http://files.dnr.state.mn.us/publications/fisheries/special_reports/178.pdf

2373-10

11. DEIS cannot accurately measure the impacts of an oil spill on any environment in MN without a complete list of chemicals and elements present in the tar sands being transported through any pipeline.

a. The bioaccumulative effect on a species and environment that can occur upon contact with a chemical of a bioaccumulative nature cannot be measured without these facts disclosed. Many apex species live in northern Minnesota, and the impact of a spill may not be immediate and direct. This potential detrimental impact on endangered species in MN has not been considered in Enbridge's submission of research on their prefered route, nor the alternate routes included in this DEIS. The considerate threat that habitat loss poses to species close to endangerment in MN must also be included, as the lifetime of this pipeline is likely to be 60 or more years, based on the applicant's history of pipeline usage.

2373-11

b. Contamination of communities can also happen through local food years after a spill has occurred. This is only minimally mentioned in this section. The EIS must measure the potential spread of pollutants to the greatest degree possible. This is especially critical to measure in areas where usufructuary rights are being threatened. The article below demonstrates more of the extent of an oil transfer in a marine environment. While some these specific species are not present in the routes in question, similar research can be applied to aquatic species in Minnesota.

2373-12

i. Lemiere, Sebastien, et al. "Genotoxicity related to transfer of oil spill pollutants from mussels to mammals via food." *Environmental toxicology* 19.4 (2004): 387-395.

2373-13

12. Ch 10. Section 4.2.1 and 4.2.2 in assessing risks to public health.

a. This section is highly lacking in data and cumulative research. The second paragraph under the Public Health header is referencing research from 2010 on Crude Oil spills. Tar sands and crude oil do not contain the same carcinogens, and therefore cannot be used in the EIS as an accurate comparison. The risk of a spill on HCA's can only be predicted through reviewed research on the effects of bitumen and all other elements that would be present in the new Line 3 pipeline.

2373-13 Cont'd

i. Chang, Stephanie, et al. "Consequences of oil spills: a review and framework for informing planning." *Ecology and Society* 19.2 (2014).
ii. Swift, Anthony, et al. *Tar sands pipelines safety risks*. New York: Natural Resources Defense Council, 2011.

b. Public health impacts from an oil spill are much more far reaching that from direct contact. Kalamazoo residents have reported decade-long impacts that are ongoing from the spill that contaminated their community. There are reported cases of cancer from exposure to bitumen in numerous oil spills. It is pertinent that this section speaks to research on bitumen and its impact on human health upon contact. While the link to cancer is briefly mentioned, the DEIS is lacking in data. Elements in tar sands have also been known to cause fatalities in livestock and an increase in still-born deaths long after a spill has occurred. 2373-14

c. The public health impact portion of the FEIS must include the public health consequences greater reaching that just in Minnesota and around the applicant's prefered route and alternate routes. Building a new Line 3 pipeline will ultimately have an impact on the Athabasca people of Alberta, where the oil is sourced. The health impacts being faced there at the present moment are already staggering. Research on this human-rights issue is ongoing, but one such study can be referenced for the purpose of this EIS: 2373-15
   i. Kelly, Erin N., et al. "Oil sands development contributes polycyclic aromatic compounds to the Athabasca River and its tributaries." *Proceedings of the National Academy of Sciences* 106.52 (2009): 22346-22351.

13. Ch 6 of the DEIS measures the socioeconomic impacts of the applicant's prefered route and route alternatives. While this section provides detailed measurement of the growth that can come with construction projects, it does little to address what happens to communities once temporary growth recedes. 2373-16

14. The DEIS contains no detailed spill analysis data for Lake Superior should there be a spill in the region. Any tributaries that lead to Lake Superior along the routes in question must be studied It contains no spill data for the other Great Lakes and the impact of potential contamination of 18 percent of the world's fresh water. Behavior models should be used to create an accurate prediction of what could happen if Lake Superior were exposed to Enbridge's infrastructure. There are several simulation methods that could be used, with much of the data available through the USGS. A proper simulation could allow for an actual assessment of the geographic area that could be impacted by the applicants prefered routes and alternate routes. 2373-17

a. The value of fresh water is of increasing value. This must be considered throughout the EIS, as well as in an section that speaks to spill risk.
   i. Reed, Mark, et al. "Oil spill modeling towards the close of the 20th century: overview of the state of the art." *Spill Science & Technology Bulletin* 5.1 (1999): 3-16.

2373-18

15. Ch 2.9: While this section does deserve its own EIS, as aforementioned, it should also include the consideration of the consequence of setting a precedent for a pipeline abandonment of this nature. Regulations for abandonment are subject to change. Will the applicant be responsible for regulatory adjustments for a given period of time, or only for the time of the abandonment process?

16. The DEIS does not consider the the risks for spills and incidents based on the quality of parts used for pipeline construction. How will the quality of parts be monitored by the state?

2373-19

17. Ch 3.6.1.3: It is stated that consultation with the U.S. Forest Service could be required for the Line 3 abandonment. Consultation must happen before a FEIS is issued to provide for accurate measurement of impact the abandonment could have on the Chippewa National Forest.

a. This should include the USFS tourism data for the National Forest, as well as its species importance value.
b. Diversity of tree species is especially important in monitoring and combating climate change. How could a spill and/or construction impact species redistribution in Minnesota?

Sincerely,

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Name	Stnum	Stname	City	State	Zip
Andrew Flood	4833	Townes Rd	Edina	MN	55424
Susan Keith	1818	Buchanan St NE	Minneapol	MN	55418
Tracy Bradfield	4244	42nd Ave S	Minneapol	MN	55406
Jason Brechin	18200	Valley View	Eden Prairi	MN	55346
Lori Myren	9372	Rath Place	Eden Prairi	MN	55347
Kelly & Greg Carlson	4136	25th Ave S	Mpls	MN	55407
Guy Chase	1037	Lombard Ave	Saint Paul	MN	55105
Michelle Hesterberg	2309	Irving Ave S #8	Minneapol	MN	55405
Teagan Hynes	4233	Ottawa Ave	St. Louis Pa	MN	55416
Tim Jolson	4716	Elliot Ave S	Mpls	MN	55417
Denise Luther	405	Lanewood Ln N	Plymouth	MN	55447
Alex Moros	1492	Pascal St. N.	St. Paul	MN	55108
Laura Stegenga	4212	Upton Ave S	Minneapol	MN	55410
Julia Winkels	3612	10th Ave S	Minneapol	MN	55404
Peter Andrews	910	Portland Ave S, #	Minneapol	MN	55407
Sarah Ashkar	504	E 9th St	Morris	MN	56267
Jacob Bernstein	1323	Seminary	St. Paul	MN	55104
Harmony Blakeway	4520	Edmund Blvd	Mpls	MN	55406
Jeff Blanchard	11241	Preswick Blvd	Eden Prairi	MN	55344
Debra Breedlove	860	FOX COURT	CHANHASS	MN	55317
Sandy Cleland	5844	Queen Ave S	Mpls	MN	55410
Marc Conterato	6705	Limerick Lane	Edina	MN	55439
Zach Dimond	4000	Lake Ridge Rd	Excelsior	MN	55331
Dave & Jo Donovan	4829	37th Ave S	Minneapol	MN	55417
Mary Fajack	2405	Bryant Ave S	Minneapol	MN	55405
Allan Floyd	3301	47th Ave S	Minneapol	MN	55406
Richard Foushee	2189	Buford Ave	Saint Paul	MN	55108
Michael Garvey	5256	W 96th St	Bloomingto	MN	55437
David Gibbons	1789	Randolph	St. Paul	MN	55105
Bre Griffin	13025	Findlay Way	Apple Valle	MN	55124
Angie H. Griffith	881	Suncrest Ct	Eagan	MN	55123
David Gutsche	1400	18th Ave NE	Mpls	MN	55418
Edward Hou	419	HERSHEL ST	ST. PAUL	MN	55104
Brian Kanter	2139	Roblyn Ave	Saint Paul	MN	55104
Shannon Karn	115	Warwick St SE	Mpls	MN	55414
Brooke Kenney	4904	31st Ave S	Mpls	MN	55417
David Kerber	13133	Murdock Terr	Eden Prairi	MN	55347
Mike Kermel	770	Prakness Ln N	Chanhasse	MN	55316
Bonnie Larson	6389	- 132nd St	Apple Valle	MN	55124
Stephanie A. Linden	3631	Garfield Ave. S.	Minneapol	MN	55409
Adam Lutterman	2536	Cedar Ave	Minneapol	MN	
Susan McCallum	4416	47th Ave S	Minneapol	MN	55406
Sally Michal	995	Wilson Ave Apt 1	Saint Paul	MN	55106
Pamela Middleton	506	5th St E	Northfield	MN	55057
Bronson Moe	1550	Eustis Ave	Saint Paul	MN	55108
Maggie B. Moorman	2225	30th Ave S	Minneapol	MN	55406

Merrick Reeder	738	Jefferson st NE	Minneapol	MN	55418
Rachel Rennert	4035	E Covina St	Mesa	AZ	85205
Emily Schmidt	405	Cedar Ave S	Mpls	MN	55424
Rachel Simpson	5424	Aldrich Ave S.	Minneapol	MN	55419
Kent Smead	2428	34th Ave S	Minneapol	MN	55406
Erika Solanen	4135	41st Ave S	Minneapol	MN	55406
Emilia Spalding	4717	Minnetonka Blvc	St. Louis Pa	MN	55416
Thomas Turgeant	1811	Spring Valley Cir	Golden Val	MN	55422
Kevin Walsh	2714	E 2nd St E	Duluth	MN	55812
Steph Walters	4824	W 41st St.	St. Louis Pk	MN	55416
Jessica Wegmann	7312	Cornelia Dr	Edina	MN	55435
Bill Thomas	1303	18th Ave S	Moorhead	MN	56560
Ri Zoldak	330	Oak Grove St #3	Mpls	MN	55403
Danny Kahler	1621	E Hennepin Ave	Minneapol	MN	55414
Sarah Brown	2734	Humboldt Ave S.	Minneapol	MN	55408
Pat Crosby	2608	31st Ave NE	St. Anthony	MN	55418
Dennis Dischinger	2600	29th Ave S	Minneapol	MN	55406
JEANIE SCHAEFER	10804	HAYES DR	BURNSVILL	MN	55337
Rhesa Schwartz	3933	Harriet Ave S	Minneapol	MN	55409
Michael Benneyworth	1815	Humboldt Ave S	Mpls	MN	55403
John Fischer	2538	Johnson St NE	Mpls	MN	55418
JOHN HOTTINGER	14	Irvine Park	SAINT PAU	MN	55102
Beverly Bailey	6933	Oakland Ave	Richfield	MN	55423
Dawn Buchanan	4616	Casco Ave	Edina	MN	55424
Shannon Hansen	3512	E 32nd St	Minneapol	MN	55422
Tom & Dawn Foster-Hart	1515	Pascal St	St. Paul	MN	55016
Theo Hysell	2401	Pierce St NE	Mpls	MN	55418
Michelle LaCasse	3001	Juniper Lane, Un	Woodbury	MN	55125
Karin McEwan	1680	Oak Ave S	Arden Hills	MN	55112
Christy Pettis	3725	34th Ave S	Minneapol	MN	55406
Linda Quam	3524	Tyler St NE	Minneapol	MN	55418
Max Scott	445	Kenmar Cir	Minnetonk	MN	55305
Linda Thurmer	205	W 77th St	Chanhassei	MN	55317
Tony Aarts	3018	Johnson St NE	Mpls	MN	55418
Vicki Adducci	5109	Colfax Ave S	Minneapol	MN	55419
Ben Botanel	504	Asbury St	St Paul	MN	55104
Danielle Briand	3615	Abbott Ave S	Mpls	MN	55410
Erika Broadhead	304	St. Olaf Ave	Northfield	MN	55057
Patrick Donnelly	4704	Nokomis	Mpls	MN	55406
Mary Jo Erickson	3823	Kipling Ave S	St. Louis Pk	MN	55416
Stephen & Jodi Heller	4457	GAYWOOD DRIV	Minnetonk	MN	55345
Kim Medin	2206	E 34th Street	Minneapol	MN	55407
Bruce Nelson	8556	Beacon Rd	Woodbury	MN	55125
Wendy Pilot	2084	Jefferson Ave	Saint Paul	MN	55105
John Rains	1559	Fairmount Ave	St. Paul	MN	55105
Matt Rhiel	3230	1st Ave S	Minneapol	MN	55408
Steve Semler	1644	Kilmer Ave	Saint Louis	MN	55426

Miles Sibley	510	W 33rd St	Mpls	MN	55408
Phil Winden	2222	Sharon Ave SE	Mpls	MN	55414
TRACI CAPESIUS	4813	13TH AVE S	MINNEAPC	MN	55417
Jeff Coffman	4414	Lyndale Ave S	Mpls	MN	55419
Jennifer Corrigan	4000	Nicollet Ave	Mpls	MN	55409
Melissa Fogel	968	Seminole Ave	W St. Paul	MN	55118
Darrell Gerber	3733	Pillsbury Ave S	Minneapol	MN	55409
Emer Griffin	3824	16th Ave S	Minneapol	MN	55407
Kelsey Halberg	1263	Hague Ave	St. Paul	MN	55104
Heidi Haltson	3955	W. Broadway Av	Robbinsdal	MN	55422
Leilani and Kaaren Hotali	16237	The Strand	Minnetonk	MN	55345
Penny Ives	3840	Elliot Ave S	Minneapol	MN	55417
Lou Karp	1009	Richmond Court	Shoreview	MN	55126
Ted Kelly	4515	Saddlewood Dr	Minnetonk	MN	55345
Lorie Marsh	1437	Hartford	St. Paul	MN	55116
Benjamin Marzinski	3347	Bloomington Ave	Minneapol	MN	55407
Cheyenne Meyer	13405	Heather Hills Dri	Burnsville	MN	55337
Jean Mitchell	2025	29th Ave S	Minneapol	MN	55406
Laurel Nightingale	4715	Columbus Ave s	Mpls	MN	55417
Elle Olson	1700	Kenwood Pkwy	Mpls	MN	55405
Gregory Ripley	122	Jersey Ave N	Golden Val	MN	55422
Tom Saunders	3437	Aldrich Ave S	Mpls	MN	55408
Belle Scott	3200	W Calhoun Pkwy	Minneapol	MN	55416
Troy Thielen	4745	Debra Ln	Shoreview	MN	55126
Edie von Gradtke	1319	Jefferson Street	Minneapol	MN	55413
Paul & Janelle Wegner	5236	Knox Ave S	Minneapol	MN	55419
Ryan Williams	3915	Morningside Rd	Edina	MN	55416
Paul Wojda	1970	Iglehart Ave	Saint Paul	MN	55104
Gina Young	1834	Eleanor Ave	St. Paul	MN	55116
Erikka Ackran	600	2nd St NE	Mpls	MN	55413
Beth Anderson	1936	Stinson Pkwy	Mpls	MN	55418
Jeremy Anderson	3651	45th Avenue Sou	Minneapol	MN	55406
Jennifer Applebaum	1	Fletcher Pl	Hopkins	MN	55305
Allan Bach	30740	106th St	Princeton	MN	55371
Karen Barton	1351	Hewitt Ave	St. Paul	MN	55104
Claudia Benson	3454	26th Ave S	Minneapol	MN	55406
Ryan Berg	3724	Pillsbury Ave S	Mpls	MN	55408
TERRI BLAZER	932	LOGAN LN	SAINT PAU	MN	55075
Tricia Boley	3212	W 44th St #3	Minneapol	MN	55410
Mike Carlson	3405	42nd Ave	Mnneapoli	MN	55406
Mike Chew	5648	Pleasant Ave S	Minneapol	MN	55419
Tamara Dennison	5718	Bryant Ave S	Mpls	MN	55419
Emiwa Gazzuolo	2748	Brookridge Ave N	Crystal	MN	55422
Elisa Helmke	3613	2nd Ave S	Minneapol	MN	55409
Rachel Hipps	1082	Linwood Ave	St. Paul	MN	55105
Katie Johnson	5445	Jackson Drive #2	Mounds Vi	MN	55112
Andy JOhnson	5748	28th Ave South	Minneapol	MN	55417

Hailey JOhnson	17208	Padons Dr	Eden Prairi	MN	55346
Carla Johnson	1811	Spring Valley Cir	Golden Val	MB	55422
Ryan Kennedy	1416	3rd St NE	Minneapol	MN	55413
Kerry Kennedy	2706	Florida Ave S	Saint Louis	MN	55426
Sonja Kroell	1788	Lindig St	Falcon Heig	MN	55113
Joyce & Ron Kvaas	3496	Milton St N	Shoreview	MN	55126
Alicia LaBrosse	3945	12th Ave S	Mpls	MN	55407
Lydia LeTourneau	2243	11th St	White Bear	MN	55110
Michelle LuBa	703	Schifsley Rd	Shoreview	MN	55126
Leslie McDonald	15824	Park Terrace Dri	Eden Prairi	MN	55346
Dane McLain			Minneapol	MN	55406
Peter Nickitas		PO Box 15221	Minneapol	MN	55415
Elisabeth Parrish	1736	Hague Ave	Saint Paul	MN	55104
Laura Poehlman	3358	41st Ave S	Mpls	MN	55406
Carrie Simi	1934	Buchanan st NE	Mpls	MN	55418
Stephen Skaja	3625	10th Ave S	Minneapol	MN	55407
Lynnette Smith	5626	Clinton Ave	Minneapol	MN	55419
Megan Sparks	3155	Cleveland St NE	Minneapol	MN	55418
Nathan Thompson	4301	Emerson Ave N	Mpls	MN	55412
Jackie Tsui	18410	31st Ave N	Plymouth	MN	55447
Mike Verhoeven	4901	28th Ave S	Mpls	MN	55417
Andrew Winton	7304	Schey Dr	Edina	MN	55439
Margaret Wirth-Johnson	2224	Dayton Ave	Saint Paul	MN	55104
Victoria Woolley	2024	29th Ave S	Minneapol	MN	55406
Luke Anderson	3600	16th Ave S	Mpls	MN	55407
Lori Benoy	3844	1st Ave S	Minneapol	MN	55409
Rosa Stein	7920	Valders Ct	Golden Val	MN	55427
Emma Conner	2921	Drew Ave N	Robbinsdal	MN	55422
Constance Schey	2620	36th Ave S	Minneapol	MN	55406
Robert Farlee	3115	32nd Ave S	Minneapol	MN	55406
Bev Gunness	5244	Chicago Ave	Minneapol	MN	55417
Daniel Stephens	6338	Pillsbury Ave S	Richfield	MN	55423
Joan Evans	1065	26th Ave SE	Minneapol	MN	55414
Laura Fredrickson	1512	Minnehaha Ave	St. Paul	MN	55104
AMY GOMEG	195	BAKER ST W	Saint Paul	MN	55117
Sally Kundert	7308	Sheridan Ave S	Richfield	MN	55423
Jean & Ted Maltese	4045	Garfield Ave	Minneapol	MN	55409
Jessica Russo	1526	Holton St.	St. Paul	MN	55108
Katy Sunsdahl	608	1st St N	Waterville	MN	56096
Bill Beekman	400	8th Ave NE #1	Minneapol	MN	55413
Onyeje (Jay) Bose	8700	Bothell Way NE	Bothell	WA	98011
Tony Cuneo	3019	E 1st Street	Duluth	MN	55812
Stephanie Darrow	3624	Cedar Ave S	Mpls	MN	55407
Kara Johnson	7646	142nd St	Apple Valle	MN	55124
Susan Keith	1818	Buchanan St NE	Minneapol	MN	55418
Mary Anne Kinane	1806	Van Buren Ave	Saint Paul	MN	55104
Tom Knowles	16400	Creekside Cir	Minnetonk	MN	55345

John Krakan	3208	33rd Ave NE	St. Anthony	MN	55418
Laurie E. Mackenzie	2112	26th Ave S #1	Minneapol	MN	55406
Tara Nelsen	17544	Gage Ct	Farmingtor	MN	55024
Mark Nesset	6321	Elm Tree Ave	Chanhassei	MN	55317
Elizabeth (Betsy) Numricl	4540	Longfellow Ave	Mpls	MN	55407
Alyssa Otten	10470	Sherman Dr	Eden Prairi	MN	55347
Chris Robinson	465	3rd St S #4	Bay Port	MN	55003
Mark Solie	2304	Vermilion Rd	Duluth	MN	55803
Anna Timmons	2812	Florida Ave S	St. Louis Pa	MN	55426
Anne Wojdyla	5218	40th Ave S	Minneapol	MN	55417
Rachelle Alberts-Thorpe	5757	1st Ave S	Minneapol	MN	55419
Judith Bastien	2729	Idaho Ave. S.	St. Louis Pa	MN	55416
Frank Beeck	617	Westwood Dr S	Golden Val	MN	55416
Magda Bilska	402	3rd Ave NE	Minneapol	MN	55413
Trish Campbell	1556	Selby Ave Apt#2	Saint Paul	MN	55104
Pat Connolly	2409	Terrace Dr	Burnsville	MN	55337
Dianne Corder	9709	Mill Creek Dr	Eden Prairi	MN	55347
Tim Dale	4405	Highway 7 Apt G	Saint Louis	MN	55416
Lynn C. Eaton	3500	Sherman Dr NE	Bemidji	MN	56601
Gary & Trudy Edelburg	3019	41st Ave S	Minneapol	MN	55406
Nicole Frost	2108	Oliver Ave S	Minneapol	MN	55405
Krista Fuller	2150	Indiana Ave N	Golden Val	MN	55422
Mary Greeman	2307	Sherwood Cir	Bloomingtc	MN	55431
Daniel Gunter	3325	W. 34 1/2 St.	Minneapol	MN	55410
Teresa Hill	2429	E 2nd St	Duluth	MN	55812
Molly Johnson	843	Summer St	Mpls	MN	55418
Ryan Kavoosi	17679	Kingswood Cir	Lakeville	MN	55044
Jeremy Lang	5128	Wentworth Ave	Minneapol	MN	55419
Joseph Mann	17421	Saddlewood Ln	Minnetonk	MN	55345
Nate Medbery	1346	Boone Ave N	Golden Val	MN	55427
Steve Morvay	429	Arbor Street	St Paul	MN	55102
Matt Pogatshnik	4312	12th Ave S	Mpls	MN	55407
Julie Prairie	2739	Lincoln St NE	Minneapol	MN	55418
Mark Roemer	4012	19th Ave S	Minneapol	MN	55407
Judy Schlukebier	1117	Osceola Ave	Saint Paul	MN	55105
Sheila Schneider	3949	Elliot Ave, #3	Mpls	MN	55407
Sandra Wahl	5722	Garfield Ave S	Minneapol	MN	55419
Jared(JareBear) Yakle(Yul	5	Oh Eight 2nd St	Mini-Apple	MN	55413
Mark Abeln	131	W Minnehaha Pl	Minneapol	MN	55419
Ivy Arnett					
Elaine Barber	4830	Acorn Ridge	Minnetonk	MN	55345
Denise Barley	3558	Benjamin St	Mpls	MN	55418
Scott Barnhart	4424	Russell Ave N	Minneapol	MN	55412
Teresa Belden	2937	Orchard Ave N	Golden Val	MN	55422
John and Barb Bender	16176	Edenwood Drive	Eden Prairi	MN	55347
Corrine Benson	3836	Quail Ave N	Robbinsdal	MN	55422
Christine Bezek	5501	Mayview Rd	Minnetonk	MN	55345

Anita Birmingham	1705	Lowry Ave NE	Minneapol	MN	55418
Curt Blandin	4008	Randall Ave	Saint Louis	MN	55416
Wesley "Wes" Burdine	1251	Charles Ave	SAINT PAU	MN	55104
Kathleen Cassidy	4008	Bryant Ave S	Minneapol	MN	55410
Julia Chavira	3013	43rd Ave S	Minneapol	MN	55406
MaryLou Christensen	8600	Westmoreland L	Saint Louis	MN	55426
John Cleveland	3450	2 1/2 St NE	Minneapol	MN	55418
Vicki & Robert Coffman	2170	James Ave	Saint Paul	MN	55105
Glenn Davis	4828	28th Ave S	Minneapol	MN	55417
Margaret "Maggie" Dolar	4608	44th Ave S	Minneapol	MN	55406
Lisa Dornacker	17730	Lorence Way	Eden Prairi	MN	55346
Sally & Mike Downing	622	8th St SE	Minneapol	MN	55414
Sue Droegemueller	18340	5th Ave N	Plymouth	MN	55447
Mary Dunnewold	513	Nevada Street	Northfield	MN	55057
Megan Elliasen	3456	Pillsbury Ave. S.	Minneapol	MN	55408
Ellen Enebo	4209	15th Ave S	Minneapol	MN	55407
Carol Englehart	4160	Burton Lane	Minneapol	MN	55406
Monica Erling	2833	Polk St NE	Mpls	MN	55418
Lisa Finley	911	W. 28th St	Mpls	MN	55408
Mary Finley	1157	Summit Ave	Saint Paul	MN	55105
Carolyn Fure-Skocum	916	W 2nd St	Northfield	MN	55057
Adel Gardner	3420	16th Ave S	Minneapol	MN	55407
Loretta Glynn	2192	Hartford Ave	Saint Paul	MN	55116
James Greeman	12101	Grandview Terra	Apple Valle	MN	55124
Becky Hagan	15247	Dupont Path	Apple Valle	MN	55124
Betty Jean Hahn	3935	Joppa Ave S	St Louis Pa	MN	55416
Judy Hammer	7650	Golden Valley Rc	Golden Val	MN	55427
Will Hanson	2853	35th Ave S	Mpls	MN	55406
Chris Hartnett	3546	Blaisdell Ave	Minneapol	MN	55408
Joellen Haugo	4411	Thomas Ave S	Minneapol	MN	55410
Pat Haus	7529	Aldrich Ave S	Richfield	MN	55423
Katerina Helebrantova	1940	Drew Ave S	Minneapol	MN	55416
Joseph Hernandez	3300	N View Ln	Woodbury	MN	55125
Sarah Hoch	601	Madison st NE	Mpls	MN	55413
Tim Hoppenrath	1511	Sargent Ave	St Paul	MN	55105
Cindy Howard	1081	Hoyt Ave W	Saint Paul	MN	55117
Cameron Hubley	1819	E. 6th St	Duluth	MN	55812
Todd or Siri Hustad	2507	Humboldt Ave S	Minneapol	MN	55405
Jean E. Inglehart	101	Wildwood Beach	Mahtomed	MN	55115
Thomas Jackson	320	Vincent Ave N	Minneapol	MN	55405
Lois Jaeger	2006	W 21st St	Minneapol	MN	55405
Mark Janning	18249	Evener Way	Eden Prairi	MN	55346
Francis Jeutter	5201	Park Ave S	Minneapol	MN	55417
Janice Jones	717	Fillmore St NE	Minneapol	MN	55413
Anne C. Jones	3441	47th Ave S	Minneapol	MN	55406
Brad Kahley	498	Otis Ave	Saint Paul	MN	55104
Maria Kalin	9617	Dakota Rd	Bloomingto	MN	55438

Pete Keely	493	Pelham Blvd	St. Paul	MN	55104
Michael Keffle-McCene	3134	Lincoln St NE	Mpls	MN	55418
Jim Kennedy	9548	Woodridge Dr	Eden Prairi	MN	55347
Hyder Khan	4149	Dupont Ave S	Mpls	MN	55409
Aron Khoury	4841	Grand Ave S	Minneapol	MN	55419
Cindy Kirk	4640	Washburn Ave S	Minneapol	MN	55410
Michael Koye	4323	Longfellow Ave	Minneapol	MN	55408
Jennifer Krzmarzick	560	Montrose Ln	Saint Paul	MN	55116
Craig Lassig	2538	Pleasant Ave	Minneapol	MN	55404
Sally Latimer		221 2nd St NE	Minneapol	MN	55413
Kathy Levine	1125	E Skyline Parkwa	Duluth	MN	55805
Erik Lidstrom	7693	171st St	Lakeville	MN	55044
Larry Lockman	2605	W 44th St	Minneapol	MN	55410
Jane Lucas	225	Dakota Ave S	Golden Val	MN	55416
Leland (Lee) Lynch	34	Park Ln	Minneapol	MN	55416
Rob Machelek	4200	Toledo Ave. S.	St. Louis Pa	MN	55416
Debbie March	8700	2nd Ave S	Bloomingto	MN	55420
Ben Martin	2905	E. 26th St.	Minneapol	MN	55406
Doug Maydole	16921	Prairie Lane	Eden Prairi	MN	55346
Lynn McMalin	2212	25th Ave S	Minneapol	MN	55406
Cassidy Meeks	2909	Hillsboro Ave N /	New Hope	MN	55427
Janet Merrill	5317	Zenith Ave S	Minneapol	MN	55410
Emily Meyering	7639	W 14th St	St. Louis Pa	MN	55426
Elizabeth Meylor	5112	Zenith Ave S	Minneapol	MN	55410
Mike Miller	4108	15th Ave S	Minneapol	MN	55417
Laura Mills	2116	23rd Ave S	Mpls	MN	55406
Terence Miranda	10315	Old Rockford Rd	Plymouth	MN	55441
Tom Moberg	1285	Niles Ave	Saint Paul	MN	55116
Joel Morrissette	3809	Perry Ave N	Robbinsdal	MN	55422
Michael Muellerleile	3554	Polk St NE	Mpls	MN	55418
Catherine Nayes	4932	37th Ave S	Minneapol	MN	55417
Joan Nelson	2226	Eleanor Ave	Saint Paul	MN	55116
Jane Nichols	5237	36th Ave S	Minneapol	MN	55417
Rod Nordberg	508	7th St W	Park Rapid	MN	56470
Brock & Natalie Obee	924	Hague Ave	St. Paul	MN	55104
Lars Olson	2066	Saint Anthony Pl	Minneapol	MN	55418
Don Osborn	1234	Charles Ave	Saint Paul	MN	55104
Quinn Palar	2529	E 22nd St #1	Minneapol	MN	55406
Kay Parkhurst	18060	Fairhomes Ln	Deephaven	MN	55391
Kathryn Peterson	7713	Vasserman Pl	Chanhasse	MN	55317
Martha Phillips	4144	10th Ave S	Minneapol	MN	55407
Craig Poling	18980	Pheasant Cir	Eden Prairi	MN	55346
Ian Prince	3418	Buchanan St	Mpls	MN	55418
Michele Repke	14060	30TH ST N	STILLWATE	MN	55082
Beverly Richman	3635	Huntington Ave	Saint Louis	MN	55416
Howard Rines	4292	Nancy Pl	Shoreview	MN	55126
Harry Robinson	115	W 45th Ave S	Minneapol	MN	55409

Jean Rodvold	5101	Norwood Ct	Duluth	MN	55804
Molly Rolfsmeier	4232	29th Ave S	Minneapol	MN	55406
Andrew Running	1801	Texas Ave S	St. Louis Pa	MN	55420
Jackie & Steve Rust	208	Morgan Ave S	Minneapol	MN	55405
Gail Safehjoo	6540	Warren Ave	Edina	MN	55439
Mark Sanger	16572	Grays Bay Blvd	Wayzata	MN	55391
Brandi Schorn	5304	15th Ave	Mpls	MN	55412
Susan Seatter	2164	Holly Ave N	Oakdale	MN	55128
David Sieving	3041	Florida Ave S	Saint Louis	MN	55426
Shelly Silvernail	2944	Blackstone Ave S	St Louis Pa	MN	55416
Maria Sims	9260	Duckwood Trl	Woodbury	MN	55125
Liz Sipley	4736	Chowen Ave S	Mpls	MN	55410
Ben Smith	3112	W Lake St	Minneapol	MN	55416
Tom Smith	3506	Ulysses St NE	Minneapol	MN	55418
Tom Smith	550	York Ave #2	Saint Paul	MN	55130
Fred Starr	6433	Clinton Ave S	Richfield	MN	55423
Kristen Swanson	1040	Idaho Ave W	St Paul	MN	55108
Jay Tappe	2639	Yosemite Ave	St. Louis Pa	MN	55416
Daniel Taylor	2127	Dayton Ave	Saint Paul	MN	55104
Cole Thimser	2737	Vernon Ave S	St. Louis Pa	MN	55416
Micaela Torchia	4701	5th Ave S	Minneapol	MN	55417
Joe Uhlhorn	3254	30th Ave S	Minneapol	MN	55406
Dawn Urich	3640	17th Ave S	Mpls	MN	55407
Jackie Vader	1258	W Briar Ridge Ct	Riverdale	GA	30296
Karen Van Schyudel	1285	Folsom St	St. Paul	MN	55117
Beth Vanderloop	2639	39th Ave S	Mpls	MN	55406
BERNIECE VANZYL	379	E CURTICE S T	WEST SAIN	MN	55107
DONNA Wamstad	1669	HILLVIEW RD	SHOREVIEV	MN	55126
Robin Wetzel	4412	5th Ave S	Minneapol	MN	55419
Liz Wilknson	2409	24th Ave S	Minneapol	MN	55404
Norman Wilsman	1020	Rhode Island Ave	Golden Val	MN	55427
Susan Yunis	241	W Arrowhead Rc	Duluth	MN	55803
Dianne E. Zepeda	1665	Arona St	Falcon Heig	MN	55108
Don Zwolensky	6024	3rd Ave S	Minneapol	MN	55419
Cheri Abraham	7611	Nicholas Way	Chanhassei	MN	55317
Howard Ackerman	9270	Overlook Trl	Eden Prairi	MN	55347
Joey Adams	18735	37th Ave N	Plymouth	MN	55446
Erin or Mike Adams	4222	Harriet Ave S	Minneapol	MN	55409
Katie Albright	4041	Garfield Ave	Minneapol	MN	55409
Marcy Alexander	4436	Park Ave	Minneapol	MN	55407
Amy Allin	1103	Winona St	Northfield	MN	55057
David Amdur	1926	Lincoln Ave	Saint Paul	MN	55105
Heidi Andermarl	2705	Townview Ave	St. Anthony	MN	55418
Liz Anderson	127	51st Ave E Apt 2	Ely	MN	55731
Ellen Anderson	905	Lakeview Ave	Saint Paul	MN	55117
Lisa and Tom Anderson	1308	Liberty Ct	Northfield	MN	55057
Theresa Angelapoulos	1643	Lafond Ave	Saint Paul	MN	55107

Brooke Aretz	957	Armstrong Ave	St. Paul	MN	55102
Brian Astry	3834	Saunders Path	Chaska	MN	55318
Regula Badertscher-Gallo	3826	Blaisdell Ave S	Minneapol	MN	55409
Barbara Baichtal	3418	Elliot Ave	Minneapol	MN	55407
Randy Barenburg	3230	Everest Ln N	Plymouth	MN	55447
Heidi Batcheller	4352	Columbus Ave	Minneapol	MN	55407
Stuart (Stu) Baumann	601	W Minnehaha Pl	Minneapol	MN	55419
Bryan Bearss	1967	Sargent Ave	St. Paul	MN	55105
Donald Beauchane	6460	Devonshire Dr	Chanhassei	MN	55317
Karen Benson	1807	Sargent Ave	Saint Paul	MN	55105
Shannon Berg	11131	Goodrich Cir	Bloomingto	MN	55437
Jacqui Blakeley	3911	Queen Ave N	Mpls	MN	55412
Michael Blanch	3126	Oakland Ave	Minneapol	MN	55407
DALE Watson Blount	4146	18TH AVE S	Minneapol	MN	55407
Dale Blount	4146	18th Ave S	Minneapol	MN	55407
Kristen Boelcke-Stennes	2952	Tyler St. NE	Minneapol	MN	55418
Don & Julie Bolgrean	4230	Redding Ridge D	Minnetonk	MN	55345
Pat Bordewich	7476	Granada Circle	Cottage Gr	MN	55016
Stephen & Dixie Brachlov	1799	Rome Ave	St Paul	MN	55116
Abby Bracke	13622	Essex Ct	Eden Prairi	MN	55347
Janet Braemer	756	Lasso Ln	Saint Paul	MN	55123
Drew Brockington	4404	18th Ave S	Mpls	MN	55407
Patrick & Carol Bronder	4700	Park Ave S	Minneapol	MN	55407
Kate Brooks	3813	37th Ave S	Minneapol	MN	55406
Charissa Brudnak	1532	Simpson St	St. Paul	MN	55108
Dave Bucklin	400	N 1st St. #302	Minneapol	MN	55401
Kristofor & Bob Bulander	5352	28th Ave S	Minneapol	MN	55417
Page Burkum	3001	Taylor St NE	Minneapol	MN	55418
Joe "Chip" Burnett	2400	Harriet Ave #104	Minneapol	MN	55405
Celeste Burton	1824	Weber St	White Bear	MN	55110
Michael Burton	1645	Palace Ave	St. Paul	MN	55105
Karina Bushnell	4005	Garfield Ave S	Minneapol	MN	55409
Miriam Butwin	520	5th St SE	Minneapol	MN	55414
Grace Bymark	2083	Watson Ave	St. Paul	MN	55116
Tim Callaghan	3062	Shorewood Ln	Roseville	MN	55113
Dayton Carlin	13327	Huntington Cir	Apple Valle	MN	55124
Carol Carver	4181	White Bear Ave	White Bear	MN	55110
Chad Casey	4755	Debra Ln	Shoreview	MN	55126
Joy Cedarleaf	909	Arcwood Rd	Mahtomed	MN	55115
ROXANNE CHASONSKY	706	125TH LN NE	BLAINE	MN	55434
Ken Chin-Purcell	2338	Bourne Ave	Saint Paul	MN	55108
Charles Christ	1330	Hubbard Ave	St. Paul	MN	55104
Steve Claas	1258	Thomas Ave	Saint Paul	MN	55104
Molly Clabots	4417	Clinton Ave S	Mpls	MN	55407
Patrick Cochran	4328	30th Ave S	Minneapol	MN	55406
Leslie Kemp & Mark Colb	1039	Ruggles St	Roseville	MN	55113
Peyton Cook	332	W Diamond Lk R	Mpls	MN	55419

Jack Coverdale	3747	Abbott Ave S	Mpls	MN	55410
Jennifer Cox-Johnson	5125	130th St E	Northfield	MN	55057
Paul Culp	610	Queensland Ln N	Plymouth	MN	55447
Ian & Michelle Cunningha	2671	E. Lake of the Isl	Minneapol	MN	55408
Elizabeth Curiskis	1199	Edlin Pl	Minneapol	MN	55416
Darla Dahl	500	Carter Dr.	Northfield	MN	55057
Darryl Dahlheimer	2614	Benjamin St NE	Minneapol	MN	55418
Scott Dailey	4917	Park Ave S	Minneapol	MN	55417
Beth or Mark Davies	3838	Blaisdell Ave S	Minneapol	MN	55409
Zenon Dawydowycz	721	2nd St. NE	Minneapol	MN	55413
Jeff Daykin	1854	Moore St	Falcon Heig	MN	55113
Dorothy DeFreese	6711	Lake Shore Dr S	Richfield	MN	55423
Adele Della Torre	3827	Zenith Ave S	Minneapol	MN	55410
Nick Desni	2621	Aldrich Ave S	Minneapol	MN	55408
Lyn & Orville Dodd	5349	27th Ave S	Minneapol	MN	55417
Molly Donovan	3217	14th Ave S #1	Mpls	MN	55407
Katherine Doyle	2232	Vermilion Rd	Duluth	MN	55803
DeAnne Dreyer	10305	40th Ave N	Plymouth	MN	55441
Ron Dubis	10917	Sheridan Ave S	Bloomingto	MN	55431
RUSS DUEHR	1625	BEECHWOOD Av	SAINT PAU	MN	55116
Tom Easthouse	1461	Simpson St	St. Paul	MN	55108
Christopher Edge	1890	Jefferson Ave	Saint Paul	MN	55105
Tim J. Egan	3820	W Calhoun Pkwy	Minneapol	MN	55410
Kirsten Eitreim	2708	Drew Ave	Mpls	MN	55416
Deb Elliott	1175	Thomas Ave	St. Paul	MN	55104
Ellie Emanuel	1757	Jefferson ave	St. Paul	MN	55105
Peter and Karen L. Ericks	2107	W 49th St	Minneapol	MN	55419
Alvin Erickson Jr.	6600	Lyndale Ave S #7	Richfield	MN	55423
Jessica Faber	4321	Abbott Ave N	Robbinsdal	MN	55422
Michele Faherty	5428	Emerson Ave S	Mpls	MN	55419
Eileen Fanning	3045	E 50th St	Minneapol	MN	55417
Tim Faricy	668	Chippewa Ave	Saint Paul	MN	55107
Kevin Fauke	4104	26th Ave S	Mpls	MN	55406
Graham Faulkner	3120	Park Ave S	St Paul	MN	55105
Betty Fedde	1662	Norwood Dr	Eagan	MN	55122
James Fellman	2310	6th St NE	Minneapol	MN	55418
Diane Ferreira	512	Marshall Ave #1	St Paul	MN	55102
Eric Fielder	3201	Bryant Ave S	Mpls	MN	55408
Todd Firman	3443	Grand Ave S	Minneapol	MN	55408
Alissa Fisher	1323	Hubbard	St. Paul	MN	55104
Zach Fisher	2100	Girad Ave S #1	Minneapol	MN	55405
Mark Fleischhacker	3530	Steele St	Minnetonk	MN	55345
Erica and Alex Ford	4025	20th Ave S	Minneapol	MN	55407
Lynnea Forness	3752	19th Ave S	Minneapol	MN	55407
James Forsythe	2845	Colfax Ave S Apt	Minneapol	MN	55408
Louise Fowler	5412	Hampshire Dr	Minneapol	MN	55419
Lisa Fralish	1086	Como Place	St Paul	MN	55116

Terry Frazier	343	Roslyn Pl	Minneapol	MN	55419
Matt Fredericks	3851	10th Ave N	Mpls	MN	55408
Frank Freedman	2530	Pennsylvania Av	Saint Louis	MN	55426
Cindy French	111	W Kent Road	Duluth	MN	55812
Carolyn Fruin	5321	15th Ave S	Mpls	MN	55417
Steve GAgner	121	W 35th St	Minneapol	MN	55408
Gary Gagner	3018	E 25th St	Minneapol	MN	55406
Maryanne Galvin	6468	Ivy Way	Edina	MN	55436
Shirley Garner	27	Highview Pl	Minneapol	MN	55419
Tom J. Garrett	9950	Bluebird Street #	Coon Rapic	MN	55433
Deb Garvey	7475	Flying Cloud Driv	Eden Prairi	MN	55344
Susanna Gaunt	2408	E 2nd St	Duluth	MN	55812
Ann or Daniel Gifford	4016	Linden Hills Blvd	Minneapol	MN	55410
Karen Gjerstad	4733	Isabel Ave	Mpls	MN	55406
Gwen Gmeinder	525	Ashland Ave	St. Paul	MN	55102
Jeff Goetz	232	Vincent Ave N	Minneapol	MN	55405
Jon Goldman	1501	Zealand Ave N	Golden Val	MN	55427
Neal Goman	3617	47th St	Mpls	MN	55406
Bill Goodnature	15205	44th Ave	Plymouth	MN	55446
Mark Gormley	138	W Rustic Lodge	Minneapol	MN	55419
Joseph Graif	5343	Morgan Ave S	Minneapol	MN	55419
Amanda Granaas	1516	Grand Ave	St Paul	MN	55105
Vince Granquist	318	Orchard St N	Northfield	MN	55057
Terry Grigg	1134	Lincoln Ave	St Paul	MN	55105
JoAnn Grimes	2710	Salem Ave	Saint Louis	MN	55416
Jean Gruber	1143	W. Shryer Ave	Roseville	MN	55113
SETH GUPTON	4027	27TH AVE S	MINNEAPC	MN	55407
David Gustafson	5206	Zenith Ave S	Minneapol	MN	55410
Linda and Kim Hageman	4720	Elliot Ave	Mpls	MN	55417
Dana Hallstrom	1012	25th Ave SE	Minneapol	MN	55414
Jenifer Halvorson	5505	24th Ave S	Mpls	MN	55417
Jerry Hanlon	3411	Benjamin St	Minneapol	MN	55418
Sara Hannahan	567	Pond View Drive	Saint Paul	MN	55120
Felicia Hansell	623	8th Ave SE	Mpls	MN	55414
Jon Hanson	1730	Berkeley Ave	St. Paul	MN	55105
Clara Hardy	305	E 5th Street	Northfield	MN	55057
Elizabeth Harper	105	13th Ave S #6	Hopkins	MN	55343
Andrew (Andy) Harrison	1912	Humboldt Ave S	Minneapol	MN	55403
Sabrina Harvey	2416	Irving Ave S	Minneapol	MN	55405
Andrew Haston	17215	12th Ave N	Plymouth	MN	55447
Sharlene or Jack Hauer	4804	Elliot Ave	Minneapol	MN	55417
ETHAN HEILIDER	12000	GOLDEN ACRE D	MINNETON	MN	55305
Jeanne Heitz	15210	Mckenzie Blvd	Minnetonk	MN	55345
John Hemann	3625	Gettysburg Ave S	Saint Louis	MN	55426
Richard Hendrickson	50	Melbourne Ave S	Minneapol	MN	55414
Michael Henley	5320	Hampshire Dr	Mpls	MN	55419
Karen Henry	3038	Buchanan St NE	Mpls	MN	55418

Lauren Hill-Kremm	1123	Laurel Ave	St. Paul	MN	55104
Travis Hinck	1621	Sumter Ave N	Golden Val	MN	55427
Carol Hipps	15512	Almond Ln.	Eden Prairi	MN	55347
Tony and Christine Hodgl	5432	13th Ave. S.	Minneapol	MN	55417
Lynn Hodulik	1612	Bayard Ave	Saint Paul	MN	55116
Mark Hoffa	4032	37th Ave S	Minneapol	MN	55406
BRUCE HOFFMAN	3205	CHASE DR	MINNETON	MN	55305
Lowell Holland	13952	Galway Ct	Apple Valle	MN	55124
Judy Hoover	2020	Orkla Dr	Golden Val	MN	55427
Natalie Hopfield	1027	Fairmount Ave	Saint Paul	MN	55105
David Hopper	1757	Lincoln Ave	Saint Paul	MN	55105
James Hoska	3209	31st Ave	Mpls	MN	55418
Denise Houser	4724	Vincent Ave S	Mpls	MN	55410
Martha Hrobak	2100	Xylon Ave N	Golden Val	MN	55427
David Hunt	6701	Apache Rd.	Edina	MN	55439
Christine Huset	3511	Winnetka Ave N	New Hope	MN	55427
Karen Irvin	1729	Laurel Ave	Saint Paul	MN	55104
Kari & David Isaacson	3220	Rankin Rd	St.Anthony	MN	55418
Andrea Itenler	4628	Drew Ave S	Mpls	MN	55410
Melissa Jackson	2744	Ewin Ave S	Minneapol	MN	55416
John Jaglo	4231	Beard Ave S	Minneapol	MN	55410
John Jarvis	11854	Runnel Circle	Eden Prairi	MN	55347
Kathy Jenkins	816	Manomin Ave	Saint Paul	MN	55107
Liz Jergensen	7618	York Ave S Unit 1	Edina	MN	55435
Steven Johnson	18620	34th Ave N	Plymouth	MN	55447
Nicole & David Johnson	9791	Tree Forum Rd	Eden Prairi	MN	55347
Stacey Johnson	555	Grand Hill	St. Paul	MN	55102
Harriet Johnson	619	8th Ave SE	Minneapol	MN	55414
Carol Johnson	120	W 49th St	Minneapol	MN	55419
Sydney Jordan	1015	8th St SE	Bloomingto	MN	55420
Robert Kaiser	4221	Scott Terrace	Edina	MN	55416
Marnie Kelly	3220	Fremont Ave S #	Minneapol	MN	55408
Angie Kilcher			Minneapol	MN	55413
Joe Knaeble	2533	Colfax Ave S	Minneapol	MN	55405
Sandra Knoche	5129	Nicollet Ave	Minneapol	MN	55419
Paul Knutson	4759	Crane Creek	Owatonna	MN	55060
Katrina Koller	4049	Abbott Ave. S.	Minneapol	MN	55410
Carl & Sam Kragh	3917	16th Ave S	Minneapol	MN	55407
Marilynn Krekelberg	4740	Ewing Ave S	Minneapol	MN	55410
Matt Kresl	3712	Lyndale Ave S	Minneapol	MN	55409
Amy Krolak	3315	Chalet Dr NW	Rochester	MN	55901
Kim Kuznia	3720	W 41st	Mpls	MN	55410
Lori Labarre	5500	Washburn Ave S	Minneapol	MN	55410
Matthew LaBo	1406	Midway Pkwy	Saint Paul	MN	55108
Jon Lamb	3420	Fremont Ave S	Mpls	MN	55408
Barbara Lambert	4007	W 49th St	Edina	MN	55424
Gretchen M. Lang	1385	Brompton St	Saint Paul	MN	55108

Louise Langberg	2021	Sheridan Ave	St. Paul	MN	55116
John Laponte	4412	Drew Ave N	Robbinsdal	MN	55422
Annika Larson	2800	31st Ave NE	St. Anthony	MN	55418
Evan Laudahl	3306	Washington Ave	Mpls	MN	55412
Marie LaVictoire	4325	Lyndale Ave S	Minneapol	MN	55409
Matt Layman	1082	Summit Ave	St. Paul	MN	55105
Peter Leach	1420	Almond Ave	Saint Paul	MN	55108
Celine Leathead	4250	Grand Ave S	Mpls	MN	55409
Roger & Yvonne Leick	2161	Niles Ave	Saint Paul	MN	55116
Carmen Lemay	5301	Girard Ave S	Minneapol	MN	55419
Janet Lenius	910	Main St Ne	Minneapol	MN	55413
Steve Levi	3226	24th ave s	Minneapol	MN	55406
Doug Lewer	433	Desnoyer	St. Paul	MN	55104
Martha Lind	5516	Irving Ave S	Minneapol	MN	55419
Leah Lindeman	2813	Buchanan St NE	Minneapol	MN	55418
Monica & Mark Little	131	W Minnehaha Pl	Minneapol	MN	55419
Donna Lory	1397	County Road B V	ROSEVILLE	MN	55113
Amy Lott	2561	Croquet Drive #9	Wilmingtor	NC	28412
Judy Loverewombe	4600	W 44th St	Edina	MN	55424
Sarah Lume	955	James Ave	Saint Paul	MN	55102
David Lund	9508	Brunswick Circle	Bloomingto	MN	55438
Dan Lynch	3919	Thomas Ave N	Minneapol	MN	55412
John Lyon	1829	Jefferson Ave.	St. Paul	MN	55105
John MacLeod	3529	Skycroft Dr	St. Anthony	MN	55418
Georgine Madden	7400	Hwy 7 Apt #123	Saint Louis	MN	55426
Dick Madden	4108	Elliot Ave S	Mpls	MN	55407
Julie A. Madden	2106	E 22nd St	Minneapol	MN	55404
Cam & Jan Magnus	873	Tatum St	St. Paul	MN	55104
Sue Marshall	3717	Vincent Ave S	Minneapol	MN	55410
Dean Martin	17149	Gannon Way	Lakeville	MN	55044
Marti Martindale	5117	Bryant Ave S	Minneapol	MN	55419
Stephanie Martineau	1474	Summit Ave	St Paul	MN	55105
Steve Matheson	4251	Harriet Ave S	Mpls	MN	55409
LAURA MATTHEWS	1274	JUNO AVE	SAINT PAU	MN	55105
Nick Matzke	3145	Pleasant Ave	Mpls	MN	55418
Erin Maurelli	2201	Draper Ave	Roseville	MN	55113
John Maurer	1463	Hythe st	St. Paul	MN	55108
Andrew May	3228	Girard Ave S	Mpls	MN	55408
Pauline McCann	3912	Washburn Ave S	Minneapol	MN	55410
Jean McCann	685	Grandview Ave \	Roseville	MN	55113
Stephanie McCleerey	4151	40th Ave S	Minneapol	MN	55406
Rob McGarry	3312	Yosemite Ave S	Saint Louis	MN	55426
Joan McKearnan	1487	St. Albans St	St. Paul	MN	55117
Amy McTavish	2624	Yosemite Ave	Saint Louis	MN	55416
Tom Meagher	1612	Archibald St	Northfield	MN	55057
Carol Meeter	1379	Hamline Ave. N.	St. Paul	MN	55108
Judy & John Meisner	4647	Woodridge Rd	Minnetonk	MN	55345

Seth Menning	8217	Chowen Ave S	Bloomingto	MN	55431
Mary E. Meyer	1834	S Mississippi Riv	St. Paul	MN	55116
Chet & Miriam Meyers	1425	W 28th Street #3	Minneapol	MN	55408
Jean & Iva J. Mgeni	1084	Laurel Ave	Saint Paul	MN	55104
Kelly Milkus	4916	Clinton Ave	Mpls	MN	55417
Kris Miner	12706	Riverview Rd	Eden Prairi	MN	55347
Jill Mithun	5308	Halifax Ave S	Edina	MN	55424
Bev Moody	2560	Kenzie Terrace #	Minneapol	MN	55418
Joe Moore	1608	Maryland Ave	St. Louis Pa	MN	55426
Nancy Moye	7610	Blackwell Ct	Inver Grove	MN	55076
Mildred Mueller	3609	Maplewood Dr N	Minneapol	MN	55418
Jeanne Mugge	2104	24th Ave S	Minneapol	MN	55406
Matt Murphy	1218	W 32nd St	Mpls	MN	55408
Francis Murphy	4925	Maple Rd	Edina	MN	55424
Karen Murray	2109	Ewing Ave S	Mpls	MN	55416
Gretchen Musicant	3701	Glendale Ter	Minneapol	MN	55410
Claudia Nanninga	4110	Washburn Ave S	Mpls	MN	55410
Piyali Nath Dalal	2601	Arthur St NE	Mpls	MN	55418
Christopher Nelson	1368	Simpson St	St.Paul	MN	55108
Bruce Nelson	5800	Prior Circle	Prior Lake	MN	55376
Chris Nelson	1689	Jefferson Ave	St. Paul	MN	55105
Nancy Nelson	5041	Gladstone Ave	Mpls	MN	55414
Rachel Nelson	501	12th Ave	Two Harbo	MN	55616
Dee Nelson	1859	Arcade St	Maplewoo	MN	55109
Averial Nelson	2420	Russell Ave S	Minneapol	MN	55405
Karen Nestingen	3641	47th Ave S	Minneapol	MN	55406
Bryan Newman	4653	Ewing Ave S	Mpls	MN	55410
Robert Nichols	3116	Dupont Ave S	Mpls	MN	55408
Elizabeth Norton	4145	Heathcote Road	Wayzata	MN	55391
Angie or David Nowak	8519	Virginia Cir N	St Louis Pa	MN	55426
Aaron Nyghist	4518	17th Ave S	Minneapol	MN	55417
Alison O'Brien	9165	Plymouth Road	Woodbury	MN	55129
Ruth O'Haver	13308	Windyhill rd	Minnetonk	MN	55305
Maureen O'Keefe	101	St. Olaf Ave. #10	Northfield	MN	55057
Tim O'Neill	1966	Iglehart Ave	St. Paul	MN	55104
Susan Oeffling	5525	Woodlawn Blvd	Minneapol	MN	55417
Michael Oiseth	10119	Boone Circle	Bloomingto	MN	55438
Nanci Olesen	3614	Harriet Ave	Minneapol	MN	55409
Don Olson	1309	Westwood Hills	St. Louis Pa	MN	55426
Eric or Heidi Olson	4700	Emerson Ave S	Minneapol	MN	55419
Jeannine Osborne	4816	Churchill Street	Shoreview	MN	55126
Suasannah Ottaway	1207	Woodland Trl	Northfield	MN	55057
Eloise and Bob Paddock	1198	Laurel Ave	Saint Paul	MN	55104
Susan Palchick Silva	2608	Princeton Ave	St. Louis Pa	MN	55416
Mary "maryanna" Palmer	4508	Poplar Bridge Rd	Bloomingto	MN	55437
Forrest Pape	1431	Rosewood Ct.	New Bright	MN	55112
Kay Pekel	1129	Laurel Ave	St. Paul	MN	55104

Gary Pelcl	4115	Perry Ave N	Robbinsdal	MN	55422
Sarah & Cary Percy	4840	14th Ave S	Mpls	MN	55417
Marge Pescheck	1608	Washington St.	Northfield	MN	55057
Nathan Petersen-Kindem	3117	40th Ave S	Minneapol	MN	55406
Deb Pierce	4528	Xerxes Ave S	Minneapol	MN	55410
Norma B. Pierson	17840	4th Ave N	Plymouth	MN	55447
Norma & John Pietz	104	W 35th Street	Minneapol	MN	55408
Michael Pleasants	1145	Ashland Ave	Saint Paul	MN	55104
Dale Pollock	3840	Orleans Ln N	Plymouth	MN	55442
Clare Poulose	1317	Summit Ave	Saint Paul	MN	55105
Jacob Powell	6361	St Johns Drive	Eden Prairi	MN	55346
Kristina Prescott	2918	Lincoln St Ne	MInneapol	MN	55418
Helen Proechel	168	Erie Street	Saint Paul	MN	55102
Judy Radel	1131	Toledo N	Golden Val	MN	55422
Laura Radosevich	14765	Cambrian Ave W	Rosemount	MN	55068
Carmen Ramirez	2657	Georgia Ave st.	St. Louis Pa	MN	55426
Janet Rasmussen	2914	46th Ave S	Minneapol	MN	55406
Tarry Rauschendorfer	1721	Terra Glenn Ct	Eagan	MN	55122
John Reardon	6277	Sequoia Cir	Eden Prairi	MN	55346
Srini Reddy	13109	44th Ave N	Plymouth	MN	55442
Valerie L. Ree	530	Niagara Ln N	Plymouth	MN	55447
GAYLA REGER	4241	10TH AVE S	Minneapol	MN	55407
Jason Reilly	2014	Jade Ln	Eagan	MN	55122
Jeri Reinhardt	1611	Ashland Ave	Saint Paul	MN	55104
Aimee Reker	6836	Sand Ridge Rd	Eden Prairi	MN	55346
Dina Reminick	1312	Hillsboro Ave N	Golden Val	MN	55427
Anna Resele	2200	E 36 1/2 St	Minneapol	MN	55407
Eric Rhyner	6201	W 34th St	St. Louis Pa	MN	55426
David & Marge Richards	4046	Salem Ave	Saint Louis	MN	55416
Margaret Richardson	4609	Emerson Ave S	Mpls	MN	55419
Philip Ricketts	2025	Zealand Ave N	Minneapol	MN	55427
Khadijah Riopelle	118	Craig Way NE	Fridley	MN	55432
Michael Risk	3204	Humboldt Ave S	Minneapol	MN	55408
Vicki Riven	10400	Hillside Ln W	Minnetonk	MN	55305
Sue Roberts	2853	44th Ave S	Minneapol	MN	55406
Curtis Roeder	4605	Garfield Ave S	Minneapol	MN	55419
Janet Rog	1509	10th Avenue S. #	Minneapol	MN	55404
Elizabeth Rogers	3033	Colfax Ave S	Mpls	MN	55408
Barry Rohweder	1401	Texas Ave S	St Louis Pa	MN	55426
Robert Roscoe	1501	E River Pkwy	Minneapol	MN	55414
Sharon Rose	228	Washburn Ave N	Mpls	MN	55405
David Rossi	2024	Jefferson Ave	St. Paul	MN	55105
Helen Rossman	1907	Princeton Ave	Saint Paul	MN	55105
Jeffrey Ruha	2537	35th Ave S	Minneapol	MN	55406
Dagmar Runyon	2086	Goodrich Ave	Saint Paul	MN	55105
Karen Saari	649	Arbogast St	Shoreview	MN	55126
Kathryn Saice	5315	Oakley St	Duluth	MN	55804

Sami Sass	1450	Wellesley Ave	Saint Paul	MN	55105
DENNIS SCHARIDER	798	INTERLACHEN DI	WOODBUR	MN	55425
Andy Schilling	3309	41st Ave S	Minneapol	MN	55406
Keller Schmid	12093	Gantry Ln	Apple Valle	MN	55124
Diane Schmidt	1836	Fernwood	Roseville	MN	55113
Steve Schmitt	4233	Chowen Ave. S.	Minneapol	MN	55410
Louis Schweizer	1961	Prior Ave N	Roseville	MN	55113
Brenda and Hugh M. Scot	5329	Woodlawn Blvd	Minneapol	MN	55417
Daniel Seburg	1143	Cleveland Ave S	St. Paul	MN	55116
Marion Seeley Kreisman	1144	Iowa Ave W	St. Paul	MN	55108
Janice Shay	10903	Oak Knoll Ter	Minnetonk	MN	55305
Marie Sidonie	1439	Summit Ave	St. Paul	MN	55105
LAUREN SILBERMAN	3927	7th St NW	Washingto	DC	20011
Bruce Singer	4620	Bassett Creek La	Golden Val	MN	55442
John Skillings	3113	Croft Dr	St. Anthony	MN	55418
Joyce Slaughter	4576	Maple Leaf Cir	Eagan	MN	55123
Brad Sleeper	161	Ridgeview Dr	Wayzata	MN	55391
Craig & Katie Smith	6020	Sheridan Ave S	Minneapol	MN	55410
NEAL SMITH	1337	EDMUND AVE	SAINT PAU	MN	55104
Connie Smith	3741	Colfax Ave S	Minneapol	MN	55409
Jim Sokup	1005	Prairie Circle	Northfield	MN	55057
Mr. Robert Solotaroff	4148	Upton Ave S	Minneapol	MN	55410
Craig Sorlie	4003	Pillsbury Ave. S.	Minneapol	MN	55409
Jerry Sosinske	5112	Tifton Dr	Edina	MN	55439
Forrest Sparke	11109	Hillsboro Ave N	Champlin	MN	55361
Carolyn Sparks	472	Otis Ave	St. Paul	MN	55104
Annie Sparrows	3916	14th Ave S	Minneapol	MN	55407
Andre (Andy) Speake	1503	Monroe St. NE	Minneapol	MN	55413
Diane Staberg	7601	Alyssia Road	Woodbury	MN	55125
Charles Stander	574	Summit Ave	Saint Paul	MN	55102
Eric Stark	4442	41st Ave S	Minneapol	MN	55406
Jeremy Steil	1150	Hennepin Ave #1	Mpls	MN	55403
Shanda Stengel	3438	St. Paul Ave	Mpls	MN	55416
Barb Stevens	4314	Harriet Ave	Mpls	MN	55409
Jeff Stites	4216	Washburn Ave S	Minneapol	MN	55410
Janet Strand	3328	22nd Ave S	Minneapol	MN	55407
Tom Strand	13212	Birchwood Ln	Burnsville	MN	55337
Stephen Streif	1637	Texas Ave S	Saint Louis	MN	55426
Bill Strommen	17505	28th Ave N	Plymouth	MN	55447
Jan Stroup	629	5th St SE	Minneapol	MN	55414
Shaun Struntz	384	Fulton St	Saint Paul	MN	55102
Jake Sturgis	3941	Linden Cir	Chanhasse	MN	55331
Melissa Sullivan	1919	Ulysses St NE	Minneapol	MN	55418
ANGELA SULLIVAN	8005	CHEYENNE AVE	CHANHASS	MN	55317
Doug Swanson	5523	Kipling Ave	Minnetonk	MN	55345
Alan Swanson	2510	Lancaster Ln N	Plymouth	MN	55441
Erik Swenson	1039	Van Slyke Ave	Saint Paul	MN	55103

Axelina Swenson	2535	Clinton Ave	Minneapol	MN	55404
Melissa Taney	4043	Zenith Ave S	Minneapol	MN	55410
Linda Teppo	327	Cleveland Ave S	Saint Paul	MN	55105
Paul Teske	866	Ashland Ave	St. Paul	MN	55104
June Thiemann	5153	Beard Ave S	Minneapol	MN	55410
Michael Thimmesch	4701	Bryant Ave S	Minneapol	MN	55419
Peter Thomas	1512	E 37th Street	Minneapol	MN	55407
Kay Thomas	2515	Humbolt Ave S	Minneapol	MN	55405
Keith Thompson	4449	33rd Ave S	Mpls	MN	55406
Ross Thompson	3917	23rd Ave S	Mpls	MN	55407
Karen & Terence Ubel	1417	Frankson ave	St.Paul	MN	55108
Alexa Umbreit	1160	Churchill St	Saint Paul	MN	55103
Haley Van Cleve	508	2nd Street NE Ap	Minneapol	MN	55413
Bev Van Ruden	637	Lake Ridge Drive	Woodbury	MN	55129
Haley VanCleve	1379	Sheldon St	St. Louis Pa	MN	55416
Marie Vanderpan	1125	Selby Ave	St. Paul	MN	55104
Carrie VanEpps	1701	8th St SW	Willmar	MN	56201
Anne Vars	5100	Woodlawn Blvd	Mpls	MN	55417
June Vashro	5122	Knox Ave N	Minneapol	MN	55430
Donna Votino	7208	Frontier Trl	Chanhassei	MN	55317
Amanda Votis	7124	Ticonderoga Trl	Eden Prairi	MN	55346
Dan Wagner	15430	Breezy Point Rd	Prior Lake	MN	55372
Mary Jo Wall	1448	Kent St	Saint Paul	MN	55117
Emily Walz	1248	Alameda St	St. Paul	MN	55117
Karen Warren	4536	Pleasant Ave S	Mpls	MN	55419
Dan Wascoe	2421	Lee Ave N	Golden Val	MN	55422
Mary Weeks	4740	Beard Ave S	Minneapol	MN	55410
Hermann Weinlick	3224	30th Ave S	Minneapol	MN	55406
Peter West	4508	30th Ave S	Minneapol	MN	55406
Judy Whalen	944	Briar Glen Ln	Woodbury	MN	55129
Lisa Wheeler	21009	Intrepid	Lakeville	MN	55044
Janet White	762	Sibley Dr	Northfield	MN	55057
Nora Wildgen-White	4144	Brookside Ave	Minneapol	MN	55416
Nicole "Nicki" Williams	3915	Morningside Rd	Edina	MN	55416
Betsy Williams	8011	W 25th St	St. Louis Pa	MN	55426
Jessica Williams	505	Narcissus Ln N	Plymouth	MN	55447
Steve Wilson	3626	Stinson Blvd NE	Mpls	MN	55418
Jesse Winsell	758	Arlington Ave W	St. Paul	MN	55117
Anne Wisker	2315	Walnut Grove Lr	Plymouth	MN	55447
Cheryl Witt	17372	Inland Loop	Lakeville	MN	55044
Ann Wobig	3020	Kimberly Ln N	Plymouth	MN	55447
Mariel Wolter	12705	Welcome Ln	BURNSVILL	MN	55337
Heather Womack	5215	Baker Rd	Minnetonk	MN	55343
Jennifer Woodland	2906	Benton Blvd	Mpls	MN	55416
Marijo A. Wunderlich		1512 Fairmount	Saint Paul	MN	55105
Judith Young	6711	lakeshore Dr Uni	Richfield	MN	55423
Steve Young-Burns	3335	15th Ave S	Mpls	MN	55407

Ardis Zantek	2787	Farrington St	Roseville	MN	55113
Nancy Zaun	5022	30th Ave S	Minneapol	MN	55417
David Zuker	18510	34th Ave N	Plymouth	MN	55447
Daniel Aamot	8406	Clinton Ave S	Bloomingtc	MN	55420
Greg Abbott	4840	Drew Ave S	Minneapol	MN	55410
Jim Acheson	4837	Avondale St	Duluth	MN	55804
James Achter	2132	Cape Cod Pl	Minnetonk	MN	55305
Scott Addison	1427	Marshall St NE	Minneapol	MN	55413
Kathleen Adee	2505	Jefferson st	Duluth	MN	55812
CYNDY AEGERTER	3815	THOMAS AVE N	Minneapol	MN	55412
Ruth Agar	4616	Abbott Ave S	Minneapol	MN	55410
Marcia Agee	225	Frank Street	Saint Paul	MN	55106
Raymond Aguilar	2522	Stinson Blvd NE	Mpls	MN	55418
Rick Ahern	202	Cambria Ct	Woodbury	MN	55125
Elizabeth Ahlin	7638	Grand Ave S	Minneapol	MN	55423
Susanna "Suzy" Ahrens	1435	Jefferson Ave	Saint Paul	MN	55105
David Alberg	407	Oak St	Northfield	MN	55057
Shari Albers	3247	14th Ave S	Minneapol	MN	55407
Stephen Alderson	5316	Clinton Ave. S.	Minneapol	MN	55419
Val Aldrich	11750	38th Ave N	Plymouth	MN	55441
Denise Aldrich	1053	Linwood Ave	St Paul	MN	55105
Carl Allen	3920	Garfield Ave S	Minneapol	MN	55409
Jim Allen	3030	Holly Ln	Plymouth	MN	55447
Betsy Allis	2847	E Lake Isles Prkw	Minneapol	MN	55408
Tony Almen	15001	Williston Ln	Minnetonk	MN	55345
Jim Alsdurf	4024	County Rd 101	Minnetonk	MN	55345
Deb & Michael Alvin	3150	Torrey Drive	Woodbury	MN	55125
Bonnie Ambrosi	21	N 28th Ave E	Duluth	MN	55812
DONETTE AMBROSY	4454	LONGFELLOW A	POWDERH	MN	55407
Sarah & Richard Amos	3437	Skycroft Circle	St.Anthony	MN	55418
Cheryl Andersen	5309	James Ave S	Minneapol	MN	55419
Gar Anderson	5325	Lowry Ter	Golden Val	MN	55422
Carmi Anderson	3745	10th Ave S	Minneapol	MN	55407
Kristi Anderson	3856	Blaisdell	Minnepaol	MN	55409
Sally Anderson	4168	Hillcrest Lane	Deephaven	MN	55391
BARBARA ANDERSON	3430	11TH AVE S	MINNEAPC	MN	55407
Mari Anderson	2321	Parklands Rd	St. Louis Pa	MN	55416
Sami Anderson	3044	Colfax Ave S	Mpls	MN	55408
Barbara & Rodney Ander	5221	Vincent Ave S	Minneapol	MN	55410
Robert Anderson	7066	Lyndale Ave S	Richfield	MN	55423
Candace or David Anders	5320	Park Ave	Minneapol	MN	55417
Dean and Janet Andersor	3821	18th Ave S	Minneapol	MN	55407
ELIZABETH JARRETT AND	4244	24TH AVE S	Minneapol	MN	55406
Dolores Andrews	10208	Clinton Ave	Bloomingtc	MN	55420
Jodi Annis	2816	E Minnehaha Pa	Minneapol	MN	55417
Rick Appelsies	5021	Morgan Ave S	Minneapol	MN	55419
Mary and Rick Arneson	5800	Irving Ave S.	Minneapol	MN	55419

Margaret (Peggy) Arveso	3528	20th Ave S	Minneapol	MN	55407
Amy or Jon Asbury	5020	Gladstone Ave. S	Minneapol	MN	55419
Diane Ashby	40	Newton Ave	Mpls	MN	55405
Leslie Asher	2637	Pierce St NE	Minneapol	MN	55418
Nancy Augustson	10509	Kell Ave S	Bloomingto	MN	55437
Gary Aurit	4016	Standish Ave	Minneapol	MN	55407
Ben Austin	4321	Aldrich Ave S	Mpls	MN	55409
Davi Axelson	1783	Iglehart Ave	Saint Paul	MN	55104
Celia & Daniel Backman	4840	10th Ave S	Minneapol	MN	55417
Craig Bader	1291	Stratton Ct	Chanhasse	MN	55317
Cheryl Bailey	2153	Iglehart Ave	Saint Paul	MN	55104
Thomas Bailey	4421	32rd Ave S	Minneapol	MN	55406
Holly Baker	2100	Hawthorne Ave S	Mpls	MN	55405
Gene Bale	5508	Park Pl	Edina	MN	55424
Todd and Karen Ballen	908	Arlington Ave W	Saint Paul	MN	55117
STEVE BARNES	7136	UTICA LN	CHANHASS	MN	55317
Lynn Barnhouse	2532	Pillsbury Ave S	Minneapol	MN	55408
Michelle Baron	1600	E River Terr	Mpls	MN	55414
Janet BartelsMVD	4944	Emerson Ave S	Minneapol	MN	55419
Jane Barton	3947	Ewing Ave S	Minneapol	MN	55410
Caroline "Carrie" Bassett	4042	Abbott Ave S	Minneapol	MN	55410
Eve and Todd Bassinger	5231	Clinton Ave	Minneapol	MN	55419
Susan Baxter	1122	Montana Ave W	St. Paul	MN	55117
Cara Beames	5424	Clinton Ave S	Minneapol	MN	55419
Ann Beane	4485	Chatsworth St	SHoreview	MN	55126
Joey Beattie	1	not provided	St. Louis Pa	MN	55416
Bill Beck	1780	Emerald Dr	New Bright	MN	55112
Mitch & Mary Becker	4817	4th Ave S	Minneapol	MN	55419
E Casey Beckett	14835	44th Place N	Plymouth	MN	55446
Mary Belisle	669	Hamline Ave S	St. Paul	MN	55116
Aaron and Tina Bellamy	1242	Charles Ave	Saint Paul	MN	55104
Mark Bellingham	4069	Alabama Ave S	St Louis Pa	MN	55416
Linda Bellow-Olson	208	5th Ave NE	Minneapol	MN	55413
John Bellows	1925	Bidwell St	West Saint	MN	55118
Carol & Jacqueline Bemis	1334	Spring Valley Rd	Golden Val	MN	55422
Rose & Mark Benishek	4956	W 40th St	St Louis Pa	MN	55416
Avner Benner	3534	W 28th St	Minneapol	MN	55416
Anne Benson	1997	Selby Ave	Saint Paul	MN	55104
Roxy Benthin	1418	Wisconsin Ave N	Golden Val	MN	55427
Jacob Berendes	2819	Garfield St NE	Mpls	MN	55418
Michael Berg	8256	131st St W	Apple Valle	MN	55124
Margaret Berger	3731	19th Ave	Minneapol	MN	55407
Steven Bergerson	3349	45th Ave S	Minneapol	MN	55406
Scott Berndt	1424	Albert St N	St. Paul	MN	55108
Marco Bernini	11015	40th Pl N	Plymouth	MN	55441
David Berry	1847	Princeton Ave	Saint Paul	MN	55105
Cindy Bertanitz	3748	46th Ave S	Mpls	MN	55406

Deborah Bieleck	13612	Irving Aves S	Burnsville	MN	55337
Steve Biesselter	1546	Oakwood Dr	Shoreview	MN	55126
Val Bishop	20760	Fairview St.	Deephaven	MN	55331
Toni and Lee Bjorklund	326	Elmwood Pl W	Minneapol	MN	55419
Gretchen Black	4625	Cottonwood Ln I	Plymouth	MN	55442
Richard Black	7717	Tanglewood Ct	Edina	MN	55439
Paul Blackburn	4145	20th Ave S	Minneapol	MN	55406
Bruce and Judith Blackbu	4045	E Valley Rd	Wayzata	MN	55391
Ellen M. Blank	1305	Christy Cir	Roseville	MN	55113
Eric J. Blomquist	1818	Lincoln St NE	Mpls	MN	55418
Paul Bloom	1515	Hythe St	Saint Paul	MN	55108
Jane-Marie Bloomberg	6766	Woodland Drive	Eden Prairi	MN	55346
Bruce Boatlund	3313	Huntington Ave	St Louis Pa	MN	55416
Byron Bodin	11010	40th place n	Plymouth	MN	55441
June Bogen	4616	Chowen Ave S	Mpls	MN	55410
Richard Bolan	1425	W. 28th St #121	Minneapol	MN	55408
Gen Bolling	5976	Grass Lake Terra	Minneapol	MN	55419
Judith Bonar	2770	Quail Ave N	Golden Val	MN	55422
Samantha Bonner	15724	50th Ave N	Plymouth	MN	55046
Mary & Graig Borck	1393	Lincoln Ave	Saint Paul	MN	55105
Lucas Bordwell	3217	Fremont Ave S	Minneapol	MN	55408
Jon Bormann	3837	Kipling Ave	St Louis Pa	MN	55416
Greta Bornhoft	2750	Dale St N #51	Roseville	MN	55113
Mark & Noelle Bortschell	2308	Saint Anthony Pl	Minneapol	MN	55418
Al Bostelmann	3655	45th Ave S	Minneapol	MN	55406
Jason Boumeester	2625	Edgewood Ave S	Saint Louis	MN	55426
Marilyn and Rex Boutelle	1444	Eleanor Ave	st Paul	MN	55116
Aaron Bowser	2137	Palace Ave	Saint Paul	MN	55105
Elizabeth & Frank Boyle	416	Sheridan Ave S	Minneapol	MN	55405
Roxie & Jay Bozicevich	4310	Douglas Ave	Golden Val	MN	55416
Jeff Brace	3917	Shady Oak Rd	Minnetonk	MN	55305
Paul Bramsen	1131	Adams St NE	Mpls	MN	55413
Elisabeth Brand	1316	E 36th St	Mpls	MN	55407
John or Terrie Brandt	2230	Goodrich Ave	Saint Paul	MN	55105
Leslie Branson	1606	W Idaho Ave	St. Paul	MN	55108
Jeff Brant	4011	Vincent Ave N	Minneapol	MN	55412
Emily Braun	3445	Abbott Ave N	Robbinsdal	MN	55422
Anna Breen	711	4th St Se Apt 31	Minneapol	MN	55414
Renae Brekken	2304	Totem Trail	Minnetonk	MN	55305
Wilamette Brennaman	2120	Juno Ave	Saint Paul	MN	55105
Sarah Brew	2112	Oliver Ave S	Mpls	MN	55410
John Breyfoyle	5137	17th Ave S	Minneapol	MN	55417
Jack & Christine Brezny	4824	W 86th St	Bloomingto	MN	55391
Frank Broderick	610	3rd Ave NE	Minneapol	MN	55413
Robin Brookins	4725	E Marie Ln	Golden Val	MN	55422
Deb Brown	1433	Highland Pkwy	Saint Paul	MN	55116
Carolyn Brownlie	5111	Garfield Ave S	Mpls	MN	55419

Ann Brummer	4449	41st Ave S	Mpls	MN	55406
Jan Bruncati	1324	Douglas Ave	Minneapol	MN	55403
SASA BUBALO	1469	ARUNDEL ST	SAINT PAU	MN	55117
Dave Buckholz	7541	Chippewa Trail	Chanhasse	MN	55317
Candis Buending	3412	Xenwood Ave S	St. Louis Pa	MN	55416
Mauricio Buitrago	4953	Girard Ave s	Mpls	MN	55419
James Bujold	2701	1st Avenue Sout	Minneapol	MN	55408
Linda Burkett	3136	Fremont Ave S	Minneapol	MN	55408
Kris Burns	5152	Upton Ave. S.	Minneapol	MN	55410
Teresa Burns	5757	Pillsbury Ave S	Minneapol	MN	55419
Mag Bussey	209	W 48th St	Minneapol	MN	55419
Lavonne Butalden	1449	Hythe St	St. Paul	MN	55108
Margaret Buystedt	309	Dayton Rd #311	Champlin	MN	55316
Hillis Byrnes	3832	20th Ave S	Mpls	MN	55407
Karen Cadigan	4714	Ottawa Ct	St. Louis Pa	MN	55416
Clay Callander	1435	Hythe St	St. Paul	MN	55108
Kathleen Cameran-Kuha	2905	W 54th St	Minneapol	MN	55410
Kjerstin or Stewart Came	5232	Zenith Ave. S.	Minneapol	MN	55410
ROBERT CAMPBELL		4348 Drew Ave N	Robbinsdal	MN	55422
Billy Campbell	311	1/2 E 9th St	Morris	MN	56267
Walker Canarsky	4406	Curve Ave	Edina	MN	55416
Paul & Melinda Caouette	12824	Greenwood Trl	Minnetonk	MN	55343
Pamela Caplan	3405	31st Av NE	St. Anthony	MN	55418
Corey Capps	5224	30th Ave S	Mpls	MN	55417
Lila & Dick Cargill	17930	8th Ave N	Plymouth	MN	55447
John Carlotto	4835	W 40th Ln	St Louis Pa	MN	55416
Chris Carlson	13024	Orchard Rd	Minnetonk	MN	55305
Michelle Carlson	2717	vernon Ave	St. Louis Pa	MN	55416
Jonathan Carlson	2122	Penn Ave S	Minneapol	MN	55405
Emily Carlson	5225	Morgan Ave S	Minneapol	MN	55419
Carolyn Carr	4050	39th Ave S	Minneapol	MN	55406
Allison Carrol	1072	24th Ave SE #1	Minneapol	MN	55414
Logan Carter	188	Wheeler St	st. Paul	MN	55105
Joan B. Caselius	6609	2nd Ave S	Richfield	MN	55423
Tom Cassidy	5136	Lyndale Ave	Minneapol	MN	55419
Glen Castore	5873	145th St E	Northfield	MN	55057
Sara & Eric Caugh	3315	Vagabond Ln N	Plymouth	MN	55446
Norm Champ	5418	Pillsbury Ave S	Minneapol	MN	55419
Willy & Dorothy Chaplin	2500	E 24th St	Minneapol	MN	55406
Douglas Chapman	4330	Highland dr	Shoreview	MN	55126
Lisa Chapot	5305	11th Ave S	Minneapol	MN	55417
Carolyn Charles	1414	Kilmer Ave	Saint Louis	MN	55426
Yan Chen	5509	Morgan Ave S	Minneapol	MN	55419
Anna Chiera	5050	Colfax Ave S	Minneapol	MN	55419
Kathy or Alex Chinn	1743	Juliet Ave	Saint Paul	MN	55105
Robin and Steve Chirpich	3201	43rd Ave S	Minneapol	MN	55406
Juno Choi	1900	Hayes St. NE.	Minneapol	MN	55418

Sue Christiansen	5547	Grand Ave S	Minneapol	MN	55419
Rich & Gina Cisneros	2610	Ulysses St NE	Minneapol	MN	55418
Elizabeth T. Clark	1485	Osceola Ave	St. Paul	MN	55105
Mary Clipp	4116	Harriet Ave S	Minneapol	MN	55408
Susan Cobin	1494	Grantham St	Saint Paul	MN	55108
Joan Cochran	903	Goodrich Ave Ur	St. Paul	MN	55105
Alexandra Coe	2700	kennilworth Pl	Minneapol	MN	55405
Brook Cole	3226	Arthur St NE	Mpls	MN	55418
Marc & Vordula Coleman	3414	Buchanan St NE	Minneapol	MN	55418
Melissa and Kevin Colem	904	30th Ave S	Mpls	MN	55406
Karen Collyard	1509	E River Parkway	Mpls	MN	55414
Chelsea Comeaux	4033	Gwen ave south	Mpls	MN	55410
Janet Conn	5804	Oak Ln	Edina	MN	55436
Pam Conner	3925	Glacier Ln N	Plymouth	MN	55446
Christian and Heathe Cor	5308	Chicago Ave S	Minneapol	MN	55417
Virginia Connors	5149	Penn Ave S	Minneapol	MN	55419
Celia Connoy	2327	22nd St Ne	Minneapol	MN	55416
John Conte	6017	Abbott Ave S	Edina	MN	55410
Matt Conway	3430	List Place #802	Minneapol	MN	55416
Natalie Cook	520	2nd St E #324	Minneapol	MN	55414
Martha & David Cook	589	S Owasso Blvd W	Roseville	MN	55113
Cathy Coppersmith	1758	Hubbard Ave	Saint Paul	MN	55104
Deborah Copperud	5007	Fremont Ave S	Minneapol	MN	55419
Joe and Tara Corbett	5501	Donconster Way	Minneapol	MN	55410
John Cordes	6500	Glenwood Ave	Golden Val	MN	55427
Bob Cosgrove	7187	Fawn HIll Rd	Chanhassei	MN	55317
Gary Cossetta	1367	Grand Ave	St. Paul	MN	55105
Meg Cox	4552	Washburn Ave S	Mpls	MN	55410
Molly Cox	4920	Morningside Rd	St Louis Pa	MN	55416
Tom Crane	594	Ashland Ave	St Paul	MN	55102
Judy Crane	757	Idaho Ave W.	St. Paul	MN	55117
Joe & Elizabeth Cregan	1487	Chelsea St	Saint Paul	MN	55108
Leslie Crichton	13241	Everest Ave	Apple Valle	MN	55124
Judy Crocker	4901	Culver Rd	Golden Val	MN	55422
George Cromer	432	Sheridan Ave S	Mpls	MN	55372
Dan Crosbie	2907	W 44th St	Minneapol	MN	55410
Joe Crosby	952	Grand Ave	Saint Paul	MN	55105
W.H. (Bill) Crowder	1084	Selby Ave	Saint Paul	MN	55104
John & Ann Curtis	410	Santa Fe Cir	Chanhassei	MN	55317
Andrea D'Angelo	3906	16th Ave S	Mpls	MN	55407
Scott Dahl	3016	Hilldale Ave NE	Minneapol	MN	55418
Tyler Dal	2273	Sycamore Trl	Woodbury	MN	55125
Julie Dallman	2210	Taft St NE	Minneapol	MN	55418
Wayne Damerow	5535	Alaneda Street	Shoreview	MN	55126
Steve Darnell	2920	123rd Circle NE	Blaine	MN	55449
Scott Dary	8908	Braxton Dr	Eden Prairi	MN	55347
Bill Davini	5804	19th Ave S	Mpls	MN	55417

Marshall Davis	314	7th Ave N	Hopkins	MN	55343
Tyler Davis	3205	Emerson Ave S	Mpls	MN	55408
Robbie Davis	4824	Penn Ave S	Minneapol	MN	55419
COLLIN DAVIS-JOHNSON	356	W WHEELOCK PI	WEST SAIN	MN	55107
Charles Dayton	1666	Coffman St, Apt	Saint Paul	MN	55108
Margaret de Geus	4343	42nd Ave S	Minneapol	MN	55406
Laura Deaton	3820	Forest View Ln N	Plymouth	MN	55441
Russell Dedrick	605	Kingston Ave	Saint Paul	MN	55117
Patrice Deising			St. Louis Pa	MN	55426
Anne Delaney	702	Griggs St S	Saint Paul	MN	55116
CL Delfs	4800	Overlook Dr	Bloomingto	MN	55437
Wade DeLong	12550	Eland Ct	Apple Valle	MN	55124
Barbara Deming	361	Wilder N. St.	Saint Paul	MN	55104
Julene & Bill DeNet	1345	Skillman Ave W	Roseville	MN	55113
Tom Dengler	781	Ohio St.	St. Paul	MN	55107
Richard Dennis	2246	Commonwealth	Saint Paul	MN	55108
Brian Derwin	8035	Upper 145th St \	Apple Valle	MN	55124
Alex Desnick	4343	Beard Ave S	Minneapol	MN	55410
Amy Diesen	13525	Larkin Dr	Minnetonk	MN	55305
Vicki Dilley	714	Highland Ave	Northfield	MN	55057
Eric Dion	5125	28th Ave S	Mpls	MN	55417
Gunter & Susan Dittmar	4621	Colfax Ave S	Minneapol	MN	55419
Siobahn Dizio	1536	Arona St	Saint Paul	MN	55108
Kent Doffing	214	Vincent Ave N	Saint Louis	MN	55405
Patty Dolan	3937	16th Ave S	Minneapol	MN	55407
Mary Dolan	4933	Newton Ave S	Mpls	MN	55410
Cathy Dolan	5056	Emerson Ave S	Minneapol	MN	55419
Kathy Dols	4228	Oak Dr Ln	Minnetonk	MN	55343
Chris Donahue	4347	Lyndale Ave S	Minneapol	MN	55409
Ed Donoghue	290	McCarrons Blvd	Roseville	MN	55113
Arthur Dorman	817	Orange Ave W	Saint Paul	MN	55117
Julie Dorn	2640	Harriet Ave S	Minneapol	MN	55408
Andy & Jon Dosdall	2315	Laurel Ave	Minneapol	MN	55405
Martin Dosh	3524	11th Ave S	Minneapol	MN	55407
Katherine Dowd	2845	Inglewood	St. Louis Pa	MN	55416
Abby Drumm	4218	Blaisdell Ave S	Mpls	MN	55409
Julie Dubois	1144	Ashland Ave	Saint Paul	MN	55104
Stan Due	2242	Wilson St. NE	Minneapol	MN	55418
Kelly Duffy	4845	McComber Rd	Duluth	MN	55803
Ron Duffy	2560	Fisk St	Roseville	MN	55113
Vicki Dunlop	9338	Briar Lane	Bloomingto	MN	55437
Brad Durham	3338	Holmes Ave.	The Wedge	MN	55408
Rosalyn Eaton-Neeb	712	St. Olaf Ave	Northfield	MN	55057
Earl Eberhardt	662	Shryer Ave W	Roseville	MN	55113
Deanna Ebert	4437	Nokomis Ave	Minneapol	MN	55406
Mark Edstrom	4331	Harriet Ave	Minneapol	MN	55409
Laura Ehramjian	15785	25th Place N	Plymouth	MN	55447

Becky Eifert	2425	Merrimac Lane	Plymouth	MN	55447
Kathi Eilers	2317	Humboldt Ave S	Minneapol	MN	55405
Molly Ekstrand	15508	Highwood Dr	Minnetonk	MN	55345
Elizabeth Elcombe	1572	Huron St	St. Paul	MN	55108
Sean Elder	3458	Fillmore St NE	Mpls	MN	55418
David Elements	1046	Hoyt Ave W	St. Paul	MN	55117
Jack Elenquist	1312	16th Ave. NW	New Bright	MN	55112
Julie Ell	5318	Malibu Dr	Edina	MN	55436
Mary Emen	307	Cherry St	Northfield	MN	55057
Tracy Emerson	3249	York Dr	Woodbury	MN	55125
Carolyn Engelhardt	3511	Yukon Ave S	St Louis Pa	MN	55426
Chip English	505	Sutherland Dr	Woodbury	MN	55129
Katie Engquist	2404	Sherwood Hills R	Minnetonk	MN	55305
Joanna & Erik Engstrom	5044	Kent Ave	Edina	MN	55436
Joanna Ergstrom	5044	Kent Ave	Edina	MN	55436
Tracy Ericksen	3355	St. Louis Ave	Minneapol	MN	55416
Linda Erickson	1935	Jewel Dr	Woodbury	MN	55125
Ann Erickson	1850	Rome Ave	St. Paul	MN	55116
Anne Erickson	5541	1st Ave S	Mpls	MN	55419
Eric & Peggy Erickson	136	W Minnehaha Pl	Minneapol	MN	55419
JOANNE ESPE-TILLO	9169	Edinburgh LANE	WOODBUR	MN	55125
Charles Essig	542	Ashland Ave	St. Paul	MN	55104
Sarah Evans	2327	E 4th St	Duluth	MN	55812
Alice Evenson	4206	19th Ave S	Minneapol	MN	55407
Kelly Everding	3301	Harriet Ave S	Minneapol	MN	55408
Harald Faber	4520	Douglas Ave	Saint Louis	MN	55416
Laura Famq	105E	Bedford St	Mpls	MN	55414
Judith & Ted Farmer	147	Cecil St SE	Minneapol	MN	55414
JERRY FARRELL	2953	BEACH WOOD A	MINNETON	MN	55391
Karen or James(Jim) Fass	3903	Xerxes Ave S	Minneapol	MN	55410
Sean Favorite	1128	Selby Ave	St. Paul	MN	55104
Marlene Feldman	2417	Russell Ave S	Minneapol	MN	55405
John Fields	5415	43RD Ave S	Minneapol	MN	55417
Jen Filardo	875	Delaware Ave	Saint Paul	MN	55107
Curtis Finney	5029	Oakland Ave S	Mpls	MN	55419
Marie Flanagan	3155	Hayes St NE	Minneapol	MN	55418
Cheryl Flugaur-Leavitt	12023	23rd Ave N	Plymouth	MN	55441
Gerald (Jerry) Foley	4736	Coffey Ln	Minneapol	MN	55406
Meleah Follen	7507	110th St E	Northfield	MN	55057
Carrie Ford	4883	Churchill	Shoreview	MN	55126
Molly Forrest	2906	Hayes St Ne	Minneapol	MN	55418
Brad & Arlene Forrest	4400	W 50th St	Edina	MN	55424
Anne Marie Forrester	3145	Oakland Ave	Minneapol	MN	55407
Ruth Forsline	2322	Benjamin St NE	Minneapol	MN	55418
Brett Forsman	1815	Arthur St NE	Minneapol	MN	55418
Caroline & Dutton Foster	1882	Goodrich Ave	Saint Paul	MN	55105
Suzanne Frances		4616 34th Ave S	Minneapol	MN	55406

Shirley Frank	76	7th Ave NE	Minneapol	MN	55413
Marcia Franklin	1557	Virginia St	Saint Paul	MN	55117
Mary Jo Franske	6104	Arbour Ave	Edina	MN	55436
Dede Fredrick	20750	Italy Ave	Lakeville	MN	55044
Chrysa Freeman	1451	Knoll Drive	Shoreview	MN	55126
Helen Freeman	4201	Raleigh Ave	St. Louis Pa	MN	55416
Dan Freese	14220	39th Ave N	Plymouth	MN	55447
Nathan Freiemuth	1123	Maple St	Northfield	MN	55057
Meghan Fricke	6725	West Trail	Edina	MN	55439
Dennis Fritz	629	Jefferson St NE	Minneapol	MN	55413
Joe Fuemmeler	4656	Clinton Ave S	Minneapol	MN	55419
John Fulton	1398	Frankson Ave	St. Paul	MN	55108
Kristin Gaarder	2441	Sheridan Ave S	Minneapol	MN	55405
Nathan & Kristin Gabel	2813	Colorado Ave S	Saint Louis	MN	55416
Becky Gaertner	4717	Dupont Ave	Minneapol	MN	55419
Peter Gaffney	1224	Lafond Ave	Saint Paul	MN	55104
Judy Galbraith	832	Meadow Ln S	Golden Val	MN	55422
Phyllis Galbraith	3911	York Ave S	Minneapol	MN	55410
Jane B. Galbraith	5741	13th Ave S	Minneapol	MN	55417
B. Andrea Galdames	1622	Hague Ave	St. Paul	MN	55104
Rebecca Galkiewicz	1023	Woodlynn Ave	Saint Paul	MN	55113
Craig Gallas	2018	Franklin Ave. SE	Minneapol	MN	55414
Anita Gamache	3644	154th St W	Rosemount	MN	55068
Lisa Gambiana	2915	Polk St NE	Mpls	MN	55418
Sam Gannakas	9254	Preston Pl	Eden Prairi	MN	55346
S Garahan	493	Laurel Ave	St. Paul	MN	55104
Brett Garczynski	5249	45th Ave S	Minneapol	MN	55417
Wilson Garland	8131	Westwood Hills	St. Louis Pa	MN	55426
Greg Garman	4253	13th Ave S	Minneapol	MN	55407
Kathleen Garry	4829	Girard Ave S	Minneapol	MN	55419
Tanya Garvis	19395	Lake Ave	Wayzata	MN	55391
Lisa Gatzke	1232	Danforth Street	St Paul	MN	55104
Gene Gennaro	1771	Lindig St.	Falcon Heig	MN	55113
Robert & Liz J. Genovese	4012	Monterey Ave	Edina	MN	55416
Jessica Gerard	1611	Selby Ave	Saint Paul	MN	55104
Laura Gerdes	4744	13th Ave	Minneapol	MN	55407
Laura Geronsin	3420	Benjamin St NE	Minneapol	MN	55418
Joe Gerteis	1668	Minnehaha Ave	St. Paul	MN	55104
Mike Getty	2909	Sunset Blvd, #1	Mpls	MN	55416
Curtis & Debbie Ghylin	2763	10th St NE	Sauk Rapid	MN	56379
Mark and Vicky Gilbert	1855	Lincoln Ave	Saint Paul	MN	55105
Margaret Gilland	4300	West River Pkwa	Minneapol	MN	55406
Mick Gillespie	1923	E 3rd St	Duluth	MN	55812
hayley Gindlin	2619	Burd Pl	St. Louis Pa	MN	55426
Marion Glasow	1904	Huron Ave	Roseville	MN	55113
Kristin Gloe	3220	Columbus Ave S	Minneapol	MN	55407
Tom Goblish	670	Bighorn Dr	Chanhassen	MN	55316

Otis Godfrey	4630	Douglas Ave	Golden Val	MN	55416
Arielle Goebel	316	6th St SE	Mpls	MN	55414
Ryan Goldberg	602	N 16th Ave E	Duluth	MN	55812
Bill Golden	2638	Pierce St NE	Minneapol	MN	55418
Nancy Goldman	3609	15th Ave S	Minneapol	MN	55407
Gabe Goldstein	3546	Buchanan St NE	Minneapol	MN	55418
Bruce Goldston	2110	Austrian Pine	Minnetonk	MN	55345
Sarah & Kevin Goodman	1930	Walden Pl NE	Mpls	MN	55418
Lynell Gordon	6710	37th Ave N	Crystal	MN	55427
Paul Gordon	4730	31st Ave S	Mpls	MN	55406
Peter Gosz	1937	Deer Hill Drive	Minnetonk	MN	55391
Randy Gould	2130	Sheridan Hills Rd	Wayzata	MN	55391
Shirene Gounili	10515	Glen Eagle Rd	Woodbury	MN	55129
Jess Graba	4362	Rustic Place	Shoreview	MN	55126
Gene Gradoois	4774	Clinton S	Mpls	MN	55419
Mark Granlund	1014	Burgess St	St. Paul	MN	55103
Don Gravon	14817	Peteler Ln	Minnetonk	MN	55345
Michael Gray	5521	Morgan Ave S	Minneapol	MN	55419
James Green	3010	Lincoln Street NE	Minneapol	MN	55418
Kim Green	20620	Kearney Path	Lakeville	MN	55044
Carol Greenwald	4608	Washburn Ave S	Minneapol	MN	55410
Bonnie Gretz	814	Highland Ave	Northfield	MN	55057
Diane Grey	2250	Ranchview Lane	Plymouth	MN	55447
Cheryl Griffith	4727	Nokomis Ave S	Minneapol	MN	55406
Ron Griffith	2813	Drew Ave	Mpls	MN	55416
Richard Groh	315	E 50th St	Minneapol	MN	55419
Bryan & Lynn Groll	1331	Strathon Ct	Chanhassen	MN	55317
Brent Gross	2734	Filmore St NE	Minneapol	MN	55418
Jill Guetschow	1721	Hague Ave	Saint Paul	MN	55104
Shayna Gulstrand	3042	Pennsylvania Ave	Saint Louis	MN	55426
Sari Gunderson	2451	Clevehill St	Roseville	MN	55113
Steve Gustafson	3158	Arthur St NE	Minneapol	MN	55418
Margaret Guthrie	1508	Arona St	Saint Paul	MN	55108
Laura Haave	613	5th St E	Northfield	MN	55057
Dwight Haberman	2417	Oxford St N	Roseville	MN	55113
Cheryl & Mike Haeg	3599	144th St W	Rosemount	MN	55068
Todd Hafermann	1101	Pierce St NE	Minneapol	MN	55413
Ted & K Haiden	4335	Pleasant Ave	Mpls	MN	55409
Theresa Haider	675	Sumner St	St Paul	MN	55116
Rick Hailig	5440	Vernon Ave S #3	Edina	MN	55436
Thomas & Diane Haines	8868	Hidden Oaks Dr	Eden Prairi	MN	55344
Janis Hall	4846	Thomas Ave S	Minneapol	MN	55410
John Halla	1872	Wellesley Ave	Saint Paul	MN	55105
Rochelle Hallan	1901	W 49th St	Minneapol	MN	55419
Brad & Callie Halvorson	8149	Emerald Ln	Woodbury	MN	55125
Darrell or Carol Ham	4956	W 40th St	St Louis Pa	MN	55416
Joseph Hamel	1489	Holton St	Saint Paul	MN	55108

Mark Hamel	4820	Sheridan Ave S	Minneapol	MN	55410
Abigail Hamilton	1815	Humboldt Ave S	Minneapol	MN	55403
Modi Hammarstelt	722	27th Ave S #6	Minneapol	MN	55454
Katy Hammel	5536	23rd Ave S	Mpls	MN	55417
Jake Hammer	5617	Beard Ave S	Edina	MN	55424
Hannah Hankins	1163	Charles Ave	St. Paul	MN	55104
Dean Hansen	402	6th St S	Stillwater	MN	55082
Shirley Hanson	3325	30th Ave S	Minneapol	MN	55406
Greg Hanson	1670	Hague Ave	St. Paul	MN	55104
Margo Hanson	18445	20th Ave N	Plymouth	MN	55447
Bruce and Stephanie Han	1853	Simpson St	Falcon Heig	MN	55113
Jody Hargrove	1293	Yukon Ct	Golden Val	MN	55427
Renaye Harn	4701	Blaisdell Ave	Minneapol	MN	55419
Kathryn Harper	2316	Seabury Ave. S.	Minneapol	MN	55406
Anne Harrington	5125	10th Ave S	Minneapol	MN	55417
Rod Harris	2205	Quebec Ave S	Saint Louis	MN	55426
Nelda and Roger Hart	1033	36th Ave. NE	Minneapol	MN	55418
Connie & Bob Hartshorn	5340	Newton Ave S	Minneapol	MN	55419
Patti Haskins	306	Nevada Street	Northfield	MN	55057
Kathleen Haskins	2108	Milwaukee Ave	Minneapol	MN	55404
Bea Hasselmann	2850	Cavell Ave S	Saint Louis	MN	55426
David Hatch	2712	Chowen Ave S	Minneapol	MN	55416
Holly Hatch-Surisook	739	Madison St NE	Minneapol	MN	55413
Liz Hathaway-Castelan	1681	Saunders Ave	Saint Paul	MN	55116
Dave Hatz	4124	Dublin Dr	Minnetonk	MN	55345
Laura Haug	3140	Chowen Ave S #1	Mpls	MN	55416
Jason Haugland	4744	17th Ave S	Minneapol	MN	55407
Carol Hauser	169	Seymour Ave SE	Minneapol	MN	55414
Nathan Hawk	6789	Lockenburn Rd	Eden Prairi	MN	55346
Judy Hawkinson	287	Wilder St N	Saint Paul	MN	55104
Alana Hawley	4616	Harriet Ave	Mpls	MN	55419
Suzanne K. Hay	3633	10th Ave S	Minneapol	MN	55407
Jeff Hayne	4704	York Ave S	Mpls	MN	55410
Monta - Marie Hayner	63	Arthur Ave SE	Minneapol	MN	55414
Elena Haynes	619	36TH ST E	Minneapol	MN	55406
Matt Hazard	14770	40th Ave N	Plymouth	MN	55447
Penny Heaberlin	22	Kent St.	St. Paul	MN	55104
Steve Hedman		2831 E 1st St	Duluth	MN	55812
Diane Heiges	2049	Saint Anthony Pl	Minneapol	MN	55418
Jackie Heilicher	2643	Snowmass Cir	Minnetonk	MN	55305
Laura Helmer	8596	Drake Ct	Chanhassei	MN	55317
Roger Henry	700	Lincoln Ave	Saint Paul	MN	55105
Pat and Carol Hergott	7064	Red Cedar Cove	Excelsior	MN	55317
Sam Hilde	3611	Benjamin St NE	Minneapol	MN	55418
Dhavid Hilgendorf	775	Aldine St	Saint Paul	MN	55104
Jonathan E. Hill	1713	Sunset Dr	Northfield	MN	55057
ANNIE HILL	3832	42ND AVE S	LONGFELLC	MN	55406

Janelle Hill	4041	Elliot Ave	Minneapol	MN	55407
Paul Hill	3151	Hayes St NE	Minneapol	MN	55418
Suzy Hiller	4525	Park Ave S	Minneapol	MN	55407
Jana O. Hiller	4949	3rd Ave S	Minneapol	MN	55419
Maggie Hillmer	6520	Welsley Ct	Chanhassei	MN	55317
Moria Hirsch	8007	Cedar Lake Rd	St. Louis Pa	MN	55426
Leslie Hite	1923	W 49th St	Minneapol	MN	55419
Scott Hochhalter	3812	Vincent Ave S	Mpls	MN	55410
Shana Hodel	908	4th St E	Northfield	MN	55057
Anne Hodgson	318	Busch Terrace	Minneapol	MN	55419
Matt Hoffman	1774	Hartford Ave	Saint Paul	MN	55116
Chris Holden	3936	Nanchez Ave S	St. Louis Pa	MN	55416
Kathy Hollander	3824	Edmund Blvd	Minneapol	MN	55406
Arik Holm	5804	Emerson Ave S	Mpls	MN	55419
Peggy and Peter Holmes	3112	Fremont Ave S	Minneapol	MN	55408
Patty Hongell	4345	Sussex Road	Golden Val	MN	55416
Alan B. Hooper	387	Pelham Blvd	Saint Paul	MN	55104
John Hoops	810	Arlington Ave W	Saint Paul	MN	55117
Susan Hopp	5245	Knox Ave S	Minneapol	MN	55419
Martha Hoppe	3342	Cleveland St NE	Minneapol	MN	55418
Harry Hoppmann	4602	Moorland Ave	Edina	MN	55424
Justin Hossle	2550	Stinson Blvd NE	Mpls	MN	55418
Brian and Joy Houska	3027	Ulysses St NE	Minneapol	MN	55418
Kate Hudak	5912	Van Nest Ave	Mpls	MN	55409
Ellen Hughes	4410	Douglas Ave	Golden Val	MN	55446
John & Bonnie Hunt	130	Arthur Ave SE	Minneapol	MN	55414
Stacie Hunt-vickerman	4242	Grand Ave	Minneapol	MN	55409
Rob Hunter	13642	Oakwood Curve	Burnsville	MN	55337
Musab Husaini	2961	Zenith Ave N	Robbinsdal	MN	55422
Nick Huseby	3621	West 54th St	Edina	MN	55410
Kayti Hylden	3700	Pleasant Ave	Mpls	MN	55409
John Hynes	96	Saint Albans St N	Saint Paul	MN	55104
Tom Hyska		PO Box 18614	Minneapol	MN	55418
John Ingham	2704	Crestwood Cir	Minnetonk	MN	55305
Tim Ittner	4517	33rd Ave S	Mpls	MN	55417
Erik Iverson	1482	Victoria Street N	St Paul	MN	55117
Duane Jabaay	411	- 6th St E	Northfield	MN	55057
Andrew Jackson	2700	Chowen Ave S	MPLS	MN	55410
Chris Jackson	3941	13th Ave S	Mpls	MN	55407
Steve Jackson	5832	Morgan Ave S	Minneapol	MN	55419
Eric Jacobsen	247	Winona St W	West Saint	MN	55118
Virginia Jacobson	2848	Monterey Pkwy	St. Louis Pa	MN	55416
Kathleen Jacobson	610	W Minnehaha Pl	Minneapol	MN	55419
Jill or Chuck Jacobson	4908	Clinton Ave	Minneapol	MN	55419
Ann Jaede	164	Arthur Ave SE	Minneapol	MN	55414
Kendra Jaeger	218	Warwick St SE	Mpls	MN	55414
Erinn Jagiela	4150	Wentworth Ave	Mpls	MN	55409

Suzan James	4033	11th Ave S	Minneapol	MN	55407
Kevin Jelle	3131	4th St SE	Minneapol	MN	55414
Kathryn Jensen	1119	6th St NE	Minneapol	MN	55413
Jean Jentz	5217	Logan Ave S.	Minneapol	MN	55419
Lynne Jeske	3112	Edgemere Ave	St. Anthony	MN	55418
Brady Jeunesse	3355	Brunswick	St. Louis Pa	MN	55416
Terry Johnson	6400	44th Ave N	Crystal	MN	55428
Steven Johnson	3236	Minnesota Ave	Duluth	MN	55802
Deb Johnson	236	E Pleasant St	Mankato	MN	56001
Eric Johnson	477	Grand Ave	St. Paul	MN	55102
Chris Johnson	4958	Dupont Ave S	Minneapol	MN	55419
Kim Johnson	5233	W 91st St	Bloomingto	MN	55437
Kathryn Johnson	3636	43rd Ave S	Mpls	MN	55406
Mark Johnson	10529	Mt Curve Road	Eden Prairi	MN	55347
Andrew Johnson	1421	Midway Pkwy	St. Paul	MN	55108
Christopher Johnson	3735	Parkway	Wayzata	MN	55391
Curtis or Lisa Johnson	4649	Aldrich Ave S	Minneapol	MN	55419
Marilyn Johnson	5226	11th Ave S	Minneapol	MN	55417
Kathy Johnston	2854	Garfield ST NE	Minneapol	MN	55418
Heidi Jones	329	E 43rd Street	Minneapol	MN	55409
Tom Jones	3704	Vincent Ave	Minneapol	MN	55410
Joanne Jongsma	4052	10th Ave S	Mpls	MN	55407
Terra & Seth Jonker	2024	Iglehart Ave	St. Paul	MN	55104
STEPHANIE JORDAN	701	10TH AVE	HAMPTON	IL	31256
Mary Jordan	4146	Blaisdell Ave S	Minneapol	MN	55409
Sally Jorgensen	1615	E River Pkwy	Minneapol	MN	55414
Susan "sue" Jorstad	700	Sextant	Roseville	MN	55113
Jeff Josephs	15005	61st Ave N	Plymouth	MN	55446
Nicole Jung	4530	Arden Ave	Edina	MN	55424
Mark K	1606	28th St W	Mpls	MN	55407
Roberta Kagin	150	W Minnehaha Pl	Minneapol	MN	55419
Renee Kaiser-Muelken	15013	Green Oaks Tr S	Prior Lake	MN	55372
Jen Kalika	5711	Cedar Lane	Minnetonk	MN	55345
Christine & Daniel Kallma	519	Winona St	Northfield	MN	55057
Anne Kalow	3524	17th Ave	Mpls	MN	55407
Brit Kamrow	4141	Beard Ave S	Mpls	MN	55410
Kathleen Kane		P.O. Box 16187	St. Louis Pa	MN	55416
Patricia Kane	4054	Quentine Ave	St. Paul	MN	55416
Morton Kane	2201	Lee Ave N	Golden Val	MN	55422
Maythee Kantar	3426	St Paul Ave	Minneapol	MN	55416
IAN KANTONEN	2044	BREWSTER ST	WEST SAIN	MN	55103
Darleen Kanyon	1461	W 31st St	Minneapol	MN	55408
Dave Kapell	313	W 49th St	Minneapol	MN	55419
Lucy Kapp	1644	Ashland Ave	Saint Paul	MN	55104
LaVerne Kapsner	1525	Saint Clair Ave	Saint Paul	MN	55105
Ismail and Sue Karagoez	221	12th Ave Ne	mInneapoli	MN	55413
Ruth Kascan	2636	Yosemite Ave. S.	St. Louis Pa	MN	55416

Jeanne Kating	4340	Oakland Ave S	Mpls	MN	55407
Edith Katz	4725	Minnetonka Blvc	St. Louis Pa	MN	55416
Briana Kaufmann	5500	26th Ave S	Minneapol	MN	55417
Dari Kaveh	2012	28th Ave S	Mpls	MN	55414
Shannon Kearney	1466	Lincoln Ave	Saint Paul	MN	55105
Carol Keehn	2111	Eleanor Ave	Saint Paul	MN	55116
Marty Keenan	4800	Douglas Ave	Golden Val	MN	55446
Maryam Keer-Yusefzadeh	4817	Fremont Ave S	Minneapol	MN	55419
Philip Kelly	7321	12th Ave S	Richfield	MN	55413
David Kelly	4952	Thomas Ave S	Minneapol	MN	55410
Marie Kennedy	1456	E Como Blvd	St. Paul	MN	55117
Sharon Kennedy	4347	Abbott Ave S	Minneapol	MN	55410
Dale Kennen	1985	10th St	White Bear	MN	55110
Daniel Keyser	1636	Ashland Ave	Saint Paul	MN	55104
Deb Kilgore	4925	Xerxes Ave S	Minneapol	MN	55410
Gary Kimball	3081	Lydia Ct	Roseville	MN	55113
Janet & Ross Kimmerle	2418	W 22nd St	Minneapol	MN	55405
Carol Kimmes	5651	2nd Ave S	Minneapol	MN	55419
James B. Kinder	5607	Girard Ave S	Minneapol	MN	55419
Cheyne King	5321	Park Ave S	Mpls	MN	55419
Jaine or Greg King	5116	17th Ave S	Minneapol	MN	55417
Rachel Kinny	1454	Thomas Ave	St Paul	MN	55104
Paula Kirschenheiter	1693	Charles Ave	St. Paul	MN	55104
Adele Klar	13425	34th Ave N	Plymouth	MN	55441
Jayne Klatt	4402	Branson St	Edina	MN	55424
Gabe Klemm	4014	Blaisdell Ave S	Mpls	MN	55409
Kari Kleven	4437	47th Ave S	Minneapol	MN	55406
Dave Klusman	1443	Portland Ave	St. Paul	MN	55104
John Knutson	605	Russell Ave S	Mpls	MN	55405
Patricia Knutson	1502	Summit Ave	Minneapol	MN	55403
Mary & Paul Knutson	4845	Garfield Ave S	Minneapol	MN	55419
Elizabeth Koch	945	Ivyhills Rd	Bell Plane	MN	56011
Shashana & Craig Koch	1531	Simpson St	St. Paul	MN	55108
Sean Koebele	2707	Ulysses St NE	Mpls	MN	55418
Deb Koefod	3137	Dakota Ave S	St Louis Pa	MN	55426
David & Genelle Koernig	3924	44th Ave S	Minneapol	MN	55406
Erin Koerselman	6610	Pointe Lake	Chanhasse	MN	55317
James Kolens	418	Sante Fe Cir	Chanhasse	MN	55317
Michael Kolodj	4220	Browndale Ave S	Saint Louis	MN	55426
Haley Konitshek	2709	Emerson Ave S, #	Mpls	MN	55405
Karen Kopacz	1129	Randolph Ave	St. Paul	MN	55105
Eric Korbach	1340	Como Blvd E	St. Paul	MN	55108
Mike Korus	17100	Round Lake Rd.	Eden Prairi	MN	55346
Bob Kost	19155	Lake Ave	Wayzata	MN	55391
Kathryn & Dean Koutsky	2005	James Ave S	Minneapol	MN	55405
Max Kramer	79	Clarence Ave	Mpls	MN	55414
Lita Krause	3024	Taylor St NE	Mpls	MN	55418

Sue Krech	2608	Murray Ave	St. Anthony	MN	55418
John Kreuser	4270	Yosemite Ave S	St Louis Pa	MN	55416
Janice C. Krick	6501	Woodlake Dr. #7	Richfield	MN	55423
John Krumberger	127	Malcolm Ave SE	Minneapol	MN	55414
Janice Krupke	14207	Spring Lake Rd	Minnetonk	MN	55345
Gloria Kruppstadt	11224	Minnetonka Blvc	Minnetonk	MN	55305
Kevin Kuaclu	17020	12th Ave N	Plymouth	MN	55447
Joanne Kuehl	1120	S. 2nd St	Minneapol	MN	55415
Candy Kuehn	718	6th St SE	Minneapol	MN	55414
Jim Kuhn	5415	Emerson Ave S	Minneapol	MN	55419
Deborah B. Kusnetz	2530	Inglewood Ave S	St Louis Pa	MN	55416
Margaret Kvam	13012	Jane Lane	Minnetonk	MN	55343
Nina Lachary	1260	Ashland Ave	St. Paul	MN	55104
Stacey Lackner	5221	Birchcrest Dr	Edina	MN	55436
Ramona Lackore	1500	9th St SW	Willmar	MN	56201
Jodi Ladd	18035	30th Place N	Plymouth	MN	55447
Ruth Ladwig	5354	Newton Ave S	Minneapol	MN	55419
Jack Laffe	4929	41st Ave S	Minneapol	MN	55417
Jeff Lakatos	1955	Yorkshire Ct	St. Paul	MN	55116
John Laliberte	217	Myrth Pl	South St. P	MN	55075
Dawn Lamm	2782	Arlington Ave	St. Paul	MN	55117
Lynda Lange	4719	1st Ave S	Minneapol	MN	55419
Karen Larsen	428	Horse Shoe dr	Shoreview	MN	55126
Steve Larson	4949	28th Ave South	Mpls	MN	55417
Simon Larson	2011	Ewing Ave S	Mpls	MN	55416
Christine Laube	1530	Natchez Ave S	Golden Val	MN	55446
Richard Laumer	3116	W 44th St W	Mpls	MN	55410
Tim Lavaasen	10713	Cavell Rd	Bloomingto	MN	55438
Karen Law	4101	Beard Ave S	Minneapol	MN	55410
Dan Leary	1377	Van Buren Ave	Saint Paul	MN	55104
Katherine Lee	5800	High Park Dr	Minnetonk	MN	55435
Susan Lee	2721	Lynn Ave S	St. Louis Pa	MN	55416
David Lee	2195	Como Ave	Saint Paul	MN	55108
Mark Leefeldt	2321	Texas Ave S	Saint Louis	MN	55426
Tim & Robyn Leer	4386	Coolidge Ave	Edina	MN	55439
Pat LeFebure	3217	31st Ave NE	Mpls	MN	55418
Jerry Lefever	7979	Jonellen Ln	Golden Val	MN	55427
Beth Lehman	7194	Frontier Trail	Chanhassen	MN	55317
Dan and Karen Leighton	4901	St. Croix Ave N	Golden Val	MN	55422
Tom Lemmer	4210	20th Ave S	Mpls	MN	55407
Carin Lenard-Gomil	3601	Abbott Ave N	Robbinsdal	MN	55422
Robert Lengeling	4260	Winchester Ct	Minnetonk	MN	55345
Naurine Lennox	924	Ivanhoe Dr	Northfield	MN	55057
Dave Lentz	245	8th Ave N	Hopkins	MN	55343
Theodore (Ted) Lentz	692	Summit Ave	Saint Paul	MN	55105
Kristen Leonard	200	Peninsula Rd	Medicine L	MN	55441
Dennis Levandowski	3936	12th Ave S	Minneapol	MN	55407

Kay Levitt	1451	Clarmar Ln	Roseville	MN	55113
Nik Lewandowski	1356	Hewitt Ave	St. Paul	MN	55104
Frances Lewellen	4928	Stevens Ave	Minneapol	MN	55419
Bethany Lewis	1771	Highland Pkwy	St. Paul	MN	55116
Michelle & Andrew J. Lev	1893	Winslow Court	W St Paul	MN	55118
Carrie & James Lichtenbe	5140	Logan Ave S	Minneapol	MN	55419
Jay and Sally Lieberman	3345	40th Ave S	Minneapol	MN	55406
Rob Lieving	3905	Washburn Ave S	Mpls	MN	55410
Warren Linc	6927	Jersey Cir	Crystal	MN	55427
John Lind	4839	32nd Ave S	Minneapol	MN	55417
Courtney Lind	4014	Wentworth Ave	Mpls	MN	55409
Terry & Katherine Lipelt	1381	Raymond Ave	Saint Paul	MN	55108
Catherine Lipinsky	5103	Colfax Ave S	Mpls	MN	55419
William Lipschol	3580	Fairway Dr	Minnetonk	MN	55305
Melanie Liska	449	Saratoga St	St. Paul	MN	55105
Lee Lockrem	1325	Westwood Hill R	Minneapol	MN	55426
Bruce Loeschen	11246	Baltimore St. NE	Blaine	MN	55449
Scott Loessin	3424	Sumter Ave S	Saint Louis	MN	55426
Gabrielle Lofgren	2210	Queensland	Plymouth	MN	55447
Dave Lofquist	4224	Garfield Ave S	Minneapol	MN	55409
Perry Logan	1230	Berkely Ave	St. Paul	MN	55105
Janice Lohman	15128	40th Ave N	Plymouth	MN	55446
Gina Longstein	4112	Quentin Ave N	St Louis Pa	MN	55416
Jo Lottsfeldt	159	Duke Street	St Paul	MN	55102
Stephen Low	3055	Cleveland St NE	Mpls	MN	55418
Marilyn Luedtke	528	6th Ave SE	Minneapol	MN	55414
Cynthia Lund	202	Lincoln St S	Northfield	MN	55057
Kristen Lund	1700	Portland Ave	Saint Paul	MN	55104
Brad Lundell	1884	Como Ave	St Paul	MN	55108
Ben Luoma	505	N 16th Ave E	Duluth	MN	55218
Gunda Luss	2117	25th Ave S	Minneapol	MN	55406
Paul Lussenhop	3140	Holmes Ave S	Minneapol	MN	55408
Joyce Lyon	2201	Dudley Ave	Saint Paul	MN	55108
Molly MacDonald	17310	11th Ave N	Plymouth	MN	55447
John Maciejny	11830	85th Pl	Maple Gro	MN	55369
Mark and Mary Mackmill	15694	Village Woods D	Eden Prairi	MN	55344
Joan Madden	2328	W 53rd St	Minneapol	MN	55410
Steve Magistad	2219	Knapp St	St PAul	MN	55108
Martha Magnuson	1930	Sargent	St. Paul	MN	55105
Nettie Magnuson	1453	W Minnehaha Pl	Minneapol	MN	55419
Laura Magy	2805	Jobba Ave S	St Louis Pa	MN	55416
Sarah & Kristin Maier	1469	Sheldon St	St. Paul	MN	55108
Carol Makkyla	599	36 1/2 Ave NE	Minneapol	MN	55418
Maria Maldonado	4437	15th Ave S	Mpls	MN	55417
Donna Manley	3238	Mckinley St NE	Minneapol	MN	55418
Michael Mann	1405	Fairmount Ave	Saint Paul	MN	55105
Jamie Manning	99	Castle Ridge Ct	Chanhasse	MN	55317

Annie Manning	3111	W 47th St	Mpls	MN	55410
Lynn Marasco	421	Oliver Ave S	Minneapol	MN	55405
GEORGINA MARCH	2401	Cromwell Dr	Minneapol	MN	55410
Danny Marchese	208	14th Ave NE	Minneapol	MN	55413
Tricia Markle	3124	Dupont Ave S	Minneapol	MN	55408
Lorelei Markson	11464	Loftman Trl	North Bran	MN	55056
Helen Marlin	5744	Russell Ave S.	Minneapol	MN	55419
Ann Marx	5370	Nolan Dr	Minnetonk	MN	55343
Don Marxen	5431	Butternut Cir	Minnetonk	MN	55343
Nancy & Mike Mason	829	Woodhill Dr	Chanhassei	MN	55317
Mary L. Mathison	4503	Grimes Ave S	Edina	MN	55424
James Matyas	4344	Halifax Ave N	Robbinsdal	MN	55422
Jennifer Matz	2111	Folwell Ave	Falcon Heig	MN	55108
Julia L. Maunder	7108	4th Ave S	Richfield	MN	55423
Peter Mauriutto	4305	Abbott Ave S	Mpls	MN	55410
Ann Mavis	1870	Albert St	Falcon Heig	MN	55113
Christine May	64	Chatsworth St. N	St. Paul	MN	55104
Ann McCague	4600	W 39th St	St. Louis Pa	MN	55416
Amanda McCarly	3408	45th Ave S	Minneapol	MN	55406
Cindy & Marc McCleary	2950	Everest Lane N	Plymouth	MN	55447
Diana McCleery	3115	39th Ave S	Minneapol	MN	55406
Barbara & Tom McClellar	1865	Pascal St	Saint Paul	MN	55113
Gladys McClendon	4548	Grimes Ave N	Robbinsdal	MN	55422
Donald W. McClung	4145	Ewing Ave S	Minneapol	MN	55410
Mark McClure	36	Oliver Ave S	Mpls	MN	55405
James & Martha McDerm	1252	Willow Ln	Roseville	MN	55113
Joel & Debra McDermott	958	County Rd C2 W	Saint Paul	MN	55113
Jim McDonald	2100	Troy Lane	Plymouth	MN	55447
Sandra McFarland	546	Montcalm Pl	Saint Paul	MN	55116
Ann McGinn	5114	Knox Ave S	Minneapol	MN	55419
Patrick McGrath	2644	Garfield Ave S	Minneapol	MN	55408
Duncan McGrath	120	Forestview Ln N	Plymouth	MN	55441
Cynthia McInroy	8224	Lyndale Ave S	Bloomingto	MN	55420
Liadan McKiernan	4249	Nokomis Ave	Minneapol	MN	55406
Whitney McKinley	1486	W Minnehaha A	St. Paul	MN	55104
Lorna McLeod	2119	Hartford Ave	Saint Paul	MN	55116
Jean McMahon	416	S Lexington Ave	Saint Paul	MN	55105
Jim McMahon	5728	Beard Ave. S.	Edina	MN	55410
Luke McMullen	2121	Juliet Ave	St. Paul	MN	55105
Pete & Pamela McMurry	919	W 53rd St	Minneapol	MN	55419
Daniel & Natalie McNall	3200	Mckinley St NE	Minneapol	MN	55418
Al McNee	10317	Franlo Rd	Eden Prairi	MN	55347
Kate McNulty	5400	25th Ave S	Mpls	MN	55417
Tim McPartland	714	Cedar Lake Rd S	Mpls	MN	55405
Pat McQuade	201	W Winona	Duluth	MN	55803
Andy John McQuigg	3613	E 26th St	Minneapol	MN	55406
Mary Mcraith	834	Lincoln Ave	St. Paul	MN	55105

Kate McRoberts	2116	Commonwealth	St. Paul	MN	55108
Anne McShane	4300	Eton Pl	Edina	MN	55424
Durand Meissenbach	200	East Parker Ave	Dassel	MN	55325
Cathy Melander	1220	Paxton Ave	Cincinatti	OH	45208
Susan & Eric Melbye	2757	Florida Ave S	Saint Louis	MN	55426
Deb Melhade	5116	27th Ave S	Mpls	MN	55417
Jeff Merboth	730	Conestoga Tr	Chanhassen	MN	55317
Jessica Meredith	902	Maple St	Northfield	MN	55057
Mary Mergenthal	2393	Bourne Ave	Saint Paul	MN	55108
Jeri Meshbesher	14103	Laurel Rd	Minnetonk	MN	55305
James Meyer	4227	Lyndale Ave S	Mpls	MN	55409
Dean & Karen Meyer	2813	Idaho Ave S	St. Louis Pa	MN	55426
Paul Michalke	4555	Wentworth Ave	Minneapol	MN	55419
Jill Miel	3624	Penrod Ln	St. Anthony	MN	55418
John G. Mihelic	44	Russell Ave S	Minneapol	MN	55405
Jadrian Miles	3204	Grand Ave S	Minneapol	MN	55408
Scott Miller	4520	Jay St	Duluth	MN	55804
Rebecca & Steven Miller	3145	Colfax Ave S	Minneapol	MN	55408
Jordan Miller	5528	42nd Ave	Mpls	MN	55417
Jason Miller	5406	Abbott Pl	Edina	MN	55410
Gary & Jamie Milurojel	413	Cedar Lake Rd S	Minneapol	MN	55405
Deborah Minkler	16310	Temple Terrace	Minnetonk	MN	55345
Jeanine Mlynek	2300	W 97th St	Bloomingto	MN	55431
Joy A. Mobarry	5820	W 61st St	Edina	MN	55436
Blair Moe	2944	Blackstone Ave S	Saint Louis	MN	55416
Neota Moe	2408	23rd Ave S	Minneapol	MN	55404
Dorothea Moga	4325	Beard Ave N	Robbinsdal	MN	55422
Ella Mogilevsky	5429	James Ave S	Minneapol	MN	55419
Kim Monaghan	1819	36th Ave NE	Mpls	MN	55418
Shawn Monitor	3641	Orchard Ave N	Robbinsdal	MN	55422
Sidney Monroe	3829	Bryant Ave S	Minneapol	MN	55409
Jane Montemayor	6301	Greenbriar	Excelsior	MN	55331
Cam Moore	5153	Vincent Ave. S.	Minneapol	MN	55410
Alice Moormann	30	Luverne Ave	Minneapol	MN	55419
Ben MORGAN	891	Winterberry Driv	WOODBUR	MN	55125
BARB Moriarty	1880	IGLEHART AVE	ST. PAUL	MN	55104
Scott Mork	313	Vincent Ave N	Mpls	MN	55405
Al Morris	5201	34th Pl N	Crystal	MN	55422
Gabrielle Morris	2012	30th Ave S	Minneapol	MN	55406
Bill Morris	3128	Dean Court	Mpls	MN	55416
Katie & Mark Mortenson	5441	10th Ave S	Minneapol	MN	55417
Dan Mossey	2525	Brighton Ave NE	Minneapol	MN	55418
Kelsey Moyer	1625	Ottawa Ave S	St Louis Pa	MN	55418
David Mruz	3142	Holmes	Mpls	MN	55408
Amanda Mulfinger	6037	Oliver Ave. S.	Minneapol	MN	55419
Anna Mulfinger	4312	Alabama Ave S	St Louis Pa	MN	55416
Jan Mulfinger	4529	Washburn Ave S	Minneapol	MN	55410

Luann` Muller	486	Otis Ave	St. Paul	MN	55104
Susan Mulvahill	6133	Russell Ave S	Minneapol	MN	55410
Mike Munos	405	21st Ave N	St. Paul	MN	55075
Mary Musier	4512	Wentworth Ave	Minneapol	MN	55419
Erin Muzzio	3389	Sumter Ave S	St Louis Pa	MN	55426
GLORIA MYLLENBECK	192	DEMAR AVE	SHOREVIEV	MN	55126
Roberta Nagan	6108	Upton Ave S	Minneapol	MN	55410
Mike Neaton	4433	Upton Ave S	Minneapol	MN	55410
Frank Nebehar	3457	Lee Ave N	Crystal	MN	55422
Lisa Neitse	912	Meadowview Dr	Northfield	MN	55057
Gary & Lezlie Nelson	3712	19th Ave S	Minneapol	MN	55407
Vivian Nelson	3100	Quail Ave N	Golden Val	MN	55422
Lowell Nelson	2621	Pleasant Ave S	Minneapol	MN	55408
Jim Nelson	4717	27th Ave South	Minneapol	MN	55417
Brittany Nelson	4232	Park Ave S	Minneapol	MN	55407
Emily Nelson	4043	Sheridan Ave S	Mpls	MN	55410
Sara Nelson	4500	Elmdale Rd	Golden Val	MN	55422
Paul Nelson	1661	Ashland Ave	Saint Paul	MN	55104
Sarah Nettleton	1716	Knox Ave S	Minneapol	MN	55403
Kelly Newell	961	Western Dr	Chanhasse	MN	55317
Jenni Newhall	15929	Highwood Drive	Minnetonk	MN	55345
Brian & Angela Newshou	1500	Sheldon St	Saint Paul	MN	55108
Nicole Newton	1839	St. Clair Ave	St. Paul	MN	55105
Russ Nguas	9118	Pinehurst Rd	Shoreview	MN	55126
James Nicholie	5334	Stevens Ave	Minneapol	MN	55419
Tim Nichols	1133	Seminary Ave	St. Paul	MN	55104
Tessa Nichols-Meade	3101	E. 24th St	Minneapol	MN	55406
Stuart & Kate Nielsen	2420	Lake Pl	Minneapol	MN	55405
Jeff Niemasz	1011	W Minnehaha Pl	Minneapol	MN	55419
Diane Niemela	1492	Albert St N	Saint Paul	MN	55108
Gene Niemi	4624	Zenith Ave S	Minneapol	MN	55410
Tasha Nienow	5120	35th Ave. S.	Minneapol	MN	55417
ANNALIE NIENOW	3841	COLUMBUS AVE	Minneapol	MN	55407
Julie Niewald	2327	Arthur St NE	Minneapol	MN	55418
Peter Nikola	2107	Iglehart	St. Paul	MN	55104
Becky Nilsen	104	Congress St W	Saint Paul	MN	55107
Sarah Noble	1374	Breda Ave	St. Paul	MN	55108
Diane Noble	1821	Franklin Ave SE	Minneapol	MN	55414
Leigh Ann Nolan	311	W 49th St	Mpls	MN	55419
Nevin Nolder	4943	Drew Ave S	Mpls	MN	55410
Tamir Nolley	3511	Lyndale Ave S	Mpls	MN	55409
Dave Nordby	2921	Ranken Rd	Minneapol	MN	55418
Michael Nordin	1029	Grandview Ave	Duluth	MN	55812
Karen Nordstrom	9123	Forest Hill Circle	Bloomingto	MN	55437
Brent Norgaard	3844	Aldrich Ave S	Minneapol	MN	55409
Craig & Karen Norman	1651	Huron St	Saint Paul	MN	55108
Terry North	2300	NE Wilson St	Minneapol	MN	55418

Carol & John Novicki	4718	Ottawa Ct S	St. Louis Pa	MN	55416
Lois Nyman	1720	Chatsworth St N	Roseville	MN	55113
Alvin "Al" Nyquist	2134	Harvard Ave	Duluth	MN	55803
Rhonda O'Brien	4359	Penn Ave N	Mpls	MN	55412
Joe & Jan O'Brien	5124	Lyndale Ave S	Minneapol	MN	55419
Diana O'Donnell	4210	Dupont Ave S	Mpls	MN	55410
Alice O'Hara	4332	Fremont Ave S	Minneapol	MN	55409
Joyce O'Mera	2615	E 22nd St #2	Minneapol	MN	55406
Viv O'Shea	5125	Beard Ave S	Minneapol	MN	55410
Carol Oeltjenbruns	13417	Xerxes Ave	Burnsville	MN	55337
Jesse Okie	4627	Lake Ave N	White Bear	MN	55110
Andrew Oldenburg	3716	1st ave S	Minneapol	MN	55409
Dawn Oliver	2518	Hayes St NE	Minneapol	MN	55418
Gordon Olsen	1736	Dayton Ave	Saint Paul	MN	55104
Eric Olsen	5601	Vermont St	St Louis Pa	MN	55416
Karen Olson	1720	Valders Ave N	Golden Val	MN	55427
Richard Olson	5934	229th Ave NW	Anoka	MN	55303
Ted Olson	194	6th St N	Dayport	MN	55003
CHUCH OLSON	7330	TROTTERS CIR	CHANHASS	MN	55317
Dalay Olson	3041	Emerson Ave S	Mpls	MN	55408
Melissa Onyango-Robsha	3829	24th Ave S	Minneapol	MN	55406
Peter Opatrny	1499	Portland Ave	St. Paul	MN	55104
Leona or Steve J. Opensh	516	3rd St E	Northfield	MN	55057
Charlotte Osborn	1471	Fulham St	Saint Paul	MN	55108
Tim Ostergren	1794	Blair Ave	St Paul	MN	55104
Mark Ostlund	3237	48th Ave S	Minneapol	MN	55406
Leslie Ostrehn	2025	Walnut Grove La	Plymouth	MN	55447
Katy Oswald	4736	10th Ave S	Minneapol	MN	55407
Mary Owen	8853	Pinehurst Circle	Woodbury	MN	55125
Mike Paddock	15612	Willowood Dr	Minnetonk	MN	55345
Clare Padgett	5025	Newton Ave S	Minneapol	MN	55419
Mary Anne Page	91	Seymour Ave SE	Minneapol	MN	55414
Kevin Page	2944	Zarthan Ave S	St. Louis Pa	MN	55416
Dave Palm	1385	Almond Ave	St. Paul	MN	55108
Debra or Michael Palmqu	4749	Xerxes Ave S	Minneapol	MN	55410
Carol & Mike Panser	2651	Jersey Ave S	Saint Louis	MN	55426
Mark Paquette	4035	Perry Ave N	Robbinsdal	MN	55422
Luc Parker	2323	27th Ave S Apt.	Minneapol	MN	55406
Holly Parker	8959	Bristol Hill	Eden Prairi	MN	55347
Kris Parson	1333	Fairmount Ave	Saint Paul	MN	55105
Roy Partridge	12070	Jasper Lane	Eden Prairi	MN	55347
Terry Pate	13030	12th Ave N	Plymouth	MN	55441
Greg Pates	1755	Berkeley Ave	St. Paul	MN	55105
Richard & Sonia Patten	2932	37th Ave S	Minneapol	MN	55406
Larry Paulsen	2716	Lynn Ave	St Louis Pa	MN	55416
Tim Paulson	7241	Upper 136th St.	Apple Valle	MN	55124
Steve Payne	8430	W 35th St	St. Louis Pa	MN	55426

Andy Pearson	1425	Angelo Dr	Golden Val	MN	55442
Scott Pearson	1414	McKinley St	St. Paul	MN	55418
Robert Pelzel	4621	E Lake Harriet Pk	Minneapol	MN	55419
Susan Pemberton	14844	Lloyds Dr	Minnetonk	MN	55345
Lance Pemberton	1536	Hewitt Ave Box 2	Saint Paul	MN	55102
Cris Pena	3719	1st Ave S	Minneapol	MN	55409
Constance Pepin	4031	Zenith Ave S	Minneapol	MN	55410
Alison Peppler	4541	Clinton Ave	Minneapol	MN	55419
Billy & Andrea Perkiss	3825	Aldrich Ave S	Minneapol	MN	55409
E. Carleton Perry	5025	Belmont Ave S	Minneapol	MN	55419
Diane Perry	312	4th Ave NE	Mpls	MN	55413
Dan Persons	11420	Park Ridge W	Minnetonk	MN	55343
Jimmy Pesis	16600	Grays Bay Blvd	Minnetonk	MN	55391
David Peters	3005	Regent Ave N	Golden Val	MN	55422
Michelle Peters	5448	Aldrich Ave S.	Minneapol	MN	55419
Annie Peterson	6044	Russell Ave S	Minneapol	MN	55410
Ron Peterson	1502	Midway Pkwy.	St. Paul	MN	55108
Gail & Judy Peterson	776	Cottage Ave W	Saint Paul	MN	55117
Sharon Peterson	11900	Shady Oak Lane	Edina	MN	55343
Kathleen Pettit	9278	Hyland Creek Rd	Bloomingto	MN	55437
Lee & Gary Pfannmuller	3754	Edmund Ave	Minneapol	MN	55406
Paul Philpott B. Philpott	325	Pelham Blvd	Saint Paul	MN	55104
Eddie Piasecki Jr.	516	Spear Ave	Duluth	MN	55803
Anthony Pierce	1235	Raymond Ave	Saint Paul	MN	55108
James Pirkl	939	Brenner Ave	Roseville	MN	55113
Paul Pirner	3229	Holmes Ave S	Minneapol	MN	55408
Taylor Pirner	3925	Shady Oak Rd	Minnetonk	MN	55305
Karen Platt	4515	W. 36 1/2 St #30	St Louis Pa	MN	55416
Heather Playman	3359	Benjamin St NE	Mpls	MN	55418
Alyssa Polack	1514	W 25th St	Mpls	MN	55405
Kate Poole	1425	Angelo Dr	Golden Val	MN	55422
Kealy Porter	17002	The Strand	Minnetonk	MN	55391
Sandra Potthoff	2437	35th Ave S	Minneapol	MN	55406
David Potyondy	4508	Harriet Ave	Minneapol	MN	55419
Ali Pratt	11374	Balsam Way	Woodbury	MN	55129
Regine & Peter Prenzel-G	410	Elm St	Northfield	MN	55057
Jackie Prince	7200	York Ave S #602	Edina	MN	55435
Mark Prince	7546	Kimberely Lane	Eden Prairi	MN	55347
Kevin Proescholdt	2833	43rd Ave S	Mpls	MN	55406
Joyce S. Prudden	2318	Parkwood Rd S.	St. Louis Pa	MN	55416
Elizabeth Psihos	6128	Westridge Blvd	Edina	MN	55436
Lori & Mike Ptak	3505	Downers Ave	St. Anthony	MN	55418
Sally and Steve Pundt	456	Newton Ave. S.	Minneapol	MN	55405
Ginny Quattlebaum	3661	Huntington Ave	St. Louis Pa	MN	55416
Emily Quick	3107	Johnson St Ne	Minneapol	MN	55418
Paul G. Quie	2154	Commonwealth	Saint Paul	MN	55108
Peter Quinlan	3115	Keewaydin Pl	Minneapol	MN	55417

Elizabeth Raasch-Gilman	1081	Laurel Ave	Saint Paul	MN	55104
Beth Rademacher	3924	Blaisdell Ave	Minneapol	MN	55409
Mary Beth Rahn	4220	Washburn Ave S	Minneapol	MN	55410
Richard Rames	3521	Aldrich Ave S	Minneapol	MN	55408
Edward Rapacz	3521	18th Ave S	Minneapol	MN	55407
Joe Rardin	1046	Lovell Ave W	Saint Paul	MN	55113
Ben Rasmussen	5405	Mirror Lakes Dr.	Edina	MN	55436
Bryan Raymond	3054	Benjamin St NE	Minneapol	MN	55418
Marcy Rede	3537	16th Ave S	Mpls	MN	55407
Del & Elizabeth Reed	1523	Branston St	Saint Paul	MN	55108
Cheri Register	4226	Washburn Ave S	Minneapol	MN	55410
Nancy Rehnke	4128	Grand Ave S	Minneapol	MN	55409
Julie Reichhoff	2803	E 8th St	Duluth	MN	55812
Ryan Reid	3100	Townview Ave N	St. Anthony	MN	55418
Rolly & Julia Reidhead	14000	McGirty Rd	Minnetnok	MN	55305
Camilla Reiersgord	4500	W. 44th St.	Edina	MN	55424
Judy Remington	232	Xerxes Ave S	Mpls	MN	55405
Barry Resnik	4900	Morgan Ave S	Mpls	MN	55410
Kay Richardson	11635	37th Ave N	Minneapol	MN	55441
Alexandria Rick	2938	Albert St N	Roseville	MN	55113
Jack Rinn	2836	Brighton Ave	Mpls	MN	55418
Jason & Amy Ripley	520	Greenvale	Northfield	MN	55057
Peter Rissi	2734	Buchanan St NE	Minneapol	MN	55418
Kent Rissman	6801	Telemark Trl	Edina	MN	55436
Jim Ritchart	1776	Sargent Ave	St. Paul	MN	55105
Vicki & Mike or Rex Ritch	2633	Natchez Ave	Saint Louis	MN	55416
Eric Roberts	2400	W Lake Of The Is	Minneapol	MN	55405
Judy Roberts	3724	47th Ave S	Mpls	MN	55406
Nancy Roberts	8865	Pinehurst Circle	Woodbury	MN	55125
Tiffany Roberts	4031	Blaisdell	Mpls	MN	55409
John & Shiela Robertson	4127	Washburn Ave S	Minneapol	MN	55410
Jim Roehl	3310	Virginia Ave S	St Louis Pa	MN	55426
Chris Roemhildt	1347	Rice Creek Trail	Shoreview	MN	55126
Mike & Cecelia Rohrer	4500	Edmund Blvd	Minneapol	MN	55406
Robert & Jaime Rooney	3108	Armour Terr	St. Anthony	MN	55418
Drew Rosielle	5059	Washburn Ave S	Mpls	MN	55410
Christina Roste	1111	California Ave W	St Paul	MN	55108
Cathy Roth	3420	Zircon Ln N	Plymouth	MN	55446
Gregory (Greg) Rotter	3653	Colfax Ave S	Minneapol	MN	55409
Karen & Russ Rubin	6601	Biscayne Blvd	Edina	MN	55436
David Rubin	2345	Stone Creek Lan	Chanhassen	MN	55317
Blair Rumble	969	Lombard Ave	St Paul	MN	55105
John Runge	3528	35th Ave S	Minneapol	MN	55406
Mike Rusert	743	Idaho Ave W	St. Paul	MN	55117
SUSAN RUSSELL	1897	LINCOLN AVE	MAC GROV	MN	55105
Bonnie Russell	5712	Susans Ave	Edina	MN	55439
Sarah & Joe Rutledge	4011	Xenia Ave N	Robbinsdal	MN	55422

Dave Ryan	19159	Kristie Ln	Eden Prairi	MN	55346
Mary and Bruce Sabatke	3420	Irving Ave S	Minneapol	MN	55408
Candace Sabers	2408	Britton Ln	Wayzata	MN	55391
Eric Sabesma	4015	Woodend Dr	Edina	MN	55410
Allen Saeks	150	S 5th St Ste 2300	Minneapol	MN	55402
GREGORY SAGER	3704	24TH AVE S	MPLS	MN	55407
Kelly Salb	2640	Hayes St NE	Mpls	MN	55418
Mark Salsbury	5908	Abbott Ave S	Edina	MN	55410
Steve Sampson	17716	Powderhorn Dr	Minnetonk	MN	55345
Nels Sandberg	1103	Fillmore St NE	Minneapol	MN	55413
Francine Sanders	4228	Penn Ave N	Mpls	MN	55412
Anna Sandor	3329	Highland Ave	Minnetonk	MN	55391
Sharon Sanford	4043	38th Ave S	Minneapol	MN	55406
Bob Savard	8080	Marsh Dr	Chanhassei	MN	55317
Mark Scannell	4556	18th Ave S	Minneapol	MN	55407
Andrew and Jean Scarr	3232	Rice Creek Terra	New Bright	MN	55112
Britt Schachtele	3517	Skycroft Dr	Minneapol	MN	55418
Sarah Schachtele	4338	13th Ave S	Mpls	MN	55407
Matt Schaefer	1503	Arona St	St. Paul	MN	55108
Karen Schaffer	2100	Fairview Ave N	Roseville	MN	55113
Alecia Scharback	2223	Black Oak Dr	Minnetonk	MN	55305
GERALD SCHELIN	322	E BAKER ST	SAINT PAU	MN	55106
JB Scherpelz	3736	Inglewood Ave	St. Louis Pa	MN	55416
Anya Schestak	2726	Lincoln St NE	Minneapol	MN	55418
Chris Schirber	1605	Summit Ave	St. Paul	MN	55104
Ben Schmidt	15920	26th Ave n	Plymouth	MN	55447
Jerold Schneider	17	Alice Ct	Saint Paul	MN	55107
Jeff Schneider	4936	Park Ave	Mpls	MN	55419
Cora & Robert Scholz	704	Saint Olaf Ave	Northfield	MN	55057
Liz Schreiber	3000	Polk Street	Minneapol	MN	55418
Robin Schribman	18975	Easton Rd	Wayzata	MN	55391
Robert Schriver	7465	Ridgeway Rd	Golden Val	MN	55426
Ron Schulte	100	Clydesdale Trl Ap	Hamel	MN	55340
Paul Schultz	5610	37th Ave S	Minneapol	MN	55417
Ron Schultz	7620	W 111th St	Bloomingto	MN	55438
Jane or Niles Schulz	1949	E River Ter	Minneapol	MN	55414
Lynne Schulz	8030	W 25th Street	St Louis Pa	MN	55426
Brockman Schumacher	5128	Garfield Ave. S.	Minneapol	MN	55419
Randy Schumacher	3616	Tonkawood	Minnetonk	MN	55345
Terri Schwartz	2091	Opal Dr	Eagan	MN	55122
Stacey Schwebach	3232	5th Ave S	Minneapol	MN	55408
Kathy Schweigert	1655	Blair Ave	Saint Paul	MN	55104
Jonathon Scott	4420	York Ave S	Minneapol	MN	55410
Patty Scott	336	5th St NE	Mpls	MN	55413
Jim Scoville	2093	Jefferson Ave	Saint Paul	MN	55105
Dennis & Susan Searle	4912	Clinton Ave	Minneapol	MN	55419
Wendie Sederstrom	2198	Haddington Rd	Roseville	MN	55113

Kevin Sedlezly	2972	Simpson St	Roseville	MN	55113
Howard Segal	4409	Sunset Rdg	Minneapol	MN	55416
Sharon Segal	150	Second Street N	Minneapol	MN	55413
Howie Segal	4409	Sunset Ridge	Golden Val	MN	55416
Philip Sellew	1588	Vincent St	Saint Paul	MN	55108
Chad Selmecki	1911	Mckinley St NE	Minneapol	MN	55418
Joanne Senander	13000	Melody Ln	Minnetonk	MN	55305
Jackie A. Seurer	20665	Hollins Ave	Lakeville	MN	55044
Tony Severt	2105	Humboldt Ave. S	Minneapol	MN	55405
Hazel Shackleton	3043	Fillmore St.	Minneapol	MN	55418
Karen Shanahan	1835	Iglehart Ave	St. Paul	MN	55104
Leslie Shank	2550	Dupont Ave S	Minneapol	MN	55405
Charles Shannon	7476	Saratoga Dr	Chanhassei	MN	55317
Barbara Shaterian	912	W 31st St	Minneapol	MN	55408
Erica Shearer	3829	Cottage Ln	Minnetonk	MN	55305
Cynthia Shelton	4900	Colfax Ave S	Minneapol	MN	55419
Joanna Shelton	3509	Fremont Ave S	Minneapol	MN	55408
Kate Sherlock	4519	35th Avenue Sou	Minneapol	MN	55406
Aki Shibata	192	Charles Ave	St. Paul	MN	55103
Mike Shields	631	Desnoyer Rd	St Paul	MN	55104
Jan & Ross Shoger	201	Oak St	Northfield	MN	55057
Bob Sidenberg	3319	Irving Ave S	Minneapol	MN	55408
Samuel Siegel	930	Toledo Ave N	Golden Val	MN	55422
Larry Silber	5013	Belmont Ave	Minneapol	MN	55419
Robert B. Silberman	2121	Milwaukee Ave	Minneapol	MN	55404
David Silverthorn	1435	Bayard Ave	St. Paul	MN	55116
Jon Simpson	1800	Taylor St NE	Minneapol	MN	55418
Laura Simpson	3829	Lyndale Ave S	Minneapol	MN	55409
ANNA SISKIND	3429	16TH AVE S	MINNEAPC	MN	55407
Maryellen Skan	428	3rd Ave NE	Minneapol	MN	55413
Lauren Sleinhammer	1479	Grand Ave	St. Paul	MN	55105
Robert Slembarski	3005	29th Ave NE	St. Anthony	MN	55418
Robert Slifer	5013	Vincent Ave S	Minneapol	MN	55410
Judith Smertenko	11860	Tapestry Lane	Minnetonk	MN	55305
Cheryl Smith	3624	Arbor Ln	Minnetonk	MN	55305
Scott Smith	2725	Garfield Ave	Minneapol	MN	55408
Sue Smith	457	Pascal St S	Saint Paul	MN	55105
James Smith	334	Cherokee Ave #1	Saint Paul	MN	55107
Becki Smith	4301	Washburn Ave N	Mpls	MN	55412
Hilary Smith	4300	5th Ave S	Minneapol	MN	55419
Scott Smith	819	4th st NE	Minneapol	MN	55413
Gayle Smith	157	Duke Street	St Paul	MN	55102
Elaine Smith	3305	31st Ave NE	Mpls	MN	55418
Sarah Snapp	738	Holton	St Paul	MN	55104
Richelle "shelly" Sobiesk	13	TAMARISK RD	DELLWOOI	MN	55110
Hannah Sohre	1310	Sherburne Ave	St. Paul	MN	55104
Joette Solberg	3660	34th Ave S	Minneapol	MN	55406

Joan Solie	2517	Rhode Island Ave	St. Louis Pa	MN	55426
Scott Solowiej	1750	Stanford Ave	Saint Paul	MN	55105
James E. Sorensen	1917	Kenwood Pkwy	Minneapol	MN	55405
Mahyar Sorour	729	8th Street SE	Burnsville	MN	55111
Brian Sostek	217	Russell Ave S	Minneapol	MN	55405
Roger Southwick	1317	Thomas Ct	Northfield	MN	55057
Rebecca Souvanxayler	4614	Russell	Mpls	MN	55412
Kathy Staege	1851	Ulysses St NE	Minneapol	MN	55418
PAULA STAFF	5745	STANDISH AVE S	MINNEAPC	MN	55417
Lois Stahl	4709	Abbott Ave S	Minneapol	MN	55410
Marika Staloch	1094	Milton St N	St. Paul	MN	55103
Caroline Stammers	3905	Urbandale Ln N	Plymouth	MN	55446
Rosalie Standing	4546	Washburn Ave N	Minneapol	MN	55412
Catherine (Kate) Stanley	3118	Dean Ct	Minneapol	MN	55416
Todd Starch	3240	46th Ave S	Minneapol	MN	55406
Adele Starr	3125	E 22nd St	Minneapol	MN	55406
David Stein	1881	Saunders Ave	Saint Paul	MN	55116
Carol Steinberg	848	20th Ave SE	Minneapol	MN	55414
Marilyn Steinwall	4655	N Victoria St #1	Shoreview	MN	55126
Frederic Stephens	2045	Hand Ave	Saint Paul	MN	55113
Ed Stern	630	4th St NE	Minneapol	MN	55413
Nora Stewart	4833	Harriet Ave	Minneapol	MN	55419
Paul Stibal	800	Chanview	Chanhassei	MN	55317
David Stiggers	1541	Hamline Ave N	St. Paul	MN	55108
Joan Stockinger	4119	York Ave S	Minneapol	MN	55410
Kari & Michael Stoick	2206	Highland Pkwy	Saint Paul	MN	55116
Pamela Strom	1229	Hague Ave	Saint Paul	MN	55104
Kamala Stromwall	17353	Glencoe Ave	Lakeville	MN	55044
Sara Strzok	3641	Pleasant Ave S	Minneapol	MN	55408
Grace Sulerud	549	Otis Ave	Saint Paul	MN	55104
Mary Sullivan	12578	Everest Trl	Apple Valle	MN	55124
Chris Sullivan	3506	Sunrise Dr W	Minnetonk	MN	55345
Bob Sullivan	1612	Washington St.	Northfield	MN	55057
Donna Sutherland	4140	25th Ave S	Minneapol	MN	55406
Steve Sutherland	4848	Dupont Ave S	Mpls	MN	55419
KARI SWALINKAVICH	931	SADDLE BROOK	CHANHASS	MN	55317
Eric Swanlund	4209	Xerxes Ave S	Mpls	MN	55410
Renee Swanson	2007	Sargent Ave	Saint Paul	MN	55105
Eli Swanson	100	Orlin Ave SE	Minneapol	MN	55414
Teri Swatzendruber	4130	Girard Ave N	Mpls	MN	55412
Karen Swierczek	3663	Pierce St NE	Minneapol	MN	55418
Brian Swiglo	1523	Arona St	St. Paul	MN	55108
Bryce Tache	5444	Portland Ave S	Mpls	MN	55417
Bob & Pat Tammen		PO Box 398	Soudan	MN	55782
Mike Taylor	2007	Fremont Ave S	Mpls	MN	55403
Rhona Templeton	3050	Ewing Ave S	Minneapol	MN	55416
Jeanne Terhaar	214	6th Ave N	Hopkins	MN	55343

Randall Thaden	5217	31st Ave S	Minneapol	MN	55417
Diane Thayer-Peterson	4428	Washburn Ave S	Minneapol	MN	55410
Connor Theisen	2054	Lincoln Ave	St Paul	MN	55105
Michelle Thiarios	381	Sterling Cir	Golden Val	MN	55422
Christopher & M. Thiel	402	W Minnehaha Pl	Minneapol	MN	55419
Laurie Thomas	4712	18th Ave S	Minneapol	MN	55407
David & Jennifer Thomas	4744	Thomas Ave S	Minneapol	MN	55410
Laura Thomas	3300	48th Ave S	Minneapol	MN	55406
Jill Thompson	1757	Stanford Ave	Saint Paul	MN	55105
Paul Thompson	4244	Crocker Ave.	Edina	MN	55416
Bruce Thompson	5555	Park Dr S	Savage	MN	55378
Anthony (A.J.) Thompson	5101	Beard Ave South	Minneapol	MN	55410
Robert Thorn	2647	Vernon Ave S	St Louis Pa	MN	55416
Gene Tiernes	2516	22nd	Mpls	MN	55405
Betty Tisel	4155	Garfield Ave	Minneapol	MN	55409
Rose Tjornhom	16630	Meadowbrook L	Wayzata	MN	55391
Annette Toews	1460	N Victoria St	Saint Paul	MN	55117
Dan Toggart	5836	Ashcroft Ave	Edina	MN	55424
Larry Tolle	312	Afton Dr	Northfield	MN	55057
Marc Tomas	3308	Skycroft Dr	St. Anthony	MN	55418
Brian Tomassoni	1035	Linwood Ave	St. Paul	MN	55105
Mary Tomback	3830	Glenhurst Ave.	St. Louis Pa	MN	55416
Lynn Torke	990	Hawthorne Ave	St Paul	MN	55106
Jean Train	3411	Shore Dr	Excelsior	MN	55331
DICK TRAPP	1045	LAKE OAKS DR	SHOREVIEW	MN	55126
Paul Traugh	566	Otis Ave	Saint Paul	MN	55104
Katrina Trent	7204	Kiowa Circle	Chanhassen	MN	55316
Brent Trinacty	4817	Oliver Ave S	Mpls	MN	55410
Terry Trudeau	1190	Laurel Ave	Saint Paul	MN	55104
Steve Trunk	5553	Aldrich Ave S	Minneapol	MN	55419
Naomi Tsanti	3112	Bell Ln	St. Anthony	MN	55418
Richard Tuma	10146	Laurel Dr	Eden Prairi	MN	55347
Mike Tuminelly	1945	Drew Ave S	Minneapol	MN	55416
Christine Tunake	14415	4th Ave N	Plymouth	MN	55447
Robert Tupa	1219	6th St NE	Minneapol	MN	55413
Sandy Turner	196	Sidny St W	Saint Paul	WI	55107
Larry & Gail Turner	2814	Brookwood Ter	Minneapol	MN	55410
Marian Turner	4042	Wentworth Ave	Minneapol	MN	55409
Ross Turner	875	Parkview Ave	Saint Paul	MN	55117
CJ Uliesni	3251	NE Arthur St	Minneapol	MN	55418
Eileen Ulrich	101	E 10th St Apt 54	Saint Paul	MN	55101
Brian Upell	5605	15th Ave S	Minneapol	MN	55417
Carol Urness	1030	23rd Ave Ne #1	MInneapol	MN	55418
Erik Van Mechalen	1800	W. Lake	Mpls	MN	55408
Catharine Van Nostrand	4105	Columbus Ave S	Mpls	MN	55407
Mary VanBeuseken	6610	Rocky Island	Excelsior	MN	55331
Mary & Michael Vanderf	4154	Blaisdell Ave	Minneapol	MN	55409

Robert W. Vanderhoof	420	Oak St	Northfield	MN	55057
Lori & Mark Vandersteen	1437	Breda Ave	Saint Paul	MN	55108
Chase Vasquez	136	Waverly Place	Duluth	MN	55803
Patricia Vaurio	5328	Oaklawn Ave	Edina	MN	55424
Subba Reddy Venkata	10930	Throne Ridge	Woodbury	MN	55129
Tammy Verchota	5648	23rd Ave S	Minneapol	MN	55417
Scott VettenHeimer	1945	Holm Rd	Two Harbo	MN	55615
Nathan Vickery	632	Holly Ave	St. Paul	MN	55104
William Viebann	301	Washburn Ave N	Minneapol	MN	55405
Bradford R. Vifquain	4145	Chowen Ave S	Minneapol	MN	55410
Angela Vold	5433	33rd Ave S	Minneapol	MN	55417
Karl von Gohren	1942	Ulysses St NE	Mpls	MN	55418
Beth VonEschen	8507	Westmoreland L	Saint Louis	MN	55426
Dan & Kathy Voss	3536	Dupont Ave. S.	Minneapol	MN	55408
Dawn Vukson-Vanbeek	2017	22nd Ave S	Minneapol	MN	55406
Norris Waalen	1524	Branston st	St. Paul	MN	55108
Sharon Wagener	7216	W 18th St	Saint Louis	MN	55426
Nancy Wagner	570	Montcalm Pl	Saint Paul	MN	55116
Vern Wagner	5221	42nd Ave. S.	Minneapol	MN	55417
Susi Wagner	4925	York Ave	Mpls	MN	55410
Carol Wahl	5748	James Ave S	Minneapol	MN	55419
Doris Wahl	953	Mound St	Saint Paul	MN	55106
Sharon or Joe Walbran	3806	Glenhurst Ave	St Louis Pa	MN	55416
Joanne Wald	1420	Archer Ln	Plymouth	MN	55447
James Waldo	1444	E Shore Dr	St. Paul	MN	55106
Tammy Walhoff		PO BOX 18056	MINNEAPC	MN	55418
Pat Walker	1993	Princeton Ave	Saint Paul	MN	55105
Chad Walker	2183	Hendon Ave	St. Anthony	MN	55108
Michele Walsh	4552	42nd Ave S	Minneapol	MN	55406
Thomas & Martha Walsh	161	Williams Ave	Mpls	MN	55414
Tanya Walten	5345	25th Ave S	Mpls	MN	55417
Jennifer Waltos	4309	18th Ave S	MPLS	MN	55407
John Wanamaker	1131	5th St NE	Minneapol	MN	55413
Susan or Bill Ward	2118	Parklands Rd	St Louis Pa	MN	55416
Carroll Watson	3300	126th Ave NE #B	Blaine	MN	55449
Noah Watt	3025	Polk St NE	Minneapol	MN	55418
Carolyn Weaver	4728	32nd Ave S	Minneapol	MN	55406
Lisa Weaver	5905	Russel Ave S	Minneapol	MN	55410
Michael Weber	12715	58th Ave N	Plymouth	MN	55442
Tami Weber	12526	Empress Ct	Apple Valle	MN	55124
Trevor & Cindy Weber	3524	Chelmsford Rd	St. Anthony	MN	55418
Bob Weidman	3233	Harriet Ave	Mpls	MN	55408
Doug Weimerskirch	3800	Orleans Ln N	Plymouth	MN	55441
Mike Weinberg	17735	2nd Ave N	Plymouth	MN	55414
Gerald L. Weispfenning	215	Isabel St W	Saint Paul	MN	55107
Kate Wellner	4748	Harriet Ave S	Minneapol	MN	55419
JO WELLS	4924	4TH AV S	Minneapol	MN	55419

Bill and Jen Welsh	3015	Golden Valley Rc	Golden Val	MN	55422
Joel Welter	2813	Silver Lk Rd NE	St. Anthony	MN	55418
Mona Welter	4306	13th Ave S	Mpls	MN	55407
Lee Wenzel	8666	Westwind Cir	Eden Prairi	MN	55344
Dobson West	1700	Mt. Curve	Minneapol	MN	55403
Bjorn Westgard	5037	Dupont Ave S.	Minneapol	MN	55419
Ashley Rose Westzeer	5233	Chicago Ave S	Minneapol	MN	55417
Katie Weyandt	2737	York Ave N	Robbinsdal	MN	55422
Eric & Kara Parker White	1520	Asbury St	Saint Paul	MN	55108
JOE WHITE	5359	MIRACLE LN	MINNETON	MN	55345
James Whittaker	3554	Fillmore St Ne	Minneapol	MN	55418
David Wick	2365	Yuma Ln N	Plymouth	MN	55447
Carol & Steve Widstrand	2540	Brighton Ave NE	Minneapol	MN	55418
Kris Wiederhold	3238	Benjamin St NE	Minneapol	MN	55418
JOHN Wiehe	1126	Vilas Ave	Madison	WI	53715
George Wilcox	2560	Kyle Ave N	Golden Val	MN	55422
Mark Wilcox	3707	Fairlawn Dr	Minnetonk	MN	55391
Jean & Andvin Wilhide	3019	W 43rd St	Minneapol	MN	55410
Gay Wilker	1345	Colby Ave	Saint Paul	MN	55116
Anthony (Tony) Williams	3832	10th Ave S	Minneapol	MN	55407
Katie Williams	3725	Parkway St	Wayzata	MN	55391
JT Williams	2839	Hayes St NE	Mpls	MN	55418
Martha or Michael Wilso	2053	Dayton Ave	Saint Paul	MN	55104
Richard Wilson	1070	Ivy Ave E	Saint Paul	MN	55106
Robert Winberg	3616	Aldrich Ave. S.	Minneapol	MN	55409
Robert Windels	17484	Evener Way	Eden Prairi	MN	55346
Holly Windle	3521	Aldrich Ave S	Minneapol	MN	55408
Karen Winger	4424	Pleasant Ave	Minneapol	MN	55419
Edward Winthrop	1806	Colfax Ave S	Minneapol	MN	55403
Cecilia Wirth	3152	40th Ave S	Minneapol	MN	55406
Adam Wirtzfeld	41	Melbourne Ave S	Minneapol	MN	55414
Ruth Wittmers	4322	McCulloch St	Duluth	MN	55804
Jason Wolf	4400	E44th St	Mpls	MN	55406
Valerie Wolfe	1115	Rhode Island Ave	Golden Val	MN	55427
Erin Wolff	5412	Queen Ave S	Mpls	MN	55419
Pam Wollum	2223	Sharon Ave	Minneapol	MN	55414
Stan Woolner	130	Prospect Blvd	Saint Paul	MN	55107
Philip Worrell	2325	Vale Crest Rd	Golden Val	MN	55422
Melissa Worthington	4355	Brook Ave S	St Louis Pa	MN	55424
Jim Wright	1256	Danforth St	Saint Paul	MN	55117
Charles Wyatt	5312	Humboldt Ave S	Mpls	MN	55419
Scott Yager	2351	Hunter Dr	Chanhassen	MN	55317
Chris Yang	2354	Golf Dr	Woodbury	MN	55129
Ron Yates	3332	Chowen Ave	Robbinsdal	MN	55422
Steve Yelter	1499	Hythe St	St. Paul	MN	55108
Courtney Zaato	114	Melbourne Ave S	Minneapol	MN	55414
Rebecca Zadrogen	3512	Pillsbury Ave	Minneapol	MN	55408

Brian Zaidman	965	Coneflower Ct	Eagan	MN	55123
Freddy Zambrano	2364	Timberlea Drive	Woodbury	MN	55125
Erin Zellnen	5905	Colfax Ave S	Minneapol	MN	55419
Mark Zerby	4716	29th Ave S	Mpls	MN	55406
Naomi Ziegler	1523	Pheasantwood T	Northfield	MN	55057
Martha Lee Zins	17509	Saddlewood Ln	Minnetonk	MN	55345
Arya Zipoy	10100	Kiersten Pl	Eden Prairi	MN	55347
DAVID ZUMETA	4720	E 34TH ST	LONGFELLC	MN	55406
Jory Zunich	4417	Abbot Ave S	Minneapol	MN	55401
Jennifer Zupan Mauser	2905	Colorado Ave S	St. Louis Pa	MN	55416
MARIE	1200	JOSEPHINE RD	ROSEVILLE	MN	55113
Annan	3815	Upton Ave S	Minneapol	MN	55410
Mel ?	5546	Upton Ave S	Mpls	MN	55410
<egam {eterspm	4736	5th Ave S	Mpls	MN	55419
Rachel A	4135	Raleigh Ave	St. Louis Pa	MN	55416
Mary Jo A	2545	Troy Ln	Plymouth	MN	55447
Bill A	4618	Cedarwood Rd	St. Louis Pa	MN	55416
Michael Aafedt	14	Forestdale Rd	Minneapol	MN	55410
Paula Aal	4217	Abbott Ave S	Minneapol	MN	55410
Jeanne Aaron	4809	W 27th	St. Louis Pa	MN	55416
Andriana Abariotes	1740	Portland Ave	Saint Paul	MN	55104
Rebecca & Bruce Abas	1873	Sargent Ave	Saint Paul	MN	55105
Marysa Abbas	1341	W. Estes Ave #5	Chicago	IL	60626
Anas Abdi	2732	Blackstone Ave S	St. Louis Pa	MN	55413
Nasir Abdi	3528	Colfax Ave S	Mpls	MN	55408
Raza Abedi	1450	Ottawa Ave	Golden Val	MN	55416
John Abel	3708	Pillsbury	Minneapol	MN	55409
Mark Abelin	113	W Minnehaha Pl	Mpls	MN	55419
Jill & Steve Abenth	2023	Pinehurst Ave	St. Paul	MN	55116
Ryan Abis	3821	Waveland Ter	Minneapol	MN	55401
Jeanne & Stuart Abraham	4020	W 44th St	Edina	MN	55424
D Abrahamson	1833	Garfield St NE	Mpls	MN	55418
Dorothy Abrahamson	2180	Carter Ave	Saint Paul	MN	55108
Omer Abramouigh	2736	Quentin Ave	St. Louis Pa	MN	55416
Ahmad Abumayatch	2791	Victoria St	Roseville	MN	55113
F. S. Abuzzahab	2601	E Lake Isles Pkwy	Mpls	MN	55408
Lynne Ackerberg	123	Melbourne Ave S	Minneapol	MN	55414
Larry Ackerman	282	Victoria St N	Roseville	MN	55113
Nick Ackley	1121	Kenwood Pkwy	Minneapol	MN	55403
Nicole or Mark Ackmann	5206	Hampshire Dr	Minneapol	MN	55419
David Adair	928	Franklin Terr	Mpls	MN	55406
Mary Adair	505	Janalyn Cir	Golden Val	MN	55416
Tom Adam	4233	E hill Dr	Browndale	MN	55416
Jasper Adamek	3839	Blaisdell Ave	Mpls	MN	55409
EILEEN ADAMS	963	EDGEWATER	SHOREVIEW	MN	55126
Dave & Elizabeth Adams	8123	Marsh Dr	Chanhassen	MN	55317
JULIA ADAMS	165	MILTON ST S	CROCUS HI	MN	55105

MaryAnn Adams	3480	Kent Dr	Shoreview	MN	55126
Rachel Adams	3328	Colfax Ave S	Mpls	MN	55408
Ramona Adams	14813	Belvoir Dr	Minnetonk	MN	55345
Connie L. Adams	2749	40th Ave S	Minneapol	MN	55406
Rachel & Zac Adams-Bliss	3849	35th Ave S	Minneapol	MN	55406
Mentor & Duke Addicks	1453	Hoyt Ave W	Saint Paul	MN	55108
Gregory Adrian	139	Cecil St SE	Minneapol	MN	55414
Mina Adsit	3034	Benjamin St NE	Minneapol	MN	
Deepak Advani	4022	Zenith Ave. S	Wedge	MN	55410
Karen Aelony	4228	Lyndale Ave s	Minneapol	MN	55409
Linda Aeton	3202	Harriet Ave	Minneapol	MN	55408
Sanaz Afiat	1722	Bohland Ave	St. Paul	MN	55116
Lorie Afremov	1664	Virginia Ave S	Minneapol	MN	55426
Loretta Agee	1945	Major Dr	Golden Val	MN	55422
Adrienne Agre	95	Castle Ridge Ct	Chanhasse	MN	55317
Sergio Aguilar	2015	26th Ave	Mpls	MN	55406
Will & Elizabeth Ahern	1191	Homestead Ln	Chanhasse	MN	55317
Sarah Ahlbrecht	18873	Barrington Dr	Eden Prairi	MN	55436
Catherine Ahlin-Halverso	3650	France Ave s	St Louis Pa	MN	55416
Barbara Ahlster	17010	24th Ave N	Plymouth	MN	55447
Giba Ahlstrand	50	Barton Ave SE	Mpls	MN	55414
Sandy Ahlstrom	6085	Riviera	Shorewoo	MN	55317
Kathleen Ahrea	4229	Garfield Ave S	Mpls	MN	55409
Tobias Aickin	3809	Waveland T	Mpls	MN	55410
Hashim Aideed	2738	Jersey Ave S	St. Louis Pa	MN	55426
Joe Aiken	2225	32nd Ave S	Minneapol	MN	55406
Adam Ailabonni	307	Elm St.	Northfield	MN	55057
Julia Ailts	5504	Blaisdell Ave S	Mpls	MN	55419
Rebecca Airnet	912	Laurel Ave	Mpls	MN	55104
Aarah Aizman	4225	W 25th St	St. Louis Pa	MN	55416
Golssu Akgue	4222	Basswood Rd	St Louis Pa	MN	55416
Alex Alarcon	940	Garland Ln N	Plymouth	MN	55447
Margaret & Robert Alber	3927	Zenith Ave S	Minneapol	MN	55410
Robert & Sonia Albers	2890	Arthur Pl	Roseville	MN	55113
Leah Albersheim	1932	Cedar Lake Prkw	Minneapol	MN	55416
Deb & Dave Albersman	1405	Natchez Ave S	Minneapol	MN	55416
Bobbi Alelt	1827	Chatsworth St	Roseville	MN	55113
Ellie Alexander	4420	Cedar Ave S	Mpls	MN	55407
Karilyn & Gary Alexander	4300	Nawadaha Blvd	Minneapol	MN	55406
Paul Alfonse	1611	Chelsea St	Saint Paul	MN	55108
Teresa Alfuth	4459	28th Ave S	Nokomis	MN	55407
Sofia Ali	2108	Carroll Ave	Saint Paul	MN	55104
Don Allan	3316	W Owasso Blvd	Shoreview	MN	55126
Michael Allen	20525	Kalmeadow Ct	Lakeville	MN	55044
Beth Allen	19130	Highland Ave	Deephaven	MN	55391
Will Allen	1977	Princeton Ave	St Paul	MN	55105
Nancy Allen	994	Roma Ave	Roseville	MN	55113

DeElt Allen	209	2nd Ave	Minneapol	MN	55413
Mary Jo Allen	4733	28th Ave S	Minneapol	MN	55406
Matthew Allen	2224	Sheridan Ave S	Minneapol	MN	55405
Laura K. Allen	222	Oak St	Northfield	MN	55057
Seamus Alligan	808	Meadow Ln	Golden Val	MN	55416
Heather Allison			St. Paul	MN	55105
Said Alsauah	3424	Aldrich Ave S	Minneapol	MN	55409
Lynn Alswie	2220	Ulysses St NE	Minneapol	MN	55418
Julie Alt	1730	Skillman Ave W	Roseville	MN	55113
Dawn Alteri	1267	Charles Ave	Saint Paul	MN	55104
Suzanna Altman	2637	Bryant Ave S	Mpls	MN	55408
Kathy Altman	3916	Garfield Ave S	Mpls	MN	55409
Larina Alton	3026	41st Ave S	Minneapol	MN	55406
Claudine Altonbilek	1835	Chatsworth St	Roseville	MN	55113
Ruben Alvarez	100	Madison St S	Northfield	MN	55057
Kathy Alvig	18530	37th Ave N	Plymouth	MN	55447
Abor Amara	3300	McKinley St NE	Minneapol	MN	55418
C Amburn	2539	McKinley St	Mpls	MN	55418
Elize Amel	2039	Ashland	Edina	MN	55104
Brian Amelang	3320	Emerson Ave S	Minneapol	MN	55408
Rita Amendola	879	Parkview Ave	St. Paul	MN	55108
Elena Ames	2221	Princeton Ave	St Paul	MN	55105
Gretchen & Bob Amis	1911	Kenwood Pkwy	Minneapol	MN	55405
Jenny & Dean Ammerma	3789	Briarwood Ln	Eagan	MN	55123
Lila Ammons	3220	21st AVe S apt#2	Minneapol	MN	55407
Martha Amores	608	9th Street E	Northfield	MN	55057
Bob Amos	2932	Georgia Ave S	St. Louis Pa	MN	55416
Paul Amundson	3400	Lauderdale Lane	Plymouth	MN	55446
Steven Amundson	1201	Cannon Valley D	Northfield	MN	55057
Anna Amyx	5429	24th Ave S	Minneapol	MN	55417
Tycho Amyx	5317	York Ave S	Mpls	MN	55410
Christine Anamere	3724	Bryant Ave S	Minneapol	MN	55409
Brian Andeesa	4170	Chaven Ave N	Robbinsdal	MN	55422
Sunday Anderjohn	1243	Draper Ave	Roseville	MN	55113
Amy Andersen	1	park rapids mn	Park Rapid	MN	55345
Tim Andersen	2929	Old Hwy 8	Roseville	MN	55113
Paul Anderson	4321	Dart Ave S	Saint Louis	MN	55416
Liz Anderson	914	Parkview	St. Paul	MN	55117
Travis Anderson	4111	Abbott Ave S	Minneapol	MN	55410
Karen Anderson	2505	Perry Ave N	Golden Val	MN	55422
Randy Anderson	5109	Russell Ave S	Minneapol	MN	55410
Rolf Anderson	212	W 36th St	Minneapol	MN	55408
Jacob Anderson	4621	Ewing Ave S	Minneapol	MN	55410
Hayley Anderson	1912	5th St NE	Minneapol	MN	55418
Deb Anderson	1020	Idaho Ave W	St. Paul	MN	55117
Tom Anderson	2440	Olive Ln N	Plymouth	MN	55447
MJ Anderson	5644	Humboldt Ave S	Mpls	MN	55419

Norm Anderson	2630	30th Ave NE	St. Anthony	MN	55418
Wayne & Sue Anderson	1420	Nevada Ave S	St. Louis Pa	MN	55426
Brian Anderson	1661	Virginia Ave S	St. Louis Pa	MN	55426
Chris Anderson	4524	Beard Ave S	Mpls	MN	55410
Kirstin Anderson	2444	W 24th St	Mpls	MN	55405
Kristin Anderson	2705	31st Ave NE	St. Anthony	MN	55418
Jamie Anderson	3116	Edward St	Mpls	MN	55418
Joe Anderson	18118	33rd Ave N	Plymouth	MN	55447
Larry & Mary Jo Anderso	2226	Cleveland St NE	Mpls	MN	55418
Christina Anderson	17605	Hackberry Ct	Eden Prairi	MN	55347
Anna Anderson	9982	Bennett Place	Eden Prairi	MN	55347
Corey Anderson	2512	2512 Armour ter	St. Anthony	MN	55418
Shannon Anderson	2608	St. Anthony Blvd	St. Anthony	MN	55418
Karoline Anderson	3647	Major Ave N	Robbinsdal	MN	55422
Rodeer Anderson	4522	Drew Ave N	Robbinsdal	MN	55422
Melinda Anderson	4745	Clinton Ave S	Mpls	MN	55419
Robert Anderson	4931	Winsdale St N	Golden Val	MN	55422
Pat Anderson	1455	Laurel Ave	St Paul	MN	55104
Dianna Anderson	611	W 37th St S	Minneapol	MN	55409
Royal Anderson	2121	Lowry Ne	Minneapol	MN	55418
Martha Anderson	1018	Main St Ne	Minneapol	MN	55413
Holly Anderson	3825	Aldrich Ave S	Minneapol	MN	55409
Kirsti Anderson	1520	Brenner Ave	Roseville	MN	55113
Deb Anderson	1973	Eldridge Ave	Roseville	MN	55113
Katie Anderson	5445	Queen	Minneapol	MN	55419
Kristi Anderson	1760	Aglen St	Roseville	MN	55113
Valarie Anderson	402	Iona Lane	Roseville	MN	55113
Hans Anderson	4916	Stevens Ave	Minneapol	MN	55419
Priscilla Anderson	1177	Idaho Ave	Minneapol	MN	55108
Jarrad Anderson	2640	Aldrich Ave S	Minneapol	MN	55408
Alan Anderson	3100	Spruce Ln	Minnetonk	MN	55305
Valerie Anderson	4256	20th Ave S	Minneapol	MN	55407
Kathryn Anderson	1930	Knox Ave S	Minneapol	MN	55403
S. Brian Anderson	4213	West 42nd St	Edina	MN	55415
Ray Anderson	2803	Zarthan Ave S	St Louis Pa	MN	55416
Damon Anderson	2279	Folwell Ave	Falcon Heig	MN	55108
Kirk Anderson	2064	James Ave	Saint Paul	MN	55105
Deborah Anderson	4241	Scott Ter	Edina	MN	55416
Cordelia Anderson	4405	Garfield Ave	Minneapol	MN	55419
Amy Anderson	4933	Fremont Ave S	Minneapol	MN	55419
John Anderson	2246	Quebec Ave S	Saint Louis	MN	55426
Peggy Anderson	4800	Folwell Dr	Minneapol	MN	55406
Gwen Anderson	1115	Winona St	Northfield	MN	55057
Georgia Anderson	5252	Vincent Ave S	Minneapol	MN	55410
Gail Anderson	4718	Folwell Dr	Minneapol	MN	55406
Ellen or Wells Anderson	3336	Glenhurst Ave	St Louis Pa	MN	55416
Evelyn & John Anderson	436	Upton Ave S	Minneapol	MN	55405

Jessa Anderson-Deitz	23	Sidney Pl	Mpls	MN	55414
Morgan Anderson-Mums	4228	Fremont Ave N	Mpls	MN	55412
Nancy Andraschko	3916	Washburn Ave S	Minneapol	MN	55410
Lucas Andrea	1810	Cleveland St NE	Mpls	MN	55418
Taylor Andrehi	2825	Dakota Ave S	St. Louis Pa	MN	55416
Jan Andrew	10125	Boone Circle	Bloomingto	MN	55438
Adayle Andrews	1720	E 57th St	Mpls	MN	55417
Mark and Sophie Anema	4949	Logan Ave S	Minneapol	MN	55419
Emil Angelica	4925	Logan Ave S	Minneapol	MN	55419
Bob Angell	333	E 50th St	Minneapol	MN	55419
Tony Anglis	4126	Xerxes S	Minneapol	MN	55410
Shdai Anin	1110	Two Cedar Dr	Eagan	MN	55123
Anon071207b			Minneapol	MN	55406
Anonymous Anonymous	1	not provided	St. Louis Pa	MN	55426
Anonymous Anonymous	1	crossed out	Mpls	MN	55414
3 mpls Anonymous	3	55407	Mpls	MN	55407
MPLS Anonymous	1	mpls	Mpls	MN	55407
2 mpls Anonymous	2	anonymous	Mpls	MN	55407
A anonymousst. paul	1	mn	St. Paul	MN	55104
Rebecca Ansari	1545	June Ave S	Golden Val	MN	55416
Stacey Anschutz	3538	Benjamin	Mpls	MN	55418
Jim Anton	2322	Seabury Ave S	Mpls	MN	55406
Anna Appelbaum	1171	Charles Ave	Saint Paul	MN	55104
Kim Appeldorn	3465	Chandler Rd	Shoreview	MN	55126
Scott Appell	3049	Decaturr Ave S	St. Louis Pa	MN	55426
Steve Applebaum	2835	June Ave N	Golden Val	MN	55422
Shane Apundel	2529	Bryant Ave S	Minneapol	MN	55408
Deanna Arce	819	4th St NE	Minneapol	MN	55413
Nick Archer	3124	E Minnehaha Pk	Minneapol	MN	55406
Lucy Archibald	417	Winona St	Northfield	MN	55057
Melanie Arcilla	15600	Randall Ln	Minnetonk	MN	55345
Tracy Arends	2027	Sheridan Ave S	Mpls	MN	55405
Karen S. Arens	3501	Downers Dr NE	Minneapol	MN	55413-8
Terri Arguyo	2716	Brunswick	St. Louis Pa	MN	55416
Eylan Ben Ari	1501	Mt Curve Ave	Mpls	MN	55403
Don Arkosti	1722	Princeton	St Paul	MN	55105
Sahrch Armajeni	1415	Dunkirk Ln	Plymouth	MN	55447
Carlos Armendarie	5536	29th Ave S	Mpls	MN	55417
Shirley Arms	4612	Longfellow Ave	Mpls	MN	55417
John Armstrong	1277	Dayton Ave	St. Paul	MN	55104
Jessica Armstrong	1095	Hoyt Ave W	St. Paul	MN	55108
Sharon Armus	4825	Girard Ave S	Minneapol	MN	55419
Fred Arndt	5704	W 68th St	Edina	MN	55439
Andrew Arndt	411	Penn Ave S	Mpls	MN	55405
Julia Arneson	1700	Minnehaha Park	Minneapol	MN	55407
Dolores Arneson	3401	Shore Dr	Chanhasse	MN	55331
Nancy Arneson	2116	Cedar Lk Pkwy	Minneapol	MN	55405

Rose Arnold	17235	11th Ave N	Plymouth	MN	55447
Peggy Arnson	4804	15th Ave S	Mpls	MN	55407
Dan Aronson	2021	Humboldt Ave S	Minneapol	MN	55405
Alyssa Arredonde	1497	Fulham St	St. Paul	MN	55108
James Arrell	4216	Shoreline Dr	Robbinsdal	MN	55422
Jason Arseneen	7280	Caches	Chanhasse	MN	55317
Denise Artley	1864	Sargent Ave	St Paul	MN	55105
Nevin Arun	8262	Drexel Ct	Eden Prairi	MN	55347
Karen Aruns	3501	Downer Dr NE	St. Anthony	MN	55418
Peg Arveson	3528	20th Ave S	Minneapol	MN	55407
Sarah Aschbrenner	887	Nebraska Ave W	St. Paul	MN	55117
HAssan Asghar	4620	Vincent Ave S	Minneapol	MN	55410
Steve Ash	4051	Wooddale Ave	St. Louis Pa	MN	55416
Alice Ash	4065	BeardAve	Robbinsdal	MN	55422
David Ashling	155	Kentucky Ave N	Golden Val	MN	55426
Mohamed Ashpool	2923	Polk St Ne	Minneapol	MN	55418
Elizabeth Ashton	4015	Sunnyside Rd	Edina	MN	55424
Diane Ashtox	36	Newton Ave	Minneapol	MN	55404
Nancy Askay	1212	Hawthorne Ct	Northfield	MN	55057
Grant Aslakson	4237	Grimes Ave N	Robbinsdal	MN	55422
George Aslanishvili	18215	23rd Ave N	Plymouth	MN	55447
Steve Asper	1005	Idaho Ave W	St. Paul	MN	55108
Anil Asrani	16910	9th Ave N	Plymouth	MN	55447
Rose Marie Assad	991	Hoyt Ave W	Saint Paul	MN	55117
Stu Astleford	3101	W 47th	Minneapol	MN	55410
SONIA ASWEGAN	1530	OAKWOOD DR	SHOREVIEV	MN	55126
Andrea Atkinson	208	Melourne Ave SE	Mpls	MN	55414
Orcey Auber	3384	Beard Ave N	Robbinsdal	MN	55422
Kelly Audette	510	Summerfield Dr	Chanhasse	MN	55317
Glenn Audis	16580	N Manor	Eden Prairi	MN	55347
Geny Augdahl	8278	Drexel Ct	Eden Prairi	MN	55347
Jen Augustson	5000	Arden Ave	Edina	MN	55424
Cindy Aumer	924	Grandview Ave \	Roseville	MN	55113
Carol Aus	1392	Portland Ave	St Paul	MN	55104
Terri Ausen	783	Fairmount Ave	Saint Paul	MN	55105
Mary Austin	1511	Skywood Lane	Duluth	MN	55803
Nora Austin	2218	Cleveland St NE	Mpls	MN	55418
Thaddis Austin	955	Lombard	St Paul	MN	55105
Katherine "KATHY" Austi	1410	Spring Valley Rd	Golden Val	MN	55422
Gus Avenido	958	W Neraska	St Paul	MN	55117
Adam Avery	976	Montana Ave W	St. Paul	MN	55108
Tony Axtell	2912	France Ave S	St Louis pa	MN	55416
John Azer	4005	W 49th St	Edina	MN	55424
Nancy Azzam	2300	Noble Ave N	Golden Val	MN	55422
chris B	4046	Raleigh Ave	St. Louis Pa	MN	55416
Jennifer B	436	4th St NE	Mpls	MN	55404
Charlie B	3313	Ewing Ave N	Robbinsdal	MN	55422

Jon B	5101	Queen Ave S	Mpls	MN	55410
Michele B	3924	Harriet Ave	Mpls	MN	55408
Melissa B	5121	Upton Ave S	Mpls	MN	55410
Tom B	2115	Xylon Ave	Golden Val	MN	55426
Rich B	3111	Average St	Roseville	MN	55113
Yourson B	4017	Zenith ave S	Minneapol	MN	55410
Brent Babeaisa	4550	York Ave S	Mpls	MN	55410
Bob Babin	5632	14th Ave S	Minneapol	MN	55417
Herb Bacal	4446	Ellerdale Rd	Minnetonk	MN	55345
Nina Bacaner	2737	Huntington Ave	St Louis pa	MN	55416
Barbara Bach	5690	Dunlie Ave N	Shroeview	MN	55126
Jeannette Bach	1453	Hoyt Ave W	Falcon Heig	MN	55108
Howard Bach	4237	W 25th St	St Louis Pa	MN	55416
Marcia Bachalien	4033	Washburn	Minneapol	MN	55410
Sigrid & T. Bachmann	1908	E River Ter	Minneapol	MN	55414
Patty Bachmeier	3808	Harriet Ave	Minneapol	MN	55409
Rachelle Backer	2525	Garfield St Ne	Minneapol	MN	55418
Tom Backstrom	5020	Logan Ave S	Mpls	MN	55410
Joe Badalucco			Plymouth	MN	55447
Heather Bae	1220	Hawthorne Ct	Northfield	MN	55057
Fred Baer	10350	Buckingham Dr	Eden Prairi	MN	55347
Alejandro Baer	627	Mt. Curve Blvd	St. Paul	MN	55116
Jane Baer	1058	Summit Ave	Saint Paul	MN	55105
Leonore Baeumler	2130	Abbotsford	Duluth	MN	55803
Erica Bagason	4110	Nicollet Ave	Minneapol	MN	55409
Chris Bagwell	507	W 33rd St	Mpls	MN	55408
Karen Baher	2812	Jersey Ave S	St. Louis Pa	MN	55426
Christopher Bahn	3131	Pierce St NE	Minneapol	MN	55418
John Bahn	434	Woodhill	Roseville	MN	55113
Beverly Bail	523	Iona Ln	Roseville	MN	55113
Steven Bailey	2220	Legend Dr W	Golden Val	MN	55422
Elizabeth Bailey	5429	26th Ave S	Mpls	MN	55417
Janet Bailey	4008	23rd Ave S	Mpls	MN	55407
Tom Bailey	4941	Newton Ave S	Minneapol	MN	55419
Robert Bailey	4648	31st Ave S	Minneapol	MN	55406
Georgia Bailey	5600	11th Ave S	Minneapol	MN	55417
Mark Bailihy	1149	Ashland Ave	St Paul	MN	55105
Jim Baillie	2029	Thomas Ave	Mpls	MN	55405
Katy Bain	535	Lake Cove Ct	Shoreview	MN	55126
Steven Baird	2452	Aglen St	Roseville	MN	55113
Mike Bak	1806	Ulysses St NE	Mpls	MN	55418
Richard Baker	224	Janalyn Cir	Golden Val	MN	55422
Roberta "bobbie" Baker	1288	sargent ave	Saint Paul	MN	55105
Philip Baker	5028	Russell Ave S	Minneapol	MN	55410
Dan Baker	7719	Nicholas Way	Chanhasse	MN	55317
Caitlin Baker	3801	W 55th St	Mpls	MN	55410
William Baker	4924	Nokomis Ave	Mpls	MN	55417

Pam Baker	3725	Dupont Ave S	Mpls	MN	55405
Mary Jose Baker	4312	Camelot Dr	Minnetonk	MN	55345
Dawn Baker	4708	Oakland Ave	Minneapol	MN	55407
Myles Bakke	13	Bunday Ct	Northfield	MN	55057
Andrew Bakke	1786	Humboldt Ave S,	Mpls	MN	55403
Lori Bakken	4924	Thomas Ave S	Minneapol	MN	55410
Brandon Balcom	1452	Lakeview Ave S	Minneapol	MN	55416
Kirk Ballard	1360	Waterford Dr	Golden Val	MN	55422
Martha Ballard	527	7th St SE	Minneapol	MN	55414
Chuck Ballotak	3256	Ewing Ave N	Robbinsdal	MN	55422
Lois & Steven Balogh	521	Warwick St	Saint Paul	MN	55116
Daniel Balson	3043	Pierce	Mpls	MN	55418
Duane Bandel	5315	Blaisdell Ave	Minneapol	MN	55409
Paula Bandhuin	4314	Blaisdell Ave	Minneapol	MN	55409
Dan & Cindy Bandoli	2905	Stinson Blvd	St. Anthony	MN	55418
Rachel Banfad	2544	Not Legible, #30	Mpls	MN	55407
Joseph Bangard	5529	45th Ave S	Mpls	MN	55417
Gerald & Patricia Bannac	18942	Wynnfield	Eden Prairi	MN	55347
Cindy Banovetz	5335	Garfield Ave	Minneapol	MN	55419
Mark Banta	3468	Brunswick Ave S	St. Louis Pa	MN	55416
Pat Barbeau	2620	York Ave N	Robbinsdal	MN	55422
Mary Barbosa-Jerez	748	Lathrop Dr	Northfield	MN	55057
Tim Bardell	2333	Parkwoods Rd	St Louis Pa	MN	55416
Nancy Bardeto	2171	Palace Ave	St Paul	MN	55105
Jenny Bardon	3724	Blaisdell Ave S	Minneapol	MN	55409
Tara Barenok	4842	33rd Ave S	Minneapol	MN	55417
Jordan Barett	1263	Avon St N	St. Paul	MN	55117
KC & Lori Barghini	2004	Portland Ave	Saint Paul	MN	55104
Anne Bark	3533	Woodlawn Blvd	Minneapol	MN	55417
Hanna Barker	5137	Gorges Arc	Edina	MN	55424
Randy Barker	151	Cleveland S	St Paul	MN	55105
Jeff Barkmeier	5133	Dupont Ave S	Minneapol	MN	55410
Maca Barnes	2117	22nd Ave NE	Minneapol	MN	55416
Ty Barnett	1225	Charles Ave	St. Paul	MN	55104
Katrina Barnett	4981	Turtle Lake	Shoreview	MN	55126
Jane Barnstable	2468	Churchill St	Roseville	MN	55113
Chris Baron	3550	Fremont Ave S	Minneapol	MN	55409
Craig Baros	3648	17th Ave S	Mpls	MN	55407
Leah Y. Barra	3033	Pascal St N	Roseville	MN	55113
John Barrett	3448	Hayes St NE	Mpls	MN	55418
Kate Barrett	2152	Berkeley	St Paul	MN	55105
Carol Barry	2936	Kyle Ave N	Golden Val	MN	55422
Mark Barsness	3020	Grand Ave	Minneapol	MN	55408
Andre Bartel	1442	W Taylor Ave	St Paul	MN	55104
Anne or Greg Bartel	4920	Harriet Ave	Minneapol	MN	55419
Blake Bartelma	5041	16th Ave S	Mpls	MN	55417
Christopher Barth	220	Lincoln St N	Northfield	MN	55057

Kory Barthelemy	7331	Cactus Curve	Chanhassei	MN	55317
Todd Bartholomay	4144	Aldrich Ave S	Minneapol	MN	55409
Jennifer or Rick Bartholo	2112	Drew Ave S	Minneapol	MN	55416
Paul Bartholow	8024	W 26th St	Saint Louis	MN	55426
Scott Bartolo	9101	Club Rd	St. Louis Pa	MN	55416
Paula Barton	5019	Nokomis	Mpls	MN	55417
Julie Barton	4128	24th Ave S	Mpls	MN	55407
Conor Bartress	1653	Laurel Ave	St. Paul	MN	55104
David & Sheri Barwig	18620	26th Ave N	Plymouth	MN	55447
Anne Barz	5533	Woodlawn blvd	Mpls	MN	55417
Luis & Michael Barzallo	1411	18th Ave NE	Mpls	MN	55418
Colleen Basney	495	Cretin Ave	Highland P	MN	55116
Betsy Bason	1201	Maple St	Northfield	MN	55057
Sean Bassett	4404	Aldrich Ave S	Minneapol	MN	55409
John Bassett	4350	W Lake Harriet P	Minneapol	MN	55410
Beth & Jason Bassett	283	Wilder St N	Saint Paul	MN	55104
Brittany Bastian			Saint Paul	MN	55130
Mike Bastman	1589	Fulham St	St Paul	MN	55108
Jane Bates	2980	Old Hwy 8	Roseville	MN	55113
Bennett Batzli	100	Sandy Hook Rd	Chanhassei	MN	55317
Paula Baudhuin	4314	Blaisdell Ave. S.	Minneapol	MN	55419
Shenandoah Bauer	2612	38th Ave S	Minneapol	MN	55406
Autumn Baum	2608	W 41st St	Minneapol	MN	55410
Karyn Baum	845	Laurel Ave	Saint Paul	MN	55104
Jo Bauman	2531	Lynn ave	St. Louis Pa	MN	55416
John Baumann	720	Highland Ave	Northfield	MN	55057
Jason Baumester	2625	Edgewood Ave S	St. Louis Pa	MN	55413
Laura Baumtrog	7605	Huror Ave	Chanhassei	MN	55317
Bonnie Baur	4501	Burr Oak Ln	Minnetonk	MN	55343
William Bausman	2633	Girard Ave, #132	Mpls	MN	55408
Billy Baver	3115	Harriet Ave	Minneapol	MN	55408
Ariana Baxter	2346	Coolidge St NE	Mpls	MN	55418
Brian & Carol Baxter	4270	Ottawa Ave S	Saint Louis	MN	55416
Jerrie Bayer	2200	Roosevelt St NE	Minneapol	MN	55418
T Bayrer	2800	29th Ave NE	St. Anthony	MN	55418
Dominic Bazzett	4322	Garfield Ave	Minneapol	MN	55409
Carole Beach	2501	Parkview Blvd	Golden Val	MN	55422
Richard Beach	1201	Yale PL #1505	Minneapol	MN	55403
DAVE & Caroline BEAL	1404	PRIMROSE AVE	ROSEVILLE	MN	55113
Christopher Bearg	19115	Rutledge Rd	Deephaven	MN	55391
Maury Beauler	4029	Dublin Dr	Minnetonk	MN	55345
Isaac Beaver	1340	Idaho Ave	Falcon Heig	MN	55108
Gary Beaver	2211	Taft St NE	Minneapol	MN	55418
Dan Beck	4010	17th Ave S	Minneapol	MN	55407
Lisa Beck	6742	129th St W	Apple Valle	MN	55124
Brad Beck	902	Kimberly Ln	Chanhassei	MN	55317
Cornelia Beck	1610	E River Ter	Minneapol	MN	55414

Joe Beckendorf	5125	Thomas Ave S	Minneapol	MN	55410
Ali Becker	5105	29th Ave S	Mpls	MN	55417
Jane Becker	2087	Princeton Ave	St Paul	MN	55105
Rebecca Becker	18766	Wynnfield Rd	Eden Prairi	MN	55347
Kadie Becker	1291	Idaho Ave	Minneapol	MN	55108
John Beckey	4100	Abbott Ave S	Minneapol	MN	55410
Maren Beckman	17171	Monroe Dr NW	Elk River	MN	55330
Mikkel Beckmen	5332	Fremont Ave S	Minneapol	MN	55419
Elissah Becknell	2419	Buchanan St NE,	Mpls	MN	55418
Thomas Becknell	1088	Hoyt Ave	St. Paul	MN	55108
Molly Beckstrard	4241	Ottawa Ave S	St Louis Pa	MN	55416
Jenny Beckstrom	1268	Margaret St	St. Paul	MN	55104
Samuel & Nicholas Beddc	5321	Chateau Pl	Minneapol	MN	55417
Nancy Beecher	4424	Edward Blvd	Minneapol	MN	55406
Shawn Beem	3001	Tonkenton Dr	Minnetonk	MN	55391
Claudia Corabel Beerman	3637	15th Ave S	Mpls	MN	55407
Dara Beevas	53	Oliver Ave S	Minneapol	MN	55405
Bob Begdel	582	Desnoyer Ave	St Paul	MN	55104
Dennis Begley	2765	Vernon Ave S	St. Louis Pa	MN	55416
Kathleen Begley	4114	Sunnyside Rd	Edina	MN	55424
Brian & Andrea Behler	13073	Crolly Path	Rosemount	MN	55068
Ralph Behme	1823	Colfax Ave S	Minneapol	MN	55403
Jill Behnke	311	Washburn Ave N	Mpls	MN	55405
Patty Behrenbrinke	1958	Garven Ave.	Falcon Heig	MN	55113
Max Behrenbrinker	5155	Nicollet	Minneapol	MN	55419
Brad Behrens	8413	Virginia cir	St. Louis Pa	MN	55426
Linda Belcher	5301	Thotland	Golden Val	MN	55422
Rolf Belgum	4824	Emerson Ave	Minneapol	MN	55410
Lauren Belisle	3118	Arthur St NE	Minneapol	MN	55418
Stephen Bell	5344	30th Ave S	Mpls	MN	55417
Carolyn Bell	125	125 Meadow Ln	Mpls	MN	55416
Ginny Bell	12730	Excelsior Cir	Minnetonk	MN	55343
John Bell	4224	Linden Hills Blvd	Minneapol	MN	55410
Brian Bellemare	4706	30th Ave S	Mpls	MN	55406
Therese Bellinger	2836	Roosevelt	St. Anthony	MN	55418
Katie n Chris Bellmont	12905	Hamlet Ave	Apple Valle	MN	55124
John Bellows	4835	3rd Ave S	Mpls	MN	55419
Graham Belmon	2306	Ne McKinley St	Minneapol	MN	55418
Barb Belschner	5172	Abercrombie Dr	Edina	MN	55439
Grayce Belvedere-Young	5117	Indiana Ave.	Edina	MN	55424
Susan & Joe Belzar	2078	Flag Ave S	Saint Louis	MN	55426
Anne Belzer	1810	James Ave S	Minneapol	MN	55403
BreAnna Bemboom			St. Louis Pa	MN	55416
Susan Bemel	8901	Westmoreland L	Saint Louis	MN	55426
Ma Ben	4110	Portland Ave	St Paul	MN	55104
Lee Ben-David	3945	Xerxes Ave S	Mpls	MN	55410
Bob Bendel	582	Desnoyer Ave	Saint Paul	MN	55104

Ellen and Michael Bendel	3617	W. 55th St.	Edina	MN	55410
Michael bendelsten	3617	W 55th St	Edina	MN	55424
Dan Bender	3317	Garfield Ave	Minneapol	MN	55408
Lane Bendzick	731	W. 96th St	Chanhasse	MN	55317
Carllie Bene Bowers	4333	33rd Ave S	Minneapol	MN	55406
Bruce Beneket	855	Holly Ave	Saint Paul	MN	55104
Nicholas Benhan	2955	Chowen Ave N	Robbinsdal	MN	55422
Stfanie Beniek	5211	31st Ave	Nokomis	MN	55417
Joe Benik	2555	29th Ave NE	St. Anthony	MN	55418
Stephanie Benjamin	435	Portland Ave	St. Paul	MN	55102
Ryan M. Benkert	7324	W 14th St	Saint Louis	MN	55426
Hailey Benner	3011	E 45th St	Mpls	MN	55406
Steve Bennett	507	College st	Northfield	MN	55057
Walt Bennett	2428	Jewel Ln N	Plymouth	MN	55447
Jack Bennett	4162	Brookside Ave	St Louis Pa	MN	55416
Emily Bennett	3605	Dupont Ave S	Mpls	MN	55405
Jenn Bennington	3084	Johnson St NE	Mpls	MN	55418
Tom Benolkin	2115	E. River Terr. #1(	St. Paul	MN	55108
Larry Benson	3218	Hayes St NE	Minneapol	MN	55418
Erik Benson	5736	Scenic Dr	Minnetonk	MN	55345
John Benson	4448	Vincent Ave S	Mpls	MN	55410
Laura Benson	3042	Arthur St NE	Minneapol	MN	55418
Adam & Linnea Benson	5015	Emerson Ave S	Minneapol	MN	55419
Bruce & Carol Benson	670	Green Meadow (	Northfield	MN	55057
J Benton	2605	Charlotte St	Roseville	MN	55113
Brent Benusa	1633	Maryland Ave S	St. Louis Pa	MN	55426
Jim Benz	1501	23rd Ave NE	Minneapol	MN	55418
Mary Sue Beran	18525	23rd Ave N	Plymouth	MN	55447
Gregory Berendt	5440	Fremont Ave S	Minneapol	MN	55419
Denise Berenguer	17908	Iverness Curve	Eden Prairi	MN	55437
Karin Berg	4211	Pleasant Ave S	Minneapol	MN	55409
Karrin Berg	2710	Florida Ave S	Saint Louis	MN	55416
Jim Berg	2210	Highland Pkwy	St. Paul	MN	55116
Lora Berg	3233	Hampshire Ave S	St. Louis Pa	MN	55416
Kim Berg	11259	Windrow Dr	Eden Prairi	MN	55344
Ryan Berg	520	Laredo Ln	Chanhasse	MN	55317
Jim Berg	4235	Quaker Ln	Plymouth	MN	55441
Marlene & Douglas Berg	4230	Jefferson St	Excelsior	MN	55331
Matthew Berg-Hall	212	Maple St	Northfield	MN	55057
Rick Berge	4937	Logan Ave S	Minneapol	MN	55419
Tom Berger	8211	W. 34th St.	St. Louis Pa	MN	55426
Marnie Berger	2836	Huron St	Roseville	MN	55113
John Berger	1532	Branston St	Saint Paul	MN	55108
Eric Bergerson	19100	Easton Rd.	Deephaven	MN	55391
Eric Berggren	1451	W. Minnehaha P	Minneapol	MN	55419
Amy Berggren	4905	34th Ave S	Minneapol	MN	55406
Brenda Berglund	3130	Rhode Island Ave	St. Louis Pa	MN	55426

Rick Berglund	4804	16th Ave S	Mpls	MN	55417
Beth Bergman	105	Cambridge St	Saint Paul	MN	55105
Mallory & Kerrim Bergstr	3450	Benjamin St NE	Minneapol	MN	55418
Joel & Rose Ann Bergstro	2080	Wheeler St N	Roseville	MN	55113
Ron Berkowitz	3015	Brunswick Ave S	St. Louis Pa	MN	55416
Jay Berlin	4210	Fremont Ave S	Mpls	MN	55410
Kathy Berlin	4421	46th Ave S	Minneapol	MN	55406
Cindy Berlonts	3748	46th Ave S	Minneapol	MN	55406
Carolyn Berman	1411	Tyrol Trl	Golden Val	MN	55416
Jeremy Berman	2625	Natchez Ave S	Saint Louis	MN	55416
Allen & Kathlene Bernard	3236	Lyndale Ave S	Minneapol	MN	55408
J Bernarde	5553	York Ave S	Edina	MN	55410
Eugene Berndt	6316	Meadowbrook B	St Louis Pa	MN	55416
Peter Berner	4617	Zenith Ave S	Mpls	MN	55410
Alison Bernhardt	2938	Hayes St NE	Minneapol	MN	55418
Chris Berrens	3929	Harriet Ave	Minneapol	MN	55409
Lois & Bruce Berry	618	Morgan Ave. S.	Minneapol	MN	55405
Tim Berthauve	3033	Florida Ave S	St. Louis Pa	MN	5413
Jennifer Bertram	5434	Vincent Ave S	Minneapol	MN	55410
John Bertrand	3318	Fillmore St NE	Mpls	MN	55418
Chaire Bertz	3028	Croft Dr	Minneapol	MN	55418
Laura Besonen	4905	38th Ave S	Minneapol	MN	55417
Jena & Mitchell Best	9220	Chowen Ave	Mpls	MN	55410
John Betcher	3040	E Minnehaha Pk	Minneapol	MN	55406
Maria Bethl	4223	Pillsbury Ave S	Minneapol	MN	55409
Savita Bettagliols	3925	21st Ave S	Minneapol	MN	55407
Rosemarie Bettele	4344	Lyndale Ave	Mpls	MN	55409
Deb & Tom Betz	13337	Avon St N	St. Paul	MN	55117
Ty Beucler	3317	Highland Ave	Wayzata	MN	55391
Fred Beukema	4218	20th Ave S	Minneapol	MN	55406
Julian Beulah	4030	Nicollet Ave S	Mpls	MN	55409
Alison Bey	2923	NE Fillmore	Minneapol	MN	55418
Marjorie Beyer	415	Winnetka Ave S	Golden Val	MN	55426
Derek Beyer	1414	Burke Ave W	Roseville	MN	55113
Evan Beyer	3900	Abbott Ave N	Robbinsdal	MN	55422
Judy Beyers	4151	Zarthan Ave S	St Louis Pa	MN	55416
Max Bezada	1322	Charles Ave	St Paul	MN	55104
S Bhardway	2210	Cedar Lake Pkwy	Minneapol	MN	55416
Stephen Bi	2407	Buchanan St, #2	Mpls	MN	55418
Grant Bielefeld	3848	Abbott Ave N	Robbinsdal	MN	55322
John & Betsy Bierman	409	Elm St	Northfield	MN	55057
Amelia Biewald	3755	Pillsbury Ave S	Minneapol	MN	55409
Amy Biewona	5804	Dale Ave	Edina	MN	55436
Lisa Bigaouette	3006	W. 43rd St.	Wedge	MN	55410
Lori Bigelow	3320	Kyle Ave N	Golden Val	MN	55422
Mark Bigham	4242	Chowen Ave N	Robbinsdal	MN	55422
Jackson Bigley	1664	Lexington Pl W	St Paul	MN	55108

Dylan & Emily Bijnagte	5416	Queen Ave S	Minneapol	MN	55416
Soren Bijnagte	5249	Zenith Ave S	Minneapol	MN	55410
Sue Bikowsky	2303	Standish St	St Paul	MN	55108
Cliff or Ume Bilger	1450	Englewood Ave	St. Paul	MN	55104
Tiffany Bills	5036	W 56th St	Edina	MN	55436
David Bine	2855	Joppa Ave	St. Louis Pa	MN	55416
Melanie Bing	4940	Knox Ave S	Mpls	MN	55410
Mackwi Bingh	18540	39th Ave N	Plymouth	MN	55446
Skye Bingham	3916	22nd Ave S	Minneapol	MN	55406
Martin Birch	3409	Fremont Ave	Minneapol	MN	55409
Susan Birdsey	3810	Glendale Ter	Minneapol	MN	55410
Melanie Birks	4940	Knox Ave s	Minneapol	MN	55419
Robert Birmingham	3009	Croft Dr	St. Anthony	MN	55418
Nancy Birth	3949	Grand Ave S	Minneapol	MN	55409
Alyssa Biscue	2900	33rd Ave NE	Mpls	MN	55418
Vivek Bisen	621	5th St SE	Minneapol	MN	55414
Patrick Bisenn	4419	Upton Dr	Mpls	MN	55410
Adrienne Bishop	3340	Grimes Ave N	St Paul	MN	55422
Debra Bistodeau	4290	Queen Ave S	Minneapol	MN	55410
Steve Bittick	1508	Oakwood Terr	Shoreview	MN	55126
Eli Bjerk	2635	Dupont Ave	Minneapol	MN	55408
Nancy Bjerke	4904	38th Ave S	Minneapol	MN	55417
Bruce Bjonleana	4317	Beard Ave S	Mpls	MN	55410
Yuliya Bjorgan	2408	26th Ave S	Mpls	MN	55404
David Bjork	1900	Mount Curve	Mpls	MN	55403
Julie Bjorklund	1105	Woodland Trl	Northfield	MN	55057
Bruce Bjoukuna	4347	Beard Ave S	Minneapol	MN	55410
Lawrence Black	4248	Vincent Ave S	Minneapol	MN	55410
Jen Blackburn	7383	170th St	Rosemount	MN	55068
John Blaine	1770	Princeton Ave	St Paul	MN	55105
GREG BLAIR	3925	27TH AVE S	Mpls.	MN	55407
Matt Blair	901	Kelly Ct	Chanhassen	MN	55317
Meghan Blair	3513	virginia Ave S	St. Louis Pa	MN	55426
Jennifer Blair	1414	Simpson St	Saint Paul	MN	55108
Lucy Blake	4024	Fordham Dr NE	Mpls	MN	55418
Diane Blake	5509	Glengarry Pkwy	Edina	MN	55436
Patricia Blakely	3449	Holmes Ave	Minneapol	MN	55408
Kristy & D Blakley	3251	Cleveland St NE	Mpls	MN	55418
Jane Bland	2507	Sherwood Hills R	Minnetonk	MN	55305
Dale Blassingham	3631	10th Ave S	Minneapol	MN	55407
Lori Blatzheini	271	Hidden Lane	Chanhassen	MN	55317
Bill Blegen	3985	St. Louis Rd.	Deephaven	MN	55391
Jeff Blodgett	1437	Chelmsford St	Saint Paul	MN	55108
Kristine Blomquist	208	Robie St W	Saint Paul	MN	55107
Joyce Blomquist	1980	Skillman Ave W	Roseville	MN	55113
Joni Blomquist	5308	York Ave	Minneapol	MN	55410
Sara Bloms	5436	Dupont Ave S	Mpls	MN	55419

Kevin Blong	6491	Devonshire Dr	Chanhassei	MN	55317
Sara & Alex Blood	1611	Pennsylvania Av	Golden Val	MN	55427
Kathleen Bloom	3236	Lyndale Ave S	Minneapol	MN	55408
Stephanie Bloom	1948	Garfield ST NE	Minneapol	MN	55418
Susan Bloom	4171	Dynasty Dr	Minnetonk	MN	55345
Randal Blower	4230	Harriet Ave	Minneapol	MN	55409
Keenan Bluisoen	4005	Quentin Ave	St Paul	MN	55416
David Blumberg	1614	Oregon Ave S	St Louis Pa	MN	55426
Chris Blume	1156	Woodcourt Ave	Shoreview	MN	55126
Dina Blumenfield	3811	Joppa Ave	St. Louis Pk	MN	55416
Lynn Blumenth	2615	Burnham Rd	Mpls	MN	
Tim Boatman	2408	Humboldt Ave S	Minneapol	MN	55405
John Bobolink	4921	31st Ave S	Mpls	MN	55406
Stephen Bockhold	529	N 43rd Ave E	Duluth	MN	55804
Norma Boe	400	Utah Ave S	Golden Val	MN	55426
Michael Boe	2674	Dean Pkwy	Minneapol	MN	55416
Lynn Boeck	4404	46th Ave S	Minneapol	MN	55406
Nick Boeke	2635	Boone Ave S	St. Louis Pa	MN	55426
Chuck Boeke	2522	Humboldt Ave	Mpls	MN	55405
Mitch Boerner	1285	Hague Ave	St Paul	MN	55104
Tom Boese	5209	Woodlawn Blvd	Minneapol	MN	55417
Nancy Boettcher	3311	E 52nd St	Minneapol	MN	55406
Dacia & Mark Boeyink	1301	Hamline Ave N	Saint Paul	MN	55108
Chud Bofenkamp	3735	Lyndale Ave	Minneapol	MN	55409
Jen Boggio	2115	22nd AVe Ne	Minneapol	MN	55416
Catherine Bogolub	1424	Lincoln	Saint Paul	MN	55105
Kevan Bohan	720	W. 53rd St	Minneapol	MN	55419
Mark Bohlig	1810	Fairfield Rd S	Minnetonk	MN	55305
Dave Bohlig	5805	Park Ave	Minneapol	MN	55417
James Bohn	515	Cretin Ave S	Saint Paul	MN	55116
Evan Boid	2855	E Lake of the Isle	Minneapol	MN	55408
Doug Boie	9903	Ann Ln	Minnetonk	MN	55305
Genevieve Bojado	1915	Sharon Ave SE	Mpls	MN	55414
Jennifer Boklewski	4236	Washburn Ave	Minneapol	MN	55410
Nicole Bokman	3440	Fremont Ave	Mpls	MN	55405
Richard Bokovoy	995	Robinhood Pl	Shoreview	MN	55126
Steve Boland	556	Selby Ave	St. Paul	MN	55102
Michael Boldon	502	ROSEVIEW WOO	ROSEVILLE	MN	55113
Jenny Bolduc	16608	Meadowbrook L	Minnetonk	MN	55391
Nancy Boler	3347	41st Ave S	Minneapol	MN	55406
Jean Boler	1725	Portland Ave	St Paul	MN	55104
Marie Boler	128	Montrose Pl	Saint Paul	MN	55104
Tish Bolger	1434	Simpson St	St. Paul	MN	55108
Char Bolla	12901	April Lane	Minnetonk	MN	55305
Bonnie Boller	4564	Saddlewood Dr	Minnetonk	MN	55345
Jo Bolles	3417	18th Ave S	Minneapol	MN	55407
Terry Bolling	3647	Lyndale	Minneapol	MN	55409

David Bolnick	3635	Chelmsford Rd	Mpls	MN	55418
Robert Bolstad	4354	Garfield Ave S	Minneapol	MN	55409
Christi & Rolf Bolstad	2447	Girard Ave S	Minneapol	MN	55405
Mindy Bolton	3620	Independent Ave	St Louis Pa	MN	55426
Ken Bolvin	2818	Ulysses St NE	Mpls	MN	55418
Matthew & Becky Bomby	4234	20th Ave S	Minneapol	MN	55407
Keane Bonath	3647	Hubbard Ave N	Robbinsdal	MN	55422
Paul Bondhys	2105	Indiana Ave Nort	Golden Val	MN	55422
A. Bonds	4521	York Ave N	Robbinsdal	MN	55422
John Bonle	3554	Humboldt Ave S	Mpls	MN	55408
Nick Bonow	2755	Holly Lane N	Plymouth	MN	55447
Mary Boo	4835	33rd Ave S	Minneapol	MN	55417
George Boody	2420	23rd Ave S	Minneapol	MN	55404
Jill & Jeff Boogrem	2925	E Minnehaha Pkv	Minneapol	MN	55417
Pamela Bookhout	3620	18th Ave S	Minneapol	MN	55407
Miles Boone	5000	Morgan Ave S	Minneapol	MN	55419
Rachel Booth	7261	Bren Ln	Eden Prairi	MN	55346
Bryan Bope	57	Upton Ave. S.	Minneapol	MN	55405
David Boquist	1197	Selby Ave	St Paul	MN	55104
Evan Borchert	1259	Hubbard Ave	St Paul	MN	55104
John Borgen	2206	Quebec Ave S	St. Louis Pa	MN	55426
Ellen & Nate Borgen	5320	27th Ave S	Minneapol	MN	55417
Mary Borgh	3233	Humboldt Ave S	Minneapol	MN	55408
Gena Borgmeier	9707	Janero Ct N	St. Paul	MN	55115
Tad Bornhoft	4000	Blaisdell Ave	Minneapol	MN	55409
Stacie Bortel	4100	Upton Ave S	Mpls	MN	55410
Maura Bosch	4327	Pillsbury Ave S	Minneapol	MN	55409
Darrell Bosell	1930	Stinson Blvd NE	Mpls	MN	55418
Annie & Steve Bosmans	3306	Benjamin Street	Minneapol	MN	55418
Carl & Nancy Bostrom	2165	Hartford Ave	Saint Paul	MN	55116
Molly Bott			Minneapol	MN	55416
Robert Botten	8045	Erie Ave	Chanhassen	MN	55317
Jackie Bouder	5344	Shoreview Ave	Mpls	MN	55417
Annette Bourne	3006	Hayes St NE	Minneapol	MN	55418
Emilie Bouvier	2232	Carter Ave, Apt 1	St. Paul	MN	55108
Paula Bovis	5328	32nd Ave S	Minneapol	MN	55417
Patty Bowe	1459	Holton Street	St. Paul	MN	55108
Matt Bower	999	Idaho Ave.	St. Paul	MN	55108
Amy Boxrud	914	St. Olaf Ave	Northfield	MN	55057
Robert Boyat	3511	W 25th St	Minneapol	MN	55416
Chris Boyko	2420	Sumter Ave S	Saint Louis	MN	55426
Jonathan Boylan	1420	St Clarir	St Paul	MN	55105
Lorraine Boyle	4007	Cedarwood Rd	St. Louis Pa	MN	55416
Brian Boyle	10961	32nd St N	Lake Elmo	MN	55042
Shannon Boynosky	4544	33rd Ave S	Mpls	MN	55406
M.F. Boyum	3113	Bell Ln	St. Anthony	MN	55418
Karen Boyum	5525	Saint Johns Ave	Edina	MN	55424

Ann Braden	616	Coventry Lane	Edina	MN	55435
Bethany Bradley	2713	W 84th St	Minneapol	MN	55410
Laurel Bradley	410	Winona St	Northfield	MN	55057
Stuart Bradt	3400	Skycroft Dr	St. Anthony	MN	55418
Laura Brady	4229	Ottowa Ave S	St. Louis Pk	MN	55416
Kit Brady	3410	Pleasant Ave	Minneapol	MN	55408
Bernard Brady	1423	Goodrich Ave	Saint Paul	MN	55105
Andrew Brager	1315	Everest Ln N	Plymouth	MN	55447
Howard Brahmstedt	4820	Harriet Ave	Minneapol	MN	55419
Bruce Brakeland	2554	W Lake of the Isl	Mpls	MN	55416
Kristi Brakken	1729	Logan Ave S	Minneapol	MN	55403
Lou Branca	1140	Laurel Ave	St. Paul	MN	55105
Martha Brand	1904	Humboldt	Minneapol	MN	55405
Mary Brandenberg	3627	Druid Ln	Minnetonk	MN	55345
B Brander	6411	Teton Lane	Chanhassei	MN	55317
Mike Brandes	6411	Teton Ln	Chanhassei	MN	55317
Francisco Brandon	975	East Como Blvd	St. Paul	MN	55117
Ben Brandriet	3500	Harriet Ave S	Mpls	MN	55408
Ron Brandt	2024	Texas Ave S	Saint Louis	MN	55426
Michael Brandt	2848	Georgia Ave S	Saint Louis	MN	55426
Kim & Jonathan Brandt	4252	Chowen Ave N	Robbinsdal	MN	55422
Jean Brandt	2600	Murray Ave	St. Anthony	MN	55418
Sandra Brandt	15609	Randall Ln	Minnetonk	MN	55345
Bill Braniff	4451	Como Ave S	Mpls	MN	55407
Rick Bransford	16085	21st Ave N	Plymouth	MN	55447
M Brant	5510	York Ave	Edina	MN	55410
Abigail Brantl	4072	Alabama	St Louis Pa	MN	55416
Troy Brantner	17010	30th Ave N	Plymouth	MN	55447
Patrick Brantseg	3015	Urbandale Ln	Plymouth	MN	55447
Priscilla Braun	19390	Park Ave	Deephaven	MN	55391
Cassie Braun	410	Union St	Northfield	MN	55057
Bruce Braun	205	Cecil St SE	Minneapol	MN	55414
Tim Braussen	8301	Virginia cir	St. Louis Pa	MN	55426
Mark Braver	2006	Girard Ave	Minneapol	MN	55405
Lore Brawnson	3501	St. Paul Ave	Mpls	MN	55416
Jessica Brayles	170	Maryland Ave	Golden Val	MN	55422
Tamara Bredemus	3800	Aldrich Ave S	Minneapol	MN	55408
Howard Breed	1923	Johnson Ave	Mpls	MN	55418
David Breeden	3424	Downers Dr NE	St. Anthony	MN	55418
Joel Breeggemann	2651	York Ave N	Robbinsdal	MN	55422
Wendy Breeke	2751	Benjamin St NE	Minneapol	MN	55418
Andrea Breen	3825	Aldrich Ave S	Minneapol	MN	55409
Jeana Brehnke	1414	Louisana Ave	Saint Louis	MN	55426
Linda Breitag	2415	E 22nd St	Minneapol	MN	55406
Ann Breitenfeldt	4281	Deerwood	Plymouth	MN	55441
Jesse Brekke	3404	Quebec Ave. S.	St. Louis Pa	MN	55416
Elizabeth Brekke	2925	E 24th St	Minneapol	MN	55406

Shannon & Henry Bremh	4010	Trenton Lane N	Plymouth	MN	55441
Liz Bren	5416	Clinton Ave S	Minneapol	MN	55419
Lynne Brennan	2345	Troy Lane	Plymouth	MN	55447
Emily Brennan	1169	Portland Ave	St Paul	MN	55410
Peter Brennan	4349	Fremont Ave S	Mpls	MN	55409
Miall Brennan	2313	22nd Ave S	Mpls	MN	55404
Barbara Brenner	2618	39th Ave S	Minneapol	MN	55406
Arlis Bresnahan	2949	Pierce St NE	Minneapol	MN	55418
Greg Brew	15000	Tammer Lane	Wayzata	MN	55391
Larry Brewer	7115	Quantico Ln N	Maple Gro	MN	55311
Dan Brewer	320	Natchez Ave N	Golden Val	MN	55422
Maria M. Brewer	320	Natchez Ave N	Golden Val	MN	55429
Wanda Breyer	1229	Iowa Ave. W.	Minneapol	MN	55108
Heidi Brezinica	3053	Little Bay Rd	Roseville	MN	55113
Michele Brezinski	4047	York Ave S	Minneapol	MN	55410
Patrick Brian	1406	Cimarron	Chanhasse	MN	55317
Nick Brierley	3640	16th Ave S	Mpls	MN	55407
John Brieschke	2518	Stinson Pkwy NE	Mpls	MN	55418
Katherine Brieze	2418	Lincoln St	Mpls	MN	55418
Karen Bright	4113	11th Ave S	Mpls	MN	55407
Barb Brik	5124	Chowen Ave S	Mpls	MN	55410
Lisa Brin	5509	Mirror Lake Dr	Edina	MN	55436
Lisa Brink	102	Elmwood Place E	Minneapol	MN	55419
Michael Brink	4741	Clinton Ave S	Mpls	MN	55419
Theresa Brinkhaus	10610	39th Ave N	Plymouth	MN	55441
Deb Brinkman	4327	Alabama Ave S	St. Louis Pa	MN	55416
Sara Brinla	3120	Hampshire Ave	St. Louis Pa	MN	55416
Havila Brisbois	4225	Alden Dr	Edina	MN	55424
Casey Briskin	229	Thomas Ave S	Minneapol	MN	55405
Ben & Megan Bristen	3230	Fillmore St NE	Mpls	MN	55418
Heather Britt	1959	Wellesley Ave	St. Paul	MN	55105
Patti Broagh	865	Tanglewood	Shoreview	MN	55126
Tyler Broback	2657 1/2	Humboldt	Mpls	MN	55405
Jordan Brockpahler	5333	29th Ave S	Minneapol	MN	55417
Deb Broderick	1434	Simpson St	St Paul	MN	55108
Becky Brodin	4932	Sheridan Ave S	Minneapol	MN	55410
Barbara Broen	1183	Ashland Ave	Saint Paul	MN	55104
John Broghammer	1527	14th Ave NW	New Bright	MN	55112
Julie Brokaw	5125	Baker Road	Minnetonk	MN	55343
Tom Broll	12400	Orchard Rd	Minnetonk	MN	55305
Holly Bronken	4328	29th Ave S	Mpls	MN	55406
Irene Bronken	4520	Redwood Cir	Minnetonk	MN	55345
David Brooks	770	Parkview Ave	St. Paul	MN	55117
Henry Brooks	400	Robin Ave	Robbinsdal	MN	55422
Leslie Brort	3218	Polk St Ne	Minneapol	MN	55418
Dennis Brose	3912	Chowen Ave S	Minneapol	MN	55410
Colin Broughaun	4349	30th Ave S	Nokomis	MN	55407

Sasha Brower	635	Ramsey St NE	Minneapol	MN	55413
Mary Brown	104	Madison St S	Northfield	MN	55057
Nathan Brown	1801	Independence A	St. Louis Pa	MN	55416
David Brown	5315	14th Ave S	Minneapol	MN	55417
Nick Brown	4623	Humboldt Ave	Mpls	MN	55410
David Brown	3411	Pleasant Ave S	Mpls	MN	55408
BONNIE BROWN	1047	ASTON CIR	BURNSVILL	MN	55337
Karen Brown	523	7th St SE	Mpls	MN	55414
Rebecca Brown	4200	Pleasant Ave S	Mpls	MN	55409
Kate Brown	3501	Girard Ave S	Mpls	MN	55408
Kevin Brown	4508	Drew Ave S	Mpls	MN	55410
Jeff Brown	2716	Kipling	St Louis pa	MN	55416
Margee Brown	835	County Rd Dr	Shoreview	MN	55126
Darlene Brown	4003	Morningside Rd	Edina	MN	55416
Anthony Brown	3111	Dupont Ave S	Mpls	MN	55408
Myles Brown	3121	Fremont Ave S, A	Mpls	MN	55408
Mark Brown	2009	Upton Ave S	Mpls	MN	55405
Marina Brown	4604	W 398th St	St Louis Pa	MN	55416
Bill Brown	4305	Aldrich Ave S	Minneapol	MN	55409
Andy Brown	1120	Skillman	Roseville	MN	55113
Natalie Brown	2285	University Ave W	Saint Paul	MN	55114
Joyce Brown	1346	E. Como Blvd	Saint Paul	MN	55108
Ione Brown	3060	Avon St N	Roseville	MN	55113
Brian Brown	2725	Quentin Ave S	St Louis Pa	MN	55416
Regina Browne	4822	33rd Ave S	Minneapol	MN	55417
Tim Brownell	3103	Dean Ct	Mpls	MN	55403
Margaret Browning	3628	Pleasant Ave	Mpls	MN	55409
Natasha Brownlee	117	Warwick Ave N	Mpls	MN	55414
Marcia Brucciani	1717	22nd Ave NE	Mpls	MN	55418
Jamie Bruemmer	8020	Hidden Ct	Chanhassen	MN	55317
Laurie & Barb Bruesehoff	2841	Lincoln St NE	Minneapol	MN	55418
Kellley Brugniti	10900	41st Ave N	Plymouth	MN	55447
Edith Brunier	4634	Bruce Ave	Edina	MN	55424
Erica Brunik	1048	Roma Ave	Roseville	MN	55113
Theresa Brunker	5016	Skyline Dr	Edina	MN	55436
Jennifer Brunn	17816	Powderhorn Dr	Minnetonk	MN	55345
Steph Bruns	8500	W 35th St	St. Louis Pa	MN	55426
David Bruscott	3334	Alabama Ave S	St. Louis Pa	MN	55426
Dwight Brusen	6601	Golden Ridge Dr	Eden Prairi	MN	55344
Matt Brusven	5358	26th Ave S	Mpls	MN	55417
Kristen Bruya	5328	James Ave S	Mpls	MN	55419
David Bryan	2222	6th St NE	Minneapol	MN	55418
David Bryan	2512	Euclid Pl	Minneapol	MN	55405
Loraine Bryant	5429	Vining Point	Minnetonk	MN	55345
K. Brylan	4639	Garfield Ave. S.	Minneapol	MN	55419
Tara Bubb	1454	Jersey Ave. S.	St. Louis Pa	MN	55426
Mark Buccella	2735	Irving Ave S	Minneapol	MN	55408

Jon Buce	3836	Aldrich Ave S	Minneapol	MN	55409
LYNNE & Gary BUCHER	1036	CARLTON DR	SHOREVIEV	MN	55126
Rachel & Spencer Bucher	2226	Lincoln St NE	Mpls	MN	55418
Lisa Buchli	182	W. Winifred	St. Paul	MN	55104
D Buchman	3809	Glenhurst	St. Louis Pa	MN	55416
Paige Buck	3609	33rd Ave NE	St. Anthony	MN	55418
Bob Buck	1494	Sargent	St Paul	MN	55105
Nora & Keith Buckley	1856	Draper Dr.	Roseville	MN	55113
Dorothy Buckman	4313	Camelot Dr	Minnetonk	MN	55345
Garrett Bucko	2304	24th Ave S	Minneapol	MN	55406
Steve Budas	3609	14th Ave S	Minneapol	MN	55407
Tim Budge	4106	Queen Ave S	Mpls	MN	55410
Kathleen Budge	4106	Queen Ave S	Minneapol	MN	55419
Sarah Budish	5116	Skyline Dr	Edina	MN	55436
Priscilla Bue	2201	Louisianna Ave S	Saint Louis	MN	55426
Jim Bueche	2232	Rosewood Ln S	Roseville	MN	55113
Joseph Buelow	1623	Selby Ave	St. Paul	MN	55104
Gilbert Buffington	3800	Huntington Ave	St. Louis Pk	MN	55416
Karen Buggs	745	Grand Ave #201	Saint Paul	MN	55105
Jon Buggy	14508	Woodhill Cir	Minnetonk	MN	55345
Ann Buhr	3601	46th Ave S	Minneapol	MN	55408
Vic Buhr	3916	Own West	Minneapol	MN	55409
Daniel Bujold	80	Hunters Ct	Chanhassei	MN	55317
Bill Bukovsan	817	Ashland Ave	Saint Paul	MN	55104
Barb Bullemer	4429	33rd Ave S	Mpls	MN	55406
Charlie Bulman	1426	Simpson St	St Paul	MN	55108
Mark Bundgaard	5145	Vincent Ave S	Minneapol	MN	55410
Jason Bunge	2803	Richardson St	Roseville	MN	55113
Marvin Bunnell	5221	Silver Maple Cir	Minnetonk	MN	55343
Rob Burch	1510	W 34th st	Minneapol	MN	55408
David Burck	5406	Newton Ave	Mpls	MN	55410
Timothy Burdell	2333	Parkwoods Rd.	St. Louis Pa	MN	55416
Steve Burdock	1427	Hague Ave	St Paul	MN	55104
Daniel Burges	3239	Polk	Mpls	MN	55418
John Burke	2116	Penn Ave S	Minneapol	MN	55405
J Burke	5315	Humboldt Ave S	Mpls	MN	55419
Molly Burke	2369	Doswell Ave	St Paul	MN	55108
Kathleen Burke-Scheffler	7410	Knoll St N	Golden Val	MN	55427
Terri Burks	2115	Aldrich Ave. S.	Minneapol	MN	55405
Gillian Burling	2538	Hayes St NE	Mpls	MN	55418
Carolyn Burn	97	Langford Park	St Paul	MN	55108
Jason Burners	9	Lincoln Ln	Northfield	MN	55057
Elizabeth Burns	4055	Yosemite Ave S	Saint Louis	MN	55416
Adam Burns	969	Santa Vera Dr	Chanhassei	MN	55317
Ian Burns	1140	Skillman	Roseville	MN	55113
Daniel Burow	3123	E 51st St	Minneapol	MN	55417
James Burpee	3208	Aldrich Ave S	Minneapol	MN	55408

Gjerry Burquist	4636	Washburn Ave S	Mpls	MN	55410
Elizabeth Burr	2025	Fairmount Ave	Saint Paul	MN	55105
Jonathan Burris	5324	Golden Valley Rc	Golden Val	MN	55422
Jon Burseth	3924	not legible	Mpls	MN	55418
Rich Burton	4157	18th Ave S	Mpls	MN	55407
Amanda Burtraw	1491	Brenner Ave	Roseville	MN	
Kansas Burtwell	167	West Island Ave	Minneapol	MN	55413
Jim & Karolyn Busacker	3109	Hilldale Ave NE	Mpls	MN	55418
Jill Buschmann	7873	Garland Lane N	Maple Gro	MN	55311
Laurie Bushbaum	4249	Linden Hills	Minneapol	MN	55401
John A. Bushnell	4604	Columbus Ave	Minneapol	MN	55407
Ellen Buskirk	2630	Alvarado Ln N	Plymouth	MN	55447
Gina Buss	4724	Emerson Ave. S.	Minneapol	MN	55419
Mary Buss	1445	Pascal St N	Saint Paul	MN	55108
Melissa Buss	3545	Glenhurst Ave	St. Louis Pa	MN	55416
Irene Bussjaeger	2946	Hamline Ave N	Roseville	MN	55113
Ralph Butkowski	952	Brenner Ave	Roseville	MN	55113
Ellen Butler	3846	Zenith Ave. S.	Minneapol	MN	55410
Lin Butler	5035	28th Ave S	Nokomis	MN	55417
Peter Butler	2140	Bayard Ave	St Paul	MN	55116
Rod Butrymonicz	2830	Aquila Ave S	St. Louis Pa	MN	55426
Dawn Buttera	659	Wilder St	St Paul	MN	55116
Robert Butterbrodt	1	Water Street We	Saint Paul	MN	55107
Abbi Butterfield	3024	Knox Ave S	Minneapol	MN	55408
M Butts	4097	Pillsbury Ave	Minneapol	MN	55409
Damian Butuer	2906	E26th St	Minneapol	MN	55406
Eliz Bye	1536	Asbury	St Paul	MN	55108
Jeff & Susan Byers	4123	Wooddale Ave S	Saint Louis	MN	55416
Otto Byhre	825	Summit Ave #50	Minneapol	MN	55403
Jim Byrne	700	W 96th	Chanhasse	MN	55317
James Byrne	883	Linwood Ave	Saint Paul	MN	55105
Beth C	6823	Newbury Rd	Woodbury	MN	55125
Sami C	1633	Nevada Ave S	St. Louis Pa	MN	55426
Sherry C	4150	Vincent Ave S	Mpls	MN	55410
J C	2145	Decatur Ave	Golden Val	MN	55427
Jim C	3583	Abbott Ave N	Robbinsdal	MN	55422
Laura C-King	2305	Taft St NE	Minneapol	MN	55418
David Ca	4101	Dupont Ave S	Mpls	MN	55409
Christian Caballes	3516	Pillsbury Ave	Minneapol	MN	55408
Holly Cabuay	4208	W 25th St	St Louis Pa	MN	55416
Jeff Cachat	3832	Kipling Ave	St Louis Pa	MN	55416
Stephen Cade	410	Riley Dr	Northfield	MN	55057
Bridget Caffrey	4713	Oakland Ave S	Mpls	MN	55407
Steve Cahlander	2630	Hayes St NE	Minneapol	MN	55418
Melissa Cahn	128	W 35th St	Mpls	MN	55408
Mageen Caines	3100	32nd Ave Ne	Minneapol	MN	55418
Cathy Calabrese	608	Terrace Ct	Roseville	MN	55113

Adrienne Caldwell	4125	Brookside Ave	St. Louis Pa	MN	55416
Roberta Calhier	2937	Hamlin	Roseville	MN	55113
Andy Calkins	2997	Chatsworth St	Roseville	MN	55113
Anna Calkon	7617	Nicholas Way	Chanhassei	MN	55317
Dawn Calkso	2315	Jewell Ln	South St. P	MN	55075
Stephen Callaghan	3532	Skycroft Dr	St. Anthony	MN	55418
B Callahan	201	Jansa Dr	Shoreview	MN	
Rachel Callanan	2316	Westridge Ln	St Louis Pa	MN	55416
Mike Callery	711	Orchard Pl	Northfield	MN	55057
Joanna Callonan	28	Circle W	Edina	MN	55436
Bill Cameron	1920	Drew Ave S	Minneapol	MN	55416
Michael Cameron	3148	Humbolt Ave S	Minneapol	MN	55408
Brent Cameron	14604	Harrington Pl	Apple Valle	MN	55124
Louise Cameron	1262	Skillman Ave W	Roseville	MN	55113
Jennifer Cammack	510	Lanewood Lane	Plymouth	MN	55447
Sarah Camp	3847	Zenith Ave N	Robbinsdal	MN	55422
Bruce Campbell	3108	Polk St Ne	Minneapol	MN	55418
Lisa Campbell	5433	28th Ave S	Nokomis	MN	55417
Charles Campbell	4644	1st Ave S	Minneapol	MN	55419
Dave Campbell	349	E 53rd St	Minneapol	MN	55419
Renee Campion	2158	Carroll Ave	St. Paul	MN	55104
Kat Cancilla	3941	Leslee Curve	Chanhassei	MN	55331
Matthea Canepa	3101	Bell Ln	St. Anthony	MN	55418
Bayley Cangan	2645	Idaho Ave	St. Louis Pa	MN	55426
Julie Caniglia	3800	W 52nd St	Mpls	MN	55410
Raquel Canihan	4101	Zenith Ave S	Mpls	MN	55410
Chris Cannis	4009	42nd Ave N	Robbinsdal	MN	55422
Alexander Cannon	2509	27th Ave NE	St. Anthony	MN	55418
Norbert Cannon	535	Lake Bay View Ct	Shoreview	MN	55126
Karen Canon	920	Angelo Dr	Golden Val	MN	55422
Ann Canpion	10369	Bluff	Eden Prairi	MN	55347
Kit Canright	2362	Carter Ave	Saint Paul	MN	55108
Susan Cantor	4240	Toledo Ave S	Minneapol	MN	55416
Zac Canyon	33	Queen Ave S	Minneapol	MN	55405
Marie Capouch	5152	Washburn Ave	Minneapol	MN	55410
Cynthia Caran	1112	Lupine Dr	Northfield	MN	55057
Deborah Cardner	296	Vincent Ave N	Minneapol	MN	55405
Mark Carignan	1920	Johnson St NE	Minneapol	MN	55418
Susan Carleton	2176	Randolph	Highland P	MN	55116
Dave Carlon	3180	Queensland Ln N	Minneapol	MN	55447
Charlene Carlotto	4835	W 40th Ln	St. Louis Pk	MN	55416
Hane & Joan Carlson	14216	Woodhaven Rd	Minnetonk	MN	55345
David Carlson	3444	Bryant Ave S	Minneapol	MN	55408
Frank Carlson	3206	Halglo Pl	Robbinsdal	MN	55422
Joa Carlson	1168	Thomas Ave	St. Paul	MN	55104
Mark & Mary Carlson	2803	OXFORD ST N	ROSEVILLE	MN	55113
Mitch Carlson	123	Cimarron Rd	Apple Valle	MN	55124

Johannah Carlson	4403	Branson St	Edina	MN	55424
Scott Carlson	820	Ivanhoe Dr	Northfield	MN	55057
Bjorn Carlson	2729	Webster Ave S	St. Louis Pa	MN	55416
Erin Carlson	4100	Colfax Ave	Mpls	MN	55409
Jenna Carlson	3319	Colfax Ave S	Mpls	MN	55408
Robin Carlson	1389	Grantham	St. Anthony	MN	55108
Steph Carlson	3331	Humboldt Ave S	Minneapol	MN	55408
Gary Carlson	1389	Grantham St	Saint Paul	MN	55108
Laura Carlson	5233	Park Ave	Minneapol	MN	55417
Dawn Carlson	4953	Upton Ave S	Minneapol	MN	55410
Carla Carlson	4956	Devaney St	St Louis Pa	MN	55416
Beth Carlson	4910	38th Ave S	Minneapol	MN	55417
Cory Carlson	16563	Grays Bay Blvd	Wayzata	MN	55391
Ben Carlson-Stehlin	886	Randolph Ave	St. Paul	MN	55102
Ann Carlson-Yunga	224	Sheridan Ave S	Minneapol	MN	55405
Margaret Carlyle	1495	Simpson St	St Paul	MN	55108
Jennifer Carnes	212	Morgan Ave S	Minneapol	MN	55404
Kate Carney	3350	Fillmore St NE	Mpls	MN	55418
Kristina Caro	2334	McKinley St NE	Minneapol	MN	55418
Marianne Carolan	4234	Dupont Ave S	Minneapol	MN	55409
Mark Caron	748	Cottage Ave W	St Paul	MN	55117
Kathy Caron	1021	Portland Ave	Saint Paul	MN	55104
Jennifer Carozza	3917	York Ave N	Robbinsdal	MN	55422
Susanne Carpenter	2514	Ulysses St NE	Minneapol	MN	55418
Carolyn Carpenter	2220	Springwood Rd	Wayzata	MN	55391
Kara & Aaron Carper	2630	Noble Ave N	Golden Val	MN	55422
Travis Carr	3219	Benjamin St Ne	Minneapol	MN	55418
James Carrent	1610	Pennsylvania Av	St. Louis Pa	MN	55426
David Carroll	4841	Zenith Ave S	Mpls	MN	55410
Katie Carrot	5309	28th Ave S	Minneapol	MN	55417
Amy & Evan Carruthers	2460	W 22nd St	Minneapol	MN	55403
Holly Carson	3511	14th Ave S	Mpls	MN	55407
Tara Carson	5515	Upton Ave S	Minneapol	MN	55410
Jessica Carter	6609	Scandia Rd	Edina	MN	55439
Angela Carter	3928	Van Nest Ave	Minneapol	MN	55409
Ann Cary	4309	28th Ave S	Minneapol	MN	55406
Paul Caryotakis	18615	29th Ave	Plymouth	MN	55447
Lisa CasaDeCalvo	3656	Hubbard Ave N	Robbinsdal	MN	55422
Savine Casar	19193	Poplar C	Eden Prairi	MN	55347
Steve Case	5260	Hillside Trl	Cottage Gr	MN	55016
Eileen Casey	1655	Bayard Ave	St. Paul	MN	55116
Daniel Casey	8616	W 25th St	St. Louis Pa	MN	55426
Eric Cason	2121	E 22nd St	Mpls	MN	55404
Bert & Maureen Caspers	2517	30th Ave S	Minneapol	MN	55406
Aaron Casselberry	10621	Pond Curve	Woodbury	MN	55129
Hannah Casselton	216	Dunlap St	St. Paul	MN	55105
Sean Casserly	4232	42nd Ave S	Mpls	MN	55406

Ed Cassidy	1511	Goodrich Ave	St. Paul	MN	55105
Gay Castle	5016	Morgan Ave S	Minneapol	MN	55419
James Catalfamo	4512	York Ave S	Minneapol	MN	55410
Cory Cater	8426	Stone Creek Dr	Chanhasse	MN	55317
Joel Cates	8116	Franklin Ave S	Saint Louis	MN	55426
C Catlins	4217	Harriet Ave	Mpls	MN	55409
Liane Cavanaugh	2537	Kipling Ave	St. Louis Pa	MN	55416
Peg Cavanaugh	1715	Eldridge Ave	Roseville	MN	55113
William Cayo	15102	Boulder Pt. Rd.	Eden Prairi	MN	55347
Rita M. Cech	2300	19th Ave NE	Minneapol	MN	55418
Jim & Pat Cedar	4305	Polaris Ln N	Plymouth	MN	55446
Anne Celander	1711	Palace Ave	St. Paul	MN	55105
James & Margaret Cellett	1528	Sargent Ave	Saint Paul	MN	55105
Rachele Cermak	2823	Hayes St NE	Minneapol	MN	55418
Casey Cervenka	5409	Wentworth Ave	Mpls	MN	55419
Catherine Cesnik	11825	26th Ave N	Plymouth	MN	55441
Matthew Chadwick	817	2nd St Ne	Minneapol	MN	55413
Rebecca Chaiken	6841	Point Dr	Edina	MN	55435
Aziza Chalbi	677	Terrace Dr	Roseville	MN	55113
Paul Chamberlain	3541	16th Ave S	Mpls	MN	55407
Anchalee Chambundabor	4020	Wasatch Ln	Golden Val	MN	55422
Stephanie Champ	3719	Lee Ave N	Robbinsdal	MN	55422
Wing & Brian Chan-Zache	6108	Minnetonka Blvc	St. Louis Pa	MN	55413
Mary Chandler	3901	Thomas Ave S	Minneapol	MN	55410
Cindy Chandler	2217	22nd AVe Ne	Minneapol	MN	55418
Ben Chandler	2711	McKinley St NE	Minneapol	MN	55418
Kevin Chang	2815	Lincoln St NE	Mpls	MN	55418
Karen Chang	4053	Bryant Ave S	Minneapol	MN	55409
Winston Chang	2012	Emerson Ave S	Minneapol	MN	55405
Ryan Chang	2636	Humboldt S	Minneapol	MN	55405
Lynette Chapin	17710	8th Ave N	Plymouth	MN	55447
Chris Chapman	9612	Chicago Ave	Bloomingto	MN	55420
Stephanie Chapman	2517	Parkview Blvd	Golden Val	MN	55422
Kendal Chapman	3901	Major Ave N	Robbinsdal	MN	55422
Karen & Bret Chaput	1500	Minnehaha Ave	Saint Paul	MN	55104
Ed Charboneau	2104	Glenhurst Rd	St Louis Pa	MN	55416
Matthew Charboream	1712	Ashland Ave	St. Paul	MN	55104
Rebecca Charles	4346	Ewing Ave N	Robbinsdal	MN	55422
David Chase	14500	34th Ave N	Chanhasse	MN	55317
Jessica Chase	5445	Fremont Ave S	Mpls	MN	55419
Timothy Chase	1391	Midway Pkwy	Saint Paul	MN	55108
Greg Chastain	4118	Blaisdell Ave S	Minneapol	MN	55409
JEAN CHASTAIN	3430	CHATSWORTH S	SHOREVIEV	MN	55126
Betsy (Elizabeth) R. Chast	4728	10th Ave S	Minneapol	MN	55407
Jean Chastan	3430	Chatsworte	Shoreview	MN	55126
Deirdre Chatfield	2200	Majestic Way	Chanhasse	MN	55318
Lisa Chatteerton	1855	E 38th St	Mpls	MN	55407

CLAUDIA CHAVES	4741	FOLWELL DR	Minneapol	MN	55406
Winston Chay	2012	Emerson Ave S	Mpls	MN	55405
Jennifer Chayer	1365	Sargent Ave	St Paul	MN	55105
Stuart Chazin	2615	Burnham Rd	Minneapol	MN	55416
Jerome Chazmea	2921	Raleigh ave S	St.louis Par	MN	55416
Terrence (Terry) Check	3523	Harriet Ave	Minneapol	MN	55408
Charles & Jan Chell	3305	Glenhurst Ave	St. Louis Pk	MN	55416
Nels Chella	4144	CR 101	Minnetonk	MN	55345
Ping Chen	772	Cottage Place	Shoreview	MN	55126
Jerry Chen	18905	38th Ave N	Plymouth	MN	55446
Susan J. Cheney	1384	Como Blvd E	Saint Paul	MN	55117
Renee Cheng	1512	W. 26th St.	Minneapol	MN	55405
Tammy Cheng	1176	Marshall Ave	St Paul	MN	55104
CLERO CHENU	4553	45th AVE S	POWDERH	MN	55419
Juliette Cherbuliez	1466	Hythe St	St Paul	MN	55108
Oumar Cherif	3133	James Ave S	Minneapol	MN	55408
Chris Cherryhomes	335	Busch Ter	Minneapol	MN	55419
Sarah Cherveny	319	Elmwood Dr	Minneapol	MN	55419
Mary Chesin	17051	Lake St	Minnetonk	MN	55345
Lauren Chesnut	1685	W Taylor Ave #2	St. Paul	MN	55104
Larry & Melody Chestler	5117	Mirror Lakes Dr	Edina	MN	55436
Judi Chevalier	2920	Ellsworth lane	Minnetonk	MN	55305
Pang Chiar Yang	1265	Idaho Ave W	Saint Paul	MN	55108
James Chick	236	Bedford St	Mpls	MN	55414
Joan Childers	2951	Chowen Ave	Robbinsdal	MN	55422
Kip Childers	3520	W 46th St	Minneapol	MN	55410
Jey Chin	2942	Boone Ave S	St. Louis Pa	MN	55426
Conrad Chin	4425	Douglas Ave	Golden Val	MN	55416
Corey China	2623	Irving Ave S	Minneapol	MN	55405
Jill & Colin Chisholm	2116	Roblyn Ave	Saint Paul	MN	55104
Tom Chismar	5632	Girard Ave S	Minneapol	MN	55419
Bryan Chitwood	1657	Lincoln Ave	St Paul	MN	55105
George Chlebecek	3709	46th Ave S	Minneapol	MN	55406
Kathryn & Anthony Chleb	3409	Sumter Ave S	Saint Louis	MN	55426
Thinley Choedon	4232	Pillsbury Ave S	Mpls	MN	55409
Carol Chomsky	1900	Kenwood Pkwy	Minneapol	MN	55405
Jessica Chorney	1123	W Minnehaha Pl	Minneapol	MN	55419
Alexia Chrisan	3809	Chowen Ave S	Minneapol	MN	55410
Katy Christensen	4121	Linden Hills Blvd	Mpls	MN	55410
David Christensen	3522	Holmes Ave	Mpls	MN	55409
Ashley Christensen	4132	19th Ave S	Mpls	MN	55407
Chris Christensen	3436	Aldrich Ave S	Mpls	MN	55408
Jennifer Christensen	2520	22nd Ave NE	Minneapol	MN	55418
Dana Christensen	5043	38th Ave S	Minneapol	MN	55406
Ann Christensen	4515	Browndale Ave	Edina	MN	55424
Daniel Christenson	2926	Tyler St NE	Mpls	MN	55418
Steve Christenson	3715	Glendale Terr	Mpls	MN	55410

Ashley Christenson	10990	40th Pl N	Plymouth	MN	55447
Jeff Christenson	1482	Lincoln Ave	St. Paul	MN	55105
Scott Christie	1741	Portland Ave	St. Paul	MN	55104
Mark Christman	2664	McNair Dr	Robbinsdal	MN	55422
Carol Christo	1837	Hayes St NE	Mpls	MN	55418
Alex Christopherson	3229	Girard ave	Mpls	MN	55405
Suzannah Ciernia	41	Fareway Dr	Northfield	MN	55057
Alex Ciesielski	3839	Blaisdell Ave	Mpls	MN	55408
Amelia Cihacek	2963	Asbury St	Roseville	MN	55113
Madalyn Cioci	4006	York Ave S	Minneapol	MN	55410
Curtis Cischerns	6210	Plum Tree Ave	Chanhasse	MN	55331
Nicole Claeson	5028	Gladstone Ave. S	Minneapol	MN	55419
Craig Claflin	5865	Creek Valley Roa	Edina	MN	55439
Sarah Claim	81	Cooper Ave	Edina	MN	55436
Doron and Molly Clark	1914	Ulysses St NE	Minneapol	MN	55418
Michael Clark	2610	Shadyview Ln N	Plymouth	MN	55447
StepANIE Clark	2161	Juliet Ave	St. Paul	MN	55105
Pat Clark	3900	Bloomington Ave	Mpls	MN	55407
Michele Clark	4127	Colorado Ave S	St. Louis Pa	MN	55416
Sarah Clark	2354	Chilcombe Ave	St Paul	MN	55108
Amy Clark	3955	Sunnyside Rd	Edina	MN	55416
Tom Clark	1440	Summit Ave	St Paul	MN	55105
Katie Clark	2975	Fairchild	Minnetonk	MN	55391
Kelly Clark	3433	Aldrich Ave S	Minneapol	MN	55408
Jon Clark	4745	Washburn Ave S	Minneapol	MN	55410
Lisa Clark	575	Mount Curve Blv	Saint Paul	MN	55116
Whitney Clark	1077	Fairmount Ave	Saint Paul	MN	55105
Tonie Clarke	495	Fronlenac Pl	St. Paul	MN	55104
Lynette Clarke	3025	Croft Dr	Minneapol	MN	55418
Christie Clarke	501	3rd St E	Northfield	MN	55057
Steve Clarke	5117	Windsor Ave	Edina	MN	55436
Sue Clarke	807	Saint Olaf Ave	Northfield	MN	55057
Rachel Claseman	2716	Abbott Ave N	Robbinsdal	MN	55422
Mary Jo Clasen	1439	Goodrich Ave	St Paul	MN	55105
Joe Claus	998	Linwood Ave	Saint Paul	MN	55105
Paul Clausen	3124	10th Ave S	Minneapol	MN	55407
Roberta Clausen	13277	Huntington Terr	Apple Valle	MN	55124
Dain Clausen	2616	Lynn Ave S	St Louis Pa	MN	55416
Lynette & Jim Clausen	1540	E Minnehaha Pkv	Minneapol	MN	55417
Ty Clawson	3612	Blaisdell Ave	Mpls	MN	55408
Steve or Amy Clay	4137	York Ave S	Minneapol	MN	55410
Katherine Clayton	4452	46th Ave S	Minneapol	MN	55406
Kate Clayton	341	Pascal St S	Saint Paul	MN	55105
Marilyn Clayton	5725	Westbrook Rd	Golden Val	MN	55422
Lloyd Cledwyn	1736	Lincoln Ave	Saint Paul	MN	55105
Deborah (Deb) Clemmen	3525	Irving Ave S	Minneapol	MN	55408
Crystal & Adam Clevelan	2637	Idaho Ave S	Saint Louis	MN	55426

Steven & Laurel Clift	3211	E 44th St	Minneapol	MN	55406
Lowell Clingman	1371	Charles Ave	Saint Paul	MN	55104
Lisa Clinton	9900	Deerbrook Dr	Chanhassei	MN	55317
Sarah Clinton-McCauslan	3116	Dupont Ave S	Mpls	MN	55408
Roy Close	2740	Chowen Ave. S.	Minneapol	MN	55416
Jennifer Closner	826	Nebraska Ave W	Saint Paul	MN	55117
John Clouse	767	Timber Lane	Shoreview	MN	55126
Sarah Clowes	3151	Cleveland Ave N	Minneapol	MN	55418
Cathy Clyde	2136	Juliet Ave	Saint Paul	MN	55105
Ben Clymen	2933	Crestview Dr	Minneapol	MN	55418
Bradley Clyne	5417	27th Ave S	Nokomis	MN	55417
Bernardo Co	3318	Holmes Ave S	Mpls	MN	55409
Jaco Coats	2323	27th Ave S	Mpls	MN	55404
Janelle Cody	2147	Rosewood Ln N	Roseville	MN	55113
Gary Coen	4340	Briarwood Dr	Minnetonk	MN	55343
Angella Coffee	1827	Draper Dr	Roseville	MN	55113
Jane Coffey	4700	W 29th St	St Louis Pa	MN	55416
Evelyn & Pat Coffey	5615	Dale Ave	Edina	MN	55436
Stan Coffin	2100	Indiana Ave N	Golden Val	MN	55422
Jay Coggins	1509	Hythe St	St Anthony	MN	55108
Barry Cohen	1750	Ashland Ave	Saint Paul	MN	55104
Adina Cohen	2742	Raleigh Ave	Saint Louis	MN	55416
A Cohn	3435	Zircon ln N	Plymouth	MN	55447
Michele A. Cohn	1440	Sargent Ave S	Saint Paul	MN	55105
Mary & Peter Cole	1381	Summit Ave	Saint Paul	MN	55105
Kordula Coleman	3414	Buchanen St. NE	Minneapol	MN	55418
Lori Coleman	6540	Devonshire Dr	Chanhassei	MN	55317
Kim Coleman	2222	Roosevelt St NE	Mpls	MN	55418
Joey Coleman	463	Lafayette Ave	St Paul	MN	55116
Bruce Coles	5600	Highwood Dr.	Edina	MN	55436
Kristina Coles	2235	Roosevelt St NE	Minneapol	MN	55418
sheila Colgan	2017	Girard Ave S	Mpls	MN	55403
Michael Colicchia	5005	Oliver Ave S	Minneapol	MN	55419
George Coller	4907	Upton Ave S	Mpls	MN	55410
Maureen Colleran	2761	Zenith N	Robbinsdal	MN	55422
Marilyn Collier	6701	Lake Shore Dr S	Richfield	MN	55423
W.A. Collins	2010	Ferris Ln	Roseville	MN	55113
Karen Collins	4451	Upton Ave S	Minneapol	MN	55410
Travis Collstien	11600	Park Ridge Dr	Minnetonk	MN	55305
Barbara Colvin	2811	Aquila Ave S	Saint Louis	MN	55426
Hugo Comacho	3812	Steven Ave S	Minneapol	MN	55409
J Comb	6023	Pinewood Ln	Minnetonk	MN	55345
Sarah Combellick - Bidne	4035	25th Ave S	Mpls	MN	55406
Becky Comstock	21	W. Langford Pk	St. Paul	MN	55311
Virginia Cone	1475	Hague Ave	St Paul	MN	55104
Thomas J. Conley	5209	Morgan Ave S	Minneapol	MN	55419
Nicholas & Colin Connel	1920	E 38th St	Minneapol	MN	55407

Eric Connelly	2705	E Minnehaha Pk	Nokomis	MN	55406
Geri Connelly	477	Curfew St	Saint Paul	MN	55104
Tyson Conner	2941	Hillsboro Ave	St. Louis Pa	MN	55426
Clint Conner	2111	Humboldt Ave S	Minneapol	MN	55405
Chris Connery	6440	Buetton Way	Chanhasse	MN	55317
Thomas Conney	1451	N Hamline Ave	St. Paul	MN	55108
Kelly Connole	315	Oak St	Northfield	MN	55057
Mary & Michael Connolly	257	Upton Ave S	Mpls	MN	55405
James Connor	2109	Irving Ave S	Mpls	MN	55408
John Conorley	5015	Abbott Ave S	Minneapol	MN	55410
Dan Conrad	5011	Newton Ave S	Minneapol	MN	55419
Marcy Conrad Nutt	3107	Cleveland St NE	Minneapol	MN	55418
Patty Conroy	9921	Deerbrook Dr	Chanhasse	MN	55317
Joshua Conroy	3332	Lyndale Ave S	Minneapol	MN	55408
Jason Constein	937	Laurel Ave	Saint Paul	MN	55104
Jan Converse	4801	York Ave S	Minneapol	MN	55410
Xan Converse	408	Prospect	Mpls	MN	55414
Mike Conway	2355	Aquila Ave N	Golden Val	MN	55427
Mary Conway	1478	Minnehaha Ave	Saint Paul	MN	55104
John Cook	2811	Dean Pkwy	Minneapol	MN	55416
Dana Cook	5016	13th Ave S	Mpls	MN	55419
Andy Cook	2374	Valentine Ave	St. Paul	MN	55311
Elsie Cook	3829	Crescent View	Duluth	MN	55804
Clay Cook	2550	38th Ave S	Mpls	MN	55406
A Cook	21	Langford Pl	St Paul	MN	55108
Lucia Cook	2022	Princeton Ave	St Paul	MN	55015
Robyn Cook	3443	S Holmes	Minneapol	MN	55408
Mimi Cook	3606	Pleasant Ave	Minneapol	MN	55409
Robert Cooley	814	Holly Ave	Saint Paul	MN	55104
Sharon Coombs	3400	Owasso St	Shoreview	MN	55126
Michael Coomes	686	Fairmount	St. Paul	MN	55105
Cathy Coon	4426	Nawadaha Blvd	Mpls	MN	55406
Sarah Coonan	5048	Morgan Ave S	Mpls	MN	55410
Janet Cooper	3395	144th St W	Rosemount	MN	55068
Craig Copley	1142	Oakcrest Ave	Roseville	MN	55113
Jason Coppini	2238	Arthur St NE	Mpls	MN	55418
Scott Corbett	2724	Yosemite Ave S	St. Louis Pa	MN	55416
Chad Corbin	1516	Sherwood Rd	Shoreview	MN	55126
Matthew Corcoran	2238	Arthur Ne	Minneapol	MN	55418
Ken Corens	18545	Lake Ave	Wayzata	MN	55391
Oling Coretnro	3222	France Ave N	Robbinsdal	MN	55422
Marlo Corletto	4609	Cedar Ave S	Mpls	MN	55417
Paul Corman	17115	9th Ave N	Plymouth	MN	55447
Mike Corneille	3221	Townview Ave N	Minneapol	MN	55418
Colette Cornish	890	Parkview Ave	Saint Paul	MN	55117
Cathy Corrigan	4504	46th Ave S	Minneapol	MN	55406
Angel Cortes	1401	Nevada Ave S	St. Louis Pa	MN	55426

Frances & Gregg Corwin	210	Nevada Ave S	Golden Val	MN	55427
Shannon Cory	5315	Colfax Ave S	Minneapol	MN	55419
Cathy Cory	128	W 36th St	Minneapol	MN	55408
Stephanie Cosgrove	1530	Oakwood Ter	Shoreview	MN	55216
Tyler Cosgrove	232	Penn Ave	Minneapol	MN	55404
Kim Costello	3217	Garfield Ave	Minneapol	MN	55408
Anne Cothran	5911	Oxford St	St. Louis Pa	MN	55410
Stephen Cottingham	221	Cedar Lake Rd S	Minneapol	MN	55405
Sasha Cotton	762	Laurel Ave	St. Paul	MN	55104
Sherry Coudret	24	Fareway Drive	Northfield	MN	55057
Rob Couforor	3636	Bryant Ave S	Minneapol	MN	55408
Kelly Coughlin	5505	Shoreview Ave S	Mpls	MN	55417
Carly Coughlin	2106	E. 35TH ST	Minneapol	MN	55407
Bradley Coulthart	4201	27th Ave South	Minneapol	MN	55406
Dixie Courant	531	Curfew St	Saint Paul	MN	55104
Sam Courey	1551	Pennsylvania Av	Golden Val	MN	55427
Sara Courneya	3316	Sumter Ave S	St. Louis Pa	MN	55426
Kyle Courtney	1305	Dunkirk Ln	Plymouth	MN	55447
Dennis Cousins	14007	Flagstone Trl	Apple Valle	MN	55124
Danelle Coutts	1701	Pennsylvania Av	Golden Val	MN	55427
Martha Coventry	4612	Upton Ave S	Minneapol	MN	55410
Keith and Judith Covey	611	St. Olaf Ave.	Northfield	MN	55057
William Cowan	13105	37th Ave N	Plymouth	MN	55441
Dana or Bob Cowan	5212	Chowen Ave S	Minneapol	MN	55410
Anne & Bruce Cowie	5107	Emerson Ave S	Minneapol	MN	55419
Dave Cowly	3749	Glenhurst Ave S	Saint Louis	MN	55416
Tom Cox	4036	Utica Ave	St. Louis Pa	MN	55416
Dane Cox	2644	Vernon Ave	St. Louis Pa	MN	55416
J. Marcus Cox	1996	Carroll Ave	St Paul	MN	55104
Craig Cox	4521	45th Ave S	Minneapol	MN	55406
Elyse Cox	4132	Bryand Ave S	Minneapol	MN	55409
Mike Crabtree	3641	Aldrich Ave S	Mpls	MN	55408
Kevin Cragg	4906	Johnson Ave	White Bear	MN	55110
Brian Craig	4408	Washburn Ave S	Mpls	MN	55410
Katie Craig	4600	45th Ave S	Mpls	MN	55406
Heather & Lindsey Craig	2746	Hayes St NE	Minneapol	MN	55418
Katherine Cramer	2845	Inglewood Ave S	St Louis Pa	MN	55416
Marilyn Cramolini	4219	Linden Ave S	Mpls	MN	55410
Peter Cran	5227	Oaklawn Ave	Edina	MN	55424
Eugene Crandell	1397	Belmont Ln	Roseville	MN	55113
Ruth H. Crane	888	Cannon Valley D	Northfield	MN	55057
Anton Crane	501	W Franklin Ave A	Minneapol	MN	55405
Marlee Crave	807	West 28th St	Minneapol	MN	55408
Carole Cravens	4814	29th Ave S	Mpls	MN	55417
Gary Crawford	5054	Vincent Ave S	Minneapol	MN	55410
Frederick Crea	1609	E River Ter	Minneapol	MN	55414
Mary Creswell	4020	Forestview Ln N	Plymouth	MN	55442

Renee Crichlow	3914	Crystal Lake Blvc	Robbinsdal	MN	55422
Erik Crillion	4840	28th Ave S	Mpls	MN	55417
Jill Crimmings	4082	Brookside Ave	St Louis Pa	MN	55416
Tim Crimmins	5117	Skyline	Edina	MN	55436
Pat Croal	5555	Grand Ave S	Minneapol	MN	55419
Nancy Crocker	2432	W 24th St	Minneapol	MN	55405
Nicole (Nikki) Cron	5416	Girard Ave S	Minneapol	MN	55419
Thomas Cronmiller	2438	35th Ave S	Mpls	MN	55406
Anne Cronmiller	2312	31st Ave S	Minneapol	MN	55406
Al Croone	812	Nevada St.	Northfield	MN	55057
Winnie or Scott Crosbie	4349	Brookside Ave	St Louis Pa	MN	55436
Lesley Crosby	3965	Princeton Ave	Saint Louis	MN	55416
Megan Crosby	1408	Como Ave	St. Paul	MN	55108
Colleen Crosby	7443	Pillsbury Ave S	Richfield	MN	55423
John Crosby	600	S 2nd St Apt 103	Minneapol	MN	55401
Gayle Crose	2108	Glenhurst Rd	St. Louis Pa	MN	55416
Shana Crosson	1881	Shryer Ave W	Roseville	MN	55113
Barbara Crouter	808	2nd St E	Northfield	MN	55057
Bennet Crow	3017	Florida Ave S	St. Louis Pa	MN	55416
Jutta Crowder	364	Mount Curve Blv	Saint Paul	MN	55105
MP Crummer	900	Fernbrook	Plymouth	MN	55447
Martha Crump	904	Arlington Ave W	Saint Paul	MN	55117
Joe Crushy	1950	Wellesley Ave	St Paul	MN	55105
Melvin Cruz	1860	Gluek Lane	Roseville	MN	55113
Rana Cuccia	4916	Garfield Ave	Minneapol	MN	55419
Teige Cudahy	2323	Standish St	St Paul	MN	55108
Norma Cuderme	690	Tanglewood Dr	Shoreview	MN	55126
Gary Cugh	1391	Brompton	St Paul	MN	55108
Theresa Culhane	3511	Cleveland St NE	Minneapol	MN	55418
Jennifer Cullen	14062	Dartmouth Path	Rosemount	MN	55068
Crystal Cullerton-sen	3357	E. Calhoun Pkwy	Mpls	MN	55409
Janice Culnane	2635	Kipling Ave	St Louis Pa	MN	55416
Nick Culp	2025	22nd Ave NE	Mpls	MN	55418
Marla Cumming	4254	Queen Ave. S.	Wedge	MN	55410
Anita Cummings	981	Arbogast St	Shoreview	MN	55126
Lyssa & Scott Cummings	1253	Skillman Ave W	Saint Paul	MN	55113
Megan Cummings-Kruege	5109	Oliver Ave S	Minneapol	MN	55419
Erin Cuneo	3019	E. 1st St.	Duluth	MN	55812
Jesse Curtis	3221	Hampshire Ave S	St. Louis Pa	MN	55416
Sharon and Todd Curtis	2023	Sargent Ave	Saint Paul	MN	55105
Edward & Carolyn J. Cush	3031	Simpson St	Roseville	MN	55113
Jim Cushman	2230	Mckinley St Ne	Minneapol	MN	55418
Sarah Cusick	4617	Beard Ave S	Minneapol	MN	55410
Deb & Kent Cutkomp	5224	Vincent Ave S	Minneapol	MN	55410
Jane & Steve Cutler	5127	Belmont Ave S	Minneapol	MN	55419
Judy & John Cutler	3653	17th Ave S	Minneapol	MN	55407
Ruth Cvego	5425	York Ave S	Edina	MN	55410

Timera Cyr	1263	St Claire Ave	Saint Paul	MN	55105
Rachel Cyril	1811	W 49th St	Minneapol	MN	55419
Doug Czaplicki	1987	Stanford	St. Paul	MN	55105
Scott Czornik	2311	Brant Ave S	Minneapol	MN	55405
GINA & Cory CZUPKAG	3522	13TH AVE S	POWDERH	MN	55407
Mary D	1156	Iowa Ave W	St. Paul	MN	55108
Laura D	5008	W 40th St	St. Louis Pa	MN	55416
Paul D				MN	
Toni Dachis	4000	W 25th St	St Louis Pa	MN	55416
Jim Dade	2800	Robbins St	Mpls	MN	55410
Rachel Dahl	4666	Oat St N	Shoreview	MN	55126
Laurie Dahl	4255	Kingsview Ln N	Plymouth	MN	55446
Ken Dahlager	10586	Estate Dr	Eden Prairi	MN	55347
Thaddeaus & Carmen Dal	1927	Benjamin St NE	Minneapol	MN	55418
Beth & Kevin Dahle	2311	Greenfield Dr E	Northfield	MN	55057
Marv Dahlgren	3015	High Point Curv	Roseville	MN	55113
Chris Dahlin	223	Cedar Lake Rd S	Minneapol	MN	55405
Matt Dahlman	126	W 49th St	Minneapol	MN	55419
Amir Dahm	2243	Fairmount Ave	St Paul	MN	55105
Mike Daigh	525	Montrose Ln	Highland P	MN	55116
Sam Daigle	1537	E 137th St	Mpls	MN	55407
Tom H. Dair	615	7th SE	Minneapol	MN	55414
Rebecca Daives	3404	Maplewood Dr	Minneapol	MN	55418
Bilisie Daka	1218	Edmund Ave	St Paul	MN	55104
Heather Daldoul	6321	Greenbriar Ave	Chanhasse	MN	55331
Knuda Dalgaard	614	E 5th St	Northfield	MN	55057
Chris Dalhor	2950	Lincoln St NE	Minneapol	MN	55416
Corinne Dallas	2305	24th Ave. S.	Minneapol	MN	55404
Tim Dalton	4521	34th Ave S	Mpls	MN	55406
Don Damond	5024	Washburn Ave	Mpls	MN	55410
Mike Damron	4238	Pleasant Ave	Minneapol	MN	55409
Mike Dan	2814	Huntington Ave	St Louis Pa	MN	55416
Robert Dana	4516	18th Ave S	Minneapol	MN	55407
Teri & Dan Danckwart	3456	Benjamin St NE	Minneapol	MN	55418
Kathy Dand	4330	Tyrol Crest	Golden Val	MN	55416
Andy Danellen	2029	Sheridan Ave S	Mpls	MN	55405
Jonathan Danery	3929	Aldrich Ave S	Mpls	MN	55409
Kathleen Daniels	4215	31st Ave S	Minneapol	MN	55406
Christine Danielson	1710	Palace Ave	Saint Paul	MN	55105
Colleen Daniewier	9529	Hillingdon Rd	Woodbury	MN	55125
Andrea & Michael Danko	1077	Church Cir	Shoreview	MN	55126
Dorothy Ann Danley	1483	Hague Ave	Saint Paul	MN	55104
Claudia Danneker	1794	Vivian Ln	Minneapol	MN	55419
Jerry Dant	2932	Old Hwy 8	St. Anthony	MN	55418
Debbie Danulson	3217	Sumter Ave S	St. Louis Pa	MN	55426
Pierre Daphnee	3689	Hubbard Ave N	Robbinsdal	MN	55422
Deborah Dapkus	2821	Mckinley St. NE	Minneapol	MN	55418

Michael Darger	3455	Hayes St NE	Minneapol	MN	55418
Anne Darlington	5329	Penn Ave S	Minneapol	MN	55410
Douglas Dart	280	Vincent Ave N	Minneapol	MN	55405
Kelly Dash	2000	Girard Ave S	Minneapol	MN	55405
Misha Dashersky	1494	Branston St	St. Paul	MN	55105
Deodat Datt	2729	Georgia Ave S	St. Louis Pa	MN	55426
John Davenport	2012	Drew Ave S	Minneapol	MN	55403
Allison & Eric David	5028	Nicollet Ave	Minneapol	MN	55419
Becky Davies	3409	Maplewood Dr	St. Anthony	MN	55418
Rich Davies	1795	Portland Ave	St. Paul	MN	55104
Tes Davies	18290	Dave Ct	Eden Prairi	MN	55437
Betsy Davies	2018	Portland Ave	Saint Paul	MN	55104
Sebastian Davin	797	Hague Ave	St. Paul	MN	55104
Nora Davis	6921	Southdale Rd.	Edina	MN	55435
Brinsley Davis	2920	44th Ave S	Minneapol	MN	55406
Jim Davis	3701	Orchard Ave N	Robbinsdal	MN	55422
Tom Davis	3901	York Ave S	Minneapol	MN	55407
Isacc Davis	3928	Fordham Dr NE	Mpls	MN	55418
Andrew Davis	3341	Virginia Ave	St. Louis Pa	MN	55426
Paul Davis	3512	Zihran Ave	St Louis Pa	MN	55426
Nick Davis	9301	W 18th	St. Louis Pa	MN	55426
Tom Davis	2832	Silver Lake Rd	st. Anthony	MN	55418
Venke Davis	2017	Drew Ave S	Mpls	MN	55416
Alexandra Davis	137	Cecil St SE	Mpls	MN	55414
Addie Davis	2217	25th Ave S	Mpls	MN	55404
Julia Davis	2810	Xenwood Ave S	Minneapol	MN	55416
Olwen Davis	4912	Zenith Ave S	Minneapol	MN	55410
Thomas Davis	3901	York Ave S	Minneapol	MN	55410
Jeannie Davisson	2712	Dakota Ave S	St. Louis Pa	MN	55413
Joseph Dawinn	467	Holly Ave	St. Paul	MN	55102
Rene & David Dawis	229	Bedford St SE	Minneapol	MN	55414
Jeanne Dawn	4809	W Princeton Ave	St Louis Pa	MN	55416
Lucas Dawson	6221	Elm Tree Ave	Chanhassen	MN	55331
Keith Dawson	1850	Goodrich Ave	St Paul	MN	55105
Mel Day	3134	Cleveland St NE	Minneapol	MN	55418
Catherine Day	2168	Sargent Ave	Saint Paul	MN	55105
Leni de Mik	4140	Drew Ave S	Minneapol	MN	55410
Stephanie Dean	3441	16th Ave S	Mpls	MN	55407
Laura Dean			Minneapol	MN	55444
James Dean	6700	Golden Court	Chanhassen	MN	55317
Diana Dean	848	Goodrich Ave	Saint Paul	MN	55105
Margaret Dean	4138	Wentworth Ave	Minneapol	MN	55409
Barbara Deans	1401	June Ave S	Golden Val	MN	55416
Zach Dearen	830	5th Ave Se	Minneapol	MN	55414
Paul Dearey	3459	Vivian Ave	Shoreview	MN	55126
Debra DeBruin	1441	Burke Ave W	Roseville	MN	55113
Tom DeBruyn	188	Islan E	Minneapol	MN	55413

Genna DeChoisy	5360	1st Ave S	Mpls	MN	55419
Steve DeCosse	1322	Van Buren Ave	Saint Paul	MN	55104
Lauren Dee	1378	Como Blvd	St Paul	MN	55117
Mark Deering	3290	ElDorado Trl W	Minnetonk	MN	55305
Mary Deering	1833	Lincoln Ave	Saint Paul	MN	55105
Janis Dees	2121	St. Anthony Pkw	Minneapol	MN	55418
Allen deEtt	209	2nd St NE	Mpls	MN	55401
Scott Deetz	4255	Quentin Ave	St. Louis Pa	MN	55416
Margie Degen	4915	Vallader	St Louis Pa	MN	55416
Joe Degiovanni	18042	Valley View Rd	Eden Prairi	MN	55346
Alanna Degroot	806	6th St SE	Minneapol	MN	55414
Gary and Connie L. DeGr	1108	Woodland Trl	Northfield	MN	55057
Lindsey Dehan	2624	Hampshire Ave S	St. Louis Pa	MN	55426
Amos S. Deinard	1729	Morgan Ave S	Minneapol	MN	55405
Katherine DeKrey		Campus 737 21s	Minneapol	MN	55454
Ted deLancey	7505	Frontier Tr	Chanhasse	MN	55317
Amy & Joe Delaney	2522	Cleveland St NE	Mpls	MN	55418
Virginia Delariva	4139	Garfield Ave S	Minneapol	MN	55409
Liz Delay	669	Sumner St	Saint Paul	MN	55116
William Delehanty	1244	Hague Ave	Saint Paul	MN	55104
Andrea Delkins	2322	Wilson St NE	Minneapol	MN	55418
John Dell	2248	Goodrich Ave	Saint Paul	MN	55105
Kristina Dell Orco	3216	Townview Ave N	Minneapol	MN	55418
Patrick & Mary Delmore	3328	Birch Pl	Hopkins	MN	55305
Ailie Deloia	61	W. Sandra Lee D	St Paul	MN	55119
Stephen & Judith DeLong	814	4th St E	Northfield	MN	55057
Phil Delphey	5228	Irving Ave S	Minneapol	MN	55419
David DelRemer	2720	Noble Ave N	Golden Val	MN	55422
Angie DelRosario	962	Grandview Ave \	Roseville	MN	55113
Doug DeLuca	1543	Holton St	Saint Paul	MN	55108
Rob Delwave	5036	E Turtle Lake	Shoreview	MN	55126
Ellen Demerath	2297	Folwell Ave.	Saint Paul	MN	55108
Daniel Denneh	3730	W 22nd St	Mpls	MN	55416
Kristin & Brendon Denne	3933	Zenith Ave S	Mpls	MN	55410
Scott Dennison	972	Summerfield Dr	Northfield	MN	55057
Tom Denny	1801	Dean Hill Dr	Minnetonk	MN	55305
Tracey Dentsch	4245	Garfield Ave S	Minneapol	MN	55419
Susanne Depalma	1721	Shryere Ave W	Roseville	MN	55113
Michael Deppe	1812	Hague Ave	Saint Paul	MN	55104
Chris Derdosk	1288	W Skillman	Roseville	MN	55113
Philip deSaeSilva	1080	Dayton Ave	St. Paul	MN	55104
Jigna Desai	3229	Colfax Ave S	Minneapol	MN	55408
Mary Desalvo	12509	briarwood	Minnetonk	MN	55343
Will & Ginny DeSanto	5024	Harriet Ave S	Minneapol	MN	55419
John Desanto	881	Kimberly Ln	Chanhasse	MN	55317
Christi Desautels	3022	Buchanan St NE	Mpls	MN	55418
Brenda Destardin	3526	Stinson Blvd	Mpls	MN	55418

Vicki Deutsch	880	Laurel Ave	St. Paul	MN	55104
Loren Deutz	4151	Wentworth Ave.	Minneapol	MN	55419
Brian Devery	1645	Hewitt Ave	Plymouth	MN	55447
Donna Devery	4932	32nd Ave S	Mpls	MN	55417
Nodar Devie	1225	Ellen Pl	Mpls	MN	55405
Sean Devillers	3937	Yosemite Ave S	St. Louis Pa	MN	55426
Marie Devoe-White	1634	Laurel Ave	Saint Paul	MN	55104
Jennifer DeVries	2234	Ulysses St NE	Mpls	MN	55418
Rick DeVris	2644	Ulysses St NE	Mpls	MN	55418
Eric DeYoung	4521	31st Ave S	Mpls	MN	55406
Colin DeYoung	245	Cecil St SE	Mpls	MN	55414
Sherab Dhondup	1822	Buchanan St NE	Minneapol	MN	55418
Kate Diamll	4024	Harriet Ave	Mpls	MN	55409
Tim Dianh	17413	Lorence Way	Eden Prairi	MN	55347
Barbara DiBlasi	4041	Dupont Ave S	Minneapol	MN	55409
Josh Dick	2200	Girard Ave S	Minneapol	MN	55405
Heidi and Brian Dick	1532	Minnehaha Ave	Saint Paul	MN	55104
Kaela Dickens	2842	eWING	Minneapol	MN	55410
Linda Dickey	6221	Burberry Circle	Excelsior	MN	55331
Tim Dickinson	1349	Midway Pkwy	St. Paul	MN	55108
Sean Dickson	1001	36th Ave NE	Minneapol	MN	55418
Jon Dicus	3610	Pleasant Ave S	Minneapol	MN	55406
Amy Diedrich	221	W 77th St	Mpls	MN	55317
David Diedrich	233	Sheridan Ave S	Minneapol	MN	55405
Anjelica Dietz	616	5th St E	Northfield	MN	55057
Bill Dietz II	1	not provided	Minnetonk	MN	55305
Dennis & Marianne Dietz	2945	Hamline Ave N	Roseville	MN	55113
Paula Dietzsch	9770	85th St Place S	Cottage Gr	MN	55416
Deanne Dillan	2808	Silver Lake Ave	Minneapol	MN	55413
Marcus F. Dillard	236	Queen Ave S	Minneapol	MN	55405
David R. Diskerud	3920	White Bear Ave	White Bear	MN	55110
Margaret Divney-Fedring	600	6th St E	Northfield	MN	55057
Kristin Dobberke	2201	Texas Ave S	St Louis Pa	MN	55426
Tony Dobek	2113	Girard Ave S	Minneapol	MN	55405
John Doberskin	4414	Cooke Street	Duluth	MN	55803
Becky Dobson	2411	Oxford St N	Roseville	MN	55113
Josie Dodge	126	Syndicate St N	St Paul	MN	55104
Laura Dodge	4933	Emerson Ave S	Minneapol	MN	55419
Richard Dodson	1563	Fairmount Ave	st. Paul	MN	55105
Suzy Doerr	1205	Selby Ave	St Paul	MN	55104
Dan Doerrer	5615	Pascal St	Shoreview	MN	55126
Jill Doescher	4300	W 25th St	St Louis Pa	MN	55416
Bob Doherty	6310	Castle Ridge	Chanhassen	MN	55317
MITCHELL DOKKEN	1772	Lafond Avenue	SAINT PAU	MN	55104
Mitchell Dokken	2214	37th st	Mpls	MN	55407
Rachel Dole	88	Clarence Ave SE	Mpls	MN	55414
Dottie Dolezal	3005	W 43rd St	Minneapol	MN	55410

Christy Dolph	3323	Benjamin St NE	Minneapol	MN	55418
Coleen Doman	817	Oranve Ave W	St Paul	MN	55117
Patricia Domay	8109	Dakota Ln	Chanhasse	MN	55426
Ernest Dominguez	1112	Idaho Ave W	St. Paul	MN	55108
Ricardo Dominguez	3546	Lincoln St Ne	Minneapol	MN	55318
Tracy Domish	3234	Mckinley St NE	Minneapol	MN	55418
Gregory Domke	5513	Glengarry Pkwy	Edina	MN	55436
Danelle Dommer	450	Morgan Ave S	Minneapol	MN	55405
Elayne Donahue	526	Portland Ave	St. Paul	MN	55104
Joe Donahue	2819	Taylor St NE	Minneapol	MN	55418
Katie Donald	4905	York Ave S	Minneapol	MN	55410
Eric Donn	634	Goodrich Ave	Saint Paul	MN	55105
Tom & Fontini Donnelly	6491	Nez Perce Dr	Chanhasse	MN	55317
Anna Donnelly	2103	St. Clair Ave	St Paul	MN	55105
John Donnelly	556	Mississippi River	Saint Paul	MN	55116
Carolyn "connie" G. Donr	5516	Oaklawn Ave S	Edina	MN	55424
Laurie & Jay Donohue	6561	Troendle Cir	Chanhasse	MN	55317
Sandy Donovan	4957	Dupont Ave S	Minneapol	MN	55419
David Doody	1481	St Clair Ave	St Paul	MN	55105
Amber Dopp	4164	Browndale Ave	St. Louis Pa	MN	55416
Rose Dorer	1358	Keston St	Saint Paul	MN	55108
Robb Doser	4015	Cedar Ave S	Minneapol	MN	55407
Millie Dosh	4124	Harriet Ave	Minneapol	MN	55409
Keith or Marie Dotseth	812	Fairmount Ave	Saint Paul	MN	55105
Chris Doucet	18730	34th Ave N	Plymouth	MN	55446
Justin Doucet	1406	Flag Ave	St. Louis Pa	MN	55426
Susan Doucette	13505	Clinton Pl	Burnsville	MN	55337
Madeline Douglas	4215	Garfield Ave	Minneapol	MN	55409
Kay Douglass	4554	Aspenwood Trl	Minnetonk	MN	55345
Pat Douma	4728	Beard Ave S	Minneapol	MN	55410
Phil Dovcek	3746	Harriet Ave	Minneapol	MN	55409
Pat & Randee Dow	2815	Hayes St NE	Mpls	MN	55418
Pat Dow	6125	Birchcrest Dr	Edina	MN	55436
Alexandra Dowdy Jaehnig	3531	Tyler St NE	Mpls	MN	55418
Brendan Downes	4442	32nd Ave S	Mpls	MN	55406
Mark Downing	4254	Grand Ave S	Minneapol	MN	55409
Bridget Downputorythe	1158	Edmnd Ave	St Paul	MN	55104
Brian Downs	1322	Hewitt Ave	St Paul	MN	55104
Courtney Downs	301	6th Ave NE	Minneapol	MN	55413
Julie Downs	4843	35th Ave S	Minneapol	MN	55417
Dean Doying	2082	Iglehart Ave	Saint Paul	MN	55104
Sean Doyle	2516	22nd St. E.	Minneapol	MN	55406
Leslie Doyle	47	Mid Oaks Ln	Roseville	MN	55113
Nancy Doyle	5308	Emerson Ave S	Minneapol	MN	55419
Jean & James K. Doyle	1403	Laurel Ave	Saint Paul	MN	55104
Tim Drabandt	3605	Dowers Dr NE	St. Anthony	MN	55418
Carol Drake	4305	Coolidge Ave S	St. Louis Pa	MN	55416

David Drake	3555	Fillmore St	Minneapol	MN	55418
Brian Draske	3452	Emerson Ave S	Minneapol	MN	55408
Kelly Draz	2300	Aquila Ave N	Golden Val	MN	55427
Dave Drentlaw	709	Winona St	Northfield	MN	55057
Maggie Dreon	3305	East Gate Road	Minneapol	MN	55418
Mike Dreson	2829	Irving Ave S	Minneapol	MN	55408
nancy dress	6820	Rosemary Rd	Eden Prairi	MN	55346
Mary A. Dressel	1468	Como Blvd E	Saint Paul	MN	55117
William (Bill) Droessler	1515	Chelsea St	Saint Paul	MN	55108
Brian Drought	3317	W 55th St	Edina	MN	55424
Jennifer Druzkanski	4512	29th Ave S	Minneapol	MN	55406
Zack Dubay	5041	Russell Ave S	Minneapol	MN	55410
Diane DuBois	4805	Vincent Ave	Mpls	MN	55410
Chris DuBois	1067	Antoinette Ave	Mpls	MN	55405
Anita Duder	2748	Drew Ave S	Minneapol	MN	55416
Jane Dudley	4501	Edina Blvd	Edina	MN	55424
Austin Dufault	1243	Van Buren Ave	Saint Paul	MN	55105
Helen DuFault	1836	W Ryan Ave	Roseville	MN	55113
Barb Duffin	2716	E Minnehaha Pk	Nokomis	MN	55406
Nance Duffy	1952	Cedar Lk Pkwy	Mpls	MN	55416
Donna Duffy	4532	Ewing Ave S	Mpls	MN	55410
Jen Duggan	7	Bridge Ln	Edina	MN	55424
M Duggen	4301	Chowen Ave S	Mpls	MN	55410
Tara Duginske	2830	Aglen St	Roseville	MN	55113
Kurt Duhn	5344	Bryant Ave S	Mpls	MN	55419
Lynn Duncan	2331	E 3rd St	Duluth	MN	55812
Rick Duncan	310	W Minnehaha Pl	Minneapol	MN	55419
Kelli Jean Dune	1738	Chatsworth St	Roseville	MN	55113
Virginia (Ginger) Dunivan	1746	Lincoln Ave	Saint Paul	MN	55105
Wade Dunkley	2700	W 24th St	Saint Louis	MN	55438
Craig Dunn	2450	Como Ave	St. Paul	MN	55108
Jim Dunn	5437	Wooddale Ave	Edina	MN	55424
Brian Dunnette	3526	Benjamin NE	Mpls	MN	55418
Michelle Dunning	1507	Raymond Ave	Saint Paul	MN	55108
Ashley Dunnwahl	933	Grandview Ave \	Roseville	MN	55113
Judy DuPaul	2900	Lee Ave	Golden Val	MN	55422
Sara & Jorge Duran	3530	Johnson St NE	Minneapol	MN	55418
Tara Durney	4314	Pleasant Ave	Minneapol	MN	55409
JAmie Durutz	2815	W 45th St	Minneapol	MN	55410
Reed Duthler	3231	31st Ave NE	Mpls	MN	55418
Richard Dworsky	16502	Ringer Rd	Minnetonk	MN	55219
Alan & Betsy Dworsky	4275	Churchill Cir	Minnetonk	MN	55345
Laurie + Terry Dwyer	3810	Inglewood Ave S	St. Louis Pk	MN	55416
Mark Dyaarrs	1984	Sheridan Ave S	Minneapol	MN	55405
Tamesin Dyas	4744	Beard Ave S	Mpls	MN	55410
John Dyer	5116	Chowen Ave S	Minneapol	MN	55410
Pamela Dyer-Bennet	3721	Blaisdell Ave	Minneapol	MN	55409

Agnes Dynes	1503	Simpson St	St. Paul	MN	55108
Ashley Dyrdahl	2744	colorado Ave S	St. Louis Pa	MN	55416
Kim Dziubinski	4209	Dupont Ave S	Minneapol	MN	55409
Dan Eagan	3301	East Gate	Minneapol	MN	55418
Brian Earley	3535	Lincoln St NE	Mpls	MN	55418
Fred & Mary Easter	800	Saint Olaf Ave	Northfield	MN	55057
Timothy Eaton	696	Sumner Street	St. Paul	MN	55116
Emily Eaton	4820	Penn Ave S	Minneapol	MN	55414
John O. Eaton	2318	Commonwealth	Saint Paul	MN	55108
Sharon & Jim Eaton	2133	Berkeley Ave	Saint Paul	MN	55105
Thomas Eaton	5037	York Ave S	Minneapol	MN	55410
Nina Ebbighausen	175	Malcolm Ave SE	Mpls	MN	55414
VIcki Eberhardt	1449	Arlington Ave W	Saint Paul	MN	55108
Jessica Ebertz	1277	Avon St N	St. Paul	MN	55117
Nancy Ebner	2644	Burd Pl	St Louis Pa	MN	55426
I Eboreum	3515	Benjamine St NE	Mpls	MN	55418
Jean Echternacht	1814	W 44th	Minneapol	MN	55419
Jill Eck	1240	Blair Cir	Roseville	MN	55113
Chuck Eckberg	10569	Glen Eagle Road	Woodbury	MN	55129
Karen Eckman	966	Cobb Rd	Shoreview	MN	55126
Janet Eckoff	4652	Colfax Ave S	Minneapol	MN	55419
John Edbert	3127	Arthur St NE	Minneapol	MN	55418
Julia Ede	1929	Ulysses St NE	Mpls	MN	55418
Jennie & Ryan Edstrom	2824	Yosemite Ave S	Saint Louis	MN	55416
Jenn Edstron	2751	Zenith Ave N	Robbinsdal	MN	55422
Carlos & Krista Eduarte	2311	Garfield St NE	Minneapol	MN	55418
Marthanne Edwards	15385	Morraine Way	Eden Prairi	MN	55347
Jenny Edwards	3841	Pleasant Ave	Minneapol	MN	55409
Nicholas Edwards	2105	Bryant Ave S	Minneapol	MN	55405
Delaney Edwards	4332	Harriet Ave	Minneapol	MN	55409
Joe Edwards	5537	25th Ave S	Minneapol	MN	55417
Mary K. Edwards	1176	Ashland Ave	Saint Paul	MN	55104
Dae Eenkenbry	2430	Cedar Ln	Minneapol	MN	55416
John Eframson	4341	Rustic Place	Shoreview	MN	55422
Ben Efron	18180	S Shore Ln	Eden Prairi	MN	55436
Dan Egeland	2659	E Lake of the Isle	Minneapol	MN	55405
Jennifer Egertson	4935	35th Ave S	Minneapol	MN	55417
Damon Eggers	1209	Cedar Lake Rd S	Minneapol	MN	55405
Kate Eggers	3100	Colfax Ave S	Mpls	MN	55408
John Eggert	657	Laurel Ave	Saint Paul	MN	55104
Ed Ehlenz	288	Saratoga Ave	Saint Paul	MN	55105
Candace Ehler	4733	Harriet Ave S	Mpls	MN	55419
Jenny Ehlinger	1432	Kentucky Ave S	Saint Louis	MN	55426
Jessica Eichmiller	1530	Albert St N	St. Paul	MN	55108
Chris Eichrodt	3320	Harriet Ave	Minneapol	MN	55408
Beth Eickhoff	7320	Trotters Cir	Chanhassei	MN	55317
Stephanie Eid	2721	Meridian Dr	Robbinsdal	MN	55422

Cherste Eidman	1435	N Hamline Ave	St. Paul	MN	55418
DALE EILERS	3914	E 55TH ST	NOKOMIS	MN	55417
Magnus Eilers	2927	Blackstone	St. Louis Pa	MN	55413
Jason Eilola	4909	32nd	Mpls	MN	55417
Holly K. Einess	5021	Beard Ave S	Minneapol	MN	55410
Jonathan Eirten	3851	Blaisdell Ave	Mpls	MN	55409
Stephen Eisenmenger	3338	Fremont Ave S	Minneapol	MN	55408
Heather Eisenmeyer	4836	Elliot Ave	Mpls	MN	55419
Nathan & Erika Eklund	1515	Natchez Ave	Golden Val	MN	55416
Erin Ekstrand	95	Victoria St N	St. Paul	MN	55104
Paul Elbow	2105	Emerson Ave S	Mpls	MN	55408
Melissa Elder	6696	Mulberry Circle	Chanhasse	MN	55317
Diana Elhard	3030	Emerson ave S	Minneapol	MN	55408
Sonja & Mark Elias	2115	Fremont Ave S	Minneapol	MN	55405
Mark and Sonja Elias	2115	Fremont Ave S	Minneapol	MN	55405
Erik Elias	4245	Quentin Ave	St Louis Pa	MN	55416
Jane Elias	4109	Upton Ave S	Minneapol	MN	55410
Robyn Eliason	3239	Polk St NE	Minneapol	MN	55418
Scott Elkins	4185	Yosemite Ave	St Louis Pa	MN	55416
David and Helen Ellenbec	2111	James Ave	Saint Paul	MN	55105
John Eller	109	W Island Ave	Mpls	MN	55401
Alison Ellertson	3740	Quail Ave	Robbinsdal	MN	55422
Meg Ellestad	5314	Harriet Ave S	Mpls	MN	55419
Bill Elliaja	577	Terrace Ct	Roseville	MN	55113
Nate Elliot	6222	Mallory Lane	Eden Prairi	MN	55346
Irvina Elliott	5607	22nd Ave S	Minneapol	MN	55406
Bruce Jr. & Ina Elliott	3100	Dupont Ave S	Minneapol	MN	55408
Amy Ellis	4253	Browndale Ave.	St. Louis Pa	MN	55416
Katy Ellis	2645	Vernon Ave S	St. Louis Pa	MN	55416
Sarah Ellis	125	Warwick St SE	Mpls	MN	55414
Alex Ellis	2311	32nd Ave S	Mpls	MN	55406
Kellie Ellsworth	3521	30th Ave N	Robbinsdal	MN	55422
Deb & Mike Ellsworth	8273	Westwood Hills	Saint Louis	MN	55426
Sharon Elmore	833	Lincoln Ave	Saint Paul	MN	55105
Nadia Elnagdy	2946	Benjamin St NE	Minneapol	MN	55418
Ardis & Charlie Elowson	2515	Burnham Rd	Minneapol	MN	55416
Susan Elsass	768	Lincoln Ave	Saint Paul	MN	55105
Mike Elson	2235	W. 21st St.	Linden Hills	MN	55405
John Elstay	5025	Alden Ave	Edina	MN	55424
Karen Ely	2940	Jersey Ave S	St. Louis Pa	MN	55426
Alyse Emanuel	4041	Upton Ave S	Minneapol	MN	55410
Harold Embry	1315	Valders Ave S	Golden Val	MN	55427
Chris Emery	4842	30th Ave S	Mpls	MN	55417
Mary Ann Emery	307	Cherry St	Northfield	MN	55057
Steve Emmings	111	Would N	Chanhasse	MN	55331
Mary Endeshaw	4825	Lyndale Ave S	Mpls	MN	55408
Mark Endmen	5153	York	Minneapol	MN	55410

Scott Endo	4350	Harriet Ave S	Minneapol	MN	55409
Annie Endrizzi	4828	Columbus Ave	Minneapol	MN	55417
Dan Endy	17920	8th Ave N	Plymouth	MN	55447
Chris Engberg	2260	Garfield St NE	Minneapol	MN	55418
Audra Engebret	912	Transit Ave	Roseville	MN	55113
Pat Engebretson	2412	23rd Ave S	Mpls	MN	55404
Everett Engebretson	1511	Osceola Ave	St Paul	MN	55105
Stephen Engel	3812	Abbott Ave S	Mpls	MN	55410
Angie Engel	7290	Conestoga Ct	Chanhasse	MN	55317
Kurt Engel	2815	31st Ave NE	St. Anthony	MN	55418
Brooke Engel	4012	26trh Ave S	Mpls	MN	55407
Jon Engel	221	Washburn Ave N	Minneapol	MN	55405
Laurie Engel	5100	Washburn Ave S	Minneapol	MN	55410
Pete Engelen	2820	Xenwood Ave S	Saint Louis	MN	55416
Alice Engelman	1355	Osceola Ave	Saint Paul	MN	55105
David Engen	4548	Upton Ave N	Minneapol	MN	55412
Darcey Engen	2613	30th Ave NE	St. Anthony	MN	55418
Jacob Enger	2648	Idaho Ave S	St. Louis Pa	MN	55426
Rebecca Engers	3255	Tyler St NE	Mpls	MN	55418
Lee Engfer	5201	35th Ave S	Minneapol	MN	55417
Michael Engh	3353	St Louis Ave	Minneapol	MN	55416
Nancy Engh	1928	Humboldt Ave S	Minneapol	MN	55403
Tom England	5757	Ridge Creek Rd	Shoreview	MN	55126
Gerick Engle	217	Warwick St SE	Mpls	MN	55414
Katie Engstrom	4329	Beard Ave N	Robbinsdal	MN	55422
Christopher Ennis	907	2nd St W	Northfield	MN	55057
Matt Entinger	10269	Yorktown Ln N	MAPLE GR	MN	55369
Debbie Enyeart	18112	24th Ave N	Plymouth	MN	55447
Natalie Enzmann	1011	Hill Court	Shoreview	MN	55126
Barton Epstein	13255	Kerry Ln	Eden Prairi	MN	55346
Louis Epstein	713	St Olaf	Northfield	MN	55057
Kayla Erbach	1715	Lincoln St	Mpls	MN	55418
Jason Erdahl	3240	Ranier Ln N	Plymouth	MN	55447
Carol Erdahl	1723	Eldrigh Ave	Roseville	MN	55113
Vicki Erdmann	4015	Zenith Ave S	Minneapol	MN	55410
Louise Erdrich	2009	W 21st St	Minneapol	MN	55405
Viginia Erhard	4411	Camelot Dr	Minnetonk	MN	55345
Bonnie Erickson	5212	York Ave S	Minneapol	MN	55410
Dan Erickson	1005	Rhode Island Ave	Golden Val	MN	55427
Carl Erickson	2547	Aldrich Ave S	Minneapol	MN	55408
Alex Erickson	1008	20th Ave NE	Minneapol	MN	55418
John Erickson	5825	Beard Ave S	Edina	MN	55410
Kris Erickson	3500	Taylor St NE	Mpls	MN	55418
Ruth Erickson	436	Sheridan Ave S	Mpls	MN	55405
Brian Erickson	11010	37th Ave N	Plymouth	MN	55441
Brian Erickson	4752	Chowen Ave S	Mpls	MN	55410
Jack Erickson	839	Mach	Shoreview	MN	55126

Russ Erickson	3921	Grand	Mpls	MN	55408
Jesse Erickson	4255	Blaisdell Ave S	Mpls	MN	55409
Paul Erickson	1809	Knox	Mpls	MN	55403
Tim Erickson	5325	Woodlawn Blvd	Minneapol	MN	55417
John Erickson	3425	St Louis Ave	Minneapol	MN	55416
Andrew Erickson	2909	Rankin Rd	St Anthony	MN	55418
Sandra Erickson	680	Woodlawn Ave	Saint Paul	MN	55116
Chris Erickson	5137	17th Ave S	Minneapol	MN	55417
Leni Erickson	244	Vincent Ave N	Minneapol	MN	55405
Jan & Greg Erickson	2434	Sherwood Hills R	Hopkins	MN	55305
Rick or Sheryl Erickson	5608	Girard Ave S	Minneapol	MN	55419
Leonard Erickson	2107	W 49th St	Minneapol	MN	55405
Laura Erlandson	2756	Colorado Ave S	St Louis Pa	MN	55416
Bob Erler	9600	Flintlock Trl	Chanhassei	MN	55317
Judy Erm	4943	Birchwood Lane	Minnetonk	MN	55343
Steve Ernest	4716	17th Ave S	Mpls	MN	55407
Rachel Ernst	2628	Bryant Ave S	Mpls	MN	55408
Nahathai Ernst	11025	39th Ave N	Plymouth	MN	55441
Mattie Erstad	1660	Laurel Ave	Saint Paul	MN	55104
Wes Erwin	1549	Sherwood Rd	Shoreview	MN	55126
Lucy Esberg	3329	Xenwood Ave S	St. Louis Pa	MN	55416
Sarah Eschweiler	4710	3rd Ave S	Minneapol	MN	55419
Jose M. Escobar			Roseville	MN	55113
Shannon & Jen Eshleman	3334	Tyler St NE	Mpls	MN	55418
Liz Espe	5101	30th Ave S	Mpls	MN	55417
Miguel Espinoza	3195	Walnut Grove Lr	Plymouth	MN	55447
Jill Essner-Dodds	3403	Maplewood Dr	St. Anthony	MN	55418
Ryan Estey	3090	Hamlin Ave N	Roseville	MN	55113
Adriana Estill	512	5th St. E.	Northfield	MN	55057
Ed Estlow	100	Shasta Cir W	Chanhassei	MN	55317
Alicia Estrellado	1614	Dayton Ave	St Paul	MN	55104
Anna M. Ettel	207	Isabel St W	Saint Paul	MN	55107
Michael Etten	1416	Asbury St.	St. Paul	MN	55108
Jim & Carol Eubanks	4932	Morgan Ave S	Minneapol	MN	55419
Frank Eustis	2152	Roblyn Ave	Saint Paul	MN	55104
Brent Evanger	4549	Chowen Ave N	Robbinsdal	MN	55422
Tim Evans	3922	Grand Ave S	Minneapol	MN	55409
Michelle Evans	4054	Grand Ave S	Mpls	MN	55409
Lisa Evans	2329	Sherwood Hills C	Minnetonk	MN	55305
Bryce Evans	4812	Carleton Rd	Minnetonk	MN	55432
Susan Evans	1802	Sargent Ave	St Paul - M	MN	55105
Sue Evans	3126	Emerson Ave S.	Minneapol	MN	55408
Valerie Eve	418	Ashland Ave	St. Paul	MN	55102
Margaret Evenson	915	E 5th ST	Northfield	MN	55057
Kristen Evenson	990	Iowa Ave	St Paul	MN	55117
Craig Evenson	915	5th St E	Northfield	MN	55057
Rebecca Everman	1557	Simpson St	St. Paul	MN	55108

Tom Evers	2840	Xenwood Ave S	St. Louis Pa	MN	55416
David Everson	3815	Evergreen Ln N	Plymouth	MN	55441
Paul Everson	829	Montana Avenu	Saint Paul	MN	55117
Bill Evert	1846	Chatsworth St N	Roseville	MN	55113
Leah & Ian Evison	883	Lakeview Ave. S.	St. Paul	MN	55117
Mike F	2336	Emerson Ave S	Minneapol	MN	55408
Scott F	3305	Drew Ave N	Robbinsdal	MN	55422
Shannon Fabick	4843	29th Ave S	Mpls	MN	55417
Gretchen & Robert Faces	3650	Edmund Blvd	Minneapol	MN	55406
Lisa Facinelli	1242	Angelo Dr	Golden Val	MN	55422
Paul Fadden	539	Cretin Ave S	Saint Paul	MN	55116
Trey Fagerlee	831	Tanglewood Dr	Shoreview	MN	55126
Ryan Fagre	3633	Aldrich Ave	Minneapol	MN	55409
Tara Fahlrey	3321	16th Ave S	Minneapol	MN	55407
Jeanne Fahlstrom	3111	Garfield St NE	Minneapol	MN	55418
Pat Fair	12605	Hilloway Rd W	Minnetonk	MN	55305
R Faircloth	3516	Zinran Ave S	St. Louis Pa	MN	55426
Candace Falk	3957	Drew Ave S	Minneapol	MN	55410
Clarence Falk	4144	Ewing Ave S	Minneapol	MN	55410
Jack Falkehagen	1889	Roselawn Ave W	Roseville	MN	55113
Becky Falkun	4517	29th Ave S	Mpls	MN	55406
Max Fallek	8715	Westmoreland L	St Louis Pa	MN	55426
Paul Falley	3412	17th Ave S	Minneapol	MN	55407
Trisha Falvey	4330	France Ave	Edina	MN	55416
Sue & Al Fan	1925	Irving Ave S	Minneapol	MN	55403
Jesse Fancilli	5100	Benton Ave	Edina	MN	55436
Sara Fanucchi	4244	Lyndale Ave s	Minneapol	MN	55409
Jannell Farah	2227	Benjamin St NE	Mpls	MN	55418
Patrick Faricy	1470	Simpson St	St. Paul	MN	55108
Emma Faris	3729	Colfax Ave S	Minneapol	MN	55409
Sarah Farley	4155	Garfield Ave S	Minneapol	MN	55409
Hazel & John Farnham	325	Narcissus Ln	Plymouth	MN	55447
Kaelie Farrah	1247	Hubbard Ave	St. Paul	MN	55104
Tim Farrell	552	Summit Ave	St Paul	MN	55105
Michael Farrell	5546	Upton Ave S	Minneapol	MN	55410
John Farrell	3908	Harriet Ave	Minneapol	MN	55409
Jess Faser	3106	Linsoln St NE	Minneapol	MN	55418
Gwendolyn (Wendy) Fass	3901	Xerxes Ave S	Minneapol	MN	55410
Megan Fatheree	1813	Benjamin St NE	Mpls	MN	55418
Yonus Fato	2923	Tyler St NE	Mpls	MN	55418
Laura Faucher	2058	St Anthony Pkwy	Minneapol	MN	55418
Ron Faulkner	1449	Lakeview Ave S	Minneapol	MN	55416
Cory Faurc	1784	Lindy Ave	Roseville	MN	55113
Ashley Fayree Wegener	1208	Lakeview Ave S	Mpls	MN	55405
Casey Fearing	600	6th St E	Northfield	MN	55057
Karen Febud	4920	Vallacher	St Louis Pa	MN	55416
Kyle Fedner	1961	Skillman Ave	Roseville	MN	55113

Carol Fedorchak	808	W. 41st St.	Minneapol	MN	55409
Wes Feeney	2832	Stinson St NE	Mpls	MN	55418
Rose Feesl	1770	Hinton Trail Nort	Oakdale	MN	55128
Steve Feig	675	Koehler Rd	Vadnais He	MN	55127
Alyssa Feik	3309	Beard Ave N	Robbinsdal	MN	5422
Lauren Feiler	21	Fareway Dr.	Northfield	MN	55057
Jeanne Feist	716	E. Ridge Dr	Northfield	MN	55057
Kristina A. Felbeck	1082	12th Ave SE	Minneapol	MN	55414
Richard Felber	5500	Elliot Ave	Mpls	MN	55417
Carla & George Feldhame	894	Arlington Ave W	St Paul	MN	55117
Steve Feldman	9401	W Franklin	Saint Louis	MN	55426
Shira Feldman	401	S 1st St #604	Minneapol	MN	55418
Ed Feldman	316	West Diamond L	Minneapol	MN	55414
Edward Feldt	4006	Chowen Ave	Robbinsdal	MN	55422
JOAN FELICE	22	MID OAKS RD	ROSEVILLE	MN	55113
Joseph Felice	4817	Abbott Ave	Minneapol	MN	55410
Aaron Felix	4343	Grand Ave S	Minneapol	MN	55409
Cathy Felix	2934	Matilda Ave	Roseville	MN	55113
Justin Fellette	2601	Arthur St Ne	Minneapol	MN	55418
Jamie Felman	1534	Holton St	Minneapol	MN	55108
Patrick Fenlon	5300	Abbott Ave S	Mpls	MN	55410
Thomas Fenner	3359	Beard Ave N	Robbinsdal	MN	55422
Elizabeth Fenske	1365	Frankson Ave	St Paul	MN	55108
Abigail (Abby) C. Fenton	3252	Aldrich Ave S	Minneapol	MN	55408
Warren Ferber	4141	Abbott Ave S	Minneapol	MN	55410
Laura Ferguson	2158	Sycamore Trl	Woodbury	MN	55125
Jen Ferincek	4835	Penn Ave S	Minneapol	MN	55419
Steve Ferkingstad	3111	Drew Ave N	Robbinsdal	MN	55422
Mike Fern	3231	Webster Ave S	St. Louis Pa	MN	55416
Olga Fernandez	3612	14th Ave S	Mpls	MN	55407
Adriana Fernandez	3518	Pierce St NE	Minneapol	MN	55418
Sylvester Fernandez	2196	Highland Pkwy	Saint Paul	MN	55116
Santiago Fernandez-Gime	240	George St W	Saint Paul	MN	55107
Catherine Ferreira	5053	Sheridan Ave S	Minneapol	MN	55410
A Ferrgson	1952	Penn Ave S	Mpls	MN	55405
Judy & Burton Ferrier	4405	Jansa Drive	Shoreview	MN	55126
Andrea Ferstan	200	Valleyview Pl	Minneapol	MN	55419
Katie Fettig	7259	Bren Lane	Eden Prairi	MN	55346
Tom Ficcio	3538	Humboldt Ave	Minneapol	MN	55408
Emilie Ficek	1379	Burke Ave	Roseville	MN	55113
Sandy Field	3828	Chowen Ave S	Minneapol	MN	55410
Kari Field	2754	Garfild St Ne	Minneapol	MN	55418
Steve Field	3421	Irving Ave S	Minneapol	MN	55408
Jake Fieldseth	10202	Mildred Terrace	Minnetonk	MN	55305
Lisa Fifield	1835	Pennsylvania Av	St. Louis Pa	MN	55426
Peter Filkins	2239	Mckinley St NE	Minneapol	MN	55418
Tracy or Therese Finch	1238	Juno Ave	St.Paul	MN	55116

Bob Finch	7722	Arbretum Village	Chanhassen	MN	55317
Agnieska Fine	2360	Parkwoods Rd	St Louis Pa	MN	55416
Gary Fink	2728	W Lake of the Isl	Minneapol	MN	55416
Susan Fink	3941	Lynn Ave S	St Louis Pa	MN	55416
Gary & JoAnn Fink	2728	W Lake Of The Is	Minneapol	MN	55416
Douglas Fink	975	Osceola Ave	Saint Paul	MN	55105
Erika Finkler	2623	Huntington	St. Louis Pa	MN	55416
Lee Finlay	11615	Live Oak Dr	Minnetonk	MN	55305
Janie Finn	3707	Grand Way #214	St. Louis Pa	MN	55416
Julie Firth	2701	Vernon Ave S	St Louis pa	MN	55416
Tabitha Fischer	4047	Wentworth Ave	Minneapol	MN	55409
Reed Fischer	3122	Johnson St NE	Minneapol	MN	55418
Lucy R. Fischer	2320	Parklands Rd	St Louis Pa	MN	55416
Stefanie Fiser	4441	30th Ave S	Nokomis	MN	55406
Kim Fish	4130	Raleigh Ave S	St Louis Pa	MN	55416
Sally Fisher	8531	W 28th St	St. Louis Pa	MN	55426
Mina Fisher	2450	Girard Ave S	Minneapol	MN	55405
Jake Fishman	3110	Dean Ct	Mpls	MN	55416
Carolina Fitch	4100	York Ave S	Minneapol	MN	55410
Jack o. Fithian	3735	Pillsbury Ave S	Minneapol	MN	55409
Bethany Fitzgerald	6812	Wooddale Ave S	Edina	MN	55435
Randy Fitzgerald	1926	Walden Pl NE	Minneapol	MN	55418
Ann Fitzpatrick	7700	W 24th St	St. Louis Pa	MN	55426
Peggy Fitzpatrick	16817	Blenheim Way	Minnetonk	MN	55345
Holly Fix	3217	Cavell Ln	St. Louis Pa	MN	55426
Joan Flaateu	5345	2nd Ave S	Mpls	MN	55419
Mark Flaherty	2700	Hayes St NE	Minneapol	MN	55418
Chelsea Flaherty	1916	Penn Ave S	Minneapol	MN	55405
Anthony P. Flaminio	1882	Princeton Ave	Saint Paul	MN	55105
Kerrin Flanagan	1912	Summit Ave	St Paul	MN	55105
Kelli Flanders	2741	Hampshire Ave S	St. Louis Pa	MN	55426
Mary Grace Flannery	1814	Mount Curve Av	Minneapol	MN	55403
James Flaten	1709	Eldridge Ave W	Roseville	MN	55113
Liz Flavin	3103	Dean Ct	Minneapol	MN	55416
Meghan Fleckenstein	815	W 40th	Minneapol	MN	55409
John Flees	3400	Huntington Ave	St. Louis Pa	MN	55416
Madeline Fleischman	719	Parkview Ave S	St Paul	MN	55117
Eric Fleming	1293	Hamline Ave	St. Paul	MN	55108
Arlene Flemmer	5116	Norman Dr	Minnetonk	MN	55345
Anthony Flesher	2523	Ulysses St	Minneapol	MN	55418
Paul J. Flick	4032	Lyndale Ave S	Minneapol	MN	55409
Brady Fliflet	4228	Ottawa Ave S	St Louis Pa	MN	55416
Jeremiah Flintrop	1	not provided	Howard Lal	MN	55021
Monica & Brian Flis	1551	Rhode Island Ave	Golden Val	MN	55427
Lindsay Flocker	25436	Emerson Ave S	Minneapol	MN	55408
Maria Flom	3301	Yosemite Ave S	St. Louis Pa	MN	55416
Kaonon Flood	903	Laurel Ave	St. Paul	MN	55104

Erin Flood	9878	Lee Drive	Eden Prairi	MN	55347
Kathleen Flood	9878	Lee Drone	Roseville	MN	55113
Ronald J. Flor	638	Tanglewood Dr	Shoreview	MN	55126
Bert Flora	5336	26th Ave S	Minneapol	MN	55417
Jenny Floria	4700	Ewing ave S	Mpls	MN	55410
Tyler Flory	3155	Johnson NE	Minneapol	MN	55418
Cherry Flowers	1243	Hewitt	St Paul	MN	55104
Chris Floyd	4065	Alabama Ave S	St. Louis Pa	MN	55416
Alan Floyd	3400	Glenhurst Ave	St. Louis Pk	MN	55416
Jerry Flynn	5633	Bloomington Ave	Minneapol	MN	55417
Kevin Flynn	3112	Minnehaha pkw	Minneapol	MN	55406
Terri Ann Flynn	4810	36th Ave S	Minneapol	MN	55417
Randi Fogel	4288	Deerwood Ln W	Plymouth	MN	55447
Molly Foley	4741	13th Ave S	Mpls	MN	55407
Kate Henry Folie	4609	Coffey Ln	Minneapol	MN	55406
Hannah Folkens	3524	Benjamin St NE	Mpls	MN	55418
Vicky Follansbee	301	Cherry St	Northfield	MN	55057
Ann Follett	3426	10th Ave S	Mpls	MN	55407
Andrew Follmann	1811	Buchanan St NE	Mpls	MN	55418
Nick Folwick	3920	Glendale Dr	Chanhassen	MN	55331
Lindsay Fondon	4457	30th Ave S	Nokomis	MN	55406
Joanna Foote	4936	Nokomis Ave S	Minneapol	MN	55417
Lindsay Forcyth	4100	Drew Ave S	Minneapol	MN	55410
Esther Ford	617	So. Cedar Lake R	Minneapol	MN	55104
Lynn Ford	4737	30th Ave S	Minneapol	MN	55406
Terry Ford	3404	Aldrich Ave S	Minneapol	MN	55408
Jill Foreman	4325	15th Ave S	Minneapol	MN	55407
Joanne Foreman	1975	Sargent Ave	Saint Paul	MN	55105
Brian Forrest	3055	Garfield St NE	Mpls	MN	55418
Ann Marie Forshay	5108	Oxford Ave	Edina	MN	55424
Zac Forsman	3538	Garfield Ave S, #	Mpls	MN	55408
Cary Forss	1061	Laurel Ave	Saint Paul	MN	55104
Laurie Forster	5055	30th Ave S	Mpls	MN	55417
George Fortmeyer	1324	Silverthorn Dr	Shoreview	MN	55126
Megan Fortune	3554	Holmes Ave	Minneapol	MN	55408
Doris & Gil Forys	83	Wheeler St S	Saint Paul	MN	55105
Anne Foslid	2060	Kely Dr	Golden Val	MN	55422
Kristine Foslien	818	W 42nd St	Minneapol	MN	55409
Shannon Foss	236	Hanska Ct	Shoreview	MN	55126
Kylie Foss	4405	33rd Ave S	Mpls	MN	55408-6
Janet R. Fossan	2225	Irving Ave S	Minneapol	MN	55405
Clare Fossom	5043	Nokomis Ave	Minneapol	MN	55417
Mark Foster	805	Portland Ave	Saint Paul	MN	55104
Andi Foster	1558	Albert St N	Minneapol	MN	55108
Leta Foster	3900	Grand Ave S	Minneapol	MN	55409
Laurie Foster	4116	Washburn Ave S	Minneapol	MN	55410
Norman Foster	1409	Osceola Ave	Saint Paul	MN	55105

Peter Foster	2852	35th Ave S	Minneapol	MN	55406
Dawn Thomas Foster-Har	1515	Pascal St N	Saint Paul	MN	55108
Illigible Foukes	8261	Westwood Hills	St Louis Pa	MN	55426
Shannon Foulken	4819	Girard Ave S	Minneapol	MN	55419
Dan Fowlds	2106	Roblyn Ave	Saint Paul	MN	55104
Greg Fox	3548	Blaisdell Ave S	Minneapol	MN	55409
Ann Marie Fox	1542	Sargent	St Paul	MN	55105
Shari Fox	2925	Natchez Ave	St Louis Pa	MN	55416
Joan Fox	1606	W 28th St	Mpls	MN	55408
Meredith Fox	3326	Holmes Ave S	Minneapol	MN	55408
Stephanie Fox	5728	12th Ave S	Minneapol	MN	55417
John Fox	740	Manomin Ave	Saint Paul	MN	55107
Erin Frahm	4328	11th Ave S	Mpls	MN	55407
Ashley Fraigun	4109	Williston Rd	Minnetonk	MN	55345
Janell Frakes	1670	Virginia Ave S	St. Louis Pa	MN	55426
Sara Frame	3519	Fillmore St	Mpls	MN	55418
Kristin France	3937	20th Ave S	Mpls	MN	55407
Mary Frances Suek	5509	24th Ave S	Minneapol	MN	55406
Kjersti Francis	15400	Holdridge Rd E	Wayzata	MN	55391
Louis Francisco	2895	Sheldon St	Roseville	MN	55113
James Franczyk	1322	Portland Ave	Saint Paul	MN	55104
Jeremy Frandup	3829	21st Ave S	Mpls	MN	55407
Nick Frank	5317	1st Ave S	Mpls	MN	55419
Ken Frank	411	Cimarron Cir	Chanhassei	MN	55317
Mary Lou Frank	11624	Timberline Rd	Minnetonk	MN	55305
Cindy Franklin	3008	Arona St	Roseville	MN	55113
Beth Franzen	402	Sheridan Ave. S.	Minneapol	MN	55405
Doug Franzwa	10169	Bridgewater Ct	Woodbury	MN	55129
Patricia Frasher	2219	Sharon Ave SE	Minneapol	MN	55414
Pat Frazier	1724	Irving Ave So	Minneapol	MN	55403
Rick Fream	1320	Woodcrest Ave	Shoreview	MN	55126
Kadie Fredell	4523	15th Ave S	Mpls	MN	55407
Chan Fredkove	9099	Terra Verde Trl	Eden Prairi	MN	55347
Don Fredrickson	3424	Croft Dr	Mpls	MN	55418
Leslie & Arlene Freeberg	4240	Legend Ln	Golden Val	MN	55422
Eric Freeburg	79	Bedford St. SE	Minneapol	MN	55414
Joseph Freed	4084	Utica Ave	St. Louis Pa	MN	55416
Kate Freed	1677	Ridgewood Ln N	Roseville	MN	55113
Mary Francis Freedman	4904	Elliot Ave	Mpls	MN	55417
Sara & Andy Freeland	19183	Kristie Ln.	Eden Prairi	MN	55346
Michelle Freeland	45	Luverne Ave	Minneapol	MN	55419
Lori Freelund	708	Eastridge Drive	Northfield	MN	55057
Kristen & Corry Freeman	4424	18th Ave S	Minneapol	MN	55407
Danielle Freeman	2625	Kipling Ave	St. Louis Pa	MN	55416
Chris Freeman	1604	Huron St	Minneapol	MN	55108
Samantha Freeman	5036	Upton Ave S	Minneapol	MN	55410
Mary Freese	4612	W 39th St	Saint Louis	MN	55416

James Freitag	3205	32nd Ave Ne	Minneapol	MN	55418
Jennifer Frenz	4521	E Lake Harriet	Minneapol	MN	55409
Lanita Frerichs	8939	SW Village	Chanhasse	MN	55317
Shelly Frerichs	6600	Charina Bend	Chanhasse	MN	55317
James Frese	1267	Avon St N	Saint Paul	MN	55117
Bob Frey	2614	W 49th St	Minneapol	MN	55410
Wendy Friede	2521	Princeton Ct	Minneapol	MN	55416
Anonymous Friend	1	Anonymous	Mpls	MN	55418
Stirling Friendly	3624	42nd Ave S	Minneapol	MN	55406
Lita & Mickey Friesen	1976	Stanford	St. Paul	MN	55105
Phyllis Frisby	571	Griggs St. S	St. Paul	MN	55116
Sharon Frisell	1411	Albert St N	St. Paul	MN	55108
Kristin Frishe	7460	Longview Cir	Chanhasse	MN	55317
Ainie Frishman	2506	Lynn Ave S	St Louis pa	MN	55416
Dan Frisk	12548	Muriel Rd	Minnetonk	MN	55305
Kristin Friske	7460	Longview Cir	Chanhasse	MN	55317
Terry Fritz	1381	Belmont Ln W	Roseville	MN	55113
Kerry Fritze	3609	Maplewood Dr N	St. Anthony	MN	55418
Mike Frober	4929	35th Ave S	Minneapol	MN	55417
Mary Froberg	2601	Kyle Ave N	Golden Val	MN	55422
Mary Froiland	5517	Sanibel Dr	Minnetonk	MN	55343
Elizabeth Fronek	113	Bedford St SE	Mpls	MN	55414
Thom Frost	9	Russell Ave S	Minneapol	MN	55405
Boaz Fruchtman	5517	Portland Ave S	Golden Val	MN	55426
Polly Fry	3716	Inglewood Ave	St. Louis Pa	MN	55416
Justin Fryklund	2930	Wyoming Ave S	St. Louis Pa	MN	55426
Jane Frymike	5546	Elliot Ave	Mpls	MN	55417
Phyllis Fudali	2338	19th Ave NE	Mpls	MN	55418
Natalie Fuehrer	4257	Zenith ave N	Robbinsdal	MN	55422
Michael Fuerstein	4744	Beard Ave S	Mpls	MN	55410
Liz Fuhart	4252	Aldrich Ave S	Mpls	MN	55409
Alisha Fujita	1228	Victoria St N	St. Paul	MN	55108
Lisa Fuller	4736	London Rd	Duluth	MN	55804
Peter Fuller	2904	Georgia Ave	St. Louis Pa	MN	55416
Ted Fuller	4222	Raleigh Ave	St Louis Pa	MN	55416
Breanna Fuller	2323	Arthur St NE	Minneapol	MN	55418
James Fuller	4947	Garfield Ave	Minneapol	MN	55419
Mark Fullerton	5000	Arden Ave	Edina	MN	55424
Robert Fullery	2701	Vale Crest Rd	Golden Val	MN	55422
Jean Fulton	1001	Hill Court	Shoreview	MN	55126
Bern Funk	1360	Garfield	St Paul	MN	55108
Lisa Furey	4904	Russell Ave S	Minneapol	MN	55410
Robert Fusaro	4809	Girard Ave S	Minneapol	MN	55419
Stephen G	4525	Vincent Ave S	Mpls	MN	55410
Matt G	2947	Arthur St NE	Mpls	MN	55418
Karl G	5236	28th Ave	Mpls	MN	55417
Stephan G	112	Groveland Terr	Mpls	MN	55403

Julias G	1176	Maple Ln W	Roseville	MN	55113
Jenny Gaard	4117	Highland Rd	Minnetonk	MN	55345
Chris Gable	927	Lincoln Ave	Mpls	MN	55403
Susan Gahm	3443	Wilshire Pl NE	Mpls	MN	55418
Chris Gahn Barzath	3053	Chatsworth St N	Roseville	MN	55113
Daniel Gahres	3708	47th Ave S	Minneapol	MN	55408
Melissa Gaida	3032	Kentucky Ave S	Saint Louis	MN	55426
Mary Beth Gaines	1601	virginia Ave S	St. Louis Pa	MN	55426
Pam Galas	7218	Frontier Dr	Chanhassei	MN	55317
Mark Galatowitsch	1381	Almond Ave	Saint Paul	MN	55108
Megan Galbraith	2823	Quail Ave	Robbinsdal	MN	55422
Mike Galden	5246	Vincent Ave S	Minneapol	MN	55410
Lilly Gale	5500	Harriet Ave S	Mpls	MN	55419
A.J. Gale	2235	McKinley St NE	Mpls	MN	55418
Leslie Gale	4300	Camelot Dr	Minnetonk	MN	55345
Liane & Sam Gale	2862	Oxford St N	Roseville	MN	55113
Pamela R. Galinson	2230	Quebec Ave S	Saint Louis	MN	55426
Dorie Gallagher	4809	30th Ave	Mpls	MN	55417
Jim Gallagher	2423	Lincoln St NE	Mpls	MN	55418
Sarah Gallagher	5202	Zenith Ave S	Mpls	MN	55410
Mary Gallagher	1399	Edgecombe Rd	St Paul	MN	55116
Mary Gallagher	1432	Lafond Ave	Saint Paul	MN	55104
Cindy & Dan Gallaher	2009	Herschel St	Roseville	MN	55113
Michelle Galt	5207	Zenith Ave S	Minneapol	MN	55410
Pat Galvin	5036	28th Ave	Mpls	MN	55417
Lynne Gambucci	18129	Valley View Rd	Eden Prairi	MN	55436
Zach & Gerald Ganann	3441	Fremont Ave. S.	Minneapol	MN	55408
Greg Ganeus	2312	19th AVe Ne	Minneapol	NM	
Rachel Ganzek	5414	Byscane Ln	Minnetonk	MN	55345
J Gao	1828	Kenwood	Minneapol	MN	55403
Lyndsey Gapinski	2019	19th Ave Ne	Minneapol	MN	55418
Nick Garbis	5126	Knox Ave S	Minneapol	MN	55419
Sabrina Garbutt	813	Holly	St. Paul	MN	55104
Trish Gardiner	14409	Orchard Rd	Minnetonk	MN	55345
Andy Gardner	5220	29th Ave S	Minneapol	MN	55417
Leah Gardner	3952	27th Ave S	Minneapol	MN	55406
Michael & Kate Gardos R	2219	Taft St NE	Mpls	MN	55418
Karin Garfield	10418	Tuscon Way	Eden Prairi	MN	55347
Astrid Garino	2291	doswell Ave	St Paul	MN	55108
Peg Garofolo	17015	Kings Court	Lakeville	MN	55044
Elizabeth Garren		912 30th Ave S	Minneapol	MN	55406
Elizabeth (Liz) Garrett	5455	Bryant Ave S	Minneapol	MN	55419
Michael Garrett	3072	Patton Rd	Roseville	MN	55113
Michael Garrison	10121	Laurel Dr	Eden Prairi	MN	55347
James Garrison	3400	Quebec Ave S	Minneapol	MN	55426
Richard Garrison	3849	12th Ave S	Minneapol	MN	55407
Ashley Garske	338	3rd Ave NE	Minneapol	MN	55413

Lee Gartner	4947	Garfield Ave	Minneapol	MN	55419
Lydia Garver	1251	Charles Ave	St Paul	MN	55104
Joan Garvey	3419	Lincoln St NE	Minneapol	MN	55418
Bill Gasho	108	Orchard St S	Northfield	MN	55057
Sarah Gasparini	4023	Pillsbury Ave S	Minneapol	MN	55409
Fred Gates	5249	Ewing Ave S	Minneapol	MN	55410
Diane Gates	15009	Mckenzie Blvd	Minnetonk	MN	55345
Marcus Gatto	407	2nd St NE	Mpls	MN	55413
Mary & Sheldon Gaulke	2316	Sumter Ave S	Minneapol	MN	55426
Jen Gaveske	2708	W Armour Terr	St. Anthony	MN	55418
Francisco Gaytan	253	Macalester St	St. Paul	MN	55105
Gustav Gedatus	315	W 50	Minneapol	MN	55419
Anna Gefron	12700	31st Ave N	Plymouth	MN	55441
Linda Gehrlein	3144	Colfax Ave	Minneapol	MN	55408
C Gehrman	810	Queensland Ln	Plymouth	MN	55447
Lois Gehrman	2148	Eleanor Ave	Saint Paul	MN	55116
Ann Geier	2901	Toledo Ave S	St. Louis Pa	MN	55325
Jessica Geiger	3205	Halifax Ave N	St Paul	MN	55422
Kathy Geist	1248	Laurel Ave	St. Paul	MN	55104
C Gekas	7045	Ticonderoga Trl	Eden Prairi	MN	55346
Teddy Gelderman	306	St. Olaf Ave	Northfield	MN	55057
Annie Gemmell	4817	14th Ave S	Mpls	MN	55407
Elena Geneja	4833	Woodlawn Blvd	Mpls	MN	55417
KARA GENIA	5574	BRICKSTONE CT	SHOREVIEW	MN	55126
Richard George	15245	Lynn Terrace	Minnetonk	MN	55435
Maria A. Georgopoulos	1735	Morgan Ave	Minneapol	MN	55405
Rebecca Gepner	2221	Fairmount Ave	Saint Paul	MN	55105
Kris Gerber	3405	Rosewood Ln	Plymouth	MN	55441
Megan Gerlach	4831	Thomas Ave S	Mpls	MN	55410
Katrina Gerry	3431	Shore Dr	Chanhassen	MN	55331
Terry Gersemehl		PO BOX 842	Northfield	MN	55057
Andy Gervais	12415	Cockspur Court	Eden Prairi	MN	55347
Marie Gery	1107	Wild Rose ct	Northfield	MN	55057
Billy Gese	4710	Dupont Ave S	Minneapol	MN	55419
Amy Getsch	11711	Aster Way	Woodbury	MN	55129
Tony Ghilani	5210	Elliot Ave S	Mpls	MN	55417
Chris Giacomazza	4500	Abbott Ave S	Mpls	MN	55410
Nick Gianneth	3064	Evelyn St	Roseville	MN	55113
Allen Gibas	4239	Abbott Ave S	Mpls	MN	55410
Judy Gibbs	2335	Wilkyns Ave	Duluth	MN	55803
Tom Gibbs	3313	Glenhurst	St Louis Pa	MN	55416
Will Gibney-Jones	128	W 35th St	Mpls	MN	55408
Tim Gibson	9639	Belmont Ln	Eden Prairi	MN	55347
James Gibson	3116	Fremont Ave	Mpls	MN	55408
Elaine Giebenhain	3375	Rosewood Ln N	Plymouth	MN	55441
Laura Giefer	3100	Garfield St NE	Minneapol	MN	55418
Michelle Gies	4916	Nokomis ave S	Mpls	MN	55417

Michael Giesen	3505	Virginia Ave	St. Louis Pa	MN	55426
Joseph Giffen-Hunter	2722	RANDOLPH St NI	Mpls	MN	55418
Brian & Renissa Giffis	2934	Fillmore St. NE	Minnepolis	MN	55418
Kristine Giga Bauer	1494	Huron St	Saint Paul	MN	55108
Ann Gigrich	5308	Morgan Ave S	Minneapol	MN	55419
Amy Gilbert	1608	Hague Ave	Saint Paul	MN	55104
Sarah Gilbertson	1264	Dayton Ave	St. Paul	MN	55104
Julie Gilbertson	1215	St Anthony Pkwy	Minneapol	MN	55418
Toni Gilchrist	5013	Sheridan Ave S	Minneapol	MN	55410
Kathy Gilderman	5036	Morgan Ave S	Mpls	MN	55410
Chris Giles	1043	Grand Ave, #193	St. Paul	MN	55105
Katie Gillard	2524	Pahl Ave	St. Anthony	MN	55418
Rhoda Gilman	502	Lynnhurst Ave E	Saint Paul	MN	55104
Greg Gilmet	11507	Landing Rd	Eden Prairi	MN	55347
Mary Gilmore	17415	6th Ave N	Plymouth	MN	55447
G Gilomen	912	Juniper Ave	Northfield	MN	55057
Rie Gilsdorf	464	Newton Ave S	Minneapol	MN	55405
Therese Gimmestad	5549	23rd ave S	Mpls	MN	55417
ML Gindorff	3928	Monterey	St Louis Pa	MN	55416
Alisa Gingerich	2508	W Armour Terr	St. Anthony	MN	55418
Elliot Ginsburg	3920	Vincent Ave	Minneapol	MN	55410
David Ginter	3229	E Calhoun Pkwn	Minneapol	MN	55408
Marge Giny	4347	43rd Ave	Minneapol	MN	55406
Ross Girdeen	924	Cobb Rd	Shoreview	MN	55126
Doug Giron	7230	Green Valley Rd	Golden Val	MN	55427
Jim Gitar	4616	33rd Ave S	Mpls	MN	55406
Ingrid Giving	2301	Carter	St Paul	MN	55105-8
Marla Gladen	874	Howell St N	Saint Paul	MN	55104
Treyce Gladney	28	Oliver Ave S	Mpls	MN	55405
Pamela Glander	5544	Queen	Minneapol	MN	55419
Andrew Glasnovich	171	Arthur Ave SE	Mpls	MN	55414
Suzanne Glass	1157	Garden	Roseville	MN	55113
Pam Glass	800	Arlington Ave W	Saint Paul	MN	55117
Tifany Gleason	1266	Seminary Ave #1	St Paul	MN	55104
A Glenn	1189	Summit Ave	St. Paul	MN	55104
Veronica Glidd	3209	Hampshire Ave S	St. Louis Pa	MN	55416
Megan Glidden	2191	Eleanor ave	St. Paul	MN	55116
Colin Glidden	5219	10th Ave S	Mpls	MN	55417
Werner Glinka	1736	Oliver Ave S	Minneapol	MN	55403
Terry Glomski	2601	Webster Ave S	Saint Louis	MN	55416
Debbie Glotter	2825	Inglewood Ave S	Minneapol	MN	55416
Fran Glove	4515	17th Ave S	Mpls	MN	55407
Gleason Glover	4435	Douglas Ave	Golden Val	MN	55416
Steve Glykorgidd	8066	Hemlock Cir	Eden Prairi	MN	55347
April Glynn	3544	Bloomington Ave	Mpls	MN	55407
Sandra Godden	2240	Brewster St	St. Paul	MN	55108
Kelly Godfrey	2616	31st Ave NE	St. Anthony	MN	55418

Ann Godfrey	5133	Oliver Ave S	Minneapol	MN	55419
Cathleen Godsall	5601	Johnson Dr	Edina	MN	55436
Stephanie Goen	1157	Shyer	Roseville	MN	55113
Tim & Patty Goentz	3720	Garfield Ave	Minneapol	MN	55409
Edward and Jacquelyn Go	3622	Pleasant Ave	Minneapol	MN	55409
Gene Goetz	1710	Knox Ave S	Minneapol	MN	55403
Susan Goetzke	210	Lanewood Ln N	Plymouth	MN	55447
Angela Goetzke	4901	West Old Rd	Shakopee	MN	55347
Monica Gofts	3334	Cleveland St NE	Mpls	MN	55418
Whitney Gohman	8091	Hidden Cir	Chanhassei	MN	55317
David Gold	2709	E 50th St	Mpls	MN	55417
Rebecca Goldberg	4113	Beverly	Golden Val	MN	55422
Andrea Goldberg	2449	Dupont Ave S	Minneapol	MN	55405
Joyce Golden	11943	Welters Way	Eden Prairi	MN	55347
Brenda Golden	2835	blackstone Ave	St. Louis Pa	MN	55413
David Goldes	121	Malcom Ave	Minneapol	MN	55414
Mel Goldfein	4515	Heathbrooke Cir	Golden Val	MN	55422
Fia Goldfine	1168	James Ave	St. Paul	MN	55105
Alex Goldforb	2122	Drew Ave S	Minneapol	MN	55416
Nanette Goldman	2909	Glenhurst Ave	St Louis Pa	MN	55416
Laurie Goldsmith	2757	Zarthan Ave S	Minneapol	MN	55416
Patrick Goliwas	4113	W 42nd	Edina	MN	55416
Jodi Golliker	922	Nevada Ave W	St. Paul	MN	55108
Kristina Golling	5520	26th Ave S	Minneapol	MN	55417
Monica Gomez	4028	Ewing Ave. S.	MPLS	MN	55410
Nicole Gonyou-Robinson	5409	27th Ave S	Nokomis	MN	55417
Silvia Gonzalez	3128	42nd Ave S	Minneapol	MN	55406
George Gonzalez	3109	Rankin Rd	St. Anthony	MN	55418
Lynne Gonzalez	2918	Hillsboro Ave S	St. Louis Pa	MN	55426
Ramon Gonzalez	671	sierra Trl	Chanhassei	MN	55317
Paula Goode	412	1st St W	Northfield	MN	55057
Emily Goodhue	1257	Dayton Ave	St. Paul	MN	55104
Jennifer Goodman	4242	Blaisdell Ave S	Mpls	MN	55409
Kevin Goodman	1930	Walden Pl NE	Minneapol	MN	55418
Tim Goodman	2337	Texas Ave S	Saint Louis	MN	55426
Elizabeth Goodpaster	310	W Minnehaha Pl	Minneapol	MN	55419
Julia Goodwin	16916	Clear Springs Ter	Minnetonk	MN	55345
David Goodwin	448	Oliver Ave S	Mpls	MN	55405
John Gooley	3820	Yellowstone Ln N	Plymouth	MN	55447
Daniel Gorbunow	2942	Ewing Ave S	Minneapol	MN	55408
Chris Gordon	1240	Thomas Ave	Saint Paul	MN	55104
Zach Gordon	12560	Tussock Ct	Eden Prairi	MN	55347
Deanna Gordon	1600	Maryland Ave S	St. Louis Pa	MN	55426
Stephanie Gordon	5726	Minnehaha Dr	Golden Val	MN	55422
Adam Gordon	1116	raymond Ave	St Anthony	MN	55108
Kim Gordon	3249	47th Ave S	Minneapol	MN	55406
Zachary Gorr	2719	Johnson ST NE	Minneapol	MN	55418

Emily Gorzycki	2532	Garfield St Ne	Minneapol	MN	55418
Jane Goset	3404	The Mall	Minnetonk	MN	55345
Nancy Gosseln	2709	Xenwood Ave S	St. Louis Pa	MN	55416
Jeff Gotfredson	5404	25th Ave S	Mpls	MN	55417
Erin Gother	3518	Glenhurst Ave	St Louis Pa	MN	55416
Edmund Gottlieb	2630	Raleigh Ave	St Louis Pa	MN	55416
Greg Gouette	13813	Atwood	Rosemount	MN	55068
John Goulet	4794	Avon St	Shoreview	MN	55126
Steven Gove	2635	Sunset Ave	Minneapol	MN	55416
Amit Goyal	2915	31st Ave NE	St. Anthony	MN	55418
Dan Grabon	228	Sheridan Ave S	Minneapol	MN	55405
Kathy Grabowslike	5664	Royal Oaks	Shoreview	MN	55126
Elly Grace	1814	Oliver Ave S	Mpls	MN	55416
Ian Graf	5509	Wentworth Ave	Minneapol	MN	55419
Adam Grafa	3724	Colfax Ave S	Mpls	MN	55410
Keri Grafing	4933	Russel Ave S	Minneapol	MN	55419
Trish Grafstrom	728	Timber Lane	Shorevew	MN	55126
Ray Grahm	1276	Hague Ave	St. Paul	MN	55105
Jean R. Grams	64	Griggs	St Paul	MN	55105
Matt Gramse	937	Lowell Ave W	Roseville	MN	55113
Susan Grandys	4830	Lyndale Ave S	Minneapol	MN	55419
Alice Graner	3808	Washburn Ave S	Minneapol	MN	55410
Natasha Grant	18	W 49th St	Minneapol	MN	55419
Laura Grathwal	19135	Highland Ave	Deephaven	MN	55391
Paul Grausam	5549	Bryant Ave S	Minneapol	MN	55419
Bev Grause	808	Delaware Ave	Saint Paul	MN	55107
Randi Graves	3833	Washburn Ave. S	Minneapol	MN	55410
Richard Gray	1401	W Minnehaha Pl	Minneapol	MN	55419
Mary Gray	710	Kenneth St	St Paul	MN	55116
Rachel Gray	547	Glendale St	St. Paul	MN	55104
Cynthia Gray	2751	Aquila Ave S	St Louis Pa	MN	55426
Richard Gray	1331	Hubbard Ave	Saint Paul	MN	55104
Vince Graziano	121	Otis Ave	St. Paul	MN	55104
Khamsin Gredd	4208	W 70th St	Edina	MN	55345
Allison Gredesky	4937	31st Ave S	Mpls	MN	55417
Jennifer Green	4244	Aldrich Ave. S.	Minneapol	MN	55409
Michael Green	4043	Pleasant Ave	Minneapol	MN	55409
Charles Green	1483	Fairmount Ave	Saint Paul	MN	55105
Barbara Green	4405	Curve Rd	Edina	MN	55416
Lisa Greenberg	3400	Ziron Ln N	Plymouth	MN	55447
Beryl Greenberg	3008	E 24th St	Mpls	MN	55406
Lee Greenby	8712	Virginia Cir	St. Louis Pa	MN	55426
Connie Greenby	17940	3rd Ave N	Plymouth	MN	55447
Kim & Karyn Greene	4829	E Lake Harriet Pk	Mpls	MN	55419
Rob W. Greene	20	Russell Ave S	Minneapol	MN	55405
Meghan Greene	3328	France Ave	Robbinsdal	MN	55422
William Greene	5510	Upton S	Minneapol	MN	55410

Margaret Greener	9111	Stanten Rd	St. Louis Pa	MN	55426
Sarah Greenfield	3515	15th Ave S	Mpls	MN	55407
Nick Greennoon	1872	Pennington Ave	Eden Prairi	MN	55436
Nancy Greenwood	5504	Thomas Ave S	Mpls	MN	55410
Richard Greenwood	2615	38th Ave S	Minneapol	MN	55406
Patrick Greffin	701	Ramsey St NE	Minneapol	MN	55413
Melissa Gregg	210	5th Street E	Northfield	MN	55057
Ruth & WB Gregory	2139	Randolph Ave	Saint Paul	MN	55105
Barb Greig	19795	Cottagewood Rd	Deephaven	MN	55331
Krista Grelson	1556	Laurel Ave S	St PAul	MN	55104
William Greogry	8017	Lakeview	St Paul	MN	55117
Lorraine Grepe	3301	Townview Ln	St. Anthony	MN	55418
Ken Greshebar	5101	Oliver Ave S	Mpls	MN	55410
Judy Grew	4	Langford Park	Saint Paul	MN	55108
Andrew Grewell	33	W. 36th St.	Mpls	MN	55408
Bobby Griaiths	5341	Grand Ave S	Mpls	MN	55419
Jason Griak	2825	Irving Ave S	Minneapol	MN	55408
Mary Jane Griar	3737	Abbott Ave S	Minneapol	MN	55410
C.E. Gribble	1988	Sheridan Ave S	Mpls	MN	55405
Younee Grierson	2243	Hillside Ave	St Paul	MN	55108
Scott Griesbach	1699	Lincoln	St Paul	MN	55105
Liz Griesse	1277	W Minnehaha Pl	Minneapol	MN	55419
Elizabeth Griffen	3301	Glenhurst	St. Louis Pk	MN	55416
Patty Griffin	336	3rd Ave NE	Minneapol	MN	55413
Mandy Griffin	3051	Benjamin St NE	Minneapol	MN	55418
Beret Griffith	1412	Blue Flag Ct	Northfield	MN	55057
D Griffith	466	Portland Ave	St. Paul	MN	55104
Beth Griles	5312	Nokomis Ave	Minneapol	MN	55417
Michael Grillo	3113	Townview Ave N	St. Anthony	MN	55418
Sharon Grimes	5800	Knob Hill Ct	Minnetonk	MN	55345
Jeannie & Richard Grimm	224	W Minnehaha Pl	Minneapol	MN	55419
Adele Gro	3007	Buchanan St NE	Minneapol	MN	55418
Patrick Groessel	2955	Lincoln St NE	Mpls	MN	55418
Ben Groetsch	1445	Sheldon St	Saint Paul	MN	55108
John Grooms	3139	Pierce St Ne	Minneapol	MN	55418
C Groschen	6451	Pleasant Dr	Chanhassei	MN	55317
Ken Groshong	4500	Burr Oak Ln	Minnetonk	MN	55343
Michael Gross	3425	Aldrich Ave	Minneapol	MN	55408
Jennifer Gross	4715	Xerxes Ave S	Mpls	MN	55410
Ben Grosscup	195	Chapman St	Greenfield	MA	1301
Liv & Steve Grosser	18500	34th Ave N	Plymouth	MN	55447
Barb Grossman	6026	Hamilton St	Saint Louis	MN	55416
Sally Grossman	708	Prairie Street	Northfield	MN	55057
Aaron Grossman	3037	Aldrich Ave S	Mpls	MN	55408
Todd Gruber	4912	30th Ave S	Mpls	MN	55417
Pam or Josh Gruber	4608	W 39th St	St Louis Pa	MN	55416
Bonnie Gruen	3834	Washburn Ave S	Minneapol	MN	55410

Cheryl Gruffth	4727	Nokomis Ave	Nokomis	MN	55406
Bonnie Gruhlke	541	Arner Ave	Shoreview	MN	55126
Mary Jo Gruisdle	11765	26th Ave N	Plymouth	MN	55441
Edward Grundel	121	Cecil St SE	Minneapol	MN	55414
Joe & Kerry Grundhoefer	17	Sheridan Ave	Mpls	MN	55405
Rob Grunewald	2561	Burnham Rd	Minneapol	MN	55416
Kate Grymen	104	Seymour Ave SE	Mpls	MN	55414
Michele Guala	5305	Vincent Ave S	Minneapol	MN	55410
Brian Gubbs	5140	Irving Ave	Mpls	MN	55410
Danielle Guderian	4148	Minnehaha Ave	Mpls	MN	55406
Elizabeth Guentzel	3209	Raman Rd	Minneapol	MN	55418
Melissa Guernaccio	1916	Laurel Ave	Minneapol	MN	55405
Robert Guist	858	Albert St N	St Paul	MN	55104
Sarah Gullickson	4550	Grimes Ave N	Robbinsdal	MN	55422
Kim Guman	17120	Cedarcrest Dr	Eden Prairi	MN	55347
David Gundale	29	Clarence Ave	Mpls	MN	55414
Will Gunderson	6808	Oaklawn Ave	Edina	MN	55435
Cheryl Gunderson	5000	Woodlawn Blvd	Mpls	MN	55417
Luca Gunther	3200	Irving Ave S	Minneapol	MN	55408
M Gupta	456	Lake Wabasso Ct	Shoreview	MN	55126
Helen Guse	3357	Alabama Ave S	St. Louis Pa	MN	55416
Clay Gustafson	2319	Wilson St. NE	Minneapol	MN	55418
Alec Gustafson	104	Orlin Ave SE	Minneapol	MN	55414
Angela & Brian Gustafsor	4123	Zenith Ave S	Mpls	MN	55409
Linda Gustafson	4321	Zenith Ave	Robbinsdal	MN	55422
Cheryl Gustafson	2521	Brighton Ave Ne	Minneapol	MN	55418
Robert Gustafson	6940	Hillcrest Ln	Edina	MN	55435
Hannah Gustafsson	1238	Charles Ave	St Louis Pa	MN	55104
Tim Gustin	5104	Bryant Ave. S.	Minneapol	MN	55419
Johnny Guthman	3213	Holmes Ave	Minneapol	MN	55401
Sarah Gutknecht	2732	Ewing Ave S	Minneapol	MN	55416
Mercedez Guttier	4400	Bronson St	Edina	MN	55416
Lesley Guyton	1946	Fairmount Ave	Saint Paul	MN	55105
Darlene Guzman	1208	Portland Ave	Saint Paul	MN	55104
Jake Gysland	140	M St NE Apt#85(	Washingto	DC	20002
Angle H	6650	Hopi Rd	Chanhasse	MN	55317
Frank H	4344	Drew Ave S	Mpls	MN	55410
Herb H	7661	Nicholas Way	Chanhasse	MN	55317
Karen H	4370	Dupont Ave S	Mpls	MN	55410
Nick H	3600	13th Ave S	Mpls	MN	55407
Matt H	5004	Oliver Ave S, #1	Mpls	MN	55410
Edward H	6028	Pinewood Ln	Minnetonk	MN	55345
Gretchen H	3506	Abbott Ave N	Robbinsdal	MN	55422
Molly H	120	Waeuck St	Mpls	MN	55414
Will H	8181	Valley View Rd	Eden Prairi	MN	55436
Tracie Haagensen	305	Merrimac Ln N	Plymouth	MN	55447
Bethha Haarbaur	1137	Iowa Ave	Minneapol	MN	55108

Edward Habbing	5605	Beard Ave S	Edina	MN	55424
Brad Habeck	1849	Ulysses st. NE	Mpls	MN	55418
John Haberman	3518	Cleveland St NE	Minneapol	MN	55418
Sarah Hachey	3629	Grand Ave	Mpls	MN	55409
Katherine Hack	2916	Hilldale Ave NE	Mpls	MN	55418
Emmi Hackbarth	3132	Holmes Ave, #1	Mpls	MN	55408
Jeff Haddorff	4042	Linden Hills Blvd	Minneapol	MN	55410
Mary Hadley	2955	Asbury	Roseville	MN	55113
Doug Haefele	2215	Irving Ave S	Minneapol	MN	55405
Ellie Hagel	2730	Aldrich Ave S	Minneapol	MN	55408
Laura Hageman	1469	Pascal St	St. Paul	MN	55108
Andrew Hagemann	972	Hoyt Ave W	St Paul	MN	55117
Robert Hagen	4815	Culver Rd	Golden Val	MN	55422
Eric & Pris Hagen	4641	Washburn Ave S	Mpls	MN	55410
Rodger Hagen	3282	Owasso Hts Rd	Shoreview	MN	55126
Koby J. Hagen	4909	28th Ave S	Minneapol	MN	55417
Derek Hager	4524	Abbott Ave S	Minneapol	MN	55410
Nickie Hager	5552	24th Ave S	Mpls	MN	55417
Priscilla Hager	4641	Washburn	Minneapol	MN	55410
Barbara Hager	4253	13th Ave S	Minneapol	MN	55407
Naomi Hageston	3335	Central Ave NE	Mpls	MN	55418
Michael Haggerty	4801	15th Ave S	Mpls	MN	55417
Silas & Corzen Hagon	2716	Joppa Ave S	St Louis Pa	MN	55416
Clare Hahneman	4047	Sunnyside Rd	Edina	MN	55424
Mary Haigh	1962	Wellesly Ave	St. Paul	MN	55105
Wendy Haight	1285	Osage St	St Paul	MN	55117
Marilyn Haight	4133	Harriet Ave	Minneapol	MN	55409
Ben Hajny	4558	29th Ave S	Mpls	MN	55406
Nathan Haker	3736	Hubbard Ave N	Robbinsdal	MN	55422
Matt Hala	283	Washburn Ave N	Mpls	MN	55405
Jill Halbrooks	5300	Brookview Ave	Edina	MN	55424
Ryan Haley	9520	18th Ave S	Mpls	MN	55407
Nora Half	3036	Polk St NE	Mpls	MN	55418
Riley Halgeson	902	GRAND AVE #30	St. Paul	MN	55105
Erich Hall	2530	cleveland St NE	Mpls	MN	55418
Jim Hall	2617	S Terr	St. Anthony	MN	55418
P Casey Hall	140	Bedford St SE	Prospect Pa	MN	55414
Kristofer Hall	4823	Woodlawn Blvd	Mpls	MN	55417
Ray Hall	4724	28th Ave S	Mpls	MN	55406
Barbara Hall	815	Martha Lake Ct	Shoreview	MN	55126
Emily Hall	2218	25th Ave S	Mpls	MN	55404
David Hall	1144	Hague Ave	Saint Paul	MN	55104
Kathleen Hall	4749	Chowen Ave S	Minneapol	MN	55410
Rosemary Hall	8022	Cedar Lake Rd S	Minneapol	MN	55426
Susan Hallberg	411	Del Reo Dr	Chanhassen	MN	55331
Vern Hallberg	2700	W 55th St	Minneapol	MN	55410
Kaitlin Hallet	4901	Browndale Ave	Edina	MN	55424

Corey Halls	4230	Brookside Ave	Saint Louis	MN	55426
J.W. Hally	611	8th Ave SE	Minneapol	MN	55414
Barbara & Russell Halone	5325	Shore Trail SE	Prior Lake	MN	55435
Will Halstead	2708	Murray Ave	St. Anthony	MN	55418
Bob Halstead	5230	33rd Ave S	Nokomis	MN	55417
Bob Halt	193	Kenwood Pkwy	Minneapol	MN	55405
Joyce Halverson	2289	Commonwealth	Saint Paul	MN	55108
C Halverson	4112	Cedarwood Rd	St. Louis Pa	MN	55416
Danneka Halverson	3036	Idaho S	St. Louis Pa	MN	55426
Mary Ellen Halverson	5337	Zenith Ave S	Mpls	MN	55410
Al Halvorsen	937	Brooks Ave S	Roseville	MN	55113
Kim Halvorson	3726	Grand Ave S	Mpls	MN	55409
Gus & Joette Hamann	1628	Lafond Ave	St. Paul	MN	55104
Sara Hamann	4344	Coolidge Ave	St. Louis Pa	MN	55416
Zach Hamann	1406	Van Buren Ave	St Paul	MN	55104
Michael Hameck	2117	Hoyt Ave W	St Paul	MN	55108
Shabana Hameed	4811	Maple Road	Edina	MN	55424
Mona Hamel	963	Oakridge Ave	Shoreview	MN	55126
Emilie Hamilton	1065	Dayton Ave	St. Paul	MN	55104
Arlene Hamilton	55178	27th Ave	Nokomis	MN	55417
Kari Hamlin	820	Holton St	St Paul	MN	55104
Brad & Allyson Hammer	710	Sycamore Ln N	Plymouth	MN	55441
Debby Hammer	1488	Huron St	Saint Paul	MN	55108
Sarah Hammes	3354	Owasso Heights	Shoreview	MN	55126
Tracy Hammond	2511	McKinley St NE	Mpls	MN	55418
Lindsay Hamp	10413	W 34th Cir	Minnetonk	MN	55305
Larry Hampel	1983	Field Ave	Saint Paul	MN	55116
Neil Hamrin	1131	Homestead Ln	Chanhasse	MN	55317
Kate Hanagan	3504	Abbott Ave N	Robbinsdal	MN	55422
R Hand	1426	Hague Ave	St Paul	MN	55104
Dan Handeen	2405	26th Ave S	Mpls	MN	55404
Brent Handel	3410	10th Ave S	Mpls	MN	55407
Tyler Handeland	3640	Colfax Ave	Minneapol	MN	55408
Ann Hanek	5316	Drew Ave S	Minneapol	MN	55410
Connor Haneld	205	Lexington Pkwy	St Paul	MN	55105
Sujezana Haner	2508	Quentin Ct	St. Louis Pa	MN	55416
Andy Haney	404	Highland Dr	Chanhasse	MN	55317
Rachel Hanley	3339	Emerson Ave S	Mpls	MN	55408
Melanie Hanlon	2658	McKinley St	Mpls	MN	55418
Tim Hannagan	6613	Cornelia Dr	Edina	MN	55435
John Hannan	4321	Chowen Ave S	Mpls	MN	55410
Dave Hans	406	Santa Fe Circle	Chanhasse	MN	55346
Kristi Hans	406	Santa Fe Circle	Chanhasse	MN	55331
Gail Hansa	326	E 50th St S	Minneapol	MN	55419
Marshall Hansen	416	6th St E	Northfield	MN	55057
Brenda Hansen	2334	Carter Ave	Saint Paul	MN	55108
T Hansen	2816	Roosevelt St NE	St. Anthony	MN	55418

Thomas Hansen	4015	Wentworth Ave	Mpls	MN	55409
Lisa Hansen	3531	Halifax Ave N	Robbinsdal	MN	55422
Gretchen Hansen	2555	37th Ave S	Mpls	MN	55406
Matt Hansen	2312	32nd Ave S	Mpls	MN	55406
Cynthia Hansen	5142	Knox Ave S	Minneapol	MN	55419
Feiona Hansen	7282	Bren Ln	Eden Prairi	MN	55436
Denison Hansen	1235	Van Buren Ave	Saint Paul	MN	55105
Adele and Steven Hanser	4101	Raleigh Ave	St Louis Pa	MN	55416
Mary Hanson	4300	19th Ave S	Minneapol	MN	55407
Katherine Hanson	667	Delaware Ave	St. Paul	MN	55107
Greg & Nancy Hanson	2423	Irving Ave S	Minneapol	MN	55408
nancy hanson	4231	Xerxes Ave S	Minneapol	MN	55410
Mark Hanson	2813	Hampshire Ave S	St. Louis Pa	MN	55426
Carl Hanson	2540	Zinran Ave S	St. Louis Pa	MN	55426
Jessica Hanson	3533	12th Ave S	Mpls	MN	55407
Sue Hanson	3500	Hopkins Crossro	Shoreview	MN	55126
Erin Hanson	2510	Thomas Ave S	Minneapol	MN	55405
Bill Hanson	7607	Great Plains Blvc	Chanhasse	MN	55317
Allan Hanson	3128	Holmes Ave	Minneapol	MN	55408
Marshall Hanson	416	College St	Northfield	MN	55057
Paul A. Hanson	2100	Milwaukee Ave	Minneapol	MN	55404
Cindy & Arlen Hanson	11825	27th Ave N	Plymouth	MN	55441
Liz Hanson	2211	Quebec Ave S	Saint Louis	MN	55426
Chris Hardee	2330	Ne Roosevelt St	Minneapol	MN	55418
Lucas Harder	3414	Hayes St NE	Mpls	MN	55418
Jack Hardin	4254	Ohana Ave S	St Louis Pa	MN	55416
Lindsay Harding	128	W 35th St	Mpls	MN	55408
Paul Harding	2757	Dorman Ave	Minneapol	MN	55406
JoAnn Hardon		PO Box 47854	Plymouth	MN	5544
Clint Hardy	2330	County Rd 101 N	Plymouth	MN	55447
Mary & Daniel Hardy	686	Fairmount Ave	Saint Paul	MN	55105
Rick Hareman	2915	Cleveland St NE	Minneapol	MN	55418
Janis Harg	4609	Sunset Rdg	Golden Val	MN	55422
Joan Hargrave	5204	Washburn Ave S	Minneapol	MN	55410
Mary Harigan	3512	Aldrich Ave	Mpls	MN	55408
Chris Harkness	1482	Midway Pkwy	Saint Paul	MN	55108
Laurie Harkness	7602	Huron Ave	Chanhasse	MN	55317
Tom Harlan	4517	Vincent Ave S	Minneapol	MN	55410
Patt Steve Harlan-Marks	4537	York Ave N	Robbinsdal	MN	55422
Rae Harmel	5115	Drew Ave S	Mpls	MN	55410
Tim Harmon	4700	W 28th St	St. Louis Pa	MN	55416
Linda Harness	4636	York Ave S	Minneapol	MN	55410
Vicki Harper	1128	Woodland Tr	Northfield	MN	55057
Rebecka Harper	3240	Garfield Ave	Minneapol	MN	55408
Zach Harpster	534	Curfew St	St Paul	MN	55104
Shannon Harquine	134	Amber Street	St Paul	MN	55105
Elaine Harries	1052	Ramsdell Dr	Apple Valle	MN	55124

Dan Harrington	3004	Colorado Ave S	St. Louis Pa	MN	55416
Stacy Harrington	4249	Quentin Ave	St Louis Pa	MN	55416
Ali Harris	3011	garfield St NE	Mpls	MN	55418
Jenean Harris	3335	Everest Ct N	Plymouth	MN	55447
Sharon Harris	91	Olympic Cir	Chanhassen	MN	55317
Scott Harris	3452	16th Ave S	Mpls	MN	55407
Colin Harris	3025	Colfax Ave S	Minneapol	MN	55408
David Harris	108	Lincoln St N	Northfield	MN	55057
Frank Harris	1669	Ridgewood Ln N	Roseville	MN	55113
Julie Harrison	1391	Fairmount Ave	St Paul	MN	55105
Kari Harrison	4832	Queen Ave S	Minneapol	MN	55419
Steve Harrison	7261	Conestoga Ct	Chanhassen	MN	55317
Russell Harrisq	2347	Clevaland St	Minneapol	MN	55418
Ronda & Tim Harrity	2600	Perry Ave N	Golden Val	MN	55422
Teresa Harron	3016	Old Highway St	Minneapol	MN	55418
Janice Harstad	12100	Cambridge Ct.	Minnetonk	MN	55305
Lori Hart	4436	Vincent Ave S	Minneapol	MN	55410
Carrol Hart	92	Camridge	St Paul	MN	55105
Linda Hart	4420	Colfax Ave S	Minneapol	MN	55419
Donovan & Rama Hart	4213	Aldrich Ave S	Minneapol	MN	55409
Lindsey Hartert	2129	Lincoln Avenue	St Paul	MN	55105
Gail Harthan	4122	Vincent Ave S	Minneapol	MN	55410
Robin Hartl	9511	Cedar Lk Rd	St. Louis Pa	MN	55426
Sarah Hartman	1948	Sheridan Ave S	Burnsville	MN	55337
Robin Hartnell	1920	Oliver Pl	Minneapol	MN	55403
Mary Hartnett	2533	Colfax Ave S	Minneapol	MN	55405
Ryan Hartney	2014	W 53rd St	Mpls	MN	55410
Stephen Haruz	286	Washburn Ave N	Mpls	MN	55405
Todd Harvey	1600	Prairie St	Northfield	MN	55057
Patricia Harwell	8925	Medley Ln	Golden Val	MN	55427
Diane Harwood	401	Oak So	Northfield	MN	55057
Bob Harwood	2525	16th Ave S	Mpls	MN	55406
Maia Hasager	4051	Pleasant Ave	Minneapol	MN	55409
Richard Haskin	5037	Gladstone Ave	Minneapol	MN	55419
Jacob Haskins	5304	Nokomis Ave	Nokomis	MN	55417
A Hasmudeen	6905	Dawson Ln	Edina	MN	55435
Amy Hass	1794	Jewel Dr	Woodbury	MN	55125
Nasro Hassan	7647	Nicholas Way	Chanhassen	MN	55317
Phyllis Hassel	816	W California Ave	St. Paul	MN	55107
Marie Hassell	4945	Colfax Ave S	Mpls	MN	55419
Stacy Hastad	430	Lace Way Rd	Chanhassen	MN	55317
Robert & Marian Hatch	2005	Pinehurst Ave	Saint Paul	MN	55116
Paul Hatch	4720	Wentworth Ave	Minneapol	MN	55419
Derek Hatten	2601	Kentucky Ave	St. Louis Pa	MN	55426
Dana Hauch	5528	Girart Ave S	Minneapol	MN	55419
Eric Hauer	2428	35th Ave S	Minneapol	MN	55406
Don Hauge	1478	Branston St	Saint Paul	MN	55108

Arlen & Marge J. Hauge	5233	Woodlawn Blvd	Minneapol	MN	55417
David Haugen	3343	Tyler St NE	Mpls	MN	55418
David Haugen	3348	Rhode Island Ave	St Louis Pa	MN	55426
Deb Haugen	1141	Portland Ave	St. Paul	MN	55104
Brianna Haugen	14821	Lloyds Dr	Mpls	MN	55408
Kris Haugen	5408	Columbus Ave	Minneapol	MN	55417
Jon Hauger	3838	Lynn	St Louis pa	MN	55416
John Hauger	9673	Belmont Ln	Eden Prairi	MN	55347
Meg Haugo	2281	Priscilla St	St Paul	MN	55108
Beth Haukebo	3219	E 50th St	Minneapol	MN	55406
Arlen Haurilla	9020	W 31st St	St. Louis Pa	MN	55426
Dave Haus	1534	Sheldon	St. Paul	MN	55108
Tiffany Hauser	3108	Croft Dr	Minneapol	MN	55418
Melissa Hausing	4520	Chowen Ave S	Mpls	MN	55410
Brynn Hausmann	2725	Lynn Ave	St Louis Pa	MN	55416
Lynette Hawkinson	18205	24th Ave N	Plymouth	MN	55447
Betsy Hawn	3837	Beard Ave S	Mpls	MN	55410
Susan Hawthorne	4230	Abbott Ave S	Minneapol	MN	55410
Elisa Hayday	2112	Berkeley Ave	Saint Paul	MN	55105
Pat Hayes	5848	Logan Ave S	Minneapol	MN	55419
Thao Hayzh	2418	Fremont Ave S	Minneapol	MN	55405
Ru He	3820	Yellowstone Ct N	Plymouth	MN	55446
Yi & Mei He & Chen	2947	Dunlap Cir N	Roseville	MN	55113
Kathy Heafey	2722	W 47th St	Minneapol	MN	55410
Chris Heagle	4812	31st Ave S	Minneapol	MN	55417
Jimmie Heags Jr.	4023	25th Ave S	Mpls	MN	55407
Mike & Judy Healy	2316	Oliver Ave S	Minneapol	MN	55405
Andy Healy	2824	Edgewood Ave S	St. Louis Pa	MN	55426
Andrew & Shelly Healy	99	Forest Dale	Minneapol	MN	55410
Dave Healy	2246	Scudder St	Saint Paul	MN	55108
Jeff Heathcote	6115	Lincoln Dr #143	Edina	MN	55436
Eric Heaton	2165	Carroll Ave	St Paul	MN	55104
Andrew Hebert	6566	Shadow Ln	Chanhassen	MN	55317
Paul Heck	8713	Walton Oaks Dr	Bloomingto	MN	55438
Kirsten Hedin	19017	Joseph Curve	Eden Prairi	MN	55346
Doug Hedin	508	Minnehaha Pkwy	Mpls	MN	55419
Shawna Hedlund	4628	31st Ave S	Minneapol	MN	55406
Steve Hedlund	2625	Holly Lane N	Plymouth	MN	55447
John and Margi Hedren	18905	Highland Ave	Wayzata	MN	55391
Sarah Hedstrand	232	Penn Ave S.	Minneapol	MN	55406
Chris Heeb	4201	Marlborough Ct	Minnetonk	MN	55345
Tim Hegg	5517	Cumberland Rd	Minneapol	MN	55410
Amy Hehir	1731	Portland Ave	St Paul	MN	55104
Marian Hehre	5345	Clinton Ave	Minneapol	MN	55419
Joanne Heider	2091	Juno Ave	Saint Paul	MN	55116
Aaron Heidgeken-Greene	212	Bedford St SE	Mpls	MN	55414
Jacqui Heie	4213	13th Ave S	Mpls	MN	55407

Kim & Gene Heikkinen	301	Sinner Circle	Chanhassei	MN	55317
Philip Heil	4239	Russell Ave N	Minneapol	MN	55412
Kathleen Heinlen	462	Otis Ave	St Paul	MN	55104
Monty Heinnick	5404	Irving Ave S	Mpls	MN	55419
James Heintz	1308	Tyrol Trl	Golden Val	MN	55416
Karl Heinzehy	4206	Cedar Lake Rd S	St Louis Pa	MN	55416
Paul Heiring	2046	Acorn Circle	Wayzata	MN	55391
Kristy Heise	2326	W 54th	Minneapol	MN	55410
Kari Heitaner	2918	Benton Blvd	Minneapol	MN	55416
Leslie Held	5924	Ewing Ave S	Edina	MN	55410
Sandra Helder	3723	Garfield Ave	Minneapol	MN	55409
Matt Helge	4709	4th Ave S	Mpls	MN	55419
Robin & John Helgen	5312	Fremont Ave S	Minneapol	MN	55419
Randy Mary Helgesen	9702	Belmont Lane	Eden Prairi	MN	55347
Jessica Helland	361	Parkland Way	Chanhassei	MN	55317
Mary Beth Heller	3920	Van Nest Ave	Mpls	MN	55408
Josh Hellman	3009	Polk ST NE	Minneapol	MN	55418
Randi & Geoffrey Hellma	2119	Emerson Ave S	Minneapol	MN	55405
Sharon Helps	3659	Lee Ave N	Robbinsdal	MN	55422
Turi Hembre	17630	27th Ave N	Plymouth	MN	55447
Lori Hemmah	612	6th St E	Northfield	MN	55057
Soo Hemmingson	1725	Logan Ave S	Minneapol	MN	55403
Jill Hempel	3707	S Cedar Dr	Chanhassei	MN	55331
Caitlin Hemstad	1124	Iowa Ave W	St. Paul	MN	55108
Jessie Hendel	3252	36th Ave S	Mpls	MN	55406
Tom Henderson	11621	????	Minnetonk	MN	55305
Jenny Henderson	710	Maple Pond Ct	Shoreview	MN	55126
Craig Henderson	187	Island Ave NE	Minneapol	MN	55413
Sarah Henderson	2330	Taft St NE	Minneapol	MN	55418
Tristan Henderson	1924	Laurel Ave	Minneapol	MN	55405
Lara Hendlin	1600	Jersey Ave S	St. Louis Pa	MN	55426
Jason Hendrekson	1184	Fairmount	St. Paul	MN	55105
Mary & Neil Hendrickson	1452	Van Buren Ave	St. Paul	MN	55104
T Hendrickson	5404	Bryant Ave S	Mpls	MN	55419
Diana Hendrickson	2730	Ulysses ST NE	Minneapol	MN	55418
Timothy Hendrickson	2319	McKinley St NE	Minneapol	MN	55418
Bob & Kathy Hendricksor	4725	Vallacher Ave	St Louis Pa	MN	55416
Volney Hendrix	5220	Irving Ave S	Minneapol	MN	55419
Julie Hendry	3421	Fordham Ct.	St. Anthony	MN	55421
Christal Hendson	8980	SW Village Loop	Chanhassei	MN	55317
Jill Hener	3925	Grand Ave S	Mpls	MN	55408
Kris Hengel	4829	W 41st St	St Louis Pa	MN	55416
Robert Hengelfelt	756	Ashland Ave	Saint Paul	MN	55104
Peter Henke	1100	E Minnehaha Pk	Minneapol	MN	55417
Marnie Henke	425	France Ave	Golden Val	MN	55429
John Henna	1822	Emerson Ave S	Minneapol	MN	55403
Robert Hennelly	1726	Portland Ave	St Paul	MN	55104

Emily Hennen	1541	Laurel Ave	St. Paul	MN	55104
John Hennessy	2330	Benjamin St NE	Minneapol	MN	55418
Jeff Henning-Smith	330	E 50th	Mpls	MN	55419
Jesse Hennum	1191	Ashland Ave	Saint Paul	MN	55104
Eiler Henrickson	3047	Arthur St NE	Mpls	MN	55418
Julie Henry	3421	Fordham Ct	Mpls	MN	55418
Phil Henry	1061	Idaho Ave W	St. Paul	MN	55108
Wendy Henry	4728	Garfield Ave	Minneapol	MN	55419
Travis Henspeter	1115	Edmund	St Paul	MN	55104
Renee Hepperlan	4634	Twin Haven Rd	Minnetonk	MN	55343
Tim Herbstrith	914	W 36th St	Minneapol	MN	55408
Pat & Ray Herje	916	Franklin Ter	Minneapol	MN	55406
Charlotte Herman	79	Clarence Ave SE	Minneapol	MN	55414
Dan Herman	5353	41st Ave S	Minneapol	MN	55417
John & Bettine Hermansc	1173	Hague Ave	Saint Paul	MN	55104
Timothy Hermes	8418	Virginia Cir N	St Louis Pa	MN	55426
Rebecca Hernandez	3191	W Owasso Blvd	Shoreview	MN	55113
Kathy Herrema-Johnson	1541	Arona	St. Paul	MN	55108
Bror Herrick	1046	Brooks Ave W	Roseville	MN	55113
James Herring	4237	Utica Ave S	St Louis Pa	MN	55416
Linda Herron	2617	E 5th St	Duluth	MN	55812
Jason Hertel	2322	McKinley St NE	Minneapol	MN	55418
Jeff Hertel	2474	Lydia	Roseville	MN	55113
Lisa & Hearth Hertel	2833	Joppa Ave S	St Louis Pa	MN	55416
Pat Hertelendy	1855	Noble Dr	Golden Val	MN	55422
Lee Herum	1464	Como Ave	St. Paul	MN	55117
Todd & Karen Hesla	3517	17th Ave S	Minneapol	MN	55407
L Hess	146	Prospect Ave	Minneapol	MN	55419
George Hess	5237	Lochloy Dr	Edina	MN	55436
John Hesse-Moline	388	Hamline Ave S	St. Paul	MN	55105
Paul Hestrom	1472	Clarman Ave	Roseville	MN	55113
Heather Hetleen	4021	York Ave N	Robbinsdal	MN	55422
Nicole Hettwer	2738	Polk St. NE	Minneapol	MN	55418
Martha Hewett	5124	Vincent Ave S	Minneapol	MN	55410
Clint Hewitt	2412	Russel Ave S	Minneapol	MN	55409
Bruce Heyl	4325	30th Ave S	Nokomis	MN	55407
Mar Heyl	4325	30th Ave S	Minneapol	MN	55406
Brad Heyne	18130	20th Ave	Plymouth	MN	55447
Susan Hicklin	17872	Lin Ln	Eden Prairi	MN	55346
Barb Hickman	3412	31st Ave NE	St. Anthony	MN	55418
Chris Hickman	3424	31st Ave NE	St. Anthony	MN	55418
Kedar Hickman	863	Laurel Ave	St. Paul	MN	55104
Joanna Hicks	2624	Joppa Ave S	St. Louis Pa	MN	55416
Bill Hicks	1425	Granthams St	St. Paul	MN	55108
Jeff & Julie Hickstein	2856	France Ave S	Minneapol	MN	55416
Layne Hieb	2235	Leyland Trl	Woodbury	MN	55125
Tawny Hieger-lerdal	1610	Hamline Ave N	St. Paul	MN	55108

Amy Higgins	2217	E Lake	Minneapol	MN	55408
Yesi High	4125	Trenton Ln N	Plymouth	MN	55447
Jim Hilbert	2089	Upper Saint Den	Saint Paul	MN	55116
Sherri Hildebrandt	1622	Berkeley Ave	Saint Paul	MN	55105
Vivian Hildebrandt	5508	Chicago Ave	Minneapol	MN	55417
Gerri Hilgers	3057	Highpointe Cir	Roseville	MN	55113
Marilyn Hill	619	Nevada St.	Northfield	MN	55057
Peter Hill	2605	Urbandale Ln	Plymouth	MN	55447
Martel Hill	1282	Hague Ave	St. Paul	MN	55105
Kate Hill	1716	Dupont Ave S	Minneapol	MN	55403
John Hill	734	Amber Dr	Shoreview	MN	55126
Karla Hill-Donison	4148	Garfield Ave S	Minneapol	MN	55409
Lauren Hill-Klemme	1123	Laurel Ave	St. Paul	MN	55105
Penny Hillemann	12	Frances Cir	Northfield	MN	55057
Michelle Hillesheim	1621	Jersey Ave S	St Louis Pa	MN	55426
Cheryl Hillman	3459	Halifax Ave	Robbinsdal	MN	55422
Lisa Hillman	4020	21st Ave S	Mpls	MN	55407
Dawn Hills	1234	Sherburne	St Paul	MN	55104
Denny Hills	3226	Polk St Ne	Minneapol	MN	55418
John Hilsen	7929	Sheldon St	Roseville	MN	55113
Andres Himmelstrup	1333	Chelmsford St	Saint Paul	MN	55108
Rob Himmerick	980	Saddlebrook Cur	Chanhassei	MN	55317
Jack Hindes	1486	Lincoln Ave	ST paul	MN	55105
Lueann Hindraker	1505	Grand Ave	St Paul	MN	55105
Mitch Hine	2900	Taylor ST	Minneapol	MN	55418
Jenna Hines	2630	Benjamin St NE	Mpls	MN	55418
Michael Hines	5545	23rd Ave S	Mpls	MN	55417
Andrew Hinkley	2609	W 39th St	Mpls	MN	55410
LEE HINMAN	4437	NOKOMIS AVE S	Minneapol	MN	55405
Chelsea Hinnekamp	2928	Zenith Ave N	Robbinsdal	MN	55422
Amy Hinrichs	2154	Dayton Ave	Saint Paul	MN	55104
Jennifer Hinz	15873	Elodie Ln	Minnetonk	MN	55345
Sarah Hippert	1715	Lowry Ave NE	Minneapol	MN	55418
Mike Hirsch	516	Fourth Ave SE	Mpls	MN	55414
Jerilyn Hirsch	1633	Cedar Lake Pkwy	Minneapol	MN	55416
Brett Hirsch	2726	Arthur St Ne	Minneapol	MN	55418
Steve & Frances Hirsch	1115	W Minnehaha Pl	Minneapol	MN	55419
Paul Hirschboeck	2124	Niles Ave	Saint Paul	MN	55116
Steve Hirshfeld	2810	Dunbury Way	Minnetonk	MN	55305
Revae Hitt	1311	Peralta	Oakland	CA	94607
Emma Hixson	1959	Stinson Blvd NE	Minneapol	MN	55418
Lora Hlavsa	1846	E 26th St	Mpls	MN	55404
Melissa Hoag	3337	Yosemite Ave. S.	St. Louis Pa	MN	55416
Cynthia and Russell Hobb	2751	Folwell Ave	Falcon Heig	MN	55108
Ken Hobbins	1102	W Hayton Ave	St Paul	MN	55108
Ben Hobbins	430	3rd Ave NE	Minneapol	MN	55413
Mollie Hoben	1443	Grantham St	Saint Paul	MN	55108

Melissa Hochstetler	2200	E 24th St	Mpls	MN	55404
Ryan Hockey	4163	Brookside Ave	St. Louis Pa	MN	55416
Anne Hodeson	318	E Busch Terr	Minneapol	MN	55419
Evan Hodgdon	4120	Yosemite Ave S	St. Louis Pa	MN	55416
Fred Hodges	4825	Upton Ave S	Mpls	MN	55410
Muhamed Hodzic	4432	Thomas Ave S	Mpls	MN	55410
Matt Hoenck	3830	Inglewood Ave. S	St. Louis Pa	MN	55416
Matt Hoerek	3830	Inglewood Ave S	St Louis Pa	MN	55416
Wayne Hoeschen	4405	Harbor Pl	Shoreview	MN	55126
Monica Hofe	3953	Van Nest Ave	Minneapol	MN	55409
Susan Hoff	221	Frontier Ct	Chanhasse	MN	55317
Mike Hoff	4315	York Ave S	Minneapol	MN	55410
Noreen Hoff	1811	Scheffer Ave	Saint Paul	MN	55116
Andrea & Brian Hoff	1109	Lupine Dr	Northfield	MN	55057
KIM or Jim HOFFMAN	7570	CHIPPEWA TRL	CHANHASS	MN	55317
Cecilia Hoffman	1435	Thomas Ave	St Paul	MN	55104
Martha Hoffman	1510	Osceola Ave	Saint Paul	MN	55105
Chris Hogan	2217	St. Anthony Pkw	Mpls	MN	55418
Cory Hogan	3732	Harriet Ave	Minneapol	MN	55409
Jo Hogan	1115	Laurel Ave	Saint Paul	MN	55104
Mike Hoganson	919	Iowa Ave. W.	St. Paul	MN	55117
Sally Hogen	17660	27th Ave N	Plymouth	MN	55447
Bob Hohman	590	Transit Ave	Roseville	MN	55113
Gina Hohn	3137	Shores Blvd	Minnetonk	MN	55391
Roger Hokanson	2941	42nd Ave S	Minneapol	MN	55406
Judy Holberg	2637	Zarthan S	St. Louis Pa	MN	55413
Matt Holcomb	914	E Minnehaha Pk	Mpls	MN	55419
Syd Holcomb	4232	Aldrich Ave S	Minneapol	MN	55409
Ann or Scott Holdahl	705	E 57th St	Minneapol	MN	55417
Stephanie Holden	3531	14th Ave S	Mpls	MN	55407
Jake Holdrelth	2199	St. Clair Ave	Saint Paul	MN	55105
Chuck & Alice Holdswortl	3732	Blaisdell Ave. S.	Minneapol	MN	55408
Luke Holifield	5357	Irving Ave S	Minneapol	MN	55419
Kelly & Michael Holland	2238	Buchanan St NE	Mpls	MN	55418
Jennifer Hollander	3535	York Ave N	Robbinsdal	MN	55422
Spragae Hollander	4023	Wentworth	Minneapol	MN	55409
Max & Patricia Hollenback		Rosewood Lane	Roseville	MN	55113
Lisa Hollingsworth	1610	W. Franklin	Mpls	MN	55405
Matt & Karla Hollinshead	2114	Pinehurst Ave	Saint Paul	MN	55116
Melanie Holloway	5010	3rd Ave S	Mpls	MN	55419
Chol Holm	2836	Irving Ave S	Minneapol	MN	55408
Rebecca Holman	210	Warwick St	Mpls	MN	55414
Andrew Holmberg	4025	CHICAGO AVE	Minneapol	MN	55407
Domnic Holmes	2410	Zircon Ln N	Plymouth	MN	55447
Mim Holmes	493	Mount Curve Blv	Saint Paul	MN	55116
Debora Holmes	1208	Garrison St NE	Olympia	WA	98506
Beth Holmgren	703	Portland Ave	Saint Paul	MN	55104

Holy Holt	3000	Cleveland St NE	Minneapol	MN	55418
Anne Holt	5624	Bernard Pl	Edina	MN	55436
John Holt	1967	Drew Ave S	Mpls	MN	55416
Linda Holt	4300	W. River Pkwy #4	Minneapol	MN	55406
Shernan Holtan	867	Linwood Ave	St Paul	MN	55105
Ken Holte	3820	Orleans Ln	Plymouth	MN	55441
Ned Holte	2355	Wisconsin	Golden Val	MN	55427
Ryan Holten	5712	Zenith Ave	Minneapol	MN	55409
CHRIS HOLTZ	3521	COLFAX AVE S	MINNEAPC	MN	55408
Ralph Holzenthal	3035	Fairview Ave N	Roseville	MN	55113
Dean Holzman	3129	James Ave S	Minneapol	MN	55408
Nancy Homans	2308	22nd Ave S	Minneapol	MN	55404
George Cherry Homes	335	Busch Ter	Minneapol	MN	55419
Kristina Homstad	3380	Rosewood Ln N	Plymouth	MN	55441
Torild Homstad	311	Manitou St	Northfield	MN	55057
Donald Hon	3135	Arthur St Ne	Minneapol	MN	55418
Tim Hon	406	Orchard St N	Northfield	MN	55057
Penny & Evan Hon	3135	Arthur St NE	Minneapol	MN	55418
Susan Honadel	3410	10th Ave S	Minneapol	MN	55407
Lisa Hondros	171	Island Ave E	Minneapol	MN	55413
Ryan Honle	5009	Russell Ave S	Mpls	M	55410
Leah Hood	4023	17th Ave S	Mpls	MN	55407
Lisa Hopkins	5646	Interlachen Cir	Edina	MN	55436
Carsten "toby" Hopmann	4311	Dupont Ave N	Mpls	MN	55412
Janet Hopper	2304	19th Ave NE	Minneapol	MN	55418
Brian Hopper	5237	Shoreview Ave	Minneapol	MN	55417
Michelle Horan	4215	Lynn AVe	Edina	MN	55424
Joe Horan	3829	Pillsbury Ave S	Minneapol	MN	55409
David Horan	4215	Lynn Ave	Minneapol	MN	55416
Betsy Hork	2337	Texas Ave S	Minneapol	MN	55426
Frank Hornstein	4344	Drew Ave. S	Mpls	MN	55409
Ruth Hornstein	2120	Oliver Ave S	Minneapol	MN	55405
Renee Horsman	1332	Hewitt	St Paul	MN	55104
Ruben Hortensius	1399	Albert St N	St Paul	MN	55108
Stephanie Horton	4270	Kingsview Ln N	Plymouth	MN	55446
Rachel Horysi	5145	Queen Ave S	Mpls	MN	55410
Emilie Hossick-Scholt	5330	Dupont Ave S	Minneapol	MN	55419
Carla Hoter	2240	Quebec Ave S	St. Louis Pa	MN	55426
Ellen Hotlwich	2921	Inglewood Ave S	St Louis pa	MN	55416
Robin Houghdahl	1811	19th Ave NE	Minneapol	MN	55418
Melissa Houghtaling	2232	Dayton Ave	St. Paul	MN	55104
Ron Houland	5141	Drew Ave S	Mpls	MN	55410
Kelley Houlihan	4404	Queen Ave N	Mpls	MN	55412
Sherry Hoult	905	Transit	Roseville	MN	55113
Steve & Kelly Housh	5808	Garden Ave	Edina	MN	55436
Scot & Gretchen Hovan	4807	Nokomis Ave	Mpls	MN	55417
Mary Hove	91010	Valley Dr.	Northfield	MN	55057

Kim Hover	8600	Chanhassen Hills	Chanhassei	MN	55317
Lisa Hovey	3731	Inglewood Ave S	St. Louis Pa	MN	55416
Minna Hovinen	5810	Schaefer Rd	Edina	MN	55436
Donna Hovland	2544	Lynn Ave S	St Louis Pa	MN	55416
Therese Howard	5407	Abbott Place	Edina	MN	55410
Don Howard	118	9th St	Northfield	MN	55057
Karen Howard	209	Penn Ave S	Minneapol	MN	55404
Sarah Howard	1269	Como Blvd W	Saint Paul	MN	55103
Shawn Howard	3419	Harriet Ave	Minneapol	MN	55407
David Howd	1246	Shryer Ave W	Roseville	MN	55113
Kyle Howe	2913	32nd Ave NE	Mpls	MN	55418
Andrew Howe	1080	Raymond Ave	St Paul	MN	55105
Judy & John Howe	1421	Hythe St	Saint Paul	MN	55108
Jinx Howell	9512	Zenith Ave S	Minneapol	MN	55410
Matthew Hower	5228	28th Ave S	Mpls	MN	55417
Jerry (Jerrod) Hromatka	1922	Hayes St NE	Minneapol	MN	55418
Stephanie Hu	5304	Ayrshire Dr.	Edina	MN	55436
Michele Hu	4210	Cedarwood Rd	St Louis Pa	MN	55416
Jing Huang	7410	34th Ave N	Plymouth	MN	55447
Daren Huasa	764	Cottage Place	Shoreview	MN	55126
B Hubbard	35	Luverne Ave	Minneapol	MN	55419
Jym Hubbel	841	Nebraska Ave W	St. Paul	MN	55117
Jaymes Hubbell	841	Nebraska Ave W	Saint Paul	MN	55117
Teresa Hubby	6380	Teton Lane	Chanhassei	MN	55317
Carolyn Hubec	1458	Goodrich Ave	St Paul	MN	55105
Brent Huberty	900	Grandview Ave \	Roseville	MN	55113
Mike Huck	4112	Sheridan Ave S	Minneapol	MN	55410
Ashley Huebner	1106	E 38th St #2	Minneapol	MN	55407
Louann Huebsch	3417	N Dale St	Shoreview	MN	55126
Ashley Huellik	5521	24th Ave S	Minneapol	MN	55406
Christine Huff	1472	W Minnehaha A	St Paul	MN	55104
Midge Huffman	9950	Welington Lane	St. Anthony	MN	55108
John Hughes	1230	Orkla Dr	Golden Val	MN	55427
John Hughes	19150	Lake Ave. S.	Deephaven	MN	55391
Helen Hughes	1314	Orkla Dr	Golden Val	MN	55427
Jennifer Hughes	4300	40th Ave S	Mpls	MN	55406
Karma Hughes	2515	W 40th St	Mpls	MN	55410
Gretta Hughes	2319	Cleveland St NE	Minneapol	MN	55418
Stacy Hughes	1530	Arona St	Minneapol	MN	55108
Megan Hughes	2551	Benjamin St Ne	Minneapol	MN	55418
Richard Hughes	3509	13th Ave S	Minneapol	MN	55407
Jill Hughes	738	Sextant Ave W	Roseville	MN	55113
Sally Huireng	1929	Emerson Ave. S.	Minneapol	MN	55403
Doug Huiskeh	5004	Columbus Ave	Mpls	MN	55417
Dayton Hultgren	3400	Croft Dr	Minneapol	MN	55418
Mark Hultig	1015	W 37th St	Mpls	MN	55405
Bret Hummel	6830	Yuma Dr	Chanhassei	MN	55317

Kathy Hummel	2817	Drew Ave N	Robbinsdal	MN	55422
John & Jane Hunacek	1416	Nevada Ave S	Minneapol	MN	55426
Carol Hunn-Gregory	807	Lakeview Ave	St. Paul	MN	55117
John Hunsicker	1920	Oliver Pl S	Mpls	MN	55405
Suzanne Hunt	1521	Lake Susan Hills	Chanhassei	MN	55317
Tom Hunt	8181	Hidden Ct	Chanhassei	MN	55317
Debi Hunter	3210	Lake Shore Blvd	Minnetonk	MN	
Andrew Hunter	2515	Ulysses St NE	Minneapol	MN	55418
Brian Huntington	3142	Colfax Ave S	Mpls	MN	55408
Nancy Huntley	2925	Kyle Ave N	Golden Val	MN	55422
Sheri Huppert	5600	Bernard Pl	Edina	MN	55436
Judy Hurd	3204	Hillsboro Ave S	Saint Louis	MN	55426
John Hurley	3420	Dale St N	Robbinsdal	MN	55422
Mary Huschle	1050	Lombard Ave	Saint Paul	MN	55105
Heidi Huseth	12727	Wood Ct	Minnetonk	MN	55343
Shirley Huskins	1841	Eagle Ridge Dr	Mendota H	MN	55118
Kay Huskisson	3197	W Owasso Blvd	Shoreview	MN	55126
Gary Huss	3224	Croft Dr NE	Minneapol	MN	55418
Brianna Huston	4529	33rd Ave S	Mpls	MN	55406
George Hutchinson	5319	Knox Ave. S.	Minneapol	MN	55419
Greg Hutterer	4712	16th Ave S	Mpls	MN	55417
Thang Huynl	2925	Raleigh Ave S	St. Louis Pa	MN	55416
Peter Hwang	5728	Villa Dr	Saint Paul	MN	55126
Sally Hwang	1929	Emerson Ave S	Minneapol	MN	55403
Robert Hyams	1423	Rambler Rd	Roseville	MN	55113
Tom Hyder	901	W. Minnehaha P	Minneapol	MN	55419
LYNN HYLDON	4036	13TH AVE S	MINNEAPC	MN	55407
Jared Iacolucci	3033	Harriet Ave	Minneapol	MN	55408
John L. Ibele	5608	Edgewater Blvd	Minneapol	MN	55417
Con Iber	5050	Colfax Ave S	Minneapol	MN	55419
Kimihobu Ichikowei	140	8th Ave NE	Minneapol	MN	55413
Mary Idzik	2710	Bent Tree Cir	Minnetonk	MN	55305
Amy Ihlan	1965	Stanford	St Paul	MN	55105
Dan Ihnat	4220	Crocker Ave	Edina	MN	55416
Jae Ijiyode	8460	Westbend Rd	Golden Val	MN	55427
George Ilaug	3544	Aldrich Ave S	Minneapol	MN	55408
Pam illegible	2877	Highland Ave	St Paul	MN	55116
Conrad Illegible	4425	Douglas Ave	Saint Louis	MN	55418
Ethan Illigible	2730	Upton Ave S	Minneapol	MN	55416
Ralph Imholte	2502	W 21st St	Minneapol	MN	55405
Anonymous in Bryn Maw	1	mpls	Mpls	MN	55405
Anonymous in St. paul	1	St. paul	St. Paul	MN	55104
Leisha Ingdal	2915	Armour	Minneapol	MN	55418
Kate Ingelsell	2429	Aldrich Ave S	Minneapol	MN	55405
Bob Ingrassa	972	Portland Ave	Saint Paul	MN	55104
Anne Ingvoldstad	41	Sheridan Ave	Minneapol	MN	55405
Greg Inmen	2300	Black Oak	Minnetonk	MN	55305

Erin Innes	4695	Chandler Rd	Shoreview	MN	55126
John Inveen	244	Russell Ave S	Minneapol	MN	55405
Prad Ip	17711	Southridge Ct	Minnetonk	MN	55345
Maureen Iqbal	5409	Queen Ave	Minneapol	MN	55419
Amy Irvin	17548	Alcove Circle	Eden Prairi	MN	55347
Dennis Irye	4115	21st Ave S	Minneapol	MN	55407
Marilyn Isaacson	3215	Lincoln St NE	Minneapol	MN	55418
Leah Isbell	4709	Xerxes Ave S	Minneapol	MN	55410
David Ische	5237	France Ave S	Mpls	MN	55419
Christopher Isett	1916	E River Ter	Minneapol	MN	55414
Lisa Ishag	674	Montcalm Pl	St Paul	MN	55116
Sonia Islas	4353	France Ave N	Robbinsdal	MN	55422
Naira Istephanous	812	Millwood Ave	Roseville	MN	55113
Sothan Ith	3021	Croft Dr	Minneapol	MN	55418
Libby ivanov	2235	Ulysses St NE	Minneapol	MN	55418
Sue Ivers	4514	Beard Ave S	Minneapol	MN	55410
Laurie Iversen	4135	Pillsbury Ave S	Minneapol	MN	55409
Blain Iverson	5012	Logan Ave S	Mpls	MN	55419
SHARON IVERSON	7580	CHIPPEWA TRL	CHANHASS	MN	55317
Rebecca Iverson	1374	Sheldon St	Champlin	MN	55316
Alexa Iverson	745	Laurel Ave	St. Paul	MN	55104
Andy Iverson	4112	Thomas Ave	Minnetonk	MN	55345
Brianna Ives	4349	7 St NE	Columbia H	MN	55418
Thulani Iwacy	3051	Hayes St	Minneapol	MN	55418
Betti Iwanski	1258	Osage St	St Paul	MN	55117
Jennifer Iwau	4897	Woodlawn	Mpls	MN	55417
Kim J	5344	Chowen Ave	Mpls	MN	55410
Abraham J	2623	York Ave N	Robbinsdal	MN	55422
Katie Jackel	7384	Moonlight Lane	Eden Prairi	MN	55346
Martey Jackel	1432	Portland Ave	Saint Paul	MN	55104
Theresa Jackson	290	Woodlawn Ave	Saint Paul	MN	55105
Todd Jackson	621	Broken Arrow Rc	Chanhassei	MN	55317
Kate Jackson	3901	Monterey Ave	St. Louis Pk	MN	55416
Jim Jackson	11755	38th Ave	Plymouth	MN	55441
April Jackson	12040	Hilloway Rd W	Minnetonk	MN	55305
Amber Jackson	1	mpls	Mpls	MN	55417
Ardi Jackson	4861	Irving Ave S	Minneapol	MN	55419
Laurie Jacobi	4242	Queen Ave S	Minneapol	MN	55401
Laurie Jacobi	4242	Queen Ave S	Minneapol	MN	55410
Rebecca Jacobs	4205	Ottawa Ave S	St Louis Pa	MN	55416
Fred & Janet Jacobs	3064	Mildred Dr	Roseville	MN	55113
Michael Jacobsen	127	Chevy Chase Dr	Wayzata	MN	55391
Anna Jacobsen	1784	Portland Ave	St. Paul	MN	55104
Isabelle Jacobsen	2184	Huron St	Roseville	MN	55113
Marta Jacobsen	3848	46th Ave S	Minneapol	MN	55406
Cathryn Jacobson	5149	27th Ave	Mpls	MN	55417
Leah Jacobson	3214	Buchanan St Ne	Minneapol	MN	55418

Mark Jacobson	735	Co Rd B2 W	Roseville	MN	55113
Paulina & Bo Jacobsson	2612	Joppa Ave. S.	St. Louis Pa	MN	55416
Ben Jacoby	1145	Iowa Ave W	St. Paul	MN	55108
Mikala Jaderborg	1121	Kenwood Pkwy	Mpls	MN	55403
Jennifer & Richard Jaeger	3735	47th Ave S	Minneapol	MN	55406
Mary Ellen Jaghne	1650	Ridgewood Ln S	Roseville	MN	55113
Benson Jahnke	1358	Simpson St	Saint Paul	MN	55108
Ravi Jaiswal	1	np	Chanhasse	MN	55317
Shehab Jakui	2934	Ulysses St NE	Minneapol	MN	55418
Yassin Jama	5109	Windsdor	Edina	MN	55436
Barry James	415	Rustwood Lane	Duluth	MN	55804
Charles James	6788	Tartan Curve	Eden Prairi	MN	55346
Bill James	3224	Ebrids Ave S	St. Louis Pa	MN	55416
Robert James	4249	Brookside Ave	St. Louis Pa	MN	55416
Brogan James	1384	St Paul Ave	St Paul	MN	55105
Sherwin James	1419	Albert St N	St. Paul	MN	55108
Ian & Anthony James	5705	Bloomington Ave	Minneapol	MN	55417
Michael Jamnick	4620	Colfax Ave	Minneapol	MN	55419
James Anthony Janick	2048	Texas Ave S	St. Louis Pa	MN	55426
Susan Janick	2048	Texas Ave S	St Louis Pa	MN	55426
Francis Janik	2310	Milwaukee Ave	Mpls	MN	55404
Tammy Janke	7742	Inske Tr.	Cottage Gr	MN	55016
Kelly Jannett	1334	Nebraska Ave	St Paul	MN	55108
Renae Jansen	8027	Erie Ave	Chanhasse	MN	55317
Eric Jansen	3130	Ulysses St NE	Mpls	MN	55418
Emily Jansen	609	Hague Ave	St. Paul	MN	55104
Carmen Jansk	610	Kent Lane	Shoreview	MN	55126
Ron Janzen	815	5th Ave SE	Minneapol	MN	55414
Michael Jaques	1055	Burgess St	St. Paul	MN	55103
Sarah Jarrett	2765	Georgia Ave S	St. Louis Pa	MN	55426
Serge Jarusz	2912	Drew Ave N	Robbinsdal	MN	55422
Tim Jarvis	4229	Princeton Ave	St. Louis Pa	MN	55416
Lea Anne Jasper	2316	24th Ave S	Minneapol	MN	55406
Mary Jauss	3038	Ulysses St NE	Minneapol	MN	55418
Ron Jay	3637	Blaisdell Ave	Minneapol	MN	55409
Barb Jeanetta	3731	Garfield Ave	Minneapol	MN	55409
Mary T. Jeddeloh	117	Melbourne Ave S	Minneapol	MN	55414
Jen Jeffries	1648	Laurel Ave	St. Paul	MN	55104
Diane Jeise	5349	Drew Ave S	Minneapol	MN	55409
John Jekner	2926	Bucmans ST NE	Minneapol	MN	55438
Pam Jenkins	4820	Sheridan Ave S	Minneapol	MN	55410
Phillip Jenkins	572	Arner Ave	Shoreview	MN	55126
Anne Jenkins	1842	Ryan Ave W	Roseville	MN	55113
Tim J. Jenkins	1806	Aglen St	Roseville	MN	55113
Lorrayne Jennarz	4041	Lyndale Ave S	Mpls	MN	55409
Rhonda Jennen	88	7th Ave NE	Minneapol	MN	55413
Raquel Jenney	945	Santa Vera Dr	Chanhasse	MN	55317

Dan Jenney	3294	Dupont Ave S	Mpls	MN	55408
Heather Jennings	1070	Burgess St	St. Paul	MN	55103
Phil Jennings	1525	Ottawa Ave S	Golden Val	MN	55416
Jason Jennings	2546	Dupont Ave	Minneapol	MN	55405
Mimi Jennings	2222	Hillside Ave	Saint Paul	MN	55108
Paul Jennings	3925	Joppa Ave S	St Louis Pa	MN	55416
David & Melissa Jensen	2171	JUNO AVE	SAINT PAU	MN	55105
Thomas Jensen	3054	Cavell Ln	St. Louis Pa	MN	55426
Derek Jensen	8044	cheyenne Ave	Chanhasse	MN	55317
Brad Jensen	17833	Powderhorn Dr	Minnetonk	MN	55345
Bruce Jensen	759	Lathrop Dr	Northfield	MN	55057
Amber Jensen	4240	Redding Ridge D	Minnetonk	MN	55345
Joel Jensen	5047	Culver Ave	Golden Val	MN	55422
Jessica Jensen	2726	Colfax Ave	Minneapol	MN	55408
Jonathan Jensen	2124	Kenwood Pkwy	Minneapol	MN	55405
Shelley & Matthew Jense	6704	Wooddale Ave S	Edina	MN	55435
Nellie Jerome	2319	29th Ave	Mpls	MN	55406
Henry Jerome	145	Wheeler St S	Saint Paul	MN	55105
John Jerry	4549	Nokomis	Mpls	MN	55406
Maryjo C. Jerve	1841	Independence A	Saint Louis	MN	55426
Brian Jeuerts	11408	Lakeview Dr	Minnetonk	MN	55305
Mark Jezierski	4226	Scott Terr	Edina	MN	55416
Anthony Joarnt	2504	Oregon Ave S	St Louis Pa	MN	55426
Jim Joers	152	Avon St S	St. Paul	MN	55105
Kathy Johannes	2221	30th Ave S	Minneapol	MN	55406
Laura Johansen	3329	Garfield Ave	Minneapol	MN	55408
Bruce Johanssen	6211	Morbaule Dr	Chanhasse	MN	55317
James Johns	1805	Portland Ave	St. Paul	MN	55104
Jenna Johnshoy	1113 18	1/2the Ave NE	Minneapol	MN	55413
Jane Johnson	4468	Ellerdale Rd	Minnetonk	MN	55345
Rita Johnson	3142	Jersey Ave N	Crystal	MN	55427
Jeff Johnson	3312	45th Ave S	Minneapol	MN	55406
Donald (Trip) Johnson	126	W Delos St	Saint Paul	MN	55107
Clyde Johnson	2305	E 3rd St	Duluth	MN	55812
Jeff Johnson	5028	17th Ave. S.	Minneapol	MN	55417
Jeanne Johnson	3811	Inglewood Ave. S	St. Louis Pa	MN	55416
Jeremy Johnson	3629	Xenia Ave N	Crystal	MN	55422
Al Johnson	3740	Cottonwood Ln	Plymouth	MN	55441
Clarence Johnson	308	Sunnyridge Lane	Golden Val	MN	55422
Betty & Robert JOHNSON	12814	MARCH CIR	MINNETON	MN	55305
RAY JOHNSON	3910	THE MALL	MINNETON	MN	55345
Andrew Johnson	1421	Midway Pkwy	St.Paul	MN	55108
Pat Johnson	4101	Blaisdell Ave S	Minneapol	MN	55409
Prudence Johnson	113	West Island Ave	Minneapol	MN	
Bruce Johnson	12649	Dover Dr	Apple Valle	MN	55124
Jeff Johnson	409	Afton Dr	Northfield	MN	55057
Dennis Johnson	3419	Tyler St Ne	Minneapol	MN	55418

Bob Johnson	1120	Portland Ave	St. Paul	MN	55104
EUNICE JOHNSON	4649	31ST AVE S	MINNEAPC	MN	55417
Zach Johnson	2716	Blackstone Ave	St. Louis Pa	MN	55413
Jeff Johnson	4844	38th Ave	Mpls	MN	55417
Amy Johnson	4151	Yosemite Ave	St. Louis Pa	MN	55426
Jeffrey Johnson	2716	Dakota Ave S	St. Louis Pa	MN	55413
Sue Johnson	4967	109th Pl N	Champlin	MN	55316
Walt Johnson	2520	Princeton Ct	St. Louis Pa	MN	55416
Jason Johnson	2841	Coulese St NE	St. Anthony	MN	55418
Kevin Johnson	6231	Cypress Dr	Excelsior	MN	55331
Tim Johnson	2601	Silver Ln NE	Mpls	MN	55418
Sally Johnson	7496	Saratoga Dr	Chanhassen	MN	55317
Bret Johnson	3940	Country Oaks Dr	Excelsior	MN	55331
Korrie Johnson	2916	Silver Lake Ct	Mpls	MN	55418
Beverly Johnson	4200	Wooddale Ave S	Plymouth	MN	55447
Linnae Johnson	2925	Walnut Grove	Plymouth	MN	55447
Julie & Zach Johnson	2951	Taylor St NE	Mpls	MN	55418
Brian Johnson	10610	40th Ave N	Plymouth	MN	55447
Abbey Johnson	2743	Benjamin St NE	Mpls	MN	55418
Karen Johnson	8694	Mary Jane Cir	Chanhassen	MN	55317
Jordan Johnson	2508	37th Ave S	Mpls	MN	55406
Todd Johnson	3612	Garfield Ave S	Mpls	MN	55408
Ryan Johnson	3830	Noble Ave N	Robbinsdal	MN	55422
Brad Johnson	4519	Cedar Ave S	Mpls	MN	55417
Sam Johnson	1522	Minnehaha	St Paul	MN	55104
Tim Johnson	4705	18th Ave S	Mpls	MN	55407
Jeff Johnson	16085	Marle Ln	Center City	MN	55021
Karen Johnson	16907	Linden Dr	Minnetonk	MN	55435
Karl Johnson	3621	Sunrise Dr W	Minnetonk	MN	55345
Simon Johnson	2217	26th Ave S	Mpls	MN	55404
Marvin Johnson	3421	26th Ave N	Robbinsdal	MN	55422
Tim Johnson	2158	Sargent Ave	St Paul	MN	55105
Sarah Johnson	4109	19th Ave S	Mpls	MN	55407
Thelma Johnson	4925	4th Ave S	Mpls	MN	55419
Kara Johnson	40	Barton Ave SE	Mpls	MN	55414
Randi Johnson	3913	York Ave N	Robbinsdal	MN	55422
Amanda Johnson	2851	Huntington Ave	St Loius Pa	MN	55416
Katy Johnson	4912	Garfield Ave S	Mpls	MN	55419
Philip Johnson	3805	Harriet Ave	Minneapol	MN	55409
Pamela Johnson	2238	Cleveland St NE	Minneapol	MN	55418
Craig Johnson	1525	N Pascal St	St Paul	MN	55108
Max Johnson	2175	Rosewood Ln S	Roseville	MN	55113
Brad Johnson	3809	45th Ave	Minneapol	MN	55406
Bruce Johnson	4722	31st Ave S	Minneapol	MN	55406
Warren Johnson	2822	Chowen Ave	Minneapol	MN	55416
Paula Johnson	3021	Emerson Ave	Minneapol	MN	55408
Jason Johnson	5333	1st Ave S	Minneapol	MN	55419

Russ Johnson	8187	Pristine Pine	Eden Prairi	MN	55437
Rebecca Johnson	7480	Saratoga Drive	Chanhassei	MN	55317
Kay Johnson	8015	132nd Ct	Apple Valle	MN	55124
Sonia M. Johnson	711	Winona St	Northfield	MN	55057
Mark Johnson	4121	Raleigh Ave	Minneapol	MN	55416
Terri & Bruce Johnson	3715	Ximines Ln N	Plymouth	MN	55441
Kathryn Johnson	2420	W 54th St	Minneapol	MN	55410
Eunice Johnson	4649	31st Ave S	Minneapol	MN	55406
Ed Johnson	1300	Dayton Ave	Saint Paul	MN	55104
Darryl Johnson	5642	Girard Ave S	Minneapol	MN	55419
Carol Johnson	2125	Xanthus Ln W	Plymouth	MN	55447
Mark Johnson	3116	Mildred Dr	Roseville	MN	55113
Joel Johnston	3309	Croft Dr	St. Anthony	MN	55418
Samuel Johnston	3400	Zenith Ave N	Robbinsdal	MN	55422
David Johnston	3355	Drynswick	St. Louis Pa	MN	55416
Kate Johnston	4317	Browndale	St. Louis Pa	MN	55416
Ashley Johnston	917	W 28th St	Mpls	MN	5408
Nick Johnston	2925	Noble Ave N	Golden Val	MN	55422
Mary Johnston	1148	Hague Ave	Saint Paul	MN	55104
Scott Johnston	417	Tarrymore Ave	Minneapol	MN	55419
Chris Johnstone	12551	briarwood Ct	Minnetonk	MN	55343
Bill Jokel	706	5th St E	Northfield	MN	55057
Linda Jokela	5001	Aldrich Ave S	Mpls	MN	55419
Jessica Jolie	17860	Liu Lan	Eden Prairi	MN	55346
Cindy Jomialon	5536	Richmond	Minneapol	MN	55419
Elizabeth Jones	1232	Palace Ave	Saint Paul	MN	55105
Russ Jones	3961	Country Oaks Dr	Chanhassei	MN	55331
Bruce Jones	4224	10th Ave S	Mpls	MN	55407
Chris Jones	97	Olympic Circle	Chanhassei	MN	55317
Jared Jones	4537	Chowen Ave S	Mpls	MN	55410
Amy Jones	2501	Rhode Island Ave	St Louis	MN	55426
Latisha Jones	7351	University Ave N	Robbinsdal	MN	55422
Candice Jones	5047	Sheridan Ave S	Mpls	MN	55410
Jess Jones	1453	Holton St	St Paul	MN	55108
Mary Jones	3411	Cleveland St NE	Minneapol	MN	55418
Mary Jones	3201	Skycroft Dr	Minneapol	MN	55418
Valerie Jones	5940	Russell Ave S	Minneapol	MN	55410
Anne Jones	480	Bighorn Dr	Chanhassei	MN	55317
Iva Jones	3617	Minnehaha Ave	Minneapol	MN	55406
Steven or Candace Jonge	1377	Arona St	Saint Paul	MN	55108
Andy Jopling	3232	Ewing Ave N	Robbinsdal	MN	55422
Brad Jordahl Redlinn	3012	ARmour Terr	St Anthony	MN	55418
Maralle Jordan	2923	Tyler St NE	Mpls	MN	55418
Virginia Jordan	3628	36th Ave S	Mpls	MN	55406
Roberta Jordan	451	Thomas Ave S	Mpls	MN	55405
Bridgit Jordan	4661	31st Ave	Minneapol	MN	55406
Mary E. Jordan	2440	Beverly Rd	Saint Paul	MN	55104

Timothy Jordan	2919	Polk St NE	Minneapol	MN	55418
Charles Jorgensen	1615	E River Pkwy	Minneapol	MN	55410
Dede Jorstad	3701	Cardinal Rd	Golden Val	MN	55416
Todd Josephs	443	Baker St W	Saint Paul	MN	55107
Ram Josger	6613	Southdale Rd	Edina	MN	55435
Joel Joshua	3332	Harriet Ave	Minneapol	MN	55408
Walter Jost	3108	E Minnehaha Pk	Minneapol	MN	55406
Myer Joy	1219	West 51st St	Mpls	MN	55419
Jarred Jrim	1167	Josephine Rd	Roseville	MN	55113
Nick Jubeslt	2898	Dunlap St	Roseville	MN	55113
Edward Juda	2007	Drew Ave S	Minneapol	MN	55416
Heidi Judge	4307	Eton Pl	Edina	MN	55416
David and Trudi Juncker	16	E Minnehaha Pk	Minneapol	MN	55419
Jerry Jung	3920	10th Ave S	Mpls	MN	55407
William Junker	1472	Fairmount Ave	St. Paul	MN	55105
Vanessa Junker	787	co Rd B2	Roseville	MN	55113
Barb Juntenen	4220	Upton Ave S	Minneapol	MN	55410
Dave Juregich	1231	Shryer Ave	Roseville	MN	55113
Cindy Jurgensen	4209	Browndale Ave	St Louis Pa	MN	55416
Cindy Jurgenson	4209	Browndale	St. Louis Pa	MN	55416
Alex Just	815	5th Ave SE	Minneapol	MN	55414
Michael Justin	183	Goodrich Ave	Saint Paul	MN	55102
Allison Jutil	5337	27th Ave S	Minneapol	MN	55417
Jeanne K	8100	Russel Ave S	Bloomingto	MN	55431
Peter K	515	Nora Ln	Plymouth	MN	55447
Matt K	1220	Dunkirk Ln N	Plymouth	MN	55447
Jim K	216	Cecil St SE	Mpls	MN	55414
Penny K	3417	Druid Ln	Minnetonk	MN	55435
Sigrid Kaaland	4652	34th Ave S	Mpls	MN	55406
Christoper Kaczmarczyk	3016	Emerson Ave S	Minneapol	MN	55408
Leigh Kadahl	5405	Clinton Ave	Minneapol	MN	55419
Kristin Kaekr	2128	Stanford	St Paul	MN	55105
Hannes Kaestner	1247	Ryan Ave W	Roseville	MN	55113
Miriam Kagol	4240	Heathcote Rd	Deep Have	MN	55391
Ann Kaim	6687	Mulberry	Chanhasse	MN	55317
Betty Kaiser	730	Bucher Ave	Minnetonk	MN	55305
Karen Kajcic	1948	Skillman	Roseville	MN	55113
Manos Kalaitzakis	2621	29th Ave NE	St. Anthony	MN	55418
Therese Kalealis	4908	Arden Ave	Edina	MN	55424
Lisa Kaler	876	Lakeview Ave	St. Paul	MN	55108
Hope Kalin	5045	Colfax	Minneapol	MN	55410
Marilyn & Larry Kalina	749	Montana Ave E	Saint Paul	MN	55106
Jon Kalinowski	790	County Rd B2	Roseville	MN	55113
Nan Kalke	1011	W 24th St	Minneapol	MN	55405
Jesse Kallhoff	150	Cascade Court	Chanhasse	MN	55317
Santo & Kaspars Kalnitri	3455	Tyler St NE	Minneapol	MN	55418
J Kalscheur	3024	Bryant Ave S, #2	Mpls	MN	55408

J Kalten	5312	Upton	Minneapol	MN	55410
Barb Kalvik	2250	New Brighton	Minneapol	MN	55418
Ned & Carol Kamar	3430	St. Paul Ave	Mpls	MN	55407
Amy Kamenick	5128	Ewing Ave S	Mpls	MN	55410
Jim Kamin	4048	Abbott S	Minneapol	MN	55410
Anne & Lewis Kamiri	5907	Dawn Dr.	Minnetonk	MN	55345
Diana & Kendall A. Kamp	3945	Joppa Ave S	St Louis Pa	MN	55416
Bea & Howard Kampf	8540	23rd Ave N	Golden Val	MN	55427
Katharine M. Kanazawa	901	Ivanhoe Dr	Northfield	MN	55057
Michael Kane	1439	Summit Ave	St Paul	MN	55104
Rick Kane	3524	Colfax Ave S	Minneapol	MN	55408
Lisa Kane	1902	Oliver Ave S	Minneapol	MN	55405
Timothy Kane	2004	Cedar Lake Pkwy	Minneapol	MN	55416
Christine Kane	3422	Fillmore St NE	Minneapol	MN	55418
Abbie Kane	253	Upton Ave S	Minneapol	MN	55405
Dave & Holly Kangas	2700	Georgia Ave S	Saint Louis	MN	55426
Timo Kanning	1575	Knoll Dr	Shoreview	MN	55126
Ned Kantar	3430	Saint Paul Ave	Minneapol	MN	55416
Jeff Kanter	11435	Royzelle Ln	Hopkins	MN	55305
Jackie Kanthak	931	Ashland Ave	Saint Paul	MN	55104
Jud Kanwischer	4421	Xerxes Ave S	Minneapol	MN	55410
Frances Kanz	4332	Aldrich Ave S	Mpls	MN	55409
April & Steven Kaplan	3045	Bryant Ave S	Minneapol	MN	55408
Angie Karaloski	2917	Troseth Rd	Roseville	MN	55113
D Karan	1955	E River Terrace	Mpls	MN	55414
Jodi Kareb	4210	Reding Ridge Dr	Minnetonk	MN	55345
Mike Karels	14991	Williamsburg Ct	Eden Prairi	MN	55347
Andy Karl	4089	Toledo Ave S	St Louis Pa	MN	55416
Adam Karlen	5641	15th Ave S	Mpls	MN	55417
Patrick Karm	4365	Lawndale Lane N	Plymouth	MN	55446
Gene Karstens	12524	Creek Rd West	Minnetonk	MN	55305
Cindy Karwacki	2632	Joppa Ave S	St Louis Pa	MN	55416
Kathleen Karyes	4625	Zenith Ave S	Mpls	MN	55410
Stanley Kasal	2801	Silver Lake Rd	St. Anthony	MN	55418
Victor Kasanezky	1440	Louisiana Ave	Saint Louis	MN	55426
Nancy Kasella	12166	Gantry Ln	Apple Valle	MN	55124
Judith & Clifford Kashtan		2828 Huntingtor	Saint Louis	MN	55416
Rick Kaster	16825	12th Ave N	Plymouth	MN	55447
Daphne Kasypis	4640	Drew Ave S	Mpls	MN	55410
Arjun Kataria	3200	Humboldt Ave	Mpls	MN	55408
Mary Katynsk-Johnson	1007	Fairview Ave S	Saint Paul	MN	55116
Don Katz	3301	Wyoming Ave S	St Louis Pa	MN	55426
Steve B. Katz	2000	Jersey Ave S	Minneapol	MN	55426
Stacy Katzovitz	2530	Montery Ave	St. Louis Pa	MN	55416
Lynne Kaufman	107	Sandy Hook Rd	Chanhassen	MN	55317
Dave Kaufman	2215	Taft St NE	Mpls	MN	55418
Isaac Kaufman	3508	16th Ave S	Mpls	MN	55407

Leah Kaul	930	Laurel Ave, #2	St.Paul	MN	55104
Mitch Kauppi	1302	Douglas Ave	Mpls	MN	55403
Kim & Chuck Kausalik	3839	Blaisdell Ave	Minneapol	MN	55409
Carol or Mostafa Kaveh	1625	E River Pkwy	Minneapol	MN	55414
Jeff Kavisne	4545	Saddlewood Dr	Minnetonk	MN	55345
Patricia Kawlewski	8033	Erive Ave	Chanhassei	MN	55317
Kathleen Kay	1515	Arona St	St Paul	MN	55108
Nancy Kaysen	4060	Alabama Ave	St. Louis Pa	MN	55416
Carolyn Kayser	709	Linwood Ave	St Paul	MN	55105
Kari Kazer	4928	Sheridan Ave S	Minneapol	MN	55419
Taylor Kearn	500	Ohio Street	St Paul	MN	55107
Amy Keepper	4940	Oliver Ave S	Mpls	MN	55410
Noah Keesecker	2422	E 22nd St	Mpls	MN	55406
Peter Keesey	3206	Arthur St NE	Mpls	MN	55418
Ken Kefer	7302	Paul Alcove	Woodbury	MN	55125
Chris Kehew	3720	48th Ave S	Minneapol	MN	55406
Terry Keir	4905	Knox Ave S	Minneapol	MN	55419
Jean or Terry Keir	4905	Knox Ave S	Minneapol	MN	55419
Teena Keiser	2836	Kenwood Isle	Minneapol	MN	55408
Max Keller	1343	Van Buron Ave	St. Paul	MN	55104
Michael Kelley	942	Kimberly Ln	Chanhassei	MN	55317
David Kelley	3947	Cottage Ln	Minnetonk	MN	55305
Christina Kelley	1420	Minnehaha Pkw	Mpls	MN	55419
Peter Kelley	4020	Inglewood Ave S	Edina	MN	55416
Bob Kellin	4546	16th Ave S	Mpls	MN	55407
Ginna Kellott	5329	1st Ave S	Minneapol	MN	55419
Stefanie Kelly	13483	Carbury Ave	Rosemount	MN	55068
Charles Kelly	4513	Vandervork Ave	Edina	MN	55436
Mark Kelly	1212	Laurel Ave	St Paul	MN	55104
Linda Kelly	736	Fairmount Ave	St. Paul	MN	55105
Jeanne Kelly	2728	Dakota Ave S	St. Louis Pa	MN	55413
Matt Kelly	2050	Stanford Ave	St Paul	MN	55105
Dominic Kelly	890	Parkview	St Paul	MN	55108
Kevin Kelly	3335	Emerson Ave	Minneapol	MN	55408
Jacqueline Kelly	1561	Laurel Ave	Saint Paul	MN	55104
Peter Kelsey	2136	Iglehart Ave	Saint Paul	MN	55104
Cara Kemnitz	4123	25th Ave S	Mpls	MN	55407
Nick Kemp	2712	Idaho Ave S	St. Louis Pa	MN	55426
Sara Kemp	5111	Thofland Rd	Golden Val	MN	55422
Sharon Kemp	801	ROCKVIEW COU	Duluth	MN	55804
H Kempcke	1446	W 34th St	Minneapol	MN	55408
Mary Kendall	14515	Oakwood Rd	Minnetonk	MN	55345
Amelia Kendall	4224	W 24 th St	St Louis Pa	MN	55416
Julie Kennedy	2800	Hilldale Ave	Mpls	MN	55418
Jonathan Kennedy	8111	Erie Cir	Chanhassei	MN	55317
Jordan Kennedy	5240	28th Ave S	Minneapol	MN	55417
Luke Kennedy	7331	Frontier Trail	Chanhassei	MN	55317

Ann Kennedy	4420	Thomas Ave S	Minneapol	MN	55410
Pamela Kennedy	294	Washburn Ave N	Minneapol	MN	55405
Peg Kennedy	525	Heinel Dr	Roseville	MN	55113
Nona Kennedy-Carlson	2926	Armour Ter	St. Anthony	MN	55418
Daniel Kenney	3016	Rhode Island Av	Saint Louis	MN	55426
Steve Kenney	219	W Minnehaha A	Minneapol	MN	55404
Alan Kenvey	306	3rd Ave NE	Minneapol	MN	55413
Kathleen Kephart	2100	Oliver Ave S	Minneapol	MN	55405
Shawn Kepland	5532	Thomas Ave S	Mpls	MN	55410
Shawn Keptard	5532	Thomas Ave S	Minneapol	MN	55410
Stephanie Kerbage	806	Parkview Ave	St. Paul	MN	55117
Kate & Mike Kerfoot	5356	Abbott Ave S	Minneapol	MN	55410
Tanya Kern	1326	Hartford Ave	St. Paul	MN	55116
Mike Kerner	4131	Kibbott Ave	Robbinsdal	MN	55422
Patrice Kersting	1833	Taylor Ave	Saint Paul	MN	55105
James Kerwin	4243	Harriet Ave	Minneapol	MN	55409
Bruce Kessler	2085	St. Clair Ave	St Paul	MN	55105
Mel Kessler	5140	Newton Ave S	Minneapol	MN	55419
Melissa Kestner	2018	Pinehurst Ave	St Paul	MN	55116
Jon Ketokoski	1401	Spring Valley Rd	Golden Val	MN	55422
Susan Kettering	2018	Queen Ave S	Mpls	MN	55405
Brad Kettesuts	3412	Garfield	Mpls	MN	55408
marie Kettleler	4504	Larame Trl	Minnetonk	MN	55345
Barb Ketz	1609	Utah Ave	St. Louis Pa	MN	55426
Bill Keyes	5532	Aldrich Ave S	Mpls	MN	55419
Dain Keyton	514	6th St SE	Minneapol	MN	55414
Zachary Khan	101	W 35th St	Minneapol	MN	55408
Sam Khoroosi	1210	W 22nd St	Minneapol	MN	55405
Ada Kiatoukays	3536	Beard Ave N	Robbinsdal	MN	55422
Angela Kidd	6690	Mulberry Blvd	Chanhassen	MN	55317
J. Kielkopf	1963	Ashland Ave	Saint Paul	MN	55104
Song Kien	4955	Woodlawn Blvd	Mpls	MN	55417
Beth Kiene	9630	16th Ave S	Bloomingto	MN	55425
Janette Kihm	1905	Fairmount Ave	Saint Paul	MN	55105
Anna & Hugh Killam	2407	Valley Dr	Northfield	MN	55057
Jason Killey	5320	Drew Ave S	Mpls	MN	55410
Julie Kim	538	Cretin Ave S	St Paul	MN	55116
Vicki Kimble	5212	Logan Ave S	Mpls	MN	55410
Andy Kimmes	2839	Oxford St N	Roseville	MN	55113
Kyle Kincaid	2215	24th Ave S	Mpls	MN	55406
Roald Kindem	7943	Lower Hamlet Ct	Apple Valle	MN	55124
Tery Kinder	2957	Arona St	Roseville	MN	55113
Jon Kindred	2108	Humboldt Ave S	Minneapol	MN	55405
Joanna Kindt	2732	Dakota Ave S	St. Louis Pa	MN	55413
Tamra King	1478	Goodrich Ave	Saint Paul	MN	55105
Joseph King	2305	Taft St NE	Minneapol	MN	55418
Nancy King	3615	Cleveland St NE	Minneapol	MN	55418

Ruby King	4715	Zenith Ave	Minneapol	MN	55410
mary king	3520	w 28th	MPLS	MN	55410
Grace King	32	Orlin Ave	Mpls	MN	55414
David King	1459	Glenhill Rd	Roseville	MN	55113
Hilary King	3537	Girard Ave	Minneapol	MN	55409
Dorine King	4038	Pillsbury Ave S	Minneapol	MN	55409
Vince King	1941	Ashland	St Paul	MN	55104
Lisa or Chris King	1247	Dayton Ave	Saint Paul	MN	55104
Scott King	307	Oxford St	Northfield	MN	55057
John King	1861	Gluek Ln	Roseville	MN	55113
Christian King	2783	Irene Cir	Roseville	MN	55113
Joseph kingman	641	Summit Ave	St. Paul	MN	55439
Henry Kingman	4204	Ewing Ave S	Mpls	MN	55410
Margaret Kinney	6805	Southdale Rd	Edina	MN	55435
Brian Kinney	5253	Penn Ave S	Minneapol	MN	55419
Jackie Kinsella			Northfield	MN	55057
Owen Kinsky	1	not provided	St. Paul	MN	55116
David Kirby	2216	E. 2nd St.	Duluth	MN	55812
Brian Kirby	893	Linwood Ave	Saint Paul	MN	55105
Barbara Kirby	2933	Benjamin St NE	Minneapol	MN	55418
Derek Kirchhoff	2604	Freemont Ave S	Minneapol	MN	55408
Debbie Kirihara	8207	Westwood Hills	Minneapol	MN	55426
Gunn Kirkeng	4929	Vincent Ave S	Minneapol	MN	55410
Peg Kirkvold	201	Frontier Ct	Chanhassei	MN	55317
Jenny Kirmis	801	Nebraska Ave W	St. Paul	MN	55117
Jennie Kirshbaum	1808	Westwood Hills	St. Louis Pa	MN	55426
Mark Kirwin	2001	22nd Ave NE	Minneapol	MN	55418
David & Sarah M. Kise	3524	E 25th St	Minneapol	MN	55406
Miriam Kiser	3663	Park Center Blvd	St Louis Pa	MN	55416
Rhonda Kist	3525	16th Ave S	Mpls	MN	55407
DorothyAnn and Terry Ki	5036	Queen Ave S	Minneapol	MN	55410
Suzanne Kitch	5745	Elliot Ave S	Mpls	MN	55417
Benjamin Kitt	1184	Idaho Ave W	Minneapol	MN	55108
Karen Kitzis	5030	31st Ave S	Minneapol	MN	55417
Gail Kjor	10083	Brookhaven Dr	Woodbury	MN	55129
Karen Kjos	3744	Colfax Ave S	Mpls	MN	55405
Robert (Bob) Klaiber	2984	Highcourte	Roseville	MN	55113
Jesse Klapn	5628	Hethawan ln	Somewher	MN	55044
Corinne Klatzko	2500	Inglewood	St. Louis Pa	MN	55416
William Kleckmer	3814	Xerxes Ave s	Mpls	MN	55410
Dave & Lisa Klein	3730	Inglewood Ave	St. Louis Pk	MN	55416
Maritta Klein	4264	Linden Hills Blvd	Mpls	MN	55410
Lisa Klein	3730	Inglewood Ave S	St. Louis Pa	MN	55416
Thomas Klein	1410	W Minnehaha A	Mpls	MN	55410
MariAn Klein	4264	Linden Hills Blvd	Minneapol	MN	55401
David Kleine	4124	Abbott Ave	Mpls	MN	55410
Marie Klepinski	2124	Parklands Rd	St Louis Pa	MN	55416

Molly Klevra	1128	Fairmount St	St. Paul	MN	55105
Richard Klimala	1520	Hythe St	Saint Paul	MN	55108
Erin Kline	116	S. High St	Marshall	MN	56258
Sandy Kline	3364	Zarthan Ave S	St Louis Pa	MN	55416
Bob Klingberg	2575	Ivory	Mora	MN	55051
D.A. Klingman	4314	Pillsbury Ave	Mpls	MN	55409
Kristin Klinkhammen	4549	Abbott Ave	Minneapol	MN	55410
Doreen Kloehn	4036	Xerxes Ave S	Minneapol	MN	55410
Kate Kloos	1521	Sheldon St	St Paul	MN	55108
Joe Klosterman	3928	Natchez Ave S	St Louis Pa	MN	55416
Kate Kluegel	941	Jefferson Ln	Eagan	MN	55123
Kathleen Klukas	348	Stonebridge	St Paul	MN	55105
Jim Klukken	1	np	Plymouth	MN	55441
Carrie Klun	5344	15th Ave S	Minneapol	MN	55417
Mary Klusmann	2924	Noble Ave N	Golden Val	MN	55422
Kelsey Kmyzanowski	5049	44th Avenue Sou	Minneapol	MN	55417
Bernadette Knaeble	2741	Bryant Ave S	Minneapol	MN	55408
Cassandra Knapik	1641	Ottawa Ave S	St Louis Pa	MN	55416
Erin Knapp	4837	Pleasant Ave S	Mpls	MN	55419
Peter Knapp	1992	Lincoln Ave	Saint Paul	MN	55105
Carol Kneekern	3018	cobblecrest ct	St. Louis Pa	MN	55426
Paula Kneeland	4795	Avon St	Shoreview	MN	55126
Betsy Knighton	3104	Colfax Ave S	Mpls	MN	55405
Barb Knoche	5127	Nicollet Ave. S.	Minneapol	MN	55419
Beth Knocke	106	W. 49th St.	Minneapol	MN	55419
John Knoll	5	Edina Ct	Edina	MN	55424
Barbara Knott	5054	Fremont Ave S	Minneapol	MN	55410
Meghan Knox	4240	Brookside Ave	St. Louis Pa	MN	55416
Mary Ann Knox	3300	Bryant Ave S	Minneapol	MN	55408
Robert Knudsen	5429	25th Ave S	Mpls	MN	55417
CARL KNUDSON	895	HATCH AVE	SAINT PAU	MN	55103
Ted Knudtson	1302	Hague Ave	St. Paul	MN	55105
Sherri Knuth	875	Parkview Ave	Saint Paul	MN	55117
Dan Knutsen	1529	Hague Ave	St Paul	MN	55104
Todd Knutson	5757	Wentworth Ave	Minneapol	MN	55419
Rob Knutson	209	Janalyn Cir	Golden Val	MN	55422
Paul Knutson	3731	Blaisdell Ave S	Mpls	MN	55409
Dawn Knutson	4817	Washburn Ave S	Minneapol	MN	55410
Eric Knutson	3061	Shorewood Lane	Roseville	MN	55113
April Knutson	3744	Garfield Ave	Minneapol	MN	55409
Brett Knutson	5415	Vincent Ave S	Minneapol	MN	55410
Megan Knuttila	5415	Bryant Ave S	Mpls	MN	55419
Natalie Koch	2400	Fremont Ave S	Minneapol	MN	55405
Susan Koch	1463	Sargent Ave	Saint Paul	MN	55105
Jill Kochanek	2633	Dupont Ave	Minneapol	MN	55408
Barbara Kochevar	4064	Sunnyside Rd	Edina	MN	55424
Richard Kocourek	7366	W 14th St	Saint Louis	MN	55426

Carolyn Koefod	912	21st Ave #310	Minneapol	MN	55404
Todd Koehler	3415	Polk St NE	Mpls	MN	55418
Aaron Koelman	4731	Washburn Ave N	Minneapol	MN	55430
Pam Koene	1408	Rhode Island Ave	Golden Val	MN	55422
Imogene Koenen	422	6th St SE	Mpls	MN	55414
Tara Koenig	1333	Jefferson St NE	Mpls	MN	55413
Nancy Koepcke	4200	Fremont Ave S	Saint Paul	MN	55119
Nick & Barb Koester	732	Sumter Ave S	Golden Val	MN	55422
Ryan Koester	11610	Park Ridge Dr	Minnetonk	MN	55305
Ron & Wanda Koetz	2867	Merrill St	Roseville	MN	55113
Corey Kohan	3000	Armour Ter	Minneapol	MN	55418
Michael & Liz KOHANE		6220 YUMA DR	CHANHASS	MN	55317
Kelly Kohlbaener	4836	Clinton Ave S	Mpls	MN	55419
Edward Kohler	1412	Frankson Ave	Saint Paul	MN	55108
Jeffrey Kohlhepp	3522	Saint Paul Ave	Minneapol	MN	55416
Dave & Peggy Kohner	270	Pelham Blvd	Saint Paul	MN	55104
Leigh Koidahl	5405	Clinton Ave S	Mpls	MN	55419
David Kok	2318	Cedarwood Ridg	Minnetonk	MN	55305
Sydney Kokjohn	5224	Logan Ave S	Minneapol	MN	55419
Lisa Koland	1926	Gluek	Roseville	MN	55113
Cameron Kolbe	1568	Hague Ave	St. Paul	MN	55104
Sarah Kolbinger	7653	Nicholas Way	Chanhassei	MN	55317
Jerry Kolby	3015	Troseth Rd	Roseville	MN	55113
Eric Kolcinski	2920	W 42nd St	Mpls	MN	55410
James Kolkin	4437	16th Ave S	Mpls	MN	55407
Megan Kolkman	4116	Sheridan Ave S	Minneapol	MN	55401
Carolyn Kolovitz	6	E Minnehaha Pk	Minneapol	MN	55419
Elina Kolstad	2021	22nd Ave S	Minneapol	MN	55404
Jeffrey Kolstad	16122	Ringer Rd	Minnetonk	MN	55219
Camille Kolters	3504	Garfield Ave	Mpls	MN	55409
Lori Komoto	1505	Natchez Ave S	Golden Val	MN	55416
Alison Konkor	3315	Virginia Ave S	St. Louis Pa	MN	55426
Torsten Konrad	21	University Ave N	Minneapol	MN	55413
Ray Konz	1900	Cowry Ave	Minneapol	MN	55418
Sandee Kooh	3514	Garfield Ave S	Mpls	MN	55408
Clare Kooiman	10410	White Tail Crossi	Eden Prairi	MN	55347
Jennifer Koomen	10315	Dellwood Rd N	Stillwater	MN	55082
Jana Kooren	594	W. Wheelock Pk	St. Paul	MN	55103
Joyce Kopell	2214	University Ave N	Mpls	MN	55418
Ted Kopet	4239	13th Ave S	Mpls	MN	55407
Mari Koplin	1176	Edmund Ave	St Paul	MN	55104
Todd Koppelman	2109	22nd Ave Ne	Minneapol	MN	55416
Chadly Koppenhaver	3312	Lyndale Ave S	Minneapol	MN	55408
Jerry Kortgard	3901	Glendale	Excelsior	MN	55331
Mary Kosciolek	3705	Harriet Ave	Minneapol	MN	55409
Kurt Koshiol	14617	Spring Lake Rd	Minnetonk	MN	55345
Paula Koshmrl	6847	Sand Ridge Rd.	Eden Prairi	MN	55346

Susan Kosin	1475	Terrace View Lar	Plymouth	MN	55447
Candace Koslow	2700	Drew Ave S	Minneapol	MN	55416
Meg Kosluslky	2537	Jackson St NE	Minneapol	MN	55418
Mary Kosuth	4845	Columbus Ave	Minneapol	MN	55417
Molly Kotoski	4338	10th Ave S	Mpls	MN	55407
Amy Kotoski	1236	Willow Lane	Roseville	MN	55113
Val Kotsenowsky	4420	Thomas Ave S	Mpls	MN	55410
Meghan Kotz	1355	Van Buren Ave	St Paul	MN	55104
Carol Kough	2931	Ashbury St	Roseville	MN	55113
Nancy Kovala	5212	Knob Hill Ct	Minnetonk	MN	55345
Attila Kovao	37	Thomas Ave	Minneapol	MN	55405
Ahila Kovars	37	Thomas Ave S	Mpls	MN	55405
J Koviztt	3205	Skycroft Dr	St. Anthony	MN	55418
Peter Kowalumshi	3807	Xerces AVe S	Minneapol	MN	55410
Randy Koyonen	17505	25th Ave N	Plymouth	MN	55447
Peter Kozar	2300	Stinson	Minneapol	MN	55418
Jessica Kracl	2516	Brighton Ave Ne	Minneapol	MN	55418
K Kraemer	1365	Avon St N	St Paul	MN	55108
Karl Kraft	5005	Manor Rd #127	Austin	TX	78723
Lauri and Larry Kraft	2248	Drew Ave S	St Louis Pa	MN	55416
Lars Kragness	2895	N Albert St	Roseville	MN	55113
Mike Krahulec	3511	3rd St NE	Minneapol	MN	55418
Cara Krailer	4219	20th Ave S	Mpls	MN	55407
Aaron & April Kramer	2833	Xenwood Ave. S.	St. Louis Pa	MN	55416
Steve Kramer		PO BOX 8715	Minneapol	MN	55408
Randy Kramer	8519	Virginia Cir S	St. Louis Pa	MN	55426
Jon Kramer	4708	York Ave S	Minneapol	MN	55410
Jackie Krammer	5101	Emerson Ave S	Minneapol	MN	55419
Jennifer & Michael Krant	2343	Wilson St NE	Minneapol	MN	55418
Ellen Kranz	4421	shoreview Rd	Robbinsdal	MN	55422
Sonja Kraseaz	5038	29th Ave S	Mpls	MN	55417
Kathy & Bob Krasky	3436	41st Ave S	Minneapol	MN	55406
Katie Krause	13708	Green Briar Dr	Minnetonk	MN	55305
Gram Krause	3320	Lyndale Ave S	Mpls	MN	55408
Connie Krause	555	Tomlyn Ave	Shoeview	MN	55126
Marilyn Krause	3001	E 24th St	Minneapol	MN	55406
Barbara Krauss-Christens	1913	Penn Ave. S.	Minneapol	MN	55405
Y Krauthammer	4711	Upton Ave S	Minneapol	MN	55410
Ginny Kravs	520	Grand Hill	Saint Paul	MN	55102
Don Krebs	6605	Naomi dr	Edina	MN	55439
Colleen Krebs	3655	Garfield Ave	Minneapol	MN	55409
David Krejci	1024	W 53rd St	Mpls	MN	55419
Elliot Krelitz	944	Lincoln Ave	Saint Paul	MN	55105
PAM OLESON KREMER	4329	PORTLAND AVE	MINNEAPC	MN	55407
Mike Krenz	216	Penn Ave S	Minneapol	MN	55405
Nita Krevans	3301	32nd Ave NE	Mpls	MN	55418
David Krign	4301	Dupont Ave S	Minneapol	MN	55409

Barry Krinke	1804	Ulysses St NE	Mpls	MN	55418
Donna Krisch	11516	Friar Ln	Hopkins	MN	55305
Kathy Krishnan	884	Nebraska Ave W	Saint Paul	MN	55117
Mark Kristjanson	1922	Wellesley Ave	St. Paul	MN	55105
Gregory Kroening	937	Orchard Ln	Roseville	MN	55113
Mark & Alison Krogan	6701	Cornelia Dr	Edina	MN	55435
Tom Krohol	305	Xerces Ave N	Minneapol	MN	55405
Aaron Kromlor-Levsh	1153	LaFord Ave	St Paul	MN	55104
Steve & Christene Kron	106	Winifred St W	Saint Paul	MN	55107
Jarvod Kronebusch	5408	29th Ave	Nokomis	MN	55417
Rich Kronfield	2705	Beverly	Minneapol	MN	55416
Zoe Kropf	5324	29th Ave S	Minneapol	MN	55417
Adam Kropp	3735	Lee Ave N	Robbinsdal	MN	55422
Cedrik Krouch	8	Bedford St SE	Mpls	MN	55414
Kathy Krpel	4185	Zarthan Ave S	St. Louis Pa	MN	55426
Marie Kruegel	4011	Monterey Ave	Edina	MN	55424
Molly Krueger	6981	Tecumseh Ln	Chanhassei	MN	55317
Sally Krueger	4161	Trail Ridge Ln	Minnetonk	MN	55345
Brian Kruesi	2914	Hayes St NE	Mpls	MN	55418
Rob Krugel	4011	Marcus	Edina	MN	55416
Anita Kruger	3401	Skycroft Cir	St. Anthony	MN	55418
Rebecca Krum	2454	Oxford St N	Roseville	MN	55113
Joel Kruse	2555	Queensland	Plymouth	MN	55447
Alene Krutach	2320	Sumter Ave S	St Louis Pa	MN	55426
JIM KRUZITSKI	3832	21ST AVE S	POWDERH	MN	55407
Ben Kuam	377	Cretin Ave S	St Paul	MN	55105
Peter Kubes	1459	Farimount Ave	St Paul	MN	55105
Linda Kubes	12501	Briarwood Ter	Hopkins	MN	55343
Ann Kubitza	5820	W 41st St	St Louis Pa	MN	55416
Josh Kubosta	1719	St. Anthony Pkw	Mpls	MN	55418
Julie Kucinsky	2509	Irving Ave St	Mpls	MN	55408
Ryan & Renae Kuehl	4131	Raleigh Ave. S.	St. Louis Pa	MN	55416
Frederick Kueppers	2546	Dupont Ave S	Minneapol	MN	55405
Diane & Bill Kuhlmann	696	Mississippi River	St. Paul	MN	55116
Cal Kuhman	7	Park Dr	Northfield	MN	55057
Barbara Kuhn	4711	Humboldt Ave S	Minneapol	MN	55419
Julia & Kurt Kuistberg	316	Lanewood Ln N	Plymouth	MN	55447
Wayne Kuklinski	4752	16th Ave S	Minneapol	MN	55407
Cookie Kulas	2645	Burd Pl	St Louis Pa	MN	55426
Kris Kulevsky	2921	Yosemite Ave S	St. Louis Pa	MN	55416
Colin Kulo	229	Russell Ave S	Minneapol	MN	55405
Carla Kum	4190	vinewood Ln	Plymouth	MN	55441
Tom & Sharon Kunau	1253	Laurel Ave	Saint Paul	MN	55104
Phyllis Kunkel	1062	39th Ave N	Plymouth	MN	55441
Norm Kunselman	40	Upton Ave S	Mpls	MN	55405
Gloria Kunshier	4131	26th Ave S	Minneapol	MN	55406
Darlene Kunze	875	Nebraska Ave W	Saint Paul	MN	55117

Laurie Kurmes	18454	Creeks Bend Dri	Minnetonk	MN	55345
Ruth Kuroki	2640	Hampshire Ave S	Saint Louis	MN	55426
Bryan Kurth	4133	Ewing Ave S	Mpls	MN	55410
Gabriele Kushr	4265	Harriet Ave S	St. Louis Pa	MN	55416
Rebecca Kutty	2716	E 22nd St	Mpls	MN	55404
N Kvatky	4012	Cedarwood Rd	St. Louis Pa	MN	55416
Ben Kyle	2725	Parkview Blvd	Robbinsdal	MN	55422
Kate Kysar	2087	James Ave	Saint Paul	MN	55105
Shirley Kysilko	4010	Crestview Ln	Shoreview	MN	55126
Stephe L	4800	Drew Ave S	Mpls	MN	55410
Jeanne L	3752	Garfield Ave	Mpls	MN	55408
Rita La Doux	2190	Dosweed	St. Anthony	MN	55108
Melissa Laatsch	2915	Troy Ln N	Plymouth	MN	55447
Terry LaBissoniere	3248	Drew Ave N	Robbinsdal	MN	55422
C LaCasse	4245	Abbett Ave S	Minneapol	MN	55410
Debra Lach	696	Wilder St S	Saint Paul	MN	55116
Jessica Laden	700	Maple Pond Ct	Shoreview	MN	55126
Mary P. Ladneil	4801	Ewing Ave S	Minneapol	MN	55410
Solfrid Ladstein	1892	Wellesley Ave	St. Paul	MN	55105
Curtis LaDuke	3404	Dale St	Shoreview	MN	55126
Janice LaDuke	1052	Avon Street N	St Paul	MN	55103
Kathy Lafayette	5312	Emerson Ave S	Minneapol	MN	55419
Lindsay & Nick lagos	3445	Cleveland St NE	Minneapol	MN	55418
Susan Lahbil	1512	W. 34th St.	Minneapol	MN	55408
Jeanie Lahn	10316	Morris Rd	Bloomingto	MN	55437
Marilyn Laing	9200	Minnetonka Blvc	St. Louis Pa	MN	55426
Janis Lajon	629	Cedar Lk Rd S	Minneapol	MN	55405
David Lake	520	Rose St	Duluth	MN	55803
Hannah Lakin	964	17th Ave SE	Minneapol	MN	55414
Lisa Lally	2132	Juliet Ave	St Paul	MN	55105
Michael Lambert	2168	Carroll Ave	Saint Paul	MN	55104
Annie Lamere	121	W Elmwood Pl	Minneapol	MN	55419
David Lamotte	732	Golden Meadow	Eagan	MN	55123
Jude Lampson	2342	Wilson St. Ne	Minneapol	MN	55418
Cynthia Lancaster	1553	Albert St. N.	St. Paul	MN	55108
Ben Lancette	1724	23rd Ave NE	Mpls	MN	55418
Jeanette Landin	520	Macubin Cir	Shoreview	MN	55126
Deborah Landon	4424	Abbott Ave S	Minneapol	MN	55410
Ken Landro	1890	Hampshire Ln N	Golden Val	MN	55427
Daniel Landuehr	4322	- 13th Ave S	Mpls	MN	55407
Katherine (Katie) Lane	3523	McKinley St NE	Minneapol	MN	55418
Jamie M. Lane	3141	James Ave S	Minneapol	MN	55408
Lindsay Lane	2600	Jersey Ave	Saint Louis	MN	55426
Susan Laner	1155	Ravenswood St	Shoreview	MN	55126
Ben Lang	510	2nd Ave NE	Minneapol	MN	55414
Mark Lang	9119	Scarlet Globe Dr	Eden PRair	MN	55347
Tim Lang	1915	Johnson St	Mpls	MN	55418

Sarah L. Lang	3241	Irving Ave	Minneapol	MN	55408
Emily Langan	2944	Alabama Ave S	St. Louis Pa	MN	55416
Mark Lange	18305	20th Ave N	Plymouth	MN	55447
David R. Lange	1556	Holton St	Saint Paul	MN	55108
Richard & Roxanne Lange	3655	Huntington Ave	St Louis Pa	MN	55416
Karen Langegran	140	S Wheeler	St Paul	MN	55105
Frederick Langendorf	4917	Fremont Ave S	Minneapol	MN	55419
Elise Langer	1706	Buchanan St NE	Mpls	MN	55418
Ed Langerak	205	Manitou St	Northfield	MN	55057
Sheri Langfield	4049	Sunnyside Rd	Edina	MN	55424
Jim Langford	719	6th Ave SE	Mpls	MN	55414
Logan Langley	29	Sidney Pl	Mpls	MN	55414
Peter Langsjoen	1446	Kentucky Ave S	St Louis Pa	MN	55426
J Lanning	4439	Cedar Ave	Mpls	MN	55407
Connie Lanphear	3415	43TH AVE S	MINNEAPC	MN	55406
Nicole Lantz	3221	Arthur St NE	Mpls	MN	55418
Jen Lappin	3436	Garfield St Ne	Minneapol	MN	55418
Diane Largille	4916	Chowen Ave S	Minneapol	MN	55401
Sylvie Lariviere	9115	Flyway Cir	Eden Prairi	MN	55347
Susan & Matt Larkin	580	Tomlyn Ave	Shoreview	MN	55126
Daniel Larkin	1233	Hague Ave	Saint Paul	MN	55104
Dan Larkins	6565	Dawkin	Mpls	MN	55407
Kathy Larrea	3254	Harriet Ave	Minneapol	MN	55408
MEGHAN LARSEN	1419	Taylor Ave	Saint Paul	MN	55104
Shawn Larsen	4604	Deerwood Dr	Minnetonk	MN	55345
Melinda Larsen	1636	Hauge Ave	St Paul	MN	55104
David Larsen	4525	Marlborough Ct	Minnetonk	MN	55345
Karen & Leslie Larsen	2015	Summit Ave	Saint Paul	MN	55105
Libby Larsen	2205	Kenwood Pkwy	Minneapol	MN	55405
Arlene Larson	5421	28th Ave S	Minneapol	MN	55417
Pat Larson	759	Cougar Drive	Eagan	MN	55123
Linda Larson	1006	Arbogast St	Shoreview	MN	55126
Oliver Larson	4150	41st Ave	Minneapol	MN	55406
Claudia Larson	8039	Erie Ave	Chanhassei	MN	55317
JD Larson	3010	Tyler St NE	Mpls	MN	55418
Christina Larson	2909	Fairchild Ave	Minnetonk	MN	55391
Micki Larson	1514	Arona St	St. Paul	MN	55108
Candice Larson	5224	W Nokomis Pkw	Mpls	MN	55417
Peter Larson	336	Burntside Dr	Golden Val	MN	55429
Amy Larson	2104	Fremont Ave S	Mpls	MN	55405
Eric Larson	1410	Primrose Curve	Roseville	MN	55113
Chaz Larson	3526	Harriet Ave S	Minneapol	MN	55408
David Larson	2919	Troy Ln N	Plymouth	MN	55447
Paul Larson	5017	Queen Ave S	Minneapol	MN	55410
Pat Larson	1620	E River Ter	Minneapol	MN	55414
Mary Jo Larson	4338	Grand Ave S.	Minneapol	MN	55409
Lee Larson	4524	Edmund Blvd	Minneapol	MN	55406

Craig Larson	4453	46th Ave S	Minneapol	MN	55406
Leonard N. Larson	212	Cedar Lake Rd S	Minneapol	MN	55405
Nicole Lasarage	4005	20th Ave S	Mpls	MN	55407
Dave Lasecke	3124	Christoper Plane	Shoreview	MN	55126
Nancy Laskaris	2371	Buford Ave	Saint Paul	MN	55108
Libby Lasley	9657	Belmont Ln	Eden Prairi	MN	55347
Jarret Lasman	2752	AGLEN ST	ROSEVILLE	MN	55113
Heather & Eric Laubach	2246	Wilson St NE	Minneapol	MN	55418
Kathy Lauer	6925	Glenwood Ave	Golden Val	MN	55422
William Lauer	2725	Vagabond Ln N	Plymouth	MN	55447
Hella Lauge	1567	Summit	St Paul	MN	55104
Lang Laumbach	4603	Vincent S	Mpls	MN	55410
Tyler Law	815	Heinel Dr	Roseville	MN	55113
Amelia Lawler	18600	Azure Rd	Deephaven	MN	55391
Anthony Lawrence	4610	Bassett Creek Ln	Golden Val	MN	55422
Scottt Lawrence	4520	Strawberry Ln	Golden Val	MN	55416
Liza Lawrence	1	np	Mpls	MN	55406
Mary Lawrence	5232	28th Ave S	Minneapol	MN	55417
John Lawrow	5015	Fremont Ave S	Minneapol	MN	55419
Greg Lawson	1718	Pierce St NE	Minneapol	MN	55418
Julia Lawson	4520	Parkside	Edina	MN	55436
Wendy Lazear	1519	Natchez Ave S	Golden Val	MN	55416
Tam Le-Pong	3466	Garfield St Ne	Minneapol	MN	55418
Judy Leal	1505	Mt Curve Ave	Mpls	MN	55403
Ann Lear	3632	Larchwood Cir	Minnetonk	MN	55391
Sara Leauro	200	N Saratoga St	St. Paul	MN	55104
Laurel Leaword	3725	Garfield Ave S	Minneapol	MN	55409
Pete LeBak	2911	Buchanan St	Minneapol	MN	55418
Pete LeBas	2911	Buchanan St NE	Mpls	MN	55418
Paul J. Lebens-Englund	5620	15th Ave	Mpls	MN	55417
Abby Leber	5	Bridge Ln	Edina	MN	55424
Scot Lebere	2116	Stanford	St Paul	MN	55105
Karen LeBlanc-Brotzler	3322	Tyler St NE	Mpls	MN	55418
Mike Lebus	4200	Salem Ave. S.	St. Louis Pa	MN	55416
Luke Lecheler	204	Penn Ave S	Minneapol	MN	55404
Kathleen Leck	319	Busch Terr	Minneapol	MN	55419
Justin LeClair	2247	Wilson St NE	Mpls	MN	55418
David LeDuc	2631	Huntington Ave	St Louis Pa	MN	55416
Chris Leduyer	1398	Judith Ave	Roseville	MN	55113
Heather &Christopher Le	2104	19th Ave NE	Minneapol	MN	55418
JoAnn Lee	4150	Blaisdell Ave. S.	Minneapol	MN	55409
Sande Lee	1121	Fifield St	St. Paul	MN	55108
Robert Lee	4660	Baker Rd	Minnetonk	MN	55343
Caleb Lee	4041	Washburn S	Mpls	MN	55410
Randy Lee	4917	Ewing Ave s	Mpls	MN	55410
Janet Lee	215	2nd St NE	Mpls	MN	55401
Lynn Lee	6331	Greenbriar Ave	Excelsior	MN	55331

Jeff Lee	4300	28th Ave	Nokomis	MN	55407
Son-Young Lee	2500	Winfield Ave	Golden Val	MN	55422
Patty Lee	3853	21st Ave S	Mpls	MN	55407
Greg Lee	44	Forest Dale Rd	Mpls	MN	55410
Thea Lee	4425	10th Ave S	Mpls	MN	55407
Josh Lee	4031	Blaisdell	Minneapol	MN	55409
Elizabeth H. Lee	2195	Knapp St	Saint Paul	MN	55108
Carolyn Leech	3641	Lee Ave N	Robbinsdal	MN	55422
Jeramiah Leeper	11229	5th St NE	Blaine	MN	55406
Ann Lefebvre	5401	Newton Ave S	Minneapol	MN	55419
Paul & Fiona Lefebvre	5325	Upton Ave S	Minneapol	MN	55410
Thomas Legeros	4600	Drew Ave	Mpls	MN	55410
Not Legible	5531	Vermont St	St. Louis Pa	MN	55416
Not Legible	3200	Fillmore St NE	Mpls	MN	55418
Not Legible	1940	Garfield St NE	Mpls	MN	55418
Not Legible	3428	something dr	St. Anthony	MN	55418
Not Legible	3805	Inglewood Ave S	St. Louis Pa	MN	55416
Not Legible	3123	W 43rd St	Mpls	MN	55410
not legible	3533	16th Ave S	Mpls	MN	55407
Not Legible	1376	Albert Ave	St. Paul	MN	55108
Katie Lehinger	711	Grandview Ave \	Roseville	MN	55113
Nancy Lehman	6431	Pleasant Park Dr	Chanhassen	MN	55317
Christine Lehman	4225	Ottawa Ave S	Minneapol	MN	55416
Andre Leicester	4949	Woodlawn	Mpls	MN	55417
Julie Leiferman	3445	Grimes Ave	Robbinsdal	MN	55422
Holly Leighton	2717	Colfax Ave S	Minneapol	MN	55408
Coresa Leighty	4524	43rd Ave S	Mpls	MN	55406
Gwyn Leile	3000	Ensign Ave	St. Louis Pa	MN	55426
Jim Leinfelder	2906	Benton Blvd	Minneapol	MN	55416
Alex Leis	4744	Xerxes Ave S	Minneapol	MN	55410
Dan Leisen	3620	16th Ave S	Minneapol	MN	55407
Gerry Leitsch	1464	Schletti St	St. Paul	MN	55117
Michele Leland	5017	Garfield Ave	Minneapol	MN	55419
Alex Lelchuk	4208	Xerxes Ave S	Mpls	MN	55410
Shelly Lell	7020	Parkview Ln	Eden Prairi	MN	55436
Collin & Jilian LeMaster	5057	Garfield Ave	Minneapol	MN	55419
Andy LeMay	5048	15th Ave. S.	Minneapol	MN	55417
Lisa LeMay	1159	Autumn St	Roseville	MN	55113
Lynn LeMere	4239	13th Ave S	Minneapol	MN	55407
Lisa Lemiert	784	Osceola Ave	St Paul	MN	55105
Jordan Lemm	861	Lake Susan Dr	Chanhassen	MN	55317
Amy Lenarz	3917	Grand Ave S	Minneapol	MN	55409
Jim Lenfestsy	1833	Girard Ave S	Mpls	MN	55403
Lindsay Lenharalt	2855	florida Ave S	St. Louis Pa	MN	55426
Paul Lennander	710	3rd Ave SE	Minneapol	MN	55414
Tomo Lennox	13005	34th Ave N	Plymouth	MN	55441
Fiona Lennox	5341	Zenith Ave S	Minneapol	MN	55410

Thomas Lentz	404	Santa Fe cir	Chanhassei	MN	55317
Jenifer Leonard	2169	Elanor Ave	St Paul	MN	55146
Laurie Leone	2105	Bryant Ave S	Minneapol	MN	55405
Peter Leppa	815	Niagara Ln	Plymouth	MN	55447
Rachel Lerner	1011	W Minnehaha Pl	Minneapol	MN	55419
Brian LeRoux	2701	Edgewood Ave S	St. Louis Pa	MN	55416
Nina Lesaout	3228	Hennepin Ave.	Mpls	MN	55405
Thaddeus Lesiak	5209	Portland Ave. S.	Minneapol	MN	55417
Magnus Leslie	5636	Edgewater Blvd	Minneapol	MN	55417
Bill Leslie	1228	Hoyt Ave W	St. Paul	MN	55108
Sylvian Lesne	2656	Inglewood Ave S	Saint Louis	MN	55416
Beth Leurquin	1431	Simpson St	St Paul	MN	55108
Nicolette Leuster	4708	Twin Haven Rd	Minnetonk	MN	55343
Christine Leventhal	2011	W 49th St	Minneapol	MN	55419
Peter Levi	1305	29th Ave NE	Mpls	MN	55418
Kris Levielle	3415	Johnson St NE	Minneapol	MN	55418
Herb Levin	3429	St. Paul Ave	Minneapol	MN	55416
MARGARET LEVIN	1355	LAFOND AVE	SAINT PAU	MN	55104
Sue Levin	3305	Zircon Ln N	Plymouth	MN	55446
Gene Levin	3153	Webster	St. Louis Pa	MN	55416
Rachel Levitt	198	Malcolm Ave SE	Minneapol	MN	55414
Miles Levy	3427	Polk St NE	Mpls	MN	55418
Adam Levy	2814	Ulysses St NE	Minneapol	MN	55418
Margaret Lew	3421	Sumter Ave. S.	St. Louis Pa	MN	55416
Marthel LeWinn	4300	Lancelot Dr	Minnetonk	MN	55345
Patricia Lewis	809	Saint Olaf Ave	Northfield	MN	55057
Bob Lewis	5340	Colfax Ave. S.	Minneapol	MN	55419
Rod Lewis	3256	Colorado Ave S	St Louis Pa	MN	55416
Kelly Lewis	798	Pascal	St Paul	MN	55104
Mychal Lewis	2177	Ferris Lane	Roseville	MN	55113
Carolyn Lewis	4110	Shoreline Dr	Robbinsdal	MN	55422
Linda Lewis	4825	Townes Rd	Edina	MN	55424
Michael Lhedal	2081	Sargent Ave	St Paul	MN	55105
Yang Li	1307	Ruggles St	Roseville	MN	55113
Hunter Liat	3127	Lincoln St NE	Minneapol	MN	55418
Craig Lidneke	1163	Portland Ave	St Paul	MN	55104
Jeremy Lieblg	2742	Johnson St NE	Mpls	MN	55418
Greg Lien	1485	Pascal St N	Saint Paul	MN	55108
Nancy Lien Berndt	162	Otis Avenue	Saint Paul	MN	55104
Elizabeth Lienesch	705	Raymond Ave	St. Paul	MN	55108
Robin Lienke	7230	Bren Ln	Eden Prairi	MN	55436
Jane Liepitz	5637	Aldrich Ave S	Minneapol	MN	
Amy & Mike Lietzou	5040	Winsdale St	Golden Val	MN	55422
Cari Lifland	16420	38th Ave N	Plymouth	MN	55446
M Lifson	8911	Westmoreland L	St. Louis Pa	MN	55426
Molly Ligg	3332	France Ave S	St Louis Pa	MN	55416
Nan Lightner	130	Nina St	Saint Paul	MN	55102

Phil Lilja	3712	Colfax Ave S	Minneapol	MN	55408
Mary Lillestol	2315	Taft St NE	Mpls	MN	55418
Karen Lilley	2079	Dudley Ave	Saint Paul	MN	55108
Perrin Lilly	18	Summit Ct	Saint Paul	MN	55102
Mike Limckliem	7610	Canyon Cv	Chanhassei	MN	55317
Lena Lin	16715	12th Ave N	Plymouth	MN	55447
Matt Lind	2816	Colorado Ave S	St. Louis Pa	MN	55416
Phil Lind	17525	26th Ave N	Plymouth	MN	55447
Margaret Lind	95	W Island	Mpls	MN	55401
Tom Lind-Mou	13311	E 51st St N	Minneapol	MN	55417
James Lindbeck	4344	Harriet Ave S	Mpls	MN	55409
Jenny Lindberg	3116	W 42nd St	Minneapol	MN	55410
Peder Lindberg	3030	Ensign Ave	St. Louis Pa	MN	55426
Jennifer Lindberg	3116	42nd St W	Mpls	MN	55409
Carol Lindborg	3024	Dakota Ave S	St Louis Pa	MN	55416
Mike Lindelien	7610	Canyon Curve	Chanhassei	MN	55317
Sarah Lindeman	3439	Owasso St	Shoreview	MN	55126
Tristen Lindemann	1470	W. Minnehaha P	Minneapol	MN	55410
Mary Linden	2918	Zenith Ave N	Robbinsdal	MN	55422
Rachel Linder	3144	Elliot Ave	Minneapol	MN	55407
Anna Linder	5209	Knox Ave S	Minneapol	MN	55419
Rachel Linder	1708	23rd Ave Ne	Minneapol	MN	55418
Olie Lindgren	4208	Ottawa Ave S	St. Louis Pa	MN	55416
Taylor Lindgren	2512	W 21st St	Mpls	MN	55405
Robert Lindholm	3524	Holmes Ave	Mpls	MN	55409
Therese Lindholm	4354	Lyndale Ave S	Minneapol	MN	55409
Tom Lindmeier	5124	Abbott Ave S	Mpls	MN	55410
M Lindmere	3926	Richfield Rd	Mpls	MN	55410
Allen Lindquist	3745	Wellington Ln	Plymouth	MN	55441
Jane Lindsay	17202	Grays Bay Blvd	Minnetonk	MN	55391
Glenn Lindsey	3430	Humboldt	Mpls	MN	55409
Esme Linede	5011	28th Ave S	Mpls	MN	55417
Brigid & Jeremy Ling	1152	Laurel Ave	Saint Paul	MN	55104
Paul Linnebach	465	Newton Ave. S.	Minneapol	MN	55405
Theresa Linnihan	4031	Vincent Ave	Minneapol	MN	55410
ryan Linwood	1719	36h Ave NE	Minneapol	MN	55418
Page` Lipe	4315	Aldrich Ave S	MInneapol	MN	55419
Tim or Katheryn Lippert	2133	Grand Ave	Saint Paul	MN	55105
Steve Lish	225	Sheridan Ave	Minneapol	MN	55405
Steve Liss	1900	Kenwood Pkwy	Minneapol	MN	55403
Amy Liss	5021	Bryant Ave S	Minneapol	MN	55419
Amie Liste	401	Del Rio	Chanhassei	MN	55317
Rob Little	5012	Arden Ave	Edina	MN	55424
Brent Littlejohn	3415	Humboldt S	Minneapol	MN	55408
Walter & Florence Littma	76	Clarence Ave SE	Minneapol	MN	55414
Jeremy Litton	2420	Forest Meadow	Minnetonk	MN	55305
Steve Litton	1850	Kelly Dr.	Minneapol	MN	55427

Nien Liu	49	Oliver Ave S	Mpls	MN	55405
Keith Liuzzi	3210	Cleveland st NE	Minneapol	MN	55418
Fred Livesay	2410	University Ave W	Saint Paul	MN	55114
Rachel Livingston	333	Shore Dr	Chanhasse	MN	55331
Christine Lloyd	4815	York Ave S	Minneapol	MN	55410
Danny Lochram	1452	Portland Ave	St Paul	MN	55104
Phetsomphone Locke	640	Santa Vera Dr	Chanhasse	MN	55317
Sheryl Locke	4238	Alabama Ave S	St. Louis Pa	MN	55416
Nathan Lockwood	2546	Fillmore St NE	Minneapol	MN	55418
Mary Loehhart	5413	Pleasant	Minneapol	MN	55419
Gordon Loery	1510	W 32nd St	Minneapol	MN	55408
Jill Loesch	4114	Blaisdell Ave S	Mpls	MN	55409
Aseon Loevner	100	Seymour Ave SE	Mpls	MN	55414
Tom Loftns	3207	Bucanan St NE	Minneapol	MN	55418
Kim Logan	3322	Pierce St NE	Minneapol	MN	55418
Diane Logan	5445	Irving Ave S	Mpls	MN	55419
Elizabeth Logas-Lindstror	1448	Albany Ave	St. Paul	MN	55108
Sheila Loger	1408	Hubbard Ave	Saint Paul	MN	55104
Noah Logsdon	1379	Canfield Ave	St. Paul	MN	55108
Gene Loida	2959	Patton Rd	Roseville	MN	55113
Stan Loiya	4618	Queen Ave N	Minneapol	MN	55412
Dave Loken	3030	Garfield St NE	Mpls	MN	55418
Kara Lombard	5131	Elliot Ave S	Minneapol	MN	55417
Tam Lombardi	3247	France N	Robbinsdal	MN	55422
Ruth Loncedyke	1356	No. Grotto	St. Paul	MN	55117
Steven Long	2151	Dunedin Ave	Duluth	MN	55803
June Long	8	Central Ln	Northfield	MN	55057
Ellen Longfellow	2324	Hillside Ave	Saint Paul	MN	55108
Hannah or Nance Longley	2214	Hillside Ave	St.Paul	MN	55108
Tom Lonsky	1146	Montana Ave W	Saint Paul	MN	55108
Jen Loomis	316	5th Ave NE	Minneapol	MN	55413
Steven Loop	5428	Fremont Ave S	Minneapol	MN	55419
Rodney G. Loper	2314	19th Ave NE	Minneapol	MN	55418
Susan Losacker	3548	17th Ave S	Minneapol	MN	55407
Curt Loschy	3039	Highpointe Curv	Roseville	MN	55113
Matt Loth	1550	Fulham St	St. Paul	MN	55105
Brian Lother	3209	Ewing Ave N	Robbinsdal	MN	55422
Ruth Lotsof	2351	Sherwood Hill Rc	Minnetonk	MN	55305
Susan Lottman	720	St. Olaf	Northfield	MN	55057
Tim Louctoy	4425	Bryant Ave S	Minneapol	MN	55419
CARLOS LOUDINS	8039	DAKOTA LN	CHANHASS	MN	55317
Judy Loughlin	2810	Monterey Pwky.	St. Louis Pa	MN	55416
Tim Louris	4501	47th Ave S	Mpls	MN	55406
Matt Louwagie	3739	Pillsbury Ave S	Minneapol	MN	55409
Barbara Lovell	3936	21st Ave S	Mpls	MN	55407
Kara Lovemelt	33	Penn Ave. S.	Minneapol	MN	55405
Marnie Loven-Bell	414	5th St Se	Minneapol	MN	55414

Sharon Lovo	1335	Arlington Ave W	Saint Paul	MN	55108
Jim Lovrien	2318	Willow Lane S	St. Louis Pa	MN	55416
Ann Lowry	3985	Plymouth Rd	Minnetonk	MN	55305
Philip Lowry	1925	James Ave S	Minneapol	MN	55403
Catherine Loye	5629	40th Ave S	Minneapol	MN	55417
Alli Lubben	4079	Colorado Ave S	St. Louis Pa	MN	55416
Adam Lubbert	3729	Pillsbury Ave	Minneapol	MN	55409
Ben Lubet	1860	Princeton Ave	St Paul	MN	55105
Alex Lubet	1860	Princeton Ave	Saint Paul	MN	55105
Jonathan Lubin	1177	Lincoln Ave	st. Paul	MN	55105
Peggy Lubozynsk	5042	Gladstone Ave	Minneapol	MN	55419
Jeremy Lucca	2401	Humboldt Ave S	Mpls	MN	55408
Ann or Don Luce	3845	Harriet Ave	Minneapol	MN	55409
Jesse & Carrie Lucio	807	Albert St	St. Paul	MN	55104
Loretta Luciow	2923	Ewing Ave S	Minneapol	MN	55416
Liberty Lucken	2637	Joppa Ave S	St Louis Pa	MN	55416
Sarah Lucken	2186	Draper Ave	Roseville	MN	55113
Harold Ludtke	2218	Texas AVe S	St. Louis Pa	MN	55426
Scott Ludtkey	5425	Oliver Ave S	Minneapol	MN	55419
Nancy Ludwig	280	Brimhall St	st. Paul	MN	55105
Erika Ludwy	5205	Abbott Ave S.	Minneapol	MN	55410
Nathan Lueck	1697	Hague Ave	St. Paul	MN	55104
Dan Luedke	1584	Huron Ave	St. Paul	MN	55108
Sarah Luedtke Jones	3430	Buchanan St NE	Minneapol	MN	55418
Charles Luepre	921	Hoyt Ave W	St Paul	MN	55117
Matt Luiz	4853	Xerces Ave S	Minneapol	MN	55410
Sarah Lukitsch	2722	Zenith Ave	Robbinsdal	MN	55422
Olaf Lukk	1902	Drew Ave S	Minneapol	MN	55416
Lynn Lukkas	1915	Fremont Ave S	Mpls	MN	55403
C Lukoskie	4776	Kent Way	Shoreview	MN	55126
Askia Luminae	11300	Minnetonka Mill	Minnetonk	MN	55305
Anita Hope Lumye-Silver	5060	Interlachen Bluff	Edina	MN	55436
Kimberely Luna	1611	Chatsworth St N	St. Paul	MN	55108
Carmen Luna	4949	Upton Ave S	Minneapol	MN	55410
Mark Lund	3505	Garfield Ave S	Minneapol	MN	55408
Steph Lund	4045	Raleigh Ave. S.	St. Louis Pa	MN	55416
Kristian Lund	4045	Raleigh Ave	St Louis Pa	MN	55416
Kristina Lund	1902	Quincy St NE	Minneapol	MN	55418
Greg Lund	1792	Maryland Ave N	Golden Val	MN	55427
Kathy Lund	5321	27th Ave S	Minneapol	MN	55417
James Lundberg	4521	Ewing Ave s	Mpls	MN	55410
Darah Lundberg	3828	24th Ave S	Mpls	MN	55407
Bobbie Lundberg	4912	3rd Ave S	Mpls	MN	55419
Phil and Jo lundblad	1939	Berkeley Ave	St Paul	MN	55105
Eric Lunde	14416	Spring Lake Rd	Minnetonk	MN	55345
Lil Lundeen	5105	Chown Ave S	Mpls	MN	55410
Gail Lunden Braud	2132	Sargent Ave	St Paul	MN	55105

Eileen Lundgren	3009	Crestview Dr	St. Anthony	MN	55418
Rhonda Lundgren	3146	Shores Blvd	Wayzata	MN	55391
Melissa Lundquist	1427	Chelmsford St	Saint Paul	MN	55108
Chris Lundstrom	4950	Lyndale Ave S	Minneapol	MN	55419
Jim Lundy	1405	Arona st	St. Paul	MN	55108
Tricia Luoma	4966	Devaney st	St. Louis Pa	MN	55416
Keith Lurie	4751	Girard Ave S	Minneapol	MN	55419
Jan Lusken	209	N Linden St	Northfield	MN	55057
Margaret Lutie	5059	Upton Ave S	Minneapol	MN	55410
John Lutz	2905	31st Ave NE	St. Anthony	MN	55449
W Lyle	3611	Croftview	Minnetonk	MN	55345
Barbara Lyman	1834	Pierce St NE	Mpls	MN	55418
Wendy & Andrew Lyman	2659	Cleveland St Ne	Minneapol	MN	55418
Scott Lynam	2633	Ulysses St NE	Minneapol	MN	55418
Amy Lynch	1300	Alpine Pass	Golden Val	MN	55416
Sue Lynch	5807	Garden Ave	Edina	MN	55436
December Lynch	3047	Cleveland St	Minneapol	MN	55418
Kathy Lynch	2101	Juno Ave	Saint Paul	MN	55116
Gary Lynn	5232	Humboldt Ave S	Minneapol	MN	55419
Sue Lyon	3205	Bell Ln	St. Anthony	MN	55418
Ian Lyon	5129	Columbus Ave S	Mpls	MN	55419
Charles Lyon	2323	Irving Ave S	Minneapol	MN	55405
Jodi M	740	Conestoga Tr	Chanhassen	MN	55317
Betty M	7040	W 24th St	St. Louis Pa	MN	55426
Kenneth M	1600	Lincoln St NE	Mpls	MN	55418
S M	17845	4th Ave N	Plymouth	MN	55414
Josh M	614	4th Ave SE	Mpls	MN	55414
Tom M	3201	Dayton	Chanhassen	MN	55331
Chris M	3015	43rd St W	Mpls	MN	55410
Mark M	823	Holly Ave	St. Paul	MN	55104
Andre M	1624	E River Terr	Mpls	MN	55414
Larry M	1573	Fernwood St	St Paul	MN	55117
K M	3741	Grand AVe	Minneapol	MN	55409
LeAnne M	3552	McKinley St NE	Minneapol	MN	55418
Karin Maas	4151	Red Oak lane	Excelsior	MN	55317
Chustma Maas	17210	11th Ave	Plymouth	MN	55447
Erika Maas	993	Portland Ave	St. Paul	MN	55104
Dick Mabbs	4727	27th Ave S	Minneapol	MN	55406
Anita MacDonald	1925	Gleuk Lane	Roseville	MN	55113
Ariel Macho	4045	Harriet Ave	Mpls	MN	55409
Kaci Maciej	1121	Angelo Dr	Golden Val	MN	55422
Dan Mack	4146	Wentworth	Mpls	MN	55410
John Mack	1938	Walden Pl NE	Mpls	MN	55418
Greg Mack	8300	Virginia Cir N	St Louis Pa	MN	55426
Matt Mackall	2641	Dupont Ave S	Minneapol	MN	55408
Margaret Mackaman	3320	Emerson	Minneapol	MN	55408
Olivia Mackee	1299	Laurel Ave	St Paul	MN	55104

Virginia MacKenzie	1137	Ryan Ave W	Roseville	MN	55113
Dale Mackereth	4322	1st Ave S	Mpls	MN	55409
Mary Mackey	3924	Joppa Ave S	St Louis Pa	MN	55416
Jesse Macklin	1836	Aglen St	Roseville	MN	55113
Audra Mackowiak	2116	Randolph	Highland P	MN	55116
Doug MacLaughlin	328	Burntside Dr	Golden Val	MN	55429
Tyler Macneal	2700	Emerson Ave S	Minneapol	MN	55408
Bob Macuna	6340	Cypress Dr	Excelsior	MN	55331
June Macy	3505	Meadow Ln	Minnetonk	MN	55391
Michael Madans	2919	Zarthan Ave	St. Louis Pa	MN	55416
Julie Maday	7361	Hunters Run	Eden Prairi	MN	55346
Francis Madden	2919	E 50th St	Mpls	MN	55406
Rachel Madden	4047	Pleasant Ave	Minneapol	MN	55409
Lynn Maderich	1957	Berkeley Ave	Saint Paul	MN	55105
Mark Madigan	3206	Ulysses St	Minneapol	MN	55418
Zack & Sarah Madison	2860	Irving Ave S	Mpls	MN	55408
Kim Madrid	4805	40th Lane	St. Louis Pk	MN	55416
Yader Madriz	1838	E 42nd St	Mpls	MN	55407
Kirk Madson	1395	Chelmsford St.	St. Paul	MN	55116
Audrey Madson	2718	E 5th St	Duluth	MN	55812
Allen Maffit	5343	Portland Ave S	Minneapol	MN	55417
Suzanne Magdalene	14	Sidney Pl	Minneapol	MN	55414
Beatrice Magee	764	Lincoln Ave	Saint Paul	MN	55105
Cynthia Maghrak	4433	42nd Ave S	Minneapol	MN	55406
Beth Magistad	2219	Knapp St	St. Paul	MN	55311
Kathy Magne	1989	Wellesley Ave	Saint Paul	MN	55105
Marie Magnus	726	Illegible Ave W	Roseville	MN	55113
Roy Magnuson	727	Wheelock Pkwy	St. Paul	MN	55117
John Magnuson	31120	Fremont Ave	Minneapol	MN	55409
Jan Magrane	5336	York Ave S	Minneapol	MN	55410
Dean Magraw	1497	Sargent Ave	St Paul	MN	55105
Kristen Maguire	1520	E 56th St	Mpls	MN	55417
Lucille Maher	7101	Utica Lane	Chanhasse	MN	55317
Barb Mahigan	3519	Elmo Rd	Minnetonk	MN	55305
Joe Mahoney	6101	Wooddale Ave	Edina	MN	55424
Mary Mahoney	6810	W 26th St	Saint Louis	MN	55426
Annie Mai	707	Tanglewood Dr	Shoreview	MN	55126
Trinh Mai	2551	Arthur St Ne	Minneapol	MN	55418
Joe Mailander	4424	16th Ave S	Mpls	MN	55407
Kirsten & Bruce Mair	1813	Irving Ave S	Minneapol	MN	55403
Sara Mairs	1407	Arona St	Saint Paul	MN	55108
Bob Maisel	5005	Wentworth Ave	Mpls	MN	55419
Aspira Maison	7475	Flying Cloud Dr,	eden Prairi	MN	55334
Maggie Majerski	3921	Garfield Ave S	Minneapol	MN	55404
Thomas Major	5445	Portland Ave	Minneapol	MN	55417
Matt Mak	504	Highland Dr	Chanhasse	MN	55317
Zoe Makala	2123	21st Ave S	Mpls	MN	55404

Tyler Makela	4432	Zenith Ave S	Mpls	MN	55410
Christie Maki	1805	Merrimac Ln	Plymouth	MN	55447
Amanda Malaney	3421	35th Ave S	Mpls	MN	55406
Victoria Malawey	41	Griggs St N	St. Paul	MN	55104
Jan Malcolm	3819	Zenith Ave S	Minneapol	MN	55410
Britt Malee	2010	23rd Ave S	Mpls	MN	55404
Kevin Maler	2116	Laurel Ave	Minneapol	MN	55405
Al Maleson	3804	Washburn	Minneapol	MN	55410
Chris Maley	5205	Shoreview Ave S	Minneapol	MN	55417
Elka Malkis	2096	Bayard Ave	St Paul	MN	55116
Susan Mallison	1443	James Ave	St. Paul	MN	55105
Angela Malone	1608	Niles Ave	St. Paul	MN	55116
Andrew Maloney	4657	baker Rd	Minnetonk	MN	55305
Mary Maloney	2221	W 52nd St	Minneapol	MN	55419
Adam Malourh	3372	Rhode Island Ave	St. Louis Pa	MN	55426
David Malsrud	4709	18th Ave S	Minneapol	MN	55407
Gregory S. Malush	1693	Laurel Ave	Saint Paul	MN	55104
Lori Malvey	4901	13th Ave S	Mpls	MN	55417
Mark Mandarano	964	Portland Ave	St. Paul	MN	55104
Richard Mandel	3520	Skycroft Dr	Mpls	MN	55418
Scott Manior	7073	Ticonderoga Trai	Eden Prairi	MN	55346
Barbara Mank	1088	Cedar View	St.Paul	MN	55405
David (Dave) Mann	2024	28th Ave S	Minneapol	MN	55406
William Manning	463	Mt Curve Blvd	St Paul	MN	55105
Lynn Manning	5400	Vining Pt Rd	Minnetonk	MN	55435
Yana Manolov	2216	Humboldt Ave S	Minneapol	MN	55405
Nate Mans	3231	Garfield	Minneapol	MN	55418
Ann Manthey	2614	Zenith Ave N	Robbinsdal	MN	55422
John Manthey	2079	Skillman	Minneapol	MN	55113
Mavis Mantila	3516	15th Ave S	Minneapol	MN	55407
John Manzarrakas	5032	Nicollet Ave	Minneapol	MN	55419
Jolene Manzey	1709	Jackson Ct	Northfield	MN	55057
Kathy Marah	2227	Taft St NE	Minneapol	MN	55418
Matt & Kristi Marckel	4107	Colorado Ave S	St Louis Pa	MN	55416
Mark Maribeth	5124	Wentworth	Minneapol	MN	55419
Eric Marini	501	Del Rio Dr	Chanhassen	MN	55317
Paulette Marini	16307	Blenheim Way	Minnetonk	MN	55345
Kris Maritz	5360	1st Ave S	Mpls	MN	55419
Kris Maritz	5360	1st Ave S	Mpls	MN	55419
Jasen & Heidi mark	3125	Shadyview Ln N	Plymouth	MN	55447
Terry & Andrew Marks	8208	W Franklin Ave	Saint Louis	MN	55426
Tara Markus	3320	Beard Ave N	Robbinsdal	MN	55422
Jaime Marline	2720	Murray	St. Anthony	MN	55418
Mark Marluto	1	np	Mpls	MN	55419
Chris Marquardt	3636	Blaisdell Ave	Minneapol	MN	55409
Ulysses Marquel	101	Crest Ridge Dr	Burnsville	MN	55337
Kerry Marrou	3920	White Oak Ln	Chanhassen	MN	55331

Jane Marsh	1682	Stillwater St	White Bear	MN	55110
Sue Marsh	1566	Fernwood	St. Paul	MN	55108
Mae Marsh	15351	Lakeshore Ave	Minnetonk	MN	55345
Lisa Marshall	3928	Sheridan Ave S	Minneapol	MN	55410
Libby Marshall	96	Orlin Ave Se	Mpls	MN	55414
Angie Marshall	4355	Galtier	Shoreview	MN	55422
Christap Marshall	7320	Longbiew Cir	Chanhasse	MN	55317
Todd Marshall	1782	Portland Ave	Saint Paul	MN	55104
Jeremy MArshik	4156	Grand Ave S	Minneapol	MN	55404
Jake Marshman	2012	Gettysburg Ave I	Golden Val	MN	55427
Terri Marsten	3528	28th Ave. S.	Minneapol	MN	55416
Ewart Martens	2624	E 22nd St	Minneapol	MN	55406
Sharon Martenson	3620	46th Ave S	Minneapol	MN	55406
Daniel Martin	1305	E. 8th St	Duluth	MN	55805
Geoff Martin	4909	Zenith Ave S	Mpls	MN	55410
Amy & Doug Martin	1932	Cleveland st NE	Mpls	MN	55418
Mike Martin	4648	York Ave S	Mpls	MN	55410
Drew Martin	3804	W 52nd St	Mpls	MN	55410
Jacob Martin	1538	E 54th St	Mpls	MN	55419
Elizabeth Martin	4955	Sorrel Ave	Golden Val	MN	55422
Vivian Martin	2709	Irving Ave S	Mpls	MN	55408
Ruth Martin	5134	Irving Ave S	Mpls	MN	55410
Mike Martin	528	Iona Lane	Roseville	MN	55113
Tim Martin	1901	Palace Ave	Saint Paul	MN	55105
Jim Martin	98	wheeler st	Saint Paul	MN	55105
Matt Martindale	3110	Buchanan St NE	Minneapol	MN	55418
Helen Martineau	4521	Colfax Ave S	Minneapol	MN	55419
JESSICA MARTINEZ	4120	15TH AVE S	POWDERH	MN	55407
Marisa Martinez	2106	Dayton Ave	St. Paul	MN	55104
Kari Martinez	4128	19th Ave S	Mpls	MN	55407
Deb Martinez	3212	Skycroft Dr	Minneapol	MN	55418
Sue Martinez	1398	Albert St N	Saint Paul	MN	55108
Jane Martinson	1141	Angelo Dr	Golden Val	MN	55422
Allison Martinzer	4121	Salem Ave S	St. Louis Pa	MN	55416
John Martner	301	E 8th St	Northfield	MN	55057
Nancy Maruy	3931	Washburn Ave N	Mpls	MN	55412
Kristine Marvets	5548	26th Ave S	Minneapol	MN	55417
C Marvets	5217	33rd Ave S	Nokomis	MN	55417
Chase Marx	2344	Aldrich Ave S	Minneapol	MN	55405
Chad and Shawna Maryai	1227	Como Blvd W	St. Paul	MN	55103
Olivia Mashy	5108	Juanita Ave	Edina	MN	55424
Ronald Mask	3225	Ranier Ln N	Plymouth	MN	55447
Margaret Mason	4620	Washburn Ave S	Minneapol	MN	55410
Emily Mason	2550	Benjamin st NE	Minneapol	MN	55418
Theresa Mason	1205	Dayton Ave	St Paul	MN	55104
Ron Mason	58	Groveland Ter	Minneapol	MN	55403
Vivian Mason	2849	Burnham Blvd	Minneapol	MN	55416

Libby Massa	4134	Thomas Ave N	Mpls	MN	55412
Chet Mastella	1311	Stratton Ct	Chanhassei	MN	55317
Sara Masterman	5126	Oakland Ave S	Minneapol	MN	55419
Sandra Masterson	1401	Hartford Ave	St. Paul	MN	55116
Kathy Matalamaki	237	Bedford Ave. SE	Minneapol	MN	55414
Scott Matheson	4024	Upton Ave S	Mpls	MN	55410
Cynthia Mathews	2417	Sheridan Ave S	Minneapol	MN	55405
Alan Mathiason	2680	Oxford St N. APT	Roseville	MN	55113
Patricia Mathien	6808	Point Dr	Edina	MN	55435
Gary Mathila	1321	Ithiliem	Chanhassei	MN	55364
Cheryl Mathison	1909	Sibley View Ln	Northfield	MN	55057
Christine Matimba C Mat	1624	E River Terrace	Mpls	MN	55414
Ron Matross	486	Frontenac Pl	St. Paul	MN	55104
Leah Matsh	1023	Watson Ave	St Paul	MN	55116
Laura Matson	3326	Pierce St Ne	Minneapol	MN	55418
Lana Matson	6893	Navajo Dr	Chanhassei	MN	55317
Chris Matt	1231	Hewitt Ave	St. Paul	MN	55104
Andy Mattina	3533	Benjamin Ave NE	Minneapol	MN	55418
Margaret Mattlin	2085	Buford	St. Anthony	MN	55108
Dan Mattson	5028	Oliver Ave S	Minneapol	MN	55419
BARBARA MATTSON	3035	Humboldt Ave S	Minneapol	MN	55410
Molly Mattson	4324	14th Ave S	Mpls	MN	55417
Jaana Mattson	3303	Humboldt Ave S	Minneapol	MN	55408
Clark Mattson	7024	Newton Ave N	Brooklyn C	MN	55430
Peggy Matushak	2905	McKinley St NE	Minneapol	MN	55418
Annette Matzen	11720	26th Ave N	Plymouth	MN	55441
Cheryl Maulton	1467	Albert St N	St. Paul	MN	55105
Matt Mauren	7716	W 13 1/2 St	St. Louis Pa	MN	55426
Cindy Maurer	4544	31st Ave S	Mpls	MN	55406
Erika Maus	993	Portland Ave	St. Paul	MN	55104
Julie Mauty	2478	Lydia	Roseville	MN	55113
Betsy May	4701	Zenith Ave S	Minneapol	MN	55410
Tom May	6341	Teton Ln	Chanhassei	MN	55317
Kamala Mayemurthy	2204	Sheridan Ave S	Mpls	MN	55416
David Mayer	1751	Highland Pkwy	Saint Paul	MN	55116
Jack Mayfield	2677	Brittany Lane	Woodbury	MN	55129
Leslie Maynard	3018	Knox Ave S	Minneapol	MN	55419
Donna Mayotte	3926	Sheridan Ave S	Minneapol	MN	55410
David Mazda	1596	Hamline Ave	St. Paul	MN	55108
Al and Terry Mazig	4721	Clinton Ave	Minneapol	MN	55419
Jill or Mark Mazullo	1168	Ashland Ave	Saint Paul	MN	55104
Gita Mazumdar	1164	Ashland Ave	St. Paul	MN	55104
Michael Mcaneney	3641	Pleasant	Minneapol	MN	55414
Lydia & John McAnerney	111	Melbourne Ave S	Minneapol	MN	55414
Jessica McBride	2919	Benjamin St NE	Minneapol	MN	55418
Kyle McCabe	9700	Flintlock	Chanhassei	MN	55317
Erick McCabee	1527	E. 39th St	Mpls	MN	55407

Reivee McCaffrey	3400	Halifax N	St Paul	MN	55422
Bryan McCallum	4020	River Ln N	Plymouth	MN	55441
Elizabeth (Liz) McCambri	2300	33rd Ave S	Minneapol	MN	55406
Robbin McCarthy	7527	Pillsbury Ave S	Richfield	MN	55423
Mary McCarthy	2621	Newton Ave S	Minneapol	MN	55405
Brian McCarthy	4052	Nicollet Ave	Mpls	MN	55409
Patrick McCarthy	2919	Chestnut Ave	Minneapol	MN	55405
Brian McCarthy	3315	Huymboldt Ave S	Minneapol	MN	55408
Sue McCarthy	1903	Kenwood Pkwy	Minneapol	MN	55405
Kevin McCarthy	3015	Emerson Ave S	Minneapol	MN	55408
Molly McCarthy	3058	Garfield St NE	Minneapol	MN	55418
Mike & Cathy McCarty	205	Queen Ave S	Minneapol	MN	55405
Blaire McCathcham	4100	Golden Valley Rc	Golden Val	MN	55422
F McCe	225	Cecil	Mpls	MN	55414
Lisa McChesney	3730	Trenton Ln N	Plymouth	MN	55441
Lindsay McClain	1202	Juno Ave	St Paul	MN	55116
Valerie McClannahan	2720	1st Ave S #3	Minneapol	MN	55408
Judy McCleery	1918	Autumn St	Falcon Heig	MN	55113
Tami & Daniel McClellan	4516	Chatsworth St	Shoreview	MN	55126
Katherine McClure	3916	Thomas Ave S	Mpls	MN	55410
Connie McCollough	4924	5th Ave S	Mpls	MN	55407
Kim McCollow	900	W 53rd St	Minneapol	MN	55419
Jennifer McComas	1961	E River Ter	Minneapol	MN	55414
Dorothy McConnell	9331	W Franklin	St. Louis Pa	MN	55426
Dale McCormick	5330	Pleasant Ave	Mpls	MN	55419
Steven McCown	212	6th St E	Northfield	MN	55057
Bob McCowor	3249	Ewing Ave N	Robbinsdal	MN	55422
Zeny McCoy	8764	Walton Oaks Dr	Bloomingtc	MN	55438
Lynn McCracken	4860	Oxford St	Shoreview	MN	55126
Michelle McCreery	2917	Drew Ave S	Minneapol	MN	55416
Brian McCullough	5301	Logan Ave S	Minneapol	MN	55419
Laura Jo McCullough	6470	Brelton Way	Minneapol	MN	55417
Benjamin McCuskey	3050	Rosewood Ln N	Plymouth	MN	55441
Brian McDermott	4049	22nd Ave S	Mpls	MN	55407
Brian McDermott	4716	Park Ave S	Mpls	MN	55417
T McDill	1269	Idaho Ave W	St. Paul	MN	55108
Kerry McDonald	2909	West 50th	Minneapol	MN	55410
Joel McDongall	5202	Elliot Ave S	Mpls	MN	55417
Mary McDonough	3506	Benjamin Street	Minneapol	MN	55418
Shannon McDonough	1322	Mississippi River	St. Paul	MN	55104
Megan McDonough	2959	Lincoln St NE	Minneapol	MN	55438
Courtney McDowell	3345	Benjamin St NE	Mpls	MN	55418
Judith McElhallon	1607	Mount Curve	Mpls	MN	55403
Suzy McElrath	4700	Lyndale Ave S	Mpls	MN	55419
Ryan McElsath	2331	Arthur St NE	Minneapol	MN	55418
Colin McFadden	1143	St. Clair Ave	St. Paul	MN	55105
Matt McFalls	2805	Silver Lake Rd Ne	Minneapol	MN	55418

Joe McFarlane	684	Orleans	St. Paul	MN	55107
Ryan McGary	4824	W 41st Street	Saint Louis	MN	55416
Kathleen McGee	217	W 34th St	Minneapol	MN	55408
Rebecca McGee	3011	Grand Ave NE	Minneapol	MN	55418
Dan McGeeve	4456	31st	Nokomis	MN	55406
Mike McGollow	900	W 53rd St	Minneapol	MN	55419
Earl McGovern	5015	35th Ave S #715	Minneapol	MN	55417
Julia McGregor	1293	Castle Ct	Golden Val	MN	55427
Carrie McGrew	4347	Pleasant Ave	Minneapol	MN	55419
Tim McGuire	2390	Bourne St	St Paul	MN	55108
Lindsay McGuire-Lee	5542	Shoreview Ave	Mpls	MN	55417
Brian McHenry	5136	17th Ave S	Mpls	MN	55417
Renee Mchugh	3436	Wilshire Pl NE	Minneapol	MN	55418
Pat McIlvenna	4653	Vincent Ave S	Minneapol	MN	55410
Kathryn McIntire	7531	Erie Ave	Chanhasse	MN	55317
Nichole McIntosh	4149	42nd Ave S	Minneapol	MN	55406
Scott McIntyre	2745	Princeton Ave S	St Louis Pa	MN	55416
Mary Mcintyre	208	Miss River Blvs S	St Paul	MN	55105
Meg Mckay	3717	Beard Ave N	Robbinsdal	MN	55422
Will Mckeand	505	Queensland Ln N	Plymouth	MN	55447
Sarah McKee	1958	Pierce St NE	Minneapol	MN	55418
Flynn McKeegan	3416	Bryant Ave S	Mpls	MN	55408
Cate McKegney	2305	Lincoln St NE	Minneapol	MN	55418
Marie McKeighan	760	Nebraska Ave W	St. Paul	MN	55117
Mary McKelvey	2601	W 52nd St	Mpls	MN	55410
Abby McKenzie	1625	Portland Ave	St. Paul	MN	55104
Gizelle Mckenzie	448	Penn Ave S #4	St Paul	MN	55108
Tony McKinley	802	23rd Ave N	South St. P	MN	55075
Barry McKinney	8046	Cheyenne Ave	Chanhasse	MN	55317
Elizabeth McKirahan	3530	Maplewood Cir	Chanhasse	MN	55317
Maggie McKnight	1395	Minnehaha Ave	Saint Paul	MN	55104
Rebecca McLane	1320	Portland Ave	Saint Paul	MN	55104
Patrick McLaughlin	5106	Knox Ave S	Minneapol	MN	55419
Darlene Mclean	4700	Chandler Rd	Shoreview	MN	55126
Joan K. McLeod	1324	Bohland Pl	Saint Paul	MN	55116
Darcy McLinden	136	Mellbourne Ave	Mpls	MN	55414
Candace Mclour	4109	21st Ave S	Mpls	MN	55407
Brook Mcloy	4015	Quentin Ave	St Paul	MN	55416
Bruce & Deena McMahon	1026	Portland Ave	Saint Paul	MN	55104
Kate McManus	4533	44th Ave S	Minneapol	MN	55406
William McMurray	3039	Buchanan St NE	Mpls	MN	55418
Madeline McNab	4645	Nokomis Ave	Nokomis	MN	55406
Bo McNab	4227	11th Ave S	Mpls	MN	55407
Meredith McNab	74	Barton Ave SE	Minneapol	MN	55414
M McNally	4644	Upton Ave S	Mpls	MN	55410
Daniel McNamara	2942	McKinley St NE	Minneapol	MN	55418
Teri McNamara	4008	Lake Dr	Robbinsdal	MN	55422

Linda McNary	3527	Garfield Ave S	Minneapol	MN	55408
Grau McNeely	504	Division St	Northfield	MN	55057
Michael McNeil	2432	Aldrich Ave S # 1	Minnepolis	MN	55405
Mark McNeil	514	5th St E	Northfield	MN	55057
Anthony McNelly	3332	Fremont Ave S	Mpls	MN	55405
Gretchen McQueeney	16610	14th Ave N	Plymouth	MN	55447
James (Jim) McRoe	3408	E 49th St	Minneapol	MN	55417
Karen McVann	1412	Wisconsin Ave N	Golden Val	MN	55427
Debra Mead	5032	Kent Ave	Edina	MN	55436
Stacey Meath	1181	Hague Ave	St. Paul	MN	55104
Sophie Meath	107	Rustic Lodge Ave	Mpls	MN	55419
Judy Meath	5555	Wingwood Court	Minnetonk	MN	55345
Andrew Mechelke	4508	Halifax Ave	Robbinsdal	MN	55422
Barbara Mednick	4715	Chandler Rd	Shoreview	MN	55126
Chris Medower	2532	Millwood Ave	Roseville	MN	55113
Katrina Meehan	716	4th St E	Northfield	MN	55057
Mary J. Meehan	4509	Oxford Ave	Edina	MN	55436
Brian & Josh Meeker	2008	Girard Ave S	Minneapol	MN	55405
Tom Mega	781	Sextant Ave W	Roseville	MN	55113
Carole Megarry	3536	Pleasant Ave	Minneapol	MN	55408
Martha Meier	115	Winona St	Northfield	MN	55057
Garey Meinjohans	4424	Pillsbury Ave	Mpls	MN	55419
Robert Meints	7760	France Ave S 11t	Edina	MN	55435
Robert & Ann Meisch	3112	E 50th St	Minneapol	MN	55417
Mariah Melin	1511	Arona St	St Paul	MN	55108
Amy Mellinge	2927	Gettysburg Ave S	St. Louis Pa	MN	55426
Paul Melsuess	3607	Garfield Ave S	Mpls	MN	55408
Mackenzie Melton	1869	St. Clair Ave	St. Paul	MN	55105
Beatrice Menanteau	3438	Harriet Ave	Minneapol	MN	55408
Katie & Miles Mendenhal	2508	35th Ave S	Minneapol	MN	55406
Jenna Mendoza	2943	Xenwood Ave S	St. Louis Pa	MN	55416
S Mendoza-Shelton	4304	Beard Ave S	Minneapol	MN	55410
Peter Menge	690	MISSISSIPPI RIVE	ST PAUL	MN	55116
Oscar Menjivar	2023	9th St S	Mpls	MN	55406
Scott Menk	11326	Friar Ln	Minnetonk	MN	55305
Steve Menke	5201	Grove St	Edina	MN	55436
Vatsala Menon	3489	Milton Ave	Shoreview	MN	55126
Laura Mens	5606	Albert St	Shoreview	MN	55126
Kristy & Dale Mensch	4800	Larksplar Ave	Edina	MN	55435
David Mercer	142	10th Ave Ne	Minneapol	MN	55413
Beth or Katie Mercer-Tay	2231	Folwell Ave	Falcon Heig	MN	55108
Julie Merricam	1085	Idaho aVe	St Paul	MN	55117
Steve Merrill	5317	Zenith Ave. S.	Minneapol	MN	55410
Mike Merrill	4012	Wooddale Ave S	St. Louis Pa	MN	55416
Lori Merrill	5635	Albert St	Shoreview	MN	55126
Bri Merriman	1919	Cleveland St NE	Mpls	MN	55418
Eric Merriman	1919	Cleveland St Ne	Minneapol	MN	55416

Peter Mersch	4008	21st Ave S	Mpls	MN	55407
Jeff Mervy	11015	38th Place	Plymouth	MN	55441
Paul Merwin	977	Nebraska Ave W	St Paul	MN	55117
Peter Mesick	3532	Zinran Ave S	St. Louis Pa	MN	55426
Mark Messacar	4244	Columbus Ave	Minneapol	MN	55407
George Messing	2958	Fillmore St. NE	Minneapol	MN	55418
Zdenek Mestenhauser	4800	Lyndale Ave S	Minneapol	MN	55419
Michael Metcalf	700	3rd Ave SE	Minneapol	MN	55414
Sarah Meuissen	2216	Sharon Ave SE	Mpls	MN	55414
Roger Mever	5347	Oaklawn Ave	Edina	MN	55424
Rodney Meyer	1631	Flag Ave S	St Louis Pa	MN	55426
Lisa Meyer	404	Mississippi River	St. Paul	MN	55104
Brian Meyer	4109	Chowen Ave	Mpls	MN	55410
Gordon Meyer	4848	York Ave S	Mpls	MN	55410
Matt Meyer	4632	Browndale Ave	Edina	MN	55424
Andrew Meyer	1863	Fernwood St	Roseville	MN	55113
Gayle Meyer	204	Valleyview	Minneapol	MN	55419
Jason Meyer	2925	Mildred Drive	Roseville	MN	55113
Marie Meyer	3424	Cleveland St NE	Minneapol	MN	55418
Anthony & Rhonda Meye	210	Woodley St E	Northfield	MN	55057
Sue Meyer	1525	Oregon Ave N	Golden Val	MN	55427
Aimee Meyer	4236	Washburn Ave S	Minneapol	MN	55410
Keith Meyer	3612	Bloomington Ave	Minneapol	MN	55407
Vicki Meyerding	694	Sextant Ave W	Roseville	MN	55113
Jeanine Meyers	1870	Valders Ave N	Minneapol	MN	55427
Rick Meyers	5841	Deerbrook Dr	Chanhassen	MN	55317
Charles Meyers	2944	Tyler St NE	Mpls	MN	55418
Gordon Meyers	1841	Saunders Ave	Saint Paul	MN	55116
Carol Meyers	4504	Grimes Ave N	Minneapol	MN	55422
David Meysman	4218	Grand Ave S	Minneapol	MN	55409
Jennifer Micek	5008	York Ave S	Mpls	MN	55410
Robin Michaels	3618	E. 4th St	Duluth	MN	55803
Jeff Michaelson	3308	Bryant Ave S	Mpls	MN	55408
Kris Michaelson	705	Grandview Ave \	Roseville	MN	55113
Mike Michalik	1795	Bohland Ave	St. Paul	MN	55116
Katrina Michals	3400	Sumter Ave S	St. Louis Pa	MN	55426
Rosalie & Lou Michelich	11545	39th Ave N	Plymouth	MN	55441
Jill & Rich Michell	85	Cambridge St	Saint Paul	MN	55105
Jennifer Michlitsch	86	Arthor Ave SE	Mpls	MN	55414
Lynell Mickelson	4237	Linden Hills Blvd	Mpls	MN	55410
Sherri Middendorf	87	Mid Oaks Ln	Roseville	MN	55113
Geneva Middleton	2145	Zealand Ave N	Golden Val	MN	55426
Berit Midelfort	5046	Aldrich Ave S	Minneapol	MN	55419
Jennifer Midilitsch	86	Arthur Ave	Minneapol	MN	55414
Jim Migely	4921	Clinton Ave S	Mpls	MN	55419
Aimee Mihock	4035	York Ave S	Minneapol	MN	55410
Mike Mikeday	12751	Wood Courtlane	Minnetonk	MN	55126

Robin Mikiska	20760	Junco Trail	Lakeville	MN	55044
Robert Milanov	910	Franklin Terr	Mpls	MN	55406
Mccall Milbrandt	3559	Pierce St Ne	Minneapol	MN	55318
Ben Miles	4024	12th Ave S	Mpls	MN	55407
GINA MILETTE	1148	W MINNEHAHA	HAMLINE M	MN	55104
Donna Miliotis	1128	County Rd	Roseville	MN	55113
Brian Millberg	1504	Summit	St Paul	MN	55105
Ryan Mille	5446	Vincent Ave S	Mpls	MN	55410
Karin Miller	2900	Yosemite Ave S	Saint Louis	MN	55416
Pat Miller	1464	E Como Blvd	Saint Paul	MN	55117
Paula Miller	12782	Florida Ln	Apple Valle	MN	55124
Jeff Miller	4625	Washburn Ave S	Minneapol	MN	55410
JACOB MILLER	1770	N CHATSWORTH	ROSEVILLE	MN	55113
Nicolas Miller	3929	Lyndale Ave S	Mpls	MN	55409
John Miller	3042	Garfield St NE	Mpls	MN	55418
Kristen Miller	4441	York Ave S	Mpls	MN	55410
Angie Miller	814	45th St	Mpls	MN	55419
Jessica Miller	4719	37th Ave S	Mpls	MN	55417
Jay Miller	4044	Sheridan	Mpls	MN	55410
Emily Miller	2816	Lee Ave N	Golden Val	MN	55422
Heather Miller	3421	Aldrich Ave S	Mpls	MN	55408
Michael Miller	4400	Washburn Ave S	Minneapol	MN	55410
Mackenzie Miller	3108	31st Ave Ne	Minneapol	MN	55418
Jonathan Miller	1197	Autumn St	Roseville	MN	55113
Julie Miller	3209	Dupont Ave S	Minneapol	MN	55408
Nancy Miller	1809	Girard Ave S	Minneapol	MN	55403
Van Miller	4644	York Ave S	Minneapol	MN	55410
Michael Miller	5	Edgcumbe Pl.	Saint Paul	MN	55116
Michael Miller	4014	Monterey Ave	Edina	MN	55416
Mary Ann Miller	4334	Drew Ave S	Minneapol	MN	55410
Alex Miller	2177	Juno Ave	Saint Paul	MN	55116
Beverly Miller	5331	Irving Ave S	Minneapol	MN	55419
Daniel(Dan) Miller	985	Chatsworth St N	Saint Paul	MN	55103
David Miller	4809	13th Ave S	Minneapol	MN	55417
Kay Miller	5337	Woodlawn Blvd	Minneapol	MN	55417
Kent Miller	2126	James Ave	Saint Paul	MN	55105
Karen Millette	3016	Armour Terr	St Anthony	MN	55418
Rachel Millios	2910	W Armour Ter	Minneapol	MN	55418
Greg Millirea	3400	Zarthan Ave S	St. Louis Pa	MN	55416
Nick Milnowski	3420	Girard Ave S	Minneapol	MN	55408
Nathan Milstein	4020	Lyndale Ave S	Mpls	MN	55409
Louise Miner	2158	Hartford Ave	Saint Paul	MN	55116
Henri & Susan Minette	3716	48th Ave S	Minneapol	MN	55406
Vera & Welby Ming Won	1521	Asbury St	Saint Paul	MN	55108
Sherry Minnick	535	Desnoyer Ave	Saint Paul	MN	55104
Brier & Bruce Minor	4620	29th Ave S	Minneapol	MN	55406
JEN MIRANDA	974	JAMES AVE	STP	MN	55102

Sarah Mireth	3119	McKinley St N	Minneapol	MN	55418
John Misa	2005	Autumn Place	Roseville	MN	55113
Sam Mischke	4256	Browndale	St Louis pa	MN	55416
Alison Mischke	2720	Foxgate Dr	Minnetonk	MN	55305
Jason Mish	3910	Lyndale Ave S	Minneapol	MN	55409
A Misra	110	Gray Fox Ln	Chanhasse	MN	55317
Katie Misra	2228	Ulysses St NE	Mpls	MN	55418
E Miszool	1793	Portland Ave	St Paul	MN	55104
Sarah Mitchell	5026	Emerson Ave S	Minneapol	MN	55419
Tabitha Mitchell	1157	Charles Ave	St Paul	MN	55104
John Mitchell	1470	Sheldon St	Minneapol	MN	55108
Michelle Mitchell	1355	Portland Ave	St Paul	MN	55104
Kris or Dave Mitchell	5144	Queen Ave S	Minneapol	MN	55410
Mary A. Mithun	1520	W 35th St	Minneapol	MN	55408
Katie Mitter	3747	Inglewood	St Louis pa	MN	55416
Karen Mixen	1991	Ryan Ave W	Roseville	MN	55113
Eric Mjols	2260	Fernwood	Roseville	MN	55113
Kurt Mo	10735	Union Terrace Way			
Jenna Moberg	3409	30th Ave N	Robbinsdal	MN	55422
Lisa Moceri	1901	Deerhil Dr	Minnetonk	MN	55305
Gary MoCreaps	2240	Rosewood Ln	Roseville	MN	55113
Tracy Moe	5356	26th Ave S	Minneapol	MN	55417
Nick Moeckel	1751	Skillman Ave	Roseville	MN	55113
Jean Moede	749	Fairmount Ave	Saint Paul	MN	55105
Rachel Moeller	1919	Benjamin St NE	Mpls	MN	55418
Sarah Moeller	2518	Joppa Ave	St. Louis Pa	MN	55426
David Moen	1451	Sargent Ave	St Louis Pa	MN	55426
Brian & Patricia Moen	4122	40th Ave S	Minneapol	MN	55406
Patricia Moen	2019	Ewing Ave S	Minneapol	MN	55408
Chris Moencl	4001	Dupont Ave S	Minneapol	MN	55409
Sharon & Arthur Moenin	3255	Shadyview Ln N	Plymouth	MN	55447
Barbara Moffett	5737	13th Ave S	Minneapol	MN	55417
Janna & Keegan Moffitt	3925	Garfield Ave	Minneapol	MN	55404
Salih Mohamed	3424	Abbott Ave N	Robbinsdal	MN	55422
Andrea Mohen	9570	SKY LANE	Eden Prairi	MN	55347
Brian Moher	3804	Sunflower Ct	Burnsville	MN	55306
Marjorie Mohlis	17230	25th Ave N	Plymouth	MN	55447
Rob Mohns	5220	Chicago Ave S	Mpls	MN	55417
Robin Moir	1312	W SHRYER	ROSEVILLE	MN	
Karen Moldenhauer	289	Snail Lake Rd	Shoreview	MN	55126
Karlind Moller	686	Arbogast St	Shoreview	MN	55126
Yvonne & Denise Molme	4428	16th Ave S	Minneapol	MN	55407
Rebecca Mondale	7440	Chippewa Trail	Chanhasse	MN	55317
Gilliane Monnier	3449	Garfield St NE	Minneapol	MN	55418
Liz & Joe & Sue Monson	53	Queen Ave S	Minneapol	MN	55405
Joe Monsow	57	Queen Ave S	Minneapol	MN	55405
Gina Montenaro	2611	Taylor St NE	Minneapol	MN	55418

Alfred Montero	6	Fareway Dr	Northfield	MN	55057
Jodi Montgomery	928	Lincoln Ave	Minneapol	MN	55403
Molly Montgomery	7337	Frontier Trail	Chanhasse	MN	55317
Mike Monti	11010	36th Pl N	Plymouth	MN	55441
Lindsay Moody	2930	Taylor St NE	Minneapol	MN	55418
Mike Moonan	4012	Wayzata Blvd	Golden Val	MN	55416
Therese Mooney	2540	38th Ave S	Minneapol	MN	55406
Amy Moore	903	Division St.	Northfield	MN	55057
Patricia Moore	916	Logan Ln	South St. P	MN	55075
Betty Moore	4049	10th Ave S	Mpls	MN	55407
Micheal Moore	2704	Garfield St NE	Mpls	MN	55418
Bradley Moore	4005	Quaker Ln N	Plymouth	MN	55441
Mike Moore	2316	Cromwell Dr	Mpls	MN	55419
Jason Moore	3319	Beard Ave N	Robbinsdal	MN	55422
Kerry Moore	5	Washburn Ave S	Mpls	MN	55405
Terri Moore	3334	Lakeland Ave N	Robbinsdal	MN	55422
Bev Moore	658	Woodlawn Ave	Saint Paul	MN	55116
Bill & Yvonne Moore	2108	Niles Ave	Saint Paul	MN	55116
Doug & Theresa Moore	2647	E Lake of the Isle	Minneapol	MN	55408
Emily Moore	4055	Colfax Ave S	Minneapol	MN	55409
Shelly Ann Moorman	5220	Upton Ave S	Minneapol	MN	55410
John Moors	4121	Grand Ave S	Minneapol	MN	55409
Peter Mootz	1310	Seminary Ave	Saint Paul	MN	55104
Brian Morabito	1300	Dunkirk Ln N	Plymouth	MN	55447
Eileen Moran	2265	Kilmore Ln N	Plymouth	MN	55441
Anthony Morantz	1400	Nevada Ave S	St. Louis Pa	MN	55426
Kirk Morgan	867	Linwood Ave	St. Paul	MN	55105
Julie Morgan	5070	Arrowood Ln N	Plymouth	MN	55442
Lisa & Andy Morgan	746	Holly Ave	St. Paul	MN	55104
Trent Morgan	4833	Xerxes Ave	Mpls	MN	55410
Elizabeth Morgan	1822	Franklin Ave Se	MPLS	MN	55414
Jay Morgan	4043	Quentin Ave	St Paul	MN	55416
Silas Morgan	4821	3rd Ave S	Mpls	MN	55419
M Morgan	1615	Lowry Ave	Minneapol	MN	55418
Elizabeth Morgan	2550	Bryant Ave S	Minneapol	MN	55408
Jeff Moriarity		2301 Wilson St.	Minneapol	MN	55418
Paul Morin	2605	26th St E	Mpls	MN	55406
Tina Morin	3056	Fairview Ave N	Roseville	MN	55113
Angus Morison	1794	Sargent Ave	St. Paul	MN	55105
Gail Morland	5409	Clinton Ave	Minneapol	MN	55419
Krista Morley	5037	Kent Ave	Edina	MN	55436
Paul Morley	2916	Jersey Ave S	Saint Louis	MN	55426
Elizabeth Morque	5035	2nd Ave S	Mpls	MN	55419
Mallom Morr	1801	Jersey Ave S	St. Louis Pa	MN	55426
Laura or Paul Morrill	3936	Harriet Ave	Minneapol	MN	55409
Hugh Morris	257	Russell Ave S	Mpls	MN	55405
Howard Morris	1532	Huron St	Saint Paul	MN	55108

Ellen & Ben Morrison	3046	Johnson St NE	Minneapol	MN	55418
Jon Morrison	4740	Park Ave S	Mpls	MN	55407
Susan Morrison	1649	Summit Ave	St. Paul	MN	55104
Rachel Morrison	509	Fourth St E	Northfield	MN	55057
Jean Morrison	2149	Rosewood Ln S	Saint Paul	MN	55113
Victoria M. Morse	109	Winona St	Northfield	MN	55057
S V Mortensen	1419	Sheldon St	St Paul	MN	55108
Gary Mortenson	3325	Colfax Ave S	Minneapol	MN	55408
Kristin Mortenson	3306	Fillmore St NE	Mpls	MN	55418
Hannah Mortenson	2911	Lincoln st NE	Minneaplis	MN	55438
Jenny or Darren Moseley	1128	Autumn St	Roseville	MN	55113
Lynne Moser	717	Montcalm Pl	St Paul	MN	55116
Christian Moses	1090	17TH AVE SE	Golden Val	MN	55414
Marc Mosiman	4309	Lancelot Ct	Minnetonk	MN	55345
Stacy Mosiman	4412	Camelot Dr	Minnetonk	MN	55345
Gary Mosiman	4130	Dynasty Dr	Minnetonk	MN	55345
Sondra Mosing	16	Orlin Ave	Mpls	MN	55414
W Moskouitz	3900	Ewing	Minneapol	MN	55410
Jack Moskowitz	2764	Utica Ave S	St Louis Pa	MN	55414
Shelley Mosqueina	2849	Jersey Ave S	St. Louis Pa	MN	55416
Anna Mosser	1049	Van Slyke Ave	St Paul	MN	55103
Michael Motre	1801	Fremont Ave S	Minneapol	MN	55405
Mark Motzko	7606	Erie Ave	Chanhasse	MN	55317
Ben Mouitsen	3329	Dupont Ave	Minneapol	MN	55408
anony mous	1	np	Mpls	MN	55417
Maryalice Mowry	1939	Benjamin St NE	Mpls	MN	55418
Chris Moyer	4005	Roandice Cir	Golden Val	MN	55429
William Moyers	873	Fairmount Ave	Saint Paul	MN	55105
Wm Mozey	4114	Colorado Ave S	St. Louis Pa	MN	55416
Anonymous Mpls	1	np	Mpls	MN	55408
Anonymous Mpls	1	mpls	Mpls	MN	55419
Anonymous Mpls	1	mpls	Mpls	MN	55419
Anony Mpls	1	np	Mpls	MN	55419
Addie Mrosla	1322	Douglas Ave	Mpls	MN	55403
Mertyce Mrvos	5004	Bruce Ave	Edina	MN	55424
Cortney Muehlbauer	5442	Newton Ave	Mpls	MN	55410
Henry Mueller	32	Fareway Drive	Northfield	MN	55057
Brent Mueller	18788	cHENNAULT wA	Eden Prairi	MN	55346
Adelaide Mueller	903	Ashland Ave	St. Paul	MN	55104
Eileen Mueller	1004	Ashland Ave	Saint Paul	MN	55104
Matt Mulaestad	8905	23rd Ave N	Golden Val	MN	55427
Mike Mulbrandt	3559	Pierce St NE	Mpls	MN	55418
Carol Mulcahy	502	Linhurst Ave E #	Saint Paul	MN	55104
Joseph Mulheran	4433	Zenith Ave S	Minneapol	MN	55410
Stephen Mulholland	4433	Colfax Ave S	Minneapol	MN	55419
Luann F. Mullen	486	Otis Ave	Saint Paul	MN	55104
Gretchen Mullen	5508	Doncaster Way	Edina	MN	55436

Marilyn Muller	2811	Ulysses St NE	Mpls	MN	55418
Chris Muller	1434	Como Blvd E	St Paul	MN	55117
Alina "aleena" Muller	5527	Grand Ave S	Minneapol	MN	55419
Joe Mullery	4101	Vincent Ave N	Minneapol	MN	55412
Kathi Mullin	4635	Vincent Ave. S.	Minneapol	MN	55410
Diane Mullin	2410	Irving Ave S	Minneapol	MN	55405
Tim Mulrennan	5420	York Ave	Edina	MN	55410
Amy Mulvahila	76	Groveland Terr	Mpls	MN	55403
Chet Mulwolland	2097	Wilder ST	Roseville	MN	55113
Amanda Munoz	1625	Virginia Ave	St. Louis Pa	MN	55426
Sierra Munoz	128	W 35th St	Mpls	MN	55408
Felipe Munoz	914	W 56th St	Mpls	MN	55408
Beverly Munson	7027	Park Ave	Richfield	MN	55423
Michael & Mary Munson	4400	Snail Lake Blvd	Shoreview	MN	55126
David Mura	1920	E River Terr	Mpls	MN	55414
Gordon Murdock	1489	Hythe St	St. Anthony	MN	55108
Kathleen Murdock	4637	Colfax Ave S	Minneapol	MN	55419
Robin Murie	1768	Ashland Ave	Saint Paul	MN	55104
Mike Murphey	4059	Quentin Ave	St. Louis Pk	MN	55416
Anne Murphy	1672	Lincoln Ave	Saint Paul	MN	55105
Elizabeth Murphy	2528	Lincoln St NE	Mpls	MN	55418
Meg Murphy	1479	Hague Ave	St. Paul	MN	55104
Tiemee Murphy	1076	Lincoln Ave	St Paul	MN	55105
Jeanette Murphy	2183	Roselawn Ave W	Roseville	MN	55113
Kathy Murphy	908	Iowa Ave	St Paul	MN	55117
H.L. Murphy	1120	Ryan Ave W	Roseville	MN	55113
Karen Murray	2109	Ewing Ave S	Minneapol	MN	55417
David Murray	3045	Georgia Ave S	St. Louis Pa	MN	55413
Jane Anne Murray	4035	Sheridan Ave S	Mpls	MN	55410
Kevin Murray	4022	Nicollet Ave	Mpls	MN	55409
Steve Murray	2750	Colfax Ave	Minneapol	MN	55408
Mike Murray	4401	Dupont Ave S	Minneapol	MN	55419
Jane Anne Murry	4013	Sheridan Ave	Minneapol	MN	55410
Addy MURTAUGH	692	WOODLAWN AV	St. Paul	MN	55116
Kevin Murtaugh	2660	Queensland Ln N	Plymouth	MN	55447
Shawn Murtaugh	1922	Arthur St Ne	Minneapol	MN	55418
Michael Murtaugh	2957	Northview St	Roseville	MN	55113
Steve Muscanto	2003	Skillman Ave W	Roseville	MN	55113
Asha Muse	3301	Ewing Ave N	Robbinsdal	MN	55422
Maggie Muske	1644	Oregon Ave S	St. Louis Pa	MN	55426
Beth Mussiner	11005	41st Ave N	Plymouth	MN	55447
Mary Beth Mutchler	3496	Nancy Place	Shoreview	MN	55126
Kaitlin Muth	4426	35th Ave	Mpls	MN	55406
Andrew Muth	4441	York Ave S	Minnepolis	MN	55410
Makai MW	4413	York Ave	Robbinsdal	MN	55422
Lawrence Myer	1819	Emerson Ave. S.	Minneapol	MN	55403
GWEN & Mason MYERS	12009	HILLOWAY RD W	MINNETON	MN	55305

Larry Myers	3740	Evergreen Ln	Plymouth	MN	55441
David Myers	4247	Vincent Ave S	Mpls	MN	55410
Roy & Jillia Myers	3907	Sunset Blvd	St Louis Pa	MN	55416
Gordon Myers	2145	Knapp St	Saint Paul	MN	55108
Sophia Myers-Kelly	1233	Hubbard Ave	St. Paul	MN	55104
Katie Myhre	1500	St Olaf Ave	St. Anthony	MN	55057
Siri & Mike Myhrom	4212	Bryant Ave S	Minneapol	MN	55410
Scott Myles	4347	Blaisdell Ave S	Mpls	MN	55409
James Myrman	2631	McKinley St. NE	Mpls	MN	55418
Victoria N	3042	Harding St NE	St. Anthony	MN	55418
Annela N	1943	Summit Ave	St. Paul	MN	55104
John N	1000	46th St S	Minneapol	MN	55419
Anna Naaklgeboren	1351	Canfield Ave	St. Paul	MN	55108
Mary Nadeau	97	Nicollet St. NE	Minneapol	MN	55418
SANDI NADON	12721	PHEASONT AVE	BURNSVILL	MN	55337
Ross and Lois Naegele	3425	Downers Dr NE	St. Anthony	MN	55418
Joel and Katie Nagel	610	Laurel Ave	St. Paul	MN	55102
Ted & Judy Nagel	2506	Lake Place	Minneapol	MN	55405
Zack Nagle	4746	4th Ave S	Mpls	MN	55419
Ellen nagle	3900	Huntington Dr	Minnetonk	MN	55305
Tara Nahey	4632	Ewing Ave S	Minneapol	MN	55410
Judie Nahlstrom	3346	Pierce St NE	Minneapol	MN	55418
Pouya Najmaise	3416	16th Ave S	Mpls	MN	55407
Leslie Nall	2009	Humboldt S	Minneapol	MN	55405
Margaret Nallick	6200	Cypress Dr	Chanhasse	MN	55331
Unny P. Nambudiripad	342	E 44th St	Minneapol	MN	55409
Ben Nardozzi	4301	29th Ave S	Nokomis	MN	55407
Leon Narem	20	Sandy Hook Rd	Chanhasse	MN	55317
Vikas Narula	5244	Zenith Ave S	Mpls	MN	55410
James Nash	3548	Humboldt Ave S	Minneapol	MN	55408
Nancy Nash	5128	Halifax Ave	Edina	MN	55424
Barry Nash	2569	Webster Ave S	St. Louis Pa	MN	55416
Andrea Nasmith	4937	Thomas Ave S	Mpls	MN	55410
Madelyn Nasser	3930	W 44th St	Edina	MN	55416
Jake Nassif	37	Arthur Ave SE	Mpls	MN	55414
David & Monica Nassif	1010	W Minnehaha Pl	Minneapol	MN	55419
Ed Nater	551	Frontenac Pl	St. Paul	MN	55104
Judi Nathenson	4253	Ottawa Ave	St Louis Pa	MN	55416
Linda Nation	3853	Pillsbury Ave S	Minneapol	MN	55409
Mary Nattenstad	2550	Burn Lane Rd	Minneapol	MN	55416
Cory Natz	2516	Sumter Ave	St Louis pa	MN	55426
Adam Natziger	5221	27th Ave S	St. Louis Pa	MN	55416
Jeff Natzke	3301	Mckinley St NE	Minneapol	MN	55418
Theresa Nauar	3324	Virginia Ave S	Minneapol	MN	55426
Emma Naughton	1627	W 26th St	Mpls	MN	55408
Alexandra Naughton	3307	Holmes Ave	Minneapol	MN	55408
Wendy Naughton	4804	29th Ave S	Minneapol	MN	55417

Abby Naumann	2250	Valders Ave N	Golden Val	MN	55427
Mari Navarro	3045	Taylor ST NE	Minneapol	MN	55418
Philip Nayed	5621	Vermont St	St. Louis Pa	MN	55416
Carolyn Nayemaste	1446	Summit Ave	St Paul	MN	55105
William Naylor	17	Russell Ave S	Mpls	MN	55405
David Neall	4276	Drew Ave S	Minneapol	MN	55410
Alex Needham	4300	11th Ave S	Mpls	MN	55407
Carrie Neerland	3632	46th Ave S	Minneapol	MN	55406
Anorga Negwath	4937	Thomas Ave S	Minneapol	MN	55419
Annette Nehk	3027	Blackstone	St. Louis Pa	MN	55426
Justin Neiberg	4305	Lancelot Dr	Minnetonk	MN	55345
Mike Neiberg	1648	Ashland Ave	St Paul	MN	55104
Amy Neitzel	1460	Jersey Ave S	St. Louis Pa	MN	55426
Russ Nelsen	3812	Kipling Ave	St Louis Pa	MN	55416
Jeri Nelsen	3021	E Minnehaha Pk	Mpls	MN	55406
Jeff Nelsen	5340	Bryant Ave	Minneapol	MN	55419
Nancy Nelsen	2313	Essex Rd	Minnetonk	MN	55305
Cynthia & James Nelson	351	Chester St	Minneapol	MN	55419
Kari Nelson	914	W 2nd St	Northfield	MN	55057
Brad C. Nelson	3720	14th Ave S	Minneapol	MN	55407
Kjersti Nelson	3246	Cleveland St NE	Minneapol	MN	55418
Theresa Nelson	1463	Blair Ave	Saint Paul	MN	55104
Don Nelson	12986	Euclid Ave	Apple Valle	MN	55124
Dan Nelson	18667	Jasper way	Lakeville	MN	55044
Josie Nelson	239	Peninsula Rd	Plymouth	MN	55441
Imogene and Allan Nelso	705	Primrose Ct	Northfield	MN	55057
Justine Nelson	1463	Blair Ave	St. Paul	MN	55104
Brett & Beth Nelson	1235	W Idaho Ave	St. Paul	MN	55108
Donna Nelson	5348	27th Ave South	Minneapol	MN	55417
Joan Nelson	3955	Waldenshores R	Deephaven	MN	55391
Jess Nelson	1414	Hewitt Ave	St. Paul	MN	55104
Susan Nelson	3061	Aquila Ave S	St. Louis Pa	MN	55426
Kim Nelson	320	Sinnen Cir	Chanhasse	MN	55317
Rachel Nelson	3214	Cleveland St NE	Mpls	MN	55418
Eric Nelson	5201	Mirror Lakes Dr	Edina	MN	55436
Keri Nelson	14214	Orchard Rd	Minnetonk	MN	55345
Wyatt Nelson	8024	W 25th Av eS	St Louis Pa	MN	55426
Katie Nelson	2901	Raleigh Ave	St Louis Pa	MN	55416
Merlin Nelson	5005	Turtle Lake E	Shoreview	MN	55126
Tory Nelson	4428	Abbott Ave N	Robbinsdal	MN	55422
Thea Nelson	24	Sheridan Ave S	Mpls	MN	55405
Lauren Nelson	17100	Hampton Ct	Minnetonk	MN	55345
Jim Nelson	5128	17th Ave S	Mpls	MN	55417
David Nelson	1635	Cedar Lake Pkwy	Minneapol	MN	55416
Elizabeth Nelson	3230	Dartmouth Dr	Chanhasse	MN	55317
Kathryn Nelson	4712	Coffey Ln	Minneapol	MN	55406
Sharon & Shirley Nelson	3805	18th Ave S	Minneapol	MN	55407

Tim Nelson	4841	4th Ave S	Minneapol	MN	55419
Craig Nelson	2900	E 22nd St	Minneapol	MN	55406
Denice Nelson	4915	37th Ave S	Minneapol	MN	55417
Kristen Nelz	2221	Hillside Ave	St Paul	MN	55108
Joe & Brooke Nemo	2121	Hartford Ave	St. Paul	MN	55116
Jon Nen	3400	Hopkins	Minnetonk	MN	55305
Towle & Catherine Nen	4326	Grand Ave S	Minneapol	MN	55409
Kelly Nenn	7406	Carol Dr	Chanhassei	MN	55317
Randi Nervig	1150	Sherburne	St Paul	MN	55104
Paul Neseth	3617	Dupont Ave S	Minneapol	MN	55409
Guy Neske	3410	Fillmore St NE	Mpls	MN	55418
Dan Ness	4415	Washburn Ave S	Mpls	MN	55410
Eric Ness	3013	Silver Lake Rd	St. Anthony	MN	55418
Joni Ness	18568	Schreider	Eden Prairi	MN	55436
Marie Ness	18671	Magenta Bay	Eden Prairi	MN	55347
Karen Ness	4529	47th Ave S	Minneapol	MN	55406
Kristina Nesse	2601	Hampshire Ave S	St. Louis Pa	MN	55426
Mary Nessman	3715	Lee Ave N	Robbinsdal	MN	55422
Leon Nesvacil	4931	129th St N	Hugo	MN	55038
Tay Netsff	8112	W 30th St	St. Louis Pa	MN	55426
Dean NeuBurger	921	Juniper Ave N	Northfield	MN	55057
Brad & Dana Neuhauser	4012	14th Ave S	Minneapol	MN	55407
Bryan Neuman	1347	Arona St	St Paul	MN	55108
Carol Neumann	694	Oakdale Ave	Saint Paul	MN	55107
Matt Neutgens	18015	30th Ave N	Plymouth	MN	55447
Julie Neutgens	18015	30th Ave N	Plymouth	MN	55447
Saoncy Neville	5256	Columbus Ave	Mpls	MN	55417
Mel Newman	4530	Halifax Ave N	Robbinsdal	MN	55422
Chris Newmarker	4114	Raleigh Ave S	St Louis Pa	MN	55416
Nga Ngo	3425	Aldrich Ave S	Mpls	MN	55408
Edward Niblett	3250	47th Ave S	Minneapol	MN	55406
Mary Nichols	3526	Skycroft Dr	Mpls	MN	55418
Tessa Nichols-Meade	3101	E 24th St	Mpls	MN	55406
James Nicholson	3735	Glenhurst	St Louis Pa	MN	55416
Dirk Nicholson	118	Elmwood Place E	Minneapol	MN	55419
Shawn Niebl	3434	Mckiley St NE	Minneapol	MN	55418
Lilita B. Niebler	3206	Taylor St	Minneapol	MN	55418
Mary Ellen Niedenfush	923	Osceola Ave	St. Paul	MN	55105
Heather Nielsen	3909	Garfield Ave	Minneapol	MN	55409
Paul Nieman	3218	54th St E	Nokomis	MN	55417
Debra Niemeke	3515	Garfield Ave	Mpls	MN	55408
GERANNE NIENOW	3625	18TH AVE S	POWDERH	MN	55407
Dennis Niewoehner	5009	Wooddale Ln	Edina	MN	55424
Laura Nikkanen	27	Circle W	Edina	MN	55436
Karen Nikobi			St Paul		55115
Jennifer Nillum	4145	Brookside Ave	St. Louis Pa	MN	55416
Betsy Nimmas	3754	Glenhurst Ave S	St. Louis Pa	MN	55416

Greg Niska	1538	Holton St	Saint Paul	MN	55108
Katie Nissly	2500	37th Ave S	Mpls	MN	55406
Jio Nocon	136	Cecil St SE	Mpls	MN	55414
Gerald Nolte	2164	Commonwealth	St. Paul	MN	55108
Michelle Noltimier	5400	Queen Ave S	Minneapol	MN	55410
Roger & Morice Nord	3307	Decatur Ln	St. Louis Pa	MN	55426
Jane Nordmey	2821	Ottawa	St. Louis Pa	MN	55416
Maja Nordrum	2801	Idaho Ave S	St. Louis Pa	MN	55426
Eileen J. Nordstrom	1240	Hoyt Ave W	Saint Paul	MN	55108
Pat & Dave Noren	4525	47th Ave S	Minneapol	MN	55406
Linda Norenberg	2750	McNair Dr	Robbinsdal	MN	55422
Lonnie Norling	11430	42nd Pl N	Plymouth	MN	55441
Josh Norman	4907	Bryant Ave S	Mpls	MN	55419
Heidi Norman	4609	Moorland Ave	Edina	MN	55424
Robert Norris-Weber	5404	Girard Ave S	Minneapol	MN	55419
Anonymous I. Northfield	1	northfield	Northfield	MN	55057
Greg Northrop	1260	Dayton Ave	St. Paul	MN	55104
Alyssa Northrop	5037	Belmont Ave S	Minneapol	MN	55419
Jenifer Northwick	2329	Taft St NE	Mpls	MN	55418
Wendy Norton	4840	Birchwood Lane	Minnetonk	MN	55343
Jim and Sherry Norton	16955	Jasper Path	Lakeville	MN	55044
Yukiko Norton	3051	Johnson St NE	Mpls	MN	55418
Gail Nosek	2527	Arthur St NE	Mpls	MN	55418
A not legible	3800	Glenhurst	St. Louis Pa	MN	55416
A Not legible	1431	Nevada Ave S	St. Louis Pa	MN	55426
David & Monique Notch	10527	Parker Dr	Eden Prairi	MN	55347
Diane K. Notch	305	N Orchard	Northfield	MN	55057
Greg Notting	1260	Dayton Ave	St Paul	MN	55104
William Nour	2116	E 42nd St	Minneapol	MN	55407
Heidi Novak	4141	Vincent Ave. S.	Wedge	MN	55410
Jerri Novak	8955	Hidden Meadow	Woodbury	MN	55125
Kathy Novak	1409	Midway Pkwy	St. Paul	MN	55108
Anna Novak	3157	McKinley	Minneapol	MN	55418
Jen & Tom Nowak	3921	Lynn Ave. S.	St. Louis Pa	MN	55416
Steve Nowicki	3032	Dupont Ave S	Mpls	MN	55408
Gal Noyman	150	Kentucky Ave	Golden Val	MN	55422
Melanie Nugent-Bies	761	Nevada Ave W	St Paul	MN	55117
Mab K. Nulty	4212	W 42nd St	Edina	MN	55416
Paul Nutting	2031	Pinehurst	St Paul	MN	55116
Julie Nyberg	1738	St. Clair	St Paul	MN	55105
Aaron Nyborg	7619	Cedar Lake Rd S	Saint Louis	MN	55426
JOHN NYLANDER	15482	BOWDER CREEE	MINNETON	MN	55345
Michele Nyman	3925	20th Ave S	Mpls	MN	55407
Nicole Nzendoski	5217	27th Ave S	Mpls	MN	55417
Bob O' Harr	1873	Berkeley Ave	St Paul	MN	55105
Jeff O'Brien	1418	Albert St N	Saint Paul	MN	55108
Ethan O'Brien	3242	Tyler St NE	Mpls	MN	55418

Shanna O'Brien	6201	Cascade Pass	Chanhassen	MN	55317
Trish O'Brien	3024	E 25th St	Mpls	MN	55405
Amanda O'Brien	1212	Marshall Ave	St. Paul	MN	55104
David O'Brien	2208	Princeton Ave	Saint Paul	MN	55105
Chris O'Connor	3562	Fillmore St	Mpls	MN	55418
Jennifer O'Connor	4573	Saddlewood Dr	Minnetonk	MN	55345
Colleen O'Connor	316	St Anthony Pkwy	Minneapol	MN	55418
Cathy O'Donell	4121	Zarthan Ave S	St. Louis Pa	MN	55426
Maureen O'Dougherty	4027	Yosemite Ave	St Louis Pa	MN	55416
Derek O'Grady	225	Luverne Ave	Minneapol	MN	55419
Patricia O'Halloran	4145	Garfield Ave	Minneapol	MN	55409
Sean O'Keefe	4343	Garfield Ave S	Mpls	MN	55409
David O'Keefe	708	Winona St	Northfield	MN	55057
Michael and Beth O'Keef	1865	Lincoln Ave	Saint Paul	MN	55105
Kathy O'Malley	2115	Gordon Ave	St. Anthony	MN	55108
Tom O'Mara	5116	Park Ave. S.	Minneapol	MN	55419
Angela O'Neil	3717	W Fuller St	Edina	MN	55424
Amanda O'Neil	1908	Carroll Ave	St Paul	MN	55104
Tom O'Neill	6600	Rocky Island	Excelsior	MN	55331
Robin O'Neill	8291	Drexel Ct	Eden Prairi	MN	55347
Margie O'Neill	1527	Arona St	Saint Paul	MN	55108
Bill & Margie O'Niell	1527	Arona Ave.	St. Paul	MN	55108
Steph O'reilly	3825	Orchard	Robbinsdal	MN	55422
Louise O'Reilly	4845	Oakland Ave S	Mpls	MN	55407
Aaron O'Rielly	15309	Holdridge Rd E	Wayzata	MN	55391
Dennis O'Rourke	1371	Midway Pkwy	Mpls	MN	55419
Bonnie O'Sabina	2040	Utah Ave S	St. Louis Pa	MN	55426
Amy O'Toole	8001	W 251st St	St Louis Pk	MN	55426
Mary O'Toole	5513	Dundee Rd	Edina	MN	55436
Brian Oake	4521	30th Ave S	Minneapol	MN	55406
Klaus Obergfau	3348	Irving Ave S	Mpls	MN	55408
Pam Obriveau	4520	Browndale Ave	Edina	MN	55424
Ann Ocallahan	786	Summit Ave	St Paul	MN	55105
Paul Ockuly	4909	Vincent Ave S	Minneapol	MN	55410
John OConnell	412	W Minnehaha Pl	Minneapol	MN	55419
Dick & Joan Ocson	1705	Lincoln	St Paul	MN	55105
Melissa Odeabach	5015	Oakland Ave S	Mpls	MN	55419
Jodi Oeifke	4800	Clinton Ave	Minneapol	MN	55419
Adrienine Oesterle	2410	Oliver	Minneapol	MN	55405
Rosa Oesterreich	3608	14th Ave S	Mpls	MN	55407
Sandra Offerdalh	4214	Vincent Ave S	Mpls	MN	55410
Mark Ogilvige	908	Lovell Ave W	Roseville	MN	55113
Vanessa Ogren	2330	Coolidge St NE	Mpls	MN	55418
Amy Ogren	2716	Western Ave N	Roseville	MN	55113
Elaine Ogren	1530	W Larpenteur, A	Falcon Heig	MN	55113
Patricia OHalka	4145	Garfield	Minneapol	MN	55409
Peter Ohland	1598	Ridgewood Ln	Roseville	MN	55113

Dawn Olaughlin	18612	Schroeder Pl	Eden Prairi	MN	55436
Christine Oliver	3224	Colfax Ave S	Mpls	MN	55408
Nathan Oliver	2823	Princeton Ave	St Louis Pa	MN	55416
Dennis Oliver	5140	Ewing Ave S	Minneapol	MN	55410
Ben Olk	1320	W Minnehaha Pl	Minneapol	MN	55410
Monica Olmschenk	3925	Bloomington Ave	Minneapol	MN	55407
Darlene Olsen	901	Vineland Ct	Chanhasse	MN	55317
Yvonne Olsen	3124	Irving Ave S	Mpls	MN	55408
Margaret Olsen	1847	Fairmount Ave	Highland P	MN	55116
Jeanne Olsen	5057	Morgan Ave S	Minneapol	MN	55419
Cheryl Olseth	124	W. Minnehaha P	Minneapol	MN	55419
Larry Olson	5909	12th Ave S	Minneapol	MN	55417
Stephanie Olson	1486	Raymond Ave	Saint Paul	MN	55108
Yvonne Olson	5229	33rd Ave S	Minneapol	MN	55417
Amy Olson	4770	107th Ave NE	Blaine	MN	55014
Gary Olson	1260	Eldridge Ave	Roseville	MN	55113
Susan Olson	1797	Stanford Ave	Saint Paul	MN	55105
Natasha & Greg Olson	18205	30th Pl N	Plymouth	MN	55447
Cody Olson	4405	Colfax	Mpls	MN	55419
SARAH OLSON	3508	14TH AVE S	POWDERH	MN	55407
Mike Olson	5401	Morgan Ave S	Minneapol	MN	55419
Tony Olson	6209	Hillside Rd	Edina	MN	55436
Michael Olson	3213	Georgia Ave S	St. Louis Pa	MN	55416
Jessica & Lars Olson	3407	Buchanan St NE	Mpls	MN	55418
Andrew Olson	4325	Xerxes Ave S	Mpls	MN	55410
Carolyn Olson	3317	Croft Dr	Mpls	MN	55418
Erik Olson	4810	W 40th	St. Louis Pa	MN	55416
John Olson	3741	Lyndale Ave S	Mpls	MN	55408
Ingrid Olson	1520	Zealand Ave N	Golden Val	MN	55427
Jeff Olson	702	Washington St	Northfield	MN	55052
Lyndsey Olson	989	Portland Ave	St. Paul	MN	55104
Tom Olson	12627	Creek Rd	Minnetonk	MN	55305
Matt Olson	1207	W 28th St	Minneapol	MN	55408
Gary Olson	1508	Simpson	St Paul	MN	55108
Michele Olson	487	Owasso Hills Dr	Roseville	MN	55113
Nancy Olson	1865	Eldridge Ave W	Roseville	MN	55113
Nate Olson	5349	Knox Ave S	Minneapol	MN	55414
Barbara Olson	1236	Garden Ave	Roseville	MN	55113
Orville Olson	7500	York Ave	Edina	MN	55435
Aimee Olson	3730	Joppa Ave S	St Louis Pa	MN	55416
Amy Olson	804	Delaware Ave	Saint Paul	MN	55107
Don Olson	16416	Hilltop Ter	Minnetonk	MN	55345
Jacqueline Olson	5901	Portland Ave	Minneapol	MN	55417
Jim Olson	3917	Lynn Ave	St Louis Pa	MN	55416
Karen Omlung	3602	Abbott Ave N	Robbinsdal	MN	55422
Nick Ondler	4308	Morningside Ave	Edina	MN	55416
Jeannine Onelle	45	Balson Ave SE	Mpls	MN	55414

Pat Onken	6221	Greenbriar Ave	Chanhassei	MN	55331
Richard D. Ooms	922	W 38th St	Minneapol	MN	55408
Viviann Opsal	4620	Xerxes Ave S	Minneapol	MN	55410
Alex Opstad	3354	Pierce St NE	Mpls	MN	55418
Jill Orbuch	2220	Cedar Lake Pkwy	Minneapol	MN	55416
Dennis Ormseth	1306	Raymond Ave	Saint Paul	MN	55105
Gabe Ormsky	3740	Blaisdell Ave	Mpls	MN	55408
Caroline Ornelas	4100	York Ave S	Mpls	MN	55410
Mark Orr	5200	Morningside	St Louis Pa	MN	55416
Charlie Orr	4204	Browndale Ave	Saint Louis	MN	55416
Katie Orr	4306	Pleasant Ave	Minneapol	MN	55409
Harry Orr	5133	Luverne Ave	Minneapol	MN	55419
Marcelo Ortz	4321	28th Ave S	Nokomis	MN	55407
John Osborn	309	Brimhall St	Saint Paul	MN	55105
Tom Osborne	400	Winnetka Ave S	Golden Val	MN	55422
J Osburne	5121	29th Ave S	Mpls	MN	55417
Marri Oskarn	6901	Dakota Trail	Edina	MN	55439
mark Oslund	14811	Lake St	Minnetonk	MN	55345
Ibrahiam Osman	1826	Ulysses St NE	Mpls	MN	55418
Thomas Osmonson	23	Sidney Pl	Mpls	MN	55414
Dan Oster	2731	Benjamin St NE	Mpls	MN	55418
Lisa Osteraas	4170	Lakeridge Rd	Chanhassei	MN	55331
Nicole Osterhaus	1395	Knoll Dr	Shoreview	MN	55126
Wolfor Ostrom	5127	34th Ave S	Minneapol	MN	55406
Gary Oths	6715	Ney Pence	Chanhassei	MN	55317
Todd Otis	1458	W 35th St	Mpls	MN	55408
Jennifer Otremba	1220	Churchill St	St. Paul	MN	55103
Jeff Otshi	3817	47th Ave S	Minneapol	MN	55406
Andrea Otter	2809	Irving Ave S	Minneapol	MN	55408
Sarah Otterdahl	5332	Logan Ave S	Minneapol	MN	55419
Charles Otto	3009	Taylor St NE	Minneapol	MN	55418
Tom Otto	2730	Yosemite Ave S	St Louis Pa	MN	55416
Linda Otto	4721	W 40th St	St Louis Pa	MN	55416
Krista Ottoson	3900	Crystal Lake Blvc	Robbinsdal	MN	55422
Jon Oug	3050	Garfield St NE	Minneapol	MN	55418
Mose Ouray	4313	17th Ave S	Mpls	MN	55407
Anna Overbo	3720	11th Ave S	Minneapol	MN	55407
Richard Owen	1929	Emerson Ave S	Minneapol	MN	55405
Katharine Owens	4248	Salem Ave. S.	St. Louis Pa	MN	55416
Robert Owens	2848	Glenhurst Ave	St Louis Pa	MN	55416
Brad Owens	3120	Shores Blvd	Minnetonk	MN	55345
Brodie Owens	640	Queensland Ln N	Plymouth	MN	55447
Barb Owens	4841	Nokomis Ave S	Mpls	MN	55406
Becky Oyanagi	1491	Raymond Ave	St. Anthony	MN	55108
Sarma Ozmen	3948	Harriet Ave	Minneapol	MN	55404
Adam P	4519	Chowen S	Mpls	MN	55410
Rob P	4532	Zenith Ave	Mpls	MN	55410

Jenna P.	3236	Pierce St NE	Minneapol	MN	55418
Richard & Amy Paal	2755	Drew Ave S	Minneapol	MN	55416
John Pacheo	3900	Upton Ave S	Minneapol	MN	55410
Max Pacousky	3542	Pillsbury Ave S	Mpls	MN	55408
Sherry Paderin	4390	Browndale Ave	Edina	MN	55424
Marion Padilla	4416	Pleasant Ave	Minneapol	MN	55419
Brian Padolny	1179	Ravenswood St	Shoreview	MN	55126
Barbara Padruos	1518	35th St W	Mpls	MN	55409
Stephanie Pagac	2915	Colorado Ave S	St. Louis Pa	MN	55416
Ann Page	10	Hill St	Chanhassei	MN	55317
Thomas Pagel	5526	Vermont St	St Louis Pa	MN	55416
Tony Pahla	4015	Pleasant Ave	Mpls	MN	55409
Eldin Paho	700	Main St NE	Minneapol	MN	55413
Jack Pahr	3200	Webster Ave S	St. Louis Pa	MN	55416
Joshua Paine	7701	Erie Ave	Chanhassei	MN	55317
Susan Palchick	2608	Princeton Ave	St Louis Pa	MN	55416
Justin Paleek	4425	Shoreview Rd	Robbinsdal	MN	55422
Deborah Paley	323	Vincent Ave N	Mpls	MN	55405
Lisa Palkowtsch	1393	Eldridge Ave	Roseville	MN	55113
Evelyn Pallas	3001	Sandy Hook Dr	Roseville	MN	55113
Lyelle Palmer	504	Lake St	Winona	MN	55987
Raymond Palmer	4141	Harriet Ave	Minneapol	MN	55409
Kathy Palmer	4712	Beard Ave S	Minneapol	MN	55410
Joe & Shalee Palmquist	1387	Midway Pkwy	St.Paul	MN	55108
Scott Pampuch	1520	Natchez Ave S	Golden Val	MN	55446
Robert & Mary Paoli	2186	Berkeley Ave	Saint Paul	MN	55105
Leftheris Papageorgiou	4150	Harriet Ave	Minneapol	MN	55409
Nicholas Paradis	3610	Sunrise Dr E	Minnetonk	MN	55345
Joeanne Paradise	3019	Pierce St NE	Mpls	MN	55418
Darla Pardo	1808	York Ave N	Golden Val	MN	55422
Jouanny Paredes	3644	Bloomington Ave	Mpls	MN	55407
Mary Parish	143	Orlin Ave SE	Minneapol	MN	55414
Patty Park	3339	15th Ave S	Mpls	MN	55407
Jeremy Park	3430	Buchanan St	Minneapol	MN	55418
Glennon Park	2070	Midlothian Rd	Roseville	MN	55113
Shelley Parker	2430	Xylon Ave N	Golden Val	MN	55427
James Parker	5009	Sheridan Ave S	Mpls	MN	55410
Kristine Parker	1346	Rice Creek Trail	Shoreview	MN	55126
Anne Parker	1123	Portland Ave	St Paul	MN	55105
Dick Parker	1358	W Skillman	Roseville	MN	55113
Shaun Parks	2301	25th Ave S	Minneapol	MN	55406
Vicki Parks	7343	Niagra Ln N	Maple Gro	MN	55311
Werner Parovich	185	Vernon	St Paul	MN	55105
Judy Parr	849	Linwood	St Paul	MN	55105
Jeff Parrish	4318	Blaisdell Ave S	Mpls	MN	55409
Lorien Parson	1423	19th Ave NE	Mpls	MN	55418
N Partarek			St. Louis Pa	MN	55426

Patsy Parter	4617	Grand Ave S	Mpls	MN	55419
Kathy Pass	1912	Shryer Ave W	Roseville	MN	55113
Brad Passer	367	Cimarron Rd	Apple Valle	MN	55422
Mary Pat Dunlap	1399	Raymond	St. Anthony	MN	55108
Nate Pate	161	Seymour Ave SE	Minneapol	MN	55414
Mary Patka	2850	Evergreen Ln N	Plymouth	MN	55441
Matt Pattee	340	Hidden Lane	Chanhassei	MN	55317
Elizabeth Patten	3827	Hubbard AVe N	Robbinsdal	MN	55422
Mary Patterson	3905	E 26th St	Minneapol	MN	55406
Alex Patterson	4115	Yosemite Ave S	St. Louis Pa	MN	55426
Kristi Patterson	11005	36th Pl N	Plymouth	MN	55441
Megan Patterson	2507	Virginia Ave S	St Louis Pa	MN	55426
Jeanne Patterson	4336	Avondale Rd	Golden Val	MN	55416
W Pattinson	3937	Garfield Ave	Minneapol	MN	55404
Teresa (Teri) Pattison	2958	Hayes St NE	Minneapol	MN	55418
Thomas Paul	8696	Stonefield Ln	Chanhassei	MN	55317
Brady Paul	4541	44th Ave S	Minneapol	MN	55406
Nathan Paul	2921	Glenwood Ave	Minneapol	MN	55405
Julia Paulsen	4900	Harriet Ave	Minneapol	MN	55419
Tim Paulsen	3133	Holmes Ave	Minneapol	MN	55408
Scott Paulsen	17810	2nd Ave N	Plymouth	MN	55414
Pam Paulson	1216	W 34th St	Minneapol	MN	55410
Patti Paulson	4109	43rd Ave N	Robbinsdal	MN	55422
Dan Pauly	2100	W 49th St	Minneapol	MN	55419
Elizabeth Pauly	2900	Hayes St NE	Minneapol	MN	55418
Deb Pauly	2813	W Armour Terr	St. Anthony	MN	55418
Emily Paventean	4300	Aldrich Ave	Minneapol	MN	55409
Allan Pavia	5237	Chowen Ave S	Minneapol	MN	55410
Anita Pavit	3220	Skycroft Dr N	Saint Paul	MN	55418
Summer Pavon	3421	Croft Dr	Minneapol	MN	55418
Alison Pawlus	2358	Doswell Ave	St Paul	MN	55108
Heyther Payne	505	1st St W	Northfield	MN	55057
Mraissa Payton	9	Montcalm Ct	St Paul	MN	55116
Paul & Sarah Pearson	2610	Hayes St NE	Minneapol	MN	55418
Charles Pearson	12813	MuRIEL RD	MINNETON	MN	55305
Mike Pease	7631	W 14th St	Saint Louis	MN	55416
Tony PeAuglis	4726	Xerxes Ave S	Mpls	MN	55410
Sheila Pechacek	3400	Polk St NE	Mpls	MN	55418
Jim & Yvonne Pedersen	5312	29th Ave S	Minneapol	MN	55417
Katie Pederson	2945	Major Ave N	Golden Val	MN	55422
Sam Pederson	725	Heinel Dr	Roseville	MN	55113
Karly Peeters	1307	Falsom St	St. Paul	MN	55117
Audrey Peham	4304	12th Ave S	Minneapol	MN	55407
Joel Pehoski	4057	27th Ave S	Mpls	MN	55407
Richard & Gratchen Peik	2000	22nd Ave NE	Minneapol	MN	55418
Steve Pekala	5217	Knox Ave S	Minneapol	MN	55414
Josh Peklo	4937	29th Ave S	Mpls	MN	55406

Chad Pelarski	40th	Pillsbury Ave	Mpls	MN	55409
Mara Pelevis	3005	Washburn Ave S	Minneapol	MN	55410
Jaime Pelliza	4525	Vincent Ave S	Minneapol	MN	55410
Jan Peltit	500	W 53rd St	Minneapol	MN	55419
Jina Penn-Tracy	4234	Vincent Ave S	Mpls	MN	55410
Marcus & Whitney Penny	9005	Club Rd	St. Louis Pa	MN	55426
Annie Penny	3238	Mckinley St	Minneapol	MN	55418
Ed Pens	2187	Juno Ave	St. Paul	MN	55116
Pat Penshorn	1655	Juliet Ave	Saint Paul	MN	55105
Ted Pentel	11530	38th Ave N	Plymouth	MN	55447
William Pentelovitch	6	Park Ln	Minneapol	MN	55416
Carrie Peoples	4239	1st Ave S	Minneapol	MN	55410
David Peppzro	5012	W 40th St	St. Louis Pa	MN	55416
Pam Percy	804	Saint Olaf Ave	Northfield	MN	55057
Janelle Percy	3117	Zenith Ave N	Robbinsdal	MN	55422
Andrew Perk	1620	E 5th St	Mpls	MN	55417
Joanna Perkins	13033	Hialeah Path	Apple Valle	MN	55124
Justin Perl	29	Park Lane	Minneapol	MN	55416
VIRGINIA PERMAN	1724	SKILLMAN AVE	ROSEVILLE	MN	55113
Chelsey Permenter	5331	Penn Ave S	Minneapol	MN	55419
Jake Perreault	1631	Oregon Ave S	St. Louis Pa	MN	55426
Jon Perrier	303	Hilldrest St	Redwing	MN	55066
Catherine Perry	1403	Midway Pkwy	St. Paul	MN	55108
Patrick Person	3933	Pleasant Ave S	Mpls	MN	55409
Ronald Personius	2807	Hayes St NE	Minneapol	MN	55418
Caitlin Perszyk	3479	Harriet Ct	Shoreview	MN	55126
Judith & Ralph Pesonen	705	20th St SW	Austin	MN	55912
Carl Peter	9212	Virgnia Ave S	St Louis Pa	MN	55426
Carl Peters	2609	Burd Pl	St. Louis Pa	MN	55426
Marcia Peters	8324	Emerald kLn	Woodbury	MN	55125
K Peters	14812	Belvor Dr	Minnetonk	MN	55345
Erin Peters	1014	St. Olaf Ave	Northfield	MN	55057
Stephan Peters	1500	W 31st	Minneapol	MN	55408
Debra L. Petersen	4506	Nawadaha Blvd	Minneapol	MN	55406
Guy Petersen		P.O. Box 356	Chanhassen	MN	55317
Kathryn Petersen	2204	Girard Ave S	Mpls	MN	55405
Kathy Petersen	2719	York Ave N	Robbinsdal	MN	55422
Kelly Peterson	3920	Lynn Ave	St Louis Pa	MN	55416
Virgil Peterson	5249	Chowen Ave S	Minneapol	MN	55410
Ruth Peterson	5645	Hathaway Ln	Minnetonk	MN	55345
James Peterson	1416	Woodlynn Ave	Roseville	MN	55113
Paul E. Peterson	301	7th St W #2206	Northfield	MN	55057
Maryanne M. Peterson	1787	Pinehurst Ave	Saint Paul	MN	55116
Kevin Peterson	3400	16th Ave S	Minneapol	MN	55407
George & Helen Petersor	2140	Kelly Dr	Golden Val	MN	55427
Dan Peterson	1206	27th Ave NE	Minneapol	MN	55418
Brad Peterson	4338	Pillsbury Ave S	Minneapol	MN	55409

Glenn and Erna Peterson	215	Garden St	Duluth	MN	55812
Leanne Peterson	3715	Trenton Ln N	Plymouth	MN	55441
Josh Peterson	4917	York Ave S	Minneapol	MN	55410
Steve Peterson	5543	Grand Ave S	Minneapol	MN	55419
KATHIE PETERSON	6055	BOWMAN AVE	INVER GRO	MN	55076
Marcia Peterson	11430	39th Ave N	Plymouth	MN	55441
James Peterson	7401	Kellogg Ave	Edina	MN	55435
Rolf Peterson	3536	Zuran Ave S	St. Louis Pa	MN	55426
Christopher Peterson	2735	McKinley St NE	Mpls	MN	55418
Emily Peterson	3223	Benjamin St NE	Mpls	MN	55418
Lindsay Peterson	3865	Walnut Grove Lr	Plymouth	MN	55447
Craig Peterson	2851	Garfield St NE	Mpls	MN	55418
Nate Peterson	7100	W 23rd St	St. Louis Pa	MN	55426
Ken & Karen Peterson	2813	29th Ave NE	St. Anthony	MN	55418
Ben Peterson	8817	Westmoreland L	St. Louis Pa	MN	55426
Kristen Peterson	4024	Quentin Ave	St Louis Pa	MN	55416
Kathleen Peterson	5436	Chicago Ave S	Mpls	MN	55417
Duane Peterson	3249	Colfax Ave S	Mpls	MN	55408
Gay Peterson	4828	4th Ave S	Mpls	MN	55419
Carl Peterson	4545	29th Ave S	Mpls	MN	55406
Barbara Peterson	1749	Princeton	St Paul	MN	55105
Paul Peterson	2157	Jefferson Ave	St Paul	MN	55105
Mark Peterson	3604	Beard Ave N	Robbinsdal	MN	55422
Danton Peterson	1555	Lincoln Ave	St Paul	MN	55105
Maureen Peterson	297	Demey St	St. Paul	MN	55104
Jackie Peterson	5813	Bernard Pl	Edina	MN	55436
Judi Peterson	12908	Sheffield Crv	Minnetonk	MN	55305
Marcia Peterson	2008	Fairview Ave	Roseville	MN	55113
Nico Peterson	90	Groveland Terra	Minneapol	MN	55403
Janice Peterson	2801	Sunset Blvd	Minneapol	MN	55416
Nick Peterson	984	Shryer Ave W	Roseville	MN	55113
Susan Peterson	521	Cumberland Rd	Minneapol	MN	55410
George Petros	5637	Wood Lane	St. Louis Pa	MN	55416
Dawn Petroskas	1422	Lafond Ave	Saint Paul	MN	55104
Chris Petroskus	1115	Thomas Ave	St Paul	MN	55104
Stelzer Pets	5432	25th Ave S	Minneapol	MN	55417
Maria Petsenko	2330	Troy Ln N	Plymouth	MN	55447
David or Cheryl Pettersor	6421	W 26th St	Saint Louis	MN	55426
Trent Petterson	4520	Chowen Ave S	Mpls	MN	55410
Jan Pettit	500	W 53rd St	Minneapol	MN	55419
Jennifer Petzel	3541	Drew Ave S	Minneapol	MN	55410
Annie Pexa	2400	E 43rd St	Mpls	MN	55407
Sarah Pfahl	916	Grandview Ave \	Roseville	MN	55113
T Phan	4221	Cedarwood	St Louis Pa	MN	55416
Lee Phandanvry	8529	Chanhassen Hills	Chanhasse	MN	55317
Sarah Phemister	1386	Pascal St N	St. Paul	MN	55108
Alvina Pheneger	2471	N Oxford St	Roseville	MN	55113

Dennis Philander	35	Highview Pl	Minneapol	MN	55419
#NAME?	2801	Colorado Ave S	St Louis Pa	MN	55416
Julien Phillips	3930	Xerxes Ave N	Minneapol	MN	55412
Mike Phillips	4211	Grand Ave S	Minneapol	MN	55409
Bill Phillips	1080	Laurel Ave	St. Paul	MN	55104
Peggy Phillips	10119	37th Ave N	Plymouth	MN	55447
Dan Phillips	3238	Cleveland St NE	Minneapol	MN	55418
Jason Picka	4537	Nokomis Ave	Mpls	MN	55406
Mary Pickering	3100	Darmouth dr	Chanhasse	MN	55331
Keri Pickett	413	E Hennepin Ave	Minneapol	MN	55414
Joel Pieper	2643	Monroe St NE	Minneapol	MN	55418
Ken & Sally Pierce	911	2nd st W	Northfield	MN	55057
Khadijah Pierce	779	Albert St	St Louis pa	MN	55104
Cindy Pierce	4806	Xerces Ave S	Minneapol	MN	55410
Chad Pierson	1815	E 7th St	Duluth	MN	55812
Hannah Pierson	1277	Englewood Ave	St Paul	MN	55104
James "Jim" Pigman	1832	E 6th St	Duluth	MN	55812
Jim Pikala	4421	Dupont Ave S	Minneapol	MN	55409
Jennifer Pinsch	2738	Lincoln St.	Mpls	MN	55418
Dave Pinslee	4216	Crodren	Edina	MN	55343
Dave Pipper	5612	W 46th St	St Louis Pa	MN	55416
Nate Pischke	15708	Park Terrace Dr	Eden Prairi	MN	55344
Kolean Pitner	2576	Upton Ave S	Minneapol	MN	55405
Matt Pittman	4805	Vallacher Ave	Saint Louis	MN	55416
Jeff Plaman	1901	Carroll Ave	St Paul	MN	55104
Don Plaziak	2750	Norwood Ln N	Plymouth	MN	55441
Susan T. Ploetz	1380	Sheldon St	Saint Paul	MN	55108
John Plomondon	714	4th St NE	Minneapol	MN	55413
Katrina Plotz	3155	Hayes St Ne	Minneapol	MN	55418
Brian Plourde	611	Cleveland Ave	St Paul	MN	55116
Dan Plovnick	1437	Frankson Ave	St Paul	MN	55108
Virginia Pnar	2117	Highland Pkwy	St Paul	MN	55116
William (Bill) R. Poehlma	105	Lincoln St. S.	Northfield	MN	55057
Hope Pogemiller	4932	Clinton Ave S	Mpls	MN	55419
Anilea Pohlenz	1	np	Edina	MN	55436
Jenny Pokela	2906	Tyler St NE, #2	Mpls	MN	55418
Rick Polanski	4132	Xerxes Ave S	Minneapol	MN	55410
Maia Poling	810	39th St	Mpls	MN	55409
Bonnie Polk	10038	Cedar Lake Rd.	Minnetonk	MN	55345
Ben Polk	3328	Humboldt Ave S	Minneapol	MN	55408
Louis Polk	2920	Kentucky Ave S	St. Louis Pa	MN	55426
Chase Polk	3440	Larchwood Dr	Minnetonk	MN	55391
MaryAnn Polley	1012	Maple	Northfield	MN	55057
ANN POMMIER	1683	Sage LANE	SHAKOPEE	MN	55379
Salvador Ponce	1487	Huron St	Minneapol	MN	55108
Nicole Ponce Carmona	3700	18th Ave S	Mpls	MN	55407
Imants Pone	3636	Pillsbury Ave S	Mpls	MN	55408

Mary Anne Pontzer	1867	Ivy Ave W	St. Paul	MN	55117
Alisha Poole	3102	France Ave N	Robbinsdal	MN	55422
Craig Poorker	8711	YORK AVE N	ROBBINSD/	MN	55422
Bonnie Pope	7113	Pontiac Circle	Chanhassei	MN	55317
Tim Popp	2711	Garfield St NE	Minneapol	MN	55418
Christy Poppen	505	Summerfield Dr	Chanhassei	MN	55317
Mark Poppendeck	3050	Holly Ln	Plymouth	MN	55447
Pam Porry	2935	Taylor St NE	Mpls	MN	55418
Eric Porte	4945	Abbott Ave S	Minneapol	MN	55410
James Porter	3149	Edgewood Ave S	St. Louis Pa	MN	55413
Dan Porter	3515	Basswood Ave	Minneapol	MN	55416
Rich Portney	5505	Queen Ave	Minneapol	MN	55419
Caroline Portoghese	1056	Portland Ave	St. Paul	MN	55104
Jane Poskanzer	217	Union Street	Northfield	MN	55057
Ron (R.J) Post	4729	36th Ave S	Minneapol	MN	55406
Tom Poten	7020	Sandy Hook Cir	Chanhassei	MN	55317
Teddie Potter	480	Otis Ave	St Paul	MN	55104
Mitch Potter	5352	Bernington Way	Shorewooc	MN	55331
Katina Pougiales	767	Arlington Ave W	Saint Paul	MN	55117
Ben Poupard	2164	Rosewood Ln	Roseville	MN	55113
Deborah Powell	11155	Mill Run	Minnetonk	MN	55304
Craig Powers	3126	Garfield St. NE	Minneapol	MN	55418
Jennifer Powers	1798	Princeton St	St Paul	MN	55105
Daniel Pragerd	3336	Colfax Ave S	Minneapol	MN	55408
Leslie Prairie	2222	Hayes St NE	Minneapol	MN	55418
Ryan Prat	3505	Chippewa Rd	Minnetoka	MN	55305
Sandhya Pratapaneni	1007	Kenwood Parkw	Minneapol	MN	55403
Jon Pratt	3525	Irving Ave S	Minneapol	MN	55408
Katie Pratt	5116	W 46th St	St Louis Pa	MN	55426
Josh Pratt	3033	Taylor St NE	Minneapol	MN	55418
Ian Pratt	5115	28th Ave S	Mpls	MN	55417
Mike Preble	1352	Ithilien	Chanhassei	MN	55364
Helen Preddy	700	Saint Olaf Ave	Northfield	MN	55057
Franke Preese	2097	Folwell Ave	Saint Paul	MN	55108
Monica & Andrew Preise	3724	Harriet Ave	Minneapol	MN	55409
Mark Preissing	2400	Winfield Ave	Golden Val	MN	55422
Ruth Premer	1956	Cedar Lake Pkwy	Minneapol	MN	55416
Prcya Premo	5817	Park Ave S	Mpls	MN	55417
Chuck Prentice	5009	W 60th St	Edina	MN	55436
Steve Prentice	5317	Girard Ave S	Minneapol	MN	55419
Kari Prescott	110	W 49th	Minneapol	MN	55419
Irene Present	811	Holly Ave	Saint Paul	MN	55104
Valynne Preska	3654	Bryant Ave S	Minneapol	MN	55403
Maurice Preston	2219	Lincoln NE	Minneapol	MN	55418
Nick Preuss	1290	Thomas Ave	St Paul	MN	55104
Jan Price	849	Holly Ave	Saint Paul	MN	55104
Anita Price	6660	W. 168th Ave.	Eden Prairi	MN	55346

John Price	1961	Crestview Lane	Excelsior	MN	55331
Erin Price	5145	Beard Ave S	Minneapol	MN	55410
Mary Price	1840	Lincoln Ave	Mac-Grove	MN	55105
Karen Price	3539	Buchanan St Ne	Minneapol	MN	55318
Susan Price	400	Blk Pillsbury Ave	Minneapol	MN	55409
Don Prieb	2359	Cleveland ST NE	Minneapol	MN	55418
Soren Priede	3132	36th Ave S	Minneapol	MN	55410
Steven Prince	2547	Emerson Ave S	Minneapol	MN	55405
Lorraine Prince	1113	Selby Ave	St Paul	MN	55104
Dawn Prinsen	1621	W 31st St	Minneapol	MN	55408
Matt Prise	905	W 44th St	Minneapol	MN	55419
Terese Pritschet	3748	Bryant Ave S	Minneapol	MN	55409
Tony & Mara Proell	5112	Belmont Ave	Minneapol	MN	55419
Phil & Kimberly Proffitt	5149	Zenith Ave S	Minneapol	MN	55410
Joanna Prokes	16615	Five Hawks Ave	Prior Lake	MN	55372
Matt Pronschinske	1056	Roma	Roseville	MN	55113
Erica Prossek	2035	Sheridan Ave	Minneapol	MN	55405
Gerald Prouly	4311	Lake Dr	Robbinsdal	MN	55422
Hugh Pruitt	2174	Hoyt Ave W	Saint Paul	MN	55108
Ryan Przybilla	3420	Croft Dr	St Anthony	MN	55418
Luis Puenter	2802	Yosemite Ave	St. Louis Pa	MN	55416
Chris Puffrin	3430	Hayes St Ne	Minneapol	MN	55418
Catherine Pulling	3229	Aldrich Ave S	Minneapol	MN	55408
Mick Pulsifer	2432	Decatur	St. Louis Pa	MN	55426
Cody Pumper	4006	Nicollet Ave	Mpls	MN	55409
Steve Punnkk	661	Heinel Dr	Roseville	MN	55113
Burt Purrington	1340	Farimount	St Paul	MN	55105
Gary Purtney	4704	Garfield Ave S	Mpls	MN	55419
Paula Puxol	5153	Nicollet Ave	Minneapol	MN	55419
Josh Pyke	1116	Lincoln, #2	St. Paul	MN	55105
Carolyn Quehl	2504	30th Ave NE	St. Anthony	MN	55418
Lynn Quello	1129	Laurel Ave	St. Paul	MN	55104
Fred Quiggle	4709	Washburn Ave S	Minneapol	MN	55410
Lewis Quiglen	4937	16th Ave S	Mpls	MN	55417
Charlie Quimby	2415	Vale Crest Rd	Golden Val	MN	55422
Anne & John Quincy	5157	Oakland Ave. S.	Minneapol	MN	55417
Anne Quincy	5157	Oakland Ave S	Minneapol	MN	55417
MARK QUINLAN	1750	HILLVIEW RD	SHOREVIEV	MN	55126
Amy Quinlivan	1767	Irving Ave S	Minneapol	MN	55403
Chris Quinn	5636	Aldrich Ave S	Minneapol	MN	55419
Mike Quinn	3071	Dartmouth Dr	Excelsior	MN	55231
Matt Quinn	4219	12th Ave S	Mpls	MN	55407
MK Quinn	10317	Franlo Rd	Eden Prairi	MN	55347
Lance R	3204	Skycroft Dr	St. Anthony	MN	55418
Shery R	8527	Westmoreland L	St. Louis Pa	MN	55426
Temay R	8012	Westwood Hills	St. Louis Pa	MN	55426
John & Linda R	2730	Glenhurst	St. Louis Pa	MN	55416

Garth R	2200	Humboldt Ave	Mpls	MN	55405
Eda R	4001	W 49th St	Edina	MN	55424
Patrick R	627	Ashland Ave	St. Paul	MN	55104
Natalie Raab	4418	Nawadaha Blvd	Minneapol	MN	55406
Ann & Siegfried Rabie	2330	Commonwealth	Saint Paul	MN	55108
Betty Racette	2625	Kipling Ave	St. Louis Pa	MN	55416
Molly Rachet	4025	Linden Hills Blvd	Minneapol	MN	55410
Suzanne Raddell	3036	Alvarado Ln N	Plymouth	MN	55447
Kelly Rademacher	965	St. Clair Ave	St. Paul	MN	55105
Mitch Radin	5230	Washburn Ave S	Minneapol	MN	55410
Ken Rador	4512	Lancing	Minnetonk	MN	55345
David Radtke	3645	Blaisdell Ave	Minneapol	MN	55409
Andrew Radtke	3629	Colfax Ave S	Mpls	MN	55405
Kelly Radtke	15	Park Dr	Northfield	MN	55057
Erika Rae	1033	Lombard Ave	Saint Paul	MN	55105
Jennifer Raeden	5	Crocus Pl	St. Paul	MN	55102
Marwan Rahal	3517	Xylon Ave S	St. Louis Pa	MN	55426
Sara Rahn	8	Spur Rd	Edina	MN	55436
Sue Raia	9654	Belmont Ln	Eden Prairi	MN	55347
Calvin & Melinda Raines	1200	Woodland Trl	Northfield	MN	55057
Jeff & Hope Rajacich	5309	3rd Ave S	Minneapol	MN	55419
Jennifer Rajkenar	4094	Alabama Ave S	St Louis Pa	MN	55416
Noreen Ralston	500	5th Ave S	Hopkins	MN	55343
Robert Ramgren	800	Lake View Dr	Shoreview	MN	55126
Michelle Ramier	3140	Harriet Ave	Minneapol	MN	55408
Norma Ramsay	4507	Edina Blvd.	Edina	MN	55424
Ethan Ramsay	519	College St	Northfield	MN	55057
Barb Ramsden	16294	Parkview Dr	Prior Lake	MN	55372
Grey Ramsey	3300	Emerson Ave S	Minneapol	MN	55408
Adam Randall	3318	Pierce St NE	Minneapol	MN	55418
N Randall	6680	Nez Perce	Chanhasse	MN	55317
Frank Rangel	409	Winslow Ave	Saint Paul	MN	55107
Ann Rannow	17150	Cedar Crest Dr	Eden Prairi	MN	55347
Robert Ranum	2116	Carter Ave	St. Anthony	MN	55108
Susan Rapacz	3311	Benjamin St NE	Mpls	MN	55418
Dave Rapaport	1348	Lincoln Ave	St. Paul	MN	55105
Ed Rapaport	9615	W 25th St	St Louis Pa	MN	55416
Mike Rapatz	2118	Drew Ave S	Minneapol	MN	55416
Shelly Rapp	6711	Nex Perce dr	Chanhasse	MN	55317
Linda Rappath	345	Maple Ln Ct	Roseville	MN	55113
Anne Monique Rapport	4605	W. 28th St.	St. Louis Pa	MN	55416
Sonja Raschke	7402	Frontier Trail	Chanhasse	MN	55346
Matt Raslaw	5157	10th Ave S	Minneapol	MN	55417
Juli Rasmussan	3040	Jersey Ave S	Minneapol	MN	55426
Ben Rasmussen	4632	Clinton Ave	Minneapol	MN	55419
Darieen Rasmussen	655	Green Meadow	Northfield	MN	55057
Elizabeth Rasmussen	665	Green Meadow	Northfield	MN	55057

Ashlee Rasmussen	2649	Lynn Ave S	St Louis Pa	MN	55416
Denise Rauchman	2553	Oregon Ave S	St Louis	MN	55426
Wendy Lee Raun	4244	Alabama Ave S	Saint Louis	MN	55416
Dawn Rausch	12807	Do Little Dr	Minnetonk	MN	55305
Andrea Rauser	140	Idaho Ave N	Golden Val	MN	55422
Scott & Katherine Raver	4741	Colfax Ave S	Mpls	MN	55419
Barbara & Bill Read	1431	E River Pkwy	Mpls	MN	55414
Idk Really ID	12000	Cambridge Ct	Minnetonk	MN	55305
Kat or Jud A. Reaney	1302	Seminary Ave	Saint Paul	MN	55104
Susan Reaney	4016	Ewing Ave S	Minneapol	MN	55410
Jason Reasoner	424	W Diamond Lk R	Mpls	MN	55419
Carrie Reay	1907	Ulysses St NE	Mpls	MN	55418
John & Linda Rebane	2730	Glenhurst Ave	St Louis Pa	MN	55416
Jodi Rebuffani	5815	colfax Ave S	Mpls	MN	55419
Catherine & Dean Rebuff	5421	Queen Ave S	Minneapol	MN	55410
Patricia Redding	2164	Princeton Ave	Saint Paul	MN	55105
Robin Redman	3833	Kipling Ave	St. Louis Pa	MN	55416
KARREEN C REDWOOD	3641	13TH AVE S	MINNEAPC	MN	55407
S Reed	1968	Sheridan Ave S	Minneapol	MN	55405
Jeff Reed	3445	Irving Ave S	Minneapol	MN	55408
Dianna Reed	1589	Portland Ave	St. Paul	MN	55104
Patrick Reedy	908	Idaho Ave W	St Paul	MN	55117
Robert Rees	2312	31st Ave S	Mpls	MN	55406
Courtney Reese	2929	Sheldon St	Roseville	MN	55113
Jennifer Regan	3411	Holmes Ave	Minneapol	MN	55408
Shelby Regan	8501	W 35th St	St. Louis Pa	MN	55426
Rosemarie Reger Rumsey	791	Linwood Ave	St Paul	MN	55105
Lucy Rehm	8132	Dakota Ln	Chanhasse	MN	55317
Andrea Rehm	3712	Orchard Ave	Robbinsdal	MN	55422
Carolyn Rehmann	1649	Ridgewood Ln S	Roseville	MN	55113
Marilyn Rehog	4000	44nd Ave N	Robbinsdal	MN	55422
Brooke Reichart	2100	farimount Ave	St Paul	MN	55105
Adele Reichel	3401	Croft Dr	Mpls	MN	55418
Alan Reichel	4811	Deerwood Dr	Minnetonk	MN	55345
Claudia Reichert	4736	Vincent Ave S	Minneapol	MN	55410
Cindy Reichert	5340	Golden Valley Rc	Golden Val	MN	55422
John Reichl	4433	Vincent Ave SE	Mpls	MN	55410
Eric Reichwald	1124	Valley View Pl	Minneapol	MN	55406
ANNA REID	4528	NOKOMIS AVE S	NOKOMIS	MN	55406
Carol Reid	4708	Kent St	Shoreview	MN	55126
Julia Reiersgord	3043	Lincoln	Minneapol	MN	55418
Bonnie Reiland	2330	19th Ave NE	Minneapol	MN	55418
Roger Reiling	1877	Glueck Ln	Roseville	MN	55113
Russ & Jennifer Reilly	694	Schitsley Rd	Shoreview	MN	55216
Amy Reilly	4301	Blenheim Cir	Minnetonk	MN	55345
Bob Reilly	249	Upton Ave S	Minneapol	MN	55405
Nancy Reimers	2708	Mesa Verde Ct	Burnsville	MN	55337

M Reinburg	2307	France Ave S	St Louis Pa	MN	55416
Jonathan Reiner	3208	Harriet Ave	Minneapol	MN	55408
Jim Reinerdy	188	Arthur Ave SE	Minneapol	MN	55414
Cheryl Reiners	4126	Wentworth Ave	Minneapol	MN	55409
Scott & Joanne Reinertso	6801	Utica Ter	Chanhasse	MN	55317
Steven Reinhardt	716	Bridle Ridge Rd	Eagan	MN	55123
Phoebe Reinhart	2234	Buchanan St NE	Mpls	MN	55418
Eric Reinhart	523	Heinel Dr	Roseville	MN	55113
Lindsay Reiske	2900	Chowen Ave S	Mpls	MN	55416
Daniel Reisman	3314	Humboldt Ave S	Minneapol	MN	55408
Ashley Reiter	1177	Thomas Ave	St Paul	MN	55104
Adhouk Rejool			Minneapol	MN	55410
Bill Reker	2345	Brookridge Ave	Golden Val	MN	55422
David Remick	4617	Townes Cir	Edina	MN	55424
Katie Remole	2204	Oliver Ave S	Mpls	MN	55405
Rahjta Ren	2912	France Ave S	St Louis Pa	MN	55416
Patty Renes	3000	W. 47th St	Mpls	MN	55410
Ron Rengel	3638	47th Ave S	Minneapol	MN	55406
PENI RENNER	41616	134TH LN	SAVAGE	MN	55378
Glenn Renning	2120	W Lake of the Isl	Mpls	MN	55405
Dean Renstrom	3230	Queensland Ln N	Plymouth	MN	55447
Jonathan Reppe	518	Union St	Northfield	MN	55057
Frank Resch	573	S Owasso Blvd W	Roseville	MN	55113
Alice Ressler	2165	Commonwealth	Mpls	MN	55417
Dayna Rethlake	3351	Cleveland St NE	Minneapol	MN	55418
Charles Rethwisch	18510	38th Ave N	Plymouth	MN	55447
Renee Retka	2908	Zarthan Ave S	St Louis Pa	MN	55416
Nadja Reuberova	4537	29th Ave S	Mpls	MN	55406
Nicole Reynolds	912	W 32nd St	Minneapol	MN	55408
Gratra Reynolds	70	Orlin Ave SE	Mpls	MN	55414
Carol Rheaume	8039	Cheyenne Ave	Chanhasse	MN	55317
HEATHER RHEINGANS	6310	Bloomington Ave	Richfield	MN	55423
Mary Rhode	3161	Sandy Hook Dr	Roseville	MN	55113
LaVerne Rhode	4997	E turtle Ln	Shoreview	MN	55126
Brynn Rhodes	4154	Pillsbury Ave. S.	Minneapol	MN	55419
Andrea Rhodum	2319	Lincoln St NE	Mpls	MN	55418
Theresa Rian	3216	46th Ave S	Minneapol	MN	55406
Louise Ribnick	4310	W 25th St	St Louis Pa	MN	55416
Craig Rice	4011	Russell Ave N	Mpls	MN	55412
Chris Rice	19375	Rosedale Court	Deephaven	MN	55341
Ted Rice	13051	Berkshire Dr	Minnetonk	MN	55343
JoAnn Rice	2100	St Anthony	Minneapol	MN	55418
Heidi & Brian Rich	4205	Washburn Ave S	Minneapol	MN	55410
Rebekah Richards	1271	Raymond Ave	St Paul	MN	55108
Lori Richards	2100	County Road E #	New Bright	MN	55112
Reuben Richardson	5425	13th Ave S	Minneapol	MN	55417
Judith Richardson	163	Nicollet St	Minneapol	MN	55401

Kathy Richardson	6028	Russell Ave S	Minneapol	MN	55410
Tom Richardson	2848	Ulysses St NE	Minneapol	MN	55418
Adrienne Richardson	1825	Jersey Ave S	St. Louis Pa	MN	55426
Tami Richardson	5324	Zenith Ave S	Mpls	MN	55410
Judy Richardson	1185	Brooks Ave W	Roseville	MN	55113
Craig Richter	1165	Garden Ave	Roseville	MN	55113
Terry Richter	2724	Monteray S	St Louis Pa	MN	55416
Lisa Ricka	10300	38th Ave N	Plymouth	MN	55447
David Ricke	1505	W 34th St	Mpls	MN	55409
Troy Rickord	1673	Westwood Hills	St. Louis Pa	MN	55426
Donette Rico	45	Russell Ave S.	Minneapol	MN	55405
Bill Ridelius	1425	Alpine Pass	Golden Val	MN	55416
Courtney Rider	4016	Wooddale ave	St. Louis Pa	MN	55416
Katie Ridge	3211	Hayes St NE	Mpls	MN	55418
Aaron Ridgeway	2750	Regent Ave N	Golden Val	MN	55422
Andrew & Karen Riebel	4230	Washburn Ave S	Mpls	MN	55410
Mary Jo Rieger	4008	Pleasant Ave S	Minneapol	MN	55409
Michelle Rielle	1616	Chelsea	St Paul	MN	55108
Sonja & Garren Riemensc	2359	Beverly Rd	St. Paul	MN	55104
Barey Riesck	2281	Knapp St	St PAul	MN	55108
Amy Riesenberg	4779	Avon St	Shoreview	MN	55126
John Riley	2917	Sunset Blvd	Minneapol	MN	55416
Emily Riley	529	Burntside	Minneapol	MN	55422
Mark Riley	969	Lincoln Ave	St. Paul	MN	55105
Dan Rimmer	4236	Brook Ave	St. Louis Pa	MN	55416
Rodger Ringham	4409	Dupont Ave S	Minneapol	MN	55419
Ted Ringsred	3120	Irving Ave S	Mpls	MN	55408
Nancy Rinn	302	Manitou St	Northfield	MN	55057
Sarah Rinn	5104	W 56th St	Edina	MN	55436
Janet Risinger	1797	Shryer Ave W	Roseville	MN	55113
Laurence E. Risser	4904	Thomas Ave S	Minneapol	MN	55410
Julie Ristan	4053	Garfield Ave	Mpls	MN	55409
Mark Ristau	8010	Ridgeway Rd.	Golden Val	MN	55422
Larry Ristow	11264	Minnetonka Mill	Minnetonk	MN	55305
Jake & Judie Ritchie	2924	Yosemite	St. Louis Pa	MN	55416
Linda Ritchie	18825	27th Ave N	Plymouth	MN	55447
Niel Ritchie	4221	Vincent Ave. S.	Minneapol	MN	55410
Camille Ritter	1831	Hillsboro Ave S	Saint Louis	MN	55426
Wendy Ritter	7554	Great Plains Blvc	Chanhassei	MN	55317
Kathi Rivard	1	mpls	Mpls	MN	55417
Heather Rivera	18200	31st Ave N	Plymouth	MN	55447
Rosa Rivera	4532	Beard Ave S	Minneapol	MN	55410
Jeremy Rivord	1794	Ashland Ave	St Paul	MN	55104
John & Cynthia Roach	5025	Abbott Ave S	Minneapol	MN	55410
Shannon Road	4217	Ewing Ave N	Robbinsdal	MN	55422
Erik Roadfeldt	5029	Dodge Street	Duluth	MN	55804
Larra Roads	1264	Marshall Ave	St Paul	MN	55104

Stacy Robate	2520	Millwood Ave	Roseville	MN	55113
Jesse Robb	3112	31st Ave Ne	MPLS	MN	55418
Peter Robb	5337	Oaklawn Ave	Edina	MN	55424
Brenda Roberson	3216	Mondamin St	Nokomis	MN	55417
Colleen & Mark Roberts	42	Norbert Pl	Saint Paul	MN	55116
Hugh Roberts	6561	Nez-Perce Dr	Chanhassei	MN	55317
John Roberts	425	Suzanne Ave	Shoreview	MN	55126
Dane Roberts	4845	12th Ave S	Mpls	MN	55417
Lisa Roberts	6801	Southdale Rd	Edina	MN	55435
Alex Roberts	527	5th St SE	Minneapol	MN	55414
Andrew Robertson	5201	York Ave. S.	Minneapol	MN	55410
Greg Robertson	4073	Utica Ave	St. Louis Pa	MN	55416
Aaron Robertson	3450	Lincoln St NE	Mpls	MN	55418
Gerard Robertson	132	Orlin Ave SE	Mpls	MN	55414
Thomas Robertson	3633	12th Ave S	Mpls	MN	55407
Heidi Robertson	5530	Cumberland Rd	Minneapol	MN	55410
Ann Robetsen	17273	Hampton Ct	Minnetonk	MN	55345
Kimberly Robey	3401	Hennepin Ave S	Minneapol	MN	55408
Patty Robey	2083	Carroll Ave	St Paul	MN	55104
Susan Robiner	1137	Xerxes Ave S	Minneapol	MN	55405
Bill Robiner	1137	Xerxes Avenue	Minneapol	MN	55405
Karen or Nancy Robinett	3408	31st AVe Ne	St. Anthony	MN	55418
Rob Robinsky	420	Ford Road #119	St. Louis Pa	MN	55426
Angie Robinson	1955	Hythe St	Roseville	MN	55113
Julia Robinson	2830	Kenwood Isle	MPLS	MN	55405
Matt and Sarah Robinson	1883	Iglehart Ave	St Paul	MN	55104
Matt Robinson	1883	Iglehart Ave	St Paul	MN	55104
Steve Robinson	2400	Vale Crest Rd	Golden Val	MN	55422
Ann Robinson	2901	Ottawa Ave S	St. Louis Pa	MN	55416
Nicole Robinson	5409	27th Ave	Mpls	MN	55417
Matt Robinson	433	Tarrymore Ave S	Mpls	MN	55419
Dana Robotnik	3455	Nancy Place	Shoreview	MN	55126
Jon Robson	221	4th AVe NE	Minneapol	MN	55413
Michele Rockne	3104	11th Ave S	Minneapol	MN	55407
Dean Rockne	2440	Perry Ave N	Golden Val	MN	55422
Timonthy Rodguniz	5357	25th Ave S	Mpls	MN	55417
Gil Rodman	2904	Lyndale Ave S	Minneapol	MN	55408
SUE ROEDL	4529	CEDAR AVE S	MINNEAPC	MN	55407
Mark Roemek	4012	19th Ave S	Mpls	MN	55407
Jenny Roemhildt	16250	The Strand	Minnetonk	MN	55391
Krista Roering	1338	Hampshire Ave S	St. Louis Pa	MN	55426
Jeff & Susan Roessler	459	Terrace Dr	Roseville	MN	55113
Dan Rogan	3815	42nd Ave N	Robbinsdal	MN	55422
Larry Rogard	4301	33rd Ave S	Mpls	MN	55406
Suzanne Rogers	3316	Humboldt Ave S	Minneapol	MN	55408
Mary Rogers	4752	Zenith Ave S	Minneapol	MN	55410
Alan Rogers	2709	Webster Ave S	St. Louis Pa	MN	55416

Mary Roggenbuck	3388	Rhode Island Ave	St. Louis Pa	MN	55426
Mary Rogness	5229	32nd Ave S	Minneapol	MN	55417
Cynthia Roh	1721	James Ave S	Minneapol	MN	55407
Ross Roholt	2208	Buchanan St NE	Mpls	MN	55418
Chris Rohrer	1430	Sheldon St	St. Paul	MN	55108
Rick Rohwen	12925	Saratoga Lane	Champlin	MN	55316
Hayden Rolansky	820	Pascal St	St. Paul	MN	55104
Julie Roles	1311	Saint Albans St N	Saint Paul	MN	55117
Jessie Rolfe-Platt	640	Conestoga Tr	Chanhassen	MN	55317
Sue Rolfson	8543	135th St W	Apple Valle	MN	55124
Karl Rollar	7550	Chippewa	Chanhassen	MN	55317
Mike Rollin	3758	Garfield Ave	Minneapol	MN	55409
Dottie Roman	2517	36th Ave NE	St. Anthony	MN	55418
Jason Rombalski	1500	Toledo Ave N	Golden Val	MN	55422
Jeramie Romine	4538	Wentworth Ave	Mpls	MN	55419
Charlotte Ronan	9400	W Franklin Ave	St. Louis Pa	MN	55426
Jane Roosa	1020	29th AVe NE	Minneapol	MN	55418
John Roper-Batker	10009	Drew Avenue	Bloomingto	MN	55431
Molly Rosa	3616	18th Ave S	Mpls	MN	55407
Becky Rose	983	Portland Ave	Saint Paul	MN	55104
Kara Rose	998	Brooks Ave	Roseville	MN	55113
Jeremy Rose	8507	Virginia Cir	St. Louis Pa	MN	55426
George Rose	702	E Minnehaha Pkv	Mpls	MN	55417
Edelle Rose	4337	29th Ave S	Nokomis	MN	55407
Lucas Rosen	1794	Ryan Av W	Roseville	MN	55113
Melissa Rosenbaum	5439	Cumberland Rd	Minneapol	MN	55410
David J. and Anne E Rose	1560	Dora Ln	Saint Paul	MN	55106
Casey Roser	2028	29th Ave S, Apt.	Mpls	MN	55406
Franco Ross	2909	Yosemite Ave S	St. Louis Pa	MN	55416
Andrew Ross	3124	Abbott Ave N	Robbinsdal	MN	55422
Kate Rosso	628	Upton Ave S	Mpls	MN	55405
Lacey Rotem	2947	Hillsboro Ave	St. Louis Pa	MN	55426
Lamont Roth	5133	17th Ave S	Mpls	MN	55417
Carol Roth	3308	Colfax Ave S	Mpls	MN	55408
Craig Roth	5117	James Ave	Minneapol	MN	55419
Gary C. Rother	5208	16th Ave S	Minneapol	MN	55417
Aaron Rothmeyer	31	Lincoln Ln	Northfield	MN	55057
Rochelle Rottenberg	2449	Humboldt Ave S	Minneapol	MN	55405
Virginia Rouainen	1459	Berkly Ave	St. Paul	MN	55105
Steve Rouge	1900	Gluke Lane	Roseville	MN	55113
Deana Rousseau	3520	19th Ave S	Mpls	MN	55407
Seth Rowan	57	Russell Ave S	Minneapol	MN	55405
Diane Rowe	4040	Wasatch Ln	Golden Val	MN	55422
Howard Rowland	829	E Freemont	Northfield	MN	55057
Dan Rowles	4444	W Lake Harriet	Minneapol	MN	55410
Devyn Rowley	1521	Hamline Ave	St. Paul	MN	55105
Elizabeth Rowley	310	Orchard Ave	Northfield	MN	55057

Douglas Roy	4360	BROOKSIDE COU	Edina	MN	55436
Jon Rozenbergs	1217	Hague Ave	St. Paul	MN	55104
Peggy Ruberto	1011	Interlachen Pkw	Woodbury	MN	55125
Vicki Rubich	5337	Humboldt Ave S	Minneapol	MN	55419
Allison Rubin	3130	Girard Ave S	Minneapol	MN	55408
Elaine Rubin	1305	Mt. Curve Ave	Mpls	MN	55408
Dan & Barbara Ruble	4733	17th Ave S	Minneapol	MN	55407
Stearline Rucker	5019	2nd Ave S	Minneapol	MN	55419
Anne Rucker	3344	Fremont Ave S	Minneapol	MN	55408
Tim Ruddy	4545	Valleyview	Edina	MN	55410
Deanna Rudebusch	4575	Dale St N	Shoreview	MN	55126
Linda Ruecker	372	Stryker Ave	Saint Paul	MN	55107
Linda Ruelle	16929	Cottage Grove A	Minnetonk	MN	55391
Dick Rueter	4225	Grand Ave S	Minneapol	MN	55409
Sophia Ruff-Berganza	1159	Dayton Ave	St Paul	MN	55104
Haruko Ruggiero	3704	19th Ave S	Mpls	MN	55407
Lyndsey Ruhland	1909	19th Ave NE	Mpls	MN	55418
Craig Ruhland	3249	Georgia Ave S	St. Lois Par	MN	55416
Lindsay Ruliffson	3013	Crestview Dr	St. Anthony	MN	55418
Jane Ruliffson	3421	Downer Dr	St. Anthony	MN	55418
Luanne Rund	3332	Webster Ave S	St. Louis Pa	MN	55416
Rulf Rundeut	5236	Zenith Ave S	Mpls	MN	55410
Brent Rundquist	5032	Morgan Ave S	Minneapol	MN	55419
Phoebe Ruona	900	W 48th St	Minneapol	MN	55419
Britta Rupp	141	Melbourne SE	Mpls	MN	55414
Anne and Paul M. Ruppel	219	Elm St	Northfield	MN	55057
Christine Ruppert	5276	Lochloy Dr	Edina	MN	55436
Judith @ Joshua Rush	453	Cretin Ave	Saint Paul	MN	55105
Cher Rush	1281	Arlington Ave	Saint Paul	MN	55108
Ross Russell	2406	Pierce St NE	Mpls	MN	55418
Robert Russell	2805	39th Ave S	Mpls	MN	55406
Connor Russell			Minnetonk	MN	55305
Matthew Russman	3020	James Ave S	Mpls	MN	55408
Nyra Rustad	4516	W 39th St	St Louis Pa	MN	55416
Chad Ruter	1402	Mckinley St	St. Paul	MN	55108
George R. Ruth	1210	Roselawn Ave W	Roseville	MN	55113
Leslie Ruth	4517	Chowen Ave S	Minneapol	MN	55410
Beth Ruthen	225	Russell Ave S	Minneapol	MN	55405
James Rutherford	1509	Alpine Pass	Golden Val	MN	55416
Maxine Ruthford	5251	Xerxes Ave S	Minneapol	MN	55410
Katie Rutledge	10408	W 34th circle	Minnetonk	MN	55305
Steve Rutz	110	Kingsview Ln	Plymouth	MN	55447
Mary Ruud	18525	24th Ave N	Plymouth	MN	55447
Amy Ruzick	1134	Cedar View Circl	Minneapol	MN	55405
Jim Ryan	364	Woodlawn Ave	Saint Paul	MN	55105
John Ryan	4155	Pillsbury Ave S	Minneapol	MN	55409
Margaret Ryan	3814	Waveland Ter	Minneapol	MN	55410

Colleen Ryan	3530	Tyler St NE	Minneapol	MN	55418
Janet Ryan	2342	19th Ave Ne	Minneapol	MN	55418
Dennis Ryan	2335	Wilson St NE	Mpls	MN	55418
W. P. Ryan	4925	Knox Ave S	Mpls	MN	55410
Kristi Ryan	4006	Sunnyside Rd	Edina	MN	55416
Rose Ryan	2305	32nd Ave S	Mpls	MN	55406
Sara Ryan	2441	Humboldt Ave	Mpls	MN	55408
Emily Ryan	3613	Dupont Ave	Mpls	MN	55405
Pat & Elise Ryan	6587	Shadow Ln	Chanhassei	MN	55317
Ben Ryba-White	2717	Aldrich Ave S	Minneapol	MN	55408
Carole Rydberg	3225	Wellington Ln N	Plymouth	MN	55441
Tyler & David Rygg	6325	Markwood Dr	Crystal	MN	55427
Dave and Connie Ryks	3215	Everest Lane	Plymouth	MN	55447
Kristy Ryner	3910	Grand Ave S	Mpls	MN	55408
James Ryshey	4504	York Ave S	Mpls	MN	55410
Michelle S	4502	Drew Ave	Mpls	MN	55410
Randy S	3330	Everest Ct N	Plymouth	MN	55447
Brent S	3127	Ulyesses St NE	Mpls	MN	55418
Jason S	1400	18th Ave NE	Mpls	MN	55418
Ronny S	7317	Cornelia Dr	Edina	MN	55435
Stefan S	3204	36th Ave NE	Mpls	MN	55418
Sheila S	2837	Coolidge St	St. Anthony	MN	55418
Dan S	3502	Glenhurst	St. Louis Pa	MN	55416
Angle S	3760	Trenton Ln N	Plymouth	MN	55441
Roger S	1380	Independence A	St. Louis Pa	MN	55426
Mike S	1525	Simpson St	St. Paul	MN	55108
Dave S	3329	Fremont Ave S	Mpls	MN	55405
Erin S	1700	E 57th St	Mpls	MN	55417
Chris S	5345	Zenith Ave S	Mpls	MN	55410
JoAnne S	3509	15th Ave S	Mpls	MN	55407
Regina S	2408	E 43rd St	Mpls	MN	55407
Nancy S	9640	13th Ave	Mpls	MN	55407
Mary S	210	Union St	Northfield	MN	55057
Aaron S	1	mpls	Mpls	MN	55419
Maggie S	1	not provided	St. Paul	MN	55105
Harley S	701	Bighorn Dr	Chanhassei	MN	55317
Zachary Sabri	285	Fairview Ave	Saint Paul	MN	55104
Pam Saby	911	West 32nd	Mpls	MN	55408
Fred Sadaghy	3021	Slim Lake Pl	Minneapol	MN	55418
Chris Sadar	6008	Parnell Ave	Edina	MN	55424
Tony Sadder	2401	Cavell Ave S	St. Louis Pa	MN	55426
Tom Saefke	3268	Ewing Ave N	Robbinsdal	MN	55422
Jackie Safari	2934	Ulysses St NE	Mpls	MN	55418
Anne Saffert	4960	St Croix Ave N	Golden Val	MN	55422
Anette & Daniel Safverbl	4844	Vincent Ave S	Minneapol	MN	55410
Lauri Sager Wright	1436	Lakeview Ave S	Minneapol	MN	55416
Lauri Sager-Wright	1436	Lakeview Ave. S.	Minneapol	MN	55405

Mike N. Sahyun	4041	Garfield Ave	Minneapol	MN	55409
Phil Sailor	6430	Pleasant Park Dr	Chanhassei	MN	55317
Katie Sainobn	4181	White oak Ln	Chanhassei	MN	55331
Susan "Sue" Sako	7539	Harriet Ave S	Richfield	MN	55423
Patrick or Steve Salek	3404	Parkview Blvd	Robbinsdal	MN	55422
Robert Salender	1302	Sherburne	St Louis Pa	MN	
Nancy Salmon	1207	Skillman Ave W	Roseville	MN	55113
Roger Salo	4782	Avon St	Shoreview	MN	55126
Kelly Salutz	4544	47th Ave S	Minneapol	MN	55406
Warren Salveson	3123	W 47th St	Minneapol	MN	55410
Hunter Salzlad	5138	St. Croix Cir	Golden Val	MN	55422
Michelle Salzwedel	8211	Brendenlane	Eden Prairi	MN	55347
Jennifer Samaha	215	Russell Ave S	Minneapol	MN	55405
Jill Samajob	5218	Zenith Ave S	Minneapol	MN	55410
Nick Samardzija	11533	Park Ridge Dr.	Minnetonk	MN	55305
Masoud Samet	4501	Aspenwood Trail	Minnetonk	MN	55345
Mary Sampson	2222	Taft St Ne	Minneapol	MN	55418
Heidi Samsel	4612	York Ave S	Minneapol	MN	55410
Stu Samsky	647	Atlantic Hill Dr	Eagan	MN	55123
Cecelia Samson	3525	15th Ave S	Mpls	MN	55407
Amy Samson Burke	4044	Bryant Ave	Minneapol	MN	55409
Chris Samuelson	4232	Cedar Ave S	Mpls	MN	55407
John Sanborne	2804	Irving Ave S	Minneapol	MN	55408
Adam Sanchez	780	Sextant Ave W	Roseville	MN	55113
Liz Sand	3611	Druid Ln	Minnetonk	MN	55391
Brittany Sandbakken			White Bear	MN	55433
Shawn Sandberg	5561	Knoll Dr	Shoreview	MN	55126
Matt Sandblad	5021	Indianola Ave	Edina	MN	55424
Leann Sande	3301	Aldrich Ave S	Mpls	MN	55408
Claire Sander	2100	Bayard Ave	St Paul	MN	55116
Sarah Sander	5038	Colfax Ave S	Minneapol	MN	55419
Jeff Sanders	582	Clifford St	St Paul	MN	55104
Jean Sanderson	3708	warewood Dr	Minnetonk	MN	55345
John & Carolyn Sandgren	5122	James Ave S	Minneapol	MN	55419
Annette Sandler	3010	E Medicine Lk Bl	Plymouth	MN	55441
Doug Sandley	3308	Croft Dr	Mpls	MN	55418
Greta & David Sandquist	1537	Hamline Ave N	St. Paul	MN	55108
Sharon & Steve Sands	18420	37th Ave N	Plymouth	MN	55446
Claire Sanga	4333	Ewing Ave S	Minneapol	MN	55410
Brian Sanger	4217	Columbus Ave S	Mpls	MN	55407
Marylou Sanka	2721	Kentucky Ave	St. Louis Pa	MN	55426
Shirley Sanken	3760	Arrowood N	Plymouth	MN	55447
Adam Sanockl	6640	Yucca Lane	Maple Gro	MN	55311
Vicki Sanville	1501	Vermilion Rd	Duluth	MN	55812
Jenny Saplis	1379	Canfield Ave	St Paul	MN	55108
Steven Sarafolean	870	Ashland Ave	Saint Paul	MN	55104
Margaret Sarfehjoy	6916	W 24th St	St Louis Pa	MN	55426

Sally Sartb	891	Fernwood Rd	Roseville	MN	55113
Lisa Sartori	5801	York Ave S	Edina	MN	55410
Kelly & Sam Sater	401	N. Sibley St #449	St. Paul	MN	55101
Jeanna Sather	4146	19th Ave S	Mpls	MN	55407
Tiffany Sather	3641	Colfax Ave	Minneapol	MN	55409
Ryan Satre	532	Heinel Dr	Roseville	MN	55113
Dawn Sattel	3701	Colfax Ave S	Minneapol	MN	55409
Sue Sattel	2112	23rd Ave S	Minneapol	MN	55404
C Sauber	5616	Bryant Ave S	Mpls	MN	55419
Tresa Sauer	3406	Zenith Ave N	Robbinsdal	MN	55422
Roberta Saunders	1934	DEER HILL DR	Shoreview	MN	55126
Max Savage	411	W 35th St	Minneapol	MN	55408
Audrey Savagrean	4536	Zenith Ave N	Robbinsdal	MN	55422
Laurence & Sue SAVETT	1605	EDGCUMBE RD	St. Paul	MN	55116
Elaine Savick	7708	W 13 1/2 st	St. Louis Pa	MN	55426
Kay Savik	807	Summit Ave	St. Paul	MN	55104
Laura Savin	1054	Lombard Ave	Saint Paul	MN	55105
Deborah Savran	3709	Colfax Ave S	Minneapol	MN	55410
Dennis Sawdberg	2846	Oxford St N	Saint Paul	MN	55113
Jeff Sawyer	2500	Quentin Ct	Saint Louis	MN	55416
Nancy Sawyer	949	Robinhood	Shoreview	MN	55126
Justin Sawyer	2800	32nd Ave	Mpls	MN	55418
Jeff Sawyer	5210	Zenith Ave S	Mpls	MN	55410
Anne Saxton	5518	Vermont St	St. Louis Pa	MN	55426
Drew Sayer	3251	Ulysses St NE	Mpls	MN	55418
Loarm Sayme	17879	Bren Ln	Eden Prairi	MN	55436
Molly Scalley	4711	Lake Harriet Pkw	Mpls	MN	55410
Thomas & Mary Scanlan	2355	Commonwealth	Saint Paul	MN	55108
Anna Schaefer	4220	Colfax Ave S	Minneapol	MN	55409
Cristen Schaefer	2943	Tyler Street NE	Minneapol	MN	55418
Julie Schaefer	4645	17th Ave S	Mpls	MN	55407
Kristine Schaefer	1736	Oliver Ave S	Minneapol	MN	55403
Brendan Schaenzer	4729	Park Ave	Mpls	MN	55417
Linda Schaetzel	3905	10th Ave S	Minneapol	MN	55407
Ed Schafer	3104	W 42nd St	Mpls	MN	55410
Roger Schaffham	44	Sheridan Ave	Mpls	MN	55405
Isaac Schall	3920	Glenhurst Ave	St Louis Pa	MN	55416
Rob Schanilei	415	College St	Northfield	MN	55057
Carol Schaub	2537	Oregan Ave S	Saint Louis	MN	55426
Elizabeth Scheele	3920	Leslee Curve	Chanhassen	MN	55331
Jane Scheidnes	2083	Cohansey Blvd	Roseville	MN	55113
Becky Scheig	3815	Inglewood	St Louis Pa	MN	55416
Paul Schelin	4040	Upton Ave S	Minneapol	MN	55410
Tom Scheller	6600	Mistral Ln	Eden Prairi	MN	55347
Aline Schellhas	5028	Juanita Ave	Edina	MN	55424
Diane Schember	924	Goodrich Ave	St Paul	MN	55105
Ron Schenbonski	8001	W 26th St	Saint Louis	MN	55426

Shannon Schendel	2183	Saint Clair	St Paul	MN	55105
Wynne Schendel	1068	Hoyt Ave W	St. Paul	MN	55108
Gretchen Scherer	1452	Lakeview Ave S	Minneapol	MN	55416
Devin Scherer	4914	28th Ave S	Mpls	MN	55417
Elaine Scherllhans	2016	Kentucky Ave S	St. Louis Pa	MN	55426
Judy & Dan Schermer	4624	Washburn Ave S	Minneapol	MN	55410
Shon & Vicki Schetnan	1006	Maple St	Northfield	MN	55057
Susan Schierts	5937	Upton Ave S	Minneapol	MN	55410
Thail Schifsky	8945	Medley Lawn	Golden Val	MN	55427
Katherine Schilling	1495	Osceola Ave	Saint Paul	MN	55105
Karolyn Schiltgen	6211	Cypress Dr	Chanhasse	MN	55317
Karolyn Schiltger	6211	Cypress Dr	Chanhasse	MN	55331
David Schinler	5148	27th Ave S	Mpls	MN	55417
Susan & Terry Schiro	2010	Walnut Grove	Plymouth	MN	55447
David Schlagel	904	E River Ter	Minneapol	MN	55414
Megan Schletty	5345	26th Ave S	Mpls	MN	55417
Chantel Schliegel	2635	Edgewood Ave S	St. Louis Pa	MN	55426
Leonard & Linda Schloff	1827	Hillcrest Ave	Saint Paul	MN	55116
Stephen Schmelz	3855	York Ave N	Robbinsdal	MN	55422
Julia Schmelzer	3209	Edgewood Ave S	Saint Louis	MN	55426
Jerid Schmickle	17425	30th Ave N	Plymouth	MN	55447
Helen Schmidt	2408	30th Ave S	Minneapol	MN	55406
Tim Schmidt	1406	Cleveland Ave S	St. Paul	MN	55116
Michael Schmidt	1436	Albert St N	Minneapol	MN	55408
Jill Schmidt	500	Highland Dr	Chanhasse	MN	55317
Charlotte Schmidt	4852	13th Ave S	Mpls	MN	55407
Luke Schmidt	4636	33rd Ave S	Mpls	MN	55406
April Schmidt	3608	Elmwood Pl	Minnetonk	MN	55391
Paul Schmidt	5332	Chicago Ave S	Mpls	MN	55417
Caleb Schmidt	5405	25th Ave S	Mpls	MN	55417
Anne Schmige	945	Hague Ave	St. Paul	MN	55104
Jay Schmitt	3313	15th Ave S	Mpls	MN	55407
Jim Schmitz	5229	Abbott Ave S	Minneapol	MN	55410
Stuart Schmitz	576	Montcalm Pl	Saint Paul	MN	55116
Rick Schmitz	4004	Beard Ave S	Mpls	MN	55410
Samuel Schmitz	3217	Georgia Ave S	St. Louis Pa	MN	55416
Grant Schmura	2151	Fairmount Ave	St Paul	MN	55105
Mary Schnabel	4540	43rd Ave S	Minneapol	MN	55406
Molly Schned	3255	Garfield St Ne	Minneapol	MN	55418
Karen Schneewind	1554	Fulham St Unit A	St. Paul	MN	55108
George Schnell	1864	Laurel Ave	Saint Paul	MN	55104
Kristin Schneller	4011	Dupont Ave S	Mpls	MN	55419
Ashley Schoenecker	3231	Emerson Ave S	Mpls	MN	55408
Kirsten & Michael Schoer	1225	Josephine Rd	Roseville	MN	55113
Mike Schomisch	3735	Crosscliffe Path	Rosemount	MN	55068
jOe Schrader	4505	Laguna Dr	Edina	MN	55435
Jim Schramm	3305	29th AVe	Minneapol	MN	55418

Sharon Schrantz	1291	Sargent Ave	Saint Paul	MN	55105
Sarah Schrantz	3848	Oakland Ave	Minneapol	MN	55407
Rick Schreiber	4246	20th Ave S	Mpls	MN	55407
Rebin Schreiner	18904	Burmington	Eden Prairi	MN	55436
Raymond Schreurs			Roseville	MN	
Larry Schrieber	775	Tanglewood Dr	Shoreview	MN	55126
Marnita Schroeder	2136	Penn Ave S	Minneapol	MN	55405
Nate Schroeder	2417	Lincoln St.	Mpls	MN	55418
Eric Schroeder	7809	E 46th St	Mpls	MN	55407
Russel Schroedl	5027	29th Ave S	Minneapol	MN	55417
Joel Schrutberger	149611	Camden Hill	Eden Prairi	MN	55347
Kathy Schuarman	509	Ivanhoe Ave	Northfield	MN	55057
Sara Schuders	2486	Churchill	Roseville	MN	55113
Elaine Schuedel	8243	Wellsworth	St. Louis Pa	MN	55426
Ericka Schuld	4821	Dawnview Terra	Golden Val	MN	55422
Amy Schuler	6221	Cascade Pass	Chanhassei	MN	55317
Jeremy Schultz	452	Morgan Ave S	Minneapol	MN	55405
Steven Schultz	4637	Washburn Ave	Minneapol	MN	55410
Tom Schultz	2330	Roosevelt St NE	Mpls	MN	55418
Dan Schultz	278	Milton	St Paul	MN	55105
Nancy Schultz	3171	N Victoria	Shoreview	MN	55126
Peter Schulze	2315	23rd Ave S.	Minneapol	MN	55404
Julie Schumacher	2157	Sargent Ave	Saint Paul	MN	55105
Judy Schumacher	1542	Grantham St	Saint Paul	MN	55108
Mary Schuster	2122	elliot Ave	St. Anthony	MN	55404
Liz Schuster	4440	Washburn Ave S	Mpls	MN	55410
Ala Schuwachs	988	Hoyt Ave W	St Paul	MN	55117
Joe Schwab	1803	Ashland Ave	St. Paul	MN	55104
Marlin & Molly Schwaige	4422	Nawadaha Blvd	Mpls	MN	55406
Stephanie Schwandt	3740	Longfellow Ave s	Mpls	MN	55407
Josh Schwantes	805	Holton St	St Paul	MN	55104
Hollis Schwartz	8441	Irwin Rd #302	Bloomingto	MN	55437
Molly Schwartz	871	Tuscarona Ave	St Paul	MN	55104
Jean Schwartz	4129	13th Ave S	Minneapol	MN	55407
SUE SCHWARTZ	1697	W Minnehaha A	Saint Paul	MN	55104
Jon Schwartz	8051	Cheyenne Ave	Chanhassei	MN	55317
Phil Schwartzberg	2529	Garfield Ave	Minneapol	MN	55405
Kaetne Schwehn	901	1st St W	Northfield	MN	55057
Kurt Schweickhardt	1231	Charles Ave	Saint Paul	MN	55104
Peder Schweigert	816	Arlington Ave W	St Paul	MN	55117
Wenda Schwoch	2339	Roosevelt St Ne	Minneapol	MN	55418
Karen Schwoerer	3044	36th Ave S	Roseville	MN	55113
Drew Sciacca	329	4th St NE	Mpls	MN	55413
Gioyson Scoggin	3608	14th Ave S	Mpls	MN	55407
Tom Scold	3314	Dupont S	Minneapol	MN	55408
Robert (Bob) Scott	4528	Fremont Ave S	Minneapol	MN	55419
Tom Scott	4200	Ewing Ave	Minneapol	MN	55408

Lydia & David Scott	4444	Vincent	Mpls	MN	55410
Melissa Scott	1559	Sumter Ave N	Golden Val	MN	55427
Sarah Scott	1995	Iglehart Ave	St Paul	MN	55104
Jen Scott	720	W 40th St	Minneapol	MN	55409
natalia Scovorara	2006	Texas Ave S	St. Louis Pa	MN	55426
Lisa Scroggins	4355	Pleasant Ave	Mpls	MN	55409
Ronda Scroggins	4705	Zenith Ave S	Minneapol	MN	55410
Patrick Scully	107	W Island	Mpls	MN	55413
Kathleen Seal	1401	Minnehaha Pkw	Minneapol	MN	55419
Jeff Seamans	3215	Ranier Ln N	Plymouth	MN	55447
N See	4201	Wentworth	Minneapol	MN	55409
Bill & Paula J. Seeberg	401	Ivanhoe Ave	Northfield	MN	55057
Joel Seeger	5108	York Ave. S.	Minneapol	MN	55410
Melissa Seeley	5136	Indianola Ave	Edina	MN	55424
Rosalyn Segal	2208	Hartford Ave	Saint Paul	MN	55116
Betsy Sehaneman	1490	Teman Dr	Shoreview	MN	55126
Sara Seholtens	1852	Sryer Ave	Roseville	MN	55113
Walt Seibert	3145	Edgewood Ave S	St. Louis Pa	MN	55416
Gretchen Seichrist	4954	Zenith Ave S	Minneapol	MN	55410
Abbey Seidel	1201	E River Pkwy	Mpls	MN	55409
Rozanne Seidel	5128	Dupont Ave S	Minneapol	MN	55419
Paul Seifert	4737	Beard Ave S	Minneapol	MN	55410
Matt Seiler	1017	W 32nd St	Mpls	MN	55408
Ronn Seim	4150	Ximines Ln	Plymouth	MN	55441
Tammy Seitdt	2115	Newton Ave S	Minneapol	MN	55419
Dick Seitz	3511	Sunrise Dr E	Minnetonk	MN	55345
Alex Seitz	2841	Edgewood Ave S	St. Louis Pa	MN	55426
Gina Sekelsky	1721	Franklin Ave S	Mpls	MN	55414
Pia Sektnan	999	Nebraska Ave W	St. Paul	MN	55108
Wolde Selameab	1953	Como Ave	St Paul	MN	55108
Jason Selby	4154	Yosemite Ave S	St. Louis Pa	MN	55426
Heather Selinen	4367	Harriet Ave	Mpls	MN	55409
Kerry Selix	3653	Hubbard Ave N	Robbinsdal	MN	55422
Kyle Sell	2944	Asbury St	Roseville	MN	55113
Don Sellers	2923	Taylor St NE	Mpls	MN	55418
Adam Sellke	1315	Tyrol Trl	Golden Val	MN	55416
Jack or John Senander	2075	Randolph	St. Paul	MN	55105
Meredith Senborn	4232	Sheridan Ave S	Minneapol	MN	55401
Joe Senden	1076	St. Clair Ave	St. Paul	MN	55105
Deborah Senn	15549	Canyon Ridge	Eden Prairi	MN	55347
Ardeshir Sepahsaral	3753	20th Ave S	Mpls	MN	55407
Jenny Serie	3508	Pillsbury Ave	Minneapol	MN	55408
Alan Serposs	4001	Forest Rd	Minneapol	MN	55416
William or Diana Servant	3722	Grand Ave S	Minneapol	MN	55409
Jeff Sesdenstrieker	3323	Cleveland ST NE	Minneapol	MN	55418
Sandra Sester	4217	Powderhorn	Minnetonk	MN	55345
Richard Sethre	2821	W 54th St	Minneapol	MN	55410

Cindy Setum	17410	29th Ave N	Plymouth	MN	55447
Desi Setzepfandt	458	Summerfield	Chanhassei	MN	55317
Madeline Sevdand	14418	Wildcrest Rd	Minnetonk	MN	55345
Karen Severine	1266	Como Blvd E	St Paul	MN	55117
Elsa Severson	2117	Knapp St	St. Anthony	MN	55108
Jim Seward	1066	Carlton	Shoreview	MN	55126
Fred E. Sewell	16	Park Ln	Minneapol	MN	55416
Michele Sexton	4226	Upton Ave S	Minneapol	MN	55410
Chris Sexton	4912	29th Ave S	Mpls	MN	55417
Samuel Sexton	4633	Xerxes Ave	Mpls	MN	55410
Virginia Seybold	657	Heinel Dr	Roseville	MN	55113
Thomas Seymour	28	Line Drive	Morris	MN	55362
Rik Sferiza	2333	France Ave S	Saint Louis	MN	55416
Jen Shaen	2814	Ulysses ST Ne	Minneapol	MN	55418
Mark & Ginger Shafer	5016	Newton Ave S	Minneapol	MN	55419
Ron Shaffer	2952	Beachwood Ave	Wayzata	MN	55391
Andrew Shaffer	2529	Irving Ave S	Mpls	MN	55408
S Shahrian	4858	Lyndale Ave S	Mpls	MN	55419
Audrey Shamge	3509	31st Ave Ne	Minneapol	MN	55418
Connor Shandley	2901	Dakota Ave S	St. Louis Pa	MN	55416
Kim Shandley	3510	Maplewood Ct	Excelsior	MN	55331
Peter Shanedling	2324	Lake Pl	Minneapol	MN	55405
Leslie Shant	2550	Dupont Ave S	Minneapol	MN	55405
Michelle Shapiro	1801	Westwood Hills	St. Louis Pa	MN	55426
Linda Shapiro	95	Bedford St SE	Minneapol	MN	55414
James Shapland	1045	Nebraska Ave. W	St. Paul	MN	55117
Steven Share	4133	Abbott Ave S	Minneapol	MN	55410
Darren Sharp	4511	Aldrich Ave. S.	Minneapol	MN	55409
Libby Sharp	1711	Sumter Ave N	Golden Val	MN	55422
David Shattuck	1526	Sheldon St	Saint Paul	MN	55108
Jocelyn Shaw	2103	Wilder St N	Saint Paul	MN	55113
Betty Shaw	2649	Huntington Ave	St Louis Pa	MN	55416
Ruth & Frank Shaw	1987	Ryan Ave W	Roseville	MN	55113
Dennis Shaw	18930	33rd Ave N	Plymouth	MN	55447
Ginny Shea	126	W Minnehaha Pl	Mpls	MN	55419
Kathleen Shearon	2820	N HURON	ROSEVILLE	MN	55113
Amy Shebeck	3315	W 46th St	Minneapol	MN	55410
Bob & Agnes Sheedy	4724	Abbott Ave S	Minneapol	MN	55410
Ames Sheldon	8700	Lunski Ln	Eden Prairi	MN	55347
Jeff Shelstad	21252	Inuit Ln	Lakeville	MN	55057
Lizhau Shen	2348	Harding St	Minneapol	MN	55418
Kathleen Sheorn	2820	N Huron	Roseville	MN	55113
Joe Shepard	507	6th St E	Northfield	MN	55057
Debra Shepard	1425	St Clair	St Paull	MN	55105
Sally Shepherd	6354	Oxbow Bend	Chanhassei	MN	55317
Shelley & Mark Sherman	1410	Raymond Ave	Saint Paul	MN	55108
Ken Sherman	3824	Pillsbury Ave. S.	Minneapol	MN	55409

Lia Sherman	4025	Colfax Ave S	Mpls	MN	55409
Thomas Sherman	2737	Ewing Ave N	Robbinsdal	MN	55422
Erin Sherman	4130	Angelo Drive	Golden Val	MN	55422
John Shevlin	4824	W 40th Lane	St Louis Pa	MN	55416
Juliane Shibata	315	Elm St.	Northfield	MN	55057
Tony & Joy Shidla	6037	11th Ave S	Minneapol	MN	55417
Sheri Shigdald	4826	32nd Ave S	Mpls	MN	55417
David Shimota	4237	Sheridan Ave S	Mpls	MN	55410
Madeline and Ed Shinbac	127	Woodlawn Ave	Saint Paul	MN	55105
Sylvia Shinder	3445	Jewel Ln	Plymouth	MN	55447
Judy Shinn	9592	Falcons Way	Eden Prairi	MN	55347
Todd Shipman	3757	Lyndale Ave S	Minneapol	MN	55409
Mark Shireman	15701	La Bon Terrace	Minnetonk	MN	55345
Michelle Shive	195	Vernon St	St Paul	MN	55105
Jan Shivers	1151	Ryan Ave W	Roseville	MN	55113
Glenn Shoemaker	3820	Pillsbury Ave S	Minneapol	MN	55409
Peter Sholtz	346	13th Ave N	Hopkins	MN	55343
F. Shore	1903	Huron St	Roseville	MN	55113
Matthew Shore	3544	Pillsbury Ave	Mpls	MN	55408
Elizabeth Short	3036	Humbolt Ave. S.	Minneapol	MN	55408
Phillip Shoultz	2802	Yosemite Ave S	St Louis Pa	MN	55416
Kevin and Sarah Shriver	5100	Harriet Ave	Minneapol	MN	55419
Tiffany Shrode	2342	Parkwoods Rd	St Louis Pa	MN	55416
Victoria M. Shultz	6641	Lochanburn Rd	Eden Prairi	MN	55346
J Shur	2086	Skillman	Roseville	MN	55113
KRISTINA SICORA	3706	ABBOTT AVE N	ROBBINSDA	MN	55422
Guy Sicora	4420	16th Ave S	Mpls	MN	55407
Bradley Sidle	3900	Lee Ave N	Robbinsdal	MN	55422
Ron Siefert	4017	23rd Ave S	Mpls	MN	55407
Alyssa Siems-Roberson	3413	42nd Ave S	Minneapol	MN	55406
Janis and Mark Sieve	4519	17th Ave S	Minneapol	MN	55407
Laurie Sieve	711	Summit Ave W	Northfield	MN	55057
Vira Sigh	2631	W 44th St	Minneapol	MN	55410
Diane Signorelli	1644	Hamlin Ave N	Roseville	MN	55113
Sydney Silko	3309	Huntington Ave	St. Louis Pa	MN	55416
Markus Silpala	909	W 42nd St S	Mpls	MN	55409
Mark Silsby	4708	Park Ave S	Mpls	MN	55417
Heather Silva	911	Saddlbrooke Cur	Chanhassei	MN	55317
Angel Silvan	3324	Bloomington Ave	Mpls	MN	55407
Anna & charles Silvermar	1825	Major Dr N	Golden Val	MN	55422
Stefan Silverman	18519	Pathfinder Dr	Eden Prairi	MN	55347
Madnelle Silverman	4924	Knox Ave	Mpls	MN	55410
BETH SILVERSTEIN	2601	MERIDIAN DR	ROBBINSDA	MN	55422
Sandra Simbeck	335	Summit Ave	St. Paul	MN	55102
Carol Sime	2130	Watson Ave	Saint Paul	MN	55116
Sara Simma	557	Ottawa Ave	St. Paul	MN	55107
Megan Simmons	2545	32nd Ave S	Minneapol	MN	55406

Kayla Simmons	1	not provided	St. Louis Pa	MN	55413
Scott Simmons	3216	Rankin Rd	St. Anthony	MN	55418
Linda Simon	4829	Nokomis Ave	Minneapol	MN	55417
Erin Simon	2323	Standish St	St Paul	MN	55108
Gail Simon-Kian	3841	France Ave S	St. Louis Pa	MN	55416
Stephanie Simore	4900	Nokomis Ave	St. Paul	MN	55417
David P. Simpson	999	Lincoln Ave	Saint Paul	MN	55105
Elna Geige Simpson	5034	35th Ave	Mpls	MN	55417
Nels Simpson	3324	Alabama Ave S	St. Louis Pa	MN	55426
Stephanie Simpson	4101	Washburn Ave S	Minneapol	MN	55410
Robert Sinclair	3735	Cottonwood Ln I	Plymouth	MN	55441
SHARON SINCLAIR	1387	LAFOND AVE	SAINT PAU	MN	55104
Ashley Sinnen	3844	Quail Ave N	Robbinsdal	MN	55422
Andy Sinykin	330	Cecil St SE	Mpls	MN	55414
Becky & Al Sippel	17330	24th Ave N	Plymouth	MN	55447
Dominic Sisby	4415	18th Ave S	Mpls	MN	55407
Amy Skare Klecker	557	Woodhill Dr	Roseville	MN	55113
Dean Skel	2940	Merrill St	Roseville	MN	55113
Hannah Skeldum	1128	Washburn Ave S	Mpls	MN	55405
Kayla Skibbe	411	Manitou St	Northfield	MN	55057
Ann Skinner	618	6th St SE	Mpls	MN	55414
Ben Skinner	8760	Lake Susan Ct	Chanhassei	MN	55317
Fritz Skinner	4815	Oakland Ave S	Mpls	MN	55407
Janet Skjei	1052	E Circle Drive	Wayzata	MN	55391
Jan Skogstrom	1310	W 53rd St	Minneapol	MN	55419
Douglas Skor	701	Fairmount Ave	Saint Paul	MN	55105
Aine Skow	2888	Irving Ave	Minneapol	MN	55408
J Skully	2610	Lynn Ave S	St Louis Pa	MN	55416
Guna Skusina	2300	E 22nd St	Mpls	MN	55406
Colleen and John Slack	1938	Walden Pl NE	Minneapol	MN	55418
Joram or Hadassa Slager	2701	Joppa Ave S	Saint Louis	MN	55416
Dawn Slane	5220	Chowen Ave S	Mpls	MN	55419
Jim Slanga	2646	McKinley St NE	Minneapol	MN	55418
Brian Slater	4337	Nokomis Avenue	Minneapol	MN	55406
Lukas Slater	1413	Como Ave	St Paul	MN	55108
Erin Slattengren	4814	N 41st St	St. Louis Pa	MN	55416
Mariam Slayhi	3542	Lincoln St NE	Mpls	MN	55418
Mack Sledge	2221	Bryant Ave	Minneapol	MN	55405
Carolyn Sleeth	5237	Irving Ave S	Mpls	MN	55419
Lisa Slezak-Moser	7000	Dakota Ave	Chanhassei	MN	55317
Elizabeth Slogle	4712	13th Ave S	Mpls	MN	55407
Brendon Slotterbeck	817	39th St W	Minneapol	MN	55409
Bruce & Rita Slough	2913	Princeton Ave S	Saint Louis	MN	55416
Ryan Smead	2042	Jersey Ave S	St. Louis Pa	MN	55426
Ashley Smerick	2900	Jersey Ave S	St. Louis Pa	MN	55426
Jack Smethells	1458	Arona St	St. Paul	MN	55108
Laura Smidzik	1201	Dayton Ave	St Paul	MN	55104

Wendy Smith	5017	3rd Ave S	Minneapol	MN	55419
Kristi Smith	4130	Upton Ave. S.	Wedge	MN	55410
Mark Smith	5575	Nantucket Rd	Minnetonk	MN	55345
Kristen Smith	225	Thomas Ave. S.	Minneapol	MN	55405
Sean Smith	4226	Vincent Ave S	Minneapol	MN	55410
Laura Smith	1594	Hillcrest Ave	Saint Paul	MN	55116
Brett Smith	5300	Irving Ave S	Minneapol	MN	55419
Bobbi Smith	3249	Dupont Ave S	Minneapol	MN	55408
Alexander B. Smith	2008	2nd Ave S #4	Minneapol	MN	55404
Nona Smith	2959	Taylor St NE	Minneapol	MN	55418
Pat Smith	6911	Sherwood Road	Woodbury	MN	55125
Maureen Smith	1145	Ryan Ave W	Roseville	MN	55113
Greg Smith	8927	St. Croix Rd	Woodbury	MN	55125
Susan Smith	3040	Florida Ave S	St. Louis Pa	MN	55416
Jacob Smith	5141	28th Ave S	Mpls	MN	55417
Sarah Smith	1630	Jersey Ave S	St. Louis Pa	MN	55426
Clay Smith	3115	Lawndale Ln	Plymouth	MN	55447
James & Michon Smith	2701	Pahl Ave	St. Anthony	MN	55418
Michelle Smith	7487	Saratoga Dr	Chanhassen	MN	55317
Molly Smith	2908	Drew AVe N	Robbinsdal	MN	55422
Kim Smith	3744	21st Ave S	Mpls	MN	55407
Dorothea Smith	2124	Folwell	St Paul	MN	55108
Meg Smith	3519	Grand Ave, #2	Mpls	MN	55408
Cindy Smith	4122	43rd Ave N	Robbinsdal	MN	55422
Jay Smith	3705	W Fuller	Edina	MN	55424
K Smith	2219	25th Ave S	Mpls	MN	55404
Jill Smith	5202	Upton Ave S	Mpls	MN	55419
Kat Smith	863	Holton	St Paul	MN	55104
Angela Smith	711	2nd st W	Northfield	MN	55057
James LD Smith	2215	W 49th St	Minneapol	MN	55419
Corinne Smith	505	College St	Northfield	MN	55057
Chantel Smith	4849	James Ave S	Minneapol	MN	55419
David Smith		4411 Thomas Av	Minneapol	MN	55410
Collin Smith	2600	Colfax Ave S	Minneapol	MN	55405
Nate Smith	1214	Avon St N	St Paul	MN	55117
Bonnie Smith-Yackel	2728	Hayes St NE	Minneapol	MN	55418
Andrea Smitz	3630	Zenith Ave S	Mpls	MN	55410
Jorge C. Smpouerde	3154	McKinley St NE	Minneapol	MN	55418
Jerry Smrekar	5211	Upton Ave S	Minneapol	MN	55410
Nathan Smreker	3940	Aldrich Ave	Minneapol	MN	55409
Chad D. Smude	1949	Ewing Ave S	Minneapol	MN	55403
Christina & Maria C. Snea	2725	Idaho Ave S	Saint Louis	MN	55426
Karen Sneed	15810	Holdridge Rd E	Minnetonk	MN	55219
Mark & Ana Sneider	4415	Tyrol Cr	Golden Val	MN	55416
Garrett Sneider	3043	Arthur St NE	Mpls	MN	55418
Michelle Sneks	2813	105th St	Minneapol	MN	55410
Mary Kaye Snell	1744	Magnolia Ln N	Plymouth	MN	55441

Cindi Snow	863	Lakeview Ave.	St. Paul	MN	55117
Cliff Snow	4055	Beard Ave N	Robbinsdal	MN	55422
Jeanette Sobania	1109	Hoyt Ave W	Saint Paul	MN	55108
Karen Soderberg	286	Washburn Ave N	Minneapol	MN	55405
Kaari Soderholm	5324	Morgan Ave S	Minneapol	MN	55419
Daniel Sogin	574	Mt. Curve Blvd	Saint Paul	MN	55116
Rita Sohleicher	2312	32nd Ave S	Mpls	MN	55406
Tara Solander-Lee	4333	Aldrich Ave S	Mpls	MN	55409
Kris Solberg	2101	22nd Ave NE	Minneapol	MN	55418
Marit Solheim-Witt	3850	Leslee Cur	Excelsior	MN	55331
Ivan Solis	4841	14th Ave S	Mpls	MN	55407
Jonathan Sollie	3853	45th Ave S	Minneapol	MN	55406
Kathilyn Solomon	2857	Edgewood Ave S	Saint Louis	MN	55426
Amare Solomon	1157	Skillman Ave	Roseville	MN	55113
Jon Solz	2604	31st Ave NE	St. Anthony	MN	55418
Sonja Somdahl	4817	Knox Ave S	Minneapol	MN	55419
Rachel Sommerfield	3043	Johnston St NE	Minneapol	MN	55418
Callie Sommers	4653	Zenith Ave S	Mpls	MN	55401
Ronald Somnore	2601	Kensington Terra	St. Anthony	MN	55418
Sally Sonday	1933	James Ave S	Mpls	MN	55403
Karen Sontag-Sattel	212	3rd AVe NE	Minneapol	MN	55410
Nikki Soren	3800	Sheridan Ave S	Minneapol	MN	55410
Julie Sorensen	506	7th St SE	Mpls	MN	55414
Margaret Sorensen	3093	Yard Dr	Roseville	MN	55113
Robert Sorenson	2125	Laurel Ave W	Minneapol	MN	55404
Bradly Sorock	3936	Zenith Ave S	Mpls	MN	
Laura Soter	412	Union St	Northfield	MN	55057
A Soth	5200	Hampshire Dr	Mpls	MN	55419
Jane Souriyathayi	207	w 77th St	Chanhassen	MN	55317
Laura Southwick	2208	Hayes St NE	Minneapol	MN	55418
Jane Southwood	4916	Emerson Ave S	Minneapol	MN	55419
Nicole Sovde	7231	Sierra Ct	Chanhassen	MN	55317
Kerry J Sovell	4839	5th Ave S	Minneapol	MN	55419
Michael Sowads	16800	Grays Bay Blvd	Minnetonk	MN	55391
Molly Sowash	2501	Aldrich Ave S	Minneapol	MN	55405
Monica Sowder	5440	Richmond Curve	Mpls	MN	55410
Mary Spalding	1448	Rambler Rd	Roseville	MN	55113
Amy Spanks	3108	Bell Ln	Minneapol	MN	55418
Alex Spanton	1977	Grand Ave	St Paul	MN	55105
Mike Spargerberg	5308	Zenith Ave S	Mpls	MN	55410
Kevin Spatts	4804	Drew Ave S	St. Louis Pa	MN	55426
Lauren Speer	4449	18th Ave S	Mpls	MN	55407
LuAnne Speeter	7128	Valley View Rd	Edina	MN	55439
David Speetzen	524	W 7th St	Winona	MN	55987
John Speltz	1267	W Skillman	Roseville	MN	55113
Jayson Spence	3815	21st Ave S	Minneapol	MN	55407
Tammy Spencer	3045	Utah Ave S	St Louis Pa	MN	55426

Maria Spencer	1438	St. Clair Ave	St. Paul	MN	55105
Cathy & Mike Spengler	4732	30th Ave S	Minneapol	MN	55406
Ruth Spiegel	4624	York Ave S	Minneapol	MN	55410
Aaron Spiegel	1410	Tyrol Trl	Golden Val	MN	55416
Kevin Spints	5304	Stevens Ave	Minneapol	MN	55419
Daniel Spirn	3520	Humboldt Ave S	Mpls	MN	55408
Karen Spirov	5421	Bryant Ave S	Mpls	MN	55419
LuAnn & Ron Spoelstra	3341	Chippewa Road	Minnetonk	MN	55305
Scott & Sarah Sponheim	3241	Irving Ave S	Minneapol	MN	55408
Sonja Sponhein	2354	Hillside Ave	St Paul	MN	55108
Dennis and Emily Sponsle	3841	Lyndale Ave S	Minneapol	MN	55409
Kelly Spors	4114	Raleigh Ave	St. Louis Pa	MN	55416
Gretchen Spottke	833	Wood Hill Dr	Chanhassei	MN	55317
Casey Sprague	2135	Glendhurst Rd.	St. Louis Pa	MN	55416
Julia Spranger	3100	Woodlawn Ave	Minnetonk	MN	55391
Ron & Teri Spratt	581	Bighorn Dr	Chanhassei	MN	55316
John & Megan Spriggs	5221	James Ave S	Minneapol	MN	55419
Nancy Springer	4428	47th Ave S	Minneapol	MN	55406
Valija Springstead	2221	Albert St N #104	Roseville	MN	55113
Adam St. John	4817	Drew Ave	Mpls	MN	55410
Beth St. John	5049	Queen Ave S	Mpls	MN	55419
Anonymous St. Paul	1	Anonymous	St. Paul	MN	55108
Anonymous2 St. paul	1	mn	St. Paul	MN	55104
Randal & Beth Staats	4222	Blaisdell Ave S	Minneapol	MN	55409
Beth Stack	4236	Zenith Ave N	Robbinsdal	MN	55422
Ian Stade	5021	Lyndale Ave S	Minneapol	MN	55419
Chris Stadick	15613	Wing Lake Dr	Minnetonk	MN	55345
Robert Staeheli	1484	Clarmar	Roseville	MN	55113
Patrick Stafford	20310	Post Road	Minnetonk	MN	55305
Dale Stahl	580	Bighorn Drive	Chanhassei	MN	55317
Joe Stahl	4340	Drew Ave S	Mpls	MN	55410
Jillian Stahl	2526	Ulysses St NE	Minneapol	MN	55418
Lorae Stahley	904	Laurel Ave	St. Paul	MN	55104
Sue Stahr	14617	Idylwood Rd	Minnetonk	MN	55345
Chad Stamps	4805	14th Ave S	Minneapol	MN	55417
Paula Stanberry	4144	Ottawa Ave	St. Louis Pa	MN	55416
Zorica Stancevic	4629	35th Ave S	Mpls	MN	55406
Erica Standal	3254	Harriet Ave	Minneapol	MN	55408
Carol Stangler	4627	Queen Ave N	Minneapol	MN	55412
Carisa Stangler	6221	Arbor Ln	Chanhassei	MN	55331
Mark Stankey	7712	13 1/2 St W	Saint Louis	MN	55426
Gail Stankey	3553	Tyler St NE	Minneapol	MN	55418
Sandra Stanley	2205	S Hill Ln	St Louis Pa	MN	55416
Robert Stans	17751	Duck Lake Trail	Eden Prairi	MN	55346
Stephanie Stanton	866	Parkview Ave	St Paul	MN	55117
Kellylynn and Rob Stanto	776	Lathrop Dr	Northfield	MN	55057
Stacey Stark	3737	Quail Ave	Saint Louis	MN	55416

Erica Stark	3949	Blaisell Ave S	Minneapol	MN	55408
Britney Stark	5442	Edgewater Blvd	Minneapol	MN	55417
Carolyn Stark	4020	Garfield Ave. S.	Minneapol	MN	55409
John Stark	5442	Edgewater Blvd	Minneapol	MN	55417
J.D. Starky	1589	Vincent St	Minneapol	MN	55418
Jane Starr	126	Orlin Ave SE	Minneapol	MN	55414
Will Starr	1700	W 26th St	Minneapol	MN	55405
Erick Start	3217	Humboldt	Minneapol	MN	55408
Stan Stattman	3811	Elendale Dr	Chanhasse	MN	55331
Joanna Stavre	4508	Edina Blvd	Edina	MN	55424
Elizabeth Stavrou	639	E 57th St	Minneapol	MN	55417
Rebeccah Stay	2016	Fremont Ave S	Minneapol	MN	55406
PAUL STEARNS	15025	CHERRY LN	MINNETON	MN	
Jean Stearns	8109	Xerxes Cir	Bloomingto	MN	55337
Mark Steehr	228	Cecil St SE	Mpls	MN	55414
Erin Steer	1303	Idaho W	St. Paul	MN	55108
Doug Steere	4052	Pillsbury Ave	Mpls	MN	55409
Tara Stefanson	4313	Thornhill Ln	Roseville	MN	55113
Sandra Steffen	1368	Ithilien	Chanhasse	MN	55317
Suzanne Stegic	1904	James Ave S	Minneapol	MN	55417
Emily Steidel	102	Arthor Ave SE	Mpls	MN	55414
Zach Steigarf	1128	Montana Ave W	Minneapol	MN	55108
Charles Steigerwald	4904	Upper 148th Ct	Apple Valle	MN	55124
Ken Steil	301	East Anoka St	Duluth	MN	55803
Marvin & Sarah Stein	51	Barton Ave SE	Minneapol	MN	55414
Marcy Steinberg	1243	Dayton Ave	St. Paul	MN	55104
Richard Steinberg	5512	Beard Ave S	Edina	MN	55410
Kathy Steinberger	2201	Milwaukee Ave	Mpls	MN	55404
Kelsey Steinboecher	12205	Virginia Ct	Champlin	MN	55316
I Steiner	3641	Huntington Ave	St Louis Pa	MN	55416
Ann Steingroeber	1829	Farimount Ave	St Paul	MN	55105
Dan Steinhacker	1407	Arona St	St. Paul	MN	55108
Pete Steinhagen	2354	Como Ave	St Paul	MN	55108
Doris Steinhoff	5728	High Park Dr	Minnetonk	MN	55345
Erin Steinlage	5232	3rd Ave S	Minneapol	MN	55419
Donna Steinward	1424	Skillman Ave W	Roseville	MN	55113
Nancy Stellick	3125	45th Ave S	Mpls	MN	55406
J Stellpfly	1900	Dupont Ave S	Minneapol	MN	55405
Kim Stelson	2200	Milwaukee Ave	Mpls	MN	55406
Brooke Stelzer	5032	Raleigh Ave S	St. Louis Pa	MN	55416
T Stem	5017	Gladstain Ave	Minneapol	MN	55419
S Sten	3057	Tyler St NE	Mpls	MN	55418
Kirsten Stendahl	3500	Skycroft Dr	St. Anthony	MN	55418
Mark Stender	5216	Girard Ave S	Mpls	MN	55419
Beth Stenglein	2653	Webster Ave S	St. Louis Pa	MN	55416
Cordelin Stenstrom	1109	Elm St	Northfield	MN	55057
James Stephenson	3917	Grand Ave S	Mpls	MN	55409

Lawrence Stephenson	4836	Maple Rd	Edina	MN	55424
Elliot Stephenson	2777	Irving Ave S	Minneapol	MN	55405
Pierce Stepp	2095	St Clair Ave	St. Paul	MN	55105
Scott Sterling	16805	12th Ave N	Plymouth	MN	55447
Elizabeth Stern	605	Russell Ave S	Mpls	MN	55405
Joan Sterner	3606	CRESCENT VIEW	Duluth	MN	55804
Heather & John Sterner	3635	Sunrise Dr	Minnetonk	MN	55345
Derek Sterns	6204	Cascade Pass	Chanhassei	MN	55317
Dana Stetzer	8183	Marsh Dr	Chanhassei	MN	55317
David Stevens	45	Neptune St	Mahtomed	MN	55115
Mark Stevens	3345	Vagabond Ln	Plymouth	MN	55447
Meg Stevenson	846	Fairmount Ave	St. Paul	MN	55105
Jill Stevenson	4929	33rd Ave S	Mpls	MN	55417
Sarah Stevenson	649	Mt curve	St Paul	MN	55116
Hillary Stewart	4712	Vallacher Ave. S.	St. Louis Pa	MN	55416
Emily Stewart	2829	Alabama Ave S	Saint Louis	MN	55416
Ann Stewart	4721	31st Ave S	Minneapol	MN	55406
Brett Stewart	5537	24th Ave S	Mpls	MN	55417
Paul D. Stewart	4106	Washburn	Minneapol	MN	55410
Leah Stich	1615	W Franklin	Minneapol	MN	55403
Jeff Stichn	15910	12th Ave N	Plymouth	MN	55447
Michael Stiegler	4115	Forestview Ln N	Plymouth	MN	55441
Erin Stigmenovic	3817	W 55th St	Edina	MN	55424
Kate Stiles	4311	W 44th	Edina	MN	55424
Sue Stiller	7113	Park View Lane	Eden Prairi	MN	55436
Sue Stillman	420	Oliver Ave S	Minneapol	MN	55405
Kristen Stinger	5335	Nicollet Ave NW	Minneapol	MN	55419
Rachel Stockert	5432	Xerxex Ave S	Edina	MN	55410
Scott Stodola	4600	France Ave N	Robbinsdal	MN	55422
Nathan Stohlmann	2182	Dudley Ave	St. Paul	MN	55108
Molly Stoker	4924	York Ave S	Mpls	MN	55410
Lynn Stokks	7221	Sierra Ct	Chanhassei	MN	55317
Larry Stolberg	640	Bighorn Dr	Chanhassei	MN	55316
Kate Stoltenberg	2853	Idaho Ave S	St. Louis Pa	MN	55426
Maren Stone	505	2nd Ave	Minneapol	MN	55414
Ann Stone	1501	Summit Ave	St Paul	MN	55104
Brittany Stoneback	3036	West Lake St #3(	Minneapol	MN	55416
Leann Stoneburg	6511	Welsley Ct	Chanhassei	MN	55317
Adam Storm	3242	Sumter Ave S	St. Louis Pa	MN	55426
Bryan Storm	929	Lonbard	St. Paul	MN	55105
Aaron Stottlemeyer	1075	Robinhood Pl	Shoreview	MN	55126
Jeff Stottlemyer	3423	Milton St N	Shoreview	MN	55126
Judith Stoucard	210	Manitou St	Northfield	MN	55057
Judith A. Stoutland	210	Manitou St	Northfield	MN	55057
Jema Strainlutz	2905	31st Ave NE	St. Anthony	MN	55418
Conni Strait	1015	Cobb Rd	Shoreview	MN	55126
Scott Strand	1772	Eleanor Ave	Saint Paul	MN	55116

Sally Strand	11931	54th Ave N	Plymouth	MN	55442
Tim Strand	1550	Sheldon St	Saint Paul	MN	55108
Justin Strandjod	5312	27th Ave S	Minneapol	MN	55412
Cary Strandjord	4101	Blaisdell Ave	Mpls	MN	55409
Michelle Strangis	1800	Irving Ave S	Minneapol	MN	55403
Patricia Straub	1228	Dayton Ave	St. Paul	MN	55104
Ericka Strauman	4019	Highland Rd	Minnetonk	MN	55345
Erin J. Strauss	3531	15th Ave S	Minneapol	MN	55407
Molly Street	415	S Cretin Ave	St PAul	MN	55105
Elizabeth Streffhl	2212	Drew Ave	Minneapol	MN	55416
Terry Streich	1319	Spring Valley Rd	Minneapol	MN	55422
Jodie Striab	5600	Albert St	Shoreview	MN	55126
Russell Stricker	5404	Abbott Place	Edina	MN	55410
Morgan Strickland	993	Dayton Ave	St. Paul	MN	55104
David & Debra Strike	2244	Sargent Ave	Saint Paul	MN	55105
Scott Stroeing	3230	E 50th St	Mpls	MN	55417
Logan Strom	1726	Kenwood Pkwy	Mpls	MN	55416
Jeff & Chris Stromgren	5245	Irving Ave S	Minneapol	MN	55419
Brian Stromquist	5308	York Ave. S.	Minneapol	MN	55410
Steven & Zoe Stromswol	1918	Ulysses St. NE	Minneapol	MN	55418
Braden Stroot	2895	N Albert St	Roseville	MN	55113
Trevor Stroscher	822	SE 7th St	Minneapol	MN	55414
Ben Stroup	3208	Garfield Ave	Minneapol	MN	55416
Rihnccl S. Struel	169	Orlu Ave S	Mpls	MN	55414
Virginia Strusell	416	E 5th St N	Northfield	MN	55057
Heather & Brett Struwe	226	Upton Ave S.	Minneapol	MN	55405
Jonn Stuart	2517	W 54th St	Minneapol	MN	55410
Meredith Stuart	5500	Pillsbury Ave	Minneapol	MN	55408
John Stucker	4624	West 28th St	St. Louis Pa	MN	55416
Jeff & Mary Studnek	2796	Western Ave N	Roseville	MN	55113
Gary Stueck	5419	Abbott	Edina	MN	55424
Deon & Judy D. Stuthmar	1885	Fernwood St	Roseville	MN	55113
Krista Suarue	3811	Glendale Terr #2	Minneapol	MN	55410
Lisa Suchy	2906	Colorado Ave S	St. Louis Pa	MN	55416
Kristen Suckow	4534	Chowen Ave N	Robbinsdal	MN	55422
Darcy Sudderth	2219	22nd Ave	Mpls	MN	55404
David Sudermann	118	Orchard Street	Edina	MN	55416
Jimmy Sugg	3732	17th Ave S	Mpls	MN	55407
Tadashi Sugimoto	5149	York Ave s	Mpls	MN	55410
Peter Suiko	405	Rambler Ct	Roseville	MN	55113
Kevin M. Suing	4375	Kirkwood Ln	Plymouth	MN	55442
Merrilee Sullivan	3415	Benjamin St NE	Minneapol	MN	55418
Veronica & Ed Sullivan	6572	175th St	Lakeville	MN	55024
Patricia Sullivan	1143	Dayton Ave	St. Paul	MN	55104
Colleen Sullivan	3417	33rd Ave	St. Anthony	MN	55418
Elizebeth Sullivan	3330	Virginia Ave S	St. Louis Pa	MN	55426
Tim Sullivan	3303	Emmert St	Shoreview	MN	55126

Patti Sullivan	1024	Ashland Ave	St. Paul	MN	55104
Pete Sullivan	132	Wheeler St	St Paul	MN	55105
Joan Sullivan	1295	Silverthorn Dr	Shoreview	MN	55126
Katie Sulul	2901	E Minnehaha Pk	Mpls	MN	55406
Christopher Summa	812	Saint Olaf Ave	Northfield	MN	55057
Stephanie Summers	743	Parkview Ave W	St. Paul	MN	55108
Andrew Summers	1414	Sumner Street	St Paul	MN	55116
Jay Summers	1862	St Claire Ave	St Paul	MN	55105
Jessica Sumpter	8600	W. 29th St.	St. Louis Pa	MN	55426
Louise Sundin	5216	Vincent Ave S	Minneapol	MN	55410
s Sunner	1123	Woodland	Northfield	MN	55057
Ane Suro	3406	Garfield Ave S	Mpls	MN	55408
Angela Surprenaht	5120	Benton Ave	Edina	MN	55436
David Sussman	1445	Fairlawn Way	Golden Val	MN	55416
Evy Sussman	1086	Cedar View Dr	Mpls	MN	55405
Tim Sutherland	3356	Johnson St NE	Minneapol	MN	55418
Ken Sutherland	4316	Coor Hard Rd	Minnetonk	MN	55345
J Sutman	2154	Jane S	St Paul	MN	55105
Ross Sutter	183	Island Ave E	Minneapol	MN	55401
Richard & Jan Sutton	4140	Xerces Ave S	Minneapol	MN	55410
Ronald Suttons	2712	Yosemite Ave S	St Louis Pa	MN	55416
Tracy Svea	3205	42nd Ave S	Minneapol	MN	55406
Katherine Svensgaard	795	Carver Beach Rd	Chanhasse	MN	55317
Shannon Svensrud	3856	Pleasant Ave	Mpls	MN	55401
Svinivasa Svinivasa	18590	38th Ave N	Plymouth	MN	55446
Shelly Swan	754	Nebraska Ave W	St Paul	MN	55117
Beth Swanberg	1376	Albert St N	St Paul	MN	55108
Jacklyn Swangstne	1619	Selby Ave	St Paul	MN	55104
Terry Swanson	2216	32nd Ave S	Minneapol	MN	55406
Judy Swanson	910	Saint Olaf Ave	Northfield	MN	55057
Claudia Swanson	1493	Grand Ave	Saint Paul	MN	55105
David Swanson	1622	25th Ave NE	Minneapol	MN	55418
Mary Swanson	5305	York Ave S	Mpls	MN	55410
Steve Swanson	2570	Xenwood Ave	St. Louis Pa	MN	55416
Jay Swanson	11440	42nd Ave N	Plymouth	MN	55447
Arvid Swanson	4912	Nokomis Ave	Mpls	MN	55417
Charlie Swanson	711	Cunesage Trail	Chanhasse	MN	55317
Austin Swayne	3114	4th St SE	Mpls	MN	55315
Lee Sweauyer	18448	Melissa Circle	Eden Praire	MN	55347
Paul & Rita D. Swedenbe	2190	Doswell Ave	Saint Paul	MN	55108
Bella Swedin	4133	Chowen Ave S	Minneapol	MN	55410
Noah Sweet	4020	Randall Ave	St Louis Pa	MN	55416
C Sweetland	1230	Belair Cir	Roseville	MN	55113
Susan Sweezo	2342	Benjamin St NE	Minneapol	MN	55418
Tammy Swenson	2934	Benjamin St Ne	Minneapol	MN	55418
Kris & Scott Swenson	2000	Portland Ave	Saint Paul	MN	55104
Maria Swenson	818	24th Ave NE	Mpls	MN	55418

Nate Swenson	10	Sidney Pl	Mpls	MN	55414
Chelsea Swenson	4845	4th Ave S	Mpls	MN	55419
Thomas Swenson-Bellsor	1369	Wynne Ave	Saint Paul	MN	55108
Patty Swess	2147	Elanor Ave	St Paul	MN	55146
Anthony Swierczek	3237	Colfax Ave S	Minneapol	MN	55408
Nauia Swift	1	Red Ledge Ln	Mpls	MN	55410
Lori Swift	29	Cooper Circle	Edina	MN	55436
P Swinnea	1517	W 53rd	Minneapol	MN	55419
Samantha Swonger	3254	Halifax Ave N	Robbinsdal	MN	55422
Pat Sykes	4524	Casco Ave	Edina	MN	55424
Chad Sylvain	2411	Hayes St NE	Minneapol	MN	55418
Cathy Sylvester	791	Nebraska Ave W	St. Paul	MN	55117
R.E. Syverson	4338	Woodhill Rd	Minnetonk	MN	55345
Erika Szabo	2341	Taft St	Minneapol	MN	55418
Thomas Szalapski	1198	Sunset Dr	Woodbury	MN	55125
Zach Szody	2477	Lydia Ave W	Roseville	MN	55113
Maggie T	3018	Old Hwy 8	St. Anthony	MN	55418
Cory T	5027	Ewing Ave	Mpls	MN	55410
Sara T	9416	Frederick Ave	St. Louis Pa	MN	55426
Brnt T	570	Bighorn Dr	Chanhassei	MN	55317
Robert T	2720	Major Ave N	Golden Val	MN	55422
Mario T	872	Dayton Ave	St. Paul	MN	55104
Kristin Tabb	373	Maple Lane Ct	Roseville	MN	55113
Peter Tabor	100	W 38th St	Minneapol	MN	55409
Paul Tabor	8596	Chanhassen Hills	Chanhassei	MN	55317
Allison Taffe	19820	Near Mountain E	Shorewooc	MN	55331
Sepi Taghishl	3801	York Ave S	Mpls	MN	55410
Deborah Talen	4720	Dupont Ave S	Minneapol	MN	55419
Lauren Tallarita	4014	Blaisdell Ave	Minneapol	MN	55409
Adam Talle	4227	Pillsbury Ave S	Mpls	MN	55409
Lens Tamang	29	Sidney Pl	Mpls	MN	55414
Matthias Tande	2846	Agler St	Roseville	MN	55113
Ann Tandy	709	4th St NE	Mpls	MN	55413
Bryon Tang	3123	Pierce St. NE	Minneapol	MN	55418
Kam Wa Tang	6215	Drew Ave	Mpls	MN	55410
Dario Tangelson	1194	Seminary Ave	St Paul	MN	55104
Linda Tanl	1302	Garfield St NE	Mpls	MN	55418
John Tapp	5116	30th Ave S	Mpls	MN	55417
Paul Tarabek	1002	Wildwood Ct	Northfield	MN	55057
Dave Taragos	3249	Dupont Ave	Minneapol	MN	55408
M Tarrell	2959	Ulysses St NE	Mpls	MN	55418
Darin M. Tarrents	708	SE 9th St	Minneapol	MN	55414
Andrew Tasi	4608	West 86th Stree	Bloomingto	MN	55437
Paul Tatting	3544	Wyoming Ave S	St. Louis Pa	MN	55426
Mandi Tauferner	3933	Blaisdell Ave	Minneapol	MN	55409
Elisa Tavera	3574	France Ave S	St Louis Pa	MN	55416
Peter Tawfick	2228	Buchanan St NE	Mpls	MN	55418

J H Taylor	6890	NE Perce Ave	Chanhassei	MN	55317
Edward Taylor	1848	Pinehurst Ave	St Paul	MN	55116
Dawn Taylor	5340	Irving Ave S	Minneapol	MN	55419
Amy Taylor	2924	Lee Ave N	Golden Val	MN	55422
Tracy Taylor	3631	Huntington	St. Louis Pa	MN	55416
PETER Taylor	5108	Vincent Ave S	Mpls	MN	55410
Kerry Taylor	7288	Bren Ln	Eden Prairi	MN	55436
Roger Teachworth	1811	Goodrich	St. Paul - M	MN	55105
David Teater	2400	Irving Ave S	Minneapol	MN	55405
Louis Teerlinck	6525	Tingdale Ave	Edina	MN	55439
Mary or Donald Tehven	2073	Carroll Ave	Saint Paul	MN	55104
Allie Tempelis	4925	Hanson Rd	Shoreview	MN	55126
Elaine & George Temple	2100	Juliet Ave	Saint Paul	MN	55105
Jim Temple	3407	Garfield St NE	Mpls	MN	55418
Raul & Tricia Templonuev	3328	Chippewa Rd	Minnetonk	MN	55305
Erica Tenbroek	485	Crescent Lane	Roseville	MN	55113
Cathy TenBroeke	3904	Upton Ave S	Minneapol	MN	55410
Karen Terhark	5211	33rd Ave S	Nokomis	MN	55417
Raymond Terrilly	1534	Sargent Ave	St Paul	MN	55105
Athalic Terry	18530	22nd Ave N	Plymouth	MN	55447
Theresa Terry	1946	Stanford Ave	St Paul	MN	55105
Jennifer Tesch	920	Maple Pond Ct	Shoreview	MN	55126
Stephanie Teseh	5605	Johnson Dr	Edina	MN	55436
Heather Teskey	5609	Interlachen Circl	Edina	MN	55436
Tom Tessman	5017	Yvonne Terrace	Edina	MN	55436
Paul Tethersen	3514	Grand Ave S	Minneapol	MN	55408
Alden Tetue	2284	Commonwealth	St Paul	MN	55108
Leon Tetzlaff	1545	St Clair Ave	St Paul	MN	55105
Garrett & Lynn Tews	5456	25th Ave S	Minneapol	MN	55417
Tracy Teyssier	3049	Jersey Ave	St. Louis Pa	MN	55426
Sam Thai	3518	Polk St NE	Mpls	MN	55418
Amala Thakkar	514	Mississippi River	St. Paul	MN	55116
Mitsue Thanadabout	507	W 33rd St #2	Minneapol	MN	55408
Elaine Thander	4417	Upton Ave S	Minneapol	MN	55410
Sunshine Thao	3049	Camelot Dr	Woodbury	MN	55125
Peng Thao	3508	Colfax Ave	Minneapol	MN	55409
ANDREA THARALDSON	2965	SIMPSON ST	ROSEVILLE	MN	55113
Sabina Thatcher	17500	29th Ave N	Plymouth	MN	55447
Vern Theisen	446	Woodhill Dr	Roseville	MN	55113
David Theisen	4246	19th Ave S	Minneapol	MN	55407
Al Theisen	2211	W 52nd St	Mpls	MN	55410
Anna or Chris Theisen-Ols	2623	Sylvan Rd S	Minnetonk	MN	55305
Bob Theumann	1290	Osage St	St Paul	MN	55117
Molly Thibert	3335	Holmes Ave	Minneapol	MN	55408
Brianna Thibodeau	2201	Hayes St Ne	Minneapol	MN	55418
Amy Thie	1449	Maryland Ave S	Saint Louis	MN	55426
Dan Thiede	4717	5th Ave S	Minneapol	MN	55419

Sue Thielke	5140	Woodlawn	Mpls	MN	55417
Peter Thier	428	31st Ave NE	Minneapol	MN	55413
Jean Thies	3506	Lincoln St NE	Minneapol	MN	55418
Paul Thillen	5429	2nd Ave S	Mpls	MN	55419
Steve Thoes	2623	Cleveland St NE	Minneapol	MN	55418
Tony Tholkes	121	Warwick St SE	Mpls	MN	55414
Nora & Tyler Tholl	3300	Croft Dr	St Anthony	MN	55418
Anne Thom	1355	Victoria Ave N	St Paul	MN	55117
Aaron & Bre Thom	2606	Hayes St NE	Mpls	MN	55418
Mark Thom	3600	46th Ave N	Robbinsdal	MN	55422
Paul Thomas	2489	Churchill St	Roseville	MN	55113
Kathleen Thomas	197	Wheeler St S	Saint Paul	MN	55105
Nancy A. Thomas	4264	Ottawa Ave S	St Louis Pa	MN	55416
Michael Thomas	1151	Ruggles St	Roseville	MN	55113
Bruce Thomas	418	College	Northfield	MN	55057
Ellis Thomas	406	W 76th St	Chanhasen	MN	55317
Ardou Thomas	3929	Aldrich Ave S	Minneapol	MN	55409
Kent & Sandy Thometz	3100	Holmes Ave	Minneapol	MN	55408
Ben Thompson	1163	Portland Ave	Saint Paul	MN	55104
Marilyn Thompson	4825	Girard Ave. S.	Minneapol	MN	55419
Peter Thompson	4735	Thomas Ave S	Minneapol	MN	55410
Theodore Thompson	449	Woodhill Dr	Roseville	MN	55113
Erin Thompson	4609	Lyndale Ave. S.	Minneapol	MN	55419
Josh & Heidi Thompson	2722	Parkview Blvd	Robbinsdal	MN	55422
Adam Thompson	17825	4th Ave N	Plymouth	MN	55447
Doug Thompson	805	Queensland Ln	Plymouth	MN	55447
Karen Thompson	3818	35th Ave S	Mpls	MN	55406
Melanie Thompson	948	11TH AVE NE	Rochestor	MN	55906
Randy Thompson	3907	Haven Rd	Shoreview	MN	55126
Liz Thompson	3613	Sunrise Dr	Minnetonk	MN	55345
Cindy Thompson	5316	Xerxes Ave S	Mpls	MN	55419
Brett Thompson	2030	Penn Ave S	Mpls	MN	55405
Ken Thomsen	8391	143rd St W	Apple Valle	MN	55124
Jim Thomson	4620	Roanoke Rd	Golden Val	MN	55422
Scott Thorde	4440	46th Ave s	Mpls	MN	55406
Kelly Thorp	5108	W 56th St	Edina	MN	55436
David Thorpe	5058	Drew Ave S	Minneapol	MN	55410
Jen Thorpe	4108	Park Ave S	Minneapol	MN	55419
Kathy & Mark Thorseu	2041	Valders Ave N	Golden Val	MN	55426
Todd Thorsgard	793	Lakeview	st. Paul	MN	55117
Julie & Howard Thorsheir	606	Thye Court	Northfield	MN	55057
Becky Thorvig	3112	Townview Ave	St. Anthony	MN	55418
Shelly Thrall	4431	Bloomington Ave	Minneapol	MN	55407
Jessica Thuerillger	4704	13th Ave S	Mpls	MN	55417
Paul Thuras	2757	Bryant Ave S	Minneapol	MN	55408
Daniel Thurman	2600	Xenwood Ave S	St Louis Pa	MN	55416
Jotanta Tibeler	17416	Wexford Dr	Eden Prairi	MN	55347

David Tidaback	1445	Pascal St N	Saint Paul	MN	55108
Patricia Tieman	1300	E Minnehaha Pk	Minneapol	MN	55417
Tara Tierney	2816	Princeton	St. Louis Pa	MN	55416
Sheila Tierney	2931	Buchanan St NE	Mpls	MN	55418
Margaret Tiffany	4972	W 40th St	St. Louis Pa	MN	55416
Bruce Tiffany	5300	31st Ave S	Minneapol	MN	55417
William Tillman	3727	Aldrich Ave S	Minneapol	MN	55409
Kim Tillmann	2904	Crestview Dr	St. Anthony	MN	55418
Matt Tillotson	1236	Hague Ave	Saint Paul	MN	55104
Aaron Timbo	1423	19th Ave NE	Minneapol	MN	55418
Jeffrey Timm	3923	Blaisdell Ave	Minneapol	MN	55409
Pat Timm	1420	Talisman Curve	Roseville	MN	55113
Leo Timmons	2028	Ashland Ave	Saint Paul	MN	55104
Jim & Sue Tincher	5337	France Ave S	Minneapol	MN	55410
Al Tineisen	2211	W Sla St	Minneapol	MN	55419
Toni Tinetti	2611	Taylor St NE	Minneapol	MN	55418
Debra Ting	5229	Beard Ave S	Minneapol	MN	55410
Josh Tischlens	3516	17th Ave S	Mpls	MN	55407
Thoms Tisell	1368	Victoria st N	St. Paul	MN	55117
Nicolas Tiziou	2016	Laurel Ave	Mpls	MN	55405
Bruce Todd	2385	Eagle Valley Dr	Woodbury	MN	55129
Anna Toegel	3505	Colfax Ave S	Mpls	MN	55408
Brad Toeries	6912	Minnehaha Blvd	St. Louis Pa	MN	55426
Anne Tollefsen	1011	Iowa Ave W	St Paul	MN	55117
Andrew Tolzmann	216	5th St NE	Mpls	MN	55413
Carmen Tomas	3413	27th Ave N	Robbinsdal	MN	55422
Richard Tomassoni	991	Ingerson Rd	Shoreview	MN	55126
Craig Tomeh	1217	Portland Ave	St. Paul	MN	55104
Sara Tomezyk	3040	Croft Dr	Minneapol	MN	55418
Christina Tomlinson	2820	Silver Lake Rd	st. Anthony	MN	55418
Rosemary Tomscha	4425	Beard Ave S	Mpls	MN	55410
Sue Tomsich	17040	32nd Ave N	Plymouth	MN	55447
Yaoui Toneh	4135	Halifax Ave N	Robbinsdal	MN	55422
Kimberly Tonies	4221	Brookview Ct	Eagan	MN	55123
Megan Tonkinson	4107	Pillsbury Ave	Mpls	MN	55409
Emily Topinta	1852	Stanford	St Paul	MN	55105
Bob Torgerson	4021	Colfax Ave S	Minneapol	MN	55409
Sharon Torodor	2311	Rhode Island Ave	St Louis Pa	MN	55426
Porfino Tors	9524	Chowen Ave N	Robbinsdal	MN	55422
Joyce Tosarek	4708	13th Ave	Mpls	MN	55407
Mark Totcke	1815	Sunny Slope Ln	St. Paul	MN	55116
Andrew & Jane Townsend	6920	W 26th St	Saint Louis	MN	55426
Thomas Townsend	1871	Skillman	Roseville	MN	55113
Ann Townsend	4852	Dakota Ave S	Minneapol	MN	55416
Ann Tozer	2104	Penn Ave S	Mpls	MN	55405
Liz Tracy	2518	France Ave S	St Louis Pa	MN	55416
Donna Traczyk	3565	Tyler St NE	Mpls	MN	55418

Tony Tran	3038	Harriet Ave S	Minneapol	MN	55408
Ben Trapsking	4805	Washburn Ave S	Mpls	MN	55410
Deb & Dan Traun	5704	Code Ave	Edina	MN	55436
Jake Travis	7037	Bren Ln	Eden Prairi	MN	55346
Kurt Tredal	1244	Marshall Ave	St. Paul	MN	55104
Tammi & Mark Trelstad	3712	21st Ave S	Minneapol	MN	55407
Stacie Tremen	101	Valleyview Pkwy	Minneapol	MN	55419
Ann Trench	3429	Skycroft Cir	Minneapol	MN	55418
Monica Trent	1412	Albert St	St Paul	MN	55108
Ramona Treuer	1516	W 25th St	Minneapol	MN	55405
Cheryl Trewatha	18430	Harrogate Dr	Eden Prairi	MN	55346
Mike Trewjek	2330	Drew Ave S	Minneapol	MN	55416
Chris Tripp	4010	Pillsbury Ave S	Mpls	MN	55409
Kelly Trita	5533	Dundee Rd	Edina	MN	55436
Jason Tritan	2159	Carroll Ave	St Paul	MN	55418
Robert or Nancy Tronnie	1370	Alpine Pass	Golden Val	MN	55416
Robb Tronson	3212	Hampshire Ave.	St. Louis Pa	MN	55426
Alexis Troschinetz	2400	24th Ave S	Minneapol	MN	55406
Carol Trosset	703	4th St E	Northfield	MN	55057
Bryan Trottier	5009	Yvonne Terrace	Edina	MN	55436
Judy Truc	10565	Estate Dr	Eden Prairi	MN	55347
Daniel Truong	1446	Burke Ave	Roseville	MN	55113
Chris Truscott	5537	27th Ave	Minneapol	MN	55417
Tom Trutnau	5449	Cumberland Rd	Mpls	MN	55410
Brett Tryland	3311	W 46th St	Minneapol	MN	55410
Kelvin Tryon	1458	Almond Ave	St. Paul	MN	55108
Michelle Tschida	642	Sandy Vera Dr	Chanhasse	MN	55317
Mimi Tschida	1262	Hoyt Ave W	St. Paul	MN	55108
Tenzin Tsepel	2811	Lincoln St Ne	Minneapol	MN	55418
Sarah Tshida	3646	Pillsbury	Minneapol	MN	55408
Don Tuber	2221	Pennsylvania	St Louis Pa	MN	55426
Joe Tucker	664	Maple Pond Ct	Shoreview	MN	55126
Jim Tucker	225	Arthur Ave SE	Mpls	MN	55414
Chris Tuescher	330	8th Ave. NE	Minneapol	MN	55413
Sara Tufuesson Doure	166	Bedford St SE	Mpls	MN	55414
Gary Tulien	4317	Trenton Trl	Eagan	MN	55123
Randy & Katie Tuma	271	Mt. Curve	Saint Paul	MN	55105
Linda Tuma	2547	Arthur St NE	Mpls	MN	55418
Laura Tumbino	3722	Greysolon Road	Duluth	MN	55804
Lorenzo Tunesi	4413	Ellsworth Dr	Edina	MN	55435
Dale Turnacliff	1804	Afton St	Northfield	MN	55057
Brett Turner	444	Laurel Ave	Saint Paul	MN	55102
Mike Turner	2531	Zinrane Ave S	St. Louis Pa	MN	55426
Nikoline & Tony Tushar	2704	30th Ave NE	St. Anthony	MN	55418
Jayne Tuttle	4609	Arden Ave	Edina	MN	55424
Meaghan Tuttle	2242	Stinson Pkwy	Mpls	MN	55418
Mark Tuveson	911	W 43rd St	Minneapol	MN	55409

Ertugrul Tuzcu	45	Groveland Terra	Minneapol	MN	55403
Sarah Twedt	3676	Windtree Dr	Eagan	MN	55123
Tom Twiss	123	Cambridge St	Saint Paul	MN	55105
Ritchie Two Bulls	3317	33rd Ave S	Minneapol	MN	55406
Gloria Tyirsen	7643	Stonebridge	Roseville	MN	55113
Jan & Maren Tyklo	5409	Fremont Ave S	Minneapol	MN	55419
Sean Tyre	1930	Lincoln St NE	Minneapol	MN	55418
Jan & Jay Tyson-Roberts	1724	James Ave S	Minneapol	MN	55403
Sara Udvig	207	Winona St E	Saint Paul	MN	55107
Karen Ueland	821	Lakeview Ave	St Paul	MN	55117
Kamil Ugurbil	2812	Benton Blvd	Minneapol	MN	55416
Jane uhgrud	3816	Pillsbury Ave S	Mpls	MN	55409
Tom & Debbie Uhlemann	3504	W 55th St	Edina	MN	55410
Rachel Ulfers	339	Elmwood Pl W	Mpls	MN	55419
Fran Ulrich	4553	Zenith Ave S	Minneapol	MN	55410
Jess Ulua	1486	Raymond Ave	St. Anthony	MN	55108
Erin Uncorman	4521	Garfield Ave S	Minneapol	MN	55419
Leon Unden	3226	Pierce St NE	Mpls	MN	55418
Chris Underdahl	2205	Dunedin Ave	Duluth	MN	55803
Liz Underwood	3032	Emerson Ave S	Mpls	MN	55408
James Unger	537	Lovell Ave	Roseville	MN	55113
Jean Unknown	1499	Holton St	St Paul	MN	55108
Maureen Uraritch	2922	Taylor St NE	Minneapol	MN	55418
Nicole Urbain	8985	Belvedere Dr	Eden Prairi	MN	55347
Carla Urban	114	Arthur Ave SE	Minneapol	MN	55414
Jason Urista	1941	McKinley St Ne	Minneapol	MN	55418
Trevor Urman	875	Albert St N	St. Paul	MN	55104
Pavel Ushear	4245	Scott Terr	Edina	MN	55416
Rachel Uthmann	4911	35th Ave	Minneapol	MN	55417
Nina Utne	4025	Linden Hills Blvd	Minneapol	MN	55410
Karen Utter	2307	30th Ave S	Minneapol	MN	55406
Brad Utter	3727	Glendale Terrace	Minneapol	MN	55410
Anne V	3818	Glenhurst	St. Louis Pa	MN	55416
J V	3501	Tyler St NE	Mpls	MN	55418
Pam Vadnais	1910	Birch Lake Ave	White Bear	MN	55110
Nicole Vagle	3221	Hazelwood	Minnetonk	MN	55391
David Vagneur	5225	3rd Ave S	Minneapol	MN	55419
Bob Vaillancourt	2913	Georgia Ave S	Saint Louis	MN	55426
Jeremy Vaitltob	1573	Osceola Ave	St Paul	MN	55105
Gino Valaufaul	1707	Colfax Ave S	Minneapol	MN	55403
Gretchen Valdez	4845	James Ave S	Minneapol	MN	55419
Brian Valentine	3428	Sumter Ave	St. Louis Pa	MN	55426
Amy Valentine	806	Arlington Ave	St. Paul	MN	55108
John Valentini	4455	N Hwy 169	Plymouth	MN	55442
John Valesano	4025	Washburn Ave S	Minneapol	MN	55410
Mark Vallan Court	1781	Skillman Ave	Roseville	MN	55113
Daniel A. Vallera		2509 Princeton (	St Louis pa	MN	55416

Trish Valusek	5344	York Ave S	Minneapol	MN	55410
Theo Van Blyenburgh	303	W 77th St	Chanhasse	MN	55317
Mike Van Cleve	1374	Sheldon St	Saint Paul	MN	55108
Gretchen Van Hauer	5256	York Ave. S.	Minneapol	MN	55410
Joe & Gerarda Van Kirk	5308	Oaklawn Aver	Edina	MN	55424
Judy Van Osdel	6444	Wilryan Ave	Edina	MN	55439
Mary Van Pilsum	2930	Quentin Ave S	Saint Louis	MN	55416
Gerald VanAmaong	2533	Washburn Ave S	Mpls	MN	55410
Melissa VanBergsen	2632	Aldrich Ave s	Minneapol	MN	55408
Dalton & Jennifer VanBu	2858	Garfield St. NE	Minneapol	MN	55418
Jerry Vancleave	4801	Clinton Ave	Minneapol	MN	55419
MK VanDeLide	524	Heinel Dr	Roseville	MN	55113
Dale Vandenhouten	145	Rustic Lodge Ave	Mpls	MN	55419
Danielle Vanderhoef	1616	E. Minnehaha Pk	Mpls	MN	55407
Ryan VanDerMoie	8592	chanhassen Hills	Chanhasse	MN	55317
Wendell Vandersluis	2588	Upton Ave S	Mpls	MN	55406
Lisa Vandersteur	3200	46th Ave N	Robbinsdal	MN	55422
Steven Vandevere	13001	Fairfield Rd W	Minnetonk	MN	55305
Youa Vang	6412	Humboldt Ave	Plymouth	MN	55447
Bill Vang	4019	Beard Ave N	Robbinsdal	MN	55422
Melissa VanMuyden	5240	32nd Ave S	Nokomis	MN	55417
Jessica Vannasy	4705	Colfax Ave S	Mpls	MN	55419
Robert VanNelson	1215	W 31st St	Minneapol	MN	55408
Karen Vanney	401	Mt. Curve Blvd	Saint Paul	MN	55105
Beth VanOrsow	620	Queensland Ln N	Plymouth	MN	55447
Terri VanSloun	2615	Idaho Ave S	St. Louis Pa	MN	55426
Mike Vant	495	Mackubin Cir	Shoreview	MN	55126
Dawn VanTassel	2748	Xenwood Ave	St. Louis Pa	MN	55416
Brian Varland	18636	Chennault Way	Eden Prairi	MN	55346
Rebecca Varone	661	Bighorn	Chanhasse	MN	55317
Megan Vasatka	3210	Arthur St	Minneapol	MN	55418
Tom Vasiceka	1712	Humboldt Ave S	Mpls	MN	55403
Kivil Vassilieu	3645	Pillsbury Ave S	Mpls	MN	55408
Carol L. Vaubel	4321	York Ave S	Minneapol	MN	55410
Jennifer Vaubel	1139	Charles Ave	St. Paul	MN	55104
Richard Vaugh	2145	Queensland Ln N	Plymouth	MN	55447
Jim Vaughan	1436	Flag Ave	St. Louis Pa	MN	55426
Jon Vaughn	6720	W 24th St	St. Louis Pa	MN	55426
Andrew Vavoulis	3412	Fremont Ave	Minneapol	MN	55409
Bob & Elizabeth Vavra	741	Terrace Dr	Roseville	MN	55113
Jeffrey Veatch	10519	W. Riverview Dr	Eden Prairi	MN	55347
Rodrigo Vega	4113	10th Ave S	Mpls	MN	55407
Daniele Veknetti	1065	Churchill St	St. Paul	MN	55103
Toni Veldey	2544	33rd Ave S	Minneapol	MN	55406
Kathleen Vellenger	2224	Goodrich Ave	St Paul	MN	55105
Lia Venchi	34	Wheeler St N	St. Paul	MN	55104
Shannon Vento	2140	Wisconsin Ave N	Golden Val	MN	55426

Hans Verbeten	2818	Western Ave N	Roseville	MN	55113
Sam Verdja	1626	Fernwood St	St. Paul	MN	55108
Pete Verkuilen	7303	Green Ridge	Eden Prairi	MN	55346
James & Jane Vernon	2536	Seabury	Mpls	MN	55406
Clemence Veronnean	3144	Grand Ave	Minneapol	MN	55408
Jodi Versaw	4411	34th Ave S	Mpls	MN	55406
Margene Vessel	1541	Albert St N	Saint Paul	MN	55108
Tom Vetscher	3800	48th Ave S	Minneapol	MN	55406
Tony Vezina	2048	Utah Ave S	St. Louis Pa	MN	55426
Tim Vicchiolle	583	Summerfield Dr	Chanhasse	MN	55317
Silvester Vicic	1693	Portland Ave	Saint Paul	MN	55104
Tom Vick	4612	Colfax Ave S	Minneapol	MN	55419
Tom Victor	5345	27th Ave S	Minneapol	MN	55417
Mike Vidmar	1868	Sargent Ave	St Paul'	MN	55105
Alicia Viera	5096	Merimac Lane	Minneapol	MN	55426
John Vierow	1843	Iglehart Ave	St. Paul	MN	55104
Warren Vigue	4301	11th Ave	Mpls	MN	55407
Peter Villalta	4016	Aldrich Ave S	Minneapol	MN	55409
Joni Vincent	3956	Abbot Ave N	Robbinsdal	MN	55422
Chip Vindeke	1917	W Franklin Ave	Minneapol	MN	55403
Steve Vinge	1536	Scheffer Ave	Saint Paul	MN	55116
Mark Vinge	4225	Marlborough Ct	Minnetonk	MN	55345
Emily Virant	959	Nevada Ave W	St Paul	MN	55117
Peter Vircks	3921	20th Ave S	Minneapol	MN	55407
Brandi Virgin	6310	Cyprus Drive	Excelsior	MN	55331
Karen Viskochil	3715	Thomas Ave S	Minneapol	MN	55410
Beth Vitek	1370	Fairmount Ave	Saint Paul	MN	55105
Mark and Christine Vitelli	2723	Benjamin St NE	Minneapol	MN	55418
John Vlatkovich	5321	Oliver Ave S	Minneapol	MN	55419
Sara Vogel	3312	Churchill Dr	Woodbury	MN	55125
Thomas Vogel	3200	33rdd Ave NE	St. Anthony	MN	55418
Sam Vogel	3625	Not legible	Mpls	MN	55410
Annmarie Vogelgeshy	4000	Bassett Creek Dr	Golden Val	MN	55422
Liz & Matt Vogt	3045	Emerson Ave S	Mpls	MN	55408
Angie & Tom Volding	457	Newton Ave S	Minneapol	MN	55405
Jeremy Volenez	4019	Pleasant Ave	Mpls	MN	55409
Julie Vollenweider	3226	Hayes St NE	Minneapol	MN	55418
Brian Volz	3207	Garfield Ave	Minneapol	MN	55408
Dan Von	31	Sandy Hook Rd	Chanhasse	MN	55317
Tom Von Fischer	4155	Blaisdell Ave S	Mpls	MN	55409
Ellen Vondrashek	1670	Skillman Ave W	Roseville	MN	55113
Jennifer Voorhees	3841	Orchard Ave N	Robbinsdal	MN	55422
Jason Vorbeck	3006	Benjamin St NE	Minneapol	MN	55418
Dave Vos	4528	Drew Ave N	Robbinsdal	MN	55422
Lori Vosejpka	516	Prairie St	Northfield	MN	55057
Jon Voss	1532	Simpson St	Saint Paul	MN	55108
David Voss	6443	Thompson PArk	Cottage Gr	MN	55016

Andrea Voss	3417	31st Ave NE	Minneapol	MN	55418
Steven Voss	1024	Hill Ct	Shoreview	MN	55126
Sharon Votel	1622	Juliet Ave	St. Paul	MN	55105
Helen Voytos	1283	Shoreview Dr	Shoreview	MN	55126
J Vuenuso	5151	17th Ave S	Mpls	MN	55417
Chris W	5420	25th Ave	Mpls	MN	55417
John W	3217	Irving Ave	Mpls	MN	55408
Joe W	977	Santa Vera Dr.	Chanhassei	MN	55317
Lile W	5401	Oliver St	Mpls	MN	55410
Karen Waberg	3409	36th Ave NE	Mpls	MN	55418
Brian Wachtler	3205	W Owasso Blvd	Shoreview	MN	55126
Brian Wachutka	3323	Benjamin St NE	Minneapol	MN	55418
Geneveve Wachutka	2243	Benjamin St NE	Minneapol	MN	55418
John Wackman	1779	Goodrich Ave	St Paul	MN	55105
Aaron Wad	4347	Harriet Ave	Minneapol	MN	55409
Cheryl Wademeyer	1215	W Minnehaha Pl	Mpls	MN	55419
Shannon or Bruce Wadm	4037	Colfax Ave S	Minneapol	MN	55409
Jim Wadsworth	4638	16th Ave S	Mpls	MN	55407
Julie Wagner	4328	Lexington Pt Pkw	Eagan	MN	55123
Hilma and Donna Wagne	120	W 35th Street	Minneapol	MN	55408
Laura Wagner	5537	26th Ave S	Mpls	MN	55417
Mary Wagner	2108	Niles Ave	St. Paul	MN	55116
Diana Wagner	530	Mackubin Cir	Shoreview	MN	55126
Pete Wagner	1100	W 53rd St	Mpls	MN	55419
Allison Wagner	3200	Buchanan St NE	Minneapol	MN	55418
Peter Wahl	4652	Lyndale Ave S	Mpls	MN	55419
Tim Wahl	2225	Draper Ave	Roseville	MN	55113
Eric Waino	822	Baylis St. #209	Duluth	MN	55811
Kate Wakal	335	Wilder St	St Paul	MN	55104
Patricia Wakkinen	10535	34th Ave N	Plymouth	MN	55441
Sharon Walboa	3806	Glenhurst Ave. S	St. Louis Pa	MN	55416
Nancy Walczak	3215	Xanthus Ln N	Plymouth	MN	55447
Tim Waldeck	4500	Fremont Ave	Minneapol	MN	55410
Zora Waldeck	4832	Vincent Ave S	Minneapol	MN	55410
Olivia Walden	3641	Pleasant Ave	Mpls	MN	55409
Kevin Waldo	3438	Tyler St NE	Minneapol	MN	55418
Jennifer Waldron	7020	Dakota Cir	Chanhassei	MN	55317
Charlie Waldron	7020	Dakota Circle	Chanhassei	MN	55317
John Walker	4001	Auburn Dr	Minnetonk	MN	55305
Steven Walker	5229	Woodlawn Blvd	Minneapol	MN	55417
Dan Walker	2333	Texas Ave S	Minneapol	MN	55426
Alex & Sarah Walker	2214	Roosevelt St NE	Minneapol	MN	55418
Sharon Walker	3419	Maplewood Dr	St. Anthony	MN	55418
Scott Walker	7660	S. Shore Dr	Chanhassei	MN	55317
Lee Wallace	4234	Garfield Ave	Mpls	MN	55409
Kathy Wallenta	3653	34th Ave S	Minneapol	MN	55406
Maggie Wallenta	1143	Skillman Ave W	Roseville	MN	55113

Mark Waller	4319	Harriet Ave	Mpls	MN	55409
Pat & Paul Wallerich	2820	Huntington Ave.	St. Louis Pa	MN	55416
Ken Wallin	2848	Utica Ave S	St. Louis Pa	MN	55416
Nicole and Sam Walling	83	Cambridge St	Saint Paul	MN	55105
Jay T. Walljasper	4053	Garfield Ave	Minneapol	MN	55409
Mark Walorski	255	Robie St W	Saint Paul	MN	55107
Stephanie Walseth	1146	Marshall Ave	St Paul	MN	55104
Jody Walsh	4821	E 38th St	Minneapol	MN	55406
Thomas Walsh	4009	Xerxes Ave S	Minneapol	MN	55410
Larry & Ginny Walsh	1210	Bluestem Court	Northfield	MN	55057
Megh Walsh	1150	Iowa Ave W	Saint Paul	MN	55108
Stephen Walsh	1198	Charles	St. Paul	MN	55104
Andrea Walsh	4180	Yosemite Ave	St Louis Pa	MN	55416
Annie Walsh	98	Malcolm Ave SE	Mpls	MN	55414
Matt Walsh	5112	30th Ave S	Mpls	MN	55417
Mark Walstrom			Mpls	MN	55418
Dave Walter	5024	Bruce Ave	Edina	MN	55424
Anne Walters	2900	Urbandale Ln N	Plymouth	MN	55447
Brad Walters	5052	Upton Ave	Minneapol	MN	55410
Meg Walters	2116	W Loti Pkwy	Minneapol	MN	55403
Heather Walton	3649	Grand Ave S	Minneapol	MN	55409
Matt Walvatne	3526	Garfield Ave	Minneapol	MN	55408
Bruce Wambheim	413	Oak Street	Northfield	MN	55057
Chiung Wang	967	Lydia Dr W	Roseville	MN	55112
Teresa & Tim Wang	3021	Crestview Dr	Mpls	MN	55418
Joseph Wangerin	3408	23rd Ave S	Minneapol	MN	55407
Dan Wankum	4944	Penn Ave S, #2	Mpls	MN	55410
Brian Ward	5121	Bryant Ave S	Minneapol	MN	55419
Nancy Ward	3532	Holmes Ave	Minneapol	MN	55408
Zane Ward	433	Cedar Lake Rd.	Mpls	MN	55405
Heather Ward	819	Albert St W	St. Paul	MN	55104
Chris Ward	4848	Lake Nokomis	Mpls	MN	55410
Jody Ward-Rannow	10296	Franlo Rd	Eden Prairi	MN	55347
Erik Wardenaar	708	St Olaf Ave	Northfield	MN	55057
Susan Warhman	1423	Albany Ave	St Paul	MN	55108
Wade Warner	4734	3rd Ave S	Minneapol	MN	55417
Cecilia Warner	459	Centennial Dr	Roseville	MN	55113
Elizabeth Warner	4855	Grenwich Way N	Oakdale	MN	55128
Phyllis Warner	3562	Stinson Blvd NE	Mpls	MN	55418
Cassie Warner	558	Moncalm Pl	St Paul	MN	55116
Scott Warner	2413	Prenner Ct	Roseville	MN	55113
Danette Warner	45	7 th Ave	Minneapol	MN	55413
Rick Warren	18620	Jaques Ct	Eden Prairi	MN	55436
Jan Warthar	4620	Vallacher Ave	St. Louis Pa	MN	55416
Vicki Warzenski	4401	33rd Ave S	Mpls	MN	55406
Carol Washington	5143	Aldrich Ave S	Minneapol	MN	55419
Barb Wasmoen	3554	Beard Ave N	Robbinsdal	MN	55422

Brad Watarai	1455	Holton St	Minneapol	MN	55108
Thom Waters	2927	Tyler St NE	Minneapol	MN	55418
Trent Wato	3166	Dean Ct	Mpls	MN	55403
Marion Watson	2140	Hoyt Ave W	Saint Paul	MN	55108
Jean Watson	2216	30th Ave S	Minneapol	MN	55406
Gabe Watson	2518	Ulysses St NE	Mpls	MN	55418
K Watson	473	Newton Ave S	Mpls	MN	55405
Christopher Watson	5317	Xerxes Ave S	Mpls	MN	55410
Toni & Gavin Watt	2731	Ulysses St NE	Minneapol	MN	55418
Charles Watt	1531	OSCEOLA AVE	SAINT PAU	MN	55105
David Wattman	3	Barton Ave SE	Minneapol	MN	55414
Lawrence Watts	2665	Larch Ln N	Plymouth	MN	55441
Annette Watz	3424	Fairlawn Dr	Minnetonk	MN	55345
Lawrence Wauka	3425	E 50th St Apt 10	Mpls	MN	55406
Denise Wax	2924	Benjamin St NE	Minneapol	MN	55418
Ron Way	5708	Lois Ln.	Edina	MN	55439
Tim Waytey	14610	38th Ave N	Plymouth	MN	55446
Olive Weatherma	2613	29th Ave NE	St. Anthony	MN	55418
Corey Weaver	980	Butte Ct	Chanhassen	MN	55317
Virginia WEBB	5525	WOODLAWN BL	NOKOMIS	MN	55417
Jeffrey Webber	4609	Abbott Ave S	Minneapol	MN	55410
Chris Weber	4525	York Ave S	Minneapol	MN	55410
Linda Weber	3534	Glen Oaks Ave	White Bear	MN	55110
Suze Weber	3880	Walnut Grove Lr	Plymouth	MN	55446
Joshua Weber	4843	Nottingham Pl	Shoreview	MN	55126
Ryan Webert	2636	Hayes St NE	Minneapol	MN	55418
Ann Webster	444	Sheridan Ave S	Minneapol	MN	55405
Paula Webster	626	Montcalm Pl	Saint Paul	MN	55116
Yvette Webster	4502	Beard Ave S	Mpls	MN	55410
Jennifer Wedel	1149	Josephine	Roseville	MN	55113
Karen Weeks	1532	E River Ter	Minneapol	MN	55414
Joe & Clair Weepie	3725	48th Ave S	Minneapol	MN	55406
Joel Wegener	2305	29th Ave S	Minneapol	MN	55406
Brita Wegener	3165	Victoria St	Shoreview	MN	55126
Silas Wegerson	4202	Washburn Ave	Minneapol	MN	55410
Amanda Wegler	6691	Deerwood Dr	Chanhassen	MN	55317
Donna Wegley	2225	Vale Crest Rd	Golden Val	MN	55422
Peter Wegner	1926	Hayes St NE	Minneapol	MN	55418
Ryan Wehrs	2701	Georgia Ave S	St. Louis Pa	MN	55426
Julie Weibb	426	W Horseshoe Dr	Shoreview	MN	55126
Steve Weigel	3900	Yellowstone Ln N	Plymouth	MN	55447
Allison Weiland	142	10th Ave Ne	Minneapol	MN	55413
Sara Weiler	3912	14th Ave S	Mpls	MN	55407
Rebecca Weinbeck	6604	Cedar Lake Road	Saint Louis	MN	55426
Gittel Weing	2629	Lynn Ave S	St Louis Pa	MN	55416
Sara Weingartner	4516	Aldrich Ave S	Minneapol	MN	55419
Mike Weisbrod	1565	Laurel Ave	St Paul	MN	55104

Elizabeth Weiser	12960	Rutledge Cir	Hopkins	MN	55305
Tom Wegner Weisman	2530	37th Ave S	Minneapol	MN	55406
Barbara Weissberger	3910	Upton Ave. S.	Wedge	MN	55410
Tamar Weisserhorn	110	Melbourne Ave	Mpls	MN	55414
Steve Weixel	2348	Texas Ave S	St. Louis Pa	MN	55426
Matthew & Michelle Wel	923	W Minnehaha Pl	Minneapol	MN	55419
Winifred Weld	1426	Hewitt Ave	Saint Paul	MN	55104
Susan Weldman	2817	Brookwood Ter	Mpls	MN	55419
Doris Welke	46	Fareway Dr	Northfield	MN	55057
Rachel Weller-Roska	4020	E Wing Ave S	Minneapol	MN	55410
James Wellman	3621	Blaisdell Ave	Minneapol	MN	55409
Colin Wells	4008	Kipling Ave	Edina	MN	55416
Katie Welsch	2941	Cavell Ave S	St. Louis Pa	MN	55426
Jenna Welter	1159	Gibbs Ave	St. Anthony	MN	55108
Alison Welwood	1767	Humboldt Ave S	Minneapol	MN	55403
Amy Wendland	1136	Hague Ave	St. Paul	MN	55104
Scott Wendt	7445	Chippewa	Chanhassen	MN	55317
Ed Wengartner	4042	Yosemite Ave S	St Louis Pa	MN	55416
Shaun Wenisch	200	E 10th St Unit 40	St Paul	MN	55104
Mark Wenninger	1307	Seminary Ave	St Paul	MN	55104
Curt Wenzel	1764	Ashland Ave	St Paul	MN	55104
Chris Werle	4717	Ewing Ave S	Minneapol	MN	55410
Teresa or Harry Werneck	475	Centennial Dr	Roseville	MN	55113
Randy Werner	3328	W 56th St	Edina	MN	55410
Christine Werner	2744	Blackstone Ave S	St. Louis Pa	MN	55413
Nancy Werner	1439	Minnehaha Ave	St Paul	MN	55104
Autumn Werner	3258	Indiana Ave N	Robbinsdal	MN	55422
Mark Wernick	3527	Cedar Lake Ave	Minneapol	MN	55416
Helen Werronen	1621	Hillview	Shoreview	MN	55126
Kristin Wertz	1798	Jefferson Ave	Saint Paul	MN	55105
Steve Wesch	990	Fairmount Ave	St. Paul	MN	55105
Wally Wescott	3013	Hill	St. Paul	MN	55105
Christine Wesely	5316	York Ave S	Minneapol	MN	55410
Jeff Wesselman	5624	W 66th St	Edina	MN	55439
Genevieve West	2016	Grand Ave S #20	Minneapol	MN	55410
Laurence West	2419	Cromwell Dr	Minneapol	MN	55410
Ashley West	2230	Arthur St NE	Mpls	MN	55418
Rebekah West	1940	Wisconsin Ave N	Golden Val	MN	55426
Tina Westard	1237	Dayton	St Paul	MN	55104
Richard and Sandra West	2901	E 24th St	Minneapol	MN	55406
Sara Westdal	1702	Lincoln St NE	Minneapol	MN	55418
Matt Westerlund	1636	Texas Ave	St. Louis Pa	MN	55420
Jeanne Westerlund	18911	Broadmoore Dr	Eden Prairi	MN	55346
Amy Westermeyer	2820	Norwood Ln	Plymouth	MN	55441
Sandy Western	8707	Westmoreland L	St. Louis Pa	MN	55426
Deanne Westlund	3705	Cottonwood Ln	Plymouth	MN	55441
Abbie Westra	2801	Cleveland St Ne	Minneapol	MN	55418

Joshua Wetjen	4046	Pillsbury Ave	Minneapol	MN	55409
Magon Weyers	869	Nebraska Ave W	St. Paul	MN	55117
Monica Weyill	1400	E Como Blvd	St. Paul	MN	55117
Nora Whalen	2313	E 22nd St	Minneapol	MN	55406
Billy Whalen	5115	17th Ave S	Minneapol	MN	55417
Kim Whalen	4709	Virgina Ln	Edina	MN	55424
Eric Wharton	1388	Portland Ave	Saint Paul	MN	55104
Anne Wharton	530	Grand Hill	Saint Paul	MN	55102
Vince Wharton	530	Grand Hill	St. Paul	MN	55102
Heather Whatley	1392	Grotto St N	Saint Paul	MN	55117
Kim Wheber	14235	Coronet Dr	Minnetonk	MN	55345
Penny Wheeler	3503	Cedar Lake Ave	Minneapol	MN	55416
Robert Wheeler	400	Natchez Ave	Golden Val	MN	55416
Alex Wheeler	3726	Joppa Ave S	St Louis Pa	MN	55416
Bethany Wheeler	3921	Pillsbury Ave S	Minneapol	MN	55409
Lynne Whitacre	420	Vinewood Ln N	Plymouth	MN	55441
Mary & James White	825	Summit Pl #150	Minneapol	MN	55403
Duane White	707	Kenwood Pkwy	Minneapol	MN	55403
Elisobeth White	4118	Randall Ave	St. Louis Pa	MN	55416
Matthew White	3912	43rd Ave S	Mpls	MN	55406
Cindy White	2416	W 24th St	Mpls	MN	55405
Carol White	1074	Cedar View Dr	Mpls	MN	55405
Lauren White	2114	24th Ave S	Mpls	MN	55404
Terry & Hope White	4945	Clinton Ave	Mpls	MN	55419
Elizabeth White	1455	Pascal St N	Minneapol	MN	55108
Phred White	3433	St Louis Ave	Minneapol	MN	55416
Nora Whiteman	3500	W 29th St	Minneapol	MN	55416
Zach Whitney	7360	W 14th St	St. Louis Pa	MN	55426
Susan Whitney-Brown	4508	Drew Ave S	Mpls	MN	55410
Vincent Whitted	716	Minnehaha Pkw	Mpls	MN	55417
Robert whoknows?	3509	Fremont Ave S	Mpls	MN	55405
Bob Wichmann	5307	1st Ave S	Minneapol	MN	55419
Colleen Wickberg	4344	Brook Lane	St Louis Pa	MN	55416
Jamie Wickens	2508	St. Anthony Blvd	St. Anthony	MN	55418
Madi Wickham	2107	Lowry Ave	Minneapol	MN	55418
Heather Widell	2965	Mitten Ct	Roseville	MN	55113
A. Wiechma	3120	F Minnehaha	Minneapol	MN	55406
Barbara Wiegand	5328	15th Ave S	Minneapol	MN	55417
Elizabeth Wienke	4785	Kent St	Shoreview	MN	55126
Franklin Wierzbickli	4600	Chowen Ave S	Mpls	MN	55410
Brent Wiessner	1408	Nevada Ave S	St. Louis Pa	MN	55426
Janet Wievocla	2750	Yosemite Ave S	St Louis Pa	MN	55416
Kris Wiinikainen	4749	Beard Ave S	Minneapol	MN	55410
Jan Wikman	4207	Upton Ave S	Minneapol	MN	55410
Jim Wilbershide	5110	Emerson Ave S	Minneapol	MN	55419
Paul Wilbery	1428	Frankson	St Paul	MN	55108
Bonnie Wildley	3133	Birch Place	Minnetonk	MN	55305

Kai Wilhelm	510	W 32nd St	Mpls	MN	55408
John Wilhelms	5210	Belmont Ave S	Minneapol	MN	55419
Cassie Wilke	3547	Humboldt Ave	Minneapol	MN	55408
Diane Wilkins	10827	Mt Curve Rd	Eden Prairi	MN	55347
Chris Wilkins	5740	16th Ave S	Mpls	MN	55419
Todd Wilkinson	4334	Pillsbury Ave S	Minneapol	MN	55409
Lisa & Tom Wilkolak	2231	Scheffer Ave	Saint Paul	MN	55116
Sue Will	3405	Glenhurst Ave	St. Louis Pa	MN	55416
Don Willeke	2774	Dean Pkwy	Mpls	MN	55408
Barbara Willenbring	2211	23rd Ave S	Minneapol	MN	55404
Barbara Willett	586	Heinel Dr	Roseville	MN	55113
Andy & Amy Willette	2541	Rhode Island Ave	Saint Louis	MN	55426
Mark Williams		PO BOX 268	Excelsior	MN	55331
Sheri Williams	3824	Beard Ave S	Minneapol	MN	55410
Dave Williams	891	Parkview Ave	St.Paul	MN	55117
Judi Williams	570	Bighorn Drive	Chanhassei	MN	55317
Clay & Karen Williams	2168	Hoyt Ave W	Falcon Heig	MN	55108
Michael Williams	5533	26th Ave S	Mpls	MN	55417
Lulie Williams	3308	Huntington Ave	St Louis Pa	MN	55416
Larry Williams	3516	Dupont Ave S	Mpls	MN	55408
Melissa Williams	4605	Zenith Ave S	Minneapol	MN	55410
Rachal Williams	2326	Cleveland St	Minneapol	MN	55418
David Williamschen	3908	Sheridan Ave S	Minneapol	MN	55410
Nick Williamson	1863	Oxford St N	Roseville	MN	55113
Kari Willielm	5152	29th Ave S	Mpls	MN	55417
Christi Williford	2602	Cromwell Ct	Minneapol	MN	55410
Jeffey Willing	5201	27th Ave S	Minneapol	MN	55417
Rick Willington	2100	Dwight Ln	Minnetonk	MN	55305
Danielle Williquett	7060	Boyd Ave	Eden Prairi	MN	55436
Peg Willis	1030	Topping St	Saint Paul	MN	55103
Marcia Williston	2243	Buchanan St NE	Minneapol	MN	55418
Jon and Jane Willman	9912	Kell Ave S	Bloomingto	MN	55437
Mac Wilm-Knapp	1522	Minnehaha	St Paul	MN	55104
Carrie Wilmot	4880	Nottingham Pl	Shoreview	MN	55126
Heather & Dave Wilsey	2924	natchez Ave	St. Louis Pa	MN	55416
Jim Wilson	4201	Cedar Lake Rd S	St Louis Pa	MN	55416
Kurt Wilson	2201	Saint Anthony Pl	Minneapol	MN	55418
Carol Wilson	3122	Dean Ct	Minneapol	MN	55416
Bob & Sara-Jane Wilson	5156	Vincent Ave S	Minneapol	MN	55410
Ann and Kent Wilson	656	Montcalm Pl	Saint Paul	MN	55116
Larry Wilson	2109	Princeton Ave	Saint Paul	MN	55105
Mary Wilson	16281	Hudson Ave	Apple Valle	MN	55044
Rebekah Wilson	1952	Orchard Dr	Woodbury	MN	55125
Levi & Rebecca Wilson	4444	18th Ave S	Mpls	MN	55407
Bill Wilson	3209	Bell Ln	St. Anthony	MN	55418
Curtis Wilson	1915	Sharon Ave SE	Mpls	MN	55414
Alexa Wilson	1400	18th Ave NE	Minneapol	MN	55418

Mike Wilson	4932	Stevens Ave	Minneapol	MN	55419
Carol Wimsatt	16551	Grays Bay Blvd	Wayzata	MN	55391
Craig Windherst	3617	16th Ave S	Mpls	MN	55407
Gretchen Windschitl	6801	Russell Ave S	Richfield	MN	55423
Janer Windsor	1038	Tiller Ln	Shoreview	MN	55126
Michael (Mike) Winer	4617	Xerxes Ave S	Minneapol	MN	55410
R Wink	3481	Shore Dr	Chanhassei	MN	55317
Patricia Winkels	1674	Berkeley Ave	Saint Paul	MN	55105
Robert Winkler	4924	Colorado Street	Duluth	MN	55804
Hilary Winkworth	3039	Lincoln St NE	Minneapol	MN	55418
Cameron Winter	3416	Skycorft Circle	Minneapol	MN	55418
Clara Winters	1001	Butte Court	Chanhassei	MN	55317
Allison Winters	6810	Eliot View Rd	St. Louis Pa	MN	55426
Heather Winters	4007	Abbott Ave	Mpls	MN	55410
Robert Winters	1872	Princeton Ave	St Paul	MN	55105
Jan Winters	4007	Abbot Ave S	Minneapol	MN	55410
Sue Winterstein	3628	Fairlawn Dr	Minnetonk	MN	55391
Darcy Wintir	2322	W 53rd St	Minneapol	MN	55410
Donna Wirth	1347	Van Buren Ave	Saint Paul	MN	55104
Joe Wirth	13124	April Lane	Minnetonk	MN	55345
Emily Wirth	4253	Ewing Ave N	Robbinsdal	MN	55422
Beth Wischman	3524	Basswood Rd	Mpls	MN	55416
Matt Wise	3225	Humboldt Ave S	Mpls	MN	55408
Jen Wiseman	2155	Juliet Ave	St Paul	MN	55105
Edith Wisiol	115	Ardmode	Golden Val	MN	55426
Peggy Wittenberg	14076	Sundial Ct	Eden Prairi	MN	55346
Sharon Wittorf	4617	Vallacher Ave	St. Louis Pa	MN	55416
Teri Witzary	8768	Pheasant Run Rc	Woodbury	MN	55125
Charlie Wivinas	4304	Lake Drive	Robbinsdal	MN	55422
Bruce Wizik	2914	Cleveland St NE	Minneapol	MN	55418
Dawn Wob	1289	Hubbard Ave	St Paul	MN	55104
Marian Wocher	3458	Richmond Ave	Shoreview	MN	55126
Bruce Wodmen	4231	Colfax Ave S	Minneapol	MN	55409
Tim Woessner	3362	Benjamin St NE	Mpls	MN	55418
Jim Wohlford	4519	Edina Blvd	Edina	MN	55424
Ernie and Sharon Woizes	812	Pleasant Ave N	Champlin	MN	55316
James Wolf	8585	Chan Hills Dr.	Chanhssen	MN	55317
Ian Wolfe	4317	12th AVe S	Minneapol	MN	55407
Steve Wolfe	3328	Aldrich Ave S	Minneapol	MN	55408
Kaitlin Wolfe	8518	Virginia Cir S	St Louis Pa	MN	55426
Dorothy Wolff	1311	Fair St	Mankato	MN	56001
Mike Wollan	3770	46th Ave S	Minneapol	MN	55406
Megan Wolle	1931	St. Anthony Pkw	Mpls	MN	55418
Erin Wolloln	5332	Elliot Ave S	Minneapol	MN	55417
Craig Wolqey	4038	Raleigh	St louis Par	MN	55426
Kristen Womack	2706	Hayes St NE	Mpls	MN	55418
Henry Wong	160	Cascade Ct	Chanhassei	MN	55317

Mary Wood	910	Cannon Valley D	Northfield	MN	55057
Vanessa Wood	116	E 49th St	Mpls	MN	55410
Teresa Wood	13114	Gamma Way	Apple Valle	MN	55124
Darlene Wood	18430	33rd Ave N	Plymouth	MN	55447
Allison Woodbury	5328	Stevens Ave	Mpls	MN	55419
Mary Woodford	3156	Dakota Ave S	St. Louis Pa	MN	55413
Justin Woodington	2437	1st Ave S	Mpls	MN	55408
James Woodley	3641	Harriet Ave S	Mpls	MN	55409
Nick Woods	1550	Pennsylvania Av	Golden Val	MN	55427
Megan Woods	509	Chanview	Chanhassei	MN	55317
Matthew Woodward	13615	Wentworth	Hopkins	MN	55305
Rob Woodworth	234	Sunnyridge Ln	Golden Val	MN	55429
Joanna Woolman	3932	Thomas Ave S	Mpls	MN	55410
Ghittann & William Worc	1911	Lincoln St NE	Minneapol	MN	55418
Jess Wornson	1282	Englewood Ave	St Paul	MN	55104
Michelle Woster	2250	Stinson Pkwy	Minneapol	MN	55418
Casey Woster	2047	Bayard Ave	St Paul	MN	55116
LINDA WOYTASEK	5520	24TH AVE S	NOKOMIS	MN	55417
Karyn Wrenshall	1201	Lincoln Ave	Saint Paul	MN	55105
Sandy Wright	16205	4th Ave N	Plymouth	MN	55447
Gary Wright	2129	Hoyt Ave W	St. Anthony	MN	55108
Melissa Wright	4326	Garfield Ave	Minneapol	MN	55409
Andrea Wrobbel	3050	Garfield St NE	Minneapol	MN	55418
Kat Wrzos	1426	Ashland Ave	St Paul	MN	55104
Dave Wuessner	1	golden valley	Golden Val	MN	55427
Peter Wuest			Minneapol	MN	55419
Susan Wunderlich	423	Thomas Ave S	Minneapol	MN	55405
Erich Wunderlich	513	5th Ave SE	Minneapol	MN	55414
Heather Wuori	1774	Oakwood Dr	Shoreview	MN	55126
Vonda Wurzburger	5413	3rd Ave S	Mpls	MN	55419
B Wutss	2611	Kyle Ave N	Golden Val	MN	55422
Dee Wyatt	4270	Wooddale Ave	St Louis Pa	MN	55416
Nancy Wylie	5104	26th Ave S	Mpls	MN	55417
Karen xandernean	1465	Knoll Dr	Shoreview	MN	55126
Stephanie & George Xenc	1311	Hubbard Ave	St. Paul	MN	55104
Linda Xiong	957	36th Ave NE	Minneapol	MN	55418
Mai See Xiong	1747	Oakwood Dr	Shoreview	MN	55126
Yer Xiong	4335	Galtier Street	Shoreview	MN	55126
Matt Yackle	1250	Dayton Ave	St Paul	MN	55104
Omar Yamoor	4023	Kipling Ave	Edina	MN	55416
Sue Yang	1415	Brenner Ave	Roseville	MN	55113
Kevin Yang	2197	Eleanor Ave	St Paul	MN	55116
Thong Yang	1426	Talisman Curve	Roseville	MN	55113
David Yanko	142	W 49th St	Minneapol	MN	55419
Levi Yankosky	3647	Bloomington Av	Mpls	MN	55407
Will Yazdom	2284	Windsor Ln	Woodbury	MN	55125
Bo Ye	5663	ChatsworthSt N	Shoreview	MN	55126

Retta Yeslinh	5104	Bedford Ave	Edina	MN	55436
Howard Yesnes	12921	Woodbridge Trl	Hopkins	MN	55305
Elyssa Yesnes	808	W 42nd St	Minneapol	MN	55409
Ann & Steve R. Yetter	1499	Hythe St	Saint Paul	MN	55108
Heidi Ylviaskse	748	N 3rd St	St. Paul	MN	55401
Cynthia Yokiel	11809	Bradford Rd	Hopkins	MN	55343
Hiromi Yokoi	5220	30th Ave S	Mpls	MN	55417
Jennifer Yoos	4416	Edmund Blvd	Minneapol	MN	55406
Tyler York	1831	Hayes St NE	Mpls	MN	55418
Pam York	1488	Al;bert St N	Minneapol	MN	55108
Sarina Yospin	3504	15th Ave S	Mpls	MN	55407
Kristina You So Coung	1682	St Clair	St Paul	MN	55105
Dahabo Youb	2700	Colorado Ave. S.	St. Louis Pa	MN	55416
Emily Youke	5105	Wooddale Ave	Edina	MN	55424
Ingrid Youmans	7890	Newberry Court	Stillwater	MN	55082
Lynne & James Young	101	Plum St South	Northfield	MN	55057
Joyce Young	3512	Edmund Blvd	Minneapol	MN	55406
Teresa Young	3929	21st Ave S	Mpls	MN	55407
David Young	1711	Laurel Ave	St. Paul	MN	55104
Elizabeth Young	2025	Wisconsin Ave	Golden Val	MN	55427
John Young	2414	W 54th St	Minneapol	MN	55419
Barb Young	1437	Shryer Ave	Roseville	MN	55113
Jerry Young	1776	Lakeview	St Paul	MN	55117
Steve Young-Burns	3335	15th Ave S	Minneapol	MN	55407
Annie Youngblood	93	Clevelan Ave S	St Paul	MN	55105
Jerome Younger	1464	Simpson St	St. Paul	MN	55108
Tanya Yourchuck	3217	29th Ave NE	St. Anthony	MN	55418
Daiare Yudeshwer	900	Saddlebrook Pls	Chanhassen	MN	55317
Judy (Helen) Yung	1940	Dupont Ave S	Minneapol	MN	55403
Margaret Yurek	3343	Colfax Ave S	Mpls	MN	55408
Lori Yurick	4300	Abboott Ave N	Robbinsdal	MN	55422
Cheryl Yurny	4201	Grand Ave	Minneapol	MN	55409
Margaret Yzaguirre	4603	Folwell Dr	Minneapol	MN	55406
Audric Zaccardi	1	mpls	Mpls	MN	55417
Nate Zack	5709	41st Ave	Minneapol	MN	55417
Maryam Zafar	2202	E 22nd St	Minneapol	MN	55404
Jared Zagelbaum	200	Cecil St SE	Minneapol	MN	55406
Vassil Zamev	4549	Washburn Ave S	Mpls	MN	55410
Jenny Zanaltz	3540	Pleasant Ave S	Mpls	MN	55408
Clark and Beth Zander	695	Cottage Ave W	Saint Paul	MN	55117
Dave Zander	5218	11th Ave S	Mpls	MN	55417
Nicola Zapzalka	16455	not legible	Wayzata	MN	55391
Aloida Zaragoza	3215	4th St SE	Mpls	MN	55414
PETE ZAREMO	4288	BRIGADOON DR	SHOREVIEW	MN	55126
David Zarkower	1125	Ashland Ave	Saint Paul	MN	55104
Judith Zasada	1645	Stanbridge Ave	Roseville	MN	55113
Joel Zaslofsky	7124	Heatherton Trail	Edina	MN	55435

Jodi Zastrow	13005	Shady Dale Road	Minnetonk	MN	55343
Nora Zedurd	1619	Laurel Ave	St Paul	MN	55104
Judith Zegers	5715	Fairlawn Dr	Minnetonk	MN	55391
Thomas Zell	2219	Highland Pkwy	St Paul	MN	55146
Lowell & Jan Zeller	795	Woodduck Dr	Woodbury	MN	55125
Butch Zellinsky	2719	W 28th St	Minneapol	MN	55416
Pete Zepelak	5039	30th Ave S	Mpls	MN	55417
Diana Zera	4956	Woodhurst Ln	Minnetonk	MN	55345
Elizabeth Zerby	41	Arthur Ave SE	Minneapol	MN	55414
Kirsten Zerhusen	16416	Blenheim Way	Minnetonk	MN	55345
Mark Zerr	3272	Drew Ave N	Robbinsdal	MN	55422
Yong Yong Zhang	810	Nagarai Ln N	Plymouth	MN	55447
Tianrui Zhang	3228	Bryant Ave S	Minneapol	MN	55408
Ben Zibble	1470	Miday Ave.	St. Paul	MN	55108
Andrea Zibble	2543	benjamin St Ne	Minneapol	MN	55418-EMS
Jen Ziemei	1543	Summit Ave	St. Paul	MN	55104
Kirsten Field Zillm	300	6th St E	Northfield	MN	55057
Steven Zillmer	300	E. 6th St.	Northfield	MN	55057
Maggie Zimmerman	995	Montana Ave W	St.Paul	MN	55117
Scott Zimmerman	5505	Woodlawn Blvd	Nokomis	MN	55417
Jill Zimmerman	2406	Fremont Ave S	Minneapol	MN	55405
Linda Zimney	3805	Kipling Ave	St. Louis Pa	MN	55416
Tom Zins	8925	23rd Ave N	Golden Val	MN	55427
Ann Zirkos	3323	Buchanan St NE	Minneapol	MN	55418
Patrick Zisho	4151	Pleasant Ave	Minneapol	MN	55409
Jim Zitler	857	Portland Ave	St. Paul	MN	55104
Liz Zoet	1300	E Como Blvd	St. Paul	MN	55117
Patti Zona	4216	Abbott Ave	Minneapol	MN	55410
Richard Zona			Mpls	MN	55418
Nan Zosel	2304	Fremont Ave S	Minneapol	MN	55405
Harvey Zuckman	3500	Holmes Ave	Mpls	MN	55409
Niki Zuidema	16300	Pine St	Minnetonk	MN	55345
Paul Zuke	1907	Benjamin St Ne	Minneapol	MN	55418
Lee Zukor	4824	Elliot Ave	Mpls	MN	55417
Randall Zutz	2240	Pierce St NE	Mpls	MN	55413
Deb Zwickey	209	12th Ave NE	Minneapol	MN	55413
J Zylla	2244	Benjamin St NE	Mpls	MN	55418

Levi, Andrew (COMM)

From: Melodee Monicken <mmonicken@gmail.com>
Sent: Monday, July 10, 2017 11:55 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Draft EIS

Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

To: Environmental Review Manager:

I have been a Minnesota resident since the early 1970's. I live in Hubbard County, and I care about the quality of Minnesota's water. Listing all of my concerns about the draft EIS would require a massive tome, but here are a few of the items that might not have been addressed by others:

1. Why did the Department of Commerce rely on data and analysis from Barr Engineering and Cardno? These are firms that have an employment history with Enbridge. In fact, they will both get more work from Enbridge after the inevitable spill. Why didn't the Department of Commerce make any effort to avoid this apparent conflict of interest? Why couldn't they find and hire firms without the Enbridge connection? And how can the DOC imagine that the public would trust the assessment and insights of firms with this history?

2. Why doesn't this EIS provide an honest analysis of an alternate route away from Minnesota lake country and the Mississippi Headwaters? Why aren't there any oil release sites on the the alternate route SA-04? SA-04, a route researched and submitted by Friends of the Headwaters, doesn't create hazards for pristine water, and it is located in less sandy and porous soils. Unlike the applicant's preferred route, it is already a pipeline corridor, not just the so-called "energy corridor" for HTVL that Enbridge likes to pretend is an established "energy corridor.

Also important: why doesn't the DEIS include any data about recent studies that suggest the HTVL accelerates corrosion on oil pipelines?

3. In Chapter 13, why aren't the preparers listed by name, along with a CV detailing their experience and credentials? What are the names of the people/contractors/firms responsible for the groundwater hydrogeology assessments? Without this information about the EIS preparers, how can the public trust that this EIS is an independent and competent document prepared by people with the expertise to make these judgments? 2438-1

4. NEPA and the MN Environmental Policy Act require a Certificate of Need analysis in the EIS. Where is it? And why isn't there a serious and thoughtful analysis of the "no-build" option? Anyone reading a newspaper has noticed that investors are retreating from investments in the Alberta tar sands. The headlines are about the glut of oil and more affordable electric cars and renewable energy. In an era when TransCanada can't find customers for Keystone XL, and oil companies are over producing to service their debt loads, why would Minnesota decide to grant permits for a pipeline transporting tar sands from Alberta to export markets? And why would MN allow Enbridge to jeopardize the Mississippi Headwaters and MN lake country en route?

5. Even though Enbridge has been the long-time poster child for the pipeline industry's integrity and infrastructure issues, this EIS is relying on Enbridge data. Why? Why should the Department of Commerce acquiesce to language that reads "Enbridge would…" when the record demonstrates that, very often, "Enbridge won't" and " Enbridge doesn't"? How can the EERA imagine that the public will join them in deciding to

entrust Minnesota's clean water to the corporation responsible for the 2010 debacle in Kalamazoo? And if Enbridge has recently developed an environmental conscience, where was it it in 2015 when this happened? http://www.huffingtonpost.ca/2013/05/06/enbridge-breaking-safety-rules-backup-power_n_3225116.html?utm_hp_ref=ca-neb-enbridge

6. The certificate of need is not about whether Enbridge needs to build a pipeline or how that might enhance its bottom line. Why isn't the NEED for the pipeline a consideration in this EIS? This is not a "replacement" pipeline. Enbridge spin persists in calling this expanded and relocated Line 3 an urgent "replacement." But any MN resident governed by the DNR's shoreline ordinance knows that she/he would not be allowed to "replace" their old house, however decrepit and damaged, with a new and bigger house much closer to the water — just by calling it a "replacement." (Since the Department of Commerce adopted Enbridge's misleading nomenclature, the media has followed suit and this EIS is now being discussed as a document examining a "replacement" pipeline. Artful deception.)

Speaking of Need, why isn't the maintenance of the current Line 3 one of the NO BUILD options under consideration? Enbridge states in the DEIS that maintaining the current Line 3 will cost $30-$40 million per year. Their stated cost for building the expanded and relocated Line 3 is $2.1 billion. At maintenance costs of $40 Million, Enbridge could maintain the current Line 3 for the next 52.5 years. At $30M annually it would be 70 years. Again, why isn't the "no-build" option examined in the EIS? If Enbridge profit margins are not part of the PUC's criteria, these figures from Enbridge make the the NO BUILD option seem viable.

7. Where is the National Academy of Sciences study on dilbit in this EIS? It seems to me that an EIS examining the impact of an oil pipeline carrying tar sands products would want to reference that document and its findings about why tar sands pipelines should not be routed near water. It would detail dilbit's toxicity and its interaction with air and water. And why does the EIS pretend to discuss the physicochemical chemicals of crude oil while omitting the names of the carcinogenic diluents in Enbridge's so-called "Cold Lake Blend"? https://insideclimatenews.org/news/09122015/unique-hazards-tar-sands-oil-spills-dilbit-diluted-bitumen-confirmed-national-academies-of-science-kalamazoo-river-enbridge 2438-2

8. As a citizen lake monitor for the MPCA, I'm familiar with the trophic index and its measures for eutrophication. How can it be that the Executive Summary on page 14 the draft EIS says, *"There is no one way to measure the general region-wide or state-wide differences in surface water resource quality across Minnesota."* If specialists and scientists have developed the TSI and it's employed by the MPCA, what did the preparers of the EIS use instead and why would they choose other methodologies? What other standard protocols did they ignore? Just how much input did the MPCA and MN DNR have in preparing data and analysis for this EIS? Why isn't their collaboration more evident?

9. In Chapter 5 the methodology used for analyzing construction impacts to groundwater is inconsistent and biased to the Applicant's preferred route. The ROI, Region Of Interest, for the Applicant's route was a 1000 foot buffer on either side of the centerline of the route. For system alternative, SA-04, a 2500 foot buffer was considered on either side of centerline. Why have EIS preparers biased potential impacts to groundwater in favor of Enbridge's proposed route? 2438-3

10.Enbridge plans to drill horizontally under certain stream and river beds. The drilling fluids used for that process contain additives. These additives are toxic to aquatic wildlife and vegetation if a frac-out occurs. Where is the drilling materials list in this EIS? How can the public adequately comment without knowledge of these material and additives? 2438-4

Melodee Monicken
Hubbard County

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Levi, Andrew (COMM)

From: Melodee Monicken <mmonicken@gmail.com>
Sent: Monday, July 10, 2017 7:29 PM
To: Janet Hill
Cc: MN_COMM_Pipeline Comments
Subject: Re: Comment for Enbridge Line 3 Project: CN-14-916 and PPL-15-137

Follow Up Flag: Follow up
Flag Status: Flagged

Why aren't they analyzing "cold lake blend"? This part is SOOOOOO great, Janet. 2466-1

- The same section goes on to state, "In general, the toxic properties of both bitumen and diluents are similar to those of other crude oil products, including conventional heavy crude; however, *little research has been conducted on the toxicity of dilbit to organisms*. The components of the diluents are commonly found in other crude oils; however, *bitumen additionally contains several potentially toxic metals*, stable and persistent resins, and asphaltenes."

It's alarming that a study on the toxicity of dilbit to organisms hasn't been conducted, and that it is stated as a fact in the EIS without any further analysis, or even a suggestion that more study should be done. The final EIS *must* address toxicity of dilbit to organisms before an adequately informed decision can be made to permit a pipeline carrying dilbit in Minnesota waters.

On Jul 10, 2017, at 4:24 PM, Janet Hill <janethillnew@gmail.com> wrote:

<JanetHillComment.pdf>

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: MARIAN MOORE

Street Address: 2427 West 22nd St

City: MPLS. State: MN Zip Code: 55405

Phone or Email: marmoore@aol.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

(1) 3 weeks is not enough time to review 5000+ pages

(2) Where are the considerations of ALTERNATIVES to Pipelines: renewable energy, conservation etc. No assessment of declining oil use.

(3) What about transport POST-SUPERIOR??

(4) Where are spill analyses for tributaries of St Louis River + Nemadji River 0718-1

(5) Spill modeling is not thorough. What about Lake Superior

(6) No analyses of leak detection

(7) Risk of pipeline abandonment not adequately assessed. Property with risk 0718-2

(8) What are mitigation + management plans for abandoned Line 3?!

(9) No analysis of exposed Pipe + # of exposure once emptied

(10) No analysis or discussion of abandonment of line 1, 2, + 4 or future abandonment of a new line 3.

(11) No acknowledgement of end of Enbridge tax payments when they abandon.

(12) no acknowledgement of TREATY RESPONSIBILITIES

(13) conclusion that disproportionate + adverse impacts on Native populations would not be a reason to deny the project. MAKES NO SENSE!!

(14) Where are Enbridge's archaelogical surveys? They have not revealed them. 0718-3

(15) Spill response strategy missing in places w/ difficult access 0718-4

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Tisha Moore

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Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

MY PRIMARY CONCERNS:

* only analyzes impact for next 30 years, which seems inadequate and leaves our future generation unprotected (St. Louis + Nemadji Rivers) — Lines 1-4 are already 55-65 yrs old! 0719-1

* no spill analysis for significant rivers which could also impact Mississippi River and Lake Superior

CHAPTER 11

* lack of attention to important and vulnerable people, including our Native people who are already victims of structural racism and who would be adversely & unfairly affected by this additional health stressor

* does not include the BEE population & risk to important pollinators with application of pesticides 0719-2

* effects on aquatic life section does not cover algae and other important microorganisms 0719-3

* does not talk explicitly enough about global environmental impacts and greenhouse gas emissions, wherever it is this oil is utilized and this oil burns "dirtier" than many other oil sources.

* section 9.6 acknowledges that ANY possible routes could have "longterm detrimental detrimental effects on tribal members and resources" that cannot be measured or quantified

* EIS has clearly shown that the proposed route has more risk to wild rice lakes and biodiversity

If including additional pages please number them and tell us how many you are providing:_____ pages

* Does the certificate of need address "need" in the context of renewable energy and the values of the people of Minnesota?

MR. JORDAN MORGAN: Thank you.

My name is Jordan Morgan, J-O-R-D-A-N, M-O-R-G-A-N.

I want to start by saying thank you for hosting this event. It's an honor to be here this afternoon with my neighbors. I think that it's incredibly important that when we're considering projects that are going to impact our backyards and communities, that we

have an opportunity to voice our concerns. So thank you for facilitating that today.

I also want to start off by saying that we should not grant the Certificate of Need for this particular project, and the reason for that is if you look at the social demand within the state of Minnesota, our demand is not going up for oil.

What the demand that this project is citing is Enbridge wants to sell this Canadian oil on the global market, and to do that, they think the best way to do that is to put pipe through our backyards.

What that means is that we would have to incur that social risk of a potential spill and not get a lot of the social benefits since we don't really need more oil to begin with, if you look at our economy.

So as a community, as a state, we should not have to incur the economic externalities that are associated with this project.

Instead of investing in more pipeline, what we should be doing is investing in green renewable technologies. There are

already more green energy jobs than there are fossil fuel jobs in this country, and it's for a fraction of the price. 0870-1

I would like to move on and start talking about some more of the actual content of the DEIS. I'd like to take a moment and talk about the social cost of carbon.

According to the DEIS, this preferred route would emit 452,496.6 tons of greenhouse gases per year. And that accumulates to $673,365,050 of social costs over the next 30 years.

I think that alone should be grounds to not give a Certificate of Need. I will also say that I don't think that's adequate. I think that when we're looking at the social cost of carbon, 30 years is not long enough of a time table. I'm 23 years old. I plan to be very much alive in 30 years.

And I'm going to have to be dealing with the impact of this project, if it passes, in 30 years and likely longer.

So we should be doing social

0870-2

carbon cost projections up to 50 years, 100 years, and perhaps even farther to really capture the true social cost of this project, which 30 years cannot.

I would add that the DEIS also says the preferred route is the most impactful and disturbing to wildlife beds and other areas of rich biodiversity found in northern Minnesota. And that that would add to the negative mental, spiritual, and physical health impacts already suffered disproportionately by American Indian populations.

Again, this, which is already stated in the DEIS, is grounds to not give Certificate of Need, but again, I would add is not thorough enough. I guess I would like to see the environmental justice section expanded. In this 1,800-page document, there's only 16 pages devoted to environmental justice.

I think that is not thorough enough, and there's a lot more information there that is not represented in the DEIS that could be. So I would very much support

expanding the environmental justice section of the DEIS.

Next, I'd like to say that we should not allow Enbridge to abandon this pipeline. That's bad for Minnesotans. It's bad for our environment.

And I would like to use an analogy of saying that you just gotta clean up after yourself. My mom raised me that if I make a mess, I have to clean up after myself. If I get up in the morning and I want to make some eggs in my frying pan, I better clean the pan from the day before. You know, that's just common sense. That makes sense to me.

If they want to build this new pipeline, if Enbridge wants to build this new pipeline, they need to clean up the old one.

And like folks who said previously, we should absolutely support landowner choice. If a landowner wants that pipe removed from their land, Enbridge should be required to do that on their own dime. Our neighbors and our community should not have to deal with the lingering effects of having pipe in their ground, abandoned, if they don't want

to. That's just fair for everyone.

And since I'm supporting that we do remove it, basically what I'm saying is let's put hard-working Minnesotans to work. Let's give them those jobs. They're good for our economy to clean up the pipeline. It's good for the environment. It's really a win/win for our entire state.

The only person that wouldn't benefit would be Enbridge, because they would lose some money, but they've already profited billions of dollars off this pipeline's lifespan. So I think that it's economically fair to ask them to spend that money cleaning it up and creating jobs for our hard-working Minnesotans.

I also want to remind everyone that this pipe carries tar sands oil from Canada, and tar sand oil is the most carbon intensive oil on the market.

If we really are concerned about climate change, if we're really concerned about limiting our emissions, tar sands oil is the last oil we should be burning. We should be burning less carbon intensive oils while we

transition to a green economy.

And really, tar sands oil should be a last case scenario that really needs to stay in the ground and not be burned. That's the right thing to do. That's what we should do with this project.

I want to end by saying it is our responsibility as Minnesotans to protect our most valuable resource, and our most valuable resource is our clean water. Our clean water is great for our economy. Our clean water is great for our health, both mental, spiritually and physically.

It is one of the greatest ways that Minnesotans recreate, whether it be fishing, whether it be boating, or a variety of other ways that we can enjoy our pristine water.

If we can protect our clean water, we will preserve our Minnesotan way of life. Thank you.

MINNESOTA

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Please provide your contact information. This information and your comments will be publicly available.

Name: Melody Morrell

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Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

0720-1

Abandonment of existing Line 3 with no new line has received little attention in the document. Because there are no current federal or state regulations regarding pipeline abandonment on the books, the DEIS appears to simply take Enbridge's word that they will ~~monitor + clean the pipeline~~ clean + then "indefinitely" monitor the abandoned line. Given a cursory ~~search~~ look at Enbridge's past actions, their word does not suffice.

The proposed cleaning of the line is not a proven method for such a long stretch of pipeline. This needs more attention in the DEIS.

Also, should future issues with the abandoned line be discovered, ~~or oil~~ what assurance do we have that Enbridge will clean them up? What assurance do we have that it CAN be cleaned up?

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Ellen Morrow <ellenlmorrow@gmail.com>
Sent: Saturday, July 08, 2017 7:55 PM
To: MN_COMM_Pipeline Comments
Subject: Docket CN~14~916, PPL~15~137

To Whom It May Concern:
As lifelong citizens of Minnesota, we are very concerned that a thorough and adequate EIS is completed for this project that may so endanger water resources for the State of MN as well as jeopardize the beautiful headwaters area. Some questions that need to be explored and answered are:
1. Who hired the company that did the EIS ~ Enbridge or Minnesota?
2. What methodologies were used to measure water quality? 1407-1
3. Why wasn't the alternate route that did not go through the headwaters area as well as some of MN's most pristine lakes, considered?
4. Since Minnesota's EPA states that "Where there is potential for significant environmental effects resulting from a major government action, the action shall be preceded by a detailed environmental impact statement" why has this not been done taking NEED into consideration.
5. The original Line 3 pipeline is smaller in diameter than the proposed line? Why? 1407-2
6. It is commonly held knowledge that the refinery in Superior cannot possibly handle all this oil, and that the real destination is further south, and that much of this oil will be shipped overseas. Why then, is rail and truck equivalence to Superior the only one discussed? 1407-3
7. What are the drilling fluids for horizontal drilling? Most known fluids of 'this type are known to be toxic to aquatic wildlife and vegetation, as happened at the Straight RIver during construction of MinnCan LIne 4. What will be done to ameliorate that happening again? 1407-4
8. Enbridge's preferred route (instead of the SA~04 alternative) impacts over 5 acres of wild rice bodies, yet the report states 3 acres. How was this determined and which is accurate? 1407-5
9. Job creation numbers are misleading in nearly every pipeline project, and advertising by Enbridge has inflated job numbers~. What are the net jobs long term? Is the project really impactful to job creation? 1407-6
10. Lastly, and perhaps most importantly, Itasca State Park is WAY too close to this project! Why is it not considered a Minnesota historic resource? This proposed route goes way too close to Itasca as well as Lasalle Creek, LaSalle Lake Recreation Area and Upper Rice Lake. Why would the state consider jeopardizing these wonderful and important resources?

Sincerely,
Chuck and Ellen Morrow
579 Lincoln Ave
St. Paul, MN 55102

"Be kind whenever possible. It is always possible." - Dalai Lama Sent from my iPad

Levi, Andrew (COMM)

From: Jeff Mosner <jlmosner@gmail.com>
Sent: Saturday, July 01, 2017 8:37 PM
To: MN_COMM_Pipeline Comments
Subject: DEIS Comments
Attachments: DEIS Commentary - Climate Change.doc

Please see attached comments for CN-14-916 and PPL-15-137.

- Jeff Mosner

DEIS Commentary – Cumulative Impacts to Climate Change

"Death by a Thousand Cuts"

This buzz phrase "death by a thousand cuts" comes from the knowledge that a small cut will not kill you but, if you acquire enough of them, you would bleed to death. The term is derived from an ancient form of torture, in which the condemned person was subjected to a number of less devastating wounds over time until the accumulation of damage eventually became fatal. This is what we are unwittingly doing to our planet. Simply put, building this pipeline, for the transportation of Alberta tar sand oil will enable and encourage more burning of this incredibly dirty, carbon-intensive fossil fuel.

Recent news reports indicate that 2016 added the 2nd highest ever amount of carbon into our atmosphere. Indeed, the following graphic rather starkly shows the sudden and unprecedented (going back 400,000 years) rise in Earth's carbon dioxide levels.

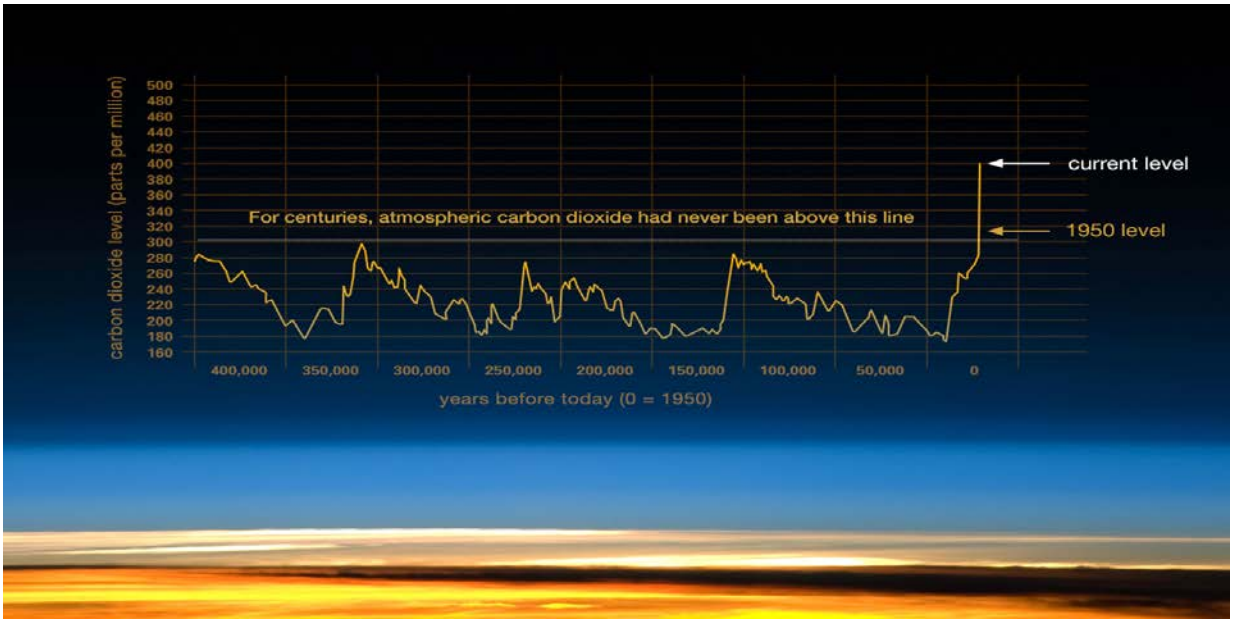

While the full Draft Environmental Impact Study (DEIS) attempts to compare the additional carbon costs of the greenhouse gas emmissions created during the construction and operation of the various pipeline and transport options, these costs, although steep, are dwarfed by the "social cost of carbon" (SCC) that is released when one considers the <u>entire life-cycle of tar sands oil</u> from extraction to refining and finally, combustion. Section 5.2.7 Air Quality of the DEIS describe the exacerbating impact on climate change that will occur if the Certificate of Need is approved and ANY of the pipeline routes are approved.

From section 5.2.7 Air Quality of the DEIS...

Life-Cycle Greenhouse Gas Emissions
The Project is part of a larger crude oil extraction, production, refining, and consumption system that is affected by changes in the availability and price of transportation to get crude oil from the point of extraction to the refineries that process the oil into refined products. An increase in the availability of options for transport via pipeline, for example, could lower the overall cost of transporting crude oil to market, improving its market prospects. Similarly, increased upstream activity induced by the project could ultimately result in increased end-use of refined products, because, for example, gasoline becomes more abundant and cheaper as a result additional extraction and cheaper pipeline transport. Addressing the GHG impact of these types of upstream and downstream changes requires a look at GHG emissions at each stage of the life-cycle of the crude oil—

extraction to combustion and everything in between.

Emissions at each stage of the life-cycle differ for different types of crude. For example, oil extracted from the Western Canadian Sedimentary Basin (WCSB) like the heavy crudes that would be carried by the Line 3 Replacement, require greater energy input for extraction and upgrading than U.S. light crudes, and therefore create more GHG emissions at each stage during production. Using the SCC estimates described above, the 30-year cost associated with the Project lifecycle emissions could range up to $120 billion!!! (Emphasis added)

This $120 billion SCC project life-cycle cost, a comprehensive estimate of climate change damages, is a cost inherent in **any** of the pipeline routes under consideration.

The harmful effects of our addiction to fossil fuels to our way of life are real and have begun. The real, known effects of this climate change damage for Minnesota and the Midwest is summarized in the following from the White House **National Climate Assessment – 2014**
and **FACT SHEET: What Climate Change Means for Minnesota and the Midwest**

The Midwest's agricultural lands, forests, Great Lakes, industrial activities, and cities are all vulnerable to climate variability and climate change. Climate change will tend to amplify existing risks climate poses to people, ecosystems, and infrastructure. Direct effects will include increased heat stress, flooding, drought, and late spring freezes. Climate change also alters pests and disease prevalence, competition from non-native or opportunistic native species, ecosystem disturbances, land-use change, landscape fragmentation, atmospheric and watershed pollutants, and economic shocks such as crop failures, reduced yields, or toxic blooms of algae due to extreme weather events. These added stresses, together with the direct effects of climate change, are projected to alter ecosystem and socioeconomic patterns and processes in ways that most people in the region would consider detrimental.

Regional Findings of the Third U.S. National Climate Assessment: MIDWEST:

- *"In the next few decades, longer growing seasons and rising carbon dioxide levels will increase yields of some crops, though those benefits will be progressively offset by extreme weather events. Though adaptation options can reduce some of the detrimental effects, in the long term, the combined stresses associated with climate change are expected to decrease agricultural productivity.*
- *The composition of the region's forests is expected to change as rising temperatures drive habitats for many tree species northward. The role of the region's forests as a net absorber of carbon is at risk from disruptions to forest ecosystems, in part due to climate change.*
- *Increased heat wave intensity and frequency, increased humidity, degraded air quality, and reduced water quality will increase public health risks.*
- *The Midwest has a highly energy-intensive economy with per capita emissions of greenhouse gases more than 20% higher than the national average. The region also has a large and increasingly utilized potential to reduce emissions that cause climate change.*
- *Extreme rainfall events and flooding have increased during the last century, and these trends are expected to continue, causing erosion, declining water quality, and negative impacts on transportation, agriculture, human health, and infrastructure.*
- *Climate change will exacerbate a range of risks to the Great Lakes, including changes in the range and distribution of certain fish species, increased invasive species and harmful blooms of algae, and declining beach health. Ice cover declines will lengthen the commercial navigation season." (NCA, Ch. 18: Midwest)*

The findings in this National Climate Assessment underscore the need for urgent action to combat the threats from climate change, protect American citizens and communities today, and build a sustainable future for our kids and grandkids.

The DEIS mentions the "greater energy input for extraction and upgrading than U.S. light crudes" inherent in the use of tar sand oil. While the following excerpts, taken from the Scientific American, Jan 23, 2013... How Much Will Tar Sands Oil Add to Global Warming? is talking about the harmful effects of building the Keystone XL, it is the same Alberta tar sand oil to be used in Line 3.

To avoid passing tipping points, such as initiation of the collapse of the West Antarctic Ice Sheet, we need to limit the climate forcing severely. It's still possible to do that, if we phase down carbon emissions rapidly, but that means moving expeditiously to clean energies of the future," explains NASA climatologist James Hansen. ***"Moving to tar sands, one of the dirtiest, most carbon-intensive fuels on the planet, is a step in exactly the opposite direction, indicating either that governments don't understand the situation or that they just don't give a damn."***

"Alberta's oil sands represent a significant tonnage of carbon. With today's technology there are roughly 170 billion barrels of oil to be recovered in the tar sands, and an additional 1.63 trillion barrels worth underground if every last bit of bitumen could be separated from sand. "The amount of CO2 locked up in Alberta tar sands is enormous," notes mechanical engineer John Abraham of the University of Saint Thomas in Minnesota.

The greenhouse gas emissions of mining and upgrading tar sands is roughly 79 kilograms per barrel of oil presently, whereas melting out the bitumen in place requires burning a lot of natural gas—boosting emissions to more than 116 kilograms per barrel, according to oil industry consultants IHS Cambridge Energy Research Associates. All told, producing and processing tar sands oil results in roughly 14 percent more greenhouse gas emissions than the average oil used in the U.S. And greenhouse gas emissions per barrel have stopped improving and started increasing slightly, thanks to increasing development of greenhouse gas–intensive melting-in-place projects. "Emissions have doubled since 1990 and will double again by 2020," says Jennifer Grant, director of oil sands research at environmental group Pembina Institute in Canada. "

For the tar sands "the climate forcing per unit energy is higher than most fossil fuels," argues Hansen, who believes he is fighting for the global climate his five grandchildren will endure—or enjoy. After all, none of his grandchildren have lived through a month with colder than average daily temperatures. There has not been one in the U.S. since February 1985, before even Hansen started testifying on global warming. As he says: ***"Going after tar sands—incredibly dirty, destroying the local environment for a very carbon-intensive fuel—is the sign of a terribly crazed addict."***

From the National Resources Defense Council (NRDC) Aug 13, 2015 10 Threats from the Canadian Tar Sands Industry

Despite economic losses, Big Oil remains determined to triple production of the dirty crude over the next two decades, and it has plans to flood the United States with up to six million barrels a day.

The tar sands invasion will pollute our land, air, and water if we don't stand up and say no to the real and widespread threats it represents.

1. *Digging up tar sands wreaks havoc on Alberta's boreal forest.*
2. *The production process wastes enormous quantities of freshwater.*
3. *Tar sands development produces huge amounts of toxic wastewater.*
4. *Burning tar sands oil creates more pollution than regular crude.*
5. *A web of new pipelines will fan out from Alberta's tar sands pits.*

6. *We aren't prepared to deal with tar sands spills.*
7. *Exporting tar sands will put rivers and coastlines at risk of spills.*
8. *Rail cars carrying tar sands crude will pass through densely populated areas.*
9. *Tar sands oil refineries produce dangerous petcoke waste.*
10. *Low-income communities will be disproportionately impacted.*

And apparently it is not only carbon dioxide that is harming our air. From the Globe and Mail, May 25, 2016 Oil sands found to be a leading source of air pollution in North America

A cloud of noxious particles brewing in the air above the Alberta oil sands is one of the most prolific sources of air pollution in North America, often exceeding the total emissions from Canada's largest city, federal scientists have discovered.

The finding marks the first time researchers have quantified the role of oil sands operations in generating secondary organic aerosols, a poorly understood class of pollutants that have been linked to a range of adverse health effects. The pollutants the scientist measured are minute particles that are created when chemical-laden vapours from the mining and processing of bitumen react with oxygen in the atmosphere and are transformed into solids that can drift on the wind for days.

Jobs vs Environment – a false choice

Much of the debate surrounding the building of these pipelines recently has been centered on jobs and Enbridge's promises of increased economic activity. The following article (again relating to Keystone XL, but really about the harmful long term economic effects of pursuing tar sand oil) is from Labor Network for Sustainability - 5 Reasons Why the Keystone Pipeline is Bad for the Economy

While labor leaders weigh the pros and cons of building KXL, they should keep in mind that the pipeline is as much a threat to our economy as it is to our planet. After a year of extreme weather — at an extreme cost to the economy — this age old jobs vs. environment debate is emerging as a false choice. Hurricanes, floods, and droughts are already having a devastating effect on American jobs, and that is nothing compared to what will happen if we throw open the spigot to the tar sands from Canada, considered the dirtiest oil in the world.

Here are 5 reasons why building the Keystone pipeline is bad for the economy — and workers.

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1. *Building the Keystone pipeline and opening up the Tar Sands will negatively impact national and local economies: Burning the recoverable tar sands oil will increase the earth's temperature by a minimum of 2 degree Celsius, which NYU Law School's Environmental Law Center estimates could permanently cut the US GDP by 2.5%. At the same time state and local economies are already buckling under the real-time economic effects of our nation's dependence on fossil fuels. In the past two years, the vast majority of U.S. counties (67 percent) were affected by at least one of the eleven $1 billion dollar extreme weather events. Superstorm Sandy alone caused an estimated $80 billion in damage. The drought that affected 80% of US farmland last summer destroyed a quarter of the US corn crop and did at least $20 billion damage to the economy.*
2. *The same fossil fuel interests pushing the Keystone pipeline have been cutting, not creating, jobs: Despite generating $546 billion in profits between 2005 and 2010, ExxonMobil, Chevron, Shell, and BP reduced their U.S. workforce by 11,200 employees over that period. In 2010 alone, the top five oil companies slashed their global workforce by 4,400 employees (the same year executives paid themselves nearly $220 million.) But at least those working in the industry as a whole get paid high wages, right? Turns out that 40 percent of U.S oil-industry jobs consist of minimum-wage work at gas stations. Instead of bankrolling an industry that is laying off workers and threatening our economic future, isn't it time to take the billions in subsidies going to oil companies and invest instead in a sector that both creates jobs and protects the planet?*

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3. *Unemployment will rise: According to Mark Zandi, the Chief Economist of Moody's Analytics: "Superstorm Sandy wreaked havoc on the job market in November, slicing an estimated 86,000 jobs from payrolls." In the wake of Hurricane Irene, the number of workers filing unemployment claims in Vermont went from 731 before Irene to 1,331 two weeks afterwards. Hurricane Katrina wiped out 129,000 jobs in the New Orleans region (nearly 20 percent.) For the U.S. economy as a whole, 2011 cost US taxpayers $52 billion.*
4. *Poor and working people will be disproportionately affected: KXL and projects like it result in disproportionately negative impact on already struggling working families. According to a recent report by the Center for American Progress called "Heavy Weather: How Climate Destruction Harms Middle- and Lower-Income Americans, lower-and middle income households are disproportionately affected by the most expensive extreme weather events. Sixteen states were afflicted by five or more extreme weather events in 2011-12. Households in disaster-declared counties in these states earn $48,137, or seven percent below the U.S. median income.*
5. *Building the sustainable economy, not the Keystone pipeline, will create far more jobs: Our nation is in desperate need of jobs. Approving the Keystone pipeline locks our nation into a trajectory of guaranteed job loss and threatens the stability of the US economy. Why keep the "job-killing" course, when the alternative-energy path is already out-performing other sectors of the economy. For example, the solar industry continues to be an engine of job growth — creating jobs six times faster than the overall job market. Research by the Solar Foundation shows a 13 percent growth in high-skilled solar jobs spanning installations, sales, marketing, manufacturing and software development — bringing total direct jobs to 119,000 in the sector.* ***And according to the Political Economy Research Institute at the University of Massachusetts Amherst, investment in a green infrastructure program would create nearly four times as many jobs as an equal investment in oil and gas.***

A study by Synapse Energy Economics developed a Transition Scenario for the electric power industry based on reducing energy consumption, phasing out high-emission power plants, and building new, lower-emission energy facilities. The study estimated the number of "job years" (one new worker employed for one year) that would be created by the Transition Scenario over a decade:

- *444,000 job-years for construction workers, equivalent to 44,400 construction workers working full time for the entire decade.*
- *90,000 job-years for operations and maintenance workers, equivalent to about 9,000 full time workers employed over the decade.*
- *3.1 million indirect jobs for people designing, manufacturing, and delivering materials and jobs in local economies around the country induced by spending by workers hired in the Transition Scenario.*

Organized labor is right to demand that public policy pay attention to our desperate need for jobs. But the Keystone XL pipeline will only make our jobs crisis worse by making our climate crisis worse. Plus, there are lots of pipelines that need fixing. Construction workers can be put to work rebuilding our crumbling natural gas transmission pipeline system — this will create good union jobs and cut carbon emissions. And these same workers can rebuild our crumbling water infrastructure. ***If labor is going to fight for jobs, let's fight for jobs that build the future we want for ourselves and our children, not ones that will destroy that future.***

<u>Climate Change and Political Leadership</u>

Minnesota's 8th district Congressman Rick Nolan, corroborating much of what has been stated above, has this to say in his June 5th, 2017 Monday Report, concerning Washington politics and President Trumps' recent decision to remove the United States from the Paris Climate Change Accords.

Addressing climate change is the great challenge of our time, and the President's decision to remove the United States from the Paris Accords is a momentous setback for the United States and for all humankind. His move last week abdicates our leadership in the world, undermines our economy and our national security, and ignores the clear will of the American people, our best scientific minds and scores of U.S. business leaders. And it jeopardizes the livability of our planet for generations yet to come.
Under President Obama, the United States led 195 nations into the purely voluntary Paris Accords of 2015 because the facts and science of climate change are irrefutable. The Earth is getting warmer, and the damage from CO2 carbon emissions is intensifying. Unless the world comes together with a plan of action, heat waves, failing crops, terrible storms, and mass migrations of people will continue to cost lives, destabilize governments and call into question the very survival of humankind.

President Trump has failed to realize that inaction on climate change cannot be an option. As polar ice caps continue to melt, billions if not trillions of dollars will be required to mitigate the threat rising ocean waters pose to our U.S. military installations up and down the East Coast. Warming throughout the Great Lakes has already begun to affect every aspect of shipping, fishing and recreation and the millions of good paying jobs those industries create. Rural America is struggling as lengthy droughts and terrible storms make it increasingly difficult for thousands of small family farms to stay in business. And consequences like these are just the tip of the spear.

To be clear, U.S. exit from the Paris Accords won't spell an end to the agreement. The good and bad news is that China, India, and the European Union have vowed to assume America's worldwide leadership role.

Meanwhile, Minnesota and many other states have vowed to push back, and keep leading the way with groundbreaking efforts to reduce carbon emissions. U.S. companies will continue to create millions of good paying jobs with revolutionary breakthroughs in clean and sustainable wind, solar and hydro-energy. And hopefully, sooner rather than later, America will resume its leadership in the global campaign to save our planet and all who call it home.

Conclusion

The additional highly harmful, environmental and economic impacts of the cumulative greenhouse gases released by the entire life-cycle use of tar sand oil, which will only be exacerbated by the rebuilding of Line 3 outlined on the previous pages and more fully detailed in articles referenced herein, need to be included in this 1056-2

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MR. JOHN MUNTER: I'm John Munter from Warba, a retired guy, and I'm working with Allen here on the pipeline cleanup. We've been really concerned about the abandonment issue as one huge major issue for us in the Line 3 corridor.

And we did some data here, throughout -- the DEIS is plastered -- the pipes are generally 10, 15 feet apart, you know.

So we did some data here and found that from Wawina to Grand Rapids we had pipelines. On the average, on the average one in three are about 18 feet apart, and on the average, three in four are about 30.6 feet apart.

So it makes the point that the pipeline should be able to be pulled up by Enbridge and we're advocating one size does not fit all. There should be more choices here.

There may be some people with pipelines that want to leave them there, that they may be seven feet apart, and they're worried about damaging the next pipe over if

they replace it or take it out. But we think that it's ample opportunity for a lot of these pipelines to be pulled out, and it should be the opportunity for the tribe to make their own choice or the city or the state or the county or a landowner to make their own choice about whether they want the pipeline out or not based on maybe the best scientific data from the PCA and DNR and whoever they want to consult with that.

So this is one example of really the huge holes in the DEIS that we found. There's no spill data probably ever we're going to get, because everybody thinks it's private information; which will hurt our risk assessments or damages.

There's the economic data. A huge amount of it won't come until after the public hearings, and so it will be difficult to make our arguments that way.

But just looking at some of the basic facts in there like this one -- and then I found on this one -- typical right of way configuration of Enbridge main line system, and they have Line 13 next to Line 3. On the other

side is Line 4.

Well, Line 3 and 4 are together here between Wawina and Grand Rapids, but 13 is not. It's in the same corridor, but it's actually Line 4.

So there's lots of these things that need to be fixed, and Department of Commerce has come up to me personally and said they're really interested in working on some of these issues and verifying my data that we collected here. I really appreciate that, and kudos to them to be proactive about looking into some of the things that we found.

And I have a lot of things to say, but I'm going to focus today really on the issue of exposed pipe.

There's no discussion of how fast an exposed piped will degrade in the DEIS.

Enbridge only has the worst case -- now, in terms of finding this information, the official DEIS chapter on abandonment is Chapter 8. It's only about 13 pages or so.

If you want to read a lot more of it, go to appendix B, that's like 86 pages, on

abandonment, so I congratulate Enbridge actually for at least putting the pages together for the abandonment issue, even though I disagree with them on things.

So in terms of the exposed pipe, the worst-case scenario of degraded polyethylene tape and no cathodic protection on presumably buried pipe where penetration of the pipe may happen in 25, 50 years. That's kind of the worst case, in 25 to 50 years, you'll get a break through there. 0872-1

This is a study from 2011. So therefore, in 19 years from now, then, the worst-case scenario is you could get exposure.

Enbridge, in appendix B, ignores the question of exposure, citing a 2008 study showing less than 1 percent of the pipe was exposed in 2008.

That was like nine years ago, and that's like one-fifth of the age of the entire pipeline. And so we know that there's a lot of -- go on Google Earth, they could do it or we could do it, shows many exposed area of pipes in Fond du Lac, or go to Grand Rapids, Cass Lake, and further north.

So what's the up-to-date thing, percentage now of exposed pipe, is really a question we have.

In addition, while it's acknowledged that pipes will rise in the ground without the heavy oil in them, there is no effort made to graft per year or estimate what percentage of the pipes will become exposed.

Will they experience an initial bump up in the soil when the pipe leaves and then gradually continue rising forever? Is there an expected date when most of the pipe will be exposed that isn't under, say, a depressed road or railway or with aggregate or something on it? So that could be studied.

As the pipe becomes gradually exposed and the polyethylene tape degrades, wrinkles can form in allowing water seepage, which tends to disbond the tape. This then can render to no effect the electric current cathodic protection that helps preserve the pipe.

In 1996, Enbridge found 15 disbonded coatings of polyethylene tape on pipe, though, that was presumably buried in

this period or before Enbridge experienced a handful of leaks. Two of these were from external wear from "external, general, and pitting corrosion," and also, "narrow axial external corrosion."

However, these were explained away with the excuse that there were pipe defects involved.

The level of pipe defects possibly present to aggravate external corrosion was never explained. Actually, Line 3, when it came from the factory, it had defects, you know, and so that's why they reduced the pressure from 760,000 barrels a day to 390,000 barrels a day, fearing a giant break in the pipe at some point.

So we know there are defects in this, and it could well be asked, what's the worst case expected penetration of a pipe or exposure for exposed pipe versus half exposed pipe versus the 25, 50-year possibility for a buried pipe?

And these are very real issues to landowners here, I think.

The issue of exposed pipe is a

big one since it not only affects degradation rates. So the pipe -- the landowner issues. Exposed pipe can hinder water flow like a beaver dam, which might kill trees.

It could be a constant source of maintenance if Enbridge has to keep arriving on landowner's property to replace polyethylene tape, which would also maintain cathodic protection even -- if they cared to, and we'll have to see about that. It may be an eyesore. It may hinder property resale. An exposed pipe will hinder lake traffic across it.

I can quit there for now. Thanks.

0874-1

MR. JOHN MUNTER: My name is John Munter from Warba again. I'm retired.

And perhaps the talk of property values would be in order here as well. Appreciate some of the comments that were made regarding pipes and swamps.

Yeah, there will be more buoyancy there and more danger for exposed pipes and the heavy oil on them. And offering as a water conduit from here to there, we're real concerned about that.

And also the toxicity of the coatings on these pipes. That's got to be a question for Department of Commerce, maybe ask Enbridge, is, before 1980, how much of the pipes were coated with asbestos, for example, and maybe something else, PCBs or whatever.

In terms of the property values, in Chapter 8, we have a quote, "In the near term, impacts on socioeconomics are anticipated to be minimal."

Well, what about the landowner, though? There's no talk of landowner property values. Why would anybody in their right mind want to buy a piece of property, all things being equal, with a rusting oil pipeline going through it?

Even if it's buried, you know, and if you have to honestly admit that you have a buried pipe that's down there and it's not being used and it's going to be rusting out and

there could be legacy contamination under it when the oil goes through it, potentially dangerous to children, and fire equipment if it's above ground, can serve as a water conduit, as we said, rusts out, brings water from pond to pond.

Already there are many, many areas of exposed pipe from Fond Du Lac to Warba to Grand Rapids to Cass Lake and beyond, that can be easily seen from Google Earth. How much more exposure will there be without the heavy tar sands keeping it down and no company to rebury the pipe?

Reburying pipe for Enbridge is a risk assessment. It's not a given deal or anything. It's easy to find plenty of excuses about disrupting the ecology to avoid reburying pipes.

Now, Enbridge quotes in appendix B, "The Canadian Energy Pipeline Association, CEPA, Pipeline Abandonment Matrix," which it takes as the standard for industry practice of abandonment. "The CEPA land use guidelines recommend abandonment in all cases except if agriculture can be disrupted or if a future

development is projected."

Enbridge argues that since Line 3 is in the middle of a suite of other pipelines, that developments in agriculture won't be issues. So therefore, abandonment is the logical option. Enbridge ignores a number of key points, however.

Number one would be that the other pipelines, 1, 2, and 4, most closely aligned with Line 3, would be mostly probably be deactivated in the next few years and moved to maybe the lake country preferred corridor, if that's what's chosen by the PUC, if the company gets its way, since they were built in the '50s and '60s as well.

A study should be done regarding the proximity of Line 3 to Line 67, that was just activated in 2010. There could be considerable distance between them at some points and a waste of land between them.

Once again, one size does not fit all situations.

Line 67 could even be deactivated in decades to come as the world demand for oil falls and as the tar sands production becomes

uneconomic.

So we're seeing in the 2020s, a lot of very important commentators are thinking that the world oil demand is going to start declining, and so at that point, the Saudi oil will be all that will be needed to suffice for the world supply of oil. It won't be the 21 percent dirtier oil from Canada at that point, either, so we won't be seeing a lot of new projects going into Alberta.

Right now all of the major oil companies are getting out of Alberta and they're selling off to local Canadian companies.

Number two, the allowance for agriculture and industry as mitigating factors for removing pipelines opens the door to other important considerations. The wide open spaces of Canada are another one size does not fit all situation, since Line 3 in the U.S. often passes near residences of small farmers and landowners who are denied use of their property by prohibitions of crossing pipes with heavy machinery.

They also have the worry of pipes

rising above grade without the oil in them to divert water flow and impede light travel and depress property values as well, if you have it in your front or backyard.

Thirdly, legacy oil contamination will not be found if the pipe is not dug up. That may potentially slowly seep into the groundwater or a nearby well. If you try to sell your property, it's like, "Well, there might be legacy contamination in there, but we don't know, because," you know, so --

And then fourth, well, the overall structural integrity of the pipe may last for quite a long time. Spot corrosion could wear through it here and there making it a conduit for water flow and diversion anyway, especially with the rising of the pipe in the soil.

So I could quit there for now. Thanks.

MR. JOHN MUNTER: My name is John Munter, J-O-H-N, M-U-N-T-E-R.

I want to say first, the major oil companies are all getting out of Canada. They don't see a future for (indiscernible) barrel of oil anymore and they're rushing into the (indiscernible).

The Saudis are cranking out all the oil we need for the next few years. That's why we're still so backlogged with oil from

these sources, up until about the 2020s, and the world oil demand will start to be tanking.

If you look around, you'll see India and China and Europe are all going to electric vehicles and that's going to tank the oil. So we'll have all we need rather than depending on oil from Canada, which is 21 percent more carbon intensive and polluting.

I'd like to talk about the abandonment issue that was brought up earlier because I live near Line 3, and that's a huge issue for property owners, for property values, for one, for possible contamination.

What's under the pipe if they don't pull it out? That needs to be discovered. What happens to the pipe once the heavy oil is not there; it starts rising in the ground and becomes a hazard and could change the water flow, become a water conduit.

So that needs to be pulled out. It can be done. In the DEIS, it said that the pipes are 10, 15 feet apart. And that's the argument for not pulling the pipes out.

That's actually the Department of Commerce's version of what Enbridge actually

said. Enbridge actually said there's 17, 18 feet, if you look in appendix B. Even that's kind of deceptive.

We did a study from Wawina to Grand Rapids on 15 named public roads, can verify, and we found that the space between Line 1 and Line 3 is 18 feet on the average, and the space between 3 and 4 is 30 feet on the average, 30.6 feet. There's no argument should be a landowners' choice to pull it out.

Other land is on tribal land, county land, state land. That should be county, state, and tribal choices. You may find pipes that are close together. Fine, if they want to keep their pipes in, fine. 0875-2

But for the most part, landowners want them out, and this is what we do with gas stations that are no longer operating. They're forced to take them out. This is what we do with mines in Minnesota. They're forced to remediate them.

The same thing should be true for pipelines.

And so this will create a $1.28 billion cleanup job or deconstruction

project. A lot of jobs for people in northern Minnesota, cutting up the pipe, throwing it on a truck, driving it out, and this is what we should be focusing on for jobs in northern Minnesota.

So thanks.

MR. JOHN MUNTER: I'm John Munter from Warba; J-O-H-N, M-U-N-T-E-R. W-A-R-B-A, by the way.

And I'm -- several of us developed a group here called Minnesotans for Pipeline Cleanup, because we're really concerned about the abandonment issue. Personally, I don't think Enbridge wants to have a redo of Line 3 down the old tracks, because of the possible legacy contamination

under it and various other reasons, and the tribes don't want to either. 0876-1

So I think abandonment is really a big issue for this area. And I found a lot of discrepancies in DEIS that tells me that the PCA and the DNR and the DOC and -- never really came up here and looked at the pipes that they're talking about. They have no idea.

I found this one -- one diagram, this is in Chapter 4. It's called, "Typical Right of Way Configuration of Enbridge Main Line System." It's got Line 2, and then Line 13, and then Line 3, and then Line 4.

So Line 3 and Line 4 up here are next to each other, if you examine your pipes, but Line 13 is not next to Line 3. It's Line 1.

And we did a study on this, Wawina up to Grand Rapids, 14, 15 named roads that we checked the pipelines on, so there is obvious errors like this.

And plastered throughout the DEIS is the assertion that, oh, they're only 10, 15 feet apart. Well, if you check your pipes in this area, they're way more than that, way

more.

In fact, our study here says between Lines 1 and 3, the average is 18 feet apart. And the average between, distance between Pipes 3 and 4 is actually 30.6 feet apart.

If you just check your pipelines in your area and maybe come to the next hearings in Cass Lake or Floodwood and support me on this, we'd appreciate that.

But, you know, I mean the DEIS didn't even get right the information from Enbridge, actually.

They only cover about 13 pages in Chapter 8, which is kind of a bastardization of Enbridge's material, which is 86 pages in appendix B.

If you look there, they say that the pipes are actually -- a majority are between 7 and 18 feet, okay.

And so how do you collapse the discrepancy between those numbers?

Well, chances are you'll find a lot of close numbers, close distances between Lines 1 and 3, and that's where you get the

51 percent plus some close distances on Lines 3 and 4.

And so there should be plenty of opportunity for Enbridge equipment to go down in between the Lines 3 and 4 and remove pipe.

And so that's what we're asking for is landowner choice on this.

There is a false choice between, oh, it's all this or all that. It's all take it out or leave it in.

No, there's landowner's choice. There are some landowners who may want to leave it there, because the pipes are close together and they're scared about what might happen, whatever, so fine.

But in the majority of cases where there's plenty of space, then the pipes should be removed, because we're looking towards the future. Once you don't have that heavy oil there, you've got the pipes rising in the field like a rock in a field there, and how much more exposed pipe we're having.

They also don't even talk about exposed pipe much.

They quote their study from eight

years, nine years ago, I think it was, which is like one-fifth the timeline of Line 3. And what they should do is look at Google maps. You'll find a lot more exposed pipe there.

With all of that heavy oil there, though, of course it's going to rise in the future, and there's no study of how much is it going to rise year-by-year. We have no idea what the impacts of not having that oil in there is.

And so pipeline -- oil pipeline owners, I mean, have -- I'd like to know what the property value discrepancy is between having a rusty oil pipeline that's rising in your field, it's not being used, compared to not having it there.

I mean, let's calculate that for the landowners, the landowner value.

So that's all I have to say at the moment.

MR. JOHN MUNTER: Thank you. My name is John Munter. J-O-H-N. M-U-N-T-E-R. I'm from Warba. As you see, we have tremendous holes in this DEIS, tremendous discrepancies and deceptions.

And one thing we found here -- I'm with the Minnesota for Pipeline Cleanup. And south of you here and throughout the DEIS, we find the phrase, the pipes are generally 10 or 15 feet apart, generally 10 or 15 feet apart here and there and everywhere. And that's really a huge deception here. We found a study that on the 14, 15 named, the roads between Rowena and Grand Rapids, the average distance between Line 1 and 3 is 18 feet; the average distance between 3 and 4 is 30.6 feet. And so this makes the point that for pipeline cleanup and pull up, we're making the argument that it should be land over choice and also tribal choice and city choice and county choice. Whoever owns the land, they should be involved. It's not one size fits all.

These pipelines go in and out and everywhere, and there's all kinds of crazy things going on with them. Some are maybe real close

together, fine. But it should be choice.

Beyond that I wanted to talk about the criteria addressing the certificate of need. There's basically four sections that they talk about here. Number one talks about the future adequacy, reliability, efficiency of energy supply of the Applicant, da, da, da, and talks about that. 0878-1

B talks about more reasonable and prudent alternatives. The proposed facility has not been demonstrated by parties other than the Applicant. And so these have been discussed.

But C and D have not really -- the first two that are proposed in them, there's a lot of economic data that's being withheld until later. There's no spill data that we're happy with at all. And in terms of alternatives, they are very poor.

Number C, the consequences of society granting the certificate are more favorable than the consequences of denying the certificate. Well, that's not discussed at all on this whole document, that I can find anyway, and it should be addressed there.

And, D, it has not been demonstrated that the design, construction, or operation of the proposed facility would fail to comply with relevant

policies, rules, or regulations of other federal, state, or local agencies. And this is the one I want to address that has not been addressed by anyone anywhere. So let's be first here in Cass Lake.

When we ask somebody for a job interview and the Applicant is there with the interviewer, the interviewer would ask about their past history, they would go online to see if they made any nasty comments about their past employer, they might look for any DWIs they might have, they look at a whole wide range of aspects. And Minnesota as the employer, so to speak, of Enbridge here, the response of Enbridge, should be doing a wide ranging search of issues with Enbridge.

This has relevance, because of our First Amendment rights. In the First Amendment there is the ability to petition for redress of grievances. And so we should be dealing with the past grievances, because this PUC process is really the only opportunity that we have to say, you know, you got to clean this up, Enbridge, before we're going to permit this pipeline. And this -- there's a range of different grievances that we can talk about here.

Now, petition for redress of grievances is not only a federal thing that you all march in front of Washington, D.C. and ask them to do something; it applies to state and regulatory agencies of state governments. So we should be able to come to the PUC and ask for a petition for redress of past grievances as well.

And on the local level, you have many landowners, for example, who own land that's been damaged by Enbridge over -- maybe disputes between, you know, they lost trees or there's water flow differences, and maybe weeds have been planted instead of alfalfa planted, which hurt the cattle, and different issues, disputes between, you know, pro and con of these -- of these agencies. And so this should be mediated somehow. There should be a process in the EIS to -- DEIS to call for mediation of these processes, before the PUC advocates or approves a pipeline. And there should be mandatory adjudication of this so that, you know, if the approval goes through, then the landowner and Enbridge are locked into a process where an independent adjudicator can say, yes, you're right or you're right or we'll go halfway in between or something like that so there's some justice done for

all these various issues that come up with people and pipelines.

And then there's the larger issues. Like the Bad River Band of Wisconsin, for example, it has not had a permit since 2013. And, you know, what's the situation there? Is Enbridge going around Bad River or negotiating with them? And this is a legal situation where are they going to treat it just like Red Lake and negotiate for 65 years and maybe finally come up someday with a permit? I mean, that's just not acceptable, and there should be some answers here for some of these larger issues.

Then there's the issue of damaging pipes as well -- or defective pipes. There were a lot of defective pipes that were imported by Enbridge about a decade ago, according to the Canadians, and they want to know where the sales receipts are and where those pipes go. And as far as I know, they have not found out where those pipes went. So this is another issue where Enbridge should come up and make clean with what's going on with those defective pipes.

And then as actually -- many people are starting to complain now about the damage it's

having to the First Nation's north of the tar sands. Winona a couple of times the last couple of days and other people here. So the tribe -- the First Nations north of tar sands can't hunt, fish, or gather anymore safely. And it's a really genocidal situation. And we're all basically complicit in that situation by importing oil.

And this really goes back to the Nuremberg trials, where they even put industrialists on trial, for example, a couple dozen of them even, for making the gas that went into the gas chamber and that type of thing, you know. And half of them were acquitted; half of them spent some time in jail. But this is a society problem, complicity with this genocidal situation.

And even though it's up in Canada, it's not in Minnesota, I don't think that will pass muster. I mean, there's a lot of excuses that a lot of people made in Germany after World War II, ex post facto law that was made after we committed crimes. No, sorry, that doesn't work. Or we're just following orders, you know, that type of thing. So this should be addressed by the DEIS.

And that's all I really have to say at the moment. Thank you.

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Saturday, July 08, 2017 10:11 AM
To: MN_COMM_Pipeline Comments
Subject: Comments re CN-14-916 and PPL-15-137

From John Munter
14860 Bruce Creek Rd
Warba, MN 55793

There is no effective supervision of Enbridge in the DEIS which would require some power of sanction, otherwise supervision is meaningless. There is no independent discussion in the DEIS regarding various possible degrees of third party monitoring involving on-site work, sanctioning authority, numbers of monitors, and cost. The one paragraph in 2.7.1.1 on third party monitoring seems to have just been entirely cut and pasted for the Enbridge agenda which states: "They do not have stop work authority" and goes on to prescribe how they would be micro-managed by Enbridge: "Enbridge would coordinate with the participating agencies to identify the appropriate qualifications of third party monitors and DETERMINE THEIR SPECIFIC ROLE DURING CONSTRUCTION"! This is not supervision but regulatory capture in a cage. 1410-1

1. Enbridge has made a lot of promises to a lot of land owners which have not been fulfilled even though they are out waving signs many have complained to Enbridge and to state agencies about exposed pipes, water flow, plantings toxic to cattle, replacing culverts, tree damage, leaving construction refuse, and soil compaction.

One very important aspect of site work is collecting the top soil and putting it back on top where it was. This is true not only for agricultural land but for forest land as well. This requires stop-work authority by state inspectors to make sure workers are not cutting corners on site remediation.

The DEIS has no chapter on Invasive species but this is another possible corner-cutting area that should be monitored with someone with stop-work authority so that equipment used in wet areas is cleaned off and made to dry for 24 hours where invasive species are present and where minor work delays may be necessary. 1410-2

Enbridge has a long history of running old and damaged pipelines into the ground, of poor clean-up practices in the Kalamazoo spill, operating pipelines with no leases, long spill history, and even corporate deception of the tar sands in the Kalamazoo pipe at the time of the spill. They cannot be trusted without monitors with stop-work authority. The Department of Commerce is completely remiss in simply regurgitating the Enbridge agenda in the DEIS without even a discussion of this issue.

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Saturday, July 08, 2017 2:01 PM
To: MN_COMM_Pipeline Comments
Subject: Re: CN-14-916 and PPL-15-137

From: John Munter
14860 Bruce Creek Rd
Warba, MN 55793

Another fatal flaw to the adequacy of the DEIS is not a complete set of alternative are analyzed since the project purpose is to get oil to market, not just to 'replace' in place an aging pipeline. What are the consequences if Old Line 3 is shut down with no substitute? What about the adequacy of the other North American pipeline projects in play to deliver product? What about KXL? No mention has been made of the Spectra pipeline from Alberta to Illinois that Enbridge recently purchased which can easily be expanded since it has the cross-border permit and a corridor and runs currently only a couple of hundred thousand barrels per day. As DC notes on p 16 of the Final MPCA interagency comments of 2017: "KXL—Status no longer 'denied' per presidential executive order. Given that, is this now a feasible alternative, at least in part? The last paragraph in this section may need to be amended. Overall, now that KXL and Dakota Access pipelines are a "go", how does that impact the need to replace L3?" 1411-1

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Saturday, July 08, 2017 2:14 PM
To: MN_COMM_Pipeline Comments
Subject: Re CN-14-916 and PPL-15-137

From: John Munter
14860 Bruce Creek Rd
Warba, MN 55793

There is no evaluation of invasive species risk (endangered species, yes). We have huge issues with aquatic invasive species like zebra mussles. Are there any contaminated bodies of water routes traverse? Will opening up a pipeline route speed the spread? How will Enbridge manage not facilitating the spread of species? Will they do what boat owners now do and hose off their equipment and let it dry for a day? Even if this slows the work schedule? Are there permanent risks with a new corridor? Which routes are more susceptible? These questions need to be answered before any new corridor is approved through the lake country routes since we have had enough Minnesota lakes destroyed already by invasive species. This is a key question. What monitoring with what authority to compel compliance? 1412-1

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Saturday, July 08, 2017 5:03 PM
To: MN_COMM_Pipeline Comments
Subject: Re: CN-14-916 and PPL-15-137

From John Munter
14860 Bruce Creek Rd
Warba, MN 55793

The following study was done proving that in many cases there is plenty of room around Line 3 to remove it in contrast to the miss-information in Chapter 8 and Appendix B so that it should be land owners choice whether to have it removed or not. Removal of Line 3 also corresponds to State regulations requiring the remediation of mining sites or gas stations when their active life is ended. The third option beyond just 'leave it in' or 'take it out' not analyzed by the DEIS should be 'land-owners choice' which should be made a requirement by the PUC if a route is chosen:

Line 3 Pipeline Distance Apart Study 1415-1

The distance between pipes of Enbridge pipelines 1, 3, and 4 was measured today, May 17, 2017 by John Munter on only public, named thoroughfares between Wawina and Grand Rapids Minnesota that can easily be verified without going on private property. While the DEIS of Line 3 claims many times that there are "generally" only 10-15 ft (which is a mis-characterization of the Enbridge data in Appendix B which claims that a "majority" are within 7-18 ft)of separation between all these pipes everywhere, the reality is starkly different and begs the question about offering land owners, tribal landowners, cities, counties, and even the state the option of whether to have the pipe removed or not. (some property owners may, indeed, have pipes so close together they preferred them not pulled up.)

Fifteen samplings were taken and the average distance between Line 1 and Line 3 was found to be 18 ½ ft. Fourteen samplings were averaged for the distance between Line 3 and Line 4 (One adjacent pipeline was not even in view for Hwy 65 and not counted in). These distances averaged 30 ½ ft. The total of numbers falling within the Enbridge "10-15%" was five out of thirty (17%--rounding up to be charitable)

If the DOC, PCA, DNR, and Enbridge can't be trusted to measure pipe distances of what value is the rest of the 5,000 page DEIS. The obvious truth is that Enbridge provided the misleading figures and the agencies gullibly believed everything they said:

Here is the raw date: Feet Apart between Lines 1, 3, and 4

Wawina –Itasca 426:	#1-#3=18 ft;	#3-#4=46 ft
Swan River-Itasca 428:	#1-#3= 16 ft	#3-#4=25 ft
Swan River-Hwy 65:	#1-#3=off the charts	#3-#4=20 ft

Itasca 476:	#1-#3=12 ft	#3-#4=31 ½ ft
Warba—Itasca 456:	#1-#3=33 ft	#3-#4=48 ft
Warba—Itasca 73:	#1-#3= 14 ft	#3-#4=45 ft
N. Shallow Lake Rd:	#1-#3=16 ft	#3-#4=22 ft
Shallow Lake Rd:	#1-#3=21 ft	#3-#4=18 ft
Blackberry-Hummingbird Rd:	#1-#3=22 ft	#3-#4=27ft
Blackberry Happy Hollow Rd:	#1-#3=13 ft	#3-#4=27ft
Blackberry Dove Rd:	#1-#3=11 ft	#3-#4=27ft
Blackberry Hwy 2:	#1-#3=15 ft	#3-#4=36 ft
N Blueberry Dr:	#1-#3=22 ft	#3-#4=27 ft
Kolp Rd	#1-#3==21 ft	#3-#4=22 ft
Grand Rapids—Gunn Rd:	#1-#3=23 ft	#3-#4=28ft

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Saturday, July 08, 2017 12:49 PM
To: MN_COMM_Pipeline Comments
Subject: re CN-14-916 and PPL-15-137

From John Munter
14860 Bruce Creek Rd
Warba, MN 55793

Paul Stolen's argument about the 3% berms changing water flow should be combined with the defective analysis of new corridor co-location of pipelines. The DEIS foresees a possibility of one extra pipeline. No. There could be Lines 1, 2, and 4 and a new Sandpiper. Lines 1, 2, and 4 are especially foreseeable since they were made in the 50's and 60's! These will require a larger corridor. This requires an expanded EIS study. Many, many exceptions have been made already to go around sensitive areas in the preferred corridor. How many more will need to be made or considered? How much greater an impact will this 3% bermed and cleared water fence and conduit have along with a wide enough corridor to accommodate four more pipelines? As PE notes on page 11 of the Final MPCA interagency comments of 2017: "I question these "permanent berms" as they could disrupt existing drainage/surface flows to waterbodies, could impact groundwater recharge and infiltration, and could create incidental wetlands along the pipeline corridor." 1417-1

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Saturday, July 08, 2017 1:06 PM
To: MN_COMM_Pipeline Comments
Subject: Re CN-14-916 and PPL-15-137

From John Munter
14860 Bruce Creek Rd
Warba MN 55793

Not Including Superior to IL in the routing and operation analysis is a fatal flaw. It is not done because all routes going through Superior would lose out to SA-04. While SA-04 would be a brand new pipeline, Line 61 going south is 10 years older (2009) and could be expected to have 10 years more wear and tear. Its 42 inches with volume up to 1.2 billion bpd with Line 3 added oil could push it to the max or require expansion. They have already been doing surveying: "While the possibility of expansion along Enbridge's existing pipeline corridor between Superior, Wis. and Pontiac, Ill. was first introduced in February 2014, we have consistently communicated to our landowners, stakeholders and the media since then that the company does not have a project." (Enbridge site) Line 5 going east could be expected to take more tar sands as well which is an older pipeline. It is outrageous the DEIS can claim twice as many spills on the SA-04 route and boldly admit because it is 'longer'. As KTS on page 15 of the Final MPCA Interagency notes of 2017 says: "If APR crude is moved from Superior down to Illinois (where SA-04) crude would be sent then the Wisconsin pipeline mileage (e.g. line 61) needs to be included in this analysis. Otherwise this is not a fair comparison of APR and SA-04 because the crude would be traveling for approximately the same distance for both routes to Illinois. WS notes on p 19 of the Final MPCA interagency comments of 2017 in a fuller discussion:

> "The Apples-Oranges issue is a potential fatal flaw. As raised earlier we need to compare impacts equally. I won't repeat at length since this isn't a new issue. In scoping we include SA4 as a reasonable alternative after Sandpiper was tabled. SA4 impacts are analyzed for the entire project length. There is no dispute that at 760K some quantity of project oil will also travel on the APR (current Preferred Corridor) from Superior to the same end point as APR. The PDEIS analyzes construction and operation impacts for the full length of SA4 to termination at the refinery. For APR, impact analysis terminates at Superior. There is no analysis of operational impacts during the life of the project for oil traveling down Enbridge mainline to the SA4 termination point. There is a very brief mention. There is a very brief mention that Enbridge is significantly upgrading its Wisconsin mainline capacity, but no mention that APR oil will travel that mainline or analysis of potential impacts during the operation life of the project. The comparison of APR and SA4 is largely dependent on the large difference in length; while this is largely valid for construction, the operational phase for APR oil going down the Wisconsin mainline is missing." 1419-1

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Saturday, July 08, 2017 1:28 PM
To: MN_COMM_Pipeline Comments
Subject: Re CN-14-916 and PPL-15-137

From: John Munter
14860 Bruce Creek Rd
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The shut-down of Old Line 3 is a reasonably foreseeable action and should be part of the No Action analysis since it would only take one big spill to cause such an uproar to close it down—or discovery of a long-present pin-hole leak. The DEIS is flawed in assuming Old line 3 will go on forever and that running it until it totally fails is socially optimal. This approach makes the pipeline opponents points that it is not a question of "if" a spill occurs but "when". As DB comments on p 7 in the Final MPCA interagency notes of 2017: "I have not seen in the EIS any analysis or discussion that indicates this crude oil transfer capacity is needed by the larger society or economy and is socially optimal." Additionally, WS on page 21 of the Final MPCA interagency comments: ": I continue to be troubled that we have no analysis of the cost to repair and maintain and accept Enbridge's conclusion that it is "cost-prohibitive and not feasible" at face value. We are comparing this to a minimum 2.1 billion project. If this is a key assumption in the No Action alternative how do we support it?" 1420-1

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Saturday, July 08, 2017 1:37 PM
To: MN_COMM_Pipeline Comments
Subject: RE: CN-14-916 and PPL-15-137

From: John Munter
14860 Bruce Creek Rd
Warba, MN 55793

The shut-down of Old Line 3 is a reasonably foreseeable action and should be part of the No Action analysis since it would only take one big spill to cause such an uproar to close it down—or discovery of a long-present pin-hole leak. The DEIS is flawed in assuming Old line 3 will go on forever and that running it until it totally fails is socially optimal. This approach makes the pipeline opponents points that it is not a question of "if" a spill occurs but "when". As DB comments on p 7 in the Final MPCA interagency notes of 2017: "I have not seen in the EIS any analysis or discussion that indicates this crude oil transfer capacity is needed by the larger society or economy and is socially optimal." Additionally, WS on page 21 of the Final MPCA interagency comments: ": I continue to be troubled that we have no analysis of the cost to repair and maintain and accept Enbridge's conclusion that it is "cost-prohibitive and not feasible" at face value. We are comparing this to a minimum 2.1 billion project. If this is a key assumption in the No Action alternative how do we support it?" 1421-1

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Saturday, July 08, 2017 1:45 PM
To: MN_COMM_Pipeline Comments
Subject: Re CN-14-916 and PPL-15-137

From: John Munter
14860 Bruce Creek Rd
Warba, MN

A fatal flaw in the DEIS is comparing wells on farmland in SA-04 to the water-rich un-fragmented forest of the Preferred Corridor. This is ridiculous. Wells are surrounded by topsoil and there may be an aquifer but you have to get to the aquifer. A leak on a buried pipe on farmland would normall migrate upword to surrounding soil rather than to surrounding water on the Preferred Corridor. As KSM notes on page 10 of the Final MPCA interagency comments: "." I don't consider a water supply well to be a groundwater discharge point. It is a groundwater extraction point." But, this is the only way the DEIS can get around the MPCA and DNR comments in the old docket of Jan 23, 2015 which preferred a southern route over the lake country route—because of the water issues. A related issue is how the karst geography is presented very prejudicially in the ES—which is only 11 miles and could be circumnavigated just like many, many exceptions have been made for the Preferred Corridor. The difference is that you cannot avoid all the flowing water resources in the glacial moraine topography of the Preferred Corridor. In contrast to the large, colored 'wells versus wilderness' graph of ES-2 padded with stats worried about wells the very small graph on the following page of "High Quality Surface Waters" showing SA-04 having almost none is almost illegible. Additionally, it could be pointed as KTS did on page 15 in the Final MPCA interagency comments of 2017 regarding that: "From this table it should be pointed out in the text, where this table is discussed in the text (including conclusion sections), that APR makes 6 crossings of MN Nationwide River Inventory rivers, while SA-04 makes 2 crossings of such rivers in MN." In addition RL notes on p 19 of the Final MPCA interagency comments of 2017: "…there seems to be no thought given to the relative ease of gaining access to the areas that are downstream of waterbody crossings. While Cardno may argue that the easement itself provides a means of access to the waterbody crossings, the bigger concern is how to gain access to remote areas downstream of waterbody crossings. In the case of stream crossings, the opportunity for transport of spilled oil by the stream greatly complicates the process of access for cleanup. Flowing water crossings then represent a much greater concern and should be part of the calculation of risk (hopefully that was done but not sure)" The MPCA and DNR letters of Jan 23, 2015 emphasize how difficult access is into wild rice areas in the Preferred Corridor as well. 1422-1

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Saturday, July 08, 2017 1:51 PM
To: MN_COMM_Pipeline Comments
Subject: Re: CN-14-916 and PPL-15-137

From John Munter
14860 Bruce Creek Rd
Warba, MN 55793

A fatal flaw in the DEIS is not analyzing the worst case scenario for emergency response to a spill along the various routes including SA-04. The reason that this is not done is that it would show SA-04 to be much more accessible since it is along established roads. Secondly, spills would be much more visible to the local populace for a quicker response time. This should be a very important criteria for route choice and it isn't analyzed. As LK says on page 14 of the Final MPCA interagency comments of 2017: "A comparative analysis should be made that looks at the feasibility of addressing a catastrophic failure for each of the route alternatives. And SA-04. How easy would it be to access a pipeline break along each of these potential alignments? In each case, how long would it take to get appropriate oil spill equipment to the most remote areas of these proposed corridors? How easy or difficult would it be to address a large spill given their proximity to roads, etc." WS is also very concerned about this issue on page 25 of the Final MPCA interagency comments of 2017: "How does the recent spill discovered in ND that was leaking for weeks square with the last paragraph 'pinhole releases…become visible in several hours to a few days.' This may be stated in Enbr 2016a, but we should address the 176,000 gallon spill reported in dec 2016 about 150 miles from the Dakota Access camp." WS expands upon this concern on p 26 of the Final MPCA interagency comments of 2017: 'First responders generally arrive within minutes…' The concern with APR, as PCA and DNR comments in the past have mentioned, is the large areas of limited access in the event of a spill. My concern is how this hasn't really been factored into the analysis or mentioned much at all. A pipeline in a roadless area has both leak detection and leak response challenges." Exactly. 1423-1

MR. JOHN MUNTER: My name is John Munter, J-O-H-N, M-U-N-T-E-R.

I want to say first, the major oil companies are all getting out of Canada. They don't see a future for (indiscernible) barrel of oil anymore and they're rushing into the (indiscernible).

The Saudis are cranking out all the oil we need for the next few years. That's why we're still so backlogged with oil from

these sources, up until about the 2020s, and the world oil demand will start to be tanking.

If you look around, you'll see India and China and Europe are all going to electric vehicles and that's going to tank the oil. So we'll have all we need rather than depending on oil from Canada, which is 21 percent more carbon intensive and polluting.

I'd like to talk about the abandonment issue that was brought up earlier because I live near Line 3, and that's a huge issue for property owners, for property values, for one, for possible contamination.

What's under the pipe if they don't pull it out? That needs to be discovered. What happens to the pipe once the heavy oil is not there; it starts rising in the ground and becomes a hazard and could change the water flow, become a water conduit.

So that needs to be pulled out. It can be done. In the DEIS, it said that the pipes are 10, 15 feet apart. And that's the argument for not pulling the pipes out.

That's actually the Department of Commerce's version of what Enbridge actually

said. Enbridge actually said there's 17, 18 feet, if you look in appendix B. Even that's kind of deceptive.

1829-1

We did a study from Wawina to Grand Rapids on 15 named public roads, can verify, and we found that the space between Line 1 and Line 3 is 18 feet on the average, and the space between 3 and 4 is 30 feet on the average, 30.6 feet. There's no argument should be a landowners' choice to pull it out.

Other land is on tribal land, county land, state land. That should be county, state, and tribal choices. You may find pipes that are close together. Fine, if they want to keep their pipes in, fine.

But for the most part, landowners want them out, and this is what we do with gas stations that are no longer operating. They're forced to take them out. This is what we do with mines in Minnesota. They're forced to remediate them.

The same thing should be true for pipelines.

And so this will create a $1.28 billion cleanup job or deconstruction

project. A lot of jobs for people in northern Minnesota, cutting up the pipe, throwing it on a truck, driving it out, and this is what we should be focusing on for jobs in northern Minnesota.

So thanks.

MR. JOHN MUNTER: My name is John Munter, J-O-H-N, M-U-N-T-E-R.

I'm a retired guy from Warba, and the Public Utilities Commission needs to render a judgment of no build on this project because the PCA and the DNR both submitted letters January 23rd, 2015, into these past dockets saying if the pipeline is to be built, it should be built (indiscernible) of I-94, should be what they called SA-03, now it's SA-04, which currently goes down the North Dakota border and then cuts through southern Minnesota and goes to Joliet, Illinois.

The current project has to be rejected before they can resubmit for that one, but they have done some analysis. By comparison, this is the DEIS here, part of it, the executive summary, is very deceptive by comparison. 1833-1

You see here, this graph, red means bad and green means good, and so

1833-1
Cont'd

Enbridge's project is here on this green side. SA-04 is two over. It's got some red in it, some orange in it.

If you look at it more in a detailed manner, it's drinking water areas of interest, which is bad, SA-04. And drinking water sources, well, yes, they have a lot more wells in SA-04 because they have a lot more people, two and a half times more people, and they have a lot more farmland, so of course.

But if you look farther down to biological areas of interest under preferred route of Enbridge, through the lake country, you see 102,000 biological areas of interest as opposed to 369 system alternative SA-04.

So that means there's one-third of one percent, so the biological areas of interest in the system alternative, SA-04, and that should be weighted a whole lot more.

In fact, there's a whole lot of commodity production areas of interest or 37,000, and in the -- which is, I would assume, wild rice there, but only 191 acres in the system alternative. So It's a very deceptive section.

1833-2

Two pages over, under, "Ground waters," the second paragraph, SA-04 is the only Certificate of Need alternative that crosses vulnerable karst topography, which they call fractures, joints, sinkholes, cavities, caves.

Well, they neglect to mention it's a limited area that can't be gone around very easily with exceptions as they are planning to do in the lake country corridor.

And by comparison, there's no discussion of a glacial marine in SA-04, which PCA makes a big deal about, that you can't tell where the water is going, the oil is going to flow.

There's more topographical distances. So you see a lot more fast water flow, and so you have pollution of bigger bodies of water like lakes and aquifers instead of a well.

So thank you.

MR. JOHN MUNTER: John Munter from Warba, again. And I feel like a 21st archeologist reading this DEIS document, looking at the 20th Century, because there's so many defects in there, we can't figure out if there's any good water studies in there that aren't paid for by Enbridge, for example. And we don't see good peer review data in there, and comments from professionals of the past have been ignored. And it goes even down to my research. I live up in Warba. We did a study from Rowena to Grand Rapids that we found the pipes from 2005-1

2005-1
Cont'd

Line 3 to 4 were actually 30 feet apart and not 10, 15 feet apart, as the DEIS said. There's a vast discrepancy there, for example. So the more you dig, the more you'll find.

And so this makes the argument -- and to the Department of Commerce's credit, they are looking into that and want to verify my numbers. But this was in 15 named road between Rowena and Grand Rapids. That pipeline can be pulled up. And so that's where people can being employed, is cut up that pipe and put it on trucks and haul it out. And so that's what should be done. So thanks.

MR. JOHN MUNTER: My name is John Munter. J-O-H-N. M-U-N-T-E-R. Retired guy from Warba. And as Allen was saying, there's huge discrepancies in the DEIS we found when we were doing our pipeline study.

2006-1

In the DEIS, for example, they're saying generally the pipes are 10, 15 feet apart, just plastered all over the document. And we found in our study that, on the average, from Rowena to Grand Rapids and 14, 15 named roads, that they're

2006-1 Cont'd

actually 30 feet apart from Line 3 to Line 4 and Line 1 to 3 is 18 feet apart. And to their credit, though, the Department of Commerce has come up to me and said, we want to look into that data and verify it and maybe ask Enbridge some questions. And so I'm gratified that they're responsive to that.

And we need all of your responses, all of your eyes on the document, because the more you look at it, the more holes you'll see and the better this document will be.

There's four criteria they use for assessing the certificate of need. The first is basically the need. And the problem with this is we're not being given all the economic data. And it won't be available. They're in the process of hiring an economist right now, and all this stuff won't be available till after all of the public comments are made. And it's not a fair process to not have complete disclosure here, because this meeting involves both the route and the need itself. They're combined.

Secondly, in terms of the routing, it's been amply talked about earlier that there's real active water studies and a big problem with Enbridge not wanting to disclose how much oil is

flowing at certain point. So we can't do proper risk assessments, which is just ridiculous. They're using the idea that, oh, there might be terrorism, so we can't, you know, disclose where the most oil is flowing through. Well, just call up the pipeline, and you'll probably find it. But all you have to do is -- for a terrorist is to go up Highway 2 and find Line Number 3 there on the road or you can go into a substation or you can find all the exposed pipe, you know, in all these places along Highway 2 and everywhere.

So it's not -- it's just a ridic-- and you wouldn't, you know, stop voting because a terrorist might blow up your voting booth someplace. You know, this destroys democ-- really destroys the democratic process.

So the third criteria is -- most of the third and fourth, which has not been dealt with at all by the DEIS anywhere: The consequences to society of granting a certificate of need are more favorable than the consequences of denying the certificate of need.

So we've heard a lot about the negative stuff, but they're not putting this in a chapter heading, like, well, here's the positive

stuff; here's the negative stuff; let's compare, you know. You can't have a real debate, unless you're going to provide both sides to it.

I mean, for example, could it be cheaper if we don't have oil coming down from Canada? Possibly. You know, what happens if we import all the oil from farther south or farther east or refineries outside of our area? Is is 3 cents cheaper? 10 cents cheaper? Is that a benefit? Well, that should be discussed here pro and con. Right?

Reliable supply. That's been in past documents we've read that Enbridge has put out rationales, you know, about reliable supplies from Canada, all this stuff. We don't really see it in there, as far as I don't see it anyway.

But, you know, there's -- this goes back to the oil embargo days. Now we have an oversupply, so we're in a whole different environment of oil. But oil is a global commodity. And so even if we stopped buying Saudi oil and just relied on tar sands, it wouldn't change anything. The price might skyrocket.

Well, the world is really going to EB vehicles. And, actually, a lot of important

commentators are saying that there's going to be a decline in the world oil demand in the 2020s and -- which is only going to be a few years away. Because even India has a goal by 2030 to be 100 percent electric vehicles, for example.

So then the fourth criteria talks about it has not been demonstrated the design, construction, or operation of the proposed facility would fail to comply with relevant policies, rules, or regulations of federal, state, and local agencies.

So we ask -- when people come for a job interview, you know, they check out their job history, they go online and see if they said anything nasty about their prior employers, they look at their DWIs. And are we doing this with Enbridge? Are we really looking at all the various issues of genocide up in Canada?

And Bad River Band up in Wisconsin doesn't have a permit since 2013. What is Enbridge going to do with Line Number 5? Are they going around Bad River? Is it going to -- and what about all the landowners up here who just have issues with Enbridge?

So these should be mediated before the

PUC grants anything. And it could be a forced mediation, where it doesn't have to happen before the PUC makes the decision. But there should be some process so all of these issues are dealt with before the final judgment of the PUC because, otherwise, there won't be anything happening afterwards, we know.

MR. JOHN MUNTER: My name is John Munter, M-U-N-T-E-R. Department of Com-- I'm from Warba, by the way. I'm a retired guy.

The Department of Commerce has been given an impossible job here. I don't think the DEIS can be fixed. There are four criteria for the PUC to judge adequacy. The Department of Commerce has just now gotten agreement from the Public Utilities Commission to hire an economist. That means that the economic data will be coming someday in the future, after all your public hearings are done. And so if you want to get the full story, you have to go online and go to these other hearings, and then comment on that. I'm not sure that's been

clear to people.

So that's a problem for the MEPA process where route, rote, and need here should be combined in this public engagement process. As it is, the Department of Commerce relies on the Energy Information Administration, the EIA, of the United States, which has been very wrong by factors of seven and ten on projections of renewable energy, Jeff St. John at Greentech Media says, for four reasons: One, the EIS doesn't track falling cost of renewables; two, they underestimate the performance of current facilities, renewable facilities' improvements; and, third, there are future low costs of renewables; and, fourth, the rise of solar is missed as well. Consequently, the EIA projects world oil demand rising 5 percent through roughly 2040. This conflicts with present reality, unfortunately. All major oil companies are fleeing Canada with Saudi oil and Permian oil flooding the market. The big boom in the Permian is why we still have a glut of oil, and it's going to go on for a while. 2007-1

This is why many economists and astute observers are saying that we're going to be hitting peak oil demand very soon. Carbon tracker says in

2020. Michael Liebreich at Bloomberg Energy Finance says between the 2023 and 2028. Michael Seeley of Deutsche Bank, 2024. Simon Henry, who was a shell chief financial officer, actually, 2022 to 2032. The World Energy Council, 2030. The ratings agency Fitch suggests pumping electric vehicle batteries could be the death spiral for the oil industry, actually.

This is why the second criteria -- alternative is problematic, because it doesn't consider the Saudi and Permian oils as alternatives. Instead, it talks about trucks and trains coming from Canada. And if that was reasonable, we would have seen that happen after the KXL was defeated, and that didn't happen. I mean, why not have wagon trains and horseback and mule trains coming down with oil, I mean, the U.S. carbon emissions and you have to subtract the burps and that type of thing.

But -- so this is why the second criteria is problematic. You're not dealing with reality here, but options that are really not going to happen with trucks and trains.

Thirdly, there's no discussion of consequences to society are more favorable to granting the certificate of need than denying it.

We've heard a lot about all of the dreadful consequences about what is the benefit. Is there going to be a drop in gasoline prices? Is there any benefit, actually, to putting this project through, really? I don't see that discussion in the DEIS.

Fourthly, would the proposed facility comply with relevant policies, rules or regulations of other federal, state, or local agencies? And I don't believe that it complies with Minnesota greenhouse gas goals. There's the Alberta First Nation genocide issue of the First Nations north downstream from the tar sands. There's the environmental justice issues around Detroit refinery and the Port Arthur refinery, and little bit connected action of the Bad River Band in Wisconsin of Line Number 5. It doesn't have a lease since 2013. I consider that an environmental justice issue as well.

So I'll quit there. Thank you.

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Monday, July 10, 2017 11:33 PM
To: MN_COMM_Pipeline Comments
Subject: Re CN-14-916 and PPL-15-137

From John Munter
14860 Bruce Creek Rd
Warba, MN 55793

Executive Summary

In contrast to the DNR and PCA letters of Jan 23,2015 in the Sandpiper docket which both preferred a southern route on farm land compared to the lake route through un-fragmented forest, wild rice, and much fast-flowing water, the Executive Summary is weighted towards worry over scattered wells on farm land.

The most egregious and prominent display of prejudice against SA-04 and towards Enbridge's Preferred Corridor is colorfully displayed in all its full-page glory on ES-2. Red and orange are colored 'bad' and green and yellow are colored 'good'. The only way that the Preferred Corridor can look pretty compared to SA-04 is to insert not one but two "drinking water" sources (since there are a lot more people around SA-04) and paint them red and orange and ignore the 102,000 "biological areas of interest" compared to only 369 in SA-04. 2447-1

The definition of "Drinking water areas of interest" includes only "Wellhead protection Areas" which is painted red for SA-04. The definition for "HCA drinking water sources". You have to flip to 10.4.1 for that answer! HCA or High Consequence Area drinking water sources happen to include "those supplied by surface water or wells and where a secondary source of water in not available"—wells again! It might be considered doubtful if too many farmers are slurping up water in nitrate-laden drainage ditches. Next comes: "The land area in which spilled hazardous liquid could affect the water supply is also treated as an HCA". Yet, there is no problem in the Preferred Corridor with plenty of fast-flowing surface water and easy access to ground water? But, finally, we come to the truth in the last sentence: "This HCA was derived from state Wellhead Protection Area or Source Water Area"—Wells, again, but this time it is just areas with fewer good wells since most of them have probably been already poisoned with nitrates, pesticides, and herbicides. 2447-2

The trouble with this analysis is that ignores the low likelihood that these wells will be affected by a spill—BECAUSE THEY ARE ON MILES OF LEVEL FARMLAND, compared to hilly and wet terrain of the preferred corridor conducive to spills that cannot be cleaned up unlike on farm land.

2447-2 Cont'd

While there are 16 times more wells on SA-04 than the Preferred Corridor and 12 times more lonely wells marked dramatically by color differences we find in the "biological areas of interest" only 1/3 of one percent of them on SA-04—but no dramatic red or orange color to alarm the reader of the Preferred Corridor. How is that fair?

When come to the graph on the following page "high quality water resources" we find a tiny little graph 2 ½ inches by 2 ½ inches where the Preferred Corridor has ample amounts of Tullibee lakes, outstanding lakes, wild rice lakes, and trout streams while SA-04 has only a few nice lakes and trout streams—if you have your magnifying glass with you to see them. What makes the Preferred Corridor look GREAT though is the "Transport by Rail" and "Transport by Truck" in between the other two showing them to be vicious killers of trout streams especially.

2447-3

The next area of appalling bias comes in the second and last paragraph under 'Groundwater' on the next page. "karst topography" is the bogeyman full of scary "fractures, joints, sinkholes, cavities, caves and void spaces". What this isn't saying is they only comprise about 11 miles in a few counties WHICH CAN BE AVOIDED by reroutes just like a tremendous number of reroutes have be approved already for the Preferred Corridor—especially can reroutes be done on all the wide-open farmland of SA-04. What is especially discriminating is that there exists no balance in this small section discussing the crazy glacial moraines of the Preferred Corridor where water can run any which way and faster with more sloping topography. Faster flow can mean wider spill area along with difficulty of access and slowness of finding them—especially pinhole leaks—in comparison to pipes along roadsides in SA-04 where spills can be spotted more easily.

Page ES-16 presents another egregious misrepresentation by claiming at the top: "SA-04 would affect the most acres because it travels the greatest distance" without explaining that the Preferred route analysis stops in Superior! This warped analysis pervades the DEIS ('There will be twice as many spills on SA-04 because it is twice as long'). This type of analysis is especially appalling for operational impacts since Line 61 going South from Superior is not analyzed but for construction impacts, the potential for Enbridge to put in a twin of 61 called 66 is not explored as a possible connecting project. After all, surveying has already been done on a potential Line 66!

On the same page in the third paragraph the DEIS tries to equate "high quality agricultural soils" with "high quality forested and aquatic habitats" without explaining that spill on topsoil can be cleaned up and remediated but spills in water are forever—at least to a certain extent.

Next on the same page the DEIS raise the bogeyman of trucks and trains clogging commerce without analyzing if that is a realistic possibility. The DEIS also brings up the “risk of incidents involving fatalities” without discussing the vastly increased safety standards mandated by the US and Canada or that pipeline spills are 10 times larger. In fact it has been a few years since we had a lot of train congestion.

Table ES 3 makes a big point that greenhouse gases are worse for SA-04 than the Preferred Corridor since they don’t count the Superior to IL segment again or possibility of engineering a new Line 66.

ES-22 promotes the fiction that Line 3 is “Generally 10-15 feet apart” from the others which is a bastardization of what Enbridge actually said in Appendix B where the “majority of the pipes are 7-18 feet apart” We have beat this into a dead horse and I expect it to be fixed but “the majority” of short distances are between Lines 1 and 3 while there is still 20-30-40 ft of space between Lines 3 and 4 allowing plenty of work space.

ES-26 might have more luck finding a less impactful route for Native Americans if they included SA-04, although I believe there are some there too.

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Monday, July 10, 2017 6:09 PM
To: MN_COMM_Pipeline Comments
Subject: Re: CN-14-916 and PPL-15-137

From John Munter
14860 Bruce Creek Rd
Warba, MN 55793

Environmental Justice

The EJ section of the DEIS--Chapter 11—is deficient in quality and quantity. It needs to explain the worst case scenario for oil spills and leaks along the various EJ routes—including SA-04—so that a person can evaluate operationally which would be the best route. Would a spill on the Preferred Corridor possibly be worse in impacting a large wild rice lake than the same large spill on Fond du Lac or Leech Lake which would not? Certainly the economic consequences could be quantified for large spills not able to be well remediated. Any EIS without this analysis is not acceptable. 2449-1

Chapter 11 does not mention the evolving law of The United Nations Declaration of the Rights of Indigenous Peoples' which talks about 'free and informed consent' which is different from the 'consultation' by the DOC and requires a higher level of engagement than is present in the DEIS which acknowledges a "large pattern of structural racism" but seems OK with going ahead with more impositions of the pipeline project anyway.

Chapter 11 doesn't do any real analysis of benefits to society versus deficits like using the Equator Principle but merely throws up its hands saying all routes are problematic but that doesn't negate making a choice. How is a decision-maker supposed to learn anything from this chapter?

Section 11.4.3 mentions how wild parsnip was introduced to Fond du Lac during pipeline construction which is a noxious weed with health effects and suggests the same could be done in the Preferred Corridor but gives no remedial suggestions like saving top soil or planting grass. And, it does not bring up all the other possible invasive species like zebra mussels and prevention protocols. 2449-2

The DEIS as a whole does not notice wild rice watersheds which is a problem since they are so prevalent along the Preferred Corridor. It doesn't discuss protecting them or how to restore them. This is a big problem and needs to be fixed before the document is found to be acceptable.

The end of Chapter 11 suggests some mitigation ideas such as the last bullet point: "Identifying clear consequences and penalties for failure to implement effective mitigation measures." This sounds great but who is going to do what and when? The answer is "These measures can be evaluated in the final Certificate of Need or route permit decision" But will they be? And, after the public has no more chance to weigh in and require it before the PUC final decision? Why can't we have a clear, upfront statement of what the State and Enbridge are going to do in the DEIS and FEIS programmatically now if this just isn't pie-in-sky window dressing for an ideal world? The state needs to have on-the-ground monitoring capability and stop-work authority to implement protocols to reduce the likelihood of invasive weeds and other species which may become long-term problems. 2449-3

The DEIS does not cover EJ in connected projects to Line 3 such as the lack of a lease on Line 5 from Superior since 2013 of the Bad River Band in Wisconsin which has rejected further negotiation in January of 2017 and requested Enbridge to vacate its territory which Enbridge so far has refused to do. This is reminiscent of Red Lake in Minnesota where Enbridge had no lease from pipe placement in 1949 and stubbornly refused to leave until recently when Red Lake finally accepted a deal. Will Enbridge keep arm-twisting Bad River while maintaining an illegal presence on their land?

The entire tars sands project in Alberta is the beneficiary of First Nations downstream who bear the costs of the huge, earthen tailings ponds comprising fifty square kilometers or as long as twelve miles and as high as three hundred feet which leak so much a day that Cree and Dene First Nations downstream are afraid to hunt, fish, gather, and drink the water for fear of getting cancer. This has been called 'cultural genocide' and has been proscribed by international conventions. Dr. John O'Connor of Fort Chipewyan was well-known for his findings of high cancer rates and rare cancers in his area. Very little remediation is being done with only a few silt ponds being dried out and trees planted. These ponds are a loaded gun pointed at the people downstream when the tar sands industry is bankrupt and no longer tends these earthworks. They should be drained using centrifuges or reverse osmosis to defuse their danger. Other states and companies should not be complicit in this on-going abuse which could be likened to slavery in the South before the Civil War.

The 'Truth and Reconciliation Commission of Canada' has recognized this cultural genocide in its "Calls to Action":

> "92. We call upon the corporate sector in Canada to adopt the United Nations Declaration on the Rights of Indigenous Peoples as a reconciliation framework and to apply its principles, norms, and standards to

corporate policy and core operational activities involving Indigenous peoples and their lands and resources. This would include, but not be limited to the following:

i. Commit to meaningful consultation, building respectful relationships, and obtaining the free, prior, and informed consent of Indigenous peoples before proceeding with economic development projects.

How does complicity in the tar sands square with not violating Minnesota Rule 7853 D regarding complying with federal “relevant policies, rules or regulations” in regard to genocide and cultural genocide and compliance with international protocols and standards of conduct?

Levi, Andrew (COMM)

From: Brent Murcia <brentmurcia@gmail.com>
Sent: Tuesday, July 11, 2017 12:00 AM
To: MN_COMM_Pipeline Comments
Subject: line 3 docommenbt
Attachments: BrentMurciaDraftEIScomments.pdf

Hello, please find attached my public comment on the line 3 draft eis.

Brent Murcia
brentmurcia@gmail.com
400 6th ave SE Apt 24 Minneapolis MN 55414
860-796-1994

thank you!

Public Comment on behalf of Brent Murcia
Docket Numbers CN-14-916 and PPL-15-137

Hello,

My name is Brent Murcia. I am 22 years old and a resident of Minneapolis. I have lived in Minnesota for 5 years, and recently graduated from Carleton College with a degree in Environmental Studies. My specific focus area within the Environmental Studies program was environmental justice, and I am familiar with standard environmental justice methodology as well as the use of GIS as a result of those studies. As a young person concerned with environmental justice and climate change, I have been involved with movements to stop oil pipelines for four years. I have attended four of the public meetings on the Line 3 Draft EIS, worked to educate the public on the issue, and participated in a number of public actions to raise awareness about it. I am also one of 13 individuals intervening as a Party in these proceedings under the label "Youth Climate Intervenors;" however, I wish to note that my comments here on the Draft EIS are my own and are not being made behalf of that group.

I have reviewed a significant portion of the Line 3 Draft EIS, though I regret that as simply an average citizen (and someone currently working at 3 jobs), I have been unable to study this 5,000 document as thoroughly as I would have liked. Still, in my review of the document, I have noticed significant flaws that should be fixable within the scope of a proper review process. I raise them here in the hopes that the people with the privilege and responsibility of being paid to work on this document will take note and do their best to address them. In addition to my personal comments here, I also plan to work diligently as one of the Youth Climate Intervenors to continue gathering evidence on the impacts of Line 3, with the goal of creating a more complete public record to advise the PUC on this project.

In these comments, I will focus on two areas of concern: the overall scope of the Draft EIS, and the specific methodology of the Environmental Justice section. These areas do not represent the entirety of my concerns with this document, but rather are the subjects I feel most qualified to comment on given my lived experience and knowledge of these issues. Given constraints on my time and resources, I have chosen to limit my comments to these two points.

I. Overall Scope of the Draft EIS.

Page 3 of Chapter 3 ("Regulatory Framework") states the purpose of this Environmental Impact Statement as follows:

"An EIS is intended to facilitate informed decision-making by entities with regulatory authority over a project. It also assists citizens in providing guidance to decision-makers regarding the project. An EIS describes and analyzes the potential environmental and socioeconomic impacts of a project and possible mitigation measures, including alternatives to the project. It does not advocate or state a preference for a specific alternative. Instead, it analyzes and compares alternatives so that citizens, agencies, and governments can work from a common set of facts."

The purpose of this EIS is thus established as being a complete and useful document to inform decision-makers on the impacts of this project and its alternatives. Of course, as the EIS notes, an important step is to determine what comprises a complete and thorough review.

As Page 7 of Chapter 3 describes:

The first step in preparing an EIS is scoping. The purpose of scoping is "to reduce the scope and bulk of the EIS, identify only those potentially significant issues relevant to the proposed project, define the form, level of detail, content, alternatives, time table for preparation, and preparers of the EIS, and to determine the permits for which information will be developed concurrently with the EIS."

The section titled "Scoping" (3.3.1) describes the process by which alternative technologies and system alternatives, route alternatives, and route segment alternatives were selected for inclusion in this document. However, a notable omission in this section is any justification for a time-scale over which this environmental analysis is to take place.

The temporal scope of this Draft EIS appears to vary from chapter to chapter, and indeed from section to section. For example, consider Chapter 5 ("Existing Conditions, Impacts and Mitigation- Certificate of Need"). In Section 5.3 ("Socioeconomic Environment"), some permanent but minor or negligible impacts on resources - timber, mining, etc - are considered "into perpetuity," and income from property taxes is considered to be "permanent" or "for the life of the Project." However, in section 5.2.7 ("Air Quality"), the comparably massive impacts of climate change (as measured by social cost of carbon) are only considered over a span of 30 years.

A 30-year analysis for climate change impacts is unacceptable. Consider that page 6 of Chapter 2 ("Project Description") of the Draft EIS states:

2450-1

"The Applicant anticipates that the physical life of the Line 3 Replacement pipeline (i.e., the number of years that the pipeline would be capable of transporting crude oil) would be indefinite given appropriate construction, maintenance, and integrity systems. The economic life of the

2450-1 Cont'd

Project (i.e., the number of years that continued operation of the Project would be feasible) is anticipated to be no less than 30 years."

If the Line 3 Replacement is expected to operate for "no less than" 30 years, then limiting analysis of a major impact to 30 years constitutes inadequate environmental review. In 30 years, the impacts of climate change resulting from today's emissions are expected to be greater, not lesser. And fossil fuels burned in 31 years will have equal or greater impacts on the environment compared with fossil fuels burned today. The continued operation of the Line 3 Replacement in 30 years seems highly realistic, given that the existing Line 3 is currently over 50 years old, along with much of the rest of Enbridge's mainline corridor. The Air Quality section should thus account for this, and consider the social cost of carbon at least 60 years out.

Or, if the writers of the Draft EIS have reason to believe that the pipeline will not be in operation after 30 years, this expectation should be noted in Section 5.3 ("Socioeconomic Environment"). Rather than identifying positive economic impacts as "permanent," the Draft EIS should cap them, as they do for climate impacts. At the very least, a consistent analysis is needed in order to properly compare costs.

Also concerning is that in Chapter 10 ("Accidental Crude Oil Releases"), the danger of a spill is calculated on a per-year basis, but is never identified over the potential lifespan of the pipeline. This is a problem; analysis of the cumulative risk presented by this pipeline over its entire lifespan is required for decision-makers to have an adequate idea of what is at risk. 2450-2

As a young person who very much hopes to be around in 30 years (and who hopes to someday have children), attention to the cumulative impacts of this pipeline over time, and to its impacts beyond 30 years, is absolutely essential. Please consider the interests of future generations in the next draft of this document.

II. Environmental Justice Section

As stated on Chapter 11 Page 1, an environmental justice review "allows analysts and decision-makers to identify and understand what portion of the total impacts may be borne by minority or low-income communities, to assess whether they are disproportionately high and adverse, and to develop alternatives and mitigation measures if necessary." Unfortunately, I believe that this section does not meet that goal. 2450-3

To begin with, Page 11-2 states that "the census tracts intersected by the right-of-way for the Applicant's preferred route and route alternatives constitute the geographic area within which potential disproportionate adverse impacts from the proposed Project are likely to occur." This

2450-3
Cont'd

lays the groundwork for an environmental justice analysis in which GIS is used to compare minority populations within and outside of these census tracts. This is relatively standard methodology for environmental justice research, and has been used effectively to identify injustice in the siting of toxic waste facilities, landfills, and other environmental harms.

However, as clearly established throughout the rest of this Draft EIS, the impacts of this pipeline are not immediately limited to the area adjacent to this pipeline. When the pipeline crosses lakes, streams, and rivers, the potential exists for a spill to pollute an area well beyond the bounds of a particular census tract; as laid out in Chapter 5, oil may travel many miles downriver following a spill. Watersheds do not neatly follow the boundaries of census tracts, and no apparent effort has been made to analyze minority populations in an area that more accurately reflects the pipeline's impacts. Closer attention to census tract selection is needed to make this an effective environmental justice analysis.

Chapter 11 does in fact acknowledge this reality. As Page 7 notes, "In addition to the individual land use categories that would be affected by the routes, various waterbodies and streams would be crossed." However, absent any attempt to include this observation in the quantitative analysis of this section, the statement is, sadly, relatively meaningless.

Page 11 also notes that "From an Ojibwe perspective, waterbodies at risk from the proposed pipeline include any water directly downstream from a pipeline crossing. Pollution of these waters from a petroleum spill would create a significant hardship to traditional lifeways and spiritual and religious needs of the people." It is correct that this statement is true "from an Ojibwe perspective." Of course, it is also true from any other fact-based perspective, including that of earlier chapters of this EIS. This "significant hardship" is deserving of greater mention.

Beyond all of this, the biggest omission in Chapter 11 is not quantitative, but qualitative. Even if only 5% of a population is minority/low-income, if that population is particularly dependent on a resource compared with the rest of the population, then it is still an environmental justice issue if that resource is affected, because the impacts disproportionately fall on that population. Considering equity in the siting of a project is important; considering equity in its impacts is equally so. A community's share of the population being low does not mean that the impacts they face are not disproportionate. In order to be an effective analysis, this section must consider qualitatively (and if possible, quantitatively) how project impacts vary on different segments of a population within the same geographic location as well as between them.

III. Miscellaneous Concerns

A couple of other things that seem to require serious reconsideration::

- As I've previously cited, Chapter 3 states that an EIS "does not advocate or state a preference for a specific alternative. Instead, it analyzes and compares alternatives so that citizens, agencies, and governments can work from a common set of facts." However, Chapter 11 Page 13 states that "a finding of 'disproportionate and adverse impacts' does not preclude selection of any given alternative."

  Given the scope of this document as stated previously, such a statement is entirely out of place. What does and does not "preclude selection of any given alternative" would seem to fall to decision-makers to determine, not the writers of an EIS. The purpose of this EIS is solely to advise decision-makers on what potential impacts may be. There is, for example, no sentence in the "Socioeconomic Environment" section advising that the presence of lower tax revenue does not preclude selection of a given alternative. To avoid bias in presentation, this sentence should be removed.

- Page 11-7 states, regarding treaty rights, that "these treaty rights and tribal resources are important to the Indian tribes as both natural and cultural resources and reinforce their cultural identity. Additionally, the mental well-being of Indian tribal members is linked to their tribal resources and access to their treaty rights." It is also worth noting here that treaties constitute binding legal documents as well. "Access to treaty rights" does indeed impact mental well-being; it also impacts legal rights. This crucial fact deserves acknowledgement in this section. 2450-4
- The length of the chapters on Existing Line 3 Abandonment and Removal (13 pages), Environmental Justice (15 pages), and Tribal Resources (31 pages) are entirely insufficient in the context of a 1,894 page document (not including appendices). The Abandonment section is particularly lacking. These sections require additional substance.
- Notably, there is no analysis anywhere in this Draft EIS of the eventual abandonment or removal of a new Line 3 pipeline. This is an obvious and substantial impact of the Line 3 Replacement, especially as the abandonment and removal of the existing Line 3 warrants an entire chapter here. Some analysis of the costs and dangers of the eventual removal of this new pipeline must be included in order to ensure a complete review for the record. 2450-5

CONCLUSION

Thank you for the work you have done on this Draft Environmental Impact Statement. Some pieces of this review are quite strong. Unfortunately, other pieces are sorely lacking and in need of attention. It is my opinion at this time that the latter outnumber the former. I regret that at this time my critiques are still a work in progress; I will do what I can to develop them through continued engagement in this process. Thank you in advance for your continued work in

improving and refining this environmental review for the good of all Minnesotans, present and future.

Levi, Andrew (COMM)

From: Matthew Nameth <nameth.matt@gmail.com>
Sent: Saturday, July 08, 2017 2:23 PM
To: MN_COMM_Pipeline Comments
Subject: Stop Reckless Land Management
Attachments: images.jpg

Dear Public Servant,

This letter is in regards to Line 3, docket number CN-14-916, and docket number PPL-15-137. There are many people across the country keeping a eye on your actions. You have the potential to preserve your beautiful State of Minesota for many future generations. Line 3 is posing a major threat to national security. Being the headwaters of the Mississippi River, and a state of the Great Lakes region, the State of MN and it's elected officials have a comitment to protect our nation, and it's waters. I strongly oppose this project and feel the Line 3 project, if approved, will turn into a situation larger than that of Standing Rock. This letter is in no way a threat. The people will come in a good way. Peacefully. Yet they will be assulted by unregistered private security firms, militarized police forces, and National Guard for taking action against issues that should not be overlooked by the state of MN. Please ask yourself if you want that in your state.

10 THINGS EVERY AMERICAN NEED TO KNOWABOUT THE LINE 3 DEIS

Enbridge wants to abandon their crumbling Line 3 pipeline in our lands and build a new one in a new corridor through our lakes, wild rice beds, and treaty territories. The Draft Environmental Impact Statement (DEIS) for the Line 3 pipeline found that every single option for the project would have long-term detrimental effects on tribal communities. Most of the issues specific to tribal people and resources are confined to a separate chapter that attempts to provide “an American Indian perspective”, siloed and excluded from the main chapters that assess potential impacts. The 5000+ page document attempts to justify why the oil industry’s need to profit is greater than the need of the Anishinaabeg people to survive.

These are the 10 ways the Line 3 DEIS has failed to serve tribal communities of Minnesota:

1. NO FREE, PRIOR, AND INFORMED CONSENT OF TRIBAL NATIONS

Enbridge seems to have learned nothing from Standing Rock. Nowhere does the document say that free prior and informed consent of Tribal Nations must be attained through formal Nation-to-Nation consultation before any plans or decisions are made for this pipeline. 1427-1

The State of Minnesota doesn't seem to understand the basic concept of tribal sovereignty. The route alternatives compared in the DEIS include two routes, called RA-07 and RA-08, that would cross the Leech Lake and Fond du Lac Reservations, despite the fact that the tribes clearly will not consent to a new pipeline. Enbridge's "preferred" route would skirt reservations boundaries while still crossing watersheds and lands of 1855 Treaty Territory. This is a clear attempt to circumvent tribal consent.

2. DISREGARD FOR THE HEALTH OF TRIBAL COMMUNITIES

Chapter 9 of the DEIS acknowledges that impacts on tribal communities "are part of a larger pattern of structural racism" that tribal people face in Minnesota. The DEIS also states that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities", but concludes that is "insufficient reason" to deny the project.

3. NO CONSULTATION OR PLAN FOR PROTECTING SACRED SITES

Just as we saw in North Dakota, the assessment of archeological artifacts were performed by the company, whose best interest is to put the pipeline through their preferred route at any cost. Enbridge admits that 63 sacred sites are slated for destruction, but claims that only 3 are eligible for protection under the National Register of Historic Places (5.4.2.6.1). Pipeline corporations cannot be trusted to understand and implement protections for our numerous sacred sites.

4. NO PROTECTIONS FOR WILD RICE LAKES

The DEIS acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences." It also shows that Enbridge's preferred route would "impact more 1855 Treaty Territory wild rice

lakes and areas rich in biodiversity than any of the proposed alternative routes." These sensitive areas would be the worst place for a tar sands oil spill.

5. LINE 3 IS GUARANTEED TO SPILL

The DEIS estimates the annual probability of different kinds of spills on the proposed route:

Pinhole leak = 27% (once every 3.7 years)

Small Spill = 107% (once every 11 months), Medium = 7.6%, Large = 6.1%

Catastrophic = 1.1% (once every 87 years)

Basically what this means is that in 50 years, the 1855 treaty territory can expect 14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic spill.

The DEIS also contains no spill analysis for tributaries of the St. Louis River (which is already a toxic superfund site) or Nemadji River, where a spill could decimate our sacred Gichigami, Lake Superior. 1427-2

6. NO "WELLS TO WHEELS" ASSESSMENT OF IMPACT

There is zero discussion of how Line 3 starts at the sacrifice zone of the Alberta Tar Sands where Dene and Cree people continue to be poisoned, raped, and murdered by the most extreme extraction project in the world. Further, there is no mention of how with 370,000 bpd of additional capacity, Enbridge will need a new pipeline departing its terminal in Superior. We know that they plan to expand pipelines through Ojibwe and Ho-Chunk territories in Wisconsin to accommodate. Finally at the end of the line, refineries are poisoning communities of color. Residents live with fear of kidney failure, autoimmune diseases and cancer and early death due to chemical exposure from massive refineries. This big picture must be considered to truly assess the impacts the Line 3 pipeline.

7. NO PLAN TO HOLD ENBRIDGE ACCOUNTABLE

Neither the State of Minnesota nor the Federal Government have a plan for enforcing environmental regulations for Line 3. When searching through extensive databases of Enbridge's spill history, the numbers often disappear once they hit the reservation line. How many spills have already ruptured in our communities without any response or reporting?

Many of the DEIS's environmental impacts and plans for minimizing them are drawn directly from Enbridge's permit application without any evidence of compliance or genuine consideration that Enbridge won't follow all the rules. History shows that they continually violate permit conditions.

8. NO PLAN TO STOP SEX TRAFFICKING IN PIPELINE MAN-CAMPS

The DOC assumes "all workers would re-locate to the area" and zero construction jobs will go to Minnesotans. We are all too familiar with how "the addition of a temporary, cash-rich workforce increases the likelihood that sex trafficking or sexual abuse will occur".But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). That is in no way an assurance that our women and children will be any safer come 2018 when construction is slated to begin.

9. INADEQUATE ASSESSMENT OF ABANDONMENT

Enbridge's current plan is to cap off the crumbling old Line 3 pipe in sections and leave it in the ground for landowners to take care of, setting a dangerous precedent for future pipelines in Minnesota, including the NEW Line 3. The risks of abandoning pipelines are not adequately assessed in the DEIS. There is no discussion of the dangers of exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied. These rusting pipes are conduits, and could one day drain a lake or wetland and dump toxified water onto farm fields. What is the plan for cleaning up the contamination from the countless spills that have already occurred along Line 3? There is also no mention of the abandonment of the other 3 ancient pipelines in Enbridge's existing mainline corridor (Lines 1, 2, and 4), which we expect Enbridge will very soon attempt to follow suit. It should also be known that Enbridge will stop paying taxes to the MN counties along the mainline corridor. For many of these poor northern counties including 1427-3

the Leech Lake and Fond du Lac reservations, revenue from Enbridge's property tax makes up a significant portion of the county budget.

10. THE "NO BUILD" OPTION IS NOT GENUINELY CONSIDERED

The DEIS includes an option of the "Continued Use of Existing Line 3" (Chapters 3 and 4), but nowhere is the "No Build" Alternative considered. Enbridge already has a massive pipeline corridor leaking across our territories. It is not the responsibility of our communities to continue to sacrifice our waters and lands so a foreign corporation can maintain their bottom line. When will the "Shut Line 3 Down Because It's Falling Apart and Poisoning Our Communities" option be considered?

MS. SHARON NATZEL: Sharon Natzel, S-H-A-R-O-N, N-A-T-Z-E-L.

I'm talking about the new route

for the proposed Line 3 pipeline, which I believe threatens Minnesota's clearest lakes, and that's our fresh water.

This proposal would really establish a new pipeline corridor, which just south of Park Rapids, Minnesota, all the way to Superior is really a totally new corridor.

It would cross the Mississippi River in multiple spots, also. And this is a water rich environment in that new corridor, and some of the sandy soils are very permeable, and also some of the aquifers are connected.

The oil spills could pollute and endanger these fresh waters for our drinking, for our recreation, and our wildlife during the project's lifetime, which we know, because of this replacement project, is at least 50 years.

So this would be 50 years of potential pollution. The Mississippi River does provide drinking water for St. Cloud, Minneapolis, and St. Paul.

We also need to consider, in the Yellowstone River 2015 pipeline spill, which

happened under the ice, it was near Glendive, Montana, and there the drinking water had to be replaced with truckloads of fresh water that was brought into Glendive.

We know that from our ice-out contests around the area, that we have at least three months of frozen ice here.

The United States Geological Service, in November of 2010, did a national research program document entitled, "Water Security, National and Global Issues," and they referenced a United Nations' environment program document.

In that document it states that, "By 2025, our global fresh water stress that owes to the increasing population on water use, will increase significantly." And we know that overseas that will happen, but even in the United States.

And the document projects that by 2050, nearly 5 billion people will be affected by fresh water scarcity.

"By 2025," the document states, "Across the United States the water withdrawal as a percentage of total available is

projected to be 20 to 40 percent."

And we know that even in Minnesota we're starting to look at groundwater management areas because of the amount of fresh water available, and our straight river groundwater management area is now in that.

The EPS also states that Lake Superior is 20 percent of the entire global fresh water.

The pipeline corridor goes to Lake Superior. The USGS document also explains that the amount of fresh water is finite, and that fresh water makes up only 2.5 percent of all the water on earth.

So we need to consider, when we're placing a pipeline corridor, just where our waters are and the soils that we're placing the pipeline in.

If we need to have pipelines, we need to also consider our fresh water. All of our water is connected and it's needed for life.

Thank you.

Levi, Andrew (COMM)

From: Ken Neihart <kjneihart@gmail.com>
Sent: Sunday, July 09, 2017 6:01 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN - 14-916 and PPL - 15-137).

Specific Comments:
1. Certificate of Need.
With the number of oil pipeline corridors in the state and the decline in demand for oil in the state and the country, a close look has to be taken when considering the CON. Since 2004 there has been a decreased demand of oil of 14-19% in Mn. and 4-5% in the country. We don't need any new pipeline corridors. The PUC needs to study/analysis the system of oil pipelines and pipeline corridors in the state and come up with a workable solution to move these oil products through the state using the existing corridors. The cost of mining tar sand oil also needs to be considered. How much longer will it be cost effective to continue mining it.
2. Alternate route SA-04:
SA-04 in mentioned in some sections and tables in the Executive Summary but not in others. Is this route considered to be an alternate? In my opinion, the route is a much safer and environmental sounder route that the other alternatives that are being considered. The other alternative routes travel through a more water-rich environment. Evaluation of SA-04 is missing from the following figures ES-9, ES-10, ES-11, Table ES-4, and sections on Habitat Fragmentation and Impact of Fish and Wildlife Habitat. To complete a fair and objective evaluation, SA-04 needs to be included into these portions of the final EIS. 1429-1
3. "Stray Current Corrosion":
Stray Current Corrosion describes the effect a high voltage power line can have on a pipeline that is co-located in the same corridor and the risk is increased when the pipeline in located in a water-rich environment such as a swamp, marsh, etc. The stray voltage travels to the pipeline and can cause corrosion in the pipe. A portion of the applicants preferred route is in a utility corridor with a high voltage power line. I didn't see any mention of a "Stray-current Mitigation System" in the DEIS. 1429-2
4. Economic and Employment:
Minnesota Administration Rules 4410. 2300 (content of EIS) paragraph H requires an EIS to consider environmental, economic, employment and sociological impacts. I didn't see any mention of this in the DEIS. Will this paragraph H be covered in the EIS? The applicants preferred route traverses lake county that depends on tourism year round. 1429-3
This tourism industry has a very large impact on the area's economy and needs to be considered in the EIS.
5. Aromatic Hydrocarbons:
Benzene and toluene are examples of aromatic hydrocarbons. These two chemicals are added to the bitumen (tar sand) to thin the bitumen so it can be transported in a pipeline. When there is a spill the hydrocarbons either evaporate or find there way to the water column or water table. Once in the water table, they are transported with the water. The bitumen usually sink to the bottom in water and is difficult to remove and in some cases impossible to remove. The aromatic hydrocarbons are carcinogenic solvents. I have a cabin on West Fox Lake which is in Fifty Lakes. Fifty Lakes is 4-6 south of the applicants preferred route and the water table flows in a southwest direction so any spill could find it's way to the city. It also could find it's way to the drinking water of some of the residents who has shallow wells. Daggett Brook also flows south from the proposed pipeline and flows into the Whitefish Chain of lakes passing through a couple lakes in Fifty Lakes.

General comments:
1. I was disappointed not to see any comments from the DNR or the MPCA. They were suppose to to be part of this process! I had expected comments from these two important state agencies. Their comments on this proposed pipeline need to be part of the process. I would suggest devoting a chapter in the EIS to both the DNR and MPCA for their comments on this proposal.
2. I only saw one author of the DEIS listed. 1429-4
3. Has anyone mentioned the three crude oil pipelines exposed on the Tamarac River?

4. Is there 192 water crossing on the proposed pipeline route?
5. How many other DEIS' has Cardno, Inc. done for the state?
6. What is the maximum number of barrels of oil can be transported in the proposed 36" pipe? 1429-5

Thank you,
Ken Neihart

Sent from my iPad

MR. JAMIE KYLE NELSON: Jamie Kyle Nelson. J-A-M-I-E, K-Y-L-E, N-E-L-S-O-N.

Since 1999 I've lived right across the road from the Viking pipeline station. And the pipeline has always been courteous. The workers have been great to me, they have been good neighbors.

I support the new pipeline, proposed pipeline. I think they're great for the community of Viking, they've donated vehicles and money. They

paid a huge amount of taxes and I think it would be a shame for the state to deny the pipeline to go through.

1748-1

I would like to see on that chart that shows the accidental crude oil releases, I would like to see a chart that showed the amount of gallons released for, you know, like per million barrels pumped, so that I could compare the amount of gallons that actually leaked between the rail, the pipeline, and trucks based on how much oil is actually transferred so you can see the amount released per million barrels, or however they wanted to do it. I think that would be helpful, to see the comparison between rail, pipeline, and trucks.

So, and that's all on the comments, I guess.

Thank you.

Line 3 DEIS comments: Docket #'s: CN-14-916 & PPL-15-137

0321-1

Abandonment:

The DEIS states that Enbridge has indicated that it would develop of a contaminated sites management plan to identify, manage and mitigate historically contaminated soils and waters found during the abandonment or removal of the existing Line 3 (8.3.1.1.1) Where is the actual plan???

0321-2

Construction and Restoration:

Cathodic protection will not be installed for up to 1 year after pipeline completion (2.3.2.3). Lack of cathodic protection is the causative factor in many pinhole pipeline leaks. The proposed route follows a utility corridor for much of its length. This is unacceptable.

Economic Impacts:

Chapter 5 states that line 3 will create ZERO permanent jobs. Enbridge's application states that existing operations staff will be able to operate the pipeline and that few additional employees would be hired to assist the staff. Zero construction jobs will go to Minnesota. (5.3.4)

Climate Change:

(Executive Summary pg 18) The DEIS acknowledges that Line 3 would contribute to climate change through analysis of 3 different types of emissions: direct, indirect and lifecycle. The direct and indirect emissions alone would be about 453,000 tons of CO 2 per year, costing approx. $478 billion over a 50 year life span.

The DEIS does not discuss the unprecedented challenges of human casualty, displacement, conflict, natural disaster, biodiversity loss, etc., that climate change is causing, OR the consensus from the Scientific communities that we must leave fossil fuels in the ground. It also fails to acknowledge that across the planet, indigenous people are disproportionately impacted.

Chapter 9 states that ANY of the possible routes for line 3 "would have a long term detrimental effect on tribal members and tribal resources." It also states that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound consequences." Why is that finding not reason enough to stop this plan??? 0321-3

Chapter 11.4.1: The DEIS acknowledges that 'The addition of a temporary, cash rich workforce increases the likelihood that sex trafficking and/or sexual abuse will occur." Asking Enbridge to prepare and implement an educational plan or awareness campaign to address this issue is not likely to change the outcome. Perhaps you haven't noticed the connection between the rape of women and the rape of the planet's resources yet, but it's there, please wake up...

Specific comments:

History shows that Enbridge continually violates permit conditions. Promises of Enbridge pledges to do this or that without a concrete action plan should not be accepted.

Alternatives to the pipeline are ludicrous. Our focus needs to be on replacing fossil fuels with renewable, sustainable resources; wind, solar, geothermal...all will provide jobs.

We all know pipelines leak – we are at the point that ANY leak is unacceptable. The probability of spills on the proposed route shows that in 50 years we could expect 14 pinhole leaks, 54 small leaks, 4 medium, 3 large and 1 catastrophic...

Thank you, Karen Nielsen

06/16/2017 01:34PM 3202534116 EDGEWATER MEDICINE PAGE 02/02

Draft Environmental Impact Statement
Public Comments
07/10/2017 for consideration in the final Environmental Impact Statement for the below mentioned dockets.

Submitted by James W Reents
Leader, Pipeline Working Group
Northern Water Alliance of Minnesota

RE: IN THE MATTER OF THE APPLICATION OF ENBRIDGE ENERGY,LIMITED PARTNERSHIP FOR A CERTIFICATE OF NEED AND PIPELINE ROUTE APPLICATION FOR THE LINE 3 REPLACEMENT PROJECT IN MINNESOTA FROM THE NORTH DAKOTA BORDER TO THE WISCONSIN BORDER
(DOCKET NOS.PL-9/CN-14-916 AND PL-9/CN-15-137)

General comments and observations:

In reviewing the document in the time given I would first request that any information included within the EIS provided by the applicant should be highlighted and boxed with different shading such that one can evaluate the parts of the EIS which the applicant's information stands alone.

I object to the perpetuation of the applicant's "PR speak" with the use of anomalies form leaks, ruptures and pipeline failures as well as missing pipeline coating being referred to as "coating holidays". While the applicant is free to use these terms, the Department of Commerce is not. It gives the perception of bias to the applicant.

The Department of Commerce's consultant in preparing the DEIS, Cardo, states in Chapter 5: "professional judgement based upon other impact statements." I would as what other Impact statements and how they affected that professional judgement. Where any of these others done for the applicant rather than a State entity?

If cathodic protection is necessary for a pipeline, why is it installed a year after construction?

- A full economic analysis of need for additional oil transportation through Minnesota is needed. This should take into account not only the touted benefits of the proposed projects in terms of short-term jobs and additional tax contributions, but also the economic impacts of climate change and mitigation from the continued uses of fossil fuels. While there is impact locally, the economic impact should be considered on at least a national scale as decisions fragmented by state regulatory agencies have impacts 1570-1

that extend well beyond their jurisdictional boundaries. Since the Environmental Impact Statement is to inform the PUC for consideration of approval or denial of the Certificate of Need, the economic analysis will provide an assessment of whether the proposed project is of benefit to the citizens of the State of Minnesota

- Climate Change needs to be integral to the EIS, not just the evaluation of the additional CO2 released into the atmosphere from the product transported, but also at the end point of consumption, and on the production end. There was a news release from the Minnesota Pollution Control Agency dated June 14th of this year which cites a new report by the State's Interagency Climate Adaptation Agency (ICAT): 1570-2

" For several decades Minnesota has seen substantial warming during the winter and at night, with increased precipitation throughout the year, *particularly from larger and more frequent rainstorms.* These two effects will continue to be the leading symptoms of climate change.
These changes have *damaged buildings and infrastructure, limited recreational opportunities, changed our growing seasons, and affected the quality of our lakes, rivers, and drinking water.*" (Italics added for emphasis) For the full report, contact: Risikat Adesaogun, 651-757-2056. This report should be considered in the final EIS. At present, there is no evaluation of changes in construction and specifications regarding construction and severe weather events.

- Line 3 abandonment was initially presented by the applicant with the following statement; the existing Line 3 will be flushed and filled with an inert gas and receive continued monitoring. In the DEIS, other methods of abandonment are presented. The questions unanswered in the several approaches are: for how long, and a what point does the liability revert to the state? 1570-3

- Reasoning for the Line 3 relocation includes a current line that is operating at reduced capacity because of deterioration within the line. Although the date stated by the applicant has varied from 2007 to 2008, if there was such a need, and the line in such a state of deterioration the Federal Government ordered the reduced volume, why has the applicant continued to operate the line for almost a decade in this deteriorated state? Is it a public responsibility to approve another energy corridor for the convenience of the applicant when the current line demonstrates a lack of maintenance on the existing line and poor planning on the part of the applicant in the existing energy corridor? The DEIS states in Section 3.1 that the risks associated with pipeline removal are similar to a new pipeline project. The applicant also states that repair or removal would inconvenience existing landowners. What about the inconvenience of landowners on the proposed route or any of the alternatives?

- Tar sand oil cleanup methodology; none currently exists for cleanup on water and analysis of risk based upon water crossings and water proximity should become part of the EIS Scope. Information is provided regarding the specific gravity of the dilbit stating it is lighter than water and therefore floats. While the NSF study does state that the oil initially floats, it does so only until the diluent evaporates or is floated off; the the tar sands sink. This should be corrected and the NSF study should be references. 1570-4

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- Evaluation of the cost of carbon mitigation of the proposed trans-shipped oil in light of climate change and atmospheric carbon reduction goals; both statewide, nationally, and also those targets committed to by the US in the 2015 Paris Climate Summit should be included within the EIS. Nothing done in Minnesota impacts only Minnesota. Carbon impacts should be considered from point of extraction to final consumption. 1570-5

- What will become of stranded assets? Current estimates on Bakken and Williston Basin Oil is that they will be depleted in 20 years. The Canadian Government is saying 80 to 90% of the tar sand oils in Alberta should remain in the ground, negating , except for the short term, any need for a new Line 3. What's to become of the infrastructure? Removal? Abandonment? Other proposed uses by the applicant? 1570-6

- Most major players in the Alberta Tar Sands have either delayed, put on hold, and in some cases, such as Statoil, have pulled out of Tar Sand Oil. Need for additional oil should be included within the EIS. This should be based upon current industry data, not government projections which overestimate demand in light of the changing world dynamics.

- Is the proposed Line 3 as a 36-inch diameter pipeline (12% larger by volume) actually a replacement or an entirely new pipeline, which needs a new US State Department approval? Why is it being considered by the state without this determination. The applicant's statement that it can undertake these improvements under a 1960's permit should, at the very least be questioned and confirmed by the U.S. State Department

- The current State Department EIS review of the Alberta Clipper should be included within the scope of the EIS. Presently, the Alberta Clipper is operating at a capacity for which the lie has yet to be approved through the sleight of hand Line 3 / Alberta Clipper bypass at the Canadian Border. The currently underway EIS was a condition of the original approval of the Alberta Clipper. The inclusion would enhance the evaluation of the Sandpiper ? Line 3 Energy Corridor proposals. One example: it is our understanding that the spill modeling in the current DEIS only analyzes 10 mile downstream while the Alberta Clipper review models 20 mile downstream. No explanation is given for the change in criteria and then the information is closely held "for security reasons".

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• The EIS should include spill modeling under both average and worst-case weather conditions on all river crossings as well nearby lakes, streams and wetlands. Too often modeling is done at average or perfect weather conditions that in turn can skew the findings. The northern part of Minnesota through which this proposal passes experiences at least 5 months of winter and almost as long a period of ice cover. This needs to be taken into account with any modeling. See note above; hard to evaluate information that is withheld. 1570-7

• Impacts on both natural and human resources: including but not limited to those natural and human resources of importance to the Native Bands and including their retained rights under the 1837, 1854, and 1855 Treaty Areas. The statement of dismissal that native groups would be unfairly impacted by the proposed route but it is not a reason for denial appears racist, whether that was the intent or not. The issue of the exploitation of women was dismissed with the statement that the applicant would provide educational training around the issue for its contractors. This is not acceptable.

• The EIS should include the entirety of the project from beginning to end; i.e.: from the Tar Sands of Alberta or the Bakken and Williston Basin fields in North Dakota to the Gulf Coast.

• The EIS should not assume that the criteria for route evaluation include any intermediate through-points (Clearbrook or Superior) . In the public input sessions conducted by the Department of Commerce, it was unclear as to how system alternatives and route alternatives would be evaluated within the EIS. To be fair to both the applicant and the citizens of Minnesota, both system alternatives and route alternatives should be included within the EIS. The inclusion of the rail and trucking alternatives have no basis in reality. If there is a need for an additional 300,000+ BBD of dilbit from Alberta or any combination of oil types, it is currently being accommodated by other transportation methods. To imply greater risk to large urban areas if the proposal is not built ignores both the market place and restrictions (or lack thereof) of hauling liquids of greater hazard. These options should be stricken from the final EIS or at a minimum refined so that they make sense. 1570-8

• Enbridge's initial applications include some information, it should not be used to limit the scope of the EIS nor should any conclusions by the applicant become part of the final EIS. Initially within the proceedings, route alternatives were eliminated based primarily on additional cost to the applicant. Cost to the applicant should only be considered if there is also a public cost considered. Instead, based on the evaluation of the EIS of both route and system alternatives, the least environmentally sensitive with the least impact on Minnesota's natural resources should be considered along with the no build option.

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• A request by the Department of Commerce to add an economist speaks to a lack of time and staff to accomplish the incorporation of public comment into the final EIS in the 30 days within their schedule. One would ask, behind the scenes, who is driving the schedule.

• There should be a chapter included in the final EIS which speaks only to water as a public resource within the state. The quality of the water for drinking purposes as well as the downstream demand for that drinking water over the life of the project needs to be included. One study by the Humphrey School of the University of Minnesota states that because of the current rate of water table drawdown by the metro suburbs, all of the metro area (the majority of the population of the state) will be relying on the Mississippi River for their water supplies within 13 years (2030) Swackhammer, UMN. 1570-9

- Additionally, there is a blanket statement accepted within the DEIS that the groundwater table is at a depth of 10 feet. It light of the many wetland and water crossings, I would question 10 feet as even an average. I would estimate that the majority of the pipeline, buried at the 7 foot depth stated in the DEIS would be 1570-10

within the water table. Pinhole leaks have a potential to contaminate the water table and remain undetected for long periods of time. While the applicant states they will monitor throughput for loss, they use terms like "beyond a certain threshold for line loss" and "predetermined minimums and maximums". What are these potential losses? Over time? Hydro testing is mentioned with a demand for 11 to 17 million gallons per spread. No water source of water is identified and the water discharge plan which is approved by the applicant. As statement is made about treating the water before discharge, but to what standard? Water testing on an existing line done, I believe in 2015, sourced water from the Red River in North Dakota and discharged it in Wisconsin. No concern was apparent at that time for treatment. In Northern Minnesota, in light of our challenges with aquatic invasive species, we should not be considering these volumes of water transferred from one point to another without a plan approved by the MPCA.

. The construction plans and techniques are obviously provided by Enbridge boilerplate but it is stated that only Enbridge has the right to issue a stop work order. Especially in light of high pollution sensitivity areas identified, does it not seem reasonable that the State and Federal Governments should have the final say as to appropriate construction and adherence to the required permits issued. We don't want a "fox guarding the henhouse" situation. Any applicant cannot be trusted to adhere to permits and construction techniques unless verified. The State should step up and not just rely on the applicant's statements.

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MR. JIM REENTS: Jim, J-I-M,

Reents, R-E-E-N-T-S. I'm with the Northern Water Alliance of Minnesota's Pipeline working group.

I have four points to make today.

FACILITATOR: Jim, sorry to interrupt. Could you please move closer to the mic.

MR. JIM REENTS: I have four points to make today. The seven spill sites addressed in the draft do not adequately represent the very sensitive and biodiverse lands and waters of this route.

Additionally, with Enbridge withholding much of the information, as Richard said, it can't be analyzed. They did not address wild rice wetlands, the St. Louis River tributaries of Lake Superior, the Nemadji River tributaries, the Mississippi River. All will be impacted by inevitable spills, leaks, or anomalies.

One thing we know for sure, pipelines spill. It's not if, it's when. And the product proposed for this Line 3 primarily dealing with tar sands oil cannot currently be

cleaned up, and in fact, according to the National Science Foundation, there is no current technology to clean up this type of oil in a water environment. 2043-1

Expand the modeling for water spill sites, and I would recommend that the ten-mile impact range for the analysis should at least be doubled to match the analysis that was done for Line 67 by the State Department. 2043-2

The Enbridge permit application cites what they would do to minimize environmental impact. Nowhere does the draft identify what outside entity or agency will monitor these commitments, supervise the permits, and what regulations are in place that these promises become contractual.

Name the outside entities that we can look to and show contracts for this critical process.

In Chapter 11 of the EIS, Environmental Justice, the draft acknowledges that any of the alternative routes would be detrimental in the long term for tribal impact.

MS. KOREY NORTHRUP: Korey Northrup, K-O-R-E-Y, N-O-R-T-H-R-U-P.

I'm from Fond du Lac, I'm a Fond du Lac Band member. I'm an actually enrolled Fond du Lac Band member.

My first question is what is the punishment for Enbridge if they construct the pipeline without permission? Is it just like a fine or something?

MS. JAMIE MACALISTER: I don't know.

MS. KOREY NORTHRUP: I mean, like, do we get to talk about what we would want to see if they did that? 'Cause that's, like, something that's super common. Like, I remember they told me the story of how the aerial lift bridge came. And they told me that somebody went in the middle of the night and blew it up, so then it's already blown up,

so then there's no decision to be made because it's already gone, the canal is already in there, we don't have a choice. We don't have an environmental impact statement or any comment period for them.

So I would like to know what the punishment is if they get caught constructing without a permit. And if it's just a fine, I don't feel like that's enough. So there's that.

Let's see. What else do I have on my paper?

The other thing I'm concerned about is they talked a lot about abandonment, they talked about pipeline fatigue. And I was kind of, like, walking my dog the other day, 'cause I got this, like, new dog, and I just happened to, like, walk down where these proposed parts are. And it seems like there's quite a bit of pipelines already in the corridors that they want to put this replacement line in. So what is the impacts of that? Like, how many pipelines is pipeline fatigue if that corridor has more pipelines than the one where it exists already? That's my question for that. 2882-1

And then my other one is, in your draft EIS, I haven't had a chance to look at it since I just, like, received your -- whatever you

call it, today. But my main concern is, like, other medicines. We talked a lot about wild rice and things like that, and like sugar bush and some of these, like, real common ones. But there are a lot of medicines that are out there that aren't, like, you know, particularly known as medicines, or that we want people to know are.

What kinds of things do we have for that? Like, you know, let's say we use trillium for tea, you know, what about that? Like, what is the impact of the trillium and all the tiny little plants and roots and nuts and berries that we use? Because we don't use like a little bit, we use every single thing that's out there. Every piece of leaf, every branch is utilized in what we do to, like, you know, do our Indian stuff, our secret Indian stuff.

So I really want to know about that. Like, the damage to the ecosystems and stuff like that. 'Cause we have all kinds of different stuff out there and we want to protect everything equally.

So the other thing that I want to know is, you know, when you destroy the ecosystem, that also takes the people with it. Like, a lot of what we believe and know is what we see around us. So when you take those things away from us, like, what

about us as people, like, what are we going to do when you, like -- when our plants are extinct, our medicines are extinct and our animals are extinct, and all those things that we rely on in nature to, like, help keep us balanced as humans. You know, that to me, you know, is like a forced extinction of who we are as people. Like, not only just taking our lands, but taking the things around us, and taking away, like, things that can't ever come back. Like, we just can't grow a new Anishinabe people. They don't just come out of the woodwork. That's just what we have.

And I'm concerned mostly that if pipelines push their way through, that they will just push us out and then there will be no more of us. And that is, like, my main concern, you know. We are a part of this ecosystem, and for it to be sustainable, our presence here is very important.

And I guess that's all I got to say about that. Thanks for listening.

MS. DANIELLE OXENDINE MOLLIVER: I think there is someone in the back here that wanted to speak as well.

But just to speak to your point, Korey, because I understand that lots of folks

haven't had the time to look at it and we are here to talk to it. But just to give a little background on, you know, the consultation, or potentially where you want to focus in the draft if you can't start at 5,000 pages. There is a section called Tribal Resources, which in that is both cultural and medicinal. And then there is also a chapter on Environmental Justice. And there is a Tribal appendix, which has, you know, pretty much every Band has passed a resolution that relates to Line 3. You know, MIAC, there's other organizations and other resources that are in the appendix.

And we did write those. We are clear and we're going to continue to be clear in the draft that we have consulted. That doesn't mean that we have the consent of the tribes, but through the consultation there was those chapters, the Environmental Justice and Tribal Resources was exchanged with some of the technical staff at DNR and to folks. So, you know, I'm sure there is some information there from the staff that is above and beyond maybe the general knowledge of some of the medicines.

But, you know, I would urge you to, if you need to kind of do a quick read, to maybe focus

on that and maybe you can see if there's an overlook and put that into a comment.

MS. KOREY NORTHRUP: All right.

MS. JAMIE MACALISTER: Let me try and unpack a couple of your questions there. The first being about a fine. I don't -- I will have no satisfactory answer for you on a couple of these things.

I don't know how the fines or what the ramifications are, actually, for Enbridge, if they start constructing without permits. I don't know what that is. To my knowledge, they haven't started construction. If they have started construction someplace, that is definitely something that we would want to know about and that is something that the Public Utilities Commission would want to know about.

So that is the first one. Remind me of your second.

MS. KOREY NORTHRUP: I think --

MS. JAMIE MACALISTER: Oh, the corridor fatigue. And, again, the concept of corridor fatigue is subjective, to some extent. What constitutes corridor fatigue? I don't know. It's a term that is used in a number of different

ways. Is five pipelines too many? Is seven pipelines too many? I personally cannot say that constitutes corridor fatigue.

But some of the things that would be looked at, at least that we're looking at in the draft EIS is looking at what's going on in the mainline corridor. Because we obviously know that there are a number of pipelines in the mainline corridor. There's looking at, you know, what does it mean if you put the pipeline in a new corridor and what does that look like, what are those impacts, and how do you look at those impacts compared to the impacts that are already in the existing mainline corridor.

So I think those are good questions and, again, I don't have a satisfactory answer for you because there is no real definition of what corridor fatigue is.

MS. KOREY NORTHRUP: Can we have a clear definition of what that is so that we can all be on the same page of what that means? Because if it's used as an excuse for a replacement and they try to put it in a place that has more pipelines, that doesn't sound like it makes sense to me. So I don't know if you need to call them up or whatever,

2882-1 (cont)

but I feel like we all need to have a clear definition of what corridor fatigue means and what it entails and what it's about. 2882-1 (cont)

MS. JAMIE MACALISTER: Okay. In terms of corridor fatigue, corridor fatigue has been used by several different parties. You know, one way the corridor fatigue is looked at is can any areas sustain, if you will, a certain number of pipelines. As it relates to the mainline corridor, Enbridge is arguing that there is not room in some places within the existing mainline corridor to put an additional pipeline in. That's their preference, that's why they're saying they can't do it, saying there's not room in the existing mainline corridor to squeeze another pipe in there. The other option that's being looked at is the removal of old Line 3 and replacement in the same trench. So those are the two things that are being evaluated.

I think the comments on what -- how do you define corridor fatigue is a fair comment to put in, as you have. I can't -- I don't have a definition for what corridor fatigue is.

MS. KOREY NORTHRUP: So we'll get right on it?

MS. JAMIE MACALISTER: I'll see what I

can do.

COURT REPORTER: I can't hear you.

MS. KOREY NORTHRUP: She was saying she wants it in five-year-old English. Because a lot of us are bilingual, you know, when they use like really big, fancy words in the English words, a lot of us can't follow along because we're bilingual.

MS. SHEILA LAMB: It's the PR language, instead of language to the average person, it's PR. We don't want a commercial, we want it clear and understand it.

MS. JAMIE MACALISTER: I hear what you're saying. If I think about what corridor fatigue means, I get your point, yes.

There was someone in the back.

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Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Lance Novacek

Street Address: 10386 390TH ST NE

City: Middle River State: MN Zip Code: 56737

Phone or Email: Lance novacek@yahoo.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I support the L-3 project. ~~I would~~ I would like to see a statistic that shows all the product that travels from point A to point B. that actually makes it to its destination throughout North America. The DEIS should show job creation for construction. Thanks 0443-1

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: youneek one <youneekone@gmail.com>
Sent: Saturday, July 08, 2017 3:51 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

Nancy Oldham

13332 Beach Haven Rd

Park Rapids, MN 56470

Re: Docket numbers CN-14-916 and PPL-15-137

As a property owner in Hubbard County in northern Minnesota, I strongly object to the proposed, relocated Line 3 Pipeline. Enbridge has picked the worst possible route for this pipeline, with significant potential to harm aquifers, drinking water, recreational areas, tribal lands, rice fields, residential, agricultural land and wildlife. Spills are inevitable. The issue is not WHETHER there will be a spill, but when, where and how much. Let's not allow this pipeline to risk Minnesota's most valuable resources.

The draft environmental impact statement that has been released is impossible for the public to review thoroughly, as it is thousands of pages long and feet high. It would likely take years of research to properly verify all of the statements, facts and figures used in the report.

Of great concern is assumptions made for evaluating hypothetical spills. As Section 7.5.3 notes, "The maximum simulation duration using OILMAP Land was 24 hours, as it was assumed that emergency response measures to prevent continued downstream transport of released oil would be in place within that length of time." In reality, there may be areas in which identification of a spill and a spill response couldn't even BEGIN within that length of time, such as those for which a temporary road may need built in order to get equipment to a spill site. 1436-1

Safety equipment certainly doesn't always detect a spill. Landowners and the public have discovered many spills in the past. Imagine a break in a pipeline at night, undetected by equipment. It would likely be hours and possibly even days before such a spill was identified, much less remediated.

Another deeply problematic assumption is that complete remediation of an area is even possible after a spill. In many spills in the past, the spill area experiences environmental problems many, many years after the event. Think of Kalamazoo, Michigan. Here, Enbridge operators assumed an alarm to be a false one, and failed to shut down the leaking line for SEVENTEEN HOURS.

In the draft EIS section about the Sandy River there is the following statement, "It is assumed in the model that crude oil would enter directly into the Sandy River with no holdup of oil on land. In the event of an actual oil release, any oil on land would undergo prompt and effective remediation." This is clearly the public hope and goal. However, prompt and effective remediation is, quite simply, not always the experience AND not always possible. However, it is commonly known that oil companies own stock in the companies that remediate spills, meaning that they profit from spills as well as the transportation and sale of oil.

PLEASE see that a foreign company such as Enbridge does not gain the power to profit from and endanger the State of Minnesota, its landowners, visitors and economic as well as environmental resources. Many pray the state will focus on alternative energy sources and U.S.-based businesses.

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Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: JAMES M OLSON

Street Address: 37018 ROINEZ TRL

City: BATTLE LAKE State: MN Zip Code: 56515

Phone or Email: mjolson@prtel.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

In the Line 3 Project Draft EIS, I am unable to find a discussion of the solvents required to make the tar sand crude "pumpable". The current line must be employing such a solvent and the proposed Line 3 will be requiring a great deal more. These solvents are not environmentally friendly and need to be accounted for - and how will facilities in Duluth handle the increased volume? 0633-1

If including additional pages please number them and tell us how many you are providing:_____ pages

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Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Josh Olson

Street Address: 305 E 24th St A8

City: Minneapolis State: MN Zip Code: 55404

Phone or Email: 218 348 5701

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I have come here today, of my own free will, to express my concern of Line 3's DEIS. The draft is both inadequate and inconsistent. As someone who values proper research & truthful information, I am dissappointed that the document contains incorrect information. Such as on page 4 of Chapter 7, which lists Line 67's (Alberta Clipper) flow rate to be 570,000 bpd, the line instead operates at close to 800,000 bpd since 2014. 0729-1

I am also upset that the document references broken links, and cites non-existant sources such as "historicaltrauma.com" (Chapter 9). This is extremely unprofessional, and it leads me to question the legitimacy of all information contained within the document. 0729-2

I am dissapointed in Enbridge's Draft Environmental Impact Statement, and concerned about the true impact and implications of this pipeline for MN citizens.

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Joan Ostrove <ostrove@macalester.edu>
Sent: Wednesday, July 05, 2017 7:53 PM
To: MN_COMM_Pipeline Comments

The recently released Draft Environmental Impact Statement concerning the proposed new Line 3 pipeline raises many concerns. I write with the request that the proposal be *denied* given the fact that it encourages investment in a dying industry (tar sands) and commitment to the use of fossil fuels which must be stopped and not only destructive but are clearly a way of the past (e.g., Volvo just announced that all of its cars will be electrified by 2019). In addition, it endangers Indigenous/tribal lands and livelihoods in Minnesota.

Below are some more specific comments about the DEIS.

There is absolutely no discussion of what would happen with exposed pipe, only the acknowledgement: "When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high" (8.3.1). 1226-1

The report clearly states that Line 3 would contribute to climate change. 1226-2
Line 3's direct and indirect emissions alone would be 453,000 tons of CO2 per year. Over a 50-year lifespan, that would cost an estimated $1.1 billion. (Executive Summary p.18).
Climate change is having a devastating impact on humans and other forms of life - displacement, loss of biodiversity, conflict and war; the effects on indigenous peoples are disproportionate.

Chapter 5, "Existing Conditions, Impacts, and Mitigation" states that Line 3 will
NOT create
permanent jobs
, and few if any jobs would go to Minnesotans
. Enbridge's application states that "existing operations staff would be able to operate the [pipeline] and that few additional employees would be hired to assist the staff" (5.3.4).

The DEIS concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5)
That should be a reason to deny the project.
Chapter 6 states that Enbridge's preferred route would impact more wild rice lakes and areas rich in biodiversity than any of the proposed alternative routes (Figure ES-10).
The "No Build" Alternative is not really considered. It is framed as "Continued Use of Existing Line 3" (Chapters 3 and 4), but nowhere is the "Shut Line 3 Down" option considered. There is no discussion of renewable energy, conservation, or the rapid development of electric car technology.

The DEIS indicates that the costs far outweigh the benefits. Please do not allow a permit of Line 3. It would be much better to develop renewable energy infrastructure.
Thank you, Joan M. Ostrove

--
Joan M. Ostrove
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Levi, Andrew (COMM)

From: Star Otto <creatastar@gmail.com>
Sent: Sunday, July 09, 2017 9:09 PM
To: Ek, Scott (PUC); Wachtler, John (COMM); MN_COMM_Pipeline Comments
Subject: Commentary for the DEIS for Line Three - Wichahpi Otto
Attachments: Enbridge Letter.docx

Attached is my public submission for the DEIS for Line 3. Please respond that this has been received and filed appropriately.

Thank you!

Wichahpi Otto

The communication in this email is private and confidential intended only between the parties addressed in the communication. If you are not the sender or recipient intended please respond or call 952-210-8303. Any intention to use the content of the information in the email is strictly prohibited without permission from the sender.

July 10, 2017

Minnesota Public Utilities Commission
Attn: Scott Ek, Planning Director
121 E. 7th Place East, Suite 350
St. Paul, MN 55101-2147
Email: Scott.Ek@state.mn.us
Phone: 651-201-2255

Re: DEIS Line 3 Comments, Enbridge Energy, Ltd.

I am writing this scoping letter to respond to the Draft Environmental Impact Statement for Line 3, Enbridge's proposed project requires two separate approvals from the Minnesota Public Utilities Commission (Commission) – a certificate of need (CN) and a route permit. The Commission's docket numbers for these approvals are PL9/CN-14-916 and PL9/PPL-15-137.

I respectfully request that the Minnesota Public Utilities Commission comply with the Minnesota Statute 216H.02 Greenhouse Gas Emission Control, subdivision 1, greenhouse gas emission-reduction goal. Currently, the goal reflects that the state to reduce statewide greenhouse gas emissions across all sectors producing those emissions to a level at least 15% below 2005 levels by 2015, to a level at least 30 percent below 2005 levels by 2025, and to a level at least 80 percent below 2005 levels by 2050.

The last dated report on the Minnesota Pollution Control Agency's website is lacking two years of data, with the last report done in 2014. Fortunately, the report can be found at https://www.eqb.state.mn.us/sites/default/files/documents/CSEO_EQB.pdf

Oddly, with the last legislation, Representative Garofalo entered a bill to violate the Minnesota Statute 212H.02. His attempt to simply bypass the greenhouse gas emission reduction plan for the state of Minnesota while holding the position as House Speaker was a dangerous action for him to make and one that does not represent the views of the State of Minnesota, based on the 2016 report. At the Omnibus session, handouts were give to the floor acknowledging climate change as real. I watched him throw his papers on the floor and tantrum about false information that he had no knowledge on arguing without this DEIS. Fortunately, Governor Dayton vetoed Garofalo's attempt and removed the language that would have violated every single Minnesota Residents right to clean air by violating the code per a uniformed and biased legislative vote.

Fortunately, the allowance to simply pass the pipeline with no certificate of need was removed as language from the bill. As the next steps by the State of Minnesota Residents would and still should come at the cost of demanding and enforcing the **Minnesota Statute 216H.02**. To date, per the 2016 EQB report, the State of Minnesota has **not** met the goal of reducing greenhouse

gas emissions, in fact has increased greenhouse gas emissions and just about considered that the republican viewpoint in the great state of Minnesota that is known for its pristine forests, the land of 10,000 lakes, a place for families and a state where families can enjoy the land that is still very much lush in its landscape.. I know, because I have lived here my entire life. Since some people of the state believed that the majority needs to be a republican point of view, which does not agree with the standing Minnesota Statute, I bring this statute to your attention and again, assert that the Public Utilities Commission must enforce the reduction of greenhouse gas emissions for this project by denying the permits and asserting the no action plan.

1440-1

The DEIS for Line 3 did not sufficiently calculate the CO2 emissions in the assessment. While the Draft EIS on page ES-17 argues that the pipeline will cause indirect and direct Greenhouse Gas (GHG). The current EQB report from 2016 directly reflects that the clause of the Direct and Indirect section of transporting the pipeline has two clauses to consider that reinforces that the State of Minnesota will not meet the **Minnesota Statute 216H.02**. First, while running through a pipeline may produce smaller numbers in transportation, the DEIS fails to acknowledge that the **product** transported in the line, is in fact a fossil fuel. The very same product that is outlined in the 2016 EQB report as the product that must be reduced in order to meet the **Minnesota Statute 216H.02** of reducing fossil fuels.

While the State did capture some information through the DEIS, there is some very large components that the DEIS did not capture. As a contractor in the State of Minnesota, I know that construction produces some of the highest GHG emissions. From construction waste, to transportation in the industry, as well as what was not included was the additional traffic that will be rerouted in additional miles and extra fossil fuels for the construction of the line. As well as one other important component, there are inspections that must be done and traveled to in order to assure that the line is appropriately built, as well as continued education and new education that must be traveled to in order to educate oneself on spill reduction and mitigation, not through just the construction company, however, the emergency response teams in effort to gain the education to cope with spills should they occur.

Minnesota has already experienced more than enough damages from Enbridge. In July 2010 there was a 20,000 barrel loss of crude oil into the Kalamazoo. Enbridge also reflects that they have 56 reported crude oil spills in the last five years just on its Midwest Pipeline System. Enbridge in the State of Minnesota had the most accidents, while the least amount spilled through the six states they house in, mainly at their terminal and pumping stations.. With the worst occurring in 2007 with the loss of 2 workers who died in an explosion and fire near Clearbrook, MN.. Sadly, the loss of human life cost some people their jobs, however, it will never replace the damages caused by the fire, explosion and more importantly, people who had families that will never ever see their family member again. Enbridge produces a lot of handouts to the public that they will do more to improve the environment and assure that the environment and public is safe, however, the proof of Enbridge's actual actions reflect that they

do **not** show that they actually do what they say.

The essence of factoring in GHG is skipping a lot in the construction process of the contribution to GHG. The consideration of the preferred line has consideration of the removal of the old line. Doubling the construction to the area. Thus increasing the potential GHG count. On top of it, the DEIS clearly outlines that the impacts to increase GHG is considered, in part, but has not given due diligence in the fact that the construction activity itself should be included in consideration of the GHG factor and all contributing factors that would be included with calculations. It all adds up at the end of the day, and while the DEIS wants to consider current effects and does not consider long term effects, I believe that the public is aware enough and wise enough to the concept of what is being stated within the parameters of the law that by taking the No Action Plan, that the Public Utility Commission will maybe actually start achieving what is not just a goal for the state of Minnesota In reducing GHG, however, it is the law. Your job is to make decisions per the law that would protect the public interest. Knowing that the PUC has failed to contribute all activity of transportation for all contractors, subcontractors, and employees of the pipeline for transportation, as well as time to educate, certify, inspect and train for mitigation planning that the PUC has failed to sufficiently meet the criteria of the **Administrative Rules 4410.0300, Subp. 3, and Subp. 4.** 1440-2

The PUC has also not contributed the rise in public awareness with public commentary and the fact that there are many locations to travel to for public commentary. It is clear that there are people and groups, including myself that must battle the concept of producing GHG emissions just to travel to the Public Hearings that have not been included in the calculations of GHG for the State of Minnesota just driving to participate in the Public Meetings and commentary, as well as the Hearings as well. The rise in people who traveled just to Standing Rock and are moving all over the nation right now to fight the pipelines may produce a demand for fossil fuels, but consider that the travel is done in effort to fight the fossil fuel industry and the only way that people have been literally forced to find a way into having a voice, is to travel and fight in person to assure objectivity to the pipelines. Just Standing Rock alone is a reflection of how many people felt compelled to go to North Dakota from all over the country to fight Dakota Access Pipeline, a company that Enbridge is invested in and preparing to produce more fossil fuels, with an estimated count of people driving 1.5 additional miles out of the way, the cost of security to keep people from a shorter route of travel and reduce the GHG through travel, as well as the last known count of approximately 23,000 people who had arrived to object to not only Dakota Access but the consideration of the connected action with Enbridge that will have a trigger effect on not only just Minnesota, but across the United States in six other states that Enbridge transports across from Minnesota to Michigan and down a tree like pattern all the way to Texas.. As Enbridge is housed in Houston, Texas and holds a base in Canada as well. The cross the continent effect of GHG count has not thoroughly been calculated that has been raised to attempt to get the message across that the public does not want fossil fuels as a means of energy any longer.

As Minnesota must consider the MEPA process, I ask that the PUC consider Federal factors when attempting to move a public utility through the State of Minnesota that works in conjunction with Federal Permits as well.

Considering other factors such as Federal Permits that are still needed. With this DEIS, it is based on The Minnesota Environmental Policy Act, The Minnesota Environmental Rights Act (MERA), and the National Environmental Policy Act (NEPA). With crossing the Mississippi, there is a connected action currently that reflects that

The DEIS did not analyze the impacts of the Federal Action (granting the easement) on lands outside of Federal jurisdiction. Granting of the easement is a connected action with construction of the entire pipeline. Actions are connected if they automatically trigger other actions that require an EIS, cannot proceed unless those actions are taken, or if the actions are **interdependent parts** of a larger action and depend upon the larger action for their justification (see 40 CFR 1508.25 (a)(i, ii, iii)). This clearly meets the criteria of a connected action as defined by the *Council of Environmental Quality Regulations for the Implementation of the National Environmental Policy Act* (CFR Part 1500). What that means, in basic terms, is that the pipeline cannot proceed without the easement. Accordingly, the Corps of Engineers is required to disclose all impacts of its decision, included the connected action impacts on private and tribal lands (40 CFR 1508.25 (a)(1). As such, the Army Corps permit approval makes it the prime decision-maker in the pipeline going forward and NEPA requires the Corps to disclose the entire impacts of the pipeline as connected actions to that decision.

Please note the following court decisions related to the requirement to disclose the impacts of connected actions.

National Trust For Historic Preservation in The United States v. United States Department of Veterans Affairs In The United States District Court For The District of Columbia, May 1, 2009

"24. Federal agencies must also analyze the impacts of "connected" actions in a single EA or EIS. 40 C.F.R. § 1508.25(a). Actions are connected if they "automatically trigger other actions which may require [EISs]," "cannot or will not proceed unless other actions are taken previously or simultaneously," or "are interdependent parts of a larger action and depend on the larger action for their justification." 40 C.F.R. § 1508.25(a)(1)." [Paragraph 24]

It is my understanding that while Minnesota is constitutional capable of writing their own laws, Minnesota however, is not to write laws that conflict with federal laws.

Source: National Trust for Historic Preservation.pdf

Thomas v. Peterson, 753 F.2d 754 (9th Cir. 1985)

"The construction of the road and the sale of the timber in the Line 3 area meet the second and third, as well as perhaps the first, 2 of these criteria. It is clear that the timber sales cannot proceed without the road, and the road would not be built but for the contemplated timber sales. This much is revealed by the Forest Service's characterization of the road as a "logging road," and by the first page of the environmental assessment for the road, which states that "the need for a transportation route in the assessment area is to access the timber lands to be developed over the next twenty years." Moreover, the environmental assessment for the road rejected a "no action" alternative because that alternative would not provide the needed timber access." [A. CEQ Regulations, Para. 24]

"Rather, we believe that if the sales are sufficiently certain to justify construction of the road, then they are sufficiently certain for their environmental impacts to be analyzed along with those of the road. Cf. City of Davis v. Coleman, 521 F.2d 661 , 667-76 (9th Cir.1975) (EIS for a road must analyze the impacts of industrial development that the road is designed to accomodate). Where agency actions are sufficiently related so as to be "connected" within the meaning of the CEQ regulations, the agency may not escape compliance with the regulations by proceeding with one action while characterizing the others as remote or speculative." [C. Timing of the EIS, Para. 32]

"We therefore reverse the district court on the NEPA issue and hold that, before deciding whether to approve the proposed road, the Forest Service is required to prepare and consider an environmental impact statement that analyzes the combined impacts of the road and the timber sales that the road is designed to facilitate." [C Timing of the EIS, Para. 34]

Source: Open Jurist: Thomas v Peterson

Save the Yaak Committee v. J.R. Block, 840 F.2d 714 (9th Cir. 1988)

"Thomas teaches that an environmental assessment must include an analysis of these connected actions. This assessment of connected actions is necessary even if the impact of the proposed action is not significant. The impact or significance of a particular project is a separate analysis to be considered in deciding whether to prepare an EIS or only an EA." [C. The EA's Analysis of Connected Actions, Para. 39].

"Both connected actions and unrelated, but reasonably foreseeable, future actions may result in cumulative impacts. As discussed, there is an inextricable nexus between the road reconstruction and the logging operations. Yet, the EA did not evaluate the environmental impacts of either the reconstruction or the ongoing and future accelerated timber harvest. The cumulative impact of these actions raises material issues of fact concerning the project's effect upon the human environment." [C. The EA's Analysis of Connected Actions, Para. 45]

Source: Open Jurist: Save the Yaak Committee v Block

Should the States assessment be used for Federal Permitting, the parameters of the process do not meet the criteria to allow the federal permits and both conflict with one another.

Hells Canyon Preservation Council, Earthworks, and the Northwest Environmental Defense Center v. Richard J. Haines, Steve Ellis, and United States Forest Service, CV. 05-1057-PK (Aug. 4, 2006) in the United States District Court for Oregon

"As noted above, part of the purpose and need for the Project at issue here is to address the fact that several reaches of the North Fork Burnt River and its tributaries do not meet state water quality standards for temperature and sediment. AR 7936; ROD at 1. The Forest Service may not ignore or defer its responsibility to remedy existing water pollution in the project area based on a misguided notion that the right to mine trumps federal and state environmental laws. For the foregoing reasons, plaintiffs' motion for summary judgment on claims under the Clean Water Act is granted." [Opinion and Order, Page 11]

Source: Hells Canyon Decision.pdf

Colorado Rail Passenger Association v. Federal Transit Administration, Denver Union Station Project Authority and the Regional Transportation District

"Construction authorization for the area around DUS will not only result in immediate ground-disturbing activities as trenches are dug, pipes laid, a tunnel excavated and foundations poured, but it will also open the door to DUSPA and private real estate developers to begin environmentally destructive construction activities on a project which has not been properly analyzed for its environmental impacts as a "connected action" with respect to areas which are not properly part of the Environmental Impact Statement ("EIS") and in violation of CEQ regulations in 40 CFR § 1508.35 mandating EIS scope. The irreparable harm will include, among other things, degradation of the irreplaceable historic environment of Lower Downtown Denver; harm to the traveling public; mobility impairment for disabled and elderly persons. Further, the harm results from danger signals arising from the failure of FTA to take a "hard look" at serious environmental problems that have been inadequately analyzed and proposed to be mitigated." [Page 6]

The artificially segmentation of the analysis was contrived as a justification for the Corps' claim that the granting of the Corps easement does not constitute a significant impact and to allow them to permit the project based on an Environmental Assessment and a subsequent Finding of No Significant Impact (FONSI). As stated above, because the easement has no independent utility, the Corps needs to consider the impacts of the entire pipeline in determining significance. Under CEQ regulations, significance is defined through considerations of the context and intensity of impacts. Context refers to its impact on human and natural resources, including the affected local and region and associated interests. Intensity refers to the severity of the impacts (40 CFR 1508.27). To determine severity of effect, you must consider direct, indirect (including connected actions), and cumulative effects (40 CFR 1508.25(c)).

The CEQ includes considerations to use in evaluating the significance of the intensity of project impacts **(40 CFR 1508.27).** I have listed those applicable criteria by which the project clearly meets the CEQ definition for significant impacts. Line Three not only affects the water quality of Federal Standards, however, has not proven sufficiently in the DEIS that it can work in conjunction with federal needs and conflict, once again.

1) **Public health and safety (40 CFR 1508.27)**. This history of oil pipelines, particularly those operated by Enbridge and affiliates, indicate that they will leak. The DEIS assumption regarding an average leak are a very slight chance of leak misrepresents the risk posed by a large leak so close to a water supply. In fact, Sunoco, who is a subsidiary of Energy Transfer Partners recently had one of their pipelines leak approximately 1,300 barrels of gasoline to the Susquehanna River in Pennsylvania. A review of federal records indicates that pipelines constructed/operated by Energy Transfer Partners (who owns the Dakota Access Pipeline Project), and that Enbridge is an investor in, have leaked a total 18,845 barrels of crude oil across the country since 2005. Sunoco Logistics, who will operate the pipeline, has had more leaks of hazardous materials in the last decade than any other company (274 incidents). The second company on the list for most leaks had 18 incidents in the past decade and it operates over 4 times the miles of pipeline as Sunoco (See ABC new report at http://kstp.com/news/oil-and-water-dakota-access-pipeline-north-dakota-energy-transfer-partners-standing-rock-sioux-reservation/4319858/*).* Because of the importance of the Mississippi, the listed aquifers, as well as the wells, and ground water listed as drinking water sources for the tribe, as well as other downstream users, the pipeline project clearly poses a risk to public health and safety. The DEIS did not include a description of the methodologies used in making the determination that an average leak would be 4 barrels, nor did it include the full risk assessment used to support a conclusion that the risk of leakage and contamination would be low ("Stantec 2015" is referenced in Section 3.2.2.2 as the citation for an analysis of benzene contaminations, but the full reference is not provided and the report is not included an appendix to the EA). The DEIS must analyze and disclose a robust risk assessment for public review and comments. 1440-3

2) **Degree to which effects are likely to be highly controversial (40 CFR 1508.27(b)(4)**

   It is clear that the level of public controversy related to the pipeline is extremely high, as shown by massive local, national, and international protests against the project. Additionally, I would note that **several federal agencies (including those with regulatory authority over resources impacted by the project) disagreed with the Corps conclusion that the pipeline did not have significant environmental impacts**, including impacts related to environmental justice. **The agencies expressing these concerns included the Environmental Protection Agency (EPA), the U.S. Department of Interior (DOI), and the Advisory Council on Historic Preservation (ACHP)**. It is clear that both the public and major federal agencies are in disagreement with the findings of the Environmental Impact Statement and the findings of the Public Utilities Commission.

3) **Consideration of whether the action is related to other actions with cumulatively significant impacts (40 CFR 1508.27(b)(7)**

As noted above, the easement is inextricably connected to the entire pipeline, which could not be built without the granting of the Certificate of Need. Currently, Enbridge has moved their materials into place and is already prepared to allow this without the Certificate of Need secured. **Accordingly, the impacts of the entire pipeline must be disclosed and considered when making a determination of significance**. A pipeline of this length, number of stream crossings, and public concerns clearly would have significant impacts as shown by similar EIS analyses conducted for other pipelines throughout the country. I reference the following examples:

- Final Environmental Impact Statement For the Keystone Oil Pipeline Project
- Final Environmental Impact Statement for the Rover Pipeline, Panhandle Backhaul, and Trunkline Backhaul Projects, 2016
- Sandpiper Pipeline and Line 3 Replacement Projects EIS (prior and current)
- Atlantic Sunrise Project (CP15-138-000)
- NEXUS Gas Transmission Project and Texas Eastern Appalachian Lease Project (CP16-22-000, CP16-23-000)
- Leach XPress and Rayne XPress Expansion Projects (CP15-514-000, CP15-539-000)
- Golden Pass Products, LLC; and Golden Pass Pipeline, LLC's Golden Pass LNG Export Project (Docket Nos. CP14-517-000, and CP14-518-000)

4) **Any effects that threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment (40 CFR 1508.27(b)(10)).**

The easement and the associated proposed pipeline threaten to violate laws imposed for the protection of the environment by the Clean Water Act. Enbridge's record of violations of these requirements is well documented (see text above) and the assertions in the DEIS regarding the safety of the pipeline are not supported by the "hard-look" analysis required by NEPA and the softer look at the impacts through the MEPA. Accordingly, those conclusions are arbitrary and capricious and require a robust analysis in the EIS, including quantitative analysis and detailed qualitative description to support any conclusions.

Similarly, the alternatives development process for the easement is in clear violation of *Executive Order 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.* This executive order requires that Federal agencies achieve environmental justice by addressing, as appropriate, disproportionately high and adverse human health or environment effects of its programs, policies, and activities on minority populations and low-income populations

in the United States and its territories. The Sioux tribe clearly meets the definition of one of these communities. The alternatives development process described in the EA specifically states that a potential alternative to the existing proposed route was eliminated as a viable alternative retained for detailed analysis because of its proximity to municipal water supply wells for the town of Bismarck, North Dakota (92% white). In its place, the Corps retained a route that provided a direct risk to the water supply for the Sioux tribe. The analysis of environmental justice dismissed this potential impact by indicating that there were non-tribal water sources at risk closer to the proposed crossing. This disclosure does little to establish the context of the potential impacts to those wells. Do they serve an entire community, for example? In fact, it is arbitrary to use this as justification for dismissing potential impacts to the Standing Rock Sioux water supply. Native American tribes typically have some of the worst municipal infrastructure in the nation due to neglect from the Federal and State government. Regardless of the "percentage of low-income and minorities in the area", a spill affecting the tribe water supply would in and of itself constitute a disproportionate impact as the Tribe does not have the same resources to upgrade infrastructure or address contamination as easily as affluent communities with State and Federal support. A similar example is demonstrated in Flint, Michigan, where low-income communities have contaminated water after years of systematic and informed neglect by State and Federal agencies. **This concern was also expressed by the United States Commission on Civil Rights in a news release published November 22, 2016. The Commission stated "The pipeline also poses a threat to the water supply of the Standing Rock Sioux, which raises issues of environmental justice and the lack of power of marginalized communities to have a say in the environmental health of the their communities."**

This assessment does not assess all minorities and low income populations in the State of Minnesota and has reflected an extreme bias in removing other minorities and low income citizens of the State of Minnesota.

1440-4

The EPA states that environmental justice is the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." (*See EPA Environmental Justice webpage at* https://www.epa.gov/environmentaljustice). **Clearly the development of the proposed route did not include "fair treatment" as it put the Tribes and other Minority groups as well as Citizens within the way of Line 3's water supply at risk to protect the water supply..** This is particularly true of the concerns expressed by the tribe regarding traditional cultural properties and the spiritual significance of the area to the tribe. The DEIS shows no evidence of how these concerns were addressed in the DEIS for both the Chippewa Tribes and the Seven Fire's Tribes in the State of Minnesota.

Additionally, regulations for the implementation of Section 106 of the NHPA (36 CFR Part 800) require that Federal agencies consult with Indian Tribes on a government-to-government basis, in a manner that is **"respectful of tribal sovereignty"** and that they **"acknowledge the special expertise of Indian Tribes in determining which historic properties are of religious and cultural significance to them"** (See ACHP publication *List of Federal Tribal Consultation Statutes, Orders, Regulations, Rules, Policies, Manuals, Protocols and Guidance, January 2009*). The fact that the Public Utilities Commission has hand selected tribal representation and misrepresented that the Sierra Club, Honor the Earth and other organizations can represent Sioux Treaty Rights**. The Public Utilities Commission depicts the removal of Tribal representatives sent from the Oceti Sakowin to speak on Treaty and represent on the Sioux Community.**

It is also worth noting once again that the flawed process of intentionally segmenting the analysis of the project in an attempt to permit the permits, regardless of public commentary or the appropriate process under the State and Federal laws and regulations.

No other alternative is discussed as options, even though the Administrative rules clearly articulate that other alternatives with the no action plan is allowed under the rules of MEPA. Another alternative that the State of Minnesota needs to consider knowing that the climate is changing, the medicines of the State of Minnesota is growing at a rate that months ahead of the normal bloom time for the sacred ceremonies of the tribe. As one who is on the Medicine Road for the Oceti Sakowin, I can personally attest that there is a difference in the environment as a whole, when medicines that should not be ready now are growing and the medicines I should be able to use now have bloomed ahead of time and at an expedited rate that they are not usable as they should be for the timing of the ceremonies that have been practiced for the last five hundred years.

Knowing the great changes that are occurring throughout the world with climate change, the alternative would be to enforce the law under Minnesota Statute 216H.02 Greenhouse Gas Emission Control, subdivision 1, greenhouse gas emission-reduction goal. Enbridge should be moving to new demands of the public, which is the demand for renewable energy and the Certificate of Need as well as the Route Permits should be denied.

The State and the Federal Government do not meet on the same level of the law and the protection of the public, therefore the Permits should be denied and Enbridge should be asked to meet the new and growing upcoming public demands of clean and renewable energy instead of fossil fuels, which is proven to add to the problems of climate change.

Lastly, the public commentary did hold public meetings, however, had failed to reach other communities for public engagement such as those who hold specific psychological disabilities such as learning disabilities, cognitive disorders, nor reached those who are fall within other

governed disability categories such as the blind and the deaf. There are many tribal members who are financially disabled with no access to transportation, nor internet services besides their phone. To attempt to go through such a document removes many people from access to these documents, or knowing about them without more elaborate efforts to obtain public engagement.

At the St.Paul public meeting, I personally met with many people who were unsure how to read the DEIS or comment. There is no way for the public to know all the rules and regulations that would govern the involvement of the public and has unfairly produced a situation that has limited much of the publics involvement with this process nor be educated appropriately in how to comment and what would be construed a valid comment to aid in the process to make better decisions for the people of the State of Minnesota.

In conclusion, capping on the entire commentary letter:

The effect of the codes from municipality to municipality is not addressed in the impacts on how that affects the people under the governing laws, and as one that directly works in that field, do not feel that it has been properly addressed or represented.

I do not see that the construction laws are included in the draft either, nor the representation of the Department of Labor and Industry.

The laws governing the State that affect construction do have an impact in all areas of construction and the impacts that are done by construction may be a part of the draft, yet the industry itself is not appropriately represented and feel that it best to intervene on the level of a contractor as the lack of discussion on the construction company and their actions during this proceeding is not discussed nor covered.

I also do not see psychological impacts that this is having to the communities. As one who was raised on the reservation and now live off the reservation, there are significant psychological effects that have not been addressed at all in the draft. While there is some coverage of tribal aspects, there is not all.

As well as other minority groups either. In fact the DEIS omits covering other minority groups at all in the Draft EIS. As a dual minority female, the effects to me as multiple minorities as I outlined in my original intervention, are not covered at all in the DEIS and do not believe that I should be omitted from intervention due to the lacking representation.

Enbridge is an investor in the Dakota Access Pipeline. The reflection of the current legal proceedings reflect that there has already been a spill, which is indicative that the construction process was not adequately covered.

Also, the legal proceedings reflect that the Environmental Assessment was not appropriately addressed. While the State believes that the Draft EIS is comprehensive, it reflects bias in research. As one who

holds a degree in mitigation as well as clinical research that is certified by degree, and can add to the record to help the public remove the bias that is reflected in the court documents, I ask that my intervention be resubmitted and that this letter be added to the record as an amendment to the assertion of the intervention.

Respectfully,

Wichahpi Otto

15444 Lesley Lane

Eden Prairie, MN 55346

July 10, 2017

Minnesota Public Utilities Commission
Attn: Scott Ek, Planning Director
121 E. 7th Place East, Suite 350
St. Paul, MN 55101-2147
Email: Scott.Ek@state.mn.us
Phone: 651-201-2255

Re: DEIS Line 3 Comments, Enbridge Energy, Ltd.

I am writing this scoping letter to respond to the Draft Environmental Impact Statement for Line 3, Enbridge's proposed project requires two separate approvals from the Minnesota Public Utilities Commission (Commission) – a certificate of need (CN) and a route permit. The Commission's docket numbers for these approvals are PL9/CN-14-916 and PL9/PPL-15-137.

I respectfully request that the Minnesota Public Utilities Commission comply with the Minnesota Statute 216H.02 Greenhouse Gas Emission Control, subdivision 1, greenhouse gas emission-reduction goal. Currently, the goal reflects that the state to reduce statewide greenhouse gas emissions across all sectors producing those emissions to a level at least 15% below 2005 levels by 2015, to a level at least 30 percent below 2005 levels by 2025, and to a level at least 80 percent below 2005 levels by 2050.

The last dated report on the Minnesota Pollution Control Agency's website is lacking two years of data, with the last report done in 2014. Fortunately, the report can be found at https://www.eqb.state.mn.us/sites/default/files/documents/CSEO_EQB.pdf

Oddly, with the last legislation, Representative Garofalo entered a bill to violate the Minnesota Statute 212H.02. His attempt to simply bypass the greenhouse gas emission reduction plan for the state of Minnesota while holding the position as House Speaker was a dangerous action for him to make and one that does not represent the views of the State of Minnesota, based on the 2016 report. At the Omnibus session, handouts were give to the floor acknowledging climate change as real. I watched him throw his papers on the floor and tantrum about false information that he had no knowledge on arguing without this DEIS. Fortunately, Governor Dayton vetoed Garofalo's attempt and removed the language that would have violated every single Minnesota Residents right to clean air by violating the code per a uniformed and biased legislative vote.

Fortunately, the allowance to simply pass the pipeline with no certificate of need was removed as language from the bill. As the next steps by the State of Minnesota Residents would and still should come at the cost of demanding and enforcing the **Minnesota Statute 216H.02**. To date, per the 2016 EQB report, the State of Minnesota has **not** met the goal of reducing greenhouse

gas emissions, in fact has increased greenhouse gas emissions and just about considered that the republican viewpoint in the great state of Minnesota that is known for its pristine forests, the land of 10,000 lakes, a place for families and a state where families can enjoy the land that is still very much lush in its landscape.. I know, because I have lived here my entire life. Since some people of the state believed that the majority needs to be a republican point of view, which does not agree with the standing Minnesota Statute, I bring this statute to your attention and again, assert that the Public Utilities Commission must enforce the reduction of greenhouse gas emissions for this project by denying the permits and asserting the no action plan.

1571-1

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While the State did capture some information through the DEIS, there is some very large components that the DEIS did not capture. As a contractor in the State of Minnesota, I know that construction produces some of the highest GHG emissions. From construction waste, to transportation in the industry, as well as what was not included was the additional traffic that will be rerouted in additional miles and extra fossil fuels for the construction of the line. As well as one other important component, there are inspections that must be done and traveled to in order to assure that the line is appropriately built, as well as continued education and new education that must be traveled to in order to educate oneself on spill reduction and mitigation, not through just the construction company, however, the emergency response teams in effort to gain the education to cope with spills should they occur.

Minnesota has already experienced more than enough damages from Enbridge. In July 2010 there was a 20,000 barrel loss of crude oil into the Kalamazoo. Enbridge also reflects that they have 56 reported crude oil spills in the last five years just on its Midwest Pipeline System. Enbridge in the State of Minnesota had the most accidents, while the least amount spilled through the six states they house in, mainly at their terminal and pumping stations.. With the worst occurring in 2007 with the loss of 2 workers who died in an explosion and fire near Clearbrook, MN.. Sadly, the loss of human life cost some people their jobs, however, it will never replace the damages caused by the fire, explosion and more importantly, people who had families that will never ever see their family member again. Enbridge produces a lot of handouts to the public that they will do more to improve the environment and assure that the environment and public is safe, however, the proof of Enbridge's actual actions reflect that they

do **not** show that they actually do what they say.

The essence of factoring in GHG is skipping a lot in the construction process of the contribution to GHG. The consideration of the preferred line has consideration of the removal of the old line. Doubling the construction to the area. Thus increasing the potential GHG count. On top of it, the DEIS clearly outlines that the impacts to increase GHG is considered, in part, but has not given due diligence in the fact that the construction activity itself should be included in consideration of the GHG factor and all contributing factors that would be included with calculations. It all adds up at the end of the day, and while the DEIS wants to consider current effects and does not consider long term effects, I believe that the public is aware enough and wise enough to the concept of what is being stated within the parameters of the law that by taking the No Action Plan, that the Public Utility Commission will maybe actually start achieving what is not just a goal for the state of Minnesota In reducing GHG, however, it is the law. Your job is to make decisions per the law that would protect the public interest. Knowing that the PUC has failed to contribute all activity of transportation for all contractors, subcontractors, and employees of the pipeline for transportation, as well as time to educate, certify, inspect and train for mitigation planning that the PUC has failed to sufficiently meet the criteria of the **Administrative Rules 4410.0300, Subp. 3, and Subp. 4.**

The PUC has also not contributed the rise in public awareness with public commentary and the fact that there are many locations to travel to for public commentary. It is clear that there are people and groups, including myself that must battle the concept of producing GHG emissions just to travel to the Public Hearings that have not been included in the calculations of GHG for the State of Minnesota just driving to participate in the Public Meetings and commentary, as well as the Hearings as well. The rise in people who traveled just to Standing Rock and are moving all over the nation right now to fight the pipelines may produce a demand for fossil fuels, but consider that the travel is done in effort to fight the fossil fuel industry and the only way that people have been literally forced to find a way into having a voice, is to travel and fight in person to assure objectivity to the pipelines. Just Standing Rock alone is a reflection of how many people felt compelled to go to North Dakota from all over the country to fight Dakota Access Pipeline, a company that Enbridge is invested in and preparing to produce more fossil fuels, with an estimated count of people driving 1.5 additional miles out of the way, the cost of security to keep people from a shorter route of travel and reduce the GHG through travel, as well as the last known count of approximately 23,000 people who had arrived to object to not only Dakota Access but the consideration of the connected action with Enbridge that will have a trigger effect on not only just Minnesota, but across the United States in six other states that Enbridge transports across from Minnesota to Michigan and down a tree like pattern all the way to Texas.. As Enbridge is housed in Houston, Texas and holds a base in Canada as well. The cross the continent effect of GHG count has not thoroughly been calculated that has been raised to attempt to get the message across that the public does not want fossil fuels as a means of energy any longer.

As Minnesota must consider the MEPA process, I ask that the PUC consider Federal factors when attempting to move a public utility through the State of Minnesota that works in conjunction with Federal Permits as well.

Considering other factors such as Federal Permits that are still needed. With this DEIS, it is based on The Minnesota Environmental Policy Act, The Minnesota Environmental Rights Act (MERA), and the National Environmental Policy Act (NEPA). With crossing the Mississippi, there is a connected action currently that reflects that

The DEIS did not analyze the impacts of the Federal Action (granting the easement) on lands outside of Federal jurisdiction. Granting of the easement is a connected action with construction of the entire pipeline. Actions are connected if they automatically trigger other actions that require an EIS, cannot proceed unless those actions are taken, or if the actions are **interdependent parts** of a larger action and depend upon the larger action for their justification (see 40 CFR 1508.25 (a)(i, ii, iii)). This clearly meets the criteria of a connected action as defined by the *Council of Environmental Quality Regulations for the Implementation of the National Environmental Policy Act* (CFR Part 1500). What that means, in basic terms, is that the pipeline cannot proceed without the easement. Accordingly, the Corps of Engineers is required to disclose all impacts of its decision, included the connected action impacts on private and tribal lands (40 CFR 1508.25 (a)(1). As such, the Army Corps permit approval makes it the prime decision-maker in the pipeline going forward and NEPA requires the Corps to disclose the entire impacts of the pipeline as connected actions to that decision.

Please note the following court decisions related to the requirement to disclose the impacts of connected actions.

National Trust For Historic Preservation in The United States v. United States Department of Veterans Affairs In The United States District Court For The District of Columbia, May 1, 2009

"24. Federal agencies must also analyze the impacts of "connected" actions in a single EA or EIS. 40 C.F.R. § 1508.25(a). Actions are connected if they "automatically trigger other actions which may require [EISs]," "cannot or will not proceed unless other actions are taken previously or simultaneously," or "are interdependent parts of a larger action and depend on the larger action for their justification." 40 C.F.R. § 1508.25(a)(1)." [Paragraph 24]

It is my understanding that while Minnesota is constitutional capable of writing their own laws, Minnesota however, is not to write laws that conflict with federal laws.

Source: National Trust for Historic Preservation.pdf

Thomas v. Peterson, 753 F.2d 754 (9th Cir. 1985)

"The construction of the road and the sale of the timber in the Line 3 area meet the second and third, as well as perhaps the first, 2 of these criteria. It is clear that the timber sales cannot proceed without the road, and the road would not be built but for the contemplated timber sales. This much is revealed by the Forest Service's characterization of the road as a "logging road," and by the first page of the environmental assessment for the road, which states that "the need for a transportation route in the assessment area is to access the timber lands to be developed over the next twenty years." Moreover, the environmental assessment for the road rejected a "no action" alternative because that alternative would not provide the needed timber access." [A. CEQ Regulations, Para. 24]

"Rather, we believe that if the sales are sufficiently certain to justify construction of the road, then they are sufficiently certain for their environmental impacts to be analyzed along with those of the road. Cf. City of Davis v. Coleman, 521 F.2d 661 , 667-76 (9th Cir.1975) (EIS for a road must analyze the impacts of industrial development that the road is designed to accomodate). Where agency actions are sufficiently related so as to be "connected" within the meaning of the CEQ regulations, the agency may not escape compliance with the regulations by proceeding with one action while characterizing the others as remote or speculative." [C. Timing of the EIS, Para. 32]

"We therefore reverse the district court on the NEPA issue and hold that, before deciding whether to approve the proposed road, the Forest Service is required to prepare and consider an environmental impact statement that analyzes the combined impacts of the road and the timber sales that the road is designed to facilitate." [C Timing of the EIS, Para. 34]

Source: Open Jurist: Thomas v Peterson

Save the Yaak Committee v. J.R. Block, 840 F.2d 714 (9th Cir. 1988)

"Thomas teaches that an environmental assessment must include an analysis of these connected actions. This assessment of connected actions is necessary even if the impact of the proposed action is not significant. The impact or significance of a particular project is a separate analysis to be considered in deciding whether to prepare an EIS or only an EA." [C. The EA's Analysis of Connected Actions, Para. 39].

"Both connected actions and unrelated, but reasonably foreseeable, future actions may result in cumulative impacts. As discussed, there is an inextricable nexus between the road reconstruction and the logging operations. Yet, the EA did not evaluate the environmental impacts of either the reconstruction or the ongoing and future accelerated timber harvest. The cumulative impact of these actions raises material issues of fact concerning the project's effect upon the human environment." [C. The EA's Analysis of Connected Actions, Para. 45]

Source: Open Jurist: Save the Yaak Committee v Block

Should the States assessment be used for Federal Permitting, the parameters of the process do not meet the criteria to allow the federal permits and both conflict with one another.

Hells Canyon Preservation Council, Earthworks, and the Northwest Environmental Defense Center v. Richard J. Haines, Steve Ellis, and United States Forest Service, CV. 05-1057-PK (Aug. 4, 2006) in the United States District Court for Oregon

"As noted above, part of the purpose and need for the Project at issue here is to address the fact that several reaches of the North Fork Burnt River and its tributaries do not meet state water quality standards for temperature and sediment. AR 7936; ROD at 1. The Forest Service may not ignore or defer its responsibility to remedy existing water pollution in the project area based on a misguided notion that the right to mine trumps federal and state environmental laws. For the foregoing reasons, plaintiffs' motion for summary judgment on claims under the Clean Water Act is granted." [Opinion and Order, Page 11]

Source: Hells Canyon Decision.pdf

Colorado Rail Passenger Association v. Federal Transit Administration, Denver Union Station Project Authority and the Regional Transportation District

"Construction authorization for the area around DUS will not only result in immediate ground-disturbing activities as trenches are dug, pipes laid, a tunnel excavated and foundations poured, but it will also open the door to DUSPA and private real estate developers to begin environmentally destructive construction activities on a project which has not been properly analyzed for its environmental impacts as a "connected action" with respect to areas which are not properly part of the Environmental Impact Statement ("EIS") and in violation of CEQ regulations in 40 CFR § 1508.35 mandating EIS scope. The irreparable harm will include, among other things, degradation of the irreplaceable historic environment of Lower Downtown Denver; harm to the traveling public; mobility impairment for disabled and elderly persons. Further, the harm results from danger signals arising from the failure of FTA to take a "hard look" at serious environmental problems that have been inadequately analyzed and proposed to be mitigated." [Page 6]

The artificially segmentation of the analysis was contrived as a justification for the Corps' claim that the granting of the Corps easement does not constitute a significant impact and to allow them to permit the project based on an Environmental Assessment and a subsequent Finding of No Significant Impact (FONSI). As stated above, because the easement has no independent utility, the Corps needs to consider the impacts of the entire pipeline in determining significance. Under CEQ regulations, significance is defined through considerations of the context and intensity of impacts. Context refers to its impact on human and natural resources, including the affected local and region and associated interests. Intensity refers to the severity of the impacts (40 CFR 1508.27). To determine severity of effect, you must consider direct, indirect (including connected actions), and cumulative effects (40 CFR 1508.25(c)).

The CEQ includes considerations to use in evaluating the significance of the intensity of project impacts **(40 CFR 1508.27).** I have listed those applicable criteria by which the project clearly meets the CEQ definition for significant impacts. Line Three not only affects the water quality of Federal Standards, however, has not proven sufficiently in the DEIS that it can work in conjunction with federal needs and conflict, once again.

1) **Public health and safety (40 CFR 1508.27)**. This history of oil pipelines, particularly those operated by Enbridge and affiliates, indicate that they will leak. The DEIS assumption regarding an average leak are a very slight chance of leak misrepresents the risk posed by a large leak so close to a water supply. In fact, Sunoco, who is a subsidiary of Energy Transfer Partners recently had one of their pipelines leak approximately 1,300 barrels of gasoline to the Susquehanna River in Pennsylvania. A review of federal records indicates that pipelines constructed/operated by Energy Transfer Partners (who owns the Dakota Access Pipeline Project), and that Enbridge is an investor in, have leaked a total 18,845 barrels of crude oil across the country since 2005. Sunoco Logistics, who will operate the pipeline, has had more leaks of hazardous materials in the last decade than any other company (274 incidents). The second company on the list for most leaks had 18 incidents in the past decade and it operates over 4 times the miles of pipeline as Sunoco (See ABC new report at http://kstp.com/news/oil-and-water-dakota-access-pipeline-north-dakota-energy-transfer-partners-standing-rock-sioux-reservation/4319858/*).* Because of the importance of the Mississippi, the listed aquifers, as well as the wells, and ground water listed as drinking water sources for the tribe, as well as other downstream users, the pipeline project clearly poses a risk to public health and safety. The DEIS did not include a description of the methodologies used in making the determination that an average leak would be 4 barrels, nor did it include the full risk assessment used to support a conclusion that the risk of leakage and contamination would be low ("Stantec 2015" is referenced in Section 3.2.2.2 as the citation for an analysis of benzene contaminations, but the full reference is not provided and the report is not included an appendix to the EA). The DEIS must analyze and disclose a robust risk assessment for public review and comments.

2) **Degree to which effects are likely to be highly controversial (40 CFR 1508.27(b)(4)**

   It is clear that the level of public controversy related to the pipeline is extremely high, as shown by massive local, national, and international protests against the project. Additionally, I would note that **several federal agencies (including those with regulatory authority over resources impacted by the project) disagreed with the Corps conclusion that the pipeline did not have significant environmental impacts**, including impacts related to environmental justice. **The agencies expressing these concerns included the Environmental Protection Agency (EPA), the U.S. Department of Interior (DOI), and the Advisory Council on Historic Preservation (ACHP)**. It is clear that both the public and major federal agencies are in disagreement with the findings of the Environmental Impact Statement and the findings of the Public Utilities Commission.

3) **Consideration of whether the action is related to other actions with cumulatively significant impacts (40 CFR 1508.27(b)(7)**

As noted above, the easement is inextricably connected to the entire pipeline, which could not be built without the granting of the Certificate of Need. Currently, Enbridge has moved their materials into place and is already prepared to allow this without the Certificate of Need secured. **Accordingly, the impacts of the entire pipeline must be disclosed and considered when making a determination of significance**. A pipeline of this length, number of stream crossings, and public concerns clearly would have significant impacts as shown by similar EIS analyses conducted for other pipelines throughout the country. I reference the following examples:

- Final Environmental Impact Statement For the Keystone Oil Pipeline Project
- Final Environmental Impact Statement for the Rover Pipeline, Panhandle Backhaul, and Trunkline Backhaul Projects, 2016
- Sandpiper Pipeline and Line 3 Replacement Projects EIS (prior and current)
- Atlantic Sunrise Project (CP15-138-000)
- NEXUS Gas Transmission Project and Texas Eastern Appalachian Lease Project (CP16-22-000, CP16-23-000)
- Leach XPress and Rayne XPress Expansion Projects (CP15-514-000, CP15-539-000)
- Golden Pass Products, LLC; and Golden Pass Pipeline, LLC's Golden Pass LNG Export Project (Docket Nos. CP14-517-000, and CP14-518-000)

4) **Any effects that threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment (40 CFR 1508.27(b)(10)).**

The easement and the associated proposed pipeline threaten to violate laws imposed for the protection of the environment by the Clean Water Act. Enbridge's record of violations of these requirements is well documented (see text above) and the assertions in the DEIS regarding the safety of the pipeline are not supported by the "hard-look" analysis required by NEPA and the softer look at the impacts through the MEPA. Accordingly, those conclusions are arbitrary and capricious and require a robust analysis in the EIS, including quantitative analysis and detailed qualitative description to support any conclusions.

Similarly, the alternatives development process for the easement is in clear violation of *Executive Order 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.* This executive order requires that Federal agencies achieve environmental justice by addressing, as appropriate, disproportionately high and adverse human health or environment effects of its programs, policies, and activities on minority populations and low-income populations

in the United States and its territories. The Sioux tribe clearly meets the definition of one of these communities. The alternatives development process described in the EA specifically states that a potential alternative to the existing proposed route was eliminated as a viable alternative retained for detailed analysis because of its proximity to municipal water supply wells for the town of Bismarck, North Dakota (92% white). In its place, the Corps retained a route that provided a direct risk to the water supply for the Sioux tribe. The analysis of environmental justice dismissed this potential impact by indicating that there were non-tribal water sources at risk closer to the proposed crossing. This disclosure does little to establish the context of the potential impacts to those wells. Do they serve an entire community, for example? In fact, it is arbitrary to use this as justification for dismissing potential impacts to the Standing Rock Sioux water supply. Native American tribes typically have some of the worst municipal infrastructure in the nation due to neglect from the Federal and State government. Regardless of the "percentage of low-income and minorities in the area", a spill affecting the tribe water supply would in and of itself constitute a disproportionate impact as the Tribe does not have the same resources to upgrade infrastructure or address contamination as easily as affluent communities with State and Federal support. A similar example is demonstrated in Flint, Michigan, where low-income communities have contaminated water after years of systematic and informed neglect by State and Federal agencies. **This concern was also expressed by the United States Commission on Civil Rights in a news release published November 22, 2016. The Commission stated "The pipeline also poses a threat to the water supply of the Standing Rock Sioux, which raises issues of environmental justice and the lack of power of marginalized communities to have a say in the environmental health of the their communities."**

This assessment does not assess all minorities and low income populations in the State of Minnesota and has reflected an extreme bias in removing other minorities and low income citizens of the State of Minnesota.

The EPA states that environmental justice is the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." (*See EPA Environmental Justice webpage at* https://www.epa.gov/environmentaljustice). **Clearly the development of the proposed route did not include "fair treatment" as it put the Tribes and other Minority groups as well as Citizens within the way of Line 3's water supply at risk to protect the water supply..** This is particularly true of the concerns expressed by the tribe regarding traditional cultural properties and the spiritual significance of the area to the tribe. The DEIS shows no evidence of how these concerns were addressed in the DEIS for both the Chippewa Tribes and the Seven Fire's Tribes in the State of Minnesota.

Additionally, regulations for the implementation of Section 106 of the NHPA (36 CFR Part 800) require that Federal agencies consult with Indian Tribes on a government-to-government basis, in a manner that is **"respectful of tribal sovereignty"** and that they **"acknowledge the special expertise of Indian Tribes in determining which historic properties are of religious and cultural significance to them"** (See ACHP publication *List of Federal Tribal Consultation Statutes, Orders, Regulations, Rules, Policies, Manuals, Protocols and Guidance, January 2009*). The fact that the Public Utilities Commission has hand selected tribal representation and misrepresented that the Sierra Club, Honor the Earth and other organizations can represent Sioux Treaty Rights**. The Public Utilities Commission depicts the removal of Tribal representatives sent from the Oceti Sakowin to speak on Treaty and represent on the Sioux Community.**

It is also worth noting once again that the flawed process of intentionally segmenting the analysis of the project in an attempt to permit the permits, regardless of public commentary or the appropriate process under the State and Federal laws and regulations.

No other alternative is discussed as options, even though the Administrative rules clearly articulate that other alternatives with the no action plan is allowed under the rules of MEPA. Another alternative that the State of Minnesota needs to consider knowing that the climate is changing, the medicines of the State of Minnesota is growing at a rate that months ahead of the normal bloom time for the sacred ceremonies of the tribe. As one who is on the Medicine Road for the Oceti Sakowin, I can personally attest that there is a difference in the environment as a whole, when medicines that should not be ready now are growing and the medicines I should be able to use now have bloomed ahead of time and at an expedited rate that they are not usable as they should be for the timing of the ceremonies that have been practiced for the last five hundred years.

Knowing the great changes that are occurring throughout the world with climate change, the alternative would be to enforce the law under Minnesota Statute 216H.02 Greenhouse Gas Emission Control, subdivision 1, greenhouse gas emission-reduction goal. Enbridge should be moving to new demands of the public, which is the demand for renewable energy and the Certificate of Need as well as the Route Permits should be denied.

The State and the Federal Government do not meet on the same level of the law and the protection of the public, therefore the Permits should be denied and Enbridge should be asked to meet the new and growing upcoming public demands of clean and renewable energy instead of fossil fuels, which is proven to add to the problems of climate change.

Lastly, the public commentary did hold public meetings, however, had failed to reach other communities for public engagement such as those who hold specific psychological disabilities such as learning disabilities, cognitive disorders, nor reached those who are fall within other

governed disability categories such as the blind and the deaf. There are many tribal members who are financially disabled with no access to transportation, nor internet services besides their phone. To attempt to go through such a document removes many people from access to these documents, or knowing about them without more elaborate efforts to obtain public engagement.

At the St.Paul public meeting, I personally met with many people who were unsure how to read the DEIS or comment. There is no way for the public to know all the rules and regulations that would govern the involvement of the public and has unfairly produced a situation that has limited much of the publics involvement with this process nor be educated appropriately in how to comment and what would be construed a valid comment to aid in the process to make better decisions for the people of the State of Minnesota.

In conclusion, capping on the entire commentary letter:

The effect of the codes from municipality to municipality is not addressed in the impacts on how that affects the people under the governing laws, and as one that directly works in that field, do not feel that it has been properly addressed or represented. 1571-2

I do not see that the construction laws are included in the draft either, nor the representation of the Department of Labor and Industry. 1571-3

The laws governing the State that affect construction do have an impact in all areas of construction and the impacts that are done by construction may be a part of the draft, yet the industry itself is not appropriately represented and feel that it best to intervene on the level of a contractor as the lack of discussion on the construction company and their actions during this proceeding is not discussed nor covered.

I also do not see psychological impacts that this is having to the communities. As one who was raised on the reservation and now live off the reservation, there are significant psychological effects that have not been addressed at all in the draft. While there is some coverage of tribal aspects, there is not all.

As well as other minority groups either. In fact the DEIS omits covering other minority groups at all in the Draft EIS. As a dual minority female, the effects to me as multiple minorities as I outlined in my original intervention, are not covered at all in the DEIS and do not believe that I should be omitted from intervention due to the lacking representation.

Enbridge is an investor in the Dakota Access Pipeline. The reflection of the current legal proceedings reflect that there has already been a spill, which is indicative that the construction process was not adequately covered.

Also, the legal proceedings reflect that the Environmental Assessment was not appropriately addressed. While the State believes that the Draft EIS is comprehensive, it reflects bias in research. As one who

holds a degree in mitigation as well as clinical research that is certified by degree, and can add to the record to help the public remove the bias that is reflected in the court documents, I ask that my intervention be resubmitted and that this letter be added to the record as an amendment to the assertion of the intervention.

Respectfully,

Wichahpi Otto

15444 Lesley Lane

Eden Prairie, MN 55346

Levi, Andrew (COMM)

From: Jackie Parr <simmons.jax@gmail.com>
Sent: Monday, July 10, 2017 9:06 AM
To: MN_COMM_Pipeline Comments
Subject: Stop Line 3

To whom it may concern:

This pipeline does NOTHING for the people of Minnesota, in fact it is harmful. It will also negatively affect Minnesota by bringing CRIME, there are acknowledgments that pipeline construction is known to bring criminal activities to the area. And finally, the impact the pipeline will have for the climate, which is could be catastrophic.

- People of Minnesota
  - Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "**would have a long-term detrimental effect on tribal members and tribal resources**" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). **This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members**. 2334-1
  - Chapter 5, "Existing Conditions, Impacts, and Mitigation" states that Line 3 will create ZERO permanent jobs. Enbridge's application states that "existing operations staff would be able to operate the [pipeline] and that few additional employees would be hired to assist the staff" (5.3.4).
  - Also in Chapter 5, the DOC assumes "all workers would re-locate to the area" and ZERO construction jobs will go to Minnesotans. The pipeline would have "no measureable impact on local employment, per capita household income, median household income, or unemployment" (5.3.4).
    The DEIS does not acknowledge that when the existing Line 3 shuts down, Enbridge will stop paying taxes to the MN counties along the mainline corridor. For many of these poor counties in the north, revenue from Enbridge's property tax makes up a significant portion of the county budget. There is also the issue that Enbridge is now in the process of appealing years of back taxes, burdening two of the poorest counties in Minnesota with over $10 million due.
- Acknowledged Crime
  - The DEIS acknowledges that "The addition of a temporary, cash-rich workforce **increases the likelihood that sex trafficking or sexual abuse will occur**," and that these challenges hit Native communities the hardest. But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). What experience does Enbridge have planning and implementing an anti-sex trafficking program? 2334-2
- Construction & Prep (analyzing spills and other environmental impacts)
  - The DEIS contains **no spill analysis for tributaries of the St. Louis River or Nemadji River**, where spills could decimate **Lake Superior** and the harbors of the Twin Ports. 2334-3
  - For calculations of impact, the lifespan of the new Line 3 is estimated at *30 years*. But Lines 1-4 are 55-65 years old! And hasn't the technology improved?
    There is no analysis on Enbridge's leak detection system, or their inability to respond quickly to major emergencies.
    The DEIS estimates the annual probability of different kinds of spills on the proposed route in MN:
    - Pinhole leak = 27%
    - Catastrophic = 1.1%
    - Small Spill = 107%, Medium = 7.6%, Large = 6.1%
    - So in 50 years, we can expect **14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic**!
  - Cathodic protection, which applies electric current to the pipeline in order to protect it from corrosion caused by nearby utility lines, **will not be installed for up to 1 year after pipeline**

construction (2.3.2.3). Lack of cathodic protection is what caused many pinhole leaks in the Keystone pipeline, almost immediately after construction. The proposed route for Line 3 follows a utility corridor for much of its length - this is a recipe for disaster. Even the US Army Corps's rubber-stamp approval of the Dakota Access pipeline required the cathodic protection system to be installed within 6 months!

- Maintenance
  - There is also no discussion of **exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied**. "When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high" (8.3.1). 2334-4
  - The DEIS states that it will be very risky to remove and clean up the existing Line 3 because the pipelines are very close together. "The distance between pipelines within this corridor varies, but they are generally 10 to 15 feet apart" (8.3.1). This is not consistent with our extensive observations and physical measurements on the land. Also, don't they dig up pieces of pipe for maintenance purposes all the time? **Why is it suddenly risky?**
- End of Life Pipeline Items (Abandonment)
  - The DEIS simply states that "Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage, and mitigate historically contaminated soils and waters" found during the abandonment or removal of the existing Line 3 (8.3.1.1.1). **We want to see that plan**. 2334-5
    The risks of pipeline abandonment are not adequately assessed. For example, there is no discussion of landowner property values and the effect that an abandoned pipe could have on them, especially if there is indeed "**legacy contamination**" on people's land.
- Climate Change
  - The DEIS acknowledges that Line 3 would contribute to climate change. It analyses 3 different types of emissions - direct, indirect, and lifecycle. Direct emissions are those that the pipeline infrastructure itself emits, and these are very small. Indirect emissions are those created by the power plants that provide electricity for the pipeline's pumping stations, and these are significant. Lifecycle emissions are those caused by the refinement and eventual use of the oil, and these are massive. Line 3's direct and indirect emissions alone would be 453,000 tons of CO_2 per year. Over a 50-year lifespan, that would cost society an estimated $1.1 billion. (Executive Summary p.18).
  - The lifecycle emissions of Line 3 would be 193 million tons of CO_2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3)

Please stop Line 3. It does nothing good for the people, state, and climate. Thank you for you time.

Jackie Parr

Levi, Andrew (COMM)

From: Brian PaStarr <bpastarr@gmail.com>
Sent: Thursday, July 06, 2017 4:04 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline: Document # CN-14-916 and PPL-15-137

Dear State of Mn.
My name is Brian PaStarr and I submitted a comment before, but know that Monday July 10 is the deadline and I wanted to put forth a 2nd comment as this is so important to me. As a parent, retired teacher, former church deacon, it matters to me as to what kind of a world we leave for our children. Before I wrote about the effects of climate change caused by the pipeline as well as the decreased need for oil as we move forward. Today I want to focus only on the economic impacts of the pipeline. Economically, the pipeline is not good for the state of Mn.
Chapter 5 of the EIS states that line 3 will create no permanent jobs. The application that Enbridge uses notes that "existing operations staff would be able to operate the pipeline and that few additional employees would be hired to assist the staff." (5.3.4

Chapter 5 also notes "all workers would re-locate to the area: and that no construction jobs would go to Minnesotans. In addition, the pipeline would "have no measureable impact on olcal employment, per capita household income, median household income, or unemployment.: (5.3.4)

There is no mention in the EIS that when the existing LIne 3 shuts down, that Enbridge will stop paying taxes to the Mn. counties along the mainline corridor. For many of these poor counties, revenue from this property tax helps keep the county budget in working order. 1441-1

In addition, the pipeline goes through pristine areas of the state that depend on tourism for its income. There has never been a pipeline built that does not leak. The EIS estimates that the annual probability of leaks is as follows: A. Pinhole leak 27& or every 3.7 years. B. Small Spill 107% or every 11 months. C. Medium spill 7.6% D. Large spill 6.1% E. Catastrophic spill 1.1% or every 87 years. This is a lot of oil spilled in the ground and streams and affects tourism, farming, and the overall health of any region the pipeline passes through.
Thus the pipeline does not generate jobs for Minnesotans and costs us money lost to tourism and farming that the pipeline passes through. This is not a situation that benefits the state of MN.

Thank you. Sincerely,
Brian PaStarr

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David Patterson
13763 Shirley Drive
Burnsville, MN 55337
7/9/2017

Jamie Macalister
Environmental Review Manager
MN Dept. of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Re: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Jamie Macalister:

It recently came to my attention that Enbridge submitted applications to the Minnesota Public Utilities Commission to construct a new 340-mile pipeline to replace the existing Line 3. It is important to note that this pipeline is substantially the same as the 2013 Sandpiper Pipeline Project which was deferred due to environmental concerns. Given the time constraints of the review period, a detailed review of all 5,000 pages is impossible. However, a review of a few key topics shows significant holes in Cardno's analysis. Their EIS amounts to mostly filler material (Cardno's close ties to Enbridge raise additional questions about the impartiality and integrity of this EIS process).
The two main topics that this letter will address are the economic benefits and the generation of alternatives. A discussion of each follows.

Economic benefit

5.3.4.3 Impact Assessment
"Construction and operation of the Applicant's preferred route and most of the CN Alternatives (except for aspects of the existing Line 3 pipeline alternative since that pipeline is in place and operating) would increase employment, income, and tax revenue. Direct impacts on employment would be driven by the large number of construction personnel. Although it is expected that the workers would not live in the counties where construction would occur, they may temporarily re-locate to these counties during construction or spend money locally which could result in temporary county-level income changes in supporting industries. Tax revenues would increase due to the increase in labor income (i.e., taxable income), sales tax on the purchase of goods locally, and property taxes. Construction would also have a temporary indirect influence on economic conditions due to employment and income for service industries supporting construction activities (e.g., the hotel industry, fueling services, and the food service industry)."

Additional detailed information on economic benefit can be found in section 6.5.4.3.1 but generally mirrors the information provided in section 5.3.4.3 (excerpted above).

- The EIS indicates that no permanent jobs will be created by the project along the pipeline route and all of the skilled labor required would need to be imported. Any employment gains would only be expected to last 8 months.
- Enbridge has a history of fighting property tax assessments from local counties as detailed in *The Star Tribune's* March 26, 2017 article "Enbridge tax challenge could cost northern Minn. counties millions".

5.3.2.3.1 Applicant's Preferred Route (from Neche to Superior)

- The EIS indicates that there are minimal construction impacts and almost no long-term impacts to recreation and tourism due to pipeline construction and operation. This analysis is based almost exclusively on an analysis of state lands and designated areas (scenic byways and rivers). It does not look at the economic impact to tourism in the area as a region or deal with the impact to tourism and recreation due to a spill. To be clear a spill is inevitable - the Executive Summary notes that the existing Line 3 has had 15 failures (spills) of over 50 barrels each since 1990. The proximity of the proposed Line 3 to valuable water resources would make any spill catastrophic to the local tourism industry. Figure ES-4 of the Exectutive Summary shows the severity of the average pipeline release – 225 barrels! 2844-1

Alternatives Analysis

4.2 DESCRIPTION OF ALTERNATIVES – CERTIFICATE OF NEED

- The alternatives analysis does not evaluate in-situ rehabilitation of the pipeline. Many pipelining and pipe in pipe options are currently available and would result in considerably reduced environmental impacts compared to any of the presented alternatives. Given that fossil fuel usage has dropped over the last 10 years in Minnesota, Enbridge should be planning for reduced transmission demand so any reduction in pipeline diameter due to lining or carrier pipe installation may actually be desirable, especially since the existing Line 3 pipeline has been running at one half capacity for some time now (390,000 barrels/day vs. 760,000 barrels/day). Furthermore, the mix of fuels consumed in the United States has drastically changed over the last decade with the United States becoming a large producer (and consumer) of natural gas. This pipeline is intended to carry heavy crude which will likely to see reductions in demand as evidenced in the July 9, 2017 *Star Tribune* article entitled "Minn. mulls new infrastructure for expected electric-car surge". The article notes that along with the number new electric car offerings, Volvo plans to produce electric and hybrid vehicles starting in 2019. Given these changes, the EIS fails to adequately make the case that additional long term heavy crude capacity is even required for the region.
- A significant portion of the new proposed Line 3 route parallels high voltage lines. The EIS presents this as an environmental advantage. However, steel pipelines are highly susceptible to voltage induced corrosion which often result in pinhole leaks. The proposed Line 3 follows the high voltage corridor through the heart of Minnesota's lake country – making a spill in this area a certainty. In section "2.3.2.3 Cathodic Protection 2844-2

Systems" states that Cathodic protection must be in place within one year of pipeline installation. With the induced voltage from the powerlines even the smallest scratch in the pipeline's exterior coating could lead to accelerated corrosion. Given these conditions the only question remaining is when the spill will occur and how much will leak. However, if it's an 'average' spill, Figure ES-4 indicates that it will be well over 200 barrels 2844-2 Cont'd

Based on a review of the Economic Benefits and the Alternatives Analysis, it is clear that the existing EIS is inadequate and fails to demonstrate that this project is in the State's Interest – as required by the Certificate of Need.

Sincerely,

David Patterson,

MR. ANDY PEARSON: Thank you very much. My name is Andy Pearson. A-N-D-Y. P-E-A-R-S-O-N. And I'll make a few comments tonight.

First of all, let's just agree on the face of it that the Line 3 replacement project is absurd. Can we just agree on that; that this is completely nuts that we're even considering at this time, this time of climate chaos, right, just building in our world, right, we're considering building a pipeline -- a three-foot-wide pipeline to carry the dirtiest oil in the world when we don't even need that oil here anymore? Can we agree that that's absurd?

I'm asking for a few considerations. I'm asking that the Environmental Impact Statement, a document that's supposed to consider rules, both in statute and rules as a matter of policy, I am asking that it be updated to reflect the recent decision by Minnesota Governor Mark Dayton to commit Minnesota to following through on the Paris Climate Agreement, following the absolute lack of leadership displayed at the federal level in withdrawing us from that international agreement.

Now, let's be real here. This

project, as analyzed in the current draft Environmental Impact Statement, carries a social cost of carbon of $287 billion. And that is billion with a B. That is a staggering amount. That's the number that includes the environmental cost of the oil that the pipe would transport, as well as the number, which I know was read earlier, 673 million. Just to be clear, that's only the impact of the infrastructure of the pipe itself. It doesn't even include the oil inside. 0884-1

$287 billion is the number in the DEIS that includes the oil, and that is not even a comprehensive number; that is only over a 30-year time span. And we know that there's pipe in the ground right now that's been pumping for over 60 years. If we double that number, that would be a closer approximation. And let's know there are people here in the room today that are barely even going to be middle-aged 30 years from now. That number needs to be extended. We need to have calculations that go out to, at a minimum, 60 years social cost estimates.

And please revise the climate section, taking into account its compatibility with Governor Dayton's decision to stay with Paris. It is crystal

clear that the only viable option, if he is serious about sticking to the Paris agreement, is to not build this new pipeline at all, to be very clear about that.

Second thing I want to mention is the alternatives analysis. You know, one way to make a bad project look like the only way forward is to remove all the other alternatives one by one or make them look bad. And that is what was done in this document. It was done just in a way that surprised even me. And I didn't know what I'd find, but I am surprised.

We have a proposal from the Department of Commerce's document that Enbridge might actually choose to build a rail-loading terminal in Canada just on the other side of the U.S. border after, you know, a thousand miles of pipe; and then they would put the oil onto trains, ship it across Minnesota to another rail-loading terminal to go down the rest of the way to the Gulf where this oil is headed. I mean, is that done anywhere in the world? This is one of my questions: Is there a rail bridge between two pipeline terminals anywhere in the world? These alternatives are supposed to be reasonable and prudent. Right? There is -- there is no way that

that can possibly be met. That's why I have no idea why it's in the document.

There are viable potential rail alternatives which could at least be studied that would involve the rail being loaded up in Canada and shipped to refineries. That's the way Canadian oil moves by rail when it moves by rail, which is rare. This absolutely must be changed.

The same goes for the truck alternative. By the way, 4,000 truck trips per day in the DEIS, a pipeline on trucks? Again, this is not the case anywhere in the world. You are reading a work of fiction here. This isn't even based on remote fact, this alternatives analysis.

And then we have what Levy brought up, where two of the route alternatives goes through Leech Lake, when Leech Lake has made it absolutely clear that that is not a possibility. Again, that is not reasonable and prudent.

The alternatives section is a work of fiction, and it's got to be treated like that. And we can't make decisions based on a work of fiction. We need to make them based on a work of fact.

Last point. Where is the oil going, once it gets to Superior, Wisconsin? Now, Enbridge

has pipelines that cross down Wisconsin. It's my understanding that Enbridge plans to use those pipelines. It's also my understanding that the current flow rates on the pipelines going into Superior and out of Superior do not allow for the extra capacity which the Line 3 expansion would bring. 0884-2

Now, in Wisconsin, Enbridge has gone back and forth about whether or not they plan to build a brand-new pipeline across that state to carry extra oil coming from Minnesota. That line has been at some points referred to as Line 66 or the Line 61 twin. That is not referenced in the draft Environmental Impact Statement, as far as I can see; and it must be, because if that line is part of what could potentially move this oil, if it is necessary to move the volume transported by the Line 3 project, then it is a connected project, and it must be included within the scope of this EIS for the study. The fact that that was not included and there's no discussion of it, that Enbridge's numbers on potential flow rates are omitted from the document, are censored from the document that we don't even know where this oil is going once it leaves the state, we cannot make a decision based on

that.

So I don't think what I'm asking is too much here. I don't think it's crazy. I don't think it's totally unreasonable. I think what I'm asking for is basic facts. You know, we have some of those in the document already, and that's good, and I appreciate where the facts have been followed and where they've been drawn out; but there's a heck of a lot of places where they haven't been and they need to be.

Thank you so much.

MR. ANDY PEARSON: Thank you. My name is Andy Pearson. A-N-D-Y. P-E-A-R-S-O-N. And I want to make a couple of specific points about the DEIS, which in a lot of ways is a very good document. It has a lot of information that we maybe didn't have before.

One of the pieces that was the most shocking to me to see was that the climate change social impact of the project is projected to be, over 30 years, up to $287 billion, which is an awfully staggering number. However, pipelines have been currently operating that are -- have been in the ground for over 60 years; and I think that that number needs to be extended in terms of studying the long-term impacts, to cover the full length of how long some of these pipelines have been operating. So I wanted to make that point.

I also want to say specifically the analysis of the alternatives, the truck and the rail alternatives, assumes that out of Clearbrook, Minnesota there is going to be takeaway capacity dropping south to the Minnesota refineries on Minnesota pipeline -- the Koch Brothers operate the pipeline network that serves Twin Cities refineries -- equivalent to the full takeaway capacity of those pipelines. And I don't believe that that's an accurate assumption, and I want to push back against it. And I would encourage the DOC to analyze that more fully, because there are several pipelines that are capable of delivering that oil right now.

1844-1

Among other pipelines that Enbridge has, there's 1, 2, 4, and the Alberta Clipper Line 67. And, in particular, Line 4 and 67 are capable of carrying the type of heavy crude, the diluted bitumen, that the Minnesota pipelines, the Koch refineries, take and take away. And this is relevant because the alternatives that have been proposed in the document all assume that any potential project needs to supply the full capacity of those pipelines going down to the Twin Cities.

I haven't seen information that

1844-1 Cont'd

suggests that Line 3 is currently doing that or that it would need to do that in any building scenario, even if the pipeline is to be constructed in a different location or in the present location.

So I would encourage the final version of the DEIS to examine what the takeaway needs are and how else it could be supplied out of Clearbrook for the Twin Cities area refineries and not make an automatic assumption that Line 3 has to provide all of that. I believe it does not.

The other thing is I want to read a small section of the DEIS about the minimum lifespan of a pipeline. It says, The Applicant anticipates that the physical life of the pipeline, i.e., the number of years the pipeline will be capable of transporting crude oil, would be indefinite, given appropriate construction, maintenance, and integrity systems.

Now, I know that pipelines can last a long time, and we have pipelines in Minnesota that have lasted a long time. But I don't think it's an exaggeration to say that nothing is indefinite, nothing is infinite, nothing is going to keep being able to be repaired forever. And I would encourage and expect that a final version of this document

would dig into that a little bit more. What does indefinite actually mean here? What's the maximum lifespan we can assume from a project? When are we going to have to start looking at the eventual cleanup and potential removal cost of this project, and what generation is that going to fall on? Because it's going to fall on somebody. It's going to fall on somebody. And in the document it does list the projected pipeline removal cost, if Enbridge was to do it, at $1.28 billion. So I don't think it's unfair to ask what generation this cost will be falling on. We need to know what indefinite means.

There's too many uncertainties in the document where Enbridge is allowed to get away with terms like indefinite, when, in fact, there are numbers, there is data, there is historical precedent in Minnesota and elsewhere for how long these things can last, and we can make better decisions if we have the specifics.

Thank you.

MR. ANDY PEARSON: Hello, thank you.

My name is Andy Pearson, A-N-D-Y,

P-E-A-R-S-O-N. Some of you may know me as the person who offered you a sticker when you walked in about opposing the pipeline project.

I have been to all 22 of these meetings, and I think it's important to say that those of us who are opposing this project, even those of us who may have been on the road for a while, are coming from a lot of different places as well.

And we were not -- we're not all, you know, just here to say no pipeline and that's what we've been doing all our lives.

My own example, I have worked for a union, and I have worked for the Minnesota Chamber of Commerce. Those might be things you didn't expect about somebody standing up here with a sticker. So I wanted to say that first.

Now, let's talk about the Draft Environmental Impact Statement. This is a document that was made with a lot of good intentions. I really do believe that. This is also a document that has some deep flaws that need to be addressed, some of which are real tricky to find; others of which maybe aren't that tricky.

So I'm going to do a little exercise here. I'm going to ask anybody who's willing to open up the book that you got when you walked in to page 16, and I'm going to refer back to a piece of paper I have over here. It's a big piece of paper; hopefully you all can see it. 1851-1

Now, that's a graph that's on page 16. That's the relative spills of pipeline versus other modes of transportation. It's simply been made wrong, and the proof is in the little blue line for spill size, average spill size for pipeline spills. Thank you -- my lovely assistant will hold the sign here.

For pipeline spills, what the Department of Commerce did, they wrote a line right below that, that that number should be 462. That's the number.

But they measured it using the scale on the left, not the scale on the right, for purposes of making this graph. So this line is half as tall as it should be.

I think any of you with at least a couple of years of any type of education will see that. Anybody who graduated high school

should be able to see that right away. As soon as you look at the document, you'll see they made it wrong.

I believe there are many places in this document where that level of care was applied. That is what I trust, and I hope, that we will be seeing revised and improved in the next version of the Environmental Impact Statement.

The line should be twice as tall, exactly twice as tall. Look at it there. This is the better way to visualize the information. You can see how much pipeline spill compared to rail and truck. I want better visuals, better information.

I'm almost out of time, and I'm not a particularly spiritual individual. Not as much anyway as many others in this room. But I want to close by saying that by God, if there ever was a time when future generations were screaming at us to do the right thing, it is now.

Thank you.

MR. ANDY PEARSON: Thank you -- hello. My name is Andy Pearson, A-N-D-Y, P-E-A-R-S-O-N.

Thanks for the chance to comment. So I have two points today that I want to make. One is the technical and one is a little less so.

To start with the technical one, one of the things that I really appreciate about the Draft Environmental Impact Statement is the climate modeling section where it does calculate out the social cost of carbon as being $50 something billion and $287 billion,

depending on the displacement of oil in the pipeline, as in how much oil this pipeline offsets that's currently being transported now by other means.

I will say, and I've said this before, that the 30-year time horizon is short and that it needs to be at least 60 years, because there's strong precedent in Minnesota for Enbridge operating that line. So I believe the numbers are understated right now.

But the second point about that, is that in addition to changing the timeline, I would encourage the Department of Commerce to explore modeling with partial displacement, because I believe that that is what the Enbridge company is actually proposing here; unless I am confused. 2013-1

It appears that Enbridge is proposing to stop the operation of the current Line 3 and to begin a new pipeline, which would, in theory, carry some amount of the oil that's currently going on Line 3; essentially what Line 3 is carrying now plus an additional 370,000 barrels per day of primarily heavy crude.

2013-1
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And I didn't see that addressed in the climate section. I saw only no displacement or full displacement, when it appears the company's been, in fact, proposing from the beginning partial displacement.

So I would encourage a partial displacement model in the climate section and for it to be modeled on a 60-year social cost of carbon, again, given precedent in Minnesota. So that's a technical comment.

The less technical one is I had a wonderful conversation earlier today with one of the state employees here and we talked about public process, because this is really cool what we're doing here.

It's really cool that the State has said, "We will be open and we will listen and we will make a commitment to have 22 meetings and to hear voices."

I know that it's tough to sit up there or stand up there and essentially hear your work criticized, and I want to say that I think all the speakers share a belief that good process can lead to good outcomes and good science. So that's where this is coming from.

Now, the thing that came out of this conversation this morning, I want to say to everybody in the room, including all the state employees, is I think maybe in some people's minds it's a little bit of a lack of understanding of the importance of this particular decision.

Because what I heard was that, hey, it feels great. We're in kind of a new moment here with a lot of groups coming out and participating. We're seeing a lot of young people at many of these meetings.

We're seeing a lot of indigenous people really committing their time to this process. And what I heard this morning was that that would probably continue and it's really cool to see this kind of future we're heading into where people feel they have a voice in government this way.

But what I want to say is that that isn't automatic, and I am more sure of this than I am sure of virtually anything.

The outcome of the decision on this project is what is going to determine the way that the State interacts on environmental

issues with young people and indigenous people for the next 50 years.

If we go through this process with all this openness and positive discussion, good science and the project is built anyway, that will absolutely shut that off. That will shut that off.

You do not get to make that decision and then keep the collaboration going forward, because it will have been a slap in the face to the hundreds and hundreds of people who have come out, voiced their opinion, been heard or felt like they were heard in that way.

This is thus extending a hand in cooperation and goodwill times 22. You're in a lot of meetings. But it is not going to be there forever and it is especially not something that can be kept automatically, regardless of the decision made on this project.

It is dependent on an outcome that's based in the science and on a strong environmental impact statement being the end result here.

And I would encourage everybody

to just realize the gravity of the decision that's upon us and how it's going to impact the way that so many constituencies interact with the State of Minnesota for decades to come and how they feel. Thank you.

Levi, Andrew (COMM)

From: Lourdes Pérez, Musician & Writer <lourdesperezchannel@gmail.com>
Sent: Monday, July 10, 2017 5:30 PM
To: MN_COMM_Pipeline Comments
Subject: Fwd: Shut down Line 3

To: Jamie MacAlister, Pipeline.Comments@state.mn.us

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I am from: San Antonio, Texas. I have relatives and friends in Minnesota whose health would be directly, adversely effected by the proposed Line 3.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground for the reasons listed below.

Sincerely,

TRIBAL IMPACTS

- The United Nations international standard for projects that impact Indigenous Peoples is **Free, Prior and Informed consent**. Tribal consultancy after the project is already proposed and designed is not free, prior, and informed consent. 2338-1
- Most of the issues specific to tribal people and tribal resources are **confined to a separate chapter** that attempts to provide "an American Indian perspective." They are excluded from the main chapters that assess potential impacts. This allows the EIS to **avoid drawing conclusions** about the impacts on tribal people. (Chapter 9) 2338-2
- Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "**would have a long-term detrimental effect on tribal members and tribal resources**" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). **This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members**. 2338-3
- Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "**are part of a larger pattern of structural racism**" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3). 2338-4

- The DEIS concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) **But it also states that this is NOT a reason to deny the project**!
- Chapter 6 states that Enbridge's preferred route would impact **more wild rice lakes and areas rich in biodiversity** than any of the proposed alternative routes (Figure ES-10).
- Most of the analysis of archaeological resources in the path of the pipeline rely on **Enbridge's surveys**. For some reason, only 3 of their 8 surveys are available, and the 5 missing are the most recent! In those, Enbridge found 63 sites, but claims that only 3 are eligible for protection under the National Register of Historic Places. (5.4.2.6.1). Honor the Earth has had the studies we have been able to see reviewed, and there are numerous flaws in their methodology. 2338-5
- The DEIS acknowledges that "The addition of a temporary, cash-rich workforce **increases the likelihood that sex trafficking or sexual abuse will occur**," and that these challenges hit Native communities the hardest. But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). What experience does Enbridge have planning and implementing an anti-sex trafficking program?

BIG PICTURE PROBLEMS

- Many of the environmental impacts and "plans" for minimizing them are drawn directly from Enbridge's permit application ("Enbridge would do this" and "Enbridge would do that") without any evidence of compliance or genuine consideration that maybe, just maybe, Enbridge won't follow all the rules. History shows that they continually violate permit conditions - we are working on compiling an enormous record of these violations. The DEIS should analyze the likelihood of compliance.
- **The Alternatives chosen for comparison to the pipeline proposal are absurd** -- for example, the only rail alternative assumes the construction of a new rail terminal at the US border, and thousands of new railcars to transport oil to Clearbrook and Superior. Enbridge would never do that. The only reasonable rail option would begin in Alberta. The truck alternatives are similarly unreasonable.
- **The "No Build" Alternative is not genuinely considered.** It is framed as "Continued Use of Existing Line 3" (Chapters 3 and 4), but nowhere is the "Shut Line 3 Down" option considered. There is no discussion of renewable energy, conservation, or the rapid development of electric car infrastructure. There is no assessment of the decline in oil demand. The entire study assumes that society needs X amount of oil, simply because Enbridge says they can sell it. That assumption ignores the massive fossil fuel subsidies and debts that make Enbridge's profits possible, and avoids the moral question of what is good for people and the planet. We know we must stop burning fossil fuels yesterday.
- There is zero discussion of how all this extra oil will go once it leaves Superior, Wisconsin. With 370,000 bpd of additional capacity, Enbridge will need a new pipeline departing its terminal in Superior. We know that they plan to build Line 66 through Ojibwe territories in Wisconsin, but they continue to deny this. Why isn't MN asking?
- The DEIS contains **no spill analysis for tributaries of the St. Louis River or Nemadji River**, where spills could decimate **Lake Superior** and the harbors of the Twin Ports.
- For calculations of impact, the lifespan of the new Line 3 is estimated at *30 years*. But Lines 1-4 are 55-65 years old! And hasn't the technology improved? The lifespan should be at least 50 years, a shorter lifespan is a clear indication that Enbridge

themselves know that the fossil fuel era is coming to an end. In Honor the Earth's analysis, we have attempted to predict the impacts of this pipeline on the next 7 generations.

- This project is a further investment in a dying Tar Sands industry. Numerous international oil companies and financing institutions are divesting from the tar sands. Why should Minnesota invest in this industry? Why should our Nation be forced to deal with a bad idea in perpetuity.
- The DEIS assumes that the Koch pipelines to MN refineries get all their oil from Line 3, but the current Line 3 does not supply enough capacity for this (390,000 barrels per day), and we know that some of it comes from Line 81, which brings oil from the Bakken in North Dakota.

SPILL RISK

- The 7 sites chosen for spill modeling are not representative of the locations and resources put at risk along the entire corridor. A more thorough analysis of different locations is needed - for example, what about Lake Superior?
- There is no analysis on Enbridge's leak detection system, or their inability to respond quickly to major emergencies.
- Enbridge's response plans are highly guarded, and Honor the Earth's attempts to receive and review these documents has been blocked. What we can infer is that Enbridge relies on local first responders for their emergencies. They attempt to use the money they donate to communities along their corridors as proof that they have an integrated emergency response program.

The DEIS estimates the annual probability of different kinds of spills on the proposed route in MN:

- Pinhole leak = 27%
- Catastrophic = 1.1%
- Small Spill = 107%, Medium = 7.6%, Large = 6.1%

So in 50 years, we can expect **14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic**!

ABANDONMENT

- The risks of pipeline abandonment are not adequately assessed. For example, there is no discussion of landowner property values and the effect that an abandoned pipe could have on them, especially if there is indeed "**legacy contamination**" on people's land.
- Impacts on human and natural resources due to the abandoned Line 3 are anticipated to be minimal in the near term but could be significant in the longer term, absent effective monitoring, adaptive management, and the timely introduction of mitigation measures. There is not much information on what these mitigation and management plans are.
- If there is a dearth of surrounding soil, or if the cover for the pipeline is relatively shallow, the pipeline bears more of the load and, all things being equal, is more likely to fail. We know from experience that there are numerous areas where the pipes are exposed and near the surface.

- There is also no discussion of**exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied**. "When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high" (8.3.1).
- We know that the abandonment of the existing line 3 is bad. But there is also no mention of **the abandonment of the other 3 ancient pipelines in Enbridge's existing mainline corridor (Lines 1, 2, and 4)**, which we expect Enbridge will very soon attempt to abandon. Nor is there any discussion of the **abandonment of the NEW Line 3** in the future.
- The DEIS states that it will be very risky to remove and clean up the existing Line 3 because the pipelines are very close together. "The distance between pipelines within this corridor varies, but they are generally 10 to 15 feet apart" (8.3.1). This is not consistent with our extensive observations and physical measurements on the land. Also, don't they dig up pieces of pipe for maintenance purposes all the time? **Why is it suddenly risky?**
- The DEIS simply states that "Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage,and mitigate historically contaminated soils and waters" found during the abandonment or removal of the existing Line 3 (8.3.1.1.1). **We want to see that plan**.

CONSTRUCTION AND RESTORATION

- Chapter 2, "Project Description" states that Enbridge has requested a 750-foot route width (375 feet on each side of the Line 3 Replacement pipeline centerline). They claim only 50 of the 750 feet would remain a permanent right-of-way (2.1) All of this width should be included in an impact analysis because Enbridge's environmental protection plan and record is abysmal.
- Their "restoration" plans for restoring the landscape around the corridor after installation is laughable. Enbridge's process for restoring wetlands includes dumping the now compacted (and probably de-watered) soil back in the trench, sowing some oats and "letting nature take it's course". This is not how you re-establish a wetland. Studies have shown that even with proper restoration practices, it can take decades to get back to the biological functioning it was at prior to disturbance. When Enbridge stores the soil, they will also be driving equipment over it- which compacts it, they also plan to compact the soil after refilling the trenches. This is not good for the soil.
- Cathodic protection, which applies electric current to the pipeline in order to protect it from corrosion caused by nearby utility lines, **will not be installed for up to 1 year after pipeline construction** (2.3.2.3). Lack of cathodic protection is what caused many pinhole leaks in the Keystone pipeline, almost immediately after construction. The proposed route for Line 3 follows a utility corridor for much of its length - this is a recipe for disaster. Even the US Army Corps's rubber-stamp approval of the Dakota Access pipeline required the cathodic protection system to be installed within 6 months!

ECONOMIC IMPACTS

- Chapter 5, "Existing Conditions, Impacts, and Mitigation" states that Line 3 will create ZERO permanent jobs. Enbridge's application states that "existing operations staff would

be able to operate the [pipeline] and that few additional employees would be hired to assist the staff" (5.3.4).

- Also in Chapter 5, the DOC assumes "all workers would re-locate to the area" and ZERO construction jobs will go to Minnesotans. The pipeline would have "no measureable impact on local employment, per capita household income, median household income, or unemployment" (5.3.4).
- The DEIS does not acknowledge that when the existing Line 3 shuts down, Enbridge will stop paying taxes to the MN counties along the mainline corridor. For many of these poor counties in the north, revenue from Enbridge's property tax makes up a significant portion of the county budget. There is also the issue that Enbridge is now in the process of appealing years of back taxes, burdening two of the poorest counties in Minnesota with over $10 million due.

CLIMATE CHANGE

- The DEIS acknowledges that Line 3 would contribute to climate change. It analyses 3 different types of emissions - direct, indirect, and lifecycle. Direct emissions are those that the pipeline infrastructure itself emits, and these are very small. Indirect emissions are those created by the power plants that provide electricity for the pipeline's pumping stations, and these are significant. Lifecycle emissions are those caused by the refinement and eventual use of the oil, and these are massive. Line 3's direct and indirect emissions alone would be 453,000 tons of CO2 per year. Over a 50-year lifespan, that would cost society an estimated $1.1 billion. (Executive Summary p.18).
- The lifecycle emissions of Line 3 would be 193 million tons of CO2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3)
- The DEIS does not discuss the unprecedented challenges of human casualty, displacement, conflict, natural disaster, biodiversity loss, etc, that climate change is causing, or the consensus from the scientific community that we must leave fossil fuels in the ground. It also fails to acknowledge that across the planet, Indigenous people are disproportionately impacted.

The DEIS affirms that the MN PUC can only grant the permit if "the consequences to society of granting are more favorable than the consequences of denying the certificate." Regardless of whether or not Enbridge can find customers, the DEIS shows that the negative impacts far outweigh the benefits. So our position remains:

NO PERMIT. SHUT DOWN LINE 3.

Sincerely,

Lourdes Pérez

Levi, Andrew (COMM)

From: Jerry Perkins <jerrypeggyp@hotmail.com>
Sent: Monday, July 10, 2017 12:20 PM
To: MN_COMM_Pipeline Comments
Subject: Comments for docket numbers CN-14-916 and PPL-15-137
Attachments: Comment on Line 3 DEIS.docx

To: Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce

Re: Public comment for docket numbers CN-14-916 and PPL-15-137.

From: John R. Perkins and Gerald V. Perkins, Jr.

We are property owners in Hubbard County with a lake home located near the proposed Enbridge tar sands crude oil pipeline known as Line 3. We oppose the issuance of a Certificate of Need for Line 3. The Minnesota Public Utilities Commission (MPUC) should decline to issue a Certificate of Need based on the following factors:

2339-1

1. There is no economic need for the pipeline because of the glut of oil currently being produced in shale oil fields in the United States that has driven oil prices down to levels not seen in years. Many experts say this glut is expected to be a permanent feature of the petroleum industry. More fuel-efficient cars and Zero Emission Vehicles (electric cars), increased production of renewable energy and fuels, and declining demand for liquid fuels all point to a declining need for more petroleum-based fuels.

   Despite this widely-known and -recognized scenario of lower demand for crude oil, I didn't see an analysis in the Draft Environmental Impact Statement (DEIS) of the need for Line 3 that the MPUC could use to render its decision on the issuance of the Certificate of Need.

   The final EIS should contain an analysis of the need, or lack thereof, for another crude oil pipeline. Any honest analysis based on the facts will conclude that Line 3 is not needed.

2339-2

1. There is no mention in the DEIS about how the proposed Line 3 route preferred by Enbridge through the heart of Minnesota's lake country will impact the state's and local businesses' revenues from fishing, water recreation, camping, hiking, off-road vehicles, cross-country skiing and tourism in general. An economic risk-benefit analysis would give the MPUC an idea if Line 3 as proposed by Enbridge will provide enough economic benefits to offset the considerable risk it poses to the environment and how that will impact the number of visitors to the region.

2339-3

2. Canadian tar sand oil is among the most flagrant examples of fossil fuels that contribute to Greenhouse Gas (GHG) emissions. Their production and movement should be discouraged, not promoted. Line 3 should be rejected for environmental reasons.

2339-4

3. Minnesota is currently the fourth largest ethanol producer in the United States with 1.18 billion gallons of ethanol produced annually by 20 ethanol plants. The State of Minnesota has been one of the most active in terms of promoting and supporting its renewable fuels industry. Denying the certificate of need for Line 3 is another way the state can continue to support ethanol, which promotes rural economic development and jobs in small towns and rural areas of the state, boosts U.S. energy

independence, and cuts the emissions of GHG because of ethanol's much lower carbon footprint compared to petroleum-based gasoline. 2339-4 Cont'd

4. Because of widespread opposition to the pipeline, eminent domain will undoubtedly be invoked to force landowners to permit access to their property for the construction of the pipeline. Granting eminent domain for a project intended to boost the profits of a foreign company is an illegitimate use of eminent domain, which is properly intended only for projects that serve the public good. The Line 3 project serves Enbridge's bottom line, not the public good, and should be rejected. 2339-5

2339-6

If the MPUC decides that the pipeline is needed, it should require that the pipeline follow System Alternative (SA)-04, as described by the DEIS. The DEIS analysis of alternative routes for the pipeline shows clearly that the best alternative is SA-04 because it avoids the pristine lakes and rivers of the Mississippi Headwaters, Minnesota's precious wild rice beds, and its water-purifying wetlands.

2339-7

SA-04 would direct the Canadian tar sands oil to a refinery in Joliet, IL instead of sending it to Superior, WI as proposed for Line 3. Diverting the pipeline to deliver crude oil to Joliet means the crude oil refined there will, more likely, be used domestically by U.S. motorists rather than being exported if it is refined in Superior, WI, near the Great Lakes' shipping lanes.

Because SA-04 is longer than the other proposed pipeline routes, it will provide more jobs and economic benefits. 2339-8

Furthermore, the DEIS clearly states that when a crude oil spill occurs, it spreads much less on land than it does in a water setting. For that reason alone, SA-04 should be the favored route. 2339-9

2339-10

The final EIS can be improved from the draft EIS by using a more realistic analysis of the alternatives modes of transportation for crude oil, especially by rail. It was pointed out frequently during the public hearing in Bemidji, MN on June 22 that the rail option has not been adequately or fairly treated in the DEIS.

For example, the bar chart on page 16 of the Executive Summary is in error when it shows the length of the blue bar for the pipeline's average size of accidental release of crude oil in barrels. If this chart was accurately rendered, it would clearly show that, although pipelines average fewer spills (because they carry far less crude oil), the average size of pipeline spills is far larger by a factor of 10 or more. For that reason, carrying crude oil by truck or rail through fragile ecosystems with a large amount of surface water is much safer than by pipeline. 2339-11

One final point also is worth noting: The DEIS states that Enbridge refused to release information pertinent to the analysis. By refusing to be transparent or forthcoming when important public decisions are being made, Enbridge has shown that it cannot be trusted as the custodian of the environmental well-being of northern Minnesota's lake country.

The MPUC should show Canadian-based Enbridge that refusing to comply with the publics' right to know is not the way we conduct governmental affairs in the United States and it should reject the applicant's request to build a pipeline through the Minnesota Headwaters.

Furthermore, in the interest of transparency, we would like some answers to the following questions: Who wrote the DEIS? Have the writers worked with Enbridge before? Who chose the DEIS writers, Enbridge or the State of Minnesota?

Thank you for the opportunity to voice our opinions on an issue that will impact the Minnesota environment for decades to come.

To: Jamie MacAlister, Environmental Review Manager
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state can continue to support ethanol, which promotes rural economic development and jobs in small towns and rural areas of the state, boosts U.S. energy independence, and cuts the emissions of GHG because of ethanol's much lower carbon footprint compared to petroleum-based gasoline.

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through fragile ecosystems with a large amount of surface water is much safer than by pipeline.

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Thank you for the opportunity to voice our opinions on an issue that will impact the Minnesota environment for decades to come.

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Robert Peterson

Street Address: 59057 Great River Road

City: Palisade MN State: MN Zip Code: 56469

Phone or Email: (218) 845-0065

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

0732-1

Estimate of reduction in property values for people adjacent to above-ground pipeline infrastructure, as well as disruption due to protests and related issues.

I am on RSA 21

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Mary Carroll Peterson <marycarrollpeterson@gmail.com>
Sent: Sunday, July 09, 2017 3:43 PM
To: MN_COMM_Pipeline Comments
Subject: Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137

Dear Environmental Review Manager:

I understand that an engineering firm called Cardno, with ties to Enbridge, was instrumental in preparing part of the draft Environmental Impact Statement for Line 3. In light of this fact, in the final EIS I would like to see an independent analysis of the information they provided. Minnesota requires verified facts for such a large project.

Also, there is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. 1445-1
Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete.

Please protect our environment.

Thank you.

Mary Peterson
23386 County 7
Park Rapids, MN 56470

218 732-0822

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Joni Phillips

Street Address: 51379 190th Place

City: McGregor State: MN Zip Code: 55760

Phone or Email: djphillips@q.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

0734-1 The EIS does not cover the social impact of this pipeline. This community is already under enough stress economically. The building process alone will remove any income coming in from recreational purposes let alone the de-valuation of property (or no valuation) or tax assessments for clean up. The social impact to the people/businesses of the area for the new proposed Line 3.

0734-2 Where is the environmental impact statement or of what happens when there is a spill or leak, this DEIS reads like a economic impact statement for Enbridge.

2 of 2

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Joni Phillips

Street Address: 51379 190th Place

City: McGregor State: MN Zip Code: 55760

Phone or Email: djphillips@g.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

0735-1

(1) I am very concerned about any spills / Leaks from Line 3 into the Big Sandy Watershed. After reviewing spills across the country, it appears clear that there is irreparable damage done and this is unacceptable for our watershed / small community that is pristine at this point.
The EIS spill analysis p13-14 of ch 10 only shows the probability of annual spills. Need spills over a lifetime and the lifetime of a pipeline is longer than stated most like 60 yrs vs 30 yrs. How concerning for MN and for our water if/when there are leaks/spills. The public needs to be able to review all scenarios for spills (table 10.3-1 p36 ch12)

(2) Take out existing Line 3 by completely removing it and replace the new Line 3 in exactly the same place, not in a new place where there is pristine waters.
This option does not appear to be noted as an option in the DEIS and needs to be — it would solve multiple problems. The existing line is a problem or will be a tremendous problem that the state of Minnesota should not have to be responsible for. Enbridge should be responsible.

(3) If not existing Line 3 as the route, run the new Line down the western part of the state away from water where it can be monitored.

If including additional pages please number them and tell us how many you are providing: 2 pages

and make sure Enbridge removes existing Line 3.

Levi, Andrew (COMM)

From: Joni Phillips <djphillips1@icloud.com>
Sent: Friday, June 30, 2017 1:47 AM
To: MN_COMM_Pipeline Comments
Cc: Joni Phillips
Subject: Public Comment: Line 3 Project CN-14-916 and PPL-15-137
Attachments: Draft EIS response 6292017.pages

Follow Up Flag: Follow up
Flag Status: Flagged

Docket Numbers CN-14-916 and PPL-15-137

June 29, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St Paul, MN 55101-2198

Re: Public Comment: Line 3 Project CN-14-916 and PPL-15-137

Dear Mr MacAlister,

Having expressed displeasure over the Sandpiper docket in writing and in person over these past few years, I find it extremely frustrating to re-live this again with Line 3. This is Enbridge re-packaging the Sandpiper Pipeline Project and a southern corridor. All of us in Minnesota should be thinking of longer term goals in renewable and clean energy, particularly where the alternatives impact our pristine waterways and forest.

After reviewing the EIS, I respectfully request that the CN be denied or if necessary, create a new option to rebuild the existing Line 3 given it already exists within a pipeline corridor. Thereby not allowing Enbridge the opportunity to build another pipeline corridor in our state. The rational provided in the Executive Summary as to why the old pipeline should not be completely removed ("Although removing the pipeline is potentially desirable, abandonment is easier and far less risky"…) and the new pipe installed in the same trench, does not stand up to the risks a brand new pipeline in an otherwise pristine route would have to endure. Enbridge cannot be allowed to access new MN land routes just because they don't want to clean up their existing mess. The proposed route crosses the Sandy River (which flows directly into Big Sandy Lake) and crosses the width of the Big Sandy Lake Watershed (BSLW) in Aitkin County. I am opposed to a pipeline being built through Aitkin county and the BSLW where any leak/spill would cause irreparable damage to 6500+ acres of currently pristine waterways. There is no calculation or replacement cost you can put on this.

Additionally, I find it difficult to believe that we are entrusting Enbridge to this new project given their poor record of spills as well as their community/project relations to-date. Enbridge pipelines average 1.8 spills/week — in fact, just last week there was a spill in Grand Rapids on Line 3. The diluent they use to move the bitumen in these pipes is carcinogenic and flows in the direction of the water. Even after 270 miles, it is still at toxic levels and Enbridge's proposed Line 3 would run just a few miles from the inlet into Big Sandy. Even a pinhole leak will release 28 barrels per day into the surrounding water — and because most of Aitkin County is wetland, there is a great deal of water for diluent to travel. In the case of this most recent Grand Rapids spill - Enbridge was digging down 9 feet to put a sleeve on a pipe that had "bent" as the work supervisor put it (during the so called integrity dig). This kind of small spill wouldn't have been reported in the news. When this kind of problem occurs in town, they will go to the trouble to repair it, but when anomalies happen in the boggy BSLW, its doubtful they'll go the trouble to get out there to repair it. Therefore, I ask that they

don't get to put a pipeline there. Please explain the process of locating a leak and recovery in BSLW in the EIS.

Financially speaking the only "benefits" Line 3 provides are temporary jobs and tax dollars that our counties may be at risk of ever seeing (see current court case referenced in article; "Enbridge tax challenge could cost northern minnesota counties millions, Star Tribune March 2017) and I would argue are not worth the economic losses our area will sustain. The losses will be to our property values when the construction starts and then when a spill/leak happens - because they will happen. At the public meeting held June 12 at the East Lake Community Center, David, a pipe-fitter stated "there is no way I can guarantee there won't be a leak". Please note this paragraph in the EIS.

Regarding the leaking/spills, no smart PIG can totally detect issues as described in the EIS and also in articles on the internet (see Bent article by Trudy Bell on Pipelines Safety and Security, Winter 2015). Coupled with the fact that this data is delivered post-leak and not preventative. Humans have to read the data and act on it - which Enbridge has demonstrated an inability to do with previous pipeline spills such as the 2010 Marshall, MI spill into the Kalamazoo River fouling 40 miles of that river. Planes flying overhead and inspections every 2 and 5 years are not enough to monitor. Humans on the ground have to monitor pipelines on a continuous basis. Unfortunately, it is extremely difficult to monitor a pipe that is under water or in a bog/wetland. 22% of all spills/leaks are found by citizens. I feel extremely uncomfortable that no monitoring will be able to go on by boots-on-the-ground over these very sensitive areas most at risk. This information should be noted in chapter 10 in the EIS. 1061-1

The EIS population data does not appear to have included second homeowners and therefore is much lower than actual for the proposed Line 3. See "Profile of Second Homeowners in Central and West Central Minnesota" by Pesch and Busier, University of Minnesota, Oct 2014. 1061-2

ES-19 "flooding, while mentioned,.. **could** damage project facilities…and **could** also effect how spilled oil **might** interact with the environment. …or flooding **could** cause spilled oil to be transported further downstream. I would change the wording to read "will" instead of each of the bolded (or at the least "will/could" & "will/might). And, why in the EIS is there no mention of Big Sandy Lake Watershed in Aitkin County (BSLW)? BSLW in Aitkin County is 260,000 acres (406 square miles) in size with 49 lakes. Over the last several years, the good people of this area have worked hard to bring Big Sandy Lake and surrounding to be rated as a Star Level Status lake. Any leaks/spills **will** impact part or all of this watershed and be irreparable. Please note this in the EIS. 1061-3

ES-21 Nowhere that I can find in the EIS are the future plans of Enbridge stated. It seems very clear that once a new pipeline is built creating this new corridor more pipelines can and will be built much more readily. If this is what Enbridge is intending, this must be noted in the EIS.

1061-4

2.7.1.13 where is "pipe debris and rinse water" going to be disposed of? or ie where is the appropriate waste facility? Is it at each pump station and therefore I'm concerned that its in wetland areas. Where does the test water come from? This is not clear in the EIS.

1061-6

3.6.3.3 MN Dept of Health - there doesn't appear to be a permit required, only <u>encouragement</u> of project applicants to consult with the MD of H regarding potential effects on drinking water supplies. I

1061-7

heard citizens noting in the public meeting (6/12/17 at East Lake Community Ctr) that wells are closer to the surface than planned for in the EIS. This could be a bigger problem then anticipated in Aitkin county and thus should be noted in the EIS. What does "encouragement" look/smell like anyway? There needs to be a permit requirement. 1061-7 Cont'd

10.3.1.3.4 Catastrophic spills - this section talks about how catastrophic spills can occur as a result of a complete break in the pipeline due to flooding and other activities. Flooding is a very real condition of life in Aitkin county and this county /preferred route has not been noted throughout the EIS as a HCA - High Consequence Area. The definitions and data in the EIS for HCA's need to be adjusted for this. In 2012 there was a record flood throughout the spring and summer. It is not uncommon for flooding to occur each spring throughout the Big Sandy Lake Watershed (BSLW) that is directly in this proposed Line 3 pipeline route. Additionally, the BSLW includes the Mississippi River so any flooding and spills into the watershed could and most likely would impact the Mississippi River having up and downstream impacts. This information MUST be provided in the EIS and throughout all the data analysis given this flooding activity has become more prevalent in recent years. 1061-8

10 This entire section on Accidental Crude Oil Releases appears to be highly biased for the proposed - preferred route. There is a considerable amount of repetitive data that unfortunately is not complete in terms of missing HCA for Aitkin County as noted in the above paragraph. 1061-9

10.4-5 It should be noted that it can't just be about the wells within 2500 feet of the centerline if water becomes contaminated across an entire 6500 acre watershed (see 2012 Big Sandy Lake flood as evidence that wells were contaminated due to flooding across Aitkin county). This information should be added to the EIS as it is critical for understanding the ramifications of a decision to put a pipeline in the proposed route. 1061-10

The Certificate of Need must take into account whether there is a need in Minnesota for this pipeline. In other words, there must be a state need. In Minnesota, fuel demand was down 19% in 2016 compared to its 2004 peak. Renewable energy via wind, hydroelectric, solar and biomass are starting to become more popular and less expensive. This is the way of our future. Minnesota does not need this pipeline, nor do we benefit long-term financially. It only serves to hurt us both financially and environmentally.

Please feel free to contact me if you have any questions.

Kind Regards,

Joni L. Phillips
51379 190th Place
McGregor, MN 55760

djphillips@q.com

2776

RECEIVED

JUL 05 2017

MAILROOM

Docket Numbers CN-14-916 and PPL-15-137

June 29, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St Paul, MN 55101-2198

Re: Public Comment: Line 3 Project CN-14-916 and PPL-15-137

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Homeowners in Central and West Central Minnesota" by Pesch and Busier, University of Minnesota, Oct 2014. 2776-1 Cont'd

ES-19 "flooding, while mentioned,.. **could** damage project facilities...and **could** also effect how spilled oil **might** interact with the environment. ...or flooding **could** cause spilled oil to be transported further downstream. I would change the wording to read "will" instead of each of the bolded (or at the least "will/could" & "will/might). And, why in the EIS is there no mention of Big Sandy Lake Watershed in Aitkin County (BSLW)? BSLW in Aitkin County is 260,000 acres (406 square miles) in size with 49 lakes. Over the last several years, the good people of this area have worked hard to bring Big Sandy Lake and surrounding to be rated as a Star Level Status lake. Any leaks/spills **will** impact part or all of this watershed and be irreparable. Please note this in the EIS. 2776-2

ES-21 Nowhere that I can find in the EIS are the future plans of Enbridge stated. It seems very clear that once a new pipeline is built creating this new corridor more pipelines can and will be built much more readily. If this is what Enbridge is intending, this must be noted in the EIS.

2.7.1.13 where is "pipe debris and rinse water" going to be disposed of? or ie where is the appropriate waste facility? Is it at each pump station and therefore I'm concerned that its in wetland areas. Where does the test water come from? This is not clear in the EIS.

3.6.3.3 MN Dept of Health - there doesn't appear to be a permit required, only encouragement of project applicants to consult with the MD of H regarding potential effects on drinking water supplies. I heard citizens noting in the public meeting (6/12/17 at East Lake Community Ctr) that wells are closer to the surface than planned for in the EIS. This could be a bigger problem then anticipated in Aitkin county and thus should be noted in the EIS. What does "encouragement" look/smell like anyway? There needs to be a permit requirement.

10.3.1.3.4 Catastrophic spills - this section talks about how catastrophic spills can occur as a result of a complete break in the pipeline due to flooding and other activities. Flooding is a very real condition of life in Aitkin county and this county /preferred route has not been noted throughout the EIS as a HCA - High Consequence Area. The definitions and data in the EIS for HCA's need to be adjusted for this. In 2012 there was a record flood throughout the spring and summer. It is not uncommon for flooding to occur each spring throughout the Big Sandy Lake Watershed (BSLW) that is directly in this proposed Line 3 pipeline route. Additionally, the BSLW includes the Mississippi River so any flooding and spills into 2776-3

the watershed could and most likely would impact the Mississippi River having up and downstream impacts. This information MUST be provided in the EIS and throughout all the data analysis given this flooding activity has become more prevalent in recent years. 2776-3 Cont'd

10 This entire section on Accidental Crude Oil Releases appears to be highly biased for the proposed - preferred route. There is a considerable amount of repetitive data that unfortunately is not complete in terms of missing HCA for Aitkin County as noted in the above paragraph.

10.4-5 It should be noted that it can't just be about the wells within 2500 feet of the centerline if water becomes contaminated across an entire 6500 acre watershed (see 2012 Big Sandy Lake flood as evidence that wells were contaminated due to flooding across Aitkin county). This information should be added to the EIS as it is critical for understanding the ramifications of a decision to put a pipeline in the proposed route.

The Certificate of Need must take into account whether there is a need in Minnesota for this pipeline. In other words, there must be a state need. In Minnesota, fuel demand was down 19% in 2016 compared to its 2004 peak. Renewable energy via wind, hydroelectric, solar and biomass are starting to become more popular and less expensive. This is the way of our future. Minnesota does not need this pipeline, nor do we benefit long-term financially. It only serves to hurt us both financially and environmentally.

Please feel free to contact me if you have any questions.

Kind Regards,

Joni L. Phillips
51379 190th Place
McGregor, MN 55760

djphillips@q.com

J. Phillips
7180 Jubert Lane
Corcoran MN 55340

WINNEAPOLIS MN 553

06 JUL 2017 PM 4 L

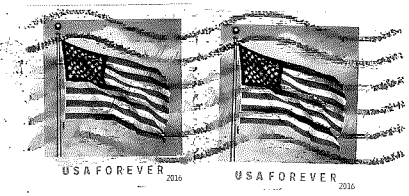

Jamie MacAlister
Environmental Review Manager
Minnesota Dept. of Commerce
85 7th Place East, Suite 280
St Paul, MN 55101-2198

55101-2198355

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Robert Pilot
Street Address: 2084 Jefferson AVE
City: St. Paul State: MN Zip Code: 55105
Phone or Email: Robert.Pilot@gmail.Com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

This EIS does not speak on The long term affect of The enviromental Impacts nor does it talk about the law on green house gas emissions that has never been met by the state of Minnesota.

0736-1

* Page 10.41 Section Public Health reflects only studies from the U.S. on health effects on human beings.
Canda has more exposure to tar sands and reflect a more comprehensive data to effects on human populations while on human populations while all of the oil stems from Canda. No studies from Canda are in this analysis which has reflected in 2014 that cancer of the colon has been linked to exposure to tar sand exposure. the rate of cancer is 1 in 4, which is a genocidal rate, the U.S. cannot take foreign transport of hazardous materials and remove foreign hazardous material effects.

If including additional pages please number them and tell us how many you are providing:_____ pages

MR. GREGORY JOHNSON: My name is Gregory Johnson, G-R-E-G-O-R-Y, J-O-H-N-S-O-N. I'm a board member of the Pine River Watershed Alliance, and, Barbara, I'm going to come and recruit you. That was good. 0852-1

You said most of what I could say about the watershed, with the exception that a very large portion of the watershed where the pipeline is proposed to go is co-located with high powered transmission lines in highly conductive soils called wetlands.

And I issued or entered into evidence a report from Little Falls about the extremely high risk of cathodic protection failure in exactly these types of soils, and so I did not see any of that, other than a very quick reference by Enbridge that they would use cathodic protection, but nothing about the much higher risk of failure of cathodic protection.

These wetlands are some of the last native pristine wetlands in the state. And by bridging them and putting pipelines in, I didn't see anything about disruption of

natural flow through those wetlands into the White Fish and Pine Ridge watershed.

I'm very concerned that this DEIS is just fancy paper over Enbridge's data. I don't think it's taken into account enough of the input from MPCA and DNR.

In addition, over here was -- it's a corridor. Let's not talk about a pipeline. We know Enbridge has at least two other aging pipelines along Route 2, and Sandpiper could be revised.

So we could be looking in the future at three or four more pipelines going through the same corridor, and I think we need to address the entire system, rather than taking it piecemeal, one at a time, one state at a time.

The oil will eventually go to Patoka, so why not put it through SA-04, get it into lands that are away from our waters and through the very most pristine part of the state. Thank you.

Levi, Andrew (COMM)

From: Steve Roe <roetreat@crosslake.net>
Sent: Saturday, July 08, 2017 11:40 AM
To: MN_COMM_Pipeline Comments
Subject: Emailing: Comments Line 3.Enbridge.pdf
Attachments: Comments Line 3.Enbridge.pdf; Steve Roe.vcf

Attached please find my comments on the Enbridge Line 3 DEIS project.
Please Acknowledge Receipt.

Sincerely,
Steve Roe

-----Original Message-----
From: Steve Roe [mailto:roetreat@crosslake.net]
Sent: Saturday, July 08, 2017 11:37 AM
To: 'Pipeline.comments@stste.mn.us'
Subject: Emailing: Comments Line 3.Enbridge.pdf

Attached please find my comments on the Enbridge Line 3 DEIS project.
Please Acknowledge Receipt.

Sincerely,
Steve Roe

Note: To protect against computer viruses, e-mail programs may prevent sending or receiving certain types of file attachments. Check your e-mail security settings to determine how attachments are handled.

Pine River Watershed Alliance

P.O. Box 822
Crosslake, MN 56442
218-692-3331

roetreat@crosslake.net

To: JAMIE MACALISTER
From: STEPHEN L. ROE
Re: DEIS Enbridge Line 3

Fax: 651-539-0109
Date: 07.08.2017
Pages: 15 not incl. cover

☐ Urgent ☒ For review ☐ Please comment ☐ Please reply ☐ Please recycle

11663 Whitefish Ave.
Crosslake, Minnesota 56442

218-692-3331
218-232-3554 cell
roetreat@crosslake.net

Stephen L. Roe

July 8, 2017

Jamie MacAlister, Environmental Review Manager
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

VIA FAX: 651-539-0109

Re: Comments on Line 3 Pipeline Project
Dockets CN-14-916 & PPL-15-137

Dear Ms. MacAlister;

The pipe for the subject project may meet industry standards. It does not, however, meet the federal specification provision requiring ***"good judgement"***. In accordance with many professional expert treatises on the subject of hydraulic pipe design, the Enbridge design falls far short of a safe design. The number of failures experienced by the pipeline transport industry bears witness to the structural deficiencies of this pipe design. Historic failures and the fact that "small releases" are not included in their statistical risk analysis warp their results. The number of individuals affected by a spill into the Mississippi River is misstated as the Mississippi is the principal water source for many Americans. Special care should be taken throughout the Mississippi headwaters. Pipe design must be included and reviewed in this EIS. 1447-1

Please obtain the signature of a qualified independent registered professional engineer for this pipe design.

Sincerely,

Stephen L. Roe
Pine River Watershed Resident

Attachments: Pipeline Design Papers (2)
Basic Design Calculation

CFR 192.105 Design Formula Hoop Stress Only

Pipe Wall Thickness	0.515	Inch	t
Pipe Outside Diameter	36	Inches	D
Yield Strength	70000	psig	S
Design Factor	0.8		
Longitudinal Joint Factor	1		
Temperature Derating	1		
Operating Pressure	1480		

Additional Considerations

Longitudinal Stress
Material Strength Deviation
Fluid Hammer
Design Factor is not a **Safety Factor**
Need for Safety Factor
Handling Stresses
Harmonics from Pump
Economics Dictate Cheapest Design

Conventional Pipe Longitudinal Stress as taught

Area	1017.8784	
Force	1506460.032	
Pipe Circum Area	58.25	
Long Pipe Stress	25864	psi
Pipe Hoop Stress	51755.6	psi
Total operating stress		
	3347592645	
Total w/Circum and	57858	psi total
Steel Yield Stress	70000	
Steel Design Stress	56000	
Safety Factor	44800	This should be the design stress they operate to
Water Hammer	127288	This is the maximum operating stress anticipated
The safe operating pressure		
	521	psi
Enbridge Operating Pressure		
	1480	psi

Enbridge Operating pressure must be reduced for this pipe design

Allowances		
Fluid hammer	2.2	Factor
Safety Factor	1.25	
Design Factor	0.8	

Chapter

4

Design of Pressure Pipes

The design methods for buried pressure pipe installations are somewhat similar to the design methods for gravity pipe installations which were discussed in Chap. 3. There are two major differences:

1. Design for internal pressure must be included.
2. Pressure pipes are normally buried with less soil cover so the soil loads are usually less.

Included in this chapter are specific design techniques for various pressure piping products. Methods for determining internal loads, external loads, and combined loads are given along with design bases.

Pipe Wall Stresses and Strains

The stresses and resulting strains arise from various loadings. For buried pipes under pressure, these loadings are usually placed in two broad categories: internal pressure and external loads. The internal pressure is made up of the hydrostatic pressure and the surge pressure. The external loads are usually considered to be those caused by external soil pressure and/or surface (live) loads. Loads due to differential settlement, longitudinal bending, and shear loadings are also considered to be external loadings. Temperature-induced stresses may be considered to be caused by either internal or external effects.

Hydrostatic pressure

Lamé's solution for stresses in a thick-walled circular cylinder is well known. For a circular cylinder loaded with internal pressure only, those stresses are as follows:

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Tangential stress: $$\sigma_t = \frac{P_i a^2 (b^2/r^2 + 1)}{b^2 - a^2}$$

Radial stress: $$\sigma_r = \frac{P_i a^2 (b^2/r^2 - 1)}{b^2 - a^2}$$

where P_i = internal pressure
a = inside radius
b = outside radius
r = radius to point in question

The maximum stress is the tangential stress σ_t, and it occurs at $r = a$ (Fig. 4.1). Thus,

$$\sigma_{\max} = (\sigma_t)_{r=a} = \frac{P_i a^2 (b^2/a^2 + 1)}{b^2 - a^2}$$

or $$\sigma_{\max} = \frac{P_i (b^2 + a^2)}{b^2 - a^2} \tag{4.1}$$

For cylinders (pipe) where $a \approx b$ and $b - a = t$,

$$b^2 - a^2 = (b + a)(b - a) = \overline{D}t \tag{4.1a}$$

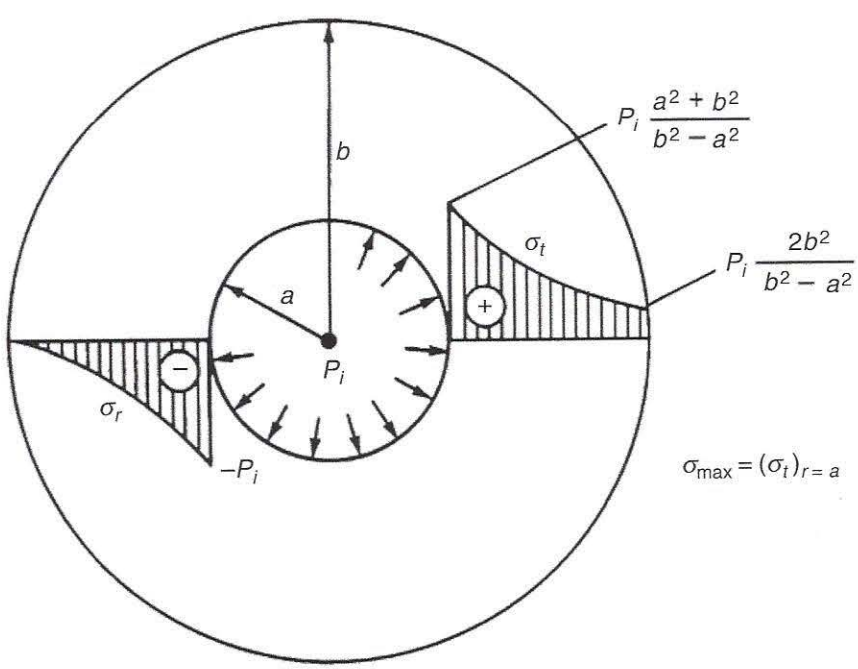

Figure 4.1 Thick-walled cylinder with internal pressure.

where $\overline{D}$ = average diameter = $b + a$ and t = thickness = $b - a$. Also,

$$(b + a)^2 = \overline{D}^2 = b^2 + a^2 + 2ab \tag{4.1b}$$

$$b^2 + a^2 = \overline{D}^2 - 2ab \approx \overline{D}^2 - 2\,\overline{r}^2 = \overline{D}^2 - \frac{\overline{D}^2}{2}$$

Thus Eq. (4.1) can be rewritten using Eqs. (4.1a) and (4.1b) as follows:

$$\sigma_{\max} = \frac{P_i\,(\overline{D}^2/2)}{\overline{D}t} = \frac{P_i\,\overline{D}}{2t} \tag{4.2}$$

Equation (4.2) is recognized as the equation for stress in a thin-walled cylinder (Fig. 4.2). This equation is sometimes called the Barlow formula, but is just a reduction from Lamé's solution. This equation is the form most often recognized for calculating stresses due to internal pressure P_i.

If the outside diameter D_o is the reference dimension, Eq. (4.2) can be put into another form by introducing

$$\overline{D} = D_o - t$$

That is, the average diameter is equal to the outside diameter minus thickness. Equation (4.2) becomes

$$\sigma_{\max} = \frac{P_i\,(D_o - t)}{2t} \tag{4.3}$$

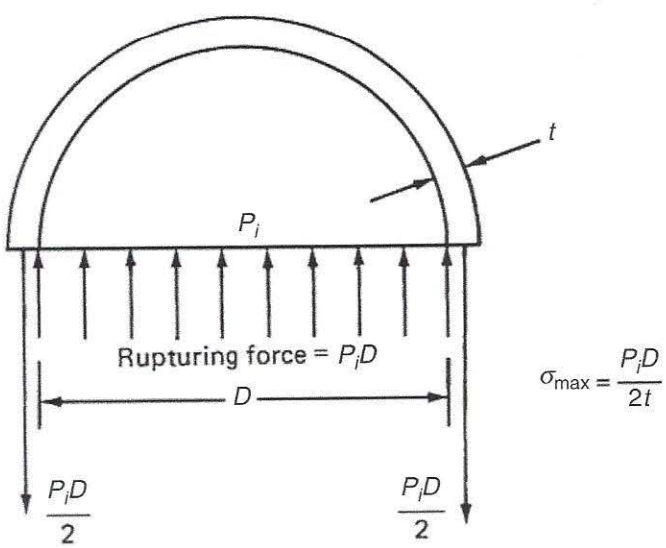

Figure 4.2 Free-body diagram of half section of pipe with internal pressure.

Certain plastic pipe specifications refer to a dimension ratio (DR) or a standard dimension ratio (SDR), where

$$\mathrm{DR} = \frac{D_o}{t} \qquad \text{or} \qquad \mathrm{SDR} = \frac{D_o}{t}$$

Both DR and SDR are defined the same. However, SDR often refers to a preferred series of numbers that represents D_o/t for standard products. By introducing D_o/t = SDR into Eq. (4.3), it can be rewritten as follows:

$$\sigma_{\max} = \frac{P_i}{2}(\mathrm{SDR} - 1) \tag{4.4}$$

The above equation may be expressed as

$$\frac{2\sigma_{\max}}{P_i} = \mathrm{SDR} - 1 \tag{4.5}$$

Equation (4.5) is often referred to as the ISO (International Standards Organization) equation for stress due to internal pressure. However, this basic equation has been known to engineers for more than a century and was originally given by Lamé in "Leçons sur la theorie de l'elasticité," Paris 1852. Obviously, ISO is a relative newcomer and should not be given credit for Lamé's work.

To calculate these tangential stresses in the pipe wall produced by internal pressure, either Eq. (4.2) or Eq. (4.4) are often suggested by the manufacturer or by national standards. All forms are derived from Lamé's solution and will produce comparable results.

Surge pressure

Pressure surges are often divided into two categories: transient surges and cyclic surges. Cyclic surging is a regularly occurring pressure fluctuation produced by action of such equipment as reciprocating pumps, undamped pressure control valves or interacting pressure regulating valves, oscillating demand, or other cyclic effects. Cyclic surges may cause fatigue damage and should be designed out of the system.

Transient surges are just that—transient in nature, occuring over a relatively short time and between one steady state and another. A transition surge may occur, and the system then returns to the same steady state as before the surge. Transient surges are usually not cyclic in nature although they may be repetitive. A transient surge is often referred to as *water hammer*.

Any action in a piping system that results in a change in velocity of the water in the system is a potential cause of a water hammer surge.

A partial listing of some typical causes of water hammer is given below.

1. Changes in valve settings (accidental or planned)
2. Starting or stopping of pumps
3. Unstable pump or turbine characteristics

The magnitude of water hammer pressures generated by a given change in velocity depends on (1) the geometry of the system, (2) the magnitude of the change in velocity, and (3) the speed of the water-hammer wave for the particular system.

These variables are expressed quantitatively as

$$\Delta H = \frac{a}{g}\,\Delta V \tag{4.6}$$

where ΔH = surge pressure, feet of water
a = velocity of the pressure wave, ft/s
g = acceleration due to gravity (32.17 ft/s^2)
ΔV = change in velocity of fluid, ft/s

The pressure rise, in pounds per square inch, may be determined by multiplying Eq. (4.6) by 0.43 lb/in^2 per feet of water as follows:

$$\Delta P = \frac{a}{g}\,\Delta V\,(0.43) \tag{4.7}$$

The wave speed is dependent upon

1. Pipe properties
   a. Modulus of elasticity
   b. Diameter
   c. Thickness
2. Fluid properties
   a. Modulus of elasticity
   b. Density
   c. Amount of air, and so forth

These quantities may be expressed as

$$a = \frac{12\sqrt{K/\rho}}{\sqrt{1 + (K/E)\,(D/t)\,C_1}} \tag{4.8}$$

where a = pressure wave velocity, ft/s
K = bulk modulus of water, lb/in^2
ρ = density of water, slug/ft^3

D = internal diameter of pipe, in
t = wall thickness of pipe, in
E = modulus of elasticity of pipe material, lb/in^2
C_1 = constant dependent upon pipe constraints (C_1 = 1.0 for pipe with expansion joints along its length)

For water at 60°F, Eq. (4.8) may be rewritten by substituting ρ = 1.938 slug/ft^3 and K = 313,000 lb/in^2.

$$a = \frac{4822}{\sqrt{1 + (K/E)(D/t)C_1}} \tag{4.9}$$

Equations (4.6), (4.7), and (4.8) can be used to determine the magnitude of surge pressure that may be generated in any pipeline. The validity of the equations has been shown through numerous experiments.

Figure 4.3 is a plot of the pressure rise in pounds per square inch as a function of velocity change for various values of wave speed. Tables 4.1 and 4.2 give the calculated wave speed according to Eq. (4.8) for ductile iron and PVC pipe, respectively. In general, wave speeds vary from 3000 to 5000 ft/s for ductile iron and from 1200 to 1500 for PVC pipes.

Example Problem 4.1 Determine the magnitude of a water hammer pressure wave induced in a 12-in class 52 ductile iron pipe and in a class 235 DR 18 PVC pipe if the change in velocity is 2 ft/s.

solution From Tables 4.1 and 4.2 and Fig. 4.3:

Pipe	Wave speed, ft/s
Class 52 DI	4038
Class 235 PVC	1311

The resulting pressure surges are

Pipe	Surge pressure, lb/in^2
Class 52 DI	105
Class 235 PVC	35

Some appropriate rules of thumb for determining maximum pressure surges are listed below in pounds per square inch of surge per 1 ft/s change in velocity.

Pipe	Surge pressure rise, lb/in^2, per 1 ft/s velocity change
Steel pipe	45
DI (AWWA C150)	50
PVC (AWWA C900)	20
PVC (pressure-rated)	16

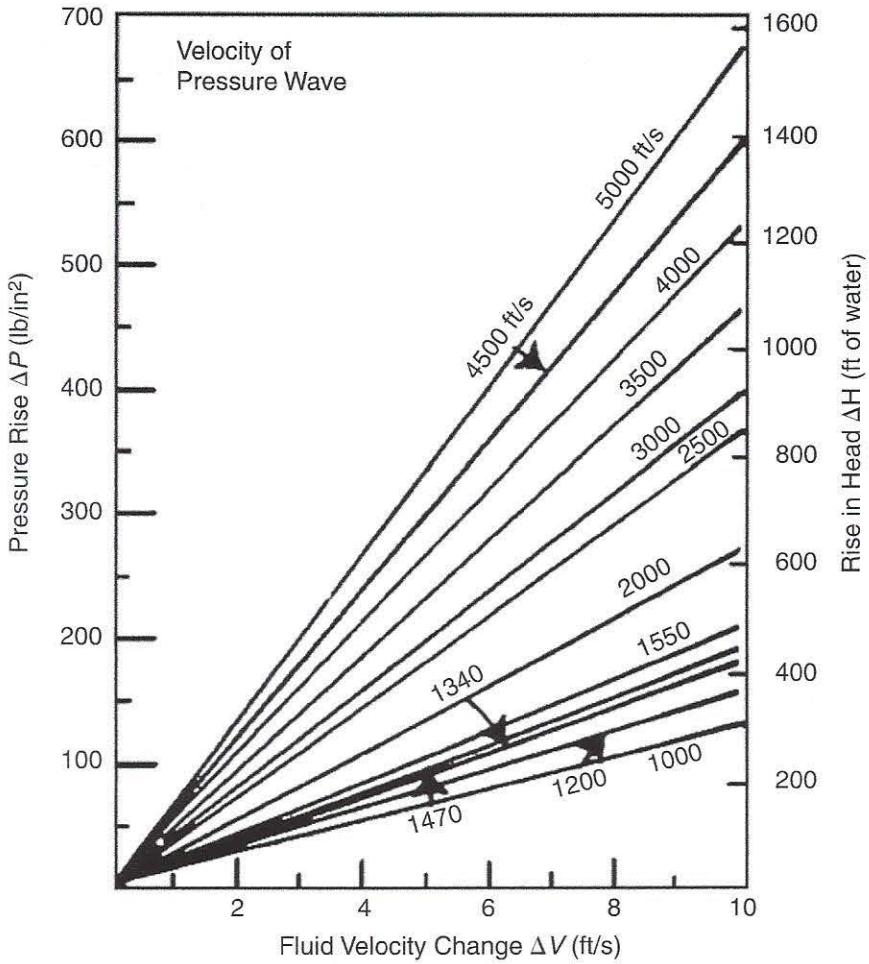

Figure 4.3 Water hammer surge calculation.

TABLE 4.1 Water Hammer Wave Speed for Ductile Iron Pipe, ft/s

	Class						
Size	50	51	52	53	54	55	56
4	—	4409	4452	4488	4518	4544	4567
6	4206	4265	5315	4358	4394	4426	4454
8	4085	4148	4202	4248	4289	4324	4356
10	3996	4059	4114	4162	4205	4242	4276
12	3919	3982	4038	4087	4130	4169	4205
14	3859	3921	3976	4024	4069	4108	4144
16	3783	3846	3902	3952	3998	4039	4076
18	3716	3779	3853	3887	3933	4038	4014
20	3655	3718	3776	3827	3874	3917	3957
24	3550	3614	3671	3723	3771	3815	3855
30	3387	3472	3547	3615	3676	3731	3782
36	3311	3409	3495	3571	3638	3700	3755
42	3255	3362	3456	3539	3612	3678	3737
48	3207	3323	3424	3512	3590	3659	3721
54	3201	3320	3423	3512	3591	3599	3724

TABLE 4.2 Water Hammer Wave Speed for PVC Pipe, ft/s

	(AWWA C900) DR			Pressure-rated PVC SDR			
Size	25	18	14	21	26	32.5	41
4	1106	1311	1496	1210	1084	967	859
6	1106	1311	1496	1210	1084	967	859
8	1106	1311	1496	1210	1084	967	859
10	1106	1311	1496	1210	1084	967	859
12	1106	1311	1496	1210	1084	967	859

Since velocity changes are the cause of water hammer surge, proper control of valving may eliminate or minimize water hammer. If fluid approaching a closing valve is able to sense the valve closing and adjust its flow path accordingly, then the maximum surge pressure as calculated from Eq. (4.6) may be avoided. To accomplish this, the flow must not be shut off any faster than it would take a pressure wave to be initiated at the beginning of valve closing and returning again to the valve. This is called the *critical time* and is defined as the longest elapsed time before final flow stoppage that will still permit this maximum pressure to occur. This is expressed mathematically as

$$T_{cr} = \frac{2L}{a}$$

where T_{cr} = critical time
L = distance within the pipeline that the pressure wave moves before it is reflected back by a boundary condition, ft
a = velocity of pressure wave for the particular pipeline, ft/s

Thus, the critical time for a line leading from a reservoir to a valve 3000 ft away for which the wave velocity is 1500 ft/s is

$$T_{cr} = \frac{2\,(3000)\text{ ft}}{1500\text{ ft/s}} = 4\text{ s}$$

Unfortunately, most valve designs (including gate, cone, globe, and butterfly valves) do not cut off flow proportionate to the valve-stem travel (see Fig. 4.4).This figure illustrates how the valve stem, in turning the last portion of its travel, cuts off the majority of the flow. It is extremely important, therefore, to base timing of valve closing on the *effective closing time* of the particular valve in question. This effective time may be taken as about one-half of the actual valve closing time.

Induced Stresses in Pipe- Hoop, Longitudinal and Radial Stresses

3 Comments

Topics covered

Introduction
Circumferential or Hoop Stresses
Longitudinal Stresses
Radial Stress

Introduction to Induced Stresses:

When the ends of the pipe ends are closed and pipe is subjected to an internal pressure 'P' there are various stresses that develop in the pipe. Each element of pipe are subjected to the below mentioned stresses which act in the direction as shown in the fig.1.

Circumferential (hoop) stress σH
Longitudinal Stress σL
Radial Stress σR

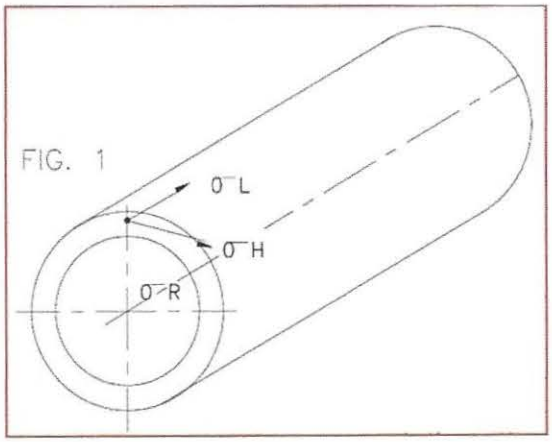

Fig 1: Different stresses induced in pipe

CIRCUMFERENTIAL OR HOOP STRESS: σH

The effect of this may split the pipe into two halves as shown in fig.2. The failure of the pipe in two halves in fact is possible across any plane, which contains diameter and axis of the pipe. Elements resisting this type of failure would be subjected to stress and

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direction of this stress is along the circumference. Hence the above stress is called **Circumferential or Hoop Stress.**

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If –

D = Diameter of the pipe

L = Length of the pipe

t = thickness of the pipe.

Then

Bursting force, FB	=	Pressure * Area
	=	P * D * L
Resisting force, F_R	=	Resisting metal area * Stress, σH
Equating F_B & F_R		
P * D * L	=	2t * L * σH
∴ t	=	(P * D)/ 2 * σH
or σH	=	(P * D) /(2 * t) _____(1)

This equation is used for calculating the thickness of pipe so as to withstand pressure 'P' where σ H is **allowable circumferential stress.**

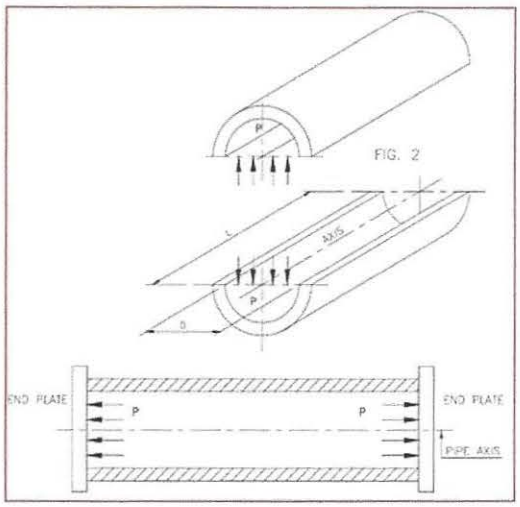

Fig 2: Circumferential or Hoop stress

LONGITUDINAL STRESS:σR

Considering that the pipe ends are closed and pipe is subjected to **an internal pressure 'P'** the pipe may fail as shown in **Fig.3**. Elements resisting this type of failure would be subjected to stress and direction of this stress is parallel to the longitudinal direction of the pipe. Hence this stress is called **longitudinal stress**.

Then

Bursting force, FB	=	Pressure × Area
	=	P * (πD * D)/4
Resisting force, FR	=	Resisting metal area x Stress, σL
	=	π D t * σL (when t is significantly small as compared to D)
Equating F_B & F_R		
P * (πD * D) /4	=	π D t * σL
∴ t	=	(P D)/4 * σL
or σL	=	(P D)/(4 * t) _____ (2)

NOTES:

1) On comparing equations 1 & 2, it is clear that when a pipe having diameter 'D' and thickness 't' is subjected to an internal pressure 'P', the induced circumferential tress is double the induced longitudinal stress.

2) Normally, the pipe is considered as a thin wall cylinder i.e. t < D/6

3) Usually D is substituted by Do (outside diameter) in order to have higher safely margin.

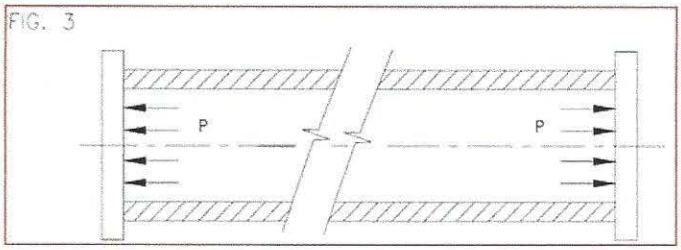

Fig 3: Longitudinal stress

RADIAL STRESS: σR

Radial stress is a stress in directions coplanar with but perpendicular to the symmetry axis.

The radial stress for a thick-walled pipe is equal and opposite to the gauge pressure on the inside surface, and zero on the outside surface.

The radial stress is always compressive.

Each element of the pipe is subjected to radial stress which acts in radial direction as shown in Fig.4 and calculated as

σR = P

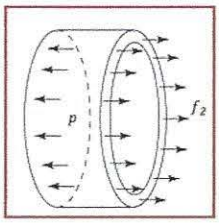

Fig 4: Radial stress

MORE READ

Basic Load Cases used for Piping Stress Analysis
May 15, 2015

Flexibility Calculation/Stress Analysis: Softwares Used and Data Required
May 15, 2015

Spring Hangers in Piping Stress Analysis: Purpose, Types and Selection Procedure
March 16, 2016

3 COMMENTS

rupak
May 27, 2016 at 5:04 am

wonderful explanation!

Reply

Ganesh S Kharote
October 11, 2016 at 5:23 am

its so useful insight as it bridges theoritical and practical aspect

Reply

Haofeng
March 6, 2017 at 2:52 am

Thanks for the explanation! Helpful!

Reply

LEAVE A REPLY

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CFR 192.105 Design Formula Hoop Stress Only

Pipe Wall Thickness	0.515	Inch	t
Pipe Outside Diameter	36	Inches	D
Yield Strength	70000	psig	S
Design Factor	0.8		
Longitudinal Joint Factor	1		
Temperature Derating	1		
Operating Pressure	1480		

Additional Considerations

- Longitudinal Stress
- Material Strength Deviation
- Fluid Hammer
- **Design Factor** is not a **Safety Factor**
- Need for Safety Factor
- Handling Stresses
- Harmonics from Pump
- Economics Dictate Cheapest Design

Conventional Pipe Longitudinal Stress as taught

Area	1017.8784	
Force	1506460.032	
Pipe Circum Area	58.25	
Long Pipe Stress	25864	psi
Pipe Hoop Stress	51755.6	psi
Total operating stress	3347592645	
Total w/Circum and	57858	psi total
Steel Yield Stress	70000	
Steel Design Stress	56000	
Safety Factor	44800	This should be the design stress they operate to
Water Hammer	127288	This is the maximum operating stress anticipated
The safe operating pressure	**521**	psi
Enbridge Operating Pressure	**1480**	psi

Enbridge Operating pressure must be reduced for this pipe design

Allowances		
Fluid hammer	2.2	Factor
Safety Factor	1.25	
Design Factor	0.8	

Levi, Andrew (COMM)

From: Devyn Powell <devyn@powershift.org>
Sent: Monday, July 10, 2017 3:56 PM
To: MN_COMM_Pipeline Comments
Subject: 1,411 public comments - Line 3 Pipeline (Dockets CN-14-916 and PPL-15-137)
Attachments: Line 3 comments - DOCKET CN-14-916 AND PPL-15-137.xlsx

Follow Up Flag: Follow up
Flag Status: Flagged

To whom it may concern - I would like to submit 1,411 public comments on the Line 3 pipeline (Dockets CN-14-916 and PPL-15-137), originally collected by the Power Shift Network (a 501(c)3 nonprofit organization) via this page. Please let me know if you have any questions.

Best,
Devyn

Devyn Powell // Digital Organizer
The Power Shift Network
503.333.0169 (c)
@devynfromoregon

NOTE ON THE ATTACHED PUBLIC COMMENTS ON THE LINE 3 PIPELINE (DOCKETS CN-14-916 and PPL-15-137): The following 1,411 comments were collected by the Power Shift Network, a nonprofit 501(c)3 organization, on this page: https://actionnetwork.org/petitions/add-your-voice-to-stop-the-line-3-tar-sands-pipeline/ All commenters would like to submit the below statement, in addition to further personal comments indicated below. For any questions, contact Devyn Powell at devyn@powershift.org.

COMMENT TEXT:

The Line 3 Draft Environmental Impact Statement is a step in the right direction for assessing oil pipeline projects in Minnesota, but contains multiple glaring errors and deficiencies. Keeping in mind the young people of Minnesota - and those across the country, and the globe - we respectfully submit the following critiques:

I. The inclusion of a comprehensive social cost of carbon is absolutely essential, but even the staggering prediction of up to $287 billion (Chapter 5, page 433) only utilizes a 30 year scope. Page 6 of the Project Summary in Chapter 2, states "The Applicant anticipates that the physical life of the Line 3 Replacement pipeline (i.e., the number of years that the pipeline would be capable of transporting crude oil) would be indefinite given appropriate construction, maintenance, and integrity systems. The economic life of the Project (i.e., the number of years that continued operation of the Project would be feasible) is anticipated to be no less than 30 years," (emphasis added). It is illogical and irresponsible to use a timeframe that Enbridge and the DEIS itself admit to be the bare minimum potential lifetime and impact of the Project. The current Line 3 is more than 60 years old, and Enbridge claims to have improved their technology and building practices, making a 30 year scope is drastically inadequate. Furthermore, the climate impacts being examined will continue well beyond the operating life of the physical pipeline, and should be analyzed with that scientific reality in mind. A minimum 60 year timeline for the direct pipeline impacts and 100 year timeline for the indirect climate impacts should be the absolute minimum acceptable scope.

2322-1

2322-2

II. Chapter 5, page 435, states that "Construction along the Applicant's preferred route could require the removal of trees from up to 1,682 acres of forested land in the construction work area. Of this, 702 acres would remain permanently without trees, while the forest would be allowed to regrow on the other 981 acres….Consequently, the amount of carbon that potentially would be released back into the atmosphere during construction tree removal of 1,682 acres is estimated at approximately 205,500 tons of CO2e. Regrowth of the forest on the 981 acres outside of the pipeline right-of-way eventually would more than halve this loss in the long run after forest regrowth, bringing net CO2 emissions from forest clearance down to a level of about 85,658 tons." The "Methods for Calculating Forest Ecosystem and Harvested Carbon with Standard Estimates for Forest Types of the United States" paper by Smith et. al. from which the carbon release numbers are derived uses data from trees ranging in age from zero years to 125 years of age. Full sequestration of the 119,842 tons of CO2e associated with the 981 acres of reforestation can therefore not be expected to be fully complete until the year 2143, assuming the deforestation occurs in 2018. Given the prevailing scientific conclusion that greenhouse gas emissions need to be significantly curbed over the next 5-10 years to avoid initiating catastrophic feedback loops, it is unrealistic and scientifically unsound to equate sequestration taking place over 125 years with mitigation of the CO2e release in the year 2018. The associated climate impacts will have taken place long before the sequestration is complete, and delayed absorption of CO2 will not remediate the significant alterations to the earth's climate (and the planet's ability to support its current ecosystems) brought about as a result of exacerbated feedback loops. Therefore, these calculations and the assumed net CO2 emissions from forest clearance should be revised.

2322-3

2322-4

III. The Executive Summary states on page 19 that the "primary impacts of climate change on the Project include severe weather, freeze-thaw cycles, and flooding, all of which could damage project facilities." Climate impacts are projected to worsen over the course of the next 80 years, increasing the likelihood that these damages to the Project occur during the lifetimes of Minnesota's current youngest generation. The increased likelihood of a spill or decrease in the Project's structural integrity due to climate impacts should be included in the projected likelihood of accidental product release events, and identified as such, on a timeline of a minimum of 60 years (a benchmark consistent with the lifetime of the current Line 3).

IV. There is no serious consideration of a no-build option. The Executive Summary specifically states on page 17 that "all GHG emissions contribute to cumulative climate change, so all of the alternatives would play a role in global climate change," (emphasis added). This clearly ignores any no-build alternative. The Environmental Impact Statement is not meant to analyze the necessity of the Project, but instead to prepare all relevant data so that the need (or lack thereof) can be adequately examined during the Certificate of Need process. Therefore, the DEIS is incomplete without a serious examination of a scenario in which the current Line 3 is decommissioned and not replaced. This option has been advocated for by thousands of Minnesotan citizens, is realistic with projected economic modeling around reducing oil dependency and increasing electrification and alternative energy, and clearly deserves serious consideration and study. It is also the most consistent with Minnesota's commitment to upholding the Paris Agreement, and leading on climate action.

V. The overall workmanship of the draft Environmental Impact Statement is flawed and indicative of only a cursory level of dedication to the analysis. The serious and long-lasting impacts this Project will have on Minnesota's youngest generation deserve a more thorough and respectful review than this document conveys. First, nine of the citation links in Chapters 9, 10, 11, and 12 are broken or inaccessible without site login information. This makes the source material for the DEIS both questionable in authenticity, and inaccessible for public review. Second, the listed alternatives in Chapter 4 involving rail and truck transportation are inconsistent with standard methods in the industry, and wholly infeasible and illogical. Beyond the overall absurdity of these proposals, page 13 of Chapter 4 uses the same volume of product that would transported by pipeline in the calculations for transportation by rail, without discussing the removal of diluent that would only be needed to increase the viscosity of the oil in a pipeline, not a rail car. This could significantly change the volume of product to be moved in a rail scenario, so these numbers should be revisited. Finally, Tribal Resources and Environmental Justice chapters (Ch. 9 and Ch. 11, respectively) lack depth, do not sufficiently cross-reference one another, and are offensively incomplete in their analysis of structural societal impacts such as the increase in sex trafficking associated with similar projects (page 10, Chapter 11).

VI. This draft Environmental Impact Statement is inadequate without serious consideration given to the eventual retirement and removal of the Line 3 Replacement. There is no sunset clause or removal plan referenced in this document whatsoever. As previously cited, page 6 of the Project Summary in Chapter 2, states "The Applicant anticipates that the physical life of the Line 3 Replacement pipeline (i.e., the number of years that the pipeline would be capable of transporting crude oil) would be indefinite given appropriate construction, maintenance, and integrity systems." An indefinite life expectancy is shorthand for a lack of research and attention given to obvious fact that the pipeline will eventually become inoperable, obsolete, or prohibitively damaged, and need to be retired. Especially given the level of concern being raised about the current Line 3 and the lack of planning that led to it being cited close enough to other lines to make its removal difficult, forethought about clean-up measures is clearly needed from the beginning of a project.

In conclusion, we appreciate the requirement of an Environmental Impact Statement for crude oil pipeline projects in the State of Minnesota, and believe that this DEIS should set a more diligent precedent for these kinds of analyses. The current DEIS is inadequate because it disregards its own parameters for a realistic scope, contains miscalculations in regards to carbon sequestration from land reforested after construction, does not account for the increased risk of accidental product release as a result of climate-change-induced stress on the Project, neglects to fully analyze all reasonable alternatives by ignoring a no-build scenario, displays poor workmanship and multiple simple data errors, and omits any consideration of the eventual retirement of the Line 3 Replacement. Only a comprehensive DEIS that addresses these concerns will be adequately complete and support an informed decision on the future of Minnesota's infrastructure and natural resources.

First Name	Last Name	Additional personal comments
Devyn	Powell	
Genevieve	Guzman	
Louisa	Matthias	
David	Easton	The young are the wise ones in this matter...good for you!
Lindsay	Meiman	
Robert	Janusko	
RUSS	RIPP	
Kalliope	M.	
Marian	Cruz	NO, to Tar Sands!
James	Forero	
michael	zuckerman	
Joanna	Welch	
Edward	Freeman	
Robert	Sanders	
Rose	Wood	
Bruce	McGraw	
Cleo	Dioletis	

Jared	Howe	
Susan	Hathaway	
Sandra	Currie	No more infrastructure for fossil fuels. No more tar sands extraction.
Jim	Sandoe	
Christopher	Weiss-Lehman	
Hannah	Dahm	
Paul	DiMarco	
Jack	Garcia	
Susan	Shaak	
Dr. Prisca	Gloor	
Herbie	Shelton	
Eban	Goodstein	
Jacqueline	Jobin	
Alison	Walker	
Lorne	Stockman	
michele	smolen	
Laura	Ticciati	
Kate	Kenner	These pipelines are like an epidemic spreading, destroying , and killing this and all should come to an end.
S	C	
David	Loy	
Natalie	Wallace	
Hannah	Nowakowski	
Nancy	Chismar	
Katie	Shultz Walker	
Shirley	Gunn	
Carmelita	Means	
Caryn	Wagner-McPherson	
Ruth	Richter	
Neil	Quarles	
Tracey	O'Kelly	Take care of our future! Stop the tar sands now!
Kathy	Koch	
Mark	Clearwater	
Dave	Long	
Erin	McCabe	
Philip	Wight	
Joseph	Grant	
A Lynn	Raiser	
Sandra	Woodall	Tar sands oil is some of the most damaging of petroleum products in terms of extraction and impurity. Native peoples in Canada are trying to block further tar sands exploitation.
Karla	Frandson	
Tim	Barrington	
Andrew	Goldman	
Jacqueline	Leavy	I'm honored to follow the lead of our young people in speaking up to protect our environment. This country needs to start LISTENING to the voices of these young leaders, and shift our policies to protect their future.
Grace	Burson	
Anthony	Albert	
Andrea	Frank	
Robert	Jacobson	
Valerie	Hensley	
Irwin	Hoenig	
Ramiro	Herrera	
Terry	Bergeron	
RICHARD	JACKSON	...RENEWABLES are the future!...
Andrew	Jackson	
terence	cuneo	
Colleen	Spindler-Ranta	
Pamylle	Greinke	
barbara	watts	
Molly	Kinney	
Juliana	Schwartz	
Scott	Gibson	
Max	Kaehn	
Charles	Behrens	
Joanne	Dixon	
Todd	Larsen	
Hans	van Huijkelom	
A.L.	Steiner	
Dennis	Smith	
Kathleen	Kaiser	
Jaci	Christenson	We have a moral responsibility to seriously consider the impacts of Line 3 on the next generation!
Jan	Hall	
Tristan and Aimee	Merino	
Glen	Anderson	Protect our future from climate disruption and corporate abuse!!!!!!!!!!
Kenneth	Lapointe	
Edward	Spevak	
Larry	Lapuyade	
Kellie	Smith	
Carol	Kari	I say NO TO tar sands.
John	Crotty	
James	Keenan	
KD	Kidder	This is critical to saving future generations !!!!
Lori	Cameron	
Liam	McIlroy	
Jane	Berrigan	
Laura	Yokochi	
Carol	Culnan	These are the people who will be most effected by the pipeline- they should be listened to. No-build should be the choice.
Michaela	Wehner	

Alyssa	Lee	
Molly	Wilbur-Cohen	Thank you to the wonderful youth who will intervene. I gladly stand with you against Enbridge Line 3.
Douglas	Cooke	
Jackie	Hanser	
Doris Quintanilla	Quintanilla	
Theresa	Knapp	
Polly	Street	
Gary	Porter	
Kate	Heller	
Edward	Wolfsohn	
Drew	Cucuzza	
William	Lorch	
Peter Jack	Tkatch	
Ken	Windrum	
Gabriele	Markert	
Nicki	Mokhtari	
Francine	Johnston	Power companies are not concerned about the future - only immediate profits. Young people take a longer view.
Meredith	McCown	
Mark	Reback	
Robert	Shippee	
Chase	Farnsworth	
Hillary	Oshea	
K.	Nilsen	
Megan	Fink	
Karen	Stimson	
Larisa	Long	
Katherine	Meduna	
Molly	Raske	
Allie	Arnold	
janet	Teresko	
Kim	Aughenbaugh	That land belongs to the natives!!
Julian	Peet	
Julie	Sanford	
Anna	Woodbury	
Mary Etta	Moose	
Megan	Sheridan	
		Minnesota has so many other wonderful resources from which to profit without detriment to its future generations. Please don't sell out to this dubious group who will turn around and sell YOU out the moment it profits them to do so. Minnesota is a magical place that I find difficult to leave whenever I visit, and my wallet is always quite a bit thinner thereafter as well! Please let's keep it this way. Love to the Land of Lakes <3
Sarah	Rosenberg	Sarah
Todd	Klempner	
Michael	Huston	Young Americans are the citizens who will be most impacted by the air and water pollution, as well as climate warming, associated with all of the Tar Sands pipelines, and the further development of the tar sands. They deserve to be heard, and to be taken seriously.
Lawrence	Crowley	
Julia	Cranmer	
Cynthia	Mahlau	
Liz	Amsden	
Priscilla	Carlson	
William	Huggins	
Robert	Allenson	
Lynda	Kolesar	
Patricia	Montague	
Catherine	Mendoza	These young people are the future! Of course they must have a seat at the table.
Hayden	Smith	
mary ann	Calvert	
Shawn	Gardner	
Margot	Lenhart	The Youth Climate Intervenors each stand to be harmed by climate change in specific and personal ways from increased food prices and electricity bills, to the dangers of severe heat waves for individuals with pre-existing health conditions, to the additional strain on vulnerable wild rice lakes and treaty lands guaranteed to the Indigenous people of Minnesota.
Linda	Headley	
Betty	Lawrence	
Misty	Chung	
troy	denman	Nice work everyone! Thank you and go get them!!
Barbara	Clifford	These young people are absolutely correct in their claims. I understand tar sand oil is so acidic it will damage the pipelines and guaranty leaks. In addition the methane produced in the extraction is up to 100% more heat trapping in the atmosphere than CO2 and there is virtually as much energy used to extract this oil as the energy of the oil itself. All this, for private profit. The Minnesota Department of Commerce needs to recognize that a healthy planet for current and future life is an urgent consideration beyond the monetary. We are reaching the bottom of the barrel with commerce. Life is worth more than corporate profit.
Deborah	DeSimone	
Diana	Sheen	
Michael	Iltis	
Mobi	Warren	The young people of our country and world stand to suffer terrible consequences of climate change. They above all other interested parties need to be given a voice at the table.
Amanda	Gentile	
Christianna	Nelson	
Larry	Hale	
Jair	Carrasco	Jair Carrasco
Charlotte	Glennie	I urge you to consider your own children and grandchildren. What impact will climate change have on their lives? Regardless of the resources you personally amass and pass on to them, they will lead harder lives because of the environmental and societal destabilization this pipeline produces. In order to provide the possibility of a peaceful and prosperous future, we need to move away from fossil fuels now.
Jonathan	Cohn	
Lisa	Goodrich	

Keith	Koelling	
ethel anne	keeble	We owe it to our grandchildren to do the BEST we can to protect the earth.
Donnalynn Polito	Polito	
Michael	Halloran	
Nora	Kramer	
Sharon	Findling	
Christianna Nelson	Nelson	
Randall	Webb	
vicki	hughes	
Julia	Rapczynski	
Tina	Wilson	
Michele	Temple	
Emily	Gold	
Lisa	Mazzola	
Laura	W	Please consider long term health consequences as equally if not more important than short term profit for a corporation.
Gertrude	Glazer	
Edna	Mullen	
Jacob	Herbers	
Tru	Dunham	
Celeste	Howard	
Jessie	Thornton	
Karen	Erickson	
Anne	Flanz	
Lydia	Avila	
Steve	Overton	
Gabriel	Brossy de Dios	
Rita Olson	Olson	
Helene Carol	Meeks	Americans lives are being sacrificed for corporate greed. Stop now.
Lo	Daniels	
Glenn	Gawinowicz	
Tamara	Matz	
Anne	Craig	Thanks to these courageous young people!
Abigail	Gindele	
Susan	Kollar	
Pamela	Evans	
Dawn	Cheek	
Joshua	Seff	
Susan	Feiner	
Lisa	DeVille	I live with oil and gas. Industry will lie to the people and communities for greed. Industry will convince also that they have the safest way.
Allen	Leinwand	
Ed	Schulz	
Bryn	Truscott	
ANGELA	COLONNA	
Ananya	Singh	
Ruth	Darden	
Susan	VanMeter	
Laura	Landolt	
Brian	Keck	
William	Sharfman	
Maddie	Renaud	
Dee	Randolph	
Ryan Bradley	Bradley	
M	A	
Laurie	Puca	
Joan	Lawson	
Vanessa	Roanhorse	
jean	slocum	
Sally	Hinshaw	
Roseanne	Hovey	NO TAR SANDS PIPELINES in the USA PERIOD!!!
Sandi	Covell	
Carolyn	Summers	
Rachel	Willett	
Mark	Spohr	
Jack	O.	
Mary	Lester	
Eric	Sandler	
g	m	
Gail	Landy	Transporting dirty Tar Sands Oil is not only a grave environmental risk with the likelihood of spills, but it may contaminate the water and the health of those living near it. Why make a 40 year commitment to fossil fuel extraction and transport when we have so many clean energy options that will not contribute to climate change?
Joan	Miller	
Marilyn	Glasgow	
Terri	Gilbert	
J.A.	Perry	
Robert	Seltzer	
Meya	Law	
Rachel	Mandelbaum	
Janet	Boyd	
Stephen	Bergen	
Y. Armando	Nieto	
Evelyn	Hamilton	
James	Soares	
Lillian	McLoughlin	
Paul	Berland	
Christine	Pritchard	

		To our Youth-- Your voice must be heard and listened to. Your action respected and bring positive results. I am with you all the way! Thank you for your commitment and voices!
Jane	Church	Jane Church
Sharon	Anton	
Jack	McCarthy	
mark	mendoza	
Brian	Sullivan	There is no serious consideration of a no-build option. The Executive Summary specifically states on page 17 that"all GHG emissions contribute to cumulative climate change, so all of the alternatives would play a role in global climate change,â€ (emphasis added). This clearly ignores any no-build alternative. The Environmental Impact Statement is not meant to analyze the necessity of the Project, but instead to prepare all relevant data so that the need (or lack thereof) can be adequately examined during the Certificate of Need process. Therefore, the DEIS is incomplete without a serious examination of a scenario in which the current Line 3 is decommissioned and not replaced. As one who will be affected by oil coming through Line 3, I can say emphatically that such oil will be a public health hazard and a serious environmental danger. Please respect my health, the health of all those near this line and the wisdom and ways of Native Americans. Thank you.
Lynn	Shoemaker	
Danielle	Casper	
Eric	Ashley	
Elisabeth	Wertheim	
Melissa	Schultz_Ahearn	
Maureen	Tobin	
cooper	ashe	
Patricia	Koso	
Richard	Baker	
Christopher	Marrs	
Theresa	Zatirka	
Sidney Walker	Walker	Please give these young people a voice in the process. If you believe in democracy, how can you let fear govern your decision-making process? This is about the future and those that will live with the decisions made today. Stand with our youth. This is their future and they deserve to have a say in the environment that they will have to live in.
Dani	Brusius	
Kim	Gosh	
Maayan	Cohen	
Julia DeNiro	DeNiro	
Mildred	Templeton	
Richard	Shook	
Ray	Bellamy	Young people matter. Future generations matter. It should not be all about short term profits for a few.
Lori	Sherry	
Andrea	Beeman	
Marg	Cawley	
JUSTINE	TILLEY	
Richard	Han	
Patrick	Maloney	
Gene	Massion	
Mercy	Myers	
Carlotta	Hayes	
Arielle	Mazzuca	Dear Minnesota Department of Commerce: Climate change threatens us all and especially threatens my generation and generations to come. Do a full and honest evaluation of the environmental and health risks that this pipeline poses and say no to tar sands. Thank you in advance. Sincerely, Arielle Mazzuca Age:21
J	Beverly	
Roy	Hunt	
		Time to work "...for the people", NOT the Corporations!
eggers k.	k.	Thank you for doing the RIGHT thing!!!
Dean	Borgeson	
Diana	Emerich	
Claudine	Armand	
Thomas	Meacham	
Kara	Duffy	
Jon	Bazinet	
Caroline	Cruys	
Seamus	MacCallum	
Pamela	Nordhof	
Robert	Landolt	
Jackie	Miller	
Anita	Garrison	
Julia	Morgan	
James	Mulcare	
Colin	Hill	
Ingrid	Alpha	
Hon	Soulo	
Dan	Lara	
Elizabeth	Paulson	
Wayne	Mayer	
David	Osterhoudt	
Lynne	St. John	

Marjorie	Nafziger	
Denise	Johnston	
Marcy	Allen	
stephen	fleitas	
Bill	Link	
Gail	Conners	
Larry	Kraft	
Alison	Guzman	
Janet	Smarr	
Sean	Mooney	
Aurora	Levins Morales	These young people have every right to have a voice in decisions that will shape their world. Make room at the table!
Carl	Diethelm	In addition to the environmental impacts of the proposed pipeline, the resulting addition to oil production is not sustainable economically, as tar sands end up producing about as much energy that it takes to process them, resulting in no energy return on the investment. This is as much a step backwards from realizing a world of abundant, low-impact energy accessible by everyone.
anthony	montapert	
Victoria	Olson	
Barbara	Murray	
		Oil is on it's way OUT!
j.	eggers	Time to utilize the renewable energy systems, and save the planet (and its' people)!!!
Joyce	Pusel	
William	Fisk	
Mary	DeCarlo	
Javier	Rivera	
Wendy	Raschke	
Diane	Glick	
Susan	Moren	They are our future. We need to have them at the table to help make sustainable solutions!
Tracy	Brown	
Mark	Smith	
Rich	Yurman	no more fossil fuels and environmental devastation
Annie	Davidson	
Adri	Norris	
MR. & MRS. BRUCE	REVESZ	
Tom	Csuhta	
Zoe	Zandbergen	
Javier	Rivera	
David	Walker	
Jacob	Sable	
Jelica	Roland	
Janet	Walls	
Maggie	Mandzuk	
Ryan	Baka	
Jenny	Cottle	
Keth	Luke	
Joshua	Wallman	
James	Shaver	
Bruce	Van Tassell	
Jack	Greene	
Karen	Berger	
Susan	Peirce	
fay	forman	
Ilene	Cento	
Staci	Evans	
Katarina	Alajbegovic	
Y	P	
Terri	Tylo	
Mark	Laity-Snyder	
Harry	Hochheiser	
Fredrick	Seil	
viola	freeman	
Thomas	Patterson	
Bernice	Kelman	
sylvia	r	
Phil	Hanson	
Phil	Hanson	
Dionicio	Barrales	
meg	kettell	
Thomas	Olbert	
Laura	Dailey	
Jennifer	Kunze	
Martha	Booz	
Ricki	Newman	
Parween	Irani	
eileen	cantrell	
J	Angell	
Dolores	Andersen	
Billile Kanter	Kanter	
Anne	Dale	It's time to shift to alternative energy!!
Erica	Johanson	
Virginia	Mendez	
Lois	Norrgard	
Kelley	Scanlon	
Jean	Dowell	Solidly behind these young people!
Jessica	Peraza	
Germaine Gogel		
Ken	Box	

Andrea	Chisari	
marge	dakouzlian	
Cindy	Risvold	
Daniel	Green	
Maren	Kentfield	Why more pipelines? The need to go forward for clean energy.
David	Stetler	
Hannah	Fithen	We can do better for our present and our future. We can justly transition to cleaner air, water, and soil for all, which includes Indiginous People plants and animals.
Sam	Carpenter	
Raymond	Barry	
William	Pohley	
Jim	Tjepkema	
Mary	Madeco-Smith	Investors put a price on jobs, supplies, etc....but what is the dollar cost on extinction? Once a species, planet, lifeforms are dead. ...You cannot bring back the dead.
Barbara	Scott	
Hank Broege	Broege	
Barbara	Bailey	
Jeanne	St. Pierre	
stephen	batzer	
Ray	Derrickson	
Kevin	Rolfes	
C	B	Yeah. Its a democracy, of, by and for the PEOPLE. People, not oil pipelines.
Aleks	Kosowicz	
Alan	Smith	
Amelia	Schmale	
Greta	Wilkening	
Patricia	Wiley	
Susanne	Rash	I applaud these young activists! They certainly have their priorities in order and set an outstanding example for young Americans.
Chris	Kozak	Climate change is real, it's bad, it's us, and we can and must do everything in our power to stop it.
Greg	Sells	
Marie	Wakefield	
terry	hokenson	
Jonathan	Gottlieb	
Rebecca	Rose	
Linda	Odgers	
Steven	W Gaylord	
Nick	Engelfried	
Nicholas	Medina	
Linda	Gillaspy	We are in the process of destroying the future of our children and our planet. The faster we move to renewable energy, the faster our planet can heal.
Tiffany	Wong	
Walter	Pankoe	
Steven	Snyder	
David	Greene	
Rob	Parker	
Rohana	Wolf	
Kimberly	Wiley	
Janet	Handford	
Linda	Szymoniak	
Art	Hanson	We MUST keep ALL climate-changing fossil fuels IN THE GROUND!
Wayne	Langley	
ken	gunther	
Paul	Rink	As someone deeply concerned about climate change, I strongly oppose the Line 3 tar sands pipeline. It threatens the future ability of humans to thrive and survive on this planet.
Celeste	Hong	
Melissa	Sharp	
Mathieu	Farges	
Elaine	de Saxe	ANY more fossil fuel projects are a project too many. Please stop this now. Invest in renewables. NOW!
Judy and Lester	Hoyle	
Debbie	Royalty	
Lilithe	Magdalene	
Lisa	Zeuner	
Geralyn	Leannah	
Joshua	Barclay	
Rachel	B	It is bad enough that several graduates from environmental science and engineering are being denied good paying jobs that would help them make their loan repayments. MN has multiple environmentalist due to the beauty of our state's nature. Several of these environmental graduates were told environment was where future jobs will be, plus our love of the beautiful natural wonders that MN has to offer. To rip these good paying jobs away and leave the much needed environmental graduates with competing for poor paying jobs, like fast-food or multiple part time jobs which won't allow them to make loan repayments AND human necessities of food and shelter plus forced to have car due to lack public transit, is appalling. We need to support our future in environmental graduates and MN beautiful environment which is a worthwhile economic investment, e.g. tourism and fishing.
Robert	Rynasiewicz	
Richard	Boyce	
Dennis	Ledden	
Chrysteen	Moelter-Gray	
Carol	Painter	
William	Ryder	
Carla	Falconi	
Sharon	Powell	Water Is Life...
Volker	Albrecht	
Peter	Lee	
Stephen	Williams	
Susan	Dixon	I would be one of these "kids" and standing beside them is correct. They are smart enough to know the dangers that have been growing and enacted upon by our government to roll back safety measures for our health.
Aaron	Campbell	
Greta	Gaard	
Michelle	Sandoval	This land is all we have so let's protect it!
Pepper	Luboff	
Linda	cantu	I love my mother earth.

Donna	Seabloom	
Victoria	Olson	
		NO to tar sands
Paul	Brooks	YES to Indigenous rights, clean energy and clean water
Lilli	Ross	
Sandra	Materi	
Lindsay	Johnson	
Terrie	Williams	
Eva	Wojcik	We Need Clean Energy Now. No more dirty crude power.
Judson	Wynne	
Margot	Barnet	
Melody	Bates	
Melody	Bates	
Dorothy	Zazelenchuk	
Cristina	Muresan	
Ann	Waterman	Our young people's future needs to be protected! Do an EIS that takes their well being into account!!
Janice	Bernard	
Pamela	Flattum	There is a better way. Why does big money, in this case, Enbridge, always get to buy their outcome? Proving that the government sells out. Money before people. Profit before people. Maybe its time to put people before money. It's not too late to,for once, do the right thing.
Rebecca	Burnell	
Cs	Symington	
Natalie	Hanson	We MUST keep ALL climate-changing fossil fuels IN THE GROUND!
Jon	Wood	
Allie	Lindstrom	
Tim	Glover	
Michelle	Gould	
Ingrid	Woerner	
Lynnette	Patch	
Anne	W.	
Mark M	Giese	
leann	magee	Our future lies in our children; but also in the hands of this Judge. Please remember that 100 years from now, our actions today will be remembered either as working towards their demise, or their success.
AURORA	INSURRIAGA	
Lauren	Dryburgh	
Jacob	Hackman	Climate change threatens the right that young people have to live a healthy life
Vonda	Vandaveer	
Andrijana	Bilbija	
mark	mendoza	
Connor	Duffy	
Joanna	Sharf	
Diane	Good	
Mae	Basye	Enbridgeâ€™s proposed Line 3 tar sands pipeline threatens us all. future generations will suffer disproportionate harm from the climate crisisâ€"and Enbridge's project will push that crisis forward at full speed.
karla	kavanaugh	
Linda	Smith	
Elizabeth	Wright	
Elizabeth	Wright	
dan	sponseller	People first! No pollution!
D L	Webster	The very idea of the 3 tar sands pipeline is absolutely crazy!!! I am sure this is all about the $$ What is it about GREED that simply seems to rule some people. Think about it, you can't take it with you when you die. And, there are so many other valuable enterprises to get involved in -- something that is less destructive to humans and the environment -- something that will really benefit a lot of people! And, I guarantee that kind of investment would not only make you have more $$ but would make so many people safe and probably more happy! And, I think, that in the long haul, you would also be more happy! And, think about it, even if we live to be a 100, would not it give you something to grow old about, i.e., that you had done some REAL good in this world!
Audrey	Byrne	
Susan	Muskat	
Betty	Dickey	These young people have the right idea. They are fighting for their future. Listen to them.
Tyler	Price	
Judith	Solomon	
Dr. William 'Skip'	Dykoski	
Brenna	Doheny	
Jim	Gibson	
Jim	Steitz	This pipeline is irreconcilable with US policy on carbon dioxide pollution, and would help to foreclose the possibility of America and the world substantially shifting away from carbon-intensive transportation fuels. The â€˜Line 3â€™ pipeline expansion would help establish America as a significant exporter of the most carbon-intensive oil in the world, by linking Canada to American export facilities via Minnesota, thereby grossly violating the objectives of any international agreement or Minnesota policies on reducing carbon dioxide pollution. The expansion of the â€˜Line 3â€™ pipeline and the commitment of America to several decades of Canadian tar sands oil export and possible consumption would substantially frustrate this existential American need.
Larry	Norman	
Steve	Karges	
Noah	Erickson	
Donna	Kingsboro Hill	
Lily	Frenette	
Shelia	Numan	
		To Whom It May Concern: My wife, Jeanne Stoppels, and I are retired educators living in Rose City, MI. Please allow this direct action intervention by these 13 young Minnesotoans to proceed. We have grandchildren; through prayer, study, talking with friends, watching the news, and experience, we believe that climate change is the most important facing our children and grandchildren! The effects are being seen NOW. Since our retirement, we have been travelling West. We are already living in Climate Change times...even " end times" for some people. However, not us...we believe we are at a very difficult transition(aggrevated by the dinosaur attitude of a worldwide fossil fuel industry); however, with enough wisdom, prayer, self-sacrifice and worldwide cooperation, the human race will make it through this crisis. In closing, please allow these youth to represent their generation's concerns as the world's peoples are All ONE at the heart of it all. Love and peace, John Carroll/Jeanne Stoppels

Rebecca	Steelman	
Thomas	Beck	
Stan	Sattinger	This is our chance to begin saving all of humanity -- not only the next generation!
Frances	Goff	
Darren	Mitton	
kate	eller	
Espoir	DelMain	
Lisa	Danz	
Ellen	Hadley	Additionally, the proposed route violates the Treaty of 1855, which guarantees hunting, fishing, and gathering rights to the Ojibwe people. Treaties are the supreme law of the land and we must fulfill the pledge our ancestors made to our Indigenous neighbors.
Robert	Neal	Let the young environmentalists have their say in regards to this abomination of a pipeline! It will affect them more in the long run then older Citizens. Remember this; We ALL have to breath the SAME AIR!
Joseph	Wenzel	
Linda	Johns	Stop all oil and tar pipelines! They damage the land and water. What kind of earth do you plan to leave your children and grandchildren? Any state that does this is destroying something that cannot be replaced!
Laura	Oochoo	It's simply time now, to end all pipelines! The shift to clean environment is now. No more negative destruct on lands and waterways. Megwetch. Nikanikewitinopinehsi.
Schuyler	Kempton	
Evan	Feldberg-Bannatyne	
Nicole	Gambino	
Marie	Curtis	
Eileen	Carlton	Please put your profit motive on the back burner. Noe one, including you, profits when the earth's crust is damaged.
Meredith	Kates	
Lenore	Reeves	
Steve	Campbell	
Kristina	von Hoffmann	
James	Tatum, Jr.	
William	Bishop	
Margaret	Merrill	
Rebecca	Waterhouse	
Ellen	Sanders	
Melissa	Hastings	
Sue	Schneidler	
Richard	Mills	
Judy	Welles	More than anyone else, these young people deserve a voice in their own future.
Kimberly	Snyder	
Elma	Tassi	
Kate	Field	
Darren	Skotnes	
Nancy	Bauer	
		The is another tragedy caused by the fossil fuel industries vast mone control of all news and a majority of politions and police forces and is in no way a representation of the peoples desires who are overwhelmingly in favor of transitioning to a green energy but are blocked ! America could have been totally of of fossil fuels in the late 60 or at least by the mid seventies using thorium (el 232) liquid salt electric generators instead of the dangerious nukes we are using today! America simply doesn't need any new pipelines and should be killing several old lines ! America's statistics show we have 85 years worth of natural gas in storage or deliverable through existing pipelines What for? Why build more? Every one should use the net to get the truth about this scam of gigantic proporations waged on America by the wealthiest industry in the world who can buy news and "FACTS" that never were anything but bull shit! Just like the tobacco industry did and nobody seemingly can stop them until Americans get out in the streets and demand real green energy solutions and dump the industries that are built around them like autos big energy requiring houses etc!
Monte & Elora	McKenzie	
Lopamudra	Mohanty	
Devin	McMhon	
Kerry C.	Kelso	Pipelines are very harmful to our environment, from their construction to their inevitable leaks. Building more pipelines just prolongs our dependence on fossil fuels at a time when it is essential to address the climate crisis by moving away from the use of fossil fuels and toward clean, renewable energy sources.
Liisa	Wale	
Kelsey	Pence	
Pauline	Thomas-Brown	
Gerry	Snyder	
Anjali	Helferty	
Trevor	Strandness	
Jason	Rodney	
Sharron	laplante MD	
Jesse	Gore	
DK	Bolen	
Simon	Gunner	
Victoria	Stratton	
Sean	Estelle	!!
Jacob	Herbers	
Julia	Rice	
Emily	Duma	
Corrigan	Nadon-Nichols	
Maria	Hadden	
Ariana	Hunter	
Amber	Houghstow	
Kay	Brainerd	
Alice	Labay	
Walter	Evans	
Elizabeth	Garibaldi	
Steve	Rusk	
Zoya	Marincheva	
Lynn	Johnson	

		Never stop fighting !
		Love from France
FABIENNE	SAISI	Fabienne SAISI
Mei Mei Miriyam	Sanford	
c	s	
Tiffany	French	
Glen	Venezio	
Heather	Cross	
Alex	Lewis	
Vic	Bostock	
Hogan	Dwyer	
Vicky	Bair	NO to TAR SANDS. We need to quit destroying our planet. people, and Nature!
Xaver	Kandler	
Lisa	Neste	
Douglas	Zook	
Peter	McCumber	
Rosemary	Caolo	
Lasha	Wells	
Ieva	Berzins	
Sid and Susan	Madison	Climate should be a major criteria in approving pipelines.
Chesley	Walsh	
Gerry	Milliken	
Carol J.	Loomis	
Lisa	Walsh	
Susan and John	Teague	
anthony f	marple	
Roger	Falk	
Sharon	Richey	
Arlene	East	
Zach	Jones	
Collin	Rees	
Evelyn	Pietrowski-Ciullo	
Janell	Stanton Soderberg	At this critical moment, we need to turn away from dirty sources of energy and be investing in clean energy sources, which we need in order to save this world for our future generations!
Rick	Faust	The full impact of this action needs to be fully understood. Once done it cannot be easily undone. It is preferable to err on the side of caution.
Don	Bergey	
Nancy	Mueller	Leave tar sands in the ground Forever!
Anne	Salinas	
N. Jo	Lane	
Sandra	Van Buskirk	
Sybil	Marcus	
Francene	Shed	
Shirley	Bickel	Yet again we stand in absolute opposition to tar sands pipelines. It has all been said over and over and over again. NO, NO, NO. How amazing and heartening that our young people are the ones who are stepping out in opposition. They will soon replace those now in charge and that gives me hope.
		Environmental subjects FIRST !
Norbert	WOLTERS	Make the PLANET big again !
Anni	Kuhn	
Susan	Nedell	
Claudia	Elzey	
Diane	Matza	Please give the earth the chance to endure
Aimee	Coogan	
Randall	Hughes	Generally speaking and following the practices of The First Nation People, development should be made with consideration for at least 7 generations. Have we done that? No.
Rosie	O'Brien	
Peter	Hoy	
Elizabeth	Bloemer	
Kristi	Venz	
		I am a real print journalist, Viet-Nam War veteran and we were betrayed after 9-11 to overthrow Iraq, steal its oil and kill almost one million defenseless people to do it, all of which is censored by corporate media. We are a lying, bloody mess and the tar sands pipelines are a symptom of a sick, greedy, parasitic society devoid of any moral compass or spine to hold us up long enough to learn. We are America. We have now spent trillions murdering Iraqis Reagan armed from 81 to 88 to murder Iranians who provided oil and gas to America and all our allies during both World Wars I and II through British Anglo-Iranian Oil, today's BP. America overthrew Iran in 53, Operation Ajax for oil, to reprivatize Iran's oil Mohammad Mossadegh nationalized. We are a bloody mess. Rockefeller and Standard Oil may arguably be the most murderous congealment of white mutants to terrorize oil fields around the globe. Syria is a war crime. The tar sands oil pipelines leak but we told you they would leak. We told you the stinking suckasses at the US Army Corps of Engineers couldn't get off their corporate knees long enough to do the right thing and create a true Environmental Impact Statement. BUT then the Corps are Americans sooooo what do you expect from people who would toss grandma down the stairs for a buffet coupon. America can't run a plane. America can't run a train. But you can slit the throat of a colored gal from 30 grand with a plane she can't see so some pissant from Boeing can get an erection and bank bloody tax free war profits in Switzerland in a numbered account. America worships tar sand pipelines and a Prince of Peace. HORSE SHIT! DO THE RIGHT THING. Manhood can prove elusive.
		Robert Hyer II
		real print journalist
Robert	Hyer II	Viet-Nam War loser
Tricia	Leonard	
Ron	Rattner	
Naomi	Morrison	
Jayne	Chase	
Steve	Brown	
Sara	Sh	
Leslie	Cassidy	
TWILA	ROTH	

Kristen	Riedinger	
Wink Davis	Davis	As a farmer I feel the effects of the climate crisis every day and I am reminded that climate change knows no boundaries. That is why I, a Colorado farmer, feel the responsibility to speak out against this climate-destroying pipeline proposal: it will affect me deeply. I join those demanding a more robust and scientifically in-depth EIS on the Line 3 pipeline.
bernhard	gruber	
James	Cleghorn	
Janna Olson	Olson	
Samuel	Lees	
Cecil	Bothwell	Leave the tar sands in the ground. Put all available resources into solar, wind and other renewable technologies.
Ron	Saff	
Dorothy	Mitchell	
Marsha	Love	
Maarten	Bosland	
FRANK M YOUNG III	M YOUNG III	
Alexis	Bay	
chad	hayes	
Lynn	Rosen	
John	Badila	
Aditya	Nochur	
Jamie	cunningham	
Florence	Dacey	
Jonathan	Clapp	
suzanne	williams	
Bill	Russell	
Steve	Troyanovich	
Pamela Donehower	Donehower	
Frank	Cassianna	"
Robin	Humes	
B. Thomas	Diener	
emile	d'almeid	
Chris	Young	
tom	feldman	
Olivier	Stas	
Aaron	Silberman	
Jeffrey	Rattner	
Mollie	Roever	This is a climate catastrophe. You don't have the right to destroy other people's air, water, land for your own greed.
Buckie	Jones	
Jane	Fasullo	
amy	russell	
R.	Romaker	
Harriet	Grose	
Karen	Stimson	
John Fredrickson	Fredricksson	
Linda	Tift	You must do a complete review of any pipeline being built.
Corrine	Mohnasky	
Donna	Carr	
Stephanie	Shepherd	
emily		
Lauren	Bohannan	
Julia	Cranmer	
Jean	Ross	
Janice	Hallman	
Joe	Rawlings	
Gerrit	Crouse	
Sheila	Knoploh-Odole	Our environmental laws are designed to allow polluters to pollute at a slightly lower level than they would if there were no regulations at all. THAT IS NOT GOOD ENOUGH! We need to recognize that pushing the edge on what is "allowable" is pushing us OVER the edge. Now is the time to Stand Strong and say, "No further." We cannot afford the fossil fuel industry to continue if we are going to survive on this planet. Other renewable and less-polluting energies & technologies exist that are far better for humans and the planet. It is NOT ok to permit continued fossil fuel investment and development when so much is at stake. It's time to say NO to the Fossil Fuel Industry's insatiable thirst for profit at the expense of humanity. There short-sighted greed is killing us, literally. As there are no guarantees in life, neither should there be a guarantee for an industry to continue when the damage is causes so catastrophic and all the negative externalities are borne by everyone BUT the Fossil Fuel Industry.
alicia	todd	
richard silvestri	Silvestri	
Kate	Heller	
Sheilagh	Bergeron	
Sandra	Bolton	
Kim	Cowgar	
William	Weaver	
Aaron	Wagner	
Pablo	Bobe	
Janet	Robinson	Please, do a real review. Don't just give it to them. You own it to your citizens to do the right thing.
Gary	Thaler	
Eric	Bare	
Rondi	Saslow	
John	Turner	
Tim	Drum	
Brenna	O'Brien	
Maggie	Sallah	
Jean	Perez	
Miriam kurland	kurland	
Lily	Kosmicki	
Deborah	Exum	stop this hazardous line 3 tar sands pipeline. do the right thing for our environment.
elaine	risch	
Abby	Fox	
Ralph E.	Miner	

Christine	Watts	
Glen	Wolf	
Jonathan	Evelegh	
Gordon	Abrams	
Kelley	Scanlon	
Mary Kay	Benson	#OilMoneyOut #PeoplePowerIn #WaterIsLife
Brian	Fink	
Lisa	Garvey	
Eleanor	Skibo	We together as brothers and sisters who care about our future and the future of others must stand up and prevent disastrous happenings from occurring to destroy the air we breathe, the water we drink, the food we eat, and our health from being destroyed along with the beauty and stability of our environment. We must stop this pipeline!
Brennan	Madden	
Thomas	McGlinchey	
Michael	Pan	
Paula	Wanzer	
Sallie	Thalhimer	
Judy	Creason	
Anna	Lynch	
Nancy	Merrick	
Charles	Wirth	
Gary	Reese	
Darlene Lovell	Lovell	
Martha	Scott	
Elizabeth	Hickman	
James	Stone	
Linda	Siefert	The exploitation of tar sands is a disaster for the environment. Please think green and ban the Line 3 pipeline!
linda	reens	
Jon	Olsen	
Wesley	Hemmings	
Abigail	Rome	
Stephen	Keener	
Silvia	Cachaco	It is time to protect the environment! OUR Environment.
Pamela	Ludwig	
O'Neill	Louchard	
Erin	Hesla	No more fossel fuels! Water is life! Protect the wetlands.
Anne	Fuller	climate justice for people all over and those who come after us -- the tar sands exploitation is a mistake!
Lorenz	Steinininger	
Mary	smith	
kimber	hawkey	WE ARE AGAINST THIS HORRIFIC POLLUTION. WE WANT RENEWABLES!
Erika	Styslinger	
Lindsay	Crouch	
Donlon	McGovern	
Madeleine	Sosin-Rocha	
Emily	Rushton	
Sarah	Johnson	
Patricia	Popple	
Patricia	Vazquez	
Marilyn	mills	
c.	martinez	
Michael	Fulwiler	
Linda	Nicholes	Bar the Tar -- sands, that is! Please move forward to renewable energy sources.
		Is no one in power paying attention to the harm fossil fuels is doing to our land? Or is it they just don't care because they are getting rich?
Rebecca	Knox	Stop the expansion of fossil fuels now, before it is too late to protect our clean waters and the earth.
Carolyn	Norr	I have two young children. I know that by the time they are adults, they are going to ask me what I did, back in 2017. If I worked to allow them a chance at a livable planet, or if I sat back and watched us give in to greed and the status quo. Your kids will ask you, too. I hope you stand up for the future.
Art	Hanson	However, you MUST do MUCH more. We MUST keep ALL climate-changing fossil fuels IN THE GROUND!
Michael	Kavanaugh	
Joost	Janse	
Al	Starr	
eusebio manuel	vestias	
Thomas	Ellis	
James	Cleghorn	The young people will lead us into the future. Fossil fuel infrastructure needs to be shut down, and fossil fuels kept in the ground, starting now if we are to save our planet from climate disaster.
Paul	Cassidy	1: American (North-Latin-); 2: RBS (Russia British Scandinavia); 3: EUROPE AFRICA; 4: AIOP (Arab India Pacific Ocean).WAR: WAR-WAR-WAR! Tag: Tag-Tag-Tag!
tess	Kindig	
Andria	Childs	
bob	nace	
Kathleen	Collins	Minnesota is a leader in the fight against Anthropogenic Climate Change. It has been a leader in green technology. Please do the right thing and stop this pipeline now, before the unthinkable happens. Do you really want to take a chance at a broken pipeline? A very good chance?
		We must do all we can to put a stop to any and all
Teresa	Richardson	Pipelines that may be going under ground becouse it could harm everyone so please don't put in the Pipeline
Kirsten Lovett	Lovett	
Matthias	Grembler	
Jim B	Perry	
Christine	Hendryx	
Jenya	Polozova	
David	Pearson	
paul	lajeunesse	
Lucius	Sorrentino	
lanie and jack	flaherty	
Shirley	Crenshaw	
jeanette	capotorto	
GASCON	DANIELLE	
Bubba	Younse	

Rebecca	Moss	
Thomas	Cannady	
Jana	Howe	
Matt	Stern	
Brenna	Taylor	
Helen	Ghiradella	
Thomas	Pietryla	
LARRY	WALSKE	It's the 21st century,adjust your attitude and business model.Go with the future and quit sucking the big oily pipe.
Rebecca	Krasky	As a young Minnesotan, my future is at stake. I have asthma triggered by air pollution and hot weather, and I'm concerned that it will only get worse as Minnesota's climate warms. Minnesota should be leading our country in rejecting the status quo: our state doesn't need another pipeline! Let's reject this one and help move our state to a fossil free future, one that ensures a save and livable state for my generation and those coming after.
Bette	Koetz	
Bette	Koetz	
theresa	del rosario	
Roger	Orgill	
Ryan	Wishart	
Rebecca	Holder	
Regina	Flores	
Kim	Schultz	Protect Minnesota's beautiful environment and stop this pipeline!
Robert	Sandgrund	
William	Nusbaum	
Natalie	Hanson	owever, you MUST do MUCH more. We MUST keep ALL climate-changing fossil fuels IN THE GROUND!
Trisha	Piercey	
Albert	Garcia	
Dana	Stokes	
elke	mauer holler	
Belinda	Miles	
Jake	Goodman	
John	Jeglum	Tar Sands is expensive, and super polluting. Line 3 simply adds to the emissions of the world.
Catherine	Hart	
David	Fallow	
Deborah	Richards	
Susan	Johnson	
Grace	Feldmann	
Kim	Kokett	
James	Paschky	Fossil. Fuels. Are. Dead. Save the planet, go renewable
Joseph	Burgwinkle	
Karyn	Taylor-Moore	
Mike	Bauer	
Jill	Estep	
Audrey	Byrne	
Emily	Richardson	
Joy	Chodan	
Lauren	Dryburgh	
Erica	Mooney	
Michelle	Temple	
Ethan	Viets-VanLear	Chicago Stands with You, Ase and Power to Yall
Susan	VanDerzee	These projects are on the wrong side of history. America has always led the world into the future, not protected the past, particularly when that protection hastens climate and environmental destruction.
Susan	Duncan	
Terry	Sovil	Minnesota is my home. Tar sands do not belong. Leave it in the ground.
Ray	Lou	
Holly	Greene	Water is Life
carrie	clabaugh	
James	Giles	
Patricia	Hartzog	In addition to all of this, the oil is not for us, it is for China!
Kimberly	Carlson	
Suzan	Shinazy	
Carol	Gross	
kathleen	koblensky	no more of this ....it can not be undone it is bad math and very bad science....poison to the water....is poison to us
Laura	Timmis	
Edward	Gould	
Parita	Shah	
Kim	Dorsey	
Shane	Worth	
Debra	Prebor	
Claire	Mathews-Lingen	I am a young student, this is my future, Minnesota is my home and this pipeline will damage my home and the home of beings Accross all of MN and the throughout the Mississippi River watershed. This is our chance as a state to set a president, the country is watching.
Jean-Louis	Rocheteau	
Karla	Kavanaugh	
Stephanie	Allen	Please, WE must invest in the future - clean and viable.
Michael	Gelineau	
Jane	Tavener	
D.	Singer	
Christine	Frank	
Brenda	Bailey-White	Tar sands oil production and transport perpetuate toxic, last-century thinking, practices, and all-too-familiar negative outcomes. The Commerce Dept. should be integrating their processes and planning with jobs creation and sustainable infrastructure strategies. Invest in better energy strategies now, rather than propping up these high-risk, dead-end, greenhouse-gas-intense endeavors. Protect air and water resources. The people of Minnesota, you yourselves, and concerned US citizens, demand and deserve no less than thorough analyses of all potential adverse impacts and benefits for all foreseeable alternatives. Thank you for your time and attention in this crucial matter.
Shawn	Sargent	
Megan	Fink	
Eva	Cosgrove	
Iwona	Krzeminska	
Pamela	Haun	
Katie	Archbold Andrs	
Benita	Mahanta	

Benita	Mahanta	
Lindsay	Crouch	
Eve	van Lanen	
Siiri	Bigalke	
Ariel	Israea	
Lily	Frenette	
Hannah	Woolhouse	
Jane	Barroll	
Natalie	Van Leekwijck	
Taylor	Edelhart	
Christine	Frank	
Jane	Tavener	
Gayle	Tuch	
Kimberly	Snyder	
Rebecca	Burnell	
Hayden	Smith	
Pete	Sikora	
Jeanne	Bergman	
Sara	Axtell	I am particularly concerned that the report uses a timeframe of only 30 years in its examination of impacts.
Sarah	Peters	
Heidi	Jurgens LaDoucer	
		I am apposed to allowing the most carbon intensive oil to be transported accross my state. Reason #1, burning this tarsands oil will put the planet past the tipping point for managable climate change. We cannot afford to invest in new fossil fuel infrstructure when it will only encourage more fossil cyel burning. Minnesota's clean water and land is the right of all future Minnesotans and should not be compromised to enrich a few very wealthy oil comoany owners.
Tom	Cajacob	
Elizabeth	Cohen	
elizabeth	fulmer	
Allan	Graham	
Shannon	Marshall	
Karyn	Quinlan	
Jeffrey	Urbauer	
Nylah	Burton	
Ernie	Howard	No more tar sands...EVER
Gloria	Johns	
Livia	Lund	
Shea	Riester	
Benjamin	Pines	
Jacob	Nelson	
		I whole heartedly support the individual to stop the pipeline
Neil	Pereira	Neil Pereira
Mark	Koch	
Eric	Lester	Keep fighting the good fight. We need more troops on the front line so don't be shy people. I'm physically unable but there are millions of you out there that are very capable of assisting these fighters!!!!
Riley	Anderson	
Phyllis	Erwin	
Terri	Breed	
Nate	Marshall	
		We are borrowing this planet from our progeny. Our responsibility to protect it for them and their progeny is our most important act. We know we must keep fossil fuels in the ground. We know that safe, clean, renewable energy is financially viable. It's up to us to accelerate the shift from last century's energy technology of extract and combust to
RJ	Harrington	today's energy technology of sun and wind.
Melenie	Sheehan	
Mary	Kirby	tHE LEGEND OF
Douglas	Long	The Enbridge pipeline has a lot of potential for harm to the environment and to health. Once that pipeline genie gets out of the bottle, it would be very hard and costly to put it back.
Christopher	Pelham	
		Nothing matters more than climate change for our future generations. We must stop moving oil now and invest in renewables.
Gregg	Kleiner	
Mary	Kirby	THE LEGEND OF "THE GREAT BLACK SNAKE (PIPELINE) DESTROYING OUR COUNTRIES WATER IS BEING DEFENDED BY THESE BRAVE WARRIORS.
Jeff	Palazzo	
Jennie	Lindberg	
E.	Michael Barnes	This is about the future security of our world, not just one company's proposal to provide a service. Climate change is driving people from areas where they have lived as changing climates make those areas less inhabitable.
Jamie	Shultz	
Lisa	Hammermeister	
Anthony	Borzotta	
Bonnie	Faith-Smith	
Tony	Mendousa	You've got my support! Let's stop all pipelines, tar sands oil, mining and drilling now! Green tech energy is the future! Impeach or arrest trump and his band of idiots too! Fight on!
David	Gillette	This is an extremely important issue, and needs to be reviewed with the future in mind. Renewable energy is what the future of our country needs.
bertha	gold	
Ian Osborne	Osborne	
Leah	Feingold	Leah Feingold
Sharon	Madagan	
Laurie & Dave	King	Great! People of color and youth must lead us to victory over the corporate dictatorship.

Ben	Abrams	
Y	York	
Rick	Easton	
Colin	Pryor	
Mark	Sherburne	Dirty oil, polluted air, polluted and ill children and elderly, ...all for what....to make more money. Support clean wind, solar, hydro, tidal energy sources and conservation.
Renaissance	Moynihan	
Jessica	Padilla	
Laurie	Dougherty	
James	Monroe	
janet	forman	
vladimir abramov	Abramov	
Ellie	Morse	It is the youth who need to protect this land from the folly of the legislating bodies. Thank God we have them to try to keep America great.
Victoria	Groshong	
Deborah	Letofsky	
		Some see, are alive Others are short-sighted And blinded by gold
R P	Moye	
Michael	Parsons	
Christine	Berger	
Laura	Simon	
Liz	Bernstein	
Daniel	Mois	
Dorothy	Holi	
pat	berger	
Mike	Metelmann	
Victoria	Hickman	
Ronald	Buckanaga	
		#NoMoreFossilFuels
Susan	Allen	#SaveTheEarth
Tricia	Herron	
Ric	Melton	Go destroy another planet. This one inhabits life.
Maureen	McCarthy	
David	Carey-Kearney	
		I see no reason to continue with Tar sands. It is going to be obsolete soon as Renewable are the Future. We must save our planet for future generations and we just can't do it with Oil.
Mary	McDermott	Go Solar and Wind. There are plenty of jobs and our air and water will be clean. It is OUR RIGHT to have a CLEAN sustainable Energy system for All.
Albert	Geuzaine	
Carolin	Schellhorn	
Carolin	Schellhorn	
Erin	D'Ambrosio	much love â€¦
Jacques	Jougla	The State of Minnesota should make space to listen to its citizens, not just the lobbyists of a large oil company.
Alexi	Newhouse	
Dee	Noblett	
Rabbi Dr Adele	Plotkin	
Manos	Taliadouros	
Caron	Cadle	It is insane to trade our future (clean groundwater and arable land) for the fossil fuels of the past. No more pipelines, no more fracking, no more tar sands!
Jeff Gang	Gang	
Dr. Susan	Zipp	
		It's time for our country to move forward with 100% renewable energy for all instead of building new fossil fuel infrastructure that endangers our climate and communities. Minnesota has a long history of environmental leadership. Your lakes, streams and forests are not only a great natural and economic resource, they're a sign of our promise to protect the planet for future generations. Be brave and stand up against this dangerous tar sands pipeline. These young leaders are showing the way. The state should follow their
Jamie	Henn	lead.
Diane	Voripaieff	Congratulations!
Ashley	Cobb	
Olivia	Bueno	Olivia Bueno
Danielle	Tran	
Ashley	Cobb	I stand in solidairty with the Minnesota 13!
Maddie	Renaud	
		Love & respect for our water, land, air, communities, and our collective home, mother earth, is stronger than the ignorance/arrogance/greed behind these projects. So respect
Tracy	White	existence or expect resistance!
Mary-Lou	Pardue	
Jessica	Locicero	
Brooke	Girty	
Zach		
Debra	Rowe	As a professor of renewable energies and efficiency and a former energy company owner, I know the above petition makes sense.
robert	spottswood	
Phoebe	Anderson	
CHERYL	GROSS	
Richard	Martini	
Klaus	Proemm	
		In November 2007, I was one of nearly 6,000 young people to attend the first youth climate summit in American history. I represented my rural WI narrative of crop failure, urban sprawl, great lakes water quality and wind potential. I absorbed many other climate justice narratives from people across all 50 states. Ten years later, these voices are louder, the impacts of fossil fuel dependence are scarier, and environmental injustices are greater, disproportionately impacting communities of color, the global majority. It's time to move
Mollie	Thompson	the needle on this narrative and I am relying on my Representatives to stand up and shout. There's a new path forward and it begins where the pipeline ends.
Amy	Cusick	
Hope	Meyn	
forest	gregory	
Karen	Vasily	
Shannon	Marshall	

natalia	stimac	
Kristen	Rubino	
Jessica	Glendinning	
Peter	von Au	
Bill	Link	
Erica Marken		I stand with the Minnesota youth in saying no to Line 3 tar sands pipeline. Keep it in the ground! Already everything is melting. This is not normal. Do we really want this to be our legacy to future generations? We want a rich biodiverse future for all!
Katie	Sakol	AAABSOLUTELY SUPPORT THEIR BRAVERY IN STANDING UP AGAINST BIG POWER/OIL !!
Ulrike	von Moltke	
Laura	Tiaga	
Sophia	McNicholas	
Erik	Schnabel	
Alan	Barthel	
Maggie	Davidson	
		These brave young people are representing the FUTURE for ALL of us! Their air, water, ...the soil they stand on...ALL is endangered. Stop all extractive undertakings; follow the principles of the Iroquois Nations-in environmental decisions, choose based on the effect unto the 7th generation. Validate these Minnesota 18; their courage, resolution, responsibility to and respect for the environment informs my actions and point your way to acting for our world now and for tomorrow. Please Do The Right Thing. Stop this pursuit of short-term profit; Stop the Line 3 tar sands pipeline!
Ruth	Feldman	and thank you for reading and for acting responsibly.
Robert	Van Wagoner	
bernardo	alayza mujica	
Lucy	Segatti	After decades of peddling misinformation and denial about human-caused climate change, the oil and gas industry should find other ways to make their billions, and just leave the tar sands in the ground.
Deborah	Meckler	KEEP IT IN THE GROUND! We all know what causes climate change and how to fix it. And it's not with more oil pipelines.
r dean	James	
Patricia	Dunn	
Leila	Cahillane	
angelina	preza	WE oppose the Line 3 tar sands pipeline!
Marcella	Hammond	
Catherine Haigney	Haigney	
Diane	Green	Well done; admirable group of young people
Todd	Davis	
Susan	Waltner	
Henry	Lowendorf	
Joy	Kennedy	It's their future. Listen to them.
Marcia	Bernstein	This pipeline will transport dirty oil and as all pipelines is subject to leaks which will poison the environment. it will also add to destruction of our climate. It should be stopped.
nancy	polito	
Marya	Bradley	I stand with those who are calling for a stop to the Line 3 Pipeline and all the tar sand extraction. The continuation of fossil fuel use and production is wreckless and irresponsible and is precipitating the destruction of our planet and all the species which live on it including ourselves. Stop the pipeline and the tar sands.
Taylor	Edelhart	
Lorrie	Ogren	
Linda	Wasserman	
Ellen	Dryer	
Warren	Keller	
Valeri	Fornagiel	
Angela	Whang	
Peggy	Moore	
bernardo	alayza mujica	
thomas	phillips	The writings on the wall. These will be failed investments. Investors beware.
Dawn	Peacock	
Claude	Robert	
Patricia	libbey	
Rachel	Lidov	

Federal and state governments in the United States INCLUDING MINNESOTA have a serious responsibility to enact and enforce timely, not tardy, laws and policies that protect the health and well-being of their residents and the ecosystems upon which they depend.

The consequences of global warming and resulting climate change increasingly threaten not only the daily functioning of communities and societies, but also the very viability of human and earthly life on our planet. For evidence of climate change, visit climate.nasa.gov/evidence.

It is also the responsibility of those working in government to more boldly legislate, govern and officiate based upon the fact that Americans â€" like all human beings â€" have international human rights that were formally adopted by the United States, with 48 other countries, in the historic and fundamental United Nationsâ€™ Universal Declaration of Human Rights on Dec. 10, 1948. The U.S.â€™s own longest-serving First Lady, Eleanor Roosevelt, chaired that crucial declarationâ€™s drafting committee, and Article 3 specifically states that,"Everyone has the right to life, liberty and security of person.â€

In 1977, the U.S. also signed the U.N.â€™s International Covenant on Civil and Political Rights that Congress finally ratified in 1992. In Article 6.1 of that human rights, multilateral treaty, it also re-confirms that,"Every human being has the inherent right to life. This right shall be protected by law. No one shall be arbitrarily deprived of his life.â€

Unfortunately, all U.S. residentsâ€™ rights to life, now and in the future, are indeed at risk from the rising levels of carbon dioxide and methane in our atmosphere and oceans, which are causing increasing temperatures, and climate change effects of all types including extreme weather. These long-predicted damaging effects and new, unforeseen developments require our American legislatorsâ€™ and elected officialsâ€™ strongest attention and boldest actions to address them properly.

Growing risks to our climate and all humanity are why 193 countries in the UN General Assembly, including the United States, also adopted the important Sustainable Development Goals by 2030 on Sept. 25, 2015. These 17 interrelated goals are designed to"end poverty, protect the planet and ensure prosperity for all as part of a new sustainable development agenda.â€For more information, see sustainabledevelopment.un.org/sdgs.

In fact, as recently as March 17, the UN Human Rights Councilâ€™s 34th Session ending March 24 published its Jan. 17 assessment report titled Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment. Written by UN Special Rapporteur John Knox, a human rights expert and professor of international law at North Carolinaâ€™s Wake Forest University, the report re-confirmed in Article II.A.7 that:

Janette	Dean	
Andrea	Presson	
Kelley	Scanlon	
Etienne	LeBlanc	Keep up the great work !!!! Save the planet for another generation!
arthur	johnston	
Connie & lynn	Baer	
Gil Niederlitz	Niederlitz	
Martha	Lynch	Leave it in the ground! All fossil fuels, period. There can be no well people on a sick planet. Honor Mother Earth, for the generations to come.
Alicia	Chiaravalli	
Susan	Warren	
Marcia	Coling	
Susanna	Lewis	
Jose	De arteaga	
Sharon	Powell	
		Also, a competent DEIS should contain discussion and analysis of cumulative impacts, with a time spread across past, present and foreseeable future. Furthermore, a robust analysis of environmental justice issues must be reviewed.
Tom	Connor	
Sue	Janssen	
Cynthia	Justice	Brave and smart, educated with the facts, youth of Minnesota! Listen to them!
S.	Rudzik	
Heather	White	
Colleen	O'Brien	
Larry	Goldberg	
Danielle	Zemmel	
Karen	Renaud	
Jackie	Dow	
Alicia	Wittink	
Susan	Schmale	
Nancy	Dickerson	
John	DeYoung	
Lynn	Smith	Its time to stand up to dirty oil and start protecting the land and waters from pollution.
Justine	King	
Kelly	Lyon	
		Energy Transfer Partners hold no regard to past pipeline ruptures that have had irrereversable damage to life and property. Energy Transfer Partners are at the moment fighting a fine associated with disturbing Native artifacts and burials. They have proven over and over that they are not concerned about the public'sleeps' safety. Energy Transfer Partners only concern as a business is to profit. I am asking you to stop a future catastrophic rupture that will happen.Thank you, Anita Reyes
Anita	Reyes	
Elizabeth	Douglas	
Edward	Schreiber	Piping tar sands oil is dirty business. May environmental sanity prevail over greed of gain to stop the flow.
Barton	Schoenfeld	
Karen	Baker	
Daniel	Heyduk	
Jessica	Webb	
Jamie	Winters	
Yee Yean	Lim	
Linda	McDougal	
peter	roda	
Steve	Kent	
Richard	Tucker	
Laurel	Davis	
Bill	Marotz	
Nancy	Fifer	too disgusted to make a civil comment now!!! I support all efforts to stop the insanity of,fracking, pipelines, and drilling!!!

Catherine	Harrison	
k	bensusen	Thank goodness for the young people who know oil and gas will not be part of their futures.
Laura M	Stone	This analysis by 13 young Minnesotans is unmatched in its comprehensive evaluation and recommendations. STOP the pipeline approval and look at the facts presented.
Leah	Cain	
Christie	Noble	
Abby	Fenton	
Art	Hanson	We MUST keep ALL climate-changing fossil fuels IN THE GROUND!
Leila	Cahillane	
Sherry	Weise	
David	LaVerne	
Darcy	Augello	
Frances	Hoffman	
Sisarie	Sherry	
Ed Bennett	Bennett	
Adam	Powers	
Armchair	Activist	
Perry	Maddox	
Carl	Stilwell	
T.J.	Gaither	
Amanda	Hollenbeck	
Penny	Blubaugh	
Christina	Crusius	I am a young person in my 20s and I care about the quality of the world my peers and descendants will live in for years to come. Please consider the long-term impacts on our future!
Shireen	I Parsons	NO TAR SANDS PIPELINE ON NATIVE AMERICAN LAND!!!!
Lane	Gosnay	
Robert	Dick	
Claudia	Campero	
Sarah	Rosengard	
Douglas	Smith	I sign this petition not as a youth but as a 76-year old retired energy consultant who fully supports the points made by these forward-looking youth leaders.
PATRICIA	MCHUGH	
Sherie	Mitchell	
Sherie	Mitchell	Stop with everything your doing to destroy our planet earth.
Paul	Hurley	
Deborah	Kushner	These young people are speaking from their hearts and consciousnesses to protect the planet.
Jane Maya	Shippy	
Melissa	Redd	
Donna	Osler	
Joan	Parrish	
Katie	Diekman	
Natalie	Hanson	We MUST keep ALL climate-changing fossil fuels IN THE GROUND!
MHope	Fish	
Ronald	Hart	
Ellen	Gutfleisch	
Kent	Clark	
Sarah	Peters	
Andrew	Goldman	
Emily	Freilich	This pipeline is unacceptable for the people of Minnesota, including politicians of Minnesota, as well as the future of the livable planet. Listen to your citizens, these young people, and listen to the future. Pipelines do not create real jobs and do not hold up to cost benefit analysis in the appropriate time scales. Stop the Line 3 Pipeline.
		For those of us who can no longer
		be on the front line it is most
		encouraging to see these young
Nancy	Mikelsons	people picking up the torch! Many thanks to them and may all of us 'elders' support and cherish them!
Gaia	Mistriel	
Pryce	Hadley	
MHope	Fish	
Sharon	Widigan	We MUST preserve our lands for the future generations!
Lisa	Evasiuk	
Andy	Plotkin	This pipeline will mostly help the wealthy oil companies at the expense of the environment and people on the land. If this money were spent on safer alternative energy sources, such as wind and water power, we would all be better off. Andy Plotkin
Gwendolyn	Albert	
Henry	Ickes	
Patricia	Harris	Our young people deserve a seat at the table since THEY are having to deal with the future that WE are creating!
Lora	Lucero	
brig	larson	
Sarah	Parr	
Frank	Lahorgue	Wake up! These are the people to listen to, not the aging, greedy and corrupt old billionaires who own and run the fossil fuel corporations that are ruining our beautiful world!
Adam	Parker-Lavine	
Jesse	Meisenhelter	
Kate	Sherman	
		Since us old-timers don't have the will to protect our land, at least empower the folks who have the will to take some control.
Ruth	Garrison	They are the ones who have to live through all the changes that will occur.
Anthony	Gatti	
sidney	berman	
sally	yagol	
Mary	Liepold	
Benjamin	Tamarin	
Fran	Varney	
Cameron	Rao	
Alicia	Van Couvering	

Stan	Olson	I fully support the concerns of the group of 13 young leaders who want a thorough review of the Line 3 pipeline, and a transition to renewable forms of energy. We need to take immediate steps to move away from use of fossil fuels rather than encourage longer use.
Elena	Bird	
Sarah	Combellick-Bidney	
Matthew	Buccelli	
Kendall	Linzee	
David	O'Leary	
T	Sensenig	I would not want that most polluting oil coming through my area for this and the next generation. If not here, then not in Minnesota or elsewhere. We need renewable energy in our future.
Pamela	Beard	
Alaya	Bouche	I stand with these young people who have to live in this world and they have the right to be able to BREATHE CLEAN AIR AND HAVE WATER THAT IS NOT polluted.
Maegan	Prentice	
Chuck	Wyro	It is vitally important to get a thorough comprehensive DEIS for a project of this magnitude.
Steve	Conn	If powershift really wanted to win it could make getting rid of trump now a centerpiece demand and help organize marches for that demand all over the country. But the truth is power shift is far too attached to the Democratic party which is determined to continue as Trump's enablers. So we all continue to lose the foght we otherwise might win.
Alexandra	Colby	
rhonda	seidenwurm	
Matthew	Glenwood	
Shirley	Davis	
Caroline	Kralovec	
Earth	Mum	Keep it (oil) in the ground so that waters stay clean and drinkable. Don't endanger drinking water and food (wild rice).
Barbara	Poulsen	
Kendra	Beaver	The health of the planet for future generations is undeniably more important than corporate profit.
Caroline	Hansley	
Angela	Connor	
Joseph	Alfano	
Samuel	Fuller	As a Franciscan priest and as who cares for the sustainability of our common home, I heed the words of Pope Francis, â€œOn climate change, there is a clear, definitive and ineluctable ethical imperative to act.â€
Art	Hanson	However, you MUST do MUCH more. We MUST keep ALL climate-changing fossil fuels IN THE GROUND!
Susan	Lohwater	
Duane	Ediger	
Mark	Pezzati	This pipeline project would not meet the water quality standards Minnesota authorities are mandated to uphold under NEPA and the enforcement of the Clean Water Act. The DEIS must be wider in scope and made more robust in order to protect Minnesota's resources and citizens from this misguided fossil-fuel project.
Michael	Busby	
Melissa	Miles	
Marvin	Feil	
Al	Becker	
Jeanne	Acosta-Caipe	
Sudia	McCaleb	The time has come to halt ALL pipeline projects and protect the present and future of the Earth and of humanity..
Carole	McAfee	I support your brave stance in doing what is right!
Judith	Crim	I will stand with you.
janet	rolnick	Bravo! To these young people. As a retired teacher I am proud o our public schools. Please listen to them and protect our country.
Mary	Disney	
Mary Ann	Baier	
Nicholas	McCarren	
Laura	Bramley	We need more clean energy, not pipelines to get fossil fuels from tar sands - the dirtiest energy out there. These pipelines are dangerous for our communities and they help to sell our future for a quick profit now. No more pipelines!
Anne	Kepplinger	Do our Earth - and the U.S. economy - a favor. Invest in less controversial energy that does not pollute. Invest in harnessing renewable energy, like solar and wind for instance; this will be better for everyone...not just the big corporations.
Robert and Donna	Janusko	
Kacey Katzenmeyer	katzenmeyer	
Nancy	Schimmel	Climate change will affect where I live in coastal California, and spills will affect the beautiful landscape of Minnesota, which I have been privileged to visit many times. Some of my best friends live there. Please protect your state and mine from this pollution.
Andreana	Saunders	
Radney	Wood	
Susan	Cooper	Tar sands is the most dangerous and filthy fuel that there is. It contains multiple toxic chemicals to liquify it, such as arsenic and mercury. Tar sands is a major contributor to pollution and global warming. No to tar sands! I am proud of the young folks who are opposing this pipeline.
Edna	Brooks	
Bill	Link	
George	Senjan	Leave it in Canada
Tyler	Hall	
Peter	Bull	
Cathrine	Estar	
Bonnie	McLean	
Elizabeth	Brancato	
Teresa	Tucker-Trainum	
		Clean energy now. Only clean energy infrastructure.
Barbara	Ocskai	Protect the sacred. Protect the water, soil, and air for the generations to come.
Stacy	Denton	
Natalie	Hanson	However, you MUST do MUCH more. We MUST keep ALL climate-changing fossil fuels IN THE GROUND!
Clark	Davis	
David	Freedman	
Kelly	Kraemer	We need to stop building pipelines and invest instead in renewable sources of energy. Tar sands oil is one of true worst kinds in terms of damage to the planet in its retrieval. Additionally pipelines leak, ruining land and drinking water sources. We do not need this in Minnesota. Stop Line 3. I say NO in every way possible to the further development of tar sands!
Kay	Ferguson	The long fight extends to the next generation. So proud and gladdened. Elected officials, your job is to look forward past the immediate this quarter interests of your corporate donors and protect these children's future. Do your job.

Beth	Jones, expat Iowan	I don't care how much money & power the Fools for Fossil Fuels have. They are dead wrong and ruining our planet for everyone, including their own descendants. The vast majority of citizens understand that and demand CLEAN ENERGY. We bless these young people for their foresight and efforts. The fossil fuel dinosaurs are doomed and rightly so.
Lee	Smithey	Thank you for receiving these detailed comments. I would like to re-emphasize the points about the odd omission of the no build option and the costs of decommissioning the line if it is built. These indicate a rather striking lack of diligence, which does not inspire confidence in this process. As it stands now, this impact study does not stand up to scrutiny and should be fully peer reviewed. I am sure you share my concern about the impact of climate change on our children and I appeal to you to take action and ensure that the full costs of this project, within the parameters of irreversible climate change, be fully and rigorously documented. Thank you.
Aaron	Lehmer	
Theresa	Kehres	
Vicki	Geehan	
Jan	Modjeski	
wayne	Lewis	
Barbara	Silverstein	
Grant	Silverstein	
Marnie	Greene	
Andrew	Orlikoff	
Elizabeth	Dixon	
Bette	porter	This young people's analysis is beyond reproach. They r heroes.
Daazhraii	Princesslucaj	Minnesota should be proud of them, listen to them & act in their favor on their proposals.
Savannah	English	
Hannah	Rosner	
Hannah	Rosner	
Savannah	English	
Susan	Labandibar	I'm proud to stand with people of all ages from across the country in refusing this most recent corporate takeover of our land.
Tristan	Glowa	
Mark	martinez	
Robert	Kincses	
judy	rosenblatt	Good for these young people! Oil is going to run out eventually, so why don't we start phasing it out now and save our planet, the only one we have??
Joshua	Barclay	
Ronald	Hart	Why enable the dirtiest oil when climate change action is so urgent?
Zara	Muren	I am a deeply concerned citizen and landscape architect who stands in opposition to the Line 3 Tar Sands Pipeline!
NICOLE	ZASLOFF	
Jim	Warren	
Sarah	Poe	I believe it the time is now, not tomorrow, to use more renewable, responsible energy. We need to protect our natural habitat in order to sustain a balance in nature. Please stand with us so you can tell your grandchildren that you stood up to protect the planet. Gratefully, Sarah Poe
Alan	Hoeffler	Nice petition wording.
Barry	Benjamin	Please stop any and all 'dirty' oil pipelines such as the tar sands pipeline Line 3.
Nancy	Galloway	
Joan	Parrish	Stop the pipe line. There is plenty of solar, wind and geothermal energy to power the planet. Go, young leaders!
James	Adams	
GARY	HOGAN	The appeal by this group is concise and fully supported by reason and forward thinking
Jude	Smithet	
lori	dombek	
Valerie	Borfitz	Congratulations to the 3 young heroes who are standing up against the tar sands oil pipeline! THEY ARE REPRESENTING WHAT THE PEOPLE WANT ----- NOT WHAT THE BIG CORPORATE GREED MONGERS WANT. Keep that oil in the ground! We don't want it. We don't need it. We are trying to save this Earth****###****
Shirley	Lewis	
Jennifer	Dotson	
John	Coleman	NO TO TAR SANDS. NO TO THE LINE THREE PIPELINE. STOP NOW!!
Kjrsten	Holt	Oil contamination of groundwaters will be the catalyst to raise clean water prices worldwide. Just watch
Roxa	Meyer	
Alison	Altman	
Tegan	Kehoe	
Nick	Knighton	
Karen	Krause	
Jessica	Wallach	
Kim	Alarie	
Rebecca	Hartley	
Jean	Publi	too many pipelines destroying all of america. they all leak. rich white men making big money and the rest of us get the destruction and pollution
Valerie	Borfitz	"Right to LIFE, liberty and the pursuit of happiness." It is unconstitutional to poison us. Pipelines jeopardize our right to clean water and land, a necessity for LIFE.
Ed & Linda	Mc Dade	
Cindy	Powell	
Li	Mo	May the fighting spirits stay strong and our prayers are with you!
katie	fagan	Keep that dirty oil in the ground. The young people are the future, listen to them.
H.K.	Peters, Jr.	
Veronica	Smith	

Wanda	Laurin	I live in northern Alberta, Canada, in an area that extracts fossil fuels. I am very much against constructing any new pipelines as this completely contradicts the reduction in carbon emissions that we are all working toward. We need to be installing alternative energies on home and businesses as a means to employ people, not constructing pipelines to move the polluting and energy intensive tar sands to market. Do not allow further pipeline construction. Thank you from Canada!
carol	dicks	
Keith	Rick II	
Xaver	Kandler	
Molly	Anderson	
Ronald	Yeomans	
Jane	Yett	Hooray for courageous children, and may our governments be as courageous and honest in the face of money vs. life.
Beatrice	Denham	
Alejandra	Fernandez	
Nora	Eisenberg	A thorough environmental study will show the negative impact to the Line 3 Pipeline on the environment. It is a public health and safety imperative to tar sands traveling in our earth.
Carmen Sanchez	Sadek	Probably in the ancient history of lead therewas a chapter similar to TAR SANDS -- IT is time to say NO to oil & really begin to move up to the FUTURE in our need for oil -- NO to line 3 PIPELINE!!!!!!!
Laura	Annan	
Marisa	Braun	Please stop the line 3 pipeline. We need clean water in our communities for our families and young people for years to come. Line 3 is a major threat against clean water.
Alice	Darby	These young ppl should be studying and enjoying their youth. Not forced to fight for clean water, air, and their very future. That's your job! All adults who have failed them miserably. We don't want or need filthy tar sands. That is only benefiting a relative handful of wealthy investors and not in the best interest of Americans. Especially children and youth! Please reevaluate this project and if not these kids think of your own, and your grandchildren. We want and desperately need clean energy now!
Stanley	McDonald, Jr,.	
Cheryl	Ritenbaugh	
Terry	Dyck	We will all be driving electric cars in the future so the need for pipelines will not be needed.
		We need to be moving toward renewable energy as fast as possible. Creating a target the world's dirtiest form of petroleum is the opposite of progress. Even Canada, where tar sands are produced, is having a hard time legitimizing the pipelines needed to market this dirty mess called tar sands.
Dwain	Wilder	Please included ALL the environmental consequences of sending tar sands to market. It is a part of your responsibility too, not just the direct environmental consequences of laying a steel pipeline.
Brady	Bradshaw	
Nan	Lin	
Natalie A.	Carter	
Martha	McClintock	
Ruth	Nicol	
Ginny	Boyle	
Patricia	Campbell	Keep on standing up for our and your environmental future! I applaud you!
Erma	Lewis	Thank you and I stand with you.
Panagioti	Tsolkas	
Jon	Barrows	
Irene	Lutz	
Lori	Olinger	Also, any new pipeline should be required to include money for complete removal in the future so that individual land owners and the State of Minnesota don't have to pay for it in the future.
Irene	Lutz	
Sonya	Lippold	YOUNG PEOPLE ARE THE FUTURE, AND RIGHTFULLY THEIR VOICES /CONCERNS FOR THE LAND- AIR- WATER WITHOUT WHICH WE ALL CANNOT SURVIVE SHOULD /MUST BE HEARD.
Kirsten	Wilson	
Scott	Finnell	
J	Talbot	
Melinda	Barnes	Please address the omissions and incomplete analyses of the Draft Environmental Impact Statement. Underestimating environmental impacts in order to promote short-term profits and gains poses serious risks.
Andrew	Katsetos	
Emily	Murad	"I promise to dream, I promise to rise, I promise to fight" for climate justice
Paul	Ford	No to the Tar Sands! The future of the Youth Climate Intervenors is directly in the path of the pipeline, the future of all youth around the globe is directly in the path of the pipeline. Should any other group, other than Enbridge, in the community hold the future to ransom it would be a criminal act. Enbridge's pipeline is a crime against the future of humanity and its rights to fair and proper access to clean water, clean air and an environment that sustains life. I wish the Youth Climate Intervenors group all the best with the decision making process and hope that common sense and a better future for all will prevail.
Barb	Leahy	
Liam	Ruff	
PETER	SIGMANN	
diane	burke	Tar sands are one of the dirtiest fossil fuels, we need to invest in wind and solar. That's it! While we continue to follow in the direction of the billionaires in the fossil fuel industry. We suffer, they don't pay for their external costs while the rest of us cover the costs of drought, sea level rise and mega-storms. According to the journal Science, the public burden could exceed 5.6% of GDP. Stop the pipeline and you stop the slow down the tar sands. Thank you, Diane Burke
James	Pilewski	
Elizabeth S.	Putnam	The oil obtained from thee tar sands comes at a terrible price. The land is left almost unusable and the wildlife have no homes. this creates a vacuum for invasive species and the loss of beautiful landscapes.
Phyllis	Allen	
Debra	Diegoli	There is a history of many pipelines in the US leaking. People, other animals and the rest of the national world deserve to be protected from the consequences. Ensure that a proper and thorough Environmental Impact Statement process, as outline above, is followed. Thank you.
John	Peterkin	
David	Sanders	
Elizabeth	Brobst	
Jay	Rozner	
Pat	Baker	
Marsha	Lerenberg	
Claudia	Leung	
Paul	Rink	
Grace	Treffinger	
Theo	HÃ¼rlimann	No Tar Sands !

Susan	Brown	They absolutely need to be required to clean up old pipeline before being permitted to build a new one. I spoke to an aide to the late Congressman Jim Oberstar who said Oberstar thought that they were a very dishonest company.
Janet	Carter	
David	Burdige	
Richard	Heinlein	
Ellen	Malven	
Kimberly	Schwanke	
Julie	Smithey	I support stopping the line 3 pipeline!
rafael	ravelo sr	
		STOP GAMBLING ON POISONING "OUR WATER"!!!!
Beverly	Hollingsworth	Clean Renewable Energy only, PERIOD!
David Wieland	Wieland	
Cassie	Metz	No more coal; no more oil- keep our carbon in the soil!
Margaret	D'Amico	
sandy	morse	
Ilse	Lopes	
Mauricio	Jimenez	
Ana Katharina	Drechsler	
Benjamin	Werner	Keep it in the ground!
Elise	Mysels	
Ben	Seigel	
Mary	McKenna	
Sarah	Brangdorfer	
Joanna	Klonsky	
Nevin	Grossnickle	Tar sands oil is very thick and must be pumped under high pressure. That almost assures that an oil spill will occur in the future if Line 3 is approved. There is no good way of cleaning up all this think tar sands oil, so Line 3 must not be approved.
Greg	Spevak	
Rhiannon	Maher	No pipe lines those young people we will be here longer and will see the disasterous effects. Please have the foresight to cancel this pipeline. We are trying to protect her future.
Juliana	Schwartz	It's time we start investing in a sustainable future for our families. Fossil fuels are a one-way ticket to an uninhabitable planet, please stop this pipeline for all of us!
Kathleen	Odonnell	Tar sands are among the dirtiest fuels on the planet and their extraction ruins vast swathes of land. Fund renewables not fossil fuels.
Jayni	Chase	We must listen to our youth, they need to be heard and respected. They are the future!
Jennifer Rowland	Rowland	
Erin	Cozart	
Barbara	Bailey	Clean water, air and food, NOT dirty oil. Tar sands should stay in the ground. We do not need more oil pipelines, we need fewer to none.
Adam	Rottman	

MR. KEVIN PRANIS: Kevin Pranis. K-E-V-I-N. P-R-A-N-I-S.

So I'm also with the laborers union representing the skilled construction workers. We're proud to work in a range of industries, including pipeline, but also, as Steve mentioned, renewables.

A couple of points. One, I want to thank the Department of Commerce for the tremendous amount of work that went into the Draft Environmental Impact Statement. I wouldn't say it's perfect, but it is the most comprehensive study that's ever been done, to my knowledge, on any pipeline in Minnesota and gives us a great basis for moving forward with a decision.

I'd also say that preventing spills has to be a top priority. It's a top priority for us, just as it is, I think, for everyone in this room. That's actually why we support this project, because simply by replacing an outdated line that

was built with outdated technologies that are no longer in use and shouldn't be, we can reduce the risk of spills by nearly 40 percent. Because, folks, we're not talking about whether to have a pipeline; we're talking about the difference between building a safer, newer pipeline and the existing pipeline.

The decision to not go forward with a replacement won't mean there's no pipeline. All it will mean is that we're still using the existing line. And we can't keep Band-Aiding that forever, although I think our members do a good job. We get lots of work out of it, but it's not a long-term solution.

I would also say that the climate change is also essential. That's why we're involved in building wind and solar, natural gas, replacement of coal, reducing carbon emissions. All those are great things to do. Those are climate investments. Stopping a pipeline is not a climate investment. It makes virtually zero impact on climate, because the truth is the oil moves by other means. If you're going to invest in electric cars, that's a different story. But that's not what we're talking about here. We're talking about whether the oil moves

safely through a newer pipeline, whether it moves through the old pipeline, or whether it moves through rail, which is much more unsafe.

In terms of the Environmental Impact Statement, while it's overall excellent and it's 5,000 pages, you know, incredibly comprehensive, there's one big glaring hole on construction job impacts. An assumption was made, sort of for purposes of the report, that there will be zero local jobs. It's acknowledged that's not based on anything, and that's completely inaccurate. As all of us know, in fact, our agreement that will cover this contract require that half of the workforce be local workforce. And we've seen that on project after project. So we're talking hundreds and thousands of jobs for local people, not only existing members, but also new career opportunities for people for whom this would be a first chance to get into a family-supporting career that can last the rest of their lives. 2042-1

Also, I think it's important to look at the public safety of the rail alternatives. There is no discussion of the actual public safety risks of rail not only from derailments and explosion, but also at at-grade crossings. In fact, 2042-2

2042-2
Cont'd

the Keystone report that the U.S. State Department did showed that you're talking about additional deaths and injuries as a result of moving those volumes by rail instead.

Last, I think that it's important to look -- to look at the -- Line SA04 we think is a waste of time, because ultimately all of this feedstock fuels Minnesota's refineries. The gas only moves --

FACILITATOR: Thank you.

MR. KEVIN PRANIS: -- to get here. That all comes from this pipeline.

FACILITATOR: Thank you.

MR. KEVIN PRANIS: We have to find a safer alternative.

* A few more comments I would have made. (+ questions for data)

0241

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Rose Roggle (also current President, Thin Lakes Association)

Street Address: 39754 Thin Lakes Road (SEBSOAR)

City: Menahga State: MN Zip Code: 56464

Phone or Email: (302) 475-6109

(Resident of SC)

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

FOR REPORT:

* Please provide information on a barrel = approximately ____ gallons (I've heard 42 gallons referenced) for readers. 0241-1

* (Page ES-11) "since 1990" "Line 3 has experienced 15 failures that released more than 50 barrels of oil during each incident" with "7 in minnesota" (incidents) — What are the specific amounts per spill? (+ List).

* How many rail oil spills have occurred in MN since 1990?" (FYI)

* Page ES-14 "The Applicant's Proposed Project"

EMPHASIZE "would have construction impacts + introduce new risk of spills in northern MN where the watersheds are in general very healthy + water quality is very good."

So, why with 2008 Legacy Amendment, would this route be considered ???

Minnesota passed Hallmark Legislation for Responsible practices in thinking about cherished resources for future generations !!! The people spoke.

* What is Minnesota's Need for this pipeline?

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Ellis Rausch <ellis.rausch@gmail.com>
Sent: Sunday, July 02, 2017 2:09 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

CN-14-916 and PPL-15-137

Enbridge wants to abandon their crumbling Line 3 pipeline in our lands and build a new one in a new corridor through our lake, wild rice beds, and treaty territories. The Draft Enviromental impact statement (DEIS) for the new Line 3 pipeline found every single option for the project would have long term detrimental effects on tribal communities. Most of the issues specific to tribal communities are regulated to a separate chapter that attempts to provide "an American Indian Perspective." siloed and excluded from the mane chapters that assess potential impacts. The 5000+ page document attempts to justify why the oil industry's need to profit is greater than the need of the Anishinaabeg people to survive.
These are just 8 ways Line 3 DEIS has failed to serve tribal and all communities of Minnesota:
1. No free, prior, and informed consent of tribal nations:
The route alternatives compared in the DEIS include two routes, RA-07 and RA-08. Both would cross the Leech Lake and Fond du Lac Reservations. Despite the fact that Tribes clearly will not consent to a new pipeline. Enbridge's preferred route would skirt reservations boundaries while still crossing the watersheds and lands of 1855 Treaty Territory.
2. Disregard for health of tribal communities.
Chapter 9 of the DEIS acknowledges the impacts on tribal communities "are part of a larger pattern of structural racism" that tribal people face in Minnesota. The DEIS also states that "the impacts associated with the proposed project(new Line 3) and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" but claims this is an insufficient reason to stop the project.
3. No consultation or plan for protecting sacred sites.
Enbridge admits 63 sacred sites are slated for destruction. Pipeline corporations cannot be trusted to understand and implement protections for our numerous sacred sites.
4. No protection for Wild Rice lakes and surrounding environment.
The DEIS acknowledges "that traditional resources are essential to the maintenance and realization of tribal life ways, and their destruction or damage could have profound cultural consequences." It also shows that Enbridge's preferred route would "impact more 1855 Treaty Territory wild rice lakes and areas rich in biodiversity than any of the other proposed alternative routes." These sensitive environments would be the worst place for a tar sands oil spill.
5. Line 3 is guaranteed to spill.
The DEIS estimates the annual probability of different kinds of spills on the proposed route: The analysis predicts that in a 50 year time span there will be 14 "pinhole" leaks , 54 small spills, 4 medium spills, 3 large spills, and 1 catastrophic spill!
The DEIS also contains no analysis of tributaries of the St. Louis River, where a spill could decimate Lake Superior. 1065-1
6. No plan to stop sex trafficking in pipeline man-camps.
The doc assumes "all workers would relocate the area" and **zero construction jobs would go to Minnesotans**. We are too familiar how the addition of temporary workers, cash-rich workforce increases the likelihood that sex trafficking or sexual abuse will occur. But the DEIS dismisses this saying, "Enbridge can prepare and implement an education plan or awareness campaign around this issue"(11.4.1) That is in no way an assurance that women and children will be safer once construction starts.
7. Inadequate assessment of abandonment

Enbridge's current plan is to cap off the crumbling old Line 3 pipe in sections and leave it in the ground for landowners to take care of, setting a dangerous precedent for future pipelines in Minnesota including the new Line 3. The risks of abandoning pipelines are not adequately accessed in the DEIS. These rusting pipes are conduits and could one day leak into water sheds and dump toxic waters into surrounding agriculture.

8. The "No Build" option is not genuinely considered. 1065-2

When will "shut the line down because it's falling apart and poisoning our communities" option be considered!

These are my comments to be considered for the **CN-14-916 and PPL-15-137**

Ellis Rausch
1722 Mississippi River Blvd
Saint Paul, MN 55116

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Pat Renner

Street Address: 4236 Wooddale Ave S.

City: St Louis Park State: MN Zip Code: 55416

Phone or Email: prenner.renner@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

factors not considered in Draft EIS
→ Environmental impacts beyond 30 year should be considered. Who pays for damage of Enbridge gets out of bankruptcy
→ No spill estimates in St Louis River
→ EIS Chapter 11 - Structural racism - impacts of health stressor on indigenous people of MN. Cut off access to water or negative impacts - Pipeline violates Anishinaabe treaties 0743-1
→ Herbicides used around pipeline - effect on pollinators already in trouble. 0743-2
→ High pressure because of more oil through pipeline - risk not accessed by EIS
→ Line 3 - Spills threaten Wild Rice Crops - Sacred food
→ Global impacts of Climate Change - greenhouse gas transported through pipelines are virtual Tar Sands oil burns dirtier - more CO_2 in atmosphere which causing damage in our ecological system
→ My opinion strongly supports using the money to produce energy from renewable wind - solar - geothermal. With the price of oil going down & the cost of installing solar, wind, renewables going down this pipeline make no sense.
→ Notwithstanding Tar Sands are the most expensive type of oil to produce & the most toxic. Time transition to a new cleaner, renewable energy future.
→ MN is worth it, and we must protect environmental justice, and protect our State for future generations.

If including additional pages please number them and tell us how many you are providing:_____ pages

MR. ALLEN RICHARDSON: My name is Allen Richardson, A-L-L-E-N, R-I-C-H-A-R-D-S-O-N.

Let's see, there's some polling data recently released about if people asked about what do they think about an oil pipeline going through rural oil territory, and they rephrased the question, "What do you think

about a tar sands pipeline going through oil territory?" People had a much more negative visceral reaction to tar sands mining, and rightly so.

I think there should be a big graphic of a tar sands mine up there. It looks like Dante's Inferno to me. It looks like hell on earth. Tar sands mining is an abomination. It's not a casual thing. We need to be responsible and say, "That's not good enough."

We're not going to endorse people on the other end being a sacrifice zone just so we can have our lights and boaters, because it's wrong. Are we going to kick that can down the road?

So that's my personal opinion that tar sands mining is abominable, and therefore, we should not embrace it.

I was talking with some of my labor union brothers and sisters over the last couple of meetings, and I will say that as someone who's worked with organized labor -- but I'm a clean water guy. I really don't like being in opposition to pipeline workers,

you know, union members. It's one of my least favorite things, but sometimes it's just what you have to do.

And you know, they used to use the term solidarity a lot more often. I don't know if it's still in vogue in organized labor circles.

But you know, I think we should all think about the idea of solidarity. I want to express solidarity with the people on the other end of this pipeline, and I would encourage pipeline workers, regardless of your background, to give that some thought and to express solidarity with those people for real. What are they going through? 0897-1

Let's see, regarding jobs, though, right, we know that there's a fair amount about this project that we, that there is disagreement about.

But there is one area where there should be wide agreement, and I think we should focus on what common ground we can find, and I'm referring to the jobs that would be created by removing abandoned pipeline.

I would like to see the

Environmental Impact Statement include more detailed information about how many jobs would be created if we went that way.

I would say that I want to encourage the workers to be a little less timid on this question, which is to say they'll tell you that they want the jobs, but it's -- really, it's not at all clear that the workers would do anything. If Enbridge gets their way, they're going to leave that pipeline in the ground.

I guess my question is, would the workers who would be doing that work of removal, would you just take that line down? You're just going to shrug your shoulders and look at your shoes?

You know, because there's a whole mountain of jobs to be had. And we know that we're setting a precedent here on the question of pipeline abandonment, so we can also establish a precedent for digging those pipelines up where it's safe.

We want to be a science-based people. We don't have a science-based administration in Washington, D.C. right now,

which is a shame, but perhaps we can fix that by -- at least at the local level and state level we can take pride in not being afraid of the science.

To that end, the Draft Environmental Impact Statement makes some pretty sweeping statements about how close the pipelines are to each other in the context of whether or not it's safe to take -- you know, to remove them. You know, would it be possible to remove an abandoned pipeline relative to its proximity to hot lines.

Well, John Munter over there took it upon himself to measure some of the distances between the pipelines in the Grand Rapids area, and there's quite a bit more space there than we've been led to believe from the Draft Environmental Impact Statement, which is to say that there is certainly ample room to remove large sections of pipeline.

So maybe the complete -- the final Environmental Impact Statement could have more detail. You know, let's measure the whole thing. Let's get some soil samples going in there, right.

You know, again, back to the workers, some people will tell you Enbridge is a great neighbor. Well, I've spoken to a lot of landowners out there, working with this organization, Minnesotans for Pipeline Cleanup, and most of the folks that I have spoken to do not want to be left with a section of abandoned pipeline on their private property.

You know, sometimes it's a mixed bag. Sometimes there's one section where they definitely want it up, and there's another section where maybe it would be better to leave it there because of what the process of removing it would do to an already delicate ecosystem.

But the point there is to embrace, for everyone to embrace this idea of landowner choice.

You know, there's so much common sense embedded in this idea, that I'm confident that we can find a whole lot of common ground on this question.

So that's basically it. I just want to reaffirm that, you know, pipeline

workers, people who stand to benefit from those jobs, you're going to have to publicly assert your solidarity with the landowners who are saying we want landowner choice. Don't let Enbridge just walk away from this and say it's all good.

So we need those workers to support the landowners, and then society at large, I think we need to take a good long look at tar sands mining and extreme extraction and realize it's time to take things in another direction.

Thank you very much for your time.

MR. ALLEN RICHARDSON: It's Allen Richardson. A-L-L-E-N. R-I-C-H-A-R-D-S-O-N. Afternoon, folks. I'm with the organization called Minnesotans for Pipeline Cleanup. I just want to again speak to the abandonment issue.

We're taking exception to the DEIS's sort of blithe assertions that most of the pipelines in the mainline corridor are, in general, 10 or 15 feet apart. We took it upon ourselves -- Mr. John Munter over there took it upon himself to walk some of these lines to measure the distances between them. And we'd love it if the PUC and Friends, DOC, or whoever, would confirm that we're correct, basically that there is ample room to remove abandoned pipeline.

So basically we're here to advocate for landowner choice. And I think this really

speaks to what I'm going to call Minnesotan common sense. There is a lot of common ground to be had on this question of abandonment. And so we should look at it strongly. I think we should embrace it.

I've said this a few times over these meetings, and I'll say it again to my brothers and sisters in the labor movement, that if -- if you want to benefit from the jobs that would come from digging up abandoned pipeline, it's my opinion that you're going to have to publicly assert your solidarity with landowners who have made it clear that they don't want to be stuck with abandoned pipeline on their land. 0899-1

And I'll take it a step further; that, you know, regardless of what happens with the proposed new route, that this project should not move forward in any way, shape or form until this question of abandonment is conclusively settled.

Would love it for the final Environmental Impact Statement to have some really solid data about the distance between these pipelines, about how many jobs would be created pulling out those pipelines. We know that a precedent is being established on this question.

We know that Enbridge has every

intention of abandoning this line. They do not want to dig it up. So they're, you know -- may have to apply some pressure to them and the PUC on this point.

They are likely to abandon the rest of those pipelines in the mainline corridor eventually. So to take the long view, if we can, you know, continue to look for common ground on this question. There are long-term economic benefits to be had to the pipeline workers, who are definitely the ones who are qualified to do that work.

So thank you for your time.

MINNESOTA

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Please provide your contact information. This information and your comments will be publicly available.

Name: Dean Rietmann

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Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

0748-1

The EIS should have/calculate monetary values for the contaminated land, water, air, and the human health effects of the inevitable spills, leaks, abandoned lines, disposal of equipment after useful life cycle, as well the burning of the oil. After all it is an ~~ME~~ EIS, correct? How can the impact be determined if we do not calculate, or even understand the true costs of the project?

The review/approval process cost alone should also be considered, and documented, and paid for by the applicant.

What about the opportunity cost of ~~devoting not~~ devoting the resources above to Line 3, instead of a comparable renewable energy project such as wind and solar?

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Wachtler, John (COMM)
Sent: Monday, June 26, 2017 9:26 AM
To: MN_COMM_Pipeline Comments
Subject: FW: Sandpiper and Line 3 Stress design.xlsx
Attachments: Sandpiper and Line 3 Stress design.xlsx; Steve Roe.vcf

---

From: Steve Roe [mailto:roetreat@crosslake.net]
Sent: Monday, June 26, 2017 9:23 AM
To: Wachtler, John (COMM) <john.wachtler@state.mn.us>
Subject: Sandpiper and Line 3 Stress design.xlsx

John,

Thank you for your patience. Attached is my calculation of the pipeline stresses as accepted by those who teach and the professional societies such as ASME and ASCE. This follows what I previously sent to you. 1069-1

Thanks,
Steve Roe

Steve Roe
S & B Investments

(218) 232-3554 Mobile
(218) 692-3331 Home
roetreat@crosslake.net

11663 Whitefish Ave.
Crosslake, MN 56442

1069-1
Cont'd

CFR 192.105 Design Formula Hoop Stress Only

Pipe Wall Thickness	0.515	Inch	t
Pipe Outside Diameter	36	Inches	D
Yield Strength	70000	psig	S
Design Factor	0.8		
Longitudinal Joint Factor	1		
Temperature Derating	1		
Operating Pressure	1480		

Additional Considerations

Longitudinal Stress
Material Strength Deviation
Fluid Hammer
Design Factor is not a **Safety Factor**
Need for Safety Factor
Handling Stresses
Harmonics from Pump
Economics Dictate Cheapest Design

Conventional Pipe Longitudinal Stress as taught

Area	1017.8784	
Force	1506460.032	
Pipe Circum Area	58.25	
Long Pipe Stress	25864	psi
Pipe Hoop Stress	51755.6	psi
Total operating stress	3347592645	
Total w/Circum and	57858	psi total
Steel Yield Stress	70000	
Steel Design Stress	56000	
Safety Factor	44800	This should be the design stress they operate to
Water Hammer	127288	This is the maximum operating stress anticipated
The safe operating pressure	**521**	psi
Enbridge Operating Pressure	**1480**	psi

Enbridge Operating pressure must be reduced for this pipe design

Allowances

Fluid hammer	2.2	Factor
Safety Factor	1.25	
Design Factor	0.8	

Levi, Andrew (COMM)

Full Name:	Steve Roe
Last Name:	Roe
First Name:	Steve
Company:	S & B Investments
Home Address:	11663 Whitefish Ave. Crosslake, MN 56442
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MS. ANGELA RONAYNE: Hi, my name is Angela Ronayne. A-N-G-E-L-A. R-O-N-A-Y-N-E. I'm a shareholder with --

FACILITATOR: Could you hold the mic a little bit closer?

MS. ANGELA RONAYNE: I'm a shareholder with Merjent, an environmental consulting firm based in Minneapolis that works with both public and private entities and mainly within the energy

industry. I'm also a registered professional engineer in the state of Minnesota.

Enbridge retained Merjent early in the project planning process to conduct environmental and cultural resource surveys, advise on resource avoidance and minimization strategies, participate in the development of permit applications, and engage in discussions with federal, state, and local permitting agencies.

My role on this project is the engineering interface and data management lead. I work with Enbridge environment department staff and Enbridge staff from other departments in data management and environmental permitting and analysis efforts.

My work on the project began in 2014. Since May of 2013 Merjent has coordinated several types of environmental and cultural surveys for Enbridge within the environmental survey area, which completely contains the route considered in the DEIS, referred to as the Applicant's preferred route.

I have reviewed portions of the DEIS and read in several sections about how DOC used Enbridge's survey data to inform certain analyses

2049-1

2049-1
Cont'd

when comparing route -- the route to alternatives.

I would like to emphasize the survey information that our scientists have gathered regarding Enbridge's route is much more specific than the information presented on any alternatives; and I would like for the DEIS to make this clarification, when necessary, so the public is informed of the extensive work that has gone into studying the proposed route.

And while I appreciate our survey information is represented in some places, I would like to speak to the completeness of the environmental information that our scientists, as well as those of several specialized firms that we have subcontracted, have gathered on the preferred route and how it has informed the route that Enbridge is proposing.

Over the past five survey seasons, our team of scientists have gathered information on over 29,600 acres of land covering 430 miles in Minnesota alone. We surveyed 99 percent of wetland and water bodies; 98 percent of geomorphic stream surveys have been completed; 95 percent of protected flora surveys have been completed; 100 percent of northern long-eared bat surveys have been completed;

98 percent of cultural resources surveys have been completed.

These are just a few examples of the extensive information we have gathered on the proposed route. We have also gathered information on bald eagle and osprey nests, grassland habitat and butterflies, protected mussels and invasive species.

Levi, Andrew (COMM)

From: Maggie Rozycki <rozymaggie@gmail.com>
Sent: Friday, June 23, 2017 6:13 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 comments, docket numbers CN-14-916 and PPL-15-137

To Jamie MacAlister, Environmental Review Manager,

Concerning line 3 pipeline, **docket numbers CN-14-916 and PPL-15-137. These comments focus on the current DEIS and how it falls short of including all the negative impacts of Line 3.**

I am completely against building Line 3 Pipeline or transporting oil through existing pipelines. Shut down Canadian tar sands oil entirely!!!

It makes no sense to build it in terms of: the social costs of carbon, damage to water, wildlife, and all living beings , damage to already struggling Native Communities because of exploitation by the dominant culture, and there is no need for the pipeline because of the economics of dirty tar sands oil.

The social costs of carbon, the financial burden on society due to increased climate change impacts -- of building the pipeline were underestimated at $287 Billion!! over 30 years. I cannot even imagine how much this is . This is an underestimate because many pipelines operate over 60 years. The more accurate cost is twice as much. Half of this is shocking. 0563-1

Damage to damage to water, wildlife, and all living beings through OIL Spills. The DEIS does not look at spills over the entire lifetime of the pipe. Over time, as pipelines become exposed, there is no analysis of increased spill potential. Deis claims that increased pressure as a result of higher flow rates in a pipeline has no effect on spill rates. This claim has no citation, and is highly disputable. The worst case scenario is secret so the public has no chance to review it. This is ridiculous. the public has every right to know how this will affect us.

Damage to Native Communities is not fully looked at because of the methodology of using census tracts which does not take into account the movement of water to multiple census tracts. Thus, again, underestimation the amount of space and numbers of people impacted. It also ignores that many people travel to utilize the potentially-impacted resources (such as wild rice), and negates the disproportionate use of certain resources by minority populations.

No need for pipeline because today's oil prices are too low to sustain growth in the tar sands region of Canada. Exxon Mobil has admitted they have $3.4 billion dollars in tar sands oil fields that are not economically viable assets on their books in the current low price environment (below $50/barrel)

sincerely,

Margaret Rozycki, Minneapolis

MR. SCOTT RUSSELL. Thank you. Scott Russell, S-C-O-T-T, R-U-S-S-E-L-L.

The most important thing for me to comment on today is treaty rights. If you look in sections 9 and 11, there is language that says that, "The pipeline," quote, unquote, "crosses treaty lands, or," quote, unquote, "has impacts on treaty lands."

It is not explicit as to whether in the view of the Department of Commerce Line 3 proposal violates treaty rights, and you need to be explicit about that.

In section 11, page 7, the Draft EIS appears to leave wiggle room. It says, "All routes, including the Applicant's preferred route, would cross treaty lands that are off-reservation; these lands may be used for traditional tribal uses such as fishing, hunting and trapping, and/or agricultural activities."

And then it goes on to say that, "These treaty rights and tribal resources are important to the Indian tribes as both natural and cultural resources."

So my commentary is if the EIS says treaty rights are, quote, unquote, important to Indian tribes and that kind of phrasing trivializes really what treaty rights are and gives an inadequate assessment for what is required.

Treaties are not just important to Indian tribes, they're important to me, they're important to the state of Minnesota, and they are the law of the land.

This makes it sound like treaty rights are optional, something that's important but not required by federal law. So either the state of Minnesota nor Enbridge can unilaterally break treaty rights by offering some form of mitigation if they deem appropriate.

So the EIS does not -- what the EIS really needs is a leak look-in and a clear answer on what your view is on how Line 3 impacts treaty rights.

If you're not clear on that, you're, again, putting the burden on the Anishinaabe people to go to court to defend their rights, a cost they should not have to

bear.

If your conclusion is that Line 3 violates treaty rights, that should be the end of the story.

Second, I'd like to say that I would like to ask the EIS include direct quotes from Anishinaabe people, not just summaries of what has been gleaned from interviews. It's really important how this narrative style works. If there are no personal stories, no direct quotes, it really robs people of the power of their voice. 2100-1

And I'll give one example, this is from section 11, page 11 of the EIS: "American Indian communities and individuals have unique health issues associated with historical trauma and structural racism. Data from the Minnesota Department of Health indicate that American Indians in Minnesota have greater health disparities and poorer health outcomes compared to other racial and ethnic groups.

"The impacts associated with the proposed Line 3 and its alternatives would be an additional health stressor on tribal

2100-1
Cont'd

communities that already face overwhelming health disparities and inequalities."

So my common sense is words like historical trauma and health stressors are kind of bureaucratic terms that really don't get to the point of the pain that's been suffered. So please add the voice of the Anishinaabe people to your report.

Thank you very much.

MR. STAN SATTINGER: I'm Stan, S-T-A-N, last name Sattinger, S-A-T-T-I-N-G-E-R. I have a copy -- detailed copy of my testimony that I can furnish.

Okay. So I'm a resident of South Minneapolis. I'm a registered mechanical engineer and past employee of Westinghouse Electric Corporation, where I worked on the design and testing of mechanical systems.

My five-year-old grandson comes to vacation with us up north in Minnesota each year, and I want to do my part to ensure that together we

can enjoy waters that are uncontaminated by crude oil spills. So I've reviewed the analysis of the likelihood of spills from the proposed line replacement, as presented in Chapter 10.

Section 10.2.1 outlines how the probabilities of failures were put together at a number of water crossing sites per the route using historic data on failure incident. No rationale is offered for taking the presence of a water crossing or any other feature as a basis for determining the likelihood of a rupture. 2050-1

Pipelines are typically operated over wide ranges of flow rates, so there are up-and-down cycles of pressure on the pipe wall. The pipe wall fatigue damage that results from these -- from this pressure cycling causes ruptures, which tend to occur at close distances from pump discharges. 2050-2

The National Transportation Safety Board established that fatigue played dominant roles in the 6,000-barrel rupture of Enbridge Line 4 at Cohasset in 2002 and in the 20,000-barrel rupture of Enbridge Line 6B in Marshall, Michigan in 2010.

In my opinion, using historic failure data to make valid failure probability predictions would require taking into account the distances from

2050-2
Cont'd

the nearest pump discharges where the actual historic failures occurred and where the predictions are to apply in the new system.

On page 10-17 of the DEIS appears a statement that, quote, the risk of an accidental spill on an existing pipeline in the Enbridge system in Wisconsin or elsewhere would not be materially different whether Line 3 operates at the current capacity of 390,000 barrels per day or at the proposed 760.

Levi, Andrew (COMM)

From: Stan Sattinger <sattin501@gmail.com>
Sent: Monday, July 10, 2017 5:13 PM
To: MN_COMM_Pipeline Comments
Subject: Comment Submittal -- Line 3 Replacement Project DEIS
Attachments: Sattinger Comments- Line 3 DEIS- GHG Emiss..docx

To: Jamie MacAlister, Environmental Review Manager, Minnesota Department of Commerce

Jamie --

I'm attaching a document commenting on emissions aspects of the subject DEIS. Please forward to the appropriate parties.

Thanks,
Stan Sattinger

DOCKET # CN-14-916
DOCKET # PPL-15-137

Draft Environmental Impact Statement for the Line 3 Replacement Pipeline Project

COMMENT ON ASSESSMENTS OF GREENHOUSE-GAS EMISSIONS IN THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE LINE 3 REPLACEMENT PIPELINE PROJECT

Stan Sattinger
Registered Mechanical Engineer
Minneapolis, MN 55407
Sattin501@gmail.com

1. Background and Scope:

I hold a Bachelor's degree in Mechanical Engineering from Georgia Tech and Master's degrees in Engineering Mechanics from Cornell University and Vibration and Acoustics from Massachussetts Institute of Technology. I'm a past employee of the Westinghouse Electric Corporation, where I was involved in the design and testing of mechanical systems and managed the Dynamics and Acoustics Section of the Westinghouse Science & Technology Center.

Working as a volunteer, I founded or co-founded three environmentally related non-profit organizations, including the all-volunteer Montour Trail Council, which has converted western Pennsylvania's abandoned Montour Railroad into a premiere 50-mile recreational trail. Another start-up was the Montour Run Watershed Association, which has cleaned up much of the polluted drainage resulting from the abandonment of coal mines throughout a 37-square-mile watershed.

I've become familiar with crude-oil pipeline issues through a four-year volunteer involvement with the non-profit group MN350, which seeks to limit or reverse climate destabilization due to uncontrolled releases of carbon dioxide (CO_2) and other greenhouse gases (GHG). I testified in scoping hearings on the Environmental Impact Statements for the Sandpiper and Line 3 Replacement projects in 2016 and have followed the MN Public Utilities Commission's proceedings on them from the beginning.

I have a 5-year-old grandson on whom the current and future impacts of unmitigated climate change are of grave concern to me. I've reviewed many sections of the DEIS for its conclusions on the impacts of the Line 3 Replacement project on continued GHG releases. I am convinced that the DEIS does not do an adequate job of evaluating these impacts.

2. Summary: The Line 3 DEIS does not fulfill its intended purpose; it fails to adequately assess project impacts on the emissions of greenhouse gases that destabilize the climate.

Although Minnesota Department of Commerce policies seem to imply otherwise, the worsening of climate change must be a prime consideration in undertaking infrastructure projects world-wide for the foreseeable future. Applicable policies on climate, including Governor Dayton's Re-commitment to the Paris Climate Accord, the Minnesota Environmental Policy Act, and the Next Generation Energy Act, have been ignored in this DEIS.

The writers of this DEIS must begin to regard climate change as the crucial issue that it is, for America and for the world. I offer specific observations below on the inadequacies of the DEIS with regard to its treatment of climate change.

3. Annual ("operations") emissions of greenhouse gases are falsely evaluated in the DEIS. 2473-1

The annual greenhouse-gas (GHG) emissions estimates given in the DEIS do not address Line 3 in its entirety. As a result, the comparison between the Applicant's preferred route (APR) and the alternate SA-04 given in the Executive Summary (Table ES-3, reproduced here for ease of referral) erroneously credits the APR as being less emitting.

Table ES-3. Summary of Greenhouse Gas Emissions and Costs for Certificate of Need Alternatives

Route/Certificate of Need Alternative	Direct GHG Emissions (tons per year)	Indirect GHG Emissions (tons per year)	30-Year SCC for Direct and Indirect GHG Emissions[a]	Loss of Carbon Sequestration (tons per year)
Applicant's preferred route	375.9	452,496.6	$673,365,150	1,262.3
Continued use of existing Line 3	--	--	--	--
System alternative SA-04[c]	850.3	946,670.5	$1,408,845,737	74.3
Rail alternative	568,472.8	--	$845,248,443	--
Truck alternative	1,506,291.3	--	$2,239,688,011	--
Continued use of existing Line 3 with rail	284,236.4	--	$422,624,221	--
Continued use of existing Line 3 with truck	753,145.6	--	$1,119,833,958	--

GHG = greenhouse gas, SCC = social cost of carbon

The APR in actuality is no less emitting than alternate SA-04. Given that the "indirect" category would be dominated by emissions associated with power generation for crude-oil pumping, it is meaningless to compare emissions over just the contending-route segments of the pumping. Table 1 shows that the total miles over which oil must be pumped in the two cases would be almost exactly equal. Therefore, the APR option would, in reality, offer no advantage like that shown.

Pro-rating the indirect GHG emissions values from the table by the ratios of total distance to segment distance, the resulting figures for total indirect emissions are 2.06 million tons per year for the APR versus 1.85 million tons per year for SA-04. Except for minor percentages of difference in line

2473-1
Cont'd

diameters, it is appropriate to pro-rate as described, because the indirect emissions would be dominated by the energy consumed in pumping.

TABLE 1
COMPARISON OF DISTANCES THROUGH WHICH LINE 3 CRUDE OIL WOULD FLOW: EDMONTON, ALBERTA TO FLANAGAN TERMINAL, JOLIET, IL

Via Applicant's Preferred Route (APR) Plus Line 61		Via Alternate SA-04	
Segment	Length, mi	Segment	Length, mi
Edmonton to Neche, ND	757	Edmonton to Neche, ND	757
APR, Neche, ND to Superior, WI	340	Route SA-04, Neche, ND to Flanagan Term.	795
Line 61, Superior to Flanagan Term.	454		
	1,551		1,552

Table ES-3 should be replaced, and its conclusions totally revamped in the Executive Summary and elsewhere. If the project's declared purpose were to supply the energy that people and nation's economy need to function, rather than transporting oil from the Applicant's Point A to Point B, the merits of the route featuring segment SA-04 would become clear: advantages such as the 17-fold smaller annual loss of carbon sequestration seen in the right-most column of Table ES-3. This would be a result of much less destruction of wetlands vegetation that would, if undisturbed, enable greatly needed sequestration of CO2 and other GHG's to continue.

On p.1-6 of the DEIS appears the statement that it does not "determine the need for the project." And in doing so it avoids clarifying what the purpose or need is for the project -- a determination that is essential to the selection of reasonable alternatives.

4. Greenhouse-gas emissions due to construction are improperly compared among route alternatives in the DEIS. 2473-2

In comparing Table 5.2.7-6. (Estimated Construction Emissions for the Applicant's Preferred Route) with Table 5.2.7-12. (Estimated Construction Emissions for the System Alternative SA-04), one sees that the corresponding per-spread emissions estimates are almost exactly the same. The only differences taken into account are the numbers of spreads per route. No attempt has been made to distinguish differences in per-mile emissions among these route alternatives due to differences in land cover, vegetation type, soil properties, etc. This extreme oversimplification has been made on emissions, despite considerable detail regarding, for example, differences in soil characteristics reported elsewhere in the DEIS. SA-04 is likely to actually release less GHG than the APR owing to less destruction of wetlands, but that question can only be speculated, because the DEIS basis of assessment is faulty.

2473-2
Cont'd

Table 5.2.7-6. Estimated Construction Emissions for the Applicant's Preferred Route

Emission Source Description	Direct Emissions (tons)							
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs
On- and off-road diesel equipment combustion emissions	8.6	123.5	121.0	0.2	5.3	5.0	23,690.0	0.5
On- and off-road gasoline equipment combustion emissions	1.10	2.34	15.3	1.2	0.2	0.2	2,105.0	0.0
Fugitive emissions from paved roads	0.0	0.0	0.0	0.0	59.1	14.5	0.0	0.0
Fugitive emissions from unpaved roads	0.0	0.0	0.0	0.0	8.4	0.8	0.0	0.0
Emissions from open burning of wood debris	0.0	0.0	272.7	0.0	26.6	26.6	141.0	0.0
Blasting emissions[a]	0.0	0.2	0.3	0.003	0.0005	0.00003	0.0	0.0
Subtotal per spread	***9.7***	***126.0***	***409.3***	***1.4***	***99.6***	***47.1***	***25,936.0***	***0.5***
TOTAL EMISSIONS[b]	**67.7**	**880.8**	**2,863.3**	**9.8**	**697.3**	**329.6**	**181,552.0**	**3.7**

Source: Enbridge 2017.

Notes:

[a] Blasting would be required for only one 1,500-foot section in Spread 7.

[b] Total emissions represent emissions from 7 construction spreads.

CO = carbon monoxide, GHGs = greenhouse gases, HAPs = hazardous air pollutants, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

2473-2
Cont'd

Table 5.2.7-12. Estimated Construction Emissions for the System Alternative SA-04

Emission Source Description	Direct Emissions (tons)							
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs	HAPs
On- and off-road diesel equipment combustion emissions	8.6	123.5	121.0	0.2	5.3	5.0	23,690.0	0.5
On- and off-road gasoline equipment combustion emissions	1.10	2.34	15.3	1.2	0.2	0.2	2,105.0	0.0
Fugitive emissions from paved roads	0.0	0.0	0.0	0.0	59.1	14.5	0.0	0.0
Fugitive emissions from unpaved roads	0.0	0.0	0.0	0.0	8.4	0.8	0.0	0.0
Emissions from open burning of wood debris	0.0	0.0	272.7	0.0	26.6	26.6	141.0	0.0
Blasting emissions[a]	--	--	--	--	--	--	--	--
Subtotal per spread	***9.7***	***125.8***	***409.0***	***1.4***	***99.6***	***47.1***	***25,936.0***	***0.5***
TOTAL EMISSIONS	**145.1**	**1,887.0**	**6,135.0**	**21.0**	**1,494.3**	**706.4**	**389,040.0**	**8.0**

Source: Enbridge 2017.

Notes:

Total emissions represent emissions from 15 construction spreads (absent blasting).

[a] Blasting emissions have not been quantified.

CO = carbon monoxide, GHG = greenhouse gas, HAPs = hazardous air pollutants, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

"--" = Emissions not estimated.

This faulty basis for estimating the construction release of GHG's has been carried over into the comparison of emissions for route alternatives. The comparisons of GHG emissions due to pipeline construction, Table 6.3.7-14., is a false portrayal of the differences among the APR and all other route alternatives included/presented. A related question is why corresponding total construction emissions estimates for the APR should differ so drastically between Table 6.3.7-14. and Table 5.2.7-6: all of the APR emissions numbers reported in Table 6.3.7-14 are only 58% of the corresponding numbers in Table 5.2.7-6.

2473-2
Cont'd

Table 6.3.7-14. Estimated Total Construction Emissions for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton

Route	Direct Emissions (tons)						
	VOCs	NOx	CO	SO_2	PM-10	PM-2.5	GHGs
Applicant's preferred route	39.0	507.0	1,648.3	5.6	401.5	189.8	104,525.1
Route alternative RA-03AM	48.5	631.2	2,052.3	7.0	499.9	236.3	130,143.3
Route alternative RA-06	34.7	451.5	1,468.0	5.0	357.6	169.0	93,093.0
Route alternative RA-07	29.6	384.9	1,251.5	4.3	304.8	144.1	79,359.9
Route alternative RA-08	29.1	378.3	1,229.9	4.2	299.6	141.6	77,992.0

Notes:

The estimates for GHGs do not include emissions from forest clearance.

Blasting emissions have not been quantified for the route alternatives.

CO = carbon monoxide, GHGs = greenhouse gases, NOx = nitrogen oxide, PM-10 = suspended particulate matter less than or equal to 10 microns in diameter, PM-2.5 = fine PM less than or equal to 2.5 microns in diameter, SO_2 = sulfur dioxide, VOCs = volatile organic compounds

We cannot rely on this comparison because it does not reflect differences in land characteristics, and other errors have been made, as noted above. In my view, all of the sections on construction emissions in Chapters 5 and 6 are in need of revision. I would also suggest that the reported 205,500 tons of CO2e to be released by 1,682 acres of tree removal in the APR, and the 12,033 tons released by 99 acres of removal in SA-04, be included and tallied up with all other sources of GHG emissions in revising the above tables.

5. The DEIS omits significant greenhouse-gas emissions that would occur due to disturbances of soils and peat bogs throughout construction. 2473-3

The writers of this document are apparently unaware of the carbon-storage densities of soils, and especially those of peat bogs, and how construction-caused disturbances of both would release significant amounts of carbon dioxide and other greenhouse gases.

According to the journal, Scientific American": [1]

> "Peatlands are wetland ecosystems that accumulate plant material to form layers of peat soil up to 60 feet thick"……."the world's peat bogs represent an important 'carbon sink'—a place where CO_2 is stored below ground and can't escape into the atmosphere and exacerbate global warming. When drained or burned, however, peat decomposes and the stored carbon gets released into the atmosphere."

This reference states that the world's estimated 988 million acres of peatland are capable of storing some two trillion tons of CO_2 , from which I calculate a storage density of 2,020 tons CO_2 per acre. By way of comparison, a paper on GHG emissions from Canadian peat extraction[2] states that northern Canadian peatlands cover approximately 3.5×10^{12} m^2 and store between 220 and 460 Gt of carbon, from which the storage density value is 1,440 tons CO_2 per acre.

The 1,730 tons CO_2 per acre average value of these two figures for peatland carbon storage is larger than the 30.2 tons CO_2 per acre for the average of forests cited in the DEIS by a factor of 57. The

2473-3
Cont'd

illustrated importance of minimizing peat destruction due to pipeline installation needs to be highlighted in the final EIS.

6. The DEIS makes empty promises of special provisions to prevent environmental damage, but it does not identify parties responsible for carrying them out and following up on their completion.

Promises are put forth in Section 2.7.2.5 and elsewhere that special drilling procedures would be used to install the pipeline under wetlands. This is but one example of the many promises made in the DEIS. Where would Enbridge Energy document agreement that they will take on all of the described precautions? What agencies will be asked to ensure that Enbridge actually implements them? How will the public know that those agencies accept those roles?

Section 2.7.6, "Environmental Compliance and Inspection," states that "EIs (Environmental Inspectors) would monitor compliance with the environmental restoration and mitigation measures included as permit conditions and in contract specifications with landowners along the construction work area." What agencies would provide those inspection services? At whose cost?

7. CONCLUSION: The MPUC cannot rely on this document in its present form for ensuring that the climate-destabilizing impacts of the proposed project are adequately addressed and minimized.

Section 1.4.1.2 of the DEIS lists "the risks associated with extracting and transporting fossil fuels, including potential threats to human rights." It states that human rights include the following:

- The right to water
- The right to health
- The right to information about the potential effects of these industries
- The right to protest, and
- Indigenous rights to free, prior, and informed consent.

Omitted from this list has been the right of humans to a survivable future, i.e., survivable conditions on the earth.

This project has the potential for major adverse environmental effects, the most important of which is arguably the worsening of the climate crisis through significant additional greenhouse gas releases, both by the construction and operation of the facility and by the combustion of the conveyed crude oil. In my view, the DEIS is in need of major revisions to adequately address this most serious of impacts.

Stan Sattinger
July 10, 2017

References:

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1 "How the Loss of Peat Lands Affects Greenhouse Gas Buildup," Earth Talk, June 2009, https://www.scientificamerican.com/article/peat-lands-and-greenhouse-gasses/ .

2 "Greenhouse Gas Emissions from Canadian Peat Extraction, 1990–2000: A Life-cycle Analysis," by Julian Cleary, Nigel T. Roulet and Tim R. Moore, http://www.geog.mcgill.ca/faculty/roulet/Published%20Manuscript%20pdfs/Cleary%20et%20al.%20Ambio%202005.pdf

June 9, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Re: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Jamie MacAlister,

I am writing to provide my written comment to you on the Draft EIS that was discussed in Brainerd, MN on June 8th, 2017. A brief word about me; I am a 6 month AZ / 6 month MN resident. I have been retired 3 years from a rewarding career in Environmental Health and Safety. I have experience in writing EIS and Wastewater Discharge Permit applications in Arizona as well as Emergency Preparedness, IH, Life Safety and Joint Commission compliance. When I was working, I held the Certified Safety Professional (CSP) and Certified Medical Laser Safety Officer (CMLSO) credentials.

The Draft Environmental Impact Statement (DEIS) does not seem to specifically address that the Applicant's Preferred Route (APR) endangers the Headwaters of the Mississippi River, and it's watershed. In the permit application, Appendix O - Water Bodies Crossed, there are noted two crossings of the Mississippi River and 1 crossing of a Mississippi River Tributary. 0338-1

In RA-03AM-L3 it is stated in Table 1 that 41 public waters are crossed by the APR. One hundred sixty seven (167.2) acres of wetlands are within the APR corridor. In the Appendix F by Eberth (Updates Appendix E) pages 703-706 of 950 pages (docket 20171-128676-19) it describes the processes for wetland crossings; clearing the Right of Way (ROW), etc. etc. but does not specify any measures that will be taken to protect areas of wild rice or any methods to restore damaged lands growing wild rice. In discussion about oil spills, Eberth states, 0338-2

> "Oil released into a wetland would spread less and move more slowly than in flowing water. In the event of a crude oil release, wetland migration could result in effects to a lake if free product were to flow through a wetland to a lake or a tributary to a lake. Oil released into a wetland spreads under the influence of gravity, but energy to induce flow is limited because the water surface in a wetland is essentially flat and water flow velocity is negligible. Oil migration in a wetland is also limited by wetland vegetation which impedes oil movement"

The APR crosses Treaty lands and impacts Anishinaabeg and the Tribal members way of life. It brings great risks to water areas that provide one quarter of North America with clean drinking water, and poses great risk to wild rice, hunting, fishing, and cultural and religious practices. All this at a time when the US can and should be moving to clean energy.

I am also quite concerned that the data used in this DEIS may have been provided by Enbridge - and that they may have not provided all the data they possess. The MN-PUC has a responsibility to the public to provide robust, independent, comprehensive, and fair environmental impact statement that is analytical, not encyclopedic.

Sincerely,

Sharli L Schaitberger

Sharli L. Schaitberger
1402 S. 8th Street
Brainerd, MN 56401

e-mail: SharliF@cox.net

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June 9, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Re: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Jamie MacAlister,

At no time in the discussion in Brainerd, MN on 6/8/17 did anyone comment about security for the pipeline. I bring this up because without security, there is an increased risk of release. In keeping with Homeland Security, Critical Infrastructure - Chemical Sector defined as integral component of the US economy that manufacturers, stores, uses, and ***transports*** potentially dangerous chemicals upon which a wide range of other critical infrastructure sectors rely. (www.dhs.gov). The Department of Homeland Security requires that Critical Infrastructure be "secured". Pipelines that are "hanging above streams" are not secure. In Appendix D - Pipeline Safety Report Page 24 Emergency Response, Enbridge acknowledges their status in this partial quote: "As the operator of ***vital energy infrastructure*** across North American . . ". In Table 1 of RA-03AM-L3 regarding public waters crossed by the APR, the crossing methods for streams and rivers are described as "span in-stream support". There are also many open ditch crossings that may not be underground, it was difficult to find any information about their construction or security. 0338-3

I must say that I am disappointed in the DEIS in the lack of information in the form of data and abundance of generalized talk. Something as important as an Environmental Impact Statement, being generated by the State of Minnesota and having potential impact on all of North America, deserves serious attention with forward thinking analysis.

Sincerely,

Sharli L Schaitberger

Sharli Schaitberger
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e-mail: SharliF@cox.net

June 9, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Re: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Jamie MacAlister,

Why are we leaving "old Line 3 in place"? Concerns include:

- built 1961 with defective steel
- seam wrap off polyethylene ("PE") tape has separated from the steel and allowed corrosion
- flash welded (FW) longitudinal seams are failing (53% of welds are FW, including the 1991 spill of 1.7 Million gallons in the Grand Rapids spill).
- covers approx. 300 miles
- crosses 1855 and 1842 treaty areas (Tribal)
- substances have been deposited on the walls inside of the pipeline
- pipeline can transform into a water conduit and could drain areas impacting the ecosystems

0338-4

It is stated in the Executive Summary that there is a Federal safety regulation that outlines the process and requirements for abandoning oil pipelines. It has also been stated elsewhere that there are no Federal rules, so I respectfully suggest that a reasonable model for requiring Enbridge to responsibly manage the "old" Line 3 (not simply abandon Line 3 to become the next Superfund Cleanup Site) would be to look to Canada's National Energy Board Commission (NEBC).

I further assert that if it is true, that Enbridge Energy is a LLC with many firewalls against liability, (as stated during Public Comments 6/8/17) then the Superfund site that will result from the "Old" Line 3 being left in place will fall to the State of Minnesota and the Minnesota land/homeowners. Knowing this is possible, even probable, makes allowing the "Old" Line 3 to be abandoned a very bad idea that must be avoided. If Enbridge wants "line 3" bad enough, make them take out the "Old Line 3" and replace it with the new technologically advanced pipeline in the same locations.

Sincerely,

Sharli L Schaitberger

Sharli Schaitberger
1402 S. 8th Street
Brainerd, MN 56401

e-mail: SharliF@cox.net

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Brian Shea

Street Address: 610 W Franklin Ave #116

City: Minneapolis State: MN Zip Code: 55405

Phone or Email: 612.423.7705 brian.shea@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

In the executive summary of the draft Environmental Impact Statement, Figure ES-4 might be improved in a few ways:

(1) The two axes are confusing in parallel, but have a straightforward interpretation when presented orthogonally — the product of the average number of accidental release incidents per year and average size of accidental release is the average total volume released over the years included — see the attached figure for an example 0465-1

(2) The average size of the releases is recorded in the last paragraph of page 16. This paragraph indicates that the figure is mislabelled. The blue bar for "pipeline" indicates ~250 [redacted], but the text indicates 462 barrels. It seems that the blue bars and purplish bars are both refering to the left hand vertical axis for counts. 0465-2

(3) The footnote indicates that the incident counts come from PHMSA data, but not specifically what data. Unlike the average release volumes, the incident counts are not reported in the text. 0465-3

If including additional pages please number them and tell us how many you are providing: 1 *pages*

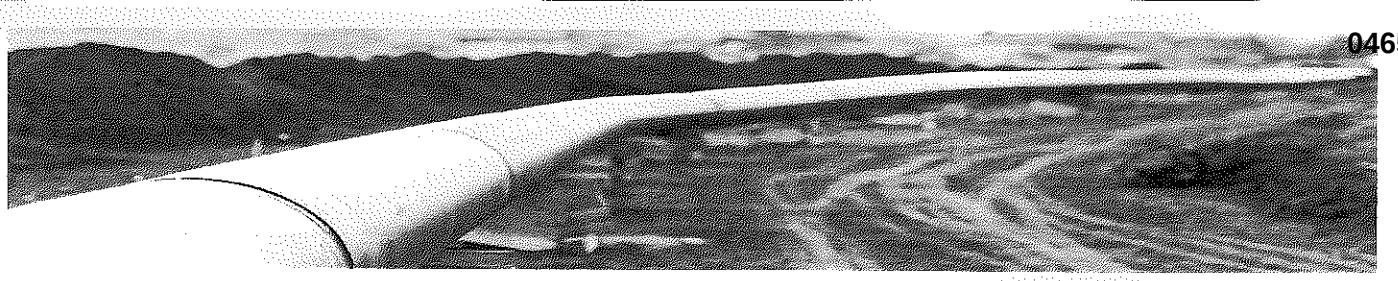

Line 3 Draft Environmental Impact Statement Public Hearing: June 2017

Thank you for joining us at this Public Meeting. Minnesota's Department of Commerce (DOC) will be advising the Public Utility Commission in their process of reviewing the impacts of the expansion of tar sands infrastructure coming across the border from Canada and through the state of Minnesota. They recently drafted an Environmental Impact Statement (EIS) and are now holding public meetings and gathering public comment from across the state. Today's hearing is a part of the process necessary to review the controversial expansion and reroute of Enbridge's Line 3 tar sands pipeline. Currently, this aging and corroded Line 3 is operating at a lower capacity of 390,000 bpd. **This public meeting is an opportunity for you to voice your concerns about the impacts of tar sands expansion and ensure that the DOC does a more robust analysis ahead of their final EIS and making a final decision on the Line 3 tar sands pipeline expansion. You are encouraged to add in additional thoughts, facts and stories from your own experience.**

Start out with an introduction:
Hi, my name is _____ and I am a [name of organization/affiliation] member/activist and a citizen of Minnesota. I want to thank the Department of Commerce for drafting an Environmental Impact Statement and voice my concerns about what this draft analysis does not adequately review in regards to how this tar sands pipeline expansion is posing a threat to the safety and wellbeing of fellow Minnesotans and to the environment.

Tar Sands expansion is all risk, no reward for Minnesotans:

- The DEIS fails to prove that the new tar sands pipeline is needed, especially as Minnesota's oil consumption rates are down 19% and have continued to drop since their peak in 2004.
- The tar sands in Line 3 is some of the dirtiest oil in the world, and also the most difficult to clean when it spills. A recent National Academy of Sciences report found that cleaning up a tar sands spill in a waterway is much more difficult and up to 14.5 times more expensive than cleaning up a non-tar sands spill. Enbridge has a history of spills and greater scrutiny is needed for spill clean-up, permanent damage to waterways, impacts to Minnesota's economy and the threat to Ojibwe wild rice rights and sensitive ricing waters.
- It is not inevitable that this tar sands will get to market without a pipeline expansion, but the no action alternative in this analysis assumes that tar sands comes out of the ground and to market by rail or truck if there is no pipeline permitted, but we know that with current oil prices rail is cost prohibitive and this tar sands would not come out of the ground.
- In this analysis, the Department of Commerce values the Line 3 pipeline's increase to the social cost of carbon at $287 billion over 30 years. At a time when our Governor has just recommitted our state to the strongest climate action.

The voices of impacted citizens need to be heard:

- Enbridge is proposing the construction of a brand new 3-foot diameter steel tar sands pipeline called Line 3 and abandoning the existing line for hundreds of miles without adequate landowner consultation or clean-up.
- The new route would cut through Mississippi River headwaters region and the pristine lake country of northern Minnesota where Native Americans harvest wild rice and hold treaty rights to carry Canadian oil to out-of-state markets..
- The Department of Commerce recognizes in its analysis that there are environmental justice issues related to disproportional impact (of construction and maintenance) activities, stating that this project would "add to the negative mental, spiritual, and physical health impacts already disproportionately suffered by American Indian populations" and must recognize that therefore this pipeline should not be built.

Ask the Minnesota Department of Commerce to ensure that the final Environmental Impact Statement takes into account the climate impacts of additional tar sands extraction and transport and further considers the risk of impacting Ojibwe cultural heritage and wild rice harvesting waters!

Revision of Figure ES-4 (pg 16) from DEIS executive summary

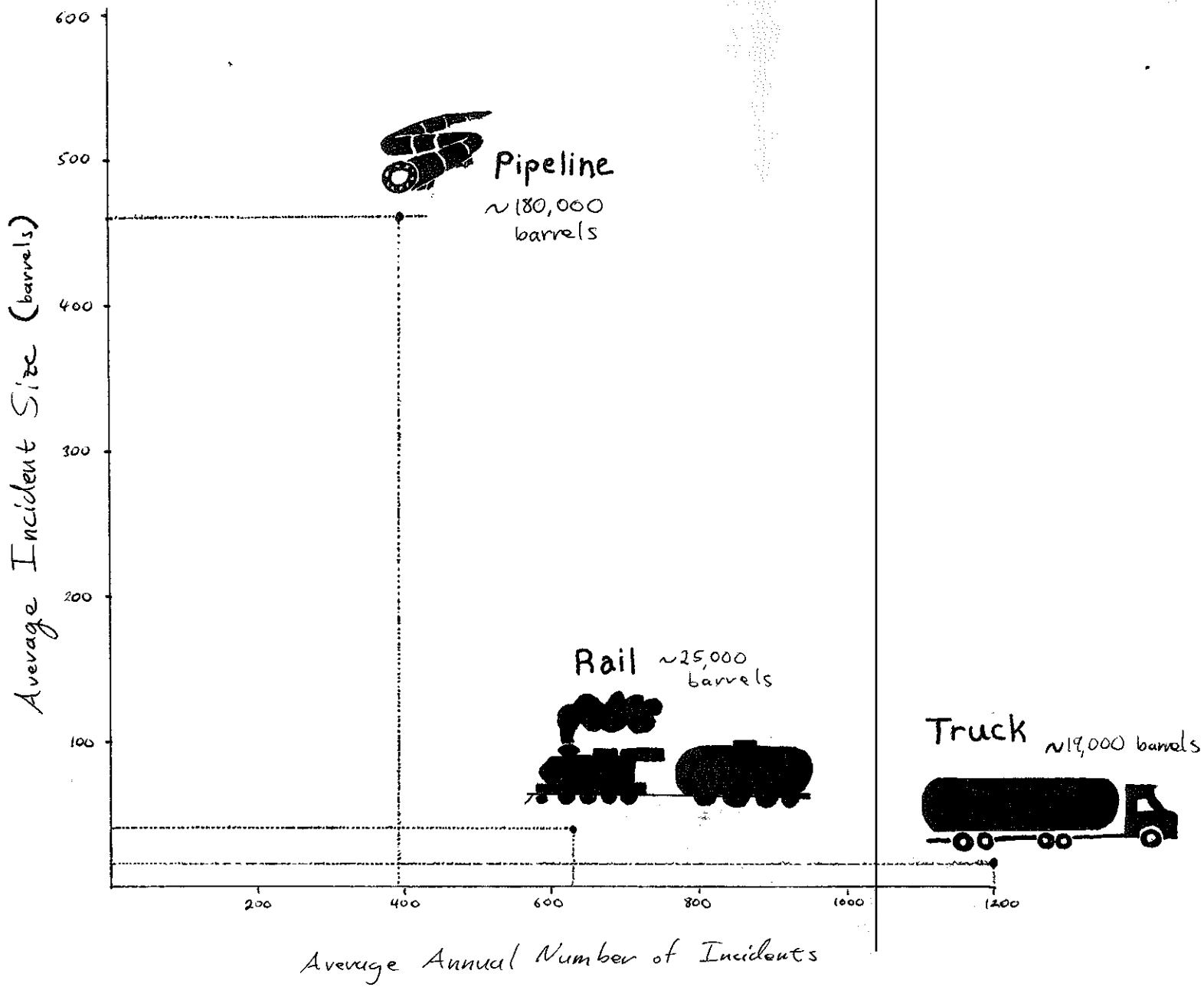

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Lauren Siegel

Street Address: 2709 W 60th St.

City: Minneapolis State: MN Zip Code: 55410

Phone or Email: 262-844-7012

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

(1) I don't believe the EIS adequately addresses the future impact of the pipeline (1) considering the trend toward renewable energy, (2) the increasing scarcity of clean water. As well as the future impact of keeping another pipeline in the ground, which is the fate of the proposed pipeline.

(2) I am very concerned about the lack of substance in the EIS on the predicted increase of human/sex trafficking along the pipeline. Duluth + Bloomington are already outliers in this way and we need a commitment from the state of Minnesota to reduce increased risk of this

(3) I am not happy with the amount of analysis on opportunity cost of funding workers/jobs for this project to the deficit of workers to construct renewable projects. We know more jobs are created creating renewable opportunities in comparison to those created by this project.

(4) Enbridge has proven itself to be irresponsible - with a history of violations, fines and deferred maintenance. Should they are responsible for the largest-ever inland oil spill in the US (continental) shouldn't the risks of this + Enbridge's past track record be included in this report? All potential outcomes from this should be analyzed in there

(5) We can't ignore how this route impacts indigenous + rural areas would be disproportionately impacted. This environmental justice issue needs to be a priority as the state of MN has a strategic priority of addressing racial/ethnic disparities - this priority was set by Gov. Dayton.

0758-1

If including additional pages please number them and tell us how many you are providing:_____ pages

Public Comments of the Sierra Club on the

Draft Environmental Impact Statement

for the Proposed Line 3 Pipeline Project

Submitted to the Minnesota Department of Commerce

Energy Environmental Review and Analysis

Docket Nos. CN-14-916/PL-15-137

July 10, 2017

Via electronic and U.S. mail to:

Minnesota Department of Commerce
Attn: Jamie MacAlister, Environmental Review Manager
85 7th Place East, Suite 280
St. Paul, MN 55101-2198
Pipeline.Comments@state.mn.us

I. INTRODUCTION

Sierra Club submits the following comments on the Draft Environmental Impact Statement ("DEIS") for the proposed Line 3 Pipeline Project (hereinafter "L3 project" or "the project"). The Revised Notice of Availability of Draft Environmental Impact Statement for the project was published on May 15, 2017 and indicated that the public comment period closes on July 10, 2017.

The Department of Commerce ("the Department") has produced a DEIS that does exactly what the Minnesota Court of Appeals said it should not do—it substitutes the review requirements for the Public Utilities Commission's ("the Commission") Certificate of Need ("CN") and route permit decisions for those of the EIS environmental review process under the Minnesota Environmental Policy Act ("MEPA"). As such, the DEIS also violates the Commission's EIS Order, which directed the Department to produce an EIS in accordance with MEPA and not the CN and route permit criteria. If finalized, the EIS would face certain appeal and overturn.

As a result of being prepared using CN and route permit requirements instead of MEPA requirements, the DEIS is grossly incomplete. It does not adequately identify or assess alternatives to the project, it fails to assess whether the project is in the interest of the state, and it is riddled with technical errors in methodology.

Any additional delays resulting from having to complete a more thorough EIS are justified by the magnitude and permanence of the project's environmental risks and impacts.

II. DEIS DOES NOT SATISFY THE LEGAL REQUIREMENTS OF THE MINNESOTA ENVIRONMENTAL POLICY ACT (MEPA)

A. Legal Requirements Under MEPA

MEPA establishes that it is the policy of the state of Minnesota to:

> . . . use all practicable means and measures . . . in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of the state's people.[1]

In enacting MEPA, the legislature did not establish this policy as a mere aspiration; the statute imposes on the state government the obligation to account for a robust set of environmental considerations in course of carrying out its other mandates, including preserving sensitive natural resources and habitats, minimizing the environmental impacts of energy production and use, and discouraging economic activities than harm the environment.[2] The most rigorous of MEPA's obligations are the substantive and procedural mandates imposed on state agencies by the statute's requirement that they prepare a "detailed environmental impact statement" before taking any action with the "potential for significant environmental effects."[3]

The legal requirements for environmental review by EIS are established both in §116D.04 of MEPA and in rules adopted by the EQB pursuant to the statute, which are codified in Minn. R. Ch. 4410 (hereinafter, "EQB Rules"). An EIS is required to be "an analytical rather

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[1] Minn. Stat. § 116D.02, subd 1.
[2] Minn. Stat. § 116D.02, subd. 2.
[3] Minn. Stat. § 116D.04, subd. 2a.

than an encyclopedic document"[4] that evaluates the environmental, economic, employment, and sociological effects that are direct, indirect, and cumulative for the proposed action and each reasonable alternative to it.[5] The EIS must also identify any measures that could mitigate these effects.[6]

MN courts apply a "hard look" approach to MEPA and its requirements for an EIS. The MN Supreme Court has stated that, like the National Environmental Policy Act (NEPA), its federal counterpart on which it was modeled, MEPA "primarily operate[s] by requiring administrative agencies to take a `hard look' at the environmental consequences of governmental action"[7] and that its purpose is "to force agencies to make their own impartial evaluation of environmental considerations before reaching their decisions."[8] Because it was patterned on NEPA, MN courts often use federal case law to interpret MEPA.[9] As such, the MN Supreme Court has adopted the U.S. Supreme Court's reasoning that:

> [p]ublication of an EIS . . . also serves a larger informational role. It gives the public the assurance that the agency has indeed considered environmental concerns in its decisionmaking process . . . and, perhaps more significantly, provides a springboard for public comment."[10]

However, one critical difference between the two statutes is that, while NEPA's EIS requirements are entirely procedural, MEPA's also include a substantive requirement in § 116D.04, subd. 6:

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[4] Minn. Stat. 116D.04, subd. 2a
[5] Minn. R. 4410.2300 (H).
[6] Minn. R. 4410.2300 (I).
[7] *Minn. Ctr. for Envtl. Advocacy v. Minn. Pollution Control Agency*, 644 N.W.2d 457, 468 (Minn. 2002).
[8] *No. Power Line, Inc. v. Minn. Envtl. Quality Council*, 262 N.W.2d 312, 327 (Minn. 1977).
[9] *See, e.g., MN Center for Environmental Advocacy v. MNPUC*, 644 NW 2d 457, 468; *No Power Line,* 262 N.W. 2d at 325*; MPIRG v. Minnesota EQC,* 237 N.W.2d 375 (1975).
[10] *MCEA v. MNPUC*, 644 NW 2d at 468 (2002) (quoting *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349, 109 S.Ct. 1835, 104 L.Ed.2d 351 (1989)).

> No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct.

As such, like NEPA, MEPA does not have any substantive requirements for an agency to grant or deny an approval for a project on the basis of an EIS showing the existence or absence of environmental impacts.[11] However, unlike NEPA, MEPA does require that an agency deny a permit for a project if there exists a "reasonable and prudent alternative" that is more environmentally sound, even if it is more expensive or less economically beneficially. Furthermore, the Minnesota Environmental Rights Act (MERA), which has no federal equivalent, gives this MEPA requirement teeth by granting grants any private party or local government the right to sue an agency in district court over any action the plaintiff can show has or is likely to have adverse environmental impacts and, also, making the agency's only affirmative defense:

> . . . that there is no feasible and prudent alternative and the conduct at issue is consistent with and reasonably required for promotion of the public health, safety, and welfare in light of the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not constitute a defense hereunder. [12]

As such the alternatives are even more so "the heart of the environmental impact statement"[13] under MEPA than under NEPA, especially since, the Minnesota Supreme Court has

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[11] Minn. R. 4410.0300, subp. 3 ("Environmental documents shall not be used to justify a decision, nor shall indications of adverse environmental effects necessarily require that a project be disapproved. Environmental documents shall be used as guides in issuing, amending, and denying permits and carrying out other responsibilities of governmental units to avoid or minimize adverse environmental effects and to restore and enhance environmental quality.").

[12] Minn. Stat. 116B.04, 116B.03, subd. 1 and 116B.02, subd. 5.

[13] 40 CFR 1502.14.

consistently applied a standard that sets a very high bar for an alternative to not be "feasible and prudent."

B. Procedural History

The routing of pipelines falls into the category of actions for which an EIS is mandatory;[14] however, MEPA grants the EQB authority to promulgate rules establishing alternative forms of environmental review that satisfy the same issue and procedural requirements as an EIS.[15] Pursuant to this authority, EQB has approved, and MN Courts have upheld, the comparative environmental analysis (CEA) required by Minn. Rule 7852.1500 for granting a pipeline route permit as an acceptable alternative to preparing an EIS.[16] Since the Commission has traditionally always combined CN and route permit dockets for oil pipelines, the CEA has served as the MEPA-compliant environmental review document for both decisions.

In October 2014, the Commission ordered the CN and route permit dockets for the Sandpipe Pipeline Project to be bifurcated such that the CN proceedings would happen first.[17] This meant that the CN proceedings would happen without a MEPA-compliant environmental review document. Friends of the Headwaters petitioned for reconsidered of this decision, which the Commission denied, resulting in an appeal to the MN Court of Appeals.[18]

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[14] 4410.4400, subpt. 24 (2009).
[15] Minn. Stat. 116D.04, subd. 4a
[16] *Minn. Ctr. for Envtl. Advocacy v. Minn. Public Utilities Comm 'n*, No. AI0- 812, 2010 WL 5071389, at *3-4 (Minn. ct. App. Dec. 14, 2010) (finding that finding that Minn. R. Ch. 7852 complies with the alternative environmental-review process required under MEPA); see also In re Minn. Pipe Line Co., No. A07-1318, 2008 WL 2344736, at *10 (Minn. ct. App. June 10,2008) (stating that Minn. R. Ch. 7852 is an approved alternative form of environmental review for proposed pipelines).
[17] *See* Docket Nos. PL-6668/CN-13-473, PL-6668/PPL-13-474, *Order Separating Certificate of Need and Route Permit Proceedings and Requiring Environmental Review of System Alternatives*, October 7, 2014.
[18] Docket Nos. PL-6668/CN-13-473, PL-6668/PPL-13-474, *Petition for Reconsideration and Amendment*, October 27, 2014; *In re N. Dakota Pipeline Co. LLC*, 869 N.W.2d 693, 696 (Minn. App. 2015),*review denied* (Minn. Dec. 15, 2015) (explaining the procedural history of the case).

On September 14, 2015, the MN Court of Appeals held that CN decisions on oil pipelines independently trigger MEPA requirements for an EIS.[19] The Court further said that it was "not convinced" that EQB's approval of CEA as a MEPA-compliant alternative for a route permit decision should extend to a CN decision in any case since neither the legislature nor the EQB saw fit to explicitly exempt need determinations for pipelines from the requirement for an EIS nor allow for an alternative form of review.[20] The Court further stated that, while the CN process does provide for a "high level environmental review, . . . [t]his review was not meant to serve as a substitute for the more rigorous and detailed review needed to satisfy MEPA, and it cannot take the place of a formal EIS now."[21] On December 15, 2015, the MN Supreme Court declined to review the Court of Appeal's decision.

The Commission met on December 17, 2015 to consider how to move forward with the dockets for Line 3, which it had similarly bifurcated before the Court's decision in the Sandpiper case. On February 1, 2017, the Commission ordered that proceedings for Line 3's CN and route permit dockets be joined and that the Department prepare "a combined environmental impact statement that addresses issues related to the certificate of need and routing permit dockets in accordance with Minn. Stat. § 116D.04 and Minn. R. Ch. 4410."[22]

C. The DEIS Substitutes the Review Process for CN and Route Permit Decisions for that of an EIS in Direct Violation of MEPA, the Court of Appeals Decision, the Commission's EIS Order, and Its Own Final Scoping Document

In its section that explains its approach to MEPA's requirements for environmental review, the DEIS provides that the Commission has ordered the Department to prepare an EIS in

[19] *In re N. Dakota Pipeline Co. LLC,* 869 N.W.2d 693, 696 (Minn. App. 2015),*review denied* (Minn. Dec. 15, 2015)
[20] *In re N. Dakota Pipeline Co. LLC,* 869 N.W.2d 693, 696 (Minn. App. 2015),*review denied* (Minn. Dec. 15, 2015)
[21] Id. At 699.
[22] Order Joining Need and Routing Dockets, February 1, 2016, eDockets Number 20162-117877-01.

accordance with Minn. R. Ch. 4410, so "[t]he EIS content and procedures therefore are being completed under [those Rules]."[23] It then states, however, that since the Commission is required to assess the criteria in Minn. R. Ch. 7853 and 7852 in order to make it decisions on the CN and route permit, the EIS will also use Minn. R. Ch. 7853 and 7852 to evaluate the impacts and alternatives for these decisions.[24]

It is very unclear how it is possible for the Department to claim that the "content and procedures" of the EIS are being completed in accordance with MEPA and its related EQB Rules when, concurrently, it demonstrates that they categorically are not. It appears that the Department may be trying to argue that all it and the EIS need to do to satisfy the legal obligations of MEPA is go through the EIS scoping process and the public meetings and comment periods for the DEIS. The fact that the Department does not recognize that using the criteria for CN and route permit decisions to evaluate the impacts and alternatives of the project is exactly what the Court of Appeals ruled impermissible is demonstrative of a fundamental and profound misunderstanding of the MEPA process and the purpose of an EIS with respect to agency permitting decisions. This faulty understanding is reflected strongly and consistently in many of the most major deficits of the DEIS. 2803-1

The Department is incorrect in its belief that because the EIS is being prepared to inform the Commission's CN and route permit decisions, then its purpose, scope, and content are also governed by those two decisions. The requirement for the EIS is triggered by the Commission's CN and route permit decisions, but not because of the legal requirements for certifying need or permitting a route. The EIS exists because MEPA requires its preparation for any significant 2803-2

[23] DEIS at 1-4.
[24] DEIS at 1-4.

government action that may impact the environment.[25] As such, the Commission has ordered that the Department prepare an EIS so that it can satisfy its legal obligations under MEPA to independently take a "hard look" at the potential effects of permitting the proposed pipeline, consider all feasible and prudent alternatives to the project, and consider any methods for mitigating the adverse impacts of the project.[26]

2803-2 cont

The Department, in turn, must satisfy the legal obligations imposed by MEPA on the RGU that is responsible for preparing the EIS. These include, but are not limited to, the obligations to produce a detailed and analytic EIS that evaluates the environmental, economic, employment, and sociological effects that are direct, indirect, and cumulative for the proposed action and each reasonable alternative to it.[27] It also includes the requirement that:

> [t]he responsible governmental unit shall, *to the extent practicable, avoid duplication and ensure coordination … between environmental review and environmental permitting*. Whenever practical, information needed by a governmental unit for making final decisions on permits or other actions required for a proposed project shall be developed in conjunction with the preparation of an environmental impact statement. [28]

(emphasis added).

Indeed, the Department needs to look no further than MEPA's plain statutory text to see that it has prepared a 5,000 page DEIS for the express purpose of providing entirely discretionary information that relates directly to decision-making matters that are expressly outside the scope of the required environmental review. This is not to say that it is discretionary for the EIS to provide information on the alternatives that Minn. R. 7853 and 7852 require the Commission to consider before issuing a CN or routing permit—the EIS must, in fact, do that in order to avoid

[25] 116D.04, subd. 2a.
[26] 116D.04; 4410.2000, subp. 1.
[27] Minn. R. 4410.2300 (H).
[28] 116D.04, subd. 2a (g).

the situation where the Commission is required by Minn. R. 7853 or 7852 to consider some alternative without knowing its impacts in violation of MEPA or vice versa. Rather, it is to say that, we can also get to the conclusion that the DEIS substitutes the CN and route permit processes under Minn. R. 7853 and 7852 for that of an EIS under MEPA by looking at what the statute itself provides is outside its legal scope. The provision quoted above clearly shows that MEPA differentiates between the information it requires for environmental review (which must be in the EIS) and the information required other statutes for environmental permitting (which may be in the EIS). Because the only information the DEIS evaluates is that which is required pursuant to other statutes for environmental permitting,[29] the DEIS contains only information that is discretionary under MEPA because it actually belongs to another statue—this is substitution and, by itself, it requires that the DEIS be entirely redone. 2803-2 cont

D. The DEIS Is Based Entirely on Enbridge's Purpose and Need Which Renders Defective All the Analysis in the DEIS and Gives Enbridge Multiple Advantages

The DEIS states that it will not define the purpose and need for the proposed project because deciding whether the project is needed is the Commission's responsibility pursuant to its authority to issue a CN.[30] Furthermore, the DEIS does not seek to inform that aspect of the Commission's CN decision based on the Department's belief that the CN process assigns that responsibility to the parties that are participating in the contested case hearing. The DEIS believes it is only then that "if the Applicant establishes the underlying need," the Commission 2803-3

[29] Minn. R. 7853 and 7852 are authorized by Minn. Stat. § 216B.243 and § 216G.02, respectively.
[30] DEIS at 1-6.

can begin looking at the environmental and socioeconomic analysis in the EIS to evaluate whether any of the alternatives are better.[31]

MEPA requires that the Department independently identify a purpose and need for the project. Without doing so, the Department is unable to produce the most important part of the EIS, the analysis of alternatives to the project. This is because, in order for an alternative to be reasonable and feasible, it must satisfy the same purpose or need as that which it seeks to replace. Accordingly, under the EQB Rules, "[a]n alternative may be excluded from analysis in the EIS if it would not meet the underlying need for or purpose of the project" [32]

Because the Department does not identify the purpose and need for the project, the DEIS is unable to carry out its legal requirement under MEPA to independently identify and evaluate prudent and reasonable alternatives to it. Furthermore, in opting not to define the purpose and need for the project, what the Department actually does is to assume Enbridge's purpose and need for the project as the basis for the alternatives evaluated in the EIS. That has, in essence, allowed Enbridge to control which alternatives are included or excluded from the EIS based exclusively on their ability to meet the company's economic need for the pipeline. Unsurprisingly, the handful of alternatives that made it into the DEIS are all as or more environmentally unsound as Enbridge's proposal and preferred route.

Without the independent assessment of the EIS as to the purpose and need for the project, the Commission is also impaired in its ability carry out its statutory obligation to base its CN determination on whether the project serves the interests of the state because, per the DEIS'

[31] DEIS at ES-4
[32] 4410.2300 (G)

approach, all that information and analysis would have to be developed through the contested case hearing process.[33]

Minn. Stat. § 645.17 provides that the laws of the state should be interpreted in accordance with the intent of the legislature "to favor the public interest as against any private interest."

The DEIS correctly states that "the CN is a decision by the Commission about whether a proposed project is in the State's interest."[34] Under Minn. Stat. §2156.243, the statute that governs CNs for pipelines, the criteria that the Commission must use to assess need for a project are entirely focused on the public interest matters including: the extent to which the project contributes to overall state energy needs and security, whether the need could instead be met through energy conservation or efficiency measures, whether the project offers any benefits in terms of protecting or enhancing environmental quality, and whether demand for the project may be the result of promotional activities. None of the criteria are concerned with the economic interests of the applicant.[35]

E. DEIS Relies Excessively on Enbridge's Filings

2803-4

The DEIS demonstrates a very high degree of reliance on and deference to Enbridge's filings for information and analysis that, under MEPA, is the legal obligation of the Department to independently produce.

[33] Minn. Stat. § 216.243.
[34] DEIS at ES-3.
[35] Minn. Stat. § 216.243, subd. 3.

Federal Courts have repeatedly held that NEPA prohibits an agency from preparing an EIS that relies solely on information provided by projects proponent.[36] Based on these federal decision, MN Courts have held that: 2803-4

> The purpose of all environmental legislation, at both the state and the federal levels, is to force agencies to make their own impartial evaluation of environmental considerations before reaching their decisions. The agency's role in the preparation of an EIS is not to serve as an arbiter between two opposing parties, as a judge is expected to do in the adversary process. Instead, it is expected to be a source of independent expertise whose scientific investigation can uncover the data necessary to make an informed environmental decision.[37]

F. The Department Should Have Prepared an EIS That Could Be Used By Other Federal, State, Regional, and Local Agencies

A frequent criticism of environmental review, especially by permit applicants, is that it is often poorly coordinated among the local, state, and federal agencies with overlapping permitting authority and, as such, takes too long and is too repetitive. MEPA addresses this by requiring that the RGU preparing an EIS "avoid duplication and ensure coordination between state and federal environmental review" to the extent practicable.[38] Furthermore, the EQB Rules provide that two

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[36] *City of Des Plaines v. Metropolitan Sanitary Dist. of Chicago*,552 F.2d 736 (7 Cir. 1977); *Greene County Planning Bd. v. Federal Power Comm.*,455 F.2d 412, 420 (2 Cir. 1972); *Calvert Cliffs' Coordinating Committee, Inc. v. Atomic Energy Comm.*, 146 U.S.App. D.C. 33, 43, 449 F.2d 1109, 1119 (1971).

[37] No power line at 327

[38] Minn. Stat. 116D.04, subd. 2a(g).

of the objectives of the EIS process are to "reduce delay" and "eliminate duplication."[39] Under MEPA, coordination with other agencies is not just an aspirational priority of environmental review. It is the first of a small number of duties imposed by MEPA on all state agencies which they must carry out in the course of all their work. [40]

The Department acknowledges this in the DEIS when it states that, in addition to the Commission's CN and route permit decisions, the EIS will also be used by "other state and local agencies with permitting authority over the project."[41] It also indicates that federal agencies that are required to prepare an EIS under NEPA, "most notably the U.S. Army Corp of Engineers," can also opt to use tis EIS, or they can prepare their own.[42]

As explained above, this DEIS, if finalized, would be invalid under MEPA even for the dockets at hand; however, even if that were not the case, it still would not be useable by any other agency, be it local, state, or federal. This is not because it would be impracticable for the Department to prepare the EIS in a manner that would serve multiple agencies and jurisdictions, but, rather, because the Department has foreclosed that possibility by design through limiting the alternatives and impacts evaluated by the EIS, as well as the evaluation criteria used, to only those that are required for CN and route permit decisions under Minn. R. Ch. 7853 and 7852. As such, even if its technical analyses of the pipeline's impacts were flawless, no agency would be able to the use this EIS to satisfy its own legal obligations under MEPA or NEPA. 2803-5

[39] Minn. R. 4410.0300, subp. 4 (E) and (F).
[40] 116D.03, subd. 2 ("All departments and agencies of the state government shall: (1) on a continuous basis, seek to strengthen relationships between state, regional, local and federal-state environmental planning, development and management programs").
[41] DEIS at ES-3.
[42] DEIS at ES-3.

III. COMMENTS ON ALTERNATIVES

The DEIS evaluates too narrow a set of alternatives. Under MEPA, an EIS "must address one or more alternatives of each of the following types of alternatives or provide a concise explanation of why no alternative of a particular type is included in the EIS: alternative sites; alternative technologies; modified designs or layouts; modified scale or magnitude, and alternatives incorporating reasonable mitigation measures identified through comments received during the comment periods for EIS scoping or for the draft EIS.[43] Alternatives may only be excluded from the EIS if they don't meet the need for or purpose of the project or it is not any better environmentally than the proposed project or some other alternative.[44] The DEIS does not provide alternatives for each of these categories and does not provide adequate explanation for why. 2803-6

A. No Action Alternative is Wrong

The DEIS assumes that under the No-Action alternative, Enbridge would either (a) use a different pipeline system to move Line 3 oil, (b) use an alternative transportation mode such as rail or trunk to move Line 3 oil, or (c) continue using the existing Line 3, with or without rail or truck supplement, to move Line 3 oil.

i. Continued use of old line 3 is neither reasonable nor prudent, so it shouldn't be included at all as an alternative 2803-7

Enbridge can't be reasonably expected to meet shipper demand through continued use of the old line 3 because old Line 3 is too dangerous to be in operation. Even though Enbridge has

[43] 4410.2300 (G)
[44] 4410.2300 (G)

framed their project in terms "restoring the line's capacity," they have very ready availed themselves of the subtext that the people of Minnesota are choosing between a "brand new, state of the art pipeline with all the most recent safety technology" and a "60 year old pipeline that requires a ton of regular maintenance and monitoring to prevent another big spill coming from it."

ii. No Action Alternative should be surrogate for alternative energy

2803-8

One reasonable outcome of the No-Action Alternative is that Enbridge decommissions the existing Line 3 and does not take any measures reroute or use alternative transportation to move Line 3 oil but, rather, abandons shipment of this oil. This outcome is entirely reasonable given that oil consumption rates in MN are continuing to drop and oil prices continue their persistent decline. In fact, per the final Scoping Decision Document for Line 3, it is necessary for the DEIS to consider this fourth reasonable outcome. Page 36 of that document states that "evaluation of alternative energy types or energy conservation efforts is beyond the scope of the EIS....However, it will include a No-Action Alternative, which is an effective surrogate for the evaluation of energy alternatives because it assess the consequences of the only action available to the PUC—denial of the Project—to implement a change in regional or national energy use." Exclusion of this fourth reasonable outcome renders the No-Action Alternative incomplete, making it impossible for the PUC to properly assess need for the Line 3 pipeline replacement.

B. No Action Alternative Assumes a False-Choice

There's no justification or support for the assumption that, without a Line 3 replacement, Enbridge will continue to operate at its current capacity by either using the existing pipeline, rerouting to another pipeline system, or using rail or truck transport. This assumption sets up a false choice between pipelines and rail/truck as the only two options for "maintaining the future adequacy, reliability, or efficiency of energy supply." This is a false choice because there is also a third option available for maintaining the future energy supply—the use of energy alternatives like renewable sources of energy (e.g., solar, wind). Again, the scoping document indicates that the No-Action Alternative is the vehicle by which energy alternatives are to be considered.

C. The No Action Alternatives are Inadequate for the Commission to Use in its CN Process

2803-9

Because the No Action Alternative is flawed and incomplete, it is impossible for the PUC to evaluate whether the "consequences to society of granting the CN are more favorable than the consequences of denying the certificate." Currently, the DEIS is framed such that PUC is forced to falsely weigh the positive consequences of granting of the CN (a state-of-the-art pipeline) versus the negative consequences of denying the CN (the adverse risks of using a failing pipeline, a different pipeline systems, or rail/truck transport). However, if as the Final Scoping Document states the No Action Alternative serves to "assess the consequences of the only action available to the PUC…to implement a change in regional or national energy use," then the DEIS should provide the PUC with information to also weigh the negative consequences of granting of the CN (the risks and hazards of continued transport and consumption of tar sands oil) versus the

positive consequences of denying the CN (stable, economically-beneficial, and environmentally-friendly energy supply from renewable sources).

D. DEIS should evaluate alternative pipeline capacity owned by Enbridge and other companies

2803-10

The DEIS states that "[t]he EIS is not evaluating [alternative pipelines owned by Enbridge or others] based on whether they meet the need for this proposed Project." This Sierra Club finds this language and reasoning to be unclear. It appears to be saying that the EIS is not evaluating alternative pipelines to assess whether they could meet the need for the proposed project. This is problematic because § 216B.243, Subd. 3(6) requires that the Commission consider:

> possible alternatives for satisfying the energy demand or transmission needs including but not limited to potential for increased efficiency and *upgrading of existing energy generation and transmission facilities*, load-management programs, and distributed generation . . . .

(Emphasis added.) Furthermore, 7853 might require something like this to be considered as an alternative if parties can show in the CCH that it's reasonable and there's sufficient evidence to support it (7853.0120 says the commission "shall consider only those alternatives proposed before the close of the public hearing and for which there exists substantial evidence on the record with respect to each of the criteria listed in part 7853.0130.") 7853.0130(B) in turn requires that only alternatives that are "reasonable" and "prudent" be considered, but given that 216B.243 specifically requires it and the fact that there's plenty of empirical examples to show

it, it's a mistake for DOC to categorically exclude alternatives based on upgrading and more efficiently using existing infrastructure.

Again, this would require the Commission to either violate 216B by excluding consideration of upgrading existing facilities as an alternative or to violated MEPA by considering it without environmental review.

It seems like DOC anticipates that this might be the case because they provide in the DEIS that it does not evaluate the environmental impacts of alternative pipeline capacity owned by Enbridge or other companies because "[t]heir environmental impacts have been (or would be) evaluated in other jurisdictions."[45] Sierra Club understands this to be an acknowledgment by the DOC that the Commission may have to consider other pipeline alternatives and that MEPA would require consideration of their environmental impacts. Deferring to an existing or, worse yet, hypothetical EIS from another jurisdiction does not satisfy this requirement, especially in the absence of any analysis as to the sufficiency, quality, or adequacy of those other EISes to satisfy the requirements imposed by MEPA and other relevant MN statutes and rules. It is unreasonable, impractical, and improper for the DEIS to abdicate its primary responsibility to analysis that may or may not exist in another jurisdiction. This is especially troubling with respect to the public's rights to transparency, accountability, and input into decisions about the proposed Project. Also, PUC can't take a hard look at the impacts of granting or denying the CN if it doesn't have information about the potential impacts of alternative pipelines. It's not acceptable under MEPA for DOC to assume that PUC would get this information from the parties through the CCH because MEPA requires DOC to do it.

[45] DEIS at 4-8.

E. Mitigation factors should be applied to alternatives

DEIS doesn't provide mitigation analysis for the alternatives the way it does for the project. It should take into consideration the extent to which their impacts would be reduced assuming full compliance with regulatory frameworks + adoption of all the best practices available.

IV. DEIS DEVIATES TOO MUCH FROM FINAL SCOPING DECISION

2803-11

MEPA requires "an early and open process" of scoping to determine "the form, content and level of detail of the [environmental impact] statement as well as the alternatives which are appropriate for consideration in the statement,"[46] which is subsequently to be "incorporated into the order requiring the preparation of an environmental impact statement."[47] As an "early and open" process, scoping ensures that the public and other government bodies whose areas of expertise or jurisdictions are implicated by the EIS or the project have an opportunity to review and provide input on the EIS before public funds are used to prepare it. Relatedly, the open process of scoping is also a critical component of the public participation, transparency, and accountability that the EIS process is supposed to provide under MEPA and, as such, includes an opportunity for public hearing and comment under Minn. R. 4410.2100.

The purpose of scoping is "insure[] that the EIS provides a comprehensive overview of all environmental impacts of the project, . . . including appropriate alternatives."[48] The Final Scoping Decision Document (FSDD) is supposed to provide a roadmap for what to include in the

[46] Minn. Stat. 116D.04, subd. 2a (f).
[47] Minn. Stat. 116D.04, subd. 2a (f).
[48] Iron Rangers Ridge Action v. Resources, 531 NW 2d 874, 884 - Minn: Court of Appeals 1995

DEIS in order to satisfy the requirements of MEPA. To that end, the EQB Rules provide that it must at a minimum include the following information:

A. the issues to be addressed in the EIS;

B. time limits for preparation, if they are shorter than those allowed by parts 4410.0200 to 4410.6500;

C. identification of the permits for which information will be gathered concurrently with EIS preparation;

D. identification of the permits for which a record of decision will be required;

E. alternatives that will be addressed in the EIS;

F. identification of potential impact areas resulting from the project itself and from related actions which shall be addressed in the EIS; and

G. identification of necessary studies requiring compilation of existing information or the development of new data that can be generated within a reasonable amount of time and at a reasonable cost.[49]

Adherence to a well-conceived FSDD can help to significantly enhance the efficiency of environmental review by reducing the chance of mistakes, oversights, and deficiencies in the DEIS. As such, adherence to the FSDD is mandatory under MEPA and the EQB Rules, which explicitly states that a DEIS "shall be prepared consistent with [the rules in ch. 4100] and in accord with the scoping determination."[50] Indeed, one of the three requirements that must be

[49] 4410.2100 subp. 6
[50] 4410.2600 subp. 1

satisfied in order for PUC to make a positive adequacy determination on the EIS is that it addresses all the issues and alternatives identified in scoping so that all issues "for which information can be reasonably obtained have been analyzed."[51]

Sierra Club has been and continues to be critical of the FSDD that was prepared for the Line 3 DEIS. Indeed, in December 2016, we petitioned the Commission to reconsider its order approving the FSDD and to amend its contents.[52] In that petition, we identified and explained the many ways in which the FSDD was unlawful and unreasonable and cautioned that it would result in a DEIS that falls well short of MEPA requirements—and, indeed, it has. As anticipated, many of our most substantial problems with the DEIS discussed in these comments are the very same ones we have expressed concern about in the FSDD. However, at the same time that the DEIS comports to all the flawed aspects of the FSDD, it also deviates substantially from some of the parts of the FSDD that were consistent with MEPA.

As stated above, the nonconformity of an EIS with its underlying scoping decision is legally impermissible and renders the EIS inadequate under the explicit terms of the EQB Rules. It also, as a matter of practice, undermines the very purpose of scoping that has the most statutory, administrative, and judicial emphasis—public transparency and participation. In developing the FSDD for the Line 3 EIS, the department reviewed and incorporated oral and written comments from the 45-day public comment period on the DSDD, which included 12 public scoping meetings in 7 of the 10 counties crossed by the proposed L3R, as well as from 15 public meetings held by Department and Commission staff in 2015.[53] These public inputs into

[51] Minn. R. 4410.2800 Subp. 4.
[52] Exhibit 1 (Sierra Club Petition for Rehearing and Reconsideration of Order Approving Scoping Decision and for Amendment ff Proposed Final Scoping Decision Document, December 20, 2016).
[53] Fsdd 4-5

the environmental review process and the citizen rights from which they stem are rendered meaningless if the Department is permitted to ignore the determinations of the scoping process with impunity. This not only breaks the public's trust but, worse, creates the false sense of security about the procedural and substantive rigors of the EIS process, including the false pretense that public input matters.

Attempting to correct these nonconformities in the FEIS does little to rectify the procedural harms to the public. They should have been afforded the opportunity during the DEIS comment period to evaluate and weigh in on the issues, alternatives, data sources, and analysis methods that were required by the FSDD to be developed for the DEIS.

V. PROBLEMS WITH DEIS PROJECT DESCRIPTION

Minn. R. 4410.2300, which governs the contents of an EIS, states in that an EIS must include a "project description" section in which "the proposed project shall be described with *no more detail than is absolutely necessary* to allow the public to identify the purpose of the project, its size, scope, environmental setting, geographic location, and the anticipated phases of development. (Emphasis added) This restrictive language is usually and conspicuously emphatic such that it very clearly intends to limit the information provided in the project description section of the EIS to a discrete, enumerated set of basic project aspects presented in manner that minimizes the chances of subjectivity, partiality, misinformation, or mislead. This requirement for informational restraint and objectivity in this section of the EIS makes sense given the Rule's specification that the section's purpose is to enable members of the public to identify the main aspects of the proposed project.

As such, it would not be particularly concerning that the preface to the Project Description section of the DEIS states "[t]he Project information in this chapter is primarily based on public filings by the Applicant" were the section limited to just the basic information listed in Minn. R. 4410.2300.[54] This is not the case, however—the Project Description section of the DEIS provides a high level of detail about a wide range of project aspects that fall well outside the legally permissible scope of this section, all presented from Enbridge's partial and self-interested perspective and drawn from a range of Enbridge's filings. At the same time, the DEIS omits information legally required to be included in this section even when majority of the necessary information is provided in the "General Information" section Enbridge's CN application, as well as included elsewhere in the DEIS pursuant to the other EIS requirements of MEPA.

Indeed, Enbridge in its CN application provides all the information that 4410.2300 requires to be included in the DEIS Project Description section, plus some additional information required for the CN application that 4410.2300 does not require, and does so in nine pages. The DEIS's Project Description section, by comparison, is forty-six pages long.

A. DEIS' Project Description Section Omits Legally Required Information

The Project Description section is legally required to describe the proposed project's purpose, size, scope, environmental setting, geographic location, and anticipated phases of development using the absolute least amount of detail necessary.[55] It does not meet this legal

[54] DEIS at 2-1.
[55] Minn. R. 4410.2300 (2016).

requirement with respect to the size, scope, or environmental setting of the project. In fact, one would think that the clearest and most logical way to present this information without extraneous detail and in a manner that allows the public to easily identify these factors would be to have a subsection for each size, scope, environmental setting, geographic location, and anticipated phases of development in the Project Description section. The DEIS's Project Description section, however, has no such subsections. In fact, the words "scope" and "environmental setting," do not even appear in this section of the DEIS and the words "size" and "location" only appear in reference to a few specific components of the project such as additional temporary work spaces and mainline valves and never with respect to the proposed pipeline itself.

i. Project Size is Inadequately Described

2803-12

The size of the proposed project should be described in the EIS Project Description section in a manner consistent with and relevant to the purposes of EIS, as well as in compliance with other relevant legal definitions for measuring the size of a pipeline such as the one proposed. The DEIS' Project Description section does neither.

Minn. R. 7853.0010 provides definitions for pipeline CNs and states in Subp. 16 that:

"Mbpd-mile" [Million barrels per day-miles] means a descriptive unit used as a measure of the size of a pipeline, the quantity of which is determined by multiplying:

A. either the length in miles of the new (section of) pipeline in Minnesota, or 50 if the capacity expansion is achieved by adding power; and

B. the new or additional design capacity in thousand barrels per day (Mbpd), at a viscosity of 100 SSU/60 degrees Fahrenheit and a specific gravity of .88/60 degrees Fahrenheit.

> If the pipeline capacity would be expanded by a combination of looping and adding power, the Mbpd-mile corresponding to each method of expansion shall be calculated and the sum of the two shall be the size of the pipeline.

This is the unit of measure in which the CN law requires the size of the proposed pipeline to be stated.[56] However, the DEIS does not include this measurement in the Project Description section. In its CN Application, Enbridge states that the size of the proposed L3R pipeline will be 256,120 Mbpd-mile.[57] This measurement, however, is based on the annual average capacity of 760,000 bpd at which Enbridge purports it will operate the pipeline and not the ultimate annual average capacity of the pipeline which is 915,000 bpd.[58] To accurately convey the size of the pipeline, the EIS should include the size of the L3R pipeline in Mbpd-miles based on this latter ultimate capacity.

Since the purpose of the DEIS is broader than just the CN and requires consideration of all of the pipeline's cumulative environmental impacts, it makes sense for the size of the proposed project to be described to the public in the manners that are consistent with those impact analyses. As such, the Project Description section should also list the size of the Enbridge Mainline System in Mbpd-miles.

ii. Project Scope is Inadequate Described

2803-13

The DEIS takes a totally delimited approach to describing the project's scope in the Project Description section and liberally includes Enbridge's descriptions of the various

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[56] Minn. R. 7853.0230, Subp. 1(D) (2003) (requiring that a CN applicant describe the size of the proposed pipeline in mbpd-miles).
[57] Enbridge Energy, Limited Partnership, Certificate of Need Application, MPUC Docket No. PL-9/CN-14-916 (April 2015), p. 2-6.
[58] *Id.* at. 8-3.

regulatory and voluntary mitigation measures that will purportedly alleviate some of the project's environmental impacts. Interestingly, while the Department saw it fit to detail as part of the scope of the project the many ways in which Enbridge claims it will be a model of regulatory compliance and environmental stewardship, it did not see it fit to also include as part of that scope the adverse environmental impacts of the project that create the need for those mitigation measures. 2803-13 cont

Describing the scope of the project for the purposes of the DEIS' Project Description section makes most sense in terms of identifying the components of the project that must be included for the purposes of the DEIS.

The EQB Guide further provides that "cumulative potential effects [have] nothing to do with determining what is the complete project… [and] [o]nly 'other projects' that are connected or phased actions" are relevant to this determiniation.[59]

iii. Environmental Setting is Improperly Described 2803-14

The DEIS' Project Description section takes a highly bizarre approach to describing the environmental setting of the proposed project that is completely antithetical and counterproductive to the purpose of this section. Rather than describing the types of environmental settings the project sits in or impacts, the Project Description hints at some of these settings by means of describing Enbridge's proposed efforts to mitigate harms to those settings. This approach thus substitutes descriptive information that is prohibited by 4410.2300 (explained further below) in place of descriptive information that is required by it. Furthermore,

[59] EQB Guide at 12.

it requires that members of the public read through page after page of Enbridge's unsubstantiated claims of how it intends to mitigate environmental impacts just to get an incomplete sense of what some of the project's environmental settings might be.

For example, rather than state that the proposed pipeline would run through agricultural land, the DEIS Project Description states:

> Enbridge proposes that topsoil would be stripped and segregated to maintain the integrity of the existing seed bed in cropland, hayfields, pastures, government set-aside program areas, and other areas as requested by landowners along the construction work area and in accordance with the Environmental Protection Plan and the Agricultural Protection Plan.[60]

(internal citations excluded).

The Department's approach here is particularly perplexing and unacceptable because Enbridge's CN Application includes this necessary descriptive information. For example:

> Approximately 40.3 percent of the area affected by the construction ROW will be agricultural land. This land consists of pastures or hay fields and cultivated crops such as corn, soybeans, wheat, oats, wild rice, and dry edible beans. Potatoes, sugar beets, vegetables, sod, and Christmas trees are also common crops in the counties crossed by the Project (USDA 2012). Approximately 46.8 percent of the area affected by the construction ROW will involve forested land, consisting of deciduous, evergreen, and mixed forests. The construction ROW will also cross wetlands/open water (approximately 6.2 percent of the area, including emergent herbaceous wetlands, woody

[60] DEIS at 2-25.

wetlands, and open water), open land (approximately 6.5 percent of the area, including maintained rights-of-way, shrub/scrub areas, grasslands, developed open space, and barren land), and developed land (less than 1.0 percent, including areas of intensive use with much of the land covered by structures).[61]

The EIS must be corrected to remove the extraneous information and add the necessary information about the project's environmental settings. As it is currently written, members of the public are denied the ability to identify this critical information without having to search through the dense and detailed portions of the DEIS. Furthermore, as explained further below, members of the public may well be misled by the conclusory and biased nature of the information that is currently include in this section.

B. Extraneous Information in the DEIS Project Description Section is Biased and Misleading to the Public and Violates the Law

The Projects Description section of the DEIS includes considerable detailed information about several aspects of the project that have no nexus to the section's legal purpose of allowing the public to identify the proposed project's purpose, size, scope, environmental setting, geographic location, and anticipated phases of development using the absolute least amount of detail necessary.[62]

As one example, the Project Description section includes extraneous information about the project's costs for Enbridge:

[61] Enbridge CN Application at 9-6.
[62] Minn. R. 4410.2300 (2016).

> Enbridge expects the total costs of designing, permitting, and constructing the Line 3 Replacement Project from Hardisty, Alberta, Canada, to Superior, Wisconsin, to be $7.5 billion. Enbridge expects the U.S. portion of the Project to total approximately $2.6 billion and the Minnesota portion of the Project to account for approximately 80 percent, or $2.1 billion, of the U.S. total.[63]

2803-15

This information is wholly irrelevant to the project aspects that this section needs to describe. The cost of the proposed project to the Applicant is an irrelevant matter for environmental review of the project.

More problematically, the DEIS' Project Description section also includes detailed information about "Construction Methods," which primarily focuses on describing with considerable detail "the measures Enbridge would be required and/or has proposed to take to avoid or minimize potential impacts from the Project."

The inclusion of the impermissible extraneous details about mitigation measures in the Project Description section of the EIS is highly problematic because it takes assertions drawn directly from Enbridge's filings[64] and presents them in a manner that is very conclusory as to their effectiveness.

For example, the measures Enbridge proposes to undertake to prevent the spread of noxious weeds and invasive species are summarized in considerable detail but without any attendant

[63] DEIS at 2-18.

[64] DEIS at 2-1 (stating "[t]he Project information in this chapter is primarily based on public filings by the Applicant.").

information about the nature and magnitude of the spread of these plants resulting from the project, as well as whether and to what extent the mitigation measures described are likely to be effective.[65] Statements like "[t]o best protect sensitive resource areas such as wetlands or waterbodies, trench breakers would be installed on site specific conditions . . . ." suggest that the installation of trench breakers in the manner described are, as a matter of fact, the way to best protect sensitive resource areas without any information referenced or cited to by which to substantiate such a conclusion.[66] Similarly, the assertion that "Enbridge would restore the site as much as possible to its original condition" is a misleading statement in the absence of additional language that indicates what that possibility is. As one final and particularly glaring example, the following statement from the Project Description on Enbridge's crude oil transport operations reads like marketing language for the company:

2803-15 cont

> Enbridge abides by all PHMSA regulations and works directly with regional, state, and local agencies, landowners, and other stakeholders to ensure that its programs meet the needs of the community in which it operates.[67]

2803-16

DOC must eliminate these and other instances of extraneous language from the Project Description as they do nothing "to allow the public to identify the purpose of the project, its size, scope, environmental setting, geographic location, and the anticipated phases of development" but, rather, mislead the public into thinking that claims of mitigation efforts by Enbridge that have yet to be conclusively evaluated are, instead, fact descriptions of the Project components.

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[65] DEIS at 2-24.
[66] DEIS at 2-27
[67] DEIS at 2-37

C. DEIS' Description of Project Purpose is Excessively Detailed

Our comments here pertaining to way the DEIS approaches the project purpose are explained in much greater detail and with more holistic analysis as to the legal requirements for the EIS in section ____ of these Comments. Here we draw on that later analysis by reference in order to provide more limited comments specific to the legal requirements for stating the project's purpose in the EIS' Project Description section.

The Project Description section should define the project purpose in accordance with the way the EIS defines the project purpose in order to satisfy the requirements of MEPA—that is in terms of state and public need for the project and not the needs of the Applicant. Furthermore, the EIS should frame the project purpose such that it allows the Commission to identify and evaluate the full range of reasonable and prudent alternatives to the project. 2803-17

The DEIS' Project Description section, however, describes the project's purpose exclusively from the perspective of Enbridge and its private interests. Drawing directly from Enbridge's filings, the Project Description states that the purpose of the project is to replace the existing Line 3 pipeline to (a) avoid the expense of having to continue maintaining it, (b) increase the capacity of Enbridge's pipeline system to meet demand for Canadian crude oil, and (c) reduce curtailment, improve operational flexibility, and the energy efficiency of Enbridge's system.[68]

The reasons for why this approach to defining the project's purpose result in the EIS violating MEPA are explained later in these Comments. In the context of the DEIS' Project Description section, however, the Department's decision to define the project purpose based on

[68] DEIS at 2-5.

Enbridge's purpose is problematic because it confuses and misleads the public to the aspects of the project that matter for the purposes of the environmental review and the Commission's decision about the pipeline.

VI. THE DEPARTMENT SHOULD DEVELOP A NEW DEIS IN CLOSE CONSULTATION AND COORDINATION WITH OTHER AGENCIES THAT HAVE MORE EXPERIENCE WITH PREPARING AN EIS AND MORE EXPERTISE IN EVALUATING ENVIRONMENTAL IMPACTS

The DEIS major deficiencies by and large take two forms: (1) failures to meet MEPA requirements for an EIS, which are detailed in these comments and (2) failures in methodology for evaluating impacts, which are detailed in the comments of many of our organizational allies and technical experts. Both can be attributed in great part to the fact preparation of an EIS is highly complex, both legally and technically, This is understandable and but also especially concerning given the complexity, scale, and range of the project itself and of its impacts on our water, land, air, health, safety, security, and communities.

We encourage the Department to prepare a new DEIS in close coordination and consultation with the Department of Natural Resources, the Pollution Control Agency, and other agencies who can lend both their knowledge and experience on how to prepare an EIS so that it complies with the requirements of MEPA and their technical expertise on evaluating the range of environmental effects the EIS must consider.

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Nicolette Slagle

Street Address:

City: Pons fond State: MN Zip Code:

Phone or Email:

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Appendix B.7.1

↳ Cleaning Validation Report is from NEB filing. They couldn't be bothered to write a new one for Minnesota? 0257-1

↳ where does flush water go after the cleaning process?

↳ all of the other various permits that Enbridge will need to get over the life time of the project should be spelled out so we can get a full picture of all the impacts

→ Appendix B pg 15

→ creation of water conduits along outside of the pipe → we can already see these water conduits from Google Earth.

General Comment → where is the discussion of the fact that even Enbridge has been talking about the need to replace this line since 2003, ~~but~~ Dispite this, they waited till the cost between repair & building a new line reached equillibrium before looking to start this project.

→ at what point can we have a dialouge w/ the DOC, PUC, & enbridge? We have been told throughout this process the time is not now. When will this time be?

→ Appendix B pg 25 → hoop stress → how is the hoop not facing external pressure after it is empty?

If including additional pages please number them and tell us how many you are providing:_____ pages

0257-2

Levi, Andrew (COMM)

From: Cynthia Smith <cynthiasmith5333@gmail.com>
Sent: Sunday, July 09, 2017 1:41 PM
To: MN_COMM_Pipeline Comments
Subject: Sandpiper Concerns

TO:

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
SAINT PAUL, MN 55101-2198

I am very concerned that the DEIS (Draft Environmental Impact Statement), supplied by Enbridle and their paid contractors, does not consider the effect of Line 3 Project on our waters. It is of great concern that there are 192 water crossings in Minnesota via the proposed route.

Among my concerns are:
-There is no disclosure of hydraulic drilling fluids used to tunnel under streams, but which are known to be TOXIC to aquatic life. 1467-1
-There is no winter spill analysis - how to clean a lake or river covered by ice.
-Explaination of how first response personnel get to the site of aa spill where no roads exist?

I feel that an independent third party should be involved in the DEIS, not Unbridle and their paid contractors.

Sincerely,

Cynthia Smith
PO Box 645
19675 Jig Saw Drive
Park Rapids, MN 56470

Levi, Andrew (COMM)

From: Steven Smokey <SSmokey@bepc.com>
Sent: Friday, July 07, 2017 3:10 PM
To: MN_COMM_Pipeline Comments
Subject: Comments Regarding Enbridge Energy's Proposed Line 3 Pipeline Project

In response to dockets: CN-14-916 and PPL-15-137

More specifically in regard to RSA-White Elk Lake:

As a property owner along the proposed alternate route (RSA-White Elk Lake) I support the studies' direction that the route proposed by the Minnesota DNR has significant drawbacks that reduce the alternate routes ranking. Although some details may have been missed, I would also include some important information that does not appear listed in the studies or contained maps.

1. Our family owns seasonal structures that were not included in the study. These structures are occupied for approximately 3 weeks in a year for recreational purposes. The construction of the pipeline through my property would greatly impact the use and enjoyment of my property. It also raises the question of why seasonal use property was not included in the study (i.e. cabins and lake homes). 1468-1
2. The RSA mentions impacts to White Elk Lake, but does not address impacts to Bass and Mud Lakes (there may also be a fourth lake in the corridor). Mud Lake is a historical ricing lake, and the surrounding wetlands may be more extensive than the White Lake wetland system. The hydrologic connectivity between Mud Lake and White Elk lake is far more complex than the report noted. 1468-2
3. The original DNR letter proposing this route is full of glaringly inaccurate biases regarding forest designation and wildlife impacts.
4. RSA-White Elk Lake follows a historic route where an old settlement and old farmsteads were located. There is a high potential in this corridor for archeological issues that were not impacted or addressed when the power line was installed. 1468-3

Should this route be seriously considered for construction, I will expand my comments and add additional ones.

Thank you
Steve Smokey

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Andrea Sonum

Street Address: 3908 5th Ave S. #1

City: Minneapolis State: MN Zip Code: 55409

Phone or Email: andreasonum2@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

To reduce spills into MN lakes, rivers, streams, etc. we need to shut down Line 3 and keep the Tar Sands in the ground. The EIS is negligent in commenting on environmental devastation pumping (and, consequentially, burning) the dirtiest crude oil in North America. The CO_2 released just from this oil would make our planet inhabitable. The danger to our waterways is completely irresponsible. My children are small (4 & 6) but already know that ocean acidity, melting icecaps & extreme weather are a frightening future. The EIS needs to address the impacts this pipeline will have on global climate change & the list alternatives that include not building a new Line 3 & shutting down the current Line 3. The EIS also needs to specify the chemicals (bitumen, etc.) Enbridge plans to use & how those affect the health of our state's environment & people. 0765-1

If including additional pages please number them and tell us how many you are providing:_____ pages

MS. MAHYAR SOROUR: Okay. Hi. So Mahyar Sorour. M-A-H-Y-A-R. S-O-R-O-U-R. And I am a member of the Minnesota Pollution Control Agency Environmental Justice Advisory Group. I'm here today as a St. Paul resident, as a lifelong Minnesotan, concerned with the inadequacy of the Draft Environmental Impact Statement for the proposed Line 3 Pipeline Project.

Every summer when I was growing up, I had the honor of going up to the Boundary Waters, swimming in Lake Superior, enjoying the pristine natural resources of the land. Now, as a St. Paul resident, I have the honor of living right by the the Mighty Mississippi River.

The DEIS contains no spill analysis

2065-1 Cont'd

for the tributaries of the St. Louis River or the Nemadji River, where spills could decimate Lake Superior and the harbors of the Twin Ports. A spill in Lake Superior not only affects the communities who reside near the water, but all Minnesotans, as the Mississippi River is connected. All of our water is connected.

As someone who has spent their life working on environmental justice, this project is a clear example of environmental racism. In the environmental justice chapter, Chapter 11 of the DEIS, which might I add is less than 20 pages long out of a 5,000-page document, it acknowledges that pipeline impacts on tribal communities are part of a larger pattern of structural racism that tribal people face in Minnesota, which was well documented in a 2014 student by the Minnesota Department of Health. It also concludes that the impacts associated with the proposed project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities.

The injustices of cumulative impact is an aspect that must be acknowledged, but is clearly forgotten in this Draft Environmental Impact

Statement. You are proposing a pipeline on environmental injustice communities that already have to live with a number of disparities, and cutting off access to water, where native communities hunt, fish, and gather wild rice is environmental racism. This is just not right.

The Draft Environmental Impact Statement concludes that a disproportionate and adverse impacts would occur to native populations in the vicinity of the proposed project. Therefore, to honor our environmental justice communities and not perpetuate the cycle of structural and environmental racism that's so clear in our country today, we cannot move forward with this project

Thank you.

Levi, Andrew (COMM)

From: Carolyn Spangler <carolynspangler1@gmail.com>
Sent: Sunday, July 09, 2017 11:45 AM
To: MN_COMM_Pipeline Comments
Subject: public comment-line 3 project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. I have heard that Enbridge redacted those numbers from the public version of the DEIS. Without them, there is no reliable way an independent party to verify their results. 1475-1

I believe that in order for Minnesota citizens and agencies to make an educated decision about Line 3, we must have that information, and I would like to know why Enbridge won't release it. Please insist that Enbridge provide their data on oil releases and spills in Minnesota.

If Enbridge objects due to security reasons, then I would like to know why they have failed to cover the exposed pipes in the Tamarack River in northwest Minnesota, and why they allow people to joyride over exposed pipes south of Clearwater. This is surely a security issue as well. For Enbridge to pick and choose what issues warrant "security," is unacceptable.

Sincerely
Carolyn Spangler
15995 Freedom Drive
Park Rapids, MN 56470

Levi, Andrew (COMM)

From: Hannah Specht <hannah.m.specht@gmail.com>
Sent: Friday, June 23, 2017 11:35 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Draft Environmental Impact Statement

Dear MN Department of Commerce:

I believe that the risks posed by the Enbridge Line 3 Draft Environmental Impact Statement to MN waters are unacceptable. The estimated 25% estimated annual spill probability is unacceptably high- it suggests that MN could experience an oil spill as often as every 4 years. This risks is FAR to high- it effectively acccepts contamination in our waters, which provide a source of recreation, habitat for Minnesota's wildlife & fish, and are critical to the quality of life. Furthermore, spills, especially those into moving water, would not necessarily be contained within the 10 mile region of interest designated in the EIS. At minimum, this ROI should be broadened to reflect the extent of the potential region of impact that COULD be affected in a bad spill (for example, Enbridge's spill on the Kalamazoo) based on spills in other similar systems. 0568-1

Thank you for your consideration of these important threats to MN's waters.

--
Hannah Specht
hannah.m.specht@gmail.com
413.636.9204

"Don't worry about what you will do next. If you take one step with all the knowledge you have, there is usually just enough light shining to show you the next step." ~ Mardy Murie

Levi, Andrew (COMM)

From: DeCourcy Squire <decourcy350@cs.com>
Sent: Monday, June 26, 2017 10:51 PM
To: MN_COMM_Pipeline Comments
Subject: Draft EIS line 3 pipeline PPL 15-137/CN 14-916
Attachments: DEIS testimony.docx

I spoke at the June 13 public meeting in St. Paul but because of time limitations I was not able to present my full testimony. I am attaching the complete copy, somewhat revised, to be added to the comments on the draft EIS of the line 3 pipeline, PPL 15-137/CN 14-916. Please add these comments into the record. (If you wish, you may delete my incomplete testimony from June 13 and replace it with this, if that is allowable.)

DeCourcy Squire
612-209-9561
1902 4th Avenue South #2
Minneapolis, MN 55404

Comments re the Draft EIS for Line 3 PPL 15-137 CN 14-916

My name is DeCourcy Squire of Minneapolis. I am here, not as an expert, but as a concerned citizen. I am extremely concerned about the risk the proposed pipeline may pose for the environment when there are spills.

I will not cover all the issues or all my questions, but will share a few comments and 12 questions based on my reading of chapter 10 of the DEIS.

The DEIS acknowledges in the introduction to chapter 10 section 10.1 "The probability of a release of some type along the entire pipeline during its lifetime is not low. The consequences of a large release can be significant." 1080-1

Enbridge commissioned two studies, which the DEIS drew largely on, by Stantec and by Stantec and Barr: one on pinhole leaks and one on larger leaks. The one on larger leaks redacts the estimates of how much the volume of potential leaks could be at various sites.
1. **Why is this not considered public information?**

Stantec et al. estimated the probability of leaks based only on past history although as financial advisers are always reminding us, past performance alone does not necessarily predict future performance. They took the number of incidents (80) and divided that by miles/year, miles of pipeline (roughly 2000 miles) times 14 years (2002-2015) for which they had data. (Tables 2.4 And 2.5 in their report *Line 3 Replacement Project: Assessment of Pinhole Release*) 1080-2

In the DEIS (section 10.2.5.3) the probabilities are figured by miles/single year using the length of the new Line 3 route only (380.38—although actually the Minnesota part is 337 miles). To get a better prediction, one also needs to look at the expected lifetime of the pipeline to see how many incidents there might be, (multiplying by the number of years) but also take into account that the older the pipeline gets, the higher the probability of leaks. It is also becoming more difficult to estimate the weather dangers as we are seeing some changes in average temperatures, severity of storms, etc.

The report cites extreme weather, storms, flooding, mudslides, and wind as being potential causes of leaks/spills.
2. How was the real problem of the changing climate, including *increased* summer heat and the increase in the number and severity of storms taken into account in assessing the risk?
3. How will the increased risk that these changes lead to be mitigated?

The lifetime of a pipeline is now expected to be about 60 years (according to Petroleum News, week of Feb. 14, 2010) although catastrophic spills have occurred when pipelines were less than 30 years old as with the old Line 3.

4. **How long is the new Line 3 expected to last?**
5. When it gives out, will it too be left in the ground to corrode and leak?

For prevention of large leaks, early detection and action is crucial. Leaks caused by pinhole leaks are more difficult to detect than regular leaks and can slowly lead to large leakage. In the 2015 report by the Department of Public Safety on *Minnesota's Preparedness for an Oil Transportation Incident*, there were numerous recommendations to improve the readiness of first responders dealing with pipeline leaks.
6. **Have these recommendations been fully implemented?**

There are 2.7 million miles of pipeline in the US and only 188 federal PHMSA inspectors and 340 state PHMSA certified inspectors. This is 5000 miles per inspector nationally. Minnesota is in the central region of PHMSA, made up of 12 states, with a total of 12 certified inspectors, of whom 2 are in Minnesota.
7. **Is this a sufficient number?**
8. If they detect a problem, will they have the authority to order the pipeline turned off?

I am concerned that with decreased funding for environmental concerns, there is likely to be less research on the national level to assess risk and to fund inspections.
9. In what ways is Minnesota able and ready to fill that breach?

I am not in favor of this new Line 3, but I agree that the old Line 3 should be closed down.
10. W**hy is there no provision for Enbridge to take responsibility to remove it?**

Pipelines leak, and rail or truck transport come with their own set of risks. So what about other options?

11. Very importantly, why was there no study of the impact of expanding the use of sustainable power, such as solar, to replace the use of oil for our energy needs?

12. What would be the environmental impact of this and the job creation and the amount of risk compared to the pipeline?

I feel it is a serious failure that the Draft EIS did not consider this option.

Our state has tribal treaty obligations; it has rice lands; it has 1/5 of the world's supply of fresh water; it has a beautiful countryside for tourism; it has agricultural land. All this could be endangered by the oil pipeline when the spills and leaks occur, which the DEIS acknowledges is inevitable.

I urge you to look closely at the risks vs. benefits of this pipeline proposal and investigate other non-fossil fuel options.

MS. DECOURCY SQUIRE: DeCourcy Squire. D-E capital C-O-U-R-C-Y. And last name is S-Q-U-I-R-E.

And I'm here not as an expert, but as a concerned citizen. And I've read parts of the Draft EIS, especially Chapter 10, and as well as the reports by Stantec that were commissioned to the EIS on pinhole releases and on assessment of accidental releases and also the 2015 report by the Department of Public Safety on Minnesota's preparedness for an oil transportation incident, because I'm extremely concerned about the risk the proposed pipeline may pose to the environment if there are spills. And

what reading the draft report has left me with are some questions. So here are 12 of them.

The DEIS acknowledges in the introduction to Chapter 10, Section 10.1, the probability of release of some type along the entire pipeline during its lifetime is not low. The consequences of a large release can be significant. 2114-1

Enbridge commissioned the two studies that I mentioned earlier. The one on the large release redacts the estimates of how much the potential leaks could be. Why is this not considered public information?

Stantec, et al., estimates the probability of leaks based on past history. And I realize we cannot always predict the future, even though my financial advisor is always saying past performance isn't a guarantee of the future.

What they did is they took the number of incidents, which were 80, over a period of 14 years, from 2002 to 2015, and they divided that on miles per year using the miles of the pipeline, roughly 2,000 miles. And that was Tables 2.4 and 2.5 in the report, Line 3 Replacement Project, Assessment of Pinhole Release.

In the DEIS Section 10.2.5.3, the

probabilities are figured by miles per single year, using the length of new Line 3 route only. But to get a better prediction one also needs to look at the expected lifetime of the pipeline to see how many incidents there might be, so multiplying by the number of years, although this does not take into account that the older the pipeline gets, the higher the probability of leaks. It's also becoming more difficult to estimate weather dangers, as we are seeing some changes in average temperature, severity of storms, et cetera.

The lifetime of a pipeline can be expected to be about 60 years, according to Petroleum News in the week of February 14th, 2010 newsletter, although catastrophic spills have occurred when pipelines were less than 30 years old, as with the old Line 3. So how long is the new Line 3 expected to last? And when it gives out, will it too be left in the ground to corrode and leak?

Reports cite to --

CN-14-916 PPL-15-137

0966

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Karen Stout Heller

Street Address: 101 Thompson SW

City: Verndale State: MN Zip Code: 56481

Phone or Email: 218-296-2525

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Invasive machinery Bring Invasive plants.

Please include a study on how invasive plants destroy native colonies as they spread outward from pipeline clearings. 0966-1

Especially Reed Canary is very destructive in wetland eco systems.

If including additional pages please number them and tell us how many you are providing:_____ pages

MR. GERALD STRIEGEL: Hi.

FACILITATOR: Start by spelling your name.

MR. GERALD STRIEGEL: Gerald Striegel. G-E-R-A-L-D. Striegel, S-T-R-I-E-G-E-L. Hi.

I'd like to focus on the greenhouse gas emissions associated with the materials to be pumped through the proposed pipeline. Although the Draft EIS identifies potential shipping variations, the corresponding lifecycle emissions are not quantified adequately. In the final EIS document is -- if the final EIS document is to provide heat-trapping contribution of the transported material lifecycle, greenhouse gas emissions must be thoroughly identified. 1540-1

In Section 10.3.1.1.2 both heavy crude and dilbit are listed. They are unique substances. But Table 5.2.7-10 lists only heavy Western Canada sedimentary basin crude, with a range of 584 through 632 kilograms of CO2 equivalent per barrel. We're going to call it WCSB basin from here on out. It's an expansive area and contains both conventional and tar sands formation.

So what material is being identified? Page 5-440 states that lifecycle analysis or greenhouse gas tracks the total production of greenhouse gases from their extraction from the earth to the end-use combustion of the refined petroleum products or by-products. So in the case of dilbit, is the inclusion of Petcoke -- is that inclusive of Petcoke, and what emission content is applicable? 1540-2

Given the expanse of the tar sands fields and the waning life of conventional basin assets, it seems that a worst-case scenario, dilbit and associated Petcoke products, would be an appropriate baseline. I would like to see those numbers identified and applied to the subsequent discussion. 1540-3

Independently, the proposed pipeline

and its lifetime distributions to atmospheric CO2 could be dismissed as insignificant, if all other considerations are ignored, an approach foolishly applied to many discussions today. It adds up. It's cumulative.

When we consider this or any pipeline servicing the tar sands formation, it's critical to recognize not just the destructive contribution of the proposed pipeline, but also those already existing. It's important to understand there are roughly 170 billion barrels of recovered tar sands material. And when burned, it will add 25 billion metric tons of carbon to the atmosphere.

Levi, Andrew (COMM)

From: Jerry Striegel <grstriegel@gmail.com>
Sent: Monday, July 10, 2017 12:36 PM
To: MN_COMM_Pipeline Comments
Subject: Docket Numbers CN-14-916 and PPL-15-137 Public Comments - DEIS Life Cycle GHG Emissions Omissions
Attachments: line 3 DEIS Life Cycle GHG Emissions Omissions.pdf

Jamie MacAlister, Environmental Review Manager

Minnesota Department of Commerce

Submissions to: Docket Numbers CN-14-916 and PPL-15-137

Subject: DEIS Life Cycle GHG Emissions Omissions

I will focus on the GHG emissions associated with the materials to be pumped through the proposed Line 3 pipeline. Though the DEIS identifies potential variations, the corresponding life cycle emissions are not quantified adequately. If the final EIS document is to provide the heat trapping contributions of transported material, life cycle GHG emissions must be clearly identified.

In Section 10.3.1.1.2 both heavy crude and dilbit are listed. They are unique substances, but Table 5.2.7-10 "Average Life-cycle GHG Emissions for Various Crude Oils" lists only Heavy WCSB crude with a range of 584-632 kg CO_2-e./barrel. That's quite a spread. WCSB is an expansive area containing both conventional and tar sands formations. So what material is being identified? Further, page 5-440 states that Life-cycle analysis for GHGs tracks the total production of GHGs from their extraction from the earth to the end-use combustion of refined petroleum products or byproducts. So, in the case of dilbit is that inclusive of petcoke and what emission content is applicable? 2692-1

Given the expanse of the tar sands fields and waning life of conventional WCSB assets it seems that a worst case scenario, dilbit and associated petcoke byproduct, would be an appropriate baseline. I would like to see those numbers identified and applied to any subsequent discussion.

Alone, the proposed pipeline and its lifetime contribution to atmospheric CO_2, could be dismissed as insignificant. An approach foolishly applied to many decisions today. It all adds up. It's cumulative.

When we consider this or any pipeline servicing the tar sands formation it is critical to recognize not just the destructive contribution of the proposed pipeline, but those already existing. It's important to understand the extraction of this material will produce roughly 170 billion barrels of dirty crude, and when burned will add some 25 billion metric tons of carbon to the atmosphere.

For the sake of argument, let's take life-cycle tar sands emissions at roughly 20% higher than the conventional U.S. oil supply. Why would our Trustee, the PUC, consider permitting this dirtier Canadian crude when both cleaner U.S. sources and conventional supplies are available? PUC members have to be able to see the GHG comparisons. There are no silver bullets in the race to mitigate climate change. There is a need for many smart decisions. A complete Final EIS is a starting point.

Gerald Striegel

400 Beacon Ave.

St. Paul, MN 55104

Minnesota Department of Commerce

Submissions to: Docket Numbers CN-14-916 and PPL-15-137

Subject: DEIS Life Cycle GHG Emissions Omissions

I will focus on the GHG emissions associated with the materials to be pumped through the proposed Line 3 pipeline. Though the DEIS identifies potential variations, the corresponding life cycle emissions are not quantified adequately. If the final EIS document is to provide the heat trapping contributions of transported material, life cycle GHG emissions must be clearly identified.

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Gerald Striegel

400 Beacon Ave.

St. Paul, MN 55104

Levi, Andrew (COMM)

From: Dan Sauve <dan.sauve@co.clearwater.mn.us>
Sent: Friday, June 23, 2017 8:53 AM
To: MN_COMM_Pipeline Comments
Subject: Docket Number CN-14-916 and PPL-15-137

Hello,

I attended the meeting on June 22, 2017 in Bemidji concerning the Draft EIS for Docket Number CN-14-916 and PPL-15-137. I provided verbal and written comments at that meeting. Here are some additional comments.

Page 16 of the Executive Summary and Figure ES-4 is really misleading. I believe that pipelines are the safest mode of transportation for oil. An attempt was made in Figure ES-4 and the accompanying text to compare the various modes of transportation. The only fair way to compare would be based on volume-miles transported versus total spill volume. So the left side of the chart would be "Total Volume Transported" and the right side of the chart would be "Total Spill Quantity". You could still discuss the average spill volume size, but the way it is presented it is really miss leading because there is so much more volume being transported by pipeline. So you really are not comparing apples to apples. The only way to compare to each other is to compare based on the same volume being transported by the various modes. 0564-1

I also feel a better explanation should be made in the safety comparison for humans. Again this needs to be compared by volume mile transported. Because if all the oil that is transported by pipeline is now placed in trains and trucks it will have a great impact to safety of the public using our roads and the towns it passes through. We have vehicle crash rate data based on miles travelled. So the increase in the various crash intensities can be calculated. Simple take the volume-miles being transported by pipeline and place that in a truck to get miles traveled in a truck. Take the total truck miles that would be needed to transport the same volume by truck. From there you can calculate the total number crashes, number of fatalities, and serious injury crashes. The MnDOT Traffic office could help with this calculation. A valid safety comparison needs to be made to transport the same volume by each mode of transportation. 0564-2

Thank you

Dan Sauvé, P.E.
County Engineer
Clearwater County
113 7th St. NE
Bagley, MN 56621
Phone (218) 694-6132
dan.sauve@co.clearwater.mn.us

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Levi, Andrew (COMM)

From: Sara Suppan <sara.suppan@gmail.com>
Sent: Tuesday, July 04, 2017 1:59 PM
To: MN_COMM_Pipeline Comments
Subject: Citizen Comment: Line 3 DEIS 2017
Attachments: SaraSuppan_Comment_Line3DEIS.pdf

Attached: Sara Suppan, Comment on the Line 3 DEIS, July 4, 2017.

Please give response indicating that this comment has been received.

Thanks,
Sara

Sara Suppan
Comment on the Line 3 Replacement Project DEIS
Minnesota Department of Commerce
85 7th Place E, Suite 280, St Paul 55101
July 5, 2017

I. Qualifying Background and Introduction

My name is Sara Suppan. I have been a volunteer with MN350 for over a year now, during which time I have attended meetings of the PUC, EQB, and with the State Department in Bemidji, have attended and led info sessions about Line 3, have helped to compile a Fact Book about the pipeline, and have gotten to speak with dozens of Minnesotans who live along its current route. I've been following the Line 3 replacement proposal for fourteen months. Before that, I self-educated on environmental justice issues with voracious reading, by attending free lectures, and with a lot of documentaries. I have lived in Minnesota my whole life. I also grew up with a parent who works at the Institute for Agriculture & Trade Policy (as their Senior Policy Analyst of 25 years). I was raised on discussions of climate change. I went on to become the captain of my high school Earth Club, and also spent six weeks of school on a farm in Wisconsin where I tracked changes to the environment by counting birds and collecting plant samples. I had the pleasure of beekeeping there, and grew a relationship with bees that would last. In college, I worked with the University of Minnesota's bee labs on an art project to raise awareness of colony collapse. Now I often go up North to visit Duluth, Two Harbors, and Hermantown Minnesota, where my partner of four years has family. The new pipeline will affect them, and will affect me, and so I appreciate the opportunity to comment today.

I am writing out of concern that a new major oil pipeline in Minnesota will result in a new major oil spill in Minnesota. As I am certain others worry about what an inevitable spill will mean for our lakes and rivers, I will focus my comment on Chapter 10 of the Environmental Impact Statement for Line 3, titled "Accidental Crude Oil Releases". I am going to address the source for the study on which this analysis is based, errors of method, and factors left unconsidered in the DEIS. I will express the opinion throughout that this DEIS is both unreliable and dangerously inadequate, considering the wide scope of the project.

II. Considering the Source for this DEIS and Potential Bias

I ask, Can a study commissioned by Enbridge itself on the risk of an oil spill from the Line 3 Replacement be considered an ***independent*** source of assessment? I am doubtful. There are some troubling framing devices used in the study written by Enbridge-funded Stanec + Barr Engineering (2017) and Stanec et al (2017) (10.2.1.1.1), which I will allege suggest bias and are meant to persuade the Minnesota government and public, rather than inform them.

First, their spill analysis is stated in terms of ***annual*** spill risk, rather than risk multiplied across the lifetime of a pipeline, which could be 50 or 60 years (10.2.1.2) (Table 10.2-2). The estimated annual probabilities of an incident for the proposed pipeline are thus framed in inconceivable figures such as "0.249 incidents per year" (Table 10.2-1) (10.2.4.2.2). These estimates should be multiplied into a half-century to give a clearer picture of actual risk. The purpose of the DEIS is to provide information to both decision makers and to the public of Minnesota, and so framing the risk in honest terms matters a great deal. Indeed, since an older pipeline likely poses a greater leak threat, the DEIS really should have included an algorithmic estimate, compounding the leakage risk each year over the anticipated life of the pipeline. The older the pipeline gets, the higher the risk that it will spill. Presumably, the annual risk of a spill would not remain at a plateau across six decades.

Second, I believe that the route alternatives listed improve Enbridge's image unfairly, by using favorable language toward them. The authors of the spill risk assessment throughout will repeatedly use the word "***only***" to describe risk statistics associated with the applicant's preferred route (APR), but do not use the qualifier "only" to describe the projections (i.e. number of spills, number of nearby water-bodies) for alternative routes like SA-04, which was proposed by Friends of the Headwaters. The language used in the DEIS idealizes Enbridge as a company while doing little to acknowledge Enbridge's historical failures to work up to its own standards. For example, the document claims that, "Modern crude oil pipeline systems are designed, constructed, and operated with technology to minimize the potential for integrity failures and to rapidly detect and manage unanticipated releases" (10.1.2.1). This sounds great, but does not disclose that Enbridge's rapid detection mechanisms have failed in the past. Sometimes control room operators have even ignored the detection mechanism warnings, and local residents are the ones to first report a smell or the presence of oil, as happened in Kalamazoo, Michigan. "Pinhole" leaks are numerous in the current Line 3 and go undetected and without response, which is why I am confused by the assumption in 10.3.1.4 that once the leaked substance reaches the surface, "visual detection and response would occur." This is cited as from Stanec et al 2017; but who are they to say there would ***actually*** be response to a pinhole leak? What is the record of Enbridge ever responding to a pinhole leak, when they've already acknowledged that the current Line 3 is "weeping" in numerous places, and they haven't shut it down? And if there are no adequately sensitive technological mechanisms to detect a tiny leak, who are we relying on for that visual detection? I learned from personnel at the Saint Paul public meeting that there are pigs that run up and down the line, as well as human staff that walk sections of it. But the DEIS does not disclose how often visual inspections occur, or how inspection for pinhole leaks are conducted underneath

bodies of water. And under ice? How many state inspectors are hired, and is there an adequate number of them to cover the hundreds of miles they will need to physically walk? The study warns that "Pinhole releases can remain undetected for long periods of time, ultimately releasing volumes that would be classified as medium or large spills" (10.3.1.4). So why are pinhole and small spills not monitored?

Next, the alternatives to the Applicant's Preferred Route seem intentionally unreasonable. The Friends of the Headwaters route SA-04 is frequently measured as being longer than the APR, and therefore as having greater negative impact. However, the DEIS does not account for the fact that the oil delivered by the APR will then have to continue from Wisconsin to Chicago. That distance and its impacts are not measured….in the Environmental Impact Statement! Some of the route alternatives that the Preferred Route is compared to seem like inappropriate alternatives, anyway. Just clearly bad or improbable ideas that will make Enbridge's proposal seem better, and which will give the illusion that some alternatives have been explored. By Truck and By Train are red herrings—easy outs. The DEIS does not even make clear to the reader how a combination of rail and pipe would work, even though these pairings are listed as alternatives. (In my mind, I had pictured some sort of funnel from a pipeline into a box car, until a staff member at the St Paul Public Meeting explained to me that it meant the two would be used in tandem. This process should be made explicit for the reader in Chapter 10.) Moreover, the DEIS analysis completely neglects an obvious alternative to the proposed route: an alternative called "No Pipeline At All". The DEIS is required to have a "No-Build" option, and it is bizarre to me that the continued operation of a failing, 55 year-old Line 3 would suffice as the "No-Build" option. In every table of the DEIS, Enbridge's preferred route is posed as the lesser of evils because it excludes a Minnesota without new oil infrastructure. A pipeline that threatens 6,903 Unusually Sensitive Ecological Areas (Table 10.4-2) seems somehow reasonable you frame it against worse numbers. No Pipeline At All is a promising option. The per-mile risk of an oil spill where there is no pipeline? Zero. If the purpose of this new pipeline were really to supply good energy to US citizens, and was not just a desperate attempt to squeeze the last dimes out of an oil industry in decline, renewable energy systems would have been evaluated as an alternative.

Back to the issue of biased language: The DEIS discloses that between 2002 and 2017, there were seven known pipeline failures in the existing Line 3 (10.2.4.1.2). But the conclusion drawn from that fact is that these spills "underscore the increased risk associated with the older Line 3 technology and pipeline aging compared to the newer technology for the other pipeline alternatives". The emphasis is on the newer and better technology; rather than that Enbridge continues to operate pipelines which are deeply flawed and at risk. It continues: "Enbridge

pipelines constructed before 1980, such as the existing Line 3 employed different coating technologies which do not meet current standards for corrosion". (10.2.1.3.1). This would include lines 1, 2, and 4, which, if not up to standard, must ***also*** require replacement. Line 3 is not their oldest pipeline. Enbridge says that the aging infrastructure still in operation is the reason for building a new pipeline. It is as if the analysis itself, which I believe is meant to be without bias, is advertising for Enbridge. It seems like the DEIS is sold on them, but I say Enbridge should stop operating their failing pipes. They have lost the right to a new pipeline.

The bottom line is that this 5,000 page document is insurmountable and is littered with Enbridge rhetoric. The Minnesota Environmental Policy Act (1973, MS 116D) requires that "The environmental impact statement shall be analytical rather than an encyclopedic document", and this DEIS is so encyclopedic that it takes a team of professionals to look at it. In summary of my concerns, each alternative seems intentionally framed to make the APR look best: Transportation by Rail and Transportation by Truck are the red herrings, Continued Use of Existing Line 3 is not an honest N0-Build scenario, Existing Line 3 Supplemented by Rail and by Truck are processes not well-described and not reasonable, and route SA-04 is measured as a much longer distance than the Applicant's Preferred Route, which conveniently does not measure an entire length of the APR from Wisconsin to Chicago. Not all alternatives are investigated equally here. The risk is calculated in miniscule year-to-year numbers, and the assessment describes Enbridge as an upstanding company with state-of-the-art equipment, while not disclosing their history of malfeasance; all to suggest that there is only one real option here.

III. Poor Systems of Measurement in the DEIS

Now I will cover some flaws of process in the assessment of environmental impact. I am not confident that this analysis was conducted with full scientific integrity. As a life-long skeptic, this was fun to pick apart. I am generally bothered that the methodology of the Spill Risk analysis was not thoroughly described, nor were sources consistently cited. I want to know why the method taken of analysis was the best among others available, I want to know who (if anyone) peer-reviewed the study by Stanec et. al, I want to know what initial criticisms were made during the review process and how those were resolved, and I want to see a demonstration of independent analysis. Because the Stanec study was commissioned by Enbridge, I would expect even more transparency. The section above describes why I am not convinced that the analysis was independent.

The Spill Risk Analysis in Chapter 10 charts the impact on various resources and areas of interest based only on each route's physical proximity to it. So the charts list how close, say, a pipeline would get to some number of drinking wells (Table 10.4-6). But the importance of a resource varies in a way not captured in these numbers. To take bodies of water as an example: these may be different based on current water quality, the ecosystem that depends on it, the families that enjoy visiting it, or even its historical significance. There are already data available that could be used to determine the value of various Minnesota resources, including the Minnesota Pollution Control Agency's "Stream Use Classification System" and "Index of Biotic Integrity". To just outline impacts based principally on physical distance in terms of acres misses the point.

So, the seven sites used to model the spill risk analysis are not, in fact, the worst-case zones when ranked by relative sensitivity or the importance of their resources. Route alternative SA-04, for example, passes mostly through already-disturbed agricultural lands that are not feasible to restore currently. The Applicant's Preferred Route, however, crosses more virgin territory where ecosystems are as-yet intact. The difference in conditions here is not recognized in the DEIS, suggesting to me that SA-04 was not considered seriously.

Finally, 10.3.1.3.1 Acknowledges that "small releases can persist in the environment for long periods of time and can cause localized contamination requiring cleanup and remediation", and that these are the most common spill category. Shouldn't there be more effort to monitor and report pinhole leaks if, when undetected, they can spill an amount equivalent to a medium spill? I am not certain why a pinhole or small leak would not be measured and documented in the spill analysis.

IV. Major Points Unconsidered in the DEIS

Now I will list nine more topics that I found missing from and unconsidered in the DEIS. Individually, these are glaring oversights, and collectively, they result in an Impact Statement with holes big enough to pass a 36-inch-diameter pipe through.

First, I would like to see more discussion of how the harsh climate in Minnesota will affect Enbridge's capacity for prompt and full cleanup in the likely event of a spill. There is no description of temperature as it relates to oil viscosity, and no information on whether the underwater cleanup equipment can actually be used in a river where the depth may only be one or two feet. (10.3).

Second, In the worst-case scenario spill modeling conducted by Stanec et al for seven cites along the proposed route, Enbridge has classified the Predicted Volume Out as "Non-Public Data". If those estimates exist, surely they must be disclosed so the public may respond to the projected leakage volume at each site. (Table 10.3-1)

Third, the terrestrial wildlife risk analysis does not include the bee population, which is under threat. My understanding is that there will be herbicides used around the pipeline. If so, there must be consideration of which herbicides will be used, and what the scientific literature says about how these herbicides will affect the food source for one of our state's most important pollinators. (10.4.2.1.1)

Fourth, the Effects on Aquatic Life section does not discuss the effect of small, medium, and large spills on algae and other microorganisms in the water, nor the long-term effects for aquatic plants and the food chain of removing oxygen from the water. Doesn't Enbridge have such data from previous spills and if so, why aren't they included in the DEIS? An Aquatic Life impact assessment should extend beyond the likelihood that fish may get sick from eating contaminated algae. (10.4.2.1.1) This section does not currently describe environmental consequences of using bioremediation techniques and chemicals to reduce the spread of oil in water. Even if Enbridge is not expressly permitted to use dispersant chemicals in Minnesota, they have done so against state law in the past, and so these effects still need to be described here. See article: "Did Enbridge Use Toxic Chemicals to Clean Up Their Oil Spill in Kalamazoo?", Michael Toledano, Vice News, December 24, 2013. 1081-1 1081-2

Fifth, 10.4.1 The analysis should consider non-potable water to also be an AOI (Area of Interest). Some water sources not considered a resource for humans will be a resource for wildlife. This relates to the aforementioned need to rank the value of various AOIs.

Sixth, The new Line 3 will carry 65% heavy and 35% light crude oil (10.3.1.1.1). The DEIS should describe the materiality of these crude types: a thick, sandy peanut butter sludge. The DEIS does not consider the amount of pressure required to force that sludge through pipe, and the potential to exacerbate weaknesses in the pipe with high pressure and pressure cycling. The list of factors cited in the DEIS that may result in a pipeline "incident" does not include the very threat thought to have been the culprit in some documented Enbridge spills: fatigue damage due to inadequate cradling during the shipping of pipe segments. The amplitude of pressure swings capable of producing fatigue cracks is a consequence of the pump discharge required to force heavy, viscous crude oil through the pipe. (10.2.1.2) To not

consider the relationship between high pressure, high volume, and fatigue cracking is an enormous oversight.

Seventh, What effective steps will Enbridge take to prevent intentional third-party damage? In some areas, the current pipeline is above ground and is clearly vulnerable to attack. In a corridor with multiple pipelines, it seems plausible that a terrorist could strike all at once and cause a multi-catastrophic event. The topic of Third-Party damage is addressed in 10.5.1.1.1, but the Public Awareness Program indicates only what measures will prevent accidental third-party rupture of a pipeline. Marking the pipeline may help stop an accident, but would help someone with the intention of doing a lot of damage very quickly.

Eighth, The Impact Statement narrowly focuses on the repercussions of this one project without considering the tangential human activity that has already changed the environment for each of the proposed routes. This is called the Cumulative Impact. Every pipeline has to be compounded with the sum of the impacts from highways, farmland, housing, plumbing, and deforestation to get a clearer picture of how further disrupted the area will be. The DEIS should respond to: What past projects have touched each site? What future projects are planned for these areas? Perhaps the DEIS should even consider what projects will no longer be possible along the route because Minnesota has chosen to build a new and costly pipeline rather than a sustainable project (Opportunity Cost). 1081-5

Finally, it is acknowledged that the risk of this pipeline is largely placed on rural communities, and that those communities won't have easy access to the promised rapid-response tech and crew. However, there is essentially a "To-Be-Decided" where there ***should*** be a plan for getting help to those remote areas. "In Minnesota, the Applicant's preferred route and route alternatives generally pass through rural, sparsely populated areas. Rural communities can face challenges regarding emergency preparedness and response, such as proximity to adequate response personnel and equipment, and may lack needed space, supplies, and staff to respond quickly and effectively to emergencies" (See section 10.5.3.2.1 below)

The above passage is a small part of "Potential Spill Response Challenges". When it indicates at the end to see section 10.5.3.2.1 below, titled, "Remote Area Analysis"...the following 4 sentences are the only thing in that section.

"The magnitude of potential impacts on a resource may be directly related to the response time and response time may be related to the accessibility of the spill. Rapid detection and response can reduce crude oil exposures and impacts on resources. Remote areas may be

less accessible to spill response teams and therefore potentially more vulnerable to effects from crude oil spills. When a final route is selected, spill response strategies will be developed for areas with difficult access" (My emphasis) 10.5.3.2.1

At least an ***outline*** of such response strategies should be detailed in the Environmental Impact Statement. The detection and cleanup procedures described by Enbridge sound great, but if they aren't readily available to the population that will need them most---those plans are not adequate. Surely Enbridge must be able to describe general strategies for accessing low-population areas without needing the route to be approved first?

V. Conclusion

I am not convinced at all that Minnesota will benefit by this massive pipeline project. In fact, the DEIS focuses so much on varying degrees of risk, that it fails to address any substantial evidence that a new oil pipeline ***is*** needed in Minnesota. Both the noticeably biased content and the unconsidered factors outlined here, reflected against the cases on record where Enbridge has failed as a corporate citizen, demonstrate that the DEIS is unreliable and inadequate.

Enbridge is unprepared for and undeserving of yet another pipeline, not to mention that they appear desperate in the face of declining demand for oil. There is no need: the damage will be too great, and the economics don't even make sense. This pipeline is transporting the thickest, dirtiest, and least profitable stuff. It has higher concentrations of heavy metals and because it does not flow easily, requiring higher pressure and more dilutent chemicals. The study shows that this pipeline is guaranteed to leak: supposedly once every four years. It is stated in the DEIS that heavy crude mixed with dilbit may sink or evaporate; that not all of it floats and may be collected off of the water: Dilbit is more likely to lose mass to evaporation, and will be quicker to adhere to loose soil. If it's worse for the economy, more likely to spread, and worsens the structural integrity of the pipe, why does Minnesota need the risk?

MS. SARA SUPPAN: My name is Sara Suppan. That's S-A-R-A, S-U-P-P-A-N. I am a volunteer with MN350, and I appreciate the opportunity to testify today.

I am concerned that a new major oil pipeline in Minnesota will result in a new major oil spill in Minnesota. I will focus my testimony on

accidental crude oil releases.

The premise that there is a need for a new pipeline is flawed. The DEIS discloses that between 2002 and '17 there were seven known pipeline failures in the existing Line 3. Remember that Enbridge continues to operate pipelines they know are at risk. Line 3 is not even their oldest pipeline in operation; it is their third oldest. It should also be acknowledged that this analysis misses an obvious alternative to the proposed route. It's called no pipeline at all.

Now I will list several points missing from the DEIS. First, the Terrestrial Wildlife Risk Analysis does not include the bee population. My understanding is that there will be herbicides used around the pipeline. If so, there must be consideration of which herbicides will be used and what scientific literature says about how these will affect one of our most important pollinators. 1543-1

Second, the effects on aquatic life section does not discuss the effects of spills on algae and other microorganisms in the water, nor the long-term effects of removing oxygen from the water. 1543-2

Third, this should cover what effective steps Enbridge will take to prevent

intentional third-party damage. In a corridor with multiple pipelines, it seems plausible that a terrorist could strike all at once and cause a multi-catastrophic event. The topic of a public awareness program indicates only what measures will prevent accidental third-party damage.

Fourth, I am confused by the assertion that the risk of a spill would not be different whether Line 3 operates at the current capacity or at the proposed capacity, which is almost double. This document does not consider the pressure required to force thick crude through pipe, and the potential to exacerbate weaknesses in the pipe with high pressure and pressure cycling. More oil, more pressure, more risk.

Finally, it is acknowledged that the risk of this pipeline is largely placed on rural communities and that those communities won't have easy access to the promised rapid response tech and crew.

However, the Remote Area analysis is a four-sentence placeholder where there should be a spill response strategy for areas with difficult access.

I am not convinced at all that

Minnesota will benefit by this massive pipeline project. Both the DEIS content and the unconsidered factors outlined here, reflected against the cases on the record where Enbridge has failed as a corporate citizen, demonstrate that Enbridge is unprepared for and undeserving of yet another pipeline. This pipeline is transporting the thickest, dirtiest, and least-profitable stuff. It has higher concentrations of heavy metal and, because it does not flow easily, requires higher pressure and more diluent chemicals. This pipeline is guaranteed to leak, supposedly once every four years.

Why does Minnesota need the risk?

Levi, Andrew (COMM)

From: ssuppan@comcast.net
Sent: Monday, July 10, 2017 3:09 PM
To: MN_COMM_Pipeline Comments
Subject: pdf version of my comment to Docket numbers CN-14-916 and PPL-15-137
Attachments: Pipeline 3 Draft EIS comments FINAL 7.10.17.pdf

In the event that you are accept only pdf files for the comment on the DEIS for Pipeline 3, please find attached the pdf version of my comment.

Steve Suppan
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Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
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July 10, 2017

Comments on the Draft Impact Statement for the Pipeline 3 construction

Docket numbers CN-14-916 and PPL-15-137

Submitted electronically to Pipeline.Comments@State.mn.us

Dear Ms. MacAlister,

General comment

I am submitting the following short comment as a private citizen whose home lot borders the James J. Hill line of the BNSF Railway near Wayzata, MN, on which crude oil and coal are currently shipped. While I appreciate the opportunity to comment on the draft Environmental Impact Statement (DEIS), the time for comment relative to the length of the document is extraordinarily short, just five weeks, plus three weeks of public hearings. I have been commenting professionally on U.S. federal rulemakings in agriculture, trade policy and commodity market regulation for twenty-three years. A 90-day comment period for a 100 to 200-page proposed federal rule is routine, but often industry asks for, and is almost always granted, a 90-day comment extension. The DEIS indicates that the EIS will be finalized by the end of August, just 40 days after the comment period closes today.[1] This is an extra-ordinarily short amount of time to incorporate public comment to revise a 5,547-page document. There is no justification given for these very tight timelines, which give the impression that public comment will be reviewed hastily and is unlikely to result in substantive revision of the draft. The Minnesota Public Utilities Commission (Commission) and the Department of Commerce should extend both the deadline for comment by at least 60 days and the deadline for finalizing the EIS by at least 60 days following the close of the comment period.

The following comments are informed by my research as a Senior Policy Analyst at the Institute for Agriculture and Trade Policy (IATP), a non-profit, non-governmental organization headquarter in Minneapolis, with offices in Washington, DC and Berlin, Germany. I have worked at IATP since 1994. From 2009 to 2012, I represented IATP in the Non-Governmental Organization Majority Stakeholder Group of the United Nations Framework Convention on Climate Change (UNFCCC), focusing on climate finance, the adaptation of agriculture[2] and consequences for agriculture of the Business As Usual production of greenhouse gases, including those produced by agricultural practices.[3] IATP continues to monitor the UNFCCC negotiations[4] and has been critical of U.S. trade policy, which prioritizes and supports commercial objectives in binding rules and schedules. The environmental and public health

consequences of trade, when included in trade agreements, are referenced in non-binding 'best endeavor' language that is unenforceable. The categorical imperative of trade policy to increase trade, regardless of the environmental and public health costs, helps to exacerbate climate change.[5] We have co- organized a series of Rural Climate Dialogues in Minnesota to help rural communities and farm operations adapt to climate change.[6] The Dialogues have benefited from the participation of the Department of Commerce, the Department of Agriculture and the Environmental Quality Board, among other Minnesota agencies and organizations.

An IATP report has documented the trade policy synergy between increased Canadian tar sands exports and the loss of U.S. sovereignty over our economic development and environment under the terms of the energy chapter of the North American Free Trade Agreement.[7] TransCanada filed a $15 billion lawsuit against the U.S. State Department in 2016, under NAFTA's provision for a private arbitration investor tribunal, due to the Obama administration's decision not to permit the construction of the Keystone XL pipeline.[8] Enbridge Energy, Limited Partnership (Enbridge), a strong supporter of NAFTA and so-called free trade in energy,[9] could likewise file a NAFTA mediated lawsuit against federal or sub-federal entities if the Commission does not grant the company the permit to build Pipeline 3. Deciding whether to permit under the explicit or implicit threat of a NAFTA based lawsuit would be tantamount to extortion.

It is imperative that the Commission determine and document publicly whether permitting the construction and operation of Pipeline 3 is in the public interest of Minnesotans according to Minnesota law, conforming to the requirements of the Minnesota Environmental Policy Act (MEPA) and the Next Generation Energy Act of 2007. The Commission must make public any *ex parte* written and/or oral communications from and with Enbridge and/or its legal representation and/or communications from and with federal officials, contractors and/or legal representatives even hinting at the possibility of an Enbridge lawsuit against the State of Minnesota, in the event of a denial of permit to construct Pipeline 3. If a deciding factor in permitting Pipeline 3 is discovered to be the threat of an Enbridge lawsuit outside the due process of public law, the legal validity of the permitting process may become the subject of public interest litigation.

Comments on the Executive Summary and the Regulatory Framework of the DEIS

The Executive Summary invokes the MEPA at the outset of its explanation of the purpose of the EIS, but then reduces the authority of MEPA by subordinating it to the decision-making procedures of the Public Utilities Commission. As a result of the figurehead role given to MEPA in the DEIS, the Executive Summary "Certificate of Need Alternatives and Criteria," presents no alternatives to granting the Certificate of Need except for Business As Usual options to expand tar sands oil exports to up to 760,000 barrels per day by one means or another.[10] The option to not build a new Pipeline 3 and not to allow the continued operation of the existing Pipeline 3 is not considered, much less, proposed in the Certificate of Need analysis. As other commenters will inform you at greater length and detail than I can, the continued exodus of investors from Canadian oil sands investments is a strong indicator that the economic cost of mining and

transporting oil sands, to say nothing of the environment liabilities of mining and transporting tar sands, is too great for investors to continue supporting.[11] Calculating the rate of Return on Investment, a standard commercial practice, should be part of the Commission's decision-making, if it is not already.

The DEIS should be revised to enable review of the Enbridge application according to the standards of MEPA and State responsibilities under it, e.g. "practice thrift in the use of energy and maximize the use of energy efficient systems for the utilization of energy, and minimize the environmental impact from energy production and use" and "minimize wasteful and unnecessary depletion of nonrenewable resources."[12] If the Commission must not subordinate the authority of MEPA to the "Certificate of Need Alternatives and Criteria." To do so will reduce the decision-making weight of environmental, economic and public health damages from Pipeline 3's construction and operation to project-specific Region of Interest phenomena, whose description is often based on Enbridge supplied data. Enbridge promises to mitigate damages outlined in Chapter 5. The DEIS takes Enbridge at its word, despite the company's well-documented performance failure in risk prevention and mitigation, even failing to follow its own operational procedures.[13]

Given the legal literature on the past subordination of MEPA to project development regulations and administrative procedures,[14] it will be surprising if the Certificate of Need is not challenged in court, due to the MEPA subordinated inadequacy of the Regulatory Framework in the draft EIS. That inadequacy cannot be remedied by hasty and opportunistic citation: rather a systematic interpretation of data and literature under MEPA's and the Next Generation Energy Act's requirements must become the ground floor of the regulatory framework for an adequate EIS.

One of the many regrettable consequences of marginalizing MEPA in the draft EIS is that assessment of environmental and economic damage is confined to a specific Region of Interest, thus ignoring the potential impact of Pipeline 3 outside the specific region. For example, "The DEIS contains **no spill analysis for tributaries of the St. Louis River or Nemadji River"** (bold in the original)[15] which would contaminate Lake Superior and the port of Two Harbors. This is not a small oversight. A rupture in Line 3 in 1991 spilled at least 1.7 million gallons of crude oil into the Prairie River near Grand Rapids,[16] the largest U.S. inland water oil spill. The toxicity of that oil was low compared to that of diluted tar sands that Line 3 would transport. This historically significant spill is not mentioned in the Executive Summary. If it does not already, the final EIS should, at a minimum, contain a chapter on the 10 worst Line 3 spills, including how the spills were discovered, the mitigation measures taken, the efficacy of those measures, and the environmental and economic impacts of the spills. Enbridge's spill frequency and severity, and the efficacy of its mitigation measures should be compared to that of pipeline operations in other states.[17] The Executive Summary should briefly summarize this proposed chapter.

Enbridge claims that its "worst case scenario" spill data is a trade secret to which the public must not have access.[18] The Commission must not allow this data affecting public and

environmental health to remain secret. It would be arbitrary and capricious for the Commission to allow Enbridge, which is demanding so much from Minnesota[19], to maintain a purported trade secret to protect its worst-case scenario spill data. Enbridge has no competitor for building Line 3, so it cannot claim that the data must remain secret to protect it against a commercial competitor. What Enbridge seeks in the final EIS is for those data to remain secret from the public. There is no well-reasoned way for the Commission to legally justify that it is in the public interest of Minnesota to allow those data to remain secret. 2261-0 Cont'd

The Executive Summary acknowledges that climate change is one of six key issues in its Certificate of Need analysis within the DEIS. (ES-10) The DEIS attempts to estimate the long-term cost of the greenhouse gas emissions, in terms of the Obama administration's Social Cost of Carbon (SCC) for the alternatives the Commission has identified in its Certificate of Need Analysis. However, the estimate of $287 billion SCC assumes that Pipeline 3 will operate only for 30 years.[20] Because many current pipelines have been operating for up to 60 years,[21] this estimate should be more than doubled, taking into account both the likely operating life of Pipeline 3 and the greater volume of GHG emissions as the pipeline deteriorates. Whatever the Trump administration does to try to disrupt or at least create the appearance of doubt about the scientific consensus concerning the causes, effects and consequences of climate change science,[22] Minnesota's SCC will grow, if federal and state officials counter GHG mitigation projects with support for Pipeline 3 and other major GHG emitting projects.

The Chapter 5 analysis of GHG emissions estimates specific to Enbridge's preferred route is given in terms of construction and operational impacts. However, these estimates are not correlated, even qualitatively, to economic, environmental, public health and cultural damages that cannot be captured in the SCC estimates, even though the DEIS acknowledges that "Given current modeling and data limitations, however, it [the SCC estimates] does not include all important damages." Because the self-imposed time frame for CN determination does not allow for the Commission to verify the data supplied by Enbridge, the final EIS should attempt to characterize and quantify the "important damages" out of the SCC formula and the data limitations of the DEIS. 2261-1

The DEIS makes no attempt to characterize or quantify the climate change damages of the life cycle of tar sands mining, conversion into transportable crude and end user consumption associated with Pipeline 3. The regulatory framework of the Certificate of Need applied to the proposed pipeline route spares the Commission from having to estimate the entire life cycle impact of tar sands oil on Minnesota's people, infrastructure and natural resources. Climate change, however, is a transboundary phenomenon and measures to mitigate damage from GHG emissions must be designed in a transboundary framework, even though the Commission's authority is not international. The DEIS should contain a robust estimate of tar sands life cycle GHG emissions for the proposed Pipeline 3 route and its alternatives to enable federal authorities to determine whether the construction and operation of Pipeline 3 meets 2261-2

the public interest requirements of MEPA, the Next Generation Energy Act and the National Environmental Policy Act. 2261-2 Cont'd

Conclusion

The Minnesota Department of Commerce is well-aware that renewable energy is the growing future of energy for Minnesota, since your website proudly advertises the 22 percent of energy generation in Minnesota that currently comes from renewable sources. We are in a race against time to end Business As Usual energy generation and distribution and to transition, with difficulty and over three decades, to renewable energy.[23] Permitting the construction of Pipeline 3 would help cause Minnesota to lose that race by making Minnesota dependent for another 50-60 years on the most environmentally destructive and least economically efficient (once environmental and social remediation costs are internalized) form of oil as a source of transitional energy. Creating future long-term dependence on tar sands oil will be a disincentive to investment and job creation in renewable energy, particularly in northern Minnesota.

2261-3

An adequate DEIS for the energy and environmental future of Minnesota must develop a regulatory framework based on MEPA and the Next Generation Energy Act of 2007. If the regulatory framework for that future is limited to Minnesota Statutes § 216B.243 and Minnesota Administrative Rules Part 7853.0130 for approving major construction projects, then the Commission very likely will grant a Certificate of Need to authorize the construction and operation of a pipeline transporting 50-60 years of an energy source that is incompatible not only with achieving the federal Clean Power Rule's GHG emissions reduction targets, but with achieving the reduction requirements of Next Generation Energy Act—an 80 percent reduction in GHG emissions in Minnesota by 2050.[24] Permitting the construction and operation of Pipeline 3 appears to violate Article 5.3.3 of the Next Generation Energy Act, because Pipeline 3 is new construction that cannot be grandfathered under pre-2007 law.

The Commission's task in finalizing a DEIS with a regulatory framework that is adequate to Minnesota's energy and environmental future is a difficult one. Revising the DEIS is not a task that should be done in haste. I again urge the Commission to extend the deadline for comment on the DEIS by at least 60 days and to extend the Commission's self-imposed deadline for finalizing the EIS by at least 60 days following the last day of the comment extension period.

Respectfully submitted,

Steve Suppan, Ph.D.

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[1] Table ES-5: Key Milestones and Dates for the Line 3 Replacement Project, Executive Summary at 29. https://mn.gov/commerce/energyfacilities/documents/34079/1.DEIS_Line_3_Executive%20Summary.pdf
[2] E.g. Steve Suppan, "Agriculture and the Green Climate Fund: two U.S. bargaining chips at the climate talks," Institute for Agriculture and Trade Policy, December 1, 2011. https://www.iatp.org/blog/201112/agriculture-and-the-green-climate-fund-two-us-bargaining-chips-at-the-climate-talks
[3] E.g. Suppan, "The daily stipend and the future of climate negotiations," Institute for Agriculture and Trade Policy, June 4, 2012. https://www.iatp.org/blog/201206/the-daily-stipend-and-future-of-climate-negotiations
[4] E.g. Ben Lilliston, "Plotting the course: CoP 21 and agriculture," Institute for Agriculture and Trade Policy, December 21, 2015. https://www.iatp.org/blog/201512/plotting-the-course-cop21-and-agriculture
[5] Lilliston, "The Climate Costs of Free Trade: How TPP and free trade agreements undermine the Paris climate agreement," Institute for Agriculture and Trade Policy, September 6, 2016. https://www.iatp.org/climate-cost-of-free-trade
[6] "Rural Climate Dialogues: State Convening Report," The Jefferson Center and the Institute for Agriculture and Trade Policy, January 2017. https://www.iatp.org/documents/rural-climate-dialogues-state-convening-final-report
[7] Patrick Tsai, "Tar Sands: How Trade Rules Surrender Sovereignty and Extend Corporate Rights," Institute for Agriculture and Trade Policy, August 2014, particularly Figure 2, comparing greenhouse gas emissions source, based on Pembina Institute research. https://www.iatp.org/sites/default/files/2014_08_21_TarsSands_PT_f_0.pdf
[8] Todd Tucker, "TransCanada is suing the U.S. over Obama's rejection of the Keystone XL pipeline. The U.S. might lose." *The Washington Post*, January 8, 2016. https://www.washingtonpost.com/news/monkey-cage/wp/2016/01/08/transcanada-is-suing-the-u-s-over-obamas-rejection-of-the-keystone-xl-pipeline-the-u-s-might-lose/?utm_term=.181ca43e994f
[9] Shawn McCarthy, "North American energy leaders defend free trade at conference," *The Globe and Mail*, March 6, 2017. https://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/north-american-energy-leaders-defend-free-trade/article34226818/
[10] Table ES-1, ES, 5. https://mn.gov/commerce/energyfacilities/documents/34079/1.DEIS_Line_3_Executive%20Summary.pdf
[11] E.g. Nicholas Kusnetz. "Exodus from Canada's Oil Sands Continues as Energy Giants Shed Assets," *Inside Climate News*, April 14, 2017. https://insideclimatenews.org/news/13042017/canadian-oil-sands-tar-sands-climate-change-conocophillips-exxon
[12]"State Environmental Policy," Minnesota Statutes 1986, Chapter 116 D, Subdivision 2, paragraphs i and l. https://www.revisor.leg.state.mn.us/statutes/?id=116D&year=1986
[13] "Enbridge's Proposed Line 3 Replacement/Expansion/Re-Route, MN 350, March 2017, 30-33.
[14] E.g. Stacy Lee Bettison, "The Silencing of MEPA: The Minnesota Court of Appeals and the Need for Meaningful Judicial Review," *William Mitchell Review*, Vol 26:4 (2000). http://open.mitchellhamline.edu/cgi/viewcontent.cgi?article=1861&context=wmlr
[15] "The Line 3 DEIS Highlight Reel," Honor the Earth, June 2017, at 2. https://healingmnstories.files.wordpress.com/2017/06/deishighlightreel.pdf
[16] "Company revises oil spill upward to 1.7 million gallons," Associated Press, March 13, 1991. http://www.apnewsarchive.com/1991/Company-Revises-Minnesota-Oil-Spill-Upward-to-1-7-Million-Gallons/id-2d06afe9e6c0712a86b91309d7c4932b
[17] A useful source for developing a framework to make these proposed pipeline performance comparisons is L. Patterson et al, "Unconventional Oil and Gas Spills: Risks, Mitigation Priorities and State Reporting Requirements, *Environmental Science and Technology*, February 21, 2017, http://pubs.acs.org/doi/abs/10.1021/acs.est.6b05749
[18] Table 10.3-1 on page 36 of Chapter 12, as cited in "Line 3 DEIS Replacement—Talking Points for Public Comments," MN 350, June 2017, at 2. http://www.mn350.org/wp-content/uploads/2017/06/MN350-Public-Meeting-L3R-Testimony-Points-1.pdf
[19] In addition to demanding eminent domain access to public lands and water, access to tribal lands and water and access to private land via easements, Enbridge is demanding tax relief. Mike Hughlett, "Enbridge tax challenge could cost northern Minn. counties millions," *Star Tribune*, March 26, 2017. http://www.startribune.com/enbridge-tax-challenge-could-cost-counties-up-north/417137923/

[20] Table 5.2.7-11. Average Life Cycle Greenhouse Gas Emissions for Various Crude Oils. Chapter 5, DEIS, 443 https://mn.gov/commerce/energyfacilities/documents/34079/2.DEIS_Line_3_Chapter%205.pdf.
[21] "Line 3 DEIS Replacement—Talking Points for Public Comments," at 2.
[22] E.g. Brady Dennis and Julie Eilperin, "EPA chief pushing government-wide effort to question climate change science," *The Washington Post*, July 1, 2017. https://www.washingtonpost.com/news/energy-environment/wp/2017/07/01/epa-chief-pushing-governmentwide-effort-to-question-climate-change-science/?utm_term=.29f5e30870a9
[23] Richard Heinberg, "100% Renewable Energy Is Possible: Here's How," EcoWatch, February 28, 2016. https://www.ecowatch.com/100-renewable-energy-is-possible-heres-how-1882182049.html
[24]"Minnesota Next Generation Energy Act of 2007," Hogan Lovells, July 16, 2007. http://www.lexology.com/library/detail.aspx?g=861895ac-f2eb-4489-a922-231b94a57a64

Levi, Andrew (COMM)

From: ssuppan@comcast.net
Sent: Monday, July 10, 2017 3:05 PM
To: MN_COMM_Pipeline Comments
Subject: Comment on Pipeline 3 DEIS: Docket numbers CN-14-916 and PPL-15-137
Attachments: Pipeline 3 Draft EIS comments FINAL 7.10.17.docx

Please find attached my comment on the Draft Environmental Impact Statement for Pipeline 3. Thank you for the opportunity to comment on this crucial public policy issue.

Steve Suppan
16309 Adeline Lane
Wayzata, MN 55391

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St Paul, MN 55101-2198

July 10, 2017

Comments on the Draft Impact Statement for the Pipeline 3 construction

Docket numbers CN-14-916 and PPL-15-137

Submitted electronically to Pipeline.Comments@State.mn.us

Dear Ms. MacAlister,

General comment

I am submitting the following short comment as a private citizen whose home lot borders the James J. Hill line of the BNSF Railway near Wayzata, MN, on which crude oil and coal are currently shipped. While I appreciate the opportunity to comment on the draft Environmental Impact Statement (DEIS), the time for comment relative to the length of the document is extraordinarily short, just five weeks, plus three weeks of public hearings. I have been commenting professionally on U.S. federal rulemakings in agriculture, trade policy and commodity market regulation for twenty-three years. A 90-day comment period for a 100 to 200-page proposed federal rule is routine, but often industry asks for, and is almost always granted, a 90-day comment extension. The DEIS indicates that the EIS will be finalized by the end of August, just 40 days after the comment period closes today.[1] This is an extra-ordinarily short amount of time to incorporate public comment to revise a 5,547-page document. There is no justification given for these very tight timelines, which give the impression that public comment will be reviewed hastily and is unlikely to result in substantive revision of the draft. The Minnesota Public Utilities Commission (Commission) and the Department of Commerce should extend both the deadline for comment by at least 60 days and the deadline for finalizing the EIS by at least 60 days following the close of the comment period.

The following comments are informed by my research as a Senior Policy Analyst at the Institute for Agriculture and Trade Policy (IATP), a non-profit, non-governmental organization headquarter in Minneapolis, with offices in Washington, DC and Berlin, Germany. I have worked at IATP since 1994. From 2009 to 2012, I represented IATP in the Non-Governmental Organization Majority Stakeholder Group of the United Nations Framework Convention on Climate Change (UNFCCC), focusing on climate finance, the adaptation of agriculture[2] and consequences for agriculture of the Business As Usual production of greenhouse gases, including those produced by agricultural practices.[3] IATP continues to monitor the UNFCCC negotiations[4] and has been critical of U.S. trade policy, which prioritizes and supports commercial objectives in binding rules and schedules. The environmental and public health

consequences of trade, when included in trade agreements, are referenced in non-binding 'best endeavor' language that is unenforceable. The categorical imperative of trade policy to increase trade, regardless of the environmental and public health costs, helps to exacerbate climate change.[5] We have co- organized a series of Rural Climate Dialogues in Minnesota to help rural communities and farm operations adapt to climate change.[6] The Dialogues have benefited from the participation of the Department of Commerce, the Department of Agriculture and the Environmental Quality Board, among other Minnesota agencies and organizations.

An IATP report has documented the trade policy synergy between increased Canadian tar sands exports and the loss of U.S. sovereignty over our economic development and environment under the terms of the energy chapter of the North American Free Trade Agreement.[7] TransCanada filed a $15 billion lawsuit against the U.S. State Department in 2016, under NAFTA's provision for a private arbitration investor tribunal, due to the Obama administration's decision not to permit the construction of the Keystone XL pipeline.[8] Enbridge Energy, Limited Partnership (Enbridge), a strong supporter of NAFTA and so-called free trade in energy,[9] could likewise file a NAFTA mediated lawsuit against federal or sub-federal entities if the Commission does not grant the company the permit to build Pipeline 3. Deciding whether to permit under the explicit or implicit threat of a NAFTA based lawsuit would be tantamount to extortion.

It is imperative that the Commission determine and document publicly whether permitting the construction and operation of Pipeline 3 is in the public interest of Minnesotans according to Minnesota law, conforming to the requirements of the Minnesota Environmental Policy Act (MEPA) and the Next Generation Energy Act of 2007. The Commission must make public any *ex parte* written and/or oral communications from and with Enbridge and/or its legal representation and/or communications from and with federal officials, contractors and/or legal representatives even hinting at the possibility of an Enbridge lawsuit against the State of Minnesota, in the event of a denial of permit to construct Pipeline 3. If a deciding factor in permitting Pipeline 3 is discovered to be the threat of an Enbridge lawsuit outside the due process of public law, the legal validity of the permitting process may become the subject of public interest litigation.

Comments on the Executive Summary and the Regulatory Framework of the DEIS

The Executive Summary invokes the MEPA at the outset of its explanation of the purpose of the EIS, but then reduces the authority of MEPA by subordinating it to the decision-making procedures of the Public Utilities Commission. As a result of the figurehead role given to MEPA in the DEIS, the Executive Summary "Certificate of Need Alternatives and Criteria," presents no alternatives to granting the Certificate of Need except for Business As Usual options to expand tar sands oil exports to up to 760,000 barrels per day by one means or another.[10] The option to not build a new Pipeline 3 and not to allow the continued operation of the existing Pipeline 3 is not considered, much less, proposed in the Certificate of Need analysis. As other commenters will inform you at greater length and detail than I can, the continued exodus of investors from Canadian oil sands investments is a strong indicator that the economic cost of mining and

transporting oil sands, to say nothing of the environment liabilities of mining and transporting tar sands, is too great for investors to continue supporting.[11] Calculating the rate of Return on Investment, a standard commercial practice, should be part of the Commission's decision-making, if it is not already.

The DEIS should be revised to enable review of the Enbridge application according to the standards of MEPA and State responsibilities under it, e.g. "practice thrift in the use of energy and maximize the use of energy efficient systems for the utilization of energy, and minimize the environmental impact from energy production and use" and "minimize wasteful and unnecessary depletion of nonrenewable resources."[12] If the Commission must not subordinate the authority of MEPA to the "Certificate of Need Alternatives and Criteria." To do so will reduce the decision-making weight of environmental, economic and public health damages from Pipeline 3's construction and operation to project-specific Region of Interest phenomena, whose description is often based on Enbridge supplied data. Enbridge promises to mitigate damages outlined in Chapter 5. The DEIS takes Enbridge at its word, despite the company's well-documented performance failure in risk prevention and mitigation, even failing to follow its own operational procedures.[13] 2262-1

Given the legal literature on the past subordination of MEPA to project development regulations and administrative procedures,[14] it will be surprising if the Certificate of Need is not challenged in court, due to the MEPA subordinated inadequacy of the Regulatory Framework in the draft EIS. That inadequacy cannot be remedied by hasty and opportunistic citation: rather a systematic interpretation of data and literature under MEPA's and the Next Generation Energy Act's requirements must become the ground floor of the regulatory framework for an adequate EIS.

One of the many regrettable consequences of marginalizing MEPA in the draft EIS is that assessment of environmental and economic damage is confined to a specific Region of Interest, thus ignoring the potential impact of Pipeline 3 outside the specific region. For example, "The DEIS contains **no spill analysis for tributaries of the St. Louis River or Nemadji River"** (bold in the original)[15] which would contaminate Lake Superior and the port of Two Harbors. This is not a small oversight. A rupture in Line 3 in 1991 spilled at least 1.7 million gallons of crude oil into the Prairie River near Grand Rapids,[16] the largest U.S. inland water oil spill. The toxicity of that oil was low compared to that of diluted tar sands that Line 3 would transport. This historically significant spill is not mentioned in the Executive Summary. If it does not already, the final EIS should, at a minimum, contain a chapter on the 10 worst Line 3 spills, including how the spills were discovered, the mitigation measures taken, the efficacy of those measures, and the environmental and economic impacts of the spills. Enbridge's spill frequency and severity, and the efficacy of its mitigation measures should be compared to that of pipeline operations in other states.[17] The Executive Summary should briefly summarize this proposed chapter. 2262-2

Enbridge claims that its "worst case scenario" spill data is a trade secret to which the public must not have access.[18] The Commission must not allow this data affecting public and

environmental health to remain secret. It would be arbitrary and capricious for the Commission to allow Enbridge, which is demanding so much from Minnesota[19], to maintain a purported trade secret to protect its worst-case scenario spill data. Enbridge has no competitor for building Line 3, so it cannot claim that the data must remain secret to protect it against a commercial competitor. What Enbridge seeks in the final EIS is for those data to remain secret from the public. There is no well-reasoned way for the Commission to legally justify that it is in the public interest of Minnesota to allow those data to remain secret.

The Executive Summary acknowledges that climate change is one of six key issues in its Certificate of Need analysis within the DEIS. (ES-10) The DEIS attempts to estimate the long-term cost of the greenhouse gas emissions, in terms of the Obama administration's Social Cost of Carbon (SCC) for the alternatives the Commission has identified in its Certificate of Need Analysis. However, the estimate of $287 billion SCC assumes that Pipeline 3 will operate only for 30 years.[20] Because many current pipelines have been operating for up to 60 years,[21] this estimate should be more than doubled, taking into account both the likely operating life of Pipeline 3 and the greater volume of GHG emissions as the pipeline deteriorates. Whatever the Trump administration does to try to disrupt or at least create the appearance of doubt about the scientific consensus concerning the causes, effects and consequences of climate change science,[22] Minnesota's SCC will grow, if federal and state officials counter GHG mitigation projects with support for Pipeline 3 and other major GHG emitting projects.

The Chapter 5 analysis of GHG emissions estimates specific to Enbridge's preferred route is given in terms of construction and operational impacts. However, these estimates are not correlated, even qualitatively, to economic, environmental, public health and cultural damages that cannot be captured in the SCC estimates, even though the DEIS acknowledges that "Given current modeling and data limitations, however, it [the SCC estimates] does not include all important damages." Because the self-imposed time frame for CN determination does not allow for the Commission to verify the data supplied by Enbridge, the final EIS should attempt to characterize and quantify the "important damages" out of the SCC formula and the data limitations of the DEIS. 2262-3

2262-4

The DEIS makes no attempt to characterize or quantify the climate change damages of the life cycle of tar sands mining, conversion into transportable crude and end user consumption associated with Pipeline 3. The regulatory framework of the Certificate of Need applied to the proposed pipeline route spares the Commission from having to estimate the entire life cycle impact of tar sands oil on Minnesota's people, infrastructure and natural resources. Climate change, however, is a transboundary phenomenon and measures to mitigate damage from GHG emissions must be designed in a transboundary framework, even though the Commission's authority is not international. The DEIS should contain a robust estimate of tar sands life cycle GHG emissions for the proposed Pipeline 3 route and its alternatives to enable federal authorities to determine whether the construction and operation of Pipeline 3 meets

the public interest requirements of MEPA, the Next Generation Energy Act and the National Environmental Policy Act. 2262-4 Cont'd

Conclusion

The Minnesota Department of Commerce is well-aware that renewable energy is the growing future of energy for Minnesota, since your website proudly advertises the 22 percent of energy generation in Minnesota that currently comes from renewable sources. We are in a race against time to end Business As Usual energy generation and distribution and to transition, with difficulty and over three decades, to renewable energy.[23] Permitting the construction of Pipeline 3 would help cause Minnesota to lose that race by making Minnesota dependent for another 50-60 years on the most environmentally destructive and least economically efficient (once environmental and social remediation costs are internalized) form of oil as a source of transitional energy. Creating future long-term dependence on tar sands oil will be a disincentive to investment and job creation in renewable energy, particularly in northern Minnesota.

An adequate DEIS for the energy and environmental future of Minnesota must develop a regulatory framework based on MEPA and the Next Generation Energy Act of 2007. If the regulatory framework for that future is limited to Minnesota Statutes § 216B.243 and Minnesota Administrative Rules Part 7853.0130 for approving major construction projects, then the Commission very likely will grant a Certificate of Need to authorize the construction and operation of a pipeline transporting 50-60 years of an energy source that is incompatible not only with achieving the federal Clean Power Rule's GHG emissions reduction targets, but with achieving the reduction requirements of Next Generation Energy Act—an 80 percent reduction in GHG emissions in Minnesota by 2050.[24] Permitting the construction and operation of Pipeline 3 appears to violate Article 5.3.3 of the Next Generation Energy Act, because Pipeline 3 is new construction that cannot be grandfathered under pre-2007 law.

The Commission's task in finalizing a DEIS with a regulatory framework that is adequate to Minnesota's energy and environmental future is a difficult one. Revising the DEIS is not a task that should be done in haste. I again urge the Commission to extend the deadline for comment on the DEIS by at least 60 days and to extend the Commission's self-imposed deadline for finalizing the EIS by at least 60 days following the last day of the comment extension period.

Respectfully submitted,

Steve Suppan, Ph.D.

16309 Adeline Lane
Wayzata, MN 55391

[1] Table ES-5: Key Milestones and Dates for the Line 3 Replacement Project, Executive Summary at 29. https://mn.gov/commerce/energyfacilities/documents/34079/1.DEIS_Line_3_Executive%20Summary.pdf
[2] E.g. Steve Suppan, "Agriculture and the Green Climate Fund: two U.S. bargaining chips at the climate talks," Institute for Agriculture and Trade Policy, December 1, 2011. https://www.iatp.org/blog/201112/agriculture-and-the-green-climate-fund-two-us-bargaining-chips-at-the-climate-talks
[3] E.g. Suppan, "The daily stipend and the future of climate negotiations," Institute for Agriculture and Trade Policy, June 4, 2012. https://www.iatp.org/blog/201206/the-daily-stipend-and-future-of-climate-negotiations
[4] E.g. Ben Lilliston, "Plotting the course: CoP 21 and agriculture," Institute for Agriculture and Trade Policy, December 21, 2015. https://www.iatp.org/blog/201512/plotting-the-course-cop21-and-agriculture
[5] Lilliston, "The Climate Costs of Free Trade: How TPP and free trade agreements undermine the Paris climate agreement," Institute for Agriculture and Trade Policy, September 6, 2016. https://www.iatp.org/climate-cost-of-free-trade
[6] "Rural Climate Dialogues: State Convening Report," The Jefferson Center and the Institute for Agriculture and Trade Policy, January 2017. https://www.iatp.org/documents/rural-climate-dialogues-state-convening-final-report
[7] Patrick Tsai, "Tar Sands: How Trade Rules Surrender Sovereignty and Extend Corporate Rights," Institute for Agriculture and Trade Policy, August 2014, particularly Figure 2, comparing greenhouse gas emissions source, based on Pembina Institute research. https://www.iatp.org/sites/default/files/2014_08_21_TarsSands_PT_f_0.pdf
[8] Todd Tucker, "TransCanada is suing the U.S. over Obama's rejection of the Keystone XL pipeline. The U.S. might lose." *The Washington Post*, January 8, 2016. https://www.washingtonpost.com/news/monkey-cage/wp/2016/01/08/transcanada-is-suing-the-u-s-over-obamas-rejection-of-the-keystone-xl-pipeline-the-u-s-might-lose/?utm_term=.181ca43e994f
[9] Shawn McCarthy, "North American energy leaders defend free trade at conference," *The Globe and Mail*, March 6, 2017. https://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/north-american-energy-leaders-defend-free-trade/article34226818/
[10] Table ES-1, ES, 5. https://mn.gov/commerce/energyfacilities/documents/34079/1.DEIS_Line_3_Executive%20Summary.pdf
[11] E.g. Nicholas Kusnetz. "Exodus from Canada's Oil Sands Continues as Energy Giants Shed Assets," *Inside Climate News*, April 14, 2017. https://insideclimatenews.org/news/13042017/canadian-oil-sands-tar-sands-climate-change-conocophillips-exxon
[12]"State Environmental Policy," Minnesota Statutes 1986, Chapter 116 D, Subdivision 2, paragraphs i and l. https://www.revisor.leg.state.mn.us/statutes/?id=116D&year=1986
[13] "Enbridge's Proposed Line 3 Replacement/Expansion/Re-Route, MN 350, March 2017, 30-33.
[14] E.g. Stacy Lee Bettison, "The Silencing of MEPA: The Minnesota Court of Appeals and the Need for Meaningful Judicial Review," *William Mitchell Review*, Vol 26:4 (2000). http://open.mitchellhamline.edu/cgi/viewcontent.cgi?article=1861&context=wmlr
[15] "The Line 3 DEIS Highlight Reel," Honor the Earth, June 2017, at 2. https://healingmnstories.files.wordpress.com/2017/06/deishighlightreel.pdf
[16] "Company revises oil spill upward to 1.7 million gallons," Associated Press, March 13, 1991. http://www.apnewsarchive.com/1991/Company-Revises-Minnesota-Oil-Spill-Upward-to-1-7-Million-Gallons/id-2d06afe9e6c0712a86b91309d7c4932b
[17] A useful source for developing a framework to make these proposed pipeline performance comparisons is L. Patterson et al, "Unconventional Oil and Gas Spills: Risks, Mitigation Priorities and State Reporting Requirements, *Environmental Science and Technology*, February 21, 2017, http://pubs.acs.org/doi/abs/10.1021/acs.est.6b05749
[18] Table 10.3-1 on page 36 of Chapter 12, as cited in "Line 3 DEIS Replacement—Talking Points for Public Comments," MN 350, June 2017, at 2. http://www.mn350.org/wp-content/uploads/2017/06/MN350-Public-Meeting-L3R-Testimony-Points-1.pdf
[19] In addition to demanding eminent domain access to public lands and water, access to tribal lands and water and access to private land via easements, Enbridge is demanding tax relief. Mike Hughlett, "Enbridge tax challenge could cost northern Minn. counties millions," *Star Tribune*, March 26, 2017. http://www.startribune.com/enbridge-tax-challenge-could-cost-counties-up-north/417137923/

[20] Table 5.2.7-11. Average Life Cycle Greenhouse Gas Emissions for Various Crude Oils. Chapter 5, DEIS, 443 https://mn.gov/commerce/energyfacilities/documents/34079/2.DEIS_Line_3_Chapter%205.pdf.
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[22] E.g. Brady Dennis and Julie Eilperin, "EPA chief pushing government-wide effort to question climate change science," *The Washington Post*, July 1, 2017. https://www.washingtonpost.com/news/energy-environment/wp/2017/07/01/epa-chief-pushing-governmentwide-effort-to-question-climate-change-science/?utm_term=.29f5e30870a9
[23] Richard Heinberg, "100% Renewable Energy Is Possible: Here's How," EcoWatch, February 28, 2016. https://www.ecowatch.com/100-renewable-energy-is-possible-heres-how-1882182049.html
[24]"Minnesota Next Generation Energy Act of 2007," Hogan Lovells, July 16, 2007. http://www.lexology.com/library/detail.aspx?g=861895ac-f2eb-4489-a922-231b94a57a64

Levi, Andrew (COMM)

From: aimee sutherland <anmisutherland@yahoo.com>
Sent: Monday, July 10, 2017 5:02 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 (CN-14-916 and PPL-15-137)

To Whom it May Concern,

Having looks at some of the statements/finding in the DEIS, I find glaring holes will try to communicate those that concern me. I feel there are more concerns than I will touch on.

My two major concerns are impacts on the Native Americans and the environment, not that the two don't overlap. First the the affected tribes get separate chapter to address most of their impacts. Chapter 9 then states that "traditional resources are essential to the maintenance and realization of tribal life ways, and their destruction or damage can have profound cultural consequences" (9.4.3) But later your state (9.6) that the effects "cannot not be accurately categorized, quantified, or compared". So what then? Do we just ignore them? Place them in their own Chapter and forget about it. Well you did reprise that there as an effect in chapter 11. These (11.5)" disproportionate and adverse impacts would occur to the American Indian populations in the vicinity of the proposed project". But again we can' measure it so lets forget it. Why can't we hire a Native American to really get a good perspective? But lets consider the proposed route. The high number of wild rice lakes, 17, is higher than alternative routes. With the likely hood of spills (as seen with other pipelines) you bet their life ways will be affected. The 7 sites studied for spills were not good representatives of possible waterway contamination. No spill analysis was done for the the tributaries of the St. Louis or Nemadji Rivers. We need more impact Studies that are representative of the spills that are likely to occur. Why the 1 year delay for the cathodic protection to minimize the spill potential. We will have a spill before then with a small spill likely to occur that first year. While we are talking construction why only considering the impact of the 50 mile pipeline footprint when 750 mile path will be needed for the construction? 2263-1 2263-2

There are many considerations missed are dismissed in this draft. Archeological impacts- use Enbridge's info not complete. We need and expect more from a 5000 page report!!!

Thanks for your consideration and attention to this,

Aimee Sutherland

Levi, Andrew (COMM)

From: Rhonwen Personal <rhonwencj@gmail.com>
Sent: Monday, July 10, 2017 8:04 PM
To: MN_COMM_Pipeline Comments
Subject: re the Line 3 Draft Environmental Impact Statement (DEIS):

Dear MN Department of Commerce: I find the Enbridge Line 3 Draft Environmental Impact Statement to unacceptable. See below for reasons why:

1. DEIS Chapter 5.2.1.4
During pipeline construction and maintenance, Enbridge plans to store and apply petroleum products and hazardous chemicals 100 feet from surface waters.
This is an unacceptable risk to MN waters. For comparison, the Boundary Waters Canoe Area Wilderness rule for protecting water is to keep dish soap 150 feet from shore.

2. DEIS Chapter 5.2.1.2.4
Horizontal Directional Drilling (HDD) will be used to cross under our most pristine, most sensitive waters, and anywhere there is flowing water, which describes most of the route. The potential exists for contamination through release of drilling fluid to the ground and/or water, termed a “frac-out." The DEIS cites a 35 mile section of Enbridge pipeline in Michigan where there were 11 HDD crossings, multiple minor releases and 2 major frac-outs. MN will not accept the risk of a frac-out every 5.5 river crossings.

3. DEIS Chapter 10.2.4.1.1
"The annual probability of a spill incident for the Applicant’s preferred route was estimated as 0.249 incidents per year with a recurrence interval of 4.0 years."
Every year there would be a 25% risk of an oil spill and one every four years. We should not accept this high risk probability.

4. DEIS Chapter 10.4.1
Regarding river oil spills, the DEIS uses a 10 mile Region of Interest (ROI), when we know that an oil spill can pollute more than 35 miles downstream (Enbridge's oil spill in the Kalamazoo was 35 miles). The ROI in the EIS should include at least 35 miles of impact. 2266-1

Risk from Line 3 is in conflict with several of our Minnesota Statutes:
1. MN Statute 103F.305 Scenic River Protection Policy
https://www.revisor.mn.gov/statutes/?id=103F.305

2. MN Statute 116D.02 Declaration of State Environmental Policy
https://www.revisor.mn.gov/statutes/?id=116d.02

Warm Regards,

Rhonwen Tas

MS. NANCY TERHARK: My name is Nancy, N-A-N-C-Y, Terhark, T-E-R-H-A-R-K. I live in the city of Park Rapids just north of here.

I have many concerns with the Enbridge relocated and expanded Line 3 pipeline, but my testimony today will be primarily about the part of the pipeline that goes through the Pineland Sands Straight River Aquifer.

The water from this already compromised aquifer is the main source of water for the City of Park Rapids as well as the source of many private wells, much agricultural and irrigation and various industries in the area.

Enbridge hopes to relocate and expand Line 3 and bring tar sands/build this/coal lake blend oil not only through the lakes, rivers, and waters that make Park Rapids the destination of many tourists, fishermen, and outdoor enthusiasts, but also through the source of drinking water the Park Rapids residents consider vital to their lives.

Those of us who live in Park Rapids have been through changes in our water quality and the cost of treatment for these changes have been added to our water bills for the past two years.

The Pineland Sands Straight River Aquifer has recently come under study by the Minnesota DNR and ECA.

In February of 2015, the DNR Commissioner Tom Landwehr said he was ordering the study of water and wildlife impacts in the

Pineland Sands Aquifer.

A quote from the Star Tribune on February 5th, 2015, he says, "We simply have to get a better handle on what's happening with the water use and quality of this very, very, very important aquifer."

He also spoke about the already compromised aquifer and how some municipalities were having to invest in deeper wells, and the area was home to a number of unique species.

In October of 2016, another Star Tribune article quotes MPCA Commissioner John Linc Stine, "What we do to our land, we do to our water."

The article, "Minnesota's Threatened Rivers," talks about the dangers of continuing to pollute the upper Mississippi watershed, which includes the Pineland Sands Straight River Aquifer, which feeds into the Crow Wing River and continues onward to the Mississippi River.

Most recently, the Minnesota DNR has designated the Straight River groundwater management area that's one of three compromised areas that the DNR put at the top of their list

for a plan to be sure that the groundwater aquifers remain sustainable.

Sustainable cities included in the mapping area include Park Rapids, Osakis, and Hansford.

My questions, to go along -- a couple to go along with that and a couple that don't -- with all the studies being done by the Minnesota DNR and Minnesota Pollution Control Agency, I'm just wondering if any of the information was included in the DEIS? Were the DNR and the MPCA truly involved in it, and if so, in what capacity?

Why was the Pineland Sands Aquifer, an already compromised at risk aquifer system, passed over when selecting the still study sites? There were seven still study sites, but that was not one of them, and a more thorough analysis of different locations is needed.

There's some horizontal drilling under streams and river beds that contain additives that are toxic to aquatic wildlife and vegetation.

The Straight River, a nationally

known brown trout stream, suffered a frac-out during (indiscernible) four project. The public needs to be given a list of these additives to adequately comment.

BAR Engineering, here to testify as an advocate for Enbridge during the Sandpiper hearings. They referred to the groundwater south of Park Rapids as insignificant because it was already polluted.

How can they be trusted to be objective and to behave differently? Enbridge and their contractor prepared the entire report on oil releases and pinhole leaks.

Obviously it works to their benefit to downplay risks and damages. How can we trust them to write an objective report? Why was this not done by an independent expert reviewer?

More questions: Who are the private contractors used to compile the EIS? Do they have a work history with the applicant who hired them, State of Minnesota or Enbridge? 1547-1

And last, but not least, this came to my computer yesterday, I believe it was. It's the definition of regulatory

capture, which is a question I have in the Minnesota DOC.

And the definition is: "Regulatory capture is a theory associated with George Stigler, a Nobel Laureate economist. It is the process by which regulatory agencies eventually come to be dominated by the very industries they were charged with regulating. Regulatory capture happens when a regulatory agency, formed to act in the public's interest, eventually acts in ways that benefit the industry it's supposed to be regulating, rather than the public."

And I ask the Minnesota DOC if they have become a regulatory agency that has fallen victim to Enbridge.

Thank you for your time.

Levi, Andrew (COMM)

From: Kristen Blann <kblann@TNC.ORG>
Sent: Monday, July 10, 2017 3:13 PM
To: MN_COMM_Pipeline Comments
Subject: Docket Nos. CN-14-916 and PPL-15-137 Draft Environmental Impact Statement (DEIS) for Enbridge Energy's Proposed Line 3 Pipeline Project; Request for Public Comment and Review
Attachments: TNC comments on L3_CN-14-916 and PPL-15-137_July 10 2017.pdf

On behalf of The Nature Conservancy in MN, ND, and SD, please accept these comments on Docket Nos. CN-14-916 and PPL-15-137 Draft Environmental Impact Statement (DEIS) for Enbridge Energy's Proposed Line 3 Pipeline Project.

Thank you for this opportunity to provide comment.

Sincerely,

Kristen

Kristen Blann, Ph.D.
Freshwater ecologist
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July 10, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

RE: Docket Nos. CN-14-916 and PPL-15-137 Draft Environmental Impact Statement (DEIS) for Enbridge Energy's Proposed Line 3 Pipeline Project; Request for Public Comment and Review

Dear Ms. MacAlister,

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for Enbridge Energy's proposed Line 3 Replacement Project. These comments are submitted on behalf of The Nature Conservancy in Minnesota, North Dakota and South Dakota ("the Conservancy"). These comments are in response to the DEIS and include comments about project impacts as well as specific information and analyses that we respectfully request be included in the Final Environmental Impact Statement for the Project.

The mission of The Nature Conservancy is to conserve the lands and waters on which all life depends. The Conservancy is a leading conservation organization working in all 50 states and more than 65 countries. We have helped conserve nearly 15 million acres of land in the United States and more than 118 million acres globally. As a pragmatic, science-based, non-confrontational organization, The Nature Conservancy works closely with energy developers as well as state and federal agencies to inform siting and operation of energy sources in a way that balances the needs of nature and people. Our approach is not to question whether energy development and associated transmission infrastructure should proceed, rather the question is where and how to locate energy development to avoid and minimize impacts and how to incorporate mitigation measures for impacted habitats and species.

The Nature Conservancy is also committed to reducing greenhouse gas emissions, including lessening reliance on fossil fuels as a critically important step in a transition to a low-carbon future and in reducing the impacts of climate change.

Enbridge Energy's ("the Applicant") preferred route for the Line 3 Replacement Project crosses through several areas of deep conservation investment for The Nature Conservancy, including: Agassiz Beach Ridges, Kettle and Snake Rivers, Sugar Hills, Upper Mississippi River, Brainerd Lakes, and the St. Louis River Estuary. In these areas, The Conservancy has worked with public agencies, corporations, private landowners, and local communities to "keep clean water clean", and to undertake land protection, management, and restoration

actions across public and private lands, e.g. the $44M Upper Mississippi River Forest Project completed in 2010 that protected 188,000 acres of forest land, wetlands, lake and river frontage through working forest conservation easements intended to prevent fragmentation and conversion of large forest blocks. We continue to work regularly in specific areas of the Mississippi headwaters (e.g. Rum River watershed, Camp Ripley Sentinel Landscape, Brainerd Lakes area, Anoka Sand Plain), in partnership with more than 30 agencies and NGOs, to rigorously develop and implement strategies to protect the healthiest forested watersheds, lake, wetland and riverine habitats so that they continue to support a diversity of species in the face of a changing landscape and changing climate.

The quality of lakes and streams are intimately linked to the quality of the lands adjacent to them. The extensive network of rivers and streams, thousands of lakes and adjacent high quality forests that make up the headwaters of the Mississippi River are especially important. For this reason, the Mississippi Headwaters Basin in Minnesota has been identified as a major freshwater conservation priority for The Nature Conservancy in Minnesota, North Dakota, and South Dakota. This landscape provides significant habitat to an abundance of biological diversity. Its exceptional lakes, extensive forests, important freshwater resources, and climate-resilient strongholds support native species, including the federally protected bald eagle, gray wolf, and Canada lynx, and state-listed species of concern (e.g. short-eared owl, red-shouldered hawk; little brown myotis, big brown and northern long-eared bats; Blanding's turtles; black sandshell, fluted shell, elktoe, spike, and creek heelsplitter freshwater mussels; and many, many others identified as state species of greatest conservation need (SGCN) such as the golden-winged warbler). Additionally, this region is critically important to the supply of fresh, clean drinking water to nearly 2 million Minnesotans, as well as millions of people downstream who are dependent on the valuable, clean, water resources that originate in the Mississippi headwaters.

Recognizing the importance of the Mississippi Headwaters region, from Lake Itasca to the Twin Cities, The Nature Conservancy has recently launched a new initiative aimed at protecting healthy lands and waters and keeping clean water clean. This new initiative, the Minnesota Headwaters Fund, is working to raise significant public and private funds to protect high priority fish and wildlife habitat as well as clean drinking water benefits in Minnesota's healthiest watersheds. The goal of the Minnesota Headwaters Fund is to provide a sustainable funding source for the conservation of natural ecosystems that simultaneously supports biodiversity conservation benefits, such as protecting aquatic habitat for native fish and wildlife, while ensuring clean, drinking water supplies for local and downstream communities.

Of particular interest and concern to the Conservancy is potential long-term degradation and loss of wild rice habitat. Wild rice is an indicator for healthy water quality and watershed function, in that it tends to decline in response to cumulative watershed stresses such as altered hydrology or water quality. It is a significant cultural and natural resource to both people and wildlife, providing food and habitat for numerous wildlife species, many of which are also sensitive or state species of greatest conservation need (SGCN; e.g. American bittern, Sora rail, Yellow Rail, Trumpeter swans) as well as important game species (e.g. American black duck, Northern pintail). Although the extent of wild rice has declined

significantly across the northern states, including some parts of Minnesota, the portion of the state where the pipeline is proposed contains some of the healthiest remaining stands of wild rice in the U.S. The cultural and ecological significance of wild rice to Minnesota—and the value of protecting it—cannot be overstated. Chapter 5 of the DEIS states that Enbridge's preferred route would impact more wild rice lakes, forests, and areas ranking high or outstanding for biodiversity than any of the proposed alternative routes.

The Applicant's preferred route for the Line 3 replacement would involve approximately 340 miles of new 36-inch diameter, underground crude oil (light, medium, and heavy crude) pipeline that would be constructed along a route between the North Dakota/Minnesota border and the Minnesota/Wisconsin border. The proposed corridor runs from North Dakota, Minnesota to the existing Enbridge Superior station and terminal facility near Superior, Wisconsin. It enters Minnesota just south of Grand Forks, North Dakota, heads east to Enbridge's Clearbrook terminal and then south toward Park Rapids along an existing crude oil corridor. From Clearbrook Terminal, the new Line 3 proposes the same new route as the previously proposed and now withdrawn (or deferred) "Sandpiper" pipeline. Although both projects follow existing electric transmission right of way and other infrastructure for much of the preferred route, both also involve substantial disturbance along a new pipeline corridor that is proposed to cross what citizens, tribes, and agencies have all identified as some of the highest quality lake, river, wetland, wild rice, and forested watershed habitats remaining in Minnesota, including areas identified as high conservation priority in the 2015 update to the State Wildlife Action Plan, as well as many lakes and watersheds identified as high priorities for protection through the Minnesota Pollution Control Agency's recent Watershed Restoration and Protection Strategy development processes being conducted in each of the state's major watersheds.[1]

Specifically in reference to the Conservancy's identified freshwater priorities in the Mississippi Headwaters, the Line 3 corridor proposes to cross the highest scoring aquatic priority areas in several places (Attachment B, Fish and Wildlife Benefits Model and C, Priority Areas for Drinking Water):

1. The Mississippi River headwaters north of Lake Itasca and the state park
2. US 71 corridor crossing, west of Island and Potato Lakes
3. The Shell River southwest of Park Rapids
4. The large wetland complex west of MN64 and south of MN87, associated with the Crow Wing River crossing south of First, 2nd and 3rd Crow Wing Lakes.
5. Pine River watershed: headwaters in the Foothill State Forest and south of Pine Mountain Lake; as well as the headwater areas between Roosevelt and Washburn Lakes
6. The Mississippi River crossing in Aitkin County
7. The entire corridor in Aitkin County from where the route crosses the Sandy River flowage (upstream of Davis Lake) to the headwaters where it crosses into Carlton County and the Kettle River headwaters

[1] See Crow Wing River WRAPS, Pine River WRAPS; Leech Lake River Watershed WRAPS reports. https://www.pca.state.mn.us/water/watersheds

Cumulative Effects

Chapter 12 of the DEIS addresses potential cumulative effects, and both Chapters 5 and 12 address the issue of habitat fragmentation. The DEIS is clear in many places that construction and operational impacts from the Applicant's Preferred Route result in the greatest amount of disturbance to and loss of forested habitat, and the largest number of crossings of wild rice lakes. We note that the figures in the Executive Summary and Chapter 5 on impacted forest and wetland acres as well as wild rice, trout streams, and lakes of biodiversity significance from the preferred route are significant. For example, the DEIS notes that "a total of 38 miles of the Applicant's preferred route, for example, would permanently fragment 21 large-block habitats" (Executive Summary pg ES-15, Chapter 5, pg 5-264). The negative impacts of cumulative effects are not fully captured by simple summaries of impacted acres. Ecological research is clear on this point: habitat loss and fragmentation is one of the leading causes of biodiversity declines and losses locally and globally, and the effects are cumulative and may be irreversible when habitat loss or fragmentation reaches certain thresholds[2]. In addition to direct habitat impacts, infrastructure corridors also provide vectors for introduction and spread of nuisance and invasive species. Therefore, we raise the question of whether the DEIS has adequately accounted for the cumulative impacts of habitat fragmentation for sensitive biological and ecological resources. Impacts from cumulative effects of habitat fragmentation, degradation, and loss are extremely difficult to mitigate. We also note that one of the alternative routes considered (SA-04) largely eliminates the impacts to large forest blocks as well as the need for extensive ecological mitigation. 2267-1

We appreciate that the DEIS evaluates climate change impacts, including the specific greenhouse gas emissions associated with the proposed Project and its alternatives in Sections 5.2.7 and 6.3.7 (including direct and indirect effects) and the cumulative potential effects of greenhouse gas emissions on climate in Section 12.5. We note that the DEIS makes it clear that climate change in all cases compounds the risks from the project, including potentially exposing the project itself to higher risk of damages and spills (pages 12-35 and 12-36). The DEIS also acknowledges that most of the state-listed species along the Applicant's preferred route are unlikely to be very adaptable to climate change (pages 12-38 to 12-39), which compounds their vulnerability to habitat loss and disturbance. To these observations, we add that wild rice is also sensitive to water quality and hydrologic disturbance, and is likely to be negatively impacted by increased frequency and intensity as well as unseasonal timing of precipitation events. 2267-2

[2]Groves and Game (2015) contains a thorough discussion and references (Craig R. Groves, Edward T. Game. 2015. *Conservation Planning: Informed Decisions for a Healthier Planet*. MacMillan Publishing, Greenwood Village, CO.) These thresholds, though real, are often difficult to quantify, especially in advance.

The Need for a Comprehensive, Statewide Approach to Energy Infrastructure Siting and Development.

The state of Minnesota would benefit from a comprehensive, statewide approach to evaluating energy infrastructure, such as a Generic EIS as provided for in MINN. R. 4410.3800 (2009).[3] Enbridge's Line 3 project represents at least the 5th request in recent years for a Certificate of Need for a major pipeline project or expansion[4], including the Sandpiper project which would have followed much the same route in Minnesota, withdrawn in 2015.[5] A 2016 paper found that energy sprawl is, and will likely continue to be, the largest driver of land use change in the U.S. for the foreseeable future.[6] The study's authors recommended improved siting of facilities and infrastructure, energy conservation, and more end-use energy production (such as rooftop solar) in order to speed the transition to low-carbon energy production while avoiding impacts to natural areas that support wildlife and benefit people. In previous public record comments on pipeline projects in the eastern U.S. (e.g. the proposed Atlantic Coast Pipeline (ACP) and associated projects), conservation organizations, including The Nature Conservancy in North Carolina, Virginia, and West Virginia as well as the Conservancy's Central Appalachian and Albemarle Sound Projects have specifically requested programmatic approaches to large scale energy infrastructure, and landscape-scale application of the mitigation hierarchy (avoidance, minimization, and measures to offset or compensate) for energy and other infrastructure development, as called for in President Obama's Executive Order 13604 and the May 2013 Presidential Memorandum (PM) on "Modernizing Federal Infrastructure Review and Permitting Regulations, Policies, and Procedures." Conversion of forest and wetlands is already one of the most pressing conservation issues affecting the Mississippi Headwaters region.[7] The current DEIS acknowledges in many areas (e.g. Chapters 5, 10, 12) that the risks, impacts, and costs to habitat, drinking water, and climate are significant; yet in our view the analysis does not go far enough in summarizing the cumulative and synergistic costs. Likewise, we find it likely that going forward, there are additional alternatives to meeting Minnesota/society's energy needs that have not been fully identified and scoped. A statewide assessment led by the State of Minnesota would identify least impactful route corridors, provide better certainty for developers, and reduce conflicts and the need for project-by-project evaluation each time a new one is proposed. This would also meet the need for assessing the "Water-Energy Nexus", highlighted as a major issue in the 2011 Minnesota Water Sustainability Framework. 2267-3

[3] MINN. R. 4410.3800 Generic EIS, Subpart 1. Order for: A generic EIS may be ordered by the EQB to study types of projects that are not adequately reviewed on a case-by-case basis."

[4] Minnesota's Petroleum Infrastructure: Pipelines, Refineries, Terminals. Updated: October 2016. INFORMATION BRIEF. St. Paul, MN: Research Department Minnesota House of Representatives. http://www.house.leg.state.mn.us/hrd/pubs/petinfra.pdf

[5] Ibid. Note, however, that the section on "reasonable and foreseeable actions" includes the possible scenario of co-location of additional, unspecified pipeline projects in the near future.

[6] Trainor AM, McDonald RI, Fargione J (2016) Energy Sprawl Is the Largest Driver of Land Use Change in United States. PLoS ONE 11(9): e0162269. https://doi.org/10.1371/journal.pone.0162269

[7] Lark, TJ, JM Salmon, and HK Gibbs. 2015. Supplementary Information for "Cropland expansion outpaces agricultural and 1 biofuel policies in the United States" Environ. Res. Lett. 10 (2015) doi:10.1088/1748-9326/10/4/044003. See also: Star Tribune series "Minnesota's Threatened Rivers", http://www.startribune.com/mighty-mississippi-river-faces-mounting-environmental-threats/393294611/

Risk and Potential Impacts of Spills and Accidental Releases

The DEIS addresses potential changes in wetlands, beaches, shores, streambeds, and lake bottoms; contamination of groundwater aquifers; contamination of wildlife; and fate and transfer of spills and degradation products where effects may persist for years such as marshes, backwaters, and protected shores[8].

The DEIS estimates the annual probability of different kinds of spills on the proposed route (Chapter 10, Tables 10.2-4 – 10.2-6):
Pinhole leak = 27% (once every 3.7 years)
Small Spill = 107% (once every 11 months), Medium = 7.6%, Large = 6.1%
Catastrophic = 1.1% (once every 87 years)

This suggests that over 50 years, much of the affected area can expect up to 14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic spill. The risk that this poses to our aquatic priorities is a serious concern. The final EIS should include response plans and commitments to full mitigation in the event of a spill or accidental release, including financial accountability. The effects of oil releases on aquatic systems may be far-reaching. As part of any selected route permits, the state should ensure that adequate monitoring is in place, funded by the Applicant, to ensure early detection of and avoidance of impacts from construction, maintenance, and/or operational leaks or spills to biologically and culturally significant natural resources, fish and wildlife habitat, and drinking water. We also request that detailed, comprehensive, and fully resourced spill response and mitigation plans be developed and made publicly available.

Mitigation

The Conservancy's approach to environmental review is guided by the "mitigation hierarchy," which provides that the guiding principles for conserving natural resources are to avoid, minimize, mitigate and compensate for environmental impacts, in that order. The DEIS generally addresses the need to avoid and minimize impacts (Chapter 5). For example, the DEIS acknowledges both direct and indirect impacts on groundwater, surface waters, as well as protected wildlife resources such as bald eagles and other migratory bird species federally protected under the Migratory Bird Treaty Act of 1918 and the Bald & Golden Eagle Protection Act of 1940. The DEIS states the "Applicant would work with Minnesota DNR and USFWS to develop measures to avoid and minimize destruction of migratory birds" (p. 5-262, 263).

Mitigation for construction and operations, as well as emergency spill response plans and post-spill mitigation, are discussed. However, we reiterate the importance of committing to full mitigation plans for affected species, water bodies, interior forests, and other identified high-value ecological resources for both construction impacts as well as potential damages from accidental spills and releases, focusing on offsets and compensatory mitigation. The

[8] Kingston, P. F. (2002). Long-term environmental impact of oil spills. Spill Science & Technology Bulletin, 7(1), 53–61

Conservancy requests that the Applicant be required to fully develop mitigation plans for critical resources likely to be impacted by the proposed project in advance of permitting construction and more fully describe those plans in the FEIS. We further emphasize the importance of having adequate monitoring in place to ensure early detection of and avoidance of impacts from construction, maintenance, and/or operational leaks or spills to biologically and culturally significant natural resources, fish and wildlife habitat, and drinking water.

Furthermore, it is not clear that existing plans and requirements for mitigation will be required to fully address cumulative effects as described in Chapter 12. The final EIS should include commitments to the full mitigation hierarchy, according to best practices and principles for mitigation considering landscape context, additionality, equivalence, and temporal location.[9] In the event of a major spill, it seems unlikely that existing obligations to compensate for damages will be adequate to compensate for the loss of resilience from cumulative effects of habitat loss, degradation, and climate change.

Summary

The DEIS does a thorough job of presenting the significant potential costs of and impacts from the proposed Line 3 Replacement Project and alternatives for Minnesota's high quality forests, wetlands, lakes and rivers, fish and wildlife, cultural and recreational natural resources. These impacts clearly have the potential to negatively impact The Nature Conservancy in MN, ND, and SD's freshwater aquatic priorities in the Mississippi Headwaters, St. Croix, and Lake Superior watersheds. This applies both to construction impacts as well as potential damages from accidental spills and releases.

Regardless of the final decision regarding the Certificate of Need for the proposed route or an alternative, we respectfully request that the final EIS and subsequent permits include the following elements:

- commitment to full mitigation plans (including offsets and compensatory mitigation where appropriate) for affected species, water bodies and wetlands, interior forests, and other identified high-value ecological resources for both construction impacts as well as potential damages from accidental spills and releases
- commitment to complete mitigation plans (including offsets and compensatory mitigation as necessary) for all state and federally listed species (including species listed by neighboring states) as well as state listed SGCN (as appropriate)
- Adequate monitoring in place to ensure early detection of and avoidance of impacts from construction, maintenance, and/or operational leaks or spills to biologically and culturally significant natural resources, fish and wildlife habitat, and drinking water
- Adequate spill response and mitigation plans

[9]McKenney B. and J. Wilkinson. 2015. Achieving Conservation and Development: 10 Principles for Applying the Mitigation Hierarchy. Development by Design Program, The Nature Conservancy. https://www.nature.org/ourinitiatives/applying-the-mitigation-hierarchy.pdf

The Conservancy's overarching recommendation is that the state of Minnesota engage in a more thorough and comprehensive process to evaluate ongoing and future energy infrastructure impacts as a whole, rather than one project at a time. A comprehensive process such as development of a Generic Environmental Impact Statement on Energy Infrastructure (ideally encompassing alternatives designed to meet Minnesota's identified needs for a transition to renewable energy and achieve state climate / CO_2 emissions targets) would simultaneously consider the purpose and need of each project, the cumulative impacts of these projects on land and water resources in Minnesota—perhaps in conjunction with impacts in neighboring states—and identify areas to permanently avoid for habitat conservation, drinking water protection, and other priority resource values. Such an assessment should be completed prior to issuing a Certificate of Need for additional pipeline and other energy infrastructure projects in the future.

Thank you for the opportunity to provide comments on this important issue. If you have any questions about these comments, please contact me at 612-331-0705, or dshaw@tnc.org.

Sincerely,

Douglas T. Shaw, Ph.D
Assistant Chapter Director
The Nature Conservancy in Minnesota, North Dakota & South Dakota
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(612) 331-0705 (Phone)
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Attachments:

Figure A. Active Conservation Priority Landscapes for The Nature Conservancy in the Mississippi River Headwaters & Northern Minnesota

Figure B. Applicant's Preferred Route in relation to The Nature Conservancy's Freshwater Multiple Benefits analysis for setting Mississippi Headwaters Protection Priorities (Fish and Wildlife Module).

Figure C. Applicant's Preferred Route in relation to The Nature Conservancy's Freshwater Multiple Benefits analysis for setting Mississippi Headwaters Protection Priorities (Drinking Water Module)

Attachments

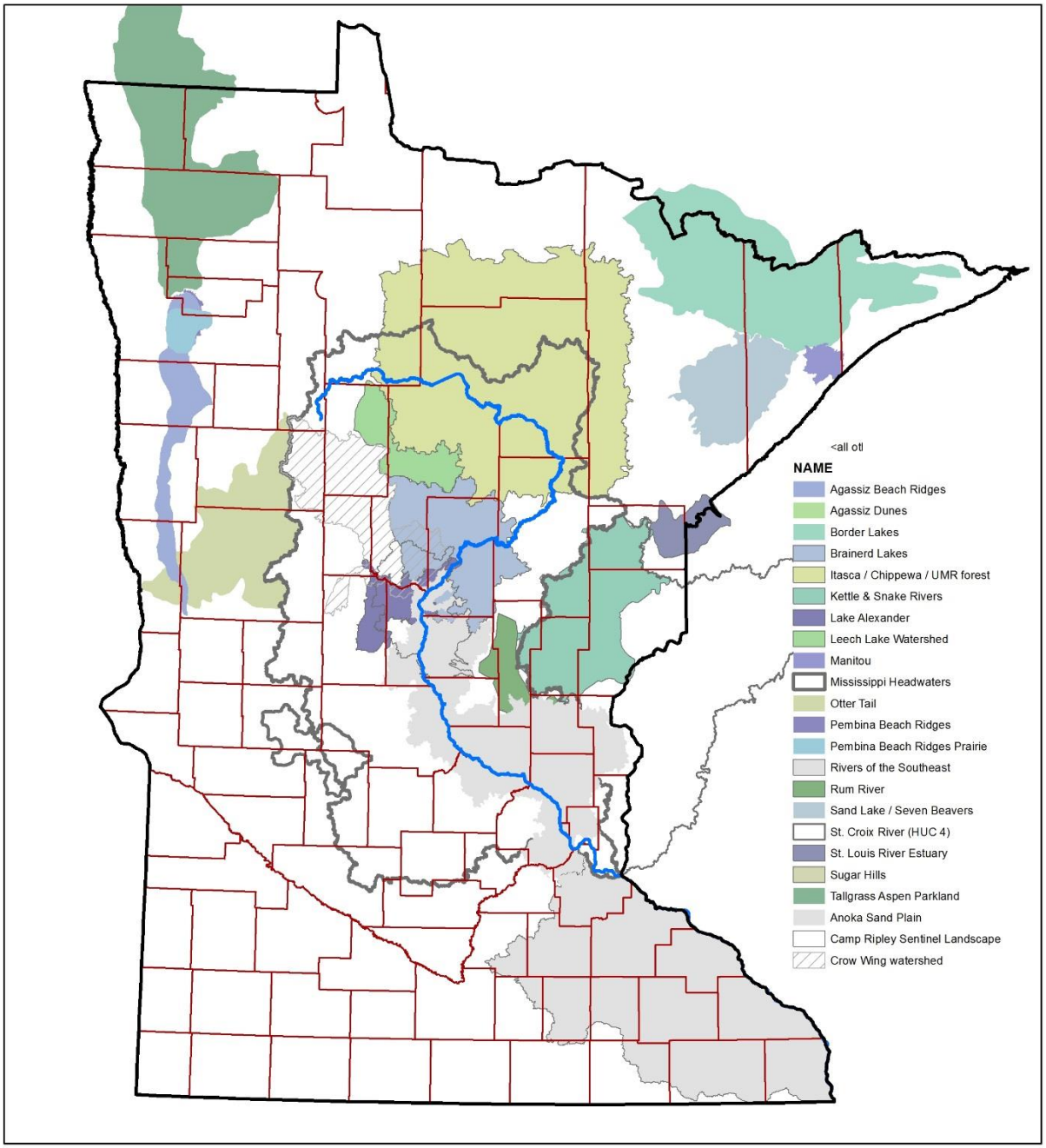

Active Conservation Priority Landscapes
for The Nature Conservancy
in the Mississippi River Headwaters &
Northern Minnesota

The Nature Conservancy
Protecting nature. Preserving life.™

Figure A. Active conservation landscapes for The Nature Conservancy in MN, ND, and SD.

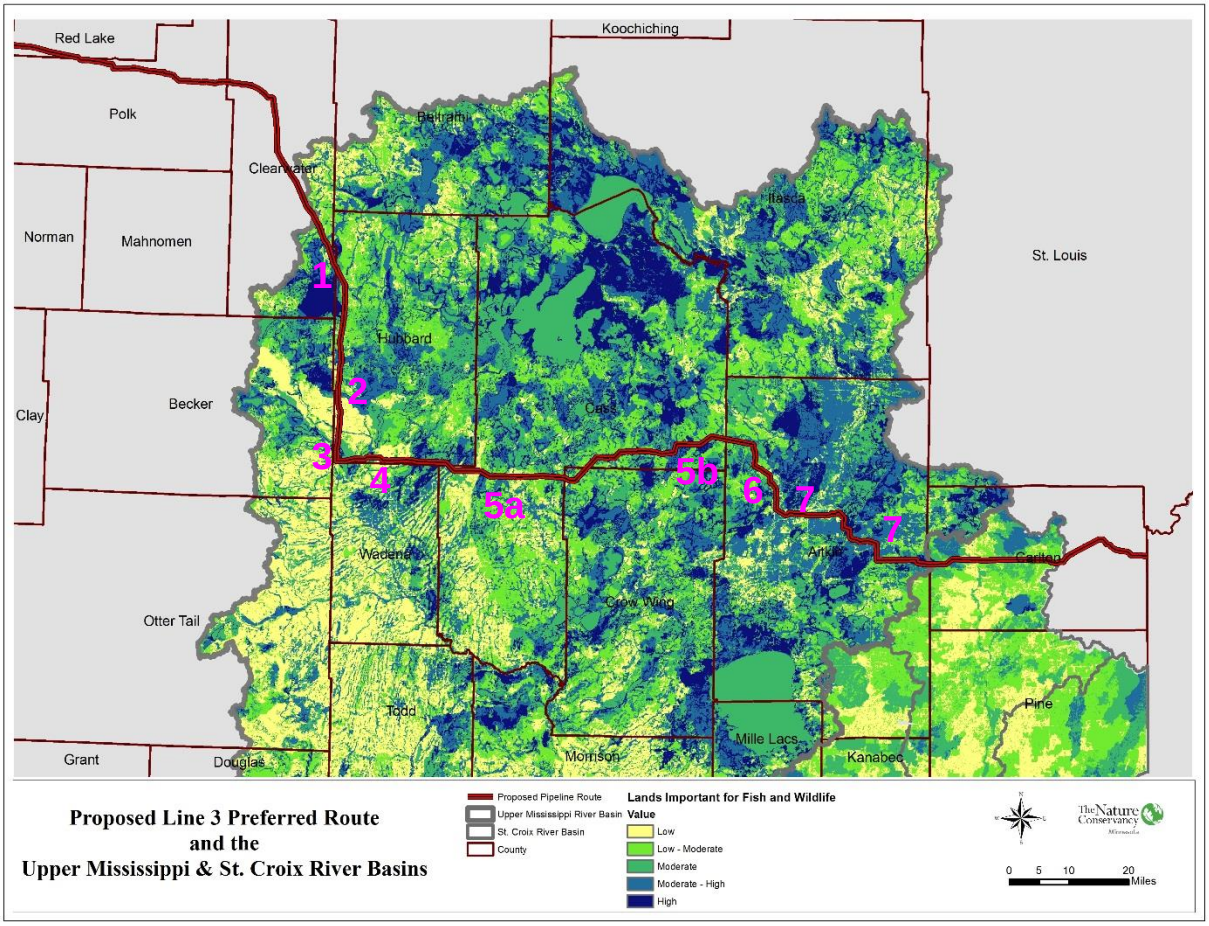

Figure B. Applicant's Preferred Route in relation to The Nature Conservancy's Freshwater Multiple Benefits analysis for setting Mississippi Headwaters Protection Priorities (Fish and Wildlife Module).

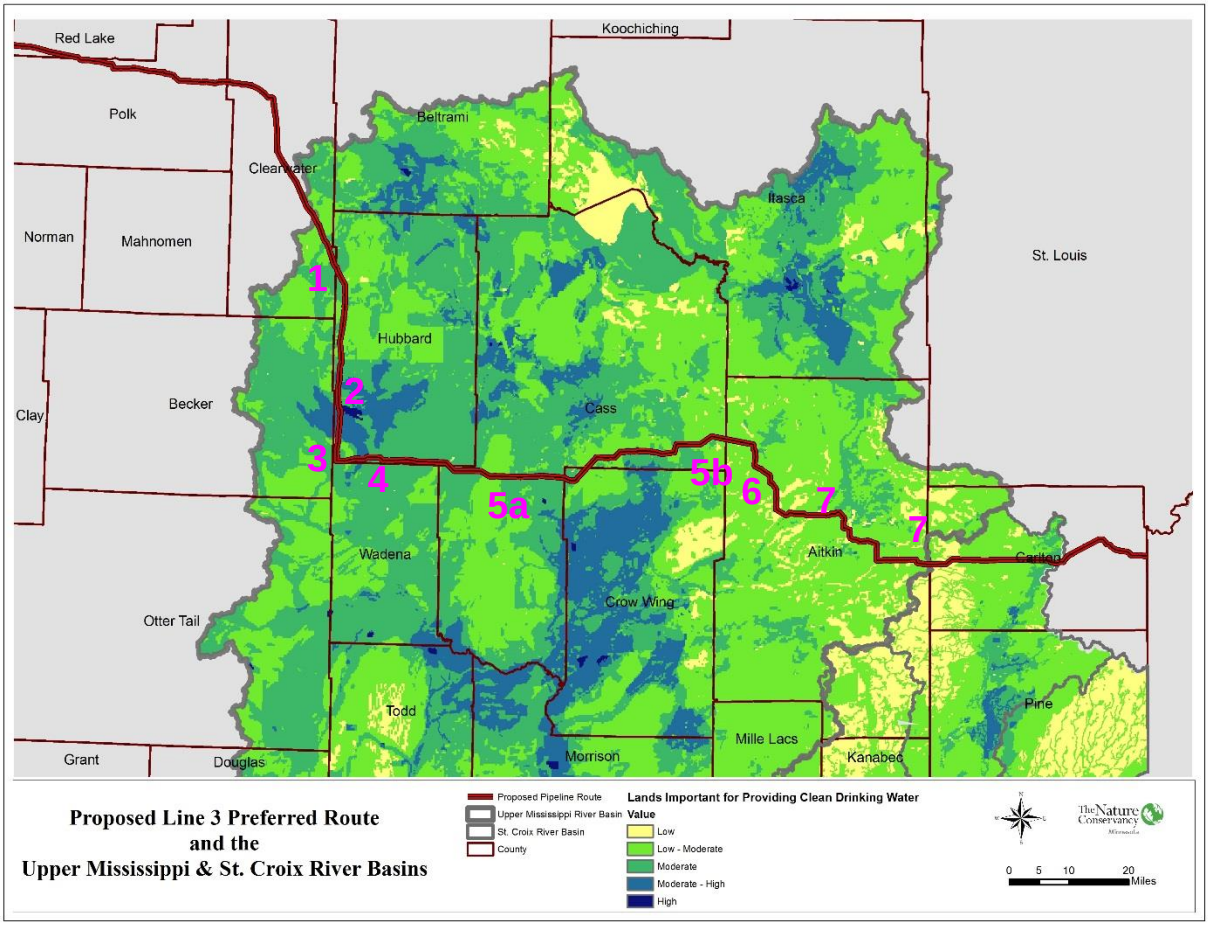

Figure C. Applicant's Preferred Route in relation to The Nature Conservancy's Freshwater Multiple Benefits analysis for setting Mississippi Headwaters Protection Priorities (Drinking Water Module)

Levi, Andrew (COMM)

From: Jennifer <jenniferinthegardens@msn.com>
Sent: Sunday, July 09, 2017 12:50 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

I have grave concerns about Enbridge's proposed Line 3 expansion and relocation tar sands oil pipeline route. In addition, I even question the NEED for the pipeline as alternative energy is fast becoming less expensive, far safer and wiser for our earth and its inhabitants. With clean water becoming ever more scarce on our earth, it is not only prudent, but more critically important than ever that we work carefully together to keep oil out of some of North America's cleanest water here in northern Minnesota. The risks are too great; the potential damage too severe. My values dictate that life and health for people, plants, animals, land, water and air are more precious and important than corporate demands and profits.

Nevertheless, here are a couple of specific questions needing your sincere and thorough attention.

1. Enbridge has proposed to horizontally drill under certain stream and river beds. The drilling fluids used for that process contain additives. These additives are toxic to aquatic wildlife and vegetation if a frac-out occurs. The Straight River, a nationally known brown trout stream, suffered a large frac-out during construction of the MinnCan Line 4 project. A drilling materials list should be provided to the public. The public cannot adequately comment without knowledge of these materials. What are those additives? 1488-1

2. The Applicant's Preferred Route has numerous minor route alternatives to avoid significant features in the environment. Why were "minor route alternatives" not considered in the overall SA-04 route analysis?

3. In the Geology and Soils analysis why aren't the specific, not the generic, types of soils used in consideration of impacts whether construction or oil spills? 1488-2

4. A recent Enbridge direct mail promotion states 13,600 jobs will be created by the Applicant's project, but in the draft EIS the maximum number of jobs created is 4800, 600 local workers and 4200 non-local workers. Which is the correct figure? Explain the discrepancy. Who provided the information for calculating those numbers? 1488-3

Looking forward to a care-filled review,

Jennifer Therkilsen
19715 Grandview Drive
Park Rapids, MN

Levi, Andrew (COMM)

From: Rachel Thibault <rachel.thibault53@gmail.com>
Sent: Sunday, July 09, 2017 10:17 PM
To: MN_COMM_Pipeline Comments
Subject: Docket CN14-916 & PPL-15-127 Draft EIS for proposed Line 3 pipeline
Attachments: Pipeline testimony.docx

Please see attached testimony regarding the DEIS for Line 3 project.

Rachel & Jack Thibault
Minnetonka, MN 55305

Hello,

We are writing to state that we oppose the proposed Line 3 replacement project. We are lifetime residents of Minnesota. Like all Minnesotans, we are proud of our pristine northern lakes, which are famous for wildlife, fishing and recreation.

Our key concerns related to this proposed new pipeline are that the DEIS (Draft Environmental Impact Statement) does not fully address the many risks associated with (1) building the pipeline; (2) abandoning the existing Line 3 pipeline; and (3) leaks that, statistically, will likely occur. The DEIS states many risks of Enbridge's proposal but does not fully analyze the impact to our environment—this is a key gap that needs to be corrected in the final EIS.

1. Many of the environmental impacts and plans for minimizing them are drawn directly from Enbridge's permit application ("Enbridge would do this" and "Enbridge would do that") without any evidence that Enbridge will do what is claims it will do. The DEIS should analyze the likelihood of compliance and the cost to the environment if they do not.

2. In Section 8.3.1.1.1 related to abandonment of the existing Line 3, the DEIS states that Enbridge has indicated that it would develop a contaminated sites management plan to identify and mitigate contaminated soils and waters found during the abandonment of Line 3. We need to see that plan, yet there is no plan. It should be submitted and scrutinized.

3. In Section 8.3.1.2, the risks to critical habitat as a result of the aging pipeline creating hydrological connections are stated. While Enbridge proposes segmentation to mitigate the risk, they admit that the potential need for more segmentation requires further study – and the DEIS states that state, federal and tribal agencies may require more segmentation; these studies need to be done now and be included in the EIS.

4. The DEIS contains no spill analysis for tributaries of the St. Louis River or Nemadji River, where spills could decimate Lake Superior and the harbors of the Twin Ports.

5. The DEIS looks at a 30 year timeline to calculate impact—but lines 1-4 are all 55-65 years old. The analyses need to be redone using a more realistic time line .

6. The 7 sites chosen for spill modeling are not representative of the locations and resources put at risk along the entire corridor. A more thorough analysis of different locations is needed - for example, what about Lake Superior? 1489-1

   The DEIS estimates the annual probability of different kinds of spills on the proposed route:
   - Pinhole leak = 27% (once every 3.7 years)
   - Small Spill = 107% (once every 11 months), Medium = 7.6%, Large = 6.1%
   - Catastrophic = 1.1% (once every 87 years)

Using the DEIS probabilities - Over a 50 year pipeline lifetime, we can expect 14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic spills. What would one small spill – let alone 54 small or 3 large spills – do to our pristine MN lakes?

7. Chapter 2, "Project Description" states that Enbridge has requested a 750-foot route width--375 feet on each side of the proposed Line 3 centerline. They claim only 50 of the 750 feet would remain a permanent right-of-way (2.1)—so why do they need to affect such a broad area? This is not a small amount of land that would be damaged/destroyed by the construction, given the 340 mile length of the requested pipeline.

8. Enbridge's proposed process for restoring wetlands includes dumping the soil back in the trench (the soil being compacted as a resulted of driving equipment over it, which is bad for the soil), sowing some oats and "letting nature take it's course". This is inadequate, and the DEIS should address proper restoration. Studies have shown that even with proper restoration practices, it can take decades to get back to the biological functioning it was at prior to disturbance.

9. The DEIS states that it will be very risky to remove and clean up the existing Line 3 because the pipelines are very close together. "The distance between pipelines within this corridor varies, but they are generally 10 to 15 feet apart" (8.3.1). This is not consistent with our extensive observations and physical measurements on the land. Also, they routinely dig up pieces of pipe for maintenance purposes. Why is it suddenly risky?

   - The DEIS COMPLETLY IGNORES APPLICABLE POLICY REFERENCES
   - Paris Climate Accord & Dayton's Re-commitment to Accord
   - State Energy Policy
   - Minnesota Environmental Policy Act
   - Greenhouse Gas policy
   - Legislative Energy Commission: Primer on Minnesota Energy - March 11, 2016
   - Minnesota's 2025 Energy Action Plan
   - Global Climate Leadership Memorandum of Understanding (Under 2 MOU)
   - Next Generation Energy Act
   - Civic Engagement Plan (Gov's Order)

10. The DEIS does not discuss the unprecedented challenges of human casualty, displacement, conflict, natural disaster, biodiversity loss, etc., that climate change is causing, or the consensus from the scientific community that we must leave fossil fuels in the ground.

11. The decision on Enbridge's request to abandon Line 3 could set a precedent, yet there is no mention of the potential abandonment of the three other aging pipelines in Enbridge's existing mainline corridor across MN (Lines 1, 2, and 4), which Enbridge might next attempt to abandon. Nor is there any discussion of the abandonment of the NEW Line 3 in 50-60 years. We don't know whether Enbridge will still be around in 50-

> 60, or 100 years – if they are not, we would put a costly burden on future generations – risking their health and right to clean water and land.

In addition, the DEIS does not address the fact that the demand for oil is declining, posing the question of whether building new, increased capacity infrastructure for a declining energy source at a very high risk to our environment makes sense for MN.

Please do not grant a Certificate of Need.

Jack & Rachel Thibault

MS. DEBRA TOPPING: Boozhoo. My name is Debra Topping, Fond du Lac enrolled Band member. I make it sound so boring. All right. No, really.

So thinking back on this, when we're going when we first started just these hearings, I ran up to Cass Lake, and I talked about this before, about the blueberries. Everybody knows where that bog is where all the blueberries are, right. And so my husband got me these blueberry plants and because now I know when they're flowering and what they look like. So when we were going up to Cass Lake, I saw nothing for miles and miles and miles of those blueberry flowers. Oh, my God. I should be taking pictures so I remember where all these blueberries are going to be.

Anyways, so we live by the season,

right. And as people have alluded to or witnessed or whatever. So blueberries is just the beginning of the spring, you know. Then I had one elder say, you know, let's learn how to go get manoomin. Well, wait a minute. What part of that do you want to learn? Because it's not just go out there and get it. You know, do you want to learn how to gather the birch bark and to be able to make a basket and whatnot.

And so when you're talking about this environmental impact statement study on Anishinabe, it's just so much more than that. Right now we're out gathering birch bark. My husband said he put his knife in there and it just popped, it's ready to gather, you know. And so how we know these things is because of what we've been told for generations. Is that when the horse flies start to bite, you know, is when it is. And so the horse flies is the smallest part next to the bees and the mosquitos and, you know, the things that rely on all of that.

So it's just one big circle here. Anywhere there's birch bark is my land, regardless if there's a line there that says it is or not. Right? That goes with the wild rice. Wherever there is wild rice to be gathered, whether the state

says I can or cannot, the creator says I can and cannot. So if you can supersede that, you know, by all means.

But that's my right as an Indigenous person. And that's everybody's right just as people, to be able to have clean air, clean water. And to have our wild rice the way it is right now. In seven generations, how will it be different? How will it genetically be different? And that's not -- that right there, even asking that question, is genocide. And it's just that simple, plain and simple.

We want maps. I want maps that show 2886-1 which way the water flows. I want maps that show the elevation of the land, the depth of the water. Because what grows in that water at certain different depths, right, we know that wild rice only grows at this depth. We know that must live at this depth. We know turtles live at this depth. So that's what I want to know, so when we do have that draft environmental impact statement, I want to know what the impact is on all of that. On my birch bark trees. On the horse flies. I would like plant identification for all of this, not only for the proposed, but for the current.

As everybody may or may not know, we do have our -- there is the wild parsnips, that is on the pipeline right now, and we have paperwork that shows that documentation and whatnot. And how dangerous that is. You know, it's coming into the communities now, into the neighborhoods where babies are running out into the woods and they can get second degree burns. And these last forever, you know, and these are bad burns. So, you know, people need to know on our reservation, on the pipeline route that this has been an issue.

I also want to know that if there should be an oil -- what is it, oil weepage, is that what they're calling it now, I want to know which way it will flow, the oil will flow if something should happen.

So that's all I have to say for now. Miigwech.

MS. JAMIE MACALISTER: Anyone else?

Levi, Andrew (COMM)

From: troo0001 University of Minnesota <troo0001@umn.edu>
Sent: Sunday, July 09, 2017 11:37 AM
To: MN_COMM_Pipeline Comments
Subject: Comments on Line 3 DEIS
Attachments: Comments on Chapter 8 of the Enbridge Line 3 Replacement Draft EIS, Submitted by Troy Trooien 9 July 2017.pdf

Hello
The attached pdf document contains my comments on line 3 DEIS. Please add them to the record.

Troy Trooien
557 Beaumont St.
St. Paul MN 55130
(651.468.7812)

Comments on Chapter 8 of the Enbridge Line 3 DEIS

Dealing with the existing line 3 is a process that will involve considerable costs and risks. Enbridge has produced a deactivation plan that calls for abandoning existing line 3 in the ground. Naturally, Enbridge's plan is one that primarily reflects its own interests. The major shortcomings of Chapter 8 of the DEIS are that it is not sufficiently critical of the Enbridge deactivation plan and fails to balance the Enbridge perspective with independent perspectives.

The law requires that the EIS provide the information and analysis the PUC and the public will need to make decisions about the treatment of existing line 3. Because the DEIS fails to point out the obvious shortcomings of the Enbridge deactivation plan, it must be redrafted. Following are matters that need more attention.

1. Purging and cleaning Abandoned Line 3

Enbridge claims:

- Line 3 will be purged of oil
- Line 3 will be cleaned
- The techniques to be used for these operations exist and are adequate

Enbridge claims to have tested a pipeline cleaning method. Referencing that test, Enbridge makes the following statement in the first paragraph of page 19 of 83 of Appendix B: "Scientific analysis of the rinse water concluded that 99.9999987% of the product was removed from the pipeline after the cleaning regime was completed."

The stated fact (that the rinse water had a very low percentage of "product") is misleading. If the Enbridge cleaning method leaves oil in the pipe, a batch of rinse water is not likely to remove it. After all, water and oil do not readily mix. Thus, the discovery that the rinse water contains very little oil is not an indication that the cleaning method was effective. If Enbridge had wanted to demonstrate that their cleaning method was effective, they would have entered the pipeline and examined it. There is no indication they did so.

If Enbridge is to be allowed to abandon existing line 3 in the ground, they must purge and clean it, at the absolute minimum. Whatever cleaning method is used must be effective. As written, the DEIS accepts the Enbridge cleaning process uncritically.

It is not sufficient to accept the applicant's statement that they have an effective cleaning method. It is the responsibility of the PUC to <u>know</u> that an effective method exists. The purpose of the EIS is to examine the Enbridge plan critically, to subject it to analysis of independent experts, and to compare it to methods used by others. Only then will the EIS have fulfilled its purpose of fully informing the choices that need to be made by the PUC.

Furthermore, the PUC must condition any permit it may grant with timelines and penalties to assure the work is completed. The EIS would serve the public interest better if it drew the PUC's attention to this by stating it clearly.

2. Deactivation plan has no completion date for purging and cleaning Line 3

1493-1

In the second paragraph on page 19 of 83 appears the following statement:

"As mandated by the Department of Justice Consent Decree, cleaning and purging of the existing Line 3 must begin within three months of the in-service date (ISD) for the Line 3 Replacement Project."

The following shortcomings are problematic:

- There is no mention of when the cleaning must be completed.
- There is no provision for verification that the work is done correctly.
- There are no penalties for failure to do the work correctly or to complete the work.

These shortcomings must be addressed by the PUC. The EIS would serve the public interest better if it drew the PUC's attention to this by stating it clearly.

3. Using cathode protection to mitigate the risk Line 3 becoming a water conduit

1493-2

Enbridge states it will mitigate the risk of Line 3 becoming a water conduit by maintaining cathodic protection (CP) indefinitely. By using CP to slow down the deterioration of Line 3, Enbridge hopes to delay the time when water will enter the pipeline. CP is an active system. It requires devices to create the current, cables to carry the current to the pipeline, and cables to carry the current from the pipeline to an anode field. Breaks in the pipeline must be bridged with electrical cables. Any, and all, of these components can and will fail.

Enbridge promises to maintain the CP for decades. Enbridge's track record suggests we should be very skeptical about this promise. Consider their performance during the Kalamazoo spill. Even though the stakes were very high, they failed to act for many hours while nearly a million gallons of crude oil spilled into the Kalamazoo River. The stakes involved with the ongoing maintenance of Line 3 are, in comparison, much lower.

If Enbridge fails to maintain the CP system, the pipeline will corrode sooner than if CP is maintained. In either case, they will lose no oil, pay no fines, nor fail to meet delivery schedules. If Enbridge does not maintain an operating and revenue-generating pipeline, how can we be asked to believe they will maintain an abandoned one?

The EIS must be modified to remind the PUC that it must include provisions to guarantee that Enbridge maintains the CP system. The maintenance requirements must be stated clearly, there must be a verification process, and there must be financial penalties in the event Enbridge fails.

4. Using segmentation to mitigate the risk Line 3 becoming a water conduit

The water conduit risk is described this way in Section 4.2.1 (page 19/83) of Appendix B:

"If the structural integrity of the pipeline is compromised, water and surrounding materials may infiltrate the pipe and have the potential of travelling downslope and exiting the pipe at another location. Water conduits may cause water migration to or from sensitive environmental features such as wetlands, watercourses, water supply areas such as aquifers, areas with sodic/saline or sandy soils, agricultural lands, and areas with a high water table."

Enbridge proposes to mitigate the water conduit risk by segmenting the abandoned pipe. Segmentation is the process of blocking the pipeline such that water cannot pass.

Pump stations and main line valves (MLV) are natural and obvious locations for segmentation. In both cases the pipeline rises above ground level which means segmentation can be accomplished without digging down to the pipeline, cutting it, welding plates on both openings, installing an electrical cable for CP, and then covering the pipe again.

Indeed, Enbridge proposes to use 7 pump stations and 40 MLVs as segmentation points. However, there is a difference in elevation of 640 feet along the 282 miles of Line 3 in Minnesota (see Table 4-1). Additional segmentation points may be needed. Enbridge describes what appears to be a truly sophisticated approach to determine if additional segmentation will be needed to protect the environment. The approach is described in sections 4.2.2.2.1 and 4.2.2.2.2 of their deactivation plan (page 22 of 83 of Appendix B).

Enbridge reaches the following conclusion (Section 4.2.2.4 of their deactivation plan (page 23 of 83 of Appendix B)):

"Based on the engineering assessment completed, 47 locations have been identified in the state of Minnesota for isolation (see Table 4-1). These 47 locations consist of the 40 mainline valves, 6 pump stations, and one co-located pump station/terminal within MN. There are three additional locations that have been identified as potential segmentation locations (items 8, 10 and 12 in Table 4-1) due to elevation changes and waterbody characteristics; these locations are currently being analyzed based on site specific factors (e.g., soil characteristics, topography, and hydraulic connectivity) and will be used as segmentation locations if determined that the water conduit effect poses a risk. Additionally, final isolation locations are subject to further refinement based upon the completion of the field assessment and detailed engineering and constructability review."

After all the data, scientific analysis, assessments, desk top reviews, computer assisted iterative modeling, topographical reliefs, hydraulic disconnections, and pipeline profile data, Enbridge can identify only 3 additional locations that will need segmentation! Worse yet, a careful reading of the text reveals that these locations are only being analyzed, and are "subject to further refinement based upon the completion of the field assessment and detailed engineering and constructability review", and

Enbridge will carry out segmentation at these points only "if determined that the water conduit effect poses a risk".

It is clear that Enbridge intends to segment the pipeline only in those locations where it can do so with little or no effort. This may or may not be adequate. What is objectionable is the appearance of a rigorous process that is more of a public relations stunt than a good faith effort to protect the environment. The elaborate description of an exhaustive process is a smokescreen whose purpose is to lull the public into a false sense of security. This exercise calls into question Enbridge's credibility and sincerity.

The final EIS must make it clear to the PUC that Enbridge must be obligated to segment the pipeline in all places where doing so will mitigate the risk of Line 3 becoming a water conduit. Enbridge's calculations must be verified by independent parties and the completion of the work must be enforceable by penalties and other legal remedies.

5. **The citation of "state and federal regulations" creates a false sense of security**

1493-3

Section 8.1 of the DEIS states: "As part of the Project, Enbridge proposes to abandon the existing Line 3, permanently removing it from service, following state[1] and federal[2] regulations, which outline the process and requirements for pipeline abandonment."

- The state laws that "outline the process and requirements for pipeline abandonment" are nothing more than the "Gopher State One Call" law that requires document retention for all abandoned underground utilities.
- Footnotes 3 and 4 of chapter 8 of the DEIS refer to CFR 192, but this must be a typographical error, as this law applies to natural gas pipelines.
- Footnotes 3 and 4 of chapter 8 of the DEIS refer to CFR 195, which does apply to pipelines for hazardous liquids, but mentions only reporting.

The idea that there is a set of state and federal laws that outline the process and requirements for environmentally sound pipeline abandonment is comforting. However, by citing laws that only require Enbridge to keep records of the location of an abandoned pipeline, the DEIS creates a false sense of security. If laws that outline the process and requirements for abandonment do exist, the EIS should bring them to the attention of the PUC. Only then can the PUC and the public begin to form an opinion as to whether the Enbridge deactivation plan satisfies those requirements.

6. **The overall impact of pipeline construction and decommissioning**

The first paragraph of Section 3.1 of the Enbridge Line 3 Permanent Deactivation Plan (U.S.), which can be found in Appendix B of the DEIS states:

"Pipeline removal would create impacts to the environment, land use, and public safety <u>similar to a new pipeline project</u> (commenter's emphasis). Environmental hazards associated with pipe removal are related to the disturbance of the soil, potential impacts to the groundwater, and potential impacts to human activities, natural wildlife and vegetation. Reduced soil stability during and after excavation can

also be a concern, as it can lead to increased localized erosion and destabilized slopes. These hazards may cause considerable disruption to ongoing and future land management activities. These risks increase significantly during a large-scale removal project. "

This statement can be taken to mean two, and only 2, things:

- *If meant literally*, Enbridge is telling us that pipeline construction activities are too destructive to the environment and too disruptive of human activities to be allowed. Thus, Line 3 Replacement ought NOT be constructed.
- *If <u>not</u> meant literally*, Enbridge is telling us that pipeline construction activities are inconvenient, but no more than that. Thus, if construction of a replacement for Line 3 is acceptable, then removal of existing Line 3 is also acceptable.

The EIS fails to address this contradiction. This shortcoming must be corrected.

1493-4

7. Quantity of timber mats needed to remove Line 3 exaggerated at least a hundred fold

The first paragraph on page 8 (page 13/83) of the Enbridge Line 3 Permanent Deactivation Plan (U.S.) states:

"Unlike the installation of a new pipeline (i.e., a pipeline installed as the outside pipe in a multi-pipe corridor), where crews can work over areas where there aren't active pipes underneath, the removal of a pipeline within a multi-pipe corridor necessitates the placement of timber mats over the active pipelines. The placement of these mats creates a working and travelling surface for large equipment to use when excavating and pulling out the abandoned pipe. Enbridge estimates approximately 600,000 – 900,000 mats would be required to safely remove Line 3 from the ground. Securing this volume of mats at one time may not be feasible."

Simple calculations indicate the suggested numbers of timber mats needed to remove line 3 are at least a hundred times greater than what is needed.

Enbridge's illustrations (Figure 3-1 on page 14 of 83 in Appendix B) suggests that each mat is approximately 10 feet square in size. Furthermore, the figures suggest the matting would be placed in 5 rows to create a protected area 50 feet wide. If you take the number of mats Enbridge claims it would need (600,000 to 900,000) and arrange them to form a 50 foot wide working space, the resulting space would be between 227 and 340 miles long. (The Minnesota part of Line 3 is only 282 miles long!)

The idea that a safe working space hundreds of miles long would be needed is preposterous. A more reasonable approach would be to create a work space 1000 feet in length, complete the removal operations, and then move the mats to the next area. If Enbridge chose such a method, a 1000 foot long work space could be formed with 500 timber mats. If Enbridge had 10 crews working this way, they would need 5000 mats.

The numbers Enbridge suggests (between 600,000 and 900,000 mats) appear to be a self-serving, gratuitous and disingenuous exaggeration whose purpose is to make an operation they prefer not to

undertake, seem impossible. Its inclusion in the EIS is a flaw that must be corrected. An independent and credible effort to assess the matter must be found and included in the EIS. 1493-4 Cont'd

8. Heavy equipment cannot be operated in wetlands 1493-5

The last paragraph on page 13/83 of the Enbridge Line 3 Permanent Deactivation Plan (U.S.) argues that existing line 3 should be abandoned in place because it will likely be impossible to operate heavy equipment in wetlands. This statement gives rise to the following observations:

- If it is indeed not safe to remove a pipeline from wetlands, that is not a valid reason to leave the pipe in place in areas that are not wetlands.
- If pipelines cannot be removed from wetlands, pipelines ought not be constructed through wetlands.
- How was it possible for Enbridge to build existing Line 3 in wetlands if it's not possible to operate heavy equipment in such terrain?

These contradictions in the Enbridge Line 3 Permanent Deactivation Plan need to be addressed. Its uncritical inclusion in the EIS is a flaw that must be corrected. The Enbridge plan must be complemented with reliable and independent study of the implications of abandonment.

Conclusion

It is difficult to know whether these shortcomings in Chapter 8 of the Draft Environmental Impact Statement are the result of inexperience, incompetence, or overreliance on material supplied by Enbridge. In any case, the DEIS fails in its role of informing the PUC and the public about the environmental impacts of the project and must be redrafted to address these shortcomings.

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Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: S. Tyra

Street Address: 1870 Cantail Drive NE

City: Outing State: MN Zip Code: 56662

Phone or Email:

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Concerns about both **cyber terrorism** and **physical acts of terrorism** abound in this day and age, and are not going away. Any acknowledgment of or plan to manage this potential for an environmental disaster is missing from the DEIS, with one exception.

- The **only** mention of terrorism (physical) in the DEIS is in Chapter 10 (*Accidental Crude Oil Releases*), section 1.2.2 and relates only to crude oil transport by rail – no mention at all of a plan by Enbridge to manage/handle a sophisticated cyber-attack with resulting "unanticipated releases" of crude oil from pipelines into the environment, possibly throughout the entire Enbridge operation. This is not implausible. When the federal government is worried about a nation-wide power grid cyber-attack, I have to believe that the interruption of an oil pipeline network would be an attractive target as well. What is Enbridge doing to "mitigate" this potential threat? 1933-1
- Physical acts of terrorism to a pipeline are a concern as well. A plane can be shot out of the sky – certainly a series of explosions can be coordinated to take out sections of underground pipeline causing massive spills. Set-up activities can be conducted relatively "in the dark" as rural area pipelines have low-ish populations and these destructive activities could go unnoticed. A physical attack does not necessarily mean terrorism, either – it could be pipeline vandalism or other criminal activity with unknown motivation to cause environmental damage. What is Enbridge doing to "mitigate" this potential threat? 1933-2

Another concern: Where is research regarding the potential for an earthquake to cause "unanticipated releases" from a pipeline? While not a major a concern here, we have had up to 10 recorded quakes, one with a magnitude of 4.6, several in the area where Enbridge wants to put Line #3. 1933-3

Enbridge has been held up BY THEIR PEERS IN THE INDUSTRY as an example of how NOT to run an energy delivery company. Why MN would consider allowing this company to expand their operation here is beyond me. If this goes through, MN officials should be ashamed, because the only reason Enbridge would be allowed to proceed is MONEY. Energy demand is down and will continue to decrease as the use of solar and wind energy is perfected and increases. Other energy delivery companies have ceased their operations in the tar sands areas. There is no reason to allow Line #3 to be built ... except one. (see above)

If including additional pages please number them and tell us how many you are providing:_____ pages

MS. WENDY ULRICH: My name is Wendy Ulrich, W-E-N-D-Y, U-L-R-I-C-H. We, as a nation, have a history, right up to this current time, of not honoring our pacts, agreements, and treaties.

We are learning that when this happens, our consciences compel us to take out of the ordinary action to turn around policies and decisions that we don't agree with and are not right.

I am not of indigenous heritage so I do not speak for the original people on this land.

I speak as a citizen and a benefactor of our collective history who is

learning about and observing our native neighbors' historic relationship with Federal and Minnesota government.

In Table ES-1 titled, "Certificate of Need, Alternatives and Criteria," of the DEIS, a series of questions are shown at the top which the Public Utilities Commissioner will use in making the decision whether to grant a Certificate of Need to Enbridge, and if granted, to decide on method of oil.

So then this process is about granting a Certificate of Need, and if that need is granted, then to decide how oil will be transported.

One final question at the top of this table asks, "Does the project comply with other laws?"

1552-1

At this point there is an omission in this table. It does not include the similarly important question, "Does the project comply with state and federal governments -- does the project comply with state and federal treaties with affected indigenous groups?"

Our nation, in this case by way of Minnesota government, must abide by the 1855 Treaty signed by the federal government with the Ojibwe people.

From Honor the Earth -- we saw their stand near the back of the room -- from their organization's, "What we need to know," Line 3 resource. The pipeline, "threatens critical resources on Ojibwe treaty lands where tribal members retain the right to hunt, fish, gather, and hold ceremony, and travel." That is in the treaty.

Destruction of forested and wetland habitat and lakes within the 1855 Treaty area will result from oil spills, habitat fragmentation due to the construction which affects animals, birds, and vegetation and develops micro-climates.

This is stated in the booklet that we've all gotten here today called the, "Guide to the Line 3 Public Meetings for the DEIS - Executive Summary," and it's on page 32.

All of Enbridge's proposed routes and virtually all of their preferred routes go through the 1855 treaty lands of

north-central -- and that spans all the way from the east to the western border of our state -- northern and all northeastern Minnesota above Lake Superior.

All these areas include pristine wild rice lakes important to our neighbors' culture.

I'm going to ask this question: Is it right to construct a treaty back in 1855 saving hunting, fishing, gathering, wild ricing for indigenous people, then alter the land, rivers, lakes, and wetlands by practices that leave them less useful ecologically and culturally -- sorry -- that leave them less useful ecologically and culturally and environmentally harmful?

I support the Ojibwe people in opposing the Line 3 oil pipeline.

I believe there is an omission in Table ES-1 of the DEIS used in the decision-making criteria granting a Certificate of Need for Enbridge's Line 3 tar sands oil project.

We must honor our treaty with the Ojibwe people.

Thank you.

RECEIVED
JUN 28 2017
MAILROOM

To whom ~~let~~ May Concern 6/25/17

I oppose the passage of CN-14-916
+ PPL-15-137

1. We need to focus on renewable energies, oil is becoming outdated and is a dirty fuel

2. Enbridge has and would continue to violate permit conditions as past records show.

3. The proposed oil route would infringe on Native communities. They are already at risk. Also, it could affect ricing lakes and spoil their economy.

4. There should be spill analysis for tributaries of the St. Louis + Nemadji River. A spill going into Lake Superior could be disastrous. 1268-1

5. The future of the pipeline is uncertain. It's a high price for temporary distribution of oil.

6. The property values for landowners could decrease because of the pipeline.

7. Re-establishing the surrounding area is difficult and there is no real plan.

8. Oil usage contributes to climate change

Levi, Andrew (COMM)

From: Nick Voss <nickvoss12@gmail.com>
Sent: Saturday, July 08, 2017 12:55 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Greetings, my comment on the Line 3 Project Draft EIS consists of four parts:

1. The Draft EIS could be improved by providing specific response plans (budget, personnel responsible for corrective actions, and time frame) in the case of oil spills. 1497-1

2. While the EIS contains valid scientific process, the EIS could be improved by acknowledging that routing the line around lakes containing wild rice (17 of them), thus leaving the lakes completely untouched by any new line developments, would be not only beneficial to the lakes, but is also valid in terms of scientific process. It would be biased and disgraceful to science to exclude this option in the EIS. It should be stated it clearly in the EIS that routing the line around wild rice lakes would contain the lowest-risk possible in terms of harm to the lakes. 1497-2

3. The draft Line 3 Project Draft EIS could be improved by prioritizing the removal AND remediation of the old line 3 before any construction occurs on any new route. 1497-3

4. As a Minnesota resident, I support, advocate for, and urge the MN Department of Commerce to authorize alternate route SA-04. This route is the best balance between Enbridge interests, the interests of the Minnesota Public, and the State Forests and wild rice lakes that overlap the Line 3 Project Draft EIS. StateForests and public lands in the route of the proposed new line 3 project should be protected from this project, as this is the desire of much of the MN public interest.

Thank you for your time and consideration. My contact details and information is as follows:

Nick Voss
Education and Outreach Coordinator
Vadnais Lake Area Water Management Organization

3415 Bellaire Ave
White Bear Lake, MN 55110

612.790.7926

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Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Ken Vraa

Street Address: 22070 - 512th Lane

City: Mcgregor State: MN Zip Code: 55760

Phone or Email: 218-426-3687 KLVRAA@Yahoo.Com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

0775-1

The Executive Summary (Page 19 - Groundwater) Seems to Address Groundwater on a Macro Level I'm Concerned that disruption to Smaller Ground Water Aquifers Are Not Addressed. There Are Many of us who Rely on Shallow wells that Are not that far from Construction that is Proposed Does the E.I.S Address the Potential Impact on Volume Flow / Quality of water After Construction to those who Live Along the Proposed Pipeline.

Thanks —

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Gretchen Walker <gmhwalker@hotmail.com>
Sent: Wednesday, July 05, 2017 7:50 PM
To: MN_COMM_Pipeline Comments
Subject: Comments regarding CN-14-916 and PPL-15-137

My comments concern the topic of habitat fragmentation. The issue of ample natural habitat occupies a prominent place in the Minnesota psyche, but unfortunately is addressed only cursorily in the DEIS. I urge the Commission to consider habitat fragmentation more carefully and closely.

Page 6-439 of the DEIS states "Applicant would work with USFWS to develop measures to avoid and minimize destruction of migratory birds." A plan document to address migratory bird survival and safety needs to be prepared with USFWS participation and submitted to the Commission to accompany the DEIS. The Applicant needs to thoroughly describe and explain steps to ensure protection of migratory birds. 1233-1

Page 6-439 also states that construction on the Applicant's preferred route will impact a great blue heron rookery. The Applicant needs to consult with the USFWS and MN DNR regarding impact and consequences to the rookery and submit findings to include with the DEIS. 1233-2

Pages 6-439 and 6-444 state that songbirds are particularly vulnerable to habitat fragmentation associated with linear projects such as a pipeline, and that ongoing operation of the Applicant's preferred route would cause permanent degradation to these populations. Unfortunately the DEIS does not offer any mitigating or remedial actions for this danger to songbirds and forest nesting birds. For that reason, Route Alternatives RA-03AM, RA-07, and RA-08 need to be weighed more heavily. Table 6.3.4-24 states there is no further habitat fragmentation associated with these routes, as they are co-located with existing pipelines. 1233-3

I oppose the proposed pipeline project. The pipeline would serve to transport crude oil from the tar sands operations in Alberta. I urge the Commission to recognize that environmental degradation cause by the oil sands industry is far greater than conventional oil production. But an even large consideration to bear in mind is simply that US demand for oil is declining. Please scrutinize the DEIS and view the Applicant's request to construct this new unwanted and unneeded pipeline with cation, concern, and skepticism.

Respectfully submitted,

Gretchen H. Walker

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Mike Warner

Street Address: 40589 Golden Ave.

City: North Branch State: MN Zip Code: 55056

Phone or Email: MWarner@Liunagroc.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

The Line 3 DEIS ignores public safety risks of Rail alternative. We've seen over the past few years what can happen when rail lines get crowded with oil tankers, but the DEIS makes no mention of how the rail alternative could lead to more accidents and injuries at rail crossings 0492-1

Also - the DEIS ignores construction job impacts. The anylsis of construction job impacts is based on a flawed assumption that NO local jobs will be created, BUT our union contracts require local hiring. And it's not just construction workers pipelines employ engineers, inspectors, technicians, marketers and sales to name a few. The Line 3 replacement will keep our pipelines operating safely and efficiently so we keep Northern MN working. 0492-2

We can't afford delay: Replacing Line 3 is crucial to the safety & reliability of MN's pipeline infrastructure. We need to keep the process moving forward so the commission can make a decision rather than delay and increase the chance of major disruption.

Thank You -

If including additional pages please number them and tell us how many you are providing: 1 *pages*

Levi, Andrew (COMM)

From: Elizabeth <elizabeth.watts@verizon.net>
Sent: Monday, July 10, 2017 7:54 PM
To: MN_COMM_Pipeline Comments
Subject: Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

Importance: High

To: Jamie MacAlister

I am from Lynbrook, New York. I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

The Line 3 Pipeline concerns me because of the many negative impacts it will have. The DEIS concerns me because it does not adequately address these negative impacts.

TRIBAL IMPACTS

- The United Nations international standard for projects that impact Indigenous Peoples is **Free, Prior and Informed consent**. Tribal consultancy after the project is already proposed and designed is not free, prior, and informed consent.
- Most of the issues specific to tribal people and tribal resources are **confined to a separate chapter** that attempts to provide "an American Indian perspective." They are excluded from the main chapters that assess potential impacts. This allows the EIS to **avoid drawing conclusions** about the impacts on tribal people. (Chapter 9)
- Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "**would have a long-term detrimental effect on tribal members and tribal resources**" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). **This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members**. 2284-1
- Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "**are part of a larger pattern of structural racism**" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3).
- The DEIS concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) **But it also states that this is NOT a reason to deny the project**!
- Chapter 6 states that Enbridge's preferred route would impact **more wild rice lakes and areas rich in biodiversity** than any of the proposed alternative routes (Figure ES-10).
- Most of the analysis of archaeological resources in the path of the pipeline rely on **Enbridge's surveys**. For some reason, only 3 of their 8 surveys are available, and the 5 missing are the

most recent! In those, Enbridge found 63 sites, but claims that only 3 are eligible for protection under the National Register of Historic Places. (5.4.2.6.1). Honor the Earth has had the studies we have been able to see reviewed, and there are numerous flaws in their methodology.

- The DEIS acknowledges that "The addition of a temporary, cash-rich workforce **increases the likelihood that sex trafficking or sexual abuse will occur**," and that these challenges hit Native communities the hardest. But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). What experience does Enbridge have planning and implementing an anti-sex trafficking program? 2284-2

BIG PICTURE PROBLEMS

- Many of the environmental impacts and "plans" for minimizing them are drawn directly from Enbridge's permit application ("Enbridge would do this" and "Enbridge would do that") without any evidence of compliance or genuine consideration that maybe, just maybe, Enbridge won't follow all the rules. History shows that they continually violate permit conditions - we are working on compiling an enormous record of these violations. The DEIS should analyze the likelihood of compliance. 2284-3
- **The Alternatives chosen for comparison to the pipeline proposal are absurd** -- for example, the only rail alternative assumes the construction of a new rail terminal at the US border, and thousands of new railcars to transport oil to Clearbrook and Superior. Enbridge would never do that. The only reasonable rail option would begin in Alberta. The truck alternatives are similarly unreasonable.
- **The "No Build" Alternative is not genuinely considered.** It is framed as "Continued Use of Existing Line 3" (Chapters 3 and 4), but nowhere is the "Shut Line 3 Down" option considered. There is no discussion of renewable energy, conservation, or the rapid development of electric car infrastructure. There is no assessment of the decline in oil demand. The entire study assumes that society needs X amount of oil, simply because Enbridge says they can sell it. That assumption ignores the massive fossil fuel subsidies and debts that make Enbridge's profits possible, and avoids the moral question of what is good for people and the planet. We know we must stop burning fossil fuels yesterday.
- There is zero discussion of how all this extra oil will go once it leaves Superior, Wisconsin. With 370,000 bpd of additional capacity, Enbridge will need a new pipeline departing its terminal in Superior. We know that they plan to build Line 66 through Ojibwe territories in Wisconsin, but they continue to deny this. Why isn't MN asking?
- The DEIS contains **no spill analysis for tributaries of the St. Louis River or Nemadji River**, where spills could decimate **Lake Superior** and the harbors of the Twin Ports.
- For calculations of impact, the lifespan of the new Line 3 is estimated at *30 years*. But Lines 1-4 are 55-65 years old! And hasn't the technology improved? The lifespan should be at least 50 years, a shorter lifespan is a clear indication that Enbridge themselves know that the fossil fuel era is coming to an end. In Honor the Earth's analysis, we have attempted to predict the impacts of this pipeline on the next 7 generations.
- This project is a further investment in a dying Tar Sands industry. Numerous international oil companies and financing institutions are divesting from the tar sands. Why should Minnesota invest in this industry? Why should our Nation be forced to deal with a bad idea in perpetuity.

- The DEIS assumes that the Koch pipelines to MN refineries get all their oil from Line 3, but the current Line 3 does not supply enough capacity for this (390,000 barrels per day), and we know that some of it comes from Line 81, which brings oil from the Bakken in North Dakota.

SPILL RISK

- The 7 sites chosen for spill modeling are not representative of the locations and resources put at risk along the entire corridor. A more thorough analysis of different locations is needed - for example, what about Lake Superior?
- There is no analysis on Enbridge's leak detection system, or their inability to respond quickly to major emergencies.
- Enbridge's response plans are highly guarded, and Honor the Earth's attempts to receive and review these documents has been blocked. What we can infer is that Enbridge relies on local first responders for their emergencies. They attempt to use the money they donate to communities along their corridors as proof that they have an integrated emergency response program.

The DEIS estimates the annual probability of different kinds of spills on the proposed route in MN:

- Pinhole leak = 27%
- Catastrophic = 1.1%
- Small Spill = 107%, Medium = 7.6%, Large = 6.1%

So in 50 years, we can expect **14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic**!

ABANDONMENT

- The risks of pipeline abandonment are not adequately assessed. For example, there is no discussion of landowner property values and the effect that an abandoned pipe could have on them, especially if there is indeed "**legacy contamination**" on people's land.
- Impacts on human and natural resources due to the abandoned Line 3 are anticipated to be minimal in the near term but could be significant in the longer term, absent effective monitoring, adaptive management, and the timely introduction of mitigation measures. There is not much information on what these mitigation and management plans are.
- If there is a dearth of surrounding soil, or if the cover for the pipeline is relatively shallow, the pipeline bears more of the load and, all things being equal, is more likely to fail. We know from experience that there are numerous areas where the pipes are exposed and near the surface.
- There is also no discussion of **exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied**. "When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high" (8.3.1).
- We know that the abandonment of the existing line 3 is bad. But there is also no mention of **the abandonment of the other 3 ancient pipelines in Enbridge's existing mainline corridor (Lines 1, 2, and 4)**, which we expect Enbridge will very soon attempt to abandon. Nor is there any discussion of the **abandonment of the NEW Line 3** in the future.
- The DEIS states that it will be very risky to remove and clean up the existing Line 3 because the pipelines are very close together. "The distance between pipelines within this corridor

varies, but they are generally 10 to 15 feet apart" (8.3.1). This is not consistent with our extensive observations and physical measurements on the land. Also, don't they dig up pieces of pipe for maintenance purposes all the time? **Why is it suddenly risky?**

- The DEIS simply states that "Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage,and mitigate historically contaminated soils and waters" found during the abandonment or removal of the existing Line 3 (8.3.1.1.1). **We want to see that plan**.

CONSTRUCTION AND RESTORATION

- Chapter 2, "Project Description" states that Enbridge has requested a 750-foot route width (375 feet on each side of the Line 3 Replacement pipeline centerline). They claim only 50 of the 750 feet would remain a permanent right-of-way (2.1) All of this width should be included in an impact analysis because Enbridge's environmental protection plan and record is abysmal.
- Their "restoration" plans for restoring the landscape around the corridor after installation is laughable. Enbridge's process for restoring wetlands includes dumping the now compacted (and probably de-watered) soil back in the trench, sowing some oats and "letting nature take it's course". This is not how you re-establish a wetland. Studies have shown that even with proper restoration practices, it can take decades to get back to the biological functioning it was at prior to disturbance. When Enbridge stores the soil, they will also be driving equipment over it- which compacts it, they also plan to compact the soil after refilling the trenches. This is not good for the soil.
- Cathodic protection, which applies electric current to the pipeline in order to protect it from corrosion caused by nearby utility lines, **will not be installed for up to 1 year after pipeline construction** (2.3.2.3). Lack of cathodic protection is what caused many pinhole leaks in the Keystone pipeline, almost immediately after construction. The proposed route for Line 3 follows a utility corridor for much of its length - this is a recipe for disaster. Even the US Army Corps's rubber-stamp approval of the Dakota Access pipeline required the cathodic protection system to be installed within 6 months!

ECONOMIC IMPACTS

- Chapter 5, "Existing Conditions, Impacts, and Mitigation" states that Line 3 will create ZERO permanent jobs. Enbridge's application states that "existing operations staff would be able to operate the [pipeline] and that few additional employees would be hired to assist the staff" (5.3.4).
- Also in Chapter 5, the DOC assumes "all workers would re-locate to the area" and ZERO construction jobs will go to Minnesotans. The pipeline would have "no measureable impact on local employment, per capita household income, median household income, or unemployment" (5.3.4).
- The DEIS does not acknowledge that when the existing Line 3 shuts down, Enbridge will stop paying taxes to the MN counties along the mainline corridor. For many of these poor counties in the north, revenue from Enbridge's property tax makes up a significant portion of the county budget. There is also the issue that Enbridge is now in the process of appealing years of back taxes, burdening two of the poorest counties in Minnesota with over $10 million due.

CLIMATE CHANGE

- The DEIS acknowledges that Line 3 would contribute to climate change. It analyses 3 different types of emissions - direct, indirect, and lifecycle. Direct emissions are those that the pipeline infrastructure itself emits, and these are very small. Indirect emissions are those created by the power plants that provide electricity for the pipeline's pumping stations, and these are significant. Lifecycle emissions are those caused by the refinement and eventual use of the oil, and these are massive. Line 3's direct and indirect emissions alone would be 453,000 tons of CO2 per year. Over a 50-year lifespan, that would cost society an estimated $1.1 billion. (Executive Summary p.18).
- The lifecycle emissions of Line 3 would be 193 million tons of CO2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3)
- The DEIS does not discuss the unprecedented challenges of human casualty, displacement, conflict, natural disaster, biodiversity loss, etc, that climate change is causing, or the consensus from the scientific community that we must leave fossil fuels in the ground. It also fails to acknowledge that across the planet, Indigenous people are disproportionately impacted.

The DEIS affirms that the MN PUC can only grant the permit if "the consequences to society of granting are more favorable than the consequences of denying the certificate." Regardless of whether or not Enbridge can find customers, the DEIS shows that the negative impacts far outweigh the benefits.

Sincerely,

Elizabeth Watts

16 Starks Place

Lynbrook, NY 11563

July 1, 2017

TO: Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul MN 55101-2198

FROM: John Weber
22382 Glacial Ridge Trl.
Nevis, MN 56467-4018

Subject: Comments on Line 3 Project

Thanks for sending paper copy of Executive Summary in response to my letter during scoping comment period.

The attached seven pages w/ applicable docket numbers are enclosed starting my written comments.

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Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 - John Weber comment

page 1-7 section 1.4.2.1 (emphasis added)

The Public Is Concerned About a New Pipeline Corridor Potentially Being Established

During the scoping of this EIS, many public comments raised concerns about the establishment of a new pipeline corridor—in the Mississippi River Headwaters area specifically, and in the "Lake District" generally. This concern stems from the fact that, as the pipelines in the existing Mainline corridor age and need to be replaced, a new corridor for the Line 3 Replacement Project may become a de facto new Mainline corridor. The need for a more deliberate energy infrastructure planning process, potentially through a "generic EIS," is at the core of the public's concern. An overwhelming amount of public comment and testimony in the Sandpiper docket[9] reflects this large and complicated question.

Comment: For the APR, how many more pipelines would be squeezed in? FEIS should not only state, but lay out impacts. Flawed process, a "generic EIS" certainly needed for pipeline corridors rather than piecemeal one line at a time. Evidently overwheming concern raised in the Sandpiper docket was not reflected in the DEIS. Since the APR largely follows the APR for Sandpiper, the FEIS should reflect and address these concerns.

also page 1-7 section 1.4.2.2

1.4.2.2 Resource Prioritization

The EIS Establishes Facts and Does Not Prioritize Some Resources over Others

Comment: Whose "facts"? Only Enbridge-provided? Any from independent sources? If so, FEIS should provide citations.

page 2-4 section 2.2

Enbridge Believes Replacing the Existing Pipeline Is Less Expensive and Avoids Extensive Inspections 2785-1

Comment: What is basis for $30 to $40 million/yr? Also what is basis for $2 million (per year?) for new line?

A whole host of things/events could/should make "30-year economic" life for L3R a moot point:

- o A saner approach that ends the current extreme extraction phase of the fossil fuel era that deems these methods for tar sands and fracking are socially, environmentally unacceptable.
- o A carbon tax/appropriate carbon pricing
- o Continued decline in petro. demand

So the "bottom line" could/should be, if L3R built it might "enjoy" only a few years, not decades of "economic usefulness". Thus if the $30 to $40 million/yr. figure, is true, it would be a "bargain".

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 – John Weber comment

also page 2-4:

Enbridge States that Demand for Canadian Crude Oil Exceeds Current Capacity

Comment: Is Enbridge pipeline system only way to transport the tar sands oil?

page 2-6:

The Life of the Proposed Pipeline Could Be Indefinite, with an Economic Life of More Than 30 Years

The Applicant anticipates that the physical life of the Line 3 Replacement pipeline (i.e., the number of years that the pipeline would be capable of transporting crude oil) would be indefinite given appropriate construction, maintenance, and integrity systems. The economic life of the Project (i.e., the number of years that continued operation of the Project would be feasible) is anticipated to be no less than 30 years.

Comment: Why only 30-year "economic life" if it's going to be, or so Enbridge claims, it would be "indefinite"? What assurances that Enbridge would do "appropriate" things? Also what if Enbridge goes into bankruptcy?

page 2-7:

The maximum allowable operating pressure would be 1,440 pounds per square inch gauge (psig). The pipeline would be designed to withstand pressures over and above normal operating pressures, and would operate according to applicable codes and regulations.[2]

Comment: Seems like an incredibly high number. I recognize that given the concrete-consistency of tar sands that a high level of pressure is needed. However, seems like a "recipe" for disaster waiting to happen...even with a new line. Does PUC want to foist that on Minnesota, especially given the location of proposed APR?

page 2-41:

Enbridge also patrols the entire Mainline system by air every two weeks to observe the condition of the right-of-way, nearby construction, erosion and other circumstances that could affect the safety and operation of the pipelines or could indicate a potential crude oil release.

Comment: What about winter snow cover in conjunction with both detection and subsequent spill response?

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 – John Weber comment

Also page 2-41:

If irregular conditions are observed during the air surveys, Enbridge personnel would be deployed to investigate the irregularity on the ground. If a release is suspected, the survey pilot/ground personnel would immediately notify the Enbridge Control Center by radio so the affected pipeline could be shut down pending an onsite investigation.

Comment: No mention on this page that the Control Center is located in distant Edmonton, Canada. Raises all sorts of issues that FEIS should address. A few would be:
o Stating measures to counter cyber attacks would be in place.
o Contingencies, if otherwise, computers go down.
o Measures taken to avoid staff boredom, inattention, etc. such as experienced in more recent years at USAF nuclear-missile silos.

Also page 2-41:

Maintenance of the Right-of-Way Includes Routine Mowing and Brush Removal 2785-2

Comment: Once the construction dust, so to speak settles, pipeline corridors could and should serve as biological corridors for pollinators. However, the routine mowing, brushing and herbicide applications will produce "no fly zones". I've personally seen, from public roadways that pipelines cross under on butterfly counts near Itasca S.P. and Bemidji that this has been the case over the past 25 years. Whereas not many years ago, nectar sources flourished on such corridors, more recent years have produced denuded stretches. Ironic that Enbridge making a PR splash with pollinator Ecofootprint grants near ag fields when pipeline corridors could provide so much more!

page 2-43 (emphasis added):

Enbridge personnel participate in both classroom and practical training in safety and emergency response procedures, including Incident Command System training, and are required to demonstrate knowledge and proficiency in these areas as appropriate to their responsibilities in accordance with the approved ERAP. PREP standards require at least one written/classroom spill response exercise and one equipment deployment exercise annually. Enbridge has indicated that their training programs exceed this standard.

Comment: Has any entity outside of Enbridge that can vouch that Enbridge does indeed exceed this standard? If so, should be included in FEIS.

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 - John Weber comment

page 2-43 section 2.9:

2.9 ABANDONMENT OF THE LINE 3 PIPELINE

Comment: How long will Enbridge maintain and monitor old Line 3? If not physically removed, Enbridge should be required to set up a multi-million dollar trust fund to clean up messes discovered long after Enbridge out of the picture.

page 3-3 CERTIFICATE OF NEED

Enbridge submitted a CN application to the Commission on April 24, 2015. After accepting the application as complete, the Commission ordered the Department of Commerce, Energy Environmental Review and Analysis (DOC-EERA) to prepare a combined EIS that addressed both the CN and routing permit dockets in accordance with Minnesota Administrative Rule Chapter 4410. The Commission also referred the application to the Office of Administrative Hearings (OAH) for a contested case hearing for the CN decision, to be conducted jointly with the hearing for Enbridge's route permit application (discussed below).[4]

Comment: FEIS should add a sentence to this paragraph that in effect says: "A court ruling upheld by the Minnesota Supreme Court ordered an EIS be performed."

page 3-4:

The Commission's CN decision does not determine the route that the pipeline would take between its endpoints in Minnesota. The route is determined by the Commission's route permit process (as discussed below and in Table 3.1-1 (further discussion is provided in Chapter 4).

Comment: Enbridge through its affiliate NDPL LLC claimed "only way" to move Bakken oil had to have Sandpiper pipeline connecting Clearbrook and Superior, WI. However, subsequently Enbridge withdrew Sandpiper application and bought into Dakota Access Pipeline. DAPL totally bypasses Minnesota. The FEIS should reflect that Enbridge met it Bakken oil "needs" <u>not</u> with a Clearbrook-Superior route. <u>Now,</u> APR for Line 3 "replacement" follows the withdrawn Sandpiper route. So how hard and fast is that??

page 3-8 section 3.3.2

This combined CN and route permit EIS has been prepared by DOC-EERA staff in cooperation with the Minnesota DNR and Minnesota PCA. It is issued as a draft EIS so that it can be improved through public comment[23] and a Final EIS can be developed based on those comments.[24] Once a Final EIS is issued, the public may comment on the adequacy of the Final EIS.[25] The Commission must then determine whether the Final EIS is adequate for decision-making purposes or whether it needs to be revised.[26]

Comment: FEIS should elaborate on what DNR and MPCA staffs proposed and how incorporated in the DEIS.

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 - John Weber comment

page 4-3 section 4.2.2

The EIS must evaluate the environmental consequences of the No Action Alternative. In this case, a Commission decision to deny the certificate of need is the "No Action" Alternative. If the Commission determines that the demand for increased shipping capacity exists but denies the CN, the Applicant (or entities other than the Applicant) could reasonably be expected to meet shipper demand through other means, such as a different pipeline system, or by train or truck.

Comment: Many reliable sources project decreased shipping demand over the next 30 years. FEIS should include independent (i.e. non-Enbridge provided) sources and projections. (Probably other commentators may even be mentioning at least some of them.)

page 4-6 section 4.2.3 Alt. 1 - Existing Line 3

Maintaining the Existing Line 3 Would Require 4,000 Excavations over the Next 15 Years

Continued operation of Line 3 at its present capacity would require that Enbridge continue the high level of maintenance that the pipeline currently requires. Enbridge has estimated that up to 4,000 integrity digs (excavating and exposing the pipeline for maintenance and correction of anomalies) would be required over the next 15 years of operation (approximately 267 procedures per year) (Enbridge 2015). The effects of this high level of maintenance activity would continue under the No Action Alterative.

Comment: This certainly is not a "No Action Alternative"! Enbridge would be kept busy with integrity digs. Further, it is interesting that Enbridge going out only 15 years with projection. When demand for petro. downshifts to an even lower gear?

page 4-7 section 4.2.4 Alt. 2 - Use Other Pipelines

Other existing and potential future pipelines with available capacity were considered as alternatives to the Project if they (1) interconnected in the crude oil supply region near Edmonton, Alberta; and (2) served the same Clearbrook and Superior destinations.

Environmental Impacts of Alternative Pipeline Capacity Owned by Enbridge or Others Are Not Evaluated

Comment: Doesn't make sense not to evaluate Alt. 2. Are Clearbrook and Superior "destinations" as "firm" as they supposedly were for Sandpiper APR? Also, if other Enbridge pipelines could handle tar sands oil, why not?

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 – John Weber comment

page 4-8 more on Alt. 2:

The EIS is not evaluating these alternatives based on whether they meet the need for this proposed Project. Their environmental impacts have been (or would be) evaluated in other jurisdictions. Therefore, the "other pipeline" CN Alternatives are not evaluated in the EIS.

Comment: Prime example of what a "rigged game" the whole approval process is at this time. An applicant, such as Enbridge, knows how many pipelines, where and when they will be placed. On the other hand, the public gets to see only one pipeline proposal at a time, not the full array the applicant has "up its sleeve". This provides more evidence that "generic EIS" for energy corridors is needed in Minnesota.

p. 4-20:

The probability of an incident leading to a crude oil release would also be similar for a smaller diameter pipeline. Because the impacts are generally the same, a smaller diameter pipeline configuration was not evaluated in detail as a Project configuration alternative.

Comment: Less volume means less oil to spill. The FEIS should evaluate the impact.

page 5-184

Table 5.2.3-5. EPA Ecoregions Crossed by System Alternative SA-04

Comment: Crops/pastures represent over 80 percent of the 795 miles traversed by SA-04.

page 5-215 Table 5.2.3-18 Summary Potential Impacts on Vegetation

Comment: APR would have a 36.1 percent impact on cropland; leaving almost 2/3 (i.e. 63.9 percent) impact on forests,croplands, scrub/shrub.
On the other hand, SA-04 has 95.0 percent impact on cropland: only 5.0 percent on all other types combined.
Important to note that a pipeline through croplands would be 1) easier to monitor and 2) easier to respond to leaks/spills by being less remote.

page 5-216 continuation of Table 5.2.3-18

Comment: With regard to right-of-way (permanent) the APR would impact 45.2 percent forest, whereas SA-04 would impact only 1.4 percent. For a variety of factors, the fewer forest acres affected, the better.

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 - John Weber comment

page 5-227:

Four AMAs occur within 0.5 mile of the Applicant's preferred route: Blackhoof River AMA, La Salle Creek AMA, Spire Valley AMA, and Straight River AMA (see Figure 5.2.4-1).The Applicant's preferred route runs directly adjacent to Portage Lake. Portage Lake meets the criteria for a Lake of Biological Significance and is also a Sentinel Lake.

Comment: Putting LaSalle Creek & Straight River AMAs and Portage Lake in jeopardy are a few of the multitude of reasons why Enbridge's incursion into Minnesota streams and lakes country with its APR would be a big mistake.
further page 5-227:

The ROI includes Minnesota DNR-designated trout streams, which occur throughout the state (Figure 5.2.4-2). There are 22 trout streams (21 in Minnesota and one in Wisconsin) identified within 0.5 mile of the Applicant's preferred route, as described in more detail in Section 5.2.4.3.1. Five lakes rated for the Fish IBI are located in the ROI in the following watersheds: Roosevelt, Island, Waukenabo, Big LaSalle, and Portage.

Comment: Again putting these trout streams in jeopardy by the APR should be opposed.

pages 5-232 & -233 & -234

Table 5.2.4-3. Wildlife Conservation Lands within 0.5 Mile of the Applicant's Preferred Route and System Alternative SA-04

Comment: 91.5 percent of SA-04 traverses the Dakota Tallgrass Prairie WMA. Does SA-04 "have" to go through that WMA in N.D.? Can it be altered?
On the other hand, 93.3 percent of acreage traversed in Minnesota is in State Forests by the APR. A whole host of factors should argue against this assault on MN S.F. (A few would be 1) fragmentation, 2) difficulty in monitoring, 3) difficulty with access for spill and leak response, 4) carbon sequestration reduction and so forth.)

page 5-236 Itasca S.P. and McGregor IBAs

Comment: Another argument against APR since it would unnessarily place both in jeopardy.

page 5-245

The SA-04 would cross many different dominant vegetation classes, including evergreen forest, deciduous forest, mixed forest, shrub/scrub, grassland/herbaceous, hay/pasture, cultivated crops, woody wetlands, emergent herbaceous wetlands, and barren land (see Section 5.2.3 for a general discussion of vegetation along SA-04). Broadly, SA-04 occurs within ecoregions that are dominated by agricultural activities but also include areas of prairie/grasslands and non-forested wetlands. 2785-3

Comment: Last sentence in paragraph should read in FEIS: "Broadly, SA-04 occurs within ecoregions that are dominated by 82 percent agricultural activities and far lesser percentages of prairie/grasslands and non-forested wetlands."

July 4, 2017

TO: **Jamie MacAlister, Environmental Review Manager**
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

FROM: John Weber JJW
22382 Glacial Ridge Trl.
Nevis, MN 56467-4018

Subject: Second installment of comments on Line 3 Project

Attached are additional pages of Line 3 comments.

A nice day to reflect on a future era when saner, sustainable energy policies and approaches are in place. In the meantime...

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Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 – John Weber comment

page 5-180

Figure 5.2.3-2. Sites of Biodiversity Significance in the Region of Interest for the Applicant's Preferred Route and Certificate of Need Alternatives

Comment: Map shows in "living color" true impact of a frontal attack on significant biodiversity by APR and other alternatives except for SA-04 and a true "no build" alternative.

page 5-271

Table 5.2.4-10. Vegetation Cover Potentially Affected by System Alternative SA-04 (acres)

Comment: Construction work area would be 95 percent in cultivated crop areas. Permanent right-of-way would also be 91 percent in cultivated crop areas. Many positive implications could ensue. A few would be:
o Ease year-round monitoring.
o Spill/leak responses aided by proximity of a number of existing access roads.
o BMPs that aided, rather than thwarted, pollinators, could make SA-04 a model for how extensive corridors could truly benefit pollinators in a far more meaningful way than a few token Enbridge Ecofootprint grants will ever do.

page 5-272

Table 5.2.4-11. Wildlife Conservation Lands Potentially Affected by System Alternative SA-04 2785-4

Comment: FEIS should state that SA-04 construction would be 93.8 percent of total in Dakota Tall Grass Prairie WMA and same WMA would have 93.6 percent of coverage in permanent right-of-way. But further, FEIS should explore how a RA could largely, if not totally, by-pass Dakota Tall Grass Prairie WMA.

page 5-285

Table 5.2.4-12. Summary of Potential Impacts on Fish and Wildlife for the Applicant's Preferred Route and Certificate of Need Alternatives

Comment: The "permanent/minor to major impacts from maintenance of the right-of-way" for APR and SA-04 are too vague. FEIS should quantify and qualify now much "minor"? How much "major"?

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 - John Weber comment

page 5- Table 5.2.5-18

Comment: This table alone should stop the APR in its tracks!

page 5-363 (emphasis added)

If present, the Dakota skipper, Poweshiek skipperling, and rattlesnake-master borer moth could be affected by construction activities that disturb native vegetation. These activities would disrupt egg laying and foraging during spring and summer, and could crush dormant larvae during fall and winter. These prairie-dependent insects depend on high-quality native grasslands and tallgrass prairies to provide food from flower pollen and nectar. Vegetation clearing and replacement with non-native ground covers could injure or kill these butterflies and moths, and would remove forage plants for the species. While it is possible that these invertebrates could be present along the construction work area, no habitat or presence/absence surveys have been conducted. Direct construction impacts on these populations would be temporary. The SA-04 route is sited to follow existing pipeline, transmission line, or road corridors; consequently, potential impacts, habitat loss, and habitat fragmentation would be minimized. If these species are present, impacts from construction activities would be temporary to short term and minor. 2785-5

Comment: Unlike 99.9 percent of commenters on the DEIS, I have actually seen and photographed both Dakota Skippers and Poweshiek Skipperlings in the wild. It is unacceptable that surveys have not been conducted. Rather than "temporary", construction impacts would be permanent especially when combined with non-BMP operational mowing and spraying of herbicides.

page 5-416

Table 5.2.6-3. Federal Lands Crossed by System Alternative SA-04 (acres) 2785-6

State	Construction Work Area	Permanent Right-of-Way
North Dakota	800.2[a]	331.2[b]
Minnesota	0.3	0.1
Iowa	0.0	0.0
Illinois	176.5	73.6[e]
TOTAL	**977.0[a,b]**	**404.9[a,b]**

Source: PAD-US – USGS 2016.

Notes:

[a] Includes acreages of the Dakota Tallgrass Prairie Wildlife Management Area that are not owned by the U.S. Fish and Wildlife Service.

[b] Includes acreages of the Illinois and Michigan Canal National Heritage Area that are not owned by the National Park Service.

Comment: Backtracking to Table 5.2.4-3 which gives the impression that all of 34,806.8 acres of Dakota Tallgrass Prairie WMA may be impacted by SA-04, 5.2.6-3 indicates 34,000 fewer acres would actually be crossed there. Is this but one of series of instances that "deck is stacked" unfairly against SA-04 in an attempt to cast a more favorable light on the APR?

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 - John Weber comment

page 5-438:

Social Cost of Carbon

The potential increased GHG emissions associated with the Project would contribute incrementally to global climate change, in conjunction with other regional, national and global sources of GHG emissions; when aggregated together on a global scale, emissions can have large cumulative effect on climate change.

Comment: At present, the "social cost of carbon" is generally a vague construct. It is disproportinately being "paid" by respiratory sufferers, victimes of catastrophic weather events, residents of low-lying islands around the world, victims of prolonged drought-caused famines and members of future generations, to name just a few instances. However, it would be a "new ballgame" if saner heads adopted a "carbon tax" of instituted "carbon pricing". How economically viable would Enbridge L3 "replacement" be then? FEIS should address this.

page 5-454 & -455 5.2.7.4.2 Mitigation

Comment: The first four items listed are "laughable" (i.e. so small that it would seem embarassing to even put them on paper). Rather, Enbridge's new pipeline (whether APR or SA-04) should be viewed as an "enabler" (i.e. continuing the upstream method of extreme extraction of Alberta tar sands and the downstream end-use of burning a fossil fuel) rather than a true energy bridge to a post-fossil fuel era. This leaves, the largely-dismissed in the DEIS, a real "No Build Alternative" as the only meaningful alternative. All others add, not subtract GHG emissions.

page 5-235 Figure 5.2.4-3 2785-7

Comment: SA-04 avoids all WMAs and Refuges and should be noted as such in the FEIS.

page 5-237 Figure 5.2.4-4

Comment: Figure shows SA-04 close to Swan Lake NWR (MN), Upper Miss./Tremelau NF & W Refuges (IA/IL) and Midewin National Tallgrass Prairie Audubon IBA (IL). Seems like all could be avoided by route alteration.

page 5-314 Figure 5.2.5-5 2785-8

Comment: SA-04 would avoid all (i.e. "moderate, high and outstanding") and FEIS should note this.

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 - John Weber comment

page 5-477 (emphasis added)

2785-9

The value of the annual lost growth of forested land within the construction work area is approximately $19,000 (Table 5.3.1-10). Assuming that this value is lost annually over 50 years, the present value of the future growth foregone is approximately $158,000, with the majority of the impact occurring in Minnesota. When compared to the present value of the timber harvest market over the same time period (50 years, $662 million), the impact of construction on the associated local timber industry is likely to be long term and negligible.

Comment: Stated economic life of L3R is 30 years. Why is 50 years being used?

page 5-506 Construction Impacts (emphasis added):

Construction Impacts

As discussed in Section 4.3.1, SA-04 would be constructed and operated in the same manner as the Applicant's preferred route. However, the route would be within the jurisdiction of other states and other local governments for approximately 544 miles, or 68 percent of the total route. The system alternative is over twice the length of the Applicant's preferred route and would cross more recreational land and waterbodies than the Applicant's preferred route.

Comment: Agree with first part of last sentence (i.e. the "twice the length"), but feel the FEIS should quantify "more recreational land and waterbodies" than APR, since recreational land such as Itasca S.P. impacted by APR is far different than others. Also Headwaters of the Mississippi River, again, is of a different magnitude and affected by APR in a much different way than other "waterbodies".

Further comment, the DEIS is terribly deficient when it comes to "tourism". DEIS seems to fail in recognizing that "outdoor recreation" is but a part of tourism.

also page 5-506:

At the county level, the majority of the land disturbed during construction (795 acres) would occur in a WMA within Richland County, North Dakota (Table 5.3.2-2). However, a review of national wildlife refuge maps revealed that the disturbed land represents a very small portion (less than one-half of a percent) of the total amount of land that remains available in the WMA. In total, over 185,000 acres of land would remain unaffected and available during construction within the Dakota Tallgrass WMA in Richland County.

Comment: Finally, hidden on page 5-506, the very minor impact on Dakota Tallgrass Prairie WMA is revealed. FEIS should reflect "more realistic" numbers of impacted acres.

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 - John Weber comment

page 5-525

Table 5.3.3-3. Populated Areas near System Alternative SA-04

Comment: Table shows 223,526 population for Fargo, West Fargo and Grand Forks (ND) and Mankato (MN). Those 223,526 people represent 81 percent of the supposedly-affected population. It seems like route adjustments near those four cities could shrink the alleged population impact from SA-04 by 80 percent!

pages 5-538 & -539 Construction & Operations Impacts SA-04

Comment: If one is to believe narrative on these two pages, the construction and operations impacts on populated areas would be negligible.

page 5-558

Table 5.3.4-6. Government Revenue in Counties Crossed by System Alternative SA-04 2785-10

Comment: Several ways to view this table. One is the fairly-high (i.e. average of 41 percent) reliance on property tax revenues. A number of county commissioners have gotten all "starry eyed" at the prospect of "more" property tax revenues from an Enbridge pipeline. However, this is a double-edged sword, so to speak. Within the past several years, Enbridge has gone to Tax Court to have counties repay "too high" property taxes paid in the past few years. How can cash-strapped counties repay past revenues they're already spent and don't have current funds to repay? The FEIS should note that Enbridge already seeking repayment of past propery taxes paid. Nothing to stop Enbridge from going back to Tax Court in the future. Another way at looking at this is a further dependence of counties on property tax revenue. Though pipeline percentage portions may seem small, the dollar valuations will certainly not be. Is it healthy to have counties even more dependent on Enbridge pipelines when they are on such razor-thin margins for error?

Further, the FEIS should address what happens to these revenues when Enbridge takes a pipeline out of commercial service and impact on property taxes paid.

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 – John Weber comment

page 5-563 (APR) & page 5-567 (SA-04):

2785-11

Table 5.3.4-11. Estimated Income Tax Generated from Construction-Related Income for the Applicant's Preferred Route

State/County	Miles of Pipeline through County	Estimated Income Tax Generated from Direct and Indirect Construction-Related Income[a] ($2016 millions)
TOTAL	380.5	$103.9

[a] The estimates represent a conservative upper bound on the actual values. The underlying data are based on results from an IMPLAN model that uses national data, rather than data at the state level. The national data inflate the results at a more localized level, compared to a state-level model.

Table 5.3.4-12. Estimated Income Tax Generated from Construction-Related Income for System Alternative SA-04

State/County	Miles of Pipeline through County	Estimated Income Tax Generated from Direct and Indirect Construction-Related Income[a] ($2016 millions)
TOTAL	795.4	$178.1

[a] The estimates represent a conservative upper bound on the actual values. The underlying data are based on results from an IMPLAN model that uses national data, rather than data at the state level. The national data inflate the results at a more localized level, compared to a state-level model.

Comment: Same two footnotes used for both = mumble jumble. FEIS should present aggregated tax data from actual counties and states.

page 5-567

Employment and Income

For the purposes of the analysis, it was assumed that SA-04 would be operated in the same manner as the Applicant's preferred route. Based on Enbridge's estimate that very few permanent workers would be needed for operation of the preferred route, it is expected that SA-04 would similarly require few operational staff. Based on the small number of permanent jobs, it is likely that operation of the pipeline would result in no impact on the per capita household income, median household income, or unemployment rates in the ROI. 2785-12

Tax Revenues

Since there is likely to be a small number of permanent operational staff, it is also likely that operation of the pipeline would result in a permanent, negligible impact on tax revenues associated with payroll spending (i.e., income taxes) in the ROI.

Property tax revenues are likely to be the largest source of ongoing revenue to the counties in the ROI.

Comment: Again demonstrates how few permanent jobs there would be along either route. Most of ongoing revenue would reside in property tax basket which Enbridge can (will?) challenge.

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 - John Weber comment

pages 5-574 & -575 (emphasis added);

Table 5.3.4-13. Summary of Potential Impacts on Employment, Income, and Tax Revenue for the Applicant's Preferred Route and Certificate of Need Alternatives

Impact	Applicant's Preferred Route	Existing Line 3	Alternative SA-04
Construction Impacts			
Employment, unemployment, per capita income, median household income	Temporary/ negligible to minor impacts • 4,800 workers *(all workers assumed non-local)* • Increase in income/jobs in secondary industries that support construction	No impact	Temporary/ negligible to minor impacts • 9,000 workers *(all workers assumed non-local)* • Increase in income/jobs in secondary industries that support construction
Property tax revenue during construction	No impact	No impact	No impact
Income tax revenue during construction	Temporary/minor to major impacts • $104 million	No impact	Temporary/minor to major impacts • $178 million
Operations Impacts			
Employment, unemployment, per capita income, median household income	No impact	No impact	No impact
Property tax revenue during operations	Permanent/major impacts	No impact	Permanent/major impacts • Longest route, highest property tax revenue
Income tax revenue during operations	Permanent/ negligible impacts	No impact	Permanent/ negligible impacts

Comment: APR and SA-04 = main contenders as should a true "no build". The other so-called "alternatives" are "straw men" that can be easily blown away/dismissed. Interesting that prior to June 7 meeting in Park Rapids, an Enbridge mailer touted "an expected 13,600 jobs". The mailer came out several weeks after release of DEIS with "4,800 workers (all workers assumed non-local)". That's almost a 9,000 discrepancy! Is that just one example of how untrustworthy Enbridge-provided "information" is? SA-04 with "longest route - highest property tax revenue" should have county commissioners salivating! Also interesting this this table lays to rest Enbridge-assertion of "permanent" jobs!

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 – John Weber comment

2785-13

Chapter 6 Land Use Zoning Categories page 6-23
"NA" (for Hubbard and Clearwater counties) = "zoning data not available for this county"

Comment: This is a "cop out" dealing only with "zoned" counties. Page ignores "Shoreland Ordinance" in Hubbard County that does "zone" what goes on within 1,000 feet of a waterbody. Overall, DEIS should have made some attempt to obtain land use GIS for Hubbard and Clearwater counties.

page 6-27 "operating impacts" on shoreland

Comment: Tends to severely downplay what impacts there would be for shoreland itself and adjacent water quality.

page 6-415 Audubon IBAs

Comment: Does appear to accurately report which bird species are present. However, I get the impression: "These are just birds. They shouldn't stand in the way of an Enbridge pipeline." Rather, they should be viewed as a valid measure of the biodiversity (i.e. birds don't exist in a "vacuum" but are part of a larger community of plants and animals) that is present. And that shouldn't be subjected to presence of a pipeline.
Still further, Figure 6.3.4-4 shows how close the APR skirts Itasca S.P. itself not only putting the IBA in jeopardy, but important tourist destination that State Park represents.

page 6-487 Table 6.3.5-1

Comment: Dakota Skipper and Poweshiek Skipperling are both very small (i.e. easy to overlook unlike Monarchs or Regal Fritillaries) and very sensitive to habitat disturbances.

page 6-672 begins the 6.5.2 Recreation and Tourism section

Comment: Much verbage is spent on "recreation" which is well and good. On other hand, "tourism" is given short-shrift whereas leaks and spills from pipelines could have multiyear (even decades' long) negative impacts. Yet another shortcoming of DEIS. Remedied in FEIS?

July 5, 2017

TO: Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

FROM: John Weber JJW
22382 Glacial Ridge Trl.
Nevis, MN 56467-4018

Subject: Third installment of comments on Line 3 Project

Attached are additional pages of Line 3 comments.

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Docket Nos. CN-14-916 and PPL-15-137 - John Weber comment

page 6-751 6.8 Regulatory Control

Comment: Since Enbridge has been granted pre-emptive powers of eminent domain and supercedes local regs. and ordinances, the FEIS should clearly state the higher standards Enbridge will be held, if a Certificate of Need is granted, to protect the "public health, safety and welfare" of Minnesotans and its environment.

page 8-3 ABANDONMENT

Enbridge Has Filed a Proposed Abandonment Plan per PHMSA Regulations 2785-14

Comment: Since Enbridge probably had a hand in writing the PHMSA regs., FEIS should state who will independently assess Enbridge's Abandonment Plan.

also page 8-3 (emphasis added)

- **Monitoring and Maintaining the Pipeline** – Enbridge would continue to monitor and maintain the abandoned Line 3 right-of-way in accordance with PHMSA regulations indefinitely. 2785-15

Comment: The "indefinitely" is troubling enough by itself. Unless a massive, multi-million dollar trust fund is set up to keep monitoring and maintaining for decades and even centuries down the road, what's to prevent Enbridge from "just walking away"? Also the "in accordance with PHMSA" regs. is equally troubling. Can they be further "watered down" in the future, especially as more and more pipeline companies want to walk away from old pipelines still in the ground?

page 8-4 (emphasis added)

The existing Line 3 is situated between other active oil pipelines within Enbridge's Mainline corridor (see Figure 4.3-2). The distance between pipelines within this corridor varies, but they are generally 10 to 15 feet apart. Enbridge has indicated that abandonment would minimize risk to other pipelines in the 2785-16

Comment: Again another instance where independent assessment needed. Minnesotans for Pipeline Cleanup claim average distance between Line 3 & 4 from Wawina and Grand Rapids is 30 feet. So which is correct?

page 8-5

Table 8.3-1. Potential Impacts of Line 3 Abandonment

Comment: For most resource categories, this phrase appears: "These impacts could be avoided and mitigated through long-term monitoring, adaptive management, and site-specific mitigation measures." What proof will appear in the FEIS that this is not just a glib phrase that doesn't really mean anything?

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 - John Weber comment

page 8-5 (continued) further comment:

Short-term cost of $85 million and annual monitoring estimated at $100,000. What would an independent cost analysis show? Again, $100,000 per year sounds like a nice round number. What about inflation, etc.?

Abandonment would contribute to "ongoing stress and anxiety" on one hand seems to be acceptable from Enbridge's side of the "Environmental Justice" equation. But should the PUC accept it?

page 8-6 (emphasis added)

Enbridge Has Developed a Cleaning Protocol to Comply with PHMSA Regulations

and any other materials on the pipeline walls. The pigs would be propelled through the pipeline by nitrogen gas, and the solvents would consist of water and biodegradable cleaning agents.

Comment: Enbridge's abandonment plan smacks of the proverbial "buying a pig in a poke" (i.e. "you can't open the poke to see the pig, but buy it anyway")
Also, the solvents may start as "water and biodegradable cleaning agents", but what do they end up being?

Further, DEIS states: "Laboratory analysis conducted by Enbridge" should raise red flags. What about independent analysis?

further page 8-6 (emphasis added)

If Effective on Long Pipelines, Enbridge's Protocol Could Minimize Effects on Soils and Waters

However, the testing done by Enbridge of its cleaning protocol was conducted on a 12-mile length of pipe, and the existing Line 3 in Minnesota is approximately 282 miles long. It is currently unknown whether Enbridge's protocol works on a longer length of pipeline.

Comment: The fact that the 12-mile test is only 4.3 percent of 282-mile length of Line 3 should raise a huge red flag against having Line 3 serve as a guinea pig (there goes a "pig" reference again!). I suspect that Enbridge had a very careful test (i.e. did it "work" the first time? did anyone independent of Enbridge witness it?) What happens if PUC approves abandonment in place and cleaning protocol doesn't pan out? In fact, how would public health, safety and welfare even be protected in this matter?

In fact, the FEIS should make this a strong argument against allowing Enbridge to abandon L3 in place.

page 8-7 Contaminated Sites Plan

Comment: FEIS should state who would require Enbridge to do anything.

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 - John Weber comment

page 8-7: (emphasis added)

manage, and mitigate historically contaminated soils and waters. Such a plan would require them to identify potential contamination sources along abandoned Line 3 and coordinate with resource agencies and authorities to determine appropriate mitigation measures (see Sections 5.2.1.1, 5.2.2, 6.3.1.1, and 6.3.2).

Comment: What resource agencies and authorities? With current assault on State agency funding and staffing, what agencies and staff would still be around to "coordinate"?

page 8-7 (emphasis added)

through existing Line 3 are anticipated to be minimal. As Enbridge acknowledges in its plan, however, additional segmentation locations require further study. Additionally, water resources may be identified

Comment: Doesn't sound as though Enbridge really has a"plan".

page 8-8 (emphasis added)

Enbridge's analysis indicates that it would take a minimum of 506 years for the abandoned Line 3 to fail under typical highway loads and 87 years to fail under typical railway loads. How much subsidence

Comment: Again, it's "Enbridge's analysis", not independent assessment.

page 8-9 (emphasis added)

length of the existing Line 3 and the variety of resources along it, the primary mitigation strategy would be effective monitoring and adaptive management.

Enbridge's analysis also indicates that impacts on public safety are anticipated to be minimal in the near term, but that the potential exists for significant impacts on highway, railways, and other utilities, absent monitoring, adaptive management, and effective mitigation measures. Subsidence of highways and railways could result in significant adverse impacts, and avoiding and mitigating these impacts is a site-specific and authority-specific endeavor. Initial analysis by Enbridge indicates that the existing Line 3 crosses under 297 roads and 17 railways.

Enbridge notes that tolerable subsidence levels for roads, railways, and utilities have not been established with respect to pipelines.

Comment: "Effective monitoring and adaptive management" seems a constant mantra for Enbridge. But what does it actually mean? And then in same section, Enbridge admits "tolerable subsidence levels ... have not been established with respect to pipelines." Seems like they should be before abandonment in place is granted!

Line 3 Project

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page 8-9 (emphasis added)

Exposed Pipe Could Affect Streambeds and Cause Erosion, but Locations Are Difficult to Predict

If the abandoned Line 3 became buoyant, the exposed pipeline could adversely affect natural resources, including soil erosion and impacts on streambeds. Because of the length of Line 3, the variety of resources crossed, and the number of variables that determine whether a specific segment of pipe will become buoyant, it is difficult to predict where buoyancy and exposed pipe will occur. Accordingly, the primary mitigation measures are monitoring and adaptive management.

In the CNEB report, Enbridge indicated that it would conduct a preliminary buoyancy analysis of Line 3 in Canada to determine areas where there might be pipeline buoyancy issues. Buoyancy analysis may also be required by PHMSA. Enbridge noted that it would use a variety of mitigation measures to address exposed pipeline, including weights or engineered fill, placing additional cover over the pipeline and, in some circumstances, removing segments of the pipeline.

Comment: Again, Enbridge defaults to "monitoring and adaptive management" fall-back position. As of the release of the DEIS, Enbridge apparently had not performed a preliminary buoyancy analysis on Line 3 in Canada. PHMSA "may" require buoyancy analysis. And still Enbridge goes into fall-back mode again -- i.e. "a variety of mitigation measures."

back to page 8-8:

The Longer the Pipe Is in the Ground, the More Likely It Is to Fail

Comment: Seems like this would be a strong case for removing Line 3. In many ways, Enbridge's so-called "Abandonment Plan" has more holes than Swiss cheese. At best, it seems too lame. At worst, it would place miles of Minnesota in jeoparday, not only for decades, but centuries!

page 8-10 (emphasis added)

responsible for issues that involve crossing the state's waters. Buoyancy is a phenomenon that occurs near and within water resources, making it more likely that mitigation measures designed for specific exposed segments of pipeline would involve working with the Department of Natural Resources.

Comment: MN DNR cited as responsible State agency. As I questioned earlier (my page 18) would future funding and staffing enable the MN DNR to carry out this role?

page 8-10

Short-Term Cost of Abandonment Estimated at $85 Million

Comment: How "short-term" is the $85 million figure given for? Again, an independent assessment of cost should be included in FEIS along with basis for $100,000 per year monitoring. (Given the cost of things, seems like $100,000/year is a low-ball number.)

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 – John Weber comment

page 8-10 cost comment (contin.):

Further comment: FEIS should state that if Enbridge is allowed to abandon L3 in the ground, it would expect in the future it would also abandon Line 1, 2 & 4 in the ground. How much of "unpaid" $1.28 billion bill will be borne by present and certainly future generations if L3 abandoned in place?

page 8-11

Cost	Enbridge estimates the cost of removing Line 3 at approximately $1.28 billion. Enbridge estimates the cost per-foot for removal at about $855.a
Environmental Justice	Communities with potential environmental justice impacts related to the Line 3 Project are discussed in Chapter 11. Removal of the existing Line 3 could positively affect these communities by removing stress or anxiety related to the presence of the abandoned pipeline and ongoing risks related to water flow, soil and water contamination, and subsidence.

[a] Communication with Enbridge, March 10, 2017.

Comment: Another example of need for an independent cost estimate. "Environmental Justice" would be served by removal.

page 8-12 (emphasis added)

Primary Challenge Is Proximity of Other Pipelines, but Mitigation Measures Would Be Used

The primary challenge in removing Line 3 is that it is situated between other active oil pipelines within Enbridge's Mainline corridor (see Figure 4.3-2). The distance between pipelines within this corridor varies, but they are generally 10 to 15 feet apart. Enbridge has indicated that there is a significant risk that pipeline removal activities could damage an active pipeline and cause an accidental release. Damage could be caused by striking a pipeline with equipment or by the weight of the equipment as it works above operating pipelines. This damage would be immediately apparent if equipment struck a pipeline, or observable later if the pipeline was damaged and only leaked in the future.

Comment: Seems curious that Enbridge was able to "pack" these pipelines close together, but claims too difficult to remove one now. What about other pipes in Mainline Corridor. Are they going to be permitted to decay in place once economic usefulness exhausted? Again the Enbridge-reported "10 to 15 feet apart" figures repeated. What about an independent assessment of actual distance? Same goes for having independent risk assessment done.

page 9-23 Tribal Resources Chapter 9 (emphasis added)

The tribes look at not just the immediate impacts but what is going to affect future generations; they are taught to project to seven generations in the future. Any major changes to the environment affects not

Comment: It should not be limited to the tribes to project to seven generations in the future, but the PUC CN process should look far beyond Enbridge's "30-year economic" horizon for L3R since far beyond that narrow timeframe, impacts will be registered.

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 - John Weber comment

page 9-27

9.6.1 Climate Change

The Fond du Lac band elaborated on the cumulative effect of climate change from the Project, including the cost of petroleum extraction, the cost to the climate from production of the steel used to transport the oil, the cost of pumping the oil, the cost of trucking to transport the pipe and other assorted materials used in construction of the pipeline, the cost of the refining process, and the cost of using the oil once it is transported and refined.

Comment: I'd say the tribes made an excellent start to identifying cumulative effects of L3R. I would say the DEIS has only given cursory, lip-service to the magnitude of impacts on society and the environment that the Project is enabling.

page 9-28

9.7 SUMMARY

This chapter provides an American Indian perspective on the construction and operation of a new pipeline. From this perspective, any route, route segment, or system alternative would have a long-term detrimental effect on tribal members and tribal resources. The impacts cannot be categorized by duration (short term or permanent) or by extent (region of interest, construction work area, permanent right-of way). It is also not possible to determine which alternative is better when each alternative affects tribal resources, tribal identity, and tribal health.

Comment: How true! Impacts aren't limited to "duration" nor "extent". However, there is one alternative -- a true "No Build" -- that hands down is "better" though DEIS largely ignores or even dismisses. All other alternatives, including APR and SA-04, are really bad choices, but the "process" wants to box them in as only possibilities to pick from.

page 10-10

Figure 10.2-1. Seven Sites Evaluated in Stantec et al. 2017 Study

Comment: There are so many flaws that one wonders where to begin?! For starters, who is this "Stantec"? Has Stantec ever done work for Enbridge? Does it hope to do work for Enbridge in the future? Seven sites are way too few. None on sA-04. Also who is "Barr Engineering"? Has Barr previously done work for Enbridge? Does it hope to do more in the future? The list could go on and on. Hopefully other commenters will add many more.

July 7, 2017

TO: Jamie MacAlister, Environmental Review Manager
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FROM: John Weber JW
22382 Glacial Ridge Trl.
Nevis, MN 56467-4018

Subject: Fourth installment of comments on Line 3 Project.

Attached are the final pages of comments on the DEIS that hasty July 10, 2017 deadline allows me to make.

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Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137 - John Weber comment

Chapter 10: Accidential Crude Oil Releases

Comment: My understanding ia that Enbridge redacted numbers used to calculate spills impacts from the DEIS and is fighting with State of Minnesota to keep the public from seeing them. What has Enbridge to hide? Also, a FEIS should not be issued until those numbers are made public.

page 10-19 (emphasis added)

Table 10.2-2. Annual Failure Probabilities and Recurrence Intervals for Small, Medium, Large, and Catastrophic Spills for the Applicant's Preferred Route and System Alternative SA-04

Calculations are based on Enbridge incident failure rates presented in DOS 2017: Table B-2.

Comment: Again Enbridge as a "sole source". Are these "reported" incidents only?

page 10-23 (emphasis added)

10.2.5.2 Regional Comparisons of Failure Probabilities for SA-04

The estimated AFFs and annual probabilities for the Applicant's preferred route, SA-04, and the route alternatives were considered within the same regional context. The AFF values were identical for the route alternatives, but differences in annual incident probability estimates result from differences in the miles of wetlands, open water, and uplands traversed by each route, as well as the total distance of each route. The incident probabilities are slightly lower, but generally within the range of values developed using the data for Minnesota, North Dakota, and Wisconsin, as described above for the existing Line 3 pipeline (Section 10.2.4.1).

Comment: FEIS should state why slightly lower.

also page 10-23 (emphasis added)

The route alternatives exhibit annual incident probabilities that are lower compared to those of the Line 67 Expansion (DOS 2017). The annual incident probability for SA-04 (0.568 incidents per year) is higher than other routes examined. This appears to largely result from the 795-mile length of SA-04.

Comment: FEIS should provide an explanation other than "appears". It appears to me that Enbridge may have produced a flawed analysis ... or was an analysis even done?

Line 3 Project

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page 10-43

Table 10.4-2. HCA Unusually Sensitive Ecological Areas within 2,500 Feet of the Centerlines of the Applicant's Preferred Route and Certificate of Need Alternative Routes (acres) 2785-18

Applicant's Preferred Route	Continued Use of Existing Line 3	System Alternative SA-04	Transportation by Rail	Transportation by Truck	Existing Line 3 Supplemented by Rail	Existing Line 3 Supplemented by Truck
6,903.4	19,045.5	10,530.3	17,960.0	26,016.8	37,005.4	45,062.3

Source: Enbridge 2016c.

HCA = high consequence area

Comment: Again, surprise, surprise!, another Enbridge provided data set. FEIS should further convert raw acres to average acres per pipeline mile. This would provide a bit more apples to apples comparison. By converting,

SA-04 becomes 13.25 acres per mile, and
APR becomes 20.3 acres per mile

By doing so, it is revealed that APR is 53 percent more than SA-04!

page 12-4 (emphasis addded)

Table 12.2-1. Reasonably Foreseeable Actions Considered in the Analysis

9. Addition of pipeline in same corridor	If a new pipeline corridor is permitted for this Project, outside of the existing Enbridge Mainline, the new corridor creates an opportunity for future corridor sharing that could ultimately result in accumulation of multiple pipelines within the corridor chosen for the Line 3 Replacement Project. This analysis considers the future addition of another pipeline to a new Line 3 pipeline corridor.	Crude oil pipeline

Comment: Instead of being relegated to #9 in the lineup, should have been #1. Analysis supposedly based on addition of one pipeline to new corridor. How many other pipelines would still fit into that corridor? Would they be allowed to be packed in so tightly that "only option" available in future would be to abandon in place, not remove?

page 12-35

12.5.2 Potential Impacts of Climate Change on the Project

Comment: Section totally ignores the real possibility that climate change impacts would spur saner heads to adopt a "carbon tax" or other meaningful "carbon pricing" putting onus of SCC (social cost of carbon) more appropriately on the fossil fuel industry unlike the past two centuries when the industry merrily passed off the SCC. The FEIS should factor in what meaningful "carbon pricing" would mean for oil shipment demand for L3R.

page 13-1

13.1 STATE AGENCIES

The Department of Commerce, Energy Environmental Review and Analysis Division (DOC-EERA) was the lead agency on behalf of the Minnesota Public Utilities Commission. The Commission is the Responsible Government Unit for the EIS. The Minnesota Department of Natural Resources and Minnesota Pollution Control Agency acted as assisting agencies throughout the process.

Comment: After thousands of pages, suddenly the DEIS becomes very skimpy on details. FEIS should state 1) qualifications and 2) past experience of DOC-EERA working on oil pipeline EIS. Also specificy of what assistance MDNR and MPCA provided 1) during scoping and 2) the development of DEIS. Plus how that assistance was utilized?

also page 13-1

13.2 ENVIRONMENTAL IMPACT STATEMENT PREPARATION TEAM

DOC-EERA was supported by Cardno, Inc. in preparing the EIS. Cardno's team included project management, a range of resource specialists, technical writers, and geographic information system analysts.

Comment: Interesting that under "Who prepared the EIS?" blurb on ES-3 page, no mention of Cardno, Inc. FEIS should specify Cardno's qualifications, selection process used to hire and spell out any past work done for applicant Enbridge. Further, FEIS should state the percentage/proportion of the DEIS that Cardno actually prepared. (Again page ES-3 gives impression that EIS was "prepared by (DOC-EERA) in consultation with the Commission's Executive Secretary" and with assistance of DNR and MPCA. No where is Cardno, Inc. mentioned.)

Final overarching comment: How can meaningful consideration and incorporation of thoughtful public comments that improve the usefulness of the DEIS for the decisionmaking of the PUC Commissioners be achieved by the hasty issuance of a FEIS on August 10, 2017??? Is this "rush to judgment" in the best interests of Minnesotans and their environment???

Levi, Andrew (COMM)

From: Darril Wegscheid <djwegscheid@earthlink.net>
Sent: Monday, July 10, 2017 7:47 AM
To: MN_COMM_Pipeline Comments; MacAlister, Jamie (COMM)
Subject: Docket Numbers: CN-14-916 and PPL-15-137 - Additional comments of July 10, 2170
Attachments: MN PUC LINE 3 ADDED COMMENTS as of Jul 10 - WEGSCHEID.docx

Ms. MacAlister - Good day,

Here are further comments concerning the Enbridge dockets

Regards,
Darril

July 10, 2017
Re: Docket Numbers: CN-14-916 and PPL-15-137
Additional Comments of PM July 10, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

Good day,

I believe that there needs to be some honest independent reality / perspective given to the numbers and perspectives in the Enbridge-drafted DEIS.

The DEIS must be revised to quit ignoring key policy issues that must be addressed in much more detail, by independent experts.

The EIS must be corrected for this significant bias and misleading perspectives.

The report presents terrible, and terribly self-serving projections of demand for carbon molecules along the Enbridge system / routes/ corridors.

There is literally NO demand for crude oil along the Enbridge System! There is no Minnesota use along this corridor. Every operating site along their route is of their choosing for receiving and dispatching to further locations – there is not a true source for any supply of the oil, nor any true destination for any use of the oil along this corridor. Thus, there is no need in MN for the pipeline.

There is only the Enbridge effort to limit the analysis of the CN and the routing to limit it to 'sub-optimal' segments, and thereby to ignore the obvious options to more correctly move crude oil in a straight line from Alberta and Western North Dakota to the REAL destination – the oil refineries in the Chicago area.

And beyond that Chicago site, some of the oil flows into the pipeline systems to get to refineries further South and West of Chicago. That is a truly wiser and more direct route (aka SA-04) that also avoids Northern MN, Northern Wisconsin, Central Wisconsin, and Michigan, and is more on solid ground and less on wetlands and waters.

If Enbridge pumps more oil into Superior, they will need to upgrade and impact pipelines in Wisconsin and / or Michigan to further push the increased flows.

This Enbridge advocacy document presents virtually zero credible, independent, observable numbers to be reviewed analytically, that demonstrates that the state of Minnesota or its citizens NEED this pipeline. There is much wording pleading to give the company more territory to do its business, but not the need for the State of Minnesota to survive without such capacity. The EIS needs to present credible economic projections that can be seen to qualify this pipeline in a capacity that, if not satisfied, would harm Minnesota.

Thus, for starters, there needs to be that independent study of the economic demand for energy and the carbon molecule. This should be a nothing less than a credible econometric model assessment by independent experts that looks at reality now, and out over several decades. It needs to consider factors of total energy usage and the transition of alternative sources. It also needs to "carbon molecule" demand for industry, etc.

If a truly independent Energy Vision and Strategic Analysis (by a broadly-based panel of Global energy experts) sees an ***existing*** crisis of supply, or a ***credible view that a carbon-molecule supply crisis would occur during the time proposed to build this***, then a VERY limited Certificate might be granted to Enbridge - but only then.

Lacking that, the requirement must be that Enbridge be responsible, and be limited and required to replace the existing Line 3.

And if they want to operate any pipeline in the future, it can only be operated within the existing corridor in MN. Enbridge needs to manage Minnesota's resources to the advantage of Minnesotans.

If those Independent and Qualified experts are unable to attest to that, then the State of Minnesota should NOT grant a CN at this time, at least not for anything other than modest adjustments along the existing route to allow replacing the operating capacity of Line 3.

NO WORN-OUT PIPE TO BE ABONDONED AND NO NEW CORRIDOR TO BE ALLOWED:

Over the years, the Enbridge effort to 'break out' a pipeline from their poorly managed corridor along Highway 2 is but their first (likely) step in the near future, to sequentially shut-down their other old and failing pipes in that corridor, abandon those damaged areas and simply move all of that operation into - and to subsequently further abuse the environments along any new corridor.

The State of Minnesota should clearly see that as their game plan.

Thus, the EIS must require truly independent, comprehensive systems modeling and analysis that can be reviewed and critiqued as to the demands, sources, flows, alternative pipelines and alternative sources to meet the demands at the actual refineries – not at an intermediate intersection of Enbridge pipes. That system analysis needs to demonstrate the "all-sources" distribution capacity of the Region, and determine that THIS specific route is truly needed, needed in Northern Minnesota, and needed – even in the next ten years, and needed into the future to meet Minnesota's "carbon molecule" demands. This report fails to provide such adequate analytical, observable, and independent numbers. It does NOT make the case for NEED in Minnesota. And it sets the trap to open a wholly new corridor for future disruption in Minnesota. 2285-1

Enbridge has been allowed for some 50 years to use the current right of way along Hwy 2 to transport crude oil. Essentially, they have added more pipelines when and as they wanted, and apparently made no 'strategic' nor even 'tactical' managerial nor common-sense provisions / allowance for a responsible plan to remove old and broken pipes.

Enbridge failed to manage their system of pipelines that were aging in the corridor. They failed to properly manage their capacity as and while that had 'easy room' to do replace them. Now, they propose to dump and run - to treat that corridor as a disposable 'Dixie Cup' environment, and discard it. They must be held / limited to that corridor, if they wish to operate in Minnesota.

And in any case, they need to remove abandon lines as they occur – and clean-up the same as the law requires for "Leaking Underground Storage Tanks".

Enbridge reportedly has 'repaired' anomalies along Line 3 when failures have disrupted their economic cash flows. Now, having allegedly packed that corridor with pipes (and complaining about their own failings), they are proposing to have the state of Minnesota grant them yet another / different corridor to begin their irresponsible practices of trashing the environment – all the while stating in their "plans" to abandon what they have desecrated and ruined in that corridor.

Enbridge's threat to additional vital resources in any of the major corridors through Northern Minnesota should more likely be prosecuted, than it should be considered for further environmental risk and certain damage. Like "Leaking Underground Storage Tanks" that the Stat of Minnesota dealt with the in 1980's, this needs to be confronted, and now.

Enbridge seems to make it very clear that they intend to abandon the existing Line 3, all other lines across MN, and initiate a new corridor through fragile eco-systems and natural resources.

If allowed to develop it, Enbridge appears quite ready to abandon THAT new corridor as well - whenever it is no longer "economically viable" – that is, whenever it suits their economic parameters to walk away.

IF ANY ROUTE IS GRANTED, THE STATE OF MINNESOTA SHOULD NOT DLELEGATE ANY ASPECT OF EMMINENT DOMAIN TO A FOREIGN CORPORATION, BUT THE STATE SHOULD REMAIN IN CONTROL AND EXECUTE SUCH AUTHORITY ITSELF, AND ONLY AS NEEDED TO MEET ITS ROUTE DESIGNATION.

THE ECONOMIC DATA FOR PROTECTING THE CORRIDOR FAR OUTWEIGHS THE ALLEGED ENBRIDGE RISKS / PROMISES:

The economic 'siren-song' that Enbridge is playing is so full of holes, if anyone looks at it, it should be material for a vaudeville act.

The effort to simplistically talk of "jobs" - and trying to make-believe these are anything other than temporary and passing workers – is a farce. That misleading practice can be easily addressed:

CHANGE THE EIS DISCUSSION TO TERMS OF "HOURS OF EMPLOYMENT, BY MONTH, FOR THE PROJECT", AND NO LONGER USE "JOBS" AS THE FOCUS. 2285-2

SHOW WHICH "PERMANENT JOBS" WOULD EXIST AND WHERE AND DOING WHAT OVER WHAT TIME PERIOD

THE ENBRIDGE COST FOR THE ENTIRE PROJECT IS MINISCULE IN COMPARISON TO THE VALUE OF PRODUCT THEY PLAN TO TRANSPORT OVER THE ECONOMIC LIFE OF THE PROJECT

Let me use the following 'assumptions' – these are values taken verbatim from the DEIS or experts:

- A "barrel" is 55 gallons;
- This project will "last" as constructed for 50 years, maintenance is undifferentiated by route;
- Routing of the proposed pipeline is assumed to have no differential operating costs (a stand-alone issue);
- Assume that the 'average price' per barrel of crude is $60.00 per barrel for the next 50 years;
- The proposed cost of the ENTIRE project is estimated at $7,500,000,000;
- That cost is in USD;
- At 760,000 barrels per day, 365 days per year, for 50 years, this will move some:
    - 13,870,000,000 barrels @ $60 USD per barrel, which is:
    - $832,200,000,000 of value / product, and is:
    - $0.0098 per gallon piped – less than 1 cent per gallon for the entire project

YES, LESS THAN ONE (1) PENNY PER GALLON OF CRUDE TRANSPORTED COVERS THE ENTIRE PROJECT.

That said, and to repeat it: that covers the entire project construction (in USD) as proposed for less than 1 cent per gallon of crude over the expected life of the operation. If that $7.5 Billion estimate is in Canadian Dollars, the entire cost per gallon of crude would drop by approximately another 25%.

THE EIS NEEDS TO ALSO ADDRESS / ANSWER THE FOLLOWING:

What aspect of the environment, wildlife, waters, and economic engine of this North Central Minnesota region can we afford to "throw" to Enbridge for less than a penny per gallon?

What trade-offs demand public risking and giving-up those critical Minnesota values of these critical ricing lakes, the fishing lakes, tourism, the businesses and vacation resources of the area designated as "Applicant's Preferred Route"?

The EIS must clearly identify, quantify and designate which resources are worth less than 1 penny.

Darril Wegscheid
PO 251
Emily, MN 56647

- VITA:
- Bachelor degree in Mathematics
- Master degree in Operations Research and Statistics
- 31 years of Logistics Modeling at a Fortune 100 international Company
- 8 years of Operational Modeling at a top-5 USA airline
- 6 years in MN State Senate – 1982- 1986
    - Commerce and Economic Development Committee
    - Agriculture and Natural Resources Committee
    - State and Local Government
    - Government Operations
    - K-12 Education

Levi, Andrew (COMM)

From: Stephanie White <stephwhite86@gmail.com>
Sent: Monday, July 10, 2017 12:20 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline Comments

Dear Environmental Review Manager,

Enbridge is proposed to horizontally drill under certain stream and river beds. The drilling fluids used for that process contain additives. These additives are toxic to aquatic wildlife and vegetation if a frac-out occurs. The Straight River, a nationally known brown trout stream, suffered a large frac-out during construction of the MinnCan Line 4 project.

A drilling materials list should be provided to the public. The public cannot adequately comment without knowledge of these materials. What are those additives? They need to be included in the Final EIS. 2293-1

Thank You,

Stephanie White
515 N. 8th St.
Brainerd, MN 56401

Levi, Andrew (COMM)

From: Stephanie White <stephwhite86@gmail.com>
Sent: Monday, July 10, 2017 12:22 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline Comment

Dear Environmental Review Manager,

Crow Wing Watershed District has recently had a hard working committee put together a WRAPS. These actions are mandated by the state of MN to protect our overall water quality. As individual watershed districts within the Mississippi River Basin are working hard to improve water conditions and protect existing clean water resources, what protections are being offered for those efforts? I do not see any indication within the draft EIS, about the effects of a spill or construction through pristine clean water ecosystems, and how that will effect the efforts and money being invested on a local level? How does the applicant plan to work with the local watershed districts? How will they compensate for these local investments in the case of a release?
The state has mandated the MPCA to review the quality of MN water bodies, and set forth recommendations to achieve the goal of protecting MN's existing clean water resources. These bodies of water are scare worldwide. Protecting them has been deemed by the MPCA to be the best course of action. Prevention is less costly than a clean up effort. The state is supposed to be following these recommendations to protect existing clean water in Northern MN. Southern MN does not have much hope of ever recovering those bodies of water. How does this project fit into the model of preventing these clean bodies of water in the north from being contaminated? This conflict needs to be addressed in the final EIS. 2294-1

Thank You,

Stephanie White
515 N. 8th St.
Brainerd, MN 56401

MR. TOM WATSON: Good evening. My name is Tom Watson, spelled T-O-M, W-A-T-S-O-N. I'm here on behalf of the Whitefish Area Property Owners Association, of which I'm the president. For the record, it's the largest lake association of its kind in Minnesota. 50 years old. You know it up in the Crosslake area. It's 14,000 acres of surface water; part of the Pine River Watershed, which is half a million acres of land and water.

I want to be clear that we're not opposed to using pipelines to transport oil. We are opposed to putting pipelines in a water-rich area that, as Mr. Raedeke pointed out very correctly --

he took half my words -- is the essence of the economy of the northern part of Crow Wing County, Southern Cass, Hubbard, Aitkin County, et cetera.

Comments specifically about the DEIS. I don't know how many years it's going to take to get through 5,000 pages, but I'm trying to read fast. But a couple of comments on the content of the document.

Section 116(d)(04), which is the description of the law covering environmental impact statements, speaks to the fact that these documents are supposed to be analytical, not Encyclopedic. This document is full of Encyclopedic information to tell me how to define soil, how to define a walleye, how to define water. The analytical part is to take the current experience and apply it. And this document is woefully inadequate in doing the analytical piece.

But we have a lot of redundancy, so I know -- I now know how to define a certificate of need. Commissioner Grant hit that one very quickly, in terms of the process. But just for the public to understand, a certificate of need actually requires the RGU, which in this case is the Minnesota Public Utilities Commission, to actually make a decision to

determine that the benefits to the public of Minnesota exceed the costs associated with this project. The costs of this project include the things that are negative, oil spills, et cetera.

Let me comment on section -- 0925-1

throughout this document, but particularly Chapter 4, Section 4.1, which has a reference to it that talks about the fact that the economic and -- economic analysis and the technical information relative to jobs, employment, tax revenue, etcetera, will be provided by the Applicant, other parties, and the public that are participating in the contested case hearing. I'm sorry, the law says that the independent body retained to consult and advise the Public Utilities Commission is to do that work. You don't ask the Applicant to do that.

If it looks like a postcard that's arrived in our area, the data is totally misrepresented about how much revenue they're going to generate, etcetera -- this document talks about $100 million worth of tax revenue. The postcards I've seen are numbers that are two and three times that. So you don't want the Applicant to do that. You know, they've got a dog in this battle. We need the independent bodies be doing that.

0925-2

I want to speak to Section 5 on water resources. A comment was made earlier about the amount of water we've got in the district. We're part of the Pine River Watershed, which is in the south end of Hubbard, a small part of the south end of Cass, most of northern Crow Wing, and a little bit of Aitkin County. 5,400 acres of land and water. It turns out in that particular area 40 percent of it is wetlands, open rivers, creeks, and streams. 51 percent is land. Others are roads and matters such as that.

The critical thing that I find objectionable in this document is that of the 338 miles of pipe that are being proposed with the Company's preferred line, 100 miles of that -- about 110 goes through an area that's never had a pipeline through it before. We have no research. We have no data. That goes from Park Rapids essentially to about ten miles east of -- or west of Duluth.

What we have in that area is a high-voltage power line. We have a lot of water. We have a number of things in that particular area. If I had the time, I'd show you a map. But a part of that I want three things to be touched on real quick.

Groundwater is totally inadequate in this area in the report. It doesn't address the fact that a vast majority of people in that particular area depend on groundwater for consumption, for bathing, for a variety of human use. 0925-2 Cont'd

I've been a mayor in the Twin Cities, and I went through an environmental spill, and I know what that's like to deal with that with the public.

The other thing that's not in this document is addressing watersheds. This area is rich with watersheds. It's important to understand why watersheds exist. We have a report that I'm happy to provide the Department of Commerce produced by the DNR. It's called lake trout -- Protection Strategies for Big Trout Lake, which is one of the few lake trout lakes away from the Canadian border. In the report we have decreasing water quality. Their researcher, Pete Jacobson out of Park Rapids, indicated that we should have 2,000 -- 250 acres of private forested land under protection to manage that rainwater that's flowing into these bodies of water. Can you imagine what that would do with a pipeline spill in that area? 0925-3

0925-4

Very last comment. The document does not tell you anything about the Enbridge history with oil spills. We have an awful lot of engineered data in there about the probability of spilling occurring at certain times.

Let me tell you what the experience is in their annual report. From 2004 to 2015 --

FACILITATOR: Tom, it's been six minutes.

MR. TOM WATSON: -- they talk about 850 spills in an 11-year period. I'm a dumb kid from International Falls, but I can tell you it turns out to be 1.6 spills a week. And that was 160 barrels per spill. Translated, that's two spills a week. That's 300 barrels a week in 11 years. These are not the de minimis spills. These are not the little spills.

FACILITATOR: Tom, if you could wrap it up.

MR. TOM WATSON: These are the spills reported to the EPA and the state agencies, etcetera.

Thank you.

MR. TOM WATSON: Tom Watson is the name. T-O-M. W-A-T-S-O-N. I'm a resident of Crow Wing County and also representing the Whitefish Area Property Owners Association in Crow Wing County, and I'm their president. And for the record, we're 1,200 members and basically involved with the northern part of Crow Wing County and the very southern part of Cass is our district.

I appreciate the opportunity to speak to this matter. I want to begin by a couple of items that I would ask Jamie to reinforce as we do this. I served as an elected official in local government, in city government, so I've been through an EIS as part of the responsible government unit. This is a difficult task.

The important thing to remember on a certificate of need, to be real clear about that, is to describe a process that is to result, thus, in a decision that evaluates the benefits to the

residents of Minnesota. Not the residents of Brainerd, Little Falls, Cass Lake, Aitkin; the benefits to Minnesota versus the costs to the residents of Minnesota. Everybody. This is not a vote on Enbridge. It's not a vote on any of those kinds of matters. It's really -- as I've said to somebody the other day, take a piece of paper, strike a line down the middle; on one side put pluses, there's your benefits; on the other side put minuses. And when you're all done, take a look and see whether you've got more pluses or minuses, because ultimately that's the decision the Public Utilities Commission is going to have to make.

I'm not going to repeat some things. I did testify in Brainerd. But I do want to address some items that specifically are not in this particular document. As Ms. MacAlister indicated, it's important to describe things not whether you're for or against, but what's not in this document that would help make that decision for you or any other reasonable individual.

Chapter 4 is a chapter in the draft EIS relative to alternates. There needs to be a section that very clearly describes what happens when the benefits do not exceed the costs to the

public. It's called a no-build option. What happens in that case?

Enbridge has been mailing out literature and postcards and communications to taxpayers throughout all of these areas in which these hearings are being held. They're giving them $20 gas certificates in Park Rapids, for example, and indicating but for them they wouldn't be buying gas in Park Rapids. That's just hogwash.

And so that no-build option really needs to define what happens. Are we going to be leaving people in Park Rapids and Cass Lake and Little Falls, et cetera, without a gas station? Because that's kind of the implication.

Chapter 5 covers a lot of conditions. And the argument that I have with that -- I made it in Brainerd and I'll repeat it here -- the document, in a sense, indicates that Enbridge and the Applicant will provide all the data relative to current conditions; current environmental conditions, current economic conditions, current employment conditions, et cetera, et cetera. That's fine. I'm glad they're doing that.

The problem is that the law on environmental impact statements, the document is to

be prepared by the State of Minnesota as an independent body. It doesn't mean that all of us can't contribute to this. Enbridge can contribute to it. But the document needs to be prepared by an independent body. Enbridge, unfortunately, is not an independent body, and they need to put that data out there.

And to give you an example, I've been along on this thing for about three or four years. One day I hear that they're going to employ a thousand people and they're going to generate $2 billion worth of economic benefit to Minnesota. The next day I hear it's 2,500. The next day I hear it's $20 million. The next day I hear it's $200 million. The State's job is to figure out exactly what that data means.

I'll give you a comparison. In our area, for example -- and if I include Morrison County, if I include Cass, Crow Wing, Hubbard, Aitkin County, travel tourism second home owners, the income associated with people who visit up here, who live here, who reside here, who own second homes in this area, the economic benefits -- and I can give you all data; comes from the State of Minnesota itself -- the economic benefit in those areas is

only exceeded by Hennepin and Ramsey County. Tax revenue, jobs, primary and secondary jobs. So this is somebody who lives here who works at the hardware store, is a cashier at the bank, et cetera. They have a job in many cases because there is the primary visitor who also spends money in the area. It's significant.

Water resources, in my opinion, is not well described in this particular document for two reasons. There is no section specifically on the hydrology of the area, which is a mistake. The critical thing about hydrology, at least in our area in northern Crow Wing County, the water table is at 30 and 40 feet. It's all sand. Any kind of product that will spill into the ground or anything else will be in your drinking water system, in your well, you'll be using it for human consumption, you'll be taking a bath in it, you'll be washing your vegetables and preparing your foods with that particular material. I suspect you don't want to do that. 1557-1

If you were living in the Twin Cities, it's different. You got a rock orgini-- rock operation in that ground condition down there, you got aquifers that are 200 feet down. That's not the

case up here.

Number 3, in this particular section -- and this would apply both to Chapter 5 and 6 -- there's a corridor from Park Rapids to Carlton County that is -- right today is essentially a wooded area. There's wetlands in that area, there's habitat for migratory birds, et cetera.

This particular document has sprinkled through all 5,000 pages information to tell you -- if you can figure it out and you got enough patience and you're going to live long enough to finish reading it, tell you what's going on from Park Rapids through Backus on to Outing on to Carlton County. It's an area in which there is no pipeline corridor today. It's 120 -- about 110 or 120 miles. Enbridge has proposed to run Line 3 preferred route that's 334 miles. In other words, this a third of the distance.

1557-2

I've asked the State that there needs to be a separate chapter in which all of the cultural, historic, environmental, economic, water resources conditions are fully disclosed, rather than have to pick and choose. I don't know about you, but I've been reading at this sucker, and I'm not very far along, and I can't -- I can't do that.

MR. TOM WATSON: Thank you very much.

MR. TOM WATSON: Again, Tom Watson, Pine River, Minnesota, president of Whitefish

Property Owners Association in Crow Wing County.

I have a couple, three, four more items that I want to address. But I want to start by saying let's remember one of the decisions hopefully the State will make in this particular matter, which is our environmental policy. Let me just read it, because I think it's important that we all have a context for that decision.

And that is: To create, maintain conditions under which human beings and nature can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations of state's people.

That's one of the requirements of the Public Utilities Commission in making this decision. And I trust that Jamie would say that that's obviously farmost in the minds of their staff, as they're working on preparing an Environmental Impact Statement.

What I want to comment on is two other items that I think belong in Chapter 5 and, by extension, would obviously continue into Chapter 6, which is -- 5 is really dealing with the certificate of need in current conditions; 6 is really dealing with the routing question.

In Minnesota there's a little fish called a walleye and some cold water fish that we know pretty well. Any fishermen in the room? Anybody goes, eats walleye, catches fish? What you might want to know is that one of the largest fish reproduction management centers is Brainerd, Minnesota. A large walleye stripping operation, the stripping operation on the Pine River, which somebody mentioned earlier actually, this proposed pipeline crosses two forks of the Pine River, the north and the west and would be within about three to four miles literally by the way the crow flies -- I didn't measure the curves in the river -- from that stripping operation. 75 million eggs are produced and about 50 million of those turn into fry and/or fingerlings that get introduced into our lakes. That's every year for a period of about two, three weeks. It's significant.

1558-1

The hatchery isn't sitting at the mouth of the Pine River. The eggs are transported to Brainerd, they're transported to St. Paul, and they're grown there. The report doesn't have a single word on that subject. Not a single word. That's an important resource in Minnesota to identify who we are.

Hell, we even had a governor on Time Magazine holding up a northerner, for god's sake, if you remember long enough.

Mr. Schumacher, you and I would remember those things, because we're just a little over 47 years old, aren't we?

MR. SCHUMACHER: Try about 77.

MR. TOM WATSON: The report does talk about Spire Valley. It does talk about a couple others, which are known for raising lake trout, steelhead, et cetera. But the hatchery is right there, and this pipeline would go just south of that.

And my question in this case isn't opposed to pipelines. The question really is a serious question about do we have a need; does it benefit Minnesota? That's the question. It's not a question of whether we're going to be driving cars and all those kinds of things. The benefit is to Minnesota and how does that compare to the costs?

My organization is not opposed to using pipelines. The piece I can't figure out, Enbridge will offer a $2 million economic benefit to Minnesota during a couple of years of construction, 18 months, whatever. The industry that I mentioned

earlier is three-quarters of a billion dollars a year already. That's the people who come and visit up here. Why do they come here? It's the same reason my six-year-old -- five-year-old granddaughter says, I go to see grandma and grandpa because of the water; I get to swim; I can't do that in Minneapolis.

We have a lot of people that get to come up here. There's 18,000 jobs that are created that are seasonal, related to travel, tourism, and people coming up for conventions and going to a fishing tournament, et cetera.

Do you know what the impact is on Mille Lacs Lake at the moment, as a result of all the nonsense and disaster we've got over there with fishing problems and god knows what AIS is in that lake, even what's been found and what's not? I've already taken a look at property values in the six communities on the south end of Mille Lacs Lake -- so that would be East Shore, Isle, and around to Kathio, Wahkon, South Shore. Tax year '14, paid '15, compared to tax year '15, paid '16, those six communities -- let me tell you what the bad news is. The entire Mille Lacs County, which goes all the way to Princeton, properties that's commercial and

residential seasonal dropped $8 million. Those six communities dropped 30 million. 30 million. And what those -- that is the basis of real estate transactions of people buying and selling homes and businesses and other ways. We don't want that kind of thing in Minnesota.

So, by extension, are we willing to take the risk? A section that's not in this report is a section on risk analysis. I heard somebody talk about, you know, is Enbridge going to be around and do all these kinds of things. You guys know how they organize these companies? Enbridge is not a single company owning pipeline. Enbridge has a zillion little subsidiary corporations that owns sections of pipelines in Minnesota. The corridor from Calgary, Alberta, to south of Chicago, the last I checked, has about six different little companies. In other words, if something goes wrong, what you do in the United States is you go visit the federal bankruptcy court. And guess who pays for that? I think we need a section here on risk.

We are going to have some risks. I'm not being negative about it. I'm a businessman. But we sit down and look at risks when we're looking at benefit, isn't that one of those costs.

I've got two other things to say. Somebody talked about paddling the Pine River, and I know probably where you are. This report does not have a study such as this in it. Doesn't address it at all. This (indicating) happens to be called A Sensitive Shoreline Survey, which was done for us in the Whitefish Chain and finished up in March of 2012. The work was done in 2011. Last I know there's probably ten of these done in Minnesota. Don't ask me right now what all of them are. I can't tell you that. But what it's doing is it is doing an inventory on every piece of plant and wildlife, animal or otherwise, that exists around lakes in Minnesota. It's addressing the migratory birds. It's addressing frogs. It's addressing fish. It's addressing plant materials. I think there should be an inventory of that in the current situation section when we're talking about need, when we're talking about routing.

Very last comment. Every one of these lakes in Minnesota -- I don't care whether you're in Morrison County or where I grew up in Koochiching County or any other, we are now trying to manage watersheds. This report doesn't have a single word on watersheds. We're trying to

1558-2

manage a half a million acres of watershed, which is what surrounds the Whitefish Chain itself. Half a million acres of land and water, 40 percent of which is water. But we're trying to manage upstream flows and otherwise to try to manage the runoffs into our lakes. So we filter them.

I don't care who you are in Minnesota, but every one of our public bodies of water, the water quality isn't improving. If it is, it's only because you got overabundance of zebra mussels that have eaten all the plant materials so the clarity really looks good. The phosphorus won't be very attractive, however.

So we need a section on that whole watershed piece, because that's as critical to this thing and to sustaining water in Minnesota as is it to managing roads and building bridges.

FACILITATOR: It's been eight minutes.

MR. TOM WATSON: Oh, did I say that? Old politicians can't shut up. Thank you.

Levi, Andrew (COMM)

From: Tom Watson <twatson@iphouse.com>
Sent: Monday, July 10, 2017 11:49 PM
To: MN_COMM_Pipeline Comments
Cc: MacAlister, Jamie (COMM)
Subject: Whitefish Area Property Owners Association (WAPOA) Comments on Line 3 DEIS
Attachments: WAPOA Comment MN DOC re Enbridge LIne 3 Expansion and Replacement DEIS.pdf; Take time to get Sandpiper pipeline route right - StarTribune_com.mht

Please find our comments attached.

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Ms. Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
Energy Environmental Review and Analysis
85 7th Place East, Suite 500
Saint Paul, MN 55101-2198

July 10, 2017

Re: Line 3 Expansion and Replacement Pipeline Project Draft Environmental Impact Statement – PUC Dockets CN-14-916 and PPL-15-137

Dear Ms. MacAlister:

On behalf of the 1,150 members of the Whitefish Area Property Owners Association (WAPOA), a nonprofit Sec 501c3 member association located in northern Crow Wing County, we have read and reviewed many sections of the Draft Environmental Impact Statement (DEIS) prepared for Enbridge Energy Ltd's (Enbridge) proposed Line 3 Expansion and Replacement Pipeline Project, attended several of the public hearings conducted about the DEIS, and submit the comments in this letter about the content of the DEIS.

The applicant Enbridge espouses "Corporate Values" for employee safety, environmentally conscientious, integrity, and respect. WAPOA appreciates those Values. Enbridge met with our Board of Directors one time several years ago, after filing their application for Sandpiper, and they have never contacted us again. WAPOA has values too, which are outlined and briefly described in the next section of this letter.

Then Enbridge Project Manager Paul Eberth in December 2014 reported to the Brainerd Lakes Chamber of Commerce, where Enbridge was a new member, that their engineering firm (Barr Engineering) reported about the risk three lakes/lake systems in our area, including the Whitefish Chain of Lakes, the ninth (9th) largest lake body in Minnesota, from constructing and operating crude oil pipeline.

Enbridge got our attention and apparently lacked the "integrity and respect" to address directly with us. Crude oil and fresh surface and ground water do not mix. We are puzzled how an "environmentally conscientious" foreign corporation (Canadian) would propose a new corridor easterly from Park Rapids for crude oil pipelines through an area of North Central Minnesota to transport crude oil primarily to non-Minnesota markets (85% by Enbridge data) and pose real

negative impacts to the natural environment during construction, during maintenance and spillage during operation, and additional construction for repairing "anomalies" after spills.

Enbridge got our attention after their one and only meeting with us.

Why is the Whitefish Area Property Owners Association (WAPOA) interested in this DEIS?

1. Enbridge's preferred route would traverse about 35 miles of the Pine River Watershed through southern Cass County (starting west of MN Highway 371), northern Crow Wing County, and continue in southern Cass County ending east of MN Highway 6 and east of the City of Outing.
    a. Enbridge's preferred route would cross or be below the west and north branches of the Pine River, which flow directly into Upper Whitefish Lake, one of 14 lakes in the Whitefish Chain of Lakes; and
    b. Enbridge's preferred route also would cross or be below the streams and waterways in Fifty Lakes that flow into Daggett Brook and enter the Whitefish Chain of Lakes via Little Pine and Daggett Lakes;
2. The Whitefish Chain of Lakes is the ninth (9th) largest lake in Minnesota, consisting of:
    a. 14 interconnected lakes, 14,200 acres of surface water, 119 miles of shoreland, and
    b. the largest component of the Pine River Watershed, a 500,000 acre watershed composed of land and water; and
3. The Whitefish Area Property Owners Association (WAPOA) is one of the largest and oldest (if no the oldest) tax exempt, nonprofit lake associations providing services not only for the private property owners and businesses about the 14 interconnected lakes of the Whitefish Chain of Lakes, but also "partnering" on water quality matters with another twenty-five (25) lakes in the Pine River Watershed.

Since 1973, WAPOA continues to serve the following mission filed with our charter:

> ***Stewardship of the natural world throughout the Whitefish Area and the Pine River Watershed is the mission of Whitefish Area Property Owners Association.***
>
> ***The Association shall lead and work with citizens, groups, associations, and government units to conserve and improve the quality of our waters, shoreland, fishery, wildlife resources, and general welfare for the benefit of present and future generations.***

Applicants who desire to construct and operate oil pipelines through the northern parts of Minnesota, especially areas of North Central Minnesota, do and did get our attention prior to the Sandpiper application and now with the Line 3 Expansion and Replacement Pipeline Project.

WAPOA fully supported and agreed with the September 2015 Court of Appeals decision requiring the Environmental Impact Statement (EIS) on oil pipelines prior to a certificate of need (CON) decision. Along with other organizations, we advocated for the completion of an

EIS on the two (2) Enbridge pipeline proposals, both individually and cumulatively. Of course, we understand that Enbridge "suspended" the Sandpiper Project. The Minnesota Court of Appeals decision, reversing the District Court decision, together with the Minnesota Supreme Court decision to not review or consider the Court of Appeals decision, ruled on not only requiring an Environmental Impact Statement (EIS) be completed prior to any CON decision, but also ruled on the importance of the EIS for large oil pipeline CON decisions as follows:

> ". . . decision to grant a certificate of need for a large oil pipeline constitutes a major governmental action that has the potential to cause significant environmental effects."
> [Judge Klaphake opinion Sept 14, 2015: STATE OF MINNESOTA IN COURT OF APPEALS A15-0016]

Is WAPOA opposed to transporting oil by pipeline? We advise that the Minnesota Department of Commerce (MDOC) and Minnesota Public Utility Commission (MPUC) fully, thoroughly, and accurately apply the Minnesota Environmental Policy Act (MEPA), other applicable Minnesota laws, and applicable administrative regulations to this Line 3 application and all future oil pipeline applications proposed to be placed on or in Minnesota soil and waters. Minnesota, as we all know and may need to be reminded at times like this, is the "Land of 10,000 Lakes". That vision of Minnesota is who we are and what is important to the majority of our citizens!

The Whitefish Area Property Owners Association (WAPOA) provides the following specific comments, suggestions and recommendations regarding the content of the DEIS:

1. **The Project "Title"**

    a. Chapter 1, Page 1-1. *"This EIS generally refers to the Enbridge proposal as the "Line 3 Project." Enbridge refers to their proposal as the "Line 3 Replacement Project," a term that is also used periodically in the EIS."*

    b. **Comment and Suggestion: This Project should be labelled what it really is - Proposed Line 3 Expansion and Replacement Pipeline Project.** 2296-1

        i. Math alone would indicate to a casual reader of the DEIS that it not only proposes to replace existing Line 3 in the Mainline Corridor (that is to be determined yet), but also (1) increases the pipe diameter by 2 inches from 34 inches to 36 inches and (2) increases the pipe capacity from a "present" capacity of 390,000 barrels per day to at least 760,000 barrels or more per day. That is called "expansion" and MDOC should label this Final EIS correctly for all readers, reporters and advisors.

2. **Enbridge Project Purpose**

    a. Chapter 1, Section 1.1

        i. *". . . in its CN application, Enbridge indicated that it proposes to replace the existing Line 3 pipeline for three main reasons. First, according to Enbridge, the*

Project would avoid the integrity risks associated with the existing Line 3 by replacing it with a new pipeline that uses new technology and materials (instead of continuing their ongoing dig and repair program). Second, Enbridge indicated that the new pipeline would improve their ability to fill all of the requests to ship Western Canadian crude oil on their system by allowing throughput of 760,000 barrels per day and improving the line's capacity to carry heavy crude oils. Third, Enbridge indicated that the new pipeline would reduce the amount of power used per barrel for Line 3 and on the Enbridge Mainline system (Enbridge 2014).

b. Chapter 1, Section 1.2 (paragraph 2)

   i. *"The Enbridge Mainline system, together with four Minnesota Pipe Line Company pipelines that carry crude oil south in a corridor from Clearbrook to the Twin Cities area, supplies approximately 400,000 barrels of oil per day to Minnesota's two petroleum refineries. These refineries use about 15 percent of the crude oil crossing into the state, with the bulk of the products refined from Canadian crude oil. Nearly all the heavy crude oil refineries in the Upper Midwest receive a portion of their crude oil, either directly or indirectly, from the Enbridge pipeline system that crosses Minnesota."*

c. Chapter 2, Section 2.2 (paragraph "Enbridge has Indicated that Expanded Capacity Would Reduce Curtailment and Improve Operational Flexibility")

   i. *"Enbridge's objective for the proposed Line 3 Replacement project would be to restore the capability of this line to carry heavy crude and increase capacity, which would allow operational flexibility to the Enbridge system. This would reduce ongoing and forecasted apportionment to the refining industry in eastern Canada, the Gulf Coast, and the Midwest, including the Flint Hills and Northern Tier Energy refineries in Minnesota. Although the increased capacity of the Line 3 Replacement pipeline would not be sufficient to meet all of the demand noted, Enbridge's goal would be to increase its ability to respond to fluctuating demand of different refineries in the United States in general and in Minnesota in particular."*

d. <u>Comment and Suggestion</u>: The definition of the purpose of the Line 3 Expansion and Replacement Pipeline proposal must be defined more broadly than from Neche, North Dakota and extend 365 miles across Minnesota to the Superior terminal at Superior, Wisconsin to conform to Enbridge's plan to get "Canadian crude oil to market", enable a "true" definition of "need for Line 3", and allow consideration and analysis of <u>all reasonable alternatives to Enbridge's preferred route and new corridor</u> for transporting this crude oil on existing lines and corridors. 2296-2

i. Defining the purpose as a system to transport oil from Clearbrook, MN to Superior WI is not reasonable considering the market for the petroleum products proposed for transport via these proposed pipelines. The applicant Enbridge and its related companies have proposed the "narrow" purpose so as to exclude significant, functional, and environmentally appropriate alternatives with destinations that leave Minnesota and the Upper Midwest and are destined for foreign markets and company operations in eastern and southern parts of the United States.

- Please confirm the distance/length of the Applicant's Preferred Route plus the length of Line 61 to Joliet, Illinois and compared it to the length of SA-04; 1551 miles vs 1552 miles; really the SAME! 2296-3

ii. MN Administrative Rules 4410.2300 requires an EIS ". . . shall compare the potentially significant impacts of the proposal with those of other reasonable alternatives for the proposed project". That clearly does not limit the scope of an EIS to a project purpose proposed by an applicant.

iii. Enbridge's representative Paul Eberth is quoted as stating:

"many of the alternate routes that veer west and south of the state's northern lakes country would cost more"

iv. Minnesota should not allow the applicant to limit project scope, which is a strategic business decision for the applicant to reduce its capital investment with significant disregard for the quality of this state's natural resources.

v. Might this proposed Enbridge preferred route from North Dakota to Superior actually be a financial risk avoidance strategy? How many subsidiary and partnership companies will own the segments of the Line 3 Expansion and Replacement pipeline? 2296-4

vi. Is it realistic that Enbridge will be refining this Canadian crude oil (there estimate is 15% of daily quantity serves the "area needs"), in a small refinery in Superior, after subtracting the 400,000 bpd transported from Clearwater by Minnesota Pipe Line Company (MinnCan) to Twin Cities refineries?

3. <u>Certificate of Need (CON)</u>

a. Paragraph 2, Opening Section *("Aside from Federal …)* of Chapter 3, page 3-1.

i. **<u>Comment and Suggestion</u>:** The third sentence should be corrected, consistent with the referenced federal and state regulations, as shown with the "red-lined" addition we propose: 2296-5

"As a result, states regulate the project need, routing and construction of oil pipelines through a variety of approvals, permits, and licenses." 2296-5 Cont'd

b. Section 3.1; Certificate of Need; page 3-3

i. This Section does briefly identify the fact that the Certificate of Need (CON) decision must precede the routing decision.

ii. **Comment and Suggestion: The header of this Section should more accurately be restated, as shown with our proposed "red-lined" changes, to avoid the confusion in that there can be NO routing decision without a positive CON decision and they are not simultaneous decisions that could be conveyed with the header below in the DEIS:** 2296-6

"A CN Is the first Required Decision for the Proposed Project, ~~and This EIS Addresses Both CN and Routing Permit Issues~~"

c. Section 3.1.1; Certificate of Need Criteria; pages 3-3 and 3-4

i. The four criteria listed in this Section of the DEIS is terribly incomplete list of the CON criteria required by MN Administrative Rules Section 7853.0130.

ii. **Comment and Suggestion: This Section should fully repeat the detailed criteria for each of the Criteria A through D, so there is no confusion, mistake or limitation in the need to apply each of the specific additional thirteen (13) detailed criteria required for Criteria A through C., including:** 2296-7

"A certificate of need shall be granted to the applicant if it is determined that:

A. the probable result of denial would adversely affect the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states, considering:

(1) the accuracy of the applicant's forecast of demand for the type of energy that would be supplied by the proposed facility;

(2) the effects of the applicant's existing or expected conservation programs and state and federal conservation programs;

(3) the effects of the applicant's promotional practices that may have given rise to the increase in the energy demand, particularly promotional practices that have occurred since 1974;

(4) the ability of current facilities and planned facilities not requiring certificates of need, and to which the applicant has access, to meet the future demand; and

(5) the effect of the proposed facility, or a suitable modification of it, in making efficient use of resources;

B. a more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record by parties or persons other than the applicant, considering:

(1) the appropriateness of the size, the type, and the timing of the proposed facility compared to those of reasonable alternatives;

2296-7
Cont'd

(2) the cost of the proposed facility and the cost of energy to be supplied by the proposed facility compared to the costs of reasonable alternatives and the cost of energy that would be supplied by reasonable alternatives;

(3) the effect of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives; and

(4) the expected reliability of the proposed facility compared to the expected reliability of reasonable alternatives;

C. the consequences to society of granting the certificate of need are more favorable than the consequences of denying the certificate, considering:

(1) the relationship of the proposed facility, or a suitable modification of it, to overall state energy needs;

(2) the effect of the proposed facility, or a suitable modification of it, upon the natural and socioeconomic environments compared to the effect of not building the facility;

(3) the effects of the proposed facility or a suitable modification of it, in inducing future development; and

(4) socially beneficial uses of the output of the proposed facility, or a suitable modification of it, including its uses to protect or enhance environmental quality; and

D. it has not been demonstrated on the record that the design, construction, or operation of the proposed facility will fail to comply with those relevant policies, rules, and regulations of other state and federal agencies and local governments."

Statutory Authority: MS s 216B.08; 216B.2421; 216B.243; 216C.10

4. <u>Need for the proposed Enbridge Line 3 Crude Oil Pipeline</u>

a. Section 1.4.1.1 of course says "The EIS does not determine need for this Project". We understand the need decision is the ultimate responsibility of the MPUC.

b. But, MN Statute 2017, Section 216B.243 states --- ". . . the commission shall evaluate (1) the accuracy of the long-range energy demand forecasts on which the necessity for the facility is based . . . ."

c. Check the next several items in Section 216B.243. Who provides the demand forecast, overall state energy needs, feasible combination of energy conservation improvements, etc? Obviously we don't have it in the DEIS.

d. As stated in Criteria A of MN Administrative Rules Section 7853.0130, "*the probable result of denial would adversely affect the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states . . . .*"

e. WHY is the NEED for this pipeline project NOT being considered in this EIS? Applying the above referenced CON criteria, the Commission is required to first consider the underlying need and related economic drivers for the proposed pipeline and prior to any consideration of a routing decision.

f. Applying MN Statutes 2017, Section 216B.243, MN Administrative Rules Section 7853.0130, and MN Statutes 2017, Section 116D.04, Subd. 2a., the MDOC is

required to provide and analyze data to address in the EIS the specific CON criteria and the EIS *". . . shall be an analytical rather than an encyclopedic [note: emphasis added] document which describes the proposed action in detail, analyzes its significant environmental impacts, discusses appropriate alternatives to the proposed action and their impacts, and explores methods by which adverse environmental impacts of an action could be mitigated."*

g. **Comment and Suggestion: We do not find the "NEED" to be adequately addressed and lacks specific details to address and/or provide data to answer the criteria for MPUC's CON decision.** 2296-8

i. MDOC must obtain and provide data and analyze the completeness and accuracy of factors such as and not limited to – (1) present crude oil contracts, terms and demand, (2) future crude oil contracts, terms and demands, (3) state (Minnesota) energy need and changes in demand, (4) industry demand and supply facts, and (5) energy conservation improvement projections -- so as to clearly and accurately provide and quantify the "need" that would/should enable proper analysis as required by Minnesota law so that the MPUC may rely on this need analysis for their CON decision.

ii. MDOC must identify data and provide analysis that is sufficient to address the criteria items in Minnesota law and administrative rule, including these following items in Criteria A of MN Administrative Rules Section 7853.0130:

- future adequacy, reliability, or efficiency of energy supply to applicant
- future adequacy, reliability, or efficiency of energy supply to applicant's customers
- future adequacy, reliability, or efficiency of energy supply to the people of Minnesota
- future adequacy, reliability, or efficiency of energy supply to the people of neighboring states
- the environmental, economic, employment and sociological impacts that must be thoroughly analyzed.

iii. MDOC must identify specifically what is the "market" for the energy supply that directly benefits Minnesota

iv. MDOC must identify clearly who are our neighboring states; e.g. Wisconsin and Iowa; North and South Dakota

v. What is the measure of the energy supply that satisfies the CON criteria on the matter above?

5. **<u>DEIS Chapter 4, Section 4.1. CN and Route Permit Alternatives Are Addressed Separately (DEIS page 4-2)</u>**

   a. The referenced section includes the following statement in paragraph 2: "This EIS focuses on providing the applicable environmental information for the CN, the route permit, and other agency decisions. The next section, Section 4.2, describes the alternatives evaluated in the EIS for the CN decision. The majority of the economic analysis and other technical information for the CN decision will be provided by the Applicant, other parties, and the public that are participating in the contested case hearing." [note: *color emphasis added*]

   b. **<u>Comment and Suggestion:</u>**

      i. **Certainly other parties and the public will participate and provide the information; yes, that is very probably accurate.**

      ii. **The MPUC has ordered MDOC-EERA to prepare an EIS. We believe that MN Administrative Laws, Section 4410.2300, Content of EIS (provided below) is applicable to who should be providing this information, analyzing the data and information including that provided by the Applicant Enbridge, and provide with the Final EIS:**

      > *H. Environmental, economic, employment, and sociological impacts: for the proposed project and each major alternative there <u>shall be a thorough but succinct discussion of potentially significant adverse or beneficial effects generated, be they direct, indirect, or cumulative.</u> Data and analyses shall be commensurate with the importance of the impact and the relevance of the information to a reasoned choice among alternatives and to the consideration of the need for mitigation measures; the RGU shall consider the relationship between the cost of data and analyses and the relevance and importance of the information in determining the level of detail of information to be prepared for the EIS. Less important material may be summarized, consolidated, or simply referenced. <u>The EIS shall identify and briefly discuss any major differences of opinion concerning significant impacts of the proposed project on the environment</u>. [Note: emphasis added]*

      iii. **We find that the MDOC-EERA should be providing the analysis of the ". . . significant adverse or beneficial effects . . . " of the environmental, economic, employment, and sociological impacts; and NOT Enbridge.**

2296-9

6. **<u>Connected Actions; How many pipelines are expected to be added over a period of time such as the "life" of a new or existing oil pipeline corridor?</u>**

   a. Connected actions are defined in Minnesota Rules 4410.4300 Subpart 9. Two projects are "connected actions" if a responsible governmental unit determines they are related in any of the following ways: (A) one project would directly

induce the other; (B) one project is a prerequisite for the other and the prerequisite project is not justified by itself; or (C) neither project is justified by itself.

b. Section 2.10; pages 2-43 to 2-44. Identifies the issue, but provides no details for connected actions. We understand that additional pipelines would be a new permit. That does not address the subject.

c. The Enbridge Mainline Corridor has six (6) oil pipelines, the Minnesota Pipe Line Company (MinnCan) corridor has four (4) oil pipelines serving the Twin Cities refineries, and each corridor started with a lesser number of oil pipelines before increasing the quantity of oil pipelines in both corridors.

d. <u>Comment and Suggestion</u>: It would seem only reasonable that the Final EIS include the MDOC analysis of the proposed Enbridge preferred route and each alternate route for the "connected actions", based on clause (A) above, of additional oil pipeline applications to be placed in the proposed NEW Line 3 pipeline corridor, and other existing oil corridors. For example, we find no analysis for two, three, four or six oil pipelines, likely each a larger diameter pipe with greater "through-put" capacity than present pipelines, in the proposed Enbridge new corridor. The analysis should be completed and provided in the Final EIS. 2296-10

i. During the EIS scoping hearings, a number of "Lake District" testifiers asked if the new corridor for the Enbridge Preferred Route (APR) would become the location for more replacement and expansion pipelines. Enbridge has not denied this in their materials or testimony.

ii. Alternately, is Enbridge committing during this application and CON process that, if it were approved, there would never be more than Line 3 in this new corridor?

7. "Lake District" Analysis

a. Section 1.4.2.1 refers to:

"During the scoping of this EIS, many public comments raised concerns about the establishment of a new pipeline corridor – in the Mississippi River Headwaters area specifically, and in the "Lake District" generally."

b. We have not been able to find in the DEIS what area is specifically referred to as the "Lake District".

i. **<u>Comment and Suggestion</u>**: Please define specifically the area of Minnesota you refer to as the "Lake District". 2296-11

c. "Lake District" as we have testified and defined it were the Minnesota Counties of Hubbard, Cass, Crow Wing and Aitkin.

d. Applicant (Enbridge) Preferred Route (APR): The applicant Enbridge Energy has proposed creating <u>a new 220 mile crude oil pipeline corridor</u> [reference: DEIS page 2-1] starting at Clearbrook south to Park Rapids in Hubbard County and continue easterly through southern Cass County, northern Crow Wing County, and northern Aitkin County and reconnect with the Mainline Corridor near Carlton.

   i. This 220 mile segment, or about 2/3 of the 340 route miles in Minnesota, of the APR does not now and never has had an oil pipeline of any kind in this APR segment.

e. This corridor from Park Rapids to the intersection with the Mainline system in Carlton County will traverse about 35 miles through the northerly part of the Pine River Watershed and cross rivers and streams that feed into the Whitefish Chain of Lakes, including the west and north branches of the Pine River that flows into Upper Whitefish and the Daggett Brook on the east that flows into Little Pine, Daggett and Cross Lakes, as shown on the map below:

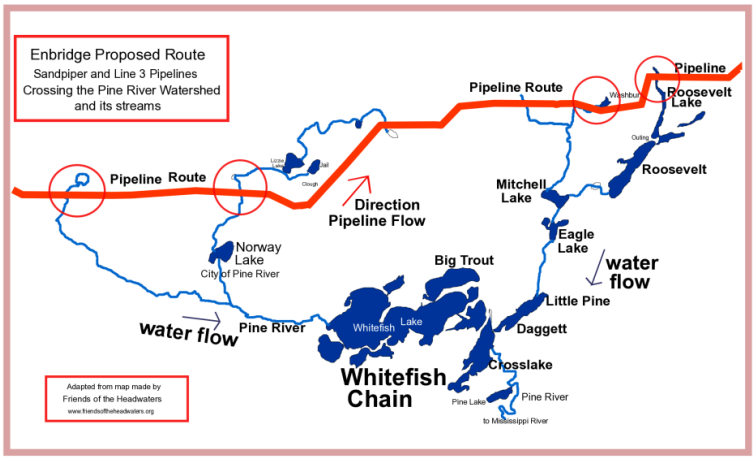

f. Enbridge Project Manager Paul Eberth made a presentation December 18, 2014 to the Brainerd Lakes Brainerd Lakes Chamber of Commerce members at Breezy Point Resort. During the presentation, as reported in the December 31, 2014 Brainerd Daily Dispatch and Pineandlakes Echo Journal editions, Eberth said, "We've employed many engineers and scientists to study the route. Barr Engineering did some studies on the route and studied which watersheds we would cross, and which lakes we would potentially impact, should there be an impact, and the results were that we do cross about 14 different watersheds, but really, we only have the connectivity to about 3 percent of lakes in those watersheds." Further Eberth reported that Barr has identified Norway Lake, the

Whitefish Chain and Roosevelt Lake as three lakes within the lakes area that are at risk along the Sandpiper (which is also the proposed Line 3 route) route, though many other lakes would not be connected to the Pine River, and therefore, less at risk. [Reference: *http://www.pineandlakes.com/news/3645448-enbridge-representatives-meet-chamber-members*]

i. "Norway Lake, the Whitefish Chain and Roosevelt Lake as three lakes within the lakes area that are at risk" with the Enbridge APR!!

2296-12

g. **Comment and Suggestion:** This is a very serious matter to WAPOA, the property owners, businesses, and visitors to the Whitefish Lakes area, and our neighbor lakes and lake associations. Rather than a "generic EIS" as commented in Section 1.4.2.1. (page 1-7), the Final EIS should provide a comprehensive summary in both Chapter 5, Existing Conditions, Impacts, and Mitigation – Certificate of Need, and Chapter 6, Existing Conditions, Impacts, and Mitigation – Route Permit, for the new corridor (we will label it "Lake District Corridor") proposed by Enbridge from Park Rapids easterly through Carlton County.

i. The "Lake District Corridor" is unlike every other present corridor and pipeline where the State of Minnesota, MPUC has completed a Certificate of Need and Routing Permit at some time or other, and likely with upgrades in recent years, for the present pipelines and corridors.

ii. Enbridge's Eberth, the Project Manager, reported that their contract engineering firm, Barr Engineering, identified ". . . Norway Lake, the Whitefish Chain and Roosevelt Lake as three lakes within the lakes area that are at risk . . ." as a result of the installation of crude oil pipelines, which at the time of the Eberth statement, involved the lesser volume proposed Sandpiper Pipeline serving the Bakken area of North Dakota.

iii. The Whitefish Chain of Lakes, the ninth largest lake body in Minnesota measured by surface water area, is an interconnected navigable group of 14 lakes consisting of 14,280 acres of surface water.

iv. The Whitefish Chain of Lakes is the largest body of water in the Pine River Reservoir (Army Corps of Engineers responsibility) and the 500,000 acres of land and water in the Pine River Watershed, through which Enbridge as proposed to route Line 3 in the "Lake District Corridor".

v. The economic significance of the lakes in North Central Minnesota for travel, tourism, conventions, destination weddings, and second homeowners is over $700 million including Hubbard, Cass, Crow Wing

and Aitkin Counties. [reference: Source: Univ of MN, Extension Service, June 2007-May 2008, Davidson-Peterson Associates]

- This fact and supporting data analysis is provided in Section 10 of this letter report.

vi. There is nothing in the DEIS that addresses in detail the existing conditions that are specific to this totally new "Lake District Corridor".

- The Natural Environment section (DEIS Section 5.2) provides an "encyclopedic" address of water, geology and soils, vegetation, fish and wildlife, and more. There is little to no analysis for the APR and the alternates. Terrible work and it fails to include some relevant work addressing natural resources issues within the Watershed and the greater Whitefish Lakes area.
- We have addressed these deficiencies in the Sections 8 and 9 of this letter report.

vii. Considering that a reported 92 miles of the proposed "Lake District Corridor" would have the expanded Line 3 replacement pipeline co-located with a high voltage powerline is a problem. We read the disclosure of this co-location, but without any analysis of their compatibility. During the public hearings and no doubt in the comments submitted, the research on the co-location of high voltage powerlines and oil pipelines will be provided, which must also be addressed in the Final EIS.

8. DEIS Chapter 5, Existing Conditions; Section 5.1. Introduction

a. In the second paragraph, third sentence (DEIS page 5-1) it reads -- "The chapter evaluates potential impacts on various resources associated with the natural environment, socioeconomic environment, and cultural resources."

b. **<u>Comment and Suggestion</u>:**

i. "Various resources"??? We believe you understand the specific criteria for the CON in MN Administrative Rules Section 7853.0130. We assume and trust that these specific criteria will be applied to this pipeline application.

ii. Missing: a section that addresses the existing conditions for a section of Enbridge's preferred route through North Central Minnesota, including over 100 miles from Park Rapids to Highway 2 in Carlton County; this is an area with no oil pipeline history for the new 340 mile preferred route or the 282 miles of the present Line 3 route. 2296-13

iii. Missing: a section that addresses the 30-35 miles through the Pine River Watershed, which extends through the Pine River Watershed from the south end of Hubbard County to western part of Aitkin County and includes northern Crow Wing County and southern Cass County. 2296-14

iv. Please refer to Section 7 – "Lake District Analysis" – for more details on these two (2) omissions that need to be specifically addressed in detail.

9. DEIS Chapter 5, Section 5.2.1. Water Resources

Today, Crow Wing County and the areas of the "Lake District" (as identified in the DEIS and noted previously) of North Central Minnesota continues to attract people of all ages.

a. Approximately 28 percent – or 209,211 acres - of Crow Wing County is covered by lakes, streams and wetlands, and another 50 percent – or 374,488 acres - is covered by forests.

b. The Pine River Watershed encompasses 504,000 acres primarily in northern Crow Wing and southern Cass Counties with a smaller portion in Hubbard and Aitkin Counties. The Pine River watershed contains 586 stream and river miles of various sizes, and 441 lakes greater than 10 acres.

c. The Watershed is 51% forested, 21% wetlands, 13% open water, and includes several heavily developed lakes. The majority of the lakes are important recreational resources and provide significant economic benefits to the immediate area, the Counties in the "Lake District", and the State of Minnesota.

i. The importance of watersheds is not addressed, and is an integral natural environment component in Minnesota and the "Lake District" in particular.

ii. To illustrate the importance of this matter: The presence of at least two (2) coldwater lakes with lake trout and ciscos that are warming, oxygen quantities decreasing, and existing oxygen levels rising to shallower lake depths, is the subject of a 2015 MN DNR plan – "Lake Trout Habitat Protection Strategies for Big Trout Lake", lead by Peter Jacobson, MN DNR fisheries biologist. The key recommendations presented below point out the importance of the watershed, which should be addressed in the Final EIS.

Key recommendations include:

- *Protect 2,250 acres of private forest land in the watershed with conservation easements or acquisition. This will protect critical groundwater infiltration areas and minimize surface runoff of nutrients* 2296-15

2296-15
Cont'd

and sediments. This will require an investment of $3.25 million (or $650,000 annually if spread across 5 years). Likely sources of funding include the Outdoor Heritage and Clean Water Funds.

- *Explore opportunities to protect the last remaining undeveloped shorelines on the lake. Protection could include conservation easements with willing landowners.*
- *Educate landowners on the benefits of native plants on shorelines and how to restore shoreline buffers.*
- *Implement Best Management Practices on portions of the watershed that have been developed to reduce runoff of sediment and nutrients. The ongoing project to capture and divert runoff from County Highway 66 is a good example of such a project.*
- *Continue developing consistent and effective shoreland zoning regulations among the several LGUs that have jurisdiction for Big Trout Lake.*
- *Develop a high resolution LiDAR-based watershed model that will provide specific and detailed recommendations on where restoration and protection efforts should be targeted.*

d. As noted with the DEIS, Enbridge proposes its preferred route to cross an area of North Central Minnesota that does not have petroleum pipelines in it at this time. This over hundred (100) miles corridor from Park Rapids to Carlton County, also traverses about 35 miles of the northerly part of the Pine River Watershed and cross rivers and streams that flow into the Whitefish Chain of Lakes; see map.

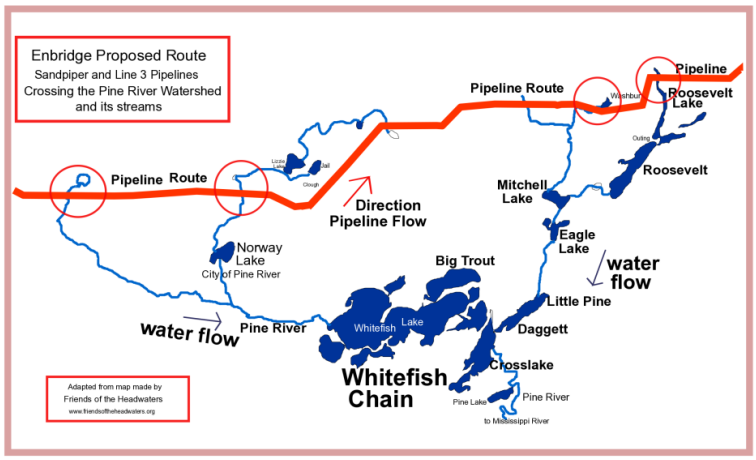

e. Water Quality. The DEIS fails to address the subject of water quality that is very important to persons in the "Lake District" of North Central Minnesota.

i. WAPOA manages an annual 39 lake and at least six streams (all located in the Pine River Watershed) water quality testing program with water testing completed monthly from May through September, with water quality measured by the Trophic State Index (TSI) that is a measure of water clarity, phosphorus, and chlorophyll-a,

ii. The TSI data for these 39 lakes is submitted to the Minnesota Pollution Control Agency (MPCA).

iii. There is no measure or analysis of water quality in the DEIS, especially for the new corridor, that we have labelled "Lake District Corridor".

f. Walleye Management. The Whitefish Lakes and the entry of the Pine River in Upper Whitefish is the site for the annual spring walleye egg harvesting. Annually, this operation of the Brainerd Office of the MN DNR produces 25 to 70 million walleye fry that are grown in area lakes and rearing ponds and stocked as fingerlings in area lakes and other lakes in MN.

i. While there is information about Spire Valley addressed, the Pine River walleye management operation and hatchery is not addressed.

ii. As proposed, the Enbridge APR would cross the North and West branches of the Pine River, the site of the annual and important egg harvesting operation, and there is no information about the impacts from construction, maintenance, repairs, and oil spills.

g. Sensitive Shorelands. Again, this is an area that has been and regularly studied for habitat management relative to fish, migratory waterfowl and birds, and other aquatic plants and animals.

i. Paul Radomski, DNR aquatic biologist, was the lead researcher on the Sensitive Lakeshore Survey, a study of the Whitefish Chain of Lakes, in northern Crow Wing County, completed March 2012. [Reference:http://files.dnr.state.mn.us/eco/sli/whitefish_lakereport_2012.pdf]

ii. This survey report identified the diverse aquatic plant and animal communities in the 14 lake Whitefish Chain of Lakes. Applying their ecological model, the DNR not only identified numerous species, but also pointed out ". . . 10 primary sensitive shoreland areas to be considered for potential resources protection districts . . .".

h. Watersheds

i. Watersheds are not addressed at all; and MUST be. Major and minor watersheds in this area are extremely important to managing, sustaining and restoring water quality in this area.

iii. As required "the potentially significant human and environmental consequences", EIS must include the analysis, not repeating only descriptions, of these watersheds, especially those where there are no pipelines and contrast with the impact on present watersheds on the

present Line 3 and Mainline Corridor (won't only be Line 3 if preferred route approved)

[Reference: http://www.dnr.state.mn.us/mcvmagazine/issues/2016/may-jun/refuge-lakes.html]

h. Critical Habitat Protection Planning.

i. In 2014, the Leech Lake Area Watershed Foundation (LLAWF) in partnership with Minnesota Land Trust and MNDNR Fisheries launched the LLAWF Clean Water Critical Habitat protection campaign. This effort has numerous partners include Lake Associations, Conservation Districts and the MN Board of Water and Soil Resources (BWSR). The focus of our program is sustaining a strong angling heritage that revolves largely around protecting fisheries habitat. Resurging shoreland development pressures, looming climate change are direct threats to Minnesota lakes' ecology. This project focuses on fisheries habitat protection on lakes that have the best biological integrity for a sustained sport fishery and many of these lakes are in close proximity to the Applicant Preferred Route (APR). The LLAWF protection efforts are focused on tullibee (aka cisco) a preferred forage fish of walleye, northern pike, muskellunge and lake trout. They require cold, well oxygenated waters, a condition most common in lakes with deep water and healthy watersheds.

ii. Minnesota DNR Fisheries researchers studied tullibee lakes and designated 68 lakes in Minnesota as the primary "refuge lakes" for tullibee that need protection. Our program targets thirty (30) of these lakes located in Hubbard, Crow Wing, Cass, and Aitkin counties, a large number of these thirty (30) lakes in the Enbridge APR or the watershed in which the APR would be constructed.

i. <u>Comment and Suggestion</u>:

i. <u>The DOC-EERA should (MUST) require a section that FULLY analyzes "the potentially significant human and environmental consequences" of this section of North Central Minnesota. Why?</u> 2296-16

- The information and facts presented in this part of our letter report and comments should be sufficient to emphasize the importance of water resources, water quality and the active research and management in this area.

2296-16 Cont'd

- Water Quality is not addressed in the DEIS and should be analyzed and presented with the Final EIS. The analysis should report the data for each of the lakes along the proposed APR, but also the impact of construction, maintenance, repairs and oil spills (anomalies).
- Groundwater significance not fully addressed in an area with shallow aquifers and heavy use of groundwater for human use and consumption. The material does not describe or analyze the impact on populations (quantity, age, young and older, water groundwater quality among other items) for our area.
- Watersheds are not addressed at all; and MUST be. Major and minor watersheds in this area are extremely important to managing, sustaining and restoring water quality in this area. Must be addressed, especially where they involve proximity to large lakes and water bodies.

ii. Effect of high-voltage powerlines on oil and oil pipelines in the Enbridge preferred route and the corridor in this area must be analyzed carefully.

iii. Combining each of the points we identify in our comments about Chapter 5, Water Resources Section, the DEIS is woefully inadequate in its analysis along the new "Lake District Corridor" and fails to utilize referred research reports and studies completed by the Minnesota DNR.

iv. This same analysis should be provided for the only system alternative SA-04. 2296-17

10. DEIS Chapter 5, Section 5.3. Socioeconomic Environment

a. Section 5.3.2. Recreation and Tourism

i. As a result of "good, quality lakes", regions of Minnesota such as North Central Minnesota, Crow Wing County and the greater Whitefish Area Chain of Lakes are highly sought-after destinations. The local economy of the region, county, and the Whitefish Area benefits significantly from travel, tourism, second homeowners and the expenditures they make.

ii. How significant are "good, quality lakes" to the local economy? The <u>greater</u> Whitefish Chain of Lakes area, along with Pelican Lake that is also located in the Pine River Watershed, is a major tourism area in Minnesota and drives the economy of this northern Crow Wing County area. "Going to the lake"

or "going up north" is a Minnesota quality of life feature, and according to the research "good, quality lakes" are the attraction.

iii. What is the tourism economy in our area – northern Crow Wing County, southern Cass County, and Hubbard County? Water is the attraction and key element for the tourism industry in this area year-round, but especially in the summer season. Based on research completed by the University of Minnesota, Extension Service, during a recessionary period, travel and tourism spending was nearly $300 million in Crow Wing County, the third largest spending outside of the Twin Cities seven county area only after Olmstead and St. Louis Counties, as shown in the table below.

iv. Travel and tourism in 4 Counties (Aitkin, Cass, Crow Wing and Hubbard Counties); over $700 million annual spending on travel and tourism

- During the recession (2007-08) travel and tourism spending was nearly $300 million in Crow Wing County and over $700 million in the four (4) counties of North Central Minnesota, as shown:

2007-08	Traveler Exp	State Revenue	FTE Jobs	*Direct Jobs*	*Indirect Jobs*
Crow Wing	$294,295,204	$135,953,389	7,218	*5,029*	*2,189*
Aitkin	74,257,356	30,992,479	1,556	*1,158*	*398*
Cass	245,867,979	113,581,822	6,033	*4,202*	*1,831*
Hubbard	99,248,707	45,849,199	2,431	*1,692*	*739*
Total	$713,669,246	$326,376,889	17,238	*12,081*	*5,157*

Source: Univ of MN, Extension Service, June 2007-May 2008, Davidson-Peterson Associates

- In fact, the combined travel and tourism annual expenditures in Aitkin, Cass, Crow Wing and Hubbard Counties exceeds every Minnesota county except Hennepin and Ramsey Counties.

b. Section 5.3.4. Employment, Income, and Tax Revenues

i. This Section understates horribly and totally inadequately analyzes the "true and real" economic impact of the Enbridge preferred route through North Central MN. It looks and reads like it was prepared by Enbridge or its PR firm.

ii. We agree that there would be added employment primarily during the two (2) years of construction, additional local spending during construction, and some increased property and sales tax revenue.

iii. This section does not include:

- Local economy data and analysis; a water and recreation based economy

- Travel and tourism in 4 Counties (Aitkin, Cass, Crow Wing and Hubbard Counties); over $700 million annual spending on travel and tourism, as noted in the data and comment above

- Seasonal, second homeowners in this area and North Central MN
  - Largest increasing impact on the local economy
  - Impact of Second Homeowners; own the largest number of homes (shown in the table below as Non-Commercial Seasonal Residential and Recreational ("Non-Comm'l Season Res & Rec"), which also have the largest EMV; exporter of property tax revenue to other parts of State of MN

Economic Market Value for Cities and Counties. Assessment Year 2015 for taxes pay in 2016

City of CROSSLAKE *plus* *Timothy, Jenkins, Ideal, 50 Lakes, Manhattan Beach*

Type	Property Type Name	Economic Market Value	% of Total Econ MV	% of CW County
01	Residential	$728,685,619	28.4%	15.8%
03	**Non-Comm'l Season Res & Rec**	**$1,667,931,773**	**65.0%**	**41.5%**
06	Commercial	$57,910,536	2.3%	7.5%
14	**Comm'l & Resort Season Rec**	**$27,401,800**	**1.1%**	**25.4%**
97	Total Agriculture	$72,335,646	2.8%	10.5%
	Other	$12,038,277	0.4%	5.0%
		$2,566,303,651	100.0%	24.5%

- Negative impact of oil spills that might impact water resources (lakes, rivers, streams, groundwater, etc)
  - How about property values in the 2010 Kalamazoo Michigan area? That should be available after 7 years for the MDOC-EERA to analyze as a measure of economic impact.
  - Unrelated to oil and oil spills, MN has the Mille Lacs Lake experience of bad walleye and fishing decisions, non-native AIS, and resultant decline in travel and tourism at resorts, and second homes.
  - Illustration of Negative Impact to Lakeshore/riparian property values. Six local government units/districts in Mille Lacs County (south end of lake): property values for property tax purposes decreased $29M from 2014-15 to 2015-16; that is

one year only and represented 30% of the taxed parcels in the Mille Lacs County.

- Recognition of how the MN property tax and aid to local governments works for areas of MN that have lesser property values and real estate equity
    - Taxpayers in property-rich areas are taxed and tax revenue redistributed through local government state aids

c. **<u>Comment and Suggestion</u>: The Final EIS must address the economic, employment impacts the pipeline proposals, including Enbirdge's APR and all reasonable route alternatives and system alternative SA-04 for the proposed project.** 2296-18

i. How large is the impact of travel and tourism on the local economy? Statewide, travel/tourism industry gross sales was $13 billion in 2013. In the Central Minnesota region, the spending in Crow Wing County was 18% of the regional total; the county with the most travel and tourism spending in the region. The Leisure and Hospitality industry consists of accommodations; food and beverage businesses; and arts, entertainment and recreation. As you can see, travel and tourism spending is a significant contributor to sales, employment, and taxes in Crow Wing County and our area as shown in these two measures.

ii. For second homeowners, the single largest annual expenditures are for home improvements, remodeling and home construction; about sixty (60%) percent of their annual spending. Food, utilities, entertainment, and local purchases account for the remaining forty (40%) percent.

iii. Yes, Enbridge indicates that they will have a one billion dollar ($1B) impact on the economy along the ENTIRE proposed pipeline route, and this amount has varied with each report. The report Enbridge paid to have the University of Minnesota-Duluth prepare using Enbridge data on employment, tax revenue, and economics is limited to a two (2) year period, largely the construction period. This projected economic benefit reduces, according to the report, and provides much less tax revenue, economics and employment after construction and during operation.

iv. How does the present over $0.75 billion annual economic benefit in ONLY four (4) counties (annual expenditures) compare to Enbridge's economic benefit over the ENTIRE route (can't be sure if it the 340 miles in Minnesota

or the 1,000 miles from Alberta)? The Final EIS must provide the accurate data and a comparable analysis of employment, taxes, and economic impacts.

11. Chapter 10. Accidental Crude Oil Releases.

As we have described several times in this letter report with our comments, this area of North Central Minnesota ("Lake District") has very important and significant natural resources among plants, animals, fish, and lake-based ecosytems and sensitive areas for these natural resources. WAPOA cannot imagine a project that has more potential for "significant environmental effects" than these pipeline projects and this Line 3 proposal. The lakes of and about the Whitefish Chain of Lakes and the Pine River Watershed, which are some of the clearest and cleanest in Minnesota, along with the area rivers, creeks, and wetlands are all extremely vulnerable to adverse impacts from construction, leaks and spills from these pipelines. Our water resources, including both surface and ground water, are extremely vulnerable to these adverse impacts and threats from construction and spills. Actual incidents that are highly predictable could be devastating to these public waters. The forests, lands and wildlife in the area of the proposed Pipeline are also vulnerable to adverse impacts from predictable oil spills that should be analyzed thoroughly.

a. WAPOA has a major concern about safety. We know that pipeline spills, leaks, fires and other pipeline breaches have occurred in Enbridge operations (over 800 in twelve years). In recent years including this year 2017, Enbridge has had oil spills in Kalamazoo, Michigan (over 1 million gallons of crude oil), Montana, Illinois, and Grand Rapids, MN.

Table 1. Total Spills on Enbridge Pipelines (Canada and U.S.), 1999 - 2010[171]

Year	Number of spills	Quantity of barrels spilled
1999	54	28,760
2000	48	7,513
2001	34	25,980
2002	48	14,683
2003	62	6,410
2004	69	3,252
2005	70	9,825
2006	68	5,734
2007	65	13,777
2008	92	2,842
2009	103	8,441
2010	91	34,258
Total	**804**	**161,475** (Approximately 25.67 million litres, or 6.8 million gallons)

b. **<u>Comment and Suggestion</u>: The EIS must address impacts of the predicted spills associated with this Line 3 oil pipeline proposal, including all reasonable alternatives to the proposed project.**

c. While we have reviewed most materials submitted by Enbridge, we believe strongly that proposed prevention and safety measures for protecting our wetlands, rivers, lakes and environmentally sensitive lands and areas from the construction and operation of the proposed Sandpiper Pipeline must be factored in the economics of this proposal.

2296-19

d. The Final EIS should provide the oil spill history of Enbridge and the resolution of the major spills, example Kalamazoo.

e. We are also providing the attached article printed in the Minneapolis Star Tribune entitled "Take time to get Sandpiper pipeline route right". This same argument applies to Line 3 replacement pipeline.

WAPOA appreciates this opportunity to submit our comments and suggestions about the content of the DRAFT Environmental Impact Statement (DEIS) and matters that need to be addressed in the FINAL EIS.

Regards,

Thomas N. Watson
President
Whitefish Area Property Owners Association
39195 Swanburg Court
Pine River, MN 56474

cc: WAPOA Board of Directors
Minnesota State legislators representing the WAPOA area
Local government mayors in the Whitefish Lakes area
jamie.macalister@state.mn.us

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COMMENTARY

Take time to get Sandpiper pipeline route right

Landowners cheer Court of Appeals’ call for an environmental-impact statement.

By Tom Watson

OCTOBER 18, 2015 — 7:07AM

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Recently, House Speaker Kurt Daudt, R-Crown, and his GOP caucus expressed their displeasure with the court's decision, complaining about the jobs and property tax revenue negated by it. We communicated with Daudt and expressed our displeasure with their failing at their news conference to address all of the relevant environmental and economic considerations for our area, along with providing misleading jobs and tax data.

We are not opposed to pipelines, but we are opposed to approving pipeline routes in an area of high-quality lakes and waters that have major significance to the Minnesota travel and tourism economy. Pipelines are not DFL or GOP, the last I checked.

Travel and tourism and second homeowners provide over $600 million in annual expenditures and over $300 million in annual tax revenues in Hubbard, Cass, Crow Wing and Aitkin Counties combined, an area through which Enbridge proposes not one or two but multiple pipelines.

Travel and tourism also provide an estimated 17,250 jobs. This travel and tourism employment is more than 10 times the 1,500 jobs that Enbridge projects for work to be performed along the proposed route from North Dakota to Superior, Wis., which is not limited to the four counties mentioned above. Enbridge testified at an Aug. 24 hearing in Pine River that it expects 20 to 25 jobs would be long-term along the entire pipeline route.

Because unanticipated environmental consequences can be costly to undo and environmentally sensitive areas impossible to restore, environmental review creates the opportunity to anticipate and manage these issues before projects like pipelines are built in significant "environmental, social, and economic" areas. The more-comprehensive EIS, compared with the limited environmental assessment analysis, also should examine whether there are alternative project designs or locations or existing pipelines that would result in fewer environmental impacts.

This should have been completed long before now — based on my 18 years' experience as a mayor and an elected municipal government official in Ramsey County — when considering local land-use decisions and comprehensive plans, managing actions to sustain quality water and addressing dangerous chemicals in groundwater.

We agree that the estimated $25 million in annual property taxes and 1,500 jobs are important, but small compared with the consequences of a negative event (for example, oil spills, breaches or “Enbridge anomalies”), considering that Enbridge has experienced 800 spills, or more than 1.5 per month. That’s about 200 barrels per each spill or anomaly in the past 10 years.

Daudt should know that the estimated jobs and taxes will be realized wherever a pipeline is constructed. But we can’t predict when and where spills will occur. They will occur. Enbridge does not deny that.

Incidentally, a pipeline using the southern Minnesota existing corridor to Enbridge’s Chicago destination — as recommended by Friends of the Headwaters and others — and not through Superior would produce more jobs and more tax revenue along this route in an area with lakes under stress that mostly likely can’t be restored, as the Minnesota Department of Natural Resources and the U.S. Environmental Protection Agency report.

The EIS is critical before any decisions are made, as Gov. Mark Dayton implied.

We encourage Daudt, the House GOP, and all of our legislators and regulatory agencies to consider all relevant environmental, social, economic and routing alternatives during the preparation of the EIS and before any pipeline decisions are made.

Tom Watson, of Crosslake, Minn., is president of the Whitefish Area Property Owners Association.

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Levi, Andrew (COMM)

From: Julia Wilber <juliaannwilber@gmail.com>
Sent: Friday, June 30, 2017 10:12 PM
To: MN_COMM_Pipeline Comments
Subject: Re the Line 3 Draft Environmental Impact Statement (DEIS): Docket numbers CN-14-916 and PPL-15-137

Dear MN Department of Commerce,

I find the Enbridge Line 3 Draft Environmental Impact Statement to be unacceptable for the following reasons and request that you offer thorough and comprehensive responses to each concern.

Thank you,

Julia Wilber

Marine on St. Croix, MN

1. DEIS Chapter 5.2.1.4 1089-1
During pipeline construction and maintenance, Enbridge plans to store and apply petroleum products and hazardous chemicals 100 feet from surface waters.
This is an unacceptable risk to MN waters. For comparison, the Boundary Waters Canoe Area Wilderness rule for protecting water is to keep dish soap 150 feet from shore.

2. DEIS Chapter 5.2.1.2.4
Horizontal Directional Drilling (HDD) will be used to cross under our most pristine, most sensitive waters, and anywhere there is flowing water, which describes most of the route. The potential exists for contamination through release of drilling fluid to the ground and/or water, termed a “frac-out." The DEIS cites a 35 mile section of Enbridge pipeline in Michigan where there were 11 HDD crossings, multiple minor releases and 2 major frac-outs. MN will not accept the risk of a frac-out every 5.5 river crossings.

3. DEIS Chapter 10.2.4.1.1
"The annual probability of a spill incident for the Applicant’s preferred route was estimated as 0.249 incidents per year with a recurrence interval of 4.0 years."
Every year there would be a 25% risk of an oil spill, which means a risk of one spill every four years. We should not accept this high risk probability.

4. DEIS Chapter 10.4.1 1089-2
Regarding river oil spills, the DEIS uses a 10 mile Region of Interest (ROI), when we know that an oil spill can pollute more than 35 miles downstream (Enbridge's oil spill in the Kalamazoo was 35 miles). The ROI in the EIS should include at least 35 miles of impact.

Risk from Line 3 is in conflict with several of our Minnesota Statutes:
1. MN Statute 103F.305 Scenic River Protection Policy
https://www.revisor.mn.gov/statutes/?id=103F.305

2. MN Statute 116D.02 Declaration of State Environmental Policy
https://www.revisor.mn.gov/statutes/?id=116d.02

--
Julia Wilber

"There is a crack in everything. That's how the light gets in." --Leonard Cohen

Levi, Andrew (COMM)

From: Julie Wissinger <julieww951@gmail.com>
Sent: Tuesday, July 04, 2017 1:31 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Draft Environmental Impact Statement (DEIS)

Dear MN Department of Commerce:

I find the Enbridge Line 3 Draft Environmental Impact Statement to be unacceptable for the following reasons.

1. During pipeline construction and maintenance, Enbridge plans to store and apply petroleum products and hazardous chemicals 100 feet from surface waters. 1091-1
This is an unacceptable risk to MN waters. For comparison, the Boundary Waters Canoe Area Wilderness rule for protecting water is to keep dish soap 150 feet from shore.

2. Horizontal Directional Drilling (HDD) will be used to cross under our most pristine, most sensitive waters, and anywhere there is flowing water, which describes most of the route. The potential exists for contamination through release of drilling fluid to the ground and/or water, termed a “frac-out." The DEIS cites a 35 mile section of Enbridge pipeline in Michigan where there were 11 HDD crossings, multiple minor releases and 2 major frac-outs. MN will not accept the risk of a frac-out every 5.5 river crossings.

3. "The annual probability of a spill incident for the Applicant’s preferred route was estimated as 0.249 incidents per year with a recurrence interval of 4.0 years."
Every year there would be a 25% risk of an oil spill, which means a risk of one spill every four years. We should not accept this high risk probability.

4. Regarding river oil spills, the DEIS uses a 10 mile Region of Interest (ROI), when we know that an oil spill can pollute more than 35 miles downstream (Enbridge's oil spill in the Kalamazoo was 35 miles). The ROI in the EIS should include at least 35 miles of impact. 1091-2

5. Risk from Line 3 is in conflict with our Minnesota Statutes:

MN Statute 103F.305 Scenic River Protection Policy
https://www.revisor.mn.gov/statutes/?id=103F.305

MN Statute 116D.02 Declaration of State Environmental Policy
https://www.revisor.mn.gov/statutes/?id=116d.02

Please take these concerns into your consideration.

Sincerely, Julie Wissinger

951 Nason Hill Rd N

Marine on St Croix, MN 55047

651-433-4324

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Josh Yank

Street Address: 5023 30th Ave S.

City: MPLS State: MN Zip Code: 55417

Phone or Email: josh.yank@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

1.) 30 yr. estimates for the costs of the project (eg. the SCC) seem rather arbitrary considering that the existing line 3, which has been known to be defective, has been in place/operation for 60 yrs. It seems like a minimum of 60 yrs should be used for estimates.

2.) Concerns over damaging the existing lines surrounding line 3, should the line be completely removed, ~~are~~ ~~not~~ could be valid. It does not seem that the EIS considers damage to the surrounding lines caused by the displacement of earth as the result of a corroding line, should it remain in place. 0788-1

3.) Draft EIS does not offer an estimate of the impact of removal of line 3, in its entirety, + no replacement option (should MN decide that tar sands oil will not pass through MN). What is the cost/benefit of this removal/no replacement option?

4.) The life span of the new line is not estimated in the Draft EIS. 0788-2

5.) There is no hypothetical removal plan for the proposed line, when that line becomes obsolete. What are the costs associated with this inevitable project? (monetary + environmental) 0788-3

If including additional pages please number them and tell us how many you are providing:_____ pages

6.) It seems like the proposed project could create jobs, despite projections

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Catherine Zimmer - Women Observing Wildlife MN

Street Address: 1790 Hague Ave

City: St. Paul MN 55104 State: Zip Code:

Phone or Email: ~~tt~~ wow.mn@usfamily.net

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

★ 1. The social cost of carbon has been under-estimated. The estimated cost of almost $300B over ~~the lifetime of the~~ a 30-year pipeline must be adjusted to reflect the expected life of the pipeline which is closer to 60 years. Line 3 is 50 years old.

2. The alternative of shutting down the pipeline has not been considered. MN has strong renewable energy goals + a climate mitigation plan. We don't need the oil from the Canadian tar sands, but our environment, water + public health are all being put at risk with the proposed replacement.
Additionally, oil prices are at a nadir + will likely continue to decline due to reduced consumption. The line proposed is not / will not be needed by citizens of the world. This ~~proposed~~ line will only serves to impoverish our quality of life

3. Page 18 of Ch. 10 claims increased pressure in the pipe due to higher flow rates will have no effect on spill rates. Anyone who has ever used a garden hose knows that increasing pressure certainly increases the velocity with which the water leaves the hose. Increased velocity and pressure in a pipe ~~can~~ will very likely contribute to corrosion + increased risk of spills. The claim in the DEIS is disputable at best and patently false at worst.

★ 4. "Worst case scenario" spill data is not included by the company responsible for the largest inland oil spill in US history

If including additional pages please number them and tell us how many you are providing: 2 *pages*

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Catherine Zimmer

Street Address:

City: State: Zip Code:

Phone or Email:

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

0792-1

5. Chapter 10 neglects to consider Pollinators at risk. The Rusty Patch Bumble Bee, endemic to MN is the first Bee to be placed on the Endangered Species list. MN has significant number of pollinator species who are already at risk due to climate change, loss of habitat & pesticides. These animals are foremost in the minds of many citizens and require a thorough scientific analysis.

Thank you for consideration of these comments.

If including additional pages please number them and tell us how many you are providing: 2 *pages*

Appendix T-2

Responses to Comments

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Response to Comments - Federal

Response#	Commenter	Response
2421-1 2421-2	National Park Service	Thank you for your comments on the Draft EIS. The use of the North Country National Scenic Trail (NST) would be temporarily restricted during active construction. Depending on the weather and other environmental conditions, construction may last several days to several weeks. The most common types of impacts to the North Country NST would likely be limited access, noise, and visual disturbances. Because the pipeline will be co-located with existing pipelines in the area, operational impacts will be negligible due to the existing right-of-way. It was assumed in development of the FEIS that crossing through public lands would prompt authorizing agencies to ensure that the Applicant's preferred route or a CN Alternative complies with the designated uses of the land; therefore, the various agencies would require mitigation, and the Applicant would need to coordinate with the authorizing agency, which in this case would be the National Park Service.
2421-3 2421-4	National Park Service	It was assumed in development of the FEIS that crossing through public lands would prompt authorizing agencies to ensure that the Applicant's preferred route complies with the designated uses of the land; therefore, the various agencies would require mitigation, and the Applicant would need to coordinate with the authorizing agency.
2421-5	National Park Service	Mitigation measures were added to Section 6.3.6.4.2, where appropriate.
2280-1, 2280-2, 2280-3	U.S. Army Corps of Engineers	Thank you for your comments on the Draft EIS. The text has been modified as requested in the Executive Summary, Chapter 3, and elsewhere in the FEIS. Additional clarification regarding jurisdiction for such permits has been provided in Chapter 3.
2280-4	U.S. Army Corps of Engineers	The revisions suggested as part of this comment have been incorporated into the text.
2280-5	U.S. Army Corps of Engineers	The text regarding this sentence has been revised.
2280-6	U.S. Army Corps of Engineers	Your comment was considered in development of the FEIS. The FEIS assumes that the Applicant will obtain and comply with all necessary permits and approvals that would be required for the construction and operation of the pipeline if a Certificate of Need and route permit are approved by the Commission.
2280-7	U.S. Army Corps of Engineers	This comment has been addressed by noting the United States Environmental Protection Agency's (USEPA's) role in 401 Certification on tribal lands.

Response to Comments - Federal

Response#	Commenter	Response
2280-8	U.S. Army Corps of Engineers	The text has been modified per the comment.
2280-9	U.S. Army Corps of Engineers	Your comment was considered in development of the FEIS. Compensatory mitigation information is provided in Sections 5.2.1 and 6.3.1. The text was revised in Section 5.2.1 to show that the types of wetlands listed are examples of those that may require mitigation. No changes were made to the mitigation section, as compensatory mitigation was noted generally.
2280-10	U.S. Army Corps of Engineers	Your comment was considered in development of the FEIS; information regarding acreages/classification was checked to the extent possible.
2280-11	U.S. Army Corps of Engineers	Thank you for the information provided as part of this comment. No changes were made to the text within this section of the FEIS.
2280-12	U.S. Army Corps of Engineers	The text has been modified per the comment.
2280-13	U.S. Army Corps of Engineers	At this time, we are unable to reconduct the analysis for NWI wetland crossings. A wetland delineation of the Project would have to be completed; this survey would provide actual wetland impact acreages.
2280-14	U.S. Army Corps of Engineers	The text has been modified per the comment.
2280-15	U.S. Army Corps of Engineers	Comment noted. At this time we are unable to reconduct the analysis for NWI wetland crossings. A wetland delineation of the Project would have to be completed; this survey would provide actual wetland impact acreages.
2280-16	U.S. Army Corps of Engineers	Comment noted. At this time we are unable to reconduct the analysis for NWI wetland crossings. A wetland delineation of the Project would have to be completed; this survey would provide actual wetland impact acreages.
2280-17	U.S. Army Corps of Engineers	The EIS was formatted as best possible to be easily readable. Subject matter reflects information on existing conditions and impacts for all of the alternatives, so the reader can compare routes in a systematic manner.
2280-18	U.S. Army Corps of Engineers	The text has been modified per the comment.

Response to Comments - Federal

Response#	Commenter	Response
2280-19	U.S. Army Corps of Engineers	As noted in the comment, the USACE will be directly involved in EIS review and permitting of the Project, should it go forward.
2280-20	U.S. Army Corps of Engineers	A reference to birds protected under the Bald and Golden Eagle Protection Act (BGEPA) has been added to Section 6.3.5.1. Bird species protected under the BGEPA and the Migratory Bird Treaty Act are generally discussed in Sections 5.2.4 and 6.3.4.
2280-21	U.S. Army Corps of Engineers	Thank you for the information noting the review of the Army Corps of Engineers.
2280-22	U.S. Army Corps of Engineers	Text has been added to note that the status is not initiated.
2280-23	U.S. Army Corps of Engineers	Recommended language has been added to Table 6.8-1.
2280-24	U.S. Army Corps of Engineers	Recommended language has been added to Table 6.8-1.
2279-1	U.S. Environmental Protection Agency	Thank you for your comments on the Draft EIS. Periodic checks for updates have been made to ensure that information, if applicable, is included.
2279-2	U.S. Environmental Protection Agency	Table 3.6-1 has been updated to include the Clean Water Act (CWA) 402 National Pollutant Discharge Elimination System (NPDES) permit.
2279-3	U.S. Environmental Protection Agency	Tribal specific resource policies have been acknowledged throughout the EIS and noted in Chapter 9. A reference to this chapter was added to Section 6.3.1.
2279-4	U.S. Environmental Protection Agency	A detailed analysis of all impacts to all of the various and site-specific natural resources was not possible under the FEIS process.
2279-5	U.S. Environmental Protection Agency	Information on tribal oversight for water quality issues has been added to the FEIS per the comment.
2279-6	U.S. Environmental Protection Agency	The text has been modified per the regulatory comment.
2279-7	U.S. Environmental Protection Agency	A detailed analysis of all impacts to all of the various and site-specific natural resources was not possible under the FEIS process.

Response to Comments - Federal

Response#	Commenter	Response
2279-8	U.S. Environmental Protection Agency	Wetland mitigation banks are discussed in Sections 5.2.1 and 6.3.1. A discussion of public lands is provided in 6.3.6; this provides information on the federal, state, and local lands crossed by the Applicant's preferred route and route alternatives.

Responses to Comments – State and Local

Response#	Commenter	Response
2600-1	Alberta, Government of - Minister of Energy	Thank you for your comments on the Draft EIS. The statement noted as part of the comment refers to the proposed project, not the existing Line 3. The environmental document does include mention of the integrity digs and maintenance program of the existing Line 3; however, the evaluations of impacts are on the proposed project (and the Applicant's preferred route).
2600-2	Alberta, Government of - Minister of Energy	The methodology used to evaluate greenhouse gas (GHG) emissions is provided in Section 5.2.7.1.2. GHG emissions were evaluated using pump station electricity consumption data supplied from the Applicant and GHG emissions factors from the United States Environmental Protection Agency's (EPA's) eGRID (Emissions and Generation Resource Integrated Database). While the methodology does not replicate that conducted by the Department of State for the Line 67 environmental document, it does consider typical industry practices.
2600-3	Alberta, Government of - Minister of Energy	While it is accurate that GHG intensities of heavy Western Canadian Sedimentary Basin (WCSB) crude oil fall on a continuum, the EIS presents a conservative estimate of lifecycle gas emissions based on a higher value of CO2e/bbl of crude oil. The conservatism of the estimate is indicated in Section 5.2.7 of the EIS.
2600-4	Alberta, Government of - Minister of Energy	The displacement scenarios in this table are not meant to be exhaustive, but rather to bookend possible outcomes considering only the changes associated with WCSB, in part due to the location of the pipeline. The introduction of additional scenarios is not necessary to convey the relevant range of GHG emissions and does not materially contribute to a reasoned choice between alternatives. No changes were made to Table 5.2.7-11.
2600-5	Alberta, Government of - Minister of Energy	As noted above, the EIS presents a conservative estimate of lifecycle gas emissions based on a higher value of CO2e/bbl of crude oil. The conservatism of the estimate is indicated in Section 5.2.7 of the EIS.
2367-1	Becker-Finn, Jamie - Minnesota House of Representatives	Thank you for your comments on the Draft EIS. Chapter 9 provides a discussion of the various types of land holdings for individual tribal members and tribes. Figures 9-1, 9-2, 9-4, and 9-5 show the presence of ceded land. Treaty rights for hunting, fishing, and gathering were considered when evaluating the potential for impacts to occur as a result of the Applicant's proposed project/preferred route, along with the alternatives.

Responses to Comments – State and Local

Response#	Commenter	Response
2367-2	Becker-Finn, Jamie - Minnesota House of Representatives	The discussion of the spill analysis is provided in Chapter 10. Within this chapter, a discussion of the acreage of reservation land that is crossed by the alternatives is provided. Spills are also referenced in Chapter 9. In this chapter, text was added to show that if a spill were to occur to reservation land, the impact could be major, as the tribes are tied to this land and are not able to replace resources permanently damaged or to move away from the reservation.
2367-3	Becker-Finn, Jamie - Minnesota House of Representatives	Please refer to Chapter 6, Section 6.5.1 of the FEIS for details on potential impacts to wild rice due to the proposed project. Details include acreage of wild rice impacted per project component, as well as approximate annual commodity economic loss during construction and operation.
2367-4	Becker-Finn, Jamie - Minnesota House of Representatives	The EIS has been revised to refer to the Applicant's proposed project as the Line 3 Project. Where applicable, the word "replacement" has been deleted.
2367-5	Becker-Finn, Jamie - Minnesota House of Representatives	Federal treaty experts were not consulted with regard to the EIS. Potential impacts to affected natural resources are discussed in Chapters 5 and 6, and how American Indian tribes experience and interact with these resources is summarized in Chapters 9 and 11. This constitutes the analysis of treaty rights within this EIS. Discussions regarding the potential for oil spills is provided in Chapter 10. Information on the potential for spills within reservation boundaries is supplied. Chapter 9 provides information regarding the American Indian perspective on the proposed project. It includes direct quotations from elders and tribal leaders consulted as part of the development of the EIS. In this manner, the EIS provides a discussion of how Ojibwe peoples and their culture would be impacted. A discussion of economic impacts is provided in Section 5.3 and 6.5. Please note, the discussion on wild rice is based on limited publicly available information and thereby may only capture some of the actual economic impacts.
2278-1	Eden Prairie, City of	Thank you for your comments on the Draft EIS. Pipeline corrosion is generally discussed within Chapter 8.

Responses to Comments – State and Local

Response#	Commenter	Response
2278-2	Eden Prairie, City of	Appendix E provides the Environmental Protection Plan from the Applicant. This provides information on their procedures in case of a spill. The EIS does not provide information on the financial responsibilities associated with a spill if the Applicant is no longer able to provide this service (e.g., due to closure of business). The scoping decision document (available here: https://mn.gov/commerce/energyfacilities/documents/34079/FSDD_L3R_FN_160112.pdf) provides the topics that were planned for inclusion within the EIS.
2278-3	Eden Prairie, City of	Water quality information on lakes potentially affected by the proposed Project has been accounted for in the FEIS. Impacts to water quality and natural resources will be the same as all other impact sources that could potentially lessen lake attributes.
1235-1	Grand Rapids, City of	Thank you for your comments on the Draft EIS. As discussed in Chapter 8 and detailed in Appendix B, the proposed purging and cleaning regimen has been tested and must comply with PHMSA requirements. Design, testing and review of the methods addresses the ability of the line to “handle” the cleaning and purging regimen. If contaminated soils or groundwater are encountered, they would be handled and disposed of in accordance with applicable regulations; the Environmental Protection Plan; and a Contaminated Soils Management Plan, which the Applicant will develop prior to construction in coordination with the MPCA.
1235-2	Grand Rapids, City of	Additional information regarding wellhead protection areas has been provided in Section 5.2.1 and 6.3.1 of the FEIS.
2372-1	Hansen, Rick - Minnesota House of Representatives	Thank you for your comments on the Draft EIS. Section 4.1 of Appendix B in the FEIS provides information on the Applicant's plans to minimize the risk of soil and water contamination. The section includes a discussion of mitigation and cleaning protocols. As shown, information can be extrapolated to calculate the potential for remaining hydrocarbons.
2372-2	Hansen, Rick - Minnesota House of Representatives	Information on the abandonment and removal of the existing Line 3 is provided in Chapter 8. The use of fill and concerns regarding subsidence are discussed within this chapter.
2372-3	Hansen, Rick - Minnesota House of Representatives	Thank you for the information provided as part of this comment. Enbridge will be required to provide monitoring for public safety to the degree that local, state, and federal laws dictate. Additional monitoring can be raised as a potential permit condition for consideration during the contested case hearing process.

Responses to Comments – State and Local

Response#	Commenter	Response
2372-4	Hansen, Rick - Minnesota House of Representatives	Section 8.3.1.4 of the FEIS discusses the potential issues concerning the loss of buoyancy. Buoyancy also is discussed in Appendix B of the FEIS.
2372-5	Hansen, Rick - Minnesota House of Representatives	As noted in this comment, no previous pipeline removals are cited within Appendix B to show that roads, bridges, and crossings may be damaged. However, as shown in Chapter 8, impacts to human settlement would be similar to that discussed for RA-07.
2372-6	Hansen, Rick - Minnesota House of Representatives	Additional information has been included in Chapter 8 to add detail where data is available. The introduction also was revised to show that the discussion of abandonment and removal would be applicable to the new pipeline (if approved) at the end of its service life.
2372-7	Hansen, Rick - Minnesota House of Representatives	Section 8.3.1.1 of the FEIS discusses Enbridge's current and ongoing liability and responsibility under the Minnesota Statutes 115E.
2867-1	Hornstein, Frank - Minnesota House of Representatives	Thank you for your comments on the Draft EIS. The physiochemical characteristics of crude oil, including benzene, are discussed in Section 10.2.1.1 . Benzene also is discussed as part of the discussions of historic spills.
2867-2	Hornstein, Frank - Minnesota House of Representatives	Potential impacts to Drinking Water Supply Management Areas (DWSMAs) and vulnerability, wellhead protection areas, hydrogeologic sensitivity, domestic wells and sensitivity, and public wells are evaluated in the EIS. When the volume of releases is compared to the volume of crude oil transported, rail and truck transport release a significantly higher percentage of the volume transported, 0.309% and 0.154%, respectively. Comparatively, pipeline transport release an average of 0.006% of the volume of crude oil transported.
2867-3	Hornstein, Frank - Minnesota House of Representatives	As part of the evaluation of accidental releases, seven sites were modeled; they represent a broad range of stream/waterbody characteristics, such that the results of the modeling help illustrate potential impacts in different types of waters.
2867-4	Hornstein, Frank - Minnesota House of Representatives	Additional information related to abandonment and associated impacts have been added to Section 8.3 of the FEIS.
2867-5	Hornstein, Frank - Minnesota House of Representatives	Chapter 9 of the FEIS has been revised to include additional information regarding impacts on tribal resources. This includes incorporating additional information received from individual tribal members.

Responses to Comments – State and Local

Response#	Commenter	Response
2867-6	Hornstein, Frank - Minnesota House of Representatives	Revisions to the FEIS text have been made to note the State's commitment to upholding the Paris Accord and to reducing fossil fuel consumption. If the pipeline is permitted, consideration would need to be made to offset the emissions associated with the pipeline.
2867-7	Hornstein, Frank - Minnesota House of Representatives	The range of alternatives evaluated as part of the EIS is consistent with the scope. The No Action alternative assumes the continued use of Line 3, if the Commission denies the CN. Section 1.4 explains the Department's rationale for the treatment of overarching policy issues. The Minnesota Environmental Policy Act (MEPA) requires that decision makers be informed of the environmental impacts for permitting decisions before they issue a permit. As indicated in MN Rules 4410.0300, environmental documents are to be used as guides in issuing, amending, and denying permits and carrying out other responsibilities of governmental units to avoid or minimize adverse environmental effects and to restore and enhance environmental quality. Consistent with this purpose, the evaluation of impacts in the EIS attempts to inform the Commission about the impacts of the decisions before them. The EIS does not provide a global assessment of these overarching policy issues; however, where the policy issues specifically relate to the CN or routes, the EIS provides a project-level assessment.
1405-1	Lueck, Dale - Minnesota House of Representatives	Thank you for your comments on the Draft EIS. Chapter 5.3.3 includes a discussion of potential concerns with regard to safety associated with rail transport. For instance, annual crossing incidents are provided in Table 5.3.3-8. Section 10.1.2.2 provides additional information on the potential for rail incidents, including derailment, collisions, and other miscellaneous incidents.
1405-2	Lueck, Dale - Minnesota House of Representatives	SA-04 is a system alternative evaluated to aid the Commission's evaluation of whether or not to grant a CN for the proposed project. A system alternative is not a routing alternative, as no entity has proposed to build such a pipeline, detailed routing and design have not been conducted, and a route permit could not be issued for SA-04. Instead, a system alternative serves as a broader level point of comparison to the Applicant's Proposed project and the other CN alternatives. The level of analysis of SA-04 is in line with this concept.
1405-3	Lueck, Dale - Minnesota House of Representatives	Please refer to Table 5.3.4-2 for information regarding government revenue.
1405-4	Lueck, Dale - Minnesota House of Representatives	Section 8.4 of the FEIS provides a discussion of the removal of the pipeline. Consideration for the distances between existing pipelines was considered.

Responses to Comments – State and Local

Response#	Commenter	Response
1405-5	Lueck, Dale - Minnesota House of Representatives	Information is provided in Chapter 10 of the FEIS regarding spills. Section 10.1.2 discusses the potential causes of unanticipated releases. Section 10.3.1.2 then provides a discussion of the spill history within MN. Table 10.3.1-5 notes the potential causes of these spills.
1405-6	Lueck, Dale - Minnesota House of Representatives	The FEIS acknowledges that the creation of forest edge habitat as part of construction will benefit some species that favor such habitat.
1404-1	Marty, John - State of Minnesota Senate	Thank you for your comments on the Draft EIS. A discussion of pipeline removal is discussed in Section 8.4 of the FEIS.
1404-2	Marty, John - State of Minnesota Senate	Section 8.1 of the FEIS discusses the eventual need to replace the proposed pipeline.
1404-3	Marty, John - State of Minnesota Senate	Additions have been made to Chapter 11 to provide more information on how adverse impacts to environmental justice communities are addressed. As shown, this finding does not preclude approval of the project or selection of a route alternative; however, it does require detailed efforts to avoid, mitigate, minimize, rectify, reduce, and/or eliminate the impacts.
1404-4	Marty, John - State of Minnesota Senate	For purposes of comparison across alternatives, a consistent time window of 30 years was chosen to match the economic life of the project indicated by the Applicant and to understand typical annual operating impacts/tradeoffs of the alternatives. A brief discussion regarding GHG related statues in Minnesota has been added to Section 5.2.7.2.
1404-5	Marty, John - State of Minnesota Senate	The Project's contribution to direct and indirect GHG emissions and for CN alternatives and route alternatives are provided in Section 5.2.7 and Section 6.3.7, respectively. The cumulative potential effects of climate change and trends in Minnesota and the Midwest are discussed in Section 12.
1404-6	Marty, John - State of Minnesota Senate	The denial of a CN for a new oil pipeline will not necessarily result in operational changes to existing infrastructure, such as shutdown and/or removal of existing Line 3. Therefore, the No Action alternative assumes the continued use of Line 3, if the Commission denies the CN. If the proposed Line 3 project is not approved by the Commission, the continued operation of the existing Line 3 will be regulated by the Federal government, not the State of Minnesota. Accordingly, shutting down and removing existing pipelines in the mainline corridor is not included in the No Action Alternative.
1404-7	Marty, John - State of Minnesota Senate	As noted in the comment, the "No Action" alternative assumes the continued use of Line 3. The continued operation of the pipeline will be the responsibility of the Applicant (Enbridge). Enbridge will be required to adhere to standards and conditions of its operations, including those noted in the consent decree (i.e., if a new pipeline is not constructed).

Responses to Comments – State and Local

Response#	Commenter	Response
1055-1	Minnesota Department of Health	Thank you for your comments on the Draft EIS. The FEIS considered DWSMAs potentially affected by all of the alternatives in Chapter 5 and Chapter 6. Wellhead protection areas are also evaluated in Chapter 5 as this allowed an assessment of potential impacts across other states where the DWSMA designation is not used. Wellhead protection areas are evaluated in Chapter 6 in order to provide an additional layer of information consistent with recommendations from Department of Health and MPCA.
1055-2; 1055-3	Minnesota Department of Health	The recommended monitoring and communication can be raised as a potential permit condition for consideration during the contested case hearing process.
1055-4	Minnesota Department of Health	Figures ES-1 and ES-3 have been updated.
1055-5	Minnesota Department of Health	Figure 2.3-1 has been updated.
1055-6	Minnesota Department of Health	The recommended siting considerations can be raised as a potential permit condition for consideration during the contested case hearing process.
1055-7	Minnesota Department of Health	Figures 2.4-3 through 2.4-6 have been updated.
1055-8	Minnesota Department of Health	Pipeline construction schedules will be public knowledge. Potential effects to public or private wells would be coordinated during final design and construction planning. Currently, there is no definitive plan on where the Applicant will obtain water for hydrostatic testing. Thank you for the constructive comment on water conservation during testing procedures.
1055-9	Minnesota Department of Health	The text has been revised as suggested.

Responses to Comments – State and Local

Response#	Commenter	Response
1055-10	Minnesota Department of Health	Chapter 4 provides information on the alternatives evaluated as part of the EIS. Details on each of the alternatives are included in this section. The system alternative (SA-04) is a conceptual route, whereas the route alternatives (RA-03AM, RA-06, RA-07, and RA-08) present potential routes for consideration for a specific project.
1055-11	Minnesota Department of Health	Karst is discussed in Section 5.2.1.1.2 under the SA-04 heading.
1055-12	Minnesota Department of Health	Information was added to Section 5.2.1 to indicate that well data is not comprehensive and that some wells may be missed.
1055-13	Minnesota Department of Health	No change was made to the EIS. The information was retained to demonstrate that sole source aquifers were evaluated.
1055-14	Minnesota Department of Health	The information provided has been reviewed; however, no changes were made to the EIS to note the setback distance as noted in the comment.
1055-15	Minnesota Department of Health	The analysis of DWSMA data relied on database information available at the time the Draft EIS was prepared.
1055-16	Minnesota Department of Health	The text has been modified to reflect Minnesota Department of Health's (MDH's) drinking water responsibilities.
1055-17	Minnesota Department of Health	Big Lake has been removed from the table.
1055-18	Minnesota Department of Health	Thank you for the information provided on the potential for underestimating domestic wells. A discussion of this was added to Section 5.2.1.
1055-19	Minnesota Department of Health	Thank you for the information provided on mineral rights. Impacts to mineral resources in the Iron Range region are discussed in Chapter 6.5.1.

Responses to Comments – State and Local

Response#	Commenter	Response
1055-20	Minnesota Department of Health	The paragraph referenced in this comment has been moved.
1055-21	Minnesota Department of Health	The FEIS assumes that the Applicant would abide by all federal, tribal, state, and local regulations associated with permits. The use of trench breakers is discussed in Appendix E – the Applicant's Environmental Protection Plan.
1055-22	Minnesota Department of Health	The information provided as part of this comment was reviewed in evaluating potential impacts associated with blasting. No changes to the EIS have been made.
1055-23	Minnesota Department of Health	The information provided as part of this comment was reviewed. No changes to Table 6.8-1 regarding drinking water have been made.
1055-24	Minnesota Department of Health	An assessment of public water supply wells located within 1250 feet of the centerline of each RSA is included in Chapter 7 of the FEIS.
1055-25	Minnesota Department of Health	Chapter 5 of the FEIS discusses the applicant's intention to store materials and hazardous substances outside of drinking water source areas and water resource locations.
1055-26	Minnesota Department of Health	Section 8.3 of the FEIS discusses potential further evaluation of segmentation locations.
1055-27	Minnesota Department of Health	There are no notable changes anticipated on the existing (recently upgraded) infrastructure in Wisconsin or elsewhere in conjunction with the Applicant's proposal. Therefore, new impacts associated with the Applicant's proposal are limited to the length of the proposed Line 3 route and do not extend through Wisconsin to an end destination in Illinois. The EIS compares the new impacts associated with the Applicant's proposal (extending from Neche to Superior) to the new impacts associated with the significantly longer SA-04 (extending from Neche to Joliet).
1055-28	Minnesota Department of Health	The high consequence area drinking water sources figure (10.4-3) was updated.

Responses to Comments – State and Local

Response#	Commenter	Response
1055-29	Minnesota Department of Health	Where applicable, changes have been made to Chapter 10.
1055-30	Minnesota Department of Health	The FEIS has been updated to reflect the source of the DWSMA definition.
1055-31	Minnesota Department of Health	Thank you for your comments regarding the sensitivity of well locations. The maps are shown at a scale that keeps exact locations from being determined.
1055-32	Minnesota Department of Health	This comment notes that the residences identified in the map 26A of this map series for RA-06 are greater than ½ mile from the route of RA-06. This should be noted when evaluating this map, as the legend incorrectly identifies these as being within ½ mile.
1055-33	Minnesota Department of Health	Both DWSMAs and WHPAs are relevant data sets to consider when evaluating potential sensitive resources located in proximity to the proposed project or alternatives. The preference of MDH to focus on DWSMAs is noted.
2368-1	Minnesota State Historic Preservation Office	Thank you for your comments on the Draft EIS. Table 3.6-1 has been updated in the FEIS to show that the State Historic Preservation Office (SHPO) does not provide clearance. Information also was added to show the SHPO role in reviewing and consulting with State Agencies.
2368-2	Minnesota State Historic Preservation Office	Text within Section 3.6.3.4 of the FEIS has been revised to more clearly show the role of the SHPO in consulting with state agencies.
2368-3	Minnesota State Historic Preservation Office	The definition of cultural resources has been revised in Sections 5.4 and 6.4 of the FEIS to include historic districts, objects, and landscapes.
2368-4	Minnesota State Historic Preservation Office	The text in Section 5.4.1.1.2 of the FEIS has been revised to clarify the jurisdiction to lands or waters. The statement at the end of the Minnesota Private Cemeteries Act was removed.

Responses to Comments – State and Local

Response#	Commenter	Response
2368-5	Minnesota State Historic Preservation Office	The text in Section 5.4.2.6 of the FEIS was revised to account for additional studies completed by the Applicant. These reports are now listed in Table 5.4.2-1. The text also was revised to more accurately show what is included within the Minnesota Historical Society (MHS) information from the database. Additions were made to the text to show that the analysis of the CN alternatives focuses on information obtained from these databases. Corresponding changes were made in Section 6.4, as well.
2368-6	Minnesota State Historic Preservation Office	Additional information regarding the Applicant's surveys has been added to Sections 5.4.2.6 and 6.4.2.1. NRHP-listed properties also have been noted for each of the alternatives (CN and Route) that are within the respective regions of interest (ROIs). Text also was added within Sections 5.4.2.2 and 6.4.2.2 to show that additional survey may be needed depending on the outcome of the Commission decisions regarding the Certificate of Need and a subsequent route permit.
2368-7	Minnesota State Historic Preservation Office	Text was added within Sections 5.4.2.2 and 6.4.2.2 to show that additional survey may be needed depending on the outcome of the PUC decisions regarding the Certificate of Need and a subsequent route permit. Additional efforts regarding cultural resources also would be needed by the Applicant (and federal/state agencies) in order to obtain permits associated with the construction of the project.

Responses to Comments - Tribal

Response#	Commenter	Response
2477-1	1854 Treaty Authority - Kaspar, Tyler	Thank you for your comment on the Draft EIS. Impacts to aquatic communities and resources are addressed in Chapters 5, 6, and 10.
2477-2	1854 Treaty Authority - Kaspar, Tyler	Wild rice lakes have been identified within 0.5 mile of alternative routes and impacts have been assessed based on right-of-way intersection with GIS-based wild rice locations. Impacts to wild rice are addressed in Chapters 5, 6, and 10.
2477-3	1854 Treaty Authority - Kaspar, Tyler	Information on tribal consultation is included in Chapter 9 of the Final EIS. Wild rice was among the many topics discussed; impacts to wild rice are addressed in Chapters 5, 6, and 10.
2477-4	1854 Treaty Authority - Kaspar, Tyler	Accidental crude oil releases are addressed in Chapter 10.
2477-5	1854 Treaty Authority - Kaspar, Tyler	Impacts from construction are evaluated in Chapters 5 and 6. Blasting and subsequent contamination have been noted for portions of the alternatives where there is a high likelihood for this occurrence.
2477-6	1854 Treaty Authority - Kaspar, Tyler	Under Minnesota statutes and rules, blasting and demolition requires permitting and analysis of potential impacts. Construction procedures are discussed in Chapter 2, and impacts of construction are addressed in Chapters 5 and 6. If a permit is issued, Enbridge will be required to meet the permit conditions of the Minnesota Pollution Control Agency (MPCA) Stormwater Pollution Prevention Plan (SWPPP), the United States Army Corps of Engineers, and Minnesota Department of Natural Resources (DNR) permits. These permits are identified in Chapter 3.
2477-7	1854 Treaty Authority - Kaspar, Tyler	The Final EIS assumes that the Applicant will obtain and comply with all necessary permits and approvals that would be required for the construction and operation, including any required mitigation for anticipated wetland impacts, of the pipeline if a Certificate of Need and route permit are approved by the Commission. A list of required permits and approvals for the Applicant's proposed Project is presented in Table 3.6-1.
2477-8	1854 Treaty Authority - Kaspar, Tyler	Section 5.2.3.3.1 of the EIS has been revised with updated summaries of potential impacts to vegetation resources, including forested communities and woody wetlands, from activities associated with construction and operations associated with the proposed Project.

Responses to Comments - Tribal

Response#	Commenter	Response
2477-9	1854 Treaty Authority - Kaspar, Tyler	Minnesota Department of Commerce is consulting with American Indian tribes. Information regarding tribal consultation is provided in Chapter 9 and Appendix P. A discussion of treaty rights and potential impacts to them are also discussed in Chapter 9.
2477-10	1854 Treaty Authority - Kaspar, Tyler	Chapter 9 has been revised to include information on the 1854 Treaty Authority and the management of off-reservation resources.
2477-11	1854 Treaty Authority - Kaspar, Tyler	Chapter 9 has been revised to include more information on potential impacts to tribal resources. Chapter 11 also contains information on tribal resources.
2477-12	1854 Treaty Authority - Kaspar, Tyler	Chapter 9 and Appendix P provide information regarding tribal consultation. Cultural resources were among the topics discussed. Revisions to Sections 5.4 and 6.4 were made to account for additional information on the potential to impact cultural resources. If the Project were to move forward, additional consultation with American Indian tribes would be needed to account for other federal and state agency involvement.
2477-13	1854 Treaty Authority - Kaspar, Tyler	The comment correctly notes that according to the analysis completed in Chapter 11 of the Final EIS, potential environmental justice communities would be likely to experience disproportionately high and adverse impacts of the project, largely based on tribal use of the lands within the region of interest. Mitigation measures are proposed to minimize and mitigate potential impacts.
2477-14	1854 Treaty Authority - Kaspar, Tyler	Additional consideration for removal as an alternative has been included in Section 8.3 of the Final EIS.
2477-15	1854 Treaty Authority - Kaspar, Tyler	Additional information regarding removal as an option has been included in Section 8.4 of the Final EIS. Additional information regarding potential loss of buoyancy has been included in Section 8.3.
2477-16	1854 Treaty Authority - Kaspar, Tyler	The Applicant will need to abide by all state and federal regulations regarding waterbody crossing construction techniques. See Chapter 3 for a discussion of additional permits required.

Responses to Comments - Tribal

Response#	Commenter	Response
2477-17	1854 Treaty Authority - Kaspar, Tyler	As explained in Sections 12.1 and 12.2 of the Final EIS, past and present actions are now considered part of the "existing environment" for the purpose of the EIS and thus analyzed in detail in Final EIS Chapters 5 and 6. Where possible, the analyses included within Chapter 12 of the Final EIS include cumulative quantitative impacts, such as acres of wetland anticipated to be impacted within the environmentally relevant area of an alternative and reasonably foreseeable action. However, reporting quantitative impacts was not possible for all resource impacts, and in those cases, a qualitative analysis is included.
2477-18	1854 Treaty Authority - Kaspar, Tyler	Where possible, the analyses included within Chapter 12 of the Final EIS include quantitative impacts, such as acres of wetland anticipated to be impacted. However, reporting quantitative impacts was not possible for all resource impacts, and in those cases, a qualitative analysis is included.
2477-19	1854 Treaty Authority - Kaspar, Tyler	A discussion of cumulative impacts is provided in Chapter 9 for tribal resources. Additional text has been included to discuss abandonment and also the potential for opening a new corridor.
2478-1	1855 Treaty Authority - Bibeau, Frank	Appendix P of the Final EIS has been reviewed and re-compiled to include additional information received from American Indian tribes. A revised table of contents is included to assist readers in finding information. As the file noted in the comment was received as an attachment, only the main letter is identified in the table of contents.
2478-2	1855 Treaty Authority - Bibeau, Frank	Chapter 9 has been revised to re-organize the section on the types of lands that may be held by individual tribal members or tribes as a whole. Additional information also is included on the various treaties for the Dakota. Where appropriate, text also was added to further describe hunting, fishing, and gathering rights.
2478-3	1855 Treaty Authority - Bibeau, Frank	This comment has been noted. The analysis in Chapter 11 is completed within the context of the existing regulatory framework and does acknowledge that the regulatory framework is not recognized by the American Indian community.
2478-4	1855 Treaty Authority - Bibeau, Frank	This comment raises a number of issues that may or may not fall within the confines of the EIS and, specifically, Chapter 12 of the Final EIS "Cumulative Potential Effects." It is unclear which specific issues the commenter wishes to address. Regarding the methodology utilized in Chapter 12, Sections 12.1 and 12.2 explain the reasoning for why past and present actions are not included within Chapter 12: these actions are now considered part of the "existing environment" for the purpose of the EIS and thus analyzed in detail in Final EIS Chapters 5 and 6.

Responses to Comments - Tribal

Response#	Commenter	Response
2617-1	Fond du Lac Band	Thank you for your comments on the Draft EIS. Section 1.4 of the Final EIS explains the Department's rationale for the treatment of overarching policy issues. The Minnesota Environmental Policy Act (MEPA) requires that decision makers be informed of the environmental impacts of permitting decisions before they issue a permit. As indicated in MN Rules 4410.0300, environmental documents are to be used as guides in issuing, amending, and denying permits and carrying out other responsibilities of governmental units to avoid or minimize adverse environmental effects and to restore and enhance environmental quality. Consistent with this purpose, the evaluation of impacts in the EIS attempts to inform the Commission about the impacts of the decisions before them. The EIS does not provide a global assessment of these overarching policy issues; however, where the policy issues specifically relate to the CN or route alternatives, the EIS provides a project-level assessment.
2617-2	Fond du Lac Band	General discussion of swamp weights is provided in Chapter 8 of the Final EIS.
2617-3	Fond du Lac Band	If a route permit is issued, Enbridge will be required to submit cathodic protection locations prior to construction.
2617-4	Fond du Lac Band	A discussion of cathodic protection is provided in Chapter 8.
2617-5	Fond du Lac Band	Consideration for the information provided within the comment has been considered when revising the EIS. Burning of woody material is presented as an option only after an appropriate permit is obtained from Minnesota DNR; it is not included with the calculations. Greenhouse gas (GHG) and other emissions from open burning of wood debris are estimated in Section 5.2.7 of the FEIS. Climate change is discussed as part of the air quality sections, as well as in Chapter 9 and Chapter 12.
2617-6	Fond du Lac Band	The stated erosion control measures are appropriate for such activities.
2617-7	Fond du Lac Band	Upland topsoil salvage is also discussed in the Project Environmental Protection Plan (Appendix E in the DEIS), Section 1.10. The cited statements reflect the difficulty of salvaging topsoil in cleared forested and shrub vegetation communities, due to woody roots within the topsoil column. Sections 5.2.33 and 6.3.3 in the EIS discuss the long-term impacts of this action, and others, to forested and shrub-dominated vegetation communities from construction and operation activities associated with the Proposed Project and alternative routes.

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Response#	Commenter	Response
2617-8	Fond du Lac Band	All federal and state regulations relevant to construction and operation of the facility will be required. Additional requirements may be included as permit conditions.
2617-9	Fond du Lac Band	The use of trench breakers is discussed in Appendix E – Section 1.13. According to Enbridge's Environmental Protection Plan, trench breakers will be constructed with bags filled with rock-free subsoil or sand, and the use of foam trench breakers will be approved by Enbridge in advance and installed in accordance with applicable project permits, local/state/federal regulations, and manufacturer's recommendations.
2617-10	Fond du Lac Band	The cited text has been revised to clarify the sequence and specifics of soil compaction within the trenches; decompacting soil in other disturbed areas; and application of salvaged topsoil. These changes are consistent with details in the Project Environmental Protection Plan (EPP) (Appendix E to the Draft EIS), Section 1.16 - Cleanup and Rough/Final Grading and Section 1.18 - Soil Compaction Treatment.
2617-11	Fond du Lac Band	Appendix E – Section 8.0 describes the use of frozen backfill according to Enbridge's Environmental Protection Plan. All federal and state regulations relevant to construction and operation of the facility will be required. Additional requirements may be included as permit conditions.
2617-12	Fond du Lac Band	Appendix E provides information on the Applicant's Environmental Protection Plan. As part of this, construction methods for stream and water crossings and wetlands are provided. The Final EIS assumes that the Applicant will obtain and comply with all necessary permits and approvals that would be required for the construction and operation of the pipeline, including the use of particular construction methods, if a Certificate of Need and route permit are approved by the Commission.
2617-13	Fond du Lac Band	The use of temporary bridges is noted in Section 2.7.2 in the FEIS. Temporary bridges are noted in the Applicant's Environmental Protection Plan (Appendix E of this Final EIS). The FEIS assumes that the Applicant will obtain and comply with all necessary permits and approvals that would be required for the construction and operation of the pipeline, including the use of temporary bridges, if a Certificate of Need and route permit are approved by the Commission.
2617-14	Fond du Lac Band	Beaver dam removal is discussed in the Applicant's Environmental Protection Plan (Appendix E of this Final EIS - 2.2.1 Beaver Dam Removal and Prevention of Dam Rebuilding).
2617-15	Fond du Lac Band	The bullet point regarding horizontal directional drilling (HDD) has been revised. A reference also has been included for Sections 5.2.1 and 6.3.1, for which a discussion of "frac-outs."

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Response#	Commenter	Response
2617-16	Fond du Lac Band	The FEIS assumes that the Applicant will obtain and comply with all necessary permits and approvals that would be required for the construction and operation of the pipeline, if a Certificate of Need and route permit are approved by the Commission. Additional requirements may be included as permit conditions.
2617-17	Fond du Lac Band	Appendix E of this Final EIS provides the Applicant's Environmental Protection Plan. As part of this plan, the Applicant has outlined how Enbridge would restore and revegetate water crossings and would stabilize streambanks. Text was revised as part of Section 2.7.2.3.4 to show that is not referring to entry/exit points.
2617-18	Fond du Lac Band	The cited text describes temporary streambank stabilization to be installed immediately (within 24 hours of crossing completions). Plans for temporary revegetation is more completely described in Section 7.2 of the Project Environmental Protection Plan (EPP), Appendix E in the Final EIS. Appendix C in the EPP provides detailed seed mixes for temporary cover crops as well as for site-specific permanent revegetation seed mixes, which comprise native plant species appropriate to each particular habitat. The cited text has been modified to include slender wheatgrass, a native perennial grass, also specified in Appendix C to the EPP, for temporary revegetation. The text has been amended to include as a Best Management Practice, that annual rye be avoided as a temporary cover crop due to its potential allelopathic effects to permanent revegetation species.
2617-19	Fond du Lac Band	Text in Chapter 4 of the Final EIS has been revised to show that this RSA crosses the Fond du Lac Reservation. Table 7.3-14 shows the mileage of vulnerable water tables and MBS lakes crossed.
2617-20	Fond du Lac Band	Notes have been added in Final EIS to detail the land use ordinance and that RAs may pass through areas with those established land use and zoning regulations in Chapter 6.
2617-21	Fond du Lac Band	The mitigation measures were revised to include topsoil segregation in temporary workspace, forested areas in Chapter 6.
2617-22	Fond du Lac Band	The EIS has identified wetlands and other waterbodies using state and federal hydrography databases.
2617-23	Fond du Lac Band	The document has examined impacts to various types of wetlands, not just public water wetlands. The text has been modified to include these in the introduction of the section.
2617-24	Fond du Lac Band	The multitude of stressors for the many resources addressed is beyond the scope of the EIS.
2617-25	Fond du Lac Band	This information is valuable and appreciated. All federal and state regulations relevant to construction and operation of the facility will be required. Additional requirements may be included as permit conditions.

Responses to Comments - Tribal

Response#	Commenter	Response
2617-26	Fond du Lac Band	This information is valuable and appreciated. All federal and state regulations relevant to construction and operation of the facility will be required. Additional requirements may be included as permit conditions.
2617-27	Fond du Lac Band	This information is valuable and appreciated. All federal and state regulations relevant to construction and operation of the facility will be required. Wild rice lakes would be addressed specifically in permitting activities for sensitive resources.
2617-28	Fond du Lac Band	The Final EIS has been updated to address your comment in Chapters 5 and 6.
2617-29	Fond du Lac Band	Appendix E provides information on the Applicant's Environmental Protection Plan where in Best Management Practices during various construction activities are discussed. Additionally, the Applicant would file a Fugitive Dust Control Plan and provide further details regarding commitments to reduce pollutants from mobile and stationary construction equipment. The plan would specify the precautions that would be taken to minimize fugitive dust emissions from construction activities, mitigation measure including use of water or a palliative needs, describe inspection, reporting procedures to identify and abate visible dust plumes, and how the Applicant would ensure that the sub-contractors would carry out the requirements. The Applicant would also provide further details regarding commitments to reduce pollutants from mobile and stationary construction equipment including during restoration and routine maintenance activity and implementation of no-idling, or reduced idling, policy.
2617-30	Fond du Lac Band	Appendix E provides information on the Applicant's Environmental Protection Plan; this includes a discussion of best management practices during various construction activities.
2617-31	Fond du Lac Band	The range of alternatives, for which impacts are assessed and emissions for activities are estimated, is consistent with the scope of the proposed Project.
2617-32	Fond du Lac Band	Your comment has been considered in preparation of Final EIS. The particulate matter emissions are provided in Table 6.3.7-4.
2617-33	Fond du Lac Band	As noted in this comment, vehicle combustion emissions are included in Table 6.3.7-5. These typically are estimated based on fuel characteristics. Notes are provided in subsequent tables regarding these emissions for the route alternatives. Please note, a mitigation measure is included to limit construction equipment idling to the extent practical when not in use.

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Response#	Commenter	Response
2617-34	Fond du Lac Band	Your comment has been considered in preparation of the FEIS. No changes have been made to the EIS. The range of alternatives, for which impacts are assessed and emissions for activities are estimated, is consistent with the scope of the proposed Project.
2617-35	Fond du Lac Band	The EIS acknowledges a mitigation measure to follow equipment manufacturer-recommended operations and good combustion practices, including not tampering with engines to increase horsepower and using ultra-low sulfur diesel. This measure accounts for the appropriate use of equipment, exclusive of the age of the equipment.
2617-36	Fond du Lac Band	Additional information has been provided in Chapter 7 regarding the individual route segment alternatives.
2617-37	Fond du Lac Band	Text has been added to Chapter 4 to show that this RSA crosses the Fond du Lac Reservation.
2617-38	Fond du Lac Band	Text in Chapter 4 has been revised to show that this RSA crosses the Fond du Lac Reservation. Additional information also has been included in Chapter 7 regarding the individual RSAs.
2617-39	Fond du Lac Band	RSA-53 as described in Chapter 7 connects RA-07 to RSA-22. This revision has been made in the chapter.
2617-40	Fond du Lac Band	Additional information regarding manual valves has been included in Section 8.3.1.2 of the Final EIS.
2617-41	Fond du Lac Band	Additional information related to preemptive measures has been included in Section 8.3 of the Final EIS.
2617-42	Fond du Lac Band	Additional information has been included in Section 8.3 of the Final EIS pointing to further identification of specific areas, which may help to better estimate associated costs.
2617-43	Fond du Lac Band	This information has been included in Section 8.4.1 of the Final EIS.
2617-44	Fond du Lac Band	The text in Chapter 9 has been updated to show the revised number of crossings.
2617-45	Fond du Lac Band	The text in Chapter 9 has been revised to show that these are only a few examples of the many plants used by American Indian tribes.
2617-46	Fond du Lac Band	Text has been added to Chapter 9 to show that American Indian tribes are connected to the reservation, thereby making it more difficult to replace resources that are impacted in these particular locations.
2617-47	Fond du Lac Band	Case studies of several spills, including the 2010 spill, and their impacts to various resources is now provided in the EIS in Chapter 10.
2617-48	Fond du Lac Band	As discussed in the EIS, the Applicant is committed to limiting equipment idling during construction when not in use. The Applicant will use similar practices during restoration and maintenance activities.
2617-49	Fond du Lac Band	A discussion of impacts related to climate change and American Indian tribes is provided in Chapter 9.

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Response#	Commenter	Response
2617-50	Fond du Lac Band	Appendix E provides information on the Applicant's Environmental Protection Plan; this includes a discussion of best management practices during various construction activities. Additionally, the Applicant would file a Fugitive Dust Control Plan and provide further details regarding commitments to reduce pollutants from mobile and stationary construction equipment. The plan would specify the precautions that would be taken to minimize fugitive dust emissions from construction activities, mitigation measure including use of water or a palliative needs, describe inspection, reporting procedures to identify and abate visible dust plumes, and how the Applicant would ensure that the sub-contractors would carry out the requirements. The Applicant would also provide further details regarding commitments to reduce pollutants from mobile and stationary construction equipment including during restoration and routine maintenance activity and implementation of no-idling, or reduced idling, policy.
2617-51	Fond du Lac Band	This comment has been noted. The lighter compounds aromatics and alkanes tend to be the more toxic parts of crude oil, most of which evaporates in the hours and days after spilling. These components also tend to be the more toxic parts of the oil (see Chapter 10).
2617-52	Fond du Lac Band	The air emissions associated with ongoing integrity digs and repair of the existing Line 3 are discussed in Chapter 5.2.7.3.2 of the EIS and are not expected to be significant at any one location.
2617-53	Fond du Lac Band	VOC emissions referenced in Section 12.3.1.3.2 provide annual estimates. The text in the EIS has been updated accordingly.
2617-54 2617-55	Fond du Lac Band	A description of the new truck loading facility at Clearbrook analyzed within Final EIS Section 12.3.5.3 can be found in Section 4.2.7 of the FEIS. Section 4.2.7 notes that a new access road and other highway upgrades would be required in conjunction with the loading facility; it is not clear whether idling would be reduced by these upgrades. It is not known whether there are plans to require use of clean diesel/low-emission trucks.
2617-56	Fond du Lac Band	While the potential for increased mold levels in homes and resultant illness to result from the proposed project is beyond the scope of this FEIS, other impacts associated with greenhouse gas emissions are discussed in Chapter 5.2.7.2.1.
2617-57	Fond du Lac Band	As discussed in the EIS, the Applicant has committed to limiting equipment idling when not in use during construction. The Applicant would use similar practices during restoration and maintenance activities.

Responses to Comments - Tribal

Response#	Commenter	Response
2617-58	Fond du Lac Band	As discussed in the EIS, the Applicant has committed to limiting equipment idling during construction. The Applicant has also committed to following equipment manufacturer-recommended operations and good combustion practices, including not tampering engines to increase horsepower and using ultra-low sulfur diesel.
2634-1	Great Lakes Indian Fish & Wildlife Commission	Thank you for your comments on the Draft EIS. Chapter 10 provides an overview of the types of resources that may be impacted by a potential oil spill. Table 10.4 in particular has been revised to more accurately show that this references reservation land. The numbers of resources are drawn from SHPO databases. A note was added to table 10.4-28 to show this.
2634-2	Great Lakes Indian Fish & Wildlife Commission	A 10-mile downstream distance was selected, because it was considered to be not overly conservative, and crossing widths for the RAs were unavailable. The Applicant surveyed the streams and rivers for the APR ONLY, so small (<10 m wide) and large (10 m or > wide) crossings are only known for this route. It would be biased to only run the 2 downstream buffers (30 miles for large rivers, and 10 miles for small streams) along the APR. Furthermore, it was determined that it would be overly conservative to run a 30-mile downstream buffer for all water crossings, especially since many of these water bodies are ditches and terminate within a few miles.
2634-3	Great Lakes Indian Fish & Wildlife Commission	The FEIS provides data on the Applicant's spill history, as well as comparisons of the Applicant's spill and incident rate compared to other crude oil pipeline operators, both in Minnesota and nationwide.
2634-4	Great Lakes Indian Fish & Wildlife Commission	The discussion of cumulative impacts includes an analysis that provides a focused, Project-specific review of cumulative potential effects; it does not address impacts outside of the environmentally relevant area at a broad regional level.
2634-5	Great Lakes Indian Fish & Wildlife Commission	Discussion related to watershed impacts is found in Section 5.2.1.2.
2634-6	Great Lakes Indian Fish & Wildlife Commission	Discussion related to watershed impacts is found in Section 5.2.1.2 of the FEIS.

Responses to Comments - Tribal

Response#	Commenter	Response
2634-7	Great Lakes Indian Fish & Wildlife Commission	Thank you for your comment. A detailed analysis of all impacts to all of the various and site-specific natural resources was not possible under the FEIS process.
2634-8	Great Lakes Indian Fish & Wildlife Commission	Corridor management activities would adhere to both state and federal guidelines and directives, considering off-site migration and impacts to proximal waterbodies and supported flora and fauna. State and federal required management plans are required for both construction and operation.
2634-9	Great Lakes Indian Fish & Wildlife Commission	This comment has been noted. The wetland and waterway high consequence areas evaluated for spill impacts were limited to: Aquatic Management Areas, Lakes of Biological Significance, Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites), native plant communities, wetland bank easements, wild rice lakes, Muskie lakes, and sensitive lakeshore areas (see Chapter 10).
2634-10	Great Lakes Indian Fish & Wildlife Commission	Further information regarding financial assurance has not been provided by the Applicant. The pertinent regulations for responsibility and liability have been identified throughout the EIS. Financial assurance will be addressed if permits are issued.
2634-11	Great Lakes Indian Fish & Wildlife Commission	The cumulative potential effects analysis described with FEIS Chapter 12 does not restrict the analysis to pipeline and transmission lines that cross the route alternatives, as is stated in the comment. The description of the cumulative potential effects analysis (Final EIS Section 12.1) clarifies that cumulative potential effects analyses are performed for environmentally relevant areas, which vary in size depending on the type of resources and potential impacts considered. For example, one of the reasonably foreseeable actions considered (Table 12.2-1) is "addition of pipeline in same corridor." This would parallel an alternative. Section 12.1 provides an explanation of what the cumulative effects analysis does, and that it does not address impacts outside of the environmentally relevant area at a broad regional level. Finally, habitat fragmentation and water quality/resources are addressed as potential cumulative effects for alternatives where these resources are potentially affected.
2634-12	Great Lakes Indian Fish & Wildlife Commission	Chapter 12 clarifies that cumulative potential effects relevant to tribal resources are discussed in Chapter 9. The discussion in Chapter 9 provides a brief discussion of the types of impacts that may occur. The experiences of tribal members and contributions to current and historical trauma are noted as part of this evaluation in Chapter 9.

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Response#	Commenter	Response
2634-13	Great Lakes Indian Fish & Wildlife Commission	Chapter 9 of the FEIS discusses cumulative potential effects relevant to tribal uses. The information provided as part of this comment was reviewed in revising Chapter 9.
2634-14	Great Lakes Indian Fish & Wildlife Commission	Pipeline and Hazardous Materials Safety Administration (PHMSA) does not have specific requirements regarding weighting of the pipe, commonly called swamp weights. However, there are requirements to ensure movement of a pipeline does not create stress on joints or equipment that would compromise the pipe. Chapter 8 and Appendix B provide additional information related to weighting down pipelines.
2634-15	Great Lakes Indian Fish & Wildlife Commission	Additional information regarding cathodic protection locations has been included in Section 2.3.2.3 of the Final EIS.
2634-16	Great Lakes Indian Fish & Wildlife Commission	A discussion of cathodic protection is provided in Chapter 8. Your comment has been considered in updates to this section.
2634-17 2634-18	Great Lakes Indian Fish & Wildlife Commission	As shown in Chapter 2, the coating consists of non-hazardous fusion-bonded epoxy. Information on its removal, if it were to fail, is provided. Hazardous waste handling is addressed as part of the Applicant's Environmental Protection Plan provided as Appendix E.
2634-19	Great Lakes Indian Fish & Wildlife Commission	A detailed analysis of all impacts to all of the various and site-specific natural resources, for all potential routes, was not possible under the FEIS process. Detailed wetland surveys for all alternative routes is not a standard practice in conducting an EIS. Available desktop analysis is relied upon to identify known resources.
2634-20 2634-21 2634-22	Great Lakes Indian Fish & Wildlife Commission	Text has been added relevant to tribal water quality regulation consideration by the project.
2634-23	Great Lakes Indian Fish & Wildlife Commission	Management of various construction activities will be reviewed by the relevant state and federal agencies during the construction permitting process.

Responses to Comments - Tribal

Response#	Commenter	Response
2634-24	Great Lakes Indian Fish & Wildlife Commission	Water quality standards may vary based on the surface water body being considered. Applicant will be required to adhere to those standards and criteria as relevant to the water body in question.
2634-25	Great Lakes Indian Fish & Wildlife Commission	The Applicant will be required to develop crossing plans that will provide specific measures for limiting impacts and for restoration of affected natural resources, including wild rice waterbodies.
2634-26	Great Lakes Indian Fish & Wildlife Commission	Chapter 10 of the Final EIS includes an analysis of the potential for spill impacts to wild rice lakes and wild rice harvest areas within Areas of Interest (AOIs).
2634-27	Great Lakes Indian Fish & Wildlife Commission	The analysis of air quality impacts (and specifically the use of diesel) is based on the type of equipment that is proposed for construction. The assumption can be made that if alternative types of fuel would be used, the air emissions would generally be less.
2634-28	Great Lakes Indian Fish & Wildlife Commission	Dust suppression water sources have not yet been identified based on need. All chemical additives to dust suppression water would be considered during construction plans and operational permitting processes.
2634-29	Great Lakes Indian Fish & Wildlife Commission	Enbridge has not provided information regarding additives in dust control water.
2634-30	Great Lakes Indian Fish & Wildlife Commission	Additional information related to abandonment and ongoing maintenance and monitoring has been included in Section 8.3 of the Final EIS.
2634-31	Great Lakes Indian Fish & Wildlife Commission	This is discussed in Section 8.3.1.2 of the Final EIS.
2634-32	Great Lakes Indian Fish & Wildlife Commission	Additional discussion has been included in Section 8.3.1.2 of the Final EIS.

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Response#	Commenter	Response
2634-33	Great Lakes Indian Fish & Wildlife Commission	Additional information related to subsidence and other issues associated with abandonment has been included in Section 8.3 of the Final EIS.
2634-34	Great Lakes Indian Fish & Wildlife Commission	Further discussion related to preemptive measures has been included in Section 8.3 of the Final EIS.
2634-35	Great Lakes Indian Fish & Wildlife Commission	Additional information related to understanding the specific locations of necessary measures has been included, which may help to better estimate associated costs.
2634-36	Great Lakes Indian Fish & Wildlife Commission	The text in Chapter 9 has been revised to show that these are only a few examples of the many plants used by American Indian tribes.
2634-37	Great Lakes Indian Fish & Wildlife Commission	Text has been added to Chapter 9 to show that American Indian tribes are connected to the reservation, thereby making it more difficult to replace resources that are impacted in these particular locations.
2634-38	Great Lakes Indian Fish & Wildlife Commission	Information has been added to the EIS to more clearly show how volume of transported oil is considered. For instance, Figure ES-4 has been revised to demonstrate amount spilled per volume transported.
2369-1	Leech Lake Band of Ojibwe	Thank you for your comments on the Draft EIS. The sentence has been revised to show that the importance for these resources is on both reservations and ceded lands.
2369-2	Leech Lake Band of Ojibwe	This figure (Figure ES-2) is intended to provide an overview of the CN alternatives. Figures have been reviewed throughout the EIS for clarity.
2369-3	Leech Lake Band of Ojibwe	This information has been included within the Executive Summary within the section noted as advantages and disadvantages of removing the old pipeline.
2369-4	Leech Lake Band of Ojibwe	Your comment has been noted, and language was revised within the section to account for the Leech Lake Band of Ojibwe objection to the routes.
2369-5	Leech Lake Band of Ojibwe	Your comment has been noted, and language was revised within the section to account for the Leech Lake Band of Ojibwe objection to the routes.

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Response#	Commenter	Response
2369-6	Leech Lake Band of Ojibwe	A sentence has been added to the Executive Summary to note that relationship (distance) to other pipelines within the Mainline corridor is provided in Chapter 8.
2369-7	Leech Lake Band of Ojibwe	This sentence has been revised to show that RA-07 would be compatible with existing land use to the extent that it is to be placed within an existing corridor.
2369-8	Leech Lake Band of Ojibwe	This sentence has been revised to show that some benefit may occur due to the use of an existing corridor. It is not intended to negate potential impacts to the reservations through which the route alternative crosses.
2369-9	Leech Lake Band of Ojibwe	The information provided as part of the comment has been considered, as the statement refers to what the Applicant has identified as their challenges for RA-07; no change has been made. As shown in Chapter 3, other types of permits and approvals would be needed, if the proposed project were to move forward.
2369-10	Leech Lake Band of Ojibwe	Changes have been made throughout the EIS to address consistency with terminology. This comment has been considered in this effort.
2369-11	Leech Lake Band of Ojibwe	This comment has been considered. Changes have been made in Chapter 9 and Chapter 11 to show how impacts to the political integrity, economic security, and health or welfare of American Indian tribes may occur.
2369-12	Leech Lake Band of Ojibwe	While this information is not provided as part of the Executive Summary, Chapter 11 of the EIS has been revised to include additional detail on potential EJ communities. The section describes potential impacts to American Indian populations, including those residing on or using the Leech Lake Reservation.
2369-13	Leech Lake Band of Ojibwe	Information provided as part of your comment was considered in revising portions of the EIS. Where information was available, additional data has been included regarding wild rice lakes.
2369-14	Leech Lake Band of Ojibwe	Sections 5.3.1 and 6.3.1 provide information on potential impacts to wild rice lakes. Where additional information was available, data were included in the EIS.
2369-15	Leech Lake Band of Ojibwe	Thank you for the information provided as part of this comment. Revisions within the EIS have included additions showing where tribal regulations are applicable, as well as to emphasize that the federally recognized American Indian tribes noted in this EIS are sovereign nations (see Chapter 9).
2369-16	Leech Lake Band of Ojibwe	As part of the mapping analyses within the EIS, available datasets were used to the extent possible. Wild rice data included, but was not limited to, that from the DNR.

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Response#	Commenter	Response
2369-17	Leech Lake Band of Ojibwe	The word "shallow" has been removed from this sentence.
2369-18	Leech Lake Band of Ojibwe	Figure 6.3.1.2-1 utilized data from the DNR. Information from this dataset is noted on the figure.
2369-19	Leech Lake Band of Ojibwe	The information for crossings is based on data from the DNR. The text included shows the results from the use of these data.
2369-20	Leech Lake Band of Ojibwe	The evaluation of wild rice lakes within this EIS largely draws on data from the DNR.
2369-21	Leech Lake Band of Ojibwe	Information as provided in the comment was added to the Executive Summary to show that RA-07 and RA-08 would have the greatest impacts, since they cross reservations.
2369-22	Leech Lake Band of Ojibwe	The information provided in your comment has been noted. This census tract is discussed in Chapter 11. Information on changes to this section are noted in the Executive Summary, even though specific references to individual census tracts are not.
0812-1	Leech Lake Band of Ojibwe	Thank you for your comments on the Draft EIS. Information regarding the Leech Lake resolution has been added to the Executive Summary of the Final EIS.
0812-2	Leech Lake Band of Ojibwe	The maps in Chapter 9 have been revised to more clearly show the information provided as part of the legend.
0812-3	Leech Lake Band of Ojibwe	A discussion of wild rice is provided in Chapter 9. This discussion focuses on the importance of rice within the tribal community, including the economic importance.
2464-1	Mille Lacs Band of Ojibwe	Thank you for your comments on the Draft EIS. Section 6.7 of the Final EIS provides a discussion of corridor sharing. Within Chapter 6, distinctions are made between sections of the Applicant's preferred route and route alternatives due to the possibility of corridor sharing. In this manner, the existing conditions and impacts discussions account for this potential.
2464-2	Mille Lacs Band of Ojibwe	Additional information was provided in Chapter 8 to note the presence (and average distance) of existing pipelines within the Mainline corridor. The EIS as a whole accounts for the presence of existing pipelines, as well, as some analyses show the differences within the Clearbrook to Carlton section as a discrete analysis.

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Response#	Commenter	Response
2464-3	Mille Lacs Band of Ojibwe	References to Applicant provided materials are made in places throughout the EIS. A list of preparers is also included within Chapter 13.
2464-4	Mille Lacs Band of Ojibwe	Chapter 9 has been re-organized to include a description of what is evaluated in Chapters 5 and 6. The purpose in doing so is to show that Chapters 5 and 6 focus on those that are recorded in the State Historic Preservation Office (SHPO) databases. Chapter 9 provides an additional component, which is the connection between natural resources and cultural resources. A discussion of traditional cultural properties also was added to Chapters 5 and 6. The tables in Chapter 10 have been revised to show that the reference is to reservations, which include the potential of cultural resources being presented. As this chapter is meant to be more of an overview of potential impacts, specific resources are not called out.
2464-5	Mille Lacs Band of Ojibwe	Information included in Appendix P was considered when writing the Draft EIS and Final EIS, along with all public comments received. Included among these are those from the Great Lakes Indian Fish and Wildlife Commission (“GLIFWC”).
2464-6	Mille Lacs Band of Ojibwe	As shown in the revised text for Chapter 9, consultation will continue beyond the release of the FEIS.
2464-7	Mille Lacs Band of Ojibwe	Enbridge stated in their Certificate of Need application that the State required a permanent access road at each mainline valve.
2464-8	Mille Lacs Band of Ojibwe	Appendix O contains an unanticipated discovery plan for cultural resources. As shown in this plan, appropriate American Indian authorities would be contacted in the event of a discovery of human remains. Please note – this plan contains information for those areas under federal and state jurisdiction. A mitigation measure has been included in Chapter 9 to recommend the use of tribal monitors in archaeological surveys and monitoring.
2464-9	Mille Lacs Band of Ojibwe	Of the requested items, Enbridge has only supplied information regarding restoration of wetland areas after construction. This information is provided in Section 5.2.1.3.3.
2464-10	Mille Lacs Band of Ojibwe	Hazardous waste handling is discussed as part of the Applicant's Environmental Protection Plan. This is included as Appendix E.

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Response#	Commenter	Response
2464-11	Mille Lacs Band of Ojibwe	The applicant has not supplied a plan specific to avoidances of cultural artifacts/resources during directional drilling. However, they have discussed their plans for limiting the loss of circulation of drilling fluid throughout Chapter 5, which will help limit the impacts to subsurface soil and artifacts outside of the borehole. Additionally, it may be possible to further avoid impacts by drilling deeper in locations of potentially affected artifacts/resources.
2464-12	Mille Lacs Band of Ojibwe	Such requirements may be conditions of a permit.
2464-13	Mille Lacs Band of Ojibwe	The Environmental Protection Plan is provided in Appendix B. Section 1.6.1 provides information on the use of herbicides. Impacts associated with the use of herbicides are discussed in Sections 5.2.4, 6.3.4, and 6.3.5. A mitigation measure was added to Chapter 9 to indicate that tribes may be consulted prior to the use of herbicides.
2464-14	Mille Lacs Band of Ojibwe	The Environmental Protection Plan is provided in Appendix B. Section 1.6.1 provides information on the use of herbicides. Impacts associated with the use of herbicides are discussed in Sections 5.2.4, 6.3.4, and 6.3.5. A mitigation measure was added to Chapter 9 to indicate that tribes may be consulted prior to the use of herbicides.
2464-15	Mille Lacs Band of Ojibwe	A review of publicly available policies, rules, and regulations for the abandonment of pipelines was conducted. This statement is intended to be general, as more detailed information is provided in Chapter 8 and Appendix B.
2464-16	Mille Lacs Band of Ojibwe	Section 8.3.1.1 of the Final EIS discusses Enbridge's current and ongoing liability and responsibility under the Minnesota Statutes 115E.
2464-17	Mille Lacs Band of Ojibwe	Fish IBI and other waterbody quality metrics have been used to the best of DOC's ability. State agencies tasked with assessing aquatic metrics generally address the most relevant waterbodies during their assessment program. During subsequent permitting activities the quality and supporting capability of various waterbody's crossed would be taken into account.
2464-18	Mille Lacs Band of Ojibwe	Impacts have been directed at sensitive species. Protection of sensitive species and resources will ultimately be protective of species that are considered less sensitive. Impacts to lakes and waterbodies, via consideration of water quality standards and criteria, would allow for protection of warmwater fisheries.

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2464-19	Mille Lacs Band of Ojibwe	Information on tribal policies regarding wild rice are noted in Chapter 9. As part of the revisions to this chapter, an example of one of these policies was provided.
2464-20	Mille Lacs Band of Ojibwe	A detailed analysis of all impacts to all of the various and site-specific natural resources was not possible under the Final EIS process.
2464-21	Mille Lacs Band of Ojibwe	A detailed analysis of all impacts to all of the various and site-specific natural resources was not possible under the Final EIS process.
2464-22	Mille Lacs Band of Ojibwe	A detailed analysis of all impacts to all of the various and site-specific natural resources was not possible under the Final EIS process.
2464-23	Mille Lacs Band of Ojibwe	A detailed analysis of all impacts to all of the various and site-specific natural resources was not possible under the Final EIS process.
2464-24	Mille Lacs Band of Ojibwe	A detailed analysis of all impacts to all of the various and site-specific natural resources was not possible under the Final EIS process.
2464-25	Mille Lacs Band of Ojibwe	A detailed analysis of all impacts to all of the various and site-specific natural resources was not possible under the Final EIS process.
2464-26	Mille Lacs Band of Ojibwe	A detailed analysis of all impacts to all of the various and site-specific natural resources was not possible under the Final EIS process.
2464-27	Mille Lacs Band of Ojibwe	Invasive species would be addressed via plans during construction. The project will be required to meet all requirements of the National Invasive Species Act.
2464-28	Mille Lacs Band of Ojibwe	Generally, in each situation where there are impacts to private individuals, remedies reflect the unique situation and are addressed based on a detailed analysis of need. It is difficult to predict the mechanisms required for all situations.
2464-29	Mille Lacs Band of Ojibwe	Revisions to Chapter 9 include additional references to other chapters within the EIS. Likewise, additions were made in other chapters to refer back to Chapter 9. Chapter 11 also includes a summary of impacts to particular resources. It provides a discussion of impacts to American Indian tribes.
2464-30	Mille Lacs Band of Ojibwe	The concern for the use of a new pipeline corridor and corridor sharing is discussed in the Executive Summary - "What are the benefits or drawbacks of corridor sharing versus opening a new corridor?" - This section provides a short discussion of how this concern is reviewed as part of the EIS. Section 6.7 also discusses Right-of-Way Sharing or Paralleling.

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2464-31	Mille Lacs Band of Ojibwe	Information within Chapter 9 indicates that other tribes may have an ancestral tie to the lands within Minnesota. Where applicable, this information is noted within the EIS.
2464-32	Mille Lacs Band of Ojibwe	The text has been revised to show that Minnesota is the ancestral homeland of the Dakota.
2464-33	Mille Lacs Band of Ojibwe	The full names of the tribes are included in Chapter 9.
2464-34	Mille Lacs Band of Ojibwe	Additional information on the sovereignty of American Indian tribes has been added to Chapter 9.
2464-35	Mille Lacs Band of Ojibwe	The text has been revised to show that management of natural resources may extend outside of reservation boundaries.
2464-36	Mille Lacs Band of Ojibwe	The text has been revised per the comment received.
2464-37	Mille Lacs Band of Ojibwe	Text has been added to Chapter 9 to include the names of elders and tribal leaders that were interviewed as part of the consultation.
2464-38	Mille Lacs Band of Ojibwe	Text has been added to Chapter 9 to account for the information in the comment received.
2464-39	Mille Lacs Band of Ojibwe	Information has been added to Chapter 9 to show how the cultural corridors were developed.
2464-40	Mille Lacs Band of Ojibwe	Text has been added to Chapter 9 to show the importance of water to American Indian tribes and to their future.
2464-41	Mille Lacs Band of Ojibwe	Appendix P provides a copy of the resolutions received by American Indian tribes consulting with the Minnesota Department of Commerce. Revisions also were made to add Section 5.4.1.1.7, which includes a discussion of tribal cultural resources policies. A similar addition was made to Section 6.4.1.1.
2464-42	Mille Lacs Band of Ojibwe	This sentence has been revised per the comment received.

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Response#	Commenter	Response
2464-43	Mille Lacs Band of Ojibwe	The scope of the Final EIS does not allow for all studies that could provide additional information on subject areas. Many of the studies noted would be part of the state's purview on aquatic and fisheries assessment. Additionally, all cumulative aspects of global warming on specifically-assessed resources is beyond the scope of the EIS process.
2464-44	Mille Lacs Band of Ojibwe	The scope of the FEIS does not allow for all studies that could provide additional information on subject areas. Many of the studies noted would be part of the purview by state regulatory agencies associated with management of aquatic and fisheries resources. Additionally, all cumulative aspects of global warming on specifically-assessed resources is beyond the scope of the EIS process.
2464-45	Mille Lacs Band of Ojibwe	The spelling has been revised.
2464-46	Mille Lacs Band of Ojibwe	The text has been revised to show that Leech Lake is one of the wild rice lakes within MN.
2464-47	Mille Lacs Band of Ojibwe	Wild Rice harvest data have been included in the spill analysis
2464-48	Mille Lacs Band of Ojibwe	Chapter 9 has been revised to more accurately show that some of the impacts analysis provided represents a summary of resource specific impacts discussed in more detail in Chapter 6.
2464-49	Mille Lacs Band of Ojibwe	The text noting this statement has been removed.
2464-50	Mille Lacs Band of Ojibwe	The EIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
2464-51	Mille Lacs Band of Ojibwe	The spill model accurately deals with the fate and transport of the spills given the factors provided by the spill model. Only in cases where the spill volume was exhausted to losses from adhesion, evaporation, and other environmental factors prior to the 24-hour time limit did the model predict how far the spill could travel. All other cases was how far the spill traveled in 24 hours and remaining volume of the spill.
2464-52	Mille Lacs Band of Ojibwe	SIMAP (Integrated Oil Spill Impact Model System) was also used.
2464-53	Mille Lacs Band of Ojibwe	The non-public data are available to decision makers.

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Response#	Commenter	Response
2464-54	Mille Lacs Band of Ojibwe	Ten miles downstream was selected because it was considered to be not overly conservative, and crossing widths for the RAs were unavailable. The Applicant surveyed the streams and rivers for the APR ONLY, so small (<10 m wide) and large (10 m or > wide) crossings are only known for this route. It would be biased to only run the 2 downstream buffers (30 miles for large rivers, and 10 miles for small streams) along the APR. Furthermore, we determined that it would be overly conservative to run a 30-mile downstream buffer for all water crossings, especially since many of these water bodies are ditches and terminate within a few miles.
2464-55	Mille Lacs Band of Ojibwe	The ROI was identified as the distance that released oil would typically spread on flat ground (calculated to be 1,214 feet from the centerline) plus an additional distance of 1,050 feet for estimated down-gradient migration in groundwater (if groundwater were contacted); the estimated total distance of approximately 2,264 feet was rounded up to 2,500 feet.
2464-56	Mille Lacs Band of Ojibwe	The FEIS does include data on wild rice harvest areas and water and wetlands of high biological significance.
2464-57	Mille Lacs Band of Ojibwe	Table 10.4-16 was updated to show that this is referring to reservation land and not cultural resources. Text was revised in Section 10.4.2.1.2 to clarify what the acreage in Table 10.4-9 was referencing and that reservation lands may contain cultural resources.
2464-58	Mille Lacs Band of Ojibwe	The analysis is of reservation land, which contain cultural resources, but not of all cultural resource sites.
2464-59	Mille Lacs Band of Ojibwe	This has been corrected. The applicant (primary responsible party or PRP) and their contractors are the responders. Spill recovery efforts are monitored, and as needed directed, by the Federal and State on-scene coordinators. If the PRP's response efforts are deemed to be inadequate, the NCP authorizes mobilization of federal and state resources, funded by the Oil Spill Liability Trust Fund, which in turn will bill the PRP for funds expended in the response.
2464-60	Mille Lacs Band of Ojibwe	Chapter 11 of the EIS has been updated to reflect that census tract level data does not necessarily capture micro-populations within larger tracts. The East Lake Community near Gregor, MN is used as an example of this. The EIS explains that the qualitative analysis, the discussion of potential impacts, and the proposed mitigation measures provided in this section would be applicable to these communities as well as the potential EJ communities identified through quantitative analysis of census tracts.

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Response#	Commenter	Response
2464-61	Mille Lacs Band of Ojibwe	Chapter 12 of the Final EIS contains a thorough analysis of the potential cumulative effects associated with "adding another pipeline within the corridor" of the Applicant's Preferred Route and Route Alternatives outside of the Mainline Corridor, i.e. RA-03AM and RA-06, including effects on planning and zoning, aesthetics, vegetation, and other resources. The referenced section of the FEIS also includes discussion on cumulative spills. The addition of another pipeline is a "reasonably foreseeable action" discussed in detail throughout Chapter 12.
2290-1	White Earth Nation	Thank you for your comments on the Draft EIS. Results from a comprehensive review of federal and state-listed lands and species within proposed project and alternative routes, some of which are also known to occur within the 1855 Treaty Area, are presented in Sections 5.2.5 and 6.3.5 of the Final EIS.
2290-2	White Earth Nation	An analysis of Audubon Important Bird Areas (IBAs), Migratory Bird Treaty Act (MBTA)-protected birds, and Bald and Golden Eagle Protection Act (BGEPA)-protected birds near the proposed project and alternative routes, is presented in Sections 5.2.4 and 6.3.4 of the FEIS.
2290-3	White Earth Nation	Chapter 9 provides information on tribal consultation process, along with Appendix P. A tribal consultation policy was developed in March 2016.
2290-4	White Earth Nation	Tribal consultation is discussed in Chapter 9. A formal consultation policy is provided in Appendix P.
2290-5	White Earth Nation	Chapter 9 provides an assessment of tribal resources and incorporates input gathered from consultation. The chapter shows how American Indian tribes often think beyond one generation and how natural and cultural resources are one in the same.
2290-6	White Earth Nation	Based on a secondary GIS analysis of the DNR Wild Rice Lakes database, it is confirmed that 17 wild rice lakes occur within the ROI (0.5 miles from centerline) for the Applicant's proposed project.
2290-7	White Earth Nation	Appendix E of the EIS provides a discussion of the Applicant’s Environmental Protection Plan. While wild rice bodies are not specifically addressed, the plan provides information on the restoration of waterbodies and associated features.
2290-8	White Earth Nation	Appendix E of the EIS provides a discussion of the Applicant’s Environmental Protection Plan, which includes a discussion of the restoration of wetlands.
2290-9	White Earth Nation	Additional information related to abandonment and removal has been included in Sections 8.3 and 8.4, respectively.
2290-10	White Earth Nation	Text has been added to note that tribal water quality standards and criteria would be addressed within tribal lands.

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Response#	Commenter	Response
1702-1	Ackerman, Mary	Thank you for your comments on the Draft EIS. The FEIS assumes that the Applicant will obtain and comply with all necessary permits and approvals that would be required for the construction and operation of the pipeline, including any required pipeline monitoring, if a Certificate of Need and route permit are approved by the Commission. Table 3.6-1 provides a list of additional permits and approvals required for the Line 3 Project.
2479-1	Adams, Mary	Thank you for your comments on the Draft EIS. Section 5.3 and Section 6.5 provide the socioeconomic analysis.
2479-2	Adams, Mary	Additional information on spill impacts are included in Chapter 10 of the FEIS. The spill models include winter and summer runs.
1202-1	Adams, Mary	Thank you for your comments on the Draft EIS. The FEIS is designed to identify and analyze all of the various impacts potentially feasible based on the various alternatives chosen. Crossing methods for various waterbodies identified for determined alternatives has been proposed by the Applicant and are provided in Appendix G.
1202-2	Adams, Mary	Spill data were provided by the Applicant and reviewed by the Department of Commerce and the third-party EIS preparation team. The updated list of EIS preparers is included in Chapter 13, List of Preparers. The methodology for assessing spills is included in Section 10.1.5, Methodology for Assessing Failure Probabilities, Potential Exposure, and Resource Impacts.
1202-3	Adams, Mary	The various tables within Section 5.3.4.2 of the FEIS report workforce numbers for each county that would be crossed by the Applicant's proposed project and alternatives. The FEIS notes the source/date for these data: U.S. Bureau of Economic Analysis, August 2015.

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Response#	Commenter	Response
1202-4	Adams, Mary	After establishing these baseline employment conditions within the counties crossed by the Applicant's proposed project/preferred route and alternatives, and discussing potential impacts on employment for the Applicant's proposed project/preferred route and alternatives, Section 6.5.4 of the FEIS clarifies that it is likely that the Applicant would hire local residents during construction of any of the alternative routes for a portion of its workforce. Based on current labor agreements in Minnesota at least 50% of workers will be expected to be employed from local union halls. Chapters 5 and 6 of the FEIS include analysis of the potential economic impacts of the project on recreation, property values, and taxes.
0800-1	Adams, Mary	Thank you for your comments on the Draft EIS. See Appendix G in the FEIS for a more detailed explanation of horizontal directional drilling (HDD) activities.
0800-2	Adams, Mary	The FEIS addresses impacts to waterways and natural resources through evaluation of multiple alternatives. Chapter 5 provides detailed discussions on the major alternatives and the Applicant's proposed project. Chapter 6 provides information on the route alternatives in Minnesota.
0644-1	Arnosti, Don	Thank you for your comments on the Draft EIS. The Minnesota Pollution Control Agency (MPCA) and Department of Natural Resources (DNR) are assisting the Department of Commerce in preparing the FEIS. Data and suggestions from these agencies have been incorporated into the FEIS.

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Response#	Commenter	Response
0498-1	Auchterlonie, Clare	Thank you for your comments on the Draft EIS. Section 6.2.4.3 of the FEIS includes a discussion on the presence of an oil or gas pipeline, or pipeline easement, and potential effects on property values. A review of relevant literature provided limited to no conclusive evidence that the presence of a pipeline and associated easement would have an effect - negative or otherwise - on surrounding property values. Table 6.2.4-5 within the aforementioned section summarizes the findings reviewed. Ultimately, landowner property values are a product of many local or regional market variables, of which the presence of a pipeline is only one. The discussion clarifies that spills, ruptures, and other incidents potentially resulting in "legacy contamination" may have a greater impact on property values. The magnitude of such impacts is highly dependent on the specific nature of the contamination. As stated within Table 8.3-1, in the long term, socioeconomic impacts can be lessened by monitoring, adaptive management, and site-specific mitigation measures. As stated within FEIS Section 8.3.1.1.1, the Applicant would continue to be responsible for preventing discharges and contamination, as spelled out in Minnesota Statutes.
1282-1	Bad Axe Lake Association - Molin, Kay	Thank you for your comments on the Draft EIS. The FEIS provides analyses of various water and terrestrial resources that could potentially be affected by the project. All potentially affected surface water bodies are discussed in Chapters 5 and 6.
2496-1	Baker-Knuttila, Elizabeth	Thank you for your comments on the Draft EIS. Please see the updated Chapter 13, List of Preparers.
2496-2	Baker-Knuttila, Elizabeth	The methodology and datasets used to develop the resource analyses in the EIS are detailed in each section throughout the EIS. Please see also the lists of references at the end of each section throughout the EIS. Note that it is common for the applicant to provide comments on an EIS and to request various modifications to the EIS. Not all of the Applicant's suggested changes have been made to the EIS. Please see responses to comment letters 1568 and 2603.

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2496-3	Baker-Knuttila, Elizabeth	The pipeline will cross through numerous counties in Minnesota with varying zoning regulations. Zoning was analyzed at a county level for the Project, so if a county does not have approved zoning regulations, a zoning analysis could not be conducted for it. Hubbard County does not have county-wide zoning implemented. Land use impacts for Hubbard County were included in the analysis through the National Land Cover Dataset (NLCD) database detailed in Table 6.2.1-5 of the FEIS.
2498-1	Bantle, Elena	Thank you for your comments on the Draft EIS. The data utilized to evaluate the annual risk of oil releases is based on historical data for existing pipelines that range in age from old to new. Operation of the pipeline, if it is approved and constructed, would be under the jurisdiction of the Pipeline and Hazardous Materials Safety Administration, which requires additional monitoring and safety measures for operating pipelines as they age. Changes have been made to Chapter 10 based on comments.
2116-1	Barnett, David	Thank you for your comments on the Draft EIS. The figure in the Executive Summary of the FEIS has been revised to demonstrate amount spilled per volume transported. When volume of releases is compared to the volume crude oil transported, rail and truck transport release a significantly higher percentage of the volume transported, 0.309% and 0.154% respectively. Comparatively, pipeline transport release an average of 0.006% of the volume of crude oil transported.
1284-1	Barten, John	Thank you for your comments on the draft EIS. Please see Section 1.4.1.1, Need for this Project. While the FEIS does not make a determination regarding project need, the FEIS does consider the environmental impacts of alternatives that would meet the applicant's proposed need. Enbridge’s proposed need for the Project is contained in their Certificate of Need application and is summarized in Section 2.2 of the FEIS.
1284-2	Barten, John	Additional discussion regarding abandonment/removal near water has been included in Sections 8.3 and 8.5 of the FEIS.
1284-3	Barten, John	A specific monitoring schedule has not been determined at this time. Structural integrity, surface subsidence, and buoyancy of the abandoned pipeline will be evaluated from routine inspections and monitoring associated with cathodic protection.

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1284-4	Barten, John	The Applicant has proposed to abandon the existing Line 3 rather than remove it. However, Section 8.4 discusses the removal option of the existing line, which would not include shutting down adjacent lines.
1284-5	Barten, John	Evaluating the cost of removing or abandoning the Applicant's proposed project (if permitted by the Commission and constructed), is outside the scope of this FEIS. For general information on abandonment and removal of pipelines, please see Appendix B and Chapter 8 of the FEIS.
1284-6	Barten, John	The topsoil, which has the majority of the organic material within the various soil horizons, will be stripped to a depth of 12 inches and segregated from the subsoil to prevent unnecessary compaction during construction. Once the pipeline is installed, areas of subsoils that are prone to compaction will be deep tilled to further reduce compaction impact prior to replacement of the topsoil and revegetation.
1286-1	Beatty, Kathryn	Thank you for your comments on the Draft EIS. Historical pipeline incident data from publicly available sources were used in the development of the FEIS and is presented in Chapter 10.
0980-1	Beckel, Bonnie	Thank you for your comments on the Draft EIS. The FEIS analyzes impacts 10 miles downstream of all alternatives. See further discussion in Chapter 10.
0350-1	Bellefy, Austin	Thank you for your comments on the Draft EIS. Section 6.5.4 of the FEIS clarifies that it is likely that the Applicant would hire local residents during construction of any of the alternative routes for a portion of its workforce - based on current labor agreements in Minnesota, at least 50% of workers will be expected to be employed from local union halls. Section 10.1.1.1 discusses federal and state regulatory requirements for oil pipelines, as well as industry standards, which would apply to each of the pipeline alternatives.

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Response#	Commenter	Response
1290-1	Bennett, Sheila	Thank you for your comments on the Draft EIS. A 30-year time window was chosen to match the economic life of the project indicated by the Applicant. For purposes of comparison across alternatives a consistent time window was targeted that is long enough to understand typical annual operating impacts/tradeoffs of the alternatives. Extending the timeframe and updating the analysis does not appear to add additional value in this comparison.
2505-1	Berdahl, Bob & Mary	Thank you for your comments on the Draft EIS. The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release. Case studies of several significant spills and discussion of their impacts to various resources have been included. See Chapter 10 for more details.
0503-1	Berkholtz, Ric	Thank you for your comments on the Draft EIS. The importance of cultural resources and natural resources to American Indian tribes is discussed in Chapter 9. Among those discussed is wild rice. A discussion of wild rice is also included in Chapters 5, 6, and 10.
0503-2	Berkholtz, Ric	The sovereignty of American Indian tribes is discussed in Chapter 9.
2509-1	Big Sandy Lake Association - Johnson, Bruce	Thank you for your comments on the Draft EIS. The National Academies of Sciences, Engineering, and Medicine 2016 citation is included in the EIS. The EIS has been updated to include discussion on the properties of dilbit as it weathers. The EIS contains discussion of releases, the fate and transport of spills, and case histories of the effects of spills to resources. See Chapter 10 for more details.
2509-2	Big Sandy Lake Association - Johnson, Bruce	For a new hazardous liquid pipeline, high consequence areas must be identified prior to operation, and hazardous liquid pipeline operators are required to develop and submit to Pipeline and Hazardous Materials Safety Administration (PHMSA) a written Integrity Management Plan (IMP) within 1 year of the start of operation (49 CFR 195.452). See Chapter 10 for more details.

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1705-1	Birchem, Regina	Thank you for your comments on the Draft EIS. For purposes of comparison across alternatives, a consistent time window of 30 years was chosen to match the economic life of the project indicated by the Applicant and to understand typical annual operating impacts/tradeoffs of the alternatives.
2510-1	Bischoff, Toni	Thank you for your comments on the Draft EIS. The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
2510-2	Bischoff, Toni	The Draft EIS noted that only three reports were reviewed; the additional reports now have been reviewed. Revisions to Sections 5.4.2 and 6.4.2 have been made to show this. Additional information regarding National Register of Historic Places (NRHP)-listed properties also has been included.
2517-1	Bleichner, Jessica	Thank you for your comments on the Draft EIS. Surface water quality may be associated with aquatic life use or other related use categories. The condition/measurement of the physiochemical attributes of a waterbody may not fully dictate their meeting, or not meeting, use designations. All information on water quality and designated use was considered for assessing impacts from construction and operation for all alternatives in Chapters 5 and 6.
1897-1	Borgeson, Dean	Thank you for your comments on the Draft EIS. This comment touches on the larger usage of oil production. The Executive Summary of the FEIS provides information on the purpose of the EIS and the decisions they inform, while Section 1.4 provides details about broader policy implications.
1206-1	Borgeson, Dean	Thank you for your comments on the Draft EIS. The anticipated diluent composition for the Applicant's project, if a certificate of need and route permit is approved by the Commission, is not known at this time. A general discussion of diluting agents can be found in Section 10.3.1.1.2.
1206-2	Borgeson, Dean	Dilbit diluent is natural gas condensate. The seasonal variations are due to temperature. Natural gas condensate evaporates as the dilbit weathers once exposed. Effects after initial weathering are similar to very heavy crude oil. See Chapter 10 for more information.

Responses to Comments - Citizen

Response#	Commenter	Response
1206-3	Borgeson, Dean	Potential impacts from an oil discharge are addressed in Chapter 10 of the FEIS.
1206-4	Borgeson, Dean	Impacts to potentially affected resources are identified within the region of influence (ROI) in Chapters 5, 6, and 10, along with the environmentally relevant area in Chapter 12. . The overall economic effects or impact of the project is addressed within the FEIS in Chapters 5 and 6.
1206-5	Borgeson, Dean	The cost for supplementing water resources, by providing potable water to residents or fish stocking, to offset any associated impacts is uncertain at this time, and an evaluation of such a cost is outside the scope of the FEIS.
1206-6	Borgeson, Dean	An evaluation of project costs in the event of an accidental spill is outside the scope of the FEIS. However, this topic can be further addressed in negotiated agreements during the certificate of need process.
2307-1	Bourdeaux, Dawn	Thank you for your comments on the Draft EIS. Potential transmission line connected actions are discussed in Section 2.10 of the FEIS. Reasonably foreseeable actions included as part of the cumulative potential effects analysis is presented in Table 12.2-1 of the FEIS.
2307-2	Bourdeaux, Dawn	This EIS only covers the Line 3 Project and not any approvals for other projects. Please refer to Chapter 12, "Cumulative Impacts," on how recent projects within proximity of the Line 3 are being considered. Also, please refer to Section 2.10 of Chapter 2, "Potential Connected Action - Transmission Lines," regarding information on how connected projects are described.
2307-3	Bourdeaux, Dawn	Existing conditions, impacts, and mitigation related to commodity production, including for agricultural lands - including pasture land and livestock grazing areas - for the Applicant's Proposed Project and Certificate of Need alternatives, and the Applicant's Preferred Route and Route alternatives, are discussed in FEIS Section 5.3.1 and Section 6.5.1, respectively.
2307-4	Bourdeaux, Dawn	Please refer to Chapter 5, Section 5.3 and Chapter 6, Section 6.5 for details on existing conditions, potential impacts, and mitigation measures for various socioeconomic factors in the project area.

Responses to Comments - Citizen

Response#	Commenter	Response
2307-5	Bourdeaux, Dawn	Minnesota Department of Commerce, Energy Environmental Review and Analysis (DOC-EERA) staff has prepared this FEIS in consultation with the Commission's Executive Secretary, and with assistance from the Minnesota Department of Natural Resources (Minnesota DNR) and Minnesota Pollution Control Agency (Minnesota PCA). Route Alternative RA-03AM analyzed in the FEIS, which was initially proposed by the Minnesota PCA and modified with input from Minnesota DNR, largely reflects the alternative suggested by the commenter.
1780-1	Boyd, Natalie	Thank you for your comments on the Draft EIS. This information has been considered in the development of the FEIS. This EIS assumes that the Applicant will obtain and comply with all necessary permits and approvals that would be required for the construction and operation of the pipeline, including required mitigation, if a Certificate of Need and route permit are approved by the Commission.
2524-1	Boyd, Natalie	Thank you for your comments on the Draft EIS. The National Academies of Sciences, Engineering, and Medicine 2016 data are included in the FEIS. The FEIS has been updated to include discussion on the properties of dilbit as it weathers in Chapter 10.
2524-2	Boyd, Natalie	The PHMSA incident report for the Line 6b indicates the Enbridge control center in Edmonton, Alberta first noted the leak on July 26, 2010 at 11:45 am EDT and reported it to the NRC at 13:33 EDT.
2524-3	Boyd, Natalie	The EIS acknowledges that the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release. The EIS contains discussion of releases, the fate and transport of spills, and case histories of the effects of spills to various resources, including aquatic environments.

Responses to Comments - Citizen

Response#	Commenter	Response
2524-4	Boyd, Natalie	Section 5.3.4.3.1 of the FEIS and other sections related to employment impacts are updated to include the expectation that Enbridge would utilize local labor for construction based on the information from direct testimony of Barry Simonson (lines 505-513) that current labor agreements in Minnesota require that at least 50% of workers would be expected to be employed from local union halls. Therefore, it is likely that direct construction-related employment would have a minor positive impact on county-level unemployment and per capita and/or median household income levels. No measureable impacts to county-level unemployment as a result of operations are still anticipated as stated in the FEIS.
2524-5	Boyd, Natalie	Oil that would be transported comes from sources that may reflect removal from geologic fissures.
2524-6	Boyd, Natalie	Section 195.563 of 49 CFR Subpart H – Corrosion Control states that cathodic protection must be in operation no later than 1 year after the pipeline is constructed. This does not mean Enbridge would wait a full year to install the system. It is typically installed as part of the construction process. The buried pipeline would also be protected from external corrosion by application of a coating.
2524-7	Boyd, Natalie	This EIS assumes that the Applicant will obtain and comply with all necessary permits and approvals that would be required for the construction and operation of the pipeline, including required mitigation, if a Certificate of Need and route permit are approved by the Commission.
2524-8	Boyd, Natalie	Such requirements may be included as conditions of the permit.
2524-9	Boyd, Natalie	The Draft EIS noted that only three archaeological reports were reviewed; the additional reports now have been reviewed. Revisions to Sections 5.4 and 6.4 have been made to show this. The evaluations in Sections 5.4 and 6.4 largely are based on data received from SHPO databases and known site information. Mitigation has been recommended in Chapter 9 to include tribal monitors in conducting archaeological surveys and monitoring.

Responses to Comments - Citizen

Response#	Commenter	Response
2524-10	Boyd, Natalie	Chapter 11 of the FEIS has been revised to clarify that the applicant may provide funding to support the efforts of local and tribal law enforcement to address sexual abuse and sex trafficking, which would enable local entities to tailor approaches and solutions to their community, and/or to collaborate with experts in this field.
0620-1	Brainard, Diana	Thank you for your comments on the Draft EIS. Various sections within Chapters 5 and 6 of the FEIS, including Section 5.3.4 and Section 6.5.4, address baseline employment conditions within the counties crossed by the Applicant's proposed project/preferred route and alternatives, and anticipated impacts on employment as a result of construction and operations. Section 6.5.4 of the FEIS clarifies that it is likely that the Applicant would hire local residents during construction of any of the alternative routes for a portion of its workforce - based on current labor agreements in Minnesota at least 50% of workers will be expected to be employed from local union halls. Section 5.3.4.1 of the FEIS does state that Enbridge has appealed the amount of property taxes paid between 2012 and 2016 and that to date the appeal has not been settled. Tax implications associated with retirement/abandonment of the existing Line 3 are uncertain at this time.
1299-1	Brandt, Diane	Thank you for your comments on the Draft EIS. Potential impacts to Aquatic Management Areas, Lakes of Biological Significance, Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites), native plant communities, Wetland bank easements, wild rice lakes, Muskie lakes, sensitive lakeshore areas, and Scientific and Natural Areas are evaluated in the EIS.
1299-2	Brandt, Diane	Thank you for your comments on the Draft DEIS. You comment has been considered in development of the FEIS.
1299-3	Brandt, Diane	The downstream analysis in Chapter 10 is based on the national hydrology dataset.
1299-4	Brandt, Diane	Spill data are available from PHMSA and were used in the EIS. Enbridge has asserted that public disclosure of potential release volumes is a security risk that could be exploited.

Responses to Comments - Citizen

Response#	Commenter	Response
2527-1	Brenegan, Erik	Thank you for your comments on the Draft EIS. For purposes of comparison across alternatives, a consistent time window of 30 years was chosen to match the economic life of the project indicated by the applicant and to understand typical annual operating impacts/tradeoffs of the alternatives. The life-cycle GHG estimates provided in Table 5.2.7-11 show the full range of possible outcomes for general comparison purposes. The life cycle emissions are calculated assuming worst-case throughput and provide a conservative estimates of life cycle GHG emissions.
2534-1	Brown, Shannon	Thank you for your comments on the Draft DEIS. You comment has been considered in development of the FEIS, and changes have been made to Chapter 10.
2534-2	Brown, Shannon	The EIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
2534-3	Brown, Shannon	Section 8.3 of the FEIS discusses corrosion and buoyancy concerns, as well as the need for additional analyses.
2534-4	Brown, Shannon	Enbridge does not plan to remove the pipeline. If removal is a permit condition, a removal plan would be required..

Responses to Comments - Citizen

Response#	Commenter	Response
2534-5	Brown, Shannon	The proposed project Environmental Protection Plan (EPP) (Appendix E in the DEIS), details wetland protection and reclamation requirements that would be implemented during construction and reclamation within wetland areas. As specified in this plan, wetland topsoil would be salvaged and stockpiled, protected from compaction, contamination, and any construction impacts. Subsoils within the construction ROW would be protected from compaction. Therefore, upon replacement, these soils would be expected to be suitable substrate to provide for natural regeneration, or reclamation seedings. Section 2.7.2.4 of the DEIS notes the plan also implements any further restoration and long-term monitoring guidance required by USACE in the required CWA Section 404 permit or by the local government unit in relation to the Wetland Conservation Act permit. Section 5.2.3 - Vegetation, Section 6.3.3 - Vegetation, and Chapter 7 of the DEIS all address specific potential direct and indirect impacts to terrestrial vegetation in terms of land vegetation cover classes, native plant communities, and rare plant communities, integrating EPP actions. These include discussions of specific impacts to wetland communities from activities associated with construction and operations associated with the Proposed Project and alternative routes.
2534-6	Brown, Shannon	Section 195.563 of 49 CFR Subpart H – Corrosion Control states that cathodic protection must be in operation no later than 1 year after the pipeline is constructed. This does not mean Enbridge would wait a full year to install the system. It is typically installed as part of the construction process. The buried pipeline would also be protected from external corrosion by application of a coating.
2534-7	Brown, Shannon	Section 5.3.4.1 of the FEIS does state that Enbridge has appealed the amount of property taxes paid between 2012 and 2016, and that to date the appeal has not been settled. Tax implications associated with retirement/abandonment of the existing Line 3 are uncertain at this time.
2534-8	Brown, Shannon	The draft EIS noted that only three reports were reviewed; the additional reports now have been reviewed. Revisions to Sections 5.4.2 and 6.4.2 have been made to show this.

Responses to Comments - Citizen

Response#	Commenter	Response
2534-9	Brown, Shannon	Chapter 11 of the FEIS has been expanded to include additional information on the assessment of and impacts to potential EJ communities. As described in the section, the identification of potential EJ communities or the potential for disproportionately high and adverse impacts does not preclude approval of the project or selection of a route alternative; however, it does require detailed efforts to avoid, mitigate, minimize, rectify, reduce, and/or eliminate the impacts. Section 11.4 of the EIS describes the measures that may be undertaken by the applicant to minimize or mitigate adverse impacts. As noted in this section, the Applicant may work with companies and subcontractors hired to construct, restore and operate the pipeline to prepare and implement an education plan or awareness campaign regarding the issue of sexual abuse or sex trafficking. Section 11.4 has been revised to clarify that the applicant may also provide funding to support the efforts of local and tribal law enforcement on this and other safety-related issues, which would enable local entities to tailor approaches and solutions to their community, and/or to collaborate with experts in this field.
0813-1	Buric, Maureen	Thank you for your comments on the Draft EIS. The study has been completed with all available information.
0288-1	Capistrant, Katie	Thank you for your comments on the Draft EIS. Section 8.3.1.1 of the FEIS discusses the requirements that Enbridge must abide by according to State Statutes.
0288-2	Capistrant, Katie	The description of Route Alternative RA-07 provided within Chapter 4 considers removal of the existing Line 3 with the new pipeline placed in the existing trench. Additional discussion on abandonment/removal is included within Chapter 8, and clean-up would be a part of the removal effort. This discussion, specifically within Section 8.4.1 also notes the approximate cost of removal as well as an estimate for the number of potential jobs created during a hypothetical removal effort (approximately half of the jobs generated by construction of a new Line 3). Chapters 5 and 6 of the FEIS, specifically Sections 6.5.4.3 et al, clarify that jobs would be created for local labor as current labor agreements in Minnesota require that at least 50% of workers would be expected to be employed from local union halls. Some of these jobs would likely be permanent jobs.

Responses to Comments - Citizen

Response#	Commenter	Response
0816-1	Christenson, Jaci	Thank you for your comments on the Draft EIS. The FEIS considers the potential impacts to water resources based on the crossing methods proposed for stream/river crossings. HDD may in many cases present the lowest potential for impacts to streams. See Appendix G for a more detailed explanation of HDD activities.
1525-1	Cobb, Curtis	Thank you for your comments on the Draft EIS. Details about project operation and maintenance, including monitoring systems for detecting anomalies, can be found in Section 2.8 of the FEIS. Chapter 10 of the FEIS address the potential for unanticipated releases and the potential consequences of such releases.
0996-1	Cosgriff, Nancy	Thank you for your comments on the Draft EIS. The FEIS considers the potential impacts to water resources based on the crossing methods proposed for stream/river crossings. HDD may in many cases present the lowest potential for impacts to streams.
0996-2	Cosgriff, Nancy	Changes have been made to Chapter 10 based on comments received.
1373-1	Crocker, Kyle R.	Thank you for your comments on the Draft EIS. Current GIS technology was used for accurately indicating waterbodies and wetlands on maps. The data was obtained from both state and federal natural resources databases.
1373-2	Crocker, Kyle R.	Section 5.2.3 - Vegetation, Section 6.3.3 - Vegetation, and Chapter 7 of the DEIS all address specific potential direct and indirect impacts to terrestrial vegetation in terms of land vegetation cover classes, native plant communities, and rare plant communities. These include discussions of specific impacts to forested and wetland communities from activities associated with construction and operations associated with the Proposed Project and alternative routes, including roads. Section 5.2.5 - Unique Natural Resources and Section 6.3.5 - Unique Natural Resources discuss specific potential direct and indirect impacts to special status plant species and plant communities.
1716-1	Dean, Laura	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS, and changes have been made to Chapter 10.

Responses to Comments - Citizen

Response#	Commenter	Response
1716-2	Dean, Laura	The FEIS has been revised to include data on the Applicant's spill history, as well as comparisons of the Applicant's spill and incident rate compared to other crude oil pipeline operators, both in Minnesota and nationwide.
1716-3	Dean, Laura	The FEIS has been revised to include data on the Applicant's spill history, as well as comparisons of the Applicant's spill and incident rate compared to other crude oil pipeline operators, both in Minnesota and nationwide.
1716-4	Dean, Laura	Section 5.2.1.3.3 addresses topsoil management in wetlands. The following mitigation measures must be followed by the Applicant in order to avoid and minimize impacts to wetland soils: Stripping the top 1 foot of topsoil or the amount of topsoil present, whichever is less, over the trench line, segregating it, and replacing it after pipe installation and backfilling in unsaturated wetlands Restoring wetlands to preconstruction contour Using construction mats, as needed, to facilitate equipment access and pipeline installation and to minimize soil compaction and/or mixing.
0821-1	Diessner, Chuck	Thank you for your comments on the Draft EIS. Chapter 13 of the FEIS includes a List of Preparers.
0821-2	Diessner, Chuck	Chapter 13 of the FEIS includes a List of Preparers.
1316-1	Dixon, Janet	Thank you for your comments on the Draft EIS. SA-04 is a system alternative evaluated to aid the Commission's evaluation of whether or not to grant a CN for the proposed project. A system alternative is not a routing alternative, as no entity has proposed to build such a pipeline, detailed routing and design have not been conducted, and a route permit could not be issued for SA-04. Instead, a system alternative is a serves as a broader level point of comparison to the Applicant's Proposed project and the other CN alternatives. The level of analysis of SA-04 is in line with this concept.
1316-2	Dixon, Janet	A description of the CN alternatives is provided in Chapter 4. As shown, SA-04 would terminate near Joliet, Illinois. As this is a conceptual route, the specific facilities of the alternative are not provided in detail.

Responses to Comments - Citizen

Response#	Commenter	Response
1316-3	Dixon, Janet	When volume of releases is compared to the volume crude oil transported, rail and truck transport release a significantly higher percentage of the volume transported, 0.309% and 0.154% respectively. Comparatively pipeline transport release and average of 0.006% of the volume of crude oil transported. The figure in the executive summary has been revised to demonstrate amount spilled per volume transported.
2585-1	Dolph, Christine	Thank you for your comments on the Draft EIS. The figure in the executive summary has been revised to demonstrate amount spilled per volume transported. When volume of releases is compared to the volume crude oil transported, rail and truck transport release a significantly higher percentage of the volume transported, 0.309% and 0.154% respectively. Comparatively pipeline transport release and average of 0.006% of the volume of crude oil transported.
2585-2	Dolph, Christine	The figure in the executive summary has been revised to demonstrate amount spilled per volume transported. When volume of releases is compared to the volume crude oil transported, rail and truck transport release a significantly higher percentage of the volume transported, 0.309% and 0.154% respectively. Comparatively pipeline transport release and average of 0.006% of the volume of crude oil transported.
2585-3	Dolph, Christine	The figure in the executive summary has been revised to demonstrate amount spilled per volume transported. When volume of releases is compared to the volume crude oil transported, rail and truck transport release a significantly higher percentage of the volume transported, 0.309% and 0.154% respectively. Comparatively pipeline transport release and average of 0.006% of the volume of crude oil transported.
2585-4	Dolph, Christine	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS. Changes have been made to Chapter 10.

Responses to Comments - Citizen

Response#	Commenter	Response
2585-5	Dolph, Christine	The figure in the executive summary has been revised to demonstrate amount spilled per volume transported. When volume of releases is compared to the volume crude oil transported, rail and truck transport release a significantly higher percentage of the volume transported, 0.309% and 0.154% respectively. Comparatively pipeline transport release and average of 0.006% of the volume of crude oil transported.
2585-6	Dolph, Christine	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS. Changes have been made to Chapter 10.
2585-7	Dolph, Christine	Warmwater streams and biota were considered in the DEIS. Potential impacts, including excessive turbidity, will affect warmwater systems similar to coldwater or trout waterbodies. Generally, warmwater biota are hardier than those biota found in coldwater streams and consideration of coldwater streams would be protective of warmwater biota, thus the focus on coldwater and trout systems.
2585-8	Dolph, Christine	Warmwater streams and biota were considered in the DEIS. Potential impacts, including excessive turbidity, will affect warmwater systems similar to coldwater or trout waterbodies. Generally, warmwater biota are hardier than those biota found in coldwater streams and consideration of coldwater streams would be protective of warmwater biota, thus the focus on coldwater and trout systems.
2585-9	Dolph, Christine	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS. Changes have been made to Chapter 10.
2587-1	Dougherty, Michael	Thank you for your comments on the Draft EIS. 10 miles downstream was selected for the ROI, because it was considered to be not overly conservative, and crossing widths for the RAs were unavailable. The Applicant surveyed the streams and rivers for the APR only, so small (less than 30 feet wide) and large (30 feet wide or greater) crossings are only known for this route. It would be biased to only run the two downstream buffers (30 miles for large rivers, and 10 miles for small streams) along the APR. Furthermore, it was determined that it would be overly conservative to run a 30-mile downstream buffer for all water crossings, especially since many of these water bodies are ditches and terminate within a few miles.

Responses to Comments - Citizen

Response#	Commenter	Response
1317-1	Downing, Mary Theresa	Thank you for your comments on the Draft EIS. It is unclear what details are included with the referenced direct mail promotion, and it is outside of the scope of the EIS and this response to evaluate its veracity. The methodology for evaluating existing conditions, impacts and mitigation related to employment is discussed within Chapters 5 and 6 of the FEIS. A quantitative analysis for each alternative is based on anticipated numbers of workers per construction spread. The FEIS clarifies that based on Minnesota labor contracts, at least 50% of workers would be local, and the FEIS assumes that some of the construction jobs generated by the project would be permanent, although this is based on unquantifiable market demand. Additional qualitative analysis regarding other jobs anticipated to be generated by the project is also included in the aforementioned chapters. Finally, the methodology of the IMPLAN model is included in one of the FEIS appendices; based on an IMPLAN model, a research report prepared by the University of Minnesota Duluth (April 18, 2017) identified that the Line 3 Project is estimated to support, directly and indirectly, approximately 8,600 jobs over the two-year period.
1237-1	Draper, Janet	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
1212-1	Drescher, Tod	Thank you for your comments on the Draft EIS. The High Consequence Areas (HCAs), Areas of Interest (AOIs) and Regions of Interest (ROIs) in Chapter 10, Accidental Crude Oil Releases, was developed based on input from the Minnesota Department of Natural Resources, Minnesota Department of Health, and Minnesota Pollution Control Agency, and well as existing information and relevant case studies.
1319-1	Dvorak, Andrew	Thank you for your comments on the Draft EIS. Tribal resources are addressed primarily in Chapters 9 and 11; however, references are provided throughout the EIS to note where specific resources analyses (e.g., wild rice, cultural sites) include a discussion of impacts to American Indian tribes and tribal resources.
1319-2	Dvorak, Andrew	The site selection process for modeling is discussed in detail in Section 10.3.3.1.
1319-3	Dvorak, Andrew	The modeled sites were chosen based on a thorough site selection process that included state and federal agencies and MN Department Of Commerce Energy Environmental Review and Analysis. Additional details are provided in Section 10.3.3.1.

Responses to Comments - Citizen

Response#	Commenter	Response
1319-4	Dvorak, Andrew	Since there would be few additional staff members hired for operation of the Project, there would be very little change in income tax or sales tax revenues due to increased spending by permanent operational staff. Therefore, the impact on income tax and sales tax revenues would be permanent, but at most negligible. Operation of the pipeline would have no measureable impact on local employment, per capita household income, median household income, or unemployment in the ROI.
1319-5	Dvorak, Andrew	Section 5.3.4.1 of the FEIS does state that Enbridge has appealed the amount of property taxes paid between 2012 and 2016, and that to date the appeal has not been settled. Tax implications associated with retirement/abandonment of the existing Line 3 are uncertain at this time.
2071-1	Dvorak, Elanor	Thank you for your comments on the Draft EIS. The Applicant, Enbridge, has not supplied the mentioned plan.
2071-2	Dvorak, Elanor	Additional information regarding the benefit of such analyses has been included throughout Chapter 8 of the FEIS.
2071-3	Dvorak, Elanor	Additional information regarding the benefit of additional buoyancy analyses has been included within Section 8.3 of the FEIS.
2594-1	Dvorak, Eleanor	Thank you for your comments on the Draft EIS. The regulatory framework is discussed in Chapter 3 of the FEIS.
2594-2	Dvorak, Eleanor	Publicly available datasets related to natural resources were used in the development of the FEIS. Discussion and maps are provided in Chapters 5 and 6.
2594-3	Dvorak, Eleanor	Important resources that potentially could be impacted by the proposed project were identified in the EIS process, including sensitive and high priority or critical resources. The Executive Summary highlights impacts to resources that were considered among the most important.
2594-4	Dvorak, Eleanor	All available land use acreages were used within the EIS.

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Response#	Commenter	Response
0514-1	Eagle, Jane	Thank you for your comments on the Draft EIS. The Draft EIS noted that only three reports were reviewed; the additional reports now have been reviewed. Revisions to Sections 5.4.2 and 6.4.2 have been made to show this.
0514-2	Eagle, Jane	The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release. Spill impact analysis was limited to the expected areas of impact, which are 2500 ft. and 10 miles downstream from the pipeline.
0514-3	Eagle, Jane	The 30-year timeframe was chosen to match the economic life of the project indicated by the Applicant. For purposes of comparison across alternatives, the EIS targets a consistent timeframe that is long enough to understand typical annual operating impacts/tradeoffs of the alternatives.
0674-1	Eger, Andrea	Thank you for your comments on the Draft EIS. The proposed project Environmental Protection Plan (EPP) (Appendix E in the DEIS), details wetland protection and reclamation requirements that would be implemented during construction and reclamation within wetland areas. As specified in this plan, wetland topsoil would be salvaged and stockpiled, protected from compaction, contamination, and any construction impacts. Subsoils within the construction ROW would be protected from compaction. Therefore, upon replacement, these soils would be expected to be suitable substrate to provide for natural regeneration. Section 2.7.2.4 of the DEIS notes the plan also implements any further restoration and long-term monitoring guidance required by USACE in the required CWA Section 404 permit or by the local government unit in relation to the Wetland Conservation Act permit. The EPP does not call for use of pesticides in wetland areas.

Responses to Comments - Citizen

Response#	Commenter	Response
0673-1	Eger, Andrea	Thank you for your comments on the Draft EIS. The ROI for comparisons among alternatives encompasses a 2,500-foot-wide distance extending in each direction from the centerline of the alternative (pipeline routes and transportation mode corridor); thus, the total area assessed is a 5,000-foot-wide corridor centered on the pipeline route, rail bed, or roadway. The ROI was identified as the distance that released oil could spread on flat ground (calculated to be 1,214 feet from the centerline) plus an additional distance of 1,050 feet for estimated down-gradient migration in groundwater (if groundwater were contacted); the estimated total distance of approximately 2,264 feet was rounded up to 2,500 feet. This ROI was determined to be an appropriate distance, based on a review of existing information and relevant case studies to be applied comprehensively across the HCA and AOI resources listed above, with the exception of certain drinking water resources, which are discussed in more detail in Section 10.4.2.1.1. The numbers and/or acres of HCAs and AOIs within the ROI for each alternative were determined by overlaying GIS layers for each HCA and AOI with the ROI.
0673-2	Eger, Andrea	The figure in the executive summary has been revised to demonstrate amount spilled per volume transported. The EIS has been updated to include discussion on the properties of dilbit as it weathers.
1568-1	Enbridge Energy	This change has been made.
1568-2	Enbridge Energy	No change has been made to this text. Additional information on the White Earth Reservation has been added.
1568-3	Enbridge Energy	This change has been made.
1568-4	Enbridge Energy	This change has been made.
1568-5	Enbridge Energy	This change has been made.
1568-6	Enbridge Energy	No change has been made to this statement; the EIS considers a range of alternatives.
1568-7	Enbridge Energy	This change has been made.

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Response#	Commenter	Response
1568-8	Enbridge Energy	A change has been made to reference the resolutions passed by various American Indian tribes and organizations.
1568-9	Enbridge Energy	This change has been made.
1568-10	Enbridge Energy	No change has been made to the EIS. Table 7.3-24 discusses this.
1568-11	Enbridge Energy	The changes have been made.
1568-12	Enbridge Energy	Clarification has been included in the paragraph.
1568-13	Enbridge Energy	No change has been made to the EIS.
1568-14	Enbridge Energy	This reference has been updated.
1568-15	Enbridge Energy	The changes have been made.
1568-16	Enbridge Energy	The changes have been made. The text in this section of the Executive Summary has been revised.
1568-17	Enbridge Energy	The word "far" has been removed.
1568-18	Enbridge Energy	No footnotes are associated with Table ES-3. The references to these have been removed; and additional text was included to further explain this table.
1568-19	Enbridge Energy	This change has been made.
1568-20	Enbridge Energy	This change has been made.
1568-21	Enbridge Energy	This change has been made.
1568-22	Enbridge Energy	No change has been made to the EIS
1568-23	Enbridge Energy	This change has been made.

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Response#	Commenter	Response
1568-24	Enbridge Energy	This change has been made.
1568-26	Enbridge Energy	The text noted has been removed.
1568-28	Enbridge Energy	Edits have been made accordingly.
1568-29	Enbridge Energy	This change has been made.
1568-30	Enbridge Energy	This change has been made.
1568-31	Enbridge Energy	This change has been made.
1568-32	Enbridge Energy	This change has been made.
1568-33	Enbridge Energy	This change has been made.
1568-34	Enbridge Energy	Appendix B describes a process using nitrogen gas and a series of pigs to purge the line of product prior to cleaning and rinsing. After that, Enbridge proposes to disconnect and seal the various sections. They do not intend to fill each emptied section with inert gas after cleaning. This process follows the process described in Commerce's reference.
1568-35	Enbridge Energy	The changes have not been made.
1568-36	Enbridge Energy	This change has been made.
1568-37	Enbridge Energy	This change has been made.
1568-38	Enbridge Energy	This change has been made.
1568-39	Enbridge Energy	This change has been made.
1568-40	Enbridge Energy	This change has been made.

Responses to Comments - Citizen

Response#	Commenter	Response
1568-41	Enbridge Energy	This change has been made.
1568-42	Enbridge Energy	The changes have been made.
1568-43	Enbridge Energy	As RA-06, RA-07, and RA-08 would cross the Minnesota Coastal Zone, this section has been left as is.
1568-44	Enbridge Energy	The changes have been made.
1568-45	Enbridge Energy	This change has been made.
1568-46	Enbridge Energy	This change has been made.
1568-47	Enbridge Energy	This change has been made.
1568-48	Enbridge Energy	This change has been made.
1568-49	Enbridge Energy	This comment has been considered; however, no changes were made.
1568-50	Enbridge Energy	This change has been made.
1568-51	Enbridge Energy	Publicly available datasets and field reports were used to develop the FEIS.
1568-52	Enbridge Energy	This change has been made.
1568-53	Enbridge Energy	This comment has been considered; however, no changes made.
1568-54	Enbridge Energy	Karst bedrock removed from statement.
1568-55	Enbridge Energy	The text as noted has been changed to reflect blasting will be approximately 1/4 mile in length.
1568-56	Enbridge Energy	Modified text to reflect blasting comment as noted in DR01-70.
1568-57	Enbridge Energy	Corrected text to identify WPA within ROI of APR.

Responses to Comments - Citizen

Response#	Commenter	Response
1568-58	Enbridge Energy	Text modified to reflect karst topography along SA-04.
1568-59	Enbridge Energy	Summary information was modified to reflect that the APR crosses more highly susceptible groundwater and is there for somewhat more critical in this respect.
1568-60	Enbridge Energy	This comment has been considered; however, no changes made.
1568-61	Enbridge Energy	Text added to include USACE Section 404/10 requirement.
1568-62	Enbridge Energy	Deleted text.
1568-63	Enbridge Energy	Text modified to reflect county permit requirements.
1568-64	Enbridge Energy	Text has been modified to reflect that 17 wild rice lakes occur within 0.5 mile of APR.
1568-65	Enbridge Energy	Text revised to show these resources are within 0.5 mi of APR.
1568-66	Enbridge Energy	GIS analysis shows 4 wild rice lakes and ~5 acres impacted. Text modified as such.
1568-67	Enbridge Energy	The text has been deleted.
1568-68	Enbridge Energy	Modified text per comment.
1568-69	Enbridge Energy	Comment noted, although impacts discussion related to fens is still relevant, and has not been revised.
1568-70	Enbridge Energy	This change has been made.
1568-71	Enbridge Energy	The text has been corrected to reflect 1/4 mile of blasting.
1568-72	Enbridge Energy	All acreage numbers in the tables have been checked and all are now consistent with one another.
1568-73	Enbridge Energy	The text was modified to reflect the blasting comment as noted in DR01-70.
1568-74	Enbridge Energy	This statement is about existing conditions, and not impacts.

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Response#	Commenter	Response
1568-75	Enbridge Energy	The Environmental Assessment Worksheet (EAW) indicates 3.4 acres of permanent access roads and 1.2 acres for mainline valves (MLVs), and 60.2 acres for facilities. The EIS has been updated.
1568-76	Enbridge Energy	The EIS has been updated.
1568-77	Enbridge Energy	The EIS has been updated.
1568-78	Enbridge Energy	The EAW indicates 3.4 acres of permanent access roads and 1.2 acres for MLVs, and 60.2 acres for facilities. Table 5.2.2-4 and other pertinent sections of the EIS for the preferred route and SA-04 have been updated.
1568-79	Enbridge Energy	The text has been changed to reflect the incomplete and preliminary nature of MBS site mapping to the following statement: Delineation of MBS Sites is an on-going effort. These data are therefore incomplete and are considered to be preliminary. What are available for intersection with the Applicant's proposed project and CN Alternatives are illustrated in Figure 5.2.3-2.
1568-80	Enbridge Energy	Table 5.2.3-3 has been revised. All noxious weeds and invasive plant species mapped along the APR and Alternative SA-04 are listed, distinguished by route. Data from all traversed states are included. In addition, respective states' noxious weed law status categories are included for all listed species and all common names have been revised for accuracy.
1568-81	Enbridge Energy	Verified total stated in Table 5.2.3-16 is correct. Revised total shown in Table 5.2.3-18 to be consistent. Checked all other values in table 5.2.3-18 for accuracy and consistency with source text and tables.
1568-82	Enbridge Energy	This edit has been made.
1568-83	Enbridge Energy	A statement was added that no salmon occur in APR-crossed streams or rivers.
1568-84	Enbridge Energy	Text modified to reflect that these type management units may be in the vicinity of the Applicant's proposed project.
1568-85	Enbridge Energy	Publicly available datasets and field reports were used to develop the FEIS.

Responses to Comments - Citizen

Response#	Commenter	Response
1568-86	Enbridge Energy	The sentence is reference refers to existing Line 3, not the Applicant's proposed project as the comment suggests. The route of the existing Line 3 pipeline does cross a wildlife refuge.
1568-87	Enbridge Energy	Table 5.2.4-6 was corrected to reflect text.
1568-88	Enbridge Energy	This was corrected to match crossing method noted in Appendix G.
1568-89	Enbridge Energy	The table title was revised to show streams within 0.5 mi of the Applicant's preferred route (APR).
1568-90	Enbridge Energy	Although APR does not cross Pembina WPA, an access road will impact 1.5 acres. These changes have been made to Table 5.2.4-8.
1568-91	Enbridge Energy	The text has been revised.
1568-92	Enbridge Energy	Text has been revised to indicate that conservation measures have not been received by the Applicant from the USFWS or Minnesota DNR regarding rookeries.
1568-93	Enbridge Energy	Text has been revised to indicate that the aboveground portion of the TransAlaska Pipeline is limited.
1568-94	Enbridge Energy	Table 5.2.3-8 has been updated to more accurately reflect the dominant vegetation present in the Applicant's proposed project and SA-04.
1568-95	Enbridge Energy	The table has been modified to reflect impacts discussed for SA-04.
1568-96	Enbridge Energy	The text was revised to further define consultation under Section 7 of the Endangered Species Act.
1568-97	Enbridge Energy	The text was revised to avoid confusion between federal and state processes concerning listed species.
1568-98	Enbridge Energy	Publicly available datasets and field reports were used to develop the FEIS. The 2014 northern long-eared bat mist-net and telemetry survey report was added to the bulleted list.
1568-99	Enbridge Energy	The text was revised to reflect the species presented in Table 5.2.5-3.

Responses to Comments - Citizen

Response#	Commenter	Response
1568-100	Enbridge Energy	Table 5.2.5-3 and associated text was updated to include Cass County in the geographic range for the rusty patched bumble bee.
1568-101	Enbridge Energy	The sentence in reference summarizes the species included in Table 5.2.5-4, including the northern long-eared bat. Additionally, the section in reference includes a sentence indicating the northern long-eared bat is a Minnesota state species of special concern. As such, no change was made.
1568-102	Enbridge Energy	Illinois was removed from the state/status column of Table 5.2.5-4.
1568-103	Enbridge Energy	Publicly available datasets and field reports were used to develop the FEIS. Reference was changed to Merjent 2016c.
1568-104	Enbridge Energy	Publicly available datasets and field reports were used to develop the FEIS.
1568-105	Enbridge Energy	The text was revised to include a restricted speed limit as a typical conservation measure to reduce impacts to gray wolves.
1568-106	Enbridge Energy	The text was revised to include results from the 2014 and 2015 bat mist-net and telemetry surveys conducted within the Applicant's proposed project.
1568-107	Enbridge Energy	Publicly available datasets and field reports were used to develop the FEIS. Text was revised to indicate that three potentially suitable habitat areas for the Dakota skipper and Poweshiek skipperling were found along the Applicant's proposed project during the initial desktop habitat assessment.
1568-108	Enbridge Energy	The section in reference includes language indicating that the Applicant's proposed project would not cross any high use areas for the rusty patched bumble bee. A text revision was made to clarify that hibernating queens are present in the winter.
1568-109	Enbridge Energy	Text revised to indicate temporary to short term and negligible construction impacts are expected for the Dakota skipper. Details regarding the survey results for each species precede the referenced text.

Responses to Comments - Citizen

Response#	Commenter	Response
1568-110	Enbridge Energy	Text was revised to include restricted vehicular speed limits as a conservation measure to minimize/avoid impacts to the gray wolf.
1568-111	Enbridge Energy	Text was revised to indicate that operational impacts on the northern long-eared bat would only occur if trees are allowed to grow larger than 3 inches diameter at breast height between maintenance activities.
1568-112	Enbridge Energy	Text revised to indicate permanent, negligible construction impacts are expected for the Dakota skipper and Poweshiek skipperling. Details regarding the survey results for each species precede the referenced text.
1568-113	Enbridge Energy	Text was revised to indicate that operational impacts on the Canada lynx and gray wolf are both expected to be temporary and minor.
1568-114	Enbridge Energy	A footnote clarification was added to the table in reference, and to similar tables.
1568-115	Enbridge Energy	Revised per comment.
1568-116	Enbridge Energy	References to the APR crossing of the Pembina WPA removed.
1568-117	Enbridge Energy	Sentence removed per comment.
1568-118	Enbridge Energy	FEIS paragraph revised per comment.
1568-119	Enbridge Energy	Confirmed that no county-owned lands would be crossed by SA-04.
1568-120	Enbridge Energy	Revised per comment.
1568-121	Enbridge Energy	The text has been revised to address comment.
1568-122	Enbridge Energy	The text has been revised to address comment.
1568-123	Enbridge Energy	The number of acres of trees logged is corrected in Chapter 5. The numbers in Chapter 6 are correctly reported. No changes were made in Chapter 6.

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Response#	Commenter	Response
1568-124	Enbridge Energy	The text has been revised to address comment. Additional details will be provided in the air permit.
1568-125	Enbridge Energy	This comment has been considered; however, no changes were made. No record of how these emissions are estimated is available. The difference in the emissions is expected to be minor.
1568-126	Enbridge Energy	No change made to EIS. The social cost of carbon provides context for the long term costs associated with GHG emissions.
1568-127	Enbridge Energy	No change made to EIS, life cycle analysis included per scope. While C-intensity of electricity will change over the next 30 years, the exact trajectory is speculative at best, and for comparative purposes going through that exercise doesn't really add much value.
1568-128	Enbridge Energy	The text has been revised to address comment.
1568-129	Enbridge Energy	No changes made. The acres of trees logged is taken from Table 5.3.1-9. Forested Land Crossed by System Alternative SA-04 (acres) and is correct as-is.
1568-130	Enbridge Energy	Air emissions associated with continued operations are ongoing and considered part of the existing environment. Air emissions associated with integrity digs for continued use of existing Line 3 have not been quantified in the EIS. The incremental emissions from other options are provided.
1568-131	Enbridge Energy	The table has been revised per the comment received.
1568-132	Enbridge Energy	The table has been revised per the comment received.
1568-133	Enbridge Energy	The table has been revised per the comment received.
1568-134	Enbridge Energy	The text has been revised per the comment received.

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Response#	Commenter	Response
1568-135	Enbridge Energy	Section 5.3.1.3.3 addresses how active mining activities may be disrupted: construction activities would temporarily prevent development of these resources for duration of construction, but mineral resources outside of the permanent right-of-way and permanent facilities could be available for extraction after construction was complete. Sections 5.3.1.2 and 5.3.1.3 do not attempt to quantify the value of mineral resources; rather, construction and operations impacts anticipated to occur to mineral resources are compared based on acreage, not monetary value.
1568-136	Enbridge Energy	Footnote added to Table 5.3.1-11
1568-137	Enbridge Energy	Available data was used to provide the analyses discussed within the FEIS.
1568-138	Enbridge Energy	The text has been revised per the comment received.
1568-139	Enbridge Energy	The text has been revised per the comment received.
1568-140	Enbridge Energy	The text has been revised per the comment received.
1568-141	Enbridge Energy	Paragraph already addresses concern stated in comment; therefore, no further revisions were made.
1568-142	Enbridge Energy	As stated in the section referenced in the comment, it was assumed that all workers would be non-local and bring their families in order to establish a "worst-case scenario" within the population analysis. Statements throughout the FEIS note that this is unlikely.
1568-143	Enbridge Energy	Table 5.3.3-15 is correct (15 Populated Areas); text in document has been revised per the comment received.
1568-144	Enbridge Energy	Section 5.3.3.3.1 does discuss impacts to traffic; therefore, no further revisions were made.
1568-145	Enbridge Energy	The report has been included as Appendix R.
1568-146	Enbridge Energy	Based on our review, it is already clear that these impacts are positive; therefore, no further revisions were made.

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Response#	Commenter	Response
1568-147	Enbridge Energy	The text has been revised per the comment received.
1568-148	Enbridge Energy	As noted in the comment, the referenced report was provided by the Applicant as part of direct testimony and was considered.
1568-149	Enbridge Energy	To the extent possible, NRHP data has been incorporated into the section. However, it will only include those that are already listed and not those that are recommended as eligible.
1568-150	Enbridge Energy	This sentence has been removed.
1568-151	Enbridge Energy	Impacts to Tribal Lands is discussed in Section 6.2.3, Aesthetics/Visual Resources. This Section details the impacts to crossing of American Indian reservations in the State of Minnesota.
1568-152	Enbridge Energy	Utilizing the principles of the USFS' SMS provided a method to consistently analyze visual impacts and landscapes along the entire Project. The methodology was used for the entire route of the pipeline in order to maintain consistency in the analysis. Federal management standards are routinely utilized for non-public lands in order to provide a defensible analysis.
1568-153	Enbridge Energy	Section 6.2.3.2.1 revised to reflect correct acreages in Table 6.2.1-2
1568-153	Enbridge Energy	Utilizing the principles of the USFS' SMS provided a method to consistently analyze visual impacts and landscapes along the entire Project. The methodology was used for the entire route of the pipeline in order to maintain consistency in the analysis. Federal management standards are routinely utilized for non-public lands in order to provide a defensible analysis.
1568-154	Enbridge Energy	Enbridge has confirmed that RA-03AM would not cross the Crane Meadows Wildlife Refuge. Mention of the Crane Meadows Wildlife Refuge removed from the FEIS.

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Response#	Commenter	Response
1568-155	Enbridge Energy	Road crossings updated per GIS analysis. Correct road crossings for the APR is now 320. Paragraph dealing with other states omitted
1568-156	Enbridge Energy	Road crossings updated per GIS analysis. Correct road crossings for the APR is now 320. Paragraph dealing with other states omitted.
1568-157	Enbridge Energy	Clarifications regarding 401 permitting have been added to the paragraph.
1568-158	Enbridge Energy	The footnotes have been revised for clarification.
1568-159	Enbridge Energy	Due to the existence of Gully 30, this discussion has not been removed.
1568-160	Enbridge Energy	Revised to say "Coarse-textured soils are present."
1568-161	Enbridge Energy	Errors in the table were corrected.
1568-162	Enbridge Energy	EIS updated
1568-163	Enbridge Energy	Noted.
1568-164	Enbridge Energy	EIS updated
1568-165	Enbridge Energy	A further description of Minnesota's Wildlife Action Network (WAN) is provided in Section 5. A reference to that section has been added to Section 6.3.5.2.1.
1568-166	Enbridge Energy	The gray wolf (not associated with the Great Lakes Distinct Population Segment) and whooping crane have been removed from Table 6.3.5-1.
1568-167	Enbridge Energy	Citation removed.
1568-168	Enbridge Energy	Reference to the whooping crane has been removed from this sentence.
1568-169	Enbridge Energy	Table 6.3.5-45 revised to match the numbers presented in Tables 6.3.5-21 and 6.3.5-22.

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Response#	Commenter	Response
1568-170	Enbridge Energy	To the extent possible, NRHP data will be incorporated into the section. However, it will only include those that are already listed and not those that are recommended as eligible.
1568-171	Enbridge Energy	The table has been revised per the comment received.
1568-172	Enbridge Energy	Text has been revised to state that 13 populated areas are located along/near the Applicant's Preferred Route. Clearbrook appears in Table 6.5.3-1 twice, but is only counted once; hence 13 populated areas.
1568-173	Enbridge Energy	The text has been revised per the comment received.
1568-174	Enbridge Energy	Sufficient examples have already been provided; therefore, no further revisions have been made.
1568-175	Enbridge Energy	Section 6.5.3.3.1 of the FEIS includes discussion on what constitutes as worst-case scenario. "In the event that two construction spreads are adjacent to each other during construction, a maximum of 1,200 workers could be present in a county at a given time. In the largest county crossed by the Applicant's preferred route (Crow Wing County), it would represent a 2-percent increase in population. In the smallest county crossed by the route (Red Lake County), this would represent 30 percent of the county's total population. Additionally, Kittson County (27 percent), Marshall County (13 percent), and Clearwater County (14 percent) all would experience population increases over 10 percent of their current population. For these counties, additional strain may be expected in a worst-case scenario. Added population would create more traffic on roadways and emergency services, as discussed in Section 6.2.5. As discussed in Section 6.2.4, the total housing available is expected to be adequate. While adequate housing may be available across the ROI and the potential population increase would be less than 10 percent for most counties, 4 of the 12 counties (Red Lake, Kittson, Marshall, and Clearwater) could experience more than a 10-percent increase in population if all workers from two construction spreads were present in the county at the same time. This could result in congestion on the roads and within the service industry area (e.g., restaurants, gas stations). However, the worst-case scenario of two construction spreads operating close to each other would be temporary as pipeline construction moves along the route, and any local impacts would diminish."

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Response#	Commenter	Response
1568-176	Enbridge Energy	Based on our review, it is already clear that these impacts are positive; therefore, no further revisions were made.
1568-177	Enbridge Energy	The report has been included as Appendix R.
1568-178	Enbridge Energy	This paragraph has been updated accordingly.
1568-179	Enbridge Energy	The reference to hibernacula has been removed.
1568-180	Enbridge Energy	The un-impacted wild rice waterbodies have been removed from the paragraph.
1568-181	Enbridge Energy	The statement has been clarified to demonstrate that the APR would also not impact the referenced WMA's.
1568-182	Enbridge Energy	The RSA section has been updated to reflect that no further analysis is merited because this RSA is non-viable.
1568-183	Enbridge Energy	No changes have been made.
1568-184	Enbridge Energy	The statement has been revised to reflect that no comparison between the RSA and the APR is made.
1568-185	Enbridge Energy	This portion of the text has been removed and moved to the section on treaties.
1568-186	Enbridge Energy	The figures in Chapter 9 have been revised, and a new figure has been added. The references to the figures have been updated throughout the chapter.
1568-187	Enbridge Energy	This section has been re-organized to more clearly show what existing regulations are at the federal and state level.
1568-188	Enbridge Energy	This text has been revised to show that these are the sentiments of members of the Mille Lacs Band. In this manner, it is not referencing the APR's geographic crossing of these wildlife refuges.
1568-189	Enbridge Energy	This paragraph has been revised and moved within the section to show that these are locations that are contain potential waterfowl habitat more generally within Minnesota.

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Response#	Commenter	Response
1568-190	Enbridge Energy	The context for this paragraph is to show the types of resources that are present. As such, no change has been made, as it does not reference where the Applicant's preferred route or route alternatives would cross.
1568-191	Enbridge Energy	Table 6.3.2.1-6 was revised per GIS analysis of rice lakes. Text for this comment was revised to match the table in Chapter 6. Also, a similar table is included in Chapter 5.
1568-192	Enbridge Energy	This text has been removed per the comment received.
1568-193	Enbridge Energy	The reference to Brave Heart, M.Y.H. 2011 has been removed. Additional references regarding this topic are provided.
1568-194	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-195	Enbridge Energy	EIS updated. Major now used for spills >10,000 bbl. Catastrophic reserved for failure discussion.
1568-196	Enbridge Energy	The AER data and results should not be used in the EIS. Oilfield pipelines are different than transmission pipelines in many ways that affect the failure rate by mechanism. Less stable crude is more corrosive, third party damage is less likely, SCADA is not typical on oilfield lines. This said, the potential impact of the AER data on the AFF is minor. This is discussed in risk analysis memo attached to Chapter 10. Application of a consistent bias in the failure rate calculations would enable a comparative assessment to be made, however the DEIS used the AER data inconsistently, not consistently. It drew from the AER data to produce a 3rd party damage contribution to the upland pipeline lengths.
1568-197	Enbridge Energy	Although the text of the EIS states the scaling performed using the rupture failure rate of 5%, the use of this scaling in the calculated frequencies could not be validated. Another references place the rupture frequency to total leak frequency at from 5-23% over the past 16 years (CONCAWE)
1568-198	Enbridge Energy	Third party damage rates for AER data will not be an appropriate dataset to use for the Line 3 project. Another reference report the 3rd party fraction of total leaks at 68% (CONCAWE)

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Response#	Commenter	Response
1568-199	Enbridge Energy	Equipment failure rates are a separate category from mainline pipe failures. Direct comparisons cannot be made between equipment only failure rates and equipment and pipeline failures. The AER data is dominated by oilfield flowlines and gathering systems, the equipment failure rates will not be comparable to transmission pipeline equipment failure rates. It appears that the authors of the EIS defined an additive factor, based on the described equipment failure rate of 5*10E-05/mi*yr., and applied it to pipeline lengths traversing upland areas, hence no attempt was made to co-locate the equipment failure rates with the proposed location of pump stations.
1568-200	Enbridge Energy	Failure rate by cover was developed from 4 sources; Enbridge DOS 2014, DOS 2017, Stantec 2017 and AER. Failure rate by spill magnitude was developed from 3 sources: Stantec and Barr 2017, Stantec 2017 and DOS 2017. Explanation of these AFF and validity are provided in the risk analysis memo attached to Chapter 10.
1568-201	Enbridge Energy	This is a known issue and the failure probability calculation could not be verified.
1568-202	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-203	Enbridge Energy	Table 10.2-4 provides Estimated Annual Probabilities of Failure and Recurrence Intervals for the Applicant's Preferred Route and Route Alternatives between Clearbrook and Carlton, however the failure rates basis is the same for the Applicant's preferred route and SA-04, as discussed in the EIS.
1568-204	Enbridge Energy	Probability is quantified as a number between 0 and 1 and does not have a unit of measure. If the EIS was discussing percent probability then the % unit would have been used.
1568-205	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-206	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-207	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.

Responses to Comments - Citizen

Response#	Commenter	Response
1568-208	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-209	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-210	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-211	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-212	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-213	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-214	Enbridge Energy	The EIS indicates following clean-up efforts that successfully removed approximately 75 percent of the released oil, the U.S. Geological Survey, Minnesota Pollution Control Agency (Minnesota PCA), Enbridge, and Beltrami County established the National Crude Oil Spill Research Site in Bemidji to evaluate the migration and evolution of the remaining contaminant plume.
1568-215	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-216	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-217	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-218	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-219	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-220	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-221	Enbridge Energy	Commodity production limited to Publicly managed resources (forests and wild rice harvest areas)
1568-222	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.

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Response#	Commenter	Response
1568-223	Enbridge Energy	EIS refers only to bioaccumulation of toxic products, such as metals, associated with hydrocarbons, not bioaccumulation of hydrocarbons.
1568-224	Enbridge Energy	Noted.
1568-225	Enbridge Energy	This information is incorporated when discussing soil impacts and use of fertilizer to promote biodegradation. The discussion referenced is discussing the impacts to vegetation from spills.
1568-226	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-227	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-228	Enbridge Energy	Discussion provided in Section 10.1
1568-229	Enbridge Energy	The EIS has been updated to account for the information provided as part of this comment.
1568-230	Enbridge Energy	The reference has been added to the chapter.
1568-231	Enbridge Energy	The text has been revised per the comment received.
1568-232	Enbridge Energy	The text has been revised per the comment received.
1568-233	Enbridge Energy	The comment states that, "field surveys for sensitive flora were conducted in this area between 2013 and 2016, and no threatened or endangered plant species were found." However, while the comment only mentions plant species, the section specifically mentions tree removal and potential effects on the northern long-eared bat. Furthermore, it is unclear what surveys have been completed for the MPL-Laporte 115kV project, which could identify the potential for impacts within the environmentally relevant area. Therefore, we believe that the FEIS language in section 12.3.1.4.5 is accurate.

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Response#	Commenter	Response
1568-234	Enbridge Energy	Chapter 9 has been revised to show that only the route alternatives were evaluated in detail. However, it also notes that the system alternative (SA-04) if it were to be considered as a potential route would have similar impacts, especially when discussed from a qualitative perspective and the impact on non-physical elements of tribal resources (e.g., spirituality, connections to the environment).
1568-235	Enbridge Energy	The text has been revised per the comment received.
1568-236	Enbridge Energy	The comment has been considered. No change made.
1568-237	Enbridge Energy	Missing citation is included in the FEIS.
2603-1	Enbridge Energy	The Executive Summary was written in order to provide highlights and key outcomes of the analyses. MN 4410.2300 B. indicates the summary should stress the major findings, areas of controversy, and the issues to be resolved. The Executive Summary includes this information.
2603-2	Enbridge Energy	The Executive Summary has been revised to account for changes made throughout the document, as well as to account for comments received during the public comment period. While compliance with regulations and permit conditions may help to mitigate potential impacts, these are not true mitigation measures.
2603-3	Enbridge Energy	Table 5.2.1.2-3 identifies the state and crossing milepost for each crossing to make the locations more clear.
2603-4	Enbridge Energy	The e-docket numbers have been added to the section.
2603-5	Enbridge Energy	Section 4.2.5.3 indicates the need for other permits if SA-04 were to be considered as a project.
2603-6	Enbridge Energy	Text within Chapter 3 has been revised to account for the information provided as part of this comment.
2603-7	Enbridge Energy	SA-04 is a conceptual alternative. It is not one that has been submitted by an applicant for permitting or review. The purpose of the alternative is to provide an appropriate comparison within the evaluation of CN alternatives.

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Response#	Commenter	Response
2603-8	Enbridge Energy	See comment response to #2603-7.
2603-9	Enbridge Energy	See comment response to #2603-7.
2603-10	Enbridge Energy	The measure of 193.3 CO2-e tons/year emissions is estimated correctly. However, the no displacement scenario presents a case for “new 760,000 of WCSB heavy” in addition to the “existing line 3,”which amounts to 193 million tons CO2e plus 80.5 million tons of CO2e, totaling 273.5 million tons of CO2e per year. This is represented in Table 5.27-11 correctly.
2603-11	Enbridge Energy	Thank you for the information provided as part of this comment. This information was reviewed and considered for the development of the Final EIS. Additional information has been included in the discussion of the route alternatives in Chapter 4, as well as throughout the EIS.
2603-12	Enbridge Energy	Thank you for the information provided as part of this comment. This information was reviewed and considered for the development of the Final EIS. Additional discussion has been added to Chapter 7 for each of the route segment alternatives evaluated as part of the EIS.
2603-13	Enbridge Energy	Thank you for your comments on the Draft EIS. Additional information has been included in Sections 8.3 and 8.4.
2603-14	Enbridge Energy	Cumulative impacts are discussed in Chapter 12; additional information also has been added to Chapter 8 with regard to removal.
2603-15	Enbridge Energy	Thank you for your comment. Additional information regarding potential future mitigation and regulatory liability has been added throughout Chapter 8.
2603-16	Enbridge Energy	Additional information regarding potential subsidence has been included in Section 8.3.
2603-17	Enbridge Energy	References to Chapter 9 have been made throughout the EIS to note where information also may be discussed with relation to the American Indian tribes.

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Response#	Commenter	Response
2603-18	Enbridge Energy	A statement was added to Chapter 9 to show why the focus is on the route alternatives, rather than the CN alternatives (i.e., SA-04). This addition shows how impacts would be similar in type, although in a different geographic location.
2603-19	Enbridge Energy	Quotations within Chapter 9 have been attributed to the individuals who have made them. Information included within Chapter 9 from the TASC report is not represented as having a legal meaning or requirement. It simply notes some resource areas; in some cases, a second source is provided. The first sentence within the hunting discussion has been adjusted to more accurately show that the GLIFWC publication references regulations when hunting on ceded lands. An additional source was provided, as well. The figures have been revised; source information is provided as part of the legend (e.g., DNR, MPCA). The cultural corridors are noted as being developed through consultation with tribal members. This information is provided in a footnote.
2603-20	Enbridge Energy	Chapter 9 was revised to include additional discussion on the potential impacts to tribal resources. This particular section was revised to show this refers to direct impacts on tribal resources that are located within reservations.
2603-21	Enbridge Energy	Additional text is included in Chapter 9 to show that while the emphasis is on American Indian tribes, lands, and resources within Minnesota, the potential for impacts extends beyond the boundaries of the state. Where information was obtained from the tribes or where geographic place names could be provided, Chapter 9 provides this information.

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Response#	Commenter	Response
2603-22	Enbridge Energy	The discussion of the project description is provided in Chapter 2. It provides the various details of what will be done if the project receives the necessary permits and approvals. A section has been added to show how the Applicant's preferred route does not cross American Indian Reservations and notes the consideration made to avoid the two reservations for which the existing Line 3 crosses. However, text was added to show that if differences in boundaries are considered for the White Earth Reservation, the APR (and RA-03AM) would cross this land.
2603-23	Enbridge Energy	Information on RSA-05 has been added to the project description in Chapter 2. This addition includes the rationale as noted in the comment provided.
2603-24	Enbridge Energy	Information has been incorporated into Sections 5.4 and 6.4 to account for the additional archaeological surveys and results of these investigations that were not accounted for within the draft EIS. However, as the primary basis of the analysis was on SHPO database records, further discussion of the Applicant's specific methodology and reporting was not necessary.
2603-25	Enbridge Energy	A section has been added to Chapter 9 to more clearly show the federal regulations associated with tribal consultation. A statement also is provided within Chapter 9 under state regulations to show that the SHPO will continue to consult with the Applicant and other agencies. A specific reference to the Army Corps of Engineers process is not noted within Chapter 9. Policies associated with the Army Corps are noted in Appendix P, and information on needed permits/consultation is noted in the Executive Summary and Chapter 3.
2603-26	Enbridge Energy	The information received from American Indian tribes and tribal organizations is provided in Appendix P. As noted in the comment provided, sensitive information is not included.

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Response#	Commenter	Response
2603-27	Enbridge Energy	Chapter 9 has been revised to include additional discussion regarding potential impacts to tribal resources. In this manner, references were provided to individual sections within Chapters 5 and 6. An additional discussion was included in Chapter 11, Environmental Justice, as well, to document potential impacts to American Indian tribes.
2603-28	Enbridge Energy	While specific references were not provided to the report noted as part of this comment, references to Chapter 10 were noted to indicate where the discussion of spills is located.
2603-29	Enbridge Energy	While specific references were not provided to the report noted as part of this comment, references to Chapter 10 were noted to indicate where the discussion of spills is located.
2603-30	Enbridge Energy	While specific references were not provided to the report noted as part of this comment, references to Chapter 10 were noted to indicate where the discussion of spills is located.
2603-31	Enbridge Energy	Chapter 9 was re-organized. Additional information has been provided on the various treaties, including how usufructuary rights are addressed and how reservations were formed.
2603-32	Enbridge Energy	The introduction to the impacts assessment in Chapter 9 has been revised to more clearly show that a portion of the discussion is a summary of the information provided in Chapters 6, 8, and 10 and thereby represents the more quantitative approach to the analysis and that a portion noted as overall impacts accounts for the more qualitative approach.
2603-33	Enbridge Energy	The statement regarding impacts “as difficult, if not impossible, to mitigate” refers to those that are qualitative in nature. In this regard, it does not detract from mitigation measures noted in other chapters of the EIS.

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Response#	Commenter	Response
2603-34	Enbridge Energy	The particular project cited as part of this comment was a joint federal/state effort due to the involvement of the USDA. In this regard, the tribal consultation requirements and responsibilities are different than for this EIS, which is a state requirement. Chapter 9 was re-organized to more clearly show the responsibilities for consultation for federal and state agencies. In this manner, the impacts and mitigation discussed as a part of that project do not necessarily correlate to what is provided as part of this EIS.
2603-35	Enbridge Energy	Additions have been made to Chapter 9 to acknowledge that other pipelines are present within the Mainline Corridor and are in operation. One of the purposes of Chapter 9 was to include information specific to tribes that may be impacted by the Applicant's preferred route and the route alternatives. While a pipeline may be built in other parts of the country as noted in this comment, this EIS considers the unique resources and input by the American Indian tribes with a particular interest in Minnesota and with an ancestral or geographic tie to the project location. This may lead to different types of information included in this environmental review document, as well as different views and perspectives as to what the pipeline means. Where possible, quotations and input provided by the tribes is included in Chapter 9 and in Appendix P.
2603-36	Enbridge Energy	Appropriate citations and information related to the applicant's efforts have been included in Section 10.2.
2603-37	Enbridge Energy	Additional information has been included throughout Section 10.3.
2603-38	Enbridge Energy	Section 10.3.1 has been updated in include additional discussion on methods of modeling releases.
2603-39	Enbridge Energy	The identified definitions have been included in Section 10.2.
2603-40	Enbridge Energy	The identified details have been included in Section 10.2.1.1.2.
2603-41	Enbridge Energy	Additional information related to adhesion has been included in Section 10.2.1.2.1.
2603-42	Enbridge Energy	The proposed additions in this comment were reviewed. No changes were made the FEIS.

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Response#	Commenter	Response
2603-43	Enbridge Energy	This information is discussed in Section 10.3.1.
2603-44	Enbridge Energy	The modeling work is presented in Section 10.3.1.
2603-45	Enbridge Energy	Additional information on the models and methods has been included in Section 10.3.1.
2603-46	Enbridge Energy	Additional summary information has been included in Section 10.3.5 and 10.3.6.
2603-47	Enbridge Energy	Recovery of various groups is discussed throughout Section 10.4.2.
2603-48	Enbridge Energy	The DOC had discussions with the MPCA to determine the appropriate way to evaluate Environmental Justice (EJ) impacts. Within this analysis, it was determined that a comparison to each county and the 10 percentage points greater was important as the route passes through some of the poorest counties within the State. This methodology is an acceptable one per industry standards.
2603-49	Enbridge Energy	While a table as noted in the comment was not included in the Final EIS, additional information was provided on American Indian tribes
2603-50	Enbridge Energy	Distances have been added to this statement.
2603-51	Enbridge Energy	The names of tribal members provided quotes has been provided in Chapter 9. A list of all those included in the interviews also is included.

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Response#	Commenter	Response
2603-52	Enbridge Energy	Section 11 of the EIS addresses concerns regarding sex trafficking that have been raised by commenters, local communities, and other communities where pipelines have been sited or proposed. The EIS cites two sources when noting that increases in sex trafficking, particularly among Native populations, is well documented (National Congress of American Indians Policy Research Center 2016), and that American Indian and minority populations can be at higher risk based on various factors (Minnesota Department of Health [MDH] 2014). The conclusion can be generally drawn that these concerns have the potential to be amplified with the addition of a cash-rich workforce. To address this potential, and to address the concern that rural areas may not have resources necessary to detect and prevent these activities, Section 11.4 of the FEIS indicates that the applicant may provide funding to local and tribal law enforcement to support efforts to awareness and prevention.
2603-53	Enbridge Energy	Additions to Chapter 11 have been made to provide a summary of the resource-specific impacts. References to the individual sections also are included.
2603-54	Enbridge Energy	The e-docket numbers have been added to the Section.
2603-55	Enbridge Energy	A sentence has been added to show that this analysis focuses on projects located within Minnesota.
2603-56	Enbridge Energy	The information provided as part of this comment has been considered in developing the cumulative impacts discussion. Additional information has been added to Chapter 8 on removal as an individual activity.
0825-1	Fahlstrom, Jeanne	Thank you for your comments on the Draft EIS. If Line 3 is abandoned in place it will be cleaned out to remove existing product.
0825-2	Fahlstrom, Jeanne	Section 8.4.1 of the FEIS notes the approximate cost of removal as well as an estimate for the number of potential jobs created during a removal effort - approximately half of the jobs generated by construction of a new Line 3.
0825-3	Fahlstrom, Jeanne	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS. Changes have been made to Chapter 10.

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Response#	Commenter	Response
2610-1	Ferber, Margaret	Thank you for your comments on the Draft EIS. Sections 5.3 and 6.5 of the FEIS assesses the potential Project-related impacts with respect to commodity production; recreation and tourism; and employment, income, and tax revenues.
2610-2	Ferber, Margaret	The comment has been considered in the development of the FEIS.
2611-1	Ferber, Rich	Thank you for your comments on the Draft EIS. Impact analysis on surficial aquifers is included in the FEIS.
2612-1	Ferguson, Catherine	Thank you for your comments on the Draft EIS. The multiple use designations, applied standards and criteria, and impairment (or not) make comparison of basic physicochemical parameters difficult when assessing a waterbody in comparison to another. Although reduced dissolved oxygen may be critical for support of various biota in one system, this may not hold true for all. This is the basis for the statement.
2612-2	Ferguson, Catherine	The soil analysis was derived from SSURGO and STATSGO2 data developed by soils surveys conducted by the NRCS. While details specific to every soil component of every mapped soil was not provided, the characteristics that may be sensitive to disturbance, including prime farmland, soils highly erodible by water or wind, hydric soils, compaction-prone soils, stony/rocky soils and coarse-textured soils, shallow bedrock, hydric soils, and similar features were evaluated. These same factors are used in the hydrogeologic sensitivity of near-surface materials in regards to oil spill impacts.
2612-3	Ferguson, Catherine	As shown in Section 5.2.1.1.1, the ROI for the evaluation consists of a 1,000 foot buffer to either side of the centerline. The same ROI is used for both the evaluation of the Applicant's proposed project and SA-04.
2612-4	Ferguson, Catherine	Potential impacts from oil spills to resources within 2,500 feet of and 10-mile downstream of SA-04 are evaluated. Spill models were run to demonstrate the transport and fate of spills at select locations, but are not intended to represent all potential oil spills for any route.
2612-5	Ferguson, Catherine	The correct acreage is 5 acres of impact to wild rice lakes. This was determined using GIS-based technology and laying the corridor size onto spatial depictions of wild rice lakes.

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Response#	Commenter	Response
2612-6	Ferguson, Catherine	Section 5.3.3.3.1 Enbridge estimates that each construction spread would require about 600 workers, resulting in a total maximum workforce of 4,200 workers across seven different construction spreads between Neche, North Dakota, and Superior, Wisconsin.
0519-1	Fountain, Elizabeth	Thank you for your comments on the Draft EIS. As noted in Section 11.4 of the FEIS, the applicant may employ various measures to minimize or mitigate impacts to environmental justice communities. The applicant may work with companies and subcontractors hired to construct, restore and operate the pipeline to prepare and implement an education plan or awareness campaign regarding the issue of sexual abuse or sex trafficking. Additionally, the applicant may provide funding to support the efforts of local and tribal law enforcement on this and other safety-related issues, which would enable local entities to tailor approaches and solutions to the local community.
0297-1	Frechette, Allen	Thank you for your comments on the Draft EIS. Chapter 12 of the FEIS includes a discussion on the cumulative potential effects of the Certificate of Need and route alternatives, and reasonably foreseeable future actions including "public infrastructure" on potential development impediments and other impacts of a socioeconomic nature. Some types of public infrastructure, such as other pipelines and electric transmission lines, are compatible with a pipeline corridor and can be co-located within the same corridor. Many other types of land development are compatible in the "vicinity of a pipeline", e.g. agriculture, forestry, etc.
0297-2	Frechette, Allen	The FEIS discusses abandonment and removal as different alternatives with Chapter 8. The proposed method is abandonment.
0297-3	Frechette, Allen	The requested edits were not made as the text accurately states the level of risk as identified by Enbridge.
0297-4	Frechette, Allen	The requested edits were not made as the text accurately states the federal requirements for abandonment that do exist.

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Response#	Commenter	Response
0297-5	Frechette, Allen	The commenter contends that oil extraction and refining should be included in the analysis; however, these activities are included in the existing baseline activities and would occur with or without approval of the new pipeline. Therefore, they are not a trigger for the proposed pipeline or triggered by the pipeline and are properly excluded from the analysis.
2621-1	Friends of the Headwaters	Thank you for your comments on the Draft EIS. Per Minnesota Rules 4410.2700, Commerce considers all timely substantive comments on the draft EIS consistent with the scoping decision. The material in the appendices to this comment letter provided by FOH has been considered to the extent that FOH draws on the material in their comments providing specific reference to the EIS and providing rationale for an addition, clarification, correction, discussion of uncertainty or application of alternative methodology in the EIS.
2621-2	Friends of the Headwaters	In a letter dated May 16, 2017 to Administrative Law Judge Ann C. O'Reilly, the Department requested that the ALJ determine whether data regarding oil spills in the draft environmental impact statement (DEIS) filed May 15, 2017, at Table 10.3.1 on page 10-36 is public or non-public. A hearing on this matter was held on August 3, 2017. To-date, no order has been issued by the ALJ. The commenter's suggestion that the Department "choose values" and conduct new modeling using a different model and approach does not resolve the non-public data issue; furthermore, the recommendation that the Department "choose values" is entirely inconsistent with the commenter's assertions that the modeling should include a site specific damage assessment, which would clearly require, as a first step, site specific assessment of release associated with a full bore rupture.

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Response#	Commenter	Response
2621-3	Friends of the Headwaters	The specific impacts of large oil releases are highly dependent on incident-specific factors that are impossible to predict with certainty. For example, as the commenter notes, the largest ever inland spill in Grand Rapids did not produce the damages a model may have suggested from a spill of its magnitude because incident-specific conditions happened to include ice cover on the Prairie River. One purpose of the EIS is to provide decision makers with relevant information for their decision. Detailed modeling of site/situation specific environmental damages is so incident-specific, it does not provide decision makers with particularly actionable information about which alternative is environmentally preferable. In fact, this sort of impact modeling is likely to provide a false level of precision that is counterproductive. The modeling approach used in the EIS is intended to provide information relevant to a reasoned choice among the alternatives by focusing on several components of spill risk that can be considered to develop a broader understanding of the risks and tradeoffs of different routes. These risk components include: 1) Modeling of fate and transport of spilled oil in a suite of locations spanning a range of different environmental conditions; 2) characterization of the general probability of a spill occurring for different modes and different routes; 3) description of how resources are typically impacted by spilled oil; and 4) quantification of the resources exposed along the various alternatives under consideration. Potential impacts to wild rice associated with an oil spill are discussed in Chapter 10, as well as part of the water resources in Chapters 5 and 6.
2621-4	Friends of the Headwaters	A discussion of access limitations is included in Section 10.5.3.2. In the preparation of the DEIS, no actionable, systematic method for assessing the ease or difficulty of access along the entire length of each pipeline route could be identified. In the absence of such an analysis, direct comparison of ease of access across the different routes cannot be made. However, regardless of the route or the number of areas with difficult access, specific spill response strategies will be developed for areas with difficult access when a final route is selected.

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Response#	Commenter	Response
2621-5	Friends of the Headwaters	A discussion of long term impacts of oil on the environment, based on a review of observed impacts from historical spills studied by government agencies, academic researchers, and industry professionals, has been included as Section10.2.2.
2621-6	Friends of the Headwaters	Please see response to comment #2621-03 for a discussion of site specific impact analysis.
2621-7	Friends of the Headwaters	Please see response to comment #2621-03 for a discussion of site specific impact analysis. Additional discussion of the rationale for site selection and the range of characteristics represented by the sites has been included in Section 10.3.4.1.
2621-8	Friends of the Headwaters	See response to comment #2621-03 for a discussion of site specific impact analysis.
2621-9	Friends of the Headwaters	10 miles downstream was selected, because it was considered to be not overly conservative, and crossing widths for the RAs were unavailable. The Applicant surveyed the streams and rivers for the APR ONLY, so small (<10 m wide) and large (10 m or > wide) crossings are only known for this route. It would be biased to only run the 2 downstream buffers (30 miles for large rivers, and 10 miles for small streams) along the APR. Furthermore, we determined that it would be overly conservative to run a 30-mile downstream buffer for all water crossings, especially since many of these water bodies are ditches and terminate within a few miles.

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Response#	Commenter	Response
2621-10	Friends of the Headwaters	"The representative-site modeling approach, as applied and presented in the EIS has the benefit of providing a means to analyze the potential trajectory (movement), fate (behavior and weathering), and effects of hypothetical spill scenarios under a variety of environmental circumstances. The locations and environmental conditions (as well as the hypothetical volumes of oil in the release scenarios) were selected in a conservative manner to effectively maximize oil transport and impacts to create simulations of various scenarios. The modeling results can be used to qualify and quantify the consequences of a worst-case discharge for risk assessment purposes. The conservatively-developed site approach also fosters the understanding of the potential worst-case circumstances that pipeline engineers and emergency and spill response officials need to factor into planning. That said, the modeling of representative sites can never comprehensively forecast all conceivable outcomes of hypothetical spill scenarios at the virtually infinite number of unique locations along the along the Line 3 pipeline. Each oil spill incident is a unique event in terms of the specific circumstances that affect the behavior, trajectory, fate, and effects of the oil. Case studies of past spill events in the US and around the world have demonstrated that many different factors determine the outcome of each incident. Limitations of the models are discussed in the EIS.
2621-11	Friends of the Headwaters	Please see response to comment #2621-03 for a discussion of site specific impact analysis. Additional discussion of the rationale for site selection, including Mosquito Creek (Table 10.3-1), and the range of characteristics represented by the sites has been included in Section 10.3.4.1.
2621-12	Friends of the Headwaters	Please see response to comment #2621-03 for a discussion of site specific impact analysis. Additional discussion of potential impacts of a spill on wild rice/economic value of wild rice resources has been included in Section 10.4.2.
2621-13	Friends of the Headwaters	The deficiencies of the pinhole release report are noted. Supplemental case studies and supporting data are provided in the EIS to address issues mentioned here.

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Response#	Commenter	Response
2621-14	Friends of the Headwaters	SA-04 is a system alternative evaluated to aid the Commission's evaluation of whether or not to grant a CN for the proposed project. A system alternative is not a routing alternative, as no entity has proposed to build such a pipeline, detailed routing and design have not been conducted, and a route permit could not be issued for SA-04. Instead, a system alternative is a serves as a broader, system level point of comparison to the Applicant's Proposed project and the other CN alternatives. The level of analysis of SA-04 is in line with this concept.
2621-15	Friends of the Headwaters	The Applicant has requested a specific route width and right–of-way (ROW) widths. The EIS assumes that the requested route and ROW will be adequate, and that if a route permit is granted, the Applicant will comply with permitted route and ROW widths. The EIS, therefore, analyzes impacts within the corresponding footprint.
2621-16	Friends of the Headwaters	No notable changes are anticipated on the existing (recently upgraded) infrastructure in Wisconsin or elsewhere in conjunction with the Applicant's proposal. Therefore, new impacts associated with the Applicant's proposal are limited to the length of the proposed Line 3 route and do not extend through Wisconsin to an end destination in Illinois. The EIS compares the new impacts associated with the Applicant's proposal (extending from Neche to Superior) to the new impacts associated with the significantly longer SA-04 (extending from Neche to Joliet).
2621-17	Friends of the Headwaters	The EIS acknowledges that Minnesota’s non-proliferation policy is likely to lead to the proposal of another oil or gas pipeline in the same corridor should Enbridge’s proposal be approved and provides an evaluation of cumulative effects of such a proposal (see Chapter 12, Table 12.2-1).

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Response#	Commenter	Response
2621-18	Friends of the Headwaters	In assessing past actions and their associated impacts, the EIS analysis assumes impacts are now part of the existing environment and are included in the affected environment described in Chapters 5 and 6 (Minn. R. 4410.0200, Subp. 11a). The 30 year time-frame for the analysis within the EIS was chosen to match the economic life of the project indicated by the Applicant. For purposes of comparison across alternatives, the EIS targets a consistent time-frame that is long enough to understand typical annual operating impacts/tradeoffs of the alternatives.
2621-19	Friends of the Headwaters	The Department cannot verify the commenter's assertion that Enbridge intends to increase the capacity of the proposed line, and no reference has been provided by the commenter. The "reasonably likely to occur" threshold (Environmental Quality Board Guide to Minnesota Environmental Review Rules, May 2010: https://www.eqb.state.mn.us/sites/default/files/documents/Guide%20to%20MN%20ER%20Rules-May%202010.pdf accessed 7/27/2017) does not appear to be met. This includes: 1. Applications for permits have not been filed with any units of government; 2. Detailed plans and specifications have not been prepared; 3. This is not a future development indicated by adopted comprehensive plans, and zoning or other ordinances; 4. It is not clear that historic or forecasted development trends would support it; and 5. Any other factors, for example funding status for the project, do not suggest that this is a reasonably foreseeable project or that has sufficiently detailed information available about the project (e.g., size or placement of the pump stations indicated by the commenter) to contribute to the understanding of cumulative potential effects.
2621-20	Friends of the Headwaters	Please see comment response #2621-18.

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Response#	Commenter	Response
2621-21	Friends of the Headwaters	Please see comment response #2621-17. Regarding Line 66, consistent with EQB guidance, in looking to the future, the cumulative potential effects analysis addresses other projects actually planned for which a basis of expectation has been laid and for which sufficiently detailed information available about the project (e.g. size or placement of the pump stations indicated by the commenter) to contribute to the understanding of cumulative potential effects. The speculative "Twin Line 61" has not been included in our review because no proposal has been made for such a project with sufficient detail to address in this review. If proposed, such a project would undergo environmental review in the appropriate jurisdictions
2621-22	Friends of the Headwaters	Chapter 12 has been revised to include additional information on cumulative impact analyses.
2621-23	Friends of the Headwaters	Chapter 12 has been revised to include additional information on cumulative impact analyses.
2621-24	Friends of the Headwaters	Chapter 12 has been revised to include additional information on cumulative impact analyses.
2621-25	Friends of the Headwaters	Please see comment response #2621-15.
2621-26	Friends of the Headwaters	Drilling mud releases ("frac-outs") are discussed in Section 5.2.1.1.3, Section 6.3, and Section 6.5.
2621-27	Friends of the Headwaters	Please see response to comment #2621-03 for a discussion of site specific impact analysis.
2621-28	Friends of the Headwaters	Drilling mud releases ("frac-outs") are discussed in Section 5.2.1.1.3, Section 6.3, and Section 6.5.
2621-29	Friends of the Headwaters	Please see response to comment #2621-15.

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Response#	Commenter	Response
2621-30	Friends of the Headwaters	1. The predictive risk analysis was removed due to issues with its application. Historic pipeline incident data was expanded to detail historic incident rates and causes. Current spill probabilities for a new pipeline using modern metallurgy and coating technologies would likely be less than historic incidents caused by corrosion or other internal failures. 2. There is a state of the art practice that defines responsible and rigorous use of expert opinion based estimation of parameters in risk assessments in place of other sources of basic data, some of which are recognized and sponsored by the National Academy of Engineering, there is no need to provide guidance on a study-by-study basis. 3. If qualitative risk analysis (QRA) is used, sensitivity analysis to key failure rate parameters should always be performed. 4. QRA is not a new science and clear documentation and best practice includes all of these recommendations.
2621-31	Friends of the Headwaters	Please see response to comment #2621-17.
2621-32	Friends of the Headwaters	Providing this information on a per year basis vs. the lifetime of project makes no material difference to the comparison of the alternatives, or informing a reasoned choice between alternatives by the Commission. The predictive risk analysis was removed due to issues with its application. Historic pipeline incident data was expanded to detail historic incident rates and causes. Current spill probabilities for a new pipeline using modern metallurgy and coating technologies would likely be less than historic incidents caused by corrosion or other internal failures.
2621-33	Friends of the Headwaters	Please see response to comment #2621-15.
2622-1	Friends of the Headwaters	Thank you for your comments on the Draft EIS. Available design details are provided in Chapter 4 of the FEIS.

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Response#	Commenter	Response
2622-2	Friends of the Headwaters	The EIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
2621-1	Friends of the Headwaters	Thank you for your comments on the Draft EIS. Per Minnesota Rules 4410.2700, Commerce considers all timely substantive comments on the draft EIS consistent with the scoping decision. The material in the appendices to this comment letter provided by FOH has been considered to the extent that FOH draws on the material in their comments providing specific reference to the EIS and providing rationale for an addition, clarification, correction, discussion of uncertainty or application of alternative methodology in the EIS.
2622-3	Friends of the Headwaters	Thank you for your comments on the Draft EIS. Your comment has been considered in development of the FEIS.
2621-2	Friends of the Headwaters	In a letter dated May 16, 2017 to Administrative Law Judge Ann C. O'Reiley the Department requested that the requests that the ALJ determine whether data regarding oil spills in the draft environmental impact statement (DEIS) filed May 15, 2017, at Table 10.3.1 on page 10-36 is public or nonpublic. A hearing on this matter was held on X date. To-date, no order has been issued by the ALJ. The commenter's suggestion that the Department "choose values" and conduct new modeling using a different model and approach does not resolve the non-public data issue, furthermore, the recommendation that the Department "choose values" is entirely inconsistent with the commenter's assertions that the modeling should include a site specific damage assessments, which would clearly require, as a first step, site specific assessment of release associated with a full bore rupture
2622-4	Friends of the Headwaters	Release incident data for the Applicant and the industry are now presented in the FEIS.

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Response#	Commenter	Response
2621-3	Friends of the Headwaters	The specific impacts of large oil releases are highly dependent on incident-specific factors that are impossible to predict with certainty. For example, as the commenter notes, the largest ever inland spill in Grand Rapids did not produce the damages a model may have suggested from a spill of its magnitude because incident-specific conditions happened to include ice cover on the Prairie River. One purpose of the EIS is to provide decision-makers with relevant information for their decision. Detailed modeling of site/situation specific environmental damages is so incident-specific, it does not provide decision-makers with particularly actionable information about which alternative is environmentally preferable. In fact, this sort of impact modeling is likely to provide a false level of precision that is counterproductive. The modeling approach used in the EIS is intended to provide information relevant to a reasoned choice among the alternatives by focusing on several components of spill risk that can be considered to develop a broader understanding of the risks and tradeoffs of different routes. These risk components include 1) Modeling of fate and transport of spilled oil in a suite of locations spanning a range of different environmental conditions 2) Characterization of the general probability of a spill occurring for different modes and different routes 3) Description of how resources are typically impacted by spilled oil 4) Quantification of the resources exposed along the various alternatives under consideration.
2622-5	Friends of the Headwaters	Thank you for your comments on the Draft EIS. Your comment has been considered in development of the FEIS.
2621-4	Friends of the Headwaters	A discussion of access limitations is included in Section 10.5.3.2.1. In the preparation of the DEIS, no actionable, systematic method for assessing the ease or difficulty of access along the entire length of each pipeline route could be identified. In the absence of such an analysis, direct comparison of ease of access across the different routes cannot be made, however, regardless of the route or the number of areas with difficult access, specific spill response strategies will be developed for areas with difficult access when a final route is selected.
2622-6	Friends of the Headwaters	PHMSA will address pipeline integrity management requirements in areas where HCAs could not be avoided

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Response#	Commenter	Response
2621-5	Friends of the Headwaters	A discussion of long term impacts of oil on the environment, based on a review of observed impacts from historical spills studied by government agencies, academic researchers and industry professionals, has been included as Section 10.3.2.4 of the FEIS.
2622-7	Friends of the Headwaters	The FEIS has been updated to include discussion on the properties of dilbit as it weathers.
2621-6	Friends of the Headwaters	See response to comment 2621-3 for a discussion of site specific impact analysis.
2622-8	Friends of the Headwaters	Thank you for your comments on the Draft EIS. Your comment has been considered in development of the FEIS.
2621-7	Friends of the Headwaters	See response to comment 2621-3 for a discussion of site specific impact analysis. Additional discussion of the rationale for site selection and the range of characteristics represented by the sites has been included in Section 10.3.3 of the FEIS.
2621-8	Friends of the Headwaters	See response to comment 2621-3 for a discussion of site specific impact analysis.
2621-9	Friends of the Headwaters	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS
2621-10	Friends of the Headwaters	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS
2621-11	Friends of the Headwaters	See response to comment 2621-3 for a discussion of site specific impact analysis. Additional discussion of the rationale for site selection, including Mosquito Creek, and the range of characteristics represented by the sites has been included in Section 10.3.3 of the FEIS.
2621-12	Friends of the Headwaters	See response to comment 2621-3 for a discussion of site specific impact analysis. Additional discussion of potential impacts of a spill on wild rice/economic value of wild rice resources has been included in Section 10.4.3 of the FEIS

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1332-1	Gaither, Daniel	Thank you for your comments on the Draft EIS. The referenced citations have been updated.
1332-2	Gaither, Daniel	Sources have been re-checked throughout the document in preparation of the Final EIS. Per the comment received, the source for "historical trauma" has been re-checked and replaced.
1332-3	Gaither, Daniel	The FEIS has been corrected. Enbridge has asserted that public disclosure of potential release volumes is a security risk that could be exploited. A non-redacted version was available to the Department of Commerce. Noted.
1332-4	Gaither, Daniel	The 30 year time-frame was chosen to match the economic life of the project indicated by the Applicant. For purposes of comparison across alternatives, the EIS targets a consistent time-frame that is long enough to understand typical annual operating impacts/tradeoffs of the alternatives.
1332-5	Gaither, Daniel	Discussion of Enbridge's required ongoing responsibility for the pipeline is provided in Section 8.3.1.1 of the FEIS.
1332-6	Gaither, Daniel	Discussion of Enbridge's required ongoing responsibility for the pipeline is provided in Section 8.3.1.1 of the FEIS.
1332-7	Gaither, Daniel	Enbridge’s Application materials use the term “construction right-of-way” when referring to the temporary construction areas located alongside the permanent right-of-way that would be used temporarily for construction of the pipeline (Section 2.7.1.2). The Applicant uses the term “construction workspace” to encompass additional temporary workspaces, or ATWS (Section 2.3.5). This EIS uses the term “construction work area” when referring to the temporary construction areas located alongside the permanent right-of-way, and uses the term “ATWS” when referring to the ATWS required for staging equipment, storing some excavation spoil materials, and providing additional workspace where required for special construction methods. Table 2.4-1 provides the dimensions for each of these areas.

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1332-8	Gaither, Daniel	The methodology used to complete the environmental justice analysis in Chapter 11 is commonly used to characterize potential EJ communities. The potential impacts of the project are described within the EIS and further discussed in Chapter 11 to discuss the potential for disproportionately high and adverse impacts to the EJ census tracts within the region of impact. This analysis is further expanded to include a qualitative discussion of potentially affected communities such as American Indian populations or tribal members who use potentially-impacted resources like wild rice. This discussion and these impacts are not limited to the census tracts, and the section has been updated to indicate that micropopulations not captured by census data may also be adversely impacted. Several sources were reviewed to better understand the concerns related to sex trafficking. These concerns have been raised in recent local media, by commenters, local communities, and other communities where pipelines have been sited or proposed. Two sources are cited to support this concern; Section 11 indicates that increases in sex trafficking, particularly among Native populations, is well documented (National Congress of American Indians Policy Research Center 2016), and that American Indian and minority populations can be at higher risk based on various factors (Minnesota Department of Health [MDH] 2014). The discussion concludes that these concerns have the potential to be amplified with the addition of a cash-rich workforce. To address this potential, the EIS has been revised to clarify that the applicant may provide funding to support the efforts of local and tribal law enforcement to address this issue.
1012-1	Gaither, Jami	Thank you for your comments on the Draft EIS. Chapter 11 of the FEIS identifies potential environmental justice communities in the region of interest. These communities were determined based on a quantitative analysis using census data. Additional discussion is provided to qualitatively characterize unique communities within the area of interest, to ensure consideration of populations that may not be fully captured by census tract data. Chapter 11 describes the potential for disproportionately high and adverse impacts to these communities, and identifies project impacts that may affect EJ communities. As noted in Chapter 11, a finding of disproportionate impact, or the identification of environmental justice communities, does not preclude approval of the project or selection of a route alternative; however, it does require detailed efforts to avoid, mitigate, minimize, rectify, reduce, and/or eliminate the impacts. Measures that the applicant may undertake to minimize or mitigate adverse impacts are discussed in Chapter 11.4.

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1012-2	Gaither, Jami	The FEIS provides data on the Applicant's spill history as well as comparisons of the Applicant's spill and incident rate compared to other crude oil pipeline operators, both in Minnesota and nationwide.
1013-1	Garriott, Grant and Kathy	Thank you for your comments on the Draft EIS. Section 5.3.2 of the FEIS establishes a baseline of the recreational resources that could be affected by the Applicant's project and Certificate of Need alternatives. The section also assesses potential impacts to such resources. Table 5.3.2-3 summarizes these impacts - resulting construction and operational impacts are anticipated to be minor to negligible.
0680-1	Gibson Wall, Mae	Thank you for your comments on the Draft EIS. The 30 year time-frame was chosen to match the economic life of the project indicated by the Applicant. For purposes of comparison across alternatives, the EIS targets a consistent time-frame that is long enough to understand typical annual operating impacts/tradeoffs of the alternatives.
0680-2	Gibson Wall, Mae	The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
0680-3	Gibson Wall, Mae	The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release. Spill impact analysis was limited to the expected areas of impact 2500 ft. and 10 miles downstream from the pipeline.
0835-1	Goodwin/Yaashiik, Dawn	Thank you for your comments on the Draft EIS. The FEIS states that vulnerable populations, such as children, those with respiratory diseases, and the elderly, could be particularly sensitive to airborne pollutant releases following a spill and would likely experience moderate respiratory impacts depending on their proximity to the incident, current health status, and seasonal/weather conditions in the aftermath of the spill. In the event of a spill, spill response teams will be at the site as soon as possible.
0835-2	Goodwin/Yaashiik, Dawn	Additional discussion of removal of the existing Line 3 has been added to Section 8.4 of the FEIS.

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0833-1	Goodwin/Yaashiik, Dawn	Thank you for your comments on the Draft EIS. Chapter 9 of the FEIS has been updated to show that traditional practices continue today.
0833-2	Goodwin/Yaashiik, Dawn	Chapter 9 of the FEIS has been updated to show that traditional practices continue today.
0833-3	Goodwin/Yaashiik, Dawn	The FEIS focuses on impacts to waterbodies of concern and tribal issues associated with those waterbodies.
0833-4	Goodwin/Yaashiik, Dawn	The FEIS focuses on impacts to waterbodies of concern and tribal issues associated with those waterbodies.
0833-5	Goodwin/Yaashiik, Dawn	The FEIS focuses on impacts to waterbodies of concern and tribal issues associated with those waterbodies.
0833-6	Goodwin/Yaashiik, Dawn	The cumulative potential impacts of climate change are discussed in the Executive Summary and Section 12.5 of the FEIS. Section 12.5 also discusses climate change trends in Minnesota and the Midwest.
2632-1	Graeve, Ken	Thank you for your comments on the Draft EIS. Acreages have been reviewed for discrepancies and edited as appropriate.
2632-2	Graeve, Ken	Thank you for your comment. A detailed analysis of all impacts to all of the various and site-specific natural resources was beyond the scope of the EIS process.

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Response#	Commenter	Response
2630-1	Graeve, Ken	Thank you for your comments on the Draft EIS. Section 5.2.3 - Vegetation, Section 6.3.3 - Vegetation address specific potential direct and indirect impacts in terms of the spread of noxious weeds and invasive plants. This is quantified to the degree possible by noting the specific known locations of state-listed noxious weeds, and invasive plant species, within the ROI of the Proposed Project as well as alternative routes. The impact analysis integrates the plan for preventing the spread of invasive species, as addressed in Section 1.6 - Controlling Spread of Undesirable Species, of the Environmental Protection Plan (EPP), Appendix E of the DEIS. Appendix A to this document lists the known State-listed noxious weeds, and invasive terrestrial and aquatic plant species, as well as invasive fish and invertebrate species known to occur within the vicinity of the Proposed Project and alternative routes, by state. The EPP outlines construction-related environmental policies, procedures, and protection measures that would be implemented during project construction and operation specifically to avoid introduction and spread of noxious weeds.
2630-2	Graeve, Ken	Section 5.2.3 - Vegetation, Section 6.3.3 - Vegetation address specific potential direct and indirect impacts in terms of the spread of noxious weeds and invasive plants. This is quantified to the degree possible by noting the specific known locations of state-listed noxious weeds, and invasive plant species, within the ROI of the Proposed Project as well as alternative routes. The impact analysis integrates the plan for preventing the spread of invasive species, as addressed in Section 1.6 - Controlling Spread of Undesirable Species, of the Environmental Protection Plan (EPP), Appendix E of the DEIS. Appendix A to this document lists the known State-listed noxious weeds, and invasive terrestrial and aquatic plant species, as well as invasive fish and invertebrate species known to occur within the vicinity of the Proposed Project and alternative routes, by state. The EPP outlines construction-related environmental policies, procedures, and protection measures that would be implemented during project construction and operation specifically to avoid introduction and spread of noxious weeds.

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2630-3	Graeve, Ken	Section 5.2.3 - Vegetation, Section 6.3.3 - Vegetation, and Chapter 7 of the DEIS all address specific potential direct and indirect impacts to terrestrial vegetation in terms of potential impacts from spread of noxious and invasive plant species. These include discussions of potential impacts specifically to Sites of Biodiversity significance. Also addressed are specific impacts to forested and wetland communities from activities associated with construction and operations associated with the Proposed Project and alternative routes, including roads. Section 5.2.5 - Unique Natural Resources and Section 6.3.5 - Unique Natural Resources discuss specific potential direct and indirect impacts to special status plant species and plant communities. The impact analysis integrates the plan for preventing the spread of invasive species, as addressed in Section 1.6 - Controlling Spread of Undesirable Species, of the Environmental Protection Plan (EPP), Appendix E of the DEIS. Appendix A to this document lists the known State-listed noxious weeds, and invasive terrestrial and aquatic plant species, as well as invasive fish and invertebrate species known to occur within the vicinity of the Proposed Project and alternative routes, by state. The EPP outlines construction-related environmental policies, procedures, and protection measures that would be implemented during project construction and operation specifically to avoid introduction and spread of noxious weeds.
2630-4	Graeve, Ken	This comment addresses the potential efficacy of implementation of the project Environmental Protection Plan (EPP), Appendix E of the DEIS, not on the EIS itself. As a practical matter, it is impossible to predict if any noxious weeds or invasive plant species, from their known population locations, would be introduced or spread through construction and operation activities of the Proposed Project, without implementation of weed control activities detailed in the EPP. That is why the EPP has addressed this topic comprehensively and, when applied assiduously, should reduce the potential for weed or invasive species introduction or spread to the levels estimated in the DEIS impact analysis in Section 5.2.3 - Vegetation, Section 6.3.3 - Vegetation, and Chapter 7.

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2630-5	Graeve, Ken	It is not within the scope of the EIS to address perceived issues and concerns with state weed laws or their enforcement. Nor can the Proposed Project be responsible for existing regional conditions regarding the number and spread of state-listed, and other, invasive plant species. As stated in the Project Environmental Protection Plan (EPP), the intention of the Project "... is to minimize the potential introduction and/or spread of undesirable species (i.e., invasive species, noxious weeds, or crop diseases) along the construction ROW due to pipeline construction activities." Section 1.6 of the EPP details prevention and control measures to be implemented to accomplish this goal. Implementation of these measures was integrated into the impact analysis in Section 5.2.3 - Vegetation and Section 6.3.3 - Vegetation, by addressing specific potential direct and indirect impacts in terms of the spread of noxious weeds and invasive plants. This is quantified to the degree possible by noting the specific known locations of state-listed noxious weeds, as well as other known invasive plant species, within the ROI of the Proposed Project as well as alternative routes.
0397-1	Gustofson, Cedrik	Thank you for your comments on the Draft EIS. Section 6.5.4 of the FEIS clarifies that it is likely that the Applicant would hire local residents during construction of any of the alternative routes for a portion of its workforce - based on current labor agreements in Minnesota at least 50% of workers will be expected to be employed from local union halls.
1535-1	Harper, Sarah	Thank you for your comments on the Draft EIS. The executive summary of the FEIS provides information on the purpose of the EIS and the decisions they inform, while Section 1.4 provides details about broader policy implications.
2653-1	Hauser, Patricia	Thank you for your comments on the Draft EIS. An acronym and abbreviations list has been provided in the FEIS.
2653-2	Hauser, Patricia	Table ES-1 has been revised in the FEIS.
2653-3	Hauser, Patricia	Figures throughout the EIS have been revised. Some of the major rivers noted in this figure are identified by the blue line or noted by name.

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2653-4	Hauser, Patricia	The text has been revised to show what is presented in the figure. Please note, Figure ES-4 has been revised; it also includes additional information as compared to that provided within the draft document.
2653-5	Hauser, Patricia	All surface water crossed by all alternatives was determined based on state and federal national hydrologic databases. Modification, as relevant, to impacted waterbodies has been modified in the FEIS based on subsequent analysis.
2653-6	Hauser, Patricia	This comment was considered in revising the figures for the Executive Summary. For this figure, the title was adjusted; however, no other changes were made.
2653-7	Hauser, Patricia	No changes have been made to this figure; however, please note - the measurement for this figure is acres and not miles.
0842-1	Hess, Russell	Thank you for your comments on the Draft EIS. Additional discussion of rail transport has been included in Section 10.1.2.2.
2662-1	Hill, Janet	Thank you for your comments on the Draft EIS. Chapter 4 provides information on each of the alternatives. SA-04 is described in detail in this chapter. The appearance of this route may look different depending on the scale of each map (which is shown on each of the various figures).
2662-2	Hill, Janet	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS. Changes have been made to Chapter 10.
2662-3	Hill, Janet	Available data on the health risk of bitumen have been presented.
2662-4	Hill, Janet	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS. Changes have been made to Chapter 10.

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2662-5	Hill, Janet	SA-04 is a system alternative evaluated to aid the Commission's evaluation of whether or not to grant a CN for the proposed project. A system alternative is not a routing alternative, as no entity has proposed to build such a pipeline, detailed routing and design have not been conducted, and a route permit could not be issued for SA-04. Instead, a system alternative is a serves as a broader level point of comparison to the Applicant's Proposed project and the other CN alternatives. The level of analysis of SA-04 is in line with this concept.
2662-6	Hill, Janet	The scope of analysis of impacts to recreation and tourism resources included within Chapter 5 is explained in greater detail within Section 5.3.2.1 of the FEIS: "In addition, Minnesota Administrative Rules Part 7853.0600, Subpart 2(J) requires listing of 'state critical areas, state WMAs; state scientific and natural areas; state wild, scenic, and recreational rivers; state parks; state scenic wayside parks; state recreational areas; state forests; state trails; state canoe and boating rivers; state zoos, and designated trout lakes through which the route passes, as mapped on the inventory of significant resources by the State Planning Agency.' Chapter 10 of the FEIS deals specifically with accidental releases/spills, including potential impacts to recreation and tourism areas and related resources resulting from a release/spill.
2662-7	Hill, Janet	For analysis of construction impacts Chapter 5 provides: The ROI for the analysis of potential impacts on groundwater during construction generally consists of the pipeline, rail, or truck corridor and a 1,000-foot buffer on either side of the centerline of the Applicant’s proposed project and the CN Alternatives. This includes Alternative SA-04. Operational impacts are addressed per established corridor size.
1982-1	Hill, Janet	Thank you for your comments on the Draft EIS. Enbridge has not supplied information regarding security of the SCADA system.
1982-2	Hill, Janet	Additional information regarding inspections and monitoring is presented in Section 8.3.
1982-3	Hill, Janet	Soil acidity is related to corrosion, which is discussed within Section 8.3.
0126-1	Hill, Jenny	Thank you for your comments on the Draft EIS. Requirements that Enbridge must abide by are discussed in Section 8.3.1.1 of the FEIS, according to State Statutes.

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2667-1	Honor the Earth - Blackburn, Paul	Thank you for your comments on the Draft EIS. In an effort to address comments raised in scoping and comments on the DEIS and in an effort to respond to feedback and collaboration from federal and state agencies, tribal governments and natural resource staff, non-governmental agencies, citizens, and a host of other participants, an extensive range of topics have been addressed in the EIS. Information provided by the applicant has been reviewed and included in the EIS as appropriate based on the professional expertise of the team that prepared the EIS including DOC EERA staff, MN DNR staff, MPCA staff and staff from a team of consultants (see Chapter 13).
2667-2	Honor the Earth - Blackburn, Paul	This EIS assumes that the Applicant will comply with all necessary permits that would be required for the construction and operation of the pipeline, if a Certificate of Need and route permit are approved by the Commission. While the comment notes past permit violations, the evaluations within the EIS are based on the project for which applications were submitted and the commitments outlined by the Applicant. Assessing impacts based on assumed permit violation is not an approach that the Department finds to be practical or defensible.
2667-3	Honor the Earth - Blackburn, Paul	While the Applicant has reported that the ultimate design capacity of this pipeline is 915,000 barrels per day, the Applicant has indicated that this is not the level of throughput that they are seeking to permit and that further engineering design studies would be required to determine the number of pump stations needed to achieve this ultimate design capacity level. Should the Applicant choose to seek this expanded capacity in the future, they would need to apply for a Certificate of Need from the Commission, and the proposal would be subject to environmental review at that time.
2667-4	Honor the Earth - Blackburn, Paul	Please see response to comment #2667-125.

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2667-5	Honor the Earth - Blackburn, Paul	The EIS approach on the Purpose and Need is explained in Chapter 1 of the EIS. Chapter 2 describes the Applicant's proposal, including an explanation of the Applicant's rationale for pursuing the project. Chapter 2 does not represent the Department's assessment of need.
2667-6	Honor the Earth - Blackburn, Paul	No notable changes are anticipated on the existing (recently upgraded) infrastructure in Wisconsin or elsewhere in conjunction with the Applicant's proposal. No proposal has been made for capacity expansions with sufficient detail to address in this review. If proposed, such a project would undergo environmental review in the appropriate jurisdictions.
2667-7	Honor the Earth - Blackburn, Paul	Please see response to comment #2667-129.
2667-8	Honor the Earth - Blackburn, Paul	Please see response to comment #2667-125.
2667-9	Honor the Earth - Blackburn, Paul	Please see response to comment #2667-128.
2667-10	Honor the Earth - Blackburn, Paul	Chapter 1 provides a discussion of the treatment of purpose and need in the EIS. Chapter 4 provides for a discussion of alternatives, including the continued use of existing line 3 at its existing capacity of 390,000 barrels per day.

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Response#	Commenter	Response
2667-11	Honor the Earth - Blackburn, Paul	The range of alternatives evaluated is consistent with the scope of this EIS. As described in Section 4.2.3 of the EIS, under the current version of the proposed consent decree, increasing the capacity of the existing Line 3 to a higher operating capacity would require significant investment by Enbridge to repair and maintain the existing facilities. Based on a review of the proposed consent decree, the extent of effort/disturbance required to simply maintain a capacity of 390,000 barrels per day, and a review of Enbridge's rationale regarding the feasibility of this option, the alternative of increasing the throughput on the existing line 3 was not evaluated in the EIS. The Department did evaluate two alternatives that eliminate the need for an entirely new pipeline route, including the continued use of existing line 3 at its existing capacity, use of existing line 3 at its existing capacity supplemented by up to 370,000 bpd of transport via alternative modes, and up to 760,000 bpd of transport via alternative modes, RA-07 and RA-08 (see Sections 4.2.8 and 4.2.9).
2667-12	Honor the Earth - Blackburn, Paul	The Department's treatment of the purpose and need is described in Chapter 1 of the EIS. It is not clear whether existing and other proposed pipelines meet the need for this proposed project; however, further information on the economic need or viability of other regional pipelines to transport the volume of additional oil proposed by the Applicant’s project will be developed in the Certificate of Need hearing process. The environmental implications of a Commission determination that existing and/or other proposed pipelines meet the need for the proposed project is addressed in the review of continued operation of existing line 3 at 390,000 barrels per day. This analysis (i.e., the environmental impacts associated with the Certificate of Need alternatives) is provided in Chapter 5 of the EIS.
2667-13	Honor the Earth - Blackburn, Paul	The EIS evaluates the environmental impacts of a range of alternatives, providing for an assessment of the impacts of options for transport that may be considered by the Commission. The economics of the CN alternatives will be evaluated by the Department of Commerce Division of Energy Resources Energy Planning and Advocacy and other parties as part of the contested case hearing.

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0859-1	Honor the Earth - Laduke, Winona	Thank you for your comments on the Draft EIS. The denial of the Certificate of Need by the Commission for a new oil pipeline is not a mechanism through which specific operational changes to other infrastructure can be mandated, such as action to shut down or remove existing Line 3 or any of the other mainline pipelines. Therefore, action to shut down and remove pipelines in the mainline corridor is not included in the “no-action” alternative.
0858-1	Honor the Earth - Laduke, Winona	Thank you for your comments on the Draft EIS. The comment was considered in development of the FEIS.
0858-2	Honor the Earth - Laduke, Winona	The comment was considered in development of the FEIS.
0858-3	Honor the Earth - Laduke, Winona	Chapter 12 of the FEIS focuses on the cumulative potential effects of greenhouse gas emissions on climate, while the specific greenhouse gas emissions associated with the proposed Project and its alternatives are discussed in Sections 5.2.7 and 6.3.7 of the FEIS.
0868-1	Honor the Earth - Maxwell, Thane	Thank you for your comments on the Draft EIS. Essentially correct. Please note predictions are not a guarantee of outcome. The predictive risk analysis was removed due to issues with its application. Historic pipeline incident data was expanded to detail historic incident rates and causes. Current spill probabilities for a new pipeline using modern metallurgy and coating technologies would likely be less than historic incidents caused by corrosion or other internal failures.
0868-2	Honor the Earth - Maxwell, Thane	The EIS discusses the abandonment of only Line 3.
0867-1	Honor the Earth - Maxwell, Thane	The FEIS focuses on impacts to waterbodies of concern and predicts oil spill impacts to a variety of natural resource areas.
0867-2	Honor the Earth - Maxwell, Thane	The first was the chance of a small spill and the second was chance of pinhole releases.
0867-3	Honor the Earth - Maxwell, Thane	A discussion of buoyancy controls is presented in Section 8.3.1.4 of the FEIS.

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0867-4	Honor the Earth - Maxwell, Thane	In the near term, impacts on socioeconomics from Line 3 abandonment are anticipated to be minimal. Abandonment could decrease tax revenues or shift them to other taxing authorities. In the longer term, impacts on socioeconomics, particularly agricultural production, could be significant due to subsidence and/or exposure of pipeline. These potential impacts could be lessened by monitoring, adaptive management, and site-specific mitigation measures
2062-1	Honor the Earth - Slagle, Nicolette	Thank you for your comments on the Draft EIS. Additional information related to corrosion and the failing coating has been included within Section 8.3 of the FEIS.
2053-1	Honor the Earth - Slagle, Nicolette	Thank you for your comments on the Draft EIS. Section 195.563 of 49 CFR Subpart H – Corrosion Control states that cathodic protection must be in operation no later than 1 year after the pipeline is constructed. This does not mean Enbridge would wait a full year to install the system. It is typically installed as part of the construction process. The buried pipeline would also be protected from external corrosion by application of a coating.
2053-2	Honor the Earth - Slagle, Nicolette	While ultraviolet light does degrade various type of plastic pipe, the effect on steel pipe is de minimis.
2053-3	Honor the Earth - Slagle, Nicolette	Tribal consultation is discussed in Chapter 9. A formal consultation policy is provided in Appendix P. Revisions have been made to Chapter 9 to show that consultation does not equate to consent of a project.
2030-1	Honor the Earth - Slagle, Nicolette	Thank you for your comments on the Draft EIS. The occurrence of 17 wild rice lakes within 0.5 mile of the Applicant's Preferred Route does not mean all of these lakes will be affected. Only 4 lakes would be affected. The amount of acreage impacted would be less than 5 acres.
0909-1	Honor the Earth - Slagle, Nicolette	Thank you for your comments on the Draft EIS. The referenced cost estimate was provided by Enbridge to Cardno. There has been no further verification of the removal cost estimate.
0525-1	Horyza, Tim	Environmental benefits are discussed throughout the EIS for the Applicant's proposed project/preferred route and the alternatives. These are noted as positive impacts.

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1027-1	Houston, Jennifer	Thank you for your comments on the Draft EIS. Tribal resources are addressed primarily in Chapters 9 and 11; however, references are provided throughout the EIS to note where specific resources analyses (e.g., wild rice, cultural sites) include a discussion of impacts to American Indian tribes and tribal resources.
1027-2	Houston, Jennifer	Potential impacts to affected natural resources are discussed in Chapters 5 and 6, and how American Indian tribes experience and interact with these resources is summarized in Chapters 9 and 11. This constitutes the analysis of treaty rights within this EIS.
1027-3	Houston, Jennifer	The draft EIS noted that only three reports were reviewed; the additional reports now have been reviewed. Revisions to Sections 5.4.2 and 6.4.2 have been made to show this.
1027-4	Houston, Jennifer	As noted in Section 11.4 of the FEIS, the applicant may work with companies and subcontractors hired to construct, restore and operate the pipeline to prepare and implement an education plan or awareness campaign regarding the issue of sexual abuse or sex trafficking. The section has been revised to clarify that the applicant may also provide funding to support the efforts of local and tribal law enforcement on this and other safety-related issues, which would enable local entities to tailor approaches and solutions to the local community.
1027-5	Houston, Jennifer	The FEIS provides an assessment of potential spills at 7 waterbodies selected through a process of likelihood for impact.
1027-6	Houston, Jennifer	The 30 year time-frame was chosen to match the economic life of the project indicated by the Applicant. For purposes of comparison across alternatives, the EIS provides a consistent time that is long enough to understand typical annual operating impacts/tradeoffs of the alternatives.
1027-7	Houston, Jennifer	The EIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.

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1027-8	Houston, Jennifer	This has been corrected. The applicant (primary responsible party or PRP) and their contractors are the responders. Spill recovery efforts are monitored, and as needed directed, by the Federal and State on-scene coordinators. If the PRP's response efforts are deemed to be inadequate, the NCP authorizes mobilization of federal and state resources, funded by the Oil Spill Liability Trust Fund, which in turn will bill the PRP for funds expended in the response.
1027-9	Houston, Jennifer	Section 6.2.4.3 of the FEIS includes a discussion on the presence of an oil or gas pipeline, or pipeline easement, and potential effects on property values. A review of relevant literature provided limited to no conclusive evidence that the presence of a pipeline and associated easement would have an effect - negative or otherwise - on surrounding property values. Table 6.2.4-5 within the aforementioned section summarizes the findings reviewed. Ultimately, landowner property values are a product of many local or regional market variables, of which the presence of a pipeline is only one. The discussion clarifies that spills, ruptures and other incidents potentially resulting in "legacy contamination" may have a greater impact on property values. The magnitude of such impacts is highly dependent on the specific nature of the contamination. As stated within Table 8.3-1, in the long term, socioeconomic impacts can be lessened by monitoring, adaptive management, and site-specific mitigation measures. As stated within FEIS Section 8.3.1.1.1, the Applicant would continue to be responsible for preventing discharges and contamination, as spelled out in Minnesota Statutes.
1027-10	Houston, Jennifer	Long-term monitoring and mitigation is discussed in Section 8.3.1 of the FEIS.
1027-11	Houston, Jennifer	Discussion of buoyancy is provided in Section 8.3.1.4 of the FEIS.
1027-12	Houston, Jennifer	Discussion of buoyancy and surface subsidence is provided in Section 8.3.1.4, and Appendix B Section 7.2, respectively of the FEIS. Further discussion of corrosion is provided in Appendix B Section 4.
1027-13	Houston, Jennifer	Discussion of abandonment of Line 3 only is provided in this EIS.
1027-14	Houston, Jennifer	Enbridge states risks associated with removal in Appendix B and Section 3.1 of the FEIS. Additional discussion related to pipe spacing and potential for removal is included in Section 8.4.

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Response#	Commenter	Response
1027-15	Houston, Jennifer	Enbridge has been, and will continue to be responsible for such contamination as regulated by State Statutes identified in Section 8.3.1.1 of the FEIS.
1027-16	Houston, Jennifer	The affected area width, or Region of Interest (ROI), is discussed under the Methodology heading of each sub-section within Chapter 5.
1027-17	Houston, Jennifer	Additional information regarding installation in wetlands, and subsequent restoration, is included in Section 2.7.2.
1027-18	Houston, Jennifer	Section 2.3.2 has been updated to indicate the requirement of 49 CFR that cathodic protection systems be operational within one year of construction.
1027-19	Houston, Jennifer	Section 5.3.4.1 of the FEIS does state that Enbridge has appealed the amount of property taxes paid between 2012 and 2016, and that to date the appeal has not been settled. Tax implications associated with retirement/abandonment of the existing Line 3 are uncertain at this time.
2669-1	Howe, Arthur	Thank you for your comments on the Draft EIS. Section 10.5.1 of the FEIS discusses the applicant's programs in place to help prevent spills. This includes additional training for personnel. The applicant has not indicated the potential use of drones.
2669-2	Howe, Arthur	Case studies of several significant spills and discussion of their impacts to various resources have been included in the EIS. Section 10.5.3.1 of the FEIS discusses the use of the Region 5 Regional Response Team's Inland Response Tactics Manual, which provides techniques and methods for responding to various spill conditions. Specific actions and equipment are discussed in Section 10.6.1.
0693-1	Howley, Nora	Thank you for your comments on the Draft EIS. The 30 year time-frame was chosen to match the economic life of the project indicated by the Applicant. For purposes of comparison across alternatives, the EIS targets a consistent time-frame that is long enough to understand typical annual operating impacts/tradeoffs of the alternatives.

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Response#	Commenter	Response
2764-1	Hubbard County Coalition of Lake Associations	Thank you for your comments on the Draft EIS. The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release. The spill model does include winter, spring and summer conditions. Case studies of several significant spills and discussion of their impacts to various resources have been included. Discussion of access and weather conditions impacts to response times is included in the FEIS.
2764-2	Hubbard County Coalition of Lake Associations	State plan/recreational areas, State parks, Wildlife Management Areas (WMAs), and Waterfowl production areas are included in the assessment crude oil exposures and impacts.
2764-3	Hubbard County Coalition of Lake Associations	Thank you for your comment. Each project presents its own unique characteristics. Relative to water crossings, project-specific information is required and relevant for assessing impacts or required mitigation measures.
2764-4	Hubbard County Coalition of Lake Associations	Section 5.2.3 - Vegetation, Section 6.3.3 - Vegetation, and Chapter 7 of the DEIS all address specific potential direct and indirect impacts to terrestrial vegetation in terms of potential impacts from spread of noxious and invasive plant species. The analysis is quantified to the degree possible by noting the specific known locations of state-listed noxious weeds, and invasive plant species, within the ROI of the Proposed Project as well as alternative routes. The impact analysis integrates the plan for preventing the spread of invasive species, as addressed in Section 1.6 - Controlling Spread of Undesirable Species, of the Environmental Protection Plan (EPP), Appendix E of the DEIS. Appendix A to this document lists the known State-listed noxious weeds, and invasive terrestrial and aquatic plant species, as well as invasive fish and invertebrate species known to occur within the vicinity of the Proposed Project and alternative routes, by state. The EPP outlines construction-related environmental policies, procedures, and protection measures that would be implemented during project construction and operation specifically to avoid introduction and spread of noxious weeds.

Responses to Comments - Citizen

Response#	Commenter	Response
2764-5	Hubbard County Coalition of Lake Associations	SA-04 is a system alternative evaluated to aid the Commission's evaluation of whether or not to grant a CN for the proposed project. A system alternative is not a routing alternative, as no entity has proposed to build such a pipeline, detailed routing and design have not been conducted, and a route permit could not be issued for SA-04. Instead, a system alternative is a serves as a broader level point of comparison to the Applicant's Proposed project and the other CN alternatives. The level of analysis of SA-04 is in line with this concept.
0694-1	Hughes, Joan	Thank you for your comments on the Draft EIS. The 30-year timeframe was chosen to match the economic life of the project indicated by the Applicant. For purposes of comparison across alternatives, the EIS targets a consistent timeframe that is long enough to understand typical annual operating impacts/tradeoffs of the alternatives.
1985-1	Hulstrand, Karen	Thank you for your comments on the Draft EIS. Enbridge has not supplied a list of the chemical makeup of the product. Information related to the potential components is provided in Chapter 5.
0831-1	International Union of Operating Engineers - George, Jason	Thank you for your comments on the Draft EIS. Section 6.5.4 of the FEIS clarifies that it is likely that the Applicant would hire local residents during construction of any of the alternative routes for a portion of its workforce - based on current labor agreements in Minnesota at least 50% of workers will be expected to be employed from local union halls.
0831-2	International Union of Operating Engineers - George, Jason	Section 6.5.4 of the FEIS clarifies that it is likely that the Applicant would hire local residents during construction of any of the alternative routes for a portion of its workforce - based on current labor agreements in Minnesota at least 50% of workers will be expected to be employed from local union halls.
0831-3	International Union of Operating Engineers - George, Jason	The comment was considered in development of the FEIS.

Responses to Comments - Citizen

Response#	Commenter	Response
1030-1	International Union of Operating Engineers, Local 49 - George, Jason	Thank you for your comments on the Draft EIS. Chapters 5 and 6 of the FEIS included updated information regarding anticipated impacts of the project and various alternatives on employment, including labor requirements for various alternatives based on an estimate of 600 workers per construction spread. Specifically, Section 6.5.4.3 clarifies that jobs would be created for local labor as current labor agreements in Minnesota require that at least 50% of workers would be expected to be employed from local union halls. The FEIS also clarifies that some of these jobs would likely become permanent, based in part on overall labor market demand.
1030-2	International Union of Operating Engineers, Local 49 - George, Jason	Chapters 5 and 6 of the FEIS, specifically Sections 6.5.4.3, clarify that jobs would be created for local labor as current labor agreements in Minnesota require that at least 50% of workers would be expected to be employed from local union halls.
1030-3; 1030-4	International Union of Operating Engineers, Local 49 - George, Jason	Section 11 of the EIS addresses concerns regarding sex trafficking that have been raised by commenters, local communities, and other communities where pipelines have been sited or proposed. The EIS cites two sources when noting that increases in sex trafficking, particularly among Native populations, is well documented (National Congress of American Indians Policy Research Center 2016), and that American Indian and minority populations can be at higher risk based on various factors (Minnesota Department of Health [MDH] 2014). The conclusion can be generally drawn that these concerns have the potential to be amplified with the addition of a cash-rich workforce. To address this potential, and to address the concern that rural areas may not have resources necessary to detect and prevent these activities, Section 11.4 of the FEIS indicates that the applicant may provide funding to local and tribal law enforcement to support efforts to awareness and prevention.

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Response#	Commenter	Response
0696-1	Jeffrey, Susu	Thank you for your comments on the Draft EIS. A discussion of alternatives is presented in Chapter 4. Specifically, a no action alternative, which is the denial of the CN, is discussed in Section 4.2.2. The purpose of the CN process is to determine whether the particular project being proposed is needed. There is no legal authority in a CN proceeding of a separate proposed project (at the state or with the Public Utilities Commission) to evaluate the ongoing need of an existing project. Once constructed, the safety and operation of an existing pipeline is regulated by the United States Department of Transportation, Pipeline and Hazardous Materials Safety Administration. In this particular case, Enbridge has entered into a consent decree with the United States Environmental Protection Agency that allows for the continued operation of the existing Line 3 if a replacement for the line is not approved. In other words, if the proposed Line 3 project is not approved by the Commission, the continued operation of the existing Line 3 will be regulated by the Federal government, not the State of Minnesota. Accordingly, shutting down and removing existing pipelines in the mainline corridor is not included in the No Action Alternative.
0696-2	Jeffrey, Susu	The EIS states that vulnerable populations, such as children, those with respiratory diseases, and the elderly, could be particularly sensitive to airborne pollutant releases following a spill and would likely experience moderate respiratory impacts depending on their proximity to the incident, current health status, and seasonal/weather conditions in the aftermath of the spill. In the event of a spill, spill response teams will be at the site as soon as possible (see Chapter 10).
0697-1	Jewett, Kelly	Thank you for your comments on the Draft EIS. An evaluation of potential impacts associated with oil spills is provided in Chapter 10, and an evaluation of potential impacts to low-income populations is included in Chapter 11. Appendix E provides the Environmental Protection Plan from the Applicant. This provides information on their procedures in case of a spill.
2375-1	Johnson, Deanna	Thank you for your comments on the Draft EIS. Chapter 3 of the FEIS discusses the regulatory framework.

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Response#	Commenter	Response
2375-2	Johnson, Deanna	The comment was considered in development of the FEIS.
2375-3	Johnson, Deanna	The comment was considered in development of the FEIS.
2375-4	Johnson, Deanna	Information on Itasca State Park has been added in the FEIS.
2375-5	Johnson, Deanna	References to impaired waters crossed by the various alternatives was based on georeferenced data on stream segments and alternative crossings, and the waterbody's determination of water quality impairment as determined by MPCA.
2375-6	Johnson, Deanna	10 miles downstream was selected for the ROI, because it was considered to be not overly conservative, and crossing widths for the RAs were unavailable. The Applicant surveyed the streams and rivers for the APR only, so small (less than 30 feet wide) and large (30 feet wide or greater) crossings are only known for this route. It would be biased to only run the two downstream buffers (30 miles for large rivers, and 10 miles for small streams) along the APR. Furthermore, it was determined that it would be overly conservative to run a 30-mile downstream buffer for all water crossings, especially since many of these water bodies are ditches and terminate within a few miles.
2375-7	Johnson, Deanna	In Section 5.2.6.2.1, Itasca State Park is noted as being proximate to the Applicant's proposed project. In Section 6.3.6.2.1 and Section 6.3.6.2.2, the Applicant's preferred route and RA-03AM are noted as being proximate to Itasca State Park. Sections 5.4.2.6 and 5.4.3.1 were revised to include Itasca State Park, as the NRHP listed property is located within the ROI for the Applicant's proposed Project. Sections 6.4.2.1, 6.4.2.2.1, 6.4.3.1, and 6.4.3.2 were revised to include Itasca State Park, as the NRHP listed property is located within the ROI for the Applicant's Preferred Route and RA-03AM.

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Response#	Commenter	Response
2375-8	Johnson, Deanna	Section 5.4 has been revised to focus on the data available from the Minnesota Historical Society databases. At the time of developing the EIS, this was the most complete data available. A discussion of Itasca State Park is included in Sections 5.4 and 6.4. This discussion, however, relates only to its NRHP significance, as per the cultural resources discussion. Its status as one of the National Natural Landmarks has been added to Section 5.2.6 and Section 6.3.6. Additional discussion of the Itasca State Park is also found in the wildlife sections, as it relates to the IBA (Important Bird Area).
2375-9	Johnson, Deanna	Thank you for your comment.
2375-10	Johnson, Deanna	The analyses performed on the Applicant's Preferred Route and route alternatives are for the purpose of this EIS. Routing issues, including the public's concerns with a new pipeline corridor potentially being established as documented within comment and testimony in the Sandpiper docket, are discussed in Chapter 1.
2375-11	Johnson, Deanna	References to the Minnesota Department of Commerce Energy Environmental Review and Analysis (DOC-EERA)'s Scoping Summary Report for Line 3 Replacement and Sandpiper Pipeline Projects, and related dockets are included within the FEIS.
2375-12	Johnson, Deanna	Minnesota Department of Commerce, Energy Environmental Review and Analysis (DOC-EERA) staff has prepared this FEIS in consultation with the Commission’s Executive Secretary, and with assistance from the Minnesota Department of Natural Resources (Minnesota DNR) and Minnesota Pollution Control Agency (Minnesota PCA). Route Alternative RA-03AM analyzed in the FEIS, was initially proposed by the Minnesota PCA and modified with input from Minnesota DNR, largely reflects the alternative referenced by the commenter. Compared to other alternatives, this option reroutes around fens, fish hatcheries, and communities, and avoids specific Wildlife Management Areas.

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Response#	Commenter	Response
2375-13	Johnson, Deanna	Comments made by the public and agencies including the MPCA and DNR regarding the Sandpiper Projects are acknowledged per references throughout the FEIS, including references to the Sandpiper docket and routing issues (FEIS Chapter 1). Chapter 12 of the FEIS addresses cumulative potential effects pertaining to the Applicant's Proposed Project/Preferred Route and Certificate of Need Alternatives and Route Alternatives pertaining to this EIS, including resources impacted, as well as cumulative spills, by all alternatives that would share an environmentally relevant area with the reasonably foreseeable action of addition of pipeline in the same corridor.
2375-14	Johnson, Deanna	Climate change is affecting many natural resources. Thank you for your comment.
2375-15	Johnson, Deanna	The executive summary of the FEIS provides information on the purpose of the EIS and the decisions they inform, while Section 1.4 provides details about broader policy implications.
2375-16	Johnson, Deanna	The executive summary of the FEIS provides information on the purpose of the EIS and the decisions they inform, while Section 1.4 provides details about broader policy implications.
2375-17	Johnson, Deanna	Each alternative is analyzed based on its overall impacts along its proposed route.
0851-1	Johnson, Deanna	Thank you for your comments on the Draft EIS. Chapter 13 of the FEIS includes a list of preparers for the Document. Information provided by Enbridge and others throughout the FEIS has been noted as such.
0851-2	Johnson, Deanna	An updated list of preparers is provided in Chapter 13.
0851-3	Johnson, Deanna	An updated list of preparers is provided in Chapter 13.
0851-4	Johnson, Deanna	The FEIS focuses on impacts to waterbodies of concern and relevant natural resources potentially affected by the alternatives presented.
0851-5	Johnson, Deanna	Thank you for the comment. In cooperation with the Minnesota Department of Commerce, the Minnesota Pollution Control Agency and Minnesota Department of Natural Resources were both included in the DEIS and FEIS process.

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Response#	Commenter	Response
2769-1	Johnson, Gregory	Thank you for your comments on the Draft EIS. Section 195.563 of 49 CFR Subpart H – Corrosion Control states that cathodic protection must be in operation no later than 1 year after the pipeline is constructed. This does not mean Enbridge would wait a full year to install the system. It is typically installed as part of the construction process. The buried pipeline would also be protected from external corrosion by application of a coating.
2768-1	Johnson, Gregory	Thank you for your comments on the Draft EIS. SA-04 is a conceptual alternative. It is not one that has been submitted by an applicant for permitting or review. The purpose of the alternative is to provide an appropriate comparison within the evaluation of CN alternatives.
2768-2	Johnson, Gregory	SA-04 is a conceptual alternative. It is not one that has been submitted by an applicant for permitting or review. The purpose of the alternative is to provide an appropriate comparison within the evaluation of CN alternatives.
2767-1	Johnson, Gregory	Thank you for your comments on the Draft EIS. A detailed analysis of all impacts to all of the various and site-specific natural resources was not possible under the FEIS process.
2381-1	Joo, Misa	Thank you for your comments on the Draft EIS. Information regarding tribal consultation is provided in Chapter 9 and Appendix P of the FEIS. A tribal consultation policy was developed in March 2016.
2381-2	Joo, Misa	Tribal resources are addressed primarily in Chapters 9 and 11; however, references are provided throughout the EIS to note where specific resources analyses (e.g., wild rice, cultural sites) include a discussion of impacts to American Indian tribes and tribal resources.
2381-3	Joo, Misa	Potential impacts to affected natural resources are discussed in Chapters 5 and 6, and how American Indian tribes experience and interact with these resources is summarized in Chapters 9 and 11. This constitutes the analysis of treaty rights within this EIS.

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Response#	Commenter	Response
2381-4	Joo, Misa	Chapter 11 of the FEIS has been expanded to include additional information on the assessment of and impacts to potential EJ communities. As described in the section, the identification of potential EJ communities or the potential for disproportionately high and adverse impacts does not preclude approval of the project or selection of a route alternative; however, it does require detailed efforts to avoid, mitigate, minimize, rectify, reduce, and/or eliminate the impacts. Section 11.4 of the EIS describes the measures that may be undertaken by the applicant to minimize or mitigate adverse impacts. As noted in this section, the applicant may work with companies and subcontractors hired to construct, restore and operate the pipeline to prepare and implement an education plan or awareness campaign regarding the issue of sexual abuse or sex trafficking. Section 11.4 has been revised to clarify that the applicant may also provide funding to support the efforts of local and tribal law enforcement on this and other safety-related issues, which would enable local entities to tailor approaches and solutions to their community, and/or to collaborate with experts in this field.
2381-5	Joo, Misa	The draft EIS noted that only three reports were reviewed; the additional reports now have been reviewed. Revisions to Sections 5.4.2 and 6.4.2 have been made to show this.
2381-6	Joo, Misa	The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
2381-7	Joo, Misa	The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.

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2381-8	Joo, Misa	Information about Potential Impacts of Line 3 Abandonment are detailed in Section 8.3.1 and Table 8.3-1. "In the near term, impacts on socioeconomics are anticipated to be minimal. Abandonment could decrease tax revenues or shift them to other taxing authorities. In the longer term, impacts on socioeconomics, particularly agricultural production, could be significant due to subsidence and/or exposure of pipeline. These potential impacts could be lessened by monitoring, adaptive management, and site-specific mitigation measures."
2381-9	Joo, Misa	Enbridge has analyzed and modeled potential subsidence of the abandoned Line 3 in its proposed abandonment plan (see Appendix B). This analysis includes projecting loss of pipeline wall thickness due to corrosion over time, possible failure modes for the pipeline, and estimated subsidence levels should the pipeline fail.
2381-10	Joo, Misa	Additional information is included in Chapter 8 regarding the distance between existing pipelines in the Mainline corridor (see Table 8.4-2).
2381-11	Joo, Misa	Information regarding the temporary restoration of wetlands is provided in Appendix E. This outlines the methods that the Applicant will take to restore the conditions to the pre-condition state.
2381-12	Joo, Misa	Cathodic protection is discussed in Chapter 8 of the FEIS.
2381-13	Joo, Misa	The cumulative potential impacts of climate change are discussed briefly in Executive Summary and additional details in Section 12.5. Section 12.5 also discusses climate change trends in Minnesota and the Midwest.
2381-14	Joo, Misa	Chapter 1 of the FEIS clearly states that the EIS is a factual document that is designed to inform public deliberations and government decision-making, but does not make specific recommendations regarding the Certificate of Need (or Route Permit) for the Project. The Commission will consider if the consequences to society of granting the Certificate of Need are more favorable than the consequences of denying the Certificate, among other decision factors per Minnesota Administrative Rules Chapter 7853, stated in the FEIS Executive Summary.

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Response#	Commenter	Response
2349-1	Jordahl Redlin, Erin	Thank you for your comments on the Draft EIS. Ten miles downstream was selected for the ROI, because it was considered to be not overly conservative, and crossing widths for the RAs were unavailable. The Applicant surveyed the streams and rivers for the APR only, so small (less than 30 feet wide) and large (30 feet wide or greater) crossings are only known for this route. It would be biased to only run the two downstream buffers (30 miles for large rivers, and 10 miles for small streams) along the APR. Furthermore, it was determined that it would be overly conservative to run a 30-mile downstream buffer for all water crossings, especially since many of these water bodies are ditches and terminate within a few miles.
2349-2	Jordahl Redlin, Erin	Permitting requirements will adhere to all state and federally-relevant regulations. All relevant state and federal agencies will be involved in permitting decisions relative to streams, lakes and other natural resources.
2387-1	Kennedy, Lucille Allison	Thank you for your comments on the Draft EIS. Potential impacts to affected natural resources are discussed in Chapters 5 and 6, and how American Indian tribes experience and interact with these resources is summarized in Chapters 9 and 11. This constitutes the analysis of treaty rights within this EIS.

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Response#	Commenter	Response
2387-2	Kennedy, Lucille Allison	Additional information has been added to the discussion of impacts to wild rice (based on limited availability of public information) in Sections 5.2.1 and 6.3.1, as well as in Chapters 9 and 10. Additional information has been added to the discussion of cultural resources in Sections 5.4 and 6.4. In these sections, impacts to archaeological sites, which may include American Indian artifacts, are discussed for both the CN alternatives and the route alternatives. With respect to Chapter 11, several sources were reviewed to better understand the concerns related to sex trafficking. These concerns have been raised in recent local media, by commenters, local communities, and other communities where pipelines have been sited or proposed. Two sources are cited to support this concern; Chapter 11 indicates that increases in sex trafficking, particularly among Native populations, is well documented (National Congress of American Indians Policy Research Center 2016), and that American Indian and minority populations can be at higher risk based on various factors (Minnesota Department of Health [MDH] 2014). The discussion concludes that these concerns have the potential to be amplified with the addition of a cash-rich workforce. To address this potential, Section 11.4 of the EIS notes that the applicant may work with companies and subcontractors hired to construct, restore and operate the pipeline to prepare and implement an education plan or awareness campaign regarding the issue of sexual abuse or sex trafficking. Section 11.4 has been revised to clarify that the applicant may also provide funding to support the efforts of local and tribal law enforcement on this and other safety-related issues, which would enable local entities to tailor approaches and solutions to their community, and/or to collaborate with experts in this field.
2387-3	Kennedy, Lucille Allison	Additional information has been included in Chapter 10.
2387-4	Kennedy, Lucille Allison	Discussion of emergency response are required by the Consent Decree, which is discussed is Section 8.3.1 of the FEIS.

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Response#	Commenter	Response
2387-5	Kennedy, Lucille Allison	Information about Potential Impacts of Line 3 Abandonment are detailed in Section 8.3.1 and Table 8.3-1. "In the near term, impacts on socioeconomics are anticipated to be minimal. Abandonment could decrease tax revenues or shift them to other taxing authorities. In the longer term, impacts on socioeconomics, particularly agricultural production, could be significant due to subsidence and/or exposure of pipeline. These potential impacts could be lessened by monitoring, adaptive management, and site-specific mitigation measures."
2387-6	Kennedy, Lucille Allison	The EIS uses social cost of carbon (SCC) values that were assessed using a 3-percent discount rate developed by the Interagency Working Group to provide an estimate of potential climate change damages for the Applicant's proposed project and CN Alternatives based on total direct and indirect GHG emissions. The SCC is a useful measure to assess the benefits of CO_2 reductions.
1035-1	Kilpatrick, Julie	Thank you for your comments on the Draft EIS. Your comment has been considered in the development of the FEIS.
1035-2	Kilpatrick, Julie	The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
1034-1	Kilpatrick, Julie	Thank you for your comments on the Draft EIS. The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
1035-3	Kilpatrick, Julie	A discussion of potential buoyancy mitigation measures is provided in Section 8.3.1.4 of the FEIS. Corrosion rates are discussed in Appendix B Section 4.3.1.4.
1034-2	Kilpatrick, Julie	A discussion of potential buoyancy mitigation measures is provided in Section 8.3.1.4 of the FEIS. Corrosion rates are discussed in Appendix B Section 4.3.1.4.

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Response#	Commenter	Response
2400-1	Kroeger, Amelia	Thank you for your comments on the Draft EIS. Surface water quality can vary based on factors such as whether the waterbody in question has uses for public consumption, aquatic life or other valued attributes. The requirements for meeting various standards or criteria are based on each individual waterbody's potential to meet the standards for the use as designated by the state.
2400-2	Kroeger, Amelia	Section 5.2.1.1.4 of the FEIS discusses multiple additives that may be used in drilling mud to help prevent loss of circulation. Section 5.2.1.2.3 discusses that only additives that have been approved by Minnesota Pollution Control Agency will be used.
2400-3	Kroeger, Amelia	The Applicant's preferred alternative would cross over approximately 5 acres of wild rice lake habitat. The alternative SA-04, like other alternatives, would not impact any wild rice lakes. The current FEIS has been corrected to reflect these numbers. The applicant would be required to meet all state construction requirements for constructing within a wetland/waterbody prior to approval. Mitigation would be required for all impacts to state resources.
0335-1	Kuhns, Matt	Thank you for your comments on the Draft EIS. Long-term considerations are discussed in various sections within Chapter 8 of the FEIS. Additional technical long-term considerations are provided in Appendix B.
0335-2	Kuhns, Matt	Section 8.3.1.1 of the FEIS discusses the requirements laid out in State Statutes that Enbridge must abide by.

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Response#	Commenter	Response
0335-3	Kuhns, Matt	Section 11 of the EIS addresses concerns regarding sex trafficking that have been raised by commenters, local communities, and other communities where pipelines have been sited or proposed. The EIS cites two sources when noting that increases in sex trafficking, particularly among Native populations, is well documented (National Congress of American Indians Policy Research Center 2016), and that American Indian and minority populations can be at higher risk based on various factors (Minnesota Department of Health [MDH] 2014). The conclusion can be generally drawn that these concerns have the potential to be amplified with the addition of a cash-rich workforce. To address this potential, and to address the concern that rural areas may not have resources necessary to detect and prevent these activities, Section 11.4 of the FEIS indicates that the applicant may provide funding to local and tribal law enforcement to support efforts to awareness and prevention. Evaluating the effectiveness of these plans is beyond the scope of this EIS. Tribal resources are addressed primarily in Chapters 9 and 11; however, references are provided throughout the EIS to note where specific resources analyses (e.g., wild rice, cultural sites) include a discussion of impacts to American Indian tribes and tribal resources.
1039-1	LaBerge, Kathy	Thank you for your comments on the Draft EIS. The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
2410-1	Learmont, R	Thank you for your comments on the Draft EIS. Section 5.3.4.1 of the FEIS does state that Enbridge has appealed the amount of property taxes paid between 2012 and 2016, and that to date the appeal has not been settled. Tax implications associated with retirement/abandonment of the existing Line 3 are uncertain at this time.
2410-2	Learmont, R	The FEIS is not intended to provide information on the specifics of easements and the agreements between the Applicant (Enbridge) and property owners.
2410-3	Learmont, R	An assessment of whether removal (or partial removal) is viable has been included in Sections 8.4 and 8.5 of the FEIS. Such conditions may be conditions of a permit.

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Response#	Commenter	Response
2408-1	Learmont, R	Thank you for your comments on the Draft EIS. Chapter 10 of the FEIS provides historic pipeline incident data including detailed historic incident rates and causes. Current spill probabilities for a new pipeline using modern metallurgy and coating technologies would likely be less than historic incidents caused by corrosion or other internal failures.
2407-1	Learmont, R	Thank you for your comments on the Draft EIS. The EIS and supporting maps were generated based on available data, while route alternatives data were supplied by the applicant.
2407-2	Learmont, R	Alternate route data was provided by the applicant.
2406-1	Learmont, R	Thank you for your comments on the Draft EIS. Additional information related to abandonment and removal has been included in Chapter 8 of the FEIS. This includes potential further studies related to both alternatives.
2406-2	Learmont, R	Additional information has been included in Chapter 8 to help present the viability of each option.
2406-3	Learmont, R	If the Applicant is issued a Certificate of Need and route permit by the Commission, Enbridge could exercise the power of eminent domain to acquire land for the Project. Enbridge cannot use eminent domain to acquire a pipeline right-of-way across federal/state public or tribal lands. A detailed discussion of eminent domain is outside the scope of the FEIS.
2406-4	Learmont, R	The FEIS assumes that the Applicant will obtain and comply with all necessary permits and approvals that would be required for the construction and operation of the pipeline if a Certificate of Need and route permit are approved by the Commission. A list of required permits and approvals for the Applicant's proposed project is presented in Table 3.6-1. It is the responsibility of each respective permitting authority to monitor and/or pursue enforcement of permit conditions with the Applicant.
2390-1	Leech Lake Area Watershed Foundation	Thank you for your comments on the Draft EIS. Publicly available datasets and field reports were used in developing the FEIS.

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Response#	Commenter	Response
2390-2	Leech Lake Area Watershed Foundation	Thank you for your comment. It was considered in development of the FEIS. The FEIS assumes that the Applicant will obtain and comply with all necessary permits and approvals that would be required for the construction and operation, including any USEPA requirements, of the pipeline if a Certificate of Need and route permit are approved by the Commission. A list of required permits and approvals for the Applicant's proposed project is presented in Table 3.6-1.
2390-3	Leech Lake Area Watershed Foundation	Publicly available datasets and field reports were used in developing the FEIS.
2390-4	Leech Lake Area Watershed Foundation	Case studies of several significant spills have been included.
2390-5	Leech Lake Area Watershed Foundation	If the applicant (primary responsible party or PRP) spill response efforts are deemed to be inadequate, the NCP authorizes mobilization of federal and state resources, funded by the Oil Spill Liability Trust Fund, which in turn will bill the PRP for funds expended in the response. If it appears that there are significant impacts on natural resources due to a spill, a Natural Resource Damage Assessment (NRDA) may be initiated. NRDA is a legal process under the Oil Pollution Act of 1990 (OPA 90) that is used by federal, state, and tribal governments (referred to as "trustees") to seek compensation for natural resource damages and restore vegetation; fish, wildlife, and their habitat; recreation resources; and other affected resources to pre-spill baseline conditions.
2390-6	Leech Lake Area Watershed Foundation	SA-04 is a system alternative evaluated to aid the Commission's evaluation of whether or not to grant a CN for the proposed project. A system alternative is not a routing alternative, as no entity has proposed to build such a pipeline, detailed routing and design have not been conducted, and a route permit could not be issued for SA-04. Instead, a system alternative is a serves as a broader level point of comparison to the Applicant's Proposed project and the other CN alternatives. The level of analysis of SA-04 is in line with this concept.

Responses to Comments - Citizen

Response#	Commenter	Response
2390-7	Leech Lake Area Watershed Foundation	Discussion of access and weather conditions impacts to response times is included in the EIS.
2390-8	Leech Lake Area Watershed Foundation	SA-04 is a system alternative evaluated to aid the Commission's evaluation of whether or not to grant a CN for the proposed project. A system alternative is not a routing alternative, as no entity has proposed to build such a pipeline, detailed routing and design have not been conducted, and a route permit could not be issued for SA-04. Instead, a system alternative is a serves as a broader level point of comparison to the Applicant's Proposed project and the other CN alternatives. The level of analysis of SA-04 is in line with this concept.
2390-9	Leech Lake Area Watershed Foundation	The comment has been considered in the development of the FEIS.
2390-10	Leech Lake Area Watershed Foundation	Additional information related to water resources for each route alternative has been included in Section 6.3.1 of the FEIS.
2390-11	Leech Lake Area Watershed Foundation	All construction and operational activities associated with pipelines must comply with the National Invasive Species Act.
2390-12	Leech Lake Area Watershed Foundation	Thank you for your comment. Groundwater resources are considered during evaluation of all alternatives. The quality of the groundwater has been considered based on protective regulations and designated groundwater protection areas for all alternatives.
2390-13	Leech Lake Area Watershed Foundation	Thank you for your comment. The analysis of impacts to groundwater considered the nature and potential viability of the resource as a water source. Groundwater analysis also considered the geologic nature of the underlying substrate and its capacity to limit or enhance impacts to groundwater regionally.

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Response#	Commenter	Response
2390-14	Leech Lake Area Watershed Foundation	The ROI was identified as the distance that released oil would typically spread on flat ground (calculated to be 1,214 feet from the centerline) plus an additional distance of 1,050 feet for estimated down-gradient migration in groundwater (if groundwater were contacted); the estimated total distance of approximately 2,264 feet was rounded up to 2,500 feet. 10 miles downstream was selected, because it was considered to be not overly conservative, and crossing widths for the RAs were unavailable. The Applicant surveyed the streams and rivers for the APR ONLY, so small (<10 m wide) and large (10 m or > wide) crossings are only known for this route. It would be biased to only run the 2 downstream buffers (30 miles for large rivers, and 10 miles for small streams) along the APR. Furthermore, we determined that it would be overly conservative to run a 30-mile downstream buffer for all water crossings, especially since many of these water bodies are ditches and terminate within a few miles.
2390-15	Leech Lake Area Watershed Foundation	Publicly available datasets and field reports were used in the development of the FEIS.
2390-16	Leech Lake Area Watershed Foundation	Thank you for your comment. It was considered in development of the FEIS. Potential degradation of surface water quality from construction and operation of the proposed project is discussed in Sections 5.2.1.2.4 and 6.3.1.2.4 of the FEIS.
2390-17	Leech Lake Area Watershed Foundation	The cumulative potential effects of climate change and trends in Minnesota and the Midwest are discussed in Section 12 of DEIS.
2390-18	Leech Lake Area Watershed Foundation	The EIS has been updated to include discussion on the properties of dilbit as it weathers.
2390-19	Leech Lake Area Watershed Foundation	Please refer to Greenhouse Gases in Section 5.2.7.2 of the FEIS. Also discussed in this Section are life-cycle GHG emissions from extraction to the end-use.

Responses to Comments - Citizen

Response#	Commenter	Response
2390-20	Leech Lake Area Watershed Foundation	Chapter 8 of the FEIS discusses abandonment and removal.
2390-21	Leech Lake Area Watershed Foundation	Comment noted. As described in Chapter 11, per the regulatory framework, the identification of potential EJ communities or the potential for disproportionately high and adverse impacts does not preclude approval of the project or selection of a route alternative; however, it does require detailed efforts to avoid, mitigate, minimize, rectify, reduce, and/or eliminate the impacts. Section 11.4 of the EIS describes the measures that may be undertaken by the applicant to minimize or mitigate adverse impacts. With respect to the potential for sexual abuse or sex trafficking, Chapter 11.4 notes that the applicant may work with companies and subcontractors hired to construct, restore and operate the pipeline to prepare and implement an education plan or awareness campaign regarding the issue of sexual abuse or sex trafficking. This section has also been revised to clarify that the applicant may also provide funding to support the efforts of local and tribal law enforcement on this and other safety-related issues, which would enable local entities to tailor approaches and solutions to their community, and/or to collaborate with experts in this field.
2390-22	Leech Lake Area Watershed Foundation	Thank you for your comment. It was considered in development of the FEIS. 10 miles downstream was selected for the ROI, because it was considered to be not overly conservative, and crossing widths for the route alternatives were unavailable.
2390-23	Leech Lake Area Watershed Foundation	10 miles downstream was selected, because it was considered to be not overly conservative, and crossing widths for the RAs were unavailable. The Applicant surveyed the streams and rivers for the APR ONLY, so small (<10 m wide) and large (10 m or > wide) crossings are only known for this route. It would be biased to only run the 2 downstream buffers (30 miles for large rivers, and 10 miles for small streams) along the APR. Furthermore, we determined that it would be overly conservative to run a 30-mile downstream buffer for all water crossings, especially since many of these water bodies are ditches and terminate within a few miles.
2390-24	Leech Lake Area Watershed Foundation	While the entire project is discussed generally, the scope of the analysis provided in this EIS is specific to the portion of the pipeline crossing through Minnesota.

Responses to Comments - Citizen

Response#	Commenter	Response
2390-25	Leech Lake Area Watershed Foundation	The comment has been considered in development of the FEIS.
2390-26	Leech Lake Area Watershed Foundation	An updated list of preparers is provided in Chapter 13.
2390-27	Leech Lake Area Watershed Foundation	The methodologies used for each water resource type are discussed in their respective subsections within Section 5.2.1.
2390-28	Leech Lake Area Watershed Foundation	As required under Section 195.563 of 49 CFR Subpart H – cathodic protection must be in operation no later than 1 year after the pipeline is constructed. This does not mean Enbridge would wait a full year to install the system. It is typically installed as part of the construction process. The buried pipeline would also be protected from external corrosion by application of a coating.
2390-29	Leech Lake Area Watershed Foundation	The applicant stated in their Certificate of Need application that the existing pipeline must run at reduced pressures due to its current state, and therefore cannot achieve the desired flow rate. They state that the proposed 36" pipeline is capable of higher flows than requested, but that they do not intend to pump at that rate.
2390-30	Leech Lake Area Watershed Foundation	Available design information for each alternative has been used to develop Chapter 6 of the FEIS.
2390-31	Leech Lake Area Watershed Foundation	For analysis of construction impacts Chapter 5 provides: The ROI for the analysis of potential impacts on groundwater during construction generally consists of the pipeline, rail, or truck corridor and a 1,000-foot buffer on either side of the centerline of the Applicant’s proposed project and the CN Alternatives. This includes Alternative SA-04. Operational impacts are addressed per established corridor size.

Responses to Comments - Citizen

Response#	Commenter	Response
2390-32	Leech Lake Area Watershed Foundation	An updated list of preparers is provided in Chapter 13.
2390-33	Leech Lake Area Watershed Foundation	Publicly available datasets and field reports were used in developing the FEIS.
2390-34	Leech Lake Area Watershed Foundation	Construction of the pipeline across streams and waterbodies will be required to meet all state and federal approved methods and construction techniques and mitigation of effects to water quality and associated fauna.
2390-35	Leech Lake Area Watershed Foundation	In Section 5.2.6.2.1, Itasca State Park is noted as being proximate to the Applicant's proposed project. In Section 6.3.6.2.1 and Section 6.3.6.2.2, the Applicant's preferred route and RA-03AM are noted as being proximate to Itasca State Park. Sections 5.4.2.6 and 5.4.3.1 were revised to include Itasca State Park, as the NRHP listed property is located within the ROI for the Applicant's proposed Project. Sections 6.4.2.1, 6.4.2.2.1, 6.4.3.1, and 6.4.3.2 were revised to include Itasca State Park, as the NRHP listed property is located within the ROI for the Applicant's Preferred Route and RA-03AM.
2390-36	Leech Lake Area Watershed Foundation	The text accurately states that approximately 5 acres of wild rice habitat will be affected by the Applicant's propose project. It is unclear what table you are referring to regarding 3 acres of impact.
2390-37	Leech Lake Area Watershed Foundation	"Construction spread" estimates were provided by the Applicant. Technical information on construction spreads can be found in FEIS Chapter 2.
2390-38	Leech Lake Area Watershed Foundation	Thank you for your comment. Certain locations are not a Census designated area.
1738-1	Lelchuk, Steve	Thank you for your comments on the Draft EIS. SCADA system can be automatic control or just notifications of issue.

Responses to Comments - Citizen

Response#	Commenter	Response
1806-1	Lemley, Kylie	Thank you for your comments on the Draft EIS. Appendix E, Environmental Protection Plan (EPP) provides revegetation and seeding in wetlands. Unsaturated wetlands shall be reseeded with a seed mix of native grasses as provided in the EPP. In cases where there is the concern for potential soil erosion post construction an annual companion crop (such as oats) to assist in reducing soil erosion in the first growing season while native grasses become established. This is a typical soil erosion practice used through the U.S.
1806-2	Lemley, Kylie	As noted in Section 11.4 of the FEIS, the applicant may work with companies and subcontractors hired to construct, restore and operate the pipeline to prepare and implement an education plan or awareness campaign regarding the issue of sexual abuse or sex trafficking. Section 11.4 has been revised to clarify that the applicant may also provide funding to support the efforts of local and tribal law enforcement on this and other safety-related issues, which would enable local entities to tailor approaches and solutions to their community, and/or to collaborate with experts in this field.
1380-1	Levi, Bruce T. and Kathy J.	Thank you for your comments on the Draft EIS. Noise and vibration are discussed in Section 6.2.2. This section provides the methodology and discussion of the impacts anticipated with the construction and operation of the proposed pipeline project. Please note, the location of potential pump stations for all of the route alternatives is not provided, as such the analysis for this type of operation is limited.
1380-2	Levi, Bruce T. and Kathy J.	Table 6.2.2-8 provides information on the noise levels and potential impacts from pump station operations. As shown, the information is provided to the nearest sensitive receptor. This methodology often is used in analyses, such as the one provided within an EIS.

Responses to Comments - Citizen

Response#	Commenter	Response
1380-3	Levi, Bruce T. and Kathy J.	The Minnesota State noise standards are discussed in detail in Section 6.2.2.1.1. Additionally, Table 6.2.2-4 details the state standards for day and nighttime hours. Noise measurement readings from sensitive receptors is the established method for acquiring noise data for analyzing noise impacts. Noise readings are only conducted when winds are light and they cannot be recorded if the wind speed is above a certain threshold. Additionally, Minn. R. 7030.0040 states that the noise readings must be conducted within the applicable noise area classification (NAC) or as stated in the FEIS, sensitive receptor. When noise measurements are being captured, an average of the decibel level is recorded in order to remove any outlier noise readings (i.e., wind gusts).
1380-4	Levi, Bruce T. and Kathy J.	This comment will be considered. Enbridge will only release reports/data to the public that are deemed appropriate for public release.
1380-5	Levi, Bruce T. and Kathy J.	This comment will be considered. Enbridge will only release reports/data to the public that are deemed appropriate for public release.
1380-6	Levi, Bruce T. and Kathy J.	Potential impacts associated with the view of pump stations are provided in Section 6.2.3.3.The Two Inlets pump station is noted as being partially visible to nearby receptors. While lights are not discussed, it is shown that this station would be partially screened.
1380-7	Levi, Bruce T. and Kathy J.	Information has been added to Chapter 2 to identify the e-Dockets information for three of the four connected actions that will be addressed by the state of Minnesota.

Responses to Comments - Citizen

Response#	Commenter	Response
1380-8	Levi, Bruce T. and Kathy J.	Thank you for pointing out this closer sensitive receptor. While Enbridge concedes that this sensitive receptor referred to in the comment is closer to the proposed pump station than the one surveyed from, the existing conditions and impacts of the sensitive receptor that was surveyed remain valid. The ambient noise levels recorded for the sensitive receptor at Two Inlets pump station would likely be similar to noise levels recorded at the closer sensitive receptor pointed out in the comment due to their close distance to each other and similar adjacent vegetation. Therefore, the impacts reported in Section 6.2.2.3 remain correct. Any changes as a result of recording noise levels at the other sensitive receptor, would not alter the concluding results of the study.
1380-9	Levi, Bruce T. and Kathy J.	Concur with the comment. Viewshed impacts related to the Two Inlets Pump Station changed to permanent and major. Due to the open area of the proposed pump station and open views from the nearby residences and highway, it was determined that nearby users could likely experience a higher degree of impact.
1810-1	Lindh, Ruth	Thank you for your comments on the Draft EIS. Information from the Consent Decree, including responsibility and timeframe, have been added to Section 8.3.1.1 of the FEIS.
2772-1	Long Lake Area Association	Thank you for your comments on the Draft EIS. Project alternatives, and associated natural resources that could be potentially affected, were identified during the EIS process using GIS-based analysis. ROIs considered those areas distal and but reasonably proximal to the selected alternative. Impacts were based on corridors identified during GIS analysis.
2772-2	Long Lake Area Association	Information cited in the comment regarding 2013 Hubbard County GIS and Assessor information is not disputed. It appears that this comment is regarding the Route Segment Alternative noted above. Please refer to previous response regarding project alternatives. Chapter 6 of the FEIS includes discussion on property taxes (existing conditions and impact assessment).
2772-3	Long Lake Area Association	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
2772-4	Long Lake Area Association	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.

Responses to Comments - Citizen

Response#	Commenter	Response
0708-1	Lowery, Katy	Thank you for your comments on the Draft EIS. The 30 year time-frame was chosen to match the economic life of the project indicated by the Applicant. For purposes of comparison across alternatives, the EIS targets a consistent time-frame that is long enough to understand typical annual operating impacts/tradeoffs of the alternatives.
0706-1	Lowery, Katy	Thank you for your comments on the Draft EIS. This EIS assumes that the Applicant will comply with all necessary permits that would be required for the construction and operation of the pipeline, if a Certificate of Need and route permit are approved by the Commission. While the comment notes that the safety record of the Applicant is not provided, the evaluations within the EIS are based on the project for which applications were submitted and the commitments outlined by the Applicant.
2423-1	Ludington, Mary	Thank you for your comments on the Draft EIS. An updated list of EIS preparers is provided in Chapter 13.
2423-2	Ludington, Mary	SA-04 is a conceptual alternative. It is not one that has been submitted by an applicant for permitting or review. The purpose of the alternative is to provide an appropriate comparison within the evaluation of CN alternatives.
1386-1	Lund, Lisa	Thank you for your comments on the Draft EIS. The figure in the executive summary has been revised to demonstrate amount spilled per volume transported.
1386-2	Lund, Lisa	Section 4.2.2 discusses the option of No Certificate Granted.
1386-3	Lund, Lisa	This comment has been considered in development of the FEIS.
1386-4	Lund, Lisa	Section 8.3.1.1 of the FEIS discusses Enbridge's current and ongoing liability and responsibility under the Minnesota Statutes 115E.
1386-5	Lund, Lisa	Potential impacts regarding abandonment and removal of the pipeline are discussed in Chapter 8 of the FEIS.

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Response#	Commenter	Response
1386-6	Lund, Lisa	An analysis of Audubon Important Bird Areas (IBAs), Migratory Bird Treaty Act (MBTA)-protected birds, and Bald and Golden Eagle Protection Act (BGEPA)-protected birds near the proposed project and alternative routes, is presented in Sections 5.2.4 and 6.3.4 of the FEIS. Additionally, an analysis of rare species, including species of concern, is presented in Sections 5.2.5 and 6.3.5 of the FEIS.
1386-7	Lund, Lisa	Section 10.3 of the FEIS discusses independent modeling performed by Stantec.
1386-8	Lund, Lisa	The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
1386-9	Lund, Lisa	Noted. Available Applicant data were included.
1386-10	Lund, Lisa	Noted. Available Applicant data were included.
1386-12	Lund, Lisa	The comment was considered in development of the FEIS.
1386-12	Lund, Lisa	The comment was considered in development of the FEIS.
1049-1	Lundin, Martha	Thank you for your comments on the Draft EIS. The figure in the executive summary has been revised to demonstrate amount spilled per volume transported.
1050-1	Madden, Alice	Thank you for your comments on the Draft EIS. Section 10.4.2.2 of the FEIS provides an analysis of downstream impacts associated with spills.
1050-2	Madden, Alice	Potential impacts to affected natural resources are discussed in Chapters 5 and 6, and how American Indian tribes experience and interact with these resources is summarized in Chapters 9 and 11. This constitutes the analysis of treaty rights within this EIS.

Responses to Comments - Citizen

Response#	Commenter	Response
1388-1	Maertens, Gerald	Thank you for your comments on the Draft EIS. SA-04 is a conceptual alternative. It is not one that has been submitted by an applicant for permitting or review. The purpose of the alternative is to provide an appropriate comparison within the evaluation of CN alternatives.
1388-2	Maertens, Gerald	Table 10.7-4 includes data in Table 10.4-8 color-coded. Section 10.4 and 10.7 have the same data in the tables.
1388-3	Maertens, Gerald	SA-04 is a conceptual alternative. It is not one that has been submitted by an applicant for permitting or review. The purpose of the alternative is to provide an appropriate comparison within the evaluation of CN alternatives.
1388-4	Maertens, Gerald	SA-04 is a conceptual alternative. It is not one that has been submitted by an applicant for permitting or review. The purpose of the alternative is to provide an appropriate comparison within the evaluation of CN alternatives.
1388-5	Maertens, Gerald	The comment was considered in development of the FEIS.
0713-1	Marine-Rietmann, Kara	Thank you for your comments on the Draft EIS. Section 10.6.3 “Liability and Compensation” of the FEIS thoroughly discusses the laws and standards that will be followed if a spill occurs.
2432-1	Mattison, Willis	Thank you for your comments on the Draft EIS. Revisions have been made to Chapter 13, List of Preparers.
2432-2	Mattison, Willis	Thank you for providing your comment regarding an eco-system approach. The methodology used for each resource area is noted within the EIS. These methods are typical of the individual fields for which the analysis addresses.
2432-3	Mattison, Willis	Contrasting impacts to resources along each route was accomplished by considering the intersects of groundwater and surface water resources along each alternative route. A comprehensive evaluation of landscape and outlying characteristics was beyond the scope of the EIS.

Responses to Comments - Citizen

Response#	Commenter	Response
2432-4	Mattison, Willis	SA-04 is a conceptual alternative. It is not one that has been submitted by an applicant for permitting or review. The purpose of the alternative is to provide an appropriate comparison within the evaluation of CN alternatives.
2432-5	Mattison, Willis	Section 5.2.1.3 provides a discussion of the methodology used for evaluating potential impacts to wetlands. The analysis of the proposed project includes a discussion of mitigation measures as some have been provided as part of the applicant proposed measures; whereas for other CN alternatives, these are conceptual, in that a specific project has not been developed by an applicant. The region of interest (ROI) for each is noted in the methodology, as well.
2432-6	Mattison, Willis	Each resource area was evaluated with regard to the potential impacts that may occur as a result of the proposed project (Chapter 5) and the Applicant's preferred route (Chapter 6), as well as for alternatives. Where appropriate, information was provided as to level of impact that would be anticipated to occur. Summary information is provided for each resource area in the form of a table at the end of each section.
2432-7	Mattison, Willis	The EIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release. Case studies of several significant spills and discussion of their impacts to various resources have been included in the FEIS.
2432-8	Mattison, Willis	Your comment has been considered in the review of the document. Chapter authors reviewed each section and where appropriate made revisions in response to comments and/or to incorporate new/updated information.

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Response#	Commenter	Response
2002-1	McGowan, Dan	Thank you for your comments on the Draft EIS. Chapters 5 and 6 of the FEIS included updated information regarding anticipated socioeconomic impacts of the project and various alternatives on employment, including labor requirements for various alternatives based on an estimate of 600 workers per construction spread. Specifically, Section 6.5.4.3 clarifies that jobs would be created for local labor as current labor agreements in Minnesota require that at least 50% of workers would be expected to be employed from local union halls. The FEIS also clarifies that some of these jobs would likely become permanent, based in part on overall labor market demand.
2002-2	McGowan, Dan	Sections in the FEIS pertaining to impacts of the project on employment clarify that it is likely that the Applicant would hire local residents during construction of any of the alternative routes for a portion of its workforce - based on current labor agreements in Minnesota at least 50% of workers will be expected to be employed from local union halls. The FEIS also states that as construction jobs are typically permanent in nature, permanent jobs may result from said construction - but that this is also dependent on an unquantifiable backlog of other construction project demand, and that based on this assumption it is likely that direct construction-related employment would have a minor positive impact on county-level unemployment and per capita and/or median household income levels.
2002-3	McGowan, Dan	The comment was considered in development of the FEIS.
2002-4	McGowan, Dan	SA-04 is a conceptual alternative. It is not one that has been submitted by an applicant for permitting or review. The purpose of the alternative is to provide an appropriate comparison within the evaluation of CN alternatives.
1401-1	Mena, Ugo	Thank you for your comments on the Draft EIS. Section 8.3.1.1 of the FEIS discusses Enbridge's current and ongoing liability and responsibility under the Minnesota Statutes 115E.
1822-1	Menghini, Paul	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
2049-1	Merjent - Ronayne, Angela	Thank you for your comments on the Draft EIS. The data contained in the site-specific field surveys conducted by Merjent on the Applicant’s proposed project are utilized and referenced throughout the FEIS.

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Response#	Commenter	Response
2462-1	Minnesota 350	Thank you for your comments. These approximate oil volume data are included within the EIS to provide context. Enbridge filings to FERC may differ for a variety of reasons. The 290,000 barrels per day estimate is based on Enbridge forecast data in Table 7.B-1 in their certificate of need application for the Line 3 project. The approximately 400,000 barrel per day estimate for the amount of oil shipped on the Minnesota Pipeline system to Minnesota refineries is based on historical peak volume data provided in Minnesota Pipeline Company's July 2014 Application for a Certificate of Need, available here: https://mn.gov/commerce/energyfacilities/documents/34034/CN%20Application%207-25-14.pdf.
2462-2	Minnesota 350	Enbridge's proposed new pipeline would be capable of carrying 760,000 barrels of Canadian heavy crude oil per day; however, the pipeline also may be capable of carrying 915,000 barrels per day. The Applicant has indicated that this is not the level of throughput that they are seeking to operate and that further engineering design studies would be required to determine the number of pump stations needed to achieve this ultimate design capacity level. Should the Applicant choose to seek this expanded capacity in the future, they would need to apply for a Certificate of Need from the Commission and the proposal would be subject to environmental review at that time.
2462-3	Minnesota 350	This sentence has been revised to show that tribal members value both the reservations and ceded lands for hunting, fishing, and gathering. Additional discussions of treaties is provided in Chapter 9.
2462-4	Minnesota 350	The Executive Summary includes a statement to show that in addition to the Commission, the EIS can be used by other permitting agencies, the public, and Enbridge. Chapter 3 provides additional information regarding the regulatory framework and where the EIS fits into the overall decision making process for the Certificate of Need and route permit. In this chapter, information more clearly shows how the public is involved within the process (see Section 3.3).

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Response#	Commenter	Response
2462-5	Minnesota 350	Please see updates to Chapter 13 that provide additional detail on EIS preparers. The EIS was a collaboration between DOC, MPCA, MN DNR and consulting teams from Ecology and Environment, Inc., as well as Cardno. Material for the EIS was developed based on independent analysis, review of materials submitted by the Applicant, and review of materials submitted by commenters on the EIS. No single individual drafted a section of the EIS; sections were often drafted by multiple authors, with multiple levels of review and revision. As a result, the new information provided in Chapter 13 does not attempt to parse individual components of the EIS and assign them to individual preparers. It, however, does provide a listing of contributors and their degrees/professional certifications.
2462-6	Minnesota 350	MEPA requires that decision makers be informed of the environmental impacts of permitting decisions before they issue a permit. As indicated in MN Rules 4410.0300, environmental documents are to be used as guides in issuing, amending, and denying permits and carrying out other responsibilities of governmental units to avoid or minimize adverse environmental effects and to restore and enhance environmental quality. Consistent with this purpose, the evaluation of impacts in the EIS attempts to inform the Commission about the impacts of the decisions before them. The range of alternatives for which impacts have been assessed is consistent with the range of decision options before the Commission. As such, the EIS has not attempted to characterize the environmental impacts associated with decision alternatives that are not available to the Commission. One of the decision alternatives that would not be available to the Commission would be to require the Applicant to cease operation of Line 3.
2462-7	Minnesota 350	The EIS explores a range of CN alternatives, including alternatives that assume the Applicant (or entities other than the Applicant) could be expected to meet shipper demand for the oil through other means. Chapter 4 provides a discussion of each of these alternatives.
2462-8	Minnesota 350	Section 4.2.4 provides a discussion of the "use of other pipelines."

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Response#	Commenter	Response
2462-9	Minnesota 350	SA-04 is a system alternative evaluated to aid the Commission's evaluation of whether or not to grant a CN for the proposed project. A system alternative is not a routing alternative as no entity has proposed to build such a pipeline, detailed routing and design have not been conducted, and a route permit could not be issued for SA-04. Instead, a system alternative serves as a broader level point of comparison to the Applicant's proposed project and the other CN alternatives. The level of analysis of SA-04 is in line with this concept.
2462-10	Minnesota 350	Table ES-1 was revised to assist the reader; accompanying text also was provided to depict the information in the table.
2462-11	Minnesota 350	Figures throughout the Executive Summary have been re-formatted for better visibility in the FEIS.
2462-12	Minnesota 350	The text regarding this sentence has been revised to show that "if a CN is issued," the Commission will then consider issuance of a route permit.
2462-13	Minnesota 350	Revisions were made within the Executive Summary to acknowledge that the Leech Lake Band of Ojibwe would need to provide their permission and that their comments submitted publicly for the draft EIS indicate that they were not in support of the Project on their lands.
2462-14	Minnesota 350	Figures throughout the Executive Summary have been re-formatted for better visibility in the FEIS.
2462-15	Minnesota 350	There are no reasonably foreseeable actions related to lines 1, 2 and 4. See Chapter 12 for a discussion of how "reasonably foreseeable actions" are defined.
2462-16	Minnesota 350	See revised Figure ES-4 in the FEIS. Note that total volumes transported via each mode have been added to the discussion to provide context for spill volume and frequency (barrels spilled per barrel transported).

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Response#	Commenter	Response
2462-17	Minnesota 350	The EIS compares the impacts associated with the Applicant's proposal (extending from Neche, North Dakota to Superior, Wisconsin) to the impacts associated with the significantly longer SA-04 (extending from Neche to Joliet, Illinois). For the assessment of the impacts of SA-04, the EIS evaluates impacts in North Dakota, Iowa, and Illinois, in addition to Minnesota because these are the states through which SA-04 passes. As a majority of SA-04 is located outside of Minnesota, the majority of impacts occur outside of this state. Comments received on the Draft EIS have indicated that impacts outside of Minnesota (for example lifecycle greenhouse gas emissions) are relevant considerations in the Commission's decision. In this case, the magnitude and intensity of impacts associated with the construction and operation of an alternative that largely skirts Minnesota is a relevant part of understanding the environmental tradeoffs in the decisions before the Commission.
2462-18	Minnesota 350	The chart (Table 10.7-3 – now 10.7-2) for which this comment appears to reference indicates the “Summary of Potentially Exposed Resources of Concern from an Unanticipated Release of Crude Oil along the Applicant’s Proposal and Certificate of Need Alternatives (acres).” This table is an indicator of resources present, not an indicator of severity of impact or difficulty of clean-up. Chapter 10 provides discussion of crude oil spill impacts on various ecological systems and resources.
2462-19	Minnesota 350	Construction impacts for each CN alternative are discussed in detail in Chapter 5 of the EIS.
2462-20	Minnesota 350	The EIS evaluates the environmental impacts of a range of alternatives, "bookending" the impacts of options for transport that may be considered by the commission.
2462-21	Minnesota 350	The Index of Biotic Integrity (IBI) is used in evaluation of impacts to surface water and impacts to aquatic resources throughout both Chapter 5 and Chapter 6 of the EIS. Please see Section 5.2.4 and 6.3.4.

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Response#	Commenter	Response
2462-22	Minnesota 350	Figures throughout the Executive Summary have been re-formatted for better visibility in the FEIS.
2462-23	Minnesota 350	The table (Table ES-2) referenced as part of this comment provides a summary of the exposed resources of concern (in acres). It is intended to demonstrate the potential for exposure and to provide a snapshot of information that is included in Chapter 10 of the EIS. The Executive Summary is not meant to be exhaustive, but instead to present key findings and to help readers understand the types of questions addressed by the EIS. In this manner, the addition of a new table to this section – “Will the proposed Project damage forests and wildlife habitat in northern Minnesota far more than any other alternatives?” – is not needed. Figure ES-6 was revised to include a more detailed title; accompanying text also was revised to include additional information about the contents of the bar graphs depicted in the figure.
2462-24	Minnesota 350	Section 1.4 of the EIS provides a discussion of the purpose and need. The EIS evaluates the environmental impacts of a range of alternatives, "bookending" the impacts of options for transport that may be considered by the commission. A more detailed discussion of alternatives is provided in Chapter 4.
2462-25	Minnesota 350	Please see Sections 4.2.6 and 4.2.7 for a discussion of the development of truck and rail alternatives and underlying assumptions.
2462-26	Minnesota 350	Figure ES-4 has been revised. The associated text provides a discussion of the spill size/frequency tradeoffs between alternate transport modes. Chapter 10 provides additional information on the various transport modes and the potential for spills.
2462-27	Minnesota 350	The Executive Summary, which is referenced by this comment, is intended to provide only a short synopsis of key findings. Discussion of each alternative is provided in Chapter 4. In particular, this chapter provides the assumptions made for each alternative.

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Response#	Commenter	Response
2462-28	Minnesota 350	All of the alternatives evaluated in this EIS result in the emission of greenhouse gases. Removal of existing line 3 would also result in stationary and mobile combustion emissions for the operation of construction equipment for the excavation and removal of the line. If removal of existing Line 3 resulted in a net decrease in production and consumption of western Canadian crude, the overall effect would be a reduction in global emissions.
2462-29	Minnesota 350	This comment was considered in developing the FEIS. Table ES-3, however, was not amended, except to revise the title to more accurately show that the reference is to operations. Additional text was added to describe the contents of the table.
2462-30	Minnesota 350	The 30-year timeframe was chosen to match the economic life of the project indicated by the Applicant. For purposes of comparison across alternatives, the EIS targets a consistent timeframe that is long enough to understand typical annual operating impacts/tradeoffs of the alternatives.
2462-31	Minnesota 350	The label for Figure ES-8 has been revised.
2462-32	Minnesota 350	Lifecycle greenhouse gas implications of potential upstream and downstream changes were assessed consistent with the scope for the EIS. As greenhouse gas impacts are global in nature, impacts could be assessed generically assuming increased production and consumption somewhere, but without any need for a site specific assessment or detailed understanding of what particular upstream and downstream developments may take place. Extending this lifecycle assessment beyond greenhouse gases would require a more specific set of plans or proposals than are available at this time. Environmental impacts associated with new plans and proposals for expansion would undergo environmental review under the environmental review program in the appropriate jurisdiction.

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Response#	Commenter	Response
2462-33	Minnesota 350	Section 12.6 provides a discussion of the cumulative impacts of climate change on Minnesota, as well as discussion of the impacts of climate change on the project. Chapter 9 provides a discussion more specific to American Indian tribes.
2462-34	Minnesota 350	This particular statement has been struck from the document. A discussion of risks and impacts related to abandonment and removal is provided in Chapter 8.
2462-35	Minnesota 350	Additional analysis of adjacent pipeline spacing and the viability of removal as an alternative has been included in Section 8.4.
2462-36	Minnesota 350	The text in the Executive Summary has been updated to clarify that the acreage provided refers to the stretch from Clearbrook to Carlton.
2462-37	Minnesota 350	The Executive Summary, which is referenced by this comment, is intended to provide only a short synopsis of key findings. Discussion of potential impacts associated with the construction of CN alternatives is included in Chapter 5 for each specific resource area, including habitat loss and habitat fragmentation.
2462-38	Minnesota 350	Enbridge's proposed new pipeline would be capable of carrying 760,000 barrels of Canadian heavy crude oil per day; however, the pipeline also may be capable of carrying 915,000 barrels per day. The Applicant has indicated that this is not the level of throughput that they are seeking to operate and that further engineering design studies would be required to determine the number of pump stations needed to achieve this ultimate design capacity level. Should the Applicant choose to seek this expanded capacity in the future, they would need to apply for a Certificate of Need from the Commission and the proposal would be subject to environmental review at that time.
2462-39	Minnesota 350	References throughout the document have been updated in the FEIS to refer to the project more generally as the Line 3 Project. The footers and many of the figures also have been revised to show this.

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Response#	Commenter	Response
2462-40	Minnesota 350	Section 1.4 explains the Department's rationale for the treatment of overarching policy issues. MEPA requires that decision makers be informed of the environmental impacts of permitting decisions before they issue a permit. As indicated in MN Rules 4410.0300, environmental documents are to be used as guides in issuing, amending, and denying permits and carrying out other responsibilities of governmental units to avoid or minimize adverse environmental effects and to restore and enhance environmental quality. Consistent with this purpose, the evaluation of impacts in the EIS attempts to inform the Commission about the impacts of the decisions before them. The EIS does not provide a global assessment of these overarching policy issues; however, where the policy issues specifically relate to the CN or route alternatives, the EIS provides a project-level assessment. Information regarding the purpose of the EIS is provided in the Executive Summary, along with the type of information that is included within it.
2462-41	Minnesota 350	The Commission is charged in the CN decision with determining public purpose for which the right of eminent domain should be allowed by the State of Minnesota. This EIS has been prepared to help inform that decision.
2462-42	Minnesota 350	These approximate oil volume data are included within the EIS to provide context. Enbridge filings to FERC may differ for a variety of reasons. The 290,000 barrels per day estimate is based on Enbridge forecast data in Table 7.B-1 in their certificate of need application for the Line 3 project. The approximately 400,000 barrel per day estimate for the amount of oil shipped on the Minnesota Pipeline system to Minnesota refineries is based on historical peak volume data provided in Minnesota Pipeline Company's July 2014 Application for a Certificate of Need, available here: https://mn.gov/commerce/energyfacilities/documents/34034/CN%20Application%207-25-14.pdf.

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Response#	Commenter	Response
2462-43	Minnesota 350	Line 3 is one of seven oil pipelines in the Enbridge Mainline corridor in Minnesota from the border with North Dakota to Clearbrook. Line 3 is one of six oil pipelines in the Enbridge Mainline corridor in Minnesota from the Clearbrook to Superior. This is noted as such in Section 1.2.
2462-44	Minnesota 350	These approximate oil volume data are included within the EIS to provide context. Enbridge filings to FERC may differ for a variety of reasons. The 290,000 barrels per day estimate is based on Enbridge forecast data in Table 7.B-1 in their certificate of need application for the Line 3 project. The approximately 400,000 barrel per day estimate for the amount of oil shipped on the Minnesota Pipeline system to Minnesota refineries is based on historical peak volume data provided in Minnesota Pipeline Company's July 2014 Application for a Certificate of Need, available here: https://mn.gov/commerce/energyfacilities/documents/34034/CN%20Application%207-25-14.pdf.
2462-45	Minnesota 350	Section 2.2 addresses Enbridge's objectives for the proposed Line 3 project, including restoring the capability of line 3 to carry heavy crude and increase capacity, which they have indicated would allow operational flexibility to the Enbridge system, since line 3 is restricted to carrying lighter crudes.
2462-46	Minnesota 350	As indicated in MN Rules 4410.0300, environmental documents are to be used as guides in issuing, amending, and denying permits and carrying out other responsibilities of governmental units to avoid or minimize adverse environmental effects and to restore and enhance environmental quality. Consistent with this purpose, the evaluation of impacts in the EIS attempts to inform the Commission about the impacts and issues relevant of the decisions before them. Based on the information provided as part of this comment, it is not clear how the information it suggests to be included would be used to assist the Commission or other permitting agency.
2462-47	Minnesota 350	The statement noted in this comment is intended to provide information on one aspect of the order. No changes have been made to the EIS.
2462-48	Minnesota 350	The wording provided as part of this comment has been considered.

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Response#	Commenter	Response
2462-49	Minnesota 350	Multiple consultants and agencies contributed to the preparation of this EIS. A list of preparers is provided for those who contributed to the FEIS.
2462-50	Minnesota 350	Chapter 4 of the EIS provides an explanation of each of the CN alternatives. As shown, the quantity of trains and trucks is not assumed to be at the level of the new proposed line.
2462-51	Minnesota 350	Enbridge has requested that the Commission permit a 750-foot route width (375 feet on each side of the pipeline centerline). The 50-foot permanent right-of-way would be located within this 750-foot corridor. The 750-foot route width would encompass construction workspace for the pipeline and associated facilities; it would allow Enbridge to make small-scale refinements of the pipeline centerline within the corridor, as needed, prior to and during construction. Once construction is complete and as-builts are filed, Enbridge will maintain easements for the 50-foot permanent right-of-way and will not have any long-term occupation of or claim to the 750-foot route width.
2462-52	Minnesota 350	The EIS has been revised to refer to the Applicant's proposed project as the Line 3 Project. Where applicable, the word "replacement" has been deleted.
2462-53	Minnesota 350	The 30-year timeframe was chosen to match the economic life of the project indicated by the Applicant. For purposes of comparison across alternatives, the EIS targets a consistent timeframe that is long enough to understand typical annual operating impacts/tradeoffs of the alternatives.
2462-54	Minnesota 350	Figure 2.1.1 shows existing pipelines. Per the comment, the Sandpiper pipeline and Line 65 are not existing pipelines, so they have not been included in the figure.
2462-55	Minnesota 350	Section 1.4 of the EIS provides a discussion of the purpose and need.

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Response#	Commenter	Response
2462-56	Minnesota 350	MEPA requires that decision makers be informed of the environmental impacts of permitting decisions before they issue a permit. As indicated in MN Rules 4410.0300, environmental documents are to be used as guides in issuing, amending, and denying permits and carrying out other responsibilities of governmental units to avoid or minimize adverse environmental effects and to restore and enhance environmental quality. Consistent with this purpose, the evaluation of impacts in the EIS attempts to inform the Commission about the impacts of the decisions before them. The range of alternatives for which impacts have been assessed is consistent with the range of decision options before the Commission. The EIS evaluates the environmental impacts of a range of alternatives, "bookending" the impacts of options for transport that may be considered by the commission. A discussion of alternatives is presented in Chapter 4. Specifically, a no action alternative, which is the denial of the CN, is discussed in Section 4.2.2. Note that the purpose of the CN process is to determine whether the particular project being proposed is needed. There is no legal authority in a CN proceeding of a separate proposed project (at the state or with the Public Utilities Commission) to evaluate the ongoing need of an existing project. Once constructed, the safety and operation of an existing pipeline is regulated by the United States Department of Transportation, Pipeline and Hazardous Materials Safety Administration. In this particular case, Enbridge has entered into a consent decree with the United States Environmental Protection Agency that allows for the continued operation of the existing Line 3 if a replacement for the line is not approved. In other words, if the proposed Line 3 project is not approved by the Commission, the continued operation of the existing Line 3 will be regulated by the Federal government, not the State of Minnesota. Accordingly, shutting down and removing existing pipelines in the mainline corridor is not included in the No Action Alternative.

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Response#	Commenter	Response
2462-57	Minnesota 350	No notable changes are anticipated on the existing (recently upgraded) infrastructure in Wisconsin or elsewhere in conjunction with the Applicant's proposal. Therefore, new impacts associated with the Applicant's proposal are limited to the length of the proposed Line 3 route and do not extend through Wisconsin to an end destination in Illinois. The EIS compares the new impacts associated with the Applicant's proposal (extending from Neche, North Dakota to Superior, Wisconsin) to the new impacts associated with the significantly longer SA-04 (extending from Neche to Joliet, Illinois).
2462-58	Minnesota 350	The reference to Line 67 throughput has been updated.
2462-59	Minnesota 350	Chapter 10 provides a discussion of the factors that contribute to the probability for a potential release to occur.
2462-60	Minnesota 350	Additional analysis of adjacent pipeline spacing and the viability of removal as an alternative has been included in Section 8.4
2462-61	Minnesota 350	References within the FEIS have been reviewed. Where possible, links were revised, and in some cases, new sources were provided.
2371-1	Minnesota Center for Environmental Advocacy	Thank you for your comments on the Draft EIS. Section 2.2 of the FEIS discusses the project purpose.
2371-2	Minnesota Center for Environmental Advocacy	Additional information from various resource groups has been included in the FEIS to present accurate data and findings in an unbiased manner.
2371-3	Minnesota Center for Environmental Advocacy	Impacts of long-term reliance on oil are outside the scope of the EIS. The comment regarding alternatives has been considered in preparation of the alternatives.

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Response#	Commenter	Response
2371-4	Minnesota Center for Environmental Advocacy	Seven CN alternatives and 5 route alternatives were evaluated within the FEIS. Chapter 4 provides more description on each alternative.
2371-5	Minnesota Center for Environmental Advocacy	Seven CN alternatives and 5 route alternatives were evaluated within the FEIS. Chapter 4 provides more description on each alternative.
2371-6	Minnesota Center for Environmental Advocacy	Seven CN alternatives and 5 route alternatives were evaluated within the FEIS. Chapter 4 provides more description on each alternative.
2371-7	Minnesota Center for Environmental Advocacy	Impacts to various resources from integrity digs is provided in Chapter 5 and 6 of the FEIS. Third-party verification of the number and cost estimate of integrity digs anticipated as part of the proposed project is outside the scope of the EIS.
2371-8	Minnesota Center for Environmental Advocacy	Long-term mitigation measures are included within Section 8.3.1 of the FEIS.
2371-9	Minnesota Center for Environmental Advocacy	Positive and negative impacts of the removal alternative are discussed in Section 8.4.1 of the FEIS.
2371-10	Minnesota Center for Environmental Advocacy	Seven CN alternatives and 5 route alternatives were evaluated within the FEIS. Chapter 4 provides more description on each alternative.
2371-11	Minnesota Center for Environmental Advocacy	The comment has been considered in preparation of the FEIS.
2371-12	Minnesota Center for Environmental Advocacy	The comment has been considered in preparation of the FEIS.

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Response#	Commenter	Response
2371-13	Minnesota Center for Environmental Advocacy	The comment has been considered in preparation of the FEIS.
2371-14	Minnesota Center for Environmental Advocacy	The comment has been considered in preparation of the FEIS.
0828-1	Minnesota Environmental Partnership	Thank you for your comments on the Draft EIS. The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
0828-2	Minnesota Environmental Partnership	The Environmental Justice section of the FEIS has been revised to include additional information, including impacts resulting from the CN Alternatives. A Minnesota pipeline spill analysis has also been added to Section 10.1.3.2 of the FEIS and a 10-mile downstream ROI was used in development of Chapter 10. While only seven sites were modeled as part of the analysis, they represent a broad range of stream/waterbody characteristics such that the results of the modeling help illustrate potential impacts in different types of waters.
0827-1	Minnesota Environmental Partnership	Thank you for your comments on the Draft EIS. The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
0827-2	Minnesota Environmental Partnership	Additional information regarding abandonment has been included in Section 8.3 of the FEIS.
2373-1	Minnesota Public Interest Research Group (MPIRG)	Thank you for your comments on the Draft EIS. Enbridge release incident data are presented in Chapter 10 of the EIS. Case studies of several significant spills, including the 2010 spill, have been included.

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Response#	Commenter	Response
2373-2	Minnesota Public Interest Research Group (MPIRG)	Non-pipeline methods of transportation are discussed and evaluated in Chapter 5.
2373-3	Minnesota Public Interest Research Group (MPIRG)	The comment was considered in development of the FEIS.
2373-4	Minnesota Public Interest Research Group (MPIRG)	Abandonment and removal are discussed in detail in Chapter 8 of the FEIS.
2373-5	Minnesota Public Interest Research Group (MPIRG)	The potential for toxic products could remain in soil, plant tissues, or prey items after cleanup and continue to bio-accumulate up the food chain is discussed in the EIS.
2373-6	Minnesota Public Interest Research Group (MPIRG)	Case studies of several significant spills and discussion of their impacts to various resources have been included.
2373-7	Minnesota Public Interest Research Group (MPIRG)	Enbridge did not provide additional information regarding soil restoration in wetlands.
2373-8	Minnesota Public Interest Research Group (MPIRG)	Available data on the health risk of bitumen have been presented.
2373-9	Minnesota Public Interest Research Group (MPIRG)	The cumulative effects of global warming on all aspects of the environment and ecological community is beyond the scope of the EIS process. Regulatory agencies, based on their mission, will have the authority to consider all aspects of this issue from an overall industry perspective.
2373-10	Minnesota Public Interest Research Group (MPIRG)	Case studies of several significant spills, including the 2010 spill, have been included.

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Response#	Commenter	Response
2373-11	Minnesota Public Interest Research Group (MPIRG)	The FEIS is limited to potential effects within the United States.
2373-12	Minnesota Public Interest Research Group (MPIRG)	Case studies of several significant spills and discussion of their impacts to various resources have been included in the FEIS. Section 10.4.2.1.1 discusses potential effects of a spill on the food chain.
2373-13	Minnesota Public Interest Research Group (MPIRG)	The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
2373-14	Minnesota Public Interest Research Group (MPIRG)	USDOT is mandated to regulate pipeline safety under Title 49 U.S. Code Chapter 601. The Pipeline and Hazardous Materials Safety Administration (PHMSA) is the agency within USDOT that has jurisdiction and is responsible for developing and enforcing regulations for the safe, reliable, and environmentally sound operation of interstate pipelines. PHMSA's regulations encompass design, construction, testing, operation, maintenance, and emergency response for hazardous liquid pipelines and related facilities.[1] 49 Code of Federal Regulations (CFR) 195 (Transportation of Hazardous Liquids by Pipeline) include Subparts A through H, establish reporting requirements, design requirements, construction requirements, pressure testing, operation and maintenance, integrity management, required qualifications of pipeline personnel, and corrosion control. For a new hazardous liquid pipeline, high consequence areas must be identified prior to operation, and hazardous liquid pipeline operators are required to develop and submit to PHMSA a written Integrity Management Plan (IMP) within 1 year of the start of operation (49 CFR 195.452). [1] Parts 190, 194, 195, 198, and 199 are relevant to hazardous liquid (including crude oil) pipelines. Parts 194 and 195 address issues that are directly related to pipeline system integrity and oil spill risk assessment and environmental consequences. The regulations at 49 CFR 194 (Response Plans for Onshore Oil Pipelines) contain requirements for onshore oil spill response plans that are intended to reduce the environmental impact of oil unintentionally discharged from onshore oil pipelines. Parts 190, 198, and 199 address issues that are tangential to pipeline system integrity, including rulemaking procedures, regulations for grants and state aid for safety programs, and required drug and alcohol testing for operators of pipeline facilities.

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Response#	Commenter	Response
2373-15	Minnesota Public Interest Research Group (MPIRG)	The comment was considered in the development of the FEIS.
2373-16	Minnesota Public Interest Research Group (MPIRG)	"Operation Impacts" in the FEIS detail the measurements of the growth and any associated impacts due to the operation of the project, which occurs once construction is complete.
2373-17	Minnesota Public Interest Research Group (MPIRG)	The comment was considered in the development of the FEIS.
2373-18	Minnesota Public Interest Research Group (MPIRG)	Such period-of-time conditions may be included with a route approval. However, this document can only address current regulatory requirements.
2373-19	Minnesota Public Interest Research Group (MPIRG)	Publicly available datasets and field reports were used in the development of the FEIS.
2466-1	Monicken, Melodee	Thank you for your comments on the Draft EIS. Dilbit diluent is natural gas condensate. The lighter compounds aromatics and alkanes tend to be the more toxic parts of crude oil, most of which evaporates in the hours and days after spilling. These components also tend to be the more toxic parts of the oil. The heavier components, such as the PAHs and polar compounds are more persistent in the environment. While extensive studies of long-term dilbit toxicity in the environment are not available, comparisons to the long term effects of heavy crude impacts are the most applicable.
2438-1	Monicken, Melodee	Thank you for your comments on the Draft EIS. See revisions to Chapter 13, List of Preparers.
2438-2	Monicken, Melodee	The National Academies of Sciences, Engineering, and Medicine 2016 data is included in the EIS. The EIS has been updated to include discussion on the properties of dilbit as it weathers.

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Response#	Commenter	Response
2438-3	Monicken, Melodee	As shown in Section 5.2.1.1.1, the ROI for the evaluation consists of a 1,000 foot buffer to either side of the centerline. The same ROI is used for both the evaluation of the Applicant's proposed project and SA-04.
2438-4	Monicken, Melodee	Section 5.2.1.1.3 describes the drilling mud Enbridge has proposed to use. No further information has been provided.
0718-1	Moore, Marian	Thank you for your comments on the Draft EIS. The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release. Spill impact analysis was limited to the expected areas of impact, which are 2500 ft. and 10 miles downstream from the pipeline.
0718-2	Moore, Marian	Leak detection falls under monitoring and maintenance, which is discussed in Section 8.3 of the FEIS. Mitigation measures for the abandoned line are discussed in 8.3.1. Pipe exposure via buoyancy is discussed in 8.3.1.4. Only the abandonment of Line 3 is considered as part of the EIS. Section 6.2.4.3 includes a discussion of available studies on the effects of the presence of pipelines and/or easements on property values. Findings are inconclusive, disputed or show minimal to no relationship between pipeline easements and property values. Reaching a conclusion that property values would be generally impacted - positively or negatively - by the presence of a pipeline easement would be speculative at best.
0718-3	Moore, Marian	The draft EIS noted that only three reports were reviewed; the additional reports now have been reviewed. Revisions to Sections 5.4.2 and 6.4.2 have been made to show this.
0718-4	Moore, Marian	The FEIS States: 10.1.1.1.1 Remote Area Analysis Rapid detection and response can reduce crude oil exposures and impacts on resources. Remote areas may be less accessible to spill response teams and therefore potentially more vulnerable to effects from crude oil spills. When a final route is selected, spill response strategies will be developed for areas with difficult access.

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Response#	Commenter	Response
0719-1	Moore, Tisha	Thank you for your comments on the Draft EIS. The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release. Spill impact analysis was limited to the expected areas of impact, which are 2500 ft. and 10 miles downstream from the pipeline.
0719-2	Moore, Tisha	Potential impacts to the federally listed endangered rusty patched bumble bee from the Applicant's proposed route, CN alternatives, and route alternatives are presented in Sections 5.2.5 and 6.3.5 of the FEIS. Potential impacts to non-listed bee and other insect species are presented in Sections 5.2.4 and 6.3.4 of the FEIS, and due to the implementation of BMPs for use of herbicides, are expected to be minimal.
0719-3	Moore, Tisha	Correct, the DEIS is designed to address macrofauna and the most significant and relevant plant species. Effects to algae and similar taxa are considered by design through the assessment of water quality standards and criteria.
0870-1	Morgan, Jordan	Thank you for your comments on the Draft EIS. An extensive discussion on the Social Cost of Carbon (SCC) can be found within Section 5.2.7 of the FEIS, including the economic values of the 30-year SCC for direct and indirect emissions. Furthermore, as stated within the referenced section, the SCC does internalize net agricultural productivity; human health; property damages from increased flood risk; and changes in energy system costs, such as reduced costs for heating and increased costs for air conditioning.
0870-2	Morgan, Jordan	As noted in Chapter 11, a quantitative and qualitative analysis of impacts to environmental justice communities was conducted for the project. The quantitative analysis used census data to characterize the region of interest. The EIS expanded its analysis to include a qualitative discussion of potentially affected communities and associated impacts, acknowledging the unique connection of American Indian tribal members to reservation lands, ceded lands, and the project area. The analysis contains a robust discussion of potential EJ communities, impacts, and possible mitigation measures. The FEIS was revised to include additional detail on impacts as they pertain to environmental justice communities, and to include discussion of CN alternatives.

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Response#	Commenter	Response
0720-1	Morrell, Melody	Thank you for your comments on the Draft EIS. Federal regulations regarding pipeline abandonment are discussed in Section 8.1. Enbridge's ongoing responsibility for the abandoned pipeline is discussed in Section 8.3.
1407-1	Morrow, Chuck & Ellen	Thank you for your comments on the Draft EIS. Information on water quality for potentially affected streams was obtained from both state and federal agency data bases.
1407-2	Morrow, Chuck & Ellen	Sections 2.1 and 2.2 of the FEIS provide a summary of the project and describe its purpose.
1407-3	Morrow, Chuck & Ellen	Crude oil from the Hardisty terminal in Alberta, Canada, would be transported in the Line 3 pipeline to the Clearbrook and Superior terminals. From these locations, oil would be distributed into existing pipelines, for delivery from the Clearbrook terminal to Minnesota refineries and from the Superior terminal to refineries in the Midwest, on the Gulf of Mexico, and in eastern Canada. Chapter 2 of the FEIS provides additional details about the project.
1407-4	Morrow, Chuck & Ellen	Horizontal directional drilling fluid is discussed in Section 5.2.1.1.3 of the FEIS.
1407-5	Morrow, Chuck & Ellen	Thank you for your comment. [How was 3 acres of wild rice waterbodies within the ROW determined? Section 5.2.1.2.4 Disturbance of Wild Rice Waterbodies]
1407-6	Morrow, Chuck & Ellen	Various sections within Chapters 5 and 6 of the FEIS, including Section 5.3.4 and Section 6.5.4 address baseline employment conditions within the counties crossed by the Applicant's proposed project/preferred route and alternatives, and anticipated impacts on employment as a result of construction and operations. Section 6.5.4 of the FEIS clarifies that it is likely that the Applicant would hire local residents during construction of any of the alternative routes for a portion of its workforce - based on current labor agreements in Minnesota at least 50% of workers will be expected to be employed from local union halls.

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Response#	Commenter	Response
1056-1	Mosner, Jeff	Thank you for your comments on the Draft EIS. The cumulative potential impacts of climate change are discussed in the Executive Summary and in Section 12.5 of the FEIS. Section 12.5 also discusses climate change trends in Minnesota and the Midwest. Additional relevant documents used for GHG discussion are provided in Sections 5.2.7.5 and 12.6.
1056-2	Mosner, Jeff	The lifecycle GHG intensity of various crude oils is discussed in the Section 5.2.7.3 of the FEIS. The average life cycle GHG emissions for heavy ECSB are calculated based on higher value of CO_2e/bbl of crude oil. This provides conservative estimates of life cycle greenhouse gas emissions in Table 5.27-11.
0878-1	Munter, John	Thank you for your comments on the Draft EIS. A discussion of alternatives is provided in Section 6.3 of the FEIS.
0878-2	Munter, John	A discussion of applicable regulations and agencies is provided in Chapter 3 of the FEIS.
0876-1	Munter, John	Thank you for your comments on the Draft EIS. The referenced figure was provided by Enbridge as a typical situation only, and does not necessarily reflect the exact pipeline configuration throughout the entire length.
0875-1	Munter, John	Thank you for your comments on the Draft EIS. The comment was considered in the development of the FEIS.
0875-2	Munter, John	As part of the Project, Enbridge proposes to abandon the existing Line 3, permanently removing it from service, following state and federal regulations, which outline the process and requirements for pipeline abandonment.
0874-1	Munter, John	Thank you for your comments on the Draft EIS. The pipe will be coated to retard external corrosion. PHMSA is aware of the effect of buoyancy on pipeline stresses and recommends that pipelines have sufficient cover and be neutrally buoyant to prevent movement.
0875-3	Munter, John	The comment has been considered in preparation of the FEIS.
0874-2	Munter, John	The comment was considered in the development of the FEIS.

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Response#	Commenter	Response
2449-1	Munter, John	Thank you for your comments on the Draft EIS. The Environmental Justice section of the FEIS has been revised to include additional information, including impacts resulting from the CN Alternatives.
2449-2	Munter, John	To minimize the potential for introduction of invasive species during construction, the Applicant would implement an invasive species minimization plan. In addition, environmental inspectors would monitor construction activities to ensure compliance with permit conditions and the invasive species plan, reducing the potential for introduction of invasive species during construction. Additional details regarding invasive species impacts to native aquatic species can be found in Section 5.2.4 and 6.3.4.
2449-3	Munter, John	This EIS assumes that the Applicant will obtain and comply with all necessary permits and approvals that would be required for the construction and operation of the pipeline, if a Certificate of Need and route permit are approved by the Commission. Environmental inspectors would monitor construction activities to ensure compliance with permit conditions and the invasive species plan, reducing the potential for introduction of invasive species during construction. Additional details regarding invasive species impacts to native aquatic species can be found in Section 5.2.4 and 6.3.4.
2447-1	Munter, John	Thank you for your comments on the Draft EIS. The comment was considered in development of the FEIS.
2447-2	Munter, John	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
2447-3	Munter, John	SA-04 is a conceptual alternative. It is not one that has been submitted by an applicant for permitting or review. The purpose of the alternative is to provide an appropriate comparison within the evaluation of CN alternatives.
2007-1	Munter, John	Thank you for your comments on the Draft EIS. Section 1.4 of the FEIS generally discusses overarching policy issues that are beyond the scope of the EIS.
2006-1	Munter, John	Thank you for your comments on the Draft EIS. Additional discussion on the spacing of adjacent pipes has been included in Section 8.4.

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Response#	Commenter	Response
2005-1	Munter, John	Thank you for your comments on the Draft EIS. Additional discussion regarding spacing of adjacent pipes has been provided in Section 8.4.
1833-1	Munter, John	Thank you for your comments on the Draft EIS. Publicly available data were used to present the findings.
1833-2	Munter, John	The comment was considered in development of the FEIS.
1829-1	Munter, John	Thank you for your comments on the Draft EIS. Additional information regarding spacing of adjacent pipelines is provided in Section 8.4.
1423-1	Munter, John	Thank you for your comments on the Draft EIS. The FEIS has been corrected in the pinhole leak discussion.
1422-1	Munter, John	Thank you for your comments on the Draft EIS. Karst analysis is based on data provided in surveys by the USGS, Minnesota Geological Survey and the Department of Geology and Geophysics at the University of Minnesota. Karst lands in Minnesota typically developed in Paleozoic carbonate and sandstone bedrock, which occur in the southeast portion of the state. Only SA-04 is present in this area of Minnesota
1421-1	Munter, John	Thank you for your comments on the Draft EIS. The comment has been considered in development of the FEIS.
1420-1	Munter, John	Thank you for your comments on the Draft EIS. The comment has been considered in development of the FEIS.
1419-1	Munter, John	Thank you for your comments on the Draft EIS. SA-04 is a system alternative evaluated to aid the Commission's evaluation of whether or not to grant a CN for the proposed project. A system alternative is not a routing alternative, as no entity has proposed to build such a pipeline, detailed routing and design have not been conducted, and a route permit could not be issued for SA-04. Instead, a system alternative is a serves as a broader level point of comparison to the Applicant's Proposed project and the other CN alternatives. The level of analysis of SA-04 is in line with this concept.

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Response#	Commenter	Response
1417-1	Munter, John	Thank you for your comments on the Draft EIS. Permanent berms, as approved by permit conditions, would be installed on all slopes greater than 3 percent to prevent erosion and sedimentation into surface waters once construction is complete, unless otherwise specified by permit conditions.
1415-1	Munter, John	Thank you for your comments on the Draft EIS. Further discussion of removal has been included in Section 8.4 of the FEIS.
1412-1	Munter, John	Thank you for your comments on the Draft EIS. All work will require monitoring and measures to reduce and eliminate the spread of invasive species, both terrestrial and aquatic. Waterbody crossing plans will include the use of various techniques to reduce transfer of any aquatic nuisance species to other water bodies. This is part of the permitting process if and when the Applicant is granted a Certificate of Need.
1411-1	Munter, John	Thank you for your comments on the Draft EIS. The executive summary of the FEIS provides information on the purpose of the EIS and the decisions they inform, while Section 1.4 provides details about broader policy implications.
1410-1	Munter, John	Thank you for your comments on the Draft EIS. Specifics regarding third-party monitoring of the pipeline are not known at this time. Monitoring associated with abandonment and removal of the existing Line 3 is discussed in Chapter 8 of the DEIS.
1410-2	Munter, John	An invasive species control plan will be required by the Applicant.
0872-1	Munter, John	Thank you for your comments on the Draft EIS. Additional information regarding cathodic protection on an abandoned pipeline has been included in Section 8.3.

Responses to Comments - Citizen

Response#	Commenter	Response
2450-1	Murcia, Brent	Thank you for your comments on the Draft EIS. As a practical matter, re-visiting the timeframe for operational impacts and revising all of the analysis is not possible. A 30 year time window was chosen to match the economic life of the project indicated by the Applicant. For purposes of comparison across alternatives the EIS targets a consistent time window that is long enough to understand typical annual operating impacts/tradeoffs of the alternatives. Extending the timeframe and re-doing the analysis doesn't appear to add any value in this comparison.
2450-2	Murcia, Brent	The FEIS now includes historic incident data.
2450-3	Murcia, Brent	As noted in Chapter 11, a quantitative and qualitative analysis of impacts to environmental justice communities was conducted for the project. The quantitative analysis used census data to characterize the region of interest. The EIS expanded its analysis to include a qualitative discussion of potentially affected communities and associated impacts, acknowledging the unique connection of American Indian tribal members to reservation lands, ceded lands, and the project area. The analysis contains a robust discussion of potential EJ communities, impacts, and possible mitigation measures. The FEIS was revised to include additional detail on impacts as they pertain to environmental justice communities, and to include discussion of CN alternatives.
2450-4	Murcia, Brent	Potential impacts to affected natural resources are discussed in Chapters 5 and 6 of the FEIS, and how American Indian tribes experience and interact with these resources is summarized in Chapters 9 and 11. This constitutes the analysis of treaty rights within this EIS.
2450-5	Murcia, Brent	Chapter 8 of the FEIS discusses the abandonment and removal alternatives, and discusses that a similar analysis will be needed for the proposed Line 3 at the end of its service life.
1427-1	Nameth, Matthew	Thank you for your comments on the Draft EIS. Tribal consultation is discussed in Chapter 9 of the FEIS. Materials from consultation efforts are provided in Appendix P.
1427-2	Nameth, Matthew	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.

Responses to Comments - Citizen

Response#	Commenter	Response
1427-3	Nameth, Matthew	Section 8.3 of the FEIS provides discussion of further analysis to determine buoyancy, subsidence, and corrosion location. Appendix B provides calculations on corrosion rates.
0879-1	Natzel, Sharon	Thank you for your comments on the Draft EIS. The analysis considered groundwater and surface water impacts from the various alternative routes.
1429-1	Neihart, Ken	Thank you for your comments on the Draft EIS. System alternative SA-04 was evaluated as an alternative to inform the Certificate of Need decision. It is not considered as part of the route alternatives to inform the routing permit decision. Figures ES-9, ES-10, ES-11, and Table ES-4 only cover the route alternatives considered as part of the routing permit.
1429-2	Neihart, Ken	The FEIS assumes that the Applicant will comply with all necessary permits or approvals that would be required for the construction and operation of the pipeline, if a Certificate of Need and route permit are approved by the Commission. Table 3.6-1 provides a list of additional permits and approvals required for the Line 3 Project. Potential connected actions, including transmission lines, are discussed in Section 2.10 of the FEIS.
1429-3	Neihart, Ken	Thank you for your comment. Economic and Employment data are included in the document.
1429-4	Neihart, Ken	Chapter 13 of the FEIS provides a list of preparers.
1429-5	Neihart, Ken	Enbridge has indicated that the new pipeline would allow transport of 760,000 barrels per day (bpd), an increase over the current Line 3 operating level of 390,000 bpd. Additional details on the project can be found in Chapter 2.
1748-1	Nelson, Jamie Kyle	Thank you for your comments on the Draft EIS. The figure in the executive summary has been revised to demonstrate amount spilled per volume transported. When volume of releases is compared to the volume crude oil transported, rail and truck transport release a significantly higher percentage of the volume transported, 0.309% and 0.154% respectively. Comparatively pipeline transport release and average of 0.006% of the volume of crude oil transported.

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Response#	Commenter	Response
0321-1	Nielsen, Karen	Thank you for your comments on the Draft EIS. A detailed plan is not included with the EIS. Please see Appendix E - Environmental Protection Plan. If a permit is issued, additional conditions may be included.
0321-2	Nielsen, Karen	Section 2.3.2.3 has been amended for clarification; 49 CFR requires the cathodic protection be operational within 1 year, though it would likely be installed during construction.
0321-3	Nielsen, Karen	The applicant may employ various measures to minimize or mitigate impacts to environmental justice communities. As noted in section 11.4 of the FEIS, the applicant may work with companies and subcontractors hired to construct, restore and operate the pipeline to prepare and implement an education plan or awareness campaign regarding the issue of sexual abuse or sex trafficking. Additionally, the applicant may provide funding to support the efforts of local and tribal law enforcement on this and other safety-related issues.
1570-1	Northern Water Alliance	Thank you for your comments on the Draft EIS. The scope of analyses included in the FEIS is focused on evaluation of the Applicant's Proposed Project/Applicant's Preferred Route and Certificate of Need and Route Alternatives. Chapters 1 and 3 detail the methodology and regulatory requirements of the EIS.
1570-2	Northern Water Alliance	The cumulative potential effects of climate change and trends in Minnesota and the Midwest are discussed in Section 12 of DEIS. Additional relevant documents used for GHG discussion are provided in Section 12.6 and Section 5.2.7.5.
1570-3	Northern Water Alliance	For a discussion on liability, please see Section 8.3.1.1 of the FEIS.
1570-4	Northern Water Alliance	The FEIS has been updated to include discussion on the properties of dilbit as it weathers.
1570-5	Northern Water Alliance	Please refer to Greenhouse Gases in Section 5.2.7.2. Also discussed in this Section are life-cycle GHG emissions from extraction to the end-use.
1570-6	Northern Water Alliance	The Consent Decree discussed in 8.3.1 of the FEIS requires the abandoned pipeline not be used again in the future.

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Response#	Commenter	Response
1570-7	Northern Water Alliance	The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release. The spill model does include winter, spring and summer conditions.
1570-8	Northern Water Alliance	An updated discussion of alternatives is provided in Section 6.3 of the FEIS.
1570-9	Northern Water Alliance	Thank you for the comment. The goal of the EIS is to analyze impacts to all water resources from construction and operation of the Project. There are many non-Project associated water resource issues that are beyond the scope of the EIS. State and federal agencies will have permitting authority if the Project goes forward. Many of the issues noted by your comment are relevant to these agencies.
1570-10	Northern Water Alliance	Groundwater levels vary; levels and appropriate mitigation that could be required will be evaluated on a site by site basis during construction.
2043-1	Northern Water Alliance	Thank you for your comments on the Draft EIS. Potential impacts to wild rice lakes and harvest areas has been included in the analysis.
2043-2	Northern Water Alliance	The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release. 10 miles downstream was selected, because it was considered to be not overly conservative, and crossing widths for the RAs were unavailable. The Applicant surveyed the streams and rivers for the APR ONLY, so small (<10 m wide) and large (10 m or > wide) crossings are only known for this route. It would be biased to only run the 2 downstream buffers (30 miles for large rivers, and 10 miles for small streams) along the APR. Furthermore, we determined that it would be overly conservative to run a 30-mile downstream buffer for all water crossings, especially since many of these water bodies are ditches and terminate within a few miles.

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Response#	Commenter	Response
0443-1	Novacek, Lance	Thank you for your comments on the Draft EIS. Various sections within Chapters 5 and 6 of the FEIS, including Section 5.3.4 and Section 6.5.4 address baseline employment conditions within the counties crossed by the Applicant's proposed project/preferred route and alternatives, and anticipated impacts on employment as a result of construction and operations.
1436-1	Oldham, Nancy	Thank you for your comments on the Draft EIS. The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
0633-1	Olson, James	Thank you for your comments on the Draft EIS. Dilbit diluent is natural gas condensate, not solvent.
0729-1	Olson, Josh	Thank you for your comments on the Draft EIS. Publicly available datasets and field reports were used to develop the FEIS. The sentence in question could not be found on page 7-4.
0729-2	Olson, Josh	Publicly available datasets and field reports were used to develop the FEIS. The reference in question has been removed from the document and replaced with valid sources.
1226-1	Ostrove, Joan	Thank you for your comments on the Draft EIS. PHMSA is aware of the effect of buoyancy on pipeline stresses and recommends that pipelines have sufficient cover and be neutrally buoyant to prevent movement.
1226-2	Ostrove, Joan	Thank you for your comment on the Draft EIS. Your comment was considered in development of the FEIS.
1571-1	Otto, Wichahpi	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
1571-2	Otto, Wichahpi	Various chapters of the FEIS, including Chapter 3 ("Regulatory Framework") address the regulatory requirements that must be considered within the analyses of the FEIS.
1571-3	Otto, Wichahpi	The EIS assumes that if the permits are issued, the Applicant will abide by all federal, tribal, state, and local laws and regulations. Where applicable, this would include laws governing its construction.

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Response#	Commenter	Response
1440-1	Otto, Wichahpi	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS
1440-2	Otto, Wichahpi	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
1440-3	Otto, Wichahpi	The predictive risk analysis was removed due to issues with its application. Historic pipeline incident data was expanded to detail historic incident rates and causes. Current spill probabilities for a new pipeline using modern metallurgy and coating technologies would likely be less than historic incidents caused by corrosion or other internal failures. Case studies of several significant spills and discussion of their impacts to various resources have also been included.
1440-4	Otto, Wichahpi	Additions have been made to Chapter 11 to provide more information on how adverse impacts to environmental justice communities are analyzed and addressed. As described in Chapter 11, a the identification of a potential environmental justice community, or the potential for disproportionately high and adverse impacts, does not preclude approval of the project or selection of a route alternative; however, it does require detailed efforts to avoid, mitigate, minimize, rectify, reduce, and/or eliminate the impacts. Section 11.4 of the FEIS identifies several measures that may be undertaken by the applicant to minimize or mitigate impacts to environmental justice communities.
2334-1	Parr, Jackie	Thank you for your comments on the Draft EIS. Potential impacts to affected natural resources are discussed in Chapters 5 and 6 of the FEIS, and how American Indian tribes experience and interact with these resources is summarized in Chapters 9 and 11. This constitutes the analysis of treaty rights within this EIS.

Responses to Comments - Citizen

Response#	Commenter	Response
2334-2	Parr, Jackie	Several sources were reviewed to better understand the concerns related to sex trafficking. These concerns have been raised in recent local media, by commenters, local communities, and other communities where pipelines have been sited or proposed. Two sources are cited to support this concern; Section 11 indicates that increases in sex trafficking, particularly among Native populations, is well documented (National Congress of American Indians Policy Research Center 2016), and that American Indian and minority populations can be at higher risk based on various factors (Minnesota Department of Health [MDH] 2014). The discussion concludes that these concerns have the potential to be amplified with the addition of a cash-rich workforce. To address this potential, the EIS has been revised to clarify that the Applicant may provide funding to support the efforts of local and tribal law enforcement to address this issue.
2334-3	Parr, Jackie	Section 195.563 of 49 CFR Subpart H – Corrosion Control states that cathodic protection must be in operation no later than 1 year after the pipeline is constructed. This does not mean Enbridge would wait a full year to install the system. It is typically installed as part of the construction process. The buried pipeline would also be protected from external corrosion by application of a coating.
2334-4	Parr, Jackie	Section 8.3 and Appendix B discusses corrosion rates, subsidence, and exposure.
2334-5	Parr, Jackie	Additional information regarding abandonment and potential future mitigation has been added to Section 8.3 of the FEIS.
1441-1	PaStarr, Brian	Thank you for your comments on the Draft EIS. The FEIS assesses the impacts from the Applicant's proposed project, and Project-related impacts with respect to tax revenues are discussed in Sections 5.3 and 6.5 of the FEIS. Assessing the socioeconomic impacts from decreasing tax revenue along existing Line 3 corridor after it has been abandoned/removed is outside the scope of the FEIS.

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Response#	Commenter	Response
2844-1	Patterson, David	Thank you for your comments on the Draft EIS. The scope of analysis of impacts to recreation and tourism resources included within Chapter 5 is explained in greater detail within Section 5.3.2.1 of the FEIS: "In addition, Minnesota Administrative Rules Part 7853.0600, Subpart 2(J) requires listing of 'state critical areas, state WMAs; state scientific and natural areas; state wild, scenic, and recreational rivers; state parks; state scenic wayside parks; state recreational areas; state forests; state trails; state canoe and boating rivers; state zoos, and designated trout lakes through which the route passes, as mapped on the inventory of significant resources by the State Planning Agency.'" Regarding the second part of this comment - Section 5.3.2.3.1 does not deal with the impact to tourism and recreation due to a spill - analyses within Chapter 5.3.2 of the FEIS pertain to normal construction and operation of the pipeline. Chapter 10 of the FEIS deals specifically with accidental releases/spills, including potential impacts to recreation and tourism areas and related resources resulting from a release/spill.
2844-2	Patterson, David	The vast majority of spills are small (less than 1 barrel).
2013-1	Pearson, Andy	Thank you for your comments on the Draft EIS. For purposes of comparison across alternatives, a consistent time window of 30yrs was chosen to match the economic life of the project indicated by the applicant and to understand typical annual operating impacts/tradeoffs of the alternatives.
1851-1	Pearson, Andy	Thank you for your comments on the Draft EIS. Chapter 10 of the FEIS address the potential for unanticipated releases and the potential consequences of such releases.
1844-1	Pearson, Andy	The required capacity is discussed in Section 2.1 of the FEIS.
0884-1	Pearson, Andy	Thank you for your comments on the Draft EIS. An extensive discussion on the Social Cost of Carbon (SCC) can be found within Section 5.2.7 of the FEIS, including the economic values of the 30-year SCC for direct and indirect emissions. Furthermore, as stated within the referenced section, the SCC does internalize net agricultural productivity; human health; property damages from increased flood risk; and changes in energy system costs, such as reduced costs for heating and increased costs for air conditioning.

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Response#	Commenter	Response
0884-2	Pearson, Andy	The Applicant's proposed project is the "action" evaluated in this FEIS. The pipeline distribution route and terminus beyond the Superior terminal is outside the approved scope of the FEIS.
2338-1	Perez, Lourdes	Thank you for your comments on the Draft EIS. The Department of Commerce is consulting with American Indian tribes. Information on consultation is provided in Chapter 9 and Appendix P of the FEIS.
2338-2	Perez, Lourdes	Tribal resources are addressed primarily in Chapters 9 and 11; however, references are provided throughout the EIS to note where specific resources analyses (e.g., wild rice, cultural sites) include a discussion of impacts to American Indian tribes and tribal resources.
2338-3	Perez, Lourdes	Potential impacts to affected natural resources are discussed in Chapters 5 and 6, and how American Indian tribes experience and interact with these resources is summarized in Chapters 9 and 11. This constitutes the analysis of treaty rights within this EIS.
2338-4	Perez, Lourdes	Chapter 11 of the FEIS has been expanded to include additional information on the assessment of and impacts to potential EJ communities. As described in the section, the identification of potential EJ communities or the potential for disproportionately high and adverse impacts does not preclude approval of the project or selection of a route alternative; however, it does require detailed efforts to avoid, mitigate, minimize, rectify, reduce, and/or eliminate the impacts. Section 11.4 of the EIS describes the measures that may be undertaken by the applicant to minimize or mitigate adverse impacts. As noted in this section, the applicant may work with companies and subcontractors hired to construct, restore and operate the pipeline to prepare and implement an education plan or awareness campaign regarding the issue of sexual abuse or sex trafficking. Section 11.4 has been revised to clarify that the applicant may also provide funding to support the efforts of local and tribal law enforcement on this and other safety-related issues, which would enable local entities to tailor approaches and solutions to their community, and/or to collaborate with experts in this field.
2338-5	Perez, Lourdes	The Draft EIS noted that only three reports were reviewed; the additional reports now have been reviewed. Revisions to Sections 5.4.2 and 6.4.2 have been made to show this.

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Response#	Commenter	Response
2339-1	Perkins, John and Gerald	Thank you for your comments on the Draft EIS. Section 4.2.2 addresses a no-action alternative.
2339-2	Perkins, John and Gerald	Sections 5.3 and 6.5 of the FEIS assesses the potential Project-related impacts with respect to commodity production; recreation and tourism; and employment, income, and tax revenues.
2339-3	Perkins, John and Gerald	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
2339-4	Perkins, John and Gerald	The range of alternatives for which impacts have been assessed in the EIS is consistent with the scope of the project. The contribution to the GHG emissions is discussed in the Section 5.2.7 and Section 6.3.7.
2339-5	Perkins, John and Gerald	The comment was considered in development of the FEIS.
2339-6	Perkins, John and Gerald	As stated in the FEIS Executive Summary, construction of the SA-04 route would be expected to fragment less habitat than the Applicant's Preferred Route. The effects of SA-04 and the other Certificate of Need alternatives on habitat and fish and wildlife are addressed in FEIS Section 5.2.4. Chapter 1 of the FEIS states that the EIS is a factual document that is designed to inform public deliberations and government decision-making, but does not make specific recommendations regarding the Certificate of Need (or Route Permit) for the Project.
2339-7	Perkins, John and Gerald	System alternative SA-04 was evaluated as an alternative to inform the Certificate of Need decision. It is not considered as part of the route alternatives to inform the routing permit decision.
2339-8	Perkins, John and Gerald	System alternative SA-04 was evaluated as an alternative to inform the Certificate of Need decision. It is not considered as part of the route alternatives to inform the routing permit decision.
2339-9	Perkins, John and Gerald	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
2339-10	Perkins, John and Gerald	Alternative transportation modes are discussed in Section 5.2.4 of the FEIS.

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Response#	Commenter	Response
2339-11	Perkins, John and Gerald	Average number of transport incidents per transit method (pipeline, rail, or truck) based on data acquired from the Pipeline and Hazardous Materials Safety Administration. The average volume of yearly transport based on Energy Information Administration United States Refinery Receipts of Crude Oil by Method or Transportation data.
1445-1	Peterson, Mary	Thank you for your comments on the Draft EIS. Sections 5.3 and 6.5 of the FEIS assesses the potential Project-related impacts with respect to commodity production; recreation and tourism; and employment, income, and tax revenues.
0732-1	Peterson, Robert	Thank you for your comments on the Draft EIS. Section 6.2.4.3 of the FEIS includes discussion on potential impacts to property values resulting from the presence of an oil or gas pipeline and/or pipeline easement, including related infrastructure. A review of relevant literature is summarized in Table 6.2.4-5. Findings were inconclusive, disputed, or showed minimal to no relationship between pipeline easements and property values. At least one of the studies included in the aforementioned literature review, a 2008 study on the impacts of the South Mist Pipeline Expansion on property values in Oregon, included a review of a pipeline project with above-ground valves and other above-ground components; this study found that the pipeline had no statistically significant relationship with residential property values. Any effect on property values resulting from disruption due to protests and related issues would be purely speculative and cannot be reasonably anticipated.
2776-1	Phillips, Joni	Thank you for your comments on the Draft EIS. FEIS population data was derived from the United States Census Bureau for populated areas crossed by the project. The referenced study does not provide data for every populated area identified as crossed in the FEIS. For data and analysis consistency, the United States Census Bureau was used for the analysis since it provides adequate coverage.
2776-2	Phillips, Joni	While not called out by name, the resources within the Big Sandy watershed are part of the potential spill impact analysis.
2776-3	Phillips, Joni	Thank you for your comment. Your comment was considered in development of the FEIS.

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Response#	Commenter	Response
1061-1	Phillips, Joni	Thank you for your comments on the Draft EIS. Your comments have been considered in development of the FEIS.
1061-2	Phillips, Joni	The methodology utilized for analysis of existing conditions of, impacts on and mitigation for population is discussed within the associated sections of Chapters 5 and 6 of the FEIS. While population data utilized may in fact discount the presence of second homeowners, it is difficult to assess second homeowner population in a spatial and temporal context. The analysis for impacts on population is broken into two components: impacts associated with the non-local workforce re-locating to communities near the Project, and impacts associated with construction and operation of the pipeline near densely populated areas. The qualitative assessment of potential impacts on population, based on these components, is unlikely to change based on the presence of second homeowners.
1061-3	Phillips, Joni	Thank you for your comments on the Draft EIS. Your comments have been considered in development of the FEIS.
1061-4	Phillips, Joni	As stated in Chapter 1 of the FEIS, the EIS is intended to evaluate the impacts of granting a Certificate of Need for the proposed action against denial of the CN by considering alternatives including continued use of the existing Line 3; use of alternative pipeline systems or modes of transport such as trucks and trains to support adequate, reliable, and efficient supply; and alternative methods of supplementing the existing Line 3 to support adequate, reliable, and efficient supply. The EIS also evaluates proposed and alternative routes, contingent on CN approval. Reasonably foreseeable actions are also discussed within Chapter 12 of the FEIS. Future speculative pipelines are outside of the scope of the EIS.
1061-6	Phillips, Joni	Additional information regarding discharge of hydrostatic test water and source water has been included in Section 2.7.1.13 of the FEIS.
1061-6	Phillips, Joni	Additional information regarding discharge of hydrostatic test water and source water has been included in Section 2.7.1.13 of the FEIS.
1061-7	Phillips, Joni	Table 3.6-1 of the FEIS discusses DOH permit requirements.

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Response#	Commenter	Response
1061-8	Phillips, Joni	Thank you for your comments on the Draft EIS. Your comments have been considered in development of the FEIS.
1061-9	Phillips, Joni	Data were evaluated equally for all alternatives.
1061-10	Phillips, Joni	Thank you for your comment. Your comment was considered in development of the FEIS.
0735-1	Phillips, Joni	Thank you for your comments on the Draft EIS. The AFF extrapolated over a period of time would provide the potential of failure over that period of time. The EIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
0734-1	Phillips, Joni	Thank you for your comments on the Draft EIS. It is unclear what is specifically meant by "social impact" of the pipeline. Various chapters of the FEIS, including Chapters 5, 6, and 11 do address factors that could be considered "social impacts". Chapters 5 and 6 of the FEIS include analysis of the potential economic impacts of the project on recreation, property values, and taxes. Statements that construction will remove recreational income and property values will decrease across the board are incorrect, as discussed within the aforementioned chapters. An analysis of potential environmental impacts of accidental releases, spills and leaks can be found in Chapter 10.
0734-2	Phillips, Joni	Thank you for your comment. Section 10.5 of the EIS goes into detail about spill prevention, preparedness and response.
0736-1	Pilot, Robert	Thank you for your comments on the Draft EIS. Case studies of several significant spills and discussion of their impacts to various resources have been included. The National Academies of Sciences, Engineering, and Medicine 2016 and other non-US studies are included in the FEIS.
0852-1	Pine River Watershed Alliance - Johnson, Gregory	Thank you for your comments on the Draft EIS. Cathodic protection is discussed in Chapter 8 of the FEIS.

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Response#	Commenter	Response
0852-2	Pine River Watershed Alliance - Johnson, Gregory	Impacts to water resources, which includes watersheds, from the certificate of need and route alternatives is discussed in Sections 5.2.1 and 6.3.1 of the FEIS.
1447-1	Pine River Watershed Alliance - Steve, Roe	Thank you for your comments on the Draft EIS. Your comments were considered in development of the FEIS.
2322-1	Power Shift Network	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
2322-2	Power Shift Network	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
2322-3	Power Shift Network	The comment has been considered in development of the FEIS.
2322-4	Power Shift Network	Additional information regarding the future retirement of the proposed Line 3 has been included in Section 8.1 of the FEIS.
2042-1	Pranis, Kevin	Thank you for your comments on the Draft EIS. Section 6.5.4 of the FEIS clarifies that it is likely that the Applicant would hire local residents during construction of any of the alternative routes for a portion of its workforce - based on current labor agreements in Minnesota at least 50% of workers will be expected to be employed from local union halls.
2042-2	Pranis, Kevin	Discussion of railroad transport is discussed in Section 4.2 of the FEIS.
0241-1	Ragole, Rose	Thank you for your comments on the Draft EIS. Information on gallons per barrel has been included in Section 2.1 of the FEIS. Information on oil releases is included throughout Section 10 of the FEIS.
1065-1	Rausch, Ellis	Thank you for your comments on the Draft EIS. The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.

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Response#	Commenter	Response
1065-2	Rausch, Ellis	A discussion of alternatives is presented in Chapter 4. Specifically, a no action alternative, which is the denial of the CN, is discussed in Section 4.2.2. The purpose of the CN process is to determine whether the particular project being proposed is needed. There is no legal authority in a CN proceeding of a separate proposed project (at the state or with the Public Utilities Commission) to evaluate the ongoing need of an existing project. Once constructed, the safety and operation of an existing pipeline is regulated by the United States Department of Transportation, Pipeline and Hazardous Materials Safety Administration. In this particular case, Enbridge has entered into a consent decree with the United States Environmental Protection Agency that allows for the continued operation of the existing Line 3 if a replacement for the line is not approved. In other words, if the proposed Line 3 project is not approved by the Commission, the continued operation of the existing Line 3 will be regulated by the Federal government, not the State of Minnesota. Accordingly, shutting down and removing existing pipelines in the mainline corridor is not included in the No Action Alternative.
0743-1	Renner, Pat	Thank you for your comments on the Draft EIS. Spill impact analysis was limited to the expected areas of impact, which are 2500 ft. and 10 miles downstream from the pipeline.
0743-2	Renner, Pat	Comment noted. Potential impacts of the project on environmental justice communities are described in Chapter 11 of the FEIS.
0899-1	Richardson, Allen	Thank you for your comments on the Draft EIS. The typical configuration and distance between pipelines is provided in Section 4.3.4.3 of the FEIS.
0897-1	Richardson, Allen	Thank you for your comments on the Draft EIS. Section 8.4.1 of the FEIS notes the approximate cost of a potential removal effort as well as an estimate for the number of potential jobs created during a hypothetical removal effort (approximately half of the jobs generated by construction of a new Line 3). This can be compared with employment and jobs anticipated to be created by the project, for which discussion can be found in Chapters 5 and 6.

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Response#	Commenter	Response
0897-2	Richardson, Allen	Section 8.4.1 of the FEIS notes the approximate cost of a potential removal effort as well as an estimate for the number of potential jobs created during a hypothetical removal effort (approximately half of the jobs generated by construction of a new Line 3). This can be compared with employment and jobs anticipated to be created by the project, for which discussion can be found in Chapters 5 and 6.
0748-1	Rietmann, Dean	Thank you for your comments on the Draft EIS. Chapters 5 and 6 of the FEIS include analysis of the potential economic impacts of the project on federal/state public lands, water resources, and air quality. An analysis of potential environmental impacts of accidental releases, spills and leaks can be found in Chapter 10.
1069-1	Roe, Steve	Thank you for your comments on the Draft EIS. Your comments were considered in development of the FEIS.
0563-1	Rozycki, Margaret	Thank you for your comments on the Draft EIS. The 30 year time-frame was chosen to match the economic life of the project indicated by the Applicant. For purposes of comparison across alternatives, the EIS targets a consistent time-frame that is long enough to understand typical annual operating impacts/tradeoffs of the alternatives. The EIS uses social cost of carbon (SCC) values that were assessed using a 3-percent discount rate developed by the Interagency Working Group to provide an estimate of potential climate change damages for the Applicant's proposed project and CN Alternatives based on total direct and indirect GHG emissions. The SCC is a useful measure to assess the benefits of CO_2 reductions.
2100-1	Russell, Scott	Thank you for your comments on the Draft EIS. Text has been added to Chapter 9 of the FEIS to include the names of elders and tribal leaders that were interviewed as part of the consultation.
2473-1	Sattinger, Stan	Thank you for your comments on the Draft EIS. The cumulative potential effects of climate change and trends in Minnesota and the Midwest are discussed in Chapter 12 of the FEIS. The range of alternatives for which GHG emissions are estimated and impacts have been assessed in the EIS are consistent with the acceptable industry standard and scope of the project. Please note that Table 6.3.7-14 shows construction emissions only between Clearbrook and Carlton for the Applicants Proposed Project and route alternatives whereas Table 5.2.7-6 shows construction emissions for the entire route of the Applicants Proposed Project and the CN alternatives.

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2473-2	Sattinger, Stan	The construction emissions are calculated based on standard industry wide estimation procedures and provide conservative estimates. Please note that Table 6.3.7-14 shows construction emissions only between Clearbrook and Carlton for the Applicants Proposed Project and route alternatives whereas Table 5.2.7-6 shows construction emissions for the entire route of the Applicants Proposed Project and the CN alternatives.
2473-3	Sattinger, Stan	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
2050-1	Sattinger, Stan	Thank you for your comments on the Draft EIS. Additional discussion regarding the probability of spills has been included in Section 10.1.3.1.3.
2050-2	Sattinger, Stan	The comment has been considered in the development of the FEIS.
0564-1	Sauve, Dan	Thank you for your comments on the Draft EIS. That has been recognized and corrected in the FEIS.
0564-2	Sauve, Dan	Additional analysis of the potential for incidents to occur has been included in Section 10.1.2.
0338-1	Schaitberger, Sharli	Thank you for your comments on the Draft EIS. The FEIS is focused on impacts to waterbodies of concern and tribal issues associated with those waterbodies.
0338-2	Schaitberger, Sharli	The FEIS is focused on impacts to waterbodies of concern and tribal issues associated with those waterbodies.
0338-3	Schaitberger, Sharli	The FEIS is focused on impacts to waterbodies of concern and tribal issues associated with those waterbodies.
0338-4	Schaitberger, Sharli	Section 8.2 of the FEIS discusses the applicable regulatory requirements. No requirement exists mandating the removal of a pipeline.
0465-1	Shea, Brian	Thank you for your comments on the Draft EIS. Figure ES-4 of the FEIS has been updated to compare the “Average Yearly Transport (Thousand Barrels)” to “Percent Volume Spilled” per type of transport.

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Response#	Commenter	Response
0465-2	Shea, Brian	Thank you for your comments on the Draft EIS. The information mentioned has been considered while revising the executive summary.
0465-3	Shea, Brian	The figure in the executive summary has been revised in the FEIS to demonstrate amount spilled per volume transported.
0465-4	Shea, Brian	The information mentioned has been considered while revising the executive summary.
0758-1	Siegel, Lauren	Thank you for your comments on the Draft EIS. Discussion of existing conditions, impacts and mitigation on employment, other socioeconomic factors, and other resources within the FEIS is focused on the Certificate of Need alternatives and Route alternatives identified and discussed in greater detail in Chapter 4 and throughout the FEIS.
2803-1	Sierra Club	The EIS includes extensive analyses of environmental, economic, employment, and sociological impacts of the proposed project and reasonable alternatives as required in Minn. R. 4410.2300 and as described in the EIS scoping document. Minn. R. 4410.0300, Subp.3 indicates that environmental documents are to be used as guides in issuing, amending, and denying permits and carrying out other responsibilities of governmental units. Since the EIS is intended to inform the Commission's decision-making, the extensive information in the EIS is therefore organized by CN and route criteria in order to help the Commission evaluate the environmental implications of its two separate decisions.
2803-2	Sierra Club	The comment maintains that information that relates directly to permit decision-making matters is "discretionary." On the contrary, under Minn. R. 4410.2000, one of the primary purposes of an EIS is to provide information for governmental units. The EIS, therefore, contains information required for permitting to the extent practicable. The EIS helps inform the Commission's decisions, but does not substitute for it.

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Response#	Commenter	Response
2803-3	Sierra Club	Chapter 1 describes the approach to purpose and need for the EIS. As described in Section 4.1 of the Alternatives Screening Report for the Line 3 Replacement Project, September 21, 2016, project “purpose and need” was not used to screen out alternatives to evaluate in this EIS. The Sierra Club scoping comment letter, dated May 26, 2016, provides a rational for this approach. In addition, the EIS is not based on Enbridge’s proposed purpose. Chapter 2 is a description of Enbridge’s proposed project. Section 2.2, which is part of the project description, is a summary of Enbridge’s explanation of why they are proposing the project. Therefore, Section 2.2 by definition is Enbridge’s description of their project purpose.
2803-4	Sierra Club	The purpose and need for the EIS is provided in the Executive Summary under the heading of "What is the purpose of this Environmental Impact Statement?" This section identifies how the EIS is used to help decision makers. The decision makers then will use the EIS to help determine if a permit should be issued. The EIS relies extensively on agency and other expert independent analysis of environmental and engineering information. Where applicable, information from the Applicant was reviewed, assessed, and included in the analysis.
2803-5	Sierra Club	The EIS is organized primarily to inform the Commission’s threshold decisions on the Certificate of Need and the route permit, but it also contains information applicable to other permits. It is impracticable to develop all of the detailed information and final designs required for all “downstream” permits required for eventual construction (such as for all wetlands or public water crossings). That level of detail would be developed during final, detailed design and permitting, if a CN is granted and a route selected.

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Response#	Commenter	Response
2803-6	Sierra Club	The analysis of the alternatives categories requested in the comment is provided in Section 3 of the Final Scoping Decision Document for Line 3 Pipeline Replacement Project, dated December 5, 2016. Chapter 4 of the EIS provides information regarding each of the alternatives that is carried forward for analysis.
2803-7	Sierra Club	The Applicant (Enbridge) has stated in Section 10.1 of their CN application that if the CN were denied, they would continue to operate Line 3 and the required integrity management program, as long as practicable. For this reason, this is included as one of the alternatives. Table ES-1 and Table 4.2-1 provide information on the CN alternatives carried forward.
2803-8	Sierra Club	A discussion of alternatives is presented in Chapter 4. Specifically, a no action alternative, which is the denial of the CN, is discussed in Section 4.2.2. The purpose of the CN process is to determine whether the particular project being proposed is needed. There is no legal authority in a CN proceeding of a separate proposed project (at the state or with the Public Utilities Commission) to evaluate the ongoing need of an existing project. Once constructed, the safety and operation of an existing pipeline is regulated by the United States Department of Transportation, Pipeline and Hazardous Materials Safety Administration. In this particular case, Enbridge has entered into a consent decree with the United States Environmental Protection Agency that allows for the continued operation of the existing Line 3 if a replacement for the line is not approved. In other words, if the proposed Line 3 project is not approved by the PUC, the continued operation of the existing Line 3 will be regulated by the Federal government, not the State of Minnesota. Accordingly, shutting down and removing existing pipelines in the mainline corridor is not included in the No Action Alternative.
2803-9	Sierra Club	The EIS does not assume that oil is needed and that moving it by pipeline, rail, or truck is inevitable. Instead, the EIS provides an analysis of the environmental implications of potential outcomes should the Commission find that the demand does exist (See Table ES-1 and Table 4.2-1).

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Response#	Commenter	Response
2803-10	Sierra Club	It is not clear whether these alternative pipelines could meet the need for this proposed project. However, the Certificate of Need hearing process will evaluate additional information on the economic need or viability of other regional pipelines to transport the volume of additional oil proposed by the Project. The environmental impacts associated with these other pipelines have been (or would be) evaluated in other jurisdictions. Therefore, the "other pipeline" CN alternatives are not evaluated in the EIS. Chapter 4 of the EIS provides information on the alternatives that are carried forward.
2803-11	Sierra Club	Thank you for your comments regarding the Scoping Decision Document. While general information is included as part of the comment, specific information related to an action for the EIS is not provided. Therefore, the Department did not revise the EIS based on this comment.
2803-12	Sierra Club	The EIS was not revised based on this comment as no specific rationale was provided as to indicate how this measurement is relevant to the environmental analysis. The reader can easily calculate million barrels per day-miles, should it be relevant, by multiplying route miles by pipeline capacity.
2803-13	Sierra Club	The project description has been revised to show that the Applicant is required to implement the measures as a regulatory requirement. Chapter 2 provides a discussion of the project description.
2803-14	Sierra Club	As this is a large, complex project, Chapter 5 and Chapter 6 include extensive descriptions of the environmental setting for the proposed project/Applicant's preferred route and various alternatives (CN and route). It would be redundant to also include this information as part of the project description in Chapter 2.

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2803-15	Sierra Club	Estimated project cost is typically included in the project description in an EIS, in part, in order to help analyze socioeconomic impacts (Section 5.3 and Section 6.5). In addition, the details on Enbridge's proposed measures during construction are included in the project description, because they are a critical component of the project itself. The EIS assesses potential impacts in part based on the Applicant complying with the commitments in their permit applications. The additional "mitigation" needed to reduce remaining environmental impacts are then considered in the EIS as potential permit conditions as well.
2803-16	Sierra Club	The comment has been addressed. The final EIS has been revised to eliminate statements that appear to promote the Applicant or its plans.
2803-17	Sierra Club	EIS Chapter 2 is a description of Enbridge's proposed project. Section 2.2, which is part of the project description, is a summary of Enbridge's explanation of why they are proposing the project. Therefore, Section 2.2 by definition is Enbridge's description of their project purpose.
0257-1	Slagle, Nicolette	Thank you for your comments on the Draft EIS. Flush water disposal is addressed in Section 8.3 of the FEIS. Please see Table 3.6-1 for a list of required permits and approvals for the Line 3 Project.
0257-2	Slagle, Nicolette	Section 4.3.1.2 of the FEIS discusses hoop stress reduction from internal pressure after the removal of product.
1467-1	Smith, Cynthia	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
1468-1	Smokey, Steven	Thank you for your comments on the Draft EIS. Permanent structures that are seasonally used such as cabins and lake homes will be captured in the route segment alternative analysis through the "developed" National land Cover Database category. For RSA-White Elk Lake, Table 7.3-5 details the land cover percentages impacted by the APR's route segment, and the route segment alternative.
1468-2	Smokey, Steven	The revised version of the EIS provides the most accurate evaluation of waterbodies proximal and potentially impacted by the Project. All information was derived from state and federal GIS databases.

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1468-3	Smokey, Steven	Information regarding cultural resources (those listed within the Minnesota Historical Society databases) has been added to Chapter 7. While the databases show that no resources have been identified within this route segment alternative (RSA), the potential for previously undocumented resources exists. If this RSA were to be constructed, additional surveys would likely be required.
0765-1	Sonim, Andrea	Thank you for your comments on the Draft EIS. Chapter 8 and Appendix B of the FEIS includes an assessment of the abandonment and removal of the existing Line 3, including a discussion on anticipated cleaning solution.
2065-1	Sorour, Mahyar	Thank you for your comments on the Draft EIS. The FEIS contains discussion of releases, the fate and transport of spills and case histories of the effects of spills to resources. The selected sites were to show potential behavior of spills at various conditions and are not intended to be a prediction of all potential release locations and volumes.
1475-1	Spangler, Carolyn	Thank you for your comments on the Draft EIS. The FEIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
0568-1	Specht, Hannah	Thank you for your comments on the Draft EIS. The ROI was identified as the distance that released oil would typically spread on flat ground (calculated to be 1,214 feet from the centerline) plus an additional distance of 1,050 feet for estimated down-gradient migration in groundwater (if groundwater were contacted); the estimated total distance of approximately 2,264 feet was rounded up to 2,500 feet. 10 miles downstream was selected, because it was considered to be not overly conservative, and crossing widths for the RAs were unavailable. The Applicant surveyed the streams and rivers for the APR ONLY, so small (<10 m wide) and large (10 m or > wide) crossings are only known for this route. It would be biased to only run the 2 downstream buffers (30 miles for large rivers, and 10 miles for small streams) along the APR. Furthermore, we determined that it would be overly conservative to run a 30-mile downstream buffer for all water crossings, especially since many of these water bodies are ditches and terminate within a few miles.

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Response#	Commenter	Response
2114-1	Squire, Decourcy	Thank you for your comments on the Draft EIS. Enbridge has asserted that public disclosure of potential release volumes is a security risk that could be exploited. A non-redacted version was available to the Department of Commerce.
1080-1	Squire, DeCourcy	Thank you for your comments on the Draft EIS. Enbridge has asserted that public disclosure of potential release volumes is a security risk that could be exploited. A non-redacted version was available to the Department of Commerce. The EIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
1080-2	Squire, DeCourcy	The predictive risk analysis was removed due to issues with its application. Historic pipeline incident data was expanded to detail historic incident rates and causes. Current spill probabilities for a new pipeline using modern metallurgy and coating technologies would likely be less than historic incidents caused by corrosion or other internal failures.
0966-1	Stout Heller, Karen	Thank you for your comments on the Draft EIS. This topic is addressed in Section 1.6 - Controlling Spread of Undesirable Species, in the Environmental Protection Plan (EPP), Appendix E of the DEIS. The EPP outlines construction-related environmental policies, procedures, and protection measures that would be implemented during project construction and operation specifically to avoid introduction and spread of noxious weeds. This section also address use of herbicides for additional control of noxious weeds and invasive plants. These actions were integrated into the impact analysis, which includes reed canarygrass on the list of potential invasive plant species considered.
1540-1	Striegel, Gerald	Thank you for your comments on the Draft EIS. The life-cycle GHG estimates provided in Table 5.2.7-11 show the full range of possible outcomes for general comparison purposes. The life cycle emissions are calculated assuming worst-case throughput and provide a conservative estimates of GHG emissions. For additional information, please refer to the reference documents list provided in Section 5.2.7.5.
1540-2	Striegel, Gerald	For additional information, please refer to the reference documents list provided in Section 5.2.7.5.

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1540-3	Striegel, Gerald	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
2692-1	Striegel, Gerald	Thank you for your comments on the Draft EIS. The life-cycle GHG estimates provided in Table 5.2.7-11 show the full range of possible outcomes for general comparison purposes. The life cycle emissions are calculated assuming worst case throughput and provide a conservative estimates of GHG emissions. For additional information, please refer to the reference documents list provided in Section 5.2.7.5.
1543-1	Suppan, Sara	Thank you for your comments on the Draft EIS. Potential impacts to the federally-listed endangered rusty patched bumble bee from the Applicant's proposed route, CN alternatives, and route alternatives are presented in Sections 5.2.5 and 6.3.5 of the FEIS. Potential impacts to non-listed bee and other insect species are presented in Sections 5.2.4 and 6.3.4 of the FEIS, and due to the implementation of BMPs for use of herbicides, are expected to be minimal.
1543-2	Suppan, Sara	Effects from spills considers in most cases impacts to water quality and prominent taxa such as fish and large invertebrates. Effects noted to water quality will have subsequent relevance for lower taxa such as algae and microorganisms.
1081-1	Suppan, Sara	Thank you for your comments on the Draft EIS. You are correct. There is a myriad of effects that can occur within an aquatic ecosystem as a result of a spill. Seasonal aspects and oil type can result in differing exposure and water quality effects. The FEIS approach was to note the issues of greatest concern and most likely measureable effects.
1081-2	Suppan, Sara	Under state and federal regulations, the Applicant will be required to develop an SPCC plan for addressing release of oil. The plan would require response techniques to be employed in the event of a spill under all circumstances.
1081-5	Suppan, Sara	Cumulative potential effects of reasonably foreseeable actions are assessed in Chapter 12. The methodology for assessing cumulative potential impacts is described in Section 12.1 and 12.2.

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Response#	Commenter	Response
1081-5	Suppan, Sara	Cumulative potential effects of reasonably foreseeable actions are assessed in Chapter 12. The methodology for assessing cumulative potential impacts is described in Section 12.1 and 12.2.
1081-5	Suppan, Sara	Cumulative potential effects of reasonably foreseeable actions are assessed in Chapter 12. The methodology for assessing cumulative potential impacts is described in Section 12.1 and 12.2.
2262-1	Suppan, Steve	Thank you for your comments on the Draft EIS. The comment was considered in development of the FEIS.
2262-2	Suppan, Steve	The EIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release. Case studies of several significant spills, including the 2010 spill, have been included.
2261-1	Suppan, Steve	Thank you for comments on the Draft EIS. For purposes of comparison across alternatives, a consistent time window of 30 years was chosen to match the economic life of the project indicated by the applicant and to understand typical annual operating impacts/tradeoffs of the alternatives. The cumulative potential effects of climate change and trends in Minnesota and the Midwest are discussed in Chapter 12 of the FEIS. Recognizing that the totality of climate change is not attributable to any single action, but is exacerbated by a series of actions, the analysis does not attempt to directly link the emissions from a single action to an incremental change in climate. The lifecycle GHG intensity of various crude oils is discussed in the Section 5.2.7.3. The average life cycle GHG emissions for heavy ECSB are calculated based on higher value of CO_2e/bbl of crude oil. This provides conservative estimates of life cycle gas emissions in Table 5.27-11. Further details can be found in the list of referenced documents provided in Section 5.2.7.5.
2262-3	Suppan, Steve	Extensive discussion on the Social Cost of Carbon (SCC) can be found within Section 5.2.7 of the FEIS, including the economic values of the 30-year SCC for direct and indirect emissions. Furthermore, as stated within the referenced section, the SCC does internalize net agricultural productivity; human health; property damages from increased flood risk; and changes in energy system costs, such as reduced costs for heating and increased costs for air conditioning. It is untenable to expect that any and all damages can be captured within SCC calculations.

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Response#	Commenter	Response
2261-2	Suppan, Steve	The range of alternatives evaluated as part of the EIS is consistent with the scope. The lifecycle GHG intensity of various crude oils is discussed in the Section 5.2.7.3. The average life cycle GHG emissions for heavy ECSB are calculated based on higher value of CO_2e/bbl of crude oil. This provides conservative estimates of life cycle gas emissions in Table 5.27-11. Further details can be found in the list of referenced documents provided in Section 5.2.7.5.
2262-4	Suppan, Steve	See response to comment 2262-1.
2261-3	Suppan, Steve	Chapter 3 discusses the regulatory framework.
2263-1	Sutherland, Aimee	Thank you for your comments on the Draft EIS. Tribal resources are addressed primarily in Chapters 9 and 11 of the FEIS; however, references are provided throughout the EIS to note where specific resources analyses (e.g., wild rice, cultural sites) include a discussion of impacts to American Indian tribes and tribal resources.
2263-2	Sutherland, Aimee	The EIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release. Section 195.563 of 49 CFR Subpart H – Corrosion Control states that cathodic protection must be in operation no later than 1 year after the pipeline is constructed. This does not mean Enbridge would wait a full year to install the system. It is typically installed as part of the construction process. The buried pipeline would also be protected from external corrosion by application of a coating.
2266-1	Tas, Rhonwen	Thank you for your comments on the Draft EIS. 10 miles downstream was selected for the ROI, because it was considered to be not overly conservative, and crossing widths for the RAs were unavailable. The Applicant surveyed the streams and rivers for the APR only, so small (less than 30 feet wide) and large (30 feet wide or greater) crossings are only known for this route. It would be biased to only run the two downstream buffers (30 miles for large rivers, and 10 miles for small streams) along the APR. Furthermore, it was determined that it would be overly conservative to run a 30-mile downstream buffer for all water crossings, especially since many of these water bodies are ditches and terminate within a few miles.
1547-1	Terhark, Nancy	Thank you for your comments on the Draft EIS. Chapter 13 of the FEIS provides a list of preparers.

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Response#	Commenter	Response
2267-1	The Nature Conservancy	Thank you for your comments on the Draft EIS. Chapter 12 of the FEIS addresses potential cumulative effects of the Applicant's Proposed Project/Preferred Route (APR) and Certificate of Need/Route Alternatives and Reasonably Foreseeable Actions. The comment pertains to cumulative impacts resulting from the entire Applicant's Preferred Route and/or Alternatives. This information can be found in Chapters 5 and 6. As discussed in Chapter 12 of the FEIS, corridor sharing by the APR and reasonably foreseeable actions would be possible in many cases and is discussed in greater detail within Chapter 12. General effects to fish and wildlife species from habitat loss/fragmentation is discussed in Sections 5.2.4 and 6.3.4. Effects to federal and state protected species and habitats from habitat loss/fragmentation is discussed in Sections 5.2.5 and 6.3.5.
2267-2	The Nature Conservancy	Climate change will affect various supporting habitats that could potentially result in various plant and animal taxa becoming vulnerable. Detailed analysis of this phenomenon was not possible within the scope of the DEIS, but it is well understood.
2267-3	The Nature Conservancy	Cumulative potential effects are discussed in Chapter 12.
1488-1	Therkilsen, Jennifer	Thank you for your comments on the Draft EIS. Construction methods are detailed in Section 2.7 of the FEIS.
1488-2	Therkilsen, Jennifer	The soil analysis was derived from SSURGO and STATSGO2 data developed by soils surveys conducted by the NRCS. While details specific to every soil component of every mapped soil was not provided, the characteristics that may be sensitive to disturbance, including prime farmland, soils highly erodible by water or wind, hydric soils, compaction-prone soils, stony/rocky soils and coarse-textured soils, shallow bedrock, hydric soils, and similar features were evaluated. These same factors are used in the hydrogeologic sensitivity of near-surface materials in regards to oil spill impacts.
1488-3	Therkilsen, Jennifer	The workforce figure is 4,200.

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1489-1	Thibault, Rachel & Jack	The predictive risk analysis was removed due to issues with its application. Historic pipeline incident data was expanded to detail historic incident rates and causes. Current spill probabilities for a new pipeline using modern metallurgy and coating technologies would likely be less than historic incidents caused by corrosion or other internal failures. The EIS acknowledges the spill model runs were not intended to be a prediction of all possible spills, but to show fates and trajectory for the types of oil in different environmental conditions within the first 24 hours of a release.
1493-1	Trooien, Troy	Thank you for your comments on the Draft EIS. Additional information from the Consent Decree has been included in Section 8.3 of the FEIS.
1493-2	Trooien, Troy	Thank you for your comments on the Draft EIS. Your comments were considered in development of the FEIS.
1493-3	Trooien, Troy	Section 8.3.1.1 of the FEIS discusses Enbridge's current and ongoing liability and responsibility under the Minnesota Statutes 115E.
1493-4	Trooien, Troy	Additional information has been provided in Section 8.4 of the FEIS.
1493-5	Trooien, Troy	Please see Section 8.4 of the FEIS for additional information related to heavy equipment and timber mats.
1933-1	Tyra, S	Thank you for your comments on the Draft EIS. Your comments were considered in development of the FEIS.
1933-2	Tyra, S	The SCADA system would only monitor the pipeline system for normal operation.
1933-3	Tyra, S	Seismic activity would have to be much greater to impact pipeline integrity.
1552-1	Ulrich, Wendy	Thank you for your comments on the Draft EIS. The intent of Table ES-1 in the FEIS is to provide an overview of the regulations in Part 7853. It does not provide the federal, state, and/or tribal permits (or approvals) needed. This information is included in Chapter 3, Regulatory Framework.
1268-1	Urgo, Sandra	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.

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Response#	Commenter	Response
1497-1	Voss, Nick	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
1497-2	Voss, Nick	Within the EIS, all analyses of impacts were based on Applicant proposed routes and potential alternatives. Siting routes considered all natural resources and potential effects.
1497-3	Voss, Nick	Additional information regarding the potential for removal has been included in Section 8.4 of the FEIS.
0775-1	Vraa, Ken	Thank you for your comments on the Draft EIS. Chapter 5 of the FEIS addresses potential impacts to localized, surficial groundwater.
1233-1	Walker, Gretchen	Thank you for your comments on the Draft EIS. In development of the FEIS, it was assumed that the Applicant would obtain all necessary permits and approvals, as required by federal and state law, prior to construction if a Certificate of Need and route permit are approved by the Commission.
1233-2	Walker, Gretchen	In development of the FEIS, it was assumed that the Applicant would obtain all necessary permits and approvals, as required by federal and state law, prior to construction if a Certificate of Need and route permit are approved by the Commission.
1233-3	Walker, Gretchen	Impacts on songbirds and their habitats from fragmentation was considered in development of the FEIS.
0492-1	Warner, Mike	Thank you for your comments on the Draft EIS. Additional information has been included in Section 10.1.2.2 regarding potential risks associated with transport by rail.
0492-2	Warner, Mike	Section 5.3.3.3.1 of the FEIS states "While it is likely that Enbridge would use some local workers, it was assumed as a conservative estimate that all workers would be non-local and would need to re-locate to the area during construction."
2284-1	Watts, Elizabeth	Thank you for your comments on the Draft EIS. Potential impacts to affected natural resources are discussed in Chapters 5 and 6 of the FEIS, and how American Indian tribes experience and interact with these resources is summarized in Chapters 9 and 11. This constitutes the analysis of treaty rights within this EIS.

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Response#	Commenter	Response
2284-2	Watts, Elizabeth	Chapter 11 of the FEIS has been expanded to include additional information on the assessment of and impacts to potential EJ communities. As described in the section, the identification of potential EJ communities or the potential for disproportionately high and adverse impacts does not preclude approval of the project or selection of a route alternative; however, it does require detailed efforts to avoid, mitigate, minimize, rectify, reduce, and/or eliminate the impacts. Section 11.4 of the EIS describes the measures that may be undertaken by the applicant to minimize or mitigate adverse impacts. As noted in this section, the applicant may work with companies and subcontractors hired to construct, restore and operate the pipeline to prepare and implement an education plan or awareness campaign regarding the issue of sexual abuse or sex trafficking. Section 11.4 has been revised to clarify that the applicant may also provide funding to support the efforts of local and tribal law enforcement on this and other safety-related issues, which would enable local entities to tailor approaches and solutions to their community, and/or to collaborate with experts in this field.
2284-3	Watts, Elizabeth	If the commenter observes a violation of any permit during construction or operation, the violation should be reported to the proper agency or to the State of Minnesota. Such violations are handled outside of the EIS process and would be investigated by the appropriate authorities
2785-1	Weber, John	Thank you for your comments on the Draft EIS. Enbridge provided the estimated cost within the Certificate of Need Application, Section 1.0 (Docket No. PL-6668/CN13-473).
2785-2	Weber, John	Vegetation maintenance along the permanent right-of-way to remove woody vegetation and maintain the right-of-way in an herbaceous vegetative state will occur periodically. Operation impacts to insect pollinators are expected to be temporary and minor.
2785-3	Weber, John	Sentence was revised to include the percentage of cultivated cropland located within SA-04.
2785-4	Weber, John	Sentence was revised to include the percentage and acreage of the Dakota Tallgrass Prairie Wildlife Management Area that will potentially be impacted by SA-04 during construction.

Responses to Comments - Citizen

Response#	Commenter	Response
2785-5	Weber, John	Species-specific field surveys were conducted only within the route associated with the Applicant's proposed project. The results from these surveys are incorporated into the FEIS.
2785-6	Weber, John	Table 5.2.4-3 lists the wildlife conservation lands within 0.5-mile of SA-04. The acreage reported in this table is all of the lands that are within 0.5-mile of project. Table 5.2.6-3 details the acreage that will be directly impacted, both during construction and operation. This acreage in Table 5.2.6-3 is drastically smaller than that reported in Table 5.2.4-3 because it is only detailing the lands directly impacted, not all of the lands within 0.5-mile.
2785-7	Weber, John	SA-04 does not avoid impacts to all wildlife management areas and refuges. Further details on the wildlife conservation lands potentially affected by System Alternative SA-04 can be found in Table 5.2.4-11 of the FEIS.
2785-8	Weber, John	A small percentage of the SA-04 ROI would cross through habitats within Minnesota's Wildlife Action Network. Further details regarding Minnesota's Wildlife Action Network can be found in Section 5.2.5.2.3.
2785-9	Weber, John	The impact of construction on the local timber industry over a 30-year, versus 50-year period, is still expected to be long term and negligible.
2785-10	Weber, John	The FEIS notes (in Section 5.3.4.1) that Enbridge has appealed the amount of property taxes it paid between 2012 and 2016, alleging that the Minnesota Department of Revenue overvalued the value of the pipeline property, resulting in overpayment of taxes to counties and Minnesota. The appeal has not been settled at the time the FEIS document was prepared.
2785-11	Weber, John	The same footnote is used for both tables because the same referenced model was utilized to derive estimates reported within the tables. Using a different model for each route would result in an incorrect comparison due to the use of different datasets. It is unclear why the commenter believes that different data should be utilized. Please refer to the methodology included within the IMPLAN model (Appendix R).

Responses to Comments - Citizen

Response#	Commenter	Response
2785-12	Weber, John	The referenced statements in the FEIS are based on available information: that few new jobs related specifically to operations of the pipeline would be required, and that it is likely (based on available information) that property tax revenues would likely be the largest ongoing source of revenue to counties in the Region of Interest. It is unknown whether Enbridge would challenge future property tax payments.
2785-13	Weber, John	The pipeline will cross through numerous counties in Minnesota with varying zoning regulations. Zoning was analyzed at a county level for the Project, so if a county does not have approved zoning regulations, a zoning analysis could not be conducted for it. Land use impacts for Hubbard and Clearwater counties was included in the analysis through the NLCD database.
2785-14	Weber, John	Sections 8.3 and 8.4 of the FEIS have provided additional information related to regulatory responsibility and ongoing liability of the applicant.
2785-15	Weber, John	Additional information related to the ongoing liability has been included in Section 8.3 of the FEIS.
2785-16	Weber, John	Additional information regarding adjacent pipeline spacing has been provided in Section 8.4.
2785-17	Weber, John	Additional information regarding potential future mitigation and regulatory requirements has been included in Section 8.3 of the FEIS.
2785-18	Weber, John	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
2285-1	Wegscheid, Darril	Thank you for your comments on the Draft EIS. Information supplied by the applicant has been evaluated and analyzed independently. The EIS has provided discussion on positive and negative impacts that may occur over the short- and long-term.

Responses to Comments - Citizen

Response#	Commenter	Response
2285-2	Wegscheid, Darril	Sections in the FEIS pertaining to impacts of the project on employment clarify that it is likely that the Applicant would hire local residents during construction of any of the alternative routes for a portion of its workforce - based on current labor agreements in Minnesota at least 50% of workers will be expected to be employed from local union halls. The FEIS also states that as construction jobs are typically permanent in nature, permanent jobs may result from said construction - but that this is also dependent on an unquantifiable backlog of other construction project demand, and that based on this assumption it is likely that direct construction-related employment would have a minor positive impact on county-level unemployment and per capita and/or median household income levels. The comment that "hours of employment by month" should be utilized instead of "jobs" would not provide a more detailed picture of permanent jobs created, as this metric would only identify potential hours worked during the project, not whether these jobs would be permanent. Indeed, it is infeasible to identify how many permanent jobs would be created because, as stated above, a permanent construction job is often a job that is spatially temporary in the sense that workers move from project to project, and dependent on an unquantifiable backlog of other construction project demand. Due to this uncertainty, therefore, this discussion includes both quantitative (4,200 workers across seven construction spreads) and qualitative analysis. The EIS states that employment impacts related to operations are anticipated be minimal.
2294-1	White, Stephanie	Thank you for your comments on the Draft EIS. Potential impacts to water bodies proximal to the Project have been considered during the FEIS process. Stringent best management practices will be required for limiting impacts to water bodies that have been deemed important resources by regulatory agencies.
2293-1	White, Stephanie	Thank you for your comments on the Draft EIS. Section 5.2.1.1.3 of the FEIS describes the drilling mud Enbridge has proposed to use. No further information has been provided.
1557-2	Whitefish Area Property Owners Association	Discussion of the referenced sections is provided in Chapter 5 of the FEIS.

Responses to Comments - Citizen

Response#	Commenter	Response
0925-1	Whitefish Area Property Owners Association	Thank you for your comments on the Draft EIS. The majority of the economic analysis and other technical information for the CN decision will be provided by the Applicant, other parties, and the public that are participating in the contested case hearing.
0925-2	Whitefish Area Property Owners Association	Potential impacts to Drinking Water Supply Management Areas (DWSMAs) and vulnerability, Wellhead protection areas, Hydrogeologic sensitivity, Domestic wells and sensitivity, and Public wells are evaluated in the EIS in Chapters 5 and 6.
0925-3	Whitefish Area Property Owners Association	Potential impacts to Aquatic Management Areas, Lakes of Biological Significance, Minnesota Biological Survey Sites of Biodiversity Significance (MBS Sites), Native plant communities, Wetland bank easements, Wild rice lakes, Muskie lakes, Sensitive lakeshore areas, and Scientific and Natural Areas are evaluated in the EIS.
0925-4	Whitefish Area Property Owners Association	Enbridge release incident data are presented in the FEIS.
2296-1	Whitefish Area Property Owners Association	Thank you for your comments on the Draft EIS. Chapter 2 of the FEIS defines and describes in detail the proposed project.
2296-2	Whitefish Area Property Owners Association	The executive summary of the FEIS provides information on the purpose of the EIS and the decisions they inform, while Section 1.4 provides details about broader policy implications.
2296-3	Whitefish Area Property Owners Association	Such distances have been analyzed using the available data provided by the applicant.
2296-4	Whitefish Area Property Owners Association	Evaluation of the Applicant's financial risk avoidance is outside of the scope of this EIS. It is unknown how many subsidiary and partnership companies would own segments of the pipeline, and this information is outside of the scope of this EIS.

Responses to Comments - Citizen

Response#	Commenter	Response
2296-5	Whitefish Area Property Owners Association	The comment was considered in development of the FEIS.
2296-6	Whitefish Area Property Owners Association	The suggested change was made.
2296-7	Whitefish Area Property Owners Association	This information has been considered in the development of the FEIS.
2296-8	Whitefish Area Property Owners Association	The executive summary of the FEIS provides information on the purpose of the EIS and the decisions they inform, while Section 1.4 provides details about broader policy implications.
2296-9	Whitefish Area Property Owners Association	Chapter 12 of the FEIS contains a thorough analysis of the potential cumulative effects associated with adding another pipeline within the corridor of the Applicant's Preferred Route and Route Alternatives outside of the Mainline Corridor, i.e. RA-03AM and RA-06, including effects on planning and zoning, aesthetics, vegetation, and other resources. A list of the projects considered as a "reasonably foreseeable actions" is provided in Table 12.2-1.
2296-10	Whitefish Area Property Owners Association	The comment has been considered in development of the FEIS.
2296-11	Whitefish Area Property Owners Association	Such terminology was provided by commenters during the scoping phase. The EIS has provided specific locations related to alternatives based on the data provided by the applicant.
2296-12	Whitefish Area Property Owners Association	General construction and operation impacts to surface water, including lakes, are discussed in Sections 5.2.1.2 and 6.3.1.2.

Responses to Comments - Citizen

Response#	Commenter	Response
2296-13	Whitefish Area Property Owners Association	Existing conditions of the applicants preferred route are discussed in Section 6.3.1.1.2 of the FEIS.
2296-14	Whitefish Area Property Owners Association	Section 5.2.1.2.3 provides a discussion of the Pine River Watershed.
2296-15	Whitefish Area Property Owners Association	Water quality and designated trout streams that occur within the Pine River Watershed were considered during impact assessment for all alternatives.
2296-16	Whitefish Area Property Owners Association	Section 5.2.1.2 provide information on surface water in the vicinity of the Applicant's proposed project and CN Alternatives, including streams, rivers, lakes, wild rice waterbodies, and wetlands. The section assesses the potential for construction and operation of the proposed Project to affect surface water resources. Surface water impacts that could occur during construction and operation are evaluated and compared for the Applicant's proposed project and the CN Alternatives. The impact analysis focuses on potential impacts on surface waters associated with the following concerns: Runoff and flows – increases in stormwater runoff and erosion, increases in TSS concentrations and increased sedimentation, changes in stream flows from water withdrawals and discharges, and disruption of flow paths or local hydrologic connectivity; Surface water and aquatic habitat quality – degradation of surface water quality, degradation of aquatic habitat from instream and other construction activities, degradation of water quality and habitat from releases of drilling mud during HDD crossings; Channel morphology and stability – changes in channel morphology and stability caused by channel and streambank modifications; and Disturbance of wild rice waterbodies.
2296-17	Whitefish Area Property Owners Association	SA-04 is a system alternative evaluated to aid the Commission's evaluation of whether or not to grant a CN for the proposed project. A system alternative is not a routing alternative, as no entity has proposed to build such a pipeline, detailed routing and design have not been conducted, and a route permit could not be issued for SA-04. Instead, a system alternative is a serves as a broader level point of comparison to the Applicant's Proposed project and the other CN alternatives. The level of analysis of SA-04 is in line with this concept.

Responses to Comments - Citizen

Response#	Commenter	Response
2296-18	Whitefish Area Property Owners Association	Socioeconomic impacts are discussed in Section 5.3.
2296-19	Whitefish Area Property Owners Association	Enbridge release incident data are presented in the FEIS. Case studies of several significant spills, including the 2010 spill, have been included.
1558-1	Whitefish Area Property Owners Association - Watson, Thomas	Thank you for your comments on the Draft EIS. Effects to various taxa and populations are dealt with in both Chapters 5 and 6. Impacts that could result in reduced water quality and subsequent impacts to the carrying capacity for fish are also addressed in Chapters 5 and 6.
1558-2	Whitefish Area Property Owners Association - Watson, Thomas	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS
1557-1	Whitefish Area Property Owners Association - Watson, Thomas	Thank you for your comments on the Draft EIS. Analysis of impacts to groundwater resources is provided in Chapters 5 and 6. In both chapters the type of underlying geology has been considered for assessing potential impacts to groundwater.
1089-1	Wilber, Julia	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.
1089-2	Wilber, Julia	The vast majority of these spills are less than 1 barrel.
1091-1	Wissinger, Julie	Thank you for your comments on the Draft EIS. Your comment was considered in development of the FEIS.

Responses to Comments - Citizen

Response#	Commenter	Response
1091-2	Wissinger, Julie	Ten miles downstream was selected, because it was considered to be not overly conservative, and crossing widths for the RAs were unavailable. The Applicant surveyed the streams and rivers for the APR ONLY, so small (<10 m wide) and large (10 m or > wide) crossings are only known for this route. It would be biased to only run the 2 downstream buffers (30 miles for large rivers, and 10 miles for small streams) along the APR. Furthermore, we determined that it would be overly conservative to run a 30-mile downstream buffer for all water crossings, especially since many of these water bodies are ditches and terminate within a few miles.
0788-1	Yarik, Josh	Thank you for your comments on the Draft EIS. Appendix B, Section 7.2 of the FEIS discusses structural integrity and surface subsidence due to corrosion of the abandoned line.
0788-2	Yarik, Josh	As discussed in Chapter 2 of the FEIS: The Applicant anticipates that the physical life of the Line 3 pipeline (i.e., the number of years that the pipeline would be capable of transporting crude oil) would be indefinite given appropriate construction, maintenance, and integrity systems. The economic life of the Project (i.e., the number of years that continued operation of the Project would be feasible) is anticipated to be no less than 30 years.
0788-3	Yarik, Josh	Information regarding the eventual removal of the proposed pipeline was not provided by Enbridge. The EIS discusses regulations for abandonment of pipelines in Section 8.2 of the FEIS.
0792-1	Zimmerman, Catherine	Thank you for your comments on the Draft EIS. Potential impacts to the federally-listed endangered rusty patched bumble bee from the Applicant's proposed route, CN alternatives, and route alternatives are presented in Sections 5.2.5 and 6.3.5 of the FEIS. Potential impacts to non-listed bee and other insect species are presented in Sections 5.2.4 and 6.3.4 of the FEIS, and due to the implementation of BMPs for use of herbicides, are expected to be minimal.
2869-1	Jaakola, Lyz	Thank you for your comments on the Draft EIS. The Executive Summary provides information on how comments are incorporated into the development of the EIS and how the public can participate after the publication of the Final EIS.

Responses to Comments - Citizen

Response#	Commenter	Response
2874-1	Jaakola, Lyz	Thank you for your comments on the Draft EIS. Chapter 9 has been revised to include additional information on the sovereignty of tribes, as well as how consultation does not equate to consent.
2874-2	Jaakola, Lyz	The maps presented in Chapter 9 were developed in coordination with multiple tribes. Sensitive information was not displayed in these maps; however, where information was provided regarding important cultural areas, it was considered in evaluating potential impacts. For instance, a Section 5.4 and 6.4 include information on traditional cultural properties (TCPs), which include wild rice lakes.
2874-3	Jaakola, Lyz	Cultural resources were discussed in Sections 5.4 and 6.4. These sections focus on those resources that are documented in databases or noted in previously conducted surveys. A discussion of National Register listed sites and traditional cultural properties (TCPs) was added. Cultural resources are quantified to the extent that the number of archaeological and historic resources were noted. The “quantification” of impacts is more difficult, as sites are unique in what they consist of, how they are important, and if they retain integrity.
2886-1	Topping, Debra	Thank you for your comments on the Draft EIS. As part of the EIS, a number of maps are included to help illustrate the discussion of existing conditions and/or potential impacts. They show a range of topics depending on the section in which they are included. Maps specific to tribal resources are provided in Chapter 9.
2878-1	LaPorte, Joyce and Topping, Debra	Thank you for your comments on the Draft EIS. Information regarding the burial ground near Highway 23 was included in Sections 5.4 and 6.4, as well as in Chapter 9. As shown, this area is approximately 3 miles from the closest route alternative. Appendix O provides the Applicant’s Unanticipated Discovery Plan for cultural resources. This outlines their planned procedures in case of an inadvertent find. Additional monitoring has been included as a mitigation measure (see Sections 5.4 and 6.4).

Responses to Comments - Citizen

Response#	Commenter	Response
2871-1, 2871-2	Lamb, Sheila	Thank you for your comments on the Draft EIS. Information on the storage of pipe is provided in Chapter 2. Section 2.3.4 in particular provides information on temporary contractor and material/pipe storage yards. Section 2.7.1.7 includes information regarding observations of existing pipe being stored. Transportation and public services are discussed in Section 6.5. As part of this discussion, information is provided on the potential impacts associated with roads and highways and emergency services. However, the EIS does not provide information on the actual dollar amounts associated with these impacts. Additional information may be found in Appendix E, which provides the Applicant's Environmental Protection Plan. This contains a section on highways and roads.
2871-3	Lamb, Sheila	A discussion of potential impacts associated with spills is provided in Chapter 10. Section 10.6.3 provides information on costs associated with clean-up.
2871-4	Lamb, Sheila	Chapter 8 provides information on the impacts associated with the abandonment of a pipeline. Section 10.2.2.4.16 provides information on the impacts of oil spills on human health.
2882-1	Northrup, Korey	Thank you for your comments on the Draft EIS. Figure 4.3.3 provides a depiction of the existing Mainline system. This figure, therefore, shows the number of existing pipelines present. Chapter 8 provides information on the abandonment and removal of a pipeline, as well as information regarding the existing pipeline spacing. Chapter 12 provides information on reasonably foreseeable future actions, among which is a pipeline project (Line 67). Pipeline fatigue as described as part of this comment refers to the presence of multiple pipelines; however, fatigue also can refer to a process of structural degradation caused by fluctuations or cycles of stress or strain within the pipe itself.

Responses to Comments - Citizen

Response#	Commenter	Response
2869-1	Killsfirst, Buster	Thank you for your comments on the Draft EIS. Chapters 5 and 6 provide the bulk of the discussion of the impacts on particular resources, including those of the natural and built environment. Chapter 8, 9, 10, and 11 provide more in depth discussions of particular issues, including removal and abandonment, tribal resources, accidental oil releases, and environmental justice. Section 6.5 provides a discussion of transportation and emergency services. While this information is presented, the EIS does not provide a discussion of monetary costs of security during and after construction of the pipeline. The inclusion of this type of information is outside that needed within the EIS for the Commission to utilize in their decision-making process for the CN and route permits.

Levi, Andrew (COMM)

From: Deborah DeLuca <ddeluca@duluthport.com>
Sent: Monday, July 10, 2017 5:26 PM
To: MN_COMM_Pipeline Comments
Cc: Becky McMillan; Deborah DeLuca
Subject: Enbridge Line 3 Replacement Draft EIS; Document Numbers PPL-15-137, CN-14-1916
Attachments: Enbridge Line 3 - Draft EIS Support July 2017 to MN DOC (Autosaved).pdf

The Duluth Seaway Port Authority submits the attached letter in support of the Enbridge Line 3 Replacement project – specifically in regards to Document Numbers PPL-15-137 and CN-14-1916. Please call or email if you have problems with the attachment.

Thank you,

Deborah DeLuca
Government & Environmental Affairs Director
Duluth Seaway Port Authority
1200 Port Terminal Drive
Duluth, MN 55802
Office: (218) 727-8525
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July 10, 2017

Email: Pipeline.Comments@state.mn.us

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

Re: Enbridge Line 3 Replacement Draft EIS;
Document Numbers PPL-15-137, CN-14-1916

Dear Ms. MacAlister:

The Duluth Seaway Port Authority (DSPA) is writing in support of Enbridge's Line 3 Replacement Project. Specifically, we ask that that the Minnesota Department of Commerce (DOC) approve the Draft Environmental Impact Statement (EIS) for the project, and that the Minnesota Public Utilities Commission (PUC) approve the certificate of need and preferred route applications for the project.

In regards to the certificate of need: the replacement project is needed. All pipeline projects face loud and organized opposing voices in the current pop-culture environment, and this project is no exception. A major point in the opposition rhetoric is that the nation is moving to renewable energy sources, rendering the need for petroleum products and their transport obsolete. A second major point is that pipelines pose an unacceptable threat to the environment.

While the DSPA encourages and applauds the transition to renewable energy sources (we are the number one Port on the Great Lakes for wind energy equipment), we are compelled to raise an importune but unavoidable fact. In 2016, only 10% of the Nation's total energy consumption was supplied by renewable sources[1], and this is not projected to increase significantly by 2040. The bulk of renewable energy is currently used for electricity. We are still using petroleum and will be for some time into the future. The crude oil that moves through Line 3 is refined for use as fuel and as a feedstock for a wide variety of products that all of us use every day, including medical supplies, eye- and sun-glasses, bike parts, auto- and jet components, asphalt for roads and roofs, and poly-fiber fabrics used to make clothing, outdoor gear and tents. We all use refined petroleum products. Let's ensure that crude oil is delivered safely and securely by replacing Line 3, which is a key component of the safe energy transportation network used to deliver crude oil to refineries in the upper Midwest.

[1] U.S. Energy Information Administration, Monthly Energy Review (April 2017), Tables 1.3, 1.4a, 1.4b, and 2.1-2.6.

In regards to the Draft EIS: the document is well prepared and thorough. The EIS scoping process led to a good selection of alternative routes for assessment, and the entire EIS preparation process through the proposed public hearings (scheduled for September through November 2017) is effectively designed for public input opportunities. We call upon the DOC and the PUC honor the existing regulatory process and keep the EIS timeline to the statutory deadline of 280 days.

The preferred route follows existing utility corridors and avoids environmentally and culturally sensitive lands to the extent possible. The Draft EIS effectively demonstrates that the preferred route generally minimizes environmental risks (GHG emissions, likelihood of spills and associated environmental damage to habitat of varying sensitivities). The proposed Line 3 Replacement project will restore capacity of the line and reduce the need for maintenance. The new pipeline coupled with Enbridge's monitoring and spill response practices should maximize safety and efficiency for transport of crude oil.

If the PUC chooses not to grant permits to replace Line 3, Enbridge will continue to operate the old line as permitted. Furthermore, additional crude oil will move on rail and trucks because Line 3's capacity will continue to be reduced. This will cause more wear and tear on roads and rail and increased congestion, slowing the movement of other goods to market. This option also increases inconvenience and safety risks for communities along rail routes. According to the US Department of Transportation, pipelines are the safest way to transport crude oil.

The Line 3 Replacement Project has the potential to create more 6,500 jobs for Minnesotans over a two-year period in construction, hospitality, supplies and manufacturing, according to a recent study by the University of Minnesota Duluth. While opponents like to claim that the State's tourism industry will suffer in the event of a spill, it is important to recognize that without crude oil, there wouldn't be a tourism industry in Minnesota. All facets of the tourism experience hinge on petroleum products: fuel to travel to Minnesota's hinterlands, fuel for boats, fiberglass for canoes, and plastics in life jackets, bicycles, skis, and hunting and fishing equipment.

Expanding pipeline capacity becomes an impetus for future economic growth and development here in the Twin Ports as well. Fifteen percent of the nation's oil already passes through Superior. The potential increase in capacity will lead to additional infrastructure investment on both sides of the harbor. It's these kinds of investments that leverage additional opportunities to increase the global competitiveness of the Port of Duluth-Superior and the region as a whole.

We urge the PUC and the DOC to issue the certificate of need and approve the Draft EIS and the preferred route. Thank you for the opportunity to comment.

Sincerely,

Vanta E. Coda II
Executive Director

LEECH LAKE RESERVATION BUSINESS COMMITTEE

RESOLUTION NO. 2016 - 26

RESOLUTION PETITIONING FOR PROPER INDEPENDENT ENVIRONMENTAL ANALYSIS OF THE RISK OF PIPELINE RUPTURE AND LEAKS, CONSEQUENCES OF SUCH RUPTURE AND LEAKS FOR NEW CONSTRUCTION AND PIPELINE ABANDONMENT, AND PROPER COMPARISON OF PIPELINE ROUTES THAT INCLUDE ROUTES NOT TRAVERSING LANDSCAPES CONTAINING ABUNDANT WILD RICE WATERS

WHEREAS, The Leech Lake Band of Ojibwe ("Band") is a Federally recognized Indian Tribe organized under the Indian Reorganization Act of 1934, and operating under the Revised Constitution and Bylaws of the Minnesota Chippewa Tribe; and

WHEREAS, Pursuant to its inherent sovereign authority and its By-Laws, the Band's Reservation Business Committee ("RBC"), made up of duly elected representatives, is the governing body of the Band, having all the legislative powers and responsibilities of the tribal government; and

WHEREAS, The RBC is charged with the responsibility of protecting and advocating for the health and welfare of Leech Lake Band members within the exterior boundaries of the Leech Lake Indian Reservation; and

WHEREAS, Wild rice is of cultural, religious, and historic significance to the Anishinaabe people; and is the special focus of this resolution; there are, however, other important natural resources involved that we do not address here but that would have greater assurance of protection if the course we insist on be pursued; and

WHEREAS, The Band is in support of the removal of Line 3 from the Leech Lake Reservation and reclamation of any lands impacted by Line 3; and

WHEREAS, Enbridge Energy Resources, LLC (Enbridge) seeks to locate two crude oil pipelines, known as the Sandpiper and the Line 3 projects, in locations that cross many wild rice landscapes in Minnesota, including the 1855 Treaty ceded territory; and

WHEREAS, it is therefore clearly time for the federal, tribal and state governments to address the cumulative environmental impact of these energy corridors, with particular attention to the cumulative impact of oil release risks and consequences to wild rice waters, including the impacts of pipeline abandonment; and

WHEREAS, The proposed new pipelines are projected to carry huge amounts of toxic and profoundly damaging oil products, including tar sand oil from northern Alberta, Canada, the same variety of crude oil that damaged more than 35 miles of the Kalamazoo River in Michigan in 2010 when another Enbridge pipeline ruptured; and

WHEREAS, There are other possible routes that have been proposed for the Sandpiper project, and that will be proposed for the Line 3 project that do not cross wild rice landscapes and other environmentally sensitive and pristine areas; and

WHEREAS, Enbridge has provided testimony that the market for the crude oil products to be carried by the proposed Sandpiper and Line 3 pipelines are mostly in the Chicago regional area, and that the proposed routes as a general case follow old pipeline routes established before environmental laws were enacted, and are therefore merely for the convenience of this private pipeline company; and

WHEREAS, The 1855 Treaty Authority has described the impacts to wild rice lands and waters in some detail, and has requested protection of resources in the 1855 Treaty ceded territories in letters to the Secretary of the U.S. Department of Interior and the Assistant Secretary for Indian Affairs ("Petition for Environmental Protection", dated July 15, 2015), and in a letter to Minnesota Governor Mark Dayton ("Notice of 2015 Wild Rice Harvesting Season", dated August 7, 2015); and

WHEREAS, To date, and to our continued consternation, no federal or state agency having review and permit authority over these two pipelines has committed to conducting a scientifically sound and thorough assessment of the risks and consequences of leaks and ruptures of the proposed pipelines (including pipeline abandonment) over the more than 50 year project life in a manner that properly compares proposed routes that cross wild rice landscapes with those that don't cross such

WHEREAS, To our high consternation, the Minnesota Public Utility Commission (PUC) recently decided (June 5, 2015) to proceed on a course to dismiss all route alternatives that do not cross wild rice landscapes; the result being to narrow the PUC approval process to only routes traversing wild rice landscapes, without even studying the differences in risk and consequences between routes, and in spite of extensive expert testimony to date that such studies are needed. Accordingly, we seek redress through federal law and Treaties against such indifference, fatigue, or administrative legerdemain by the state government; and

WHEREAS, Decisions concerning the location of pipelines and abandonment of pipelines, as well as the protection of wild rice and other important natural resources, as described in the 1855 Treaty Authority's "Petition for Environmental Protection", cannot be rationally considered without a thorough understanding of the risk of oil releases and the consequences of such releases; and

WHEREAS, Generally accepted technical considerations involved in a responsible environmental analysis must be considered with respect to Enbridge's two proposed projects, which entirely support our demand that the risk of oil releases and the consequences of such releases must be thoroughly understood; and must be understood in the context of route comparisons which include routes that do not cross water-rich landscapes containing wild rice.

NOW THEREFORE BE IT RESOLVED, That Leech Lake RBC, at a duly called meeting with a quorum present, does hereby conclude that a risk assessment and analysis of consequences of the two proposed Enbridge projects should be completed through a comprehensive Environmental Impact Statement (EIS); and

BE IT FURTHER RESOLVED, That such EIS must be at least of the type and quality of the federal EIS that was completed with respect to the Keystone XL pipeline; and which the Leech Lake Division of Resource Management would be a cooperating agency responsible for providing a Record of Decision; and

BE IT FURTHER RESOLVED, That such studies must be developed in consultation with the Anishinaabe of Minnesota, and must specifically develop techniques and methods to determine the potential impacts to the loss and damage to the cultural, religious and historic significance of wild rice to the Anishinaabe people; and

BE IT FURTHER RESOLVED, That the technical issues described and listed in Attachment A strongly demonstrate that pipeline failure can occur on new pipelines; can occur from failure of modern pipeline monitoring systems; and will likely occur over the more than 50 year project life of the pipelines, to the extent that decisions on locating these pipelines through wild rice lands are extremely concerning and thus demand the most careful attention from unbiased, objective experts; and

BE IT FURTHER RESOLVED, That such studies be accomplished prior to any permits being granted for the Sandpiper and/or the Line 3 Relocation/Enlargement/Abandonment projects; and that such studies be accomplished for alternative routes selected without regard to Enbridge's contracts with shippers or its present system of pipeline configurations; and

BE IT FURTHER RESOLVED, That the Tribal Council hereby requests that the Bureau of Indian Affairs, other agencies of the Department of Interior, the Army Corps of Engineers, the Environmental Protection Agency, as well as the Anishinaabe tribes of Minnesota and Wisconsin participate in such risk and consequence analyses prior to granting any federal permits.

BE IT FINALLY RESOLVED, That this Resolution is effective immediately.

CERTIFICATION

WE DO HEREBY CERTIFY that the foregoing Resolution was duly presented and acted on by a vote of __4__ for, __0__ against and __0__ silent at a Special Meeting of the Leech

Lake Reservation Business Committee, a quorum being present, held on October 22, 2015 at Cass Lake, Minnesota. Accordingly, this Resolution is duly adopted by the Reservation Business Committee for the Leech Lake Band of Ojibwe, and the Reservation Business Committee further certifies that this Resolution is in full force and has not been amended or rescinded in any way.

Carri Jones, Chairwoman
Leech Lake Band of Ojibwe

Arthur LaRose, Secretary/Treasurer
Leech Lake Band of Ojibwe

Levi, Andrew (COMM)

From: Mark Aamodt <56mraamo@gmail.com>
Sent: Monday, July 03, 2017 9:52 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I believe this is a very important project and the safest way to go.

Sincerely,

Mark Aamodt
218 5th St NE
Bagley, MN 56621
56mraamo@gmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Mark V Adams	651 890 6715	Mvadams@frontiernet.net

ADDRESS
20718 Camden Circle

CITY, STATE, ZIP
Farmington, MN 55024

COMMENTS
I support the line improvement / move it!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Mary Adams <mmkadams65@gmail.com>
Sent: Sunday, July 09, 2017 10:38 PM
To: Hillary Stoltz
Cc: Hilary hillbob.stoltz@gmail.com Stolz; MN_COMM_Pipeline Comments
Subject: Re: CN-14-916 and PPL-15-137

Thank you! I so appreciate your continued support, Hillary, protecting this precious land upon which we reside. I know writing to the DOC takes a fair amount of time ....you stepped forward and did it! Blessings of friendship....Mary

On Jul 9, 2017 10:22 PM, "HILLARY STOLTZ" <hillbob@arvig.net> wrote:

> Please consider my concerns as expressed and detailed on the attached document. If you have any difficulty opening the attachment, please contact me at once.
>
> Please note: I am very concerned about the exclusion of SA04 in the Enbridge DEIS.
>
> Sincere regards,
>
> Hillary Stoltz
>
> 702-604-1687

Levi, Andrew (COMM)

From:	Bill Adamski <adamski.bill@gmail.com>
Sent:	Wednesday, June 21, 2017 10:14 AM
To:	MN_COMM_Pipeline Comments
Subject:	Comments on the Line 3 Draft Environmental Impact Statement (DEIS) (Docket #s CN-14-916 & PPL-15-137)
Attachments:	L3R_DEIS_comments_21June2017_Bill_Adamski.docx

The attached file contains my comments on the Draft Environmental Impact Statement (DEIS) for Enbridge Energy's proposed oil pipeline - the Line 3 Replacement ("L3R") Project. Docket #s CN-14-916 & PPL-15-137.

Sincerely,

Bill Adamski
Minneapolis, MN

L3R-DEIS-comments_21June2 017_Bill_Adamski.docx 8 pp

Email address for comments: Pipeline.Comments@state.mn.us

Re: Comments on the Draft Environmental Impact Statement (DEIS) for Enbridge Energy's proposed oil pipeline - the Line 3 Replacement ("L3R") Project. Docket #s CN-14-916 & PPL-15-137 (Minnesota Public Utilities Commission [MNPUC] and the Minnesota Dept of Commerce [MNDOC]).

I am Bill Adamski, a resident of Minneapolis. I worked as an environmental specialist for the Wisconsin Department of Natural Resources (WDNR) for 35 years.

My specific comments on the DEIS for the proposed L3R project in Minnesota address issues regarding Enbridge's proposed:

1) Preferred route for the proposed Line 3 from the Enbridge terminal at Clearbrook to Carlton – proposed to veer for approximately 228 miles from the existing Line 3 corridor.

2) Intention to abandon "in place" (i.e., leave in the ground) – the Minnesota portion of its existing Line 3 oil pipeline (length: 288 miles) - in the event that Enbridge receives all Minnesota regulatory approvals for the proposed L3R.

I can reasonably assume that others have already submitted comments on the DEIS that address either of these two topics.
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1) Enbridge's preferred route for the proposed Line 3 from the Enbridge terminal at Clearbrook to Carlton – proposed to veer for approximately 228 miles from the existing Line 3 corridor.

In both Chapters One and Two of the DEIS, Enbridge's preferred L3R route is very briefly described, e.g., on page 2.1:

> "..the [L3R] pipeline permanent right-of-way would follow the existing Enbridge Line 67 pipeline in the Enbridge Mainline corridor for approximately 110 miles from North Dakota to the existing Clearbrook terminal in Clearwater County. The right-of-way would diverge from the Mainline corridor at the Clearbrook terminal, routing south and then east for approximately 220 miles, where it would then rejoin the Mainline corridor near Carlton, Minnesota, and extend for approximately 10 miles to the Minnesota-Wisconsin border.
>
> From the Clearbrook terminal to Carlton, the right-of-way would primarily follow third-party pipeline, utility, and transportation corridors, although some construction would occur through areas where no third-party utilities are present."

Enbridge's preferred proposed route for Minnesota is mapped in Figure 1.

In my cursory read of the DEIS's table of contents and several selected chapters – I was unable to find any statement on how Enbridge developed its preferred L3R route. Such an explanation may be in the DEIS and that I inadvertently missed it.

Regardless, unique to the preferred route is that from Enbridge's Clearbrook terminal to Carlton – Enbridge wants to diverge the proposed L3R from its mainline corridor (containing about 6 oil pipelines). The favored pathway would travel south, then east for a total of 228 miles before connecting with the Mainline corridor again(Figure 1).

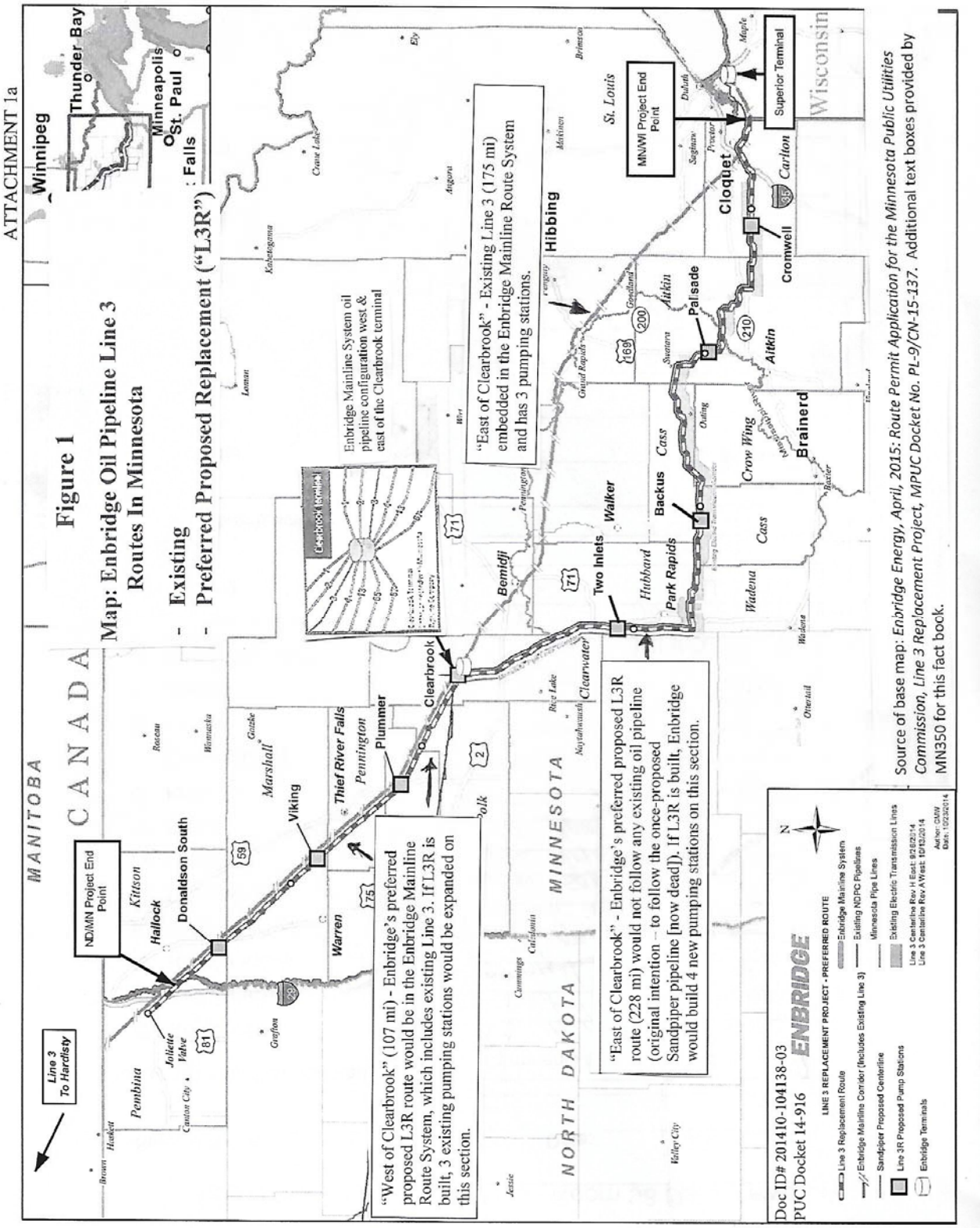

Enbridge, in its L3R routing permit application [1] - explains how this proposed 228 mile "break" from its mainline corridor came to be. On page 6-33 of its permit application for the proposed L3R route – Enbridge wrote "…the project's preferred route [Clearbrook to Carlton] has the potential to be collocated with and run parallel to the planned pipeline right-of-way of the proposed Sandpiper Pipeline Project if approved by [MNPUC] (Figure 1).

In November 2013, Enbridge, through its North Dakota Pipeline Company subsidiary, applied to the MNPUC for permits to build and operate a new 612 mile oil pipeline ("Sandpiper") from the Bakken Oil Fields near Beaver Lodge Station, North Dakota to Superior Wisconsin [2]. It was intended that the Sandpiper line would be in place and operational when the proposed L3R was to be built [3].

Assuming that the proposed Sandpiper line would have been built on Enbridge's intended timeline – the Company planned to route the proposed L3R from Clearbrook to the Minnesota-Wisconsin border in the same corridor of the hopefully-already operational Sandpiper line [4].

Of important note is that the proposed Sandpiper line, if permitted and built – would have been the first oil pipeline in this 228 mile Clearbrook-to-Carlton corridor.

However, in September 2016, Enbridge / North Dakota Pipeline Company announced that it was terminating its Sandpiper project [5].

Consequently, Enbridge's justification for L3R's proposed 228 mile route divergence from its mainline corridor (including existing Line 3) between Clearbrook and Carlton is severely weakened – since its construction and operation would be on land that had no major human-caused disturbance beforehand.

Whatever arguments that Enbridge have to support the proposed Clearbrook to Carlton route – such environmental impacts from the construction and operation of L3R on previously-undisturbed land would be much greater than simply keeping the entire new L3R in the Company's mainline corridor.

Kathryn Hoffman is the legal director for the Minnesota Center for Environmental Advocacy (MCEA), which represented Friends of the Headwaters ("FOH") in a lawsuit against the proposed Sandpiper project. At the time of Enbridge's decision to end the Sandpiper project - Ms. Hoffman said that the MN PUC should reconsider the new route for Line 3 in light of Enbridge's Sandpiper decision [6].

Ms. Hoffman noted that the 2 pipelines were a package deal, with Sandpiper providing a pathway for the proposed L3R [7]. She said. "Now, there is no Sandpiper corridor. This is a different proposal now" [8].

The Hoffman-litigated Sandpiper lawsuit included her contention that "It [the proposed Sandpiper pipeline] put sensitive natural resources at risk in a corridor where no pipeline should be built" [9]. That assertion would obviously also apply to the L3R in Enbridge's preferred Clearbrook-to-Carlton route.

Since Enbridge is still proposing that the L3R pipeline be placed in that 228 mile stretch of the now-dead Sandpiper corridor (i.e., the proposed "East of Clearbrook" segment [Figure 1]) - the same argument could reasonably be made that the proposed L3R should not be built in that environmentally-sensitive corridor.

The FOH have constructed a map that shows the locations of lakes in Minnesota that contain wild rice beds (Figure 2). On this same map FOH has also plotted the preferred proposed route of Enbridge's

proposed Line 3. As conveyed in this map, much of the "east of Clearbrook" section of the Enbridge's preferred L3R route would traverse through areas that contain a substantial number of lakes that have wild rice beds. These perennial crops grow in shallow lakes and are quite intolerant to most types of contamination in their waters [10].

Furthermore, the Anishinaabeg tribe of the Ojibwe Nation, under 1855 treaty rights, are entitled to harvest wild rice from many of these off-reservation lakes as part of their native subsistence living [11].

The US Supreme Court has upheld these treaty rights of native peoples to subsist off the land [12]. If Enbridge's preferred route for Line 3 is built and operated to transport oil - the sensitive wild rice beds would be threatened. And with it - jeopardizing the culture and physical survival of Ojibwe people [13].

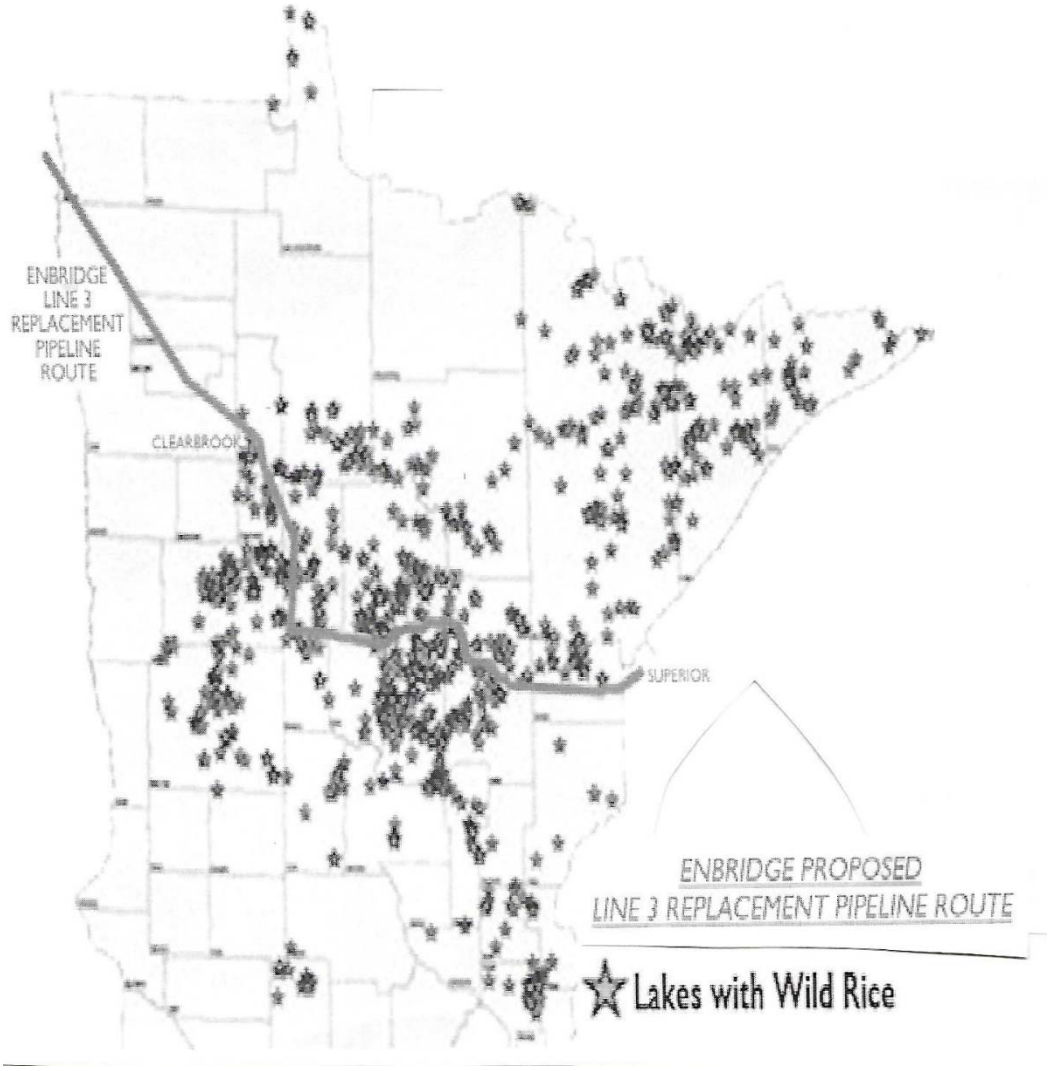

Figure 2: Map of Minnesota: Highlighting the Location of Lakes with Wild Rice and Enbridge's Preferred Route for the Proposed Line 3 Replacement Pipeline Source: Friends of The Headwaters (http://www.friendsoftheheadwaters.org/uploads/3/4/7/4/34740584/l3-wild-rice-72_orig.jpg)

The Minnesota Department of Commerce - Energy Environmental Review and Analysis (DOC-EERA) is the lead governmental unit that prepared this draft EIS, which I understand to be the first DEIS done by the EERA staff. It will consider the comments received on this draft when it prepares a final EIS.

In finalizing its first EIS, the EERA staff must be especially conscious to continually adhere to the purpose and principles of an EIS as outlined in the Minnesota Environmental Policy Act (MEPA). These requirements include "..considering reasonable alternatives, and exploring methods for reducing adverse effects" (chapter 1, page 1 of the L3R DEIS). Many of the worthwhile ideas for reducing adverse effects from this proposed oil pipeline will be called to attention by commenters.

The EIS principle of "reducing adverse effects" is clearly borne out in questioning Enbridge's preferred L3R route. In particular, the massive environmental disruption that would come from constructing, then operating the proposed pipeline in the 228 mile Clearbrook-to-Carlton stretch of previously-undisturbed land (Figure 1). Of extra-special concern is that this proposed pipeline would go through a region that contains numerous lakes that are extremely ecologically sensitive because they hold wild rice beds (Figure 2).

All of this severe environmental disruption could be avoided if Enbridge would simply contain the entire Minnesota portion of its proposed L3R route in its current mainline corridor of oil pipelines, which also holds existing Line 3.

Indeed, Enbridge is proposing to keep both 1) the first approximately 110 miles of the L3R route in Minnesota (Kittson to the Clearbrook terminal) and 2) the several miles from Carlton to the Wisconsin border - in that existing pipeline corridor (Figure 1).

By keeping the L3R in the mainline corridor for the 175 mile stretch from Clearbrook to Carlton - Enbridge would 1) preserve the largely undisturbed environment of the 228 mile currently-proposed deviated route from the corridor, 2) Reduce the environmental impact because the line would be built in an already-existing group of pipelines, 3) make the overall L3R about 50 miles shorter, and 4) help to continue preserving the health of sensitive wild rice beds in lakes, many of which are harvested by the Ojibwe people as part of their subsistence living - as part of their federally-protected treaty rights.
---

2) Enbridge's intention to abandon "in place" (i.e., leave in the ground) – the Minnesota portion of its existing line 3 pipeline (length: 288 miles) - in the event that Enbridge receives all Minnesota regulatory approvals for the proposed L3R.

In the event that Enbridge is fully permitted to build a new Line 3 - the Company's proposal to both abandon and leave a 50+ year old, deteriorating, leaking existing oil pipeline (1097 miles long) in the ground is highly controversial. This is especially so for many private landowners as well as the Leech Lake and Fond du Lac nations.

Alarmingly, in its L3R DEIS (over 5500 pages) - the DOC-EERA could only muster a paltry 14 page chapter (Ch 8) on the topic of abandonment. Furthermore, it appears that a sizable portion of the chapter's content is derived from Enbridge's application to the MNPUC for a route permit for the proposed L3R [14].

Fortunately, it can be reasonably assured that many people have submitted comments, both orally at public meetings and written, about serious concerns on this very controversial intent by Enbridge.

In general, I will not be replicating what other people have already stated about Enbridge's plan to abandon the old Line 3 if a new one is permitted and built.

First, simply noting that Section 8.2 in the L3R DEIS ("Regulatory Framework And Methodology" [for abandoning an oil pipeline]) briefly outlines the federal and State of Minnesota steps that Enbridge will be required to follow in decommissioning and abandoning in place (leave in the ground) – existing Line 3.

This same section clearly notes that "State and federal pipeline regulations do not specifically regulate the removal of pipelines".

Second, the Canadian National Energy Board (CNEB), in April, 2016 gave its regulatory approval for the Canadian portion of the proposed L3R [15]. CNEB's approval does include allowing the existing Line 3 to be abandoned and left in the ground.

However, of important note is that "...CNEB has imposed 89 project-specific conditions that Enbridge must follow to enhance public safety, environmental protection, and consultation between the company and stakeholders" [16].

In particular, in its detailed assessment and conditional approval of Enbridge's proposed L3R in Canada - the Board's ".. Decommissioning Condition 20 requires Enbridge to file a status report with the [CNEB] every five years during the [existing Line 3] Decommissioned Period" [17].

This status report must include, among many monitoring concerns, the "...status on Enbridge's ability to complete the remaining steps of the life cycle of the Existing Line 3 Pipeline...a summary of outstanding concerns raised by potentially affected stakeholders and Aboriginal groups regarding the Decommissioned Line 3 Pipeline; and Enbridge's expected timeline for submitting an abandonment application for the Decommissioned Line 3 Pipeline or any part of it." [18].

"This information will help the [CNEB] regularly assess the ongoing status of the corridor, including **the continued appropriateness of the Existing Line 3 Pipeline remaining in-place [i.e., abandoned and in the ground]."** [19] (emphasis added by commenter Bill Adamski).

Consequently, the CNEB, in its conditional approval of the L3R project in Canada – reserves the right to require Enbridge to remove at least some portions of existing Line 3 if the Board determines that the Company's adherence to any of the 89 imposed conditions (especially Condition # 20) is deemed sufficiently inadequate.

The CNEB can put this punitive measure (i.e., require pipeline removal) in its conditional approval because it has the authority to do so.

As noted above, the U.S. and State of Minnesota regulators of oil pipelines do not have a similar authority.

Nevertheless, the MNPUC has potential regulatory leverage to force Enbridge to respect the rights of landowners on whose land the abandoned line 3 would be located.

Specifically, the Sierra Club of Minnesota, in its scoping comments to the L3R docket on Sept 30, 2015 [20] – notes that there are many negative consequences resulting from oil pipeline abandonment (e.g., soil and groundwater contanmination, soil erosion, creating water conduits, residual hydrocarbons in the pipeline, etc..). Furthermore, the Sierra Club points out that there are costs of mitigating these consequences.

The Sierra Club of Minn further states that the "..foregoing issues put a wide variety private and public financial and natural resources and rights at risk. [These] risk should not be borne by landowners and government agencies." [21]

Additionally, the Sierra Club of MN makes the case that "Minnesota law provides the [MNPUC] with authority to require mitigation that protects landowners and the public from the financial and environmental risks caused by abandoned pipelines." [22] The Sierra Club cites various MN statutes that give the MNPUC the authority to impose modifications on 1) "applications without express limitation" and 2)" pipeline rights of way", as well as 3) "..require an EIS [environmental impact statement under the MN Environmental Protection Act {MEPA} to] explore methods by which adverse environmental impacts of an action could be mitigated." [23]

The Sierra Club of MN further states "Since the abandonment of the existing Line 3 pipeline would create environmental impacts and such impacts clearly can be mitigated, the [MNPUC] must include consideration of such mitigation in its environmental review." [24]

The Sierra Club MN says that "…landowners [should have the right] to determine which mitigation techniques are appropriate on their land, relative to the right of Enbridge or the [MNPUC] to make this decision for them." [25]

The Sierra Club MN notes that "Enbridge has asserted that abandonment in place [left in the ground] with ongoing cathodic protection and monitoring is the best abandonment practice for almost all of the existing pipeline route. **This being said, Enbridge has a substantial self-interest in minimizing its costs and discounting future adverse impacts and costs to landowners. Therefore, landowners should have the right to evaluate and choose between various mitigation techniques and should be trusted to do what's best for their land."** [26] (emphasis added by commenter Bill Adamski)

The Sierra Club MN contends that "..If landowners have a reasonable belief that Enbridge's approach would externalize costs and risks onto them that should in fairness be borne by Enbridge and its customers, then the [MNPUC] should carefully analyze the efficacy of Enbridge's abandonment plans as they impact landowner interests." [27] (emphasis added by commenter Bill Adamski)

This suggestion to hold Enbridge accountable so that it does not pass on any mitigation costs associated with the abandoned line to the landowners – is similar to the previously-discussed CNEB's Condition 20. [28] (emphasis added by commenter Bill Adamski)

The Sierra Club of MN warns that "A [MNPUC] approval of the project that either allows by Enbridge in practice to determine mitigation, or that expressly approves Enbridge's

abandonment mitigation plan, risks benefitting Enbridge at the expense of Minnesota landowners." [29] (emphasis added by commenter Bill Adamski)

References

[1, 14] Enbridge Energy, April, 2015: Route Permit Application for the Minnesota Public Utilities Commission, Line 3 Replacement Project, MPUC Docket No. PL-9/PPL-15-137

[2] Enbridge Energy, November, 2013: Certificate of Need Application for the Minnesota Public Utilities Commission, Sandpiper Project, MPUC Docket No. PL-6668/CN-13-473

[3,4] Enbridge Energy, April, 2015: Certificate of Need Application for the Minnesota Public Utilities Commission, Line 3 Replacement Project, MPUC Docket No. PL-9/CN-14-916

[5-9] Minneapolis Star Tribune, Sept 2, 2016: "Enbridge Energy pulling plug on Sandpiper pipeline". www.startribune.com/enbridge-energy-pulling-plug-on-sandpiper-pipeline/392082361/

[10-13] Honor The Earth, 2016. "Enbridge Line 3 Fact Sheet". www.honorearth.org/line_3_factsheet

[15,16] Cision, April 25, 2016: "National Energy Board Issues Decisions and Recommendations regarding Enbridge Line 3 Replacement Project". www.newswire.ca/news-releases/national-energy-board-issues-decisions-and-recommendations-regarding-enbridge-line-3-replacement-project-577020261.html

[17-19] Canadian National Energy Board [CNEB], April, 2016: "In the Matter of Enbridge Pipelines, Inc. Application Dated 5 November 2014 for the Line 3 Replacement Program, OH-002-2015, Volume II: Our Detailed Assessment." https://apps.neb-one.gc.ca/REGDOCS/Item/View/2949686.

[20-29] Sierra Club of Minn, Sept 30, 2015: "Scoping Comments, Proposed Line 3 Replacement Project". https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={BC206FF7-A039-46EB-AEF5-98AC651326EC}&documentTitle=20159-114471-01

From: Sharon Adesman Furlong
To: MN_COMM_Pipeline Comments
Subject: enbridge"s Line 3 Pipeline
Date: Wednesday, May 31, 2017 2:27:16 PM

---

dear sir or madam:

i felt the need to submit a comment on this particular project because the history of the State's actions regarding this pipeline, i.e., trying to avoid a full EIS statement is parallel to other efforts to subvert or go around the only set of laws that have been established to try to have some sort of control over projects that can destroy habitat and resources all people are dependent. in addition, these kind of shenanigans are used frequently, even by government agencies that are charged with the mandate of its own citizens, to support the efforts of private companies that stand to gain everything while we, Mr. and Mrs Citizen....lose everything.

and one more in addition: there has been a concerted attack on Native People and their rights to intact and clean land devoid of industrial invasion and pollution, for centuries now. centuries. the latest of attacks have come from resource extractive industries such as natural gas and shale oil, and the pipelines their companies wish to place over Native sovereign land, crossing water sources that are often the primary or only water for a Nation of people, confiscate rights of ways, destroy habitat.....all in ways they would never dream of doing to non-native communities, at least without hearings and compromises and so on.

enough is enough. this environmental racism needs to stop. and it needs to stop here, with this project. now.

thank you for your attention to this matter.

yours,

sharon furlong
sfurlong5@verizon.net
133 bristol road
feasterville, pa. 19053
215-322-0492

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Heidi Aff

Street Address: 1471 Lincoln Avenue

City: Saint Paul State: MN Zip Code: 55105

Phone or Email: heidiseaff@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

The EIS must include alternatives that include not building the pipeline, the option A, and a Line 3 removal option. Avoiding tribal communities whose treaties and human rights must be respected is a must. It is illegal not to. Furthermore, the EIS must include a longer, more in depth, and better section on indigenous voices and considerations. It is crucial in considering this pipeline. The draft fails to adequately consider colonial, contemporary and future trauma to the original inhabitants of this land. It is objectively criminal.

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Kathy Ahlers <boskybay@gmail.com>
Sent: Monday, July 10, 2017 11:41 PM
To: MN_COMM_Pipeline Comments
Subject: docket numbers CN-14-916 and PPL-15-137

Hello,

Given that using railroads for transport would use existing rail lines, meaning that no additional habitat disruption would be necessary, I would like to suggest that the state encourage Enbridge to undertake using railroads versus building a new pipeline (and versus using the existing pipeline, which is deteriorating).

Rail transport of oil is also more easily ceased when society finds other ways to fuel activities currently using fossil fuels by implementing alternatives, which humans as a species must do soon or face almost certain extinction. The railroad will simply be used for other cargo once oil shipments cease. But it the wild areas were to be disturbed for a pipeline construction and operation, it would be very difficult and costly, if even possible at all, to return those areas to their natural state.

The land in Minnesota through which the proposed pipeline routes would pass contains vast valuable freshwater reserves and sensitive environmental areas. Also, the natural hunter-gatherer livelihoods of Indians on the potentially affected reservations easily could be irreparably harmed by the proposed pipeline.

Therefore, please deny the CN (and by extension, the pipeline routes, collectively).

Thank you.

Sincerely,

Kathy Ahlers
Columbia Heights, MN

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
BRUCE AHLGREN	218-879-6571	bgahlgren@gmail.com

ADDRESS
245 Freeman Rd

CITY, STATE, ZIP
Cloquet MN 55720

COMMENTS
WE NEED TO UPGRADE OUR LINE 3 ITS IS GETTING OLD

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jason Ahlgren	832 758 2431	Jasun@Matrcomfg.com

ADDRESS
2218 Bolgover

CITY, STATE, ZIP
Houston, TX 77005

COMMENTS

We support the pipeline

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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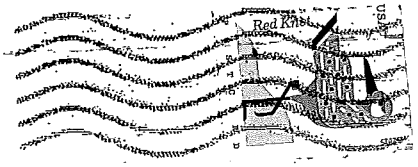

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Docket numbers: CN-14-916, PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jonathan Bruce Ahlgren	(218)260-9290	jahlgren91@gmail.com

ADDRESS
245 Freeman Rd

CITY, STATE, ZIP
Cloquet, MN 55720

COMMENTS

I support your cause

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Line 3 Replacement Project DEIS

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Marla Ahlgren	879-6571	
ADDRESS: 245 Freeman Rd.		
CITY, STATE, ZIP: Cloquet, MN 55720		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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Docket numbers: CN-14-916; PPL-15-137

POSTAGE

USA

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Nicole Anlgren	832-798-2431	jason@mattcomfg.com

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2218 Bolsover

CITY, STATE, ZIP
Houston, texas 77005

COMMENTS
we support the pipeline

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Docket numbers: CN-14-916, PPL-15-137

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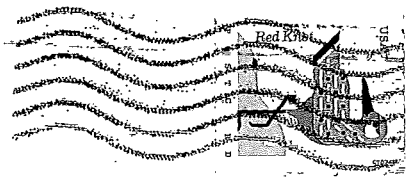

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Ron Ahlgren	318-2453	
ADDRESS: 849 Lyndhurst Bay Dr		
CITY, STATE, ZIP: Cloquet, MN 55720		

COMMENTS: We support the line

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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ST PAUL MN 551

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85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Ron Ahlgren	218-310-2433	RKLyndhurst@aol.com

ADDRESS
849 Lyndhurst Bay Dr

CITY, STATE, ZIP
Cloquet, MN

COMMENTS
Go for it ☺

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Sean Ahlgren	832-758-2431	tasonmalcom@
ADDRESS: 2218 Bolsover		
CITY, STATE, ZIP: Houston, TX 77005		

COMMENTS We support the pipeline!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

ST PAUL MN 551
MAY 2017 PM 3 T

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916, PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Tammy Ahlgren	713-248-0095	tammy@mattcomp.com

ADDRESS
2218 Bolsover

CITY, STATE, ZIP
Houston, TX 77005

COMMENTS

We support the pipeline

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

ST PAUL MN 551
OCT 2017 PM 3 T

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916, PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Sandra Ahlstrom <sandy.earth350@gmail.com>
Sent: Monday, July 10, 2017 10:05 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comments on the DEIS

This response concerns: Docket numbers: CN-14-916 and PPL-15-137. Sent July 10, 2017.

My husband, Tom, and I have serious questions about several of the DEIS assertions.

1. Who were the sources who compiled the EIS? Were private contractors included in this important work?
Who hired them - the state of MN or Enbridge? Did the state note any "conflict of interest" in their employment history if there was one?

2. Would someone explain this statement in the Executive Summary on Page 14? "There is no way to measure the general region-wide or state-wide differences
in surface water quality across Minnesota." What measures/methodologies were used?
Does this mean that the TSI used by the MPCA in measuring eutrophication is not a reliable way to measure water quality?

3. "Minnesota's declared environmental policy is "to create and maintain conditions under which human beings and nature can exist in productive harmony, and fulfill the social,economic and other requirements of present and future generations of our state's people".
Then the MN Environmental Policy Act also requires that "Where there is potential for significant environmental effects resulting from a major governmental action, that action
shall be preceded by a detailed environmental impact statement."
In this case, the "governmental action" are two separate by related decisions by the MPUC (MN Public Utilities Commission)
1. Whether to issue a certificate of need
2. Whether to issue a route permit for the project and if so, with what conditions

"Enbridge submitted a CN application to the Commission on April 24, 2015. After accepting the application as complete, the Commission ordered the Dept. of Commerce,
Energy Environmental Review and Analysis (DOC-EERA) to prepare a combined EIS that addressed both the CN and routing permit dockets in accordance with Minnesota
Administrative Rule Chapter 4410."
"This EIS Evaluates Impacts and Alternatives for the CN Decision Using Applicable Criteria"
"Under these criteria, the Commission would first consider the underlying economic drivers for the proposed pipeline."

4. We want to know why there is no examination of corrosion from co-location of pipelines with high voltage transmission lines? There was information about a
4 yr. old pipeline (Keystone 1)which suffered leaks from accelerated corrosion due to stray voltage from powerlines. How many pipelines are leaking right now
as you read our questions?

5. Would you please provide contractor firms and names responsible for the groundwater hydrogeology assessments?

All of the above questions have been discussed in our family and neighborhoods. . . We expect that our MN Department of Commerce will contact us with answers
as this comment period ends tonight, July 10th, 2017. Again, the docket numbers CN-14-916 and PPL-15-137 are our concern.

Sandra Ahlstrom
sandy.earth350@gmail.com

Levi, Andrew (COMM)

From: drsuzy@comcast.net
Sent: Monday, July 10, 2017 5:31 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Pipeline Comments

To Whom It May Concern at the Mn Dept of Commerce,

The following are some of the many reasons I oppose the current Enbridge pipeline proposal:

1. I think Enbridge should not be allowed to simply cap, clean, then leave their current pipeline in place. I realize that it would be more costly for the company to dismantle the line, but that is the cost of doing buisness. It will continue to decay and be an eyesore for decades. If the company is allowed to simply abandon it, the state will ultimately have to pay the cost of removing it if/when we finally decide to restore the land or use it for some other purpose. Seems like a very bad deal for the state to me.

2. I believe the new pipeline corridor near native american wild rice beds is a very bad and unnecessary idea. Wild rice fields are very environmentally sensitive and likely would not survive any sort of oil spill. Enbridge should be required to utilize the exhisting corridor for their new line.

3. Oil is a diminishing non-renewable resource. The state of Mn should be focusing on promoting wind and solar companies, not oil pipeline companies.

4. Enbridge is not working in the best interests of our state, but for their bottom line. They are being disingenuous regarding their concern for the process. They have already started building the new line in Canada and likely will use this as an excuse for why we should allow this new proposal. We should not be in the buisness of aiding any company to the detriment of our state.

Thank you for reading my comments. I hope you will require Enbridge to dismantle it's exhisting pipeline and build a new one along the current corridor (if it is allowed to rebuild at all). Please remember that your priorities are to protect and serve the people of MN, not a pipeline company.

Sincerely,
Suzy Ahrens
St Paul

Sent from XFINITY Connect Mobile App

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Casey Alagna	218-879-9913	casey@hotmail.com

ADDRESS
5 N 13th Street ~~Clogquet~~

CITY, STATE, ZIP
Clogquet, MN 55720

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Misha Alagas	218-879-9913	
ADDRESS		
5 North 13th Street		
CITY, STATE, ZIP		
Cloquet, MN 55720		

COMMENTS

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Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Steve Alask	218-353-0375	
ADDRESS: 23 Aspen Lane		
CITY, STATE, ZIP: Esko, Mn 55733		

COMMENTS

Bruce For President

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

From: kalbright36@aol.com
To: MN_COMM_Pipeline Comments
Date: Tuesday, May 30, 2017 9:46:14 PM

Re: CN-14-916 and PPL-15-137
To Whom it May Concern:
I wish to join many Native Americans in expressing my objection to the proposed tar sands pipeline. Please listen to them with respect. Why take this risk of polluting the water? Please find some other way to transport the oil.
Thank you for your attention to this matter.
Sincerely,
Karen Albright
Greenwood, MS

From: Brian Allen
To: MN_COMM_Pipeline Comments
Subject: Line 3 comments from Allen Forestry
Date: Thursday, June 08, 2017 10:00:26 AM

The main concern I have from a forestry perspective is the inability of logging and forestry equipment to cross more new pipeline. Most likely this new pipeline will create additional expense and burdens on foresters, loggers, and forest landowners. Pipeline companies have required loggers in the past to install "air bridges" to cross pipelines with equipment even when the ground is frozen. I have seen this extra expense kill some smaller or marginal timber sales on private land . . . basically taking these forest lands out of timber production. Pipelines create more fragmentation of forests causing more difficulty for forest managers.

If this line is to built, any parcel of productive private forest land (at least lands that are enrolled in SFIA or 2C) that is traversed should have a harden forestry crossing installed by the pipeline company that is capable of supporting logging equipment year round. Also, when the old line is closed forestry and logging equipment should be allowed to cross it without restrictions.

The oil and natural gas industry should not be allowed to restrict access to productive forest lands by forest mangers and loggers. This is an impact of pipelines that never seems to be addressed.

--
Brian Allen
Allen Forestry
218-724-8799
218-348-5252 (cell)

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

JUN 2017

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Curtis K Allen	218-481-2741	Curtis.Allen@Bend Tec.com

ADDRESS: 2601 E 4th ST.

CITY, STATE, ZIP: Superior WI 54880

COMMENTS: This is the Safest and Most Economical way to transfer all Resources.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Bradley W. Oachs
ALLETE Senior Vice President
President Regulated Operations

July 7th 2017

Dockets CN-14-916 & PPL-15-137

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Dear Ms. MacAlister:

On behalf of ALLETE and Minnesota Power, I am writing to encourage the timely acceptance of the Line 3 Replacement Project Environmental Impact Statement (EIS). The acceptance of this EIS should be granted on the basis of the proven, long-standing and responsible record of Enbridge operating multiple pipelines in northern Minnesota and the prudent nature of this pipeline replacement in contrast to other transportation options.

The existing Enbridge Line 3 has provided a vital transportation link between the politically secure oil producing regions of western Canada and energy users in the Midwest for more than half a century. During this time, the pipeline has operated in a very similar environment as the preferred route alternative proposed in the EIS. Since the original Line 3 was constructed, the technology for manufacturing steel, welding and coating pipelines as well the ability for monitoring operations and integrity of pipelines has dramatically improved. With these changes in technology, the proposed replacement pipeline will operate in an even more environmentally responsible manner.

Transportation of energy by pipeline carries several advantages over transport by rail or truck, including being located away from busy population centers, having a better safety and environmental record, and not tying up railroad capacity that impedes the movement of other commerce. Additionally, pipeline transportation has additional oversight in the form of federal PHMSA and the state of Minnesota Office of Pipeline Safety that the other forms of transportation do not benefit from, increasing the ability for this form of transportation to operate safely.

We urge the Department of Commerce to maintain the statutory deadline of 280 days and approve the Line 3 Replacement EIS without further delay.

Sincerely,

Bradley W. Oachs

Bradley W. Oachs
ALLETE Senior Vice President & President Regulated Operations

Bradley W. Oachs
ALLETE Senior Vice President
President Regulated Operations

July 7th 2017

Dockets CN-14-916 & PPL-15-137

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

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Sincerely,

Bradley W. Oachs

Bradley W. Oachs
ALLETE Senior Vice President & President Regulated Operations

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

UNITED STATES POSTAGE
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MAILED FROM ZIP CODE 55419

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
WADE ALMER	(218) 721-2229	—
ADDRESS		
8715 S ST Hwy 35		
CITY, STATE, ZIP		
FOXBORO, WI 54836		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

1094

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916 PPL-15-137

ST PAUL MN 55

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0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Craig Altman	218-590-7387	
ADDRESS		
7300 John Ave		
CITY, STATE, ZIP		
Superior WI 54880		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Joyce + Jack Alwin

Street Address: 23395 Cnty Rd 109

City: Menahga State: MN Zip Code: 56464

Phone or Email:

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

To Whom it may Concern:

Enbridge is a powerful wealthy company. When it comes to expanding they do not put the environment first. There is much evidence of this. It is not if there will be a spill or leakage in their pipes, it is WHEN

As a couple who have summered for 50 years in this area in which Enbridge wants to put their Line 3 and who want our children and grandchildren to be able to carry on this tradition, We do not want a new pipeline in our backyard.

There are other areas less pristine and less vulnerable where Enbridge could route their Line 3. Their profit might be less.

Why should Enbridge not be required to remove the old faulty line? Why is it acceptable for them to leave their trash in the ground? Why couldn't the new line go in the old line's place? Less profit for Enbridge I imagine.

We ask for your consideration —

Sincerely,

Joyce + Jack Alwin

If including additional pages please number them and tell us how many you are providing:_____ pages

0328

MINNEAPOLIS MN 553

TAPE HERE (PLEASE DO NOT STAPLE)

13 JUN 2017 PM 6 L

MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

RECEIVED
JUN 15 2017
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JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
SAINT PAUL, MN 55101-2198

55101-214355

FOLD HERE

Public Comment Period Ends Monday, July 10, 2017

Comments must be postmarked or received electronically by the comment deadline.

How to comment:

- Drop this form in a comment box at a public meeting
- Mail this form, remembering to affix appropriate postage
- Mail comments in a separate envelope using the mailing address on this form
- Email comments to the Environmental Review Manager: Pipeline.Comments@state.mn.us
- Fax comments to the Environmental Review Manager: (651) 539-0109

Comments do not need to be on this form to be accepted. We encourage you to provide comments in whatever way is most convenient for you. If commenting by email or fax please use *"Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)"* in the subject line.

Thank you for participating in the Draft EIS public review process! By commenting you are helping inform the Minnesota Public Utility Commission's decisions regarding this project.

FOLD HERE

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is unclear? What is missing? Please reference specific sections of the Draft EIS, if possible. Use additional pages as needed.

For project information visit: http://mn.gov/commerce/energyfacilities/line3.

Levi, Andrew (COMM)

From: Erin Roth <Rothe@api.org>
Sent: Sunday, July 09, 2017 11:34 AM
To: MN_COMM_Pipeline Comments
Subject: "Public Comment: Line 3 Project (CN-14-916 and PPL-15-137"
Attachments: Line 3 Draft EIS.pdf

Please find attached our comments on the Enbridge Line 3 Draft EIS.

Mr. Erin T. Roth
Executive Director
American Petroleum Institute MN/WI
400 Robert St. N., Ste. 1560
St. Paul, MN 55101
(608) 209-0789
www.api.org

AMERICAN PETROLEUM INSTITUTE
Minnesota & Wisconsin

Erin T. Roth
Executive Director

July 9, 2017
Ms. Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Ste. 500
St. Paul, MN 55101

Dockets CN-14-916 and PPL-15-137
Enbridge Line 3 Crude Oil Replacement Pipeline Project

The Minnesota/Wisconsin Petroleum Council is a state office for the American Petroleum Institute (API) based in Washington, D.C. API is the only trade association representing all facets of the oil and natural gas industry that supports 9.8 million U.S. jobs and 8 percent of the U.S. economy. API's more than 625 members include large integrated companies, as well as exploration, production, refining, marketing, pipeline operations, marine businesses, and services and supply firms.

API would like to commend the Department's staff for conducting a thorough and comprehensive Draft Environmental Impact Statement (DEIS) on Enbridge Energy Partners, LLC's proposed Line 3 replacement pipeline project in northern Minnesota. We believe that the current regulatory timeline for the project should remain on schedule.

API strongly supports the company's application for a certificate of need permit and a routing permit. The project will utilize some of most advanced pipeline materials, state of the art inspection and monitoring equipment, and technologies to further enhance the pipeline safety and protection of our State's valuable environment and natural resources. The project will also enable Enbridge to operate more efficiently to supply continued reliable crude oil deliveries to Minnesota refiners.

The proposed project is estimated to be a $2.1 billion dollar investment for the Minnesota portion of the design, permit and construction of Line 3. In the state, the replacement pipeline will use existing utility corridors for more than 98 percent of the route West of Clearbrook, and 75 percent East of Clearbrook. Replacing the pipeline will help restore historical operating capabilities to move 760,000 barrels of crude oil per day. This is the equivalent of more than 10,000 rail cars per day or 24,000 tanker trucks per day if it is not replaced.

The pipeline replacement project will create thousands of family-sustaining jobs and provide a significant economic boost to an area that often experiences higher rates of unemployment than the rest of the state. It will also provide much needed long-term property tax revenues to local governments in the counties along the preferred route.

400 Robert Street, North
Suite 1560
St. Paul, MN 55101

Phone 202-682-8304
Cell 608-209-0789
Email rothe@api.org
www.api.org

An equal opportunity employer

Thank you for your consideration.

Erin Roth, Executive Director
API Minnesota/Wisconsin Petroleum Council

Levi, Andrew (COMM)

From: Mr. & Mrs. Kevin Amundson <user@votervoice.net>
Sent: Monday, June 26, 2017 4:44 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 replacement

Dear Ms. MacAlister,

I am in agreement that Line 3 should be installed along the new corridor going through Aitkin County. I appreciate the high tech provisions that are in place: to safe guard against any and all potential leaks, to get the oil off the highways and train cars. This would also help the local MN Power and Light company get there coal for electricity in a more timely manner and not make either the oil companies or the electric companies have to have a waiting period in taking care of supply and demand. In other words it would alleviate the congestion on the railways.
Furthermore, it would be beneficial to the struggling economy in Aitkin and surrounding areas.
Thank you for your time and consideration to my thoughts and opinions. I hope you pass this effort soon.
Susan Amundson

Sincerely,

Susan Amundson
17596 420th St
McGregor, MN 55760
amundfam@yahoo.com

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD USA

THE PROPOSED LINE 3 ROUTE CROSSES TREATY TERRITORY AND SOVEREIGN INDIGENOUS' LAND. I ASK YOU TO CONSULT THE LOCAL NATIVES TO GAIN A BETTER UNDERSTANDING OF THE PLANTS AND ANIMALS THAT WILL BE IMPACTED, NOT TO MENTION CULTURAL SITES. THIS ROUTE WILL BE DAMAGING TO OUR TRADITONAL LANDS. THANKS

SINCERELY,

BABII ANIAKIWAD

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

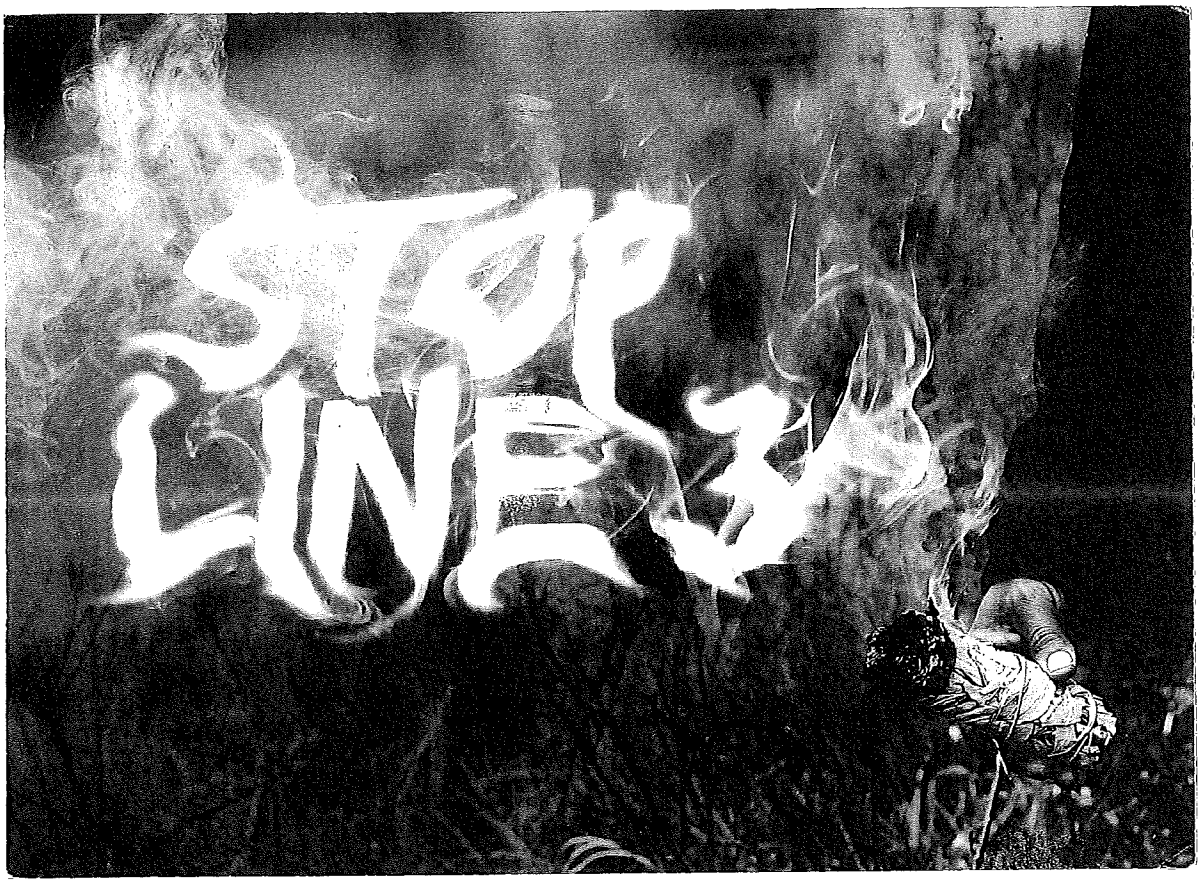

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
17 JUL 2017 PM 4 L

POSTCARD USA

PLEASE CONSIDER THIS PIPELINE CAREFULLY. THE PLAN TO LEAVE AN EXISTING PORTION OF THE FAILING PIPELINE IN THE GROUND IS NOT ACCEPTABLE. LETTING AN ENERGY COMPANY LEAVE GARBAGE/WASTE IS NOT A GOOD PLAN AND IS IRRESPONSIBLE AND NOT IN THE BEST INTEREST OF PEOPLE.

SINCERELY,

BABII AANAKWAD

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 552
07 JUL 2017 PM 3 1

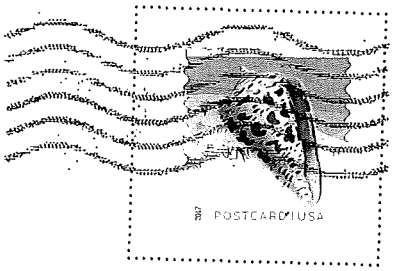

THE PROPOSED LINE 3
ROUTE CROSSES WATER,
WHICH IS AN ESSENTIAL
RESOURCE TO ALL LIFE ON
EARTH. PLEASE CONSIDER
AN ALTERNATE ROUTE AWAY
FROM WATER. IF THERE
WAS A LEAK IN OR AROUND
OUR NATURAL WATERWAYS IT
WOULD BE DEVASTATING TO
OUR MOST ESSENTIAL RESOURCE

SINCERELY,

BABII AANAKWAD

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
07 JUL 2017 PM 3 L

POSTCARD USA

I ASK YOU TO DO A THOROUGH ENVIRONMENTAL IMPACT STATEMENT. PIPELINE LEAKS HAPPEN ALL TOO OFTEN, AND THE RATE OF PIPELINE LEAKS, AND THE NATURAL ENVIRONMENT ALL NEED TO BE CAREFULLY EXAMINED. THERE ARE LITTLE-TO-NO BENEFITS FOR OUR COMMUNITY, AND WE BEAR ALL THE RESULTS FROM ANY SPILLS OR LEAKS.

SINCERELY,

BABII AANAKUHAD

55101-214355

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
2017 FEB 3 L

POSTCARD USA

LINE 3 PROPOSED ROUTE WILL BE CROSSING OUR LAND AND POTENTIALLY POLLUTING OUR LAND AND WATER, BUT WE DO NOT BENEFIT FROM THE PIPELINE. THE OIL CROSSES OUR LAND TO BE SHIPPED OUT OF THE USA. WE SHOULDN'T BEAR THE COSTS OF BENEFITING A FOREIGN COMPANY.
AMERICA FIRST, NOT FOREIGN INTERESTS.

SINCERELY,

BABII AANJAKINAID

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

The UPS Store®
1961 Main Street
Watsonville, CA 95076
831.728.1507 fax

FAX

To Jamie MacAlister

From S. Anderson

Company

Phone number 831-566-3963

Fax number 651-539-0109

Fax number

Date

Total pages 3

Subject: Leje 3 DEIS

Jamie Mac Alister, Environmental Review Manager July 6, 2017

Minnesota Department of Commerce

85 7th Place East, Suite 280

St. Paul, MN 55101-2198

Re: Docket # CN-14-916 Docket # PPL-15-137

Dear Mr./Ms. Mac Alister:

Please let this serve as my comment on the DEIS for Line 3. Although I do not live in your beautiful water rich state, I have visited my cousin in Bemidji many times and have taken wonderful side trips. I feel that I have a sense of Minnesota's many natural treasures.

I have read the DEIS for Line 3 and feel that it is contradictory in its implicit recommendation that the project be able to move forward in light of its own findings.

On the one hand, it fully acknowledges that the pipeline would have adverse and disproportional consequences on tribal lifeways in addition to that community's current inequities on many other levels. Then on the other hand it states that this is not enough of a reason to deny the permit. I would like to know, then, what exactly would or might cause the permit to be denied?

The spill risk assessment in the DEIS is non-representative in its modeling sites which do not reflect areas whose resources are at most risk. For example, it contains no spill analysis or risk assessment for tributaries of the St. Louis or Nemadji Rivers where a spill would impact Lake Superior and its main harbors.

Language in the statement is vague about compliance and reporting. Independent reporting indicates a dismal history of violations by this company. The DEIS should also address the risk of non-compliance by Enbridge on the environment.

It does not specify a management plan for dealing with the contamination that will occur when the existing Line 3 is eventually either shut down or abandoned. In fact, it states up front that the existing line will continue, as if in perpetuity, but then later on states that it would be risk adverse to remove and clean it. We are left to assume that Enbridge has no plan. The DEIS doesn't address the other aging lines that will need to be decommissioned in the near future, either. In school and in life I was taught to clean up one mess before making another.

If the so-called restoration plans in this DEIS are any indication of how it intends to deal with the decommissioning of these lines, God help you all, downstream. Wetlands take years to be fully re-established even with the best of plans.

Speaking of downstream, what does Enbridge plan to do with all the oil arriving in Superior, WI from both new and old Line 3's? I would think that each state involved in the transport of oil needs to know

the answer to that question. Shouldn't this be addressed in the DEIS for a product Enbridge plans to produce, especially since it crosses state lines?

The DEIS doesn't adequately address the fact that the new Line 3 will follow an existing utility corridor without cathodic protection for an entire year. It is by now established knowledge that this is exactly what caused the pinhole leaks in the Keystone pipeline. This project should not proceed without cathodic protection at the time of construction.

In terms of local economics, the DEIS states there will be no permanent jobs created by this project and whatever construction jobs are created will go to workers outside Minnesota. That means we will see yet another seedy mantown created overnight by temporary, newly rich, lonely, sex starved men who prey on already marginalized women and children.

Regarding local taxes, what effect will the eventual abandonment or removal of the existing Line 3 have on property values? Also, will Enbridge continue to pay taxes to the communities along its mainline route when this same Line 3 is shut down? These questions deserve answers, not promises or even pledges.

I would have thought any of these reasons, let alone in combination, would be cause for rejecting this DEIS, but perhaps the most basic reason for rejecting it is that worldwide the demand for oil is going down, not up. And for good reason. The havoc that extracting, transporting and refining fossil fuels wreaks simply can't be kept under wraps anymore and folks all over the world are connecting the dots. The question for each of us becomes do we want to be part of the long-term, collective solution or do we want to sabotage the viability of that solution for short term personal gain?

I don't know if you are old enough to remember, but I am reminded of the early days of fuel efficient cars. Our Big 3 automakers refused to embrace or even envision the future that the best and brightest minds of the day (dare I say scientists?) warned us to prepare for. Only today, the stakes are much higher, according to a new generation of great minds with new and improved tools of measurement. And according to the DEIS itself when it acknowledges that Line 3 would contribute to climate change!

So I say to Enbridge, "There will be life after oil. It served us well for many years. But it is time to invest in the future. We can break the habit together. Indeed, we must." And I say to you, please have the courage to embrace a new way forward and cause Minnesota to lead on this important issue. This DEIS essentially begs for rejection. I respectfully ask you to do just that.

Sincerely,

Barbara Anders

Barbara Anders

5 Delaney Avenue

Watsonville, CA 95076

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
ANTHONY ANDERSON	343-8423	
ADDRESS: 1404 11th ST		
CITY, STATE, ZIP: INT'L Falls MN 56649		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Eric Anderson <user@votervoice.net>
Sent: Tuesday, June 27, 2017 2:58 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Enbridge has worked dilligently to minimize impacts to natural resources and the public. They performed many repairs to verify the integrity of the existing Line 3, but delaying this review and approval process would likely lead to more un-necessary repairs putting the natural resources and public at un-necessary risk. Replacing the line seems like it would minimize the risk and impact to critical resources. Not exposing the existing line more, and removing crude oil from it would keep us out of those areas almost completely where the line is going to be de-activated.

I think we just need to focus on the facts of what will lead to the lowest potential risk and let that dictate the decisions that are made. We cant allow emotions that have no alternative solutions backing them up dictate what is done.

Sincerely,

Eric Anderson
7454 S County Rd S
Lake Nebagamon, WI 54849
eraander@yahoo.com

Levi, Andrew (COMM)

From: Gary Anderson <gw.anderson@comcast.net>
Sent: Monday, July 10, 2017 10:56 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Jamie Macalister, Environmental Review Manager,

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota's 10,000+ lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lake country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the DEIS to be complete.

Big Sandy watershed covers 406 square miles not counting the fact that it flows into the Mississippi River. Should a spill occur like pipe ruptured in Marshall, Michigan in 2010 and Mayflower, Arkansas in 2013, a spill in this watershed could economically be devastating. A worst case scenario should be described in the DEIS so the economic impact could evaluated.

Please respond to my questions and comments and keep me informed as this potential project is evaluated.

Sincerely,

Gary W Anderson
gw.anderson@comcast.net

Sent from my iPhone

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Hannah Anderson

Street Address: 114-40 Dalian Ct.

City: College Point State: NY Zip Code: 11356

Phone or Email: ande1976@yahoo.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Line 3 should be completely removed. It caused the largest inland oil spill in U.S. history (AP News Archive.com). There should be no expansion of this pipeline or any alternative pipeline. The Draft Environmental Impact Statement even states "there is incomplete information for the environmental impact (5-6). Replacing the Existing Line 3 will just have another spill at another time. The system alternative SA-04 does not outline enough detail to even consider. Pump sites and temporary work spaces have not been listed.

The Commission Must consider if a denial of the proposal would adversely affect energy supply to the people of Minnesota. It will not because the oil is set to be exported. That is why the line is proposed to end at Lake Superior. This pipeline or its alternatives will damage land and water in Minnesota with No Benefit to Minnesotans. Most oil in MN is imported.

A more prudent alternative is to put the pipeline through Canada. ~~If the oil~~ Another prudent alternative is for Minnesota to only allow 100% renewable energy sources that will have greatly reduced impact on the environment and will be sustainable for generations to come. Just consider the delicate fens that are rare in the world and can easily be turned to bogs. (According to the MNDNR.)

If including additional pages please number them and tell us how many you are providing:_____ pages

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
JACOB ANDERSON	218-310-2853	
ADDRESS		
2336 Co Rd 105 Barnum		
CITY, STATE, ZIP		
Barnum MN 55707		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jason Anderson		
ADDRESS: 506 11th St. North		
CITY, STATE, ZIP: Virginia, MN 55792		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: John Anderson <user@votervoice.net>
Sent: Friday, June 30, 2017 1:20 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Pipeline Upgrade in Minnesota

Dear Ms. MacAlister,

I am in favor of this pipeline upgrade as it will increase overall pipeline safety and reliability with newer technology. There are other ways of delivering petro products and I see trains all the time and they scare the hell out of me. They are pulled through populated areas where they could overturn and burn like the accident in Quebec. Since I live and use the roads in Minnesota, I would still like access to petro for my car and this will help!

Thanks,

John

Sincerely,

John R Anderson
25067 112th St NW
Zimmerman, MN 55398
jrande2006@yahoo.com

Levi, Andrew (COMM)

From: MacAlister, Jamie (COMM)
Sent: Monday, July 10, 2017 12:52 PM
To: MN_COMM_Pipeline Comments
Subject: FW: Line 3 Draft EIS
Attachments: K Anderson Comment on EIS Docket Numbers CN-14-916 and PPL-15-137.pdf

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280, Saint Paul, MN 55101
P: 651-539-1775

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From: Kirsten Anderson [mailto:kkandersonvan@gmail.com]
Sent: Sunday, July 09, 2017 12:29 PM
To: MacAlister, Jamie (COMM) <jamie.macalister@state.mn.us>
Cc: Kirsten Anderson <kkandersonvan@gmail.com>
Subject: Re: Line 3 Draft EIS

Dear Ms. MacAlister,

Please find attached my comments to the EIS.

Kind regards,

Kirsten Anderson

On Thu, Jun 8, 2017 at 2:35 PM, MacAlister, Jamie (COMM) <jamie.macalister@state.mn.us> wrote:

> Dear Interested Party:
>
> Attached is the public notice and the summary of the draft environmental impact statement (EIS) for the Line 3 Pipeline Project. We have provided the DEIS summary because you previously submitted comments regarding the scope of this EIS.

Hard copies of the draft EIS are available in your county library, and the electronic version is available on the Department of Commerce web site here:

www.mn.gov/commerce/energyfacilities/line3

If you have any questions, please contact me.

Sincerely,

Jamie MacAlister

Environmental Review Manager

Minnesota Department of Commerce

85 7th Place East, Suite 280, Saint Paul, MN 55101

P: 651-539-1775

CONFIDENTIALITY NOTICE: This message is intended only for the use of the individual(s) named above. Information in this e-mail or any attachment may be confidential or otherwise protected from disclosure by state or federal law. Any unauthorized use, dissemination, or copying of this message is prohibited. If you are not the intended recipient, please refrain from reading this e-mail or any attachments and notify the sender immediately. Please destroy all copies of this communication.

Ms. Jamie MacAlister

Environmental Review Manager Minnesota Department of Commerce

85 7th Place East, Suite 280 St. Paul, MN 55101-2198

Email: Pipeline.Comments@state.mn.us

July 9, 2017

SENT BY EMAIL

Re: Docket numbers CN-14-916 and PPL-15-137.

Dear Ms. MacAlister,

I am writing to object to granting the Proposed Line 3 Pipeline a Certificate of Need. I also object to Enbridge's proposed pipeline route and to the alternative SA-04.

I was born and raised in Minnesota and much of my family still lives there. I remember camping, in northern Minnesota. I swam and canoed in the clean lakes and rivers. I am proud to be from Minnesota, Land of 10,000 Lakes. While I live do not live in Minnesota now, I still return to Minnesota for family visits and to enjoy its lakes and rivers.

Minnesota's clearest lakes area and freshwater are threatened by Enbridge's Proposed Route. The new route for the Proposed Line 3 Pipeline threatens Minnesota's clearest lakes - - some of the most important freshwater in the United States. The proposed pipeline would establish a new pipeline corridor just south of Park Rapids, MN all the way to Superior, crossing the Mississippi River in multiple spots. Just one oil spill could pollute and endanger these freshwaters for drinking, recreation, and wildlife during the project's lifetime of 50 years.

The Mississippi River provides drinking water for St. Cloud, Minneapolis and St. Paul. In the Yellowstone River 2015 Pipeline Spill under the ice near Glendive, Montana, the drinking water had to be replaced with truckloads of fresh water brought into Glendive. The United States Geological Service Nov 2010 National Research Program document "Water Security – National and Global Issues" https://pubs.usgs.gov/fs/2010/3106/pdf/FS10-3106.pdf references the United Nations Environment Programme (1999) projects that:

- By 2025, global freshwater stress, owing to increasing population, on water use will increase significantly, especially in northern Africa, Eurasia, the Middle East and even the Unites States, and by 2050, nearly 5 billion people will be affected by freshwater scarcity.
- By 2025, across the United States the water withdrawal as percentage of total available is projected to be 20 to 40 percent.

According to the Environmental Protection Agency, the Great Lakes, including Lake Superior, provide 84% of North America's surface freshwater and about 21% of the world's supply of surface freshwater. See https://www.epa.gov/greatlakes/great-lakes-facts-and-figures.

Given the projections listed above about water scarcity combined with the Environmental Protection Agency's facts and figures about the Great Lakes, it is clear that the potential damage to society of an oil spill in Minnesota is dire for Minnesota residents and to the citizens of other U.S. states and Canada who rely on the Mississippi as well as the Great Lakes for their water supply.

There has been an incredible growth in wind and solar energy in the last few years. Volvo just announced that it will start using only electric and hybrid engines in its vehicles. Given this, it is clear that safer alternatives than building oil pipelines, which will endanger drinking water, surface water, ground water and food supplies. It is the Minnesota Department of Commerce's duty to seriously consider these other alternatives for its society when looking at the request for the Certificate of Need for this new pipeline project. The EIS does not address the need for the Enbridge Pipeline.

The Department of Commerce also must conduct in independent analysis and consider alternatives to bringing more oil into Minnesota. It cannot rely solely upon information provided by Enbridge or other oil companies or it will be abandoning its duty to conduct an independent review considering the risks and benefits for residents of Minnesota. The Department of Commerce should provide the information on the independent contractors that compiled the EIS. Did the Department of Commerce confirm that there was no conflict of interest when it hired the private contractors to conduct the EIS? Was there an open, public procurement? Where did the Department of Commerce obtain the money to pay the fees for the private contractor who prepared the EIS?

Minnesota residents are counting on the Minnesota Department of Commerce to make responsible choices for the current citizens of Minnesota, future generations of Minnesotans and for Minnesota tourism. This means the Department must consider whether the economic benefits of this pipeline project are necessary and compelling enough to risk clean drinking water as well as the fishing, food and recreational industries that depend on clean surface and groundwater.

The Department of Commerce must deny Enbridge a Certificate of Need for the Proposed Pipeline and Enbridge's proposed pipeline route. Moreover, alternative route SA-04, which may have less clear impact on surface water, fails to account for the damage an oil spill will do to groundwater in along that route and also should be rejected.

Sincerely,

Kirsten Anderson
861 Elizabeth Street,
San Francisco, CA 94114

Levi, Andrew (COMM)

From: laurelanderson@frontiernet.net
Sent: Monday, July 10, 2017 10:56 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 (CN 14-916 and PPL-15-137

Dear MN Department of Commerce:

I have grave concerns about the proposed Enbridge Line 3 Pipeline (CN-14-916 and PPL-15-137) because of environmental risks for essential bodies of water, dangers to public health, and violations of treaty rights. The Enbridge Line 3 Draft Environmental Impact Statement utterly fails to address basic conditions for safety and environmental justice. It violates MN Statute 103F.305 Scenic River Protection Policy and MN Statute 116D.02 Declaration of State Environmental Policy.

There has been no free, prior, and informed consent of Tribal Nations. I am deeply concerned about the impact of this proposed project on the health of tribal communities, their sacred sites, and the basic sovereignty of treaty rights.

How can our state approve a project that is guaranteed to spill? Why should our state agree to allow further poisoning of communities and degradation of precious resources, with a company that has a history of major permit violations, and without meaningful accountability? There should be NO consideration of new construction while we await plans for cleaning up the contamination from the countless spills that have already occurred along Line 3.

The "NO BUILD" option needs to be seriously considered. The DEIS poses unacceptable risks to Minnesota waters (for example DEIS Chapters 5.2.1.4; 5.2.1.2.4; 10.2.4.1.1; and 10.4.1). And again, this proposal violates fundamental Tribal Sovereignty. The rights of Tribal Nations as well as the rights of all Minnesotans take precedence over the purported benefits of this project.

Thank you for considering these important concerns.

Sincerely,
Laurel Anderson and David Morris

-

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916, PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Leslie Anderson		
ADDRESS: 306 N 35th St		
CITY, STATE, ZIP: Clear Lake, Ia 50428		

COMMENTS

I support line 3 replacement project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Lynn Anderson <lynn@colordancedesign.com>
Sent: Friday, July 07, 2017 6:25 PM
To: MN_COMM_Pipeline Comments
Subject: Opposition to Enbridge Proposed New Line 3 Pipeline

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

We are submitting comments in opposition to the Enbridge Proposed New Line 3 Pipeline. This concerns docket numbers (CN-14-916 and PPL-15-137). This proposal would cross many Native American sovereign Indian reservation lands, and threaten wild rice crops in pristine bio-diverse habitats in many Minnesota lakes. As property owners of two parcels in Aiken County, Minnesota we have a vested interest in protecting Minnesota's pristine environment and honoring Native American lifeways in their respective communities. These Native communities have already experienced overwhelming health inequities and hardships that include poverty, disruption of their natural diet which has led to a diabetes epidemic, depression and suicide, and gang violence.

The United Nations asserts any project that impacts Indigenous People and their life ways must protect their freedom and rights to prior and informed consent. Since this project has already been proposed without prior and informed consent of the Ashinawbe peoples it does not meet the United Nations criteria. In addition, the state of Minnesota has treaty responsibilities with tribal members it is charged to uphold.

The proposed document is misleading in that it segregates any discussion of Native American rights and potential impacts of this misguided pipeline to a mere chapter which attempts to provide an American Indian perspective. By doing this, Enbridge avoids thinking about and making any conclusions about the impacts of this pipeline on tribal people. (Chapter 9). This in immoral and unconscionable since the proposed Enbridge New Line 3 Pipeline cuts through many sovereign Native American reservations which have rich wild beds and bio diverse environments and archeological remains. This discussion should have been integrated into the entire document. If it were, it would be obvious that the proposal is detrimental and racist towards Indigenous life ways. A 2014 study by the MN Department of Health, established that American Indian communities who already faced huge and seemingly insurmountable inequities would experience additional health stressors with the pipeline construction. Why did this proposal not consider their needs? We are not living in the 1850's when white European greed decimated Native American culture.

Any of the routes proposed along Line 3 would have serious, long term and detrimental effects on tribal members and their resources, since it is only a matter of time until any pipeline leaks. The DEIS concludes that a "disproportionate and adverse impacts would occur to Native American populations in the vicinity of the proposed project which increases the likelihood that sex trafficking and sexual abuse would occur." Yet, goes on to say "that this is not a reason to deny the project." What kind of logic is this? This is greed and racism speaking. We are opposed to this vicious undermining of Native American rights. All of our rights matter. Pipeline construction means bringing in a temporary, cash-rich workforce increasing the likelihood of a thriving camp like wild west culture. The DEIS proposal dismisses this problem, saying they would create an educational campaign regarding this issue. (11.4.1) Does this mean some signage and a short training program

would address such a complex and challenging issue which NGO's tackle? How would a pipeline company be competent in this area?

This "proposal" is irresponsible as it contains no information about spill possibilities for the St. Louis River or the Nemadji River tributaries where spills could decimate the harbors of the Twin Ports and Lake Superior, affecting a much larger area, and impacting tourism in the area.

Other pressing questions that the DEIS fails to address:

- Enbridge has a long history of violating permit conditions so why would the public think Enbridge would suddenly be responsible in this endeavor?
- What is the plan for how the oil would leave Superior, Wisconsin? Is their a plan to build pipeline 66 through Ojibwey territory in Wisconsin? Why does Enbridge refuse to answer this question?
- Where is the discussion of pipeline leaks when it is common knowledge that all pipelines leak overtime?
- What about abandonment of Enbridge's existing mainline corridor (Lines 1, 2, 4) and discussion of the abandonment of new Line 3?
- Why does the DEIS state that it will be very risky to remove the existing Line 3, given that the pipelines are close together?
- Why has the plan to develop a contaminated sites management procedure not been shared? Do they even have one?
- Why does the DEIS not discuss the tax loss when the existing Line 3 shuts down? Enbridge will stop paying taxes to the MN counties along the mainline corridor in the north. For many of these poor counties in the north, revenue from Enbridge’s property tax makes up a significant portion of the county budget. There is also the issue that Enbridge is now in the process of appealing years of back taxes, burdening two of the poorest counties in Minnesota with over $10 million due.

There are too many unanswered questions in this proposal. This is irresponsible planning. The No-Build option needs to be explored, along with shutting down and cleaning up Line 3.

Enbridge should be pursuing renewable energy, conservation, the rapid development of electric car infrastructure as fossil oil sales are already on the decline. Climate change is upon us, as climate scientists are now saying we may only have a few years (2-3) to turn things around before irrefutable damage is done. Around the world their is a growing realization that fossil fuels need to be left in the ground. especially since Indigenous and poor people are disproportionately impacted.

The negative impacts far outweigh anything positive. The priority is to shut down line 3, clean up existing lines, and develop renewable energy infrastructure in Minnesota instead.

Lynn and Tom Anderson
Tamarack, MN

Levi, Andrew (COMM)

From: Mark Dennis Anderson <marcobell78@gmail.com>
Sent: Monday, July 10, 2017 5:59 PM
To: MN_COMM_Pipeline Comments
Subject: Re: Engbridge's plans???

Dear Environmental Review Manager:

I would like to know, in the final EIS for Line 3, what Enbridge's plans are if their preferred route is approved.

Will it be just the one pipeline, or will they eventually move all six pipelines to the new corridor?

This would have a huge effect on how people feel about Enbridge's preferred pipeline route.

Sincerely,

Mark D. Anderson

1615 15th Ave SE
Apartment 360
St. Cloud, MN 56304
(612) 670-1093

Levi, Andrew (COMM)

From: Scott Anderson <jscottgms@gmail.com>
Sent: Monday, June 26, 2017 4:24 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge should be denied....

The last thing we need are more pipelines. Running through wetlands, sensitive environments and in remote areas difficult to monitor and respond to.
Enbridges' track record is not stellar and to continue our dependence on oil, let alone tar sands oil, is living in the twentieth century thinking. What I've learned around this issue is the lack of up keep/replacement of their equipment. Do you then give them more capacity ? Show a commitment to what's installed and I don't believe we need or want more.

Sent from my iPad

Levi, Andrew (COMM)

From: Suzanne Anderson <szmha@live.com>
Sent: Friday, July 07, 2017 11:23 AM
To: MN_COMM_Pipeline Comments
Cc: Suzanne Anderson
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137

7-7-17

My comment letter on the MN Draft Environmental Impact Statement (DEIS) for the Enbridge Line 3 Pipeline Expansion.

Public Comment: Line 3 Project

Docket numbers CN-14-916 and PPL-15-137

Dear Environmental Review Manager,

Thank you to the Department of Commerce for giving the public in Minnesota this important opportunity to express our views.

This is the first time I have taken part as an observer in a public meeting, which I did on June 13, 2017. It is also the first time I have submitted my written comments. I have been a citizen of Minnesota my whole life. My family has owned land for over 90 years just south of the current Line 3 and just north of the proposed Alternate Route. This land is uniquely pristine, vulnerable and crucial as part of the Mississippi Headwaters watershed to keep clean and healthy for all beings living anywhere along the Mississippi River. It is at this crucial time that I feel a moral duty to speak up.

It's our sacred covenant: We are our brothers' keeper, we are the stewards of the earth. As such, producing and using fossil fuels is every bit as immoral and unacceptable as slavery. The time has come for society to abolish its production and use of fossil fuels and products, not expand them. Especially not in this way. Approving Enbridge's plan would set a very bad precedent for the removal (or lack thereof) future pipelines as well.

As with slavery, we have allowed ourselves and our leaders to become dependent upon petroleum products and fossil fuels. That will never make it right, no matter how much we cling to denial and rationalization. Especially now when we know we are capable of transitioning to clean, renewable energy and non-petroleum products. We are at a pivotal moment in history. Do we use our courage to cast off this scourge of fossil fuels, petroleum products and our dependency upon them? Or do we betray our moral obligations to future generations by continuing to accept and allow the poisoning of our water, land, air and people through the process of feeding our dependency on them?

Our grandchildren will look back upon this time and judge us accordingly. We all know that, by our habit of producing and using these products, we are jeopardizing the earth's ability to sustain us. The damage inflicted to ecosystems and communities alike through the construction process, spills, and emissions alone is permanent. There is no moral justification for this.

For goodness sake, just this once, can't we listen to what our native peoples have been telling us all along and do the right thing? For our earth, for our kids, for ourselves? It shouldn't take yet another catastrophe or war to prod us into doing what's right.

With the tremendous rights I have been lucky enough to be gifted as a natural-born US citizen, I understand I have tremendous responsibilities to do what's right including doing all I can to end my dependency on fossil fuels and products. Similarly, each of us, including our leaders, has tremendous power to choose what's right and consequently, to

be looked upon as a hero for many generations to come. I am asking that both our citizens and our leaders make that choice and, together, do all we can to lead us in transitioning our society away from fossil fuels and toward a clean, renewable and sustainable future.

So, what should we do about the Enbridge Line 3 pipeline?

My family's beautiful beachfront property has been a source of healing and rejuvenation for us for over 90 years. That's a mere blink of an eye compared to the amount of time the Native American community has been inhabiting this land and trying to keep it sustainable for us all. They can't do it alone. Enbridge has to do its fair share.

First and foremost, Enbridge needs to be held responsible for completely cleaning up their tremendous mess along Line 3 NO MATTER WHAT. Since they were the ones who created it and profited from it, they are the ones responsible for it. PERIOD. Why haven't they replaced the decaying, cracked Line with new pipe in the same location LONG before now?? Abandonment is NOT an acceptable option. They need to REMOVE the faulty line and ACTUALLY do the cleaning up. Just paying a fine, or doing nothing at all is UTTERLY unacceptable. Who else would be allowed to get away with that? And have they no shame about how they will be remembered throughout our future?

The DEIS needs to further address how other countries, like Canada, effectively regulate and hold pipeline companies accountable for ensuring cleanup and removal procedures that are safe, sufficient and followed for old pipelines like Line 3. It also needs to include a much more rigorous analysis of LONG-TERM effects of cumulative poisons in our waters and land from these tar sands oil poisons due to the numerous spills that have already happened, and based on this the high probability that spills will continue to happen in all Enbridge lines.

Second, the DEIS should have included an alternative plan to step down the amount of oil flowing through this pipeline to zero no later than 10 years from now. This plan should also include the requirement that, once Line 3 shuts down in 2027, they should have no more than 5 years to remove that pipeline and completely clean up the toxins. As has been done in Canada, they need to provide us with an insurance plan to make sure they comply with this plan.

Enbridge should NOT be allowed to destroy a whole new path through the Mississippi headwaters and the most pristine and vulnerable ecosystem in the state. PERIOD. They have proven to be very bad stewards of the land. Their construction camps destroy communities and create new sex trafficking, putting local girls at high risk of kidnapping. Also, in the last 16 years alone, their Line has required over 950 excavations. Their spills have already impacted high quality watersheds, land, and wildlife badly. We should NOT give them permission to do this again in a new location. NO to Line 3 expanding or being abandoned and replaced with a new pipeline.

There comes a time when it is essential to stand up and say, "Enough is Enough." It's immoral to support Line 3 expansion, abandonment or replacement just as it was immoral to support slavery. Knowingly allowing more and more poison in our waters and land that cannot be sufficiently removed to avoid long-term affects has to stop. As hard as this may be to accept, we must find the courage and the will to say NO to any new pipelines and YES to complete removal and cleanup of existing pipelines and YES to transitioning to non-petroleum products. Our future depends on it.

Again, thank you for this opportunity for Minnesotans to express their views.

By: Suzanne Anderson Maplewood, MN 55109 651-247-4147

Levi, Andrew (COMM)

From: Tim Anderson <ta25123742@aol.com>
Sent: Monday, July 10, 2017 11:51 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline Project
Attachments: Line 3 Project Comments

Follow Up Flag: Follow up
Flag Status: Flagged

Please accept my comments regarding the Line 3 Pipeline Project

Jamie MacAlister, Environmental Review Manager
Energy Environmental Review and Analysis
Minnesota Department of Commerce
85 7th Place East, Suite 500
Saint Paul, MN 55101-2198

Dear Ms. MacAlister,

I am writing in response to the Draft Environmental Impact Statement for the Line 3 Pipeline Project proposed by North Dakota Pipeline Company LLC and Enbridge Energy The project is currently before the Minnesota Public Utilities Commission, the designated Responsible Governmental Unit, for consideration of a Certificate of Need and Route Permit (CN-14-916/PPL-15-137)..

I have several concerns regarding the DEIS. They include the reality of the need for the project, the economics of energy production, pipeline safety, environmental concerns, and human impacts.

Regarding the Certificate of Need, there are many reasons to question whether it should be granted. Several relate to the economics of oil. The current price of Brent crude oil is $47 dollars/barrel. According to the June 14, 2017 issue of the New York Times, the oil industry has experienced its deepest downturn since the 1990's. In fact, oil prices continue to trend downward. Oil prices are depressed because there is a glut of oil. According to the May 3, 2016, *Wall Street Journal*, U.S. oil storage is near capacity, and the U.S. Energy Information Administration shows 2017 inventories are 1.6% higher. These facts clearly show there is no need for the oil produced from the Alberta tar sands, which means it is likely destined for other countries. One reason for this glut of oil is the increased use of renewable sources of energy. The U.S. Energy Information Administration projects an 11.3% increase in electricity provided by renewable energy sources in 2016. In fact, Minnesota's Next Generation Energy Act and Minnesota's Renewable Energy Standard of 25% renewable energy by the year 2025 has made Minnesota "an energy sector leader with more than 15,000 clean energy jobs, which contribute more than $1 billion in wages to our economy. It helped wind energy become a reliable, affordable source of electricity for Minnesota, while taking the equivalent of one million cars off the road." A new goal of 50% renewables by the year 2030 "will help Minnesota remain an energy leader and capture the health, environmental, and economic benefits of clean energy."

Another factor related to the economics of carbon based fuels like oil that are not often addressed, is their costs due to climate change and their impacts on public health. These are often referred to as externalities because they are viewed as a cost experienced by unrelated third parties. But that is exactly the type of thinking that has resulted in many of our environmental problems. By understanding that everything is interconnected, there is no such thing as an unrelated third party, and therefore these costs need to also be addressed. The U.S. Environmental Protection Agency estimates $180 billion dollars in economic losses by the end of the century due to the effects of climate change caused by the burning of fossil fuels, and $886.5 billion dollars annually due to impacts on health caused by fossil fuel pollution. Recently, the Climate Central website reported flaring of natural gas in the Bakken shale oil fields added 4.5 million metric tons

of carbon dioxide, a greenhouse gas, and significant amounts of ethane, nitrogen dioxide, and black carbon (lung irritants) to the atmosphere. Do we really need these things?

If the PUC chooses to ignore the evidence against granting the Certificate of Need, then careful consideration needs to be given to selection of the least environmentally damaging route as required by MEPA. The only way to adequately analyze impacts to the environment is to give them equal weight to any economic considerations. One way to do this is to account for the value of ecosystem services provided by natural environments. These services include atmospheric gas and climate regulation; water filtration, storage, and retention; storm protection and flood control; soil retention and erosion control; nutrient storage and cycling; pollination sources and food production; biological materials and products; genetic resources; and cultural and recreational uses. Robert Costanza et. al., in an article published in *Nature*, volume 387, May, 1997, estimated these services to be worth an average of 33 trillion dollars per year to the planet. The only way to adequately quantify these services is to conduct robust, independent GIS and economic analyses of all proposed system and route alternatives. Several of the alternatives, in accordance with MEPA, seek to avoid some of the most pristine watersheds in the state, including the Lake Superior basin, and deserve serious consideration. Again, these costs are not externalities – they are costs directly associated with the impacts on our health and quality of life.

Another cost associated with pipelines is pipeline safety. Enbridge is responsible for pipeline spills ranging from 200 gallons in the Upper Peninsula of Michigan to 800,000 gallons in the Kalamazoo River in lower Michigan. Despite the range in quantity of oil spilled, what these spills have in common is Enbridge's disregard for pipeline safety. The 200 gallon spill occurred in 1980, but was just recently revealed in a May 9, 2016 article in the Detroit Free Press; and in the 800,000 gallon spill, it was determined by the Pipeline and Hazardous Materials Safety Administration that Enbridge knew about cracks in the pipe for over a year and took over 17 hours to respond to the alarms indicating there had been a rupture in the pipe. These two examples indicate the importance of requiring Enbridge to develop spill response scenarios for all potential types of spills, in all types of aquatic and terrestrial habitats, for all system and route alternatives. In addition, Enbridge should be required to install automatic shut-off valves in all ecologically sensitive areas, and make annual inspections of pipeline integrity using all means necessary including robotic "smart pigs" to identify pipe corrosion, weld failures, and other potential safety issues. And in the event of any oil spill, Enbridge should be required to provide financial assurance against any long-term treatment or disaster, like the Kalamazoo River spill of 2010, the largest inland oil spill in history, which still taints the water eight years later. Enbridge estimates the total costs from the disaster at $1.2 billion, and state taxpayers should not be left holding the sponge if Enbridge goes belly-up like many of the fish in the river.

Fish are just one example of food and medicinals indigenous people were granted rights to hunt and gather for their physical and spiritual health. Others include wild rice, maple syrup, game animals, berries, sweet flag, and ginseng that the MPUC needs to consider when analyzing the impacts of the proposed system and route alternatives. All means necessary should be taken to preserve these resources for native peoples.

While on the surface, the Line 3 Replacement project might seem like a good thing (for it replaces an old deteriorating pipeline), a deeper look into the ecological

impacts of the tar sands it will transport makes it abundantly clear it is also a disastrous proposal. James Hansen, a leading NASA climatologist who has studied climate change since at least 1988, said in the January, 2013 issue of *Scientific American*, "Moving to tar sands, one of the dirtiest, most carbon-intensive fuels on the planet, is a step in exactly the opposite direction …" when referring to avoiding tipping points that will result in run-away and irreversible climate change. In addition, the physical and chemical properties of tar sands makes spill clean-up extremely difficult as shown by the 2010 Kalamazoo spill which still has not been completely mitigated.

There are many concerns regarding the proposed construction of the Sandpiper pipeline and replacement of Line 3. I have highlighted several reasons the Certificate of Need should be denied. If the MPUC chooses to ignore what is in the best interest of the state citizenry and grant the Certificate of Need, then please insure the least environmentally damaging route is selected in accordance with the MEPA.

Respectfully,

Tim Anderson
Biology Instructor/Environmental Educator
2195 Olson Rd.
Carlton, MN 55718

Levi, Andrew (COMM)

From: Wendy Anderson <wendysa@me.com>
Sent: Friday, July 07, 2017 11:52 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 through MN

Whomever it may concern:
I think trying to run another line (Line 3 through MN) is a complete mistake.
You must understand the passion and love people have for our clean water and air .
This state is dedicated financially and economically to our lakes, streams and wildlife.
Besides the passion of the people (i am a white upper middle class professional living in Sw Mpls) for preserving our ecology, I think there are many obstacles to consider.
What about land owner options?
Oil spills????????? Don't lie you KNOW they happen
Treaty Rights
The harm to our entire state that depends on our ecology for economic reasons.
The inevitable climate change situation (Isn't this what Homeland Security says is our #! threat?)
People will fight tooth and nail in this state. Plus we saw STANDING ROCK! (how shameful)

WHEN YOU MESS WITH OUR NATURE YOU MESS WITH ALL OF US!

ALSO, HOW ABOUT CLEANING UP YOUR OLD LINE? WHY WOULD YOU LEAVE SUCH A MESS?

OUR AIR AND WATER ARE YOUR AIR AND WATER

Wendy J. Anderson
Licensed Gyrokinesis® and Gyrotonic® Trainer / Pre-Trainer
wendysa@me.com

612-964-3315

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Zack Anderson	218 591 6439	
ADDRESS		
1331 Central Hall rd		
CITY, STATE, ZIP		
cloquet MN 55720		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Alan Andreae <alanancy@citlink.com>
Sent: Thursday, June 29, 2017 7:38 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I am a Minnesotan and want to see the environment protected like most others.I believe replacing aging infrastructure like pipelines is imperative to protecting the environment. Enbridge has found a route that follows existing utility corridors.
Pipelines are everywhere in Minnesota, according to the Environmental Quality Board's report. I'm familiar with pipeline right of ways in northern Minnesota around Bemidji, Grand Rapids, Cass Lake and Alexandria. Pipelines and natural resources have gone hand-in-hand in northern Minnesota for decades. As a resident of northern Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project.
I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3.
No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS. Please keep the EIS timeline to the statutory deadline of 280 days. Enough is enough!!!

Sincerely,

Alan Andreae
644 E James St
Ely, MN 55731
alanancy@citlink.com

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

ST PAUL MN 551
JUL 2017 PM 5 L

USA FOREVER 2015

Dear Ms. Macalister
I am deeply concerned about the damage the Line 3 pipeline will do to the environment, the Tribal people, sacred sites, wild rice lakes and on and on.
Please respect the land and it's people.
Thank you

SINCERELY,

Julia Andreas Darlington

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Levi, Andrew (COMM)

From:	vicandr@mchsi.com
Sent:	Monday, July 10, 2017 8:54 PM
To:	MN_COMM_Pipeline Comments
Subject:	Public Comment Line 3 Project (CN-14-916 & PPL-15-137)
Attachments:	Line 3 Replacement Comment (Autosaved).docx
Importance:	High

To: Environmental Review Manager

I did speak at the public hearing in Grand Rapids, I hope my comments got in then but I could find no way to check and see if they did.

Attached is a message with additional concerns.

Thank you for the opportunity to comment on this important matter.

Vicki Andrews
31135 Sunny Beach Road
Grand Rapids MN
218-259-4254

Line 3 Replacement Comment

To: Environmental Resource Manager

From: Vicki Andrews
31135 Sunny Beach Road
Grand Rapids MN 55744

Re: Docket numbers: CN-14-916 and PPL-15-137

Additional concerns about the Line 3 Replacement DEIS
(in addition to spoken testimony given at hearing in Grand Rapids MN)

I am very concerned about the total cost of carbon and an estimate of the financial burden on society due to increased climate change impacts of building the pipeline. According to your document, this could be as high as $287 billion over a 30 year timespan. Thank you for including this, but we need to realize that the pipeline could last much longer than that, which would greatly increase the impact. The DEIS should update the figures to reflect that. Another estimate I recently read (The Line 3 DEIS Highlight Reel by Honor the Earth) states that the lifecycle emissions of Line 3 would be 193 million tons of CO2 each year. Over a 50-year lifespan that would cost society an estimated $478 billion. I would really like to see some consideration of how that amount of money could provide solar panels and wind turbines, in addition to many new jobs, across the state of Minnesota. Why are we spending more and more money to use fossil fuels for energy when we know this will impose an incredible financial burden (as well as illness and death) to future generations! This money should be used for cleaner, greener energy!

I think the consideration of rail and trucking alternatives are ridiculous. They are not good alternatives to pipelines as there is much risk of additional pollution, accidents, and explosions along the line, as well as the need for additional roads and/or tracks, which causes serious environmental damage. The only intelligent alternative is to stop extracting and shipping oil across our state, across our country. We need to immediately change from a fossil fuel economy to a clean energy economy, building and maintaining solar and wind power across the states and making it accessible to all. It's wrong to even consider building this pipeline across our state, when we know the damage it will cause and the cost of the financial burden over the years.

I am also concerned about the potential damage that will likely be caused by the plan to abandon the original pipeline 3. It already has had serious leaks and has many more anomalies. Sections are above ground and can be seen to be rusting through. This will not get better over time. There is danger from the shifting of the pipeline, possible leakage and seepage of the chemicals they fill it with, damage done to the Earth from shifting and rising. The DEIS says that Enbridge clean-up method has only been proven successful on a 12 mile stretch of pipe; the existing Line

3 in Minnesota is 282 miles long. There needs to be much more analysis of this as well as more of a commitment from Enbridge as to what they will be legally liable for in the future of this abandoned pipeline. They should be required to set aside money to be available when needed.

In my spoken testimony, I mentioned the concerns about Indigenous Peoples' rights and the harm this pipeline could cause them. The likelihood of sex trafficking for the "benefit" of the imported workers is a tragedy. We've seen it happen before, we don't need to set up a situation where it is certain to happen again. Chapter 9 on Tribal Resources states that any of the possible routes for Line 3 "would have a long-term detrimental effect on tribal members and tribal resources", Chapter 11 acknowledges that pipeline impacts on tribal communities are part of a larger pattern of structural racism that tribal people face in Minnesota and "would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities". In addition there is the almost certain damage to prime wild rice beds, areas rich in biodiversity and critical forests and waterways. Allowing the pipeline to be so close to the headwaters of the Mississippi River is totally inappropriate. There also needs to be further and more complete analysis of the archaeological resources in the path of the pipeline. These issues need much more research and clarity so we can really understand the dangers of this project, both now and in the future.

The DEIS says there will be zero permanent jobs created and that this proposal would bring in many construction jobs that will be filled by out of state workers. I know unions and construction workers are expecting jobs from this and don't believe these statements. This needs to be clarified. How many and what type of jobs will be available for local people. The only reason many support this proposal is because of the hope for employment. They deserve to know if this is not going to happen.

Levi, Andrew (COMM)

From: Mary Androff <maryandroff@gmail.com>
Sent: Sunday, July 02, 2017 11:57 AM
To: MN_COMM_Pipeline Comments
Subject: Grave Concerns re: Enbridge Line 3 (CN-14-916 and PPL-15-137)

Dear MN Department of Commerce:

I am strongly opposed to the proposed Enbridge Line 3 Pipeline because of the environmental risks for essential bodies of water, dangers to public health, and violations of treaty rights. The Enbridge Line 3 Draft Environmental Impact Statement utterly fails to address basic conditions for safety and environmental justice. It violates MN Statute 103F.305 Scenic River Protection Policy and MN Statute 116D.02 Declaration of State Environmental Policy.

There has been no free, prior, and informed consent of Tribal Nations. I am deeply concerned about the impact of this proposed project on the health of tribal communities, their sacred sites, and the basic sovereignty of treaty rights.

How can our state approve a project that is guaranteed to spill? Why should our state agree to allow further poisoning of communities and degradation of precious resources, with a company that has a history of major permit violations, and without meaningful accountability? There should be NO consideration of new construction while we await plans for cleaning up the contamination from the countless spills that have already occurred along Line 3.

The "NO BUILD" option needs to be seriously considered. The DEIS poses unacceptable risks to Minnesota waters (for example DEIS Chapters 5.2.1.4; 5.2.1.2.4; 10.2.4.1.1; and 10.4.1). And again, this proposal violates fundamental Tribal Sovereignty. The rights of Tribal Nations as well as the rights of all Minnesotans take precedence over the purported benefits of this project.

Thank you for considering these important concerns.

Sincerely,

Mary Androff
2201 Jackson Circle
Marine on St Croix, MN 55047

--
Mary Androff, MD
651-917-9395
www.drmaryandroff.com

Certified AEDP Therapist

"Don't ask yourself what the world needs. Ask yourself what makes you come alive, and go do that, because what the world needs is people who have come alive." Howard Thurman

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I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Suzanne Anich	218-590-7288	
ADDRESS		
1573 Carlton Ave. W. #1		
CITY, STATE, ZIP		
Cloquet, MN 55720		

COMMENTS

Yay Bruce go!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

From: April Anson
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 pipeline proposal
Date: Tuesday, May 30, 2017 9:51:46 PM

The DEIS for the pipeline is inaccurate, incomplete, and based on biased assumptions. We know that all pipelines leak, and this one will never bring enough oil (which is running out and dangerous to extract) to make it worth the millions of lives that will be put further at risk.

Please think about the future, your future, our future. Water IS Life. Where would we be without it? Imagine spending the money on sustainable energy infrastructure - imagine the legacy that your family will know you were a part of.

Water is a gift right from god. Thank you for protecting the gifts that we are blessed, not entitled, to have.

April Anson

Levi, Andrew (COMM)

From: Brian Hanson <Brian@ApexGetsBusiness.com>
Sent: Monday, July 10, 2017 12:05 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Docket Numbers CN-14-916 and PPL-15-137
Attachments: Line 3 Enbridge Comments 7_10_17.pdf

Dear Ms. MacAlister & Team:

Attached please find comments from APEX regarding the Line 3 Replacement Project.

Thank you.

Brian W Hanson
President & CEO
APEX
306 W Superior St
Suite 902
Duluth, MN 55802

O 218.740.3667
C 218.730.7330

July 10, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

RE: LINE 3 REPLACEMENT PROJECT – Docket Nos: CN 14-916 and PPL-15-137

Since 2003, the Area Partnership for Economic Expansion (APEX) and our 70+ investor-members, have played an active role in business development in the APEX region of northeast Minnesota and northwest Wisconsin, including the Twin Ports of Duluth and Superior. APEX investor-members represent some of the most influential companies in the region, with a collaborative approach to promoting sustainable economic growth. Throughout the past 14 years, APEX's collective efforts have impacted more than 4,200 jobs in the region, resulting in a regional payroll of over $170 million and contributing to over $23 million in state and local taxes annually. We are proud of that contribution to our economy.

APEX is proud to work with our investor-members and partners to advance important projects in our region. I am specifically writing you today regarding Enbridge's Line 3 Replacement Project. APEX has actively participated in the extensive public process. Through that process we have become very comfortable that the Draft Environmental Impact Statement (DEIS) is thorough, and well-prepared. Further, we support the certificate of need and preferred route applications for this project, and we hope this project can move forward without delay.

To measure the economic impact of the Line 3 Replacement project for ourselves, the Bureau of Business and Economic Research (BBER) at the University of Minnesota Duluth's Labovitz School of Business was commissioned by APEX to conduct an economic impact study. Findings indicated this project would inject more than $2 billion in direct spending to Minnesota's economy. In a two-year timeframe, Enbridge's Line 3 project will create over 8,600 jobs in our region, representing a significant contribution to the local economy, including significant state and local tax generation. In addition, the study indicated non-local construction workers will spend approximately $162 million in northern Minnesota during the two-year construction period in retail, lodging and food service sectors. Finally, when construction is completed, a new and improved Line 3 will contribute an estimated $19.5M in property taxes to state and local government on an

annual basis. While APEX is confident in the overall results of the DEIS, we did feel it was important to highlight this helpful information.

Statewide, Line 3 will ensure the safe delivery of abundant, dependable energy that is vital to Minnesotans' homes; fueling vehicles, rail lines, ships and aircraft; and creating products like plastic, asphalt and chemicals for residential and industrial uses. Here in the APEX region, Enbridge directly employs hundreds, and supports a contractor workforce numbering hundreds more. These dedicated professionals are part of a carefully crafted team that administers construction projects all across North America. These teams have led construction projects in several states and provinces. Unfortunate delays here in the state of Minnesota are putting these jobs, significant investment, and our regional economy, at great risk. If delays continue, there are no guarantees that Enbridge can continue to move forward with the Minnesota builds in a time when all of Minnesota, especially the northern part of our state, could use the economic boost.

The economic benefits, safety and efficiency of shipping oil through pipelines, and public support for this project should emphasize the importance of seeing this process through, in a timely and effective manner. We ask that the Department of Commerce declare the DEIS adequate, and move forward with Approving the Certificate of Need and preferred route applications.

Thank you for the work you do for the state of Minnesota and thank you for your dedication in moving this project forward.

Sincerely,

Brian W. Hanson
APEX President & CEO

Levi, Andrew (COMM)

From: Nancy <Nancya@shipsquarters.com>
Sent: Wednesday, July 05, 2017 9:50 PM
To: MN_COMM_Pipeline Comments
Subject: Comment on Pipeline Pipeline 3
Attachments: Jamie MacAlister
July.pdf

Jamie MacAlister July, 7, 2017
Environmental review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St Paul, Mn 5501

To Whom It May Concern

Re: Proposed Pipeline Number 3

I wish to provide the following public comment for the comment period that ends July 10 2017:

In reviewing the public materials, I believe that pipeline should be replaced given the age of the facility, increased risk of leakage an obsolete pipeline harbors and the fact that Enbridge has a significant investment in an already overall functioning pipeline system.

I am a user and property owner in the watershed impacted by this project. In my view, the real environmental risk of a pipeline is a future break in the pipe. Parts of the pipeline in lengthy water/wetland crossings make it more difficult to detect leaks and to effectively clean up the spillage. As a result I believe that the southerly route has attributes that outweigh the other routes proposed as alternatives. Route RA-03AM, while more expensive due to the increased distance, navigates around significant watershed issues except at the expense of the trout habitat. However, short trout steam crossings and increased farmland routes make the monitoring of future leaks more manageable than lake/wetlands crossings required by the other options. The increased product capacity of the new pipeline over the replacement pipeline provides Enbridge the financial ability to pay for the increase cost required by Route RA-03AM.

Steve Apfelbacher
168 6th St East
St Paul, Mn
55101

Levi, Andrew (COMM)

From: mandalf3000@gmail.com on behalf of Amanda Arend <amandajarend@gmail.com>
Sent: Thursday, July 06, 2017 11:33 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Draft Environmental Impact Statement (DEIS) -- CN-14-916 and PPL-15-137

To whom it may concern:

I would like to provide my comments in opposition to the Proposed Pipline (Line 3) over the Kettle River.

During pipeline construction and maintenance, Enbridge plans to store and apply petroleum products and hazardous chemicals 100 feet from surface waters.

This is an unacceptable risk to MN waters. For comparison, the Boundary Waters Canoe Area Wilderness rule for protecting water is to keep dish soap 150 feet from shore.

Horizontal Directional Drilling (HDD) will be used to cross under our most pristine, most sensitive waters, and anywhere there is flowing water, which describes most of the route. The potential exists for contamination through release of drilling fluid to the ground and/or water, termed a “frac-out." The DEIS cites a 35 mile section of Enbridge pipeline in Michigan where there were 11 HDD crossings, multiple minor releases and 2 major frac-outs. MN will not accept the risk of a frac-out every 5.5 river crossings.

"The annual probability of a spill incident for the Applicant’s preferred route was estimated as 0.249 incidents per year with a recurrence interval of 4.0 years." -- Every year there would be a 25% risk of an oil spill and one every four years. We should not accept this high risk probability.

Regarding river oil spills, the DEIS uses a 10 mile Region of Interest (ROI), when we know that an oil spill can pollute more than 35 miles downstream (Enbridge's oil spill in the Kalamazoo was 35 miles). The ROI in the EIS should include at least 35 miles of impact.

The State of Minnesota cannot say it values its natural landscapes and geographical beauty while also supporting this pipeline which puts these resources in great danger. My extended family has been enjoying the waters of Minnesota for decades, please make sure our children and generations to come can still enjoy our state.

Regards,
Amanda Arend

CN-14-916 and PPL-15-137

Levi, Andrew (COMM)

From: Mark Arend <mark.arend83@gmail.com>
Sent: Monday, July 10, 2017 1:20 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Draft Environmental impact statement (DEIS) --CN-14-916 and PPL-15-137

To whom it may concern:

I would like to provide my comments in opposition to the Proposed Pipline (Line 3) over the Kettle River.

During pipeline construction and maintenance, Enbridge plans to store and apply petroleum products and hazardous chemicals 100 feet from surface waters.

This is an unacceptable risk to MN waters. For comparison, the Boundary Waters Canoe Area Wilderness rule for protecting water is to keep dish soap 150 feet from shore.

Horizontal Directional Drilling (HDD) will be used to cross under our most pristine, most sensitive waters, and anywhere there is flowing water, which describes most of the route. The potential exists for contamination through release of drilling fluid to the ground and/or water, termed a “frac-out." The DEIS cites a 35 mile section of Enbridge pipeline in Michigan where there were 11 HDD crossings, multiple minor releases and 2 major frac-outs. MN will not accept the risk of a frac-out every 5.5 river crossings.

"The annual probability of a spill incident for the Applicant’s preferred route was estimated as 0.249 incidents per year with a recurrence interval of 4.0 years." -- Every year there would be a 25% risk of an oil spill and one every four years. We should not accept this high risk probability.

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The State of Minnesota cannot say it values its natural landscapes and geographical beauty while also supporting this pipeline which puts these resources in great danger. My extended family has been enjoying the waters of Minnesota for decades, please make sure our children and generations to come can still enjoy our state.

Regards,
Mark Arend

CN-14-916 and PPL-15-137

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Deb Arro	2184762507	
ADDRESS		
5577 Hwy 73		
CITY, STATE, ZIP		
Floodwood MN 55736		

COMMENTS

I Support the Maint Project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Jeremy Lehman <Jeremy@tritecmn.com>
Sent: Monday, July 10, 2017 9:44 AM
To: MN_COMM_Pipeline Comments
Subject: Arrowhead Manufacturers and Fabricators Association comment on Enbridge Line 3
Attachments: Enbridge Line3 AMFAltr.pdf

Please find Arrowhead Manufacturers and Fabricators Association's (AMFA) comment on Enbridge Line 3 Replacement project, docket numbers CN-14-916 and PPL-15-137 per attached file.

Thank you,

Jeremy Lehman
Production Manager of Machining
TriTec of Minnesota, Inc.
Virginia, MN 55792
218-741-1083 phone
218-404-6860 cell
jeremy@tritecmn.com
www.tritecmn.com

President
Arrowhead Manufacturers and Fabricators Association

Arrowhead Manufacturers & Fabricators Association

P.O. Box 150 • Elbow Lake, MN 56531-0150
877.330.2632
midwest@runestone.net • www.amfa-mn-wi.org

July 10, 2017

Re: Arrowhead Manufacturers and Fabricators Association Support for Enbridge Line 3, Docket numbers CN-14-916 and PPL-15-137

The Arrowhead Manufacturers and Fabricators Association (AMFA) is a member-driven organization whose mission is to strengthen and grow the manufacturing industry in Northeast Minnesota and Northwest Wisconsin.

Our Board of Directors recently passed a resolution by unanimous vote to support Enbridge's Line 3 pipeline replacement project. This is a vital piece of energy transport infrastructure and should not be delayed any further. The State of Minnesota relies on Enbridge to supply crude oil to two large refineries in the Twin Cities area, meeting nearly 80% of the refining demand. This project is based on demand from the marketplace. The prompt replacement of Line 3 is an essential project for Minnesotans that will ensure the safety and environmental protection of our important natural resources as well as the continued safe transportation of crude oil to refineries in Minnesota, the Midwest and beyond. The project will also restore the line's original carrying capacity of 760,000 barrels per day (bpd), from its current 390,000 bpd. The Line 3 Replacement Project will allow Enbridge to continue to meet the needs of Minnesota and other regional refineries. If the project goes through, it will mean many pipefitters and other tradesmen will be employed to build the pipeline, in addition to the positive economic impact to the suppliers and other companies in the area, many of whom are our members.

As such, our Board sees the positive impact this project will have on our region, as well as our member companies. It is for these reasons we are in support of the Line 3 pipeline replacement project. I do this on behalf of our Board of Directors and over 100 member companies.

Respectfully,

Jeremy Lehman
President, Arrowhead Manufacturers and Fabricators Association

AMFA CELEBRATING 1997-2017 20 YEARS

Levi, Andrew (COMM)

From: Arsan, Karin P <karin.arsan@exceltd.com>
Sent: Thursday, July 06, 2017 4:44 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

To Environmental Review manager:

You need to choose a route that does not have detrimental impact on the Tribes of Minnesota and their wild rice wetlands. The Native American Tribes need to be included in the decision as to where the line will run. As planned it will have detrimental effects on their lands, waters, and wetlands when there's a leak. And there are always many leaks. And the type of tar sand oil they propose to transport will be impossible to clean up in the wetlands and lakes of northern MN. The spill analysis was not conducted on the type of wetlands and waters that the proposed route will cross. They need to expand the modeling for water spill sites.

Also what will you do in response to the EIS? Please name the contractor and show proof of a contract and let Enbridge not be the one managing this.

We need to keep our waters and wet-lands free of the contamination of oil. Please run this pipeline further south and not through lake country.

Karin Arsan
4817 Boone Point Road NW
Hackensack, MN 56452

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
JP ARVIN	(317) 796-8183	jp_arvin@hotmail.com

ADDRESS
1875 WYNDAM DR.

CITY, STATE, ZIP
SHAKOPEE MN 55379

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Kenneth Ashe
To: MN_COMM_Pipeline Comments
Subject: Line 3 pipeline
Date: Saturday, June 03, 2017 8:37:52 AM

Good Day,

This is in regards to docket items: CN-14-916 and PPL-15-137

The people of the earth are facing an existential crisis known as global climate change. It is real. It is deadly serious. It needs our attention NOW!

We do not need any more petroleum pipelines because we need to quit using fossil fuels.
]
Please reject this proposed pipeline. The future is in renewable power not hydrocarbon fuels.

Renewable energy creates many many jobs. It leaves the air and water clean to be used by all the people. Can't say that about oil!

Do the right thing. Stop the madness.

The men wanting to build more pipelines have gotten very rich and powerful by exploiting mother earth. They will not stop. You have the power to stop them for us.

Ken Ashe
Viet Nam veteran and friend of the earth

Dear Mr. Jamie Macalister
Environmental Review Manager
MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

I want to voice my strong objections to Enbridge's appeal to create a new Line 3. I am gratified to note that most of those present at the Saint Paul June 13th meeting spoke eloquently in favor of defending the environment against the degradation this pipeline poses to our land and water. I share their detailed concerns. What follows, in bullet fashion are my major concerns and objections:

- *Stewardship and Responsibility*: Why aren't we holding Enbridge responsible for funding and removing all of the original pipeline before granting them permission to lay an alternate line? Also, if Enbridge is issued a route permit, why isn't Enbridge required to set aside funds in escrow to cover potential mishaps and disasters while its pipeline exists on our lands? Individual landowners should not be expected to pay for the clean-up of potential Superfund sites left behind by companies like Enbridge, which may go bankrupt or dissolve or otherwise change – and so escape accountability for the problems such projects will create.

- *Guidelines and Definitions:* At the state level, we should establish abandonment guidelines and definitions for intrastate crude oil pipelines. Those guidelines should make clear what Enbridge's responsibility is for the pipelines it already has in place and for any future pipelines it creates in Minnesota. This should be done before any further construction occurs.

- *Risks of Profound Environmental Damage*: Pipeline 3 and the alternate route both pass through vulnerable wetlands, so pose a grave risk to these environments. Tar sands oil is very dirty and heavy, so a ruptured or leaky pipe could devastate these waters, including the Saint Louis River watershed and Lake Superior. Enbridge's history of good stewardship is not encouraging. Need I site the 1991 spill that dumped 1.7 million gallons of oil near Grand Rapids? Along with this are numerous other leaks and spills throughout that pipeline's history. Tar sands oil mining is horribly destructive and unnecessarily serves a dying industry at the expense of the wider population and the land itself. We should not support such a ruinous enterprise. We need to invest in cleaner energies that will not contribute to climate change as significantly as this new pipeline would.

My closing statement is that we should refuse Enbridge's request for a pipeline permit. The risks to the common good of the state are too high, and all to profit a mining industry with a dismal record of operating responsibly and transparently.

Sincerely yours,

Louis B. Asher
4525 Birch Ridge Rd.
Vadnais Heights, MN 55127

RECEIVED
JUN 22 2017
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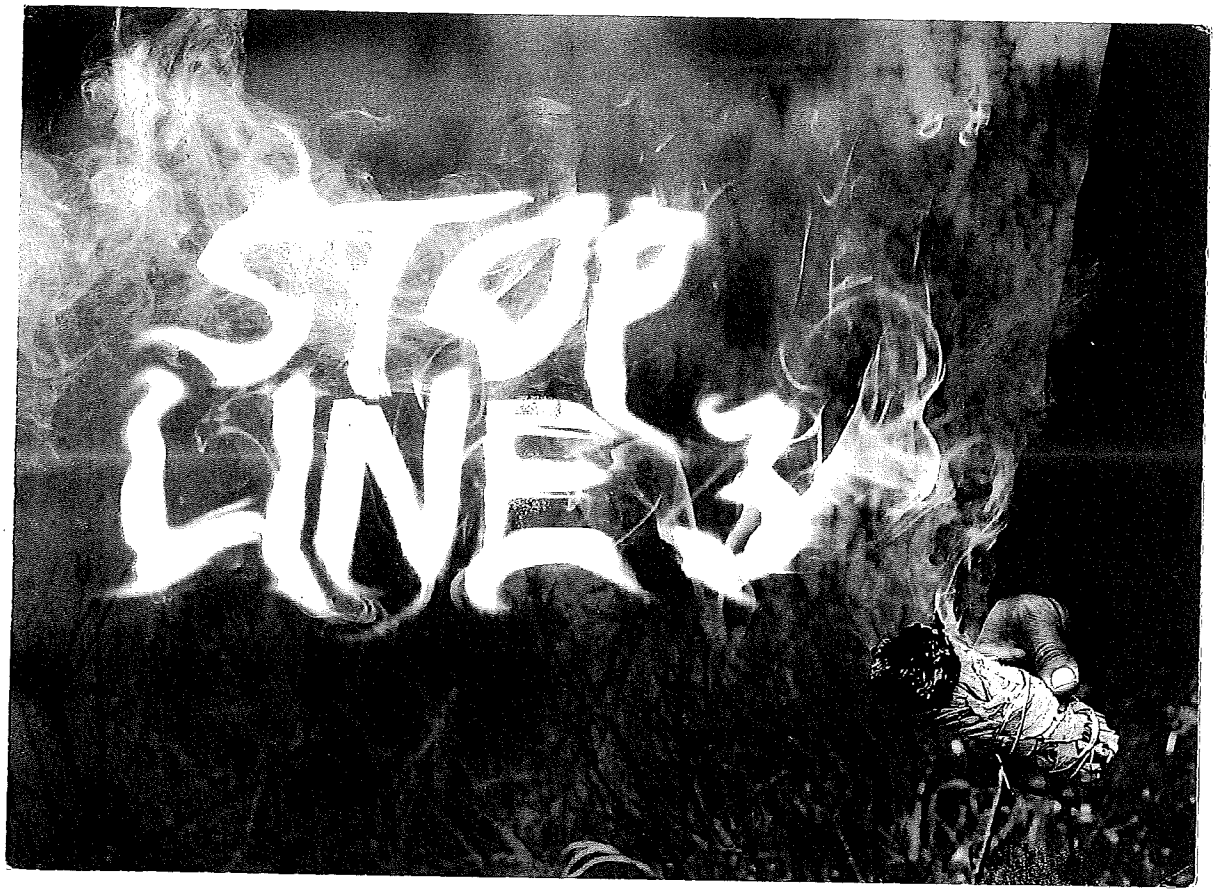

DEAR DEPARTMENT OF COMMERCE, MINNEAPOLIS MN 553
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137 JUL 2017 PM 5

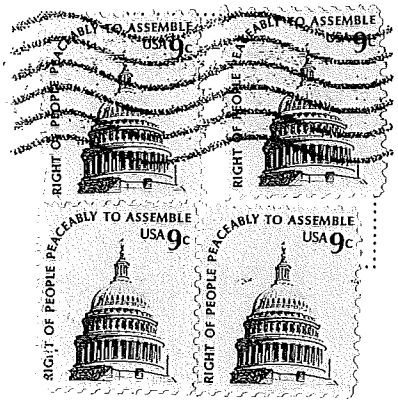

Please have the Company that owns Pipeline Three! If they don't clean it up! who will?

Clara Asp

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

55101-601399

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
07 JUL 2017 PM 3 L

POSTCARD USA

Why is the oil industry's need to profit more important than the people's need to survive?

SINCERELY,

Maria Asp

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Levi, Andrew (COMM)

From: Thomas Atchison <atchison.thomas@gmail.com>
Sent: Wednesday, July 05, 2017 4:36 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

As a resident of northern Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project.
I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3.
No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS.
Please keep the EIS timeline to the statutory deadline of 280 days.

I support the pipeline.

Sincerely,

Thomas Atchison
23091 Agate Lake Ln
Deerwood, MN 56444
atchison.thomas@gmail.com

Levi, Andrew (COMM)

From: Julie Austin <julesdb.austin@yahoo.com>
Sent: Monday, July 10, 2017 9:25 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge 3 Pipeline proposal CN-14-916 & PPL-15-137

As, a Minnesotan and soon to be retiree in Northern Mn, I oppose the building of a new Embridge oil pipeline proposed to reach across the northern part of out great state. We must protect our natural resources. I don't understand is why we need a new pipeline - when jobs can be created by fixing or at least cleaning up after the old one. The proposal for the new pipeline will go through precious tribal ricing territories and spills would definitely threaten waters that support fish & wildlife. Overall, we need to start making a shift away from fossil fuel and like the rest of the world - move more towards renewable energy resources. Also, I ask for careful scrutiny of damage that may have already been done from the original pipelines leakage and possible connects he may cause in the form of cancer and other disease. I believe the overall harm way surpasses the good in this decision. In my view - building new pipelines is not the answer.

Thank you sincerely for your full consideration on this subject. Please acknowledge receipt of this request..

Julie D Austin
936 Ottawa Ave
West St Paul, MN 55118

Also former/future resident of northern MN

Levi, Andrew (COMM)

From: Charles Ayers <cayers@umn.edu>
Sent: Monday, July 10, 2017 11:09 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 PPL-15-137 Enbridge pipeline

Hello,
CN-14-916
PPL-15-137

I am writing to let you know that I believe that the enbridge pipeline should not be allowed to be built along any of the proposed routes nor any other. Valuable time and resources should be used for other projects. Oil and natural gas are not the future. Build for the future of our country and the safety of our environment not for short sighted gains of a few stack holder companies. No new pipelines should be developed for any reason. The existing line 3 which is ancient should be shut down without replacement. Save our lakes respect indigenous peoples!

-Charles Ayers

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55419

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Justin Ayers	218-481-3949	
ADDRESS		
24 Bubalo Drive		
CITY, STATE, ZIP		
Duluth, MN, 55808		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Mn Dn
To: MN_COMM_Pipeline Comments
Subject: Line 3
Date: Tuesday, June 06, 2017 6:49:34 AM

Line 3 has always been disruptive, ruined my grampa's land passed down to me. I'm against Replacement no matter the argument, my family's already been through it.

Levi, Andrew (COMM)

From: Bruce bwc <brucewc7@gmail.com>
Sent: Tuesday, June 20, 2017 4:12 PM
To: MN_COMM_Pipeline Comments

No pipelines! Go Solar!

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: _____

Street Address: _____

City: _____ State: _____ Zip Code: _____

Phone or Email: _____

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

A person we know was at the Fond-Du-Lac Community College on Tue, Jan, 13, 2017. We listened to this person and they told of the discussion on Enbridge. Most of the people who spoke were against a new pipeline. The comments also were on renewable energy like solar power, wind power, and hydro power from water.

I guess many have various opinions. Why not put in a new, safe pipe line, that is small in diameter? Enbridge needs to clean up the messes they have made all over Minnesota however as was stated by a young woman who said she reported a leak in a pipe because of oil leaks. She called Enbridge and told of this, but got no response or an answer at all from Enbridge, why??

Enbridge could then install a new, safe system, maybe not in Native American lands, and hire also all these pipefitters and welders out of a job to restore the environment by planting trees, planting grasses, and garbage left behind also?? This was along old pipeline this mess was done.

Lets all work then together and solve and find a compromise on this pipeline??

Also, you need more of these meetings all over Minnesota to get many comments on a pipline.

RECEIVED

JUN 19 2017

MAILROOM

If including additional pages please number them and tell us how many you are providing:_____ pages

TAPE HERE (PLEASE D

MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

JAMIE MACALISTER
ENVIRONMENTAL RI
MN DEPARTMENT O
85 7TH PLACE EAST,
SAINT PAUL, MN 55

FOLD H

Public Comment Period Ends Monday, J

Comments must be postmarked or received electronical

How to comment:

- Drop this form in a comment box at a public meetir
- Mail this form, remembering to affix appropriate pc
- Mail comments in a separate envelope using the m
- Email comments to the Environmental Review Man
- Fax comments to the Environmental Review Manag

Comments do not need to be on this form to be accepte
whatever way is most convenient for you. If commentin
Project (CN-14-916 and PPL-15-137)" in the subject line.

Thank you for participating in the Draft EIS public revi
Minnesota Public Utility Commission's decisions regardi

FOL

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137

Please share your comments on the Line 3 Project Draf
What is missing? Please reference specific sections of t

For project information visit: http://mn.gov/commerce

SAINT PAUL MN 550
15 JAN 2017 PM 4 L

Jamie MacAlister, ERM
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

55101 8248 C012

GRAND CASINO HINCKLEY
777 Lady Luck Drive
Hinckley, Minnesota 55037

Levi, Andrew (COMM)

From: vicandr@mchsi.com
Sent: Sunday, July 09, 2017 5:13 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916) & (PPL-15-137)

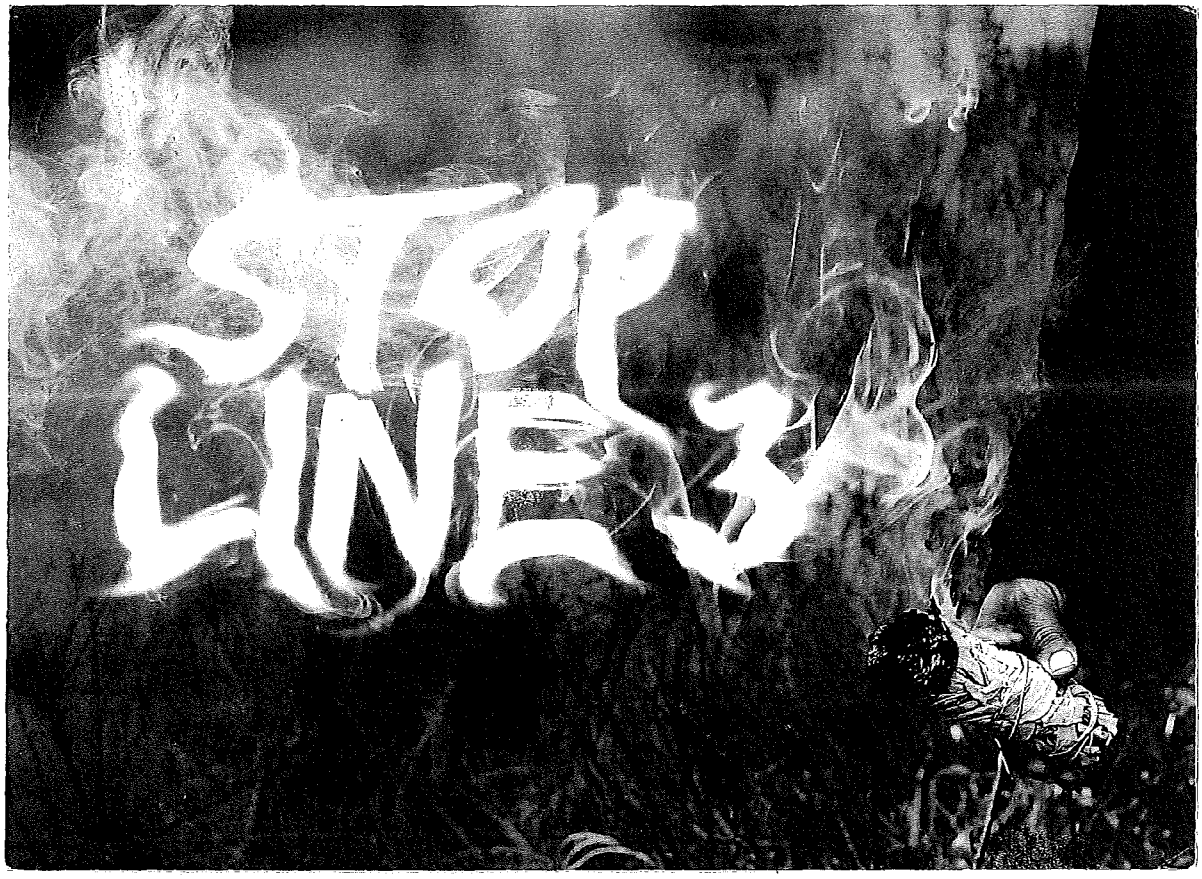

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

Line 3 has the potential to be a major source of minnesota's water contamination. Please Don't authorize Line 3, It violates the rights of the tribal Nations in the state

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
2017 PM 4 L

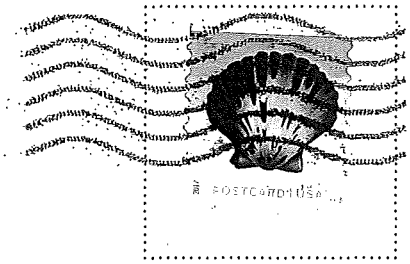

Please explain
How this pipeline
dosen't disregard
the health of
Tribal communities?

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

daughter of an activist

55101-601099

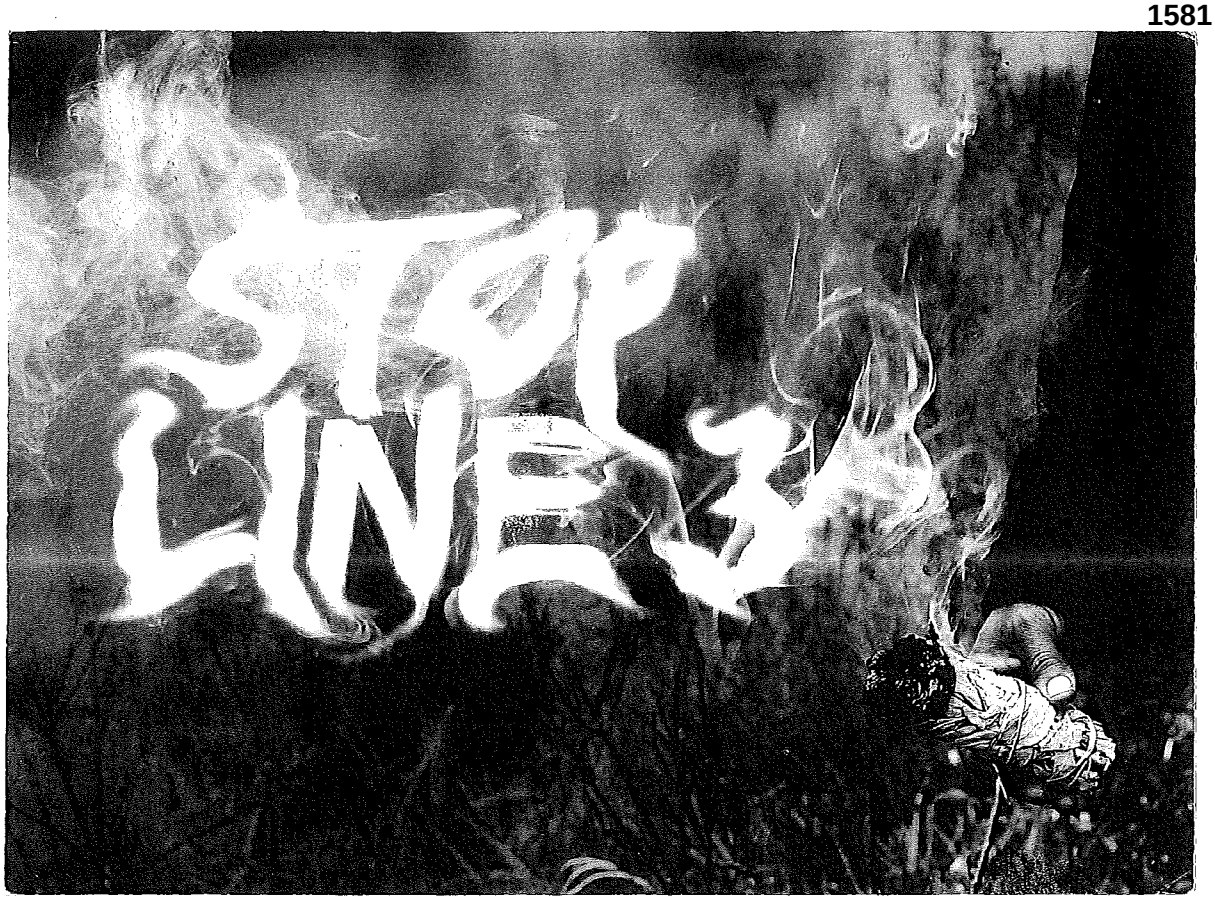

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 4 L

POSTCARD USA

The DEIS estimates the annual propability of a small spill from the proposed pipeline to occur about once every 11 months. 14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastroptic spill is predicted in the next 50 years. Even one is too much. Stop this pipeline.

SINCERELY,

Liz

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD USA

Power fact that human traffic rises with pipeline construction. Stop the flow of sex slaves NOW. Stop line 3.

SINCERELY,

Ger

55101-6013

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

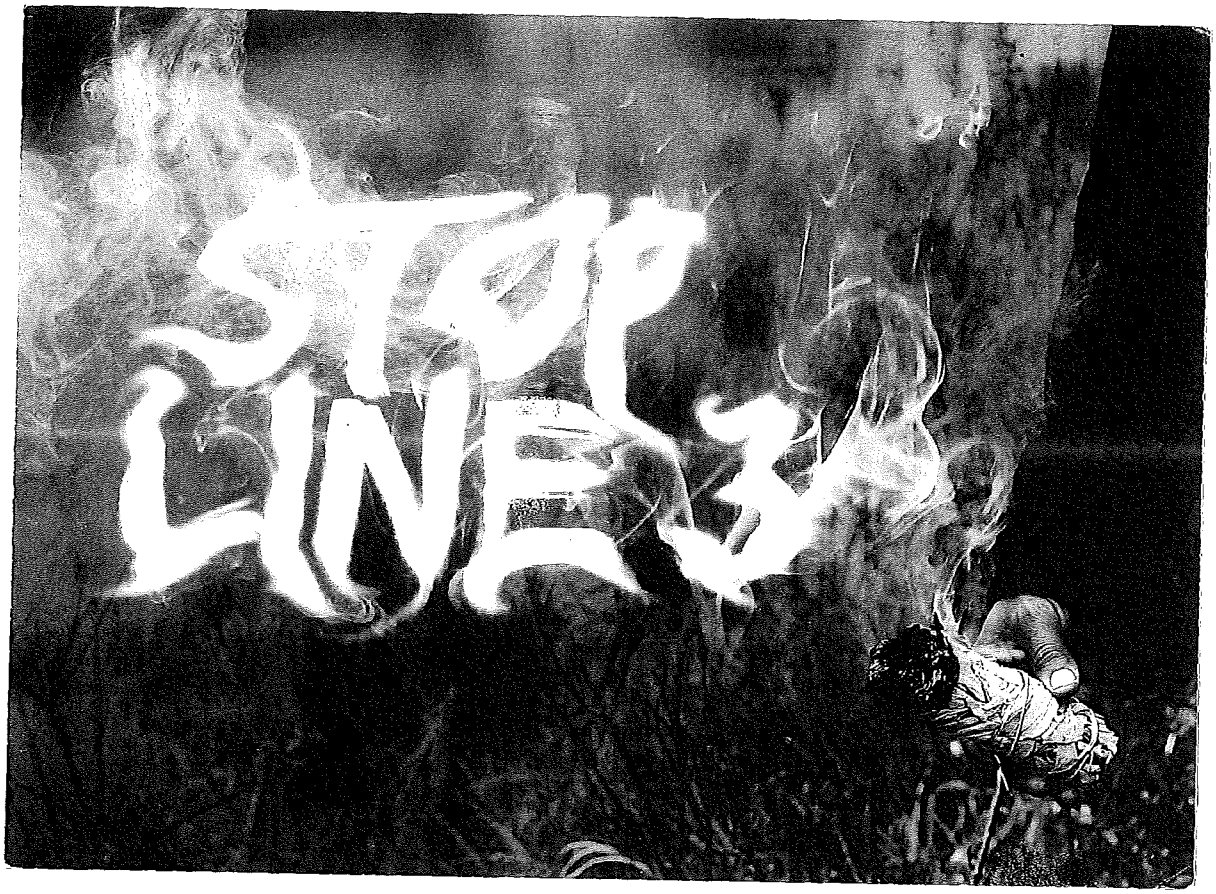

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD USA

Black lives matter NOT Black oil.

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,
community

DEAR DEPARTMENT OF COMMERCE, MINNEAPOLIS MN 553

PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR

LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

13 JUL 2017 PM 4 L

POSTCARD USA

SAVE THE
WILD RICE
IN A MN
TRADITION

SINCERELY,

YUMMY

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

Dear Realitives
of Jamie Macalister -
to - talk to Jamie now -
Jamie had the chance
to STOP this pipeline
and change the conversation.
Do you have acess to
clean water?

SINCERELY,
Agitator

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

Transporting tar sand oil makes MN guilty by assosiation. Built wind turbines

SINCERELY, Not Pipelines

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
07 JUL 2017 PM 3 L

POSTCARD USA

Jamie
Please be the end to this madness. We don't need more pipelines. Help the people not big companies. We need healthy food and community activities.

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

MAD

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

How about the "No Build" Alternative?
Shut Line 3 Down because it's falling apart and Poisoning our Communities"

SINCERELY,

Community Member

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
JUL 2017 PM3 L

Profit over
our water - really
Restore the
pipelines

SINCERELY,
Bessie

55101-601399

POSTCARD USA

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

MINNEAPOLIS
MN 554
06 '16 '17

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

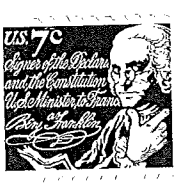

FUCK
the
Pipe!

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
05 JUL 2017 PM 3 L

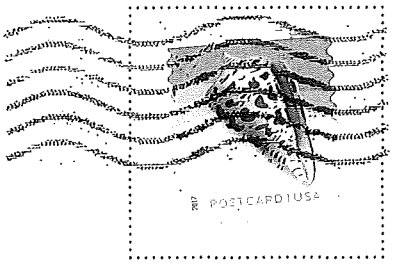

Stop Line 3
You have the Power
use it for the
good of the
community

SINCERELY,
frustrated

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

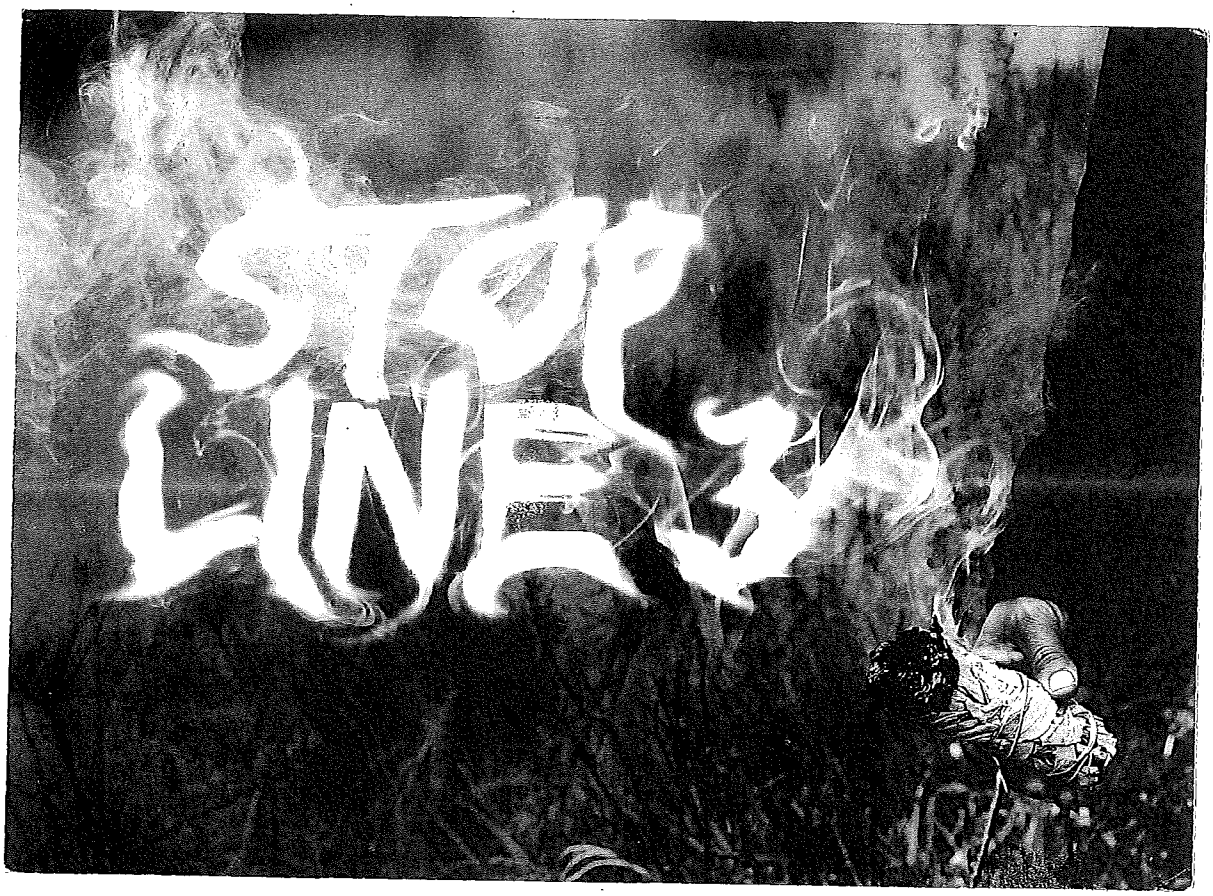

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
07 JUL 2017 PM 3 L

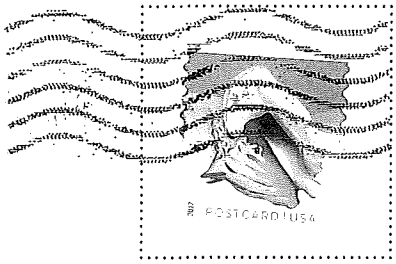

Pipelines are high risk and low rewards for Minnesota. Line 3 is not expected to reduce oil train traffic in Minnesota. It is guaranteed to spill. It violates treaty rights. Please stop this Line 3 from being built.

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Zoongwegii-ahigook

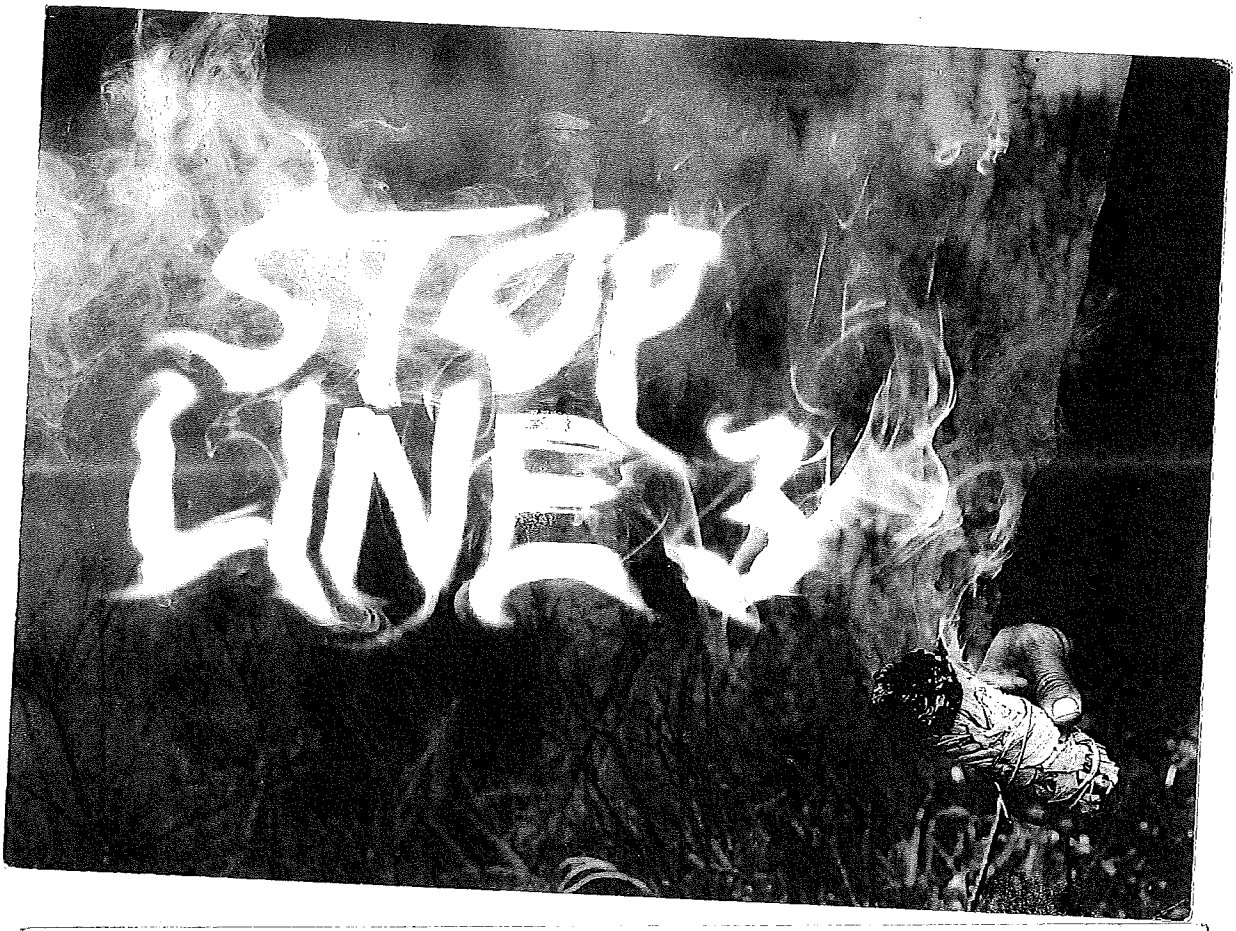

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

Jamie,
Enough is enough!
We have enough
We don't need any
more. Please say
NO.

SINCERELY,
Madeleine

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

POSTCARD | USA

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

Jamie -
How do I explain
to my Grandchild
that the Land of
Sky Blue Water - is the
Land of Poisioned water?
Stop the pipeline

SINCERELY,
Angry

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
JUL 2017 PM 3 L

Dear Assholes,
I know you only care about profit. Clean energy is 300 - 300 - 300% more profitable than coal or oil. Please re-invest in MORE - MORE profitable possibilities.
OR ELSE I WILL.
1.2.3.GO.
GOODS Tuesday.
I WIN.

SINCERELY,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

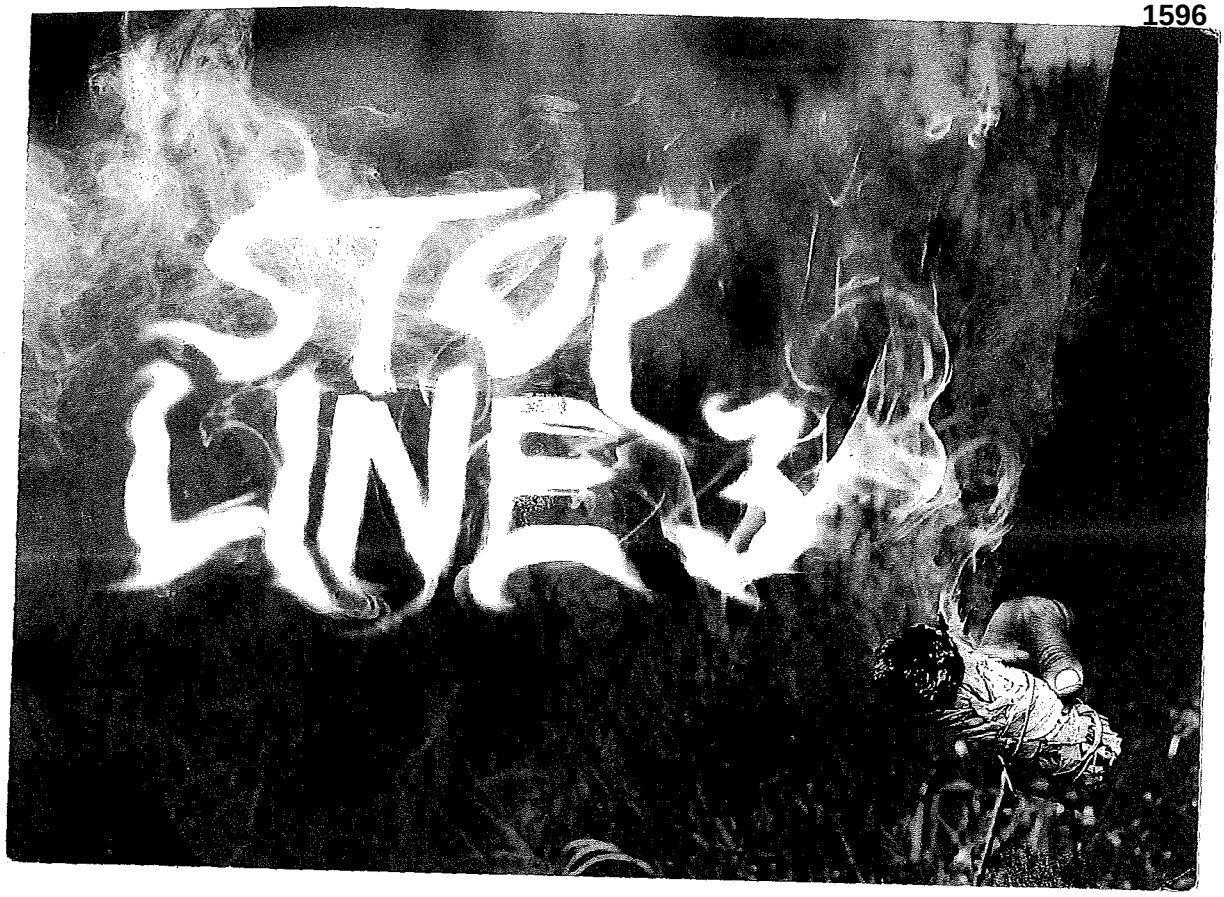

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

SAINT PAUL MN 550
03 JUL 2017 PM 4 L

POSTCARD

I oppose the Line 3 pipeline because the health & environmental risks of tar sands are too great to risk. Indigenous sovereignty must be honored. Stop killing us!

SINCERELY,

Baly Sh

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

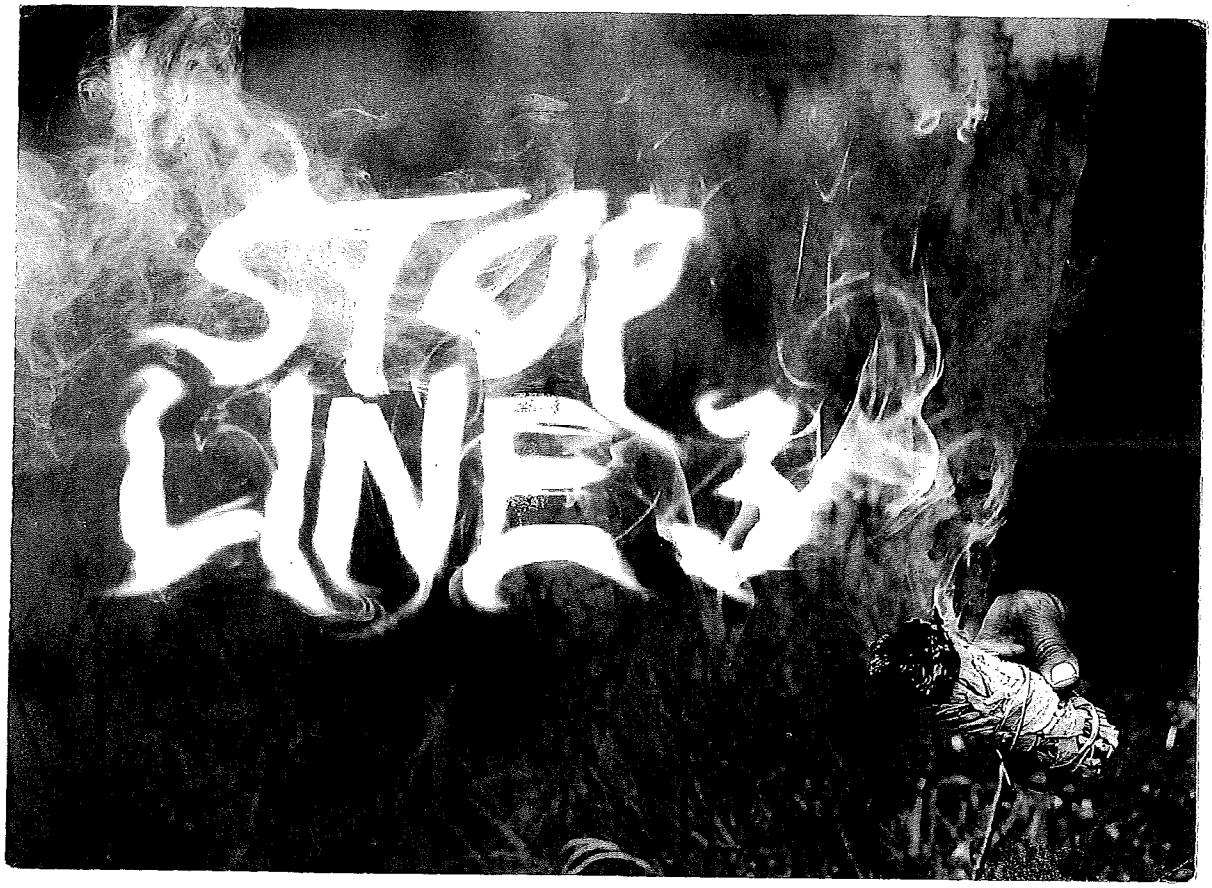

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

ST PAUL MN 551
JUL 2017 PM 5 L

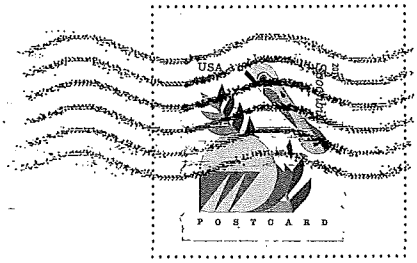

I oppose the Line 3 pipeline because of the harms it is causing to the Indigenous peoples of Minnesota and Canada, the environment and community members. Please re-evaluate the construction of this pipeline and [illegible]

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

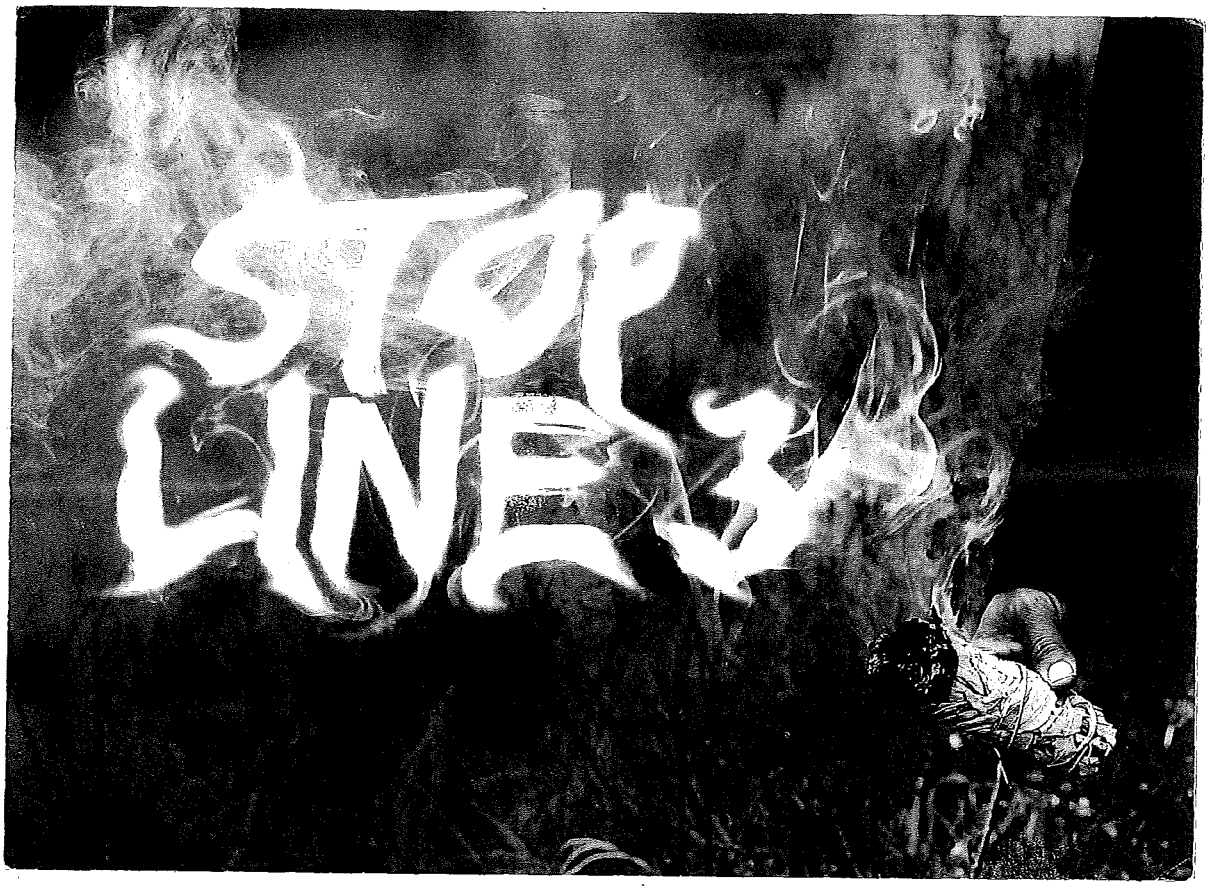

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD USA

Be the voice
of a sex slave.
Stop line 3.
NOW!

SINCERELY,

Dave

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 4 L

POSTCARD USA

What are all the ways you use water everyday? drink, bath, laundry, cooking = Now add oil Toxic oil -

SINCERELY,
Stop the Pipeline!

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

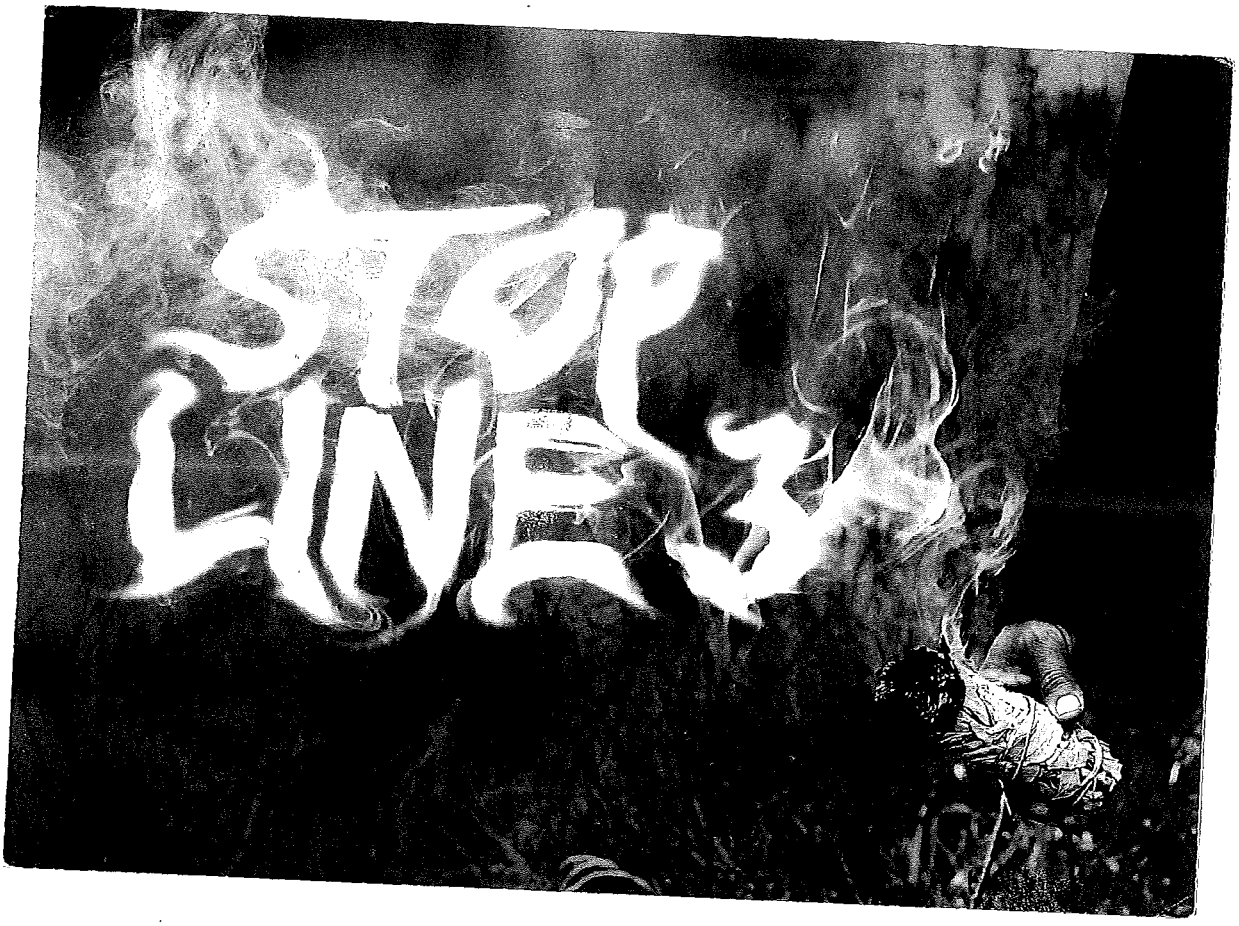

MINNEAPOLIS MN 554
PM 1

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

Jamie-
Practice saying
We have enough
again
We have enough
No more pipelines

SINCERELY,
Brother O

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

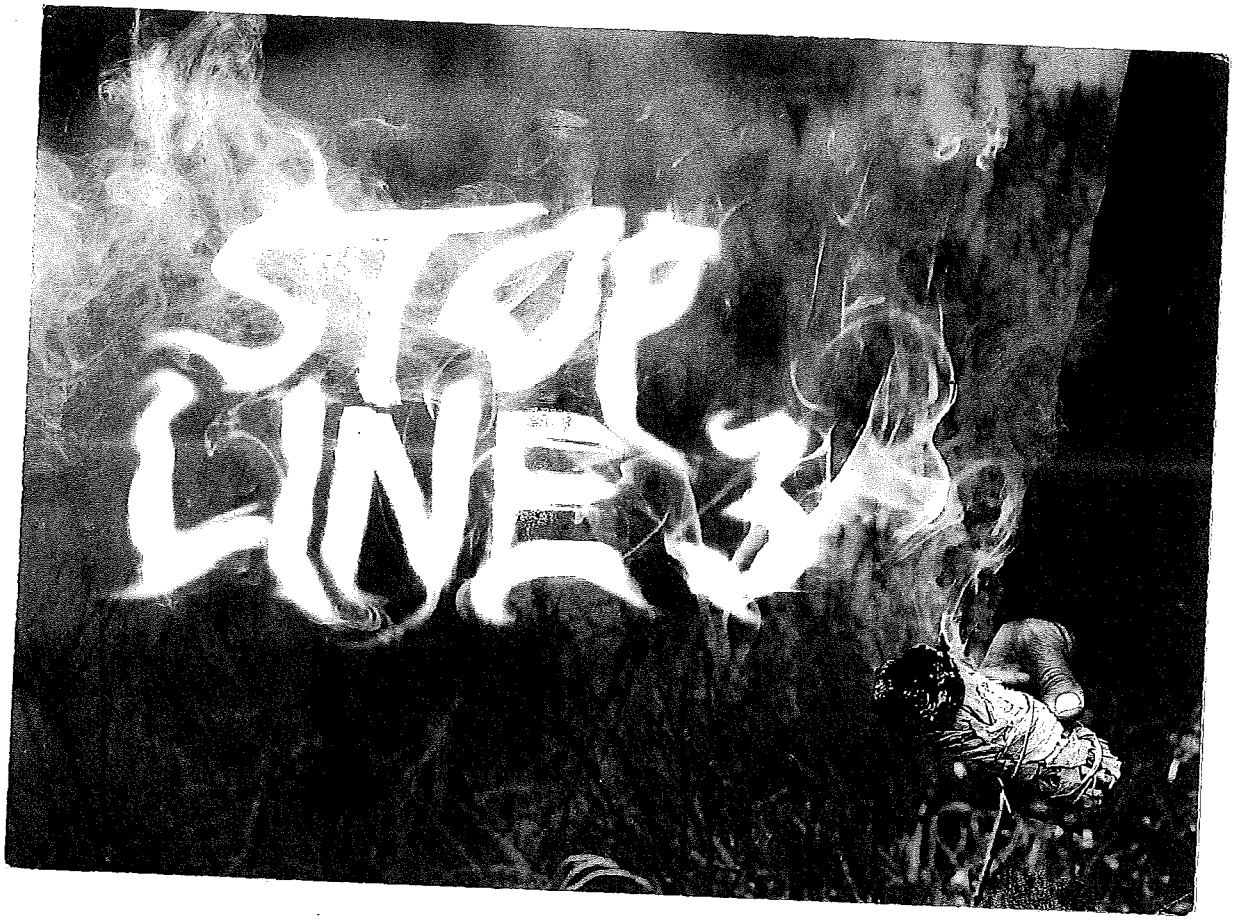

DEAR DEPARTMENT OF COMMERCE, MINEAPOLIS
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

PM 3-L

Jamie —
How are you
honoring the
treaty of 1855?

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,
Pissed off

STOP
LINE 3

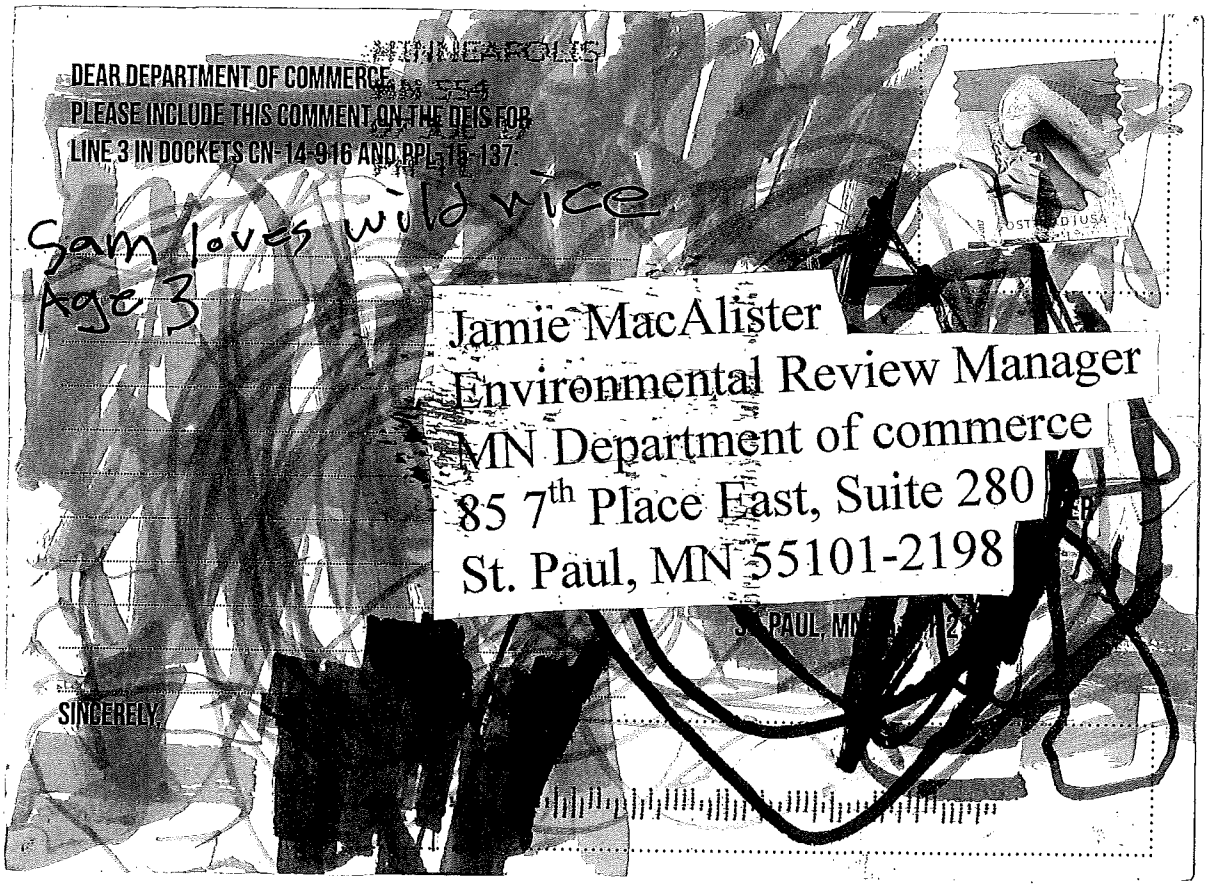
DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.
Sam loves wild rice
Age 3
Jamie MacAlister
Environmental Review Manager
MN Department of commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198
SINCERELY,

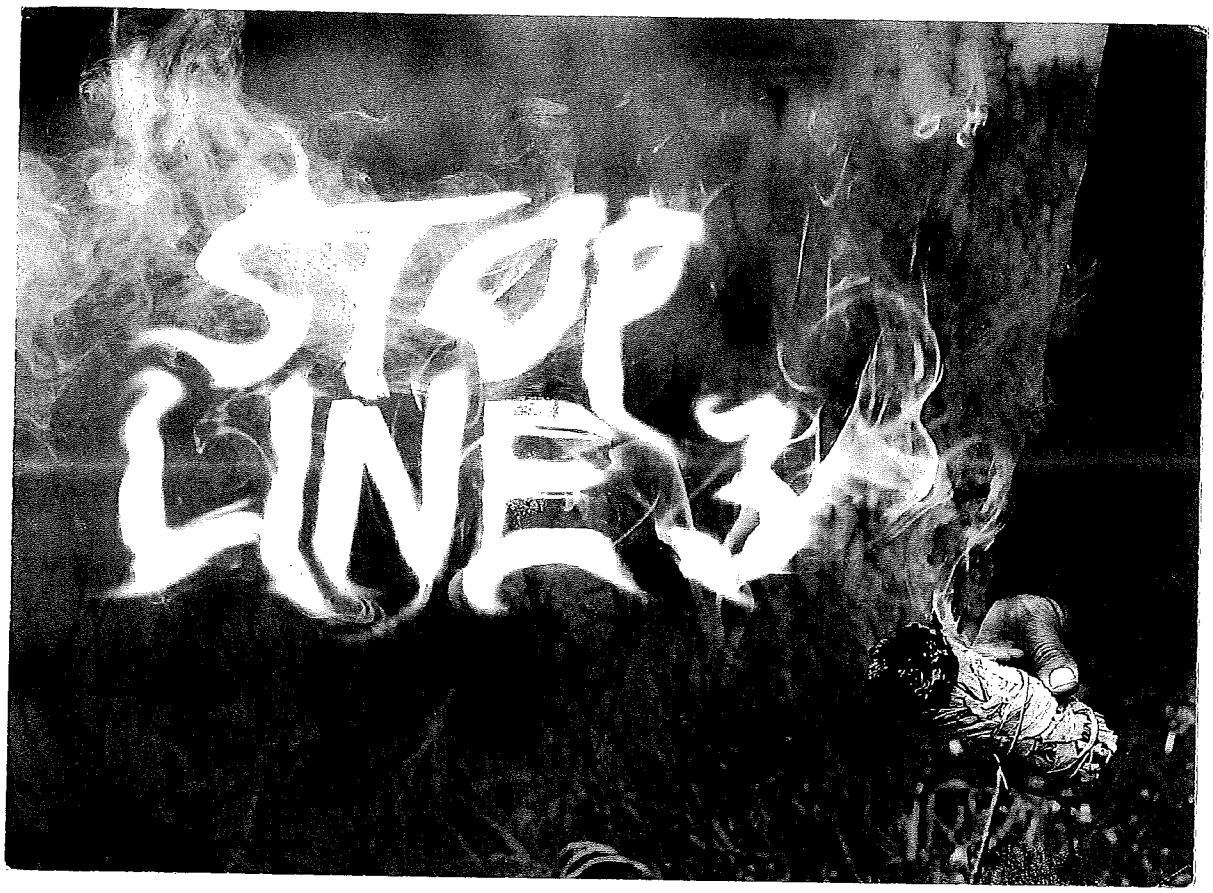

MINNEAPOLIS
MN 554

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND RPL-15-137:

When I say Spill
You say Kill
Spill - Kill
Spill - Kill
Are you ready to own this?

SINCERELY,

Son

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 4 L

POSTCARD USA

When are children old enough for us to tell them the truth about Pipelines? At what age should we lie?

SINCERELY,

Mother

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

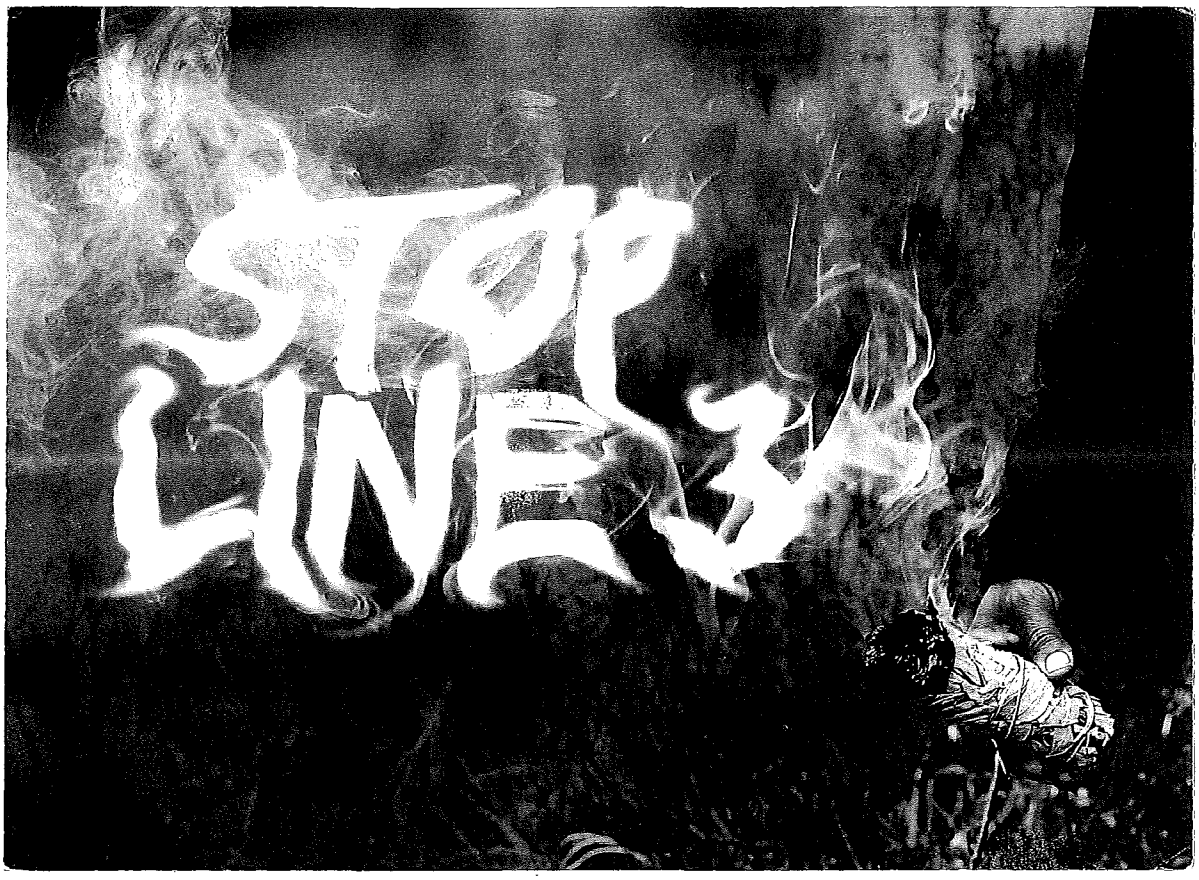

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 4 L

POSTCARD USA

Thank you for choosing Water with Rice

SINCERELY,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

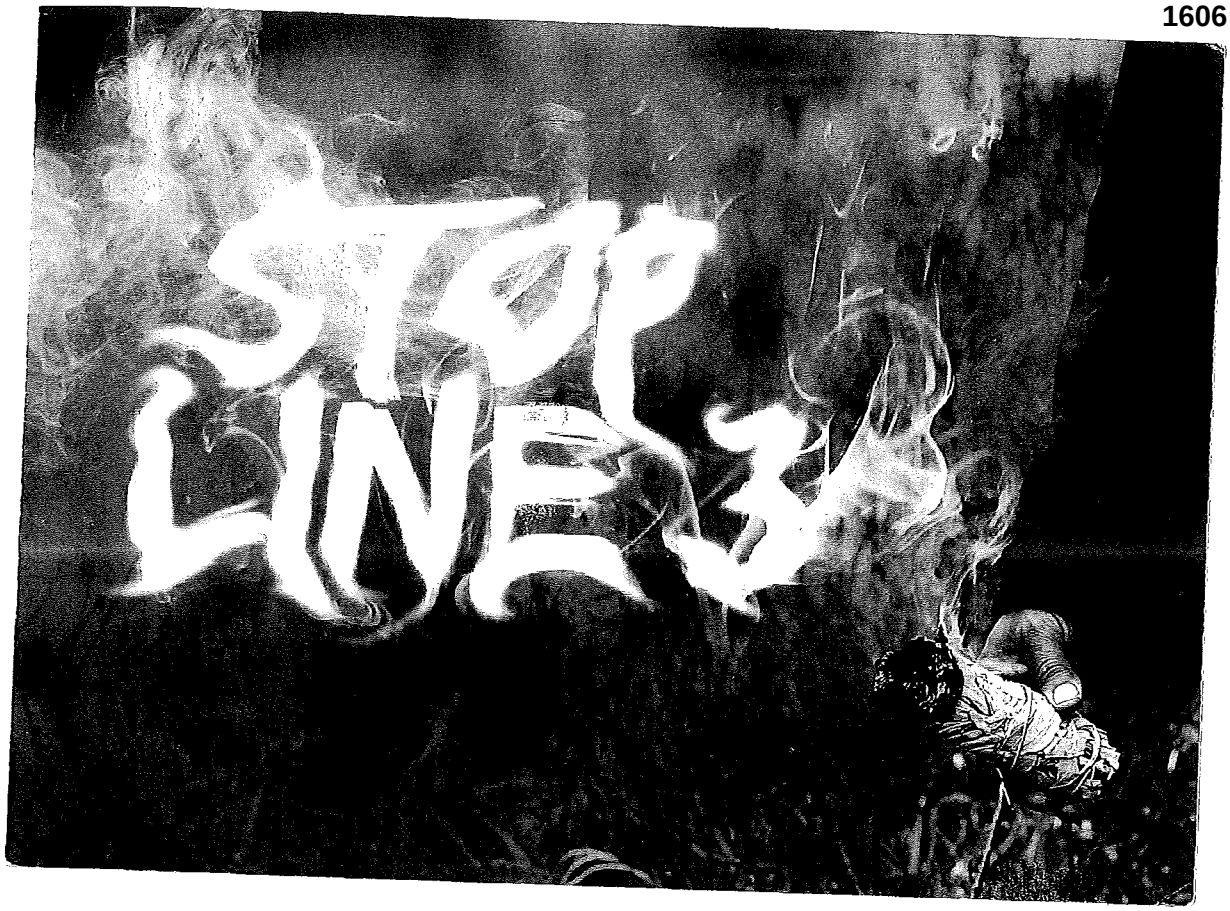

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 4 L

POSTCARD USA

Me = "What is water?"
My Son = "The most valuable resource for ever"

SINCERELY,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

55414

55101-214355

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD USA

Jamie -
Informed consent
What's up with that?
Stop the Pipe! the
You have the Power

SINCERELY,
teacher

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

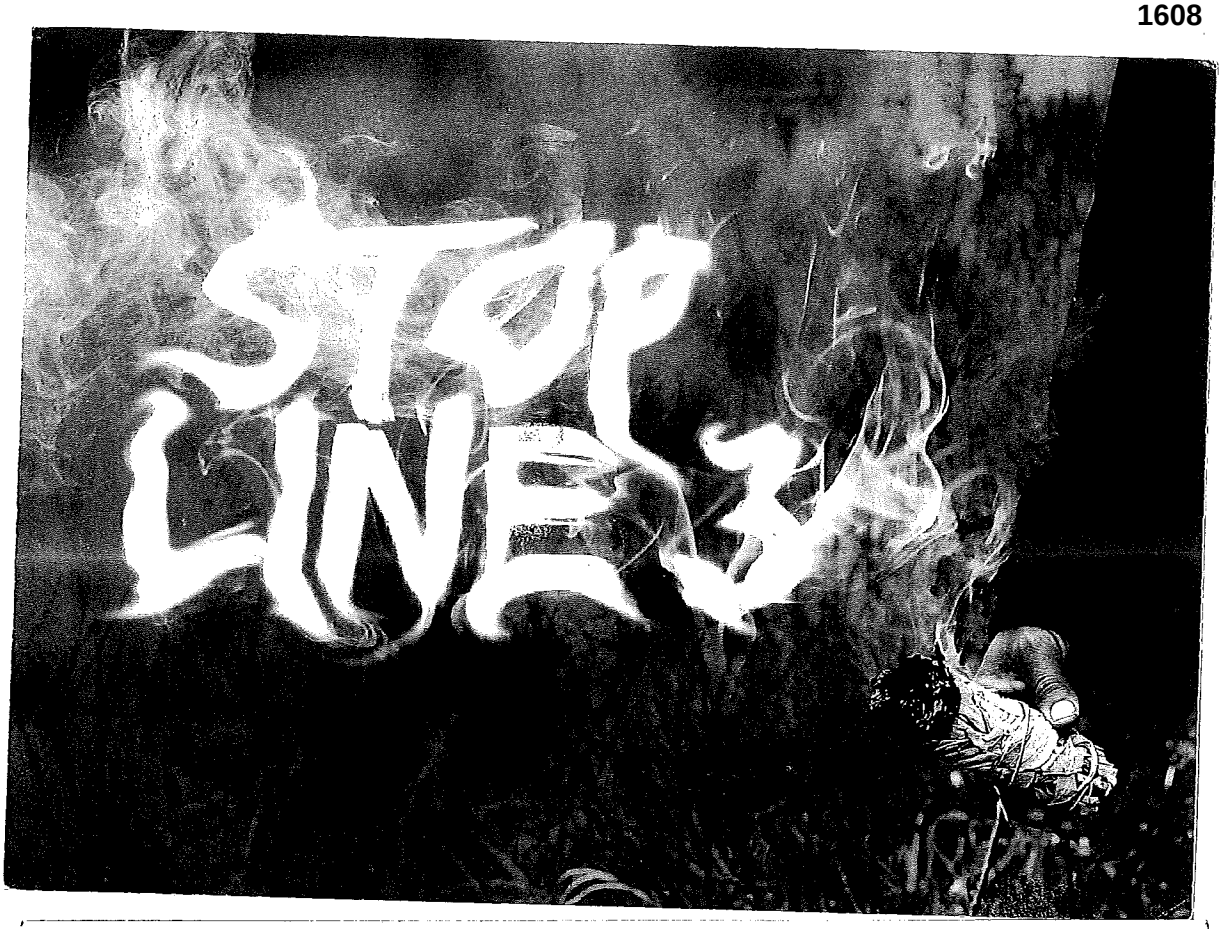

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
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MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD USA

What Poisoin
is okay?
What would you do
to protect your
family from poison
in our water?!
Stop Line 3

SINCERELY,
Your
Neighbors

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

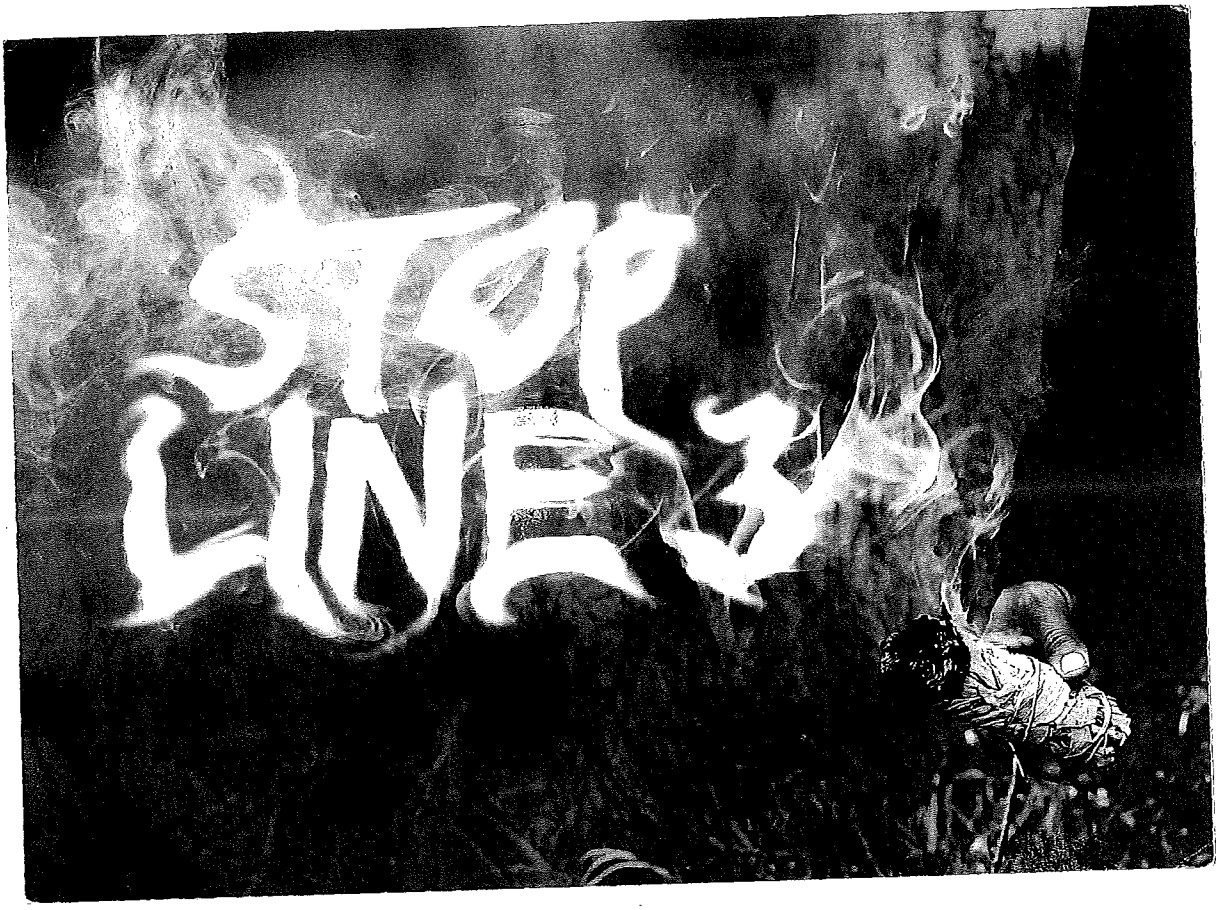

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 5 L

POSTCARD USA

Water > oil

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

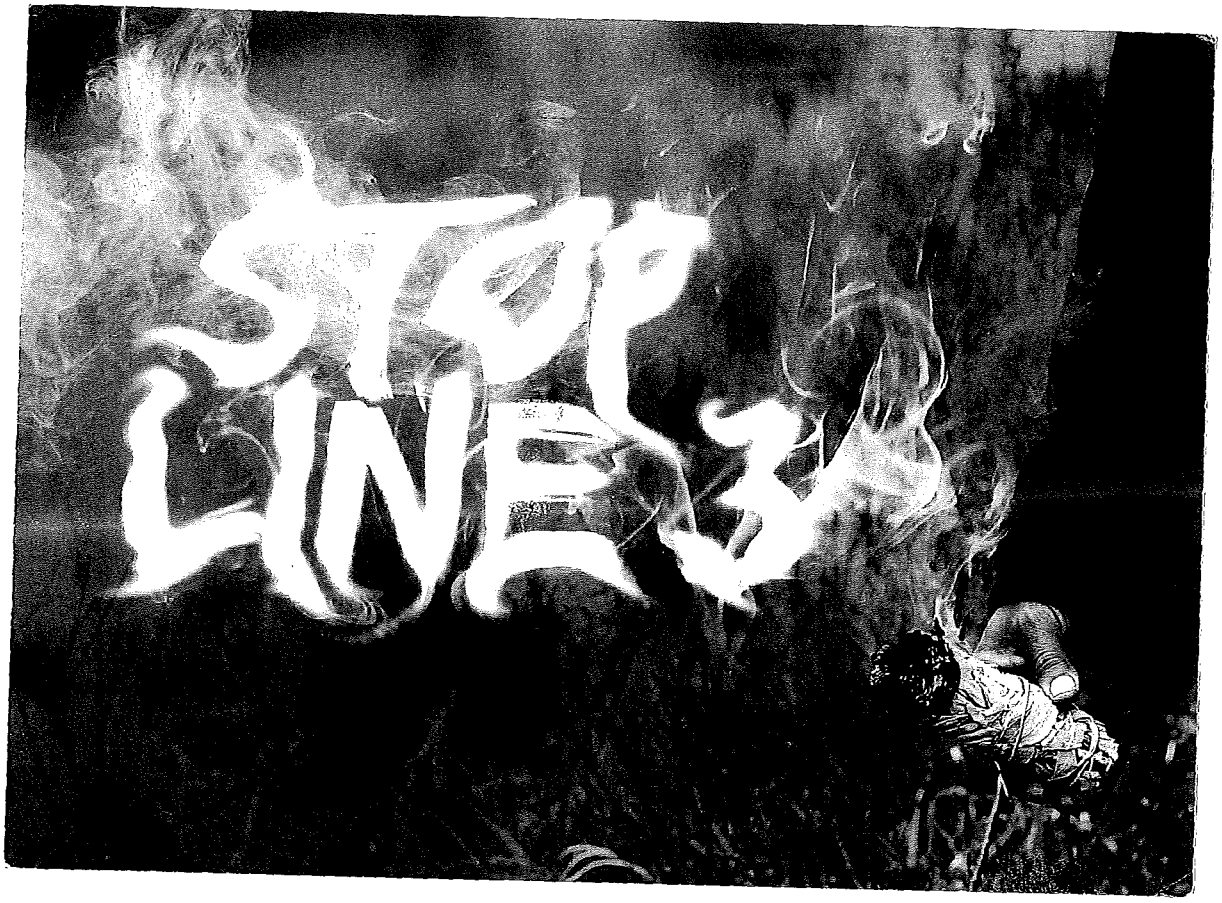

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD • USA

The pipeline is high risk and has little reward for Minnesota. It does not provide more jobs for Minnesotans. It contaminates our land and water. It contributes to climate change. The pipelines have inadequate leak detection systems. Reconsider the construction of the pipelines.

SINCERELY,

Liz

55101-2198

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
6 JUL 2017 PM 5 L

POSTCARD USA

Jamie -
Really - Profit
over people?
Please Stop the
pipeline!

SINCERELY,

Susan

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

I hate white
People

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

DEAR DEPARTMENT OF COMMERCE; MINNEAPOLIS MN 553
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137 JUL 2017 PM 5 L

POSTCARD USA

Be the voice of the environment. We are the stewards,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,
child of GOD

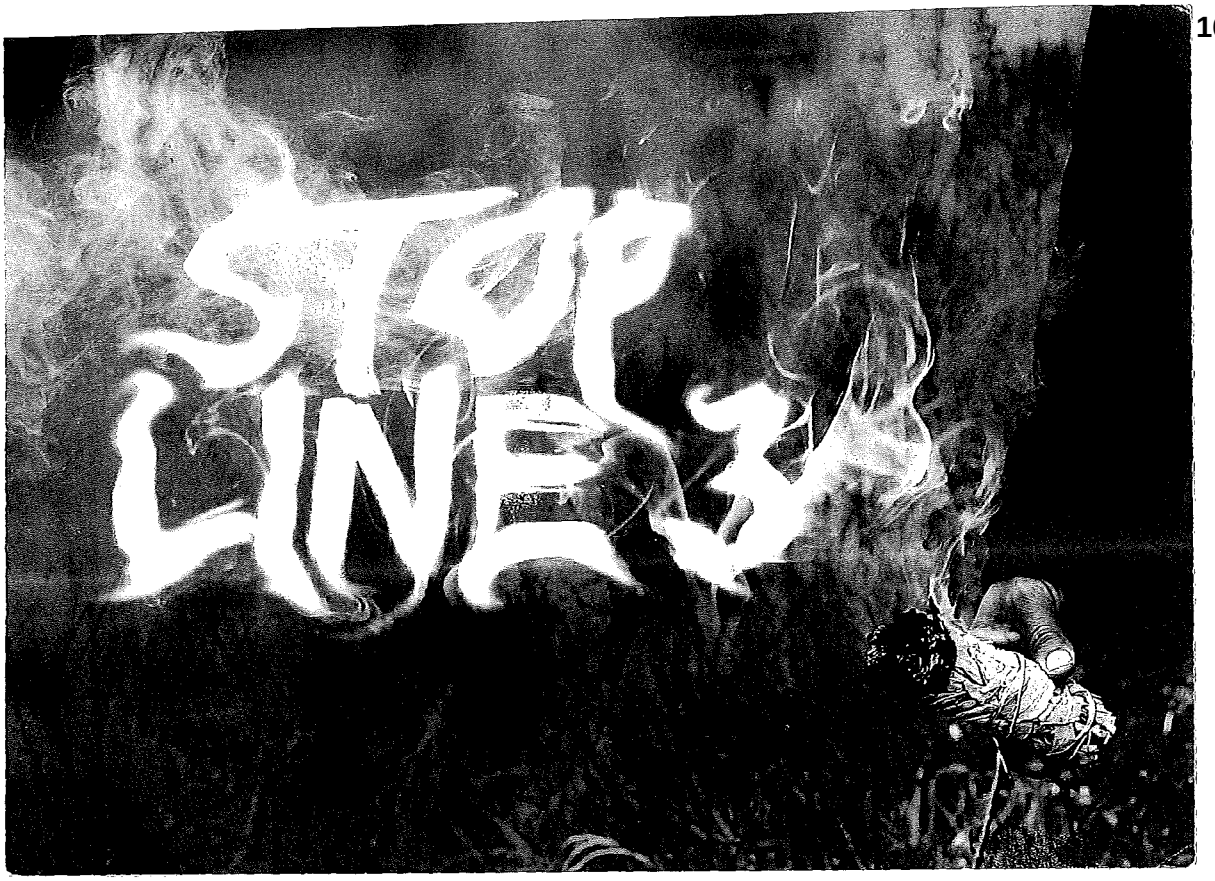

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
07 JUL 2017 PM 5 L

How many children and women are you willing to let be raped by the culture of abuse associated w/ workers?

SINCERELY,
Stop Line 3

POSTCARD USA

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

Am ira Hill
Dont put
a nother
pipeline
it can
kill all
animals
and ruin
our water

SINCERELY,
could
get sick

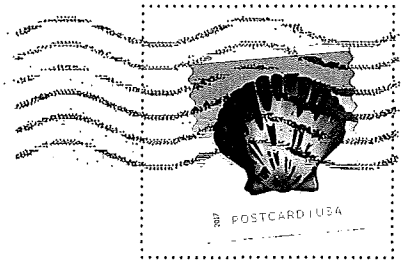

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
07 JUL 2017 PM 3 L

POSTCARD USA

more
water
less oil

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,
charlie

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

63 sacred sites are
slated to be destroyed

What is sacred
to you?

What are you willing
to do to protect
what is sacred?

SINCERELY,

a Grandmother

POSTCARD USA

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

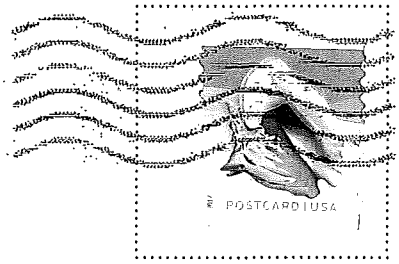

The Mini
in Minnesota
means water.
It's our
job to protect it.

SINCERELY,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE, MINNEAPOLIS MN 553
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137 JUL 2017 PM 6 L

POSTCARD USA

Man camps are bad
keep them
out of
MN

SINCERELY

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 4 L

POSTCARD USA

The leak detection systems of the pipelines are inadequate, and even if they were better even one spill is too many. Dont let Enbridge use our land so they can benefit! It is high risk with low rewards. Keep our water clean!

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Liz

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD USA

Jamie -
Do the right thing
Stop Line 3
We are trusting you
to hold our water and
our future

SINCERELY,
Lover of
water

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 4 L

POSTCARD USA

NO OIL
IN THE HEAD
WATERS. STOP
LINE 3 NOW.

SINCERELY,

CONCERNED

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

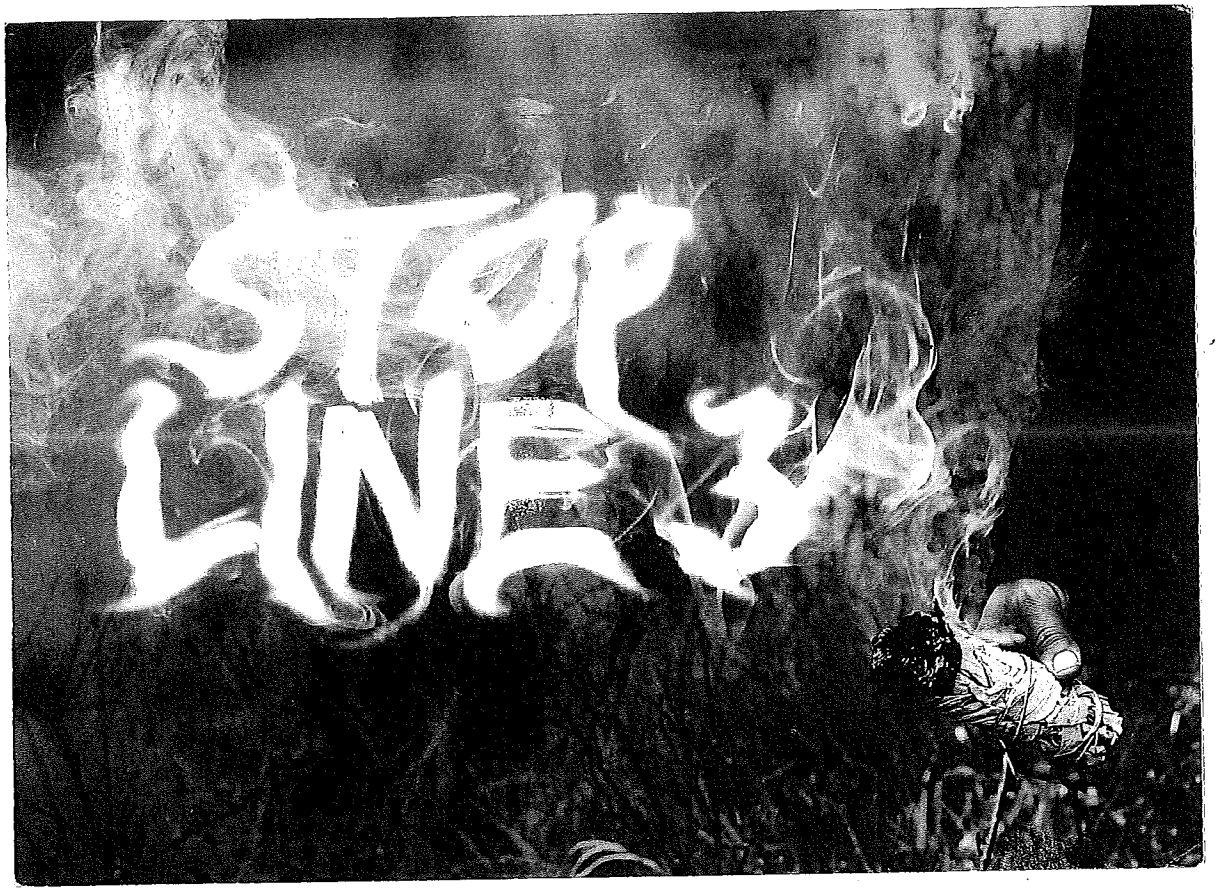

DEAR DEPARTMENT OF COMMERCE MINNEAPOLIS
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

FM 3 L

H 2 the izzO
Water is
Dope

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

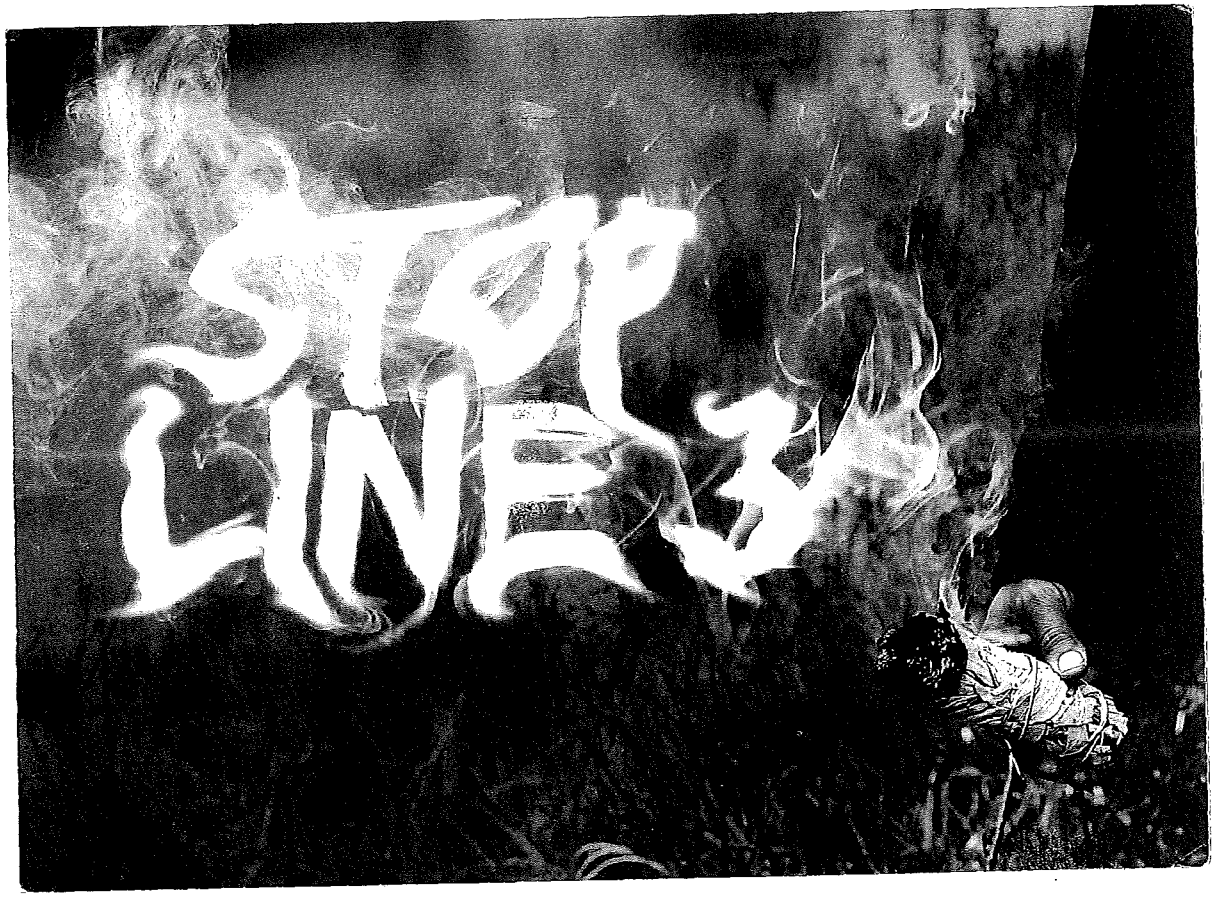

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
07 JUL 2017 PM 5 L

POSTCARD USA

A replacement line is one that replaces a line. Demand that enbridge cleans up & takes away the expired Line 3 plant food NOT ABE

SINCERELY,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 5 L

POSTCARD | USA

Line 3 will spill
so in Southwest [illegible]
our children in Southwest
Expect 14 [illegible]
54 [illegible]
4 medium [illegible]
3 large [illegible]
1 catastrophic [illegible]

now - What will your
children say?

SINCERELY,

a teacher

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

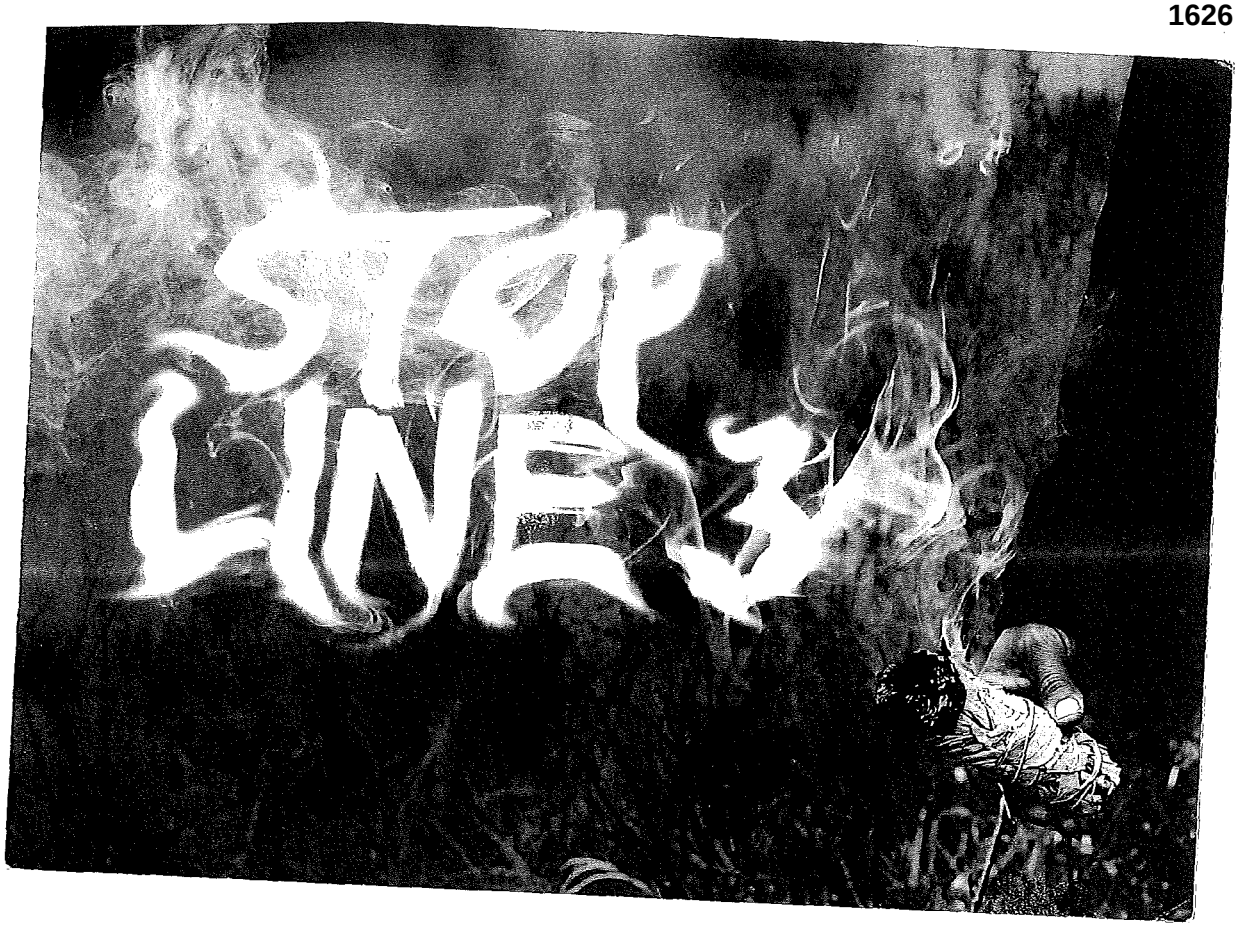

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD USA

There is no plan to hold Enbridge accountable for their impacts on the environment from the pipeline. There is no plan for enforcing regulations for Line 3. History shows they continually violate permit conditions.
No pipeline!

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Liz

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD USA

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

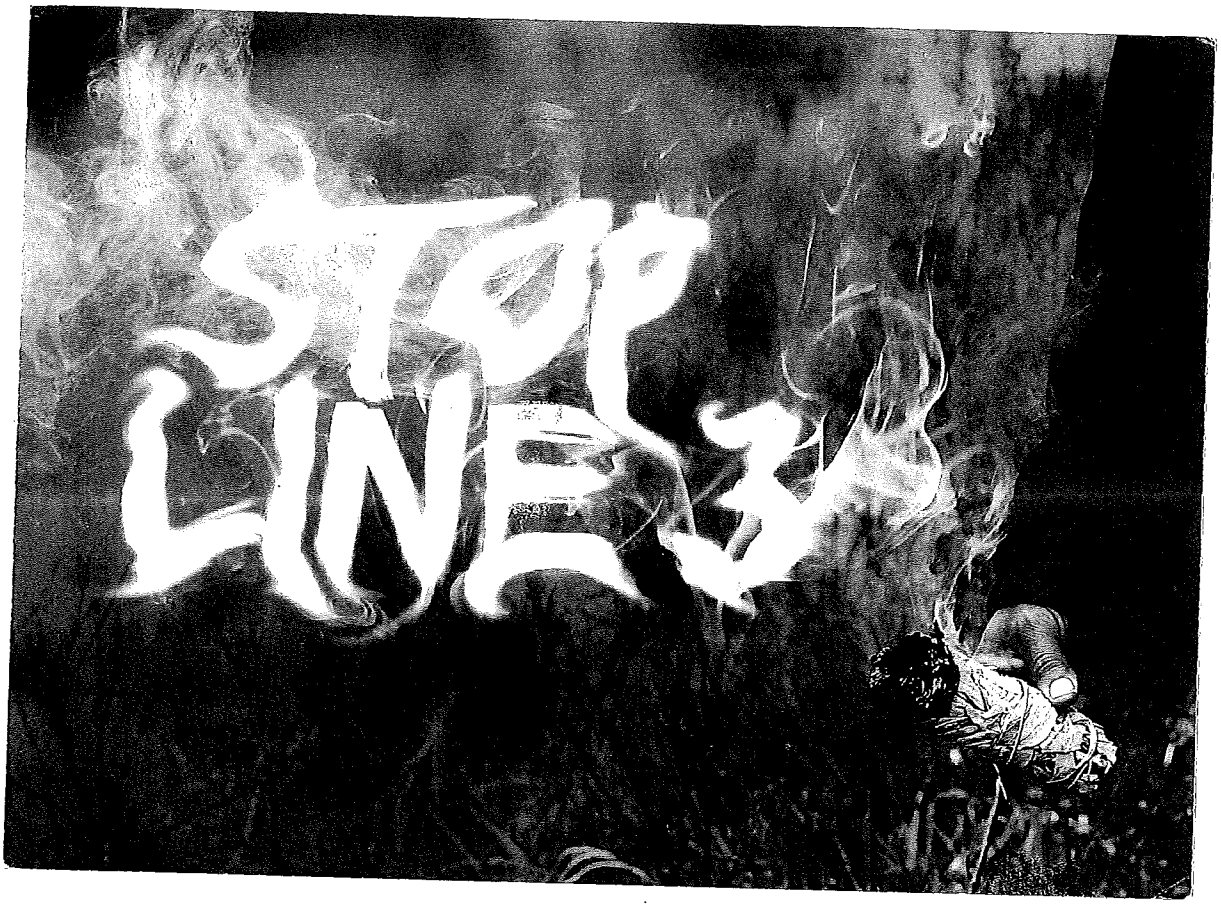

DEAR DEPARTMENT OF COMMERCE, MINNEAPOLIS MN 553
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-13 JUL 2017 PM 4 L

Jamie-
I like to water
my Garden Wort
Poison & Oil
Stop Line 3

POSTCARD/USA

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,
Gardener

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
27 JUL 2017 PM 4 L

POSTCARD USA

For or against pipeline...
No one is for more sex trafficing.
→ see pipeline map

SINCERELY

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

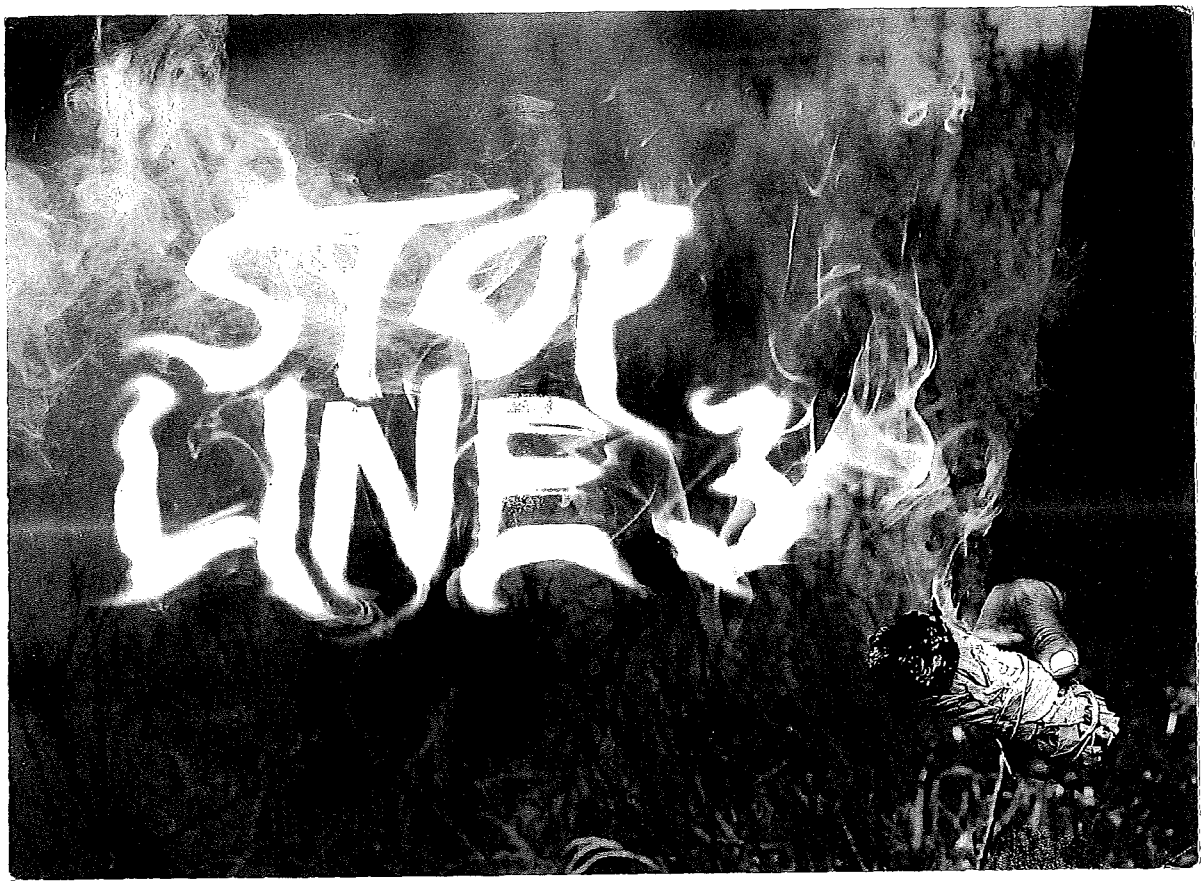

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD USA

Because of water, we are alive. Building this pipeline runs the nearly inevitable risk of a spill that would contaminate Gichigami, Lake Superior, many of our river systems, lakes and wild rice beds. The short time that someone will benefit from this pipeline is nothing compared to the value of our clean waters in Minnesota. Stop Line 3!

SINCERELY,

Liz

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

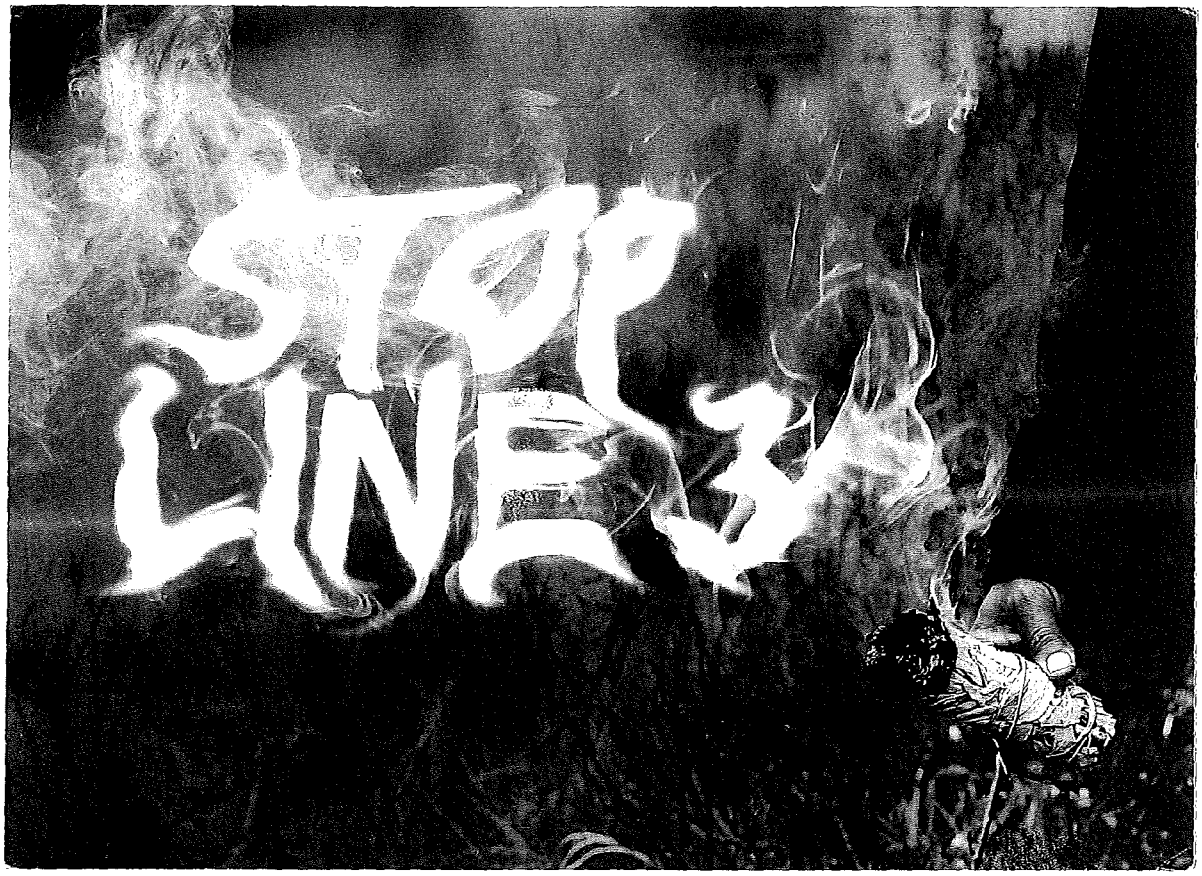

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-16-137.

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD USA

Jamie,
please don't let
~~Bem~~ Minnesota
become home
to another
pipeline battle
like in N. Dakota

SINCERELY,
Minneapolis

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

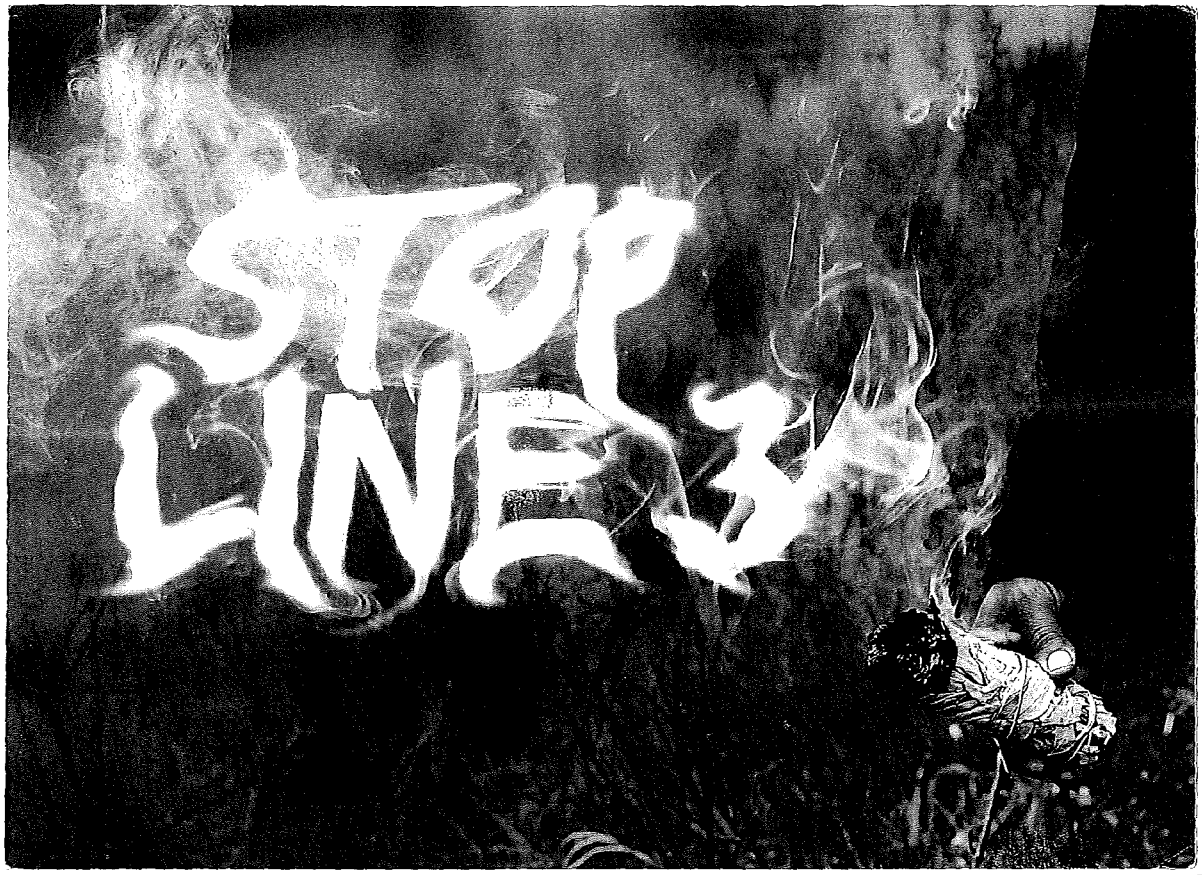

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD | USA

Thank
you for
your hard
work

SINCERELY,

The People

55101-2143

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

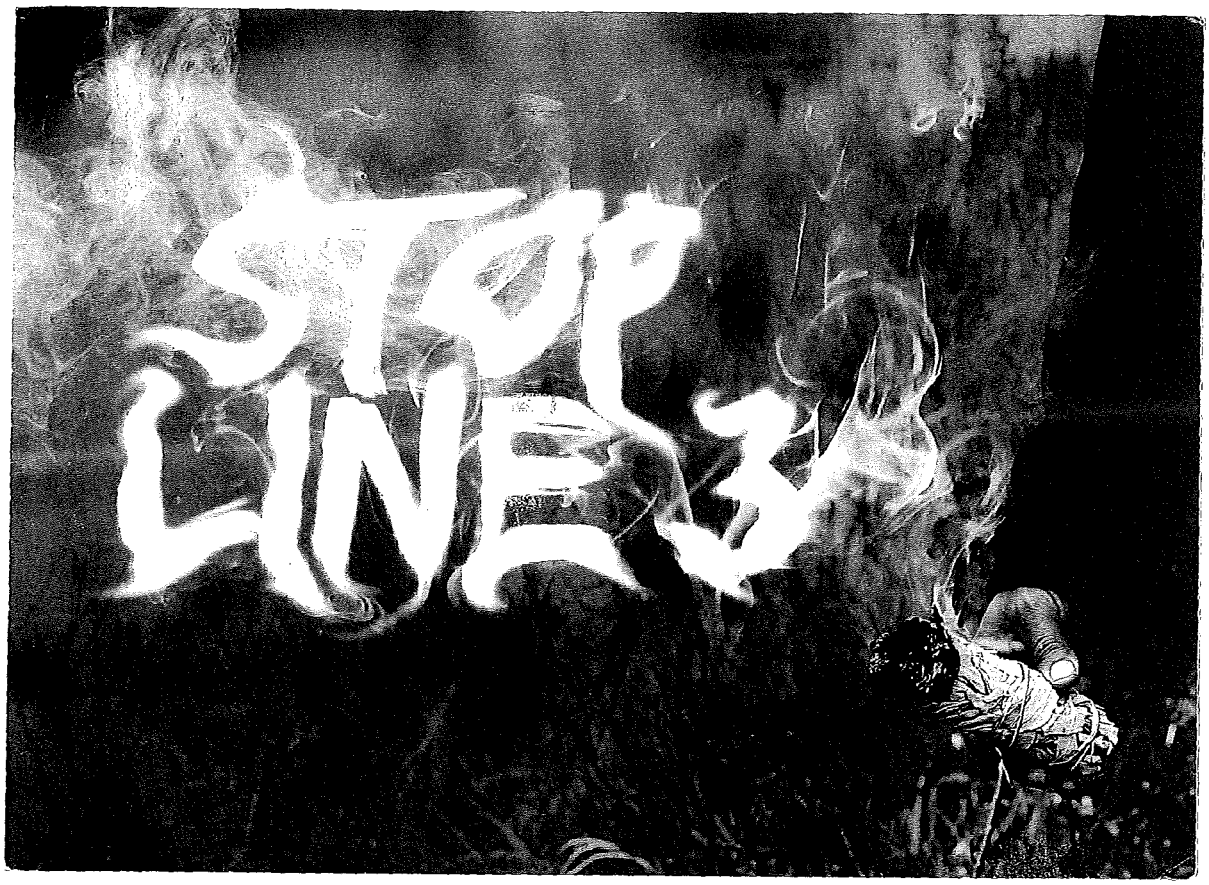

MINNEAPOLIS
MN 554
PM 11

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

Samie –
what are you
prepared to protect?
What do you value?
Please STOP this pipeline

SINCERELY,
Uncle O

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

MINNEAPOLIS

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

Please
stop
— MN — St. Croix MN

SINCERELY,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

Jamie—
Please make a
public statement
outlining how the
Pipeline does not
disregard the health of our
tribal community.
Waiting

SINCERELY,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

POSTCARD USA

Call the ~~communi~~ environmental IMPACT STATEMENT WHAT IT IS. A LOAD OF CRAP.

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,
Madely

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

Now is the time for different. Please make the difference.

SINCERELY,

Love

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

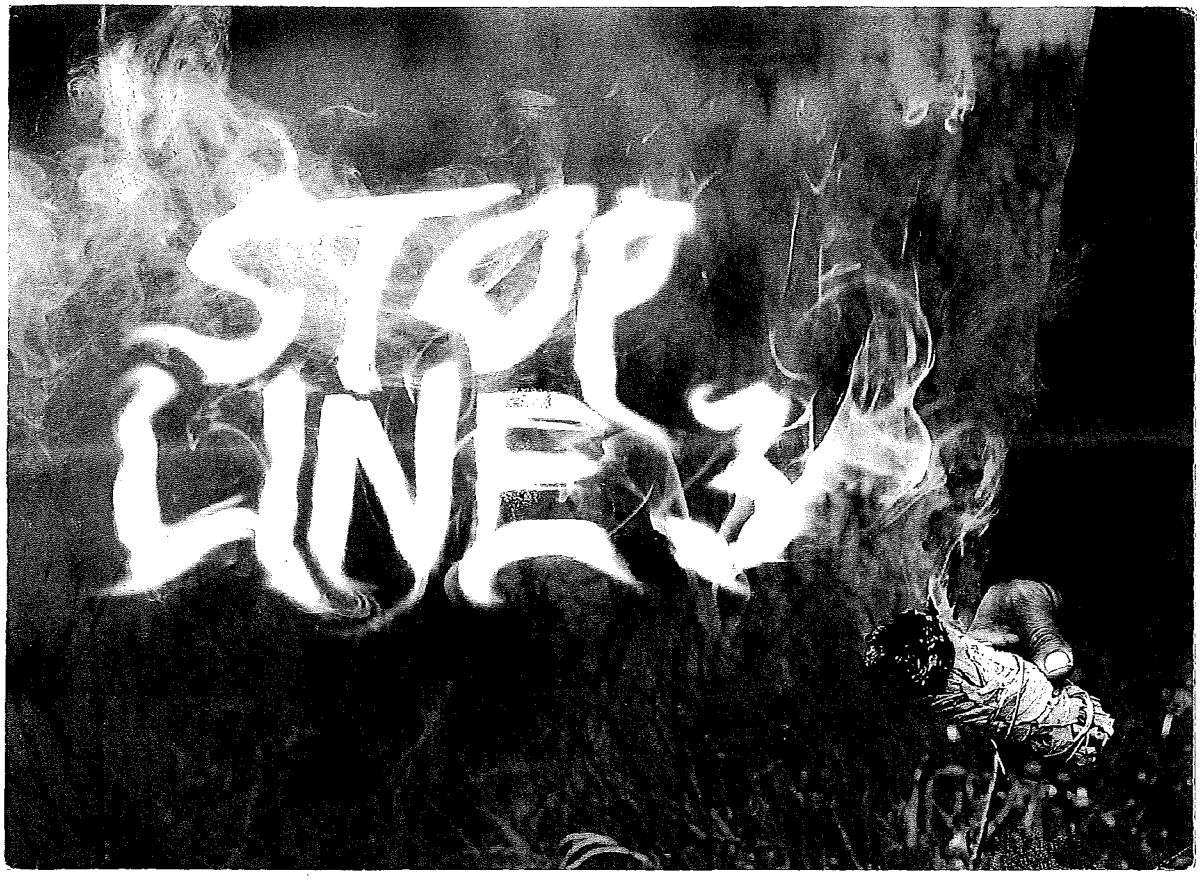

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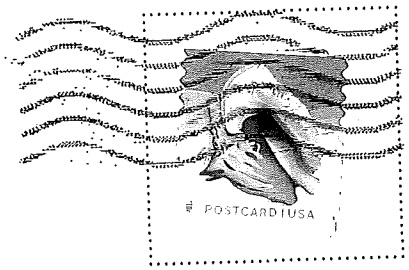

water is life. think of our children

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

pipelines explode in 62 yrs.

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

Dear Jamie –

Stop Line 3 –
Stand up for what
is Right. Think of our
children. Let them
believe in people over
profits

SINCERELY,
Neighbor

POSTCARD USA

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
02 JUL 2017 PM 3 L

POSTCARD USA

LEAVE IT
IN THE
GROUND.

SINCERELY,
Bill

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

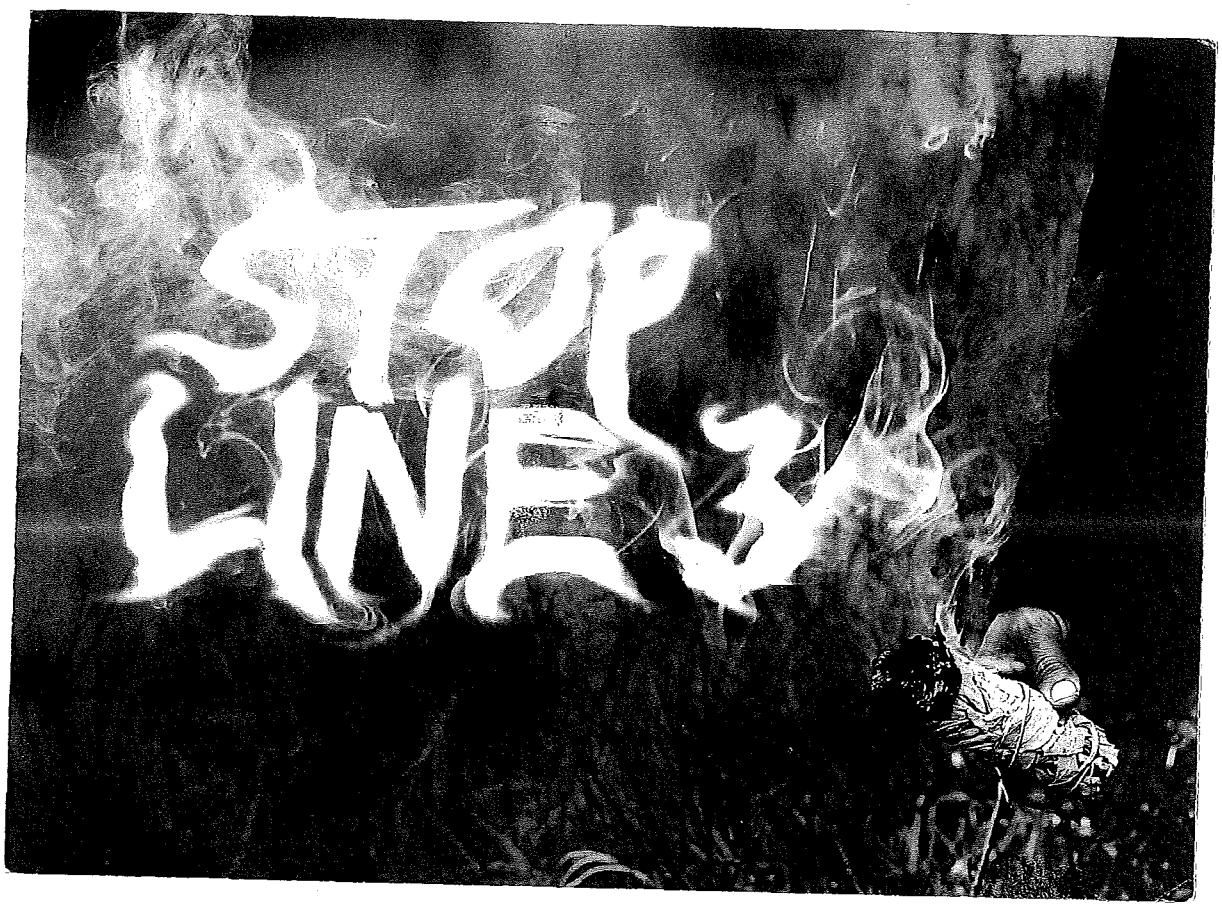

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
02 JUL 2017 PM 3 L

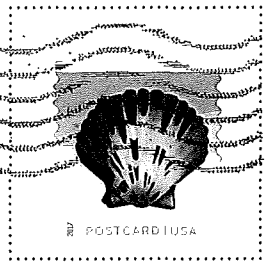

The construction of the pipeline is in violation of treaty rights. Enbridge even admits to 63 sacred sites slated for destruction. The route of Line 3 would impact many wild rice lakes in the 1855 treaty Territory. Stop Line 3!

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Liz

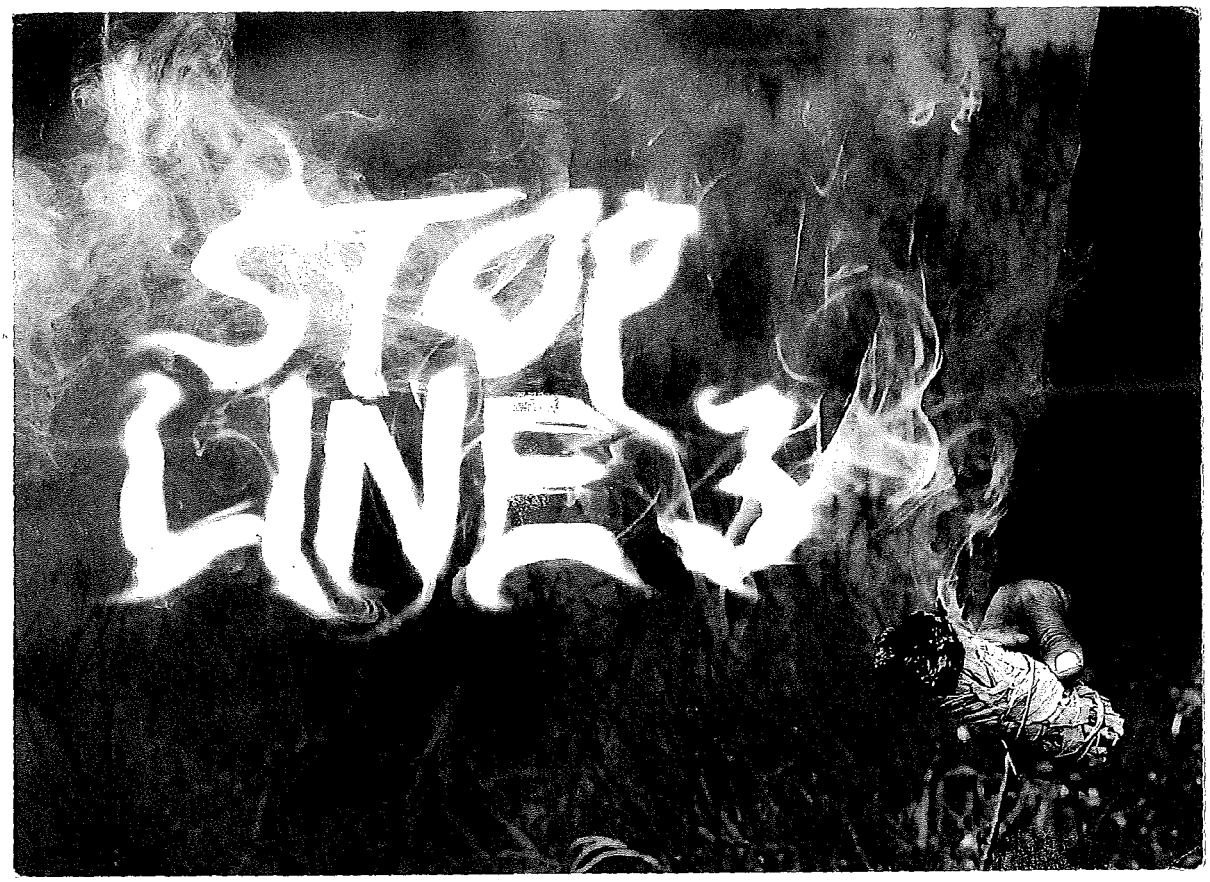

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

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07 JUL 2017 PM 3 L

POSTCARD | USA

MN doesn't want to be part of Alberta tarsand oil.

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Jeb

55101 4955

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

slow down
slow down
slow down
take your
time
think long term

SINCERELY, → our children

POSTCARD USA

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
2017 PM 3 L

POSTCARD/USA

Taxes: Are corporations excempt from paying them? Enbridge pay to counties along pipeline!

SINCERELY,
Uncle

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

MINNEAPOLIS
MN 554
05 JUL 2017

DEAR DEPARTMENT OF COMMERCE:
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

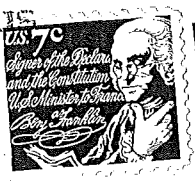

IDK IF YOU READ MY EARLIER POSCARD, BUT ALREADY I WON. ITS OKAY. YOU'LL STILL BE ABLE TO GET BASIC HEALTH CARE AND HUMAN NEEDS. OH SHIT. TRUMP YOU ARE. FUCKED.

I'M SURE 4 YEARS IS NOT A BIG DEAL.

GOOD LUCK

SINCERELY,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

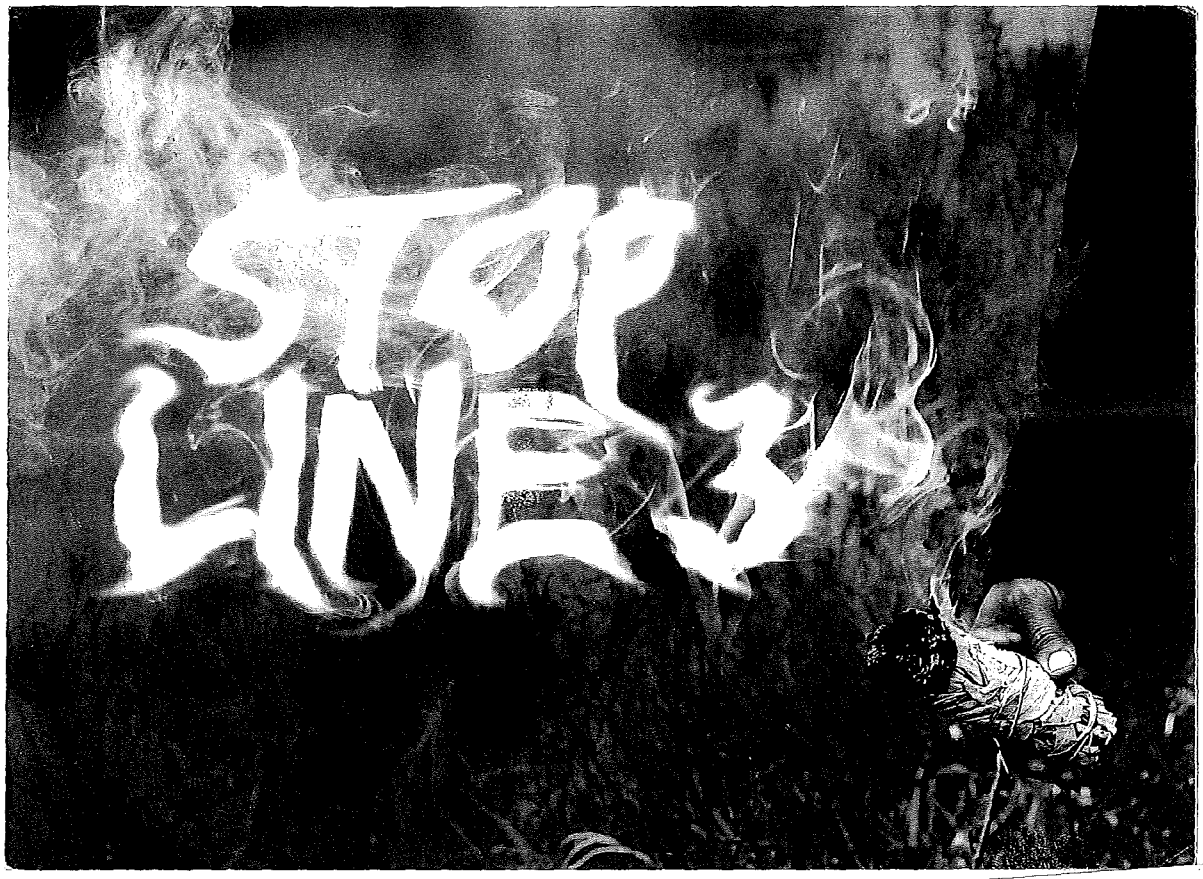

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 4 L

POSTCARD | USA

Seventy
over
Manifest Destiny
Do you want to
be like the Nazis
and the Colonizing forces?

SINCERELY,
Artist

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

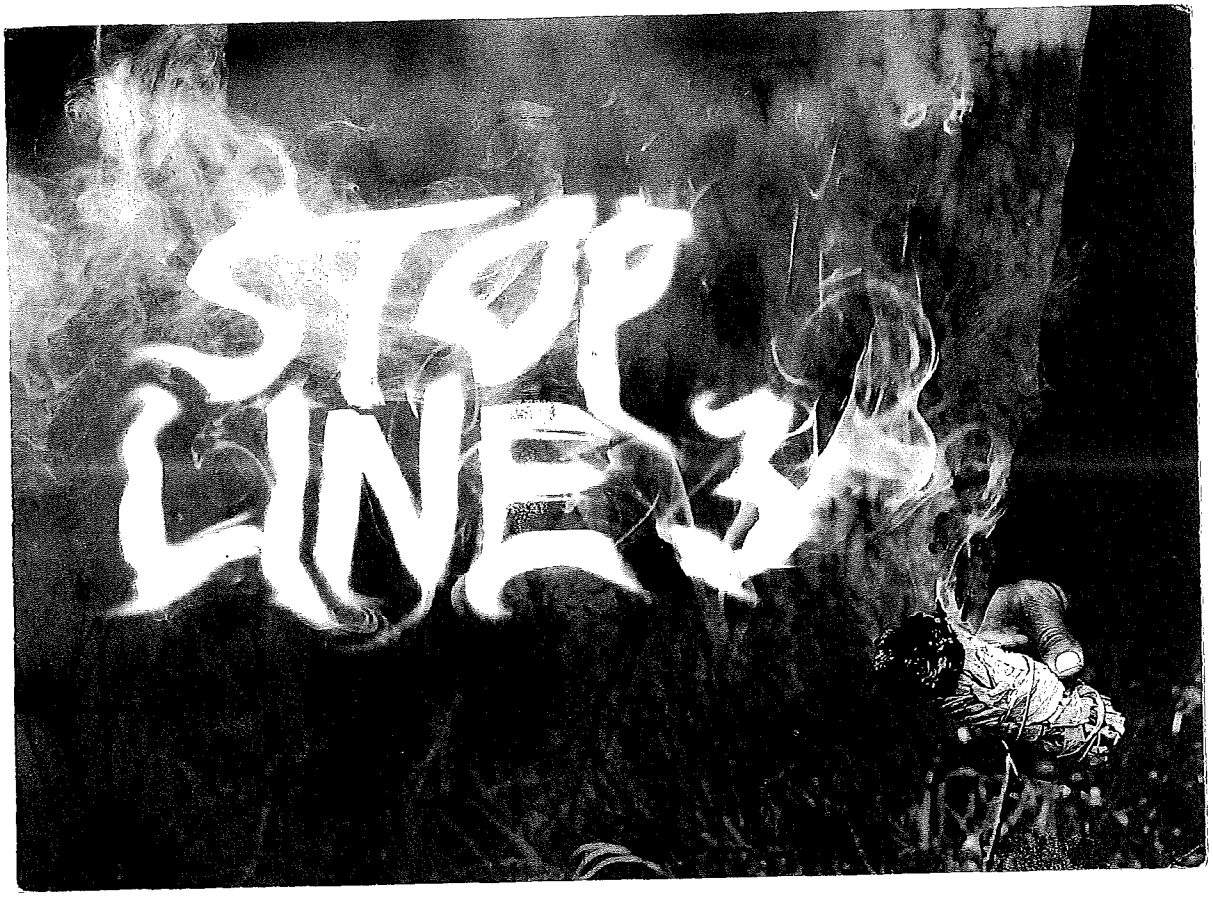

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
07 JUL 2017 PM 3 L

POSTCARD | USA

Honor the treaty of 1855

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

The Best

55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

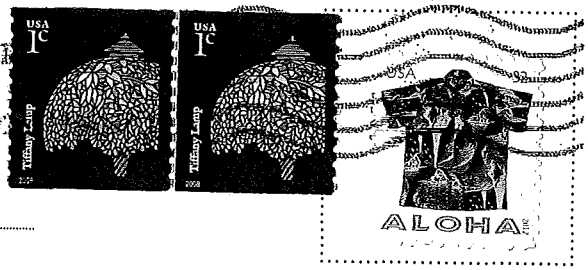

Water is Life!

Remove the Pipeline.

SINCERELY,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

DON'T BUILD
THIS PIPELINE!

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

POSTCARD USA

WERRATO

I asked my 4
year old niece
"what is water?"
she said

SINCERELY,

"Water is Life"

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
JUL 2017 PM 3 L

POSTCARD USA

What about the people? Do the right thing. Stop line 3.

SINCERELY,
the people

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
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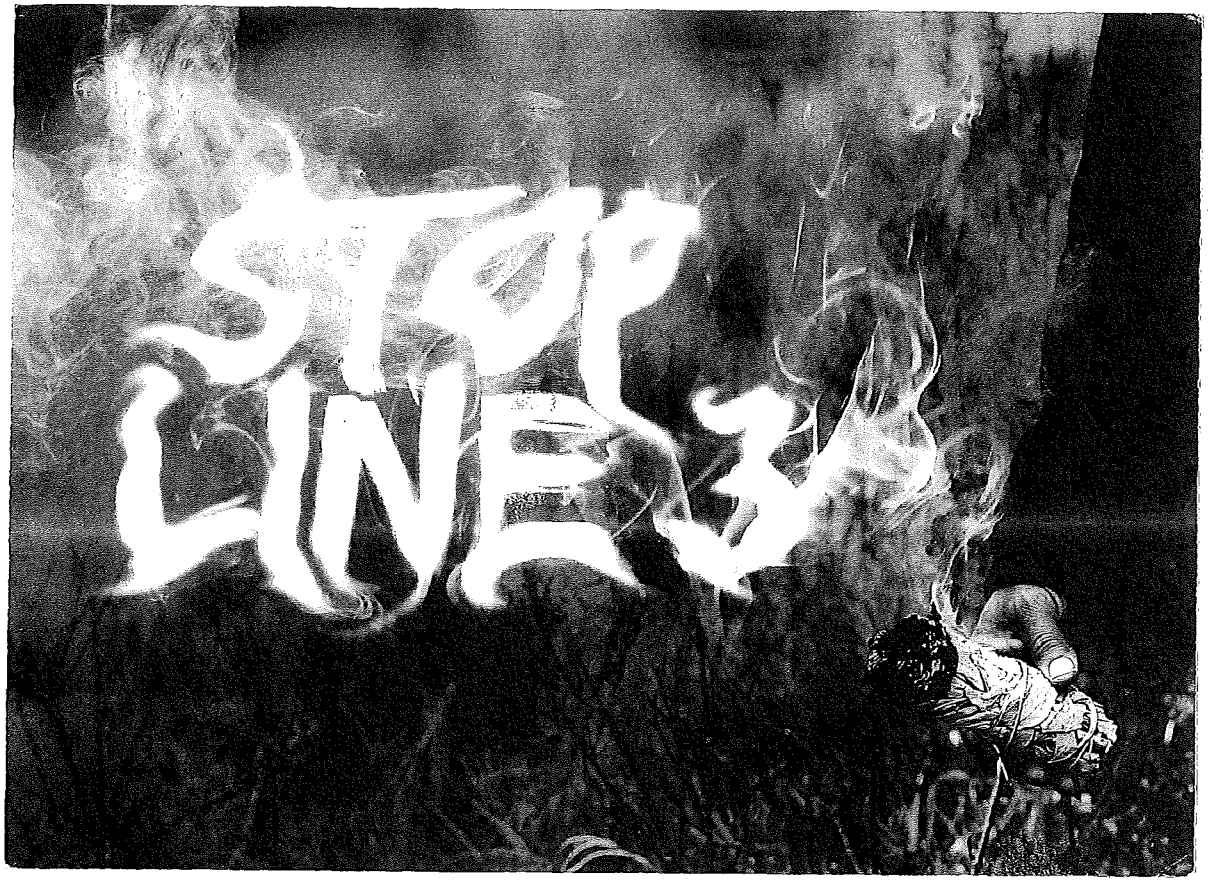

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD USA

The pipeline does not benefit Minnesotans and instead creates huge risk of contaminating our land and water, creating destructive man-camps around sites of pipeline construction, and there is little to no accountability from Enbridge. No pipeline!

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

55101-601399

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD USA

YOU HAVE THE
RIGHT TO SEE
PAST THE BOLOGNA.
LEAD WITH COM-
PASSION FOR THE
EARTH & PEOPLE
NOT COMPANIES.

SINCERELY,
JAMES

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

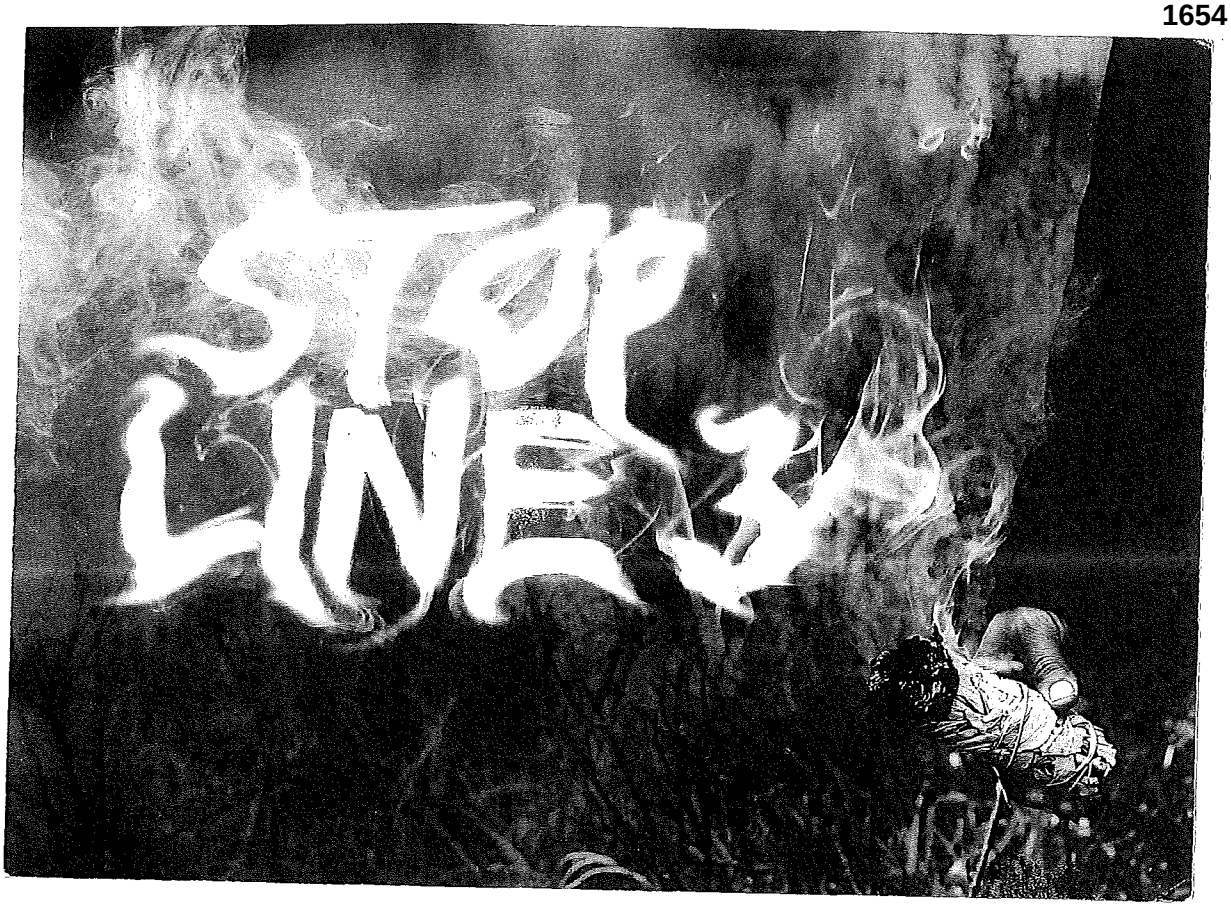

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PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 4 L

POSTCARD USA

Let MN. Shines Stop Line 3. Be the change for our communities.

SINCERELY,
Your neighbor

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

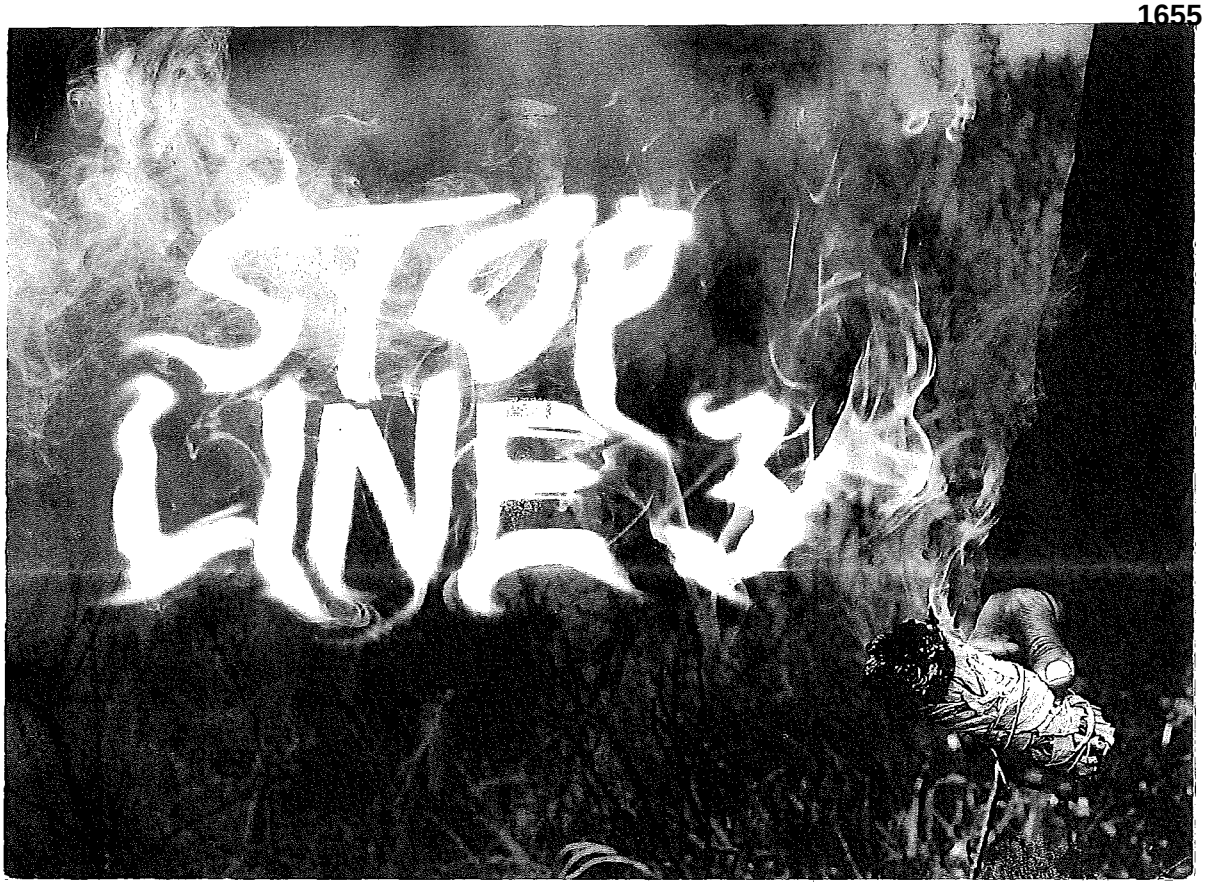

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
27 JUL 2017 PM 4 L

POSTCARD USA

What will you do
to protect women
from the sex
trafficking we
know will come?

SINCERELY,
NO Line
3

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 4 L

POSTCARD USA

the pipeline would not bring any jobs or reduce oil train traffic. It contributes to the destruction of Canadian forests and the destructive violent extraction of the tar sands. There is a high risk of spills that would contaminate the water and reduce land value. No pipelines please!

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Liz

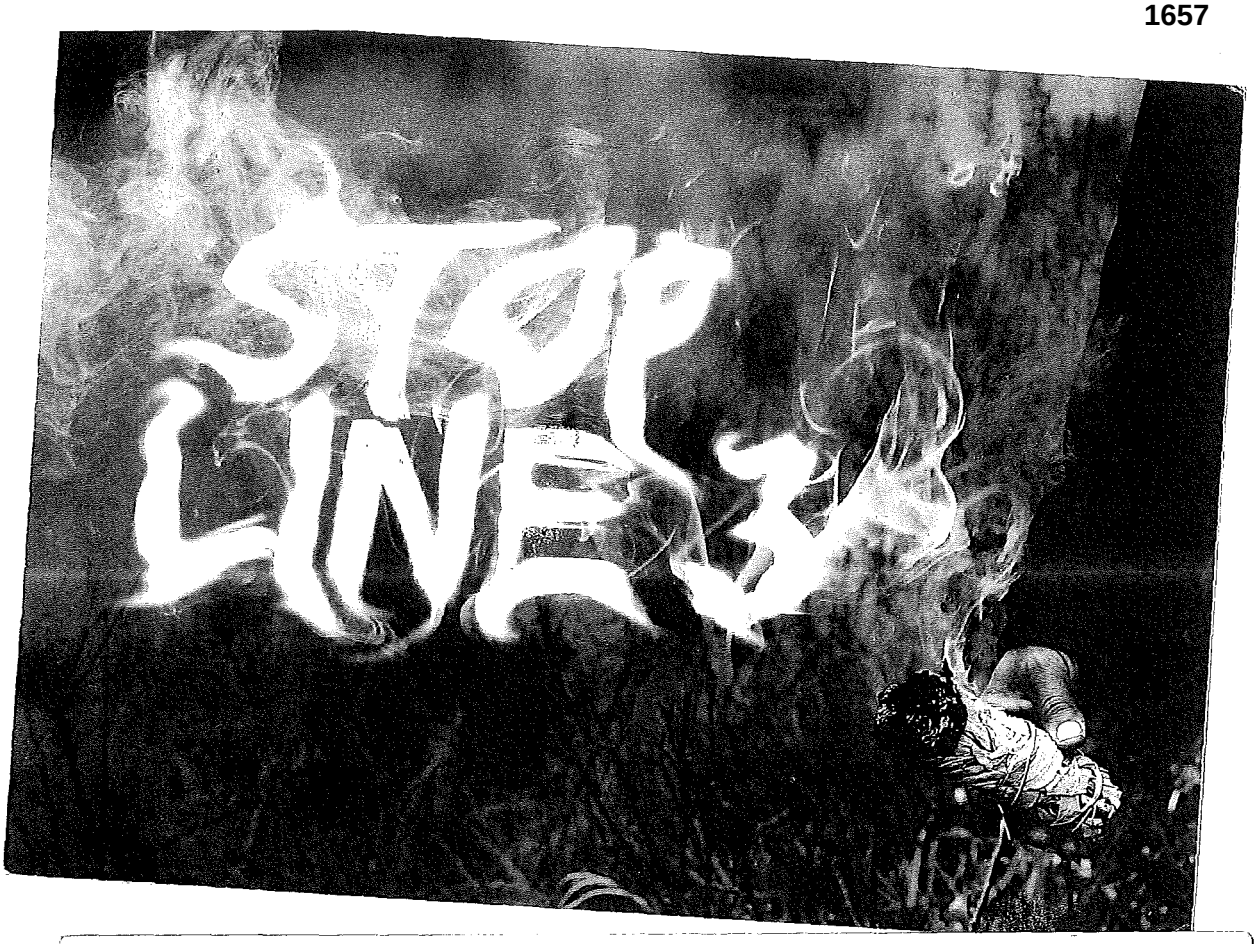

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD USA

Reframe the question

How do I get from point A to point B w/out using oil?

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Mother

55101-601399

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
JUL 2015 PM 5 L

POSTCARD USA

Stop Line 3
You have the
Power - Please
use it!

SINCERELY,
Resident

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

MINNEAPOLIS
MN 554
PM 5L

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

My daughter (3 year old)
wants a world
with clean water!

SINCERELY, a child who wants clean water

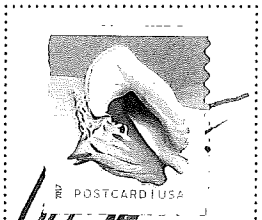

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD | USA

Read the
Fuck out

SINCERELY,
Now

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD | USA

When do we say
we have enough?

How many pipelines
do we need
before we
change the way
we live?

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Sista

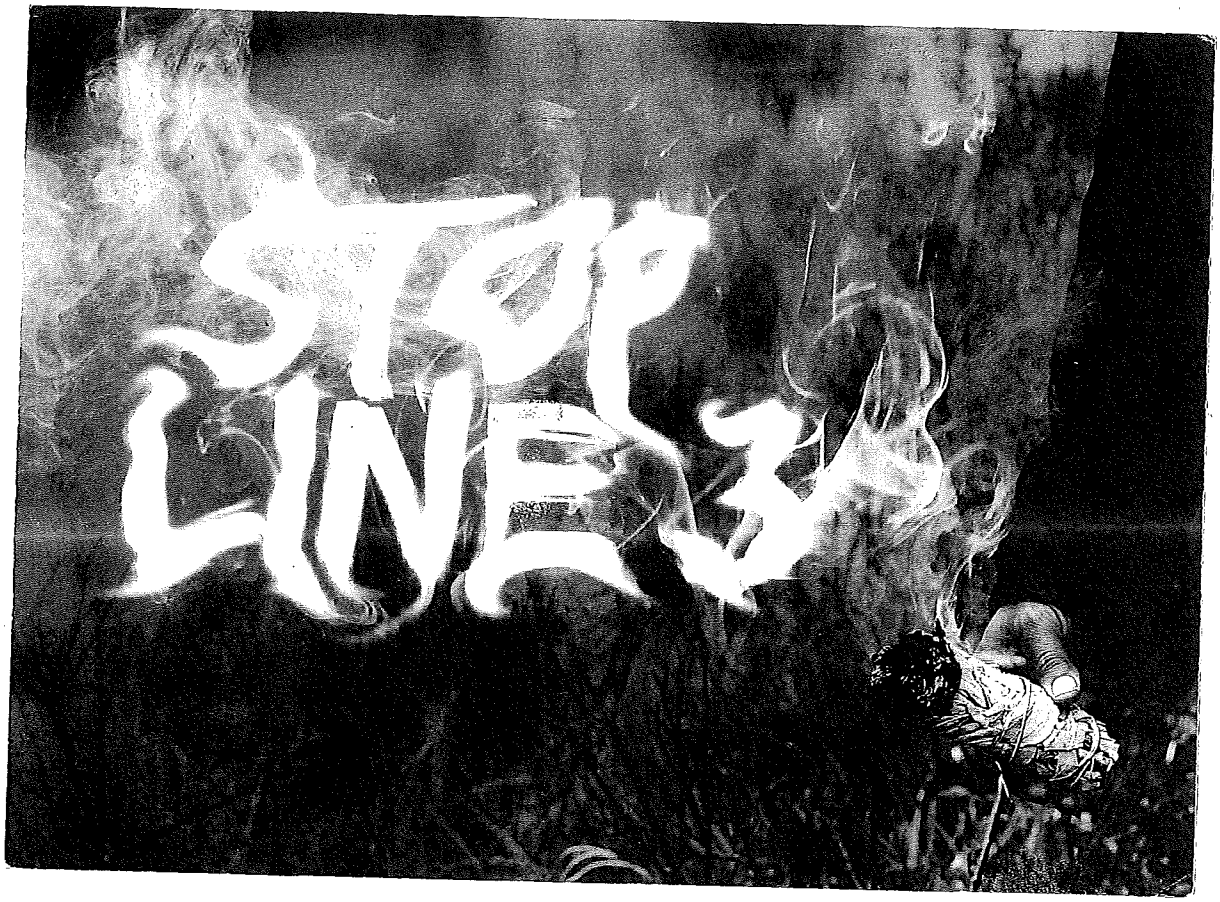

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
2017 PM 6 1

POSTCARD

What's up with Enbridge stopping paying taxes to the MN counties along the mainline corridor?

SINCERELY,

Property tax payer

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
07 JUL 2017 PM 4 L

POSTCARD USA

Our clean water and health of our land, rice beds, and lake Superior are too important to even risk one spill. Stop the pipeline!

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Liz

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 55

07 JUL 2017 PM 4 L

POSTCARD USA

SPAKTR AISW
ASOPRHRQANO
SPAHRAH S
SAMFAN SSHEH
OF BASTFAN DNA
AMDROBESHEWA
SSOHAPPY THAT
HERFRANDBE
WS

SINCERELY,

55101-6013

JAMIE MAGALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

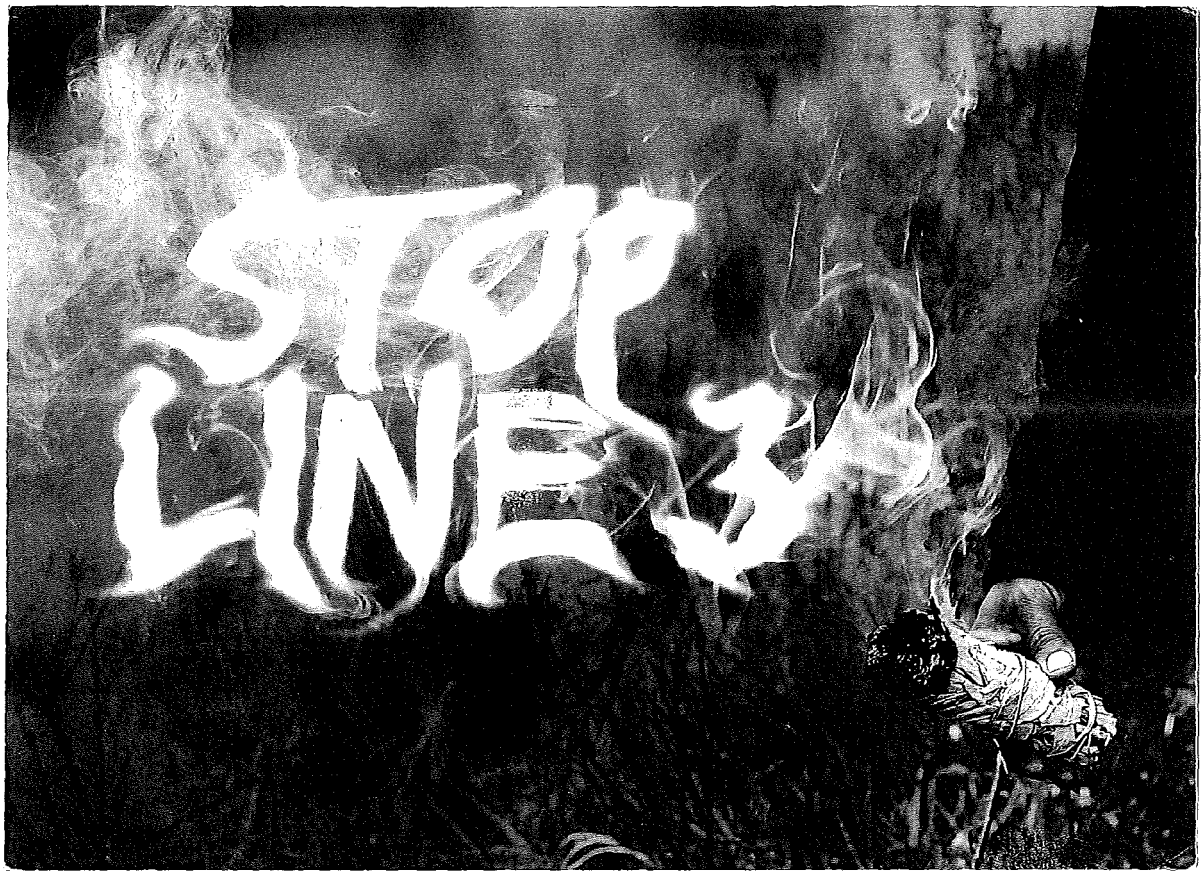

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
JUL 2017 PM 7 L

Slow it down!
Clean it up!
This needs to be done right to honor sacred sites, and make sure there are no additional problems including the sex trafficking that often accompanies pipeline construction

SINCERELY,

mpls. MN
55408

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

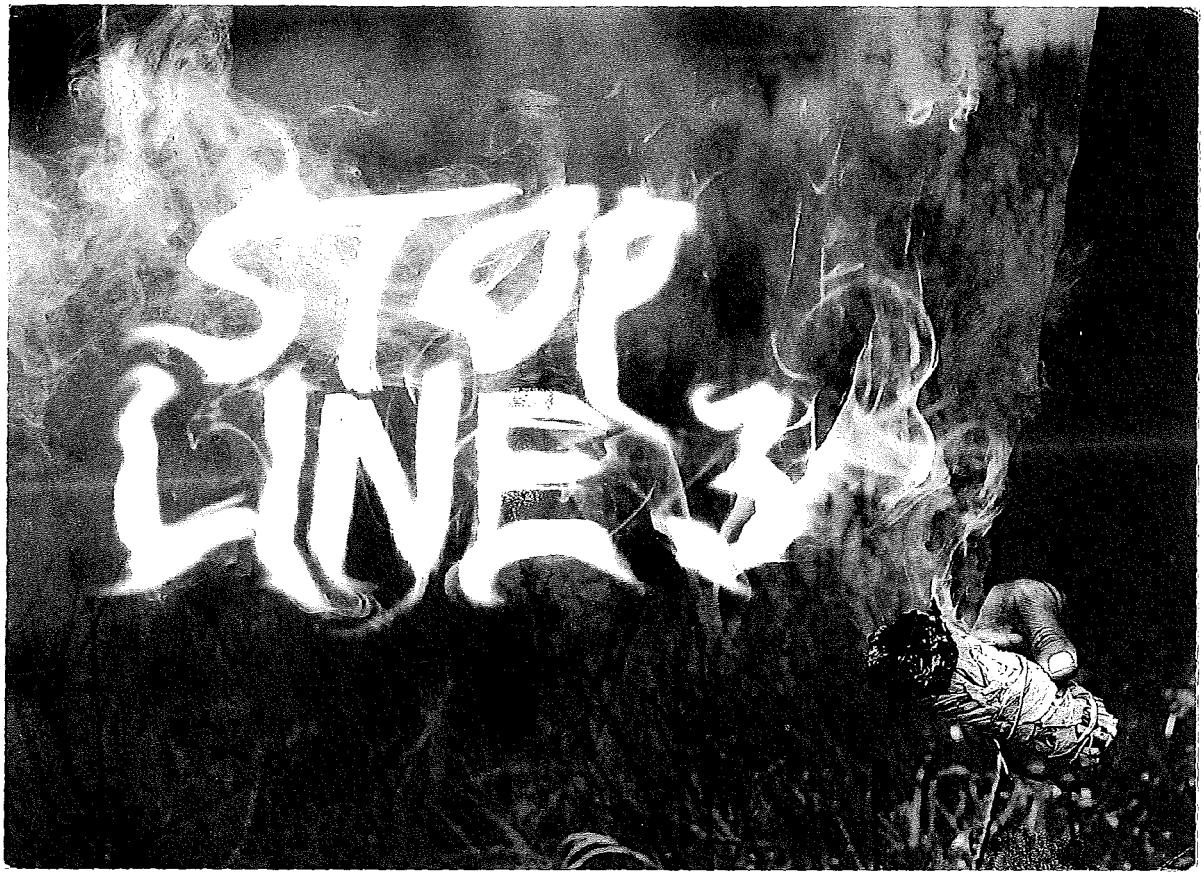

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

POSTCARD USA

If we plant another pipe in the ground we'll be doing this again in 60 years.

SINCERELY,

Don't let us be the next Standing Rock

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

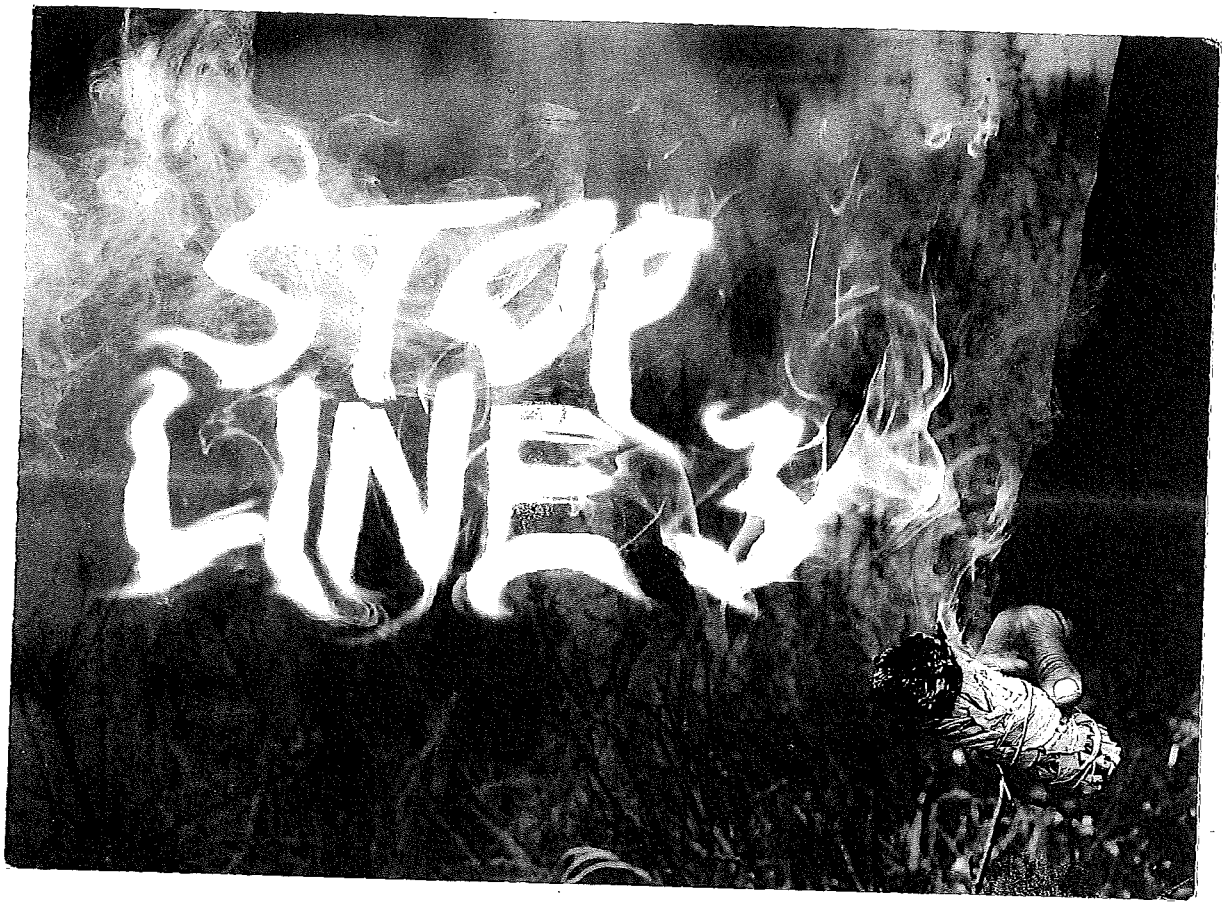

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 4 L

POSTCARD USA

I love my wild rice w/out tar sandsoil. Put the pipeline idea away - no more crap

SINCERELY,

a sister

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
JUL 2017 PM 3 L

POSTCARD USA

Informed consent of Tribal Nations must be attained before plans or decisions are made for the Pipeline so what's up with that?

SINCERELY,

a Mother

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

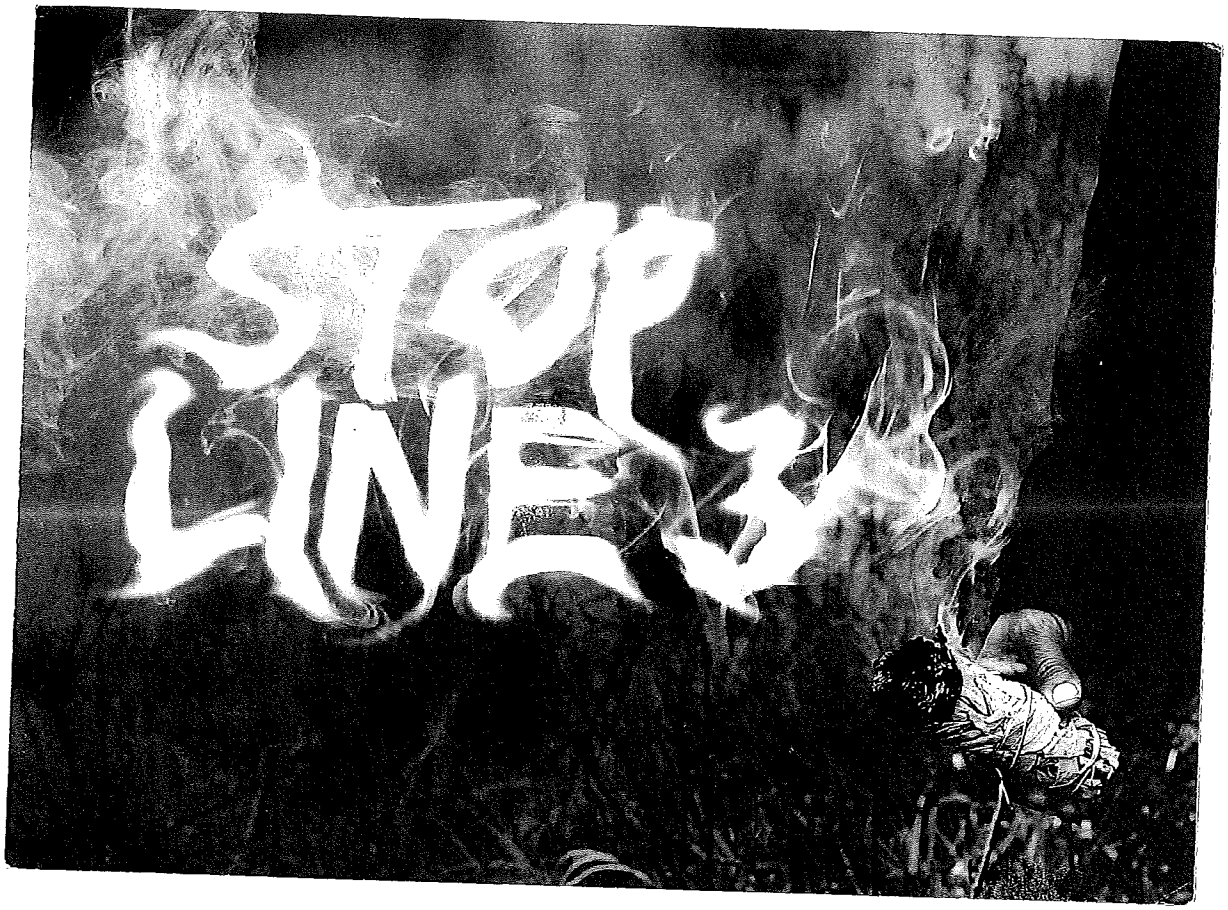

DEAR DEPARTMENT OF COMMERCE, MINNEAPOLIS MN 553
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137. 07 JUL 2017 PM 4 L

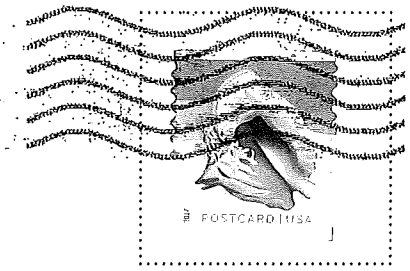

water > oil
wild rice > oil
Future > oil

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

people > oil

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017

POSTCARD USA

Pro pipeline
people cave
too. Take
old Line 3
out before you
plan New Line 3

SINCERELY,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
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SINCERELY,

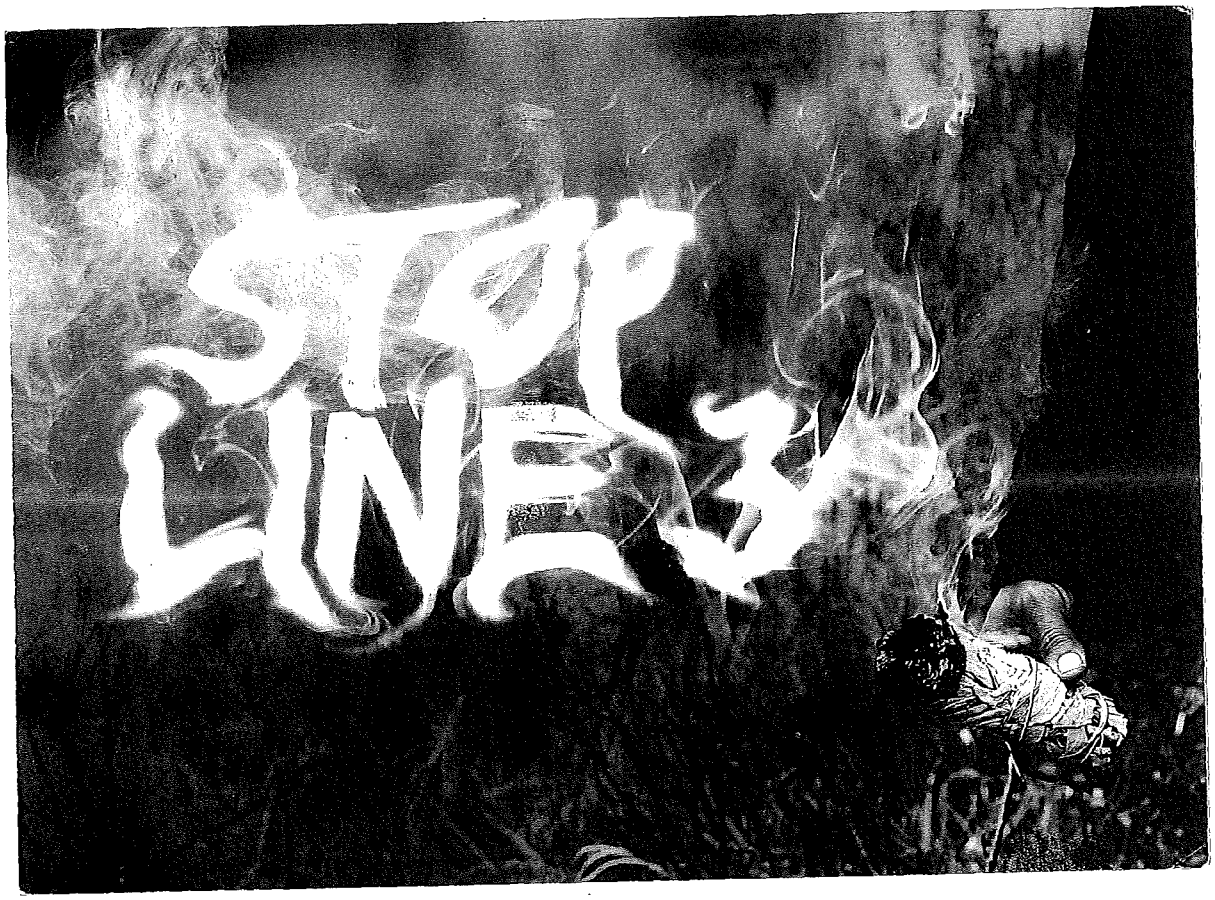

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 4 L

POSTCARD USA

Google
Man
Camp

SINCERELY,

Against Line 3

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

I [illegible] because [illegible] the [illegible] [illegible] [illegible] [illegible]

SINCERELY,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

POSTCARD

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

ST PAUL MN 550
2017 PM 41

POSTCARD

I oppose Line 3 for a number of reasons. Pipeline abandonment is incredibly risky and irresponsible as leaks and other potential problems cause significant damage to the already fragile environment. The presence of this pipeline on Indigenous land is disruptive and [illegible] to the Indigenous and [illegible]

SINCERELY,
A Minnesota [illegible]

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

we do not need
another Pipeline!
Water is life!
Mini Wi[redacted]Con

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

A Queer Redneck

Hatavis

WATER
IS
SWEET

WATER

WATER IS flowing

Water is
GROW

WATER is LOVE

Water is
Smooth

What is
Wa

Dope

water is sacred.
Protect it.

WATER
IS
AWESOME

water's world

WATER
IS
COOL

water is fun

water is fun

WATER IS
BOSS

water is us

VATGRIS

WATER
IS
MERSI

WATER IS
YOU

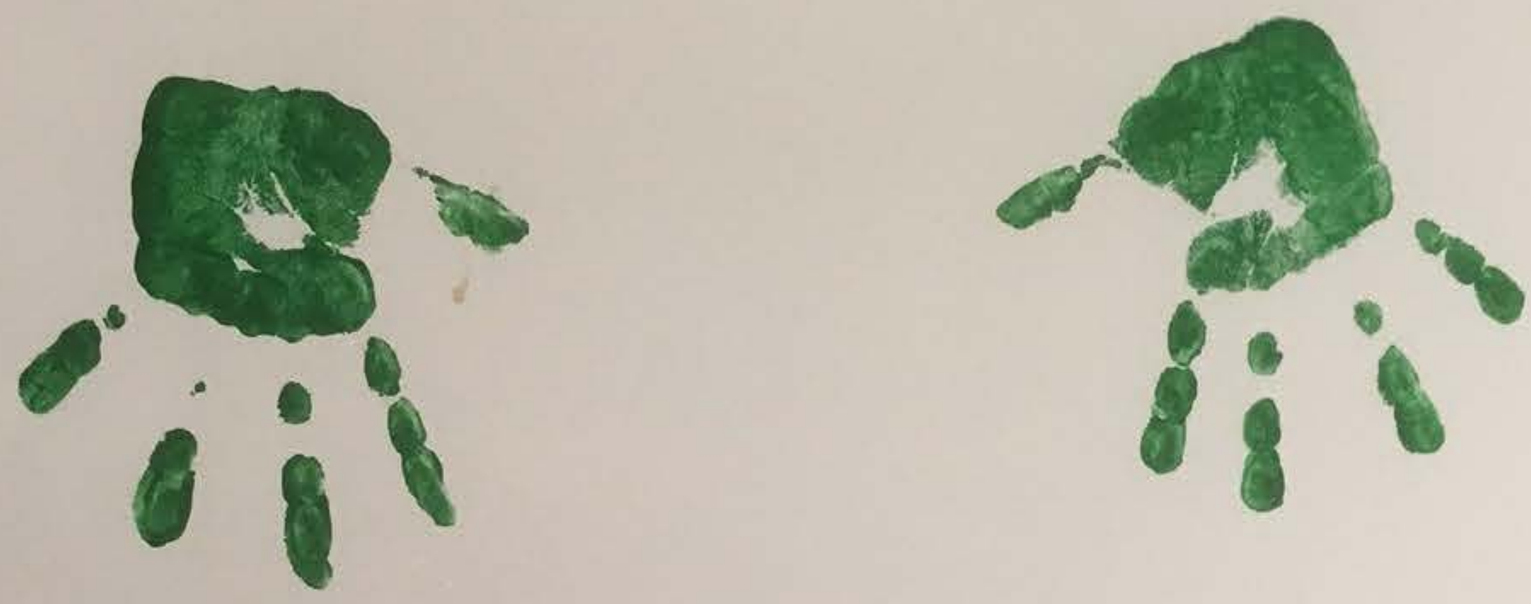

It's our job to secure new forms of energy that support long term sustainable life and commerce. Tar sand oil from canada is not something Minnesota wants to be a part of. Line 3 and Enbridge offer us an opportunity to show the world a new way forward. No Line 3. Planting another pipe in the ground that expires in 60 years is not the answer. Tell Enbridge to build wind & solar in Minnesota for my niece & her grandchildren.
(see feet & handprints above)
– Isaac

WATER IS
STRONG

Levi, Andrew (COMM)

From: NEMKid <ttgbbjww12@protonmail.com>
Sent: Monday, July 10, 2017 6:46 PM
To: MN_COMM_Pipeline Comments
Subject: Comment on line 3

I am from red lake county,

I am a Caucasian male.

It could be of interest, to the wild rice communities. To see sustained health of the water, there is an understanding that keeping pipelines out of the ground, can supliment this ideology.

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

HONOR the
1855 Treaty
Territory
Tribal consent?

SINCERELY,

an active voter

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

2812

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

What will you do to keep our women and children safe come 2018 construction of the proposed pipeline? Sex trafficking have you heard of that?

SINCERELY,

Maria

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

2813

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

Everything on Line 3 is a disastrous plan. Start over beginning w/ the mess you made by the PWCA

SINCERELY,

Scared Mom + Grandma

55101+2143

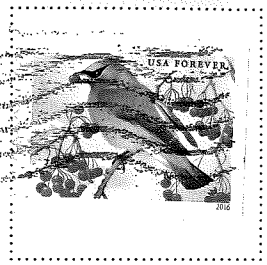

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Levi, Andrew (COMM)

From: Barbara Backberg <backberg@gmail.com>
Sent: Monday, July 10, 2017 11:44 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Energy Pipeline Line 3 Roite

Dear Jamie Macalister:

As a lifetime summer resident of Blue Lake, Crow Wing County, I urge you to reconsider the route of the Enbridge Energy Pipeline Line 3 route.

Our greatest resource in this area is our clean surface and ground water. Allowing a pipeline to be run through this area by a notoriously careless company is reckless at best, and criminal at worst.

A spill in this area would affect the economic and physical health of the population of humans, and the ecosystem hundreds of miles around a spill, including county seats such as Aitkin and Brainerd.

Allowing companies to pump oil through areas such as these sends a message of profit over ecology, and encourages the continuation of our dependence on crude oil and fossil fuels.

Please encourage the DOC to keep Minnesota as a model of a booming economy with a philosophy of a healthy environment over profit; do not allow the line three do endanger our beautiful state of Minnesota.

Sincerely,

Barbara Backberg
19693 Blue Lake Rd
Emily, MN 56447

--
Barbara Backberg
218-838-0603
backberg@gmail.com

Levi, Andrew (COMM)

From: Dan Backberg <danbackberg@gmail.com>
Sent: Sunday, July 09, 2017 4:26 PM
To: MN_COMM_Pipeline Comments
Subject: Environmental Review Manager - Re: Enbridge pipeline DEIS

To whom it may concern,
My wife and I have a lake cabin on Blue lake near the south end of Roosevelt Lake in Crow Wing County. This pristine property has been enjoyed and utilized by 4 generations of my wife's family. The pipeline route under consideration would run just north of Roosevelt Lake and impact that watershed, which passes through the Whitefish chain of lakes on the way to the Mississippi River. There has simply got to be a better route!
The lands that have been proposed for this pipeline route would expose a large number of other pristine watersheds in this part of the state. The Mississippi River is located in the proximity of the route at locations that include the very source of that great river.
A huge consideration in adapting this route involves the native people and the indigenous crop known as wild rice which flourishes in many of the lakes and rivers along the proposed pipeline. Conditions under which wild rice grows represent a narrow niche that is found in our clean northern Minnesota waters. A pipeline spill could wipe out an ancient food source used by the local Indian tribes for centuries.

I urge you to reject this high risk pipeline on the grounds that everyone knows it will leak. We do not need to let Canadian oil be piped across our virgin resources. There will be little or no financial benefit to the state of MN and its residents for allowing such a dire situation to become possible. Please stop this injustice from being shoved down our throats. Thank you, Danny L. Backberg , 19693 Blue Lake Road, Emily, MN 56447

Levi, Andrew (COMM)

From: jcbackowski@aol.com
Sent: Monday, July 10, 2017 6:27 AM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

We are submitting the following comment about Enbridge's Line 3 project.

We live in Aitkin County, where we have a lot of wetlands and peat bogs. We were dismayed to read in the DEIS (Section 10.1.2.1) that "Pipeline stress or corrosion can also occur due to the natural conditions of the substrate surrounding the pipeline. For example, many types of peat (which is common in Minnesota) exhibit negative buoyancy and place upward pressure on pipelines, causing stress on the pipe."

We feel that, given this fact, running a pipeline through an area like Aitkin County will increase the chances of leaks. We would like to see more information about pipe stress in peat bogs, and the effect of acidity on pipeline corrosion.

Jeff & Cheryl Backowski
50655 218th Place
McGregor, MN 55760

Levi, Andrew (COMM)

From: RBaker <rdbaker12@gmail.com>
Sent: Sunday, July 09, 2017 9:55 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 PPL-15-137

1. It seems to me that at the very least, all the issues and questions raised by Honor The Earth need to be addressed.
2. For me, the whole idea of extracting tar sands oil is questionable. The destruction of the land and the emissions that will result from the extraction, transport, processing and utilization of tar sands oil are obscene in my view. Most of us know that humans eventually have to move away from fossil fuels - this seems like a good early move. Leave it in the ground! No Line 3 period. Remove the old pipes, preserve the waters of northern Minnesota and respect the rights and lives of native peoples.

Roberta Baker
St. Paul

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
JASON BAKKE	487-5202	^
ADDRESS	jason.bakke@ci.clearbrook.MN.us	
CITY, STATE, ZIP	GONVICK, MN 56644	

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: David Balan <balancomics@gmail.com>
Sent: Monday, July 10, 2017 8:04 PM
To: MN_COMM_Pipeline Comments
Subject: Comments on the Draft EIS for Line 3

To Jamie MacAlister,

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

My name is David Balan, and I am from Lakewood, Ohio

The Line 3 Pipeline concerns me because as a citizen of the United States & the planet Earth, I have a vested interest for my future and my children's future to see the relentless march of potentially catastrophic climate change ground to a halt. That cannot happen without a complete change in our energy infrastructure, which concerns pipelines like Line 3.

The DEIS assumes that society needs oil. Though our current infrastructure is designed around it, that doesn't mean it's a good idea. There is no discussion of renewable energy, conservation, or the rapid development of electric car infrastructure. There is no assessment of the decline in oil demand. The "no build" option is not genuinely considered. The entire study assumes that society needs X amount of oil, simply because Enbridge says they can sell it. That assumption ignores the massive fossil fuel subsidies and debts that make Enbridge's profits possible, and avoids the moral question of what is good for people and the planet. I am young - I will be facing the droughts, extreme weather, water contamination, and food shortages that this pipeline will contribute to (Executive Summary p.18) if drastic change is not made NOW.

On top of this, the DEIS for Line 3 concerns me because it also creates disproportionate negative externalities for Native Americans. This is well documented in Chapter 11: "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) These impacts are physical (11.4.3), environmental (ES-10), cultural (9.6, 9.4.3, 5.4.2.6.1), and social (11.4.1).

Proposed remedies to these problems are either non-existent - as is the case with physical & environmental impacts - or utterly naive, as is the case with the social problems. The DEIS suggests that in the face of a higher likelihood of sex trafficking & abuse in impacted communities, Enbridge could "prepare and implement an education plan or awareness campaign around this issue". Yet, Enbridge is not a company with any specialty in ending sex trafficking or abuse, nor does the company have any ties to the impacted community with which to begin this work. This proposed remedy exhibits a deep ignorance about the many factors that lead to sex trafficking and what these communities need to end it. The people who wrote it need an education campaign themselves.

And for all of this destruction, no permanent new jobs will be created. (5.3.4) We cannot trade the life of all of our children for a few year's work for some of our people now. We must divest from fossil fuels and invest in renewable infrastructure, or we damn future generations to great hardship, possibly even death.

For all of these reasons, I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Sincerely,
David Balan

From: Joe Ballek
To: MN_COMM_Pipeline Comments
Subject: Line 3 replacement
Date: Wednesday, June 07, 2017 7:40:04 AM

Dear Ms. MacAlister,

Build baby build...!

Sincerely,

Joe Ballek
44694 243rd Ave
Leonard, MN 56652
ballekjs@gvtel.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
LUCAS BALYEAT	6127995587	LUCASBALYEAT@GMAIL.COM

ADDRESS
3236 OLD HWY 8

CITY, STATE, ZIP
ST. ANTHONY, MN 55418

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: David Bangerter

Street Address: 1300 Event Center Dr. NE

City: Bemidji State: MN Zip Code: 56601

Phone or Email: kdbang@bolbumpa.net

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

As I have traveled the pipe line from Cass Lake East I have not noticed at any time where a spill has effected any of that area. I have not noticed where wild life has been effected in any way by the existing pipe line. Why not use the shortest route possible for this line

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Kay Bangerter

Street Address: 1300 Event Center Dr. NE #3

City: Bemidji State: MN Zip Code: 56601

Phone or Email: kdbang@paulbunyan.net

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Possibly if the US would buy their steel for the pipeline from US still instead of China, Maybe eliminate the broken pipes –

Sex Trafficing? What is that about?
If native American families would love & supervise their children and know where they are, supervise their time on computers, phones, etc. maybe less sex Trafficing would be happening. We all love the water, the land, the sun, the wind and the moon. This has no connection with the pipeline if constructed with better products. If the earth is so worshipped, then reservations need to be cleaned up.

I am 100% for clean water and a clean environment. I am highly opposed to the US ~~buying~~ buying oil from countries who hate us and want to kill us and ruin our way of life –

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Tessa Barber <tessa.barber@gmail.com>
Sent: Wednesday, June 14, 2017 1:21 PM
To: MN_COMM_Pipeline Comments
Subject: Comment on Dockets CN-14-916 and PPL-15-137

Hello,

I am writing to comment on the impact that the proposed Line 3 pipeline will have on Minnesota. I think it will have a detrimental impact on the state and a larger detrimental impact on the country, which is why, even as a citizen of Pennsylvania, I am writing to comment.

The Draft Environmental Impact Statement states that the pipeline will "have a long-term detrimental effect on tribal members and tribal resources", will be a stressor on tribal communities, and is part of a "larger pattern of structural racism". The United States has a long history of harm to Native Americans, and any responsible person or corporation should not add to it, especially the pipeline project, which will affect the tribe's traditional resources and have long-term cultural and health damages - including an increased risk of sex trafficking and sexual abuse, which no amount of education can ameliorate the impact of. Moreover, the pipeline will infringe on historic sites that should be protected.

The Impact Statement does not go far enough in ascertaining the decline in oil demand or any serious discussion of not having the pipeline and doing what is good for the planet. Just because a company says they can sell oil does not mean it is the right thing to do. The impact of the pipeline may not be worth its value as a distributor of oil, when oil is harming the planet and people, and eventually we will have to transition away from it. The thinking here is too short term.

The spill modeling is not detailed enough and does not represent the locations put at risk. The probablities of spills are too high. Any spill is too much of a spill and will affect the environment and put ecosystems at risk.

The measurement of the life of the pipeline is also not in depth enough. What happens if Enbridge goes out of business? What impact do their pipelines have on property values? Once the pipelines are not useful, will they be taken down? Will they be left to corrode? There is no plan discussed here in detail, and there should be. No decisions should be made until this is thought through.

The route of the pipeline is dangerous because it follows a utility corridor - which can lead to corrision and leaks.

Chapter 5 admits that this pipeline will not create permanent jobs and that no construction jobs will be local. It will not be a sustainable source of tax revenue. The pipeline is not a good economic choice.

Finally, the pipeline will contribute to climate change,which we should be doing everything to combat.

With detrimental impact to Native people, the environment, and the economy, this pipeline should not be built.

Thank you,
Tessa Barber
405 marion ave.
Pittsburgh PA 15221

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

02 1P $000.46
0001956485 JUN 21 2017
MAILED FROM ZIP CODE 55419

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Dennis J Barclay	218-685-4758	dennisjbarclay@gmail.com

ADDRESS
106 N. Main St

CITY, STATE, ZIP
Viking Mn. 56760

COMMENTS

It needs to get done.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
John Barnes	651-675-7986	JBarnes@local49.org

ADDRESS
30980 wallmark lake dr

CITY, STATE, ZIP
Chisago City, MN 55013

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

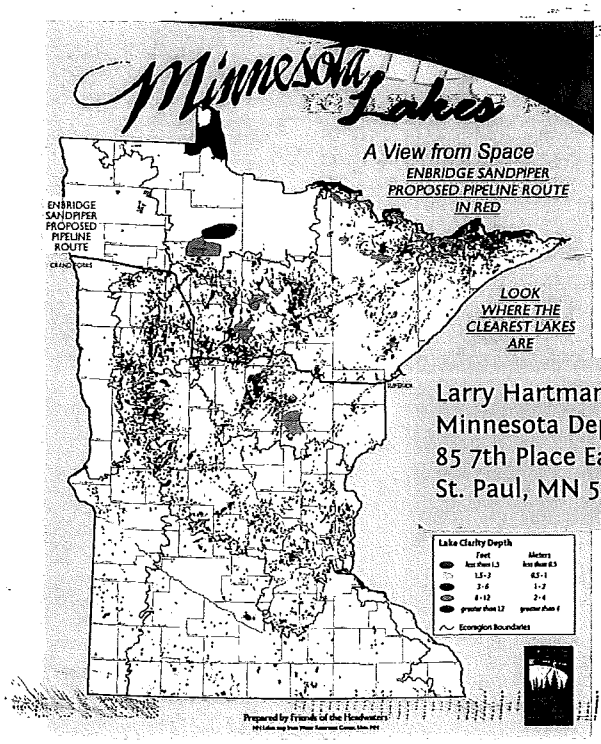

Write a public comment!

Larry Hartman
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101

Map by Friends of the Headwaters
www.friendsoftheheadwaters.org/

MN 350

I oppose the Sandpiper pipeline!

PUC Docket: 13-474

This proposed expansion of Enbridge's pipeline network would perpetuate extreme climate disruption. The Sandpiper would enable even more extraction and burning of dirty Canadian tar sands and frakked Bakken oil, while climate science tells us we need to be keeping this oil in the ground for a livable future.

Please work towards a sustainable future for Minnesota and the entire World!

Thankyou

Name: Thomas Barry

Phone: 928-273-3022 Email: tbarry@macapital.net

Address: 2104 Hastings Ave. Newport, MN 55055

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

UNITED STATES POSTAGE
PITNEY BOWES
02 1P $ 000.46⁰
0001956485 JUN 19 2017
MAILED FROM ZIP CODE 55419

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Mike Barry	218-681-8536	mjbarry@m.cable
ADDRESS: 134 Fern Road		
CITY, STATE, ZIP: Thief River Falls Mn.		

COMMENTS: please keep this project on schedule
Thanks!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Barten, Neil L (DFG) <neil.barten@alaska.gov>
Sent: Sunday, July 09, 2017 5:27 PM
To: MN_COMM_Pipeline Comments
Subject: For Docket numbers CN-14-916 and PPL-15-137
Attachments: DFGDLGBizHub36020170709141807.pdf

Thank you.

Neil Barten
POB 1335 Dillingham Alaska, 99576
Ph. 907-209-4412

Docket numbers CN-14-916 and PPL-15-137

Proposed Enbridge Line 3 comments

Thank you for the opportunity to comment on the proposed Enbridge Line 3 pipeline replacement project. My comments are as follows:

Strongly urge the PUC to deny the Certificate of Need for a new corridor and require Enbridge to remove the existing Line 3 and install the new proposed 36-inch Line 3 in the same trench. This alternative would minimize environmental impacts to water resources, forest resources and eliminate impacts from an abandoned Line 3. Abandonment of the existing Line 3 will create a long-term threat to Minnesota water resources and could result in significant public expenditures decades from now as the pipeline inevitably corrodes and fails under roadways, streams, wetlands and on private property. Ensuring adequate financial commitments from Enbridge to mitigate the inevitable pipeline collapse is very difficult, and pipeline should therefore be removed.

The Draft EIS states that the Applicants Preferred Route (APR) has the greatest impact on terrestrial habitat of all the alternatives studied, and has a significant impact on surface water resources. The APR would result in significant forest fragmentation and tree loss by creating a new utility corridor along much of the pipeline length. Construction activities are recognized avenues for invasive species, terrestrial as well as aquatic, to encroach into new habitats. The State of Minnesota taxpayers annually expend millions of dollars to manage invasive species, and allowing access into new habitats could undo much of that work. Although Enbridge proposes to minimize invasive species invasions by cleaning equipment and chemically treating known areas of these species, aerial dispersion of seeds on soil disturbed by construction activities in inevitable. Thus, utilizing the current, already disturbed corridor would minimize invasive species issues in the relatively pristine lakes and forests of northern Minnesota.

Believe that the APR should be denied in favor of RA-7, which has the smallest natural resources impact, particularly if the proposed Line 3 is installed in the same trench when existing Line 3 is removed.

Sincerely,

Levi, Andrew (COMM)

From: Gordon Barten <gordon@dairylandsupply.com>
Sent: Monday, July 10, 2017 8:33 AM
To: MN_COMM_Pipeline Comments
Subject: proposed pipeline
Attachments: Scan0011.pdf

Gordon Barten
Dairyland Supply 320-352-3987
gordon@dairylandsupply.com

Docket numbers CN-14-916 and PPL-15-137

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Believe that the APR should be denied in favor of RA-7, which has the smallest natural resources impact, particularly if the proposed Line 3 is installed in the same trench when existing Line 3 is removed.

Sincerely,

Gordon Barten Gordon Barten

36963 265th street Belgrade, Mn 56312

Levi, Andrew (COMM)

From: Nathan Barten <nbarten06@gmail.com>
Sent: Monday, July 10, 2017 10:58 AM
To: MN_COMM_Pipeline Comments
Subject: Dockets number CN-14-916 and PPL-15-137

In regards to my concerns over the proposed Enbridge Line 3 pipeline:

Docket numbers CN-14-916 and PPL-15-137

Thank you for the opportunity to comment on the proposed Enbridge Line 3 pipeline replacement project. My comments are as follows:

Strongly urge the PUC to deny the Certificate of Need for a new corridor and require Enbridge to remove the existing Line 3 and install the new proposed 36-inch Line 3 in the same trench. This alternative would minimize environmental impacts to water resources, forest resources and eliminate impacts from an abandoned Line 3. Abandonment of the existing Line 3 will create a long-term threat to Minnesota water resources and could result in significant public expenditures decades from now as the pipeline inevitably corrodes and fails under roadways, streams, wetlands and on private property. Ensuring adequate financial commitments from Enbridge to mitigate the inevitable pipeline collapse is very difficult, and pipeline should therefore be removed.

The Draft EIS states that the Applicants Preferred Route (APR) has the greatest impact on terrestrial habitat of all the alternatives studied, and has a significant impact on surface water resources. The APR would result in significant forest fragmentation and tree loss by creating a new utility corridor along much of the pipeline length. Construction activities are recognized avenues for invasive species, terrestrial as well as aquatic, to encroach into new habitats. The State of Minnesota taxpayers annually expend millions of dollars to manage invasive species, and allowing access into new habitats could undo much of that work. Although Enbridge proposes to minimize invasive species invasions by cleaning equipment and chemically treating known areas of these species, aerial dispersion of seeds on soil disturbed by construction activities in inevitable. Thus, utilizing the current, already disturbed corridor would minimize invasive species issues in the relatively pristine lakes and forests of northern Minnesota.

Believe that the APR should be denied in favor of RA-7, which has the smallest natural resources impact, particularly if the proposed Line 3 is installed in the same trench when existing Line 3 is removed.

Sincerely,

Nathan Barten

From: Jody Bartholmy
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137
Date: Wednesday, May 31, 2017 2:40:03 PM

Dear Ms. MacAlister,

As a resident of northern Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project.
I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3.
No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS.
Please keep the EIS timeline to the statutory deadline of 280 days.

Sincerely,

Jody Bartholmy
39250 Hemingway Ave
North Branch, MN 55056
jbartholmy@nardinifire.com

From: Duncan
To: MN_COMM_Pipeline Comments
Subject: Line 3 pipeline
Date: Wednesday, May 31, 2017 1:03:58 AM

Line 3 pipeline must not be allowed. Oil pipelines have, many times, been shown to be unreliable. It is certain that they will leak and spill, poisoning lands and rivers they encounter and aquifers beneath them. This particular pipe line will devastate the Anishinaabe people's territory. Do not allow this pipeline.

Duncan Baruch
Portland, Oregon

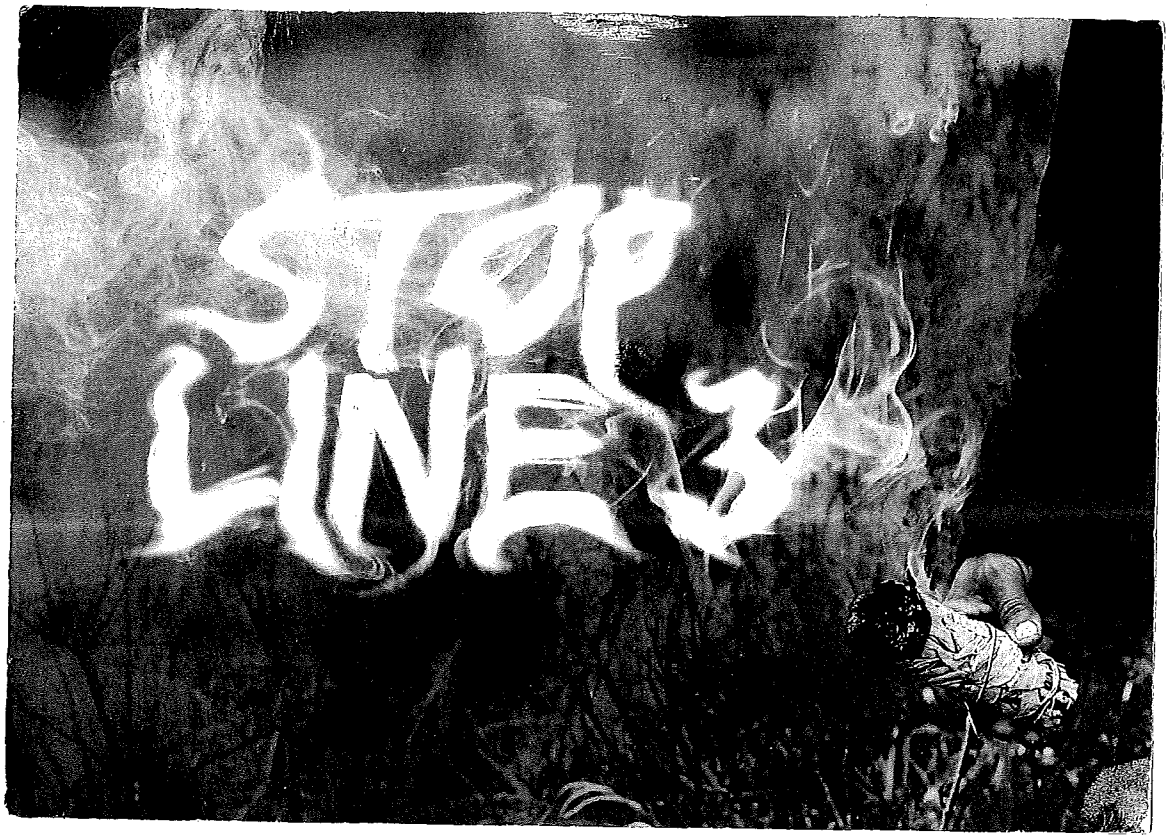

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

POLIS MN 553
20 JUN 2017 PM 2 L

USA FOREVER 2016

The proposed pipeline is an affront to tribal Sovereignity and an assault on our enviroment. It will imperil lakes and groundwater. It will contribute to more greenhouse gases in the air, thereby worsening climate change. I disagree with more pipelines in Minnesota.

SINCERELY,
Aimee Steenbakke Button

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

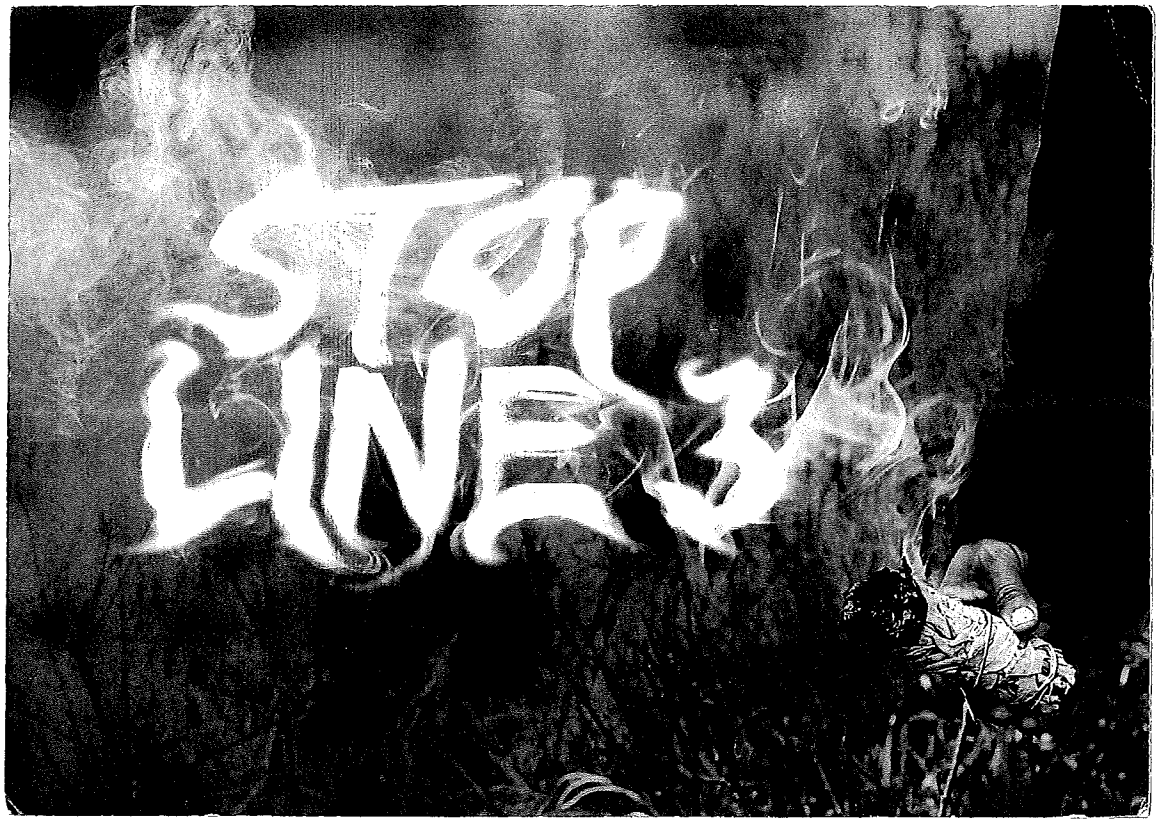

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

SAINT PAUL MN 550
2017 PM 1 1

USA FOREVER
2016

We don't need anymore Pipelines. They are a high risk for leaking and polluting ground water. The oil industry is endangering life on this planet so there is no need for more Pipelines. Minnesota should use more green Energy.

SINCERELY,
James Batton

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Levi, Andrew (COMM)

From: Janella Baxter <jbaxter@umn.edu>
Sent: Monday, July 10, 2017 12:36 PM
To: MN_COMM_Pipeline Comments
Subject: Public comment Docket numbers CN-14-916 and PPL-15-137

To the Minnesota Environmental Review Manager, Jamie MacAlister,

I am writing to register my opposition to the installation of Enbridge Energy's line 3 pipeline. The people of Minnesota do not want another oil pipeline in our state. We do not trust Enbridge Energy to safely maintain another pipeline nor do we trust them to uphold basic principles of ethics in their business dealings. Instead, we wish to protect our natural resources like water and wildlife.

Please take the people's will into consideration when you make decisions regarding this project. (Docket numbers CN-14-916 and PPL-15-137)

Sincerely,

Janella Baxter
--
Postdoctoral Researcher
From Biological Practice to Scientific Metaphysics
http://biological-practice-to-metaphysics.org/

Levi, Andrew (COMM)

From: CR BE <crbcrbcrb@frontiernet.net>
Sent: Sunday, June 25, 2017 8:21 AM
To: MN_COMM_Pipeline Comments
Subject: Clean up the old mess

Dear Ms. MacAlister,

Remove the "old"line running through U.S.; keep the new line IN CANADA!!

Sincerely,

CR BE
48034 207th Pl
McGregor, MN 55760
crbcrbcrb@frontiernet.net

Levi, Andrew (COMM)

From: Joe Bearden <chickadeebirders@gmail.com>
Sent: Monday, July 10, 2017 3:55 PM
To: MN_COMM_Pipeline Comments
Subject: Comments on Line 3 DEIS (Dockets CN-14-916 and PPL-15-137)

Please include the following comments on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137:

The Line 3 Pipeline concerns me because of climate impact. The lifecycle emissions of Line 3 would be 193 million tons of CO2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3)

The weak DEIS concerns me because:

1) The United Nations international standard for projects that impact Indigenous Peoples is Free, Prior and Informed consent. **Tribal consultancy after the project is already proposed and designed is not free, prior, and informed consent.**

2) Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "would have a long-term detrimental effect on tribal members and tribal resources" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). **This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members.**

I STRONGLY URGE/RECOMMEND the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Sincerely,

Joe Bearden
1809 Lakepark Drive
Raleigh, NC 27612
chickadeebirders@gmail.com

Levi, Andrew (COMM)

From: Joan Beaver <joanb455@gmail.com>
Sent: Monday, July 10, 2017 8:12 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

- I am writing to comment on the inadequacy of the Draft Environment Impact State for Enbridge Line #3.

  The DEIS provides no analysis of what Enbridge will do with all the additional oil, once it gets to Superior, Wisconsin.
  With 370,000 bpd of additional capacity, Enbridge will need more capacity departing its terminal in Superior. Enbridge Line #61, running south from Superior, is already a threat to the National Wild and Scenic St. Croix River as it passes under the upper part of the river and three of its tributaries. An increase of pressure to push more of this heavy oil through this aging Line #61 and build a twin to Line #61 threatens the priceless river that is shared with Wisconsin. Line #3 also directly threatens the St. Croix River by crossing the Kettle River which flows into the St. Croix.

  The DEIS also does not discuss the consensus from the scientific community that we must leave fossil fuels in the ground.

Joan Beaver

325 Edgewood Ave.

Stillwater, MN 55082

Levi, Andrew (COMM)

From: Mr. & Mrs. Kevin Beck <shonk75@gmail.com>
Sent: Saturday, July 08, 2017 5:25 PM
To: MN_COMM_Pipeline Comments
Subject: 1798 west chub lake rd

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Ms. MacAlister,

We just purcjaaed this home in May and believe we will be impacted by line 3. Who can tell us for sure?

Sincerely,

Kevin Beck
1798 W Chub Lake Rd
Carlton, MN 55718
shonk75@gmail.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Megan Beck	(218) 590-1671	megan.beck57@gmail.com

ADDRESS
151 Broadwell St.

CITY, STATE, ZIP
Tamarack, MN 55787

COMMENTS
It will bring more jobs to Minnesota.

DECLARE THE EIS ADEQUATE

Levi, Andrew (COMM)

From: Doug Beckwith <dougbeckwith@msn.com>
Sent: Saturday, June 24, 2017 3:09 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 replacement comments

Dear Ms. MacAlister,

Replacing a 65 year old pipe is important and is environmentally smart. I supervised the cleanup of hazardous waste across Minnesota for 25 years and learned it is environmentally and econmically smarter to prevent something vs remediate something after the fact. Don't dilute these two primary cornerstones with tangents

Sincerely,

Doug Beckwith
6609 Halseth Rd
Saginaw, MN 55779
dougbeckwith@msn.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Rafael Beltran	419-270-6608	
ADDRESS		
P.O. Box 423		
CITY, STATE, ZIP		
River Falls WI 54022		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: brucebendr@aol.com
To: MN_COMM_Pipeline Comments
Subject: Docket numbers: (CN-14-916 and PPL-15-137)
Date: Wednesday, May 31, 2017 9:54:37 AM

This is a comment regarding the State of Minnesota recently released Draft Environmental Impact Statement (DEIS) for Enbridge's proposed new Line 3 pipeline. This massive new tar sands pipeline threatens the territories and survival as Anishinaabe people. It would poison their water and bring more climate chaos. And we don't need it - now is the time to move to clean energy, and create a future for those who come after us.

Tar sands oil is the most impactive fossil fuel upon our climate. It perpetuates the dependency on fossil fuel. Additionally, pipelines have a high rate of failure and leakage can be devastating to our rivers.

I urge the State of Minnesota to deny this permit.

Bruce Bender
365 Kensington
Missoula, MT 59801

Levi, Andrew (COMM)

From: Frank Bender <fgbender@gmail.com>
Sent: Saturday, July 08, 2017 9:04 AM
To: MN_COMM_Pipeline Comments
Subject: Fwd: PIPELINE COMMENTS CN-14-916 AND PPL-15-137
Attachments: July 8 Pipeline Comments.docx; July 8 Pipeline Comments.pdf

I attempted to send this yesterday but used an incorrect email address. Therefore I sent a letter via the post office. To insure that you receive this message I am sending it again.
Bickey Bender

Begin forwarded message:

From: Frank Bender <fgbender@gmail.com>
Subject: PIPELINE COMMENTS CN-14-916 AND PPL-15-137
Date: July 7, 2017 at 8:24:40 AM MST
To: Pipeline.Commrents@state.mn.us

CN-14-916 AND PPL-15-137
July 8, 2017
SUBJECT: PIPLINE COMMENTS

The presentation of all of the facts concerning the proposed location of a new pipeline in Northern Minnesota through the pristine area proves that it is imperative a new location be considered.

Clean water to drink, areas to fish, swim and boat are not replaceable if they are compromised by oil spills especially undetected areas of malfunctions. Also there are very few rivers and streams remaining for wild rice to grow which provide food and earnings to the people who live here.

Our concern is for our children, grand children, visitors and tourist's, who value this area for what it is and want to continue to enjoy it for years to come.

The credibility of the company that wants to construct the pipeline has proven to have had many short comings. We can not put our trust into them to not fail in time.

Our opinion is that the outdated pipeline should be removed and not replaced.

The statement that a new pipeline will provide jobs is questionable.
A much greater service to those who vacation and spend money in our local communities has proven to be a much larger asset to the economy.

Frank and Bickey Bender
15341 Cranberry Drive
Park Rapids, MN 56470
(Stony Lake- Crow Wing Lake Township, Hubbard County)
218-732-8679

Levi, Andrew (COMM)

From: Frank Bender <fgbender@gmail.com>
Sent: Friday, July 07, 2017 10:23 AM
To: MN_COMM_Pipeline Comments
Subject: PIPELINE COMMENTS CN-14-916 PPL-15-137
Attachments: July 8 Pipeline Comments.docx; July 8 Pipeline Comments.pdf

CN-14-916 AND PPL-15-137
July 8, 2017
SUBJECT: PIPLINE COMMENTS

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Frank and Bickey Bender
15341 Cranberry Drive
Park Rapids, MN 56470
(Stony Lake- Crow Wing Lake Township, Hubbard County)
218-732-8679

Levi, Andrew (COMM)

From: Judy Benham <judyabenham@gmail.com>
Sent: Friday, June 23, 2017 5:59 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 replacement project

Dear Ms. MacAlister,

I'm a resident of Grand Rapids, MN. I want to express that I think this replacement project is necessary to continue forward with our economy as we are. Also, this pipeline has been here for years, causing minimal environmental damage. Rupture and leakage are always and have always been a risk. We are not reinventing the wheel here OR considering an entirely new pipeline. This is a replacement to prevent the inevitable rupture/leakage. As a constituent, I am saying YES to moving forward with this project.
Thank You For Your Time,
Sincerely,
Judy Benham

Sincerely,

Judy Benham
102 SE 1ST AVE APT GRAND
GRAND RAPIDS, MN 55744
judyabenham@gmail.com

From: Suzanne Bennett
To: MN_COMM_Pipeline Comments
Subject: Keep the fossil fuel industry OUT of Minnesota! NO Line 3!
Date: Wednesday, May 31, 2017 12:48:57 AM

I am writing in regards to "Line 3" CN-14-916 and PPL-15-137 specifically and on the subject of allowing the fossil fuel into MN in general.

I just arrived here from Texas in August. One of the main reasons I moved to MN was to get away from the fracking and the oil industry. The fossil fuel industry in TX is destroying the infrastructure, poisoning the air and water and causing massive earthquakes where there were no earthquakes before.

Climate change is making TX uninhabitable. When I left TX in August it was 109 degrees and we had had weeks on end of weather in the hundreds. When I was growing up in TX in the 1960s and 70s we rarely had a 100 degree day. Summers were hot with temps in the high 80s and low 90s early in the summer and a couple of 100 degree days in August.

North Texas used to have 4 seasons. Now it is over 70 degrees most of the year, and the last two years there was no freeze at all in the winter. The bugs are rampant and the weather is uncomfortable 80% of the time. This is the doing of the greedy, predatory, destructive fossil fuel industry.

Minnesota is a beautiful, natural state with clean water, healthy forests and distinct seasons. Do not destroy God's creation by allowing the predatory, exploitive, godless fossil fuel industry to come in here and plunder and rampage.

Fossil fuel is a dead dinosaur! There's a reason why it's buried under the ground. There's also a reason why sun, wind and water are freely given. They (along with industrial hemp) are the fuels of the future. They can provide clean, safe, abundant jobs that cannot be outsourced.

The state of Minnesota needs to get ahead of the game and invest in these safe, productive affordable alternatives.

Be on the right side of history. Don't let this beautiful state be destroyed in the name of greed. NO Line 3 and NO tar sands, fracking, oil or coal mining should ever be allowed in this state.

What God hath wrought, let no man put asunder!

Suzanne Bennett
600 Spruce St.
PO Box 452
Littlefork MN
56653

218-278-6770

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

02 1P $ 000.34°
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Scott Bennett	218-444-9249	bennet60@paulbunyan.net

ADDRESS
1714 Grotte Ave NE

CITY, STATE, ZIP
Bemidji, MN 56601

COMMENTS
I have 30 yrs of pipeline experience and Enbridge is the best at protecting the environment and promoting safety both during construction and line operation. The mitigation measures in the EIS reflect best practices in the industry!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Scott Bennett	218-444-9249	bennet60@Paulbunyan.net

ADDRESS: 1714 Grotte Ave N.E.

CITY, STATE, ZIP: Bemidji, MN 56601

COMMENTS: I fully support the Line 3 Replacement. This would be good economic developement that would increase County Tax Bases and provide Jobs!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Angela Benson <tabenson5@gmail.com>
Sent: Thursday, June 29, 2017 8:16 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

As a resident of northern Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project.
I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3.

Sincerely,

Angela Benson
2133 Hillcrest Dr
Duluth, MN 55811
tabenson5@gmail.com

Levi, Andrew (COMM)

From: Leslie Benson <lbnsn8@gmail.com>
Sent: Monday, July 03, 2017 9:07 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Draft Environmental Impact statement (DEIS)

Grave Concerns re: Enbridge Line 3 (CN-14-916 and PPL-15-137)

Dear MN Department of Commerce:

We are opposed to the proposed Enbridge Line 3 Pipeline because of the environmental risks for essential bodies of water, dangers to public health, and violations of treaty rights. The Enbridge Line 3 Draft Environmental Impact Statement fails to address basic conditions for safety and environmental justice. It violates MN Statute 103F.305 Scenic River Protection Policy and MN Statute 116D.02 Declaration of State Environmental Policy.

There has been no free, prior, and informed consent of Tribal Nations. We are concerned about the impact of this proposed project on the health of tribal communities, their sacred sites, and the basic sovereignty of treaty rights.

There should be NO consideration of new construction while we await plans for cleaning up the contamination from the countless spills that have already occurred along Line 3.
We are not in favor of allowing a company that has a strong history of permit violations and poor accountability to build this pipeline. We value our natural resources and do not support this proposed project.

The "NO BUILD" option needs to be seriously considered. The DEIS poses unacceptable risks to Minnesota waters (for example DEIS Chapters 5.2.1.4; 5.2.1.2.4; 10.2.4.1.1; and 10.4.1). And again, this proposal violates fundamental Tribal Sovereignty. The rights of Tribal Nations as well as the rights of all Minnesotans take precedence over the purported benefits of this project.

Thank you for considering these important concerns.

Respectfully,

Leslie & Rick Benson
189 Kingfisher Lane
Marine on St. Croix, MN 55047

Levi, Andrew (COMM)

From: Sam Benson <j.sam.benson@gmail.com>
Sent: Thursday, June 29, 2017 3:46 PM
To: MN_COMM_Pipeline Comments
Subject: Say no to the Line 3 pipeline

Approval of the line 3 pipeline is the wrong step for our future. If it were to be built, it would further our dependence on fossil fuels and put local wild life habitats and farmland in harm's way.

Levi, Andrew (COMM)

From: Walter Benson <wbwallybenson33@gmail.com>
Sent: Sunday, July 09, 2017 9:53 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3

Dear Ms. MacAlister,

Pipelines are the safest way to transport oil . Let's get the oil off the rails as much as possible .

Sincerely,

Walter Benson
3939 Deer Park Rd
Barnum, MN 55707
wbwallybenson33@gmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
William Bentley	320-980	5097
ADDRESS		
2709 25 1st st	St Cloud	mn
CITY, STATE, ZIP		

COMMENTS

Pipeliner are Safe They hav been a part of this County for years & years. Why is Mn always Negative on Pipeliner. We have To have them. Just Count Cars on the Highway. Its A must!!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jacob Richard Benton	(715) 733-0161	jacobenton1984@gmail.com
ADDRESS		
24959 Kruger Rd		
CITY, STATE, ZIP		
Webster, WI 54893		

COMMENTS
I support the Enbridge line 3 project.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Tim Berg

Street Address: 24501 120 th Ave NE

City: Thief River Falls State: MN Zip Code: 56701

Phone or Email: 218-686-1963

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am In favor of L-3 project, Enbridge is actively trying to replace a line that is in Jeopardy. Instead of possible leaks they are attempting to fix it completely and not have potential leaks.

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Carol Berg <bergdanielc@netscape.net>
Sent: Monday, July 10, 2017 9:02 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement

This proposed Line 3 is totally unacceptable. This permit must be denied. In addition, Enbridge must be required to clean up the old line. The environmental consequences far outweigh any economic benefit to the state of MN.

Sent from my iPhone

Levi, Andrew (COMM)

From: Charles Bergan <chillyb@mchsi.com>
Sent: Friday, July 07, 2017 6:59 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 replacement project

Dear Ms. MacAlister,

For me it's simple, I'm a Pipeliner!!
Safest means of transportation bar Nun!! There's NO argument and let the treehuggers be damed like the fanatic on my last project that took out his rifle to shoot up the pipe and heavy equipment then run from and then take that rifle towards the police and loose his life. I feel that most of the people who oppose pipelines are as small minded as this fellow having nothing else but an empty argument.
Of coarse I intend to be one of the Local pipeline inspectors watching over the construction of the project!
Thanks for your time and may God Bless!

Sincerely,

Chilly
1100 77th St
Victoria, MN 55386
chillyb@mchsi.com

Levi, Andrew (COMM)

From: Dody Bergan <dabergan@mediacombb.net>
Sent: Friday, July 07, 2017 6:34 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3

Dear Ms. MacAlister,

Line 3 is an important project. The existing pipe is old, it needs to be replaced using modern pipe materials utilizing modern construction methods which will improve the reliability and safety of Enbridge's mainline pipeline capability. The Line 3 project will create thousands of jobs and generate hundreds of millions of dollars in tax revenue. It must go!

Sincerely,

Dody Bergan
1156 77th St
Victoria, MN 55386
dabergan@mediacombb.net

Levi, Andrew (COMM)

From: bobberbear62@aol.com
Sent: Monday, June 26, 2017 6:50 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3: CN-14-916 and PPL-15-137
Attachments: Embridge Letter 7-25-16.doc

Jeff Bergeron
1834 West Chub Lake
RD
Carlton, MN 55718

To Enbridge:

I am writing in regards to the two proposed lines coming in close proximity of our South Boundary: Sandpiper 668/CN-13-473 and PPL-13-474; Line 3: PL-9/CN-14-916 and PPL-15-137. My wife and I have a two acre lot with three lines running through the west part of our property already. The lines are owned by Trans Canada. These lines are 36” to 42” in size and running at about 900 PSI. I had to contact Trans Canada to pound a fence post into the ground to install a fence for our garden. That just shows how close these lines are to our house.

It comes with great concern that You/Enbridge is now proposing to put two of your lines which will once again be in close proximity of our South property Boundary . These two lines are very concerning to us as they will have to cross the three lines owned by Trans Canada. I vividly recall in the 1990's when two gas lines located South of Carlton County land fill; South of Highway 210 and west of Highway Interstate 35 rubbed together and ruptured. Debris flew from the leak to both Interstate 35 and Highway 210. The good news at that time was this area was not populated. However; in this current proposal not only my family but many others are within close range of the crossing of the pipelines. I believe this is located in Wetlands.

We have lived here for the past 33 years; raised our children and planned to retire in this house we made comfortable for ourselves. My concern and fear has raised to the point of offering you/Enbridge to purchase our property; not wanting to risk harm to my family if another leak were to occur. You/Enbridge declined purchasing our property and refused to offer any fair compensation due to your compensation rules.

It would be greatly appreciated and preferred if Enbridge would re-route these lines instead of having to follow utility electrical easement below our home. My wife, children and I would like to go on record as strongly opposing the Sandpiper and line 3 installation.

Sincerely from concerned property owners,

Jeffrey & Bobbi Jo Bergeron
218-565-8599

Levi, Andrew (COMM)

From: leela bergerud <lbergerud@yahoo.com>
Sent: Thursday, June 29, 2017 10:45 AM
To: MN_COMM_Pipeline Comments
Subject: DO NOT APPROVE LINE 3 - docket numbers CN-14-916 and PPL-15-137

to whom it may concern:
please do not allow line 3 to happen in our pristine state of mn. our waters cannot afford to be violated nor can our native populations. there is absolutely nothing about this proposal that has positive benefits when you are looking very long term. our future generations deserve to inherit clean land and waters and our native population deserves to maintain the integrity of their ancestrol sites especially when it comes to their wild ricing.

Enbridge has designated the “worst-case” scenario spill data trade secret, so the public cannot review it (table 10.3-1 on page 36 of Chapter 12). The public should have access to information pertaining to serious releases of large quantities of oil into the waterways on which they rely, and be able to respond to that data.

Despite many oil pipelines routed through Minnesota, this is the first time the State of Minnesota has really seriously looked at the environmental consequences of a new pipeline corridor. The oil industry is not used to this scrutiny. The MN Court of Appeals unanimously affirmed an EIS should be done thanks to a lawsuit by Friends of the Headwaters, and the MN Supreme Court declined to take the case. Minnesota or the sovereign tribal nations within our state have never had a chance to choose an energy corridor based on their own analysis. If a new one is needed, shouldn’t Minnesota and the sovereign tribal nations decide where one would go rather than a foreign corporation? And shouldn’t any such necessary corridor be placed in the area of least environmental impact? Minnesota has strong Environmental Policy laws which require environmental considerations be considered just as strongly economic ones. Today, more oil is being brought out of the ground worldwide than the world is using. This has led to a massive worldwide build-up of oil in storage. Every time one nation cuts back, another nation tries to pump more. When supply exceeds demand, the price stays low. Low prices (below $50) mean Canadian tar sands oil is not profitable. For example, Exxon Mobil announced in Feb 2017, that it had $3.5 BILLION dollars in “stranded assets” in the Canadian tar fields, oil that it cannot profitably extract with prices below $60. If this crude oil (or products refined from it) is going for export, wouldn’t oil fields with easy access to oceans, like in Texas, be much more likely to be cost competitive to sell to the world? Canadian Tar Sands coming through MN has a long way to travel to the Gulf Coast; this distance adds cost to the oil; Canadian oil cannot compete profitability on the world market.

please do the right thing and say NO to enbridge. they have noone's interest in mind but their own bottom dollar line.

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Eric Stephen Berggren	651-315-4011	eric.berggren@lejeune.steel.us
ADDRESS		
12055 41st Ave N #121		
CITY, STATE, ZIP		
Plymouth, MN 55441		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

15-137
14-916

RECEIVED
JUL 07 2017
MINNESOTA PUBLIC
UTILITIES COMMISSION

7/4/17

The Honorable Public Utility Commissioners
121 7th Pl. E.
Ste. 350
ST. Paul

Dear Commissioners,

(Please note attached)

It seems to me that the Indians complaint that they are not being listened to holds water. I think they are being wronged.

I myself am a devout Methodist - and I dont believe in the Great Spirit - but I think we have to make room for each other. I think we should be accepting to what they say, and be open to it.

In my opinion, Indians do not deliberately make problems. For example, the Sioux at Mystic Lake have contributed a lot of money to their neighbors for good projects. For all that they have suffered, they continue to do good. This is very commendable.

Thank you for reading this.

Philip Bergh 715 W. 31st ST., MPLS. MN 55408-2915

Star 6/14/17

Enbridge pipeline fuels debate

Public hearing in St. Paul hosted a passionate economics vs. environment battle.

By MIKE HUGHLETT • mike.hughlett@startribune.com

Enbridge Energy's plan to replace its "Line 3" pipeline across northern Minnesota is a golden opportunity to get rid of an old, corroded oil conduit, creating thousands of construction jobs in the process.

Or it's a potential menace to the environment — through oil spills — as the new pipeline wends its way through the Mississippi headwaters region, including wild rice lakes sacred to American Indians.

Both views of the proposed $2 billion-plus project were on display Tuesday at dueling news conferences before a public meeting on the topic at the InterContinental St. Paul Riverfront hotel. The meeting was the 11th of 22 citizen input meetings statewide on the 337-mile pipeline, which would carry crude oil from Alberta to Enbridge's terminal in Superior, Wis. Attendance has ranged from 35 to 250 people at the first 10 meetings, with 325 at the St. Paul meeting, officials said.

Tania Aubid became emotional during the protest.

Calgary-based Enbridge, North America's largest pipeline operator, wants to build a pipeline that would follow the current Line 3 route across northern Minnesota to Clearbrook, but then would jog toward Park Rapids through an area known for pristine waters. The Line 3 replacement is being considered by the Minnesota Public Utilities Commission (PUC), a process that will go into 2018.

"We get four real positives for one project from the business community's standpoint," said Bill Blazar, the Minnesota Chamber of

See PIPELINE on D2 ▸

Pipeline stirs passions on both sides

◂ PIPELINE from D1

Commerce's senior vice president of public affairs and business development, during a news conference that laid out business support for the Enbridge project.

Enbridge will inject money into the economy and create jobs, he said. Plus, because the pipeline is old and has had some problems, the project also will improve safety along the pipeline and lower the environmental risk of a spill.

Harry Melander, president of the Minnesota State Building and Construction Trades Council, said the pipeline project will create a couple of thousand construction jobs that could last up to nine months.

Rep. Tim Mahoney, DFL-St. Paul and a pipe fitter, said state regulators need to look at the merits of the project, not the type.

"The system is now being used just to say no to any petroleum project," he said.

However, Rep. Mary Kunesh-Podein, DFL-New Brighton and of Standing Rock Lakota descent, said tribal governments have not had a proper voice in the process thus far.

"If a new line is really [built], shouldn't those tribal councils decide where it goes, not a foreign corporation?" Kunesh-Podein said at a news conference representing Indian tribes' concerns. "This pipeline threatens our sacred land in Minnesota lake country."

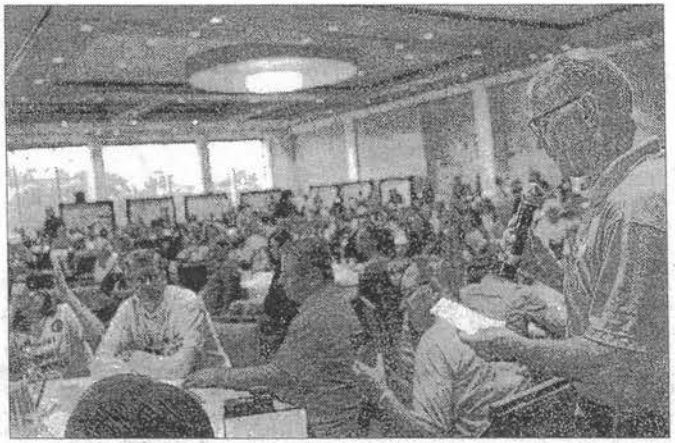

RICHARD TSONG-TAATARII • richard.tsong-taatarii@startribune.com

About 325 people attended Tuesday's meeting, the 11th of 22 citizen-input events held statewide on the 337-mile pipeline.

Winona LaDuke — executive director of Honor the Earth, a national environmental nonprofit based on the White Earth Reservation — said the tribes need to "speak for the water for future generations."

"This is the only place where we can live as Anishinaabe people," she said. "This is where the creator put us, and this pipeline will cut through the heart of our territory."

LaDuke also pointed out that thousands who protested the Dakota Access pipeline in North Dakota live in Minnesota.

Rose Whipple, a sophomore at Harding High School and of Ho-Chunk and Santee descent, is one of 13 young climate activists who officially filed to intervene on the project with the PUC.

"I do not want the wild rice that I and every other Native American eats every day to vanish," she said.

Enbridge's Line 3, which was built in the early 1960s, can move up to 760,000 barrels per day, but it's been operating at only 51 percent of capacity since 2008 because it suffers from corrosion and cracking. Enbridge's filing said the new pipeline would have a capacity of 915,000 barrels a day, but the company said it wants to operate the new Line 3 at the 760,000-barrel capacity that the old one had at its prime. If the company wanted to increase capacity, it would require separate PUC approval.

The public meetings were scheduled after the publication last month of a draft environmental impact statement (EIS) by the Minnesota Department of Commerce. The draft EIS looked at four alternative routes for Line 3, which have been proffered by state regulators and citizens (from an earlier round of public meetings). The EIS made no recommendations, but noted that all of the routes, including Enbridge's preferred route, carried some environmental risks.

The draft EIS also said that any of the routes across northern Minnesota would have a "disproportionate and adverse effect on tribal resources and tribal members, even if the route does not cross near residences." The final environmental impact statement, due out later this summer, will incorporate comments from the 22 public meetings.

Line 3 is one of six Enbridge pipelines that run along the same corridor across northern Minnesota. For over 70 percent of its trip through the state, Enbridge's new Line 3 would run along existing utility rights of way, either for Enbridge's own pipelines; another company's oil pipeline; or high-voltage power lines.

Mike Hughlett • 612-673-7003

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Brent Berghuis	612-616-5966	bkberghuis@local49.org

ADDRESS
31790 Foliage Ave.

CITY, STATE, ZIP
Northfield Mn. 55057

COMMENTS
I support the line 3 Replacement.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jesse Berglund	879-9171	
ADDRESS 118 17th St.		
CITY, STATE, ZIP Cloquet MN 55720		

COMMENTS

DECLARE THE EIS ADEQUATE

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

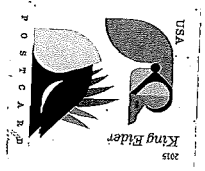

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Line 3 Replacement Project DEIS

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Dale Bergland	751-8835	
ADDRESS: 50407 US 71		
CITY, STATE, ZIP: Bemidji MN 56601		

COMMENTS
NEEDED

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: apache@web.lmic.state.mn.us
Sent: Thursday, June 22, 2017 7:32 AM
To: MN_COMM_Pipeline Comments
Subject: Bergman Thu Jun 22 07:32:29 2017 PPL-15-137

This public comment has been sent via the form at: mn.gov/commerce/energyfacilities/publicComments.html

You are receiving it because you are listed as the contact for this project.

Project Name: Line 3 Pipeline Replacement

Docket number: PPL-15-137

User Name: Casey Bergman

County: Beltrami County

City: Bemidji

Email: bergman312004@hotmail.com

Phone: 218-766-2441

Impact: I support line 3 replacement it is the safest way to transport oil.

Mitigation: I support the planned route or the existing route

Submission date: Thu Jun 22 07:32:29 2017

This information has also been entered into a centralized database for future analysis.

For questions about the database or the functioning of this tool, contact:

Andrew Koebrick
andrew.koebrick@state.mn.us

Line 3 Replacement Project DEIS

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Courtney Bergman	218-766-0608	NA

ADDRESS: 18141 Shorewood Ct NW

CITY, STATE, ZIP: Bemidji, MN 56601

COMMENTS: I support Line 3!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Glen Bergman	218-487-5473	

ADDRESS: 189 spruce Ave ~~Gonvick~~

CITY, STATE, ZIP: Gonvick, MN, 56644

COMMENTS: I support line 3 and any of the routes it takes.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Glen Bergman	218-487-5473	Kathy bergman78 cyphco.com

ADDRESS: 189 Spruce Ave

CITY, STATE, ZIP: Gonvick Mn 56644

COMMENTS:

I support the oil lines any routes they choose

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Kathleen Bergman	281-487-5473	Kathybergman78@yahoo.com

ADDRESS: 189 Spruce Ave

CITY, STATE, ZIP: Gonvick, Mn 56644

COMMENTS:

We need the oil lines to keep the oil flowing and I support the oil lines any route they choose.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Ryan Bergman	218-308-5419	bergman_ryan@yahoo.com
ADDRESS: 46840 County 7		
CITY, STATE, ZIP: Gonvick Mn 56644		

COMMENTS

I definitely support the pipeline and its replacement project, and support the oil lines any route they choose

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Beau Bergmann		
ADDRESS		
PO Box 1263		
CITY, STATE, ZIP		
Walker, MN 56484		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Jan Best <jbest51@yahoo.com>
Sent: Thursday, July 06, 2017 10:15 PM
To: MN_COMM_Pipeline Comments
Subject: CN -14-916 and PPL-15-137

In reference to Enbridge's proposed Line 3, thru a new corridor of Northern Minnesota, CN-14-916 and PPL-15-137), I would like to make the following comments.

1. The new Line 3 would cross in areas of Minnesota that is abundant in wild rice, a grain that is a complete food, second only to quinoa, in its ability to provide all the complete proteins one needs to survive. Contamination of these beds would be devastating to our Anishinabee tribes and the economic value of selling this wild rice around the world. 50% of the world's hand picked wild rice comes from Minnesota.

2. Having camped at LaSalle State Park recently, I was appalled to see the pipeline would border this area and would run parallel to the Mississippi River and a beautiful wildlife management area. Over 200,000 people visit Itasca State Park a year from all over the world. This pipeline endangers that Park and the headwaters.

3. The area this pipeline would go thru have some of Minnesota's highest water clarity lakes. This means a lot since the southern half of our state has water we can no longer fish or swim in.

4. The groundwater of this region is susceptible to contamination. Our water source is from glacial run off, 35 ft. deep sources. We do not have deep aquifers.

5. There is no known way to adequately clean up and restore tar sands oil spills. The technology has not developed. Case in point, Enbridge's Kalamazoo spill, which will never be restored to its previous state, even though Enbridge has spent $1 billion dollars so far on clean up. Why would Minnesota allow Enbridge to build Line 3 thru our pristine northern woods and wetlands and jeopardize our land and waters?

6. The world is turning away from fossil fuels. China, India and the European Union countries have recently announced new initiatives in clean energy. Fossil fuels are not our future. Volvo just announced plans to produce only electric vehicles beginning in 2019. Enbridge, a Canadian company, wants to put in a new pipeline corridor so it can export fuel to countries that are now developing and using clean technology. There will not be a market for Enbridge's exported oil. So, again, why should we destroy Minnesota's lands and waters so a foreign company can export to a diminishing market?

7. Our fossil fuel reserves are at capacity. We do not need more oil.
8. As we know, this pipeline would go thru remote areas which can not be easily monitored for spills. In fact, 22% of oil spills are detected by citizens, not by oil company employees. Pin hole leaks are not detectable by Enbridge's monitoring systems. Tar sands could leak for a long time from these pipes before someone notices these leaks. In the winter, these remote areas are even less frequented. Clean up crews would have a difficult time accessing these areas any time of year. None of the local crews are trained in tar sands oil clean up. Besides, there is no sure protocol for tar sands clean up.

9. I live four miles from where this pipeline would be dug, near Outing, MN. There is a 9,000 year old ancient travel route south of the fish hatchery on Route 6 which the pipeline would intersect, in an area that has a spring fed artesian well used by local people for their water source. Think about that! This water source and stream that runs south into Roosevelt Lake, has been pristine and used by humans for 9,000 years. Why would Minnesota jeopardize these clean waters and despoil an ancient Native American travel route?

10. If Enbridge has a spill on its tar sands line, who will pay for the clean up over the many years going forward? What kind of insurance requirements are placed on this foreign company to have a more than adequate amount of cash to finance clean ups?

11. Contrary to what Enbridge says, there will not be a lot of jobs for Minnesotans. There will only be 25 jobs if the pipeline is put in. Most of the jobs are in Canada, where the monitoring occurs. Most of the jobs for installation are out of state workers who are highly specialized in their fields, not Minnesotans.

12. Most of the lands affected by this pipeline is in 1855 treaty territory, where Native Americans were given the right to hunt, fish and gather in this area. This means they have the legal right to use the 1855 territorial lands and its bounty for subsistence. That means this territory can not be polluted!

The evidence is plain to see before our eyes. There is no reason to allow Enbridge, a foreign company, to come in and ruin Minnesota's lands and waters. This is a clear cut case that anyone, including my former third grade students, could see there is no value in Enbridge's claim they need this tar sands pipeline.

Jan Best
2825 Rapala Dr
Remer, MN 56672

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Gary Bettcher	218-750-0416	
ADDRESS		
210 chestnut st. E		
CITY, STATE, ZIP		
Virginia MN. 55792		

COMMENTS

I support Line 3 replacement because it will ensure safer oil transportion for our future needs of the United States.

Gary A. Bettcher

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: tomandchrisb@aol.com
Sent: Monday, July 10, 2017 3:54 PM
To: MN_COMM_Pipeline Comments
Subject: Concerns about Sandpiper pipeline

I am writing to voice my objections to the proposed location of the Sandpiper pipeline. The proposed site would affect a large watershed area, including the Whitefish Lake Chain which flows into the Mississippi River. Any oil leaks could have disastrous effects on this area which is the home to so much environmentally sensitive forms of wildlife, people included!

My family of origin has been owners of property on Bertha Lake for over one hundred years; I am in the fourth generation. My husband and I also own a lake place on Johnson Lake just east of Backus. We are concerned about the future of this beautiful area.

I urge you to reconsider the pipeline's placement.

Sincerely,

Christine Oemcke Bettendorf

Levi, Andrew (COMM)

From: Michael/Ruth Bettendorf <webetten@hotmail.com>
Sent: Monday, July 10, 2017 12:09 PM
To: MN_COMM_Pipeline Comments
Subject: Please DO NOT ALLOW the newest proposed Sandpiper line be built!

Dear Jamie MacAlister, Environmental Review Manager,
My husband and I are VERY concerned for this HIGHLY volatile shale oil, Sandpiper pipeline, proposed through this very fragile water way. In that this company is not from this area, much less this country, and we believe this pipeline will only cause future environmental issues that will push many wildlife animals experiencing extinction threats to cause the to be eliminated FOREVER!
We feel strongly that this pipeline is a threat to the wildlife but for the vital water filtration it provides for the upper Mississippi water source. Future generations will suffer from this disastrous pipeline proposal. Might we suggest this company should clean up their old pipeline FIRST before proposing messing up our land further!!

Dr. and Mrs. M. Bettendorf
1931 Pierce St. NE
Minneapolis, MN
55418

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: _____

Street Address: _____

City: _____ State: _____ Zip Code: _____

Phone or Email: _____

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Shame that All the People who Signed up to Speak @ 6:00pm, Had to Walk out w/out Being able to Speak.

Not Good —

Vicki Bibeau

If including additional pages please number them and tell us how many you are providing:_____ pages

From: Robert Bing
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137
Date: Monday, June 05, 2017 10:30:06 AM

Dear Ms. MacAlister,

EIS and Line 3 Replacement Regulatory Schedule
As a resident of northern Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project. The state has done its part to ensure access to the process, but now it’s time to move forward. It’s time to permit Line 3. I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3. Please keep the EIS timeline to the statutory deadline of 280 days.

Sincerely,

Robert W. Bing
5359 Martin Rd
Duluth, MN 55811
bob.bing@enbridge.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Glenn Bixler	907-301-0763	gab3483@yahoo.com
ADDRESS		
5739 Rose Rd		
CITY, STATE, ZIP		
Hermantown, MN 55811		

COMMENTS I support the line 3 replacement.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Jim Blakesley <jlblak@embarqmail.com>
Sent: Wednesday, July 05, 2017 7:38 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement

Dear Ms. MacAlister,

Let's get it built. It is a good plan and the need is there for the pipeline. It avoids populated ares so as to minimize the possibility of damage by "two guy and a backhoe."

Sincerely,

Jim Blakesley
319 4th St NW
Aitkin, MN 56431
jlblak@embarqmail.com

From: Dylan Blanchard
To: MN_COMM_Pipeline Comments
Subject: pipeline concerns
Date: Wednesday, May 31, 2017 10:47:09 AM

Hello I would like to voice my concerns over the proposed new Line 3 pipeline. I believe that there is plenty of evidence that has shown and continues to show the grave danger that pipelines can introduce through communities and ecosystems. I strongly feel that the pipeline will not adequately be able to address concerns over possible leaks. Furthermore, there is ample evidence to show that our energy needs are increasingly able to be better met by non-petroleum systems, and that we should be pursuing those technologies, and looking at ways to reduce our energy consumption.

Thank you for your time,

Dylan Blanchard

Levi, Andrew (COMM)

From: Jesse Bleichner <jesse_bleichner@live.com>
Sent: Monday, June 26, 2017 5:39 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 expansion

Dear Ms. MacAlister,

The 2017 line 3 EIC does not do enough to show what a major catastrophic oil spill would do to our waters and the watersheds of our state. It would cripple the tourism our area depends on, and ruin water quality for generations; all so a Canadian company can profit more than they would if they didn't run their oil through a pipeline. The new proposed line disregards prior treaties we have made with the Native Americans Tribes in our state, and any new line is unacceptable to their way of life. MN needs to honor our Native people, and choose water over oil. Dirty tar sands are economically a bad idea, and MN needs to include comparisons of pollution and carbon costing of shipping oil vs clean energy production and distribution costs in the EIC. I do not support a new line 3 pipeline, and demand Enbridge remove their faulty lines out of the ground at their cost.

Sincerely,

Jesse Bleichner
19419 Spencer Rd
Brainerd, MN 56401
jesse_bleichner@live.com

Levi, Andrew (COMM)

From: Jesse Bleichner <jesse_bleichner@live.com>
Sent: Monday, July 10, 2017 9:54 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 EIS comment

Dear Environmental Review Manager,

Enbridge is proposed to horizontally drill under certain stream and river beds. The drilling fluids used for that process contain additives. These additives are toxic to aquatic wildlife and vegetation if a frac-out occurs. The Straight River, a nationally known brown trout stream, suffered a large frac-out during construction of the MinnCan Line 4 project.

A drilling materials list should be provided to the public. The public cannot adequately comment without knowledge of these materials. What are those additives? They need to be included in the Final EIS.

Kind regards,

Jesse Bleichner

Levi, Andrew (COMM)

From: Jesse Bleichner <jesse_bleichner@live.com>
Sent: Monday, July 10, 2017 9:58 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 EIS comment

Crow Wing Watershed District has recently had a hard working committee put together a WRAPS. These actions are mandated by the state of MN to protect our overall water quality. As individual watershed districts within the Mississippi River Basin are working hard to improve water conditions and protect existing clean water resources, what protections are being offered for those efforts? I do not see any indication within the draft EIS, about the effects of a spill or construction through pristine clean water ecosystems, and how that will effect the efforts and money being invested on a local level? How does the applicant plan to work with the local watershed districts? How will they compensate for these local investments in the case of a release?
The state has mandated the MPCA to review the quality of MN water bodies, and set forth recommendations to achieve the goal of protecting MN's existing clean water resources. These bodies of water are scare worldwide. Protecting them has been deemed by the MPCA to be the best course of action. Prevention is less costly than a clean up effort. The state is supposed to be following these recommendations to protect existing clean water in Northern MN. Southern MN does not have much hope of ever recovering those bodies of water. How does this project fit into the model of preventing these clean bodies of water in the north from being contaminated? This conflict needs to be addressed in the final EIS.

Kind regards,

Jesse Bleichner

Levi, Andrew (COMM)

From: Jessica Bleichner <jessica.bleichner@gmail.com>
Sent: Monday, July 10, 2017 9:49 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 EIS Comment

Dear Environmental Review Manager:

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete.

I am also concerned about the Mississippi River Basin Watershed, as a whole entity, and the money being invested to our local watershed districts to clean up existing pollution. Many funds are directed to the Upper Mississippi River Watershed from downstream communities. It seems counter intuitive to these clean up efforts to consider the risk of an oil pipeline through the headwaters. We owe it to those invested to continue trying to clean up the Upper Mississippi Watershed, not putting it at additional risk. I have not seen any mention of accountability regarding the investment into those cleanup efforts. I volunteer with my local watershed district (Crow Wing, which would be implicated in the preferred route). We are trying very hard to help folks downstream, at their request and funding!

Thank you,
Jessica Bleichner
19419 Spencer Rd
Brainerd, MN 56401
MN Master Naturalist Volunteer

Levi, Andrew (COMM)

From: Jessica Bleichner <jessica.bleichner@gmail.com>
Sent: Monday, July 10, 2017 9:59 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 EIS Comment

Dear Environmental Review Manager:

I would like to know, in the final EIS for Line 3, what Enbridge's plans are if their preferred route is approved? Will it be just the one pipeline, or will they eventually move all six pipelines to the new corridor? This would have a huge effect on how people feel about Enbridge's preferred pipeline route. Being a resident in the Crow Wing Watershed District, which would be implicated in the preferred route, this is a very important consideration. This needs to be addressed in the final statement.

Jessica Bleichner
19419 Spencer Rd
Brainerd, MN 56401
MN Master Naturalist Volunteer

Levi, Andrew (COMM)

From: Jessica Bleichner <jessica.bleichner@gmail.com>
Sent: Monday, July 10, 2017 10:42 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 EIS Comment

Dear Environmental Review Manager,

I am curious, who were the private contractors used to compile the EIS? Do they have previous work histories with the Applicant? If so, was "conflict of interest" considered in their employment? Where they hired by the State of MN or Enbridge? This information should be included in the final EIS.

Thank you,
Jessica Bleichner
19419 Spencer Road
Brainerd, MN 56401
MN Master Naturalist Volunteer

Levi, Andrew (COMM)

From: Jessica Bleichner <jessica.bleichner@gmail.com>
Sent: Monday, July 10, 2017 11:06 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 EIS

Dear Environmental Review Manager,

I am a citizen water quality monitor, and educator for protecting and keeping our bodies of water clean as a MN Master Naturalist. I work closely with my local watershed districts and follow the work of the MPCA.
Crow Wing Watershed District has recently had a hard working committee put together a WRAPS. These actions are mandated by the state of MN to protect our overall water quality. As individual watershed districts within the Mississippi River Basin are working hard to improve water conditions and protect existing clean water resources, what protections are being offered for those efforts? I do not see any indication within the draft EIS, about the effects of a spill or construction through pristine clean water ecosystems, and how that will effect the efforts and money being invested on a local level? How does the applicant plan to work with the local watershed districts? How will they compensate for these local investments in the case of a release?
The state has mandated the MPCA to review the quality of MN water bodies, and set forth recommendations to achieve the goal of protecting MN's existing clean water resources. These bodies of water are scare worldwide. Protecting them has been deemed by the MPCA to be the best course of action. Prevention is less costly than a clean up effort. The state is supposed to be following these recommendations to protect existing clean water in Northern MN. Southern MN does not have much hope of ever recovering those bodies of water. How does this project fit into the model of preventing these clean bodies of water in the north from being contaminated? This conflict needs to be addressed in the final EIS.

Thank You,
Jessica Bleichner
19419 Spencer Rd
Brainerd, MN 56401
MN Master Naturalist Volunteer

Levi, Andrew (COMM)

From: Jessica Bleichner <jessica.bleichner@gmail.com>
Sent: Monday, July 10, 2017 11:35 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 EIS Comment

Dear Environmental Review Manager,

Enbridge is proposed to horizontally drill under certain stream and river beds. The drilling fluids used for that process contain additives. These additives are toxic to aquatic wildlife and vegetation if a frac-out occurs. The Straight River, a nationally known brown trout stream, suffered a large frac-out during construction of the MinnCan Line 4 project.

A drilling materials list should be provided to the public. The public cannot adequately comment without knowledge of these materials. What are those additives? They need to be included in the Final EIS.

Thank You,
Jessica Bleichner
19419 Spencer Rd
Brainerd, MN 56401
MN Master Naturalist Volunteer

Levi, Andrew (COMM)

From: LuAnn Bleiler <anders1@paulbunyan.bet>
Sent: Friday, July 07, 2017 9:17 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Department of Commerce

Topic: Environmental Protection
I am a Minnesotan and want to see the environment protected like most others.
I believe replacing aging infrastructure like pipelines is imperative to protecting the environment.
The MPCA has recently released the Mississippi River Watershed report that shows the cleanest waters in the state are in northern Minnesota. Energy infrastructure and clean waters can co-exist.
Topic: Preferred route
I am a landowner/business owner/community member on Enbridge's preferred route and have witnessed many survey crews in my community looking for artifacts and examining our lakes and rivers over the past four years.
It is preferable for me to locate pipelines in more rural areas, rather than to site them in the middle of cities and towns.
Enbridge has found a route that follows existing utility corridors.
Pipelines are everywhere in Minnesota, according to the Environmental Quality Board's report. I'm familiar with pipeline right of ways in northern Minnesota around Bemidji, Grand Rapids, Cass Lake and Alexandria. Pipelines and natural resources have gone hand-in-hand in northern Minnesota for decades.
Topic: EIS and Line 3 Replacement Regulatory Schedule As a resident of northern Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project.
I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3.
No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS.
Please keep the EIS timeline to the statutory deadline of 280 days.
Topic: Deactivation
Deactivating a pipeline in-place is the most commonly-used industry method to retire a pipeline.
Leaving the permanently deactivated pipeline in place is the safest option as it reduces the risk of soil stability issues, avoids major construction activities and reduces the potential risk to existing pipelines from heavy equipment.

Sincerely,

LuAnn Bleiler
125 Harriet Ave SW
Solway, MN 56678
anders1@paulbunyan.bet

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Erv Blom	751-2597	
ADDRESS		
11416 Eckles Rd NW		
CITY, STATE, ZIP		
Bemidji MN 56681		

COMMENTS

Everything we use is petroleum right down to the ~~Green~~ buttons on our shirt. Grass is 78° and our soil is 89° and concrete is 99° and tar is 105° – so it's a wonder where global warming is coming ~~from~~ from. We need the pipeline

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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- **Infrastructure replacement.** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
BOB BLOOMER	218-730-6111	bloomster70@icloud.com

ADDRESS
6749 MORRIS THOMAS RD. W.

CITY, STATE, ZIP
CLOQUET MN 55720

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Amy Blumenshine <amyblumenshine@mac.com>
Sent: Saturday, July 01, 2017 10:00 PM
To: MN_COMM_Pipeline Comments
Subject: Docket CN-14-916 and PPL-15-137

Dear Commissioners,

I oppose the proposed pipeline project. We Minnesotans are duty-bound to our descendants to protect the water of life. Water is essential to life. It is very easy to make toxic – a fraction of toxic material can do it. We are honor-bound to be very careful. All pipelines leak and do damage, but there is an industry standard of "acceptability" with little regard to cumulative harm.

With the Tar Sands flow, the prospect is even more hazardous. If little research has been conducted on the toxicity of dilbit to organisms, maybe it's too soon to make a 100 year plus commitment to flowing it through watersheds. Bitumen contains several potentially toxic metals, stable and persistent resins," etc Ch 10.3.1.1.2 (Ch 10, pg 26 & 27).

How can we allow Enbridge to risk our future with a substance that they refuse to identify, claiming the release of the chemical composition is a "trade secret"?

No river has successfully recovered after dilbit clean up. Let's remember that some day this line would be abandoned, too. There's also the proposed abandonment of the existing Line 3. This could be a bad precedent, considering the potential abandonment of the three other aging pipelines in Enbridge's existing mainline corridor across MN (Lines 1, 2, and 4) There's no guarantee of the continued existence of the corporation that is responsible.

This is the wrong historical moment to imperil future water for oil now. We now have better technology and cannot afford to extract or burn (much less leak) the tar sands oil mix. This very high risk to our environment makes no sense for MN. Please do not grant a Certificate of Need.

Amy Blumenshine, 3156 Elliot Ave. S., Minneapolis, MN 55407

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Tanner Bober	218-391-9247	
ADDRESS		
4867 Brandon Rd		
CITY, STATE, ZIP		
Brookston MN 55711		

COMMENTS This is my career without Jobs in This line of work many people would be without an income To support Their families and comunity

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

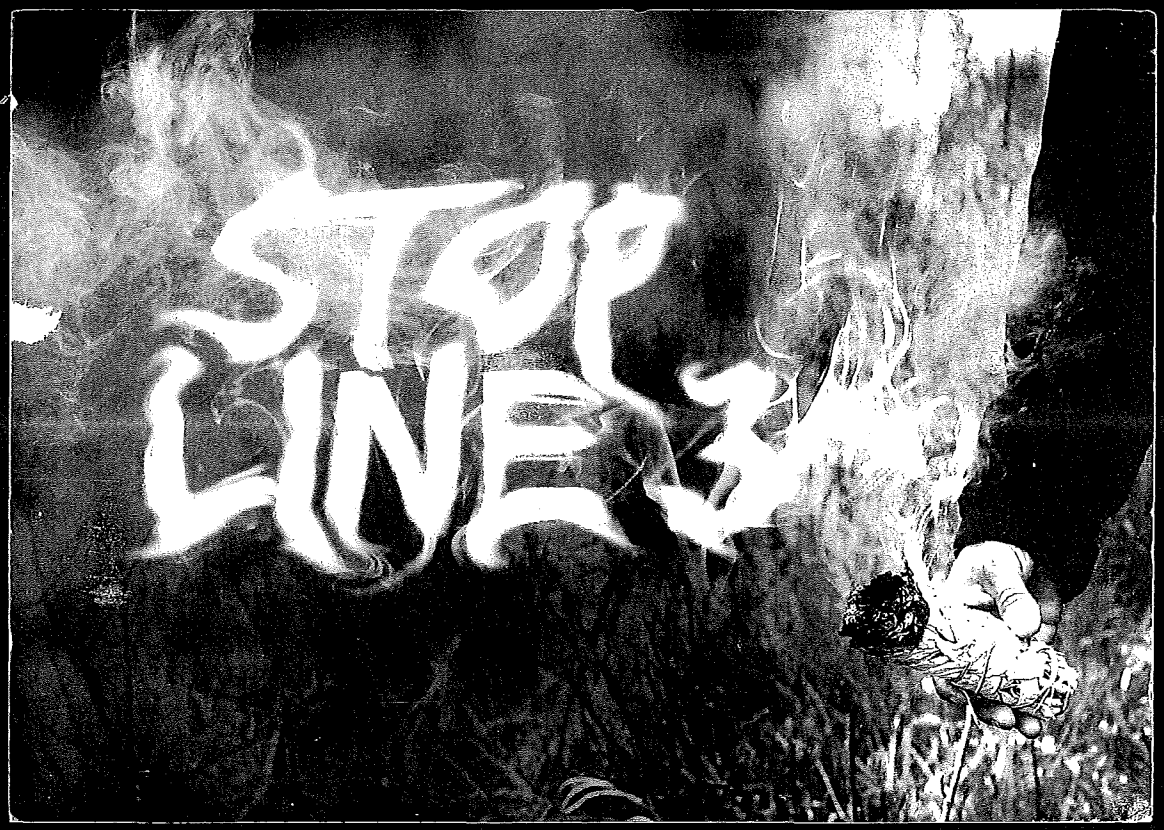

DEAR DEPARTMENT OF COMMERCE, MINNEAPOLIS MN 553
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137 JUL 2017 PM 4 L

The DEIS acknowledges that the presence of ~~the~~ a temporary workforce near reservations increases the likelihood that sex trafficking or sexual abuse will occur. Any anti-sex trafficking program will not likely be effective

SINCERELY,

Mae Boda

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Levi, Andrew (COMM)

From: Bogard, John <Bogard.John@principal.com>
Sent: Monday, July 10, 2017 9:28 AM
To: MN_COMM_Pipeline Comments
Cc: jb1416 (johnabogard@gmail.com)
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries and tourism in general. Where is the analysis of how a pipeline through some of the best lake country in Minnesota will affect the fishing, water recreation, fisheries, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete.

Thank you –

John Bogard, Chair
Thunder Lake Assn Preservation Committee
763-257-5410

(This email is being sent from my office at Principal Financial Group in Minnetonka, MN - Any response should be sent to my personal email address which is: johnabogard@gmail.com)

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Levi, Andrew (COMM)

From: MAC <mrbnhm@msn.com>
Sent: Monday, July 10, 2017 9:57 PM
To: MN_COMM_Pipeline Comments
Subject: Comment Against Pipeline Abandonment - Docket #s CN-14-916 and PPL-15-137

To: Jamie MacAlister

Environmental Review Manager Minnesota

Please note that as an owner of land comprising pipeline right of way, and as a concerned citizen, I am not in favor of any form of pipeline abandonment. I am in agreement with the city of Grand Rapids that line #3 should be totally removed. I strongly believe that if Enbridge or any other company needs another pipeline that they should be replacing it in an area that is already cleared and designated for this use rather leaving all of the steel and residuals in the ground to go to waste and cause more problems such as contamination or other possible and permanent damaging effects to vital resources. I do not believe that any company should be allowed to leave their equipment abandoned in place, especially a pipeline that is being abandoned because of its excessive deterioration. I am surprised, with all of the environmental concerns that are conveyed on a daily basis in our country today, that abandonment would even be considered. The deteriorating pipe may be difficult and costly to be removed but I believe it is the responsibility of any company that owns the equipment to remove it at the end of its use and should be considered as part of the cost of doing business.

Enbridge has already opened up a corridor for the use of conveying oil. I believe that it is wrong for them to clear and limit the use of additional property simply because it is cheaper for them than fulfilling their responsibility of removing equipment that is no longer being used. I do not believe that the majority of landowners would have initially allowed a pipeline through their property, which already limits the property from many uses, and then grant them a permanent easement, had they known that it would someday be abandoned in place. If the property is no longer being utilized for the original intent of the easement, it should restored back to its original condition by removing the equipment and full rights should be transferred back to the land owner.

Respectfully,

Mac Bonham

22371 Kolp Road

Grand Rapids, MN 55744

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
BRAD BOOS	218-310-0225	
ADDRESS		
24N 64TH AVE W		
CITY, STATE, ZIP		
DULUTH MN.		

COMMENTS

We need to upgrade our INFRASTRUCTURE. These old ~~pipeline~~ PIPLINES AND OLD Techology need updating.

(the alternative of TRAIN TRASPORT IS a Bad idea)

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Jason Borden <jason_b1975@yahoo.com>
Sent: Monday, July 10, 2017 4:59 PM
To: MN_COMM_Pipeline Comments
Subject: Docket numbers CN-14-916 and PPL-15-137

1. Enbridge wants to abandon the old line 3 pipes, rather than clean up the installation and remove them. The abandoned pipeline will corrode and pollute the area around it, so I don't understand Enbridge's stated concern that a new pipeline will create less pollution from leakage or corrosion. You can't have it both ways - they want to use "avoided pollution" as a justification to not clean up and to create pollution.

2. The price of oil is low, indicating that there is currently an oversupply of oil. This is backed up by the fact that OPEC has been curtailing oil production in an attempt to increase oil prices. Additionally, the decarbonization of the Minnesota economy and of the US economy overall is increasing its pace. All the projections I've seen are that peak oil demand is very close - in the neighborhood of 10 years or less. Building a new line 3 pipeline with increased capacity doesn't appear to take the coming reductions in demand into account. Given that oversupply will continue to dominate the oil market and keep the oil prices low, how will Enbridge make enough money to maintain the new pipeline safely? How will Enbridge be able to make enough money to decommission the pipeline at its inevitable end of life? If Enbridge does somehow earn enough money to operate the pipeline at a minimal profit, how long will Enbridge argue the pipeline needs to be operated just to cover its installation expenses? 30 years? 40 years? 60 years? 100 years? Even if it is _only_ 30 years, the demand for oil is very likely to almost completely vanish because of Minnesota's and indeed the world's population having increased awareness of the link between burning fossil fuels and climate change. The historical pace of cost reductions in renewable energy show that pure price competition will eliminate oil demand, even if public concern does not. It seems virtually certain that Enbridge will not make money in the long run for this line 3 replacement, although there will likely be some short-term gains for a handful of Enbridge executives and temporary construction jobs for a few dozen people. But how can we justify this small gain for a few, when Minnesotan's overall will get stuck with an expensive bill to clean up a project that's quite likely to ultimately be abandoned by Enbridge? It's not as if history has not shown us this is exactly what will happen. A number of mines in the Northland have suffered this exact fate. If a company operating a facility that can have an environmental impact is not profitable over time, Minnesotans end up footing the bill for the cleanup because the company cannot.

Authorizing the line 3 replacement is a boondoggle and a fool's errand. Do not allow its construction.

Thank you,
Jason Borden

1860 Elm St.
White Bear Lake, MN 55110

From: Dean Borgeson
To: MN_COMM_Pipeline Comments
Subject: Docket Numbers CN-14-916 and PPL-15-137
Date: Saturday, May 20, 2017 3:32:09 PM

Mr. Commissioner:

The proposed re-routing of Embridge pipeline #3 through north-western Crow Wing County is a reckless prospect and requires a strong EIS and an independent investigation and public explanation of why this deviation from the current location of the pipeline is being advanced:

- Is the re-routing being proposed, because Embridge is reluctant to uncover how much environmental damage has occurred along the current (relatively accessible) pipeline corridor?

- Is the new route being proposed because this more remote location will be less likely to result in the discovery of a leak by the public?

- What would be the monetary damage caused by a leak in the Pine River watershed above the dam at Cross Lake be, and is Embridge bonded to fully cover the damage sustained by area property owners as well as downstream water users on the Pine and Mississippi Rivers, including but not limited to drinking water?

Sincerely,

Dean A. Borgeson
36030 Bonnie Lakes Road
Crosslake MN 56442

Levi, Andrew (COMM)

From: Katy Botz <botzkaty@gmail.com>
Sent: Monday, July 03, 2017 7:32 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I would like to voice my support for the Line 3 Replacement. We all use oil and its by-products so let's do it in a responsible way.
It will bring jobs to our area and tax dollars will flow which in turn helps the economy of Minnesota.

I trust that safety for people and the environmental will be front and center.

Katy Botz

Sincerely,

Katy Botz
787 32nd Ave NW
Backus, MN 56435
botzkaty@gmail.com

Levi, Andrew (COMM)

From: Connie Bowen <conniegbowen@gmail.com>
Sent: Thursday, July 06, 2017 3:23 PM
To: MN_COMM_Pipeline Comments
Subject: Strongly Object to Enbridge Line 3 plans

Docket numbers: CN-14-916, PPL-15-137

The proposed plans for Enbridge's massive, destructive, and risky Line 3 should not be allowed to proceed. This line would endanger the environmental health of Minnesota irreparably and these plans are irresponsible. The DEIS lacks sufficient research on environmental impact and it is incomplete and faulty in its logic, quoting directly from Enbridge documents rather than completing an actual impact study.
The proposed pipeline blatantly violates treaty rights of access to fishing, wild rice harvest, and hunting on ceded territories. The cultural endangerment and risk to the health of many marginalized Minnesotans are inexcusable when the pipeline is NOT needed. This places company profits above the value life of Minnesotans and the beauty of this state. In this case, Minnesota suffers ALL of the potential risks and damage but gains no benefit-at all- from the process.
As noted in the New York Times today, this pipeline in Minnesota is not necessary; there is a glut:
https://www.nytimes.com/2017/07/05/business/energy-environment/oil-exports-corpus-christi-texas.html
This is an example of purely placing profits over people, and the oil industry must be stopped. Its short-term gains outweigh the long-term devastation of this beautiful state and of the rights of the indigenous peoples.
Constance Bowen
6200 Vernon CT S
Minneapolis MN 55436

Levi, Andrew (COMM)

From: dbower@gmail.com
Sent: Monday, July 10, 2017 10:11 AM
To: MN_COMM_Pipeline Comments
Subject: Against line 3

- Certificate of Need Docket: CN-14-916
- Route Permit Docket: PPL-15-137

As a minnesota resident I am completely against line 3. It puts critical wildlife habitat at risk. The risks outweigh the reward. Please deny the permit to construct line 3.

Mr. D Bower

Levi, Andrew (COMM)

From: Jay Bowers <jdbowers7@msn.com>
Sent: Thursday, July 06, 2017 10:36 PM
To: MN_COMM_Pipeline Comments
Subject: I'm in favor of line 3 going in

Dear Ms. MacAlister,

To whom it may concern,
I truly believe that it will benefit everyone for the next 40 to 50 years.

Sincerely,

Jay Bowers
21821 Mishawaka Rd
Grand Rapids, MN 55744
jdbowers7@msn.com

Levi, Andrew (COMM)

From: Joyce Bowers <joisette@gmail.com>
Sent: Monday, July 10, 2017 5:33 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment Submmission - Line 3 Project (CN-14-916 and PPL-15-137)
Attachments: Line 3 Draft EIS Comments - Joyce Bowers.pdf

My comment on the Draft EIS for the Line 3 Project is attached. Thank you for your attention.

Joyce Bowers
3118 33rd Avenue So.
Minneapolis, MN 55406

Public Comment: Line 3 Project (CN-14-916 and PPL-15-137) DRAFT EIS Chapter 13, Submitted by Joyce L. Bowers, 7/10/17

I am submitting these comments as a Minnesota citizen who is quite troubled by the deficiencies in the Draft Environmental Impact Statement for the proposed expansion/replacement of Enbridge's Line 3 oil pipeline. Given the staggering length of the document – which in itself seems a formidable barrier to citizen participation in this process – I will limit my comments to the DEIS List of Preparers (Chapter 13), with the hope that others have addressed the document's many other issues and short comings.

I attended the PUC Public Hearing on the EIS Scoping Document last year in which the Commission confirmed that, despite what seemed to me very logical objections, the EIS would be prepared by the Department of Commerce, as has been standard practice for pipelines in Minnesota. The public was asked to believe that the DOC, an agency without internal scientific and environmental resources and an historical record of nearly unqualified support for the oil and gas industry, would somehow deliver an impartial and technically rigorous EIS. We were assured the DOC would draw on Minnesota's actual (albeit underfunded, understaffed) environmental agencies for assistance. I am unsurprised to see this didn't quite work as advertised.

Chapter 13.2 tells us the DOC "was supported by" Cardno, Inc. in preparing the DEIS. (The document is silent as to the extent of the "support" and at what cost to taxpayers.) Cardno's offices in Fridley as shown on Google maps look unassuming and like the sort of place environmental consultants who could be hired for an objective study might be found. But those offices are actually a small outlet of an international company based in Australia which is involved in and profits from the fossil fuel industry in a variety of ways.

Cardno Limited is traded on the Australian Stock Exchange under "CDD" with gross revenue of $1.2 billion, according to its 2016 annual report (http://www.cardno.com/en-au/InvestorCentre/Investors%20Centre%20Documents/Annual%20Report%20to%20shareholders.pdf). According to Cardno's literature, it sells products and services in the energy, transportation, water management, security, and defense sectors, among others. Following a 2014 acquisition of another oil and gas business, Cardno's then-CEO said, "Oil, gas and energy clients will now account for around 25% of Cardno's annual revenue." (http://www.cardno.com/en-au/mediacentre/Pages/Cardno-acquires-oil-and-gas-engineering-services-business-and-completes-$50m-equity-raising.aspx)

This is a blurb from Cardno's website describing its approach to the oil and gas industry:

Oil and Gas

For more than 30 years, Cardno has served oil and gas clients ranging from global corporations to local, specialized companies. We have provided solutions that address upstream, midstream and downstream delivery challenges.

Our team comprises experts in geology, geophysics, business and risk management, health and safety, engineering, permitting, natural resource management, remediation and toxicology and environmental risk assessment.

Cardno professionals know how to best meet your technical needs and understand the context in which you operate – often under intense public scrutiny. We know how to effectively engage stakeholders, meet rigorous regulations and deliver strategic solutions that meet short- and long-term needs.

http://www.cardno.com/en-us/MarketsandServices/Pages/Oil-and-Gas.aspx

This is a list of services taken from a Cardo brochure provided to Cardo's "range of clients" designed to "deliver resource and infrastructure projects in the energy and resources sector:"

Energy and Resources

Cardno works with a range of clients in the Americas, Australia and Africa to deliver resource and infrastructure projects in the energy and resources sector. Our clients, which include the largest mining houses in the world, benefit from our extensive expertise and experience in the provision of high level services and a full range of cost-effective, sustainable solutions.

- Oil and gas, drilling and production
- Hazardous waste management
- Renewable resources evaluation
- Facilities planning and design
- Rehabilitation and remediation
- Process, refinery and power structures and planning
- Material handling structures
- Marine and offshore structures
- Conveyance and transportation
- Hydropower
- Geotechnical engineering
- Geotechnical materials testing
- Mapping and survey
- Regulatory compliance
- Environmental surveys
- Environmental monitoring
- Electrical engineering
- Mining engineering
- Exploration

http://www.cardno.com/en-au/AboutUs/Documents/Cardno%20Corporate%20Brochure[AU].pdf

Public Comment: Line 3 Project (CN-14-916 and PPL-15-137) DRAFT EIS Chapter 13, Submitted by Joyce L. Bowers, 7/10/17

In Gas Today, an Australian industry publication, Cardo specifically advertises "Commissioning, pre-commissioning and testing services," "Decommissioning and abandonment," "Engineering – pipelines," and "Pigging services, pipeline flushing, external/internal inspection" to the fossil fuel industry, among many other services. (*http://gastoday.com.au/directory/view/6733?q=cardno*)

In 2010, Cardno acquired the US based environmental consulting firms ENTRIX and Environmental Resolutions Inc. (ERI). In a presentation to its investors, Cardno states, "There are significant cross-selling opportunities both between ENTRIX and ERI and with Cardno's global businesses." In addition to acquiring revenue from the environmental consulting "growth industry," "Cardno's strategy is also to increase its proportion of revenue from resources and energy businesses including oil and gas, mining and industrial sectors." The document is explicit that Cardno believed the acquisition of these consulting firms would not only add a new revenue stream from "environmental sectors" but would also increase revenues from its existing business (summarized above) as a result.
(http://www.cardno.com/Style%20Library/MediaCentre/ASXAnnouncements2010/U.S.%20Acquisitions%20Presentation%20FINAL.pdf)

Also according to its 2016 annual report, Cardno's revenues are suffering from "a sharp reduction in oil and gas related projects" (p. 9). In his Chairman's Letter (p. 2), Cardno Board Chair (and private equity firm Managing Partner) Michael Alscher explains that Cardno's oil and gas businesses in the Americas had to be restructured "to better engage in their respective market places and be managed with different metrics and incentive structures that allow the entrepreneurial spirit of these businesses to be rebuilt."

It is, or should be, obvious the "synergies" between Cardno's fossil fuel businesses and its environmental consulting arm inevitably generate potentially serious conflicts when those consultants are hired by the public to participate in an objective review of an oil industry project. A basic web search quickly turns up the fact that Enbridge hired Cardno to work on its expensive restoration plan following the disastrous oil spill on Enbridge Line 6B in Michigan. Neither the Line 3 DEIS nor any other public document I've seen reveals how often Cardno has worked for Enbridge in the past, or indeed if it is doing so now. If the Line 3 expansion is approved, what is to prevent Cardno from selling, for example, its decommissioning and abandonment services to Enbridge? Clearly Enbridge, a major player in the oil and gas sector, is one of those clients whom Cardno professionals "understand" and to whom it intends to reach with renewed 'entrepreneurial spirit."

I do not wish to impugn the capabilities of the unnamed Cardno consultants who worked on the DEIS, about whom I know nothing. I do wish to understand why the DOC hired a multinational consultant who has not only worked for project proposer Enbridge, but who derives a significant portion of its revenue from oil and gas sources? I would like to understand what assurances the DOC was given that this consultant would contribute to an impartial analysis of the proposed plan and its alternatives, showing no bias towards Enbridge or uncritical reliance on its data. I would like to see that a rigorous conflict of interest process was followed prior to engagement. I would like to see the list of other consultants who were considered and rejected. I would also like to see a sworn statement from Cardno that they do not stand to profit in the future from an expanded/replaced Line 3, despite their recent loss of revenue from "sharp reduction in oil and gas related projects."

This apparent conflict of interest on the part of a Draft EIS preparer calls the thoroughness, objectivity and integrity of the project data and analysis into question and is a serious problem that should be rectified in the final document.

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Trey Bowman
Street Address: 3221 Jackson Ave NW
City: Bemidji State: MN Zip Code: 56601
Phone or Email: treybob2@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I support Enbridge and the line 3 replacement project. I believe it is important to get the new pipe and technology in the ground. The economic impact for Northern Minnesota is also very important. Please move this project through with no further delays. There is no denying that the pipeline is the safest way to move the petroleum that we so vitally need and depend on. Thank You.

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Ann Bowman

Street Address: 3221 Jackson Ave SW

City: Bemidji State: MN Zip Code: 56601

Phone or Email: 218 760 1837

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I believe to get the protesters who truly do want to protect the earth, whatever...
EnBridge should build a refinery in South Dakota, hire the Native Population there, train them, pay them well, help them to see the Safety Measures in place that are protecting the Environment. By hire the Native Population training them to be a part of the solution they will be an active part of protecting Mother Earth.
I do believe we need pipelines in the ground to transport our oil. I also believe the people funding some of the mighty and professors like Winona LaDuke, "Save the Earth" are bought by Middle East oil companies.
The U.S. needs to be independent oil producers. We can't continue to be dependent on the Middle East for oil. I think that why the terrorist attacks are hitting US soil. The Middle East is getting nervous.

If including additional pages please number them and tell us how many you are providing:_____ pages

1112

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

02 1P $ 000.34
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Mark Box	218-244-9509	boxm0927@gmail.com

ADDRESS
Deer River, MN 56636

CITY, STATE, ZIP

COMMENTS

Line 3 is a much needed project and I believe that pipelines are the safest way to transport the products.

MB

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: MAURICE J. BOYD

Street Address: 25652 MICHELLE LN.

City: CROSBY State: MN Zip Code: 56441

Phone or Email: ONEVOICE05 1950@GMAIL.COM

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I DONT THINK THERE SHOULD BE A NEW PIPELINE BUILD ACROSS ANY STATELINE OR RIVER, WETLAND ETC. CRUDE OIL SHOULD NOT BE PUMPED FOR ANY DISTANCE, IT SHOULD BE PROCESSED AND USED AT IT'S SOURCE OR PROCESSED AND USED AT IT'S SOURCE OR TRANSPORTED AS ITS END PRODUCT!

If including additional pages please number them and tell us how many you are providing:_____ pages

From: Jonathan Jody Boyne
To: MN_COMM_Pipeline Comments
Subject: Stop Enbridge"s proposed new Line 3 pipeline (CN-14-916 and PPL-15-137)
Date: Wednesday, May 31, 2017 12:03:58 AM

Dear Jamie MacAlister, Environmental Review Manager Minnesota Department of Commerce,

Please stop Enbridge's proposed new Line 3 pipeline.

A new pipeline corridor crossing Minnesota's lake country would threaten pristine aquatic ecosystems, the largest wild rice bed in the world, the headwaters of the Mississippi River, and and the Great Lake Superior. One-fifth of the world's fresh surface water supply lies here, and it is worth protecting.

The new Line 3 would also pierce the heart of Ojibwe treaty lands, where members of signatory bands retain the rights to hunt, fish, gather, hold ceremony, and travel. It is our responsibility as water protectors to prevent this. We will not allow Line 3 to desecrate our lands, violate our treaty rights, or poison our water. Our wild rice beds, lakes, and rivers are precious – and our regional fisheries generate $7.2 billion annually, and support 49,000 jobs. The tourism economy of northern Minnesota represents $ll.9 billion in gross sales (or 240,000 jobs).

The bottom line is that for a given pipeline in any 10-year period, there is a 57% chance of a major spill. So it’s not a question of if these pipelines will poison our sacred waters and destroy our way of life, but when. That is unacceptable. The real opportunity to create jobs lies in maintaining, cleaning up, and dismantling these old lines.

Sincerely,

Jonathan Boyne
54880

Levi, Andrew (COMM)

From: Dave Braford <daevbra2@gmail.com>
Sent: Sunday, June 25, 2017 4:08 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 replacement

Dear Ms. MacAlister,

The replacement of old and detereating pipelines is a no brainier from any point of view. New pipelines are much safer and less costly to maintain than old obsolete worn-out lines. New technology and more concern for environment would tell anyone that all old pipelines should be replaced. I am very much in favor of the line 3 replacement.

Sincerely,

Dave Braford
35836 Freestone Rd
Grand Rapids, MN 55744
daevbra2@gmail.com

Levi, Andrew (COMM)

From: Eva Braford <daevbra@gmail.com>
Sent: Wednesday, July 05, 2017 11:35 PM
To: MN_COMM_Pipeline Comments
Subject: Line three

Dear Ms. MacAlister,

Build the pipeline. The old one needs to be replaced. The environmentalists want cleaner energy. Where is it? Most of them don't care about the pipeline They just like to make noise. The native Americans in mn. Are just mad because they wanted too much money to go through the reservation so the line's going around it. We need the pipeline.

Sincerely,

Eva Braford
3201 W US Highway 2
Grand Rapids, MN 55744
daevbra@gmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Dan Brady	(612) 802 9699	dbrady@local563.org

ADDRESS
~~[illegible]~~ 901 14th Ave NE

CITY, STATE, ZIP
Minneapolis MN 55413

COMMENTS
The pipe line need to be replaced with a new line w/ up to date technology that will put MN men and women to work and ~~[illegible]~~ will be safer for the environment.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: John Brainard <john.brainard@att.net>
Sent: Thursday, July 06, 2017 12:35 PM
To: MN_COMM_Pipeline Comments
Subject: Please Support System Alternative SA-04

Docket Numbers: CN-14-916 and PPL-15-137

To Whom It May Concern,

If a pipeline must be built, please put your full support in favor of the System Alternative SA-04 for the Line 3 Pipeline Project. In this case, environmental considerations are far more important that bottom-line economic considerations.

You also need to do a financial analysis of Enbridge. Does Enbridge even have the financial viability to properly maintain and retire its existing pipelines, much less the viability to properly run and maintain the Line 3 Pipeline Project through its life cycle? Why are we even allowing a Canadian company to put Minnesota's natural resources at risk?

Once again, please support the System Alternative SA-04 for the Line 3 Pipeline Project. Thank you.

John C. Brainard
Minneapolis, MN and Park Rapids, MN

Levi, Andrew (COMM)

From: amy brallier <haylakegirl@gmail.com>
Sent: Wednesday, June 14, 2017 11:05 AM
To: MN_COMM_Pipeline Comments
Subject: Pipeline corridor through lakes area

Please do not build this through our lakes area. The Pine River Watershed is an invaluable resource and the possibility of ruining it too easy.
Thank you.
Amy Brallier, 40-year summer person Hay Lake near Longville in Cass County

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Nola Brandt

Street Address: 1128 Swinburne Crt

City: Tenstrike State: MN Zip Code: 56683

Phone or Email: nola.brandt@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

my neighbors and I are concerned about "clean water." We are dependent on rural water individual wells.

We are committed to the new DNR buffer strips on our lake and on our farm near streams.

We oppose Line 3. It does not make sense economically or environmentally to complete Line 3.

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Julia Braulick <braulickj@carleton.edu>
Sent: Sunday, July 09, 2017 12:06 AM
To: MN_COMM_Pipeline Comments
Subject: Comments regarding Line 3 and docket numbers CN-14-916 and PPL-15-137

My name is Julia Braulick and I am a Minnesota resident residing on Winona Street in Northfield, ZIP 55057.
I'm writing to express my concern regarding the Draft Environmental Impact Statement (DEIS) for the proposed expansion and reroute of the Line 3 pipeline. I thank the Department of Commerce for preparing the DEIS; however, it fails to establish a need for the proposed project, as well as to account for numerous risks this project poses to the environment.
The DEIS fails to prove that the new tar sands oil pipeline is needed, especially as Minnesota's oil consumption rates have continued to drop. Expanding Line 3 will increase climate pollution, but the DEIS fails to adequately account for the climate impacts of extracting and burning an additional 400,000 barrels per day of tar sands.
The DEIS does not accurately consider the amount of oil flowing in existing and nearly completed pipelines around Minnesota. For example, the Alberta Clipper pipeline is listed as carrying 570,000 barrels per day when it really carries nearly 800,000 barrels per day.
Further, the DEIS assumes the increased flow of tar sands even if the expansion is denied, when it should instead consider the effects if the proposal is denied and resulting in no increase in tar sands flow. The DEIS assumes that more tar sands will move through Minnesota, by train or truck, even if the pipeline expansion and re-route is denied, based on an unlikely and unreasonable scenario, given the low price of oil and the high price of trucking or moving tar sands by train. The DEIS fails to consider the effects if the expansion and re-route are denied, and there is no increased tar sands transport through the state.
A recent National Academy of Sciences report found that cleaning up a tar sands spill in a waterway is much more difficult and up to 14.5 times more expensive than cleaning up a non-tar sands oil spill. Enbridge has a history of spills and greater scrutiny is needed for spill clean-up, permanent damage to waterways, impacts to Minnesota's economy and the threat to Ojibwe wild rice rights.
I urge the Minnesota Department of Commerce to ensure a more thorough analysis is done in the Environmental Impact Statement on Line 3 that adequately presents the risks and potential impacts of an expansion on water, communities, and climate.
Thank you for consideration.
Sincerely,
Julia Braulick

Levi, Andrew (COMM)

From: Charles Brendecke <chuckbrendecke@gmail.com>
Sent: Monday, July 10, 2017 12:08 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 DEIS Comment

RE: CN-114-916 and PPL-15-137)

Dear Environmental Review Manager,

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. I have heard that Enbridge redacted those numbers from the public version of the DEIS. Without them, there is no reliable way an independent party to verify their results.

I believe that in order for Minnesota citizens and agencies to make an educated decision about Line 3, that information must be available, and why Enbridge won't release it. Please insist that Enbridge provide their data on oil releases and spills in Minnesota. Also, why was an engineering firm called Cardno, with ties to Enbridge, instrumental in preparing part of the draft Environmental Impact Statement for Line 3. In light of this fact, in the final EIS I would like to see an independent analysis of the information they provided. Verified facts for such a large project are critical.

If Enbridge objects due to security reasons, then I would like to know why they have failed to cover the exposed pipes in the Tamarack River in northwest Minnesota, and why they allow people to joyride over exposed pipes south of Clearwater. This is surely a security issue as well. For Enbridge to pick and choose what issues warrant "security," is unacceptable.

The water that could be impacted by this pipeline is some of the cleanest and purest water in the world. Clean water is becoming increasingly scarce. It is so important to that we take the responsibility of protecting very seriously.

Sincerely

Charles M Brendecke, PhD, PE
4663 Dapple Ln
Boulder, CO 80301

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
	218-547-1616	
ADDRESS		
CITY, STATE, ZIP		

Kenneth V Bresley
PO Box 56
Walker MN 56484-0056

COMMENTS I support the Line 3 Replacement project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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U.S. A FOREVER

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Carol Bring <user@votervoice.net>
Sent: Saturday, June 24, 2017 4:59 PM
To: MN_COMM_Pipeline Comments
Subject: Jobs

Dear Ms. MacAlister,

I am all for it!!!!

Sincerely,

Carol Bring
302 S Main St
Newfolden, MN 56738
carolbring@yahoo.com

Levi, Andrew (COMM)

From: Sharon Bring <sbring@wiktel.com>
Sent: Thursday, June 22, 2017 8:09 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Environmental Review

Docket CN-14-916 and PPL-15-137

I am writing to support the Enbridge Energy Line 3 replacement. They have been community partners and provide great financial support to our local schools, townships, and the county. It is very important for all of us
In Marshall County as good schools provide the education for our young people and we have heard numerous times about the good students and work ethic that our young people take to their employment whether in our state or other states. We want to continue to give local opportunities for our youth to live here or come back to our area as we don't have the congestion that large cities have and we have taught them good work ethics to succeed in life.

We also have local people working at the substations, on the line as maintenance workers, and office positions which has provided the pipeline with local employment and patronize our local businesses which also adds to our economic benefit.

I farm and we experience long lines at local elevators and have long waits for the rail cars to arrive to get our grain to market. This is a huge loss of time for local farmers who have to wait hours in line and probably get in only one or two loads a day after a long wait to be able to haul.

As a County Commissioner and a member of our transportation committee, we continually hear of the lack of funding to keep up our local roads and highways. This is also a very important factor in getting our product to market as a huge percent of farmers now have semi-trailers to haul their grain. This leads to efficiency for farmers but also impacts our roads around twenty times an average car for weight on our roads. Transporting oil by truck or rail would only multiply the situation.

As to safety of transporting the oil, I see pipelines as the safest way to transport as the underground mode of transport doesn't have to deal with daily elements such a traffic which in itself is a risk. We all experience oil as a necessity in life for our farming operations in a largely agricultural community, commuters who travel large distances to their employment, and heating our homes in our corner of the world.

We all value our environment, clean water, and clean air and I don't see this project any more of a risk to these amenities than any other factory, grain elevator, and transportation facility that makes our communities and Minnesota thrive.

Respectfully submitted,
Sharon Bring
Farmer, County Commissioner, Tax Preparer

Levi, Andrew (COMM)

From: James Brinkman <binkysfiles@charter.net>
Sent: Thursday, June 29, 2017 3:16 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I've done some research and find it hard to believe that this project would be rejected. Modern technology, thorough planning, and qualified workers make this a no-brainer. Replacing the pipeline would make spills highly unlikely given all the safeguards we have now. Environment, economy, and Minnesota would all benefit. Let's use common sense for a change.

Sincerely,

James Brinkman
213 Morris Ave
Duluth, MN 55803
binkysfiles@charter.net

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME: Clifton Brister
PHONE NUMBER: 863-206-9237
EMAIL: cpbrister@aol.com
ADDRESS: 2464 Lodge Rd. N.E.
CITY, STATE, ZIP: Bemidji, MN. 56601

COMMENTS

Many things in our lives are dependent upon oil and oil products. The safest way to transport them is by pipeline. We must all do our part.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Pat Brister	863 206-9237	
ADDRESS		
2464 Lodge Rd NE		
CITY, STATE, ZIP		
Bemidji MN 56601		

COMMENTS Petroleum products are utilized in numerous products in this country. As long as the demand for these products remains high, the pipeline is the best, safest way to transport petroleum to the refineries. To remain safe, Line 3 should be replaced.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Charlotte Britney	218-208-2604	gebrit@scicable.com
ADDRESS: PO Box 162		
CITY, STATE, ZIP: Pengilly MN 55775		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS)** is an in-depth analysis that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME: Britney, Glenn R.
PHONE NUMBER: 218 208-2604
EMAIL:
ADDRESS: 31787 Jefferson BLVD
CITY, STATE, ZIP: Pengilly, MN. 55775

COMMENTS: get 'er Done!!!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Steve Brittle <smbrittle@yahoo.com>
Sent: Monday, July 10, 2017 5:39 PM
To: MN_COMM_Pipeline Comments
Subject: comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137

To: Jamie MacAlister, Pipeline.Comments@state.mn.us

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I am Stephen M. Brittle, 2934 West Northview Avenue, Phoenix, AZ 85051. I own land on the Leech Lake Indian Reservation between Lapotre and Walker, Minnesota.

The Line 3 Pipeline concerns me because of the long history of pipeline ruptures and spills from the old line 3, which in practicality means that the new line will also be the same. The same lack of regulatory oversight will still occur because of the inherent corruption in the political system. When the new line ages or wears out, the owners/operators will also try to just leave it in the ground, where it will decay and release toxic substances into the environment, where it won't be monitored, and harm to public health and the environment will happen.

The DEIS concerns me because it doesn't address what will happen when the inevitable leaks and ruptures will occur, and it also doesn't contemplate that the new proposed Line 3 is going to close or be abandoned, and even though the owners/operators will also try to just leave it in the ground, where it will decay and release toxic substances into the environment, where it won't be monitored, and harm to public health and the environment will happen, the DEIS doesn't examine this scenario or try to mitigate it, which means it is legally deficient.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Sincerely,

Stephen M. Brittle

2934 West Northview Avenue

Phoenix, AZ 85051

Levi, Andrew (COMM)

From: Pamela Brock <pbpambrock@gmail.com>
Sent: Monday, July 10, 2017 4:40 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 MN

Dear Environmental Review Manager:

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economic analysis for the EIS to be complete.

I have heard that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state* need (not a national need). Even if we used statistics abotut the national need, U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply needed oil. (http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf)

I would like to see this information mentioned in the final EIS.

Thank you,
Pamela Brock
402 Eastern Ave S
Park Rapids MN 56470

Mr. J. MacAlister, ER Mgr.
Mn. Dept. of Commerce
St. Paul, Mn.

6-9-17
369A E. Belvidere St.
St. Paul, Mn. 55107

Ref: Line 3 Pipeline Project

Dear Mr. McAlister,

This page intentionally left blank.

After repeated review of Executive Summary Enbridge choices I come to a non-expert public citizen conclusion that RA-06 route is least offensive to Man and Nature.

Thank You,
Robert R Broder

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R. A. BRODA
369A E. BELVIDERE STREET
ST. PAUL, MN 55107

ST PAUL MN 551

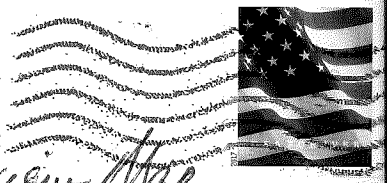

Mr. J. McAlister, Environmental Review Mgr.
Min. Dept. of Commerce
85 7th Pl. E. (Suite #280)
St. Paul, Mn. 55101

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Levi, Andrew (COMM)

From: Sarah Broderick <broderick.sarah@gmail.com>
Sent: Monday, July 10, 2017 5:31 PM
To: MN_COMM_Pipeline Comments
Subject: Comments on DEIS for Enbridge's proposed new Line 3 pipeline

To MN Public Utilities Commission:

Regarding Enbridge's proposed new Line 3 pipeline

Docket Number CN-14-916 and PPL-15-137

According to *Line 3 Replacement Project Draft Environmental Impact Statement*, "Modern crude oil pipeline systems are designed, constructed, and operated with technology to minimize the potential for integrity failures and to rapidly detect and manage unanticipated releases" (p. 10-6). Risk exists in the form of small leaks or possible large or catastrophic leak (*Impact Statement*, p. 10-1). The assumption in the *Impact Statement* is that the benefits outweigh the risks. Yet this assumption is made by the people who benefit from the pipeline. They have a monetary risk if they have to pay to clean a large or catastrophic spill and they have maintenance costs. But the company personnel do not bear the burden of long-term life with an oil spill, like those who live in the Gulf of Mexico, where the impact from the spill is still significant and ongoing (environmental defense fund), or in Alaska, where melting permafrost threatens pipelines (Greg Quinn, Bloomberg.com, 2016), and the pipelines may be a major cause of the melting. There is technology that has a much lower impact on ecosystems and communities, in which a company with the resources like Enbridge could invest, if it wanted. There are viable alternatives for the energy market than risky transportation of a volatile substance. Its risk for devastating harm to the Great Lakes make Line 3 nonviable. Further, the assumptions made by the company –that the benefits outweigh the risks – show Enbridge's interests in profit only. Companies, such as BP Petroleum, which was responsible for the Deep Water Horizon (also known as the Macondo) oil spill, have shown they make short cuts to save money as a result of poor regulatory oversight (Charles Ebinger, Brookings.edu, 2016). There is no safeguard that Enbridge does not behave in the same way and Line 3 pipeline could already be compromised.

Sincerely, Sarah Broderick

Concerned citizen, teacher, and parent

From: FLO BRODLEY
To: MN_COMM_Pipeline Comments
Subject: Written comment on the DEIS - Docket numbers CN-14-916 and PPL-15-137
Date: Wednesday, May 31, 2017 2:51:43 PM

To Whom It May Concern:

I have just heard of the pipeline issue and of the written public comments needed for the DEIS.

It is somewhat disheartening that this project, like so many others, may allow fracking, tar sands, etc. to pollute this lovely state. Tar sands are a menace that never should've been dug up and the fracking industry has not only become a major polluter that soils air, land and water but has become the generator of earthquakes in some states.

With renewable energy so competitive, it seems regressive to turn Minnesota into another backward-thinking state, with its natural resources becoming less and less available to citizens.

I also understand that a foreign government's corporation will be benefitting form this venture, a disturbing idea that can only end up harming this state and our country by scooping up valuable resources, selling them back to us and making us dependent upon them for industries we may need in the future.

I hope this does not come to pass or you will have fallen into another bind of penny wise, pound foolish politicians.

Please think first of your children and grandchildren's futures. F. Brodley

Levi, Andrew (COMM)

From: George Brook <brookcd@paulbunyan.net>
Sent: Thursday, July 06, 2017 7:58 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

My opinion is that the hugely government-subsidized "Green Energy" industry is dependent on fossil fuels as is nearly all manufacturing and transportation. The largely uninformed, hypocritical, paid activists who oppose pipeline construction should be objecting to building and resurfacing highways and streets, as well as building and construction in general, which is environmentally more harmful than pipelines.

The economic and employment benefits of pipeline construction cannot be denied, but the activists who drive their cars or fly to demonstrations aren't interested in jobs ... a lot of them are supported by the taxpayer anyway.

Sincerely,

George Brook
2165 Balsam Rd NW
Bemidji, MN 56601
brookcd@paulbunyan.net

Levi, Andrew (COMM)

From: Linda <lbrooksphoto@gmail.com>
Sent: Friday, July 07, 2017 2:27 PM
To: MN_COMM_Pipeline Comments
Subject: Comments on Draft EIS Line 3

Dear Jamie MacAlister,
First, I was impressed with the extent of the data and cultural issues not necessarily quantifiable in the Draft of the EIS and readability of the document.
There are five main points I want to add and should be addressed in the final CN and EIS.
1. Has there been any research independent of Enbridge that proves there is a need in MN for 760,000 bpd of heavy crude oil?
2. Have the increased use, and lower costs of solar, wind and other alternative power sources, along with less consumer power consumption been considered?
3. Are leaks from pipelines more readily hidden or undiscovered than leaks from truck/ rail accidents?
4a. Enbridge cannot guarantee spills /leaks will not occur now or into the future and fully determine the environmental impact. They cannot guarantee a responsibility for dealing with any negative impact. They could go out of business or be bought by another company. There is a history of this in Love Canal, NY and govt Superfund money to clean up lands.
4b. Future maintenance of any pipelines cannot be predicted. The current situation of the 50+ year old #3 pipeline is proof.
4c. A permanent "right of way" could restrict public monitoring of spills, maintenance and damage.
5. Increased harm and damage to Native American people and lands has negative impact on all citizens of Minnesota.

Thank you for considering these important points.
Sincerely,
Linda Brooks

Sent from my iPhone

Levi, Andrew (COMM)

From: Jill Brown <jillbrown0915@gmail.com>
Sent: Wednesday, June 14, 2017 12:41 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS.

Sincerely,

Jill Brown
3819 W 5th St
Duluth, MN 55807
jillbrown0915@gmail.com

Levi, Andrew (COMM)

From: William Brown <bill.brown78@gmail.com>
Sent: Sunday, June 25, 2017 12:14 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3

Dear Ms. MacAlister,

I wish to urge support for the planned Line 3 replacement. I believe that it is necessary in order to avoid possible leaks due to the current aging pipeline. In addition to improve the safety over the current line, it will also add thousands of jobs. Thank you

Sincerely,

William Brown
4998 Mapleton Rd
Baxter, MN 56425
bill.brown78@gmail.com

Levi, Andrew (COMM)

From: Jada Brown <brow4356@umn.edu>
Sent: Monday, July 10, 2017 11:59 PM
To: MN_COMM_Pipeline Comments
Subject: citizen testimony
Attachments: DEIS Line 3 testimony .docx

Find attached my testimony against Line 3. Thank you.

July 10, 2017

To the Minnesota Department of Commerce,
(Docket numbers CN-14-916 and PPL-15-137)

Boozhoo,

My Anishinaabe name is Waasode'anang and my English name is Jada. I would like to testify against the DEIS for Line 3 on my behalf as well as my family's, community, and everyone who would be impacted by the proposed pipeline. I am affiliated with the Turtle Mountain Band of Ojibwe and grew up northwest of the Twin Cities. Although I am not from the northern part of the state where Line 3 is, it still greatly affects me and others, both humans and ecosystems. Also, I want to thank you for the opportunity to express my opinions because as a youth and indigenous person, I believe I have a right to have a say in decisions affecting my community, the land, and cultural practices.

Some concerns that I have include oil spill impacts, tribal concerns, and climate change. First of all, we cannot stress enough that pipelines are prone to spills. Already, since the construction of the DAPL, it has leaked 84 gallons in April. On this route, the DEIS estimates that small spills will for sure occur (at a 107% rate) and pinhole leaks at a 27% rate. Not to mention that the abandoned corridor is still causing problems as it is old and outdated. We need to be putting more focus on cleaning up the existing problem and contamination. What we all need is real solutions, not short-term fixes that don't adequately address the variety of issues and impacts that pipelines cause.

Secondly, the DEIS is basically saying that our wild rice beds will be negatively affected, as the proposed Enbridge route goes through 17 ricing lakes (Figure ES-10). Enbridge is clearly saying they don't respect our cultural and spiritual practices if the small spill rate of Line 3 is 107%. This fact brings me into my next point which is the unnecessary harm and trauma the pipeline will be implementing on the large American Indian population in the surrounding region. In addition to the violations of treaty rights, Line 3 is continuing the structural racism against Native peoples and negatively affecting their well-being. Line 3 will have long-term detrimental effects on tribal and non-tribal members alike and their basic resources to live healthily. By putting our sacred and cultural practices at risk, they are stating that greed and fossil fuels are of greater priority. They are not concerned about the wellbeing of the communities including their input, health, and economy. Lastly, and critically important, is the increased likelihood of sex trafficking and abuse that will affect Native women and children the most (11.4.1). Who are these pipelines really serving? The abuse of Native women and Mother Earth are closely related. That's why we have been at the forefront of climate change.

Finally, the DEIS acknowledges that Line 3 would contribute to climate change. The lifecycle emissions of Line 3 would be 193 million tons of CO2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3.) Do we really want a high carbon emitting pipeline in Minnesota, whereas our Governor has just recommitted our state to the strongest climate action? This proposed pipeline replacement doesn't match up with our states plans towards greener energy. Let's truly start investing in a better future for our families, nature, and economy without fossil fuels.

Jada Brown
Apt #1, 813 University Ave SE, Minneapolis, MN 55414

Levi, Andrew (COMM)

From: mkb1952@aol.com
Sent: Monday, July 10, 2017 1:29 PM
To: MN_COMM_Pipeline Comments
Subject: Dockets CN-14-916, PPL-15-137

Hello,

My comment is this- Please, no more pipelines endangering our water, wildlife, human lives and our earth. It's time to move to renewables to save this beautiful planet and human race from extinction. There have been far too many spills and accidents. I feel the risk is grave. We have options, let's use what resources we have responsibly.

Thank you,

Marcia Brown

Line 3 Replacement Project DEIS

- The Draft Environmental Impact Statement (DEIS) is an in-depth analysis that took more than 15 months and 27 public meetings to scope and develop.
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- Infrastructure replacement: As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Scott Brunner	715-285-5756	

ADDRESS
N389 90th St

CITY, STATE, ZIP
Arkansaw, WI 54721

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
ALLAN BRUS	612-437-2749	AHBRUS@GMAIL.COM

ADDRESS
2247 SHERWOOD CT.

CITY, STATE, ZIP
MINNETONKA, MN 55305

COMMENTS
ATTENDED PRESS CONFERENCE AT API GROUP TRAINING CTR TODAY (6-13-17 @ 2:00PM) TO SHOW SUPPORT FOR ENBRIDGE ENERGY'S LINE 3 PROJECT. I BELIEVE 100% IN THE RESEARCH, PLANNING & DEVLOPMENT BEHIND THIS PROJECT AND THE POSITIVE IMPACT IT WILL HAVE ON OUR REGION.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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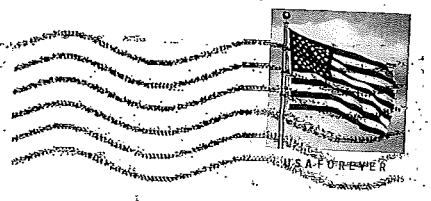

3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Russell Bruss	715-220-6727	
ADDRESS		
813 200th Street		
CITY, STATE, ZIP		
Dresser WI 54009		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Kimberly Bryan <wa2006kb@gmail.com>
Sent: Monday, July 10, 2017 1:08 PM
To: MN_COMM_Pipeline Comments
Subject: Comment on Line 3: Deny the permit!

Dear Jamie MacAlister,

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I am from Montclair, California

It doesn't matter how old or new a pipeline is, it will leak. For example, the Dakota Access Pipeline leaked three times before the it was officially running. Meanwhile, construction is also a major environmental concern of mine. Sunoco just had to stop building a pipeline in Pennsylvania because the construction caused water contamination in nearby homes.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Sincerely,

Kimberly Bryan

--

-Kimberly

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jared Bryant		
ADDRESS		
1702 Cummings Avenue		
CITY, STATE, ZIP		
Superior WI 54880		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS!

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Steve Buck	952-967-0818	Buckdogg@charter.net

ADDRESS
16530 Judicial Road

CITY, STATE, ZIP
Lakeville MN 55044

COMMENTS
It is long past time to replace this old unreliable pipeline with a new state of the art pipe line

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Donna Buckbee
To: MN_COMM_Pipeline Comments
Subject: re: Enbridge new line 3 pipeline
Date: Wednesday, May 31, 2017 12:49:44 PM

Please do not allow this pipeline. Instead of building new pipelines Enbridge should be responsibly removing all it's aging pipelines and investing in infrastructure that supports clean, renewable, non-fossil fuel energy. All pipelines will leak. It is a matter of when, not if. We as a people cannot take this risk. It would be unethical and immoral.

Donna Buckbee
5853 Ferndale Road
Rushford MN 55971
507 864 2632

Line 3 Replacement Project DEIS

20 JUN '17

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Evan Bueligen	612-965-0375	evan.bueligen@lejeune steel.us
ADDRESS		
3116 Bluestem Ave		
CITY, STATE, ZIP		
Shakopee, MN, 55379		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Marcia Bujarski <marciab@gvtel.com>
Sent: Thursday, June 29, 2017 2:47 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline

Dear Ms. MacAlister,

I support thee pipeline. We are safer with a buried line than trains running through towns. I live within walking distance of the existing line and feel safe. At one time we had guards there and after talking to them about the safety procedures we live in NO fear. Put it in it is good for our state.

Sincerely,

Marcia Bujarski
20843 Clearline Rd
Shevlin, MN 56676
marciab@gvtel.com

From: Kristeen Bullwinkle
To: MN_COMM_Pipeline Comments
Subject: docket numbers CN-14-916 and PPL-15-137
Date: Friday, June 09, 2017 4:24:15 PM

I am concerned about water quality in Minnesota. We rely on it for our economy and our very lives. I am very concerned that the proposed pipeline will endanger our Minnesotan way of life.

The Mississippi River provides drinking water for St. Cloud, Minneapolis and St. Paul. I do not want to see what happened on the Yellowstone to happen here. In the Yellowstone River 2015 Pipeline Spill under the ice near Glendive, Montana, the drinking water had to be replaced with truckloads of fresh water brought into Glendive. That's not the news about Minnesota waters that I want to see.

Enbridge proposes to build Line 3 through the vast wetland areas of the Mississippi Headwaters region and to border Itasca State Park. The Mississippi River in this area creates a winding path through vast inaccessible wetlands, areas of steep hillsides and generally hilly terrain in much of the area. There are 28 areas deemed inaccessible for this proposed route. It's not that ensuring proper maintenance of and removal of these lines will be difficult, I worry that this is impossible. Any future spills will be not be discovered until they have already damaged the headwaters of the Mississippi and/or Minnesota's clearest lakes.

Enbridge detection equipment in Alberta and fly overs and a response helicopter in Bemidji will do little to detect or effectively respond to a leak or spill. A small percentage of leaks are found by detection equipment and the huge majority of leaks and spills are found by the human eye. Due to the path of the Mississippi being in roadless areas and swampland, a rupture in this vast pristine river and wetland area would result in ruin and devastation of the area as response would be difficult and slow requiring equipment operation in areas not suited to that kind of intervention.

Line 3 will be carrying tar sands which greatly increases the danger to this area due to the physical and chemical properties of diluted bitument. This creates increased difficulty for detection and clean up as this product tends to sink and submerge in the water column. I never want this area to be suffer from bitumen, nor from the dredging that would be necessary to clean up a spill.

As everyone knows who has suffered through a sewage leak in their basement, spills happen everywhere. Pipelines are no different, except that they create an even bigger and more costly mess. Maintenance gets delayed. People get lazy or bored or distracted. This is true of businesses, as well. Maintenance does not create revenue so is easily ignored. No one can promise that there will be enough watchfulness that spills will not occur. 50 years is a long time to stay vigilant and watchful.

I refer to this Criteria:
In selecting a route for designation and issuance of a pipeline routing permit, the commission shall consider the impact on the pipeline of the following:

A. human settlement, existence and density of populated areas, existing and planned future land use, and management plans;
B. the natural environment, public and designated lands, including but not limited to natural areas, wildlife habitat, water, and recreational lands;
C. lands of historical, archaeological, and cultural significance;
D. economies within the route, including agricultural, commercial or industrial, forestry, recreational, and mining operations;
E. pipeline cost and accessibility;
F. use of existing rights-of-way and right-of-way sharing or paralleling;
G. natural resources and features;
H. the extent to which human or environmental effects are subject to mitigation by regulatory control and by application of the permit conditions contained in part 7852.3400 for pipeline right-of-way preparation, construction, cleanup, and restoration practices;
I. cumulative potential effects of related or anticipated future pipeline construction; and
J. the relevant applicable policies, rules, and regulations of other state and federal agencies, and local government land use laws including ordinances adopted under Minnesota Statutes, section 299J.05 , relating to the location, design, construction, or operation of the proposed pipeline and associated facilities.

Kristeen Bullwinkle
White Bear Lake, MN

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Josh Burch	715-573-1103	burchw2josh@yahoo.com
ADDRESS		
7830 Pine Bluff Road		
CITY, STATE, ZIP		
Wausau WI 54403		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: farmpub@gvtel.com
Sent: Wednesday, June 28, 2017 4:30 PM
To: MN_COMM_Pipeline Comments
Subject: Comments on Line 3 Replacement
Attachments: letter to dept of commerce june 28 17.doc; manhattan institute.pdf

Dear Dept. of Commerce,
Please see attached letter and accompanying report.
Tank you
Thomas Burford
Bagley MN

In regard to Docket Numbers
CN-14-916
PPL-15-137

Dear Minnesota Department of Commerce,

In my view, pipelines are the safest and most economical method of transporting crude oil and petroleum products. This opinion is supported by data gathered by the United States Department of Transportation Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety which was compiled by the Manhattan Institute and published in a report in June 2013.

I will hit some of the highlights of that Manhattan Institute (MI) report here.

Firstly, MI notes, "Almost 500,000 miles of interstate pipeline crisscross America, carrying crude oil, petroleum products, and natural gas.... Thus it is possible to answer, based on experience, the question of whether pipeline transport of oil and gas is safe."

Among the MI's findings: "...Pipelines result in fewer spillage incidents and personal injuries than road and rail. Americans are more likely to get struck by lightning than to be killed in a pipeline accident."

In the 2013 report MI noted, "Petroleum production in North America is nearly 18 million barrels a day...." A graph in the MI report shows that in 2009, pipelines transported 268.2 billion ton-miles of petroleum; motor carriers 1.7 billion ton-miles; and rail 1 billion ton-miles.

The report shows a total of 2.52 million barrels were "spilled" from pipelines over the 20-year period of 1992-2011. An average of 40 percent of that amount was recovered; meaning the net of barrels spilled was 1.49 million barrels. ("Spilled" is in quotes as any release of 5 gallons or more of oil from a pipeline or pipeline facility must be reported as a spill.) When one considers that North America ships 6,570 million barrels per year, the percentage spilled at 2.52 million over 20 years comes to a miniscule amount. The statistics I have available do not allow me to make an accurate percentage, but if we divide 2.52 million into 6,570 million, the percentage is 0.039. It is not accurate to divide this by the 20 years, but just to get the idea across: 0.039 divided by 20 years comes to 0.00195 which is a very low percentage.

The number of incidents per billion ton-miles shipped is 19.95 for roadway carriers; 2.08 for rail; 0.58 for hazardous liquid (oil) pipeline; and 0.89 for natural gas pipeline.

The MI report notes that "pipelines release more oil per spill than rail – but less than road." But, when the recovery rate on pipeline spills is counted, the amount spilled can be reduced by one-third.

However, when it comes to injuries, pipelines outperform road and rail. "The majority of (injury causing) incidents occur on road and rail," the MI reports.

If we were to channel more oil onto rail transport in the interest of a miniscule amount of spillage, simple mathematics tells us that more rail traffic means the public would be put at greater risk of injury from collisions and train derailments (remember the May 2015 derailment and fire in Heimdal, N.D.). People would find themselves waiting more and more at railroad crossings, sometimes during emergency ambulance and fire department runs. Every town an oil train passes through would be at greater risk of a derailment or crash resulting in a fire of great proportion and the ability to spread as oil crosses the ground. Here in Bagley our fire hall is close to the railroad tracks and would likely be one of the first buildings to get burned if an oil train spills and burns.

In addition, the MI report notes, "Some claim that pipelines carrying Canadian oil sands crude, known as diluted bitumen, have more internal corrosion, and are subject to more incidents. However, PHMSA (Pipeline and Hazardous Materials Safety Administration) data show that oil releases from corrosion are no more common in pipelines carrying Canadian diluted bitumen than in other lines."

By the way, the reason for the Enbridge Line 3 Replacement Project is to replace an old line with a new one. This is the best way to prevent a line leaking due to age or corrosion.

Some argue we don't need any new pipelines. Meanwhile, most of them are driving vehicles powered by petroleum, buying groceries shipped to their local stores by petroleum powered vehicles, wearing clothing and shoes with pieces made from petroleum products, driving on roads covered with a petroleum product, etc. etc.

The need for petroleum products continues to grow. Our economy and way of life depend upon petroleum. We cannot feasibly go back to the horse and buggy days, so we must have safe transport of petroleum. Pipelines have an exceedingly superior safety record and I urge you to approve the permit for the Enbridge Line 3 Replacement Project.

Furthermore, the economic plusses for Clearwater County are terrific. The property taxes paid by the pipeline companies support our schools and our county. The pipelines provide construction jobs for a short-term boost in our economy, as well as long-term jobs that support many local families. Pipelines are a great asset to us in Clearwater County.

Thank you for your consideration of my arguments

Sincerely,

Thomas Burford
PO Box 130
(34407 189th Ave.)
Bagley MN 56621
218-694-6265
Email: farmpub@gvtel.com

Attached: copy of Manhattan Institute for Policy Research report

Issue Brief
No. 23 June 2013

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UPDATED

MI
MANHATTAN INSTITUTE FOR POLICY RESEARCH

PIPELINES ARE SAFEST FOR TRANSPORTATION OF OIL AND GAS

Diana Furchtgott-Roth
Senior Fellow

The Obama administration's decision to delay approval for the construction of TransCanada Inc.'s proposed Keystone XL pipeline was based, in part, on concerns over the safety and reliability of oil and natural gas pipelines. The pipeline is intended to transport oil from Canada to U.S. refiners on the Gulf of Mexico. In announcing his decision, the president called for a full assessment of "the pipeline's impact, especially on the health and safety of the American people."

Pipelines have been used to transport American natural gas or oil, including from Canada to the United States, for three quarters of a century. Almost 500,000 miles of interstate pipeline crisscross America, carrying crude oil, petroleum products, and natural gas. This extensive and operational infrastructure network is heavily regulated by the Department of Transportation, which monitors the very issues central to the Keystone controversy: safety and reliability.

Thus it is possible to answer, based on experience, the question of whether pipeline transport of oil and gas is safe. It is, moreover, possible to compare the record of oil and gas pipelines to that of transport via rail and road. As the major alternative means of fuel shipment, transport by rail and road has been increasing as limitations on pipeline capacity have become manifest (the underlying reason for the Keystone proposal).

A review of safety and accident statistics provided by the U.S. Department of Transportation for the extensive network of existing U.S. pipelines—including many linked to Canada—clearly show that,

Published by the Manhattan Institute

in addition to enjoying a substantial cost advantage, pipelines result in fewer spillage incidents and personal injuries than road and rail. Americans are more likely to get struck by lightning than to be killed in a pipeline accident.[1]

The question of how to transport oil and gas safely and reliably is not a transitory one linked only to the Keystone controversy. Petroleum production in North America is now nearly 18 million barrels a day,[2] and could climb to 27 million barrels a day by 2020. Natural gas production in Canada and the United States could rise by a third over the same period, climbing to 22 billion cubic feet per day. This oil and gas will have to travel to where it is needed. Whether it is produced in Canada, Alaska, North Dakota, or the Gulf of Mexico, it will be used all over the country, especially since new environmental regulations are resulting in the rapid closures of coal-fired power plants, increasing the demand for natural gas as a substitute. Similarly, large fleets of buses and trucks are switching to natural gas, and General Motors and Chrysler are making dual-fuel pickup trucks.

This paper compares the record of transport via pipeline to that of road and rail and finds that pipelines are the safer option.

The first large-diameter long-distance pipelines were constructed during the Second World War, and they proliferated across the country over the ensuing two decades. Now America has 175,000 miles of onshore and offshore petroleum pipeline and 321,000 miles of natural gas transmission and gathering pipeline. In addition, over 2 million miles of natural gas distribution pipeline send natural gas to businesses and consumers.[3] This is expected to increase as households and businesses shift to natural gas to take

Table I: Crude Oil and Petroleum Products Transported in the United States by Mode (billions of ton-miles)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Share[c]
Crude oil, total	**376**	**376.6**	**384**	**380.4**	**374.1**	**376.3**	**366**	**335.5**	**372**	**336**	
Pipelinesa	283.4	277	286.6	284.5	283.7	293.5	300.5	266.6	306.3	268.2	80
Water carriers	91	98.1	95.7	94.1	88.7	81.1	63.8	66.9	63.2	65.1	19
Motor carriersb	1.2	1.1	1.2	1.3	1.2	1.4	1.4	1.6	1.7	1.7	1
Railroads	0.4	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.7	1	0
Refined petroleum products, total	**497.3**	**493.2**	**480.6**	**502.9**	**528.4**	**529.7**	**489.4**	**499.9**	**485.9**	**474.1**	
Pipelinesa	293.9	299.1	299.6	305.7	315.9	314	280.9	291.1	299.4	300.2	63
Water carriers	153.4	145.9	131.9	146	158.2	159.4	149.3	149.1	130.8	121.7	26
Motor carriersb	30.1	29.7	29.4	31.9	33.2	33.4	33.8	33.5	33.4	32.2	7
Railroads	19.9	18.5	19.7	19.3	21.1	22.8	25.4	26.2	22.3	19.9	4
Crude and petroleum products, total	**873.3**	**869.8**	**864.6**	**883.3**	**902.5**	**906**	**855.4**	**835.4**	**857.9**	**810**	
Pipelinesa	577.3	576.1	586.2	590.2	599.6	607.5	581.3	557.7	605.7	568.4	70
Water carriers	244.4	244	227.6	240.1	246.9	240.5	213.1	216	194	186.8	23
Motor carriersb	31.3	30.8	30.6	33.2	34.4	34.8	35.2	35.2	35.1	33.9	4
Railroads	20.3	18.9	20.2	19.8	21.6	23.2	25.8	26.6	23	20.9	3

Notes:

a Beginning with 2006, pipeline data were taken from PHMSA F 7000-1-1. Previously, data were extracted from FERC Form No. 6, which included data for federally-regulated pipelines. For 2005, data for federally regulated pipelines were estimated to include about 90 percent of the total national ton-miles, so the pipeline statistics for that year were adjusted to include an additional 10 percent of ton-miles. From 1990 through 2004, the federally regulated estimate was 84 percent with a 16 percent addition for other pipeline ton-miles.

b The amount carried by motor carriers is estimated.

c Share shipped by mode in 2009 (percent)

Details may not add to totals due to rounding in the source publication.

SOURCE: Association of Oil Pipe Lines, Shifts in Petroleum Transportation, 1990-2009: (Washington, DC: Annual Issues), tables 1, 2, and 3, available at http://www.aopl.org/publications/?fa=reports as of Apr. 5, 2012.

advantage of low prices that are expected to last into the foreseeable future.

Pipelines are the primary mode of transportation for crude oil, petroleum products, and natural gas. As shown in Table 1, approximately 70 percent of crude oil and petroleum products are shipped by pipeline on a ton-mile basis. Tanker and barge traffic accounts for 23 percent of oil shipments. Trucking accounts for 4 percent of shipments, and rail for the remaining 3 percent. Essentially all dry natural gas is shipped by pipeline to end users.

If safety and environmental damages in the transportation of oil and gas were proportionate to the volume of shipments, one would expect the vast majority of damages to occur on pipelines. This paper finds the exact opposite. The majority of incidents occur on road and rail.

Data on pipeline safety are available from the United States Department of Transportation Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety (PHMSA).[4] Operators report to PHMSA any incident that crosses a certain safety threshold. These reports enable the public to compare the safety of pipelines to that of road and rail.

A pipeline incident must be reported if any of the following occur: (1) Explosion or fire not intentionally set by the operator; (2) Release of five gallons or more of a hazardous liquid (any petroleum or petroleum

Table 2: Pipeline Incidents and Related Injuries and Fatalities (1992-2011)

	Number	Property Damage as Reported* (in millions)	Net Barrels of Liquids Lost	Injuries	Fatalities
1992	389	$70.5	68,810	118	15
1993	445	$67.3	57,559	111	17
1994	467	$160.6	114,002	120	22
1995	349	$53.4	53,113	64	21
1996	381	$114.5	100,949	127	53
1997	346	$79.6	103,129	77	10
1998	389	$126.9	60,791	81	21
1999	339	$130.1	104,487	108	22
2000	380	$191.8	56,953	81	38
2001	341	$63.1	77,456	61	7
2002	644	$102.1	77,953	49	12
2003	673	$139.0	50,889	71	12
2004	673	$271.9	69,003	60	23
2005	721	$1,246.7	46,246	48	14
2006	641	$151.1	53,905	36	21
2007	616	$154.9	68,941	53	15
2008	664	$555.8	69,815	59	9
2009	627	$178.0	32,258	66	13
2010	586	$1,336.4	123,419	109	22
2011	599	$336.3	108,663	65	17
Totals	10,270	$5,530.0	1,498,344	1,564	384

Source: "All Reported Pipeline Incidents," The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety, accessed April 24, 2012, http://primis.phmsa.dot.gov/comm/reports/safety/Allpsi.html?nocache=8953

product) or carbon dioxide; (3) Fatality; (4) Personal injury necessitating hospitalization; and (5) Property damage, including cleanup costs, and the value of lost product, and the damage to the property of the operator or others, or both, estimated to exceed $50,000.[5]

One way to look at the safety record of petroleum, petroleum products, and natural gas pipeline operators is to examine PHMSA's aggregated data from individual reports. Table 2 shows a summary of all reported incidents and damage between 1992 and 2011. Property damage costs are reported by PHMSA in 2011, with lost product accounted for at benchmark prices at the time of the incident.

To the untutored eye, it can appear that pipelines are prone to significant accidents. For instance, there were 721 incidents in 2005, and 53 fatalities in 1996, many caused by a propane explosion in San Juan. However, as the tables make clear, safety-related incidents, as measured by volume, are actually minor. More importantly, it is crucial to keep in mind that there is no way, in an advanced industrial economy, to avoid shipment of fuels to provide power. Crucially, by comparison with other means of such transport, pipelines emerge as relatively safe and reliable.

Table 2 shows that the number of incidents is relatively low. It has ranged from 339 in 1999 to 721 in 2005. Property damage has ranged from $53 million in 1995 to $1.3 billion in 2010. Lost barrels of liquids reached a low of 32,258 barrels in 2009 to a high of 123,419 the following year. Injuries ranged from 36 in 2006 to 127 in 1996, and fatalities ranged from 7 in 2001 to 53 in 1996.

Table 3: Percent of Liquids Recovered from Pipeline Incidents, All Reported Incidents (1992-2011)

Year	Gross Barrels Spilled	Net Barrels Spilled	Percentage Recovered
1992	137,065	68,810	50
1993	116,802	57,559	51
1994	164,387	114,002	31
1995	110,237	53,113	52
1996	160,316	100,949	37
1997	195,549	103,129	47
1998	149,500	60,791	59
1999	167,230	104,487	38
2000	108,652	56,953	48
2001	98,348	77,456	21
2002	97,255	77,953	20
2003	81,308	50,889	37
2004	89,311	69,003	23
2005	138,094	46,246	67
2006	137,693	53,905	61
2007	94,981	68,941	27
2008	102,076	69,815	32
2009	54,964	32,258	41
2010	174,921	123,419	29
2011	137,932	108,663	21
Totals	2,516,625	1,498,341	40 (Avg.)

Source: "All Reported Pipeline Incidents," The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety, accessed April 24, 2012, http://primis.phmsa.dot.gov/comm/reports/safety/Allpsi.html?nocache=8953 and Manhattan Institute calculations.

The unusual increases in gross property damage in 2005 and 2010 were largely attributable to Hurricane Katrina in 2005 and the Kalamazoo River oil spill in 2010. Higher market prices for petroleum over the period has led to an increased valuation of spillage. Throughout the 1990s, apart from a brief price spike associated with the Persian Gulf War, the West Texas Intermediate wholesale price of oil stayed below $25 dollars per barrel. Prices continued to increase between 2000 and 2008, and averaged $100 in 2008. Prices eased in 2009 and 2010, but averaged around $95 in 2011 and $94 in 2012.[6]

A major criterion for determining if an incident had to be reported to PHMSA was significantly revised in 2002. Between 1992 and 2002 a spill only had to be reported if it was greater than 50 barrels of liquids or CO2 (after 1991). However, beginning in 2002, the limit was dropped to five gallons, with an exception for maintenance-related spills of five barrels or less confined to company sites.[7] Hence, minor spills that were not reported prior to 2002 were reported afterwards. From 1992 through 2001 an annual average of 383 incident reports were filed with PHMSA. Then, from 2002 through 2011, companies filed an annual average of 644 incident reports.

Gross barrels spilled do not take into account the number of barrels that were recovered during cleanup. The volume of liquids spilled that is ultimately recovered varies widely from year to year, and is likely heavily influenced by the nature of the spill. Between 1992 and 2011 about 40 percent of spilled liquids were recovered (Table 3). Over the entire 20-year period a total of less than 1.5 million net barrels were spilled.

Volumes that are spilled are miniscule when compared to the volumes of petroleum that are used in the United States. To provide some prospective, U.S. refineries produce over 7 million barrels of gasoline every single day.[8] Considering the vast network, 175,000 miles of petroleum pipeline and over 2 million miles of natural gas pipelines (about 321,000 of transmission and gathering lines, over 2 million of local distribution main and service lines), incidents are exceedingly rare.[9]

To draw another comparison, according to the National Weather Service there was an average of 35 reported deaths annually caused by lightning from 2003 to 2012.[10] From 1992 to 2011 fatalities related to pipeline incidents were about 20 per year. An individual had a 75 percent greater chance of getting killed by lightning as being killed in a pipeline incident.

Data are also provided by PHMSA that make it possible to determine in what type of pipeline system a particular incident occurred. There are four basic categories of pipeline systems, namely hazardous liquids, natural gas gathering, natural gas transmission, and natural gas distribution. Natural gas gathering pipelines bring raw natural gas from the wellhead to the gas processing plant. The natural gas transmission system is made up of pipelines that bring processed (dry) gas from the plants and carry it across the country to city gates or to large customers (e.g., heavy

Table 4: Percentage of Incidents, Fatalities, Injuries, and Property Damage by Pipeline System (1992-2011)

	Incidents	Fatalities	Injuries	Property Damage
Natural Gas Gathering	2	0	1	7
Natural Gas Transmission	18	12	14	28
Natural Gas Distribution	26	78	75	17
Hazardous Liquid	54	11	11	49

Note: Not all columns sum to 100 due to rounding.

Source: "All Reported Incidents," The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety, accessed May 1, 2012, http://primis.phmsa.dot.gov/comm/reports/safety/Allpsi.html?nocache=3087#_all and Manhattan Institute calculations.

industry or electrical power plants). The natural gas distribution system is operated by local distribution companies which transport gas from the city gate to local households and local businesses. Table 4 displays what percentage of incidents, fatalities, injuries, and property damage from 1992 through 2011 occurred in each pipeline system.

Although fatalities and injuries are relatively low, the majority of those that do occur have been associated with pipelines that are part of a natural gas distribution system. The U.S. natural gas distribution pipeline network spans over 2 million miles, and the federal government does not regulate intrastate pipelines (local distribution and production gathering lines), except for gathering lines that are located on federal lands. Local distribution companies, where both the vast majority of pipeline miles exist and accidents occur, are regulated by states and municipalities.

The proportion of property damage from incidents originating at hazardous liquids pipelines is largely the result of the inclusion of lost product as part of the damage, and that cleanup of oil spills is costly. From an operational standpoint, incidents associated with natural gas transmission and hazardous liquid systems (large diameter interstate pipelines) have resulted in 86 deaths and 387 injuries from 1992 through 2011, as shown in Table 5.

How does this compare with road and rail? We have analyzed U.S. Department of Transportation data and produced incident and injury rates for oil and gas pipelines, road, and rail for petroleum products in the period 2005 through 2009.[11] Because reporting of pipeline incidents is only required for events involving injury or release over 5 gallons, we eliminated road and rail incidents not meeting those criteria from consideration. Even after this narrowing of scope, road and rail have higher rates of serious incidents and injuries

Table 5: Incidents, Fatalities, Injuries, and Property Damage by Pipeline System (1992-2011)

	Incidents	Fatalities	Injuries	Property Damage as Reported
Natural Gas Gathering	212	0	12	$357,080,128
Natural Gas Transmission	1845	45	216	$1,534,724,575
Natural Gas Distribution	2644	298	1165	$942,404,551
Hazardous Liquid	5569	41	171	$2,695,828,774

Source: "All Reported Incidents," The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety, accessed May 1, 2012, http://primis.phmsa.dot.gov/comm/reports/safety/Allpsi.html?nocache=3087#_all and Manhattan Institute calculations.

Table 6: Comparative Statistics for Petroleum Incident Rates: Onshore Transmission Pipelines vs. Road and Railway (2005-09)

Mode	Avg. Billions Ton-Miles Shipment Per Year	Avg. Incidents Per Year	Incidents Per Billion Ton-Miles
Road*	34.8	695.2	19.95
Railway*	23.9	49.6	2.08
Hazardous Liquid Pipeline	584.1	339.6	0.58
Natural Gas Pipeline	338.5	299.2	0.89

*Only incidents involving and ton-mileage carrying those products carried by pipeline (petroleum products, liquid natural gas, etc.) are counted for road and railway

Sources: Ton-Mileage values are based on Tables 1-50 (for Natural Gas Pipeline) and 1-61 (all others) of the Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics "National Transportation Statistics", available at http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/index.html, accessed April 2013. Incident and release volume data for Road and Railway were extracted from the Office of Hazardous Materials Safety "Incident Reports Database Search" at https://hazmatonline.phmsa.dot.gov/IncidentReportsSearch/, accessed April 2013. HL Pipeline release volumes were extracted from the Pipeline and Hazardous Material Safety Administration "Hazardous Liquid Accident Data - 2002 to 2009" file available at http://phmsa.dot.gov/portal/site/PHMSA/menuitem.ebdc7a8a7e39f2e55cf2031050248a0c/?vgnextoid=fdd2dfa122a1d110VgnVCM1000009ed07898RCRD&vgnextchannel=3430fb649a2dc110VgnVCM1000009ed07898RCRD&vgnextfmt=print, accessed April 2013.

than pipelines, even though more road and rail incidents go unreported.

Table 6 compares incident rates for road, rail, oil and petroleum products pipelines, and natural gas transmission. Road had the highest rate of incidents, with 19.95 per billion ton miles per year. This was followed by rail, with 2.08 per billion ton miles per year. Natural gas transmission came next, with 0.89 per billion ton miles. Hazardous liquid pipelines were the safest, with 0.58 serious incidents per billion ton miles.

Data in Table 7 include all hazmat, not just petroleum products. With respect to pipeline systems, natural gas transmission lines had the lowest average fatality rate for operator personnel and the general public between 2005 and 2009, with a rate of one person killed per year. This was followed by oil and rail, each with an average of 2.4 people per year. The rail figure is skewed by a chlorine incident on January 6, 2005 in Graniteville, South Carolina. The highest fatality rate is road, with an average of 10.2 people a year. This is not because members of the public are killed due to road accidents with oil trucks. Only 1.4 members of the public, on average, were killed annually, but an average of 8.8 operators died per year.

As shown in Table 8, rates of injury requiring hospitalization and of injury in general show a similar pattern. On average, annual injuries for 2005 through 2009 were lowest for hazardous liquid pipeline, at 4 people with injuries requiring hospitalization per year. The rate was higher for rail, at 4.6 of such injuries per year, although for rail this number was heavily biased by the 2005 observation. Road accidents hospitalized 8.8 people per year, and natural gas pipelines hospitalized 45 people each year.

The rates of injury per ton-mile in Table 8 are most pertinent, however. On this measure, hazardous liquid pipelines outperformed rail and road by a wide margin, causing just .0068 injuries requiring hospitalization per billion ton-miles. Rail caused nearly 30 times that many injuries requiring hospitalization on a per-ton-mile basis. Rail was also outperformed by natural gas pipelines on this measure, causing over 1.4 times as many serious injuries per ton-mile. Road was the worst performer on this measure, averaging one quarter serious injuries per billion ton-miles. This is 37 times the hazardous liquid pipeline rate.

Some claim that pipelines carrying Canadian oil sands crude, known as diluted bitumen, have more internal corrosion, and are subject to more incidents.[12] However, PHMSA data show that oil releases from corrosion are no more common in pipelines carrying Canadian diluted bitumen than in other lines.[13] Oil sands crude has been transported in American pipelines for the past decade.

The evidence is clear: transporting oil and natural gas by pipeline is safe. Furthermore, pipeline transportation is safer than transportation by road,

Table 7: Comparison of Hazmat Fatality Statistics, Operator Personnel and General Public for Road, Rail, and Pipeline (2005-2009)

	2005	2006	2007	2008	2009	Total	Average per Year	Fatalities Per Billion Ton-Miles Shipment Per Year
Road	24	6	10	8	3	51	10.2	0.293
Railway	10	0	0	1	1	12	2.4	0.100
Hazardous Onshore Only	2	0	4	2	4	12	2.4	0.004
Gas Transmission Onshore Only	0	3	2	0	0	5	1	0.003

Source: Reproduced from U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety, *Building Safe Communities: Pipeline Risk and its Application to Local Development Decisions*, October, 2010, Table 3, p. 26, http://www.pstrust.org/library/docs/PIPA-PipelineRiskReport-Final-20101021.pdf.

rail, or barge, as measured by incidents, injuries, and fatalities—even though more road and rail incidents go unreported.[14]

Despite their safety, pipelines release more oil per spill than rail—but less than road. As Table 9 shows, typical release volumes on rail, particularly of petroleum products, are relatively low at 3,504 gallons per billion ton-miles. While it outperforms road in terms of product release per ton-mile, pipeline transport of petroleum products still experienced product release of 11,286 gallons per billion ton-miles. This figure does decrease by approximately one third if the high product-recovery rate for pipelines is considered, however. Volume release data are unavailable in the PHMSA incident database for natural gas transmission pipelines.

Rising oil and natural gas production is outpacing the transportation capacity of our inadequate national pipeline infrastructure. The Association of American Railroads reports that between 2008 and 2011 the total share of oil and gas rail shipments grew dramatically, from 2 percent of all carloads to 11 percent.[15] In 2011 alone, rail capacity in the Bakken area—stretching from southern Alberta to the northern U.S. Great Plains—tripled to almost 300,000 barrels per day.[16] Crude oil shipments via rail have continued to expand at an accelerating rate; as of September 2012, U.S. Class I railroads were on pace to deliver 200,000 carloads of crude for the year, compared to just 66,000 in 2011 and 9,500 in 2008.[17]

As America continues to ramp up production of oil and natural gas, our pipeline infrastructure becomes more important. We need better pipelines to get oil from North Dakota to the refineries in the Gulf, and natural gas from the Marcellus Shale in Pennsylvania (and New York, should the Empire State allow production to move forward) and the Utica Shale in Ohio to the rest of the country.

In the next few years, the Obama administration may allow more states to explore for oil offshore. In addition, Congress might vote to give coastal areas a share of oil drilling revenue, providing a powerful incentive for more drilling. Congress could also form a liability risk pool to allow independent drillers to expand into the Gulf of Mexico. In order for these resources to get where they are needed, America needs more pipelines—the safest way to move fuel.

Research assistance for this report was provided by Claire Rogers and Andrew Gray.

APPENDIX

This paper contains four major changes in methodology from the prior version of the paper, published in May 2012.

1. Rail companies are required to report all hazmat releases, but pipeline incidents only require a report if at least 5 gallons of the material are leaked or there is an injury. In the May 2012 version, we reported all hazmat releases. In the revised version, we removed all sub-5-gallon, no-injury road and rail incidents.
2. We note that one January 6, 2005 chlorine incident skews the rail hazmat fatality statistics. Excluding the chlorine accident would reduce the rail hazmat fatalities in the period we considered from 12 to 3.
3. We used only petroleum and natural gas product incidents for Tables 6 and 8.
4. We included a new table (Table 9) showing spillage per ton mile by mode of transportation, also using only petroleum and natural gas products.

Table 8: Injuries Resulting from Petroleum Incidents: Pipelines vs. Road and Railway (2005-09)

		2005	2006	2007	2008	2009	Total	Per Year	Injuries Per Billion Ton-Miles
Road	Hospitalization	9	10	10	6	9	44	8.8	0.2526
	Total	38	37	38	17	41	171	34.2	0.9816
Railway	Hospitalization	20	2	1	0	0	23	4.6	0.1925
	Total	24	2	4	0	1	31	6.2	0.2594
Hazardous Liquid Pipeline	Hospitalization	2	2	10	2	4	20	4.0	0.0068
Natural Gas Pipeline	Hospitalization	45	32	37	53	58	225	45.0	0.1330

Sources: Road and railway injuries were counted in the data extracted for Table 6. Pipeline injuries are reproduced from http://primis.phmsa.dot.gov/comm/reports/safety/SerPSI.html?nocache=5757#_all

Table 9: Comparative Statistics for Petroleum Product Release Rates: Onshore Transmission Pipelines vs. Road and Railway (2005-09)

Mode	Avg. Product Release Per Year (gallons)	Release Per Incident (gallons)	Release Per Billion Ton-Miles (gallons)
Road*	477,558	687	13,707
Railway*	83,745	1,688	3,504
Hazardous Liquid Pipeline	6,592,366	19,412	11,286
Natural Gas Pipeline**	-	-	-

*Only incidents involving and ton-mileage carrying those products carried by pipeline (petroleum products, liquid natural gas, etc.) are counted for road and railway

**No release volume data are available for gas pipeline in the PHMSA incident database

Sources: Ton-Mileage values are based on Tables 1-50 (for Natural Gas Pipeline) and 1-61 (all others) of the Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics "National Transportation Statistics", available at http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/index.html, accessed April 2013. Incident and release volume data for Road and Railway were extracted from the Office of Hazardous Materials Safety "Incident Reports Database Search" at https://hazmatonline.phmsa.dot.gov/IncidentReportsSearch/, accessed April 2013. HL Pipeline release volumes were extracted from the Pipeline and Hazardous Material Safety Administration "Hazardous Liquid Accident Data - 2002 to 2009" file available at http://phmsa.dot.gov/portal/site/PHMSA/menuitem.ebdc7a8a7e39f2e55cf2031050248a0c/?vgnextoid=fdd2dfa122a1d110VgnVCM1000009ed07898RCRD&vgnextchannel=3430fb649a2dc110VgnVCM1000009ed07898RCRD&vgnextfmt=print, accessed April 2013.

ENDNOTES

[1] Reliable data on water-borne spills, which fall under the jurisdiction of the Coast Guard, are not readily available and so will not be included in this Issue Brief

[2] International Energy Statistics, "Petroleum Production," accessed May 7, 2013, http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=5&pid=53&aid=1

[3] "Pipeline Basics," The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety, accessed May 7, 2013, http://primis.phmsa.dot.gov/comm/PipelineBasics.htm?nocache=8264

[4] "Community Toolbox," The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety, accessed April 24, 2012, http://primis.phmsa.dot.gov/comm/Index.htm?nocache=4323

[5] "Reporting Criteria Changes," The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety, accessed April 24, 2012, http://primis.phmsa.dot.gov/comm/reports/safety/docs/IncidentReportingCriteriaHistory1990-2011.pdf

[6] "Petroleum and Other Liquids, Spot Prices," United States Energy Information Agency, accessed May 7, 2013, http://www.eia.gov/dnav/pet/pet_pri_spt_s1_a.htm

[7] "Reporting Criteria Changes 1990-Current," The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety, last updated March 2011, http://primis.phmsa.dot.gov/comm/reports/safety/docs/IncidentReportingCriteriaHistory1990-2011.pdf

[8] U.S. Energy Information Agency, *This Week In Petroleum*, accessed May 20, 2013, http://www.eia.gov/oog/info/twip/twip_crude.html#production

[9] "Pipeline Basics," The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety, accessed April 24, 2012, http://primis.phmsa.dot.gov/comm/PipelineBasics.htm?nocache=8264

[10] National Weather Service, "Weather Fatalities," 2012, http://www.nws.noaa.gov/om/hazstats.shtml

[11] U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety, *Building Safe Communities: Pipeline Risk and its Application to Local Development Decisions*, October, 2010, http://www.pstrust.org/library/docs/PIPA-PipelineRiskReport-Final-20101021.pdf

[12] See, for example, Lara Skinner and Sean Sweeney, "The Impact of Tar Sands Pipeline Spills on Employment and the Economy," Cornell University Global Labor Institute, March, 2012

[13] U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, data from form PHMSA F 7000-1

[14] Committee on Transportation and Infrastructure hearings on "Concerns with Hazardous Materials Safety in the U.S.: Is PHMSA Performing Its Mission?" (written report submitted by Majority Staff to the Members of the Committee), September 9, 2009

[15] "EIA: Rail Delivery of Crude Oil and Petroleum Products Rising," Crude Oil Trader, accessed June 05, 2012, http://crudeoiltrader.blogspot.com/2011/11/eia-rail-delivery-of-crude-oil-and.html

[16] "Buffet's Burlington Northern Among Pipeline Winners," Bloomberg News, accessed June 05, 2012, http://www.bloomberg.com/news/2012-01-23/buffett-s-burlington-northern-among-winners-in-obama-rejection-of-pipeline.html

[17] Association of American Railroads, "Moving Crude Petroleum by Rail," December 2012, https://www.aar.org/keyissues/Documents/Background-Papers/Moving%20Crude%20Petroleum%20by%20Rail%202012-12-10.pdf

Levi, Andrew (COMM)

From: Linda Burns <burns.linda3@gmail.com>
Sent: Sunday, July 09, 2017 2:08 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Project

To: pipeline.Comments@state.mn.us

Re: Public Comment: Line 3 Project (CN-14-916and PPL-15-137)

I understand that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline, specifically whether there is a *state* need (not a national need). U.S. fuel demand was down 5% in 2015 compared to its 2007 peak, and in Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars, hybrid cars, and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply oil. Also, the oil that would be transported through the pipeline doesn't benefit Minnesota; it passes through to refineries elsewhere in the Midwest, or, potentially, to overseas markets.

I believe that transporting oil by truck or train would be less of a risk to the environment in the event of a spill. The proposed line 3 replacement threatens Minnesota's natural resources as it crosses the Mississippi headwaters several chains of lakes which are popular tourist destinations and recreation sites.

Please include these considerations in the final EIS.

Thank you,

Linda Burns
6015 11th Ave S
Minneapolis, MN 55417

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jaye Timothy Burnside	218-404-9551	jaye.burnside@yahoo.com
ADDRESS		
66 Vermillion Drive		
CITY, STATE, ZIP		
Virginia, MN, 55792		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: may barton <whitepineneedlez@yahoo.com>
Sent: Monday, July 10, 2017 4:41 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

To: Jamie MacAlister, Pipeline.Comments@state.mn.us
Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.
I am from:Michigan
The Line 3 Pipeline concerns me because: The State of Minnesota and Enbridge MUST obtain Free, Prior, and Informed Consent of the **Tribes of the 1855 Treaty Territory !!!!**
- The disproportionate impacts Line 3 would have indigenous communities is the definition of environmental racism
- The profound social and ecological devastation caused by the Alberta Tar Sands is absolutely unacceptable and Minnesota must refuse to be complicit
- Enbridge must be required to clean up and remove their old pipelines, not abandon them for future generations to deal with
I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.
Sincerely,
Marcia Burton
MB

Dear Mr. Jamie Macalister
Environmental Review Manager
MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

I want to voice my strong objections to Enbridge's appeal to create a new Line 3. I am gratified to note that most of those present at the Saint Paul June 13th meeting spoke eloquently in favor of defending the environment against the degradation this pipeline poses to our land and water. I share their detailed concerns. What follows, in bullet fashion are my major concerns and objections:

- *Stewardship and Responsibility*: Why aren't we holding Enbridge responsible for funding and removing all of the original pipeline before granting them permission to lay an alternate line? Also, if Enbridge is issued a route permit, why isn't Enbridge required to set aside funds in escrow to cover potential mishaps and disasters while its pipeline exists on our lands? Individual landowners should not be expected to pay for the clean-up of potential Superfund sites left behind by companies like Enbridge, which may go bankrupt or dissolve or otherwise change – and so escape accountability for the problems such projects will create.

- *Guidelines and Definitions:* At the state level, we should establish abandonment guidelines and definitions for intrastate crude oil pipelines. Those guidelines should make clear what Enbridge's responsibility is for the pipelines it already has in place and for any future pipelines it creates in Minnesota. This should be done before any further construction occurs.

- *Risks of Profound Environmental Damage*: Pipeline 3 and the alternate route both pass through vulnerable wetlands, so pose a grave risk to these environments. Tar sands oil is very dirty and heavy, so a ruptured or leaky pipe could devastate these waters, including the Saint Louis River watershed and Lake Superior. Enbridge's history of good stewardship is not encouraging. Need I site the 1991 spill that dumped 1.7 million gallons of oil near Grand Rapids? Along with this are numerous other leaks and spills throughout that pipeline's history. Tar sands oil mining is horribly destructive and unnecessarily serves a dying industry at the expense of the wider population and the land itself. We should not support such a ruinous enterprise. We need to invest in cleaner energies that will not contribute to climate change as significantly as this new pipeline would.

My closing statement is that we should refuse Enbridge's request for a pipeline permit. The risks to the common good of the state are too high, and all to profit a mining industry with a dismal record of operating responsibly and transparently.

Sincerely yours,

John Buschette
1150 Sextant Ave
Roseville, MN 55113

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Levi, Andrew (COMM)

From: harrionslim5 <harrisonslim5@gmail.com>
Sent: Monday, July 10, 2017 10:45 PM
To: MN_COMM_Pipeline Comments
Subject: No Pipeline

Please do not put a larger oil pipeline through Minnesota land. please remove and clean up the existing pipeline. I do not agree with tar-sand oil process. I do not think there has been enough outreach to the public or native people about this new pipeline. Do want is right for the land, it is Minnesota, don't build the pipeline.

Sincerely,

Sam Busko

Levi, Andrew (COMM)

From: harrionslim5 <harrisonslim5@gmail.com>
Sent: Monday, July 10, 2017 10:48 PM
To: MN_COMM_Pipeline Comments
Subject: No Pipeline - CN-14-916 and PPL-15-137

Please do not put a larger oil pipeline through Minnesota land. please remove and clean up the existing pipeline. I do not agree with tar-sand oil process. I do not think there has been enough outreach to the public or native people about this new pipeline. Do want is right for the land, it is Minnesota, don't build the pipeline.

Sincerely,

Sam Busko

CN-14-916 and PPL-15-137

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Josh Busse	763-951-2572	joshua.busse@unitedpiping.com

ADDRESS
515 Hamline St.

CITY, STATE, ZIP
Grand Forks, ND

COMMENTS
Oil is crucial to our way of life whether you like it or not.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Bruce Busta <bruce.busta@gmail.com>
Sent: Monday, July 03, 2017 12:06 PM
To: MN_COMM_Pipeline Comments
Subject: No to Line 3

Dear Mr. MacAlister,

I am writing to express my objection to the Line 3 pipeline expansion.

Why?

1) It is time to move away from oil and fossil fuels. In Chapter 4 of the DEIS, rail, truck and other pipeline routes are examined. But the big picture of moving to alternative energy and the jobs IN Minnesota that would be created over a multi-year period are not considered. Yes, this would be a big step and challenging. But, we can do it and as a non-oil producing state we will benefit more from investment in alternative energy than old-school oil.

2) My brother-in-law is a pipeline inspector, even he agrees that every pipeline at some point will leak. So, let's not go there. Our water resources are too valuable to be polluted. Forget the plan for Line 3 and move to non-fossil fuels.

Sincerely,

Bruce Busta
St. Cloud, Minnesota
bruce.busta@gmail.com

Levi, Andrew (COMM)

From: davidb@uslink.net
Sent: Thursday, July 06, 2017 8:22 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

The executive summary of the DEIS for Line 3 states "the CN (Certificate of Need) is a decision by the Commission about whether a proposed project is in the State's interest. The Commission must consider each of the criteria in Minnesota Statutes § 216B.243 and Minnesota Administrative Rules Part 7853.0130 in determining need. Under the regulatory criteria, the Commission first considers the underlying economic need for the proposed pipeline."

The DEIS fails to adequately address a number of economic issues underlying need for the proposed pipeline and whether or not the pipeline is in the State's best interest.

-- there is no analysis of how much, if any, of the 760,000 barrels of oil proposed to travel through a new Line 3 daily actually would come back to Minnesota in the form of refined products to benefit the citizens of this state.

-- there is no analysis of the inevitable drop in property values (and in state tax revenues) which would occur to properties adjacent to or in the area of a Line 3 pipeline.

-- there is no analysis of the costs incurred to the State in the event of a spill of any size, but especially a catastrohic spill such as occurred in the Kalazmazoo river.

-- there is no discussion of the effect on long-term (or even short-term) demand for tar-sands oil and whether a new pipeline traveling through MN would remain viable in view of falling demand for petroleum, especially tar-sands oil which is more expensive to produce and which has led major producers to write off 'assets' in Canada.

__ 'Exxon's Big Oil Sands Write-Off' http://fortune.com/2017/02/23/exxon-mobil-oil-sands-sec/

__ 'As the Oil-Sands Industry Declines, Its Biggest Champion Bolts' https://www.wsj.com/articles/as-the-oil-sands-industry-
declines-its-biggest-champion-bolts-1482143402

-- there is no discussion of the long-term cost to MN of continued and expanded use of 'tar sands oil' which produces 21% more carbon emissions than normal oil, in terms of global warming.

__ 'How Much Will Tar Sands Oil Add to Global Warming?' https://www.scientificamerican.com/article/tar-sands-and-keystone-xl-pipeline-impact-on-global-warming/

__ 'Carbon Footprint of Canada's Oil Sands Is Larger Than Thought' https://insideclimatenews.org/news/04042017/tar-sands-greenhouse-gas-emissions-climate-change-keystone-xl-pipeline-donald-trump-enbridge

Respectfully submitted,

Dave Butcher
3998 67th St SW
Pequot lakes, MN 56472

email: davidb@uslink.net
tel: 218-821-1774

Levi, Andrew (COMM)

From: butcher70@frontiernet.net
Sent: Friday, July 07, 2017 1:19 PM
To: MN_COMM_Pipeline Comments
Subject: Comments on Enbridge Line 3 Replacement
Attachments: Enbridge Line 3 Comments Submitted Version .doc

To whom it may concern, please see my attached comments regarding the Enbridge Line 3 Replacement. Thank you.

Enbridge Line 3 Pipeline Replacement Comments

Ref docket numbers: CN-14-916
PPL-15-137

July 7, 2017

My name is Jim Butcher. I am a resident of Minnesota and live approximately 70 miles SW of Duluth in Aitkin County. I attended the public meeting on the Enbridge Line 3 Pipeline at East Lake Community Center, McGregor, on June 12, 2017, and made some public comments, and I would now like to add to those oral comments with these written comments.

Is This New Pipeline Needed?

To me this is the key question to be answered, prior to any discussion of how a new pipeline may or may not have any positive or negative economic or environmental impacts for Minnesota.

In my opinion the answer to this question is a resounding **NO.** The technology surrounding personal transportation is changing rapidly. The sales of hybrid, plug in hybrid and electric vehicles is rapidly expanding. And, as the range of electric vehicles increases, as it will, the time will come, more quickly than many of us expect, when all consumer vehicles are at least hybrid, and as the all-electric vehicle range continues to increase, to say around 350 miles on a charge, the majority of consumer vehicles will be electric only. No oil changes, minimal maintenance, lower emissions, what isn't there to like?

This change in prime mover from an internal combustion engine to an electric motor will dramatically reduce the need for liquid fossil fuels. This reduction in the future need for hydrocarbon fuels is the major reason the **New Line 3 Should Not be Built.**

And, on top of the reducing need for hydrocarbon fuels, the world, (and in particular Minnesota), certainly should not encourage any increase in the production of the environmentally disastrous Alberta Oil Sands, the very oil intended to flow through the New Line 3 Pipeline. With Minnesota's laudable Renewable Energy Standard, it would appear to be truly **Hypocritical for Minnesota to Permit the Building of a New Line 3 Pipeline to Transport "Dirty" Tar Sands Oil Across Minnesota from their Production in Canada to their Delivery in Superior Wisconsin.**

The production of Tar Sands produces about 20% more CO2 than the production of conventional oil, along with the release of aerosols and toxic chemicals such as anthracene and naphthalene. These impact both climate and human and animal health. **Why would Minnesota become complicit in permitting Canadian Corporate Profits to be made at the expense of the health of both the climate and human kind?** What's in it for Minnesota?

The short-term increase in employment during the potential construction of a New Line 3 will soon be forgotten, and instead will be replaced by outrage at the environmental damage and the cost of fixing leaks from the new pipeline. Murphy's Law clearly states that what can go wrong will go wrong, eventually. Despite the assurances from Enbridge,

there will be leaks. Ask Michigan residents how they feel about the leak from the Enbridge pipeline into the Kalamazoo River. Enbridge Line 5 transfers oil from Superior Wisconsin across Michigan into Ontario Canada. There have been several leaks along this pipeline, and there is much concern about future leaks from this pipeline. Should Minnesota be aiding in potentially adding to this risk? I don't think so.

And finally, if the Keystone XL pipeline does get approval to pass through Nebraska and becomes a done deal, **Minnesota certainly does not need to add further insult to injury and permit even more of this environmentally damaging Tar Sands to flow south of the Canadian border.**

If the current Line 3 is allowed to continue operating at a reduced flow rate, so be it. As mentioned earlier, the demand for liquid fossil fuels will abate, as will the need for Line 3. One has only to note the recent announcements made by Volvo and the French Government, and already taken by Norway, to see that other areas of the world are prepared to do the right thing, and mandate the use of hybrid or all electric vehicles.

As the saying, maybe attributed to Churchill, states, "One can rely on America to do the right thing, but only after it has tried everything else". This should not be said about Minnesota. The path the world, (and Minnesota), needs to be on is clear.

Minnesota has in the past shown it's willingness to demonstrate leadership in the area of Renewable Energy, and the State now has another excellent opportunity to provide clear leadership and do the right thing in the first place by <u>Not Approving a Certificate of Need for a Line 3 Replacement</u>.

The Line 3 Replacement isn't needed, plain and simple.

Thank you.

Levi, Andrew (COMM)

From: davidb@uslink.net
Sent: Monday, July 10, 2017 2:21 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Regarding the Draft Environmental Impact Statement for Line 3, there is inadequate discussion and analysis of cathodic protected pipelines installed along high voltage transmission lines. Such lines have been presenting corrosion problems.

https://www.researchgate.net/publication/254547252_Effect_of_alternating_current_by_high_power_lines_voltage_and_electric_transmission_systems_in_pipelines_corrosion

Respectfully submitted,

Dave Butcher
3998 67th St SW
Pequot lakes, MN 56472
email: davidb@uslink.net
tel: 218-821-1774

Levi, Andrew (COMM)

From: James Butler <jarjunbutler@gmail.com>
Sent: Saturday, July 08, 2017 1:33 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Project Draft EIS Public Comments

To whom it may concern:

The following are my public comments for the Enbridge Line 3 Project Draft EIS:

"A couple of weeks ago, I attended a public meeting for Enbridge's Line 3 Project Environmental Impact Statement (EIS) in Bemidji, MN. The meeting was well attended by both proponents and critics of the project. Both sides expressed their passionate and unrelenting views. However, at the end of the day, I think there was one notion everyone agreed on: we support safe energy transportation.

From the pro-pipeline camp, many donned bright neon-green shirts with that exact phrase, "We Support Safe Energy Transportation", provided by a friendly corporation by the name of . . . ah the name escapes me. Maybe M-Ridge? Anyway, over the course of the night, many who spoke in favor of a new pipeline with the preferred replacement route kept uttering the phrase "pipelines are the safest way to transport tar sands oil" or something to that effect.

Imagine the risk and uncertainty of putting all of that oil on an armada of 4,000 trucks or thousands of rail cars! One derailment or traffic accident could decimate an ecosystem! How can you care about the environment and oppose a safe, sealed, and sturdy pipeline?!

So yes, they are right. It is the safest way.

The problem is that we are assuming we *have* to transport the oil or face dire consequences. But do we?

On July 20, 2016, the Environmental Protection Agency and Department of Justice reached a settlement requiring Enbridge to replace Original US Line 3, update safety features on existing lines, and pay $62 million for violations of the Clean Water Act from pipeline spills in Marshall, MI and Romeoville, IL.

The settlement was later amended on January 19, 2017 to more specifically state the replacement of the pipeline could only take place after Enbridge obtained all necessary permits and authorizations. Thus, according to the Minnesota Environmental Policy Act, the Minnesota Public Utilities Commission must decide whether to issue a Certificate of Need and whether to issue a route permit, with or without conditions.

I urge the Minnesota Public Utilities Commission to deny Enbridge a Certificate of Need and route permit to construct any Line 3 replacement and urge Enbridge to begin remediation of old Line 3.

Oil does not need to continue to flow from Canada to Lake Superior across some of Minnesota's most valuable ecosystems. The new Line 3 would be able to deliver twice the volume of the old Line 3, which makes little sense. The demand for oil has been shrinking, and will continue to do so. Just last week, a report from Fox Business stated that TransCanada Corp. was having trouble finding customers for the oil in the Keystone XL pipeline.

Nevertheless, the opposing argument has remained the same. We *need* this oil to achieve energy independence and create American jobs. But a new pipeline would likely have the same issues as Keystone XL and only create a couple thousand temporary jobs. Oil fields in North Dakota have been scaling back operations because of a lack of demand in the last few years. If the need for oil was really present, why aren't they operating at full capacity?

Plus, how much would a replacement pipeline help the American economy? At the end of the day, a Canadian corporation would be putting Minnesota's environment at risk in order to export its oil from our soil. That does not sound like AMERICA FIRST to me.

The other consequences of a replacement Line 3 cannot be overstated. Nothing about oil pipelines, no matter how well built, can be considered "safe energy transportation". Enbridge is one of many corporations which has experiences catastrophic failures in their systems. Just ask the people of Marshall, MI or Romeoville, IL. All pipelines come with the threat of such a failure.

A replacement Line 3 would specifically threaten the water resources of Native American peoples. Over this summer, I have spent every day working to improve the water and wastewater facilities of Native peoples as an employee of the Indian Health Service. I've seen firsthand how valuable water is to them.

To threaten Native peoples water resources is to threaten their way of life. Not only do they depend on clean groundwater to use and drink, but they also depend on wild rice lakes and fishing to bring income into their communities. Depriving them of their clean water would be depriving them of their way of life, all for the sake of a foreign corporation's profits.

While the exact circumstances may have changed, to me it seems the story which began in 1492 has not.

Even more broadly, the continued dependence on fossil fuels will only further magnify the threat climate change poses to our world. If there is any hope for the planet to stay under 2 degrees of warming and thereby avoid climate change's drastic effects, our obsession with fossil fuels needs to end quickly. Our society must be carbon neutral by 2100. I think some pro-pipeline supporters understand that climate change is a real problem, but do not think this is the time and place to address it.

It is.

Addressing climate change will require us to mobilize against the problem like we have in many of the wars we have fought. There won't be a Lexington and Concord, or a Lusitania, or a Pearl Harbor, or a 9/11 for climate change. If droughts in California, snowstorms in South Dakota, or hurricanes in New Jersey do not convince you, I do not know what else to say. By the time a "Day After Tomorrow" event occurs, it will be far too late.

Action must be taken now, and by continuing to build more fossil fuel infrastructure, we are only giving climate change the upper hand and hurting the most vulnerable people on earth. At some point, oil pipelines will have to stop being built. That time is now."

Thank you.

Respectfully,

James Butler

jarjunbutler@gmail.com

Levi, Andrew (COMM)

From: Mark Butzer <butz0027@umn.edu>
Sent: Monday, July 10, 2017 1:18 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge line 3

CN-14-916

PPL-15-137

My name is Mark Butzer,

I'm an engineering technician in Plymouth Minnesota, a homeowner in south Minneapolis, and a student at the University of Minnesota. I am concerned that the potential for long term damage to Minnesota's environment hasn't been effectively assessed, and that the 1837 and 1855 treaty rights of the Ojibwe tribes of northern Minnesota have been ignored. I oppose the proposed pipeline.

Considering the lack of any contaminated sites management plan and no guarantee that Enbridge will be financially capable of assuming the costs of the removal of the pipeline and restoring the affected lands after its service life has ended in 50 or 60 or even 20 years, shouldn't Enbridge be required to put a monetary guarantee in the hands of the state large enough to fund any potential future damage and pipeline removal so the people of Minnesota will not be forced to cover the costs?

Tar sands oil is expensive and dirty. The future costs of increasing its use by adding Line 3 is hundreds of billions of dollars. I wouldn't expect companies pursuing its extraction to survive long in a world that is beginning an inevitable shift away from fossil fuels, nor would I expect legislators who accept payment form said companies or vote to approve projects that present such serious danger to the environment to remain in office.

Please do not grant a Certificate of Need

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Mary Kay Byers	218-343-2715	marykaybyers@yahoo.com
ADDRESS: 432 N 84th Ave W		
CITY, STATE, ZIP: Duluth, MN 55807		

COMMENTS

I support the Line 3 Replacement project!!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Camp Foley - Marie Schmid <Marie@campfoley.com>
Sent: Monday, July 10, 2017 9:04 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (Cn-14-916 and PPL-15-137)
Attachments: Public Comment on Line 3 doc 2.docx

I kindly ask that you read my attached letter.

Thank you,

Marie Schmid, CEO
Camp Foley
Grow Grit. Investigate Independence.
marie@campfoley.com
www.CampFoley.com
218-543-6161

Public Comment: Line 3 Project (Cn-14-916 and PPL-15-137)

Dear Environmental Review Manager,

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. I have heard that Enbridge redacted those numbers from the public version of the DEIS. Without them, there is no reliable way an independent party to verify their results.

I believe that in order for Minnesota citizens and agencies to make an educated decision about Line 3, we must have that information, and I would like to know why Enbridge won't release it. Please insist that Enbridge provide their data on oil releases and spills in Minnesota.

If Enbridge objects due to security reasons, then I would like to know why they have failed to cover the exposed pipes in the Tamarack River in northwest Minnesota, and why they allow people to joyride over exposed pipes south of Clearwater. This is surely a security issue as well. For Enbridge to pick and choose what issues warrant "security," is unacceptable.

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. I have heard that Enbridge redacted those numbers from the public version of the DEIS. Without them, there is no reliable way an independent party to verify their results.

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There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete.

I would like to know, in the final EIS for Line 3, what Enbridge's plans are if their preferred route is approved. Will it be just the one pipeline, or will they eventually move all six pipelines to the new corridor? This would have a huge effect on how people feel about Enbridge's preferred pipeline route.

I have heard that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state* need (not a national need). Even if we

used statistics about the national need, U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply needed oil. (http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf)

I would like to see this information mentioned in the final EIS.

I understand that an engineering firm called Cardno, with ties to Enbridge, was instrumental in preparing part of the draft Environmental Impact Statement for Line 3. In light of this fact, in the final EIS I would like to see an independent analysis of the information they provided. Minnesota requires verified facts for such a large project.

Thank you,
Marie Schmid, CEO
Camp Foley
Pine River, MN 56474

Levi, Andrew (COMM)

From: Bérard-Brown, Nancy <Nancy.BerardBrown@capp.ca>
Sent: Monday, July 10, 2017 11:23 AM
To: MN_COMM_Pipeline Comments
Cc: Bérard-Brown, Nancy
Subject: MPUC Dockets Nos. PL-9/CN and PPL-15-137
Attachments: CAPP Letter Line 3 DEIS to Minnesota 2017 July 10.pdf

Please find attached, the comments of the Canadian Association of Petroleum Producers on the above matter.

Regards,

Nancy Bérard-Brown | Manager, Oil Markets & Pipelines

CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS
Canada's Oil and Natural Gas Producers

D: 403.267-1114 | C: 403.829-1593| Email: nancy.berardbrown@capp.ca | Website: www.capp.ca

CANADA'S OIL & NATURAL GAS PRODUCERS

July 10, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198
Pipeline.Comments@state.mn.us

Re: In the Matter of the Applications of Enbridge Energy, Limited Partnership for a Certificate of Need and Pipeline Route Permit for the Line 3 Replacement – Phase 3 Project in Minnesota from the North Dakota Border to the Wisconsin Border
MPUC Docket Nos. PL-9/CN-14-916 and PPL-15-137;

OAH Docket Nos. 65-2500-32764 and 65-2500-33377

Dear Ms. MacAlister:

The Canadian Association of Petroleum Producers (CAPP) represents companies, large and small, that explore for, develop and produce crude oil and natural gas throughout Canada. CAPP's member companies produce about 80 per cent of Canada's crude oil and natural gas.

CAPP respectfully submits the following comments regarding the draft environmental impact statement (DEIS) prepared by the Department of Commerce (Department) for Enbridge Energy, Limited Partnership's (Enbridge) proposed Line 3 Replacement Project (Project).

Background

The Enbridge mainline, of which Line 3 is a major backbone component, has served as the principal route for exports of Canadian crude oil to U.S. markets for decades. The geographic advantage enjoyed by U.S. Midwest refineries continues to make this a premier route for Canadian exports from Western Canada.

The most recent CAPP crude oil production outlook predicts continued growth over the next 15 years. The Midwest is and will remain a very important market for Canadian producers. In 2016, imports of crude oil from Western Canada were 2.2 million barrels per day which accounted for 98% of all imports and about 60% of refineries demand in the region. Canada has provided a reliable source of crude oil to Minnesota refineries. The Project would return the Line 3 to its original capacity.

2100, 350 – 7 Avenue S.W.
Calgary, Alberta
Canada T2P 3N9
Tel 403-267-1100
Fax 403-261-4622

1000, 275 Slater Street
Ottawa, Ontario
Canada K1P 5H9
Tel 613-288-2126
Fax 613- 236-4280

1004, 235 Water Street
St. John's, Newfoundland and Labrador
Canada A1C 1B6
Tel 709-724-4200
Fax 709-724-4225

360B Harbour Road
Victoria, British Columbia
Canada V9A 3S1
Tel 778-265-3819
Fax 403-261-4622

www.capp.ca • communication@capp.ca

Need for the Line 3 Replacement Project

CAPP and its members support the safe and reliable transportation of crude oil to markets. CAPP is an active participant in the Enbridge Mainline Representative Shippers Group and as such was very involved in the negotiations for the Project. A key consideration during these negotiations was the significant number of integrity digs which would be required over the next several years absent the Project. When all factors were considered; including economic, environmental and land owners considerations, shippers agreed that a pipeline replacement was the best alternative. The proposed design and mixed service of the Line 3 pipeline replacement project will bring additional operational flexibility and more efficient use of the Enbridge Mainline System.

The "Alternatives" Identified in the DEIS Would Not Meet the Project's Need

The DEIS identifies and analyzes several "alternatives" to the Project as proposed by Enbridge, including an entirely different route (SA-04) and "no action" (including rail and truck transportation). These are not actual alternatives to the Project because they fail to meet the needs of shippers.

Of note, the DEIS indicates that most construction impacts will be temporary/minor or negligible for high quality resources along the preferred route, or any of the other route alternatives – there are few differences in the routes according to the DEIS. It also revealed there are no major differences in the routes that were analyzed, and the Enbridge preferred route seems easier to access in the event of an emergency.

Enbridge has developed a route that follows existing utility corridors, which as we understand it, is one of the criteria for siting new energy infrastructure by minimizing the environmental footprint. The large majority of the Preferred Route is co-located with existing Enbridge pipelines or existing third-party utilities: the Preferred Route west of Clearbrook is almost completely co-located with Enbridge's existing Line 67; approximately 75% of the Preferred Route east of Clearbrook is co-located with existing Enbridge pipelines or existing third-party pipelines or utilities.

The SA-04 is not a reasonable alternative for the Project because it is not a commercially feasible alternative. It is not what was contemplated by shippers nor agreed to in the Issue Resolution Sheet under the auspice of the Competitive Tolls Settlement. This alternative makes inefficient use of the existing pipeline system.

CAPP appreciates that the DEIS recognizes that, in this case, the no-action "alternative" could have substantial and negative impacts. There has been chronic apportionment on the Enbridge Mainline for a few years. Apportionment refers to conditions under which requests for transportation services exceed the capacity of the pipeline to serve that demand. CAPP notes that no-action would not relieve apportionment. Pipelines are the preferred mode – both commercially and environmentally - of transporting large volumes of crude oil for long distance

over land given the inherent economies of scale. If there isn't sufficient pipeline capacity, it will lead to increased use of rail to transport crude oil to market.

Enbridge has worked hard to address specific concerns raised by landowners along the Preferred Route which resulted in more than 95% of the private landowners having signed voluntary easements. Enbridge has modified the Preferred Route based on public comments and feedback from landowners. These efforts to minimize impacts and address concerns raised should be better reflected in the FEIS.

Conclusion

CAPP notes that the same factual context that has necessitated the replacement of Line 3 – the steady utilization of the facility over the past 60 years - has solidified this Project as a commercially well-established incumbent, with a track record that furnishes reliable and safe transportation of crude oil over the long-term.

CAPP appreciates the opportunity to provide comment on the DEIS. Given that the DEIS does not determine need, we look forward to further record development analyzing need and expect it to show that the proposed project is essential to ensure continued service required by refiners in Minnesota and neighboring states.

Yours truly,

Nancy Bérard-Brown
Manager, Oil Markets & Transportation

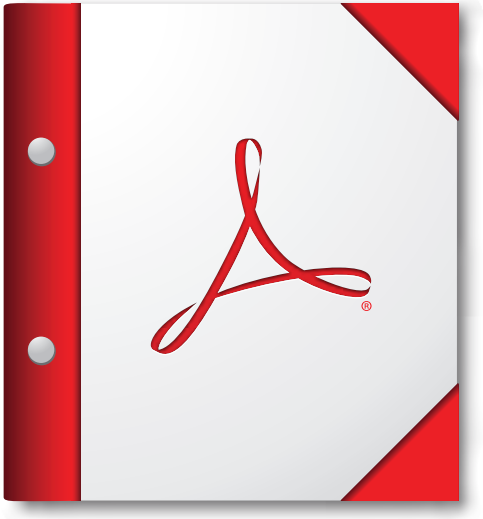

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Levi, Andrew (COMM)

From: Debbie Carlberg <debcarlberg1@gmail.com>
Sent: Wednesday, July 05, 2017 7:21 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I am a Minnesotan and want to see the environment protected like most others.
I believe replacing aging infrastructure like pipelines is imperative to protecting the environment.
The MPCA has recently released the Mississippi River Watershed report that shows the cleanest waters in the state are in northern Minnesota. Energy infrastructure and clean waters can co-exist. It is preferable for me to locate pipelines in more rural areas, rather than to site them in the middle of cities and towns.
Enbridge has found a route that follows existing utility corridors.

Sincerely,

Debbie Carlberg
36506 320th St
Aitkin, MN 56431
debcarlberg1@gmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Keith L. M. Carlson	218-879-1323	
ADDRESS		
184 Olson Rd		
CITY, STATE, ZIP		
Esko, Mn 55720		

COMMENTS

hefs replace Line 3 as soon as possible!!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

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Docket numbers: CN-14-916, PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Troy R Carlson	218-759-9843	
ADDRESS		
4014 Sunnyside Rd SE		
CITY, STATE, ZIP		
Bemidji Mn 56601		

COMMENTS Applicant preferred Route makes the most sens to me, as for removing the old line & putting the new repaclement line in its place seems like alot of extra work & more of a possiblity of more hazzards working over & around the other existing lines. Enbridge has done a good job Cleaning up if something happens

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Daniel Carlson	999 9696	Dacs carlson@gmail.com

ADDRESS
48069 Co RD 36

CITY, STATE, ZIP
Deer River MN, 56636

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Nicki Carlson <carlson4@paulbunyan.net>
Sent: Monday, July 10, 2017 7:18 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 replacement

Dear Ms. MacAlister,

Replace line 3!
Pipelines are the safest way to transport oil.

Sincerely,

NC
4014 Sunnyside Rd SE
Bemidji, MN 56601
carlson4@paulbunyan.net

Levi, Andrew (COMM)

From: Rye Carlson <ryetracker@gmail.com>
Sent: Monday, July 10, 2017 6:32 AM
To: MN_COMM_Pipeline Comments
Subject: Pipelines are Dangerous . CN-14-916 and PPL-15-137

Hello,
My name is Rye Carlson, and I own and operate a small farm in Arthur township in Kanabec county. I am incredibly concerned about the proposed pipeline route near us, or any through our state with its many treasured waterways and natural features. We rely on healthy water and soil. In fact, my work aims to improve both on my property through careful management of plants and animals. Oil companies have demonstrated they have no such concern for the land their pipelines travel. Spills are incredibly common. It has been shown that small leaks are a near constant with pipelines, which damage the land, water, and people nearby. Large spills, of course, can devestate a whole area like the Kalamazoo spill. I would lose my livelihood and life's work. We have enough oil production. Minnesota is on it's way to becoming a much more sustainable state with the renewable energy mandate. Let's invest in that, not old, dirty energy sources. I hope you consider us folk that rely on the land in your process.

Sincerely,
Rye Carlson
Owner and Operator at Fresh Starts Farm

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Jamie Carriere

Street Address: 14588 130th ST. NE

City: Thief River Falls State: MN. Zip Code: 56701

Phone or Email: Jame.carriere@enbridge.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

On the (Accidental Crude oil Release board), They should show how much volume of product is moved each day and it should also show how much oil is recovered during the clean up process of a spill The environmental impact is very minimal after oil is recovered.

I am totally in favor of pipelines!

All of those meetings always talk about about Fuel and energy but one thing the public doesn't Realize is that petroleum is used in making many different products, such as (plastics, vinyls paint, glue + etc.) This is just a (small list of Thousands of products. So if we want To continue using products like this, we will have to keep Transporting oil The safest way possible and that is by PIPELINE!

If including additional pages please number them and tell us how many you are providing:_____ pages

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Miranda Carrigan	218-259-4370	vikingsmc2018@gmail.com

ADDRESS
58885 Co. Rd. 145

CITY, STATE, ZIP
Northome, Mn, 56661

COMMENTS

It will help get more jobs. It will also help gasoline prices.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Alex Carroll <queencasca@gmail.com>
Sent: Saturday, June 24, 2017 11:41 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Concerns

Hello,

I am deeply concerned about the proposed Enbridge Line 3 Pipeline, docket numbers CN-14-916 and PPL-15-137. The pipeline would cross numerous lakes, tribal lands, wild rice patches, and wetlands. The proposed bill would allow paths to be cut through wetlands even though wetlands are extremely important to preserve since they filter toxins out of the groundwater and provide essential habitat for birds and insects.

Since beautiful lakes are one of Minnesota's greatest assets, I do not want them to be harmed. Unfortunately, tar sand oil is nearly impossible to clean out of the water table once it has been spilled, so the pipeline poses a dangerous risk to the health of Minnesota's residents as well as its ecosystems.

Please do not implement the pipeline since it destroys habitats and harms Minnesotans.

Thank you.

-Alex Carroll

Sent from my iPad

From: Bill Casper
To: MN_COMM_Pipeline Comments
Subject: CN-14-916/ PPL-15-137 (Enbridge L3 Replacement)
Date: Monday, June 12, 2017 3:01:40 PM

To Whom It May Concern,

My name is Bill Casper, I am one of the owner's of Casper Construction Inc. My company has been doing Integrity Maintenance work for Enbridge since 2002. In that time we have done the majority of our maintenance work on L3. We have seen first hand the condition of L3 and know that it is in need of replacement. It seems as each year passes the amount of work on L3 increases. To me that is a sign that L3's condition is getting worse and worse every year. Even with all of the Integrity work that has and is getting done on L3, it is only a matter of time before a leak could occur. That is a situation that nobody wants to see happen again.

I have seen first hand the emphasis that Enbridge puts towards protecting the environment and what it expects from its contractors while working for them to protect the environment. I have the utmost confidence that Enbridge will strictly adhere to their Environmental Protection Plan for the L3 Replacement Project and they will effectively minimize construction related impacts through out the project.

Enbridge has been a great company to work for and they are always willing to do whats best for the public and the environment in which they are located.

Thank you.

--

Bill Casper / Vice President / Project Manager
(218) 244-6533 / billcasper@caspercon.com

Casper Construction Inc. Office: (218) 326-9637 / Fax: (218) 326-9638
212 SE 10TH ST / Grand Rapids, MN 55744
http://caspercon.com

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Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; RPL-15-137

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0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Howard Castlie	218-409-3666	
ADDRESS		
85 94 Hwy 8		
CITY, STATE, ZIP		
Alborn Mn 55807		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: John Catron <johnlaceycatron@gmail.com>
Sent: Monday, July 10, 2017 11:49 AM
To: MN_COMM_Pipeline Comments
Subject: Clean up the mess

This historically malicious company should NOT be allowed to leave their existing leaking pipeline in the ground and build a massive new pipeline on Minnesota land. I stand with ALL of the concerned Native tribes who oppose this new pipeline. It's a bad deal for our people and the environment.

Thank you,

John Catron
Hennepin County

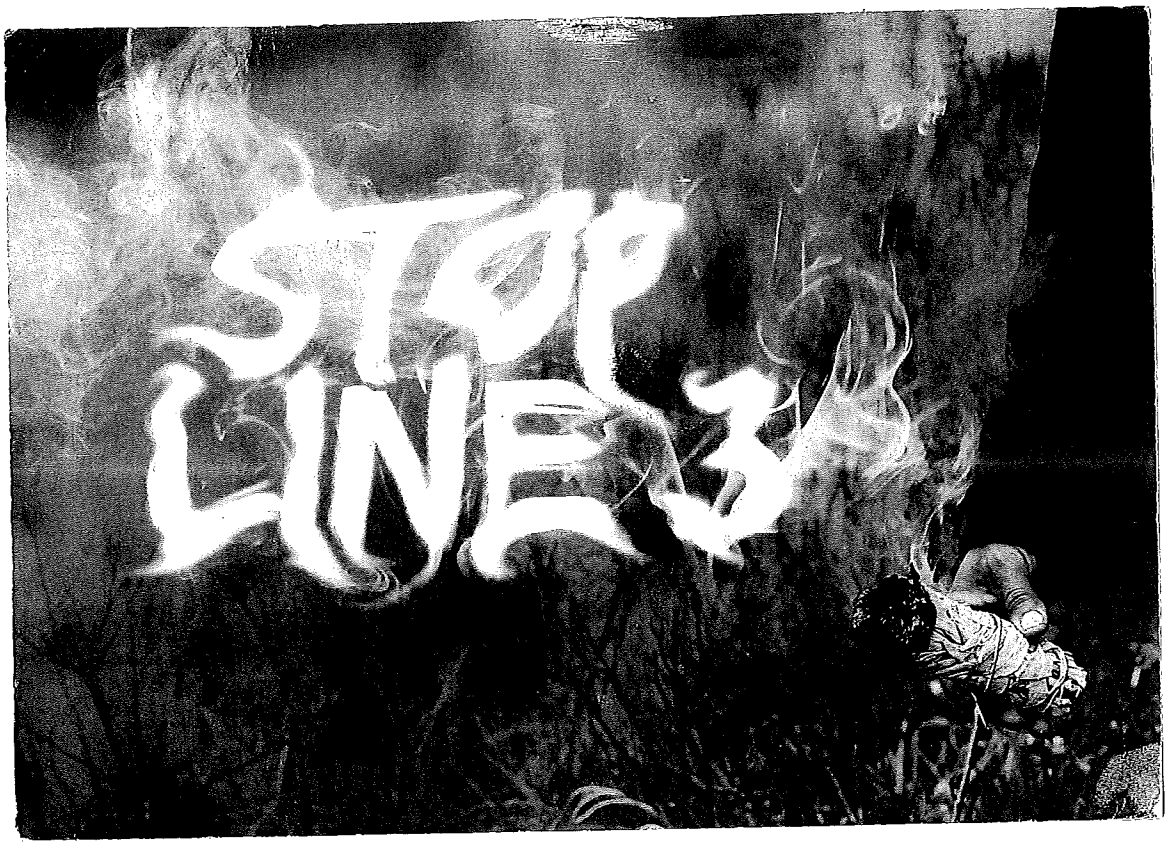

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

ST PAUL MN 550
2017 PM 1 L

USA FOREVER
2016

Dear Jamie Macalister,

Please stop the Line 3 pipeline by Enbridge. This is not the right direction for Minnesota. I am concerned about the environmental implications and the impact on Native Americans. Thank you for your time in this matter.

SINCERELY,

Tristan Cazares

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Levi, Andrew (COMM)

From: Gio Cerise <giocerise@icloud.com>
Sent: Monday, July 10, 2017 1:48 PM
To: MN_COMM_Pipeline Comments
Subject: docket numbers (CN-14-916 and PPL-15-137)

To whom it may concern,

I am writing in regards to the proposed Line 3 Replacement Project (docket numbers: CN-14-916 and PPL-15-137)

As an anishinaabe women from the White Earth Reservation, I am opposed to the new or the use of the old Line 3. We, as indigenous people, have a important relationship to the land and the waters. It is our right to clean land & water for fishing, hunting and our valued tradition of ricing. Also what would be effected would be the cultural & economic impact, this would affect future generations for years to come.(ES-7)

By expanding Line 3 (ES-11)the total impact on habitat would increase causing more devastation to my people, the land, and our waters. If the idea of using the existing Line 3 would be better, I beg to differ, it is already deteriorating and would impart the two reservations that it goes through already.

The distribution of crude oil should be avoided. It is time for the State of Minnesota to invest and acknowledge that alternative energy is in fact the safest and least impactful for the whole State of Minnesota.

Best regards,
Gio Cerise

Levi, Andrew (COMM)

From: John Chamberlain <jchamberlain@chamberlainoil.com>
Sent: Thursday, July 06, 2017 4:24 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I support the line 3 replacement project

Sincerely,

John Chamberlain
141 O Connell Ave
Clontarf, MN 56226
jchamberlain@chamberlainoil.com

Levi, Andrew (COMM)

From: Jarod & Alison Champeaux <jachampe@gmail.com>
Sent: Saturday, July 08, 2017 9:12 PM
To: MN_COMM_Pipeline Comments
Subject: Objection to the 'replacement' of Pipeline 3 - Enbridge Energy DEIS

I am writing to express my objection to pipeline #3 'replacement' as stated by Enbridge Energy in their DEIS. My objections are as follows;

1. This is not a pipeline replacement - this is the abandonment of an existing pipeline, which has multiple failures and issues and should be either fixed or properly decommissioned.

2. Pipeline # 3 'replacement' is routed through pristine wild rice lakes, areas of wildlife habitat and most importantly the source and sustainable and subsistence living for many indigenous communities.

3. The re-routing of the pipeline to go through these areas, including treaty land is unnecessary and objectionable due to lack of notice, lack of proper communication with indigenous communities and I believe the hope that these communities - who have already been historically silenced - to continue to be silenced.

4. The oil that would come through the pipeline is from the one of the most expensive and most environmentally damaging extraction processes - tar sands. We should not continue to support this for energy sources.

5. Our indigenous communities live by subsistence and live off the lakes and rely on their water and the land that the newly proposed line 3 would go through. Enbridge has not properly addressed their contingency for spills and has continuously avoided questions and addressing concerns about leaks and clean up.

6. One of the other large areas of concern is that this new line would again cross the St. Louis River and go to Superior, WI. Any potential spill or accident would result inc catastrophic damage to the St Louis river and in turn to Lake Superior. Enbridge has not adequately given account for how they would handle any issues in this area and have shown that when called when there are spills on the existing line 3 - they have not responded.

I cannot object more strongly to the new line 3 and ask that the Public Utilities Commission not grant permission to Enbridge Energy for this line, for the long term benefit of our state.

Alison Champeaux

From: JL Charrier
To: MN_COMM_Pipeline Comments
Subject: EIS: Line 3 Pipeline
Date: Sunday, June 04, 2017 9:30:42 AM

This massive new tar sands pipeline threatens the eco-system of our state. It would eventually poison our water (they all leak at some point, as you know) and create more climate issues, which we definitely do not need. Now is the time for clean energy, not another pipeline!

Thank you,
JL Charrier
1910 Heritage Dr
Wayzata, MN 55391

jcharrier21@gmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Robert J Chaston	218-999-5109	bazookatails@gmail.com

ADDRESS
36642 Alabama Road

CITY, STATE, ZIP
Grand Rapids, MN 55744

COMMENTS
Our neighbor is a trusted company who cares about the safety and environment who puts many members to work.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Cheryl Grover	218-694-2637	jcgrover@gutel.com

ADDRESS
37861 161st Ave

CITY, STATE, ZIP
Bagley, MN 56621

COMMENTS
Line 3 Replacement Project is vital to our area. This will will bring much needed employment and economic growth to our Communities!
I fully support this project.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

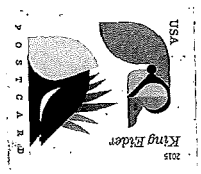

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Barb Chicos		
ADDRESS: 24 Goldfinch Crt		
CITY, STATE, ZIP: N. Mankato, MN 56003		

COMMENTS

I support the line 3 replacement project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Bob Chicos		
ADDRESS: 24 Goldfinch Court		
CITY, STATE, ZIP: W. Mankato, MN 56003		

COMMENTS: I support the line 3 replacement project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Ronald Childs (MP) <RChilds@mnpower.com>
Sent: Monday, July 10, 2017 1:30 PM
To: MN_COMM_Pipeline Comments
Subject: Line #3

Hello , My name is Ron Childs and I attended the Public Meeting on the Enbridge Line 3 Project in Grand Rapids and my written comments are as follows : I fully support the Enbridge Line 3 replacement project . I believe that we can have jobs and a clean environment. I would summaries the oppositions view as , yes we need the oil but not in my back yard . I support the Line #3 project and feel the MPUC should support it also . Thank You Ron Childs

From: Joan Christensen
To: MN_COMM_Pipeline Comments
Subject: Enbridge"s proposed expansion of capacity of line 3 tar sands pipeline
Date: Wednesday, June 07, 2017 12:08:54 AM

The DEIS fails to show this expansion is necessary and doesn't accurately consider the amount of oil already flowing. It doesn't assess the cumulative impacts on tribal lands, water sources, and climate.

In addition, I am opposed to any expansion involving tar sands oil. In order to combat global warming we need to cut back, certainly not expand, our use of fossil fuels. Tar sands oil contributes considerably more greenhouse emissions than regular oil, and it is much harder to clean up. Pipelines inevitably leak, and the Mississippi River, Great Lakes, and wild rice areas are in danger of being contaminated. Water is Minnesota's greatest resource. Indigenous people's treaties protect their rights to wild rice so this pipeline is an infringement on that as well.

Joan Christensen
3292 County Rd 24
Intl Falls, MN 56649

Levi, Andrew (COMM)

From: Jamie Reed <Jamie.Reed@Altour.com>
Sent: Monday, July 10, 2017 3:59 PM
To: MN_COMM_Pipeline Comments
Subject: Environmental Impact for CN-14-916 and PPL-15-137
Attachments: img-710155946-0001.pdf

Importance: High

Follow Up Flag: Follow up
Flag Status: Flagged

Hello,

Please find attached comments for the following docket numbers from Jane Christensen.
CN-14-916
PPL-15-137

There are 27 pages of documentation. Please confirm receipt of this, thank you!

Jamie Reed on behalf of Jane Christensen

ALTOUR
Meetings and Incentives
Jamie Reed
Sourcing Specialist
7447 Egan Drive Suite 300
Savage, MN 55378
T 952-226-9131
F 952-226-9099
E jamie.reed@altour.com
www.altourmeetings.com

July 7th - 2010

To: Jamie MacAlister - Re: Environmental Review
Minnesota Dept. of Commerce
Fax: 651-539-0109

RE. Docket numbers CN-14-916 & PPL-15-137

from. Jane Christensen
5709 Glen Ave.
Mtka. MN. 55345
Ph: 952-934-4918

RE. Lake LaSalle watershed impacts from proposed Enbridge Pipeline 3.

Enclosed is a copy of my response in 2014 and data documenting the environment and risks from various county environmental staff.

Please consider the risks this data documents. This is confirmed documented data of the topographical elements. Not my opinion. Risk of proposed pipeline is confirmed.

Regards.

Jane Christensen -
952-934-4918

July 8-2017 PUC Docket #
CN-14-916
PPL-15-137

PUC Docket # 13-474

March 12, 2014

TO Jamie MacAlister - Environmental Review Mgr.

TO: Larry Hartman, Environmental Review Manager
Energy Environmental Review and Analysis (EERA)
Minnesota Department of Commerce
85 7th Place East, Suite 500
Saint Paul, MN 55101

Dear Mr. Hartman,

I am contacting you regarding the proposed attempt by Enbridge Pipeline to add another pipeline along the existing Koch Pipeline corridor from the Clearbrook Station south past Lake LaSalle. I have been telling them for a year to not survey to the east of the existing pipelines for the following reasons, which were the same reasons Koch did a cross over and moved their recent third pipeline to the lake west.

1. Soil type is Snellman Sandy Loam and is highly erodible. Roads and hillsides will wash out. Work space is not feasible due to steep slopes and soil problems. Slopes are 45 degrees to 60 degrees. Please see attached slope stability documentation.
2. Enclosed is topographical map showing 100 feet drop from the top of the pipeline to bottom of the hill at Lake LaSalle. Also, enclosed are two letters from Clearwater County Soil and Water explaining what needs to be done to prevent erosion and damage to the watershed. One was sent in 1994, the other in 2012. This was just for existing access roads. Clear cutting the whole valley for work space would destroy <u>everything.</u>
3. Septic systems for our cabin and others have drain fields up the hill that would be compromised.
4. Springs abound around the entire lake emerging at random and run 24/7. Some properties have to build bridges over the springs coming out of the hillside or add drain tubing to run the water to the lake.
5. Erika Rowe of the DNR did a recent survey of the whole upper and lower LaSalle basin for the Legacy Act which detailed "pristine, pre-European" water quality and rare species of plants. I do a census of the Lady Slippers and have personally counted over 1500 on my property every year. These flowers take 20-30 years to bloom in a special pine, fungus bog habitat.
6. This is the first watershed that flows north into the Mississippi River. Any environmental damage done due to the pipeline contamination or sediment would impact the entire Mississippi River.
7. Enbridge and Koch will be competing for space as continued oil supply needs and expansions are deemed necessary in the future. There is no room for unlimited growth. Both companies will be impacting the roads and topography while doing inspections, pig line checks and surveys. They will blame each other for road damage erosion and habitat impacts. It took Koch two summers and 3 attempts at seeding and mesh coverings to get grasses to root in the sandy soil after their last installation.

8. Enclosed is a letter received in 1990 from the Soil and Water Conservation District regarding an abandoned dump site that was brought to my attention by a retired state park employee. It lies at the Hubbard/Clearwater County, east of Highway 200 at the #28840 beginning of the LaSalle Watershed. The site is not visibly labeled and is capped with soil that is over grown. This site needs to be assessed as to size and risk. Any pipeline going around and near it could puncture it. It is pre PCA design. Contents could be lead paint, tires, creosote oils and other chemicals. It is not known what type of seals or cap it has. A non-invasive scan or sonar test should be done. I have alerted both pipeline companies.
9. An EAW (environmental assessment worksheet) was done by Clearwater County in 1992 regarding a permit for a PUD (planned unit development) proposed on Lake LaSalle by a planning commission member, Peter Fredrickson. The permit was declined due to concerns over soil erosion, traffic and springs in the hillside. He then sold the property to the current owner Ian Bullion. The PUC has a copy of the EAW in the Koch Pipeline files.

Enbridge Pipeline Company should maintain their existing route from the Clearbrook Station east to Superior. It makes sense logistically, financially and for future growth in a competitive market. If this is not deemed possible then Enbridge must move its route to the west of Koch's exiting lines, giving them enough room to expand in their pre-existing corridor. They must pledge to honor the land and be responsible stewards.

Please take these considerations into account when making your decision regarding the "Sandpiper" Project. We cannot "stick our heads in the sand" and assume the Enbridge Pipeline Company will exercise care, concern, caution and consideration for this unique environment.

Respectfully,

Jane Christensen
5709 Glen Avenue
Minnetonka, MN 55345
952-934-4918

exhibit #8

Docket # PPL-15-137

PUC HCN-14-916

CLEARWATER SOIL AND WATER CONSERVATION DISTRICT

P.O. Box 327
Bagley, Minnesota 56621
Telephone (218) 694-6845

MINNESOTA
SOIL AND WATER CONSERVATION DISTRICTS

Jane Christensen
5709 Glen Avenue
Minnetonka, MN 55345

Dear Jane,

Milayne Lundmark asked me to answer your inquiry about the outflow from the Itasca State Park sewage lagoon and its effect on LaSalle Lake. The enclosed map shows the watershed as I interpret it. As it ap-pears to me there should be no effect on LaSalle Lake since the ponds are probably in the Lake Itasca watershed.

Since the interpretation of these maps involves a number of judgement calls based on best guess, I also checked with a fellow that I knew was familiar with that area. He used to work at the park and said that several years ago there was a controversy about the overflow from these ponds. His work crew was sent out to check the situation and found that there had been no overflow. However, since there was an overflow pipe (even though water levels had never reached the point of overflow) they were directed to plug the pipe with concrete. The question then became, where is the water going if it is not overflowing? Therefore, several test wells were drilled around the pond to check the groundwater. As he recalled, the results showed no ill effects on the groundwater.

One thing he did mention was that there was an old dump site that was once used by the park (notice the red X on the map). He related this to two DNR Division of Waters officials last year at one of our Water Plan Task Force meetings. At that time they said the site would have to be cleaned up but to date nothing has been done as far he knew. You may want to check on this further with some of the other residents in the area.

That's the extent of what I was able to find out about this question. If you need more assistance let us know.

SITE ON EAST Side of Hwy 20 #28840 near LaSalle springs + River on State Park Land

Sincerely,

Doug Thompson
District Technician

#8 + #2 PUCH CN-14-916 - PPL 15-137

Christensen Parcel - Clearwater County

Legend

early 1900's DUMP SITE E side of Hwy 200 # 28840 - ON Clearwater

- Public Water Watercourse
- Public Ditch/Altered Natural Watercourse
- Public Waters Basins
- Parcels *Parcels*
- AMA Deed Scanned
- Well-Verified

0 180 360 720 1,080 1,440 Feet

COUNTY LINE - towards La Salle Creek and watershed

N

Depth-width-size - UNKNOWN.

DOCKET # CN-14-916 - # PPL-1513 2547

Stewardship FOREST

WOODLAND STEWARDSHIP PLAN

LANDOWNER: Jane Christensen
5709 Glenn Ave.
Minnetonka, Mn. 55104

Home:

Work: (612) 292-8883

STEWARDSHIP ACRES: 24.75

TOTAL PROPERTY ACRES: 26.01

LEGAL DESCRIPTION: Portions of the S 1/2 of the SE 1/4 in Section 13, Township 144, Range 36, in Itasca Township, Clearwater County.

PREPARED BY: Jerry Stensing
Clearwater SWCD
P.O. Box 327, 312 North Main
Bagley Mn. 56621
(218) 694-6845

Nov. 24th 1993

exhibit #2

This woodland stewardship plan was designed to help guide the management activities of the natural resources on your property. The plan is based on your goals in harmony with the environment around you. Project recommendations are for your consideration.

THE GOALS YOU IDENTIFIED FOR MANAGING THE PROPERTY ARE:

* To manage the property in a way that will protect the water quality in Big LaSalle Lake.
* To use the property for enjoyment of outdoor recreation activities.
* To manage the forest on the property in a way that provides maximum wildlife benefits and general forest health.
* To restore the forest to it's pre-settlement state.

FOR MORE COST-SHARE INFORMATION CONTACT:

DNR Forestry
Hwy. 92 N.
Rt. 1 Box 22
Bagley, Mn. 56621

DNR Nongame Wildlife
2115 Birchmont Beach Rd.
Bemidji, Mn. 56601
(218) 755-2976

DOCKET # CW-74-916
PPL-15137

WOODLAND STEWARDSHIP PLAN

Leech Lake Pine Moraine Region

This landscape region is located in north-central Minnesota. It consists of glacial deposits broken by large sandy plains of glacial outwash. It is also the largest coniferous landscape in Minnesota. The area has a wide range of vegetation types ranging from bogs and fens to dry sandy uplands. Historically, the dominant forests were aspen-birch conifer, and the white-red (Norway) pine types. Extensive jack pine barrens still grow on the dry, sandy uplands. Aspen-birch, conifer bog and swamp, mixed hardwood-pine, and Big Woods vegetation types occurred less abundantly in the area. The property is within the Mississippi River Headwaters Watershed, and the sub-unit of the Lake Bemidji Watershed.

GENERAL PROPERTY DESCRIPTION:

This property is located approximately 3 miles north east of the community of Lake Itasca. Access is fair with a three season gravel road bisecting the western portion of the property. Access within the property boundaries is gained through an access road, but is somewhat limited by the steep topography leading down to the lake. *

Surrounding land ownership is Private on three sides, with County owned land to the south. Surrounding forest types are aspen, northern hardwoods, and along the creek basin; lowland hardwoods, swamp conifers, lowland brush and marsh.

The general soil types within the property boundaries are glacial deposits originating from glacial moraines and till.

In all, four general soil types are found on the property. Loamy sand, fine sandy loams, and organic soil, with drainage ranging from well drained to very poorly drained. The topography of the property is generally level along the western portion, then sloping (steep in places) down to the lake basin, and again level in the lake and creek basin. Included within the plan is a general soils map and complete soils descriptions. *

see: insert in Soils Section

The general forest cover types within the property boundaries are reflective of the soils, drainage, past management, natural succession, and wildfire. The well drained soil supports predominantly natural climax species northern hardwoods. Areas that were harvested and/or burned support predominantly aspen, and balsam fir. The poorly drained organic soil of the lake basin supports black and green ash, swamp conifers, lowland brush and sedge marsh.

Major management factors related to the soils and drainage include equipment limitations, seedling mortality in wet areas, brush competition and, in areas with steep topography, the highly erodible nature of "Snellman" fine sandy loam. *

NA-02184-02

2547

DOCKET # CN-74-916 #PPL-15137

DEPARTMENT OF MINNESOTA NATURAL RESOURCES

WOODLAND STEWARDSHIP PLAN MAP

Landowner: Jane Christensen

LEGAL DESCRIPTION

SUBDIVISION	SECTION	TOWNSHIP	RANGE	COUNTY
Portions of	13	144	36	Clearwater
S½ S½ SE¼				

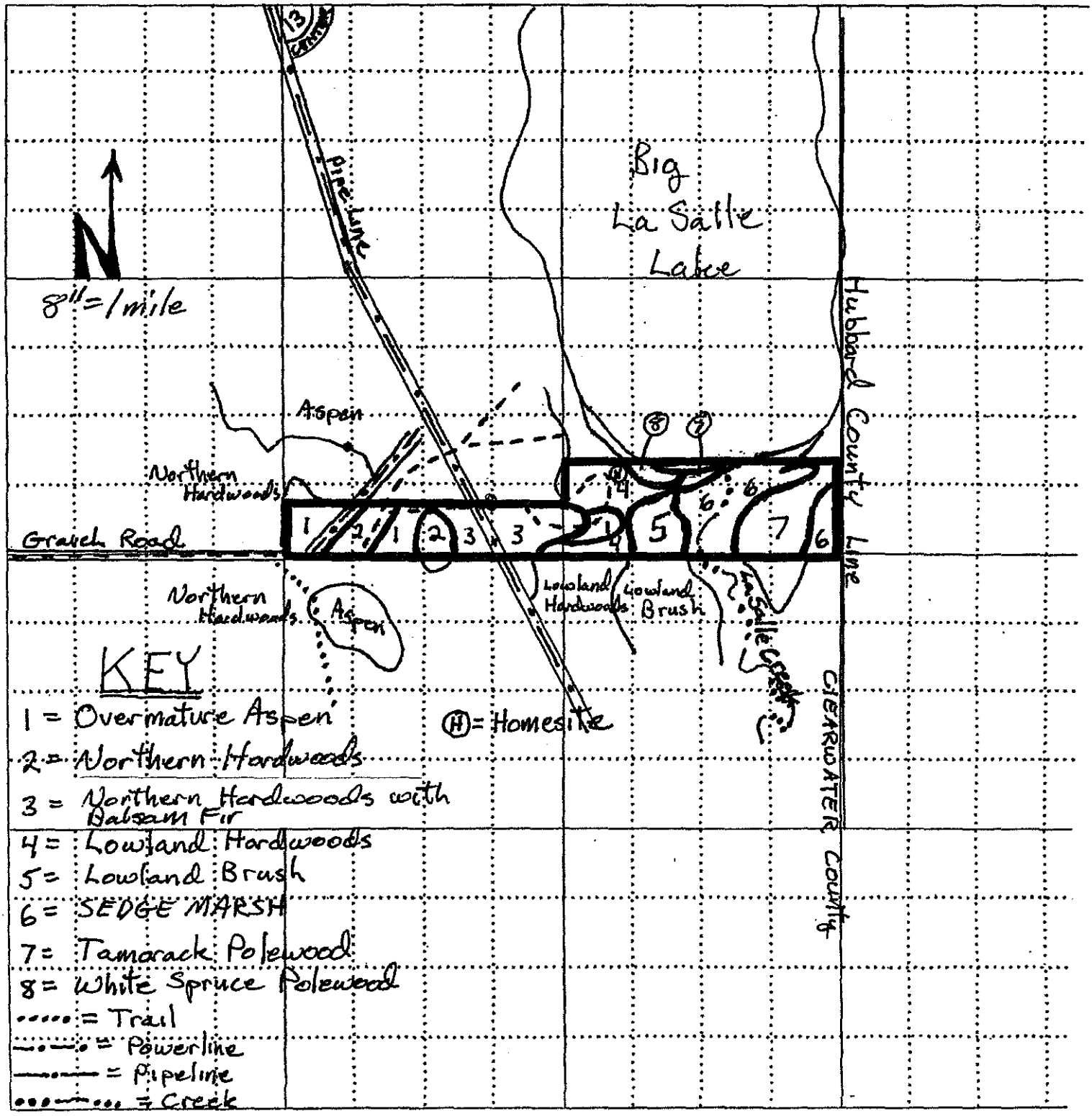

13-144-36 # CN-74-116 2547
PPC-15137

General Soils

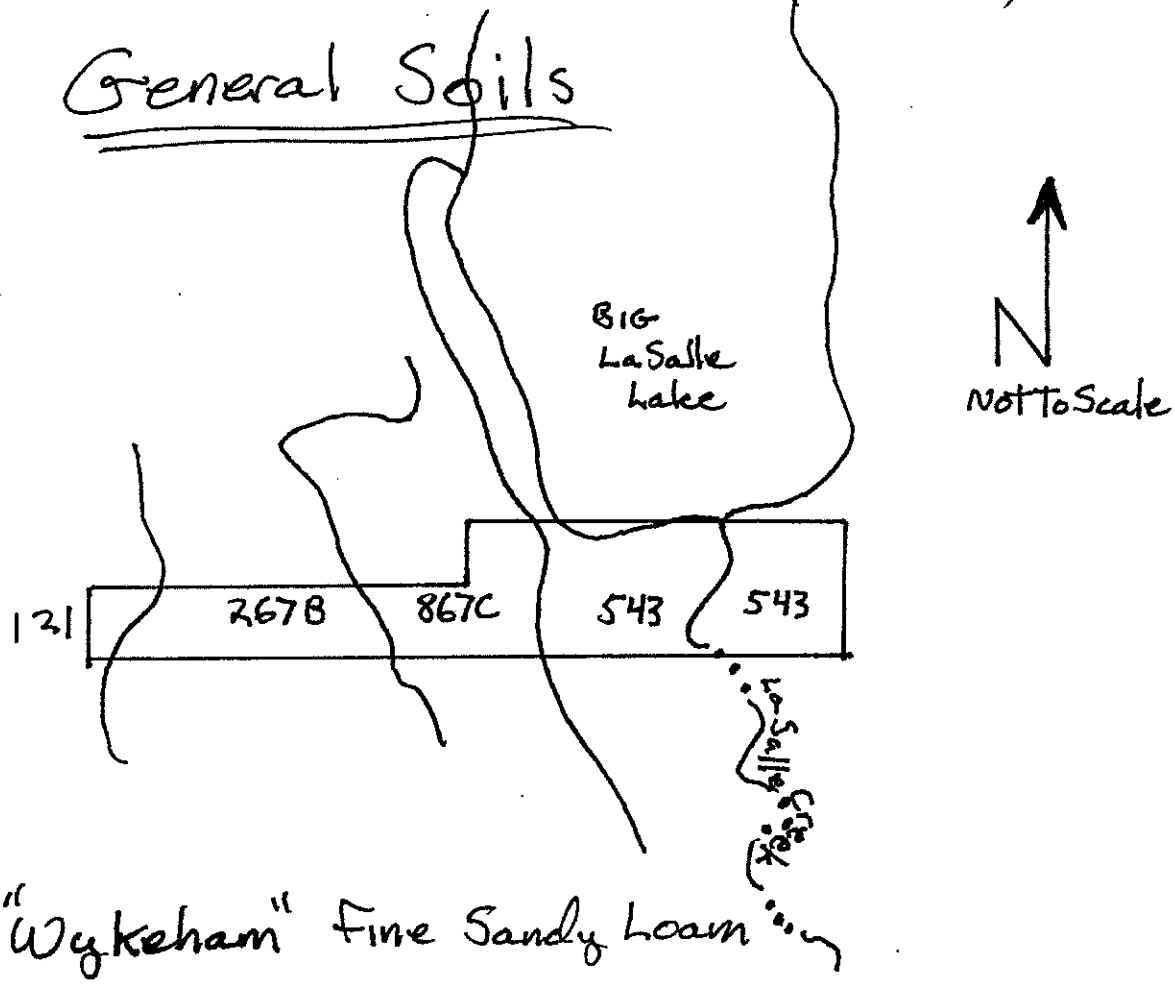

121 = "Wykeham" Fine Sandy Loam

267 = "Snellman" Fine Sandy Loam

543 = "Markey" muck

867 = "Graycalm - Menahga" Loamy Sand

CN-14916
PPL-15137

121 Wykeham fine sandy loam

Composition
Wykeham soil and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting
Landform and position on the landform: Plane to slight convex rises on moraines and till plains
Slope range: 1 to 3 percent
Shape of areas: Irregular
Size of areas: 10 to 100 acres

Typical profile:
0 to 8 inches - very dark grayish brown fine sandy loam
8 to 16 inches - brown, mottled fine sandy loam
16 to 23 inches - dark yellowish brown, mottled loam interfingered by grayish brown fine sandy loam
23 to 32 inches - dark brown, mottled loam
32 to 60 inches - light olive brown, mottled, calcareous fine sandy loam

Soil Properties and Qualities
Drainage class: Moderately well drained
Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Moderate
Surface runoff: Slow
Depth to water table: 2.5 to 5 feet

Special Characteristics: A few stones may be present on the surface in some areas

Inclusions
Contrasting inclusions:
Moderately well drained Eckvoll soils have a sandy mantle greater than 20 inches thick and are in adjacent areas of the landscape
Poorly drained Snooker soils in swales and concave basins
Well drained Snellman soils on more sloping areas of the landscape

Similar soils:
Soils that do not have the subsurface layer interfingering into the subsoil
Soils that have more clay in their profile than is typical
Soils that have a lower sand content in their profile than is typical
Soils that have a sandy loam or loam surface layer

DOCKET # CN-14-916
PPL-15137

121

Use and Management
Cropland:
Major management factor: water erosion and organic matter
Major crops grown are small grains, corn, and forages
- Reduce the risk of erosion by using tillage practices that leave crop residue on the soil surface to help control water erosion and soil blowing.
- Maintain the content of organic matter, fertility and tilth by using a suitable rotation, including grass and legume forages, and returning crop residue to the soil.
- Reduce compaction of the soil by returning crop residue to the soil and avoiding field traffic when the soil is wet.
- Crop production is enhanced by providing a balanced soil fertility program based on soil test results.

Woodland:
Major management factors: equipment limitations and plant competition
The principle tree species is quaking aspen
The tree species of limited extent are sugar maple, American basswood, white spruce and northern red oak
- Use of equipment is restricted during spring thaw and other excessively wet periods. Ruts form easily if skidders are used when the soil is wet. Deep ruts tend to restrict lateral drainage, alter soil structure and result in damage to tree roots, affecting natural regeneration.
- The operation of heavy equipment when this soils is wet can result in excessive rutting and soil compaction, which can permanently damage the site.
- Limit the use of heavy equipment during spring thaw and after heavy rains when the soil is wet and is more subject to compaction.
- Conversion of these sites from northern hardwoods to conifers requires intensive management. If conifer species are planted, competition from hardwood seedlings and suckering is severe. Site preparation by mechanical or chemical means is needed to control competing vegetation.
- Filter strips should be established in areas adjacent to lakes, perennial streams and intermittent streams to minimize the runoff of sediment and other pollutants into these water bodies.

Pastureland:
Major management factors: forage quality
- Maintain the quality and quantity of forage by rotating grazing, and fertilizing based on recommendations from soil tests.

Windbreaks:
- A wide variety of trees and shrubs can be grown as windbreak and environmental plantings on this soil.

267B-Snellman sandy loam, 2 to 8 percent slopes

Composition
Snellman soil and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting
Landform and position on the landform: Sideslopes and hilltops on moraines
Shape of areas: Irregular
Size of areas: 10 to 200 acres

Typical profile:
0 to 2 inches - very dark gray sandy loam
2 to 12 inches - brown loamy fine sand
12 to 16 inches - dark yellowish brown sandy clay loam interfingered by brown loamy fine sand
16 to 22 inches - dark yellowish brown sandy clay loam
22 to 30 inches - dark yellowish brown loam
30 to 60 inches - light olive brown, calcareous fine sandy loam

Soil Properties and Qualities
Drainage class: Well drained
Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Moderately low
Surface runoff: Medium
Depth to water table: Greater than 6 feet

Special Characteristics: A few stones may be present on the surface in some areas

Inclusions
Contrasting inclusions:
- Poorly drained Egglake soils in swales and concave basins
- Moderately well drained Wykeham soils on more level, less sloping areas

Similar soils:
- Soils that have a thicker surface layer
- Soils that have a loam or fine sandy loam surface layer
- Soils that do not have subsurface layer interfingering into the subsoil
- Soils that have a higher clay content within their profile
- Soils that are underlain by stratified sandy, silty and loamy sediments
- Soils that have a lower sand content within their profile

Use and Management
Cropland:
Major management factor: water erosion and soil blowing
Major crops grown are forages, small grains and corn
- Reduce the risk of erosion by using tillage practices that leave crop residue on the soil surface to help control water erosion and soil blowing.
- Perform tillage and planting operations across slopes to slow runoff water, increase infiltration and control water erosion.
- Maintain the content of organic matter, fertility and tilth by using a suitable rotation, including grass and legume forages, and returning crop residue to the soil.
- Incorporate crop residue and manure to help replace organic matter lost to water erosion and soil blowing.
- Crop production is enhanced by providing a balanced soil fertility program based on soil test results.

Woodland:
Major management factors: equipment limitations and plant competition
The principle tree species is quaking aspen
The tree species of limited extent are sugar maple, American basswood, paper birch, white spruce, northern red oak and red pine
- Use of equipment is briefly restricted during spring thaw and other excessively wet periods. Ruts form easily if skidders are used when the soil is saturated. Deep ruts tend to restrict lateral drainage, alter soil structure and result in damage to tree roots, affecting natural regeneration.
- Limit the use of heavy equipment during spring thaw and after heavy rains when the soil is saturated and more subject to compaction.
- Conversion of these sites from northern hardwoods to conifers requires intensive management. If conifer species are planted, competition from hardwood seedlings and suckering is severe. Site preparation by mechanical or chemical means is needed to control competing vegetation.
- Seeding logging roads, skid trails and landings after the trees have been removed helps to prevent excessive soil loss.
- Filter strips should be established in areas adjacent to lakes and perennial or intermittent streams to minimize the runoff of sediment and other pollutants into these water bodies.

Pastureland:
Major management factors: forage quality
- Maintain the quality and quantity of forage by adjusting stocking rates, rotating grazing, and fertilizing based on recommendations from soil tests.

DOCKET # CN-14-916
PPL-1513

543-Markey muck

Composition
Markey soil and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting
Landform and position on the landform: Sedge covered peatlands on outwash plains and glacial lake plains
Slope range: 0 to 1 percent
Shape of areas: Irregular
Size of areas: 10 to 200 acres

Typical profile
0 to 23 inches - black and very dark brown muck
23 to 27 inches - black loamy fine sand
27 to 60 inches - dark grayish brown and light brownish gray, mottled fine sand

Soil Properties and Qualities
Drainage class: Very poorly drained
Permeability:
upper part - Moderately rapid to moderately slow
lower part - Rapid
Available water capacity: Very high
Organic matter content: Very high
Surface runoff: Ponded
Depth to water table: 1 foot above to 1 foot below the surface

Special characteristics: These soils are natural wetlands and unless previously drained, these areas typically are ponded in the spring and after heavy rains. Other areas may be frequently flooded when they occur adjacent to streams and rivers.

Inclusions
Contrasting inclusions:
- Very poorly drained Berner and Cathro soils are underlain by loamy glacial till and are in similar landscape positions
- Very poorly drained Deerwood soils have a thinner organic surface layer and are in peatland margins adjacent to mineral uplands
- Very poorly drained Tawas soils in forested peatlands

Similar soils:
- Soils that have a higher gravel content in the underlying sands
- Soils that formed in less decomposed organic material
- Soils that have free carbonates in the underlying sands or in the organic material
- Soils that are underlain by coprogenous earth or limnic materials, or that have a thin layer of coprogenous earth between the organic material and the sands

- Soils that formed in organic material greater than 51 inches thick
- Soils that have a thicker dark mineral horizon at the contact of the organic material and the underlying sands
- Soils that have woody fragments in the organic soil material

Use and Management
Cropland:
Major management factor: wetness
Major crops grown are forages and wild rice
- Wetness limits the choice of plants, limits the period of grazing, and limits the production of deep-rooted crops.
- Providing drainage is difficult because most areas have poor outlets and are seasonally ponded.
- If these soils have been drained and cultivated, the organic soil material is highly susceptible to soil blowing when left exposed to the wind.
- Wild rice can be grown if sufficient quantity and quality of water is available for flooding paddies.

Pastureland:
Major management factors: wetness
- Maintain the quality and quantity of forage by rotating grazing and deferment of grazing during wet periods.
- The level of fertility generally is high enough for sustained production of high quality pasture.

Windbreaks:
- This group consists dominantly of soils or miscellaneous land types usually not recommended for windbreaks. Wetness limits planting, survival, or growth of trees or shrubs. On-site investigation may reveal that tree and shrub plantings can be made with special treatment.

Wetland Wildlife Land:
- Establishment or restoration of wetlands can be easily achieved on many of these sites.
- Construct open water areas to attract waterfowl and water based animals.
- The vegetation natural to these areas has good diversity that provides food, cover and nesting habitat for many species of waterfowl and water based animals.

Interpretive Groups
Land capability classification: 4w drained and 6w undrained
Windbreak suitability group: 2o drained and 10 undrained

DOCKET# CN-14-916
PPL-1513)

867B-Graycalm-Menahga complex, 1 to 8 percent slopes

Composition
Graycalm soil and similar soils: 50 to 70 percent
Menahga soil and similar soils: 25 to 45 percent
Contrasting inclusions: 5 to 15 percent

Setting
Landform and position on the landform: Sideslopes and hilltops on outwash plains and moraines
Shape of areas: Irregular
Size of areas: 10 to 200 acres

Typical profile:
Graycalm:
0 to 3 inches - very dark gray loamy sand
3 to 24 inches - yellowish brown sand
24 to 32 inches - pale brown sand
32 to 50 inches - pale brown sand, with thin bands of dark yellowish brown loamy sand
50 to 60 inches - pale brown sand

Menahga:
0 to 3 inches - very dark gray loamy sand
3 to 24 inches - yellowish brown sand
24 to 60 inches - pale brown and yellowish brown sand

Soil Properties and Qualities
Drainage class: Graycalm-somewhat excessively drained; Menahga-excessively drained
Permeability: Rapid
Available water capacity: Low
Organic matter content: Low
Surface runoff: Slow
Depth to water table: Greater than 6 feet

Inclusions
Contrasting inclusions:
- Well drained Andrusia soils have a clay enriched subsoil and are on similar landscape positions
- Moderately well drained Friendship soils in slightly concave basins
- Poorly drained Roscommon soils in swales and concave basins

867

- Plant competition around new seedlings should be controlled to reduce the demand for the minimal amounts of moisture and nutrients that are available.
- After the pine trees are harvested, plant competition can be expected to delay natural regeneration unless precautionary measures are applied.
- Planting seedlings that can withstand droughty conditions and mulching and shading the seedlings will help lower the seedling mortality rate.
- The loose, sandy surface of this soil may interfere with the traction of wheeled equipment.
- Filter strips should be established in areas adjacent to lakes and perennial or intermittent streams to minimize the runoff of sediment and other pollutants into these water bodies.
- These soils have rapid permeability and a high leaching potential. Carefully control the use and application of herbicides to reduce the risk of groundwater contamination.

Pastureland:
Major management factors: forage quality
- Maintain the quality and quantity of forage by adjusting stocking rates, rotating grazing, and fertilizing based on recommendations from soil tests.

Windbreaks:
- Trees and shrubs grown as windbreaks and environmental plantings on this soil should be those that are tolerant of droughty conditions. Seedling mortality is moderate because of the moisture stress caused by droughtiness. Leaving some vegetation on the surface during the early years of establishment helps to control soil blowing.

Wildlife Land:
- Specific management for wildlife on these sites should be directed towards forestry practices.
- One to five acre block plantings of conifers will enhance winter cover for upland game birds in agricultural landscapes.

Interpretive Groups
Land capability classification: 4s
Woodland ordination symbol: Graycalm-7A; Menahga-6S
Windbreak group: 7

Similar soils:
- Soils that have a thicker dark surface layer
- Soils that have a sandy loam surface layer
- Soils that have a higher gravel content within their profile
- Soils that formed entirely in fine sands
- Soils that have loamy bands that are thicker or that have a higher clay content
- Soils that are underlain by loamy glacial till or stratified loamy sediments at depths greater than 60 inches
- Soils that are greater than 60 inches to the thin loamy bands
- Soils that have free carbonates at depths greater than 40 inches

Use and Management
Cropland:
Major management factor: soil blowing, available water capacity and groundwater contamination
Major crops grown are forages
- Crops that are tolerant to drought are best suited. The moisture available is not adequate for good growth of other crops.
- Reduce the risk of soil blowing by using minimum tillage, maintaining crop residue on the surface, planting field windbreaks, and maintaining a plant cover.
- Maintain the content of organic matter, fertility and tilth by using a suitable rotation, including grass and legume forages, and returning crop residue to the soil.
- Conserve soil moisture by using tillage practices that leave part or all of the previous crop residue on the soil surface, returning crop residues to the soil and leave previous crop stubble standing to collect snow.
- These soils have rapid permeability and a high leaching potential. Carefully control the use and application of fertilizers, pesticides and herbicides to reduce the risk of groundwater contamination. *

Woodland:
Major management factors: seedling mortality and plant competition
The principle tree species is Jack pine
The tree species of limited extent are red pine, eastern white pine and paper birch
- Seedling mortality may be high in the summer due to the lack of adequate soil moisture. Careful preparation and selection of planting sites, which will subject the seedling to as little moisture stress as possible, helps to insure establishment and survival of seedlings.
- Poor seedling survival rates can be improved by careful planting of vigorous nursery stock or containerized seedlings early to take advantage of spring moisture. Replanting may be needed in some areas.

DOCKET # CN-14-916
PPL-15137

WOODLAND STEWARDSHIP PLAN

OVERMATURE ASPEN

Stand Number: 1 **Stand Acres: 4**

Age: 64 years Site Quality: Excellent Site Index: 80
Tree Density: Well Stocked Basal Area: 115
Total Volume: 30 to 40 cords per acre
Present Condition and Quality: Up to 70% of the aspen within the stand is affected by Phellinus (heart rot), common in overmature aspen.

Stand Description:

This stand is located in three areas within the property boundaries. The stands were created as a direct result of harvesting activities and/or wildfire that occurred around 1930.

The two portions of the stand that are located on the high-ground are better quality, better stocked, and have significantly lower volumes of brush in the understory than the small aspen stand located near the lake basin. The stands are dominated by 10" to 16" diameter aspen, with a secondary component of 10" average diameter red oak. Other tree species within the stand are bur oak, scattered maples, and balsam fir.

Regeneration beneath the forest canopy is a low volume mix of seedling and sapling size northern hardwoods. Seedling and sapling species are sugar maple, red maple, American basswood, American elm, bur oak, and red oak.

The brush understory is light density hazel, with mountain maple, Juneberry, and chokecherry.

Stewardship Objectives:

* To restore the forest to its pre-settlement state.
* To use the property for enjoyment of outdoor recreation activities.

Recommended Management Activities:

* The stand likely supported white pine prior to settlement. Underlpanting white pine will fulfill your objective of restoration. As the overmature aspen dies off, the planted pines will eventually replace the aspen as the dominant tree species and change the forest cover type back from hardwoods to conifers. Site preparation including mechanical scarification and herbicide application will be necessary. Underplanting white pine will also result in significant amounts of downed aspen, which may restrict recreational activities within the stand. Deer depredation of planted seedlings will also be a problem, and control measures will need to be implemented to assure survival of the white pine. Cost-share may be available for this practice, consult Clearwater Soil and Water Conservation District or DNR Forestry.

see: Tree Species, and Regeneration Sections (Project: Underplanting White Pine)

continued on the next page

DOCKET # CN-14916
PPL15137

WOODLAND STEWARDSHIP PLAN

NORTHERN HARDWOODS

Stand Number: 2 **Stand Acres: 2.5**

Age: 60-Basswood	Site Quality: Good	Site Index: 70
Tree Density: Well Stocked		Basal Area: 110
Total Volume: 25 to 35 cords per acre		
Present Condition and Quality: The aspen component within the stand is in a state of decline due to its advanced age.		

Stand Description:

This is a mixed stand containing 6" to 10" diameter basswood in clusters, 6" to 8" diameter red oak, and 16" diameter aspen.

Regeneration beneath the forest canopy averages 600 stems per acre in seedling and sapling sizes, and is a mix of sugar maple, red maple, basswood, red oak, bur oak, and American elm. Around 1970 some selective harvesting of aspen was performed, resulting in stimulated growth of the hardwood understory, evidenced by reduced volumes of aspen, and larger sapling size hardwoods in cut areas.

The choke cherry, mountain maple, and hazel brush understory is evenly distributed, moderate density, and provides high amounts of wildlife food and cover.

Stewardship Objectives:

* To manage the property in a way that will protect the water quality in Big LaSalle Lake.
* To manage the forest on the property in a way that provides maximum wildlife benefits and general forest health.
* To restore the forest to its pre-settlement state.

Recommended Management Activities:

Note: The following recommended management activities are focused towards all your objectives, except the restoration of the forest to its pre-settlement state. The present state of natural succession within this stand is such that, in this area, the cost and benefits of conversion to white pine, would be far outweighed by the benefits of enhancing, encouraging, and allowing succession to occur.

* Create snag and den trees by girdling several selected aspen trees per acre. This practice will provide enhanced wildlife habitat, and open the forest canopy slightly, resulting in stimulated growth of tree seedlings, saplings, brush, and ground cover.

see: Wildlife Section Cost-sharing may be available for this practice.
(Project: Snag Management)

Continued on the next page

DOCKET # CN-14-916
PPL-15137

WOODLAND STEWARDSHIP STANDS

NORTHERN HARDWOODS WITH BALSAM FIR

Stand Number: 3 **Stand Acres: 4**

Age: 54-balsam fir Site Quality: Good Site Index: 60
Tree Density: Well Stocked Basal Area: 90
Total Volume: 10 to 20 cords per acre
Present Condition and Quality: The birch within the stand is 30% affected by a general decline in vigor. This decline is a result of drought conditions prevalent several years ago.

Stand Description:

This stand was created as a direct result of harvest activities performed between 1930 and 1939. In addition to the harvesting, wildfire has also further shaped the composition of the stand. The stand is currently dominated by a mix of 8" diameter paper birch, 6" diameter bur oak, 10" diameter red oak, and 10" diameter aspen. Scattered throughout the stand are 12" diameter Norway pine. The understory is predominantly 5" diameter balsam fir. Regeneration beneath the forest canopy is high density balsam fir, with scattered maples, oaks, elm, and an occasional aspen. The dense forest canopy is closed, with very little sunlight reaching the forest floor, resulting in an almost nonexistent brush understory. This stand is located in an area with steep topography and highly erodible soil.

Stewardship Objectives:

* To manage the property in a way that will protect the water quality in Big LaSalle Lake.
* To use the property for enjoyment of outdoor recreation activities.
* To manage the forest on the property in a way that provides maximum wildlife benefits and general forest health.

Recommended Management Activities:

* Allow succession to continue, any management activities that open the forest canopy within the stand may increase the potential for soil erosion, and nonpoint source pollution entering Big LaSalle Lake. The dense forest canopy of the stand intercepts precipitation (regulating the volume of rainfall that reaches the forest floor), and allows percolation (the absorption of water into the soil) thus preventing runoff and soil erosion. Blowdown of overmature balsam fir can be expected see: Soils, Water, Water Quality Book, and Tree Species Sections

Management Alternative:

** Selective harvest overmature balsam during the winter when the ground is frozen. Underplant high wildlife value brush species along the lake-side edges of the stand to disperse any surface runoff that may occur. This practice could also be applied anywhere within the stand that the forest canopy is somewhat open.
see: Wildlife Section Cost-share may be available for planting brush.

DOCKET # CN-14-916
PPL-15137

WOODLAND STEWARDSHIP STANDS

LOWLAND HARDWOODS

Stand Number: 4 **Stand Acres: 4**

Age: 32-American elm	Site Quality: Good	Site Index: 63
Tree Density: Understocked		Basal Area: 20
Total Volume: 1 to 5 cords per acre		

Present Condition and Quality: Poor, The stand is 95% affected by dutch elm disease, which has resulted in significant mortality.

Stand Description:

This stand supports a very low volume of 6" to 8" diameter American elm, with scattered 5" diameter black and green ash, and 8" diameter balm of gilead. Regeneration is in very low volumes of seedling and sapling size ash, elm, red maple, and balsam fir.

The brush component is moderate density, high wildlife value red osier dogwood, and highbush cranberry, with heavy density clusters of hazel and alder, with willow in the very wet areas.

Stewardship Objectives:

* To manage the property in a way that will protect the water quality in Big LaSalle Lake.
* To use the property for enjoyment of outdoor recreation activities.
* To manage the forest on the property in a way that provides maximum wildlife benefits and general forest health.
* To restore the forest to its pre-settlement state.

Recommended Management Activities:

* Plant black ash and/or green ash to speed up succession and aid in restoration of the forest type. American elm is highly susceptible to dutch elm disease and therefore not considered as a viable species. This practice will require site preparation. Effective site preparation may include spot applications of herbicides. Proper application of recommended herbicides will not affect water quality. see: Water Quality Book, and Tree Species, and Regeneration Sections

* Portions of the stand that have heavy brush in competition with tree seedlings could use a "release" (removal of brush competition) within the next several years. Release of the natural ash seedlings that are experiencing competition from brush will stimulate growth and help assure a healthy, vigorous stand. see: Timber Stand Improvement Section
(Project: Lowland Hardwood Seedling Release)

* Consult Clearwater Soil and Water Conservation District or DNR Forestry to make specific plans. Cost-sharing may be available for these practices.

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PPL15137

WOODLAND STEWARDSHIP STANDS

LOWLAND BRUSH

Stand Number: 5 **Stand Acres: 2.5**

Stand Description:
This stand is located along the edge of the creek basin. It currently supports scattered clusters of overmature "rank" willow, with heavy density sedge grasses, and forbes.

Stewardship Objectives:
* To manage the property in a way that will protect the water quality in Big LaSalle Lake.
* To use the property for enjoyment of outdoor recreation activities.
* To manage the forest on the property in a way that provides maximum wildlife benefits and general forest health.

Recommended Management Activities:
* Reserve as wetland wildlife habitat. This stand supports high primary plant productivity and species richness. Many animal species are associated with this system because of the diverse vegetation of the transitional areas and its high food value. The complex interaction of water, plants, animals, and saturated soil makes this stand extremely vulnerable to disturbance by land management activities. see: Soils, Water, Ecology, and Wildlife Sections

* Create snag and den trees along the transitional areas by girdling several selected aspen or balm of gilead trees per acre. This practice will provide enhanced wildlife habitat for many wildlife species. Dead or dying trees (snags) provide many non-game species of wildlife with a source of food, nesting, perching, and territory establishment. In Minnesota 40 bird species, 29 mammals, and several species of reptiles and amphibians utilize snags.
see: Landscaping Woodlands For Wildlife insert in Wildlife Section.
(Project: Snag Management)

Management Alternatives:
** Winter shear small patches or strips to promote a young, dense, fast-growing brush type with a high browse value for white-tailed deer. Shear areas should be limited in size to reduce the impact on the delicate hydrology of the area. An alternative to shearing may be the mechanical cutting of brush clusters.
(Project: Brushland Development and Maintenance)

* Consult Clearwater Soil and Water Conservation District or DNR Wildlife to make specific plans. Cost-sharing may be available for these practices.

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WOODLAND STEWARDSHIP STANDS

SEDGE MARSH

Stand Number: 6 **Stand Acres: 4**

Stand Description:

This stand is located in the creek basin. It supports a dense cover of sedge grasses, and is seasonally flooded.

Stewardship Objectives:

* To manage the property in a way that will protect the water quality in Big LaSalle Lake.

* To manage the forest on the property in a way that provides maximum wildlife benefits and general forest health.

Recommended Management Activities:

* Reserve the entire stand as wildlife habitat. Animal use includes seven species of reptiles and amphibians, such as garter snake, tiger salamander, American toad, spring peeper, and leopard frog; ten species of mammals, such as water shrew, short-tailed shrew, star-nosed mole, meadow vole, coyote, raccoon, and bobcat; and forty-seven species of birds including red-shouldered hawk, yellow rail, sandhill crane, lesser yellowlegs, common snipe, sedge wren, and Lapland longspur. This is also an important water and nutrient holding area.
see: Wildlife Section

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WOODLAND STEWARDSHIP STANDS

TAMARACK POLEWOOD

Stand Number: 7 **Stand Acres: 3.5**

Age: 90	Site Quality: Good	Site Index: 50
Tree Density: Adequately Stocked		Basal Area: 80
Total Volume: 15 to 20 cords per acre		
Present Condition and Quality: Slight amounts of porcupine damage were noted in the largest stand.		

Stand Description:

This stand is located on both sides of Big LaSalle Creek, with the largest portion on the east side of the creek. The stand is dominated by 6" to 10" diameter tamarack, with a few scattered balsam fir and black spruce mixed in.

Regeneration beneath the forest canopy is very low volume scattered balsam fir. There is little to no brush understory.

Stewardship Objectives:

* To manage the property in a way that will protect the water quality in Big LaSalle Lake.
* To use the property for enjoyment of outdoor recreation activities.
* To manage the forest on the property in a way that provides maximum wildlife benefits and general forest health.
* To restore the forest to its pre-settlement state.

Recommended Management Activities:

* Reserve the entire stand as wildlife habitat and allow natural succession to continue. The tamarack will remain vigorous, continue to grow, and dominate the stand. After tamarack reaches 100 years of age it loses its vigor, but may survive to age 200.

Note: Tamarack habitats are of critical importance to the Great Gray owl, and its small mammal prey species. The location of these stands is also favorable to use by osprey and eagles as perching areas while they are fishing, or hunting. It may also be of interest to note that the porcupine is the fisher's main diet. See: Tree Species Section.

* Wooduck houses could be installed along edges of the stand that face the creek and/or the lake. This practice will enhance wildlife habitat, and increase the numbers of wildlife for your viewing. (Project: Nest Box Installation)

Management Alternatives:

** Clear-cut small portions of the stand to provide a source of firewood. This will result in natural seeding, and regeneration of the tamarack, and provide age class diversity. Tamarack is very intolerant of shade. For effective natural regeneration, clear-cutting portions of the stand would be required. see: Tree Species Section (Project: Firewood Harvesting)

DOCKET # CN-14-978 2547
PPL-15137

WOODLAND STEWARDSHIP STANDS
WHITE SPRUCE POLEWOOD

Stand Number: 8 **Stand Acres: . 25**

Age: 63 years	Site Quality: Excellent	Site Index: 70
Tree Density: Well Stocked		Basal Area: 100
Total Volume: 15 to 20 cords per acre		
Present Condition and Quality: Good		

Stand Description:

This stand is located along the lakeshore, it is part of a larger stand that follows a narrow strip running north along the western shoreline for approximately 1/4 mile. The stand is dominated by 6" to 14" diameter white spruce. Regeneration is a low volume of white spruce seedlings, and a significant volume of white spruce saplings. There is little to no brush understory. Some pruning and thinning activities have been performed within the stand.

Stewardship Objectives:

* To manage the property in a way that will protect the water quality in Big LaSalle Lake.
* To use the property for enjoyment of outdoor recreation activities.
* To manage the forest on the property in a way that provides maximum wildlife benefits and general forest health.
* To restore the forest to its pre-settlement state.

Recommended Management Activities:

* Allow natural succession to continue. The close proximity of the stand to the lake serves as a final filter strip that catches sediments in runoff, and prevents nonpoint source pollution from entering the lake. The somewhat open nature of the area beneath the forest canopy also serves as an ideal location for a picnic area, and walking along the lakeshore.

Note: Prune lower limbs during the dormant season to reduce the possibility of the introduction of disease causing bacteria entering the tree through wounds caused by pruning.

* Monitor the stand for insect and disease problems. Common insect pests in white spruce stands to watch for are defoliating insects. see: Protection Section

Management Alternatives:

** Blockplant high wildlife value shrubs in select areas to further enhance the filter action and provide additional food sources for wildlife.

(Project: Wildlife Habitat Enhancement)

* Consult Clearwater Soil and Water Conservation District or DNR Wildlife to make specific plans. Cost-sharing may be available for some of these practices.

DOCKET # CN-14-916 2547
PPL-15137

STEWARDSHIP PLAN SUMMARY

RECREATION

The high level of timber stand cover type diversity within your property boundaries, provide many opportunities for the enjoyment of a wide range of plant and animal interaction. Forest management activities will certainly have impacts. By following recommendations outlined in this plan you will not only be enhancing the environment, but also be providing a additional sources of enjoyment and satisfaction as you watch the effects of your management activities occur.

ROADS

The access road down to the lake may be contributing to nonpoint source pollution. Seeding the road to grasses, and installation of grade rolls or dips, will reduce the amount of down-road flow of surface water, reduce the amount of soil erosion, and nonpoint source pollution. see: Water Quality Book in the back pocket of the plan.

Cost-share may be available for this practice, consult Clearwater Soil and Water Conservation District.

(Project: Road Improvement)

Note - Koch pipeline had to do Above to road after installing the 2004 pipeline expansion At a high cost to land.

****

Once again, thank you for the opportunity to assist you in your endeavors to protect and conserve the environment. Please feel free to contact me at any time.

Jerry

Jerry Stensing
Stewardship Forester
Beltrami and Clearwater Counties
Soil and Water Conservation Districts 751-3036

Levi, Andrew (COMM)

From: Teresa Christensen (via Google Docs) <teresachristensen31@gmail.com>
Sent: Monday, July 10, 2017 10:23 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment on Line 3 doc 2.docx
Attachments: Public Comment on Line 3 doc 2.docx.pdf

Teresa Christensen has attached the following document:

Public Comment on Line 3 doc 2.docx

Please see attached comments.

We have read many of the comments of others who have written in opposition to the pipeline. In short, the question really is, why should our state jeopardise an irrelplaceable gem like the Whitefish Chain of lakes area, threw the watershed which this pipeline will be placed, in order to, in effect, allow the pipeline company to use the easier, cheaper route when there are perfectly reasonable and available alternate routes that are safer and will not threaten such valuable enviromental resources? The economic impacts of a significant spill to the livelihoods of the people who live, work and vacation in this area would be far greater than the economic gains to be had by allowing the line to be placed in the pipeline company's preferred route. The public policy considerations are weighted heavily in favor of denying a permit for this route.

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Public Comment: Line 3 Project (Cn-14-916 and PPL-15-137)

Dear Environmental Review Manager,

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. I have heard that Enbridge redacted those numbers from the public version of the DEIS. Without them, there is no reliable way an independent party to verify their results.

I believe that in order for Minnesota citizens and agencies to make an educated decision about Line 3, we must have that information, and I would like to know why Enbridge won't release it. Please insist that Enbridge provide their data on oil releases and spills in Minnesota.

If Enbridge objects due to security reasons, then I would like to know why they have failed to cover the exposed pipes in the Tamarack River in northwest Minnesota, and why they allow people to joyride over exposed pipes south of Clearwater. This is surely a security issue as well. For Enbridge to pick and choose what issues warrant "security," is unacceptable.

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I believe that in order for Minnesota citizens and agencies to make an educated decision about Line 3, we must have that information, and I would like to know why Enbridge won't release it. Please insist that Enbridge provide their data on oil releases and spills in Minnesota.

If Enbridge objects due to security reasons, then I would like to know why they have failed to cover the exposed pipes in the Tamarack River in northwest Minnesota, and why they allow people to joyride over exposed pipes south of Clearwater. This is surely a security issue as well. For Enbridge to pick and choose what issues warrant "security," is unacceptable.

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete.

I would like to know, in the final EIS for Line 3, what Enbridge's plans are if their preferred route is approved. Will it be just the one pipeline, or will they eventually move all six pipelines to the new corridor? This would have a huge effect on how people feel about Enbridge's preferred pipeline route.

I have heard that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state* need (not a national need). Even if we used statistics about the national need, U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply needed oil. (http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf)

I would like to see this information mentioned in the final EIS.

I understand that an engineering firm called Cardno, with ties to Enbridge, was instrumental in preparing part of the draft Environmental Impact Statement for Line 3. In light of this fact, in the final EIS I would like to see an independent analysis of the information they provided. Minnesota requires verified facts for such a large project.

Thank you,

Joe and Teresa Christensen
8767 Father Foley Drive,
Edina, MN 56474

Levi, Andrew (COMM)

From: Steve Christensen <shjchristensen@gmail.com>
Sent: Monday, July 10, 2017 11:39 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL -15-137)

Dear Environmental Review Manager:

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. I have heard that Enbridge redacted those numbers from the public version of the DEIS. Without them, there is no reliable way an independent party to verify their results.

I believe that in order for Minnesota citizens and agencies to make an educated decision about Line 3, we must have that information, and I would like to know why Enbridge won't release it. Please insist that Enbridge provide their data on oil releases and spills in Minnesota.

If Enbridge objects due to security reasons, then I would like to know why they have failed to cover the exposed pipes in the Tamarack River in northwest Minnesota, and why they allow people to joyride over exposed pipes south of Clearwater. This is surely a security issue as well. For Enbridge to pick and choose what issues warrant "security," is unacceptable.

Sincerely,
Stephen Christensen
9003 Father Foley Dr
Pine River, MN 56474

Levi, Andrew (COMM)

From: Steve Christensen <shjchristensen@gmail.com>
Sent: Monday, July 10, 2017 11:45 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

I have heard that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state* need (not a national need). Even if we used statistics abotut the national need, U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply needed oil. (http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf)

I would like to see this information mentioned in the final EIS.

Thank you,
Stephen Christensen
9003 Father Foley Dr
Pine River, MN 56474

Levi, Andrew (COMM)

From: Steve Christensen <shjchristensen@gmail.com>
Sent: Monday, July 10, 2017 11:48 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

I believe there is missing data in the Line 3 DEIS. There is apparently no information from a dilbit study done by the National Academy of Sciences, which you can find here: https://www.nap.edu/catalog/21834/spills-of-diluted-bitumen-from-pipelines-a-comparative-study-of.

I would like this to be included in the final EIS.

Thank you,

Stephen Christensen
9003 Father Foley Dr
Pine River, Mn 56474

Levi, Andrew (COMM)

From: Steve Christensen <shjchristensen@gmail.com>
Sent: Monday, July 10, 2017 11:52 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete.

Thank you,

Catherine Christensen
9003 Father Foley Dr
Pine River, MN 56474

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
KENNETH CHRISTENSON	218-785-2311	KCFARMSMN@AOL.COM

ADDRESS
26719 330TH ST.

CITY, STATE, ZIP
SHEVLIN MN 56676

COMMENTS
THE EXISTING PIPE LINE GOES THRU OUR TOWNSHIP (MOOSE CREEK TOWNSHIP) AND IS SEVERAL DECADES OLD. FOR SAFETY REASONS & EFFICIENCY THIS LINE DESPERATLY NEEDS TO BE REPLACED
Ken Christenson 5-29-17

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

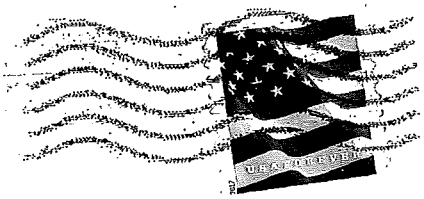

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Sam Christenson <user@votervoice.net>
Sent: Monday, June 19, 2017 9:27 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Docket number CN-14-916 and PPL-15-137
I am a Minnesotan and want to see the environment protected like most others.
I believe replacing aging infrastructure like pipelines is imperative to protecting the environment.
Pipelines are everywhere in Minnesota, according to the Environmental Quality Board's report. I'm familiar with pipeline right of ways in northern Minnesota around Bemidji, Grand Rapids, Cass Lake and Alexandria. Pipelines and natural resources have gone hand-in-hand in northern Minnesota for decades.
As a resident of northern Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project.
I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3.
No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS.
Please keep the EIS timeline to the statutory deadline of 280 days.

Sincerely,

Samuel R. Christenson
11011 Lamon Rd NE
Bemidji, MN 56601
twigbender01@yahoo.com

Levi, Andrew (COMM)

From: Cole Christenson <colejchristenson@gmail.com>
Sent: Monday, July 10, 2017 2:37 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

Dear MN department of commerce: I find the Enbridge Line 3 Draft Environmental Impact Statement to be unacceptable because the risk of a spill every four years into one of the most pristine bodies of water we have would be detrimental to the large number of people and animals that enjoy the beauty and uniqueness of the St Croix River. If you had a 25% chance of having an oil spill occur in your backyard what would you do?

Thanks,
Cole

Levi, Andrew (COMM)

From: Jessica Christianson <jessimaca69@hotmail.com>
Sent: Monday, July 10, 2017 9:27 AM
To: MN_COMM_Pipeline Comments
Subject: No to pipeline in MN!!!

Docket #"s CN-14-916 and PPL-15-137

Stop the pipeline now! Minnesota has too much to lose. I want there to be a future for my children. Not a toxic wasteland that the big oil companies seem to be hell bent on creating for us all just so they can make another buck!

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Brian Christiansen

Street Address: [redacted]

City: Bemidji State: MN Zip Code:

Phone or Email:

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I support the line 3 project - I think it would be beneficial to remove line 3 and replace it!

If including additional pages please number them and tell us how many you are providing:_____ pages

Line 3 Replacement Project DEIS

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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Shaun Christiansen	218-393-2223	
ADDRESS		
5309 John ave		
CITY, STATE, ZIP		
Superior, WI 54880		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: JERRY Christoff <TMCHRIST@msn.com>
Sent: Tuesday, June 13, 2017 6:29 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge L3 Replacement Project

Dear sir or madam:

I am writing to communicate my support of the Enbridge L3 Replacement project. This project is beneficial to protecting the environment, and it will provide a very positive financial impact in the short-term and long-term for the state of Minnesota. Currently, L3 is being operated at a reduced rate (flow and pressure) to ensure the integrity of the pipe. Enbridge has evaluated the pipeline data and made a determination that the best course of action to ensure the safe and efficient flow of crude oil is to replace L3. The replacement of L3 will have a very positive financial impact on the state of Minnesota when it is under construction. While under construction, L3 Replacement will generate numerous construction jobs and provide a significant revenue boost to suppliers and local service providers. In the long-term L3 Replacement will generate a modest number of new jobs to operate and maintain the pipeline. It will also generate significant tax revenue for the state and/or local communities and generate on-going business and revenue for local suppliers and service providers.

Opponents of the project are trying to make a case that a L3 shutdown with no rebuild is not being considered as an option. I have observed and heard implications, by opponents of the project, promoting the ideology that not replacing L3 will result in an acceleration of conversion to renewable energy. In my opinion this ideology is very naive. In my opinion substantial conversion from hydrocarbon energy to renewable energy is a minimum of 20-30 years out. Enbridge is a leader in the development of renewable energy in North America, and even with substantial investment in renewable energy, it is still a small part of the portfolio. (See renewable energy discussion below.) In my opinion, if L3 were shut down and not replaced, the Canadian crude oil will be exported to other markets that may not be as responsible or committed to reducing green-house gases.

Free markets and the economic laws of supply and demand strongly suggest that if there is a market for crude oil, which there will be, and crude oil is not transported on pipelines, suppliers will transport crude oil by rail or trucks through highly populated HCAs (High Consequence Areas). This is a major debate/topic in and of itself. In my opinion it is no contest. Transporting crude oil in underground pipelines is significantly more safe than shipping crude oil in rail cars or trucks through HCAs. Opponents of pipelines often times raise the concern about leaks at river crossings and other water bodies. In modern pipelines, in the vast majority of the cases, pipelines are directionally drilled very deep under these water bodies, and the pipe-wall thickness is double-thick compared to the rest of the buried pipe. In reality, from a risk stand-point, river crossings are the least likely location for a pipeline to develop a leak.

I would also like to point out that Enbridge has made substantial capital investments in renewable energy. Since Enbridge's first initial investment in a wind farm in 2002, Enbridge has committed a total of $7.4 billion in capital to renewable energy and <u>power transmission</u> projects either currently in operation or under construction. Together, these projects (either operating or under construction) have the capacity to generate more than 3,800 megawatts (MW) gross of zero-emission energy (nearly 3,000 MW net). Today, Enbridge is one of the largest renewable energy companies in Canada, and Enbridge's portfolio of renewable energy projects is diversified and growing. To date, Enbridge has invested in the following renewable energy ventures:

- 18 <u>wind farms</u> (about 3,300 MW gross capacity, either in operation or under construction);

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

08 JUL

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
DEAN Christofferson	218 252 6097	
ADDRESS: 19706 119th Ave		d.Christofferson55@gMail.Com
CITY, STATE, ZIP: Park Rapids MN 56470		

COMMENTS

Do the Project! It will be Better when the old line is Replaced Less Chances For Leaks!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS!

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
DEAN CHRISTOPHERSON	218 215 2024	
ADDRESS: PO Box 42		
CITY, STATE, ZIP: Pengilly MN 55775		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Debra Chute	218-927-3987	
ADDRESS		
42992 US Hwy 169		
CITY, STATE, ZIP		
Aitkin MN 56431		

COMMENTS

I support the Line 3 replacement project.

Debra Chute

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Allison Cienega Austin <rocksandrivers@gmail.com>
Sent: Monday, June 26, 2017 2:05 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 comments

To whom it may concern,

I'm writing to express my concern about the proposed Enbridge Line 3 pipeline. Building new pipelines without adequately mitigating the effects of old ones is not the answer. Forging ahead with non-sustainable actions in the absence of tribal consultation is unacceptable. The health of our Earth and the future of our children depends on people like you making decisions that support a thriving planet, not one that is degraded and toxic. Our efforts should be focused on renewable energy - it's the only way of the future.

With respect,
Allison Austin

From: Leah Cirker-Stark
To: MN_COMM_Pipeline Comments
Subject: Stop the new Line 3 Pipeline
Date: Monday, June 05, 2017 2:36:20 PM

To whom it may concern,
I recently learned that the State of Minnesota released its Draft Environmental Impact Statement (DEIS). I am deeply concerned about this. It is part of a trend that will further the damage we have already done to our planet. The environment, as well as all cultures should be respected. The relevant docket numbers CN-14-916 and PPL-15-137.
Thank you kindly,
- Leah

--
Leah C-S Photography
781-454-9570
http://leahcsphotography.com/
Leah C-S Photography on Yelp
Leah C-S Photography on Twitter

Levi, Andrew (COMM)

From: ritte009 University of Minnesota <ritte009@umn.edu>
Sent: Thursday, June 29, 2017 7:24 AM
To: MN_COMM_Pipeline Comments
Subject: CN14-916; PPL15-137

Please do not grant a Certificate of Need to Enbridge to abandon pipeline 3 and replace. The cost of monitoring it forever is monumental and will fall to the state; it is greater than the cost of removing it now. It must be removed now and not left there to poison the future. If Enbridge wants a new pipeline, they should put it in as they remove the old one. Oil is cheap now and their loss will be small compared to the loss of monitoring an abandoned line, which they don't really intend to do.

Thank you,
Clare Ritter

Levi, Andrew (COMM)

From: Steve Kerrigan <steve_w_kerrigan@msn.com>
Sent: Monday, July 10, 2017 11:17 PM
To: MN_COMM_Pipeline Comments
Subject: Fw: Line 3 Pipeline Testimony: Docket numbers CN-14-916 and PPL-15-137

From: Tina Clarke <tinaclarkeus@gmail.com>
Sent: Tuesday, July 11, 2017 3:21 AM
To: Steve Kerrigan
Subject: Line 3 Pipeline Testimony: Docket numbers CN-14-916 and PPL-15-137

Docket numbers CN-14-916 and PPL-15-137

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St Paul, MN 55101-2198

Dear Commissioners and Managers,

We write to oppose all Enbridge Line 3 Pipeline plans, whether installation of a new pipeline or expansion of the existing line.

Instead of adding new capacity or new infrastructure, we believe the most prudent, economically sound, health and environmentally protective and economically wise choice is to remove and remediate the existing, Line 3 Pipeline.

We should be investing in modernizing our energy infrastructure, not adding oil and tar sands pipelines whose value will deteriorate as nations shift towards more climate-friendly energy systems to implement the Paris agreements.

Economically, "dinosaur fuels" are unstable or risky investments. As climate-damaging fuels face shareholder worries about lower profitability, oil transport infrastructure will increasingly look like a risky choice in advanced industrial countries.

Minnesota should invest in jobs and an energy economy that will endure and provide economic potential for the longer term. Decisionmakers who lack the foresight to help the state invest wisely in durable jobs and safer, cleaner energy systems will look foolish as our state falls further behind. The transition to an all-electric, high-efficiency economy powered by safe, clean, renewable energy is well underway in Europe and other advanced economies. Now even China seeks to take the lead in the rapidly-growing market for solar, wind and high-efficiency technologies.

The price of solar and wind power continues to drop, making investments in renewable energy not only a reasonable alternative, but a much wiser choice for consumers.

The total costs of burning tar sands oil -- if health, environmental and climate impacts are included -- dwarf the costs of renewable energy and efficiency investments. Enbridge Energy's proposed Line 3 tar sands oil pipeline through Minnesota would have a **climate change cost of $287 billion dollars** over 30 years according to a recent State of MN environmental study. Add cancer, respiratory illness, water contamination, clean up costs and pipeline removal expenses and the costs to ratepayers and tax-payers is not justifiable.

Jobs in clean energy and energy efficiency are greater in number, employ more local workers, and provide longer-term economic well-being for Minnesota's communities.

We urge the State of Minnesota's regulatory agencies to reject all tar sands pipeline installation or expansion proposals and instead lead out state to a safer, cleaner, less costly, more durable energy future.

Sincerely,

Tina Clarke
1294 Arona Street
St. Paul, MN 55108
TinaClarkeOz@gmail.com
Cell: 1-413-658-8165

Steve Kerrigan
2800 St. Anthony Parkway

Levi, Andrew (COMM)

From: lisa3131@earthlink.net
Sent: Monday, July 10, 2017 10:41 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline

To Whom it May Concern,
I am opposed to the Line 3 Pipeline being proposed in the state of Minnesota. As an American citizen, I urge all officials to invest in alternative forms of energy and move away from the fossil fuel industry. We can no longer afford to build pipelines across this country. It is unsafe and an unsustainable way of living on the planet.
Thank you for your time,
Lisa Clarke
Sebastopol, CA 95473

Levi, Andrew (COMM)

From: Nancy Claussen <nclauss1@frontiernet.net>
Sent: Sunday, July 09, 2017 11:54 PM
To: MN_COMM_Pipeline Comments
Subject: "Public Comment: Line 3 Project (CN-14-916 and PPL-15-137")

Dear Environmental Review Manager,

I am writing this comment to support my reasons for opposing the Enbridge Line 3 project.

I have been a cabin/land owner on Big Sandy Lake in Aitkin County since 1988. Throughout the years my husband and I, our families and friends have enjoyed the lake, including fishing and water sports. We've enjoyed the wildlife we see everyday in and around the lake. We built a home and moved here permanently when we retired. My husband enjoys fishing in all seasons and the lake has provided us with many meals. The threat of a pipeline and possibility of a leak that could ruin our lakes, wildlife habitat, property values, tourism and have a major negative economic impact on this area is why I am opposed to this pipeline. Also the Mississippi River would be affected by a spill which could be devastating for the environment in the all areas the river flows through, including the Gulf of Mexico.

Citizens and county administrators that are proponents of this pipeline seem to be only looking at the economic impact on the county and not looking at all the negatives of placing this pipeline on the proposed route.

In 2012 this area suffered a devastating flood which has had long lasting effects on the environment and the people. Personally I still feel the effects of this flood as do many others living in the area. If there was a pipeline leak the effects would be more devastating and not only negatively affect the environment, wildlife and tourism but everyone who lives, works and plays here.

Please consider my comment when drafting the Environmental Impact Statement for the Enbridge Line 3 Project.

Sincerely,
Nancy L. Claussen

Levi, Andrew (COMM)

From: Laura Clay <clay_laura@hotmail.com>
Sent: Tuesday, July 04, 2017 2:53 PM
To: MN_COMM_Pipeline Comments
Subject: opposition to the proposed Enbridge Line 3

Jamie MacAlister
Environmental Review Manager
MN Department of Commerce
85 Seventh Place East, Suite 280
Saint Paul, MN 55102
Fax: 651-539-0109
Pipeline.Comments@state.mn.us

4 July 2017

Dear MN Department of Commerce:

I am extremely concerned about the proposed Enbridge Line 3 Pipeline due to environmental risks for the many critical bodies of water which would be impacted and the potential for public health to be compromised. The Enbridge Line 3 Draft Environmental Impact Statement completely fails to address basic conditions for safety and environmental justice. It violates MN Statute 103F.305 Scenic River Protection Policy and MN Statute 116D.02 Declaration of State Environmental Policy.

Why should Minnesotans be asked to accept a pipeline which has such a high risk of contaminating our environment? What do we leave for ourselves and our children to enjoy about the natural wonders of our state if we allow our precious water resources to be poisoned by a company with a history of significant permit violations? I urge strong consideration of the "NO BUILD" option, especially while we await plans for cleaning up contamination from previous spills along Line 3.

Thank you for your consideration of these pressing concerns.

Sincerely,

Laura Clay
St. Paul, MN

Line 3 Replacement Project DEIS

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- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
JEFF CLAYPOOL	218-209-8380	J.CLAYPOOL-2@GMA

ADDRESS
9437 SAI LN. NW

CITY, STATE, ZIP
BEMIDJI MN. 56601

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: ClearBrook Dental <clbkdental@gvtel.com>
Sent: Thursday, July 06, 2017 12:34 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment

As a property owner on the line, I can say that I fully support this project and have the utmost confidence that it will be handled in an extremely professional, environmentally sound manner.

From: Jon Cleveland
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 PPL-15-137
Date: Tuesday, June 06, 2017 8:47:35 AM

Good Afternoon,

I would like to enter a comment of record for the proposed Line 3 replacement by Enbridge Energy. As an Enbridge people leader of the men and women in northern Minnesota that work hard on safety and integrity every day on Enbridge pipelines, I am very proud of their hard work and excellent safety record to ensure we all can enjoy our quality of life and the activates important to us. Each day millions of barrels of oil travel through northern Minnesota and travel past the very lake myself and my family call home. I sleep well at night knowing these men and women take great pride in their work to make Enbridge pipelines safe and efficient. The regular maintenance these employees do daily is no different than the maintenance Enbridge it attempting to preform by replacing this aging line. This hard work and dedication shown by both Enbridge as a company and its workforce is the sole reason the current and historically safe operation of these pipelines is far better than compared to any other form of transportation. In the future I sincerely hope we can make strides towards greener energy that can be produced and sustained but in a society that is reliant on crude oil I feel the replacement of Line 3 will not only benefit those that live and work along the right of way but the rest of Minnesota as well.

Sincerely,

Jon Cleveland
Technical Supervisor- LP US Superior Rng Bemidji Elc
—

ENBRIDGE
TEL: 218-522-4890 | CELL: 715-817-2159
214 SE 10th Street Grand Rapids,MN 55744

jon.cleveland@enbridge.com

enbridge.com
Integrity. Safety. Respect.

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I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Donald R. Cloose	218-243-2789	—

ADDRESS
14545 Great Valley Rd N.W.

CITY, STATE, ZIP
Pinewood, MN. 56676

COMMENTS
I support Line 3 c I'm from Buzzle Twsp which helps a great deal on my Taxes.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
RODNEY CLOSE	368-2971	
ADDRESS		
616 PATRIOT DR NW Apt 1		
CITY, STATE, ZIP		
BEMIDJI, MN 56601		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Courtney Cochran <courtneymaecochran@gmail.com>
Sent: Wednesday, July 05, 2017 11:30 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline Concerns (Docket numbers CN-14-916 and PPL-15-137)

Dear Ms. MacAlister,

To whom it may concern at the Dept. of Commerce,

I have been a resident of Duluth, Minnesota for nearly a decade now. I live on the shores of Lake Superior and love this city. I have deep concerns for the future of my home if the Line 3 project moves forward. I do not believe that there is such a thing as a safe pipeline. With pipelines leaks and threatening the beauty and safety of my home, I want Enbridge to stop this project and listen to the communities they intend to impact with this project. Not only do I as a resident of Duluth see that there is potential damage to my home and watershed in this project, but I also see the Line 3 project as a major violation of tribal sovereignty. Northeast Minnesota is built on traditional tribal lands and surrounded by reservations. By federal law, these tribal nations need to be at the helm of decision making about their natural resources. Our tribal nations have lost enough to the Allotment Act and years of cultural genocide. Enbridge needs to stop this project and honor tribal sovereignty by listening to and responding to Tribal Nations. Stop this project now and listen to the leaders of the Fond Du Lac Band of Ojibwe in Minnesota and the Red Cliff and Bad River Band of Ojibwe in Wisconsin. I will stand with our tribal communities as will many others in this region to oppose the Line three Pipeline Replacement until tribal sovereignty is honored and the wellness of our communities in Northeast Minnesota is put before profit.

Thank you,
Courtney Mae Cochran
(218) 576-7226
Courtneymaecochran@gmail.com

Sincerely,

Courtney Mae Cochran
1610 Minnesota Ave
Duluth, MN 55802
courtneymaecochran@gmail.com

From: coffey.gail
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137
Date: Wednesday, May 31, 2017 6:45:56 AM

Please do not approve this new pipeline. We need to use renewable resources and resources that DO NOT HARM our land and water for energy. Continued pushes for this pipeline indicate that you have only one interest: money.

Gail Coffey
coffey.gail@gmail.com

"Live in love and truth and make a difference. There is no other way." ~Zen Gardner

7-6-2017

Greetings - to whom this may concern:

I am writing due to my opposition to the relaying and replacement of the Line 3 pipeline.

I have lived in this area for over thirty years. All of it on dirt roads; enjoying living on the Pine River and swimming & fishing the adjoining lakes. I now own property on Lizzie Lake in the most northern point of Crow Wing County. Your proposal brings the pipeline within a mile and crosses the upper Pine River (Norway Brook) and the very ecologically important, 'Ding Pot' there is a well spring of wild rice, wading & migrating waterfowl, fish nursery etc. etc.

I am opposed on so many levels---

1) The furthering of Environmental Degradation by fossil fuel corporates

2) High level of failures in the integrity of the infrastrure of these pipelines

3) Foreign Companies moving the 'dirtiest tar sands through the most vulnerable and important of resources - WATERLANDS -

RECEIVED
JUL 14 2017
MAILROOM

4) The fact that these pipelines should not be built in these areas at all... hidden and out of sight, but potentially lethal, when myself and most Americans feel renewables and clean energy deserve our full support and brightest innovative minds

5) Water, fresh water - our most important of resources should not be sold off as a roadway for these tarsands, our future depends on it and minnesota is rich with it.

6) I am opposed as a thinking, taxpaying citizen to paddling backwards in our energy future. I dont want you or me to be part of the generation that allows this when there are alternatives

In conclusion:

I ask you to be a strong leader by showing you will not cave to these dirty tarsands and the company that will bring them thru our most vulnerable resource. Please support the innovations of the bright + imaginative leaders that can bring us forward with green energy. Sincerely, Sue Cohee

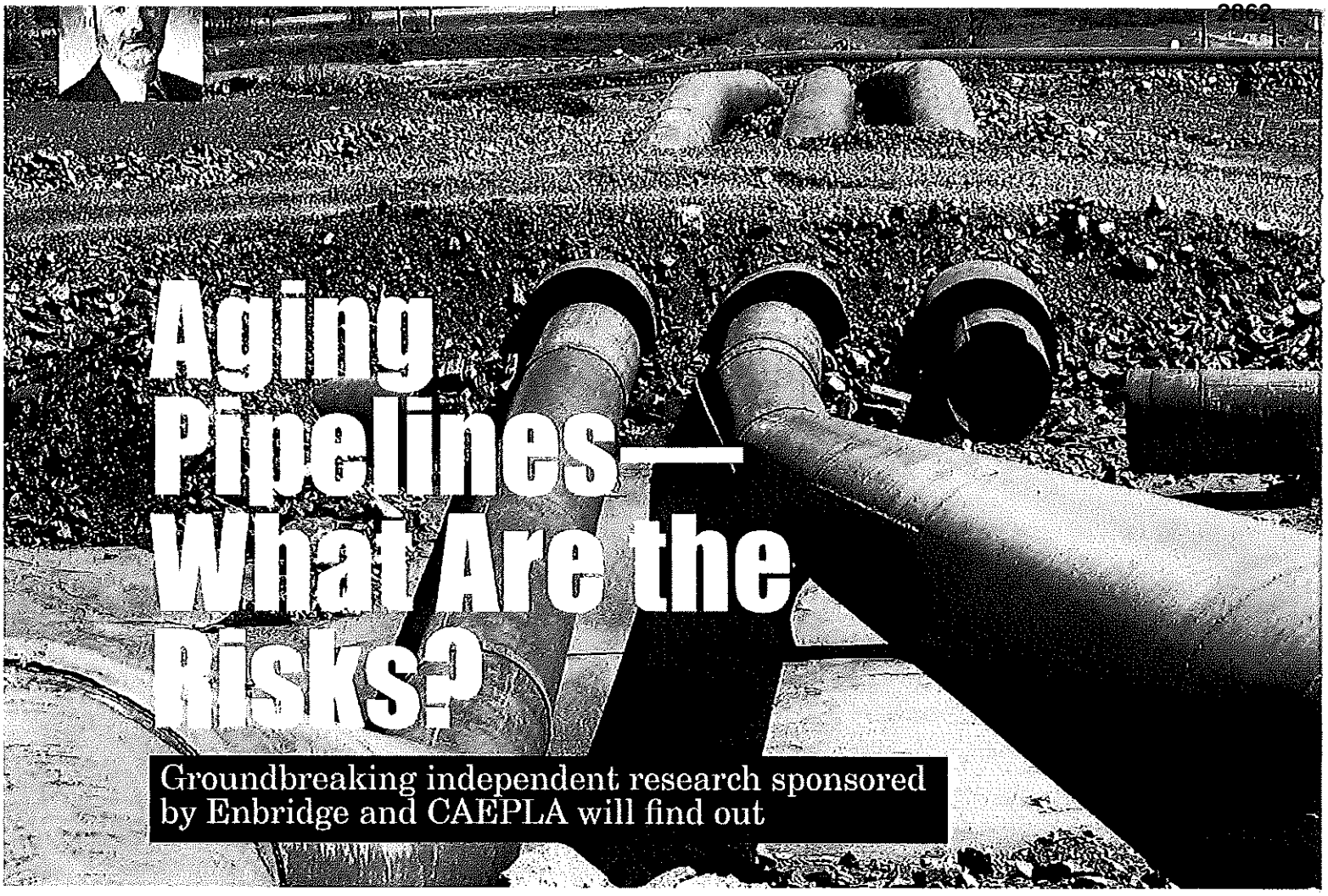

Aging Pipelines—What Are the Risks?

Groundbreaking independent research sponsored by Enbridge and CAEPLA will find out

Canada's nationally regulated oil and gas pipelines were originally constructed more than 50 or 60 years ago. Many of these pipelines are reaching the end of their useful economic life. The National Energy Board (NEB) has the regulatory authority to authorize pipeline companies to decommission or abandon these pipelines.

While the NEB has implemented a toll surcharge to generate funds for this purpose, the abandonment funding currently being generated will be sufficient only to accomplish removal of approximately 20 per cent of this pipeline infrastructure. Landowners across Canada who may be left with the remaining pipelines buried in their lands are becoming increasingly concerned about resulting interference with their agricultural operations, human and livestock health and safety risks, and potential future costs and liabilities.

In a decision released April 25, 2016, the NEB granted Enbridge Pipelines Inc.'s application for authorization to decommission its aging Line 3 pipeline in Western Canada and to replace it with a new Line 3 pipeline in an adjacent easement.

CAEPLA, the Manitoba Pipeline Landowners Association (MPLA) and the Saskatchewan Association of Pipeline Landowners (SAPL) jointly intervened in this proceeding to represent their landowner member interests with respect to Line 3 decommissioning. Enbridge's Line 3 decommissioning plan contemplates leaving the decommissioned Line 3 pipeline in place after internal cleaning while continuing cathodic protection to reduce corrosion rates as well as periodic monitoring for ground subsidence.

In responding to Enbridge's proposal, CAEPLA/MPLA/SAPL raised landowner concerns including definition of appropriate cleaning criteria; development of segmentation methodology to prevent the pipeline becoming a conduit for ground water and contaminants; and hazards

istockphoto.com

for agricultural equipment, people, machinery and livestock that could result from pipe collapse and ground subsidence.

Enbridge has acknowledged that the extensive disbonding of the Line 3 polyethylene tape pipe coating will render cathodic protection ineffective to prevent corrosion, and has estimated time to through-wall penetration at 25 to 50 years. Progressively greater agricultural surface loads increase the potential for pipeline collapse and ground subsidence. In addition to health and safety concerns and related costs and liabilities, topsoil loss upon ground subsidence would result in permanent long-term production losses.

In the negotiated settlement resolving landowner concerns with respect to the new Line 3 construction in March 2015, CAEPLA/MPLA/SAPL and Enbridge agreed to continue consultation on how to resolve these Line 3 decommissioning issues. CAEPLA/MPLA/SAPL and Enbridge subsequently concluded and filed with the NEB a further Settlement Agreement addressing Line 3 decommissioning.

Under the terms of this agreement, Enbridge acknowledges its liability with respect to decommissioned or abandoned pipelines and agrees to implement measures similar to active pipelines to maintain depth of cover, facilitate crossing with agricultural equipment and address subsidence/drainage issues.

Recognizing the considerable uncertainties related to anticipated Line 3 corrosion rates, pipe collapse potential and resulting implications for landowners, CAEPLA/MPLA/SAPL and Enbridge agreed to jointly commission and direct independent, third-party research at a Canadian university to study the impacts of decommissioning and abandoning pipelines in place, with a view to further defining the associated risks and consideration of alternative decommissioning/abandonment methodologies.

Enbridge is responsible both for the funding of this research project and for the costs of CAEPLA's participation, including CAEPLA's own independent consultants. As part of this agreement, Enbridge has also provided to landowners a prepayment to be applied on account of possible future decommissioning or abandonment damages.

In its decision granting Enbridge's application for Line 3 decommissioning, the Board references the CAEPLA/MPLA/SAPL – Enbridge Settlement Agreement:

"The Board views this Agreement as a positive initiative and found it to be a persuasive factor in favour of the reasonableness of Enbridge's decommissioning plan... The Board expects Enbridge to continue to consult with affected... landowners during the Decommissioning Activities and the Decommissioning Period and periodically reassess the constraints and hazards that limit pipeline removal to arrive at a solution that is agreeable to all parties, based on site-specific circumstances."

While authorizing Enbridge's Line 3 decommissioning, the Board expressly states:

"However, this does not mean that the Board will not order pipeline removal in a future case, should the evidence support it. It also does not mean that the Board will not order the removal of the Decommissioned Line 3 Pipeline in the future if circumstances change. This may occur where the benefits of removing certain segments of the Existing line 3 Pipeline outweigh the risks of the pipeline remaining in-place."

The CAEPLA/MPLA/SAPL – Enbridge jointly commissioned study represents part of Enbridge's required Line 3 decommissioning continuing landowner consultation. This research is now underway at the University of Calgary. It is an important first step to better defining the risks and liabilities of pipelines decommissioned and abandoned in place, and to developing acceptable methodologies to reduce these risks for landowners.

The final report that results from this research will assist landowners, the industry, and regulators in addressing these issues as Canada's aging energy pipeline infrastructure is removed from use. It is anticipated that this report will be filed with the NEB prior to Line 3 decommissioning and will then form the basis for regulatory approval for possible required changes to Enbridge's current Line 3 decommissioning plan. ●

First steps

The CAEPLA – Enbridge jointly commissioned study is now underway at the University of Calgary. It is an important first step to better defining the risks and liabilities of pipelines decommissioned and abandoned in place and to developing acceptable methodologies to reduce risks for landowners.

— Paul G. Vogel is a partner in the London, Ont., law firm of Cohen Highley LLP. He practises in the area of commercial litigation and environmental law.

Levi, Andrew (COMM)

From: Bev Cole <colebev@gmail.com>
Sent: Monday, July 10, 2017 11:29 AM
To: MN_COMM_Pipeline Comments
Subject: Public Comment (CN-14-916 PPL-15-137)

RE: CN-114-916 and PPL-15-137)

Dear Environmental Review Manager,

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. I have heard that Enbridge redacted those numbers from the public version of the DEIS. Without them, there is no reliable way an independent party to verify their results.

I believe that in order for Minnesota citizens and agencies to make an educated decision about Line 3, that information must be available, and why Enbridge won't release it. Please insist that Enbridge provide their data on oil releases and spills in Minnesota. Also, why was an engineering firm called Cardno, with ties to Enbridge, instrumental in preparing part of the draft Environmental Impact Statement for Line 3. In light of this fact, in the final EIS I would like to see an independent analysis of the information they provided. Verified facts for such a large project are critical.

If Enbridge objects due to security reasons, then I would like to know why they have failed to cover the exposed pipes in the Tamarack River in northwest Minnesota, and why they allow people to joyride over exposed pipes south of Clearwater. This is surely a security issue as well. For Enbridge to pick and choose what issues warrant "security," is unacceptable.

The water that could be impacted by this pipeline is some of the cleanest and purest water in the world. Clean water is becoming increasingly scarce. It is so important to that we take the responsibility of protecting very seriously.

Sincerely
Beverly Cole
650 Mountain Meadows Rd
Boulder, CO 80302

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

Construction of pipelines has proven to increase sex trafficking in whatever city its in.

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

D. Coles
Minneapolis, MN

Levi, Andrew (COMM)

From: Eric Coletta <ecoletta@LSconsulting.com>
Sent: Tuesday, June 27, 2017 10:23 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

As an engineer this is a project that needs to be executed. It is crucial to the our states economic, social, and environmental well being, especially in the rural communities the line passes through. This project will create thousands of construction jobs that will bring more money in a few months than some of the rural communities see in multiple years. Having been on other pipeline projects around the country I have seen this first hand. Hotels that are otherwise empty are now charging 2-3 times what they normally cost and don't have enough rooms for the demand. Restaurants and other establishments that are struggling are now packed wall to wall with people. This project could make or break some of these communities. Environmentally this project also makes sense. This is an aging pipeline that has already seen decreases in operating pressure to prevent an environmental disaster. The technology this line posses currently is no where near what is installed today. Pipe with better chemistry, coatings applications that seal the pipe from the elements, smart valves that can detect and stop a release without human error, and other components that posses the best technology in the world to make this a safer, more reliable product. The Enbridge preferred route is also the best route this line could take. It follows an existing infrastructure corridor for an extensive period which means less disturbance to the land as there are less trees being cut down, not disturbing ground that has otherwise been untouched, and it makes it easier to restore the area to it's existing condition. This is a project that has been well thought out and heavily scrutinized by Enbridge and the public and it shows in the way this is being planned.

I support the building of the Line 3 replacement project and I hope my statement here has helped in the influencing of regulators to approve the DEIS and issue the appropriate permits to allow construction.

Thank you,
Eric Coletta

Sincerely,

Eric Coletta
606 E 8th St
Superior, WI 54880
ecoletta@LSconsulting.com

Levi, Andrew (COMM)

From: Nick Compton <ndcompton@live.com>
Sent: Friday, June 16, 2017 8:28 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137 Line 3 Replacement Project DEIS

To Whom It May Concern,

I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3. Please keep the EIS timeline to the statutory deadline of 280 days.

Replacing Line 3 will ensure North America and the US their energy independence and remove any reliance on foreign fossil fuels.

Kindest Regards,
Nick Compton

Levi, Andrew (COMM)

From: Nick Compton <nick.compton@enbridge.com>
Sent: Friday, June 16, 2017 8:32 AM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

The MPCA has recently released the Mississippi River Watershed report that shows the cleanest waters in the state are in northern Minnesota. This demonstrates that energy infrastructure and clean waters can co-exist and Enbridge has been a leader in energy transportation in Minnesota since the 50's.

No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS.

Kindest Regards,
Nick Compton

Sincerely,

Nick Compton
5365 S Hudacek Rd
Superior, WI 54880
nick.compton@enbridge.com

Levi, Andrew (COMM)

From: John Condon <john@usmagnetix.com>
Sent: Friday, July 07, 2017 11:45 AM
To: MN_COMM_Pipeline Comments
Subject: Comments regarding The Draft Environmental Impact Statement (DEIS) docket numbers CN-14-916 and PPL-15-137

"Minnesota is uniquely rich in clean water, the resource we are dependent on for our survival. The Draft Environmental Impact Statement (DEIS) should be our assurance that the water will be protected. What I learned instead is that the DEIS provides inadequate information and when the information is sufficient, it only reiterates the risk of running a pipeline through the heart of Minnesota's water.

Enbridge's preferred Line 3 route in MN crosses:
192 Water Bodies
39 Sensitive/Specially Designated Surface Waters due to their water quality and beneficial use
17 designated trout streams and protected tributaries (Ch 5, pg 62).
7 Rivers, Federally protected on Nationwide Rivers Inventory (NRI) 2 crossings of 2 rivers, 9 River Crossings
Kettle River, tributary to the Wild and Scenic St Croix, twice
MN Statute 103F.305 Scenic River Protection Policy
Wild Rice-some of largest wild rice beds in the world- DEIS is reprehensible to Native communities!
3 Major Watersheds
Red River of the North
Mississippi
Lake Superior
Critical Drinking Water Sources

This is ICONIC Minnesota!
Construction and what Enbridge calls "accidental crude oil releases," or oil spills, are a threat to all waters. In the interest of time, I will focus on river crossings.

Some examples of the LINE 3 CONSTRUCTION impacts:

"During construction, surface water may become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals." "To protect surface water resources, the Applicant would store petroleum products, hazardous chemicals, and lubricating oils; conduct refueling, maintenance, and lubricating operations; and perform concrete coating activities in upland areas more than 100 feet from surface waters" (Appendix E). Ch 5.2.1.4. (Ch 5, pg 69)
I question if the DEIS is seriously considering the impacts of Line 3? When I wash my dishes in the Boundary Waters Canoe Area Wilderness (BWCAW) the US Forest Service rule is 150 feet from shore with dish soap. This DEIS is allowing hazardous chemicals at 100 feet from shore?!?

Changes in Stream Flows from Water Withdrawals and Discharges. Over 100 million gallons of Minnesota's precious waters will be used for hydrostatic testing, dust control, trench watering. An additional undisclosed amount of water will be used for Horizontal Directional Drilling (HDD) Ch 5.2.1.4 (Ch 5, pg 67). Further, when HDD goes awry, a frac-out, or spill of drilling fluid, the release can "cause long-term impacts on the aquatic ecosystem."Ch 5.2.1.4 (Ch 5, pg 72) No worries though, as Enbridge has a response plan. At in-stream locations an "observer will document and monitor release. In general, containment is not feasible for in-stream releases." Enbridge Drilling Mud Containment, Response, and Notification Plan (Ch 4.3, page 3)
Preferred Line 3 would cross flowing water more than 80 times and when HDD is used and there is a frac-out, Enbridge will monitor it but not contain it because it isn't feasible?

Even if we escape a frac-out, we still face routine pipeline construction practices that "alter and degrade aquatic habitat through increased sedimentation and erosion, disruption or alteration of streamflow, and streambank disturbance." Ch 5.2.1.4 (Ch 5, pg 70)

To summarize construction, hundreds of millions of gallons of Minnesota's fresh water will be used, while more fresh water is at risk to be impaired during routine construction practices and when HDD goes awry in a frac-out. Remember, all of this risk and we haven't even begun running tar sands oil through the pipeline.

Moving on to "ACCIDENTAL OIL RELEASE" impacts:

According to Table 10.2-1 Ch 10.2.4.1.1 (Ch 10, pg 17) the overall annual probability of a spill incident at any given place with the preferred route is .249 with a recurrence interval of 4. Each year there is approximately a 25% chance that there will be an oil spill on Line 3 and one oil spill every 4 years. That is an absurd risk to Minnesota's water! We would not accept a 25% chance of poisoned water every time we go to a faucet for a drink. If we do not accept this high probability risk in our daily life, why would we with Line 3?

"It is impossible to predict where a spill would happen, the quantity of oil involved, how far the impacts would extend, or exactly what resources would be affected. In part, this is because there are so many incident specific factors involved" Ch 10.1 (Ch 10, pg 1).
This is not the original Line 3 of the 1960's-we are not ignorant to the impacts of spills; one only needs to turn to Enbridge's history of 800 spills in the last 15 years, including the largest inland oil spill in US history (1.2 million gallons into the Kalamazoo in 2010). You have brilliant engineers on staff, put them to work and make it possible!

The DEIS uses the 10 mile downstream Region of Interest (ROI) to predict impacts of a spill Ch 10.4.1 (Ch 10, pg 40). Is a ten mile analysis supposed to make us feel safe?! 10 miles is an enormous impact in a water rich environment but Kalamazoo illustrates that the impacts can be at least 35 miles downstream. United States Environmental Protection Agency-Enbridge Spill Response Timeline

"little research has been conducted on the toxicity of dilbit to organisms." WHY not? "The components of the diluents are commonly found in other crude oils; however, bitumen additionally contains several potentially toxic metals, stable and persistent resins," etc Ch 10.3.1.1.2 (Ch 10, pg 26 & 27).
Are you serious? Little research has been conducted on toxicity to organisms, we have no idea what we are dealing with as Enbridge will not release the chemical composition (considered "trade secret") and dilbit clean up is admittedly difficult! Ch 10.3.1.1.2 (Ch 10, pg 26)

DEIS analyzes alternative routes for transporting tar sands oil. These alternatives are supposed to be reasonable; clearly they are not. For example, the rail alternative is unrealistic, economically infeasible and not logically sound, as it proposes to maintain the pipeline on either side of Minnesota border and build a new rail line to transport through Minnesota (Ch 4, pg 10). Also, Enbridge's preferred route does not ensure the safety of Line 3 in a water rich environment. Enbridge is a 60 billion dollar corporation (2015 statement) and this is their best? I find it ironic, then, that Enbridge claims the following:
" At Enbridge, we take great pride in meeting our primary responsibility of safely and reliably delivering oil and natural gas to people across North America…At the same time, we recognize that our relationship with hydrocarbons comes with great responsibility. As society looks to greater use of green energy over the long term, we must lead the way now in supporting these naturally occurring sources that are continually replenished." (Enbridge website) If this is the case, "lead the way" and include the data in the DEIS comparing renewable energy as an alternative.

This DEIS demonstrates the inherent risk of running a pipeline through a water rich environment. We can do better than this! Clean water is what connects us all and we must work together to protect it for life!

In focusing on the flowing water (rivers, streams, brooks) impacted by Line 3, the interconnected of our water becomes clear. Using a Minnesota Department of Commerce interactive map, I was able to follow the path of Line 3, looking specifically at where Line 3 crosses rivers, streams and creeks. I located at least 41 named flowing water bodies and numerous others, unnamed. Of the 41, it is not uncommon to have multiple crossings, making Line 3's crossings over flowing water greater than 80 times.

RIVERS, STREAMS, BROOKS CROSSED BY LINE 3

Mississippi River-crosses twice in MN
1st time near Lake Itasca-headwaters of Mississippi
2nd time near Palisade-Great River Road, intersection of 3 and 5

River crossings in order NW to SE
Pembina River
Tongue River
Red River of the North

Tamarac River, forks and tributaries-4 times
Middle River
Swift Coulee-2 times
Snake River-2 times
South Branch Snake River
Black River
Red Lake River and tributaries-11 times
Clearwater River-4 times
Lost River-7 times
Silver Creek-6 times
Walker Brook-2 times
Mississippi River (near Itasca)
Hay Creek
Straight River
Shell River-4 times
Fish Hook River
Crow Wing River
Big Swamp Creek-2 times

South Fork Pine River
Pine River
Blind Lake Creek
Hay Creek
Daggett Brook
Spring Branch
Moose River-2 times
White Elk Creek-2 times
Willow River
Mississippi River (near Palisade, MN)
Sandy River-3 times
West Branch Kettle River
Heikkila Creek
Kettle River
West Fork Moose Horn River-2 times
King Creek
Park Lake Creek
Moose Horn River
Blackhoof River-2times
Clear Creek
Pokegma River
Numerous other unnamed creeks, brooks”

Thank you for your consideration and please show the moral conviction needed to save our state from this potential environmental catastrophe

,

John Condon

US Magnetix
7140 Madison Ave W.
Golden Valley, MN 55427
Phone: 763-540-9497, Fax:763-540-0142
usmagnetix.com

Levi, Andrew (COMM)

From: Pat Loban <PMLOBAN@msn.com>
Sent: Monday, July 10, 2017 3:50 PM
To: MN_COMM_Pipeline Comments
Subject: public comment

"Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economic analysis for the EIS to be complete.

I have heard that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state* need (not a national need). Even if we used statistics about the national need, U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply needed oil. (http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf)

I would like to see this information mentioned in the final EIS.

I understand that an engineering firm called Cardno, with ties to Enbridge, was instrumental in preparing part of the draft Environmental Impact Statement for Line 3. In light of this fact, in the final EIS I would like to see an independent analysis of the information they provided. Minnesota requires verified facts for such a large project.

Thank you,

Kelly Conger
Father Foley Drive
Pine River, MN 56474

Levi, Andrew (COMM)

From: Pat Loban <PMLOBAN@msn.com>
Sent: Monday, July 10, 2017 3:52 PM
To: MN_COMM_Pipeline Comments
Subject: Fw: public comment

"Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economic analysis for the EIS to be complete.

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I would like to see this information mentioned in the final EIS.

I understand that an engineering firm called Cardno, with ties to Enbridge, was instrumental in preparing part of the draft Environmental Impact Statement for Line 3. In light of this fact, in the final EIS I would like to see an independent analysis of the information they provided. Minnesota requires verified facts for such a large project.

Thank you,

Mary Conger
8793 Father Foley Drive
Pine River, MN 56474

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement.** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Matt W Conito	218-391-2280	MConito@gmail.com

ADDRESS: 4315 Tondryk Rd

CITY, STATE, ZIP: Saginaw, MN 55779

COMMENTS: This Job will Keep Me busy at Work.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Liam Conroy
To: MN_COMM_Pipeline Comments
Subject: Regarding Docket numbers CN-14-916 & PPL-15-137
Date: Wednesday, May 31, 2017 8:18:56 PM

To Whom it May Concern:

Regarding Docket numbers CN-14-916 & PPL-15-137
Please think of the generations who will come after us. The United States of America should not seek to be the place where greed wins over human decency, where money and profits are more important than the health and safety of human beings.

I emphatically do NOT agree with President Trump's vision of making America great.

Let's make America wise, good, and compassionate!

Sincerely,

Liam Conroy

Virus-free. www.avg.com

From: Mary Conroy
To: MN_COMM_Pipeline Comments
Subject: Stop the Line 3 pipeline
Date: Wednesday, May 31, 2017 4:47:45 PM

Regarding Docket numbers CN-14-916 & PPL-15-137

Please think of the generations who will come after us. The United States of America should not seek to be the place where greed wins over human decency, where money and profits are more important than the health and safety of human beings.

I emphatically do NOT agree with President Trump's vision of making America great.
Let's make America wise, good, and compassionate!

Sincerely,
Mary B. Liguori Conroy
2412 Elder Drive
Owensboro, KY 42301
270-684-5552

Levi, Andrew (COMM)

From: Brydon Ross <BRoss@hbwresources.com>
Sent: Monday, July 10, 2017 4:50 PM
To: MN_COMM_Pipeline Comments
Subject: CEA Letter for Line 3 Replacement/ Docket Number: CN-14-916 and PPL-15-137
Attachments: CEA Line 3 Support Letter 7.10.17.pdf

To whom it may concern,

Attached please find a letter of support from Consumer Energy Alliance for the Line 3 Replacement Project/ **Docket Number: CN-14-916 and PPL-15-137**.

Sincerely,
Brydon Ross
VP of State Affairs
Consumer Energy Alliance

CONSUMER ENERGY ALLIANCE
THE VOICE OF THE ENERGY CONSUMER

July 10, 2017

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

RE: Docket Numbers CN-14-916 and PPL-15-137

Dear Ms. MacAlister:

On behalf of Consumer Energy Alliance (CEA) and our 82,000 members in the Great Lakes Region, I write today to share our strong support for Enbridge's Line 3 Replacement Project as well as the certificate of need and preferred route applications.

Founded in 2006, CEA is a nonpartisan, nonprofit organization advocating for a balanced energy policy and responsible access to resources. CEA represents virtually every sector of the U.S. economy – from the iron and steel industry to truckers, airlines, agriculture, restaurants, chemical manufactures, small businesses, and every day families all across the nation – that are concerned about U.S. energy policies, energy security, and long-term price and supply stability. CEA has more than 450,000 individual members and almost 300 corporate and non-profit affiliates throughout the United States.

Our members support a rational, all-of-the-above energy policy that utilizes all of our domestic natural resources – both traditional and renewable. With this in mind, we feel it's vital for policymakers to know the importance affordable, reliable energy has on the finances of families, farmers, and small businesses. They need stable and predictable energy delivery that pipelines bring to help them power their lives, make payroll, and travel for their daily commute to work and to enjoy the tremendous natural beauty Minnesota has to offer.

This is why it is so critical that Line 3 is replaced and upgraded to continue to meet the energy needs for families, seniors, households, motorists, and businesses across the state.

Upgrading Line 3 will provide tremendous economic benefits with over $2.1 billion in new investment and over $330 million in new payroll for workers in Minnesota. Local communities that rely on tax dollars provided by the pipeline to help fund schools, roads, and first responders would also see significant new revenues for construction and related activities. According to a study by the University of Minnesota Duluth, the Line 3 Replacement project will create 8,600 jobs - with 76 percent being local.

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consumerenergyalliance.org

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THE VOICE OF THE ENERGY CONSUMER

Those are incredibly compelling numbers, but it also begs the question – what would Minnesota families and those struggling to make ends meet do without pipelines like Line 3? Our very way of life is dependent upon the energy delivery these quiet workhorses supply every day.

We appreciate the opportunity to provide these comments and would like to urge the approval of this critical project and its certificate of need and preferred route applications. Should you have any questions, please contact our Executive Director of CEA - Midwest Chris Ventura at cventura@consumerenergyalliance.org.

Sincerely,

Brydon Ross

Brydon Ross
Vice President of State Affairs

2211 Norfolk Street | Suite 410 | Houston, TX 77098 | 713.337.8800
consumerenergyalliance.org

Levi, Andrew (COMM)

From: Natalie Cook <natalie.cook@sierraclub.org>
Sent: Monday, July 10, 2017 11:24 AM
To: MN_COMM_Pipeline Comments
Subject: DEIS Comments
Attachments: 0301_001.pdf; 0300_001.pdf; 0299_001.pdf

Attached please find letters for the docket CN-14-916 and PPL-15-137.

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To the MN Dept of Commerce
Re: Docket numbers CN 14-916 & PPL-15-137

I am a lifelong resident of Minnesota and I am writing to register my serious concerns with the draft EIS related to the Line 3 replacement proposal. I feel the dEIS is woefully inadequate and doesn't fully address the grave problems related to Line 3.

First, although the dEIS acknowledges that Line 3 will have a severe impact on local communities along its proposed route, it doesn't appear that that threat of severe & long term consequences to these communities to be legitimate cause for declining the permit.

Second, the dEIS does not adequately explore the effects the proposed Line 3 will have on the ecosystems & natural habitat in its path. The proposed route passes through many pristine northern lakes. The dEIS does not adequately examine what would be the impact of a spill, which we know is likely at some point given the experience of other pipelines. Given that the route passes through the Lake Superior watershed there could be serious harm to Lake Superior, one of the most precious fresh water bodies in the world. The dEIS says that Enbridge will develop a containment plan, but that is not enough.

All told, Line 3 presents enormous risks to ecosystems, communities & habitats ~~without~~ that far outweighs any potential benefits. In fact, it is unclear what the benefits to MN would be beyond several hundred short-term construction jobs.

We really need MN's leaders to be demonstrating visionary, innovative thinking about investments & infrastructure developments. We know that renewable energy is the way of the future and presents vast opportunity for jobs, economic growth, support of communities & individuals without the tremendous risks. Innovation has been key to our country's leadership ~~[illegible]~~ & success throughout our history.

Please consider the deficiencies of this dEIS & the Line 3 project as a whole & urge No permit.

Sincerely
Emily Green

3432 Park Terrace
Mpls MN 55406

7-8-2017

To Minnesota Department of Commerce
Docket Numbers CN-14-916 and PPL-15-137

I work on environmental issues at my church, First Universalist, am a recycling and composting block leader in my Minneapolis neighborhood and a member of several environmental groups including Sierra Club, MN 350 and Fresh Energy. I am also a Minnesota State Park camper and hiker and attend our UU camp on Star Island.

Chapter 6 of the DEIS says Enbridge's preferred route would impact more wild rice, lakes and areas rich in biodiversity. I am greatly concerned about the effects it would have on the lakes and streams where I camp, hike and visit. We need to protect our natural resources - lake, streams - especially in northern Minnesota where nature and tourism are thriving businesses.

As a member of Honor the Earth organization ~~you~~ I think the Department of Commerce needs to acknowledge its pattern of structural racism which was well documented in 2014 study of MN Dept. of Health. The DEIS needs to fully consider the disparities and health inequities that are placed on tribal communities.

Thank for your consideration.

Cecelia Newton
5516 Irving Ave S.
Minneapolis, MN 55419

7/8/2017

To: MN Department of Commerce

Re: Docket #'s CN-14-916 + PPL-15-137

My name is Phillip Kelly and I'm a resident of Minneapolis, MN. I'm writing to you with heavy criticism of the Draft Environmental Impact Statement and a strong opposition to the Line 3 Replacement Plan.

As a resident of the Land of 10,000+ Lakes living just a few blocks from the Mississippi River, water quality, and its protection for current and future generations, is immensely important to me. That's why I was extremely saddened to see that the water quality risks and tribal water rights were simultaneously recognized and dismissed by the DEIS.

What I mean by this is that despite recognizing that Line 3 "would have a long-term detrimental effect on tribal members and tribal resources" (9.6); "impacts associated with the Proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3); the preferred route impacts the most number of wild rice lakes (Fig. ES-10); and the DEIS annual probability of pinhole leaks,

Small spills, and catastrophic spills range anywhere from 1% to over 100%, the DEIS still is not exploring to the fullest extent possible the necessity and benefits to closing down the pipeline with no replacement.

In a state that was founded on stolen tribal land and needs to import all of its fossil fuels, not having our own sources, we have the moral and financial obligation to curb fossil fuel use to the point of elimination and in doing so stop enabling its use in other places of the country + world by stopping transportation of fossil fuels through our state - ultimately respecting tribal rights to clean water by eliminating risk of spills.

The DEIS needs to be revisited and fully explore the necessity of not replacing Line 3 and benefits. Doing so will fully examine the contributions that Tar Sands have to climate change and our current role in enabling the tribal violations on land where tar sands are exploited. Current tribal rights + exploitations that are already identified in the DEIS must be centered in the report and play a more essential role in showing why the Line 3 should not be replaced, but rather responsibly excavated + disposed of.

Thanks for taking time to read my comments,

Phillip Kelly
1419 Washington Ave S
Mpls, MN 55454

Levi, Andrew (COMM)

From: Natalie Cook <natalie.cook@sierraclub.org>
Sent: Monday, July 10, 2017 11:34 AM
To: MN_COMM_Pipeline Comments
Subject: DEIS Comments
Attachments: DEIS Comments 1.pdf; DEIS Comments 2.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Attached please find comments from concerned Minnesotans on the Line 3 DEIS. Docket number CN-14-916 and PPL-15-137.

Please let me know if you have any technical problems or questions for these documents.

Sincerely,
Natalie Cook

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Natalie Cook
Associate Organizer

612-259-2445
cell 651-295-3483

Stop Enbridge Oil and Tar Sands Pipeline Expansion (CN-14-916 and PPL-15-137)

Dear Minnesota Deptarment of Commerce,

I'm writing to express my concern regarding the Draft Environmental Impact Statement (DEIS) for the proposed expansion and reroute of the Line 3 pipeline. I thank the Department of Commerce for preparing the DEIS; however, it fails to establish a need for the proposed project, as well as to account for numerous risks this project poses to the environment. The DEIS fails to prove that the new tar sands oil pipeline is needed, especially as Minnesota?s oil consumption rates have continued to drop. Expanding Line 3 will increase climate pollution, but the DEIS fails to adequately account for the climate impacts of extracting and burning an additional 400,000 barrels per day of tar sands. The DEIS does not accurately consider the amount of oil flowing in existing and nearly completed pipelines around Minnesota. For example, the Alberta Clipper pipeline is listed as carrying 570,000 barrels per day when it really carries nearly 800,000 barrels per day. Further, the DEIS assumes the increased flow of tar sands even if the expansion is denied, when it should instead consider the effects if the proposal is denied and resulting in no increase in tar sands flow. The DEIS assumes that more tar sands will move through Minnesota, by train or truck, even if the pipeline expansion and re-route is denied, based on an unlikely and unreasonable scenario, given the low price of oil and the high price of trucking or moving tar sands by train. The DEIS fails to consider the effects if the expansion and re-route are denied, and there is no increased tar sands transport through the state. A recent National Academy of Sciences report found that cleaning up a tar sands spill in a waterway is much more difficult and up to 14.5 times more expensive than cleaning up a non-tar sands oil spill. Enbridge has a history of spills and greater scrutiny is needed for spill clean-up, permanent damage to waterways, impacts to Minnesota's economy and the threat to Ojibwe wild rice

First Name	Last Name	Address1	Address2	City	State	Postal Code	Personal Message
Alice	Welna	300 N College St		Northfield	MN	55057	
Jan	Hayne	15535 100th St N		Stillwater	MN	55082	
Steve	Wentworth	3801 W 98th St		Bloomington	MN	55431	
Philip	Rampi	2150 Jefferson Ave		Saint Paul	MN	55105	
Laurie	Hardies	2082 Jade Ln		Eagan	MN	55122	
Linda	Rauch	26557 135th Ave		Sebeka	MN	56477	This is just another way to destroy our environment.
Jeff	Stromgren	711 W Lake St		Minneapolis	MN	55408	
Michael	Monsor	17625 11th Ave N		Plymouth	MN	55447	We don't need the tar sands oil or its pipeline. Please just say no.
Jim	Florance	20827 Howland Ave W	Apt 220	Lakeville	MN	55044	
Sharon	Root	504 Fairgrounds Rd		Marshall	MN	56258	
Mark	Vesley	1598 Edmund Ave		Saint Paul	MN	55104	
Lisa	Hensel	585 Barton Ave NW		Buffalo	MN	55313	
Steven	Jessen-Howard	3018 Leyland Trl		Woodbury	MN	55125	
Audrey	Ochocki	2007 17th St S		Moorhead	MN	56560	
Wade	Stebbings	2809 37th Ave S		Minneapolis	MN	55406	
Dale and Rosema	Johnston	14615 Oakwood Rd		Minnetonka	MN	55345	

Beth	Zaiken	5300 36th Ave S	Minneapolis	MN	55417	
Rebecca	Shockley	18 Barton Ave SE	Minneapolis	MN	55414	
Lance	Erickson	533 Polk St	Anoka	MN	55303	
Connie	Lipton	1665 Princeton Ave	Saint Paul	MN	55105	
Barbara	Martin	6452 45th St N	Oakdale	MN	55128	
Sarah	Hampton	1101 Linden St S	Northfield	MN	55057	
Brenda	Scott	5329 Woodlawn Blvd	Minneapolis	MN	55417	These lakes belong to all of us Minnesotans, and anyone who wants to come and enjoy the splendor of the state. They are not the preserve of corporations to exploit for their financial gain. They are also not the free sewers of corporations. They are our pristine lakes. Keep our lakes clean and our politics pure.
Stephanie	Sarid	10511 Cedar Lake Rd Apt 512	Minnetonka	MN	55305	
Elizabeth	Inserra	786 Evergreen Knls	Mendota Heights	MN	55118	
Nicholas	Adelman	1611 E 34th St	Minneapolis	MN	55407	
Lynn	Glesne	12888 E Lake Miltona Dr NE	Miltona	MN	56354	When a train derails & a car spills, there is a limited amount of oil which is usually accessible. Pipeline companies don't seem to be able to monitor, control or cleanup their spills. Besides oil will soon be going away like coal and these pipelines will be unnecessary!
Elizabeth	Taylor	5209 4th St NE	Columbia Heights	MN	55421	
Norma	Jimenez	2744 Ensign Ave N	Minneapolis	MN	55427	
Patricia	Richard-Amato	4004 London Rd Apt 1111	Duluth	MN	55804	
Jack	Bohnhoff	4109 79th Ln N	Brooklyn Park	MN	55443	Pipelines are inherently dangerous. Transport of tar sand-derived materials is way too dangerous at this time when renewables are ascendant and represent the future of energy.
Aimee	Wallace	8830 James Ave S	Bloomington	MN	55431	
Todd	Utecht	4657 Bamble Cir	Saint Paul	MN	55122	No, no, no, no!
V	Nordstrom	8722 Stanley Trl	Eden Prairie	MN	55347	Not in our state! I support natural alternatives to oil. Keep your profits out of the environmental decisions

Sue Ann	Daley Mathieu	13537 Maryland Ave	Savage	MN	55378	We don't need this in Mn and we don't want this pipeline in our state. Take it back to Canada. Don't spoil our our waterways with oil leaks
Renae	Kirgiss	4565 Lenore Ln	Eagan	MN	55122	
Loren	Kollmar	1801 Taylor St NE	Minneapolis	MN	55418	We don't need this, why risk it? That is gambling with chips that don't belong to you.
Jodi	Johnson	8213 3rd Ave S	Bloomington	MN	55420	Dear Members of MN PUC: I deeply and vigorously oppose this expansion and reroute. Our lakes, rivers, and soil are TOO IMPORTANT to risk on such a poorly considered, and higher priced(!), product and process. We do NOT need this oil. We need strong, effective leadership that steps up and takes responsibility and truly leads the way. That means no to this pipeline and yes to continued efforts with alternative sources of energy and ways to make them more effective and less expensive. The ailing and diseased oil industry does not need to go through some of their convulsions on our land and in our water and soil. Please say no to this. We are watching what you do and we will hold you accountable. Thank you.
Owen	Swerkstrom	5210 Villa Way Apt 342	Edina	MN	55436	
Jeff	Fitzkappes	134 Grove Ave	Montevideo	MN	56265	Please consider the long term environmental impact versus short term business deals. Thank you.
Ken	Harris	1933 Emerson Ave S	Minneapolis	MN	55403	
Kristin	Jonason	5325 Beard Ave S	Minneapolis	MN	55410	
Lisa	Severson	3617 Columbus Ave	Minneapolis	MN	55407	We can't afford to keep destroying our environment to line the pockets of oil companies.
Timothy	Mullen	1272 Richland Ave	Saint Charles	MN	55972	
Audrey	Fairchild-Ehm	1837 Fernwood St	Roseville	MN	55113	
John	Margotta	2830 19th Ave NW	Rochester	MN	55901	

Elizabeth	Merryman	3660 37th Ave S	Minneapolis	MN	55406	This is irresponsible and totally unacceptable to giveaway our clean land and water to corporate greed. The PUC owes citizens a true accounting of the cumulative impacts on communities, tribal lands, lakes and rivers, and our climate.
Noah	Chan	9010 60 1/2 Ave N	New Hope	MN	55428	We need to start taking responsibility for the leaks and pipeline breaks we know are inevitable. It will only cost more money to clean up these spills and more resources to build another pipeline; we have maxed out the amount of hits America and the environment we can take. If you have care for others' than yourself, your family, your kids, you will do what it takes to keep them safe and a part of a healthy world.
Judy	Basso	7353 Landau Dr	Bloomington	MN	55438	
Juliann	Rule	35002 115th Ave	Avon	MN	56310	
Robert	Wacholtz	3940 Lancaster Ln N Apt 232	Plymouth	MN	55441	
Gerald	Turbeville	10050 Indigo Dr	Eden Prairie	MN	55347	
Mandi	Manteufel-Underv	40045 County 45	Laporte	MN	56461	
Ramiro	Herrera	49200 State Highway 48 Unit 79	Hinckley	MN	55037	
Ramiro	Herrera	49200 State Hwy 48	Hinckley	MN	55037	
Christine	Popowski	2630 Pleasant Ave Apt 101	Minneapolis	MN	55408	
Kathleen	Iverson	2641 Jersey Ave S	Saint Louis Park	MN	55426	Minnesota is a beautiful State. We cannot destroy the amazing country God gave us! Our children and future generations will suffer for our actions. Why would anyone agree to such a devastating action?? Can we really do this to our State and those we love!
Anna Marie	Darland	909 E Travelers Trl	Burnsville	MN	55337	
Louise	Clarke	3453 16th Av S 612-724-3201	Minneapolis	MN	55407	
Richard	Olson	428 S 2nd St Unit 511	Minneapolis	MN	55401	
Jennifer	Neckermann	10996 Cedar Lake Rd	Minnetonka	MN	55305	
Kelly	Kirkpatrick	1115 East Center Street	Rochester	MN	55904	
Peggy	Endres	943 Wilder St S	Saint Paul	MN	55116	

Lori	Haaland	12245 Edison St NE	Blaine	MN	55449	Do not allow the Line 3 pipeline. It is a great danger to our water resources and Minnesota use of oil is dropping. The risks to the environment are too great, especiallycuz we are increasing our use of renewable energy. Please do not allow The Line 3 Pupelne to be built! We must protect our planet and Line 3 is not a good way to do that. Thanks!
Mary	Thul	436 Oday St S	Saint Paul	MN	55119	
Barbara	Brockway	233 Nichols Ct	Shoreview	MN	55126	
Mary	Polta	1610 Sunset Ave Apt 121	New Ulm	MN	56073	
Leslie	Boudrot	5626 Clinton Ave	Minneapolis	MN	55419	
Deidra	Nutt	11600 Palmer Rd	Minneapolis	MN	55437	
Shannon	Darsow	13376 Carrach Way	Rosemount	MN	55068	
Tamara	Sparks	3121 32nd Ave S	Minneapolis	MN	55406	This is contrary to our pledge to lessen pollution.
Marilyn	Borich	4427 Luverne St	Duluth	MN	55804	no - we don't need it and however much reassurance is offered, there is always a spill and who gets hurt - certainly not Enbridge - poisoning and polluting our planet just has to stop - almighty dollar be damned~~~
Gary	Fifield	1893 Berkeley Ave	Saint Paul	MN	55105	
Melva	Lacher	8062 Cleveland St NE	Minneapolis	MN	55432	Please do your job and protect all our Minnesota residents. Thank you.
Gene	Castro	203 Cambridge Rd	Hoyt Lakes	MN	55750	
Forest	Seaberg-Wood	1024 E 36th St	Minneapolis	MN	55407	
Theodore	Trevor	9509 Yukon Ave S	Bloomington	MN	55438	
Christine	Pruvot	108-951 Goldstream Ave	Lakefield	MN	56150	
Leslie	Boudrot	5626. Clinton. Ave	Minneapolis	MN	55419	
Dulcie	Berkman	700 2nd Ave NW	Rochester	MN	55901	
Jane	Dresser	1559 Glenbeigh Pl	Woodbury	MN	55125	
Alan	Olander	25998 277th Ave	Nevis	MN	56467	
Sara	Lamharzi	2303 22nd Ave S	Minneapolis	MN	55404	
Shawn	Kakuk	4340 Clearwater Rd Apt 106	Saint Cloud	MN	56301	
Eric	Maher	7511 Crocus Ct	Chanhassen	MN	55317	
John	Witek	2950 Dean Pkwy Apt 2302	Minneapolis	MN	55416	Protect MN!!!!
Kaitlyn	Scheid	15723 Sunset Trl	Pine City	MN	55063	
Kristel	Buck	2007 Schulenberg Aly	Stillwater	MN	55082	
Mike	Ferguson	104 Thomas Dr Apt 307	Mankato	MN	56001	
Kathryn	Mosher	4316B Clemson Cir	Eagan	MN	55122	Protect our water.

Katherine	Bohn	7000 149th Ln NW	Ramsey	MN	55303	We need to be relying on pipelines less and green energy more.
Inga	Palmquist	551 Boxrud St	Red Wing	MN	55066	
Signe	Erickson	2821 Texas Ave S	Minneapolis	MN	55426	Regardless of what Donald Trump thinks, this planet and majority of it's inhabitants want clean non fossil energy. We know these co.s are trying to tell us otherwise, businesses generally don't like change if not in their favor or they have failed to diversify... They need to invest as others have in renewables, stop this archaic form of energy and go with the right flow! We are tired of the spills, disaster zones, trashing the planet with little regard for future generations, water that is undrinkable, un- fishable, polluted land! Time to grow up, time for cleaner energy. The time is now.
Robert	Albers	2890 Arthur Pl	Roseville	MN	55113	People who are informed know that the future features sustainable clean energy, not fossil fuels that pollute the ground, water and air. The planet and people are more important than money, but one would NEVER know that the way America and its leadership are currently actomg/
Caroline	Doenmez	427 Herschel St	Saint Paul	MN	55104	Pipelines are dangerous and violate Indigenous sovereignty in Minnesota and in countless other locations across North America. We cannot continue to risk the health of our communities. I strongly oppose Line 3 and insist that we shift our focus to clean energy.
William	Gotz	1907 6th Ave SE	Austin	MN	55912	
John And Barbara	Mccashin	224 Kings Pointe Dr	Delano	MN	55328	
Steven	Oehlerich	1778 Linden Cv	White Bear Lake	MN	55110	
Cynthia	Whitman	2124 Stanford Ave	Saint Paul	MN	55105	No amount of financial benefit is worth putting our clean lakes and wildlife at risk
Richard	Krebs	149 E Rooney Ave	Appleton	MN	56208	
Michelle	Camp	5180 75th St SE	Rochester	MN	55904	
Kathleen	Warling	2017 2nd St	Lake Park	MN	56554	Water is the .most important resource
Gretchen	Meek	14812 Hickory Ct	Eden Prairie	MN	55346	

Phyllis	Vrzal	108 4th St SW	Montgomery	MN	56069	
Jean	Greenwood	4515 Garfield Ave	Minneapolis	MN	55419	
Stacey	Skinner	2933 41st Ave S	Minneapolis	MN	55406	Minnesotas waters are our most precious resource. We must do everything possible to protect them. Renewable homegrown clean energy should be Minnesota's future.
Jordan	Knobel-Piehl	13250 Galleria Ct	Apple Valley	MN	55124	I am a Minnesota citizen and I am strongly against any more oil pipelines. We NEED to phase oil consumption out of our lifestyle before we make the climate crisis even worse. We are ALREADY at 400ppm of carbon dioxide in the atmosphere and the sea level is ALREADY, therefore, going to rise 20 meters, swallowing Miami, Delaware, Houston, NYC, San Diego, San Francisco, Sacramento, London, Tokyo, the Netherlands, Dubai, Bangkok, Bangladesh, and Venice.
Stephen	White	25993 Steinbauer Dr	Minnesota City	MN	55959	
Tracy	Sides	209 8th St E Apt 107	Saint Paul	MN	55101	
Judy	Peterson	581 Atlantic Hill Dr	Eagan	MN	55123	
Jeff	Roberts	7609 Edinborough Way Apt 4214	Edina	MN	55435	
Sandy	Ness	4435 Kady Ave NE	Saint Michael	MN	55376	We do not need it and it will cost us too much in the future!
Pamela	Lyngen	26358 10th Street Cir	Zimmerman	MN	55398	
Becky	Holum-Brytowski	3148 90th Ave	Princeton	MN	55371	Line 3 is totally unnecessary and a detriment to our environment. We are so tired of these nasty pipelines. THEY ALL LEAK EVENTUALLY.
Gloria	Haider	124 3rd Ave N	Waite Park	MN	56387	You will need to prove that this pipeline is needed.
Mark	Thompson	4782 Sycamore Trl	Maple Plain	MN	55359	
David	Bridges	4201 Highland Dr	Saint Paul	MN	55126	
Emily	Feigenbaum	117 Portland Ave Apt 503	Minneapolis	MN	55401	
Erin May	Baker	1531 Xerxes Ave N	Minneapolis	MN	55411	
Peggy	Sannerud	412 E Mark St	Winona	MN	55987	It is not needed, and is too risky for Minnesota. Clean water is far more precious than oil. Thank you.
Lisa	Adams	1730 Graham Ave Apt 241	Saint Paul	MN	55116	No way!
Victoria	Williams	1107 35th Ave N	Saint Cloud	MN	56303	

Logan	Paul	3535 Grand Ave S #306	Minneapolis	MN	55408	
Donald	Hammen	4140 46th Ave S	Minneapolis	MN	55406	
Aubrianna	Schlottman	601 Airport Rd N	Dodge Center	MN	55927	
Brian	Henning	2200 Dixon Dr	Bloomington	MN	55431	
Anne	Dickson	401 W 3rd St	Duluth	MN	55806	
Eric	Zimmerman	1962 Grand Ave Apt 303	Saint Paul	MN	55105	
Stephen	Aleshire	8 Arbutus Dr	Duluth	MN	55810	Don't you dare put a filthy pipline through our state. It's bad enough we have to worry about polymet poisoning our lakes.
Lee	Waltz	3080 Rush Point Dr	Rush City	MN	55069	
Christine	Higgins	3801 38th Ave S	Minneapolis	MN	55406	Do what's best for Minnesota and not what's best for big oil profits!!
Margaret	Levin	1355 Lafond Ave	Saint Paul	MN	55104	
Mason	Holger	14305 46th Ave N	Plymouth	MN	55446	
Mason	Holger	14305 46th Ave N	Plymouth	MN	55446	
Maureen	Mccullough	625 E 18th St Apt 103	Minneapolis	MN	55404	
Susan	Sexauet	330 Basil St	Taylors Falls	MN	55084	
Keith	Rafferty	325 W 98th St	Bloomington	MN	55420	
Cheri	Haram	8013 6th St NE	Minneapolis	MN	55432	
Jason	Husby	3531 N 3rd St	Minneapolis	MN	55412	
David	Zimney	7110 Excelsior Way	St Louis Park	MN	55426	
Robin	Grothe	302 Doppy Ln	Le Sueur	MN	56058	Lets make a wise long term plan, not a short term greedy plan!!! Let think of future generations!!
Anita	Johnson	1243 Cherokee Ave	Saint Paul	MN	55118	
John	Ross	4540 Whitetail Way	Saint Paul	MN	55123	We need to start funding more clean energy options to gain energy independence. We have one earth to live on and we need to preserve it.
Jonathan	Pinkerton	2729 29th Ave S	Minneapolis	MN	55406	Pipelines have a history of leaking- there has never been one that hasn't. This is a terrible idea in so many ways, don't do this!
Anita	Mcmurtry	658 Front Ave	Saint Paul	MN	55103	
Ian	Radtke-Rosen	22300 Penn Ave	Lakeville	MN	55044	
Clayton	Sankey	6484 Kings Dr	Oakdale	MN	55128	
Margaret	Beegle	550 Varner Cir N	Golden Valley	MN	55427	

Cary	Anderson	3848 45th Ave S	Minneapolis	MN	55406	Why would we put Minnesota's waters at huge risk - c'mon, do you believe such a pipeline would not leak - for Enbridge, a totally irresponsible non American company that doesn't give a shit about their environmental legacy? Well guess what, I don't give a shit about Enbridge or their profit margins. I do care about Minnesota.
Karl	Hamann	213 Spring Creek Rd S	Red Wing	MN	55066	Tar sands oil= greenhouse death!
Micah	Johnson	1408 3rd Ave SW	Rochester	MN	55902	I do not believe the Line 3 pipeline is in the best interest of MN and its residents. Oil use is going to continue to decline as electric vehicle use ramps up. We don't need it and there's no reason to encourage the incredibly dirty tar sands extraction or use.
Denise Kay	Schowalter	1300 Yale Place | Apartment 106	Minneapolis	MN	55403	
Burt	Sundquist	1666 Coffman St Apt 328	Falcon Heights	MN	55108	
Alicia	Waters	83 California Ave W	Saint Paul	MN	55117	
Dennis	McManus	1421 E 2nd St Apt 4	Duluth	MN	55805	
Sandy	Bauter	398 10th St NW	Stewartville	MN	55976	
Gretchen	Bratvold	3444 Edmund Blvd	Minneapolis	MN	55406	
Donna	Olsen	5801 73rd Ave N Apt 110	Brooklyn Park	MN	55429	
Carol	Lugg	8195 Boulder Ridge Rd	Saint Paul	MN	55125	Let's do what's best for and protect our environment for our present and future generations to come.
Mary	Boyer	3554 Architect Ave	Minneapolis	MN	55418	
William	Ashwood	581 12th Ave NW	New Brighton	MN	55112	
Bruce	Sielaff	1314 Marquette Ave	Minneapolis	MN	55403	
Lucas	Schulze	1714 43rd Ave N	Minneapolis	MN	55412	Don't harm our lakes and lands!!!!!

Michael	Eggum	916 28th St SE	Brainerd	MN	56401	I believe the Paris deal was a suckers bet, and am thrilled we didn't get made fools of once again. But that doesn't mean we shouldn't do our best at keeping our planet as clean as possible. Get rid of crude all together! We have so many more options today then we did before. Clean energy is the way to go, it's common sense. Minnesota is a great place to live, I'd like to keep it that way. It's time to put your foot down and join the 21st century! Hell no to the pipeline and to the big oil company's all together.
Kathleen	Selz	220 Northland Ave	Stillwater	MN	55082	
Larry	Bogolub	1424 Lincoln Ave	Saint Paul	MN	55105	
Paul	Densmore	800 W 65th St Apt 102	Richfield	MN	55423	
Edna	Mullen	1272 Richland Ave	Saint Charles	MN	55972	
Paul	Densmore	800 W 65th St #102	Richfield	MN	55423	
Sarah	Stahelin	503 4th St SE	Bemidji	MN	56601	My daughter is a Leech Lake Band of Ojibwe tribal member. Her Tribe opposes this pipeline and to allow this pipeline in the face of such opposition violates tribal rights to the health and integrity of their lands, their rights to water, their right to hunt, fish and gather. We do not need or want another pipeline. We do not need or want to continue our unhealthy, unbalanced reliance on oil. Climate change is real, climate change is happening. Tar sands oil is oil we don't need.
Kathleen	Brummer	133 34th Ave N	Saint Cloud	MN	56303	
Lyn	Yount	11001 Oregon Ave S	Bloomington	MN	55438	
Linda	Gross	6645 Sandy Lake Rd NE	Tenstrike	MN	56683	I am dead-set against expanding this pipeline. It's about time that we take action to prevent big oil from negatively impacting our lands and waterways in MN.
Sally	Nichols	14754 Embry Path	Apple Valley	MN	55124	
Candi	Johnson	2305 Pinestar Ln SE	Rochester	MN	55904	
Elizabeth	Wroblewski	222 Amherst St	Saint Paul	MN	55105	

Courtney	Erwin	2609 Aldrich Ave S	Minneapolis	MN	55408	I am a new resident to the state of Minnesota and am excited and happy to enjoy the beautiful natural resources the state offers. This new pipeline will be a short-term solution to a long-term problem. Ignoring the natural environment of the state the appease out of country business would be a detriment to all Americans.
Aaron	Ochocki	3351 Portland Ave	Minneapolis	MN	55407	Please don't put Minnesota's fragile ecosystem in jeopardy. Do not expand or reroute the Line 3 pipeline. Thank you!
John	McGowan	301 Ryan Ave	Saint Paul	MN	55102	
Andrew	Bell	3400 Lyndale Ave S	Minneapolis	MN	55408	Leaks, spills and the further dependence on OIL is only one segment of the problem.
Richard	Lamb	4259 W Broadway Ave Apt 104	Robbinsdale	MN	55422	
John	Mckenzie	1671 Beech St	Saint Paul	MN	55106	A leak from this pipeline is inevitable. Minnesota can't afford a leak of tar sands oil, whether into a watershed, onto indigenous people's lands, or anywhere.
Andrea	Watson	601 N 27th Ave E	Duluth	MN	55812	
David	Westermoe	6311 Washburn Ave S	Minneapolis	MN	55423	
Rob	Lingelbach	1421 Yale Pl Apt 1801	Minneapolis	MN	55403	
Mike	Chutich	1283 Sargent Ave	Saint Paul	MN	55105	
Ashley	Bengtson	5527 Quail Ave N	Crystal	MN	55429	
Doreen	Kloehn	4036 Xerxes Ave S	Minneapolis	MN	55410	
Doreen	Kloehn	4036 Xerxes Ave S	Minneapolis	MN	55410	
Kathleen	Spencer	315 N Lake Ave Apt 229	Duluth	MN	55806	
Susan	Jordan	2361 Unity Ave N	Golden Valley	MN	55422	
Lori	Shannon	5037 Sheridan Ave S	Minneapolis	MN	55410	
Sage R.	Grothe	302 Doppy Ln	Le Sueur	MN	56058	
Christine	Lowe	1440 Pond Curv	Waconia	MN	55387	Please put the PEOPLE of Minnesota first! Why should we have to suffer dirty oil spills to enrich a Canadian company?
Carol	Frechette	1511 6th Ave W	Shakopee	MN	55379	
Kari	Dyrdahl	2670 County Road I	Mounds View	MN	55112	
Veronica	Whelan	1036 5th St E	Saint Paul	MN	55106	
Amy	Baker	210 Quill St NE	Kimball	MN	55353	
Jinger	Pulkrabek	6035 Candace Ave	Inver Grove Heigh	MN	55076	DAPL is already leaking, Please protect MN waters from dirty tar sands bitumen.

Marlene	Pershke	2314 Timber Trl E	Maplewood	MN	55119	Pease spend your resources working on alternative energy sources that are less polluting to our land and water. That's how I I will be spending my money.
Steve	Wiley	229 Cedar Lake Rd N	Minneapolis	MN	55405	
Stephen	Wiley	229 N Cedar Lake Rd	Minneapolis	MN	55405	
Dianne	Hudson	701 W 5th St Apt 110	Grand Marais	MN	55604	NO MORE PIPELINES IN MINNESOTA!
Brianna	Ojard	3421 17th Ave S	Minneapolis	MN	55407	
Brianna	Ojard	3421 17th Ave S	Minneapolis	MN	55407	
Dave	Crawford	4051 Gisella Blvd	White Bear Lake	MN	55110	
Robert	Allen	900 Park St W Apt 203	Cannon Falls	MN	55009	
Joan	Vorderbruggen	301 S Olaf Ave	Battle Lake	MN	56515	Let Minnesota be a leader in renewable energy and keep our beautiful state clean!
David	Kowalski	25635 Maple View Ct	Excelsior	MN	55331	
Sam	Herrington	14875 Afton Boulevard Ct	Afton	MN	55001	
Anne	Rehder	18127 155th St NW	Elk River	MN	55330	The pipeline is not needed! We want our lands, lakes and rivers to remain untouched by the greed of Enbridge! Not in our state!
Matthew	Green	1430 County Road 133	Waverly	MN	55390	
Jennifer	Rein	2019 19th St S	Moorhead	MN	56560	No pipeline!! It is unacceptable to take this Risk to the environment. The pipeline is unnecessary. Stop the pipeline now.
Gerald	Nolte	2164 Commonwealth Ave	Saint Paul	MN	55108	
Robert	Andrews	623 3rd St NW	Rochester	MN	55901	We don't need anymore Alberta tar sands oil in Minnesota and the risks are to high to accept on behalf of some other unknown and unnamed persons.
Joshua	Houdek	2820 37th Ave S	Minneapolis	MN	55406	
Meg	Lee	22210 Jasmine Way	Rogers	MN	55374	Please protect this beautiful state. You are the stewards of the land.
Janis	Martin	1600 Bluff Ave	Saint Charles	MN	55972	There are significantly more risks than benefits to this proposed expansion. Aiding Enbridge in increased production does not help Minnesota reach its goals for reduction of carbon emissions, provide for sustained economic growth, or adequately protect and conserve our natural resources. Minnesota First.
Arlene	Kelly	1532 Christensen Ave	West St Paul	MN	55118	
David M.	Higgins	4509 Dupont Ave S	Minneapolis	MN	55419	

Lynn	Fuller	3100 43rd Ave S	Minneapolis	MN	55406	There will be an oil spill, and the pristine headwaters of northern Minnesota will be compromised. The chemical waste from a spill will flow downriver and impact the entire country.
Anthony	Hirschman	1825 Kirkwood Ln N	Minneapolis	MN	55441	
Ann	Schley	1120 Winthrop St S	Saint Paul	MN	55119	We should be looking forward to green energy solutions, and not backwards to carbon fuels. Line 3 is not needed, and is in fact risky for our MN waters.
Ivan	Zenker	5698 King Arthur Rd NW	Rochester	MN	55901	We just don't need it. We are well on our way toward renewable energy in MN!
Assata	Brown	1659 Sheridan Ave N	Minneapolis	MN	55411	
Marianna	Como	212 Newton Ave S	Minneapolis	MN	55405	
Allison S.	Hatcher	2520 Sylvan Pl	Minnetonka	MN	55305	Having been born in and lived in MN all of my 60+ years, I am deeply devoted and attached to our wild areas and especially our waterways. The risk of a spill from this pipeline is not worth the habitats and recreational value of our natural resources here in MN and elsewhere. Please don't allow this pipeline to continue without the thorough evaluation of it's impact, well beyond what has been done to date! Allison Hatcher, DDS
Robert	Kolasa	117 Paisley Ln	Golden Valley	MN	55422	
Claire	Davis	1169 Lane Pl	Saint Paul	MN	55106	
Bill	Schnell	701 SW 11th Ave	Grand Rapids	MN	55744	I live in Grand Rapids, and have seen the environmental costs of of an oil spill when Line 3 ruptured in a wetland near Cohasset. All pipelines leak sooner or later. The risks are too great, especially since there is no proven need for the project.
Kirsten	Henefelt	1532 N 8th Ave E	Duluth	MN	55805	
Andrea	Mercier	149 N Mayfair Dr	Mankato	MN	56001	

Jeffrey	Schroeder	29370 Prairie Lake Rd	Grand Rapids	MN	55744	Is this pipeline absolutely necessary for the citizens of Minnesota, or is it being built to provide profits for the already very profitable pipeline and oil industry? Let Canada deal with that environmentally destructive tar sand oil.
Jotham	Arnoldy	1625 2nd Ave N	Minneapolis	MN	55405	Don't rape my environment.
Shweta	Gaitonde	34827 335th St	Lake City	MN	55041	Oil is not the way forward.
J	Mcdavitt	21125 Christmas Ln	Excelsior	MN	55331	Are we going to wait for the inevitable leak to do something that is right for our environment? Please THINK this through!
Kevin	Larson	2699 Evergreen Cir	White Bear Lake	MN	55110	
Robert	Wohlberg	6739 11th Ave S	Richfield	MN	55423	
Doreen	Koeckeritz	7685 Gold Coast Rd	Crane Lake	MN	55725	
Kay	Randall	520 32nd Ave S Apt 109	Moorhead	MN	56560	
Wade	Johnson	4720 13th Ave S	Minneapolis	MN	55407	Now is the time to end our dependence on oil.
Sherry	Abts	1054 E Madison St	Ely	MN	55731	
Louisa	Keleher	2243 Minneapolis Ave	Minneapolis	MN	55406	
Chris And Gail	Frethem	5241 10th Ave S	Minneapolis	MN	55417	
graden	west	PO Box 422	New London	MN	56273	
Roxana	Allen	410 W 3rd Ave N Apt 10	Aurora	MN	55705	
Shannon	Turner	5435 Xerxes Ave S	Minneapolis	MN	55410	
Jerry	Fitzgerald	4181 Tall Timber Trl NW	Hackensack	MN	56452	
Sharon	Blaha	16833 91st Ave N	Maple Grove	MN	55311	Stop letting the oligarchy win!. Your loyalty is to the people of this state, show it.
Michael	Cowdery	PO Box 100	Osakis	MN	56360	Please don't let the Trump disdain for our environment erode our Minnesota values.
Moraski	Kathleen	7611 Teal Bay	Woodbury	MN	55125	
Audrey	Lazarus	5700 W Lake St Apt 109	St Louis Park	MN	55416	
Jim	Bungarden	565 4th Ave SE	Wells	MN	56097	
Anne	Kaphingst	5109 Beacon Hill Rd	Minnetonka	MN	55345	
Jane	Norman	6008 Cambridge St	Minneapolis	MN	55416	
Chaz	Heikkila	837 Amur Cir	Delano	MN	55328	
Maurita	Bernet	116 8th Ave SE	Little Falls	MN	56345	
Carol	Green	2551 Hayes St NE	Minneapolis	MN	55418	We do not need more fossil fuels, we need to expand the renewable energy resources!
Darci	Scherping	651 2nd St S	Winsted	MN	55395	
Joan	Tischner Kinn	13 Fairhills Dr	Osseo	MN	55369	

Tim	Bardell	2333 Parkwoods Rd	St Louis Park	MN	55416	While pipelines may seem safer than other forms of oil transport, but underground leaks are more difficult to detect, and therefore pose a greater risk to groundwater supplies. Native Americans have the final say on whether pipelines can cross their lands, and we should respect their decision.
Sherri	Christofaro	18910 27th Ave N	Plymouth	MN	55447	
Henry	Homburger	2950 Fox Valley Dr SW	Rochester	MN	55902	This pipeline project is unnecessary and of no benefit to our citizens or our environment. Do not permit this project to go forward.
Roxanne	Friedenfels	1204 Dayton Ave	Saint Paul	MN	55104	
Kelly	Luebesmier	13636 279th Ave NW	Zimmerman	MN	55398	
Lee	Mensinger	161 Cannon Bottom Rd	Red Wing	MN	55066	
Ryan	Baka	3107 Knox Ave N	Minneapolis	MN	55411	
Sarah Twedell	Paulsen	3631 Lancaster Ln N Apt 310	Plymouth	MN	55441	
Hideki	Yamada	2042 Charlton Rdg	West Saint Paul	MN	55118	
Christopher	Sanford	3125 Village Trl Apt 214	Hastings	MN	55033	
Molly	Gollinger	325 W Winona St	Duluth	MN	55803	
Deborah	Webster	2298 Snowshoe Ln E	Maplewood	MN	55119	
Patrick	Keene	2419 Fillmore St NE # 1	Minneapolis	MN	55418	This pipeline is a bad idea, all around.
Andrew	Larson	2939 Bandel Ct NW	Rochester	MN	55901	Tar sand oil is the worst oil in the world. We should not be using it.
Elizabeth	Burr	2025 Fairmount Ave	Saint Paul	MN	55105	
Mark	Owens	1104 3rd St NW	Austin	MN	55912	
Sarah	Brandel	3145 Dean Ct Apt 601	Minneapolis	MN	55416	
Sue	Odonnell	13402 77th St NW	Annandale	MN	55302	Thank you for listening.
William	Diederich	1034 Cleveland Ave S Apt 303	Saint Paul	MN	55116	
Cort	Viesselman	23304 Twin Point Ave	Hutchinson	MN	55350	
Maya	Sarkar	1320 S German St	New Ulm	MN	56073	
Steven	Long	17307 Hill Trail	Shevlin	MN	56676	
Patrice	Hedlund	976 E Lake Geneva Rd NE	Alexandria	MN	56308	
Catherine	Harrison	12800 Marion Ln W	Hopkins	MN	55305	
Shannon	Miller	711 3rd St W	Northfield	MN	55057	
Jonathan	Carlson	6100 Westwood Pkwy Apt 323	Saint Cloud	MN	56303	
Jon	Lambrecht	PO Box 371	Lester Prairie	MN	55354	
Ashley	Vasas	3033 Dupont Ave S	Minneapolis	MN	55408	
Jennifer	Greseth	18325 26th Ave N	Plymouth	MN	55447	
Marna	Klammer	17315 Bay Cir	Wayzata	MN	55391	
Richard	Murray	2329 S 9th St Apt 411	Minneapolis	MN	55406	

Mary	Madeco-Smith	13998 165th St	Little Falls	MN	56345	
Phil	Wolfe	2007 E Superior St	Duluth	MN	55812	
Lynda	Pauling	5812 Olene Ave N	Oak Park Heights	MN	55082	
Sonja	Walker	4300 W River Pkwy Apt 278	Minneapolis	MN	55406	
Vicki	Petersen	46 Skyline Dr	Mankato	MN	56001	This is a threat to some of Minnesota's most pristine water and indigenous treaty-protected rights to wild rice in the area. And it locks us into dirty tar sands oil we don't need now and will never need if we do the right thing by moving to solar and wind energy! ALL pipelines have had leaks. Please do now allow this one to proceed.
Beverly	Ramolae	13521 Carmody Dr	Eden Prairie	MN	55344	
Dakotah Lynn	Woller	261 Westfalls Dr	Redwood Falls	MN	56283	
Robert	Hudnut	6509 Hadley Ct S	Cottage Grove	MN	55016	
Susan	Borowick	303 Snail Lake Rd	Shoreview	MN	55126	Please stop Trump's assault on the environment.
Louise	Echola	1112 24th Ave N	Saint Cloud	MN	56303	
Mike	Schlasner	215 Elton Hills Dr NW Apt 7	Rochester	MN	55901	
Kathy	Wood	3835 Pine Point Rd	Sartell	MN	56377	No more pipelines. Every single one of them leaks! Our lakes, rivers and groundwater cannot stand a single solitary leak!!!!
Jerry	Klemm	4905 217th St N	Forest Lake	MN	55025	Enbridge does not need to profit by millions of dollars per year at the expense to Minnesota's environment. Their record to date is horrible.
Ronald	Weiss	835 Como Ave	Saint Paul	MN	55103	First of all they should have to remove the old pipeline left in the ground and thyen they should build their damn pipeline through the adjacent canadian wet lands.
Cathy	Walters	PO Box 302	Elgin	MN	55932	Water is life,the land is lived on by people & nature. Brakes & spillage are a danger that can & will happen-that isn't good for NO ONE ! Leave our ENVIRONMENT ALONE ! You are NOT needed, but our water, land & air is needed!
Mary-Jane	Caspers	240 E Chapman St	Ely	MN	55731	
Joyce	Buck	16502 Linden Dr	Hopkins	MN	55345	
Stanley	Oslund	325 Laurel Ave	Saint Paul	MN	55102	
Stephen	Girard	2411 Pillsbury Ave S	Minneapolis	MN	55404	

Halligan	Sue	1190 Schooner Way	Woodbury	MN	55125	
Stephen	Girard	2411 Pillsbury Ave S	Minneapolis	MN	55404	
Paul	Dahlen	10255 Jamaca Ave N	Saint Paul	MN	55115	
Regula	Badertscher	3826 Blaisdell Ave	Minneapolis	MN	55409	
Jayne	Griffith	8778 Alamo Cir	Minneapolis	MN	55449	
Judi	Poulson	1881 Knollwood Dr	Fairmont	MN	56031	
David	Garibaldi	9161 Archer Ln N	Maple Grove	MN	55311	
Sarah	Allen	2617 E 3rd St	Duluth	MN	55812	
T	Mo	3310 69th St E	Inver Grove Heigl	MN	55076	
Kim	Tostenson	1201 Windstar St Apt 2	Marshall	MN	56258	the pipeline is not needed and the riskd are too great!
Arlan	Medicine	6313 Palomino Ln NW	Bemidji	MN	56601	
Gregory	Hanson	9904 Yosemite Rd	Bloomington	MN	55437	
Willliam 'Skip'	Dykoski	890 9th Ave NW	New Brighton	MN	55112	
Amelia	Narigon	643 N 5th St Apt 321	Minneapolis	MN	55401	
Peter	Melka	PO Box 143	Atwater	MN	56209	There should be some way of assessing how much, or rather how little, tar sands oil will move through the state by rail or truck if line 3 is absent.
Thomas	Johnson	924 N Union Ave	Fergus Falls	MN	56537	
Yvette	Schultenover	31167 Cimarron Trl	Grand Rapids	MN	55744	We KNOW what water means to survival and it is unconscionable to me to expand this line.
Mary	Dolan	5711 Zumbra Dr	Excelsior	MN	55331	
Linda	Mckinney	413 Westminster Ave NW	Watertown	MN	55388	As Govenor Dayton said, we need to protect Minnesota from all environmental threats, which includes the risk of this Line 3. Please make keeping our lands and water safe your highest priority.
Shirley	Huskins	1841 Eagle Ridge Dr	Mendota Heights	MN	55118	
John	Sorensen	1215 S 9th St	Minneapolis	MN	55404	
Sandy	Johnson	115 18th St NW Apt 206	Sauk Rapids	MN	56379	
Angela	Hansen	2400 W 102nd St	Bloomington	MN	55431	

Kathryn	Tasto	13367 Brenda Blvd	Becker	MN	55308	My family has camped and canoed in Northern MN for years. This is one of the few pristine areas left in the U. S. and in the world. Pipelines leak. It's not an if but a when. Let's not take a risk with Northern MN. Also, it is imperative that we stop increasing the infrastructures to burn coal, oil and gas. Stop the pipeline. Stop the use of fossil fuels. Let's put our resources into sustainable, renewable energy. Thank you.
Patrick	O'Boyle	1849 Narvik Ct	Saint Paul	MN	55122	
Terrence	Nayes	9133 Preserve Blvd	Eden Prairie	MN	55347	
Laura	Brubaker	6317 Chatham Way	Eden Prairie	MN	55346	
Sheryl	Murphy	PO Box 5001	Hopkins	MN	55343	
Elizabeth	Bush	4941 Dupont Ave N	Minneapolis	MN	55430	
Jessica	Wardlaw	8263 Grange Blvd	Cottage Grove	MN	55016	
Wendy	Peardot	4500 Southmore Dr	Minneapolis	MN	55437	The time is NOW to reject this pipeline.
John And Jean	Fleming	21364 Hytrail Cir	Lakeville	MN	55044	
Scott	Hamm Jr	25621 Helena Blvd	New Prague	MN	56071	
Luann	Hagel	704 20th Ave S	Moorhead	MN	56560	I am very, very concerned about any pipeline that will carry tar sands crude.
Mary	Johannsen	2418 Aldrich Ave N	Minneapolis	MN	55411	
Kim	Carswell	261 Cygnet Pl	Long Lake	MN	55356	
James	Russell	805 Hidden Ln	Excelsior	MN	55331	
Liza	Eng	1111 Gilmore Ave	Winona	MN	55987	Now, more than ever, we need to end extreme fossil fuel extraction and transport. We have the knowhow to move to renewable energy. We need to switch to renewables right away. We can do this!
Michael	Gellerman	156 Hawes Ave	Saint Paul	MN	55126	
Scott	Dulas	5311 Greenwood Rd	Duluth	MN	55804	
Duane	Pierson	15423 80th Ave N	Maple Grove	MN	55311	
Allison	Broesder	608 W Redwood St	Marshall	MN	56258	We deserve clean water. Too many times we hear about bad water and that pipelines play a role. Too often we hear that our Native populations are stuck with the brunt of this. Enough is enough.

Carol	Scheffler	626 Lewis St S	Shakopee	MN	55379	Minnesota's economy is tied to keeping this wilderness pristine and viable for the future -- something your pipeline endangers. In addition, it is not necessary now or in the future.
Judy	Carpenter	1042 Verlin Ln	Fergus Falls	MN	56537	In reading of many recent leaks and destruction of area land and watersheds, a pipeline is not the safest means to transport a Sludge, referred to as "energy." Time and finances will be better spent focusing on renewable energy.
Jessica	Bement	1123 S 10th St	Brainerd	MN	56401	
Heyward	Nash	1425 10th Ave S Apt 656	Minneapolis	MN	55404	
Karen	Longerbone	2328 250th Ave	Mora	MN	55051	We should be leading the world toward clean, renewable energy. This is the future. We will be left behind as other countries create jobs and businesses investing in clean energy technologies. Please stop this dirty project. We're saddened and angered each time we hear of another leak polluting our precious land and water. We need to be smarter citizens of our planet. Please help make dirty tar sands oil a thing of the past.
Jim	Pounds	2540 38th Ave NE Unit 402	Saint Anthony	MN	55421	
Mary	Roozenboom	311 High St	Albert Lea	MN	56007	
Kathryn	Ananda-Owens	1220 Maple St	Northfield	MN	55057	
Kevin	Schwartz	PO Box 15	Park Rapids	MN	56470	
Mary	Knuteson	1930 Oak Glen Trl	Stillwater	MN	55082	
David	Taylor	821 Cullen Cir	Marshall	MN	56258	
Diane	Hiniker	147 Bloomquist Mountain Rd	Grand Marais	MN	55604	
Patty	Polasky	801 Boulder Dr Apt 414	Hermantown	MN	55811	
Rosemary	Sexton	9381 285th Ln NW	Zimmerman	MN	55398	
Robert	Marchant	1126 W Broadway St	Winona	MN	55987	
Katharine	Mulhern	5735 Minnetonka Dr	Excelsior	MN	55331	
Karin	Margolis	3916 Avondale St	Minnetonka	MN	55345	
Sharri	Hackbarth	70 Buck Ridge Dr	Winona	MN	55987	

Kathy	Dunn	8657 Maplebrook Pkwy N	Brooklyn Park	MN	55445	I'm outraged that we don't stop this madness of fossil fuels and invest instead in renewable, green, sustainable energy. And I don't want this oil pipeline running through our pristine state! NO
Cynthia	Mckeen	62 Dale St S	Saint Paul	MN	55102	How backward thinking this whole project is.
William & Janice	Kimes	12002 Vermillion St NE	Minneapolis	MN	55449	
Judy	Rockne	785 Warren Ave	Zumbrota	MN	55992	
Amy	Thompson	19180 Rapidan Ave	Mankato	MN	56001	
Karen	Berg	5501 Dickson Rd	Minnetonka	MN	55345	
Marjorie	Fedyszyn	515 Cedar Lake Rd S	Minneapolis	MN	55405	
Mardi	Bentzen	13611 Country Ln	Burnsville	MN	55337	I am ardently opposed to the extraction of tar sands oil. It is an expensive method of extraction - both financially and environmentally. Water is an important resource and should not be squandered to extract tar sands oil. I firmly believe it will be the next resource in short supply globally.
Mary	Daley	2230 Woodchuck Ct	White Bear Lake	MN	55110	
Margaret	Kielty	6217 14th Ave S	Richfield	MN	55423	The environment is more precious than the pipeline and profits for the oil industry. Please do not allow this in Minnesota. Thank you!
Sandra	Bissonnette	143 Dahlia St	Saint Paul	MN	55115	
Stella	Shumaker	3025 Elliot Ave	Minneapolis	MN	55407	
Linda	Weinberg	2804 Oregon Ave S	Minneapolis	MN	55426	
Heidi Lynn	Ahlstrand	1580 State Ave NW	Owatonna	MN	55060	
Jacob	Herbers	901 2nd St NE	Minneapolis	MN	55413	Oil is temporary, water should be forever.
Terese	Boeck	15940 Shadyview Ln N	Dayton	MN	55327	
David	Carlson	5818 County Road 2	Fort Ripley	MN	56449	Enough already! Get off the damn oil.
Peter	O'Gorman	2224 3rd St	White Bear Lake	MN	55110	
Laurence	Risser	4904 Thomas Ave S	Minneapolis	MN	55410	Tar sand spills, which are a certainty, are notoriously resistant to clean-up efforts. Pipelines carrying this toxic sludge have no place in, or draining into, Minnesota waters.
Terry J.	Williams	4170 Brigadoon Dr	Shoreview	MN	55126	Minnesota citizens deserve a true accounting of the cumulative impacts on communities, tribal lands, lakes, rivers and our climate.
Patricia	Hoffman	107 Lagoon Dr	Courtland	MN	55113	

Joseph	Rojas Jr	723 7th St SE	Minneapolis	MN	55414	Now more than ever after Trump has started the process of leaving the Paris Climate Accord, it is up to states, cities, and companies to keep dirty oil in the ground.
Lenore Healey	Schultz	2549 32nd Ave S	Minneapolis	MN	55406	Don't go backwards! Leave tar-sands oil in the ground!
Heidi	Larson	1615 15th Ave SE	Saint Cloud	MN	56304	I prefer to transport the oil in trains. I prefer the money be spent on transportation infrastructure, more rail lines and bridge safety and safer de-cuppling of train cars. Rail lines are multipurpose for Amtrak and communter trains. I do not trust the companies managing the pipelines, I do not feel that they would comply with regulations and safety laws.
Michelle	Gobely	1581 Wheelock Ln Apt 202	Saint Paul	MN	55117	This pipeline is so unnecessary and moves us backwards as a State and country. Our lands are exhausted of being destroyed. It is beyond time to evolve past fossil fuels!
Carrie	Mccann	1501 American Blvd E Apt 202	Bloomington	MN	55425	
Terese	Boeck	15940 Shadyview Ln N	Dayton	MN	55327	
Rory	Bezecny	3500 Rooney Pl	White Bear Lake	MN	55110	
Annette	Mcginley	PO Box 1656	Lake George	MN	56458	
Gordon	Kircher	1370 Quant Ave S	Lakeland	MN	55043	
Arlene	Renshaw	216 Locke St	Mankato	MN	56001	
Chuck	Steffel	291 Syndicate St S	Saint Paul	MN	55105	After oil spills, no amount of cleanup money can replace unspoiled natural habitat that future generations will never be able to enjoy as tourists, food gatherers and peace seeking naturalists.
Jonathan	Katz	1 4th Ave N Unit 104	Minneapolis	MN	55401	
Crystal	Lumi	27 Fairfax Street	Winona	MN	55987	
Cyndi Neus	Bradley	4510 Chatsworth St N	Shoreview	MN	55126	
Barbara A	Harvey	625 Central Ave Apt 303	Osseo	MN	55369	Our waters are pure and clean now. Please let us keep them always , for all peoples, clean and pure. This is at the very heart of life. We care about pure water with all our hearts.
Debbie	Plese	2511 4th Ave W	Hibbing	MN	55746	This expenditure is far to risky and tar sand is too high of a pollutant to the environment !

James	Newton	3309 Sunset Lake Dr	Burnsville	MN	55337	
Carol	Knoll	10081 103rd St N # M	Stillwater	MN	55082	
Nadya	Trytan	3900 42nd Ave s	Minneapolis	MN	55406	We need to be investing in renewable energy infrastructure, not oil infrastructure.
Nicole	Krishnan	5685 Turtle Lake Rd	Shoreview	MN	55126	
Michael	Custard	279 Lexington Pkwy S	Saint Paul	MN	55105	
Kimberle	Kaufman	7356 Ontario Blvd	Eden Prairie	MN	55346	Just do the right thing. We can't afford to make a mistake with our children's inheritance
Jessica	Tritsch	1489 Sargent Ave	Saint Paul	MN	55105	
Rosanna	Walker	1551 Belsly Blvd Apt 315	Moorhead	MN	56560	
Daniel	Hulse	16206 Creekwood Cir	Prior Lake	MN	55372	
Maria	Jacobson	1117 7th St N	New Ulm	MN	56073	
Robert	Gulliver	20 Melbourne Ave SE	Minneapolis	MN	55414	
Alice	Bowron	5401 51st Ave N	Minneapolis	MN	55429	
Bailey	Bear	7717 Chicago Ave Apt 317	Richfield	MN	55423	
Janet	Stram	602 4th St	Nashwauk	MN	55769	I believe this pipeline should be stopped to protect our environment, as it will cause pollution in our state and world.
Angela	Mcintyre	711 Stanwich Ln	Mendota Heights	MN	55118	
Steven	Holst	24085 Walnut Dr	Albert Lea	MN	56007	
Natalie	Stephens	15281 Flower Way	Apple Valley	MN	55124	
Pat	Middeke	15355 Morraine Way	Eden Prairie	MN	55347	Please do not risk our future, our tax money, our health on this pipeline. Once ruined the damage area will never go back to normal.
Jessica	Rydeen	1765 Carroll Ave	Saint Paul	MN	55104	The old pipeline should be taken care of first before even considering building a new one. Either way, though, oil is not the future. Don't put our lands and waters at additional risk for something that is so uncertain. At the moment I live within the oil train blast zone, but even knowing this, I also know that building pipelines won't stop their transit. Both options have pros and cons, but both their cons outweigh any pros. Building pipelines won't help my generation or help anyone's future.
Lisa	Baglio	4340 Penfield Ave S	Afton	MN	55001	

Julie	Holmen	1341 Saint Albans St N	Saint Paul	MN	55117	We are not living in the 1950 when we didn't have a clue about global warming and what our nation, alone, is doing to the planet. More thorough analysis must be done on the part of Endbridge with it's history of spills and clean-up.
Scott	Slocum	1416 Birchcrest Dr	White Bear Lake	MN	55110	We can't just pretend that this pipeline technology is environmentally safe, and proceed with it. It isn't environmentally safe, and until it is, we shouldn't be approving and using it.
Mary	Schmidt	4077 Stone Point Dr NE	Rochester	MN	55906	
Morgan	Walsh	4239 Vincent Ave N	Minneapolis	MN	55412	
Marilyn	Gockowski	1427 Cliff Ave	Duluth	MN	55811	
Chaka	Blanford	1113 8th St N	Moorhead	MN	56560	
Mary	Sienko	5752 Longfellow Ave	Minneapolis	MN	55417	
Reilona	Mcvai	11300 Minnetonka Mills Rd	Hopkins	MN	55305	We hold a sacred trust to keep the water in the north central part of the United States clean and free of pollution. History shows that pipelines leak. Pure and simple. Therefore, they have no place being in the State of Minnesota anywhere. Please vote a no on the pipeline - for me.
Andy	Lopez	5770 Burkeys Ln NW	Alexandria	MN	56308	They definitely should not be allowed to use an alternate route for this pipeline and they should be REQUIRED to clean-up and maintain the current pipeline route.
Karen	Karbo	6500 Eagle Lake Dr	Maple Grove	MN	55369	
Pam	Christoferson	15801 Day Pl	Minnetonka	MN	55345	NO LINE 3 PIPELINE NOW OR EVER
Elizabeth	Victor-Slind	2931 Blue Ridge Dr	Woodbury	MN	55125	The future is in renewable energy such as solar and wind. The risks associated with pipelines is not worth the supposed rewards.
Beth	Muetzel	17816 602nd Ave	Mankato	MN	56001	
Carrie	Eberhardt	1528 Praha St SE	New Prague	MN	56071	
Annah	Gardner	1906 1st Ave S	Minneapolis	MN	55403	
Brenna	Doheny	46378 Government Rd	Hinckley	MN	55037	
Cecelia	Silva	10300 City Walk Dr	Woodbury	MN	55129	
Von	Cloud	1501 11th Ave S Apt 305	Minneapolis	MN	55404	

Judith	Harvey	6608 Naomi Dr	Edina	MN	55439	Please reconsider approval due to the potential damage this could do to pristine wilderness and the natural resources in Minnesota.
Steve	Froemming	17547 Major Ave	Hutchinson	MN	55350	
Jane	Norling	5450 Ridgewood Cv	Mound	MN	55364	
Stephanie	Greenwood	1017 Linwood Ave Apt 10	Saint Paul	MN	55105	
Jennifer	Lipke	12016 Corey Tracts Rd	Hibbing	MN	55746	Minnesota must take a stand regarding pollution and climate change. If the federal government chooses to ignore the world's needs then we must be smarter. In addition to the impact of tar sands oil production the increase in product encourages use of petroleum fuel at a time when we must reduce the fuel use. Let's be an example to the nation and do what is right.
Carol	Bishop	807 Lake Ridge Dr	Woodbury	MN	55129	
Matthew	Butler	133 E Chapman St	Ely	MN	55731	
Conor	Hatch	3901 10th Ave S	Minneapolis	MN	55407	
Shweta	Gaitonde	34827 335th St	Lake City	MN	55041	Oil is not the way forward.
Suzanne	Birch	16015 Elgin Ct	Faribault	MN	55021	We don't want your dirty oil-build solar panels instead! Why are we taking a chance on more oil? Let's get on to the future.
Stu	Farnsworth	1646 Donald Ct	Eagan	MN	55121	
John	Viacrucis	3002 17th St S Apt 206	Moorhead	MN	56560	
Terri	Isom	8850 Hillview Dr	St Bonifacius	MN	55375	
david	WASHBURN	225 9th St E Unit 601	Saint Paul	MN	55101	
Kimberly	McReavy	1350 Heather Ct	Chanhassen	MN	55317	
Tom	Koors	833 20th Ave SE	Minneapolis	MN	55414	
Kathy	Magne	1989 Wellesley Ave	Saint Paul	MN	55105	Pipelines are last centuries technology. Let's stop pretending that climate change isn't real. Line 3 is bad for Minnesota and bad for the planet.
Wayne	Sandbulte	520 7th St E	Hector	MN	55342	Please don't allow this pipeline to be built. Thank you for your consideration.
Jay	Springer	6171 Linda Ln	Lino Lakes	MN	55014	
Leila	Tite	17953 Osage Ct NW	Andover	MN	55304	
Doug	Degooyer	3444 Northshore Dr	Wayzata	MN	55391	think of what's ahead for your children, our children, and their children.clean energy is the answer for them and our future.

Kim	Aughenbaugh	995 Saint Albans St N Apt 305	Saint Paul	MN	55103	Noooo! Minnesota is known worldwide for their lakes! This is gonna be devastating! Its not a matter of if its gonna leak! It's a matter of when! Please reconsider!
Charles	Borden	9 Delos St W Apt 3	Saint Paul	MN	55107	
Rachel	B.	1079 Gledhill Rd	St Paul	MN	55126	As a contaminant hydrologist, the problems of this pipeline significantly outweigh any and all economic benefits. You endanger the environment and MN resources, as a place for tourism, hunting and fishing. Economically, MN taxpayers do not want to pay to clean up your mess. I strongly say NO to the destruction of this beautiful state.
Mary	Bernhardt	3228 10th Ave S Minneapolis MN55	Minneapolis	MN	55407	
Katharine	Winston	4634 France Ave S	Minneapolis	MN	55410	Let's strive to "Keep It in the Ground" starting with no additional pipelines!
Cindy	Macrafic	2923 8th Ave NW	Rochester	MN	55901	please do not impact our water, our land, our lives!
Terri	Dugan	709 18th Ave NE	Rochester	MN	55906	We need to move into the future. Tar sand oil is like whaling ships searching the ocean for years before finding a whale. The oil era is ending. We need to develop wind, solar, and upgrade the electrical grid. We also need to educate our children so the next best technology can be discovered.
Thomas	Halvorsen	3320 Louisiana Ave S	St Louis Park	MN	55426	
Jessica	Matelsky	13961 21st St N	Stillwater	MN	55082	
Jennifer	Krinke	339 Wilder St N	Saint Paul	MN	55104	No more pipelines! Leave the oil in the ground. We need to cut our usage of fossil fuels!
Bethany	Haus	18892 Koetter Lake Rd	Richmond	MN	56368	After so many proven leaks in other places around the country, why would Minnesotans ever want that going through the land of 10,000 lakes? Lakes where we take our children to to fish, swim, and boat. Please do not let Line 3 come into Minnesota!
Elinor	Daleiden	69 Milton St. N. #1	St. Paul	MN	55104	
Mary Jo	Parker	468 Dayton Ave Apt 13	Saint Paul	MN	55102	Please do not put Minnesota at risk for a future expensive clean up of a tar-sands oil pipeline spill.

Susannah	Fisher	14351 Europa Ave	Apple Valley	MN	55124	
Nadine	Ronning	11442 Louisiana Ave S	Bloomington	MN	55438	Please consider the future, our children and grandchildren. Please hold DEIS accountable for accuracy and analysis.
Scott	Anderson	1150 N Elm Ave	Owatonna	MN	55060	
Laura	Troiber	11924 Norway St NW	Coon Rapids	MN	55448	
Sarah	Sederstrom	8700 Jeffrey Ave N	Stillwater	MN	55082	
Karen	Anderson	1052 Orchard Ave	Saint Paul	MN	55103	I oppose the use of Line 3 Tar Sands Oil Pipeline since it poses so many risks to the Minnesota environment. I embrace the use of renewable energies.
Kathy	Harvey	1322 Alton St Apt 321	Saint Paul	MN	55116	
Heather	Hundt	15686 141st Ave	Lake Park	MN	56554	
Janet	Roberts	4120 Colfax Ave S	Minneapolis	MN	55409	This is a project with too much of an impact on our water and the climate. We can't keep taking these irresponsible risks.
Kevin	Koschak	2384 151st Ave NW	Andover	MN	55304	
Amy	Cusick	429 Cedar Lake Rd S	Minneapolis	MN	55405	
Sheila	Lambert	213 River Ct NE	Rochester	MN	55906	
Lauren	Gedlinske	13476 Georgia Ct	Apple Valley	MN	55124	
Bruce	Goff	4557 Oak Chase Cir	Eagan	MN	55123	
Tim	King	15261 County 38	Long Prairie	MN	56347	
Kathleen	Kaysinger	4754 Winterset Dr	Hopkins	MN	55343	
Candace	Gouze	12870 12th St N	Lake Elmo	MN	55042	Rerouting a new pipeline means more disruption of earth, but more importantly, it puts more lakes at risk of an oil spill. We've already compromised the metro area lakes with urban pollution. We need to keep the northern lakes clean. There's a lot of wildlife depending on it. These lakes and forests are the jewels of our state. We need to protect them as if our lives depend on them. Because they do!
Cathy	Swanson	8660 Alvarado Ct	Inver Grove Heigl	MN	55077	There is no need for pipelines. Oil is not our future, and it is against the more important interests of clean water and environment.
Randy	Nies	3407 Harriet Ave Apt 2	Minneapolis	MN	55408	
Wilbur	Ince	4137 Elliot Avenue	Minneapolis	MN	55407	The risks from this project far out-weigh the benefits. It's not in the greater public interest to continue this project.

Marianne	De Sobrino	28600 Fairway Ln Apt 315	Chisago City	MN	55013	
Ramona	Kopnick	PO Box 1	Sandstone	MN	55072	
Edward	Shields	PO Box 165	Grand Portage	MN	55605	
Everett E	Dennis	63755 230th St	Austin	MN	55912	IF this go's MN needs to hold a y large bond plus they need to be bonded for removal and cleanup of old pipe line. We are allowing these large pipe line companies to remove every drop of oil that is left in the ground what about future generations. We have a surplus now with a lot of alternative resources emerging. GREED GREED
Carol Ann	Petersen	3816 47th Ave S	Minneapolis	MN	55406	Be wise. Be prudent. And, in the short and long run, Consider the opportunity Minnesota has to be a leader in promoting and producing CLEAN energy rather than pursuing old, worn energy pathways that threaten life and livelihoods now and for generations to come.
Thomas	Kurtovich	6004 Birch Point Rd	Saginaw	MN	55779	
Patricia	Marinan	19355 Linnet St NW	Oak Grove	MN	55011	
Susan	Smolders	815 23rd St SW	Rochester	MN	55902	
W F & Karla M	Forsyth	2212 Irving Ave S	Minneapolis	MN	55405	
Curtis	Coffer	655 Sibley Memorial Hwy	Saint Paul	MN	55118	
Brian	Hilliard	4537 16th Ave S	Minneapolis	MN	55407	
Amy	Hunter	5577 155th St E	Faribault	MN	55021	
Nancy	Hauer	1990 Ridgewood Ave	White Bear Lk	MN	55110	
Sheila	Schally	1104 Creekside Cir	Stillwater	MN	55082	
Alan	Phyllis	9301 Ryden Rd	Grand Portage	MN	55605	
P	Buck	8215 Kelsey Whiteface Rd	Cotton	MN	55724	
Paul	Johnson	13890 Fernando Ave	Apple Valley	MN	55124	
April	Nygaard	5996 5th St SW	Howard Lake	MN	55349	
Susanne	Menter	428 Bear Ave S	Saint Paul	MN	55127	
Sondra	Tryan	8540 Medicine Lake Rd	Minneapolis	MN	55427	
Joan	Mcgonigal	8522 Inverness Ln N	Minneapolis	MN	55443	

Janette	Dean	103 N Gjere Ave Apt 5	Caledonia	MN	55921	As a Minnesotan with much common sense, I am ashamed that the MN P.U.C. Is still not protecting the PUBLIC From the EXTREME climate risks of tar sands oil development and usage in relation to the UNJUSTIFIABLE environmental and human health risks of its transport! You are egregiously FAILING the public in your critical and mandated responsibilities! For shame!
Regina	Kijak	5025 W Kane Lake Rd	Two Harbors	MN	55616	
Carlys	Quiram	PO Box 22	Bluffton	MN	56518	
Marianne	Ludwig	1420 Saint Clair Ave	Saint Paul	MN	55105	We don't need this oil. We DO need clean land and water. This isn't about jobs. It is about greed and lack of our moral responsibility to protect our land for future generations. Please stop this unnecessary pipeline now.
Marianne	Thiry	1235 Minnesota Ave	Duluth	MN	55802	
Stefanie	Weisgram	104 Chapel Ln	Saint Joseph	MN	56374	
Ted	Mcgillivray	6852 Park Ave	Minneapolis	MN	55423	This pipeline is not needed or wanted by the people of MN. Tar sands oil is a dangerous fossil fuel that should never be shipped through any pipelines. Pipelines do break/leak that spills this dangerous oil into lakes, streams and other wetlands. I strongly encourage this body, PUC to deny any permits by this Canadian Company to build any new pipelines in MN.
Jeanine	Malec	3852 11th Ave S	Minneapolis	MN	55407	
George	Schoephoerster	3702 Sterling Dr	Saint Cloud	MN	56301	
Jen	Bassett	12783 Parkwood Dr	Baxter	MN	56425	
Maurice	Corrigan	4472 Napier Pkwy NE	Saint Michael	MN	55376	Our state can be so proud of our lakes and rivers. It is my hope they will be clean for future generations.
Allan	Hildenbrand	2230 E 36th St	Minneapolis	MN	55407	
Patricia	Keefe	1001 14th St NW	Rochester	MN	55901	
Janine	Anderson	7613 Dallas Ln N	Maple Grove	MN	55311	
Carol	Miller	942 6th Ave N	Sauk Rapids	MN	56379	Our forests and waterways in MN are just too precious! No pipeline!
Paul	Nelson	102 Hilton Ct	Mankato	MN	56001	

Tullika	Saraf	824 Grand Ave Apt 4	Saint Paul	MN	55105	
Virginia	Huber	1516 W 61st St	Minneapolis	MN	55419	We've done okay without this pipeline. Please do not harm our environment even more with this pipeline.
Linda	Hayes	5631 Emerson Ave N	Brooklyn Center	MN	55430	I have become quite alarmed by the reports of ongoing pipelines through this country and my state and by the news of spills from installed pipelines. I know that this is the wrong way to go and I would like to see the brakes put on the installation of oil and gas pipelines. In the end, it is really the profits of the oil and gas companies that are being puffed up by these lines and not the public good.
Peter	Veits	641 E Burnsville Pkwy	Burnsville	MN	55337	Stop clinging to obsolete fossil fuel technology. Sustainable energy including wind and solar are actually far cheaper to produce. It's time to let go of your dangerous obsession with fossil fuels and choose the more sensible alternative.
Kathleen	Mcquillan	10816 Plum Creek Rd	Cook	MN	55723	Pipelines encourage America's continued dependence upon the fossil fuel industry. The planet needs us to move away from that reliance and turn toward alternative methods to meet our energy needs. Keep carbon in the ground!
Dean	Borgeson	36030 Bonnie Lakes Rd	Crosslake	MN	56442	What is the justification for re-routing Line 3? Running it through the Pine River watershed endangers a whole new and pristine part of the state, that will present an even greater challenge in accessing and addressing spills. Use the current corridor, don't expand the area put at risk of an oil spill.
William	Nusbaum	2916 Gettysburg Ave S	Minneapolis	MN	55426	
Kay	Randall	520 32nd Ave. S., Apt. 109	Moorhead	MN	56560	
Kay	Malm	51851 179th Ave	Bemidji	MN	56601	

Jean	Scoon	9734 Summit Oak Dr	Saint Cloud	MN	56301	Please act to protect the health of the citizens of Minnesota, and the economy of Minnesota, which depends on our pristine and healthy environment and our country by opposing this expansion and rerouting. The future is in clean energy, not fossil fuel expansion.
Anne	Fox	4083 Cashell Gln	Eagan	MN	55122	
Arthur	Rosenberg	2109 Harriet Ave	Minneapolis	MN	55405	
Tamara	Rakow	14231 Azalea Path	Rosemount	MN	55068	This line 3 pipeline is not needed, and it presents potential risks to environment. Enbridge's proposed line 3 tar sands oil pipeline is NOT IN MINNESOTA'S BEST INTERESTS.
Diane	Sineps	2155 Pinehurst Ave	Saint Paul	MN	55116	
Lydia	Rappaport	21756 Memorial Dr	Glenwood	MN	56334	For generations, my family has lived in this state. We value its many environmental blessings, including its abundant water sources. Thank you for your anticipated efforts to do all you can to protect Minnesota's environment.
Jessica	Wardlaw	8263 grange blvd	Cottage grove	MN	55119	
Margaret	Brennan	18180 Kelly Lake Rd	Carver	MN	55315	Line 3 pipeline project is bad for Minnesota land and water. Keep our state as pure as possible. Don't buckle to greed & development, tainted water & fracking. Aquifers are NOT negotiable.
Sally	Downing	622 8th St SE	Minneapolis	MN	55414	
Laurie Botes	Zaepfel	2163 Randolph Ave	Saint Paul	MN	55105	Minnesota needs clean water and lands. Please oppose this unnecessary pipeline.
Rita	Clapper	5301 Broadwing Dr	Duluth	MN	55804	
John	Enblom	14755 113th St S	Hastings	MN	55033	
Kathy	Stack	740 Mississippi River Blvd S Apt 7E	Saint Paul	MN	55116	
Alva	Pingel	13894 Birchwood Ave	Rosemount	MN	55068	
Ruth	Katz	3645 Blaisdell Ave	Minneapolis	MN	55409	
Jon	Rich	20891 Aztec St NW	Anoka	MN	55303	
Kathleen	Wright	4320 W 126th St	Savage	MN	55378	Pipelines are highly at risks of dangerous spillage.
Nicholas	Vorpahl	685 22nd Ave NE	Minneapolis	MN	55418	
Erik	Voldal	3409 Woodstone Dr SW	Rochester	MN	55902	

Kay	Drache	3067 Zarthan Ave S	Saint Louis Park	MN	55416	
Barbara	Powell	771 Neville Ct SE	Rochester	MN	55904	
Amanda	Forero	315 E 24th St Apt F37	Minneapolis	MN	55404	
Paul	Harris	704 20th Ave S	Moorhead	MN	56560	
Izabella	Listopad	4151 Reiland Ln	Shoreview	MN	55126	The pipeline line 3 endangers us, our land and water. Keep it out of my state!
Kate	Weiss	3852 10th Ave S	Minneapolis	MN	55407	
James	Maggi	10239 Benjamin Dr	Pine City	MN	55063	
Gerhard J	Johnson	405 Tarrymore Ave	Minneapolis	MN	55419	How will this pipeline benefit Minnesota, and who will pay for clean up of spills? Unless a clear case for the need for the pipeline can be made, I oppose approval. Gerhard
Mary Lou	Hoff	17844 Townline Rd	Minnetonka	MN	55345	
Jill	Fonaas	2647 Garfield Ave Apt 104	Minneapolis	MN	55408	
Toni	Mcdonald	1447 Rhode Island Ave N	Golden Valley	MN	55427	Minnesota's environment needs to be protected against the impact of oil spills from pipelines. Again and again pipelines have polluted the surrounding land and water. Minnesota needs to draw the line against pipelines.
Mary	Zirbes	3200 15th St N Apt 234	Saint Cloud	MN	56303	Stop Line 3 pipeline now! Why risk harming our precious water and land when we know the line is not needed. Respect for our resources is more important to me then some additional dangerous fuel not needed.
Joe	Foss	359 66th Ave NE	Fridley	MN	55432	This is your chance to respect indigenous rights and help safeguard our water and climate.
John	Panzer	833 Nicollet Ave	North Mankato	MN	56003	Anything for a buck. Then when there's a catastrophic spill it can't be restored.
Nancy	Marvy	3931 Washburn Ave N	Minneapolis	MN	55412	
Daniel	Munson	5837 Halifax Ave N	Brooklyn Center	MN	55429	
Lori	Ramberg-Doi	5740 Xerxes Avenue S	Edina	MN	55410	Stop the development.of pipeline 3.
Barbara	Johnson	1131 Lecuyer Ct	Stillwater	MN	55082	
Daniel	Tini	PO Box 148	Lakeville	MN	55044	
K. Cash	Luck	6091 Fort Thunder Dr NE	Remer	MN	56672	
Betty	Smisek	1762 Oakdale Ave	West St Paul	MN	55118	
Julie	Jenkins	42704 Lisa Ln	Winona	MN	55987	
Henry	Padgett	503 Wilson Ave SE	Saint Cloud	MN	56304	We don't need tar sands oil we need wind and solar.

Nat	Lel	1152 Crosstown Blvd	Chaska	MN	55318	
Alana	Willroth	1605 Birch Lake Ave	White Bear Lake	MN	55110	
Brian	Wilkerson	3215 Harbor Ln N	Plymouth	MN	55447	Concisely put, it doesn't sound necessary and carries a good deal of risk.
Virginia	Haggart	PO Box 206	Loretto	MN	55357	
Judy	Anderson	91161 350th Ave	Heron Lake	MN	56137	
Vicki	Ellman	141 Poplar St E	South Saint Paul	MN	55075	
Christy	Wheasler-Davis	2923 Benjamin St NE	Minneapolis	MN	55418	
Amelia	Shoptaugh	888 Thomas Ave	Saint Paul	MN	55104	
Karla	Mckenzie	6403 131st Street Ct	Apple Valley	MN	55124	
Kathleen	Abel	3557 Highland Ave	White Bear Lake	MN	55110	No new pipeline . It is never about IF there is s spill. , but WHEN the spill will happen. Keep your greedy hands off of Minnesota's lakes and rivers.
Kris	Roberts-Cornett	2755 6th St S	Sartell	MN	56377	
Pamela	Clark	19000 Stratford Rd Apt 304	Minnetonka	MN	55345	
Christy	Wheasler-Davis	2923 Benjamin St NE	Minneapolis	MN	55418	
Christy	Wheasler-Davis	2923 Benjamin St NE	Minneapolis	MN	55418	
Deborah	Gruhlke	56604 192nd Ln	Mankato	MN	56001	
Mina	Blyly-Strauss	3425 Blaisdell Ave	Minneapolis	MN	55408	
Doug	Cain	2536 30th Ave S # So	Minneapolis	MN	55406	I believe this is an outrage... for one the environmental impacts have been downplayed, as stated above - And the second pipeline is not being taken care of -- since it is being left in the ground and not removed and the previous leaks and the negative environmental impact is not being remediated. With these omitted facts and a downplaying of its impact this plan is fundamentally flawed. AND it should be stopped in its track -- right now !
Sarah	Wovcha	426 Cherokee Ave	Saint Paul	MN	55107	
Mary Ann	Vande Vusse	13960 Kentucky Ave	Savage	MN	55378	
Gayle	Bidne	1755 Thury Ct	White Bear Lake	MN	55110	
Dan	Nelson	3010 Winnetka Ave N Apt 423	Crystal	MN	55427	
Brenda	Faber	185 Harrison	Motley	MN	56466	it's got to stop!
Holly	Hubing	10101 Bren Rd E	Hopkins	MN	55343	

Diane	Borgmann	1834 Miss Rv Blvd S Apt 119	Saint Paul	MN	55116	We need to switch to clean energy, not increasing extraction of fossil fuels. Tar sands have a huge cost in extraction and can not be cleaned up when spilled in water.
Laira	Allerai	1116 Dakota St S	Shakopee	MN	55379	
Paul	Loaney	2190 Park Ave	Saint Paul	MN	55110	
Brian	Krysinski	302 Cedar Lake Rd S # 1	Minneapolis	MN	55405	Please do the right thing.
Laura	Regan	5413 N Cloquet Rd	Duluth	MN	55810	
Robert	Mcklveen	5261 Lochloy Dr	Edina	MN	55436	
Beth	Kiene	9630 16th Ave S	Bloomington	MN	55425	
Gayle	Albee	610 E 15th St Apt 6	Minneapolis	MN	55404	
Cappierre	Dellarai	11300 Minnetonka Mills Rd	Minnetonka	MN	55305	
Bryan	Campbell	5150 Sheridan Ave N	Minneapolis	MN	55430	
Michele	Phillips	PO Box 31	Marine on Saint C	MN	55047	
William	Hunter	2900 Abbey Plaza	Collegeville	MN	56321	
Bruce	Eng	1111 Gilmore Avenue	Winona	MN	55987	This proposed pipeline will endanger native lands and also the best wild rice beds in the state. I strongly oppose the pipeline.
Alyssa	Hall	829 Stewart St	North Mankato	MN	56003	
Ben	Harvey	3446 Garfield Ave Apt 1	Minneapolis	MN	55408	
Teresa	Manzella	1741 Atlantic St	Maplewood	MN	55109	We should be investing in clean energy resources, not continuing to promote dangerous, polluting pipelines. I don't want more of this filth running through Minnesota--on trains OR in pipelines.
Joan	Hughes	4088 Utica Ave S	Minneapolis	MN	55416	We need to be moving to renewable energy, not continuing the unsafe practice of idol pipelines.
Richard	Smollen	11091 187th Ave NW	Elk River	MN	55330	
Brian	Singer-Towns	1261 W Broadway St	Winona	MN	55987	We have seen at least 3 oil pipeline leaks in Minnesota in the last year. It is just a matter of time before we see a major leak causing major and irreparable environmental damage. This pipeline is not needed and will only be a future environmental time bomb, especially with Enbridge in charge. Please reject this application or delay it for more study.
Michael	Wahowske	4978 Sycamore Dr	Eagan	MN	55123	

Evan	Heberlein	1265 Edgcumbe Rd	Saint Paul	MN	55105	Minnesota's freshwater resources are too economically important and vital to our cultural identity to jeopardize them simply because our state lies on a shipping route for fossil fuels. Northern minnesota's economy is largely dependent on the clean, sustainable use of our renewable natural resources, and building a pipeline through the state (especially at such a time of uncertainty and decline in the fossil fuel industry) is an affront to our way of life (which works!)
Julee	Mead	419 Lakewood Ln NW	Rochester	MN	55901	
Mark	Ihle	115 10th Ave N	South Saint Paul	MN	55075	
Greg	Sippl	574 Payne Ave	Saint Paul	MN	55130	Minnesota does not need this liability! We value the outdoors too much to take such risks.
Richard	Franco	1480 Van Buren Ave	Saint Paul	MN	55104	
Susan	Soule	7324 W Shore Dr	Minneapolis	MN	55435	A risk versus reward analysis of the proposal does not support an expansion. Our water sources, lake and rivers are vital to life and vital to our economy. They are entrusted to us to preserve for future generations. We are at a time when energy sources are and should be shifting away from fossil fuels to renewable and cleaner forms. Please deny this expansion. Thank you.
Kevin	Breyfogle	5836 Xerxes Ave S	Minneapolis	MN	55410	Think past the end of the month. Water is what we require to survive.
Steven	Steele	7451 Dallas Ct N	Maple Grove	MN	55311	
Arlo	Frost	9280 55th St N	Lake Elmo	MN	55042	
Joni	Karnopp	22096 Warner Ln	Elysian	MN	56028	
Alex	Motley	4840 16th Ave NW Apt 221	Rochester	MN	55901	
Kristie	Mandel	2850 Cedar Ave S Unit 302	Minneapolis	MN	55407	
Suzanne	Rohlfing	2310 15th Ave NW	Rochester	MN	55901	Please. Put Minnesota first.
Leigh	Johnson	6408 31st Ave N	Golden Valley	MN	55427	
Barbara	Zdarsky	3345 Aldrich Ave	Anoka	MN	55303	
Mark	Fischer	980 Island Lake Ave	Saint Paul	MN	55126	Not needed!
Denise	Thomas	100 Imperial Dr W Apt 301	West St Paul	MN	55118	
Denise	Thomas	100 Imperial Dr W #301	West St Paul	MN	55118	

Colette	Riethmiller	16490 45th Ave N	Plymouth	MN	55446	
Shawna	Nielson	2324 E 33rd St	Minneapolis	MN	55406	
Elizabeth	Jocobson	4860 Bryant Ave S	Minneapolis	MN	55419	
Elizabeth	Jacobson	4860 Bryant Ave. So.	Minneapolis	MN	55419	
Amelia	Narigon	643 N 5th St	Minneapolis	MN	55401	
Jace	Galley	1018 Fulton St SE	Minneapolis	MN	55414	
Richard	Deming	1717 Washington St. NE, #1103	Minneapolis	MN	55413	
Clara	Ueland	1902 Homestead Trl	Long Lake	MN	55356	
Rhonda	Malecki	3044 Hampshire Ave S	Minneapolis	MN	55426	
Chad	Martin	7144 10th Ave S	Richfield	MN	55423	
Andrew	Moritz	2825 Pennsylvania Ave S	Saint Louis Park	MN	55426	
Pam	Martin	7144 10th Ave S	Richfield	MN	55423	Keep dirty oil out of our beautiful state
Peter	Mccauley	750 Fairview Ave N	Saint Paul	MN	55104	Don't do it.
Dianne	Lefty	9011 Westmoreland Ln	Minneapolis	MN	55426	
Jenni	Thomson	6015 Cajed lane	Excelsior	MN	55331	We need to protect Minnesota's natural beauty not put it in harms way for a foreign company's profits.
Julia	Bohnen	8881 Irving Ave S	Bloomington	MN	55431	
Erin	Mccabe	586 Iowa Ave E	Saint Paul	MN	55130	We don't need this. We are better than this.
Aimee	Merino	2189 Hemlock Blvd	Woodbury	MN	55125	Please protect our lakes
Rosalyn	Fredrickson	4252 France Ave N	Robbinsdale	MN	55422	
Justin	Smith	62650 Grouse Trl	Hinckley	MN	55037	The future does not need more oil pipelines.
Cathy	Wood	3700 E. Superior St.	Duluth	MN	55804	
Sandra	Kuschel	11451 Heather St NW	Coon Rapids	MN	55433	
Warren	Vogt	17495 W 263rd St	belle plaine	MN	56011	
Dan	Iverson	4640 north arm drive	Mound	MN	55364	
Sean	Obrien	6028 10th Ave S	Minneapolis	MN	55417	
Jeanne	Ward	14011 Excelsior Blvd	Minnetonka	MN	55345	PLEASE ! THINK about LONG-TERM implications to all who must live with YOUR decisions. Thank you.
Katherine	Slama	5380 132nd Ave NE	Spicer	MN	56288	
Thomas	Seifert	10452 Zim Rd	Forbes	MN	55738	

Barbara	Kaufman	1295 32nd St SW	Pine River	MN	56474	Our property is on the Pine River a few miles downstream from where the proposed pipeline would go under it. Given that pipelines leak or spill sooner or later, this is a major concern, as are the 2 proposed crossings of the Mississippi river itself. The Pine River is used recreationally and therefore contributes to the local economy. In addition, as a tributary to the Mississippi, it is a source of drinking water for cities, from Little Falls, to St. Cloud to the Twin Cities. Given that tar sands oil is extremely difficult to clean up when spilled, this pipeline is too great a risk to be completed.
Ann	Hauer	717 Willard St W	Stillwater	MN	55082	With new clean efficient energy technologies available, this archaic proposal is unacceptable.
Tom	Crew	5108 Dupont Ave S	Minneapolis	MN	55419	
Sharon	Anderson	8409 Meadow Lake Rd E	New Hope	MN	55428	There are always leaks. Always. Keep Minnesota clean and safe ... please.
Debra	Evon	1760 Hennepin Ave Apt 34	Minneapolis	MN	55403	
Amy	Gaspard	6089 James Ave S	Minneapolis	MN	55419	
Lois	Bjorlie	306 Selby Ave	Saint Paul	MN	55102	
Brent	Pearson	608 Le Hillier St	Mankato	MN	56001	
Ann	Brady	1238 Thomas Ave	Saint Paul	MN	55104	
Mary Jo	ROBINSON-JAM	270 WARWICK STREET	ST. PAUL	MN	55105	Only a very thorough impact study can justify this new advance of Oil through our state. - Mary JO Robinson-Jamison
Frank	Stillson	4806 Winterset Dr	Minnetonka	MN	55343	
Gail	Mason	P.O.Box 50328	Minneapolis	MN	55405	
Jeff	Kreis	1194 Spruce Ct	Northfield	MN	55057	
Elizabeth	Hirschman	1825 Kirkwood Ln N	Minneapolis	MN	55441	
Matthew	Saxe	7609 32nd Ave N Apt 219	Crystal	MN	55427	Minnesota does NOT need this! Don't let Enbridge do this. Minnesota needs to be an example to the rest of the nation to standing up to big corporations like Enbridge and preserve and protect our communities, tribal lands, rivers, lakes, wildlife and climate! NO to Line3!
Owen	Gustafson	1106 Innsbrook Ln	Buffalo	MN	55313	

Denise	Thomas	100 Imperial Dr W #301	West St Paul	MN	55118	
Walter	Lorber	972 22nd St SE	Rochester	MN	55904	
John	Schmitt	5101 Park Ave	Minneapolis	MN	55417	
Shirley	Evans	PO Box 487	Kerkhoven	MN	56252	
Sara	Berglund	2589 Oak Hills Dr SW # 2589	Rochester	MN	55902	
Bernard John	Grisez	1063 Westcliff Curv	Shoreview	MN	55126	
Paul	Chindvall	1812 Dayton Ave	Saint Paul	MN	55104	
Victoria	Izquierdo	748 2nd Ave	Excelsior	MN	55331	
Kristi	Kort	939 Juno Ave	Saint Paul	MN	55102	
Cynthia	Buschena	186 3rd Ave SE	New Brighton	MN	55112	
Melanie	Moran-Grover	38 Dunbar Way	Mahtomedi	MN	55115	Please do not approve this!
Connie	Nunemaker	27231 260th St	Shevlin	MN	56676	
Mitchell	Miller	2011 3rd Ave S Apt 114	Minneapolis	MN	55404	
Karen	Peters	3420 Cleveland St NE	Minneapolis	MN	55418	Thank you for listening.
Mark	Snyder	2302 Johnson St NE	Minneapolis	MN	55418	
Cathy	Curtis	PO Box 421	Buffalo	MN	55313	
Brenda	Kemmerick	3310 James Ave N	Minneapolis	MN	55412	
Nellie	Scheffler	5234 Howard Gnesen Rd	Duluth	MN	55803	
Stephen	Hamre	22090 Ethan Ave	Forest Lake	MN	55025	
Erin	Strauss	3531 15th Ave S	Minneapolis	MN	55407	
Maddy	Bartsch	149 Virginia St	Saint Paul	MN	55102	There needs to be a thorough investigation with something that can have life-altering impacts on so many vital portions of Minnesota. If this were to go through your neighborhood where you and your family lived, the fields where you bought food from, and the recreation areas you played in, wouldn't you want there to be as thorough a review as possible?
Annika	Brock	1225 Saint Clair Ave Apt 1	Saint Paul	MN	55105	
Mallory	Malecek	1720 N Payne St	New Ulm	MN	56073	
Rebecca	Shedd	4554 Wentworth Ave	Minneapolis	MN	55419	
Peggy	Anderson	5305 43rd Ave S	Minneapolis	MN	55417	
Steven	Guillotel	15799 Village Woods Dr	Eden Prairie	MN	55347	
mel	mon	5324 washburn	mpls	MN	55410	There are other routes available, and CLEAN WATER is a scarce commodity. Enbridge is ASKING PERMISSION to cross our state. Minnesota is NOT obligated to let Enbridge create these extraordinary hazards for some of the cleanest water in North America.

Kari	Miller	626 3rd Ave NE	Minneapolis	MN	55413	
Jo	Haberman	1900 Saint Louis Ave Apt 103	Duluth	MN	55802	
Barbara	Janssen	7356 Quantico Ln N	Maple Grove	MN	55311	
Shawn	Olson	506 Elm St.	Alexandria	MN	56308	I have walked nearly all of the previous corridor all the way across Minnesota years ago on an archaeology field survey project. There were slicks at far too many wetland locations. These things leak FAR more than is commonly known and put many aspects of our shared environment at risk. Line 3 is not a "replacement", it is the abandonment of the previous leaky pipeline and installation of a whole new pipeline with up to triple the flow of dirty, risky tarsands oil. As a former candidate for the Minnesota State Senate, most people I talked to are opposed to the risk to our water.
Carolyn	Stark	4020 Garfield Ave	Minneapolis	MN	55409	Do the right thing for the people of America.
Darcy	Bergh	1121 Hallam Ave N	Saint Paul	MN	55115	
Nancy	Partin	1504 Archibald St	Northfield	MN	55057	
Laura	Wolf	16846 Island Ave	Lakeville	MN	55044	
Benton	Bakke	1243 Lake St	North Mankato	MN	56003	The government of Minnesota was elected by its people, not its industries. Minnesota must stand for native peoples, against pollution, and on the throats of industries that refuse to be transparent and honest about their practices and impacts. Our beautiful state is worth protecting.
Julia	Rice	901 18 1/2 Ave NE Apt 203	Minneapolis	MN	55418	
Dawn	Demaske	5426 Nicollet Ave Apt 311	Minneapolis	MN	55419	
Denise	Thomas	100 Imperial Dr W #301	West St Paul	MN	55118	
Michael	Pysno	12365 46th Ave. N.	Plymouth	MN	55442	
Linda	Goecke	6085 Rowland Road #111	Minnetonka	MN	55343	We CANNOT risk a tar sands spill and damage in a pristine waterway.
Brian	Abrahamson	810 N Cedar St	Luverne	MN	56156	
Anne	Paulson	17933 Rutgers St NE	Forest Lake	MN	55025	
William 'Skip'	Dykoski	890 9th Ave NW	New Brighton	MN	55112	
Fiona	Burnll	4254 21 Ave S	Minneapolis	MN	55407	
Rita	Ayers	19 W. Minnehaha Parkway	Minneapolis	MN	55419	
Miranda	Bryan	1941 Windjammer Drive	Woodbury	MN	55125	

Rita	Clapper	5301 Broadwing Drive	Duluth	MN	55804	
Christine	Popowski	2630 Pleasant Ave, 101	Minneapolis	MN	55408	
Robert	Andrews	623 3rd st nw	Rochester	MN	55901	
Lily	Frenette	1672 Avocet Lane	Lily	MN	55364	
Diane	Lawson	1305 Prince St	Mountain Lake	MN	56159	
Aimee	Merino	2189 Hemlock Blvd	Woodbury	MN	55125	The climate can not tolerate more tar sands oil and I do not trust these pipelines as they are an environmental disaster waiting to happen.
Allison	Bristow	4301 Park Glen Road, 304	St. Louis Park	MN	55416	
Dianne	Lefty	9011 Westmoreland lane	St. Louis park	MN	55426	
Donna	Butler	8438 Mississippi Blvd NW	Coon Rapids	MN	55433	
Stacy	Zeigler	301 1st St NE	Little Falls	MN	56345	
Jeanine	Malec	3852 11th Ave S	MINNEAPOLIS	MN	55407	
Kaija	Bergen	5337 Fremont Ave S	Minneapolis	MN	55419	
Becky	Nelson	2001 Flag Ave N	Golden Valley	MN	55427	
Sarah	Grenberg	5106 Ivanhoe street	Duluth	MN	55804	
Janice	Bisch	2825 39th Ave. S.	Minneapolis	MN	55406	It is time to move away from using dirty energy sources...Let's not rebuild the pipeline!
Lauren	Boritzke	2437 Emerson Ave S, Apt 5	Minneapolis	MN	55405	
Sue	ODonnell	13402 77th ST NW	Annandale	MN	55302	
PETER	Frank	1066 orchard ave	Saint Paul	MN	55103	
Elizabeth	Thorson	5 Birchwood Road, N	Mahtomedi	MN	55115	Please carefully consider these thoughts and in general, I'd like our state to place a very high value on our amazing water resources and protect them to the best our your ability; it is very expensive to clean up spills and some contaminations are never fully cleared!
Don	Kratsch	1853 Pioneer Lane	Centerville	MN	55038	
Alva	Pingel	13894 Birchwood Ave.	Rosemount	MN	55068	
Kelsey	Brodt	1013 120th lane	Coon rapids	MN	55448	
Rebecca	Corruccini	3229 Emerson Ave S	Minneapolis	MN	55408	I'm heartbroken to hear about this pipeline running through my beautiful state and putting us at risk. Please reconsider. The risks simply aren't worth it.

Jo-Ann	Sramek	4882 Woodridge Drive, 20	Duluth	MN	55811	Even though we have Enbridge stock that does not mean that we are not concerned about safety of pipelines; we want Enbe to adhere to high standards, putting safety and the environment first. Areas that are highly susceptible to ruination if an oil spill should occur should not be considered for pipeline to be laid and used. We only have one earth and corporations and people also have not done a good job of the stewardship of our resources here on this planet. We cannot afford to ignore Enbridge's threat to our environment and the impact it will have on the habitat for animals.
Lori	Shannon	5037 Sheridan Ave S	Minneapolis	MN	55410	
Corinne	Herman	1078 Front Ave Apt 3	Saint Paul	MN	55103	
Meg	Emry	6965 Belle St	Loretto	MN	55357	
Melissa	Warfield	20991 Chippendale Ave W	Farmington	MN	55024	Do not abandon your old pipeline in the ground. Clean up your old sands tar pipeline.
Kimerly	Wilcox	16590 59th Street NE	Otsego	MN	55330	
Kimerly	Wilcox	16590 59th Street NE	Otsego	MN	55330	
Josue	Morales	3801 Lyndale Ave N	MINNEAPOLIS	MN	55412	
Juliann	Rule	35002 115th Ave.	Avon	MN	56310	
Susan	Kimmel	619 Center St	New Ulm	MN	56073	
Susan	Jordan	2361 Unity Ave. No.	Golden Valley	MN	55422	
Gretchen	Meek	14812 Hickory Court	Eden Prairie	MN	55346	
Molly	Gollinger	325 W Winona St	Duluth	MN	55803	
Juliann	Rule	35002 115th Ave.	Avon	MN	56310	
Amelia	Narigon	643 N 5th St	Minneapolis	MN	55401	
Julie	Nevill	1335 BradleySt	St Paul	MN	55130	
Ellen	Jaquette	3340 32nd Ave S	Minneapolis	MN	55406	
Larry	Bogolub	1424 Lincoln Avenue	Larry	MN	55105	
Suzanne	Copeland	3016 E 50th St	Minneapolis	MN	55417	
Tamara	Rakow	14231 Azalea Path	Rosemount	MN	55068	
Gabriela	Santiago	1208 Raymond Avenue	St. Paul	MN	55108	
Gabriela	Santiago	1208 Raymond Avenue	St. Paul	MN	55108	
Marion	Potyondy	1116 Cedarwood Dr	Woodbury	MN	55125	
Alison	Schneider	4201 Merrimac Ln N #88	Plymouth	MN	55446	
Ann	Tucker	1998 Goodrich Ave.	St. Paul	MN	55105	
Martha	Tappen	1200 Maple Lane W	Roseville	MN	55113	

Christine	Pikala	4825 34th Ave. So.	Christine	MN	55417	
Lois	Nokleby	23420 Main St.	Lois	MN	55031	This is NOT something good for the future of our state.
Susan	Cox	7006 Quail Cir W	Brooklyn Center	MN	55429	
Brad	Snyder	8887 Dallas Lane N.	Maple Grove	MN	55369	As a current Science Teacher/Environmental Educator and a former Engineer, I'm totally against this pipeline! For one thing it would carry tar sands oil which is the dirtiest type of oil, so it should be left in the ground. Also, we should be reducing our dependence on fossil fuels and preparing for the Clean Energy Revolution (which has already started!)!!
kathleen	kaysinger	4754 winterset dr	hopkins	MN	55343	
marilyn	gockowski	1427 cliff ave	duluth	MN	55811	
Michael	Chutich	1283 Sargent Avenue	St. Paul	MN	55105	
J	Blagen	10386 Rich Rd.	Minneapolis	MN	55437	
Cathy	Walters	140 1st Ave NW, PO BOX 302	Elgin	MN	55932	
Crystal	Lumi	27 Fairfax Street	Crystal	MN	55987	Thank you for your dedication to preserving our lands and waters.
Suzanne	Birch	16015 Elgin Court	Faribault	MN	55021	NO PIPELINES IN MINNESOTA-WE DON'T NEED THEM!
Suzanne	Birch	16015 Elgin Court	Faribault	MN	55021	Let THEM GO THROUGH Canada not Minnesota-we don't want them.It's our state-have we no say?
Suzanne	Birch	16015 Elgin Court	Faribault	MN	55021	No pipes in Minnesota-This is our state and we should have the say-it's ridiculous if we can't.
Keith	Tyson	1206 Eastport	Mankato	MN	56001	
Kay	Slama	5380 132nd Ave NE	Spicer	MN	56288	
Craig	Long	132 Wyoming St E	St. Paul	MN	55107	
randall	yreier	23348 county road .53	bigfork	MN	56628	
Maddy	Bartsch	149 Virginia Street	St. Paul	MN	55102	
Bruce	Snyder	180 Kellogg Blvd E, Apt 1308	St. Paul	MN	55101	
Allan	Campbell	3220 W CALHOUN PKWY, APT 20	MINNEAPOLIS	MN	55416	
Kate	Wolfe-Jenson	601 Main St. SE., 101	Minneapolis	MN	55414	
Lee	Beaty	2801 42nd Ave. So.	Minneapolis	MN	55406	

C Lee	Beaty	2801 42nd Ave S	Minneapolis	MN	55406	You must act responsibly and protect the natural resources of our beautiful..... not exploit them. People, animals, trees, plants..... All need clean water and soil to exist. NO RAPE OF THE LAND NO OIL-POISON FOR THE WATER.
Susu	Jeffrey	1063 Antoinette Av	Mpls	MN	55405	Who owns you? What about the children?
Isabel	Watson	5108 Thomas Ave S	Minneapolis	MN	55410	
Robin	Poppe	3249 Sandy Pines Rd	Barnum	MN	55707	
Barbara	Brockway	233 Nichols Ct	Shoreview	MN	55126	
Douglas	Boleen	9816 Kalenda Ave NE	Monticello	MN	55362	
Karen	Renaud	1975 Collin St.	Mora	MN	55051	
Megan	Kemper	11653 Highway 8	Floodwood	MN	55736	
Joseph	Aliotto	2631 Jersey Ave. S	St. Louis Park	MN	55426	
Jon	Lee	4604 W 39th St	Minneapolis	MN	55416	
Suzy	Lovestrand	603 E. Minnehaha Parkway	Minneapolis	MN	55417	
Bruce & Michelle	Hanson	12720 27th Ave N	Plymouth	MN	55441	Michelle and I are connected through marriage to the Ojibwe community directly impacted by this proposal. There are too many risks posed by this project to that community and the general welfare of the environment in this region of Minnesota. The risk level is made even higher by the poor track record of this company.
Kate	Smith	1405 Upper 55th St E	Inver Grove Heigl	MN	55077	
Kate	Crowley	82119 Bennett Rd	Willow River	MN	55795	
Daniel	Jaquette	3340 32nd Ave S	Minneapolis	MN	55406	don't oil me, bro
Erik	Voldal	3409 Woodstone Dr SW	ROCHESTER	MN	55902	
Gregory	Gailen	PO Box 914	Grand Marais	MN	55604	
David	Lundman	12815 Pioneer Trail	Eden Prairie	MN	55347	Stop polluting the Earth.
Art	Wilkinson	830 S Winthrop St	St Paul	MN	55119	
Kaitlyn	Campbell	2120 Valleyhigh Dr NW	Rochester	MN	55901	
Mary	Thul	436 ODAY ST S	Maplewood	MN	55119	
Kathryn	Mosher	4316B Clemson cir	Eagan	MN	55122	
Kelly	Peebles	3905 44th Ave S	Minneapolis	MN	55406	
Stephanie	Johnson	PO Box 1481	Grand Marais	MN	55604	
Les	Pilgrim	1704 Vicki Lane	mendota hts	MN	55118	
Susan	Wick	1436 Raymond Ave	Saint Paul	MN	55108	It is time to take the lead on clean energy and stop relying on dirty and dangerous fossil fuels and their pipelines.

Brenda	Graves	P. O. Box 74	Sauk Rapids,	MN	56379	
Madelyn	Sundberg	4221 Nicollet Ave Apt 102	Minneapolis	MN	55409	
Allison	Bristow	4301 Park Glen Road, 304	St. Louis Park	MN	55416	
Ann Marie	Sunderland	15555 Flight Way	Saint Paul	MN	55124	
Mike	Refsland	3338 PIERCE ST NE	MINNEAPOLIS	MN	55418	
Janet	Koplos	987 Como Blvd E	Saint Paul	MN	55103	
Mary	Madeco-Smith	13998 165th St	Little Falls	MN	56345	No amount of money brings back the dead. All fossil fuel projects, from their very start point until the end point of usage murders the Planet. Fact.
Logan	Paul	3535 Grand Ave S #306	Logan	MN	55408	
Abby	Conrad	7016 Mark Terrace Drive	Edina	MN	55439	
Kriss	Wells	3929 Elliot Ave. S.	MINNEAPOLIS	MN	55407	
Emily	Flom	5 Orchard Lane	Edina	MN	55436	
Catherine	Katt	2001 2nd Ave S	Minneapolis	MN	55404	Please join the movement to save our precious earth from more pollution.
Margaret	West	1002 west 6th street	Duluth	MN	55806	WATER is our MOST important resource and concern. This new rerouted line again jeopardizes the tributaries of Lake Superior and the Mississippi, two of the most important water sources for fresh water in our nation our world.
Marcy	Leussler	4001 10TH AVE S	Minneapolis	MN	55407	
Lee	Hanson	1002 west 6th street	Duluth	MN	55806	
Anna	Cerf	6312 Loch Moor Dr	Edina	MN	55439	Minnesota is supposed to be leading the way in clean energy. So disappointed that this pipeline could be coming to our state. Please do not let this happen.
Michael	Erickson	2515 S 9th St	Minneapolis	MN	55406	
vicky	ernst	13606 COUNTY ROAD 8 NW	CLEARWATER	MN	55320	Thank you for your consideration, Vicky Ernst
randall	streier	23348 c.r. 53	bigfork	MN	56628	
Max	Jacklen	6612 3rd Ave S	Richfield	MN	55423	
Richard	Deming	1717 Washington St. NE, #1103	Minneapolis	MN	55413	

Hannah	Baxter	4164 Coffman Ln	Minneapolis	MN	55406	Enbridge should ensure that their existing Line 3 pipeline is safely dismantled without risk to ecosystems and communities along the pipeline. And Minnesotans should consider carefully whether it is in our best interests to be locked into a new pipeline carrying destructive tar sands oil. Thank you for the opportunity to comment on this issue.
Kim	Olstad	5565 Ximines Ln n	Plymouth	MN	55442	I am a cabin owner in an area that will be affected in northern MN. Please hear my -- and many others -- as we voice our deep concerns. This line and the one to be abandoned must be responsibly disposed of
Catherine	Johnson	676 Arcadia Dr	Mendota Heights	MN	55118	
Lynda	Axberg	5537 Elliot Ave	Minneapolis	MN	55417	
Emer	Griffin	3824 16th Ave S	Minneapolis	MN	55407	We need a true study of the impact of this pipeline, also considering our state's history and patrimony. Our identity as Minnesota is built on our water, and destroying that will be utterly detrimental to the state.
Dag	Knudsen	P. O. Box 180	Dag	MN	55041	Let's adopt strategies that capture carbon instead of releasing carbon as this project does. THINK FUTURE.
Mae	Sylvester	162 College Ave W #6	St. Paul	MN	55102	Please place our regulatory and financial emphasis on clean energies for the future, not continuing corporate profits based in an energy system that is outmoded.
lisa	clampitt	16051 Ramsey Blvd.	Ramsey	MN	55303	Minnesota waters, and beauty needs to be protected. It's really as simple as that.
Megan	Seger	2452 Crystal Bay CT SW	Rochester	MN	55902	
Elena	Sunland	1809 Scheffer Ave	Saint Paul	MN	55116	
Sarah	Hauglie	4215 Colfax Ave South	Minneapolis	MN	55409	
Vicki	Denissen	11200 Louisiana Ct W	Champlin	MN	55316	
Kathy	Reinhardt	2604 Abbott Ave. N	Robbinsdale	MN	55422	It is vital that the truth be closely examined about the possibility of spills and the impact that would have on our environment. Our natural resources in Minnesota are valuable and precious, and therefore must be protected.
Celeste	Birkeland	4036 Zenith Ave N	Robbinsdale	MN	55422	

Deb	Lynch	3425 Gettysburg Ave N	New Hope	MN	55427	
MaryEllen	Smith	2137 250th Street West	Farmington	MN	55024	
Dannah	Thompson	2425 County Rd. C2 W. #312	Roseville	MN	55113	
Kathryn	Mosher	4316B Clemson cir	Eagan	MN	55122	No tar sands oil.
Hugh	Curtler III	4516 North 89th Crescent	Brooklyn Park	MN	55443	
Ray	Becker	1300 Payne Ave	Saint Paul	MN	55130	
Thomas	Hoch	2100 James Avenue South	Minneapolis	MN	55405	
Jennifer	Paterson	1070 Edgewater Ave	Shoreview	MN	55126	Please do not allow this dirty tar sands pipeline to pass through our state. We don't need this dirty energy here.
Corinne	Rockstad	1853 Iglehart Ave Apt 2	Saint Paul	MN	55104	
Patricia	Halter	1531 Aspen Dr	Saint Peter	MN	56082	
Karen	Bell-Brugger	5207 Humboldt Ave S	Minneapolis	MN	55419	
Linda	Maloney	3515 Owasso St Apt 306	Saint Paul	MN	55126	
Kelsey	Blommer	4445 Chowen Ave S	Minneapolis	MN	55410	
Karen	Raccio	6400 Ranchview Ln N	Maple Grove	MN	55311	
Jane & Ben	Nicholson	705 Park Ave	Mahtomedi	MN	55115	There is no need for this to occur.
Alicia	Ester	6132 Queen Ave S	Minneapolis	MN	55410	
Nancy	Schleif	2765 Ranchview Ln N Unit 4	Plymouth	MN	55447	
Nancy	Seymour	121 Washington Ave S	Minneapolis	MN	55401	
Matt	Ringquist	402 Valley View Dr	Redwood Falls	MN	56283	
Brianna	Sharkey-Smith	515 N 1st St Apt 101	Minneapolis	MN	55401	
Mary	Goodkind	5056 Holiday Cir	Minnetonka	MN	55345	
Josh	Coccoluto	430 14th St	Delano	MN	55328	
Emi	Ito	2366 Chilcombe Ave	Saint Paul	MN	55108	
Maggie	Brown	4405 Aldrich Ave S	Minneapolis	MN	55419	
Molly Jo	Beahen	2908 Drew Ave N	Robbinsdale	MN	55422	
Brenna	O'Brien	1671 Marshall Ave	Saint Paul	MN	55104	The public deserves a more thorough and honest analysis of the risks, as well as access to clean water in the name of public health.
Ann	Mongeau	8268 Middletown Rd # C4	Spring Lake Park	MN	55432	
Miriam	Rauk	7216 Foxboro Ln	Woodbury	MN	55125	
Donna	Lober	142 8th St	Windom	MN	56101	
Lori	Heinz	2314 Quincy St NE	Minneapolis	MN	55418	
Jessica	Jubara	2900 Irving Ave S Apt 406	Minneapolis	MN	55408	
Paul	Gregory	2617 Columbus Ave	Minneapolis	MN	55407	
Joe	Eastman	25488 Loons Landing Trl	Bovey	MN	55709	
Lois	Neaton	4820 Maple Rd	Edina	MN	55424	
Lloyd	Fjare	1037 Fairmount Ave	Saint Paul	MN	55105	

Kristina	Cumpston	444 Herschel St	Saint Paul	MN	55104	
Anne	Clark	825 Summit Ave Apt 401	Minneapolis	MN	55403	Thank you for your attention to this critical issue.
Amaya	Maura	260 Osceola Ave S Apt 309	Saint Paul	MN	55102	
Richard	Caswell	2670 Kelley Pkwy Unit 107	Orono	MN	55356	
Sherry	Hottinger	405 Harrison Ave S	Hopkins	MN	55343	We do not need tar sand projects in MN!!!
Jane	Gerber	1158 Saint Paul Ave	Saint Paul	MN	55116	
Jeff	Sell	2063 210th St	Wolverton	MN	56594	
Susan	Valley	555 McKnight Rd S	Saint Paul	MN	55119	Please do not cave to private interests and promises of "more jobs". I don't want to live in a Texas like atmosphere with pollution and dependency. We have a beautiful state . Please think beyond the $$$$. Invest in wind and solar and forget the filthy forms of energy we need to move away from.
Rexi	Warner	10800 Xerxes Ave S	Bloomington	MN	55431	
Ariel	Kirst	6120 Westwood Pkwy Apt 313	Saint Cloud	MN	56303	
Bruno	Giovannoni	607 Leicester Ave	Duluth	MN	55803	
Rick	Morris	408 20th Ave SW	Rochester	MN	55902	
Larry	Wiesner	3654 Washburn Ave N	Minneapolis	MN	55412	
Leo	Klisch	PO Box 247	Saint Joseph	MN	56374	
Carol	Cochran	1913 S 6th St # A	Minneapolis	MN	55454	
Mary	Thacker	21915 Fairview St	Greenwood	MN	55331	It is extremely important to use extreme care and study. No not plunge ahead before the analysis is complete.
Dennis	Fitzpatrick	PO Box 563	Grand Marais	MN	55604	Water is life! There is no Planer B! Please oppose this pipeline.
Brandon	Cooke	5120 28th Ave S	Minneapolis	MN	55417	
Loretta	Neuman	13510 County Road 101	Wadena	MN	56482	
Anca	Zamfirescu	10830 Falling Water Ln Unit C	Woodbury	MN	55129	
Garance	Aboubi	8025 Regent Ave N	Brooklyn Park	MN	55443	
Pam	Strom	1229 Hague Ave	Saint Paul	MN	55104	

Michael	Alexander	78 10th St E Unit 1206	Saint Paul	MN	55101	I am adamant about not allowing this pipeline to pass through my beautiful state. It is FLIRTING with disaster which by past witnessing of the oil industries trackvrecord, is a 100% guarantee that a leak or worse WILL happen and the tax payers will be on the hook to clean it up. The same with the mining. No way. Keep Those filthy industries OUT Of Minnesota.
John	Harrington	30726 Ivywood Trl	Stacy	MN	55079	These concerns are not just hypothetical. According to Wikipedia, "Using data from Enbridge's own reports, the Polaris Institute calculated that 804 spills occurred on Enbridge pipelines between 1999 and 2010. These spills released approximately 161,475 barrels (25,672.5 m3) of crude oil into the environment." https://en.wikipedia.org/wiki/Enbridge#Spills_and_violations Minnesota should no be exposed to such unacceptable operations
Melissa	Urbanek	3325 Macey Place	Stillwater	MN	55082	
Franz	Kitzberger	1 1/2 S Minnesota St Apt 6	New Ulm	MN	56073	
Naomi	Rosener	630 Marshall Ave, 4	Saint Paul	MN	55104	
R	Limoges	701 Southwaite Ct	Redwood Falls	MN	56283	
Jade	Black	625 5th Ave S	Hopkins	MN	55343	
Jerry	Lee	247 Hallam Curv	Mahtomedi	MN	55115	
C	R	21301 County Road 81	Rogers	MN	55374	I do not want anymore suffering to wildlife this must not go through
M-Harper	Lea	4117 France Ave S	Minneapolis	MN	55416	
Kathleen	Jones	469 Ferndale Woods Rd	Wayzata	MN	55391	
Rebecca	Prochaska	15781 Porchlight Ln	Eden Prairie	MN	55347	
Phillip	Peterspm	4822 Russell Ave S	Minneapolis	MN	55410	
Melvin	Strand	13342 382nd Ave	Waseca	MN	56093	
Craig	Lindeman	916 10th Ave SE	Saint Cloud	MN	56304	
Sarah	Rorvick	3217 Chicago Ave	Minneapolis	MN	55407	
Jeremy	Gislason	PO Box 229	Braham	MN	55006	
Sally	Allen	3523 Colfax Ave N	Minneapolis	MN	55412	I am opposed to this pipe line, with increasing temps all over the world we need to end our dependence on oil, gas, and coal. The climate denial is dangerous.

Liz	Dahl	2057 Lindsey Rd	Cook	MN	55723	
Patricia	Loverink	403 19th St NE	Austin	MN	55912	Do not bring this poison pipeline into our beautiful state...please!
Danielle	Vlazny	2510 26th St NW	Rochester	MN	55901	
Stephanie	Ross	16562 Iredale Ct	Lakeville	MN	55044	
Rich	Kronfeld	4221 Beverly Ave	Minneapolis	MN	55422	
Judy	Linman	PO Box 542	Finland	MN	55603	To let the other line 3 rot in the ground is irresponsible short sited corporate greed nothing less. Why duplicate the same problem without properly taking care of the first problem the corporation created.
John	Gauthier	5631 Emerson Ave N	Brooklyn Center	MN	55430	I recently went online to ask how many oil and gas spills there have been so far this century. The list went to thirty-three pages and only included part of 2016. We are awash in oil and and I cannot see the need for expanding the capacity of current pipelines. Please do not allow this to happen.
Kathie	Noga	500 S 10th St Apt 321	Minneapolis	MN	55404	
Matt	Thyne	4707 Bryant Ave N	Minneapolis	MN	55430	
Deea	Gailfus	3733 40th Ave S	Minneapolis	MN	55406	
Richard Kent	Muray Jr	2329 S 9th St Apt 411	Minneapolis	MN	55406	
Greg	Kapphahn	208 Birch Ave	Alexandria	MN	56308	
Ruth	Jones	2950 Dean Pkwy Apt 1504	Minneapolis	MN	55416	The safety of our environment is FAR MORE IMPORTANT than allowing this project to go through!!!!
Gail	Frethem	5241 10th Ave S	Minneapolis	MN	55417	
Joann	Schneider	14335 Valley Creek Trl S	Afton	MN	55001	
Seshadri	Srinivas	173 McKnight Rd N Apt 211	Saint Paul	MN	55119	
Tessa	Carlson	1094 16th Ave SE	Minneapolis	MN	55414	
Kevin	Kujawa	5236 47th Ave S	Minneapolis	MN	55417	There is no need in the public interest of the people of Minnesota for this pipeline to be constructed. Do not approve the pipeline!
Mary Ellen	Vetter	7715 York Ln N	Brooklyn Park	MN	55443	
Laura	Perdue	261 Aurora Ave	Saint Paul	MN	55103	
Elizabeth	Paulson	3790 Lawndale Ln N Apt 303	Plymouth	MN	55446	
John	Pegg	1335 Minnesota Ave	Duluth	MN	55802	
Gregory	David	3956 Yosemite Ave S	Minneapolis	MN	55416	Ditto
Deb	Landon, MBA	4424 Abbott Ave S	Minneapolis	MN	55410	

Carolyn	Ganz	675 Roma Ave	Roseville	MN	55113	
Wayne	Mayer	3790 Lawndale La. N. 303	Plymouth	MN	55446	
Lawrence	Bogolub	1424 Lincoln Ave	Saint Paul	MN	55105	
Bryan	Winget	895 Howell St N	Saint Paul	MN	55104	I oppose expanding Line 3.
Dewayne	Benson	11026 Terrace Rd NE	Blaine	MN	55434	
Jerald	Ward	501 2nd St NE	Minneapolis	MN	55413	
Sherie	Bartsh	9400 Old Cedar Ave S Apt 206	Bloomington	MN	55425	
Patricia	Cram	29358 Minnesota Highway 22	Litchfield	MN	55355	
J	R	6452 highway 61	S B	MN	55614	
Rob	Menti	16794 66th Ave N	Maple Grove	MN	55311	
David	Howd	1246 Shryer Ave W	Roseville	MN	55113	
Gina	Marano	5300 Vernon Ave	Edina	MN	55436	
L	Mcclanahan	9106 Regent Pkwy	Brooklyn Park	MN	55443	
Debra	Swanson	548 B Auburn Pl NW	Elk River	MN	55330	It would be better to replace the old line. I do not want the new proposed route.
Constance	Spear	1300 Highland Pkwy	Saint Paul	MN	55116	Have you SEEN what the tar sands are doing to the environment in Canada? It is a dirty, toxic sludge. We want NOTHING to do with pipes carrying tar sands oil. Minnesota needs to be protected from this travesty.
Larry	Margolis	3916 Avondale St	Minnetonka	MN	55345	
Kathy	Kormanik	8609 40th Ave N	Minneapolis	MN	55427	
Marilynn	Reid	163 Windsor Ln	Saint Paul	MN	55112	
Roxanne	Hagge	13494 Glenhurst Ave	Savage	MN	55378	Once the damage is done it is often extremely expensive to clean up.. I think we need to do more in the way of alternative fuels/electric cars.
Nia	Doherty	201 Bayberry Avenue Ct	Stillwater	MN	55082	
Sheila	Johnston	7693 Lost Lake Trl	Lake Shore	MN	56468	
Roger	Davis	16084 Oakwood Heights Rd	New Ulm	MN	56073	
Virginia	Martin	695 Hague Ave	Saint Paul	MN	55104	
Kathryn	Mccloskey	17254 Marshfield Ln	Prior Lake	MN	55372	
Paulissa	Jirik	222 Wentworth Ave W Apt 203	Saint Paul	MN	55118	PLEASE DO THE RIGHT THING AND PROTECT OUR EARTH AND ALL ITS PEOPLE AND CREATURES. THANK YOU AND GOD BLESS.
Patrick	Zalusky	503 11th Ave NW	New Brighton	MN	55112	
Tina	King	4140 James Ave N	Minneapolis	MN	55412	
Michael	Owecke	15 Superior Ln	Winona	MN	55987	
Patricia	Thielman	5561 Fairhill Dr SE	Buffalo	MN	55313	

John	Eggert	657 Laurel Ave	Saint Paul	MN	55104	
Michael	Blandford	1666 Coffman St Apt 329	Falcon Heights	MN	55108	While the DEIS deals with annual leakage potential, it fails to consider lifetime leakage potential. It also fails to consider clean energy as an alternative. Finally, oil consumption is decreasing. There is no need to build environmentally threatening infrastructure for an outdated energy source.
Di	Leider	4123 Abbott Ave S	Minneapolis	MN	55410	
Brendon	Bryan	3702 Bear Ridge Ct S	Saint Cloud	MN	56301	
Elizabeth	Lempp	PO Box 923	Moose Lake	MN	55767	
Freda	Veljkovich	1521 2nd St N	Saint Cloud	MN	56303	No more pipelines!
Kathleen	Todd	3660 35th Ave S	Minneapolis	MN	55406	
Lisa	Siebenaler	2205 Forest St	Hastings	MN	55033	
Jill	Tollefson	720 23rd St SE	Willmar	MN	56201	
Tom	Thompson	1370 White Lake Dr	Duluth	MN	55803	
Tanya	Beyer	PO Box 446	Floodwood	MN	55736	
Paula	Kwakenat	7301 W 101st St Unit 112	Bloomington	MN	55438	The vast majority of Minnesotans do not want this -it's dangerous and the ends will never justify the means.
Rita	Teresi	33922 Duck Lake Trl	Pequot Lakes	MN	56472	
Andrew	Anderson	133 3rd Ave SW Apt 201	Hutchinson	MN	55350	
Marilla	Macgregor	140 Rice St S	Kasota	MN	56050	
Christopher	Marshall	7320 Longview Cir	Chanhassen	MN	55317	
Dianne	Knoben	49739 153rd Pl	Tamarack	MN	55787	
Sara	Mckay	500 W Jackson St Apt 217	Saint Peter	MN	56082	
Daniel	Ball	7786 Carnelian Rd	Kimball	MN	55353	
Doris	Schneider	3330 Edinborough Way Apt 1611	Edina	MN	55435	
Sandra	Bissonnette	143 Dahlia Street	Mahtomedi	MN	55115	
Larry	Schug	35002 115th Ave	Avon	MN	56310	
Bethany	Howe	1591 Geske Rd	Chaska	MN	55318	I am terrified at will this will do to our Native tribes and our wild land. We need animals healthy..how else will we eat, drink fresh water, go fishing,hunting. We need as the human race to ha e healthy water supply, it is essential for all life
Joseph	Rojas Jr	723 7th St SE	Minneapolis	MN	55414	
Molly	Pikala	6715 Penn Ave S Apt 1	Minneapolis	MN	55423	
Clarke	Dehler	4733 Trigstad Rd	Aurora	MN	55705	
David	Stewart	2549 Cedar Hills Dr	Minnetonka	MN	55305	

David	Arch	10441 Columbus Rd	Bloomington	MN	55420	
Anne	Tisel	2940 Autumn Woods Dr	Chaska	MN	55318	
Michelle	Mosley	13479 Zenith Ln	Eden Prairie	MN	55346	
Janet	Folina	3837 18th Ave S	Minneapolis	MN	55407	
Nancy	Hassett	17175 245th Ave. NW	Big Lake	MN	55309	Construction of Line 3 to carry tar sand oil, of all things, is going precisely the wrong direction from where Minnesota is headed. Our state has little except for temporary jobs to gain, and immeasurable potential damage to our state's fragile ecosystem to lose. No Line 3!!
Linda	Van Zele	2531 Unity Ave N	Minneapolis	MN	55422	
Mary	Schultz	10520 Nathan Ln N	Maple Grove	MN	55369	Our state's resources are at stake!
Peter	Glick	2349 Edgcumbe Rd	Saint Paul	MN	55116	
Joyce	Kramer	PO Box 3316	Duluth	MN	55803	We MUST find alternatives to petroleum because of its effects on negative climate change. It is only economic greed that perpetuating the thrust to build this and other pipelines!
Lee	Purrier	820 Woodland Ave	Park Rapids	MN	56470	
Margaret	Sines	4216 Dupont Ave S	Minneapolis	MN	55409	
Kathleen	Moraski	7611 Teal Bay	Woodbury	MN	55125	
George	Johnson	3193 Strand Rd	Duluth	MN	55803	
Brenda	Palo	1540 Hartford Ave	Saint Paul	MN	55116	I am very committed to the importance of this pipeline issue. The threat to indigenous rights and to our MN waters is very real and a disaster, small or large, would be irreversible.
Bill	Henney	211 E 26th St	Minneapolis	MN	55404	
Jeanne	Mc Kimpson	4862 Opal Ln NW	Rochester	MN	55901	We don't want any tar sands pipeline--and we certainly don't want another oil spill by Enbridge. The pipeline is not needed, and it endangers wildlife, human health, and tribal lands. It's time for clean energy.
Robyn	Geldner	46539 Beaver Dam Rd	Cleveland	MN	56017	
Michael	Bement	825 Warner Ave S	Mahtomedi	MN	55115	
Laura	Lineburg	5741 Sheridan Ave S	Minneapolis	MN	55410	
Mary	Brule	11246 Isanti Ct NE	Blaine	MN	55449	There is no need for another oil pipeline to potentially despoil our wilderness. Let's leave something for our future kids.

Sophia	Truempi	18647 Pathfinder Dr	Eden Prairie	MN	55347	
Billy	Curmano	27979 County Road 17	Winona	MN	55987	
John	Abbott	715 Liberty Ct	Stillwater	MN	55082	Please listen to the people. We don't want this!
Cathy	Gagliardi	1735 Sheridan Ave	Saint Paul	MN	55116	There is a lot at stake here, especially on the heels of Flint, MI. We need clean water!! ...not profits at the risk of ill health
Jenni	Charrier	1910 Heritage Dr	Wayzata	MN	55391	
Thora	Reynolds	1914 15th Ave S	Minneapolis	MN	55404	The Ojibwe wild rice rights are actually a vital part of my community in Minneapolis, as this wild rice is sold in 6 different locations in my neighborhood. It is an important part of our spiritual connection to the water and earth. My family works in public television, public radio, theater, healthcare, construction, and the restaurant industry and owns property in many parts of the state. Every member of my family has a connection to Northern Minnesota's amazing lakes and rivers, and spends money every year as a tourist in our own state. Pollution of our waterways would affect us deeply.
Jim	Marsden	1872 Howard St N	Maplewood	MN	55109	
Diane	Lawson	1305 Prince St	Mountain Lake	MN	56159	
Rebecca	Lystig	1741 Sartell Ave	Eagan	MN	55122	
Lily	Frenette	1672 Avocet Ln	Mound	MN	55364	
Judy	Brekke	PO Box 426	Chanhassen	MN	55317	
Theresa	Martin-Beier	PO Box 114	Dumont	MN	56236	
Tina	Lemke	30 W 93rd St	Bloomington	MN	55420	
Wendy	Roberts	12038 Duke Dr NE	Blaine	MN	55434	
Linda	Dean	3258 Lindahl Rd	Duluth	MN	55810	
John	Nordstrom	1652 Fernwood St	Saint Paul	MN	55108	
Ellen	Jones	5261 Lochloy Dr	Edina	MN	55436	When the risks are as high as they are.... threats to our land and water.... then we need to be cautious and responsible. Do not continue the piping of oil. Convert to sustainable energy.
Mitchel	Buergel	1870 52nd St E Apt 108	Inver Grove Heigl	MN	55077	
William	Bracey	16600 Lehn U Trl NW	Brandon	MN	56315	
Melanie	Mattsen	2491 Highway 217	Ray	MN	56669	

Kathryn	Haight	2090 Acacia Dr	Mendota Heights	MN	55120	
Adam	Eisenstein	5214 10th Ave S	Minneapolis	MN	55417	Hello - I question the need to build a new pipeline. I understand Enbridge's position that maintenance costs will increase on the current pipeline, but I would like to see over what period of time the cost of maintaining it would exceed the proposed amount of $2.1 billion spent on a new line. That doesn't even include the cost to our environment and the disruption of land, including tribal lands, that would occur if the new pipeline were to be built. rather than maintenance truly being the rationale, I reckon that this is more about increasing the flow of oil through Minnesota and the flow of profits to Enbridge. What public value do we gain from this? I fail to see it. Yours, Adam Eisenstein
Sue	Waller	3402 22nd St S	Saint Cloud	MN	56301	
Rodd	Ringquist	9661 221st St N	Forest Lake	MN	55025	
Bryan	Kaufmann	19020 Ironriver Trl	Lakeville	MN	55044	
Erika	Eberhardt	420 Leicester Ave	Duluth	MN	55803	
Dale	Forster	600 Parkway Ave S	Lanesboro	MN	55949	
Mary	Carter	4565 Saddlewood Dr	Minnetonka	MN	55345	
Michael	Heinsohn	3942 2nd St NE	Columbia Heights	MN	55421	
Danielle	Wincek	23363 Arrowhead St NW	Saint Francis	MN	55070	
Kelsey	Gabel	8682 Quarry Ridge Ln Unit J	Saint Paul	MN	55125	
Irv	Smith	3141 Dean Ct	Minneapolis	MN	55416	GET IT RIGHT! DO YOUR JOB!
Donald	Hankins	165 Wildwood Ave	Saint Paul	MN	55110	
Patty	Nichols	13585 Lynn Ave	Savage	MN	55378	
Dana	Willis-Jick	1690 Perlich Ave	Red Wing	MN	55066	
Glenn	Carnahan	1388 Wellesley Ave	Saint Paul	MN	55105	
Rebecca	Banwell	11354 Parkside Trl	Maple Grove	MN	55369	
Kathleen	Brummer	133 34th Ave N	Saint Cloud	MN	56303	
Bruce And Liza	Eng	1111 Gilmore Ave	Winona	MN	55987	The science is clear: we are in a climate emergency and the last thing we should be doing is approving even more fossil fuel projects. The answer is to switch to renewable energy. We possess the knowhow, we just have to have the political will.

Alesha	Erickson	8529 Raintree Dr Apt 5F	Mountain Iron	MN	55768	
Terry	Evans	12201 Minnetonka Blvd Unit 223	Minnetonka	MN	55305	
Thomas	Stavros	2746 21st Ave S	Saint Cloud	MN	56301	Minnesota stands to loose much more than they stand to gain by Line 3 being built.
Jon	Hayenga	421 2nd St NW	Stewartville	MN	55976	
John	Peck	12299 Sauk River Rd	Saint Cloud	MN	56301	
Jan	Coleman	5800 Upton Ave S	Minneapolis	MN	55410	Thank you for considering these concerns.
George	Bentley	1198 Churchill St	Saint Paul	MN	55103	
Janelle	Hill	4041 Elliot Ave	Minneapolis	MN	55407	
Carolina	Torres	905 Marshall Ave	Saint Paul	MN	55104	
Kathie	Smith	2015 6th St NE	Minneapolis	MN	55418	
Pat	Lang	5720 Stevens Ave	Minneapolis	MN	55419	
Patricia	Pool	1741 Laurel Ave	Saint Paul	MN	55104	
Virgil	Dahlstrom	19 S 1st St	Minneapolis	MN	55401	
Timothy	Knight	640 Madison St	Anoka	MN	55303	I've come to expect Minnesota to take the lead in doing what's right in this country. We need to move away from fossil fuels and move towards renewable energy sources. Please take the lead towards a brighter future for generations yet to come.
Bruce	Kessler	2085 Saint Clair Ave	Saint Paul	MN	55105	Avoid the dangers before they occur. Have a vision to encourage and support safer forms of energy while protecting and preserving sacred lands!
Sharon	Powell	2869 County Road 7	Grand Marais	MN	55604	
David	Roizin	300 N College St	Northfield	MN	55057	
Steven	Csorgo	28709 Pacer Dr	Browerville	MN	56438	Its not a matter of if they'll leak....its a matter of when and where. MN. waters are too precious for gambling....and losing.
Judith	Mcdonough	1614 7th Ave E Apt 202	Alexandria	MN	56308	
Linda	Weber	2925 Monterey Ave	Saint Louis Park	MN	55416	
Martha	Krikava	9696 101st St N	Stillwater	MN	55082	
Hall	Sanders	2239 Fillmore St NE	Minneapolis	MN	55418	
Richard	Holcomb	646 Quincy St NE	Minneapolis	MN	55413	

Gregory	Heberlein	1265 Edgcumbe Rd	Saint Paul	MN	55105	I want to emphasize that I am particularly concerned that the climate impacts of this project are not being given adequate consideration: we simply cannot afford to put any more carbon ino the atmosphere. I also think the voices of the Native American Community need to be privileged in this discussion, that their concerns and priorities be honored.
Dorothy	Lutz	518 Inverness Ln	Saint Peter	MN	56082	
Barry	Peterson	1600 S 6th St Apt 334	Minneapolis	MN	55454	Line 3 is an unnecessary and poor invest. Scrap it. Minnesota's environment and residents are against it. Rule byu the will of the people who will be adversely affected in the event of increased spills, as the data suggests will occur under current management, protocols, and lack of protocols and concern for the public, hereof
Jacqueline	Bilek	4948 Aldrich Ave S # 2	Minneapolis	MN	55419	
Tracy	Morics	4113 Durham Ct	Eagan	MN	55122	
Nate	Scheibe	224 3rd St W	Wabasha	MN	55981	
Connie	Grundhofer	235 Linda St	Lino Lakes	MN	55014	
Andrea	Jolley	6076 Woody Ln NE	Minneapolis	MN	55432	
Thomas	Uphaus	2650 N Pine Creek Rd	La Crescent	MN	55947	
Robert	Sothern	1903 Selby Ave	Saint Paul	MN	55104	Switch to renewables - it's the future!
Raymond	Bissonnette	143 Dahlia St	Mahtomedi	MN	55115	
Jeanette	West	46663 State Highway 48	Hinckley	MN	55037	This State is Suppose to be Natural Waters and We don't want them destroyed by polluting them with oil spills. The Spills always happen as I have witnessed in the past.
Judy	Morris	3231 Evergreen Dr	Saint Paul	MN	55121	
Franklin	Driessen	1390 Pinehurst Lane	Lakeshore	MN	56468	
Sonya	Sanford	PO Box 766	Big Lake	MN	55309	
Judith	Uebelacker	511 3rd St SE	Little Falls	MN	56345	
Michael	Tezla	1876 Yorkshire Ave	Saint Paul	MN	55116	
Paul	Walker	5559 Bimini Dr	Minnetonka	MN	55343	
Terry	Kreft	1906 Ashland Ave	Saint Paul	MN	55104	

LK	Woodruff	2884 138th St W	Rosemount	MN	55068	Every time I think this matter has finally ended, another %$#@ pipeline is started! They are NOT SAFE. They BREAK and LEAK. Other energy sources exist and are far cleaner, safer and more sustainable. It is simply old rich white fossil fuels types trying to exert power over us all and also extend their fortunes and keep receiving federal govn subsidies--which they haven't needed in YEARS--who keep this issue alive.
Carole	Festvog	17722 Icon Trl	Lakeville	MN	55044	
Lynn	Hayes	434 Blake Rd N Apt 16	Hopkins	MN	55343	
Sarah	Lantto	907 2nd Ave S	Buffalo	MN	55313	
Nicole	Hoekstra	3737 35th Ave S	Minneapolis	MN	55406	
Janice	Hasselius	33746 Deer St	Aitkin	MN	56431	Please hear our voice.
Richard	Fish	5345 37th Ave S	Minneapolis	MN	55417	
John	Munster	313 7th Ave NE	Minneapolis	MN	55413	
Frances	Bell	1830 Laurel Ave	Saint Paul	MN	55104	
Jodi	Palermo	7100 Crown Cir NW	Saint Francis	MN	55070	
Penny	Brown	4819 Azelia Ave N	Minneapolis	MN	55429	
Barbara	Hamerlind	162 Windsor Ct	Arden Hills	MN	55112	
Sarah	Schulte	6336 Phoenix St	Golden Valley	MN	55427	
Marcy	Woodruff	13175 Danube Ln	Rosemount	MN	55068	Please keep the health of our MN families, critters, and environment your number one concern. We are your constituents - not Enbridge, a Canadian corporation.
Jorden	Carlson	555 Harriet Ave	Saint Paul	MN	55126	
Christopher	Kaplan	114 Shoreview Dr	Elysian	MN	56028	
Steven	Wiese	2543 Nicollet Ave	Minneapolis	MN	55404	
Daniel	Anderson	116 8th Ave N	South St Paul	MN	55075	I also find it repugnant that they don't want to remove the existing line 3 pipeline. Leaving the old pipe in the ground for MN tax payers to pay for clean up and removal in the future. Make them remove the old pipe when it is no longer in use. Or make them put up a bond to pay for the removal of line 3 so that we as Minnesota taxpayers are not responsible for a long term economic impact form a short sighted company.
Howard	Lambert	35495 Riverwood Ct Unit 1623	Crosslake	MN	56442	Another disaster waiting to happen.

Heather	Allison	1866 Lincoln Ave	Saint Paul	MN	55105	
Sherilyn	Moe	4920 W Upland Crst	Minneapolis	MN	55421	
Rebecca	Dick	1818 Viola Heights Ln NE	Rochester	MN	55906	Please give this matter serious consideration. Thank you in advance for your help.
Pamela	Johnson	1501 US Highway 12 SW	Montrose	MN	55363	
Denise	Stime	4079 153rd St W	Rosemount	MN	55068	
Cathy	Swenson	10940 Morris Ave S	Bloomington	MN	55437	Another pipeline with thei potential to adversely affect the environment is not in the interest in preserving the integrity of our state
Mildred	Huttenmaier	3863 Brookview Dr	St Louis Park	MN	55426	
Bob	Christianson	550 E 7th St	Red Wing	MN	55066	
Lisa	Goodlander	2323 Windsor Ln	Woodbury	MN	55125	
Kathleen	Larson	255 Lilac Lane	Shoreview	MN	55126	
Curtis	Coffer	655 Sibley Memorial Hwy	Saint Paul	MN	55118	
Jacqueline	Addink	1808 Traymore Rd	Minnetonka	MN	55305	
Roger	Hagedorn	521 2nd St SE Apt 211	Minneapolis	MN	55414	Please take this seriously, because we do.
Rita	Caruso Santamar	1645 Hazelwood St	Saint Paul	MN	55106	
David	Steinhauser	6320 163rd Ln NW	Ramsey	MN	55303	
Denise	Marlowe	7406 Bolton Way	Inver Grove Heigh	MN	55076	
Kevin	Stueven	11 McKinley Pl N	Saint Cloud	MN	56303	
Kim	Mcknite	4148 38th Ave S	Minneapolis	MN	55406	please consider the future as well as the present. there is no safe pipe line, especially one carrying dirty tar sands oil. we need to do better for the sake of our children, grandchildren, etc and the planet. we need to preserve our water and land. Thank you, Kim McKnite
Denise	Fritschmann	601 Harper St Apt 1	Mankato	MN	56001	
Shay	Forstrom	421 Weston Ave	Saint James	MN	56081	
Lisa	Burke	225 9th St E	Saint Paul	MN	55101	We need to be focusing and investing in renewable, environmentally friendly energy sources rather than in environmentally and potentially devastating projects like this!
John	Leschisin	1394 140th Ave NW	Andover	MN	55304	
Diana	Hill	103 W Oxford St	Duluth	MN	55803	Safety of water and soil contamination is paramount. It must be thorough and cannot be rushed through.
Beth	Brombach	2214 Goodrich Ave	Saint Paul	MN	55105	
Todd	Lagerstam	10808 Palmer Ave S	Bloomington	MN	55437	

John	Fitzgerald	169 W Elm St	Kilkenny	MN	56052	
Beverly	Adams	2523 16th Ave S	Minneapolis	MN	55404	
Arthur	Le Suer	1914 Green Ln NE	Alexandria	MN	56308	
Rachel	Wolf	1850 Summit Ave	Saint Paul	MN	55105	
Sue	Pierce	2441 HWY 52 N	Rochester	MN	55901	STOP all of these pipelines they will eventually damage our country beyond repair. We have no right to damage this great earth.
Diana	Layeux	20355 Vance St NW	Elk River	MN	55330	
Gary	Schettl	116 Arabian Ct	Jordan	MN	55352	Solar and wind are the clean energies of Minnesota's future. I have already converted to electric cars and have no use for oil.
Vicky	Larson	1303 Englewood Ave	Saint Paul	MN	55104	
Ian	Mcgill	2200 Belmont Ln	Mound	MN	55364	
Ray	Daniels	7520 Bittersweet Dr	Eden Prairie	MN	55344	There is not enough money in the Minnesota budget to clean up a spill of tar sands. The Republican Party will not raise taxes to clean up a billion dollar spill. Minnesotans will be forced to watch the ecological damage. The damage will happen. We do not know when, where. and who will pay to clean up the spill.
Steven	Connell	18298 270th St	Sebeka	MN	56477	Why are we bringing dirty Canadian tar sands across Minnesota?When will this threat to Minnesota's land from tar sand oil ever end?
Jayson	Pereira	4028 Upton Ave S	Minneapolis	MN	55410	
Marie	Wiegert	3550 E 46th St Apt 417	Minneapolis	MN	55406	
Carlen	Lovejoy	5308 Highpointe Ter	Bloomington	MN	55437	
Dennis	Hauck	4417 42nd Ave S	Minneapolis	MN	55406	
Kimberly	Desjardin	2681 Sheldon St	Roseville	MN	55113	
Bernard John	Grisez	1063 Westcliff Curv	Shoreview	MN	55126	
Nader	Kawas	30700 Maple St	Lindstrom	MN	55045	
Kelly	Franklin	10311 Colorado Cir	Minneapolis	MN	55438	
Robert And Paula	Lund	16358 County Road 25	Brainerd	MN	56401	
Steve	Pecsenye	415 Grand St	Winona	MN	55987	
Renee	Yamada	2820 34th Ave S	Minneapolis	MN	55406	
Lynda	Haemig	7161 Riverview Ter NE	Fridley	MN	55432	
Christine	Popowski	2630 Pleasant Ave #101	Minneapolis	MN	55406	
Adaline	Shinkle	4708 Eastwood Cir	Minnetonka	MN	55345	
Laurel	Cobb	9889 Julep Trl N	Scandia	MN	55073	

Mimi	Jennings	2222 Hillside Ave.	St. Paul	MN	55108	The draft EIS is a sham, is a disaster of a business plan, is war on Nature, is a sellout, is wrong.
Penelope	Gooch	1210 E 3rd St	Duluth	MN	55805	
Bob	Bartlett	7243 Willow Ln	Brooklyn Center	MN	55430	
Greta	Gaard	3034 41st Ave S	Minneapolis	MN	55406	/The impacts on tribal lands, lakes and rivers, and our climate are of great concern t. .
Mike	Kaufman	1 Winona St W	Saint Paul	MN	55107	
Darcel	Kashmark	2215 6th St S	Moorhead	MN	56560	
Kristin	Campbell	10580 Little Ave	Waconia	MN	55387	
Lauren	Robertson	4601 Park Commons Dr	Saint Louis Park	MN	55416	
Stefan	Collinet	4257 Ottawa Ave S	St Louis Park	MN	55416	
Wai	Wong-Lai	3552 Tiffany Ln	Shoreview	MN	55126	
Jennifer	Plombon	3550 E 46th St	Minneapolis	MN	55406	***Minnesota's people, water, and natural beauty deserve our strongest protections. PLEASE support these protections.***
Jeremy	Johnson	535 Selby Ave Apt 1	Saint Paul	MN	55102	
Susan	Watts	203 Greenvale Ave W Apt 108	Northfield	MN	55057	
Mary	Olliff	1734 Cottage Ave E	Saint Paul	MN	55106	
Stephen	Troutman	3210 Hill Ct SW	Rochester	MN	55902	We do not need more tar sands oil and especially a new pipeline route.
Ann	Miller	2921 E 1st St	Duluth	MN	55812	
Rebecca	Nelson	2001 Flag Ave N	Golden Valley	MN	55427	
Rachel	Pickering	3157 Hampshire Ave S	Saint Louis Park	MN	55426	
Paula	Yankee	27946 100th St NW	Zimmerman	MN	55398	To risk the Land of 10,000 lakes, it's citizens, communities and living ecosystems of flora and fauna is too expensive and unconscionable.
Catherine	Yamoor	9052A Neill Lake Rd	Eden Prairie	MN	55347	
Ann	Shields	500 W 107th St	Bloomington	MN	55420	
Brooke	Asleson	2516 78th St E	Inver Grove Heigh	MN	55076	
Dorothy	Hammer	410 Orchard St N	Northfield	MN	55057	I,ve been to the open info meetings. Of all the options I saw, I would have to conclude that none of the possible new routes are appealing. Repair or replace the existing pipeline where it presently is, or forget the whole thing.
Theresa	del Rosario	1233 Woodland Trl	Northfield	MN	55057	
Carlen	Lovejoy	5308 Highpointe Terrace	Bloomington	MN	55437	

Christine	Harshman	30303 Abby Rd NE	North Branch	MN	55056	
Jessica	Nelson	8109 Stevens Ave S	Bloomington	MN	55420	This pipeline is disasterous to our environment and communities and our 10,000 lakes and other water sources. I urge you to reject this proposal.
Colin	Veerman	1322 Adams St NE	Minneapolis	MN	55413	
Will	Perry	13415 Europa Ct N Unit 8	Hugo	MN	55038	We need to proceed very carefully on this project. As a Minnesotan I know that the gas I use in my car may well come from the tar sands. But rather than supporting this devastating method of extracting oil we should be moving away from using it.
Louis	Asher	4525 Birch Ridge Rd	Vadnais Heights	MN	55127	
Brian	Phyle	PO Box 92	Lindstrom	MN	55045	
Diane	Tessari	5375 Eureka Rd	Excelsior	MN	55331	Clean water, clean air, and healthy soil are essential to life. We need to hand a living planet on to our children.
Betsey	Porter	10040 Penn Ave S Apt 11	Minneapolis	MN	55431	
Andrew	Larson	4628 Arden Ave	Edina	MN	55424	
Greg	Gailen	PO Box 914 W 1st St	Grand Marais	MN	55604	Please enact a process that will more thoroughly address the needs of concerned Native American interests in Minnesota.
Montana	Picard	4916 38th ave s	Minneapolis	MN	55417	No to line 3 Invest in renewable energy and stop destroying our planet
Brian	Thorbjornsen	207 W Harvey St Apt 3	Ely	MN	55731	
Elizabeth	Songalia	649 Waseca St	Saint Paul	MN	55107	
Teresa	Laduke	39821 church lane	Waubun	MN	56589	My fAmily lives here. Dont do it.
Mary	Barnett	712 Washington Memorial Dr	Saint Cloud	MN	56301	I agree. More analysis is needed
Deb	Ullrich	220 Carroll St	Mankato	MN	56001	
Neil	Hall	5929 Fremont Ave. So.	Minneapolis	MN	55419	
Thomas	Brinkman	1623 Teton Ct NE	Rochester	MN	55906	
Olivia	Dains	1743 Carl St	Lauderdale	MN	55113	
Rachel	Eskuri	39882 Tulip St NW	Braham	MN	55006	
Courtney	Nagle	1295 Fairmount Ave	Saint Paul	MN	55105	
Pat	Sykes	4524 Casco Ave	Edina	MN	55424	

Elizabeth	Monke	1000 E. Mt. Faith Ave.	Fergus Falls	MN	56537	I believe that it is critical to take a strong stand that moves our country away from fossil fuels and away from a method of transport that has the potential to damage native lands. Tar sands fossil fuel is not the direction that we can be going and maintain goals to decrease carbon emissions.
Maria	Jensen	615 Stoughton St E	Cannon Falls	MN	55009	
Ben	Effinger	314 N 20th Ave W	Duluth	MN	55806	
Linda	McGough	718 South 3rd Street	Linda	MN	55082	
Carol	Shimek	1263 Birch Ct	White Bear Lake	MN	55110	We have to take a stand against carbon pollution and do it now. Scientists are telling us life on earth is endangered. If we don't stop the movement of tar sands oil the use of it will not stop. We have to invest in renewable energy from the sun and wind and stop planet destruction now. Please stop this pipeline.
Andrea	West	4055 White Bear Avenue	White Bear Lake	MN	55110	I disagree with the expansion as it will have negative effects on our environment and our population when (not if) there is a spill.
Bob	Hinton	2250 6th St, Apt 209	White Bear Lake	MN	55110	
Kim	Rottmann	1021 Angelo Dr	Golden Valley	MN	55422	
Robert & Charlott	Vier	503 17th St E	Hastings	MN	55033	
Jian	Kettunen	2129 Saint Clair Ave	St. Paul	MN	55105	
Jan & Timothy	Dwyer	850 Shore Acres Rd	La Crescent	MN	55947	
Lois	Norrgard	10368 Columbus Circle	Bloomington	MN	55420	Abandonment is not an option - once Line 3 closes (and we DO NOT need a new line due to reduction in the use of tar sands oil) the old line must be closed and removed or filled. We cannot leave a conduit for water drainage, and the existing risk of continued presence of undiscovered legacy contamination that may exist. Abandonment is not an option for Minnesota.
Lee	Hecht	1954 Topaz Pointe Ln SW	Rochester	MN	55902	

Stop Enbridge Oil and Tar Sands Pipeline Expansion (CN-14-916 and PPL-15-137)
Dear Minnesota Deptarment of Commerce,

I'm writing to express my concern regarding the Draft Environmental Impact Statement (DEIS) for the proposed Line 3 pipeline expansion and reroute. The DEIS fails to establish a need for the proposed project, as well as to account for its numerous environmental risks.

The DEIS fails to prove that the new tar sands oil pipeline is needed, especially as Minnesota's oil consumption rates have continued to drop. Expanding Line 3 will increase climate pollution, but the DEIS fails to adequately account for the climate impacts of extracting and burning 400,000 barrels per day of additional tar sands. Further, the DEIS assumes the increased flow of tar sands even if the expansion is denied, when it should instead consider the effects if the proposal is denied and resulting in no increase in tar sands flow.

A recent National Academy of Sciences report found that cleaning up a tar sands spill in a waterway is much more difficult and up to 14.5 times more expensive than cleaning up a non-tar sands oil spill. Enbridge has a history of spills and greater scrutiny is needed for spill clean-up, permanent damage to waterways, impacts to Minnesota's economy and the threat to Ojibwe wild rice rights.

I urge the Minnesota Department of Commerce to ensure a more thorough analysis is done in the Environmental Impact Statement on Line 3 that adequately presents the risks and potential impacts of an expansion on water, communities, and climate.

First Name	Last Name	Address 1	Address 2	City	State	Zip
Jeni	Klotz	3345 23rd Ave S		Minneapolis	MN	55407-2423
Trina	Joyce					55406
Jean	Ross	3624 Bryant Ave S		Minneapolis	MN	55409-1018
Sophia	Manolis	3432 Park Ter		Minneapolis	MN	55406-2948
Lynette	Reini-Grandell	3412 Portland Ave		Minneapolis	MN	55407-2024
Hakan	Carlsson	524 W 54th St		Minneapolis	MN	55419-1819
Johnna	Johnson			Minneapolis	MN	55419
Austin	Tuttle				MN	
Jeanne	Cherner	3108 43rd Ave S		Minneapolis	MN	55406-2249
Carmen Barker	Lemay	5301 Girard Ave S		Minneapolis	MN	55419-1118
Nora	Lemay	5301 Girard Ave S		Minneapolis	MN	55419-1118
Bruno	Bazzett	4315 Garfield Ave		Minneapolis	MN	55409-1833
Iris Parrish	Chovinard			Minneapolis	MN	
Det	Bouphasavanh			Minneapolis	MN	
William	Beimers			Northfield	MN	55057

John	Carroll	5615 Colfax Ave S	Minneapolis	MN	55419-1747
Susan	Hellstrom	4704 Colfax Ave S	Minneapolis	MN	55419-5318
Hank	Hellstrom	4704 Colfax Ave S	Minneapolis	MN	55419-5318
David	Hellstrom	4704 Colfax Ave S	Minneapolis	MN	55419-5318
Laurel	Bieinski		Minneapolis	MN	55419
Jeni	Ellick	5432 Colfax Ave S	Minneapolis	MN	55419-1744
Ophelia	Washington		Minneapolis	MN	55405
Israa	Khalifa	1500 Saint Olaf Ave	Northfield	MN	55057-1574
Rebecca	Ferrer	1500 Saint Olaf Ave	Northfield	MN	55057-1574
Marlyne	Hakitimana	1500 Saint Olaf Ave	Northfield	MN	55057-1574
Luanne	Knych	4508 Harriet Ave	Minneapolis	MN	55419-4853
Angela	Rekucki	4748 Lyndale Ave S	Minneapolis	MN	55419-5304
Marcelo	Pinto	100 W 49th St	Minneapolis	MN	55419-5529
Lily	Song	5011 Belmont Ave S	Minneapolis	MN	55419-1311
Emma Kathryn	Kaveekis	4632 Grand Ave S	Minneapolis	MN	55419-5412
Joey	R.	5566 Lyndale Ave	Minneapolis	MN	55419
Maddie	Dieffenbach	4207 26th Ave S	Minneapolis	MN	55406-3041
Zachary	Bergerson	5746 Harriet Ave	Minneapolis	MN	55419-1807
Don	Bielinski	5047 Lyndale Ave S	Minneapolis	MN	55419-1215
Rita	Bielinski	5047 Lyndale Ave S	Minneapolis	MN	55419-1215
Anna	Cunningham	3828 16th Ave S	Minneapolis	MN	55407-2827
Leslie	Knoblauch	9925 Polk St NE	Blaine	MN	55434-2639
Jessica	Barker	4610 Bryant Ave S Apt 205	Minneapolis	MN	55419-5369
Steven	Pecrthvel	331 Busch Ter	Minneapolis	MN	55419-5425
Emmanuel	Taitingfong	165 Glenwood Ave	Minneapolis	MN	55405-1618
Emma	Rotilie	2609 Fremont Ave S Apt 6	Minneapolis	MN	55408-1110
Jessica	Knutson	4931 18th Ave S	Minneapolis	MN	55417-1217
Dennis	Lee	8915 Emerson Ave S	Bloomington	MN	55420-2637
Sonja & Alma	Sharp	4511 Aldrich Ave S	Minneapolis	MN	55419-4839
Matt	Kazinka	3036 Longfellow Ave	Minneapolis	MN	55407-1811
Brynley	Nadzigka	3036 Longfellow Ave	Minneapolis	MN	55407-1811
Rebecca	Smith	3627 Queen Ave N	Minneapolis	MN	55412-1959
Rana	Harlan	6005 France Ave S	Edina	MN	55410-2751
Lage	Von Dissen	4628 Bryant Ave S	Minneapolis	MN	55419-5355

Rebecca	Von Dissen	4628 Bryant Ave S		Minneapolis	MN	55419-5355
Richard	Olson	6042 Upton Ave S		Minneapolis	MN	55410-2924
Katie	Anthony	129 W 48th St		Minneapolis	MN	55419-5532
Susan	Coopmans			Minneapolis	MN	
Pat	Bjornebo	3315 Lanewood Ln N		Plymouth	MN	55447-5020
Chuck	Turchick	2112 Portland Ave		Minneapolis	MN	55404-2657
Maya	Christensen	2701 Delaware St SE Apt 1		Minneapolis	MN	55414-3400
Mary	Kelly	2215 E 36 1/2 St		Minneapolis	MN	55407-3018
Paul	Metty	3836 Grand Ave S		Minneapolis	MN	55409-1233
Karen	Metty	3836 Grand Ave S		Minneapolis	MN	55409-1233
James	Gonzates			Minneapolis	MN	
Tyler	Schuett	695 Lafond Ave		Saint Paul	MN	55104-1604
Christian	Iolvovo			Minneapolis	MN	55403
Jesus	Leyue	7772 Idaho Ave W		St Paul	MN	55108
Folitz	W.	5168 Harriet Ave		Minneapolis	MN	55419
Jorge	Martinez	2639 Sunset Blvd		Minneapolis	MN	55416-4307
Amanda	Malmin	522 Broadway St NE		Minneapolis	MN	55413-2132
Ronald	Williams	4368 France Ave N		Robbinsdale	MN	55422-1565
Sarah	Anderson	803 31st Ave N		Minneapolis	MN	55411-1421
Greta	Alquist	15 S 1st St		Minneapolis	MN	55401-1800
Landon	Bouma	15 S 1st St Apt A611		Minneapolis	MN	55401-1848
Michelle	Friesen	2012 Como Ave SE		Minneapolis	MN	55414-2527
Kathryn	Fuller	2631 12th Ave S		Minneapolis	MN	55407-3866
Joe	Harrity	2631 12th Ave S		Minneapolis	MN	55407-3866
Candace	Mealey	274 Transit Ave		Roseville	MN	55113-3617
David	Schueler	1998 Brewster St Apt 303		Saint Paul	MN	55108-2019
David	Bratt	121 Washington Ave S		Minneapolis	MN	55401-2123
Gretchen	Anderson	607 Washington Ave N	Unit 214	Minneapolis	MN	55401-2464
Tara	Niebeling	607 Washington Ave N	Unit 418	Minneapolis	MN	55401-2466
J.L.	Strand	5100 Thomas Ave N		Minneapolis	MN	55430-3376
Kim	Jeppesen	5100 Thomas Ave N		Minneapolis	MN	55430-3376
Mary	McMahon	404 Washington Ave N		Minneapolis	MN	55401-1132
Mary	Buckley	3440 Emerson Ave S Apt 12		Minneapolis	MN	55408-3929
Nicole	O'Connell	3116 Lyndale Ave S		Minneapolis	MN	55408-2938

Andrea	Galloway	3085 Old Highway 8 Apt 5	Roseville	MN	55113-1039
Ryan	Isaacson	800 N 3rd St Apt 320	Minneapolis	MN	55401-2678
Jennifer	Baker	5225 Colfax Ave N	Minneapolis	MN	55430-3572
Paula	Prentiss	4012 13th Ave S	Minneapolis	MN	55407-3244
Andy	Jacobson	5751 Thomas Cir S	Minneapolis	MN	55410-2691
Wendy	Jacobson	5751 Thomas Cir S	Minneapolis	MN	55410-2691
Sasha Nadine	Jacobson	5751 Thomas Cir S	Minneapolis	MN	55410-2691
Tray	Paulson	121 Washington Ave S	Minneapolis	MN	55401-2123
Asahi	Brandon Jenniges	730 Washington Ave N	Minneapolis	MN	55401-2816
Brian	Wigen	2206 Highway 36 W	Roseville	MN	55113-3858
Paul	Darua	2206 Highway 36 W	Roseville	MN	55113-3858
Alec	Baechle	129 N 2nd St Apt 306	Minneapolis	MN	55401-1433
Marsha	Harrell	432 N 1st St	Minneapolis	MN	55401-1374
Brooke	Tuska	2651 Queen Ave N	Minneapolis	MN	55411-1722
Scott	Tuska	2651 Queen Ave N	Minneapolis	MN	55411-1722
Sandre	Breur	330 Oak Grove St Apt 216	Minneapolis	MN	55403-4063
Marcus	Mitchell	730 Hennepin Ave	Minneapolis	MN	55403-1812
Margaret	Yapp	2324 Harriet Ave	Minneapolis	MN	55405-3268
Peter	Schmitt	2219 Bryant Ave S Apt 3	Minneapolis	MN	55405-3072
Sung-Soo	Kim	313 Oak St SE	Minneapolis	MN	55414-2926
Hart	Hornor-Jones	2324 Harriet Ave	Minneapolis	MN	55405-3268
Micheal	Annette	2200 1st Ave S	Minneapolis	MN	55404-3401
Jonothan	Cowgill	2517 Bryant Ave S	Minneapolis	MN	55405-2933
Hilary	Hodsman	3009 E Franklin Ave	Minneapolis	MN	55406-1166
Ellen	Rohman	7301 Oaklawn Ave	Minneapolis	MN	55435-4144
Hari	Capra	3834 Pleasant Ave	Minneapolis	MN	55409-1229
David	Duckler	315 SE Main St	Minneapolis	MN	55414-3802
Lillian	Duckler	315 SE Main St	Minneapolis	MN	55414-3802
Darwin	Muzzy	1516 E 86th St	Bloomington	MN	55425-1930
Mary	Wagar	4406 Minnehaha Ave	Minneapolis	MN	55406-3911
Eltowi	Black Feather	2201 Clinton Ave S	Minneapolis	MN	55404
Gabriel	Boyle	3009 E Franklin Ave	Minneapolis	MN	55406-1166
Tony	Blair	8533 Riverview Ln	Brooklyn Park	MN	55444-1305
Robert Donald	Brough	600 18th Ave N Apt 520E	Minneapolis	MN	55411-3357

LeeAnn	Steffan	602 N 1st St		Minneapolis	MN	55401-2254
Euda	Holte	337 Washington Ave N	Apt 323	Minneapolis	MN	55401-2738
Brendan	Ruter	1531 Portland Ave Apt 3		Saint Paul	MN	55104-6860
Karolina	Kaczoo	3430 List Pl Apt 106		Minneapolis	MN	55416-4547
Ander	Bolduc	827 Grand Ave		Saint Paul	MN	55105-3372
Matthew	Dyrdahl	313 Washington Ave S		Minneapolis	MN	55415-1471
Casey	Silver	2600 E 22nd St Apt 2		Minneapolis	MN	55406-1288
Clare	MacMillen	2600 E 22nd St Apt 2		Minneapolis	MN	55406-1288
Kathy	Skrypek	5108 30th Ave S		Minneapolis	MN	55417-1311
Ronald	Yonggi	850 Washington Ave SE		Minneapolis	MN	55414-3010
Jose Marvel	Rubio Bachero	2443 Pillsbury Ave S		Minneapolis	MN	55404-3259
Valerie	Griep	401 N 2nd St Unit 518		Minneapolis	MN	55401-1591
Catherine	Jensen	2214 Pillsbury Ave S		Minneapolis	MN	55404
Kamaraj Kumar	Sivva	121 Washington Ave S		Minneapolis	MN	55401-2123
Steve	Fletcher	1025 Washington Ave S	Apt 203	Minneapolis	MN	55415-1298
Julie	Pokaski	560 N 2nd St Apt 112		Minneapolis	MN	55401-4348
Taylor	Johnson	1365 Spruce Pl Apt 33		Minneapolis	MN	55403-2285
Abby	Slichter	3528 Emerson Ave S Apt 2		Minneapolis	MN	55408-3936
Khaled	Aladauri	3528 Emerson Ave S Apt 2		Minneapolis	MN	55408-3936
Susan	Brent	121 Washington Ave S		Minneapolis	MN	55401-2123
Anna	Ruelle	1105 23rd Ave NE		Minneapolis	MN	55418-3843
Brent	Clark	1850 E 46th St		Minneapolis	MN	55407
John	Manske	1536 Monroe St NE		Minneapolis	MN	55413-1437
Andrea	Guglelmino	602 N 1st St		Minneapolis	MN	55401-2254
Aanchal	Manchanda	111 Marquette Ave		Minneapolis	MN	55401-2038
Julie	Berg	4222 Grimes Ave S		Minneapolis	MN	55416-5021
Alice	Yuolu	2906 Beutou Blvd		Minneapolis	MN	
Rosselina	Carrera	2810 Cleveland St NE		Minneapolis	MN	55418-3113
Audra	Peery	3824 1st Ave S		Minneapolis	MN	55409-1302
Robert	Phillips	2420 1st Ave S		Minneapolis	MN	55404-3456
Asma	Mohammed	2325 E 35th St		Minneapolis	MN	55406-2588
Monet	Banks			Minneapolis	MN	55408
Tommy	Markley	3128 W Calhoun Blvd Apt 414		Minneapolis	MN	55416-6002
Josie	Heino	3128 W Calhoun Blvd Apt 414		Minneapolis	MN	55416-6002

Sarah	Loquasto	67 Barton Ave SE	Minneapolis	MN	55414-3511
Greta	Chizek		Minneapolis	MN	55414
Stephanie	Gonzales	2302 Johnson St NE	Minneapolis	MN	55418-3938
Mandy	Lewis	657 American Blvd E	Bloomington	MN	55420
Rob	Hollister	2302 Johnson St NE	Minneapolis	MN	55418-3938
Zeo	Leonard-Monrod	3015 Dupont Ave S	Minneapolis	MN	55408-2706
Micheal	Garmaker	4824 E 53rd St Apt 413	Minneapolis	MN	55417-5004
Mansoor	Akkten	400 Grove Ave #1110	Minneapolis	MN	55403
MC	Simpson-Faxio	2470 Island Dr	Spring Park	MN	55384-9747
Sarah	Huss	500 Robert St N Unit 203	Saint Paul	MN	55101-4452
Matt	Brillhart	4348 34th Ave S	Minneapolis	MN	55406-3831
Katie	Stocker	410 N 2nd St Apt 446	Minneapolis	MN	55401-5320
Chris	Stocker	410 N 2nd St Apt 446	Minneapolis	MN	55401-5320
Joe	Lawer	PO Box 1312	Breckenridge	CO	80424-1312
Sara	Schoen	4534 Camden Ave N	Minneapolis	MN	55412-1431
Hannah	Habermann	417 117th Ave NW	Coon Rapids	MN	55448-2310
Julia	Tabbo	184 Emerald	Minneapolis	MN	
Cynthia	Pristeu	1701 23rd Ave	Seattle	WA	98122-2921
Joel	Johnson	900 N 4th St	Minneapolis	MN	55401-1039
Stonewall	Rain	2108 Glenwood Ave	Minneapolis	MN	55405-1211
Lee	Pat	110 Malcolm Ave SE	Minneapolis	MN	55414-3502
Victoria	Barnes	1117 W Franklin Ave	Minneapolis	MN	55405-3166
Elia	Stevenson	2700 Park Ave Apt 1702	Minneapolis	MN	55407-1037
Randi	Demario	1415 Grand St NE Apt 2	Minneapolis	MN	55413-1027
Alexander	Feroe	2433 Colfax Ave S	Minneapolis	MN	55405-2942
Piyush	Kumar	111 Marquette Ave Apt 2309	Minneapolis	MN	55401-2033
Mitchell	Pascua	201 W 15th St	Minneapolis	MN	55403-2220
Jessica	Noor	1518 Spruce Pl Apt 104	Minneapolis	MN	55403-3400
Sophia	Jaszewski	2410 Dianna Ln	Little Canada	MN	55117-1616
Philip	Reed	277 Warwick St SE	Minneapolis	MN	55415
Jackie	Menth	1325 W 25-1/2th St #205	Minneapolis	MN	55405
Enrique	Ortega	667 Summer St NE	Minneapolis	MN	55413-2114
Kar	Khil	111 Marquette Ave	Minneapolis	MN	55401-2038
Jasni	Auth	111 Marquette Ave	Minneapolis	MN	55401-2038

Helen	Richard	1329 Council Oaks Dr		Spring Lake Park	MN	55432-5785
Timothy	Ewing	910 Newton Ave N		Minneapolis	MN	55411-3724
William	Tuvek	2372 Como Ave Apt 2		Saint Paul	MN	55108-1457
Larry	Gottschalk	5849 Girard Ct		Minneapolis	MN	55419-2137
Melody	Luepke	921 Hoyt Ave W		Saint Paul	MN	55117-3302
Margaret	Manderfeld	4214 Wentworth Ave		Minneapolis	MN	55409-1924
Kathy	Coskran	4953 Park Ave		Minneapolis	MN	55417-1029
C	Coskran	4953 Park Ave		Minneapolis	MN	55417-1029
Karry	Tierney	5060 Suburban Dr		Excelsior	MN	55331-8675
Judith	Wright	4017 Bryant Ave S		Minneapolis	MN	55409-1421
Beverly	Weddle	1510 11th Ave S Apt 102		Minneapolis	MN	55404-1768
Sandra	DiNanni	3400 Dupont Ave S		Minneapolis	MN	55408-5005
Jessica	Wicks	1601 California St NE		Minneapolis	MN	55413-1021
Cheryl	Anderson	5745 Upton Ave S		Minneapolis	MN	55410-2626
Pamela	Reed	5308 Columbus Ave		Minneapolis	MN	55417-1716
Joe	McGonigle	5308 Columbus Ave		Minneapolis	MN	55417-1716
RL	Wahl	3572 Delhi Overlook St		Ann Arbor	MI	48103-9450
Dick	Rueter	4225 Grand Ave S		Minneapolis	MN	55409-1911
Mary	Lee	5215 Bloomington Ave		Minneapolis	MN	55417-1819
Cody	Aikin	20 Glenview Ct		Los Alamos	NM	87547-3577
Nancy	Browne	1480 Applewood Ct W	Unit 121	Roseville	MN	55113-6291
Lisa	Lindsay	5200 W 98th St Apt 315		Bloomington	MN	55437-2067
Nicole	Lindsay	2308 Snelling Ave Apt 309		Minneapolis	MN	55404-3475
Deontay	Duffy	14400 Martin Dr		Eden Prairie	MN	55344-2031
Franklin	Barto Jr	14400 Martin Dr		Eden Prairie	MN	55344-2031
Phyllis	Stenerson	3401 Colfax Ave S Apt 106		Minneapolis	MN	55408-4077
Nathan	Horek	4541 Bloomington Ave		Minneapolis	MN	55407-3660
Rebecca	Zahler	3431 Dupont Ave S		Minneapolis	MN	55408-4091
Katie	Wahl	3205 21st Ave S		Minneapolis	MN	55407-2409
Jody	Beresford	7436 Hyde Park Dr		Edina	MN	55439-1742
Paul	Thoresen	5932 13th Ave S		Minneapolis	MN	55417-3216
Carol	Chiros	7533 2nd Ave S		Minneapolis	MN	55423-4210
Christine	Chiros	5932 13th Ave S		Minneapolis	MN	55417-3216
Richard	Huebner	1918 41st Ave NE		Columbia Heights	MN	55421-3209

Pauline	Schuller	7500 Cahill Rd	Edina	MN	55439-2734
Isabella	Odin	9335 Newcastle Rd	Woodbury	MN	55125-3446
Bryce	Hamilton	4033 Linden Hills Blvd	Minneapolis	MN	55410-1247
Donna	Hamilton	4033 Linden Hills Blvd	Minneapolis	MN	55410-1247
David	Dombrovski	9920 Oakwood Ct N	Brooklyn Park	MN	55443-1770
Jeanne	Arp	5513 27th Ave S	Minneapolis	MN	55417-1933
Walter	Cannon	110928 Von Hertzen Cir	Chaska	MN	55318-2704
Joyce	Sutphen	110928 Von Hertzen Cir	Chaska	MN	55318-2704
Eric	Utne	1484 Summit Ave	Saint Paul	MN	55105-2241
Catherine	Kistler	18216 Overland Trl	Eden Prairie	MN	55347-4192
Ken	Larson	11624 Timerline Rd	Minnetonka	MN	55305
John	Huepenbecker	5061 Interlachen Blf	Minneapolis	MN	55436-1360
Kristen	Huepenbecker	5061 Interlachen Blf	Minneapolis	MN	55436-1360
Timothy	Frantzich	11575 Palisade Ave N	Stillwater	MN	55082-3409
Esther	Frantzich	11575 Palisade Ave N	Stillwater	MN	55082-3409
Gustard	Mendoza	1020 Kilburn	St Paul	MN	55103
Harrison	Easton	3029 Central Ave NE	Minneapolis	MN	55418-2122
Elly	Luknic	3820 Bloomington Ave	Minneapolis	MN	55407-2842
Alexander	LeDoux	5737 38th Ave S	Minneapolis	MN	55417-2915
Theodore	Jorstad		Minneapolis	MN	55407
Nino	Mursal	1501 E 22nd St	Minneapolis	MN	55404-3000
Juan Carlos	Moreno	2517 17th Ave S	Minneapolis	MN	55404-4015
Ella	Cates	3535 Bryant Ave S	Minneapolis	MN	55408-4174
Brennan	Eck		Minneapolis	MN	55907
Violet	Arhill	3812 Buchanan St NE	Minneapolis	MN	55421-4017
Jonna	Carroll	5116 31st Ave S	Minneapolis	MN	55417-1439
Jewish	Aldana		Minneapolis	MN	55417
Xavier	Hines	614 S 3rd St	Minneapolis	MN	55415-1104
Brian	Saldivar		Minneapolis	MN	55408
Helen	Antan	5309 Hiawatha Ln	Minneapolis	MN	55417-2324
Charlie	Hughes	4848 3rd Ave S	Minneapolis	MN	55419-5628
Marie	Migletz	4431 Wentworth Ave	Minneapolis	MN	55419-4941
Onauya	B.	35 20th Ave S	Minneapolis	MN	55454-1060
Isfahan	Ibrah	2816 31st Ave S	Minneapolis	MN	55406-1614

Lensa	Negassa	3620 Minnehaha Ave	Minneapolis	MN	55406-2629
Reya	Jones		Minneapolis	MN	55406
Caroline	Seybold	3152 34th Ave S	Minneapolis	MN	55406-2106
Jansun	Divine	2913 Vincent Ave N	Minneapolis	MN	55411-1046
Meg	Hoyt	3624 Blaisdell Ave	Minneapolis	MN	55409-1213
Ayantv	Dawid			MN	55411
Marina	Norby	4325 27th Ave S	Minneapolis	MN	55406-3701
Walker	Ferguson	65 Clarence Ave SE	Minneapolis	MN	55414-3536
Rose	Letafsky	2741 39th Ave S	Minneapolis	MN	55406-1847
Samson	Wt	2528 35th Ave S	Minneapolis	MN	55406-1738
Johanna	Tolarova		Minneapolis	MN	55406
Tardowsa	Danir	1601 S 4th St	Minneapolis	MN	55454-1170
Jennifer	Langreek	8420 Henna Ave S	Cottage Grove	MN	55016-3115
Christopher	East	3038 40th Ave S	Minneapolis	MN	55406-2223
Eiset	Mebrantu		Minneapolis	MN	55406
Oliver	Nutter	7111 Portland Ave	Richfield	MN	55423-3263
Annie	Oace	2205 Minneapolis Ave	Minneapolis	MN	55406-1432
Jocelyn Aurrera	Amigon	3434 Bloomington Ave	Minneapolis	MN	55407-2208
Sonja	Swanson	3301 48th Ave S	Minneapolis	MN	55406-2346
Clare	McDonald	4517 47th Ave S	Minneapolis	MN	55406-3624
Richard	Nohel	3131 19th Ave S	Minneapolis	MN	55407-1901
Jana	Miller	5424 30th Ave S	Minneapolis	MN	55417-2019
Lidia	Castillo	3715 Chicago Ave	Minneapolis	MN	55407-2610
Casey	Grenys	5436 28th Ave S	Minneapolis	MN	55417-1956
Hailey	Kline	5125 40th Ave S	Minneapolis	MN	55417-1600
Jim	Martin	3332 21st Ave S	Minneapolis	MN	55407-2412
Jesse	Courter	3142 Lyndale Ave S Apt 31	Minneapolis	MN	55408-2943
Pa	Cata	336 Lafond Ave	Saint Paul	MN	55103-1730
Melodie	Irwin	7330 Tempo Ter NE	Fridley	MN	55432-3223
Rose	Lutz	3022 40th Ave S	Minneapolis	MN	55406-2223
Cleo	Rank	3915 E 26th St	Minneapolis	MN	55406-1858
Stella	Clark	3117 E Minnehaha Pkwy	Minneapolis	MN	55417-1430
Wisdom	Kowouto			MN	
Britney	Birch	3409 Columbus Ave	Minneapolis	MN	55407-2034

Brandon	Urdaz	8219 45th Ave South	Bloomington	MN	55465
Yojanly	Ramirez	3920 Park Ave	Minneapolis	MN	55407-2542
Erick	Taggert	1648 Charles Ave Apt 200	Saint Paul	MN	55104-2232
Zenon	Ostrum	2437 34th Ave S	Minneapolis	MN	55406-1426
Stella	Schaefer-Brown	3101 11th Ave S	Minneapolis	MN	55407-1607
Emily	Larabee	7216 Zurich St	Anchorage	AK	99507-2756
Jay	Manolis	3432 Park Ter	Minneapolis	MN	55406-2948
Maddie	Christy	2525 32nd Ave S	Minneapolis	MN	55406-1639
Claire	Benfield	4448 18th Ave S	Minneapolis	MN	55407-3616
Emma	Dinger	3316 46th Ave S	Minneapolis	MN	55406-2343
Laurie	Meyers	5215 35th Ave S	Minneapolis	MN	55417-2119
Aidan	Campbell	3637 Pillsbury Ave S	Minneapolis	MN	55409-1218
Cameron	Ausland	5256 37th Ave S	Minneapolis	MN	55417-2128
Auguste	Bernick	3433 46th Ave S	Minneapolis	MN	55406-2930
Beck	Stephens	3204 Elliot Ave	Minneapolis	MN	55407-2123
Andrew	Dodge	3045 16th Ave S	Minneapolis	MN	55407-1814
Nathaniel	Hasse	5229 32nd Ave S	Minneapolis	MN	55417-2032
Nina	Verger	3512 E 25th St	Minneapolis	MN	55406-1417
Bo	Coultrip			MN	
Amanda	Petro	4433 45th Ave S	Minneapolis	MN	55406-4024
Violet	McMahon	4144 46th Ave S	Minneapolis	MN	55406-3782
Claire	Lind	3939 Standish Ave	Minneapolis	MN	55407-3052
Sheyenne	Atheneos	5335 46th Ave S	Minneapolis	MN	55417-2307
Noah	Lee	3817 10th Ave S	Minneapolis	MN	55407-2623
Sara	Helmstetter	3408 32nd Ave S	Minneapolis	MN	55406-2719
Josiah	Misselt	3812 43rd Ave S	Minneapolis	MN	55406-3510
Celelia	Kaufmann	3223 41st Ave S	Minneapolis	MN	55406-2234
Cayleigh	Hickey	1609 Talmage Ave SE	Minneapolis	MN	55414-2433
Nimo	Daher	3131 19th Ave S	Minneapolis	MN	55407-1901
Lili	Jensen	3209 48th Ave S	Minneapolis	MN	55406-2337
Chandra	Morris	3528 20th Ave S	Minneapolis	MN	55407-2436
Melissa	Gubrud	4205 22nd Ave S	Minneapolis	MN	55407-3036
Charles	Turner	PO Box 277	Grand Marais	MN	55604-0277
Deborah	Stone	7621 Harold Ave	Golden Valley	MN	55427-4819

Mark	Stanley	213 Janalyn Cir	Golden Valley	MN	55416-3320
Rod	Meyer	9335 Newcastle Rd	Woodbury	MN	55125-3446
Valerie	Meyer	9335 Newcastle Rd	Woodbury	MN	55125-3446
Robin	Heil	4239 Russell Ave N	Minneapolis	MN	55412-1549
Jeri	Reilly	1484 Summit Ave	Saint Paul	MN	55105-2241
Donna	McNamara	2804 33rd Ave S	Minneapolis	MN	55406-1626
Paul	Monroe	2804 33rd Ave S	Minneapolis	MN	55406-1626
Tressa	Sularz	743 Fillmore St NE	Minneapolis	MN	55413-2525
Mike	Hazard	743 Fillmore St NE	Minneapolis	MN	55413-2525
Mary Ann	McLeod	2148 Roblyn Ave	Saint Paul	MN	55104-5026
John	Skaalen	1900 3rd St N	Stillwater	MN	55082-3907
Kathy	Wackman	4070 Crestview Ln	Shoreview	MN	55126-2332
Kathryn	Bartee	4411 Minnetonka Blvd	Saint Louis Park	MN	55416-5407
Paula	Achenbach	100 Crystal Lake Rd E	Burnsville	MN	55306-5021
Chris	Cinque	3530 Elliot Ave	Minneapolis	MN	55407-2129
Elizabeth	Smith	3212 W 88th St	Bloomington	MN	55431-1804
Gordon	Graues	14423 Spring Lake Rd	Minnetonka	MN	55345-2345
Gena	Graves	14423 Spring Lake Rd	Minnetonka	MN	55345-2345
Warren	Jacobson	17804 Townline Rd	Minnetonka	MN	55345-6147
Teri	Scheper	17804 Townline Rd	Minnetonka	MN	55345-6147
Leah	Sattler			MN	
Anna	Staeheli			MN	
Dylan	Halberg	2512 Humboldt Ave N	Minneapolis	MN	55411-2061
Sage	Crannell	5717 22nd Ave S	Minneapolis	MN	55417-2703
Annika	Mikk	3415 43rd Ave S	Minneapolis	MN	55406-2818
Mairead	Howley	2440 34th Ave S	Minneapolis	MN	55406-1427
Donald	Alexander	2710 14th Ave S	Minneapolis	MN	55407-1127
Phoebe	Cuyin	3205 E 53rd St	Minneapolis	MN	55417-2045
Alaina	Swedlund	3109 18th Ave S	Minneapolis	MN	55407-1824
Lydia	Zupanc	4132 21st Ave S	Minneapolis	MN	55407-3074
Jasper	Kluth	4552 47th Ave S	Minneapolis	MN	55406-3625
Britannia	Wyhes	2711 S 8th St	Minneapolis	MN	55454-1412
Rose	Opstad			MN	
Anielia	Henry			MN	

Xavier	Reyes	3109 16th Ave S	Minneapolis	MN	55407-1816
Jamison	Hart		Minneapolis	MN	55404
Yang	Yang	2853 44th Ave S	Minneapolis	MN	55406-1824
Macy	Ashby	686 24th Ave NE	Minneapolis	MN	55418-3579
Muhsin	Aidid	1023 E 22nd St	Minneapolis	MN	55404-2942
Olivia	Gaulden	2521 James Ave N	Minneapolis	MN	55411-1936
Elliot Askari	Rabe			MN	
Maia	King		Minneapolis	MN	55418
Elin-Margaret	Olson	3424 22nd Ave S	Minneapolis	MN	55407-2420
Alexis	Catarra			MN	
Leah	Vanek	3152 42nd Ave S	Minneapolis	MN	55406-2241
Sagal	Adan	1303 E 22nd St	Minneapolis	MN	55404-2947
Samara	Adam	2122 Elliot Ave	Minneapolis	MN	55404-2915
Stefan	Bethke	1027 23rd Ave SE	Minneapolis	MN	55414-2626
Nathan	Zehnder	4336 18th Ave S	Minneapolis	MN	55407-3344
Safiya	Sharif	3003 Cedar Ave S	Minneapolis	MN	55407-1847
Sheila	Willette	411 4th St NE	Minneapolis	MN	55413-2037
Marie	Olbekson			MN	
Mara	Morgan	2200 17th Ave S	Minneapolis	MN	55404-3067
Nara	Coldwater	3949 Elliot Ave Apt 2	Minneapolis	MN	55407-5124
Ben	Meier			MN	
Aurora	Rainwater			MN	
Joseph	Saice	881 19th Ave SE	Minneapolis	MN	55414-2503
Cali	Juberian-Mcbrine	5152 16th Ave S	Minneapolis	MN	55417-1208
Jacob	Garcia			MN	
Stevan	Brant-Domingoez	3224 Clinton Ave	Minneapolis	MN	55408-3262
Bryan Vega	Aragon	1611 E 26th St	Minneapolis	MN	55404-4022
Saryn	Sherrell			MN	
Soleman	Kasa	3322 E 26th St	Minneapolis	MN	55406-1700
Nathan	Maitedan	202 Pierce St NE	Minneapolis	MN	55413
Livia	Boschung	3808 18th Ave S	Minneapolis	MN	55407-2823
Francesca	Cannon	2232 Minneapolis Ave	Minneapolis	MN	55406-1433
Dai'Shaun	Wade			MN	
Shamirn	Ali			MN	

Nancy	Yang	4349 13th Ave S	Minneapolis	MN	55407-3221
Flynn	McKinney	3131 E 25th St	Minneapolis	MN	55406-1449
Lauren	Brauninger			MN	
Yuelin	Garostreta	25th Ave S	Minneapolis	MN	
Enrique	B.	2816 Pillsbury Ave S	Minneapolis	MN	55408-2269
Maguel	Bramdacer	3511 129th Ave S	Minneapolis	MN	
Samantha	N.	2800 Cedar Ave S	Minneapolis	MN	55407-1480
A.	W.	1750 Meadowlark Rd	Saint Paul	MN	55122-1725
Marcus	A.	4220 Minnehaha Ave	Minneapolis	MN	55406-3304
Firomsa	Saliny	2300 E Franklin Ave	Minneapolis	MN	55406-1072
Perla	Guadalupe Hernandes	3705 4h Ave	Minneapolis	MN	55408
Henry	Nufed	159 Bedford St SE	Minneapolis	MN	55414-3668
Kafia	Abou Ba Wer	2231 47th Ave	Minneapolis	MN	55404
Anna	Keillor	4023 41s Ave S	Minneapolis	MN	55406
Mick	Hamilton	1803 Vivian Ln	Saint Paul	MN	55118-3826
Francisco	Arturo Tello Ulloa		Minneapolis	MN	
Addie	Scott	4544 42nd Ave S	Minneapolis	MN	55406-4013
Julia	Offerdahl	3920 45th Ave S	Minneapolis	MN	55406-3520
Samantha	Sander	4311 14th Ave S	Minneapolis	MN	55407-3225
Rosalinda	Salazar	127 E 59th St	Minneapolis	MN	55419-2466
Hodo	Mullse			MN	
Dimanique	Chapman	3625 24th Ave S	Minneapolis	MN	55406-2531
Tania	Sogso		Minneapolis	MN	
Maureen	Colleran	2761 Zenith Ave N	Minneapolis	MN	55422-5424
Nohemi	Hernandez-Escobar		Minneapolis	MN	
Ellie	Barnett-Cashman	2901 E 22nd St	Minneapolis	MN	55406-1318
Sumia	Y.	1530 S 6th St	Minneapolis	MN	55454-1141
Rosemary	Frazel	2490 34th Ave S	Minneapolis	MN	55406
DeShawn	McArthur		Minneapolis	MN	55406
Jordan	Patron		Minneapolis	MN	
Hashi	Esse	2026 26th AVe S	Minneapolis	MN	55406
Danny	Johnson	3244 44th Ave S	Minneapolis	MN	55406-4317
Haley	Carson	1064 23rd Ave SE	Minneapolis	MN	55414-2629
Mary	Miranda	2113 5th Ave S	Minneapolis	MN	55404-2644

Simon	Baker		Minneapolis	MN	55406
Jude	Nair	3531 21st Ave S	Minneapolis	MN	55407-2462
Kieran	Panning-Miller	4021 Harriet Ave	Minneapolis	MN	55409-1440
Nadia	Hinman		Minneapolis	MN	55409
Angel	Manjarrez	4445 E Lake St	Minneapolis	MN	55406-2362
Naomi	Newman	2546 Lincoln St NE	Minneapolis	MN	55418-3858
Kate	Sosci	1701 Buchanan St NE	Minneapolis	MN	55413-1610
Nikolette	Graffunder	3701 10th Ave S	Minneapolis	MN	55407-2621
John	Grovs	3444 17th Ave S	Minneapolis	MN	55407-2310
Kieran	McLaughlin	2216 30th Ave S	Minneapolis	MN	55406-1442
Christopher	Quaderer	3221 23rd Ave S	Minneapolis	MN	55407-2421
Melody	Doyle	740 E 17th St	Minneapolis	MN	55404-1601
Sean	Powell-Burns	2213 27th Ave S	Minneapolis	MN	55406-1304
Nitesha	Ajudha	925 Penn Ave N	Minneapolis	MN	55411-3629
Lila	Kiely	4536 16th Ave S	Minneapolis	MN	55407-3604
Cass	Can	179 Malcolm Ave SE	Minneapolis	MN	55414-3501
Mikayla	Barnes	5538 43rd Ave S	Minneapolis	MN	55417-2263
Jewel	Ferguson		Minneapolis	MN	55417
Merelyn	Avila Navas	3131 19th Ave S	Minneapolis	MN	55407-1901
Maggie	Anderson	58 Malcolm Ave SE	Minneapolis	MN	55414-3552
Ridwaan	Abdi	925 30th Ave S	Minneapolis	MN	55406-1154
Iqra	Ahmed	2743 11th Ave S	Minneapolis	MN	55407-1150
Sebastian	Cross	3550 E 46th St	Minneapolis	MN	55406-3881
Claire	Riggins	5616 12th Ave S	Minneapolis	MN	55417-2521
Clinton	Mosley	2613 Emerson Ave N	Minneapolis	MN	55411-2011
Asia	Hill		Minneapolis	MN	55406
Tyler	Peterson		Minneapolis	MN	55406
Jane	Harris		Minneapolis	MN	55406
Lief	Couillard	4019 Russell Ave N	Minneapolis	MN	55412-1545
Nate	Kange		Minneapolis	MN	55412
Randy	Hedland	1931 Hayes St NE	Minneapolis	MN	55418-4733
Charlene	Anderson	3249 32nd Ave S	Minneapolis	MN	55406-2012
Jaspur	Anson	2924 44th Ave S	Minneapolis	MN	55406-1827
Carrie	Janneh		Minneapolis	MN	55406

Irene	Wilson	68 Barton Ave SE	Minneapolis	MN	55414-3512
Theo	Wilson	68 Barton Ave SE	Minneapolis	MN	55414-3512
Walker	Nelson	3308 E 24th St	Minneapolis	MN	55406-1408
Vivian	Spitzer	4043 37th Ave S	Minneapolis	MN	55406-3407
Inga	Schierkolk		Minneapolis	MN	55412
Zachary	Winkel-Somdahl	3856 28th Ave S	Minneapolis	MN	55406-3102
Fatuma	Kedir	2910 E Franklin Ave	Minneapolis	MN	55406-1161
Luis	Cuyun Grimm	3205 E 53rd St	Minneapolis	MN	55417-2045
Lilan	Schulz	4424 Nokomis Ave	Minneapolis	MN	55406-3720
Meghan	Ziegler	1905 Em Stately St	Minneapolis	MN	55404-4058
Maren	Stone		Minneapolis	MN	55404
Hanna	Ford	8837 18th Ave S	Bloomington	MN	55425-2008
Briyana	Gaddis	2523 Aldrich Ave S	Minneapolis	MN	55406
Isaiah	Obyrre	4506 Colfax Ave N	Minneapolis	MN	55412-1322
Alexis	Hanson-Mounde	5315 Minnehaha Ave	Minneapolis	MN	55417-2345
Elizabeth	Johnson	2701 44th Ave N	Minneapolis	MN	55412-1002
Charles	Miller III	2933 36th Ave S	Minneapolis	MN	55406-4107
Kaila	Abraham	2020 Elliot Ave Apt 301	Minneapolis	MN	55404-2987
Signe	Scott	2632 14th Ave S	Minneapolis	MN	55407-1125
Joe	Henry		Minneapolis	MN	55407
Ariah	Dieffenbach	4207 26th Ave S	Minneapolis	MN	55406-3041
Dawn	Nesja	1079 Rose Ave E	Saint Paul	MN	55106-2717
Jennifer	Aniceto	2825 15th Ave S	Minneapolis	MN	55407-3192
Jose	Aragon Rodriguez	2813 Bloomington Ave	Minneapolis	MN	55407-2079
Manuel	Javana	3016 Cedar Ave S	Minneapolis	MN	55407-1812
Adrian	Zuniga	3200 20th Ave S	Minneapolis	MN	55407-2404
Emely	Quintero	2429 14th Ave S	Minneapolis	MN	55404-3931
Mackenzie	Bergemann	3560 38th Ave S	Minneapolis	MN	55406-2713
Elise	Cuff	2220 E 42nd St	Minneapolis	MN	55407-3059
Madeline	Mahoney	2600 29th Ave S	Minneapolis	MN	55406-1537
Ben	Murray	3133 31st Ave S	Minneapolis	MN	55406-2044
Nora	Howley	2440 34th Ave S	Minneapolis	MN	55406-1427
Dorrayn	Tapplin		Minneapolis	MN	55406
Chriz	Dominguez	1711 E Lake St	Minneapolis	MN	55407-1872

Devon	Anderson	2530 10th Ave S	Minneapolis	MN	55404
Jason	Lewis	2815 27th Ave S	Minneapolis	MN	55406-1505
Nathanael	Childs	4432 45th Ave S	Minneapolis	MN	55406-4025
Natashia	Otiso	4620 43rd Ave S	Minneapolis	MN	55406-4019
Avery	Segebarth		Minneapolis	MN	55417
Katie	Kelbrants		Minneapolis	MN	55417
Mira	Naughton		Minneapolis	MN	55417
Emily	Davison		Minneapolis	MN	55417
Hafsa	Hussein		Minneapolis	MN	55406
Diana	Taylor-Miklasevics	3616 13th Ave S	Minneapolis	MN	55407-2708
Laura	Anderson	6427 Camden Ave N Apt 310	Minneapolis	MN	55430-1947
Sean	Bandy	4208 11th Ave S	Minneapolis	MN	55407-3212
Stacie	Kalina	5447 Chicago Ave	Minneapolis	MN	55417-2443
Ed	Shields	2011 Bordner Pl	Saint Paul	MN	55116-2504
Susan	Peterson			MN	
Megan	Williams	4649 Bryant Ave S	Minneapolis	MN	55419-5354
M	Kassapa	2880 James Ave S Apt 201	Minneapolis	MN	55408-1830
Sarah	Campbell	3804 40th Ave S	Minneapolis	MN	55406-3439
Mark	Gustafson	3804 40th Ave S	Minneapolis	MN	55406-3439
Lisa	Burkh	1006 W Lake St Apt 219	Minneapolis	MN	55408-4799
Janna	Drehir	5477 McQuade Rd	Duluth	MN	55804-2611
Vanesa	Sosa		MPLS	MN	55407
Mahamed	Mahamed		MPLS	MN	55407
Sahra	Isle		MPLS	MN	55407
Bahja	Mohamud		MPLS	MN	55407
Abdek	Dahir		MPLS	MN	55407
Samsam	Hassan		MPLS	MN	55407
Isaiah	Bischoff		MPLS	MN	55407
Anderson	Calixto		MPLS	MN	55407
Darin	Doty		MPLS	MN	55407
Ilya	Edwards		MPLS	MN	55407
Oliver	Hall		MPLS	MN	55407
Matthew	Labarre		MPLS	MN	55407
Jonathan	Acosta-Rubio		MPLS	MN	55407

Joanna	Amigan Gil		MPLS	MN	55407
Tait	Erickson		MPLS	MN	55407
Amelie	Doying		MPLS	MN	55407
Jocelyn	Ferguson		MPLS	MN	55407
Jasmyn	Stethem		MPLS	MN	55407
Joshua	Ashford		MPLS	MN	55407
Ramya	Abdullahi		MPLS	MN	55407
Jonathan	Moreno		MPLS	MN	55407
Zekeriye	Abdi		MPLS	MN	55407
Hamza	Mohamed		MPLS	MN	55407
Nada	Mohamed		MPLS	MN	55407
Priya	Dalal-Whelan		MPLS	MN	55407
George	Campozano Espinoza		MPLS	MN	55407
Shamiya	George		MPLS	MN	55407
Luciana	Rian-Senna		MPLS	MN	55407
Ruby	Davenport		MPLS	MN	55407
Isadora	Benson		MPLS	MN	55407
Salvador	Galvan		MPLS	MN	55407
Abdifatah	Abdi		MPLS	MN	55407
Aaron	Blum		MPLS	MN	55407
Abdulhakim	Abdullahi		MPLS	MN	55407
Saul	Santamaria		MPLS	MN	55407
Tarek	Azzazi		MPLS	MN	55407
Jaiden	Uttley		MPLS	MN	55407
Ashlyn	Sloan		MPLS	MN	55407
Ayla	Farrow		MPLS	MN	55407
Jonathan	Riera		MPLS	MN	55407
Becky	Dankowski	4028 Garfield Ave	Minneapolis	MN	55409-1435
Denise	Konen	4228 Salem Ave	Saint Louis Park	MN	55416-3205
Ann	McCully	3408 Lyndale Ave S	Minneapolis	MN	55408-4151
Richard	Lopez	3425 Bloomington Ave	Minneapolis	MN	55407-2216
Amanda	Kaler	4049 Elliot Ave	Minneapolis	MN	55407-3146
Diane	Rose	3431 Zorthern Ave S	St Louis Park	MN	55416
Gordon	Loery	1510 W 32nd St	Minneapolis	MN	55408-3301

Grace	Fremont	1510 W 32nd St	Minneapolis	MN	55408-3301
Polly	Talen	5924 Russell Ave S	Minneapolis	MN	55410-2949
Clarynce	Johnson		Minneapolis	MN	55403
Joni	Vaaselow	144 Windsor Ct	New Brighton	MN	55112-3370
Barbara	Sindelar	3701 Garfield Ave	Minneapolis	MN	55409-1165
Clareyse	Nelson	601 Adams St NE	Minneapolis	MN	55413-2143
Lynda	Borjesson	2530 Upton Ave S	Minneapolis	MN	55405-2346
Michele	Burlew	13 Red Fox Rd	North Oaks	MN	55127-6323
Richard	Gravrok	2925 Monterey Ave	Minneapolis	MN	55416-5801
David	Grothe	1698 Lincoln Ave	Saint Paul	MN	55105-1951
Rose	De Santo	5111 Valley View Rd	Minnetonka	MN	55345-4034
Betsy	Allis	2847 E Lake of the Isles Pkwy	Minneapolis	MN	55408-1055
Warren	High	507 W 5th St	Duluth	MN	55806-2439
Joyce	Case	3504 Humboldt Ave S Lowr	Minneapolis	MN	55408-3316
Ron	Parker	831 Fairmount Ave	Saint Paul	MN	55105-3341
Karin	Winegar	1832 Carroll Ave	Saint Paul	MN	55104-3512
Kathy	Iverson	5410 York Ave S	Edina	MN	55410-2459
Janet	Houck	831 Fairmount Ave	Saint Paul	MN	55105-3341
Susan	Mainzer	3405 Humboldt Ave S	Minneapolis	MN	55408-3333
Brian	Major	2726 E 26th St	Minneapolis	MN	55406-1301
Ann and Peter	Davidson	4506 Cooke St	Duluth	MN	55804-2345
Judy	Goebel	7500 Girard Ave S	Richfield	MN	55423-3950
Norman	Herron	2617 E 5th St	Duluth	MN	55812-1536
Harold	Pontiff	3821 E 26th St	Minneapolis	MN	55406-1857
Susan	Arquette	4708 Garfield Ave	Minneapolis	MN	55419-5428
Anne	Frenchick	449 Woodhill Dr	Saint Paul	MN	55113-2349
William	Elwood	2847 E Lake of the Isles Pkwy	Minneapolis	MN	55408-1055
Emily	Gannon	4837 Garfield Ave	Minneapolis	MN	55419-5401
Joe	Crocker	2397 313th Ave NW	Cambridge	MN	55008-7059
Roger	Howley	2440 34th Ave S	Minneapolis	MN	55406-1427
Catherine	Manning	3424 Zinran Ave S	Minneapolis	MN	55426-3844
Sharon	Hughes	1233 Amble Rd	Saint Paul	MN	55112-5761
Connie	Wanek-Dentinger	3916 46th Ave S	Minneapolis	MN	55406-3604
Louise	Andersen Raths	5533 Aldrich Ave S	Minneapolis	MN	55419-1733

Cecelia	Newton	5516 Irving Ave S	Minneapolis	MN	55419-1634
David	Michael	17 Parkview Ter	Minneapolis	MN	55416-3424
Dale	Schwie	7514 Girard Ave S	Minneapolis	MN	55423-3950
Emily	Green	3432 Park Ter	Minneapolis	MN	55406-2948
Curt	McNamara	3616 44th Ave S	Minneapolis	MN	55406-2906
Margaret	West	1002 W 6th St	Duluth	MN	55806-2306
Ann	Miller	2921 E 1st St	Duluth	MN	55812-1912
Daniel	Brown	5230 Terraceview Ln N	Plymouth	MN	55446-4514
Susan	Wilmes	2815 Exhibition Dr	Duluth	MN	55811-5344
Stuart	Henry	4728 Garfield Ave	Minneapolis	MN	55419-5428
Liz	Permar	7340 Fremont Ave S	Richfield	MN	55423-3029
Susan	Vikse	2344 River Pointe Cir	Minneapolis	MN	55411-4281
Sandra	Ahlstrom	6085 Riviera Ln	Excelsior	MN	55331-2912
Cathy	Geist	3428 34th Ave S	Minneapolis	MN	55406-2731
Rita	Franchett	7500 York Ave S Apt 613	Minneapolis	MN	55435-4751
Krishna	Seshan	212 N 1st St Apt 401	Minneapolis	MN	55401-1558
Rebekah	Leonhart	3116 Holmes Ave	Minneapolis	MN	55408-2629
Robin	Garwood	2816 28th Ave S	Minneapolis	MN	55406-1514
Bruce	Anderson	5829 Colfax Ave S	Minneapolis	MN	55419-2106
Joan	Patterson	618 3rd Ave SE	Minneapolis	MN	55414-1604
Stewart	Huagen	3217 Aldrich Ave S	Minneapolis	MN	55408-3603
Lane	Ayres	4407 Branson St	Edina	MN	55424-1046
Nancy	Gehrenbeck-Miller	3628 27th Ave S	Minneapolis	MN	55406-2510
Wendell	Vandershuis	2588 Upton Ave S	Minneapolis	MN	55405-2346
Robert	Machalek	4200 Toledo Ave S	Minneapolis	MN	55416-3209
Diane	Brady-Leighton	2652 38th Ave S	Minneapolis	MN	55406-1752
Jeffrey	Snyder	1257 W Minnehaha Pkwy	Minneapolis	MN	55419-1172
Raymond	Dillon	4225 Grand Ave S	Minneapolis	MN	55409-1911
Joy	Peterson	1008 Trenton Cir N	Minneapolis	MN	55441-4956
Terry	Hammink	320 Parkway Ct	Minneapolis	MN	55419-1463
Christine	Walz	7514 Upton Ave S	Minneapolis	MN	55423-3521
Lisa	Sinclair	4836 4th Ave S	Minneapolis	MN	55419-5636
Mary	Leoni	4045 3rd Ave S	Minneapolis	MN	55409-1610
Pat	Gottschalk	5849 Girard Ct	Minneapolis	MN	55419-2137

Stephen And Sue Ann	Rawlins	5505 Wentworth Ave	Minneapolis	MN	55419-1854
Becky	Halvorson	3340 48th Ave S	Minneapolis	MN	55406-2347
Willie	Gregg	4324 40th Ave S	Minneapolis	MN	55406-4002
Barbara	Snyder	180 Kellogg Blvd E Apt 1308	Saint Paul	MN	55101-1591
Ethel	Hill	6436 Phoenix St	Minneapolis	MN	55427-4635
Ralph	Wyman	400 Groveland Ave Apt 407	Minneapolis	MN	55403-3243
Mary M	Weitz	1122 Jefferson St NE	Minneapolis	MN	55413-1401
Cynthia	Pick	4420 York Ave S	Minneapolis	MN	55410-1454
Christine	Popowski	2630 Pleasant Ave Apt 101	Minneapolis	MN	55408-1448
Thomas	Normile	911 22nd Ave S Apt 250	Minneapolis	MN	55404-2239
Lisa	Nemec	2900 39th Ave S Apt 1	Minneapolis	MN	55406-4093
Andy	Pearson	2629 18th Ave S Apt 2	Minneapolis	MN	55407-3768
Rbennary	Levin	2213 Grand Ave S	Minneapolis	MN	55405-3413
Ruth	Mackenzie	1354 Osceola Ave	Saint Paul	MN	55105-2309
Connie	Diercks	3821 E 26th St	Minneapolis	MN	55406-1857
Deb	Stancevic	4459 44th Ave S	Minneapolis	MN	55406-4060
David	Bach	5021 Oliver Ave S	Minneapolis	MN	55419-1030
Wendy	Henry	4728 Garfield Ave	Minneapolis	MN	55419-5428
Sarah	Musgrave	7717 Chicago Ave Apt 108	Richfield	MN	55423-4436
Jennifer	Batt	1250 Hennepin Ave Apt 414	Minneapolis	MN	55403-1729
Wendi	Zimmerman	1425 W 28th St Apt 502	Minneapolis	MN	55408-1979
David	Dubois	3332 21st Ave S	Minneapolis	MN	55407-2412
Lee	Samelson	2836 18th Ave S	Minneapolis	MN	55407-1410
Sonja	May	3259 Polk St NE	Minneapolis	MN	55418-2130
Carol	Fitzmaurice	6400 York Ave S Apt 413	Minneapolis	MN	55435-2395
Jeremy	Raths	5533 Aldrich Ave S	Minneapolis	MN	55419-1733
Katie	Jones	2219 Bryant Ave S Apt 3	Minneapolis	MN	55405-3072
Janet	Merrill	5317 Zenith Ave S	Minneapolis	MN	55410-2138
Ray	Goebel	7500 Girard Ave S	Richfield	MN	55423-3950
Julie	Gottesleben	4750 E 53rd St Apt 313	Minneapolis	MN	55417-2358
Bob	Friedman	4237 22nd Ave S	Minneapolis	MN	55407-3036
Kristen	Mengelkoch	5139 Belmont Ave S	Minneapolis	MN	55419-1313
Alex	Tsatsoulis	2920 45th Ave S	Minneapolis	MN	55406-1829
Valerie	Garber	942 Ashland Ave Apt 10	Saint Paul	MN	55104-6798

Anthony	Stratton	1701 Englewood Ave		Saint Paul	MN	55104-1116
David	Leppik	2617 Joppa Ave S		Minneapolis	MN	55416-3931
Liza	Laurent	2110 30th Ave S		Minneapolis	MN	55406-2956
George	Rosar	111 4th Ave N Apt 103		Minneapolis	MN	55401-1531
Alan	Smith	2313 Mount View Ave		Minneapolis	MN	55405-1963
Victoria	Gagnon	731 21st Ave S Apt 2815		Minneapolis	MN	55454-1338
Debra	Bank	4020 W 31st St Apt 6		Minneapolis	MN	55416-4160
Lee	Hanson	1002 W 6th St		Duluth	MN	55806-2306
Karen	Digre	4629 Columbus Ave		Minneapolis	MN	55407-3527
Zackary	Leslie	3430 List Pl		Minneapolis	MN	55416-4559
Donald	Bell	22160 Poppy St NW		Anoka	MN	55303-8855
Mike	Menzel	5410 York Ave S		Edina	MN	55410-2459
Arielle	Johnson	521 6th St SE Apt 2		Minneapolis	MN	55414-1663
Donna	Kurimay	4750 E 53rd St		Minneapolis	MN	55417-2355
Margaret	Hest	3415 24th Ave S		Minneapolis	MN	55406-2501
Corky	Johnaon	825 Summit Ave Apt 1305		Minneapolis	MN	55403-3187
Raymond	Dehn	PO Box 11847		Minneapolis	MN	55411-0847
Jeff	Walkup	810 W 34th St		Minneapolis	MN	55408-4101
Bruce	Snyder	180 Kellogg Blvd E Apt 1308		Saint Paul	MN	55101-1591
Stan	Sattinger	3933 12th Ave S		Minneapolis	MN	55407-2732
Angelique	Olson	2929 Russell Avenue North		Minneapolis	MN	55411
Margaret	Hasse	1698 Lincoln Ave		Saint Paul	MN	55105-1951
Betty	Lia-Hoagberg	5250 Grandview Sq Apt 2409		Minneapolis	MN	55436-1610
Maia	Roberts	3820 39th Ave S		Minneapolis	MN	55406-3429
Raymond	Hastings	165 Glenwood Ave		Minneapolis	MN	55405-1618
Diane	Boushek	506 Ardmore Dr		Golden Valley	MN	55422-5218
Chris	Turner	2819 Aldrich Ave N		Minneapolis	MN	55411-1427
Samantha	Po	800 N 3rd St Apt 505		Minneapolis	MN	55401-2684
Valerie	Dooling	3302 W Dickens Ave # 4		Chicago	IL	60647-4987
Kurt	Howard	1000 W Franklin Ave Apt 316		Minneapolis	MN	55405-3161
Heidi	Zinky	3845 Garfield Ave		Minneapolis	MN	55409-1116
Sarah	Kise	3524 E 25th St		Minneapolis	MN	55406-1417
Cynthia	Marsh	2588 Upton Ave S		Minneapolis	MN	55405-2346
Larisa	Sherchuik	1350 Nicollet Avenue South	Apt 1605	Minneapolis	MN	55403

Kathy	Steinhauer	5708 Aldrich Ave S	Minneapolis	MN	55419-1701
Kathy	Steinhauer	5708 Aldrich Ave S	Minneapolis	MN	55419-1701
Corinth	Matera	3853 37th Ave S	Minneapolis	MN	55406-3210
Viola	Onikoro-Askeil	2534 Lincoln St NE	Minneapolis	MN	55418-3858
Abby	Gaul	4109 44th Ave S	Minneapolis	MN	55406-3538
Maria	Maldonado	4437 15th Ave S	Minneapolis	MN	55407-3648
Eoin	Irmiter	3112 35th Ave S	Minneapolis	MN	55406-2114
Jeff	Pert	818 S 3rd St Apt 415	Minneapolis	MN	55415-1439
Desmond	Lafave	2315 E 22nd St	Minneapolis	MN	55406-1005
Tyler	Sit	726 E 38th St Apt 2	Minneapolis	MN	55407-4700
Laura	Huepenbecker	5061 Interlachen Blf	Edina	MN	55436-1360
Ruby	Woletz	2307 30th Ave S	Minneapolis	MN	55406-1443
Mark	Furniss	5050 Hiawatha Ave	Minneapolis	MN	55417-1642
Norman	Whitfield	8800 Irving Ave	Minneapolis	MN	55404
Sarah	Harper	4525 Tonkawood Rd	Minnetonka	MN	55345-2843
Nancy	Michael	17 Parkview Ter	Minneapolis	MN	55416-3424
Ariel	Olson	5603 Garfield Ave	Minneapolis	MN	55419-1713
Zoe	Beck	5610 Laurel Ave Apt 119	Golden Valley	MN	55416-1050
Lynn	Burghart	7316 W 22nd St Apt 211	St Louis Park	MN	55426-2731
Brenda	Westphal	5160 Harriet Ave	Minneapolis	MN	55419-1259
Jennifer	Strahan	5319 Emerson Ave S	Minneapolis	MN	55419-1112
Josh	Peklo	4937 29th Ave S	Minneapolis	MN	55417-1303
Dorothy	Larson	3614 Westmark Dr	Minnetonka	MN	55345-2243
Thomas	Kinn	3116 Girard Ave S Apt 205	Minneapolis	MN	55408-2743
Brian	Ellis	4049 Elliot Ave	Minneapolis	MN	55407-3146
Susan	Sinning	301 7th St W Unit 1102	Northfield	MN	55057-2475
Conor	Sexton	3345 Hennepin Ave Fl 2	Minneapolis	MN	55408-3450
Carson	Kowalski	15829 Griffon Path	Apple Valley	MN	55124-6661
Trevor	Squire	2645 Dupont Ave S Apt 1	Minneapolis	MN	55408-1207
Brian	Thielke	2541 Grand Ave S	Minneapolis	MN	55405-3437
Per	Alexandes	3912 Garfield Ave	Minneapolis	MN	55409-1433
Haahen	Anderson	3600 Grand Ave S	Minneapolis	MN	55409-1102
Chloe	Persigehl-Flak	2624 38th Ave S	Minneapolis	MN	55406-1752
Derartu	Ansna	104 27th Ave SE	Minneapolis	MN	55414-3401

Minnie	Lopez	4217 16th Ave S	Minneapolis	MN	55407-3311
Meg	Allen	4550 Humboldt Ave N Apt 303	Minneapolis	MN	55412-4502
Izzy	Sillers	5048 18th Ave S	Minneapolis	MN	55417-1220
Raisa	Beashi	15250 74th Ave N	Maple Grove	MN	55311-2641
Ariana	Kimbal	5525 Park Ave	Minneapolis	MN	55417-2438
Diane	Fondow	2340 E32 Street	Minneapolis	MN	55406
Zack	Philips	5057 Penn Ave S	Minneapolis	MN	55419-1034
Sarah	Studley	211 2nd Ave Sw	Austin	MN	55412
Jacob	Ewers	4725 Minnetonka Blvd Apt 106	St Louis Park	MN	55416-2237
Jim	Brennan	2900 39th Ave S	Minneapolis	MN	55406-4092
Ben	Kell	5517 Harriet Ave	Minneapolis	MN	55419-1829
Nina	Grad	8314 12th Ave S	Bloomington	MN	55425-1710
Bryce	Maples	3240 Lyndale Ave S	Minneapolis	MN	55408-3645
Sarah	Idrovo	209 E 19th St Apt 203	Minneapolis	MN	55403-3943
Parker Gorald	Hepcia	5705 Portland Ave	Minneapolis	MN	55417-2440
Noemy Alexis	Johnson	5705 Portland Ave	Minneapolis	MN	55417-2440
Dave	Hile	410 Groveland Ave Apt 1301	Minneapolis	MN	55403-3210
Maria	Heath	875 23rd Ave SE	Minneapolis	MN	55414-2607
Alaina	Mcpherson	5604 Bloomington Ave	Minneapolis	MN	55417-2641
Rachel	Hoben	3436 Lyndale Ave S Apt 102	Minneapolis	MN	55408-4154
Cynthia	Abdulla	2833 Lyndale Ave S	Minneapolis	MN	55408-2153
Natalie	Sokol	1416 W 34th St Apt 3	Minneapolis	MN	55408-3840
Tim	Dwye	225 Cedar Lake Rd N	Minneapolis	MN	55405-1223
Christy	Gold	216 Wilder St N	Saint Paul	MN	55104-5851
Greta	Yates	14249 Park Ave	Burnsville	MN	55337-4633
Elena	Coarasa	10647 Utica Rd	Minneapolis	MN	55437-2864
Mavie	Hassell	4945 Colfax Ave S	Minneapolis	MN	55419-5321
Fless	Mintute	218 Oak Tell St	Minneapolis	MN	55408
Jackson	Skogg	9000 Pleasant Ave	Minneapolis	MN	55419
Josh	Downham	5736 Pillsbury Ave S	Minneapolis	MN	55419-1811
Lauren	Downham	5736 Pillsbury Ave S	Minneapolis	MN	55419-1811
Alison	Ferrell	1000 W Franklin Ave Apt 316	Minneapolis	MN	55405-3161
Teresa	Kiedrowski	10647 Utica Rd	Minneapolis	MN	55437-2864
Adan	Croft	3300 35th Ave S	Minneapolis	MN	55406-2118

Henry	Peklo	4437 29th Ave S	Minneapolis	MN	55406-3708
Gavin	Butterfield	657 Wheelock Pkwy E	Saint Paul	MN	55106-1718
Sarah	Silver	1474 Blackhawk Lake Dr	Eagan	MN	55122-1256
Ophelia	Peklo	4937 29th Ave S	Minneapolis	MN	55417-1303
Emma	Peklo	4937 29th Ave S	Minneapolis	MN	55417-1303
Marion	Peklo	4937 29th Ave S	Minneapolis	MN	55417-1303

Levi, Andrew (COMM)

From: jon copeland <jcnrlb@charter.net>
Sent: Wednesday, July 05, 2017 4:29 PM
To: MN_COMM_Pipeline Comments
Subject: Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Oil and gas has been a major supplier of income for my family. I fully support the pipeline coming through central Minnesota. My ties to the construction industry also create a specific interest in this project. I fully comprehend the requirements a project of this magnitude would have on the work force. I look forward to the positive results that a project like this would bring to our state. Jon Copeland

Sincerely,

jon copeland
834 2nd Ave N
Sauk Rapids, MN 56379
jcnrlb@charter.net

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

6

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
George Cordero	818 6259374	G.Cordero26@gmail

ADDRESS: 508 NE 6th Ave

CITY, STATE, ZIP: Grand Rapids, MN, 55744

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Dave Core

Street Address: 257 - 918 Albert Street

City: Regina Prov ~~State:~~ Saskatchewan Zip Code: S4R 2P7

Phone or Email: davecore@caepla.org

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

There are 2 abandonment processes happening in Canada this summer and fall that may provide a different perspective on the issue.

- Abandonment Cost Estimates Review - NEB process
  - much evidence provided by landowner assoc.
  - filed and posted at the NEB website.
  - ~~evidence~~ expert evidence from 2008 abandonment hearing and 2012 Abandonment Cost Hearing
- Peace River Mainline Abandonment Hearing
  - NEB Website - Landowners & CAEPLA evidence & IRs filed here also.
- CAEPLA negotiated a decommissioning agreement for line 3 for 300 landowners with Enbridge
- CAEPLA is doing research in tandem with Enbridge on decommissioned pipes regarding corrosion, integrity (structural) and consequences to landowners.

If including additional pages please number them and tell us how many you are providing:_____ pages

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Don Cornell	218 835 6315	
ADDRESS		
22704 Cornell Rd		
CITY, STATE, ZIP		
Blackduck MN 56630		

COMMENTS FOR

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Rodrigo Cortes	218-398-3317	—
ADDRESS		
510 NE 3rd AVE		
CITY, STATE, ZIP		
Grand Rapids MN 55744		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

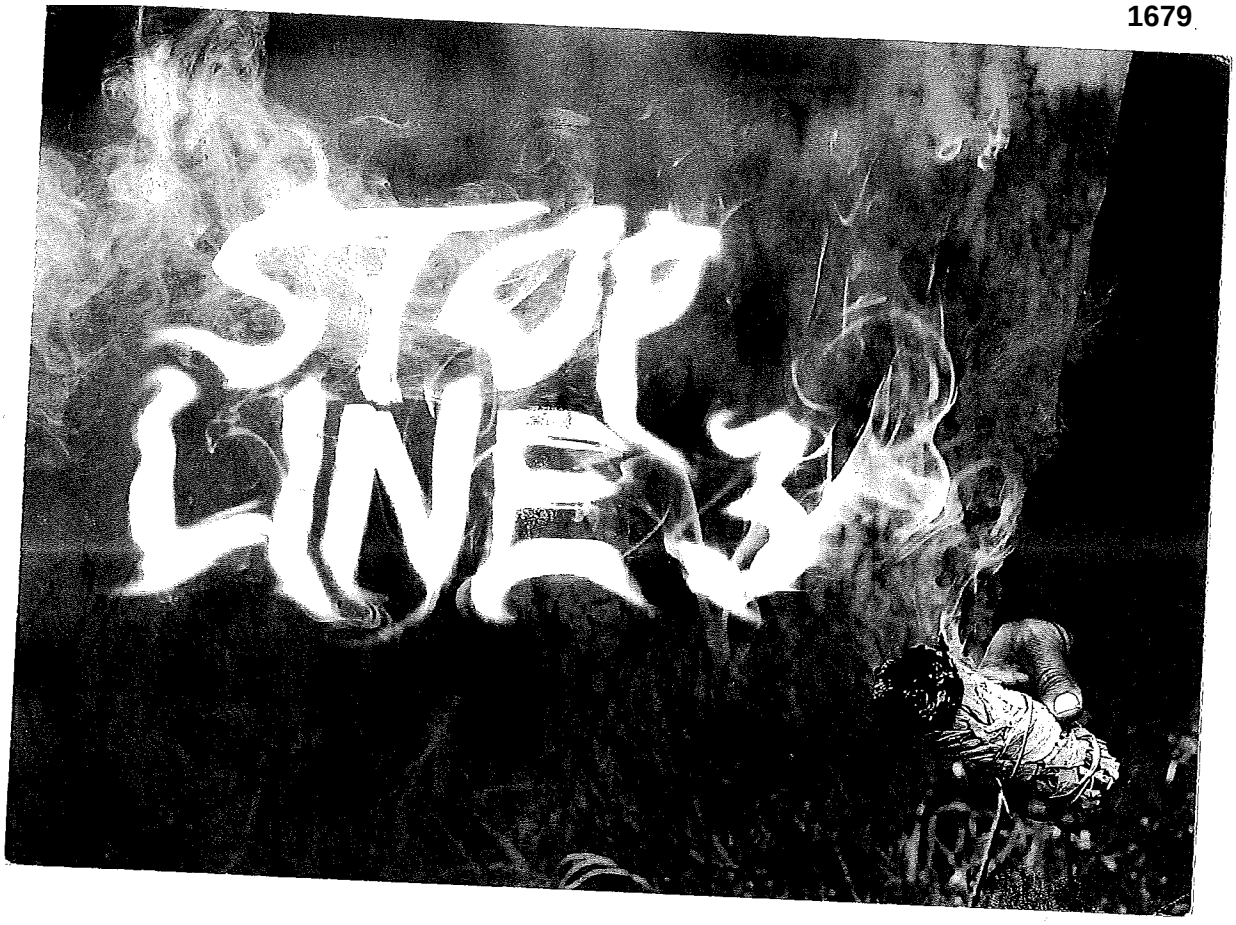

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

ST PAUL MN 551
03 JUL 2017 PM 5 L

Stop Line 3
because it will harm
lakes in Minnesota

POSTCARD

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

[illegible]

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Joseph John Couture	218-576-5170	joecouture33@gmail.com
ADDRESS		
6166 County Rd 129		
CITY, STATE, ZIP		
Kettle River MN 55757		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Mary Cowen <marylcowen@gmail.com>
Sent: Monday, July 10, 2017 7:55 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Comment

Dear Jamie MacAlister,

Please include this comment on the Line 3 DIES in dockets CN-14-916 and PPL-15-137.

I was born and raised in Minnesota. I grew up in St. Paul and was fortunate enough to have spent summers of my childhood hiking, camping and swimming in Minnesota's State Parks. For the past ten years I have lived in northern MN and currently live on the Cloquet River and work in Duluth MN. I cherish Minnesota's 10,000+ lakes, rivers, streams, vernal pools and ponds that all are a part of our water shed.

Allowing Enbridge to move forward with Line 3 would be rewarding their total disregard for our land and water. Page 7 of Chapter 11 states “In addition to the individual land use categories that would be affected by the routes, various waterbodies and streams would be crossed.” However, there is no additional analysis of potential downstream environmental impacts. The spill analysis on pages 13-14 of Chapter 10 look at the probability of annual spills, when it would be more comprehensive and relevant to analyze the spill probability over the entire lifetime of the pipe. There is no significant analysis of the increase to spill potential as pipelines become exposed over time.

Enbridge's DEIS is incomplete at best, and is more accurately offensive and insulting. I work as an advocate for commercially sexually exploited youth and Enbridge's broad response to the impacts on health and safety of women on page 10 of Chapter 11 shows that they are not taking their impacts, human or otherwise, seriously. The proposed solution to the risks of sex trafficking is limited to “Enbridge can prepare and implement an education plan or awareness campaign around this issue with the companies and subcontractors that construct, restore, and operate the pipeline, as well as by working with local communities and tribal communities to raise awareness and provide resources to address the issue.” If they took this issue seriously, they would have called upon any of the myriad of resources and information about this issue to have a more thorough and specific analysis.

There is too much to lose, and not nearly enough to gain. I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Thank you,

Mary Cowen
Saginaw MN

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Christopher Cox		
ADDRESS		
PO Box 761		
CITY, STATE, ZIP		
Walker, MN 56484		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Courtney Cox		
ADDRESS: PO Box 761		
CITY, STATE, ZIP: Walker, MN 56484		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Casey Crane	218-556-9056	
ADDRESS		
20524 Lake Julia DR NW		
CITY, STATE, ZIP		
Bemidji MN 56601		

COMMENTS
I support Line 3 replacement

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Sherry Crayne <csc414@yahoo.com>
Sent: Thursday, June 29, 2017 7:58 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge

I oppose the pipeline.
The people of Minnesota need to determine the future of the land and water, not a foreign company. We do not need more oil. We need drinking water and the entire ecosystem saved for generations to come.
Be a hero for the next generation stop this oil insanity.
Sincerely,
Sherry Crayne
Sent from my iPad

Levi, Andrew (COMM)

From: Doug Crockett <doug.crockett47@gmail.com>
Sent: Monday, July 10, 2017 11:24 PM
To: MN_COMM_Pipeline Comments
Subject: Fwd: PUBLIC COMMENTS

Corrected email address:

Begin forwarded message:

From: Doug Crockett <doug.crockett47@gmail.com>
Subject: PUBLIC COMMENTS
Date: July 10, 2017 at 9:17:18 PM MST
To: pipeline.comment@state.mn.us

Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. I've heard that Enbridge redacted those numbers from the public version of the DEIS. Without them, there is no reliable way an independent party to verify their results. I believe that in order for Minnesota citizens and agencies to make an educated decision about Line 3, we must have that information, and I would like to know why Enbridge won't release it. Please insist that Enbridge provide their data on oil releases and spills in Minnesota. If Enbridge objects due to security reasons, then I would like to know why they have failed to cover the exposed pipes in the Tamarack River in northwest Minnesota, and why they allow people to joyride over exposed pipes south of Clearwater. This is surely a security issue as well. For Enbridge to pick and choose what issues warrant "security," is unacceptable.
I believe there is missing data in the Line 3 DEIS. There is apparently no information from a dilbit study done by the National Academy of Sciences, which you can find here: https://www.nap.edu/catalog/21834/spills-of-diluted-bitumen-from-pipelines-a-comparative-study-of. I would like this to be included in the final EIS.

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete.

I would like to know, in the final EIS for Line 3, what Enbridge's plans are if their preferred route is approved. Will it be just the one pipeline, or will they eventually move all six pipelines to the new corridor? This would have a huge effect on how people feel about Enbridge's preferred pipeline route.

I have heard that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state* need (not a national need). Even if we used statistics abotut the national need, U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply needed oil. (http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf). I would like to see this information mentioned in the final EIS.

I understand that an engineering firm called Cardno, with ties to Enbridge, was instrumental in preparing part of the draft Environmental Impact Statement for Line 3. In light of this fact, in the final EIS I would like to see an independent analysis of the information they provided. Minnesota requires verified facts for such a large project.

I grew up in North Dakota, and I spent many summers on Minnesota lakes. I also lived in Minnesota for 20 years which created many fond memories and a strong loyalty to the "Land of 10,000 Lakes." I've vacationed on Minnesota lakes along the Enbridge's preferred route for over 40 years, so I can't imagine why a pipeline carrying tar sands products would be considered near some of the state's cleanest water. I hope that you will ensure that a rigorous EIS is completed on the proposed Minnesota pipeline projects. We don't need another Standing Rock fiasco in Minnesota.

Sincerely,
Doug Crockett, 6826 E. Kiami St., Tucson, AZ 85715, (520) 250-2553

Levi, Andrew (COMM)

From: Jacqueline Crockett <jacqueline.crockett@gmail.com>
Sent: Monday, July 10, 2017 10:22 PM
To: MN_COMM_Pipeline Comments
Cc: Jacqueline Crockett
Subject: Comment on Docket #MPUC PL-9/CN-14-916 MPUC PL-9/PPL-15-137

TO: Pipeline.Comments@state.mn.us

FROM: Jacqueline R. Crockett

DATE: July 10, 2017

RE: Docket #

MPUC PL-9/CN-14-916

MPUC PL-9/PPL-15-137

A rigorous EIS on MN pipeline projects is overdue. I'm grateful to Friends of the Headwaters for taking this issue to court and winning an independent and comprehensive EIS. Their timely action was crucial to ensuring that MN would not be another Standing Rock.

I lived in MN for 15 years and I have fond memories and great loyalty to the state. For the last 40 years, I have vacationed on Minnesota lakes along Enbridge's preferred route in several locations. So I am heartbroken to hear that Minnesota, a state I always credited with more enlightened and environmentally conscientious policies, would even consider allowing a pipeline carrying tar sands products near some of their cleanest water. Don't they understand how scarce clean water is? As someone who now resides in AZ, I can tell you that clean water is (and will be) more precious than oil. Here, that may come sooner than in Minnesota, but it will come there, too, and probably sooner than many believe.

Reading the draft EIS on Line 3, these are some of my many concerns:

1. Shouldn't the estimates for the pipeline's greenhouse gas emissions be measured for the entire life of the pipeline? That could be over 50 years.

2. The Enbridge record is full of calamity and citations. Why is the draft EIS relying Enbridge data? Why does the EIS imply complete trust in Enbridge with language like "Enbridge would…" How can that mean ANYTHING? This is the company responsible for the Kalamazoo disaster.

3. Why aren't the actual preparers listed, along with their names, experience, and credentials? How can the public trust that this EIS is an INDEPENDENT document, prepared by people with the expertise to make these judgments?

4. Why isn't MN and the EIS serious about the "no-build" option? Investors are pulling out of the Alberta tar sands, and TransCanada can't even find customers for its proposed Keystone XL. Additionally, renewable energy is more accessible and affordable everyday.

5. Why doesn't this EIS provide an honest analysis of an alternate route away from Minnesota lake country and the Mississippi Headwaters? SA-04, a route submitted by citizens, is already an energy corridor and it doesn't create hazards for pristine water.

6. As I understand the rules in the MN Environmental Policy Act and NEPA, the certificate of need should be included in this EIS. Why isn't it here?

7.Why is the EIS relying on analysis from Barr Engineering and Cardno, firms with a history of working for Enbridge. Isn't that called a "conflict of interest"?

I have been following the actions of the Public Utilities Commission since 2014. I remember when the former PUC chair said that the EIS ordered by the Court of Appeals was a big deal. She was right; it is a big deal. Minnesota can't rely on "business as usual" for this EIS on a tar sands pipeline. Minnesota needs to hire independent scientists and experts for this EIS, and the state absolutely needs to take the time necessary to prepare a competent EIS. What has been done to date isn't close to adequate.

Thank you for your sincere consideration of my thoughts, questions, and factual information.

Jacqueline R. Crockett
6826 East Kiami Street
Tucson, Arizona 85715-3327

Line 3 Replacement Project DEIS

- The Draft Environmental Impact Statement (DEIS) is an in-depth analysis that took more than 15 months and 27 public meetings to scope and develop.
- Years of environmental study: Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- Infrastructure replacement: As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Donald Cromer	251 402 7905	
ADDRESS		
5928 Lamborn Ave		
CITY, STATE, ZIP		
Superior WI 54880		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jack Cronemiller	218 407 0278	
ADDRESS		
4660 Grange Rd NW		
CITY, STATE, ZIP		
Bemidji Mn 56601		

COMMENTS

pipe lines are badly needed
safest and cheapest way to move
oil

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Yvonne Gonemiller	218-556-1876	
ADDRESS: 4660 Grange Rd. NW		
CITY, STATE, ZIP: Bemidji, MN 56601		

COMMENTS

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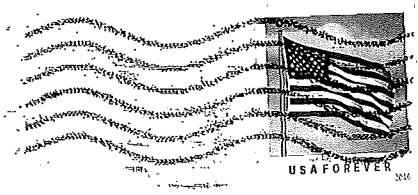

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Lilah J. Crowe	218-256-9060	Lilahcrowe@gmail.com

ADDRESS
32122 Gum Pk Dr.

CITY, STATE, ZIP
Grand Rapids MN 55744

COMMENTS
- Support line 3 replacement project
- Keep it underground
- Keep up your great work.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Holly Hartfiel <holly.hartfiel@mnlimited.com>
Sent: Monday, July 10, 2017 11:25 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

We are writing this letter in support of the Enbridge – Line 3 Replacement Project. Minnesota Limited, LLC is a Minnesota corporation that has been working in Minnesota for the past 49 years. We started in 1966 constructing small natural gas projects and have steadily grown to the point that today we rank as one of the largest contractors in the state. We employ approximately 1,500 industry professionals during our peak, most of whom are temporary union members. These high paying jobs help to support many families and bring tremendous value to many local communities. We also hire many local subcontractors as well and the cumulative effect of increased tax revenues for the state and increased revenue for hundreds of local businesses, all provides a tremendous boost to the Minnesota economy.
Minnesota Limited has been fortunate to have been a key vendor to Enbridge for the past 37 years. Today we count Enbridge as our largest customer and a true partner in our future. This Line 3 Replacement Project will bring a substantial opportunity for our company to continue our growth and the ability to pay these hundreds and hundreds of high paying jobs. The very nature of the construction industry is based on these types of construction projects. Enbridge has been an industry leader for decades and Minnesota Limited places great value in our relationship for many reasons but mostly because we share the same core values. The first of which is safety. We work every day to ensure the safety of our employees as well as the general public and we help Enbridge to maintain a safe and reliable pipeline network.

In closing, we again state our support for the Line 3 Replacement Project. It provides much needed local jobs and will also reduce the number of unit trains carrying oil through our communities by transporting this valuable commodity through a safe underground pipeline.

Sincerely,

Ted Crowe
PO Box 410
Big Lake, MN 55309
holly.hartfiel@mnlimited.com

Levi, Andrew (COMM)

From: cummingphd3@aol.com
Sent: Monday, July 10, 2017 7:35 PM
To: MN_COMM_Pipeline Comments
Subject: DEIS

To: Jamie MacAlister, Environmental Review Manager, DEIS

Dear Mr. MacAlister,

I am resident of California and am writing to express my concerns as an American citizen about the Line 3 Pipeline and the DEIS. The United Nations standard for projects that impact Indigenous peoples requires informed consent with sufficient notice. The DEIS report does not draw conclusions about the impact on tribal peoples in the immediate area of impact. The effects on tribal members and their resources will be devastating. This is a violation of the treaties the state of Minnesota has with the tribe. In addition, no spill analysis has been presented, making this issue hard to take into account. The emissions from this pipeline will cause further pollution in many forms, and be very costly to the state of Minnesota for many years to come. For these any many other reasons, I want the Department of Commerce to deny the permit for the proposed Line 3 and shut down the old line and remove it. We need renewable energy sources that are safe for American lands, water, and all American peoples.

Sincerely,

Dr. Janice Cumming

From: camille cunningham
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline CN 14-916 AND PPL 15-137
Date: Thursday, June 01, 2017 4:02:18 PM

I am writing to add my voice to the many US citizens against the Line 3 Pipeline. A leak, and there will be a leak should the pipeline project be approved, endangers Native lands and people, the State's water sources and the people of Minnesota. Too much is at risk! Please vote against this awful project. Fossil fuels and their pipelines will eventually be a thing of the past. Please do your part to make this a reality and vote NO.

Mary Camille Cunningham
Albuquerque, New Mexico

Levi, Andrew (COMM)

From: ANGIE CUNNINGTON <cunnington@wisc.edu>
Sent: Monday, July 10, 2017 9:29 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 (CN-14-916 and PPL-15-137)

Dear Jamie MacAlister,

I am a concerned citizen of Madison, Wisconsin, writing to you to urge you to have Line 3/CN-14-916 and PPL-15-137 removed and NOT replaced. We need to move into cleaner and renewable energies, not reinvest massive amounts of money, time, and manpower in pipelines. Although they may the safest way to transport fossil fuels, pipelines are extremely risky to the environment in the form of difficult-to-clean oil spills; and when the fuel is burned, we pollute our air, water, and land. Please reconsider allowing reinvestment in this fuel source.

We share the earth. We're neighbors. Please remember that pipeline companies, especially Enbridge, have a history of avoiding cleanup costs when there are spills. I ask that all public officials who have a say in pipeline installation urge fossil fuel companies to invest in renewables instead of more pipes for a finite, and very dirty, fuel source.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Sincerely,
Angie Cunnington

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jerome John CYRUS	651-402-4455	J.CCYRUS@gmail.com
ADDRESS		
290 Tingdale St. P.O. Box 4		
CITY, STATE, ZIP		
TAMARACK, MN. 55787		

COMMENTS: I am the Mayor of the City of Tamarack. The jobs that will be created, money within Co. will receive. I believe the good that comes from this project out does any of the negatives.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Erin D'Ambrosio <erindambrosio@gmail.com>
Sent: Wednesday, June 28, 2017 4:54 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

To whom it may concern;

Please consider the horrible outcomes fracking has had on our earth, animals, and humans. I know it can be challenging, but in these times we must choose morality and heart over fear based profits before it is too late.

Thank you,

Erin D'Ambrosio
Sent from my iPhone

Levi, Andrew (COMM)

From: annettedarmata@gmail.com
Sent: Monday, July 10, 2017 5:19 PM
To: MN_COMM_Pipeline Comments
Subject: Shut down Line 3

To: Jamie MacAlister, Pipeline.Comments@state.mn.us

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I am from: San Antonio, Texas. I have relatives and friends in Minnesota whose health would be directly, adversely effected by the proposed Line 3.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground for the reasons listed below.

Sincerely,

Dr. Annette D'Armata

TRIBAL IMPACTS

- The United Nations international standard for projects that impact Indigenous Peoples is **Free, Prior and Informed consent**. Tribal consultancy after the project is already proposed and designed is not free, prior, and informed consent.
- Most of the issues specific to tribal people and tribal resources are **confined to a separate chapter** that attempts to provide "an American Indian perspective." They are excluded from the main chapters that assess potential impacts. This allows the EIS to **avoid drawing conclusions** about the impacts on tribal people. (Chapter 9)
- Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "**would have a long-term detrimental effect on tribal members and tribal resources**" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). **This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members**.
- Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "**are part of a larger pattern of structural racism**" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3).
- The DEIS concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) **But it also states that this is NOT a reason to deny the project**!
- Chapter 6 states that Enbridge's preferred route would impact **more wild rice lakes and areas rich in biodiversity** than any of the proposed alternative routes (Figure ES-10).

- Most of the analysis of archaeological resources in the path of the pipeline rely on **Enbridge's surveys**. For some reason, only 3 of their 8 surveys are available, and the 5 missing are the most recent! In those, Enbridge found 63 sites, but claims that only 3 are eligible for protection under the National Register of Historic Places. (5.4.2.6.1). Honor the Earth has had the studies we have been able to see reviewed, and there are numerous flaws in their methodology.
- The DEIS acknowledges that "The addition of a temporary, cash-rich workforce **increases the likelihood that sex trafficking or sexual abuse will occur**," and that these challenges hit Native communities the hardest. But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). What experience does Enbridge have planning and implementing an anti-sex trafficking program?

BIG PICTURE PROBLEMS

- Many of the environmental impacts and "plans" for minimizing them are drawn directly from Enbridge's permit application ("Enbridge would do this" and "Enbridge would do that") without any evidence of compliance or genuine consideration that maybe, just maybe, Enbridge won't follow all the rules. History shows that they continually violate permit conditions - we are working on compiling an enormous record of these violations. The DEIS should analyze the likelihood of compliance.
- **The Alternatives chosen for comparison to the pipeline proposal are absurd** -- for example, the only rail alternative assumes the construction of a new rail terminal at the US border, and thousands of new railcars to transport oil to Clearbrook and Superior. Enbridge would never do that. The only reasonable rail option would begin in Alberta. The truck alternatives are similarly unreasonable.
- **The "No Build" Alternative is not genuinely considered.** It is framed as "Continued Use of Existing Line 3" (Chapters 3 and 4), but nowhere is the "Shut Line 3 Down" option considered. There is no discussion of renewable energy, conservation, or the rapid development of electric car infrastructure. There is no assessment of the decline in oil demand. The entire study assumes that society needs X amount of oil, simply because Enbridge says they can sell it. That assumption ignores the massive fossil fuel subsidies and debts that make Enbridge's profits possible, and avoids the moral question of what is good for people and the planet. We know we must stop burning fossil fuels yesterday.
- There is zero discussion of how all this extra oil will go once it leaves Superior, Wisconsin. With 370,000 bpd of additional capacity, Enbridge will need a new pipeline departing its terminal in Superior. We know that they plan to build Line 66 through Ojibwe territories in Wisconsin, but they continue to deny this. Why isn't MN asking?
- The DEIS contains **no spill analysis for tributaries of the St. Louis River or Nemadji River**, where spills could decimate **Lake Superior** and the harbors of the Twin Ports.
- For calculations of impact, the lifespan of the new Line 3 is estimated at *30 years*. But Lines 1-4 are 55-65 years old! And hasn't the technology improved? The lifespan should be at least 50 years, a shorter lifespan is a clear indication that Enbridge themselves know that the fossil fuel era is coming to an end. In Honor the Earth's analysis, we have attempted to predict the impacts of this pipeline on the next 7 generations.
- This project is a further investment in a dying Tar Sands industry. Numerous international oil companies and financing institutions are divesting from the tar sands. Why should Minnesota invest in this industry? Why should our Nation be forced to deal with a bad idea in perpetuity.
- The DEIS assumes that the Koch pipelines to MN refineries get all their oil from Line 3, but the current Line 3 does not supply enough capacity for this (390,000 barrels per day), and we know that some of it comes from Line 81, which brings oil from the Bakken in North Dakota.

SPILL RISK

- The 7 sites chosen for spill modeling are not representative of the locations and resources put at risk along the entire corridor. A more thorough analysis of different locations is needed - for example, what about Lake Superior?
- There is no analysis on Enbridge's leak detection system, or their inability to respond quickly to major emergencies.
- Enbridge's response plans are highly guarded, and Honor the Earth's attempts to receive and review these documents has been blocked. What we can infer is that Enbridge relies on local first responders for their emergencies. They attempt to use the money they donate to communities along their corridors as proof that they have an integrated emergency response program.

The DEIS estimates the annual probability of different kinds of spills on the proposed route in MN:

- Pinhole leak = 27%
- Catastrophic = 1.1%
- Small Spill = 107%, Medium = 7.6%, Large = 6.1%

So in 50 years, we can expect **14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic**!

ABANDONMENT

- The risks of pipeline abandonment are not adequately assessed. For example, there is no discussion of landowner property values and the effect that an abandoned pipe could have on them, especially if there is indeed "**legacy contamination**" on people's land.
- Impacts on human and natural resources due to the abandoned Line 3 are anticipated to be minimal in the near term but could be significant in the longer term, absent effective monitoring, adaptive management, and the timely introduction of mitigation measures. There is not much information on what these mitigation and management plans are.
- If there is a dearth of surrounding soil, or if the cover for the pipeline is relatively shallow, the pipeline bears more of the load and, all things being equal, is more likely to fail. We know from experience that there are numerous areas where the pipes are exposed and near the surface.
- There is also no discussion of**exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied**. "When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high" (8.3.1).
- We know that the abandonment of the existing line 3 is bad. But there is also no mention of **the abandonment of the other 3 ancient pipelines in Enbridge's existing mainline corridor (Lines 1, 2, and 4)**, which we expect Enbridge will very soon attempt to abandon. Nor is there any discussion of the **abandonment of the NEW Line 3** in the future.
- The DEIS states that it will be very risky to remove and clean up the existing Line 3 because the pipelines are very close together. "The distance between pipelines within this corridor varies, but they are generally 10 to 15 feet apart" (8.3.1). This is not consistent with our extensive observations and physical measurements on the land. Also, don't they dig up pieces of pipe for maintenance purposes all the time? **Why is it suddenly risky?**
- The DEIS simply states that "Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage,and mitigate historically contaminated soils and waters" found during the abandonment or removal of the existing Line 3 (8.3.1.1.1). **We want to see that plan**.

CONSTRUCTION AND RESTORATION

- Chapter 2, "Project Description" states that Enbridge has requested a 750-foot route width (375 feet on each side of the Line 3 Replacement pipeline centerline). They claim only 50 of the 750 feet would remain a permanent right-of-way (2.1) All of this width should be included in an impact analysis because Enbridge's environmental protection plan and record is abysmal.
- Their "restoration" plans for restoring the landscape around the corridor after installation is laughable. Enbridge's process for restoring wetlands includes dumping the now compacted (and probably de-watered) soil back in the trench, sowing some oats and "letting nature take it's course". This is not how you re-establish a wetland. Studies have shown that even with proper restoration practices, it can take decades to get back to the biological functioning it was at prior to disturbance. When Enbridge stores the soil, they will also be driving equipment over it- which compacts it, they also plan to compact the soil after refilling the trenches. This is not good for the soil.
- Cathodic protection, which applies electric current to the pipeline in order to protect it from corrosion caused by nearby utility lines, **will not be installed for up to 1 year after pipeline construction** (2.3.2.3). Lack of cathodic protection is what caused many pinhole leaks in the Keystone pipeline, almost immediately after construction. The proposed route for Line 3 follows a utility corridor for much of its length - this is a recipe for disaster. Even the US Army Corps's rubber-stamp approval of the Dakota Access pipeline required the cathodic protection system to be installed within 6 months!

ECONOMIC IMPACTS

- Chapter 5, "Existing Conditions, Impacts, and Mitigation" states that Line 3 will create ZERO permanent jobs. Enbridge's application states that "existing operations staff would be able to operate the [pipeline] and that few additional employees would be hired to assist the staff" (5.3.4).
- Also in Chapter 5, the DOC assumes "all workers would re-locate to the area" and ZERO construction jobs will go to Minnesotans. The pipeline would have "no measureable impact on local employment, per capita household income, median household income, or unemployment" (5.3.4).
- The DEIS does not acknowledge that when the existing Line 3 shuts down, Enbridge will stop paying taxes to the MN counties along the mainline corridor. For many of these poor counties in the north, revenue from Enbridge's property tax makes up a significant portion of the county budget. There is also the issue that Enbridge is now in the process of appealing years of back taxes, burdening two of the poorest counties in Minnesota with over $10 million due.

CLIMATE CHANGE

- The DEIS acknowledges that Line 3 would contribute to climate change. It analyses 3 different types of emissions - direct, indirect, and lifecycle. Direct emissions are those that the pipeline infrastructure itself emits, and these are very small. Indirect emissions are those created by the power plants that provide electricity for the pipeline's pumping stations, and these are significant. Lifecycle emissions are those caused by the refinement and eventual use of the oil, and these are massive. Line 3's direct and indirect emissions alone would be 453,000 tons of CO2 per year. Over a 50-year lifespan, that would cost society an estimated $1.1 billion. (Executive Summary p.18).
- The lifecycle emissions of Line 3 would be 193 million tons of CO2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3)
- The DEIS does not discuss the unprecedented challenges of human casualty, displacement, conflict, natural disaster, biodiversity loss, etc, that climate change is causing, or the consensus from the scientific community that we must leave fossil fuels in the ground. It also fails to acknowledge that across the planet, Indigenous people are disproportionately impacted.

The DEIS affirms that the MN PUC can only grant the permit if "the consequences to society of granting are more favorable than the consequences of denying the certificate." Regardless of whether or not Enbridge can find customers, the DEIS shows that the negative impacts far outweigh the benefits. So our position remains:

NO PERMIT. SHUT DOWN LINE 3.

Sent from my iPhone

From: Steve Dahnke
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137
Date: Monday, June 05, 2017 9:40:07 AM

Dear Ms. MacAlister,

In regard to the Line 3 Replacement Project, I would like to voice my overwhelming support to replace this aging infrastructure. We as a nation rely on the efficient availability of energy to sustain our quality of life and to also search out new emerging energy efficient technologies.

From a safety and efficiency perspective a pipeline can not be topped. It is well known, the energy will make it to market where the demand is in place. Beyond the economic impact to the State, there is also an economic benefit to the nation. A quick search of pipelines in MN shows the State as a major corridor for many transmission pipelines. These pipelines provide multitudes of benefits to MN from good paying full time jobs, construction jobs, support manufacturing, tax base for Counties and State and energy security much of the world does not enjoy. MN is, and should continue to be an Energy State.

Those in opposition also rely on energy and offer no vialble alternatives which meet the same market demands as the Line 3 Replacement Project. The "not in my backyard" mindset does little to reduce demand of the raw material Line 3 Replacement will carry. Viable btu for btu substitutes for petroleum are nowhere near as efficent in the energy market place, nor can they replace the components of petroleum as a raw material for the base stocks required for the products each and every Minnesotan consumes on a daily basis from clothing to fuel. There are risks asociated with any infrastructure, but the advancements in engineering, construction and maintenance practices have been proven effective when applied as designed.

All corporate infrastructure projects in todays business environment perform in depth due diligence toward the environmental impacts of the proposed projects. Enbridge is no different. The amount of consultation, study and analysis for these projects is staggering with many routes and alternatives presented. The considerations for each route are debated prior to selection of any preference with diligence applied to all the factors presented.

It is my firm belief the Line 3 Replacement project is a vital piece of infrastructure which has had empirical analysis prior to route selection and submission to the State Public Utility Commission for application. To that end, my message to the Minnesota Dept of Commerce is to review and weigh all analysis, I believe the diligence presented by Enbridge will prevail.

Sincerely,

Steve Dahnke
1552 White Pine Trl
Cloquet, MN 55720
Mnspd1960@gmail.com

Levi, Andrew (COMM)

From: Steve Dahnke <mnspd1960@gmail.com>
Sent: Sunday, July 09, 2017 10:40 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 DEIS

In regard to the L3 replacement DEIS;

There is a vast bank of opinion on the environmental impacts of this project. There are proponents and opponents. There are benefits and detriments. But there is one thing that can not be argued. From an overall impact per barrel, of major oil producing nations, from well to wheel, there is no place, world wide more environmentally responsible, nor more responsible for the safe execution, construction and operation of a crude oil pipeline to supply the demand for petroleum based commodities than North America. The regulations and processes required in the North American energy industry are without fail leaders in their fields. Opponents will state the movement of crude through MN will damage the environment. What they don't take into consideration is the global impact if the supply is not derived in North America. The impacts to environments around the globe will exponentially suffer if the demand for crude is satisfied outside of North America. Environmental and operational safety statistics from other global oil producing regions pale in side by side comparisons.

Projections of global population growth show a steady increase. Each and every person contributing to the demand for commodities derived from oil base stocks, will drive production, transport and supply based economic outcomes. There are 2 available scenarios when it comes to protecting environments world wide. Reduce demand and build the necessary infrastructure in North America.

Every infrastructure project in MN is subject to strigent regulations which in most cases, leads the nation. Industry is fully aware of these regulatory requirements long before a project is proposed. The route, the design and the feasibility all contribute to a decision to apply for a permit. Any industry in MN faces certain regulatory denial of the due diligence required is not accepted as fact. For those suggesting other routes or questioning the need for the Line 3 replacement, they simply have not put forth anywhere near the level of route analysis, design scope or the fesibility of the project prior to offering viable alternatives.

Enbridge would not be investing billions of dollars in the replacement project if the demand for the commodity was absent. The global demand is there. The global supply is in place. The question is; what transportation method tops the list as the most environmentally responsible for the global market place? Without question, pipelines. When you analyze the global statistics and environmental requirements, there is no argument North America tops the list. When you break these same issues down by State, there is no arguement, MN tops the list as the most environmentally responsible site for this infrastructure project.

To this end, I am in full support of the route selected by Enbridge, as the most feasible route to transport this global commodity through MN.

Steve Dahnke

Levi, Andrew (COMM)

From: Vicki Stute <vstute@dcrchamber.com>
Sent: Monday, July 10, 2017 10:30 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Letter of Support
Attachments: Line 3 Letter of Support - DCR Chamber.pdf

Attached please find a letter of support for Enbridge's Line 3 project proposal. Please contact us with any questions. Thank you.

Vicki Stute
Vicki Stute, President
Dakota County Regional Chamber of Commerce
3352 Sherman Court, Suite 201
Eagan, Minnesota 55121
D: 651.288-9201
P: 651.452.9872
F: 651.452.8978
vstute@dcrchamber.com

dakōta county regional
CHAMBER OF COMMERCE

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dakōta county regional
CHAMBER OF COMMERCE

July 10, 2017

Ms. Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101

Dear Ms. MacAlister,

Dakota County Regional Chamber of Commerce is committed to building a stronger regional business community. We steadfastly serve the cities of Eagan, Farmington, Lilydale, Mendota, Mendota Heights, Rosemount, Sunfish Lake, and West St. Paul, along with Castle Rock, Empire, Eureka, and Hampton Townships. We are the influential voice to champion economic growth for business in Dakota County.

We are writing today to urge the Department of Commerce to finalize its regulatory review of Enbridge's Line 3 Replacement Project and it further along toward approval. This project has been given significant regulatory review, with the cooperation of the proposer and with multiple hearings for public input.

Line 3 replacement is a project of statewide benefit. Minnesota's energy economy is strong and diverse. Dakota County has a refinery that provides excellent jobs to Minnesotans from Dakota County and beyond. Minnesota is leading the nation in renewable energy. The replacement of Line 3 is a private investment in Minnesota's diverse energy industry that is good for the region and the state as a whole.

We urge the Department of Commerce to advance the regulatory review and approval of the Line 3 replacement project as proposed.

Sincerely,

Vicki Stute
President

3352 Sherman Court, Suite 201, Eagan, MN 55121 | 651.452.9872 | www.dcrchamber.com

Levi, Andrew (COMM)

From: Jan Dalsin <jandalsin@gmail.com>
Sent: Monday, July 10, 2017 11:58 PM
To: MN_COMM_Pipeline Comments
Subject: Docket Numbers CN-14-916 and PPL-15-137

July 10, 2017
To: Minnesota Department of Commerce
Re: PUC Docket Numbers CN-14-916 and PPL-15-137

Based on this DEIS submitted for comment, I believe that the State of Minnesota must deny the permit requested by Enbridge.

A sufficient DEIS must include the alternative possibility of shutting down the current Line 3 pipeline, responsibly removing it, and constructing no alternative pipeline.

A sufficient DEIS must include evidence that the process meets the international standard of obtaining the Free, Prior, and Informed Consent of impacted tribal communities, as outlined in the U.N. Declaration on the Rights of Indigenous People — both in Minnesota and at the point of extraction in the Alberta tar sands, as well as en-route.

A sufficient DEIS must include critical information, e.g., spill volume estimates (remember the Kalamazoo River in Michigan is not yet satisfactorily cleaned up by Enbridge), an analysis of the economic need for the pipeline, an analysis of the current and projected effects of climate change as relates to a water-rich environment such as exists in northern and central Minnesota, and just how Enbridge is financially equipped to be responsible for keeping our Minnesota waters and surrounding environment wholesome, and able to support our peoples into the distant future.

And a sufficient DEIS would be transparent in its expectation that the scales of justice need to favor of the people of Minnesota, the environmental, the cultures and ways of life — that these are paramount over the wishes of a foreign company to come through our neighborhood with its product destined for foreign shipment out of our country.

So far, this DEIS is not sufficient to enable a good outcome for Minnesota.

Thank you for accepting my comments.

Lois Dalsin
St.Paul, Minnesota 55105

Levi, Andrew (COMM)

From: suzanne lindgren <suzanne.lindgren@gmail.com>
Sent: Wednesday, July 05, 2017 2:38 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3: CN-14-916 and PPL-15-137

Re: Docket Numbers CN-14-916 and PPL-15-137

Hello Jamie MacAlister et. al.,

I am a Minnesota resident living near our eastern border. Enbridge's proposed plan to replace and expand Line 3 would increase the amount of oil running beneath tributaries to our local federally-designated Wild and Scenic River, the St. Croix.

I support the replacement (not expansion) of Line 3 because an old line is more likely to leak. I do not support the expansion, which would increase any damages caused by an oil spill within the watershed.

We must protect our clean water for ourselves and future generations.

Thank you,
Suzanne Lindgren Dammann
Scandia, Minnesota

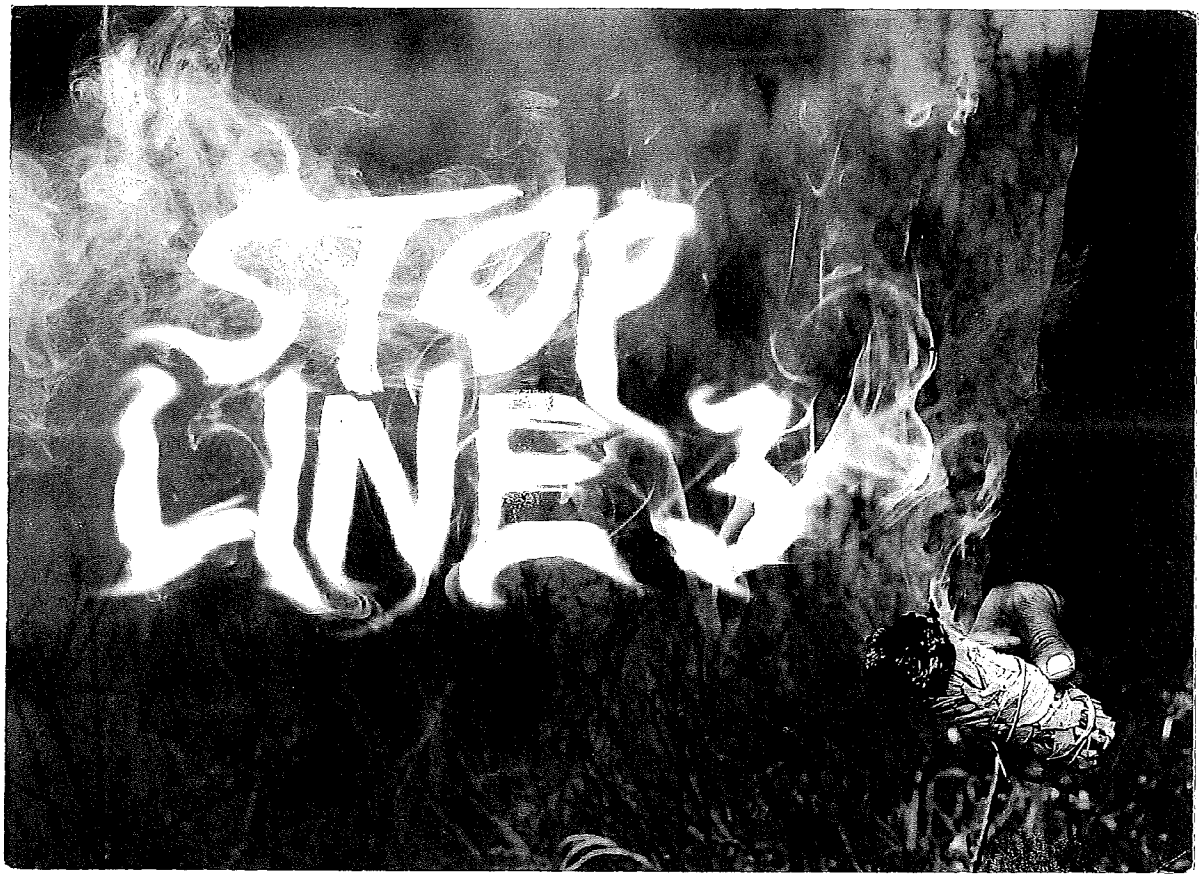

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

SAINT PAUL MN
17 JUL 2017

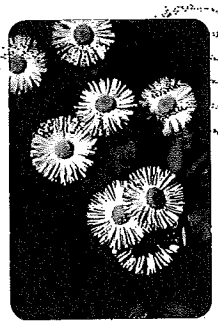

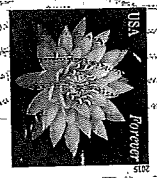

Please reconsider!
Seize this opportunity
to do right by our
tribal brothers and
sisters. Jamie, you can
take the initiative in
their behalf. Do it! you
be the one to break the
mold of the white-man's
disrespect and disenfran-
chisement of our native
peoples. I will
be your
biggest
admirer!

SINCERELY,

John Darlington Mpls. MN
6013 14th Ave S 55417

Thank you.

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Levi, Andrew (COMM)

From: Mike Darookie <mikedatookie@hotmail.com>
Sent: Friday, June 23, 2017 7:14 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge

Dear Ms. MacAlister,

I do not want this poison on my land! It is time for renewable energy . Please stop destroying the planet. Pipelines are not safe and they all leak. No line 3. Thank you.

Sincerely,

Mike Darookie
212 Main St N
Blackduck, MN 56630
mikedatookie@hotmail.com

Levi, Andrew (COMM)

From: shannon darsow <sdarsow@gmail.com>
Sent: Sunday, July 09, 2017 7:54 PM
To: MN_COMM_Pipeline Comments
Subject: Public comments on pipeline 3

Please Do Not permit pipeline 3!

At a cost of $7.5 billion, Line 3 is the **largest project in Enbridge's history**, and would be one of the largest crude oil pipelines in the continent, carrying up to 760,000 barrels toxic, Alberta tar sand oil PER DAY. Enbridge calls this project a "replacement" because they already have a Line 3 pipeline in their mainline corridor, which transects Northern Minnesota with 6 pipelines in it. But don't be fooled – this is a new pipeline. The new pipe would be larger (36" instead of 34"), carry nearly twice the volume of oil, and establish an entirely new corridor through Northern Minnesota. That is NOT a replacement. This route is the same one Enbridge had earlier proposed for the "Sandpiper", a 30" pipeline that would carry 375,000 barrels of crude oil per day from the Bakken oil fields of North Dakota across Minnesota, through Hubbard County to Superior Wisconsin. The Sandpiper pipeline proposal was withdrawn by Enbridge in August of 2016.

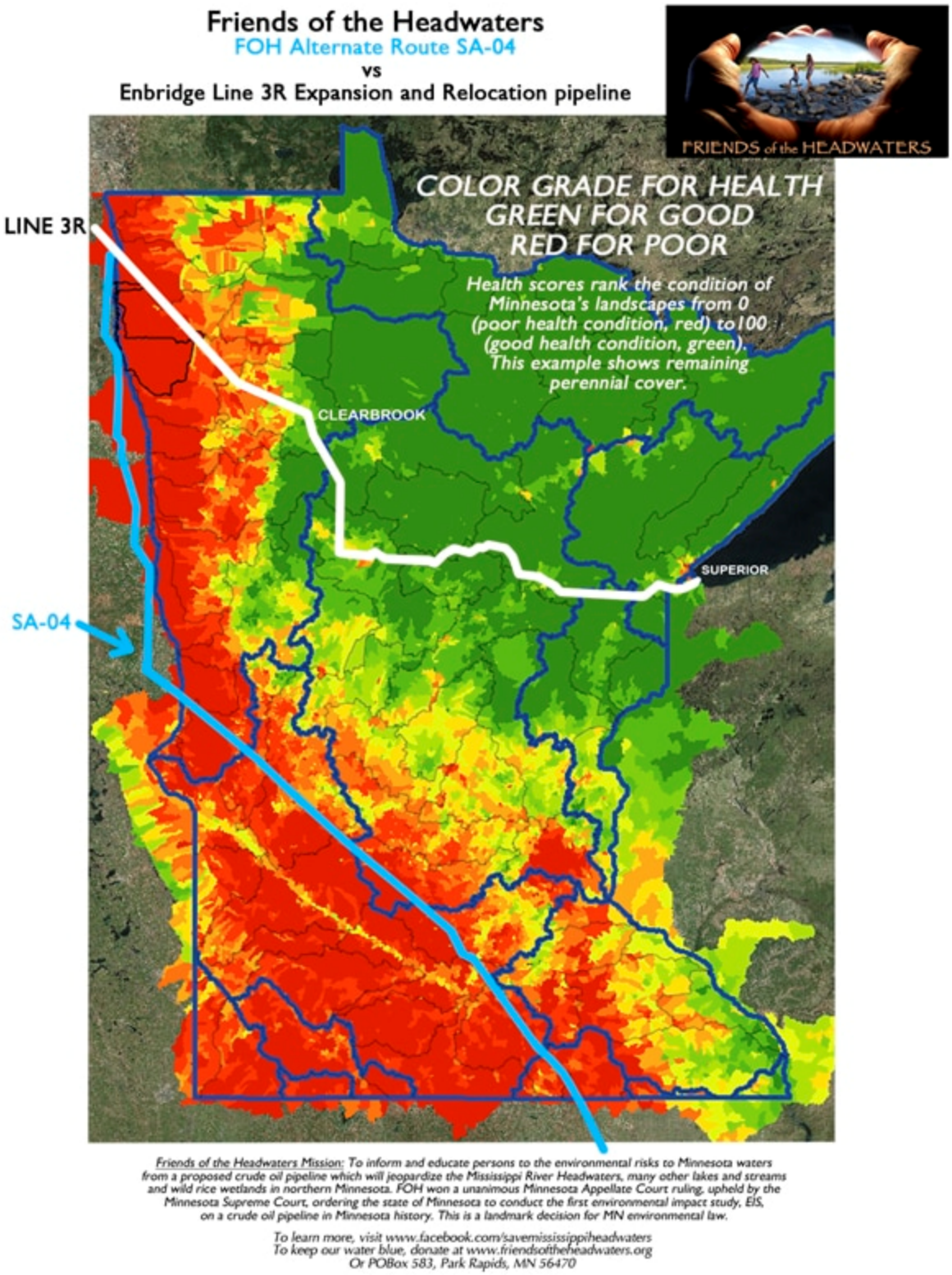

This route jeopardizes Minnesota's natural resources. The map clearly shows how Enbridge's proposed route (white line) traverses our best quality lakes, rivers, wetlands and forest ecosystems. NOT anti-pipelines. FOH has long advocated for alternative route SA-04 (light blue line) which avoids our cleanest water resources and crosses land less permeable and better suited for pipelines.

The risks posed by Enbridge's proposed route are many:

1. - This pipeline route crosses the clearest lakes area in MN based on the Census of Water Clarity (U of MN Water Resources Center).

2. - This pipeline route crosses an area with the highest susceptibility for groundwater contamination impacting drinking water aquifers (MPCA map).
3. - The pipeline route crosses the wild rice lakes area. According to the DNR, MN supplies 50% of the worlds hand-picked rice annually.
4. - The pipeline route crosses wetlands critical to waterfowl and other wildlife (DNR).
5. - The proposed route would cross 8 state forests (including the Mississippi Headwaters SF), 3 wildlife management areas, 13 trout streams (including the Straight River), as well as the North Country Trail.
6. - Line 3 would cross the Mississippi River twice in Minnesota. This river is a valuable source of drinking water for many cities on its 2,552-mile journey to the Gulf of Mexico, including Minneapolis and St Paul. 3.8 million gallons of water flow from Lake Itasca into the headwaters every day.
7. **A few more facts:**

- - The corridor will be covered with snow and ice for the long winter season. The Poplar pipeline spill (31,000 gallons) in the Yellowstone River in January of 2015 caused drinking water problems in Glendive, Montana. Clean up had to be postponed until spring. Imagine the effects of a similar spill in our Mississippi.

- PER DAY, this pipeline will carry 760,000 barrels of Alberta tar sand oil, also called "dilbit", the industry name for diluted bitumen - also known as "Cold Lake Blend". Don't be fooled. It's still tar sands oil. That's almost 32,000,000 gallons/day through our headwaters.
- Enbridge's pipeline spill of 850,000 gallons of tar sands oil in Michigan in 2010 polluted nearly 35 miles of the Kalamazoo River and has become one of the costliest spills ($1.2 Billion) in US history.
- The National Academy of Sciences Report on Diluted Bitumen (Tar Sands Oil) final finding is "diluted bitumen is virtually impossible to clean out of a water-based environment". ***WHY? BECAUSE IT SINKS!***

From: Jeffery Daveau, Sr
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137
Date: Monday, June 05, 2017 11:40:04 AM

Dear Ms. MacAlister,

The best and safest means of sending fuels cross county is by pipeline and I would encourage passing any legislation or approving any permits to allow this to be done.
Thanks for your consideration.

Sincerely,

Jeffrey Daveayu Sr.
6260 Seville Rd
Saginaw, MN 55779
mnstang@aol.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
SANDRA DAVEY	218-240-1752	sldavey@live.com

ADDRESS
5162 Gortin Rd

CITY, STATE, ZIP
Duluth, MN 55803

COMMENTS
Nothing lasts forever - replace now - before there are problems.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Alexandra David <alexandra.s.david@gmail.com>
Sent: Sunday, July 09, 2017 1:44 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment on Docket # CN-14-916 and PPL-15-137

To whom it may concern:

As a landowner of over 50 acres and 1500 feet of lakeshore on Roosevelt Lake, in Outing, MN, I stand in opposition to Enbridge's proposed route of pipeline 3. I urge the state of Minnesota to consider an alternate route so that we may protect the future of Minnesota waters.

Landowners, environmental and tribal groups oppose the project because of the risks of oil spills in sensitive areas of northern Minnesota, including the Mississippi River headwaters region and lakes where tribal bands harvest wild rice. We also oppose the project because it would carry Canadian tar sands crude contributes more to climate change than other oil.
The proposed pipeline would cross more wild rice lakes than any other proposed route.

This area has the highest concentration of such lakes, the most pristine aquatic ecosystems and the shallowest aquifers, the most delicate soil types and other environmental features. Our wild rice beds, lakes, and rivers are precious, not just to Indians but to those who value the natural beauty and resources that make up a thriving economy Up North — and for many, a summer place to live — in Minnesota's tourism industry. Regional fisheries generate $7.2 billion annually and support 49,000 jobs. The tourism economy of northern Minnesota represents $11.9 billion in gross sales, or 240,000 jobs.

According to a Minnesota Environmental Partnership survey this year, 60 percent of Minnesota opposes tar sands pipelines? Why? It's one of the dirtiest and most greenhouse gas-intensive fuels on the planet. A recent National Academy of Sciences report concluded that spilled tar sands oil is extremely difficult, if not impossible, to clean up and that U.S. communities are generally unprepared for spill response.

This pipeline could devastate our environment and local communities. Please consider an alternate route.

Kim and Nicolas David
Jonathan Eichten and Alexandra David

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Ryan Davies	218-929-0610	
ADDRESS: 21748 Airport Road		
CITY, STATE, ZIP: Grand Rapids mn 55744		

COMMENTS: Time to get this project started.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Grace Davies <gracedavies1@gmail.com>
Sent: Monday, July 10, 2017 7:18 PM
To: MN_COMM_Pipeline Comments
Subject: Comment on Line 3

Dear Jamie MacAlister,

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I am from Minneapolis, Minnesota.

The Line 3 Pipeline concerns me because it threatens fresh water in my community and Lake Superior.

The DEIS concerns me because I live here and am affected by this decision. This pipeline is not needed and has the potential to cause irrevocable damage to our precious water.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Sincerely,
Grace Davies

Cover Page

To: Environmental Review Manager

#: 651 539 - 0109

From: Karen Davis
7 Sather CT SW
Pine Island, MN. 55963

Topic: Public Comment: Line 3 Project
(CN-14-916 & PPL-15-137)

To whom it may concern,

Below are my questions and comments related to the Line3 Project Draft EIS Public Meeting:

1. What measurement/algorithm are you using to determine risk?

2. Based on the measurement of risk, what is the threshold where the risk outweighs the need?

3. Monetary penalties for companies who pollute simply is not a big enough consequence. These companies simply pay the penalty and continue to develop unreliable systems which will inevitably leak. These penalties do not pay for 100% of the clean-up. These companies have also shown that they cannot reliably clean up a spill. Most often they simply cover it up. This is not acceptable. These companies, particularly repeat offenders, like Enbridge, cannot be allowed to continue to pollute our lands, and remain in business to only pollute again.

4. The map on page 10 of your EIS draft does not accurately reflect all of the threats to MN waters and water-ways. This inaccuracy is a manipulation of data to make the addition of these pipelines seem less of a threat. This is a manipulation of truth. All nearby water-ways should be reflected in the map.

5. I don't believe that state and federal lands should be sold, leased, or even given to corporations for use for any purpose. This land belongs to the people of the MN and of the United States, and in some cases

   The Native Americans, and it should be the people who decide how it is to be used. There should be a vote by the people as to whether or not a pipeline should be allowed. Furthermore, if the pipeline is voted in, it should be the people who determine how those resources should be used. It should not be sold internationally, it should be used by the people of MN and of the United States.

6. Profit cannot be the first and only measure of value. We must place first and foremost the quality of living for people, animals, and the land. We must remain in balance to ensure our health and the health and well-being for future generations. We have an obligation to live morally and ethically. And if we find, like in this case, where morals and ethics collide with profit, we must choose the greater good. We must choose life, we must choose health, we must choose clean water for even a hope for a future.

Karen Davis
MN resident

Levi, Andrew (COMM)

From: cjdavismn@comcast.net
Sent: Monday, July 10, 2017 1:19 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Replacement - Comments on Draft Environmental Impact Statement

Attn: Jamie MacAlister, Department of Commerce, Environmental Review Manager

As a community outreach consultant for Enbridge's Minnesota pipeline projects. I have had the privilege of meeting thousands of people who need and want safe energy transportation across this great state.

While Enbridge technical experts can provide much more robust information, there are a few topics I want to address as a Minnesotan who would like to see the Line 3 Replacement Project Environmental Impact Statement finalized and deemed adequate in a timely manner:

- With its Line 3 Replacement Project, Enbridge aims to **replace an existing piece of infrastructure to more safely deliver energy we Minnesotans use every day**. Line 3 delivers oil to Clearbrook and from there Minnesota Pipe Line Company pipelines bring it to the Twin Cities where it is refined. The gas in my car likely came to Minnesota in an Enbridge pipeline.
- Like all Minnesotans, Enbridge **shares a common interest and commitment to protecting our waters**. Enbridge pipelines have safely transported oil through and coexisted in northern Minnesota for more than 65 years. During that time, our tourism has continued to flourish, wild rice has been harvested, property values remain strong and the cleanest portions of Mississippi River and its headwaters have flowed directly over Enbridge pipelines. Enbridge employees in Minnesota and elsewhere work 24/7/365 to keep it that way.
- No one wants a major spill in Minnesota like that took place in Marshall, Michigan. Enbridge learned **a great deal from the Kalamazoo River spill and is a better, safer, culturally-changed company**. Safety truly is their top priority – I have never worked for a company that puts so much emphasis on safety.
- **While Enbridge strives for zero releases, spills can be cleaned, waterways restored and communities made whole**. I know, my son has lived in Kalamazoo for the past 4 years. I've visited the area and spill site and have talked to elected officials in the area who are extremely pleased with Enbridge's commitment and clean up results. Check out the YouTube video "A river returns to its People".
- **In Michigan, Enbridge replaced and deactivated in place the entire Line 6b** that ruptured. Because Line 3 has the same external coating as Line 6b, if we really want to protect our state while enjoying the many quality of life and financial benefits we get from having pipeline infrastructure in our state, we should support the company's plans to replace Line 3.
- Once the replacement pipeline line is operational, the existing Line 3 will be permanently **deactivated in place – next to 5 or 6 other Enbridge pipelines** (some of which are only a few years old). Like all its other pipelines operating next to it, Enbridge will monitor and maintain the deactivated Line 3 right of way.
- **Enbridge remains responsible for a deactivated pipeline forever. Landowners are not responsible.**

- The deactivated Line 3 will be cleaned; then cut, capped and disconnected from the system – **adhering to all statutes, rules and regulations to protect the public, the environment, land use and cultural resources.**
- **Deactivation in place is safe, very common (the most widely used method) and reduces impacts to people and the environment.**

I mentioned, I've had the privilege of meeting thousands of other Minnesotans who need safe energy transportation. Since 2014, my team has had more than 1,200 meetings and/or presentations along the route. I've had dozens of one-one meetings with county, city and township leaders in every county along our Preferred Route. I've given presentations to groups as small as 5 or 6 or as large as 150+. When you get out along the route and talk to those most directly impacted by this project, you get a very different picture than what you read in the media and hear in this public meeting setting. There are many, many people who quietly support this project, but who do not want to stir the pot, don't feel comfortable speaking in a public setting or quite honestly aren't as emotionally engaged in this issue as those who are opposed.

They are the quiet voices of:

- the 95% of **private landowners** that have signed easement agreements
- **business owners** –even in places like Park Rapids -- that know the economic boost they enjoyed the last time a pipeline or electric transmission line construction project brought customers to their hotels, restaurants and stores
- **veterans** (like my recently passed 100-year old WWII vet grandpa, my father and father-in-law) who have served this country and would love to see us rely completely on North American energy rather than ship it in from countries that are unstable, don't share our values and put American troops at risk
- **government officials** in Northern Minnesota counties who need their portion of the estimated $19.5M in additional MN property taxes a replaced Line 3 would generate to strengthen their tax base and keep their levies in check or pay for needed projects such as road, bridge or school improvements
- **citizens, emergency responders** and others who need to add extra time to their everyday trips or have back up plans in case an oil train slows their travel or causes unexpected delays

I've talked to each of these types of people and have heard countless positive, personal stories as to why Minnesota pipeline projects are important.

Thus, it is without hesitation that I am hopeful that the Environmental Impact Statement for the Line 3 Replacement Project is completed and deemed adequate in a timely manner and that the same holds true for the Certificate of Need and Route Permit. I and the thousands of Minnesotans I've spoken to in the past four years want safe energy transportation in our state.

Christine Davis

Levi, Andrew (COMM)

From: Andrea K. Simonson <aksimonson@gmail.com>
Sent: Monday, July 10, 2017 11:53 PM
To: MN_COMM_Pipeline Comments
Subject: NO for MN

I am writing to expressing my concern and opposition to Enbridge installling another pipeline through Northern Minnesota. This company has a concerning safety record. I am concerned about leaving the existing line 3 pipelin in the land to rot and I am concerned about the new pipeline putting extensive wild rice lakes in jeopardy. WE are moving away from oil. We do not need the pipeline.

As a lifetime Minnesotan who was born in Polk County, this is bad for our beautiful Minnesota lakes, please to not allow this project. As a nurse, I have to be worried about the health consequences of land being polluted if a spill occurs.

Sincerely,

Andrea Simonson Dean

Levi, Andrew (COMM)

From: Chelsea DeArmond <chelseadearmond@gmail.com>
Sent: Monday, July 10, 2017 2:28 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Draft EIS Comment

Dear Jamie MacAlister,

Thank you for receiving my comment on the Line 3 DEIS. Please include it in Dockets CN-14-916 and PPL-15-137.

I am a resident of St. Paul (Ramsey County). The Line 3 pipeline concerns me because I am one of millions of people whose drinking water comes from the Mississippi River, and I am concerned that Enbridge wants to pump the dirtiest oil in the world through the Mississippi headwaters.

My main concern with the Draft EIS is that it does not adequately address enforcement and compliance. The fact that Enbridge will begin construction on Line 3 in Canada this summer even though the Minnesota Department of Commerce has not yet granted a Certificate of Need for the project demonstrates disrespect for the regulatory process and recklessness toward the Minnesota communities and habitats they will put at risk.

This concern is of particular importance to me because I spent time tracking bills at the Capitol during this legislative session, and I learned that the oil and gas industry lobbied our state to specifically exempt pipelines from the certificate of need requirement (thankfully this provision did not make it into the final bill). This lobbying campaign is just one of many ways the company uses its vast resources to avoid regulations that are designed to protect Minnesota's natural resources and citizens from pollution and exploitation.

This concern is also important to me because I was at Standing Rock when law enforcement officers (including some from Hennepin County) were used to aggressively defend the DAPL pipeline construction (a project that Enbridge chose to invest in) instead of the people who had gathered to oppose it, even though the pipeline was in violation of its permits and the people were acting within their first amendment rights.

In spite of Enbridge's efforts to convince Minnesotans that the corporation cares about our communities and that their pipelines are safe, doing a quick Google search on Enbridge's safety and compliance record reveals a different story, including their responsibility for the largest inland oil spill in history—1.7 million gallons right here in Minnesota. In the case of Enbridge's notorious 1 million gallon spill in Michigan's Kalamazoo River, the National Transportation Safety Board found that Enbridge knew of the defect on this pipeline five years before it burst and chose to ignore it (http://www.upi.com/Business_News/Energy-Industry/2012/07/19/Michigan-lawmaker-wary-of-Enbridge-plans/UPI-61071342697865/).

When we know that Enbridge has a history of violating safety regulations, is actively lobbying our legislature to remove oversight, and has already begun construction, why should we trust their commitment to safety and transparency? The Draft EIS does not provide any assurance.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Levi, Andrew (COMM)

From: Tyler DeArmond <tylerdearmond@gmail.com>
Sent: Monday, July 10, 2017 2:46 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 DEIS comment

Dear Department of Commerce,

Thank you for receiving my comment on the Line 3 DEIS. Please include it in Dockets CN-14-916 and PPL-15-137.

I am a resident of St. Paul (Ramsey County) and I was proud of our state when Governor Dayton joined the US Climate Alliance. I am concerned about Enbridge's Line 3 Pipeline because increasing the flow of tar sands oil through sensitive wetlands and treaty territories directly contradictions the stand Minnesota has taken on climate change.

According to the Draft EIS's own conclusions, construction of the Line
3 preferred route would contribute to climate change to the tune of costing society an estimated $478 billion over its lifespan (5.2.7.3).

The Draft EIS does not realistically consider a no-build option, does not adequately analyze potential spills (e.g. none of the 7 sample sites include tributaries to Lake Superior), and devotes only 18 pages—out of thousands—to the responsibility for cleaning up the existing pipeline that Enbridge will abandon (Chapter 8).

My understanding is that certificates of need were first used in the healthcare field to address concerns that hospitals were inflating prices in order to compensate for excess capacity in saturated markets. This concern is very valid in the context of new pipeline construction, in a market where energy demand is decreasing and renewable energy sources are out-competing fossil fuels. Not only should certificates of need be required for pipelines, we should be insisting on the highest standards for certification.

Other than shear profit for a company that is not Minnesotan—not even American—in what sense is this pipeline needed? What need justifies running a pipeline with the dirtiest oil in the world through the Mississippi Headwaters, 17 wild rice lakes, and tributaries to Lake Superior? What need justifies perpetuating injustice to indigenous communities that already face overwhelming health disparities and inequities? What need justifies approving a project that will release millions of tons more hydrocarbons into the environment at a time when our state has committed to fighting climate change?

We have an opportunity to say no to multinational fossil fuel corporations who want all the rewards of bigger faster profits, without taking any of the responsibility.

When we say no to pipeline profiteering, we say yes to the value of our fresh water. We say yes to the leadership of First Nations people who are protecting this water. We say yes to permanent jobs for Minnesotans in the renewable energy sector. We say yes to our state's commitment to resisting climate change.

When we say no to this profit for a few, we say yes to what is priceless for us all.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Sincerely,
Tyler DeArmond

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Debra DeBruzzi	763-843-1167	debradebruzzi@yahoo.com

ADDRESS
5477 East Brewster Pass

CITY, STATE, ZIP
Fridley MN 55432

COMMENTS Re-Routing line 3 is the most logical approach to take as well as safest approach too. This is a 60 years old line that will need replacement to keep commerce flowing through Minnesota.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Rich Deere <rfarm@ruralaccess.net>
Sent: Tuesday, June 20, 2017 8:21 PM
To: MN_COMM_Pipeline Comments
Subject: comments

My name is Rich Deere, I just attended a meeting in Kittson County about the Line 3 Project. I farm and I am also the Svea Township Chairman. The pipe line runs through land I farm and the Sub Station in Donaldson MN is in our Township. I have nothing but positive feeling about the project as well as Enbridge. I, as well as our Township has had many dealings with Enbridge and look forward to continue the relationship.

Thank You
Rich Deere

Levi, Andrew (COMM)

From: Lorraine Delehanty <delelor@gmail.com>
Sent: Tuesday, June 27, 2017 2:32 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

docket numbers CN-14-916 and PPL-15-137

I oppose the construction of the Line 3 Enbridge pipeline. Yes, good unionized jobs are important to create.
But, the human and environmental costs of this large pipeline outweigh job gains, especially because some
of these jobs are temporary . Moreover , longer-term market developments make the project unwise for Minnesota.
The demand for oil is decreasing. It is a lose/ lose situation for both business and the environment in Minnesota.
The Economist magazine noted in “The Future of Oil” (November 26,2016) that the future of oil is in declline as
renewables gain in the market. Rather than another big dig into our environment, we can move forward into this
new era of renewables. This will protect our Northern Minnesota lands and people: both will be healthier. .
By going ahead with this pipeline, we would go in the opposite direction of the rest of the world while we contribute
heavily to poorer air, water and land. Put people and the land ahead of profit.

Sincerely,
Lorraine M. Delehanty
525 Lexington Parkway South, 106
St.Paul,Mn 55116

Levi, Andrew (COMM)

From: Peter <petrufka@hotmail.com>
Sent: Monday, July 10, 2017 3:05 PM
To: pipeline.comments@stste.mn.us
Subject: I say no to Embridge.

Thank you for taking my comment.

Please do not grant permission for the Embridge Pipeline project. We do need to maintain our energy infrastructure but Embridge does not offer a way forward. Minnesota would do better to invest in non fossil fuel economic resources. Embridge has a history of spills and is unwilling to remove their existing pipeline and place a new one because it is cheaper to lay a new pipeline in a new location. Corporations that profit from using and extracting public resources need to be responsible for what they build.

You have already heard all the reasons why not to grant the permission. Keep the water safe. Clean water not cheap gas. Fuel extraction is to costly and a short term investment in our economy. We need long-term solutions.

I say no to corporate entitlements and yes to clean water and alternative energy resources and indigenous sovereignty.

Peter DeLong
2420 32nd ave. S
Minneapolis, mn 55406

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Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Cheyenne Denn		
ADDRESS: 1363 80th Ave		
CITY, STATE, ZIP: Javerne, MN 56156		

COMMENTS

I support the line three replacement project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Heidi Denn		
ADDRESS: 29 2nd St. NE		
CITY, STATE, ZIP: Madelia, MN 56062		

COMMENTS
I support the line 3 replacement project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Austin Denn		
ADDRESS: 922 2nd St SW		
CITY, STATE, ZIP: Madelia, MN 56062		

COMMENTS

I support the line 3 replacement project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Docket numbers: CN-14-916; PPL-15-137

Levi, Andrew (COMM)

From: Jill and DuWayne <itascapines@msn.com>
Sent: Monday, July 10, 2017 12:18 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Comment

Enbridge plans to leave original line 3 in the ground without cleaning it up. They want a new and bigger pipe to go through pristine and sensitive areas in our state risking our clean waters that are critical to the well-being of our citizens and the financial stability of our state. They also risk the sacred wild rice beds of numerous tribes throughout Minnesota. Wild rice is irreplaceable if there is a spill. Enbridge's history of oil spills and behavior to area citizens protesting in our country make them an organization we have no business making further deals with. We in Minnesota do not need this oil and we should not risk our beautiful state and its people for it. Our waters are our greatest resource and source of enjoyment throughout several generations of our family living in Minnesota and for many other citizens. In the interest of our land and it's people this new pipeline SHOULD NOT be approved.

Sincerely, Jill Deering Dentz
6721 10th Avenue South
Richfield MN 55423

Levi, Andrew (COMM)

From: spderby@bellsouth.net
Sent: Monday, July 10, 2017 3:02 PM
To: MN_COMM_Pipeline Comments
Subject: Rail vs. Pipeline statistical analysis
Attachments: July 10.docx

Sent from Mail for Windows 10
Please see my attachment above for serious consideration

July 10, 2017

I want to address the lack of objective data for analyzing rail versus pipeline solutions. Please refer to the EIS Figure ES-4 on page 16 which clearly illustrates how much less spillage there is from Rail and Truck than from Pipeline. Spillage for rail (40 barrels or 1,688 gallons) is more than 12 times less per incident than pipeline (462 barrels or 19,412 gallons).

In the Executive summary on page 20 second paragraph states Applicant's preferred route ***would have the greatest long term effects on forests.***

The sub heading "Will shipping the oil by rail or truck affect movement of other commodities and pose safety risks?" It assumes an excessive number of trains 10 per day and train size 110 tanks per day as a fixed number. Safety could be addressed by running half the number of trains per day say 5 at a smaller size say 60-70 cars at a slower speed say 40 miles per hour which would take the number of spills and fatalities to a much cheaper and safer mode of transport (less derailments) for a commodity currently in low demand. This would also address the problem in the past of congestion for grain trains. One could even have Enbridge increase the number of workers per train from 2 to 3; an insignificant cost which would address the jobs issue and expedite train inspections for a much more affordable price.

As a former Class 1 Rail Freight Engineer for 23 years and field educator on hazardous materials handling for Railroad workers I cannot sugar coat the risks of rail transport, however I can see the dangerous inevitability of pipeline spills across the most pristine forests and waterways in Minnesota.

Sincerely,

Susan Derby

305-336-5786

Levi, Andrew (COMM)

From: Martin DeWitt <martindewitt47@earthlink.net>
Sent: Monday, July 10, 2017 5:11 PM
To: MN_COMM_Pipeline Comments
Subject: NO EnbridgeNew Line3

TO: Minnesota Department of Commerce
State of Minnesota

Dear Minnesota Department of Commerce,

I am opposed to the proposed new Enbridge Line 3 pipeline - for so many reasons.

These pipelines will cut through the heart of Minnesota's clearest and cleanest lakes, through vital drinking water aquifers, through the state's best wild rice waters, sacred sites, through valuable wetlands habitat, and near Itasca State Park and the Mississippi headwaters. The impact will be devastating! This new and larger pipeline in the same proposed Sandpiper corridor is a far greater threat to Minnesota because it will transport tar sands oil.

I wholeheartedly agree with and support "Honor the Earth's" assessment, quoting from their website, www.honortheearth.org: "...A new pipeline corridor crossing Minnesota's lake country would threaten pristine aquatic ecosystems, the largest wild rice bed in the world, the headwaters of the Mississippi River, and and the Great Lake Superior. One-fifth of the world's fresh surface water supply lies here, and it is worth protecting.

The new Line 3 would also pierce the heart of Ojibwe treaty lands, where members of signatory bands retain the rights to hunt, fish, gather, hold ceremony, and travel. It is our responsibility as water protectors to prevent this. We will not allow Line 3 to desecrate our lands, violate our treaty rights, or poison our water. Our wild rice beds, lakes, and rivers are precious – and our regional fisheries generate $7.2 billion annually, and support 49,000 jobs. The tourism economy of northern Minnesota represents $ll.9 billion in gross sales (or 240,000 jobs)..."

Thank you for the opportunity to offer comment as to why I feel the proposed "new" Enbridge Line 3 must not be approved.

Sincerely,

Martin DeWitt

_____
MARTIN DEWITT
1516 Jefferson Street
Duluth, MN 55812
828.507.0053

_____
MARTIN DEWITT
www.martindewittfinearts.com
828.507.0053

Levi, Andrew (COMM)

From: Charles Diessner <cfdiessner@gmail.com>
Sent: Monday, July 10, 2017 12:34 PM
To: MN_COMM_Pipeline Comments
Subject: Comments on the DEIS
Attachments: DEIS Letter.docx

Attention: Jamie MacAlister

Environmental Review Manager

Re: Draft Environmental Impact Statement (DEIS) for Application of Enbridge Energy Limited Partnership For a Certificate of Need and Route Permit for Line 3.

PUC Docket No. PL 9/ CN 14-916

PUC Docket No. PL 9/ PPL 15-137

Attached are our comments on the DEIS

Chuck Diessner
612-790-6565
cfdiessner@gmail.com

July 10, 2017

Chuck and Joan Diessner
24328 Hazelwood Drive
Park Rapids, MN 56470

Pipeline.Comments@state.mn.us
Attention: Jamie MacAlister
Environmental Review Manager

Re: Draft Environmental Impact Statement ("DEIS") for Application of Enbridge Energy Limited Partnership ("Enbridge") for a Certificate of Need and Route Permit for Line 3.

PUC Docket No. PL 9/ CN 14-916

PUC Docket No. PL 9/ PPL 15-137

My name is Chuck Diessner and my wife, Joan Diessner, and I live on Potato Lake in Park Rapids, Minnesota. We believe that the DEIS does not meet the PUC Requirements, as hereinafter defined, and is not adequate in a number of ways, including those described below.

The PUC, at its December 17th hearing, stated that everything possible must be done to insure that the new process, which includes the EIS, for considering the Applications (at that time both the Sandpiper Application and the Line 3 Application were still under consideration) is robust, comprehensive, high quality, independent, fair, avoids further delay as much as possible without sacrificing quality, involves the public and eliminates the likelihood of a future legal challenge (the "PUC Requirements").

1. The DEIS is not adequate and fails to meet the PUC Requirements in a number of the portions of the DEIS, including:

    a. Whenever the information relied on by the DOC in reaching its conclusions is based solely on information that was provided by Enbridge, that portion of the DEIS does not meet any of the PUC Requirements. The DEIS should designate all of those portions of the DEIS that are based on Enbridge's information and studies. Also, an independent study and analysis should be conducted for such portions of the DEIS and the DEIS amended

after considering the independent study, analysis, conclusions and recommendations.

b. Whenever conflicts of interest existed in the preparation of the DEIS. Include in the DEIS a list of all situations in the DEIS that involve a potential conflict of interest, and an explanation of (i) when and how these potential conflict of interests were addressed (ii) why they were allowed to exist without violating law and the PUC Requirements and (iii) why when such conflicts of interest were raised by the parties and public during the process proceeding the DEIS was there no response by the DOC or PUC.

Some of the conflict of interest situations include the following:

(1) The DOC hired John Wachtler, a former vice president of Barr Engineering, to head the Energy Environmental Review & Analysis division of the DOC that will be responsible for the preparation of the EIS. The hiring of Mr. Wachtler creates a conflict of interest for the

DOC to act as the PUC's agent because (i) while Mr. Wachtler was at Barr Engineering the company was an environmental consultant for the Applicants and one of its employees testified as an expert for NDPC in the Sandpiper contested hearing and (ii) Barr Engineering may still be an environmental consultant for Enbridge and may provide information on behalf of Enbridge regarding the EIS by studies, analysis, written information and testimony. Is Mr. Wachtler truly independent of Barr's relationship with Enbridge, its commitment to Enbridge and its work for Enbridge? Is Mr. Wachtler truly independent of his prior, current or future relationship with Barr.

(2) The prior work relationships between Enbridge and Cardno creates a conflict of interest and lack of independence in Cardno's role in

the preparation of the DEIS.

Additional conflicts of interest may exist with the other consultants hire by DOC or Cardno. These conflicts of interest prevent the DOC from satisfying the PUC Requirements.

2. Whenever the DNR and/or the MPCA did not participate in any portion of the DEIS that involves areas of their respective expertise, the DEIS does not satisfy the PUC Requirements and is not adequate. Those portions of the DEIS must identified and amended to include the DNR's and/or MPCA's methodology, information, analysis, conclusions and recommendations if different than those in the DEIS and the DEIS amended accordingly.

This is necessary because of the continual bias and prejudice shown by the DOC against the DNR and MPCA during the PUC's proceedings in considering the Applications, including the following:

a. In the DOC's initial report and recommendations to the PUC regarding which routes, route alternatives and system alternatives should be considered as part of

the Sandpiper process, it failed to include any of the serious concerns, objections and recommendations of the DNR and MPCA.

When the PUC became aware of such failure it told the DOC in a hearing that the PUC could not make a decision in the Sandpiper matter without taking into consideration the comments and recommendations of the DNR and MPCA, the two highest state agencies responsible for protecting our natural resources and environment and with the most expertise in these matters. The PUC then told the DOC to include the DNR's and MPCA's preferred system alternatives SA-03 and SA-04 and any other system alternatives those agencies recommended be considered as part of the process.

b. When the PUC decided in September, 2014 that an environmental report (the"ER") was to be prepared by the DOC, Chair Heydinger stated that it was necessary for the DNR and MPCA to assist in the development of the record by participating in the ER; that she respected their views; that the company's proposal has significant potential

environmental impacts and there may be better choices; and that she wanted the ER to "help assure that there is a robust record on what the potential environment consequences may be of different alternatives."

Notwithstanding those statements, the DOC did not include the DNR and MPCA in the preparation of the ER.

c. The DNR and MPCA complained to the DOC that the ER could not be used by them unless the DOC provided them with certain background information used to prepare the ER. The DOC refused to provide the information because they said it was confidential. This action by the DOC was again contrary to the PUC Requirements so that the ER would be available for everyone's use and to help create a robust record. As a result the ER was useless to the DNR and MPCA.

d. The conclusion by the DOC in the ER that applying equal weight to all the environmental conditions and natural resources regarding potential environmental impacts was not accepted by the DNR, MPCA and others as an

appropriate way to compare system alternatives in the ER. This approach by the DOC was contrary to the PUC Requirements.

3. The DEIS does not meet the PUC Requirements and is not adequate unless it includes all of the critical information upon which the assumptions, studies analysis, conclusion and recommendations are based. An example of such critical information is Enbridge's oil spill and release information which Enbridge does not want disclosed in the DEIS. The DEIS must be amended to include all critical information that impacts the DEIS in any way, including the oil spill and release information.

4. The DEIS can be relied upon only if the information provided by Enbridge and relied upon in the preparation of the DEIS is truthful. Enbridge was not truthful regarding the Sandpiper route when it said through out the process that the pipeline route had to be its preferred route through Clearbrook and terminating in Superior, Wisconsin. The EIS should set forth what actions the DOC has taken to verify the truthfulness of the information provided by Enbridge. At a minimum, Enbridge should sign an agreement acknowledging that all information provided by it for the preparation of the EIS and the consideration of its

Line 3 Application is provided under oath as truthful and is subject to penalties of perjury if it is false.

I want to thank you for considering my comments. If you have any questions, please email or call me.

Sincerely,

Chuck Diessner

Chuck Diessner
612-790-6565
cfdiessner@gmail.com

Levi, Andrew (COMM)

From: Martin J. Dietl <mdietl@foleymansfield.com>
Sent: Monday, July 10, 2017 1:24 PM
To: MN_COMM_Pipeline Comments
Subject: Opposing Enbridge Pipeline in Northern Minnesota

Dear Sir/Madame:

I am writing to oppose the Enbridge pipeline being put through the pristine waters of Northern Minnesota! There are already other paths in use that we should be following!

Thank you!

Martin Dietl
3309 47th Ave. So.
Mpls, MN 55406

Martin J. Dietl | Technical Training and Development Specialist | T: 612-216-0251 | F: 6
250 Marquette Avenue,
Suite 1200 | Minneapolis, MN 55401 | foleymansfield.com

Chicago | Detroit | Indianapolis | Kansas City | Los Angeles | Miami | **Minneapolis** | New York | Oakland | Portland |

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I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Lynn Differding	218-525-5699	
ADDRESS		
3447 West Tischer Rd		
CITY, STATE, ZIP		
Duluth, Mn 55803		

COMMENTS Glad to see local towns and jobs created

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Maggie Dimock <maggiepenguin12@live.com>
Sent: Monday, July 10, 2017 12:27 AM
To: MN_COMM_Pipeline Comments
Subject: Stop Line 3

Hello,

I have lived in Minnesota for the majority of my life and I am devasted to hear about the Enbridge Line 3 pipeline that is set to cross the Mississippi River. Should this pipeline be put in place, 18 million people across the United States could have their drinking water contaminated. If, and when, this pipeline leaks, there will be a devastating impact on our land and the people who live here.

Not only that, but the pipeline is set to cross 1855 treaty lands of the Ojibwe people - lands which have not been given up for this project. Not only does this go against the treaty rights granted to the Indigenous peoples of Minnesota, it goes against the UN Declaration on the Rights of Indigenous Peoples. This pipeline would cross their land, without their consent, and have a devastating impact on their lives, even before it leaks.

Minnesota has some of the cleanest waters in the country, and we have prided ourselves for our beautiful lakes, please do not threaten our land and waters. Everyone needs water to live, and we can not drink oil.

Sincerely,
Maggie Dimock

Levi, Andrew (COMM)

From: Carol Dines <cdinesmn@gmail.com>
Sent: Thursday, June 29, 2017 7:56 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

I am writing to voice my strong opposition to the Enbridge's Line Three Replacement Tar Sands Pipeline Project. I am stunned that we are risking the water quality of northern lakes and rivers for a Canadian company and their stockholders. Yes, this pipeline will provide jobs for two to three years, but the long term prospects do not justify the cost and risks of this project. We should be focusing our money and energy into clean energy jobs, retraining unemployed people in the north, and creating sustainable energy businesses. Moreover, the analysis itself is skewed. It does not talk about the possibility of shutting down the pipeline three, but presents trucks and alternative pipeline sights as the only possibilities. Enbridge has a terrible track record, and it is not a matter of if there is a spill but when. Costs of accidents, mitigation, and abandonment cost do not take into consideration the long term effects of such spills. I was in Mexico where they are suffering from terrible algae blooms caused by the BP spill. Although the site of origin was cleaned up, there is no way to clean up the long term effects on the ecosystem. The tide is changing, and most people believe in climate change. We want our local agencies to hear us — please do not support pipeline three.

Thank you,
Carol Dines

Levi, Andrew (COMM)

From: Ryan Dinesen <dine0024@d.umn.edu>
Sent: Sunday, June 25, 2017 11:00 PM
To: MN_COMM_Pipeline Comments
Subject: Support for Line 3 replacement

Dear Ms. MacAlister,

Simply, I support the Line 3 replacement. The old line is operating reliably and safely, but this new line would greatly enhance Enbridge's ability to operate. We all want the oil to stay in the pipe while working toward a low carbon future, but because that is not feasible right now, we must keep our current energy supply safe and operating. Please approve Line 3 with Enbridge's preferred route.

Regards, Proud Minnesotan

Sincerely,

Ryan D
608 Boulder Dr
Duluth, MN 55811
dine0024@d.umn.edu

Levi, Andrew (COMM)

From: Gary Dirlam, PE <gdirlam@charter.net>
Sent: Monday, June 26, 2017 10:38 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line Replacement

Dear Ms. MacAlister,

Enbridge line replacement should remove all old pipe. No abandoned pipe should be left in the ground. This is a waste of resources and can lead to future pollution from rusted out pipe that was not completely cleaned out.

Sincerely,

Gary Dirlam PE
13783 Kenwood Ct
Baxter, MN 56425
gdirlam@charter.net

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Trevor Thomas Ditthberner	651-788-2920	trevor.ditthberner@lejeune.sted.us
ADDRESS: 7504 115th St. North		
CITY, STATE, ZIP: St. Paul, MN 55110		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Siobhan DiZio <siobhandizio@gmail.com>
Sent: Tuesday, June 13, 2017 10:42 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Dear Enbridge, The people of Minnesota should have the right to know how you will address clean up efforts when disaster strikes. It occurs to me that Enbridge, like other transfer companies, probably did not or could not secure insurance to cover a spill. What will be your alternative? Declaring bankruptcy? If you have no intention of helping Minnesota out of your impending mess, you should have no right to put us at risk.
My family owns property near 71 between Itasca State Park and Park Rapids. My concern, however, is with the small family businesses in the area, resorts that have been passed from generation to generation. They depend on clean water to attract their guests. You are putting them in jeopardy. My concern is with the family farms. You are putting their water supply in jeopardy. What about the wild rice crops, among the best in the nation? Please reconsider your options and leave struggling populations alone. Siobhan DiZio

Sincerely,

Siobhan DiZio
1536 Arona St
Saint Paul, MN 55108
siobhandizio@gmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Todd Djonne	(218) 407-7913	tdjonne@local49.org

ADDRESS
13346 HWY 89 NW

CITY, STATE, ZIP
Bemidji, MN 56601

COMMENTS
Move this project ahead, time to put people to work! There are a lot of qualified operators ready to work!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
James Dodds	218-556-4667	jodd[illegible]
ADDRESS		James.dodds@fdrn.org
2331 Wee Gwaos Dr SW		
CITY, STATE, ZIP		
Bemidji MN 56601		

COMMENTS

It just makes sense! Above ground oil movement or below ground oil movement.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Michelle S Dodds	218-766-2212	missy.dodds@gmail.com
ADDRESS		
2331 Wee Gwaus Dr SW, Bemidji MN		
CITY, STATE, ZIP		
Bemidji MN 56601		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: cheryl doering <cdoering2000@yahoo.com>
Sent: Monday, July 10, 2017 1:31 PM
To: MN_COMM_Pipeline Comments
Subject: Re: pipeline

I am e-mailing re: proposed Enbridge pipeline to register my opposition, because of the risk of oil spills in the Mississippi River headwaters region, and lakes where Ojibwe people harvest wild rice, along with the risk for the entire length of the pipeline. The pipeline would carry tar sands crude. In Canada, the extraction of this is turning boreal forest to lunar-like landscapes of open-pit mines and wastewater containment ponds. Tar sands extraction emits up to three times more global warming pollution than conventional crude. The oil is thicker and more acidic, which increases the likelihood of a leak. When it does spill, it is more detrimental to water resources. This whole scenario is an environmental disaster in the making! NO to the Enbridge pipeline!
Cheryl Doering

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Frank Dolan	7665414	
ADDRESS		
6799 Sandy Dr NE Bemidji Mn 56601		
CITY, STATE, ZIP		

COMMENTS We need the energy for Electricity Etc

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Anne Donnelly-Rieke <annedrieke@gmail.com>
Sent: Monday, July 10, 2017 1:41 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Pipeline 3

As a citizen of Minnesota, I am very concerned about the proposed new Enbridge line 3 pipeline

My first concern is that routes are proposed that are out of the existing pipeline footprint. The only way to really minimize impacts to environmental resources is by not disturbing new areas. For this reason, using the existing pipeline right of way makes the most sense and does the most to protect the environment.

My second concern is that proposed routes impact several American Indian tribal communities and some of the highest quality water resources in the state, including important wild rice areas.

The only alternative that should be considered is use of the existing right of way where the current Line 3 pipeline resides.

Anne Donnelly-Rieke
New Ulm, MN.

Sent from my iPhone

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Raymond Donohoe		rdonohoe@local49.org

ADDRESS
8224 Clinton Ave. South

CITY, STATE, ZIP
Bloomington Mn. 55420

COMMENTS
I support L3 work for Everyone!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Sue Donovan <sue.donovan@lacek.com>
Sent: Wednesday, June 14, 2017 4:53 PM
To: MN_COMM_Pipeline Comments
Subject: Feedback regarding CN 14-916 and PPL 15-137

Feedback regarding CN 14-916 and PPL 15-137

To whom it may concern,
I am writing to share my concerns about Enbridge's Line 3 replacement tar sands pipeline project. The DEIS for this project calls out many points that show the replacement proposal is fundamentally unsound.

Specifically,

- Calling it a replacement proposal is a misnomer and somewhat deceptive. The proposed 'replacement' pipeline would be larger and it would be in a new corridor - not the same corridor- for over half of its route.
- The new corridor crosses some of Minnesota's most pristine waters, permeable soils, etc. This is the same route that has been previously denied for the Sandpiper pipeline.
- The expansion doesn't make economic sense. The crude oil pipeline addition and expansion is being proposed when Minnesota's demand for crude oil has dropped by 19% since 2004 and is expected to continue to drop.
- The expansion doesn't address environmental impact and contamination. There is contaminated, oil-soaked soil underneath the pipe that is being left in the ground that is not being addressed.
- Enbridge has a very poor environmental record. That record shows that between 1999 and 2014, their network of pipelines had 1,068 spills which dumped 7.4 million gallons of oil into the environment. That equates to almost 2 spills per week.
- If Minnesota lawmakers believe Minnesotans need a larger volume of crude oil transported into our state, we should be addressing through means other than creating or expanding pipelines. Oil can be transported on existing pipelines.

Thank you. From a concerned MN resident,
Sue Donovan

SUE DONOVAN | VP, Project Management Office
The Lacek Group | A Specialty Agency of Ogilvy & Mather
P: 612-359-4081

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Levi, Andrew (COMM)

From: Lee Dowling <dowlingl@paulbunyan.net>
Sent: Monday, July 10, 2017 8:48 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 replacement project draft EIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I give my support for the Pipeline Replacement Project of Enbridge Energy's Line 3. I believe pipelines are the safest, most environmentally responsible and most cost effective way of transporting the petroleum products that our nation relies upon which are all important to me as a consumer and resident near the area of Line 3.
In addition, the project will be an economic boost for our area as I know many pipeline workers who would have good paying jobs locally on this important infrastructure upgrade.
We must maintain and upgrade our vital energy infrastructure in order to ensure our nation's security and energy independence as well as having the lowest cost energy for the consumer delivered in the safest and most environmentally responsible way.

Sincerely,

Lee Dowling
26294 County Road 62
Cohasset, MN 55721
dowlingl@paulbunyan.net

Levi, Andrew (COMM)

From: Mary Theresa Downing <marytheresad@gmail.com>
Sent: Monday, July 10, 2017 1:18 PM
To: MN_COMM_Pipeline Comments
Subject: Dockets CN-14-916 and PPL 15-137

Duplicate of earlier comment sent without complete docket number

Jamie MacAlister, Environmental Review Manager

I have several questions about the information included in the Environmental Impact Statement for Enbridge's Line 3 pipeline.

What is the source of the information used in this statement? Private contractors or the state of Minnesota? If private contractors were used, had they previously worked for the Applicant? If so, a conflict of interest seems rather obvious. Who hired these contractors, Enbridge or the state?

The actual process seems liable to have multiple mishaps. Enbridge proposes to horizontally drill under certain stream and river beds. The drilling fluids used for that process contain additives. These additives are toxic to aquatic wildlife and vegetation if a frac-out occurs. The Straight River, a nationally known brown trout stream, suffered a large frac-out during construction of the MinnCan Line 4 project. What are the additives in the drilling fluids? Shouldn't the public know what they are in order to make an accurate assessment of the danger of this process? Why would we allow such a potentially dangerous operation to take place under the Mississippi River?

Line 3 would pass under the Misssissppi near the headwaters in Itasca State Park. Should a pipeline be allowed in a state park?

The Executive Summary states,*"There is no one way to measure the general region-wide or state-wide differences in surface water resource quality across Minnesota."* If that is the case, what measures or methodologies were used? Does that mean the TSI used by the MPCA in measuring eutrophication is not a reliable way to measure water quality?

Finally, one reason given for allowing this project is the number of jobs it would create and their impact in areas of the state without robust economies. But some tribes in those areas don't want the pipeline to cross their reservations. Don't they have the right to refuse since they are sovereign nations?

And would the impact be what Is claimed? A recent Enbridge direct mail promotion states 13,600 jobs will be created by the Applicant's project, but in the draft EIS the maximum number of jobs created is 4800: 600 local workers and 4200 non-local workers. Which is the correct figure? Explain the discrepancy. Who provided the information for calculating those numbers?

I would ask that you consider whether the country and the state or only a handful of investors will benefit from this pipeline which will carry oil to be sold abroad and put at risk thousands of acres of woods and lakes that are currently a source of a strong tourist economy as well as safe drinking water for Minneapolis and other cities.

Mary Theresa Downing
4300 West River Parkway Apt. 237
Minneapolis, MN 55406

Levi, Andrew (COMM)

From: Jay Doyle <janddoyle@msn.com>
Sent: Tuesday, June 27, 2017 4:44 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge line 3

Dear Ms. MacAlister,

The new pipeline will be safer and more efficient than the current pipeline. It will also free up rail lines to transport farmers products to to market. Win Win.

Sincerely,

Jay Doyle
12725 Norway Spruce Dr
Baxter, MN 56425
janddoyle@msn.com

Levi, Andrew (COMM)

From: Jay Doyle <janddoyle@msn.com>
Sent: Thursday, July 06, 2017 9:52 AM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I believe that replacing the old pipeline makes good sense for the following reasons:
A new pipeline will be safer for the environment than one which is 50 years old.

It will reduce the amount of oil being transported by rail which will free up train capacity for the transport of agricultural products.

It will be more energy efficient resulting in lower transportation costs which should result in lower prices to the consumer.

Sincerely,

Jay Doyle
12725 Norway Spruce Dr
Baxter, MN 56425
janddoyle@msn.com

Levi, Andrew (COMM)

From: annette doyle <pentigirl348@gmail.com>
Sent: Monday, July 10, 2017 11:29 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 and line5 comments

To whom it may concern,

Considering line3 and line5 of the company Enbridge. Enbridge feet the over 5000 page document doesnot include all the detailed information, needed that is required with remediation.

Page- Es-17 discusses how using Semi trucks to ship the fossil fuels. According to this, fossil fuels should be eliminated due to CO2 emissions. However, fails to state the emissions are an issue due to the pipeline transports fossil fuel which causes carbon dioxide emission.

Page ES-20 suggest corridor sharing to "reduce impacts." This is inclusive to the existing lines in Minnesota. As well as, the line that would route to the XL plains. Line 5 has been in place since 1953. Line 5 is well over the fifty year life, in fact it's sixty-four years old. Now this line moves along the bottom of the lake scraping the line against rocks and more potentially able to puncture it. Enbridge says "they have no plans on replacing it." Enbridge's plan is to share the existing corridor to "reduce impacts." This would the include Minnesota into the route of the XL plains.

Page ES-27 says there are no other details about other routes. There are many routes that would be alteratives. However, there are no detailed information. Enbridge is not worried about the impacts of line 3 and line 5 yet the 5,000 page document has no details on the information about the impacts. They do use words like if, could, many times instead of facts and solutions in the case of a spill.

Now I found it interesting Enbridge did say on the same page that forest, shrubs could take decades to teach full potential and recovery from impacts of a spill.

Also Enbridge doesn't state if they have federal permits. However, in chapter 1 pages 1-4 under section 1.4.1.2 Need For Fossil Fuels: it states that comprehensive policy level assessment of fossil fuels in our society and Associated Tribal Rights is beyond the scope for a single pipeline.

My question is why write this document and why are they even putting pipelines in? In this document there is no deciding factor for the need that the Commissioner must use. Envisage cannot provide a certificate of need or the route permit. This is because it is clear that the need is a destruction to the environment and had risks that are outlined all over the DEIS.

Now is when we need to find alternative renewable resources. These will reduce carbon dioxide emissions by 15% as the Law outlines.

Levi, Andrew (COMM)

From: Kevin Drebing <drebingk@gmail.com>
Sent: Thursday, June 29, 2017 8:09 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I completely support the pipeline upgrades. It is good for the environment to upgrade the pipeline. This will address any future possible pipeline failure issues.
Everyone, whether for or against needs the energy! I know from following this issue that Enbridge is doing the best that they can to make these changes as safe & environmentally responsible as possible. How do I know this? Because there are a lot of people watching everything they do. They can't afford to have anything go wrong! Public opinion would crucify them!
Pipelines have been around since the 1800's. I would surmise that there are a lot of abandoned pipelines in this country right now & am unaware of any problems from abandoned pipelines.
It will create many well paying jobs!
I personally don't see any negatives with this project!
Let's do it!

Sincerely,

Kevin Drebing
3210 Sunnyside Rd NE
Bemidji, MN 56601
drebingk@gmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Paul Drechsler	218-879-3875	drechsler5@netzero.net

ADDRESS
211 Sunset Dr.

CITY, STATE, ZIP
Cloquet, MN. 55720

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Jay Dregni <jdregni@hotmail.com>
Sent: Monday, July 10, 2017 12:26 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline 3

Jamie MacAlister

I have sent a couple letters and an email. Now I want to close my opportunity to comment by thanking you for coordinating this critical decision. Alternative options exist that are better than going across Pine River and Whitefish area.
Thanks for weighing the alternatives and best wishes,
Jay Dregni

921 Bayless Avenue
St Paul, MN 55114

34852 Grass lake Trail
Pequot Lakes, MN 56472

Levi, Andrew (COMM)

From: David Drouillard, M <davidmdrouillard23@gmail.com>
Sent: Monday, June 19, 2017 9:06 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Hi. My name is David, I'm a Minnesotan and am a hard worker and willing to work with enbridge if giving the chance. Thanks

Sincerely,

David Drouillard M
PO Box 1103
Cass Lake, MN 56633
davidmdrouillard23@gmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Ronald A. Duchesneau Jr	218-547-2226	skp@dwjonsinc.com
ADDRESS		
P.O. Box 175		
CITY, STATE, ZIP		
Walker MN 56484		

COMMENTS

Please allow the line 3 replacement project to occur. A pipline is much safer than rail transportation. Do we need people to die in a train derailment before we understand the importance of this project?

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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10 JUL 2017 PM 2 L

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Robert & Shirley Dukek

Street Address: 39932 Lone Lake Rd.

City: Bagley State: Minn. Zip Code: 56621

Phone ~~or Email~~: 218-694-6761 don't have E mail

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

We attended the June 6, informative meeting at Rice Lake Community Center
The statements made by audience speakers were so many not correct
They said can't clean oil spill in winter - wrong - that is best time for leak cleanups on frozen ground.
They said water clean-up not same habitat afterwards - wrong - spills on water, oil floats if cleaned right away, have special crews, equipment, boom deployment, vacuums, people who know what they are doing
They said abandoned pipes just left - wrong both abandoned & in use pipes are monitored - smart pigs look for corrosion, dents etc.
Line 3 has been bad pipe from start, spiral welds etc. Don't stop it now when finally fixing it.
Obvious none of "the people" had been on site or involved with pipeline activities to render such unknowledgeable & false statements & did not stick to direct subjects & facts pertaining to meeting. Many things said were not factual - pure fantasy.
Pipeline only safe way to move crude now or refined products
There is a never ending increase in need - common sense, says to use the routes in existence, where applicable, less impact environmental.

Shirley Dukek

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: David Ross <dross@duluthchamber.com>
Sent: Thursday, July 06, 2017 1:34 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

CN-14-916 and PPL-15-137
The Duluth Area Chamber of Commerce's Board of Directors is in full support of Enbridge's Line 3 Replacement Project. Our board is comprised of 22 of our community's business leaders. These board members represent our 1,100 members. These leaders recently took formal action in support of the proposed project. We did so after thoroughly reviewing the scope, impact and merit of the proposed project.
Our support is also based on our deep appreciation for Enbridge as a local employer. Our community is fortunate to have Enbridge employ so many of our friends, neighbors and family members. Enbridge is also a strong corporate citizen, supporting several local initiatives and causes.
In summary, the Chamber stands in unwavering support for Enbridge and its planned replacement of Line 3.
Thank you for this opportunity to illustrate our support for Enbridge as it continues to invest in our region.
On behalf of the Duluth Area Chamber of Commerce Board of Directors, David Ross President

Sincerely,

David M. Ross
5 W 1st St
Duluth, MN 55802
dross@duluthchamber.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Evelyn Dunsmoor	218.390.0821	Ev.Dunsmoor@unitedpipeing.us
ADDRESS: 631 5th St		
CITY, STATE, ZIP: Proctor, mn 55810		

COMMENTS: I Support the Line 3 replacement project!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Alicia Dvorak <aliciadvorak@gmail.com>
Sent: Monday, July 10, 2017 10:13 PM
To: MN_COMM_Pipeline Comments
Subject: Comment for Dockets CN-14-916 and PPL-15-137
Attachments: Comment for CN-14-916,PPL-15-137.pdf

Please find my attached comment.
Thank you,
Alicia Dvorak
Minneapolis, MN

Comment for dockets CN-14-916 and PPL-15-137

A fundamental failure of the Draft Environmental Impact Statement for the Line 3 Project is the lack of assessment of a realistic No Action Alternative which is not presupposed on the need for 760,000bpd of tar sands. Tars sands are a losing proposition economically and ecologically in the face of accelerating climate change. In considering the No Action Alternative, the EIS must consider an option that does not resort to convoluted and absurd notions such as transferring the contents of a pipeline to 4000 trucks a day; clearly an unrealistic option which only serves to further Enbridge's interests by making a pipeline seem reasonable by comparison.

Alternatives must also reconsider the amount of crude slated to be transported. All of the alternatives blithely follow Enbridge's declaration that it "needs" to transport 760,000bpd. Options must consider no increase in amount as well as the cessation of tar sands transport through MN.

In Section 4.2 it states that the Commission must consider several factors while analyzing the need for the proposed project. One factor is whether "a more reasonable and prudent alternative to the proposed facility has…been demonstrated by parties or persons other than the Applicant." That prudent alternative is, in fact, no new line. The EIS recognizes "that the totality of climate change is not attributable to any single action, but is exacerbated by a series of actions" as if that excuses every action in the series instead of implicating each one. The EIS must not ignore the effects that the easing of the way for oil corporations has on climate change.

Another major flaw in the DEIS is in the analysis of spills as described in Chapter 10. Firstly, much of the spill assessment was done by the firm employed by Enbridge (Stantec and Barr Engineering). There must be independent study and review of spill risk, not simply extrapolation based on company-provided data. Secondly, of the 7 sites chosen (by Enbridge employed consultants!) none model a spill into the Great Lakes watershed. The pipeline enters the St.Louis/Lake Superior watershed as it nears Superior and an understanding of the consequences of a spill into the largest body of freshwater in the world in absolutely necessary.

A third failure of the DEIS is to fully incorporate and take seriously the impacts on indigenous communities. The summary of Chapter 9 claims that "the impacts cannot be categorized by duration… or by extent" thereby relegating any included native perspectives to a novelty sideshow. The DEIS does in fact categorize impacts on resources, land, and health. Why are native concerns about these things set aside in a separate package instead of fully included in all analyses?

In the summary of Chapter 9 it states that "any route, route segment, or system alternative would have a long-term detrimental effect on tribal members and tribal resources," but later, in section 11.5 declares that such a finding "does not preclude selection of any given alternative." In other topics, the document states challenges, risks, options and consequences but refrains from making an outright recommendation. The fact that in this one specific instance, in the face of overwhelming evidence as to the harm Line 3 will cause, the DEIS makes a suggestion about whether or not to grant a permit is a blatant expression of the racism inherent in the whole project.

Levi, Andrew (COMM)

From: Hannah <hhdvorak@comcast.net>
Sent: Monday, July 10, 2017 11:29 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 DEIS Comments
Attachments: Line 3 DEIS Testimony.pdf

Attached please find my comments regarding the Draft Environmental Impact Statement for Enbridge's requested new Line 3 pipeline. Thank you for your consideration.

Sincerely,
Hannah Dvorak
Minnetonka MN

My name is Hannah Dvorak.

I am a recent Cum Laude graduate of Minnetonka High School. I have great memories of going north to Lake Superior with my family, and want to know that I will be able continue to vacation there throughout my life and still have the water be clear and clean. I oppose the proposed Line 3 replacement project and do not think the DEIS (Draft Environmental Impact Statement) fully assesses the many risks associated with (1) building the pipeline; (2) abandoning the existing Line 3 pipeline; and (3) leaks that, statistically, we know will occur.

The photos below are from an article by Andrew Nikiforuk dated 31 July, 2010 at TheTyee.ca. Please use the link here to read the full article, which lists just some of Enbridge's worst oil disasters: https://thetyee.ca/News/2010/07/31/EnbridgeDirtyDozen/. Enbridge has a terrible track record of spills that include 2 deaths in MN and 7 in Canada, and a history of not completing required inspections (see article).

An Enbridge pipeline carrying crude oil from Saskatchewan to Chicago exploded, killing two workers trying to make a repair in Clearbrook, Minnesota in 2007.

Controlled burn after 6,000 barrels of oil spilled from ruptured Enbridge pipeline in Cohasset, Minnesota in July, 2002. Photo: US National Transportation Safety Board.

1) The DEIS lists many environmental impacts of the proposed line and plans for minimizing them, drawn directly from Enbridge's permit application. Phrases such as "Enbridge would do this" and "Enbridge would do that" are used without any evidence that Enbridge will do what is claims it will do. In particular given Enbridge's track record, the DEIS should analyze the likelihood of compliance and the cost to the environment and Minnesotans if they do not.
2) The DEIS contains no spill analysis for tributaries of the St. Louis River or Nemadji River , where spills could ruin Lake Superior and wildlife that make their home in and around Lake Superior. Enbridge's 2010 oil spill sent more than 800,000 gallons of crude oil into the Kalamazoo River, a major state waterway that flows into Lake Michigan.
3) In Section 8.3.1.1.1 regarding abandonment of the existing Line 3, the DEIS states that Enbridge has indicated that it would develop a contaminated sites management plan to identify and mitigate contaminated soils and waters found during the abandonment of Line 3. However, there is no plan. Especially given Enbridge's track record (see 2004 item in the Nikiforuk article of Enbridge's failure to conduct inspections), the Department of Commerce should require that Enbridge submits the plan and scrutinize it thoroughly before including in the final EIS.
4) The decision on Enbridge's request to abandon Line 3 could set a precedent, yet there is no mention of the potential abandonment of the three other aging pipelines in Enbridge's existing mainline corridor across MN (Lines 1, 2, and 4), which Enbridge might next attempt to abandon. Nor is there any discussion of the abandonment of the NEW Line 3 in 50-60 years. We don't know whether Enbridge will still be around in 50, 60, or more years. If they are not, they would put a costly burden on my and future generations – risking our health and right to clean water and land.

The DEIS does not address the fact that the demand for oil is declining. Wind, solar and other clean technology are the energy sources of my generation. I do not see that building more capacity infrastructure for a declining energy source makes sense for Minnesota – especially in the hands of an environmental offender like Enbridge.

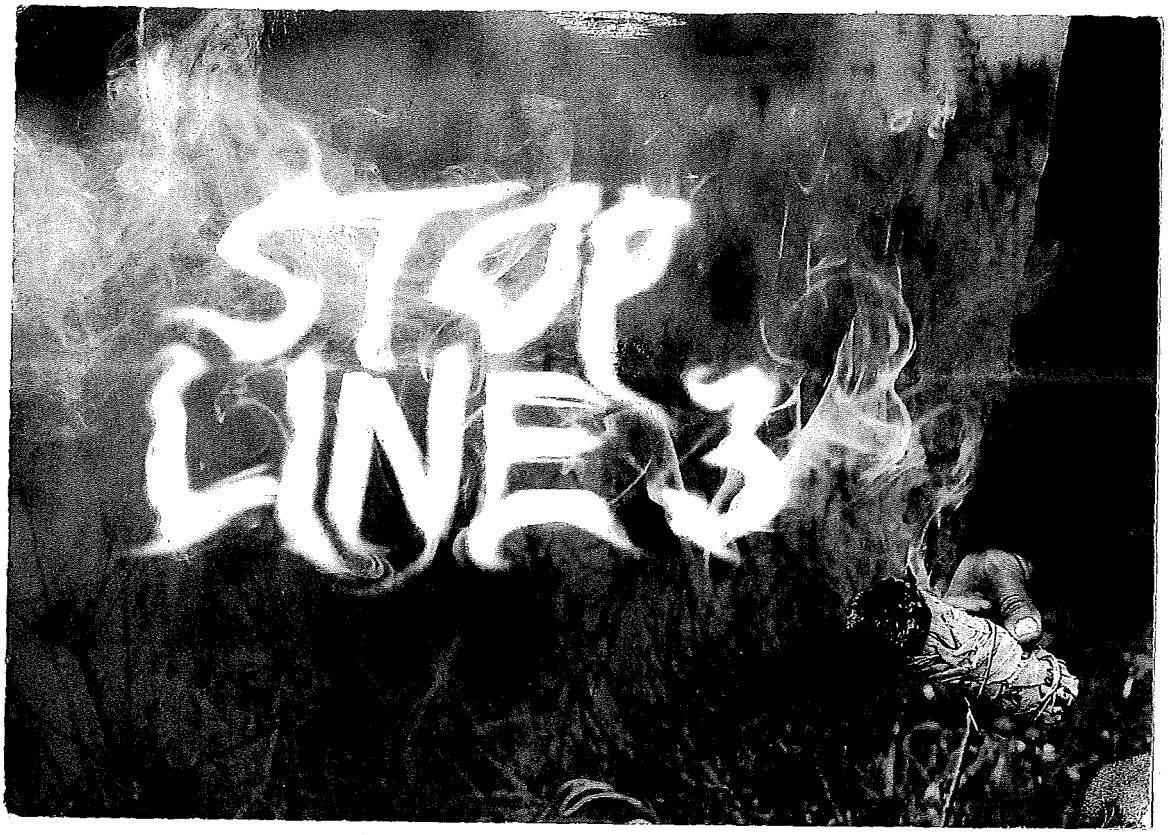

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

It is important for now and our future that we invest in solar, wind and other renewables! Line 3 is not needed and not wanted. We do need clean water and clean air.
Sincerely,

SINCERELY,
Lori Fisher Dyce

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
KEN DYKSTRA	218 259 5998	k.dykstra@hotmail.com

ADDRESS
72660 M-43

CITY, STATE, ZIP
SOUTH HAVEN, MI. 49090

COMMENTS
LETS MAKE AMERICA GREAT AGAIN!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Donovan Dyrdal <dyr-valley@hughes.net>
Sent: Monday, July 10, 2017 7:35 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment on Draft EIS: Line 3 Pipeline Replacement Project PUC Docket Numbers PL-9/CN-14-916 and PUC Routing Docket PL-9/PPL-15-137 Submitted by D. & A. Dyrdal
Attachments: 2017.07.10 Public Comment on Draft EIS Line 3 PL-9 CN-14-916 P-9 PPL-15-137.pdf

Ms. Jamie MacAlister:

Please find the attached public comment letter on the Draft Environmental Impact Statement submitted by Donovan and Anna Dyrdal.

Thank you,

Donovan and Anna Dyrdal

kr

Donovan and Anna Dyrdal
Farmers/Landowners
12744 180th St NW
Thief River Falls, MN 56701

July 10, 2017

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
Division of Energy Resources-Energy Facilities Permitting
85 7th Place East, Suite 280
St. Paul, MN 55101-2198
E-mail: Pipeline.Comments@state.mn.us

Re: Public Comment on Draft EIS: Line 3 Pipeline Replacement Project PUC Docket Numbers PL-9/CN-14-916 and PUC Routing Docket PL-9/PPL-15-137

In virtually all of the promotional pamphlets and brochures that Enbridge periodically sends to the residents of the areas through which their pipelines are located, the same phrase is used repeatedly: Enbridge states repeatedly that they want to be "good neighbors". My experience with neighbors throughout my life is that being a "good" one means having a sincere commitment for not causing harm to others by one's own actions, or, if harm is caused, compensating one's neighbor as soon as possible to try to keep the harm from being multiplied through inaction over the passage of time.

My farming business is primarily the raising of crops, small grains and row crops (sunflowers, soybeans, corn, wheat, barley, and hay). These are all plants, simply speaking, that require a suitable layer of topsoil, which must contain elements of fertilizer, nutrients, and moisture for the plants' nourishment and growth. The introduction of a pipeline commonly has several effects that change or decrease the viability of the growing environment for these crops.

Some of these effects have occurred in my fields and have caused a documented loss in value of my land, as well as costing me money and other resources and increasing my personal stress levels beyond what is normal for agricultural enterprises. The older pipes were originally placed in the ground at too shallow a depth. This has created a damming effect to delay appropriate drainage and, by not allowing the water to flow in the direction for which the drainage was designed, it essentially drowns the plants. This water retention process extends beyond the boundaries of the pipeline corridor into other areas of the fields, multiplying the damages.

After months or years of negotiating about the damages caused when the maintenance digs were conducted and the valuable topsoil was carelessly mixed with subsoil, which could not maintain a growing crop, occasionally Enbridge hauled in fresh topsoil, unfortunately contaminated by a variety of pernicious weed seeds. During the construction of the Alberta Clipper and LSr pipelines, more weeds were introduced and it took seven years to finally be compensated for the time and money required to solve that problem.

As the time drew near for the replacement of Line 3, Enbridge approached me and asked for my agreement and support. I did agree to allow the new Line 3 to be installed on my property, with the necessary expansion of the pipeline corridor that that will entail. In a separate, but related contract, Enbridge stated that they would be willing to settle some "legacy issues" that have plagued our relationship over the past approximately 50 years of my owning this land. In an effort to make this second contract bear fruit, Enbridge's representative assured me that they would keep up a monthly dialog with me to address these concerns in a timely manner and, to use their own phrase, "to ensure ongoing and fruitful discussions".

During a series of negotiations with Enbridge, we set this timetable and agreed to address our "legacy issues" within a context of monthly meetings. We began this so-called "monthly" series of communications in April 2016, but by mid-July, the monthly talks had already diminished to bi-monthly or even just occasional responses to my emails and my calls to try to continue this conversation and to bring about concrete and lasting results.

Since Enbridge has reneged on the commitments they have made to address my concerns, I no longer feel obligated to support our related agreement for me not to oppose the Line 3 replacement.

I have two over-reaching apprehensions about this operation. The first is that, in the light of Enbridge's past behavior, I see no reason to trust that they will manage this project any more effectively or safely than they have any of their past projects. This, in and of itself, is not acceptable.

The second concern that I wish to address is the future of the abandoned old Line 3. The oldest pipelines that cross my land are much nearer the ground surface than is presently allowed by state statute and, in some places, are already actually exposed to the air. Line 3 is buried at a depth over its course across my land ranging from 13 inches in some areas up to 48 inches in others.

I have heard that one of the arguments that Enbridge is using to justify leaving the abandoned pipeline in the ground is that proximity to the other pipelines is too close to be able to dig old Line 3 up safely. Line 3 is 15 feet from the Line 1 pipeline northwest of it and 28 feet from Line 4, southwest of it. If the machines are not already available to safely remove the line, a construction-engineering department should be able to design or adapt their present equipment to do it. I have witnessed railroad equipment being used in similar "tight quarters" and feel that there are viable options for Enbridge to manage pipeline removal in safe conditions.

Additionally, exposed pipelines without the weight of oil to hold them down are likely to come to the surface of the ground sooner than later. Even if they are "cleaned" out and filled with an inert substance, it is our understanding that the pipeline material and covering fabric of asbestos and steel will corrode and deteriorate over time and will almost certainly cause sinkholes and potentially other anomalies. We are already witnessing the pipelines becoming a "path of least resistance" for underground water flowing across our land. Enbridge itself says that part of the reason they wish to replace Line 3 is that there are about 900 "structural integrity anomalies", which include seam cracks and corrosion. If this were true then that would lead one to believe that there must already be considerable amounts of contamination of the soil and water that surrounds that pipeline.

Other landowners who have Enbridge pipelines crossing their land must have the same apprehensive vision of the future, since the announcement regarding Line 3 replacement. The State of Minnesota has no laws governing how a decommissioned and abandoned pipeline is to be handled. If the Public Utilities Commission or the Department of Commerce has the authority to order Enbridge to pay for an impartial survey of the pipeline and safe disposal of pipeline material, then that is what they need to do.

If the state legislature, at some later date, passes statutes that support their citizens' lives and health over the transportation of oil across our state, it may still be difficult to use that to require and force Enbridge to revisit their abandonment of Line 3, which is happening now, prior to any such legislation. The PUC and Department of Commerce may be our only avenues to bridge that gap.

Allowing Enbridge to abandon Line 3 and leave it to deteriorate in the ground and contaminate our topsoil and subsoil as well as the contaminating the water veins within the soil is not acceptable. This process, which will defer the resulting problems to become the responsibility of the landowners at some future time, will set an undesirable precedent and is certainly not in the best interest of the landowners, for whom Enbridge claims to be a "good neighbor". If Enbridge does not have to remove this one, they will likely never do others, down the road.

The Public Utilities Commission and/or Department of Commerce have a duty to protect the citizens of Minnesota and their future from the harmful and negative effects of this pipeline replacement and abandonment. They should also consider whether this expansion is even necessary, as technology is changing rapidly, and whether the need for oil will be lessening with new sources of energy from wind, solar, bio-fuels, and other forms of renewable energy gaining acceptance.

I submit these statements that I feel are factual and I am willing to present evidence to support my comments as this develops, should that become necessary.

Thank you.

Donovan Dyrdal

Levi, Andrew (COMM)

From: sedna101@aol.com
Sent: Friday, July 07, 2017 4:32 PM
To: MN_COMM_Pipeline Comments
Subject: docket numbers CN-14-916 and PPL-15-137

docket numbers CN-14-916 and PPL-15-137

The DEIS contains all the data necessary to deny the permit. The international standard of obtaining the Free, Prior, and Informed Consent of impacted tribal communities, as outlined in the U.N. Declaration on the Rights of Indigenous People, has not been met. Spills would violate treaties with the Ojibwe tribes that protect critical resources and the right to hunt, fish, and gather on ceded territories.

The meager chapter on environmental justice concludes that "disproportionate and adverse impacts would occur to American Indian populations" (11.5) and acknowledges that those impacts "would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities," documented in the Minnesota Department of Health's 2014 study as "part of a larger pattern of structural racism" (11.4.3). And the project would create zero permanent jobs, but contribute significantly to climate change.

This is a political process, not just a regulatory one. Any child can see the right thing to do: deny the permit for a new Line 3 and require Enbridge to clean up the old one. But the false assumptions, glaring omissions, and twisted framing of alternatives in the DEIS show that the state's morality and common sense are still blinded by the temptation of temporary construction jobs and tax revenue. It is our job to demand better.

The underlying assumption is that if Enbridge says it can sell X amount of additional Canadian oil, it is our responsibility to figure out a way for it to do that, and assume all the risk. The entire process prioritizes the corporation's "right" to make profit, and ignores the real questions of public need and purpose. There is a glut of oil supply everywhere, global demand is declining, and so is Minnesota's.

This oil is meant for export. Plus, prices have been too low for profitable tar sands extraction for years, and major oil companies are withdrawing their investments. The tar sands industry is a house of cards propped up by billions in taxpayer subsidies, and unfathomable debts that may never be repaid. Meanwhile, renewables are skyrocketing, and electric car infrastructure will dominate world markets in a matter of years. Any rational discussion of energy policy would consider these factors, but you won't find a single one mentioned in the DEIS.

Also missing is a discussion of Enbridge's track record in complying with regulation, despite state law requiring that consideration before issuing the permit (Administrative Rules Part 7853.0130 (D)). Many of the environmental impacts and plans for mitigation are copied and pasted directly from

Enbridge's permit application without any evidence of compliance. And since Minnesota agencies don't have the jurisdiction or capacity to monitor construction, the DEIS proposes that the fox watch the henhouse: Enbridge inspectors will have stop-work authority, and "third-party monitors" that relay information to the agencies will not (2.7.1.1).

The DEIS also fails to discuss the profound ecological, cultural, and sexual violence taking place at the point of extraction in the Alberta tar sands. Tunnel vision like that relies on the myth, easily refuted, that new infrastructure has nothing to do with new extraction. This oil comes from somewhere, and if Minnesota approves this pipeline, it will also approve the poisoning and murder of the Dene and Cree communities in the Athabascan River Basin.

Jane Eagle

Levi, Andrew (COMM)

From: Dena Eakles <denaeakles@earthlink.net>
Sent: Monday, July 10, 2017 3:25 PM
To: MN_COMM_Pipeline Comments
Subject: docket numbers (CN-14-916 and PPL-15-137)

To: Jamie MacAlister, Pipeline.Comments@state.mn.us

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I am from: Ontario, Wisconsin

The Line 3 Pipeline concerns me because: It will negatively affect tribal lands, wild rice gathering and other ways of life for indigenous people. This is no longer acceptable. We need to restore not destroy the earth for fuel. We can no longer harm people and their ways of life to feed our excesses or corporate greed.

The DEIS concerns me because: In Chapter 11, "Environmental Justice," the DEIS acknowledges that pipeline impacts on tribal communities "are part of a larger pattern of structural racism" that tribal people face in Minnesota and elsewhere. This was well documented in a 2014 study by the MN Department of Health. The DEIS also concludes that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3).

Therefore, I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Sincerely,
Dena Eakles

denaeakles@earthlink.net
608-337-4871

https://letkindnesswin.wordpress.com/
http://www.echovalleyfarmwisconsin.com/index.html
http://www.echovalleyhope.com/

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
John Ebmer	218-269-9234	
ADDRESS		
711 Lincoln Pkwy		
CITY, STATE, ZIP		
Duluth, MN 55806		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Keefe Ebmer	(218) 722-0205	keefe.ebmer@bendtec.com

ADDRESS: 366 garfield ave.

CITY, STATE, ZIP: DULUTH MN 55802

COMMENTS

get er done!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Robert Ecker <abbymcdog40@me.com>
Sent: Thursday, July 06, 2017 11:43 PM
To: MN_COMM_Pipeline Comments
Subject: docket numbers CN-14-916 and PPL-15-137

Jamie MacAlister, Environmental Review Manager,

We should not be allowing Enbridge to build another pipeline thru our Lake Country nor anywhere thru the state of Minnesota.

Our water resources and tourism resources are too precious to risk. The company has a terrible safety record.

We should be expanding Minnesotas use of Solar and Wind Energy and not allow expanded use of fossil fuels. Global climate change is the legacy we are leaving to our

children we should not be increasing use of oil.

Please do not allow this pipeline to be built as it will poison our streams and lakes.

Thanks,
Robert Michael Ecker
6114 Baldwin Lake Road
Lino Lakes, MN 55014

Levi, Andrew (COMM)

From: Kay or Eugene Edberg <ekredberg@hotmail.com>
Sent: Wednesday, June 14, 2017 4:15 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline comments

To whom it may concern:
I got a call last week polling about the pipeline. Something like "an oil pipeline brings many jobs to the area, bla, bla, bla. Would you approve of the construction of a new pipeline?" Really vague and clearly trying to lead the listener to say yes without giving them all of the details. I am certain the results of this poll will make their way into Embridge's proposal in the form of "an overwhelming percentage of Minnesotans are in favor of building a new pipeline". I hope you ask EXACTLY what was said during these polls calls because it did not seem to be seeking an unbiased response as it only told people all of the positives of a pipeline like jobs etc before asking their opinion.
I will be unable to make the meeting in Mora, but I would like to submit the following comments- One of the things that I found unacceptable about the proposal is that they already have a pipeline that is old and corroded and has leaked over 50 barrels of crude in 27 locations over the 50 years it has been in existence (by their own admission). We can certainly expect leaks within our lifetime. Second, regarding the pipeline that is being replaced, they plan to simply leave it in place and build somewhere else. Why is no one requiring them to dismantle the previous pipeline if they want to build a new one? They could then use that already approved route for their new pipeline. I see no reason for construction along a new path, allowing them access to our precious wetlands and forests not to mention the people it will be displacing. All while allowing them to leave a corroded useless pipeline in place. People aren't allowed to throw their waste on the side of the road. Why should corporations be any different?
I don't disagree with the need to replace the pipeline. But the new one should run alongside the existing one AND the old pipeline should be dismantled as soon as the new one is up and running.
Thank you for providing an opportunity for public comment.
Kay Edberg
Mora, MN

Levi, Andrew (COMM)

From: polly edington <edingtonpolly@hotmail.com>
Sent: Sunday, July 09, 2017 6:51 PM
To: MN_COMM_Pipeline Comments
Subject: Project CN-14-916 and PPL-15-137

Hi! I'm writing to comment on Enbridge's Draft Environmental Impact Statement for Line 3. In chapter 6 it states that Enbridge's preferred route would impact more wild rice lakes and areas rich in bio-diversity than any of the proposed alternative routes.

Why aren't Native Americans lives being considered?

I'm also not satisfied with Enbridge's plans to handle the possibility of sex trafficking during the work force time laying a new line. Shut down line 3 should be an option.

There are many more problems with Enbridge's plans to put a new Line 3 in, but I'm sure you are hearing from others on those.

Just to let you know I'm a female, 72, live in Grand Rapids.

Thanks for listening and may you make the best decision for those that are being negatively affected with these proposals! Polly

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Andy Eklund	218-491-0723	aeeclunde lycos.com
ADDRESS		
4806 W. 7th St		
CITY, STATE, ZIP		
Duluth MN 55807		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017 PM

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
CHRIS EFTA	218-536-0197	cefta@hotmail.com
ADDRESS		
PO BOX 84		
CITY, STATE, ZIP		
WALKER, MN 56484		

COMMENTS

I support the pipeline

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Curtis Eggerth <user@votervoice.net>
Sent: Tuesday, July 04, 2017 2:34 PM
To: MN_COMM_Pipeline Comments
Subject: Employment

Dear Ms. MacAlister,

Will you be hiring and where?

Sincerely,

Curtis m eggerth
24660 Main St
Pine City, MN 55063
ceggerth@yahoo.com

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Curtis Lee Eischens	218-252-0745	
ADDRESS		
P.O. Box 504		
CITY, STATE, ZIP		
Park Rapids, MN 56470		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Lee R. Ekblad	651-430-1612	GP52123JLL@yahoo.com

ADDRESS
11455 124TH St. North

CITY, STATE, ZIP
Hugo MN.

COMMENTS
Lets replace before something happens and you'll regret it wasn't done earlier

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Teresa Elavsky <salomae@arvig.net>
Sent: Friday, June 23, 2017 9:44 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

Dear Ms. MacAlister,

Absolutely proceed with Line 3!! No question that this is the best way to go. Use the same existing route.

Sincerely,

Teresa Elavsky
32833 County 23
Akeley, MN 56433
salomae@arvig.net

Levi, Andrew (COMM)

From: Donovan Elavsky <pipeliner49@gmail.com>
Sent: Monday, July 03, 2017 3:06 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Dear Sir, The Unique fact that line 3 has operated over 50 years in the same location as the proposed new replacement should be proof of the possible environmental impact. Over 2 year and millions of dollars have been spent to properly produce the EIS. I have boots on the ground experience working on pipeline projects. Enbridge's first priority is always safety for the environment and workforce. Because Enbridge as a company is always respondsable for accidents or spills, they are more passionate about environmental harm than any protester! The importance of oil from Canada via line 3 as a secure source of petroleum can not be over stated. Please move forward with this project as soon as possible.

Sincerely,

Donovan Elavsky
32833 County 23
Akeley, MN 56433
pipeliner49@gmail.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Kelley Eldien	218-729-1610	keldien@mnpower.com
ADDRESS		
5318 Shady Lane		
CITY, STATE, ZIP		
Duluth, MN 55811		

COMMENTS

I support the line 3 replacement project:
1) safety ~~for~~ along route due to corrosion on old lines
2) Econ. benefits

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Loren Edward Elg	612 245-7285	
ADDRESS		
2534 440th St		
CITY, STATE, ZIP		
Isle, MN 56342		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Rebecca Marie <welcomeomcenter@gmail.com>
Sent: Monday, July 10, 2017 7:18 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline 3 DEIS Dockets CN-14-916, PPL-15-137

Dear Jamie MacAlister,

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I am from New Orleans, Louisiana. In Louisiana we face the same issues as faced in all states with big oil and big gas; constant health and environmental degradation- ilness. Where we are in LA, we're known as cancer alley. Our water, our air, and our soil contaminated every single day, thus our bodies and minds. Aside from the impacts of the oil refineries and faulty pipelines, I'm sure you remember the acute and systemic BP oil carastrophe of 2010.

The Line 3 Pipeline and DEIS concern me because of the following facts; truths:

SPILL RISK

- The 7 sites chosen for spill modeling are not representative of the locations and resources put at risk along the entire corridor. A more thorough analysis of different locations is needed - for example, what about Lake Superior?
- There is no analysis on Enbridge's leak detection system, or their inability to respond quickly to major emergencies.
- Enbridge's response plans are highly guarded, and Honor the Earth's attempts to receive and review these documents has been blocked. What we can infer is that Enbridge relies on local first responders for their emergencies. They attempt to use the money they donate to communities along their corridors as proof that they have an integrated emergency response program.

The DEIS estimates the annual probability of different kinds of spills on the proposed route in MN:

- Pinhole leak = 27%
- Catastrophic = 1.1%
- Small Spill = 107%, Medium = 7.6%, Large = 6.1%

So in 50 years, we can expect **14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic**!

ABANDONMENT

- The risks of pipeline abandonment are not adequately assessed. For example, there is no discussion of landowner property values and the effect that an abandoned pipe could have on them, especially if there is indeed "**legacy contamination**" on people's land.

- Impacts on human and natural resources due to the abandoned Line 3 are anticipated to be minimal in the near term but could be significant in the longer term, absent effective monitoring, adaptive management, and the timely introduction of mitigation measures. There is not much information on what these mitigation and management plans are.
- If there is a dearth of surrounding soil, or if the cover for the pipeline is relatively shallow, the pipeline bears more of the load and, all things being equal, is more likely to fail. We know from experience that there are numerous areas where the pipes are exposed and near the surface.
- There is also no discussion of**exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied**. "When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high" (8.3.1).
- We know that the abandonment of the existing line 3 is bad. But there is also no mention of **the abandonment of the other 3 ancient pipelines in Enbridge's existing mainline corridor (Lines 1, 2, and 4)**, which we expect Enbridge will very soon attempt to abandon. Nor is there any discussion of the **abandonment of the NEW Line 3** in the future.
- The DEIS states that it will be very risky to remove and clean up the existing Line 3 because the pipelines are very close together. "The distance between pipelines within this corridor varies, but they are generally 10 to 15 feet apart" (8.3.1). This is not consistent with our extensive observations and physical measurements on the land. Also, don't they dig up pieces of pipe for maintenance purposes all the time? **Why is it suddenly risky?**
- The DEIS simply states that "Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage,and mitigate historically contaminated soils and waters" found during the abandonment or removal of the existing Line 3 (8.3.1.1.1). **We want to see that plan**.

CONSTRUCTION AND RESTORATION

- Chapter 2, "Project Description" states that Enbridge has requested a 750-foot route width (375 feet on each side of the Line 3 Replacement pipeline centerline). They claim only 50 of the 750 feet would remain a permanent right-of-way (2.1) All of this width should be included in an impact analysis because Enbridge's environmental protection plan and record is abysmal.
- Their "restoration" plans for restoring the landscape around the corridor after installation is laughable. Enbridge's process for restoring wetlands includes dumping the now compacted (and probably de-watered) soil back in the trench, sowing some oats and "letting nature take it's course". This is not how you re-establish a wetland. Studies have shown that even with proper restoration practices, it can take decades to get back to the biological functioning it was at prior to disturbance. When Enbridge stores the soil, they will also be driving equipment over it- which compacts it, they also plan to compact the soil after refilling the trenches. This is not good for the soil.
- Cathodic protection, which applies electric current to the pipeline in order to protect it from corrosion caused by nearby utility lines, **will not be installed for up to 1 year after pipeline construction** (2.3.2.3). Lack of cathodic protection is what caused many pinhole

leaks in the Keystone pipeline, almost immediately after construction. The proposed route for Line 3 follows a utility corridor for much of its length - this is a recipe for disaster. Even the US Army Corps's rubber-stamp approval of the Dakota Access pipeline required the cathodic protection system to be installed within 6 months!

ECONOMIC IMPACTS

- Chapter 5, "Existing Conditions, Impacts, and Mitigation" states that Line 3 will create ZERO permanent jobs. Enbridge's application states that "existing operations staff would be able to operate the [pipeline] and that few additional employees would be hired to assist the staff" (5.3.4).
- Also in Chapter 5, the DOC assumes "all workers would re-locate to the area" and ZERO construction jobs will go to Minnesotans. The pipeline would have "no measureable impact on local employment, per capita household income, median household income, or unemployment" (5.3.4).
- The DEIS does not acknowledge that when the existing Line 3 shuts down, Enbridge will stop paying taxes to the MN counties along the mainline corridor. For many of these poor counties in the north, revenue from Enbridge's property tax makes up a significant portion of the county budget. There is also the issue that Enbridge is now in the process of appealing years of back taxes, burdening two of the poorest counties in Minnesota with over $10 million due.

CLIMATE CHANGE

- The DEIS acknowledges that Line 3 would contribute to climate change. It analyses 3 different types of emissions - direct, indirect, and lifecycle. Direct emissions are those that the pipeline infrastructure itself emits, and these are very small. Indirect emissions are those created by the power plants that provide electricity for the pipeline's pumping stations, and these are significant. Lifecycle emissions are those caused by the refinement and eventual use of the oil, and these are massive. Line 3's direct and indirect emissions alone would be 453,000 tons of CO2 per year. Over a 50-year lifespan, that would cost society an estimated $1.1 billion. (Executive Summary p.18).
- The lifecycle emissions of Line 3 would be 193 million tons of CO2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3)
- The DEIS does not discuss the unprecedented challenges of human casualty, displacement, conflict, natural disaster, biodiversity loss, etc, that climate change is causing, or the consensus from the scientific community that we must leave fossil fuels in the ground. It also fails to acknowledge that across the planet, Indigenous people are disproportionately impacted.

- Many of the environmental impacts and "plans" for minimizing them are drawn directly from Enbridge's permit application ("Enbridge would do this" and "Enbridge would do that") without any evidence of compliance or genuine consideration that maybe, just maybe, Enbridge won't follow all the rules. History shows that they continually violate permit conditions - we are working on compiling an enormous record of these violations. The DEIS should analyze the likelihood of compliance.

- **The Alternatives chosen for comparison to the pipeline proposal are absurd** -- for example, the only rail alternative assumes the construction of a new rail terminal at the US border, and thousands of new railcars to transport oil to Clearbrook and Superior. Enbridge would never do that. The only reasonable rail option would begin in Alberta. The truck alternatives are similarly unreasonable.
- **The "No Build" Alternative is not genuinely considered.** It is framed as "Continued Use of Existing Line 3" (Chapters 3 and 4), but nowhere is the "Shut Line 3 Down" option considered. There is no discussion of renewable energy, conservation, or the rapid development of electric car infrastructure. There is no assessment of the decline in oil demand. The entire study assumes that society needs X amount of oil, simply because Enbridge says they can sell it. That assumption ignores the massive fossil fuel subsidies and debts that make Enbridge's profits possible, and avoids the moral question of what is good for people and the planet. We know we must stop burning fossil fuels yesterday.
- There is zero discussion of how all this extra oil will go once it leaves Superior, Wisconsin. With 370,000 bpd of additional capacity, Enbridge will need a new pipeline departing its terminal in Superior. We know that they plan to build Line 66 through Ojibwe territories in Wisconsin, but they continue to deny this. Why isn't MN asking?
- The DEIS contains **no spill analysis for tributaries of the St. Louis River or Nemadji River**, where spills could decimate **Lake Superior** and the harbors of the Twin Ports.
- For calculations of impact, the lifespan of the new Line 3 is estimated at *30 years*. But Lines 1-4 are 55-65 years old! And hasn't the technology improved? The lifespan should be at least 50 years, a shorter lifespan is a clear indication that Enbridge themselves know that the fossil fuel era is coming to an end. In Honor the Earth's analysis, we have attempted to predict the impacts of this pipeline on the next 7 generations.
- This project is a further investment in a dying Tar Sands industry. Numerous international oil companies and financing institutions are divesting from the tar sands. Why should Minnesota invest in this industry? Why should our Nation be forced to deal with a bad idea in perpetuity.
- The DEIS assumes that the Koch pipelines to MN refineries get all their oil from Line 3, but the current Line 3 does not supply enough capacity for this (390,000 barrels per day), and we know that some of it comes from Line 81, which brings oil from the Bakken in North Dakota.

TRIBAL IMPACTS

- The United Nations international standard for projects that impact Indigenous Peoples is **Free, Prior and Informed consent**. Tribal consultancy after the project is already proposed and designed is not free, prior, and informed consent.
- Most of the issues specific to tribal people and tribal resources are **confined to a separate chapter** that attempts to provide "an American Indian perspective." They are excluded from the main chapters that assess potential impacts. This allows the EIS to **avoid drawing conclusions** about the impacts on tribal people. (Chapter 9)
- Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "**would have a long-term detrimental effect on tribal members and tribal resources**" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). **This does**

not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members.

- Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "**are part of a larger pattern of structural racism**" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3).
- The DEIS concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) **But it also states that this is NOT a reason to deny the project**!
- Chapter 6 states that Enbridge's preferred route would impact **more wild rice lakes and areas rich in biodiversity** than any of the proposed alternative routes (Figure ES-10).
- Most of the analysis of archaeological resources in the path of the pipeline rely on **Enbridge's surveys**. For some reason, only 3 of their 8 surveys are available, and the 5 missing are the most recent! In those, Enbridge found 63 sites, but claims that only 3 are eligible for protection under the National Register of Historic Places. (5.4.2.6.1). Honor the Earth has had the studies we have been able to see reviewed, and there are numerous flaws in their methodology.
- The DEIS acknowledges that "The addition of a temporary, cash-rich workforce **increases the likelihood that sex trafficking or sexual abuse will occur**," and that these challenges hit Native communities the hardest. But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). What experience does Enbridge have planning and implementing an anti-sex trafficking program?

The DEIS affirms that the MN PUC can only grant the permit if "the consequences to society of granting are more favorable than the consequences of denying the certificate." Regardless of whether or not Enbridge can find customers, the DEIS shows that the negative impacts far outweigh the benefits.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Sincerely,

Rebecca Eller

Levi, Andrew (COMM)

From: Mr. & Mrs. Dave and renae Ellingson <user@votervoice.net>
Sent: Tuesday, July 04, 2017 6:14 AM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Please let this line go through. Mn needs the work. The line NEEDS to be REPLACED. It's old and a matter of time to have problems with it.

Sincerely,

Dave and renae Ellingson
511 Main St
Strasburg, ND 58573
renaeroehrich@yahoo.com

From: Ian Elliott
To: MN_COMM_Pipeline Comments
Subject: Pipelinew Bad Track Records
Date: Wednesday, May 31, 2017 1:19:41 AM

Pipelines recently laid including the DAPL, have all sprung leaks of oil damaging to the environment. Governments should invest in clean energy now. Fossil fuels will be gradually phased out in the near future. Let's preserve the environment in its present state and enourage the new energy technologies.

Ian Elliott
730 Florence Ave
Astoria, OR 97103

Levi, Andrew (COMM)

From: Andrew Kozelouzek <andrew.kozelouzek@enbridge.com>
Sent: Monday, June 26, 2017 9:26 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I am a resident of Cloquet, MN and want to see the environment protected like most others. I believe the most prudent way to do so is by replacing replacing Line 3. It is preferable for me to locate pipelines in more rural areas, rather than to site them in the middle of cities and towns. Enbridge has found a feasible route that mostly follows existing utility corridors. Pipelines and natural resources have gone hand-in-hand in northern Minnesota for decades.

As a resident of northern Minnesota, I've watched the regulatory process go on for more than 2 years for the Line 3 Replacement Project and I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3. I do no believe additional time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS. Please keep the EIS timeline to the statutory deadline of 280 days.
Deactivating a pipeline in-place is the most commonly-used industry method to retire a pipeline. Leaving the permanently deactivated pipeline in place is the safest option as it reduces the risk of soil stability issues, avoids major construction activities and reduces the potential risk to existing pipelines from heavy equipment.

Please support the Line 3 repaclement project as request by Enbridge

Sincerely,

Andrew Kozelouzek
1333 Valley View Dr
Cloquet, MN 55720
andrew.kozelouzek@enbridge.com

Levi, Andrew (COMM)

From: EClare <eclare@gmail.com>
Sent: Monday, July 10, 2017 12:53 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 pipeline 'replacement'

Myself and my family vacation in the heart of lake country - some of my family own property up there.

The proposal by Enbridge to "replace" line three using their designated preferred route is problematic for these reasons:

1. It is directly through the center of our state's richest lake area resources where the land is extremely permeable and contains the cleanest water.
2. It is not actually a "replacement" and it is misleading for Enbridge to characterize it that way. It is a new line with greater capacity.
3. The "abandonment" of the existing line is a convenience only for Enbridge. There is no plan or state or county guidelines for the responsibility of dealing with the old pipeline.
4. American Indian treaty rights are being violated with this route.

The proposed route SA-04 would at least bring the pipeline through an area that will avoid our cleanest water resources and it would cross land that is much less permeable.

Respectfully,
Clare Engelhart
8301 W 104th St
Bloomington, MN 55438

Levi, Andrew (COMM)

From: Engelmann, Katie <katie.engelmann@ndus.edu>
Sent: Monday, July 10, 2017 11:40 PM
To: MN_COMM_Pipeline Comments
Subject: comments

Comments regarding proposed Line 3 “Replacement” project:
CN-14-916 and PPL15-137

The Line 3 Replacement pipeline is proposed flow across northwest Minnesota through Polk County, of which I am a resident. First and foremost, the pipeline is a support system to oil extraction by the method of hydraulic fracturing from the Canadian tar sands region. A Canadian report details that there is now a clearer understanding that large water withdrawals from the Athabasca River for mining operations during the winter could impact the ecological sustainability of the river. As well, it is uncertain if land reclamation methods currently employed will be successful. These issues have moved to the forefront of environmental concerns.

Catastrophic climate change impacts are already occurring in Minnesota and globally. As a citizenry, we should be focusing on curtailing such extraction instead of supporting it. Renewable energy costs have declined recently, making them viable options for individuals and communities. Currently the oil and gas industries enjoy exclusions and exemptions to major federal environmental statutes intended to protect human health and the environment including: Comprehensive Environmental Response, Compensation and Liability Act, Resource Conservation and Recovery Act; Safe Drinking Water Act, Clean Water Act, Clean Air Act, National Environmental Policy Act, Toxic Release Inventory under the Emergency Planning and Community Right-to-Know Act. As a result of this lack of oversight, human health, wildlife communities and the environment are being endangered. Until more thoughtful state regulations are enacted and until the petroleum industry at large is held accountable to remedy the negative impacts on human health and the environment, Minnesota should not put our human communities, land or water systems at risk of degradation.

Enbridge route’s dangers shallow aquifers. The proposed preferred route threatens waterways and wetlands in Polk County, and throughout the entire route. While I am concerned about the pipeline crossing small waterways and wetlands in Polk County, I am equally concerned about the route crossing the state’s most famous river, the Mississippi. The Line 3 replacement project is proposed to cross this pristine headwaters area which is a valuable and cherished natural resource to residents of Minnesota and across the nation. The Line 3 replacement pipeline would cross numerous sensitive wetland areas. Wetlands are protected habitats, afforded through state and federal law. They are protected due to their ecological importance and their ability to store and purify water. The bounty of freshwater resources in northern Minnesota including wild rice beds, lakes and rivers and fisheries generate $7.2 billion annually. This doesn’t include the tourism industry which grosses $11.9 billion in sales. These are real and permanent jobs. I am concerned that multiple pipelines will be allowed to follow this corridor if approved. These pipelines threaten not only pristine ecosystems, but also human communities, cultural and economic livelihoods.

The price of oil has dropped drastically in recent years causing the continued loss of investors in the Alberta tar sands. Key risks and uncertainties to the outlook of tar sands oil development include: Crude oil prices: Oil sands are relatively expensive to produce; a significant drop in oil prices may lead to poor economics for many existing and potential projects. The persistence of wider than average light/heavy differentials will negatively affect project economics for those producers marketing heavy blends; Capital costs: Oil sands projects, particularly those involving upgrading facilities, are very capital intensive and project economics are extremely sensitive to capital costs. Continued escalation in raw material and labor costs will have a material impact on supply costs and project economics. Building a pipeline in Minnesota for a waning industry is not sustainable development. The current no build alternative that allows for road or railway transport will continue meeting the need to transport oil to refinery destinations. The pipeline will not eliminate or reduce the oil being transported by rail and truck. It will only allow more transportation to occur. Rail and truck transport allow flexibility to reach refineries and are the most feasible method given the short term production expectations.

Lastly, I demand that a full environmental justice evaluation be conducted on this proposal. The concept of environmental justice demands that we broaden the scope of historical environmental decision-making and ask the following questions: Who will benefit? Who will pay the costs? Who has been paying the cost? What has been paid already?

The most recent contested issue of the placement of the Line 3 “Replacement” pipeline is but one of a serious of culminating events in a long history of environmental racism against our nation's indigenous people. Colonization of the United States was based upon the Christian-centered ‘doctrine of discovery’, the legal declaration of dominion of one race over another, which justified the taking of lands from original occupiers. Effects of colonization have resulted in indigenous people being relegated to predetermined areas decided on by their conquerors- the United States government and the citizenry it represented. These predetermined areas, were diminished from their

Although a Trust Doctrine exists which suggests legal and moral obligation to fulfill treaty understandings and expectations, when it comes to significant infrastructure development and territory reduction/degradation, indigenous peoples are not the primary decision makers of their own fate. Indigenous tribes are relegated to participate in political systems that upon their very founding, have determined them to be inferior. All too often indigenous peoples have been denied participation in governing processes. I demand more meaningful engagement with tribal leaders and groups. This should be given high priority, as much of the area the pipeline transects is land with given treaty rights associated.

Minnesota’s natural resources should not be placed at permanent risk for the economic advancement of a pipeline company and its desire to transport hazardous material. This project is not in the best interest of current or future citizens of Minnesota, only for those who expect to make money. Instead of continuing along on our current march toward energy independence by evermore domestic production it is time we redefine milestones and work toward a significant transition away from oil.

Sincerely,

Katie Engelmann, M.S.

Crookston, MN 56716

The following facts underscore the detriment this pipeline would cause our natural systems:

1. This pipeline route crosses the clearest lakes area in MN based on the Census of Water Clarity (U of MN Water Resources Center).
2. - This pipeline route crosses an area with the highest susceptibility for groundwater contamination impacting drinking water aquifers (MPCA map).
3. - The pipeline route crosses the wild rice lakes area. According to the DNR, MN supplies 50% of the worlds hand-picked rice annually.
4. - The pipeline route crosses wetlands critical to waterfowl and other wildlife (DNR).
5. - The proposed route would cross 8 state forests (including the Mississippi Headwaters SF), 3 wildlife management areas, 13 trout streams (including the Straight River), as well as the North Country Trail.
6. - Line 3 would cross the Mississippi River twice in Minnesota. This river is a valuable source of drinking water for many cities on its 2,552-mile journey to the Gulf of Mexico, including Minneapolis and St Paul. 3.8 million gallons of water flow from Lake Itasca into the headwaters every day.
7. - The corridor will be covered with snow and ice for the long winter season. The Poplar pipeline spill (31,000 gallons) in the Yellowstone River in January of 2015 caused drinking water problems in Glendive, Montana. Clean up had to be postponed until spring. Imagine the effects of a similar spill in our Mississippi.

Levi, Andrew (COMM)

From: mary engen <engenmary@yahoo.com>
Sent: Friday, June 16, 2017 2:35 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment:Line 3 Project (CN-14-916 and PPL-15-137)
Attachments: Comment on Line 3 Pipeline.doc

Environmental Review Manager: Comments on the Line 3 Pipeline are attached below. Thank you for taking the time to review these comments.

Mary Engen
3136 38th Ave. S.
Minneapolis, MN 55406

Levi, Andrew (COMM)

From: Julie Engle <engle@emily.net>
Sent: Sunday, July 09, 2017 2:21 AM
To: MN_COMM_Pipeline Comments
Cc: President@WAPOA.org; mike.hughlett@startribune.com
Subject: Objection to Line 3 Pipeliine Route

July 8, 2017

Jamie Macalister
Environmental Review Manager
Minnesota Department of Commerce
85-7th Place E.
Suite 280,
St. Paul, MN 55101-2198

Re: Line 3 Pipeline Route

As a business and property owner in Emily, Crosslake and Fifty Lakes in northern Crow Wing County, Minnesota, **I strongly object to the proposed route of the Line 3 Pipeline.**

The proposed Enbridge Line 3 runs near Roosevelt Lake in Outing, Minnesota in Cass County and just north of the City of Fifty Lakes.

Line 3 endangers the Pine River Watershed, including the lakes near Outing, Emily, Fifty Lakes, and the Whitefish Chain of Lakes between Crosslake, Ideal Corners, Jenkins, Swanburg and Pine River (ie., all of Crow Wing County and beyond!)

"Enbridge has a terrible record when it comes to pipeline spills," according to Whitefish Area Property Owners Association (WAPOA) President Tom Watson. On average, Enbridge has experienced nearly 2 pipeline spills per week for over a decade. (Enbridge reported over 800 spills between 1999 and 2010.)

In 2010 an Enbridge pipeline spill in Kalamazoo, Michigan dumped over a million gallons of crude oil into the environment and was declared, "the largest crude oil spill in Midwest history". Nearly 3 years later, the cleanup was still unfinished.

Not just the environment has suffered. Hundreds of Americans have experienced physical symptoms of exposure to Enbridge's spilled crude oil.

Environmental leaders in our neighboring Wisconsin charged Enbridge with multiple violations during the building of a pipeline in that state in 2009. Another Enbridge spill in 2007 contaminated the local water table, significantly impacting property values and endangering the drinking water of WI residents and livestock.

And Minnesota has already suffered numerous spills from Enbridge pipelines. For example one Enbridge spill occurred near Clearbrook, MN; and in 2002, a 4th of July spill near Cohasset in Itasca County threatened contamination of the Mississippi River (and millions of US citizens who live downstream).

According to Enbridge, in at least one of their pipeline accidents, less than half of the spilled oil was recovered.

We all need gasoline, hence the need for pipelines, but **that level of environmental contamination is absolutely intolerable**. If pipelines can't be made and operated safely, we don't want them running across our state, threatening the lives, livelihoods, and property values of hundreds of thousands of Minnesotans.

The economy of this area (Crow Wing/Cass/Itasca and surrounding Counties) is completely dependent on summer LAKE tourism. We simply can NOT tolerate a SINGLE pipeline spill in our watershed!

The risk to our collective property values for the next 50 years far outweighs the $2B of jobs Enbridge claims the pipeline will infuse into our economy over the next 2 years.

Enbridge recently abandoned plans for the Sandpiper line along this same corridor due to public opposition. The objections of local residents have not changed since then. We didn't want the risk then, and we still don't want the risk now that any pipeline along the proposed Line 3 Pipeline presents to the local watershed. (Why not stick with the same route where the current pipeline already runs, or choose line 4, or an option that has less potential environmental impact?)

Choose a route that doesn't contribute to the loss of wildlife habitat or the wild rice crop, or threaten the pristine waters of so many Minnesota lakes and those of us who depend on them.

Don't ruin our beautiful Minnesota Lake Country! **Choose another route. Period!**

Julie Engle
39897 County Rd 3
Crosslake, MN 56442

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
LAWRENCE ENGSTROM	612 802 0550	eengstrom@local563.org

ADDRESS
10236 KARSTEN AVE NE

CITY, STATE, ZIP
Albertville MN 55301

COMMENTS
I'm in support of line 3 to provide hundreds of workers jobs to support their families. Line 3 is a great thing and needs to happen...

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Adam Erickson	7153945816	gumbudah@charter.net

ADDRESS
5623 Hammond Ave

CITY, STATE, ZIP
Superior WI 54880

COMMENTS
Energy & environment CAN co-exist. Enbridge does it every day. Examine the facts, the statistics, NOT the inaccuracies brought out by oponents. The examining is done, its time to approve.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: apache@web.lmic.state.mn.us
Sent: Thursday, June 22, 2017 7:36 AM
To: MN_COMM_Pipeline Comments
Subject: Erickson Thu Jun 22 07:36:25 2017 PPL-15-137

This public comment has been sent via the form at: mn.gov/commerce/energyfacilities/publicComments.html

You are receiving it because you are listed as the contact for this project.

Project Name: Line 3 Pipeline Replacement

Docket number: PPL-15-137

User Name: Torrey Erickson

County: Beltrami County

City: Bemidji

Email: torrey.erickson@yahoo.com

Phone: 218-751-1571

Impact: I believe this is the safest way to transport the product. I am 100% for line 3 replacement.

Mitigation: I support the new route that is in place or any alternate routes.

Submission date: Thu Jun 22 07:36:25 2017

This information has also been entered into a centralized database for future analysis.

For questions about the database or the functioning of this tool, contact:

Andrew Koebrick
andrew.koebrick@state.mn.us

Levi, Andrew (COMM)

From: EDWARD ERICKSON, J <user@votervoice.net>
Sent: Sunday, July 02, 2017 7:50 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I strongly support the replacement of line 3 and it is the safest and most economic way to ship oil there is. It will bring many good paying jobs to the region. EDWARD J ERICKSON

Sincerely,

EDWARD J ERICKSON
5858 Arnold Rd
Duluth, MN 55803
erick5858@aol.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Michael Ericson	218-355-0103	ericsonm410@gmail.com
ADDRESS		
5871 Baxter Ave.		
CITY, STATE, ZIP		
Superior WI 54880		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Barbra Erickson	218-751-1571	Barbra.erickson@yahoo.com

ADDRESS: 3927 No Country Creek N.E.

CITY, STATE, ZIP: Bemidji, MN. 56601

COMMENTS

I'm 100% For the Line 3 replacement

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Gregory Erickson	218-776-3319	
ADDRESS		
16932 490 st		
CITY, STATE, ZIP		
Clearbrook Mn 56634		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Megan Erickson	218-776-2077	
ADDRESS: 5209 179th Ave		
CITY, STATE, ZIP: Clearbrook MN 56634		

COMMENTS
Enbridge Maintains their Lines.
As a land owner near the Clearbrook terminal
I welcome all pipelines with out fear as
I know they work Diligently to
Maintain facilities and Row.
I Support Line 3 replacement!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Patrick Erickson	218-333-1314	
ADDRESS: 5593 Little Bass Lake Rd NE		
CITY, STATE, ZIP: Bemidji MN 56601		

COMMENTS

Build this Safe Pipeline. Best Method to Safely move oil. Put America to work

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Tami Erickson	333-1341	tami_erickson@hotmail.com
ADDRESS: 5593 Little Bass Lk Rd NE		
CITY, STATE, ZIP: Bemidji, MN 56601		

COMMENTS

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Line 3 Replacement Project DEIS

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Torrey Gerald Erickson	218-751-1571	Torrey.Erickson@Yahoo.Com

ADDRESS
3927 No Country Circle NE

CITY, STATE, ZIP
Bemidji, MN. 56601

COMMENTS

This is by far the safest way to transport oil. I support it 100%

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Zachary Fridson	218 333 1314	

ADDRESS
5593 Little Bass Lake Rd NE

CITY, STATE, ZIP
Bemidji Mn 56601

COMMENTS

Put America to work. Build this safe pipeline.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

JULY 10, 2017 FAX: 1 77 - 651 539 0109

JAMIE MACALPSTER
ENVIRONMENTAL REVIEW MGR
MINN. DEPT OF COMMERCE
85 TH PLACE EAST
SUITE 280
ST. PAUL, MN 55101-2198
FAX: 651-539-0109

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MACALISTER PAGE 2 JULY 10 / ERICKSON

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PLEASE CALL ME WITH ANY QUESTIONS: PH 763.559.4772
CEL 612.840-8081

SINCERELY,

DELANO & SUSAN ERICKSON
LAKE ADDRESS 2107 PENISULA RD CUYUNA MN 56662
MAIL ADD 2317 KIRKWOOD LA. PLYMOUTH MN 55441

[redacted] TAN BEACH, MERRIFIELD, OUTING, PEQUO
UESDAY, JULY 4, 2017 • VOL. 13 NO. 27 ISSUE 640 • CROSSLAKE & OUTI

WAPOA update on pipeline proposal

By Bill Monroe
Northland Press Correspondent

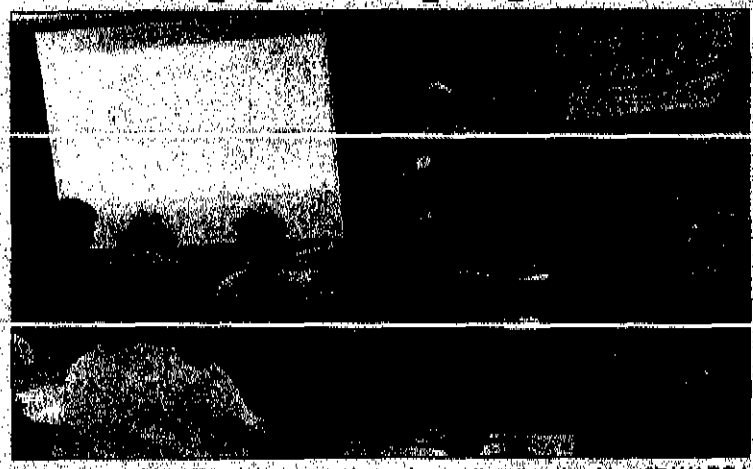

WAPOA President Tom Watson spoke to those attending the June 27 WAPOA workshop on the subject of a proposed new oil pipeline that would run through the White Fish Chain Watershed. • photo by Bill Monroe

When it comes to the proposed Enbridge Energy Pipeline Line 3 route "We've got a target on our backs" according to Richard Smith, President of the Friends of the Headwaters. Smith, along with Whitefish Area Property Owners Association (WAPOA) President Tom Watson spoke at a WAPOA workshop June 27 at the Crosslake Community Center. The workshop was held to update people on the pipeline proposal and to provide assistance to anyone wishing to submit a written comment on the project.

The Minnesota Department of Commerce (DOC) completed 22 hearings on the Draft Environmental Impact Statement (DEIS) for a proposal by Enbridge to build a new pipeline from Canada to Joliet, IL through Superior, WI. It would be constructed through roughly 35 miles of the northern part of the Pine River Watershed and pass through minor watersheds near the White Fish Chain and lakes near Fifty Lakes and Outing.

"Enbridge has a terrible record when it comes to pipeline spills," Watson said. He said the firm has experienced, on average, [illegible] pipeline spills every week between 2004 and 2015.

The proposed 36-inch pipeline would replace a current 34-inch line build in 1962 and 1963. It would cross 192 bodies of water in Minnesota and would initially carry 760,000 gallons of crude oil a day. Watson and Smith say it's likely the pipeline will eventually carry close to a million gallons a day. As proposed, Line 3 would be installed in the Pine River Watershed and buried in and near existing high voltage power lines owned by Minnesota Power, which would provide Enbridge with an easement. This project is the first in Minnesota history to require Environmental Impact Statement.

The risks of a spill could have a negative effect on ground water, habitat, surface water, wildlife and greenhouse gases Watson said. Contractors who have previously been hired by Enbridge are conducting some of the work on the study, including the impact of pipeline spills.

Watson and Smith urged those [illegible] to the DOC if they have concerns about protecting area lakes and ground water from a pipeline [illegible] 10. After that, the next step for the pipeline will be to obtain a certificate of need from the Minnesota Public Utilities Commission. If that happens, then a determination will be made on the route of the pipeline. The DEIS is only focusing on Enbridge's preferred pipeline route although another route, labeled SA-04, would avoid traveling through the Whitefish Chain and Pine River Watershed.

In order for the crude oil to be pumped through the pipeline, it must be thinned with chemicals, some of which have been judged to be very carcinogenic. "It makes for a very toxic cocktail," Smith said. Spills of some of these chemicals have been known to affect drinking water hundreds of miles from the spill, he said. "Rural first responders lack the training and equipment to deal with these spills," he said.

Construction of the pipeline has already begun in Canada. "This will put great pressure on Minnesota administrators to approve the pipeline route," Smith said. If it is approved, construction could begin in Minnesota in early 2018.

Anyone wishing to write comments on the issue can mail them to: Jamie Macallister, Environmental Review Manager, Minnesota Department of Commerce, 85 7th Place East, Suite 280, Saint Paul, MN 55101-2198. Comments can be faxed to the Environmental Review Manager at 651-539-0109 or e-mailed to Pipeline.Comments@state.mn.us.

Watson can be reached at president@wapoa.org

Crosslake Council continues work on housing developments

By Bill Monroe
Northland Press Correspondent

oper's construction of eight townhomes near Town Square by reducing the project's $13,500 park

At that meeting, Leah Heggerston of Crossroads Development

The start of the 20th a

20th An

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There were over 500 total participants in the races, including [illegible]

continued on page [illegible]

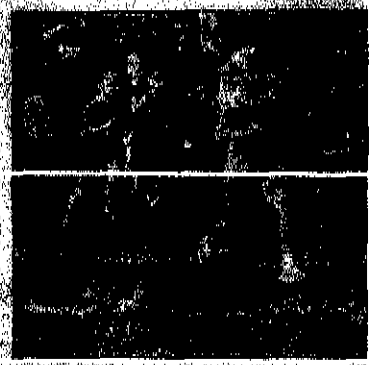

One of several heats for th

WCCO p top do

Manhattan's Tiki Bar was chosen as the top dockside bar in a recent social media poll of WCCO viewers.

On Tuesday Amelia Santaniello and crew visited the area to interview owner and general manager Kista Brunkhorst (pictured at right) and present a plaque.

Another Crosslake area staple, Moonlite Bay came in second [illegible]

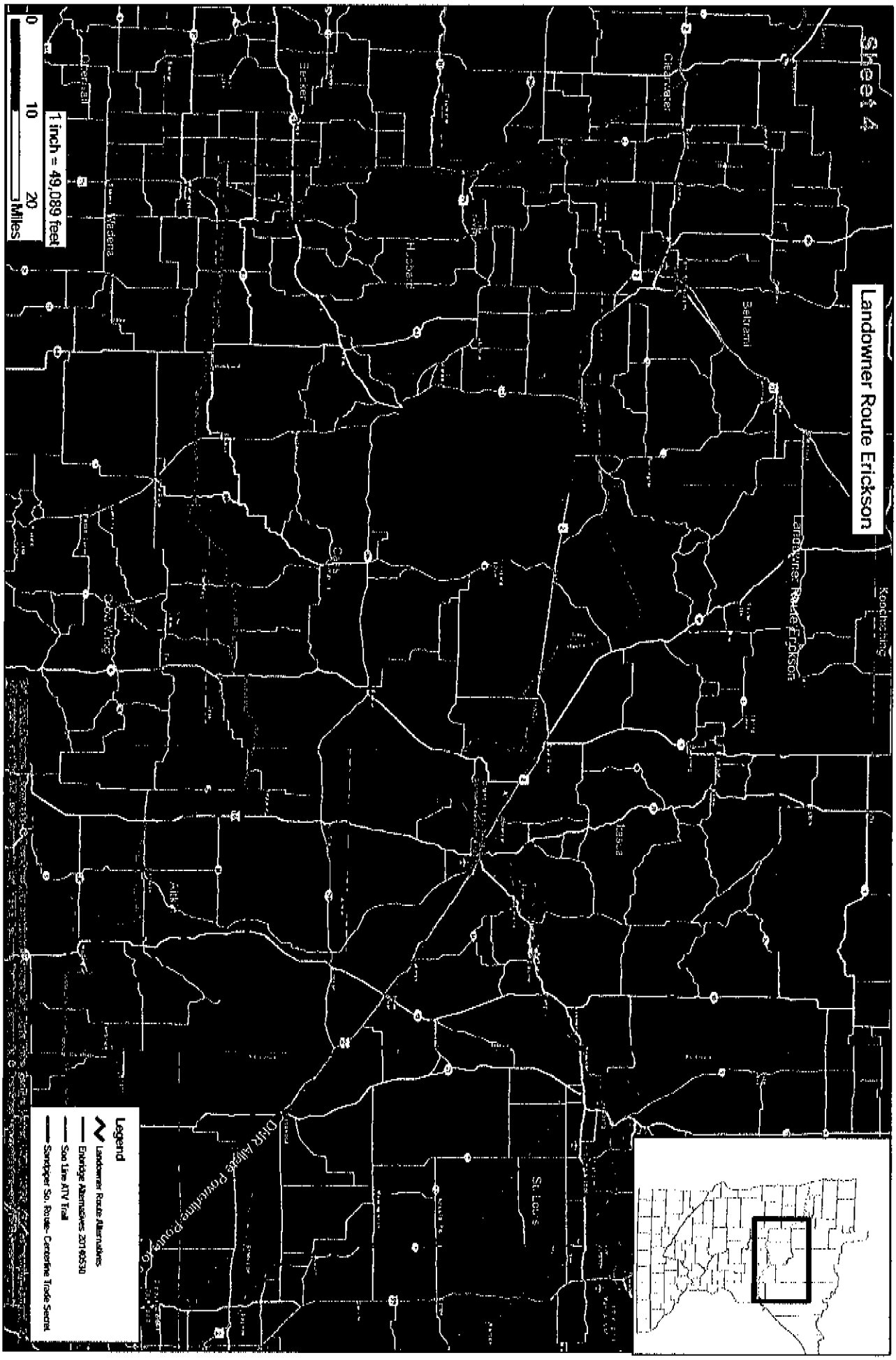
Landowner Route Erickson
Sheet 4
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Koochiching
Bemidji
Cass Lake
Bagley
Walker
Hubbard
Park Rapids
Detroit Lakes
Fergus Falls
Alexandria
Wadena
Brainerd
Pine City
Hinckley
Cambridge
Mora
Milaca
Isanti
Princeton
Elk River
Anoka
Minneapolis
St. Paul
Stillwater
Hastings
Red Wing
Lake City
Wabasha
Winona
Rochester
Austin
Albert Lea
Owatonna
Faribault
Northfield
Shakopee
Chaska
Chanhassen
Eden Prairie
Bloomington
Minnetonka
Hopkins
Edina
Richfield
Burnsville
Apple Valley
Eagan
Inver Grove Heights
Rosemount
Farmington
Lakeville

JANUARY 15, 2014
PUBLIC UTILITIES COMM. 121 7TH PL E. SUITE 350, ST. PAUL
THE HONORABLE JUDGE LIPMAN
AND THE MN PUBLIC UTILITIES COMMISSION
RE: SANDPIPER PIPELINE
- PUC DOCKET NO. 13-473
- OAH DOCKET NO. 8/2500-31260

THANK YOU FOR LISTENING TO MY COMMENTS @ THE PUBLIC HEARING - JAN 5 IN ST PAUL. AFTER LISTENING TO MOST OF THE COMMENTS IT SEEMS THAT SUPPORT FOR IS ECONOMIC (JOBS) AND AGAINST, DAMAGE TO ENVIRONMENT & WATER RESOURCES CAUSED BY CONSTRUCTION. BY LIMITING CONSTRUCTION TO EXISTING PIPELINE ROUTE, A COMPOMISE COULD WORK FOR BOTH.

I AGAIN WISH TO OPPOSE GRANTING A CERTIFICATE OF NEED FOR THE SANDPIPER PIPELINE AS PROPOSED.

1. CRUDE OIL FROM THE CANADIAN OIL FIELDS & THE BAKKEN FIELD COULD BE SENT VIA THE THE KEYSTONE ROUTE WHICH APPEARS TO BE ON ITS WAY TO APPROVAL IN CONGRESS.
2. WE ALREADY HAVE PIPELINES SERVING OUR REFINERIES AND MINNSOTA NEEDS.

(CONT. P 2)

JAN 15, 2014 P. 2 ERICKSON (CONT.) PUC DKT 13-473

3. ENBRIDGE'S PIPELINE 3 BRINGS OIL TO THEIR TERMINAL IN SUPERIOR WI
4. ENBRIDGE'S ECONOMIC NEED IS TO INCREASE CAPACITY & UPGRADE LINE 3 TO TRANSPORT BOTH CANADIAN & ND OIL TO SUPERIOR.

I SUBMIT THIS IMPROVEMENT OF THEIR EXISTING LINE FOR CAPACITY AND SAFETY BE ACCOMPLISHED ALONG THEIR EXISTING EXISTING ROUTE (IE HWY 2) AND NOT CREATE A NEW ROUTE THRU VIRGIN GROUND & ENVIRONMENTALY SENSITIVE LAKE COUNTRY USING ELECTRIC TRANSMISSION CORRIDORS AS JUSTIFICATION. THE ENVIRONMENTAL HAZARD IS EXPONENTIALLY GREATER WITH OIL PIPELINES THAN OVERHEAD POWER LINES WHICH SPAN STREAMS & WATERBODIES WITHOUT IMPACT.
I SEE NO BENEFIT FOR MINNESOTA IN APPROVING ENBRIDGE'S PROPOSAL FOR THE SANDPIPER PIPELINE. THEY SHOULD USE EXISTING ROUTE TO UPGRADE AND/OR REPLACE THEIR PIPELINES WHICH WILL HAVE THE SAME ECONOMY & JOBS BENEFIT.
(CONT. P. 3)

JAN 15, 2014 P.3 ERICKSON (CONT) PUC DKT 13-473

AS A LAKE WASHBURN HOME & LANDOWNER, I HAVE A DEEP CONCERN OF ENVIRONMENTAL & SAFETY ISSUES RELATED TO THE CONSTRUCTION OF A PIPELINE ADJACENT TO OUR LAKE AND AREA WATER SOURCES ESPECIALLY IN THE AREA OF THE FLOWING SPRING & AQUIFER LOCATED AT THE STATE FISH HATCHERY ON HWY 6 NORTH OF OTING, MN FROM WHICH WE & MANY OTHERS RECEIVE DRINKING WATER AND IS A SOURCE OF WATER TO OUR WELL AND LAKE.

WE SPEAK FOR OUR LAKE WASHBURN ASSOC. IN OPPOSITION TO THE NEED FOR THE PROPOSED SANDPIPER PIPELINE ROUTE

RESPECTFULLY SUBMITTED
DELANO & SUSAN ERICKSON

ADDRESS: LAKE - 2107 PENISULA RD. OTING, 56662
MAIL - 2327 KIRKWOOD LA., PLYMOUTH 55441
ENCL: FEB 15 '14 LETTER & MAP
CC: LARRY HARTMAN, EERA, MN DEPT OF COMMERCE

JULY 10, 2017 FAX: 1 77 - 651 539 0109

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MGR
MINN DEPT OF COMMERCE
85 TH PLACE EAST
SUITE 280
ST. PAUL, MN 55101-2198
FAX: 651-539-0109

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MACALISTER PAGE 2 JULY 10 / ERICKSON

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PLEASE CALL ME WITH ANY QUESTIONS: H 763.559.4772
CEL 612.840-8081

SINCERELY,

DELAND & SUSAN ERICKSON
LAKE ADDRESS 2107 PENISULA RD CUYUNA MN 56662
MAIL ADD 2317 KIRKWOOD LA. PLYMOUTH MN 55441

[redacted] Beach, Merrifield, Outing, Pequ[redacted]
[redacted]UESDAY, JULY 4, 2017 • VOL. 13 NO. 27 ISSUE 640 • CROSSLAKE & OUTI[redacted]

WAPOA update on pipeline proposal

By Bill Monroe
Northland Press Correspondent

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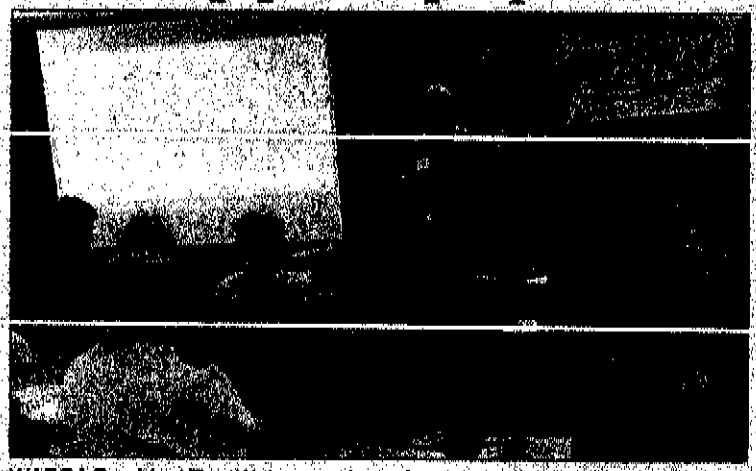

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Crosslake Council continues work on housing developments

By Bill Monroe
Northland Press Correspondent

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continued on page 8

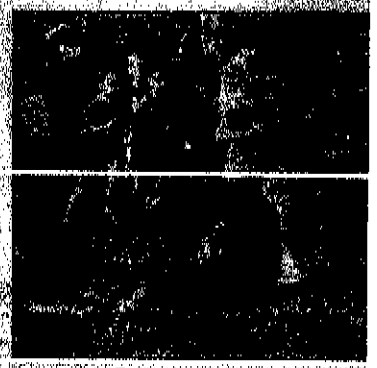

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Levi, Andrew (COMM)

From: Peter Esala <user@votervoice.net>
Sent: Friday, June 30, 2017 8:33 AM
To: MN_COMM_Pipeline Comments
Subject: Oil Pipelines

Dear Ms. MacAlister,

Pipelines appear to be much safer than trains due to explosions and spillage

Sincerely,

Peter Esala
3647 Fectos Rd
Tower, MN 55790
pmesala@yahoo.com

Levi, Andrew (COMM)

From: Dan Evans <devans@paulbunyan.net>
Sent: Friday, June 23, 2017 8:01 AM
To: MN_COMM_Pipeline Comments
Cc: Dan Evans
Subject: public comment on proposed line 3

Docket #'s CN-14-916 and PPL-15-137;

My comment is the company must be required to remove the old line completely before putting another Pipe Line in the ground. No new Pipe Line should be put in the ground unless the end destination of the oil flowing through it is designated for use by US consumers only. Enbridge should not be allowed to export the oil out of the US.

Dan Evans
104 6th Street SE,
Turtle River, MN 56601

Virus-free. www.avast.com

Levi, Andrew (COMM)

From: Dave Evenwoll <davepat@arvig.net>
Sent: Tuesday, July 04, 2017 9:42 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I support the replacement of the Line 3, it's a no brainer!!

Sincerely,

Dave Evenwoll
15782 Wilderness Dr
Lake Itasca, MN 56470
davepat@arvig.net

Levi, Andrew (COMM)

From: mary everest <maryfromtheocean@gmail.com>
Sent: Monday, July 10, 2017 11:38 PM
To: MN_COMM_Pipeline Comments
Subject: Docket Numbers CN-14-916 and PPL-15-137

To whom it may concern,

I am writing to express my concern regarding the Draft Environmental Impact Statement (DEIS) for the Enbridge Line 3 "replacement" pipeline (docket numbers CN-14-916 and PPL-15-137). The DEIS fails to adequately address alternatives to the current proposal. The alternatives outlined in chapter 4 are unrealistic and serve to give the appearance that Enbridge has diligently analyzed alternatives. The rail and truck options described are intentionally outrageous in order to give the impression that the current pipeline proposal is the best proposal. The DEIS fails to adequately outline considerations for the option to discontinue use of the old pipeline in the area, thoroughly remove it, clean up and restore damaged areas, and phase out the transportation of oil through Minnesota pipelines.

Furthermore, the Anishinaabeg in northern Minnesota are guaranteed, by an 1855 treaty, the right to support themselves through their relationship to the land in the area of the proposed Line 3 route. The DEIS does not adequately address the environmental harm that would befall the ecosystems in the pipeline's path. The right to harvest, hunt, fish, and travel in the treaty territory would be impeded by environmental degradation.

Please deny the permit for the new Line 3, and do whatever you can to ensure that Enbridge is held accountable for the compromised pipeline that is already in the area. Enbridge must remove the current pipeline, and the 1855 treaty must be honored. Line 3 cannot coexist with the protected right to harvest, hunt, fish, and travel in the treaty territory.

Thank you.

Mary Everest
Minneapolis

Levi, Andrew (COMM)

From: Jon Eversoll <jeversoll@gmail.com>
Sent: Monday, July 10, 2017 12:01 PM
To: MN_COMM_Pipeline Comments
Subject: Opposition to Enbridge Pipeline 3

Dear Mr. MacAlister:

I am writing to express my strong opposition to the proposed Enbridge Line 3 crude oil pipeline across northern Minnesota. I believe it threatens vital state resources and encourages the extraction of crude oil from tar sands and by fracking.

I believe that potential spills put at risk our natural resources, particularly water and wild rice. Clean rivers, lakes, and groundwater is essential to all Minnesotans for drinking, irrigation, and recreation. Furthermore, wild rice is a sacred food for the Anishinaabe. I believe they have every right to preserve this important resource.

Furthermore, we cannot continue to promote the extraction of crude oil from tar sands and by fracking, two of the most environmentally harmful methods of generating fossil fuels. We need to encourage "cleaner" fossil fuels such as natural gas and green sources of energy.

Again, in closing, I oppose firmly Enbridge's planned oil pipeline.

Sincerely,

Jon Eversoll

1399 Edgcumbe Road
Saint Paul, MN 55116

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Mickey Eyer		
ADDRESS		
4243 Fayre Rd		
CITY, STATE, ZIP		
Duluth Mn 55803		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: linda fadem
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline
Date: Monday, June 05, 2017 12:01:37 PM

I urge the Pipeline Commission to reject this latest destructive pipeline that will serve no purpose whatsoever but to further destroy the environment, harm native peoples and mindlessly contribute to global warming. It is regressive and backward. The future is green energy and I urge the Commission to put a stop to it.

Thank you very much.

Linda Fadem

Levi, Andrew (COMM)

From: Mary Fahlstrom <mary.fahlstrom@totinograce.org>
Sent: Friday, July 07, 2017 10:51 PM
To: MN_COMM_Pipeline Comments
Subject: Money Money and more money

Dear Department of Commerce,

Thank you for your time! I don't know if you've lived in northern Minnesota...perhaps you have and know the beauty already, but incase you haven't, I would like to testify how it has been a sanctuary for me and my family. Our ancestors live near Beauty Lake, an "alternate route" for line 3. Our livelihood and well being coincides with the wild cone flowers and the peace of the lake at sunset.

Whether this pipeline chooses an alternate route or not, livelihoods of both humans and animals would be negatively affected. It is my hope that 1. the original pipeline that is leaking be removed or fixed or "monitored" for several years and 2. a strong environmental 'draft' would be implemented. This massive project would affect 5,443 acres and require 172 NEW roads, and double the number of Enbridge pipeline surface water crossings, including two more Mississippi river crossings.

I strongly oppose this pipeline and look forward to your environmental protective actions in the future.

Sincerely,

Mary Fahlstrom

CN-14-916 and PPL-15-137

Mary Fahlstrom | Spanish Teacher
Totino-Grace High School
1350 Gardena Avenue NE | Fridley, Minnesota 55432
763-571-9116 ext 713

*A disciple is not above his teacher, but everyone who is fully trained will be like his teacher. **41**Why do you look at the speck in your brother's eye, but fail to notice the beam in your own eye? **42**How can you say, 'Brother, let me take the speck out of your eye,' while you yourself fail to see the beam in your own eye? You hypocrite, first take the beam out of your own eye, and then you will see clearly to remove the speck from your brother's eye. Luke 6: 40-42*

SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Liz Fakhoury	612-968-0748	~~Lizfakho~~ Lizfakhoury@gmail.com
ADDRESS		
15830 Cobblestone Lk Pky		
CITY, STATE, ZIP		
Apple Valley MN 55124		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 30 DAYS

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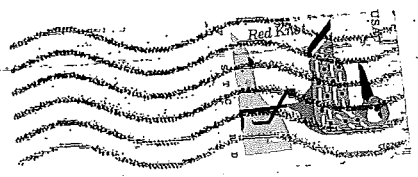

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14,916; PPL-16-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

From: Emilie Falc
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137
Date: Wednesday, May 31, 2017 4:24:51 PM

I am writing about my concerns of the environmental impact of Enbridge's Line 3 through northern Minnesota. My main concern is that the whole of the scientific evidence of the harms causes by the fossil fuel industry indicates that all of our future funding for energy should go toward building a sustainable future using renewable resources, not oil, which when burned is a main contributor to global warming, increased flooding, polar ice melting, and sea level rise. We need to protect our land and water from contamination from oil spills. Another main concern is that big corporations with help from the local governments should not be allowed to bulldoze or rape the land for their greed in opposition to the wishes of the Chippewa tribes. Consider the importance of bringing together the voices of the elders, the farmers, the outdoorsmen and women, the scientists and the children so that we can see the beauty of a system in balance, not a system headed towards the brink.
Emilie Falc
Winona, MN

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME: Haidar Falhouny
PHONE NUMBER: 612 968 0747
EMAIL: Haider.falhouny@hotmail.com
ADDRESS: 15830 Cobblestone lake parkway
CITY, STATE, ZIP: Apple Valley, MN 55124

COMMENTS

I support the pipe line

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: dennis farah <dbfarah@frontiernet.net>
Sent: Wednesday, July 05, 2017 5:01 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I fully agree a replacement line is needed as long as protection of leaks are contained or line shut downs automatic if detected to eliminate hazards to our environment or a fund is set up to deal with this issue if problems or failure of line issue. It is much safer then trucking or rail and i feel as long as it is done right with protections in place that don't have to go to litigation and bankrupt city or county or state entity's with a set aside fund this ensure's clean up is done as soon asap

Sincerely,

dgFarah
84 N Mable St
McGregor, MN 55760
dbfarah@frontiernet.net

Levi, Andrew (COMM)

From: Brenda <bleehanson@aol.com>
Sent: Saturday, July 08, 2017 7:26 AM
To: Pipeline.Comments@state.mn.us.
Subject: Enbridge

Let's get on with the future of keeping Earth, it's people, animals and nature alive.

If we continue on as we are there is no future, there will be no clean, water, air or healthy people. It's insane.

Take the old pipeline out, clean up and invest your money on energy that is sustainable and good for all life.

It's that simple, we are on the road to destruction in the hands of the greedy rich who will not see the light.

I want to see life go on and people to awaken to reality.

Sincerely invested in "NO MORE RAPING OF EARTH FOR FOSSIL FUELS."

Brenda Lee Faber
Motley MN

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Barton T East	368-2923	
ADDRESS		
47135 129th ave	Becida mn 56608	
CITY, STATE, ZIP		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jeanne Fasteland	218-697-8427	
ADDRESS		
66641 345th PL		
CITY, STATE, ZIP		
Hill City MN 55748		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Thomas K Eastland	218 697 8427	thomas.eastland@centurytel.net
ADDRESS 66641 345th Pl		
CITY, STATE, ZIP Hill City Mn. 55748		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Andrea Fazendin <andrea.faz@gmail.com>
Sent: Monday, July 10, 2017 1:12 PM
To: MN_COMM_Pipeline Comments
Subject: Docket Number CN-14-916 and PPL-15-137

Good afternoon,

I am writing with my comments to express concern over the relocation and expansion of the DAPL Line 3. CN-14-916 and PPL-15-137

I have been following the project and the background information.

I have objections to the pipeline for a myriad of reasons:

- The data the EIS relys on is heavily provided by Enbridge, rather than a non-biased source.
- I believe that clean drinking water is imperative to life as we know it. A recent example of a spill near the Yellowstone River necessitated trucking in drinking water to the town of Glendive after over 50,000 gallons of oil leaked into the water there. This is a real possibility and could harm residents and animals.
- The 3 children that are my everything (pictured below) LOVE playing in the clean Minnesota lakes. There is so much history to the lakes in Minnesota, and access to water is a key thread in the fabric of our state. It can not be jeopardized by this pipeline and I urge you to consider protecting it.

Thank you for your consideration.

Andrea

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Marty Feil

Street Address: 22075 County Rd. 2

City: Skrulin State: Mn Zip Code: 56676

Phone or Email: 218-657-2647

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I Approve the project and the E.I.S.

If including additional pages please number them and tell us how many you are providing:_____ pages

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Joshua Fenhouse	715-817-5861	fenhouse@gmail.com

ADDRESS
3132 E. 5th St. # 14

CITY, STATE, ZIP
Superior, WI 54880

COMMENTS
Enbridge is my neighbor ~~[illegible]~~ literally. It is a huge economic supporter of my community. It is also potential work for me and my family. I support the Line 3 Replacement Project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Austin Ferguson	218-591-7611	Sledhead99@aol.com
ADDRESS		
4960 Parkview Rd		
CITY, STATE, ZIP		
Duluth Minnesota 55804		

COMMENTS Got er did

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Catherine FERGUSON <penelope2413@msn.com>
Sent: Sunday, July 09, 2017 6:54 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment Re: Docket CN-14-916 and PPL-15-137

Dear Sir and/or Madam
Safety of our waters is of the utmost importance in Minnesota. Citizens and property owners comply with many laws to keep our lakes and rivers clean. Enbridge needs to comply also! This is our water-water is life!!!
Here are facts related to this route and past history so expertly shared from Friends of Headwaters:

This route jeopardizes Minnesota's natural resources. The map on the right and the ones below clearly shows how Enbridge's proposed route (white line) traverses our best quality lakes, rivers, wetlands and forest ecosystems. Friends of the Headwaters (FOH) is NOT anti-pipelines. FOH has long advocated for alternative route SA-04 (light blue line) which avoids our cleanest water resources and crosses land less permeable and better suited for pipelines.
The risks posed by Enbridge's proposed route are many:

1. - This pipeline route crosses the clearest lakes area in MN based on the Census of Water Clarity (U of MN Water Resources Center).
2. - This pipeline route crosses an area with the highest susceptibility for groundwater contamination impacting drinking water aquifers (MPCA map).
3. - The pipeline route crosses the wild rice lakes area. According to the DNR, MN supplies 50% of the worlds hand-picked rice annually.
4. - The pipeline route crosses wetlands critical to waterfowl and other wildlife (DNR).
5. - The proposed route would cross 8 state forests (including the Mississippi Headwaters SF), 3 wildlife management areas, 13 trout streams (including the Straight River), as well as the North Country Trail.
6. - Line 3 would cross the Mississippi River twice in Minnesota. This river is a valuable source of drinking water for many cities on its 2,552-mile journey to the Gulf of Mexico, including Minneapolis and St Paul. 3.8 million gallons of water flow from Lake Itasca into the headwaters every day.
7. **A few more facts:**

- - The corridor will be covered with snow and ice for the long winter season. The Poplar pipeline spill (31,000 gallons) in the Yellowstone River in January of 2015 caused drinking water problems in Glendive, Montana. Clean up had to be postponed until spring. Imagine the effects of a similar spill in our Mississippi.

- PER DAY, this pipeline will carry 760,000 barrels of Alberta tar sand oil, also called "dilbit", the industry name for diluted bitumen - also known as "Cold Lake Blend". Don't be fooled. It's still tar sands oil. That's almost 32,000,000 gallons/day through our headwaters.
- Enbridge's pipeline spill of 850,000 gallons of tar sands oil in Michigan in 2010 polluted nearly 35 miles of the Kalamazoo River and has become one of the costliest spills ($1.2 Billion) in US history.
- The National Academy of Sciences Report on Diluted Bitumen (Tar Sands Oil) final finding is "diluted bitumen is virtually impossible to clean out of a water-based environment". ***WHY? BECAUSE IT SINKS!***

FRIENDS OF THE HEADWATERS

ENBRIDGE'S PROPOSED *LINE 3*
EXPANSION & RELOCATION
TAR SANDS OIL PIPELINE ROUTE

"Could THEY have picked a worse route?"

Friends of the Headwaters Mission:
To inform and educate persons to the environmental risks to Minnesota waters from a proposed oil pipeline which will jeopardize the Mississippi River Headwaters, many other lakes and streams and wild rice wetlands in northern Minnesota. FOH won a unanimous Minnesota Appellate Court ruling, upheld by the Minnesota Supreme Court, ordering the state of Minnesota to conduct the first environmental impact study, EIS, on a crude oil pipeline in Minnesota history. This is a landmark decision for MN environmental law.

To learn more, visit www.facebook.com/savemississippiheadwaters
To keep our water blue, donate at www.friendsoftheheadwaters.org
Or POBox 583, Park Rapids, MN 56470

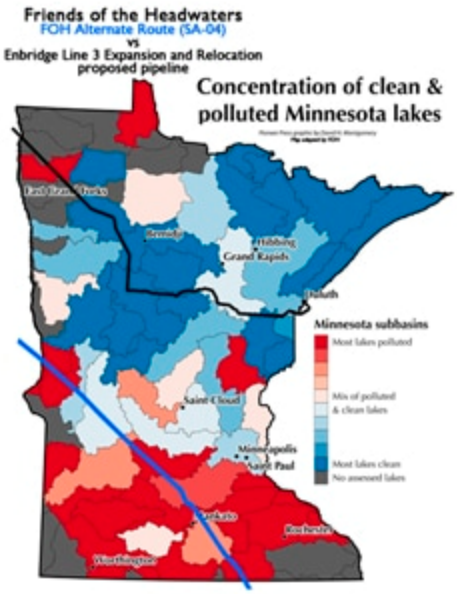

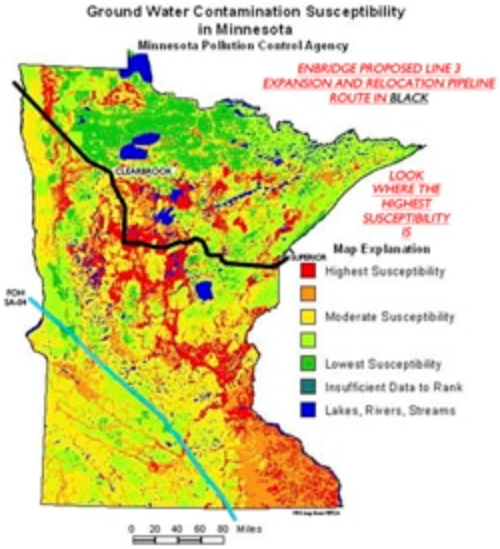

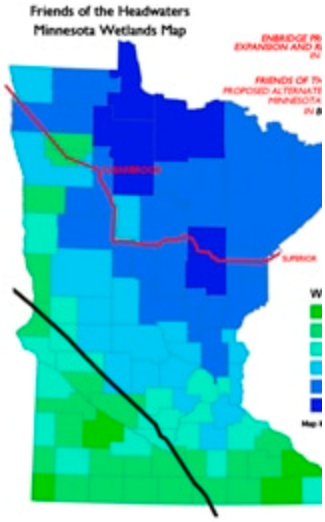

Thank you for this opportunity to share - our water is our future, water is life!
Catherine Ferguson
Sent from my iPhone

Levi, Andrew (COMM)

From: Mary Fernstrum <maryfernstrum@me.com>
Sent: Sunday, July 09, 2017 8:15 PM
To: MN_COMM_Pipeline Comments
Subject: I find the Endbrige pipe line not only unacceptable, but a crime against the planet

During pipeline construction and maintenance, Enbridge plans to store and apply petroleum products and hazardous chemicals 100 feet from surface waters.
This is an unacceptable risk to MN waters. For comparison, the Boundary Waters Canoe Area Wilderness rule for protecting water is to keep dish soap 150 feet from shore.

Horizontal Directional Drilling (HDD) will be used to cross under our most pristine, most sensitive waters, and anywhere there is flowing water, which describes most of the route. The potential exists for contamination through release of drilling fluid to the ground and/or water, termed a “frac-out." The DEIS cites a 35 mile section of Enbridge pipeline in Michigan where there were 11 HDD crossings, multiple minor releases and 2 major frac-outs. MN will not accept the risk of a frac-out every 5.5 river crossings.

Risk from Line 3 is in conflict with several of our Minnesota Statutes:
1. MN Statute 103F.305 Scenic River Protection Policy
https://www.revisor.mn.gov/statutes/?id=103F.305

2. MN Statute 116D.02 Declaration of State Environmental Policy
https://www.revisor.mn.gov/statutes/?id=116d.02

Levi, Andrew (COMM)

From: rsferrin@frontiernet.net
Sent: Monday, July 10, 2017 12:39 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Draft EIS comments
Attachments: Line3CommentsRSF2.pdf

Greetings,
Attached are my comments on the Line 3 Draft EIS. Please include these comments in your consideration of the adequacy of the DEIS. A confirmation email that indicates you received these comments would be appreciated.

Thank you.
Randy S. Ferrin

Randy S. Ferrin
23290 Quentin Ave N
Scandia, MN 55073
July 7, 20117

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198
Pipeline.Comments@state.mn.us

Dear Jamie,

I am writing to express my deep concerns about the Draft EIS preferred route for the Enbridge Line 3 pipeline. You have been and will be receiving detailed comments from many parties about what is so terribly wrong with the preferred route, so I will just summarize my concerns. The proposed route crosses an incredible area of sensitive natural and cultural resources. The pipeline will be transporting a highly toxic, impossible to clean up material, in remote areas where containment and clean-up will be difficult if not impossible. It crosses near wild rice beds, sensitive fish habitat, wetlands, drinking water supplies, forest lands, wildlife management areas, clear clean lakes, streams, and rivers. Tribal concerns about the route must be fully addressed. I urge you to reject this route and seek an alternate route that has far fewer potential impacted natural and cultural resources. Please expand the Draft EIS to include other suggested routes because this one would lead to, by far, the worst possible consequences. Minnesota stands to sacrifice incredible resources for the gain of a private Canadian company. Please do not let that happen.

Thank you for the opportunity to comment.

Sincerely,
Randy S. Ferrin

Levi, Andrew (COMM)

From: Mr. & Mrs. Michelle Figgins <smfiggins@msn.com>
Sent: Monday, June 26, 2017 2:30 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline Project

Dear Ms. MacAlister,

We need the pipeline to go through as it so helps the economy and people spend when there is good paying jobs. The pipeline is also safer than by rail and the pipeline companies do a very nice job in clean up and making sure the land is better than what they found it.

Sincerely,

Michelle Figgins
20563 Cardinal Dr
Grand Rapids, MN 55744
smfiggins@msn.com

Levi, Andrew (COMM)

From: Greg Filice <filic001@umn.edu>
Sent: Monday, July 10, 2017 10:14 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3, Enbridge

I oppose the construction of a new replacement pipeline to replace line 3.

First, to create a new corridor and expose new environmentally sensitive areas to oil spills seems incredibly short sighted. If the old line needs to be replaced, I think doing it in the old corridor makes more sense.

Second and more importantly, we should be using every means available to move away from fossil fuels because they contribute to global warming. This is the existential crisis of our century. The evidence is clear, the planet is warming because of CO_2 and other greenhouse gases. More pipelines means that market forces will favor use of fossil fuels. The US may withdraw from the Paris Accord, but all reasonable, intelligent US citizens and their leaders should still aim for the reductions in greenhouse gases that we agreed to when we joined the Paris Accord.

Sincerely and respectfully,

Greg Filice

Gregory Filice
15 Crocus Place
Saint Paul, MN 55102

Levi, Andrew (COMM)

From: Patricia Fillmore <psondag@charter.net>
Sent: Monday, July 10, 2017 3:35 PM
To: MN_COMM_Pipeline Comments
Subject: Embridge pipeline inquiry

My thanks to Jamie Mac Alister and staff for the enormous amount of time and details you have amassed in regard to the Embridge/Canadian Pipeline, both past and present.

Comments:

1 - Enbridge needs to remove the old pipeline to show “good will and care" for Minnesota lands. Their excuses show their unwillingness to care for and about our environment: rivers like the Mississippi where St. Cloud gets its drinking water, lakes, streams, forests, wild life, fish, birds, and humans. If Enbridge is unwilling to remove the old and decaying pipeline which will only continue to pollute, they exhibit no concern for our environment in general or in Minnesota. Why work with those who trash and leave! (So it’s hard, deal with it. Even as a child, I was taught to clean up my mess before starting another.)

2 -Their “tar sands oil” are the least desirable form of oil that exists; Minnesota is too smart to encourage this form of oil, especially with all your outstanding facts about its destructive properties. Both sides admit they leak and their notification system is weak at best.

3 - Minnesota needs to appreciate and cooperate with our Native Americans, especially as they look for ways to work with our environment, not destroy. This oil is Toxic!

4 - It’s Canadian Oil and they can run their pipes through Canada, directly to Lake Superior. Are we really so gullible that we don’t see the irony in destroying our land while the Canadians keep theirs clean?

In regard to Certificate of Need:

There is no economic need from Minnesota for this proposed enlarged pipeline. In fact, it threatens 17, 250 jobs in tourism.

This project is <u>not</u> in the best interest of the people of Minnesota.

Sincerely,

Pat Fillmore St.Cloud,Mn

Levi, Andrew (COMM)

From: Cynthia Finch <cfinch0340@gmail.com>
Sent: Wednesday, June 21, 2017 2:47 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I have had the privilege of living, playing and working in Minnesotan for over 40 years. Like other residents, I want our environment protected.

Replacing aging infrastructure like pipelines is imperative to protecting the environment.

A recent report released by the MPCA shows the Mississippi River Watershed has the cleanest waters in the state.

I believe energy infrastructure and clean waters can co-exist and well serve the needs of Minnesotans.

Sincerely,

Cynthia Finch
2711 W 13th St
Duluth, MN 55806
cfinch0340@gmail.com

Levi, Andrew (COMM)

From: sally fineday <sallyfineday@hotmail.com>
Sent: Thursday, July 06, 2017 2:31 PM
To: MN_COMM_Pipeline Comments
Subject: Comment Attached
Attachments: Pipeline Comment Jul 2017.pdf

Thank you for the opportunity to provide comment. My comment is attached.

Sally Fineday
28890 Connection Drive SE
Pennington, MN 56663
(218) 368-1766

Sally Fineday
28890 Connection Drive SE
Pennington, MN 56663
(218) 368-1766

July 6, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

RE: docket numbers CN-14-916 and PPL-15-137

I wish to express my adversity to the proposed Enbridge Pipeline 3 crossing the Mississippi River so close to our most valuable water resource - the Mississippi Headwaters. My concern is for the valuable clean drinking water that is provided to all citizens downstream of the Mississippi headwaters. This water has supplied my region since time immemorial with sustenance for my wild rice, water fowl, game, and life supporting drinking water.

It is time to make plans for the future that will sustain our people of this region for many generations to come. Please do not allow the proposed Pipeline 3 from passing through so much of our valuable water and land resources.

Please consider another plan to go south of the most valuable water source in our region. If the Enbridge proposed Line 3 must pass through then allow it to go through on an alternate route SA-04 where land is less permeable.

Thank you.

Sally Fineday

From: Harry Fisher
To: MN_COMM_Pipeline Comments
Subject: Attn: Jamie MacAllister Environmental Review Manager
Date: Friday, June 09, 2017 10:41:33 AM

Attn: Jamie MacAllister Environmental Review Manager

I strongly agree that Enbridge be allowed to replace Line 3! But under the following conditions:

Reuse or recycle-old-right of way good land use policy should not allow the clearing of over 12,000 acres of new right-of-way. Environmental impact would be minimized both upland and wet land by using the original Line 3 right-of-way.

Also, I believe the old pipe should not be left in the ground. Ideally, new pipe could be placed in the old trench.

Granted this may be more expensive, but saving in clearing cost and access to right-of-way will save money. Increased volumes through the pipe will help defray cost.

Harry E. Fisher
Duluth, MN

Line 3 Replacement Project DEIS

20 JUN '17
PM 2 1

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PRL-15-137

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MAILED FROM ZIP CODE 55419

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Todd Flicek	612.616.9783	tjflicekfamily@gmail.com
ADDRESS		
5921 Fairfax Ave		
CITY, STATE, ZIP		
Edina, MN, 55424		

COMMENTS
Replace before it fails!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Ann Flick <annmflick@gmail.com>
Sent: Monday, July 10, 2017 9:26 AM
To: MN_COMM_Pipeline Comments
Subject: docket numbers CN-14-916 and PPL-15-137

Concerns regarding safety for our water ways have not been sufficiently addressed. Please do not let the pipeline proceed.

Ann Flick
39446 Lodge Dr
Menahga MN 56464

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
WILLIAM FOREMAN	218-657-2279	N/A

ADDRESS
P.O. Box 525

CITY, STATE, ZIP
BAGLEY, MN. 56621

COMMENTS

WE NEED THE GAS, OIL AND JOBS!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

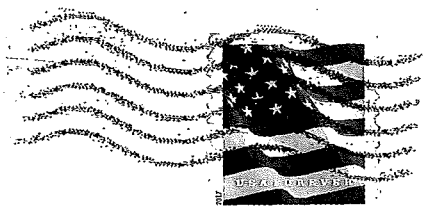

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: John Forney <jwforney@gmail.com>
Sent: Sunday, July 09, 2017 10:58 AM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Environmental Review Manager: pipeline.comments@state.mn.us

Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

I am a very concerned citizen of the State of Minnesota. My residence is in the northern portion of Crow Wing County in the Pine River Watershed on Lower Whitefish Lake in the Whitefish Chain of Lakes. The proposed route for Line 3 crosses through the Pine River Watershed a few miles from my home. I am concerned that there has not been a complete review of the potential negative impacts of an oil spill from this proposed pipeline route in this geographic area.

A great deal of examination has been done relative to the impact of a spill on surface waters. The negative consequences of a spill into surface waters are unacceptable. A spill of even modest size will do immense harm to our waters — a God given gift to the present generation and future generations that is irreplaceable. In addition, a spill will impact wildlife, the tourism economy, the general economy, and the way of life of residents in this area. I share the concern about the negative impact on surface waters as a former president of the Whitefish Area Property Owners Association, the largest lake property owners association in the State of Minnesota. The responsibility of the State of Minnesota is to protect the interests of the people of Minnesota.

My particular interest in this environmental review is the **potential impact of a pipeline spill on the ground water**. There appears to be some review of this issue in the draft document but the complete issue is not covered. Following are the key points:

> Enbridge has a history of many oil spills which have ranged from small to catastrophic. They do not have a good track record. Enbridge was responsible for the catastrophic heavy crude oil spill in Michigan that impacted the area near the Muskegon River. They average multiple spills weekly.

> Enbridge intends to transport heavy crude oil in the proposed pipeline (estimated to be 65%).

> In order to pump heavy crude oil, it must be diluted.

> One of the dilution chemicals is benzene which is a known carcinogenic substance.

> The vast majority of the residents of the area near the proposed pipeline route get their drinking water directly from private wells/ground water.

> The ground water is in a relatively shallow aquifer that is primarily sand based (not rock or clay). Water migrates easily in this sandy soil; so too would an oil spill with benzene.

> The *Geological Atlas of Crow Wing County, Minnesota* prepared for the county by the Minnesota Department of Natural Resources indicate that the foliage of water in the aquifer under and near the proposed pipeline flows directionally from northeast of the Whitefish Chain of Lakes to the southwest — from the Remer and Emily areas to the Whitefish area of Crow Wing County. [*Geological Atlas of Crow Wing County, Minnesota, Atlas C-16, Part B, Plate 7 of 10, Figures 2, 3, and 4]*

> In analyzing water from the aquifer in this part of the state, it has been determined that there is no evidence of radioactive isotopes (Tritium) that are found in the waters of other aquifers in other parts of the United States. These radioactive isotopes are the result of nuclear testing in the middle of the 20th century. The fact that the radioactive isotopes are not present means there is a great deal of water in the aquifer and it is very stable. It also suggests that the impact of an oil spill could taint the waters in this area for many, many years to come with benzene and other dangerous chemicals. [[*Geological Atlas of Crow Wing County, Minnesota, Atlas C-16, Part B, Plate 7 of 10, Figures 2]*

> Oil spills in other areas of the world have introduced benzene into the ground water/drinking water and made it unfit for human consumption. (See: Lanzhou, China (capital of northwestern Gansu Province, April, 2014 impacting 2.4 million people and Yellowstone River, Montana, 2015) Net: Benzene can adversely impact ground water/drinking water and pose a severe health risk to those who consume it.

Based on this information, I ask that there be further study and analysis of the risk from a crude oil spill with benzene as a diluent into the sandy soils covering the aquifer in northern Crow Wing County and the neighboring portion of Cass County. I believe the pipeline would present a potential and serious threat to the health and well-being of the residents in this area. It would also be extremely damaging to the economy of the area and the potential damage would destroy the small economic gain that Enbridge suggests would result from the pipeline. Finally, the challenge and cost of remediation of the damage to the ground water would be very difficult and expensive to both government and private interests.

I am opposed to the proposed route for the Line 3 pipeline. There appear to be alternate routes that would not be impacted as much as the proposed route. The base driver of this proposed route is greed. And it will cost Minnesota dearly.

Sincerely,

John Forney

11797 Whitefish Avenue
Crosslake, MN 56442

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Kerry S. Forsman	218-929-7355	Forsman512@gmail.com
ADDRESS		
704 5 ave Sw		
CITY, STATE, ZIP		
Chisholm, MN 55719		

COMMENTS Pro ib

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Dean Forsythe <dean.forsythe@enbridge.com>
Sent: Tuesday, June 13, 2017 3:52 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I am a Minnesotan and want to see the environment protected like most others.

I believe replacing aging infrastructure like pipelines is imperative to protecting the environment.

Pipelines are everywhere in Minnesota, according to the Environmental Quality Board's report. I'm familiar with pipeline right of ways in northern Minnesota around Bemidji, Grand Rapids, Cass Lake and Alexandria. Pipelines and natural resources have gone hand-in-hand in northern Minnesota for decades.

Enbridge has worked hard to address specific concerns raised by landowners along the Preferred Route. More than 95% of the private landowners have signed voluntary easements with Enbridge, and Enbridge has modified the Preferred Route based on public comments/landowner feedback. These efforts to minimize impacts and address landowner feedback should be better reflected in the FEIS.

As a resident of northern Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project. I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3. No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS. Please keep the EIS timeline to the statutory deadline of 280 days.

Sincerely,

Dean L. Forsythe
2468 Hidden Pines Dr
Carlton, MN 55718
dean.forsythe@enbridge.com

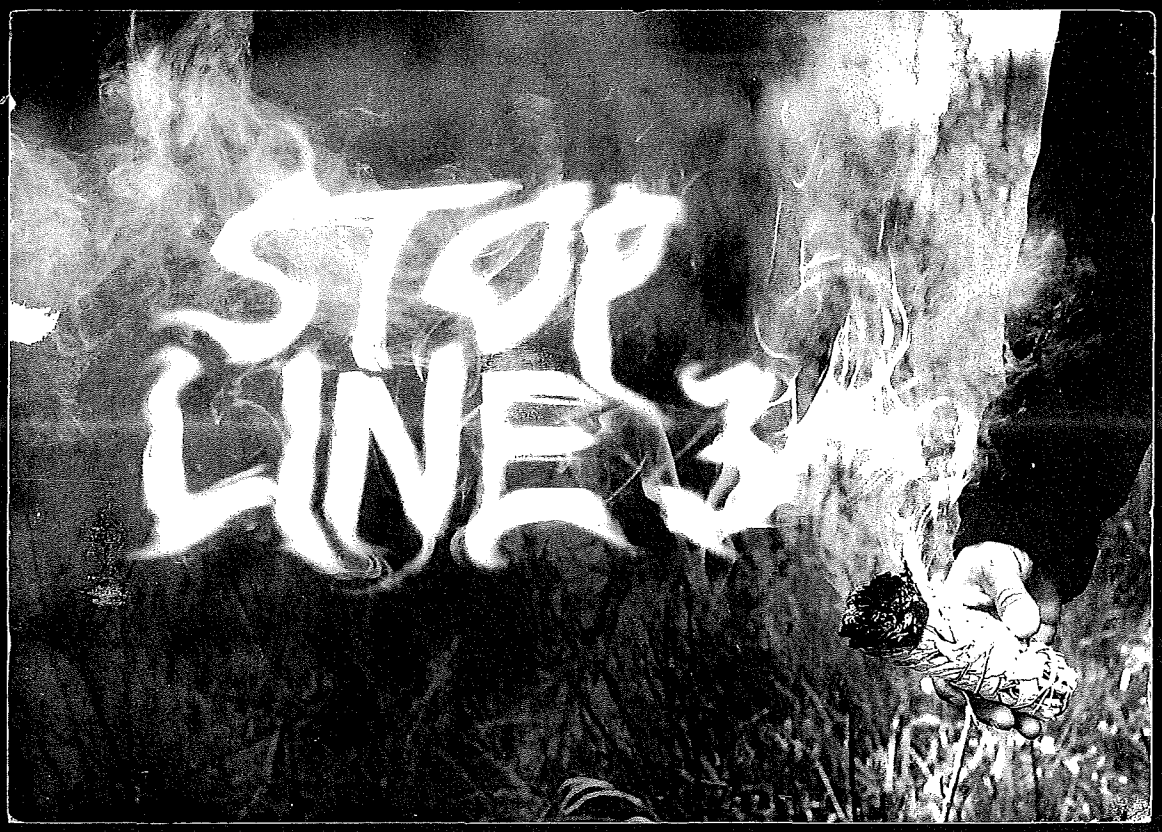

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 4 1

POSTCARD

I oppose the line 3 pipeline and encourage the public utilities commission and the department of commerce and to who else it may concern to oppose this pipeline. This is a danger to our water and in violation of native rights. please put our water and our people above the interests of the pipeline companies

SINCERELY,

Helen Forsythe

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Levi, Andrew (COMM)

From: Joe Foss <josephrfoss@gmail.com>
Sent: Wednesday, June 28, 2017 12:09 PM
To: MN_COMM_Pipeline Comments
Subject: Re: CN-14-916 and PPL-15-137

Re: CN-14-916 and PPL-15-137

I am writing to express my opposition to Enbridge Energy's proposed Line 3 tar sands oil pipeline through Minnesota. I appreciate the opportunity to submit public testimony.

There are many concerns I have about the proposed pipeline. My understanding of the draft EIS is that it states that the pipeline would have a climate change cost of $287 billion dollars in just 30 years according to a new State of MN environmental study. Of course, climate change and the feedback loops it creates mean that carbon and methane will continue to warm the planet beyond that 30 year time frame. In 2007, the Minnesota legislature understood that we have a need to decisively reduce greenhouse gas emissions. Facilitating the extraction of more tar sand oil through the building of larger pipelines capacity sets us in the opposite direction.

Secondly, I'm concerned that Enbridge proposes to build a brand new pipeline called Line 3 while abandoning an existing pipeline in place hundreds of miles away — essentially letting the old line rot in the ground, regardless of whether landowners would like it there.

Third, the proposed new three-foot-diameter steel pipeline would cross some of the best wild rice lakes in the world to carry Canadian oil to out-of-state markets. The dirty tar sands oil Enbridge plans to ship has a global warming impact far greater than standard crude.

In conclusion, the draft EIS already shows that Enbridge's pipeline would bring an extraordinary climate change cost to society, disturb the most wild rice lakes and areas of biodiversity out of all the options studied, and "add to the negative mental, spiritual, and physical health impacts already disproportionately suffered by American Indian populations." Governor Dayton has recently committed Minnesota to stepping up to take international climate action after the current administration withdrew from the Paris agreement. This pipeline's approval is entirely up to the Dayton administration and the PUC.

Please deny Enbridge's request to build Line 3.

Sincerely,
Joe Foss
359 66th Ave NE
Fridley, MN 55112
josephrfoss@gmail.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Karla Fossand	218 987 2928	ldfossand@yahoo.com
ADDRESS		
2215 Shannon Lane SE		
CITY, STATE, ZIP		
Bemidji MN 56601		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Lance Fossand	218 987 2928	ldfossand@yahoo.com
ADDRESS		
2215 Shannon Lane SE		
CITY, STATE, ZIP		
Bemidji MN 56601		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Bonnie Fox <bonnief7@gmail.com>
Sent: Sunday, July 09, 2017 7:50 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 comments

The merits of the Enbridge Line 3 replacement project should be evaluated in the context of greater regional and global climate change mitigation goals. This pipeline, designed to carry tar sands crude, will have an outsized environmental impact due to the labor intensive tar sands extraction and refining process, and the diluent requirements that would make spills harder to clean up. Furthermore, the effects of changing climate that we're already witnessing in Minnesota will have an negative impact on pipeline stability and longevity. Freeze/thaw cycles are changing, extreme weather events are more common, and average precipitation amounts are increasing in much of the state. Parts of Minnesota are getting 15% more rain now than in the 60's. Have changing weather patterns been factored into longevity estimates and clean-up estimates?

Additionally, the economic benefits of this pipeline for Minnesotans are dubious at best. There is a worldwide glut of oil from more cost effective extraction and distribution points. In the face of increased global production how can we be assured that Exxon Mobil and Enbridge will support ongoing Canadian production and distribution and associated pipeline maintenance? Pipeline abandonment is huge concern that must satisfactorily addressed.

While the US currently lags behind the rest of the world in recognizing climate change as an existential threat, political and social pressure associated with continued denial will undoubtedly continue to mount. If and when there is a backlash against the dirtiest fossil fuels and the companies that market them, Minnesotans should be very concerned about being left holding the bag (or pipeline in this case) should Enbridge and Exxon Mobile's fortunes fade.

Sincerely,

Bonnie Fox
1944 Lochaven Alcove
Woodbury, MN 55125

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
ROBERT FRANTZ	8143278762	RFRANTZ39@GMAIL.COM

ADDRESS

CITY, STATE, ZIP
STURGEON LAKE, MN

COMMENTS
THE REPLACEMENT WILL ENSURE THE SAFE TRANSPORT OF PRODUCT, AND THE LINE NEEDS TO BE REPLACED DUE TO THE AGE OF THE EXISTING LINE. THE REPLACEMENT OF LINE 3 WILL BE BENEFICIAL TO THE ENVIRONMENT.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Darlene Freeman <darmae3@gmail.com>
Sent: Monday, July 10, 2017 1:34 PM
To: MN_COMM_Pipeline Comments
Cc: Darlene Freeman
Subject: Reuse line 3

I was an employee at Itasca Community College when the spill occurred on the line by the college. It was a year or more before the cleanup was complete. During the spill and long after the smell was a part of the area. When I look at the before photos it had a healthy grove of pine and now most of those have died. The affect is still very apparent with more trees still dying. It has been around 15 years since the spill. It is still having a negative impact on the land and vegetation. **No to abandonment-Clean your mess-Reuse same route line 3!!!!**

Darlene Freeman
25363 Trout Lake Acres Rd
Bovey, MN 55709
Sent from my iPad

Levi, Andrew (COMM)

From: Sean French <solrath@gmail.com>
Sent: Monday, July 10, 2017 10:57 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

We don't need nor want this pipeline. It only hurts in our battle against climate change which is the greatest threat to mankind.

Levi, Andrew (COMM)

From: Mary Frenzel <mpfrenzel@gmail.com>
Sent: Monday, July 10, 2017 11:10 AM
To: MN_COMM_Pipeline Comments
Subject: Proposed Enbridge Pipeline 3

I am STRONGLY OPPOSED to the proposed pipeline 3 through Minnesota's environmentally sensitive lakes and wild rice country. There are other feasible, less sensitive routes. This is in regards to CN-14-916, PPL-15-137.

Mary P. Frenzel, Ph.D.
23202 Gandalf Trl.
Nevis, MN 56467

Levi, Andrew (COMM)

From: Tyler Freyberg <tyler@freybergpetroleum.com>
Sent: Thursday, July 06, 2017 10:43 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I am a Minnesotan and I support the replacement of Line 3. I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3.

Sincerely,

Tyler Freyberg
55177 210th Ln
Mankato, MN 56001
tyler@freybergpetroleum.com

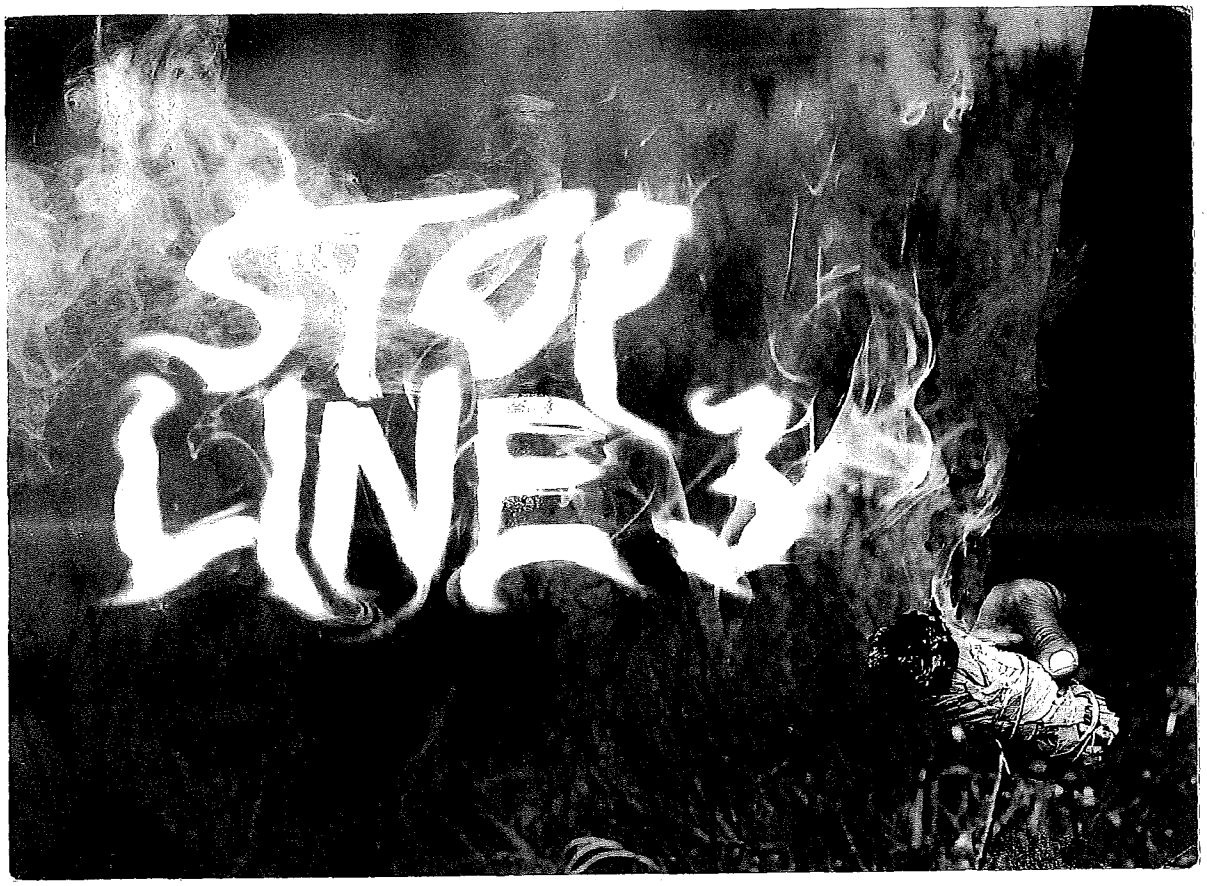

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

ST PAUL MN 551
2017 PM 5 L

USA
POSTCARD

I opose line 3 Beause
the oil going thru the proposed
pipline Is Extracted In a
Very Bad way that Harms
the Environment Directly next to
the Extracting and to the world
Environment as a Whole, I
also opose the pipline, Beause
the politics Behind the Implation
of the line are corrupt and
Dont face the signeficant Issues
SINCERELY, with the line

Leander Friedl

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Kenneth G. Fromberg	218-461-2002	KenFromb@AOL.com

ADDRESS: 2181 River Road

CITY, STATE, ZIP: Duluth, Mn 55803

COMMENTS: I support this project due to its economic importance to this area.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jon Fronden	218-348-4758	JFronden@Charter.net

ADDRESS
3013 Morris Thomas Rd

CITY, STATE, ZIP
Duluth Mn 55811

COMMENTS
I feel Pipelines are the safest way to move oil & maintanence of These lines is impartant.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

RECEIVED
JUN 14 2017
MAILROOM

Stephen A. Fuller
28253 East Harris Road,
Grand Rapids, Mn, 55744-4917

Saturday, June 10, 2017

Line 3-project draft EIS public comment.

I attended the comment session here in Grand Rapids on June 6th, and was duly impressed by the preparation and professionalism of the men & women who answered questions prior to the comment period. Full disclosure; tar sands are the dirtiest form of carbon we can pump through a pipe, and I am of the opinion that it should stay in the ground.

The transport of oil by pipeline is clearly the safest way to move it over long distances; while not perfect it has enormous advantages over rail or truck. Still pipe failures happen and the mixture of tar sands and chemicals that enable the stuff to be pumped need to be cleaned up. At the same time as the Deep Water Horizon (April 2010) fiasco was occurring an Enbridge pipe in Michigan ruptured and pumped this proprietary mixture into a creek, which emptied into the Kalamazoo River. This is seven years ago and the mess is still not cleaned up; you can't swim, or eat the fish Enbridge doesn't know how to deal with spilled tar sands and the other chemicals that are being used.

If we have to move oil (tar sands) a pipeline is the way to go which makes the question which option is the best for the citizens of Minnesota; particularly the people of north-central Minnesota; a sparsely populated area with a sizeable number of indigenous peoples. For this portion of the population another pipeline is not needed, especially one that bisects rice lakes and hunting and gathering regions.

Enbridge does need this new pipeline, with the existing line-3 able restricted to 390,000 barrels/day of heavy crude (lets call it tar sands) and showing signs of having to be restricted more as the highly abrasive tar sands erode it integrity on a daily basis. Enbridge needs this pipeline upgrade, but does Minnesota?

From Superior the tar sands will go south & east, to refineries in Michigan & Illinois. If Joliet, Illinois is the ultimate destination for the majority of these tar sands the SA-04 option seems to make a lot of sense.

Not only does the existing line not have the capacity wanted by Enbridge, it is "falling" apart; the executive summaries said something about anomalies; is this another way of saying leaks or/seeps? If so what kind of environmental damage is slowly accumulating? Allowing Enbridge to abandon existing line-3 will expose the state to a future environmental cleanup; I'd like to think Enbridge will be around to do that cleanup; sometimes the public gets stuck with the superfund sites; an abandoned line three brings to mind a 280 mile Love Canal scenario.

A new line-3 should go in the trench that the old line-3 comes out of; it won't be easy; a lot of things in life aren't easy. And it won't be cheap, especially if these seeps and leaks have created one environmental mess after another. This isn't Enbridge first rodeo they have the expertise to contract with contractors that can dig up the old line and bury the new one. What Minnesotans don't need is another strip of land dedicated to oil transport.

Thank you for your time & allowing me to vent.

Steve.

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jim Fullerton	507-766-0108	

ADDRESS: 116 So Jefferson

CITY, STATE, ZIP: Newville, MN 56073

COMMENTS: It will create more Jobs!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Cindy Funke

Street Address: 13582 Nevada Avenue

City: Savage State: MN Zip Code: 55378

Phone or Email: 612-599-4363

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am anti pipeline at this point, but sadly will accept this project. I hope the highest regulations are enforced and Enbridge is held accountable for cleaning up the old pipeline and restoring a pristine environment. They must be made to pay, not only financially, but also with an understanding that it is an honored privelege to even be allowed on this project. They must give back to everyone & ensure it will be well-monitored and regulated to prevent any damage or spillage.

Thank you.

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Raehel Funke

Street Address: 13582 Nevada Avenue

City: Savage State: MN Zip Code: 55378

Phone or Email: 612-269-7634.

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I heard about this public meeting an hour before its start while driving ~~home~~ back to my Bemidji hotel from doing rare plant surveys on Line 3's ~~lines B's~~ proposed routes. I came to this meeting to hear perspectives from all sides of this project and to gain ~~an~~ better understanding on the project I am a part of. There are great points made by both proponents and opponents of a new pipeline. I have not made a decision on which decision or alternative I would support, but based on the field work I have done, the information I have gathered, and the public opinions I have heard, these are my main comments and questions:

- I am glad that this draft EIS was created for Line 3 and was surprised to learn from speakers that this is the first pipeline EIS in the state.

- Water is a part of Minnesota's identity, for both tribal and non-tribal community members. Extra vigilance and care should be taken when considering pipeline routes in/around wetlands and water bodies.

- The Draft EIS is long. Much of the general public, although given the opportunity, will probably never read this word for word. I appreciate the summaries given as well as the materials provided at the public meeting.

If including additional pages please number them and tell us how many you are providing: 3 *pages*

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Rachel Funke

Street Address: 13582 Nevada Ave

City: Savage State: MN Zip Code: 55378

Phone or Email: 612-269-7634

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

- I agree that the current pipeline is not suitable for safe and effective transportation. A no action alternative is not plausible in this situation.

- In a broader context or larger scale, addressing the possibility (if not the need) to transition to alternative energy sources is important. Ensuring the safety and efficiency of current pipelines is necessary, but ~~mentioning on~~ in addition to route alternatives, it would also, in my opinion, be beneficial to suggest reducing phasing out or transitioning from oil to more sustainable resources.

- I feel that Enbridge is effectively monitoring for Endangered & threatened species flora. I also feel that they have made safety a top priority for employees.

- ~~Would like to make it clear that these are my personal opinions~~

- A question I still have is whether wetlands that are negatively impacted by new development will be mitigated, ~~or~~ replaced, or accounted for in some way. One public comment noted that Enbridge is filing for a utility exemption from the wetland conservation act, and a clarification on that topic would be appreciated.

If including additional pages please number them and tell us how many you are providing: 3 *pages*

(page 2)

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Rachel Funke

Street Address: 13582 Nevada Ave

City: Savage State: MN Zip Code: 55378

Phone or Email: 612-269-7634

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

· I would like to make clear that these are my personal opinions and that they do not necessarily reflect the views of my employer.

· I really appreciate these opportunities for those affected to voice their opinions and questions and hope that they continue to expand & improve. Thank you.

~~A lot of~~

· Many community members have strong opinions about ~~this~~ this project, but there are even more members that have not chosen a side yet. I believe that it is ~~okay to be~~ ~~to be~~ to remain neutral about a topic you are uneducated about, but the best thing you can do is become educated and informed about topics that affect you; and that's what I'm striving to do regarding the Line 3 project.

If including additional pages please number them and tell us how many you are providing: 3 *pages*

(page 3)

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Dale F. Gagner

Street Address: 204 S Hill Ave

City: Ogilvie State: Mn Zip Code: 56358

Phone or Email: 651-399-2634

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Thousands to tens of thousands of individuals are and will continue to be affected by the daily choices we make in our use of oil and its many byproducts. The impact on the environment, the land, the people, their air and water, that occurs at the source from which the oil is taken and continuing in the transporting, refining, delivery of the same, and in the uses and abuses of the refined product. We buy, then continue to build larger and larger equipment, cars, trucks, toys, houses, cabins, as the price of oil gets cheaper, hoping it will quench our thirst in our search for happiness.

We need to encourage, invest in, and employ our citizens to build wind, solar, and as yet to be explored and invented, safer and renewable sources of energy.

We are taking a big risk with our childrens drinking water daily, as we drive and consume manufactured products, obtaining both necessary and so called justified items. There is no limit to our demands. Is it that no one has the right to question our demands? If so, is morality thus justified under rights, and rights because I demand it?

Each of us need to have uncontaminated drinking water and anything less will directly affect our bodies today, and hopefully in our many tomorrows. How healthy we are makes a big difference not only for me, but for our families, communities and the State of Minnesota in health, financial and productivity costs.

A cup of water or a drop of oil, a choice we may have to make, before our only choice is, a drop of oil in our cup of water.

If including additional pages please number them and tell us how many you are providing:_____ pages

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JUL 13 2017

MAILROOM

MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
SAINT PAUL, MN 55101-2198

55101-214355

FOLD HERE

Public Comment Period Ends Monday, July 10, 2017

Comments must be postmarked or received electronically by the comment deadline.

How to comment:

- Drop this form in a comment box at a public meeting
- Mail this form, remembering to affix appropriate postage
- Mail comments in a separate envelope using the mailing address on this form
- Email comments to the Environmental Review Manager: Pipeline.Comments@state.mn.us
- Fax comments to the Environmental Review Manager: (651) 539-0109

Comments do not need to be on this form to be accepted. We encourage you to provide comments in whatever way is most convenient for you. If commenting by email or fax please use "*Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)*" in the subject line.

Thank you for participating in the Draft EIS public review process! By commenting you are helping inform the Minnesota Public Utility Commission's decisions regarding this project.

FOLD HERE

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is unclear? What is missing? Please reference specific sections of the Draft EIS, if possible. Use additional pages as needed.

For project information visit: http://mn.gov/commerce/energyfacilities/line3.

Levi, Andrew (COMM)

From: jenny gamer <chrisglidden@me.com>
Sent: Monday, July 10, 2017 7:29 PM
To: MN_COMM_Pipeline Comments
Subject: line 3

Hello

I want to add my voice to the opposition of a new pipeline.
Why endanger new areas when they could remove and replace the existing pipeline?

Furthermore we shouldn't be letting the tar sands oil move through our state at all. It's dangerous. If we are going to have a future we need to move beyond oil all together. Why make more messes, more dangers for a way of doing things that we need to phase out anyway?

Thanks
Jenny Gamer
4025 Kenyon Blvd Faribault MN 55021

Levi, Andrew (COMM)

From: Gardner, Annah J. <AJGARDNER@stthomas.edu>
Sent: Thursday, June 22, 2017 11:52 PM
To: MN_COMM_Pipeline Comments

The range of alternatives considered and proposed is inadequate. The rail alternative is unrealistic, economically infeasible, and not logically sound. The trucking alternative is also extremely unrealistic - replacing an entire fleet every five years would not work. The DEIS fails to consider the possibility of shutting down the current Line 3 pipeline and constructing no alternative. This is the option advocated by thousands of citizens and must be considered.

Levi, Andrew (COMM)

From: Michael Gardos Reid <gardosreid@gmail.com>
Sent: Monday, July 10, 2017 11:23 PM
To: MN_COMM_Pipeline Comments
Subject: Concerns about the EIS for proposed Enbridge pipeline

Dear Environmental Review Manager:

I have heard that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state* need (not a national need). Even if we used statistics abotut the national need, U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply needed oil. (http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf)

I would like to see this information mentioned in the final EIS.

Thank you,

Michael and Kate Gardos Reid
2219 Taft Street NE
Minneapolis, MN 55418

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Albert Alan Gartner	218-724-2306	
ADDRESS		
315 E Skyline Pkwy		
CITY, STATE, ZIP		
Duluth, Minnesota 55805		

COMMENTS

I support the pipeline we are going to need it now and moreso in the future.

Thank You for the cup.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth a** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55802

Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: anayanse garza <anayanse@hotmail.com>
Sent: Monday, July 10, 2017 5:48 PM
To: MN_COMM_Pipeline Comments
Subject: Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I am from San Antonio, TX and the Line 3 Pipeline concerns me primarily because of the tribal impacts. First, the United Nations international standard for projects that impact Indigenous Peoples is Free, Prior and Informed consent. Tribal consultancy after the project is already proposed and designed is not free, prior, and informed consent. Most of the issues specific to tribal people and tribal resources are **confined to a separate chapter** that attempts to provide "an American Indian perspective." They are excluded from the main chapters that assess potential impacts. This allows the EIS to **avoid drawing conclusions** about the impacts on tribal people. (Chapter 9). Furthermore, in Chapter 9, "Tribal Resources," it is stated that ANY of the possible routes for Line 3 "**would have a long-term detrimental effect on tribal members and tribal resources**" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). **This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members**. Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "**are part of a larger pattern of structural racism**" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3). Chapter 6 states that Enbridge's preferred route would impact **more wild rice lakes and areas rich in biodiversity** than any of the proposed alternative routes (Figure ES-10). Most of the analysis of archaeological resources in the path of the pipeline rely on **Enbridge's surveys**. For some reason, only 3 of their 8 surveys are available, and the 5 missing are the most recent! In those, Enbridge found 63 sites, but claims that only 3 are eligible for protection under the National Register of Historic Places. (5.4.2.6.1). Honor the Earth has had the studies we have been able to see reviewed, and there are numerous flaws in their methodology.

The DEIS concerns me because it concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) **But it also states that this is NOT a reason to deny the project**! As an indigenous woman I am concerned that DEIS acknowledges that "The addition of a temporary, cash-rich workforce **increases the likelihood that sex trafficking or sexual abuse will occur**," and that these challenges hit Native communities the hardest. But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). What experience does Enbridge have planning and implementing an anti-sex trafficking program?

Aside from this, the DEIS estimates the annual probability of different kinds of spills on the proposed route in MN:

- Pinhole leak = 27%
- Catastrophic = 1.1%
- Small Spill = 107%, Medium = 7.6%, Large = 6.1%

So in 50 years, we can expect **14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic**!

The DEIS simply states that "Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage,and mitigate historically contaminated soils and waters" found during the abandonment or removal of the existing Line 3 (8.3.1.1.1). **We want to see that plan**. Also, the DEIS acknowledges that Line 3 would contribute to climate change. It analyses 3 different types of emissions - direct, indirect, and lifecycle. Direct emissions are those that the pipeline infrastructure itself emits, and these are very small. Indirect emissions are those created by the power plants that provide electricity for the pipeline's pumping stations, and these are significant. Lifecycle emissions are those caused by the refinement and eventual use of the oil, and these are massive. Line 3's direct and indirect emissions alone would be 453,000 tons of CO2 per year. Over a 50-year lifespan, that would cost society an estimated $1.1 billion. (Executive Summary p.18). The lifecycle emissions of Line 3 would be 193 million tons of CO2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3). It is also disturbing that the DEIS does not discuss the unprecedented challenges of human casualty, displacement, conflict, natural disaster, biodiversity loss, etc, that climate change is causing, or the consensus from the scientific community that we must leave fossil fuels in the ground. It also fails to acknowledge that across the planet, Indigenous people are disproportionately impacted.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground. We do not need more destruction but instead to develop renewable energy infrastructure.

Sincerely,

Anayanse Garza

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Donna Gaston
Street Address: 921 Lake Blvd NE
City: Bemidji State: MN Zip Code: 56601
Phone or Email: bluemoon@paulbunyan.net

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am concerned about the future history of our water in MN. This big oil company has ignored the treaty rights of Native Americans since they placed this back in early 1960's when the Tribal Leaders were quite frankly not as strong as they are today. They were taken advantage of and the company went ahead and many disasters have followed. These tar sands are the dirtiest oil in the world and the most difficult to clean when it spills.

This new route will cut via the Mississippi River headwater region & pristine lake country of No. Mn where Native Am's harvest wild rice. This pipeline is sacrificing the safety of not only Mn but all the way down the Mississippi with the grave possibility of pipeline fractures/leaks.

Abandoning pipelines is irresponsible and sets a dangerous precedent. Enbridge should clean up its mess and put Minnesotans to work doing it.

We are producing & storing more oil than we are using! It's time to invest our $ and time & jobs into sustainable energy and move away from these toxic fossil fuels. It's killing our planet!

Let's work together and create jobs VIA cleaning of your mess! to do what is right for our planet and its people.

If including additional pages please number them and tell us how many you are providing:_____ pages

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Michael K. Gay	(218) 451-0655	KJV.AV1611@74600.com
ADDRESS		
1944 County Road 6		
CITY, STATE, ZIP		
Barnum, MN 55707		

COMMENTS

I support the Line 3 replacement project. Lets get this approved.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 1.5 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

USA FOREVER

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Jan Geerdes

Street Address: 15082 Scenic Hwy NE

City: Blackduck State: MN Zip Code: 56630

Phone or Email: jangeerd@paulbunyan.net

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I support Line 3 re-route. I believe in pipeline transportation over tanker or rail, and that is the safest and cleanest mode.

Good luck!

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Cathy Geist <Cathy.Geist@minneapolis.edu>
Sent: Monday, July 10, 2017 10:22 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment - Line 3 Replacement DEIS
Attachments: Public Comment - Line 3 DEIS (7-10-17).doc

Hello Ms. MacAlister,
Attached is my Public Comment re: the Draft Environmental Impact Statement (DEIS) for the proposed Line 3 pipeline replacement.

Docket Numbers: CN-14-916 and PPL-15-137 (also recorded on my Public Comment)

Please confirm by e-mail that you have received this document.

Thank you,
Cathy Geist

Cathy Geist
Biology Instructor
Minneapolis Community and Technical College
Cathy.Geist@minneapolis.edu
Phone: 612-200-5239

"Come forth into the light of things . . . Let nature be your teacher."
-William Wordsworth, English poet

July 10, 2017

TO: Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198
(submitted online to Pipeline.Comments@state.mn.us)

PUBLIC COMMENT: Draft Environmental Impact Statement (DEIS) - Line 3 Pipeline
DOCKET NUMBERS: CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Introduction

As a conservation biologist, an Environmental Science/Biology instructor at a Twin Cities community college, and a Minnesota citizen who cares deeply about our amazing natural environments and diversity of species, I am very concerned about the ecological consequences of the proposed Line 3 pipeline. Based on my study of the DEIS, it does not appear that this document adequately assesses or addresses the serious ecological impacts and risks of this proposed pipeline.

Specific Concerns and Questions

My main concerns regarding the DEIS include the impacts of the proposed Line 3 pipeline on (1) climate change and (2) the ecological systems impacted by this proposed pipeline (e.g. vegetation, fish and wildlife, specific ecosystems including wetlands and forests, and water quality).

(1) Impacts on Climate Change

-We are at a crucial time for decision-making in our state, in our country, and in the world as we continue to study and reflect on the strong scientific consensus on global climate change and embrace the myriad of consequences we are already seeing worldwide from its effects. We cannot refute the clear evidence for human-caused climate change provided by such entities as the UN Intergovernmental Panel on Climate Change.[1] Is this information referenced in the DEIS? (I did not find it.)

-The specific environmental impacts of tar sands oil removal in Alberta, Canada (from which the oil in the Line 3 pipeline would come) are not clearly spelled out in this DEIS, nor are the ongoing effects of the oil's future combustion. We know that further development and use of tar sands oil will further increase CO_2 emissions which we already must significantly reduce in order to address current and future climate change. We know that moving in the direction of increased use of tar sands oil is, in essence, the *opposite* of what will work to reduce the amounts of current global CO_2 emissions, prevent further climate change, and return to a lower atmospheric CO_2 concentration. In fact, if we develop all the fossil fuels that are currently slated for development (not including new sources), our CO_2 emissions are projected to be five times the amount which will allow us to stay "well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius", the stated limit of the UNFCC Paris Climate Agreement.[2] (NOTE: Though the United States has withdrawn from this agreement, these CO_2 emissions data are still relevant). None of this information is in the DEIS.

-In addition, the extensive energy use required to process the tar sands oil (with resulting CO_2 emissions), the large amounts of water used in the process, and the resulting toxic sludge are ongoing problematic issues. By increasing the production and pipeline transport of this oil, we would be facilitating the increase of these other factors. These issues are not clearly specified in the DEIS.

-I am also very concerned that this pipeline would not truly serve our state (or national) public interests. The current United States inventory of crude oil is at an all-time high.[3] Given the current abundance of oil production (and the resulting contributions to climate change), is there truly a public need for increased production and oil pipeline transport?

-This DEIS document does not list or present data for the option of "No New Line 3 and Removal of Current Line 3". This option would provide the alternative of not adding another pipeline <u>and</u> removing the current Line 3. Those numbers are missing and very important.

-The current growth in renewable energy options in Minnesota is notable (e.g. solar energy, wind energy, electric cars and electric car infrastructure). How would the Line 3 pipeline impact these blossoming industries? This information is not included in the DEIS.

(2) <u>Impacts on Ecological Systems</u>

-We must also consider the environmental effects of the proposed Line 3 pipeline on impacted ecosystems (including wetlands), their native biodiversity (plants, animals, microorganisms), water quality, and ecosystem services. There is limited information in the DEIS on the impacts of increased *habitat fragmentation* in the areas that would be impacted by the pipeline, including more than 150 roads that would be added, both to install the pipeline and deal with possible future oil spills. What will be the impacts of this habitat fragmentation over time? How will endangered species' habitats be impacted?

-During my graduate work in Conservation Biology, I chose to focus on ecological restoration for my graduate project. I learned repeatedly that successful ecological restoration of wetlands was extremely difficult and that being able to fully restore a wetland's biodiversity along with its ecological processes was basically impossible. There are a variety of examples of devastating oil spills that have destroyed wetland areas; the best that could be done was to help restore a proximate area of similar size. The high quality of the northern Minnesota wetlands, lakes, and other waters that would be impacted by this pipeline is too unique and precious to take such a risk. Though the DEIS states that "Wetlands, including marshes, swamps, peat bogs, and fens, are particularly sensitive to oil spills" (Section 10.3.2.2), the specific consequences are not fully addressed in this document, nor are the solutions.

-In addition, how will pipeline oil spills harmfully impact the lakes, groundwater, wetlands, soils, and ecosystems *over the long term*? Though there is some information on this question, it is not sufficient, nor is there sufficient information on air quality effects.

-The DEIS does not include the impacts of the pipeline on bees and other pollinators in the proposed pipeline locations. How would pollinator populations be impacted? What could be done to address these impacts, given the significant decreases that are occurring in a variety of insect pollinator populations?

-Will there be herbicides or other pesticides used in the corridors of the proposed pipeline? If so, how will these chemicals impact the pollinators and other native species? What can be done to prevent these impacts?

-How would oil spills affect lakes that have special ecological significance? What can be done to prevent these spills?

-What examples and evidence of long-term compliance with regulations can Enbridge provide?

Final Comments

Though I have not addressed my concerns about the harmful effects of the Line 3 pipeline on tribal communities in the area (including the biologically diverse wild rice-containing waters), I wanted to include these concerns as well. For me, the bottom line is that the DEIS simply does not provide adequate information or data-based solutions to fully evaluate the future impacts of the proposed Line 3 pipeline over the short or long term. In company with current information and projections on climate change, a strong, research-based evaluation (with data) is crucial.

Finally, the risks of harmfully impacting our healthy northern waters and lands must be evaluated with great care. And, though I am stepping ahead a bit in the approval process by stating the following, I strongly believe that increasing greenhouse gas emissions (thus increasing climate change) and harmfully impacting the ecological systems of our unique and biodiverse northern lands and waters are not at all worthy of Line 3 approval.

Sincerely,
Cathy Geist, MS
Minneapolis, MN 55406

References

[1] United Nations Intergovernmental Panel on Climate Change (IPCC), Fifth Assessment Report, 2014

[2] United Nations Framework Convention on Climate Change, Paris Agreement, 2016

[3] U.S. Energy Information Administration (www.eia.gov/dnav/pet/PET_STOC_WSTK_DCU_NUS_W.htm)

Levi, Andrew (COMM)

From: J E BATTY-GEORGE <jebwrg@msn.com>
Sent: Sunday, July 09, 2017 7:35 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137).

Dear Environmental Review Manager:

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economic analysis for the EIS to be complete.

Thank you,
Jo George
4016 Beard Ave S
Minneapolis, MN
55410

Levi, Andrew (COMM)

From: J E BATTY-GEORGE <jebwrg@msn.com>
Sent: Sunday, July 09, 2017 7:39 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137).

Dear Environmental Review Manager:

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. I have heard that Enbridge redacted those numbers from the public version of the DEIS. Without them, there is no reliable way an independent party to verify their results.

I believe that in order for Minnesota citizens and agencies to make an educated decision about Line 3, we must have that information, and I would like to know why Enbridge won't release it. Please insist that Enbridge provide their data on oil releases and spills in Minnesota.

If Enbridge objects due to security reasons, then I would like to know why they have failed to cover the exposed pipes in the Tamarack River in northwest Minnesota, and why they allow people to joyride over exposed pipes south of Clearwater. This is surely a security issue as well. For Enbridge to pick and choose what issues warrant "security," is unacceptable.

Sincerely
Jo George
4016 Beard Ave S
Minneapolis, MN
55410

Levi, Andrew (COMM)

From: J E BATTY-GEORGE <jebwrg@msn.com>
Sent: Sunday, July 09, 2017 7:30 PM
To: MN_COMM_Pipeline Comments
Subject: Public comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

I have heard that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state* need (not a national need). Even if we used statistics about the national need, U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply needed oil. (http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf)

I would like to see this information mentioned in the final EIS.

Thank you,
Jo George
4016 Beard Ave S
Mpls, MN 55410

Levi, Andrew (COMM)

From: Jim Ghostley <ghostley@paulbunyan.net>
Sent: Friday, June 23, 2017 10:37 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

Dear Ms. MacAlister,

We need the oil and economic benifits. Go for it.

Sincerely,

Jim Ghostley
1100 Birchmont Beach Rd NE
Bemidji, MN 56601
ghostley@paulbunyan.net

Levi, Andrew (COMM)

From: Dave Giese <D7M7G7@hotmail.com>
Sent: Monday, July 10, 2017 8:47 PM
To: MN_COMM_Pipeline Comments
Cc: Mark M Giese; north.star.chapter@sierraclub.org
Subject: Dockets CN-14-916 & PPL-15-137

To Whom it May Concern,
Regarding Docket CN-14-916 & PPL-15-137, please consider the following:

1) Enbridge a Canadian owner of the proposed pipeline replacement/volume enhancement is not shipping oil for Minnesota and/or U.S domestic use. Instead the pipeline routes to a U.S. seaport to be shipped out of the U.S. for refinement and sold on the global market. For that reason alone this pipeline should no longer even enter the U.S. and or Minnesota. Instead the pipeline should be routed totally within Canada to a Canadian seaport.

2) In order for tar sands oil to move through the pipeline at Endbridge's desired pipeline flow rate diluents are added. None of the diluents nor the tar sands are a natural part of the above ground environment therefore it will not biodegrade, the surface land/top soil/lake beds/wet land/river beds must be entirely scraped off and then replaced to cleanup a tar sand spill, something that is nearly impossible to do and if done the top soil and vegetation lost can not ever be returned to its original state.

3) 25-30% of the tar sand flow is diluents that are not biodegradable containing chemicals such as benzene a known carcinogen

4) Cleanup costs of the Kalamazoo,MI tar sands is $1.21 billion per Enbridge at the link below https://www.google.com/amp/amp.mlive.com/v1/articles/14408061/2010_oil_spill_cost_enbridge_1.amp

5) The Kalamazoo tar sands pipeline ruptured in 2010. It is now 7 years later and the cleanup is still ongoing. If an Enbridge pipeline ruptures in MN just how many years should Minnesota citizens expect a pipeline rupture to be cleaned up within? 7 years? 10 years ? 20 years? 50 years? 100 years?

5) Since Enbridge will not be paying a daily rate to ship oil across the state of MN will MN taxpayers be on the hook to pay to cleanup for any tar sand spills?

Thank you for your attention on this matter and for the comment opportunity.

Sincerely,

David Giese
2885 Knox Ave S #707

Minneapolis,MN 55408
612.825.3961

Sent from my iPhone

Levi, Andrew (COMM)

From: Mark M (Giese) <m.mk@att.net>
Sent: Monday, July 10, 2017 9:18 PM
To: MN_COMM_Pipeline Comments
Subject: Dockets CN-14-916 & PPL-15-137

To Whom it May Concern:
Regarding Docket CN-14-916 & PPL-15-137, please consider the following:

1) Enbridge a Canadian owner of the proposed pipeline replacement/volume enhancement is not shipping oil for Minnesota and/or U.S domestic use. Instead the pipeline routes to a U.S. seaport to be shipped out of the U.S. for refinement and sold on the global market. For that reason alone this pipeline should no longer even enter the U.S. and or Minnesota. Instead the pipeline should be routed totally within Canada to a Canadian seaport.

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5) Since Enbridge will not be paying a daily rate to ship oil across the state of MN will MN taxpayers be on the hook to pay to cleanup for any tar sand spills?

Thank you for your attention on this matter and for the comment opportunity.

Sincerely,
Mark M Giese
1520 Bryn Mawr Ave
Racine, WI 53403

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
John Gilbertson	218-766-2396	

ADDRESS
11216 Weltherway NW

CITY, STATE, ZIP
Pequosky Mn. 56667

COMMENTS
It is ridiculos that all these meetings need be. After 60+ years of using pipelines to move oil, without a doubt its proven to be by far the safest way. Everything is in place lets get to work.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Steve Gilbertson	218-326-6510	steve@wildrice direct.com
ADDRESS		
34731 Rebel Beach Road		
CITY, STATE, ZIP		
Cohasset, MN 55744		

COMMENTS

Please move this along. This line needs to be replaced now. Delays could result in environmental damage. The company is willing to replace it, let them do it.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

ST PAUL MN 551
14 JUN 2017 PM 6 T

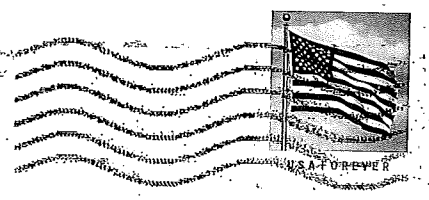

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
John Gibenison		
ADDRESS 9013 Albers Rd NW		
CITY, STATE, ZIP Pupose Mn 56667		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Shelly Gilbertson	556-1675	
ADDRESS: 9013 Albers Rd NW		
CITY, STATE, ZIP: Puposky MN 56666		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Ann Ginsburgh Hofkin <ann@aghofkin.com>
Sent: Saturday, July 08, 2017 11:33 PM
To: MN_COMM_Pipeline Comments
Subject: Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137).

I am an impartial observer, but having visited the area, I cannot understand what is the rush to invade vulnerable areas when other routes are available for the pipeline. Also, I am not encouraged by the record of breakdowns and lack of appropriate and timely repair on the part of pipelines in general and Enbridge in particular.
I would appreciate a timely response, as I speak for many friends who share my views.
Please, let's start being much more careful with regard to our environment.

Sent from my iPhone

Ann Ginsburgh Hofkin, photographer
e-mail: ann@aghofkin.com
website: http://www.aghofkin.com

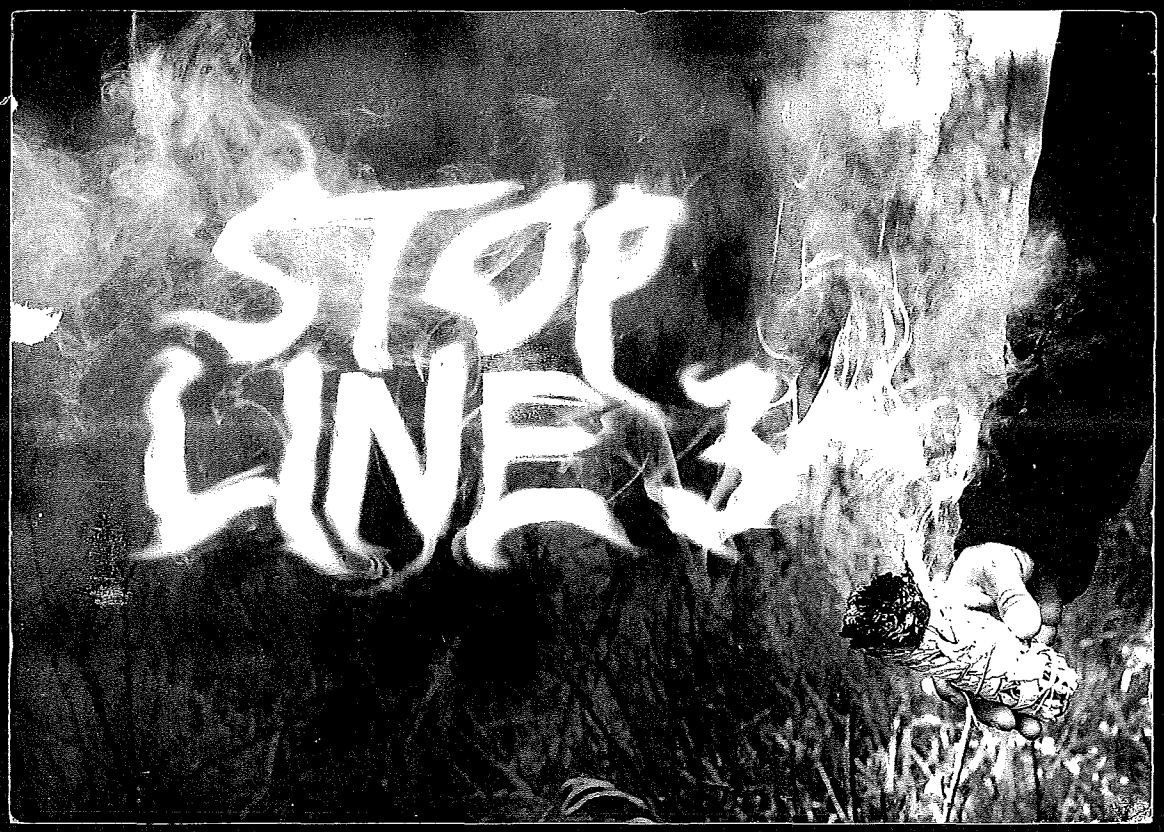

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
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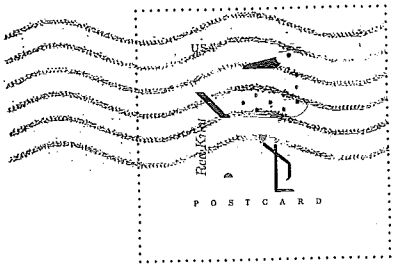

I oppose the Line 3 pipeline because of the disregard for the health of tribal communities, the disregard for the impact on the surrounding lands & especially wild rice farms, and the catastrophic disruption this pipeline will put upon tribal communities.

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Ursula Girdwood

Levi, Andrew (COMM)

From: David Givers <dgivers@midco.net>
Sent: Thursday, July 06, 2017 1:44 PM
To: MN_COMM_Pipeline Comments
Subject: Docket numbers CN-14-916 and PPL-15-137

Enbridge Draft EIS for new Pipeline 3 leaves unanswered or fails to address a number of large and small scale effects. Scale in ecosystems studies is one of the major factors that informs and drives understanding of human impact on our ecosystems. I think the Enbridge Draft EIS inadequately addresses scale at the micro-, meso-, and biome level and needs to be corrected before any additional rulings are made by your agency.

I limit my concerns of the micro effect a failure of Line 3, and also the failure to properly abandon the Existing Line 3, could have on me. I thoroughly enjoy eating native harvest wild rice. Loss of wild rice beds would take that away from me and uncatalogued others as described in the document.

I word-searched “economic” and “economy” in the tribal resources sections and found no reference to the economic impact of the loss of wild rice due to oil spills. This same comment applies to paddy rice. Economic loss to Minnesotans must take precedence over economic gains to out of state corporations and out of state construction workers.

Loss of wild rice beds due to Line 3 failure and Old Line 3 improper abandonment would cause disproportionate harm to tribal people because their rights are expressly codified in treaty laws, so it would be unlawful for Minnesota to violate treaty rights. The Draft EIS must address the free, prior, and informed consent of the tribal nations where the line crosses their land. Anything less is a violation of your moral authority.

At the ecosystem level of impact, a new Enbridge Line 3 will increase atmospheric CO2 levels and we know unequivocally, scientifically that we need to stop using additional fossil fuels and switch to more renewable technologies. If you do not have personal access to this data, please contact me and I will see that you get the data. I am not citing it here because those are so broadly known in the scientific community and should not require citation in a citizen’s letter. The Draft EIS must include the impact on current and future generations of making a 30 year investment in new fossil fuel infrastructure. Science has informed us we must reduce current atmospheric CO2 prior to 2030 A.D. Enbridge Line 3 adds to the CO2 atmospheric load. Constructing Enbridge Line 3 does the opposite and would increase atmospheric CO2.

Intentionally increasing CO2, which we know from would occur from Enbridge Line 3, also violates the Public Trust Doctrine. Briefly, the Public Trust Doctrine states that governments must assure and provide future generations their right to a viable future. This is natural law and is the same doctrine embodied in American Indian culture of providing for the seventh generation. Public Trust Doctrine is making its way through the US courts. Future generations have already been granted legal standing. Making a complete EIS will require accounting for Public Trust-Seventh Generation accounting and responsibility from the current generation decision makers.

The Enbridge Line 3 Draft EIS must address alternatives to construction, and the CO2 impact of Line 3 on micro-, meso-, and biome level impacts, to be a fully adequate EIS. The Draft EIS does not meet this standard.
Thank you.

Levi, Andrew (COMM)

From: Kristen Glaros Hanson <kristenglaroshanson@gmail.com>
Sent: Monday, July 10, 2017 6:45 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL15-137

Greetings,

Enbridge should not route their new larger capacity Line 3 tar sands oil pipeline through Minnesota wetlands. This line adversely affects native communities - directly threatening watersheds connected to the largest and the only certified organic wild rice lakes in Minnesota. I disapprove in this in entirety, but at a minimum believe if it is going to potentially proceed forward, needs much more study. Water is a finite resource and this potentially threatens our water.

What are the benefits of this proposed pipeline to Minnesotans and all Americans? It seems that This Canadian company gets all the benefit and Minnesotans and American's as a whole, take all the risk.

Finally, Enbridge needs to clean up all of the old pipe that they own and not leave it in the ground for potential leaks and future generations.

Thank you!
Kris Glaros Hanson
Chaska, MN

Sent from my iPhone

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Rowan Glaser

Street Address: 1606 Breda Ave

City: St. Paul State: MN Zip Code: 55108

Phone or Email: rowanglaser@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Improved: Figure ES-2 Map shows clearly the Minnesota River. Please clearly show the Mississippi River (our drinking source) and the St. Croix River.

Improved: EIS based on 7 generations rather than 30 years. Even Kalamazoo River spill was 42 years later.

Improved: Penalize environmental destruction with jail time, not just monetary penalties.

Improved: Include hemp seed oil as alternative options.

Missing: Algorithm for determining when the risk outweighs the need.

Missing: Enbridge's history of spills. This MUST be taken into account. Otherwise, find a better company to take care of this, if the need truly exists.

Missing: Enbridge plan to clean up old Line 3 pipeline.

If including additional pages please number them and tell us how many you are providing:_____ pages

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Brian Jay Gresnell	218-349-5285	beef55804@yahoo
ADDRESS: 4402 McCulloch St.		
CITY, STATE, ZIP: Duluth MN 55804		

COMMENTS

The Safe Transport of Petroleum in a concern of ours and we Believe this pipeline will not be Dis Cause. Thank You..

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Darrell Godbout	218-391-2295	darrellgiron512.com
ADDRESS		
1525 Schaffer Drive		
CITY, STATE, ZIP		
Carlton Mn 55718		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Natasha Godbout	218-391-2944	
ADDRESS		
1524 Schafter Dr.		
CITY, STATE, ZIP		
Carlton, MN 55718		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Donna Goldberg <sandbhreaghfarm@earthlink.net>
Sent: Monday, July 10, 2017 6:27 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline EIS

Dear Jamie MacAlister,

I am writing in regard to the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137. I am from Vermont and although I am not a Minnesota resident, I am still very effected by your pipeline as it is participating in climate change which is a global issue. It is imperative that we reduce the use of fossil fuels which are a large part of the problem and put our efforts into renewable energies which will help our planet recover from climate change and reduce our CO2 emissions. Line 3's direct and indirect emissions alone would be 453,000 tons of CO2 per year. In a recent study, Stanford scientists Frances Moore and Delavane Diaz found that the social cost of climate change (the economic damage caused by a ton of carbon dioxide emissions) may not be $37 per ton of CO2, as estimated by a recent U.S. government study, but $220 per ton. For Line 3, that is a yearly economic cost of climate change damage totaling up to $99,660,000.

In addition, the pipeline unfairly impacts the tribal communities in its proposed routes.

Please do the right thing for our future and deny the permit for the proposed Line 3. Please shut down the old line and remove it from the ground and invest in renewable energies.
Thank you for your time.

Respectfully,
Donna Goldberg
Vershire, VT

Levi, Andrew (COMM)

From: Emily GoldthwaiteFries <egoldthwaitefries@mayflowermpls.org>
Sent: Saturday, July 01, 2017 8:22 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3

I'm Rev. Emily Goldthwaite Fries from Minneapolis and a pastor at Mayflower United Church of Christ. As a person of faith and as a resident of Minnesota, I am very concerned about the new Line 3 proposed by Enbridge. Though the environmental impact statement acknowledges many severe consequences to land, water, and local communities, it appears the no-build option is not being seriously considered.
I am alarmed by the plans for this pipeline, which disregard the severe impacts of potential spills to ricing lakes, rivers, and even to Lake Superior. Furthermore, I find it unacceptable that we, as a state, continue to expect Native communities to disproportionately endure the impacts of extracting and transporting oil. These risks are outlined but not considered reason enough to reject the pipeline.
We have a responsibility to current and future generations, locally and globally, to keep out Tar Sands oil that could pollute MN waters and contribute significantly to climate change. Climate scientists agree it is time to leave the oil in the ground.
I implore you to weigh the dire consequences of this pipeline and strongly consider rejecting it.

Sincerely,
Rev. Emily Goldthwaite Fries
106 E Diamond Lake Rd

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Gaagigeyaashiik (Dawn M. Goodwin)
Street Address: 14506 Auginaush Rd.
City: Bagley State: MN Zip Code: 56621
Phone or Email: dawngoody-1@yahoo.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am disappointed that this DEIS has a poorly written Ch 9.
There isn't information that informs people of the toxicity of bitumen (Dilbit). There is very minimal reference to the health hazards that would affect those along the path of the applicant's preferred route in the case of a spill, leaks or explosion.
There is no reference to the turmaline blue spring fed lakes that are adjacent to the preferred route, namely the ~~lake~~ areas most popular camping, fishing ~~and~~, swimming scuba diving lake, Long Lake located at Clearwater Park.
I am opposed to this extremely bad idea to RELOCATE Line 3!

If including additional pages please number them and tell us how many you are providing: 2 pages

Gaagigeyaashiik

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: _____

Street Address: _____

City: _____ State: _____ Zip Code: _____

Phone or Email: _____

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I also advocate for our traditional harvestors and the White Earth Elder's Council. "We are opposed to the preferred route and the notion that old Line 3 would be left in the ground, posing human and ecosystem hazards!"

On behalf of
- Mawinzo Asiginigaazo (Berry Pickers Alliance)
- White Earth Elder's Council

Respectfully submitted,
Gaagigeyaashiik
(Dawn Goodwin)

If including additional pages please number them and tell us how many you are providing:_____ pages

2

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JUL 13 2017
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MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
SAINT PAUL, MN 55101-2198

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Public Comment Period Ends Monday, July 10, 2017

Comments must be postmarked or received electronically by the comment deadline.

How to comment:

- Drop this form in a comment box at a public meeting
- Mail this form, remembering to affix appropriate postage
- Mail comments in a separate envelope using the mailing address on this form
- Email comments to the Environmental Review Manager: Pipeline.Comments@state.mn.us
- Fax comments to the Environmental Review Manager: (651) 539-0109

Comments do not need to be on this form to be accepted. We encourage you to provide comments in whatever way is most convenient for you. If commenting by email or fax please use "*Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)*" in the subject line.

Thank you for participating in the Draft EIS public review process! By commenting you are helping inform the Minnesota Public Utility Commission's decisions regarding this project.

FOLD HERE

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is unclear? What is missing? Please reference specific sections of the Draft EIS, if possible. Use additional pages as needed.

For project information visit: http://mn.gov/commerce/energyfacilities/line3.

Levi, Andrew (COMM)

From: Joseph Gore <jgore@paragon-partners.com>
Sent: Wednesday, June 14, 2017 7:36 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Many facts are often overlooked when emotions take command and one should always weight them. Line 3 will be safe, it is needed, it will bring jobs and it will lower costs to consumers and enhance our standard of living for years and generations to come. Leaving the existing line in operation would not be the right thing to do.
When a pipeline is built, any environmental impacts are short term and are mitigated in step with environmental regulations. Enbridge takes that responsibility very seriously. Most pipeline construction impacts are minimal and temporary in nature and Enbridge works hard to minimize construction impacts and restore land after to its' original condition and use.
I believe replacing aging infrastructure like pipelines is imperative to protecting the environment. Enbridge has found a route that follows existing utility corridors, which as I understand it, is part of the criteria for siting new energy infrastructure. The large majority of the Preferred Route is co-located with existing Enbridge pipelines or existing third-party utilities: approximately 94% of the Preferred Route west of Clearbrook is co-located with Enbridge's existing Line 67; approximately 74% of the Preferred Route east of Clearbrook is co-located with existing Enbridge pipelines or existing third-party pipelines or utilities.
Enbridge has worked hard to address specific concerns raised by landowners along the Preferred Route. More than 95% of the private landowners have signed voluntary easements with Enbridge, and Enbridge has modified the Preferred Route based on public comments/landowner feedback. These efforts to minimize impacts and address landowner feedback should be better reflected in the FEIS.
According to a new economic impact study by the Bureau of Business and Economic Research (BBER) at the University of Minnesota Duluth's Labovitz School of Business and Economics. The Enbridge Line 3 replacement project will create approximately 8,600 jobs and will represent an investment of more than $2 billion in the 15-county study area of Minnesota. The Area Partnership for Economic Expansion (APEX) requested the study be conducted.
Line 3 is a "Win Win" all the way around for Minnesota and America and I believe we need to do what is good for Minnesota, America, and all Americans and line 3 is just that.

Sincerely,

Joseph Gore
PO Box 288
Rugby, ND 58368
jgore@paragon-partners.com

Levi, Andrew (COMM)

From: john goslinga <johng@morrellco.com>
Sent: Friday, June 30, 2017 10:51 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

We need pipelines to transport God given natural resources safely and economically. Alaska has proven they do not damage the environment or wildlife. In order to help the less fortunate in this country and others, we need a strong economy. We are blessed with natural resources and need to use them in order to be financially sound. Much safer than trucks or trains.

Sincerely,

john goslinga
13616 90th St
Milaca, MN 56353
johng@morrellco.com

Levi, Andrew (COMM)

From: Lori and Brian Gould <brianlorigould@gmail.com>
Sent: Monday, July 10, 2017 10:52 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Environmental Impact (Docket #'s CN-14-916 and PPL-15-137)

Dear MN Department of Commerce,

I have concerns regarding the Enbridge Line 3 Environmental Impact. The potential environmental impact on our waterways and resulting public health dangers are risks that are far greater than any benefits that a rebuild or a re-routing of the pipeline would provide. A no build option seems to be the best solution, in light of potential risks, prior violations and spills, and violations of treaty rights. I encourage you to support alternative sources of energy, such as solar and wind.

Sincerely,

Lori Gould

Levi, Andrew (COMM)

From: Ken Graeve <kmgraeve@yahoo.com>
Sent: Monday, July 10, 2017 9:50 PM
To: MN_COMM_Pipeline Comments
Subject: Alternatives analysis of the Line 3 Project Draft Environmental Impact Statement, Docket Numbers PPL-15-137 / CN-14-916

Alternatives analysis of the Line 3 Project Draft Environmental Impact Statement, Docket Numbers PPL-15-137 / CN-14-916

The alternatives discussed in the DEIS focus solely on methods to move oil, which is not necessarily in the public interest. The public has an interest not specifically in oil, but more generally in energy. Section 1.4 basically sets up the rules of engagement for the EIS, and in doing so pre-determines the outcome, without giving fair consideration to real alternatives. Without an objective analysis of alternatives, the public cannot make an informed decision and the EIS has not met the requirements of MEPA. The alternatives analysis should include methods for meeting the public's energy needs both with and without oil, and compare the environmental impacts of those alternatives.

The Department of Commerce has decided that the scope of the EIS will not include energy policy issues (Section 1.4). However, the Public Utilities Commission is required by MN Rules Chapter 7853 to consider "…the future adequacy, reliability, or efficiency of energy supply…to the people of Minnesota and neighboring states…" Nowhere does MN Rule Ch 7853 say that the PUC must consider the future adequacy, reliability, or efficiency of oil supply—it only says "energy supply." The rule does not allow a state agency to choose a subset of energy sources for analysis. The EIS should address this project in relation to overall energy supply rather than narrowing the consideration to overall oil supply. Without comparing alternative ways of supplying overall energy needs, the EIS fails to provide the PUC with the information it needs to meet is legal obligations.

While the DEIS states that it will not address overall energy policy issues, MN Rule Ch 7853 states that the PUC is required to consider energy economic issues when it says to consider "…the cost of energy to be supplied by the proposed facility compared to the costs of reasonable alternatives and the cost of energy that would be supplied by reasonable alternatives…" The DEIS fails to compare costs of energy provided by tar sands oil with costs of energy provided by alternative sources. Overall trends show decreasing costs for renewable energy sources and increasing costs of oil-based energy sources. In light of this reality, the EIS must provide the public with an honest comparison of the costs of various energy sources if it is to provide the PUC with the information needed to make an informed decision.

Section 1.4 of the DEIS attempts to make the case that a single pipeline project is not the appropriate venue for analysis of overarching energy policy issues. By following that logic, all fossil fuel projects would be exempt from any discussion of overarching energy policy issues and the overarching issues would never get discussed. Other than the circular logic of this decision there is the extreme irony that if it weren't for fossil fuel projects there would be no reason to discuss overarching energy policy issues such as climate change. Therefore, the argument in the DEIS to avoid overarching energy policy issues fundamentally flawed and needs to be thrown out. The EIS must be revised to accept that there are overarching energy policy issues and to present alternative ways of supplying energy rather than alternative ways of supplying oil.

MN Rule Ch 7583 further requires that the Commission consider whether "…the proposed facility will fail to comply with those relevant policies, rules, and regulations of other state and federal agencies and local governments." The DEIS fails to consider relevant state greenhouse gas and climate change policies such as the Next Generation Energy Standard and others. This is another case in which the DEIS does not provide the information that the Commission needs to make an informed decision. The EIS needs to be revised to include an objective assessment of how the proposed pipeline would comply with relevant policies, rules, and regulations.

Although these decisions to ignore pressing environmental consequences of pipeline projects such as climate change, Environmental Quality Board guidance provides an opportunity to reconsider previously eliminated alternatives in the EIS: "The RGU must take a hard look at the basis for prior decisions to make sure that environmentally superior alternatives were not eliminated without sufficient justification based on the rule's three criteria. Eliminated alternatives should be discussed in the EIS and noted in the scoping decision document. Prior decisions to eliminate options may need to be revisited in the EIS if insufficient consideration was given to the environmental impacts. The present DEIS has certainly

failed to give sufficient consideration to environmental impacts related to climate change, and needs to be revised to include alternative methods of supplying the state's energy needs. These alternatives must include renewable energy sources in addition to the oil source currently described in the DEIS.

Sincerely,
Ken Graeve
St Paul, MN

Levi, Andrew (COMM)

From: mike gragert <1mrmagoo@gmail.com>
Sent: Monday, July 10, 2017 11:53 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment:Line 3 Project(CN-14-916 and PPL-15-137)

PUBLIC COMMENTS;LINE 3 PROJECT;CN-14-916 AND PPL-15-137

Mike Gragert 14125 Granite Ave. Applevalley MN & with Parents Dolores Gragert and family since 1936 At 44553 State Highway 6 Emily MN On Roosevelt Lake

Dear Environmental Review Manager:

I don't see anything in the DEIS for line 3 about the economic picture for MN if this project is approved as Enbridge prefers either Without OIL LEAKS OR With OIL LEAKS. MN lakes are the source of revenue for fishing,water recreation,fisheries, and tourism in general.Where is the analysis how a pipeline through some the best lakes country in MN will affect the fishing,tourism,and recreation industries,etc in MN,with or without oil leaks? How would the towns and residents be affected(positively or negatively)?Does the pipeline provide enough benefits for Minnesota to balance the risks? There must be an economic analysis with and without oil leaks, for the EIS to be complete.

I fully stand behind and support Friends of the Headwaters and Native Tribes statements and views pertaining to Line 3. Thank You, Mike Gragert 14125 Granite Ave. St. Paul MN. 55124 & Roosevelt Lake.

Docket # CN-14-916
PPL-15-137

7-10-17

Dear Environmental Director:

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lake country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economic analysis for the EIS to be complete.

I fully stand behind the Friends of the Headwaters positions and views of line 3 replacement

Sincerely,
Dolores Gragert

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017 PM

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Alisha Graupmann	218-244-5087	agraupmann23@hotmail.com
ADDRESS		
31 6th st		
CITY, STATE, ZIP		
Proctor MN 55810		

COMMENTS

Line 3 will replace an existing Line ~~that~~ which will help keep the environment safe. MN will see a huge benefit from taxes paid and an increase in jobs.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Cody Joel Graupmann	218-256-0800	cody.graupmann@gmail

ADDRESS: 55671 Co Rd 9

CITY, STATE, ZIP: Deer River MN 56636

COMMENTS: The Pipline will supply Jobs and energy at a lot lower risk for years to come.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Shannon Graupmann	218-246-8501	relax@littlewinnie

ADDRESS
55671 Co Rd 9

CITY, STATE, ZIP
Deer River MN 56636

COMMENTS Jobs

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Shawn Gaupman	907-354-0499	

ADDRESS
36653 Co Rd 39

CITY, STATE, ZIP
Deer River MN 56636

COMMENTS
Needs to be done Get on it

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

GNDC
Greater North Dakota Chamber

Jamie MacAlister, Environmental Review Manager
Minnesota Dept. of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101

RECEIVED
JUN 23 2017
MAILROOM

June 17, 2017

Dear Ms. MacAlister:

While I have experience in Minnesota in my previous position as Government Affairs Director of the Duluth Area Chamber of Commerce, I am submitting the following comment to the Minnesota Dept. of Commerce in the matter of the Enbridge Line 3 Replacement Project on behalf of the Greater North Dakota Chamber of Commerce, the voice of North Dakota business and commerce.

While the Enbridge Line 3 Replacement does not serve the Bakken Oil reserves, it does transport oil into Minnesota from our Canadian neighbors on its way to Enbridge's Superior, Wisconsin terminal. Good energy infrastructure is vital to Minnesota and North Dakota, as it is to the Upper Midwest and the nation. Replacing the aging Line 3 with the latest in technology and materials will maintain an important part of energy infrastructure that affects both North Dakota and Minnesota. The project should be approved by the State of Minnesota.

Line 3 replacement will bring much needed quality jobs to the region with Enbridge's billions of dollars in private investment. While most of these jobs will be created in Minnesota, they will be filled with skilled workers from across the region.

We should be encouraging the development of North American energy resources and the safe transportation of those resources to market. Pipeline transportation of energy has been proven safe 99.7% of the time. Replacement of Line 3 will make it more efficient, even safer and should be permitted to move forward as proposed.

While there is healthy discussion about the route proposed that Line 3 take, we believe one alternative proposed through North Dakota is not a serious proposal. The route proposed is the clearly the best route. We urge Minnesota's regulators to approve the Line 3 Replacement project as proposed.

Sincerely,

Andy Peterson, President & CEO
Greater North Dakota Chamber of Commerce

Champions (for) Business

PO Box 2639 P: 701-222-0929
Bismarck, ND 58502 F: 701-222-1611

www.ndchamber.com

0964

GNDC
Greater North Dakota Chamber

PO Box 2639
Bismarck, ND 58502
www.ndchamber.com

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Champions for Business

Jamie MacAlister, Environmental Review Manager
Minnesota Dept of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101

Champions for Business

5510136013 C012

From: Linda Greene
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 & PPL-15-137
Date: Wednesday, May 31, 2017 1:01:03 PM

I am totally opposed to Enbridge's new Line 3 pipeline. At a time when the earth is in jeopardy from the burning of fossil fuels, a tar sands pipeline is an outrageously bad idea. Furthermore, the pipeline threatens the territories and survival of the Anishinaabe people. I urge you not to issue a permit for this pipeline.

Linda Greene
7487 N. John Young Rd.
Unionville, IN 47468

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
GREGORY A MARTIN		
ADDRESS: 4158 Norway Spruce Rd		
CITY, STATE, ZIP: Finlayson MN 55735		

COMMENTS: As a union ironworker I am in full support of creating more jobs to support our community

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916, PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Larry Brell	218-252-0697	brelllarry@gmail

ADDRESS: 18657 Eastview Dr.

CITY, STATE, ZIP: Park Rapids MN, 56470

COMMENTS

Keep the Process going - I'm in total support!!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Jamie MacAlister:
~~RE~~ docket NUMBERS CN-14-916 and PPL-15-137

I am in favor of this #3 line - I have six oil lines and two gaslines on my property now.

I tell people against this line that if their Parents, grand parents, great grand parents would have acted like these people against they wouldn't have telephone teletype, Western union, electric etc.

It is time for some of these People to realize it is cheaper + safer to transport oil in lines than in these tonka trucks

RECEIVED
JUN 27 2017
MAILROOM

Mr Gordon Greniger
25375 Dove Ln
Grand Rapids MN 55744-6200

Gordon Greniger

Levi, Andrew (COMM)

From: Emer Griffin <emer.griffin@gmail.com>
Sent: Monday, July 10, 2017 8:09 PM
To: MN_COMM_Pipeline Comments
Subject: Public comment on the Sandpiper/Line 3 EIS (Dockets PPL-15-137 and PL6668/PPL-13-474)

To Whom it May Concern:
I believe the pipeline project needs much more scrutiny and possible changes before any approval can be offered. The project in it's current form adversely affects native communities - directly threatening watersheds connected to the largest and the only certified organic wild rice lakes in Minnesota. The waters of our lakes are an intrinsic part of our state's identity, as well as a source of recreation and income for many industries.
This is a bad investment which needs much more study because it threatens our water. This Canadian company gets all the benefit and Americans get all the risk. Enbridge needs to clean up all it's old pipe and not leave it in the ground for future generations.
Emer Griffin
3824 16th Ave S
Minneapolis, MN 55407

Levi, Andrew (COMM)

From: Molly Beth Griffin <mollybethgriffin@gmail.com>
Sent: Monday, July 10, 2017 8:12 PM
To: MN_COMM_Pipeline Comments
Subject: Public comment on the Sandpiper/Line 3 EIS (Dockets PPL-15-137 and PL6668/PPL-13-474)

To Whom it May Concern:

I believe the pipeline project needs much more scrutiny and possible changes before any approval can be offered. The project in it's current form adversely affects native communities - directly threatening watersheds connected to the largest and the only certified organic wild rice lakes in Minnesota. The waters of our lakes are an intrinsic part of our state's identity, as well as a source of recreation and income for many industries.

This is a bad investment which needs much more study because it threatens our water. This Canadian company gets all the benefit and Americans get all the risk. Enbridge needs to clean up all it's old pipe and not leave it in the ground for future generations.

Molly Griffin
3824 16th Ave S
Minneapolis, MN 55407

Levi, Andrew (COMM)

From: Joe Gris <jostgris@gmail.com>
Sent: Friday, July 07, 2017 10:06 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3

Line 3 ruined my great-grandfather's land. The land has since been passed down to me, along with the persistent headaches that 4 generations of my family have suffered from because of the Line. I'm against any Replacement.
Sent from my iPhone

From: Lynsey Griswold
To: MN_COMM_Pipeline Comments
Subject: Please do not move forward with the Line 3 Pipeline
Date: Tuesday, May 30, 2017 9:44:56 PM

To whom it may concern:

I am writing to you in regards to your Environment Impact Study for the Line 3 Pipeline, with words of strong opposition to the project.

As the protests over over pipelines in recent years have shown, many citizens of the United States are opposed to oil pipelines, particularly those that cross or near tribal lands. There are legitimate fears of pipelines leaking into water systems, contaminating land, and upsetting local ecosystems and economies. As has been said before, it's not *whether* the pipeline will leak, it's *when*.

Furthermore, although big money from oil companies is at risk in pipeline projects such as this, our dependence upon fossil fuels itself is a huge risk to our environment and our continued survival. Climate change is agreed upon by the vast majority of the scientific community to be caused by human activity—primarily the burning of fossil fuels. If left unchecked, it will wreak havoc on our planet, doing far more damage to our environment than the scope of your Environmental Impact Study is meant to measure. However, this pipeline stands to bring more fossil fuels to refineries to be burned, leading to more pollution and eventually more climate change.

We are in the eleventh hour for making changes to our power grid and our energy needs. Constructing more expensive, destructive, and dangerous infrastructure for fossil fuel pipelines is counterproductive, counterintuitive, and dangerous. I urge you to consider the impact of pushing another pipeline through our soil, when our resources should be devoted to the research, development, and deployment of renewable energy options, which would provide far more permanent jobs to the American economy and cause far less lasting damage.

Sincerely,
Lynsey Griswold

Line 3 Replacement Project DEIS

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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
KARL GRONQUIST	651-464-1583	IDEALFOAMR7@Hotmail.com

ADDRESS: 9252 Lake Drive N.E.

CITY, STATE, ZIP: Forest Lake, MN 55027

COMMENTS: Lets get this project going! Delay is costing time + money + JOBS + Safety.

Karl Gronquist

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Cheryl Grover
Street Address: 37861 161st Ave
City: Bagley State: MN Zip Code: 56621
Phone or Email: jcgrover@gvtel.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

It is very clear that Line 3 needs to be replaced. My husband and I support the deactivation of Line 3 and a new pipe needs to be laid in the ground to make this a successful deactivation.

The proposed line 3 South of Shevlin crosses our farmland. The regulatory process needs to continue moving forward and this work needs to be finished in a timely manner.

I feel that the openess and transparency is this very long process is commendable.

Thank You!
Cheryl Grover

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: John G Grover

Street Address: 37861 161st Ave

City: Bagley State: MN Zip Code: 56621

Phone or Email:

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

It is time to get this project done!

Enbridge is a great company. There is an obvious need to build this line 3. The need is there. The Route is good.

Thank you.

John Grover

If including additional pages please number them and tell us how many you are providing:_____ pages

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Eugene Grover	507-291-1116	ggrover@local49.org

ADDRESS
505 Monroe Court

CITY, STATE, ZIP
Montgomery MN 55955

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

MIDJI MN 566

USA FOREVER

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Trent Grover		
ADDRESS	27471 161st Ave	
CITY, STATE, ZIP	Bagley. MN 56621	

COMMENTS I support Line 3 Construction. proposed route is the safest & least negative impact. Let's Get-r-done!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Collin Grover		
ADDRESS: Apt. #6 - Parkview Apt		
CITY, STATE, ZIP: Bagley, MN 56621		

COMMENTS

I support the proposed line 3 project and route.

Pipelines are the safest method to transport any oil or gas products

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Line 3 Replacement Project DEIS

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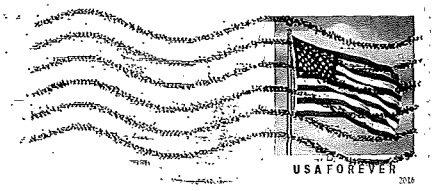

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Douglas James Grubb	218-349-9028	NA
ADDRESS		
3213 Normanna Rd.		
CITY, STATE, ZIP		
Duluth Mn. 55803		

COMMENTS
IT is the Safest way to Transport oil! and many jobs for the workers in that area!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

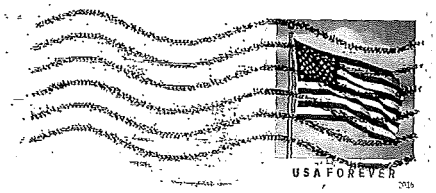

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Kimberly Grubb	218 349 3539	
ADDRESS		
3213 Normanna Rd		
CITY, STATE, ZIP		
Duluth MN 55803		

COMMENTS If there was no oil line... the oil would have to transport by truck, ship or rail... those methods result in accidents more often then an oil pipeline... and those methods pollute the environment more than a simple pipeline without leaks.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Eileen Grundstrom <egrundstrom@msn.com>
Sent: Monday, July 10, 2017 5:26 PM
To: MN_COMM_Pipeline Comments
Subject: Fw: Enbridge Pipeline

Docket Numbers: CN-14-916
PPL-15-137

I need to add a personal note to the message sent previously.

Although I moved out of the state for several years, when I had the chance to come home, I did so. My family has a long Minnesota history. Before Minnesota was declared a state in 1858, my two great-great uncles, Jerome Jerome (same first name as last name) and Joseph Rollette, signed the democratic version of the MN constitution. They were representatives from the unorganized territory before the boundaries were drawn. My greatx4 grandfather was a fur trader; Alexander Henry, the younger. He established a fur trading post at the confluence of Red and Pembina Rivers in 1802. His journals paint a picture of early Minnesota brimming with unimaginable natural resources.

As I grew up swimming and skating on the Two River, fishing from the river bank in the summer, picking wild plums, raspberries, and strawberries in the woods, witnessing the deer hunt in the fall, watching the flocks of Mallards and Canada Geese overhead signaling the coming cold weather and much more, I feel a responsibility to give my voice out of respect for the resources I hold dear; the lakes, rivers, plants, and wildlife from the destruction that could occur. A pipeline breakage would take out the heart of Minnesota and all of Minnesotans would suffer. I have to ask myself, "What kind of legacy am I leaving to my children and grandchildren?"

My hope is that we have the courage to forge ahead towards a sustainable future.

Eileen Jerome Grundstrom

From: Eileen Grundstrom <egrundstrom@msn.com>
Sent: Monday, July 10, 2017 3:04 PM
To: Pipeline.Comments@state.mn.us
Subject: Enbridge Pipeline

Docket Numbers: CN-14-916
PPL-15-137

The proposed Enbridge pipeline that crosses northern Minnesota (MN) poses a threat to one of MN precious natural resources: water.

1. The pipeline crosses the clearest lakes area in MN.
2. The pipeline route crosses an area with the highest susceptibility for groundwater contamination impacting drinking water.
3. The pipeline route crosses the wild rice lakes area that supplies 50% of the worlds hand-picked rice annually.
4. The pipeline route crosses wetlands critical to waterfowl and other wildlife.
5. The proposed pipeline would cross 8 state forests (including the Mississippi Headwaters), 3 wildlife management areas, 13 trout streams, and the North Country Trail.
6. The pipeline would cross the Mississippi River twice in Minnesota. This river is a valuable source of drinking water for many cities on its 2,552-mile journey to the Gulf of Mexico, including Minneapolis and St. Paul. 3.8 million gallons of water flow through Lake Itasca into the headwaters every day.
7. The corridor will be covered with snow and ice for the long winter season. The Poplar pipeline spill (31,000 gallons) in the Yellowstone river in January 2015 caused drinking water problems in Glendive, Montana. Clean up had to be postponed until spring. Imagine the effects of a similar spill in our Mississippi.

All of the above facts were taken from the *Friends of Headwaters* (FDH) a local citizen's group organized for the purpose of protecting our precious resources. In other words, people that live and work in Minnesota and stand a lot to lose should the pipeline leak. As a citizen of Minnesota, I agree with their position and take it as my own.

Thank you,

Eileen Grundstrom

Levi, Andrew (COMM)

From: Eileen Grundstrom <egrundstrom@msn.com>
Sent: Monday, July 10, 2017 3:05 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Pipeline

Docket Numbers: CN-14-916
PPL-15-137

The proposed Enbridge pipeline that crosses northern Minnesota (MN) poses a threat to one of MN precious natural resources: water.

1. The pipeline crosses the clearest lakes area in MN.
2. The pipeline route crosses an area with the highest susceptibility for groundwater contamination impacting drinking water.
3. The pipeline route crosses the wild rice lakes area that supplies 50% of the worlds hand-picked rice annually.
4. The pipeline route crosses wetlands critical to waterfowl and other wildlife.
5. The proposed pipeline would cross 8 state forests (including the Mississippi Headwaters), 3 wildlife management areas, 13 trout streams, and the North Country Trail.
6. The pipeline would cross the Mississippi River twice in Minnesota. This river is a valuable source of drinking water for many cities on its 2,552-mile journey to the Gulf of Mexico, including Minneapolis and St. Paul. 3.8 million gallons of water flow through Lake Itasca into the headwaters every day.
7. The corridor will be covered with snow and ice for the long winter season. The Poplar pipeline spill (31,000 gallons) in the Yellowstone river in January 2015 caused drinking water problems in Glendive, Montana. Clean up had to be postponed until spring. Imagine the effects of a similar spill in our Mississippi.

All of the above facts were taken from the *Friends of Headwaters* (FDH) a local citizen's group organized for the purpose of protecting our precious resources. In other words, people that live and work in Minnesota and stand a lot to lose should the pipeline leak. As a citizen of Minnesota, I agree with their position and take it as my own.

Thank you,

Eileen Grundstrom

From: Roger Grussing
To: MN_COMM_Pipeline Comments
Subject: No to 3
Date: Monday, May 22, 2017 2:25:00 PM

I have personally witnessed pipeline spill locations in North Dakota, Montana and Pennsylvania. The assurances of safety given by pipeline companies are not backed by experience. If they used stronger materials I would not object. They simply are too light. More investment in quality is needed. Please deny until they are willing to invest in more reliable engineering. The nuclear industry uses a "4 times safe" rule. Pipeline transport should have a similar redundancy in their systems.

Sent from

RECEIVED
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MAILROOM

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Roger Grussing

Street Address: 19054 Hardy Lake Rd

City: Pillager, MN 56473 State: MN Zip Code: 56473

Phone or Email: 218-330-4543

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Safety and system failure are not sufficiently addressed. The nuclear industry's research facilities operated with a "four times safe" operational standard. Three Mile Island's vulnerability was its "Three Times Safe" design. The third level was human safety over-ride which was exercised when level one failed. The third (human over-ride) cancelled the second level automatic shut-down, leaving the first level breach to continue.

Systems fail. Multi-level safety protocalls are necessary for reasonable safety reliability. It appears that engineering on this project is only "Two Times Safe". The first level is tested for only 150% of operating pressure. The second level of pressure-change detection is not sufficient, especially in difficult to access locations. It assumes human judgment to be a quasi-third level. Of course, engineering challenges of nuclear and oil transport are very different, BUT THE PROPENSITY FOR SYSTEMS FAILURE DEMANDS AT LEAST A "THREE TIMES SAFE" approach to pipeline reliability.

Public safety and health as well as environmental protection on-site as well as pollution caused by fossil fuel combustion calls for at least a "Three Times Safe" system.

If greater safety is built into transport of course there will be greater cost tipping energy production efficiency toward renewables. SAFETY SHOULD NOT BE SACRIFICED FOR THE BENEFIT OF CORPORATE PROFITS.

If including additional pages please number them and tell us how many you are providing: _____ pages

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Steven Grzeskowiak	218-820-2519	sj.grz@gmail

ADDRESS
27868 Greens Point Rd

CITY, STATE, ZIP
Red Wing MN 55066

COMMENTS

This will provide needed jobs & help protect our resources

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Eric Gulland	(218) 206-4401	Edgulland@Local 49

ADDRESS
154 west marble st

CITY, STATE, ZIP
Duluth MN 55811

COMMENTS

Pipelines suport good paying jobs. They Also put alot of money into Local economy!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Eric Gullano	218-206-4401	Edgulland@local49.org

ADDRESS
154 west marble st

CITY, STATE, ZIP
Duluth MN 55811

COMMENTS

I support the Line 3 project. It produces good jobs!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Alexis Gunderson <alexis.gunderson@gmail.com>
Sent: Saturday, June 17, 2017 1:57 PM
To: MN_COMM_Pipeline Comments
Subject: The wrong (and cruel) side of history

I am writing to register my opposition to the Line 3 pipe being proposed by Enbridge.

As a premise, I am against investing time and resources into installing new fossil fuel infrastructure rather than investing the same resources into building and bolstering alternative energy networks, but the DEIS for Line 3 demonstrates how this project *specifically* is a threat to both the native communities (9.4.3 and 11.4.1) and biodiversity (Chapter 6) of that region of Minnesota, while also overall of null positive impact on the local economy (Chapter 5, 5.3.4).

Every moment that we have to decide between corporate profit and social/environmental justice is one that needs to be seized, but this particular moment in history finds that need to be especially acute. In a summer where national stories are made daily about the violence women and minority communities are forced to endure as the people or systems to abuse them are repeatedly absolved of guilt, to continue with a project that by its own admission **will increase the likelihood of sex trafficking and sexual abuse** (11.4.1) and exert **disproportionate and adverse impacts on American Indian populations in the vicinity of the project** (11.5) would not only perpetuate this cycle of unchecked systemic violence, but land Enbridge and the state of Minnesota publicly on the wrong side of history—something that, after this weekend's news of the acquittal of Philando Castile's murderer, Minnesota would be wise to avoid.

Even if a moral argument can't be made against this project, Minnesota needs to recognize the opportunity for goodwill they have to buy here. I went to college in Minnesota, and worked many summers at summer camps up north. I love Minnesota, not least for its position so often on the front lines of social and economic justice (and common sense!). To have both the Castile case and Line 3 to have to contend with, though, makes it very hard for me to continue to support the state, and checks my desire to ever move back.

Please, do not approve this project.

Thank you,

Alexis Gunderson

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Bruce D. Gunderson	218-393-9012	
ADDRESS		
3670 Dana Rd.		
CITY, STATE, ZIP		
Hermantown, MN 55811		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Emily Gunn <emilylgunn@gmail.com>
Sent: Monday, July 10, 2017 8:58 PM
To: MN_COMM_Pipeline Comments
Subject: Here is my signed document Public Comment on Line 3 doc 2-2
Attachments: Public Comment on Line 3 doc 2-2.pdf

I signed the attached document. Thanks!

Signed with SignNow

Sent from my iPhone

Emily Louise Gunn

8827 Father Foley Drive, Pine River, MN 56474

July 10, 2017

RE: Public Comment: Line 3 Project (Cn-14-916 and PPL-15-137)

Dear Environmental Review Manager,

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. I have heard that Enbridge redacted those numbers from the public version of the DEIS. Without them, there is no reliable way an independent party to verify their results.

I believe that in order for Minnesota citizens and agencies to make an educated decision about Line 3, we must have that information, and I would like to know why Enbridge won't release it. Please insist that Enbridge provide their data on oil releases and spills in Minnesota.

If Enbridge objects due to security reasons, then I would like to know why they have failed to cover the exposed pipes in the Tamarack River in northwest Minnesota, and why they allow people to joyride over exposed pipes south of Clearwater. This is surely a security issue as well. For Enbridge to pick and choose what issues warrant "security," is unacceptable.

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete.

I would like to know, in the final EIS for Line 3, what Enbridge's plans are if their preferred route is approved. Will it be just the one pipeline, or will they eventually move all six pipelines to the new corridor? This would have a huge effect on how people feel about Enbridge's preferred pipeline route.

My son, Dr. William F. Woodruff, a geological engineer and Ph.D geophysicist, adds the following:
"It seems alternative routes would be preferable for the pipeline. Even modern pipeline construction includes inherent safety concerns. As with any mode of transportation of oil, there is inherent risk and the high volumes associated with a single pipeline are a real concern. The environmental issues/concerns are legitimate."

I would like to see this information mentioned in the final EIS.

I understand that an engineering firm called Cardno, with ties to Enbridge, was instrumental in preparing part of the draft Environmental Impact Statement for Line 3. In light of this fact, in the final EIS I would like to see an independent analysis of the information they provided. Minnesota requires verified facts for such a large project.

Thank you.

Sincerely,

Emily L Gunn
Property Owner

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
ROY GUNTHER	218 348 5215	
ADDRESS: 802 22ND ST.		
CITY, STATE, ZIP: CLOQUET, MN 55720		

COMMENTS

I SUPPORT THE LINE #3
REPLACEMENT PROJECT.

SINCERELY,
Roy A. Gunther

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

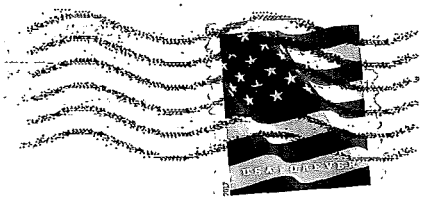

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Evan Gustafson	612-239-1662	evangusto@yahoo.com
ADDRESS		
432 so elm st.		
CITY, STATE, ZIP		
Waconia, MN	55387	

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Shannon Gustafson <shannon.gustafson@enbridge.com>
Sent: Thursday, June 29, 2017 3:07 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Thank you for your thorough work on the draft Environmental Impact Statement.

I have spent a great deal of time reading the comprehensive document and I believe with all potential environmental impacts considered, Enbridge's preferred route is the best route for this important project, where environmental resources, population centers and safety are concerned.

Deactivating the existing Line 3 is the safest option and I'm glad to see that the EIS supports this as well.

There has been more than enough time for public input and review of this important project. I urge the the Department of Commerce to stay within the timeline to finalize this document.

Replacing Line 3 with a modern pipeline is the right thing to do for Minnesotans. The time to proceed is now. Let's not delay any further.

Sincerely,

Shannon Gustafson
26 E Superior St Ste 309
Duluth, MN 55802
shannon.gustafson@enbridge.com

Levi, Andrew (COMM)

From: Mark Gustafson <markgust@gmail.com>
Sent: Saturday, July 08, 2017 10:08 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3

I'm Mark Gustafson from Minneapolis. As a person of faith and as a resident of Minnesota, I am very concerned about the new Line 3 proposed by Enbridge.

Though the environmental impact statement acknowledges many severe consequences to land, water, and local communities, it appears the no-build option is not being seriously considered.

I am alarmed by the plans for this pipeline, which disregard the severe impacts of potential spills to ricing lakes, rivers, and even to Lake Superior. Furthermore, I find it unacceptable that we, as a state, continue to expect Native communities to disproportionately endure the impacts of extracting and transporting oil. These risks are outlined but not considered reason enough to reject the pipeline.

We have a responsibility to current and future generations, locally and globally, to keep out Tar Sands oil that could pollute MN waters and contribute significantly to climate change. Climate scientists agree it is time to leave the oil in the ground.

I implore you to weigh the dire consequences of this pipeline and strongly consider rejecting it.

Sincerely,

Mark Gustafson

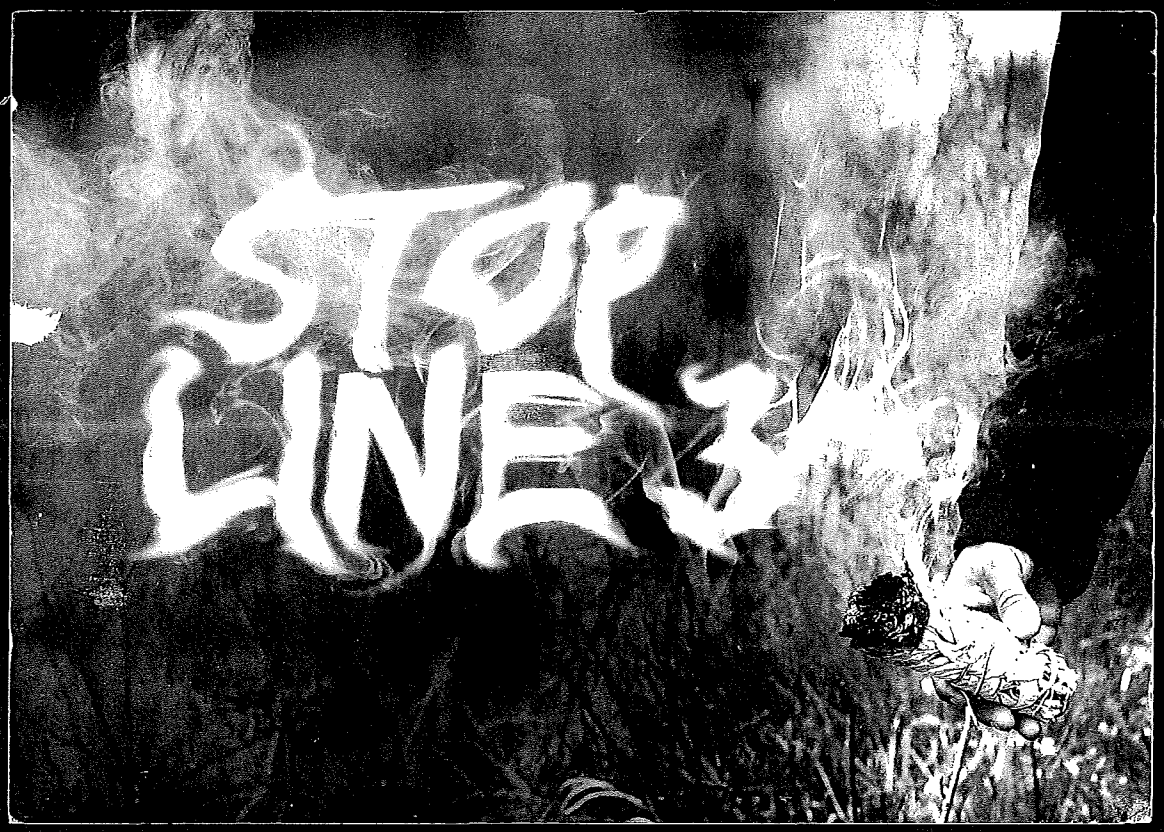

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 6 L

USA
POSTCARD

Line 3 is bad for the people and the planet! Don't allow Enbridge to follow through with the plans. Stop the plans for the Line 3 pipeline through MN tribal lands, treaty lands, and wild rice waters

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Caroline Haarman

Levi, Andrew (COMM)

From: Ellen E. Hadley <ellene798@msn.com>
Sent: Monday, July 10, 2017 2:47 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 pipeline DEIS comments

Dear Department of Commerce Staff,

My name is Ellen Hadley. I live near the Mississippi and Rum Rivers in Anoka.

I am writing regarding Docket numbers CN-14-916 and PPL-15-137

I have strong objections to the DEIS because of its numerous omissions.

First, it completely omits the Next Generation Energy Act, which requires new projects to reduce Green House Gasses to lower levels by 2025. Instead, his pipeline project will result in enormous GHG emissions that will have a powerful negative effect all across the world.

Second, the DEIS is too short-sighted. A project that affects the entire planet must be evaluated from the source in the tar sands of Alberta to the end in the atmosphere or our planet. The years when just particular miles in our state matter are over. If Minnesota ignores this essential aspect and allows this pipeline, we will be held responsible in the future for crimes against humanity for the millions of tons of CO2 and other GHGs released, and for the disasters and deaths that will result.

Third, the DEIS process cannot outrank the Treaty of 1855 and other treaties, which are the supreme law of the land. This Line 3 pipeline route would disturb and forever change thousands of acres within the Treaty Lands, with the clearing of forests, the disruption of lands and eco-systems, the habitats of animals, the destruction of native medicinal plants and trees, and worst, the possible contamination of wild rice lakes, rivers and streams. On this issue alone, the new route must be denied.

Fourth, while the DEIS does acknowledge the emotional and mental health of tribal people near the route, it ignores the historical trauma that has been proven to be carried genetically down from ancestors to today's people and their future children. It minimizes the very high suicide rates of Native teens, the high rates of drug abuse and addiction, the devastating unemployment numbers which cause such deep poverty in our Northern communities. The fear of a leak, and the likelihood of such which is certain to happen, will cause MORE mental stress and sickness for our Native brothers and sisters. This is unacceptable to me, as a Caucasian citizen. I would rather see reparation payments to the tribes, and many new services and help, than any small injury at all. We need to REPAIR our damaged relationship, not exacerbate it.

Fifth, Enbridges real responsibility is to remove and clean up the hundreds of miles of pipeline already leaking oil from one end of our beautiful state to the other. They have polluted our Waters enough, and must be required by the state to restore the old pipeline route to original condition before we would even consider any new project. The city of Grand Rapids has demanded this, and other cities along the route will likely step up, as should our state DNR for the state lands affected. Removal and clean up first.

Sixth, Enbridge has NOT proved a need for these tar sands in the first place! Our society is moving to renewables so quickly, that this pipeline will very soon be obsolete!

For these reasons, and many others, I am opposed to the pipeline route, and the entire pipeline itself. Thank you for considering my comments.

Sincerely,
Ellen Hadley
Anoka, MN

Sent from my iPad

Levi, Andrew (COMM)

From: Brad Hageman <bradhageman@aol.com>
Sent: Thursday, June 08, 2017 7:48 PM
To: MN_COMM_Pipeline Comments
Subject: No contact

Follow Up Flag: Follow up
Flag Status: Flagged

As Enbridge has never contacted me and offered any monies to come through my property I'm guessing I am no longer in consideration and just receiving these emails to update me??
My property is in Aitkin County Jevene Township section 24 address 42915 State Highway 65 north in McGregor 2 miles. Please let me know if this is correct that they are no longer coming through my property. If so why have I not been contacted with any payment like neighboring properties. I have asked that it be moved to the north and into Jack Olson's property.

Sent from my iPhone

Levi, Andrew (COMM)

From: Brad Hageman <bradhageman@aol.com>
Sent: Sunday, July 02, 2017 9:17 AM
To: MN_COMM_Pipeline Comments; Hartman, Larry (COMM)
Subject: Public comment

Docket numbers CN – 14–916 and PPL – 15–137

I have property north of McGregor 2 miles on highway 65 Jevene township range 24, T 48 N. section 24. My question is, if the pipeline is still coming through my property why has no land agent ever contacted me about payment? All the other landowners around me have been paid. Is it because I publicly announced that I did not want it on my property? Are they hoping to just take it through eminent domain?

Brad Hageman
bradhageman@aol.com
320-293-4663

Sent from my iPhone

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

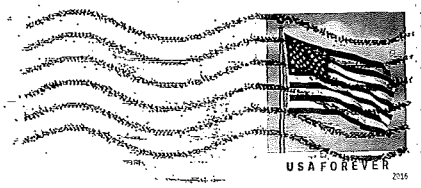

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Michael Hagen	218-678-2309	Mhagen001@embarqmail.com

ADDRESS
44211 Conifer St.

CITY, STATE, ZIP
Aitkin, MN 56431

COMMENTS
I support the Replacement of Line 3.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS!

Levi, Andrew (COMM)

From: p hager <phager60@hotmail.com>
Sent: Saturday, June 17, 2017 3:16 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridger Project CN-14-916 PPL-15-137

My name is Pat Hager and I own property south of the proposed Enbridge replacement line. I am writing to oppose this project. One spill at 760,000 barrels per day of oil would amount to 527 barrels per minute of oil. As has been seen in ND, many spills have not been noticed for days. As this line goes through a critical watershed, this would be catastrophic for the water quality of this region. This project does not benefit the state of MN except for some temporary construction jobs while it is being replaced. The risk of any spill is not worth these temporary jobs. Until Enbridge can guarantee 100% that there will be NO spills, it is not worth it to allow this. Please do not approve this project. Thank you for allowing me to provide input.

Levi, Andrew (COMM)

From: p hager <phager60@hotmail.com>
Sent: Thursday, June 15, 2017 12:19 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge- CN-14-916 PPL-15-137

My name is Patricia Hager and I own property near Waubun MN. I am writing to oppose the Enbridge new/replacement line as it will pass through a critical watershed. If this pipeline leaks when it is at 570,000 barrels per day capacity this would amount to 395 barrels per minute. In ND there were many pipeline leaks that were not discovered for days. We can not afford a disaster of this magnitude. Please do not approve this project. Thank you!

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Gregory T. Hagy		GRHagy@Gmail.com
ADDRESS: 20 SW 8th Ave.		
CITY, STATE, ZIP: Cohasset, MN. 55721		

COMMENTS Build

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Marlene Haider <mhaider1231@hotmail.com>
Sent: Sunday, July 09, 2017 12:24 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137

Environmental Review Manager:

There are several issues associated with Line 3. They include whether or not the line should be replaced, and if so the route of the new line, abandonment of the old line and the oil itself within the line.

I favor leaving the line as is along with heavy monitoring of the line and its eventual shut down. I would like to see all movement and mining of tar sands oil stopped, but that is not one of the options. I do not believe we should help move more tar sands oil by building a new pipeline with increased capacity, not only for the environmental degradation taking place in the Athabasca region in Canada but also for the safety of our water supply in the US.

You cannot drink oil. Any path chosen for the new line will cross the Mississippi or its tributaries which is a drinking water source for thousands, if not millions of people. The spill in Kalamazoo MI is still not cleaned up. Where would those millions of people, not to mention the animals and fish look for clean water? This oil is not light crude that sits on top of the water in a spill. It is heavy and sinks making clean up apparently impossible which is why Kalamazoo hasn't been able to clean up the river yet. Enbridge's track record makes the possibility of a spill quite likely. Bemidji got very lucky that their spill happened in winter when the oil sat on top of the ice. Chances are we won't be so lucky next time, after all the climate is warming and we are having less ice.

We should honor the treaties with our Native Americans, which means none of the proposed routes will work.

Why should we bring this dirty oil into Minnesota when apparently Canada doesn't want to deal with it? Let Canada take the risk.

Again, my choice for a pipeline would be to move more of our cleaner domestic oil and leave the tar sands oil in the ground. As I hear it, the price of oil is too low right now anyway. Building the new pipeline will make the glut of oil worse.

Finally, I believe we need to remove any pipelines that are abandoned. Why would we want to leave such a legacy to our children? How will we want to be remembered? As the generation that burned the oil, heated up the planet then walked away? It is not the legacy I want to leave, therefore we need to have the abandoned pipeline removed while there is still a viable company around to do so. If we don't do it now, it will be future taxpayers paying the price.

Marlene Haider
1209 7 AVE N
Sauk Rapids, MN 56379
320-253-7044
mhaider1231@hotmail.com

Levi, Andrew (COMM)

From: William Haider <wrhaider@hotmail.com>
Sent: Friday, July 07, 2017 9:37 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment Line 3

Jamie Macalister, Environment Review Manager,

I am writing in opposition to the permitting of the Enbridge Line 3 abandonment and replacement. This project is wrong in many ways, abandoning Line 3 without bonding for long term problems and possible removal, Enbridge's past record of pipe line ruptures, notably the one in a tributary of the Kalamazoo River, the difficulty of cleaning up Tar Sands oil spills in rivers as evidenced in the Kalamazoo River spill, the fact that they are transporting this oil through the U.S for processing. rather than Canada because of objections to it from Canadians and First Nation peoples.

But what most upsets me most is that we will be facilitating the distruction of vast acres of Boreal forest in Alberta, pollution of the Athabasca River that many First Nations people depend on for their water, and the impact on climate consequent to the harvest and processing of the the dirtiest oil on the planet.

William Haider
1209 7th Ave N
Sauk Rapids, MN 56379

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Esther Halberg

Street Address: 26418 270th St

City: Sheehan State: Mn Zip Code: 56676

Phone or Email: 218 657-2326

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Sitting at the meeting everyone speaking muffled could not hear the message, could hear a voice but not a bit clear, maybe a smaller lower ceiling - Hardly worth my time sitting here -

I'm real sure we need pipelines in ground out of harms way. Also am sure it is closely watched - I don't think would be approved or want to risk our earth is so great no one would want to harm the land water sources.

With out oil we see would be at a loss -

Truly I believe Oil company will be careful of the use of the land!

Esther Halberg -

ps. If people are worried about impact on ground-under water perhaps the should contact DNR - They have wrecked 2 area lakes of late - Oil Company not

E H

If including additional pages please number them and tell us how many you are providing:_____ pages

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Timothy Helberg	2186572662	nsr@grtel.com
ADDRESS		
26593 230th ST.		
CITY, STATE, ZIP		
SHEVLIN, MN 56676		

COMMENTS

AS A LOCAL LAND OWNER ON THE MISSISSIPPI RIVER, I DECLARE THE ENVIRONMENTAL IMPACT STATEMENT IS SUFFICIENT. AS A RESEARCH BIOLOGIST I BELIEVE UNDERGROUND TRANSMISSION OF OIL IS THE SAFEST AND DOESN'T INTIFERE WITH GROUND WATER LEACHING AND SURFACE T/E.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916, PPL-15-137

BEMIDJI MN
PM
10 JUL
2011
565

POSTCARD USA

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Rob Hall <rwhall51@gmail.com>
Sent: Sunday, July 09, 2017 9:29 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Pipeline Comments

Follow Up Flag: Follow up
Flag Status: Flagged

Attached please find my comments on the proposed Enbridge pipeline proceedings docket numbers CN-14-916 and PPL-15-137.

Robert W. Hall

Lake Belle Taine Enbridge Pipeline Comments

Date: July 9, 2017

To: Minnesota Department of Commerce
Attention: Jamie MacAlister, Environmental Review Manager

From: Robert W. Hall

Docket Numbers CN-14-916 and PPL-15-137

Transmission via email: Pipeline.Comments@state.mn.us

I am a property owner on Lake Belle Taine which is in Hubbard County between Park Rapids, Mn. and Nevis, Mn. My great grandparents began vacationing on the lake in 1929. I have been spending my summers on the lake for 66 years. My family and I have a long history on this clear, pristine, blue-water lake.

I oppose the proposed Enbridge pipeline that would pass near Park Rapids, Mn. (referred to in the Environmental Impact Statement as Applicant's Preferred Route (APR)). Specifically, I oppose the (1) issuance of a Certificate of Need; and (2) the issuance of the route permit for the APR near Park Rapids for the reasons hereinafter stated.

1) The APR would run through a very pristine lake region that includes the Mantrap chain of lakes. Lake Belle Taine is part of that chain. The APR would also run very close to a Minnesota and national treasure, Itasca State Park, home of the source of the Mississippi River. The whole area is a very fragile lake ecosystem that is unique and precious to Minnesota and the rest of the country. This ecosystem needs to be protected from oil contamination. Enbridge has a long history of oil spills as recited in other comments. Oil contamination in this lake ecosystem would be permanently devastating. Clean up would be inadequate and probably more costly than Enbridge or its successor could pay or be willing to pay. There is no guarantee that Enbridge would be in existence during the life of the proposed pipeline to pay for the cost of clean up. These dilemmas can be avoided if the APR is kept out of this beautiful lake region.

   I encourage the administrative law judge who decides this case to tour the affected lake region, including Itasca State Park. The natural beauty of the area will be apparent. It rivals the natural beauty of any of our finest National Parks. The beauty needs to be preserved without concern of future oil pipeline spills and contamination.(Would this pipeline be proposed through Yellowstone, Yosemite or Glacier National Parks in their most sensitive environmental areas? NO.) There are less beautiful, less fragile areas that Enbridge can locate a pipeline that will be far less damaged by oil contamination.

   I do not oppose a pipeline. I do oppose a pipeline through the pristine lake region this APR would pass through. One of the maps with the Environmental Impact Statement

(EIS) refers to a route labelled System Alternative (SA)-04. SA-04 is a conceptual pipeline route that would deliver oil directly to Joliet, Il. bypassing Clearbrook, Mn. That proposed route would go through a region of primarily farm land that could be more easily cleaned up in case of an oil spill. That route would not pass through any Tribal reservations. Many problems are avoided by using SA-04. The problem is that this EIS does not compare the environmental impact of this route to the APR and other route.

It is disingenuous for Enbridge in its EIS to use truck and train transportation alternatives. Of course these alternatives are going to reflect a higher environmental risk compared to the APR. However if APR is compared to SA-04, there is far less environmental danger to Minnesota lands because of the difference in the land quality and ecosystems affected.

It is interesting to note that there are many lake associations in the area of the APR that have been in place for many years well before the APR was proposed. The common mission statement for those associations has been to preserve water quality from such threats as Aquatic invasive species and nitrate runoff from farms. The point of all this is to point out that generations of property owners in the lake region have been proactive in protecting their lake water quality. We care about our lakes. We are passionate about our lakes.The proposed oil pipeline is a huge threat to the lake region. I am sure there are no similar associations along route SA-04 that are so organized and passionate about their property.

It would be idiotic run a pipeline through such a pristine lake region. Oil contamination would devastate the area environmentally, recreationally, and financially. There are other potential routes for the Enbridge pipeline that will be less damaging than the APR.

2) The need for oil is diminishing. It appears the need for oil could diminish exponentially in the next few years. The car maker Tesla is ready to mass produce a new line of electric cars. Solar powered cars are being developed. Warren Buffett recently announced that 90% of electricity for MidAmerican Energy will come from wind power by 2029. With all the new energy alternatives, the need for oil will drop dramatically during the life of the Enbridge proposed pipeline.

3) The APR presents a threat to the White Earth tribe, their customs and way of life. No State or Federal authorities has done anything to protect the interest of any tribe on oil pipeline issues including but not limited to the Dakota pipeline and Enbridge's APR. Now is the time for the State of Minnesota to stand up and protect the interest of the Native Americans affected according to the wishes of the tribes affected. The White Earth tribe does not want the pipeline in their reservation. The State should respect their request and deny the permit for the APR. Please note that Alternative Route SA-04 would eliminate any tribal issues as that route would not pass through a reservation.

The Enbridge APR is another example of “Manifest Destiny” wherein the white man is displacing the Native Americans from their property. The Enbridge proposal is like “backfill” for Native American property not already taken by the white man. This is another example of the government taking of Native American property as described in the book entitled “Damned Indians” by Michael L. Lawson. The book is about the 1944 Pick-Sloan Plan in the Missouri River Basin wherein the Sioux tribes were displaced of the property by the Corp of Engineers to make room for dams. The State of Minnesota should not be the agent for Enbridge to displace the White Earth tribe of their property. The State of Minnesota has a moral and fiduciary obligation to protect the White Earth tribe according to the tribe’s demands.

4) The environmental impact statement does not go far enough since it does not include comparisons of environmental impact on alternative routes outside the APR or alternative routes and methods proposed for transportation. The EIS appears to be a study designed with parameters to best serve Enbridge and not the general public and tribes affected.

For the reasons stated above, I request that the State of Minnesota deny the Enbridge request for (1) a certificate of need and (2) permit for the APR. Thank you for consideration of my comments.

Robert W. Hall

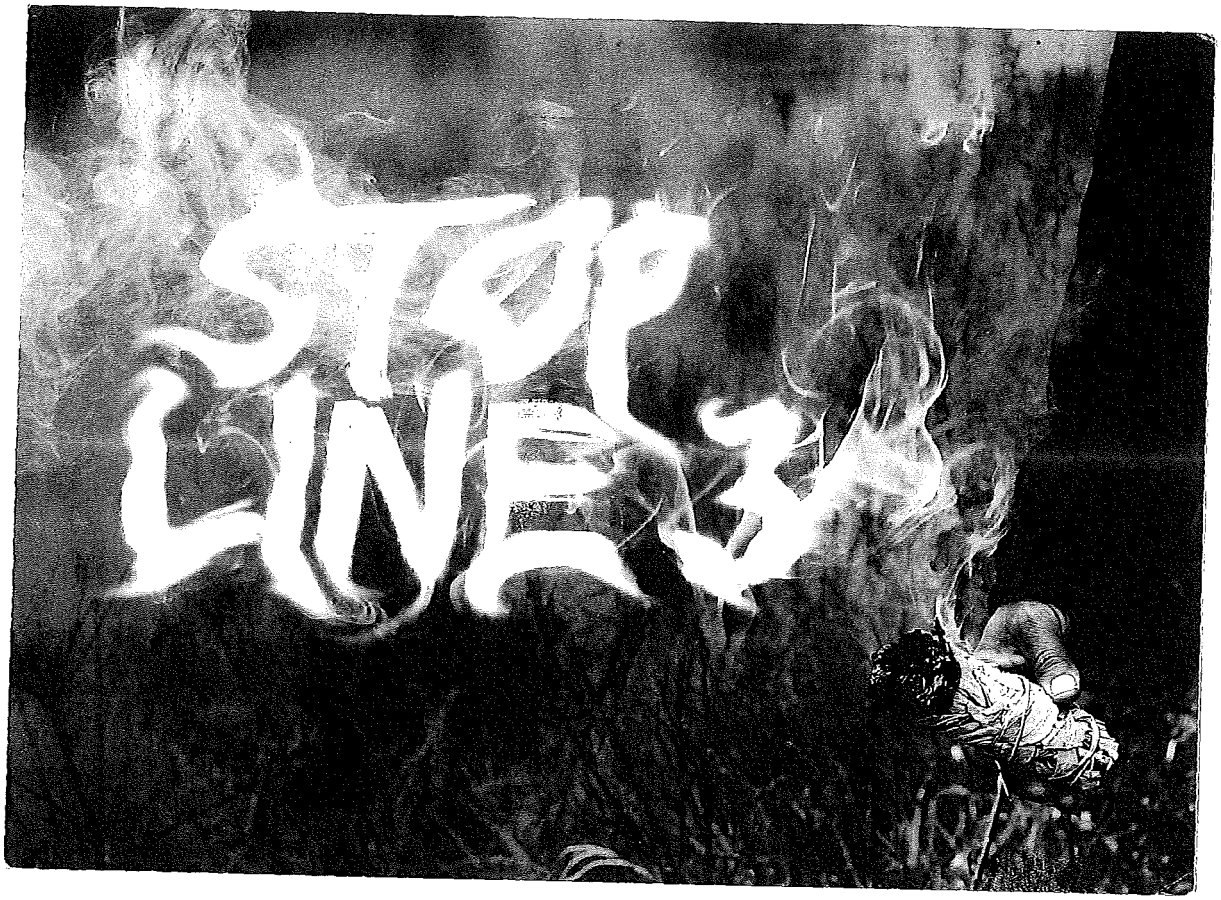

MINNEAPOLIS
MINNEAPOLIS MN 554
05 JUL 2017

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

Water is essential to life. Stop the pipelines. Life over oil!!

SINCERELY,

Iris Hall

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Levi, Andrew (COMM)

From: Jennifer Hall <jhall.mn@gmail.com>
Sent: Monday, July 10, 2017 5:26 PM
To: MN_COMM_Pipeline Comments
Subject: Oppose Line 3 replacement

RE: Docket numbers: CN-14-916 and PPL15-137

Greetings,

I'm writing to ask you to oppose the Line 3 replacement line being sought by Enbridge. The state of Minnesota has the technology and leadership to be at the vanguard of a clean energy future, and I urge you to invest in that by denying the request of Enbridge to expand their line.

The tribal nations affected by this line are conducting their own Environmental Impact Statement and I urge you to wait until they've completed their study, then honor what they indicate in their research. This line will most likely harm our water systems which we rely on for food, spiritual ceremonies, and good health.

As an Ojibwe woman indigenous to this continent, I ask you to stop the expansion of Line 3. We need to be transitioning away from fossil fuels completely, and we need our government to invest in green energy and mitigation of climate change. This pipeline is not safe or necessary. I urge you to represent Minnesotans well and oppose this expansion!

Miigwech,

Jenn

--
Jennifer Hall
651-788-1377
jhall.mn@gmail.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

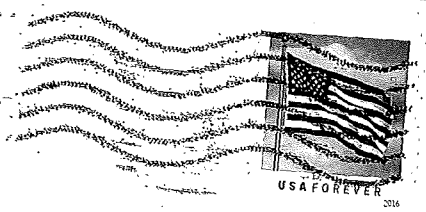

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Sandy Halling	218 966-2108	Sandyhalling77@yahoo
ADDRESS		
28320 Hwy 65		
CITY, STATE, ZIP		
Pengilly MN 55775		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- ***Infrastructure replacement:*** *As a maintenance project, the time is now to replace and modernize Line 3.*

Docket numbers: CN-14-916; PPL-15-137

09 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Del Halling	218 290-4991	delhalling777@Gmail
ADDRESS		
28320 Hwy 65		
CITY, STATE, ZIP		
Pengilly MN 55775		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Karl Hamann
To: MN_COMM_Pipeline Comments
Subject: Line 3
Date: Wednesday, May 31, 2017 3:29:26 PM

To whom it may concern, As a resident of Minnesota, I'm writing to state my firm opposition to the new Line 3 pipeline. The removal of tar sands petroleum, its refinement and its transport, are all disasters for the environment, and all living things in its path. We see irresponsible "Big Oil" insisting on legality, while ignoring the concerns of those impacted by these pipelines, as the case of the Dakota Access pipeline. We see them engaging the services of paramilitary organizations, such as Tigerswan, who target peaceful protectors with tactics usually reserved for terrorist combatants.We see these companies assuring citizens of the safety of these things, then fighting like hell in court not to fully clean up their mess when these pipes inevitably leak. #NOLine3!

From: Brandy Hamblet
To: MN_COMM_Pipeline Comments
Subject: Stop Line 3 (CN-14-916 and PPL-15-137)
Date: Wednesday, May 31, 2017 8:34:36 AM

Hello,

I am writing to voice my concerns over the new Line 3 pipeline that is currently being considered. I strongly urge you to deny Enbridge the permits for this project. The new pipeline will endanger the lakes, wildlife, rice beds, and the Ojibwe treaty lands that it's proposed to go through, and violate the rights of the Ojibwe who own that land. Furthermore, I am concerned about the fact that there are no regulations or requirements to safely remove or abate old unused oil pipelines, which will continue to pose a contamination threat to the land and any waterways surrounding the existing pipeline. Please protect Minnesota's water and land and do not allow Enbridge to build this pipeline.

Thank you,
Brandy

--
Brandy Hamblet

Levi, Andrew (COMM)

From: Jnana Hand <jnana8@hotmail.com>
Sent: Sunday, July 02, 2017 12:15 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

Dear Ms. MacAlister,

I do not support more pipelines. We need to transition to safe and sustainable energy. Native land rights to fishing, gathering, clean water are ignored for short term profit for a few and that's not acceptable. Green energy will create more long term work, invest in our future.

Sincerely,

Jnana hand
811 E 9th St
Duluth, MN 55805
jnana8@hotmail.com

Levi, Andrew (COMM)

From: Mary Hanley <mimiagogo2002@yahoo.com>
Sent: Monday, July 10, 2017 2:58 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline 3

I am writing to voice my strong objection to Enbridge line 3. Our safe water is much more important than oil. We can't drink oil and we have seen time and time again that there truly is no safe pipeline. We already successfully challenged this once. How many chances will Enbridge receive to endanger our waters and our future generations?

No Pipeline 3 in Minnesota!

Sent from my iPhone
Best regards,
Mary

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
15 JUL 2017 PM 6 L

Please do not use pipelines w/ any construction that threatens our natural habitats & natural resources.

This affects every generation and every life.

SINCERELY,

Barbara Hanlon

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

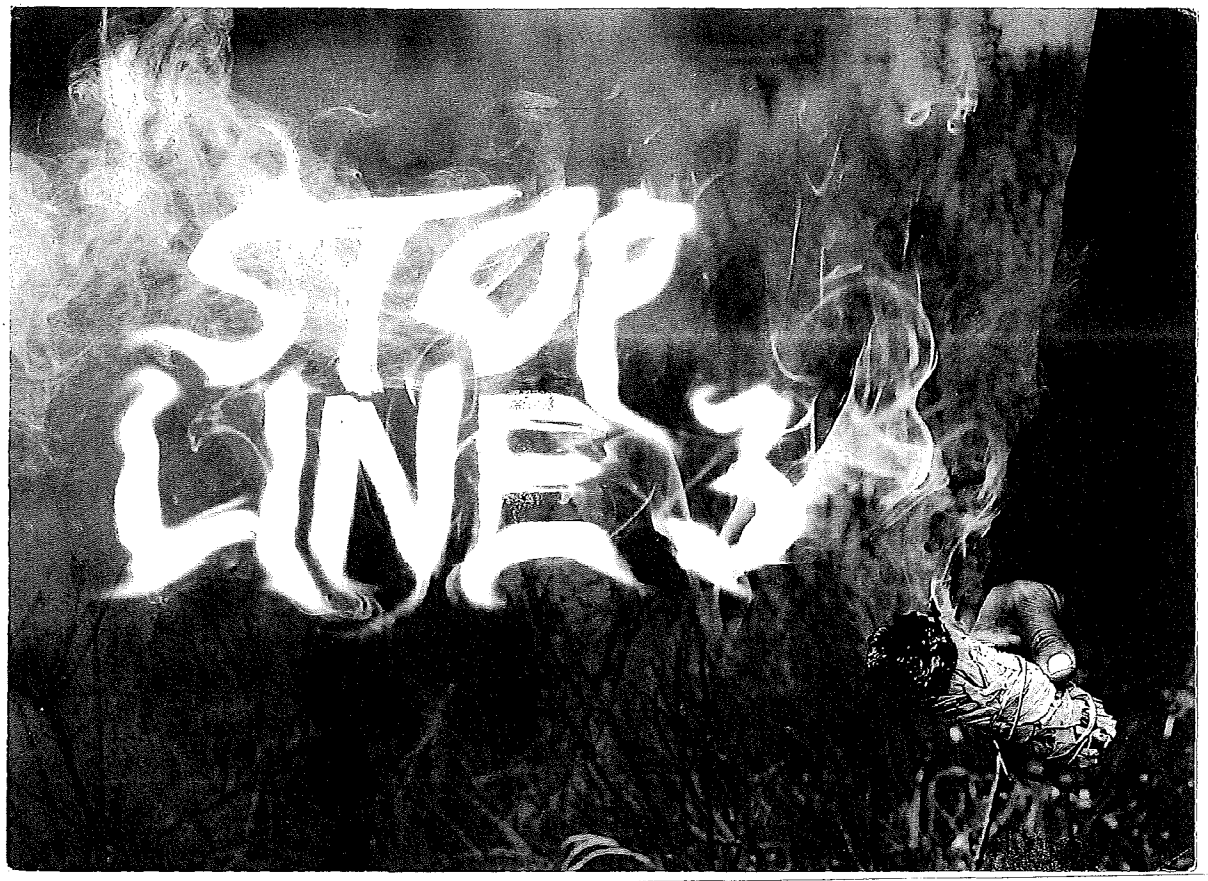

MINNEAPOLIS MN 550
15 JUL 2017 PM 5 L

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

Please halt all pipelines & any construction that threatens our natural habitats & natural resources.

This effects every generation & every life.

SINCERELY,

Kate Hanlon

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

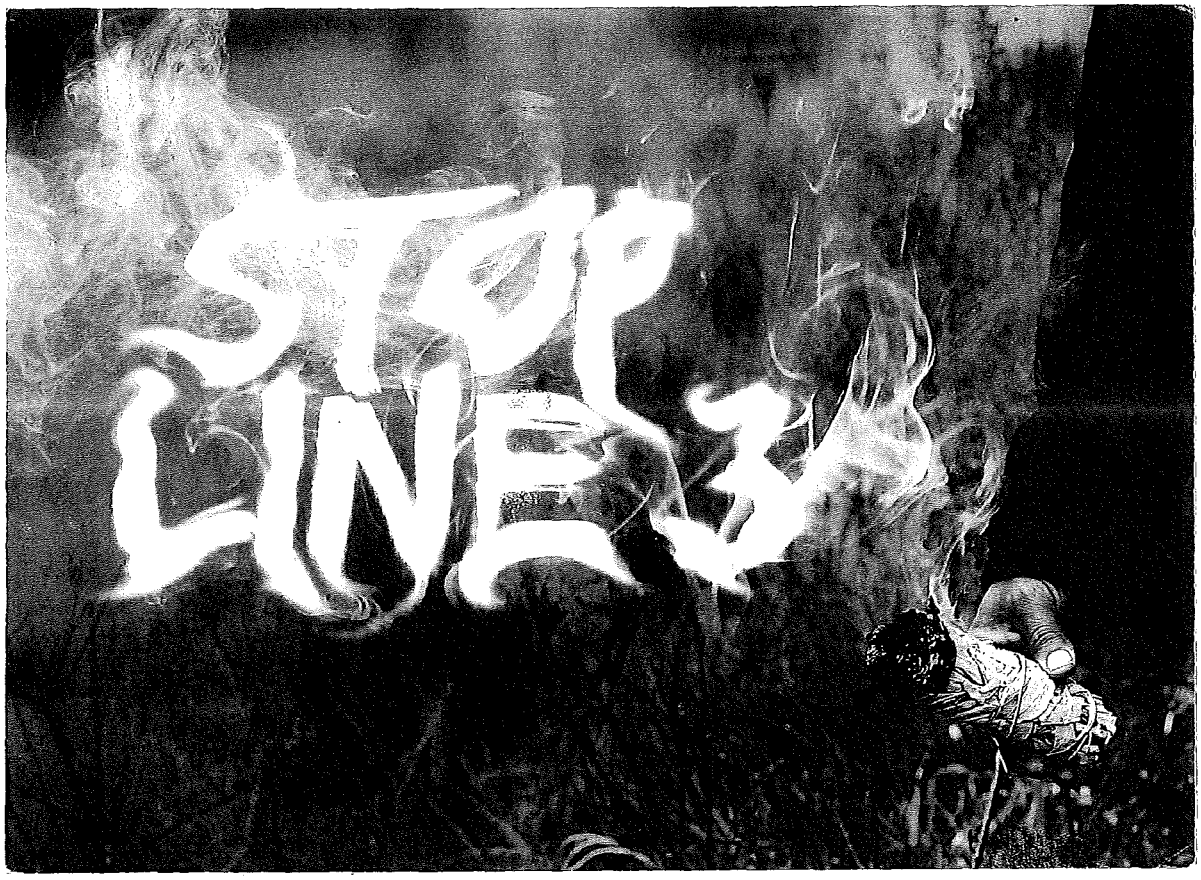

SLOW THE FLOW!!!

DEAR DEPARTMENT OF COMMERCE, MINNEAPOLIS MN 553

PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR

LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137. 15 JUL 2017 PM 6 L

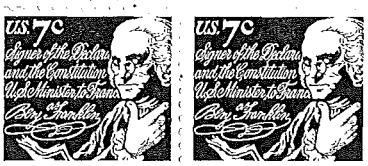

The Environmental Impact Report needs to be completed by a firm or agency that is not connected to Enbridge financially and the firm or agency needs to be focused on protecting the naturally functioning hydrologic systems of Minnesota as though there was no negative human impact on them. (Keep in mind that the freshwater we drink today is the same water our grandparents bathed in and the dinosaurs peed in.)

SINCERELY,

and thanks

Dara Hanton-Alexander

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Levi, Andrew (COMM)

From: Tom & Lisa Hanowski <thehanowskis@gmail.com>
Sent: Saturday, July 01, 2017 11:09 AM
To: MN_COMM_Pipeline Comments
Subject: Pipeline Comments

Jamie MacAlister,

I live in Little Falls. One proposed route runs through my property, between my house and shed.

I have 3 objections to this project and route as follows:

1. Enbridge proposes that the existing Line 3 pipeline be "permenantly deactivated and remain in place". I object to this because it is irresponsible and environmentally unfriendly. The old line should be removed to salvaged, and the land returned to it's original condition, or re-used for the new pipeline. Abandoning in place is just delaying the inevitable decomposition of the line, and associated negative environmental impacts. These decommissioning costs (i.e. complete line removal at end of life) should be included in all pipeline projects.

2. The project gives no financial benefit to land owners. There should be substantial annual payments to land owners for using their land for the pipeline, plus the usual easement payments.

3. The project gives no financial benefit to the state of Minnesota, as it should.

Thank you for taking and addressing these comments.

Tom Hanowski
20346 Ginger Road
Little Falls, MN 56345
320-232-9726

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
James I Hansen	612-308-9987	Jimfish4147@gmail.com
ADDRESS		
1303 5th Av S		
CITY, STATE, ZIP		
Stillwater MN 55082		

COMMENTS

We need This Line Replacement - Now

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
JEFFREY S. HANSEN	262-374-4046	jeffreysvend@hotmail.com
ADDRESS		
620 N. LINCOLN ST		
CITY, STATE, ZIP		
ELKHORN, WI 53121		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

0400

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Travis Hanson	612 325-5584	
ADDRESS		
16060 201st Ave NW		
CITY, STATE, ZIP		
Elk River MN	55330	

COMMENTS

our economy needs oil the old pipeline is nearly 60 years old. What would be impact & cost if had oil spill in old line? Local 49 has trained operators for the work needed be done

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: jessica hanson <jessicavhanson@gmail.com>
Sent: Sunday, July 09, 2017 10:41 PM
To: MN_COMM_Pipeline Comments
Subject: Please Stop Line 3

Northern Minnesota lakes and rivers are too valuable to endanger with inevitable pipeline spills. They provide so much revenue in hunting, fishing and tourism, and oil use is on the decline in the US anyway. We do not need this pipeline. As a lifelong Minnesotan who loves her state I urge you to hold Enbridge accountable in dismantling and cleaning up the existing Line 3. Please protect our lakes and rivers by halting the proposed pipeline route through the healthiest waters in the state.

Sincerely,
Jessica Hanson

Levi, Andrew (COMM)

From: Ryan Hanson, J <rhinopizza@hotmail.com>
Sent: Sunday, July 09, 2017 6:05 PM
To: MN_COMM_Pipeline Comments
Subject: Info

Dear Ms. MacAlister,

When is it supposed to kick off, maybe 2018??

Sincerely,

Ryan Hanson J
24121 Turner Lake Dr
Crosby, MN 56441
rhinopizza@hotmail.com

Levi, Andrew (COMM)

From: john hanson <solarwindconsultants@yahoo.com>
Sent: Monday, July 10, 2017 4:53 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 comments

Do not need Tar Sands oil - Environmentally terrible
With oil price lowest ever - Do not need any more production Transportation going ELECTRIC

Pipeline 3 to go through environmentally sensitive Northern Minnesota - Not worth the risk of a leak!!!

Xl pipeline has pulled their permit request as they have no market. Why should line 3 be needed??

Levi, Andrew (COMM)

From: Lisa Harala <lisa@giantvoices.com>
Sent: Friday, June 23, 2017 9:43 AM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I'd like to voice my support for the Line 3 Replacement project.

I am a Minnesotan and want to see the environment protected like most others. Replacing the aging infrastructure is, in fact, imperative to protecting the environment.

The MPCA has recently released the Mississippi River Watershed report that shows the cleanest waters in the state are in northern Minnesota. Energy infrastructure and clean waters can co-exist.

In addition, the region of Northeast Minnesota will benefit greatly from the economic impact of the construction project.

Please move the project forward.

Lisa Harala

Sincerely,

Lisa Harala
1822 Vermilion Rd
Duluth, MN 55803
lisa@giantvoices.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
HOWARD HARDER	751 5763	
ADDRESS		
3953 Big N. Rd NW		
CITY, STATE, ZIP		
BEMIDJI MN		

COMMENTS this line needs to be put in period - for safety

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Marlys Harder	751-5763	
ADDRESS		
3953 Big North Rd NW		
CITY, STATE, ZIP		
Bemidji MN 56601		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Carol Hardin <cchardin8@gmail.com>
Sent: Monday, July 10, 2017 2:06 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

To whom it may concern:

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

The EIS does not seem to consider many of the negative impacts of constructing this pipeline.

There is too high of risk of damage to the sensitive irreplaceable wetlands, especial where wild rice grows and is a cultural heritage of the indigenous people.

The extraction and transportation of the extremely dirty tar sand oil is a very bad idea. Burning this fuel will only make climate change worse.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Sincerely,

Carol Hardin

Hudson, WI

Levi, Andrew (COMM)

From: Cuack Newz <cuacknewz@gmail.com>
Sent: Monday, July 10, 2017 3:21 PM
To: MN_COMM_Pipeline Comments
Subject: Dockets: CN-14-916 and PPL-15-137
Attachments: 07-10-17 Opposing Line 3 Comment.pdf

Our comment opposing Line 3. Please see enclosed.

Steve Harding & Elizabeth Wright

Steve Harding & Elizabeth Wright
Founders of Facebook Group:
No DAPL & No Pipelines We The People Petition
& C.U.A.C.K. Newz
Email: cuacknewz@gmail.com

Jamie MacAlister
Environmental Review Manager Minnesota Department of Commerce
85 7th Place East, Suite 280 St. Paul, MN 55101-2198

Email: Pipeline.Comments@state.mn.us
Fax #: 651-539-0109

Re: Dockets: CN-14-916 and PPL-15-137

The proposed line 3 & the DEIS (Draft Environmental Impact Statement) should be denied due to the following facts:

1) No Legal Authority
There is no legal authority to pursue line 3 since the Indigenous tribes & the Anishinaabeg people have not been given an informed consent for this project. There was no consultation with the Indigenous tribes. Pursuing this line of thinking to push thru line 3 is a violation of the Treaties.

2) Violating: Treaties, the public trust, human rights, & the environment:
Proposing line 3 to be placed within this community is not protecting: the people, the land, the water. The DEIS admits the probability percentages of annual leaks for the proposed route. Any leak is too much and endangers the community. The company history has had terrible leaks.

The Ojibwe people's rights to hunt, fish, and gather in these territories would be ruined by a leaking pipeline. A government and company proposing to ruin the land and a Tribes food source of rice is unconscionable. The Ojibwe and Ho-Chunk territories in Wisconsin have not given an informed consent for this project. The Cree & Dine people have not approved this project to begin the line in Alberta Tar Sands. Why would they give permission? According to Stop Line 3 the *"Dene and Cree people continue to be poisoned, raped, and murdered by the most extreme extraction project in the world."* These refineries, at the end of this proposed line 3, would bring health devastation: cancer, autoimmune diseases, kidney failure. (Stop Line 3)

3) Desecrating sacred sites:
There was no cultural survey done on 63 sites with local experts to analyze this proposed project's impact on these sacred sites.

4) Sex Trafficking:
The DEIS even states sexual abuse or sex trafficking will occur yet there is no plan in place to prevent these tragedies and crimes. An awareness campaign is not sufficient to stop these abuses & crimes.

5) Old Line 3:
The heighth of being unaccountable shows clearly when Enbridge refuses to decommission old line 3 and plans to leave it in the ground. This is unacceptable since it effects the wild rice and land in the region.

6) No Accountability:
The DEIS does not state of any outside organization to keep Enbridge accountable for minimizing impacts of line 3. Enbridge keeping Enbridge accountable is not oversight; especially when their company's history has violated *"permit conditions, constructing illegally, and hiding and ignoring spills."* (Stop Line 3)

7) A Better Way:
A better way is to build green energy and utilizing the powerful wind in the area. We have the technology to protect the people and the environment; to ignore better options is not performing as a responsible government.

In Conclusion:
Pipelines leak. This is a fact.

In fact, this company has a horrible history of leaks. According to EcoWatch:
"Enbridge Energy Partners' aging Line 5 pipeline, which runs through the heart of the Great Lakes, has spilled more than 1 million gallons of oil and natural gas liquids in at least 29 incidents since 1968, according to data from the federal Pipeline Hazardous Materials Safety Administration obtained by the National Wildlife Federation."

Voters don't want this. According to Stop Line 3: *"Among rural Minnesota voters: 61% oppose increasing the flow of tar sands oil through Minnesota."*

This proposed project of line 3 has no legal authority to be entertained or to continue.
This proposed line 3 and the DEIS is violating the following:

- Treaty Rights
- Sacred Sites Rights
- Public Trust
- Human & Environmental Rights

Steve Harding & Elizabeth Wright

Sources:

- https://www.stopline3.org
- https://www.ecowatch.com/enbridge-line-5-spills-2379938636.html
- DEIS

Levi, Andrew (COMM)

From: Mary Harper <harper_mary@hotmail.com>
Sent: Monday, July 10, 2017 9:52 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline

Please do not put the Line 3 pipeline directly through the state of Minnesota. It has the potential to forever ruin our pristine waters and the majority of our natural resources. Some data collected includes:

1. - This pipeline route crosses the clearest lakes area in MN based on the Census of Water Clarity (U of MN Water Resources Center).
2. - This pipeline route crosses an area with the highest susceptibility for groundwater contamination impacting drinking water aquifers (MPCA map).
3. - The pipeline route crosses the wild rice lakes area. According to the DNR, MN supplies 50% of the worlds hand-picked rice annually.
4. - The pipeline route crosses wetlands critical to waterfowl and other wildlife (DNR).
5. - The proposed route would cross 8 state forests (including the Mississippi Headwaters SF), 3 wildlife management areas, 13 trout streams (including the Straight River), as well as the North Country Trail.
6. - Line 3 would cross the Mississippi River twice in Minnesota. This river is a valuable source of drinking water for many cities on its 2,552-mile journey to the Gulf of Mexico, including Minneapolis and St Paul. 3.8 million gallons of water flow from Lake Itasca into the headwaters every day.

I live here in the beautiful Chippewa National Forest and love the natural beauty of Minnesota. Please consider the alternate route proposed by the Friends of the Headwaters.

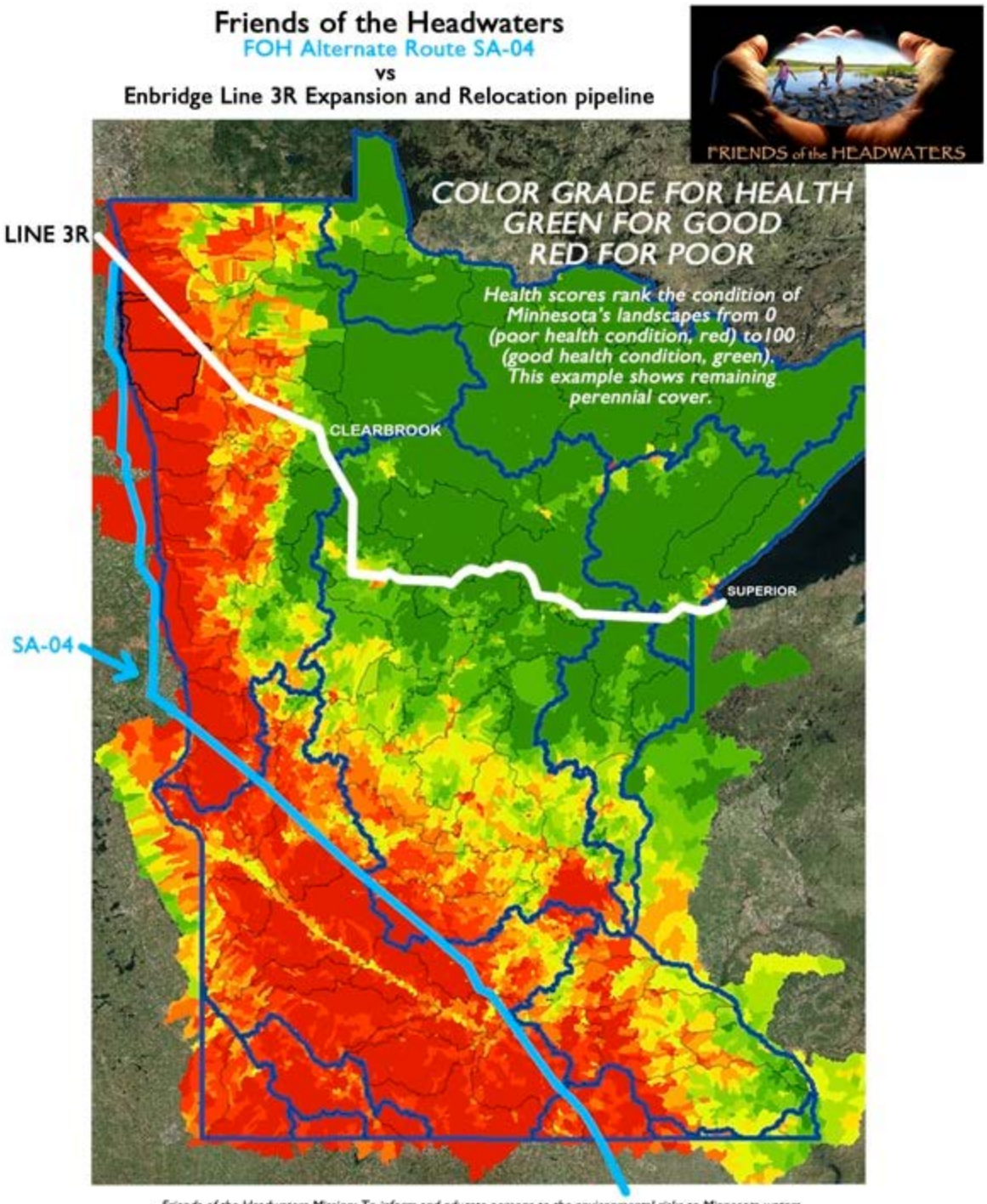

Friends of the Headwaters Mission: To inform and educate persons to the environmental risks to Minnesota waters from a proposed crude oil pipeline which will jeopardize the Mississippi River Headwaters, many other lakes and streams and wild rice wetlands in northern Minnesota. FOH won a unanimous Minnesota Appellate Court ruling, upheld by the Minnesota Supreme Court, ordering the state of Minnesota to conduct the first environmental impact study, EIS, on a crude oil pipeline in Minnesota history. This is a landmark decision for MN environmental law.

To learn more, visit www.facebook.com/savemississippiheadwaters
To keep our water blue, donate at www.friendsoftheheadwaters.org
Or POBox 583, Park Rapids, MN 56470

Thank you,
Mary C. Harper
P.O. Box 26
Cass Lake, MN 56633

Levi, Andrew (COMM)

From: Sarah Harper <sarah@mn350.org>
Sent: Monday, July 10, 2017 9:34 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 DEIS Comment
Attachments: Line 3 Comment .docx

Hello,

Attached is my comment on the Line 3 DEIS.

Docket numbers:
CN-14-916
PPL-15-137

Thanks,
Sarah

Line 3 DEIS Comment CN-14-916 & PPL-15-137

I am a senior at the University of Minnesota pursuing a degree in accounting. I was born in Minnesota and have lived here my whole life. My mother grew up on a farm in Northern Minnesota where I spent much of my childhood. I also spent many summers at Big Sandy Lake, a childhood destination that is very important to me and is just a few miles away from the proposed route. With a more personal connection to the region Line 3 will span and a particular interest in the probable consequences of this project, I was pleased to know that the State of Minnesota is allowing public engagement and participation throughout the regulatory approval process. I have been following the Line 3 proposed pipeline for over a year as an active member of MN350, and I have come to learn that it will be a major piece of infrastructure—the largest project in Enbridge history. With widely held concerns about fossil fuels exacerbating climate change, a long history of neglecting and oppressing tribal nations and an indefinite lifespan set for this pipeline, an extensive review and careful progression is warranted to ensure that there is a true need for Line 3. The current state of this DEIS does not satisfy this obligation and cannot yet be used to guide a well-informed decision.

It is stated in section 3.1.1 C that the commission must determine whether or not the consequences to society of granting the certificate are more favorable than the consequences of denying it. This is key. To reiterate, the underlying purpose of this document is to help inform decision makers of the “consequences to society.” If this is true, why are there so few pages in the DEIS that focus on said society? More specifically put, why are the Tribal Resources and Environmental Justice chapters of the smallest? (They are less than 50 pages in total, including references, out of 5,000+). We can’t possibly say that society was even taken into consideration when less than 5% of the document even mentions social issues. What societal consequences

will this decision be based off of? By looking at the current state of this document, I couldn't tell you. It is stated on page 443 of chapter 5 that the cost of climate change as a result of this pipeline alone could be as high as $287 billion. Does a number like that not call for another 5,000 pages of discussion? There are clearly enormous ways this will impact communities both in Minnesota and globally that remain predominantly undisclosed. Who is going to pay for that financial burden? This is a slap in the face to all Minnesotans who aren't given clear answers about the climate change mitigation plans both financially and existentially. I am more than disappointed—anyone could see that there is a major deficiency here. This document is undeniably incomplete.

Within the sections that do mention social impacts, the content available is sloppily put together. Why is "historicaltrauma.com" listed as a reference? This domain does not even exist. Such embarrassingly poor research conducted on tribal issues is clearly racist and insulting to the Native community. It makes me question how sound the research is for the rest of the DEIS. The entire portion that deals with the devastating and concealed network of sex trafficking among pipeline construction workers is evidently insufficient. Setting up an "education plan and awareness campaign," as Enbridge claims they "can" do (with no specifics provided), won't solve the problem. Has the company ever set up such programs before, and why would they suddenly do so for Line 3? This ignores the victims and the tremendous pain they are forced to endure. How do we value their lives? Something this serious deserves more attention in the document. Both of these examples are a sign that social science expertise in the making of these chapters was majorly lacking. Perhaps this is due to the fact that this research was conducted by the Environmental Review Manager of the MNDOC, whose expertise is in Botany

and Land Use Planning. I ask that this portion be rewritten by an expert in the field. Once again, how can the PUC sufficiently weigh social consequences without thorough research and expert assistance?

The DEIS has failed to examine the health impacts of this pipeline by not analyzing or even including the worst case scenario for emergency response to a spill along the various routes. If there is a statistical chance of a catastrophic spill happening anywhere along the APR in my lifetime (including the headwaters), doesn't the public deserve to know what Enbridge plans to do about it? Isn't this the bottom line concern of our communities? There were countless records of health problems among the victims of Enbridge's million-gallon Kalamazoo River spill in 2010 due to the absence of an effective emergency response; the disaster still hasn't been entirely cleaned up and is still causing problems in the community whose lives were tragically upturned. Enbridge should not only disclose their response plan, but explain how they have drastically improved their response times and effectiveness in the past few years. Doesn't the PUC need to be given this information in order to properly weigh the societal consequences?

Perhaps this is not taken into consideration because SA-04 would clearly prove to be the best route with the least impact, as it is more accessible by public roads in case of a spill. When it comes to mitigation, the plan in the DEIS is composed of what Enbridge claims it will do—taken directly from the company's application. There is no evidence of compliance or established procedures to hold it accountable beyond "third-party monitors" that will not have stop-work authority. This more than hints at a strong bias toward Enbridge and its preferences above all else. I urge the DOC require Enbridge to disclose more detailed mitigation and

emergency response information in the EIS. It is critically important and may be the determining factor in the PUC's decision.

On a side note, the document is overall inconsistent. An example of this is in section 4.2.2, where it is stated that approval or denial of any one crude oil transport project is unlikely to significantly impact the rate of extraction in the oil sands. This is inconsistent with what the executive summary says, which is that the Project will cause an incremental increase in extraction over what would have occurred if demand was met instead with light crude oils. This makes me question how carefully the document was put together.

Why isn't shutting down Line 3 entirely and not building a new pipeline ever discussed in the DEIS? Wouldn't this analysis be the best way to delineate what consequences there would be to society if the certificate is denied? It would certainly create plenty of temporary jobs in Northern Minnesota to remove the old Line 3. Minnesotans deserve to know more about these economic factors, and I would hope that the decision makers get a chance to hear about them. And speaking of the old Line 3, why is there no plan for addressing the contamination they will find when this old ("weeping," according to Enbridge) line is shut down? Why are there only 16 pages devoted to abandonment? What are the benefits or downsides of using alternative energy instead of petroleum in years to come? Considering the projected twofold growth of wind and solar through 2040 according to the AEO, some sort of analysis on this topic would give us a more realistic idea of what energy will eventually look like in Minnesota and how Line 3 might play into that outcome. I don't see why the shut-down without replacement option is an impossible one, and it shouldn't be ignored in the EIS. If it is absent, this will stunt the PUC's ability to make a thoughtful decision.

Many of the alternatives that *are* discussed in this document are either ridiculous or infeasible. The oil-by-rail alternative requires infrastructure that does not currently exist (a rail terminal at the Canadian border), and the oil-by-truck alternative requires 4,000 trucks a day. These proposed alternatives are nothing short of absurd and show unmistakable bias. These alternatives make Enbridge's plan look like the only option that makes sense—this is simply not true.

Throughout my years of studies, I have learned that industry is often favored to enhance the wellbeing of society through a dispersion of wealth and through the benefits reaped from the good provided. It is often believed that these benefits will offset the social cost of industry, but this isn't always true – especially not when the environment is damaged excessively. My point is that we can't know if the benefits will offset the costs, because the DEIS does not give sufficient insight into either side of the scale. As I have argued up to this point, there is not a sufficient analysis of the social or health impacts of Line 3. Further, there is not a sufficient analysis of the economic benefits. I understand a discussion of the economic need of Line 3 will supposedly be addressed during the evidentiary hearing this fall, but why are we leaving this critically important job up to the lawyers? As an accounting student, I would love to see some sort of economic justification for this pipeline. I think the rest of the public would, too. From what I know about tar sands oil, it is currently very difficult to make a profit off of, and much of it is selling at a loss right now. What I do see in section 5.2.7.3 regarding overall energy consumption in the US remaining relatively flat through 2040, would lead me to believe that upping the capacity is not a critical need at this point in time. If this is the case, is it necessary to approve Line 3, which will be the largest project in Enbridge history?

Line 3 DEIS Comment CN-14-916 & PPL-15-137

To conclude, this DEIS appears to lack the unbiased information and expertise needed to guide the PUC in making the best decision for our state. I ask that the DOC revise it to include a more thorough look at the costs and benefits of this pivotal project.

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Jake Harris

Street Address: 3255 Co Road 4

City: Wauburn State: MN Zip Code: 56589

Phone or Email: farmerjakelee@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

This pipeline needs to be removed and not replaced. This is going to leak and when it does it will ruin our waterways and the way of life for the Anishinaabe people. The wild rice is sacred and when the pipeline leaks it will destroy the water and the wild rice. This pipeline will not be producing long term jobs for people in Northern Minnesota and the oil will not even be used here. There is no way that this pipeline will be beneficial and it will be violating treaty rights. Respect the treaties, Respect our water, and respect Mother earth!

If including additional pages please number them and tell us how many you are providing:_____ pages

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

SAINT PAUL MN 550
11 JUL 2017 PM 2 L

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Kayla Louise Harris		Kammerman85@Hotmail.com
ADDRESS: 309 Atlas Ave SE		
CITY, STATE, ZIP: Remer MN 56672		

COMMENTS

People need to STOP living the past!
time to move on with the new.
I support you guys 100%!
Keep up the great work.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Fax 651-539-0109

Line 3 Pipeline comments -

Docket # CN-14-916 + PPL-15-137

My name is Karen Harris, I am a Registered Nurse caring for individuals in Clearwater County as well as a county resident. I am writing to oppose Enbridge's line 3 project.

I care for many individuals within the county that are Native Americans. The proposed route of line 3 would negatively impact many areas that are within the 1855 Treaty area that secure hunting, fishing and ricing rights for these individuals. I fear the construction of the pipeline will disrupt these areas to the point many people who continue to hunt, fish and rice will end up going without. Scientific evidence has shed light on the damage oil pipelines create even before they leak. According to The National Nurses United, there remains a concern for public health and possible increase in the damaging effects on the climate crisis. Many people in these affected areas are low income. They rely on a threatened Medicaid system for health care. We put these people at the greatest risk for negative health outcomes d/t distance from care, lack of care and social inequality as well as structural barriers. These are the people that Enbridge will be exposing toxic chemicals, increased sound levels, increased anxiety over spill possibilities as well as anxiety d/t decreased water quality from construction impact. These areas are remote with limited human observation points making possible catastrophes prolonged before emergency response is initiated. As a nurse, many of my clients rely on local artesian wells for drinking water. For individuals who rely on ground water, contamination of the one source they use would be unimaginable due to lack of income to buy safe water or to go to a water dispensing site due to lack of transportation.

> "A new University of Toronto-Scarborough study published Monday says there's another reason to be concerned about oil production in the tar sands: The Canadian government may have underestimated emissions of carcinogens known as polycyclic aromatic hydrocarbons, or PAHs, from the Alberta tar sands, and they may be a major hazard to both human and ecosystem health." (Magill, 2014).

The possible negative outcomes this pipe brings to the area are unimaginable for the health care field.

Historical trauma Native Americans have endured has been unimaginable. This continues with the exploitation of their treaty lands, treaties that have not been honored and desecration of sacred sites. Bringing the oil pipeline as well as the "man camps" involved with this type of work increases sexual crimes against native women. According to the Boston Globe:

> "In North Dakota, the man camps created during the Bakken oil boom drastically increased the levels of violent crime perpetrated against women and girls — and particularly native women and girls. Studies conducted during the peak of the oil boom — from 2010 to 2013 — showed that the number of reported domestic violence incidents and sexual assaults increased by hundreds, flooding and overwhelming service providers" (Nagle, M.K. & Steinem, G. Boston Globe, 2016).

The proposed route takes the toxic tar sands oil near one of Minnesota's most pristine and most visited state parks, Itasca. Creating several local jobs that are filled each season, this park has the Mississippi headwaters. A place where families come from all over the world to let their children walk across the waters that flow over rocks as they flood towards the Gulf of Mexico. As a nurse, mother and community member, I ask that the Enbridge line three be stopped. I do not feel adequate safeguards are in place to allow such a toxic flow of chemicals through pristine forests, marsh lands, rivers and lakes that make up the Minnesota we want to hand down to our grandchildren and their families.

Karen Harris, RN, BSN, PHN

References

Nagle, M. K., & Steinem, G. (2016, September 29). Sexual assault on the pipeline. Retrieved July 10, 2017, from https://www.bostonglobe.com/opinion/2016/09/29/sexual-assault-pipeline/3jQscLWRcmD12cfefQTNsL/story.html

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Levi, Andrew (COMM)

From: Ashley Harris <Ashley.Harris@live.bemidjistate.edu>
Sent: Monday, July 10, 2017 9:41 PM
To: MN_COMM_Pipeline Comments
Subject: Line Three Pipeline Comments
Attachments: L3 EIS.docx

Docket numbers CN-14-916 and PPL-15-137

As a young Native American living in Minnesota, I am very concerned about the proposal of Enbridge's Line Three Pipeline and its route. If a spill were to occur, which is inevitable according to Stop Line 3, the effect on wildlife could be devastating. No matter what trophic level the spill directly affects, all creatures in the affected ecosystem(s) would suffer.

Not only would the flora and fauna of the ecosystem suffer, but Minnesota's infrastructure would as well. According to Dirk Peterson of the Minnesota DNR, fishing contributes "…$640 million a year in tax revenues to the treasuries of our state and federal government ("News Release")." If a leak were to contaminate a water source fishing revenue would take a detrimental hit, as would hunting.

I urge you to reconsider the instillation of the Line Three Pipeline, as it puts animals and humans at risk just by existing. The effect of the pipeline would be much bigger than I have described here, and I fear what damage it *will* cause if it is truly built.

*Pilamaya (*Thank you) for your time.

Citations

"News Release." *MN Department of Natural Resources News Releases*. Minnesota Department of Natural Resources, 5 May 2011. Web. 10 July 2017.

"Stop Line 3." *Stop Line 3*. N.p., n.d. Web. 10 July 2017.

Levi, Andrew (COMM)

From: Glenn Harris <glennharris2010@gmail.com>
Sent: Monday, July 10, 2017 1:24 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comments on CN-14-916 and PPL-15-137

7/10/2017
Dear Jamie MacAlister and all else concerned,

I am writing to publicly oppose the creation of Enbridge Energy's proposed Line 3 Pipeline Project (see dockets numbered CN-14-916 and PPL-15-137). My name is Glenn Harris, I am a mathematician and Minnesotan resident residing in Minneapolis 55408. The reasons are many for my opposition, principal among them is the environmental concerns. Following that, it is just bad business for Minnesota. Lastly it will be a political nightmare for all involved.

It is well known that oil transportation inevitably leads to oil spills. It is also known that corporations serve their profit margins only (not first and foremost, but only). Enbridge publicly claims that this is a replacement project but that is false since the old pipeline will remain in operation; they do not intend to take out the old line and place the new one on top, this is a whole different pipeline (see https://www.enbridge.com/projects-and-infrastructure/projects/line-3-replacement-program-us). So noting that Enbridge is being purposefully misleading one cannot help but throw all their claims of 'safety as a chief concern' into doubt. That doubt then coupled with the corporation's fiduciary responsibility to produce a profit at all other costs, i.e. the environmental costs, is a clear reason to fully expect a future environmental crisis. The land and water will most assuredly be damaged then. Considering the land and water's value to the public and the Minnesotan businesses, even more so in the face of climate change as Minnesotan land may be some of the only that remains arable, forces the government to not permit Enbridge to complete this project.

The public, businesses, and the government need not be concerned with Enbridge losing money on this. I certainly do not care if Enbridge goes bankrupt (which they won't). Enbridge should not have put the cart before the horse in deciding to sink money into this project already, the losses they suffer are their own doing. The fact is that the public, businesses, the government, and even Enbridge them self will lose money when the line cracks and torrents of oil spew onto the land, destroying our water supply and making future land use impossible.

This is just a bad idea, and we need only look over one state to the Dakota Access Pipeline to see how bad things will get in the coming days if this project moves forward. The further costs of protests, police protection, litigation, etc. will be far worse in Minnesota than in the sparsely populated North Dakota. Minnesotans care deeply about their environment and not the minor gains in profits of some soulless corporation. Many peoples jobs depend on a healthy environment too, they will fight to defend their jobs and join against Enbridge.

Let's stay ahead of the curve on this one and just stop the pipeline before it becomes an environmental, monetary, or political problem.

Sincerely, Glenn Harris
3435 1st. Ave. S. Apt. 1
Minneapolis, MN, 55408

Levi, Andrew (COMM)

From: Karen Harris <Karen.Harris@whiteearth-nsn.gov>
Sent: Monday, July 10, 2017 1:55 PM
To: MN_COMM_Pipeline Comments
Subject: line 3 pipelin
Attachments: enbridge opposition.docx

Docket number CN-14-916 and PPL-15-137

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I care for many individuals within the county that are Native Americans. The proposed route of line 3 would negatively impact many areas that are within the 1855 Treaty area that secure hunting, fishing and ricing rights for these individuals. I fear the construction of the pipeline will disrupt these areas to the point many people who continue to hunt, fish and rice will end up going without. Scientific evidence has shed light on the damage oil pipelines create even before they leak. According to The National Nurses United, there remains a concern for public health and possible increase in the damaging effects on the climate crisis. Many people in these affected areas are low income. They rely on a threatened Medicaid system for health care. We put these people at the greatest risk for negative health outcomes d/t distance from care, lack of care and social inequality as well as structural barriers. These are the people that Enbridge will be exposing toxic chemicals, increased sound levels, increased anxiety over spill possibilities as well as anxiety d/t decreased water quality from construction impact. These areas are remote with limited human observation points making possible catastrophes prolonged before emergency response is initiated. As a nurse, many of my clients rely on local artesian wells for drinking water. For individuals who rely on ground water, contamination of the one source they use would be unimaginable due to lack of income to buy safe water or to go to a water dispensing site due to lack of transportation.

> "A new University of Toronto-Scarborough study published Monday says there's another reason to be concerned about oil production in the tar sands: The Canadian government may have underestimated emissions of carcinogens known as polycyclic aromatic hydrocarbons, or PAHs, from the Alberta tar sands, and they may be a major hazard to both human and ecosystem health." (Magill, 2014).

The possible negative outcomes this pipe brings to the area are unimaginable for the health care field.

Historical trauma Native Americans have endured has been unimaginable. This continues with the exploitation of their treaty lands, treaties that have not been honored and desecration of sacred sites. Bringing the oil pipeline as well as the "man camps" involved with this type of work increases sexual crimes against native women. According to the Boston Globe:

> "In North Dakota, the man camps created during the Bakken oil boom drastically increased the levels of violent crime perpetrated against women and girls — and particularly native women and girls. Studies conducted during the peak of the oil boom — from 2010 to 2013 — showed that the number of reported domestic violence incidents and sexual assaults increased by hundreds, flooding and overwhelming service providers" (Nagle, M.K. & Steinem, G. Boston Globe, 2016).

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References

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Levi, Andrew (COMM)

From: Karen Harris <Karen.Harris@whiteearth-nsn.gov>
Sent: Monday, July 10, 2017 1:47 PM
To: MN_COMM_Pipeline Comments
Subject: opposition of line 3
Attachments: enbridge opposition.docx

My name is Karen Harris, I am a Registered Nurse caring for individuals in Clearwater County as well as a county resident. I am writing to oppose Enbridge's line 3 project.

I care for many individuals within the county that are Native Americans. The proposed route of line 3 would negatively impact many areas that are within the 1855 Treaty area that secure hunting, fishing and ricing rights for these individuals. I fear the construction of the pipeline will disrupt these areas to the point many people who continue to hunt, fish and rice will end up going without. Scientific evidence has shed light on the damage oil pipelines create even before they leak. According to The National Nurses United, there remains a concern for public health and possible increase in the damaging effects on the climate crisis. Many people in these affected areas are low income. They rely on a threatened Medicaid system for health care. We put these people at the greatest risk for negative health outcomes d/t distance from care, lack of care and social inequality as well as structural barriers. These are the people that Enbridge will be exposing toxic chemicals, increased sound levels, increased anxiety over spill possibilities as well as anxiety d/t decreased water quality from construction impact. These areas are remote with limited human observation points making possible catastrophes prolonged before emergency response is initiated. As a nurse, many of my clients rely on local artesian wells for drinking water. For individuals who rely on ground water, contamination of the one source they use would be unimaginable due to lack of income to buy safe water or to go to a water dispensing site due to lack of transportation.

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References

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Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Lake Hart	218-391-3127	
ADDRESS		
PO BOX 281		
CITY, STATE, ZIP		
Floodwood mn 55736		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: BRIAN HARTJE <brian@bemidjiwelderssupply.com>
Sent: Friday, July 07, 2017 2:29 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Enbridge currently has a line the is old and needs to be updated with modern piping and coating. i feel it is more unsafe to have a old line in use and to replace it with new. They have found routes that are safe in existing corridors.

Sincerely,

BRIAN HARTJE
6720 Viking Ct NE
Bemidji, MN 56601
brian@bemidjiwelderssupply.com

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Jerry Hasnedl

Street Address: 821 East Ste E

City: Thief River Falls State: MN Zip Code: 56701

Phone or Email: Hasfarm2014@gmail.com 218-684-5142

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am a landowner with approximately 2 miles of Enbridge right of way. I find Enbridge to be a good partner in the field, friendly, operating in a safe manner.

I believe moving petroleum products by pipeline is much safer than railing petroleum through population centers.

I think this project should be support and approved as proposed.

If including additional pages please number them and tell us how many you are providing:_____ pages

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
BRANDON HASSING		
ADDRESS		
PO BOX 316		
CITY, STATE, ZIP		
WINNEBAGO, MN 56098-0316		

COMMENTS I SUPPORT THE LINE 3 REPLACEMENT PROJECT

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNEAPOLIS MN 553
10 JUL 2017 PM 2 L

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Debbie Hassing		
ADDRESS		
16211 US Hwy 169		
CITY, STATE, ZIP		
Winnebago, MN 56098		

COMMENTS I support the line 3 replacement project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

MINNEAPOLIS MN 553
10 JUL 2017 PM 3 L

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Patty Hassing		
ADDRESS		
52102 105th Lane		
CITY, STATE, ZIP		
Amboy, MN 56010		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

MINNEAPOLIS MN 553
10 JUL 2017 PM 4 L

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Docket numbers: CN-14-916; PPL-15-137

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Kathy Haugse	218-768-4227	Tamarack01@frontiernet.net
ADDRESS		
P.O. Box 94		
CITY, STATE, ZIP		
Tamarack MN 55787		

COMMENTS

DECLARE THE EIS AD QUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Sam Haugse	218-768-4227	

ADDRESS: 210 N. Main St.

CITY, STATE, ZIP: Tamarack, MN

COMMENTS: I like the idea of all the jobs & how it can better our community economically

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Pam Hautamaki <mhauts@mchsi.com>
Sent: Wednesday, July 05, 2017 4:46 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I am a Minnesotan familiar with the pipeline to be going through the state. They have met the environmental standards required and it will create much needed jobs as well. I support Enbridge.com competing this project, as we know how it can be done correctly.

Sincerely,

Pam Hautamaki
2 Highland Park Dr
Virginia, MN 55792
mhauts@mchsi.com

Levi, Andrew (COMM)

From: Jim Hawley <jjhawley@frontiernet.net>
Sent: Wednesday, July 05, 2017 8:43 PM
To: MN_COMM_Pipeline Comments
Subject: Comments re: Enbridge Line 3 Replacement: CN-14-916 and PPL-15-137 Attached
Attachments: Line 3 Replacement Comments to PUC.doc

Jim Hawley
51976 209th Place
McGregor, MN 55760
Home: 218-426-4476
Cell: 651-247-1332
jjhawley@frontiernet.net

JAMES C. AND JUDY A. HAWLEY

July 6, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Minnesota Public Utilities Commission
Re: MPUC Docket Nos. PL-9/CN-14-916 and PL-9/PPL-15-137

Dear Members of the Commission:

We have previously written you regarding the Sandpiper pipeline/corridor, and wish to emphasize a few points in this letter as to the Line 3 Replacement/pipeline corridor project currently under review. We continue to urge the Commission, if a pipeline construction is deemed to be in the public interest, to route it along the least environmentally sensitive route.

In commenting on Sandpiper, we emphasized this was a risk-based decision. You can do four things about risk: avoid it, absorb it, insure for it or mitigate it.

In addition to the element of risk, the Line 3 replacement decision is also a legacy decision – for you and ultimately for the public. The decision taken will impact multiple generations, lasting beyond your lifetimes and ours. And, given Enbridge's stated intent that this pipeline will be the first in this corridor of multiple future pipelines your decision takes on added significance.

Transporting oil by train is not without risk. We submit the statements regarding this risk have been overstated and even sensationalized by some. That said, we are not opposed to pipelines per sé. The comparative safety of pipelines has also been overstated. One thing that appears to be in common regardless of delivery mechanism – human error is the cause of many of the accidents we have seen, including the Troy, Michigan Enbridge spill that has received so much attention as well as the 2015 California spill that federal regulators estimated put 123,000 gallons of oil on the ground, with one-fifth of the volume reaching the Pacific Ocean.

The take away is that even with available technology, either ineffective training or lack of attention can lead to the human error – and a significant accident.

So, in this legacy decision process, it is incumbent upon you to make your decision based on the science and the facts available – and avoid any political predispositions. If you decide the construction of a pipeline is in the public interest and represents your best stewardship of the environment, reliance on a solid scientific and factual foundation best preserves your legacy.

The Enbridge conversations have always been in two parts: Should there be a pipeline constructed in the first place? and Where should it be built? We have believed this demarcation has been appropriate.

We addressed the should question above. As to the where question, a pipeline should be built in the absolute least environmentally sensitive area. This is no place for marginal decision making. That is, Route such-and-such is acceptable because it is only marginally more risky than another route. NO! The route selected should be, again based on the best available science, the <u>least</u> impactful from an environmental standpoint.

We understand there are tradeoffs inherent in the process. You must establish some sort of scoring or ranking of the tradeoffs to arrive at a conclusion that will withstand scrutiny.

Given commentary from the Minnesota Department of Natural Resources and the Minnesota Pollution Control Agency during the Sandpiper process, it is difficult for us to comprehend that the proposed route by Enbridge meets that least impactful criteria.

We are not environmental scientists. Nor are members of the commission, based on your published biographies. Therefore, we reinforce that any decisions you take should be based on the best science at your disposal – period. This decision defines your legacy as public servants, and becomes the legacy for this and future generations in terms of the quality of life they inherit.

In conclusion – if you deem pipeline construction is necessary, so be it; if the route selected is any other than the least impactful for the environment, your legacy is tainted.

Thank you for your consideration of our comments. In the interest of full disclosure, we live in the Big Sandy Lake Watershed, with Big Sandy Lake, according to the Army Corps of Engineers (Master Plan For Public Use and Resource Management – Published August 1977, revised 1990) controlling runoff from a 421-square mile area.

Sincerely,

James C. and Judy A. Hawley
51976 209th Place
McGregor, MN 55760

From: Victor Hayes
To: MN_COMM_Pipeline Comments
Subject: Piplinge 3
Date: Monday, May 22, 2017 10:38:16 AM

Dear committee,

Please follow existing line all the way so you don't disrupt more land and cross the Mississippi River four times (as it looks to me). The old line should be replaced or have many opening valves to gather oil when the new line should erupt and be capable of take the spill away while repairs are made. No, logical reason has been given for taking a new route. I have land near this route.

Thanks for your attention

Victor Hayes Pequot Lakes

Levi, Andrew (COMM)

From: Landmark <eheck@landmarkgroups.com>
Sent: Sunday, July 09, 2017 4:42 PM
To: MN_COMM_Pipeline Comments
Subject: Comments regarding Line 3 and docket numbers CN-14-916 and PPL-15-137
Attachments: EHeckLine3.docx

Please see the attached letter.

Thank you,
Elizabeth Heck

Date: July 9, 2017
To: Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198
From: Elizabeth Heck
Outing, MN 56662
Re: Comments regarding Line 3 and docket numbers CN-14-916 and PPL-15-137

I am submitting a written comment in response to the Draft Environmental Impact Statement (DEIS) for the proposed expansion and reroute of the Line 3 pipeline. I strongly oppose this project due to the high potential for adverse environmental impacts.

Enbridge has an extensive history of spills from their pipelines. I am the owner of a property on Lake Roosevelt in Outing, Minnesota and within one mile of the proposed pipeline route. The proposed route for the pipeline crosses a stream which directly feeds my lake. A spill here of the diluted bitumen would be virtually impossible to clean out of our lake, leaving the property owners, local businesses and county tax base in serious financial jeopardy and hardship.

The DEIS does not establish the need for this pipeline, nor does it establish the need for it to be routed through Minnesota, and in particular areas with sensitive features. These features include some of the states most pristine lakes, wetlands, drinking water sources forests and wildlife habitats.

If need can be established for this line, it is imperative to select a more appropriate route, preferably through Canada. This is a Canadian pipeline benefiting a foreign country and foreign investors, not benefiting the citizens of Minnesota.

The legal basis for this pipeline is questionable and without merit.

I strongly request the Minnesota Department of Commerce perform a more thorough analysis of the Environmental Impact Statement on Line 3 that adequately presents the risks and potential impacts on water, communities, and climate.

Thank you,
Elizabeth Heck

Levi, Andrew (COMM)

From: paul heck <heck@landmarkgroups.com>
Sent: Sunday, July 09, 2017 7:03 PM
To: MN_COMM_Pipeline Comments
Subject: Comments regarding Line 3 and docket numbers CN-14-916 and PPL-15-137
Attachments: HeckLine3.docx

Please see the attached letter.

Thank you,
Paul Heck

Paul Heck J.D.
President
Landmark Group, Inc.
8400 Normandale Lake Blvd., Suite 920
Minneapolis, MN 55438

P: 952-996-0883
M: 612-720-7675
F: 952-996-0890
www.landmarkgroups.com

Date: July 9, 2017
To: Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198
From: Paul Heck
Outing, MN 56662
Re: Comments regarding Line 3 and docket numbers CN-14-916 and PPL-15-137

I am submitting a written comment in response to the Draft Environmental Impact Statement (DEIS) for the proposed expansion and reroute of the Line 3 pipeline. I strongly oppose this project due to the high potential for adverse environmental impacts.

I have serious concerns over the safety of this pipeline and the proximity to both Lake Roosevelt and the Spire Valley Hatchery. Enbridge has a long history of numerous and frequent spills. Between the year 1999 and 2010 there were 804 spills for 15,372 miles of pipeline. This is one spill for every 19 miles of pipeline in a short period of time. This is completely unacceptable. We have read promises of better technology and increased safety, yet multitudes of outrageous spills continue to occur every year.

In no way should a pipeline be routed near critical and valuable habitats or recreational features. The proposed route winds around the west and north end of Lake Roosevelt, a large and popular recreational lake. Any spill in this area would drain directly in to the lake with devastating results. The area where the pipeline continues to the east also drains directly into Lake Roosevelt. The odds of having a spill reach this beautiful lake are unquestionable too high.

A spill here of the diluted bitumen would be virtually impossible to clean out of our lake, leaving the property owners, local businesses and county tax base in serious financial jeopardy and hardship. In addition, the Spire Valley Hatchery is adjacent to the proposed pipeline route directly to the north of Lake Roosevelt. This Minnesota DNR hatchery is valued for producing steelhead and Kamloops rainbow trout. Again, a spill here would be a devastation and far reaching beyond this immediate community.

The DEIS does not establish the need for this pipeline, nor does it establish the need for it to be routed through Minnesota, and in particular areas with sensitive features. These features include some of the states most pristine lakes, wetlands, drinking water sources forests and wildlife habitats.

Enbridge should take the responsibility and initiative to route the pipeline to avoid these treasured areas. I also believe it is imperative for Enbridge to absolutely increase its safety practices across all pipeline routes. Please ask that Enbridge step up to its promises of a safe pipeline and avoid routing near recreational and sensitive areas.

If need can be established for this line, it is imperative to select a more appropriate route, preferably through Canada. This is a Canadian pipeline benefiting a foreign country and foreign investors, not benefiting the citizens of Minnesota.

The legal basis for this pipeline is questionable and without merit.

I strongly request the Minnesota Department of Commerce perform a more thorough analysis of the Environmental Impact Statement on Line 3 that adequately presents the risks and potential impacts on water, communities, and climate.

Thank you,
Paul Heck

Levi, Andrew (COMM)

From: phecker@tds.net
Sent: Monday, July 10, 2017 8:40 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment
Attachments: Public Comment on Line 3 doc 2.docx

Please see the attached letter

Public Comment: Line 3 Project (Cn-14-916 and PPL-15-137)

Dear Environmental Review Manager,

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. I have heard that Enbridge redacted those numbers from the public version of the DEIS. Without them, there is no reliable way an independent party to verify their results.

I believe that in order for Minnesota citizens and agencies to make an educated decision about Line 3, we must have that information, and I would like to know why Enbridge won't release it. Please insist that Enbridge provide their data on oil releases and spills in Minnesota.

If Enbridge objects due to security reasons, then I would like to know why they have failed to cover the exposed pipes in the Tamarack River in northwest Minnesota, and why they allow people to joyride over exposed pipes south of Clearwater. This is surely a security issue as well. For Enbridge to pick and choose what issues warrant "security," is unacceptable.

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There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete.

I would like to know, in the final EIS for Line 3, what Enbridge's plans are if their preferred route is approved. Will it be just the one pipeline, or will they eventually move all six pipelines to the new corridor? This would have a huge effect on how people feel about Enbridge's preferred pipeline route.

I have heard that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state* need (not a national need). Even if we

used statistics about the national need, U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply needed oil. (http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf)

I would like to see this information mentioned in the final EIS.

I understand that an engineering firm called Cardno, with ties to Enbridge, was instrumental in preparing part of the draft Environmental Impact Statement for Line 3. In light of this fact, in the final EIS I would like to see an independent analysis of the information they provided. Minnesota requires verified facts for such a large project.

Thank you,

Pat Hecker
38327 S. Arrowhead Dr.
Pine River, MN 56474

Levi, Andrew (COMM)

From: Florence Hedeen <hedeencf@arvig.net>
Sent: Saturday, July 08, 2017 8:45 PM
To: MN_COMM_Pipeline Comments
Subject: Comment Line 3 Project: CN-14-916 and PPL-15-137

Dear Environmental Review Manager:

I understand that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state* need (not a national need). Many fewer investors in Alberta tar sand are supporting that project with their money. The increased access to and affordability of renewable energy makes it the "go to" investment for many investors, because that's where most of our energy needs will be met in the near future.

Even if we used statistics about the national need, U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply the reduced demand for oil. (http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf)

According to the 2013 National Climate Assessment we're already experiencing consequences of global climate change, i.e. more severe storms, floods, and droughts. Ever higher winter temperatures in northern Minnesota affect us even more than other areas in the United States, changing what vegetation will thrive here and increasing the vitality and spread of the ticks carrying more serious types of diseases.

The primary cause of global warming is human activity. When we change our energy sources, we will reduce our gravely negative impact on the climate on which we depend for our very lives to the seventh generation and beyond.

I would like to see this information mentioned in the final EIS.

Thank you.

Florence Hedeen
703 First St. West
Park Rapids, MN 56470

Levi, Andrew (COMM)

From: Ken Hedmark <khedmark@hotmail.com>
Sent: Thursday, June 29, 2017 9:54 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project

Dear Ms. MacAlister,

We need to allow this project to be built to completion!

Sincerely,

Ken Hedmark
PO Box 33
Kerrick, MN 55756
khedmark@hotmail.com

Ruth Heidelberg - nee Hirshfield
3701 Bryant Ave So - apt 403
Mpls, Mn apt 403

RECEIVED
JUL - 3 2017
MAILROOM

Gentlemen & Ladies,

As a native Minnesotan of five generations + I have seen our forests depleted, the Mesabi pit devoured + problems with taconite in Lake Superior. Swimming in Ten Mile Lake from early childhood, drinking its water went from bliss to sadness by 2000 as swimmers itch changed our lives.

Selling our home, built by Grandpa in 1921, involved ridding the yard of a huge oil tank left there after heating was changed to gas in the 1940's as our country fought World War II. A very expensive mess.

Please remember that Minnesota water flows South to New Orleans, east to St Lawrence seaway North to Hudson Bay. This pipe line is a nightmare

I'm 90 years old this year but my grandkids and yours must live and care for a world that we are destroying. Please avoid this pipe line. We try to preserve property on Dora Lake + Ten Mile Lake

Sincerely

Ruth Heidelberg +
Hirshfield Family

1246

Kenneth E. Heidelberg
3701 Bryant Ave. S., Apt. 403
Minneapolis, MN 55409

MINNEAPOLIS MN 553
30 JUN 2017 PM 5 L

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

55101$2143 C012

Levi, Andrew (COMM)

From: Rebecca Heimark <rheimark@outlook.com>
Sent: Saturday, July 08, 2017 3:06 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager for Line 3:

I am submitting the following comment about Enbridge's Line 3 project.

I and my family have lived in Aitkin County more than 27 years. We settled here to raise our family because there is so much natural and undeveloped landhere. This is a beautiful place. This is where people come to enjoy the lakes, rivers and natural areas where they can bird watch, observe wildlife and hunt and fish. We have a small organic and sustainably-based farm. In the DEIS (Section 10.1.2.1) it states that pipeline stress or corrosion can also occur due to the natural conditions of the substrate surrounding the pipeline. Our wetlands and bogs and natural areas should not be open to a Canadian company to develop for their profits. They already have an existing corridor. They should continue to use this current corridor for their new pipeline. I believe this existing corridor is already contaminated, so why should Enbridge be allowed to contaminate new and undeveloped land? I think Enbridge does not want to be forced to clean up the existing pipeline right of way; they want to abandon it and hope no one ever discovers how dirty and polluting their pipelines are. I would like Enbridge to use the corridor they already have to provide oil transportation. Please add these comments to your public testimony. Sincerely, Rebecca Heimark

Levi, Andrew (COMM)

From: Gary Heimark <gheimark@outlook.com>
Sent: Monday, July 10, 2017 7:33 AM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager for Line 3:

I am submitting the following comment about Enbridge's Line 3 project that will pass through a new corridor in Aitkin county. I'm against the new pipeline corridor in Aitkin County.

We have lived in Aitkin County more than 27 years and raised our family in this beautiful part of Minnesota. We have a small beef cattle farm that provides us with some supplemental income. We love the lakes, rivers and large areas of public land in Aitkin County. But this is one of the poorest counties in Minnesota.and has been subjected to other proposals by private companies to move polluting industries into the area.. A recent proposal was to locate a Plasma gasification trash burning plant in the Palisade area of Aitkin County. Trash was to be hauled from a large regional area on our poorly constructed roads in the old glacial lake area of Aitkin County near the Mississippi River. This proposal divided the community Palisade and Aitkin area and was never built. I hope the new Enbridge pipeline corridor is never built in Aitkin county but even this proposal will have lasting effect dividing people and families in the county into for and against camps. I hope that the State of Minnesota will stop these predatory companies from preying on the poor families of Aitkin County.

The Enbridge Line 3 proposed route is through some of the most ecologically sensitive area of Aitkin County. This area is full of wetlands and waterways of the Mississippi Rivers as it pass through the old Glacial Lake Aitkin. This is the worst route you could have picked through Aitkin County. Any major spills into this interconnected water way system will have devastating effects on the lakes and rivers in Aitkin County.

Finally, I think Enbridge should be required to remove their line 3 pipeline in the existing corridor and perform remediation of that land and install their new pipeline in the existing corridor.

Sincerely,

Gary Heimark
33683 Dove St
Aitkin, MN 56431

I

Sent from Outlook

Levi, Andrew (COMM)

From: Marne Helgesen <helgesen@purdue.edu>
Sent: Tuesday, July 04, 2017 12:36 PM
To: MN_COMM_Pipeline Comments
Cc: Marne Helgesen
Subject: Proposed Pipeline

Dear Environmental Review Manager; to whom it may concern:

*I would like to know, in the final EIS for Line 3, what Enbridge's plans are **if** their preferred route is approved. Will they eventually move all six pipelines to the new corridor, and/or will it be just the one pipeline? This would have a huge effect on how people react to and vote on Enbridge's preferred pipeline route.*
Sincerely

Dr. Marne Helgesen
6001 Royal Oak Drive NE
Outing, MN 56662

Levi, Andrew (COMM)

From: John Helland <johnhelland3@gmail.com>
Sent: Monday, July 10, 2017 10:00 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

Please do not allow the routing of Enbridge Line #3 through the heart of Minnesota's pristine water bodies, it's lakes, rivers, groundwater and adjacent wetlands, forests and wildlife corridors. It is not necessary and there is a feasible and prudent alternative if this line is permitted. Thank you!

Respectfully,
John Helland

1144

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Shawn Helmer	(218) 727-7676	shawn.helmer@unitedpipe.com

ADDRESS
4510 Airport Rd. Duluth, MN 55803

CITY, STATE, ZIP
Duluth, MN 55803

COMMENTS
I fully support this project and any others like it. It is a fact that pipelines are the safest & most reliable method to transport the nation's energy demands; period. Pipelines also support thousands of families & provide good paying jobs that provides a positive impact to our national economy.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Ryan Hendriks <rhendriks@lsconsulting.com>
Sent: Wednesday, June 14, 2017 3:31 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I am a Minnesotan and want to see the environment protected like most others. I believe replacing the aging and outdated Line 3 is imperative to protecting the environment. Many studies have been completed that analyze the potential environmental affects on "Resources of Concern". Enbridge's preferred route is far and above the best route chosen to minimize potential impact on drinking water and cultural resources even more so than the alternative of continuing use of Line 3. Continued use of Line 3 with the addition of truck or rail transportation to meet the demand is far and above the worst option for protecting our drinking water and biological areas of interest in the state.
The MPCA has recently released the Mississippi River Watershed report that shows the cleanest waters in the state are in northern Minnesota. Pipeline infrastructure and clean waters can co-exist. If Enbridge is forced to continue use of the existing Line 3 due to a rejection of the CN, the state of MN will need to answer to the angry environmentalists. I am aware of the incredible effort that Enbridge and their consultants have put into the EIS, looking for artifacts and examining our lakes and rivers over the past four years, along the preferred route .
Enbridge has found a route that follows existing utility corridors.
Pipelines are safely operating everywhere in Minnesota. Enbridge needs to be granted the CN to build Line 3 replacement in order to continue protecting the environment from a pipeline failure. Far better construction methods and technologies exist today that 50 years ago when Line 3 was constructed. Forcing Enbridge to continue use of Line 3 to meet the energy needs of our country would be like asking the MN state government to operate efficiently with technology from 1960.
I'm familiar with pipeline right of ways in northern Minnesota around Bemidji, Grand Rapids, Cass Lake and Alexandria. Pipelines and natural resources have gone hand-in-hand in northern Minnesota for decades.
I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3. It is in the best interest of public and environmental safety, the economy of northern Minnesota, and the MN PUC.
Deactivating a pipeline in-place is the most commonly-used industry method to retire a pipeline. Leaving the permanently deactivated pipeline in place is the safest option as it reduces the risk of soil stability issues, avoids major construction activities and reduces the potential risk to existing pipelines from heavy equipment.
The draft EIS released is incredibly thorough in all aspects. The preferred route is clearly the best option for environmental protection. No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS. Please keep the EIS timeline to the statutory deadline of 280 days.

Sincerely,

Ryan J Hendriks
7170 Clay Ave
Inver Grove Heights, MN 55076
rhendriks@lsconsulting.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Ryan Hendriks	2163497689	rhendriks@jsconsulting.com

ADDRESS
7170 Clay Ave

CITY, STATE, ZIP
Inver Grove Heights, MN 55076

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: JAY D HENNINGSGARD Owner <jhenningsgard@centurylink.net>
Sent: Monday, July 10, 2017 3:52 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline Project

My name is Sandra Henningsgard, I approve of the line 3 pipeline project, and feel I represent the silent majority in this matter. Pipeline opponents have been very vocal, and it does not appear to me that their opposition is warranted. I would assume our state and federal experts have approved safety and environmental issues regarding the pipeline, and their judgement should be trusted. Please do not be swayed by the vocal minority. Thank you.

Levi, Andrew (COMM)

From: Lili Herbert <lhbirdsong@gmail.com>
Sent: Monday, July 03, 2017 3:40 PM
To: MN_COMM_Pipeline Comments
Subject: No to pipeline

I'm Elizabeth Herbert from St. Paul. As a person of faith and as a resident of Minnesota, I am very concerned about the new Line 3 proposed by Enbridge. Though the environmental impact statement acknowledges many severe consequences to land, water, and local communities, it appears the no-build option is not being seriously considered.
I am alarmed by the plans for this pipeline, which disregard the severe impacts of potential spills to ricing lakes, rivers, and even to Lake Superior. Furthermore, I find it unacceptable that we, as a state, continue to expect Native communities to disproportionately endure the impacts of extracting and transporting oil. These risks are outlined but not considered reason enough to reject the pipeline.
We have a responsibility to current and future generations, locally and globally, to keep out Tar Sands oil that could pollute MN waters and contribute significantly to climate change. Climate scientists agree it is time to leave the oil in the ground.
I implore you to weigh the dire consequences of this pipeline and strongly consider rejecting it.

Sincerely,
Lili Herbert

Levi, Andrew (COMM)

From: J.A.H. <deergrazingbymoonlite@yahoo.com>
Sent: Monday, July 10, 2017 8:13 PM
To: MN_COMM_Pipeline Comments
Subject: docket numbers (CN-14-916 and PPL-15-137

To whom it may concern,

I am a non Native who as a child went every summer to MN with may family, fished and water skied and bought a case of wild rice from a Native family to bring home and enjoy on special occasions throughout the year.

This food is unique to your state and unique in our world of food. It is harvested by the Native peoples. It is delicious and healthy.

I want this food and the Natives rights to its collection and sale to be protected.
I want the beautiful waters and the wildlife of MN to be protected.

The Line 3 DEIS
has not complied with the UN International Standard for projects impacting Native Peoples
it unfairly impacts the Natives and adds an unfair burden to their already fragile health status in this country
the "preferred route" would impact wild rice fields, as stated above, an important source of healthy food and an income to the Natives

As a woman and a trained Sexual Assault Nurse Examiner
THE FOLLOWING is VERY CONCERNING:

The DEIS acknowledges that "The addition of a temporary, cash-rich workforce **increases the likelihood that sex trafficking or sexual abuse will occur**," and that these challenges hit Native communities the hardest. But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). What experience does Enbridge have planning and implementing an anti-sex trafficking program?

Additionally, No realistic alternatives have been proposed, no mention made of conservation, RENEWABLE ENERGY, or the decrease in demand for oil

There is no spill analysis
We want to see the contaminated management site plan
Protection from corrosion from nearby utility lines is essential to prevent leaks and there is nothing that will be done for a year about this!
There is also the issue that Enbridge is now in the process of appealing years of back taxes, burdening two of the poorest counties in Minnesota with over $10 million due. (Another example of the wealthy exploiting the poor)

the DEIS shows that the negative impacts far outweigh the benefits. So our position remains:

NO PERMIT. SHUT DOWN LINE 3 AND DEVELOP RENEWABLE ENERGY INFRASTRUCTURE.

Thank you,

Jo Ann Herbert RN, BSN (retired)
Vashon Is, Wa.
206-567-5852

Levi, Andrew (COMM)

From: apache@web.lmic.state.mn.us
Sent: Monday, July 10, 2017 10:39 PM
To: MN_COMM_Pipeline Comments
Subject: Herbert Mon Jul 10 22:38:54 2017 PPL-15-137

This public comment has been sent via the form at: mn.gov/commerce/energyfacilities/publicComments.html

You are receiving it because you are listed as the contact for this project.

Project Name: Line 3 Pipeline Replacement

Docket number: PPL-15-137

User Name: Patricia Herbert

County: Washington County

City: Vashon

Email: sequoia592000@yahoo.com

Phone: 2064630037

Impact: I know you would like questions concerning the pipeline--questions which you can easily answer. But I've commented on many EIS's and I've found that after everyone gives responses to the questions the companies or the government go ahead and do what they want to do. And since this is an unacceptable way to truly look at what people are saying against the proposals it seems we need to be very honest and forthright in our comments. I want to say there are thousands of people who are against each pipeline. They crisscross much of our nation. People have become very sick and died in many cases. People have lost their land and many of us ask why are we allowing these decisions to be made when there is so much opposition? What does it take from us to help you understand that each of these pipelines represents destruction, death, anger, and a continuation of our country only carrying about making more money. Sustainable energy would provide more life supporting jobs for people. When we look at the employment level these companies (governments) project we realize these levels are temporary and end soon after the pipeline is built.

Mitigation: The only mitigation that is acceptable to me is to not build any more pipelines which are potentially capable of destroying peoples lives-- certainly oil, gas, chemicals, or any other dangerous substance.

Submission date: Mon Jul 10 22:38:54 2017

This information has also been entered into a centralized database for future analysis.

For questions about the database or the functioning of this tool, contact:

Andrew Koebrick
andrew.koebrick@state.mn.us

Levi, Andrew (COMM)

From: Kathy Herbranson <glherbranson@icloud.com>
Sent: Thursday, July 06, 2017 10:17 PM
To: MN_COMM_Pipeline Comments
Subject: Comments CN-14-916 and PPL-15-137
Attachments: Pipelinecommentsjuly2017.pdf

The attachment contains comments on CN-14-916 and PPL-15-137.

Kathy Herbranson

July 7, 2017

Jamie MacAlister
Environmental Review Manager MN Dept of Commerce
85 Seventh Place E., Suite 280
St. Paul, MN 55101-2198

RE: Docket Numbers: CN-14-916 and PPL-15-137

To Whom It May Concern:

As a resident and landowner in the BSLA watershed impacted by this project, response to the recently released EIS during the public comment period regarding Docket Numbers: CN-14-916 and PPL-15-137, are as follows:

CN-14-916
The certificate of need has significantly changed, since the process started-oil drilling in North Dakota has been drastically reduced and it is predicted to be at low levels for several years. My understanding is that tar sands from Canada would also be sent through this line and that tar sands are extremely corrosive and would potentially impact our state significantly, if there is a spill. The Keystone XL pipeline has also opened and increased oil transport, so the need at this time for another pipeline is not as important. Is it worth the risk to our environment, when Enbridge's track record with oil spills seems to be the worst on record?

PPL-15-137
In reviewing the released MN draft EIS for Line 3, in which Enbridge Energy Partners, the Alberta, Canada-based oil company proposes to decommission its Line 3 pipeline and build a new one, several concerns about the preferred route are raised.

If the current line is abandoned, what serious threats does pipeline abandonment poses for rural northern communities? Chapter 8 of the DEIS identifies "Potential Impacts and Mitigation Measures", and briefly mentions how leaving the existing Line 3 in place could have potentially significant effects, including:...soil and water contamination, the ability of the pipeline to serve as a water conduit, subsidence due to the failure over time of the pipeline, and loss of buoyancy control for the pipeline". Although there are significant cost and hazards created to remove the pipeline, leaving it in place does not seem to be an option. As stated in the report, "integrity issues have arisen as the pipeline has aged and its coating has deteriorated...Line 3 has corroded and cracked, necessitating more than 950 excavations in the last 16 years... and it uses a coating, which tends to dis-bond from the pipe. Line 3 has had 10 times as many anomalies per mile as any other pipeline in the Mainline corridor. The pipe was also flash welded, which makes it more susceptible to defects." If Line 3 requires an extensive amount of extra maintenance and is subject to deterioration, why would it be safe to be left in the ground--which is an issue that

needs to addressed, if abandoned. Who will be responsible for this liability-landowners, townships, counties, cities? How will the abandoned line be monitored?

The Big Sandy Lake Area Watershed encompasses over 420 square miles and Aitkin county contains the most miles of the Mississippi River in the entire US. There are exceptional wetlands, wild rice beds, swamps and bogs in this area, which makes the pipeline invasive to critical habitat in this area. There would be a significant negative impact in the event of a spill, experts have indicated it would be impossible to remove the oil from the peat/bogs. Due to the ecology of peat wetlands, it is habitat for unique flora and fauna. A disturbance takes centuries for recovery. There is a limited area where the peat bogs can flourish and exist, so an oil spill would have a catastrophic effect on our wetlands and peat bogs. Sixty-four percent of all leaks on Enbridge pipelines have been discovered by property owners, not by Enbridge employees or their technology. Pipelines routed through remote wetlands, like those in Aitkin County, oil spills might go undetected for days.

The major industries in this area are farming, logging, fishing and recreation/tourism, all of which rely on our water and land. Other industries are limited in this area and do not significantly bring people to this area for jobs, rather the majority of jobs are supported by tourism/recreation. Per the EIS Executive Summary, the north central and northeastern portions of Minnesota, however, contain many water resources that are generally the highest quality water resources in the state. As demonstrated in a flood of the area in 2012, several businesses were not able to survive, due to the nature of the economy-primarily tourism. In the event of a spill, the negative effects to the economy would most likely be multiplied, so not only would our lakes and rivers and wild rice beds be affected, but also a portion of Minnesota's $12.5 billion dollar tourism industry.

The proposed route would cross 8 state forests, including the Mississippi Headwaters, 3 wildlife management areas, 13 trout streams, peat bogs, wild rice beds and several recreation areas. Line 3 would also cross the Mississippi River twice in Minnesota. The Mississippi River is a valuable source of drinking water for many cities on its 2,552-mile journey to the Gulf of Mexico. Enbridge Corporation's record of 800 spills, including the devastating Kalamazoo tar sands spill in 2010, and the 2014 oil byproduct spill into the Missouri River put all of the areas above in jeopardy. It's not if an oil spill, but when.

The proposed project would require an approximately 120-foot-wide construction area to be cleared. These forested uplands and woody wetlands contained within the permanent right-of-way through northern Minnesota would be changed forever. This proposed route would affect permanently more land cover and habitat than any other CN Alternative. A total of 38 miles would forever fragment 21 large-block habitats. The alternative route SA-04 avoids habitat fragmentation and permanent forest conversion in wooded northern Minnesota. SA-04 would avoid crossing the sensitive lakes, rivers and wild rice beds of northern Minnesota. SA-04 would avoid our cleanest water resources and cross land less permeable for pipelines. SA-04 routes primary impacts would be on agricultural land, which can be restored to agricultural use after

construction is complete. Plus SA-04 would be co-located with existing pipelines for much of its length, construction of the route would fragment less habitat than the Applicant's preferred route. Its proximity to well-traveled roads along the 29/94 route would greatly increase chances that spills would be noticed promptly, and would enable clean-up crews to easily reach spill sites without having to first build temporary roads. Minnesota needs a well-planned utility corridor. This route would allow the land to be returned to its use and not permanently changed as in the proposed route by the applicant.

Minnesota Statute 116D.02 subdivision 2 states that it is the State's responsibility to: "(10) *preserve important existing natural habitats of rare and endangered species of plants, wildlife, and fish, and provide for the wise use of our remaining areas of natural habitation, including necessary protective measures where appropriate..."* The proposed route would have significant impact on natural habitats of rare species of plants, wildlife and fish and the landscape would permanently be altered.

Route SA-04 has many attributes that would promote a well planned and accessible utility corridor, which is needed by Minnesota. The increased capacity of the pipeline would provide for Enbridge to pay for the potential increased costs of a more southernly route. The potential of an oil spill in our best quality lakes, rivers, wetlands and forest ecosystems is to great to risk.

Kathy Herbranson
49899 210th Place
McGregor, MN 55760

Levi, Andrew (COMM)

From: Kathy <kgherbranson@gmail.com>
Sent: Friday, July 07, 2017 11:43 AM
To: MN_COMM_Pipeline Comments
Subject: Comments CN-14-916 and PPL-15-137
Attachments: Pipelinecommentsjuly2017.pdf

Attached are comments regarding CN-14-916 and PPL-15-137
>

Kathy Herbranson

July 7, 2017

Jamie MacAlister
Environmental Review Manager MN Dept of Commerce
85 Seventh Place E., Suite 280
St. Paul, MN 55101-2198

RE: Docket Numbers: CN-14-916 and PPL-15-137

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As a resident and landowner in the BSLA watershed impacted by this project, response to the recently released EIS during the public comment period regarding Docket Numbers: CN-14-916 and PPL-15-137, are as follows:

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Kathy Herbranson
49899 210th Place
McGregor, MN 55760

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
JEFF HERFINDAHL	(218) 398-3650	

ADDRESS
48828 US Hwy 2

CITY, STATE, ZIP
DEER RIVER, MN, 56636

COMMENTS
MINNESOTA'S PIPELINE UTILITITIES HAVE PROVEN THEIR ABILITY TO TRANSPORT OIL/GAS IN EFFICIENT AND ENVIRONMENTALLY FRIENDLY MANNER. OUR CLEAN LAKES & RIVERS ARE PROOF OF THIS. I SUPPORT THE LINE 3 REPLACEMENT PROJECT. I SUPPORT JOBS AND PROSPERITY FOR OUR FRIENDS, FAMILY & COMMUNITY.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

02 1P $000.34
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Dan Herrick	218-349-8316	
ADDRESS		
718 N. 39th Ave W		
CITY, STATE, ZIP		
Duluth MN 55807		

COMMENTS Enbridge has proven to be a leader in pipeline safety. This is just another (Replace Line 3) demonstration of their commitment to keep our communities safe.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

June 12, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

Re: Proposed Line 3 Pipeline Project Docket # CN-14-916 and PPL-15-137

Dear Environmental Review Manager MacAlister,

As a Minnesotan concerned about the legacy we are leaving to future generations and the health of the planet in the broader sense, I am opposed to the replacement of Enbridge's Line 3 Pipeline and urge you to require Enbridge to remove the leaky, environmentally dangerous, now to be abandoned, old Line 3 pipeline.

A new Line 3 Tar Sands Pipeline will further our dependence upon the dirtiest of fossil fuels and reflect away from more environmentally-friendly energy sources such as wind, solar and hydro. Moreover, the new line corridor would run through the Anishinabe territory and its lakes and wild rice beds. The new line corridor threatens soils, aquifers and the Headwaters of the Mississippi River should there be spills. I understand that tribal governments and community members are against this new pipeline as well.
Since there is no state mandate to require Enbridge to clean up the old Line 3 pipeline, it falls upon the Public Utilities Commission to enforce clean-up. Enbridge must be required to remove the old pipeline and restore the damaged ecosystem. Landowners in the local communities should not bear the burden of future contamination from this now hazardous pipeline with over 900 integrity anomalies by Enbridge's own estimates.

In summary, I urge you to reject Enbridge's proposal for a new Line 3 pipeline and to require Enbridge to take responsibility for the removal of the old Line 3 pipeline. Minnesotans are depending upon you to do the right thing.

Thank you for providing for this public commentary.

Sincerely,

Linda Herron

Linda Herron
2617 E. Fifth St.
Duluth, MN 55812

RECEIVED
JUN 15 2017
MAILROOM

Levi, Andrew (COMM)

From: Philip Hess <philnjess2009@hotmail.com>
Sent: Tuesday, June 27, 2017 9:20 AM
To: MN_COMM_Pipeline Comments
Subject: Replace the pipeline

Dear Ms. MacAlister,

Please replace the pipeline. A few wetland and trees do not justify stopping a energy saving safer way to move oil. Thanks philip hess

Sincerely,

Philip hess
240 2nd St SE
McIntosh, MN 56556
philnjess2009@hotmail.com

Levi, Andrew (COMM)

From: Pamela Hibbert <pamjohnsonhibbert@gmail.com>
Sent: Monday, July 10, 2017 10:09 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment Line 3 Project(CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lake country in our country will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How will the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There needs to be an economic analysis for the EIS to be complete.

I have so many fond memories of my time in Minnesota! Not only did my family live by a beautiful lake for many years, I also had my wedding in the beautiful lake country of Minnesota. Time and again we have seen pipelines fail. My worry is that it will be too late to save our pristine lakes when (not if) the pipes break. Irreparable damage will be done to the lakes and economy. Your report does not address these concerns.

Thank you,

Pamela Johnson Hibbert
735 Chautauqua Blvd.
Pacific Palisades, Ca
90272

Levi, Andrew (COMM)

From: Pamela Hibbert <pamjohnsonhibbert@gmail.com>
Sent: Monday, July 10, 2017 10:09 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment Line 3 Project(CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

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Thank you,

Pamela Johnson Hibbert
735 Chautauqua Blvd.
Pacific Palisades, Ca
90272

SAINT PAUL MN 550

29 JUN 2017 PM 2 L

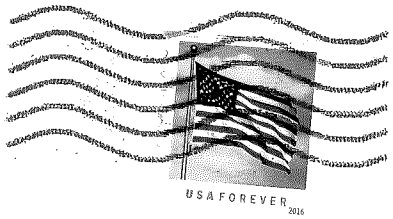

Jamie MacAlister
Minnesota Department of Commerce
85 7th Place E. Suite 280
St Paul, MN 55101-2198

SMYTH
Smyth Companies
1085 Snelling Avenue North, St. Paul, MN 55108
www.smythco.com

6/29/17

William J. Hickey III

Dear Ms. MacAlister,

I wanted to voice my opinion that the EIS for the Enbridge pipeline is not adequate. Docket numbers CN-14-916 and PPL-15-137.

I would like to see a different route.

Thank you,

RECEIVED
JUN 30 2017
MAILROOM

Mailing Address: P.O. Box 64669, Saint Paul, Minnesota 55164 • (651) 643-2328 • Toll Free: 1-800-642-4544 • bhickey@smythco.com

Levi, Andrew (COMM)

From: Missie <mfhickey@comcast.net>
Sent: Thursday, July 06, 2017 11:48 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137

Public Comment: Line 3 Project (CN-14-916 and PPl-15-137)

Dan and Missie Hickey
9141 Father Foley Drive
Pine River, MN 56474
mfhickey@comcast.net

July 6, 2017

Jamie Macalister
Environmental Review Manager
MN Department of Commerce

Hello,
Four factors result in our negative comments about the draft EIS for Enbridge Oil's proposed new tar pipeline.

Factor 1: Construction would require the permanent clearing and destruction of 340 miles of a 120-foot wide swathe of forested uplands and pristine wetlands.

Factor 2: Pipeline spills release an average of 462 barrels of crude. This is 28 times the number of barrels released in a trucking accident, and 11 times the number of barrels released in a rail accident. All three: truck, rail, and pipeline can transport 760,000 barrels of crude per day.

Factor 3: The new line could be an average of 10 to 15 feet from other lines in operation. This presents many hazards if removal of the current line is attempted. Abandonment of the current line presents environmental hazards of its own.

Factor 4: Most importantly: Royal Dutch/Shell, Marathon, Conoco Phillips, and Exxon Mobil are shedding most of their tar sands assets.

Sources for Factor 1
Page 15 of the Executive Summary of ***Line 3 Replacement Project Draft EIS*** has a passage that states that the 120-foot wide construction area in northern Minnesota would be permanently converted, thereby permanently affecting more land cover and habitat than any other Certificate of Need alternative. It is pointed out that, alternatively, the SA -04 line passes through agricultural lands in North Dakota and western and southern Minnesota that can be restored to agricultural use after pipeline construction.

Page 21 of the same document states that adding another pipeline in the corridor would result in additional clearing of forest in what is otherwise a densely forested, relatively undisturbed area with high-quality habitat and relatively pristine watersheds.

Sources for Factor 2
The chart of Certificate of Need Alternatives on page 5 of the same Executive Summary states that trucks and trains and pipelines can all potentially transport the same 760,000 barrels of oil per day.

Page 12 of the Executive Summary states that the average release of crude oil from trucks is 16 barrels, from trains is 40 barrels, and from pipelines-- **462** barrels.

Source for Factor 3
On page 22 of the same Executive Summary, it is stated: "Enbridge has indicated that there is a significant risk that pipeline removal activities could damage an active pipeline and cause an accidental release. Damage could be caused by striking a pipeline with equipment or by the weight of the equipment as it works above operating pipelines. "

The risks of abandonment are also given on page 22: "…the potential environmental risks of any existing contamination surrounding the pipe that would never be discovered or remedied if the line were abandoned, and (that there would be) potential environmental risks and impacts associated with the ongoing deterioration of abandoned pipeline."

Source for Factor 4
A March 10, 2017 online article by Adam Scott from the Oil Change International organization has the headline: ***A Fading Future For Tar Sands.***
Scott states that: "This week, Royal Dutch Shell and Marathon Oil shed their tar sands assets." Further in the article he writes: "Exxon Mobil and Conoco Phillips were forced to admit to financial regulators that the combined 4.3 billion barrels of their previously proven oil reserves might have to stay in the ground—the vast majority of it in Canada's tar sands."
And then: "As of today, no substantial new investments have been made in tar sands expansion beyond 2020."

2020 is just three years away. We ask: Why would we risk permanently destroying our relatively undisturbed habitats and watersheds if oil companies won't invest in mining tar sands after 2020?

Respectfully submitted,
Dan and Missie Hickey

Levi, Andrew (COMM)

From: Martin Hildebrand <mhildebrand1@nycap.rr.com>
Sent: Sunday, July 09, 2017 3:38 PM
To: MN_COMM_Pipeline Comments
Subject: Comments on the draft environmental impact statement for the Line 3 proposal

Dear people:

Although I am not currently a Minnesota resident, I annually spend some time in the summer at a lake in northern Crow Wing County. I wish to comment on the draft environmental impact statement for the proposed Line 3 pipeline project.

I am particularly concerned about the effect of a large or catastrophic oil spill on waters some distance from the proposed route of the pipeline and its impact on wildlife. These concerns lead to the following points:

1. The draft environmental impact statement mentions a 10 mile region of interest downstream. However I have seen reports of certain spills in the past (along the Kalamazoo and Yellowstone Rivers) suggesting that serious impacts can occur well beyond 10 miles. So is the 10 mile region of interest long enough?
2. Are there lists of lakes where the proposed pipeline lies in the portion of the watershed draining into the lake? Such a list could give an idea of where the potential environmental impact of a spill could be as well as perhaps assist responders to a potential spill if the pipeline is built. What I have in mind is different from the list of waterbody crossings and the list of lakes of biological significance within 0.5 mile of the proposed pipeline.
3. There are some species (loons and bald eagles) which are state or national symbols and which can be found in or near lakes not terribly far from the proposed pipeline. What dangers do they face in an oil spill reaching waters? I would hope that an environmental impact statement would be more specific about how these species in particular would fare in a spill.

I thank you for your attention.

Sincerely yours,
Martin Hildebrand

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Randy Hill	384-4112	
ADDRESS: P.O. Box 74 Carlton Mn.		
CITY, STATE, ZIP: Carlton Mn. 55718		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

POSTCARD USA 2015 King Eider

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 4 L

POSTCARD USA

Dear Jamie Macalister,
It is a crime that we are not considering our environment a priority when we know the dangers posed by this pipeline - Line 3. Stop this from moving forward - when this does spill & destroy land & lives there is no going back. People are more important than the "small rewards" of cash profits that Enbridge claims will benefit the community.

SINCERELY,
Jessica Hill

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Patricia A. Kiel	218-659-4481	phill@paulbunyan.net
ADDRESS		
61490 Co Rd 29		
CITY, STATE, ZIP		
Marchomo, MN 56661-1908		

COMMENTS

I support the line 3 replacement whole heartily. This is a safer way to transport oil rather than by truck

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Steve Hill <hillsteve910@gmail.com>
Sent: Monday, July 10, 2017 7:43 AM
To: MN_COMM_Pipeline Comments
Cc: Steve Hill
Subject: Comment on Enbridge Line 3 replacement DEIS

Dear Minnesota Department of Commerce,

I have 3 areas of concern which I believe need to be addressed by Enbridge and the State of Minnesota.

1. **Safety**
In 2012 the US National Transportation Safety Board (NTSB) concluded that Enbridge "took advantage of weak regulations, and tolerated a culture of deviance" (http://www.canadianbusiness.com/blogs-and-comment/enbridge-had-a-culture-of-deviance-u-s-regulator/) on safety and failed to detect and properly respond to the Enbridge oil spill near Kalamazo MI in 2010. Furthermore, the NTSB reported findings of "hostility, poor training, favoritism and chronic staffing issues at Enbridge" which played a role in this oil spill and cleanup.
a. How has Enbridge corporate safety culture and safety training changed since 2010? Can we now have 100% confidence their corporate safety ability to detect and prevent spills and leaks? Enbridge materials online seem to only address very recent changes to their safety approach. Development of a corporate safety culture is a long journey, and Enbridge, in their own words, has only just begun. In addition, the old managers from the "culture of deviance" seem to be still on the front line managing safety, and how will they be held accountable for future safety?
2. **Enbridge corporate sustainability pledge**
Enbridge does not use the word "water" in their sustainability pledge. They only begin to talk about water as they describe their recent efforts to track corporate water usage. Their unwillingness to declare a corporate pledge to protect water and water resources should be a big concern to the Minnesota Department of Commerce and the Public Utilities Commission.
a. How will Enbridge pledge to protect Minnesota surface and ground water from contamination? What and how will Enbridge guarantee water protection? Who will hold Enbridge accountable for performance of this pledge, and how will the state be held accountable for this guarantee?
3. **Decommission of the old Line 3 pipeline**
I believe it is critical to long term water protection that the old pipeline be dug up and recycled. The pipeline "decommission" tactics described by Enbridge do not seem to meet current recycling standards.
a. Enbridge describes "pinch points" in the current line 3 corridor where digging up the old line could be risky. Could the rest of the pipeline be dug up, with only the "pinch points" left in the ground? This would significantly reduce the risk to future water contamination.

Thank you for your consideration as you approach a final EIS and work toward a recommendation.

Regards,
Steve Hill
Hubbard County, Minnesota

Levi, Andrew (COMM)

From: Jan and Loran Hillesheim <lhillesheim1@msn.com>
Sent: Sunday, July 09, 2017 11:31 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline Comments

Docket Numbers CN-14-916 and PPL-15-137

As a property owner on a lake within ½ a mile from the proposed pipeline route, I am against this proposed pipeline and the applicant's proposed route. None of the potential positive impacts of this pipeline outweigh the negative impacts of this pipeline for me, my neighbors, or the residents of the State of Minnesota. A few hundred temporary jobs and a handful of permanent jobs does not outweigh the immediate loss in property value to all lakeshore owners near this pipeline. Potential buyers are not going to purchase lakeshore property knowing that a pipeline carrying hundreds of thousands of barrels of oil daily lies right next to the lake. Enbridge has a history of pipeline spills. If a spill occurs, it is Minnesota's precious natural resources that will be permanently damaged, not North Dakota's or Canada's. This pipeline permit should be denied, or at least rerouted away from the heart of lake country.

Jan Hillesheim
Lhillesheim1@msn.com

Levi, Andrew (COMM)

From: Loran Hillesheim <LHillesheim@HGKCPA.com>
Sent: Monday, July 10, 2017 11:32 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline

Docket numbers CN-14-916 and PPL-15-137

I have been a property owner on the north end of Lake Roosevelt in Cass County for over 25 years. During those 25 years I have enjoyed skiing, tubing, fishing, and swimming with my parents, siblings, children, and friends. My main concern about this pipeline is the environmental impact the construction and ongoing operation of this pipeline may have. This pipeline not only crosses within a half a mile of Lake Roosevelt, but also crosses areas that are 20 to 40% wetlands according to the DNR and an area with the highest susceptibility for ground water contamination according to Minnesota Pollution Control Agency maps. A pipeline spill near a lake or wetland in this area could pollute the well water, kill fish and wildlife, and make lakes and recreation areas unusable for years. This pipeline could very well destroy a way of life for permanent and part time residents of this area.

The environmental concerns are real considering Enbridge's history when it comes to pipeline spills. There are numerous examples of environmental disasters caused by Enbridge's pipeline spills both in Minnesota and other states. Based on Enbridge's own reports, over 800 spills have occurred on Enbridge pipelines in a 10 year period, with over 50 pipeline spills in Minnesota. These spills include 6,000 barrels in Cohasset MN during 2002, 50,000 gallons in Whitewater WI during 2007 contaminating the local water table, and 843,000 gallons into the Kalamazoo River near Marshall MI. The Cohasset spill had to be set on fire to stop it from reaching the Mississippi River. Enbridge was sued by the State of Wisconsin for over 500 environmental violations. The National Transportation Safety Board found that Enbridge knew of a defect in the Michigan pipeline 5 years before it ruptured. Why is the Minnesota Department of Commerce bending over backwards to allow this company to run its pipeline across the lakes of Minnesota? This company's record alone should be enough to deny a permit.

The threat of an oil spill is permanent and not temporary. There is no question that someday, somewhere along this pipeline in the State of Minnesota, a leak or spill of some magnitude will occur. Wherever that spill occurs, there will be a tremendous loss of property value and jobs. If that spill reaches the ground water or a lake, property around the area will become worthless. With this pipeline crossing the Mississippi River along with numerous other rivers, lakes, streams and wetlands, this pipeline has the real potential of destroying many more jobs than it creates. Tourism is the biggest industry in this area. When the inevitable leak or spill occurs, resort owners, marinas, and anyone else that makes there living in that area off tourism will be devastated.

An alternative route for this pipeline must be found that will avoid the environmentally sensitive areas of the State. If an environmentally favorable route cannot be found, then don't build the pipeline. Why would we endanger the enjoyment of the clearest and cleanest lakes in Minnesota by our children and grandchildren because a private pipeline company based in Canada feels this pipeline and route is the most economical to them?

This pipeline transporting oil across Minnesota has no direct energy benefit to the residents of Minnesota. The oil transported in this pipeline will not be used by any of the refineries located in Minnesota. Why is the State of Minnesota putting the environmental health and quality of its lakes and waterways in jeopardy for the financial benefit of a foreign pipeline company? Is it the responsibility of the State of Minnesota to put the needs and interests of Canada and North Dakota above the needs and interests of its own residents?

Loran Hillesheim

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
David Anthony Hiner	651-442-8656	David4Hiner@gmail

ADDRESS
1295 Kendon Lane

CITY, STATE, ZIP
Mendota Hts Mn 55120

COMMENTS
We need the work Please souport Pipe line.

Thank you

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Les Hinrichs	218-766-2292	
ADDRESS		
40504 Co 23		
CITY, STATE, ZIP		
Sheulin MN 56676		

COMMENTS
A Pipe Line is alot Slaser then a Mile Long Train with A Mile of Tanker Cars going thong a Big Citie

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Dan Hinrichs <user@votervoice.net>
Sent: Friday, June 23, 2017 2:42 PM
To: MN_COMM_Pipeline Comments
Subject: Replace Line 3

Dear Ms. MacAlister,

I am in full support of Line 3 replacement. Pipelines are the safest way to transport and protect our land and waters.

Sincerely,

Dan Hinrichs
1001 131st Ave W
Duluth, MN 55808
d11tipper@aol.com

From: David Hixon
To: MN_COMM_Pipeline Comments
Subject: Comment on Docket Number CN-14-916 and PPL-15-137
Date: Monday, June 05, 2017 10:57:44 AM

I vehemently oppose the Line 3 pipeline because of its potentially negative effects on the water quality and public health and its overall negative effect on the Anishinaabe people.

Warmly,
David Hixon
DavidMichaelHixon@gmail.com

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017 PM

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Clark M. Hjelle	218-487-6008	clarkhjelle@juno.com

ADDRESS: 12333 510th St.

CITY, STATE, ZIP: Gonvick MN 56644

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

08 JUL 2011

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
THOMAS D. HODGE	218-728-4030	thomas.hodge@enbridge.com

ADDRESS: 3975 Nelson Rd.

CITY, STATE, ZIP: Duluth MN 55803

COMMENTS

I have been in the pipeline business for over 33 years, Enbridge employee for 10 years.
I believe that Enbridge is as safe an operating company that exists anywhere in North America. This project will benefit the people of Minnesota + our country.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017 PM

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Ashlynn Hodges	952-297-1515	ashlynnhodges@yahoo.com
ADDRESS: 210 8th ave NW		
CITY, STATE, ZIP: New Prague, MN 56071		

COMMENTS

Boosts. jobs.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Evelynn Hodges	952-564-1311	evelynnhodges@gmail.com
ADDRESS: 210 8th ave NW		
CITY, STATE, ZIP: New Prague, MN 56071		

COMMENTS

Boosts jobs.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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08 JUL 2017 PM

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Katelynn Hodges	952-564-9011	katelynnhodges@yahoo.com
ADDRESS		
55671 Co Rd 9		
CITY, STATE, ZIP		
Deer River, MN 56636		

COMMENTS

Keeps oil domestic
Boosts jobs.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

ST PAUL MN 551
03 JUL 2017 PM 5 T

I oppose line 3 because it violates treaties by encroaching on native land. It also threatens the environment and the people who live near it while transfering a product that contributes to Climate change.

SINCERELY,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Levi, Andrew (COMM)

From: Mary Hoff <hoff001@gmail.com>
Sent: Sunday, June 25, 2017 7:28 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 pipeline

To the Minnesota Department of Commerce:

I am writing in regard to docket numbers CN-14-916 and PPL-15-137.

As a longtime Minnesota resident I am writing to ask you to reject the draft Environmental Impact Statement for the Enbridge Line 3 pipeline. The protection it provides for Minnesota's precious waterways is inadequate. We Minnesotans take great pride in and derive much benefit from our lakes and rivers, and the risk posed by this pipeline to the Kettle River and Mississippi River is too high relative to the benefits that accrue. In particular, we must ensure that waterways not be contaminated by hazardous chemicals and drilling fluid during construction and that the risk of leaks and spills after the pipeline are in place are at most 10 percent of the industry standard, because of the exceptional fragility of our waterways and the exceptional value Minnesotans place on them.

Thank you,

Mary Hoff

Jamie MacAlister, Environmental Review Manager June 8, 2017
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul. MN 55101

RE: Proposed Enbridge Line 3 Pipeline Replacement Project

Dear Ms/Mr. MacAlister,

I have lived all of my 66 years here in the Northland, and I am becoming more and more concerned that our natural environment is under threat of pollution and ultimate degradation by many forces, including such pipelines as above. I never wanted the original pipeline built, and I certainly don't want a replacement built now. Why is it that in Minnesota, I will never own the mineral rights and what's below the surface of my own property, but these big companies like Enbridge can just bull their way under ground and build on others' land? This should go to a public referendum in my view.

I recently listened to a very reasonable man interviewed, who said his land covered part of the old Enbridge pipeline. He was asked his views on their stewardship, and he smiled and said, they just abandoned it (after the decision was taken to ask to build another one.) So he doesn't know what's leaking or happening under his own property, and there is no accountability in the future, either. The few jobs gained ar NOT ever worth the long term, potential for leaking and other damage, that once it happens, cannot be undone. I am told that there has NEVER been a pipeline here in the US or in Canada, that has not leaked. Rail transport is somewhat better - if there is an overturn, at least the oil, etc. is above ground for a time so it can be: 1) measured more accurately as to volume spilled and spillage areas; 2) sopped up or otherwise removed or diverted away from fragile areas; and 3) alternate rail routes might prevent future problems.

Therefore, since the only way to prevent any further degradation of of our land and water table, I must oppose any pipeline plans by Enbridge or any other greedy grabber.

Sincerely,

Karen B. Holden

Karen B. Holden
4924 Oakley Street
Duluth, MN 55804-1235
Kbhkbh.holen@gmail.com

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JUN 13 2017
MAILROOM

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jeff Holly	218-542-1515	
ADDRESS: 8250 Industrial Park Dr.		
CITY, STATE, ZIP: Walker, MN 56484		

COMMENTS: I support line 3 replacement

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Andy Pearson <andy@mn350.org>
Sent: Monday, July 10, 2017 11:20 PM
To: MN_COMM_Pipeline Comments
Cc: Julie Holmen
Subject: Comment on Line 3 - Dockets CN-14-916 and PPL-15-137.

Hello,

I am submitting these comments on behalf of Julie Holmen from St. Paul, MN.

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

Thank you,
Andy Pearson

---------- Forwarded message ----------
From: **Julie Holmen** <julie-holmen43@centurylink.net>

Public Testimony re: Enbridge Energy's Proposed Line 3 July 9, 2017

I, Julie Holmen, of 1341 N. St. Albans Street in St. Paul MN., am opposed to the Line 3 Proposal for the following reasons:
d

Research shows that the dirty oil in the Line 3 replacement is a threat to the Mississippi River headwaters and other sensitive areas. Likewise, the pipeline threatens our food safety by significantly decreasing future soybean, wheat and corn yields in the upper midwest due to rising temperatures, and intense weather patterns such as flooding, hail damage and insect threat. Finally, This pipe line threatens the 1855 Treaty with the Red Lake nation guaranteeing sensitive rice beds. Native culture and livelihood are threatened.

Reliance on fossil fuels when we have affordable renewables will result in temperature related deaths and illness. As a citizen activist working with Twin Cities based Health Partners we recognize that temperature rise, poorer air quality, and vector borne diseases brought on by continued burning of fossil fuels impact our patient communities negatively. Likewise, mental health and well being are negatively impacted by continued burning of fossil fuels.

Close to my heart, Minnesota's identify as home to the nations only National Canoe Park is threatened by global warming and changing forest ecology. I want my grand nieces and nephews to experience the boreal forest and pristine lake country that Sig Olson wrote so eloquently of. That's won't happen with the Line 3 replacement. If the G20 nations, minus Donald Trump, can see a path toward renewables, why can't MN. leaders? I urge you to oppose this outdated, for private profit project.

Thank you for considering my comments,

Julie Holmen

Levi, Andrew (COMM)

From: Patti Holmes <plynneh@gmail.com>
Sent: Monday, July 10, 2017 10:02 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3

To the Project Reviewers:

I am extremely concerned by the threat posed by an oil pipeline that carries the capacity the the proposed Line 3 will carry. There are very sensitive environmental areas like native wild ricing stands and other relatively pristine land and water scapes.

The fact that our economy should be moving to clean energy and not embracing extremely dirty fuels like tar sands oil is also alarming.

Please reject the Enbridge Line 3 proposal.

Patricia L. Holmes
1635 Garden Avenue
Falcon Heights, MN 55113

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Aaron Holmgren	218-349-7433	aaronh@northlandcompanies.com

ADDRESS: 4843 Rice Lake rd.

CITY, ~~STATE~~, ZIP: Duluth, MN 55803

COMMENTS: This pipeline is safer for the environment than transporting the oil by rail or truck. To ensure the integrity of this system, line 3 must be replaced.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
VERN HOLZHUETER	218-751-2014	pinegrol@yahoo.com

ADDRESS: 316 GROVE ST. NW

CITY, STATE, ZIP: BEMIDJI, MN. 56601

COMMENTS

WE NEED THE PIPELINE. I LIKE CLEAN WATER & TREES, BUT I NEED DRIVE TO SEE THEM. THAT TAKES FUEL.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Mary Hooley <maryhooley@gmail.com>
Sent: Thursday, June 22, 2017 3:36 PM
To: MN_COMM_Pipeline Comments
Subject: Dockett #s: CN-14-916 and PPL-15-137

Hello,

I'm writing to express my concern about the proposed Enbridge Line 3 Draft Environmental Impact Statement. I find it to be quite unacceptable.

I thought that our obligation was to ensure that rivers, such as the St. Croix River are to be protected from the very real threats that this proposed pipeline presents. It is, after all, a Scenic River and according to MN Statute 103F.305 Scenic River Protection Policy, we are to preserve and protect these rivers.

Also, what about the DEIS Chapter 10.4.1 concept of a 10 mile "Region of Interest" for oil spills. The (Enbridge) Kalamazoo spill impacted a 35 mile stretch. This proposed pipeline will be one of the largest crude oil pipelines in the country, with the potential and likelihood for massive damage to the environment.

Also, in regard to risk (DEIS Chapter 10.2.4.1.1)——I do not think an annual risk (of a spill) of 25% is acceptable.

The likelihood of damage from this pipeline is great. The damage would very likely be exceedingly difficult if not impossible to clean up. The costs would be incalculable—because they would include more than just a fortune in money, but life itself. It is not logical to take this sort of risk.

Please know that this DEIS is insufficient for protecting Minnesota's water.

Thank you.

-Mary Hooley
14241 205th St. N.
Scandia, MN 55073
651-373-7183

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Lance Hapka

Street Address: 29756 350th St. NW

City: Argyle State: MN Zip Code: 56713

Phone or Email:

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

They were easy to work with and considerate of our wants. They also provided excelent communication with us. There was very little effect from installation of the previous lines. I support how efficient pipe lines are.

If including additional pages please number them and tell us how many you are providing:_____ pages

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TAPE HERE (PLEASE DO NOT STAPLE)

MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
SAINT PAUL, MN 55101-2198

55101$2143 C012

FOLD HERE

Public Comment Period Ends Monday, July 10, 2017

Comments must be postmarked or received electronically by the comment deadline.

How to comment:

- Drop this form in a comment box at a public meeting
- Mail this form, remembering to affix appropriate postage
- Mail comments in a separate envelope using the mailing address on this form
- Email comments to the Environmental Review Manager: Pipeline.Comments@state.mn.us
- Fax comments to the Environmental Review Manager: (651) 539-0109

Comments do not need to be on this form to be accepted. We encourage you to provide comments in whatever way is most convenient for you. If commenting by email or fax please use *"Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)"* in the subject line.

Thank you for participating in the Draft EIS public review process! By commenting you are helping inform the Minnesota Public Utility Commission's decisions regarding this project.

FOLD HERE

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is unclear? What is missing? Please reference specific sections of the Draft EIS, if possible. Use additional pages as needed.

For project information visit: http://mn.gov/commerce/energyfacilities/line3.

Levi, Andrew (COMM)

From: Nathan Horek <nathanhorek@gmail.com>
Sent: Monday, July 10, 2017 4:57 PM
To: MN_COMM_Pipeline Comments
Subject: docket numbers CN-14-916 and PPL-15-137

docket numbers CN-14-916 and PPL-15-137

I am not in favor of this pipeline. I think all in all it is a bad idea for Minnesotans and for our future. This will potentially create harmful effects to our drinking water, the environment and contribute to climate change. The state should be protecting our future and not helping just a few see return on their investment.

Pipelines is a poor choice for Minnesota. A poor choice for our future.

Nathan Horek
4541 Bloomington Ave
Minneapolis, MN 55407
612-300-9625

Levi, Andrew (COMM)

From: dhhornfeldt@gmail.com
Sent: Saturday, July 01, 2017 11:04 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Tar Sands Pipeline

I'm a lifelong resident of Minnesota and appreciate all of it. This pipeline for Canadian oil is a losing prospect that doesn't benefit me but will extract significant costs from my kids and all Minnesotans.
Our need for energy is not so great that we can afford to make foolish decisions to support oil companies over citizens.
I'm sure you'll see the best thing for our state is to choose what benefits our people instead of products.
Daniel Hornfeldt

Docket numbers CN-14-916 and PPL-15-137

Levi, Andrew (COMM)

From: dhhornfeldt@gmail.com
Sent: Saturday, July 01, 2017 11:01 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Tar Sands Pipeline

I'm a lifelong resident of Minnesota and appreciate all of it. This pipeline for Canadian oil is a losing prospect that doesn't benefit me but will extract significant costs from my kids and all Minnesotans.
Our need for energy is not so great that we can afford to make foolish decisions to support oil companies over citizens.
I'm sure you'll see the best thing for our state is to choose what benefits our people instead of products.
Daniel Hornfeldt

Levi, Andrew (COMM)

From: Rick Horton <user@votervoice.net>
Sent: Thursday, June 29, 2017 12:41 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I live in northern Minnesota and understand that pipelines are the safest and most efficient method of transporting energy resources across the country. I believe in energy independence and feel that America does an outstanding job of producing energy with limited impacts on the environment. I am very familiar with existing pipelines, and support this project, the selected route that uses existing energy corridors, and I support leaving the existing line in place once it is deactivated.

Th public comment period for the EIS has been sufficient for all to voice their opinions, and those in opposition will not change their opinion no matter how much time they are provided. Stalling is as good as a win to them, and I see no reason to slow down the process of approval. No more studies are needed. Please stick to the statutory deadline.

Sincerely,

Rick Horton
37305 Deer Lake Way
Grand Rapids, MN 55744
rick_horton@yahoo.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
DAVID HORVATH	218-522-0973	dave@becotm.com

ADDRESS
1318 20th STREET

CITY, STATE, ZIP
CLOQUET MN, 55720

COMMENTS
BUILD IT!!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

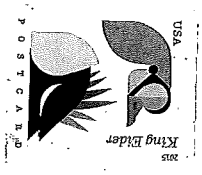

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Clint Hotchkiss <greentwodoor@gmail.com>
Sent: Saturday, July 08, 2017 12:28 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 replacement project in Minnesota.

Dear Ms. MacAlister,

I feel it is important for Minnesota and our country to support the maintenance and repair/replacement of existing pipelines.
I worked for a natural distribution companies across this country for 20 years. The extreme quality control and safety regulations that are required leave no doubt in my mind that pipelines are the safest way to transport any flammable product.
The pipelines currently go through my back 40. They consistently inspect and test the pipes for leaks. We have never had trouble with anything or anyone working with the pipes. I was very impressed with the amount of quality and safety that was involved when the last pipe that was installed.
It was unfortunate that the last pipe line that was scheduled to go through Minnesota was blocked. That was a senseless loss for all Minnesotans. The small few that opposed it probably never realized how much they benefit from and even depend on the products that come from pipelines.
I feel it would be in the best interest of Minnesota and all of it's residents to allow the line 3 replacement project to proceed. A stable supply of oil that can meet the needs of the present and future market is important for the economy in America.
I hope this replacement project can go through with no further dissruptions. I also hope that certain individuals who get a free ride of of Minnesota are not allowed to protest against the pipeline. The working class deserve a lower cost of living and a stable economy that gives us job security. When someone protests in a way that stand's in the way of production they are taking away from my rites to a secure future and driving up cost. That should be unconstitutional Hopefully everyone can come to thier senses and allow this to go through this time.

Sincerely,

C.H.
40357 191st Ave
Clearbrook, MN 56634
greentwodoor@gmail.com

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: David Houske

Street Address: 11235 240 Ave SE

City: Plummer State: MN Zip Code: 56748

Phone or Email: David.houske@Endbridge.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I support the Line 3 project, it will bring local revanue, provide A safer more efficient pipeline, bring Local work, increase local sales, Enbridge is environment friendly And sets the highest standards.

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Dave Hauske

Street Address: 11235 240 Ave SE

City: Plummer State: MN Zip Code: 56748

Phone or Email: David.Hauske@Enbridge.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am in favor of the Line 3 project. I believe the Line 3 replacement is the most cost effective and safest action. It will bring alot of good paying jobs to small town Minnesota and will continue to ~~bring~~ bring tax revenue. Ask any business owner in a small town how much better they do during mainline construction.

I believe that people who are apposed have not done their research. Electric cars still use oil, coal.

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Peter Hovde <hovde@cord.edu>
Sent: Saturday, July 08, 2017 7:54 PM
To: MN_COMM_Pipeline Comments
Subject: Comments on Line 3 Project EIS

To: Jamie MacAlister, Environmental Review Manager Minnesota Department of Commerce
From: Peter Hovde, 17300 Horseshoe Lane, Bagley, MN 56621
Date: 8 June 2017

Below please find my comment on the Line 3 Project Draft Environmental Impact Statement

Conclusion: *Enbridge's "preferred route" for the Line 3 is the very worst place to lay a pipeline. The questions will not be "whether" or "if" a breach will occur, but "how soon" and "how bad." The preference of a foreign corporation should not hold a candle to the security of our lands and waters, our economy, and the well-being of our citizens*

Rationale: Frost Heave. Frost heave of buried pipelines is of particular concern in areas with seasonably variable and cold temperatures, such as northern Minnesota. An article in the *Canadian Geotechnical Journal* examines exactly those risks. Just a sampling of problems: Upheaval buckling is a well-known phenomenon with buried pipelines: it can lead to large upward movements of a segment of the pipeline. As the pipeline arches upward, the top wall of the pipeline radically thins, making cracks to leak or fractures to spill much more likely.

The photos taken by the Ojibwa people riding the route of existing pipelines show pipelines emerging out of the ground, almost certainly from such frost heaving. Nothing else could cause the upheaval.

Stresses in the pipe due to frost heave occur because of the differences in the amount and rate of frost heave. When the pipeline passes from sandy ground (which shows little frost heave) to silty ground (which commonly shows significant heave) and freezing occurs, the pipe will be lifted in the silty segment and restrained by the sand. The points of transition from one type of soil to another are of particular concern. Freely available ground water is also highly conducive to frost heave. When the ice seasonably melts, the pipeline often does not go back to it original state, but retains the bend, which will increase year after year.

Yet Enbridge wants to put its Line 3 replacement pipeline right through the Minnesota lakes district, with its robust tourism and lake cabin culture, without which the economies of Park Rapids and other towns would shrink and shrivel. Designed to carry bitumen from the Canadian Tar Sands (and all the toxic chemicals injected into the bitumen to allow it to flow), the contamination which would flow from a major spill would be catastrophic to the economy and the environment, as well as the livelihoods and quiet lake-life pleasures of thousands of people.

The north-south portion of the pipeline (from Clearbrook to Park Rapids) is planned to go right across the Itasca moraine. With the high variability of soil types and water content in the glacial moraine—over which—a disturbingly large number of opportunities for frost heave and upheaval buckling, and disturbingly large consequences for the area should the line rupture.

Source: Andrew C. Palmer and Peter J. Williams (2003) "Frost heave and pipeline upheaval buckling." *Canadian Geotechnical Journal*. 40: 1033-1038.

From: Sarah Howard
To: MN_COMM_Pipeline Comments
Subject: Comment on Draft EIS for Line 3
Date: Sunday, June 04, 2017 6:15:15 PM

To Whom It May Concern:

Having read the Draft EIS for Enbridge's proposed Line 3 pipeline, I wish to register my opposition. I believe that the EIS clearly demonstrates that the risks to public and ecological safety posed by the pipeline outweigh the potential economic benefits.

Sincerely,
Sarah Howard
3034 Paris Ave.
New Orleans, LA
70119

Levi, Andrew (COMM)

From: Tad Howard <howards5@mchsi.com>
Sent: Friday, June 30, 2017 7:55 AM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I would like to see the pipeline to replace the old line. I think the jobs are also needed.

Sincerely,

Tad Howard
21883 Verde Ln
Grand Rapids, MN 55744
howards5@mchsi.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Larry Howes		
ADDRESS		
5340 Ladyslipper Lane		
CITY, STATE, ZIP		
Walker, MN 56484		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS!

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916, PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Cliff Hoyt	7159190493	cthoyt513@gmail
ADDRESS		
4791 E HALF MILE RD		
CITY, STATE, ZIP		
Superior WI 54880		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: David Huckfelt <dhuckfelt@gmail.com>
Sent: Monday, July 10, 2017 10:34 PM
To: MN_COMM_Pipeline Comments
Subject: No Pipeline in Minnesota!

Regarding CN-14-196 and PPL15-137...

Please, no pipeline in Minnesota! Too great a risk, too temporary a reward, too beholden to other interests and not the people... Keep it in the ground!!!

This proposed line directly threatening watersheds connected to the largest and the only certified organic wild rice lakes in Minnesota. This is a bad investment which needs much more study because it threatens our water. This Canadian company gets all the benefit and Americans get all the risk. In addition Enbridge needs to clean up all it's old pipe not just walk away and leave it in the ground for future generations.

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
KAY HUDDIE		
ADDRESS		
7696 Whipholt Beach Rd.		
CITY, STATE, ZIP		
Walker, MN 56601		

COMMENTS

I support the line 3 replacement project

AYS

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Line 3 Replacement Project DEIS

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Docket numbers: (

07/10

Levi, Andrew (COMM)

From: Carl Hudelson <Hudelsoncarl@gmail.com>
Sent: Thursday, June 29, 2017 5:56 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

The proposed route follows existing utility corridors. It is the right thing to do. Build the pipeline.

Sincerely,

Carl Hudelson
609 S Inner Dr
Hibbing, MN 55746
Hudelsoncarl@gmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Aili Hunta	369-2890	a-hunta@student.i

ADDRESS
1294 west lawrence

CITY, STATE, ZIP
Cloquet MN 55720

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
WILLIAM Nelson Hull	(781) 690-3319	nelsonhull@gmail.com

ADDRESS
315 16th Ave SE

CITY, STATE, ZIP
Minneapolis MN, 55414

COMMENTS

DECLARE THE EIS ADEQUATE

Levi, Andrew (COMM)

From: Mary Jo Huls <mamajo7barns@msn.com>
Sent: Thursday, June 29, 2017 3:01 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project

Dear Ms. MacAlister,

As a Minnesotan and mother of a construction /carpenter son, I believe the project should be constructed with the allowance for the utmost safety for not only the workers, but the communities that are involved in Project 3. A boost for our economy is always welcome, but a balance between safety and monetary gain needs to be adhered to.

Sincerely,

Mary Jo Huls
228 7th Ave S
Sartell, MN 56377
mamajo7barns@msn.com

Levi, Andrew (COMM)

From: Karen Hulstrand <hulstrandact@comcast.net>
Sent: Sunday, July 09, 2017 10:44 PM
To: MN_COMM_Pipeline Comments
Subject: comments on line 3 draft EIS

Docket # — CN-14-916 and PPL-15-137

The basic premise of the EIS does not certify that the state of Minnesota has a need for this pipeline. The EIS does not calculate the long-term need (the 50 or so years that this infrastructure will be in place) for the pumping of Tar Sands oil from a foreign company across our state. There needs to be a calculation of not using Tar Sands oil and not using a pipeline but rather switching to cleaner energy. A no build option needs to be calculated especially as it applies to the state of Minnesota.

The preferred route crosses 192 bodies of water. I live on the St. Croix River and this pipeline crosses the Kettle River which empties into the St. Croix River. The land of northern Minnesota has our cleanest and most beloved water resources in our state. The data on spills in not sufficient. The only analysis of a large spill has been done only by Enbridge. (and is not part of the main report). This is not sufficient. There needs to be an analysis by an independent source of what the effects of a large spill would be on Minnesota's waters. The spill in Michigan did not have a good outcome.

(Graph ES-4 taken from Chapter 10 and displayed at hearings if very misleading. It talks about number of spills and make the pipeline look the least but does not figure in the amount of oil and chemicals spilled per incident.)

Chemical exposure. Tar Sands oil is thick and needs to be diluted. What chemicals does the company use and what are the health effects if there is a leak? I was told at the public hearing that this is proprietary information and the company does not have to disclose it. That is not right. Minnesota should not have to approve a pipeline that we don't even know what chemicals will be used in the line. I am a physician and know that children and pregnant women carry the most risk from any contamination.

Native American rights - This impinges on the rights of a group of people who have already suffered injustice. The EIS does not adequately express the injustice this pipeline will impose. The tribes involved adamantly oppose the pipeline.

Abandonment issues - This is not explored with enough depth in the EIS. What are the long-term effects of leaving this pipeline. Who will end up bearing the costs of this?

Wetlands- This will destroy a large swathe of wetlands which the effect of is underestimated in this report.

Tar Sands — This extraction process is an environmental disaster in itself. Minnesota should not be enabling the oil companies to further devastate this area. There is no analysis of the environmental effects on the planet of the Tar Sands oil itself. Minnesota is not an isolated island. The effects of Tar Sands oil is a plant wide problem.

Climate Change - We cannot afford to put this much more carbon dioxide in the atmosphere.

In conclusion this pipeline does not meet the Certificate of Need for Minnesota.

Karen Hulstrand, MD

June 8 - 2017

Embridge Community meeting
East Lake Community center

RECEIVED
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Dear Sirs.

Jane + I along with two other neighbor families support the proposed replacement of the existing line 3 pipeline

There is no question in our minds the safest way of transporting oil is via a pipeline, why contest a replacement line which replaces a decade old line, which could become a problem.

Our individual + area economies operate on an oil base. those that oppose, how did they arrive for this meeting? via foot or horse? unfortunately some oppose just to oppose regardless of the consequences.

Sincerely

Romano + Jane Humphreys
29394 396th Pl.
Aitkin Mn.

Mr & Mrs Dennis Humphreys
29394 396th Pl
Aitkin MN 56431-4210

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MINNEAPOLIS MN 553

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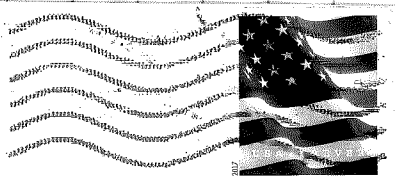

MN. DEPT. of COMMERCE
85 7TH PLACE EAST
SUITE 280
ST. PAUL MN 55101-2198

ATTN: JAMIE MACALLISTER - Mgr.

55101-214355

From: Carolyn Hunt
To: MN_COMM_Pipeline Comments
Subject: I oppose new Line 3 pipeline
Date: Wednesday, May 31, 2017 2:12:28 PM

As a native Minnesotan and graduate of Carleton College, I am deeply concerned about about the impact of CN-14-916 and PPL-15-137 legislation on the health, safety, and security of all Minnesotans. We've made too much progress as a state, a nation, and a species to allow corporate interests to dictate policy and the future of our state. Now is the time to move to clean energy as is obvious to most people.

Follow the tradition of Minnesota being at the forefront of positive health, social, and cultural change. Don't go backwards. There is no room for tar sands pipelines in our beautiful state.

Sincerely,
Carolyn Hunt

Levi, Andrew (COMM)

From: Wihinape Hunt <thesunappears@gmail.com>
Sent: Monday, July 10, 2017 11:34 AM
To: MN_COMM_Pipeline Comments
Subject: Docket Numbers CN-14-916 and PPL-15-137

Follow Up Flag: Follow up
Flag Status: Flagged

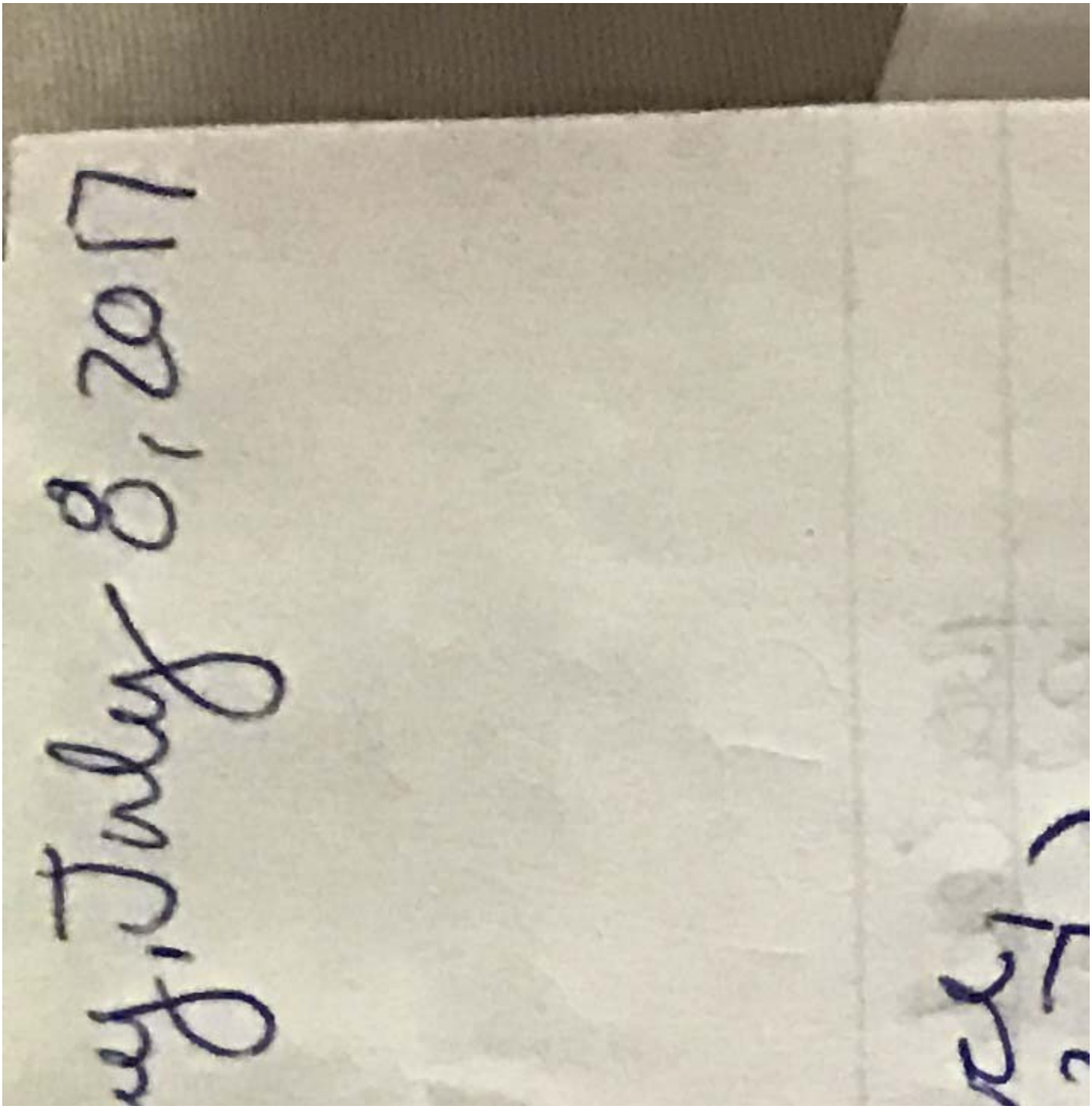

ter of Historic
knowing" that

Levi, Andrew (COMM)

From: Ross Hunter <rossh.87@gmail.com>
Sent: Sunday, July 09, 2017 10:58 PM
To: MN_COMM_Pipeline Comments
Subject: Public comment on CN-14-916 and PPL-15-137

I generally oppose Enbridge's proposal to construct a new Line 3 as I oppose all new fossil fuel extraction and infrastructure. It is unreasonable that the people of Minnesota be expected to absorb the unavoidable and universally-admitted environmental impacts of another pipeline in exchange for no clear or lasting benefit, and for the promotion of an activity which promises displacement, impoverishment, and death in the form of climate change.

I specifically object to the draft EIS on two fronts:
First, it does not evaluate the environmental impact of shutting down the existing Line 3 and displacing the volume it is currently transporting onto other pipelines, or eliminating that volume entirely. Given that the Department of Commerce apparently takes seriously the possibility of transporting said volume entirely by truck (and passing the enormous economic and health impacts of doing so on to the public), it is reasonable to consider the only alternative which does *not* expose the public or the environment to those risks. A "no new pipeline, no new volume" alternative is also the only alternative aligned with Minnesota's emissions reduction goals.

Second, the draft EIS assumes Enbridge's compliance with its own mitigation plans without establishing robust protocols for third-party monitoring. Given Enbridge's environmental track record and the host of ecological and social issues associated with constructing and maintaining fossil fuel infrastructure (sex trafficking, environmental injustice, etc.), it is unreasonable that Enbridge and its contractors be given such broad authority to self-police. I look forward to seeing these issues addressed in future versions of the EIS, along with those raised in other comments. Thank you for your time.

Sincerely,
Ross Hunter
Saint Paul, MN

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Carrie Huston	218.209.1389	
ADDRESS		
PO Box 1263		
CITY, STATE, ZIP		
Walker, MN 56484		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Christopher Huston	218-760-3269	
ADDRESS		
PO Box 1263		
CITY, STATE, ZIP		
Walker, MN 56484		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Rainie Huston		
ADDRESS		
PO Box 12603		
CITY, STATE, ZIP		
Walker, MN 56484		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: jan ide <user@votervoice.net>
Sent: Thursday, July 06, 2017 10:34 AM
To: MN_COMM_Pipeline Comments
Subject: line 3 replacement project Deis

Dear Ms. MacAlister,

Please note that I vote 100% for. I fail to see any negative in proceeding with the replacement.

Sincerely,

jan ide
801 Rockview Ct
Duluth, MN 55804
janmide@aol.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Doris Ishe		
ADDRESS		
12789 Ave Rd NW		
CITY, STATE, ZIP		
Deerwood MN 56676		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Lyle v Lhde	218-243-3006	
ADDRESS		
12789 Acre Rd. N.W		
CITY, STATE, ZIP		
Pinewood Minn. 56676		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Jill Iles <jilliles@gmail.com>
Sent: Monday, July 10, 2017 6:26 PM
To: MN_COMM_Pipeline Comments
Subject: STOP

Please do not approve any more pipelines. Wake up. This is our ONLY planet and we are supposed to be caring/nurturing her. Thank you

Levi, Andrew (COMM)

From: Neal Illies <neal.illies@co.clearwater.mn.us>
Sent: Monday, July 10, 2017 8:17 AM
To: MN_COMM_Pipeline Comments
Subject: docket numbers CN-14-916 and PPL-15-137
Attachments: public comment.docx

Please see the attached comments for the DEIS, docket numbers CN-14-916 and PPL-15-137.

Neal J. Illies

District 3 Clearwater County Commissioner
36744 Lomond Dr.
Bagley, MN 56621

218-368-5947

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

July 9, 2017

I was collecting a bunch of data while preparing for this public comment. I had pages of facts that show that Enbridge has done a wonderful job of safely transporting billions of barrels of crude oil. I was going to blow your socks off with all this great data, most of which I am sure you have seen or heard about. I wanted an opportunity to counter some of the misinformation by the anti-pipeline people and media that seems to flow so easily in during this process.

While I was taking a break and looking up information for my hobby; which is computers. I ran across an article written on June 3, 2017 in the New Yorker called "How to call BS on big data: A practical guide". While I read it, all I could think about is how I wish everyone that is in a decision-making position for the pipeline permitting process could read this and take it to heart.

The article begins with a quote from Oxford philosophy professor John Alexander Smith telling his students in 1914, "Nothing that you will learn in the course of your studies will be of the slightest possible use to you, save only this: if you work hard and intelligently, you should be able to detect when a man is talking rot."

The article is in reference to a new course offered by the University of Washington by information scientist Jevin West and biologist Carl Bergstrom. West and Bergstrom go on to say that while humans are pretty good at detecting verbal BS, that BS expressed in data is relatively new since the invent of computers, smartphones and other information gathering devices. Bergstrom said "While data can be used to tell remarkably deep and memorable stories, its apparent sophistication and precision can effectively disguise a great deal of BS."

The article points out a few other things to take into consideration in making decisions. It is important to remember that correlation doesn't imply causation. A correlation between two variables (ice cream consumption and shark attacks) maybe due to a third variable (summer weather). Watch out for unfair comparisons such as claims that many more people watched the video stream of the Trump Inauguration than that of the first Obama Inauguration, while failing to acknowledge the vastly greater availability of streaming video in 2017. Conclusions that dramatically confirm your personal opinions or experiences should be especially suspect.

The last bullet point in the article sums it up perfectly with a couple more quotes. Alberto Brandolini in 2013: "the amount of energy needed to refute BS is an order of magnitude bigger than that needed to produce it." And Jonathon Swift put it in 1720, "Falsehood flies, and truth comes limping after it."

The DEIS is laden with its share of BS, myths, and personal opinions thrown in with a lot of good data. I decided not to include all the facts and data that I found since it would be a repeat of what you have seen many times already during this process. And so, I trust that you, as decision makers for the people of the State of Minnesota, will use your intelligence to sort out the facts from the BS, **without personal biases**. I have faith that, if given a chance, that the facts will speak for themselves and will prove that replacing Line 3, using the preferred route, is the correct and intelligent thing to do for the people of Minnesota.

Thank you,

Neal Illies
Bagley, Minnesota

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Jean E Inglehart

Street Address: 101 Wildwood Beh Rd

City: Mahtomedi State: MN Zip Code: 55115

Phone or Email: jei@usfamily.net

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

* Complete Removal + Restoration of all discontinued lines.

* No BURIED Lines - too difficult to monitor, especially Under Rivers + Lakes.

* Jobs FOR SOLAR & WIND!
* Tech is changing
* We need to get With the Future
  tarsands is the past.

Protect Natural Resourses, Please.

Jean E Inglehart

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Soth, Jeffrey <jsoth@iuoe.org>
Sent: Monday, July 10, 2017 3:48 PM
To: MN_COMM_Pipeline Comments
Subject: IUOE DEIS Comments: Enbridge Line 3
Attachments: IUOE_Enbridge_7_10_17.pdf

Attached are the comments of the International Union of Operating Engineers regarding the Draft EIS for Line 3 replacement. Thank you!

Jeff

Jeffrey Soth
Legislative and Political Director
International Union of Operating Engineers
jsoth@iuoe.org
202-778-2650

International Union of Operating Engineers

AFFILIATED WITH THE AMERICAN FEDERATION OF LABOR AND CONGRESS OF INDUSTRIAL ORGANIZATIONS

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GENERAL PRESIDENT

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JAMES T. KUNZ, JR.
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EDWARD J. CURLY

GENERAL COUNSEL
BRIAN POWERS

July 10, 2017

Minn. Dept. of Commerce
Jamie MacAlister, Environmental Review Manager
85 7th Place East, #280
St. Paul, Mn. 55101-2198
BY E-MAIL TO: Pipeline.Comments@state.mn.us

RE: Docket Numbers CN-14-916 and PPL-15-137

Dear Jamie MacAlister:

The International Union of Operating Engineers (IUOE) respectfully submits the following comments regarding the Draft Environmental Impact Statement (DEIS) for the proposed Enbridge Pipeline Line 3 Replacement Project.

The Operating Engineers represent heavy equipment operators and mechanics in the construction industry throughout the United States and Canada. Thousands of IUOE members possess specialized training and years of practical experience building the nation's energy infrastructure that powers our country, including such notable projects as the Hoover Dam, the Trans-Alaska Pipeline, and countless power plants and pipelines.

The IUOE is one of four labor unions signatory to the National Pipeline Agreement with the Pipe Line Contractors of America (PLCA). It is through this agreement that skilled pipeline workers will replace Enbridge's Line 3, which is a vital portion of the Midwest's energy infrastructure, and which supplies several Midwest states.

The Operating Engineers, in partnership with employer-contractors, trains tens of thousands of apprentices and journey-level workers at over 86 training facilities around the country that are focused on construction. In 2015 alone, these programs invested over $128 million to meet employers' needs for a skilled workforce. An additional investment of over $5 million went directly into specialized training for pipeline construction.

With over 550 construction instructors at the IUOE's training centers, the union possesses extensive workforce-development capacity and expertise. The IUOE is also constructing the International Training and Education Center (ITEC) on 225 acres in the Texas Gulf Coast area, just outside of Houston. The private project will cost roughly $150 million and is slated for completion in Spring 2018.

Members of the IUOE possess decades of job skills training and on-the-job experience in pipeline and heavy construction. The IUOE is a major stakeholder in the permitting of pipelines and heavy industrial facilities for these reasons.

Our expertise, our training, and our concerns center on the safe construction and operations of facilities like the Enbridge Line 3 Pipeline replacement.

Many of our members and their families live and work in and near pipelines and industrial facilities. Like most Americans, our members are also concerned about how energy supplies and dependence on oil imports from unfriendly countries can threaten our national security. In that spirit, the IUOE thanks the Minnesota Commerce Department for preparing this Draft Environmental Impact Statement and for the opportunity to comment on it.

Enbridge Energy is proposing replacement of their sixty-eight-year-old, 34-inch crude oil pipeline (Line 3) with a new 36-inch line, four new pumping stations and other upgrades. The new line would run 340-miles across Minnesota from the North Dakota/Canadian border to Superior, Wisconsin.

Line 3 has leaked 15 times since 1990 and its maintenance has required 950 excavations since 2000. The new pipeline would allow Enbridge to move 760,000 barrels per day of crude. The original Line 3 had similar capacity but has been degraded to 390,000 barrels per day.

The IUOE believes that Line 3 should be replaced as soon as possible with a much safer, modernized pipeline. This replacement will protect the environment and help insure a steady supply of energy.

The IUOE has reviewed the Draft EIS for the Line 3 Replacement. The DEIS presented several alternative methods of oil transport. Fortunately, Table ES-2 of the DEIS provides a detailed comparison of these alternatives, ranging from a “conceptual” pipeline that would run partly through North Dakota, to a mix of rail and truck traffic, including continued use of Line 3.

Table ES-2 supports the selection of the Applicant’s Preferred Route as environmentally superior. This Table shows that in the event of a release, the Applicant’s Preferred Route would potentially affect the least acreage of important High Consequence Areas, which are populated areas, unusually sensitive ecological areas, and drinking water sources. The preferred route would potentially affect less than 16,000 areas of High Consequence Areas.

In contrast, System Alternative SA-04 (the conceptual route) could threaten over 60,000 acres of High Consequence Areas (HCAs) in the event of an oil spill. All other alternatives would threaten even larger acreages of HCAs.

Out of the seven proposed alternatives in Table ES-2, the Applicant’s Preferred Route ranked either first or second safest in all of the eight categories of potential impacts.

Table ES-3 also reveals that the Applicant’s Preferred Route would generate the least amount of greenhouse gas emissions.

Table ES-4 studied potential pipeline route alternatives between Clearbrook and Carlton. The dicta of the Draft EIS claimed the Preferred Route would potentially affect more acreage than two alternative routes. However, the Preferred Route would actually affect less acreage for the more important High Consequence areas, which are populated areas, unusually sensitive ecological areas, and areas containing drinking water sources, than would any other alternative route. The preferred route could affect more cropland than the alternative routes RA-03AM or RA-06.

The IUOE is most concerned about impacts to High Consequence Areas, and Table ES-4 indicates that the Preferred Route would have the least impacts on HCAs.

The IUOE also notes that both RA-03AM and RA-06 will require nine and seven new pump stations, respectively, compared to the Preferred Route's four new pump stations. This means those two potential alternatives will also require considerable more electrical generation to run its pumps than would the Preferred Route, causing large increases in energy consumption.

The IUOE is also concerned about comparing the Preferred Route with the proposed alternatives. The DEIS itself at ES-26 warns that there is less specific data available for the alternative routes, than for the preferred route. The Preferred Route is well known, the alternative routes less so. If a relatively un-researched alternative route is chosen, that will trigger lengthy ground-truthing of the new route that has not yet occurred. That process will consume considerable time.

The IUOE's experience is that additional scrutiny of a newly selected route is likely to turn up more problems, not fewer. That's especially important considering that one alternative, RA-03AM, runs through sensitive geologic formations.

These new detailed route reviews and new trouble-shooting of how to engineer around the geologic formations, or currently unknown factors, could slow the Line 3 Replacement, if the Preferred Route is not selected.

The IUOE opposes delaying the replacement of Line 3. Maintenance crews are having to dig up portions of Line 3 dozens or hundreds of times per year. Every excavation, and every day Line 3 remains on-line, threatens a spill or accident.

In conclusion the IUOE supports adoption of the Applicant's Preferred Route because it would have the least impacts on High Consequence Areas, it will expedite the replacement of Line 3, and it will produce less greenhouse gasses. Its pumping stations will also consume less energy than the project alternatives.

Thank you for the opportunity to comment on this critical energy infrastructure project.

Sincerely,

James T. Callahan
General President

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Carl Isaacson

Street Address: 17248 Skyview Dr

City: Bemidji State: MN Zip Code: 56601

Phone or Email: cisaacso@hotmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

If we are going to address climate change we need to keep carbon fuels in the ground.

We should not allow Enbridge to abandon line 3. This will only pass the cost of clean up of line 3 on to future generations of tax payers.

The alternative of using green energy sources is not appropriately evaluated. The evaluation of truck transport is ludicrus & shows that Enbridge is not serious out evaluating alternatives.

- Pipelines leak & any amount $$ cannot fix the contamination that results for those leaks.

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Dana Jackson <danaleej3@gmail.com>
Sent: Saturday, July 08, 2017 9:50 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Proposed Line 3 Pipeline Project comments

July 8, 2017

Jaime MacAlister

Environmental Review Manager

Minnesota Department of Commerce

85 7th Place East, Suite 280

St. Paul, MN 55101

Pipeline.Comments@state.mn.us

This letter contains comments regarding Enbridge Energy's Proposed Line 3 Pipeline Project Draft Environmental Impact Statement, docket numbers CN-14-916 and PPL-15-137.

As a member of the board of directors of the St. Croix River Association, I am greatly concerned that this proposed Enbridge pipeline could cause harm to the St. Croix River and its tributaries. The St. Croix was one of 8 rivers designated as a national wild and scenic river in 1968. It is a regional treasure, providing a large range of nature experiences and recreational opportunities for the large urban population in the Twin Cities. Pipe line spills would ruin this unique resource.

The proposed route for Line 3 is through the headwaters of the Kettle River in Minnesota, which directly drains into the St. Croix River. The pipe line would cross through the most sensitive headwater areas of the Kettle River watershed and does not adequately mitigate or minimize the environmental impacts of pipeline construction or a potential pipeline spill.

The Kettle River watershed includes large areas of intact wetlands, pristine perennial headwater streams, and diverse mussel and fish faunas. It is home to 17 species of mussels, ancient lake sturgeon, and nationally significant brook lamprey and gilt darter. Several threatened, endangered, and sensitive species including bald eagles, Blanding's turtle, wood turtles, and osprey are also found in this area. Overall the water quality and

aquatic systems of the Kettle River are in exceptional condition, as indicated by consistently high indices of biotic integrity.

Given the uniqueness and ecologically sensitive ecosystems within the Kettle River watershed, I strongly oppose the proposed Line 3 pipeline route outlined in the Line 3 DEIS. The water resources, wildlife habitat, and recreation opportunities, are of such great value to current and future populations that they must not be endangered by a pipeline carrying tar sands oil.

In addition to the pipeline construction itself, we urge you to consider the added risks of a pipeline with increased capacity. Added capacity through Superior terminal via Line 3 will likely lead to the need for increased capacity along the current pipeline corridor in Wisconsin that crosses under the headwaters of the St. Croix, Namekagon, and Totogatic rivers that flow into the St. Croix.

With Enbridge pipelines crossing the Kettle and three other tributaries of the St. Croix, the chances for catastrophic leaks and accidents polluting the national wild and scenic river during construction and operation, especially with larger pipes carrying greater amounts of oil, are just too great.

Please consider the dangers that Enbridge' Proposed Line 3 Pipeline Project could pose to the water quality, ecological resources and recreational values of the National Wild and Scenic St. Croix River.

Sincerely,

Dana Jackson

814 Everett St. N.

Stillwater, MN 55082

Levi, Andrew (COMM)

From: Julia Jackson <julia.e.jackson@gmail.com>
Sent: Friday, July 07, 2017 11:39 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

I am against the pipeline.

Julia Jackson
St. Paul, MN

Levi, Andrew (COMM)

From: Lady Jake <mzladyjake@gmail.com>
Sent: Sunday, July 09, 2017 4:34 PM
To: MN_COMM_Pipeline Comments
Subject: Docket #s CN-14-916 & PPL-15-137

Dear Sirs,

I grew up in Minnesota and spent summers at family cabins on Lake LaSalle - 5 miles from Lake Itasca - the headwaters of the great Mississippi River.

Just the thought of dirty Tar Sands and the resulting pollution in this important ecosystem turns my stomach.

We need to embrace clean energy sources, as the majority of the world is doing.

Please spare these beautiful headwaters and the people and wildlife that depend on the waters of the mighty Mississippi River!

Sincerely,
Elise Jacobson

Levi, Andrew (COMM)

From: Jill <pumilios@aol.com>
Sent: Monday, July 10, 2017 10:44 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3

At a minimum, Enbridge should be required to remove the old pipeline and then use that corridor for the new replacement.

However, allowing Enbridge to build this pipeline commits us to a fossil fuel future which takes us in the wrong direction in energy security.

No line 3.

Jill Jacoby, PhD
3971 Rehbein Rd
Duluth, MN 55803
218-724-9786

Levi, Andrew (COMM)

From: Kristina Jager <kjager218@gmail.com>
Sent: Monday, July 10, 2017 1:04 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

Dear Jamie MacAlister,

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I am from: Minnesota (Spicer, St Paul, Longville area)

The Line 3 Pipeline concerns me because: of lack of regard for our environment, our people, and lasting effects this will have generations to come.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Sincerely,
K Jager

Levi, Andrew (COMM)

From: James Brandt <jbrandt@uslink.net>
Sent: Monday, July 10, 2017 9:59 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline Comments

Public Comment: Line 3 Project (Cn-14-916 and PPL-15-137)

Dear Environmental Review Manager,

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. I have heard that Enbridge redacted those numbers from the public version of the DEIS. Without them, there is no reliable way an independent party to verify their results.

I believe that in order for Minnesota citizens and agencies to make an educated decision about Line 3, we must have that information, and I would like to know why Enbridge won't release it. Please insist that Enbridge provide their data on oil releases and spills in Minnesota.

If Enbridge objects due to security reasons, then I would like to know why they have failed to cover the exposed pipes in the Tamarack River in northwest Minnesota, and why they allow people to joyride over exposed pipes south of Clearwater. This is surely a security issue as well. For Enbridge to pick and choose what issues warrant "security," is unacceptable.

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There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete.

I would like to know, in the final EIS for Line 3, what Enbridge's plans are if their preferred route is approved. Will it be just the one pipeline, or will they eventually move all six pipelines to the new corridor? This would have a huge effect on how people feel about Enbridge's preferred pipeline route.

I have heard that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state* need (not a national need). Even if we used statistics about the national need, U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply needed oil. (http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf)

I would like to see this information mentioned in the final EIS.

I understand that an engineering firm called Cardno, with ties to Enbridge, was instrumental in preparing part of the draft Environmental Impact Statement for Line 3. In light of this fact, in the final EIS I would like to see an independent analysis of the information they provided. Minnesota requires verified facts for such a large project.

Thank you,
Jim Brandt
38623 Eagles View Road
Pine River, MN 56474

Levi, Andrew (COMM)

From: Jamie Mueller <nat.mueller3@live.com>
Sent: Friday, July 07, 2017 8:54 AM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I support the Line 3 replacement project through Minnesota. Pipelines are by far the safest and most efficent way to transport oil. With todays engineering standards new pipelines are constructed far safer, more efficent, and have the latest and greatest instrumentation all through the system for monitoring the pipeline for any abnormal conditions.

Sincerely,

Jamie Mueller
W5570 Church Rd
Johnson Creek, WI 53038
nat.mueller3@live.com

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Kristine Janiksela

Street Address: 3421 Cty Rd 143

City: Nantowa State: MN Zip Code: 55707

Phone or Email: 218 393 6724

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am a MN Middle class resident. I enjoy our MN environment and I support pipelines. Pipelines are the safest mode of transportation for oil. Line 3 Replacement is the right thing to do. I support the preferred route. Line 3 Replacement emissions on the prefreed route are the lowest level to any alternative as noted on page 22 in the booklet (executive summary). I support Line 3 Replacement preffered route and the certificate of need, and draft EIS.

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Carol Jansen <goodoldcanoe@frontiernet.net>
Sent: Sunday, July 09, 2017 10:20 PM
To: MN_COMM_Pipeline Comments
Subject: "Public Comment: Line 3 Project (CN-14-916 and PPL-15-137")

Jamie Macalister
Environmental Review Manager
MN Dept. of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Re: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Jamie Macalister,

As a resident of Aitkin County, MN, I am extremely concerned about the biological, economical, and social economic ramifications of the placement of Enbridge's proposed Pipeline 3. Let me be clear that I am a supporter of oil, and oil pipelines. However I believe that we should be making responsible decisions as to the placement of these pipelines in order to reduce the possibility of short and long-term negatives effects of a potential oil spill. There are many different issues which are impacted with this pipeline, not the least of which is the effect of a potential oil spill on the fishing and hospitality industry. Aitkin County is famous for its recreational assets, with the fishing and hospitality business replacing the earlier logging and fur trading industrial base as one of the largest employers in the county. Over 10% of all employees in Aitkin County are employed in the Food Service and Accommodations business. Only healthcare and retail sales employ more people than the hospitality industry in Aitkin County.

In Minnesota, fishing is much more than a pleasant pastime. In 2011, the MN DNR reported that fishing "supports 43,000 Minnesota jobs, generates $2.8 billion in direct annual expenditures, and contributes more than $640 million a year in tax revenues to the treasures of our state and federal government." Their study showed that Minnesota ranked third in the country for expenditures by anglers, second only to Florida and Texas. When adjusted for fishing related businesses, such as gas, lodging, and other services provided, the economic impact exceeds $4.7 billion per year. The realization that so many livelihoods are linked to water quality, fish quantity, and the overall health of our land and waters is staggering.

In addition, Minnesota ranks second only to Alaska in fishing participation per capita according to a 2016 article in the Minneapolis Star Tribune. Approximately 300,000 nonresidents visit to fish annually, while 1.2 million Minnesotans over the age of 16 purchase fishing licenses each year. Aitkin County is the destination for many anglers who return year after year to enjoy the clean air and water quality we offer.

While pipelines are an efficient means of transporting oil, they do come with serious risks. Accidents happen, and when they do the results are often catastrophic. The proposed route of Pipeline 3 takes it through our best quality lakes, rivers, wetlands, and forest ecosystems, directly through the Big Sandy Lake Watershed. The watershed includes nearly 260,000 acres, and 49 lakes (32 of which are fishable), including Big Sandy, Minnewawa, Horseshoe, Round, and Aitkin Lakes, and eventually feeds into the Mississippi River.

An oil spill from a pipeline leak can be devastating to the local fishing and hospitality industry. Not only can the oil pose significant negative short and long-term effects on fishing from the death and disease of fish, aquatic insects, birds and other wildlife; but the subsequent losses of income and employment in the related hospitality industry in Aitkin County could be a disaster for the more than 10% of the population employed in that arena for many years to come. Not to mention that a spill in the Big Sandy Lake Watershed could affect people hundreds of miles downstream in the Mississippi River. An oil spill on a river is nearly impossible to fully contain or cleanup, and could travel quickly downstream, affecting not only fishing, but the communities that rely on the Mississippi River for clean drinking water. In addition to the impact of an oil spill downstream, oil can be transported upstream of a spill by returning fish contaminated as they swim through oiled waters. This can negatively affect eggs and spawning areas. Plus, toxins from the oil can mix with water and potentially pollute a larger area than the oil itself. The contaminants and toxins in the river water are likely to penetrate the ground, mixing with the ground water contained in aquafers. Oil can linger in the environment for many years before it breaks down, even after a cleanup.

With all this at stake, I urge you to consider alternate routes for the Enbridge Pipeline #3 that avoid our cleanest water resources, and crosses land that is less permeable. Can we afford the loss of water quality, fish quantity, and the overall health of our land and waters? Why should we knowingly endanger the fishing and hospitality industry here in McGregor, MN when other alternatives are available? The livelihood of our community is at stake. Your conscientious consideration is appreciated.

Sincerely,

Carol J. Jansen
McGregor, MN 55760
carol.jansen@gmail.com

Sources:

DataUSA: Aitkin County, MN
MN DNR News Release 2011
Explore MN: Tourism and MN's Economy
Friends of the Headwaters
West Coast Environmental Law: Enbridge Northern Gateway Pipeline (Proposed)
LakeLubbers.com

SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Pamela Janssen	218-785-2025	pjanssen@gvtel.com

ADDRESS
27997 320th St

CITY, STATE, ZIP
Shevlin, MN 56676

COMMENTS
I support Line 3

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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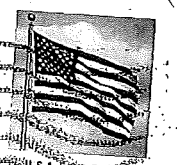

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Coty Jacques	218-393-7135	CotyJacques15@gmail.com

ADDRESS: 2322 W 10th st

CITY, STATE, ZIP: Duluth, MN 55806

COMMENTS

Replacing Line 3 is safer than keeping an old pipeline in the ground which could cause problems and also creates jobs for many people including myself and keeps me working to support my family. Approve Line 3!

DECLARE THE EIS ADEQUATE WITHIN 280 DA

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

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0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
COLLEEN JAVORINA	218-461-3622	colleen.javorina@unitedpiping.us

ADDRESS: 4510 AIRPORT RD

CITY, STATE, ZIP: DULUTH MN 55811

COMMENTS: PIPELINES ARE, WITHOUT QUESTION THE SAFEST WAY TO TRANSPORT OIL, PERIOD.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I think it's important to have a good pipe line system in America. No matter where it goes some one isn't going to be happy but we need the energy to keep our economy strong. The environmental crowd should be supporting a new pipe line to help prevent the problems the old one might have. Trains arn't as safe as pipe lines so every new pipe line is a good thing. Between the Indians and the environmental extremists its going to be hard for the U.S. to remain energy independent. Rember how the economy was hurt when gas was $4 + per gallon.

CN 14-916
PPL-15-137

RECEIVED
JUN 23 2017
MAILROOM

Brian Jemelka
Marine on St. Croix, MN
55047

0967

WEST

Brian F Jemelka
15290 Ostrum Trl N
Marine St. Crx, MN 55047-9602

St. Paul, MN 55164-0526

ST PAUL MN 551
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USA FOREVER

Jamie MacAlister
Environmental Review Manager
Mn. Dept. of Commerce
85th 7th place East, Suite 280
St. Paul, Mn 55101-2198

24945

55101$6013

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Glenn Jensen		
ADDRESS		
1039 Pennsylvania Av. N.		
CITY, STATE, ZIP		
Golden Valley, MN 55427		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Betsy Jensen <jensenbetsyr@gmail.com>
Sent: Friday, June 23, 2017 8:29 AM
To: MN_COMM_Pipeline Comments
Subject: Support for CN-14-916 and PPL-15-137

I would like to show my support for Enbridge Energy's proposed Line 3 Pipeline project.

As a volunteer EMT, I will do anything to reduce the amount of rail traffic. I have attended training on both pipeline and rail safety and would like to see fewer trains on the track.

As a farmer, I would like to reserve rail traffic for my crops. I cannot move my wheat and soybeans to export terminals via pipeline. I have no option other than rail. During the oil boom, the increased rail charges took money away from farmers, and give it to to the railroad.

Finally, I own land with an Enbridge pipeline, and have been very impressed by their care for our land. We always groan when we get notice that they are doing maintenance on our line. They do their best to make the the most of a bad situation.

Thanks,

--
Betsy Jensen
(218) 689-5375
@jensenbetsyr

Levi, Andrew (COMM)

From: Joel Jensen <JJensen@nhcc.edu>
Sent: Monday, July 10, 2017 12:18 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

I am opposed to Enbridge Energy's Line 3 oil pipeline. This project is dangerous to the climate, air and water, for reasons well established and understood. This project is not in the best interests of Minnesotans' health and environment. Further, the notion that Enbridge will monitor the pipeline, once abandoned, "indefinitely" is absurd. If the pipeline is constructed (and it should not be), there should be a clear plan for its removal.

Levi, Andrew (COMM)

From: Jennifer Jerulle <jerullej@yahoo.com>
Sent: Wednesday, June 21, 2017 12:11 PM
To: MN_COMM_Pipeline Comments
Subject: Enbrige Pipeline Comments

To whom it may concern:

I am writing to protest the new Enbridge pipeline if they do not remove the old pipeline. I understand a new pipeline will be more efficient and safe and that is fine with the proper oversight and local water testing. However, my concern is that the old pipeline will remain underground. That should absolutely not occur.

I also understand that removing the old pipeline will cost a lot and that expense should be on Enbridge. Their profits are such to fund the removal. The removal of the old pipeline is in the best interest of the public. Shareholders should understand....

Thank you for reading my comments and hopefully considering them as you move forward.

Jennifer Jerulle

Levi, Andrew (COMM)

From: Nancy Aronson Norr (MP) <nnorr@mnpower.com>
Sent: Monday, July 10, 2017 12:15 PM
To: MN_COMM_Pipeline Comments
Subject: Jobs For Minnesotans Official Comment on Line 3 DEIS docket numbers CN-14-916 and PPL-15-137
Attachments: J4MN Line 3 Comment to DOC_7 5 17_FINAL.pdf

This comment was also mailed to:

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Nancy Norr
Chairperson, Jobs For Minnesotans

JOBS FOR MINNESOTANS

jobsforminnesotans.org

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Harry Melander
Minnesota Building and Construction Trades Council

Doug Loon
Minnesota Chamber of Commerce

Jason George
International Union of Operating Engineers Local 49

Doug Connell
Barr Engineering Company

Brian Hanson
Area Partnership for Economic Expansion

Lory Fedo
Hibbing Area Chamber of Commerce

Dave Lislegard
City of Aurora and Lakehead Constructors

Russell Hess
Laborers District Council of Minnesota and North Dakota

David Ybarra II
Minnesota Pipe Trades Association

CO-FOUNDERS

David Olson
Minnesota Chamber of Commerce

Harry Melander
Minnesota Building and Construction Trades Council

July 5, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

Dear Ms. MacAlister:

On behalf of the coalition Jobs for Minnesotans, which represents business, labor and communities across the state, I'm submitting a formal comment on docket numbers CN-14-916 and PPL-15-137 related to Enbridge's proposed Line 3 Replacement Project. Our organization overwhelmingly supports the certificate of need and preferred route applications for this project.

The Line 3 Replacement Project is necessary to help ensure that Enbridge continues to meet the needs of refineries in Minnesota and the region. Replacing the line will restore capacity and reduce the need for maintenance, preserving the highest possible standards in safety and efficiency.

In our review of the Draft Environmental Impact Statement (DEIS), the no-build option does not have many impacts, but continuing to operate the existing Line 3 with all of its integrity issues comes with significant risk. If permits aren't granted to replace Line 3, the state of Minnesota will have failed to comply with a U.S. Federal Department of Justice Consent Decree, which includes directives to replace Line 3. Additionally, if the project doesn't move forward, more crude oil will be moved on rail and trucks due to reduced capacity on Line 3. This will cause more wear and tear on roads and negative impacts to industries trying to get product to market.

Fortunately, pipelines are the safest way to move crude oil, according to the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration. Enbridge is also a good steward of the environment with an excellent track record. The company employs industry leading leak detection programs and continually invests in technology development so that the company can improve leak detection thresholds in the future.

Enbridge is responsible for its pipelines, whether they are active or not. Neither landowners, nor the public will assume any financial liability for the deactivated Line 3. Once the replacement pipeline is operating, the existing Line 3 will be thoroughly cleaned, disconnected and deactivated – a standard procedure for the industry. The planned deactivation of the existing Line 3 is the best option for this project.

While our organization is confident the DEIS for the Line 3 Replacement Project is very thorough, one omission in the document is the tremendous local economic and jobs impact as a result of the project. According to a recent study by the University of Minnesota Duluth, the project will create 8,600 jobs over two years, 76 percent of which will be local.

The members of Jobs for Minnesotans believe the DEIS has been well-prepared and that the Department of Commerce should declare the DEIS adequate within 180 days. Enbridge conducted more than 1,200 meetings with local stakeholders over four years

JOBS FOR MINNESOTANS

jobsforminnesotans.org

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Russell Hess
Laborers District Council of Minnesota and North Dakota

David Ybarra II
Minnesota Pipe Trades Association

CO-FOUNDERS

David Olson
Minnesota Chamber of Commerce

Harry Melander
Minnesota Building and Construction Trades Council

and has spent thousands of hours studying the replacement route. The studies have been done and now it is time to advance this project without delay.

Sincerely,

Nancy Norr

Nancy Norr
Board Chair
Jobs for Minnesotans

Jobs for Minnesotans, a coalition representing business, labor and communities, supports statewide opportunities for prosperity and middle-class jobs from sustainable natural resource development in Minnesota. The organization is committed to the principle that our state can preserve both job opportunities and the environment for future generations. Jobs for Minnesotans was co-founded in 2012 by the Minnesota Building and Construction Trades Council representing 55,000 workers and the Minnesota Chamber of Commerce representing 2,300 companies and 500,000 employees.

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
John Grover	218-694-2637	jcgrover@gvtel.com
ADDRESS		
37861 161st Ave		
CITY, STATE, ZIP		
Bagley, MN 56621		

COMMENTS

We need to see this project completed. This pipeline is much needed & by far the safest way to transport oil.

I fully support this project

DECLARE THE EIS ADEQUATE WIT[illegible] DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Willis & Joyce Johnson

Street Address: 19449 270th St. NW

City: Viking State: MN Zip Code: 56760

Phone or Email: bjboysjhnson@wiktel.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

The pipeline has been good to us. They crossed about ½ mile of our land. The land is in CRP and away from any homes, Ed cept one whom has only one individual living there.

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Adam Johnson <user@votervoice.net>
Sent: Monday, June 26, 2017 9:55 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge pipeline

Dear Ms. MacAlister,

I totally support the new pipeline. First it's replacing an old worn out pipeline. It has been proven for decades it is better to replace something before it fails. Second, for the most part it is following the same route as the old line. Third, procedures and technology for installing the new line are way more advanced then when the old line was installed so the chance of an accident is far less. It is still by far the safest way to transport crude oil. Let this project continue without anymore delays.

Sincerely,

Adam Johnson
5895 Rose Rd
Duluth, MN 55811
irok_49@yahoo.com

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Karen S. Johnson	218-776-3454	Johnsonkst@gmail.com
ADDRESS		
50179 249th Ave		
CITY, STATE, ZIP		
Leonard, MN 56652		

COMMENTS

I support the L-3 project.
We all use crude oil in our daily needs. Safest Way -

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Todd A. Johnson	218-776-3454	~~[illegible]~~
ADDRESS		
30179 249th Ave		Johnsonkst@gmail.com
CITY, STATE, ZIP		
Leonard, Mn. 56652		

COMMENTS

I definitly support the Line 3 Replacement this is the SAFEST, economick way to move crude oil. we All use it And need it

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Tony Johnson	(218) 590-2838	TKJohnson61@Gmail.com

ADDRESS: 9336 E. Sthway 13

CITY, STATE, ZIP: South Range WI 54874

COMMENTS: it needs Replacing so For it

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

USA FOREVER 2016

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Brian W. Johnson	218-766-4645	
ADDRESS		
51254 249th Ave Leonard		
CITY, STATE, ZIP		
Minnesota 56652		

COMMENTS
this Line Replacement is Needed to Keep the Pumping of Oil Safe Underground.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Robert A. Johnson	218.694.6798	raj johnson@gvtel.com

ADDRESS
11248 398th St.

CITY, STATE, ZIP
Bagley Mn 56621

COMMENTS
We need This pipeline so it sounds like Replacing This is a good idea.

Thank you
Bob Johnson

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Brian Johnson <brian.johnson42@gmail.com>
Sent: Thursday, July 06, 2017 10:27 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I support LIne 3 replacement in Minnesota. Please move the project through the regulatory process without delay.

Sincerely,

Brian R. Johnson
2679 State Highway 175
Hallock, MN 56728
brian.johnson42@gmail.com

Levi, Andrew (COMM)

From: nanakay@unitelc.com
Sent: Friday, July 07, 2017 9:56 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3- RSA 53
Attachments: Line 3- RSA 53.rtf

Virus-free. www.avast.com

July 7, 2017

Jamie MacAlister, Environmental Review Manager

Minnesota Department of Commerce

85 7th Place East, Suite 280

St. Paul, MN 55101-2198

email address- Pipeline.Comments@state.mn.us

Dear MS. MacAlister:

I write to provide comment on Line 3 DEIS and wish to highlight route segment alternative (RSA-53). I believe this route segment is of high importance. It offers very significant options and opportunity with regard to the Line 3 decision.

The greatest benefit of RSA-53 is that it creates route options which would avoid a new corridor if there is a need established for a new Line 3 pipeline. Chapter 7 page 70 (7.3.24)of the DEIS indicates "RSA-53 is in St. Louis County. It is approximately 6.5 miles long and begins at MP 270.4 along RA-7." "The RSA -53 was proposed to connect RA-7 with RSA-21,allowing a connection between the northern route alternatives RA-06, RA-07 and RA-08 and the Applicants Preferred Route to avoid crossing the Fond du Lac Indian Reservation."

RSA-53, by creating a connection between RA-7 which is the current Line 3 trench and the Applicant's preferred Route east of Fond Du Lac provides enhancement of the possibility of replacing Line 3 in it's current trench. Replacing Line 3 with a new pipe in it's current trench provides many benefits to Minnesota's environment and protects our natural resources and water-based economy in Headwaters and Lake country from the peril a new pipeline corridor would create. MPCA and DNR have both expressed very significant concerns regarding a new corridor in MN Water environment proposed by the Enbridge. Replacing Line 3 in it's current trench also avoids the very significant problems which would be created by Line 3 Abandonment.

The solution offered by RSA -53 providing opportunity to replace Line 3 in it's current trench is subject to

the Applicant's desire to start a new corridor through the most valuable and pristine waters of the state for the purpose of enhancing it's profit goals. This is not acceptable! Minnesota must stand up and protect our resources in the face of the peril this new pipeline corridor would bring. Where Tribal Land is crossed by the current Line 3 corridor, tribal leaders have had enough of Enbridge and do not want more pipelines on their reservation. If Enbridge were to replace Line 3 in the current trench, they will need to GREATLY compensate the tribes and work with tribes on concerns. A benefit to the tribes would be the elimination of Line 3 abandonment issues.

I have great concern that Enbridge would re-activate a new pipeline in the current Line 3 trench in time and end up with two large pipelines going through our environment rather than one. During the legal negotiations with the US Government in settlement for the Kalamazoo spill, Enbridge was able to negotiate the possiblity of reinstating Line 3 in it's current trench at some point in time if current conditions were met, after they replaced Line 3 in it's new corridor. Certainly, Enbridge's negotiation in this regard exposed their possible intentions. This stipulation was only stopped due to intense public outcry in commenting on the resulting Consent Decree. But, what is to stop Enbridge from going back later in time with new decision makers and attempting again to re-instate a pipe in the current trench. Replacing the Line 3 in it's current trench and not approving a new corridor would eliminate this possiblity. This option provided by RSA-53 deserves much consideration!

Sincerely,

Deanna Johnson

15559 Explorer Circle

Park Rapids, MN 56470

Levi, Andrew (COMM)

From: nanakay@unitelc.com
Sent: Friday, July 07, 2017 3:02 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 DEIS comment
Attachments: Line 3 Comment.rtf

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July 7, 2017

Jamie MacAlister, Environmental Review Manager

Minnesota Department of Commerce

85 7th Place East, Suite 280

St. Paul, MN 55101-2198

email address: Pipeline.Comments@state.mn.us

Dear MS. MacAlister:

I write to provide comment on the Enbridge Line 3 Replacement DEIS. This proposed project is of potential great consequence to Minnesota's environment and to our citizens.

In part, the Appeals Court decision states, "In this case, the completion of an EIS at the CN stage satisfies the imperative identified by ensuring decision makers are fully informed regarding the environmental consequences of the pipeline, before determining whether there is a need for it." Does the information provided in the preparation of this DEIS support an unbiased, environmental assessment of the Proposed Project the PUC requires to make their decision or does the information primarily back up the ultimate goal of the company to obtain the CN and Route Permit for the Proposed Project?

After the Appeals Court decision to order an EIS for the Enbridge Project, it was hoped that a comprehensive and unbiased EIS would be produced. The discussion of the possibility of having the the DOC, MPCA and the DNR work as equal partners in the develpment of the EIS spoke to good intentions during the beginning discussions of how to proceed with the EIS. But, the DOC advocated to take the lead role with the MPCA and DNR being assisting agencies the DOC would direct. In the PUC Jan. 11, 2016 order, this is unfortunately the plan that emerged. The DOC stated it would enter into an agreement with the MPCA and DNR to ensure completion of an EIS that fulfils the legal requirements set forth in the Environmental Policy Act, but did that happen? After that point, the EIS process appeared to move forward with a document that would largely speak to Enbridge's stated goals for this project and often what I would consider deceptively speak to environmental concerns. Does the methodology follow CEA statutes rather than EIS Law? It appears so as I look at the document.

Chapter 13 of the DEIS is the list of preparers. It states that the DOC is the lead agency and the MPCA and DNR acted as assisting agencies throughout the process, but no information on the extent of assistance they were able to provide. On Feb. 12, 2016, The DOC (Lead Agency) in an Memorandum of

Understanding stated, "Lead Agency will enter into a separate arrangement with the project proposer to cover the cost of environmental review for proposed project. Costs assessed to project proposer shall include the costs necessary to reimburse the assisting agencies for all costs incurred by assisting agencies in accomplishing purpose of the MOU." Did the DOC ever follow through with this and if so, how much did Enbridge pay for assistance from the MPCA and DNR? Or, did Enbridge to the largest extent use Cardno's information in addition to information provided by Barr Engineering or other Enbridge affiliates in this process?

Chapter 13 goes on to state, "DOC-EERA supported by Cardno, INC in preparing EIS. Cardno's team included project management, a range of resource specialists, technical writers, and geographic information system analysts." So, Yes, the process was largely given over to Enbridge and Cardno to provide the the information for completion of this document. The role of the MPCA and DNR was left, I believe, intentionally vague. The document bears no resemblance to work the MPCA and DNR have completed on the pipeline cooridor in the past. The voice of our state's environmental guardians, the MPCA and DNR, is not evident in this document, instead replaced by Enbridge and Cardno, both corporations who would gain financially from this project. What percentage of this document did the MPCA and DNR work on and what percentage was done by Enbridge, Cardno and Enbridge affiliates?

The DEIS Executive Summary on page ES-3 under Question, " Who prepared the EIS", The Summary states, "The Commission has ordered an EIS for the CN and route permit applications to be prepared by the MN DOC-EERA in consultation with Commission's Executive Secretary and with assistance of MN DNR and MNPCA." There is no mention here of Cardno in preparing the EIS. A citizen relying on the Executive Summary for information would be left with the impression the EIS was prepared by the aforementioned state staff. They would not be informed of Cardno's influence in this process. I believe this is deceptive.

Cardno is a company that assists in remediation after oil spills. The New York Times, Oct. 7, 2011, article, "Pipeline Review Faced with Questions of Conflict", by Elizabeth Rosenthal and Dan Frosch, reports that Cardno had a relationship with Enbridge in the Kalamazoo clean up. The article quotes Oliver. A. Houck, a law professor at Tulane University and an expert on NEPA as saying, "Cardno Entrix should never have been selected on the Keystone XL because of its relationship with TransCanada and the potential to garner more work involving the pipeline. The company provides a wide range of services assisting in oil spill response. Cardno Entrix had a "financial interest" in the outcome of the project. " Mr. Houck added, "Their primary loyalty is getting this project through, in a way the client wants." The article reports that the impact report completed by Cardno for the Keystone XL project indicated that, " response to a spill from the proposed pipeline would not require unique cleanup procedures." We know from the National Academy of Science Dilbit Study that tar sands clean up is unique and much more difficult, especially in water environment. The New York Times article reports that the Enbridge Kalamazoo spill was only mentioned briefly in the addendums, and, Cardno Entrix would have been aware of the challenges in Michigan; it was hired by Enbridge to assess the damage to natural resources caused by the spill." So, why would Cardno have a buy in to produce the best product in a comprehensive and honest EIS for Line 3, when they could turn around and cash in if there were an oil spill here? Afterall, they have experience working with Enbridge on the Kalamazoo spill remediation.

Barr Engineering worked with Enbridge on the original corridor plan for the Sandpiper route, which is now planned to be used by Line 3? We know Barr was involved in the analysis. In an article by MPR News, "Critics Object to Pumping Oil Through Minnesota Lake Country" by Dan Kraker, Enbridge project Director, Paul Eberth, states, "The company worked hard to avoid lakes in designing the pipeline route. According to an analysis conducted by Barr Engineering, only 3% of the lakes in the watersheds that we cross have a hydrological connection to the pipeline." With regard to Barr Engineering, should we trust their input for environmental analysis of the Sandpiper corridor which will be the same corridor used for Line 3. Barr's website states, "Barr has worked with Enbridge and other Enbridge affiliates on nearly 300 projects, assisting with mainline expansion efforts as well as general operations. Our work with Enbridge ranges from environmental compliance assistance to project engineering support, from wetland mitigation and restoration to site assessment and remediation." On Barr's web site, there is a quote from Kristen Benson, Sr. Environmental Analyst, Enbridge Energy Partners, " If I get notice of an incident, I contact Barr directly and often they beat me to the site. Leak sites can be out in the middle of nowhere, but they will go out ...and fill in where needed. They are dedicated to our company." So we know from this quote that Barr is dedicated to Enbridge, but what does that mean for their trustworthiness in assessing the environmental concerns this route would mean to our pristine environment? We also know from this quote Enbridge calls on them to deal with spills and the quote refers to their work in the middle of nowhere with a picture on the page of this quote of an area that looks like the Mississippi River near the Headwaters, where they want to lay this pipe. So, Barr, who was heavily involved in the original corridor design, would likely be able to gain finanically if there were a spill.

There is plenty of evidence in the DEIS, that suggests in my opinion that the document sways in favor of the Project Proposers goals, by leaving out information, and providing evaluations that do not appear to be unbiased including these examples and I have emphasized Itasca State Park:

1) Most of the information on the technical report regarding accidental releases are non-public. "Worse case spills" volumes are protected information in the DEIS. There is also no third party analysis. Citizen's have been told the effects of leaks, spills and yes - catastrophic spills are none of our business. Yet, the ramifications of such incidents would be devastating to our water resources and our economy. It is not compliant with MEPA Law to deny citizen imput on this most important topic. I could not find an economic cost analysis of an oil spill. Is there one?

There is potential for conflict of interest in the spill analysis. Contractors were hired by Enbridge. Stantic completed the 7 site spill analysis for the DEIS. Benign locations were used. They used, "representative" release locations in their assessment to serve as proxy for other similar sites, without actually specifically evaluating other locations along the preferred route or alternative routes. Citizens are then expected to use a table to look for an example to represent a particular water body they are concerned about. How can this assessment be considered to be valid and how can a citizen be expected to use the information and comment on it? Stantec has a very significant work history and involvment with Enbridge. Stantec is involved in the Enbridge Alabasca Project, The Enbridge Energy Southern Access Pipeline and a Stantec Website sites it's relationship with Enbridge. On the website under "View our Work- Enbridge Integrity Team", the website indicates that around 2012, Cimarron

Engineering was acquired by Stantec, so with the addition of Edmonton offices and new skill sets in the Stantec Integrity Team, the program support role was created and Stantec resources became more embedded within the Enbridge team structure.

Now, in Enbridge's Revision Requests for the DEIS, they wish to go farther in this denial of citizen's rights for concerns regarding spills. In Enbridge's revision request, Chapter 10-1-8,, they ask that the DEIS eliminate the term, "catastrophic" to describe spills. In the revision request they state, "catastrophic is not a description of relative volume, but rather imports an emotional component. A descriptor more closely tied to volume, such as "very large" should be used in place of catastrophic." In terms of what a major rupture or a spill such as happened at Kalamazoo, in our Headwaters, our pristine lake country or our wild rice lakes and streams, the term "very large" does not aptly describe such an event and Enbridge hopes to by using this term to delegitimize public sentiment with regard to our intrinsic and valuable resources. But, at the same time, they are keeping accidental release information non-public, so the public has no information on actual volume for such spills.

2) There is very scant information in the document regarding Itasca State Park. Why was our state's crown jewel state park given little attention in the discussion? In the DEIS, the Natural Resource and Water Summary Tables and Figures indicate the Proposed Project centerline would cross Mississippi River three times, twice in the area of the Headwaters and LaSalle Creek would be crossed by the centerline one time. Line 3 would be laid at the east boundary of Itasca. Itasca receives over a half million tourists per year and is a site of international importance, with visitors from all over the country and the globe visiting our park. It is also of great significance to Minnesotans. The pipeline crossing the Mississippi two times in the Headwaters area and LaSalle one time, puts the park in peril and a spill in the Headwaters would be **catastrophic**! But, Enbridge wishes to proceed with the plan for this pipeline by pretending Itasca State Park almost doesn't exist.

3) The Mississippi River at the Headwaters where the pipeline would cross was listed as impaired waters in the document. This is found on Table G-2, page 21. Impairment would be due to naturally occuring oxygen levels caused by marsh and wetlands in the area . " Our Upper Mississippi River Monitoring and Assessment Study" by the MPCA in January 2017, "found the Mississippi Headwaters to be a largely healthy river in it's northern reaches and that the river is in great shape and the study states the Headwaters are an exceptional resource that should be protected." Is this assessment of the river included in the DEIS?

3) There is no evaluation of the Upper Mississippi Watershed in the DEIS, despite the fact that this is a high consequence area due to it's pristine nature, inaccessibility if there are oil releases, and very high volume of tourism due to Itasca State Park, .

4) There is no mention of Itasca State Park as being a Historic Resource. Though the pipeline borders Itasca State Park, Minnesota's Oldest Park established in 1891, and crosses the Mississippi two times in the Headwaters area and crosses at LaSalle which is home to the prehistoric site of early Native American Elk Lake Culture, this information is not brought out in the DEIS. Itasca was established to preserve the Headwaters of the Mississippi River. The entire park and an individual archaelogical site are

on the National Register of Historic Places. Itasca was designated a National Natural Landmark by the National Park Service under the Historic Sites Act. This program recognizes and encourages the conservation of outstanding examples of the natural history of the United States.

Again, we see in Enbridge's revision request minimization of the value of the Headwaters area. The original text of the DEIS Chapter 5 page 585 reads in part, "Surveys were not completed for historic resources in Minnesota." I ask, "Why not?" Enbridge enlarges on this issue in it's revision suggestion. It reads, "Enbridge recently completed historic structures surveys and will submit the final to the DOC when complete. Revise the statement to clarify that historic structures surveys have been completed and results and recommendations are forthcoming." So here Enbridge is conveniently only referring to structures and not mentioning natural sites which are of historic significance. The entire park (Itasca) and an archaelogical site are on the National Register of Historic Places, not limited to buildings, but the site of the park itself is of historic significance. And, the designation of Itasca as a National Natural Landmark is ignored. Enbridge is ignoring Minnesota's natural heritage and instead only focusing on buildings which the pipeline would not pose threats to as it does to the natural environment.

The DEIS document states that there would be negligible impacts on historic resources. I feel this is a cavalier attitude toward these treasured important historical sites.

5) There is what I consider offensive testimony in the docket offered by Jeffrey Lee, Barr Engineering Company on Wild Rice. The testimony speaks of it as if it were a crop which could be replanted and sites could be restored after a spill, by removing sediment from a spill site, then adding lake sediment and reseeding. The National Academy of Science's Dilbit Study would surely discuss the great difficulty of accomplishing what Mr. Lee proposes. We know that wild rice is a gift from the creator which cannot be destroyed by tar- sands contamination, and then restored and made whole again by man-made efforts.

It is deceptive in my opinion to promote this project as a replacement. It is a new pipeline which will have the capacity to more than double barrels per day currently carried by Line 3 from 390,00 bpd to a design capacity of 844,00 bpd and they are upgrading their request to 990,000 bpd which substantially more than doubles their current capacity in Line 3. Enbridge states in chapter 2.2 the project would meet demand for refining industry in eastern Canada, the gulf coast and the midwest. How much of this oil they ask for a certificate need for, is going to refineries that will ship to other countries?

As Enbridge would gain capacity from a Line 3 Replacement, they also gained capacity from Line 6. So, was the Kalamazoo spill actually and great net gain for Enbridge? The Kalamazoo Oil spill which was a devastating environmental catastrophy actually in the end allowed Enbridge to argue for a brand new replacement pipeline in that state. Same as with Line 3, they were able to replace with a new pipe which gives them increased capacity. After the Kalamazoo spill, Enbridge was able to argue for a new pipeline which they stated would be safer, but being a larger diameter pipeline it greatly added to Line 6 capacity. Capacity was increased from 240,000 bpd to 570,000 bpd, which more than doubled the capacity of Line 6. Even considering the cost of the clean up, the cost of Consent Decree agreement, with a pipeline of such increased capacity, I would like to know just how long it took for Enbridge to

actually come out ahead and actually gain financially after the spill with the new Line 6 infrastructure.

At the heart project and the DEIS lies a false choice which cancels, in my opinion, real choices for this route which would provide safer and more reasonable alternatives and an honest assessment of need. The fact that the company is able to demand the start and end points of it's proposed route, from Clearbrook to Superior, is wholly unfair and allows the company to demand what is best for profit margin rather than what is best for Minnesota's Natural Heritage and our long term economic well-being. From this ability for the company to demand it's start and end points, flow a process that is inherently flawed and which has not been corrected in this DEIS.

In their August 21, 2014, comments on the Sandpiper, which was the same corridor as Line 3, the MPCA evaluation of the Enbridge Preferred Route and the system alternative routes concluded the Enbridge Preferred Route scored the worse in categories affecting the environment compared to system alternative routes. The MPCA evaluation of the routes concluded the companies Preferred Route would have the greatest potential impact in the following categories; pristine areas of the state, areas in the state with the best water quality, greater risk to state forests, state parks, and WMAs, stands of wild rice, economics dependent on water quality, and of all the routes appears to cover the most linear miles of susceptible ground water, and a much higher density of surface water encroachment. The MPCA's evaluation stated, "Environmental and natural resources protection and the prevention of impacts tend to be less costly and more effective than restoration, therefore, scoring in this instance is based on preventing impacts to high quality areas.

In the evaluation the MPCA stated, "MPCA believes cumulative effects associated with high risk crude oil routes can be reduced or avoided if future terminal facilities were constructed at a location west of Clearbrook with possible benefits to reducing potential impact to our states valuable resources. "

On August 21, 2014 the DNR also commented on the Projects proposted route in the letter to the MN PUC. The letter states, "The Preferred Route for the Sandpiper Project is proposed in a region of the state that contains a concentration of important lakes for fisheries, trout streams, sensitive aquifers, public conservation lands, and mineral and forestry resources. The DNR is also concerned about "greenfield" routing along areas without previous disturbance." The letter expresses concern that the route could become a new corridor for multiple pipelines. The letter states, "The DNR encourages the PUC to strongly consider analysis of one or more system alternatives having fewer environmental and natural resource impacts than the Preferred Route."

Table 12.2-1 - "Reasonably Forseeable Actions Considered in Analysis" states under item 9, " If a new pipeline is permitted for this project outside of the existing Enbridge Mainline, the new corridor creates an opportunity for future corridor sharing that could ultimately result in accummulation of multiple pipelines within the corridor chosen for the Line 3 Replacment Project. This analysis considers the future addition of another pipeline to a new pipeline corridor. As noted above in highlighted comments, both the MPCA and DNR had very serious concerns with regard to this issue of cummulative effects of multiple pipelines in the watery Preferred Route chosen by Enbridge and requested a safer route.

This DEIS supports Enbridge being allowed to insist on it's Preferred Route start and end points and

does not even consider moving the Clearbrook connection upstream to the west to a safer location for our environment to Crookston, makes prominant it's stated project goals, therefore elevating it's profit margin as the most important consideration, while, very seriously jeopardizing Minnesota's environment and the economic livelihood of citizens dependent on our clean water economy.

Right now we see the western US burning up in excessive heat and pending severe water shortages in the west. Why would this particular company's profit margin eclipse the protection of our precious water resources in this state? The company is bent on delivering huge supplies of oil to Superior, Wisconsin. We should all be **alarmed** at the possibilty that next they will want to ship oil in the Great Lakes which holds 21% of the worlds fresh water. Lake Superior is the largest fresh water lake in the world. Minnesota Sea Grant site indicates that Lake Superior holds 10% of the worlds fresh water that is not frozen, it holds 3 quadrillion gallons of water, water retention time is 191 years, is remarkable clean and cold and underwater visibility is superb, sometimes exceeding 75 feet. It is profoundly beyond my imagination that we would put this invaluable, life sustaining resource as risk of being exploited and contaminated by encouraging oil pipelines to continue to route to the shores of Lake Superior!

I find the DEIS discussion of oil demands in the US to be lacking of honesty and devoid of important consideration of other pipeline alternatives ability to meet supply. Who made the decision to frame the discussion in this way?

In chapter 4. (4.2.4) In discussing Certificate of Need, the DEIS states, "Other existing and potential future pipelines were considered as alternatives to the project , 1) if they interconnected in the crude oil supply region near Edmonton, Alberta, and 2) served the same Clearbrook and Superior destinations. The EIS is not evaluating these alternatives based on whether they meet the need for the project." As I look at the document, the DEIS document appears to go so far as to discount the proposed Keystone and the TransCanada Energy East pipelines, which are projects by other companies, as not being relavant for evaluation of meeting US oil demands because they do not interconnect with Clearbrook and Superior. These companies are operating away from the proposed Line 3 route, but with the same desired endpoints as Enbridge's system. Maps of the Keystone system indicates the system when complete would provide lines from Hardisty, Alberta to Cushing to Port Arthur and Houston, Texas and there is an existing branch to Patoka. A completed Trans Canada Energy East Pipeline would connect Hardisty, Alberta to Monreal and from there to St. John, N.B. If Line 3 were approved, the increased oil capacity in the line would provide transport options to Line 5 in Michigan and Line 6 in Wisconsin to Montreal , Petoka and on to Cushing. It is easy to clearly see that the Keystone and Energy East routes not being the same as Enbridge's Line 3 with respect to connecting between Clearbrook and Superior should have anything to do with available oil supply or crude oil need for this nation.

Chapter 1.4, of the DEIS, "Result of denial adversly affects future adequacy of oil supply." Why then does the DEIS not evaluate the potential of Keystone and Energy East pipeline as they would affect oil supply? We saw with Sandpiper, the Dakota Access pipeline changed the demand and need for the Sandpiper. The possible implementation of the Keystone XL or the Energy East pipelines should be considered as to affect on demand and need for Line 3. Europe and other nations are moving away from fossil fuels and moving toward clean energy, along with investors around the globe considering

divestment from fossil fuels. It should be stongly considered as to how much capacity is really needed out of the Alberta Tar Sands.

When it comes to analysis of SA-04, comparative data is compiled in the DEIS which not only includes miles crossed in Minnesota, but inclues all the other state's miles that SA-04 would go through, thus when compared to the applicant's route, SA-04 environmental impacts will be greatly unfairly scewed to the applicant's route's favor. Oil from the applicant's Preferred Route will also be impacting other states as it goes beyond Superior and this is not considered in the DEIS as is the SA-04 route. 2.8.1 in the DEIS describes the project this way, " Crude oil from Hardisty terminal in Alberta, Canada would be transported in the Line 3 Replacement pipeline to Clearbrook and Superior terminals. From these locations, oil would be distributed into existing pipelines, for delivery from Clearbrook terminal to Minnesota refineries and from Superior terminals to refineries in the Midwest, the Gulf of Mexico and eastern Canada." The refinery in Superior processes 45,000 bpd leaving the majority of the oil in Line 3 to move beyond Superior. From Superior, with the Line 3 Replacement, Enbridge will have the ability to increase volume to Line 5, which goes under the Straits of Mackinaw and thus adding more danger to 21% of the world's fresh water than Enbridge is currently responsible for maintaining a pipeline in that fragile site. Enbridge will also be able to transfer additional oil from Superior that will cross the St. Croix River, endangering that water source and water resources beyond in Wisconsin. It is unfair not to evaluate these very serious and significant threats as oil leaves our state, as they do evaluate effects after SA-04 leaves the state.

When we think of entrusting Enbridge with our precious pristine waters, think of this. In the evaluation of the safety of Line 5 going under the Strait of Makenaw, the State of Michigan, found that there was a person conducting the evaluation who was also working for Enbridge at the same time. The State of Minnesota cannot accept an EIS that is brought forth by the hand of Enbridge and it's affiliates. We need an unbiased EIS completed by an entity who cannot gain financially by the placement of this pipeline.

I attended the Line 3 informational public meeting in Bemidji on June 22, 2017. There I saw unmasked a glaring example of the company's attitude toward our precious natural resources. John Swanson, Vice President U.S. Major Projects Execution, spokesperson for Enbridge frequently promotes the company line as he did in a commentary in the Park Rapids Enterprise before the April and May public meetings. In the commentary he stated, "Protecting the environment is important to all of us, and numerous factors went into develping a route that balanced sensitive environmental considerations." But, at the public meeting in Bemidji on June 22, 2017, in his testimony he said that in regards to the Kalamazoo Spill, the environment of the spill site was better after they cleaned it up than it was before the spill happened. This was an ignorant statement made in front of a people who treasure our resources and many native americans there to speak for protection the Mississippi Headwaters. The statement exposes an attitude of no respect and understanding of "natural resources" and really a hostile dismissive attitude toward creation and the natural world. Does he believe that here too, if there is a massive spill in the Mississippi Headwaters, our pristine lake country or our wild rice lakes and streams , the company could just dig it all out and it could be better than before?

In her book, Nature's Trust, Mary Christina Wood states, "Humanity cannot hope for a livable planet if government agencies continue to license industries to pollute and destroy the remaining natural resource."

Thank you for this opportunity to comment.

Sincerely,

Deanna Johnson

15559 Explorer Circle

Park Rapids, MN 56470

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Diane Johnson	218-766-8989	dianekjohnson.61@gmail.com

ADDRESS: 6190 Birchmont Dr. NE

CITY, STATE, ZIP: Bemidji MN 56601

COMMENTS
The job opportunities it will create is important and I believe this is the best way to transport oil & the safest

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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I SUPPORT THE LINE 3 REPLACEMENT PROJECT

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Kevin Johnson		
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CITY, STATE, ZIP: Bemidji Mn 56601		

COMMENTS

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I SUPPORT THE LINE 3 REPLACEMENT PROJECT

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Mary Johnson		
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COMMENTS

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Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Environmental Review Manager
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COMMENTS

I'm in full support of the line 3 replacement

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: nanakay@unitelc.com
Sent: Monday, July 10, 2017 12:50 PM
To: MN_COMM_Pipeline Comments
Subject: Comment on Line 3 Project (CN-14-916 and PPL-15-137)
Attachments: Line 3- RSA 53.rtf

Virus-free. www.avast.com

I am resubmitting this comment that I sent on Friday July 7, since I forgot to include docket number.

July 7, 2017

Jamie MacAlister, Environmental Review Manager

Minnesota Department of Commerce

85 7th Place East, Suite 280

St. Paul, MN 55101-2198

email address- Pipeline.Comments@state.mn.us

RE: Public Comment on Line 3 Project (CN-14-916 and PPL- 15-137)

Dear MS. MacAlister:

I write to provide comment on Line 3 DEIS and wish to highlight route segment alternative (RSA-53). I believe this route segment is of high importance. It offers very significant options and opportunity with regard to the Line 3 decision.

The greatest benefit of RSA-53 is that it creates route options which would avoid a new corridor if there is a need established for a new Line 3 pipeline. Chapter 7 page 70 (7.3.24)of the DEIS indicates "RSA-53 is in St. Louis County. It is approximately 6.5 miles long and begins at MP 270.4 along RA-7." "The RSA -53 was proposed to connect RA-7 with RSA-21,allowing a connection between the northern route alternatives RA-06, RA-07 and RA-08 and the Applicants Preferred Route to avoid crossing the Fond du Lac Indian Reservation."

RSA-53, by creating a connection between RA-7 which is the current Line 3 trench and the Applicant's preferred Route east of Fond Du Lac provides enhancement of the possibility of replacing Line 3 in it's current trench. Replacing Line 3 with a new pipe in it's current trench provides many benefits to Minnesota's environment and protects our natural resources and water-based economy in Headwaters and Lake country from the peril a new pipeline corridor would create. MPCA and DNR have both expressed very significant concerns regarding a new corridor in MN Water environment proposed by the Enbridge. Replacing Line 3 in it's current trench also avoids the very significant problems which would

be created by Line 3 Abandonment.

The solution offered by RSA -53 providing opportunity to replace Line 3 in it's current trench is subject to the Applicant's desire to start a new corridor through the most valuable and pristine waters of the state for the purpose of enhancing it's profit goals. This is not acceptable! Minnesota must stand up and protect our resources in the face of the peril this new pipeline corridor would bring. Where Tribal Land is crossed by the current Line 3 corridor, tribal leaders have had enough of Enbridge and do not want more pipelines on their reservation. If Enbridge were to replace Line 3 in the current trench, they will need to GREATLY compensate the tribes and work with tribes on concerns. A benefit to the tribes would be the elimination of Line 3 abandonment issues.

I have great concern that Enbridge would re-activate a new pipeline in the current Line 3 trench in time and end up with two large pipelines going through our environment rather than one. During the legal negotiations with the US Government in settlement for the Kalamazoo spill, Enbridge was able to negotiate the possiblity of reinstating Line 3 in it's current trench at some point in time if current conditions were met, after they replaced Line 3 in it's new corridor. Certainly, Enbridge's negotiation in this regard exposed their possible intentions. This stipulation was only stopped due to intense public outcry in commenting on the resulting Consent Decree. But, what is to stop Enbridge from going back later in time with new decision makers and attempting again to re-instate a pipe in the current trench. Replacing the Line 3 in it's current trench and not approving a new corridor would eliminate this possiblity. This option provided by RSA-53 deserves much consideration!

Sincerely,

Deanna Johnson

15559 Explorer Circle

Park Rapids, MN 56470

Levi, Andrew (COMM)

From: Hilary Johnson <hilarygjohnson@gmail.com>
Sent: Monday, July 10, 2017 7:49 PM
To: MN_COMM_Pipeline Comments
Subject: Comment on Line 3 DEIS in Dockets CN-14-916 & PPL-15-137

Greetings,

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I live in Minneapolis, grew up in Duluth, and my father owns land along the proposed Line 3.

I am concerned about Line 3 because Enbridge proposes to "compensate" my father for taking potentially up to half his land (with the 750-foot route width they want) with a pittance, a mere gesture at compensation. Even if they don't take half, it will still make a major impact on his property, both with tree-cutting, and the potential for a disastrous, or even a minor, spill. Moving to this land has made him the happiest I've ever known him - he loves the place with all his heart. Line 3 would break my father's heart, and quite possibly his health.

But even if I didn't have family living on the proposed line, I would be concerned about it. The DEIS itself acknowledges that Line 3 would contribute to climate change - the Executive Summary states that its direct and indirect emissions would be 453,000 tons of CO2 per year, with its lifecycle emissions adding up to 193 *million* tons of CO2 per year. We can't afford that. And Line 3 proposes to move oil that there isn't even a demand for - oil demand is *decreasing.* So not only can we not afford Line 3's impact on climate change, there's not even an economic reason for it - other than Enbridge's own enrichment.

Speaking of the economy, the DEIS records (Chapter 5.3.4) that Enbridge will not hire new staff to operate the pipeline, meaning that no permanent jobs will be created. In the very words of the DEIS, the pipeline will have "no measurable impact on local employment, per capita household income, median household income, or unemployment." But this statement fails to acknowledge that when the existing Line 3 shuts down, Enbridge will stop paying taxes to certain MN counties. Losing that tax base *will* have an economic impact, and it won't be a good one. In addition, the new Line 3 will reduce property values along its route, including my father's. In other words, Enbridge's proposal is an all-around economic loser.

Finally, the DEIS acknowledges some tribal impacts, but sets these aside as a separate issue, even though, in its own words, the DEIS recognizes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5). Then why are these impacts not treated as substantive and with equal weight to the other impacts? Given the history of colonialism and injustice in our country, it is unconscionable to consider approving this permit when the DEIS clearly acknowledges severe impacts on tribal people and tribal resources. It matters to me, as a white Minnesotan, that my state make decisions with a reparations lens. If Native people are saying this project is wrong, dangerous, and unjust, then we have to listen to them. And in a sense, even the DEIS is tacitly saying this same thing.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground. We need climate justice, not more of the same short-term-thinking that got us into this climate change mess in the first place. And there are options out there for climate justice. We are not stuck with Enbridge and dirty oil. It just takes everyday people like us, and employees of the DOC, making different choices.

Thank you,

Hilary Johnson
3101 E. 31st St., #3
Minneapolis, MN 55406

Levi, Andrew (COMM)

From: Kendra Johnson <kendralyse@hotmail.com>
Sent: Monday, July 10, 2017 3:31 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 support

Dear Ms. MacAlister,

As a farmer in Kittson County Red River Valley I support the Line 3. It helps bring business into our communities and brings in potential jobs for our neighbors & friends. The pipeline goes through neighbors property and some of the land we rent and farm and we have always had good experiences with Enbridge.

Sincerely,

Kendra Johnson
320 S Forest Ave
Hallock, MN 56728
kendralyse@hotmail.com

Levi, Andrew (COMM)

From: mylaurenisfaraway@gmail.com on behalf of Lauren Johnson <lauren.elisabeth.johnson@gmail.com>
Sent: Monday, July 10, 2017 10:16 AM
To: MN_COMM_Pipeline Comments
Subject: Public Comment, Docket CN-14-916 and PPL-15-137

Docket Number
CN-14-916
PPL-15-137

The need for this pipeline has not been adequately demonstrated.
The old line should be completely cleaned up and removed. Leaving the old line in the ground and starting new Line 3 construction is irresponsible at best.

I urge that line 3 construction be denied. It is a serious threat to the waters and lands of northern Minnesota, and it is a direct threat to Ojibwe ancestral lands.

We cannot allow dangerous new pipeline construction when there are clean and safe energy alternatives that would provide lasting jobs here.

The benefits to Minnesotans from Line 3 are minimal tax increases and only temporary jobs, which are not at all worth the ongoing risks and costs associated with cleanup of spills. It is the responsibility of this state to serve the interest and health of our citizens, our land, and our water over corporate interests by denying Enbridge Line 3.

Lauren Johnson
lauren.elisabeth.johnson@gmail.com
Minneapolis, MN 55405

Levi, Andrew (COMM)

From: Leonard Johnson <leonardjohnson.duluth@gmail.com>
Sent: Monday, July 10, 2017 10:51 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

As a lifelong Minnesota resident, I fully support the efforts to build Enbridge's Line 3 Replacement Project and ask that you approve the project's Draft Environmental Impact Statement (DEIS).

The efforts by Enbridge and its project team (including environmental experts and engineers), are intentional and thoughtful in regards to the pipeline's design, it's safe operation and protection of the environmental for which it will operate..

I personally know of the talented people who work for Enbridge, they are people who love the outdoors of Minnesota and are professionals working hard to build a state of the art pipeline system. Building extensive safeguards into the pipeline's design and with environmental considerations thought out throughout the pipeline's determined route. Many of the people, who work for Enbridge directly or indirectly, either live in Minnesota, such as me and my family; or live nearby in neighboring Wisconsin. We all enjoy Minnesota's vast lands and waterways for personal recreation; and I know through their work on this project, will keep it safe for future generations, their kids and grandkids to enjoy.

This Line 3 Replacement Project will bring vast economic benefits to the citizens of Minnesota and the counties it crosses for years to come. It will deliver liquids safely and efficiently to the consumers of Minnesota, either as a fuel, or later as a bi-product (such as siding, clothing, cosmetics, and other consumables) in demand by consumers across Minnesota. The project will create a great economic boom across the state, and provide jobs for both professionals and highly skilled labor required to build this major project. I personally experienced a time of layoff in October of 2016 until March of 2017 directly related to the Public Utility Commission's delays in approving the Sandpiper Project. Instead of providing revenue to Minnesota counties for years to come, the delays in the Sandpiper project caused its cancellation and the state lost jobs and lost an opportunity for a period of economic boom to the state over 1-2 years of pipeline construction. The decisions by the PUC, put people on unemployment and assistance programs, costing tax payers money rather than seeing a commercial increase in tax revenue.

Millions of dollars have been spent on Environmental studies along the route of this project by the applicant, Enbridge to select the best and safest route. Enbridge cares about the environment and supports the communities in which it operates.

Representatives of Minnesota tax payers (Department of Commerce and Public Utilities Commission), please approve Line 3 Replacement Project's Draft Environmental Impact Statement (DEIS) and move this great Minnesota Project forward.

A Minnesota Citizen and Taxpayer.

Sincerely,

Leonard Johnson
127 S 61st Ave W
Duluth, MN 55807
leonardjohnson.duluth@gmail.com

Levi, Andrew (COMM)

From: Bryn Johnston <bjohnston@gausman.com>
Sent: Thursday, July 06, 2017 11:18 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Public Comment

Dear Committee,

I wholeheartedly support Enbridge's Line 3 Replacement project. This project appears to reduce the likelihood of a spill as it is replacing a line that is nearing the end of its lifespan. It only makes sense for the public and environmental health and safety.

Economically speaking, the Duluth and Northern Minnesota region has been hit hard by the downturn in both mining and oil & gas- two of our largest economic drivers. This project would be a welcome boost for those struggling to find stable employment.

Thanks for your consideration.

Gausman & Moore
Bryn Johnston
Mechanical Engineering | 218-302-6577
www.gausman.com | www.twitter.com/gausmanmoore

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Chris Johnston		
ADDRESS: 111 W 2nd Ave		
CITY, STATE, ZIP: Floodwood MN 55736		

COMMENTS It's my livelyhood and job to keep me working.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Bill Jokela <bill.jokela@gmail.com>
Sent: Monday, July 10, 2017 10:40 PM
To: MN_COMM_Pipeline Comments
Cc: bill.jokela@gmail.com
Subject: Enbridge pipeline feedback

Environmental Review Manager
MN Department of Commerce
Docket Numbers CN-14-916 and PPL-15-137

I am a Minnesota resident writing to express my opposition to Enbridge's plan to build a new, larger pipeline in northern Minnesota. Their preferred route would pass through an area with many lakes, rivers, and wild rice waters, including parts of the White Earth Indian Reservation and other land valued by tribal members for wild rice and fishing.
Enbridge has a history of pipeline spills, some of them quite large, and a spill in this area of Minnesota would be devastating.

While alternative routes may be less problematic for this sensitive area of Minnesota, they would all be responsible for doubling the flow of oil from the tar sands of Alberta, an oil source that contributes significantly more to greenhouse gases than other sources. This is a time to be shifting to renewable energy sources, rather than increasing that from one of the most environmentally damaging sources. Furthermore, much of the oil would pass through Minnesota and other states for eventual export; so we in Minnesota and other parts of the U.S. would bear the environmental risk, but receive little or no benefit.

Thank you for considering my comments.

William Jokela
Northfield, MN

Levi, Andrew (COMM)

From: cary jones <user@votervoice.net>
Sent: Wednesday, June 21, 2017 8:06 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I support the line 3 pipeline.

Sincerely,

cary jones
PO Box 621
Moose Lake, MN 55767
hooofprint@yahoo.com

Levi, Andrew (COMM)

From: J Jordahl <jdjord@gmail.com>
Sent: Monday, July 10, 2017 9:44 PM
To: MN_COMM_Pipeline Comments
Subject: adding my voice opposing Enbridge pipeline, line 3

I grew up in Minnesota and have spent most of my life there enjoying the wealth of waters encompassed by Minnesota's boundaries. As I have learned more about this proposed pipeline (one of the largest on the continent) and how many waters it will threaten, I can only encourage our MN legislators to protect our waters by voting no to a pipeline that will cross numerous waters built by a company that has one of the worst track records regarding oil spills.

Consider our children, grandchildren and greats on down the line. We owe it to them to protect waters so vital to their futures.

This legislation is encompassed by CN-14-916 and PPL-15-137
Thank you,
Jill Jordahl currently enjoying the Namakagon and St. Croix River from the WI side.

Line 3 Replacement Project DEIS

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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
KEVIN M. JUBEK	218-590-3572	7/2/17
ADDRESS		
2212 14TH ST.		
CITY, STATE, ZIP		
CLOQUET, MN 55720		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: ginger juel <gjuel10@gmail.com>
Sent: Sunday, June 25, 2017 9:05 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement

Dear Ms. MacAlister,

Please have Enbridge immediately stop pumping oil through line 3 and hire locals to remove the aging line 3. I witnessed its corrosion on Fond Du Lac land where the natives collect sap from the trees to make maple syrup.

OPEC has recorded continuous low sales for oil because there is too much of it extracted.

Fossil fuels are not necessary for the future of our energy creation. wind and solar power are and will continue to outpace fossil fuels in regards to energy production.

enbridge is responsible for one of the largest on land oil spills in US history in kalamazoo michigan. instead of cleaning up the spill they hired locals to shovel dirt on top. see john bolenbaugh the enbridge whistleblower. Also the MICATS.

Sincerely,

ginger juel
1820 London Rd
Duluth, MN 55812
gjuel10@gmail.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Hautamaki Jukka	218-724-6500	
ADDRESS		
2918 BALD EAGLE TRAIL		
CITY, STATE, ZIP		
Duluth MN 55804		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Mary Martin <Mary.Martin@metrostate.edu>
Sent: Thursday, July 06, 2017 3:21 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline comments

To: Minnesota Department of Commerce

From: Ministry Team of Union Congregational Church, Hackensack, MN
Mary Ackerman, Barbara Courneya, Paul Courneya, Sarah Cox, Mary Martin, Ellie Nelson, Beverly Peterson, Vern Peterson, James Reents, Frederick Smith.

Date: July 6, 2017

Re: Draft Environmental Impact Statement regarding Enbridge Pipeline
Docket numbers: CN-14-916 and PPL-15-137

The Justice Ministry Team of Union Congregational Church, Hackensack, MN calls on the Department of Commerce to reject Enbridge's preferred single bitumen-carrying oil pipeline and thereby establish a brand new energy pipeline corridor potentially accommodating many pipelines.

This DEIS does not address the multiple pipelines issue. Several of the pipelines following the current Line #3 route down Highway 2 are old and Enbridge will soon want to replace them. Once a single pipeline is allowed through their preferred route, Enbridge will want to add additional lines and it will use the excuse there is already one pipeline in place so no other assessment should be required. Certainly no more than a simple Environmental Assessment (EA). Enbridge is already pointing out that the new route follows a portion of some transmission line right of way so therefore no EIS should be required. The potential for a disastrous leak is many times greater with several pipelines than with a single pipe.

The lakes of southern Minnesota are dead largely due to industrial pollution and agricultural runoff. They are dead and they are not coming back. The lakes of central and northern Minnesota, however, are still in neaarly pristine condition. They are the jewel of Minnesota .They define Minnesota. The Enbridge preferred route cuts across several lakes, rivers and the states most valuable watershed, the Pine River Watershed. Let's not put this Minnesota jewel at risk with pipelines for some short term financial gains.

Public Comment: Sherri Kahlman, Voicemail, received May 19, 2017

Hi I just wanna comment about the uh, Enbridge and the pipeline uh, I believe the docket number's 14-916 and then another's 15-137 and uh, there's just so many oil spills already that are just… uh, ruining the country so I pray that uh, you all don't uh, allow this through. It's just horrible what uhm, you know, it does to the Earth, environment and the animals. Uh, let alone people's uh, lands or public lands and the water, so thank you.

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
EDNA KAAMI	218 215 2024	
ADDRESS		
PO Box 42		
CITY, STATE, ZIP		
Pongilly MN 55775		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Angela Kappenman <angelakappenman@me.com>
Sent: Monday, July 10, 2017 9:29 PM
To: MN_COMM_Pipeline Comments
Subject: Stop Line 3

Dear Jamie MacAlister,

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I am from a Leech Lake enrollee currently living in Brooklyn Park MN.

The Line 3 Pipeline concerns me because as a tribal member I love clean water and removing Line 3'will start the healing process for the lands it is on.

The DEIS concerns me because

- Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "**would have a long-term detrimental effect on tribal members and tribal resources**" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). **This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members**.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Sincerely,
Angela Kappenman
Sent from my iPhone

Levi, Andrew (COMM)

From: John Karas <jandnkaras@hotmail.com>
Sent: Monday, July 10, 2017 12:24 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3

Dear Leaders:

I support Enbridge's Line 3 oil pipeline replacement project across northern Minnesota. It will bring many construction jobs, and also profide for a safe way to help meet our nation's energy needs.

Thank you,
Nancy Karas
Duluth, MN

From: Lisa Karulak
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137
Date: Monday, June 05, 2017 10:20:03 AM

Dear Ms. MacAlister,

I am all about protecting the environment. I believe that replaceing Line 3 is imperative in continuing to protect the environment. Please approve the well planned DEIS and approve the necessary permits needed to move forward in the Line 3 pipeline replacement.

Sincerely,

Lisa Karulak
31 10th St
Cloquet, MN 55720
lisa.karulak@mchsi.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Pat Kuehling	218-547-2433	
ADDRESS: PO Box 905		
CITY, STATE, ZIP: Walker, MN 56484		

COMMENTS: I support the line 3 replacement project.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Skylar Kastning	218-821-9527	skylark@papenfusstrucking.com

ADDRESS
Po Box 62 ~~walker~~

CITY, STATE, ZIP
Walker, MN 56484

COMMENTS

I support the line 3 Replacment Project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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USA FOREVER

3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Tanner lee Kastning	218-507-0638	
ADDRESS		
P.O. Box 771		
CITY, STATE, ZIP		
Walker, MN 56484		

COMMENTS

I Support the line 3 replacement

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
WAYNE KASTNING	218 252-0497	
ADDRESS		
BOX 920		
CITY, STATE, ZIP		
WALKER, MN 56484		

COMMENTS

I AM IN TOTAL SUPPORT
OF THE LINE 3 PROJECT

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: SUSAN KATTAS <skattas@comcast.net>
Sent: Monday, July 10, 2017 9:53 AM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137

To: pipline.Comments@state.mn.us

Topic: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137

Environmental Impact Statement on oil pipelines in MN

Docket # CN-14-916 and PPL-15-137

Date: 07.10.17

From: Susan Kattas, 200 7th Street North, Hudson, WI 54016

skattas@comcast.net

The United Nations continually cites WATER as it target priority concern around the world despairingly needing clean water for baby formula, medicine, village wells, to stem disease, and to minimize water used as a weapon as in dams that favor one faction over another.

How is it that not living in a third world country requires so much for a grass root effort to protect clean water and water ways in the Land of Ten Thousand lakes?

I grew up in Northern Minnesota just east of Headwaters of the Mississippi, with my family running a small fishing resort so I know the importance of the water for its sustainability for many, i.e. fishing, tourism, wild rice harvest, and connecting Minnesota with the Gulf of Mexico.

I do not support the weak commercial intent of Enbridge over our local economy.

Enbridge has a record of spills and a lack of disclosure about its poor safety record. They are like a bully, a Goliath against the hardworking people of Minnesota, the “David” in this case.

Please put a stop to the insidious pipeline plans by Enbridge.

I live in Wisconsin one mile from Minnesota but my homeland and roots are in our precious lake area of Minnesota, a vulnerable pristine water resource.

Susan Kattas

Levi, Andrew (COMM)

From: bkaufman@tds.net
Sent: Sunday, July 09, 2017 10:16 AM
To: MN_COMM_Pipeline Comments
Subject: Dockets CN-14-916 and PPL-15-137

I am writing to comment on the proposed Line 3 Replacement, docket numbers CN-14-916 and PPL-15-137. My husband's and my property is on the Pine River downstream from the proposed location where the line would cross under the river. We have witnessed the following on a regular basis from our property or a short way downstream from us: Over a hundred white pelicans stopping over in the early spring for a number of days, numerous waterfowl in the river, bald eagles fishing, deer with fawns coming to drink, "suckers" swimming up stream to breed and lay eggs, large snapping turtles and leatherbacks coming up the bank to lay eggs, and many people enjoying tubing, kayaking and canoeing - a boon to the local economy. All this could come to an end with a spill or leak. It is not worth the risk of losing these natural phenomena for oil which we do not need, which will not go to Minnesota, which contributes to global warming during extraction as well as when it is burned as fuel. The risk is too high to allow this line to be built.

Thank you for considering these comments.

Barbara Kaufman
1295 32nd St. SW
Pine River, MN 56474

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
FRANKIE J. KAVANAUGH	715 492-0676	
ADDRESS		
W4173 CTY RD W		
CITY, STATE, ZIP		
WINTER, WI. 54896		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME Janice Kraker	PHONE NUMBER	EMAIL
ADDRESS 6003 Oberley Loop Rd		
CITY, STATE, ZIP Walker, MN 56601		

COMMENTS I support the line 3 replacement project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Martha Kelash <martha.kelash@gmail.com>
Sent: Monday, July 10, 2017 10:04 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 And PPL-15-137

To whom it may concern,

Please include my comments on the Line 3 DEIS in dockets CN-14-916 And PPL-15-137

My name is Martha and I am from Minneapolis, MN. I believe that the old Line 3 pipeline should be shut down and removed from the ground. There should be no permit issued to reconstruct.

Instead let us invite clean, safe,
renewable energy companies into our state. There are more jobs to be created with renewable energy, and it does not bring the same risks to our sacred land as does the oil industry.

Please do not risk polluting our land with oil pipelines.

Thank you,

Martha Kelash
Minnesota resident
Concerned citizen

Levi, Andrew (COMM)

From: Dawn Kellen <sewer@tds.net>
Sent: Monday, July 03, 2017 11:47 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

Writing to express our opposition to Enbridge establishing a new pipeline Line 3 through Crow Wing and Aitkin Counties. Both counties are highly desirable because of their pristine lakes and water resources used for recreation as well as harvesting wild rice. It is too dangerous to have the potential of a damaged line and unknown amounts of oil/sludge leaking into the water resources.

We have homes in both counties.

Keith and Dawn Kellen
31950 280th St.
Aitkin, MN 56431

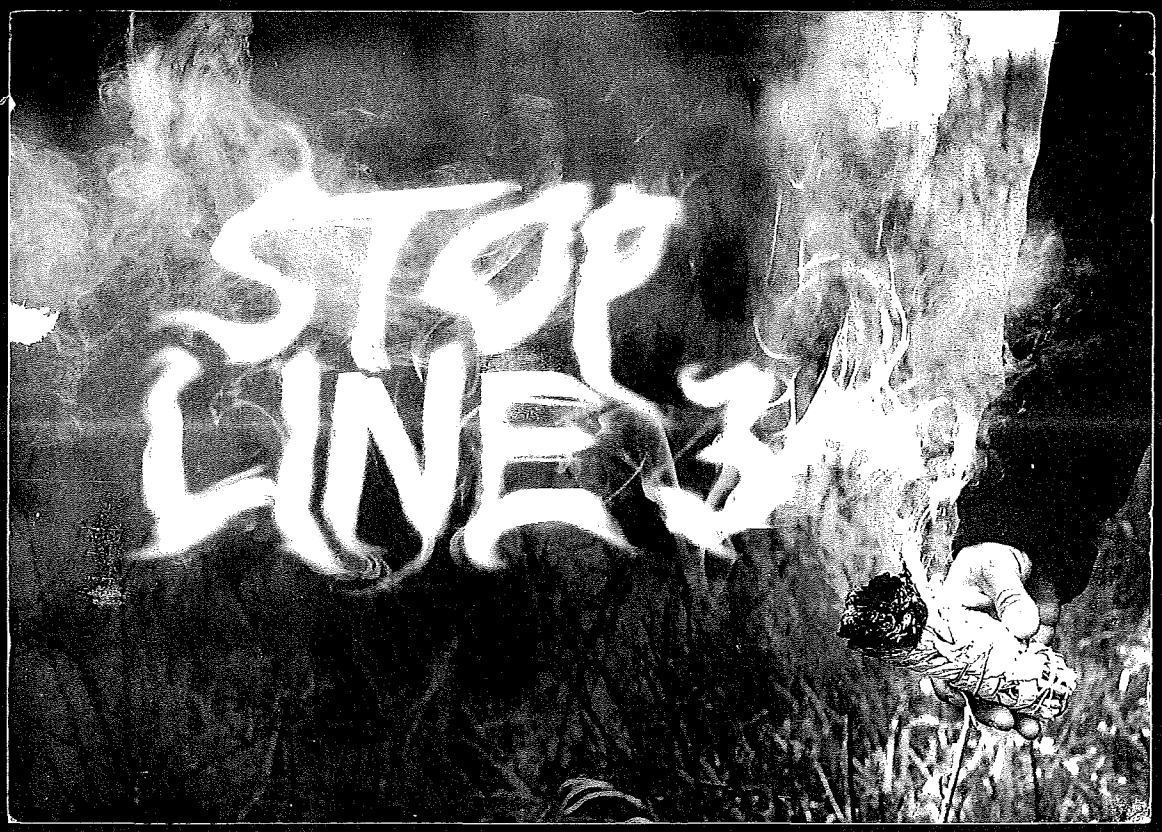

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
01 JUL 2017 PM 3 L

Line 3 is bad for the planet and will affect many people. It affect people's safety, health, and traditions. This will destroy cities!

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Maeve Kelly

Levi, Andrew (COMM)

From: Darrell Kennedy <djkennedy11@hotmail.com>
Sent: Friday, June 23, 2017 2:29 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I am a Minnesotan and want to see the environment protected like most others.
I believe replacing aging infrastructure like pipelines is imperative to protecting the environment.
The MPCA has recently released the Mississippi River Watershed report that shows the cleanest waters in the state are in northern Minnesota. Energy infrastructure and clean waters can co-exist.
It is preferable for me to locate pipelines in more rural areas, rather than to site them in the middle of cities and towns.
Enbridge has found a route that follows existing utility corridors.
Pipelines are everywhere in Minnesota, according to the Environmental Quality Board's report. I'm familiar with pipeline right of ways in northern Minnesota around Bemidji, Grand Rapids, and Cass Lake . Pipelines and natural resources have gone hand-in-hand in northern Minnesota for decades.
As a resident of northern Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project.
I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3.
No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS.
Please keep the EIS timeline to the statutory deadline of 280 days.
Deactivating a pipeline in-place is the most commonly-used industry method to retire a pipeline.
Leaving the permanently deactivated pipeline in place is the safest option as it reduces the risk of soil stability issues, avoids major construction activities and reduces the potential risk to existing pipelines from heavy equipment.

Sincerely,

Darrell Kennedy
623 35th St NW
Bemidji, MN 56601
djkennedy11@hotmail.com

Levi, Andrew (COMM)

From: JOHN KENNEDY <lucynjohn@msn.com>
Sent: Monday, July 10, 2017 10:54 PM
To: MN_COMM_Pipeline Comments
Subject: Comments in regard to CN-14-916 and PPL-15-137

I am writing today to voice my objections to the DEIS for Enbridge's Line 3 as referenced above. I have been active in opposing the construction and operation of pipelines in this part of the country for many years. Why? Because I believe that it is every citizen's duty to preserve the most precious resource we have, WATER. The northern portion of the state of Minnesota contains one of the largest reserves of pristine water anywhere on Earth. To gamble on polluting this vast treasure of clean water would be one of the most irresponsible and morally reprehensible things I can imagine. Where is our concern for future generations, who will very likely be struggling with water shortages due to global warming? Our children and our grandchildren and all successive generations deserve to have an environment that supports human life and wildlife and provides the same opportunities for recreation and appreciation of the beauty of our state as we enjoy today.

The DEIS fails on many accounts, but I would like to focus on one area in which a negative outcome for the state is virtually guaranteed. The proposed route could not involve more risk to the environment if it were planned on purpose to impact every sensitive, irreplaceable wild area in the northern part of the state. Allow me to list several of the risks involved:

1. The route crosses over the wild rice lakes area where 50% of the world's hand-harvested wild rice is picked each year.
2. The route traverses an area with the highest susceptibility for groundwater contamination impacting drinking water aquifers.
3. The pipeline would cross wetlands which are critical to waterfowl and other wildlife.
4. State forests, wildlife management areas, trout streams and the North Country Trail all lie in the path of the pipeline.
5. Lakes with the clearest water in the state lie in its path as well.
6. The Mississippi River itself would be crossed twice. My family and I get our drinking water from the Mississippi River, as do millions o other American citizens as it makes its way to the Gulf of Mexico.
7. Any oil spill to occur in the long Minnesota winter could not be addressed for months potentially, allowing the damaging impacts to persist without remedy.
8. The oil carried by the proposed pipeline would be diluted bitumen (Tar Sands Oil) which is virtually impossible to clean out of a water-based environment due to its properties.

Any one of these eight causes for concern should be raising an outcry. It is simply unacceptable for us to jeopardize so much- for ourselves and for our fellow citizens and for future generations.

Another area which I believe is of crucial importance but which is not addressed in the DEIS is the issue of impacts on the Native peoples who call northern Minnesota home and to whom these beautiful wild lands and waters are sacred. No sufficient impact study has been done to determine the consequences for the people of the First Nations who will have to bear the burden of destruction of their homeland and their way of life and

their livelihoods. How is it possible that we as citizens can stand by and allow this entire community to be dismissed when they have already been stripped of nearly all of their lands and rights? Just imagine: would we say it's OK to build a pipeline through the National Mall and the Capitol building? Yet that's what would happen with this proposed route: it would go right through sacred places, desecrating them forever.

I have tried to compile a list of many of the primary objections which I and thousands of other informed citizens have to this DEIS. Now I would like to remind those who are considering whether or not to issue a permit that we are at a moment in time when the best possible thing we can do for our planet and the fate of future generations is to stop burning fossil fuels as quickly as possible. That means saying "No" to new infrastructure projects within the fossil fuel industry, NOW. The oil that would be carried through this pipeline would not benefit Minnesotans. The depression of oil prices combined with the increasingly competitive price of renewable energy make future extraction of fossil fuels economically unsustainable. Will this pipeline create many jobs for Minnesotans? No. Is there any benefit to Minnesotans that in any way justifies undertaking all the risks and other negative outcomes listed above? No. From the beginning of my involvement in trying to preserve the natural resources and beauty of my beloved adoptive state, I have seen that a few people who stand to gain short-term profits have tried to put forward their projects in devious ways, completely disregarding the long-term interests of Minnesotans. Let us put an end to that now by denying the permits needed to build Line 3. Let us say to Enbridge, go back and clean up your other pipelines and begin to retire them. That is the way to secure a bright future for Minnesotans. I don't want our children and grandchildren asking "What were they thinking, back in 2017? How could they have thought it was a good idea to send hundreds of thousands of toxic oil over our pristine lakes and streams and marshes and not stop to think what would happen if there were to be a leak or a rupture?" I want a better future for my children and grandchildren, and I'm sure that you do, too. Thank you for taking my comments into consideration.

From: Rich Kern
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137
Date: Monday, June 05, 2017 9:20:05 AM

Dear Ms. MacAlister,

I believe replacing aging infrastructure like pipelines is imperative to protecting the environment. It is preferable for me to locate pipelines in more rural areas, rather than to site them in the middle of cities and towns. Pipelines are everywhere in Minnesota, according to the Environmental Quality Board's report. I'm familiar with pipeline right of ways in northern Minnesota around Bemidji, Grand Rapids, Cass Lake and Alexandria. Pipelines and natural resources have gone hand-in-hand in northern Minnesota for decades.

Enbridge has found a route that follows existing utility corridors. I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3. No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS. Please keep the EIS timeline to the statutory deadline of 280 days.

Deactivating a pipeline in-place is the most commonly-used industry method to retire a pipeline. Leaving the permanently deactivated pipeline in place is the safest option as it reduces the risk of soil stability issues, avoids major construction activities and reduces the potential risk to existing pipelines from heavy equipment. As a landowner, I'd rather have the pipe deactivated in place to avoid further construction on my property.

The only responsible action at this time is to complete the regulatory process and move ahead with the Line 3 replacement.

Sincerely,

Rich Kern
26 E Superior St
Duluth, MN 55802
rich.kern74@icloud.com

From: Jackson Kerr
To: MN_COMM_Pipeline Comments
Subject: Line 3"s Impact on Hiking Trails (Docket Numbers CN-14-916 and PPL-15-137)
Date: Wednesday, June 07, 2017 4:01:50 PM

This concerns the Docket Numbers CN-14-916 and PPL-15-137

I ask that the Minnesota Public Utilities Commission and residents of Minnesota consider an often undiscussed consequence of Line 3's construction that is of no little importance. Should the pipeline stay its proposed course, it would make contact with numerous Minnesota hiking trails, many of which are notable for their length and durability. Two trails Line 3 would intersect, the Paul Bunyan and Willard Munger, stand uniquely among regional trail systems, being two of the world's longest paved trails of their kind, equally accessible to bikers, hikers, and joggers alike. Minnesota also hosts the cross-border North Country Trail for a portion of its interstate run; Enbridge's pipeline would infringe upon its route as well. Should Line 3 go through, the annual tens-of-thousands of Minnesotans who frequent these footpaths will not only encounter a temporary impediment to their free passage along the trails, but the permanent threat of pollution of their pristine Northern landscape should the pipeline leak. On behalf of Minnesota hikers everywhere, I communicate this message to those able to make a decision in the hiker's favor. Thank you for your time.

-Jackson Kerr
Resident of St. Paul

This concerns the Docket Numbers CN-14-916 and PPL-15-137 of the Line 3 EIS.

I ask that the Minnesota Public Utilities Commission and residents of Minnesota consider an often undiscussed consequence of Line 3's construction that is of no little importance. Should the pipeline stay its proposed course, it would make contact with numerous Minnesota hiking trails, many of which are notable for their length and durability. Two trails Line 3 would intersect, the Paul Bunyan and Willard Munger, stand uniquely among regional trail systems, being two of the world's longest paved trails of their kind, equally accessible to bikers, hikers, and joggers alike. Minnesota also hosts the cross-border North Country Trail for a portion of its interstate run; Enbridge's pipeline would infringe upon its route as well. Should Line 3 go through, the annual tens-of-thousands of Minnesotans who frequent these footpaths will not only encounter a temporary impediment to their free passage along the trails, but the permanent threat of pollution of their pristine Northern landscape should the pipeline leak. On behalf of Minnesota hikers everywhere, I communicate this message to those able to make a decision in the hiker's favor. Thank you for your time.

-Jackson Kerr
Resident of St. Paul

RECEIVED

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MAILROOM

Jackson Kerr
1539 Maywood St.
St. Paul, MN, 55117

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Jamie MacAllister, Environmental
Review Manager Minnesota Department of Commerce,
85 7th Place East, Suite 280,
St. Paul, MN, 55101-2198

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Levi, Andrew (COMM)

From: Mr. & Mrs. Brian Keske <carolj4747@gmail.com>
Sent: Thursday, July 06, 2017 6:07 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Replacement Project

Dear Ms. MacAlister,

Yes my husband Brian and I are in favor of this project. We need more revenue in this state.
Yes us our vote.

Sincerely,

Brian Keske
20990 110th St
Park Rapids, MN 56470
carolj4747@gmail.com

From: Ryan Kieffer
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline
Date: Wednesday, May 31, 2017 8:59:41 AM

To Whom it May Concern,

Please consult and heed the wishes of the Anishinaabe people regarding the propsed Line 3 pipeline.

In my own view, this pipeline is short-sighted and dangerous, and threatens to deepen our climate woes.

Please reconsider yet another pipeline. It's time to read the writing on the wall. Their are better paths forward for us.

Thanks,
Ryan Kieffer
952-201-1912

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
JOSEPH KILSDONK	218 343 8552	joseph.d.kilsdonk@gmail.com

ADDRESS
5468 DUNAISKI RD DULUTH MN 55811

CITY, STATE, ZIP
DULUTH MN 55811

COMMENTS
I PROUDLY SUPPORT LINE 3 REPLACEMENT AND THE QUALITY JOBS, SAFETY, AND INTEGRITY THAT GO INTO MAKING THE PROJECT A SUCCESS.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT !!

FULL NAME	PHONE NUMBER	EMAIL
Kimmes Donna	218-751-5900	dskimmes@paulbunyan.net
ADDRESS: 3148 Frohn RD SE		
CITY, STATE, ZIP: Bemidji, MN 56601		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Emily King
To: MN_COMM_Pipeline Comments
Subject: Re: Docket numbers (CN-14-916 and PPL-15-137)
Date: Wednesday, May 31, 2017 7:43:39 AM

To whom it may concern:
Building more pipelines will only damage an already waivering environment for us and our children. Alternative fuel options are no longer something of the future, they are the now. If we continue to abuse our environment with these toxic unnecessary projects we will only be hurting ourselves and the future of the planet. Please vote no on these horrible projects. It's not all about money.
Thank you,
Emily King (mother to a new baby)

Levi, Andrew (COMM)

From: Vincent King <vinceking@vklaw.net>
Sent: Monday, July 10, 2017 9:10 AM
To: MN_COMM_Pipeline Comments
Subject: Docket Numbers CN-14-916 and PPL-15-137

Thank you for the opportunity to comment on Enbridge's proposal to relocate Pipeline No. 3. I urge you to reject the application, for the following reasons:

- The pipeline will carry 760,000 barrels of diluted bitumen daily. The National Academy of Sciences Report on Diluted Bitumen concluded that, because it is denser than water, "diluted bitumen is virtually impossible to clean out of a water-based environment". A 2010 pipeline spill of 850,000 gallons of tar sands oil in Kalamazoo River affected more than 35 miles of the river, and has become one of the costliest spills in US history.

- The pipeline's corridor will be covered with snow and ice for many months. The line would cross the Mississippi River twice . If a spill occurs in December into the Mississippi River, there is a high possibility that the bitumen would remain in the river for up to three or four months. More than a million Minnesotans count on the Mississippi for their drinking water.

- In addition to the surface water risks, this pipeline route crosses an area with extremely high susceptibility for groundwater contamination impacting drinking water aquifers, according to the MPCA. Again, if a break or spill occurs in winter, the bitumen could be present in or on the porous ground for months before a cleanup could be undertaken.

- The risks to the natural environment are equally high. According to the University of Minnesota Water Resources Center, the proposed route crosses the clearest lakes area in Minnesota, based on the Census of Water Clarity. The route would cross 8 state forests (including the Mississippi Headwaters State Forest), 3 wildlife management areas, 13 trout streams, as well as the North Country Trail. The pipeline route crosses Minnesota's wild rice lakes area. According to the DNR, Minnesota supplies 50% of the world's hand-picked rice annually; numerous Native residents rely on wild rice harvesting for income.

The current EIS is flawed and fails to address these and other critical issues.

Again, thank you for your review of the public comments.

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VINCENT W. KING, P.A.

VINCENT W. KING, ATTORNEY-AT-LAW / 413 WACOUTA STREET / SUITE 140 / SAINT PAUL / MINNESOTA 55101 USA
http://www.vklaw.net / E-MAIL vinceking@vklaw.net / TEL 612.288.9225 / FAX 612.344.1255

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

USA FOREVER

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Rachel Kingsley	218-244-1653	
ADDRESS		
680 main st N	P.O. Box 70	
CITY, STATE, ZIP		
Hill city MN 55748		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Andy Kircher
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 replacement
Date: Tuesday, June 06, 2017 10:54:02 AM

I support the Line 3 replacement project, it's the safest and cleanest way to transport oil.
As a resident of northern MN, I believe the community benefits from Enbridge's projects and the jobs they support.
Thank you,

Andy Kircher
Duluth, MN

From: Laura Kircher
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3- CN-14-916, PPL-15-137
Date: Monday, June 05, 2017 9:54:16 AM

Good day,
As a resident of MN, I can't stress enough the importance of the Line 3 replacement project Enbridge is undertaking.

I value our environmental resources in MN, my kids love the lakes, rivers, and trails. To see a company put over $7 Billion into the construction of a new pipeline is a great indicator that they too want these resources protected.

I am personally aware of all the outreach Enbridge employees have been doing along the preferred and existing corridor. I have experienced the training to responder groups. The response from these teams is exceptional, they appreciate the learning and the communication. This is another great indicator that Enbridge is adding value to communities.

Please keep the regulatory process moving forward, and respect the statutory deadline of 280 days. From my perspective as a resident, it seems the State defers to the opponents of a project rather than the applicant, and this is just plain wrong. The state has done a great job ensuring access to the process, but it is time to move forward now.

Laura Kircher

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Bradley Joe Kirschenheiter	612-243-2388	
ADDRESS		
1693 Charles Ave.		
CITY, STATE, ZIP		
Saint Paul, MN		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Margaret Kirtley-Sternberg <kirtleys8@yahoo.com>
Sent: Wednesday, July 05, 2017 8:40 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 replacement

I am very opposed to the plan for a line 3 replacement. In an era in which we need to reduce our use of petroleum products, building a pipeline across Minnesota that has the potential to contaminate our precious water resources is too risky. The people of Minnesota have very little to gain from a plan to pipe the worlds dirtiest oil through our state to be refined in Wisconsin and shipped to China. Even if we had more to gain, we risk losing too much.This plan benefits very few people and jeopardizes the livelihood and resources of too many.Thank you for your time. Sincerely,

Margaret Kirtley-Sternberg
320 E Buffalo St
Duluth MN 55811

Levi, Andrew (COMM)

From: Dan Kittilson <drkittil@q.com>
Sent: Sunday, July 09, 2017 10:08 PM
To: MN_COMM_Pipeline Comments
Cc: Dan & Ruby Kittilson
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)
Attachments: Line 3 EIS. 7.9.2017.pdf

Dear Environmental Review Manger:

RE: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137).

I am writing to address my concerns about Enbridge's proposed Line 3 pipeline and the recently completed Draft Environmental Impact Statement (DEIS). I live on Little Sand Lake in Hubbard County. Little Sand Lake is one of the cleanest, clearest lakes in Hubbard County and throughout Minnesota. Clean water, healthy forests and countless other environmental resources are Minnesota's greatest asset. Our water resources have long been considered as biologically, recreationally, economically and culturally important to Minnesota. Our future is connected to the protection, restoration and enhancement of our shared natural resources.

While the State of Minnesota has been dragged into this Environmental Impact Statement for Line 3 by grassroots environmental groups, it was the result of common sense and crystal clear testimony that the study should be conducted by the state's environmental agencies. However, the State of Minnesota insisted on putting the EIS in the hands of the Department of Commerce instead. Now we have a Draft EIS that is missing critical information.

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. Without them, there is no reliable way an independent party to verify their results. Enbridge has been successful in withholding spill volume from the public. The State of Minnesota should insist that Enbridge provide their data on oil releases and spills in Minnesota.

There is no analysis of the economic need for the Line 3 pipeline. Minnesota lakes and our clean water is Minnesota's greatest asset. Anglers in Minnesota spend $2.4 billion annually with a $4.2 Billion impact on the state's economic output. Tourism in Minnesota accounts for $14.4 Billion in gross sales and supports 260,000 full & part-time jobs. Fishing, lake recreation and tourism are critical components of the economy in Minnesota. Where is the analysis of how a pipeline through some of the best lake country in Minnesota will affect fishing, tourism and recreation in Minnesota? How will the communities along the route be affected? Does this pipeline provide enough benefits for Minnesota to balance the risks to the "value of our clean water"?

In Hubbard County, 37.6 % of property tax parcels with water influence represent 60% of the total taxable market value. These 37.6% of tax parcels generates 53% of the tax revenue. What will happen to these property values and tax revenue if we have a major oil leak into one of our major chain of lakes in Hubbard County? This questions has not been considered in this DEIS.

There is no plan for addressing the contamination that will be found when they shut down the existing Line 3. There are only 16 of the 5,000 + pages devoted to the issue of pipeline abandonment. Furthermore, Enbridge has three more very old lines that will eventually fail and need to be rebuilt in a new corridor. Might that new corridor be the same passageway for the new Line 3 that is being proposed through our cleanest, clearest lakes in Minnesota? If the Enbridge preferred route is approved, will it be just the one pipeline (Line 3) or will they eventually move all six pipelines to the new corridor through our cleanest lakes in Minnesota? While one pipeline will pose a big threat to our water quality, taken cumulatively, six pipelines in one corridor can significantly alter lake habitats, water quality, and economic and cultural impacts.

Our lakes are a shared resource. Protecting these beautiful places is in the public interests. The State of Minnesota owns and must protect and maintain these natural resources for our public's use.

Thank you for your consideration of my comments.

Dan Kittilson

22924 County 7

Park Rapids, MN 56470

Dear Environmental Review Manger:

RE: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137).

I am writing to address my concerns about Enbridge's proposed Line 3 pipeline and the recently completed Draft Environmental Impact Statement (DEIS). I live on Little Sand Lake in Hubbard County. Little Sand Lake is one of the cleanest, clearest lakes in Hubbard County and throughout Minnesota. Clean water, healthy forests and countless other environmental resources are Minnesota's greatest asset. Our water resources have long been considered as biologically, recreationally, economically and culturally important to Minnesota. Our future is connected to the protection, restoration and enhancement of our shared natural resources.

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in one corridor can significantly alter lake habitats, water quality, and economic and cultural impacts.

Our lakes are a shared resource. Protecting these beautiful places is in the public interests. The State of Minnesota owns and must protect and maintain these natural resources for our public's use.

Thank you for your consideration of my comments.

Dan Kittilson
22924 County 7
Park Rapids, MN 56470

BIERBRAUER CHIROPRACTIC

221 10th Avenue South
Minneapolis, Minnesota 55415
Phone: 612.332.4414
Fax: 612.332.4244
www.bierbrauerchiropractic.com

To: Jamie MacAlister	From: Maria Klein
Fax:	Pages: 2 + cover
Phone: 952-210-0004	Date: 7-10-17
Re: Pipeline 3	cc:

Comments:

Here is a letter of comment on the DEIS for Pipeline 3.

Thanks for your consideration!

MK

facsimile

5627 Green Circle Drive
Minnetonka, MN 55343

July 10, 2017

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Dear Ms. MacAlister:

I am writing to express my opposition to the Enbridge Pipeline 3. I am a semi-retired editor with a B.A. (Wellesley College/University of Minnesota/Metropolitan State University) and 20+ years' experience working alongside University of Minnesota scientists and helping to interpret science to a lay audience. Also, I served for many years on the Southwest LRT Citizens Advisory Committee, and have been following the Dakota pipeline and Pipeline 3 for more than two years. And although I do not live in the area most directly affected by the pipeline, I am a many-decades resident of Minnesota and a big fan of Minnesota's hand-harvested wild rice, as well as its many notable lakes, rivers and wetlands.

Overall, I consider this DEIS to be a long-winded rationalization for a project that is fundamentally wrong. To justify it is to condemn so many things that give Minnesota its unique character, including Native American culture, clean air and water, fertile soil, social justice, and the promise of a bright economic future through renewable energy. It's hard to comprehend how this proposal is even being considered at this time in our history.

There are many areas in which the DEIS seems inadequate, but I'd like to briefly mention four.

1) Other energy and environmental policies. The DEIS seems to ignore, or inadequately address, many existing policies, including Minnesota's commitment to the Paris Climate Accord, its State Energy Policy, the Minnesota Environmental Policy Act, as well as others.

2) Economics. As everyone knows by now, "fracking" is the most expensive, as well as the dirtiest, form of oil extraction. In an era where there is a glut of oil available for all users foreign and domestic, producing this oil – including the

construction of an expensive pipeline - makes no economic sense for Enbridge. Any benefit to Minnesotans seems outweighed by the costs and potential risks. The oil era is winding down, renewables are the source of the future in Minnesota as well as all around the planet. The DEIS does not adequately consider renewables as a cleaner, alternative source of jobs and energy for Minnesotans. Further, the pipeline benefits a Canadian corporation, not the residents of Minnesota, who do not even have use of the oil being transported across our state.

3) Leaks and spills. History has shown that nobody can make oil production and transport perfectly safe. In fact, at one of the public hearings in June, a representative from Enbridge acknowledged that oil would be spilled during construction. How much and exactly where, this gentleman did not specify, but there is no acceptable location for even a "small" oil leak or spill.

As for the existing pipeline 3, which would be abandoned if the new pipeline were completed, the DEIS inadequately addresses plans for monitoring the aging pipeline and protecting local communities from the risks to water and soil from this or other aging, deteriorating pipelines. Just leaving it in place to disintegrate, leach into water or soil, maybe checking it from time to time, is simply not acceptable.

4) Tribal sovereignty. The DEIS, indeed the whole proposal, completely ignores treaties with the tribes that inhabit the land designated for pipeline 3 construction, not to mention the wishes of the members of these First Nations. Two treaties in particular, from 1837 and 1855, were upheld by the U.S. Supreme Court in 1999 and reaffirmed in 2015.

The DEIS does not establish the need for a Canadian corporation to take precedence over the rights of these sovereign tribes. I strongly urge the MPUC to deny Enbridge a certificate of need.

A corporation, a pipeline, jobs in the oil industry – these are all things that might last another few decades at the most. But the waters of Minnesota must last as long as there are humans around The Earth who depend on it for safe food, for safe drinking, for cultural survival, and for the refreshment and renewal of their souls.

Thank you for your attention and consideration.

Maria Klein

Levi, Andrew (COMM)

From: Dan & Shari Kleinhans <shardan90@yahoo.com>
Sent: Monday, June 19, 2017 8:29 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3

I would like to comment on the proposed constructon of Enbridge Line 3. I am a landowner along the Enbridge right of way and I have nothing but high regards for them. They have had an integrity dig on my property and they were great to work with. I would like to see this new pipeline become a reality because of the condition of the existing line. I feel there would be a peace of mind effect if this new line is installed. I would rather go through pipeline construction compared to being involved with a leak on my property. This woruld also have a great financial impact in this area. The jobs and the money spent in this area would be a positive shot in the arm for this area. Please do the right thing and approve the construction of a new Line 3, it would be a win for everyone.

Corky Kleven

No speech —

Just an affirmation

we need to move energy

— In the Ground —

— Not Roots or Rob —

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Corky Klevan

Street Address: 206 7th St NE

City: Red Lake Falls State: MN Zip Code: 56750

Phone or Email: cklevan@aol.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

As studied many times and many places before

Energy moves most efficient and safely

On the Wire

and

In the Pipeline

Enbridge has been a good steward of the environment and people in this area.

Keep the energy moving safely!

If including additional pages please number them and tell us how many you are providing: ____ *pages*

218-253-2897 CKlevan

Roger Klisch
1180 Norell Ave
Stillwater, MN 55082

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Re: CN-14-916 and PPL-15-137 – Enbridge proposed Line 3 pipeline Opposition

Mr. MacAlister,

I am writing in opposition to the proposed Enbridge pipeline. I am an electrical engineer and run a prosperous business. While I could site many technical reasons to stop this pipeline, I will instead just make a simple plea. Humanity has to stop exploiting and polluting the planet. Future life on this planet depends on us NOW making good choices. We should be reducing fossil fuels, not expanding. There are now plenty of alternatives and many more innovations are arriving daily. We can reduce and change our energy system. It only takes the courageous will and the opposition to greed and ignorance.

Please, for the sake of your children, my children, everyone's grand children, and all life on the planet – it is time to make other choices.

Thank You.

Roger Klisch

RECEIVED
JUN 01 2017
MAILROOM

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
MICHAEL KLUGMAN		Mike.Klugman@unitedpiping.us
ADDRESS: 6308 620th Street		
CITY, STATE, ZIP: Wheaton MN 56296		

COMMENTS

LINE 3 will help the MN economy bring jobs to not only the people building the line and the local communities.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
MICHAEL KLUGMAN		Mike.Klugman@unitelpiping.ca
ADDRESS		
CITY, STATE, ZIP		
Duluth MN 55811		

COMMENTS

Pipe lines create jobs. We go through extensive environment controls to be able to work

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Peter Knapp
To: MN_COMM_Pipeline Comments
Subject: Line 3 replacement
Date: Thursday, June 08, 2017 1:00:19 PM

Dear Ms. MacAlister,

Build it the sooner the better the old line needs to be replaced badly so build it!!!!

Sincerely,

Peter Knapp
603 Pembina Trl S
Karlstad, MN 56732
catdieselpwr@gmail.com

Levi, Andrew (COMM)

From: Susan Knapp <knapp.ssn@gmail.com>
Sent: Monday, July 10, 2017 11:09 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Draft Environmental Impact Statement

Dear Minnesota Department of Commerce:

I find the Enbridge Line 3 Draft Environmental Impact Statement to be unacceptable. We need to protect our waterways more thoroughly than what is proposed. The damage would be not only to wildlife, habitat, water quality, the health and welfare of us — its citizens. We need to be better environmental stewards! Please protect the our beautiful scenic waters!

DEIS Chapter 5.2.1.2.4
Horizontal Directional Drilling (HDD) will be used to cross under our most pristine, most sensitive waters, and anywhere there is flowing water, which describes most of the route. The potential exists for contamination through release of drilling fluid to the ground and/or water, termed a “frac-out." The DEIS cites a 35 mile section of Enbridge pipeline in Michigan where there were 11 HDD crossings, multiple minor releases and 2 major frac-outs. MN will not accept the risk of a frac-out every 5.5 river crossings.

Sincerely,

Susan Knapp
144 Egret Lane
Marine on Saint Croix, MN 55047

Re: CN-14-916 and PPL-15-137

Levi, Andrew (COMM)

From: Candace F. Knudson <candace.knudson@gmail.com>
Sent: Sunday, July 09, 2017 9:36 PM
To: MN_COMM_Pipeline Comments
Subject: Comment for Enbridge Line 3 Project: CN-14-916 and PPL-15-137

To: Pipeline.Comments@state.mn.us

From: Candace F. Knudson <candace.knudson@gmail.com>

Date: July 9, 2017

Subject: Comment for Enbridge Line 3 Project: CN-14-916 and PPL-15-137

Dear Environmental Review Manager:

We live south of Tamarack, MN, an area rich in wetlands, and would like to comment on Enbridge's Line 3 project. It is our understanding that Enbridge's “Preferred Route” for its Line 3 replacement runs parallel to the Sandpiper route proposed by Enbridge a couple of years ago, a project which has been on hold. This preferred route would encroach upon the shores of Sheriff Lake, a small, tranquil lake approximately two miles south of our home – our favorite fishing spot. Naturally, we have concerns about potential pollution and defilement of “our” lake and the consequent death of fish and other aquatic wildlife, as well as the impact this would have on other animal and bird species, should a spill occur. (And we know that Enbridge spills do occur – we still recall news coverage of the Enbridge spill of 840,000-plus gallons into Talmadge Creek and the Kalamazoo River, in Michigan, in 2010, and the earlier 250,000-plus gallon spill in Cohasset, MN, in 2002.) Given that fishing is a primary source of recreation and tourism in Minnesota, we would like to see information in the final EIS about the taxes generated by fishing in Minnesota, as Enbridge's proposed route will affect many fishing lakes and protective wetlands, not just “ours.”

Among other issues, we're very concerned about the effect of bogs on pipes, having read in the DEIS (Draft Environmental Impact Statement) that many types of peat "exhibit negative buoyancy and place upward pressure on pipelines, causing stress on the pipe." (Section 10.1.2.1).
We would like to see more information in the final EIS about pipelines that have been built in peat bogs.

The website https://fred.stlouisfed.org/series/MNHUNTLICTAX shows that fishing and hunting licenses in Minnesota in 2015 (the latest data
reported) brought the state $63,283,000 – a figure which dwarfs Enbridge's proposed $25 million dollar annual tax payment to the state.
The $63 million dollars is for license fees alone; it doesn’t include additional income generated by fishing, such as money spent on hotels and restaurants and grocery stores. These are the same sorts of expenditures on local business that Enbridge touts as one of its main benefits, as pipeline workers would spend money in various communities during construction. The difference is that Enbridge’s “benefit” would end when construction is complete, while income derived from fishing in Minnesota will be generated annually in perpetuity. Minnesota’s reputation as a fishing destination could be damaged by a pipeline corridor, and most definitely would be damaged in the event of a spill.
If Line 3 is approved on Enbridge's preferred route, we stand to lose many more millions than Enbridge is promising with its nominal annual tax payment to the state.

More important than economic considerations is consideration of the very real potential of pipeline failure (Cohasset, Talmadge Creek and Kalamazoo River) and extensive damage to sensitive ecosystems along the path of Line 3. Exactly

where that should fit in the EIS we cannot say; however, it, too, must be addressed as part of any document on "environmental impact."

Thank you for providing this opportunity to comment, and for your diligence in carefully considering all submitted comments.

Donald and Candace Knudson
14624 404th Lane
Tamarack, Mn 55787

From: Sean Knutson
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137
Date: Wednesday, May 31, 2017 9:50:05 PM

Dear Ms. MacAlister,

Approve

Sincerely,

Sean Knutson
1207 Valley View Dr
Minot, ND 58703
seanknut@hotmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Robert E Kmitson	715-926 3903	VanRob[illegible]@yahoo.com

ADDRESS
W538 Ghiz Rd

CITY, STATE, ZIP
Mondovi WI 54755

COMMENTS
Should be Replaced
Jobs would Good

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Dawn Knutson <dawnmknutson@yahoo.com>
Sent: Monday, July 10, 2017 8:15 PM
To: MN_COMM_Pipeline Comments
Subject: Opposition to Pipeline

I am a concerned citizen, writing to strongly oppose the proposed pipeline. In the DEIS, I understand there is not even a shut down option discussed, and no discussion of renewable energy, conservation, or assessment of the decline in oil demand. My special additional concern is the fact that pipelines leak and it is not a question of whether it will but when and how much. We need to discourage fossil fuel - not promote or support this

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

08 JUL 2011 PM

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Barbara D. Koch	651-459-5169	barbiekoch@msn.com

ADDRESS
1180-16th Avenue

CITY, STATE, ZIP
St. Paul Park, MN 55071

COMMENTS
I believe the DEIS is very adequate and should be approved. I support it 100%!!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Thomas J. Koch	651-459-5169	tjkoch@msn.com

ADDRESS
1180 - 16th Avenue

CITY, STATE, ZIP
St. Paul Park, MN 55071

COMMENTS
I 100% approve and support the DEIS!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
HARDY KOCHER	612.770.0236	HARDY_KOCHER@KINDERMORGAN.COM

ADDRESS

8321 DELANEY CIRCLE EAST

CITY, STATE, ZIP

INVER GROVE HEIGHTS, MN 55076

COMMENTS

THIS IS A PROJECT THAT NEEDS TO BE DONE, AND SOON! PLEASE FIND THE EIS ADEQUATE WITHIN THE 280 DAYS. FURTHER DELAYS WILL NOT ALTER THE UNDERLYING FACTS, THAT THIS LINE NEEDS TO BE REPLACED

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

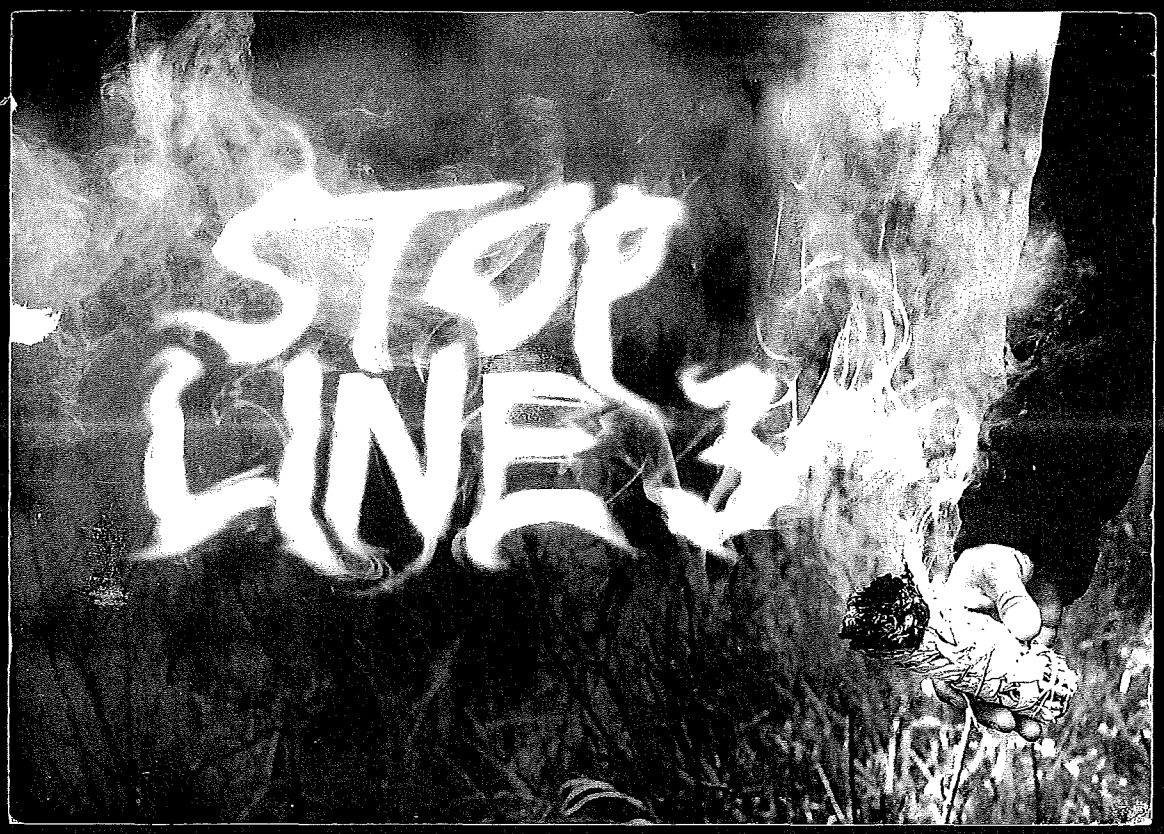

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
30 JUN 2017 PM 3 L

USA
Rail King
POSTCARD

The risk of oil spills, damage to our water + land are too great for a short term fiscal gain for a Canadian company. How does it benefit our children to have a pipeline expansion? With its great risk to damaging our major resources — how does it benefit us?

SINCERELY,
Lucy Kocher

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

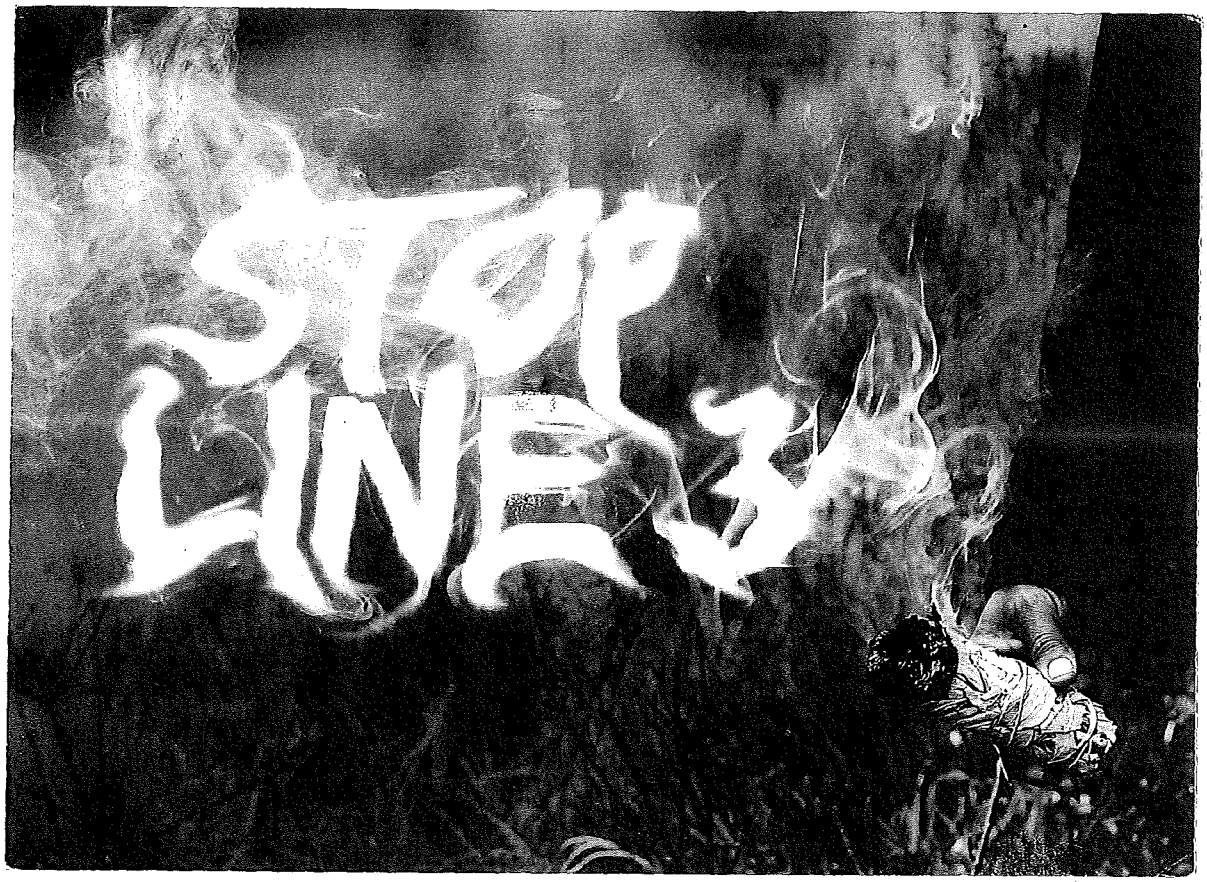

DEAR DEPARTMENT OF COMMERCE, MINNEAPOLIS MN 55
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137. JUL 2017 PM 6 L

Lets stop investing our amazing water and land resources for the short term use of pipeline (Line 3).
Lets think of our children and our future and invest in new energy forms that ensure our health + well being

SINCERELY,

Zena Kocher

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 7 L

USA
POSTCARD

Lets lead the
country and show
them new ways to
create jobs + commerce
that take our health
into consideration and
use resources like our
land and water wisely.

SINCERELY,
Frank
Kacher

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Amy Kaebke	218-586-3319	amy.kaebke@northhemps.org

ADDRESS

2443 Birchmont Beach Rd NE

CITY, STATE, ZIP

Bemidji, MN 56601

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

BEMIDJI MN 566
PM

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

From: Suzanne Koepplinger
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137
Date: Sunday, May 21, 2017 9:36:37 AM

I am writing to provide input on the proposed Pipeline Project Line 3 (CN-14-916 and PPL-15-137). I am strongly opposed to this project and urge that this new route be denied. It puts at great risk not only Minnesota's lakes, but more importantly our vulnerable wild rice areas. Wild rice is not only sacred to Native people and communities, but is an important economic product in areas of high concentration of poverty.
Line 3 should not be allowed to be constructed.
Suzanne Koepplinger
3317 21st Ave. South
Minneapolis, MN 55407
612-722-2751

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Timothy Koester	651-402-4025	TBKoester@msn.com

ADDRESS
3140 Pilot Knob rd

CITY, STATE, ZIP
Eagan, Mn 55121

COMMENTS
Oil pipeline s are essential to our Economy
If you don't support pipe line stay home
and don't drive.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: koetsjo@gmail.com
Sent: Sunday, June 25, 2017 5:22 PM
To: MN_COMM_Pipeline Comments
Subject: Public comment: Line 3 Project

I attended the Hinckley presentation at the Grand Casino and was very impressed at the displays, hand-outs and representatives from public entities available for information and non-partial interpretation. I have chosen to take the written avenue to express my views. My concerns relating to the impending decision regarding the proposed Pipeline 3 expansion and routing are many, but I will concentrate on several that are of higher importance to me.

I am keenly aware of the need for job creations in our state, but building a new corridor is not an avenue to full-time permanent jobs. In the short-term, there would obviously be jobs created, but once a corridor is in, the jobs are over and once again there is a problem with unemployment. The current corridor can attest to that. Minnesota can do better than this; temporary jobs provide temporary paychecks. Attracting long-term businesses to our state is a much more proactive avenue to take, assuming part of any decision-making considers jobs.

I understand that the current line 3 pipeline has operated for 50 years and is to a point of needing more maintenance and replacement in the near future. I disagree that a 36" diameter pipeline carrying nearly double the current capacity is needed. Extracting oil from Canadian tar sands is not looking progressively to our energy needs. Exxon Mobile has admitted that they have $3.4 billion in tar sands fields that are no longer economically viable. Oil prices have dropped so dramatically that it is no longer cost-effective for them to continue extracting oil at the same rate as was previously done. It has exploited and sickened indigenous people and ruined much of their land and water. Minnesota's oil needs are not increasing; we obviously do not require double the capacity to stay abreast of our energy needs. Minnesotans are not sharing in the profits of providing oil for exports to other places; foreign companies are! These profits are certainly not increasing the quality of life for indigenous peoples, in Minnesota, the U.S. or Canada. Reducing dependence of coal, oil and gas has been embraced by many companies and public utility entities in Minnesota and beyond; again a larger pipeline is not progressive thinking.

If line 3 pipeline must be replaced, I propose using nearly the same size of the current pipeline and following the existing route. This could run along side the current 6 pipelines if the replacement would jeopardize or create a hazard with the integrity of the other 5 lines. The right-of-way is already in place. Creating a whole new route, with a 750' swath of clear-cut trees and brush would create habitat fragmentation; keeping the current configuration would result in a greatly reduced impact to habitat. It would also not threaten other waterways and wild rice beds.

Minnesota has a vast tourist industry that relies heavily on it's natural resources. Instate and outstate visitors enjoy our great state that is known for its hunting, fishing, boating, biking, hiking resources. Creating a new pipeline corridor jeopardizes additional acreage to potential great environmental damage. This pipeline does not benefit Minnesotans; it benefits foreign interests and pocketbooks.

Thank-you for soliciting responses from Minnesota citizens.
Sincerely,
Josette Koets
6494 Finlayson Rd.
Finlayson, MN 55735

Sent from Mail for Windows 10

Levi, Andrew (COMM)

From: Ron Koetter <koett@paulbunyan.net>
Sent: Monday, July 10, 2017 9:25 PM
To: MN_COMM_Pipeline Comments
Cc: soren.koetter@hotmail.com
Subject: Proposed Line 3 Pipeline Project

Docket numbers CN-14-916 and PPL-15-137

1. This additional pipeline will disrupt an additional corridor of natural vegetation, wildlife and native soils. It would be less disturbance to replace or add line in the corridor already established. Also the existing pipelines need to be periodically replaced to avoid failures. Not just create a new line when they get old and tear up more undisturbed land.
2. The corridor fragments land by not following next to the road corridor. If a new corridor must be used, put it adjacent to the roads, specifically Clearwater county road #2, not back away from the road which causes fragmentation by leaving a strip between the road and the pipeline route.
3. Revegetate the disturbed corridor with native vegetation and control weeds. The existing corridors are full of noxious weed that spread up and down the pipeline into adjacent lands.
4. The pipeline is proposed to run through our family lands, the 160 acre Koetter properties. This will fragment our land, and is not consistent with the goals of our certified family forest land that we have worked so hard to purchase and manage. We do not want it through our forest land and object to it being located on our lands. It would be a continual battle to control the invasive species and would fragment our forest.

Ron Koetter
Chris Weir-Koetter
Tanner Koetter
Soren Koetter

Levi, Andrew (COMM)

From: Joseph Korbel <jjkorbel@hotmail.com>
Sent: Sunday, June 25, 2017 11:46 PM
To: MN_COMM_Pipeline Comments
Subject: Pipe line replacement

Dear Ms. MacAlister,

Moving oil in pipelines is a lot safer than by truck or rail especially in the frigid winter . The current line is old and needs to replaced.

Sincerely,

Joseph Korbel
4052 Blue Mayflower Rd NW
Bemidji, MN 56601
jjkorbel@hotmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Steve Korby	218-269-6643	steve.korby3@gmail.com

ADDRESS
609 Pearl St.

CITY, STATE, ZIP
Cloquet, MN. 55720

COMMENTS
Enbridge is an excellent employer and safe, efficient pipeline operation/operator.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNEAPOLIS MN 55
15 JUN 2017 PM 2 L

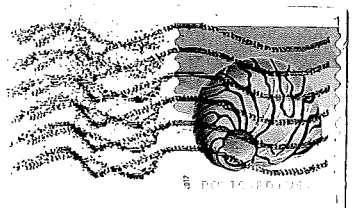

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

From: Leslie Korman
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137 - Environmental Protection
Date: Monday, June 05, 2017 9:50:04 AM

Dear Ms. MacAlister,

I am a Minnesotan and want to see the environment protected like most others. I believe replacing aging infrastructure like pipelines is imperative to protecting the environment. The MPCA has recently released the Mississippi River Watershed report that shows the cleanest waters in the state are in northern Minnesota. Energy infrastructure and clean waters can co-exist.

Sincerely,

Leslie Korman
22871 Balsa Ave
Prior Lake, MN 55372
leslie.korman@enbridge.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jon Korpi	218 969 4297	Korpi@scicable.com

ADDRESS: 30867 East Shore Drive

CITY, STATE, ZIP: Pengilly MN 55775

COMMENTS

Totally Support Line #3 Replacement.
Replace before existing pipeline collapses & causes damage.
Pipelines much more efficient than trains, trucks, etc. & much SAFER!

DECLARE THE EIS ADEQUATE WITHIN 180 DAYS

Levi, Andrew (COMM)

From: Dana Koskela <dakosk1112@gmail.com>
Sent: Friday, July 07, 2017 5:33 PM
To: MN_COMM_Pipeline Comments
Subject: I support line 3 maintenance

Dear Ms. MacAlister,

I believe that this is required for the safe keeping of our environment. Hopefully they will look into all of their lines they have and replace what needs to be replaced throughout so that they can keep the environment safe!! This is a great job on Embridge for keeping up with their lines that need maintenance done. I support this effort.

Sincerely,

Dana Koskela
5170 Gortin Rd
Duluth, MN 55803
dakosk1112@gmail.com

Levi, Andrew (COMM)

From: Barbara Koth <Barbara.Koth@unisa.edu.au>
Sent: Monday, July 10, 2017 8:18 PM
To: MN_COMM_Pipeline Comments
Subject: Comment on draft EIS - proposed Line 3
Attachments: Obama ES memo.pdf

July 9, 2017

Environmental Review Manager
Minnesota Department of Commerce
St. Paul, MN

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Being from Duluth, I opposed DAPL and went to Standing Rock last year, so I am again in opposition to continuing to build infrastructure that expands and supports the continued use of non-renewable resources, such as the Alberta tar sands or the Bakken crude. From a big picture, I think the EIS needs to emphasize even more how short-sighted it is to invest in technology and infrastructure that worsens climate change.

A priority concern for me is the spill risk given proximity to the Mississippi headwaters and the hundreds (thousands?) of lakes. There is the issue of the real damage to water quality, as well as the perceived quality of water that is important for tourism and Native American ceremony. President Obama put out a memorandum (attached) encouraging federal agencies to use ecosystem services valuation in decision-making (I don't think Trump has rescinded). That was a progressive action in terms of accounting for intangibles like water purification, climate regulation, and continuation of spiritual and cultural practices (attached). Where is the calculation of the valuation of ecosystem services that a northern Minnesota ecosystem - without threat and disturbance from pipeline removal and construction – and what that is worth? The draft EIS devalues that worth of the current ecosystem outputs, which means it doesn't allow a fair comparison with so-called (traditional) economic benefits.

I do think the disproportionate impact on the Anishinabe and Native peoples is reason alone to deny the pipeline permit; this fact is not given enough prominence and discussion. Given the long US history of environmental racism, we know better now. Make this a new day when we incorporate and make prominent indigenous wisdom about land and water management, and respect treaty rights. It is also old-school to pull out 'American Indian issues' as a separate chapter, rather than integrated discussion. We've moved now where the best documents integrate sustainability concerns throughout rather than a discrete analysis; the draft EIS needs to do the same and integrate Native American issues into the entire document at every level and on every issue.

Enbridge is a profit-making corporation, not a benevolent do-good entity. The EIS needs to treat them as such and assess their track record of noncompliance and accidents in terms of risks to northern Minnesota ecosystems and communities. I don't believe my students when they say "I will…" and I always have alternative plans – why is Minnesota so trusting of Enbridge as evidenced in the draft EIS? I also don't think you pay enough attention to the bigger picture outside Minnesota that effects the pipeline viability; for example aren't the Brule tribe outside Superior, WI refusing to let a new pipeline cross their territory?

Where is serious consideration of the "Shut Line 3 Down" option considered? Completely, don't build it; remove the old line and rehabilitate land – end of story. The market often reward early adopters of new ways of doing business.

Given that the economic forecast for Minnesota pipeline operation jobs is small, and that the human future is in transitioning to renewable energy, redraft the EIS to recognize a shifting paradigm and an economy in transition. Minnesota can do better than this. You sure didn't give people a lot of time to look at the draft (3 weeks!) – surely Minnesota is not doing a 'North Dakota' and ramrodding this through. Thank you for serious consideration of these comments.

Cheers,
Barb Koth
1924 Vermilion Road
Duluth, MN 55803
(and Adelaide, South Australia for part of the year)
Barbara.koth@unisa.edu.au

October 7, 2015

M-16-01

MEMORANDUM FOR EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: Shaun Donovan, Director
Office of Management and Budget

Christina Goldfuss, Managing Director
Council on Environmental Quality

John Holdren, Director
Office of Science and Technology Policy

SUBJECT: Incorporating Ecosystem Services into Federal Decision Making

Overview. Nature provides vital contributions to economic and social well-being that are often not traded in markets or fully considered in decisions. This memorandum provides direction to agencies on incorporating ecosystem services into Federal planning and decision making. (Broadly defined, ecosystem services are the benefits that flow from nature to people, e.g., nature's contributions to the production of food and timber; life-support processes, such as water purification and coastal protection; and life-fulfilling benefits, such as places to recreate.)

Specifically, this memorandum:

(1) Directs agencies to develop and institutionalize policies to promote consideration of ecosystem services, where appropriate and practicable, in planning, investments, and regulatory contexts. (Consideration of ecosystem services may be accomplished through a range of qualitative and quantitative methods to identify and characterize ecosystem services, affected communities' needs for those services, metrics for changes to those services and, where appropriate, monetary or nonmonetary values for those services.)
(2) Sets forth the process for development of implementation guidance and directs agencies to implement aforementioned policies and integrate assessments of ecosystem services, at the

appropriate scale, into relevant programs and projects, in accordance with their statutory authority.

Purpose. The goal of this memorandum and subsequent implementation guidance is to better integrate into Federal decision making due consideration of the full range of benefits and tradeoffs among ecosystem services associated with potential Federal actions, including benefits and costs that may not be recognized in private markets because of the public-good nature of some ecosystem services. An ecosystem-services approach can: (1) more completely inform planning and decisions, (2) preserve and enhance the benefits provided by ecosystems to society, (3) reduce the likelihood of unintended consequences, and, (4) where monetization is appropriate and feasible, promote cost efficiencies and increase returns on investment. Adoption of an ecosystem-services approach is one way to organize potential effects of an action within a framework that explicitly recognizes the interconnectedness of environmental, social, and, in some cases, economic considerations, and fosters consideration of both quantified and unquantified information. This memorandum sets a course to implement this approach.

Scope. This memorandum complements but does not supersede agency activities prescribed by or pursuant to law, tribal consultation policy, Executive Order, regulation, or other relevant guidance. This document provides direction for relevant Federal programmatic and planning activities (including activities such as natural-resource management and land-use planning, climate-adaptation planning and risk-reduction efforts, and, where appropriate, environmental reviews under the National Environmental Policy Act (NEPA)) and other analyses of Federal and Federally-assisted programs, policies, projects, and regulatory proposals. For example, should an agency's analysis require consideration of costs, the agency should consider ecosystem-services assessment methods, where appropriate and feasible.

Background. Ecosystem services provide vital contributions to economic and social well-being. These include, but are not limited to, provisioning food and materials, improving the quality and moderating the quantity of water, providing wildlife habitat and spawning and nursery habitats for fisheries, enhancing climate resilience, mitigating storms and floods, buffering pollutants, providing greater resilience for communities and ecosystems, and supporting a wide array of cultural benefits, recreational opportunities, and aesthetic values. Since the President's Council of Advisors on Science and Technology (PCAST) underscored the value of the Nation's natural capital in its 1998 report, *Teaming with Life*, successive Administrations have worked to develop methodologies and have convened interagency dialogues to advance ecosystem-services approaches in Federal decision making. In 2011, the PCAST revisited the 1998 report, making a specific recommendation to improve the capabilities of Federal agencies to promote consideration of ecosystem services in decision making. The Federal government has made progress toward this goal within individual agencies—for example, in the U.S. Forest Service's 2012 Forest Planning Rule—and in setting broad policy across agencies—for example, by including ecosystem-services concepts in the recent Principles, Requirements and Guidelines for Federal Investment in Water Resources (PR&G).

In recent years, considerable attention has also focused on the role that healthy and intact natural habitats can play in enhancing resilience of communities and ecosystems, including reducing

vulnerability to climate-change impacts. Multiple efforts are underway to incorporate natural and nature-based infrastructure (e.g., dunes and barrier islands) to enhance storm and flood protection, along with efforts to restore natural features (e.g., oyster reefs in the Chesapeake Bay) to benefit multiple ecosystem services, such as fish habitat and water quality. Increased emphasis on ecosystem services to enhance resilience underscores the need for a consistent framework for incorporating ecosystem services into Federal decision making.

Today, the links among land, air, fresh water, ocean, and human activities are better understood. Advances in science and technology have provided timely and usable information to guide decision making. For example, advances in the social sciences have further developed methods to articulate the value of ecosystem services in both monetary and non-monetary terms. By incorporating ecosystem services into Federal agency planning and decision making, and recognizing that healthy ecosystems are essential to human welfare, security, and the health of social and economic systems, Federal agencies will more effectively address the challenges facing the Nation and ensure ecosystems are healthy for this and future generations.

Directive. Agencies shall develop policies to promote consideration of ecosystem-services assessments within existing agency planning and decision frameworks, where appropriate and practicable, in accordance with their statutory authorities and consistent with their specific missions.

1. Policies should describe approaches for conducting decision-relevant and scale-specific ecosystem-services assessments, as well as plans for effective monitoring and evaluation.
2. These policies do not need to be standalone documents and may be most useful when incorporated into existing decision-making frameworks and analyses. Agencies are encouraged to carry out the provisions of this guidance through existing planning and strategic processes such as: Agency and Departmental Strategic Plans, Strategic Sustainability Performance Plans, and Annual Performance Reports.
3. To support agencies in this process, a forthcoming appendix will provide implementation guidance for this memorandum to suggest best practices for ecosystem-services assessment. The implementation guidance will outline an assessment framework for integrating consideration of ecosystem services into existing agency decision process and will describe the elements and approaches for sound integration of ecosystem-services concepts, such as: (1) describing the Federal action; (2) identifying and classifying key ecosystem services in the location of interest; (3) assessing the impact of the Federal action on ecosystem services relative to baseline; (4) assessing the effect of the changes in ecosystem services associated with the Federal action; and (5) integrating ecosystem-services analyses into decision making.

Implementation Process and Timelines. This policy guidance is intended to support those agencies already using ecosystem-services approaches and to encourage other agencies to prepare for implementation in a manner consistent with the forthcoming implementation guidance.

All agencies should begin or continue developing their policies. Agencies already deploying ecosystem-services analyses are encouraged to continue their efforts, but should be prepared to demonstrate over time how their approaches relate to the standards of best practice identified in

the implementation guidance, or to make appropriate adjustments going forward. Implementation of this memorandum will follow the timeline below.

1. **Description of current agency practice and work plans** (6 months; Agencies)
   (a) To inform future governance considerations, agencies shall describe how ecosystem services are currently defined, classified, and incorporated in planning, management, and regulatory decisions. This written description should characterize the current state of agency practice and provide a narrative description of current challenges, if any, which could or do impede the consideration of ecosystem services in Federal decision making. To help with this process, agencies are encouraged, but not required, to review or update existing inventories with relevant efforts, using common definitions and a common framework.
   (b) Each agency shall create a work plan, developed in an internally coordinated manner, laying out how it intends to move toward the goals of this policy directive. These work plans should build off agency descriptions of existing efforts developed in (a). They should identify specific examples of policies planned for the future, as well as identify high-priority programs, projects, or analyses appropriate for integrating ecosystem services assessments within existing decision frameworks.
   (c) Written descriptions (a) and work plans (b) should be completed and submitted to CEQ no later than March 30, 2016.
   (d) Following the release of the implementation guidance (timeline below), agencies will be expected to revise and refine their work plans to show that they are consistent with that document. Revised work plans should be submitted to CEQ within 120 days of the release of the final implementation guidance.

2. **Implementation guidance** (14 months; CEQ)
   (a) The implementation guidance will be developed in collaboration with subject-matter experts from relevant Federal departments and agencies and will be informed by the significant body of research published in the peer-reviewed literature. The guidance will be issued as an appendix to this memorandum.
   (b) The implementation guidance will be subject to an external peer review and public comment period, consistent with the requirements of the Office of Management and Budget (OMB)'s Final Information Quality Bulletin for Peer Review.
   (c) Prior to release for external peer review, there shall be an interagency review period of the implementation guidance of not less than 30 days.
   (d) External peer review will commence no later than November 30, 2016. The memo will be finalized and released following the resolution of the peer review and public-comment process.
   (e) The implementation guidance is intended to be a living document and will be updated as needed to incorporate emerging science and new methodological advances.

Governance and Interagency Coordination. Full integration of ecosystem services into agency decisions will be a long-term process, taking place over many years, as agencies modify existing programs and policies in accordance with the practices outlined in the implementation guidance. Ultimately, successful implementation of the concepts in this directive may require Federal

agencies to modify certain practices, policies, or existing regulations to address evolving understandings of the value of ecosystem services.

Moving forward, CEQ, in consultation with OMB, OSTP, and CEA, will facilitate interagency coordination and engagement around ecosystem services, including supporting agencies in their work to incorporate ecosystem-services assessments in decision making. CEQ, in consultation with OMB, OSTP, and CEA, will also coordinate with existing work groups and other governance structures to develop a longer-term strategy for providing sustained leadership and interagency coordination around ecosystem services. Such ongoing coordination is needed to provide support and oversight for agency work plans and to share best practices for integrating ecosystem services into Federal decision making, including policy development and institutionalization, alignment of data and tools, implementation of relevant research priorities, and integrating assessments into program and project analysis.

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: ANDREW KOZELOUZEK

Street Address: 1333 VALLEY VIEW DR

City: CLOQUET State: MN Zip Code: 55720

Phone or Email: andrew.kozelouzek@enbridge.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

The draft EIS is very thoroughly written and has addressed any potential concerns. I request the DOC move forward on the legally approved process and not delay the schedule. There are no issues I see with the EIS.

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Kraemer, Kelly (Faculty) <KKraemer@CSBSJU.EDU>
Sent: Monday, July 10, 2017 8:42 PM
To: MN_COMM_Pipeline Comments
Subject: Docket #s CN-14-916 and PPL-15-137

>
> To Those Involved in This Decision:
>
> We do not need a new Tar Sands pipeline in Minnesota! Tar sands oil is incredibly destructive to the environment. The state of Minnesota should be investing in renewable energy sources that are viable for our planet, not a new pipeline that will allow more corporate pollution.
>
> Moreover, this pipeline cannot be built without the free, prior, and informed consent of the Tribes of the 1855 Treaty Territory. Given the disproportionate impacts Line 3 would have on indigenous communities building a pipeline through their lands without their consent, interfering with their traditional hunting and disjoint practices, is the definition of environmental racism. This pipeline as planned will pass through pristine lakes and flourishing wild rice beds, while also endangering three major watersheds.
>
> Additionally, the profound social and ecological devastation caused by the Alberta Tar Sands mining in Canada is absolutely unacceptable and Minnesota must refuse to be complicit. Just because the destruction is happening in across the border does not mean we should ignore it.
>
> Instead of building Line 3, Enbridge must be required to clean up and remove their old pipelines, not abandon them for future generations to deal with. It's in the best interests of all Minnesotans to get rid of the pipelines that run through our state, not allow the construction of another.
>
> Sincerely,
> Kelly Rae Kraemer
> St. Cloud, MN

Levi, Andrew (COMM)

From: Kraemer, Kelly (Faculty) <KKraemer@CSBSJU.EDU>
Sent: Monday, July 10, 2017 1:22 PM
To: MN_COMM_Pipeline Comments
Subject: Stop Enbridge Line 3

To Those Involved in This Decision:

We do not need a new Tar Sands pipeline in Minnesota! Tar sands oil is incredibly destructive to the environment. The state of Minnesota should be investing in renewable energy sources that are viable for our planet, not a new pipeline that will allow more corporate pollution.

Moreover, this pipeline cannot be built without the free, prior, and informed consent of the Tribes of the 1855 Treaty Territory. Given the disproportionate impacts Line 3 would have on indigenous communities building a pipeline through their lands without their consent, interfering with their traditional hunting and disjoint practices, is the definition of environmental racism. This pipeline as planned will pass through pristine lakes and flourishing wild rice beds, while also endangering three major watersheds.

Additionally, the profound social and ecological devastation caused by the Alberta Tar Sands mining in Canada is absolutely unacceptable and Minnesota must refuse to be complicit. Just because the destruction is happening in across the border does not mean we should ignore it.

Instead of building Line 3, Enbridge must be required to clean up and remove their old pipelines, not abandon them for future generations to deal with. It's in the best interests of all Minnesotans to get rid of the pipelines that run through our state, not allow the construction of another.

Sincerely,
Kelly Rae Kraemer
St. Cloud, MN

Levi, Andrew (COMM)

From: rrkelk@comcast.net
Sent: Monday, July 10, 2017 12:37 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline Project

Dockets CN-14-916, PPL-15-137. Please favor the preservation of the environment of Northern Minnesota. Please consider the Ojibwe bands, and all those who live in , recreate in, and revere this area of Minnesota.
Thank you.
Eleanor Krahn
Lake Elmo, Minnesota

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
BRAD KRAL	507-766-0563	
ADDRESS		
10914 Shag Rd		
CITY, STATE, ZIP		
New Ulm MN. 56073		

COMMENTS Jobs ect.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Michelle Kramer
To: MN_COMM_Pipeline Comments
Cc: Michelle Kramer
Subject: Line 3 Pipeline Project
Date: Monday, May 22, 2017 1:56:03 PM

To whom it may concern;

I am writing because I am a resident of Minnesota and own a lake home in Emily, MN.
It appears from the Star Tribune ad (Sunday, May 21.2017) that one or more of Enbridge's pipeline proposed routes could have an indirect effect on our property.

I know I will join the ranks of a majority of homeowners in Northern Minnesota who are adamantly opposed to this proposal and feel that the potential disaster that a pipeline leak would have on the pristine lakes/wetlands of Northern Minnesota should outweigh any benefit the state would receive from allowing this pipeline to cut through an area of our state that is enjoyed by so many Minnesotans and is a Hallmark of Minnesota tourism.

I am not an activist and have never taken the time to write to someone within the state department to voice an opinion on something being considered by the state.
However, I can't believe that this proposed pipeline and the potential locations are the only viable alternatives the state of Minnesota has at this time.

Why is it necessary to add yet another pipeline? I understand that it is to replace the existing pipeline but why does this have to run through Minnesota? Why not extend it through Canada to get to feasible shipping?
If one of these pipeline routes is approved then why wouldn't you require Enbridge to remove the existing line from underground as it will continue to decay (and I can only assume the residuals in that line will then leech into our ground water)?
Why isn't there an alternative route that will not potentially affect the numerous lakes/rivers/wetlands of Northern Minnesota?

I'm not confident that my letter will be considered in this decision making process but I want you to know that as a Minnesota tax payer and voter, I am very much against this pipeline. Regardless of whether or not it is "in my backyard" I would not be in favor of allowing another oil pipeline to run through one of our state's most treasured areas with numerous lakes/streams/wetlands and wildlife.

Thank you for your consideration,

Michelle Kramer

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Joseph J Kramer	320-237-1158	
ADDRESS		
PO Box 57		
CITY, STATE, ZIP		
Watkins MN 55389		

COMMENTS

It Needs To Happen! The old line Isn't Getting Any Better! Every Day We Let This Line In We Are Asking For A Spill!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Susan Krenz	612-247-4245	susan.krenz@unitedpipe.us

ADDRESS: 1800 Krenz Rd

CITY, STATE, ZIP: Barnes WI 54873

COMMENTS: I support Line 3!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Bruce Kriens <rkriens@gmail.com>
Sent: Sunday, July 02, 2017 7:41 AM
To: MN_COMM_Pipeline Comments
Subject: About Time

Dear Ms. MacAlister,

It is about time that MN got back on board - we need the jobs, we need the oil from the US worse than we need it from the Middle East! I have personally worked with Enbridge and they do a good job!

It is good to see progress being made - let's do this and get going on the infrastructure in Minnesota also - one bridge collapse is enough!

Time to let the Saudi's keep their oil for themselves.

Sincerely,

Bruce Kriens
2050 County 41 NW
Backus, MN 56435
rkriens@gmail.com

Levi, Andrew (COMM)

From: Robin Kriens <bkriens@tds.net>
Sent: Sunday, July 02, 2017 7:35 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement

Dear Ms. MacAlister,

Great news - it's about time we got things done in MN and the US instead of taking oil from countries that hate us! We have the resources, so let's create jobs and get people off welfare and every other hand-out that is given for able bodied people that can work! It is a win-win situation! It is time to stop letting the protesting liberals and tree huggers get in the way of progress in America. Many, I am sure, find their check in their mailbox from the government and then DRIVE to the store to spend it. Thankful to see things happening again! WhooHoo!!

Sincerely,

Robin Kriens
2050 County 41 NW
Backus, MN 56435
bkriens@tds.net

Levi, Andrew (COMM)

From: Gary Kroening <G.Kroening@stategroup.com>
Sent: Monday, June 19, 2017 11:56 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement

Line 3 Replacement.

In regards to Line 3 Replacement. When a company wants to replace something that is existing to make it more safe, I do not understand? I have worked on Enbridge projects since 1991. As far as a company, they are the leader in being Safe! Over the years Enbridge has implemented an unbelievable amount of Safety standards as far as being Safe! You cannot dig next to a Pipeline any more. You have to use the Hydro VAC Method these days. This method will never allow a mechanical hit. This method is a very costly method and is just an example of the extreme precautions they take. They have so many different methods of detecting any type of problem that may occur it is unbelievable! I have worked for many different pipeline companies and Enbridge far exceeds any other company in this industry. If people think we should haul our oil by rail or truck they should be standing in line in their local Walmart as I am writing this with a Bicycle in their hands or over at the neighbors Horse farm. By the way the Bicycle will not have Tires, that is based on an Oil Product and Horse is going to starve because we will have no fuel or gas to put up hay! Enbridge has a unbelievable track record for what they have done and are continuing to improve on. Let's get started on the Line 3 Replacement and stop listening to the paid off protestors. We have many existing Lines in the state presently, By allowing this one and future lines is only going to benefit our state.
Thank You!

Gary Kroening
The **State** Group Industrial (USA) Limited
15545 Caribou Footed Drive NW
Solway, MN 56678-4657
Phone: 218-467-9266
Fax: 218-467-9267
Cell: 218-206-1374

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Levi, Andrew (COMM)

From: Christopher Krolak <cjkrolak@gmail.com>
Sent: Sunday, July 09, 2017 9:38 AM
To: MN_COMM_Pipeline Comments
Subject: Re: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

I believe there is missing data in the Line 3 DEIS. There is apparently no information from a dilbit study done by the National Academy of Sciences, which you can find here: https://www.nap.edu/catalog/21834/spills-of-diluted-bitumen-from-pipelines-a-comparative-study-of.

With so much at stake with the remaining clean lakes in Minnesota, it is important that an analysis of the findings of this study be included in the final EIS.

Thanks,

Christopher Krolak

Levi, Andrew (COMM)

From: Sandi Krueger <Sandi.Krueger@live.bemidjistate.edu>
Sent: Monday, July 10, 2017 3:28 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Route Comments on DEIS
Attachments: Promote Love.docx; Clean Water Map.pdf; Pipeline Routing.pdf

Included here is my Oil Pipeline Comments on DEIS for Final Environmental Impact Statement, concerning the Line 3 Replacement Route through the Northern Minnesota Tourism Lake Country.
Docket #'s are CN-14-916 and PPL-15-137.
The 2 Maps are; A map showing the last of the clean water in Minnesota as the green NE half, and the polluted SW half is in red.
And a map showing alternative routes that avoid the cleanest lakes like the currant route proposed in black. Rather they should
consider the blue line, red line, and purple line routes.

Sandi Krueger
Bemidji, Minnesota
Friends of the Headwaters

Promote Love, Beauty, and Balance, not the continued terror of Industrial rule polluting our environment, and destroying people's lives, forever. I have been forced to move 2 times now because of Industrial take-over of little Tourist Towns, and their surrounding areas of million dollar lake homes. First the air and water was polluted by a factory in my hometown, and then a polluting loud gravel pit at the lake cabin. Now northern Minnesota, in the Land of 10,000 Lakes, is being threatened by a Tar Sands pipeline bigger than Keystone X, called Replacement Line 3, which is just as much a NO as the Sandpiper oil from the ND Bakken was. I first heard about this some years ago when Senator Cravaak at a HS Auditorium said, China wanted this pipeline along this route...because we owe them so much money that we can't even pay back the interest...and so we have to give them what they want or they will Own us. Wow...what if the world goes to hell and this is used as a weapon ? There goes the Mississippi river from the source, and crossed several times, by amounts of oil beyond recovery, ever. People cannot believe you are even Considering going next to Itasca State Park, and crossing the Mississippi several times, they say it is Sacred ! Also beware that gravity flows in 3 directions from there. Rather, there is a map on the Friends of the Headwaters site that has 2 possible routes more south, that should work out better and we wish they would try for those.

At the last hearing in Bemidji on May 2017, a man said he comes up here to his cabin every summer of his life, but if you allow this pipeline through here, he won't come here anymore. He speaks for thousands who pay millions for the privilege to be here, and you are going to Risk taking our Tourism away ? Water is our oil, and it needs to be Protected, not Polluted by even the Risk of this pipeline ! Once the pipeline route has taken-land, it requires the land owners to patrol and report any oil spills or explosions, providing they didn't vaporize. That is too much Stress to Live With ! People are here to relax and have fun in The Lake Country ! Thank god

their is some clean lakes left in this State ! On a surveyed map from The Friends of the Headwaters Facebook site, the southern half of Minnesota is polluted, and the top third is still clean. But it is clean where you are trying to bully your way through with a huge dirty pipeline ! We cannot afford you ! And if you have a problem we cannot Trust you to clean it up, and we are not equipped ! Especially since winter has a lot of below zero weather, and the only time we have a lot of population is in the summer. People paid high prices to come here for Fun, not to constantly Fight Big Industries ! We need to keep the reasons why we are here, and for the environment of what we always expected to be held sacred, to be protected !

When I showed what I'd written to an Enbridge man at the door of a meet and greet in Dec. 2016, he pointed to the words " lies and denial" and said Enbridge didn't want to be known for that anymore. But at the May hearing, environmentalists pointed out problems with Enbridge spills and pollution that can never be cleaned up, and then the pipeline people lie and deny and say they have a great track record and leave a place better than before they arrived. Also, he laughed and said, "sex trafficking" when he read about that. It Is Not Funny ! People who might not be motivated to speak at your hearing events, are behind the scenes building shelters along the proposed pipeline route. Previous pipelines have proven to have "social problems," and even some pipeline supporters are not thrilled about it this time. In the winter during the last icy road snowstorm, 4 theaters were packed, and an auditorium was filled the next day, to learn about this problem that is so big. People plan to rescue girls and children from Pipeline Areas where too many of the men have enjoyed this problem for too many years. I know of someone who was kidnapped for this, and she was continually told she was "just a commodity," and that "everything he did he learned in prison." At a pipeline panel discussion, when we first began to learn about the Sandpiper route which is now Replacement Line 3, we studied the problems with

this proposed route. The union guy for ND and MN said, "When criminals get out and start families they need jobs." I said to him later in the hall that, " You need to hire quality people who Care to do these high risk pipeline jobs." And then we discussed options for the men's employments. Years ago I worked on a pipeline in ND, and am aware of how girls are treated, and the character of what goes on. I was a flag girl and rock picker, and locals would ask me why the pipeline was working on a Sunday, because back then nothing was open on Sundays in that state. So the pipeline doesn't follow the rules, and is a rule changer. At a job seminar on the same college stage as the panel discussion had been, the Governor was asked by an aggressive big man what he was going to do to employ the felons. For sure there are many great employees, but Pipeline experiences have been quite awful for a lot of people, and a lot more care should be taken to respect the areas you go through.

In the 5 County Tourism Lake Area on this proposed route, The Second Homeowners Survey said that by far, most important was clean water, then beauty, and peace. After 2 years of Enbridge continually delivering oil pipes to fields in preparation, and terrorizing us with their constant big truck traffic, we hope to instead keep our life sane and kind and wonderful. We Wish for them to find an already polluted route elsewhere, sorry elsewhere, but there is not much clean Minnesota water for the lakefront left. To live with the stress of waking up to black lakes is too much, and should Not be allowed in this part of the Land of Lakes.

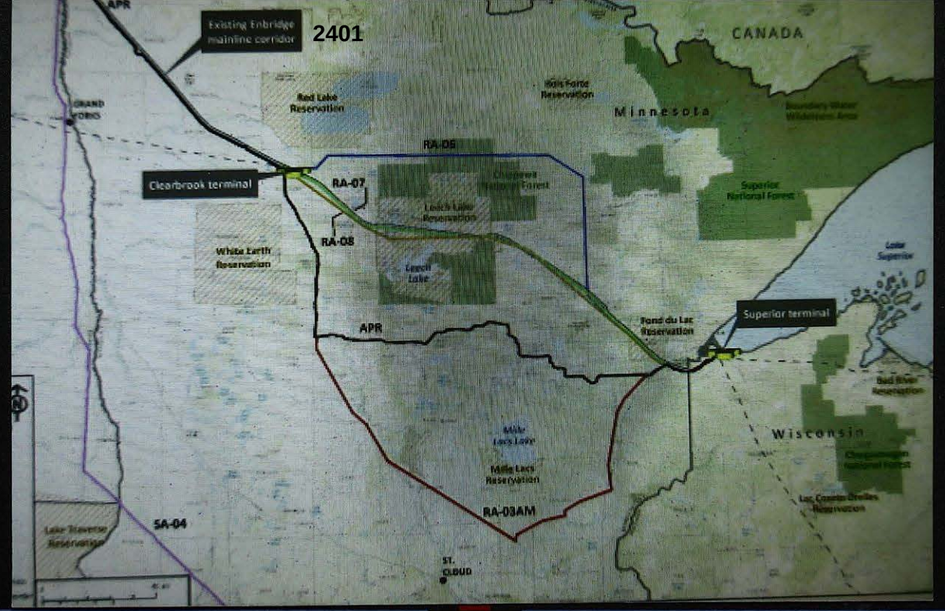
Existing Enbridge mainline corridor
2401
CANADA
Red Lake Reservation
Minnesota
RA-05
Clearbrook terminal
RA-07
RA-08
White Earth Reservation
Leech Lake Reservation
Superior National Forest
Superior terminal
Fond du Lac Reservation
APR
Mille Lacs Reservation
RA-03AM
Wisconsin
SA-04
ST. CLOUD

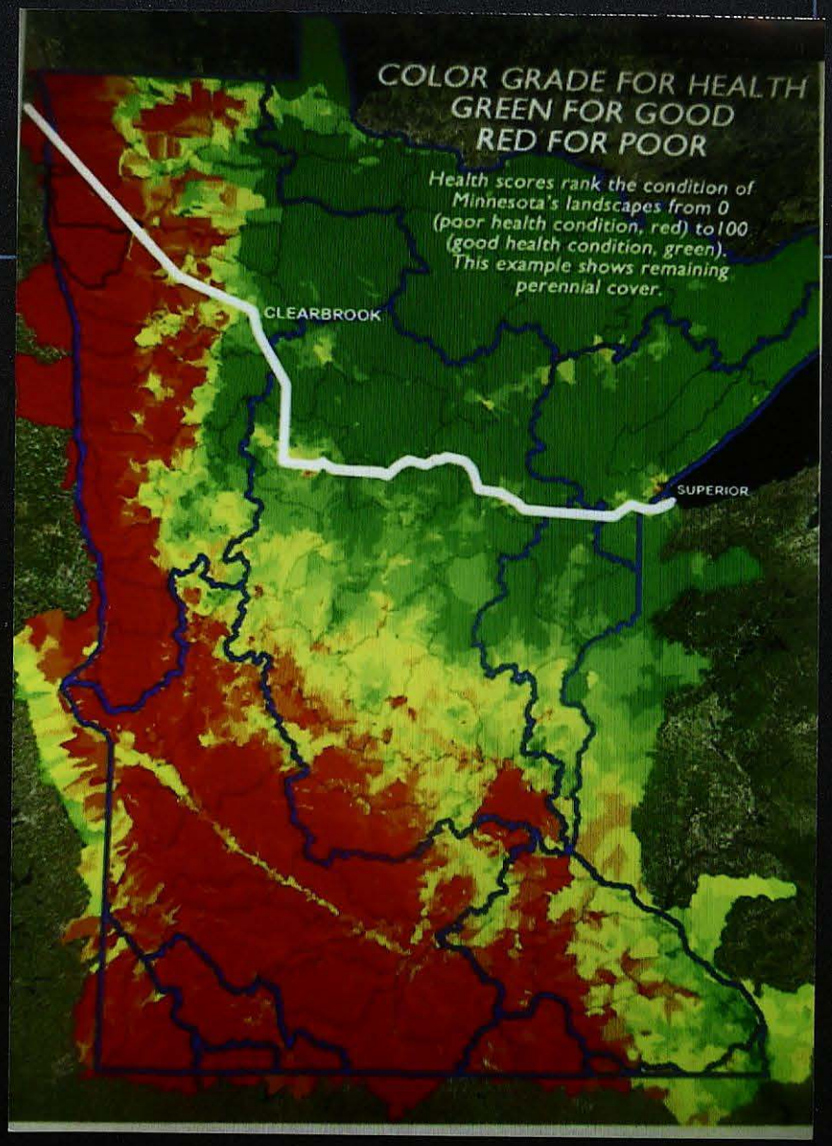
COLOR GRADE FOR HEALTH
GREEN FOR GOOD
RED FOR POOR
Health scores rank the condition of Minnesota's landscapes from 0 (poor health condition, red) to 100 (good health condition, green). This example shows remaining perennial cover.
CLEARBROOK
SUPERIOR

Levi, Andrew (COMM)

From: lyle <pahacetan@brainerd.net>
Sent: Friday, July 07, 2017 3:02 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline Proposal

Date: July 7, 2017

To: Minnesota Department of Commerce
Attn: Jamie MacAlister, Manager
Environmental Review
85 7th Place East, Suite 280
St. Paul, MN 55101-2198
(651) 539 - 0109

From: Lyle Krych
Whispering ^^^ Pine ^^^ Beach
23013 North Platte Lake Road
Hillman,Minnesota 56338-4047
(320) 360 - 9318

Dear Jamie,

This letter cannot emphasise enough for You to understand fully, my opposition to another pipeline proposal. My Mother who owns a farm in Morrison County ask me to also extend Her opposition to pipeline proposal.
When I state we, it includes my 3 Children, Friends and many Neighbors.
So, we have real estate interest in .....
Crow Wing County
Mille Lacs County
Morrison County
Please let us know that our voices have been heard and recorded by return e-mail .
We wish to be documented and counted as opposing all aspects concerning Minnesota involvement in dirty Canadian tar sands oil distribution . That would include Minnesota financial divestments from Canadian tar sands oil investments.
We have researched / studied these issues for a long time .
We have been appalled by the abuse observed against people and property, so are prepared to stand as advocates in opposition of the Canadian business of waste, destruction and pollution anywhere Minnesota .
No tankers / No Pipeline / No enbridge / No problem !
Water Is Life - Mni Wiconi - Hoka hei

From: Beth/Dan Kucera
To: MN_COMM_Pipeline Comments
Subject: Line #3
Date: Thursday, May 25, 2017 7:02:54 AM

I am a resident of NW MN and have had the current pipeline in our "backyard" for as long as I can remember. The current pipeline goes under and by many rivers, ponds, etc and have never had any problems. I know people whom have the line going through their land now and have no problem with it. I am strongly in favor of the new line #3 replacement and feel it will be a boost to our economy, energy independence while preserving our natural wildlife and environment. I am also an avid outdoorsman, hunt and fish in these same areas. Thankyou.

Levi, Andrew (COMM)

From: hkuchinka@yahoo.com
Sent: Monday, July 10, 2017 11:58 PM
To: MN_COMM_Pipeline Comments
Subject: Docket numbers CN-14-916 and PPL-15-137

Please reject the permit for Enbridge's Line 3 Pipeline project.

The pipeline poses too big a pollution risk to the lakes, rivers and Native American cultures in Minnesota.

Enbridge's plan to decommission the existing Line 3, leave it in the ground, and build a new line along a different route, is unacceptable in its lack of corporate-citizenship responsibility.

Enbridge's plan also needs clear accountability in planning for disaster prevention and response.

The company has already shown a lack of foresight and responsibility, by choosing not to remove failing lines as was possible and instead leaving a pollution-filled mess to remain behind indefinitely.

Thank you.
Heather Kuchinka
402 Bunker Drive
Northfield, MN 55057

Levi, Andrew (COMM)

From: Carl Kuhl <carl@connollykuhlgroup.com>
Sent: Tuesday, June 20, 2017 10:25 AM
To: MN_COMM_Pipeline Comments
Subject: Draft EIS for the Line 3 Replacement Project CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Pipelines are cost effective energy transportation channels that provide North America with necessary crude oil.The Line 3 Replacement Project is part of Enbridge's on-going pipeline maintenance program that will reduce the amount of future maintenance activities and landowner disruption otherwise required to maintain safe operations.

Enbridge has worked diligently with land owners and community members, including members of my extended family, to ensure voluntary statements of consent were signed and public comments and concerns were addressed. Enbridge holds it as a priority to engage with the community and work in partnership.

Enbridge has held more than 1,200 meetings with local residents in the past four years. Those most directly impacted by the project - more than 95% of the landowners, including my family in the Clearbrook area whose property would be crossed - have given Enbridge permission to cross their land.

The prompt replacement of Line 3 will ensure the safety and environmental protection of our important natural resources as well as the continued safe transportation of crude oil to refineries in Minnesota, the Midwest and beyond.

Sincerely,

Carl Kuhl
1256 Nursery Hill Ct
Saint Paul, MN 55112
carl@connollykuhlgroup.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

USA FOREVER

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Ted Kiyawa	(320) 894-1458	
ADDRESS		
309 N Main St		
CITY, STATE, ZIP		
Atwater, MN 56209		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: djkujawski@aol.com
Sent: Monday, July 10, 2017 2:49 PM
To: MN_COMM_Pipeline Comments
Subject: Attn Jamie MacAlister re: proposed pipeline 3

To: Jamie MacAlister, Pipeline.Comments@state.mn.us

re: Line 3 DEIS , Dockets CN-14-916 and PPL-15-137.

I am from your neighboring state of Wisconsin.
The Line 3 Pipeline concerns me because of its high potential for irreversible pollution of a pristine wilderness area.
The DEIS concerns me because: I do not feel that a proper study has been done of the IMPACT a pipeline like this could have, both to the water and to tourism in the region. The boundry water area, which I have canoed many times both with my family and my scouting troops, should remain unscathed by mankind and its pollution SO THAT FUTURE GENERATIONS MAY ENJOY ITS BEAUTY.

I would like to see the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and make the corporation who put it there remove it from the ground & clean up their mess.

Please, think 7 generations ahead, what kind of planet will future generations inherit?
What will they think of US if we do not act to protect our few wild places?
Do not let big oil destroy this beautiful wilderness area.
All pipelines leak, eventually. Its just a matter of time before they do.
Please deny Line 3.

Sincerely,
Debbie Kujawski

Menomonee Falls WI

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Walter Kuhlman	218-565-2193	
ADDRESS [redacted]		
CITY, STATE, ZIP		

COMMENTS
This Job would help support me and my family as do all of the other Jobs enbridge has.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Mark Kuusisto <markuso@brainerd.net>
Sent: Monday, June 19, 2017 9:24 AM
To: PUC, Docketing (PUC)
Subject: CN-14-916

Mark Kuusisto

11801 Amber Ln
Merrifield, MN
56465

markuso@brainerd.net

I am a graduate of SCSU and received my Master's degree in Aquatic Biology. We are blessed to have the cleanest, freshest, most natural water in the country. Water is the most precious resource to life period. This resource should be of national interest and regarded as economically, culturally, and socially necessary to a healthy state overall. There is no place, especially with modern understanding of the chemical materials, for these two complex substances to be anywhere near each other. As part of my education I was taught that these substances are not uniform from place to place; meaning they are chemically different, from one area to another, one lake to another, one counties lakes from another, one geographical region to another. There are no two perfectly analogous bodies of water. The chemical differences tell the story of what could happen if oil contaminates the water resources whether at the surface or underground. Some places due to chemical interactions will result in harmful distribution to surrounding ecosystems much faster than others. The illustrations of this abound across the country and are extremely well documented in a very similar substance to oil in this regard; creosote. Creosote was an important treatment for railroad ties and plants to create them for a growing country were necessary. Containment of creosote waste was nonexistent and holding ponds were little more than earthen pits. This was the standard for a very long time and in hindsight very bad. Every creosote tie treatment plant that was ever built is a Superfund site and uses tax dollars to continually remediate the toxic effects to the environment. An excellent example comes from the long lasting effects in a town I grew up near named Baxter. Baxter had a large tie treatment plant closed decades ago and recently when the booming town decided to build wells for the citizens to have city water they found the water was contaminated by creosote chemicals everywhere they tested to the point they could not use the water, it was untreatable for safe consumption by any reasonable method, and had to engineer long lines from the nearby town Brainerd for water supply. The chemicals continue to meander via the underground aquifers continually contaminating the environments as they go. There really is no way to stop them. Some chemicals in this concoction are heavy and sink down and some chemicals are light and flow on the surface, the same would be true of crude oil. When a spill occurs there really is no way, in the areas the line is proposed to run, that containment and proper cleanup could occur, not to mention our changing seasons hampering or even completely halting such an operation. Why on earth would we allow crude oil to even have the potential to come into contact with our precious water.

The existing lines should be removed carefully and quickly. Leaving them in the ground and any arguments for this are truly disturbing. This will turn inevitably into a future environmental disaster. The line will deteriorate as it is already and will break down leading to contamination all along its route. This should be common sense. What is better; to remove pipe intact or have to dig oily rust chunks out of the ground later. Any arguments against removal are highly suspect.

Any new lines should be run far south away from any bodies of water. The argument that this is economically unfeasible is purely ridiculous and in effect means the company doesn't believe in long term investment which should be a red flag all on its own. Also the union shouldn't care about longer construction times and in fact should be for it. The union

from all that I seem to gather from them, advocates about their willingness to keep working at the job at hand regardless of duration. Wouldn't a longer route be exactly what the unions would and should advocate for. Production and construction in all senses using steel is relatively cheap compared to the costs of meaningful environmental cleanup should a disaster occur.

Please do not let a new line be built across our most treasured resources and please remove any existing lines from the ground.

Sincerely,

Mark Kuusisto

Levi, Andrew (COMM)

From: Mark Kuusisto <markuso@brainerd.net>
Sent: Monday, June 19, 2017 9:24 AM
To: PUC, Docketing (PUC)
Subject: PPL-15-137

Mark Kuusisto

11801 Amber Ln
Merrifield, MN
56465

markuso@brainerd.net

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Please do not let a new line be built across our most treasured resources and please remove any existing lines from the ground.

Sincerely,

Mark Kuusisto

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: RAY Kvalvog

Street Address: 323 48th St SW

City: Moorhead State: MN Zip Code: 56560

Phone or Email: 2hotelboys@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

By the constant updates you have performed as a land owner I could not be more pleased. Your efforts to always be informative and care about the land you work on speaks volumes. When monies need be paid out Enbridge is more than fair!

Thanks for listening!

Ray Kv

If including additional pages please number them and tell us how many you are providing:_____ pages

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

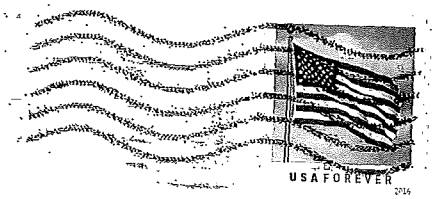

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
SCOTT KYROLA		
ADDRESS		
5940 LAUNDUE RD		
CITY, STATE, ZIP		
Duluth MN 55803		

COMMENTS

I FEEL THAT PIPELINES ARE THE SAFEST MODE OF TRANSPORTATION FOR OIL PRODUCTS & THAT TO ADVANCE OUR NATION & OUR AREA WE NEED APPROVAL OF THE LINE 3 REPLACEMENT PROJECT

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Kevin Pranis <kpranis@liunagroc.com>
Sent: Monday, July 10, 2017 4:03 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 DEIS Comments (organization and members)
Attachments: Line 3 DEIS Comment Forms.pdf; MN PUC Enbridge L3 DEIS MNLDC Comments 7-10-17 FINAL.pdf

LABORERS DISTRICT COUNCIL
MINNESOTA AND NORTH DAKOTA
Affiliated with Laborers International Union
of North America

81 E Little Canada Road • St Paul, Minnesota 55117
Ph (651) 653-9776 • Fax (651) 653-9745 • council@mnldc.org

TODD T. PUFAHL
President & Business Manager

July 10, 2017

Via Electronic Filing

Mr. Daniel P. Wolf
Executive Secretary
Minnesota Public Utilities Commission
121 Seventh Place East, Suite 350
Saint Paul, MN 55101-2147

Re: In the Matters of the Applications of Enbridge Energy for a Certificate of Need and Pipeline Routing Permit for the Line 3 Replacement Project; MPUC Dockets Nos. PL-9/CN-14-916 and PPL-15-137; OAH Docket Nos. 11-2500-32764 and 65-2500-33377

Dear Mr. Wolf:

The Laborers District Council of Minnesota and North Dakota, Intervenors in the above-referenced matters, respectfully submits these comments regarding the Draft Environmental Impact Statement for the proposed Line 3 Replacement Project.

We have electronically filed this document with the Minnesota Public Utilities Commission, and copies have been properly served on the parties on the attached service list.

Thank you for your attention to this matter.

Sincerely,

Kevin Pranis
Marketing Manager

Enclosures
c: Persons on the Service List

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

Nancy Lange	Chair
Dan Lipschultz	Commissioner
Matthew Schuerger	Commissioner
Katie Sieben	Commissioner
John Tuma	Commissioner

IN THE MATTER OF THE APPLICATION OF NORTH DAKOTA PIPELINE COMPANY LLC FOR A CERTIFICATE OF NEED AND PIPELINE ROUTING PERMIT FOR THE LINE 3 REPLACEMENT PROJECT IN MINNESOTA	MPUC Dockets Nos. PL-9/CN-14-916 and PPL-15-137 OAH Dockets Nos. 11-2500-32764 and 65-2500-33377

LABORERS DISTRICT COUNCIL OF MINNESOTA AND NORTH DAKOTA'S COMMENTS ON THE LINE 3 REPLACEMENT PROJECT DRAFT ENVIRONMENTAL IMPACT STATEMENT

The Laborers Union of Minnesota and North Dakota ("Laborers Union") wants to begin by thanking the Department of Commerce for producing a Draft Environmental Impact Statement (DEIS) that meets and exceeds the requirements of state law. The DEIS is comprehensive, covering the full range of potential environmental impacts of Enbridge's Line 3 Replacement project and proposed alternatives in exhaustive detail. At the same time, the release of the DEIS is timely, providing ample opportunity for public input and a final decision within the 280-day time frame established by state law.

The DEIS reinforces the Laborers Union's view that the project is both critically necessary and the best option for protecting Minnesota's communities and environment. We believe that Replacing Line 3 is crucial to the safety and reliability of Minnesota's pipeline infrastructure, and we appreciate the work done by the Department of Commerce to create a comprehensive DEIS in a timely fashion, which should allow the Public Utilities Commission to address the issue within the 280 timeline established by state law.

The DEIS shows that Line 3 is old and out-of-date, and that the proposed replacement would protect Minnesota's lakes, rivers, and streams by reducing spill risk nearly 40%. Protecting the natural environment is

important to our members because so many of us hunt, fish, and enjoy the outdoors, and we're committed to having pipelines operated safely.

Minnesota depends on Line 3 for the fuel that keeps the state moving. If anything happened to the pipeline, our members and contractors would be hardest hit. Construction workers often drive long distances to reach job sites, and fuel is a major factor in construction costs. The proposed Line 3 Replacement would help to prevent shutdowns or other impacts that would harm area consumers. The DEIS shows that alternative modes of transport are neither viable nor preferable to replacing Line 3

Finally, the pipeline industry is a leading source of the quality, family-supporting jobs that are in increasingly short supply in Northern Minnesota. It's not just construction workers: pipelines employ engineers, inspectors, technicians, marketers, etc. The Line 3 Replacement will keep our pipelines operating safely and efficiently so we keep Northern Minnesota working.

As stated previously, we believe that the DIES is substantially complete with respect to analysis of environmental impacts, but we have identified a handful of areas where the document falls short in its review of the potential economic and community impacts of the project and proposed alternatives.

Construction job impacts. The analysis of construction job impacts in the DEIS is based on the flawed assumption that the project would not create any local construction jobs, and would instead be built by non-local workers. The document makes clear that a non-local workforce is a hypothetical placeholder rather than a finding or even a prediction about the project.

Nonetheless, it is disappointing that the authors clearly did not consult sources with expertise in the staffing of pipeline construction projects, including organizations such as the Laborers Union that participate actively in the Line 3 permitting process. Our members could have explained that local hiring is not only commonplace, but actually required under our Collective Bargaining Agreement (CBA), which specifies that contractors hire at least half of their workforce through local union hiring halls.

It would be more realistic to assume, based on past projects, that at least half of the construction jobs on the project will be held by Minnesota residents, and that Northern Minnesotans will account for a third of the workforce. This is likely to be true, not only because our CBA requires local hiring, but also because Minnesota has a heavy concentration of skilled

pipeliners, including many who typically work out-of-state but would return home to work on Line 3.

The document's non-local workforce assumptions skew the report's findings on community and economic impacts, exaggerating the potential strain created by a traveling workforce and understating the short- and long-term economic impacts of the payroll, benefits, and career opportunities that the project would generate for local residents. This shortfall could be corrected through the use of more realistic local hiring assumptions, which we and other pipeline unions could help to substantiate.

In addition to correcting assumptions concerning the residence of the workforce, we suggest that the DEIS make a greater effort to articulate the collateral benefits that can be produced by a union construction project such as the Line 3 Replacement. For example, in addition to union paychecks, hours worked on the project will provide high-quality family health coverage for hundreds of union households, as well as pension contributions that help to pre-fund a dignified retirement.

On a typical project, benefits for a pipeline laborer could include 13 months of fully-paid family health care and over $10,000 in pension contributions. Further, large projects such as the Line 3 Replacement typically create new opportunities for local residents without previous union construction experience to begin construction careers. In fact, many Minnesota residents currently working on pipeline projects elsewhere got their start on a big local project such as the Alberta Clipper pipeline.

Our union would be happy to provide Department of Commerce staff and consultants with additional information about our experience with local hiring and the collateral benefits of employment in the union pipeline construction industry.

<u>No-Action Alternative:</u> The DEIS provides a fairly thorough comparative analysis of the spill risks associated with proposed project and its alternatives, but we believe that the document understates risks associated with the No-Action Alternative for two reasons.

First, the analysis lumps Line 3 with other aging pipelines for the purpose of calculating a spill incidence rate, ignoring the extensive evidence and analysis filed in Enbridge's direct testimony which show that Line 3 faces integrity challenges that are much greater than aging peer lines, including Enbridge lines located in the same corridor.

By simply treating L3 as an "old" pipeline rather than a line with a unique set of problems, the DEIS underestimates the risks posed by the No-Action alternative and the relative benefit of replacement. Laborers Union members who have worked on Line 3 can testify to these unique challenges. As one member put it:

> "You look at the pipe and you can see the problems with the materials they used and how it was installed. We haven't built pipelines that way in my lifetime. It's in much worse shape than other Enbridge pipelines I've seen, the tape coating has mostly come off and there's corrosion and cracking all over."

Second, while the DEIS provides extensive analysis of spill risks, there is relatively little information on the potential impact of a Line 3 shutdown that could occur as the result of a spill, spill-prevention efforts, or other operational problems. Line 3 is a major source feedstock for area refineries that provide thousands of jobs and fuel for millions of Minnesota residents, and any disruption could have an immediate impact on local jobs, fuel prices, and fuel supplies.

Rail Alternatives. We have learned over the past few years what can happen when rail lines get crowded with oil tankers, but the DEIS apparently makes no mention of how the rail alternative could lead to more accidents and injuries at rail crossings. The US State Department has looked at this issue in their Keystone analysis, and MnDOT has done the same. We recommend that the DEIS incorporate the findings of these reviews, which show that shifting crude oil from pipelines to rail lines is likely to be directly associated with an increase in injuries and fatalities at rail crossings.

SA-04 – Pipeline to Nowhere. We anticipate that other parties may have other areas where they would like to see expanded analysis. One that we do not recommend is further review of SA-04, a so-called system alternative that we believe does not deserve consideration because it serves no purpose. The problem with SA-04 should be obvious: it not only fails to meet Enbridge's need to make deliveries of crude oil at existing terminals in Clearbrook, MN and Superior, WI, but even worse, would cut off Enbridge's Minnesota customers – including the Pine Bend and St. Paul Park refineries that supply the bulk of the region's gasoline – from Line 3 shipments. SA-04 is, in effect, a pipeline to nowhere, and we believe that resources would be better spent investigating impacts of alternatives that at least theoretically serve the need and might be built.

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Joe Jensen

Address: 24989 Heath Ave N City: Forest Lake State: MN Zip: 55025

E-mail: jjjensen@Edu.com

Comments (Please Print): I Believe this pipe Line Needs to Be replaced Before it Fails & causes A Enviromental Hazard Also causing A physical Hazard to the residents in the area. It is unreasonable Not to replace this line that Has reached its MAX LiFE!!!

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Dan Brady

Address: 7601 63rd Ave N City: Brooklyn Park State: MN Zip: 55428

E-mail: dbrady@local563.org

Comments (Please Print):

Kicking the can down the road is unacceptable. Line 3 is 50 years old and must be replaced to protect residents and the Environment from potential damaging spills or major disruptions to fuel supplies.

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Tom Pender

Address: P.O. Box 887 City: Elk River State: MN Zip: 55330

E-mail: —

Comments (Please Print):

I'm a 43 yr member of LIUNA. I've worked on many different types of construction jobs over the years. In recent years, safety has become a more important part of the jobsite. Safety has been a very important part of a Laborers Career. Hoping that Line 3 goes with Union Laborers on the job.

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Keith Petersen

Address: 1023 West Broadway City: Monticello State: MN Zip: 55362

E-mail: Kpetersen@local563.org

Comments (Please Print):

Its 50 years Old lets fix the problem now

There will be alot of good jobs this will create

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Ryan Connelly

Address: 901 14th Ave NE City: Minneapolis State: MN Zip: 55413

E-mail: rconnelly@local563.org

Comments (Please Print):

Fix Line 3 now it can't wait.

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Tony Wicken

Address: Blaine 2125 119th Ave City: State: MN Zip: 55449

E-mail: twicken@ liunagroup.com

Comments (Please Print):

Line 3 is 50 yrs old its time is up.

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: DWIGHT · ENGEN

Address: 994 Bavaria Hills Circle City: Chaska State: MN Zip: 55318

E-mail: deets81@gmail.com

Comments (Please Print):

I work with Laborers Union Members and union contractors who do this important work which gives America more Energy independence. Our stakeholders are the highest skilled, Best Trained and build Pipeline projects with the Highest integrity, which benefits the economies and America.

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Greg Hegeholz

Address: 1919 Waterford Cir City: Chaska State: MN Zip: 55318

E-mail: ghegeholz

Comments (Please Print):

Replace Line 3 it need updating Very Bad

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: DAVE KEPHART

Address: 380 MORGAN City: AFTON State: MN Zip: 55001

E-mail:

Comments (Please Print):

Replace

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: GARRY CANTIN

Address: 7625 173rd ST W City: LAKEVILLE State: MN Zip: 55044

E-mail: CANTIN@CHARTER.NET

Comments (Please Print):

LINE is 50 YEAR old should BE replace
I WAS 7 YEAR old went it WHEN IN, and now
I'm 57 YEAR old

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Richard Benson

Address: 509 1st Ave NE City: Buffalo State: MN Zip: 55313

E-mail:

Comments (Please Print): We need People with the Back Bone to Stand-up to the GOP and Tell them the way it Should Be

PAPPX

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Scott Wilson

Address: 1592 US Highway 12 City: Hammond State: Wi Zip: 54015

E-mail:

Comments (Please Print):

Big projects like line 3 create new opportunities for the workforce. line 3 will be a pipeline to the middle class, connecting vocational opportunities to careers in the trades.

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Travis Strozyk

Address: 921 Rice Creek terrace NE City: Fridley State: MN Zip: 55432

E-mail: TStrozyk@yahoo.com

Comments (Please Print):

I live in the local community and support line 3. Kicking the can down in the road is unacceptable.

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Curtis DeYoung

Address: 46725 Tucker St City: Stanchfield State: MN Zip: 55080-7900

E-mail:

Comments (Please Print):

union jobs with good pay & supporting a family

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Randall Spencer

Address: 4120 Maple Hurst Dr So City: Rockford State: MN Zip: 55373

E-mail: ~~Rjr~~ rspencer @ umn.edu

Comments (Please Print):

50 years old and needs to be replaced

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Austin Judge

Address: 8500 Park Ave S City: Bloomington State: MN Zip: 55420

E-mail: amjudge84@msn.com

Comments (Please Print):

Line 3 needs to be replaced and now is the time.

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Johnny Harris

Address: 11133 Louisana Ct. East City: Champlin State: Mn Zip: 55316

E-mail: N/A

Comments (Please Print):

We need work for every one

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: CARL May

Address: 6810 63 AVE N APT 306 City: Brooklyn PARK State: MN Zip: 55428

E-mail:

Comments (Please Print):

This is a great opportunities for long term work

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Mark Asher

Address: N2605 W. Co. Rd. C City: Elmwood State: WI Zip: 54740

E-mail: mmmasher@gmail.com

Comments (Please Print):

Line 3 integrity issues are a big hazard to the locals, spills, ground water contamination.

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Nick Slavicek

Address: 32395 Co Hwy 26 City: Rochert State: MN Zip: 56578

E-mail: Nslavicek@local563.org

Comments (Please Print):

Being pro active is the only way to protect the enviroment and still help develope jobs, By doing this project we are helping both sides of the issue, Jobs/Enviroment

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Matt Illing

Address: 4050 Clearwater Trail City: Lonsdale State: MN Zip: 55046

E-mail:

Comments (Please Print):

Big Projects like Line 3 create new opportunities for workforce like Skill bec pipeline to the middle class connection Location opportunities committee Trades

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Tom Verea

Address: 28230 Durant st. City: Isanti State: MN Zip: 55040

E-mail: tVerea@local563.com

Comments (Please Print):

I would like to see a NEW line installed Because the old line is in need of complete replacement! No more leaks!

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Todd Mutch

Address: 1018 whitney DR City: Apple Valley State: MN Zip: 55124

E-mail:

Comments (Please Print):

replace it it's 50 year's old

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Will Wilson

Address: 8611 36 1/2 C N City: New Hop State: MN Zip: 55427

E-mail:

Comments (Please Print):

help keep us a job.

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Kyle M Sobaski

Address: 6864 rustic ln City: Lino Lakes State: MN Zip: 55014

E-mail: Ksob2008@gmail.com

Comments (Please Print):

put my brother and sister to work

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Chris Pettie's

Address: 9586 Junco Rd N City: Lake Elmo State: MN Zip: 55042

E-mail: CPettie@Local563.org

Comments (Please Print):

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: BRIAN AURE

Address: 4146 41 ave so City: MPLS State: MN Zip: 55406

E-mail: aure 4146@gmail.com

Comments (Please Print):

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Charles Snell

Address: 15 Wyoming St. E City: St. Paul State: MN Zip: 55107

E-mail: —

Comments (Please Print):

Re Place it it's Time To UP Date-
to Safe Specks

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Mike Schulenburg

Address: 1205 Ivy Ave East City: St Paul State: MN Zip: 55106

E-mail:

Comments (Please Print):

The line is older Than mepnd I 55
I Feel it should Be replaced
Soofty First

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: ERIC ENGSTROM

Address: 10236 KARSTON AVE NE City: ALBERTVILLE State: MN Zip: 55301

E-mail: eengstrom@local563.org

Comments (Please Print):

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Ron Huhne

Address: 3017 140th Ave NE City: Ham Lake State: MN Zip: 55304

E-mail:

Comments (Please Print):

Please take care of our old infrustructure before we have more problems and more unnessusary Expense

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: JIM BECKLIN

Address: 3667 91ST AVE NE City: CINNAMINSON State: NJ Zip: 5501

E-mail:

Comments (Please Print):

I SUPPORT UNION PIPELINES

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: SETH TAYLOR

Address: 768 McKNIGHT RD. N. City: MAPLEWOOD State: MN Zip: 55119

E-mail: staylor@local563.org

Comments (Please Print):

OLD, OUTDATED PIPE WILL CAUSE MORE HARM TO THE ENVIRONMENT THAN REPLACING WITH A NEW LINED PIPE

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: F T Loeffler

Address: 3244 Hiway 61 City: VADNAIS State: Mn Zip: 55110

E-mail: floeffler52@gmail.com

Comments (Please Print):

THIS IS a replacement line!
IT is Essential that infrastructure
is uptodate not only for oil transport
but To protect the ENVIRONMENT
and the people who reside nearby!

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: TOM SONDAY

Address: 2515 XYLON AVE. S. City: St. Louis PARK State: MN Zip: 55426

E-mail: TCSONDAY@OUTLOOK.COM

Comments (Please Print):

At 50 years old, it is time to replace Line 3 before it has a failure.

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: James S. Mackey

Address: 928 W 7th St City: Hastings State: MN Zip: 55033

E-mail: JKMACKEY@COMCAST.NET

Comments (Please Print): Having Been in the construction industry for more than 20 years, knowing how safety conscience our contractors are and knowing that the line is 50 years old and need of replacement, I believe we "need" to move ahead with its replacement. The longer we wait, the more expensive it will become and the chance of leaks and ruptures become greater. Let's get this done.

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Joe Navejas

Address: 1308 Spring Rd City: Faribault State: MN Zip: 55021

E-mail: jnavejas@liunagroc.com

Comments (Please Print):

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Benjamin Long

Address: 95 Victoria St. S Apt. 19 City: ST Paul State: MN Zip: 55105

E-mail: Benlong66@gmail.com

Comments (Please Print):

Fix the leaks and put us to work!

Laborers' International Union of North America

LiUNA!

Feel the Power

Line 3 DEIS Comment Form

Name: Tim Ohlgren

Address: 2531 Alpine Dr. City: Woodbury State: MN Zip: 55125

E-mail: tdohlgren@yahoo.com

Comments (Please Print):

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Louis LaBossiere		
ADDRESS		
34031 Unity AVE		
CITY, STATE, ZIP		
Taylors falls MN 55084		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Katie Lacy
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137
Date: Wednesday, May 31, 2017 12:33:22 PM

To Whom it may concern:

This is my comment for docket numbers CN-14-916 and PPL-15-137.

Enbridge's new tar sands pipeline threatens the territories and survival of the Anishinaabe people. It would poison their water and bring more climate chaos for everyone. And we don't need it - now is the time to move to clean energy, and create a future for those who come after us.

The Great Lakes are one of the most important water resources in America, and the entire world. They are already threatened by invasive species, algae blooms from farm runoff, and other pipelines. We should not have any new threats to our water security.

DO NOT allow Line 3 to be built!

Best Regards,
Katherine Lacy

Levi, Andrew (COMM)

From: Phil LaFlamme <pglaflamme@gmail.com>
Sent: Tuesday, June 27, 2017 4:13 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Hello, I have been born and raised in northern Minnesota and want to see the environment protected as I spent much time outdoors hunting and fishing. I believe that we can protect the environment and have strong infrastructure simultaneously. As an engineer myself, I have had time to review information about the existing Line 3, and am familiar with how pipelines are currently designed and operated. I believe that there is much more risk to not installing a new pipeline then to continue to use the current Line3. The safety measure ensured during design and continued with operations makes pipelines much more safe then transporting oil thru the rail infrastructure that runs through the same forests, wetlands, and neighborhoods that the proposed pipeline would.
Thank you for your consideration.

Sincerely,

P LaFlamme
3930 Munger Shaw Rd
Cloquet, MN 55720
pglaflamme@gmail.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

08 JUL 2011

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Peter Laine		
ADDRESS		
112 4th Ave East Po box 196		
CITY, STATE, ZIP		
Floodwood MN 55736		

COMMENTS
Its my Livelyhood

DECLARE THE EIS ADEQUATE WITHIN 28[illegible] DAYS

Levi, Andrew (COMM)

From: Jeffrey Sheldon <jsheldon@lakecountrypower.com>
Sent: Monday, July 10, 2017 7:43 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

My name is Jeff Sheldon

I live and work in northern Minnesota.

I am here as a resident and on behalf of Lake Country Power -- a rural electric cooperative that provides service to parts of eight counties in northern Minnesota.

We support the Line 3 replacement project. Having spent nearly 40 years in Minnesota after a tour of duty overseas in the military and having lived in the region for the past 20 years. My family and I own a small hobby farm on a lake only a couple miles from the existing Enbridge pipelines near the Mississippi River in Cohasset, MN.
My family eats the wild rice & fish from these waters. I am also proud to report that neither my family nor myself have gotten sick yet from eating Walleye from the Mississippi River.

Enbridge has been a good steward and solid corporate neighbor since I've lived in the region.

From what I have seen, Enbridge leaves the land better than they found it. The existing pipeline routes are clean, flat and plush with green grasses. The wildlife, especially the deer, enjoy them.

Enbridge is a great cooperate citizen and business. They employ people throughout the region. That is evidenced by the number of Enbridge families living in our communities, attending our local schools and churches.

Area counties would see an economic increase in their tax base along with the impact of hundreds, if not thousands, of high paying union construction jobs and many new permanent jobs to maintain the pipeline.

The process for proposing and reviewing pipeline projects is extensive and comprehensive. Enbridge has demonstrated a commitment to our region for 60 years ... this project demonstrates even more commitment for our region well into the future.

The Line 3 will also reduce reliance on crude oil imports from countries that are unstable or unfriendly to the U. S. and will move North America another step closer to energy independence and energy security.

The Lake Country Power Board resolution states:

- Enbridge provides tangible benefits to real people and jobs that pay family-supporting wages in rural Minnesota.
- It is my understanding that over Ninety-two percent of the landowners along the proposed route have signed right-of-way agreements and a broad coalition of labor, agriculture, elected officials and other industries have expressed support for the project.
- The use of this pipeline is an environmentally safe and cost-effective alternative to other transportation alternatives and the economic impact is well documented.

As an area resident and on behalf of Lake Country Power's board of directors which passed a resolution in support of the Line 3 replacement project, we support the need for this pipeline through northern Minnesota and the many benefits it will produce for the rural areas we serve -- along the preferred route to the Superior Terminal in Superior, Wisconsin.

Thank you

Sincerely,

Jeffrey Sheldon
38739 County Road 257
Cohasset, MN 55721
jsheldon@lakecountrypower.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
RAYMOND LALLY	218-644-3739	lalypope@citlink.net
ADDRESS		
5560 LALLY Rd		
CITY, STATE, ZIP		
CROMWELL, MN. 55726		

COMMENTS
Fully Support LINE 3. Pipelines are the only way to transport Oil. Trucks and trains to me are unacceptable and dangerous. Keep working.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

0968

RECEIVED

JUN 26 2017

MAILROOM

Gertrude Lambert
12282 Rambler Rd
Onamia, MN 56359
320-532-3583

I am very opposed to any pipeline carrying crude ~~tar~~ oil through a state of 10,000 lakes and virgin forest land or prairies. Enbridge has very bad history of oil spills with its pipelines. ~~It~~ It's wealthy enough that it does not need more money at the risk of damaging Mother Earth. Do any corporation members live in areas where pipelines would cause personal injury when a spill occurs? I doubt any do.

Gertrude Lambert
June 21, 2017

Levi, Andrew (COMM)

From: Gail Lampert <gaillampert@gmail.com>
Sent: Wednesday, June 28, 2017 8:08 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Draft EIS

Dear Ms. MacAlister,

Investing in aging infrastructure is essential to supporting healthy, communities. The U.S. infrastructure is outdated. I fully support the line 3 replacement project. Let's do this.

Sincerely,

Gail Lampert
14489 North Rd
Fenton, MI 48430
gaillampert@gmail.com

Levi, Andrew (COMM)

From: Chris Lamprecht <Chris.Lamprecht@genmills.com>
Sent: Friday, June 30, 2017 7:56 AM
To: MN_COMM_Pipeline Comments
Cc: MacAlister, Jamie (COMM); chrislamprecht@comcast.net
Subject: Lamprecht - Proposed Line 3 Project
Attachments: Stone Arch Bridge.jpg

My Name is Chris Lamprecht (612-750-2428) I own property along one of the proposed routes for proposed line 3 project. I have attached a picture of a stone arch bridge that is in the path of your proposed route. (Parcel I.D. # R 14.00295.30) This bridge was built in the late 1870's by the railroad. My family has farmed this property for over 70+ years and this bridge was purchased by my uncle then passed down to me. This bridge has been a true treasure to this area between Bock and Ogilvie along state highway #23 for decades, countless graduation, and wedding photos have been taken with this bridge as a back drop. You will never see another like it in the state of Minnesota or the rest of OUR country. As you can see this bridge has stood the test of time it is still in very good condition and I would like to keep it that way. If the proposed route from St. Cloud to Hinckley is used I would ask that it follow the Power line and not the old railroad bed were this bridge lies. Thanks for reading, Chris Lamprecht
Contact info chris.lamprecht@genmills.com 17060 bison ST NW Ramsey MN 55303.

Levi, Andrew (COMM)

From: karen lander <k_lander@msn.com>
Sent: Wednesday, July 05, 2017 10:02 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Replacement

I'd like to express my support for the Enbridge Replacement Pipeline. This new pipeline will bring Line 3 up to today's standards and will offer a safe and secure means of transport of a commodity that is SO IMPORTANT to our daily living. It also offers employment to local Minnesota workers while providing tax dollars for counties on its route. I'm hoping you approve this vital project. Karen Lander

Sent from my iPad

Levi, Andrew (COMM)

From: tdlinc@midconetwork.com
Sent: Wednesday, July 05, 2017 8:14 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Replacement Project

I am sending this email to give my support to the proposed Enbridge Line 3 Replacement Project. I currently have a home less than a half mile from the pipeline as it runs thru Bemidji. The movement of oil by pipeline is the safest option we have. Even though renewable energy is becoming part of our energy picture, oil is the lifeblood of our economy and way of life; it is a part of our every day living and will be for a long time. The replacement of the existing line is a project that is needed and makes perfect sense.

Please approve this project so that we can continue to meet our energy needs using the latest pipeline technology.

Respectively,

Thomas D. Lander
Bemidji, MN

2863 Galtier Street
Roseville, MN 55113
jlandretti@gmail.com

Jamie Macalister
Environmental Review Manager
MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

Dear Jamie Macalister and Staff,

My name is John Landretti. I am a long-standing Minnesota resident who lives in Roseville. I attended the public hearing in Saint Paul on June 13th. Thank you for providing the opportunity for a public response. I join the majority of the attendees at that meeting to voice my strong objections to Enbridge's appeal to create a new Line 3. I am gratified to note that most of those present at the Saint Paul meeting spoke eloquently in favor of defending the environment against the degradation this pipeline poses to our land and water. I share their detailed concerns. What follows, in bullet fashion are my major concerns and objections:

- *Stewardship and Responsibility*: Why aren't we holding Enbridge responsible for funding and removing all of the original pipeline before granting them permission to lay an alternate line? Also, if Enbridge is issued a route permit, why isn't Enbridge required to set aside funds in an escrow account to cover potential mishaps and disasters while its pipeline exists on our lands? Individual landowners should not be expected to pay for the clean-up of potential superfund sites left behind by companies like Enbridge, which may go bankrupt or dissolve or otherwise change – and so escape accountability for the problems this project will create.

- *Guidelines and Definitions:* At the state level, we should establish abandonment guidelines and definitions for intrastate crude oil pipelines. Those guidelines should make clear what Enbridge's responsibility is for the pipelines it already has in place and for any future pipelines it creates in Minnesota. This should be done before any further construction occurs.

- *Risks of Profound Environmental Damage*: Pipeline 3 and the alternate route both pass through vulnerable wetlands so pose a grave risk to these environments. Tar sands oil is very dirty and heavy, so a ruptured or leaky pipe could devastate these waters, including the Saint Louis River watershed and Lake Superior. Enbridge's history of good stewardship is not encouraging. Need I site the 1991 spill that dumped 1.7 million gallons of oil near Grand Rapids? Along with this are numerous other leaks and spills throughout that pipeline's history. Tar sands oil mining is horribly destructive and unnecessarily serves a dying industry at the expense of the wider population and the land itself. We should not support such a ruinous enterprise. We need to invest in cleaner energies that will not contribute to climate change as significantly as this new pipeline would.

My closing statement is that we refuse Enbridge's request for a pipeline permit. The risks to the common good of the state are too high, and all to profit a mining industry with a dismal record of operating responsibly and transparently.

Sincerely yours,

John Landretti

RECEIVED
JUN 19 2017
MAILROOM

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
JOHN LANGENBRUNER	218 260-7925	jlangenbrunner@yahoo.com
ADDRESS		
1729 ISLAND LAKE FALLS RD		
CITY, STATE, ZIP		
DULUTH, MN 55805		

COMMENTS

DECLARE THE EIS ADEQUATE

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

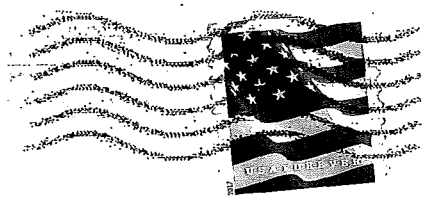

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Douglas Langer <dlanger@umn.edu>
Sent: Friday, June 23, 2017 10:29 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

Dear Ms. MacAlister,

I think we should leave Canadian oil in Canada. There is no reason to run oil through lake country and reservations. Please vote no on line 3 being increased. It can be repaired .

Sincerely,

Douglas Langer
815 Horace Ave N
Thief River Falls, MN 56701
dlanger@umn.edu

Levi, Andrew (COMM)

From: Paul Langis <aplangis5@yahoo.com>
Sent: Monday, July 10, 2017 3:32 PM
To: MN_COMM_Pipeline Comments
Subject: DEIS concern

I am from New York, the Line 3 pipeline concerns me because it is a violation of treaty rights, and is hazardous to our people's health and our environment. I want the Department of Commerce to deny the permit for the purposed Line 3, shut down the old line, and remove it from the ground! Thank you!

Sincerely,
Paul Langis

Levi, Andrew (COMM)

From: Becky LaPlant <rebeccallaplant@gmail.com>
Sent: Friday, June 16, 2017 9:45 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3

Docket numbers CN-14-916 and PPL-15-137

To: The Minnesota Department of Commerce and Public Utilities Commission,

Thank you for taking my comment. I have read enough of the EIS and other documents to feel comfortable sharing my thoughts.

I grew up in Grand Rapids, Minnesota, where I live today. I hold dear the values my parents taught me, "You always leave a campsite better than you found it," and that we "Clean up our own messes." I am opposed to Enbridge's proposed abandonment [in place] of the existing Line 3.

And I am deeply opposed to actions that do further harm to my Indigenous friends and neighbors. I appreciated that the EIS included a "Tribal Resources" section [and the Environmental Justice section too] that includes these words of truth, "American Indian communities and individuals have unique health issues associated with historical trauma and structural racism..." and this statement, "The impacts associated with the proposed Project [Line 3] and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities."

Once something has been seen it cannot be unseen. If we unpack the words "historical trauma and inequities" we see broken treaties, land grabs, boarding schools, cultural assimilation and genocide. We as a country have done enough to negatively impact Indigenous people, their health, culture, spirit and land. The Line 3 project and the new corridor perpetuates the master narrative that dictates their view as superior and that views Indigenous people and their rights as "less than". Here in Minnesota the majority of the dominant culture and most certainly those in positions of economic power have an ahistorical worldview that negatively impacts their ability to appreciate the gravitas of Indigenous voice or the intelligence of their concerns. I hope you're tracking with interest the news that on Wednesday of this week, U.S. District Court Judge James Boasberg for the District of Columbia said in 91-page decision that the Corps of Engineers did not adequately consider the impacts of an oil spill on the [Standing Rock] tribe's fishing rights, hunting rights, or issues of environmental justice when it issued the permits needed to complete the project. The Corps must

Levi, Andrew (COMM)

From: Barry Lariche <barrylarich@gmail.com>
Sent: Monday, July 10, 2017 12:25 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Public Comment

I urge the Minnesota Public Utilities Commission to deny Enbridge a Certificate of Need and route permit to construct any Line 3 replacement and urge Enbridge to begin remediation of old Line 3.

This aging pipe as ten times as many corrosion anomalies per mile than any other Enbridge pipeline in the same corridor. Enbridge wants to abandon this legacy of contamination. There are currently no regulations for decommissioning pipelines. The State of Minnesota, including the Public Utilities Commission (PUC), has the power and responsibility to regulate pipeline abandonment. Enbridge should be obligated to begin a safe and complete remediation of old Line 3.

Enbridge is one of many corporations which has experiences catastrophic failures in their systems. Just ask the people of Marshall, MI or Romeoville, IL. The MN PUC should deny Enbridge a Certificate of Need and route permit to construct any Line 3 replacement based off Enbridge's extremely poor resume and track record.

A replacement Line 3 would specifically threaten the water resources of many Minnesota residents.

Regards,

Barry Larich
Minneapolis, MN 55407

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Taylor Larsen	218-721-2823	
ADDRESS		
2317 E. CTY RD BB		
CITY, STATE, ZIP		
Superior, WI 54836		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Devin Larson

Street Address: 20586 500th St

City: Clearbrook State: MN Zip Code: 56634

Phone or Email: 218-766-4052

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I would like to comment on the Line 3 replacement project. I am in favor for the project. I have worked pipeline for 8 yrs and have made a great living. I am from a pipeline community "Clearbrook" and the pipeline is what keeps the town going along with hundreds of small towns bringing great amounts of business to all local business

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Barbi Larson

Street Address: 1920 Hwy 59

City: MLT State: MN Zip Code: 56701

Phone or Email: thetriverfalls.mn@americinn.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

As a business operator in the area our operations depends on bringing jobs and overnight visitors to the area. I fully support the replacement line and welcome it to the area. The community asks for help from area business', whether its fundraising or sponsorships we are asked to help somewhere almost daily. If we aren't bringing people & jobs to the area, our monetary support within the community decreases. We welcome anything that brings people into our area.

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Lyn Larson <lldl74@centurylink.net>
Sent: Monday, July 03, 2017 11:06 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project

Dear Ms. MacAlister,

I support this project

Sincerely,

Lyn Larson
2619 E 3rd St
Superior, WI 54880
lldl74@centurylink.net

Levi, Andrew (COMM)

From: Lori Larson <jldlarson@gvtel.com>
Sent: Wednesday, July 05, 2017 10:25 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

The DEIS has been well-prepared and the regulatory timeline should continue on schedule.

Sincerely,

Lori Larson
19837 500th St
Clearbrook, MN 56634
jldlarson@gvtel.com

Levi, Andrew (COMM)

From: Charlie Larson <charslarson@gmail.com>
Sent: Sunday, July 09, 2017 9:36 AM
To: MN_COMM_Pipeline Comments
Subject: Regarding docket numbers CN-14-916 and PPL-15-137

AS A LANDOWNER IN HUBBARD COUNTY, I OPPOSE THE BUILDING OF THE PROPOSED LINE 3 PIPELINE!!

I am concerned with the environmental impact and distrust big oils hollow pledges of environmental stewardship and having proper funding in escrow for clean up.

We are property owners at 28849 Marigold Drive, Laporte, MN

Thank you,

Charles & Mary Larson (Schmidt)

Levi, Andrew (COMM)

From: Craig Larson <craigl@lavalleyindustries.com>
Sent: Thursday, July 06, 2017 10:43 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I am a Minnesotan and want to see the environment protected like most others.
I believe replacing aging infrastructure like pipelines is imperative to protecting the environment.
The MPCA has recently released the Mississippi River Watershed report that shows the cleanest waters in the state are in northern Minnesota. Energy infrastructure and clean waters can co-exist.

I am a landowner/business owner/community member on Enbridge's preferred route and have witnessed many survey crews in my community looking for artifacts and examining our lakes and rivers over the past four years.

Pipelines are everywhere in Minnesota, according to the Environmental Quality Board's report. I'm familiar with pipeline right of ways in northern Minnesota around Bemidji, Grand Rapids, Cass Lake and Alexandria. Pipelines and natural resources have gone hand-in-hand in northern Minnesota for decades.

As a resident of northern Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project.
I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3.
No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS.
Please keep the EIS timeline to the statutory deadline of 280 days.

Deactivating a pipeline in-place is the most commonly-used industry method to retire a pipeline.
Leaving the permanently deactivated pipeline in place is the safest option as it reduces the risk of soil stability issues, avoids major construction activities and reduces the potential risk to existing pipelines from heavy equipment. As a landowner, I'd rather have the pipe deactivated in place to avoid further construction on my property.

Sincerely,

Craig Larson
37672 US 71
Lake George, MN 56458
craigl@lavalleyindustries.com

Levi, Andrew (COMM)

From: Greta Larson <gretamlarson@gmail.com>
Sent: Sunday, July 09, 2017 4:38 PM
To: MN_COMM_Pipeline Comments
Subject: Regarding docket numbers CN-14-916 and PPL-15-137

It has been the greatest joy of my life to spend spring and summer months at lake Kabekona in Hubbard county. My grandparents were high school educators that took much pride in living sustainably in economic terms, a value that enabled them to purchase what became our family cabin. They found sanctuary and community on this lake where inhabitants were “teachers and preachers.” They imparted a reverence for nature. I know what my grandparents and many of their friends would have thought about the abandonment of the existing Line 3 and construction of a new line. They would echo the phrase that has been used to protest this project: “People over profits, people over pipelines.” We further it by taking into full consideration the risk this project poses for all life.

I hope to appeal to our fellow Minnesotans that work for the Department of Commerce and the Public Utilities Commission. Please know that more of us oppose this pipeline than support it. I hope every public hearing in every county was well attended. I hope that thousands of people send in pubic comments. Please know there is a silent majority of people that feel like there opinion may not be heard or for various reasons do not have the platform and resources to express it. A friend that lived out of state for many years came back to work with Friends of the Headwaters shared a thought that I think is true of people in our state. She said people in Minnesota are mostly sustainability- minded, but are afraid to be controversial. Influenced by my entire life’s experience and more recent interactions with our communities in affected areas, I can assure those in positions of authority that the vast majority have major reservations about this project and if more people were engaged and if the real truth of the matter were laid bare, overwhelming opposition would be more apparent.

It is safe to say that a majority of people do not want a pipeline decommissioned on their own land, whether they are landowners or citizens that have a right to enjoy public lands where they they work or recreate. No one wants an oil spill. Another 1991 Grand Rapids incident is possible. The DEIS estimates the annual probability of different kinds of spills-pinhole, catastrophic, and small/medium/large leaks- on the proposed route in Minnesota. Based on the numbers provided, in 50 years we can expect 14 pinhole leaks, 54 small spills, 4 medium, 3 large and one catastrophic. I cannot believe that Enbridge will go to the necessary lengths to protect our invaluable natural resources. This company wants to move the dirtiest oil in the world and abandon the existing Line 3, with old mainlines 1, 2 and 4 to go next.

I will continue to piece through the DEIS, questioning why we allow a few people to profit at the expense of so many of us.

We can choose to live in a world where innovation keeps apace with necessity and our need right now is to stop addressing climate change in abstract. Alternatives do exist. Please support the Removal of the existing Line 3 and the Abandonment of the replacement Line 3 project.

Levi, Andrew (COMM)

From: Mary Larson <marylarson1124@gmail.com>
Sent: Sunday, July 09, 2017 9:50 AM
To: MN_COMM_Pipeline Comments
Subject: Opposition to pipeline 3

We vehemently oppose the construction of pipeline 3.! Pipelines ALWAYS leak. When will we elect officials who stand for land stewardship, and protecting the environment for later generations. The time is now to use conscience rather than dishonest manipulation of facts with false reassurances to mask corporate greed.

We have been land owners in Hubbard county for forty years. Please stop!

Docket nb. CN-14-916
PPL-15-137
We are a voting family of 5.

Mary Larson
22849 Marigold Ave.
Laporte

From: Ulysses Lateiner
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 public comment (docket numbers CN-14-916 and PPL-15-137)
Date: Wednesday, May 31, 2017 12:29:51 PM

To whom it may concern:

I write to you in regard to the proposed Enbridge Line 3 pipeline (docket numbers CN-14-916 and PPL-15-137). This project is a potential disaster and an injustice on multiple levels:

1. It will poison the land and water that it crosses. There is no such thing as a truly safe oil pipeline, as the legacy of pipeline leaks and environmental damage across the country clearly shows.
2. It will contribute to the climate chaos that Minnesota, the United States, and the planet face in our near future as a result of our addiction to carbon-based dirty energy sources. Tar sands oil is one of the most carbon-polluting energy sources in use, and for the sake of the planet's long-term health, we cannot burn it.
3. It will increase reliance on outmoded, dangerous, unsustainable carbon-based energy, when we need instead to be focusing on clean, sustainable energy sources like wind and solar. Minnesota should be developing these alternative energy sources, which are sources of jobs and investment that have a long-term future, rather than making short-term investments that bear a grievous long-term cost.
4. It will threaten the environmental and cultural survival of Native American peoples whose territories lie in the pipeline path. Justice demands that the project should not be approved without the approval of these groups who stand to suffer so much damage from it, and who have been the victims of so much environmental injustice from similar projects already.

My children, your children, and the children of all Americans deserve clean air, clean water, and clean land. We do NOT deserve the sacrifice of these priceless public resources for the short-term private profit of fossil fuel corporations. You have an obligation to the future to make the right decision. Please reject this project.

Thank you,
Ulysses Lateiner
15 Chandler Street
Somerville, MA 02144

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jess Lanner	218-580-2511	
ADDRESS		
392 Crosby rd.		
CITY, STATE, ZIP		
Cloquet, MN 55720		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 28 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

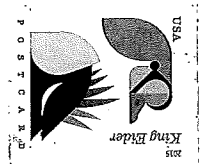

Levi, Andrew (COMM)

From: James Lawson <james.lawson@enbridge.com>
Sent: Wednesday, July 05, 2017 10:29 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I am in support of the Line 3 replacement project. The draft EIS hits several points that are very relevant and clearly shows that pipelines are the safest way to transport liquids and gasses. The preferred route follows existing utility corridors and would be the most unimpactful to the environment. The new pipeline would have significantly greater monitoring technology than the aging line 3.

Deactivating the current pipeline and leaving it in place is the most commonly used method in the industry. Even when deactivated the pipeline will be monitored to protect the environment.

There has been ample time for public comment, ample opportunity for people to voice their concerns, and based on science the EIS has been prepared very thoroughly. Please keep the EIS timeline to the deadline of 280 days.

Sincerely,

James Lawson
4340 S County Rd E
South Range, WI 54874
james.lawson@enbridge.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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0001956485 JUN 21 2017
MAILED FROM ZIP CODE 55419

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jonathan Lax	(651) 398 8944	
ADDRESS		
307 W. Owatonna St.		
CITY, STATE, ZIP		
Duluth, MN 55803		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: MacAlister, Jamie (COMM)
Sent: Monday, July 10, 2017 1:45 PM
To: MN_COMM_Pipeline Comments
Subject: FW: Comments Line 3 DEIS Ability to Remove Pipe
Attachments: Line 3 Replacement DEIS Ability to Remove Line 3.pdf

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280, Saint Paul, MN 55101
P: 651-539-1775

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-----Original Message-----
From: dlearmon@2z.net [mailto:dlearmon@2z.net]
Sent: Monday, July 10, 2017 1:43 PM
To: MacAlister, Jamie (COMM) <jamie.macalister@state.mn.us>
Subject: Comments Line 3 DEIS Ability to Remove Pipe

R. D. Learmont
PO Box 2756
Warba, Minnesota 55793
July 10, 2017

Ms. Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, Minnesota 55101

By e-mail

Re: Comments on Draft Environmental Impact Statement
Ability to Remove Abandoned Line 3
Proposed Enbridge Line 3 Replacement Project
Dockets 14-916 and 15-137

Dear Ms. MacAlister:

Thank you for keeping me informed of proceedings regarding Enbridge's proposed replacement of their Line 3, most recently the Draft Environmental Impact Statement that was recently issued for review and comment. In addition to being technically knowledgeable on many of the issues covered in the draft FEIS and also many issues not covered by the DEIS, I am also owner of property through which Enbridge's Mainline passes, such land owned by me including close to 6 miles of Enbridge pipeline, including Enbridge's Line 3 but also including Enbridge lines 1, 2, 4, 13, and 67, in addition to other high pressure pipelines not owned/operated by Enbridge. Having long experience with Enbridge and its predecessor; having some familiarity with pipeline construction and operations practices including being present when Line 3 was constructed and has subsequently been repaired; and having substantial financial and other interest in land that Enbridge mainline pipelines traverse, I respectfully request your attention to points that I make in this and other letters with comments that I submit.

A factor that DOC and PUC will be weighing among many factors in making CN and routing decisions will be the ability to physically remove the existing Line 3 pipe. This is discussed, among other places in, Chapter 8 of the DEIS, and it appears that both state and federal regulations regarding in situ pipeline abandonment are minimal and weak on this subject.

Discussion of Line 3 removal options in the DEIS appears to rely quite heavily on statements and plans developed by Enbridge. However, the DEIS should also include significant input and review by third parties, not simply from Enbridge, which is, after all, the project proponent who wants to leave Line 3 in place and will reasonably be expected to present information which favors its position. This needed review by and input from

others seems to be sorely lacking in most parts of the DEIS, including the portion regarding the ability to physically remove Line 3.

It is acknowledged that removal of a buried pipeline has its challenges. Without repeating discussion that already appears in the DEIS or information that has been presented by others, please note:

a. Enbridge is able to physically deal safely with Line 3 - its integrity digs attest to that, to be able to work safely in the vicinity of other buried pipelines, as does its ability to install new pipelines (which it does) within the same mainline corridor without incident, so removing the old pipeline has a cost, which is a cost of being in the business of hydrocarbon transport by pipeline. If Line 3 has reached the point in its life cycle that the cost of maintenance has exceeded the price of replacement, then the normal business decision would be to remove the existing Line 3 and replace it if the transportation capacity is still needed;
b. The DEIS refers to detecting unknown leaks from the existing Line 3. Methods exist to discern the possibility of subsurface leaks without digging into the ground; if Enbridge is using those non-destructive techniques, it ought to be able to locate and repair leaks detected by those means. However, if Enbridge has detected leaks that they have not repaired, then they have likely violated certain requirements with regard to safe operation and repair. If Enbridge has not detected leaks through those nondestructive means, or says that they can not, but there has in fact been a subsurface leak, then the only way to detect undetected underground leaks will be to dig the length of the existing Line 3 and remove the pipe and contaminated soil where it occurs. Either way, it appears that the proper thing is to remove all of the unused pipe, as it will all need to be excavated to test for undetected leaks.
c. That Enbridge can provide an estimate of the cost of removing the to-be-unused pipe is an indication that they have the ability to do so.

I hope that the preceding commentary will be helpful as DOC/PUC considers portions of the DEIS for revision/completion.

Thank you.

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

PITNEY BOWES
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0001956485 JUN 21 2017
MAILED FROM ZIP CODE 55419

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Corey LeBrasseur		
ADDRESS		
321 22nd St		
CITY, STATE, ZIP		
Cloquet, MN 55720		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Sarah Lechner <lechner.sarah@gmail.com>
Sent: Monday, July 10, 2017 12:02 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline

No
No
No
No
No
This shouldn't even be a question. There are so many factors that argue against this new Pipeline! If we simply increased our energy conservation and efficiency efforts we wouldn't even need this oil. Build solar, build wind farms, turn down the a/c, make cars and trucks more efficient/hybrid. Leave the damned tar in the ground.
Thank you

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Dennis Leff

Street Address: 8486 Onigum Rd NW

City: Walker State: MN Zip Code: 56484

Phone or Email: 218-547-2343

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I attended the meeting on June 7th at the Palace Casino. I was afraid to speak about my support of the pipe line project because everybody that spoke was against it. I was afraid I'd be followed home.
I live on Leech Lake, in the Leech Lake Reservation and I am fully in support of the Line 3 project. I think the soonder it gets done, the better off we will be.

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Viola Leff

Street Address: 8486 Onegum Rd NW

City: Walker State: MN Zip Code: 56484

Phone or Email: leffs@arvig.net

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am 100% in support of the Line 3 project. I live on the Leech Lake reservation and I totally approve of putting the pipeline through the Leech Lake Reservation. I attended the meeting at the Palace Casino on June 7, 2017.

If including additional pages please number them and tell us how many you are providing:_____ pages

14-916 1569

~~15-137~~

Rice, Robin (PUC)

From: Richard <rr_lehmann@hotmail.com>
Sent: Sunday, July 09, 2017 11:07 AM
To: staff, cao (PUC)
Subject: Enbridge Line 3

To whom it may concern,

We would like you to consider having the old line removed and the land replaced to what it was prior to the install of line three in the early 60's

As a matter of background, my wife and I live within 500 feet of the current line three pipeline, we also own land in Clearwater County the existing pipeline crosses. We have grandchildren that some day will inherit that land and would like to know the land will not be caving in under them in the future.

We believe, in the event the existing line is not exhumed, the current route should be reused and the new line follow the existing route. Enbridge should be held responsible for any future issues that arise from the abandonment of the current line if that route is not reused.

We recognize the need for safer transportation of fuels in the various forms and pipelines offer an acceptable alternative to other options. We do not however, believe the lines should be abandoned and left to be dealt with by future generations. When the pipeline was granted a permanent easement across the land we currently own we don't believe the issue of abandonment was considered. Now we have an opportunity to address this issue and I would like to think it will be addressed in a satisfactory manner.

Thank you for your attention to this critical decision. I hope you will do what I consider the right thing.

Sincerely,

Richard Lehmann
1426 Irvingside Lane SW
Bemidji, MN 56601
218-751-7721 (h)
218-766-4055 (c)

Levi, Andrew (COMM)

From: George, Kevin (PUC)
Sent: Monday, July 10, 2017 9:05 AM
To: MN_COMM_Pipeline Comments
Subject: FW: Enbridge Line 3 PPL-15-137

Hi Jamie, Ray,

The Commission received the comment below from Richard Lehmann. Forwarding it so it can be included. Comments are backgrounded with gray.

Kevin

Kevin George
Minnesota Public Utilities Commission
121 7th Place East, Suite 350 | St. Paul, MN 55101
(651) 201-2251 | Kevin.George@state.mn.us | mn.gov/puc/

From: PUC, Docketing (PUC)
Sent: Monday, July 10, 2017 8:39 AM
To: George, Kevin (PUC) <kevin.george@state.mn.us>
Subject: FW: Enbridge Line 3 PPL-15-137

I am forwarding this to you, I have not done anything with it.

J

Jamie Eschbach
Administrative Services/Office Administrative Specialist, Senior
Designated Department Insurance Representative (DDIR)
651/201-2204
Minnesota Public Utilities Commission
121 7th Place E, Suite 350
St. Paul, MN 55101

From: Richard [mailto:rr_lehmann@hotmail.com]
Sent: Sunday, July 09, 2017 11:22 AM
To: PUC, Docketing (PUC) <docketing.puc@state.mn.us>
Subject: Enbridge Line 3 PPL-15-137

To whom it may concern,

We would like you to consider having the old line removed and the land replaced to what it was prior to the install of line three in the early 60's

As a matter of background, my wife and I live within 500 feet of the current line three pipeline, we also own land in Clearwater County the existing pipeline crosses. We have grandchildren that some day will inherit that land and would like to know the land will not be caving in under them in the future.

We believe, in the event the existing line is not exhumed, the current route should be reused and the new line follow the existing route. Enbridge should be held responsible for any future issues that arise from the abandonment of the current line if that route is not reused.

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Thank you for your attention to this critical decision. I hope you will do what I consider the right thing.

Sincerely,

Richard Lehmann

1426 Irvingside Lane SW

Bemidji, MN 56601

218-751-7721 (h)

218-766-4055 (c)

Levi, Andrew (COMM)

From: Betsy Leighton <bleighton2@gmail.com>
Sent: Sunday, July 02, 2017 11:13 AM
To: MN_COMM_Pipeline Comments
Subject: Pipeline comments

Hello,

I'm Elizabeth Leighton from Minneapolis. As a person of faith and as a resident of Minnesota, I am very concerned about the new Line 3 proposed by Enbridge. Though the environmental impact statement acknowledges many severe consequences to land, water, and local communities, it appears the no-build option is not being seriously considered.

I am alarmed by the plans for this pipeline, which disregard the severe impacts of potential spills to ricing lakes, rivers, and even to Lake Superior. Furthermore, I find it unacceptable that we, as a state, continue to expect Native communities to disproportionately endure the impacts of extracting and transporting oil. These risks are outlined but not considered reason enough to reject the pipeline.
We have a responsibility to current and future generations, locally and globally, to keep out Tar Sands oil that could pollute MN waters and contribute significantly to climate change. Climate scientists agree it is time to leave the oil in the ground.
I implore you to weigh the dire consequences of this pipeline and strongly consider rejecting it.

Elizabeth Leighton
5416 Emerson Avenue S
Minneapolis, MN 55419

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Richard Leino	218 534 3502	leino@embarqmail.com

ADDRESS
20523 Onland Mine Road

CITY, STATE, ZIP
Deerwood Minnesota 56444

COMMENTS
Crow Wing County Farm Bureau
Supports this project.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 55
19 JUL 2017 PM 3 L

POSTCARD USA

Hi I love
about Minnesota
is too awesome
their water rite
is !!!
protected

SINCERELY,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

55101-214355

Denise Wilson

Levi, Andrew (COMM)

From: Marty <martyl@scandiacustomcabinets.com>
Sent: Monday, July 10, 2017 8:19 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge 3 replacement

All Pipelines Leak

We have a responsibility to protect our greatest natural resource, our lakes and rivers

Water Is Life

Do not approve the new route without proper study, and industry putting up money upfront for clean-ups

--

Marty Lemke

Scandia Custom Cabinets
Design and Sales
Office: 763-535-3680
Mobile: 612-481-5674
Fax: 763-535-3538

6801 Winnetka Ave N
Brooklyn Park, 55428

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Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

08 JUL 2011

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Bobby LePage		
ADDRESS		
3116 Decker rd		
CITY, STATE, ZIP		
Duluth, Min		

COMMENTS

3 year ironworker, This work is my ~~livelihood~~ livilhood, need this work

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Sandy Leuthner <sreedner@hotmail.com>
Sent: Monday, July 10, 2017 6:11 PM
To: MN_COMM_Pipeline Comments
Subject: No Line 3 CN-14-916 and PPL15-137

CN-14-916 and PPL15-137

Please do not allow Enbridge to shove a massive new tar sands line through Minnesota's watershed, wild rice, and wetlands. Make Enbridge clean up its old mess!

It is our time to recognize the tragedy and genocide of the US Government against the first people of this land, and RESPECT tribal concerns about cultural destruction, the violence it supported by funding Dakota Access, and the risks to Minnesota's environment and our future.

Lets stop trashing this planet, we have enough to be ashamed of already, quit adding to it.

Sincerely,

Sandy Leuthner

Levi, Andrew (COMM)

From: Lee Lewis <leestevenlewis@gmail.com>
Sent: Sunday, July 09, 2017 4:25 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Enbridge Line 3 Expansion

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce

RE: Enbridge Energy's Proposed Line 3 Pipeline Project: Comments on the Draft Environmental Impact Statement, CN-14-916 and PPL-15-137.
Thank you for the opportunity to review and present comments and concerns regarding Enbridge Energy's Proposed Line 3 Pipeline [the Pipeline] Project Draft Environmental Impact Statement [DEIS], docket numbers CN-14-916 and PPL-15-137. My comments will focus on two only aspects of the Pipeline and DEIS. First, the location of the proposed route that runs through the headwaters of the Kettle River, a Minnesota designated "Wild and Scenic River," which directly drains into the nationally designated "Wild and Scenic" St. Croix River. Second, the impact of the Pipeline on further climate change.

The Kettle River and St. Croix Wild and Scenic Rivers
The proposed preferred route for the Pipeline runs through remote wetlands and rivers across northern Minnesota and, specifically, crosses the headwaters of the Kettle River in Carlton County. The Kettle River is a Minnesota State designated "Wild and Scenic River" that drains directly into the nationally designated "Wild and Scenic" St. Croix River. As far as I can determine, given the maps in the DEIS, the crossing is fairly remote and distant from any road. This has the potential of making detection and response to a spill difficult.

The Kettle River is an exceptional tributary to the St. Croix River, boasting high biodiversity as well as some of the most impressive whitewater rapids in Minnesota. Its watershed includes large areas of intact wetlands, pristine perennial headwater streams, and diverse mussel and fish faunas. It is home to 17 species of mussels, ancient lake sturgeon, and nationally significant brook lamprey and gilt darter. Several threatened, endangered, and sensitive species including bald eagles, Blanding's turtle, wood turtles, and osprey are also found in this area. Overall the water quality and aquatic systems of the Kettle River are in exceptional condition, as indicated by consistently high indices of biotic integrity.

Given the uniqueness and ecologically sensitive ecosystems within the Kettle River watershed, I oppose the proposed preferred route outlined in the DEIS. That route crosses through the most sensitive headwater areas of the Kettle River watershed and does not adequately mitigate or minimize the environmental impacts of pipeline construction or a potential pipeline spill. The water resources, wildlife habitat, recreation opportunities, and rare ecological features in this area far outweigh the risks associated with the installation of Line 3.

Furthermore several governmental and nonprofit organizations have identified the headwaters of the Kettle as a focus for protection. These include agencies like the Carlton County Soil and Water Conservation District, which has been working with landowners for many years to reduce sediment and nutrients in the Kettle River, the St. Croix River Association, of which I am a member, and the Nature Conservancy. Public and private resources have been devoted to protecting this portion of the Kettle. To run several hundred thousand barrels of highly toxic tar sands under the river every day runs counter to these efforts.

The proposed preferred route places countless wetlands and waterways at risk. I highlight the Kettle as one example, a river of exceptional ecological value that drains directly into one of the nation's cleanest and most pristine rivers. In terms of protecting the waters of the state, I urge selection of the proposed alternative route 03.

Threats of further climate change

Climate change is real. The internal combustion engine is a dinosaur going extinct. There is no long-term future in fossil fuels. It is a stated Minnesota policy to reduce carbon emissions. Though the current United States administration has taken a misguided and temporary step back from reducing carbon emissions, all of the other G-20 nations and most of the nations across the globe are committed to the carbon reduction goals of the Paris Climate Agreement.

The Pipeline is not in the public interest nor is there a public need. Quite the opposite.

To make a huge, long-term investment with significant environmental cost and risk in mining and transporting Alberta tar sands is not warranted. Simply put, building the Pipeline will enable and encourage more burning of a incredibly dirty, carbo-intensive fossil fuel. While full DEIS attempts to compare additional carbon costs of the greenhouse gas emissions created during the construction and operation of various pipeline and transport options, the costs, although steep, are dwarfed by the social cost of carbon[a] [SCC] that is released when one considers the entire life-cycle of tar sands oil from extraction to refining and finally combustion.

Finally, from the National Resources Defense Council's August 13, 2015 10 Threats from the Canadian Trans Sands Industry:

1. Digging up tar sands wreaks havoc on Alberta's boreal forest
2. The production process wastes enormous quantities of freshwater
3. Tar sands development produces huge amounts of toxic wastewater
4. Burning tar sands oil creates more pollution than regular crude
5. A web of new pipelines will fan out from Alberta's tar sands pits
6. We aren't prepared to deal with tar sans spills [see: National Academy of Science, 2016, Spills of Diluted Bitumen from Pipelines: A comparative study of environmental fate, effects and response]
7. Exporting tar sands will put rivers and coastlines at risk of spills
8. Rail cars carrying tar sands crude will pass through densely populated areas
9. Tar sands oil refineries produce dangerous petcock waste
10. Low income communities will be disproportionately impacted

In short, none of the routes proposed in the DEIS is in the public interest. Though they may be needed, in the sense of producing a profit for a private company in the exportation of oil, there are better and much more needed investments in our energy future.

Note

[a] EPA and other federal agencies use the SCC to estimate the climate benefits of rulemakings. The SCC is the total cost to society arising from man-made emissions of CO2 and other GHGs. It is typically measured in U.S. dollars per metric ton of CO2 or CO2e. The SCC is meant to be a comprehensive estimate of climate change damages. It includes changes in net agricultural productivity; human health; property damages from increased flood risk; and changes in energy system costs, such as reduced costs for heating and increased costs for air conditioning.

Sincerely,
Lee

Lee Lewis
651-353-6409

Pessimism is the analysis of the situation; optimism is the orientation of the spirit

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 4 L

POSTCARD

Do not approve the tar sands pipeline. It is another violation of treaty rights in support of commercial enterprise. Clean water is more valuable than proceeds from sale to China. Think about the ancestor YOU want to be.

SINCERELY,
Hannah Lewis

Hannah Lewis
Minnesota native now living in France - feeling helpless

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

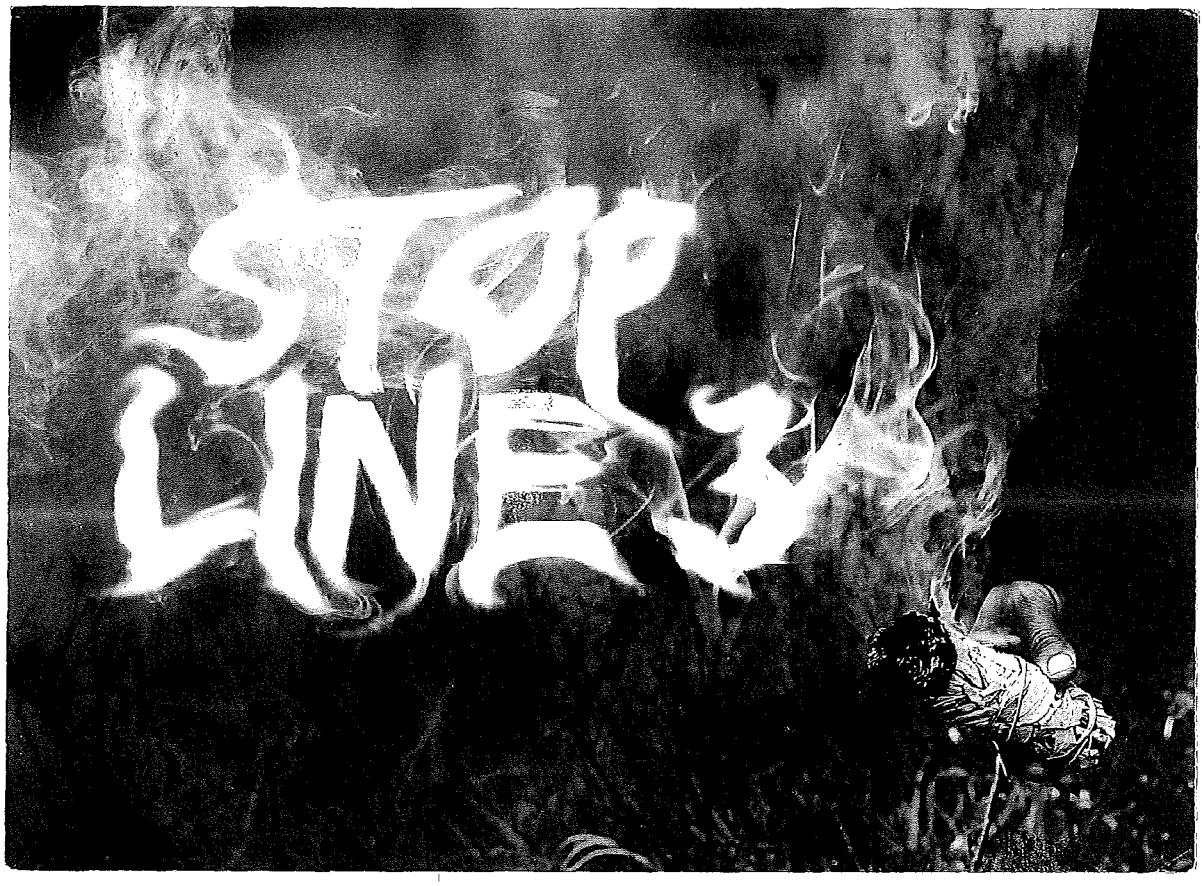

DEAR DEPARTMENT OF COMMERCE, MINNEAPOLIS MN 553
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137. 03 JUL 2017 PM 4 L

POSTCARD

We don't need this pipeline to deface MN in order to send dirty oil to China. Construction will destabilize local communities and the pipeline will interfere with the supply of clean water. Jobs do not even so to Native Americans, whose treaties are being violated again.

SINCERELY,

Holly

Holly Lewis

55 Clear 21 4355

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Tim Lewis	218-243-2976	
ADDRESS		
15302 Bazzle RD NW		
CITY, STATE, ZIP		
Pinewood, MN, 56676		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Victoria Li <vvli@colorado.edu>
Sent: Friday, June 23, 2017 1:50 PM
To: MN_COMM_Pipeline Comments
Subject: comment (re dockets CN-14-916 and PPL-15-137)

The Native American Nation is teaching its young people to stand up for justice through peaceful activism, law, technology, international relations, and spirituality.

What are you teaching your young people?

-a young person

(re dockets CN-14-916 and PPL-15-137)

Levi, Andrew (COMM)

From: Tami Liberty <ikwe_1@hotmail.com>
Sent: Wednesday, June 28, 2017 6:18 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

Dear Ms. MacAlister,

It is most important that enbridge take out line 3 from the ground. It is a danger to the waters of Minnesota. It doesn't need replacement just needs to be removed.

Sincerely,

Tami liberty
PO Box 1696
Bemidji, MN 56619
ikwe_1@hotmail.com

From: David Lick
To: MN_COMM_Pipeline Comments
Subject: Enbridge pipeline
Date: Friday, May 26, 2017 9:01:42 AM

Hello,
In this State if a business vacates a gas station the tanks are pulled out of the ground and the ground is inspected for leakage. If there is leakage the soil has to be removed and clean soil is added back. If a building in a town is vacated and left to deteriorate the local unit of government has the authority to force the clean up. I understand that we need oil, I also drive a car, I am not in favor of tar sands oil but the issue with the abandonment of number 3 by Enbridge is another example of blight. Anyone who favors effieciency over waste would suggest that this pipe be removed and recycled. The space left could be used years from now for another pipe if that becomes necessary. The argument that removal is environmentally unfriendly suggests that installing in the first place is environmentally unfriendly. Please insist that Enbridge remove the vacated line and pass the costs to the consumer.

David Lick
36514 Birch Trl.
Grand Rapids, MN. 55744

From: Olivia Lim
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Pipeline
Date: Monday, June 05, 2017 5:22:41 PM

Oil pipelines have a terrible track record of causing oil spills that pollute important land and bodies of water. Do not allow the Line 3 pipeline to transport tar sands (one of the dirtiest types of oil). Overall, we need to keep fossil fuels in the ground, unburned. If we do not, if we extract them to be refined and transported around the country to then be used and emit greenhouse gases, climate disaster will occur. Besides there is great opposition from the local people who will be most affected by the pipeline.

From: Danette Lincoln
To: MN_COMM_Pipeline Comments
Subject: Enbridge
Date: Monday, June 12, 2017 1:19:22 PM

To Whom it may concern:

What can I say that hasn't already been said? What can I say that will make a difference? I don't know. What I do know is that the Indigenous people of this country have been horribly mistreated since the day Europeans set foot here. I actually thought MN was better than that. The reroute of Enbridge pipeline 3 will continue to exacerbate the mistreatment of our Native Americans. When is enough, enough?

If forced, Enbridge will be able to come up with alternatives to this route. Right now they are seeking the least costly and least resisted route. If we stand strong against this route, they will be forced to rethink.

Please make the right decision for our Native Americans and stop the pipeline. Clean energy is on the way and that should be our focus.

Thank you,

Danette Lincoln

Levi, Andrew (COMM)

From: Danette Lincoln <danettelincoln@live.com>
Sent: Wednesday, June 21, 2017 8:40 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Pipeline 3, Docket CN-14-916 Docket PPL-15-137

Environmental Review Manager: Jamie MacAlister

I am writing to you today to express my opinion regarding the proposed re-route of Enbridge pipeline 3 through northern Minnesota. I have debated in my mind days over end to come up with the most convincing words possible to sway the MN Dept. of Commerce and the PUC to end this project. I, however, could not find the magical words. They and you have, no doubt, heard every argument for and against this proposed line. So what I have to offer is this: my simple, yet heartfelt, advise:

Just remember that at the end of the day, everything as we know it is temporary. Our lives, jobs, wealth, all temporary. What is not temporary is our legacy, our soul. The decisions we make, the actions we take will determine our legacy in a place far greater than what we can imagine. So I ask those involved to make the morally right decisions for our Native Americans, our Earth, our animals. To do so, ask and answer one question: What do you want your legacy to be?

Thank you,

Danette Lincoln
2509 Bunker Lake Blvd., NE
Ham Lake, MN 55304

612-418-8622

Levi, Andrew (COMM)

From: Danette Lincoln <danettelincoln@live.com>
Sent: Monday, June 26, 2017 10:21 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Pipeline 3, # CN-14-916, #PPL-15-137

Hello Jamie MacAlister,

I invite you to read the transcript of a speech given by Severn Suzuki at a Rio summit in 1992. Although some time ago, her words are still relevant because of the truth in the message. It is unbelievable that in twenty-five years, so little has changed in the hearts and minds of men regarding our environment and the well-being of people. Greed always seems to overcome our best judgement. Please use this child's words as a guide to making the right decision.

Full Text of Severn Suzuki's speech at the U.N. Earth Summit in Rio de Janeiro in 1992:
Hello, I'm Severn Suzuki speaking for E.C.O. – The Environmental Children's Organization.
We are a group of twelve and thirteen-year-olds from Canada trying to make a difference: Vanessa Suttie, Morgan Geisler, Michelle Quigg and me. We raised all the money ourselves to come six thousand miles to tell you adults you must change your ways. Coming here today, I have no hidden agenda. I am fighting for my future.

Losing my future is not like losing an election or a few points on the stock market. I am here to speak for all generations to come.

I am here to speak on behalf of the starving children around the world whose cries go unheard.

I am here to speak for the countless animals dying across this planet because they have nowhere left to go. We cannot afford to be not heard.

I am afraid to go out in the sun now because of the holes in the ozone. I am afraid to breathe the air because I don't know what chemicals are in it.

I used to go fishing in Vancouver with my dad, until just a few years ago, we found the fish full of cancers. And now we hear about animals and plants going extinct every day – vanishing forever.

In my life, I have dreamt of seeing the great herds of wild animals, jungles and rain forests full of birds and butterflies, but now I wonder if they will even exist for my children to see.

Did you have to worry about these little things when you were my age?

All this is happening before our eyes and yet we act as if we have all the time we want and all the solutions. I'm only a child and I don't have all the solutions, but I want you to realise, neither do you!

* You don't know how to fix the holes in our ozone layer.
* You don't know how to bring salmon back up a dead stream.
* You don't know how to bring back an animal now extinct.
* And you can't bring back forests that once grew where there is now desert.
If you don't know how to fix it, please stop breaking it!

Here, you may be delegates of your governments, business people, organisers, reporters or politicians – but really you are mothers and fathers, brothers and sister, aunts and uncles – and all of you are somebody's child.

I'm only a child yet I know we are all part of a family, five billion strong, in fact, 30 million species strong and we all share the same air, water and soil – borders and governments will never change that.

I'm only a child yet I know we are all in this together and should act as one single world towards one single goal.

In my anger, I am not blind, and in my fear, I am not afraid to tell the world how I feel.

In my country, we make so much waste, we buy and throw away, buy and throw away, and yet northern countries will not share with the needy. Even when we have more than enough, we are afraid to lose some of our wealth, afraid to share.

In Canada, we live the privileged life, with plenty of food, water and shelter – we have watches, bicycles, computers and television sets.

Two days ago here in Brazil, we were shocked when we spent some time with some children living on the streets. And this is what one child told us: "I wish I was rich and if I were, I would give all the street children food, clothes, medicine, shelter and love and affection."

If a child on the street who has nothing, is willing to share, why are we who have everything still so greedy?

I can't stop thinking that these children are my age, that it makes a tremendous difference where you are born, that I could be one of those children living in the favellas of Rio; I could be a child starving in Somalia; a victim of war in the Middle East or a beggar in India.

I'm only a child yet I know if all the money spent on war was spent on ending poverty and finding environmental answers, what a wonderful place this earth would be!

At school, even in kindergarten, you teach us to behave in the world. You teach us:

* not to fight with others,
* to work things out,
* to respect others,
* to clean up our mess,
* not to hurt other creatures
* to share – not be greedy.

Then why do you go out and do the things you tell us not to do?

Do not forget why you're attending these conferences, who you're doing this for – we are your own children. You are deciding what kind of world we will grow up in. Parents should be able to comfort their children by saying "everything's going to be alright" , "we're doing the best we can" and "it's not the end of the world".

But I don't think you can say that to us anymore. Are we even on your list of priorities? My father always says "You are what you do, not what you say."

Well, what you do makes me cry at night. You grown ups say you love us. I challenge you, please make your actions reflect your words. Thank you for listening.

Thank you, Danette Lincoln 2509 Bunker Lake Blvd., NE Ham Lake, MN

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
BRIAN LIND	715-919-2428	brianlind24@yahoo.com

ADDRESS
71830 County Hwy A ~~IRON RIVER~~

CITY, STATE, ZIP
IRON RIVER, WI 54847

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Steve Lindaas <stevelindaas@gmail.com>
Sent: Monday, July 10, 2017 5:42 PM
To: MN_COMM_Pipeline Comments
Subject: Docket numbers CN-14-916 and PPL-15-137

Dear

I am opposed to the Line 3 Replacement.

My opposition is due to serious concerns about the draft environmental impact statement. I am a citizen, scientist, educator and father as well as someone that uses energy. I know that energy is required to support my country and my lifestyle. However the required energy needs to be balanced and future costs and concerns need to be weighed.

1) The climate change discussions in the DEIS are inadequate - principally they do not fully address the social cost off carbon.

2) The economics of fossil fuel based industries is becoming increasingly volatile. I totally understand why a company wants to build a pipeline to decrease their costs and hence increase their profits. However the public costs exceed the public benefits. This is especially true when you factor in the financial and social burden of cleaning up the pipeline after the company no longer has a need for it.

3) Pipelines that are not removed will only be monitored while the company exists and is solvent. The old pipeline needs to be removed to avoid it being abandoned and the costs shifted to the general public. Basically any new pipeline should only be allowed to be built when a clean-up contingency fund and removal costs are covered in a state account that is paid for by the companies involved.

4) It is fairly clear that their are treaty rights issues that have not been mitigated.

5) The environmental/social justice issues are only superficially considered.

6) There is a lack of professionalism in the DEIS. The sources are not referenced or can not be found leading one to wonder at their authenticity and hence the veracity of the report in general.

7) This is a very large-scale proposal. Each option needs a much more thorough analysis. The total amount and diversity of natural areas that are affected during the construction and maintenance require a much more complete study.

Every year I enjoy the different environments on both public and private lands throughout the state of Minnesota but especially the northern part of Minnesota. I know I am not alone in this enjoyment. I also use energy - much of it fossil fuel based. However, if one of my students turned in something akin to this DEIS I would tell them to redo it so I would not have to give them a failing grade.

Please consider a much more comprehensive environmental impact study. Do not allow the Line 3 Replacement to proceed at this time.

Sincerely,

- Steve Lindaas

_____
Steve Lindaas
1123 22nd Avenue South
Moorhead, MN 56560

stevelindaas@gmail.com
(218) 790-1631

Levi, Andrew (COMM)

From: E Lindell <elindell218@gmail.com>
Sent: Monday, July 10, 2017 10:50 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL15-137 comments

I am writing with my comments in regards to the proposed Line 3 pipeline (CN-14-916 PPL15-137).

I do not believe that the assessments to date have sufficiently taken into account the threat to Native American tribal sovereignty, the threat to Minnesota wild rice beds, the long term costs to our climate, the no-build option, the risks of abandoning the old Line 3, and the appalling track record of this company when it comes to respect toward tribes and environmental remediation.

As a Minnesotan who is concerned about the future of this land and this economy for future generations, I do not believe it is wise to gamble with this line. There are better, safer alternatives that do not fill our environment with more destruction and fossil fuel waste.

I urge you to reject this proposed new line 3 and reject the abandonment of the old Line 3.

Sincerely,
Emily Lindell

From: Jean Lindgren
To: MN_COMM_Pipeline Comments
Subject: Docket #CN-14-916 and PPL-15-137)
Date: Sunday, June 11, 2017 2:04:12 AM

On Monday, May 15, 2017, the State of Minnesota released its Draft Environmental Impact Statement (DEIS) for Enbridge's proposed new Line 3 pipeline. This 5000+ page document is a failed attempt to analyze the potential impacts of the project on Minnesota's environment, public health, tribal resources, climate, etc, and to compare Enbridge's proposed route to several alternatives.

This Draft EIS is the result of several years of battle in the regulatory arena between Enbridge, the Minnesota state agencies, and grassroots groups working to protect the water - battles that began with the Sandpiper pipeline. The State of Minnesota tried its best to avoid doing an EIS for this project but a grassroots-funded lawsuit by Friends of the Headwaters was successful in overturning that decision.

The residents have been given only 3 weeks to analyze the 5000+ page draft EIS before the public meetings began on June 6. Obviously that is not enough time to do a thorough job of analyzing this very technical document. However, scrutiny so far has uncovered many inaccuracies.

In September 2015, the Minnesota Court of Appeals revoked the permit for the Sandpiper and ruled that the Minnesota Public Utilities Commission start over and prepare an proper EIS. The same flaws are already apparent in this current draft EIS for Enbridge's proposed Line 3 Pipeline. It is vitally important that an accurate EIS be produced and the public be given much more time to analyse it before any findings is made and/or permits are issued.

Please send the Minnesota Public Utilities Commission back to the drawing board to produce an accurate EIS that factually reflects the impacts of this pipeline on local communities, that means Indigenous People too, and includes input from the people who live there.

Thanks for your consideration.

Jean Lindgren

email: lindgren.b8@gmail.com

Virus-free. www.avast.com

Levi, Andrew (COMM)

From: Jesse Lindgren <jandklindgren@gmail.com>
Sent: Wednesday, June 21, 2017 1:46 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

It is time to replace line 3. No more wasting time and money no more talking about it. If the old line fails it will be a lot worse for the environment than replacing the line in a controlled environment.

Sincerely,

Jesse Lindgren
1524 Park View Ln NE
Sauk Rapids, MN 56379
jandklindgren@gmail.com

Levi, Andrew (COMM)

From: tom lindgren <tdlind@uslink.net>
Sent: Thursday, June 29, 2017 11:09 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I'm for the line 3 line as stated.

Sincerely,

MR. Tom lindgren
3561 Larson Lake Rd NW
Hackensack, MN 56452
tdlind@uslink.net

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

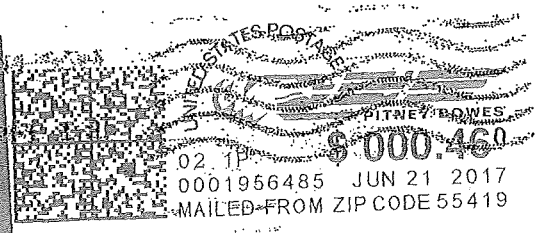

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Larry A Lindgren	218 776 3800	
ADDRESS		
43589 Cty 7		
CITY, STATE, ZIP		
Clearbrook MN 56634		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Ruth Lindh <ruthlindh@gmail.com>
Sent: Tuesday, June 13, 2017 12:31 PM
To: MN_COMM_Pipeline Comments
Subject: Docket CN-14-916 and PPL-15-137 DEIS for Enbridge Line 3 Pipeline Replacement

submitted by Ruth Lindh on June 13, 2017 in St Paul, MN.

There are numerous flaws in this draft of the EIS.
Start with the document title. This is not a replacement for Line 3. It is a mostly new and different route, pumped-up and super-sized. It endangers Minnesota waters, lands, and wildlife. This EIS is a huge document, but the troubling part is what is missing.

1) To abandon the old, crumbling pipe in place with only the vague reassurance that it will be "monitored indefinitely" is not sufficient. We need specifics; dollars, time frame, guarantees. What if Enbridge has gone out of business or morphed into a new entity? Who pays then?

2) We know that the heavier tar sands oil, when leaked or spilled into bodies of water has never been successfully cleaned up once it has sunk. What would happen if a spill made its way into Lake Superior? Minnesota should be very uncomfortable with the fact that Enbridge classifies their "worst case" scenario spill data as trade secret so it cannot be reviewed by the public.

3) We are on the brink of enormous changes in this 21st century economy. How can any 30 year projection of costs not include consideration of rapid advances and demands for renewable energy, declining oil prices, and the growing scarcity and value of clean water?

Here are a few snippets from the news this past week:

"Coal is dead and oil faces peak demand" says Jim Barry, the global head of Blackrock infrastructure investment group, the world's largest...with $5 trillion in assets..."the thing that has changed fundamentally is that renewables have gotten so cheap...in short,the smart money is headed away from fossil fuels and toward clean energy".

Solar Power in Minnesota is heating up (by Mike Hughlett ,Mpls StarTribune 6/9/2017)
Minnesota's national ranking for solar energy capacity has climbed significantly after a flurry of new projects have come online..."the community solar pipeline is finally coming in," Gallagher said.

Minnesota steps up the the plate on climate (by E.Anderson,G.Chan and M.Hortman, Mpls StarTribune 6/8/2017)
...Now more than ever, Minnesota needs to continue to make the case that moving away from fossil fuels is not just a moral imperative, but is also politically feasible and economically advantageous."

Water shortage looms (News Services, Mpls StarTribune, 6/7/2017)
U.N. Secretary General warned that by 2050 global demand for fresh water is projected to grow by 40%..."strains on water access are already rising in all regions."

It is foolhardy to grant this permit without consideration of these issues. The legitimate option of NOT building a new pipeline, but carefully maintaining the current line 3 until it's phased out could be, by far, the most prudent plan. This is not the right time to head in the wrong direction.

Ruth Lindh
436 Newton Av S
Minneapolis MN 55405

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
TIMOTHY W. LINDOW	218-657-2833	
ADDRESS		
26610 CO. #2		
CITY, STATE, ZIP		
SHEVLIN, MN. 56676		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and *27 public meetings to scope and develop.*
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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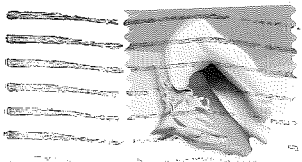

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Jordan & Kellie Lindquist <leaningcedars@gmail.com>
Sent: Monday, July 10, 2017 8:59 PM
To: MN_COMM_Pipeline Comments
Subject: Making Smart Choices For Our Future

To Whom it is Concerned,

I wanted to take a moment and let you know how I feel about the heartland of Minnesota. I want to tell you about how much I care about clean water for families to drink. I want to tell you about how much I care about the land, and the animals that make it their home. I want to tell you about how easily this could all be disrupted.

The heartland of Minnesota is full of pristine lakes that are the perfect habitat for everything from wild rice and cattails, to mallards, and swans, and fish of all varieties. You will find deer and beavers, and bears, and flowers. Lots of flowers. But truly all that would change with just one oil spill. All that would change with one anomaly. All that would change with one little mistake. No one who cares about the heart of Minnesota would want that to happen. No one who lives here wants that to happen. We live here because we love the land. We love the water. We love the beauty and greenery that is central Minnesota.

Please take the time to examine Line 3. Please take the time to insist that Enbridge be held responsible for cleaning up Line 3. Please think about the future of our great state and all that will come after us. Please think about investing in clean energy as we move forward. Protect our water. Protect our land. Protect OUR Minnesota.

Thank you for your time,
Kellie Lindquist

Docket # CN-14-916 and PPL-15-137

From: Michael Line
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137
Date: Wednesday, May 31, 2017 2:50:04 PM

Dear Ms. MacAlister,

I was raised in Wrenshall MN with the Refinery and several pipelines within a half a mile from my house. When I was still in school the big natural gas was built. We never had any problems with any of them. We need the new pipelines for national security, keeping gas prices to Americans low, and for jobs. New pipelines will be better build and safer than the old ones. The regulatory requirments and legal battles just make it all cost more. Ask the people that come to the meeting to protest h pipeline if hey drove a gas powered car to attend. When they smile and say no they drove an electric one show them how many parts of the car take gas to make. All the plastic. All the cloth. then you can add the petrolium energy it took to make the synthetic clothes they have on etc, etc,etc. Give thm a a horse to ride home on!

Sincerely,

Michael Line
3792 Grizzly Ln
Barnum, MN 55707
batyguy@aol.com

Levi, Andrew (COMM)

From: rl l <rgb2cmyk@hotmail.com>
Sent: Sunday, July 09, 2017 8:58 PM
To: MN_COMM_Pipeline Comments
Subject: Proposed Pipeline

Greetings, I humbly request you read the following.

I AM AGAINST THE PROPOSED PIPELINE BECAUSE:

~ The rest of the world is adapting to solar power on large scale, including China
~ Continuing to use fossel fuels and pipelines sets my country backwards with energy procurement and usage
~ We cannot drink oil; the potential to destroy essential resources -- water is not worth the potential benefit

~ Please make my country keep up with the rest of the world and deny the proposed pipeline.

Kind Regards,
Rose Liss

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

08 JUL 2017 PM

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jeremiah Litterknuck	218.341.8291	
ADDRESS		
624 River Road Apt 206 B		
CITY, STATE, ZIP		
Grand Rapids mn 55744		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
John A Livingston	715-399-2380	
ADDRESS		
8576 S Foxboro Chaffee Rd		
CITY, STATE, ZIP		
Foxboro wi 54836		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Pat Loban <PMLOBAN@msn.com>
Sent: Monday, July 10, 2017 3:48 PM
To: MN_COMM_Pipeline Comments
Subject: public comment

"Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economic analysis for the EIS to be complete.

I have heard that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state* need (not a national need). Even if we used statistics about the national need, U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply needed oil. (http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf)

I would like to see this information mentioned in the final EIS.

I understand that an engineering firm called Cardno, with ties to Enbridge, was instrumental in preparing part of the draft Environmental Impact Statement for Line 3. In light of this fact, in the final EIS I would like to see an independent analysis of the information they provided. Minnesota requires verified facts for such a large project.

Thank you,

George Loban
9041 Father Foley Drive
Pine River, MN 56474

Levi, Andrew (COMM)

From: Pat Loban <PMLOBAN@msn.com>
Sent: Monday, July 10, 2017 3:18 PM
To: MN_COMM_Pipeline Comments
Subject: "Public Comment"
Attachments: Public Comment.docx

CN-14-916 and PPL-15-137

Dear Environmental Review Manager,

I am writing to voice my concerns over areas that I feel were not adequately covered in the draft EIS. I will start out first by saying with the depth of information provided insufficient time was given to read it, become educated about it by those able to read it in its entirety and know the subject matter well, comprehend and research it, and then write a letter responding to its content. **I cannot possibly convey all of my concerns and would ask that an extension be given on the time for public comment.**

1. Economic Analysis:
As Secretary of the Whitefish Chain Lakes Owners Association, as well as Secretary of the Big Whitefish Northshore Property Owners Association, I know that my neighbor's greatest concern is a tar sands oil spill in the Pine River Watershed and Whitefish Chain of Lakes, pristine lakes, lakes that attract many throughout the state of Minnesota and neighboring states. Tourism is a vital part of this community, it is a major employer and economic engine. A community that depends not only on those that use the lakes recreationally but also those that come to hunt, fish, snowmobile and just to observe and savor all that mother nature has to offer. Without tourism in Minnesota northern lakes how many jobs would be lost? How many restaurants, resorts, motels and businesses would be closed or lose revenues? How many residents would have to relocate? What would happen to property values? How about the lost tax revenues and jobs when businesses are closed, incomes decline, people are unemployed and property values plummet with a spill? How would towns along the route be impacted? Are the risks worth the benefits? **An economic analysis is needed to make the EIS complete.**

"The Impact of Tar Sands Pipeline Spills on Employment and The Economy," a report by Cornell University Global Labor Institute, well supports the reason for concern. It differentiates a tar sands spill from a crude oil spill, explains the difficulty in cleaning up a tar sands spill, defines the socio-economic impact, health concerns, the impact on natural resources and the increased risk of tar sands oil pipeline cracks, leaks and spills. They note the difficulty of cleaning up tar sands from lakes," a major spill could make our pristine lakes inaccessible for months and years as was the case in Kalamazoo." This document once again supports the topics covered by the EIS, some not. The document supports the need for an economic analysis. It was the conclusion of the study, consistent with the opinion of the Sierra Club (see #5), that the future lies in fuel efficient automobiles, decreased dependency on fuel, and a focus on renewable energy, not pipelines that pose a risk to our natural resources, citizens, and economy. Is a Certificate of Need warranted?

2. Integrated Contingency Plan:
One need only look at the Kalamazoo spill to know that our concerns are well founded. The timeline provided by the Kalamazoo News is alarming. Thank for providing Enbridge's new Integrated Contingency Plan/Emergency Response Plan, it is reassuring. However, it does not take into account a factor that the spill may have well been avoided all together were it not for management's complacency and deception. Enbridge was aware of defects in the pipeline where the rupture occurred for 5 years prior to the spill. The same was true of BP with the gulf spill, warnings by workers on the rig were ignored. Would you please address whether measures in place to make sure these behaviors do not reoccur?

NTSB Chairwoman Deborah Hemaincon reported that "Enbridge's employees and spill responders acted like a troop of Keystone Cops." The EIS repeatedly states that to minimize the impact to our environment a quick an efficient response time is needed by Enbridge, State/National Agencies, and responders.

The Pine River Watershed and Whitefish Chain are in a rural area making for a slower response time. In addition, the closest Portable Emergency Response trailer is in Bemidji. **Is this close enough?** Does that put our area at greater risk? Would you please address this issue? The EIS also states rural areas would require regional or national response capabilities, another delay. Our beautiful lakes area is further threatened by the increased difficulty of containment and recovery due to the fact that it is an aquatic environment as well as the fact that our lakes, rivers, and streams freeze in the winter. Once again, do we really want to threaten our beautiful, pristine lakes for a pipeline? Is Certificate of Need in the best interest of the citizens of Minnesota, especially those impacted by the pipeline?

Would you also please address when the Emergency Response Team starts conducting their training exercises, is it before the pipeline is operational? If not there obviously should be reason for concern.

3. Mississippi River:
Little mention is made of the Mississippi which the proposed route crosses twice. The Pine River Watershed and Whitefish Chain feed into the Mississippi Basin. **How would a spill impact the drinking water that it provides to cities along its way including the Twin Cities? Would you please address this issue in the final draft?**

4. Enbridge Bias:
It is also disconcerting when you say that the DNR and Army Corp of Engineers had limited input into the DEIS and then to learn that Cardno, an engineering firm with ties to Enbridge, was instrumental in preparing part of the DEIS. **Would it not be fair to ask to have an engineering firm independent of Enbridge analyze the information to verify the facts as Minnesota requires?**

5. Certificate of Need:
A Certificate of Need must take into account whether the pipeline is a need of the state, not a national need. Even when using national statistics, the need is not supported. U.S. fuel demand was down 5**%** in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19% in 2016 compared to its peak in 2004. As higher efficiency cars and electric cars become increasingly popular, it is doubtful that a pipeline will be needed to supply needed oil.
http://www.sierraclub.org/files/sce/north-star-chapter/pdf/Energy/Security.pdf

6. Aquifers:
The EIS defines the geological properties of an aquifer and the level of threat to varying types of aquifers should a spill occur. How does one know whether their aquifer is at risk of contamination or that it is contaminated? On the Whitefish Chain and surrounding areas, we are dependent on individual wells for our water supply. We cannot depend on a city to continually test our water supply. What is the contingency plan for monitoring drinking water for those in our situation? Would you please address this in the EIS?

7. Route Comparison:

And lastly, “Going to the lake” is synonymous with “Going up North.” Not “Going to the lake” and “Going down south.” When you calculate the bodies of water impacted by SA-04 and Enbridge’s proposed route please consider the number of lakes on the SA-04 route that are unsalvageable compared to the pristine lakes of the north. Do we want to take the chance of contaminating some of Minnesota’s greatest resources? Do we want to take the chance of harming some of Minnesota’s largest tourist destinations? Minnesota, the land of 10,000 lakes. We have already lost too many to contamination, let’s not lose anymore. Is it worth the risk? Is a pipeline in the best interest of Minnesotans? Is a Certificate of Need warranted?

Sincerely,

Pat Loban

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Timothy Fauver Loew	612-390-1974	
ADDRESS		
40363 Partridge Dr.		
CITY, STATE, ZIP		
Askov, MN 55704		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Derek Stephan Loewen	651-357-7981	derekloewen50@gmail.com

ADDRESS
517 53½ Ave NE

CITY, STATE, ZIP
Fridley, MN 55421

COMMENTS

DECLA[illegible] EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Julie Lohse <julielohse@yahoo.com>
Sent: Sunday, July 09, 2017 5:16 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137).

Dear Environmental Review Manager:

The northcentral and northeastern portions of Minnesota contain many water resources that are generally the highest quality water resources in the state. The applicant's proposed project would have construction impacts and introduce new risk of spills in northern Minnesota where the watersheds are in general very healthy and water quality is very good.

The Commission is required to consider corridor sharing in determining which route to select and permit. The applicant's preferred route creates an opportunity for future corridor sharing that could ultimately result in an accumulation of multiple pipelines within that corridor, additional clearing in forested areas, with more disturbed habitat and affected watersheds in populated areas of beautiful northern Minnesota lake country.

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don’t see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete.

I would like to know, in the final EIS for Line 3, what Enbridge’s plans are if their preferred route is approved. Will it be just the one pipeline, or will they eventually move all six pipelines to the new corridor? This would have a huge effect on how people feel about Enbridge’s preferred pipeline route.

Thank you,

Julie Lohse
5461 Mule Lake Ln NE
Outing, MN 56662

Levi, Andrew (COMM)

From: ron lohse <relohse@yahoo.com>
Sent: Sunday, July 09, 2017 9:34 AM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

I was the fire chief of a rural volunteer fire department for 20 years and a member for 37 years. We had a pipeline release in our city and we were woefully ill-equipped to handle such an incident. We were fortunate that the contractor was on site to do some diking/damming or the product would have easily made it into the Rum River in Anoka County. The Enbridge Line 3 preferred route crosses the Pine River watershed, most of which has a high water table. It also has some of the best lakes in central Minnesota with fisheries in Pine River and Spire Valley north of Roosevelt Lake. A release of any kind in this environmentally sensitive area would be catastrophic. Yet there's nothing in the DEIS about the financial and environmental impact on fishing, fisheries, water recreation or tourism in this area of central Minnesota. How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economic analysis for the EIS to be complete.

Thank you,

Ron Lohse
5461 Mule Lake LN NE
Outing, MN 56662

Levi, Andrew (COMM)

From: Suzanne Long <slong79@hotmail.com>
Sent: Monday, July 10, 2017 3:44 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

The only acceptable option is the guaranteed non-destructive removal of the existing pipeline and if more evidence is presented that its replacement is necessary then it could be considered. The world is moving to renewable energy. There is no reason to invest in oil (an certainly not dirty tarsands oil) at this moment except to increase the profit of the Enbridge, company, the koch brothers, not even much to the Canadian government. The destruction to the watershed and the lands surrounding the route is too high a price to pay for their increase. Their unreliable assurances and documented failures concerning damage to the communities and the lands they have harmed is reason enough to deny this project. Their use of deceitful language and non-existent actions clearly and conclusively show that the company cannot be trusted with our land and our lives.

Sincerely,

Suzanne Long
8549 Irwin Rd
Minneapolis, MN 55437
slong79@hotmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Libbie Longfield		
ADDRESS		
34 Hillside Crt.		
CITY, STATE, ZIP		
Winona, MN 55987		

COMMENTS I support the line 3 replacement project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Carol Longseth	218-340-7217	
ADDRESS		
100 Spring Lake Rd		
CITY, STATE, ZIP		
Cloquet, MN 55720		

COMMENTS

DECLARE THE EIS ADEQUATE W[illegible] 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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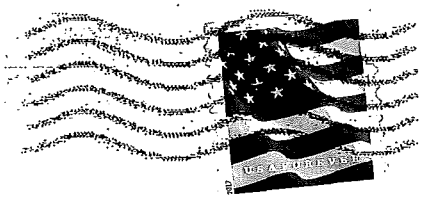

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Colin Loosbrock	763-238-3369	colin.loosbrock@yahoo

ADDRESS
11880 Utah Ave N

CITY, STATE, ZIP
Champlin MN 55316

COMMENTS
Replacing line 3 will be the safest solution to transporting oil through Minnesota. We do not need more trains transporting oil around our state, which is the only alternative.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Dustin Loosbrock	(612) 400-3463	dloosbrock@local49.org

ADDRESS
7716 118TH WAY N

CITY, STATE, ZIP
CHAMPLIN, MN 55316

COMMENTS
THE ~~[illegible]~~ COMMUNITIES THIS PROJECT WILL PASS THROUGH WILL ECONOMICALLY BENEFIT. FURTHERMORE, PIPELINES ARE THE SAFEST WAY TO TRANSPORT OIL CROSS COUNTRY.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Tim Loosbrock	612-202-6650	Bigbucket@Embarqmail.com

ADDRESS
6000 112th AVE. N.

CITY, STATE, ZIP
Champlin MN. 55316

COMMENTS

Replacing The Line is the Safest way to protect The Environment,

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Abby Loucks	2183939465	abby.loucks@united piping.us

ADDRESS

CITY, STATE, ZIP
Duluth MN 55811

COMMENTS
Pipelines are the safest mode of transportation. Line 3 will create thousands of MN jobs.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Gail Loverud <gail.loverud8@gmail.com>
Sent: Monday, July 10, 2017 3:07 PM
Subject: Enbrige CN-14-196 and PPL15-137

This directly affects the watershed that threatens the only certified organic wild rice lakes in Minnesota. This Canadian company gets the benefits while probably polluting our Minnesota waters. Oil companies are constantly attacking our indigenous communities, not to mention our gorgeous Minnesota lakes. I do not believe for one second that there will not be an oil spill. Solar & wind is where it's at & getting more economical all the time. Sincerely, Gail Loverud.

Sent from my iPad

Levi, Andrew (COMM)

From: Jason Lozano <jlozano@lsconsulting.com>
Sent: Tuesday, June 27, 2017 9:15 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Good day. It is my belief that pipelines are the safest and most effective way of transporting product. I believe it is vital for line-3 to commence as it will provide a safer more efficient way of transporting product. I have seen first hand the amount of work that goes into planning and executing any project related to the pipeline industry. It will hurt our economy and will put our environment at risk if we do not continue this work. If you want to improve the industry this is not the way.

Thank you,

Sincerely,

Jason Lozano
4725 Tioga St
Duluth, MN 55804
jlozano@lsconsulting.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Justin Lake	310-0178	
ADDRESS		
792 Laurel St.		
CITY, STATE, ZIP		
Cloquet, MN		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

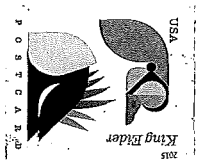

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Line 3 Replacement Project DEIS

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- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

08 JUL

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
RICHARD LUKE	218-349-8897	
ADDRESS		
206 AVE C		
CITY, STATE, ZIP		
CLOQUET MN 55720		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 D

Levi, Andrew (COMM)

From: Lukens, Nancy <nlukens@subrad.com>
Sent: Sunday, July 09, 2017 8:07 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

I have several comments about the proposed Enbridge pipeline which are not properly/thoroughly addressed in the DEIS.

Why is there no discussion of corrosion from co-location of the pipeline with high voltage transmission lines? Keystone 1, only 4 years old, suffered leaks from accelerated corrosion due to stray voltage from powerlines.

Pipelines have a history of frequent, even daily leaks. This proposed line passes within close proximity to the watershed of major recreational lakes. What reassurance does the public have that spills/leaks will be detected quickly and mitigated promptly? Does Enbridge put aside money into a clean up fund so that if they go out of business, leaks can still be cleaned up? Or do they dump responsibility on the public, similar to the current Brownfields Clean Up programs?

Will baseline data be collected from our many lovely lakes so that damage due to inevitable leaks is the responsibility of this company?

Why are we continuing to risk the danger and pollution from fossil fuels rather than insisting that these companies develop renewable energy sources?

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Levi, Andrew (COMM)

From: Jim Lundahl <jlundahl54@gmail.com>
Sent: Sunday, July 09, 2017 10:32 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager,

I attended the Park Rapids meeting and my biggest concern is not that a pipeline is being built but where it will be located. The preferred route goes through some of the most porous soil in the state. My understanding is the water table movement in Hubbard County is measured in feet, not inches as it is in most other areas of the state. My Well is 50 feet deep. My neighbors sand point wells are 25 feet deep. The shallow water table and the speed of the water movement would make cleanup of the water table nearly impossible in the event of a spill. Also complicating the cleanup process is the addition of benzene and other chemicals added to drill and make the oil less viscous so it will flow through the pipeline. To this point, Table 10.7-8 under Drinking Water areas of Interest,"High/very high hydrogeologic sensitivity" lists 81,805.5 acres, second most of any of the proposed routes And as seen from Table 10.7-5, Resources of Concern, there are 83,833.7 acres of "Drinking water AOIs" and 94,028.5 acres of "Biological AOIs" These numbers along with the sensitive water table should be a nonstarter for the location of the preferred route. Table 10.7-6, the preferred route, shows 947.8 acres of "State park and recreation areas" and 1,299.3 acres of "Wildlife Management Areas". Both numbers are the highest of any of the proposed routes. Table 10.7-7 shows 25,016.2 acres of "MBS Sites of Biodiversity Significance". This number is vastly larger than the areas of any other routes. Also this table shows 16.3 acres of "Trout stream/lake". All other routes list no trout stream acres.

These are all valid points but another concern is the addition of some of the other pipelines that mirror the current Line 3 route. If they are also allowed in this corridor, it will just multiply the likelihood of a spill in these sensitive areas.

You may think my concerns are "not in my backyard", and there is some truth to that (my cabin is within a couple miles of the proposed pipeline) but I believe I have made some very valid points, especially concerning the water table which will be virtually impossible to clean due to it's hydro geologic properties. My assumption is Enbridge picked this route since it is the cheapest and easiest to dig through sand instead of other types of soil. Cheapest isn't best when irreparable harm will be done to the environment.

Thank you for the forum to voice my concerns.

Regards,
Jim Lundahl
24095 Clover Lane
Nevis, MN 56467
218-732-1608
jlundahl54@gmail.com

Levi, Andrew (COMM)

From: Kelsey Lundberg <kelslundberg@gmail.com>
Sent: Wednesday, June 21, 2017 10:54 AM
To: MN_COMM_Pipeline Comments
Subject: Comment RE Docket Numbers: CN-14-916 and PPL-15-137
Attachments: Comment - CN-14-916 and PPL-15-137.pdf

Hi Jamie,

Hope you're having a good Wednesday. Attached you will find my comments on the oil pipeline project proposed for Northern Minnesota, Line 3 Replacement: CN-14-916 and PPL-15-137.

As a MN resident and citizen, I thank you for taking time to read these comments and supporting the democratic process.

Please let me know if you have any questions. Thanks again for your time!

Thanks!
Kelsey

Kelsey Lundberg
St. Paul, MN

To: Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101

From:
Kelsey Lundberg
64 Inner Drive, Apt N8
St. Paul, MN 55116

Subject: Line 3 Replacement: CN-14-916 and PPL-15-137

Greetings Jamie,

I hope this note finds you well. I want to start by thanking you for your work and service to the state of Minnesota. I personally benefit from the work you do to assess environmental impact on our state and advocate for the protection of our natural resources, which I'm sure takes a lot of your time, energy, and care.

If you're like me, you believe Minnesota understands the complex dynamics of living among people with diverse opinions, and we pride ourselves on finding creative ways to thrive together and solve the common problems Minnesotans face. We're a leader in many areas, including education, public citizenship, and our ability to make necessary changes to support the greater good. The coming decades will be a defining period for our state, nation, and world as we face unprecedented challenges related to limited resources and creating a durable future. But I have hope Minnesota leaders will evaluate these challenges and come up with creative, long-term solutions that create healthy communities and a healthy state.

One such challenge is the proposed Enbridge Line 3 replacement pipeline project. I have three major concerns I would like to share as a Minnesota resident after reviewing the Draft Environmental Impact Statement (DEIS) and considering the impact of this new oil pipeline on our state.

First, from what I understand about this project, Enbridge is planning to leave their old, deteriorating pipeline in the ground while they build a new one that will eventually end up in the same condition. This in itself raises concerns for me.

I live near the old Ford plant in St. Paul, and I've watched for years while they've worked hard to clean up their site to make it safe and usable for the future. Yes, this has cost Ford money and time, it's probably not their favorite task, but they're taking ownership of their waste and responsibility for the impact their business has had on the community and land. I like to think in Minnesota we hold all businesses accountable for their waste and impact. For me, I would

expect it to be a basic operating procedure for a pipeline company to remove their waste and restore any damage caused to the land or watershed.

Second, this pipeline seems to violate the rights of many people in northern Minnesota. I will admit I haven't studied law nor the intricacies of land ownership, but I'm unclear how a private business has the right to use land owned by others for their private business purposes without signed, mutual consent from each individual property owner, stakeholder, or Nation.

While I certainly haven't spoken with all property owners affected, it appears there are tribal Nations who are very public about their opposition to the pipeline impacting their lands, sacred sites, watersheds, wild rice beds, and other natural resources. To me, this would be considered a rights violation by Enbridge if they don't have Nation support.

In this regard, according to the DEIS:

> *Federally recognized tribes are sovereigns that retain the power of self-governance over their lands and members. The U.S. Supreme Court has characterized tribal governments as "domestic dependent nations" to whom the federal government has essentially a fiduciary relationship. One element of this fiduciary relationship has been to preserve tribes' status as self-governing entities within their territories, including protection from state interference without their prior, informed consent absent an act of Congress. Tribal sovereignty and the right to self-govern is the central tenet of federal Indian policy. (9.2.1)*
>
> *The United States has a trust responsibility under which the United States has both moral and legally enforceable fiduciary obligations to protect tribal resources, lands, assets, and resources (BIA 2017). Therefore, when a project such as Enbridge's proposed Line 3 Replacement Project is under consideration, tribes must be consulted; they have legally protected standing because of the unique impacts on tribal rights and resources. (9.2.3)*

Also when it comes to working with tribal Nations, Enbridge should take responsibility for working in and honoring the ways of each Nation, as would be expected for any other kind of foreign negotiation.

> *For environmental justice to have any meaning, it is important not to place traditional tribal spiritual beliefs and practices below those of more commonly understood Western religions. The constitutional system of government has too often robustly defended western religious practices while simultaneously allowing myriad assaults against the integrity of Native religions because they are categorized as something less than or too abstract to the Chapter 9 Tribal Resources 9-12 Line 3 Replacement Project Draft Environmental Impact Statement non-Indian understanding to be given parity with Western faith practices. A different model of government-to-government relations would*

> *be to accept tribal cultural differences and recognize "tribal governments can form the basis for a different civic community with a different sense of the public good" (Ranco et al. 2011). (9.3.6)*

All too often it seems that "consent" is not actually obtained because companies force projects through, finding legal and policy loopholes without actually creating a mutual agreement between two parties. Even if there is a regulation loophole allowing this, it seems the time has come for that loophole to be closed and that businesses no longer work behind the veil of complex legal systems and instead come out into the open to conduct business in an honest manner. It's time for companies to actually be held accountable, and if they don't have consent because they're operations violate the well-being of their stakeholders, these companies must change their business model, plans, or services (just like in any other industry).

In the case of the Line 3 oil pipeline, "all of the proposed routes and route alternatives cross treaty lands" (9.5). If these Nations are opposed to the pipeline, it simply should not be constructed. If stakeholders will not support the old methods pipeline companies have used to conduct business, this is Enbridge's burden to bear.

As culture continues to shift, pipeline and other old energy companies will have to change how they do business and reevaluate what services they provide for our changing communities. All businesses must adapt and change in light of new knowledge and shifting cultural values. These businesses and their leaders must determine how they will stay viable during any such culture shift. Our government leaders, instead, must recommit to supporting Minnesota residents and protecting the limited resources we all share, like freshwater, instead of protecting the businesses threatening these very things.

My third and final concern is a personal concern as a Minnesota resident. The general attitude of the report implies the pipeline will inevitably leak toxins often and, at some point, create a catastrophic oil spill. For example:

> *First, most releases ranging in magnitude from small to medium (up to 1,000 barrels [bbl]) would occur on construction sites or at operations and maintenance facilities. At these locations, spill response typically would be quick because of the presence of local staff and contractors and often mitigation systems, such as secondary containment, are employed. (DEIS, p. 12, LINE 3 REPLACEMENT PROJECT: ASSESSMENT OF POTENTIAL PINHOLE RELEASE)*
>
> *The response time between initiation of the spill event and the response is an important factor in controlling the total volume of oil released and preventing potential impacts to the environment. The following describes the various processes that control the elapsed time between the release start and detection. (DEIS, p. 11, LINE 3 REPLACEMENT PROJECT: ASSESSMENT OF POTENTIAL PINHOLE RELEASE)*

The report is dedicated to explaining that leaks and spills will happen and then details protocols for containment when toxic leaks and spills occur. In no way do the writers ensure the pipeline will not leak. Using historical data, the writers of the report actually indicate the pipeline will leak and will likely experience a catastrophic oil spill during it's lifetime.

Table 2-3 Summary of Crude Oil Pipeline Incidents, 2002 through 2015

Description	Number of Incidents		
Crude Oil Pipeline incidents	United States	Region (ND, MN, WI)	Minnesota
Crude oil mainline pipe incidents	591	44	20
Crude oil pipeline, equipment incidents (not mainline pipe)	1,227	93	41
Crude oil pipeline system, unspecified elements	641	45	19
Total crude oil pipeline incidents	2,459	182	80

(DEIS, p. 15, LINE 3 REPLACEMENT PROJECT: ASSESSMENT OF POTENTIAL PINHOLE RELEASE)

Table 2-4 Historic Incident Summary, Onshore Crude Oil Pipeline, and Reported Elements

Item	United States	Region (ND, MN, WI)	Minnesota	Unit
	Value	Value	Value	
Maximum Incident Volume Reported (bbl)	49,000	20,600	6,000	Barrels
Median Incident Volume Reported (bbl)	3	3	2	Barrels
Average Incident Volume Reported (bbl)	220	341	226	Barrels
0–50 barrels	81%	80%	88%	Percentage of incidents
50–1,000 barrels	16%	14%	6%	Percentage of incidents
>1,000 barrels	3%	6%	6%	Percentage of incidents

(DEIS, p. 16, LINE 3 REPLACEMENT PROJECT: ASSESSMENT OF POTENTIAL PINHOLE RELEASE)

From my perspective as a Minnesota resident, any leak or spill is a threat to the state's and, my own, freshwater resources. Only 2.5 percent of the Earth's water is freshwater (cited in an NPR article from January 2010). Every single human on Earth needs freshwater to survive.

Therefore, access to clean water is a right, and government leaders should be seeking to protect that right over the personal profits of businesses.

We're fortunate here in Minnesota to have an abundance (for the time being) of freshwater compared to the rest of the plant. Therefore, it should be our government leaders' duty and responsibility to protect this limited resource. From a moral perspective, it simply seems illogical to knowingly support any development that would deteriorate and contaminate the quality of Minnesota's freshwater resources.

The only argument I can see in support of the pipeline is a minimal amount of short-term jobs that might or might not be given to Minnesota residents. While this might seem like a nice momentary boost for a small town, it does nothing to provide long-term employment security for these residents and actually provides a false sense of growth and security for the state.

A better solution for job creation would be to explore ways to make Minnesota energy and food independent, which would actually create tens of thousands of long-term jobs in the state and improve overall well-being. Prioritizing the small amount of (possible) jobs over long-term durability of the state seems shortsighted, irresponsible, and isn't a solution that addresses the actual challenges in northern Minnesota.

Ultimately, we all want clean water and a clean Minnesota. I grew up floating in a canoe in the ponds at Crosby and down the St. Croix river. I've spend countless hours watching the loons dive on White Bear Lake and the eagles soar over the Mississippi. I wouldn't want a pipeline contaminating my favorite lake, my quiet stream, my local forest, or my home, and I'm sure that's a desire we both share.

Thank you for taking time to consider my comments as a Minnesota resident and citizen. I appreciate being able to share my concerns and participate in our democratic system. Thanks again for your time and energy in this effort. I appreciate it.

Wishing all things good for you today,

Kelsey

Kelsey Lundberg

Levi, Andrew (COMM)

From: Peter Lundholm <ppcnt@cloudnet.com>
Sent: Monday, July 10, 2017 6:50 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Energy's proposed Line 3 pipeline Project

I am referencing the docket numbers CN-14-916 and PPL-15-137.

I am opposed to this project on the grounds that it places in jeopardy the wild rice land in an irreparable fashion as well as the natural environment of Northern Minnesota. While Enbridge has stated that they have made efforts to reach out to the Anishinabe bands of Minnesota, all of the bands are on record as opposed to this project. At a time when we ought to be making every effort to keep petroleum in the ground, this seems to me to be a monumentally flawed proposal. In the face of opposition, Enbridge has continued to build the line in Canada with a presumption that the necessary permits will be granted in Minnesota and the U.S.

This seems to me to be a classic example of a corporate entity that makes an offer of short term gain in exchange for long term pain. The Enbridge spill in Michigan does not engender confidence. While the alternative of rail transport does have safety risks, it does have the virtue of being above ground, subject to monitoring and more ready reinforcement of the rail cars.

Again, I am opposed to this pipeline construction project.

Peter Lundholm
1838 61st Avenue North.
Saint Cloud, MN 56303

Sent from my iPad

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Brittany Lynch	218-368-7856	
ADDRESS: 503 5th Street		
CITY, STATE, ZIP: Walker, MN. 56484		

COMMENTS

Please comply with EIS 280 days

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

ST PAUL MN 551
JUN 2017 PM 6 T

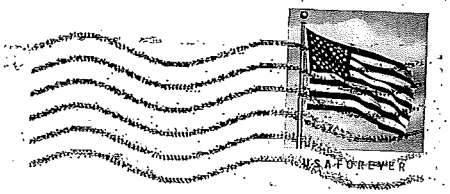

3 Replacement Project DEIS

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- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Corey Lynch	547-1191	
ADDRESS: Norway Ridge Drive		
CITY, STATE, ZIP: Laporte Minn. 56461		

COMMENTS: Declare the E.I.S. Adequate within 280 days & support the line 3 replacement Project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

ST PAUL MN 551
14 JUN 2017 PM 3 T

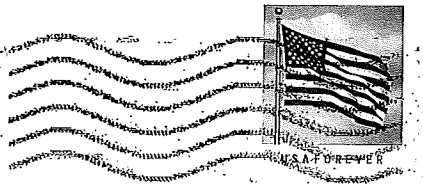

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jean Ann Lynch	224-3810	
ADDRESS: 28514 Norway Ridge Drive.		
CITY, STATE, ZIP: Laporte Minn 56461		

COMMENTS: Please comply with E.I.S. in 280 days

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

ST PAUL MN 551
1 JUN 2017 PM 3 T

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: James Lynskey <jameslynskey@outlook.com>
Sent: Monday, July 10, 2017 2:16 PM
To: MN_COMM_Pipeline Comments

my spouse and I want to add our voices to the many who object to the route Enbridge wants to build their pipeline. We should never allow pipelines to go through our sensitive water ways. Please insist they change the route to lessen the impact of a pipeline spill. Jane Dietl and James Lynskey of McGregor Mn. 55760 telephone # 218 768-2064.

From: Barry Lyons
To: MN_COMM_Pipeline Comments
Subject: Line 3
Date: Sunday, June 04, 2017 7:52:21 PM

To whom it may concern.

I live on the Mississippi River a little upstream from Bemidji. The proposed line 3 replacement will change the existing route so as to cross the Mississippi further upstream from me. I challenge the state and endbridge to show how there could be an adequate spill response downstream from the crossing. In this area there is little or no river access by motorized vehicles and oil pollution would inflict major damage to the pristine headwaters of Mississippi especially if it is the toxic tar sands oil.
Our economy is more dependent on tourism to our natural beauty than to temporary construction jobs promised by endbridge.

Barry

Levi, Andrew (COMM)

From: Duane Hillukka, K <lakelandbuilders@hotmail.com>
Sent: Monday, July 10, 2017 4:23 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

As a local resident to the proposed pipeline I think it is time we move on with the Line 3 replacement plan which is much safer, cleaner, and more efficient than moving oil by rail.

Sincerely,

Jake M
34660 US 71
Menahga, MN 56464
lakelandbuilders@hotmail.com

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 554
10 JUL 2017 PM 9 L

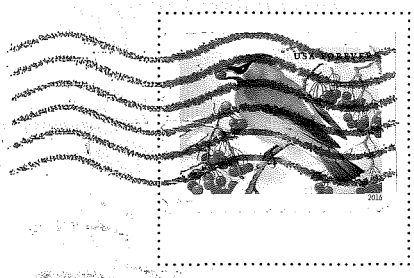

Line 3 is a disaster

CLEAN UP
THE MESS
NOW

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Bugay M.

55101+2143

Levi, Andrew (COMM)

From: Eric Mack <user@votervoice.net>
Sent: Friday, June 16, 2017 1:47 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I have worked as a vendor on past Enbridge practices and can attest to the utmost care for the environment this company takes when building and operating a pipeline. I believe in the Company so much that I joined the Enbridge team in 2014. I have learned more about the intensive testing and monitoring that they do continuously to protect the environment. Enbridge is an active participant in leak detection research and development programs. Pipelines are the safest way to move crude oil or other liquid products according to PHMSA. I ask that the replacement be moved forward as soon as possible. There is no reason to delay this project. No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS.

Sincerely,

Eric Mack
3037 S Chicago Ave
Superior, WI 54880
emack209@yahoo.com

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jeremy MacNair	763-442-0537	jmacnair@northlandco

ADDRESS: 6317 Grand Ave Duluth MN 55802

CITY, STATE, ZIP:

COMMENTS: Please Mail

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: KAREN MADISON

Street Address: 1155 IMPERIAL ST.

City: MORA State: MN Zip Code: 55051

Phone or Email: 320 396-3429

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am opposed to the new proposed Enbridge Line 3 pipeline being installed across new 300 plus miles of MN properties currently untouched by pipeline. I am also opposed to any other possible future pipeline routes that may be proposed by Enbridge in this area.

Enbridge cannot guarantee that any new pipeline installation will be safe from leaks or spills polluting the area all along the new pipeline's route. There has already been enough significant pollution damage along the existing Line 3 corridor.

Thank you very much for your consideration in this matter.

RECEIVED
JUN 20 2017
MAILROOM

If including additional pages please number them and tell us how many you are providing: ____ pages

Levi, Andrew (COMM)

From: Hilary <rquartz36@comcast.net>
Sent: Monday, July 10, 2017 11:34 PM
To: MN_COMM_Pipeline Comments
Subject: No. Find another way.

No. Invest the money in biofuels. In solar energy. We are the Land of Ten Thousand Lakes - we need to protect them from oil spills. We need to keep our lakes, rivers, and soil clean. We have the great privilege of protecting the headwaters of one of the greatest rivers in the world, the Mississippi. Running an oil pipeline through those headwaters would be a disaster.

Hilary Major

Sent from my iPhone

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Betty MAKI

Street Address: 22205 E. Burns Valley Rd

City: WINONA State: MN Zip Code: 55987

Phone or Email: DAKOTAUnity@yahoo.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

* The EIS can be improved by including the NO BUILD OPTION. Fossil fuel industry is ~~this~~ a dying industry. Want jobs? Invest in SUSTAINABLE energy sources hydroelectric, SOLAR, WIND.

* This EIS can be improved by using independent agencies to conduct prior research. Enbridge has a prior relationship with agencies involved in this EIS, therefore is not objective & potentially biased.

* This EIS can be improved by TRULY considering tribal lands, the disproportionate cultural & religious impact this would have on our Native brothers & sisters. If this pipeline were slated to be running through Bemidji, would this pipeline still be under consideration?

If including additional pages please number them and tell us how many you are providing:_____ pages

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02 1P $000.34
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Raymond Scott Maki	218-591-9138	
ADDRESS		
179 Canosia Rd Esko, Mn		
CITY, STATE, ZIP		
Esko, Mn 55733		

COMMENTS

I have worked on Line 3 for the past 15 years, welding repair sleeves etc. I am also an avid outdoors man. I know first hand the condition of Line #3, it does need to be replaced!! I also believe in going green which will come with time, meanwhile we need the oil without the spills.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Jeanine Malec
To: MN_COMM_Pipeline Comments
Subject: Stop line 3
Date: Monday, June 05, 2017 10:04:35 PM

Please halt all further consideration of the Line # pipeline project, we need to explore alternative means of providing energy to our people, that do not risk contaminating Minnesota's rich wetlands and aquifers. Water is a far, far more valuable resource than oil - the interests that fund these projects are not of the people, they are of profiteers.

STOP THIS PROJECT, out of respect for our wild places, our waters, our indigenous brothers and sisters, and the future of our children!

Sincerely

Jeanine Malec
3852 11th Ave S Minneapolis, MN 55407

Levi, Andrew (COMM)

From: Mallory Morken <mallory.morken@gmail.com>
Sent: Sunday, July 09, 2017 6:50 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

To whom it may concern,

Please, to safeguard the health of residents and the environment, I urge the Commission to reject the permit to Enbridge's Replacement Line 3. Pipelines break, and we can't drink oil.

If the process continues, at the very least, the old line 3 should be removed and remediated before any new projects commenced. Enbridge has the responsibility to clean up its existing infrastructure and should not be allowed to continue ripping up the earth without caring for what they already put in place.

The alternative route SA-04 would have lower risk of harm to the lakes and the Native communities who depend on them. This route should be authorized and pursued, as that is the purpose of the EIS process in the first place.

Fundamentally, it's in all our best interests to invest in renewable energy systems and divest from more pipelines. Let's create more jobs through wind and solar and ensure our beautiful MN parks and lakes thrive for generations to come.

Thank you,

Mallory Morken
670 Olmstead St.
Winona, MN 55987

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Timothy Maly	218-390-8559	TJmaly7@msn.com
ADDRESS: 4334 Woodland Ave		
CITY, STATE, ZIP: Duluth mn		

COMMENTS: it is needed

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
David Jerome Manderfeld	218-393-0676	
ADDRESS: 2202 Sahlman Ave		
CITY, STATE, ZIP: Cloquet MN 55720		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916, PPL-15-137

ST PAUL MN 551 2017 PM 8 T

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Kiera Manderfeld		
ADDRESS		
2202 Sahlnian Ave		
CITY, STATE, ZIP		
Cloquet MN 55720		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Rosa Lee Manderfeld	879 5269	

ADDRESS
2202 Sahlman Ave

CITY, STATE, ZIP
Cloquet MN 55720

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

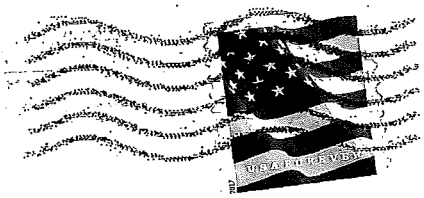

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Logan Manderfeld		
ADDRESS: 2202 Sahlman Ave		
CITY, STATE, ZIP: Cloquet MN 55720		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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Line 3 Replacement Project DEIS

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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916, PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Douglas E Mandy <dougmandy@gmail.com>
Sent: Sunday, July 09, 2017 11:27 AM
To: MN_COMM_Pipeline Comments
Subject: Docket numbers CN-14-916 and PPL-15-137

Dear Mr. MacAlister:

I live in southern MN, but have family and friends residing in the watersheds that Enbridge Energy's proposed line 3 replacement will cross, and take great pride in the quality of our state's natural recreation resources and ecosystems. I am concerned that the draft Environmental Impact Statement (for dockets CN-14-916 and PPL-15-137) overestimates an unrealistic degree of confidence in oil spill risk management. Pipelines are known to leak frequently, and there are no realistic safeguards to effectively seal the line from leaks that impact the pristine quality of our state's economically valuable watersheds. Therefore I oppose installation of another pipeline to replace the expected and necessary line 3 deactivation.

Respectfully,
Doug Mandy
403 Union St
Northfield, MN

Levi, Andrew (COMM)

From: Maria Surma Manka <mariasurmamanka@yahoo.com>
Sent: Friday, July 07, 2017 9:20 AM
To: MN_COMM_Pipeline Comments
Subject: Comment on Line 3 DEIS

Hello,

I'm writing to express my concerns about the Enbridge Line 3 pipeline that could run through Morrison County, where I live.

My biggest concern is that there is no assessment of the decline in oil demand and an assumption that demand is what Enbridge says it is. According to the U.S. EIA, crude oil imports peaked in 2005 and today imports are at mid-1990s levels. U.S. fuel demand was down 5% in 2015 compared to the 2007 peak, and in Minnesota the demand was down 19% compared to 2004. Higher efficiency cars, among other factors, are clearly making a difference.

My other concern is that there is no serious discussion of electric car and renewable energy infrastructure. As more of our transportation options move toward electricity, fuel demand will continue to fall. This should at least be discussed and assessed in the DEIS.

Thank you,
Maria

Maria Surma Manka
3018 150th Ave
Bowlus, MN 56314

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

We currently have many pipelines criscrossing the state, and we don't need additional disruption of our environment. We need some respect for tribal lands and less worship of oil company profits — people before profits. Mahsyou!

SINCERELY,
Richard Mann

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

POSTCARD USA

Levi, Andrew (COMM)

From: Sherri@Mann.Org
Sent: Monday, July 10, 2017 9:08 PM
To: MN_COMM_Pipeline Comments
Subject: No more dirty energy

I am writing to add my voice to the majority group of Minnesotans who do not want the expansion and reroute get of pipeline 3 to carry dirty tar sands oil from Alberta, CA We do not want dirty tar sand oil traveling through our state. This is an extremely dirty form of energy. We can do so much better with solar and wind. Pipelines are notorious for breaking and over time we are bound to have spillage. The planned reroute will effect our watershed polluting a vital source of life. Water is vital to life, oil is only vital to lining the pocketbooks of a small few. Please do not expand this dirty pipeline.
Sherri Mann
18180 Olinda trail n
Marine on Saint Croix Croix MN 55407

Sent from my iPhone

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
KENT MANNING	218.259.1221	
ADDRESS: 710 NE 11TH AVE.		
CITY, STATE, ZIP: GRAND RAPIDS, MN 55744		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

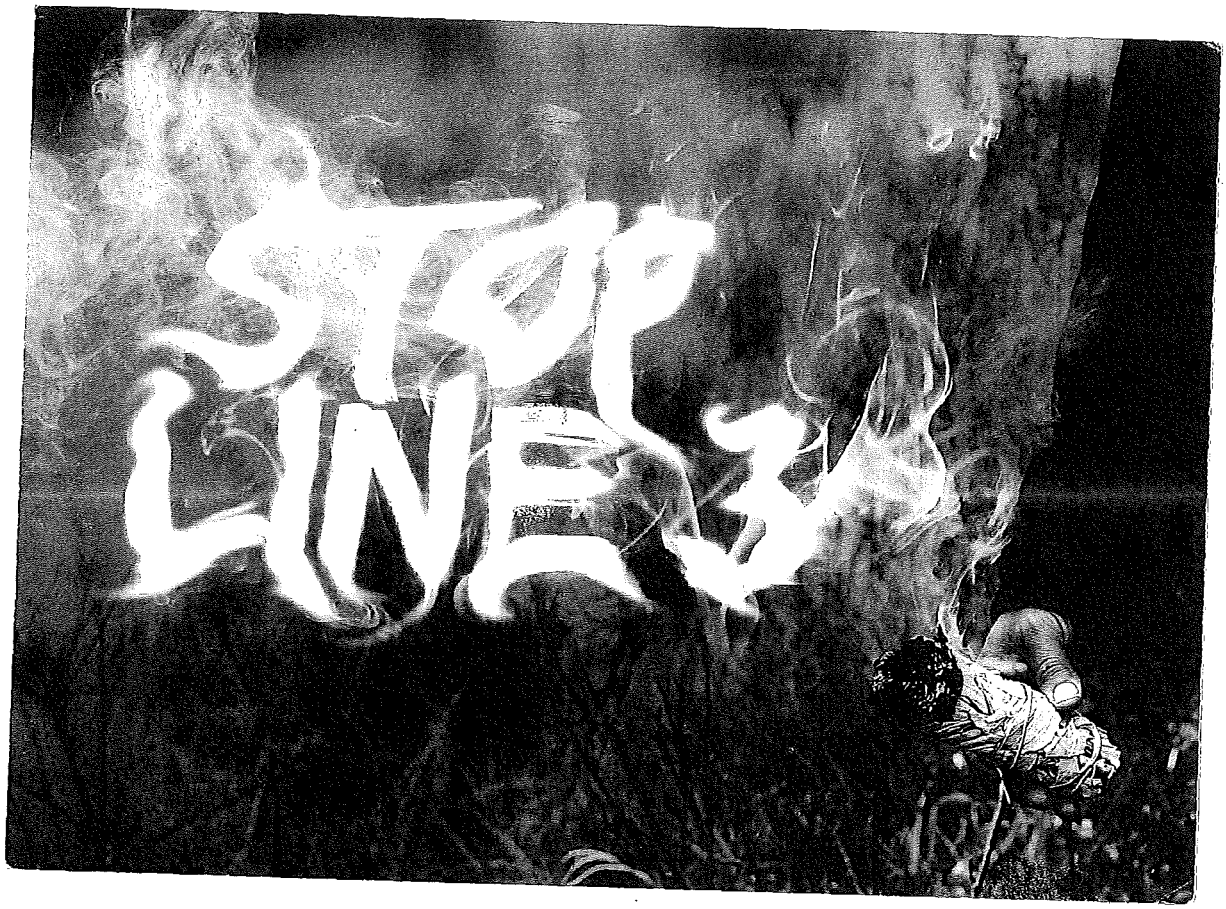

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
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POSTCARD USA

Dear Jamie Macalister, Stop Line 3!
It is essential to the future biodiversity & environmental health of all our Minnesota land and our people to stop this project NOW! The likelyhood of spills is extremely high. The Draft Environmental Impact Statement finds that Line 3 is likely to have 14 pinhole leaks, 54 small spills, 4 medium, 3 large & 1 catastrophic.

SINCERELY,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

$5.MN-601399

Levi, Andrew (COMM)

From: Matheny, Patrick Y. (MPC) <pymatheny@marathonpetroleum.com>
Sent: Friday, July 07, 2017 10:34 AM
To: MN_COMM_Pipeline Comments
Subject: Applications of Enbridge Energy, Limited Partnership for a Certificate of Need and Pipeline Route Permit for the Line 3 Replacement
Attachments: [Untitled].pdf

Minnesota Department of Commerce:

Attached please find Marathon Petroleum Company LP's comment letter for the above referenced proceeding (MPUC Docket Nos. PL-9/CN-14-916 and PPL-15-137; OAH Docket Nos. 65-2500-32764 and 65-2500-33377). The original of this letter will be sent via overnight courier.

Regards,
Patrick

Patrick Y. Matheny
Supervisor - Contracts & Compliance Analysis
Marathon Petroleum Company LP
539 South Main Street
Findlay, Ohio 45840
Office: (419) 421-4130
Mobile: (419) 615-3862
Fax: (419) 421-5727

C. M. (Mike) Palmer
Senior Vice President
Supply, Distribution & Planning

Marathon Petroleum Company LP

539 South Main Street
Findlay, OH 45840
Telephone 419/421-3269
FAX 419/421-4232
E-Mail: CMPalmer@MarathonPetroleum.com

July 7, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198
Pipeline.Comments@state.mn.us

Re: In the Matter of the Applications of Enbridge Energy, Limited Partnership for a Certificate of Need and Pipeline Route Permit for the Line 3 Replacement – Phase 3 Project in Minnesota from the North Dakota Border to the Wisconsin Border
MPUC Docket Nos. PL-9/CN-14-916 and PPL-15-137;
OAH Docket Nos. 65-2500-32764 and 65-2500-33377

Dear Ms. MacAlister:

This letter is sent in support of Enbridge Energy, Limited Partnership's ("Enbridge") proposed Line 3 Replacement Project (the "Project").

Headquartered in Findlay, Ohio, Marathon Petroleum Corporation, together with its subsidiaries, including Marathon Petroleum Company LP, Speedway LLC and MPLX LP (collectively, "MPC"), is one of the largest refiners, marketers and transporters of petroleum product in the United States.

MPC is the nation's third-largest refiner and the largest refiner in the Midwest; MPC refineries have 1,817,000 barrels per calendar day (bpcd) of crude oil throughput capacity, of which 729,000 bpcd is processed at MPC's Midwest refineries. MPC's refining, marketing and transportation operations are concentrated primarily in the Midwest, Northeast, East Coast, Southeast and Gulf Coast regions of the U.S. These operations include a seven-plant refining network, a comprehensive terminal and transportation system, and extensive wholesale and retail marketing operations, with both the Marathon brand and MPC's wholly owned retail marketing subsidiary, Speedway LLC, the nation's second-largest chain of company-owned and operated retail gasoline and convenience stores. MPC-affiliated companies also own, lease, or have an ownership interest in

products and crude oil pipelines totaling approximately 10,800 miles.

MPC appreciates the opportunity to comment on the draft environmental impact statement prepared by the Minnesota Department of Commerce for the Project (the "DEIS"). MPC is committed to obtaining increased access to secure, reliable sources of crude oil for its refineries. Pipeline transportation is safer, more reliable, more efficient and more economical than other modes of crude transportation.

MPC respectfully recommends that the alternatives proposed in the DEIS be rejected and that the Project as proposed by Enbridge be approved. In particular, MPC notes that the entirely different route identified in the DEIS as SA-04 ignores the existing Enbridge facilities in Clearbrook, Minnesota, and Superior, Wisconsin, and as such fails to provide the same service as the Project as proposed. This and the other alternatives in the DEIS, including no action, fail to meet the needs met by the Project.

Thank you for the opportunity to comment in this process.

Very truly yours,

C. M. Palmer

C. Mike Palmer
Senior Vice President, Supply, Distribution & Planning

From: Jon Marcaccini
To: MN_COMM_Pipeline Comments
Subject: COMMENTS
Date: Tuesday, May 16, 2017 1:23:55 PM

Pipelines are very important to the future of this country, oil is still a thing we use and need daily. The arguments that Fossil fuels contribute to climate change is undeniable but it is what we use and curbing that will not make alternatives appear. The automobile was not invented because horses were hard to take care of. The light bulb was not invented because whale oil was scarce. When a better cheaper cleaner power source is invented oil use will dry up just like everything we once relied on when something better was invented. We will run cute little gas powered cars in the future like we might buy a vinyl record for the novelty of it.

Regarding wild rice don't even go there, most of our rice lakes sit unharvested because interest is just not there, it is not a food source for millions and the pipeline will not destroy it. Tossing that lame issue in the mix like wild rice is the corn crop of the United States.

No one wants anything in their back yard, I have a huge Natural gas pipeline a few hundred feet from my home, and it goes between two residential lakes. I would guess many of my neighbors don't even know it is there. I would much rather have it then 50 natural gas trucks on the road each day.

Levi, Andrew (COMM)

From: rmarcum@frontiernet.net
Sent: Friday, June 16, 2017 7:54 AM
To: MN_COMM_Pipeline Comments
Subject: line 3 replacement

Dear Sirs,

I was unable to attend the meeting held locally at the East Lake Community Center recently. I would however like to add my voice to those opposing the project.

I am an active member of my community, am chair of the town board and serve on several county and state committees.

I am not speaking for my township or any particular committee I serve on. I am offering my own opinion only.

I oppose the project as it crosses wetlands in my township. It encourages use of a dirty and limited source of energy in a time we should be focusing on clean alternatives. A line failure would be devastating to our area, and to those downstream (we drain ultimately into the Mississippi).

I stand in support of our Native American community and all people of good conscience who oppose this project.

Thank You,
Bob Marcum

218-768-2337

36136 Kestrel Ave.
McGregor, Mn. 55760

Levi, Andrew (COMM)

From: Renae Marquis <rbmarquis@hotmail.com>
Sent: Tuesday, June 20, 2017 10:43 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

We've lived in Minnesota and witnessed how Enbridge takes meticulous care of the needs of the pipeline and respecting the landowners and citizens of this state. The safety of the workers is also paramount in mind. Wherever Enbridge plans a route, it's the route best served for all. The track record of Enbridge's success over the years is obvious. We need this project to come to completion as soon as possible. No more stalling. if lines need replacing and fixing in routine maintenance, let the work begin. A leaky water faucet is not going to fix itself. Shingles torn off the roof in a hail storm will not fix itself, so why wait? Replacing and fixing is a part of every day life, even with pipelines. Waiting and stalling won't stop a pipeline from aging. All the criteria has been met, let Enbridge do it's job!

Sincerely,

Renae Marquis
11003 350th Ave NE
Goodridge, MN 56725
rbmarquis@hotmail.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Arlen Marquis	218-796-5676	acjlmar@bbtel
ADDRESS		
11269 350 ave SE		
CITY, STATE, ZIP		
Trail, MN. 56684		

COMMENTS Good for Minnesota

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
STARR MARSHALL	(218) 851-5815	
ADDRESS		
322 16th Street		
CITY, STATE, ZIP		
CLOQUET MN 55720		

COMMENTS

I SUPPORT LINE 3!

DECLARE THE EIS ADEQUATE W[illegible] 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916, PPL-15-137

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POSTCARD USA

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Phyllis Marshall	218-726-1477	
ADDRESS: 1607 Stanford Ave.		
CITY, STATE, ZIP: Duluth, Mn. 55811		

COMMENTS: The safety aspect of this kind of transportation is a good thing.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Dan Marshall <user@votervoice.net>
Sent: Sunday, July 09, 2017 6:14 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 support

Dear Ms. MacAlister,

I support the construction of line 3 to transport valuable resources through Minnesota!

Programs like this, properly planned and executed, are safe and support our economy.

I encourage those concerned to provide swift action to approve the final stages of the pipeline.

Dan Marshall, Retired Air Force MSgt.
Project Engineer, Itasca Co resident.

Sincerely,

Dan Marshall
29332 Eden Loop Rd
Bovey, MN 55709
d.marshall57@yahoo.com

Mr David Martin
11116 Maryland Ave. N.
Champlin, MN 55316-3347
763 425 6193

Jamie MacAlister
Pipeline comments
Mn Dept of Commerce
85 - 7th Place East
Suite 280
St Paul Mn 55101

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MAILROOM

Mn Dept of Commerce,

My name is Dave Martin.

I am writing about the pipe line.

My concern/question is about the old line, which is planned to be left in place. My comment is that; that old pipeline should be removed especially if it is leaking/corroded or ready to.

The removal would put the metal to be recycled.

The public has no idea what would be left in it as residue, which over time would/could contaminate ground and/or surface water. If it is hazardous to remove that is even more reason to be taken out.

In the long run how much oil would be transported with the expected eventual "run out of oil" in favor of other energy sources.

Sincerely
Dave Martin

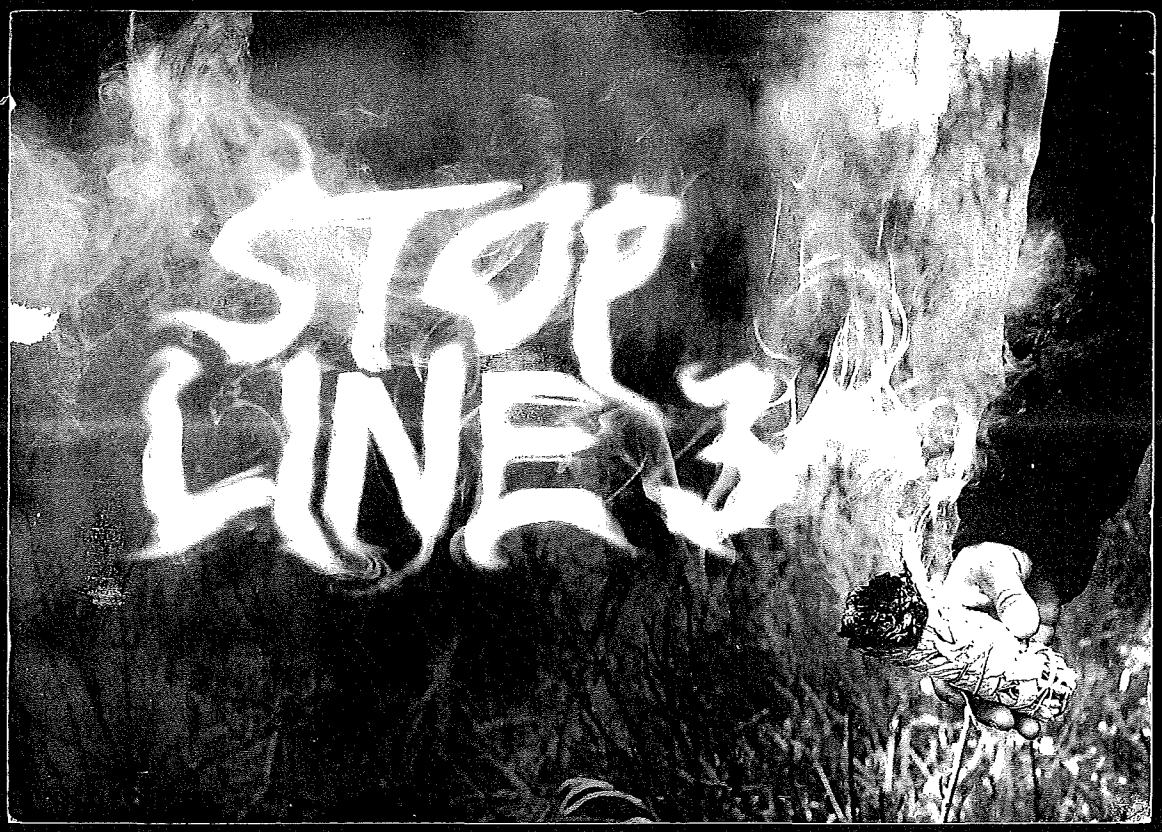

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

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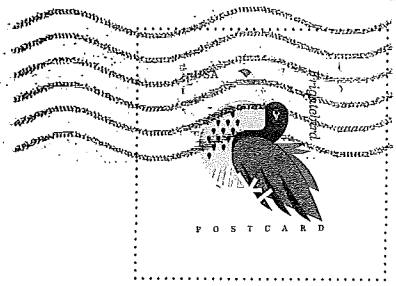

I oppose Line 3.
All pipelines have a risk of leaking & spilling. Enbridge has 800 spills in 15 years. It will violate treaty rights & property rights through eminent domain but only for the benefit of a private Canadian corporation.

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Clifford Martin
1275 62nd St. W
Northfield MN 55057

Levi, Andrew (COMM)

From: Pam Martin <reikiwithpam@gmail.com>
Sent: Saturday, July 08, 2017 10:28 PM
To: MN_COMM_Pipeline Comments
Subject: EIS #CN-14-916, #PPL-15-137

Dear Environmental Review Manager:

I believe there is missing data in the Line 3 DEIS. There is apparently no information from a dilbit study done by the National Academy of Sciences, which you can find here: https://www.nap.edu/catalog/21834/spills-of-diluted-bitumen-from-pipelines-a-comparative-study-of.

I would like this to be included in the final EIS, as I lived near the Kalamazoo River in Michigan in 2010 and saw the devastation an oil spill can have on a community and a river ecosystem. Enbridge tried to cover it up, lied about the extent of the spill ance wad unable tho clean up the tarballs that formed in the river.

Also, there is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete.
Please do the right thing for our water, the environment and the citizens of Minnesota.
Thank you.
Pam Martin
15398 Clearview Lane
Brainerd, MN 56401

#CN-14-916, #PPL-15-137

Levi, Andrew (COMM)

From: Al Martin <almartin@brainerd.net>
Sent: Monday, July 10, 2017 2:38 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project CN-14-916 and PPL-15-137 Attn: Jamie Macalaster

A. J. Martin
27518 County Road 3
Merrifield, MN 56465

218-765-4321
almartin@brainerd.net

July 9, 2017

Jamie Macalaster
Environmental Review Manager
MN Dept. of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Re: Public Comment: Line 3 Project
CN-14-916 and PPL-15-137

Dear Manager Macalaster,

Following are my comments on the Enbridge Line 3 project;

1. Abandoning the Old Line 3 in place should not be permitted. It's said it will be pressurized or whatever else is expected to be done, to keep it secured. It's 50 years old now and tired and worn out. By no longer carrying oil, Enbridge will no longer feel it a priority to keep maintained. What happens in another 10 years, when most people have forgotten it's even there? Another 20 years, or 50 years? At what point will the Old Line 3 be so rotten it can no longer be kept intact? Will it consist of unmaintained segments of rusted out pipe, causing continuous environmental harm?

It must be insisted the Old Line 3 be removed.

2. The existing lines in the existing route corridor of the current Line 3 have all been leaking and spilling to some extent for 50 years or more. Small leaks are seldom newsworthy, but the effects add up. When I stopped to refill my fuel efficient Toyota yesterday, I noticed the concrete area around the pumps was terribly stained with effects of many small spills, over a period of years; much less than 50 years, however.

New Line 3 should remain in it's existing corridor, where the grounds, trees, and waters have already been contaminated, rather than opening another corridor, where more ground, trees, and waters can be polluted and contaminated.

3. Enbridge must be required to post a "damage deposit", a cash bond with the State of Minnesota and the Minnesota Chippewa Tribes, sufficient to handle the largest possible spill and environmental disaster, and removal and disposal of all old, existing, and future lines. It's commonly done with anyone renting a house or apartment. There are, at a minimum, two reasons for this:

> A. Enbridge is a foreign corporation, which makes it much harder to make them comply with our rules and laws, and much harder to make them pay for damages and collect the money. Example: Exxon Company in 1989 created the disaster in Alaska known as Exxon-Valdez. They were fined over $500 million to pay for cleanup, and the last I know, were still dragging it out in court delays and hadn't paid their fine. It's reported only 10% of the spill had ever been cleaned up. Enbridge could easily create a similar situation in our beautiful pristine lakes and wetlands, ruining resources both spiritual and practical for Ojibwe people, and ruining practical resources for our dominant culture, including fishing, ricing, and tourism.
>
> B. Enbridge is a corporation. Corporations dissolve and disappear in the middle of the night. So trying to make Enbridge pay any future damages would possibly be futile. Their principals take the money and run, to reform as new entities later, leaving others with the consequences. This is the purpose behind the idea of forming corporations.
>
> This deposit money could be invested for them in safe US bonds, and when Enbridge finished and ended it's operations, the money would be returned to them with interest.

4. The oil has already been in the ground for millions of years. Slowing down extraction is no problem; the oil is not going anywhere. Doing anything slowly that's potentially dangerous, is doing it right. Doing it fast invites disaster.

Thank you for considering my comments to the Draft EIS public review process.

Sincerely,

Al Martin

CC: A copy of this letter was emailed to Pipeline.comments@state.mn.us

---

Virus-free. www.avast.com

RECEIVED
JUL 13 2017
MAILROOM

A. J. Martin
27518 County Road 3
Merrifield, MN 56465

218-765-4321
almartin@brainerd.net

July 9, 2017

Jamie Macalaster
Environmental Review Manager
MN Dept. of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Re: Public Comment: Line 3 Project
CN-14-916 and PPL-15-137

Dear Manager Macalaster,

Following are my comments on the Enbridge Line 3 project;

1. Abandoning the Old Line 3 in place should not be permitted. It's said it will be pressurized or whatever else is expected to be done, to keep it secured. It's 50 years old now and tired and worn out. By no longer carrying oil, Enbridge will no longer feel it a priority to keep maintained. What happens in another 10 years, when most people have forgotten it's even there? Another 20 years, or 50 years? At what point will the Old Line 3 be so rotten it can no longer be kept intact? Will it consist of unmaintained segments of rusted out pipe, causing continuous environmental harm?

It must be insisted the Old Line 3 be removed.

2. The existing lines in the existing route corridor of the current Line 3 have all been leaking and spilling to some extent for 50 years or more. Small leaks are seldom newsworthy, but the effects add up. When I stopped to refill my fuel efficient Toyota yesterday, I noticed the concrete area around the pumps was terribly stained with effects of many small spills,

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A. Enbridge is a foreign corporation, which makes it much harder to make them comply with our rules and laws, and much harder to make them pay for damages and collect the money. Example: Exxon Company in 1989 created the disaster in Alaska known as Exxon-Valdez. They were fined over $500 million to pay for cleanup, and the last I know, were still dragging it out in court delays and hadn't paid their fine. It's reported only 10% of the spill had ever been cleaned up. Enbridge could easily create a similar situation in our beautiful pristine lakes and wetlands, ruining resources both spiritual and practical for Ojibwe people, and ruining practical resources for our dominant culture, including fishing, ricing, and tourism.

B. Enbridge is a corporation. Corporations dissolve and disappear in the middle of the night. So trying to make Enbridge pay any future damages would possibly be futile. Their principals take the money and run, to reform as new entities later, leaving others with the consequences. This is the purpose behind the idea of forming corporations.

This deposit money could be invested for them in safe US bonds, and when Enbridge finished and ended it's operations, the money would be returned to them with interest.

4. The oil has already been in the ground for millions of years. Slowing down extraction is no problem; the oil is not going anywhere. Doing anything slowly that's potentially dangerous, is doing it right. Doing it fast invites disaster.

Thank you for considering my comments to the Draft EIS public review process.

Sincerely,

Al Martin

CC: A copy of this letter was emailed to Pipeline.comments@state.mn.us

Levi, Andrew (COMM)

From: Rachel Martinez <rmnerdahl@gmail.com>
Sent: Monday, July 10, 2017 12:24 PM
To: MN_COMM_Pipeline Comments
Subject: Don't do it

It would be better if the project would clean up their old mess before thinking about making a new bigger mess. All 11 tribes are against this project. Minnesota should reject this proposal.

docket numbers CN-14-916 and PPL-15-137

Levi, Andrew (COMM)

From: Brenda Martini <djbren0528@gmail.com>
Sent: Monday, July 10, 2017 10:31 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline Comments

Hello,

I am a resident of Cloquet, Minnesota located in Carlton County. I have some major concerns with the plans of the Line 3 Pipeline as proposed by Enbridge.

Leaving the old pipe in the ground is unacceptable on all levels. This pipe is going to be left to rot. There is no guarantee that they can get all the sludge out of the old pipe. With that said, when the old pipe decays it will release who knows what sludge and gases into the ground to pollute groundwater that rural towns depend on to provide drinking water to their respective communities. Not only that, Northern Minnesota is known for Wild Rice beds that are found in nearly all of the wetlands here. Do we want to destroy a food source that Minnesotans know and love? Manoomin (Wild Rice) is harvested by the Ojibwe people and is also a source of revenue to those that harvest it. Wild Rice is such a staple in Northern Minnesota.

According to Minnesota Statute 1.148 Zizania Aquatica or Wild Rice is the official Minnesota State Grain. According to the Minnesota Secretary of State's web page, it received this designation in 1977.

Furthermore, the following statute applies:

84.091 AQUATIC VEGETATION IN PUBLIC WATERS.

Subdivision 1.Ownership.

The state is the owner of wild rice and other aquatic vegetation growing in public waters. A person may not acquire a property interest in wild rice or other aquatic vegetation or destroy wild rice or aquatic vegetation, except as authorized under this chapter or section 103G.615.

Section 103G.615 states the following:

103G.615 PERMITS TO HARVEST OR DESTROY AQUATIC PLANTS.

Subdivision 1.Issuance; validity.

(a) The commissioner may issue a state general permit to a governmental subdivision or to the general public to conduct one or more projects described in this subdivision. The commissioner may issue permits, with or without a fee, to:

(1) gather or harvest aquatic plants, or plant parts, other than wild rice from public waters;

(2) transplant aquatic plants into public waters;

(3) destroy harmful or undesirable aquatic vegetation or organisms in public waters under prescribed conditions to protect the waters, desirable species of fish, vegetation, other forms of aquatic life, and the public.

(b) Application for a permit and a notification to request authorization to conduct a project under a general permit must be accompanied by a fee, if required.

(c) An aquatic plant management permit is valid for one growing season and expires on December 31 of the year it is issued unless the commissioner stipulates a different expiration date in rule or in the permit.

(d) A general permit may authorize a project for more than one growing season.

Subd. 2.Fees.

(a) The commissioner shall establish a fee schedule for permits to control or harvest aquatic plants other than wild rice. The fees must be set by rule, and section 16A.1283 does not apply, but the rule must not take effect until 45 legislative days after it has been reported to the legislature. The fees shall not exceed $2,500 per permit and shall be based upon the cost of receiving, processing, analyzing, and issuing the permit, and additional costs incurred after the application to inspect and monitor the activities authorized by the permit, and enforce aquatic plant management rules and permit requirements.

(b) A fee for a permit for the control of rooted aquatic vegetation for each contiguous parcel of shoreline owned by an owner may be charged. This fee may not be charged for permits issued in connection with purple loosestrife control or lakewide Eurasian watermilfoil control programs.

(c) A fee may not be charged to the state or a federal governmental agency applying for a permit.

(d) A fee for a permit for the control of rooted aquatic vegetation in a public water basin that is 20 acres or less in size shall be one-half of the fee established under paragraph (a).

(e) The money received for the permits under this subdivision shall be deposited in the treasury and credited to the water recreation account.

(f) The fee for processing a notification to request authorization for work under a general permit is $30, until the commissioner establishes a fee by rule as provided under this subdivision.

Subd. 3.Permit standards.

The commissioner shall, by rule, prescribe standards to issue and deny permits under this section. The standards must ensure that aquatic plant control is consistent with shoreland conservation ordinances, lake management plans and programs, and wild and scenic river plans.

Subd. 3a.Invasive aquatic plant management permit.

(a) "Invasive aquatic plant management permit" means an aquatic plant management permit as defined in rules of the Department of Natural Resources that authorizes the selective control of invasive aquatic plants to cause a significant reduction in the abundance of the invasive aquatic plant.

(b) The commissioner may waive the dated signature of approval requirement in rules of the Department of Natural Resources for invasive aquatic plant management permits if obtaining signatures would create an undue

burden on the permittee or if the commissioner determines that aquatic plant control is necessary to protect natural resources.

(c) If the signature requirement is waived under paragraph (b) because obtaining signatures would create an undue burden on the permittee, the commissioner shall require an alternate form of landowner notification, including news releases or public notices in a local newspaper, a public meeting, or a mailing to the most recent permanent address of affected landowners. The notification must be given annually and must include: the proposed date of treatment, the target species, the method of control or product being used, and instructions on how the landowner may request that control not occur adjacent to the landowner's property.

(d) The commissioner may allow dated signatures of approval obtained for an invasive aquatic plant management permit to satisfy rules of the Department of Natural Resources to remain valid for three years if property ownership remains unchanged.

Subd. 4.Enforcement authority and restoration requirements.

(a) **The commissioner may make findings and issue an order** to a person **to stop** the illegal gathering, harvesting, planting or transplanting, or **destroying of aquatic vegetation** or organisms **in public waters**.

(b) In the same or a separate findings and order, the commissioner may require restoration or replacement of any emergent or floating leaf aquatic vegetation lost as a result of the illegal activities, to the condition existing before the illegal activities were undertaken. An order for restoration or replacement must state with specificity the work that is necessary to comply with the order and must specify a date by which the work must be completed.

(c) The person or entity to whom the order is issued may request a review of the order by the commissioner within 30 days of receipt of written notice by filing a written request for review. If the written request is not submitted within 30 days, the restoration or replacement order becomes final. The commissioner shall review the request and supporting evidence and render a decision within 60 days of the request for review.

(d) If the person or entity wishes to appeal the decision of the commissioner after review under paragraph (c), a written request must be filed with the commissioner within 30 days for a contested case hearing under chapter 14. A bond, as provided in subdivision 5, must accompany the demand for a hearing. The bond and demand for hearing must be filed 30 days after the person is served with a copy of the decision of the commissioner on review.

(e) If the person or entity to whom the decision of the commissioner on review is addressed does not demand a contested case hearing under chapter 14 or demands a hearing but fails to file the required bond:

(1) the commissioner's order becomes final at the end of 30 days after the person is served with the decision of the commissioner on review; and

(2) the person may not appeal the order.

§

Subd. 5.Bond for demanding public hearing.

(a) A person or entity filing a demand for a public hearing, under subdivision 4, must execute and file a corporate surety bond or equivalent security to the state of Minnesota, to be approved by the commissioner and in an amount and form determined by the commissioner. The bond or security must be conditioned to pay the

costs of the hearing to the extent described in subdivision 6 if the commissioner's findings and order are affirmed without material modification.

(b) A bond or security is not required of a public authority that demands a public hearing.

(c) The commissioner may waive the requirement for a bond or other security.

Subd. 6.Hearing costs.

(a) Except as provided in paragraph (b), the costs of a hearing must be paid as prescribed by chapter 14 and the chief administrative law judge.

(b) If the commissioner's order is affirmed without material modification, the appellant must pay the following costs, up to $750:

(1) costs of the stenographic record and transcript; and

(2) rental costs, if any, of the place where the hearing is held.

Subd. 7.Misdemeanor.

A violation of an order issued under this section is a misdemeanor."

According to Statute 84.091 above, the State declares ownership of Wild Rice plants. This makes the State responsible for protecting said property of the State.

Please pay close attention to Subdivision 4, Section A where the focus is on destroying aquatic plants. I bolded the pertinent points of the statute for my point. Leaving a decaying pipe in the ground has the potential to do just that. If you allow the permitting to happen or allow Enbridge to leave a rotting corpse of a pipe in the ground, it has the potential to destroy Wild Rice plants. The same Wild Rice plants that the State saw fit to put into Statute in 1977. This would make the State derelict in its duty to protect its own property according to Statute.

It is also not fair to leave the cleanup of the old pipe to the communities...namely the rural taxpayers. Enbridge is the owner of the pipe, therefore, it is their responsibility to clean it up. Landowners and rural communities do not have the massive and unlimited tax base to fund such an endeavor. Enbridge has argued that some sections of the pipe are dangerously close to other lines that are live. I can make a concession for those sections. But for sections such as the part that runs through the Fond du Lac Reservation, for example, Enbridge's map posted on their website shows that the current Line 3 is the only line and no others are anywhere close to it. Why should the FDL Reservation have to be the entity clean up Enbridge's mess? I say no. It's the same principle of what Reserve Mining did by dumping its taconite waste into Lake Superior in the 60s and 70s. The State of Minnesota sued Reserve Mining in the 1970s to get them to clean up their mess. Why should small towns in rural Minnesota be tasked with lengthy and expensive court battles when Enbridge should be compelled by the State to do it at the same time?

Another concern is the proposed replacement runs extremely close to Chub Lake in rural Carlton, Minnesota. This lake is a very popular lake that those in the Carlton/Cloquet/Wrenshall area uses very frequently. There is a public park, public access, and swimming hole. A pipeline will ruin this park and the serenity it provides to the community.

Ultimately, I'd like to see all uses of pipelines cease. We have to find a better way to provide energy. I concede that I drive a car that runs on gasoline...I'd love nothing more than to drive something that would run on something other than fossil fuels. Automakers have been slackers in this department. When they do bring something to market, only the rich people can buy it. Minnesota is leading the charge with its renewable energy industry. Why can't we put more focus on that instead of fossil fuels?

Please do not approve Enbridge's permits.

(I also hope you know that Enbridge has already been delivering new pipe by rail into Carlton then trucking the pipe to build this pipeline. There is a pile of pipe already in Kettle River on County Rd 6 and Automba Road. They are behaving like they already have permits in hand. I hope they haven't already started installing the pipe.)

Sincerely,

Brenda Martini

Levi, Andrew (COMM)

From: Paul Mason <gobzrk@yahoo.com>
Sent: Friday, June 16, 2017 10:44 PM
To: MN_COMM_Pipeline Comments
Subject: Comments about Line 3 replacement

I have some thoughts about the replacement of Enbridge's Line 3
1) Line 3 is 50 year and has deteriorated to the point that Enbridge has had to reduce operating pressure as a safety measure.
2) New pipeline construction builds in many features that help keep pipeline operations safe.
3) Construction of the new line will create a lot of good paying jobs, both during the construction and ongoing operations.
4) The ability of the oil industry to be able to carry their product to market is a safe, efficient manor is crucial.
5) If you had a 50 year old highway that was full of potholes and in such crappy condition that you had to reduce the speed limit to 35, would you then decide to just close the road and tell everyone "Too bad, you can't drive there anymore because we don't want to fix the road or build a new one". Wouldn't it make more sense to build a better road along a better route that will carry traffic safer and more efficiently? Oh, wait, those are called freeways. But when it comes to pipelines, people light their hair on fire and collectively loose their minds. Those people who complain about oil pipelines drive cars that run on fuel that gets to Minnesota in pipelines, they drive on roads made out of asphalt, a product of crude oil, practically every part in those cars or in their houses are made from oil derivatives. If these people are afraid spills and accidents, why are they not blocking tanker trains? They are far more dangerous and likely to spill and damage the environment.

Bottom line, America needs new pipelines and Minnesota needs Line 3.

Paul S. Mason

Levi, Andrew (COMM)

From: Debra Massey <deb.massey.825@gmail.com>
Sent: Monday, July 10, 2017 9:22 AM
To: MN_COMM_Pipeline Comments
Subject: docket numbers CN-14-916 and PPL-15-137

I have attended meetings concerning the pipeline and left feeling that more research must be done before the pipeline can be approved. As of now there are still too many unanswered questions regarding safe guarding our waters.

Please do not let the pipeline proceed.

Debra Massey
39446 Lodge Dr
Menahga MN 56464

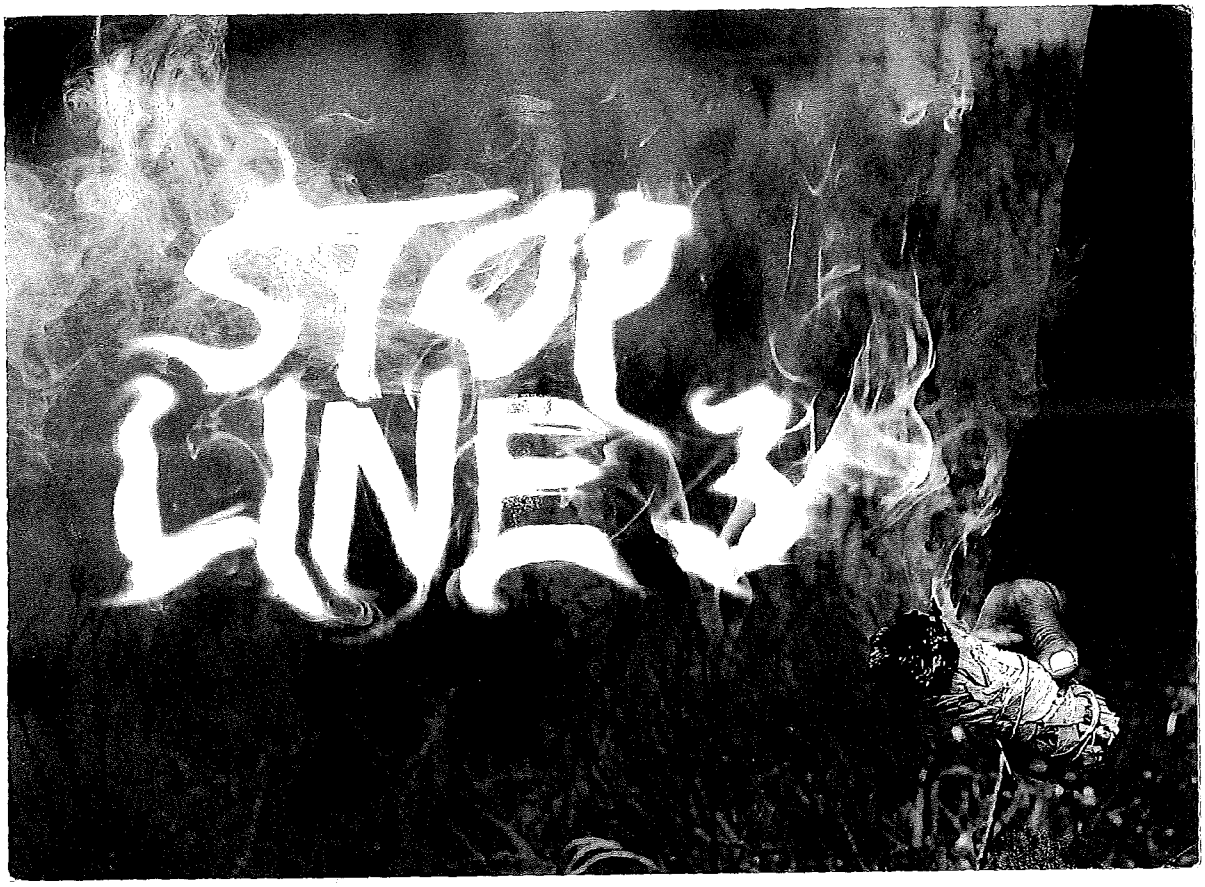

DEAR DEPARTMENT OF COMMERCE;
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
06 JUL 2017 PM 4 1

I'm very concerned about the abandonment of line 3. It runs alongside a bog on my property. What measures are being taken to protect the land once the pipeline is abandoned?

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Kathy Matalamaki
230 Bedford St SE
Mpls. Mn. 55414

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jeff Matern	952-920-7343	moosematern@msn.com

ADDRESS
4124 Utica Ave S

CITY, STATE, ZIP
St Louis Park Minn 55416-3211

COMMENTS
We need work infrastuture must be improved.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Barb Maunu		
ADDRESS		
248 Canosia Rd.		
CITY, STATE, ZIP		
Esko MN 55733		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
~~Gerald F.~~ Jenny Maunu	218-428-0666	
ADDRESS: 248 Canosia Rd		
CITY, STATE, ZIP: Esko, MN 55733		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

DEAR DEPARTMENT OF COMMERCE:
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

James Kawzil

SINCERELY,

Jamie MacAlister
Environmental Review Manager
MN Department of commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Sheila Maybanks

Street Address: 201 Bayberry Avenue Court

City: Stillwater State: MN Zip Code: 55082

Phone or Email: 651-303-2594

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I attended the Line 3 project hearing on 6/13 and had come prepared to address acceptable/non-acceptable risk. However during the hearing I was so struck by two main arguments against the study for Line 3 that I want to comment on them -

First, there were so many comments regarding the basic premise of Line 3 - carrying dirty oil - towards use in methods that are outmoded and dangerous. There were so many comments regarding alternative energies - solar + wind - that are far less socially + environmentally dangerous. Yes, we still need oil but not a new + untried pipeline. Those few - I think - speakers in favor of Line 3 could only list one benefit - jobs. Alternative energy is a much greater job builder.

Second, while I knew Line 3 would traverse tribal lands I did not know how devastating the line would be to wild rice lakes, native plants; I was not aware of the high rate of cancer among the tribal peoples in Canada whose land have been used by Enbridge. It is unbelievable that treaties with native peoples have been ignored and violated for years - Line 3 would be another violation.

Why is the PUC even considering giving Enbridge their preferred route through some of the cleanest lakes in Minnesota? Why would the Commission, or any of us, think it is a good idea to locate this potentially devastating environmental project, based on a fading energy model, through the heart of our state?

Please, PUC members, require more and more comprehensive EIS studies in the areas of social justice - specifically: risks to health from carcinogens, risks to traditional ways of life; and in the area of environmental justice - potential costs to forest, lakes, animal and plant life - and even more basic - what contribution will this dirty oil carried by Line 3 make towards climate change ~~??~~

Thank you —
Sheila Maybanks

If including additional pages please number them and tell us how many you are providing:_____ pages

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Tonk Meyer	612-791-9838	
ADDRESS: 7907 Highland Drive		
CITY, STATE, ZIP: White Bear Lake MN 55014.		

COMMENTS: I Support Line 3

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Heidi
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137
Date: Tuesday, May 30, 2017 9:45:57 PM

This pipeline is not necessary and will threaten the water and livelihood of the indigenous people's. I urge you to halt this pipeline and commit to sustainable forms of energy production. We have put it off for too long and now is the time to invest in clean energy solutions! It's about the welfare of our planet and the quality of life for ALL our children.

Sincerely,
Heidi Mayerhofer

Sent from my iPhone

Levi, Andrew (COMM)

From: Sarah Campbell <scampbell@mayflowermpls.org>
Sent: Wednesday, July 05, 2017 4:02 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge

To whom it may concern,

It is time for us to keep it in the ground and turn to renewable energy.

MN will become 50% energy renewable by 2030. We will be blanketing our land with solar and wind turbines.

Rev. Sarah Campbell, Team Lead Minister Mayflower UCC in Minneapolis

PS. I have a family cabin on Leech Lake. This summer I intend to organize my community, the high banks, to join actions with our friends from Onigum protesting Enbridge.

Rev. Sarah Campbell, Team Lead Minister
612-824-0762,112
Mayflower Community Congregational, UCC
Minneapolis
http://www.mayflowermpls.org/worship/worship-leaders/

1172

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

02 1P $ 000.34
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Rion J McCall	218-310-4813	rionmccall@yahoo.com
ADDRESS		
2224 W. 24th St		
CITY, STATE, ZIP		
Duluth, MN 55811		

COMMENTS
The line needs to be replaced. It is getting old. This Job will Keep me working for a long time.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: margo mccreary <mcc@earpop.com>
Sent: Monday, July 10, 2017 4:23 PM
To: MN_COMM_Pipeline Comments
Subject: To Jamie McAlister

Jamie McAlister, Environmental Review Manager, MN Dept. of Commerce

I would like to comment on the fact that the old leaking and undermined pipeline will stay in the ground without Embridge being responsible for removing it, which makes another swath of Minnesota land necessary for the proposed path to lay the #3 line. Embridge should be responsible as an Environmental Steward to remediate the old pipeline and polluted ground around it before they dig a new trench. Who will be cleaning up the old pipeline? As a citizen on Minnesota, I do not want future tax payers responsible while a private corporation takes profits and leaves a mess behind. That is an Environmental impact I am not willing to accept.

Thank you for a chance to comment, Margo McCreary, Minneapolis, MN (mcc@earpop.com)

Levi, Andrew (COMM)

From: margo mccreary <mcc@earpop.com>
Sent: Monday, July 10, 2017 4:20 PM
To: MN_COMM_Pipeline Comments
Subject: Embridge Pipeline 3

To Whom it May Concern (besides of millions of Minnesotans)

I would like to comment on the fact that the old leaking and undermined pipeline will stay in the ground without Embridge being responsible for removing it, which makes another swath of Minnesota land necessary for the proposed path to lay the #3 line. Embridge should be responsible as an Environmental Steward to remediate the old pipeline and polluted ground around it before they dig a new trench. Who will be cleaning up the old pipeline? As a citizen on Minnesota, I do not want future tax payers responsible while a private corporation takes profits and leaves a mess behind. That is an Environmental impact I am not willing to accept.

Thank you for a chance to comment, Margo McCreary, Minneapolis, MN (mcc@earpop.com)

Levi, Andrew (COMM)

From: Ray Mcgraw <ray.mcgraw1@gmail.com>
Sent: Friday, June 30, 2017 11:52 AM
To: MN_COMM_Pipeline Comments
Subject: Map

Dear Ms. MacAlister,

Send map of line

Sincerely,

Ray Mcgraw
6876 Old Whiskey Rd
Pequot Lakes, MN 56472
ray.mcgraw1@gmail.com

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Matthew McGregor	218-340-1425	
ADDRESS		
1605 Hughitt Ave. apt 1		
CITY, STATE, ZIP		
Superior, WI 54880		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: paulmch1952@gmail.com on behalf of Paul McHugh <paulmchughmn@gmail.com>
Sent: Thursday, July 06, 2017 6:30 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Draft EIS Comment

To: Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce

Re: docket numbers CN-14-916 and PPL-15-137

Hello,
I'm a lifelong Minnesota resident who loves northern Minnesota for its relatively pristine natural environment, scenic beauty, and recreational resources.
I am therefore deeply concerned about Enbridge's proposed Line 3 pipeline, and want to express my concerns about the Draft EIS.
1) The Draft EIS offers no plan to dismantle the existing pipeline after Line 3 is built. This is unacceptable from an environmental safety standpoint. To leave an old, unused pipeline in Enbridge's care for the indefinite future means that our state would bear the risk of the release of environmental toxins
indefinitely. Enbridge's history of spills in such places as Kalamazoo, MI does not inspire confidence. And even if it had a stellar record, no corporation can possibly permanently guarantee the environmental safety of such a facility. What happens in 50, 100, or 200 years when Enbridge no longer exists?
2) The Author(s) of the Draft EIS are not disclosed. This is unacceptable. Transparency of authorship is essential to allow potential conflicts of interest to be revealed and addressed.
3) The Draft EIS focuses its analysis of the effects of potential spills on soil types, ignoring downstream effects of spills and key factors such as groundwater sensitivity. This is unacceptable.

Thank you,
Paul McHugh
Minneapolis, MN

From: Kristen McKee
To: MN_COMM_Pipeline Comments
Subject: DEIS
Date: Wednesday, May 31, 2017 11:29:51 AM

Mr. MacAlister, and others on the review committee,

I would like to commend you on the extensive work that has gone into this impact statement, especially Chapter 9 as relates to Tribal Concerns. I really appreciate the depth of listening that is apparent by the questions asked and the responses recorded. I was particularly attentive to the following response from Mille Lacs Band member Terry Kemper:

"When Commerce explained the impacts of each route were being assessed, he responded that it could not be done, and the impact could not be isolated or measured—any impact is harmful and equally concerning."

Though I am not of Native American descent, I am closely tied to the Great Lakes area as the place of my birth. I feel a strong sense of respect and awe for that sacred place and am impelled toward right action when it comes to our interactions with the land and water there.

This is certainly a point when we have the capability, integrity and good sense to seek cleaner forms of energy, and direct our attention toward meeting the needs of all people and honoring the place where we live. We can do much better than a pipeline.

Thank you,

Kristen McKee

Levi, Andrew (COMM)

From: Terri McKeon <terri@mckeons.net>
Sent: Friday, July 07, 2017 11:23 AM
To: MN_COMM_Pipeline Comments
Subject: pipeline

My family has enjoyed 40 years of a clean pristine lake in northern Minnesota. We have a cabin on Roosevelt Lake near Outing. If you allow a pipeline to run under Washburn Lake (which is very close to us), we are risking a spill which will destroy our lakes area. Many property owners will lose a fortune not to mention our entire family would lose something we have always loved and enjoyed. I would hope that you don't give permission to the Canadian company that wants to risk our lakes and our way of life. Please!

Terri McKeon
952-933-2571 Home
612-865-3544 Mobile

Levi, Andrew (COMM)

From: apache@web.lmic.state.mn.us
Sent: Wednesday, July 05, 2017 5:05 PM
To: MN_COMM_Pipeline Comments
Subject: McLain Wed Jul 5 17:05:07 2017 PPL-15-137

This public comment has been sent via the form at: mn.gov/commerce/energyfacilities/publicComments.html

You are receiving it because you are listed as the contact for this project.

Project Name: Line 3 Pipeline Replacement

Docket number: PPL-15-137

User Name: Micheal & Virginia McLain

County: Crow Wing County

City: St. Louis Park

Email: ginnymike@q.com

Phone: 9529268653

Impact: We have a lake place on Roosevelt Lake which is in Crow WIng and Cass County. The Line 3 pipeline replacement proposes to go UNDER a portion of Washburn Lake in Cass County and passes within 900 feet of the head waters of Lake Roosevelt. Line 3 also passes close to the headwaters of the WhiteFish chain of lakes in Crow Wing County.While no one wants a pipeline near their property, this route that has potential for huge environment impact. Enbridge should be required to develop a different route through Crow WIng and Cass County

Mitigation:

Submission date: Wed Jul 5 17:05:07 2017

This information has also been entered into a centralized database for future analysis.

For questions about the database or the functioning of this tool, contact:

Andrew Koebrick
andrew.koebrick@state.mn.us

Levi, Andrew (COMM)

From: Betsey McLain. <schbets@gmail.com>
Sent: Friday, July 07, 2017 12:54 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment on the Proposed Line 3 Pipeline Project

I'm writing to oppose the building of the Line 3 Pipeline.

It serves only the profits of the companies involved, with no benefit to Minnesotans or Americans not directly involved in those companies.

The proposed pipeline runs through lands which are precious to Minnesotans for many reasons and will be detrimentally damaged by any type of oil spill: The White Earth community uses the land for harvesting wild rice and much more, plus, the area is celebrated for its natural beauty and so many Minnesotans love the northern parts of the state because it's still a relatively untouched area.

Besides forever destroying the land, building the pipeline (and any subsequent spill) will seriously harm Minnesota's economy. The tourism along the pipeline area will be crushed (something people living in the area depend on each year) and those who own property will see their property values drop.

Minnesotans cherish their clean lakes and gorgeous trees, and our culture thrives on the idea of "being up north" and "going to the lake." It's a deeply woven sentiment that no Minnesotan wants to see ruined by environmental damage.

The following points come from a letter written by Rev. Janet Spring, and also reflect my opinion on the pipeline:

- **If you want to count the few permanent jobs created by the pipeline, you must subtract the many permanent jobs jeopardized or destroyed by it. If you want to count the temporary jobs created during construction, you must also count the social damages known to be caused by the man camps at the Bakken and elsewhere. This will cost Minnesota taxpayers money for increased social services and policing. Worse, lives of innocent local people will be damaged. Does Enbridge plan to pay for the additional cost of protecting local people? You should require it as a cost of doing business.**
- **The Bakken oil fields are a temporary phenomenon. They are made possible only through hydraulic fracturing, an environmentally extravagant procedure which causes earthquakes,**

wastes and poisons water, and depletes wells rapidly. Do not invest in a near-permanent structure for a short-term energy source.

- **Climate change is becoming more and more obvious. Witness our bitterly cold winter, the droughts and fires in some places, the floods in others, and a world-wide average temperature increasing. We should not be investing in fossil fuels. We should be investing in every method that avoids or reverses climate change. This would include conservation, wind, solar, and alternative agriculture that sequesters carbon and improves rather than degrading the soil.**

We need to be the state that recognizes that Climate Change exists—something that can't be reversed. We need to be the state that thinks about the future and the consequences of this pipeline, and the needs and desires of the citizens of Minnesota.

Sincerely,

Elizabeth McLain

Levi, Andrew (COMM)

From: Laura McLain <user@votervoice.net>
Sent: Sunday, July 09, 2017 10:44 AM
To: MN_COMM_Pipeline Comments
Subject: Concern about oil pipeline

Dear Ms. MacAlister,

The proposed pipeline is of great concern to me. As many pipelines leak and damage the environment, it is very important to focus on a pathway that will allow for the least possible damage to Minnesota's environment. I don't feel the current path does that. If there are any leaks, which are likely, there could be long term damage to the state.

Sincerely,

Laura McLain
3316 35th Ave S
Minneapolis, MN 55406
lcmclain@yahoo.com

Levi, Andrew (COMM)

From: Arlan Medicine <dahkota2000@hotmail.com>
Sent: Saturday, July 01, 2017 2:20 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Draft EIS

Dear Ms. MacAlister,

PUC Docket Numbers (13-474)

I am writing to oppose the Line 3 Replacement Draft EIS. Due to a number of reasons.

The desire to transport oil from the Bakken fields to the port in Superior for export is not in the best interest of Minnesota, here's why. It serves only the profits of the companies involved, with no benefit to Minnesotans or Americans not directly involved in those companies as well as puts millions of Americans drinking water downstream the great Mississippi River at risk.

Enbridge is not a trustworthy company. It has been involved in numerous pipeline spills, which have not been identified promptly and where cleanup has been pitifully inadequate. This history of theirs should be taken seriously, as you propose to put Minnesota's lands and waters at risk.

The pipeline runs through lands which are precious for many reasons: the White Earth community, which is rebuilding traditional ways such as harvesting wild rice and much more, will be severely damaged by even a small spill. If you insist on continuing this process, you should be advised to meet the White Earth Band of Ojibwe and include them as affected parties so that they can attend.

The lands of northern Minnesota are precious to many residents who are vested in their communities, environment & way of life as this Pipeline brings great harm to any community it crosses. In addition, there is a tourism industry based on these lands, which would be destroyed both during the replacement period and particularly by a spill or leakage.

I can only imagine there will only be few temporary jobs created by the replacement line but consideration must also be taken into account for the social damages known to be caused by the man camps at the Bakken and elsewhere. This will cost Minnesota taxpayers money for increased social services and policing.

The Bakken oil fields are a temporary phenomenon. They are made possible only through hydraulic fracturing, an environmentally extravagant procedure which causes earthquakes, wastes and poisons water, and depletes wells rapidly. Do not invest in a near-permanent structure for a short-term energy source, not to mention the long term impact of leaving the pipelines abandoned after the money is made by the large oil companies & leakage of abandoned lines are left on Minnesota properties causing harm to humans and animal habitats that have to live here once all the oil is depleted.

The placement of the current line is located just a few miles from the headwaters of the great Mississippi River that sustains drinkable water for millions of Americans that live down the River.

Climate change is becoming more and more obvious. Witness our bitterly cold winter, the droughts and fires in some places, the floods in others, and a world-wide average temperature increasing. We should not be investing in fossil fuels. We should be investing in every method that avoids or reverses climate change. This would include conservation, wind, solar, and alternative agriculture that sequesters carbon and improves rather than degrading the soil.

Has there been any environmental impact study completed, if so where is it?

I oppose the replacement of this replacement pipeline in any location, and its function in developing the Bakken fields is one reason I oppose it. We do not need the oil. We need to look at safer energy resources such as wind & solar alternatives & save & protect the lands, climate & environmental habitats for our children & their grandchildren not a toxic land base they can't use or polluted waters they can't drink.

Sincerely,

Arlan Medicine

Bemidji, MN 56601

Sincerely,

Arlan Medicine
6313 Palomino Ln NW
Bemidji, MN 56601
dahkota2000@hotmail.com

Levi, Andrew (COMM)

From: Brian Meier <brian.meier@enbridge.com>
Sent: Thursday, July 06, 2017 1:58 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I live in MN and have spent time around pipelines throughout the state. I believe in keeping our enviroment healthy and believe the replacment L3 will enhance the protection of our state lands and our way of life. People, the enviroment, and safe pipelines have coexisting in our state for a long time and I advocate for upgrading those facilities to wisely continue that tradition. I also support leaving the existing L3 in place with the appropriate montioring so as not to disrupt the landowners and ecosystems along the legacy route.

Thank You for your consideration,

Sincerely,

Brian Meier
5597 W Arrowhead Rd
Hermantown, MN 55811
brian.meier@enbridge.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement.** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Eva Meierhoff	218.310.0913	eva.meierhoff@gmail.com
ADDRESS: 2444 Nanticoke St.		
CITY, STATE, ZIP: Duluth, MN 55811		

COMMENTS
Pipeline transport is a safer option than rail or OTR. Necessary to continue updating aging pipelines.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Joel Melander	218-785-3000	Hwy2Auto@yahoo

ADDRESS: 23559 Us. 2

CITY, STATE, ZIP: Shevlin Mn. 56676

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
SAMANTHA Melton	3109940332	
ADDRESS: 105 S. 18th ave east		
CITY, STATE, ZIP: DULUTH MN 55812		

COMMENTS

I Support Line 3 R!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Samantha Melton

Street Address: 105 S. 18th ave east

City: Duluth State: MN Zip Code: 55812

Phone or Email:

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Support the line 3 project!

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Kari Tomperi <ktomperi@wcta.net>
Sent: Sunday, July 09, 2017 8:30 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

The Menahga Conservation Club Menahga, MN has concerns that the first EIS in the state on pipelines is being fast tracked without proper time frames for a fair and in depth review of the EIS document itself. They would like to go on record as opposing the Line 3 Replacement as not a replacement but a new energy corridor through pristine untouched lands crossing rivers, lakes and wetlands never exposed to dangerous bitmus fracking chemicals. The EIS has been written without enough of the appropriate expertise of state agencies as the DNR and MPCA who have all voiced concerns about the effects of placing a 36" pipeline through some of nations cleanest and most abundant waterways. This water is the ultimate source for much of the Twin Cities drinking water. The Club advocates for proper safe placement and repair of existing pipelines before creating a high risk situation through pristine watersheds. The final concern is that the EIS is being used as a tool for a foreign corporation and not as intended to insure MN residents have a honest full Environmental Impact Statement that clearly addresses the concerns and safety of its citizens.

Sincerely,
David Tomperi
President
Menahga Conservation Club

Virus-free. www.avast.com

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Scott Menter
Street Address: 428 Bear Ave S.
City: Vadnais Heights State: MN Zip Code: 55127
Phone or Email: 651-762-7811 scott.menter@comcast.net

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am opposed to the pipeline because the placement of the pipeline is dangerous. The pipeline is likely to leak before the end of its useful life.
After the pipeline leaks, it is impossible to reverse the effects. Minnesota is a great state with wonderful resources that we must protect.

To allow the construction of the pipeline would be irresponsible and another win for the rich.

If we ruin the natural areas with a spill, the tranquility can never be regained. A short-term gain for the oil companies ~~which leg~~ is short-sided because we will leave a damaged environment for future generations.

You have the power to stop the destruction caused by the pipeline. Please weigh the long-term benefits against short-term gains.

Thank you

Scott Menter

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Sue Menter

Street Address: 428 Bear Ave S.

City: Vadnais Heights State: MN Zip Code: 55127

Phone or Email: suementer@comcast.net

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am very concerned that MN is considering granting a foreign oil company to transport tar sands oil across the lake country in our state. This cannot be the "safest" route for the pipeline, but I suspect, likely the cheapest. The numerous risks to our environment with this proposed plan far outweigh any perceived advantage of this plan.
Crossing near any waterway, especially in a location so near the Mississippi headwaters is unconscionable. It is certain that this pipeline will have oil releases to the environment. The damage to the surface + groundwater will be left to the MN taxpayers to pay for.
It also is unbelievable that this proposed plan will also "allow" for the existing obsolete pipeline to remain in the ground, with no plan for removal by Enbridge. This also is a certain environmental disaster for the groundwater, soil, fauna, and citizens of these areas.
The only responsible way to avoid certain future pollution that will rest with the state of MN taxpayers, will be to keep the existing pipeline in repair and plan for the removal of this pipeline in the near future. Oil is a thing of the past and soon to be obsolete. Please don't allow this plan to proceed.

If including additional pages please number them and tell us how many you are providing: _____ pages

Levi, Andrew (COMM)

From: aimee merino <ammerino13@gmail.com>
Sent: Monday, July 03, 2017 11:47 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge pipeline

Hello,

I am writing to urge against the Enbridge pipeline. There are multiple reasons why this pipeline is a bad idea for Minnesota.

1) The risk of water contamination is high with an increase in surface water crossings from the old pipeline.

2) The company does not have a good plan to deal with the pipeline that will be abandoned after the new one is built. It will be a constant source of pollution and may suck water from aquifers. This is the same problem we will have in the future when this pipeline is abandoned.

3) Fossil fuels are a dying industry. The science is clear that we must stop climate change or the earth will become inhospitable to life as we know it. There is no way around this. As wind and solar energy grow. this pipeline will be abandoned. The company will have their profit and we, the people of Minnesota, will be stuck with the consequences.

4) This pipeline will not create a single full-time job. It will create construction jobs for 1-2 seasons. In contrast, wind and solar energy create life-long careers for Minnesotans. Construction of another pipeline will simply delay our state from progressing towards a green energy future and give our neighbors the opportunity to grow these businesses.

5) It is an affront to our Native American tribes to traverse their sovereign lands with another pipeline that they do not want and vigorously oppose.

Thank you for your attention in this matter,
Aimee Merino

Levi, Andrew (COMM)

From: Kevin Merschman <kevin@cityofbreezypointmn.us>
Sent: Tuesday, June 13, 2017 9:19 AM
To: MN_COMM_Pipeline Comments

To Whom It May Concern,

I own property in Clearwater County and Bull Moose and Barclay Townships of Cass County. Most of these 280 acres is wooded with my homestead in Barclay Township, downstream from the proposed crossing of the Pine River. I am a conservationist/hunter who enjoys creating habitat for wildlife.

I grew up in Clearwater County where it has been crisscrossed by pipelines for decades with most people oblivious to their existence. There are crossings of the Clearwater River and near Itasca which are only noticeable by those who see the clearing and pipes sticking up. Oil will be needed for the foreseeable future and is safest when transported underground. Any company that follows the laws and regulations should be able to conduct its business. Any protesters who violate the law should be arrested. "Leaders" of these protesters are promoting false information to make themselves relevant and thus economic gain. If they are so concerned about the environment they should be promoting by example the use of greener technology not driving a truck and horse trailer all over the state.

I do expect that government entities responsible to monitor these industries will be certain every effort is made to make pipelines as safe as possible and hold the company responsible if there are any incidents.

A suggestion should the company actually read this would be to plant for the pollinators (bees and butterflies) in the corridor cleared for this installation.

Respectfully,

Kevin Merschman
1221 – 21st Ave SW
Backus, MN 56435

From: Mary-Louise
To: MN_COMM_Pipeline Comments
Subject: (CN-14-916 and PPL-15-137)
Date: Wednesday, May 31, 2017 10:15:47 AM

Stop compromising the environment. Move to clean energy.

Sincerely,

--
Mary Louise Mesquita, PhD
617-281-4103

CONFIDENTIALITY NOTE: The information transmitted, including attachments, is intended only for the person(s) or entity to which it is addressed and may contain confidential and/or privileged material. Any review, re-transmission, dissemination or other use of, or taking of any action in reliance upon this information by persons or entities other than the intended recipient is prohibited. If you received this in error, please contact the sender and destroy any copies of this information.

From: adrienne meyer
To: MN_COMM_Pipeline Comments
Subject: Endbridge"s Line 3 Piplene
Date: Tuesday, June 06, 2017 2:44:40 PM

Dear Jamie MacAlister,

The proposed Endridge Line 3 Pipeline route poses grave environmental risks. It is most cost effective of course for Endbridge to route the pipeline through such environmentally sensitive areas as the Mississippi headwaters, but it is not the ethical or responsible route. Endbridge needs to re-route the pipeline to an area with less lakes and not near the headwaters of the Mississippi. If they do not grave devastation to fragile ecosystems and drinking water could ensue. Please do not give a corporation a good deal and the people of Minnesota and awful deal.

Sincerely,
Adrienne Danielson

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
ROGER MEYER	763-753-6802	
ADDRESS		
912 225th LANE NW		
CITY, STATE, ZIP		
Bethel MN 55005		

COMMENTS

How CAN you Keep pipelines Safe if you don't Replace them

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

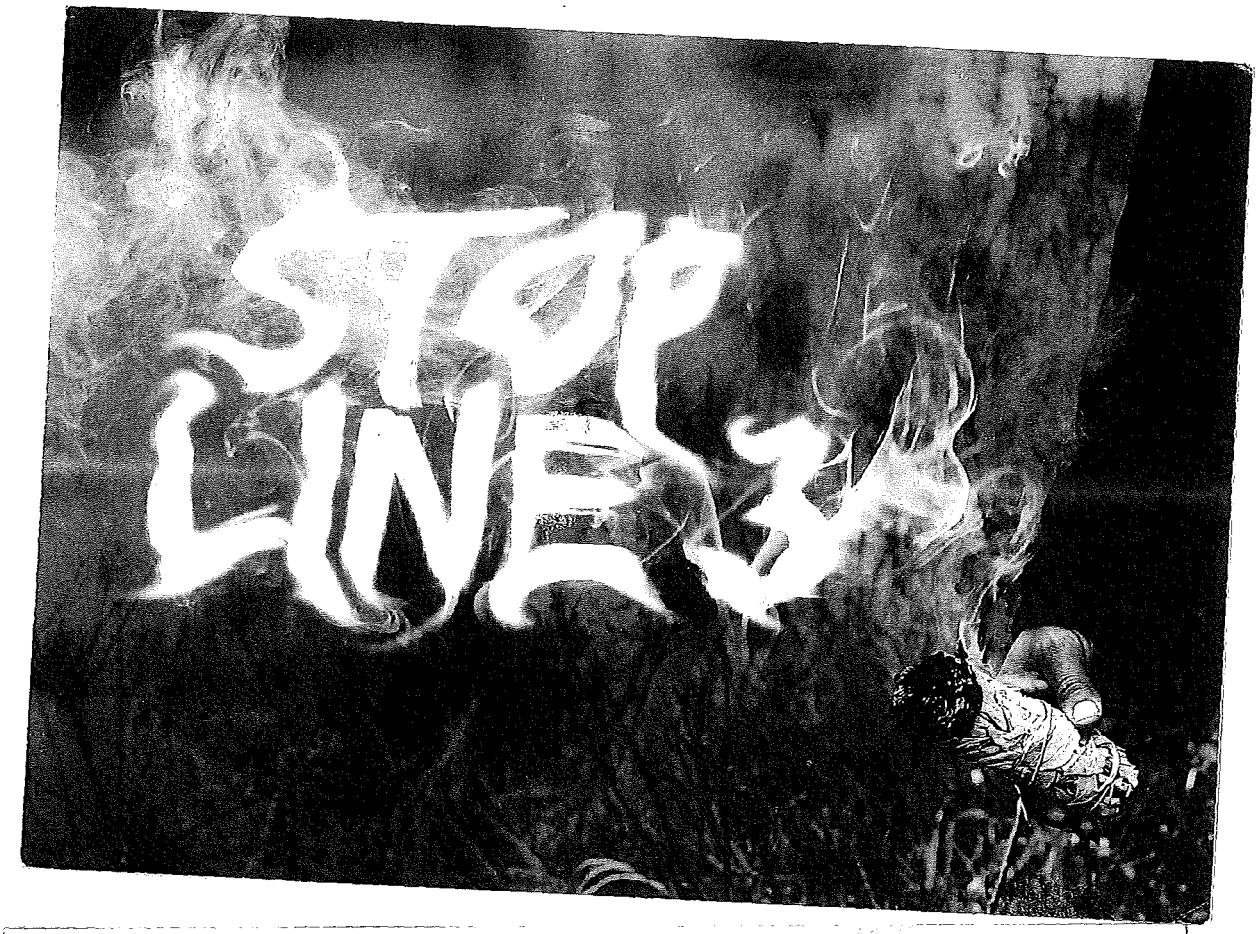

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 553
JUL 2017 PM 5 L

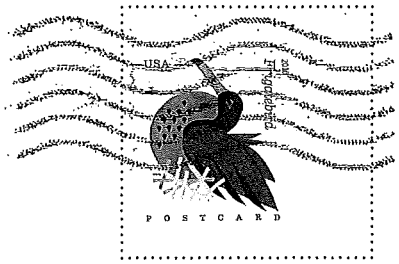

Please, please tell me you care about water & about the people of our country.

Do not allow new pipelines to disrupt & mutilate the lands of reservations & sacred sites & make Enbridge clean up existing lines.

For the sake of our country.

SINCERELY,

P. Meyer

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

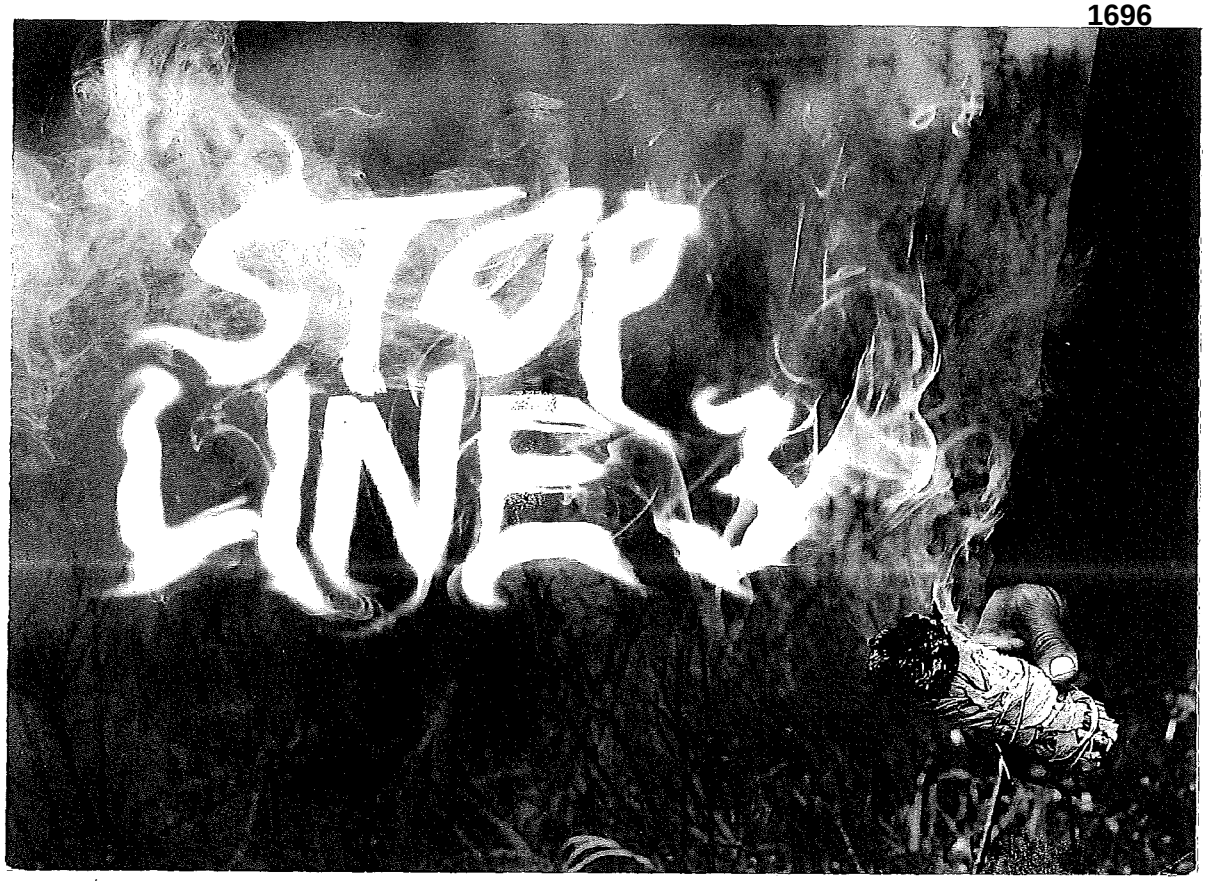

DEAR DEPARTMENT OF COMMERCE;
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
JUL 2017 PM 7 L

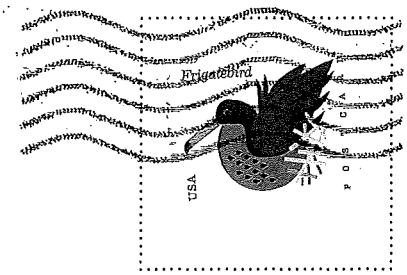

Please, please tell me you care about water & about the people of our country.

Do not allow new pipelines to disrupt & mutilate the lands of Reservations & sacred sites, & make Enbridge clean up existing lines.

For the sake of our country.

SINCERELY,

B Kleyer

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

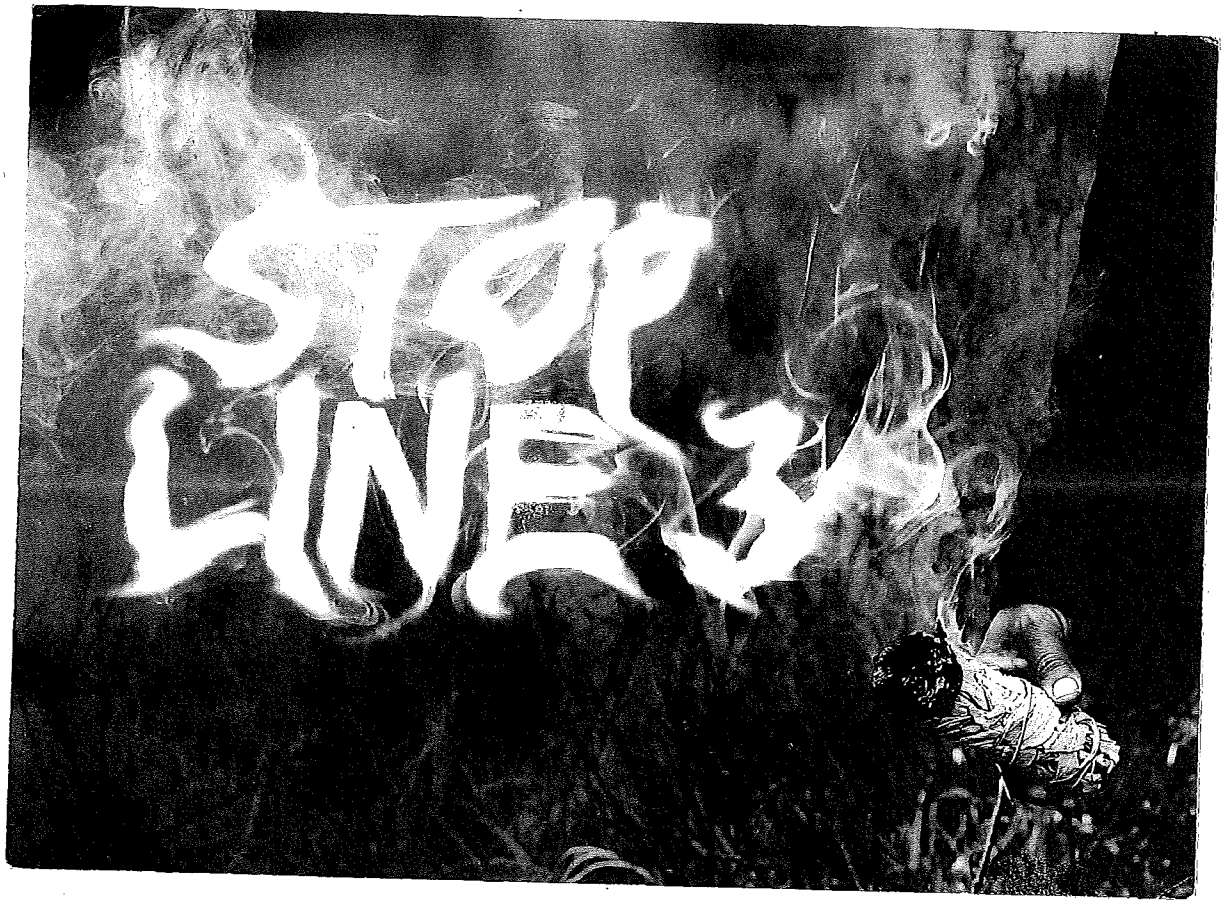

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 551
JUL 2017 PM 5 L

USA
POSTCARD

Please, please tell me you care about water & about the people of our country.

Do not allow new pipelines to disrupt & mutilate the lands of reservations & sacred sites, & make Enbridge clean up existing lines.

For the sake of our country.

SINCERELY,

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

Please, please tell me you care about water & about the people of our country.

Do not allow new pipelines to disrupt & mutilate the lands of reservations & sacred sites, & make Enbridge clean up existing lines.

For the sake of our country.

SINCERELY,

B Meyer

55101-214355

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE, MINNEAPOLIS MN 553
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137. 25 JUL 2017 PM 5 L

Please, please tell me you care about water & about the people of our country.

Do not allow new pipelines to disrupt & mutilate the lands of Reservations & sacred sites, & make Enbridge clean up existing lines.

For the sake of our country.

SINCERELY,

B Meyer

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Justin Meyer		
ADDRESS		
CITY, STATE, ZIP		
Superior, WI		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

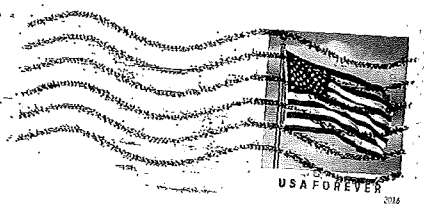

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Allen W Michael JR	715 · 399 · 0102	
ADDRESS		
2213 E Summit TRL		
CITY, STATE, ZIP		
Foxboro WI 54836		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Steven Micke	218-879-4663	steve@veliable mn.com

ADDRESS
400 Ridgewood Dri

CITY, STATE, ZIP
Cloquet, MN. 55720

COMMENTS
I am 100% in favor of Line 3 Replacement

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

POSTCARD
2015 King Bader
USA

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Andrew Micke	218-591-0887	Doogle 20@
ADDRESS: 400 Ridgewood Dr.		
CITY, STATE, ZIP: Cloquet, MN. 55720		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 260 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

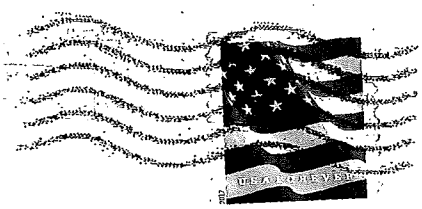

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

0436

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Scott Miland		scottmiland@unitedpiping.us
ADDRESS		
4510 Airport Rd.		
CITY, STATE, ZIP		
Duluth, MN, 55811		

COMMENTS It's the safest method of fuel transportation.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

02 1P $000.34
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Scott Miland	641 430-7476	scott.miland@unitedpiping.us

ADDRESS
4510 Airport Rd

CITY, STATE, ZIP
Duluth, MN 55811

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

0437

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Ferlin Miller	6126667328	Fmiller@lcoa.org
ADDRESS		
1016 W Minnesota St		
CITY, STATE, ZIP		
Cannon Falls MN 55009		

COMMENTS

We must build Line 3

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: john miller <sjmiller@brainerd.net>
Sent: Thursday, June 29, 2017 4:56 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

We are landowners and homesteaders in Morrison County.
We support the Enbridge Line 3 replacement. We believe that good pipelines are the safest and most environmentally conscious way to transport oil and gas products. Rail and truck transportation above ground is increasing the risk of damage to humans, communities, and environment. Enbridge has had a good safety record in the past.
We do believe that it is incumbent upon any company, including Enbridge, at their expense to remove any pipelines that are no longer in use, and clean-up any damage or contamination to land and soil around the pipeline, returning it to pre-pipeline condition.
John & Sally Miller

Sincerely,

john miller
34705 Hillcrest Rd
Motley, MN 56466
sjmiller@brainerd.net

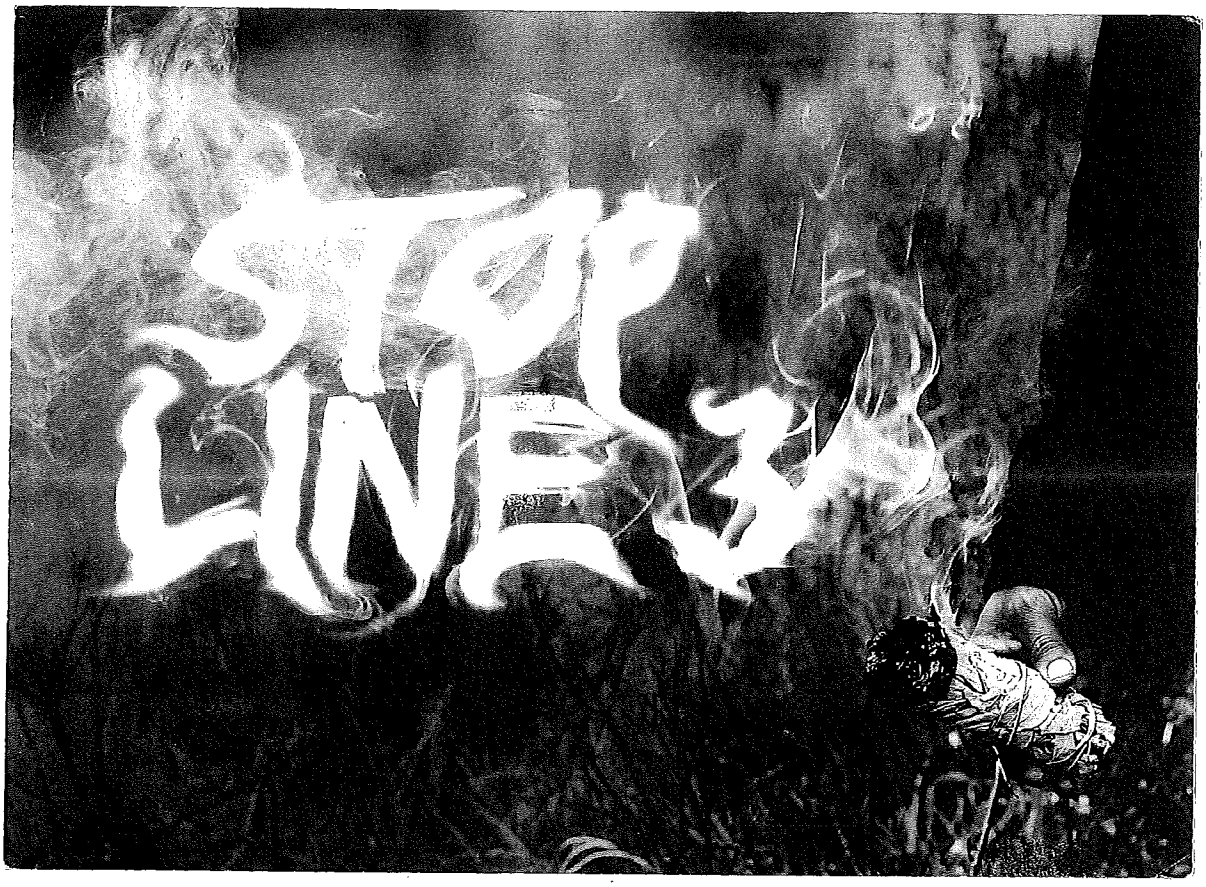

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137.

MINNEAPOLIS MN 553
05 JUL 2017 PM 7 L

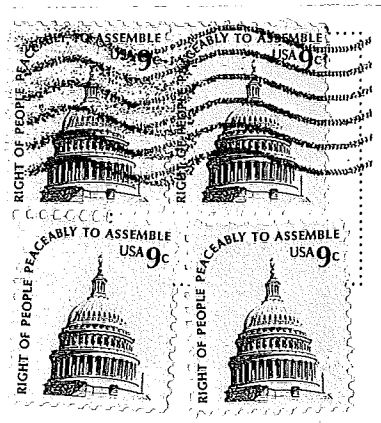

Wild rice is important to our identity as Minnesotans and deserves protection from pipelines.

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Hannah Meiers

Levi, Andrew (COMM)

From: Perry Aasness <paasness@agrigrowth.org>
Sent: Monday, July 10, 2017 7:47 AM
To: MN_COMM_Pipeline Comments
Subject: Comments from Mn AgriGrowth Council re: LIne 3 replacement project
Attachments: Line 3 letter.pdf

Please find attached comments from the MN AgriGrowth Council to the MN Dept of Commerce regarding the Enbridge LIne 3 replacement project.

Thank you.

Perry Aasness
Executive Director
Minnesota AgriGrowth Council
651-905-8900 (o)
651-235-8136 (c)
paasness@agrigrowth.org
www.agrigrowth.org

AgriGrowth™
Growing MN Food & Agriculture℠

www.agrigrowth.org

July 10, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Dept. of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101

Dear Ms. MacAlister:

On behalf of the members of the Minnesota AgriGrowth Council (AgriGrowth), I'm writing to urge the Minnesota Department of Commerce to expeditiously approve the permitting necessary for the efficient replacement of Enbridge's Line 3 through northern Minnesota.

AgriGrowth is a nonprofit, nonpartisan member organization whose mission is to serve as an advocate and represent the most vital interests of Minnesota's diverse agriculture and food sector in order to foster long-term sustainability, competitiveness, and business growth. AgriGrowth's industry-wide perspective is essential in a state where the agriculture and food sector is the second largest economic driver.

In our view, the state regulatory process that oversees the permitting of Line 3 is broken and needs significant reform. There have been over 20 public hearings of issues involving the replacement of Line 3. The public has had ample input to the process, much more than is required by law.

The Line 3 regulatory process is just the latest example of how the state's regulatory process hinders economic development and job creation in Minnesota. Business and industry in Minnesota need certainty in the regulatory process in order to pursue large job-creating projects like the Line 3 replacement project. Public input is an important part of the process. Equally important to the process is clarity and certainty for project proposers that a path exists toward a timely decision by regulators, regardless of the final decision.

Please use your authority to advance the Line 3 replacement project toward a final decision. Thank you for the consideration of these comments.

Sincerely,

Perry Aasness
Executive Director
Minnesota AgriGrowth Council

400 Robert Street North, Suite 1520 • St. Paul, MN 55101-2069 • p: 651.905.8900 • f: 651.905.8902 • e: info@agrigrowth.org

Levi, Andrew (COMM)

From: Harry Melander <hmelander@MNBCTD.org>
Sent: Monday, July 10, 2017 11:48 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

The Minnesota Building and Construction Trades Council is supporting the line 3 replacement project. We believe that the applicate has followed the procedures as described within the rules and should be allowed to move forward with this project that will benefit all Minnesotans.

We believe there has been adequate time for comments and request that the process move forward as originally outlined. This project not only provides needed repairs on an aging system but will put Minnesotans to work.

Sincerely,

Harry Melander President MB&CTC
353 7th St W
Saint Paul, MN 55102
hmelander@MNBCTD.org

Levi, Andrew (COMM)

From: Tom Nelson <nelso885@umn.edu>
Sent: Monday, July 10, 2017 10:04 AM
To: MN_COMM_Pipeline Comments
Subject: Public Comment on Unbridle Line 3
Attachments: Line3 Replacement Resolution 7-2017.pdf

TO:
Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Please find attached a letter of comment on the Draft Environmental Impact Statement (DEIS) for Enbridge Energy's proposed Line 3 Pipeline Project.

Reference to docket numbers CN-14-916 and PPL-15-137

Thank you,

Tom Nelson,
President, Minnesota Coalition of Lake Associations

MN COLA

Minnesota Coalition of Lake Associations

Minnesota Coalition of Lake Associations
Resolution
Regarding
Enbridge Energy, Inc.
Line 3 Replacement Project

Public Comment on
Draft Environmental Impact Statement

In reference to PUC Dockets, with comments concerning both:

CN-14-916: Line 3 Certificate of Need
PPL-15-137: Line 3 Route Permit

Whereas, the economic value of clean water is well established, regarding the tourism industry and livability standards of all people in the region;

Whereas, the macro-economic situation of oil production has not been adequately analyzed regarding costs and risks of transporting oil long distances from remote continental areas;

Whereas, the proposed preferred routing of oil pipelines imperil the unspoiled Mississippi Headwaters, lakes and streams in Minnesota, which constitute an irreplaceable heritage for the future generations;

Whereas, the wetlands, aquifers, and soils of the affected region are integral to the health of the overall water heritage;

Whereas, the wild rice beds within the affected region are both sacred to indigenous peoples and a key source of nourishment for all;

Whereas, additional utility corridors create the potential for further habitat fragmentation given the request of a 750 foot wide rout width that would likely be clear-cut;

Whereas, the preferred routing of Line 3 endanger these delicate and remote regions;

Whereas, Enbridge, like all pipeline operations, has a record of spills and uncorrected leakage that put this water heritage at risk;

Whereas, the record of oil pipeline spillage far exceeds that of both rail and truck transport methods combined;

Whereas, the recovery of spilled oil from pipelines has been shown to be less than 50%;

Whereas, the types of oil products proposed for transport through these water-rich regions are particularly dangerous due to their volatility, and density causing them to sink into the water;

Whereas, many of the additives to facilitate the flow of oil have remained secret, posing an unknown and further risk to clean-up efforts;

Whereas, safety testing and safety preparations to protect the remote region through which the preferred route would travel cannot be adequate to the difficulty of the task;

Whereas, the safety factors and pipe specifications have been dominated by industry, with minimal independent analysis;

Whereas, there has not been adequate requirements for site specific analysis of potential soil subsidence that could affect the performance and safety of the proposed pipelines;

Whereas, the abandonment of Line 3 and replacement in a new corridor sets a precedent for abandoning and replacing the entire set of aging oil pipelines in the present corridor;

Whereas, the preferred corridor has not been adequately analyzed for its cumulative environmental impact of additional oil pipelines in need of replacement if this route is established;

Whereas, the abandonment of Line 3 in place along its present corridor will require a thorough cleaning, gating and continuing maintenance of the pipe that by its continuing presence constitutes further risk to that region;

Whereas, the abandonment of pipes with significant leakage present, many sections of which are bored and uninterrupted underneath water bodies and wetlands, poses the additional risk of unintended drainage and material transport affecting the natural ecosystem;

Whereas, the abandonment of Line 3 in place along its present corridor prevents the analysis and cleanup of potential contaminates present underneath the pipeline due to the long history of anomalous leakage;

Whereas, the abandonment of Line 3 in place along its present corridor eliminates the possibility of reusing an established route;

Whereas, the present DEIS provides only a cursory overview of the potential environmental impacts of pipeline abandonment;

Whereas, without further study, an established electric transmission corridor in not necessarily appropriate for the co-location of oil pipelines due to the potential for dangerous conditions during a oil cleanup operation, nor for restoring a damaged electrical line;

Whereas, there is no direct availability for the transported oil products in the State of Minnesota for either refinement operations or for consumption, but only an indirect oil-market supply effect;

Whereas, unlike regulations in Canada, there are no Minnesota State Guidelines that address the special conditions inherent to the region regarding the mitigation and restoration of an abandoned oil pipeline;

Whereas, there is no guaranteed bonding or escrow for cleanup of future spills or eventual retirement, mitigation and restoration of Enbridge oil pipelines, but only meager and voluntary grants program from Enbridge for emergency response training that expects public agencies to bear additional costs;

Whereas, the intended oil flowing in a new Line 3 would be for tar-sands oil bitumen, which additionally requires the use of toxic "dilbit" that would be piped back to the source at further risk;

Whereas, tar-sands oil bitumen contributes a particular threat to global climate change;

Whereas, jobs necessitated by the construction of an oil pipeline through Minnesota are not dependant on the particular route chosen;

Whereas, the additional cost of either replacing Line 3 in its current route, or removing it altogether with mitigation and restoration should not be a concern for Minnesota regulators;

Whereas, the removal and restoration of the present Line 3 would create many additional jobs for Minnesotans;

Whereas, the property values and potential groundwater pollution of landowners and Tribes of an abandoned and historically anomalous oil pipeline has not been fully considered, nor have the landowners and Tribes been adequately consulted;

Whereas, the analysis in the DEIS of alternative means of transport by rail or truck are unrealistic, economically infeasible, and simplistic, serving to eliminate those possibilities, including the possibility of constructing no alternative at all;

Whereas, the Enbridge Company has engaged in deceptive public messaging, inadequate environmental review, undisclosed information about the oil itself, lack of transparency about future plans, and exploitation of inadequate regulation; and

Whereas, the Minnesota Department of Natural Resources and the Pollution Control Agency have each expressed serious reservations as to the preferred routing of the earlier Sandpiper and Line 3 replacement proposal and the adequacy of its environmental impact;

It is HEREBY RESOLVED, that the Board of Directors of the Minnesota Coalition of Lake Associations:

1) urges the MN Dept of Commerce and Public Utilities Commission to withdraw from the approval process and restore it to Minnesota's Environmental Quality Board, Pollution Control Agency and Department of Natural Resources.

2) urges the PUC and DOC to take greater caution, transparency and independence from industry in assessing the need and determining the routing of the proposed Enbridge pipelines;

3) urges the PUC and DOC to seriously consider the true need for these pipelines through Minnesota, and the alternative routings that have been proposed by others;

4) urges the PUC and DOC to consider more rigorously the issues surrounding the proposed abandonment of the present Line 3.

5) urges the PUC and DOC to allow landowner and Tribes to decide if they would allow the old Line 3 to remain abandoned on their property;

6) urges the PUC and DOC to consider more rigorously the economic aspects and complexity of this proposal ranging from the immediate effects on individual landowners to the overall economic feasibility of the need for this remotely located resource, and the cost implications to county, state and national for disaster relief and cleanup; and

7) urges both the State and Federal governments to create greater regulation of the oil transport industry within their jurisdictions to ensure that the environmental and economic impacts of such projects are full vetted in all their aspects.

Submitted by the Board of Directors of the Minnesota Coalition of Lake Associations (MN COLA), this day, July 10, 2017.

Thomas K. Nelson,
President, Minnesota Coalition of Lake Associations

Motion by Joseph Schneider, Coalition of Minnehaha Creek Waters
Second by Kathy Jonsrud, Wright County COLA
Passed by unanimous decision of the Board of Directors, MN COLA

Attest:
Joseph Shneider, Secretary, MN COLA

Levi, Andrew (COMM)

From: Amber Hanson <amber.hanson@fbmn.org>
Sent: Monday, July 10, 2017 12:03 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement (EIS) for the Proposed Line 3 Pipeline Project
Attachments: 7-10-17 Line 3 Comments.pdf

Please see comments on the Draft EIS for the Proposed Line 3 Pipeline Project from Minnesota Farm Bureau President Kevin Paap on behalf of the Minnesota Farm Bureau Federation.

Thank you,

Amber Hanson
Director of Public Policy
Minnesota Farm Bureau
Office: 651-768-2103
Cell: 507-272-6677

Disclaimer:
This email message and any attachments are intended only for the use of the intended recipient, and may contain information that is privileged, confidential and/or exempt from disclosure under applicable law. If you are not the intended recipient or an authorized representative of the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify us immediately by replying to this email, and delete or destroy all copies of the original message and attachments thereto. Email sent to or from FBL Financial Group, Inc. and its Affiliates may be retained as required by law, regulation or business practice.
For security reasons we strongly discourage the submission of sensitive or personal information, such as credit card numbers, social security numbers, or bank account information, through email. Email may not be a secure method of communication. Any email may be copied and held by various computers as it makes its way from our server to yours. Persons not participating in our communications may be able to intercept the communications by improperly accessing my computer or your computer or an unconnected computer through which this email passes. If you prefer that we communicate with you via a non-electronic method, please advise us of the same.

Minnesota Farm Bureau®
Farmers • Families • Food

July 10, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Dept. of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101

Emailed to: Pipeline.Comments@state.mn.us

RE: Draft Environmental Impact Statement (EIS) for the Proposed Line 3 Pipeline Project

Dear Ms. MacAlister:

I am writing you today on behalf of the Minnesota Farm Bureau to urge the Department of Commerce to advance the regulatory review and ultimately permit the replacement of Enbridge's Line 3 through northern Minnesota.

Minnesota Farm Bureau supports the replacement of Enbridge's Line 3 in accordance with our policy that is set by our nearly 30,000 farm families. Minnesota Farm Bureau policy supports efficient permitting of pipelines to help alleviate rail delays of agricultural commodities. Too often, we hear of rail cars that are in scarce supply to move grain because they the trains are loaded with oil. Oil needs to get to market. Commodities need to get to market. Commodities can't be moved by pipeline, but oil can be transported safely and efficiently by pipeline.

The Minnesota Farm Bureau urges the Department of Commerce to advance the regulatory review of the Line 3 replacement project and permit its construction as proposed.

Sincerely,

Kevin Paap

Kevin Paap
President

Physical Address: 3080 Eagandale Place, Eagan, MN 55121-2118 Mailing Address: P.O. Box 64370, St. Paul, MN 55164-0370

Phone: 651.768.2100 Fax: 651.768.2159 Email: info@fbmn.org www.fbmn.org

Levi, Andrew (COMM)

From: MGFA <mgfa@usinternet.com>
Sent: Friday, July 07, 2017 4:19 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project Comments
Attachments: doc01682520170707162828.pdf

Importance: High

Dear Ms. MacAlister,

Please see the attached letter for comments from the Minnesota Grain and Feed Association.

Best Regards,

Bob Zelenka
Executive Director
Minnesota Grain and Feed Association
3470 Washington Drive, Suite 200
Eagan, MN 55122
Phone: 651-454-8212
FAX: 651-454-8312

MINNESOTA GRAIN & FEED ASSOCIATION

July 7, 2017

Jamie MacAlister, Environmental Review Manager Minnesota Dept. of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101

Docket Number: CN-14-916 and PPL-15-137

Dear Ms. MacAlister:

I am writing today to offer an official comment from the Minnesota Grain and Feed Association (MGFA) in support of the regulatory approval of the permit to replace Enbridge's Line 3 in Northern Minnesota.

Our mission at the MGFA is to serve as a leader for the agribusiness industry with integrity, respect and innovation in its programs and services. The replacement and aging Line 3 with state-of-the-art safety technology is completely consistent with our mission as a trade group.

Our members rely heavily on rail transport to move their products to processors and to markets. Today, our rails that are increasingly congested with trains transporting oil. While the replacement of Line 3 won't entirely relieve the rail lines of oil train congestion, it will help to do so. We should take the measures necessary to move oil by pipeline, a safe and efficient means of transporting oil to its processors.

Furthermore, the proposed corridor through northern Minnesota should be approved. It has the support of many landowners and stakeholders along the line. It largely follows existing utility right-of-ways.

Please use your authority to responsibly advance the regulatory approval of the replacement of the Line 3 project, providing at least measure of relief to our congested rail system.

Sincerely,

Bob Zelenka

Bob Zelenka
Executive Director

3470 WASHINGTON DRIVE, SUITE 200 • EAGAN, MN 55122 • PHONE 651-454-8212 • FAX 651-454-8312
E-mail: info@mgfa.org • Website: www.mgfa.org

F A X

Minnesota Petroleum Marketers Association
3244 Rice Street
St. Paul, MN 55126-3047
(651) 484-7227 or (800) 864-3813

To: Jamie MacAlister
Fax number: 651-539-0109

From: Kevin J Thoma
Fax number: 651-484-9189

Date: 7/10/2017

Regarding:
Line 3

Number of pages including cover __2___

Comments: please see attached...

CONFIDENTIAL

MINNESOTA PETROLEUM MARKETERS ASSOCIATION

3244 RICE STREET
ST. PAUL, MN 55126-30
651/484-7227
800/864-3813
FAX 651/484-9189

July 10, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Dept. of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101

Dear Ms. MacAlister:

I am writing on behalf of the Minnesota Petroleum Marketers Association. The Association was formed in 1923 to provide services to the petroleum marketer, to help them at all levels of government, and to support fellow marketers. The Association has four main emphases - education, regulatory analysis and programs to help with compliance, legislative and regulatory monitoring, and services for the members.

We are writing today to urge the Minnesota Dept. of Commerce to expeditiously advance the regulatory oversight and ultimately approve construction of the Line 3 replacement project through northern Minnesota.

Line 3 represents an important piece of Minnesota's energy infrastructure. Enbridge Energy has responsibly identified the need to replace Line 3 and is asking permission to do so for good reasons related economic efficiency and safety. When done, the replacement of Line 3 with state-of-the-art petroleum transportation technology will benefit the entire state through the creation of high-paying construction jobs, on-going operations jobs and a safe petroleum pipeline transportation system for decades to come.

Minnesota's consumers deserve reliable transportation of petroleum products and the jobs and economic development that will result from the replacement of Line 3. We urge the Dept. of Commerce to move forward with the regulatory approve and permission of construction of the Line 3 replacement project as proposed.

Sincerely,

Kevin Thoma, Exec. Dir.
Minnesota Petroleum Marketing Assn.

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

I am very concerned abt. the spillage in Line 3, small spills once every 11 months? These are terrible statistics. Even one spill is too many.

SINCERELY,

Catherine Whitby
5433 Elliot S
Mpls MN 55417

55101+2143

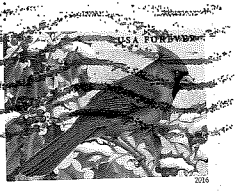

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
10 JUL 2017 PM 5 L

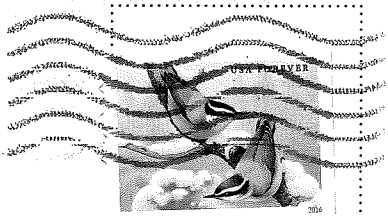

Stop the spill!
leakage, and
CLEAN UP.

It's Dangerous!

CLEAN IT
UP

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

B. MITBY

From: Victor Mitchell
To: MN_COMM_Pipeline Comments
Subject: Line 3 replacement comments
Date: Monday, June 12, 2017 6:03:41 PM

Hello,

Just a quick note for comments as to need for expeditious approval for the Line 3 replacement project by Enbridge pipeline co.

The pipeline replacement should be approved and moved forward as soon as possible to alleviate the railroads hauling oil thru parts of MN creating a real risk to the public, especially in the heavily populated areas like the Twin Cities Metro. The oil will be shipped one way or the other, the difference in shipping costs between rail and pipeline is small. The five percent or so of affected properties for the current plan
that are fighting the pipeline need to be dealt with in an appropriate way so the regulating process can move forward. Nobody really wants a pipeline in their backyard, but as in other utility routing something on the order of eminent domain has to come into play. This five percent needs to face up to the risk afore mentioned of rail shipping of oil and the pipeline needs to move forward.

Incidentally, the same logic applies to the new pipeline up for approval, also way behind schedule.

Thanks for you attention.

Victor Mitchell
1414 Komoko Rd
Carlton MN 55718

Sent from my iPad

Levi, Andrew (COMM)

From: Lynn Sue Mizner <lynnsuem@gmail.com>
Sent: Monday, July 10, 2017 4:26 PM
To: MN_COMM_Pipeline Comments
Subject: My comments on Line 3 Replacement (CN-14-916 and PPL-15-137)
Attachments: Line 3 DEIS comments.docx

Attached. I think the DEIS inadequately addresses the potential impacts of abandonment and construction. Details in my attached comments.

Lynn Sue Mizner
Chengwatana Farm
47513 334th Pl.
Palisade MN 56469
(218) 232-4189

www.chengwatanafarm.com

To: pipeline.comments@state.mn.us

Dear Jamie MacAlister,

Please include my comments on the Line 3 DEIS in the official record for **Dockets CN-14-916 and PPL-15-137**.

I am from Palisade, Minnesota.

Abandonment of the existing Line 3 Pipeline concerns me because it does not take into consideration the rights and concerns of tribal and other communities along the existing corridor. People who live near the existing corridor do not want the pipeline abandoned. They want it removed and reclaimed.

Construction of a replacement Line 3 pipeline concerns me because the proposed routed crosses many public waterways, wetlands, forest lands, open grassland habitats, and farm lands that are currently relatively clean and undeveloped. Wetland soils are very fragile and can take decades to recover if they are rutted or compacted. These lands are difficult to access in response to the inevitable leaks and spills that we all know will happen, and none of us along the proposed route want to be the next Kalamazoo, Michigan. Northern Minnesota's unique and sacred wild rice beds, fisheries, and pristine water sources should not be allowed to be damaged and/or threatened by heavy equipment, compaction, spilled fuel, lubricants, and crude oil. These sacred and irreplaceable resources are Minnesota's legacy to future generations. If (and I don't think this has been demonstrated) this pipeline is necessary, it should go through already degraded lands, such as the I94 corridor. Enbridge's monitoring plan doesn't satisfy me, because it underestimates what we all know to be longer response times than they have said. It also doesn't address extended power outages and natural or man-made disasters. Any response plan should have alternatives for those scenarios.

The DEIS concerns me because I don't think it adequately covers the effects pipeline construction will have on wetlands and waterways. I don't think it adequately considers the "no construction" option. I don't think the state agencies involved adequately carried out their mission of protecting Minnesota's natural resources, rare features, and sacred natural areas. It doesn't adequately address the significant environmental impacts of pipeline construction and maintenance, or the fact that this is rapidly becoming outdated energy technology. Solar, wind, biomass, and geothermal energy are worthy of investment of public monies. Outdated fossil fuel energy infrastructure is not, and poses unnecessary and unneeded risks to Minnesota's wild and scenic areas.

The DEIS doesn't cover the social impacts of oil pipelines on vulnerable populations either. Drugs, sex trafficking, and the loss of farm and recreational businesses are but a few of those effects we expect to see with pipeline construction.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, remove it from the ground, and reclaim the land. No new crude oil/tar sands oil pipelines are needed in Minnesota.

Sincerely,

Lynn Mizner,
Chengwatana Farm
47513 334th Pl.,
Palisade, MN 56469

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

SAINT PAUL MN 550
JUL 2017 PM 4 L

POSTCARD

I appose Line 3 because Indigenous lines matter and treaties should not be broken. Line 3 violates the treaty rights of Anishinaabeg and will have devestating effects on the families that live near the pipeline. Life is more important than oil.

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Diana Montero

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Tom Montgomery	612 807 6848	
ADDRESS		
23010 Kiowa St. NW.		
CITY, STATE, ZIP		
St. Francis, MN 55070		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Jerry Montie <jerry.montie@gmail.com>
Sent: Monday, July 10, 2017 4:35 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Pipeline comments

Grave Concerns re: Enbridge Line 3 (CN-14-916 and PPL-15-137)

Dear MN Department of Commerce:

I am strongly opposed to the proposed Enbridge Line 3 Pipeline because of the environmental risks for essential bodies of water, dangers to public health, and violations of treaty rights. The Enbridge Line 3 Draft Environmental Impact Statement utterly fails to address basic conditions for safety and environmental justice. It violates MN Statute 103F.305 Scenic River Protection Policy and MN Statute 116D.02 Declaration of State Environmental Policy.

There has been no free, prior, and informed consent of Tribal Nations. I am deeply concerned about the impact of this proposed project on the health of tribal communities, their sacred sites, and the basic sovereignty of treaty rights.

How can our state approve a project that is guaranteed to spill? Why should our state agree to allow further poisoning of communities and degradation of precious resources, with a company that has a history of major permit violations, and without meaningful accountability? There should be NO consideration of new construction while we await plans for cleaning up the contamination from the countless spills that have already occurred along Line 3.

The "NO BUILD" option needs to be seriously considered. The DEIS poses unacceptable risks to Minnesota waters (for example DEIS Chapters 5.2.1.4; 5.2.1.2.4; 10.2.4.1.1; and 10.4.1). And again, this proposal violates fundamental Tribal Sovereignty. The rights of Tribal Nations as well as the rights of all Minnesotans take precedence over the purported benefits of this project.

Thank you for considering these important concerns.

Sincerely,

Gerald Montie,

2201 Jackson Circle
Marine on St. Croix, MN 55047

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Charlene Moore	630-399-8978	Charandbobmoore@aol.com

ADDRESS
PO BOX 1136

CITY, STATE, ZIP
Walker, MN - 56484

COMMENTS

I support line 3 replacement

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

ST PAUL MN 551
15 JUN 2017 PM 8 T

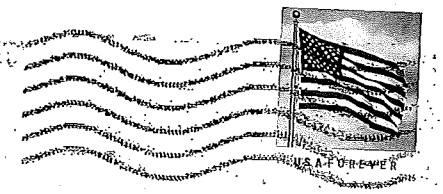

3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Robert Moore	218 547 2528	
ADDRESS		
P.O. Box 1136		
CITY, STATE, ZIP		
Walker MN. 56484		

COMMENTS

I Support Line 3 replace

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

ST PAUL MN 551
JUN 2017 PM 8 T

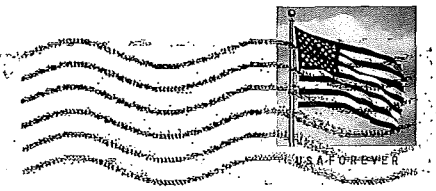

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

02 1P $ 000.34
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Josh Moore	651-788-6323	Joshmh32@gmail.com

ADDRESS
21089 Ibis Avenue

CITY, STATE, ZIP
Lakeville MN 55044

COMMENTS

I feel the pipeline is needed, I support your project.

Line 3 replacement.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

02 1P $ 000.34°
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Lindsey M. Moore	952-607-8780	
ADDRESS		
21089 Ibis Avenue / Fredrickson Lindsey@yahoo.com		
CITY, STATE, ZIP		
LAKEVILLE, MN 55044		

COMMENTS

We support Enbridges Line 3 project. Following Koch pipeline System.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

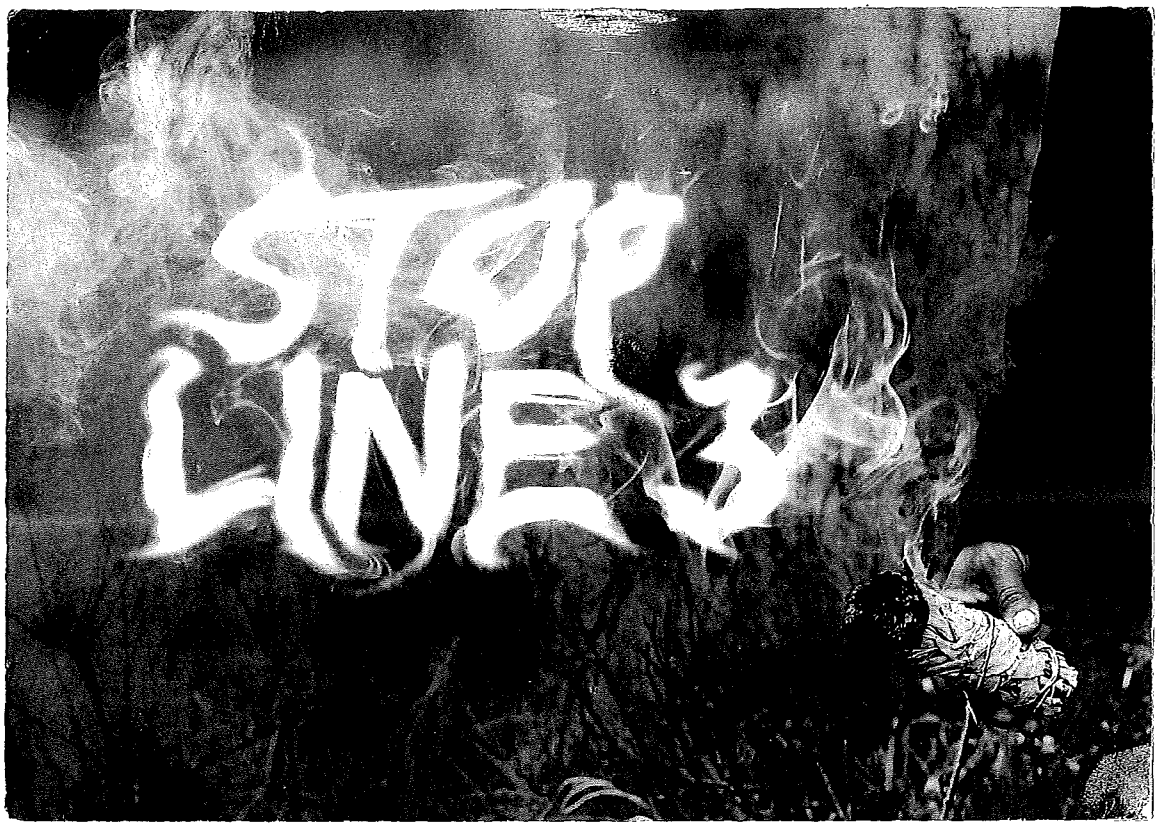

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

ST PAUL MN 554
23 JUN 2017 PM 1:17

No line 3 pipeline in Minnesota!
This pipeline will not
create a SINGLE full time
job. Green energy is
much better for the
economy and creates life-long
careers. Enbridge should
not be allowed to make
money by polluting our
air and water!

SINCERELY,
Jamie

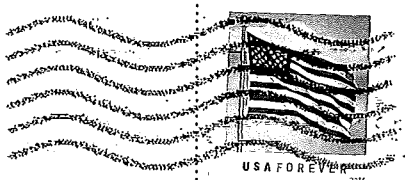

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

55101-2198

Levi, Andrew (COMM)

From: Janet Kurtz <rmjkurtz@brainerd.net>
Sent: Monday, July 10, 2017 11:57 PM
To: MN_COMM_Pipeline Comments
Subject: Comments on the Line 3 DEIS
Attachments: Comments for Line 3 - 10 July 2017.docx

Attached are my comments regarding the Line 3 Project DEIS.

Thank you.

Robert Morgan
4864 Hay Creek Road
Fort Ripley, MN 56559

Virus-free. www.avast.com

Comments for Line 3 Replacement Project DEIS:

From – Robert Morgan
4864 Hay Creek Road
Fort Ripley, MN 56449
218 829-1192
rmjkurtz@brainerd.net

My comments pertain to the Line 3 replacement project.

I have read in detail a lot of the 1800+ pages of the Line 3 DEIS, scanned the whole report, and studied the maps and charts in trying to assess this project. There is a lot of information there – some more relevant, some less, that strongly pertains to the upcoming decisions.

First I will say, I served in the US Air Force and was the systems analyst on a missile launch crew for the delivery of nuclear weapons. I have designed and constructed buildings. I have done scientific studies of natural ecosystems – my degree is in biology and earth science. I daily use technology and mostly realize its benefits and its dangers – so I choose to work within a culture that uses a lot of energy with a very limited understanding of how it affects our lives.

My first point is that the report seems to confirm that this new pipeline will leak at some time – therefore, do NOT authorize a new corridor for the contamination by petroleum [I see that the preferred route (APR) is already an electric transmission corridor – electric energy is a different kind of degradation than OIL.]. If a Certificate of Need is issued, [and I am unsure if it should be], then beyond minor reroutes, a new line should use present oil pipeline corridors.

In accepting that there will be spills, it is better to have the contamination in or near currently disturbed lands. How good is the technology - how well are the pumps and valves sited to limit the leaks. The past practices of Enbridge and other petroleum corporations indicate that placing pipeline is inherently difficult, so we don't want a line in remote areas such as the APR.

If we must have a new pipeline, it is more likely that it could be detected and responded to sooner at the current location of existing pipeline corridors. The word "safety" may be misused in stating that the pipe line should be away from population centers. Will the company will build the pipeline to the best safety standards in rural areas as they will when they build near the urban fringe at the refinery – or am I sensing a false premise in these actions?

Several tables [such as ES – 2, ES – 4…] in the DEIS gave comparisons of the APR for "potentially exposed resources" from leaks that had different criteria, rating of different section of line, unrealistically attempted to compare truck and rail spillage with pipeline leakage. This type of presentation is not realistic as this is a very unlikely scenario, so the information is not applicable and tends to confuse the issues.

The resource values are arbitrary; they need to be better defined and prioritized indicating why they are most or least significant.

If the anticipated life of the new line is only 30 years, explain why this is a reasonable investment of financial, natural, and human resources. Detail other oil pipelines around the country that have been built in the past 10 years [with 21st century technology] – and if possible, indicate the anticipated lifespan. Analyze the present global energy development process [that is responding to climate change] and justify why only a 30 year life is acceptable for constructing and maintaining this oil pipeline.

In section 2.7.1.1, the construction process indicates that Enbridge would provide EIs [environmental inspectors] to "monitor and document" compliance. The construction entity should make sure that they are following rules and regulations, but a state agency[as third party monitor] should be verifying full compliance, representing the citizens of this state, and have full authority to stop work if procedures are incorrect or illegal or wil create a future condition that compromises the integrity of the pipeline and/or the surrounding resources.

In section 10.4.11 concerning drinking water source{DWS] that is within 2,500 feet of the centerline of APR or RAs, provide more detail on oil dispersal and groundwater flows that have been learned from other incidents of oil spills, leaks, and the hydrology that is characteristic along the potential routes. How do you determine the rating values for areas that have several soil types and have wells of varying depths?

There will be spills and leaks, so please provide more depth of information on the alternative routes: RA – 06, RA – 07, RA – 08, and RA - 03AM, so that a better analysis of how spills and leaks would be minimized, how they could be responded to, and what might be the probable long term damage to natural and human resources.

The End. Thank you.

Levi, Andrew (COMM)

From: Wendy Morical <wnm@docunetworks.com>
Sent: Monday, July 10, 2017 4:18 PM
To: MN_COMM_Pipeline Comments
Subject: Halt the pipelines

Please say **no** to Enbridge's proposed line 3. The large volume of oil which will pass through this pipeline endangers environmentally sensitive areas. It is important that we preserve these waters for those who currently utilize the waters as well as generations to come.
With regard to the pipeline going through sensitive lakes and wetlands which host native wild rice beds; if those waters are damaged as the result of a pipeline leak, those beds will be destroyed for eternity.
Please save this land and water for all generations to come.

Thank you!

Wendy Morical
3942 Enchanted Ln
Minnetrista, MN 55364

wnm@docunetworks.com

763·475·9600

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Tracy Morrell		
ADDRESS: PO Box 146		
CITY, STATE, ZIP: Walker, MN 56001		

COMMENTS: I support the line 3 replacement project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNEAPOLIS MN 553
10 JUL 2017 PM 4 L

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Docket numbers: CN-14-916; PPL-15-137

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Dana Morrill		
ADDRESS: PO Box 146		
CITY, STATE, ZIP: Walker, MN 56484		

COMMENTS: I support the line 3 replacement project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

55101-2198

Levi, Andrew (COMM)

From: Mackenzie Mudgett <mack.mudgett@gmail.com>
Sent: Monday, July 10, 2017 11:44 PM
To: MN_COMM_Pipeline Comments
Subject: Comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

Attention: Jamie MacAlister, Environmental Review Manager Minnesota Department of Commerce

Chapter 9, section 9.4.1 of the EIS under 'Tribal Resources,' generally states that the "applicant's preferred route as well as any proposed alternative would result in a diminishment of Indian interests."

The Line 3 Pipeline concerns me because much is mentioned in Chapter 9 about the proposed pipeline's impact on environmenal resources such as wild rice, traditional plants, etc., however, the impact the pipeline will have on unforseen archaeological sites that the applicant has a high probability of encountering during ground disturbance is nonexistent in the EIS.

This is concerning considering MnDOT and its Cultural Resources Unit ensures its ground-disturbance activities "balance the state's transportation needs with historic preservation," using guidelines to evaluate "the historical significance of commonly encountered property types." (http://www.dot.state.mn.us/culturalresources/index.html).

MnDOT uses specific stewardship guidelines that encompass both environmental and cultural impacts which ground-disturbance activities can have on tribal nations. If it is important for state agencies in Minnesota to adopt and follow stewardship guidelines concerning Tribal Nations, it is as equally important for non-state entities to thoroughly follow these same guidelines.

Unfortunately, there is no mention of the impact the applicant will have on historic preservation as it relates to archaeological property types across the proposed pipeline routes.

Assessing the potential of archeological property is vital to "avoid impacts on archaeological sites throughout Minnesota." MnDOT has developed a tool known as the 'Mn/Model' which "uses GIS-based statistical models that map the potential for pre-1837 surface archaeological sites in Minnesota." (http://www.dot.state.mn.us/mnmodel/index.html)

Based on the "Mn/Model for archaeological site potential in Red Lake County (Elizabeth Hobbs, MnDOT)" and Figure 9-1 in the EIS titled "Route and Route Segment Alternatives with Tribal Treaty Boundaries" the applicant's preferred route will cross two bodies of water with a high probability of site potential. With Red Lake County being just the beginning of the pipeline's route, how many suspected sites of potential cultural significance that have yet to be evaluated and recorded will the applicant encounter throughout the entire project if we rely on MnDOT's Mn/Model? And why there is no mention in the EIS of the impact the applicant will have on historic preservation is deeply concerning.

Of greater concern is the applicant's history of negligible activity and decision-making when encountering archaeological property in other states. The applicant is an equity co-owner in the Dakota Access Pipeline. On September 3, 2016 in North Dakota, "Energy Transfer Inc., in partnership with the [applicant] Enbridge Corporation and Marathon Oil, bulldozed a two mile, 150 feet wide path through land currently being contested in Federal Court." Sacred places containing ancient burial sites, places of prayer and other significant cultural artifacts of the Standing Rock Sioux Tribe were destroyed by the applicant and its co-owner, Energy Transfer

Partners. (http://m.huffpost.com/us/entry/11861618)

The discovery of potentially-significant cultural artifacts is never uncommon. On May 26, 2017, MnDOT halted construction of the Highway 23 project in Duluth's Fond du Lac neighborhood after skeletal remains were discovered within the disturbed ground. MnDOT Commissioner Charles Zelle said of the discovery, "No question, disturbing the sacred ground, burial sites, was incredibly horrific."

Based on the applicant's history of poor engagement with tribal nations and negligent conduct when encountering unforseen cultural resources, the applicant will have an overall negative impact on Tribal nations and its surrounding communities. Based on data produced by MnDOT of potentially-significant archeological sites in the state of Minnesota, it's clear that the applicant will damage the state's history and culture, and risk the integrity of the state's historic preservation efforts. The Commission should reject the approval of the applicant's certificate of need and the route permit (PL9/CN-14-916 - PL9/PPL-15-137).

Sincerely,

Mackenzie Gainey Mudgett
Biological Anthropologist and lifelong resident of Minnesota

From: Cheryl Muellner
To: MN_COMM_Pipeline Comments
Subject: NO to new Line 3 pipeline
Date: Wednesday, May 31, 2017 10:07:54 AM

Please say NO to a new Line 3 pipeline. Please clean-up the old pipeline. Please protect mother earth. Please respect treaties.

Docket numbers CN-14-916 and PPL-15-137

Thank you.

Sincerely,

Cheryl Muellner

Levi, Andrew (COMM)

From: Joanne Mulbah <joanmulbah@gmail.com>
Sent: Sunday, June 25, 2017 11:33 AM
To: MN_COMM_Pipeline Comments
Subject: No line 3

Dear Ms. MacAlister,

As a member of Leech Lake Reservation please no line 3. No replacement and take out the old line. Our resources are impacted negatively with line 3.

Sincerely,

Jlmulbah
15001 Keller Lake Dr
Burnsville, MN 55306
joanmulbah@gmail.com

From: mlmunn
To: MN_COMM_Pipeline Comments
Subject: Comment: Docket numbers CN-14-916 and PPL-15-137
Date: Tuesday, May 16, 2017 8:12:05 AM

PROPOSED LINE 3 PIPELINE PROJECT
Docket numbers CN-14-916 and PPL-15-137

Dear Reader

Enbridge has no justification to move their pipeline corridor.

To expose new areas to potential spills is beyond absurd considering the environmental record of Enbridge.
There is no reason to spread the risk or the meager resources to respond to emergencies over a wider area since the abandoned pipeline will need continued monitoring. What right does the company have to abandon what is essentially a giant hazardous waste in place?

A power line corridor has no relationship to a power line corridor regardless of any vague definitions or legal generalizations; a power line corridor is a greenfield by comparison.

The preferred route is so blatantly anti-Native American, they could not have found a bigger signpost than their own maps - what is up with that? The route speaks to the company's motivations ancillary to the project: a cartographic representation that digitizes a thousand words. There appears no other justification to add so many miles and expense to a pipeline project just to avoid reservation lands.

Mary Munn
Holyoke Minnesota
Carlton County

Levi, Andrew (COMM)

From: Darlene Munneke <dmunneke@embarqmail.com>
Sent: Thursday, July 06, 2017 7:10 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline comments
Attachments: Letter to the Editor June 2017 - Enbridge.docx

Attached is my opinion regarding the Enbridge Energy's proposed Line 3 Project.

Bob Munneke
Aitkin MN

This email has been checked for viruses by Avast antivirus software.
https://www.avast.com/antivirus

At 5:58 p.m. on July 25, 2010, an alarm went off at Enbridge's pipeline control center in Edmonton Alberta, indicating a drop in pressure at the Marshall Michigan pump station on the 286 Mile pipeline. At some point during the evening, Enbridge Energy's 6B pipeline, a 30 inch steel pipeline, sustained a 6 foot rupture and began leaking crude oil into the Talmadge Creek near Marshall. Just before 9:30 p.m. Calhoun County 9th dispatcher began receiving calls from concerned residents who reported the smell of natural gas. The next day at 11:16 a.m. on July 26, 2010, it took a Consumer Energy employee to make contact with the Enbridge control center to alert them of oil spilling into Talmadge Creek, which feeds the Kalamazoo River. Almost one million gallons of crude oil ended up in the river which is the worst inland oil spill in the history of the United States.

It does not make sense for Enbridge to be permitted to construct an oil pipeline through some of the most pristine waters in the world.

On July 10, 2012 the National Transportation Safety Review Board released its final analysis of the spill. According to the report, Enbridge knew five years before the pipeline ruptured that there were cracks in the section of the pipeline that eventually leaked.

There will be some temporary jobs created during the construction phase of the proposed pipeline project, but we need to consider the impact of the pipeline on the economy of our area. A lot of our economy is sustained by jobs related to tourism, fishing, recreation, summer homes, boats, water activities. If oil gets in the water, this all goes away. Better to require Enbridge to change their proposed pipeline route and go west and south, missing the most vulnerable water areas.

A different route would permit the oil to be transported without so much danger of real harm to the environment.

Docket numbers: CN-14-916 and PPL-15-137

Bob Munneke
PO Box 197
Aitkin MN 56431
218-927-3615
dmunneke@embarqmail.com

Levi, Andrew (COMM)

From: John Munson <munsongs@gmail.com>
Sent: Monday, July 10, 2017 4:28 PM
To: MN_COMM_Pipeline Comments
Subject: Regarding CN-14-916 and PPL-15-137

To whom it may concern

I wish to register my disapproval for renewing the Enbridge pipeline for the threat it poses to wetlands and native rice gathering in Northern Minnesota.

John Munson
Circle Pines, MN

Sent from my iPhone

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Saturday, July 08, 2017 2:54 PM
To: MN_COMM_Pipeline Comments
Subject: Re CN-14-916 and PPL-15-137

From John Munter
14860 Bruce Creek Rd
Warba, MN 55793

The MPCA letter in the previous Sandpiper/Line 3 docket of Jan 23, 2015 makes a number of criticisms of the Enbridge Preferred Corridor ("SA-Applicant") which are not answered in the current DEIS. Here is a summary with letter details excepted following:

1. **The 50 IMPAIRED WATERS OF THE APPLICANT PREFERRED CORRIDOR MAY NOT BE SO ON THE LOWER STANDARDS OF SA-03-04 AGRICULTURAL LAND.**
2. **SA-APPLICANT (PREFERRED CORRIDOR) HAS MANY AREAS OF LIMITED ACCESS, INCREASING THE RISK OF EXTENDED IMPACT TO SURFACE WATERS.**
3. **POTENTIAL DAMAGES DURING PIPELINE CONSTRUCTION AND TESTING ARE GREATER FOR SA-APPLICANT THAN OTHER ALTERNATIVES BECAUSE DURING THE ALBERTA CLIPPER/SOUTHERN LIGHTS DILUENT PROJECT, ENBRIDGE EXCEEDED AGREED-UPON MAXIMUM DISCHARGE RATES ON 15 OF ITS HYDROSTATIC TESTING DISCHARGE OPERATIONS. AT TWO OF THESE SITES (ADJACENT TO THE MISSISSIPPI RIVER AND ADJACENT TO THE CLEARWATER RIVER), THE EXCEEDANCES WERE ENOUGH TO CAUSE SIGNIFICANT EROSION AND SEDIMENT DISCHARGE TO SURFACE WATERS. THESE CASES WERE REFERRED TO THE U.S. ENVIRONMENTAL PROTECTION AGENCY AND EVENTUALLY SETTLED BY THE U.S. DEPARTMENT OF JUSTICE IN 2013 WITH ENBRIDGE PAYING A $425,000 PENALTY.**
4. **THREATS TO GROUNDWATER AND POTENTIAL DRINKING WATER SUPPLIES FROM SA-APPLICANT ARE DIFFICULT TO ASSESS, BUT APPEAR TO POSE MORE SIGNIFICANT RISKS THAN THE SYSTEM ALTERNATIVES, INCLUDING SA-03. WHAT IS MOST IMPORTANT TO UNDERSTAND ABOUT THE SOILS ALONG THE SA-APPLICANT ROUTE IS THAT THE COMPLEXITY OF MORAINES IN THE AREA CREATES A SIGNIFICANT DEGREE OF LOCALIZED CHANGES IN GROUNDWATER MOVEMENT THAT ARE VERY DIFFICULT TO PREDICT, AS OPPOSED TO SOME OF THE FLATTER LANDS TO THE WEST AND SOUTH.**
5. **SA-APPLICANT THREATENS A GREATER PERCENTAGE OF WILD RICE AND NATIVE FORESTS THAN ANY OF THE PROPOSED ALTERNATIVES, INCLUDING SA-03. MPCA STAFF HAS IDENTIFIED 10 WILD RICE LOCATIONS ALONG THE SANDPIPER ROUTE FOR WHICH THERE IS NO ACCESS FROM PIPELINE TO THE LOCATION OF THE WILD RICE. BY COMPARISON, SA-03 HAS TWO SUCH AREAS.**
6. **SA-APPLICANT HAS A GREATER POTENTIAL FOR IMPACT ON ECOREGIONS THAN OTHER ALTERNATIVES, INCLUDING SA-03. AS ACCURATELY INDICATED IN THE DOC STUDY, THE MAJORITY OF SA-03 CROSSES LAND THAT HAS BEEN CONVERTED TO AGRICULTURE OR DEVELOPED….BY CONTRAST, THE SA-APPLICANT ROUTE CROSSES A SIGNIFICANT AMOUNT OF FORESTED LANDS AND WETLANDS…FORESTED AREAS, PARTICULARLY LARGER, UNFRAGMENTED EXPANSES OF FOREST, ARE NECESSARY FOR A NUMBER OF SPECIES OF WILDLIFE TO SURVIVE. IT IS IMPORTANT TO NOTE THAT ENBRIDGE HAS PROMISED TO SEPARATE TOPSOIL ONLY IF ASKED TO DO SO BY LANDOWNERS. IT IS EQUALLY IMPORTANT TO SEPARATE AND REPLACE TOPSOIL IN FORESTED, REMOTE ENVIRONMENTS TO MAINTAIN THE INTEGRITY**

OF THOSE SYSTEMS AND MITIGATE SOME OF THE POTENTIAL LONG-TERM IMPACTS OF PIPELINE CONSTRUCTION

7. **SA-APPLICANT HAS MORE LOCATIONS WITH POOR ACCESS IN THE EVENT OF A RELEASE THAN SA-03 OR OTHER ALTERNATIVES. MPCA STAFF IDENTIFIED 28 SITES ALONG THE SANDPIPER ROUTE FOR WHICH ACCESS WOULD BE DIFFICULT OR IMPOSSIBLE WITHIN 250 WATER BODIES. BY COMPARISON, SEVEN SUCH AREAS WERE LOCATED ON THE SA-03 ROUTE, AND NONE ON SA-04.** …**ACCORDING TO THE AFOREMENTIONED EXPONENT RISK ASSESSMENT FOR THE KEYSTONE XL PIPELINE, A SMALL LEAK FROM A HOLE OF 1/32 INCH IN DIAMETER IN A PIPELINE COULD REMAIN UNDETECTED FOR SEVERAL MONTHS, EVEN WITH THE MOST UP-TO-DATE LEAK DETECTION TECHNOLOGY IN PLACE. THE SAME LEAK COULD RELEASE UP TO 28 BARRELS OF OIL PER DAY, AT 42 GALLONS PER BARREL. THUS, EVEN A VERY SMALL, VIRTUALLY UNDETECTABLE LEAK IN A REMOTE AREA, SUCH AS THOSE LOCATED ALONG MUCH OF THE PROPOSED SANDPIPER ROUTE, COULD CAUSE SIGNIFICANT ENVIRONMENTAL DAMAGE SUCH AS THAT DESCRIBED UNDER HEADING C.3 OF THIS LETTER WITHOUT BEING DETECTED IN REMOTE AREAS, AND LIMITED ACCESS MAY ALSO REDUCE THE CHANCE THAT A CITIZEN MAY OBSERVE AND REPORT A LEAK TOO SMALL FOR DETECTION BY TECHNOLOGY.**

The fuller MPCA text follows:

1) **Adverse impacts to high quality surface waters--waters that are listed as impaired along the SA-Applicant route are likely to be higher quality…. and might not be listed as impaired at all along the SA-03 route** For example, on its face, the DOC study may be misinterpreted as indicating that SA-03 is a worse alternative than SA-Applicant in affecting impaired waters. The DOC study concluded that there were 50 impaired waters crossed by the Sandpiper route, and 98 impaired waters crossed by SA-03 (DOC Study, 72, 90). Under the Clean Water Act ("CWA"), an impaired water is any water body (e.g., lakes, rivers, streams, wetlands) that is too polluted or otherwise degraded to meet the applicable water quality standards set by states, territories, or authorized tribes. Water quality and water quality standards will vary throughout the state depending on the region of the state in which the waters reside. "Impaired" waters are not the same across the state. For a water body to be deemed impaired in southern or western Minnesota (western corn belt plains or Red River valley ecoregions), it typically will have a greater degree of contamination or degradation than would be required for a water body in the central 8

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hardwood forest ecoregion of Minnesota traversed by the applicant's preferred route (Sandpiper) to be deemed impaired. **Thus, waters that are listed as impaired along the SA-Applicant route are likely to be higher quality (having a lower contamination level) than a water listed as impaired in the southern part of the state, and might not be listed as impaired at all along the SA-03 route.** Waters in northern Minnesota are generally of better water quality or more pristine.

2. Significant Environmental Damage Would Occur From a Release at or near a Water Crossing Extending up to at least a Distance of 10 Miles from the Point of Release. SA-APPLICANT HAS MANY AREAS OF LIMITED ACCESS, INCREASING THE RISK OF EXTENDED IMPACT TO SURFACE WATERS.

3. POTENTIAL DAMAGES DURING PIPELINE CONSTRUCTION AND TESTING ARE GREATER FOR SA-APPLICANT THAN OTHER ALTERNATIVES. …. Damage to surface water resources during hydrostatic testing discharges has occurred recently in the state. During these tests, segments of pipeline are filled with a significant volume of pressurized water, often millions of gallons, to test the integrity of the pipe. The water is then released in a manner that should minimize environmental impact. **DURING THE ALBERTA CLIPPER/SOUTHERN LIGHTS DILUENT PROJECT, ENBRIDGE EXCEEDED AGREED-UPON MAXIMUM DISCHARGE RATES ON 15 OF ITS HYDROSTATIC TESTING DISCHARGE OPERATIONS. At two of these sites (adjacent to the Mississippi River and adjacent to the Clearwater River), the exceedances were enough to cause significant erosion and sediment discharge to surface waters. These cases were referred to the U.S. Environmental Protection Agency and eventually settled by the U.S. Department of Justice in 2013 with ENBRIDGE PAYING A $425,000 PENALTY. DURING THESE HYDROSTATIC TESTING OPERATIONS, AS MUCH AS 4,000 GALLONS OF WATER PER MINUTE CAN BE DISCHARGED FROM VALVES….**

The placement of the new terminal construction west of the proposed Clearbrook location as suggested by MPCA in SA-03 will assure that future pipelines are located west and south of these pristine areas, thus avoiding the resources that the state is spending millions of dollars to protect. Meanwhile, the continued expansion of the Clearbrook facility that will coincide with construction in the SA-Applicant location will mean continued impact and potential impact to the highest value (pristine) waters in our state as a result of future pipeline construction.

4. THREATS TO GROUNDWATER AND POTENTIAL DRINKING WATER SUPPLIES FROM SA-APPLICANT ARE DIFFICULT TO ASSESS, BUT APPEAR TO POSE MORE SIGNIFICANT RISKS THAN THE SYSTEM ALTERNATIVES, INCLUDING SA-03. WHAT IS MOST IMPORTANT TO UNDERSTAND ABOUT THE SOILS ALONG THE SA-APPLICANT ROUTE IS THAT THE COMPLEXITY OF MORAINES IN THE AREA CREATES A SIGNIFICANT DEGREE OF LOCALIZED CHANGES IN GROUNDWATER MOVEMENT THAT ARE VERY DIFFICULT TO PREDICT, AS OPPOSED TO SOME OF THE FLATTER LANDS TO THE WEST AND SOUTH….The LIDAR data strongly suggests an increased potential for impacts to drinking water from SA-Applicant than from SA-03 and some

other system alternatives. However, more in-depth study will need to be done in the routing phase in order to make an informed comparison and either confirm or negate what the LIDAR data suggests as a factual conclusion.

5. SA-APPLICANT THREATENS A GREATER PERCENTAGE OF WILD RICE AND NATIVE FORESTS THAN ANY OF THE PROPOSED ALTERNATIVES, INCLUDING SA-03.

Wild rice, in addition to being an important economic consideration in Minnesota, is also an extremely important cultural resource, as well as an essential food source for humans and wildlife. It requires very specific conditions and good water quality, both of which are provided by north central Minnesota lakes. The Sandpiper pipeline would encroach on some of the richest wild rice territory in the state of Minnesota. Further, **MPCA STAFF HAS IDENTIFIED 10 WILD RICE LOCATIONS ALONG THE SANDPIPER ROUTE FOR WHICH THERE IS NO ACCESS FROM PIPELINE TO THE LOCATION OF THE WILD RICE. BY COMPARISON, SA-03 HAS TWO SUCH AREAS. As shown in Figure 2, SA-Applicant (in green) would threaten significantly more of the state wild rice crop than any system alternative.**

6. SA-APPLICANT HAS A GREATER POTENTIAL FOR IMPACT ON ECOREGIONS THAN OTHER ALTERNATIVES, INCLUDING SA-03.

As accurately indicated in the DOC study, the majority of SA-03 crosses land that has been converted to agriculture or developed….By contrast, the SA-Applicant route crosses a significant amount of forested lands and wetlands…**Forested areas, particularly larger, UNFRAGMENTED EXPANSES OF FOREST, ARE NECESSARY FOR A NUMBER OF SPECIES OF WILDLIFE TO SURVIVE. Many species of song birds, for example, need deep woods for nesting to avoid "edge species," or species that are more tolerant of human disturbance, because certain edge species such as cowbirds can parasitize their nests and cause mortality to their young. Other species, such as certain reptiles and amphibians, are very habitat specific and cannot easily disperse if that habitat is damaged,** such as when a pipeline is placed through that habitat, altering vegetation, soils, and hydrology.

It is important to note that Enbridge has promised to separate topsoil only if asked to do so by landowners. It is equally important to separate and replace topsoil in forested, remote environments to maintain the integrity of those systems and mitigate some of the potential long-term impacts of pipeline construction…

7. SA-APPLICANT HAS MORE LOCATIONS WITH POOR ACCESS IN THE EVENT OF A RELEASE THAN SA-03 OR OTHER ALTERNATIVES.

As indicated in the June 24, 2014 letter by the MPCA (Document ID 20146-100780-01), access to potential leak sites in the State of Minnesota is of significantly greater concern along the SA-Applicant route than on any of the proposed system alternatives. **MPCA STAFF IDENTIFIED 28 SITES ALONG THE SANDPIPER ROUTE FOR WHICH ACCESS WOULD BE DIFFICULT OR IMPOSSIBLE WITHIN 250 FEET OF A 2000 FOOT DOWNSTREAM FLOW IF OIL WERE TO BE RELEASED IN CERTAIN WATER BODIES. BY COMPARISON, SEVEN SUCH AREAS WERE LOCATED ON THE SA-03 ROUTE, AND NONE ON SA-04.**

A primary rule of thumb when planning for response to an oil leak is that a release in soil is better than a release in water, and a release in stagnant water is better than a release in flowing water. …**According to the aforementioned Exponent risk assessment for the Keystone XL pipeline, a small leak from a hole of 1/32 inch in diameter in a pipeline could remain undetected for several months, even with the most up-to-date leak detection technology in place. The same leak could release up to 28 barrels of oil per day, at 42 gallons per barrel. Thus, even a very small, virtually undetectable leak in a remote area, such as those located along much of the proposed Sandpiper route, could cause significant environmental damage such as that described under heading C.3 of this letter without being detected in remote areas, and limited access may also reduce the chance that a citizen may observe and report a leak too small for detection by technology.**

The creation of access in remote locations where none exists can create its own problems, including damage to habitat, creation of a source of long-term erosion, fragmentation, aesthetic issues, alteration of hydrology, and other issues. The best way to avoid these concerns is to avoid or reduce the number of crossings of flowing water bodies, or those where access is limited…

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Saturday, July 08, 2017 3:51 PM
To: MN_COMM_Pipeline Comments
Subject: Re CN-14916 and PPL-15-137

From John Munter
14860 Bruce Creek Rd
Warba, MN 55793

Below are excerpts from the DNR letter to the Sandpiper/Line 3 docket from Jan 23, 2015. Amazing, the DNR did a "Full Length Comparison" of the Preferred Corridor versus SA-03 (which is now SA-04. They included WI and ND but not IL. Why could not the current DEIS do this? Is it only because SA-04 would be more appealing to site on? SA-03-4 has fewer wetland impacts, has fewer water crossings, and a greater number of crossings over impaired waters. Would it not be better to have a spill in an already impaired water than in a pristine one?

In the bullet points below the chart it is clear that DNR prefers SA-03-04 because of fewer all around impacts. In the fifth bullet point note that they say that "Minnesota Statutes 116D.04, Subdivision 6 prohibits State actions that are likely to cause pollution, impairment, or destruction of natural resources as long as there is a feasible and prudent alternative." This would seem to suggest by law that the state must choose SA-04 over the preferred corridor if it has less natural resource impact.

Full Length Comparison of SA-03 and SA-Applicant

While the high level of analysis presented in the Comparison of Environmental Effects of Reasonable Alternatives did not provide the DNR enough information for a full comparison of system alternative impacts, we believe it provides valuable screening information in combination with professional judgment for the DNR to provide input regarding SA-03 and SA-Applicant. After a review of the data and consideration of factors and context described above, it is the opinion of the DNR that route Sa-03 has fewer natural resource impacts when compared to SA-Applicant.

SA-Applicant features that would incur impacts greater than those identified for SA-03 are: forest and wetland acreage, river and stream segment crossings, and crossings of public lands. Cultivated lands and occurrence of already-impaired waters are greater along SA-03, indicating the developed state of lands along this route. The following table represents a preliminary comparison of natural resource impacts between SA-Applicant and SA-03, using information from the Comparison of Environmental Effects of Reasonable Alternatives. These are full route comparisons, encompassing the states of North Dakota, Minnesota, and Wisconsin.

Full length System Alternative Analysis (ND, MN, WI):
Comparison of SA-Applicant and SA-03

Feature	**SA-Applicant**	**SA-03**	**Notes [The comment reflects the preferable option from a natural resource perspective]**
Total miles	615 miles	700 miles	SA-App is shorter
Acres (from landcover)	769,145	862,053	SA-App covers fewer acres
Landcover (acres)			
Forest	144,315 (18.8%)	86,195 (10%)	SA-03 covers fewer forested acres, and less by percent. This represents a reduction in forest fragmentation.
Herbaceous/grassland	86,505 (11.2%)	90,945 (10.5%)	SA-App covers fewer grassland acres, and less by percent. This is a reduction in grassland impacts.
Cultivated	363,381 (47.20%)	512,407 (59.4%)	SA-03 covers more cultivated acres and more by percent. This represents re-working of already disturbed lands.
Wetlands	107,367 (13.9%)	90,832 (10.5%)	SA-03 covers fewer wetland acres and less by percent. This is a reduction of wetland impacts.
Water Resources			
River + stream crossings	2,049 segments	895 segments	SA-03 crosses fewer water segments
Crossings with water impairments	50	98	SA-03 has a greater number of crossings over impaired waters.

pg. 9

- Using the report in combination with DNR resources and professional judgment, with a limited amount of review time, the DNR is able to provide input regarding the least environmentally impacting System Alternatives.

- Within Minnesota, more southern routes (south of I-94 corridor) have less concentration of natural resources (regardless of length) within the 2-mile corridor. Therefore, there is a greater opportunity for avoidance of resources with the more southern System Alternatives. While the DNR lacks the expertise to undertake a market or economic analysis of the southern routes. From a natural resource perspective, the more southern routes appear to be feasible and prudent System Alternatives that merit consideration.

- MN Rules 7853.0130, Subpart B requires consideration of reasonable and prudent alternatives to proposed facilities as part of certificate of need decisions. Testimony of Adam J. Heinen submitted by the Minnesota Department of Commerce Division of Energy Resources (DER) January 6, 2015 and January 21, 2015 state that only System Alternative – 03 (SA-03) and System Alternative – Applicant (SA-Applicant) are reasonable based on the focus of the DER review. Note that Modified System Alternative – 03 is also discussed, but is understood to be addressed in the routing docket and will not be further discussed in this comment letter.

- The DNR conducted a focused review of SA-03 and SA-Applicant. When only comparing the two routes found reasonable by DER, SA-03 and SA-Applicant, SA-03 appears to impact less natural resources than SA-Applicant. SA-Applicant features that would incur impacts greater than those identified for SA-03 are: forest and wetland acreage, river and stream segment crossings, and crossings of public lands. Cultivated lands and occurrence of already-impaired waters are greater along SA-03, indicating the developed state of lands along this route. Our analysis is described further in the Supporting Information section of this letter.

- Minnesota Statutes 116D.04, Subdivision 6 prohibits state actions that are likely to cause pollution, impairment or destruction of natural resources as long as there is a feasible and prudent alternative. The statute also clarifies that economic considerations along shall not justify such an action. As SA-Applicant and SA-03 are both considered reasonable, environmental impacts of routing from a natural resource perspective would be a key criterion in the decision regarding the most reasonable and prudent System Alternative.

- Testimony submitted by Adam J. Heinen with the DER January 21, 2015 suggests analysis of SA-03 and SA-Applicant in the routing docket. The routing docket would include a level of environmental data helpful in comparing these two routes, along with Route Alternatives already scoped into the routing process such as Modified SA-03. For example, a Comparative Environmental Analysis (CEA) would likely include an estimated alignment within a larger route. If further analysis is completed, the DNR requests the opportunity to provide input and review a draft of the environmental analysis document.

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Sunday, July 09, 2017 10:17 AM
To: MN_COMM_Pipeline Comments
Subject: Re CN-14-916 and PPL-15-137

From John Munter
14860 Bruce Creek Rd
Warba, MN 55793

Willis Mattison's assertion of an environmental insurance need is right on. Not only might there be a delay in payment from litigation but there might be a collapse of the North American oil industry in the next sixty years where Enbridge is too bankrupt to fund clean-up from their last remaining pipelines. Enbridge was able to pay the clean-up costs for the Kalamazoo Spill because they have a lucrative business. This may not always be so and a company can easily let their subsidiary in the US go bankrupt while they continue on in Canada. Volvo and France have just announced goals to be 100% EV in a few years. A collapse of the oil industry is reasonably foreseeable in the extremity of our climate context The ratings agency, Fitch, has suggested the plummeting coast of EV batteries could put the oil industry into a "death spiral" (http://energypost.eu/electric-car-revolution-may-drive-oil-investor-death-spiral/) It should be a part of the analysis because it will cost Enbridge more money for insurance and therefor an appropriate topic. There is no discussion in the DEIS. This is a normal discussion for the copper-nickle mining proposals in Northern Minnesota.

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Saturday, July 08, 2017 1:03 PM
To: MN_COMM_Pipeline Comments
Subject: Re CN-14-916 and PPL-15-137

From John Munter
14860 Bruce Creek Rd
Warba, MN 55793

That the DEIS is not analyzing an 'Only MN Impacts' is a flaw. This is what MN decision-makers want to know. It is not done because it would preference SA-04 which has fewer impacts BECAUSE IT IS SHORTER for one reason over the Preferred Corridor which has more. As KTS points out on page 15 of the Final MPCA interagency comments of 2017: "The number of perennial lake/pond and perennial stream/river pipeline crossings in Minnesota are many more for the APR than for SA-04, and the total 'waterbody crossings' are about 10-12% more for MN for APR as well. That is an important fact to point out to MN stakeholders." Yup.

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Saturday, July 08, 2017 2:08 PM
To: MN_COMM_Pipeline Comments
Subject: Re CN-14-916 and PPL-15-137

From John Munter
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Paul Stolen has made a great point that economic and environmental data is still being gathered by the agencies that is highly relevant to the DEIS and to the FEIS which the public has no access to. Since this information is not in the DEIS, it will not be in the FEIS so that the public attending the next eleven Hearings around Minnesota will still have no access to it and only the lawyers in the contested case hearing will bat these aspects around. The DOC has had a second at-bat after the court ordered an EIS and all winter and they still haven't got the basics right. This is terrible public process for one under MEPA rules and requires the No Build response for a new submission by the proposer. This problem cannot be fixed without new rounds of hearings with the public given access to all the information.

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Sunday, July 09, 2017 2:22 PM
To: MN_COMM_Pipeline Comments
Subject: Re CN-14-916 and PPL-15-137

From John Munter
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WORLD OIL DEMAND

John Munter

Art Berman, the columnist guru of oil supply and demand, has long said he does not expect oil to reach 70-80$ a barrel again because of the weak world economy not producing enough demand which requires inexpensive energy to thrive. (3)

Could Berman be wrong? The DEIS thinks so in relying upon The US Energy Information Agency (EIA) which probably relies upon the International Energy Agency (IEA) in thinking so in projecting $80 per barrel oil in 2020 shooting up to $140 a barrel and peaking in 2040 with vehicular oil use declining but other uses like petrochemicals, aviation, and trucks, making up the difference and more. These agencies, though, have no track record to base a two billion dollar investment and regular oil spills upon. Here is one comment on how the EIA's prediction ability has been (http://scalinggreen.tigercomm.us/2016/03/8112/):

> **In 2005, **EIA forecast that U.S. solar power capacity would hit about 1.2 GW in 2013**. Where are we right now? According to Greentech Media, **the U.S. is closing in (if it already hasn't passed) the 10 GW mark** in solar PV capacity right about now, and that's not even counting solar thermal power generating capacity (according to this article, you can add another 1 GW or so of U.S. solar thermal power capacity). **In sum, EIA forecast 1.2 GW of U.S. solar power capacity in 2013; the actual figure is around 11 GW – nearly 10 times higher than EIA forecast!***
> **In 2005, EIA forecast that U.S. wind power capacity would reach about 9 gigawatts (GW) in 2013. Where, in fact, are we right now? According to theAmerican Wind Energy Association (AWEA), installed U.S. wind power capacity at the end of 2012 was 60 GW. Quick math: **EIA's forecast of 9 GW compared to an actual 60 GW? That's off by a factor of nearly 7!***

However, not only is Europe in the process of mandating every new house being built after 2019 having an electric vehicle recharging point built into it (4) but the two big oil increases they hang their hat on, though, are auto sales in China and India. (5) This is a problem!

Nissan is building an $8000 electric vehicle in China where EV's could be mandated with air pollution, need to import oil, and top down economy control. (6) Deutsche Bank analyst, Michael Hsueh, in refuting the IEA's high projection of oil demand in China says China will be too poor in 2035 at $10,000 USD income for one-third of its population to be auto owners. South Korea achieved that in 2003 at $17,000 USD income (7)

Hsueh goes on to even say that world oil demand will begin dropping about 2024. (8) Meanwhile, the ratings agency Fitch suggests the plummeting cost of EV batteries could put the oil industry into a "death spiral". The World Energy Council has chimed in saying world peak demand could arrive in 2030 rather than 2040 with rapid technological advances. (9) Michael Liebreich of Bloomberg's New Energy Finance estimates the oil demand crash could come as early as 2023 to 2028 if current trends don't soften. (10) Even Shell's Chief Financial Officer, Simon Henry, is quoted as saying the peak oil demand could arrive "somewhere between 5 and 15 years hence". (11) The nearest-term date of peak world oil demand comes from Carbon Tracker and the Grantham Institute in a report published in February of 2017 which concludes it will arrive in 2020 but then plateau out during the 2020's. (12)

The IEA has long been criticized as biased in under-estimating renewable energy projections as well in rejecting the idea of peak energy, and favoring US oil points of view.(13) Their 2015 "India Energy Outlook" totally ignores EV's except under 'Transport' suggesting "electric scooters" may comprise two percent of the market by 2040! The more near term forecasts of the EIA have been closer but still well of the mark with the exception of their 2010 solar projection which was off by 19,000%! (http://scalinggreen.tigercomm.us/2016/03/8112/)

Jeff St. John in greentech media (https://www.greentechmedia.com/articles/read/why-the-eias-energy-outlook-misses-the-real-value-of-green-energy) points out some logical reasons why (https://www.greentechmedia.com/articles/read/why-the-eias-energy-outlook-misses-the-real-value-of-green-energy):

- EIA fails to keep up with industry data on the rapidly falling costs of renewable technologies.
- EIA historically underestimates continuing performance improvements in terms of increasing capacity factors, or the amount of "nameplate" capacity of renewables.
- EIA's cost multipliers assume that future renewable power installations will cost more than those already built.
- Data on solar power projects excludes those smaller than 1 megawatt in size (e.g., no data on the meteoric role of rooftop PV).

With polluted cities and oil comprising 60% of their trade deficit, Indian oil minister, Piyush Goyal, has set a goal of 100% electric vehicles by 2030 where they already sell EV sedans, SUV's, and hybrids. In January of 2016 the three biggest Indian auto makers signed a pact to each design critical parts for a new electric vehicle. India could mandate EV's too. (14)

Other oil uses could be dampened by economic recessions and depressions like the worldwide recession did in 2008 when oil demand fell six percent. The world economy is poor with China limping along after a market bubble pop and over-building. It wouldn't take much of a Trumpian trade war to upset the apple cart or pop the Derivatives Bubble which is ten times the size of the global economy in shades of 2008 to reduce trade and oil demand.

The EIA and IEA haven't been following Virgin Atlantic, either, which is planning to run planes on recycled waste gases from steel making that otherwise would be vented as carbon dioxide. It estimates there is enough waste steel plant gas to make ethanol to power one fifth of current air travel bringing emissions down 65%. Increasing aviation efficiency is constant too. Virgin just bought some new airbuses that are 30% more carbon efficient. (15)

Another factor is the Saudi's keeping oil prices in the Goldilocks range to make a profit but keeping North America out of the gold diggers range. Now they're purchasing refineries like 100% of Motiva in Port Arthur, the largest US refinery at 600,000 barrels a day, and may decide to refine their own oil rather than ours. (16)

There is no economic basis to justify a new pipeline. All the major oil companies are exiting Alberta for possibly more lucrative investments in the Permian between New Mexico and Texas. Possibly they are salivating over Trump opening up off-shore oil drilling or Russian ventures. Volvo has announced plans to be 100% EV in a few years. France has announced they will only sell EV in 2040.

If the social cost of the carbon-equivalent footprint is factored into the analysis then Line 3 is more expensive and polluting than Saudi oil. Robert Howarth from Cornell calculates that fracked gas is three times more carbon-equivalent intensive than coal with twice as big a footprint as a normal gas well. (17) Satellite measurements a few years ago show a 9% and 10% methane leakage rate over the Eagle Ford and the Bakken. (18) It is this fracked gas imported from the US to Canada that heats the three units of hot water needed to produce one unit of tar sands. This is not to mention all initial gases rising and vented in these in situ Alberta

mines and processing line leaks of methane. The carbon footprint of the gas used in diluent should also be factored in which the Line 67 EIS says dilbit is MORE carbon intensive than tar sands not LESS as the DEIS claims. In fact, since the US is mandated by out-dated law to calculate methane atmospheric effects on a 100 year time scale meaning they calculate methane as only 25-33 times the footprint of carbon dioxide rather than 86 times the footprint of carbon dioxide over a 20 year period then they are using out-dated science and Minnesota should do better. The footprint of the tar sands using these two factors—methane leakage and 20 year hang time—is probably much, much more polluting than anybody guesses. Enbridge needs to be completely transparent concerning the details of their clients' emissions and carbon footprint, otherwise the obvious assumption is that their carbon footprint over Saudi oil is massive.

In lieu of answers we must just say 'No Build' to more fossil fuel infrastructure.

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(1)http://mn.gov/commerce/energyfacilities/documents/34079/10.%20CN%20Section%207%20-Forecast%20Data%204-15-15.pdf

(2)http://mn.gov/commerce/energyfacilities/documents/34079/13.%20CN%20Section%2010%20-%20Project%20Alternatives%20.pdf

(3) http://oilprice.com/Energy/Energy-General/Why-Oil-Prices-Might-Never-Recover.html

(4) https://thinkprogress.org/the-electric-vehicle-revolution-wont-be-stopped-but-a-trump-led-u-s-could-be-left-behind-59ecb56b03f5#.4xoi824or

(5) http://www.iea.org/newsroom/news/2016/november/world-energy-outlook-2016.html

(6) http://europe.autonews.com/article/20161103/ANE/161109945/renault-nissans-ghosn-eyes-$8000-ev-for-china

(7) http://www.newsmax.com/Finance/StreetTalk/Deutsche-Bank-China-oil-growth/2016/03/09/id/718312/

(8) www.marketwatch.com/story/why-we-cant-count-on-china-to-save-the-oil-market-2016-03-10

(9) https://www.bloomberg.com/news/articles/2016-10-18/batteries-may-trip-death-spiral-in-3-4-trillion-credit-market

(10) https://www.bloomberg.com/features/2016-ev-oil-crisis/

(11) https://www.bloomberg.com/news/articles/2016-11-02/europe-s-biggest-oil-company-thinks-demand-may-peak-in-5-years

(12) http://www.carbontracker.org/wp-content/uploads/2017/02/Expect-the-Unexpected_CTI_Imperial.pdf, "Expect the Unexpected: The Disruptive Power of Low-carbon Technology

(13) https://en.wikipedia.org/wiki/International_Energy_Agency , "CRITICS"

(14) https://cleantechnica.com/2016/03/29/india-lets-make-all-vehicles-electric/

(15) https://www.virgin.com/richard-branson/low-carbon-fuel-breakthrough-virgin-atlantic

(16) http://money.cnn.com/2016/03/21/investing/saudi-arabia-largest-us-oil-refinery-port-arthur/

(17) http://www.eeb.cornell.edu/howarth/summaries_CH4_2016.php

(18) https://thinkprogress.org/methane-leaks-wipe-out-any-climate-benefit-of-fracking-satellite-observations-confirm-2ac26dd30381#.d5tw7m65a

John Munter

14860 Bruce Creek Rd

Warba, MN 55793

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Monday, July 10, 2017 7:39 PM
To: MN_COMM_Pipeline Comments
Subject: Re CN-14-916 and PPL-15-137

From John Munter
14860 Bruce Creek Rd
Warba, MN 55793

Insurance and Old Line 3 Removal

No Line 3 project should go forward without adequate environmental insurance. This point was underlined by the paradigm-shifting announcement of Desjardin, the largest association of credit unions in Canada, which just announced on July 8th that it is suspending making new loans to pipeline projects and may finalize that policy in September. (https://www.yahoo.com/news/canadas-desjardins-may-stop-pipeline-loans-cites-environment-010624928--finance.html) ING, the Dutch lender, has also refused to fund pipeline construction. Recently, AP7, the largest pension fund in Sweden sold its interest in Transcanada as well.

With all these shaky developments, the future of Enbridge as a solvent company able to fund clean-up of environmental messes on into the indefinite future cannot be taken for granted. They need insurance. We are clearly in a climate situation that will not go away and the tar sands and its pipelines are easy targets to pick on.

The shakiness of the tar sands pipeline business model also underscores the point that Enbridge should pull up its old pipe now since it might not be around later to do it. The only excuse they have is to argue the pipes are too close together but that assumption has been proven erroneous. The pipelines are a little like spaghetti and there are plenty of miles of pipes which are 20 to 40 feet apart which can easily be pulled up as the Grand Rapids City Council and the Shallow lake/Sand Lake Association near Warba are calling for so they do not become a burden to land owners and municipalities with rusting, exposed pipe and possible legacy contamination. The empty pipes are at least a depressing effect on property values and land owners in Minnesota should not have to put with this. Mines and gas stations after their active life is over can't get away with this and neither should a foreign corporation like Enbridge.

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Monday, July 10, 2017 7:49 PM
To: MN_COMM_Pipeline Comments
Subject: Re: CN-14-916 and PPL-15-137

From John Munter
14860 Bruce Creek Rd
Warba, MN 55793

CN EIS MIA

MEPA on ES 3 says: "Where there is potential for significant environmental effects resulting from a major governmental action, the action shall be preceded by a detailed environmental impact statement".

The DEIS recognizes, next, that "governmental action" includes both the CN and route permit.

This means that the CN must be preceded by a “detailed environmental impact statement” as well as the route permit.

CN-14-916 is technically preceded by an EIS but there is no connection between the two of them. MEPA infers there has to be.

THERE IS NO ECONOMIC ANALYSIS IN THE DEIS INFORMING CN! Instead, "This (future) analysis, conducted by the parties in a contested case hearing, will aid the Commission in making this evaluation". So, the lawyers haggling will "aid" the Commission. But, this is not an EIS with citizen participation. This is lawyers arguing over what should have been a robust presentation of ALL the evidence and critique of ALL the criteria for the public to weigh in on.

But, not only is MN Admin Rules Chapter 7853 A) missing on the economic analysis, but B) on "prudent alternative" can be argued to have been brutalized in the abuse of SA-04, but C)"Consequences to Society of granting CN" is totally missing, and D) "fail to comply with relevant policies, rules, regulations..." is totally missing.

These above four criteria are prefaced on ES 1.3:"THE EIS EVALUATES IMPACTS AND ALTERNATIVES FOR CN DETERMINATION, UNDER MN ADMINISTRATIVE RULES CHAPTER

7853....." This should all be part of the EIS, not leaving economics for later and completely ignoring consequences to society and "policies, rules, and regulations.

7853 C, for example, in regard to "Consequences to Society" should be examining in the DEIS whether not serving the region's refineries might be a GOOD thing. Since it might mean:

1. Less air emissions around urban, polluted cities with EJ issues.
2. Would this raise the price of gasoline in PADD II? How much and for whom? Might this be a good thing in encouraging electric vehicles? Could this be mitigated for the poor if states choose with tax refunds? Compared to a 2.1 billion dollar project would a higher gas price be acceptable? Is a small gas hike better than negatively impacting all the communities in Northern Minnesota with acknowledged EJ, poverty, and environmental issues? Historically, have trains and trucks transported more tar sands in lieu of pipelines? (Assuming trucks and trains will is not an analysis but unfounded speculation.)
3. How much tar sands will actually be exported or go East out of PADD II anyway?
4. What will people do in Southern Canada if the lower percentage of lighter oils on the new Line 3 going on Line 5 cannot be refined into heating oil?

7853 D is totally absent in the DEIS in not examining possible violations of "policies, rules, and regulations" such as:

1. That which was brought forth by the DNR letter in the fifth bullet point of January 23, 2015 in the Sandpiper/Line 3 docket which makes an interesting point in regard to:

   "Minnesota Statutes 116D.04, Subdivision 6 prohibits state actions that are likely to cause pollution, impairment, or destruction of natural resources as long as there is a feasible and prudent alternative. The statute also clarifies that economic considerations alone shall not justify such an action. As SA-Applicant and SA-03 are both considered reasonable, environmental impacts of routing from a natural resources perspective would be a key criteria in the decision regarding the most reasonable and prudent System Alternative."

   Both the DNR letter and PCA letter on the same date into the Sandpiper/Line 3 docket make the argument that a Southern route is better from a natural resources perspective than the Preferred Corridor. Since the then SA-03-now SA-04 is deemed an acceptable route it would seem that Minnesota Statutes 116D.04, Subdivision 6 is contravened without the Southern route being chosen unless an extraordinary argument could be made for the lake country route.
2. Examining what tribal 'free and informed consent' from the United Nations Declaration of the Rights of Indigenous Peoples' means in regard to siting pipelines on ceded territories when there seems to be substantial opposition along with the acknowledged 'larger pattern of structural racism' and other health stressors.
3. Discussing whether a pipeline should be permitted while the connecting project of Line 5 does not have a lease from the Bad River Band in Wisconsin which can be viewed as an

   EJ issue.

4. Discussing whether the connecting projects of the tar sands present cultural genocidal issues or genocidal issues without the Cree and Dene First Nations being able to hunt, fish, and gather without fear of cancer and while higher rates of unusual cancers have been documented in the Fort Chipewyan area.
5. Discuss why Minnesota Statute 216H.02 Greenhouse Gas Emissions Control, Subdivision 1, Greenhouse Gas Emission –Reduction Goal has not yet been applied to tar sands being transported through the State since the State is falling behind in meeting its reduction goals.

Levi, Andrew (COMM)

From: John Munter <mumooatthefarm@yahoo.com>
Sent: Monday, July 10, 2017 11:51 PM
To: MN_COMM_Pipeline Comments
Subject: Re CN-14-916 and PPL-15-137

From John Munter
14860 Bruce Creek Rd
Warba, MN 55793

Missing Studies:

With the Kalamazoo and Yellowstone River spills we need to have worst case modeling of the Mississippi River crossings, Red River, Straight River, and LaSalle Creek.

There should be a slope study done in regard to run-off and construction as well as spill spread potential.

Response time study

Discovery of spill time study

Invasive species study (not just a list from an encyclopedia)

wild rice watershed study

study of pipe distances for removal or for more detailed research

Survey consequent upon that of property owners attitudes towards removal

Connected projects study

EJ issues in connected actions like Detroit and Port Arthur TX refinery emissions and Alberta and Bad River Band in WI

Levi, Andrew (COMM)

From: janet murphy <raven8jm@yahoo.com>
Sent: Monday, July 10, 2017 6:13 PM
To: MN_COMM_Pipeline Comments
Subject: RE: Line 3 DEIS in Dockets CN-14-916 and PPL-15-137

Dear Jamie MacAlister,

RE: Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

The Line 3 Pipeline concerns me because it is not needed and if approved it will have adverse environmental impacts that cannot be fully migrated.

DEIS concerns:
4.1 Description of Alternatives did not give clear or viable alternatives for green –clean energy, therefore the DEIS is not complete.

I strongly support and recommend that the Department of Commerce deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Sincerely,

Janet Murphy
Moorpark, California

Levi, Andrew (COMM)

From: Michalel Murray <mmurray2412@gmail.com>
Sent: Thursday, July 06, 2017 10:43 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Regarding Docket numbers CN-14-916 and PPL-15-137:

As a resident of northern Wisconsin, working in Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project.

I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3.

No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS.

Please keep the EIS timeline to the statutory deadline of 280 days.

The prompt replacement of Line 3 is an essential project for Minnesotans that will ensure the safety and environmental protection of our important natural resources as well as the continued safe transportation of crude oil to refineries in Minnesota, the Midwest and beyond.

Sincerely,

Michalel Murray
7088 S Cleveland Rd
Lake Nebagamon, WI 54849
mmurray2412@gmail.com

Levi, Andrew (COMM)

From: Helena Myers <hdaymyers@gmail.com>
Sent: Friday, June 23, 2017 1:17 PM
To: MN_COMM_Pipeline Comments
Subject: proposed pipeline through St. Croix River watershed

To Jamie MacAlister,

Please protect this pristine area of MN and WI. An oil pipeline is pending disaster to this natural environment and our water. It is horrifying to think of oil spills which occur and destroy the water and water life for decades.

The proposed pipeline is not even good economics when we are developing alternative clean sources of power, i.e.. wind and solar.

This proposal is simply greed by investors.

STOP THIS PROPOSED OIL PIPELINE.

Sincerely,
Helena Myers
9 Butternut Falls Tr,N,
Marine on St. Croix, MN 55047

Levi, Andrew (COMM)

From: Dave Myers <David.Myers@enbridge.com>
Sent: Monday, June 26, 2017 8:18 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 DEIS

Hello,

My name is Dave Myers. I live in Cohasset, MN. I fully support Enbridge's line 3 replacement project. The DEIS is very thorough. We use petroleum projects in virtually every aspect of life. There is no reason not to allow this project to happen. New technology will allow the products to transported in the most environmentally friendly and safest manor known. The overwhelming majority of people in our state are also in favor. Thank you for your time and effort put into the DEIS.

Dave Myers
Mechanicall Technician, Deer River
—
ENBRIDGE
TEL: 218-246-8570 | CELL: 218-398-0308
30879 Enbrige Ave, Deer River, MN 56636

enbridge.com
Integrity. Safety. Respect.

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Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Miranda I Myers	218-999-7303	clam55721@yahoo.com

ADDRESS
26580 Alandale Dr

CITY, STATE, ZIP
Cohasset, MN 55721

COMMENTS
We use products from petroleum everyday.
I support the Line 3 replacement project; as I trust the research and believe in its effort.

DECLARE THE EIS ADEQUATE WITHIN 120 DAYS

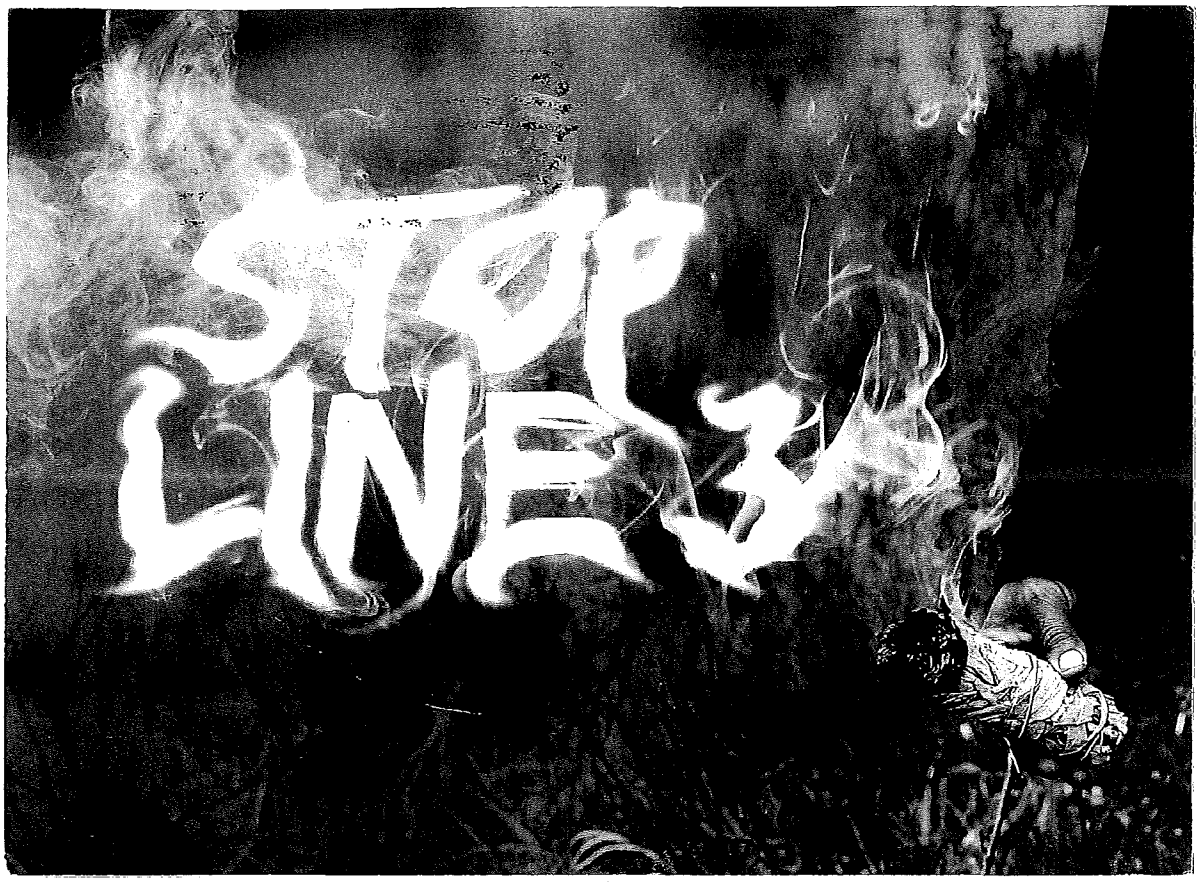

DEAR DEPARTMENT OF COMMERCE
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

I am worried about the sex trafficking that comes with pipeline construction

Please do not rush into building a new pipeline without addressing the consequences

SINCERELY, Joan
Coon Rapids MN

USA FOREVER 2016

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

55101+2198

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Ed Wardone

Street Address: 501 River Road #305

City: Grand Rapids State: MN Zip Code: 55744

Phone or Email: edwardone@hotmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I'm concerned about wildlife, pets and livestock. I'm also worried like everyone oil will get into public water. Toxic chemicals might get into our food and water system. I'm worried they want to build more pipelines that run under more lakes and rivers. I live on the mississippi. my parents live on a lake. I'm an environmentalist and animal rights activist. I'm getting concerned about climate change

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Narigonia . <narigonia@gmail.com>
Sent: Sunday, July 09, 2017 2:55 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Energy's Line 3

To Whom it May Concern,

I am writing to express my concern with the proposed construction of Enbridge Energy's Line 3 tar sands oil pipeline and the DEIS (CN-14-916 and PPL-15-137).

While there are a number of factors of the proposal that alarm me, my top concern is over the social cost of the carbon that would result from this project.

The DEIS estimates that the building of this pipeline could result in a cost as high as $287 billion over 30 years. Not only is this crazy high, but it's an estimate that only takes into consideration the shortest possible lifespan of the pipeline.

The DEIS must be updated to include an estimate of the climate cost that a pipeline in operation for 60 years or longer will have. Only then will the DEIS fully capture the impact that this pipeline will have on our state.

Thank you for your time.

Amelia Narigon
Minneapolis, MN

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Pat Nassing		
ADDRESS: 16211 US Hwy 169		
CITY, STATE, ZIP: Winnebago, MN 56098		

COMMENTS I support the Line 3 replacement project

DECLARE THE EIS ADEQUATE WITHIN 180 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: SHARON NATZEL <sorgwweh@aol.com>
Sent: Monday, July 10, 2017 10:50 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)
Attachments: Public Comments Line 3 Project by Sharon Natzel.pdf; Public Comments Line 3 Project by Sharon Natzel.pdf

Dear Jamie MacAlister, Environmental Review Manager,

Attached are my comments for the first Draft Encironmental Impact Statement in the State of MN for a Pipeline!

Thank you for the opportunity to comment on this.

Sincerely,
Sharon Natzel

Sharon Natzel
13623 County 20
Park Rapids, MN 56470

July 10, 2017

Jamie MacAlister
Environmental Review Manager
MN Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Subject: Docket Nos. CN-14-916 and PPL-15-137; Public Comment: Line 3 Project (C-14-916 and PPL-15-137)

Dear Jamie MacAlister, Environmental Review Manager,

In the Public Comment Period announcement, the public was encouraged to identify what could be improved in the EIS? What is unclear? What is missing? Here are my findings from review of the Draft Environmental Impact Statement. My comments pertain primarily to Chapters 5, 6, 7, 9, 11 for economic and environmental concerns plus Chapter 12 for cumulative effects.

What is missing and therefore could be improved upon is the following for all for economic, environmental and cumulative effects….

1. The Minnesota Pipe Line Company, LLC website states that there are 4 lines currently which run from Clearbrook to the Twin Cities and can transport 465,000 barrels of crude oil today. Their website further states it is the primary pipeline system supplying the Twin Cities Refineries. In Chapter 12, pg 7-8, the upgrade of the pump stations in MPL Reliability Project will increase throughput 185,000 barrels per day and be completed before Line 3 Replacement (L3R) would be anticipated to begin. This additional capacity that will be available for MN isn't taken into account in the Certificate of Need. If the Twin Cities refineries are gaining additional oil for their existing capacity, is the L3R additional capacity actually needed for MN or is the current constrained throughput of L3R adequate? The US Dept of Energy data shows that there are 2 refineries servicing MN. So the upgrade projection of oil to Superior through L3R is not needed for these 2 MN refineries based on the oil supply pipe lines depicted on Minnesota Pipe Line Company, LLC website; the supply pipe lines are from Clearbrook.

2. Given that there are 4 MPL pipes in the pipeline right-of-way already from Clearbrook to Park Rapids, and the L3R project seeks to establish a new corridor from Clearbrook to Superior, WI by placing L3R pipeline into the corridor from Clearbrook to Park Rapids (Chapter 8, item 9 for an additional pipeline addition after L3R), it is apparent that the argument used for the new proposed L3R because if replaced in place Line 3 is in the middle of the established Enbridge Mainline System, hasn't been thought thoroughly out and represented adequately in the DEIS. What is occurring is that the 4 MPL pipes will begin to be boxed in at least on one side by L3R and maybe others added to the "new" corridor making it more difficult to work on the MPL pipes and soon MPL will be in the same predicament as Enbridge mainline system. One of the MPL pipelines is from 1950's era currently according to their website. The L3R project proposed route is creating a new problem for the existing MPL established mainline system because they will be faced with the same dilemma as Enbridge when they go to replace the aged pipeline if the proposed L3R project is approved. The MPL will have at least one additional pipe to reach over in order to repair or replace pipes in their existing right-of-way. Will the MPL Company be then forced to "abandon" in place one of their old aged pipelines from the 1950's because of the proposed L3R making it risky to repair / replace in place their own ? The cumulative impacts also are not adequately covered for these scenarios.

3. RA-07 is not given adequate cost benefit analysis for the environment. RA-07 replaces Line 3 in place by removing the pipe and adding new. This is a great environmental benefit long term to the State of MN. The text

in the various chapters depicts the "costs" to environment of doing RA07 being as great as proposed route. It appears that the "picture" being painted is for the proposed L3R route. Since the pipes in the mainline corridor are aging, the additional space and damage to forests and potential purchase of homes in the immediate work zone could be utilized as a benefit to keep the mainline system routes intact in MN for the future without moving to a new proposed corridor now and into the future. This protects the MPL environment with its last pipeline built in 2008 xwhich supplies the two MN refineries and reduces the risk to MN in general. The existing mainline system corridor pipelines could be groomed for easy replacement over time through the Line 3 Replacement project, executed "in place". The growth of contaminated sites would be minimized too with containment hopefully in the existing corridor since there are likely spots that will be discovered during the replacement project.

4. Adding RSA-53 to RA-07 makes it very attractive as the second best option to SA04. RSA-53 also lacked substantial analysis. By utilizing RSA 53, along with RA-07 there are a number of factors that are minimized in both the environmental and economics realm. This is important and needs to be looked at from a long-term mainline system replacement plan perspective.

5. SA-04 is not analyzed well from an economic and environmental perspective. The oil company right-of-ways followed by the proposed alternative route are not depicted nor used in the analysis. The widths for right-of-ways are not "apples to apples" comparisons for L3R. The contaminated area numbers should not be a factor for a pipeline being laid in a pipeline right-of-way portion as is the case for SA-04. The oil product flowing in the pipe is not affected by the contaminated soil. It is likely that the number of contaminated sights is high because SA-04 crosses multiple states and is on oil company's ROW which would have higher numbers of contamination over time due to spills / leaks. The Alliance Pipeline is followed by SA-04 for a large portion of the proposed route. On the Alliance Pipeline website, it says it is owned by Alliance Pipeline L.P. (Alliance USA) who owns the US portion of the Alliance Pipeline System. Sponsors of Alliance USA are affiliates of Enbridge Income Fund Holdings, Inc (50%) and Venesen Inc (50%). The right-of-way data for SA-04 could be analyzed using information from Alliance USA. https://www.alliancepipeline.com/about us/documents/maps/marketdeliverymap.pdf

6. Water Quality is not addressed adequately in a qualitative or quantitative manner.

    a. There is data available that is being ignored that could enable improved education / decision-making. There are many citizen water quality monitors who sample the lakes and streams not only in Hubbard County but also across the state of MN. The clarity measure is done with the secchi disk provided by the MPCA. The water samples gathered by the citizen monitors using the 2-meter integrated sampler plus phosphorous and chlorophyll-a water samples are taken monthly and are analyzed by RMB Environmental Laboratories each month, May through Sept. Hubbard County lakes just celebrated 20 years of water, including Twin Lakes which you have a spill scenario for. The 20 year report will be available at the end of August 2017. The 15-year report for 39 Hubbard County lakes is found at this link: `http://www.hubbardcolamn.org/uploads/3/4/5/6/34563649/hubbard_county_summary.pdf.

    b. Several lakes in Hubbard County monitor for Dissolved Oxygen and Temperature of the water column at one meter increments to the bottom of the lakes to determine how the fish are doing. Suspended Solids are tracked along with Nitrates and Chloride on some lakes.

    c. There is also a Biotic Index of Invertebrate used to determine the health of the body of water based on the animals it contains that are useful. http://www.pspb.org/water/media/BioticIndexCard.pdf

Thank you for the opportunity to comment on Minnesota's first Draft Environmental Impact Statement for a Pipeline.

Sincerely,

Sharon Natzel

Sharon Natzel
13623 County 20
Park Rapids, MN 56470

July 10, 2017

Jamie MacAlister
Environmental Review Manager
MN Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Subject: Docket Nos. CN-14-916 and PPL-15-137; Public Comment: Line 3 Project (C-14-916 and PPL-15-137)

Dear Jamie MacAlister, Environmental Review Manager,

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in the various chapters depicts the "costs" to environment of doing RA07 being as great as proposed route. It appears that the "picture" being painted is for the proposed L3R route. Since the pipes in the mainline corridor are aging, the additional space and damage to forests and potential purchase of homes in the immediate work zone could be utilized as a benefit to keep the mainline system routes intact in MN for the future without moving to a new proposed corridor now and into the future. This protects the MPL environment with its last pipeline built in 2008 xwhich supplies the two MN refineries and reduces the risk to MN in general. The existing mainline system corridor pipelines could be groomed for easy replacement over time through the Line 3 Replacement project, executed "in place". The growth of contaminated sites would be minimized too with containment hopefully in the existing corridor since there are likely spots that will be discovered during the replacement project.

4. Adding RSA-53 to RA-07 makes it very attractive as the second best option to SA04. RSA-53 also lacked substantial analysis. By utilizing RSA 53, along with RA-07 there are a number of factors that are minimized in both the environmental and economics realm. This is important and needs to be looked at from a long-term mainline system replacement plan perspective.

5. SA-04 is not analyzed well from an economic and environmental perspective. The oil company right-of-ways followed by the proposed alternative route are not depicted nor used in the analysis. The widths for right-of-ways are not "apples to apples" comparisons for L3R. The contaminated area numbers should not be a factor for a pipeline being laid in a pipeline right-of-way portion as is the case for SA-04. The oil product flowing in the pipe is not affected by the contaminated soil. It is likely that the number of contaminated sights is high because SA-04 crosses multiple states and is on oil company's ROW which would have higher numbers of contamination over time due to spills / leaks. The Alliance Pipeline is followed by SA-04 for a large portion of the proposed route. On the Alliance Pipeline website, it says it is owned by Alliance Pipeline L.P. (Alliance USA) who owns the US portion of the Alliance Pipeline System. Sponsors of Alliance USA are affiliates of Enbridge Income Fund Holdings, Inc (50%) and Venesen Inc (50%). The right-of-way data for SA-04 could be analyzed using information from Alliance USA. https://www.alliancepipeline.com/about us/documents/maps/marketdeliverymap.pdf

6. Water Quality is not addressed adequately in a qualitative or quantitative manner.

    a. There is data available that is being ignored that could enable improved education / decision-making. There are many citizen water quality monitors who sample the lakes and streams not only in Hubbard County but also across the state of MN. The clarity measure is done with the secchi disk provided by the MPCA. The water samples gathered by the citizen monitors using the 2-meter integrated sampler plus phosphorous and chlorophyll-a water samples are taken monthly and are analyzed by RMB Environmental Laboratories each month, May through Sept. Hubbard County lakes just celebrated 20 years of water, including Twin Lakes which you have a spill scenario for. The 20 year report will be available at the end of August 2017. The 15-year report for 39 Hubbard County lakes is found at this link: `http://www.hubbardcolamn.org/uploads/3/4/5/6/34563649/hubbard_county_summary.pdf.

    b. Several lakes in Hubbard County monitor for Dissolved Oxygen and Temperature of the water column at one meter increments to the bottom of the lakes to determine how the fish are doing. Suspended Solids are tracked along with Nitrates and Chloride on some lakes.

    c. There is also a Biotic Index of Invertebrate used to determine the health of the body of water based on the animals it contains that are useful. http://www.pspb.org/water/media/BioticIndexCard.pdf

Thank you for the opportunity to comment on Minnesota's first Draft Environmental Impact Statement for a Pipeline.

Sincerely,

Sharon Natzel

Levi, Andrew (COMM)

From: Lisa Nebenzahl <lnebenzahl@earthlink.net>
Sent: Monday, July 10, 2017 10:28 PM
To: MN_COMM_Pipeline Comments
Subject: RE: CN-14-196 and PPL15-137

RE: CN-14-196 and PPL15-137

This proposed line directly threatening watersheds connected to the largest and the only certified organic wild rice lakes in Minnesota. This is a bad investment which needs much more study because it threatens our water. This Canadian company gets all the benefit and Americans get all the risk. In addition Enbridge needs to clean up all it's old pipe not just walk away and leave it in the ground for future generations. Please do not poison generations to come.

Thank you,
Lisa Nebenzahl
Richfield, MN

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Andrew Neft	218-647-8408	
ADDRESS		
36299 Corral Rd NE		
CITY, STATE, ZIP		
Kelliher, Mn 56650		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

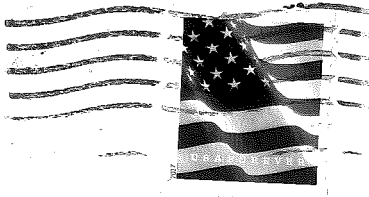

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Courtney Neifert <ckneifert@gmail.com>
Sent: Monday, July 10, 2017 5:01 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge should honor the people and lands of MN

I have researched Enbridge and found these concerning details on Wikipedia:

1) "Using data from Enbridge's own reports, the Polaris Institute calculated that 804 spills occurred on Enbridge pipelines between 1999 and 2010. These spills released approximately 161,475 barrels (25,672.5 m^3) of crude oil into the environment." https://line9communities.com/history-of-enbridge-spills/

2) In 2009, Enbridge Energy Partners, a U.S. affiliate of Enbridge Inc., agreed to pay $1.1 million to settle a lawsuit brought against the company by the state of Wisconsin for 545 environmental violations.[29] In a news release from Wisconsin's Department of Justice, Attorney General J. B. Van Hollen said "...the incidents of violation were numerous and widespread, and resulted in impacts to the streams and wetlands throughout the various watersheds".The violations were incurred while building portions of the company's Southern Access pipeline, a project to transport crude from the oil sands region in Alberta to Chicago. http://www.duluthnewstribune.com/content/enbridge-fined-wisconsin-wetlands-damage

Pipelines are hard to stop, but if they are going to be approved, the state should demand Enbridge satisfy the wishes of Minnesotans, even though it will cost the company more. Our state should protect the people, including Native Americans, even though their population is small in number. Our state should protect it's precious land and waters.

Line 3 will do little to help Minnesotans- temporary jobs for some, ongoing jobs for few. We will consume little of the energy flowing through the pipes but pay dearly when they leak. Our state should invest in renewable energy and ask fossil fuel and other hazardous waste companies to pay their fair share of the environmental and health impacts of their activities.

Line 3 will help Enbridge make more money for itself and its stock shareholders. Enbridge can afford to build, maintain and inspect regularly a safe pipeline across/under land Minnesotans agree is appropriate while following all environmental regulations.

From: https://www.thestreet.com/quote/ENB/details/financials.html

Net Income From Total Operations 2016= $1.71 Billion
Stock Price per share 7/10/17= $39.80
Stock Dividend per share 7/10/17= $1.59

Thank you for taking our comments.
Respectfully,
Courtney Neifert, Baxter, MN

Levi, Andrew (COMM)

From: Courtney Neifert <ckneifert@gmail.com>
Sent: Monday, July 10, 2017 5:00 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge should honor the people and lands of MN

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1) "Using data from Enbridge's own reports, the Polaris Institute calculated that 804 spills occurred on Enbridge pipelines between 1999 and 2010. These spills released approximately 161,475 barrels (25,672.5 m^3) of crude oil into the environment." https://line9communities.com/history-of-enbridge-spills/

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Net Income From Total Operations 2016= 1.71
Stock Price per share 7/10/17= $39.80
Stock Dividend per share 7/10/17= $1.59

Thank you for taking our comments.
Respectfully,
Courtney Neifert, Baxter, MN

~~Ken Lea~~ Kristin Neises

Start with old Line 3-
I don't trust Enbridge to clean, pig out, & plug the old pipelines, they have been proven to lack integrity at other times, (Cass Lake leak) so the MPCA needs to monitor & report the pipelines to a much greater extent.
There should be scientific studies done regarding soil samples & water samples.
Enbridge should be forced to clean those up before they even think about new projects.

~~cleanup + removal of the old old line 3 would also create many jobs.~~

Don't leave your junk in our backyard!

The old corroded, leaking pipes should be totally removed. If Enbridge doesn't want to pay $1.2 billion to clean it up, who will? ~~The~~

Removal will create many temporary jobs, as well.

The jobs created by new line 3 will disappear to "0" after the proposed Line 3 is finished.

Proposed New Line 3

Is most impactful to disturbing wild rice beds & other areas of biodiversity. It goes right under the beginning of the Mississippi River. One leak will ruin the river all the way down to the Gulf of Mexico.

The 30 year social cost of carbon ~~reforce climate change is~~ > ~~$1.28 billion~~ ~~$1.5 million~~ $670 million.

Instead of pumping dirty oil, why doesn't Enbridge pump money into a sustainable world & clean energy.

There were several broken links in the DEIS, Including a link regarding impact to Native Americans. There is a disproportionately negative impact to Native Americans.

From: katy neitzke
To: MN_COMM_Pipeline Comments
Subject: St. Croix River and water shed
Date: Monday, June 12, 2017 1:34:10 PM

To whom it may concern,

Just NO…..No to Unbridge Line 3.

Do not increase the oil flow across our beautiful waterways.
In fact, if the infrastructure for this pipe line is obsolete, shut it down.
Get rid of it entirely. This planet can not continue to sustain the human implications now.
Keep it in the ground to begin with.

Minnesota and Wisconsin are some of the best outdoor playgrounds in our country.
Do you want to vacation where there is oil on the ground and in the water? I don't.
Is it really worth it to line the pockets of the oil companies in order to move oil?
Do you think big oil is going to care if our backyards are ruined? Nope.
I feel like they only care about the bottom line.

It is a matter of time when there will be a spill. It is not worth the price to clean it up….if you can ever clean it up.
Don't allow an expansion of this oil line.

Katherine Neitzke
Cabin owner in Minnesota
Resident of Wisconsin
715-377-6579

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Robert A. Nelson		
ADDRESS		
SHEVLIN 27341 330 ST		
CITY, STATE, ZIP		
Shevlin, Mn. 56676		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Jamie Nelson

Street Address: 23636 180th Ave NW

City: Viking State: MN Zip Code: 56760

Phone or Email: 218-889-6842

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I support the L-3 Project. Oil is something the country need, we need cheap oil. pipelines are the cheapest and safest form of trans portation. Don't let a small minority decide every one else's fate. Approve the project !!

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Molly Tranel Nelson <missmolly102@hotmail.com>
Sent: Monday, July 10, 2017 12:38 PM
To: MN_COMM_Pipeline Comments
Subject: docket numbers CN-14-916 and PPL-15-137

As a citizen of Minnesota, I am very concerned about the proposed new Enbridge line 3 pipeline

My first concern is that routes are proposed that are out of the existing pipeline footprint. The only way to really minimize impacts to environmental resources is by not disturbing new areas. For this reason, using the existing pipeline right of way makes the most sense and does the most to protect the environment.

My second concern is that proposed routes impact several American Indian tribal communities and some of the highest quality water resources in the state, including important wild rice areas.

The only alternative that should be considered is use of the existing right of way where the current Line 3 pipeline resides.

Thank you,

Molly Nelson

Line 3 Replacement Project DEIS

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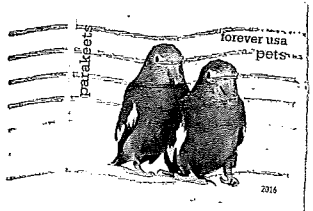

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
KENT Nelson		
ADDRESS: 30521 Cty 33		
CITY, STATE, ZIP: Akeley MN 56433		

COMMENTS

Fully Support, AS THE Majority do.

THE POST OFFICE Returned THIS So I put it in the Evelope. You SHould file a Complaint if THIS IS Common. Kent Nelson

DECLARE THE EIS ADEQUATE WITHIN 180 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

BEMIDJI MN 566 PM

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Alan C Nelson	2186370500	countrygrocery@gmail.com

ADDRESS: 11558 500th St

CITY, STATE, ZIP: Gonvick MN

COMMENTS: The Line 3 Pipline crosses my Farm very close to my home (300 yards Aprox?. Our Country Needs Petroleum! Wishing it does not dosn't Change The Facts! Stop delaying this important project! Our Country Runs on Oil! Lets Keep it Running

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: A. E. Ness <alyssa.e.ness@gmail.com>
Sent: Monday, July 10, 2017 11:11 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

To whom it may concern:

Regarding CN-14-916 and PPL-15-137, please do not allow this line to put our watersheds at risk. In crossing the Mississippi and the Lake Superior watersheds in Minnesota as well as Anishinaabe territory, we put at risk two of our great bodies of water in this state.

They say that water is the new oil; I'm not sure if this is fully true yet, if we keep feeling the need to prioritize oil needs over water security, but please consider the safety of our watersheds of the utmost importance. We all want to have safe, clean, good places to live, work, and play; I can recognize the economic and "energy needs" pull of oil, but would rather not imagine or have to face the potential consequences, as minuscule as the risks may seem; please keep in mind that a small percent chance is a far cry from a zero percent chance.

Thank you for your careful consideration of this and other comments.

Best regards,

Alyssa Ness
Lifelong Minnesotan, dependent on clean water

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Paul E. Netland	218-694-6370	
ADDRESS		
29501 201st Ave.		
CITY, STATE, ZIP		
Bagley, MN 56621		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

ST PAUL MN 551
14 JUN 2017 PM 6 T

USA FOREVER

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Kirsch, Raymond (COMM)
Sent: Monday, July 10, 2017 3:52 PM
To: MN_COMM_Pipeline Comments
Cc: Kirsch, Raymond (COMM)
Subject: FW: Enbridge Pipeline #3 request giving landowners option for removal per Grand Rapids City Council request

---

From: Patricia Neuman [mailto:neuman@mnstate.edu]
Sent: Monday, July 10, 2017 2:26 PM
To: Kirsch, Raymond (COMM) <raymond.kirsch@state.mn.us>
Subject: Enbridge Pipeline #3 request giving landowners option for removal per Grand Rapids City Council request

Dear Mr. Kirsch,
We own homestead property in Grand Rapids that the Enbridge pipeline #3 crosses for multiple acres and is scheduled for abandonment. We are asking your support for giving landowners the option for pipe removal.

Abandoned pipelines have a history of legacy contamination under them, which might be rusting out and changing water flow as well as becoming exposed. We have roughly 16 acres of open and wooded city property tied up because of the pipeline running the entire length. To my knowledge this is the largest piece of residential property in the city which is now heavily devalued & limited in use because of the pipeline. The pipeline not only critically devalues and limits the use of this beautiful piece of property but also severely threatens the environment, the nearby lakes, and water. And certainly exposed pipe which is an eventual likelihood, creates its own set of problems. We had already experienced some problems over the years. As a landowner we have no means of dealing with the known dangers of leaving the pipeline in place and urgently request your assistance in holding Enbridge responsible for giving landowners the option of pipe removal, returning the land to a safe state.

Please also note that we support, and request your support, for the Grand Rapids City council request that the pipeline be removed. Thank you, Paul and Patricia Neuman. 201 NW 17th St. , Grand Rapids MN 55744. 218-301-9540

Levi, Andrew (COMM)

From: MacAlister, Jamie (COMM)
Sent: Monday, July 10, 2017 5:08 PM
To: MN_COMM_Pipeline Comments
Subject: FW: Enbridge pipeline property owner concerns

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280, Saint Paul, MN 55101
P: 651-539-1775

CONFIDENTIALITY NOTICE: This message is intended only for the use of the individual(s) named above. Information in this e-mail or any attachment may be confidential or otherwise protected from disclosure by state or federal law. Any unauthorized use, dissemination, or copying of this message is prohibited. If you are not the intended recipient, please refrain from reading this e-mail or any attachments and notify the sender immediately. Please destroy all copies of this communication.

From: Patricia Neuman [mailto:neuman@mnstate.edu]
Sent: Monday, July 10, 2017 2:21 PM
To: MacAlister, Jamie (COMM) <jamie.macalister@state.mn.us>
Subject: Enbridge pipeline property owner concerns

Dear Jamie,

We own homestead property in Grand Rapids that the Enbridge pipeline #3 crosses for multiple acres and is scheduled for abandonment. We are asking your support for giving landowners the option for pipe removal.

Abandoned pipelines have a history of legacy contamination under them, which might be rusting out and changing water flow as well as becoming exposed. We have roughly 16 acres of open and wooded city property tied up because of the pipeline running the entire length. To my knowledge this is the largest piece of residential property in the city which is now heavily devalued & limited in use because of the pipeline. The pipeline not only critically devalues and limits the use of this beautiful piece of property but also severely threatens the environment, the nearby lakes, and water. And certainly exposed pipe which is an eventual likelihood, creates its own set of problems. We had already experienced some problems over the years. As a landowner we have no means of dealing with the known dangers of leaving the pipeline in place and urgently request your assistance in holding Enbridge responsible for giving landowners the option of pipe removal, returning the land to a safe state. Please also note that we support, and request your support, for the Grand Rapids City council request that the pipeline be removed. Thank you, Paul and Patricia Neuman. 201 NW 17th St. , Grand Rapids MN 55744. 218-301-9540

Levi, Andrew (COMM)

From: George, Kevin (PUC)
Sent: Wednesday, July 12, 2017 9:49 AM
To: MN_COMM_Pipeline Comments
Cc: MacAlister, Jamie (COMM); Kirsch, Raymond (COMM)
Subject: FW: Enbridge pipeline #3- request for support of landowner option of removal as per Grand Rapids City Council request

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Jamie, Ray,

Not sure if Ms. Neuman also sent this comment to you. I was out of the office Monday afternoon and yesterday and didn't see this. It's dated July 10, however.

Kevin

Kevin George
Minnesota Public Utilities Commission
121 7th Place East, Suite 350 | St. Paul, MN 55101
(651) 201-2251 | Kevin.George@state.mn.us | mn.gov/puc/

From: Patricia Neuman [mailto:neuman@mnstate.edu]
Sent: Monday, July 10, 2017 2:31 PM
To: George, Kevin (PUC) <kevin.george@state.mn.us>
Subject: Enbridge pipeline #3- request for support of landowner option of removal as per Grand Rapids City Council request

Dear Mr. George,
We own homestead property in Grand Rapids that the Enbridge pipeline #3 crosses for multiple acres and is scheduled for abandonment. We are asking your support for giving landowners the option for pipe removal.

Abandoned pipelines have a history of legacy contamination under them, which might be rusting out and changing water flow as well as becoming exposed. We have roughly 16 acres of open and wooded city property tied up because of the pipeline running the entire length. To my knowledge this is the largest piece of residential property in the city which is now heavily devalued & limited in use because of the pipeline. The pipeline not only critically devalues and limits the use of this beautiful piece of property but also severely threatens the environment, the nearby lakes, and water. And certainly exposed pipe which is an eventual likelihood, creates its own set of problems. We had already experienced some problems over the years. As a landowner we have no means of dealing with the known dangers of leaving the pipeline in place and urgently request your assistance in holding Enbridge responsible for giving landowners the option of pipe removal, returning the land to a safe state.

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Levi, Andrew (COMM)

From: MacAlister, Jamie (COMM)
Sent: Wednesday, July 19, 2017 12:01 PM
To: MN_COMM_Pipeline Comments
Subject: FW: Stop Line 3 Abandonment

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280, Saint Paul, MN 55101
P: 651-539-1775

CONFIDENTIALITY NOTICE: This message is intended only for the use of the individual(s) named above. Information in this e-mail or any attachment may be confidential or otherwise protected from disclosure by state or federal law. Any unauthorized use, dissemination, or copying of this message is prohibited. If you are not the intended recipient, please refrain from reading this e-mail or any attachments and notify the sender immediately. Please destroy all copies of this communication.

-----Original Message-----
From: Darren Neuman [mailto:neum0072@hotmail.com]
Sent: Tuesday, June 06, 2017 6:47 PM
To: MacAlister, Jamie (COMM) <jamie.macalister@state.mn.us>
Cc: Darren Neuman <neum0072@hotmail.com>
Subject: Stop Line 3 Abandonment

Mr Macalister:
I am opposed to abandonment of any pipeline in MN until an approved regulatory strategy is in place to ensure protection of our environment, communities, and citizens. The certificate of need docket is cn-14-916 and the route permit docket is ppl-15-137.
Thank you,
Darren Neuman
Grand Rapids, MN

Levi, Andrew (COMM)

From: Cecelia Newton <newton.cecelia@gmail.com>
Sent: Friday, July 07, 2017 3:04 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

To Whom I May Concern,

I am a retired teacher that is concerned with the effects of climate change on the students I taught from 1975 to 2005 in Minneapolis. The DEIS does not consider the possibility of shutting down the current line 3 and constructing no alternative line as a way to support our commitment to climate mitigation goals set by Minnesota legislature.

Cecelia Newton
5516 Irving Ave. S.
Minneapolis, MN. 55419

M. L. Nicholas
906 6th St. W
Hastings, MN 55033

RECEIVED
JUL 14 2017
MAILROOM

Ray Kirsch, Public Advisor
Dept. of Commerce, Energy Review and Analysis
85 7th Place East
St. Paul, MN 55101-2198

10 July 2017

Mr Kirsch

I called this morning to say No. You asked that I jot down my reasons and have it mailed today with today 10 Jul 2017 post mark. So I scanned thru all the info I had received re my Minnesota "A guide to the Line 3 Project Public meetings for the Draft Environmental Impact Statement (EIS) June 2017

CN-14-916 and PPL-15-137

1) Enbridge - History of being a responsible, honorable and/or reliable is horrific and always has been able to get out of or have greatly reduced penalties.

2) Land owners not only today but for years in the future will be responsible for the left behind residue (not sure if the correct term but it will be the landowner not the state, county and/or Enbridge - financially UNLESS very Explicit terms to cover every possible possibility is addressed in a new final statement, which

which includes Enbridge is responsible for all costs involved with removing the old line and May Not abandoned

3) I mentioned trucks & see they are too expensive ??

4) What keeps Enbridge - going Bankrupt and/or changing its name. I read they are a Canadian Company who took over from previous owners

5) Safety issues - look at Kalamazoo MI our oldest son once lived in Kalamazoo

6) Need for fuel for automobiles - look at the increase in battery not fuel powered vehicles, young people opting to rent a car versus owning a car.

7) Sex trafficing / Drug problems are finally being made aware of - big money for the pimps + providers - for the employees at sites away from family and away from nearby towns, etc.

8) Greed and Power by too many who have friend who can help with the "Wink, Wink"

There are others but I have other things I need to do today!

Levi, Andrew (COMM)

From: Robin Nicholson <rcrwnicholson@yahoo.com>
Sent: Saturday, July 08, 2017 4:19 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3

To Whom It May Concern,
I am a citizen of Minnesota.
I do not think the DEIS has not shown adequate concern for oil spill safety and other environmental concerns. It violates some some existing rules: MN Statute 103F.305 Scenic River Protection Policy and MN statute 116D.02 Declaration of State Environmental Policy.
All pipeline spill. Why or how can a state even consider allowing this to happen in our state of so many lakes, rivers, marshes, etc.? review the NO BUILD option. Our world is moving away from fossil fuels. Minnesota should do the same.
Thanks for your consideration,
Sincerely,
Robin Nicholson

Levi, Andrew (COMM)

From: Libby Nickel Baker <libby.nickel@gmail.com>
Sent: Wednesday, June 14, 2017 4:55 PM
To: MN_COMM_Pipeline Comments
Subject: Milaca Meeting re: Enbridge Pipeline

Hello-

I'm just writing to ask if anyone bothered to consult anyone in Mille Lacs County about when would be the best time to schedule these meetings to ensure education for residents of Milaca and surrounding areas about the new pipeline that might be built in their backyard.

It is, of course, a rhetorical question.

Milaca is the county seat of Mille Lacs County. Milaca's Gateway to the Northland festival parade, a parade attended by thousands of people, a parade that draws 20+ marching bands from all over the state of Minnesota just happens to start 30 minutes before the Enbridge Pipeline meeting at the Phoenix Event Center tomorrow. And I don't think that's a coincidence.

Hundreds of kids are involved in the marching band program at Milaca Public Schools, not to mention Foley, Princeton and other school districts near Milaca who will be marching in this parade. If one assumes that at least one parent of these children will want to watch their kids perform, that's hundreds of adults who will be otherwise engaged tomorrow night.

Also, this parade is the only parade where all three Milaca bands march. So how many Milaca parents whose kids have been working for over a month are going to skip the parade to talk to anyone about an oil pipeline in their backyard? Few to none. And if they have day jobs, they can't attend the Foley or Mora meetings either.

Because I have a full-time job and will be at the parade, watching my stepchildren perform, and hosting my family members who are coming to town to watch our hometown festival parade, I will not be able to attend any of the meetings.

Can you please send me the literature (.pdf of a fact sheet, etc.) that will be distributed at the Open House so that I can educate myself and make any informed comments by your July 10 deadline?

Thank you,
Libby Nickel Baker

--
Libby Nickel Baker
libby.nickel@gmail.com

Levi, Andrew (COMM)

From: Helen Nikiel <hnikiel@comcast.net>
Sent: Wednesday, July 05, 2017 9:34 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 proposed by Enbridge

Hello,

My name is Helen Nikiel and I am a resident of Bloomington in the great state of Minnesota. I am writing as a person of faith and as a concerned human being regarding the new Line 3 proposed by Enbridge.

How many times do we have to go through this argument? I don't care how "safe" pipelines are touted to be. It only takes one incident, one leak, to endanger the health of our precious environment and, in turn, the health of all of us who live here.

It is also a source of deep embarrassment to me, as it should be to all of us, that our Native communities continue to endure the impact of extracting and transporting oil (that in my humble opinion should stay in the ground).

We have a responsibility to keep our environment healthy to sustain our current and future generations. Please accept that responsibility and reject Line 3.

Thank you for this opportunity to speak out,

Helen Nikiel
Bloomington, MN

ST PAUL
MN 550

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
David J Nindorf	2184297842	
ADDRESS		
2525 E 7th ST		
CITY, STATE, ZIP		
Superior WIS 54880		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Rachel Nora	218-766-9032	thompsonra2013@gmail.com

ADDRESS
2160 State 84

CITY, STATE, ZIP
Longville, MN 56655

COMMENTS
Please comply within 280 days for EIS

DECLARE THE EIS INADEQUATE WITHIN 280 DAYS

ST PAUL MN 551
JUN 2017 PM 3 T

U.S.A. FOREVER

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Levi, Andrew (COMM)

From: HeatherR Nord <heathernord01@hotmail.com>
Sent: Monday, July 10, 2017 2:54 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-196 and PPL15-137

Greetings,

Thank you for your attention to this very important matter. We all appreciate that the state of Minnesota represents the people and your actions will be historic.

I am writing regarding CN-14-196 and PPL15-137.

I am writing in opposition to and with concern to the Line 3 proposal. Although called a replacement this new Enbridge pipe has a larger capacity to transport tar sands oil pipeline through sensitive Minnesota wetlands. This line adversely affects native communities - directly threatening watersheds connected to the largest and the only certified organic wild rice lakes in Minnesota. Native communities have treaty rights and I believe the tribes need clear and informed consent before any project of this magnitude be allowed to be built.

Line 3 has already had a 1.7 million gallon spill in 1991. This kind of project is documented to FAIL and yet the state is considering a larger capacity line? This does fit our image of the land of 10,000 lakes. We will be the land of 10,000 leaks. We love our rivers and lakes. They are more valuable than oil. Please do not take this lightly.

This is a bad investment which needs much more study because it threatens our water. This Canadian company gets all the benefit and American's get all the risk. In addition Enbridge needs to clean up all it's old pipe and not leave it in the ground for future generations. The city of Grand Rapids has asked Enbridge to remove their pipe because it is the wise thing to do. The state of Minnesota needs to ask for this to be a statewide policy.

Minnesota has already lost a large percentage of it's clean water to agriculture. The fossil fuel industry does not need this pipeline as the marketplace will naturally phase out tar sands oil production due to it's costs to the environment. I don't believe the risk is worth the perceived reward. There are more jobs with the development of clean and renewable energy and at this point, I believe, we need to move in that direction or perish.

Sincerely,
Heather R Nord

Levi, Andrew (COMM)

From: PUC, Docketing (PUC)
Sent: Monday, July 10, 2017 2:58 PM
To: HeatherR Nord
Cc: MN_COMM_Pipeline Comments
Subject: RE: CN-14-196 and PPL15-137

Please send comments to : Pipeline.Comments@state.mn.us I am ccing now, thank you

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From: HeatherR Nord [mailto:heathernord01@hotmail.com]
Sent: Monday, July 10, 2017 2:52 PM
To: PUC, Docketing (PUC) <docketing.puc@state.mn.us>
Subject: CN-14-196 and PPL15-137

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Sincerely,
Heather R Nord

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Patricia Norman

Street Address: 2225 W 24th St.

City: Duluth State: MN Zip Code: 55811

Phone or Email: normanduluth@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Improved statement regarding the Department of Justice's Consent Decree creating a Federal Law mandating the replacement of the aging Line 3. This Federal Law between the Federal Government and Enbridge requires the Line 3 be replaced to ensure the environment is protected and the threat of an aging line has been removed.

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Kirsch, Raymond (COMM)
Sent: Monday, July 10, 2017 9:07 AM
To: MN_COMM_Pipeline Comments
Subject: FW: Comments Enbridge Line 3 DEIS below and copy attached
Attachments: Line3 DEIS Lois cmts 7-10-17.pdf

From: Lois Norrgard [mailto:lnorrgard01@gmail.com]
Sent: Monday, July 10, 2017 9:06 AM
To: Kirsch, Raymond (COMM) <raymond.kirsch@state.mn.us>
Subject: Comments Enbridge Line 3 DEIS below and copy attached

Please find comments to the Line 3 DEIS below and copy attached.

TO: Department of Commerce, Energy Environmental Review and Analysis

Ray Kirsch, Public Advisor
DOC-EERA
85 7th Place East
St Paul Minnesota 55101
Raymond.kirsch@state.mn.us

RE: Public Comment for Enbridge Line 3 pipeline DEIS, 7-10-2017

I am writing today as a citizen of Minnesota and affected landowner with property downstream for the proposed pipeline along the Kettle River. I have grave concerns regarding the adequacy and the lack of analysis contained within the Draft Environmental Impact Statement (DEIS) for the Enbridge Line 3 replacement project.

I. General concerns
I am concerned with wildlife impacts and did not find an in depth assessment of impacts to Threatened and Endangered species, Minnesota species of special concern, aquatic resources (other than just fish) and pollinators, contained in the DEIS. I am also concerned about the extensive impacts to water and wild rice.

One comment that I feel holds true throughout the DEIS - you cannot expect just mentioning a word will be considered the "hard look" that NEPA requires.

Climate Change:
I request that there be a robust analysis of the GHGs from the product traveling within the pipeline – this must be a full life cycle analysis that includes the increased carbon debt of moving 390,000 barrels per day presently, as well as the increased carbon threats and risks of a new pipeline moving 760,000 barrels per day would cause to our changing climate. The burning of this carbon will add to the existing overload that we have in our atmosphere, will add to the existing extreme weather and

drought, existing impacts to agriculture, wildlife and their habitats, water quality, and human homes and communities that we are presently seeing here in Minnesota and across the world.

The science was not in existence and GHG impact was not assessed 50 years ago when the original Line 3 pipeline was first built – we now have the chance to remedy this HUGE oversight. This DEIS cannot be considered final without a life cycle analysis the increased burning and by products of the tar sands oil that will flow through this pipeline will bring to our world. The DEIS also does not address the loss of carbon from this project in our wetlands and forest soils due to this project. We must protect and increase carbon sequestered in our natural areas.

Minnesota is committed by statute to do its part for the climate by meeting its Next Generation Energy Act goals. This 2007 law requires the state cut its annual emissions of greenhouse gases by 80% between 2005 and 2050. We must prevent the problem from getting worse – this is not some far off in the future priority or need – this is TODAY.

The need for action is clear: Minnesota is already feeling the impacts of climate change. We have experienced four 1,000-year rainfalls since 2002. We have watched our spruce, fir, aspen, and birch forests retreat northward. And air pollution related to greenhouse gas emissions annually cost us more than $800 million in increased health care costs. *(information taken from CSEO report)*

Justice:
Most importantly - admitted in these documents any of the routes would have a disproportionate and adverse effect on tribal resources and members - It is inconceivable to me that that we are even considering moving forward with this project at all. This analysis and public involvement process cannot be considered adequate without a full, robust, and credible consultation with the tribes affected. And true and proper steps to ensure safety and protection of cultural resources today and into the future. I emphatically believe that if this were done, we would find this project far to “costly” to ever move forward.

750 foot corridor:
DEIS lacks adequate analysis for why this is necessary
Why does the company request a 750 foot wide corridor? Well over two football fields wide corridor – what land clearing, wetland impacts, chemical treatments, tree removal, and other environmental disturbance will occur in this corridor? This is not adequately detailed in the DEIS, this must be remedied before this document can be considered final. What are the future plans for why they are requesting such a wide corridor? This DEIS must be redone if this is for additional pipeline construction in future. Future plans for additional lines would be connected actions and must be analyzed in this DEIS. What is being done about Line 1, 2, and 4 – all of the same age as Line 3? The need for why a 750’ wide corridor must be clearly identified. Presently there are 7 pipelines in the Line 3 corridor in an easement width of 200 feet. Why the discrepancy?

Missing Alternative that must be analyzed:
One missing alternative that merits analysis and review would be a Line 3 continued use with a planned sunset, and transition alternative. This is what the citizens’ of MN, US, and all the other species we share this planet with are really looking for.

To meet the state’s 2050 goal, the state needs to immediately begin to implement long-term strategies that reduce fossil fuel use in vehicles.

Continue Line 3: We need an alternative that takes a hard look at 3 more years or some assessed timeframe continued use. Then decommission properly - NOT ABANDONMENT. For all of the reasons laid out in the Summary doc – especially the fact that this pipeline over time would continue to disintegrate and break down – become a conduit for water flow, possibly draining wetlands like farm tile, and buoyancy concerns.

The Summary shows that continuing the existing pipeline is possible. I advocate only allowing this with a comprehensive and robust analysis and plan put into place to ratchet down our use of the toxic tar sands that travel through it – a plan to transition to clean renewable energy, and alternative transportation choices. This review has been started in the Climate Solutions and Economic Opportunities (CSEO) Report from 2016. An assessment could provide a framework to allow ongoing operation of the existing Line 3 to a sunset date and new far-reaching plan for Minnesota's future. **While this framework would require heightened integrity work and progressive decreases in operating pressure, continued operation of existing Line 3 is possible.**

There are a myriad of resources that can be included in this far reaching Alternative. Some I suggest:

Our own Environmental Quality Board's Climate Solutions and Economic Opportunities Report (2016). https://www.eqb.state.mn.us/sites/default/files/documents/CSEO_EQB_0.pdf

We are moving beyond fossil fuel vehicles:
Signs For Fast-Charging Stations Now On I-94 In Minnesota
June 15, 2017 3:03 PM
Filed Under: Electric Cars, Interstate 94

MINNEAPOLIS (WCCO) – *Not sure where you can charge an electric car along Interstate 94 in northern Minnesota? Well, now there's some easy-to-spot roadside answers.*

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Expect to see similar signs on other parts of I-94 in the near future.

A stretch of the interstate from the Fargo area to Huron, Michigan, is designated as the "Great Lakes Zero Emission Corridor," part of a federal effort to promote alternative fuels.

I-94 is one of 55 roadways in the U.S. designated as an "alternative fuel corridor." A network of such corridors was created under the 2016 Fixing America's Surface Transportation Act, and it spans 35 states and covers 85,000 miles.

Charlie Zelle, the Minnesota Department of Transportation Commissioner, said in a news release that supporting electric cars on major Minnesota roads like I-94 is important because the leading cause of greenhouse gas emissions in the U.S. is transportation-related.

"By identifying where fueling stations can be found, we can increase the use of electric vehicles and improve air quality and meet the needs of current and future motorists," he said.

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Houston Chronicle (tiered subscription model) (6/20)

OIL MARKETS
Enthusiasm wanes as crude glut remains stubbornly high
Nathanial Gronewold, E&E News reporter
Published: Thursday, June 15, 2017

Industry is also coming on board with this new future we must embrace.
OIL AND GAS
Shell CEO wants climate risks disclosed

Published: Thursday, July 6, 2017

Facing shareholders' pressure to lessen his company's carbon footprint, the CEO of Royal Dutch Shell PLC acknowledged that firms need to reveal more about how they'll deal with climate change's threats to the global economy.

"It is right that it should be transparent which companies are truly on firm foundations over the long-term," CEO Ben van Beurden wrote in a LinkedIn post.

Shell, one of the world's biggest oil and gas companies, has said it assesses climate risks internally. But the firm hasn't detailed the exposure it could face from such risks.

Last week, Shell joined a Group of 20 task force seeking a framework to better assess and price climate-related risks (***Climatewire***, June 29).

Van Beurden said Shell will help the group find a way to disclose commercially sensitive data (Karolin Schaps, **Reuters**, July 4). **— AAA**

I request that an additional Alternative – Future First Alternative be given adequate analysis and credible discussion in the EIS.

Abandonment is not the answer:
Presently Line 3 has necessitated more than 950 excavations in the last 16 years. In addition, Line 3 is over 50 years old and has integrity problems. This pipeline is breaking down – we cannot leave it to future taxpayers to clean up the mess. Enbridge has had the benefit of operating and profiting on this line for many years – and should as a "good citizen" company fulfill a commitment to the state to properly address the end of life cycle as well. The benefits of proper decommissioning far outweigh any risks from the actual process to do so. Enbridge has shown over and over again that they are able to work within the confines of the easement for the many integrity failures and maintenance required – they have proven that this is possible.

In Minnesota, for the protection of our amazing natural environment and water resources, we must require a proper decommission process that reflects the process done in Canada. Closure and removal is the only answer. The price tag of $1.28 billion is small in comparison to the future risk and multiple threats that leaving this mess in place will bring to our state – plus $1.28 billion will create jobs for people today, good moral jobs that help to move us to a good future.

Abandonment is only saying to the cities, counties and citizens along the existing pipeline that this is their problem. Enbridge has a proven track record of not monitoring their pipes that are flowing – there is no guarantee, in fact much data to the contrary, that they would continue to maintain and monitor a pipeline that has been "abandoned".

More analysis that must be done before a final EIS, missing from the DEIS

- The impact to communities in Alberta Canada due to tar sands extraction. This must be part of our proper and moral life cycle analysis for this project. The tar sands are huge deposits of bitumen, a tar-like substance that's turned into oil through complex and energy-intensive processes that cause widespread environmental damage. These processes pollute the Athabasca River, lace the air with toxins and convert farmland into wasteland. Large areas of the Boreal forest are clearcut to make way for development in the tar sands, the fastest growing source of greenhouse gas emissions in Canada.

I am also concerned with the social and health costs of the tar sands. First Nations communities in the tar sands report unusually high levels of rare cancers and autoimmune diseases. Their traditional way of life is threatened. Substance abuse, suicide, gambling and family violence have increased in the tar sands region. Meanwhile, the thousands of workers brought in by oil companies face the boom and bust cycles of the oil economy rollercoaster.

- health effects from spills, the carcinogens, from the tar sands dilbit itself as well as the diluent.

- water and the effects from spills which have been known to reach 35 miles downstream from an occurrence. This is of special concern due to the connection from a pipeline crossing to the Kettle

River. There is no spill assessment for the St Louis River, or Nemadji River. There are approx. 80 water crossings – streams, rivers, lakes. The water quality and risk analysis is wholly inadequate.

- analysis that reaches further into the future is necessary. It appears that this DEIS looks only out to about 30 years for risk assessments, this is not adequate.

- frequency of spills – this needs to be further analyzed – it appears from the data that there is an expected risk of a spill every 4 years – this means 25% chance of a spill each year. This is far too high a risk for Minnesota.

In Conclusion

This project is the wrong direction for Minnesota. I urge us to look to the future and our need to stop using fossil fuels if we want to have a healthy planet for us as well as our fellow creatures. I urge the state to take a hard look at a greater range of realistic and doable alternatives. Alternatives that do not lock us into a future of a more high capacity, extremely risky, way too expensive fossil fuel infrastructure that will be, should be, obsolete in ten years. We need to ramp down our use of toxic tar sands and move to alternatives.

What would our Planet say if she were able submit comments here today? Perhaps our planet would say – I have been your best friend since the Industrial Revolution. I have done all I can to dampen and absorb. I have tried to keep the Arctic and permafrost intact. I have sent you no invoices.

But this is about to change. Like no other generation before us we have the knowledge, technology, money and capacity to save our planet. It's a win-win, investment in green solutions creates new jobs. Sustainability has become a business case. And in the longer term, the low-carbon growth story is the only growth story on offer.

Thank you for the time to submit comments here today.

Sincerely,

Lois Norrgard
10368 Columbus Circle, Bloomington MN 55420 lnorrgard01@gmail.com

TO: Department of Commerce, Energy Environmental Review and Analysis

Ray Kirsch, Public Advisor
DOC-EERA
85 7th Place East
St Paul Minnesota 55101
Raymond.kirsch@state.mn.us

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June 15, 2017 3:03 PM

Filed Under: Electric Cars, Interstate 94

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Houston Chronicle (tiered subscription model) (6/20)

OIL MARKETS

Enthusiasm wanes as crude glut remains stubbornly high

Nathanial Gronewold, E&E News reporter

Published: Thursday, June 15, 2017

Industry is also coming on board with this new future we must embrace.

OIL AND GAS

Shell CEO wants climate risks disclosed
Published: Thursday, July 6, 2017

Facing shareholders' pressure to lessen his company's carbon footprint, the CEO of Royal Dutch Shell PLC acknowledged that firms need to reveal more about how they'll deal with climate change's threats to the global economy.

"It is right that it should be transparent which companies are truly on firm foundations over the long-term," CEO Ben van Beurden wrote in a LinkedIn post.

Shell, one of the world's biggest oil and gas companies, has said it assesses climate risks internally. But the firm hasn't detailed the exposure it could face from such risks.

Last week, Shell joined a Group of 20 task force seeking a framework to better assess and price climate-related risks (***Climatewire***, June 29).
Van Beurden said Shell will help the group find a way to disclose commercially sensitive data (Karolin Schaps, **Reuters**, July 4). **— AAA**

I request that an additional Alternative – Future First Alternative be given adequate analysis and credible discussion in the EIS.

Abandonment is not the answer:
Presently Line 3 has necessitated more than 950 excavations in the last 16 years. In addition, Line 3 is over 50 years old and has integrity problems. This pipeline is breaking down – we cannot leave it to future taxpayers to clean up the mess. Enbridge has had the benefit of operating and profiting on this line for many years – and should as a "good citizen" company fulfill a commitment to the state to properly address the end of life cycle as well. The benefits of proper decommissioning far outweigh any risks from the actual process to do so. Enbridge has shown over and over again that they are able to work within the confines of the easement for the many integrity failures and maintenance required – they have proven that this is possible.

In Minnesota, for the protection of our amazing natural environment and water resources, we must require a proper decommission process that reflects the process done in Canada. Closure and removal is the only answer. The price tag of $1.28 billion is small in comparison to the future risk and multiple threats that leaving this mess in place will bring to our state – plus $1.28 billion will create jobs for people today, good moral jobs that help to move us to a good future.

Abandonment is only saying to the cities, counties and citizens along the existing pipeline that this is their problem. Enbridge has a proven track record of not monitoring their pipes that are flowing – there is no guarantee, in fact much data to the contrary, that they would continue to maintain and monitor a pipeline that has been "abandoned".

More analysis that must be done before a final EIS, missing from the DEIS

- The impact to communities in Alberta Canada due to tar sands extraction. This must be part of our proper and moral life cycle analysis for this project. The tar sands are huge deposits of bitumen, a tar-like substance that's turned into oil through complex and energy-intensive processes that cause

widespread environmental damage. These processes pollute the Athabasca River, lace the air with toxins and convert farmland into wasteland. Large areas of the Boreal forest are clearcut to make way for development in the tar sands, the fastest growing source of greenhouse gas emissions in Canada.

I am also concerned with the social and health costs of the tar sands. First Nations communities in the tar sands report unusually high levels of rare cancers and autoimmune diseases. Their traditional way of life is threatened. Substance abuse, suicide, gambling and family violence have increased in the tar sands region. Meanwhile, the thousands of workers brought in by oil companies face the boom and bust cycles of the oil economy rollercoaster.

- health effects from spills, the carcinogens, from the tar sands dilbit itself as well as the diluent.

- water and the effects from spills which have been known to reach 35 miles downstream from an occurrence. This is of special concern due to the connection from a pipeline crossing to the Kettle River. There is no spill assessment for the St Louis River, or Nemadji River. There are approx. 80 water crossings – streams, rivers, lakes. The water quality and risk analysis is wholly inadequate.

- analysis that reaches further into the future is necessary. It appears that this DEIS looks only out to about 30 years for risk assessments, this is not adequate.

- frequency of spills – this needs to be further analyzed – it appears from the data that there is an expected risk of a spill every 4 years – this means 25% chance of a spill each year. This is far too high a risk for Minnesota.

In Conclusion:

This project is the wrong direction for Minnesota. I urge us to look to the future and our need to stop using fossil fuels if we want to have a healthy planet for us as well as our fellow creatures. I urge the state to take a hard look at a greater range of realistic and doable alternatives. Alternatives that do not lock us into a future of a more high capacity, extremely risky, way too expensive fossil fuel infrastructure that will be, should be, obsolete in ten years. We need to ramp down our use of toxic tar sands and move to alternatives.

What would our Planet say if she were able submit comments here today? Perhaps our planet would say – I have been your best friend since the Industrial Revolution. I have done all I can to dampen and absorb. I have tried to keep the Arctic and permafrost intact. I have sent you no invoices.

But this is about to change. Like no other generation before us we have the knowledge, technology, money and capacity to save our planet. It's a win-win, investment in green solutions creates new jobs. Sustainability has become a business case. And in the longer term, the low-carbon growth story is the only growth story on offer.

Thank you for the time to submit comments here today.

Sincerely,

Lois Norrgard
10368 Columbus Circle, Bloomington MN 55420 lnorrgard01@gmail.com

Levi, Andrew (COMM)

From: JoAnne Norris <joanne.norris1950@gmail.com>
Sent: Saturday, June 24, 2017 9:16 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

TO: Minnesota DOC-----I am writing this to let you know I am in TOTAL SUPPORT OF LINE 3 REPLACEMENT!!!!! It only makes sense to me to do this. I live in LaPrairie MN, right off Hwy 2. The pipeline has been wonderful. It makes so much sense to move the oil this way. Not to mention all the jobs it provides for people . Why wouldn't you go in and replace it when it needs it? This is a SAFETY ISSUE!!! Why do you have to get permission AGAIN for something that was approved years ago?? This is maintenance of the pipeline that is already there!!! Has there been problems with the pipeline? NO!! It is just OLD and needs replacing! So why are people against it? I SUPPORT THIS REPLACEMENT OF PIPELINE 3 TOTALLY!! You can count on me backing you up on this!!!! I live at 325 Fuhrman Ave Grand Rapids MN 55744 THANK GOODNESS for President Trump who believes we should support ourselves with our own oil!!!! THANK YOU FOR SUPPORTING ENBRIDGE AND TO OK THEM TO DO THIS REPLACEMENT OF PIPE LINE 3.Only thing that makes sense to me. I am 66 yrs old and BELIEVE IN OUR COUNTRY!!! CN-14-916 PPL-15-137

Sincerely,

JoAnne R Norris
325 Fuhrman Ave
Grand Rapids, MN 55744
joanne.norris1950@gmail.com

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26 JUN 2017 PM 2 L

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
ESTHER NORTH	218-727-1043	
ADDRESS		
1515 STANFORD AV		
CITY, STATE, ZIP		
DULUTH, MN 55811		

COMMENTS

Enbridge Energy is complying with the safety issues. In todays world, everyone needs and uses fuel, including protesters who drive to protests, lights and heat their homes.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

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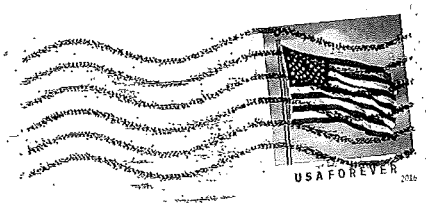

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
RONALD E. NORTH	218-727-1043	
ADDRESS		
1515 STANFORD AVE		
CITY, STATE, ZIP		
DULUTH, MN 55811		

COMMENTS

EVER-ONE NEED'S AND USES FUEL

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Lance Novacek

Street Address: 10386 390th ST NE

City: Middle River State: MN Zip Code: 56737

Phone or Email: Lancenovacek@yahoo.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I agree with this Project. I have worked for this company for 13 years, The people that work for them - contractors or company personel Are good people and Do the correct things and know right from wrong. I am a outDoors person. Love to hunt, Fish, enjoy the out Doors - I work on these pipe line systems AND They are safe. I go home everynight safely to my family, This Industry is part of my livelyhood. along with siblings, Friends, Family. It is very important for the country, State, and community for this infrastructure to be in place. Thanks

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Jeff Novak

Street Address: 17858 240 ST NW

City: Viking State: MN Zip Code: 56760

Phone or Email: jeff.Novak@enbridge.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am for the L-3 Replacement project. It will bring alot of jobs for the Local Area, also all the money it will bring for the Local businesses, resturants, hotel etc.

If including additional pages please number them and tell us how many you are providing:_____ pages

From: Curt Nyegaard
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137
Date: Wednesday, May 31, 2017 8:40:05 PM

Dear Ms. MacAlister,

Replace L3

Sincerely,

Curt Nyegaard
27833 380th St
Shevlin, MN 56676
nyegaard@gvtel.com

Levi, Andrew (COMM)

From: Curtis Nyegaard <curtis.nyegaard@gmail.com>
Sent: Thursday, June 15, 2017 3:41 PM
To: MN_COMM_Pipeline Comments
Subject: Personal opinion

My name is Curt Nyegaard and I have worked in safety in North American Oilfields for the last 5 years. I have walked entire ROW's from Tioga, ND to Park Rapids, MN; and much of it east of Park Rapids to Superior, WI. I believe the North American Oil Industry must and can do a better job in advertising the due diligence "we" exercise. I believe there are many opportunities to build partnerships with the public to provide education and give transparency and a shared ownership in our energy future. I believe we are uniquely positioned in North America to advertise our strong stewardship of the environment, to give credibility to our strong community commitments and to highlight the ways we make lives better in North America. To provide contrast, just peek south to Venezuela, South America or any other countries with vast oil reserves and see their track record regarding people and the environment! Things like grassland surveys, insect surveys, flora-fauna surveys, bat surveys, calcareous fen surveys and migratory bird surveys are just a small sample of the due diligence served to prove outstanding stewardship of the environment. Real science, with credible 3rd party providers will stand the scrutiny of critical review.

I live in Clearwater County, Shevlin township in rural Minnesota. I have a strong local stake in the proposed L3R project in MN. I feel there are powerful similarities between the Agricultural Industry and the Energy Industries. I have worked in both! Both industries must be strong stewards of the environment and we both need the people that we provide with food, fiber and energy, to understand and support our efforts. Before my oilfield career I worked with the University of Minnesota Extension Service - 4-H youth development. I feel there are a myriad of possibilities for education and development of partnerships that will serve the greater good for our citizens and our industries. We all need each other and sadly a significant population of our society does not even realize this. I believe there is nowhere in the world that the energy industry works as hard or cares as much for developing infrastructure and natural resources (ETHICALLY) as we do here in North America (Canada and the US)! That being said, I feel we must be intentional in our growth of "public perception" to be successful in our continued development.

Curtis Nyegaard, CSP
Mobile 218-556-4441
curtis.nyegaard@gmail.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
David Nyegaard	218-556-9931	davidnyegaard2010@hotmail.com
ADDRESS		
1298 Valley St. Sw.		
CITY, STATE, ZIP		
Bagley, MN 56621		

COMMENTS

DECLARE THE EIS ADEQ[illegible] WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Helen O'Brien <gho1937@gmail.com>
Sent: Wednesday, July 05, 2017 6:50 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I am for the replacement of Line 3 of Enbridge Energy. A new line has less change of breaking and creating an environmental mess.

Sincerely,

Helen O'Brien
1930 5th Ave
Seattle, WA 98101
gho1937@gmail.com

Levi, Andrew (COMM)

From: Sean O'Brien <smdobrien@gmail.com>
Sent: Monday, July 10, 2017 7:55 AM
To: MN_COMM_Pipeline Comments
Subject: Comments on Draft Environmental Impact Statement (DEIS) for Proposed Enbridge Line 3 Oil Pipeline

To Whom it May Concern,

I am deeply concerned with the draft EIS compiled on the Line 3 oil pipeline proposed to run across northern and central Minnesota. This document contains no estimates of possible spill volumes, and the list of alternatives is clearly constructed to intentionally make them each seem unfeasible, when in fact they are not.

We do not need this pipeline to ship dirty oil from Canada to Lake Superior for export to foreign markets. The risk to our state's natural resources is much too great and the economic benefits to our residents are much too little - if they exist at all.

Clearly, this document is not designed to inform a rational, science-based policy decision; it is designed to approve the pipeline without getting sued.

I urge to state to scrap the EIS as drafted and allow the proper environmental agencies (NOT the Dept. of Commerce) to accurately and thoroughly construct a new document that summarizes the true risks of this project in a comprehensive way.

Thank you,

--
Sean O'Brien
smdobrien@gmail.com
(612) 597-9515

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Ryan O'Gary		rogary@local49training.org

ADDRESS
29236 Glader Blvd.

CITY, STATE, ZIP
Lindstrom MN 55045

COMMENTS
Replace and modernize Line 3!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Keith Ochsner
To: MN_COMM_Pipeline Comments
Subject: Re: Line 3 project
Date: Wednesday, June 07, 2017 8:48:35 PM

Dear Sir:

Allow me to add my support for the replacement of Line 3 as proposed by Enbridge. Good corporate stewardship and ongoing governmental oversight will assure environmental quality. In fact the environment can only improve by full implementation of the proposal.

Count on positive economic impact, too, from the jobs created during the development and construction phases. Perhaps education incentives and vocational training could be developed to encourage qualified workers from the area, including reservations, to participate. What a boon for the Northland! Citizens living and working Duluth, Minnesota, and Superior, Wisconsin, in particular will see a lasting benefit.

Further, once operational this state-of-the-art line will reliably serve the entire nation in meeting an overarching goal of energy independence.

Sincerely,

Keith Ochsner
215 W5th St.
Washburn, WI 54891

Levi, Andrew (COMM)

From: Todd Ochsner <todd.ochsner@gmail.com>
Sent: Thursday, July 06, 2017 10:36 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Our family believes in this project, from the EIS and Line 3 Regulatory Schedule, the process has been followed, ample time has been given and we ask that the statutory deadline of 280 days be followed.

CN-14-916 and PPL-15-137

Sincerely,

Todd Ochsner
4115 Pitt St
Duluth, MN 55804
todd.ochsner@gmail.com

Levi, Andrew (COMM)

From: David Odegard <user@votervoice.net>
Sent: Wednesday, June 21, 2017 6:38 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

This proposed pipeline would make the line 3 more safe and provide jobs to people, like my self, being a union pipefitter, many jobs in Minnesota. I believe this project is a win-win for concerned citizens, pipeliners, and Enbridge.

Sincerely,

Davode
4073 Buchanan Ave SW
Bemidji, MN 56601
davode812@yahoo.com

Levi, Andrew (COMM)

From: Cody Oesterreich <cody.sojourner@gmail.com>
Sent: Monday, July 10, 2017 1:13 PM
To: MN_COMM_Pipeline Comments
Subject: No new pipeline

As a lifelong Minnesota resident I am fully opposed to the proposed line 3 pipeline. After research and consideration I see the reality that enbridge is looking to make profits at the expense of the lives of the people, animals and wilderness of Minnesota.
Do not build this pipeline. We will be out in the thousands to occupy the land if the wishes of the native and non-native Minnesotans are ignored.

Concerned citizen,
Cody Oesterreich
Mora and Minneapolis, MN

From: Curt Oien
To: MN_COMM_Pipeline Comments
Subject: Pipelines
Date: Sunday, June 11, 2017 8:23:37 PM

It's time we get serious about getting off the oil addiction. No more pipelines. Invest in sustainable energy. We will destroy all habitats one bit at a time unless we all change to a sustainable lifestyle.

Thank you,
Curt Oien

--
Curt Oien
12281 41st St NE
Saint Michael, MN 55376

Cell: 612-387-2542

From: Gary Oja
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137
Date: Tuesday, June 06, 2017 11:10:06 AM

Dear Ms. MacAlister,

I am writing to show my support of the Enbridge's Line 3 Replacement.in Minnesota. I have lived in norhern Minnesota for over 60 years and want to see the environment protected like most others as I do enjoy the lakes and forests. As with everything there needs to be common sense balance for protecting the environment. The method of leaving the existing pipeline that will be deactivated in place makes more sense to me than removing that line given there are 5 other pipelines in that corridor. There are procedures in place to remove any existing petroleum products and to cap it so no further products can be transported in the pipeline. They also have to monitor the deactivated pipeline for any further problems. The proposed route is utilizing existing utility corridors where they can and is using rural areas to avoid towns and cities. I would hope the environmental process will be done done on a timely basis based upon the standards in MN for this. Again, I emphasize my support for this project.

Sincerely,

Gary Oja
36737 Shoreview Dr
Grand Rapids, MN 55744
gdoja@msn.com

Levi, Andrew (COMM)

From: Nels Ojard <nels.ojard@krechojard.com>
Sent: Thursday, July 06, 2017 11:26 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

As a life long Minnesotan, I am writing in support of Enbridge's Line 3 Replacement Project. After more than 2-years of regulatory review and project evaluations, I believe Enbridge has demonstrated that the project is well defined, technically competent and sited in a manner that reflects a respect for social and environmental values.

Please allow this project to proceed.

Sincerely,

Nels Ojard
4976 Pike Lake Pl
Duluth, MN 55811
nels.ojard@krechojard.com

Levi, Andrew (COMM)

From: youneek one <youneekone@gmail.com>
Sent: Saturday, July 08, 2017 7:40 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

Nancy Oldham

13332 Beach Haven Rd

Park Rapids, MN 56470

Re: Dockets CN-14-916 and PPL-15-137

I believe there is some highly relevant material that has not been used or included in the Draft EIS for the proposed, relocated Line 3 Pipeline. This is an impressive dilbit study done by the National Academy of Sciences, which you can find here**:**

https://www.nap.edu/catalog/21834/spills-of-diluted-bitumen-from-pipelines-a-comparative-study-of.

The study proves and explains the significant differences between regular crude oil and dilbit, and points to additional research necessary to determine effective cleanup methods for spills. In short, the technology/method does not currently exist for effective cleanup of dilbit spills, and this information is important to the everyone's understanding of the proposed pipeline and its risks.

This is information that should definitely be included in the final Environmental Impact Study.

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Terry Olson

Street Address: 13166 120th ST NE

City: Thief River Falls State: MN Zip Code: 56701

Phone or Email: TerryOlson04979@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I have lived within two miles of the pipeline (Enbridge) for 30 of my 39 years on this earth. The first 20 by the Viking Station and the last 10 just south of Thief River Falls, MN. My experience has always been excellent as a neighbor to Enbridge. I have the upmost respect for the way in which they maintain their stations and pipelines. They have been a great neighbor.

If including additional pages please number them and tell us how many you are providing:_____ pages

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Craig Olson	218-724-6466	Colson@IUPA782

ADDRESS
2002 London Rd

CITY, STATE, ZIP
Duluth MN 55812

COMMENTS
Pipeline are safe & Reliable ways to transport Gas and oil

Jobs are Important

CO

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Connie Olson <kaune@scicable.com>
Sent: Saturday, June 24, 2017 7:31 PM
To: MN_COMM_Pipeline Comments
Subject: We need jobs and thesenpeople follow the laws. Why is there people who dont wantmprogress. Let this company do its job give them the ok to do it!

Dear Ms. MacAlister,

Stand by enbri:ge. We need the jobsnup northand they follow our countries laws. Don believe the so called. Do gooders. Most are people with money who dont care avout working. They go around bomplaining about eberything

Sincerely,

Connie Olson
PO Box 91
Hill City, MN 55748
kaune@scicable.com

Levi, Andrew (COMM)

From: Mary Olson <maolson13@gmail.com>
Sent: Thursday, June 22, 2017 7:11 PM
To: MN_COMM_Pipeline Comments
Cc: enbridgeinmn@enbridge.com
Subject: Proposed Line 3 Pipeline Project

It absolutely astounds me that this pipeline is even being considered and the routes proposed are absurd, especially the preferred route. Since there already is a pipeline in operation, use it or build the route across Canada. I totally object to the pipeline and especially object to the preferred route due to the disturbing of nature, waterways and the apparent jockeying of the route.

If you have to build the thing, stay along the original line 3 and don't disturb more of nature than you have to. Build a line right next to the original line 3. It makes more sense. Every pipeline has had a leak and all this proposed line and its new route can do, is open more area to the possibility of a leak and the ruining of more land and water.

I see no valid reason for the construction of this new pipeline. We are constantly losing more and more of our natural world and this does nothing but disturb nature and is totally unnecessary. Use what you already have and leave Minnesota better for it.

Mary Olson

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
James E. Olson	218-481-7289	—
ADDRESS		
20 Mallard LN		
CITY, STATE, ZIP		
Duluth, MN 55811		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Patricia Olson <olson310@umn.edu>
Sent: Monday, July 10, 2017 5:46 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline comments

Dear Minnesota Public Servants ----

As a person of faith and as a resident of Minnesota, I am very concerned about the new Line 3 proposed by Enbridge.

The environmental impact statement acknowledges many severe consequences to land, water, and local communities. The plans for this pipeline disregard the severe impacts of potential spills to ricing lakes, rivers, and even to Lake Superior. I find it unacceptable that we, as a state, continue to expect Native communities to disproportionately endure the impacts of extracting and transporting oil.

We have a responsibility to current and future generations, locally and globally, to keep out Tar Sands oil that could pollute Minnesota waters and contribute significantly to climate change. Climate scientists agree it is time to leave the oil in the ground.

Please revisit the harsh consequences of this pipeline and please seriously consider the no-build option.

Thank you,
Patricia Olson
7625 Edinborough Way #2218
Edina, MN 55435
olson310@umn.edu

Levi, Andrew (COMM)

From: Victoria Olson <grammyvictoria@gmail.com>
Sent: Monday, July 10, 2017 12:57 PM
To: MN_COMM_Pipeline Comments
Subject: Line3

Dear Ms. MacAlister,

Totally support any pipeline that serves the people of USA

Sincerely,

Victoria Olson
35822 420th Ave SE
Fosston, MN 56542
grammyvictoria@gmail.com

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Greg Olson

Street Address: 105 Lincoln Ave West / P.O. Box 126

City: Karlstad State: MN Zip Code: 56732

Phone or Email: greg.olson1@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I have lived in Minnesota my entire life and like most Minnesotans we like to protect the environment. If Enbridge is being proactive and wanting to replace the old Like 3 I believe this is very imperative to protecting the environment.

Pipelines seem to be the most efficient and safest way to transport oil in large volumes. I believe that our dependence on fossil fuels is certainly a reality. Possibly in the next 30 years we will not be as dependent on oil but the fact is we are. We cannot just not turn the flow of oil off. I live in a rural area and farming needs access to friendly oil. Being from Canada or North Dakota seems to me to be friendly. All of the Activist should be protesting all the oil tankers coming in from the Middle East. All we are doing is supporting terrorizing. I find it very hard to comprehend the activist in there thinking.

Today's pipelines are built with the latest technology in preventing pipeline spills. By replacing an old pipe with new technology and much stronger pipe is simply a no-brainer. We need this pipeline built without any further delays. I hope everyone has learnt from the Dakota Access Pipeline protest. There is a group that call themselves Honor the Earth. Please take a hard look on how the protesters left the land in North Dakota. I have zero tolerance for this kind of behavior.

I also believe that leaving the old line 3 in the ground is the safest and the most environmentally sound way to proceed. It seems to me that deactivating in-place makes the most sense. Contrary to what the Activist say Enbridge will be responsible for this line forever. The Activist seem to want to scare people into thinking that if something would happen to the old deactivated line the landowners would be responsible for any sort of clean-up.

So please make the right decision here and grant Enbridge the Certificate of Need and the Routing Permit for the preferred route without further delay. Please do not be influenced by the scare tactics being used by the opposition.

TAPE HERE (PLEASE DO NOT STAPLE)

RECEIVED
JUL 13 2017
MAILROOM

MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
SAINT PAUL, MN 55101-2198

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FOLD HERE

Public Comment Period Ends Monday, July 10, 2017

Comments must be postmarked or received electronically by the comment deadline.

How to comment:

- Drop this form in a comment box at a public meeting
- Mail this form, remembering to affix appropriate postage
- Mail comments in a separate envelope using the mailing address on this form
- Email comments to the Environmental Review Manager: Pipeline.Comments@state.mn.us
- Fax comments to the Environmental Review Manager: (651) 539-0109

Comments do not need to be on this form to be accepted. We encourage you to provide comments in whatever way is most convenient for you. If commenting by email or fax please use "*Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)*" in the subject line.

Thank you for participating in the Draft EIS public review process! By commenting you are helping inform the Minnesota Public Utility Commission's decisions regarding this project.

FOLD HERE

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is unclear? What is missing? Please reference specific sections of the Draft EIS, if possible. Use additional pages as needed.

For project information visit: http://mn.gov/commerce/energyfacilities/line3.

Levi, Andrew (COMM)

From: Alvin Olson <kaune@scicsble.com>
Sent: Saturday, July 01, 2017 5:08 PM
To: MN_COMM_Pipeline Comments
Subject: Go for it line 3

Dear Ms. MacAlister,

Go for it these protestets are off their rockers. Probably people supported by a rich family with nothing else to fo but cause problems

Sincerely,

Ksune
306 Gill St
Hill City, MN 55748
kaune@scicsble.com

Levi, Andrew (COMM)

From: Alvin Olson <kaune@scicsble.com>
Sent: Sunday, July 02, 2017 7:27 AM
To: MN_COMM_Pipeline Comments
Subject: Liine 3 and 8000 jobs

Dear Ms. MacAlister,

Go for it. I know we need the jobs. Ur company has to follow our laws. These idiots are attention seeking idiots. They are looking for attention and money. They hsve nothing else to do but cause problems. They're more than likely are affluent people who ban together for this. Why they aren't working to support them selves and families show they are trouble makers. Your company works for advancement of familes. Works to supply fuel so we can get to work. Doez everything in its power to repair breaks when they happen. Keep fighting for this. The majority of us are behind u. Go Enbridge!

Sincerely,

Alvin Olson
306 Gill St
Hill City, MN 55748
kaune@scicsble.com

Levi, Andrew (COMM)

From: Dan Olympia <Dan.Olympia@utah.edu>
Sent: Sunday, July 09, 2017 9:01 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Pipeline comments

Jamie MacAlister, Environmental Review Manager
MN Department of Commerce
85 7th Place East, Suite 280
St. Paul MN 55101-2198

To whom It may Concern;

- Thank you for the opportunity to comment on the potential environmental and other impacts associated with the Enbridge proposed pipeline project and the recommendations associated with the Line 3 option. As a returning resident of Minnesota and a recent homeowner now living in the Nevis, MN area, I am deeply concerned about the impact of the proposed pipeline and projected route (Option 3) through some of the most sensitive environmental areas in northern/central MN. We recently decided to develop our retirement plans around a return to this area. One of the major factors impacting our decision to do this was the relatively pristine environment that has been maintained in our area through the vigilant efforts of the DNR and MPCA and local residents who also enjoy the access to wildlife, fishing and pristine waters running from Lake Itasca south through the Mississippi watershed. According to the MPCA "impacts from construction of additional pipelines and infrastructure, emergency response and spill prevention, water crossing body methods and time frames, waste water issues, water quality, watershed and wetland issues" would seriously affect areas through which the pipeline would pass. This project provides increased threats of toxic spills and increased gas emissions. The effect of this pipeline route also negatively affects the indigenous native population as indicated within the DEIS. Their economy depends on the harvesting of wild rice. Damaged rice beds cannot be replanted.

- Notably, Route SA04 appears to have been excluded from consideration. It must in the running for the following reasons. 1) It avoids N. MN water sheds 2) It would pass through agricultural lands, co- located with existing pipelines. 3) It would fragment less habitat. 4) The line would travel a greater distance, providing a greater number of jobs for union workers. It would be a true plus for them and their families. 5) It would mostly have a short term effect on croplands, which can be replanted over pipelines. 6) Risk of oil spills are a given, no matter where the pipe exists. Spills can be more easily accessed, due to roads already in place in settled agricultural communities. 7) The forests, wetlands, pristine waters, vegetation, wildlife of northern MN. would remain high-quality habitat with pristine watersheds.

- It is completely beyond belief that other alternatives with less damaging potential consequences have not been considered. It would appear that the agenda and plans for this construction and the route have been recommended with only corporate interests in mind. The economic benefit of Option 3 to local residents has been vastly overestimated, while the risks to quality of life and to the environment have been minimized or discounted.

- While I am not against progress, the proposed route 3 seems to ignore common sense concerns which have not been adequately addressed by Enbridge or by other regulatory bodies.

Daniel Olympia, PhD
Associate Professor Emeritus

University of Utah
Salt Lake City, UT 84112 & Nevis, MN 56467
801 647-2105 (cell)

"I've learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel." - Maya Angelou

"Out of the crooked timber of humanity, nothing entirely straight can be built." - Immanuel Kant

Levi, Andrew (COMM)

From: Kathy Olympia <kathyolympia@hotmail.com>
Sent: Sunday, July 09, 2017 9:16 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline comment

Jamie MacAlister, Environmental Review Manager
MN Department of Commerce
85 7th Place East, Suite 280
St. Paul MN 55101-2198

To whom It may Concern;

- Thank you for the opportunity to comment on the potential environmental and other impacts associated with the Enbridge proposed pipeline project and the recommendations associated with the Line 3 option. As a returning resident of Minnesota and a recent homeowner now living in the Nevis, MN area, I am deeply concerned about the impact of the proposed pipeline and projected route (Option 3) through some of the most sensitive environmental areas in northern/central MN. We recently decided to develop our retirement plans around a return to this area. One of the major factors impacting our decision to do this was the relatively pristine environment that has been maintained in our area through the vigilant efforts of the DNR and MPCA and local residents who also enjoy the access to wildlife, fishing and pristine waters running from Lake Itasca south through the Mississippi watershed. According to the MPCA "impacts from construction of additional pipelines and infrastructure, emergency response and spill prevention, water crossing body methods and time frames, waste water issues, water quality, watershed and wetland issues" would seriously affect areas through which the pipeline would pass. This project provides increased threats of toxic spills and increased gas emissions. The effect of this pipeline route also negatively affects the indigenous native population as indicated within the DEIS. Their economy depends on the harvesting of wild rice. Damaged rice beds cannot be replanted.

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- It is completely beyond belief that other alternatives with less damaging potential consequences have not been considered. It would appear that the agenda and plans for this construction and the route have been recommended with only corporate interests in mind. The economic benefit of Option 3 to local residents has been vastly overestimated, while the risks to quality of life and to the environment have been minimized or discounted.

- While I am not against progress, the proposed route 3 seems to ignore common sense concerns which have not been adequately addressed by Enbridge or by other regulatory bodies.

Kathy Olympia
Nevis, MN

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study.** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement.** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
JEFF ORGAN		
ADDRESS		
4416 96th		
CITY, STATE, ZIP		
Bloomington MN 55420		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Orreds
8857 Father Foley Drive
Pine River, MN 56474

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Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul MN 55101-2198

55101-214355

July 10, 2017

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul MN 55101-2198

Dear Mr. MacAlister:

My name is Dale Orred and my wife and I own vacation property on the Whitefish Chain of Lakes approximately ten miles south of the proposed Enbridge pipeline route.

We believe the draft Environmental Impact Statement (EIS) does not adequately address the potential damage to the area watersheds, fishing and drinking water. We have not read the entire statement (I am told it is over five thousand pages) and are relying on my review of the Statement summary and input from other concerned area residents.

I realize Enbridge has the right to operate its business and to promote its preferred choice. But, we believe the best choice would be to instead select a longer route further south of the proposed pipeline through land where groundwater, streams and lakes would be less impacted. We realize you are aware that a major spill could have a devastating effect on the character of central Minnesota's aquifers, streams and lakes that, in turn could have a long-term adverse impact on jobs, property values and state tourism.

We believe that, after review and consideration of inputs, your office will make the correct decision regarding the placement of the pipeline and any necessary controls.

Respectfully submitted,

Dale Orred

Levi, Andrew (COMM)

From: Jill Jones <jilljones@osagenation-nsn.gov>
Sent: Monday, July 10, 2017 1:12 PM
To: MN_COMM_Pipeline Comments
Subject: Comments from Osage Nation Energy Services LLC: Docket Numbers CN-14-916 and PPL-15-137
Attachments: ONES LLC Support Letter - Enbridge Project.pdf

Good afternoon,

Please see attached for comments related to Docket Numbers CN-14-916 and PPL-15-137. Please let me know if you have any questions or need additional information.

Regards,
Jill

Jill S. Jones
918-645-5466
jilljones@osagenation-nsn.gov

OsageNationEnergy
SERVICES, LLC

1225 Virginia Short St
Pawhuska, Oklahoma 74056

DUNS: 078740087
CAGE CODE: 74VT6

Native American | Tribally Owned | Small Business | ISBEE

Via email: Pipeline.Comments@state.mn.us

July 10, 2017

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

RE: Comments for Docket Numbers CN-14-916 and PPL-15-137

This letter outlines the experience of Osage Nation Energy Services, LLC in relation to the Flanagan South Pipeline project, which was constructed by Enbridge in our historical tribal reservation area of Osage County, Oklahoma in 2014.

Prior to construction, Enbridge representatives actively engaged and communicated with the tribal leadership of the Osage Nation along with our company, which operates as a tribally owned subsidiary for energy related projects in our area. From the beginning of the project, the Enbridge project manager and other representatives from Enbridge were focused on how their project could benefit the local community for creating jobs and generating revenue for local suppliers.

Below are several of the initiatives which were successfully completed during the project:

- Enbridge hired a local Osage-owned construction company to construct and remediate pipeyards at Pershing, OK and Yale, OK, and assisted that company in attaining safety and other certifications required for the job, resulting in significant local revenue and job creation.
- Enbridge hired the Osage Nation Environmental & Natural Resources department to conduct environmental assessments on the project.
- Enbridge hired the Osage Nation Historic Preservation department to conduct archaeological assessments and ongoing cultural monitoring during construction in OK, MO and KS.
- Enbridge required other contractors to exercise social license as part of their involvement on the project.
- Enbridge connected its surveying contractor to our company to assist in placement of local surveyors and other positions.
- Enbridge participated with the Osage Nation and local unions in conducting a comprehensive training program for local people who wanted to work on the pipeline, resulting in hundreds of people completing training, getting union cards, and working on the pipeline in a variety of jobs. (Enbridge and their contractors also donated materials required for training.)
- Enbridge worked with our company to hire a local public relations coordinator to assist with communication, involvement of local suppliers and vendors, and general issue resolution.
- Multiple community meetings were conducted throughout our local area with Enbridge project staff to educate the community on pipeline construction and how the project would be conducted.
- Three community grants were awarded to local organizations to assist with projects related to community services.
- Enbridge worked with our company to assist with right-of-way concerns and BIA approvals.

OsageNationEnergy
SERVICES, LLC

1225 Virginia Short St
Pawhuska, Oklahoma 74056

DUNS: 078740087
CAGE CODE: 74VT6

Native American | Tribally Owned | Small Business | ISBEE

In our experience, Enbridge was very successful in involving the local community and the Osage Nation to ensure the pipeline construction project was conducted responsibly and in a way that contributed to the local community. This included revenue generation for a variety of local companies and job creation for many people, including training and skills which pipeline workers have been able to utilize for other jobs once the Enbridge project was complete. Overall impact to the community in job creation, revenue generation, and promotion of community organizations was extremely positive.

Enbridge's proactive approach in reaching out to local government and business was a key success factor, which is not always employed by companies doing business in our area. Their acknowledgement and concern for cultural factors of the Osage Nation was also appreciated.

In addition to their own efforts, Enbridge required that their contractors also engage with the local community and exercise social license during their participation on the project. Our tribal government and business representatives had a very positive experience with all management and personnel from Enbridge and continue to maintain a good relationship with them. Their professional approach was greatly appreciated.

If additional information is required, we will be glad to provide any supporting documentation that may be helpful.

Regards,

Jill S. Jones, Board Member
Osage Nation Energy Services, LLC
Cell: (918) 645-5466
Email: jilljones@osagenation-nsn.gov

Levi, Andrew (COMM)

From: Justin Osowski <jposowski@hotmail.com>
Sent: Friday, July 07, 2017 7:38 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I support the Line 3 Replacement by Enbridge, it is the safest and most efficient method of moving oil and gas for our energy needs. My family and I live in Hallock, MN with a railroad running through town. I don't like seeing the heavy oil cars coming though my town, after seeing oil car accidents on the news. My family is also farming over the pipeline in multiple fields. Enbridge has done a great job putting the topsoil back where it belongs after a dig, preserving the drainage of the land, and cleaning up when their work is done. This is extremely important to farmers. Farming beside the Red River of the North, I have never seen any affect from the pipeline being near it. Line 3 Replacement is safe for our land and my family.

Sincerely,

Justin Osowski
716 7th St SE
Hallock, MN 56728
jposowski@hotmail.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement.** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
David D. Oswskey	715 8172924	Oswskey@yahoo.com
ADDRESS		
7753 E. Carlson Rd		
CITY, STATE, ZIP		
Foxboro, WI, 54836		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Star Otto <creatastar@gmail.com>
Sent: Monday, July 10, 2017 10:01 AM
To: MN_COMM_Pipeline Comments; Dayton, Mark (GOV); staff, cao (PUC)
Subject: Comment - Robert Otto, Complaint - Wichahpi Otto

Hello,

Please confirm this has been received and filed via email. Thank you:

I am submitting a comment on behalf of my husband, Robert Otto. Our address is still the same, which is 15444 Lesley Lane, Eden Prairie, MN 55346. My husband has a valid diagnosis of a format of Dyslexia, which is audio processing disorder. To date, I would personally like to file a complaint, that there has been little involvement this process to meet the needs of the public. Having not only a husband, but also a child with audio processing disorder, which is not the dyslexia that means that one cannot read or comprehend. It means that when it is heard, it processes in a different way and must read and hear at the same time in order to comprehend. Extra time is needed for those with audio processing disorder to read on their own and to process the information. While I am able to explain some of this, and do know that there is a person that can help someone with questions, and yes, he has attended the meetings, there is one thing that has failed to meet the needs of the public with such a disability, in which, that is audio format of the material. There are many that could have benefitted.

As a person who holds a military psychology degree in war, terrorism, and combat as well as minored in manmade and natural disasters, my education does not come without the comprehension and study of cognitive disabilities. In fact it is strengthened to assure the difference between trauma and cognitive disability.

Sadly, while I may not be registered to the tribe I am from, I am not unrecognized by my people. I came per the elders of the Oceti Sakowin. My comprehension through Standing Rock as well as through this on a secondary effect to the Minnesota Sioux Communities in the State of Minnesota was sent to speak on our rights. The DEIS only speaks of Treaty rights. It has completely **failed** to speak on our independent Constitutions for each and every tribe. On many reservations, there is a serious number to consider of people with disabilities. The greatest way to reach them is via live stream, and by video. As most have a level of reading that is close to a 1st or 2nd grade level. How does the PUC believe that the documents given in the public meeting would help those needing assistance comprehending are to understand what is claimed as a comprehensive document? Over 5000 pages of that and with limited access to documents, meetings and internet access as well as very limited access to cellular signal. Most are very poor and cannot even afford to make it the meetings, let alone afford full access or to get to a public library to read the DEIS. Many want to participate. When people do not understand, they react behaviorally. The State of Minnesota has not reached a full understanding of what the people comprehend, and as per treaty, those who are representing are not the appropriate people to represent treaty. For the State of Minnesota to comprehend appropriately, if the State wants appropriate comprehension of Treaty Rights, I have been sent to inform the State of Minnesota, that for the Oceti Sakowin has not been appropriately consulted as it is a fact that the State of Minnesota has not met with 3/4 of the men, per the 1851 and 1868 treaties as appropriate consultation. I would like that lodged as a formal complaint against this process as well.

I would like a formal complaint of the judge filed at this time, as the judge has indicated that the representation of the Oceti Sakowin is sufficiently met through the Sierra Club, Honor the Earth and other tribes. Those groups cannot speak for the Oceti Sakowin. And to my knowledge has not been appointed or authorized to

speak for the Oceti Sakowin either. It is very concerning to be a part of this process and see her lack of thoroughness which is clearly reflected in the submissions through the PUC. She has not only failed to be thorough in her analysis toward me, however, to other citizens of the State of Minnesota.

Start quote:

One thingI would like heavily considered is the fact that the documents do not give a blueprint for the public. Many of us, including my wife, are able to draft and comprehend those blueprints, and could have both better served the people and the public in comprehension of those documents.

However, Enbridge has not released them to her, nor to the tribes to our understanding. Due to the lack of documentation and the fact that we both witnessed Michel's Corporation moving in material prior to receiving the permits, it is concerning that this will be another standing Rock. As one who has built pipelines and one that understands the design and concept, I want to leave the PUC with one thought as part of public commentary:

You thought that the 35W bridge was engineered appropriately, and it turned into not only a State, but also a Federal Disaster. The State of Minnesota believed that the Engineered plan was sufficient then, and it clearly reflected that it was not the case.

Engineers may be able to design, however, it is clear that I see the effect on my wife's community through the Oceti that, the same builder hired for the Dakota Access Line has not sufficiently done their job as their are many problems that are publicly noted about the Dakota Access line.

I see Michels all over the State of Minnesota working on many other lines and to know they will be building the pipeline here and have failed in North Dakota, does not make me feel safe that my life is going to be appropriately cared for by the taxes I pay for the State. I work hard in this state, I work damn hard. When I see problems that are on Dakota Access Pipeline, and look at the team building it, as I spoke to the crew that has attended the public meetings, I would not hire them after speaking to them. They do not reflect a clear knowledge of the workmanship needed or a full comprehension of what they are doing.

That is a frightening thing when it comes to public safety. If they don't fully comprehend the quality and efforts needed to build, then how can we be sure that this will not be like the explosion there was prior with Enbridge, and how can the State assure that with this process that this will not be another 35W?

Please consider this moving forward.

Regards,

Robert Otto

The communication in this email is private and confidential intended only between the parties addressed in the communication. If you are not the sender or recipient intended please respond or call 952-210-8303. Any intention to use the content of the information in the email is strictly prohibited without permission from the sender.

Levi, Andrew (COMM)

From: Bill Palmer <user@votervoice.net>
Sent: Monday, July 10, 2017 1:00 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I have worked for several pipeline operators throughout my career, Enbridge being one of them. I can attest to the fact that Enbridge has the highest standards when it comes to best practices for construction and engineering design, environmental requirements, contractor and employee safety and operations. Leadership within the company truely values to operate with integrity. They take ownership of the system and how it impacts our landowners and the public. The company continuously is reaching out to educate the public emergency responders and others as well as supporting communities monetarily with donations and encouragine volunteerism of thier staff.

Enbridge is the most responsible owner-operator in the system and will ensure Line 3 is installed with the best practices for construction and operated safely for years to come.

Thank You.

Sincerely,

Bill Palmer
17920 340th St
Bagley, MN 56621
wkpalmer1@yahoo.com

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Katrina Palodichuk

Street Address: 300 8th Street West #203b

City: Park Rapids State: MN Zip Code: 56470

Phone or Email: 218 255 5998

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

My comment is simple, pipelines are the safest mode of transporation for materials. All environmental issues are considered. Pipeline jobs are needed in our country and will bring growth to our economy. Transporting material via train, truck is far more dangerous to our environment. This isn't the pipeline construction of the past, I see Line 3 replacement as an incredible asset to our economy and families, the old line is not functioning - we need this to safely transport oil.

Thank you

If including additional pages please number them and tell us how many you are providing:_____ pages

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Sean M. Parker	763-434-6084	
ADDRESS: 2126 Swedish Dr.		
CITY, STATE, ZIP: Anoka . MN 55304		

COMMENTS This is somthing we need
Make it happen

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: nativeprid@aol.com
Sent: Monday, July 10, 2017 1:28 PM
To: MN_COMM_Pipeline Comments
Subject: LINE 3

Dear Jamie MacAlister

Please include this comment on Line 3 DEIS in Dockets CN-14-916 & PPL-15-137

I am a resident of Kumeyaay/Iipay original lands in San Diego CA

The Line 3 Pipeline concerns me because the state of Minnesota and Enbridge MUST obtain FREE, PRIOR AND INFORMED CONSENT of the tribes of the 1855 treaty territory.

The disproportionate impacts line 3 would have on indigenous communities is environmental racism.

The profound social and ecological devastation caused by the Alberta Tar Sands is absolutely unacceptable and Minnesota must refuse to be complicit.

Enbridge must be required to clean up and remove their old pipelines, not abandon them for future generations to deal with.

Sincerely,

Joyce Parker

Levi, Andrew (COMM)

From: Lacey Parr <laceymoriah@gmail.com>
Sent: Monday, July 10, 2017 10:04 PM
To: MN_COMM_Pipeline Comments
Subject: Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137

Jamie MacAlister,

Thank you for taking comments on this important issue. I am from Duluth and am opposed to the proposal for Line 3 and wish to see the old line shut down. The wilderness of northern Minnesota is a treasure to me and my family. We canoe, kayak and sail on the rivers and lakes in northern Minnesota. I want many, many generations to continue to enjoy it. I am concerned about the spill capacity of Line 3. Pipelines leak, it's a fact we have seen play out over and over. We don't want Canada's dirty tar sands spilling into our rivers and lakes. They are too precious to lose.

Thank you for your time,

Lacey Parr

Levi, Andrew (COMM)

From: Nathan Parr <nathan.parr@icloud.com>
Sent: Monday, July 10, 2017 10:03 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Comments

Mr Macalister,

I recreate every weekend in the St Louis and Nemadji rivers and a spill there would have lasting and devastating impacts. New construction would have a major impact as well. Please do not renew this pipeline or allow another one. I own property and have a family in this area. We pay taxes and support the local economy. This pipeline doesn't. I ask you to hear the voices of those in the path of this pipeline and put this monster to rest. I know several community members who own property around the pipeline and Enbridge employees disregard private property, destroy landscape, leave trash, and don't care about any of the citizens in these areas. Shut this down and do not give them a permit for this pipeline. We do not need pipelines across our state. Thank you for your time.

Nathan Parr

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Mike Parrott	218-343-4663 606-0067	mwparrott@local49.org
ADDRESS		
3867 Sandberg RD		
CITY, STATE, ZIP		
Duluth MN 55810		

COMMENTS

This Project is way over Due and Needs to Be Done.
PipeLine is the Safest way to transport oil

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Brian PaStarr
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137
Date: Saturday, June 10, 2017 4:37:42 PM

I am writing to make comments on Line 3 Pipeline, the proposed replacement pipeline Enbridge wants to build. I do not think it is in the publics interest and here is why:
1. Spills: The PHMSA data for Enbridge operated pipeline facilities from 2002-2015 listed in appendix B, pages B 21 to B 24 notes numerous spills due to equipment failure and others due to corrosion. 45% of the equipment failure spills were considered small, 5 -50 gallons; there were 27 medium spills, 50-1000 barrels; 35 large spills, 1000 - 10,000 barrels; and a catastrophic spill of over 10,000 barrels.
2. The pipeline will be going through wilderness areas, including many wild rice areas. These spills will impact the wilderness and wild ricing in those areas as well as the tourism.
3. Consumption data. A report by the Annual Energy Outlook for 2015 and 2016 reports that US consumption of petroleum will remain essentially unchanged from 2013 to 2040. But it also notes that consumption fell after 2003 and has continued to fall since. And that consumption is less in 2014 than in 1997 despite the fact the economy grew by 50% over that period. WE DO NOT NEED A NEW PIPELINE WHEN CONSUMPTION IS GOING DOWN NOT UP.
4. More consumption data: Enbridge filed a document with the Federal Regulatory Commission for the 1st 3 months of 2016 noting their pipelines imported an average of 2.38 million barrels per day but that they have the capacity to import 2.85 million barrels per day, a difference of 470,000 barrels. They do not need more capacity.
5. Enbridge makes no provision to dismantle and clean up the pipeline they are replacing,but only to "flush it out". This is inadequate and will happen again with the replacement pipeline at some point, allowing the oil that does remain (the flush will not clean it all out) to eventually leak out into the soil and ground water.
6. Frac outs. At various points, Enbridge will drill under areas such as wetlands, a lake, or stream rather than keep the pipeline above ground. To do so, a large drill will drill what is called a horizontal directional drilling or HDD. The HDD uses a mudlike fluid usually made from Bentonite and water to help lubricate the drill. The mud or "gel" is under pressure and it is not unusual for the fluid to break through to the surface. This is called a frac out. Utility Magazine, a company that reports on the mechanical devices used in HDD's, reports that "it is relatively common for a frac out to occur on an HDD project". Frac outs have been known to make roads rise and waterlines fail. On surface waters the frac out fills in fills in interstitial spaces in the substrates; interferes with gill development in fish; and reduces the ability of fish to spawn. It is similar on wetlands and the pipeline will cross various rivers, streams and wetlands. All of this is harmful to the environment and not good for tourism.

For these reasons, I believe the pipeline should not be given the go ahead to be built. I have children and now young grandchildren that I would like to be able to enjoy outdoor areas without those areas being polluted to this pipeline.
Thank you,
Brian PaStarr

Levi, Andrew (COMM)

From: Andrew Paul <apaul218@outlook.com>
Sent: Saturday, June 24, 2017 7:04 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Replacement

Dear Ms. MacAlister,

Pipelines are cost effective energy transportation channels that provide North America with necessary crude oil. The prompt replacement of Line 3 will ensure the safety and environmental protection of our important natural resources as well as the continued safe transportation of crude oil to refineries in Minnesota, the Midwest and beyond.

Sincerely,

Andrew Paul
2621 Colorado Rd
Grand Rapids, MN 55744
apaul218@outlook.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Sandi Paulouski	(218) 732-9382	—

ADDRESS
17555 Cty 107

CITY, STATE, ZIP
Park Rapids, MN 56470

COMMENTS
I am in favor of this project. More jobs in our part of the state is always a win-win, especially if rules are in place that a leak could be dealt with swiftly and safely, should that happen.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916, PPL-15-137

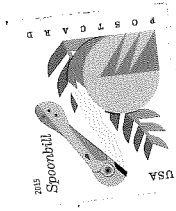

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Todd Paulouski	218-732-9382	
ADDRESS	17555 Cty 107	
CITY, STATE, ZIP	Park Rapids, Mn 56470	

COMMENTS I am in favor of this project & hope to attend a future meeting

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

From: Scott Pavelski
To: MN_COMM_Pipeline Comments
Subject: Environmental Protection
Date: Thursday, June 08, 2017 8:40:04 AM

Dear Ms. MacAlister,

I wasn't raised a Minnesotan but I'm starting to become one and want to see the environment protected like most others. To me, there's no greater demonstration to the environment than the $7.5 billion in private investment Enbridge has committed to replacing existing Line 3. The DEIS should acknowledge the environmental benefits of replacing aging infrastructure with a new pipeline built using modern materials, designs and construction techniques.

Can I just ask why people think we want to hurt the environment? Or that we don't care if our drinking waters clean? I know a lot of people who work for or with Enbridge and I can't think of one that doesn't like to be out in nature enjoying it's beauty. Not a single one of them would want to see the environment harmed in any way. Enbridge makes sure that everything is restored to the best of their ability.

Sincerely,

Scott Pavelski
2530 Meadow Ln
Plover, WI 54467
scott.pavelski@gmail.com

Levi, Andrew (COMM)

From: James Pavlek <jpavlek@hotmail.com>
Sent: Thursday, July 06, 2017 10:11 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

At this point in time, considering the infrastructure in our Nation, I believe the public would be well served by the underground pipeline that Enbridge is proposing. With this past week there was a 28 oil car derailment in the Chicago area, with some of the oil being spilled.

Given the advances in technology, and the integrity of Enbridge, the underground pipeline appears to be safer than either the railroad or transport trucks on the highway. Therefore, I support the Line 3 replacement project.
Respectfully,
James Pavlek

Sincerely,

James Pavlek
12739 Laurie Rd
Floodwood, MN 55736
jpavlek@hotmail.com

Levi, Andrew (COMM)

From: Chamber Of Commerc <pawhuskachamber@sbcglobal.net>
Sent: Monday, July 10, 2017 3:16 PM
To: MN_COMM_Pipeline Comments
Subject: Letter from Pawhuska Chamber of Commerce: RE: CN-14-916 and PPL-15-137
Attachments: doc00015720170710151406.pdf

Jamie,

Please find our letter regarding the Flanagan South Project in the attachments.
CN-14-916 and PPL-15-137

Sincerely,

Joni

Joni L. Nash
Executive Director
Pawhuska Chamber of Commerce
PO Box 5
Pawhuska, Oklahoma 74056

O: 918.287.1208
F: 918.287.3159

PAWHUSKA
CHAMBER OF COMMERCE
Gateway to the Tallgrass Prairie

210 W. MAIN
P.O. BOX 5
PAWHUSKA, OK 74056
918.287.1208
918.287.3159 (FAX)

July 10, 2017

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

RE: Docket Numbers CN-14-916 and PPL-15-137

Dear Jamie,

I would like to share some factual information regarding the Flanagan South Project and the positive impact it had on Pawhuska. During the Flanagan South Project, the Osage Tribe worked closely with labor unions, contractors, and Enbridge to develop a training programs that put our people to work on the project. There were approximately 500 people- mostly tribal members from the Osage Nation and nearby tribes- that took part in the training. We are thankful for the trainings offered, and for the jobs the project created. So far, nearly 200 trainees have gone to work on the project.

The Pawhuska Public School District was also a beneficiary to the South Flanagan Project. There was quite a boost in our ad valorem taxes, and our schools benefited greatly from the increase of tax collection.

One of our biggest events/festivals in our town is Cavalcade Rodeo. For 71 years, it was been the "world's largest amateur rodeo" and attracts thousands to Pawhuska every July. Cavalcade operates as a 501c-3, and they are also grateful to the Flanagan South Project. Cavalcade was donated several pieces of culvert piping to develop driveways and provide better access to the parking areas.

The Flanagan South Project was beneficial to Pawhuska, and we are appreciative for all of the contributions made to our community during this project.

Sincerely,

Joni Nash

Joni L. Nash
Executive Director
Pawhuska Chamber of Commerce

From: John Pechin
To: MN_COMM_Pipeline Comments
Subject: docket numbers CN-14-916 and PPL-15-137: Comments
Date: Wednesday, June 07, 2017 5:34:25 PM

I am writing to document my support for Enbridge Line 3 Replacement project. I believe the line 3 project is needed to help secure the United States energy future and security. I am a very proud Enbridge employee that works for a company of dedicated people that are all committed to continually getting better. Employees that believe in and practice the values of Integrity, Safety, and Respect. Enbridge has shown its self as a responsible company learning and growing over the many years of operation in Minnesota and throughout North America.

I believe Enbridge's proposed preferred route is the best of routes options because the preferred route is located in more rural areas and follows existing pipelines and other infrastructure. Enbridge's preferred route is a secure and safe location for this type of infrastructure. Like many Enbridge employees I live along the pipeline route and I want to state that I feel secure for me and my family. Enbridge regularly inspects the pipelines and is a leader in the industry in integrity of its pipelines.

Enbridge is a leader in demonstrating how energy development and the environment can go hand in hand and is playing a leadership role on a global stage in making the transition to a lower carbon future. Enbridge has a renewables portfolio – from $10 million invested in a small Saskatchewan wind farm over a decade ago, to over $5 billion invested today and another $2.7 billion committed to offshore wind projects.

Enbridge has spent more than four years and thousands of hours studying the proposed replacement route and environmental considerations are integral to the design and routing of Line 3. The detailed planning of the pipeline proposed route shows the extra steps we take in communities and around sensitive areas. Enbridge will take care during construction to minimize our impact on the environment and Enbridge has shown we partner with stakeholders and Indigenous communities on environmental stewardship and we invest in programs that support conservation, habitat remediation and environmental education.

In conclusion for the reasons stated above I would like to state again that I believe the line 3 replacement project is needed to support regional and the state of Minnesota energy needs, the preferred route is the best route option and project can be built and operated in an environmentally sound and manner.

Sincerely,

John Pechin
Manager Bemidji Area, LP US Superior Region Ops
—

ENBRIDGE
TEL: 218-755-6710 | CELL: 218-393-3180
1129 Industrial Park Drive SE, Bemidji, MN 56601

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Will Pehling		
ADDRESS	8188 Evergreen Cemetery Rd. NW	
CITY, STATE, ZIP	Walker, MN 56001	

COMMENTS I support the line 3 replacement project.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

From: Seth Pennington
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137
Date: Tuesday, June 06, 2017 11:40:05 AM

Dear Ms. MacAlister,

I want to show my support for this important energy transportation project that will ensure access to abundant supplies of North American crude oil, that are cost effective relative to other sources of imported crude oil and move America closer to energy security. It will also offer additional economic benefits to communities along the right-of-way with tax revenues and patronage to local businesses by employees and contractors of Enbridge.

Sincerely,

Seth Pennington
2322 E 5th St
Superior, WI 54880
pennington_seth@yahoo.com

Levi, Andrew (COMM)

From: Pepperwolf <pepperwolfsjv@gmail.com>
Sent: Monday, July 10, 2017 2:02 PM
To: MN_COMM_Pipeline Comments
Cc: Rep.Laurie.Pryor@house.mn
Subject: Docket numbers (CN-14-916 and PPL-15-137)

To: Jamie MacAlister,
Environmental Review Manager Minnesota
Department of Commerce,
85 7th Place East,
Suite 280 St. Paul, MN 55101-2198.

Concerning:
Docket numbers (CN-14-916 and PPL-15-137)

My name is Pepperwolf and I live in Minnetonka Minnesota. I would like to add my comment to the weighing in of the decision for the Pipeline 3 that Enbridge would like to build.

I believe this line should NOT be allowed. There are many many reasons, but one reason I particularly find to be of great importance is the native land that could be (and most likely) in peril. Yes, there has been leaks in the past and there will be more leaks. This land is under treaty and the government should honor this. Native people make their livelihood from the land and their children and their children's lives will be impacted by any toxic materials in the food (rice for example) and water. Make no mistake, health disadvantages will affect the whole population. The cycle of disrespect for their culture, and potential harm to their livelihood and poor health will severely affect many lives.

Our country is in transition away from fossil fuels. We don't need more dirty oil going through our state. Let Canada refine their own oil if they need to. Travel the pipeline to a Canadian refinery. NOT through our beautiful state.

Thanks for taking the time to read this.

Sincerely,
Pepperwolf
15000 Crestview Lane
Minnetonka MN 55345
612.701.6963
cc to my State Representative Laurie Pryor

Levi, Andrew (COMM)

From: Maria Maria <mmperrotta@gmail.com>
Sent: Monday, July 10, 2017 11:57 PM
To: MN_COMM_Pipeline Comments
Subject: Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I am from: Minneapolis, MN

The Line 3 Pipeline concerns me because: the continued use and extraction of fossil fuels is a major contributing factor in pushing life on this planet into a vortex of mass extinction. The DEIS fails to address this anywhere. Minnesota is blessed with a wealth of clean water and forests. We need to protect them. We have no other choice.

The DEIS concerns me because:

- The DEIS does not discuss the unprecedented challenges of human casualty, displacement, conflict, natural disaster, biodiversity loss, etc, that climate change is causing, or the consensus from the scientific community that we must leave fossil fuels in the ground. It also fails to acknowledge that across the planet, Indigenous people are disproportionately impacted.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Sincerely,

Maria Perrotta

From: Jennie DePlacito
To: MN_COMM_Pipeline Comments; jenniedperry@gmail.com
Subject: Tar Sands
Date: Saturday, June 03, 2017 12:47:17 PM

Native people must be respected after all that was stolen from them years ago. Leaving small lands, and the worst ones in each state as a leftover area for the Native tribes residing in them. Criminal. Yet, I had no part in it and feel very little guilt.

What I do feel bad about is getting emails about more lands being destroyed! More taken from a people with so little.
This was what i read today, "massive new tar sands pipeline threatens our territories and our survival as Anishinaabe people. It would poison our water and bring more climate chaos. And we don't need it - now is the time to move to clean energy, and create a future for those who come after us."

I lived on a reservation as a child, my parents helped out there and my best friends were all Native. I learned a lot and am forever a better human being after living with my Native brothers and sisters.

We should be smarter in this the year of 2017, and use more responsible energy sources as much as possible, forcing businesses and car companies to lean more and more the way of clean land, and air.

I respectfully ask that you take the Anishinabee people seriously and leave their lands alone, even if you must make this pipeline, please GO AROUND it, or do anything to respect these people. Their DNA is nearly identical to yours after all.

Thank you for your time and consideration.

Jennie Perry

Levi, Andrew (COMM)

From: Monica Perry <minniokla66@gmail.com>
Sent: Monday, June 26, 2017 8:53 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3

Dear Ms. MacAlister,

Would it not be cheaper and more productive to build a refinery at our Canadian border, which could be used by both countries, or am I being to practical?

Sincerely,

Monica Perry
22838 Glenhaven Dr
Nevis, MN 56467
minniokla66@gmail.com

Levi, Andrew (COMM)

From: jessielynneperry <jessielynneperry@gmail.com>
Sent: Monday, July 10, 2017 4:56 PM
To: MN_COMM_Pipeline Comments
Subject: We do not need a new pipeline.

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Line 3 Replacement Project DEIS

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- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
JIM PATARNILL	218-657-2646	
ADDRESS		
24301 250TH ST		
CITY, STATE, ZIP		
SHAULIN, MN 56676		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Wayne Peters	218-523-4705	WAPETERS@WIKTEL.COM

ADDRESS: 302 SO. Main

CITY, STATE, ZIP: Viking Minn 56760

COMMENTS: GET ER DONE

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Eric Petersen
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137
Date: Thursday, June 08, 2017 7:30:05 AM

Dear Ms. MacAlister,

As a resident of northern Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project. I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3. No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS. Please keep the EIS timeline to the statutory deadline of 280 days.

Sincerely,

Eric Petersen
6416 Morris Thomas Rd E
Cloquet, MN 55720
eric_petersen@att.net

Levi, Andrew (COMM)

From: Ron Petersen <rptrsn18@gmail.com>
Sent: Friday, July 07, 2017 8:59 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

As a Minnesota resident, I believe this replacement project is important for safely transporting energy and keeping our environment clean. Thank you.

Sincerely,

Ron Petersen
1919 320th Ave
Lake Bronson, MN 56734
rptrsn18@gmail.com

Levi, Andrew (COMM)

From: Tom Peterson <tom.peterson@enbridge.com>
Sent: Tuesday, June 13, 2017 8:05 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Replacement

To whom it may concern,

I am in support of the Enbridge Line 3 replacement. I think it is a responsible solution to mitigate a potential future problem. The route of the new line through a different right of way increases the tax base associated with pipelines as well and the positive economic impact that comes with the installation and maintenance of a pipeline. Small business thrive during these times of construction and maintenance because the contracts that are doing this work need the resources of the local community. I am concerned with our environment and would do whatever it takes to keep our planet clean. I have worked for Lakehead Pipeline/Enbridge for 27 years and they have giving me a great career to support me and my family, I take pride in the values that we share as a company and workers to make our company a world class organization in every way possible.

So it is with confidence that I write this letter of support for the responsible replacement of Enbridge's Line 3 across the state of Minnesota.

Please follow the trust your neighboring state of Wisconsin has given Enbridge to allow them to replace the segment of Line 3 in their state.

Tom Peterson
Terminal Supervisor, Superior Terminal

ENBRIDGE
TEL: 715-398-8327 | CELL 715-718-1572
2800 East 21st Street, Superior, WI 54880
www.enbridgeUS.com

Integrity. Safety. Respect.

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MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Raymond Peterson

Street Address: 32848 Co 113

City: Backus State: MN Zip Code: 56435

Phone or Email: 218 652 2519

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I was at Park Rapids meeting. The cards for speaking should have been numbered. I was there Room was less by filled many of them had there say. After 12:15 I left other things to do. The first meeting about 5 or 6 years ago nothing changed much

a few years ago was a train Accident w/ Wadena If that was in down town perhaps the whole main street would be gone. 2 train accidents near Cassleton ND. Past winter said bad axle on one RR car. Don't need $4 a gal fuel have tractors and power unit engine when working hard 3 gallon fuel hr. Western MN, E North Dakota Few year ago train hauling oil blocked grain car and went on Farmer took 2 years to move grain when grain prices was higher older line is getting older all the time Replace it before it springs all leak. the line just misses the SW corner of Badoura twp where I live Hubbard Line in NE Corn follows steel tower Elec line.

Don't need million dollar clean up that protector left behind in ND this winter and spring.

If including additional pages please number them and tell us how many you are providing:_____ pages

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MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

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JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
SAINT PAUL, MN 55101-2198

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Public Comment Period Ends Monday, July 10, 2017

Comments must be postmarked or received electronically by the comment deadline.

How to comment:

- Drop this form in a comment box at a public meeting
- Mail this form, remembering to affix appropriate postage
- Mail comments in a separate envelope using the mailing address on this form
- Email comments to the Environmental Review Manager: Pipeline.Comments@state.mn.us
- Fax comments to the Environmental Review Manager: (651) 539-0109

Comments do not need to be on this form to be accepted. We encourage you to provide comments in whatever way is most convenient for you. If commenting by email or fax please use *"Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)"* in the subject line.

Thank you for participating in the Draft EIS public review process! By commenting you are helping inform the Minnesota Public Utility Commission's decisions regarding this project.

FOLD HERE

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is unclear? What is missing? Please reference specific sections of the Draft EIS, if possible. Use additional pages as needed.

For project information visit: http://mn.gov/commerce/energyfacilities/line3.

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Ross Peterson	218-879-600	rpeterson@frandsenbank.com

ADDRESS
502 Heather Avenue

CITY, STATE, ZIP
Cloquet, MN 55720

COMMENTS
I support the project: energy independence from foreign oil.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

ST PAUL MN 551
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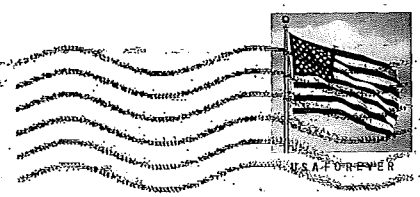

3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Thomas M Peterson	218-730-3725	Tom.Peterson050@gmail.com
ADDRESS		
2425 Sunset Lane		
CITY, STATE, ZIP		
Barnum MN 55707		

COMMENTS

I support the Replacement Project and feel it is a responsible thing to do. Replacing an aging asset is a good plan plus this will provide a great economic stimulus to parts of Minnesota as the current pipelines have with the positive on going maintenance

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Clayton Peterson <claypeterson41@gmail.com>
Sent: Sunday, July 09, 2017 3:47 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137

Dear Environmental Review Manager:

I have heard that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state* need (not a national need). Even if we used statistics abotut the national need, U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply needed oil. (http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf)

I would like to see this information mentioned in the final EIS.

Thank you,

Clay Peterson
23386 County 7
Park Rapids, MN 56470
218.732.0822

Levi, Andrew (COMM)

From: Keri Pickett <keripickett@gmail.com>
Sent: Monday, July 10, 2017 1:01 PM
To: MN_COMM_Pipeline Comments; PUC, Docketing (PUC)
Subject: Comment regarding CN-14-196 and PPL15-137

Greetings and thank you for your attention to this very important matter. We all appreciate that the state of Minnesota represents the people and your actions will be historic.

I am writing regarding CN-14-196 and PPL15-137.

I am writing in opposition to and with concern to the Line 3 proposal. Although called a replacement this new Enbridge pipe has a larger capacity to transport tar sands oil pipeline through sensitive Minnesota wetlands. This line adversely affects native communities - directly threatening watersheds connected to the largest and the only certified organic wild rice lakes in Minnesota. Native communities have treaty rights and I believe the tribes need clear and informed consent before any project of this magnitude be allowed to be built.

Line 3 has already had a 1.7 million gallon spill in 1991. This kind of project is documented to FAIL and yet the state is considering a larger capacity line? This does fit our image of the land of 10,000 lakes. We will be the land of 10,000 leaks. We love our rivers and lakes. They are more valuable than oil. Please do not take this lightly.

This is a bad investment which needs much more study because it threatens our water. This Canadian company gets all the benefit and American's get all the risk. In addition Enbridge needs to clean up all it's old pipe and not leave it in the ground for future generations. The city of Grand Rapids has asked Enbridge to remove their pipe because it is the wise thing to do. The state of Minnesota needs to ask for this to be a statewide policy.

Minnesota has already lost a large percentage of it's clean water to agriculture. The fossil fuel industry does not need this pipeline as the marketplace will naturally phase out tar sands oil production due to it's costs to the environment. I don't believe the risk is worth the perceived reward. There are more jobs with the development of clean and renewable energy and at this point, I believe, we need to move in that direction or perish.

Sincerely, Keri

Keri Pickett - Producer/Director/DP & Photographer
PICKETT PICTURES LLC, 413 East Hennepin Avenue, Minneapolis, MN 55414
612-623-3410 studio

Levi, Andrew (COMM)

From: Keri Pickett <keripickett@gmail.com>
Sent: Monday, July 10, 2017 9:34 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL15-137

Greetings and thank you for your attention to this very important matter. We all appreciate that the state of Minnesota represents the people and your actions will be historic.

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Sincerely, Keri

Keri Pickett - Producer/Director/DP & Photographer
PICKETT PICTURES LLC, 413 East Hennepin Avenue, Minneapolis, MN 55414
612-623-3410 studio, 612-801-6727 cell
Twitter @keripickett
keripickett@gmail.com
http://www.keripickett.com/

First Daughter and the Black Snake
First Daughter and the Black Snake on Facebook
First Daughter and the Black Snake on Twitter

The Fabulous Ice Age Documentary Film

The Fabulous Ice Age on Netflix

Watch The Fabulous Ice Age Online - Amazon

Please LIKE the film on Facebook

Levi, Andrew (COMM)

From: Keri Pickett <keripickett@gmail.com>
Sent: Monday, July 10, 2017 1:01 PM
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Keri Pickett - Producer/Director/DP & Photographer
PICKETT PICTURES LLC, 413 East Hennepin Avenue, Minneapolis, MN 55414
612-623-3410 studio

Levi, Andrew (COMM)

From: Theresa PIcton <pmtamundson@gmail.com>
Sent: Monday, June 19, 2017 2:33 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Replacing aging infrastructure such as pipelines is important to protecting the environment. Enbridge has shown that they are commited to protecting the Environment in the work that they do. This project will also create many jobs in the state of MN.

Sincerely,

Theresa PIcton
15192 S Lundquist Rd
Danbury, WI 54830
pmtamundson@gmail.com

Levi, Andrew (COMM)

From: Teresa Pike <pikesteroony@yahoo.com>
Sent: Monday, July 10, 2017 6:56 AM
To: MN_COMM_Pipeline Comments
Subject: StopLine3, CN-14-916 and PPL-15-137

We need to put people ahead of profits for oil companies. There are so many reasons not to proceed with line 3 due from environmental implications to sovereign treaty rights just to name a couple.

I am opposed to granting Enbridge permits for the project.

Please consider and let MN be a leader showing other states you are for the people and not big oil!

Sincerely,
Teresa Pike

Sent from my iPhone

Levi, Andrew (COMM)

From: Gabrielle Pillmann <gaelpi@yahoo.com>
Sent: Thursday, July 06, 2017 6:49 PM
To: MN_COMM_Pipeline Comments
Subject: Public comment: Line 3 Project (CN-14-916 and PPL-15-137

Comment to draft EIS Chapter 4 (Alternatives to the Proposed Project)
i have not seen anything about using renewable energy as an alternative. I ask you to consider those in the same breadth as you have the proposed pipeline to get a comprehensive view of fundamental alternatives in the most safest way for our state, and what is good for our state, and us, the people of this state.
With renewable energy we eliminate the risk of accidental crude oil releases in any type of transportation. it would be zero vs. the 400 by pipeline expelling 450 or so barrels (14175 gallons) a year.
There would also be zero green house gas emissions and climate change. installing and operating renewable resource units would also provide employment, the 4800 temporary jobs enbrige proposes should not be a reason to go forward with the project, in the end we can't eat oil. The jobs won't stay, and it does help the greater common good when our natural resources are under threat.

Gabriele Pillmann
964 Dayton Ave
St. Paul, MN 55104

Levi, Andrew (COMM)

From: Paul Pinkoski <ppinkoski@hotmail.com>
Sent: Friday, July 07, 2017 7:23 PM
To: MN_COMM_Pipeline Comments
Subject: This is an important project!

Dear Ms. MacAlister,

We need to replace old lines with new ones from time to time. Anyone who owns a home knows that pipes, valves, unions, couplers, and faucets wear out over time and need to be replaced. This should be expected to keep our enviroment free from pollution. We should expedite such project with in reason. I fully support enbridge as good neighbor!

Sincerely,

Paul Pinkoski
511 7th St NW
Chisholm, MN 55719
ppinkoski@hotmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Steven Piper	612-720-1123	spiper@local49.org

ADDRESS
20728 Idaho Ave

CITY, STATE, ZIP
Lakeville, MN 55044

COMMENTS
Build it, enough meetings

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Neil Pittman <npittman@lsconsulting.com>
Sent: Tuesday, June 27, 2017 8:37 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

As a corrosion engineer I get to see many companies construct, maintain, and decommission their pipeline assets. I have not seen a company take more care than Enbridge to protect the environment while doing so.

Sincerely,

Neil Pittman
29561 Puritan St
Livonia, MI 48154
npittman@lsconsulting.com

Levi, Andrew (COMM)

From: Wendy Weimerskirch Plager <wendywplager@gmail.com>
Sent: Monday, June 26, 2017 8:21 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Draft Environmental Impact Statement (DEIS)

Dear MN Department of Commerce,
I find the Enbridge Line 3 Draft Environmental Impact Statement to be unacceptable because the DEIS uses a 10 mile Region of Interest (ROI), when we know that an oil spill can pollute more than 35 miles downstream.
Please protect our waters!
Wendy
1028 27th ave se Minneapolis 55414

--
Wendy Weimerskirch Plager

Levi, Andrew (COMM)

From: Sharon Planer, Pianist for Parties <sharon@pianistforparties.com>
Sent: Monday, July 10, 2017 12:05 AM
To: MN_COMM_Pipeline Comments
Subject: my comment on the proposed Enbridge Line 3 replacement

Docket numbers CN-14-916 and PPL-15-137
I live in central Minnesota on a farm near Annandale. I strongly oppose the Enbridge Line 3 pipeline being used in its existing form or its replacement form.

I believe overwhelming scientific research shows us that the burning of fossil fuels is adding to the buildup of greenhouse gases that are leading our planet into disastrous consequences for human life as we know it. The warming of our oceans are creating large sections of the Great Coral Reef to die. The summer polar ice is melting at an alarming rate which will open up the lure of more drilling for oil (resulting in the release or more greenhouse gases). Most alarming is the release of methane into the atmosphere due to the thawing of the permafrost due to the melting of Artic ice. Also, with the lessening of Artic surface ice and the result of open water, the sun's radiation will much more quickly warm our oceans. We have created a dangerous cycle that will be difficult to reverse. The burning of oil transported via the Enbridge pipeline will only make the problem worse!

Minnesota should be a leader in clean renewable energy. I ask that Enbridge discontinue use of the old leaking pipeline and not be allowed to build a new bigger one. An Enbridge pipeline will only add to the global accumulation of greenhouse gases. Please think of the future of our children! I have enjoyed living on a beautiful planet, I do not want to be responsible for destroying its habitability for human life.

Sincerely,

Sharon Planer
sharon@pianistforparties.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Dave Pluttner	218-368-7027	
ADDRESS: P.O. Box 51		
CITY, STATE, ZIP: Walker, MN 56484		

COMMENTS: I support the line 3 replacement project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Marcia Podratz <marciamn@yahoo.com>
Sent: Sunday, July 09, 2017 6:57 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Replacement Project - Docket Numbers CN-14-916 and PPL-15-137

I am writing to provide comments on the Enbridge Line 3 Replacement Project Draft Environmental Impact Statement (DEIS). I believe the process so far and DEIS have been very thorough, and it is important from a fairness and efficiency standpoint for regulators to consider all available information and make a timely decision without additional schedule delays. At this point, an extended process achieves little more than added project costs.

Replacement of Line 3 is a good idea because this line has been in place for decades and now has many areas that require additional ongoing maintenance to ensure continued safety and avoid potential leaks. I understand that the line is being monitored by Enbridge for corrosion and other problems, but I am concerned that more frequent "integrity digs" will be increasingly expensive, and that money could be put to better use by proceeding with the replacement project soon.

I am very familiar with the current and proposed Line 3 routes, as I was born in Grand Rapids and grew up in Bemidji before moving to Duluth for college. Both Grand Rapids and Bemidji have experienced significant population growth since Line 3 was constructed in the mid-1900s. Therefore, in order to limit the impact on residents, I think it makes sense to route the replacement line farther south, while mostly following existing rights-of-way for power lines and highways. In addition, it seems reasonable to clean out the existing line and retire it in place rather than trying to remove it, given its close proximity to other active lines that could be jeopardized by activity to remove the old line.

Enbridge (and its predecessor Lakehead Pipe Line) is a good corporate citizen that values environmental stewardship, community engagement, and safety. Pipeline construction and maintenance provide many benefits to that state and region, including jobs, property taxes, and support of local business. For these reasons, I encourage you to allow Enbridge to proceed expeditiously with the Line 3 replacement project as proposed.

Sincerely,
Marcia Houser Podratz

Levi, Andrew (COMM)

From: V. Pogatshnik <vpogatshnik@hotmail.com>
Sent: Sunday, July 09, 2017 8:44 PM
To: MN_COMM_Pipeline Comments
Subject: Re: CN-14-916 and PPL-15-137

To whom it may concern,

In regards to the proposed pipeline, here are the facts;
This route jeopardizes Minnesota's natural resources. The map clearly shows how Enbridge's proposed route (white line) traverses our best quality lakes, rivers, wetlands and forest ecosystems. Friends of the Headwaters (FOH) is NOT anti-pipelines. FOH has long advocated for alternative route SA-04 which avoids our cleanest water resources and crosses land less permeable and better suited for pipelines.
The risks posed by Enbridge's proposed route are many:
1. - This pipeline route crosses the clearest lakes area in MN based on the Census of Water Clarity (U of MN Water Resources Center).
2. - This pipeline route crosses an area with the highest susceptibility for groundwater contamination impacting drinking water aquifers (MPCA map).
3. - The pipeline route crosses the wild rice lakes area. According to the DNR, MN supplies 50% of the worlds hand-picked rice annually.
4. - The pipeline route crosses wetlands critical to waterfowl and other wildlife (DNR).
5. - The proposed route would cross 8 state forests (including the Mississippi Headwaters SF), 3 wildlife management areas, 13 trout streams (including the Straight River), as well as the North Country Trail.
6. - Line 3 would cross the Mississippi River twice in Minnesota. This river is a valuable source of drinking water for many cities on its 2,552-mile journey to the Gulf of Mexico, including Minneapolis and St Paul. 3.8 million gallons of water flow from Lake Itasca into the headwaters every day.
7. A few more facts:
* - The corridor will be covered with snow and ice for the long winter season. The Poplar pipeline spill (31,000 gallons) in the Yellowstone River in January of 2015 caused drinking water problems in Glendive, Montana. Clean up had to be postponed until spring. Imagine the effects of a similar spill in our Mississippi.
- PER DAY, this pipeline will carry 760,000 barrels of Alberta tar sand oil, also called "dilbit", the industry name for diluted bitumen - also known as "Cold Lake Blend". Don't be fooled. It's still tar sands oil. That's almost 32,000,000 gallons/day through our headwaters.
- Enbridge's pipeline spill of 850,000 gallons of tar sands oil in Michigan in 2010 polluted nearly 35 miles of the Kalamazoo River and has become one of the costliest spills ($1.2 Billion) in US history.
- The National Academy of Sciences Report on Diluted Bitumen (Tar Sands Oil) final finding is "diluted bitumen is virtually impossible to clean out of a water-based environment". WHY? BECAUSE IT SINKS!

Up here, a barrel of water is worth more than a barrel of oil...

Vicki Pogatshnik
1406 Burntwood Ct
Grand Forks, ND58201

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I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jay Poitevin	612-979-5353	jpoitevin@bad149.org

ADDRESS
600 4th St South #13

CITY, STATE, ZIP
Cannon Falls, MN 55009

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Elizabeth Polling	218-310-8554	
ADDRESS	1410 Summit Ave	
CITY, STATE, ZIP	Cloquet, MN 55720	

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

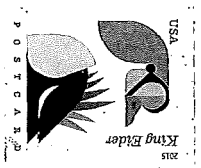

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Tim Pollock <tim.pollock@enbridge.com>
Sent: Thursday, July 06, 2017 9:50 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

As a 33 year employee of Enbridge I have witnessed the companys commitment and diligence towards the environment and the landowners/communities they operate in. I am an avid outdoors person who absolutely enjoys the lakes and outdoor activites and I very much care for the environment and want to see it protected. I know Enbridge also cares very much for the environment and has displayed there commitment to preserving the environment daily. The safety of the public, their employees and the protection of the environment are the top priorities in evey aspect of their operations and construction. This new pipeline is needed to ensure we have a safe, reliable conduit for the energy we all utilize everyday and need to maintain our lifestyle. The EIS was completed by experts and is very thoroughly done, this project needs to be approved and allow it to move forward now. This new pipeline is an example of Enbridges committment to safe trasportation of crude oil, i would urge you to examine any sites where Enbridge has performed construction or had a leak and you will be able to witness this companies committment to ensuring the Environment is protected. These sites are all as good and in most cases better than prior to Enbridge being there. This company provides vital community service in every community it operates in, including Fire depts, police departments, hospitals etc. they also provide jobs, not only for this company but also for many other busineses in these communities as Enbridge spends money at these busineses allowing them to hire employees. I am extremely proud to work for this company because of its values and integrity with all of its operating practices. Being and avid outdoorsman I have no concerns that this pipeline will adversly affect the lakes and environment during construction and during operation.

Sincerely,

Tim Pollock
1129 Industrial Park Dr SE
Bemidji, MN 56601
tim.pollock@enbridge.com

Levi, Andrew (COMM)

From: Shirley Pommerville <shirleyhelmen1@gmail.com>
Sent: Monday, July 10, 2017 2:28 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement

Dear Ms. MacAlister,

I am in favot of this replacement project. My father was the air maintenance supervisor at the Duluth 148th fight wing for many years. He continually was focused on maintenance to protect the pilots and aircraft. You don't delay maintenance!! I respect that Enbridge is taking care of this issue. The old line has lived its life. No other utility would be allowed to provide service with equipment that's at the end of its effectiveness.

Enbridge has already passed all the scrutiny needed for this, yet they are bending over backwards to listen to communities and accommodate all involved.

I believe Enbridge wants what's best for everybody. Hundreds of their employees live and work in this wonderful state. They enjoy the water and lakes! Nothing is gained by doing a line replacement that would not be safe! We all use the same land!

I'm concerned that the opposition is using this issue as a platform to raise social concerns that are not really a part of this issue. For example, one Native American woman almost physically attacked an Enbridge representative at a community meeting. She sais this project would bring in workers that would "steal their children and rape their women". She was aggressive, loud and very confrontational. This shows complete lack of knowledge about the project and speaks of an underlying anger about social issues that has nothing to do with the project.

We are all dependent on oil. It's a fact of life. Yes, efforts should and are in place to limit and reduce our carbon footprint. But that takes time. Meanwhile, safety (maintenance) must be considered first. The Native American population also relies on oil, like it or not. When one of their leaders rides dramatically to a meeting sight on a horse, is she not aware that many people saw the pickup truck pulling the horse trailer which was parked a few blocks away? So everyone needs to be wary of dramatic, attention getting actions which detract from the real issue of the line. We ALL need oil to protect our way of life.

Enbridge has a huge economic influence is our communities. They are good neighbors. They have conducted their community meetings with respect for everyone, in a non-confrontational way. This project needs to be approved. Irrational protesters who refuse thoughtful study of the issue should not be what drives this replacement issue. Safety should be what is considered first and foremost. Please look at this project with an objective mind. This is not the time for drama!

Sincerely,

Line 3 Supporter
4831 Avondale St
Duluth, MN 55804
shirleyhelmen1@gmail.com

Levi, Andrew (COMM)

From: Steven Pope <stevenppope@gmail.com>
Sent: Monday, July 10, 2017 4:30 PM
To: MN_COMM_Pipeline Comments
Subject: Docket numbers CN-14-916 and PPL-15-137

I am requesting that you please deny the request by Enbridge Energy to add a new pipeline along the next existing pipeline for Line 3. Constructing the new pipeline will result in more devastation to what is supposed to be the wildest portion of our state (i.e., the northeastern section of Minnesota), and the higher volume of oil moving through the pipeline means that almost double the amount of oil could contaminate the pristine area surrounding the pipeline in the case of a leak. Additionally, increasing our ability to transport fossil fuels is backward-thinking given that China, France, and other major economies are embracing alternative sources of energy. I request that you please respect one of the few wild places we have left in this state and deny the request by Enbridge Energy to construct a new pipeline for Line 3. Thank you.

Sincerely,

Steven Pope
256 Spring Street, Unit 415
Saint Paul, MN 55102
651-276-5718
stevenppope@gmail.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

UNITED STATES POSTAGE PITNEY BOWES $ 000.46⁰
02 1P
0001956485 JUN 21 2017
MAILED FROM ZIP CODE 55419

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Aaron Port	218-760-3086	aaronport721@gmail.com

ADDRESS: 416 carr Lake RD SW

CITY, STATE, ZIP: Bemidji, MN, 56601

COMMENTS: I support the line 3 replacement Because there is alot of safety that goes into the work so It wont leak and it will give us work to support our family.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS!

From: Laurinda Porter
To: MN_COMM_Pipeline Comments
Subject: (CN-14-916 and PPL-15-137) Comments on DEIS for Enbridge Pipeline
Date: Thursday, June 01, 2017 10:14:39 AM

To Jamie MacAlister, Environmental Review Manager,
Minnesota Dept of Commerce
St Paul, MN

I am writing to oppose the proposed Line 3 Pipeline Project that would allow Enbridge to build a substantial new portion of its Line 3. In my opinion, it would be better to continue to use the existing Line 3. Reasons can be found on page ES-11 as follows:

The primary benefits of continuing to use existing Line 3 instead of constructing the Applicant's proposed
Project are that continuing to use existing Line 3 avoids:
•Impacts and risks of opening up a new oil pipeline corridor, and
•Impacts associated with construction of a new pipeline. A significant portion of the Applicant's proposed Project would be located outside the existing Mainline corridor, causing habitat fragmentation and expanding the total acreage of land and resources exposed to the risk of a potential accidental release from a pipeline. Continued use of existing Line 3 avoids these impacts. Continued use of existing Line 3 also avoids the construction impacts associated with clearing a 120-foot-wide right-of-way and trenching hundreds of miles across Minnesota.

In my opinion, there is no need to transport crude tar sands oil from Canada to Wisconsin, crossing a substantial portion of Minnesota. This oil should remain in the ground and not be mined at all. Any pipeline carries the risk of spills and breaks. Northern and North Central Minnesota are the locations of the highest quality water resources in the state (see ES-14), including trout streams, wild rice beds, lakes of biological significance, and tullibee lakes; forest and wildlife habitat in northern Minnesota would also be damaged.

Thank you for considering my comments.

Laurinda W Porter, Ph.D.
Bloomington, Minnesota

-

Line 3 Replacement Project DEIS

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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

02 1P $000.34
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jace Porter	218-348-4773	
ADDRESS: 432 N 84th Ave W		
CITY, STATE, ZIP: Duluth, MN 55807		

COMMENTS

I support the Line 3 Replacement Project!!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Dennis Portinen <dportinen@hotmail.com>
Sent: Thursday, June 22, 2017 8:06 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I believe replacing aging infrastructure like pipelines is imperative to protecting the environment.

Sincerely,

Dennis Portinen
1857 Pine Street Rd
Ely, MN 55731
dportinen@hotmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Kevin John Potsardl	(218)206-1623	
ADDRESS		
1423 1/2 Cloquet, MN 55720		
CITY, STATE, ZIP		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

02 1P $ 000.34°
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Tari Prachar	952-836-6522	Tari.Prachar@unitedpiping.us

ADDRESS: 2714 N. 21st Street

CITY, STATE, ZIP: Superior, WI 54880

COMMENTS: I support the line 3 replacement.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Chuck Prentice <chuckprentice@yahoo.com>
Sent: Monday, July 10, 2017 11:33 AM
To: MN_COMM_Pipeline Comments
Subject: comment re CN-14-916 and PPL-15-137

My comment regarding the proposed Line 3 pipeline project:

> To protect our children and grandchildren from risk of severe climate disruption, it is now incumbent on us to NOW stop creating, investing in or allowing new fossil fuel infrastructure.

Signed,
Chuck Prentice
5009 West 60th Street
Edina, MN 55436

"Acknowledging climate change doesn't make you liberal it makes you literate." Paul Douglas

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Blake Prestemon

Street Address: 14315 500th st

City: Gonvick MN State: MN Zip Code: 56644

Phone or Email: 218-358-0290

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am in favor of line 3 pipeline project Because the opprotuity for work and all the local Bisinesses. what I dont get is the People that drive to work that arent in favor all drive vehicles and use fuel to get to their job. I really hope this passes it means alot to the community.

Thanks

Blake Prestemon

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Thomas Prew <Thomas.Prew@enbridge.com>
Sent: Tuesday, June 20, 2017 2:43 PM
To: MN_COMM_Pipeline Comments
Subject: In Support of Line 3R

I am currently an Operations Engineer for Enbridge, I have been a Licensed Professional Engineer for the State of Minnesota for nearly 30 years, I worked several years for the Minnesota Office of Pipeline Safety.

I am intimately familiar with the how these pipelines operate, the threats they operate under, and the consequences of a leak.

With that in mind, I offer the following comments:

Route Selection:

The Preferred Route was chosen to significantly reduce the risk of a leak, by first, minimizing the overall length of the pipeline. Obviously a longer pipeline creates more risk. Second, by locating it in a remote areas where 3rd party damage risk is minimized. The opportunity to locate the majority of pipeline away from highways and population centers is the major advantage of this route.

Enbridge Leak History:

Pipelines built in the 50's and 60's have a poor history of leaks which unfairly casts a cloud over modern pipelines. For example, Enbridge's Line 4 (Built in 1970's) has only 1 leak on the right of way in its history (Due to a rock in its first year of operation). Line 65 has had no leaks on the right of way. The same for Line 67. Modern pipelines have stronger steel, beautiful welds, immaculate coating, employ construction techniques that focus on what's best for the pipeline (rather than speed of installation), and far better maintenance than pipelines of previous generations. I have confidence in saying that Line 3R will have many decades of safe use.

Need:

Minnesota get the vast majority of its oil supply from Canada, as do many other Midwestern States. This stable source of oil allows us to enjoy some of the lowest gasoline prices in the country. We need to do what we can to protect this benefit for future generations.

Thomas Prew, P.E.
Senior Region Engineer
—
ENBRIDGE
TEL: 715-398-4703 | CELL: 715-817-8125
1320 Grand Avenue, Superior, WI 54880

enbridge.com
Integrity. Safety. Respect.

* IMPORTANT NOTICE* *
Unless otherwise indicated or obvious from the nature of the transmittal, the information contained in this email message

Levi, Andrew (COMM)

From: Sandie Price <tersandie@bigfork.net>
Sent: Monday, June 19, 2017 5:27 PM
To: MN_COMM_Pipeline Comments
Subject: Fw: Embridge line 3 pipeline CN-14-916, PPL-15-137

From: Sandie Price
Sent: Monday, June 19, 2017 5:22 PM
To: Pipeline.Comments@state.mn.us
Subject: Embridge line 3 pipeline CN-14-916, PPL-15-137

Embridge line 3 pipeline CN-14-916, PPL-15-137

I am a retired construction worker, energy user, and resident of the Embridge pipeline area. Embridge has safely transported energy for years. Now they want to create an even safer line for transport. PLEASE!!! Allow permits to be granted for this project. The commerce of the northland and the will-being of northland residents can only be improved by granting permits for completion of this project.

Thank you,

Terry Price
Marcell, Mn
56657

tersandie@bigfork.net

Levi, Andrew (COMM)

From: Sandie Price <tersandie@bigfork.net>
Sent: Monday, June 19, 2017 5:23 PM
To: MN_COMM_Pipeline Comments
Subject: Embridge line 3 pipeline CN-14-916, PPL-15-137

I am a retired construction worker, energy user, and resident of the Embridge pipeline area. Embridge has safely transported energy for years. Now they want to create an even safer line for transport. PLEASE!!! Allow permits to be granted for this project. The commerce of the northland and the will-being of northland residents can only be improved by granting permits for completion of this project.

Thank you,

Terry Price
Marcell, Mn
56657

tersandie@bigfork.net

Levi, Andrew (COMM)

From: Rhys Price Jones <rhyspj@me.com>
Sent: Friday, July 07, 2017 3:18 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

To Jamie Macalister
Environmental Review Manager
MN Dept of Commerce
85 7th Place East, Suite 280
St Paul, MN 55101-2198
via email to pipeline.Comments@state.mn.us

I have taught computer science at major Universities and Colleges in the United States, including Stanford University in California, the George Washington University in DC, the Rochester Institute of Technology in New York, Wellesley College in Massachusets, and Grinnell College in Iowa. I have served on advisory panels for the National Science Foundation, and am a Commissioner in Computer Science with ABET, the accreditation board for Engineering and Technology. I was an early participant in Cyber Security panels held in Washington, DC involving academics, industry, business, government, the military and the Security agencies.

I also care deeply about ecosystems and aquifers in Minnesota.

I hope the comment below will be of value in preparing the Environmental Impact Statement for the Enbridge Line 3 project.

Rhys Price Jones
Email: rhyspj@me.com
Phone: (703) 945 8916

There is abundant evidence that the proposed Enbridge Pipeline will be a prime target for cyber criminals both foreign and domestic. Enbridge's preferred route, close to crucial aquifers and water systems will leave the state of Minnesota far more vulnerable to devastating damage from the kind of cyber attack that, quite frankly, is very likely to occur.

I will reproduce here and provide references to several reports of significant cyber attacks against pipelines. Particularly concerning to the people of Minnesota must be way in which attacks have been aimed at parts of pipelines where the damage causes immense harm to important aquifers. An obvious precaution, not mentioned anywhere in the draft Environmental Impact Statement, is to position pipelines well away from crucial water systems that will be a target for criminals and terrorists. Such careful positioning is, in fact, the very opposite of what the

Enbridge preferred route accomplishes.

In Summer 2014, Symantec -- a major US provider of Cyber Security Services -- reported that hackers have sneaked malware into computers at powerplants and gas pipeline companies. The malware was used to steal documents, usernames and passwords. It is possible that the hackers have gained the ability to hijack controls. A CNN summary of this report can be found at http://money.cnn.com/2014/07/02/technology/security/russian-hackers/index.html

Also in 2014, Bloomberg Technology published "Mysterious '08 Turkey Pipeline Blast Opened New Cyberwar" (https://www.bloomberg.com/news/articles/2014-12-10/mysterious-08-turkey-pipeline-blast-opened-new-cyberwar).
There is evidence to indicate that a damaging 2008 explosion in a Turkish pipeline was the result of hacking. Future Tense, a collaboration between Arizona State University, New America and Slate, quoted (http://www.slate.com/blogs/future_tense/2014/12/11/bloomberg_reports_a_cyber_attack_may_have_made_a_turkish_oil_pipeline_catch.html)
from the Bloomberg Report:

> The central element of the attack was gaining access to the operational controls to increase the pressure without setting off alarms. Because of the line's design, the hackers could manipulate the pressure by cracking into small industrial computers at a few valve stations without having to hack the main control room. The presence of the attackers at the site could mean the sabotage was a blended attack, using a combination of physical and digital techniques. The super-high pressure may have been enough on its own to create the explosion, according to two of the people familiar with the incident. No evidence of a physical bomb was found.

Beyond damaging the pipeline, the attack caused thousands of barrels of oil to spill close to a water aquifer. NSA Director Admiral Michael Rogers has called America's energy sector our "Achilles Heel". The Department of Homeland Security's online News Wire has also reported the possibility of hacking causing the 2008 Turkish pipeline explosion:
http://www.homelandsecuritynewswire.com/dr20141217-2008-turkish-oil-pipeline-explosion-may-have-been-stuxnet-precursor

I find no reference to cybersecurity precautions within the Executive Summary of the Line 3 Replacement Project Draft Environmental Impact Statement. Indeed, when looking at the full document, all I can find of relevance is to be found within Section 2.8. And what I find there is deeply concerning. The proposed Pipeline Control System is wide open to the same kind of hacking that has been successfully used by cybercriminals worldwide for over a decade. I am reproducing those sections here so that the reader may observe the total lack of recognition of the vulnerabilities of the Control Center.

> 2.8.1.1 Enbridge Control Center

Enbridge has an existing Control Center and a fully operational back-up Control Center that would monitor operation, maintenance, monitoring, and emergency response for the Line 3 Replacement pipeline. The Control Center, which is staffed by pipeline operators 24 hours a day, includes computerized pipeline control and computational monitoring systems that allow operators to monitor and remotely control the pipelines and related facilities.

2.8.1.1.1 Pipeline Control System

Enbridge's Supervisory Control and Data Acquisition (SCADA) system is the central component of its existing pipeline control system. The Line 3 Replacement pipeline would be incorporated into the existing SCADA system. SCADA System Detects Anomalies and Allows Corrective Action

The Enbridge SCADA system, which is staffed by pipeline operators 24 hours a day, consists of pipeline sensing devices (including pressure, temperature, density, and flow sensors), a remote computer at each Enbridge pump station, a real-time communications network, a centralized data processing system, and a complete data display that is available to the pipeline control operator. The system includes automated alarms to warn operators when measurements depart from predetermined maximum and minimum limits.

The SCADA system reduces control errors and can automatically initiate pump station shut downs to maintain safe operating pressures. Pipeline control operators can also manually shut down the pipeline when they observe or suspect abnormal conditions. Enbridge enforces a "10-minute rule" that requires operators to shut down a pipeline within 10 minutes of observation of an abnormal condition that cannot be attributed to normal fluctuations in pressures and operating conditions.

In my considered opinion, these proposed precautions are woefully inadequate to deal with the very real and clear cyber threats of today's world.

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

02 1P $ 000.34⁰
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
WILLIAM PRINCL	218 269 2328	billprincl@yahoo.com

ADDRESS
2213 E 6th St

CITY, STATE, ZIP
Superior WI 54880

COMMENTS
out with the old in with the new create jobs & help with the economy

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Carmine <wyldoak@aol.com>
Sent: Monday, July 10, 2017 12:41 PM
To: MN_COMM_Pipeline Comments
Subject: Docket numbers CN-14-916 & PPL-15-137

Dear Jamie MacAlister,

I am against the MPUC approving the new Enbridge Energy pipeline.

Our state has made a commitment to developing and using renewable energy in response to the devastating effects of manmade climate change around the world. In order to actually follow through on that, we need more than words: We need to stop building and investing in fossil fuel infrastructure *now*.

We must accelerate the process of transitioning our energy grid to wind and solar immediately. Enbridge has a vested interest in delaying our conversion away from fossil fuels for as long as possible, but we cannot let the fossil fuel industry direct Minnesota's energy and environmental policies, or delay and control our response to climate change. We have the responsibility to choose wisely for the future—the stakes for our planet and our descendants are incredibly high.

Please deny the pipeline approval. Minnesota cannot afford to invest in a failing industry or to wait any longer to implement a sustainable energy future.

Sincerely,

Carmine Profant
5500 46th Ave S
Minneapolis, MN 55417

Levi, Andrew (COMM)

From: Robert Prosen <user@votervoice.net>
Sent: Friday, June 23, 2017 7:05 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 replacement

Dear Ms. MacAlister,

We need to replace pipelines to keep from have failures of old lines, otherwise the only alternative is to move the product by trucking or rail.

Sincerely,

Robert Prosen
4570 Cedar Island Dr
Eveleth, MN 55734
bobclyda@aol.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
BRYCE WILLIAM PURCELL	920-382-9824	BRYCE.PURCELL@unitedpiping.us
ADDRESS		
CITY, STATE, ZIP		
SUPERIOR, WI 54880		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Recipient Information

To: Jamie MacAlister, Environmental Review Manager
Company: Minnesota Department of Commerce
Fax #: 16515390109

faxZERO.com
send a fax for free

Sender Information

From: Carrie Quast
Email address: carrie_quast@hotmail.com (from 207.171.92.53)
Phone #: 5073139890
Sent on: Monday, July 10 2017 at 3:42 PM EDT

Hello - I am faxing to voice my concern about Enbridge's proposed new Line 3 pipeline (Dockets CN-14-916 and PPL-15-137). The proposed line goes through sensitive wildlife areas as well as being detrimental to tribal land. Also, crude oil is on the way out. I'd prefer to see permits issued for clean sources, such as wind and solar, rather than polluting oil. Thank You Carrie Quast, New Ulm MN

This fax was sent using the FaxZero.com free fax service. FaxZero.com has a zero tolerance policy for abuse and junk faxes. If this fax is spam or abusive, please e-mail support@faxzero.com or send a fax to 855-330-1238, or phone 707-400-6360. Specify fax #19830656. We will add your fax number to the block list.

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

02 1P $ 000.34°
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
THOMAS A RADKE	920-723-3841	
ADDRESS		
940, E. LAKE st.		
CITY, STATE, ZIP		
LAKE MILLS WIS 53551		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Jamie MacAlister

Environmental Review Manager

Minnesota Department of Commerce

85 7th Place East, Suite 500

St. Paul, MN 55101

June 6, 2017

RE: Enbridge Line 3 Replacement Project

This communication is to express my support for this project. This is the safest way to transport oil from the fields to storage facilities and refineries. There is such great risk to human life, property, and the environment using our rail system to transport crude. These trains go through many cities and towns, often traveling at great speeds. When a train de-rails there is imminent danger to anyone and anything surrounding the affected vicinity.

Shipping oil by rail also impedes the flow of other domestic products that vie for the availability of timely transportation. Lumber and grain are two examples. There are times farmers cannot secure shipment of their crops to market due to no available trains. They are then forced to "dump" the grain on the ground when storage facilities are full. This surely must have an effect on the quality. Our nation feeds many. The harvest needs to be distributed as quickly as possible.

It would be difficult to identify anyone who doesn't benefit from the oil production in this country. Even the most ardent opponents of this project enjoy the comforts of transportation, consume food produced on our farms, and use utilities supplied by our oil industry.

I have no doubt about Enbridge being good stewards of the earth. There are landowners in my family with "pipeline" installed in the 1960's. There has never been a problem and they are aware of the monitoring done by the company. The fact that Enbridge feels it is time to replace the existing infrastructure gives me confidence they are looking out for the good of all.

A. Radniecki

Angela Radniecki
1224 Birchwood Drive
Proctor, MN 55810

RECEIVED
JUN 09 2017
MAILROOM

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Deb Rahkola	218-428-9568	
ADDRESS		
5679 Plainview Dr		
CITY, STATE, ZIP		
Duluth, MN 55810		

COMMENTS

Reduce RAILROAD shipping of oil. INSTALL New pipe which is safer to environment and people.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

SAINT PAUL MN 550
10 JUL 2017 PM 2 L

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: lraisch@heartofiowa.net
Sent: Tuesday, July 04, 2017 10:05 AM
To: MN_COMM_Pipeline Comments
Subject: "Public Comment: Line 3 Project
Attachments: Propose Enbridge Energy Project Line 3 Comments.doc

"Public Comment: Line 3 Project
(CN-14-916 and PPL-15-137")

Jamie Macalister
Environmental Review Manager
MN Dept. of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

From:
Name: Leslie R Raisch
Address: 5612 Cutgrass Lane NE
Outing, Minnesota
56662
lraisch@heartofiowa.net
641-640-0140

Levi, Andrew (COMM)

From: Steve Giorgi <SGiorgi@ramsmn.org>
Sent: Wednesday, July 05, 2017 10:47 AM
To: MN_COMM_Pipeline Comments
Subject: Attn: Jamie MacAlister - Line 3 Replacement Comments
Attachments: Letter to Dept of Commerce on Enbridge LIne 3 project 070517.pdf

Jamie MacAlister – Environmental Review Manager

Please see attached correspondence submitted by the RAMS (Range Association of Municipalities & Schools) in support of the Enbridge Line 3 Replacement project.

Steve Giorgi
Executive Director
RAMS
SGiorgi@ramsmn.org
218-780-8877

RAMS range association of municipalities and schools
5525 Emerald Avenue · Mountain Iron, MN 55768
Phone: 218.780.8877 · Email: SGiorgi@ramsmn.org

Jamie MacAlister
Environmental Review Manager
Department of Commerce
85 7th Place East Suite 280
St Paul, MN 55101

OFFICIAL COMMENT ON THE ENBRIDGE LINE 3 REPLACEMENT PROJECT

RAMS (Range Association of Municipalities & Schools) Stands with Enbridge on Line 3 Replacement

The RAMS board of directors stands with Enbridge on the validity and need for the Line 3 Replacement project. Enbridge has built and maintained pipelines for decades in Canada, Minnesota, Wisconsin and other areas of the country. The pipeline currently carry oil to the refinery in Superior is in need of replacement to ensure the safety of our communities, the protection for the environment and the uninterrupted supply of fuel for our region.

The RAMS board of directors believes that the installation of a new pipeline installed by skilled American workers, using American made steel, utilizing the most modern monitoring equipment is a pathway to a safe and secure energy supply line that also pumps up our regional economy. The project will include a $2.1 billion dollar investment by Enbridge in Minnesota alone, which will result in over 1500 high paying construction jobs, and dollars being spent in small town local communities during the construction of the pipeline. Enbridge is a great civic business partner, not only in the Twin Ports, but across the region.

In this day and age, it seems as if every construction project of any magnitude comes with controversy, divisiveness and politics. For the RAMS board of directors, having a company stand up and be responsible by proposing to build a new, modern, safer pipeline to replace an aging, failing pipeline makes the decision easy. RAMS supports the Line 3 Replacement project because it is the right thing to do.

On Behalf of the Board of Directors,

S Giorgi

Steve Giorgi
RAMS Executive Director
sgiorgi@ramsmn.org
218-780-8877

Check us out at www.ramsmn.org

"One Range...One Voice"

From: Steve Giorgi
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Replacement Project is the Right Thing To Do
Date: Friday, June 09, 2017 1:20:05 PM

Dear Ms. MacAlister,

As the Executive Director for RAMS (Range Association of Municipalities & Schools) a public sector organization that represents townships, cities and school districts located in the Taconite Assistance Area, I am proud to stand in support of the Line 3 Replacement Project. The RAMS board of directors has also taken a position of support as the replacement project will only enhance the safe delivery of needed energy fuel for our region while providing the most modern safety measures to protect our communities, citizens and the environment.

The economic benefits for our region will also be enhanced with an investment of $2.1 billion dollars in Minnesota alone and local business owners will be directly impacted during the construction phase of the project. Enbridge's plan to replace an aging, failing pipeline with a new pipeline using Amercan made steel, with American workers is good for America and the region. The proposed routing of the pipeline minimizes the overall footprint of the project and will provide long term safe delivery of a much need energy product.

Sincerely,

S Giorgi/Executive Director RAMS
5525 Emerald Ave
Mountain Iron, MN 55768
sgiorgi@ramsmn.org

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

02 1P $ 000.34°
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
ALLen Lee RAPP	218-348-4236	
ADDRESS		
5350 Munger Shaw Rd		
CITY, STATE, ZIP		
SAginaw Mn 55779		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: doug & kathy rasch <horsehillgarden@gmail.com>
Sent: Monday, July 10, 2017 5:59 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)
Attachments: DEIS comments.docx

Attached are our comments on the DEIS for the Line 3 pipeline project.

Please respond – will they be included in the EIS?

Thank You,
Kathy and Doug Rasch

Virus-free. www.avast.com

July 10, 2017

Jamie MaCalister

Environmental Review Manager

MN Department of Commerce

85 7th Place East, Suite 280

St. Paul, MN 55101-2198

Dear Jamie MaCalister,

We would like to see RA-07 or RA-08 seriously considered as the route within the EIS to be recommended by the Department of Commerce. We wish the system alternative, SA-03 from the previous Sandpiper/Line 3 proposal, had been considered within the EIS. In the final EIS this route should be reconsidered and again offered and evaluated as an alternative route.

If this pipeline is built using the Enbridge preferred route there is serious concern in our community and others in Minnesota that the social and political effects will estrange people within their communities; it will result in physical activism that will require law enforcement to control and will make neighborhoods along the construction route unsafe for people who live there. Our greatest concern is that the relationship between Minnesota and the Native community will be hurt in ways that will be long-term and socially difficult to repair. Is Enbridge's' preferred route so important that we would, as Minnesotans, divide ourselves and risk our promising community with the Tribes? We cannot imagine the financial rewards for Minnesota are great enough to allow Enbridge to use their proposed route when less divisive options are available. These long term impacts should be carefully evaluated in the EIS.

Chapter 9 in the DEIS discusses impacts to Tribal lands and the people who live and eat there. It is about time we include the Tribes in the process of pipeline routing. If we had done this when the first pipelines were constructed nearly 70 years ago we would not be having this discussion today. The pipelines would have routed to avoid any impacts to the tribes and resources they value and would not be where they are today. The Sandpiper/Line 3 SA-03 is one more option to acknowledge social and environmental justice.

Page ES-7 of the DEIS, near the bottom of the page, states "Enbridge would need to acquire permanent right-of-way in these locations through amicable agreements with tribal and federal landowners because it cannot use eminent domain to acquire a right-of-way across these lands……. Enbridge maintains that the ability to obtain limited term permits and easements is uncertain." This should not even be included in the EIS as a criterion or factor in route or system selection. This is a pre-mature leap to the use of eminent domain and an abuse of that power.

These are our comments on the DEIS. Please include them in the final EIS.

Respectfully Submitted,

Doug and Kathy Rasch

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Alvin Rasmussen	694-2556	arr451@gvtel.com
ADDRESS		
20233 300th Street		
CITY, STATE, ZIP		
Bagley, MN 56621		

COMMENTS

We would like to see Line #3 replaced - and oil to continue flowing through our township and County.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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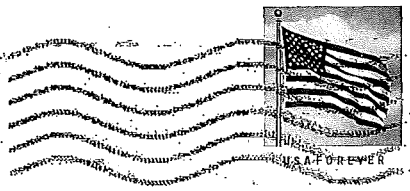

3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

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JUL - 3 2017
MAILROOM

June 27, 2017

Minnesota Department of Commerce

85 7th Place E, Suite 280

St. Paul, Minnesota 55101-2198

Attn: Jamie Macalister

Enviromental Review Manager

Re:Line 3 Project Draft EIS

Dear Ms. Macalister,

I attended one of the 22 public meetings held throughout Minnesota (In Foley)regarding the EIS Draft on the Enbridge Line 3 pipeline proposal just to familiarize myself with what is being proposed. I knew very little about it and appreciated the work your agency has done to inform residents of Minnesota of the matter. It appears that the current line 3 is not being utilized to its full capacity due to its age and current condition. I get that. What I don't understand is the applicant's choice of a preferred route. Clearly, it appears that Enbridge has chosen the most economically feasible route, but at the same time, has chosen to look the other way and disregard its potential endangerment to the heart of Minnesota's pristine lake country.

Considering that the proposed routing:

1. Crosses the clearest lakes area in Minnesota (based on the census of water clarity –U of Mn Water Resources Center)
2. Crosses an area with the highest susceptibility for groundwater contamination impacting drinking water aquifers (Minnesota Pollution Control Agency)
3. Crosses the wild rice lakes area, which according to the DNR provides 50% of the world's hand picked rice annually
4. Crosses wetlands critical to waterfowl and other wildlife
5. Crosses 8 state forests (Including the Mississippi Headwaters), 3 wildlife management areas, 13 trout streams, as well as the North Country trail
6. Crosses the Mississippi River twice in Minnesota, jeopardizing clean drinking water for many cities downstream, including St. Cloud, Minneapolis and St. Paul,

. . . I join at least three fourths of the gathering in Foley (in my estimation) who spoke against the proposed route. The reason Minnesota is a destination for hundreds of thousands of people is because of our 10,000 plus lakes. If we want to speak "economically," the combined travel and tourism annual revenues during the recession years in 2007 – 2008 in Aitkin, Cass, Crow Wing, and Hubbard Counties alone amounted to $713,699,246 and the state realized $326,376,889 in state revenues (Univ. Of Mn Extension Service June 2007-May 2008, Davidson - Peterson & Associates) That's almost a Billion dollars! In addition, it provided over 17,000 jobs! The best Enbridge can do for the people of Minnesota is 1,500 temporary jobs.

My main concern, however is the danger that this routing would pose to our beautiful and popular Minnesota environment. It is one of our greatest treasures as a state. Why would we want to Jeopardize it's future. Furthermore, if there is an oil leak it would be almost impossible to clean up. Usually, when oil meets water, it floats on the surface and can be removed. But the kind of oil that comes from the tar sands of Alberta, (Diluted Bitumen) according to the National Academy of Sciences, is virtually impossible to clean out of a water based environment. Why? Because it sinks! – coating the bottom of the waterway. Enbridge's pipeline spill of 850,000 gallons of tar sands oil in Michigan in 2010 polluted nearly 35 miles of the Kalamazoo River and has become one of the costliest spills ($1.2 Billion) in US history. Can you imagine that scenario happening in our beautiful lake region? Enbridge alone has had less than admirable record with 804 spills in the last decade amounting to 6,781,950 gallons spilled in the US and Canada.

At the public forum in Foley, I asked one of the team members if it wouldn't make sense to use an alternate route far to the North that passes through a section of the state that has very few lakes and waterways. His response was that the substrata in that part of the state is comprised of rock, making it difficult and costly. I suggested that perhaps it could be above ground where it might also be more effectively monitored. We do have that capability at a minimal cost today through the use of drones. He agreed that might be a solution. Also I have been made aware of another possibility that would by- pass Clearbrook, follow the I-29 corridor to the South Dakota Northern border and then cut across Southwestern Minnesota and Northeastern Iowa and Northern Illinois to deliver oil to Joliet. There are other options. They may not be as cost effective to Enbridge, but we have to think about what makes sense for our state and generations to come!

Again, thank you for the work you do and I sincerely hope that you will not put our state's environment in jeopardy by approving this proposed routing. We have nothing to gain by it and a whole lot to lose.

Sincerely,

Dennis C. Raymond

Dennis C. Raymond

1259

DENNIS C. RAYMOND
613 19TH AVE. SE.
ST. CLOUD, MN 56304

MINNEAPOLIS MN 553
30 JUN 2017 PM 5 L

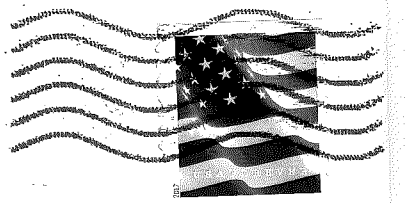

ATTN: JAMIE MACALISTER
ENVIROMENTAL REVIEW MANAGER,
MINNESOTA DEPT. OF COMMERCE
85 7TH PLACE E., SUITE 280
ST. PAUL, MN.
55101-2198

55101-601399

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Ann M. Reckinger

Street Address: 1815 N. Robin Av

City: Duluth State: MN Zip Code: 55811-2000

Phone or Email: reckfive@charter.net

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am an environmentilist #1 because I have 3 children that appreciate the outdoors and we all want this beautiful earth & clean water for generations to come.

Yes, I am an employee of 30 years at Enbridge let me tell you 2 personal stories.

In 2008, I attended a Contractors Safety meeting at the DECC in Duluth. No one knew I was an employee & sat in the back of the room of 200 people. As the contractor spoke, I listened. They mentioned that Enbridge was tough on safety, no slips, by the book, even above the book. I was pleased to hear this but said nothing.

Another event I was present at was when our Enbridge VP's had to make major decisions for a pipeline leake. The meeting was behind closed doors & they could have taken the easy & cheaper way to fix the issue, rather they did not. The chose to do the right thing, no matter the cost.

The L3 Replacement is the right thing to do now!

Thank you

If including additional pages please number them and tell us how many you are providing:_____ pages

From: Ritaannreed
To: MN_COMM_Pipeline Comments
Subject: Pipelines
Date: Wednesday, May 31, 2017 2:13:18 PM

Please stop with the pipelines, other sources of energy can be profitable.

Shalom,
Rita Reed

Sent from my iPad

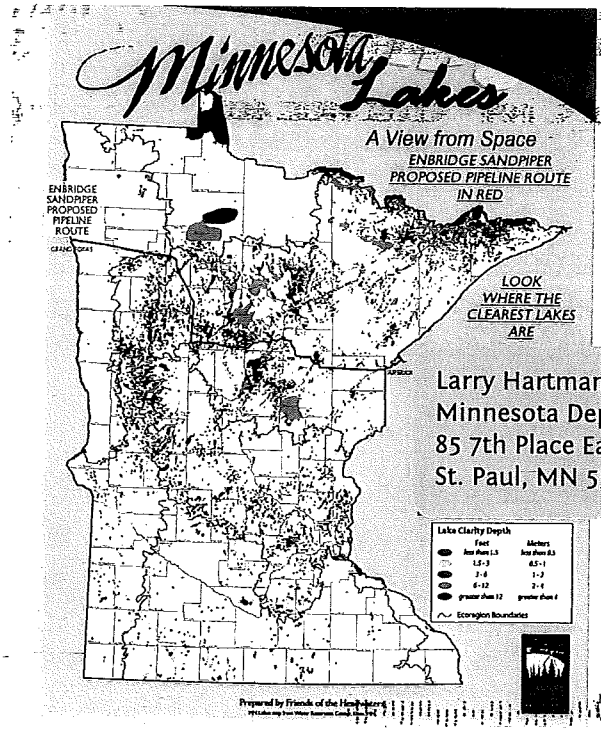

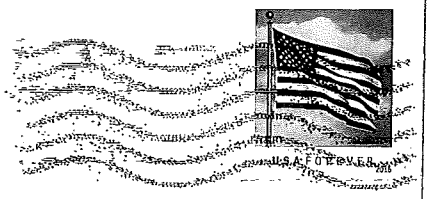

Write a public comment!

Larry Hartman
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101

Map by Friends of the Headwaters:
www.friendsoftheheadwaters.org

MN 350

I oppose the Sandpiper pipeline!

PUC Docket: 13-474

This proposed expansion of Enbridge's pipeline network would perpetuate extreme climate disruption. The Sandpiper would enable even more extraction and burning of dirty Canadian tar sands and frakked Bakken oil, while climate science tells us we need to be keeping this oil in the ground for a livable future.

Please Protect Minnesota Waters!

Name: Dan Reed

Phone:

Email: tbarry@macapitalist

Address:

Levi, Andrew (COMM)

From: Anne Reich <reichmn@gmail.com>
Sent: Thursday, June 22, 2017 3:22 PM
To: MN_COMM_Pipeline Comments
Subject: Comment re: Enbridge Line 3

Dear MN Department of Commerce:

RE: Dockett numbers CN-14-916 and PPL-15-137

As a Minnesotan who relies on clean water for survival (as each and every one of us does), I find the Enbridge Line 3 Draft Environmental Impact Statement to be unacceptable for adequately protecting Minnesota's waters for humans, wildlife, and our ecosystem. The DEIS is unsatisfactory for the following reasons, among others:

RE: DEIS Chapter 10.2.4.1.1

Enbridge's record for oil spill incidents is unacceptable. The fact that "the annual probability of a spill incident for the Applicant's preferred route was estimated as 0.249 incidents per year with a recurrence interval of 4.0 years" is shocking. In reality, every year there would be a 25% risk of an oil spill, which means a risk of one spill every four years. **Minnesota should not permit a project with such a high risk probability.** There is no such thing as a "clean up" of an oil spill — impacts to the ecosystem *and economy* are negative and longterm.

RE: MN Statute 103F.305 Scenic River Protection Policy https://www.revisor.mn.gov/statutes/?id=103F.305

Our state government is charged with protecting our waters, among them Scenic Rivers. The proposed Enbridge Line 3 is in conflict with this state statute. It will be crossing either tributaries of scenic rivers (e.g., the Kettle River is crossed twice, and is a tributary of the St. Croix River, a National Wild and Scenic River) or the rivers themselves (our mighty Mississippi). The pollution risks listed in my point above are such that our great state, which relies on clean water for life *and livelihoods*, should reject this pipeline.

Thank you for doing all you can to protect Minnesota from destructive businesses that do little to benefit our state and have the potential to inflict great harm.

Sincerely,

Anne Reich
Concerned citizen and voter
751 Pine Cone Trail
Marine on St. Croix, MN 55047
651-433-1341

Levi, Andrew (COMM)

From: Julia Reich <jul.a.reich@gmail.com>
Sent: Thursday, June 22, 2017 4:20 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Draft Environmental Impact Statement (DEIS)

Dear Jamie MacAlister and MN Department of Commerce,

Re: CN-14-916 and PPL-15-137

I consider the St. Croix River my home. I am greatly concerned about the proposed Enbridge Line 3 pipeline and its negative impacts on not only the St. Croix River, but the other 191 rivers, lakes, marshes, and wild rice beds it will affect.

The criteria that have been presented by Enbridge are unacceptable. EIS requirements must be more stringent.

Regarding DEIS Chapter 10.2.4.1.1, it is estimated the annual probability of a spill incident for the applicant's preferred route was estimated as 0.249 incidents per year with a recurrence interval of 4.0 years. This means that every year there would be a 25% risk of an oil spill, which means a risk of one spill every four years. We cannot accept this high risk probability. Minnesota is home to pristine, fragile waters, and the risk of an oil spill is not worth the few benefits of the pipeline. There is no such thing as "cleaning up" an oil spill - waters will be forever damaged, and with them ecosystems and the economy.

Water is crucial to all aspects of life, and I believe our state of Minnesota cares too much about its people, economy, and environment to approve a pipeline that benefits essentially no citizens and has the potential to harm everyone.

Thank you for doing your part to ensure the safety and wellbeing of Minnesota's people, waters, and economy.

Sincerely,

Julia Reich
P.O. Box 145
Marine on St. Croix, MN 55047

Levi, Andrew (COMM)

From: Henry Reich <reichhen@gmail.com>
Sent: Monday, July 03, 2017 12:52 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Draft Environmental Impact Statement (DEIS) Comment

Dear Manager MacAlister,

I'm writing with a comment about the proposed Enbridge Line 3 pipeline (CN-14-916 and PPL-15-137).

I am STRONGLY OPPOSED to the construction of this pipeline or any similar to it, for reasons of likely environmental damage. The environmental impact statement Chapter 10.2.4.1.1 says that "The annual probability of a spill incident for the Applicant's preferred route was estimated as 0.249 incidents per year with a recurrence interval of 4.0 years" and Chapter 5.2.1.2.4 says there is a possibility of a frac-outs every 5.5 river crossings during the construction, both of which represent an UNACCEPTABLY HIGH RISK of polluting out state's pristine waters.

In addition, the pipeline will contribute to furthering the costly impacts of climate change, which is a serious long-term threat to the State of MN and our land, air, and water.

Please REJECT the Enbridge Line 3 pipeline.

Thanks,

Henry Reich
PO Box 145
Marine on St. Croix, MN

From: Justin Reid
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137
Date: Monday, June 05, 2017 11:40:04 AM

Dear Ms. MacAlister,

Enbridge spends millions of dollars to ensure environmental protection during these new pipeline installation projects. I worked as a contractor for the Enbridge Flanagan South Pipeline (Illinois) installation and the attention to environmental impact was very impressive. We had hundreds of inspectors dedicated to invasive species, environmentally sensitive areas, ROW, and soil management. Now that I am an Enbridge employee I can now witness the tremendous amount of effort that goes into the pre-planning for these projects to ensure our state resources are protected thru out the life-cycle of the project. Enbridge will do a great job installing and operating this pipeline, and will protect our environment resources during the process.

Sincerely,

Justin Reid
3978 Lavaque Rd
Hermantown, MN 55811
justin.reid@enbridge.com

Levi, Andrew (COMM)

From: Don Reierson <drreierson@gmail.com>
Sent: Wednesday, July 05, 2017 3:19 PM
To: MN_COMM_Pipeline Comments
Subject: PIPELINE

We would like the Enbridge Energy Pipeline 3 to follow the SA-04 route to avoid traveling through the Whitefish Chain and Pine River Watershed.
Thank you,
Don & Jane Reierson
40874 West Fox Lake Road
Fifty Lakes,MN 56448

Levi, Andrew (COMM)

From: Andy Reierson <andy.reierson@flint-group.com>
Sent: Monday, July 10, 2017 10:44 AM
To: MN_COMM_Pipeline Comments
Subject: I support Enbridge Line 3 replacement

Dear Ms. MacAlister,

I am in full support of the replacement for Line 3. It is a known fact that pipelines are cost effective and safe energy transportation channels that provide North America with necessary crude oil. The prompt replacement of Line 3 will ensure the safety and environmental protection of our important natural resources as well as the continued safe transportation of crude oil to refineries in Minnesota, the Midwest and beyond.

The Line 3 Replacement Project in North Dakota, Minnesota, and Wisconsin will reduce the amount of future maintenance activities and landowner disruption otherwise required to maintain safe operations. Enbridge has gone above and beyond in their work with land owners and community members to ensure voluntary statements of consent were signed and public comments and concerns were addressed.

On top of the safe and efficient transport of crude, replacing Line 3 will significantly impact Minnesota's economy and bring jobs to the state - 8,600 jobs and long-term tax benefits to Minnesota communities.

We need the construction jobs and our communities benefit from the extra tax dollars. With 2.1 billion of the work done in Minnesota, this is a no-brainer for our state.

Thank you for your efforts to understand the issue and bring safe, smart projects like this to our state.

Sincerely,

Sincerely, Andy Reierson
3900 Gladstone St
Duluth, MN 55804
andy.reierson@flint-group.com

Levi, Andrew (COMM)

From: David Reisenweber <bigwater46@gmail.com>
Sent: Monday, July 10, 2017 4:43 PM
To: MN_COMM_Pipeline Comments
Subject: line 3

It's really stupid to run tar sands oil through
water rich Mn. DAVID REISENWEBER DULUTH MN.

Levi, Andrew (COMM)

From: john or Jane reish <jronloon@gmail.com>
Sent: Sunday, July 09, 2017 11:36 AM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137).

Dear Environmental Review Manager,

I'm writing to you today as a long time resident of Park Rapids in Hubbard County. Beside my husband John, we also have children and grandchildren living here and so I feel that I have a responsibility to write to you about this land we love.

Neither my husband nor I am opposed to pipelines in general. We are strongly opposed to the location of THIS pipeline. In a nutshell, if a pipeline can be placed where it will do the least harm in case of a leak that location should be used! **The state of Minnesota should be our staunchest warrior in this regard.**

From what I can determine, there is so much wrong or missing in the EIS: Conflict of interest with contractors hired to perform tests. Who hired them, State or Enbridge? What are the "drilling fluids" they use? I have heard they are toxic, but that question is not answered. Why this route when there is an excellent alternate route proposed?

Can I hope for answers? Will this be resolved in a way that is fair to the residents of Minnesota but particularly to Hubbard County? I want to believe someone is reading this note and my voice will be heard.

Respectfully yours,

Jane Reish
19553 Grouse Rd
Park Rapids, MN 56470
218-252-6956

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Richard A. Renner	218-780-0585	
ADDRESS: 221 Cambridge Rd		
CITY, STATE, ZIP: Hoyt Lakes MN 55750		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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MAILED FROM ZIP CODE 55811
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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Chris Reville	715 399-2252	
ADDRESS		
6955 S. Cty Rd W		
CITY, STATE, ZIP		
Foxboro WI 54836		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: John <fishes@brainerd.net>
Sent: Sunday, July 09, 2017 9:40 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137 Public Comment: Line 3 Project (CN-14-916 and PPL-15-137

Environmental Review Manager:

Please accept my comments into the public record. Leaving the current line 3 in the ground is very dangerous. I've worked on pipelines and around drill rigs. A full line is dangerous to the environment but an empty line is downright dangerous. It's only a matter of time before it corrodes through and allows the introduction of oxygen. Once that happens the pipeline becomes one very big and very long bomb.

At that point all it takes is a simple ignition which could be a grass fire or some other spark and the line begins to explode. Not only does it explode once, it continues to explode as the shock wave creates high pressure that cause another explosion and then another as the shockwave moves down the pipeline. It act like a giant diesel engine as explosions.

If this Canadian pipeline company wants to make a profit in MN it must do this in the least destructive manner. It cannot take the money and run and leave this state with the risk of injury or death and damage to our environment. The line 3 corridor is already disturbed and this is the ONLY place suitable for the new line 3.

I am intimately familiar with the area north of Crow Wing County after having trapped and hunted that area for the past 45 years. It is WET and is crisscrossed with small flowages that lead to the Whitefish Chain of lakes. It would be nearly impossible to clean up a spill at any time and nearly impossible to reach the spill in the summer. That chain supports a multi-million dollar tourist economy. Poison that with the inevitable oil spill and you will have just destroyed an economy so that a Canadian pipeline company can make a profit selling oil that should be left into the ground.

This is a BAD idea and I do not support it.

Sincerely,
John Reynolds
26385 County Road 3
Merrifield MN 56465

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Rodney Rhen	218-968-2341	
ADDRESS		
24001 2ND ST - P.O. BOX 35		
CITY, STATE, ZIP		
LEONARD - MINN - 56652		

COMMENTS

The pipeline is a asset to Both the county & the townships for the taxes the pipeline pays & the Jobs it provide & it is much safer than transpiting oil by rail.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: bteboup <bteboup@yahoo.com>
Sent: Monday, July 10, 2017 5:19 PM
To: MN_COMM_Pipeline Comments
Subject: Referencing :CN-14-916 and PPL15-137

In reference to Endbridge pipeline 3 for the sake of humanity, our future generations, the future of beautiful Minnesota golden waters, continued disregard disrespect of Native American culture treaties treatment the pipelines have to go. Endbridges continued pollution of our Mother Earth can not continue. Endbridge has to clean up their old decaying lines. They make millions while they continue to pollute our land and waters with no concern of the health hazards and the loss of clean waters of MILLIONS of people. Now they want to ruin Minnesota's wild rice, a food of Native Americans, a resource of money and culture. Shame on you for considering it to line your filthy pockets. What will your great grandchildren think of your decision??? Standing Rock will become the smallest gathering in the pipeline protest.

SAY NO TO ENDBRIDGE LINE 3

Respectfully
Lynn M Rice
Bteboup@yahoo.com
8948 Columbus Ave S
Bloomington Mn 55420

Sent from my Verizon Wireless 4G LTE smartphone

Levi, Andrew (COMM)

From: Diana Richardson <licketysplit777@gmail.com>
Sent: Sunday, July 09, 2017 10:00 PM
To: MN_COMM_Pipeline Comments
Cc: letters@oregonian.com
Subject: Comment on CN-14-916 and PPL-15-137, Draft Economic Impact Statement, Pipeline 3

My comments on the DEIS are extensive so I have chosen to limit my remarks to the arena of impacts of the proposed Pipeline 3 project of Enbridge on the Tribal Peoples living in the path of the proposed pipeline.

The State of Minnesota has treaty responsibilities to the Tribal Members who will be affected by the adverse effects, which are multiple and terminally damaging to overall well-being and sustainable life practices of Tribal People.

Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "**are part of a larger pattern of structural racism**" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3).

The DEIS concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) **But it also states that this is NOT a reason to deny the project**!

Clearly this statement that it is NOT a reason to deny the project is a contradicton of 11.4.3 and a violation of not only treaties but of
the Minnesota Department of Health's findings.

The DEIS is obligated to take this into account in preparing the final EIS. To do anything less is to contribute materially to environmental injustice for which Minnesota can be held morally and legally liable.

Sincerely,
Diana Richardson
1905 SW Sunset Blvd.
Portland, Oregon

Diana Richardson

Levi, Andrew (COMM)

From: Bruce Richardson <brichinariz@gmail.com>
Sent: Monday, July 10, 2017 2:10 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

As a proud Minnesotan, I take great interest in issues that affect my way of life and safety. Our aging infrastructure is one of those issues that concerns me.

I have closely followed the progress of Enbridge's Line 3 replacement project as it has worked its way through the environmental review and public comment period.

Allow me to be one of those voicing support for the process, the proposed route of the line which largely follows an existing route, and the line itself, which supports the safe and efficient delivery of oil to refining operations.

Underground pipelines have proven to be safe and effective means for transporting oil, natural gas and fuel long distances, reducing the need for overland transport via truck and rail, which expose the public and our communities to greater risk.

No more review and study is necessary -- please honor the statutory deadline of 280 days for the review process.

Thank you for the opportunity to comment.

Sincerely,

Bruce Richardson
2961 Edward St
Saint Paul, MN 55109
brichinariz@gmail.com

I do not want the pipeline.

Let's get serious about

climate change.

Do not invest in things that

will cripple the planet.

Lew Rickert

Levi, Andrew (COMM)

From: Nora Rickey <norarickey@gmail.com>
Sent: Monday, July 10, 2017 10:46 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge's Line 3 Pipeline

To Whom It May Concern,

Please do what you can to reject this pipeline's creation! My community depends on our pristine waters and land for life, inspiration, and futures to come. A pipeline would certainly destroy this area as it has destroyed the other territories it has cut through. I do not stand with any decisions to approve this pipeline as it goes against everything I believe and hold dear to me. Help Minnesota make the change to protect our earth's future by STOPPING this pipeline!
CN-14-916 and PPL-15-137

Thank you,
Nora Rickey

Levi, Andrew (COMM)

From: Kara Rickson <kararickson@yahoo.com.au>
Sent: Monday, July 10, 2017 8:20 PM
To: MN_COMM_Pipeline Comments
Subject: US citizen abroad & registered MN 55113 voter: Comments regarding Line 3 and docket numbers CN-14-916 and PPL-15-137

To whom it may concern,

Thank you for accepting comments on the Draft Environmental Impact Statement (DEIS) for the proposed construction of a replacement Enbridge Line 3 pipeline through northern Minnesota. I am greatly concerned about several significant issues that have received little or no attention in the DEIS. My concerns, detailed further below, include the neglect of issues of Native sovereignty, the civil and human rights and wellbeing of tribal communities, the highly toxic nature of tar sands oil, the highly sensitive nature of related watersheds, impacts on global warming and air pollution, the lack of an investigation of a 'no pipeline' scenario, and the egregious track record of Enbridge itself including operational non-compliance, and safety, ethics and human rights violations, resulting among much else in massive environmental damage at extensively documented 'leak' or 'accident' sites and well beyond. Each of these issues are highly pertinent to the impacts any such project would have on people, communities and environments. Any of these issues alone should disqualify Enbridge from building another pipeline anywhere, or operating current ones, or being permitted to simply abandon them instead of removing them. Indeed, I submit that any of these points alone would be sufficient cause for the proposed project to be rejected outright, having failed to establish a legitimate basis to proceed. To do so would represent a grave injustice, imposing harm, and risking catastrophic, irreparable social and environmental damage. These harms and risks are simply unacceptable. I ask that the final EIS, at the very least, provide a thorough accounting of the issues above, and include project rejection (a 'no pipeline' scenario) in the identified options.

In terms of developing a final EIS, I also note that the nature of the crude oil that would be pumped daily in massive quantities through the proposed Line 3 replacement is particularly harmful, in terms of extraction processes in the region of the Alberta Tar Sands and the impacts upon environments subjected to spills along the length of its pipeline, transport and its end use. The exceptional impacts entailed, and what they will mean for the people and environments affected have not received a full accounting in the DEIS. Surely this is the purpose of an EIS undertaken in good faith? Furthermore, putting in place remediation requirements in conditions of operation assumes that damage is able to be detected and undone, that harm is tolerable, manageable, identifiable and able to be remedied. Current understanding of the impacts of crude oil spills does not support such assumptions, with significant and far-reaching, perhaps permanent, harms imposed upon related environments and watersheds. Agency, professional, and company resources to monitor and respond to spills, even to the best of currently recognized standards of practice (none of which Enbridge has demonstrated that it is willing or capable of upholding), are themselves limited by reserves of financial and human resources, of course, with limits also in the technological capability to address, and scientific understanding of, longer-term ecosystem impacts and interactions.

It clearly presents unacceptable risks to entrust the protection of people and their environments, including treaty lands, wild rice beds, and the watershed areas of several reservations, and the Great Lakes, to a company that has demonstrated little interest in or commitment to these goals, even when legally required to do so. A private company and their shareholders should not be privileged over the rights of Indigenous Peoples, and over our common heritage, environments, safety and wellbeing in this way.

Thank you for your time and consideration.
Sincerely,
Kara Rickson
United States citizen abroad and registered voter in Ramsey County, St. Paul, Minnesota, 55113-1610 (Please note address above is for voter registration purposes only)

Please accept, as my key points of contention, the issues cited below that were raised by Honor the Earth, *a Native-led environmental organization based on the White Earth Reservation*, as part of their 'Stop Line 3' campaign analysis of the DEIS

and related process (https://www.stopline3.org/news/2017/6/19/10-things-tribal-communities-need-to-know-about-the-line-3-deis)

1. NO FREE, PRIOR, AND INFORMED CONSENT OF TRIBAL NATIONS
Enbridge seems to have learned nothing from Standing Rock. Nowhere does the document say that free prior and informed consent of Tribal Nations must be attained through formal Nation-to-Nation consultation before any plans or decisions are made for this pipeline.
The State of Minnesota doesn't seem to understand the basic concept of tribal sovereignty. The route alternatives compared in the DEIS include two routes, called RA-07 and RA-08, that would cross the Leech Lake and Fond du Lac Reservations, despite the fact that the tribes clearly will not consent to a new pipeline. Enbridge's "preferred" route would skirt reservations boundaries while still crossing watersheds and lands of 1855 Treaty Territory. This is a clear attempt to circumvent tribal consent.

2. DISREGARD FOR THE HEALTH OF TRIBAL COMMUNITIES
Chapter 9 of the DEIS acknowledges that impacts on tribal communities "are part of a larger pattern of structural racism" that tribal people face in Minnesota. The DEIS also states that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities", but concludes that is "insufficient reason" to deny the project.

3. NO CONSULTATION OR PLAN FOR PROTECTING SACRED SITES
Just as we saw in North Dakota, the assessment of archeological artifacts were performed by the company, whose best interest is to put the pipeline through their preferred route at any cost. Enbridge admits that 63 sacred sites are slated for destruction, but claims that only 3 are eligible for protection under the National Register of Historic Places (5.4.2.6.1). Pipeline corporations cannot be trusted to understand and implement protections for our numerous sacred sites.

4. NO PROTECTIONS FOR WILD RICE LAKES
The DEIS acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences." It also shows that Enbridge's preferred route would "impact more 1855 Treaty Territory wild rice lakes and areas rich in biodiversity than any of the proposed alternative routes." These sensitive areas would be the worst place for a tar sands oil spill.

5. LINE 3 IS GUARANTEED TO SPILL
The DEIS estimates the annual probability of different kinds of spills on the proposed route:
Pinhole leak = 27% (once every 3.7 years)
Small Spill = 107% (once every 11 months), Medium = 7.6%, Large = 6.1%
Catastrophic = 1.1% (once every 87 years)
Basically what this means is that in 50 years, the 1855 treaty territory can expect 14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic spill.
The DEIS also contains no spill analysis for tributaries of the St. Louis River (which is already a toxic superfund site) or Nemadji River, where a spill could decimate our sacred Gichigami, Lake Superior.

6. NO "WELLS TO WHEELS" ASSESSMENT OF IMPACT
There is zero discussion of how Line 3 starts at the sacrifice zone of the Alberta Tar Sands where Dene and Cree people continue to be poisoned, raped, and murdered by the most extreme extraction project in the world. Further, there is no mention of how with 370,000 bpd of additional capacity, Enbridge will need a new pipeline departing its terminal in Superior. We know that they plan to expand pipelines through Ojibwe and Ho-Chunk territories in Wisconsin to accommodate. Finally at the end of the line, refineries are poisoning communities of color. Residents live with fear of kidney failure, autoimmune diseases and cancer and early death due to chemical exposure from massive refineries. This big picture must be considered to truly assess the impacts the Line 3 pipeline.

7. NO PLAN TO HOLD ENBRIDGE ACCOUNTABLE
Neither the State of Minnesota nor the Federal Government have a plan for enforcing environmental regulations for Line 3. When searching through extensive databases of Enbridge's spill history, the numbers often disappear once they hit the reservation line. How many spills have already ruptured in our communities without any response or reporting?
Many of the DEIS's environmental impacts and plans for minimizing them are drawn directly from Enbridge's permit application without any evidence of compliance or genuine consideration that Enbridge won't follow all the rules. History shows that they continually violate permit conditions.

8. NO PLAN TO STOP SEX TRAFFICKING IN PIPELINE MAN-CAMPS

The DOC assumes "all workers would re-locate to the area" and zero construction jobs will go to Minnesotans. We are all too familiar with how "the addition of a temporary, cash-rich workforce increases the likelihood that sex trafficking or sexual abuse will occur".But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). That is in no way an assurance that our women and children will be any safer come 2018 when construction is slated to begin.

9. INADEQUATE ASSESSMENT OF ABANDONMENT
Enbridge's current plan is to cap off the crumbling old Line 3 pipe in sections and leave it in the ground for landowners to take care of, setting a dangerous precedent for future pipelines in Minnesota, including the NEW Line 3. The risks of abandoning pipelines are not adequately assessed in the DEIS. There is no discussion of the dangers of exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied. These rusting pipes are conduits, and could one day drain a lake or wetland and dump toxified water onto farm fields. What is the plan for cleaning up the contamination from the countless spills that have already occurred along Line 3? There is also no mention of the abandonment of the other 3 ancient pipelines in Enbridge's existing mainline corridor (Lines 1, 2, and 4), which we expect Enbridge will very soon attempt to follow suit. It should also be known that Enbridge will stop paying taxes to the MN counties along the mainline corridor. For many of these poor northern counties including the Leech Lake and Fond du Lac reservations, revenue from Enbridge's property tax makes up a significant portion of the county budget.

10. THE "NO BUILD" OPTION IS NOT GENUINELY CONSIDERED
The DEIS includes an option of the "Continued Use of Existing Line 3" (Chapters 3 and 4), but nowhere is the "No Build" Alternative considered. Enbridge already has a massive pipeline corridor leaking across our territories. It is not the responsibility of our communities to continue to sacrifice our waters and lands so the a foreign corporation can maintain their bottom line. When will the is the "Shut Line 3 Down Because It's Falling Apart and Poisoning Our Communities" option be considered?

I cite also comments from Thane Maxwell, Honor the Earth (https://www.minnpost.com/community-voices/2017/07/reading-between-lines-minnesota-s-draft-eis-enbridges-line-3-pipeline):

Also missing is a discussion of Enbridge's **track record** in complying with regulation, despite state law requiring that consideration before issuing the permit (Administrative Rules Part 7853.0130 (D)). Many of the environmental impacts and plans for mitigation are copied and pasted directly from Enbridge's permit application without any evidence of compliance. And since Minnesota agencies don't have the jurisdiction or capacity to monitor construction, the DEIS proposes that the fox watch the henhouse: Enbridge inspectors will have stop-work authority, and "third-party monitors" that relay information to the agencies will not (2.7.1.1).

Levi, Andrew (COMM)

From: Don R-Crenshaw <dgrc@crowswood.com>
Sent: Saturday, July 01, 2017 8:39 PM
To: MN_COMM_Pipeline Comments
Cc: Emily Goldthwaite Fries
Subject: Line 3 pipeline

I'm Donald Rideaux-Crenshaw from Burnsville, MN. As a person of faith and as a resident of Minnesota, I am very concerned about the new Line 3 proposed by Enbridge. Though the environmental impact statement acknowledges many severe consequences to land, water, and local communities, it appears the no-build option is not being seriously considered.
I am alarmed by the plans for this pipeline, which disregard the severe impacts of potential spills to ricing lakes, rivers, and even to Lake Superior. Furthermore, I find it unacceptable that we, as a state, continue to expect Native communities to disproportionately endure the impacts of extracting and transporting oil. These risks are outlined but not considered reason enough to reject the pipeline.
We have a responsibility to current and future generations, locally and globally, to keep out Tar Sands oil that could pollute MN waters and contribute significantly to climate change. Climate scientists agree it is time to leave the oil in the ground.
I implore you to weigh the dire consequences of this pipeline and strongly consider rejecting it.

Sincerely,
Donald Rideaux-Crenshaw

Levi, Andrew (COMM)

From: Patty Rieck <user@votervoice.net>
Sent: Wednesday, July 05, 2017 7:08 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project

Dear Ms. MacAlister,

Enbridge's commitment to replacing Line 3 will significantly impact Minnesota's economy and bring jobs to the state. Line 3 Replacement Program will provide about 8,600 jobs and long-term tax benefits to Minnesota communities. Workers need the construction jobs and our communities benefit from the extra tax dollars a new Line 3 will create. Communities along the right-of-way directly benefit from the patronage to local businesses by employees and contractors of Enbridge, these dollars spent recirculate in the communities.

Sincerely,

Patty J Rieck
26090 490th St
Staples, MN 56479
nystrompj@aol.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

02 1P $ 000.34°
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Leroy Priewer	218-694-6326	clriewer@qutel.com

ADDRESS: 36340 211th Ave

CITY, STATE, ZIP: Bagley, MN 56621

COMMENTS

Enbridge would not be spending this amount of time and money if they didn't feel Line 3 should be replaced!

Pipelines are the safest way to move crude oil

- Lets get this line built

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Ken Risdon <krisdon@d.umn.edu>
Sent: Friday, July 07, 2017 5:10 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 replacement

Dear Ms. MacAlister,

The choice is simple. A pipeline is much safer in all ways than any other mode. Updating an existing line makes perfect sense.

Solar and wind cannot replace the 42 million barrels of gasoline we use a day.. We need the oil, no question.

Line 3 provides increased national security simply because it is not in the Middle East!

Those against replacing the line should pay more for the gasoline!

Sincerely,

Ken Risdon
131 Waverly Pl
Duluth, MN 55803
krisdon@d.umn.edu

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

02 1P $ 000.34°
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Roger Rivera Jr	218 074 8107	roger_jr1@hotmail
ADDRESS: 12050 330TH ST.		
CITY, STATE, ZIP: New Folden MN. 56736		

COMMENTS: I am a land owner. Enbridge has been good to work with for. I painted for years for Enbridge & thought they were great to work for.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
MARK W ROBERTS	218-260-9369	mrob256@gmail.com

ADDRESS
809 Adams St

CITY, STATE, ZIP
Cloquet, MN 55720

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

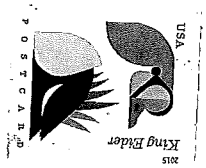

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

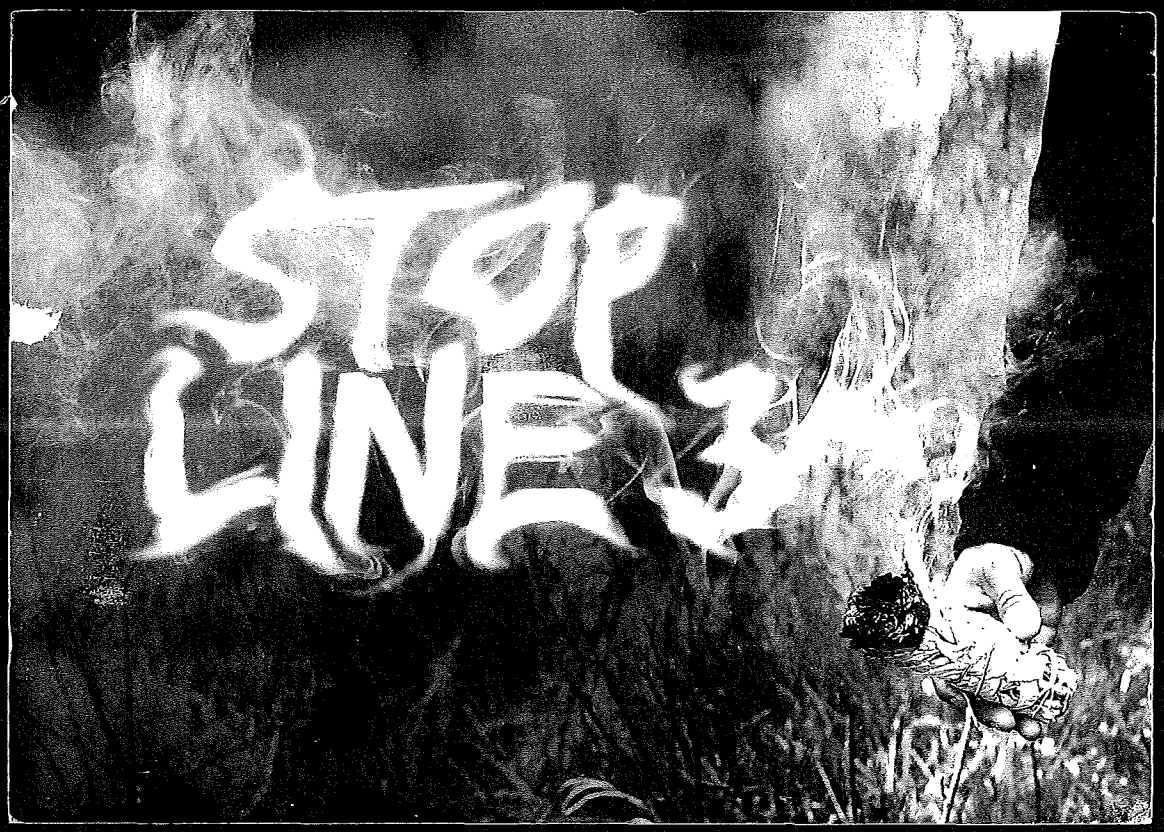

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 553
JUL 2017 PM 6 L

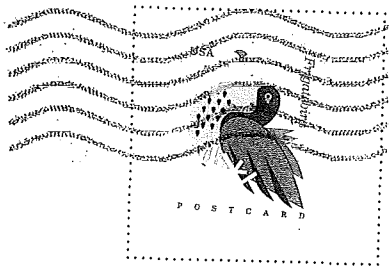

Line 3 hurts indigenous communities and young native girls targeted by sex trafficking. Please consider the lives and livelihoods of the people who are affected by this pipeline before trampling over them.

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

SINCERELY,

Maia Roberts

Levi, Andrew (COMM)

From: becky robles <brobles8888@yahoo.com>
Sent: Friday, June 23, 2017 2:36 PM
To: MN_COMM_Pipeline Comments
Cc: Rebecca Robles
Subject: Comment on Draft, EIS, Lines 67&3

To Whom it May Concern,
I am a concerned mother reaching out about this portion of your draft documents concerning Line 67. Specifically the "Certificate of need can not be issued" language on pages 1-6 section 1.4.1.2 'need for fossil fuels' comprehensive policy level assessment for fossil fuels in our society and associated tribal rights is beyond the scope of an EIS for a single pipeline"

Why would you ignore such an important piece of how this process works? We the people not only deserve to be able to comment on our concerns here but, we deserve more than just the brush off your people are pushing on us thinking somehow we are too dumb to need an EIS. Our children mean more to us than your "progress" we are seeing the genocidal circumstances moving like this across our country. In North Dakota, we saw the illegal moves perpetrated on a nation of people for profit. We know there is a federal judge who has just shown the world they broke the law. That brings me to this line 67. We feel as citizens you are breaking the law by not allowing an EIS.

Your own rule defines areas of high consequence where the potential consequences of a gas pipeline accident may be significant or may do considerable harm to people and their property. The definition includes: current class 3 and 4 locations; facilities with persons who are mobility impaired, confined, or hard to evacuate and places where people gather for recreational and other purposes. For facilities with mobility-impaired, confined, or hard-to-evacuate persons and places where people gather, the corridor of protection from the pipeline is 300 feet, 660 feet or 1000 feet depending on the pipeline's diameter and operating pressure. The offices of Pipeline Safety (OPS), Research and Special Programs Administration (RSPA), Department of Transportation (DOT) all failed to follow Laws based on licensing here. There is a mediation process in the licensing procedures for any contractor and we the people never got any mediation. Why is that? As a witness to the behaviors the oligarchs and their corporations have handed down to all people, we can say in all confidence you are trying to kill us. You don't care that cancer is rampant; you don't care that emission regulations were scrubbed all for a pipeline to make its profit. You don't care that the president of the United States willfully agreed to let you all move forward placing himself as the head of this conspiracy, charges need to be brought against him for this and you all know it. The mere fact Det Norske Veritas (DNV-GL), your independent contractor was fired says so much. How they were involved with the State EIS process while holding contracts with Enbridge shows the blatant laws being broken in this organization as well. We know your company tried to bury the spills of Kalamazoo. We will never forget the lives lost there due to your mixing the words around in illegal documents all over the country. We feel Enbridge and its associates are very guilty of multiple crimes that have been shared and crimes that are yet to come based on their willful and bias extremes to get oil no matter who dies. We see Enbridge is in the business of writing contracts that violate the law with all their dealings worldwide and are asking you shut this pipeline down. We are not agreeing to this pipeline and we insist you dig up line 3 as well. We are encouraging people to stand up in the courts now and bring civil suits against the president, the government employees who took oil contributions, these corporations, banks and the ceo's there in to get our justice. For it is what the dead deserve, the sick they deserve justice, my son who lives so far away from this issue yet feels threatened because he is losing his constitutional right to life, deserves justice. His generational rights are being stomped all over and we want change. We want you to switch your efforts to cleaning sites you have destroyed and move to renewable energies. It's time for God's sake.

Thank You,
Rebecca Maria Robles
San Diego, CA 92114

Levi, Andrew (COMM)

From: Robin RODENBORG <projectmora@gmail.com>
Sent: Thursday, July 06, 2017 9:46 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

Dear Ms. MacAlister,

Who goes back to remove the old line, check for any leakage or soil damage along that line and what is the expectation for reporting? What is the plan for "any" future leakage and can citizens and commission hold Enridge liable when total cleanup is not completed. No lines near drinking water sources.

Sincerely,

Robin Rodenborg
421 Ashland St N
Cambridge, MN 55008
projectmora@gmail.com

Levi, Andrew (COMM)

From: Wachtler, John (COMM)
Sent: Tuesday, June 20, 2017 5:33 PM
To: MN_COMM_Pipeline Comments
Subject: FW: Emailing: Piping-Engineering.pdf
Attachments: Piping-Engineering.pdf

-----Original Message-----
From: Steve Roe [mailto:roetreat@crosslake.net]
Sent: Friday, June 16, 2017 11:25 AM
To: Wachtler, John (COMM) <john.wachtler@state.mn.us>
Subject: Emailing: Piping-Engineering.pdf

John,

I will be sending my calculations. Longitudinal stress and surge pressures are not allowed for in Enbridge design.
No wonder the pipe shows stress cracks which should be considered a failure.
This is a pretty simple calculation
Showing the pictures/graphics of the of how the stresses should be accounted. The pipe they are proposing should only be used at greatly reduced pressure.

Thanks,
Steve

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Home » Stress analysis » Induced Stresses in Pipe- Hoop, Longitudinal and Radial Stresses

Induced Stresses in Pipe- Hoop, Longitudinal and Radial Stresses

3 Comments

Topics covered

Introduction
Circumferential or Hoop Stresses
Longitudinal Stresses
Radial Stress

Introduction to Induced Stresses:

When the ends of the pipe ends are closed and pipe is subjected to an internal pressure 'P' there are various stresses that develop in the pipe. Each element of pipe are subjected to the below mentioned stresses which act in the direction as shown in the fig.1.

Circumferential (hoop) stress σH
Longitudinal Stress σL
Radial Stress σR

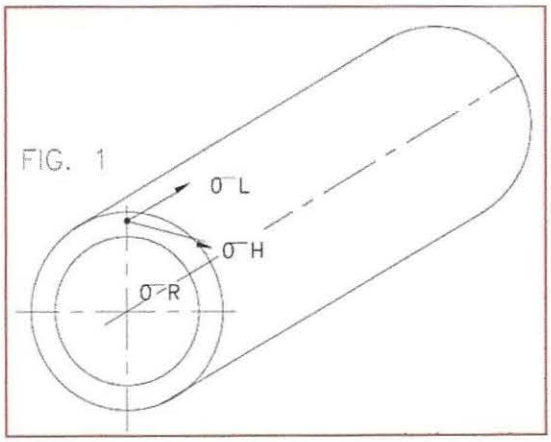

Fig 1: Different stresses induced in pipe

CIRCUMFERENTIAL OR HOOP STRESS: σH

The effect of this may split the pipe into two halves as shown in fig.2. The failure of the pipe in two halves in fact is possible across any plane, which contains diameter and axis of the pipe. Elements resisting this type of failure would be subjected to stress and

to search type and hit enter

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direction of this stress is along the circumference. Hence the above stress is called **Circumferential or Hoop Stress.**

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If –

D = Diameter of the pipe

L = Length of the pipe

t = thickness of the pipe.

Then

Bursting force, FB	=	Pressure * Area
	=	P * D * L
Resisting force, F_R	=	Resisting metal area * Stress, σH
Equating F_B & F_R		
P * D * L	=	2t * L * σH
∴ t	=	(P * D)/ 2 * σH
or σH	=	(P * D) /(2 * t) _____(1)

This equation is used for calculating the thickness of pipe so as to withstand pressure 'P' where σ H is **allowable circumferential stress.**

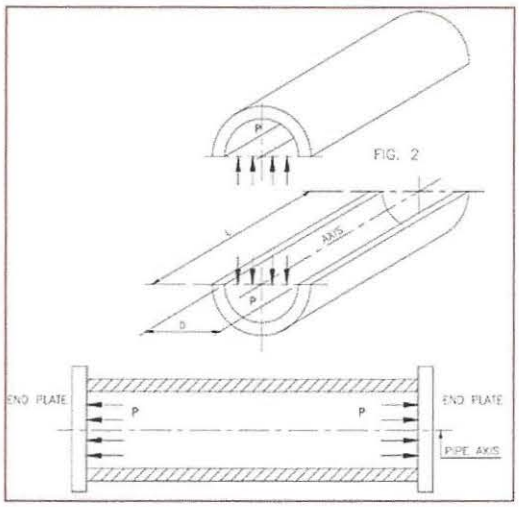

Fig 2: Circumferential or Hoop stress

LONGITUDINAL STRESS:σR

Considering that the pipe ends are closed and pipe is subjected to **an internal pressure 'P'** the pipe may fail as shown in **Fig.3**. Elements resisting this type of failure would be subjected to stress and direction of this stress is parallel to the longitudinal direction of the pipe. Hence this stress is called **longitudinal stress**.

Then

Bursting force, FB	=	Pressure × Area
	=	P * (πD * D)/4
Resisting force, FR	=	Resisting metal area x Stress, σL
	=	π D t * σL (when t is significantly small as compared to D)
Equating F_B & F_R		
P * (πD * D) /4	=	π D t * σL
∴ t	=	(P D)/4 * σL
or σL	=	(P D)/(4 * t) _____ (2)

NOTES:

1) On comparing equations 1 & 2, it is clear that when a pipe having diameter 'D' and thickness 't' is subjected to an internal pressure 'P', the induced circumferential tress is double the induced longitudinal stress.

2) Normally, the pipe is considered as a thin wall cylinder i.e. t < D/6

3) Usually D is substituted by Do (outside diameter) in order to have higher safely margin.

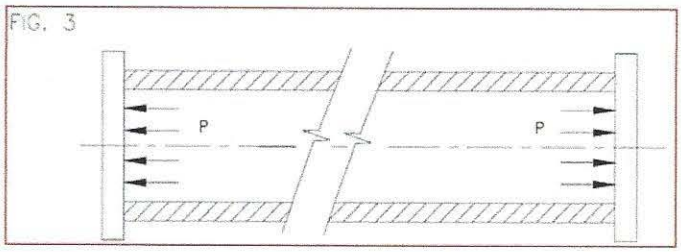

Fig 3: Longitudinal stress

RADIAL STRESS: σR

Radial stress is a stress in directions coplanar with but perpendicular to the symmetry axis.

The radial stress for a thick-walled pipe is equal and opposite to the gauge pressure on the inside surface, and zero on the outside surface.

The radial stress is always compressive.

Each element of the pipe is subjected to radial stress which acts in radial direction as shown in Fig.4 and calculated as

σR = P

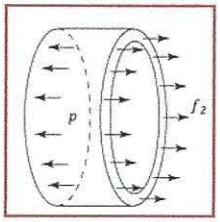

Fig 4: Radial stress

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March 16, 2016

3 COMMENTS

rupak
May 27, 2016 at 5:04 am

wonderful explanation!

Reply

Ganesh S Kharote
October 11, 2016 at 5:23 am

its so useful insight as it bridges theoritical and practical aspect

Reply

Haofeng
March 6, 2017 at 2:52 am

Thanks for the explanation! Helpful!

Reply

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Chapter

4

Design of Pressure Pipes

The design methods for buried pressure pipe installations are somewhat similar to the design methods for gravity pipe installations which were discussed in Chap. 3. There are two major differences:

1. Design for internal pressure must be included.
2. Pressure pipes are normally buried with less soil cover so the soil loads are usually less.

Included in this chapter are specific design techniques for various pressure piping products. Methods for determining internal loads, external loads, and combined loads are given along with design bases.

Pipe Wall Stresses and Strains

The stresses and resulting strains arise from various loadings. For buried pipes under pressure, these loadings are usually placed in two broad categories: internal pressure and external loads. The internal pressure is made up of the hydrostatic pressure and the surge pressure. The external loads are usually considered to be those caused by external soil pressure and/or surface (live) loads. Loads due to differential settlement, longitudinal bending, and shear loadings are also considered to be external loadings. Temperature-induced stresses may be considered to be caused by either internal or external effects.

Hydrostatic pressure

Lamé's solution for stresses in a thick-walled circular cylinder is well known. For a circular cylinder loaded with internal pressure only, those stresses are as follows:

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Tangential stress: $$\sigma_t = \frac{P_i a^2 (b^2/r^2 + 1)}{b^2 - a^2}$$

Radial stress: $$\sigma_r = \frac{P_i a^2 (b^2/r^2 - 1)}{b^2 - a^2}$$

where P_i = internal pressure
a = inside radius
b = outside radius
r = radius to point in question

The maximum stress is the tangential stress σ_t, and it occurs at $r = a$ (Fig. 4.1). Thus,

$$\sigma_{\max} = (\sigma_t)_{r=a} = \frac{P_i a^2 (b^2/a^2 + 1)}{b^2 - a^2}$$

or $$\sigma_{\max} = \frac{P_i (b^2 + a^2)}{b^2 - a^2} \tag{4.1}$$

For cylinders (pipe) where $a \approx b$ and $b - a = t$,

$$b^2 - a^2 = (b + a)(b - a) = \overline{D}t \tag{4.1a}$$

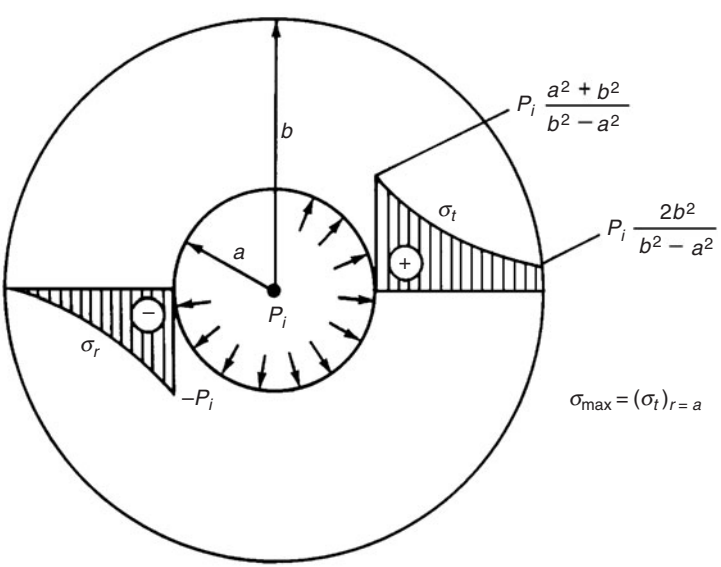

Figure 4.1 Thick-walled cylinder with internal pressure.

where $\overline{D}$ = average diameter = $b + a$ and t = thickness = $b - a$. Also,

$$(b + a)^2 = \overline{D}^2 = b^2 + a^2 + 2ab \tag{4.1b}$$

$$b^2 + a^2 = \overline{D}^2 - 2ab \approx \overline{D}^2 - 2\,\bar{r}^2 = \overline{D}^2 - \frac{\overline{D}^2}{2}$$

Thus Eq. (4.1) can be rewritten using Eqs. (4.1a) and (4.1b) as follows:

$$\sigma_{\max} = \frac{P_i\,(\overline{D}^2/2)}{\overline{D}t} = \frac{P_i\,\overline{D}}{2t} \tag{4.2}$$

Equation (4.2) is recognized as the equation for stress in a thin-walled cylinder (Fig. 4.2). This equation is sometimes called the Barlow formula, but is just a reduction from Lamé's solution. This equation is the form most often recognized for calculating stresses due to internal pressure P_i.

If the outside diameter D_o is the reference dimension, Eq. (4.2) can be put into another form by introducing

$$\overline{D} = D_o - t$$

That is, the average diameter is equal to the outside diameter minus thickness. Equation (4.2) becomes

$$\sigma_{\max} = \frac{P_i\,(D_o - t)}{2t} \tag{4.3}$$

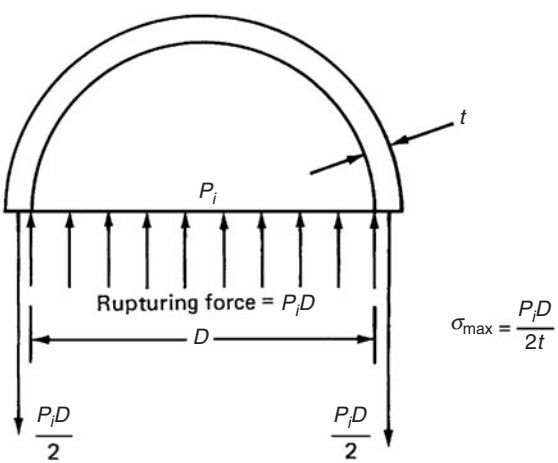

Figure 4.2 Free-body diagram of half section of pipe with internal pressure.

Certain plastic pipe specifications refer to a dimension ratio (DR) or a standard dimension ratio (SDR), where

$$\mathrm{DR} = \frac{D_o}{t} \qquad \text{or} \qquad \mathrm{SDR} = \frac{D_o}{t}$$

Both DR and SDR are defined the same. However, SDR often refers to a preferred series of numbers that represents D_o/t for standard products. By introducing D_o/t = SDR into Eq. (4.3), it can be rewritten as follows:

$$\sigma_{\max} = \frac{P_i}{2}\,(\mathrm{SDR} - 1) \tag{4.4}$$

The above equation may be expressed as

$$\frac{2\sigma_{\max}}{P_i} = \mathrm{SDR} - 1 \tag{4.5}$$

Equation (4.5) is often referred to as the ISO (International Standards Organization) equation for stress due to internal pressure. However, this basic equation has been known to engineers for more than a century and was originally given by Lamé in "Leçons sur la theorie de l'elasticité," Paris 1852. Obviously, ISO is a relative newcomer and should not be given credit for Lamé's work.

To calculate these tangential stresses in the pipe wall produced by internal pressure, either Eq. (4.2) or Eq. (4.4) are often suggested by the manufacturer or by national standards. All forms are derived from Lamé's solution and will produce comparable results.

Surge pressure

Pressure surges are often divided into two categories: transient surges and cyclic surges. Cyclic surging is a regularly occurring pressure fluctuation produced by action of such equipment as reciprocating pumps, undamped pressure control valves or interacting pressure regulating valves, oscillating demand, or other cyclic effects. Cyclic surges may cause fatigue damage and should be designed out of the system.

Transient surges are just that—transient in nature, occuring over a relatively short time and between one steady state and another. A transition surge may occur, and the system then returns to the same steady state as before the surge. Transient surges are usually not cyclic in nature although they may be repetitive. A transient surge is often referred to as *water hammer*.

Any action in a piping system that results in a change in velocity of the water in the system is a potential cause of a water hammer surge.

A partial listing of some typical causes of water hammer is given below.

1. Changes in valve settings (accidental or planned)
2. Starting or stopping of pumps
3. Unstable pump or turbine characteristics

The magnitude of water hammer pressures generated by a given change in velocity depends on (1) the geometry of the system, (2) the magnitude of the change in velocity, and (3) the speed of the water-hammer wave for the particular system.

These variables are expressed quantitatively as

$$\Delta H = \frac{a}{g}\,\Delta V \tag{4.6}$$

where ΔH = surge pressure, feet of water
a = velocity of the pressure wave, ft/s
g = acceleration due to gravity (32.17 ft/s^2)
ΔV = change in velocity of fluid, ft/s

The pressure rise, in pounds per square inch, may be determined by multiplying Eq. (4.6) by 0.43 lb/in^2 per feet of water as follows:

$$\Delta P = \frac{a}{g}\,\Delta V\,(0.43) \tag{4.7}$$

The wave speed is dependent upon

1. Pipe properties
   a. Modulus of elasticity
   b. Diameter
   c. Thickness
2. Fluid properties
   a. Modulus of elasticity
   b. Density
   c. Amount of air, and so forth

These quantities may be expressed as

$$a = \frac{12\sqrt{K/\rho}}{\sqrt{1 + (K/E)\,(D/t)\,C_1}} \tag{4.8}$$

where a = pressure wave velocity, ft/s
K = bulk modulus of water, lb/in^2
ρ = density of water, slug/ft^3

D = internal diameter of pipe, in
t = wall thickness of pipe, in
E = modulus of elasticity of pipe material, lb/in^2
C_1 = constant dependent upon pipe constraints ($C_1 = 1.0$ for pipe with expansion joints along its length)

For water at 60°F, Eq. (4.8) may be rewritten by substituting $\rho = 1.938$ slug/ft^3 and $K = 313{,}000$ lb/in^2.

$$a = \frac{4822}{\sqrt{1 + (K/E)(D/t)C_1}} \tag{4.9}$$

Equations (4.6), (4.7), and (4.8) can be used to determine the magnitude of surge pressure that may be generated in any pipeline. The validity of the equations has been shown through numerous experiments.

Figure 4.3 is a plot of the pressure rise in pounds per square inch as a function of velocity change for various values of wave speed. Tables 4.l and 4.2 give the calculated wave speed according to Eq. (4.8) for ductile iron and PVC pipe, respectively. In general, wave speeds vary from 3000 to 5000 ft/s for ductile iron and from 1200 to 1500 for PVC pipes.

Example Problem 4.1 Determine the magnitude of a water hammer pressure wave induced in a 12-in class 52 ductile iron pipe and in a class 235 DR 18 PVC pipe if the change in velocity is 2 ft/s.

solution From Tables 4.1 and 4.2 and Fig. 4.3:

Pipe	Wave speed, ft/s
Class 52 DI	4038
Class 235 PVC	1311

The resulting pressure surges are

Pipe	Surge pressure, lb/in^2
Class 52 DI	105
Class 235 PVC	35

Some appropriate rules of thumb for determining maximum pressure surges are listed below in pounds per square inch of surge per 1 ft/s change in velocity.

Pipe	Surge pressure rise, lb/in^2, per 1 ft/s velocity change
Steel pipe	45
DI (AWWA C150)	50
PVC (AWWA C900)	20
PVC (pressure-rated)	16

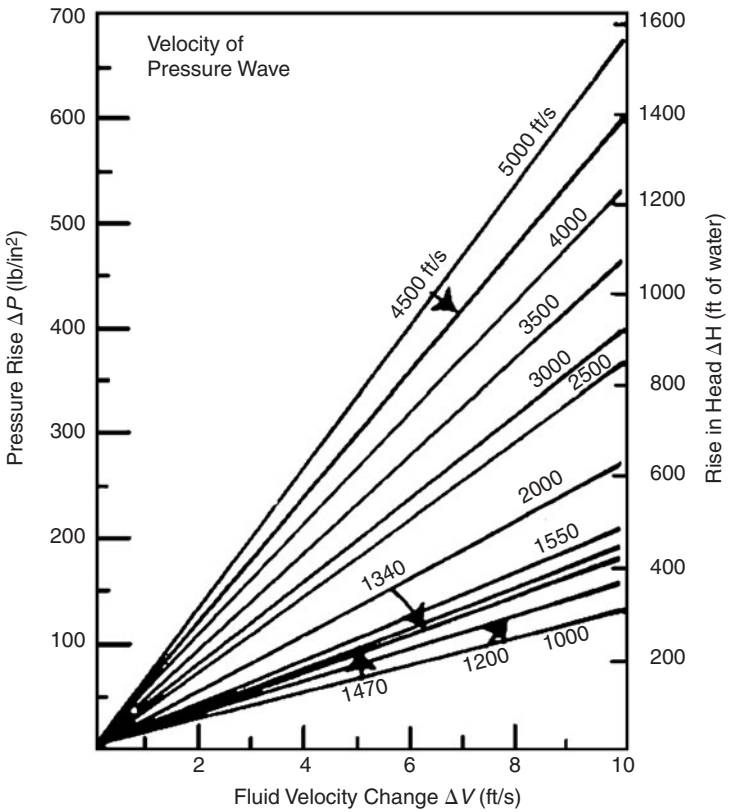

Figure 4.3 Water hammer surge calculation.

TABLE 4.1 Water Hammer Wave Speed for Ductile Iron Pipe, ft/s

	Class						
Size	50	51	52	53	54	55	56
4	—	4409	4452	4488	4518	4544	4567
6	4206	4265	5315	4358	4394	4426	4454
8	4085	4148	4202	4248	4289	4324	4356
10	3996	4059	4114	4162	4205	4242	4276
12	3919	3982	4038	4087	4130	4169	4205
14	3859	3921	3976	4024	4069	4108	4144
16	3783	3846	3902	3952	3998	4039	4076
18	3716	3779	3853	3887	3933	4038	4014
20	3655	3718	3776	3827	3874	3917	3957
24	3550	3614	3671	3723	3771	3815	3855
30	3387	3472	3547	3615	3676	3731	3782
36	3311	3409	3495	3571	3638	3700	3755
42	3255	3362	3456	3539	3612	3678	3737
48	3207	3323	3424	3512	3590	3659	3721
54	3201	3320	3423	3512	3591	3599	3724

TABLE 4.2 Water Hammer Wave Speed for PVC Pipe, ft/s

	(AWWA C900) DR			Pressure-rated PVC SDR			
Size	25	18	14	21	26	32.5	41
4	1106	1311	1496	1210	1084	967	859
6	1106	1311	1496	1210	1084	967	859
8	1106	1311	1496	1210	1084	967	859
10	1106	1311	1496	1210	1084	967	859
12	1106	1311	1496	1210	1084	967	859

Since velocity changes are the cause of water hammer surge, proper control of valving may eliminate or minimize water hammer. If fluid approaching a closing valve is able to sense the valve closing and adjust its flow path accordingly, then the maximum surge pressure as calculated from Eq. (4.6) may be avoided. To accomplish this, the flow must not be shut off any faster than it would take a pressure wave to be initiated at the beginning of valve closing and returning again to the valve. This is called the *critical time* and is defined as the longest elapsed time before final flow stoppage that will still permit this maximum pressure to occur. This is expressed mathematically as

$$T_{cr} = \frac{2L}{a}$$

where T_{cr} = critical time
L = distance within the pipeline that the pressure wave moves before it is reflected back by a boundary condition, ft
a = velocity of pressure wave for the particular pipeline, ft/s

Thus, the critical time for a line leading from a reservoir to a valve 3000 ft away for which the wave velocity is 1500 ft/s is

$$T_{cr} = \frac{2\ (3000)\ \text{ft}}{1500\ \text{ft/s}} = 4\ \text{s}$$

Unfortunately, most valve designs (including gate, cone, globe, and butterfly valves) do not cut off flow proportionate to the valve-stem travel (see Fig. 4.4).This figure illustrates how the valve stem, in turning the last portion of its travel, cuts off the majority of the flow. It is extremely important, therefore, to base timing of valve closing on the *effective closing time* of the particular valve in question. This effective time may be taken as about one-half of the actual valve closing time.

Levi, Andrew (COMM)

From: Marty Roers <mroers@csjstpaul.org>
Sent: Wednesday, July 05, 2017 1:20 PM
To: MN_COMM_Pipeline Comments
Subject: Concern for the proposed Enbridge Oil Pipeline #3 through Northern Minnesota CN-14-916 and PPL-15-137

Dear MN Public Utility Commission:

As a concerned Minnesota State citizen, I am writing to express my deep concerns regarding the proposed Enbridge Oil Pipeline #3 through Northern Minnesota (**CN-14-916 and PPL-15-137).** I am writing to express my concern with this project specifically because of the serious the lack of collaboration with impacted communities, especially the Native American communities of Northern Minnesota. In addition, I am troubled by the potential impacts of climate change and the lack of clarity regarding how long the Enbridge company will "indefinitely" monitor the abandoned pipe. Furthermore, I am deeply troubled by the secrecy and lack of public review in the Enbridge Company's "worst-case" scenarios of spill data and the impact on water and wildlife. I am deeply worried about the impacts on water and wildlife in our state of Minnesota now and for future generations.

Thank you for listening to my concerns and demanding more accountability and protections for all Minnesotans with this proposed pipeline project. I do not support the proposed Enbridge Line #3 through Northern Minnesota. Thank you, Marty Roers

Levi, Andrew (COMM)

From: Chuck Rogers <user@votervoice.net>
Sent: Thursday, June 29, 2017 5:49 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Please cut the red tape and allow the new Enbridge Line 3 project to proceed. It is the right thing to do for Minnesotans and is environmentally sound.
Chuck Rogers
Fisher, MN
218-891-4199

Sincerely,

Chuck Rogers
26337 365th Ave SW
Fisher, MN 56723
chuckdashbob@aol.com

Levi, Andrew (COMM)

From: Deb <beerog804@aol.com>
Sent: Friday, July 07, 2017 8:50 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137 Comment

I live on a beautiful pristine lake in Hubbard County. I have deep concerns about the Line 3 pipeline that Enbridge proposes to "rebuild" very close to my lake and near other lakes and rivers in Minnesota lake country. I am not against pipelines, however, I do object to their preferred route because of the potential serious damage a spill or leak could cause to our environment and wildlife. Clean up of this poisonous tar sands oil is nearly impossible in lakes and streams and would have a devastating effect on those natural resources. It is imperative that the EIS for Line 3 be complete, unbiased, and accurate.

As this is the first EIS ever being done on a pipeline in Minnesota there is probably a learning curve for the DOC in its preparation. Their DEIS doesn't appear to have some very important considerations that are critical in making any decision on Line 3 such as an economic need analysis and a contamination plan or oil spill analysis. This data will be necessary before first determining if there is even a NEED for this pipeline, and if so, then the best route with least impact on the environment and wildlife. Enbridge's preferred route is right beside Itasca State Park, a Minnesota treasure, and that was not even mentioned in the DEIS.

Also, I have a concern as to where some of the reports used in the DEIS came from. Information from Enbridge is suspect as they are not an impartial source. Cardno and Barr have ties with Enbridge as well so may not be impartial either. To what extent does the DEIS rely on information from expert, unbiased sources such as the MPCA and DNR?

This comes down to Risk vs. Profit. Why would Minnesota risk its most pristine environment and tourist dollars so that a Canadian oil conglomerate can make more profit? This EIS and the PUC's ultimate decision must be based on comprehensive, accurate and impartial information to shape Minnesota's future.

Thank you for your time and considering my comments.

Deb Rogers
21852 Duck Lake Rd.
Park Rapids, MN 56470

Levi, Andrew (COMM)

From: Annie Rohde <annierohde2@gmail.com>
Sent: Monday, July 10, 2017 12:27 PM
To: MN_COMM_Pipeline Comments
Subject: Non-starter

REMOVE, CLEAN UP, ENHANCE CURRENT ROUTE INFRASTRUCTURE, AND REPLACE OLD PIPE!!

NO other option is acceptable, PERIOD!!

Annie Rohde, Rochester, MN

From: Sylvie Rokab
To: MN_COMM_Pipeline Comments
Subject: STOP LINE 3
Date: Wednesday, May 31, 2017 12:21:43 AM

REF: Docket numbers CN-14-916 and PPL-15-137

To whom it may concern,

In general, it is critical that we move away from fossil fuels and in the direction to create a sustainable future for our children. But more specifically, line 3 is even more critical in that it is corroding, it has a history of ruptures and contamination and it violates the treaty and therefore the rights of tribal members.

I urge you to stop line 3 immediately.

Thank you,

Sylvie

"Let the beauty of what you love be what you do. There are a thousand ways to kneel and kiss the earth" Rumi

Sylvie Rokab
Los Angeles, CA, 90272

Levi, Andrew (COMM)

From: Philip Romanek <floodwoodphil@gmail.com>
Sent: Thursday, June 29, 2017 10:16 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I believe the deactivated pipeline line 3 should be removed. All deactivated pipeline should be taken out of the ground at all private property along the route. My land or anyone's land was not given to Enbridge for perpetuity when it isn't being used as an active pipeline and no plans to be used ever again. That is not right and is not fair to all landowners. The land should be returned to the owners to do as they wish without having a pipeline that may become hazardous sometime in the future. The owners didn't ask for the pipeline to be installed on their property. They should get full use of their property returned to them if the pipeline is now obsolete.

Sincerely,

Philip Romanek
PO Box 273
Floodwood, MN 55736
floodwoodphil@gmail.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Tia Ronchi	218-248-0885	tia.ronchi@bendtec.com

ADDRESS: 11911 E. Rowe Rd.

CITY, STATE, ZIP: Lake Nebagamon, WI 54849

COMMENTS: Pipeline projects get stopped, our business suffers

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
DAVID RONGSTAD	218-556-9484	
ADDRESS		
23929 SOO LINE ROAD		
CITY, STATE, ZIP		
LEONARD MN 56652		

COMMENTS

TO BAD MINNESOTA DONT WANT PIPELINES.. SHOULD HAVE ALREADY BEEN COMPLETED.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Deana Rook <2emaildeana@gmail.com>
Sent: Monday, July 10, 2017 9:10 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

It's hard to phathom even the consideration of a pipeline through the organic wild rice fields, much less that it could actually happen.

Pipelines leak. Leaks destroy the water and land our natives and others who care depend on for livelyhood. We don't have a right to do this.

You wouldn't want someone running a pipeline through your living room, don't run a pipeline through theirs.

Deana Rook,
Edmond, Oklahoma

From: Miller, Julia (COMM)
To: MN_COMM_Pipeline Comments
Subject: Line 3 Comment via Facebook
Date: Thursday, June 01, 2017 12:19:55 PM
Attachments: image001.png

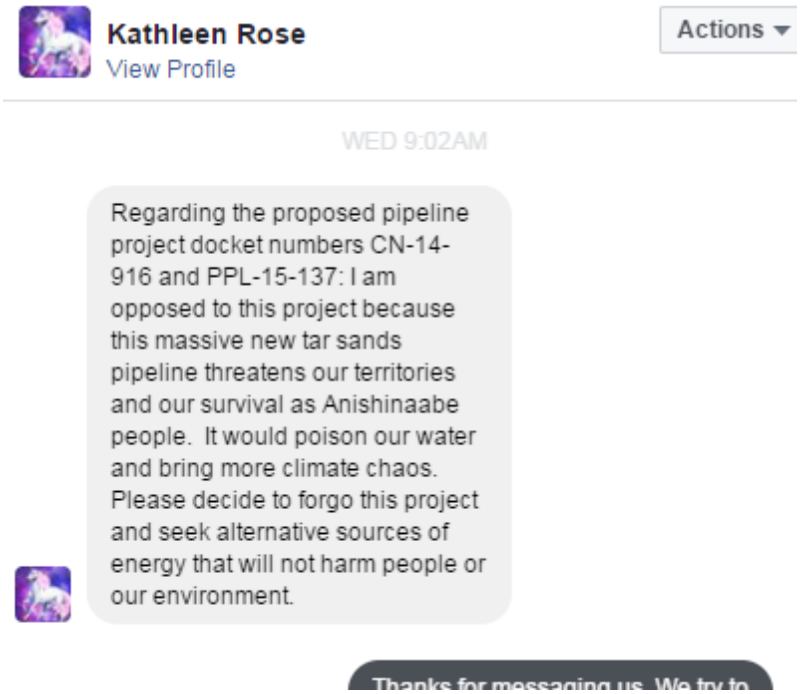

Julia Miller
Deputy Communications Director
Minnesota Department of Commerce
85 7th Place East, Suite 280, Saint Paul, MN 55101
P: 651-539-1467
C: 651-587-7213

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Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Robert J Roseth	218-391-6725	
ADDRESS		
156 WREN DR		
CITY, STATE, ZIP		
Duluth, MN 55811		

COMMENTS

I support the LINE 3 Replacement Project 100%!!!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Terry Ross
To: MN_COMM_Pipeline Comments
Subject: No pipeline
Date: Thursday, June 01, 2017 7:56:20 AM

Hello,

I live in your neighboring state of Wisconsin, where I also oppose Enbridge pipelines and stand with the Anishinaabe people. Please be mindful of the impact of the pipeline on your indigenous people and also the health of all Minnesotans. Pipelines leak, they are dangerous, they contribute to climate change: they are the past. It's time to shift our focus to clean energy and preserving our beautiful states.

Thank you for doing the right thing.

Sincerely,
Terry Ross
Madison, Wisconsin

Levi, Andrew (COMM)

From: Armin Ross <akross@gvtel.com>
Sent: Saturday, July 01, 2017 8:27 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I have been a farmer for many years. We need oil and it is the safest way to go.We have pipeline on our land for 20 years and have never had a problem.
Needs to be replace than it should be for the environment.

Sincerely,

Armin Ross
23512 370th St SE
McIntosh, MN 56556
akross@gvtel.com

Levi, Andrew (COMM)

From: Amanda R <mandarex87@gmail.com>
Sent: Monday, July 10, 2017 8:38 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 public comments

Dear MN department of commerce,

I find the risks noted in the Environmental Impact statement for the proposed Line 3 pipeline to be implemented by Enbridge Partners to be unacceptable. Chosing this route likely would endanger some of MN most sensitive watershed areas. It could limit the use of treaty lands for hunting fishing and wild rice harvest for multiple Native Tribes. In addition 1. DEIS Chapter 5.2.1.4 Enbridge plans to store and apply petroleum products within 100ft of surface waters. The risk to these sensitive waters is too great. DEIS Chapter 10.2.4.1.1 The annual probability of a spill incident for the Applicant's preferred route was estimated as 0.249 incidents per year with a recurrence interval of 4.0 years. Every year there would be a 25% risk of an oil spill and one every four years. We should not accept this high risk probability.

These comments are in reference to dockett numbers CN-14-916 and PPL-15-137.

Please take these risks into consideration and try to establish a less hazardous route, or even better a more sustainable source of energy!

Amanda Ross

Levi, Andrew (COMM)

From: Judy Rothschadl <judyrothschadl@gmail.com>
Sent: Monday, July 10, 2017 10:38 AM
To: MN_COMM_Pipeline Comments
Subject: No Oil Pipelines in MN!!

Dear MN Department of Commerce:

I strongly oppose any oil pipline coming through Minnesota. Specifically, I oppose the Enbridge pipeline coming through Minnesota's lake country!

The Mississippi Headwaters is not only a huge tourist attraction, it is the entry point to one of the greatest sources of fresh water in the world.

The Enbridge PIPES WILL BREAK. THEY ALWAYS DO. Our land & water will be forever tainted by these toxic chemicals. We must not let this happen!

And if you don't care about our health, maybe you should care about the BILLIONS OF DOLLARS IN TOURIST DOLLARS MN WILL LOSE! Who wants to go swimming in a toxic waste site?!

What is wrong with you people to even consider such a foolish move for our state?! Are you so blinded by big oil money that you've lost site of what's good for Minnesota?

I'm really angry that I have to spend my time begging you -- who supposedly should be advocating for the best interest of our state -- to stop this pipeline from happening.

Say NO TO ENBRIDGE OIL PIPELINE!

Sincerely,
Judy Rothschadl
1035 Roosevelt Avenue #313
Detroit Lakes, MN 56501
E: judyrothschadl@gmail.com

Levi, Andrew (COMM)

From: zazie courrier <zizazie@gmail.com>
Sent: Monday, July 10, 2017 1:09 PM
To: PUC, Docketing (PUC)
Subject: No more pipeline please

CN-14-196 and PPL15-137
Enbridge should not route their new larger capacity Line 3 tar sands oil pipeline through sensitive Minnesota wetlands. This line adversely affects native communities - directly threatening watersheds connected to the largest and the only certified organic wild rice lakes in Minnesota. This is a bad investment which needs much more study because it threatens our water. This Canadian company gets all the benefit and American's get all the risk. In addition Enbridge needs to clean up all it's old pipe and not leave it in the ground for future generations.
Water is life as well as clean ground, now and tomorrow.
I.Roussel

Garanti sans virus. www.avast.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
MATT ROVNAK	612 214 2185	MATT.ROVNAK@LETEVINESTEEL.US

ADDRESS: 2265 YORKTOWN AVE

CITY, STATE, ZIP: ST PAUL MN 55116

COMMENTS

REDUCE THE RISK TO ENVIRONMENT BY UPGRADING / REPLACING THIS LINE.
CREATE JOBS, UPGRADE INFRASTRUCTURE

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Robert Rowley <quietechoes@outlook.com>
Sent: Sunday, July 02, 2017 8:43 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline.Comments

Dear Jamie MacAlister
Oil, coal, and gas companies have for years pledged to protect the health of the environment and the people of their respective states and countries for many years and have continually failed in that pledge resulting in the illness and death of tens of thousands due to exposure to the very same toxic chemicals they lobby to keep deregulated to avoid the necessary costs it would require to handle and dispose of these toxic chemicals if they were regulated as hazardous substances. These toxic chemicals and poisons are not only showing up in the air we breath and the water we drink, they are also entering our food supply.

Their current safety features cannot detect leaks that fall below the threshold of 1.5 % of the capacity of the oil they carry and these leaks may well go undetected for months before making themselves apparent and require years to clean up. They have continually used inferior materials, used existing pipelines long after their life expectancy for safe operation has run out, and ignored warnings from qualified agencies and individuals about corrosion and the likelihood of failure as was made readily apparent in 2010 when Enbridge ignored warnings about Line 6, a 30 inch line, from federal regulators that failed several months later spilling over one million gallons of tar sands oil into the Kalamazoo River just 60 miles from Lake Michigan. Line 5 has had a similarly dismal record in its 64 year history.

Enbidge's dismal record has resulted in by their own data over 804 spills just in the 11 year period from 1999 to 2010 prior to the Line 2 rupture, spilling an estimated 161,475 barrels of crude oil into the environment containing hundreds if not thousands of Carcinogenic and debilitative chemicals - often not disclosed - that end up in the water supply of the communities in proximity and downstream of not just their accident sites but also the wells from where these tar sands oils are removed and processed.

The crude oil released in these accidents also contain a whole array of heavy metals with their own impact on human health and the environment such as manganese, (a neurotoxin), nickel and chromium, which are toxic at high doses, and arsenic and lead, which can damage the nervous system even at relatively low doses. Chemicals such as Benzene, Sulfur Dioxide (SO2), Nitrogen Oxides (Nox), Petroleum Coke, Formaldehyde, Polycyclic Aromatic Hydrocarbons (an entire class of toxic chemicals), Radon (from fracking), Hydrofloric Acid, and Hydrogen Fluoride are released into our ground water, rivers, and streams by fracking activities as well as pipe line leaks and ruptures resulting in an array of neurological illnesses, cancers, and even deaths for tens of thousands of individuals living within the proximity the areas of contamination.

Residents are left to deal with the consequences of increased occurrences of a whole array of illnesses associated with these chemicals such as leukemia, decreased auto immune cell function (T cells and B cells), breast and urinary track cancer, chromosome and sperm abnormalities, significant increases in non-hodgkins lymphoma, lung cancer and other cardiopulmonary conditions such as pulmonary

edema, chronic lung disease, asthma, heart disease, emphysema, bronchitis, rare nasopharyngeal cancers, DNA damage resulting in birth defects, miscarriages and infertility as well as a higher mortality rate and mental development disorders in children exposed to these chemicals.

And yet Enbridge and other companies like them Lobby for waivers from the federal clean air and water regulations known as the Haliburton Loophole, to allow them to use un-named proprietary chemicals of which only they know the carcinogenic properties and chemical composition of, to process and transport crude all over the country. They deliberately underestimate quantities of oil spilled in accidents, down play the risks to the public, abandon efforts to mitigate the damage when allotted funding runs out, or deliberately attempt to cover and conceal the damage in efforts to cut costs and increase profits for their investors.

These corporations have long been aware of the toxicity of the crude oils they transport and the chemicals and heavy metals they contain as well as the impact on public health through studies conducted by reputable scientist from institutions such as Emory University, Colorado School of Public Health, The Canadian Centre For Occupational Health, Columbia University, as well as many others yet they continue to knowingly refuse to disclose the chemicals introduced into the environment and the risk to public safety and health.

These very same corporations have sued for the right and been recognized by the courts as people in the eves of the law. If I as an individual were to dump these very same poisons into the very same water supply that these corporations continue to contaminate I would be arrested for poisoning the very same people these companies are poisoning and charged for the injuries or deaths that resulted as a consequence of my actions and more than likely I would also face charges for an act of terrorism. Shouldn't these corporations also face the same consequences? Should we continue to let them put our lives and environment at risk due to their consistent cutting of corners to increase their profit margins and lack of regard for the very people their actions impact? In the fast growing age of solar and wind power it is time that we put a stop to these pipelines and the hazards they entail to the health of our families.

Thank you for your attention and consideration on this matter.
Yours Truly, Robert M. Rowley
E-mail Quietechoes@outlook.com

Sent from Outlook

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
RICHARD ROYCRAFT	763-464-3217	richard.roycraft@mrtc.state.mn.us
ADDRESS		
10731 REDWOOD ST. NW		
CITY, STATE, ZIP		
COON RAPIDS, MN 55433		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Ginner <ginnerruddy@gmail.com>
Sent: Monday, July 10, 2017 1:59 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

I attended the hearing in St Paul on Tuesday, June 13th and was pleased with all the information available at that time. Thank you.

I am opposed to Line 3 for numerous reasons but the first I would like to comment on is the climate change effects if this pipeline would be built. It is written that the impacts over 30 years could be as high as 287 billion dollars. However, the state must update the DEIS to include what the cost would be over a 60 yr lifespan—or even greater!!

Most important to me is to consider the cost of oil—and the wisdom of going 100% green! If pipeline money was put to solar and wind power how much better for everyone—health, environment and on and on. Of course, big oil would not like that—they are interested in profits at the expense of the common good.

Water—the source of all life. If past history is a true indication, oil spills are a given—and who will clean them up???? Is Enbridge putting up money to clean up the spills??? And remove the old pipeline that is leaking???

May all the suggestions submitted be considered and the draft statement revoked at in a more realistic manner—and hopefully then say NO to Enbridge.

Ginner Ruddy

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Loretta Rudebeck	218-389-6032	
ADDRESS		
2188 Schelinder Rd		
CITY, STATE, ZIP		
Carlton, MN 55718		

COMMENTS

Safer then Transport on top of Ground

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
RICK Rudebeck	218-389-6032	
ADDRESS		
2188 SCHELINDER RD		
CITY, STATE, ZIP		
CARLTON MN. 55718		

COMMENTS

SAFER THAN TRUCK OR TRAIN

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: anetspring@lycos.com
Sent: Monday, July 10, 2017 5:45 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 commentary
Attachments: Line3 DEIS commentary.docx

Dear Jamie MacAlister

Please see my attached letter of commentary on the DEIS for line 3.

Thankyou,

Sincerely,

Annette Ruedenberg

Annette Ruedenberg PA, LGSW
27815 Northwoods Drive
Laporte, MN 56461

To: Jamie MacAlister, Pipeline.Comments@state.mn.us

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

My family owns property in Laporte, MN. The Line 3 Pipeline and the DEIS concern me. There is no assessment of the decline in oil demand. The entire study assumes that society needs X amount of oil, simply because Enbridge says they can sell it. That assumption ignores the massive fossil fuel subsidies and debts that make Enbridge's profits possible, and avoids the moral question of what is good for people and the planet.

We know we must stop burning fossil fuels. In the DEIS it is acknowledged that Line 3 would contribute to climate change. It analyses 3 different types of emissions - direct, indirect, and lifecycle. Direct emissions are those that the pipeline infrastructure itself emits, and these are very small. Indirect emissions are those created by the power plants that provide electricity for the pipeline's pumping stations, and these are significant. Lifecycle emissions are those caused by the refinement and eventual use of the oil, and these are massive. Line 3's direct and indirect emissions alone would be 453,000 tons of CO2 per year. Over a 50-year lifespan, that would cost society an estimated $1.1 billion. (Executive Summary p.18). The lifecycle emissions of Line 3 would be 193 million tons of CO2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3) In the DEIS there is no discussion of the unprecedented challenges of human casualty, displacement, conflict, natural disaster, biodiversity loss, etc, that climate change is causing, or the consensus from the scientific community that we must leave fossil fuels in the ground. The no-build alternative is not considered in the DEIS.

I value the well water I drink. My well-being is connected to the delicate balance of the healthy and vibrant ecosystems of nearby water systems including the headwaters of the Mississippi through which Line 3 would run. In the DEIS it is estimated that the annual probability of different kinds of spills on the proposed route in MN is Pinhole leak = 27%, Catastrophic = 1.1%, Small Spill = 107%, Medium = 7.6%, Large = 6.1%. So in 50 years, we can expect 14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic. This is unacceptable. There is no analysis of Enbridge's leak detection system, or their inability to respond quickly to major emergencies. The 7 sites chosen for spill modeling are not representative of the locations and resources put at risk along the entire corridor. A more thorough analysis of different locations is needed - for example, what about Lake Superior?

Line 3 would have a long-term detrimental effect on tribal members and tribal resources. In the DEIS it is concluded that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5). It is time to stop disproportionately putting native communities in harm's way.

Regardless of whether or not Enbridge can find customers, the DEIS shows that the negative impacts far outweigh the benefits. Please shut down Line 3 and develop renewable energy infrastructure. I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Thank you for your attention.

Sincerely,

Annette Ruedenberg

Levi, Andrew (COMM)

From: Dan Ruiz <ruizd19@gmail.com>
Sent: Monday, July 10, 2017 11:20 AM
To: MN_COMM_Pipeline Comments
Subject: Comments regarding CN-14-916 and PPL-15-137

Comments regarding docket numbers CN-14-916 and PPL-15-137

The DEIS does not consider the costs of closing the current Line 3 pipeline and not constructing an alternative.

In Chapter 8, Section 3.1.1.1. Contamination Outside of the Pipeline

The DEIS explains that potential impacts on soil and water resources are highly uncertain as there could be undiscovered contamination along the existing pipeline. The section further explains that Enbridge would develop a management plan to identify, manage and mitigate the historically contaminated areas.

- Does this mean that the costs identified in all of the route options outlined in the DEIS are highly uncertain?
- The DEIS could be made better if the management plan and projected costs was completed before the route options were weighed against each other.
- The public should be able to see the plan before a route decision is made.

The DEIS explains that 1,683 acres of current carbon sequestering forested areas will be cleared for the pipeline that will both create greenhouse gasses during construction, increase our current levels of transporting oil, and increase our State's contribution to greenhouse gasses in the future. I am concerned about climate change. The DEIS would be better if it considered Minnesota's commitment to curbing and mitigating climate change. I do not think the current pipeline should be left in place. I do not think a new pipeline should be constructed.

Thanks,

Dan Ruiz

Levi, Andrew (COMM)

From: Matthew Runion <runmat@icloud.com>
Sent: Monday, July 10, 2017 2:00 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137

I'm writing to provide some comments on the proposed Enbridge Line 3 Project in Northern Minnesota. As a member of the public, I consider these lands to be a shared interest and I personally share in that interest. As someone who enjoys Minnesota's lakes, streams, and forests, these things are important to me. As is good science and reason--all of these things inform my 4 comments:

1. The draft Line 3 Project Draft EIS could be improved by prioritizing the removal AND remediation of the old line 3 before any construction occurs on any new route.

2. As a Minnesota resident, I support, advocate for, and urge the MN Department of Commerce to authorize alternate route SA-04. This route is the best balance between Enbridge interests, the interests of the Minnesota public, and the State Forests and wild rice lakes that overlap the Line 3 Project Draft EIS. State Forests and public lands in the route of the proposed new line 3 project should be protected from this project, as this is the desire of much of the MN public interest.

3. I urge the improvement of the Draft EIS by providing specific response plans (budget, personnel responsible for corrective actions, and time frame) in the case of oil spills.

4. While the EIS contains valid scientific process, the EIS could be improved by acknowledging that routing the line around lakes containing wild rice (17 of them), thus leaving the lakes completely untouched by any new line developments, would be not only beneficial to the lakes, but is also valid in terms of scientific process. It would be biased and disgraceful to science to exclude this option in the EIS. It should be stated clearly in the EIS that routing the line around wild rice lakes would contain the lowest-risk possible in terms of harm to these lakes.

Thank you,
Matthew Runion
Resident
Minneapolis, MN

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Nathaniel J Runke	(507)244-1082	nrunke@local49.org

ADDRESS
611 28 ST NW

CITY, STATE, ZIP
Rochester, MN, 55901

COMMENTS
The proposed plan for line 3 replacement is the best overall option available. Any further delay only exaserbates the risk of the project overall.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Dawn Runquist
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137
Date: Monday, June 05, 2017 9:40:07 AM

Dear Ms. MacAlister,

I am a Minnesotan and want to see the environment protected like most others.I believe replacing aging infrastructure like pipelines is imperative to protecting the environment.
The MPCA has recently released the Mississippi River Watershed report that shows the cleanest waters in the state are in northern Minnesota. Energy infrastructure and clean waters can co-exist.

It is preferable for me to locate pipelines in more rural areas, rather than to site them in the middle of cities and towns. Enbridge has found a route that follows existing utility corridors.
Pipelines are everywhere in Minnesota, according to the Environmental Quality Board's report. I'm familiar with pipeline right of ways in northern Minnesota around Bemidji, Grand Rapids, Cass Lake and Alexandria. Pipelines and natural resources have gone hand-in-hand in northern Minnesota for decades.

As a resident of northern Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project. I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3. No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS. Please keep the EIS timeline to the statutory deadline of 280 days.

Sincerely,

Dawn Runquist

Sincerely,

Dawn Runquist
1409 Hammond Ave
Superior, WI 54880
dawn.runquist@enbridge.com

Levi, Andrew (COMM)

From: Dawn Runquist <user@votervoice.net>
Sent: Thursday, July 06, 2017 9:21 AM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I am a resident of Minnesota, and truly believe that replacing Line 3 would be imperative for the infrastructure to protect the environment. Pipelines are everywhere in Minnesota, according to the Environmental Quality Board's report. I'm familiar with pipeline right of ways in northern Minnesota around Bemidji, Grand Rapids, Cass Lake and Alexandria. Pipelines and natural resources have gone hand-in-hand in northern Minnesota for decades.

As a resident of northern Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project.I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3.

Sincerely,

Dawn Runquist
418 W 7th Ave
Floodwood, MN 55736
runquistd@yahoo.com

Levi, Andrew (COMM)

From: Kathryn Russell <simmons.kat@gmail.com>
Sent: Monday, July 10, 2017 1:45 PM
To: MN_COMM_Pipeline Comments
Subject: Stop Line 3

To whom it may concern:

This pipeline does NOTHING for the people of Minnesota, in fact it is harmful. It will also negatively affect Minnesota by bringing CRIME, there are acknowledgments that pipeline construction is known to bring criminal activities to the area. And finally, the impact the pipeline will have for the climate, which is could be catastrophic.
People of Minnesota
Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "would have a long-term detrimental effect on tribal members and tribal resources" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members.
Chapter 5, "Existing Conditions, Impacts, and Mitigation" states that Line 3 will create ZERO permanent jobs. Enbridge's application states that "existing operations staff would be able to operate the [pipeline] and that few additional employees would be hired to assist the staff" (5.3.4).
Also in Chapter 5, the DOC assumes "all workers would re-locate to the area" and ZERO construction jobs will go to Minnesotans. The pipeline would have "no measureable impact on local employment, per capita household income, median household income, or unemployment" (5.3.4).
The DEIS does not acknowledge that when the existing Line 3 shuts down, Enbridge will stop paying taxes to the MN counties along the mainline corridor. For many of these poor counties in the north, revenue from Enbridge's property tax makes up a significant portion of the county budget. There is also the issue that Enbridge is now in the process of appealing years of back taxes, burdening two of the poorest counties in Minnesota with over $10 million due.
Acknowledged Crime
The DEIS acknowledges that "The addition of a temporary, cash-rich workforce increases the likelihood that sex trafficking or sexual abuse will occur," and that these challenges hit Native communities the hardest. But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). What experience does Enbridge have planning and implementing an anti-sex trafficking program?
Construction & Prep (analyzing spills and other environmental impacts)
The DEIS contains no spill analysis for tributaries of the St. Louis River or Nemadji River, where spills could decimate Lake Superior and the harbors of the Twin Ports.
For calculations of impact, the lifespan of the new Line 3 is estimated at 30 years. But Lines 1-4 are 55-65 years old! And hasn't the technology improved?
There is no analysis on Enbridge's leak detection system, or their inability to respond quickly to major emergencies.
The DEIS estimates the annual probability of different kinds of spills on the proposed route in MN:
Pinhole leak = 27%
Catastrophic = 1.1%
Small Spill = 107%, Medium = 7.6%, Large = 6.1%
So in 50 years, we can expect 14 pinhole leaks, 54 small spills, 4 medium, 3 large, and 1 catastrophic!

Cathodic protection, which applies electric current to the pipeline in order to protect it from corrosion caused by nearby utility lines, will not be installed for up to 1 year after pipeline construction (2.3.2.3). Lack of cathodic protection is what caused many pinhole leaks in the Keystone pipeline, almost immediately after construction. The proposed route for Line 3 follows a utility corridor for much of its length - this is a recipe for disaster. Even the US Army Corps's rubber-stamp approval of the Dakota Access pipeline required the cathodic protection system to be installed within 6 months!

Maintenance

There is also no discussion of exposed pipe, how fast it will corrode, or how much currently buried pipe will become exposed once it is emptied. "When a pipe is empty, the weight of the liquid load that once contributed to buoyancy control is lost. As a result, the pipe could become buoyant and begin rising toward the surface at watercourse crossings, in wetlands, and in locations where soil density is low and the water table is high" (8.3.1).

The DEIS states that it will be very risky to remove and clean up the existing Line 3 because the pipelines are very close together. "The distance between pipelines within this corridor varies, but they are generally 10 to 15 feet apart" (8.3.1). This is not consistent with our extensive observations and physical measurements on the land. Also, don't they dig up pieces of pipe for maintenance purposes all the time? Why is it suddenly risky?

End of Life Pipeline Items (Abandonment)

The DEIS simply states that "Enbridge has indicated that it would develop a contaminated sites management plan to identify, manage, and mitigate historically contaminated soils and waters" found during the abandonment or removal of the existing Line 3 (8.3.1.1.1). We want to see that plan.

The risks of pipeline abandonment are not adequately assessed. For example, there is no discussion of landowner property values and the effect that an abandoned pipe could have on them, especially if there is indeed "legacy contamination" on people's land.

Climate Change

The DEIS acknowledges that Line 3 would contribute to climate change. It analyses 3 different types of emissions - direct, indirect, and lifecycle. Direct emissions are those that the pipeline infrastructure itself emits, and these are very small. Indirect emissions are those created by the power plants that provide electricity for the pipeline's pumping stations, and these are significant. Lifecycle emissions are those caused by the refinement and eventual use of the oil, and these are massive. Line 3's direct and indirect emissions alone would be 453,000 tons of CO_2 per year. Over a 50-year lifespan, that would cost society an estimated $1.1 billion. (Executive Summary p.18).

The lifecycle emissions of Line 3 would be 193 million tons of CO_2 each year. Over a 50-year lifespan, that would cost society an estimated $478 billion (5.2.7.3)

Please stop Line 3. It does nothing good for the people, state, and climate. Thank you for you time.

Kathryn Russell

Levi, Andrew (COMM)

From: Mary R <maryruth42@gmail.com>
Sent: Monday, July 10, 2017 5:50 PM
To: MN_COMM_Pipeline Comments
Subject: please

I live in Owatonna, MN, and have kept up with the news of Enbridge, the Canadian Co., wanting to come through the beautiful northeastern watery areas of MN. I cannot impart the deep sadness I feel about this. Please keep the pipeline out of the area.
We already know that in a very short time solar and wind will completely take over oil. This is so very unnecessary. What is the most troublesome is that the company is known for promises not kept in relation to reporting and fixing leaks, always after the fact. By then it's too late. Help protect all of our citizens from this very horrible proposal to place the pipeline across the beautiful state.

Mary Ruth
Owatonna, MN

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: JOHN RUTSEN

Street Address: 6794 45TH AV SW

City: PEQUOT LAKES State: MN Zip Code: 56472

Phone or Email: 218-568-5186

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

1. USING THE SANDPIPER ROUTE FOR LINE 3 REPLACEMENT IS NOT A GOOD PLAN. DIFFERENT OILS, CHEMICALS, PRESSURES, CAPACITIES, ETC.

2. ROUTE NEEDS TO BE AWAY FROM WATERWAYS. INACCESABLE BOG COUNTRY NOT A GOOD IDEA.

3. WHO IS LIABLE FOR SPILLS? LLC & SUB-CONTRACTORS.

4. LINE 3 ABANDONMENT: ENBRIDGE PUT IT IN, THEY SHOULD TAKE IT OUT.

5. I AM A WILD RICE PICKER & HAVE DOUBTS OF ANY REALISTIC CLEAN UP IN RICE & BOG LANDS.

6. MUCH OF THIS AREA IS TREATY PROTECTED FOR NATIVES, CEDED LANDS YET LITTLE REGARD FOR CULTURAL, RELIGIOUS, HISTORICAL USAGE IS BEING RECOGNISED.

7. ENBRIDGE HAS NOT PROVEN TO BE RESPONSABLE.

8. AREA OF PIPELINES CROSSES MOST OF THE WATER FLOWAGE OF MISSIPPI WATER IN CENTRAL U.S. WHY GAMBLE? OUR WATER SUPPLY IS MORE IMPORTANT THAN FOREIGN CORP, BANKING INVESTMENTS.

9. AS A 70YR OLD DISABLED VETERN LANDOWNER VOTER I ASK YOU TO CONCIDER THE CONSEQUENCES!

John H Rutsen

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Lisa Rydin Erickson <lisakayrydin@gmail.com>
Sent: Monday, July 10, 2017 4:36 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL15-137

Enbridge should not route their new larger capacity Line 3 tar sands oil pipeline through sensitive Minnesota wetlands. This line adversely affects native communities - directly threatening watersheds connected to the largest and the only certified organic wild rice lakes in Minnesota. This is a bad investment which needs much more study because it threatens our water. This Canadian company gets all the benefit and American's get all the risk. In addition Enbridge needs to clean up all it's old pipe and not leave it in the ground for future generations.

CN-14-916 and PPL15-137

Lisa Erickson

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Carter Saline	402-689-2472	saline@mail.com

ADDRESS
23716 Hampton Rd

CITY, STATE, ZIP
Elkhorn, NE 68022

COMMENTS
Pipelines are safe! Preventing the replacement of Line 3 with pose a greater risk to the environment than not.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Tony Salls <tony4duluth@gmail.com>
Sent: Monday, June 26, 2017 4:51 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

Dear Ms. MacAlister,

It is the purpose of Government to support the best solutions in today's world and its need for safely delivered energy. Certainly a pipeline is a proven safe transport of today's energy sources.
Such a move is in the best interests of the consumers , the people of the United States and that of the globe.
While I am a proud support of the Paris agreement and for technology of renewables this source of energy transportation is valuable and needed in today's world. Technology is ever changing our economy and will continue to change our everyday life. Leading to a cleaner climate, perhaps even the cleansing of the air.
While I understand the argument that blocking energy will result in quicker acceptance of new technology we aren't there yet and frankly the breakthrough may become efficiency in transportation and or the ability to recycle our own exhaust systems as discussed by Nobal Physics Award winners and the California Institute
Pipelines are our safest and most secure option for moving our energy for equal access

Sincerely,

Tony M Salls
3717 W 4th St
Duluth, MN 55807
tony4duluth@gmail.com

Larry C Salmela
22838 Rollercoaster Road
Effie, Minnesota 56639-6163
meadlake.larry@gmail.com

Jamie MacAlister
Environmental Review Manager
Department of Commerce
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

June 13, 2017

Dear Jamie MacAlister:

This letter communicates my support for the Enbridge Energy project called the Line 3 Replacement Project to proceed. I believe that this project contributes to the economic and strategic security of the nation. I believe that pipelines such as Line 3 are the safest and most economical method to transport crude petroleum and petroleum products over long distances.

Regardless that some people are opposed to the utilization of the specific crude petroleum which will be transported by Line 3, I believe that Enbridge Energy has superior knowledge about the market needs for this project. I also do not believe that it is appropriate to extend the arguments about global climate change to this project. The Line 3 project is only one of several alternative transportation options for the controversial crude petroleum. The proposed pipeline remains the safest transportation means.

Thank you for considering my comments.

Very sincerely yours,

Larry C Salmela

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JUN 16 2017
MAILROOM

RECEIVED
JUL - 3 2017
MAILROOM

June 29, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

Document #CN-14-918, and PPL-15-137

Dear Mr. MacAlister:

I just wanted to show our support for the Line 3 replacement project. I believe replacing aging infrastructure like pipelines is important to protecting our environment. And as a Minnesotan, I want to see the environment protected for future generations.

I also prefer to locate pipelines in more rural areas, rather than to site them in the middle of cities and towns. I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3. And I also agree that leaving the permanently deactivated pipeline in place is the safest option as it reduces the risk of soil stability issues, avoids major construction activities and reduces the potential risk to existing pipelines from heavy equipment. As a landowner, I'd rather have the pipe deactivated in place to avoid further construction on my property.

Sincerely,

James J. Sanders

James J. Sanders
P.O. Box 35
Kettle River, MN 55757-0035

Levi, Andrew (COMM)

From: Elena Santarella <santarellaelena@gmail.com>
Sent: Monday, July 10, 2017 12:13 PM
To: MN_COMM_Pipeline Comments
Subject: public comments
Attachments: elena santarella Line 3 DEIS Public Comments.docx

Attached are my comments regarding the Line 3 pipeline draft environmental impact statement (**CN-14-916, PPL-15-137).**

Best,
--
Elena Santarella
(720) 238-3395
santarellaelena@gmail.com

Line 3 DEIS Public Comments
CN-14-916
PPL-15-137
Elena Santarella
July 10, 2017

The proposed Line 3 pipeline unnecessary and dangerous. It will encourage the expansion of fossil fuel infrastructure despite the fact that this industry has seen losses in profits. It will cut across countless waterways threatening wildlife ecosystems and drinking water along the way. It will contribute to the further degradation of the planet through climate change. Each of these issues is not adequately addressed in the Draft Environmental Impact Statement (DEIS) prepared for the Line 3 pipeline.

To begin, the Line 3 pipeline represents unnecessary fossil fuel infrastructure. The DEIS considers a variety of routes and options for the oil to be transported, but does not address the option of shutting down the current Line 3 pipeline and not constructing a new one. The oil being transported could travel through existing pipeline structure or stopped completely. To the degree that other transportation options were evaluated, the alternative of no pipeline should be studied fully in the DEIS, as well.

Additionally, the construction of a new Line 3 pipeline will further exacerbate the effects of climate change. The emissions produced from the construction of the pipeline, the extraction of the oil, the occurrence of spills or accidents, and the combustion of this dirty tar sands oil have global impacts. The risk presented by climate change on populations within Minnesota and beyond the state are far too great and deserve to be explored within an Environmental Impact Statement. Thus, the DEIS needs to be redone to more adequately address the issue of climate change.

Last, the construction of the new Line 3 pipeline pursues a route that would endanger countless ecosystems and communities. Enbridge’s preferred pipeline route would cross at least 95 wetlands and 192 surface waters and require the clearing of hundreds of miles of trees and brush. This land cover serves an invaluable purpose of filtering contaminants. In fact, the Department of Natural Resources provides a list of 10 important functions of a wetland including the provision of erosion and flood control, groundwater recharge and discharge, as well as habitat for fish and wildlife. Placing all of these natural functions at risk for bottom of the barrel tar sands oil does not benefit a state that relies so heavily on its water resources. Never mind the fact that this pipeline route would threaten the health of communities by polluting drinking water sources and fouling wild rice waters. The DEIS needs to more adequately address the risk to natural ecosystems and environmental justice communities stemming from the construction of a pipeline along the proposed route.

If water quality in Minnesota will only improve 6-8% without additional action, the construction of an unnecessarily dangerous pipeline will definitely not facilitate the Governor's pursuit of improving water quality 25% by 2025. The construction of a new Line 3 pipeline is out of step with the environmental goals of the state.

Due to the risk that the Line 3 pipeline poses to wildlife and native communities in Minnesota as well as its implications on the world through the exacerbation of climate change, the DEIS has considerable gaps. Thus, the state needs to improve the document by exploring the possibility of no pipeline, fully addressing climate change implications, and more adequately detailing the threats to the health of ecosystems and communities throughout the region and the state caused by the proposed pipeline route. Impacts of this project will be seen for years to come, and thus needs an EIS that considers the complete impacts of the project beyond a 30 scope.

Levi, Andrew (COMM)

From: Berni Sarazine <blasarazine@gmail.com>
Sent: Monday, July 10, 2017 3:24 PM
To: MN_COMM_Pipeline Comments
Subject: sensitive Minnesota wetlands

CN-14-196 and PPL15-137

Enbridge should not route their new larger capacity Line 3 tar sands oil pipeline through sensitive Minnesota wetlands. This line adversely affects native communities - directly threatening watersheds connected to the largest and the only certified organic wild rice lakes in Minnesota. This is a bad investment which needs much more study because it threatens our water. This Canadian company gets all the benefit and American's get all the risk. In addition Enbridge needs to clean up all it's old pipe and not leave it in the ground for future generations.

Bernadette Sarazine

Minnesota all my life

Born and raised Iron Ranger

Comments for Enbridge Line 3 Replacement
June 22, 2017 at Sanford Center Bemidji Meeting Location
Docket numbers CN-14-916 and PPL-15-137
By Dan Sauve, PE

Hello,

I want to comment today in support of the Enbridge Line 3 replacement project. I am a professional engineer and the Clearwater County Engineer. I have been the Clearwater County Engineers for the past 20 years. Prior to that, I have worked as an environmental engineer in hazardous waste site investigations and cleanups. I live in Beltrami County and work in Clearwater County. I have seen at least three new pipeline installation projects come through Clearwater County during my term as the County Engineer. I have lived in this area most of my life.

I support transporting oil by pipelines because it is the safest and most environmentally friendly way to transport the oil to market. I would hate to see all this oil being transported by train or truck. Transporting the oil by train or truck would have a great safety impact to our community by the increase in train or truck traffic and increase spill potential.

I hear comments from a few people that say we should quit using oil. At this time it simply is not possible to quit using oil. It is used in so many products. I like to give this example. Our little County Highway Department uses on average approximately 800,000 gallons of oil products each year. About 70 percent of that consists of bituminous material that is mixed at about 5.8% with sand and gravel to make the asphalt road surface that we all drive on.

Oil spills are a concern, but from what I witness, Enbridge has always taken the responsibility to restore the environment. I recently have been made aware of a large oil spill that has occurred in our area in 1979 where over 400,000 gallons of crude oil spilled from a pipeline. I have driven by this site and never knew it existed. Cleanup activities resulted in the removal of more than 75 percent of the oil, meeting the environmental standards in place at the time. The environmental standards are stricter today. After further evaluation, Enbridge was going to cleanup the site further, but the regulatory agencies in cooperation with Enbridge wanted to use it as a research site. The research has greatly expanded the understanding of natural attenuation and biodegradation of crude oil in the environment. They also found that the oil impacted groundwater plume moved much less than expected and a greater degree of natural attenuation and biodegradation was occurring. This is a large spill in our area that most people do not know about and it does not have a wide detrimental effect. The point is that all modes of transportation can cause a spill, the spill can be remediated, and Enbridge has shown the responsibility to address any spills that occur.

Lastly, I have to say that Enbridge has always been a good neighbor and easy to work with. During the construction and maintenance of their pipelines, they have always addressed our concerns and restored any damages they caused to our road right-of-way. They are supportive of our community and pay a large share of our property taxes, which takes some of the tax burden off our residents.

Sincerely,

Dan Sauve

Dan Sauve, PE
113th St. NE
Bagley, MN 56621

Levi, Andrew (COMM)

From: Noah Savage <savagen@carleton.edu>
Sent: Saturday, July 08, 2017 5:30 PM
To: MN_COMM_Pipeline Comments
Subject: Comments regarding Line 3 and docket numbers CN-14-916 and PPL-15-137

My name is Noah Savage and I am a Minnesota resident residing at 300 North College Street, Northfield, MN 55057.
I'm writing to express my concern regarding the Draft Environmental Impact Statement (DEIS) for the proposed expansion and reroute of the Line 3 pipeline. I thank the Department of Commerce for preparing the DEIS; however, it fails to establish a need for the proposed project, as well as to account for numerous risks this project poses to the environment.
The DEIS fails to prove that the new tar sands oil pipeline is needed, especially as Minnesota's oil consumption rates have continued to drop. Expanding Line 3 will increase climate pollution, but the DEIS fails to adequately account for the climate impacts of extracting and burning an additional 400,000 barrels per day of tar sands.
The DEIS does not accurately consider the amount of oil flowing in existing and nearly completed pipelines around Minnesota. For example, the Alberta Clipper pipeline is listed as carrying 570,000 barrels per day when it really carries nearly 800,000 barrels per day.
Further, the DEIS assumes the increased flow of tar sands even if the expansion is denied, when it should instead consider the effects if the proposal is denied and resulting in no increase in tar sands flow. The DEIS assumes that more tar sands will move through Minnesota, by train or truck, even if the pipeline expansion and re-route is denied, based on an unlikely and unreasonable scenario, given the low price of oil and the high price of trucking or moving tar sands by train. The DEIS fails to consider the effects if the expansion and re-route are denied, and there is no increased tar sands transport through the state.
A recent National Academy of Sciences report found that cleaning up a tar sands spill in a waterway is much more difficult and up to 14.5 times more expensive than cleaning up a non-tar sands oil spill. Enbridge has a history of spills and greater scrutiny is needed for spill clean-up, permanent damage to waterways, impacts to Minnesota's economy and the threat to Ojibwe wild rice rights.
I urge the Minnesota Department of Commerce to ensure a more thorough analysis is done in the Environmental Impact Statement on Line 3 that adequately presents the risks and potential impacts of an expansion on water, communities, and climate."
This is the statement from the Sierra Club.

Thank you!

Levi, Andrew (COMM)

From: John Saw <jbssaw@frontiernet.net>
Sent: Saturday, June 24, 2017 11:09 AM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I support Mining and jobs for northeastern Minnesota. We need the jobs for our area to survive.

Sincerely,

John Saw
2650 Bear Island River Rd
Ely, MN 55731
jbssaw@frontiernet.net

Levi, Andrew (COMM)

From: John Saxhaug <john_saxhaug@yahoo.com>
Sent: Thursday, July 06, 2017 10:25 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Pipeline - CN-14-916 and PPL-15-137
Attachments: Jamie MacAlister.docx

Jamie MacAlister, Environmental Review Manager Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198
Fax: 651-539-0109

Dear Ms. MacAlister:

Attached are my comments on the Tribal Resources and Line Abandonment sections of the Draft EIS.

Thank you for your attention.

Sincerely,

John Saxhaug
3940 Harriet Avenue
Minneapolis, MN 55409

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198
Fax: 651-539-0109

Dear Ms. MacAlister;

I have the following comments on the **Tribal Resources and Line Abandonment Sections** of the Draft EIS:

Tribal Resources

The Tribal Resources section of the DEIS states the following:

"Ceded lands are those lands that the Indian tribes relinquished to the U.S. government as part of a treaty (Figure 9-1). Treaties were written in the English language, the language of the people seeking to appropriate the lands from the Dakota and Ojibwe people in Minnesota. The treaty negotiations were conducted under the implicit threat of an armed military invasion as had been done against tribes farther to the east. Tribes may retain treaty rights over ceded lands if such rights are reserved within the treaty. Tribal members still rely on natural and cultural resources located within ceded lands. Within the state of Minnesota's boundaries, all of the Applicant's preferred route and its alternatives traverse ceded lands."

"The 1837 and 1854 treaties with the Ojibwe provide for the "usufructuary right to hunt, fish, and gather the wild rice, upon the lands, the rivers, and the lakes included in the territory ceded" outside the reservation boundaries (TASC 2016)."

"This chapter provides an American Indian perspective on the construction and operation of a new pipeline. From this perspective, any route, route segment, or system alternative would have a long-term detrimental effect on tribal members and tribal resources."

*It is my opinion, that by treaty, as sovereign nations, the bands have usufructurary rights to these lands, which **must** be respected by any agreements.*

Abandonment

The Executive Summary of the DEIS states the following:

"Major issues considered in the assessment of abandoning the existing Line 3 include:
• Potential environmental benefits of not disturbing the active pipelines located on either side of existing Line 3,

• Potential environmental risks and impacts of any existing contamination surrounding the pipe that would never be discovered and remediated if the line were abandoned, and
• Potential environmental risks and impacts associated with ongoing deterioration of abandoned pipeline."

In my opinion, prior to moving forward with any Line 3 decisions, there ***must*** *be agreement on funding for perpetual maintenance of the abandoned line and liability for damages into the future.*

Sincerely,

John W. Saxhaug
3940 Harriet Avenue
Minneapolis, MN 55409

Levi, Andrew (COMM)

From: Kirsten Saylor <kirsay@gmail.com>
Sent: Monday, July 10, 2017 1:56 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-196 and PPL15-137

Enbridge should not route their new larger capacity Line 3 tar sands oil pipeline through sensitive Minnesota wetlands. T

his line adversely affects native communities - directly threatening watersheds connected to the largest and the only certified organic wild rice lakes in Minnesota.

This is a bad investment which needs much more study because it threatens our water. This Canadian company gets all the benefit and American's get all the risk.

Lastly, Enbridge needs to clean up all its old pipe and not leave it in the ground for future generations.

--
Kirsten Saylor
kirsay@gmail.com
612-968-3678 mobile

From: Brien Schacherer
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137
Date: Wednesday, June 07, 2017 11:20:08 AM

Dear Ms. MacAlister,

Hello. I am a resident near the Enbridge Line 3 pipeline in northern Minnesota and am a strong advocate of replacing the asset with a more modern pipeline that can continue to safely transport the energy resources we all need. Environmental concerns are extremely important to me and I want to ensure that the safest, most environmentally-friendly modes of oil and gas transportation are utilized. For clarity, alternative modes of transportation (rail and trucking) are a distant second in these factors compared to pipelines. Enbridge has a strong history of responsible energy transportation and I am encouraging the MN DOC to support the Line 3 project. Thank you.

Sincerely,

Brien Schacherer
4903 Trails End Dr
Duluth, MN 55811
brien.schacherer@aol.com

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

MINNEAPOLIS MN 550
10 JUL 2017 PM 3 L

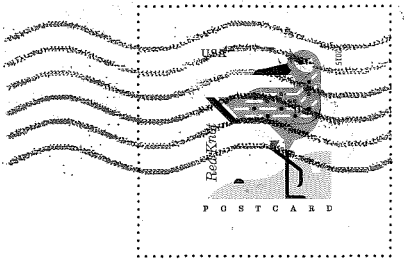

No line 3. The tar sands & the benzene, a carcinogen (caps) has no place spilling in a wetland. Further, a Canadian company has no place or right to destroy MN wilderness. A big spill in the middle of nowhere? End result: water & land destroyed. And consider MN groundwater that starts in northern MN and moves southward.

SINCERELY,

Linda Espeseth
3905 10th Avenue S. Apt 1 Minneapolis MN

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137

MINNEAPOLIS MN 353
JUL 2017 PM 5 L

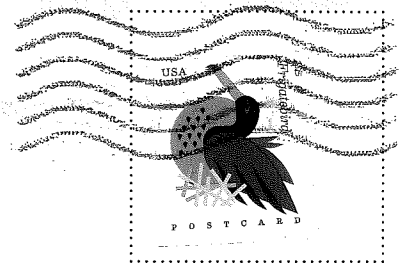

The old Line 3 should not be left to stand. It should be removed. As an individual I am responsible for disposing of my trash. A business should be required to clean up their trash. Citizens should not be required to be more accountable than corporations

SINCERELY,

Linda Schaefer
3905 19th Ave S, MPls, MN

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Levi, Andrew (COMM)

From: sharli <SharliF@cox.net>
Sent: Monday, July 10, 2017 10:14 AM
To: MN_COMM_Pipeline Comments
Cc: sharlif@cox.net
Subject: Public Comment Enbridge DEIS Line 3

July 10, 2017

Jamie MacAlister, Environmental Review Manager
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Re: Public Comment, Line 3 Project (CN-14-916 and PPL-15-137)

I am writing one more comment in the eleventh hour to voice my opinion that it is time for the US Government to finally stand up and HONOR the treaties that have been signed with the Native American Tribes. Building a new pipeline through treaty lands; lands that are reserved for hunting, fishing, gathering, and religious practices by the Tribes, would be another failure to honor our commitment to these people. A spill in these lands would cause irreparable harm to the fragile ecosystem.

Enbridge doesn't need another pipeline and Minnesota doesn't need another oil or tar-sands spill.

Sincerely,

Sharli Schaitberger
1402 S. 8th Street
Brainerd, MN 56401

Sent from my I-pad

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MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Diana Scharsberg

Street Address: 13921 91st St. NE

City: Otsego State: MN Zip Code: 55330

Phone or Email: 763-241-9786

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am very much opposed to the Line 3 pipeline. This is the dirtiest oil, will provide time limited jobs, will require our taxes to build roads needed to build the pipeline.
The proposal is to go through Native American land (through treaty) and land where they do ricing. The Native Americans do not want it on their land.
Most of the oil will be shipped to other countries - not for us to use. It is just for the oil company to sell and make billions of dollars.
I understand that the oil company will abandon the old line but not remove it. So any seeping or other consequences of abandoning the pipeline after 5 years will be passed on to the landowners. This is not right! The oil companies should FOREVER be responsible for the damage they cause.
Minnesota is blessed with thousands of lakes, rivers, parks, wetlands, forests, wildlife, etc. We all should be able to enjoy and want to keep clear for future generations.
Oil spills have caused so much damage to water, land, wildlife and humans wherever they happen.
This is a Canadian Oil Company I believe. Why aren't they building this pipeline in Canada? Is it because it has been blocked? Why would we allow anyone to contaminate our state or country? For oil companies to make more money?
My suggestions to improve the plan? Don't approve it! If they abandon the old line they must remove it and continue to be responsible for any current, past and future damage they cause. If they continue to use it they must maintain it in good working order and fix any problems that arise. I am also opposed to re-routing the pipeline. It causes bonus damage. Stop polluting Minnesota!

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Blake Scheidegger <mr.scheidegger@gmail.com>
Sent: Monday, July 10, 2017 12:00 PM
To: MN_COMM_Pipeline Comments
Subject: No new pipeline!

If Enbridge insists on investing in rebuilding their aging pipeline I, as a citizen of Minnesota, think in order to keep our water and land safe, they replace the current line and clean anything that needs to be cleaned there currently and place the new line in its place. Do not risk are beautiful fisheries, wetlands and wild rice fields! The simple facts that the current line is aging and that rail transport is not a great alternative, are NOT a good impetus to build this new line. Lacking good alternatives does not make a new line a good option or the right option. Particularly in its planned location. Minnesota is not on the hook to keep Embridge profitable and I'm certain oil companies will find a way to keep gas at the pump for all our vehicles!

Thank you

-Blake Scheidegger

June 22, 2017

Department of Commerce
85 Seventh Place E, Suite 280
St. Paul, MN 55101-2198

Subject Line 3 Replacement DEIS

I have had an opportunity to review the DEIS for the Line 3 Replacement project as proposed by Enbridge and I have the following observations and comments.

I am extremely disappointed that 2 System Alternatives were not considered in the DEIS. They are SA 03, as proposed by the Minnesota DNR and PCA during the Sandpiper review process, and SA 04. I find all of the routes considered in the DEIS are unacceptable, namely RA 06, RA 07, RA 08, RA 03M and the Applicant's Preferred Route. They all cross water influenced areas of Minnesota and impact pristine waterways. SA 03 circumvents many of the clearest lake areas and still delivers oil to Superior. It must be considered in the final EIS.

The DEIS recognizes there are 0.03 incidents of catastrophic failures per 1000 miles annually. A catastrophic failure of over 420,000 gallons is therefore predictable over the estimated 30 year life of the pipeline. If that failure happens in our lake country, it would be totally unacceptable. Just ask the people in Marshall, Michigan when in 2010 over 800,000 gallons of tar sands were spilled into the Kalamazoo River. It never has been totally cleaned up. 30 miles of the Kalamazoo River were shut down for over 2 years for water related activities.

SA 04 must be considered as a system alternative! It has been dismissed because of its length and greater chance of spill incidents. But the number of spill incidents alone cannot be the sole criteria in route selection. It must be recognized that the effects of spills differ greatly depending on the spill location. Spills in water influenced regions are transported and dispersed much more rapidly than in non-water influenced regions. Also, the ability to access spill sites is much easier and faster in non-water influenced regions. Many potential spill sites along the studied routes are 1000 feet or more from any road access. Building access roads to the spill sites would cause environmental damage, as well as damage from the spill itself and subsequent clean-up activities.

SA-04, according to the DEIS, would not cross any aquifers designated by the EPA as sole source aquifers. Therefore, there would be no impact on any sole source aquifers. Tar sands oil will be delivered to the same terminus as the studied routes with much less environmental impact. SA 04 and SA 03 must be considered in the final EIS as alternative routes.

Lowell J Schellack

Lowell J.Schellack
P.O. Box 628
Park Rapids, MN 56470
218-699-3473 lowellschellack@gmail.com

Levi, Andrew (COMM)

From: Schiller <schiller@emily.net>
Sent: Friday, June 16, 2017 11:52 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

Please stop the pipeline. It is dirty oil. It is only for the wealthy to become more wealthy. It does NOTHING for the rest of our country, except ruin the land and water.

We all know that oil production causes Climate Change, and heat and drought, fire, and horrible storms all over this land.

Does this not matter to you? America the beautiful from sea to shining sea?

We The People....want our rivers and lakes and large bodies of water like the Great Lakes, to remain pure and wonderful to behold, to be enjoyed by all, and to remain clean for those who live near and need it to drink.

How many of you working on this pipeline, making decisions on this pipeline, become wealthy also? I would say, not many. So why go along with the destruction of our state's land and water? Why carve this huge and ugly hole across Minnesota?

Minnesota, Land of 10,000 Lakes. Aren't we proud of this on our license plates? So I plead with you to do what you know is right.

From The Land of Sky Blue Water,

Judith and Richard Schiller, our children, and all our grandchildren.

Fifty Lakes, Minnesota

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
John J Schjoth	906-201-1359	jschjoth70@gmail.com

ADDRESS: ~~Pellce MI 49958~~ 12353 US4 Hwy 41

CITY, STATE, ZIP: Pellcie MI 49958

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

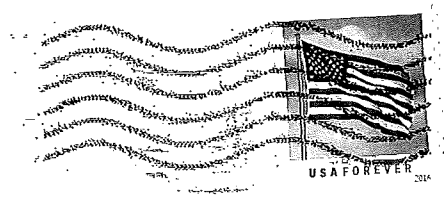

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

bschlenvogt@msn.com

FULL NAME	PHONE NUMBER	EMAIL
WILLIAM SCHLENVOGT	218-879-3675	
ADDRESS		
435 7TH ST.		
CITY, STATE, ZIP		
CLOQUET, MN 55720		

COMMENTS

-SAFEST AND CLEANEST ALTERNATIVE TO RAIL CARS

-PIPELINES HAVE BEEN AROUND FOR OVER 50 YEARS, AND CRISS CROSS THE COUNTRY BY THE THOUSANDS - THEY HAVE A GOOD OVERALL TRACK RECORD.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study.** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement.** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

$ 000.34

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jess J Schloemer	715-938-8079	

ADDRESS: 9913 Co. rd. Z E

CITY, STATE, ZIP: Pound, WI. 54161

COMMENTS: I've worked digs 4 yrs, repairing sleeves etc. New is better, whats a few more yrs?

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Margaret Schmidtke	218 547-2354	—

ADDRESS
7691 Front St NW Walker MN 56484

CITY, STATE, ZIP

COMMENTS I support

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

UNITED STATES POSTAGE
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MAILED FROM ZIP CODE 55419

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Ricklin Schmidtke		
ADDRESS		
7691 Front ST NW		
CITY, STATE, ZIP		
Walker MN 56484		

COMMENTS I support

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Elaine Schminski		
ADDRESS		
5272 Hwy 73		
CITY, STATE, ZIP		
Floodwood, MN 55736		

COMMENTS

I support the line 3 replacement project.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

BEMIDJI MN 56601

Line 3 Replacement Project DEIS

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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

PURPLE HEART
FOREVER USA

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Lori Schott		
ADDRESS		
CITY, STATE, ZIP		
Milaca MN 56353		

COMMENTS

Our small business supports Line 3

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Mike Schrage <MikeSchrage@FDLREZ.COM>
Sent: Friday, June 23, 2017 12:25 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 comments

Below are my comments on Enbridge's Line 3 replacement docket numbers CN-14-916 and PPL-15-137.

Enbridge should be required to dig up and remove the existing Line 3 pipeline rather than leave it in place. If Enbridge wants to build a new Line 3, it should remain in the existing Line 3 corridor. We don't need to chunk up any more of our landscape into pipeline corridors when a corridor already exists. If it's not economical for Enbridge to do that, then we shouldn't build a new Line 3.

Mike Schrage
Duluth, MN

Levi, Andrew (COMM)

From: Ann Schrupp <annschrupp@gmail.com>
Sent: Monday, July 10, 2017 8:26 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment Line 3 Pipeline

Public Comment: Line 3 Project (Cn-14-916 and PPL-15-137)

Dear Environmental Review Manager,

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. I have heard that Enbridge redacted those numbers from the public version of the DEIS. Without them, there is no reliable way for an independent party to verify their results.

I believe that in order for Minnesota citizens and agencies to make an educated decision about Line 3, we must have that information, and I would like to know why Enbridge won't release it. Please insist that Enbridge provide their data on oil releases and spills in Minnesota.

If Enbridge objects due to security reasons, then I would like to know why they have failed to cover the exposed pipes in the Tamarack River in northwest Minnesota, and why they allow people to joyride over exposed pipes south of Clearwater. This is surely a security issue as well. For Enbridge to pick and choose what issues warrant "security," is unacceptable.

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete.

I would like to know, in the final EIS for Line 3, what Enbridge's plans are if their preferred route is approved. Will it be just the one pipeline, or will they eventually move all six pipelines to the new corridor? This would have a huge effect on how people feel about Enbridge's preferred pipeline route.

I have heard that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state* need (not a national need). Even if we used statistics about the national need, U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak. In Minnesota, fuel demand was down 19 percent in 2016 compared to its 2004 peak. As higher efficiency cars and electric cars become increasingly popular, it is doubtful a new pipeline will be needed to supply needed oil. (http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf)

I would like to see this information mentioned in the final EIS.

I understand that an engineering firm called Cardno, with ties to Enbridge, was instrumental in preparing part of the draft Environmental Impact Statement for Line 3. In light of this fact, in the final EIS I would like to see an independent analysis of the information they provided. Minnesota requires verified facts for such a large project.

Thank you,

Ann and Dave Schrupp

Crosslake, MN 56442

July 10, 2017

Virus-free. www.avg.com

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Yvette Schultenover

Street Address: 31167 Cimarron Trail

City: Grand Rapids State: MN Zip Code: 55744

Phone or Email: oncimarron@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

6-6-2017 Please examine the numbers used when Pipeline states facts! Numbers don't add up.
as a person with immune system issues & feel that the chemicals that will be and are used in the tar sands oil to be transported have me at great risk healthwise. these leech into well water systems. there are many, many "small spills" per year.
the Kalamazoo River spill is well worth studying to see what + still is happening to its citizens. the chemicals actually burned people as they were told it was now safe.

Our great State of MN does have beautiful Lakes and Rivers that need to be protected as much as possible. Not only for our livelihoods but for health + safety of the inhabitants. Tourism is HUGE here. the health of the animals being fished + hunted is also a big consideration in MN for tourism $.

We had the largest oil spill in the State in my area + the wetlands affected can never be regained. THIS WAS THE "REGULAR" oil — not the topic tar sands.

our beautiful Rivers are under seige already with Agriculture run-off + its proximity to the waterways.

Fossil fuels, although needed, are being relied on less + less as renewable energy sources are being phased in. LARGER and more DESTRUCTIVE pipelines are not needed as once thought.

We have no idea what impact abandonment has to date! Companies are not being responsible (yes, Enbridge too) for clean-up of these and landowners do not have enormous amounts of money to regain the land as it sinks back or buried pipes rise up.

Wild Rice! what a precious commodity in MN. once contaminated will never recover. this industry is uniquely ours.

the Native American issue takes a whole page alone! they are treated terrib

Thank you for this opportunity!

If including additional pages please number them and tell us how many you are providing: _____ pages

Levi, Andrew (COMM)

From: David Schwarz <user@votervoice.net>
Sent: Wednesday, July 05, 2017 9:38 AM
To: MN_COMM_Pipeline Comments
Subject: Pipe line

Dear Ms. MacAlister,

This pipe line is infrastructure that will benefit all Minnesota and the other four states that surround Minnesota, there for it does need to be built.

Sincerely,

David Schwarz
1755 Oak Grove Rd SW
Saint Cloud, MN 56301
dsch477@yahoo.com

Levi, Andrew (COMM)

From: Laura Scott <laurascottprc@gmail.com>
Sent: Monday, July 10, 2017 8:14 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline

To Whom it may Concern: I am writing to voice my strong opposition to the Line 3 Pipeline. I request that the old pipeline be shut down and removed from the ground. Please respect the rights of the Indigenous People of Minnesota who oppose the new pipeline. The construction of a new tar sand pipeline is a step in the wrong direction. The future does not lie in building these pipelines for the short term profit of the corporations. The future of our nation depends on transitioning to sustainable energy sources as rapidly as possible. Wind and solar are in abundance in the beautiful state of Minnesota and that is what should be encouraged. Please deny the permit for the Line 3 Pipeline for the sake of our future generations. Thank you, Laura Scott

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Trent Scott

Street Address: 3625 Aldrich Ave. S. Apt. 103

City: Mpls State: MN Zip Code: 55409

Phone or Email: (612)720-6912 trentscott92@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

As a citizen of an unstable time on the horizon of what can be the summit of our collective journey it is important we look at sustainable living. As a worker in construction I wish to see jobs in my field to be supported by the communities in which I work. It seems that those who are for projects such as pipeline 3 see the prosperity it can bring. It seems to me renewable energy resources both meet prosperity boosts as well as causes little dammage to the local environment. It is also well known that handeling of fossil fuels or close contact with the raw materiels, over a prolonged time can cause health issues which will affect those who profit the least. It may create jobs but at what cost to its workers. I, as a construction worker, expect my body to deteriorate, as any aging organism, but I want it to be slow and as harmless as possible. If we are to have such projects I want to know enbridge can legally & economically be held responsible, if not why should I trust what they say? I trust the word of companies that offer guarantees, right now the only factual guarantee with hard numbers supporting it are short term jobs & that there will, certainly, at some point, be a spill.

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Christopher Sebas <christopher.sebas@icloud.com>
Sent: Monday, July 10, 2017 2:53 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment, Pipeline

To Whom it May Concern,
Please do not build any extensions on Pipe Line No. 3. Proper enviromental reviews and respect for lands that affect native peoples.
Thank you,

From: Carol Seeley
To: MN_COMM_Pipeline Comments
Subject: CN-14-916, PPL-15-137 (Pipeline 3)
Date: Tuesday, May 30, 2017 11:12:35 PM

These are my comments for your EIS:
Please don't grant a permit to Enbridge to construct this pipeline.
We should move on to develop clean energy at this time; not build pipelines which have a very high rate of failing, and ruining waterways. We cannot survive once we ruin the water. Thank you.
Carol Seeley

15 Pine Hill Road
Swampscott, MA 01907

Levi, Andrew (COMM)

From: margaret seibel <margedanny10@yahoo.com>
Sent: Monday, July 10, 2017 12:47 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 CN-14-916 PPL-15-137

From the U.S. Department of Transportation, Pipeline and Hazardous Material Safety Administration, Draft Report, Leak Detection Study DTPH56-11-D-000001, Section 2.2 Overall Summary states :

Overall Summary for Task 3 - Review and Assess Previous Pipeline Incidents The overall technical issues identified from the work performed on Task 3, based on data reviewed between January 1, 2010 and July 7, 2012 for hazardous liquid pipelines were:

1. The pipeline controller/control room identified a release occurred around 17% of the time.
2. Air patrols, operator ground crew and contractors were more likely to identify a release than the pipeline controller/control room.
3. An emergency responder or a member of the public was more likely to identify a release than air patrols, operator ground crew and contractors.
4. A CPM LDS was the leak identifier in 17 (20%) out of 86 releases where a CPM system was functional at the time of the release.
5. SCADA was the leak identifier in 43 (28%) out of 152 releases where a SCDA was functional at the time of the release.
6. For hazardous liquid pipelines, SCADA or CPM systems by themselves did not appear to respond more often than personnel on the ROW or members of the public passing by the release incident.

I think Enbridge line 3 should not go through Minnesota's premium wetlands when the pipeline controller/control room identified a release occurred only around 17% of the time. With Minnesota being frozen over much of the year combined with the tendency of tar sands oil to sink, it may be difficult for aerial surveys to catch oil spills. The remoteness of some of the land makes it difficult for the public to find a spill quickly. We need to protect our premium wetlands and wild rice beds for future generations.

Margaret Seibel
Minnesota resident

Levi, Andrew (COMM)

From: Shaina Seopa <user@votervoice.net>
Sent: Monday, July 10, 2017 4:08 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I am a Minnesotan and want to see the environment protected like most others. I believe replacing aging infrastructure like pipelines is imperative to protecting the environment. The MPCA has recently released the Mississippi River Watershed report that shows the cleanest waters in the state are in northern Minnesota. Energy infrastructure and clean waters can co-exist. My hope is that you will remove the existing line (even thought it might cost you more money). The existing line will contaminate the earth and will be left for future generations to deal with. Also, my hope is that you move the existing route that you have planned for the replacement. I live very close to the Headwaters of the Mississippi. This is sacred water. It travels the entirety of our country. If there was a major leak, this could possibly harm anyone who lives near this body of water, the drinkers of the water, the habitat, and the animals. I do not agree with the placement. If the pipeline must go in, get it away from the water. Minnesota has the most pristine waters in the country. Please keep it clean. Future generations depend on water for survival. Oil profits are temporary. Why can't we make pipelines safer? The infrastructure should also be better maintained and put together much stronger then they are. Why do we still have leaks? Please understand that I am not against pipelines, I just believe that we should be making smarter decisions. Especially when it is so close to home for me. The Headwaters is a major tourist attraction as well. If something ever happened here, what would happen to the tourist population? Also, the indigenous tribes who harvest wild rice? The wild rice in Grand Portage is completely gone. I do not want this to happen to our indigenous tribes here. They use it for their own food as well as providing fresh wild rice here in the Bemidji area. Please consider changing the route, taking out the already existing line, and making the pipeline more resistant.

Sincerely,

Shaina Seopa
1301 Minnesota Ave NW
Bemidji, MN 56601
shaina.seopa@yahoo.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Scott Sertich		
ADDRESS 5169 Vermillion Rd.		
CITY, STATE, ZIP Duluth, MN 55803		

COMMENTS

Keep the line schedule on time.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Julie S <rustysetrum@gmail.com>
Sent: Monday, July 10, 2017 11:27 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Pipeline permit. CN-14-196 PPL-15-137

Enbridge should not be permitted to build the Line 3 Pipeline through sensitive Minnesota wetlands. Particularly, it should not be allowed to threaten the watershed connected to Minnesota's largest and our only certified organic wild rice lakes. This is a bad investment that needs a lot more study, before it gets a chance to threaten our water supply.

This Canadian company will get all of the benefits out of this deal and Minnesota will have to assume all of the risk. This is unacceptable.

Julie Setrum

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Marian C. Severt

Street Address: 11465 Easy St

City: Brainerd State: MN Zip Code: 56401

Phone or Email: mcsevert@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

#1 – Certificate of need must be separated from EIS.

#2 – Line 3 must NOT be allowed to be "abandoned" by Enbridge.

#3 – Enbridge route from Clearbrook terminal MUST go directly to Superior terminal AND NEVER be allowed to go south into prime watershed areas and wetlands. As we were clearly shown "dilbit" and water do not mix

#4 Route labeled "APR" from Clearbrook terminal south thru whitefish watershed must be vetoed – Enbridge has desecrated current pipeline route – we must not allow additional disruption of environment They need to pull up line 3 & put new pipeline in its place if pipeline is to exist at all.

#5 Do we need to transport tar sand oil thru Minnesota at all? The "dirtiest oil" should/must stay in the ground. Our focus needs to be to "decrease" our dependance on fossil fuel.

thank you for the opportunity to comment.

If including additional pages please number them and tell us how many you are providing:_____ pages

TAPE HERE (PLEASE DO NOT STAPLE)

RECEIVED
JUN 15 2017
MAILROOM

MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
SAINT PAUL, MN 55101-2198

55101$2143 C012

FOLD HERE

Public Comment Period Ends Monday, July 10, 2017

Comments must be postmarked or received electronically by the comment deadline.

How to comment:

- Drop this form in a comment box at a public meeting
- Mail this form, remembering to affix appropriate postage
- Mail comments in a separate envelope using the mailing address on this form
- Email comments to the Environmental Review Manager: Pipeline.Comments@state.mn.us
- Fax comments to the Environmental Review Manager: (651) 539-0109

Comments do not need to be on this form to be accepted. We encourage you to provide comments in whatever way is most convenient for you. If commenting by email or fax please use *"Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)"* in the subject line.

Thank you for participating in the Draft EIS public review process! By commenting you are helping inform the Minnesota Public Utility Commission's decisions regarding this project.

FOLD HERE

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is unclear? What is missing? Please reference specific sections of the Draft EIS, if possible. Use additional pages as needed.

For project information visit: http://mn.gov/commerce/energyfacilities/line3.

July 9, 2017

To the Public Utilities Commission of the State of Minnesota

Re: CN-14-916 and PPL-15-137

On behalf of the residents and land owners on and near Shallow Lake, near Warba, Minnesota, and by approval of the Shallow/Sand Lake Association Board, we wish to express our concern regarding the Line 3 Replacement Project, particularly the abandonment of the decaying Line 3.

By Enbridge's admission in the draft environmental Impact statement (D-EIS) that Enbridge filed with the Minnesota Public Utilities, "longer term impacts are caused by the continued presence of undiscovered legacy contamination that may exist surrounding the existing pipeline, as well as the potential hazards associated with the aging of the abandoned pipe. These impacts include soil and water contamination, the ability of the pipeline to serve as a water conduit, subsidence due to the failure over time of the pipeline and the loss of buoyancy control for the pipeline."

Shallow Lake, a part of the Mississippi watershed, is located in southeastern Itasca County and covers an area of 540 acres with a maximum depth of 85 feet. It has good clarity and low algae levels , is known for bass fishing and pan fish, and enjoyed for boating, swimming and other watersports. A portion of the east shore is wetland and bog, but most of the shoreline is ringed by modest year-round homes and cabins. Shallow Lake has one inlet from wetlands on the north west side of the lake and one outlet on the east side. The pipeline corridor runs across the northern side of Shallow Lake, a portion of it through wetlands within 80 to 100 feet of the shoreline, in effect through the waters of Shallow Lake.

We understand from the D-EIS that the current Line 3 is in grave condition and the concerns of accidental release having 'the most exposure' is in keeping the existing Line 3 in place. It remains unclear as to how a deteriorated Line 3 would handle the removal of the oil, cleaning, disconnecting and segmenting of the pipeline, as proposed. There is no specific plan within the D-EIS that states how Enbridge will manage a contaminated site other than 'Enbridge has indicated that it would. . ." The D-EIS states that "mitigation measures, or clean-up, would be handled in collaboration with the authorities, or cities and their residents, of the area where potential failure occurs.

Based on the information in the D-EIS, the Shallow/Sand Lake Association requests that Line 3 be removed from the corridor running across the north side of the lake from Shallow Lake Road to Warba, from proximity to wetlands to the west that drain into Shallow Lake and any area where deterioration of Line 3 would threaten the health of the lake.

We appreciate the opportunity to give input to an issue, the abandonment of an oil pipeline, which has little or no precedent in our country and encourage the Public Utilities Commission and all state entities to pursue this with great caution.

Shallow/Sand Lake Association Board, Itasca County, MN
Paul Durkee, Tim Scherkenbach, Jan Bilden, Fay Klande, Andrea Heldt, Katie Thompson, Shirley Foust

Levi, Andrew (COMM)

From: Jan Bilden <jpbilden@gmail.com>
Sent: Sunday, July 09, 2017 8:46 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137
Attachments: Line 3 abandonment letter.docx

Please see attached a letter of concern regarding the abandonment of Line 3 by Enbridge Pipeline. I registered to submit on 7/9 and will fax my signature sheet in on 7/10.
A copy of the letter from our lake association board, Shallow/Sand Lake Association, is attached.
Thank you for your attention to this.
Jan Bilden

July 9, 2017

To the Public Utilities Commission of the State of Minnesota

Re: CN-14-916 and PPL-15-137

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We appreciate the opportunity to give input to an issue, the abandonment of an oil pipeline, which has little or no precedent in our country and encourage the Public Utilities Commission and all state entities to pursue this with great caution.

Shallow/Sand Lake Association Board, Itasca County, MN
Paul Durkee, Tim Scherkenbach, Jan Bilden, Fay Klande, Andrea Heldt, Katie Thompson, Shirley Faust

From: MacAlister, Jamie (COMM)
To: Kirsch, Raymond (COMM)
Cc: Levi, Andrew (COMM); Wachtler, John (COMM)
Subject: Fwd: Complaint Ticket: shaw deb |
Date: Wednesday, May 31, 2017 9:31:24 AM

A new avenue for commenting! See comment below.

JM

Sent from my iPhone

Begin forwarded message:

From: MN_COMM_MarketAssurance <MA.Mailbox@state.mn.us>
Date: May 31, 2017 at 8:17:56 AM CDT
To: "MacAlister, Jamie (COMM)" <jamie.macalister@state.mn.us>
Subject: FW: Complaint Ticket: shaw deb |

Hi Jamie,

We received the inquiry below regarding Line 3. Do we have a person who handles those?

Thank you,
Ibrahim

From: commerce.helpdesk.ticket@caspiomail.com
[mailto:commerce.helpdesk.ticket@caspiomail.com]
Sent: Tuesday, May 30, 2017 10:58 PM
To: MN_COMM_MarketAssurance <MA.Mailbox@state.mn.us>
Subject: Complaint Ticket: shaw deb |

---

85 7th Place East, Suite 280 | Saint Paul, Minnesota 55101 | (651) 539-1600 | consumer.protection@state.mn.us

---

Complaint

Date Submitted : Tuesday, May 30, 2017

Inquiry Type *(if general inquiry, scroll to the bottom)***:**

Consumer Information

Name: deb shaw

Email Address: debshaw1040@gmail.com

Phone: 2182599171

Address: 20300 River RD, Grand Rapids, Minnesota, 55744

Complaint Information

Industry :

Reason Contacting :

Account Number (for financial institutions complaints) **:**

Claim Info:

Company Information

Name : state of minnesota

Address : , , Minnesota

Individual Information (if applicable)

Name :

Address : ,,

Other Party Information (if applicable)

Name :

Address : , ,

Complaint Details :

Why are you wasting taxpayer money on all these enviromental reviews regarding the line 3 replacement? We all know it is decrepit and unstable and needs constant repair. This is a no brainer. Replace the pipeline! Now! The oil is not going to stop flowing through this line. Wouldn't it be prudent to replace with something that is brand new and updated? Please stop this madness!

Securities Questions (if applicable)

Net Worth :

Fund Source :

Investment Objectives:

Prior Investment Experience :

General Inquiry

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
JUSTIN SHAW	5127818446	shaw.77@hotmail.com

ADDRESS
PO BOX 1287

CITY, STATE, ZIP
WALKER, MN 56484

COMMENTS I support the line 3 replacement project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

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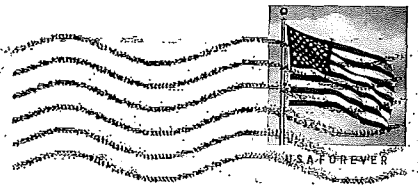

3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Star Otto <creatastar@gmail.com>
Sent: Monday, July 10, 2017 7:38 PM
To: MN_COMM_Pipeline Comments
Subject: Submitted on behalf of Aryes Sheehan
Attachments: Aryes Sheehan Public Comment.pdf

Please respond with confirmation that this has been received and filed.

My daughter is 18 years of age, and has the same address as I do. Which is 15444 Lesley Lane, Eden Prairie, MN. 55346

Thank you!

The communication in this email is private and confidential intended only between the parties addressed in the communication. If you are not the sender or recipient intended please respond or call 952-210-8303. Any intention to use the content of the information in the email is strictly prohibited without permission from the sender.

July 10, 2017

The public comments on submission regarding the Laborers Union on the dependence of the fossil fuels from Line 3 is a limited perspective. The dependence on the fossil fuels only exists due to market demand. Should the demands change, as they are reflecting in current times, around the world, fossil fuel is lessoning in demand.

http://www.telegraph.co.uk/business/2017/04/17/market-fossil-fuels-burnt/

https://www.strategyand.pwc.com/trends/2016-oil-and-gas-trends

Many who work in the pipeline industry claim the dependency on fossil fuels. However, that dependency can change as fast as the market trends and does not solely depend on the laborers that are in the field of construction.

When in fact, the laborers were ill prepared during the housing crash of 2008 that led in a major economic depression that took many in the construction field out of service.

The trends are reflecting a new trend to renewable energy. Showing that the need for fossil fuels is declining. What will the laborers do when the trend change? Be angry that new work and more long term and stable work will be created and would not require the use of fossil fuels for their industry?

That they could also care about the world that they live in and would take greater care as the skilled workers in the state to find new and more productive ways to use their skills rather than risk the public's health and clean drinking supply?

Or is it that they worry that their pay that they demand to be in a skilled area would diminish because they chose not to upgrade their skills to be in the world that is showing that it is changing to renewable energy?

While there is a true concern to the industry and the travel that it takes, to utilize new and alternative energy such as hemp or water, or solar vehicles would be much better for the environment and would not only consider the one trade in laborers but two. Think of the work that would be created for those in the automobile and mechanics industry?

While those who work in the pipeline may have concerns of their industry, both my parents are in the industry as well and have been actively working toward the new goals of the changing market.. If they can, why can't others?. They do so by recycling, adding new options to renew or repair instead of just rebuilding, not wasting, educating their customers, and using products that are more eco friendly.

If those who live and work in this state in the construction industry can see it, why can't other

laborers? Or is it just their voice that would be heard? Or do they think of the next generation, such as myself, who is currently taking courses at Hennepin Technical College in the Construction Industry not considered? I am learning how to be in this industry and want the new classes to come to allow for new and better skills to work in the changing world around us. I am the next generation and must consider my future and how to care for my parents in a world that has a constant changing market.

If my parents had raised me to be that inflexible and not able to learn the world as it changes, I could see being upset as well, however, I choose to educate myself for the world as it progresses.

We need to see renewable. We need to see change. I just graduated from high school and deserve to know the world as a better place. Not just a place that supports only some people and not all.

We deserve renewable energy for automobiles and for the construction industry, inclusive to energy. And ask that renewables be considered instead of fossil fuels.

Regards,

Aryes Sheehan

Levi, Andrew (COMM)

From: Colleen Sheehy <sheeh001@umn.edu>
Sent: Monday, July 03, 2017 7:03 PM
To: MN_COMM_Pipeline Comments
Cc: peter.murphy@walkerart.org; Colleen Sheehy
Subject: Enbridge Energy's Pipeline 3 Proposal

Jamie MacAlister, Environmental Review Manager

Dear Mr. MacAlister:

I'm writing to oppose the MN Public Utilities approving a new pipeline for Enbridge Energy through the precious north woods and water ways of Northern Minnesota. They have proved irresponsible at maintaining public safety of their existing line. We need to maintain public safety of our water sources and the water that is so important to the Minnesota way of life and to countless communities and visitors that support those economies.

In addition, we need to be shifting from the carbon based energy system to renewable sources. Minnesota can be a leader in showing the way and not proliferating more oil pipelines.

I am very concerned with the preservation of our water resources and public health as well as the health of other species that rely on clean water--in other words--all of life.

I hope you will deny the approval and permits for this project.

Sincerely,

Colleen Sheehy
4851 5th Ave. S.
Minneapolis, MN 55419

Levi, Andrew (COMM)

From: Martin Sheeks <martin.sheeks@gmail.com>
Sent: Sunday, July 09, 2017 5:50 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 EIF Comments

To whom it may concern,

I am writing to express my concerns about the Line 3 EIF and the Line 3 project in general. The existing EIF is insufficient and give undue favor the Enbridge energy. Further review and investigation, at a minimum, is necessary.

Sincerely

Martin M Sheeks

Levi, Andrew (COMM)

From: Keith Shelbourn <kshel55806_2709@yahoo.com>
Sent: Wednesday, July 05, 2017 11:28 PM
To: MN_COMM_Pipeline Comments
Subject: comment on Enbridge # 3 pipeline project

I support Enbridge's proposed project to replace & update its # 3 pipeline in northern Minnesota. It is a sensible project that will benefit Minnesota & the nation by safely & efficiently transporting oil & gas, something everyone will benefit from. It'll mean trains can be freed up to transport grain again and dangerous train tanker cars will not be lined up in small Minnesota towns, waiting to explode. It means our rural highways will have less road damaging traffic from semi-trucks hauling oil & gas. Ultimately, it will mean America saves money, because pipelines are the most economical method to move oil & gas, a savings that will trickle down to everyone. As for why some people are adamant the Enbridge pipeline be blocked (as if it were some manifestation of evil), all I can think is they aren't thinking. While it's true that a future pipeline breach would be very bad, it's not an inevitability, and through diligent oversight by the state, the danger can be managed. However, if we continue to transport oil & gas by rail & highway, it's a certainty we'll have unnecessarily polluted our air, as these forms of transportation are much dirtier. So by relying on trains & trucks instead of modern pipelines, we'll have chosen methods guaranteed to most polute the earth. Ironic that protesters are claiming the saving of the earth as their justification for opposing this project. Perhaps someday we'll live in a Star Trek world where we don't use oil & gas, but we aren't there yet. This proposed pipeline upgrade will make our energy safer & less poluting, and even save money. It makes sense we approve Enbridge's project.

Levi, Andrew (COMM)

From: ED AND DEB SHELLUM <ecdashellum@msn.com>
Sent: Wednesday, June 28, 2017 12:00 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Line 3 currently goes across my land. Enbridge has always treated us well and I have no complaints.

I believe that transporting oil through pipes is safer and more ecologically friendly than transport by rail, therefore I support this project.

Ed Shellum

Sent from my iPad

Levi, Andrew (COMM)

From: George, Kevin (PUC)
Sent: Monday, July 10, 2017 11:33 AM
To: MN_COMM_Pipeline Comments
Cc: Eschbach, Jamie (PUC)
Subject: FW: Enbridge pipeline

Jamie/Ray – Here's another one. Not sure why they're sending these comments to our docketing staff today. Someone clearly put out some misinformation about where they're supposed to send comments.

Kevin

Kevin George
Minnesota Public Utilities Commission
121 7th Place East, Suite 350 | St. Paul, MN 55101
(651) 201-2251 | Kevin.George@state.mn.us | mn.gov/puc/

From: PUC, Docketing (PUC)
Sent: Monday, July 10, 2017 11:30 AM
To: George, Kevin (PUC) <kevin.george@state.mn.us>
Subject: FW: Enbridge pipeline

Jamie Eschbach
Administrative Services/Office Administrative Specialist, Senior
Designated Department Insurance Representative (DDIR)
651/201-2204
Minnesota Public Utilities Commission
121 7th Place E, Suite 350
St. Paul, MN 55101

From: K Sherarts [mailto:ksherarts@gmail.com]
Sent: Monday, July 10, 2017 11:29 AM
To: PUC, Docketing (PUC) <docketing.puc@state.mn.us>
Subject: Enbridge pipeline

I am writing to oppose the Enbridge pipeline - it is not environmentally sound. I adovate the removal of the old LINE #3 pipeline and no new pipelines. I lived in the area for many years and know that that the pipeline threatens the way of life for many current and future residents.

--
Karon Sherarts
Tel: 612-695-5154
E-Mail:ksherarts@gmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
FRANK SHERECK		
ADDRESS		
37110 LOMOND DR.		
CITY, STATE, ZIP		
BAGLEY MN 56621		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

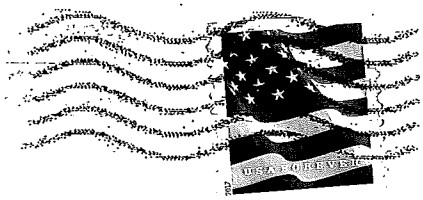

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Jesse Sherman

Street Address: 22475 270th Ave S.E.

City: Brooks State: Mn Zip Code: 56715

Phone or Email:

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I approve of the L-3 replacement project.
I live in a small community were the Enbridge pipeline ROW runs next to it. Small towns like this get a great boost in there economy from the grocery store, gas station/convenience store to the motel.
I was lucky enough to get a job with Enbridge 5 years ago. With the lack of good paying jobs in Northern Mn. this job means alot to me. Enbridge goes above and beyond the safety of myself and my coworkers and the public and land that the pipeline runs through.

If including additional pages please number them and tell us how many you are providing:_____ pages

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
SHANE SHIPMAN	612.243.2340	
ADDRESS		
118 W 60th ST		
CITY, STATE, ZIP		
MINNEAPOLIS, MN 55419		

COMMENTS

I FULLY SUPPORT THE REPLACEMENT!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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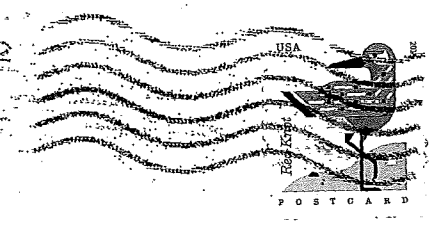

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
VICTOR SHNEUR	612-243-2358	VSHNEUR@YAHOO.COM

ADDRESS
15463 SUNEGRASS LANE

CITY, STATE, ZIP
EDEN PRAIRIE, MN 55347

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Karen Shroyer
To: MN_COMM_Pipeline Comments
Subject: Fwd: Docket numbers CN-14-916 and PPL-15-137. Enbridge Line 3 Pipeline DEIS. Opposed to abandonment and replacement.
Date: Monday, June 12, 2017 3:35:00 PM

6/12/2017

To: Minnesota Department. of Commerce.

Re: Docket numbers CN-14-916 and PPL-15-137. Enbridge Line 3 Pipeline DEIS. Opposed to abandonment and replacement.

I didn't try to read the whole draft EIS (DEIS) on the plan to abandon the old Enbridge Line 3 and build a new one, but I've been following the issue, and I want to comment on some of the problems with the plan. As I read it, the plan is to let the pipeline company abandon the old pipeline, leave it where it is to rust and collapse, leave the pollution it leaked in the land and water, and leave the future cost of cleanup to taxpayers.

If the pipeline companies aren't willing to build their pipelines so they can be maintained while they're in operation, and so they can be removed when they're worn out, and if they're not able or willing to pay for the costs of cleanup, then they shouldn't be in the pipeline business. Taxpayers shouldn't have to pay for cleanup after the pipeline companies have gone on their way, Scott free, to projects a lot like the old ones, that are going to turn out just as bad.

But since that's the only way they seem to know how to do business, I'm just going to say no, we shouldn't be abandoning the old Line 3 pipeline and constructing a new one. No, we shouldn't be approving any of the proposed routes for the new pipeline.

Instead of going on with the same bad ideas we've had in the past, we need to switch more quickly to renewable energy, conserving energy, and improving all of our green technology. That's our future, and the sooner we get started on it, the sooner we'll get to where we need to be. The sooner and the better we do that, the better we'll be able to stand up against our competition in Europe and Asia, and our oil suppliers in the Middle East and around the world.

OK, if we need better and safer ways to ship and process oil, let's do that too. We need to be smart about all of this.

To sum it up, please count me in with the opposition to the abandonment and reconstruction of Line 3. It doesn't make sense for the environment, or as a responsible business, and it shouldn't be approved by government as if it does.

Yours truly,

Karen Shroyer
1418 Birchcrest Drive
White Bear Lake, MN 55110

Levi, Andrew (COMM)

From: Steve and Patty Sigford <nshore@lakeconnections.net>
Sent: Monday, July 10, 2017 2:33 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3-Docket # CN-14-916; PPL-15-137

We fully support the proposal submitted by Enbridge regarding Line 3 replacement and construction of new as Enbridge has proposed and submitted. We fully support immediacy in doing so and with full support of those permitting agencies.
Thank you.

Steve and Patricia Sigford
Duluth, MN

Levi, Andrew (COMM)

From: asigcoyote Sigmundik <asigcoyote@gmail.com>
Sent: Monday, July 10, 2017 11:29 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline Comment

Dear Reader,

Please realize that these oil companies care more about profits than they do about their affect on human life. Please quit playing their games. Please help the human race move forward by stopping the genocide of our people. Please tell them No. No more pipelines in our state. Tell them to maintain and clean up the ones they have even though we both know they wont even if they said that they would. Let us rid our country of fossil fuels and move forward with our innovations in renewable and safe energy sources. Let us clean all work together to stop them from making any more messes so that we may begin to catch up in the long process of cleaning up what THEY, and WE have done to our habitat.

Best,

Alex Sigmundik

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Matt Simonson	2185904328	simo1185x@yahoo.com
ADDRESS		
505 Spear Ave		
CITY, STATE, ZIP		
Duluth, MN 55803		

COMMENTS
Build it already. Need to put in a newer safer line.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: MacAlister, Jamie (COMM)
Sent: Tuesday, July 11, 2017 9:49 AM
To: MN_COMM_Pipeline Comments
Subject: FW: Additional Messages to My Memo to You On Line 3 Replacement
Attachments: Sandpiper Project Letter to PUC.docx

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280, Saint Paul, MN 55101
P: 651-539-1775

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From: Sidney Simonson [mailto:sidneysimonson@yahoo.com]
Sent: Monday, July 10, 2017 7:50 PM
To: MacAlister, Jamie (COMM) <jamie.macalister@state.mn.us>
Subject: Additional Messages to My Memo to You On Line 3 Replacement

Dear Ms. MacAlister,

In my message today on the Line 3 Replacement project I referred to documents that I quoted from. One was to Beverly Jones Heydinger, former PUC Chair dated January 2, 2015, and another to Governor Dayton dated April 16, 2016.

Both of these letters referenced in my comments today (7/10/2017) are relevant to the issues that Enbridge had and continue to experience on the Line 3 Replacement project.

Although the many meetings that have been conducted regarding the Sandpiper and now the Line 3 Replacement project have been 'numerous'. In the end, we know that a final determination will be made and who will be responsible for making it! The PUC. We all know what the opposition 'opposes'..."no pipelines" ! My hope is that 'all' parties involved in the final decision would be 'totally' open minded and find that Enbridge Oil HAS complied in more ways than they should have had to but...because they are a company of integrity and have provide 'contingencies' for anything and everything that 'may' go wrong, as they have on every project that they have been responsible and accountable for, what's the 'hold-up'?

Attached are the two documents that I referred to in my earlire message to you.

Thank you for your time!

Sidney L. Simonson
316 1st Street SW
Chisholm, MN 55719

Home: 218-254-7165
Cell: 612-308-8210

January 2, 2015

Beverly Jones Heydinger, Chair
MN Public Utilities Commission
121 – 7th Place East
Suite 350
St. Paul, MN 55101

RE: PUC Docket No. PL-6668/CN-13-473
OAH Docket No. 8-2500-31260

Dear Commissioner Heydinger:

I want to share my thoughts regarding the Sandpiper Pipeline Project that is currently under consideration by the Minnesota Public Utilities Commission. First, let me say I appreciate and respect your role as commissioner and have every confidence you and your colleagues on the commission will consider the application for the new pipeline in a thorough, open minded and responsible manner. I have read numerous articles, attended open forum meetings conducted by Enbridge and am not surprised that opposition groups have filed suit. The reality is this: whether you approve the original project route (which makes much more sense to me) or an alternative, there will be opposition!

I have been retired for a few years now, having spent 35-plus years in the field of education, with the majority of that time in central office administration. Needless to say, I am very familiar with the pressures involved when my fellow school board members and I had to make major and controversial decisions. Although those decisions may differ from the decisions you face, we were forced to contend with similar opposition groups aligned against school district reorganization.

For example, one of two major projects in which I was involved merged three independent school districts into one in west central Minnesota. Two of the districts were in statutory operating debt while all three were in need of major school building repairs. The plan: maintain an elementary PK-6 in each of the communities and building a new 7-12 high school at a site to be determined. Tremendous opposition to this merger was expressed at several open-forum community meetings. The adversarial groups were not interested in the improvement of educational opportunities in course offerings for secondary school students nor were they interested in improving dilapidated building structures. They were more concerned with the loss of their respective school sports teams! I am proud to say, despite the strong opposition, all three boards of education stood strong and passed a major bond issue combining the three school districts into one along with maintaining elementary schools at each site. Quite simply, it was the right thing to do for students and taxpayers!!

My point is this—regardless of the subject matter or the decision-making entity—with change there will always be opposition. As such, whether you as a committee approve the original

proposed pipeline route for the Sandpiper Pipeline Project or an alternative route, there will be opposition! My hope is that you ignore the self-interested rumblings and make the right and proper decision for the people and taxpayers in Minnesota!

I have several friends and relatives residing in northwestern Minnesota. I can tell you that homes in the Perham area are bypassed by approximately 100 trains a day and property owners are very concerned about train derailments, as most of the railcars carry crude oil. Other friends are grain farmers whose crops are rotting as a result of few rail cars are available for transport costing them hundreds and thousands of dollars in losses. In addition, I have just learned that taconite plants in and around my home area are having to transport taconite pellets by truck to the twin ports area yet again, due to the lack of railcars available!

I have done my due diligence in reading about and studying all aspects of Enbridge Oils operational and philosophical components. What I have learned about the company is that they are, without a doubt, truly one of very high integrity!! Safety and quality assurance are only two of their many outstanding components! Obviously, we cannot be certain a release will never take place; however, we can be assured Enbridge has plans in place for quick reaction for the safety of people and the environment, should such an incident occur.

As an administrator my focus has always been on 'teachers and teaching and students and learning'! The same held true in my role as a Region 7 representative for several years and then elected to the position as President of the Minnesota Association of Administrators of State and Federal Education Programs (MAASFEP). At the schools in which I served as well as at the state level, we always provided educators with numerous teaching strategies and technologies to assist them for the purpose of improving learning for all students. Still, I would inform all educators of this bottom line: you can do your best to teach each student individually, but there a no guarantees that all students will learn. Why, because not all students are interested in learning often due to parents/guardians not supporting them in their learning process!

In education, as with pipelines and anything else in life, there are no guarantees!!

In conclusion, I again want to express my support for you and the other commissioners involved in this process. I know that you will make sound decisions regarding the Sandpiper project based upon facts, sound judgment, common sense, independent thinking and most importantly, the impact that a delay in decision-making will have on many citizens, land owners, farmers and major corporations employing thousands of employees throughout the State of Minnesota! Self-interests have no place in this kind of decision-making!

I look forward to meeting you at some of your upcoming meetings in January!!

Respectfully submitted,

Sidney L. Simonson

316 1st Street SW
Chisholm, MN 55719

Home Phone: 218-254-7165
Cell Phone : 612-308-8210
e-mail: sidneysimonson@yahoo.com

Levi, Andrew (COMM)

From: MacAlister, Jamie (COMM)
Sent: Tuesday, July 11, 2017 9:49 AM
To: MN_COMM_Pipeline Comments
Subject: FW: Forgot to attach letter
Attachments: Governor Mark Dayton letter of concern.docx

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280, Saint Paul, MN 55101
P: 651-539-1775

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From: Sidney Simonson [mailto:sidneysimonson@yahoo.com]
Sent: Monday, July 10, 2017 8:04 PM
To: MacAlister, Jamie (COMM) <jamie.macalister@state.mn.us>
Subject: Forgot to attach letter

Ms. MacAlister,
I forgot to attach the letter that I sent to Governor Dayton.
Sidney L. Simonson

April 16, 2016

Governor Mark Dayton
116 Veterans Service Building
20 W 12th Street
St. Paul, MN 55155

RE: Enbridge Pipeline Projects (Sandpiper & Line 3 Replacement)

Governor Dayton,

I have been meaning to write regarding what I consider to be some very legitimate and serious concerns regarding both of these projects and the State Agencies involved!

What prompted me to communicate with you was an article in the Duluth News Tribune dated Tuesday, April 5, 2016, entitled "State employee's email on Sandpiper not a cause for discipline, official says". My response to this article was "What"?? Scott Lucas, a PCA regulator out of Brainerd stated in e-mails to opposition interest groups <u>that a study "could be a very useful tool for us to use when making our case against Sandpiper in this area of the state"!! In another e-mail to the opposition he stated that, assuming that it was a public meeting that Enbridge conducted, that it was "much BS on the part of Enbridge"!!</u> Furthermore, the article went on to state that the Commissioner of the PCU, YES <u>Commissioner John Link Stine stated that "the statements made by Scott Lucas did not produce any cause for disciplinary action"!!!</u> You have got to be kidding Governor!!! <u>My question is this…is the PUC an agency that is to be totally "un-bias" and "transparent" in their review of "all" projects that they are assigned to work on?</u> This situation is alarming!

Based upon the aforementioned, and having spent many years in a 'leadership' role in public education, I find the remarks made by Mr. Lucas to be totally flagrant and bias and, as such, should be removed from his position as an employee with the PCU and any other state agency! As far as Mr. Stine's response to these e-mails, I find him to be a very 'weak' leader for the PCA and should be sanctioned severely for his finding that his review of the e-mail(s) "did not produce any cause for disciplinary action"!! He should either be sanctioned

severely or even to the point of being terminated or re-assigned to some other position that requires little or no leadership qualities! This situation is totally disgusting!

I have attended numerous public meetings (hearings) throughout the state on these two projects as well as having viewed the Public Utility Commission (PUC) hearings on-line. The public meetings as well as the PUC hearings were, at best, quite entertaining, to say the least!!

The public meetings were conducted in a fair manner however, many of the same individuals in opposition delivered the 'same messages' at numerous locations. Although the process must be conducted in a democratic manner, and since each of the presenters messages are documented, why allow for the repetition! Ridiculous!!

The last PUC hearing that I viewed on-line, as I did the previous revealed the following. It was obvious that the discussions, during both sessions, were dominated, primarily, by one individual. I felt that his tendencies were more in line with the opposition groups in attendance (Sierra Club and Friends of the Headwaters)! Chairperson Heydinger does a very good job in her leadership role however, I do feel that she needs to control of the 'grandstanding'. My observation was that 'he' was representing the opposition groups rather than focusing on what should be a fair and independent process. I would seriously consider the proposal that was made by Representative Dan Fabian (R-Roseau) to the legislature that greater representation on the PUC commission take into account 'greater regional representation'.

In another article Governor Dayton, you stated that State law requires "hands off by the governor and the administration" in making pipeline permitting decisions! I understand this! <u>However Governor, this law 'does not' preclude you nor diminish your overall responsibility in overseeing each of the commissions or state groups assigned to the pipeline projects (PCA; PUC; DNR; EPA; Dept. of Commerce; Dept. of Health, etc.)</u> I believe this means that you have the authority to select, assign, discipline and/or terminate any employee within any of these commissions or groups based upon flagrant prejudices within their respective positions and job responsibilities regardless if it involves pipelines or any other project within the State of Minnesota!

It is also obvious that the opposition groups (Sierra Club; Friends of the Headwaters; Carlton Co. land owners; Honor the Earth; Mille Lacs Band of Ojibwe and others take on the same philosophy as Andy Pearson with the MN350 environmental group as he has stated that "these pipeline projects are risky and ultimately not needed"!! He goes on to philosophize his opinions as he and others have the right to!!

Understand Governor Dayton that the opinions expressed within the contents of this letter are based upon public meeting attended; many articles from numerous newspapers throughout the State and adjoining States as well as viewing PUC sessions on the internet.

I'm aware that during this time, with the legislature in session, that "your plate is full'! I do have one request and/or recommendation for your office Governor Dayton and it is based upon the Lucas/Stine ordeal! I would strongly suggest that a very firm and stern letter be sent from your office to every commission or group working on the Sandpiper or Line 3 Replacement project be given notice that should any employee demonstrate a bias or prejudice in favor of or against either of these projects that they will be terminated!! Their job is to 'follow the goals' established by their respective group in an intelligent, open-minded and unprejudiced manner!

I highly respect you Governor Dayton and the position that you hold in the State of Minnesota! Hope this finds you up and about following your recent surgery!!

Respectfully submitted,

Sidney L Simonson

316 1st Street SW
Chisholm, MN 55719

e-mail: sidneysimonson@yahoo.com

Attached: Letter sent to Beverly Heydinger on January 2, 2015

Levi, Andrew (COMM)

From: Sidney Simonson <user@votervoice.net>
Sent: Monday, July 10, 2017 4:23 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project

Dear Ms. MacAlister,

Dear Ms. MacAlister,

With all due respect, I have followed many of the meetings conducted on the Line 3 Replacement Project (toooo many to mention) as I did the "Sandpiper Project" and find the it's like a 'dog and pony show'...the same people (objectors)...saying the 'same thing' at different sessions! I realize it's the 'democratic way' but 'enough is enough'!!!!!

It is truly unfortunate that Enbridge has to jump through and or over so very hurdles to accomplish project work that has been very well planned out!!

On January 2, 2015, I sent a letter to Beverly Jones Heydinger, who was then chairperson of the PUC,indicating that I hoped the commission would make their decisions based upon facts, sound judgement, 'common sense', independent thinking and most importantly, the impact of a delay in decision-making would have an impact on many Minnesotans. I will try to e-mail the letter to Ms. Heydinger as I would not want to regurgitate all that was written.

Then, on April 16, 2016, I mailed a letter to Governor Dayton regarding what I considered a VERY legitimate and serious concern regarding both the Sandpiper and Line 3 Replacement Project. In this letter I spoke of the "collusion" that existed between Commissioner John Link Stine a Scott Lucas, a regulator out of the Brainerd who was quoted as stating to opposition groups that "a study could be a very useful tool for us to use when making our case against Sandpiper in this area of the state". In another e-mail Lucas stated to opposition groups he stated "assuming that it was a public meeting that Enbridge conducted, that it was "much BS on the part of Enbridge"!! Now Commissioner John Line Stein, in his leadership role, found there to "no reason for disciplinary action" . My reaction was.."what? what kind of a 'leader is the Stein' and how much more of this type exists with other agencies involved with the Line 3 Replacement Project now that they got their way with Sandpiper. Yes it is VERY sad and SICK to hear and read about people like Stine and Lucas!! I'm wondering how many more agencies working on these projects as this one.

In any event, the Line 3 Replacement project must be approved WITHOUT and further modifications as "enough is enough"!! Enbridge is a QUALITY pipeline company and one of high integrity.

Let there be protests as the protesters will be against any type of pipelines wherever they may be proposed! Amen

Sincerely,

Sidney L. Simonson
316 1st St SW
Chisholm, MN 55719
sidneysimonson@yahoo.com

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Kathryn Simonson

Street Address: 14208 96th St NE

City: Elk River State: MN Zip Code: 55330

Phone or Email: kasimonson@gmail.com 612-306-9085

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

1. I am concerned about the project and the impact it will have on water quality, land productivity and wildlife. I am also concerned about the impact on native land and wild rice. Oil leaks always happen no matter how careful the construction.
2. The company installing a new line should have FULL responsibility for cleanup and removal of the old line. There should be no expiration of the company's responsibility.
3. The oil/tar sands transported through this line is produced at a high cost to the environment and wastes natural gas in the process — This is wasteful and dangerous. It is harmful to waterfowl, toxic to waterfowl.
4. The oil in this line will not even be used in the US — why should our state and citizens risk harm for this purpose?

Please do not approve this pipeline.

If including additional pages please number them and tell us how many you are providing:_____ pages

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JUL 13 2017

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MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

USA FOREVER

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
SAINT PAUL, MN 55101-2198

55101-214355

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Public Comment Period Ends Monday, July 10, 2017

Comments must be postmarked or received electronically by the comment deadline.

How to comment:

- Drop this form in a comment box at a public meeting
- Mail this form, remembering to affix appropriate postage
- Mail comments in a separate envelope using the mailing address on this form
- Email comments to the Environmental Review Manager: Pipeline.Comments@state.mn.us
- Fax comments to the Environmental Review Manager: (651) 539-0109

Comments do not need to be on this form to be accepted. We encourage you to provide comments in whatever way is most convenient for you. If commenting by email or fax please use *"Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)"* in the subject line.

Thank you for participating in the Draft EIS public review process! By commenting you are helping inform the Minnesota Public Utility Commission's decisions regarding this project.

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Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is unclear? What is missing? Please reference specific sections of the Draft EIS, if possible. Use additional pages as needed.

For project information visit: http://mn.gov/commerce/energyfacilities/line3.

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Richard Simonson

Street Address: 14208 96th St NE

City: Otsego State: MN Zip Code: 55330

Phone or Email: rsimonson@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

We shouldn't be facilitating the production of the dirtiest oil from the Tar Sands. With the glut of oil, how is this even viable.

Rather than abandoning their old line, Enbridge should be required to remove their old line and use this trench for their new line.

If including additional pages please number them and tell us how many you are providing:_____ pages

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JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
SAINT PAUL, MN 55101-2198

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Comments do not need to be on this form to be accepted. We encourage you to provide comments in whatever way is most convenient for you. If commenting by email or fax please use *"Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)"* in the subject line.

Thank you for participating in the Draft EIS public review process! By commenting you are helping inform the Minnesota Public Utility Commission's decisions regarding this project.

FOLD HERE

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is unclear? What is missing? Please reference specific sections of the Draft EIS, if possible. Use additional pages as needed.

For project information visit: http://mn.gov/commerce/energyfacilities/line3.

Levi, Andrew (COMM)

From: Dale Nelson Liz Simpson <dfnelsmn@centurylink.net>
Sent: Monday, July 10, 2017 1:48 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge's Line 3 pipeline

CN-14-196 and PPL15-137
this proposal does not examine the options very well. the alternatives suggested don't seem concrete. Back to the drawing board.

is there really a need and are all environmental and social factors considered.

thank you
Elizabeth Simpson
55391

Levi, Andrew (COMM)

From: Dale Nelson Liz Simpson <dfnelsmn@centurylink.net>
Sent: Monday, July 10, 2017 10:56 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge's Line 3 pipeline

this proposal does not examine the options very well. the alternatives suggested don't seem concrete. Back to the drawing board.

is there really a need and are all environmental and social factors considered.

thank you
Elizabeth Simpson
55391

Levi, Andrew (COMM)

From: Vern Simula <vsimula@pasty.net>
Sent: Tuesday, July 04, 2017 1:06 PM
To: MN_COMM_Pipeline Comments
Subject: PUBLIC COMMENT: Enbridge "Certificate of Need" application

DATE: July 1, 2017

TO: Jamie Macalister

Environmental Review Manager

MN Department of Commerce

FROM: Vern Simula

204 Gayley Avenue

(P.O.Box 222)

Coleraine MN 55722

SUBJECT: Enbridge Energy's DEIS for Line 3 Project

(CN-14-1916 and PPL 15-137)

TITLE: Revised Basis for "DENY THE CERTIFICATE OF NEED"

The CRITERIA for the determination of need is specified in Minnesota's Administrative Rules, 853.0130.

This rule states in general: "certificate of need shall not be granted to the applicant if it is determined that: "the probable result of denial would adversely affect the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states . . . ."

The ASSUMPTIONS implicit in this Rule reflect the 1970s era worldview and values of citizens and their legislators — as reflected in 1974 legislative language:

— a worldview that acknowledged, in part, 1) **"that the present rapid growth in demand for energy . . . will result in serious depletion of finite**

quantities of fuels . . . ." (116H.01); 2) that **"continued growth in demand for energy will cause severe social and economic dislocations . . . "**

and 3) **"that the protection of life, safety, and financial security for citizens during an energy crisis is of paramount importance**. (216C.05, Subd 1).

Hence, if such assumptions underlie the interpretation and application of the established criteria, then it seems obvious that a basis exists to approve the request for a "Certificate of Need" for the Enbridge DEIS Pipeline 3 application.

But in the Year 2017, these assumptions must be challenged, questioned, and revised, in the face of the global climate disruption crisis already years in the making!

In the early 1970s, as reflected in the legislative language, there was NO consideration of the relationship of fossil fuel-based energy consumption and carbon emissions to global climate impacts. The concern was primarily ensuring an adequate and reliable supply of energy —to meet ever-increasing consumer demands.

Additionally, there was little or no awareness among the public about the criticality of climate disruption. Legislative concerns focused on "serious depletion of finite quantities of fuels . . . "or "threats to the state's environmental quality." (116H.01)

Environmental quality concerns were limited to water and air pollution, not climate.

REVISION OF ASSUMPTIONS

While the Certificate of Need decision must legally rest within the parameters of Minnesota Administrative Rule 853.0130, the assumptions by which that rule is interpreted and applied must be derived from current and predicted economic, social, and environmental conditions. Such as:

Criterion A: "the probable result of denial would adversely affect the future adequacy,

reliability, or efficiency of energy supply . . . .”

Assumption: The State of Minnesota, as an integral entity of the United States, must be a full-fledged participant in the 2017 Paris Climate Accord and commit to actions to help achieve "global peaking of greenhouse gas emissions as soon as possible" by pursuing “efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change.”

Implications: The 1970-era assumptions make no acknowledgement of the role of fossil-based, non-renewable energy types of energy in climate disruption. Today’s decision makers must acknowledge the the imperative to drastically REDUCE the levels of fossil fuels. extraction, transport, and consumption.

Ironically, a denial of the Certificate of Need would, in fact, enhance, not adversely affect, the future adequacy, reliability, and efficiencies of the energy supply when those future energy supply sources are not based on fossil-based fuels, i.e., crude oil.

The nub of this implication is that the State of Minnesota must use this opportunity to promote THE REDUCTION in the levels of crude oil production and its transport by denying the Certificate of Need.

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Daniel James Sikopily	218 590 5251	
ADDRESS		
1888 Moorhead Rd.		
CITY, STATE, ZIP		
Cloquet, MN, 55720		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

POSTCARD

USA

2015 King Eider

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Shanna Skallet	715-944-9906	slskallet@gmail.com
ADDRESS		
2619 Lauren Rd		
CITY, STATE, ZIP		
Duluth MN 55804		

COMMENTS

I support this project because it is important to update and modernize our energy transport systems. The environmental assessment of this project is thorough and the project can be completed in a manner that preserves the environment while the energy and raw materials needed for daily life in the U.S.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Kim Skatrud <kim@zipkostrategy.com>
Sent: Tuesday, June 20, 2017 11:16 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

The prompt replacement of Line 3 is an essential project for Minnesotans that will ensure the safety and environmental protection of our important natural resources as well as the continued safe transportation of crude oil to refineries in Minnesota, the Midwest and beyond.

The Enbridge Line 3 replacement project will provide significant jobs and investment to Northern Minnesota. This is a project that will benefit all of Minnesota.

Please ensure that the necessary permits are provided to Enbridge to complete the Line 3 project.

Sincerely,

Kim Skatrud
8591 Darnel Rd
Eden Prairie, MN 55347
kim@zipkostrategy.com

Levi, Andrew (COMM)

From: Diane Skay <woodsbayskay@gmail.com>
Sent: Sunday, July 09, 2017 6:34 PM
To: MN_COMM_Pipeline Comments
Cc: Diane Skay
Subject: Re: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

It is my understanding that a Certificate of Need must take into account whether there is a need in Minnesota for this pipeline, not generally stating a national need but specifically a need for Minnesota. There is nothing in the DEIS addressing the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are a huge source of revenue for fishing, water recreation, fisheries and tourism in general. There does not appear to be analysis of how a pipeline running through some of the cleanest, most pristine waters in lake country in Minnesota will affect the fishing, tourism and recreational industries in Minnesota. These are huge revenue generators in our local economies. How would the towns along the route be affected (positively or negatively) with a threat of potential damage due to inability to totally eliminate contaminating those waters and wetlands. Who would be responsible for appropriate and effective reaction should an accident happen. Time, trained professionals and budget would be needed to ensure effective handling of leakage or spills. Does the pipeline provide enough benefits for Minnesota to balance the risk? What action is in place to assure Minnesotans and these communities that the risk is beneficial to our citizens and state. I don't see anything addressing this in the DEIS. There really must be detailed economic analysis for the EIS to be complete.

Thank you for addressing these issues and including them in the final EIS.

Diane Skay
5479 Woods Bay Dr. NE
Outing, MN 56662

218-792-5095

Levi, Andrew (COMM)

From: Keith Skolte <user@votervoice.net>
Sent: Sunday, July 02, 2017 5:05 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 pipeline

Dear Ms. MacAlister,

This pipe line must go through for the greater good of our country

Sincerely,

Keith Skolte
2443 Town Road 172
Mahtowa, MN 55707
kaskolte@aol.com

Levi, Andrew (COMM)

From: Eden Sky <eden@13moon.com>
Sent: Monday, July 10, 2017 9:32 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline

Dear Jamie MacAlister,

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I am from Ashland, Oregon

The Line 3 Pipeline concerns me because I am very concerned about our environment and I wish we would switch from fossil fuels to renewable energies.

The DEIS concerns me because I am very concerned about our environment and also about things being done in a respectful way to the Native Americans.

My understanding is the law is that The State of Minnesota and Enbridge MUST obtain Free, Prior, and Informed Consent of the Tribes of the 1855 Treaty Territory

My further understanding is that
- The disproportionate impacts Line 3 would have on indigenous communities is the definition of environmental racism;
- The profound social and ecological devastation caused by the Alberta Tar Sands is absolutely unacceptable and Minnesota must refuse to be complicit;
- Enbridge must be required to clean up and remove their old pipelines, not abandon them for future generations to deal with.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

PLEASE DO THE RIGHT THING. WE ONLY HAVE ONE EARTH. And we have to place People Over Profits!

Sincerely,
Eden Sky

Levi, Andrew (COMM)

From: Megan <slater.mego@gmail.com>
Sent: Sunday, July 09, 2017 7:03 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

To whom it may concern,

Please, to safeguard the health of residents and the environment, I urge the Commission to reject the permit to Enbridge's Replacement Line 3. Pipelines break, and we can't drink oil.

If the process continues, at the very least, the old line 3 should be removed and remediated before any new projects commenced. Enbridge has the responsibility to clean up its existing infrastructure and should not be allowed to continue ripping up the earth without caring for what they already put in place.

The alternative route SA-04 would have lower risk of harm to the lakes and the Native communities who depend on them. This route should be authorized and pursued, as that is the purpose of the EIS process in the first place.

Fundamentally, it's in all our best interests to invest in renewable energy systems and divest from more pipelines. Let's create more jobs through wind and solar and ensure our beautiful MN parks and lakes thrive for generations to come.

Thank you,

Megan Slater

8 3rd ST S
Sabin MN 56580

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Kevin Sleen Jr.

Street Address: 5383 Hermantown Road

City: Hermantown State: MN Zip Code: 55810

Phone or Email: kevinrsleenjr@g.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Nothing I can see.

I am the father of 10 children, 4 natural and 6 through the legal process. 4 of the children have a mother who is a member of the Menominee Nation. I have lived in northern Minnesota 44 of my 47 years of life.

I have worked 5 years in a foundry, 10 years in mining, and now 2 years in piping. The mining experience exposed me to 9 iron and coal operations. I have never been a part of an organization more dedicated to safety and quality. I have seen this organization spend $250,000 to find out why a weld cracked (no spill). $150,000 to replace components that exceed industry standards but do not meet Enbridge standards, and I can go on.

If the route would go through my yard I would have absolutely let it get built, even if it was running next to my source of well water.

If including additional pages please number them and tell us how many you are providing:_____ pages

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
BLAKE SLOAN	847 810 5069	blake.sloane legacysteel.us
ADDRESS		
16215 49TH PL. N		
CITY, STATE, ZIP		
Plymouth, MN 55446		

COMMENTS I AM IN FULL SUPPORT. PLEASE KEEP INITIATIVE MOVING FWD.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Scott Slocum
To: MN_COMM_Pipeline Comments
Subject: Docket numbers CN-14-916 and PPL-15-137. Deficiencies in the Line 3 Pipeline Draft DEIS.
Date: Saturday, June 10, 2017 11:49:39 AM

6/10/2017

To: MN Dept. of Commerce (MN DOC)

From: Scott Slocum, 1416 Birchcrest Drive, White Bear Lake, MN 55110.

Re: Docket numbers CN-14-916 and PPL-15-137. Deficiencies in the Line 3 Pipeline DEIS.

Thank you for the opportunity to comment on the Line 3 Pipeline DEIS.

I have reviewed the MN DOC draft EIS (DEIS) including the interactive map of proposed pipeline routes; the Honor the Earth fact sheet "Enbridge Line 3 Pipeline: what you need to know;" and the MN 350 analysis "Line 3 Replacement DEIS – Talking Points for Public Comments." Additionally, I have followed the tar-sands and pipeline issues in the news for several years.

I am opposed to the construction of the Line 3 Pipeline. That includes my opposition to all of the proposed routes. My overriding concern is for the high probability of environmental disaster from oil spills, and the prohibitive public expense of cleanup--in the short term after each spill, and in the long-term after the pipeline has been abandoned by its operators and placed into the public realm.

I find that the draft DEIS has not sufficiently analyzed the following: 1) the potential for pipeline spills, 2) the financial and environmental costs of the damage that are likely to be done by such spills, 3) the public costs of the immediate pollution and cleanup of such spills (either direct or transferred through consumer fees), 4) the short-term public costs of post-abandonment cleanup, or 5) the long-term public costs of pollution and other remnants of the pipeline that would be likely to remain undetected or otherwise unremoved from the land and waters after pipeline abandonment.

I don't find adequate assurances in the DEIS or elsewhere that the pipeline operators will be able to pay, or be required to pay, these costs; or that the full, probable long-term public costs have been adequately accounted for. Part of my perspective on this comes from looking back on the history of the solid-waste landfill sites that are now in the Minnesota Closed Landfill Program; or to the immediate pollution zone around the abandoned Duluth Works that is still polluted, and still under massive cleanup efforts at public expense. Another part of my perspective comes from the operators' plans to abandon the old Line 3 pipeline rather than do a thorough job of removing it and cleaning it up. And yet another part of my perspective comes from the lack of documentation in the draft DEIS of credible, long-term assurances that the operators will pay the real costs of pollution and cleanup. It is clear to me that, as with other large-scale industrial projects of this consequence in the past, the long-term and preponderant financial and environmental costs of this project would be abandoned to the public expense, and that that public expense makes this project a financial and environmental folly.

What are the practical alternatives that can be encouraged by the state of Minnesota? First and foremost, public investment in renewable energy generation, and in energy conservation. Second, public investment in safer mechanisms for the transport of petroleum and other hazardous products. Third, public investment in petroleum-refining alternatives that don't require such dangerous, long-distance transport. I'm not familiar with the other alternatives, but I believe they're significant. We can do a lot with smart public policy, allied with industry innovation and developments in sustainable technology.

Sincerely,
Scott Slocum

Levi, Andrew (COMM)

From: Beth Slocum <bethslocum004@gmail.com>
Sent: Monday, July 10, 2017 8:45 AM
To: MN_COMM_Pipeline Comments
Subject: Do not permit Enbridge Line 3 - docket numbers: CN-14-916 and PPL-15-137

For these reasons:

1) This line is proposed to pass through the sensitive environments of Minnesota treaty lands and delicate, pristine watersheds of the Great Lakes and our vast network of Minnesota lakes. This will become an environmental disaster as Enbridge has a very poor record of safe transport of oil with over 800 spills in the last 15 years -- with the ultimate disaster of the 2010 spill into the Kalamazoo River. Spills of great magnitude with this new proposal are inevitable.

2) The proposal violates the treaty rights of the Anishinaabe tribes to have their access to these lands for hunting, fishing, wild rice gathering and their cultural resources in these lands. The original Line 3 has been abandoned and this new proposal shoudl not go forward. This proposal threatens the way of life of the Ojibwe people.

3) Enbridge is a private, for profit, publicly traded Canadian company and as such should never be considered a public utility as it does not provide necessary public services to any of Minnesota's citizens. In fact, much of what it transports will be sold on the international market at no benefit to Minnesota.

4) No foreign company should be allowed to have the right to eminent domain in our state. This must be a prerogative only for our Minnesota government which serves our citizens and is responsible to them.

5) The old Enbridge Line 3 should be abandoned carefully and monitored by Minnesota regulators to protect our soil and water resources. It should not be replaced with this new proposal. Too much is at stake.

I urge you to deny the proposal for Enbridge's new line 3.

Thank you,
Nancy Slocum
453 Oliver Ave South
Mineapolis, MN 55405
612-823-6112

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
BRUCE Sly	218-694-6041	borv49@LIVE.com

ADDRESS
37679 County 7

CITY, STATE, ZIP
BARLEY MN 56621

COMMENTS

A NEW LINE IS BETTER THAN
A OLD RUSTED & CORRODED LINE

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

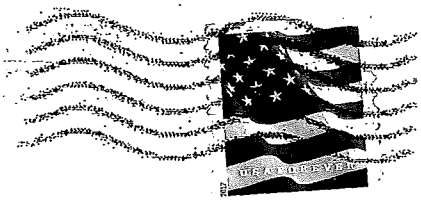

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Connie Smallman	651717-9715	Cookie55126@gmail.com

ADDRESS
5629 Aldine St.

CITY, STATE, ZIP
Shoreview MN 55126

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Jennifer Smith
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137
Date: Tuesday, May 16, 2017 8:20:10 PM

Dear Ms. MacAlister,

I am a Minnesotan and want to see the environment protected like most others. I also believe replacing aging infrastructure like pipelines is imperative to protecting the environment

We all use the products made from the crude oil shipped on Line 3 every single day. The State of Minnesota needs to keep to the EIS timeline of the statutory deadline of 280 days.

Sincerely,

Jennifer L. Smith
5135 Fish Lake Rd
Duluth, MN 55803
jenjens1121@yahoo.com

Levi, Andrew (COMM)

From: Jeff Smith <blixxx44@gmail.com>
Sent: Saturday, July 01, 2017 8:16 PM
To: MN_COMM_Pipeline Comments
Subject: A job

Dear Ms. MacAlister,

A job where can you put in application

Sincerely,

Jeff Smith
512 Rose St
Duluth, MN 55803
blixxx44@gmail.com

Levi, Andrew (COMM)

From: Barb Smith <blsmithmd@gmail.com>
Sent: Saturday, July 08, 2017 2:42 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline

Jamie MacAlistir
Environmental Review Manager
Minnesota Department of Commerce

Docket Numbers CN14-916 and PPL0150137

I would like to express my strong oppostion to the pipeline currently proposed to go through the Headwaters of the Mississippi watershed. My family began coming to this area to vacation in the early 1930s when my granddad and dad began coming to fish on Two Inlets Lake. My family was lucky enough to be able to build a cabin there in the 70s and my first grandson just spent his first summer “at the lake” in 2016. We want this area to be protected against environmental degradation which seems inevitable with the presence of a pipeline so that his grandchildren and others can still be enjoying this beautiful lake area in the next 100 years. The risks of an oil spill are too great and would definitely counteract any short term economic gains for the area. Once the groundwater is contaminated, it will take decades for those effects to subside. It is just not worth it. I hope that you strongly oppose this plan and protect the invaluable lakes and forest of Northern Minnesota. A second route which sends this pipeline through less sensitive landscape—less permeable rock, fewer natural wildlife areas—has also been proposed. Please consider supporting a thorough EIS of these routes before a final decision is made.

Sincerely

Barbara Smith

31348 Two Inlets Drive

Park Rapids, MN56470

218 732 8074

Levi, Andrew (COMM)

From: C Smith <clarabillsmith@gmail.com>
Sent: Sunday, July 09, 2017 4:09 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

I am opposed to the Line 3 project. In my opinion, the environmental risks far outweigh any economic benefit to the citizens of Minnesota. No permanent jobs will go to Minnesotans and most temporary jobs will go to out-of-state residents. Enbridge will stop paying taxes to the Minnesota counties along the mainline corridor once the existing Line 3 shuts down. The question is how long will we continue to rely on oil as we expand alternatives to fossil fuel. Climate change regulations will curb fossil fuel demand. Developing a renewable energy infrastructure should be our focus. The following excerpt is from The Economist, Nov., 2016.

"The International Energy Agency (IEA), a global forecaster, says that to come close to a 2ºC target, oil demand would have to peak in 2020 at 93m barrels per day (b/d), just above current levels. Oil use in passenger transport and freight would plummet over the next 25 years, to be replaced by electricity, natural gas and biofuels. None of the signatories to the Paris accord has pledged such draconian action yet, but as the costs of renewable energy and batteries fall, such a transition appears ever more inevitable. 'Whether or not you believe in climate change, an unstoppable shift away from coal and oil towards lower-carbon fuels is under way, which will ultimately bring about an end to the oil age,' says Bernstein, an investment-research firm."

Since I am a resident near Park Rapids I am deeply concerned about the rerouting of Line 3 through our area and the environmental impact. Enbridge has no vested interest in the quality of our lakes, rivers, and marshlands. Oil spills are inevitable and my understanding is that tar sand spills are almost impossible to clean up. I am also concerned about the pipe that will be abandoned and left in the ground. This is unacceptable.

Therefore, I strongly urge the Commission to <u>not</u> issue a Certificate of Need and <u>not</u> issue a route permit for the project. Are the consequences for granting the CN more favorable than the consequences of denying the certificate? No! Finally, in the Guide to the Line 3 Project Public Meeting Booklet there are many references to "the Commission". Who is the Commission?

Thank you for providing this public forum. Thank you for considering my comments.

Sincerely,
Clara E. Smith
24822 State 87
Nevis, MN 56467

Levi, Andrew (COMM)

From: Kendolynn Smith <kmlaroque@msn.com>
Sent: Monday, July 10, 2017 2:20 PM
To: MN_COMM_Pipeline Comments
Subject: Stop Enbridge Line #3 replacement, Stop insurgence of activists.

I hope they get this stopped so we don't have thousands of people coming into MN. Yes, a protest is good, but the damage. Still not the damage that an oil spill could cause. I don't know, just stop this. Does it really have to run through or that close to our water supply? Why do we have to give private companies a right of way wherever they want to go.

Kendolynn Smith

https://www.mprnews.org/story/2017/07/05/minn-enbridge-pipeline-fight-stokes-standing-rock-fear

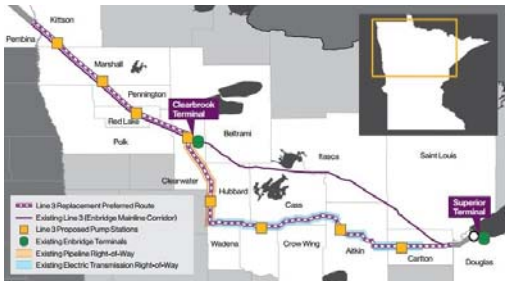

Minn. oil pipeline fight stokes threats, fears of Standing ...

www.mprnews.org

That was never clearer than last year when what began as a small protest over the route of an oil pipeline near North Dakota's Standing Rock Reservation mushroomed ...

Levi, Andrew (COMM)

From: Kendolynn Smith <kmlaroque@msn.com>
Sent: Monday, July 10, 2017 2:14 PM
To: Pipline.Comments@state.mn.us
Subject: Stop Line 3 replacement. Thousands of people descending on our State will bring damage also.

Get this stopped so we don't have thousands of people coming into MN. Yes, a protest is good, but the damage. Still not the damage that an oil spill could cause. I don't know, just stop this. Does it really have to run through or that close to our water supply? Why do we have to give private companies a right of way wherever they want to go.

Kendolynn Smith

Levi, Andrew (COMM)

From: Tamara Smith <tss15@outlook.com>
Sent: Monday, July 10, 2017 10:15 PM
To: MN_COMM_Pipeline Comments
Cc: jts1101@yahoo.com; tamara.s.smith@outlook.com
Subject: Our Comments - Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)
Attachments: Tamara and James Smith - Public Comment on Line 3.docx

Jamie MacAlister
Environmental Review Manager Minnesota Department of Commerce
85 7th Place East, Suite 280 St. Paul, MN 55101-2198

Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Jamie MacAlister,

Please find below my concerns regarding the information found in the Draft Environmental Impact Statement for the Line 3 Pipeline Project (DEIS).

1. **This route jeopardizes Minnesota's and many of the United States' natural resources used for drinking water, recreation and wildlife.**

   Enbridge's proposed route traverses our best quality lakes, rivers, wetlands and forest ecosystems. I am not against pipelines, but I strong recommend that you consider route SA-04 which avoids our cleanest water resources and crosses land less permeable and better suited for pipelines.

   The risks posed by Enbridge's proposed route are many:
   - This pipeline route crosses the clearest lakes area in MN based on the Census of Water Clarity (U of MN Water Resources Center).
   - This pipeline route crosses an area with the highest susceptibility for groundwater contamination impacting drinking water aquifers (MPCA map).
   - Line 3 would cross the Mississippi River twice in Minnesota. This river is a valuable source of drinking water for many cities on its 2,552-mile journey to the Gulf of Mexico, including Minneapolis and St Paul. 3.8 million gallons of water flow from Lake Itasca into the headwaters every day.
   - The pipeline route crosses the wild rice lakes area. According to the DNR, MN supplies 50% of the world's hand-picked rice annually.
   - The pipeline route crosses wetlands critical to waterfowl and other wildlife (DNR).
   - The proposed route would cross 8 state forests (including the Mississippi Headwaters SF), 3 wildlife management areas, 13 trout streams (including the Straight River), as well as the North Country Trail.

   This pipeline will carry 760,000 barrels of Alberta tar sand oil per day, also called "dilbit", the industry name for diluted bitumen - also known as "Cold Lake Blend". That's almost 32,000,000 gallons/day through our headwaters. The National Academy of Sciences Report on Diluted Bitumen (Tar Sands Oil) final finding is "diluted bitumen is virtually impossible to clean out of a water-based environment". Why? Because it sinks.

2. **This route creates a significant risk to Minnesota's 2nd largest economic area.**

Minnesota lakes are the key source of revenue for tourism, recreation, fishing, and fisheries. The lakes are at the heart of our economy. The DEIS has a gaping hole as it does not discuss the general economic picture and great risks for Minnesota if this project is approved as Enbridge prefers. I am asking that an economic analysis for the project be completed.

- Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota?
- How would the towns along the route be affected (positively or negatively), keeping in mind that nearly 2/3 of the population in these areas derive their income and livelihood from the tourism and recreation provided by our lakes and other natural resources.
- Does this pipeline provide enough benefits for Minnesota to balance the risk?

3. **The DEIS is missing key facts, numbers and risks related to oil spills – specifically oil spills along the proposed route, Enbridge's history of oil spills and its response(s) to these spills, and an analysis of oil spills running through similar climates.**

In the DEIS analysis there is no mention of the numbers used to calculate oil spill impacts. I believe that in order for Minnesota citizens and agencies to make an educated decision about Line 3, we must have that information, and I would like to know why this information is not in the DEIS. Please insist that Enbridge provide their data on oil releases and spills in Minnesota and throughout the United States, as I am concerned as Enbridge's track record is not flawless – see examples below:

- Enbridge's pipeline spill of 850,000 gallons of tar sands oil in Michigan in 2010 polluted nearly 35 miles of the Kalamazoo River and has become one of the costliest spills ($1.2 Billion) in US history. AND Enbridge took 17 hours to respond to an oil spill in the Kalamazoo River.
- Enbridge has failed to cover the exposed pipes in the Tamarack River in northwest Minnesota.
- Enbridge allows people to ride for recreation over exposed pipes south of Clearwater. Why?

In addition, the corridor that the proposed pipeline runs across will be covered with snow and ice for the long winter season. The Poplar pipeline spill (31,000 gallons) in the Yellowstone River in January of 2015 caused drinking water problems in Glendive, Montana. Clean up had to be postponed until spring. Imagine the effects of a similar spill in our Mississippi River which flows down through the United States.

Thank you listening to my comments. I would like to see the additional information mentioned in the final EIS.

Sincerely,

Tamara and James Smith
9331 Father Foley Drive
Pine River, MN 56474

5006 Keystone Ridge SE
Cedar Rapids, IA 52403

Jamie MacAlister
Environmental Review Manager Minnesota Department of Commerce
85 7th Place East, Suite 280 St. Paul, MN 55101-2198

Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

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Sincerely,

Tamara and James Smith
9331 Father Foley Drive
Pine River, MN 56474

5006 Keystone Ridge SE
Cedar Rapids, IA 52403

From: Daniel Snidarich
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137
Date: Sunday, June 04, 2017 6:50:04 PM

Dear Ms. MacAlister,

I support this project for reasons of jobs and responsible means of transport of fuel. The area can benefit by moving forward with the project.

Sincerely,

Daniel Snidarich
8760 Savage Rd
Angora, MN 55703
dsnidarich@local49.org

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Daniel Alan Snidarich	(218)290-2684	dsn.dar.ch@lowell.net org

ADDRESS
8760 Sawage Road

CITY, STATE, ZIP
Angora, MN, 55703

COMMENTS
Build the project.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: PAUL SNABL

Street Address: 858 LITTLE FIELD CT SW

City: BEMIDJI State: MN Zip Code: 56601

Phone or Email: ptsnabl@yahoo.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

ENBRIDGE HAS SUPPLIED MULTIPLE VALUABLE JOBS AND IS CONSTANTLY IMPROVING THE EFFICIENCY AND SAFETY OF THEIR PIPELINES. ~~[illegible]~~ THE REPLACEMENT OF L3 THEY ACCOMPLISH THE FACT ~~[illegible]~~ THE PIPELINE HAS ALSO REDUCED ITS EFFICIENCY TO TRANSPORT OIL SAFELY AND RESPONSIBLY. CONSIDER AN OLD CAR, YOU CAN BUILD ON AS MUCH MAINTENANCE ON IT PRIOR TO FINALLY RECYCLING IT FOR A NEW ONE. ENBRIDGE WILL AND HAS ABIDED BY THE REGULATORY REQUIREMENTS, PERMITS, AND PROPER APPROACH PRIOR TO BUILD CONTINUES TO DO THINGS THE RIGHT WAY. I SUPPORT THE L3 PIPELINE TRANSITION AND HAVE NOTHING BUT ~~[illegible]~~ GREAT THINGS TO SAY ABOUT ~~[illegible]~~ THE APPROACH ENBRIDGE HAS TAKEN. ~~[illegible]~~ ~~A [illegible]~~

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Kim Solberg

Street Address: 16137 560th St.

City: Gonvick State: MN Zip Code: 56644

Phone or Email: hair_lounge@hotmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

This project needs to go through. It will create many jobs which is a necessity.
Enbridge has covered every point possible to make this a safe & economical project.

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Susan Snyder <susan_tyra@sbcglobal.net>
Sent: Sunday, July 09, 2017 10:23 AM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Isn't the inclusion of rail and truck transport of oil to Superior a false equivalence in the preparation of this EIS?

With the exception of a small refinery in Superior, everyone knows this oil is destined for markets further south in the United States.

Thank you.

It's unfortunate and unfair that the public wasn't given additional time to respond to the DEIS, as a result of Enbridge delays, in releasing it (probably purposeful) .

Virus-free. www.avast.com

Levi, Andrew (COMM)

From: Susan Snyder <susan_tyra@sbcglobal.net>
Sent: Sunday, July 09, 2017 10:06 AM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

A *Certificate of Need* for this proposed project must take into account whether there is a need in Minnesota for this pipeline — in other words, whether there is a *state* need (not a national need).

Statistics relative to national need show that U.S. fuel demand was down 5 percent in 2015 compared to its 2007 peak.

In Minnesota, fuel demand was down **19 percent** in 2016 compared to its 2004 peak.

As these trends continue, and higher efficiency/electric cars become increasingly popular (as well as alternative sources of energy, e.g. solar, wind, etc.), it is highly unlikely a new pipeline is needed.

(http://www.sierraclub.org/sites/www.sierraclub.org/files/sce/north-star-chapter/pdf/EnergySecurity.pdf)

Further analysis of this information must be addressed in the EIS.

Thank you.

Susan

Virus-free. www.avast.com

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: R. Snyder

Street Address:

City: Outing State: MN Zip Code: 56662

Phone or Email:

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Please provide the names and firms responsible for the groundwater hydrogeology assessments. These are oddly enough, missing from the DEIS. Do these firms/individuals have any connection to Enbridge? Have they prepared assessments for them previously? Are they shareholders? Employees (former)? The public cannot comment accurately unless we have all information.

Thank you

If including additional pages please number them and tell us how many you are providing:_____ pages

RECEIVED
JUL 13 2017
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TAPE HERE (PLEASE DO NOT STAPLE)

MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
SAINT PAUL, MN 55101-2198

FOLD HERE

Public Comment Period Ends Monday, July 10, 2017

Comments must be postmarked or received electronically by the comment deadline.

How to comment:

- Drop this form in a comment box at a public meeting
- Mail this form, remembering to affix appropriate postage
- Mail comments in a separate envelope using the mailing address on this form
- Email comments to the Environmental Review Manager: Pipeline.Comments@state.mn.us
- Fax comments to the Environmental Review Manager: (651) 539-0109

Comments do not need to be on this form to be accepted. We encourage you to provide comments in whatever way is most convenient for you. If commenting by email or fax please use "*Public Comment: Line 3 Project (CN-14-916 and PPL-15-137)*" in the subject line.

Thank you for participating in the Draft EIS public review process! By commenting you are helping inform the Minnesota Public Utility Commission's decisions regarding this project.

FOLD HERE

Line 3 Project

Docket Nos. CN-14-916 and PPL-15-137

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is unclear? What is missing? Please reference specific sections of the Draft EIS, if possible. Use additional pages as needed.

For project information visit: http://mn.gov/commerce/energyfacilities/line3.

Line 3 Replacement Project DEIS

20 JUN '17
PM 21

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PRL-15-137

UNITED STATES POSTAGE
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MAILED FROM ZIP CODE 55419

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Ellie Solberg	(612) 243-2369	ellie.solberg@lejeunsted.ms

ADDRESS
118 W. 60th St.

CITY, STATE, ZIP
Minneapolis, MN 55419

COMMENTS

DECLARE THE EIS ADEQUA[illegible] WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Maren Sarah Solheim <Maren.Solheim@colorado.edu>
Sent: Saturday, July 08, 2017 12:45 PM
To: MN_COMM_Pipeline Comments

I'm Maren Solheim from Minneapolis. As a person of faith and as a resident of Minnesota, I am very concerned about the new Line 3 proposed by Enbridge. Though the environmental impact statement acknowledges many severe consequences to land, water, and local communities, it appears the no-build option is not being seriously considered.
I am alarmed by the plans for this pipeline, which disregard the severe impacts of potential spills to ricing lakes, rivers, and even to Lake Superior. Furthermore, I find it unacceptable that we, as a state, continue to expect Native communities to disproportionately endure the impacts of extracting and transporting oil. These risks are outlined but not considered reason enough to reject the pipeline.
We have a responsibility to current and future generations, locally and globally, to keep out Tar Sands oil that could pollute MN waters and contribute significantly to climate change. Climate scientists agree it is time to leave the oil in the ground.
I implore you to weigh the dire consequences of this pipeline and strongly consider rejecting it.

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Tom Sundly	651.674.0821	tsundly@local49training.org

ADDRESS
44237 Deerwood Trl.

CITY, STATE, ZIP
Harris MN 55032

COMMENTS
This is important work for our members and will bring an important product that everyone needs.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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MINNEAPOLIS
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MAILED FROM ZIP CODE 55419

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
TRACEY SORENSON	218-391-7408	tsorenson10@HOTMAIL.com
ADDRESS: 1803 Garfield Ave		
CITY, STATE, ZIP: Superior, WI 54880		

COMMENTS
Line 3 needs to be replaced. Enbridge has been working for years to safely replace this aging pipeline before there are any leaks. They need to replace this pipeline and can do it safely for people and the environment. Let them do what they do best and stop delaying them!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Ann Sorum <annbsorum88@gmail.com>
Sent: Monday, July 10, 2017 2:43 PM
To: MN_COMM_Pipeline Comments
Subject: Fwd: Fw: pipeline

In addition to what my friend wrote in her email,(see below), I will add that the only people who seem to benefit are those who have stock in oil production.
In the 1950's, tobacco companies had campaign ads to "prove" cigarette smoke does not cause cancer. How many died because of that?
The oil is sent to New Orleans and shipped to...??? China, which is desperately trying to reduce their pollution. Should we not be thinking about the future of our grandchildren and the air they breathe, instead of lining the pockets of climate-change-deniers who hold stock in oil companies and are told lies by the oil companies? There are many more jobs in clean air energy !!

Ann Sorum
annbsorum88@gmail.com

----- Forwarded Message -----
From: cheryl doering <cdoering2000@yahoo.com>
To: "pipeline.comments@state.mn.us" <pipeline.comments@state.mn.us>
Sent: Monday, July 10, 2017 1:31 PM
Subject: Re: pipeline

I am e-mailing re: proposed Enbridge pipeline to register my opposition, because of the risk of oil spills in the Mississippi River headwaters region, and lakes where Ojibwe people harvest wild rice, along with the risk for the entire length of the pipeline. The pipeline would carry tar sands crude. In Canada, the extraction of this is turning boreal forest to lunar-like landscapes of open-pit mines and wastewater containment ponds. Tar sands extraction emits up to three times more global warming pollution than conventional crude. The oil is thicker and more acidic, which increases the likelihood of a leak. When it does spill, it is more

detrimental to water resources. This whole scenario is an environmental disaster in the making! NO to the Enbridge pipeline!
Cheryl Doering

Levi, Andrew (COMM)

From: Carol Soto <carol111us@yahoo.com>
Sent: Sunday, July 09, 2017 5:10 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge New Line 3 -- DEIS CN-14-916 and PPL-15-137

Dear Mr. MacAlister,

The state of Minnesota, like the rest of the US, has reached a fork in the road regarding our energy future. We can chose to move to sustainable, non-polluting energy sources like wind and solar or continue to utilize environmentally destructive and unsustainable fossil fuels.

The current request by Enbridge to abandon its old pipeline and build the Line 3 pipeline will not provide sigificant benefits to any party other than Enbridge, but it will negatively impact the people and lands of Minnesota. These negative impacts will be particularly onerous for Native Americans who rely on the clarity of the waters and land for their existence (as we all do, ultimately).

Please do not grant this permit. It does not benefit the many but the few.

Sincerely,
Carol Soto
San Francisco, CA

Levi, Andrew (COMM)

From: Mr. & Mrs. Marty Soukup <user@votervoice.net>
Sent: Sunday, July 09, 2017 3:35 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I am a Minnesotan and want to see the environment protected like most others.
I believe replacing aging infrastructure like pipelines is imperative to protecting the environment.
The MPCA has recently released the Mississippi River Watershed report that shows the cleanest waters in the state are in northern Minnesota. Energy infrastructure and clean waters can co-exist.
Enbridge has found a route that follows existing utility corridors.
Pipelines are everywhere in Minnesota, according to the Environmental Quality Board's report. I'm familiar with pipeline right of ways in northern Minnesota around Bemidji, Grand Rapids, Cass Lake and Alexandria. Pipelines and natural resources have gone hand-in-hand in northern Minnesota for decades.
Topic: EIS and Line 3 Replacement Regulatory Schedule As a resident of northern Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project.
I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3.
No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS.
Please keep the EIS timeline to the statutory deadline of 280 days.
Topic: Deactivation
Deactivating a pipeline in-place is the most commonly-used industry method to retire a pipeline.
Leaving the permanently deactivated pipeline in place is the safest option as it reduces the risk of soil stability issues, avoids major construction activities and reduces the potential risk to existing pipelines from heavy equipment. As a landowner, I'd rather have the pipe deactivated in place to avoid further construction on my property.

Sincerely,

Marty & Julie Soukup
2911 W 15th St
Duluth, MN 55806
fitnessedge2@yahoo.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Kate Southwick	218-260-5773	
ADDRESS		
2501 Leonard ST #307		
CITY, STATE, ZIP		
Duluth MN 55811		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Robert Southwick	218-260-5781	[redacted]

ADDRESS
2501 Leonard ST #307

CITY, STATE, ZIP
Duluth MN 55811

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
MARY SOYRING	218-590.3869	Msoyring@msn.com

ADDRESS
820 Taylor Ave

CITY, STATE, ZIP
CLOQUET MN 55720

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

POSTCARD
USA
2015
King Bidder

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Robert Soyring	218-879-6865	Robertsoyring@msn.com

ADDRESS
820 Taylor Ave

CITY, STATE, ZIP
Cloquet, MN 55720

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

POSTCARD USA 2015 King Bidder

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Carolyn Spangler <carolynspangler1@gmail.com>
Sent: Sunday, July 09, 2017 11:47 AM
To: MN_COMM_Pipeline Comments
Subject: public comment Line 3 project (CN-14-196 and PPL-12-137)

Dear Environmental Review Manager:

I believe there is missing data in the Line 3 DEIS. There is apparently no information from a dilbit study done by the National Academy of Sciences, which you can find here: https://www.nap.edu/catalog/21834/spills-of-diluted-bitumen-from-pipelines-a-comparative-study-of.

I would like this to be included in the final EIS. Thank you.

Carolyn Spangler
15995 Freedom Drive
Park Rapids, MN 56470

Levi, Andrew (COMM)

From: Maurice Spangler <mauricespangler@gmail.com>
Sent: Sunday, July 09, 2017 12:06 PM
To: MN_COMM_Pipeline Comments
Subject: Public comment: Line 3 Project (CN-14-916 and PPL-15-137)

Dear Environmental Review Manager:

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete

Enbridge estimates that the spill rates would be twice as much for SA04 as for the preferred route since SA04 is twice as long. However, if a spill occurs in the preferred route it would cause, in my opinion, more devastation to very clean waters that are important to tourism than would a spill along SA04. I'd like to see more analysis as to the effects of spills on the quality of the waters, not just on the numbers based on the length of the corridors.

I'd also like to know if Enbridge plans to add more pipelines to their proposed route if the PUC agrees to the preferred route and, if so, how this would affect the spill devastations. Spills will happen, especially pinhole spills that can turn into large spells by being undetectable early in the course.

I think more information has to include whether there really is a <u>state</u> need for this pipeline. If it's to be used primarily for transporting tar sands oil to refineries to be shipped overseas, does the need of the oil drilling and transport companies to increase their profits justify the potential environmental damage of an oil spill in our beautiful waters? Estimate oil use is projected to continue to decline, especially with the advent of more and more electric vehicles.

Thank you,
Maurice Spangler, 15995 Freedom Drive, Park Rapids, MN 56470

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Samuel Sparhawk	218-686-7996	samuel.sparhawk@enbridge.com

ADDRESS
13698 Big Buzzle Rd NW

CITY, STATE, ZIP
Pinewood, MN 56676

COMMENTS
Pipelines and the work that is generated supports my family with wages as well as provides affordable energy

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

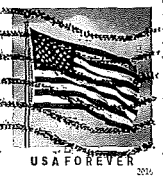

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Clarine M. Speck	218-751-5045	
ADDRESS		
1500 3rd St. SE ~~Bemidji~~		
CITY, STATE, ZIP		
Bemidji, Mn. 56601		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

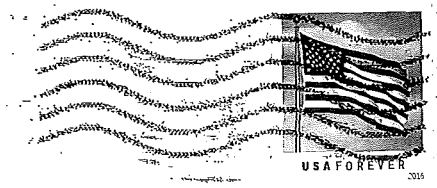

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
John A. Speck	218-751-5045	
ADDRESS: 1500 3rd st. SE		
CITY, STATE, ZIP: Bemidji MN 56601		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: David Spero RN
To: MN_COMM_Pipeline Comments
Subject: New Line 3 pipeline (CN-14-916 and PPL-15-137)
Date: Wednesday, May 31, 2017 12:31:11 PM

Please use the strictest possible assessment of the environmental risks of this pipeline (New Line 3 pipeline (CN-14-916 and PPL-15-137) because the tar sands oil it will transport IS NOT NEEDED. We need to start using cleaner sources of energy NOW. Sacrificing Minnesota environments as a side effect of an undesirable end - increasing oil consumption - is a lose-lose proposition. Real Minnesotans, human and animal, will suffer. Please take a hard, hard look at this project.

David Spero, San Francisco, CA

Levi, Andrew (COMM)

From: Shodo Spring <shodo.spring@gmail.com>
Sent: Monday, July 10, 2017 6:23 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

Greetings!

Here are brief comments on the proposal to replace Line 3 with a new and larger line.

Page ES-4ff: About the Certificate of Need:

1. Enbridge offered a list of possibilities if the CN is denied. All of them assume that there is a need to ship oil. This is not realistic. The need for oil is decreasing.The economics of fossil fuels versus alternative are shifting rapidly. If one includes the health and economic effects of environmental damage and climate change, the preference easily swings to the alternatives. Note that the planned KXL faces lack of demand and withdrawal of investors. People are using less oil in general. There is no need.
2. The oil is not for Minnesota. The plan is to deliver it to Superior, Wisconsin, to be used elsewhere. All Minnesota gets is temporary construction jobs, a new pipeline, an old pipeline closed off,immediate environmental damage, and the wait to see when and where the spills will happen. The profits go to Enbridge - a Canadian corporation.
3. What if the same amount of money were put into other sources of energy? The economics are shifting, and if one adds the costs and benefits of environmental damage and climate change, there is no question.
4. In short, Minnesota does not need this pipeline.

(no page reference) Safety Claims and Industry Standards:

1. Enbridge claims that capping the old line is safer than removing it, that there will be absolutely no oil left in the line, and that there will be regular monitoring because it runs along with several other pipelines. Enbridge has a long history of spills and accidents. http://www.corp-research.org/enbridge, as well as a history of denying responsibility and inadequate cleanup. After the Kalamazoo spill in 2010, they were fined and cited for "lack of safety culture."
2. I respectfully suggest that there is no reason to believe Enbridge will do any better here and now than they have done in the past, and they should be unwelcome in the State of Minnesota, where people live, work, breathe, and eat.

Page ES-12 ff: Need for Oil Pipelines, Part 2:

1. **ES-18-19** To assume that we need oil is to assume that we are in favor of climate change, even as the wildfires, droughts, and deaths escalate. However, if we are in favor of these things, pipelines are not the best way to transport oil.
2. When a pipeline leaks, the automated equipment usually does not catch it. Most spills are noticed by random individuals, not by the company, and vast amounts of oil are spilled before the cleanup even begins.
3. When a truck or rail car spills, on the other hand, it is noted immediately. The amount of spill is limited by the amount in the car or truck, and cleanup begins. The spill is dramatic - and noticed. Oil companies prefer the hidden spills of pipelines, which are much larger and do much more damage.

Environmental Justice:

Briefly, because others have covered this better:

1. All the tribes in the area are strongly opposed to this pipeline. and are working to create an alternative EIS.
2. **Page ES-26:** The Applicant's Preferred Route maximizes damage to ricing lakes, Without a spill, there is damage; with a spill, there is more damage. This is damage that cannot be repaired.

Summary: The most important alternative has been left out of Enbridge's EIS. That alternative is to abandon fossil fuels and replace them with alternatives. By ignoring this option, the EIS is deeply flawed and should be rejected in whole.

Sincerely,

Shodo Spring
507-384-8541

www.MountainsandWatersAlliance.org

Levi, Andrew (COMM)

From: Monica Zachay <monicaz@scramail.com>
Sent: Monday, July 10, 2017 3:33 PM
To: MN_COMM_Pipeline Comments
Cc: Deb Ryun
Subject: Line 3 Draft EIS Comment, St. Croix River Association
Attachments: Line3CommentSCRA.pdf

Greetings,

Pease accept this letter on behalf of the St. Croix River Association, commenting on the Line 3 Draft EIS.

Thank you,

Monica Zachay
Land and Water Director

St. Croix River Association
Advocating for conservation throughout the watershed.
PO Box 655
St. Croix Falls, WI 54024
715.483.3300 | stcroixriverassociation.org

Join us on Sunday, August 6 for our annual event, *Celebrating the River*, at the Horst Rechelbacher Farm. Visit our website for tickets and details: stcroixriverassociation.org.

St. Croix River ASSOCIATION

Advocating for conservation throughout the watershed

July 6, 2017

Jaime MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101
Pipeline.Comments@state.mn.us

RE: Enbridge Energy's Proposed Line 3 Pipeline Project: Comments on the Draft Environmental Impact Statement, CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Thank you for the opportunity to review and present our comments and concerns regarding Enbridge Energy's Proposed Line 3 Pipeline Project Draft Environmental Impact Statement, docket numbers CN-14-916 and PPL-15-137. The location of the proposed route runs through the headwaters of the Kettle River, a Minnesota State designated "Wild and Scenic River", which directly drains into the nationally designated "Wild and Scenic" St. Croix River.

The St. Croix River and its tributaries, specifically the Kettle River, adds immeasurably to the quality of life on our communities and supports important tourism-based economic activity. We are very interested in pipeline safety. As background, the St. Croix River Association's (SCRA) mission is to protection, restore, and celebrate the St. Croix River and its watershed. As the only watershed-wide based organization for the St. Croix Basin, with Land and Water Resource Conservation main objective being to keep the Riverway and its tributaries clean, and to protect and restore critical ecosystems for habitat and scenic values, we are compelled to comment.

The Kettle River is an exceptional tributary to the St. Croix River, boasting high biodiversity as well as some of the most impressive whitewater rapids in Minnesota. Its watershed includes large areas of intact wetlands, pristine perennial headwater streams, and diverse mussel and fish faunas. It is home to 17 species of mussels, ancient lake sturgeon, and nationally significant brook lamprey and gilt darter. Several threatened, endangered, and sensitive species including bald eagles, Blanding's turtle, wood turtles, and osprey are also found in this area. Overall the water quality and aquatic systems of the Kettle River are in exceptional condition, as indicated by consistently high indices of biotic integrity. Given the uniqueness and ecologically sensitive ecosystems within the Kettle River watershed, we strongly oppose the proposed Line 3 pipeline route outlined in the Line 3 DEIS. The proposed route crosses through the most sensitive headwater areas of the Kettle River watershed and does not adequately mitigate or minimize the environmental impacts of pipeline construction or a potential

pipeline spill. The water resources, wildlife habitat, recreation opportunities, and rare ecological features in this area far outweigh the risks associated with the installation of Line 3.

In addition to the pipeline construction itself, we urge you to consider the added risks of a pipeline with increased capacity. The likelihood of a spill or breach are considerably greater with increased capacity, and with that risk comes potential for an increased impact on the resources. The cumulative potential effects of anticipated future pipeline construction within the St. Croix Watershed are of further concern. Added capacity through Superior terminal via Line 3 may lead to the need for increased capacity along the current pipeline corridor that crosses under the headwaters of the St. Croix, Namekagon, Eau Claire, and Totogatic rivers. We have had direct communications with Enbridge regarding the safety of the current pipelines, and intend to continue that open dialogue. However, the SCRA is opposed to a new line that runs through the St. Croix National Scenic Riverway, a congressionally designated wild and scenic river and a national park.

Thank you for considering these comments. It is critical to ensure the protection of the Kettle and St. Croix Rivers for the long-term health of these state and congressionally designated “Wild and Scenic” Rivers.

Sincerely,

Deb Ryun

Deb Ryun
Executive Director

From: Cindy Stahler
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137
Date: Wednesday, May 31, 2017 7:05:26 AM

I wish to comment: no new pipelines are necessary. We need more renewable energy resources and not more fossil fuels. The drilling, processing, transporting, and burning of fossil fuels threatens the future of our planet. This particular pipeline would immediately threaten the Anishinaabe people. I would encourage you to think in terms of a viable future for people in Minnesota. Do not approve (CN-14-916 and PPL-15-137).

Rev. Cynthia Stahler
United Church of Christ

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
BRUCE STAHNKE	320-761-3653	
ADDRESS		
BOX 337		bstahnke49@gmail.com
CITY, STATE, ZIP		
ATWATER	MN	56209

COMMENTS

PIPELINES ARE THE SAFEST WAY TO TRANSPORT THE PRODUCT

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: bestancer@gmail.com
Sent: Saturday, July 08, 2017 8:45 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment: Line 3 Project (CN-14-916 and PPL-15-137).

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economic analysis for the EIS to be complete. In the October 19, 2015 Star Tribune letter, from the Whitefish Area Property Owners Association (WAPOA), the annual revenue from lake cabin and home owners in property tax alone is $300 million in Hubbard, Cass, Crow Wing, and Aitkin counties and add to this another $300 million in tourism and second property owners expenditures. It is not a question of if, but when the proposed line 3 pipeline develops a leak what is the economic and environmental cost going to be when there is no proven way to clean up the spill in water,

http://www.mlive.com/news/index.ssf/2016/07/kalamazoo_river_oil_spill_time.html

https://www.ecowatch.com/5-years-since-massive-tar-sands-oil-spill-kalamazoo-river-still-not-cl-1882075674.html

Do you really want to take the risk of this kind of spill in wetlands, rivers, marshes and lakes?

Thank you,
Robert Stancer
3715 Wellington Lane N
Plymouth, MN 55441

Levi, Andrew (COMM)

From: Wachtler, John (COMM)
Sent: Sunday, July 09, 2017 9:57 AM
To: MN_COMM_Pipeline Comments
Subject: FW: Enbridge Line 3 comment

From: Susan Stanich [mailto:sstanich@yahoo.com]
Sent: Sunday, July 09, 2017 9:17 AM
To: Ek, Scott (PUC) <scott.ek@state.mn.us>; Wachtler, John (COMM) <john.wachtler@state.mn.us>
Cc: sen.eric.simonson@senate.mn
Subject: Enbridge Line 3 comment

To the Minnesota Public Utilities Commission and the Minnesota Department of Commerce:

I live near where this pipeline is planned for Carlton County; I have goats and horses in the county; our family has been involved in Carlton County 4H; we buy much of our food from independent Carlton County farmers; I have an organic garden.

I oppose the entire project. Notwithstanding all the hard work and detailed research of the DEIS, the fact that looms over it all is that there are far too many serious safety variables* to allow the pipeline. It isn't particularly comforting to know that "a large release of crude is unlikely" when it is clear that many smaller releases are both likely and damaging.

On the contrary, we need to move definitively in the opposite direction, towards stopping the expansion of oil use and transport altogether. I once had a horse who manured in his manger and water bucket. We need to be smarter than that, and protect our land and water, not despoil it.

Susan Stanich
218-626-3318

*variables as listed in the DEIS conclusion:

- _Receptor itself in terms of its vulnerability to exposure to crude oil, and its sensitivity, if it is exposed to crude oil
- _Type and volume of crude oil released
- _Timing and location of the release relative to seasonal occurrences and locations of sensitive receptors and uses
- _Climatic and site conditions at the time of the release
- _Ability of responders to contain the release
- _Speed, type and extent of cleanup, remediation, and restoration activities

Levi, Andrew (COMM)

From: Joe Stattine <jstattine@gmail.com>
Sent: Thursday, July 06, 2017 1:44 PM
To: MN_COMM_Pipeline Comments
Cc: Joe & Dawn Stattine
Subject: Comments, Line 3 Project Draft EIS

1. Please seriously reconsider the need for any new pipeline.
   -Our future is not in oil, especially not dirty, difficult to extract tar sands oil.
   -No real positive impact on job growth in Minnesota.
2. If any action is taken, it needs to include absolute and complete removal of the old line 3 line.
3. If any new pipeline is considered, it should be located in the existing corridor.

Thank You,
Joe Stattine
16399 Ahrens Hill Circle
Brainerd, MN 56401
218-829-4092

Levi, Andrew (COMM)

From: James Stauber <jamesstauber@stauberbrothers.com>
Sent: Sunday, July 09, 2017 9:50 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement

Dear Ms. MacAlister,

A heartfelt thank you to Enbridge for their continued concern for our environment, their concern for our safety, their concern for our economy, their concern for our way of life and for providing the resources we need to maintain our standard of living. It's time to let this company move forward with the Line 3 replacement.

Sincerely,

James E. Stauber
2706 W 11th St
Duluth, MN 55806
jamesstauber@stauberbrothers.com

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Scott Stebe

Street Address: 13015 Pine vista Drive

City: Cornick State: MN Zip Code: 56649

Phone or Email: 218-230-5310

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I would like to comment on the Line 3 pipeline project. I am in favor of this project. It puts a lot of people to work and brings in a lot of money for the communities in the area. I have been a pipeline laborer for almost 10 years and work hard to make sure pipelines are safe as possible. This is the safest and most efficient way to transport.

If including additional pages please number them and tell us how many you are providing:_____ pages

Line 3 Replacement Project DEIS

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- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Lucie Stein-Cartford	(651)397-5562	lucie.steincartford@gmail.com

ADDRESS
1417 E. 1st St, Apt 3 Duluth MN 55805

CITY, STATE, ZIP

COMMENTS
I believe replacing Line 3 in necessary for the continued environmental health of northern Minnesota. Aging pipelines are dangerous to people and wilderness alike and should be replaced.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Becky Steinhoff <beckstein hoff@gmail.com>
Sent: Sunday, July 09, 2017 6:53 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge proposed pipeline dockets CN-14-916 and PPL-15-137
Attachments: Comment for Dockets CN-14-916 and PPL-15-137.docx

Attached is my letter of comment for dockets CN-14-916 and PPL-15-137.

Thank you,

Rebecca Steinhoff

Sunday, July 9, 2017

Dear Minnesota PUC and anyone else this concerns:

I don't even know where to begin . . . an oil pipeline through the cleanest freshest waters in the whole United States . . . Really! I hope this horrible idea does not go through.

I moved to this area 6 years ago. Why? Because of the beautiful forests and the sparkling clean lakes that make up this area. It just doesn't make sense to me. Digging a trench through our lakes and rivers, wild rice beds and a main supply of water for those lucky folks in the Metropolitan area down in southern Minnesota, to lay a pipeline for some of the dirtiest, nastiest oil from CANADA. Let me see . . . it comes from Canada for Pete's sake. And WHY is this crappy dirty oil coming from CANADA to go through our beautiful pristine waters? Doesn't Canada have room for a pipeline for their OWN oil on their own soil?

So, this nasty oil coming into Minnesota, is it helping our economy? I think not, since it appears to me that it's being shipped out of the country! This is pure insanity! Think about it, isn't the United States supposed to be one of the most progressive countries in the world? Not so much. We are still living in the dark ages. We have access to clean energy alternatives. Clean energy as in wind (North Dakota the windiest state, I know because I moved from the flatlands!) and solar power. And I also know for a fact that both would employ more people, be ultimately more efficient and less expensive to use. So what do you think? Invest in our future with clean energy alternatives, preserving our precious natural resources, give more people jobs and have a cleaner environment? Yes!! A thousand times Yes!! It just makes more sense. Leave the oil and tar sands in the ground where it belongs!

Speaking of the economy, the area this supposed pipeline is proposed to go through will not provide jobs for our local people. The biggest source of income for this area is tourism. The number one, top income producer for this area. Why is tourism our top source of income? Because of the beautiful forests and CLEAN lakes and rivers! When the pipeline leaks it will ruin our lakes, rivers and aquifers. Think that will draw people here? Come swim and fish in our pools of oil!?! I am a shop owner, my lively hood depends upon tourism. That would vanish very quickly if (no when) that pipeline leaks.

Please, please, do not approve a pipeline for Enbridge, a foreign company with a horrible track record for pipeline leaks, when there is absolutely no need for this! Plus, they cannot be allowed to abandon the current line 3!

Thank you so much for your consideration in this matter,

Rebecca Steinhoff

Levi, Andrew (COMM)

From: Jim Steinlicht <jim@rushcreeklumber.com>
Sent: Friday, July 07, 2017 11:23 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

While pipelines may be safer than transporting oil by rail or truck, the potential for damaging our environment is huge. I'm concerned about the high pressure aspect of this pipeline & also the route it might take.

We can't afford to lose our pristine natural resources, especially our lakes & rivers in Northern & Central MN. Any project proposed for this area requires state of the art monitoring and safety practices. An oil spill is just not acceptable.

Best Regards,
Jim Steinlicht
Faribault, MN

Levi, Andrew (COMM)

From: Judy Stern <jsternmotherearth@aol.com>
Sent: Sunday, July 09, 2017 3:43 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge pipeline

Please do not allow the pipeline to cross the headwaters of the Kettle River or St. Croix River. Leaks do happen and all of us downstream do not want to risk this. We do have a choice. We should not be forced to take that risk.Walter Mondale created the Wild and Scenic River to protect it from just this risk. It makes no sense to consider it.

Judy Stern
jsternmotherearth@aol.com

Levi, Andrew (COMM)

From: Steve Sternberg <ssternbe@gmail.com>
Sent: Monday, July 10, 2017 2:22 PM
To: MN_COMM_Pipeline Comments
Subject: Comments for docket numbers CN-14-916 and PPL-15-137. Line3 Project.

Comments for docket numbers CN-14-916 and PPL-15-137.

I am writing to express my opposition to the line 3 expansion. My reasons are:

The project does not benefit Minnesota. The company will collect all the profits for the project, while the taxpayers of Minnesota are forced to accept the risk. These risks include harm to the land and people during construction, harm to the lakes and rivers when the line leaks (they all do), and harm to the climate if the pumped oil is used. The costs (risks) far outweigh the benefits of a few temporary jobs during construction.

I also wish to express my concern that the old line 3 pipeline will remain in place to eventually leak and contaminate our State's lands. The statements from Enbridge do not adequately address this future problem - they only serve to show the lack of concern with future generations of people that will be harmed when the pipeline is breached by corrosion. I want the old line either completely filled with inert solids materials or completely removed. Filling it with inert gas only works for a while. This is an unacceptable level of risk for our State.

Finally, I do not agree with the certificate of need. The world is moving away from oil and fossil fuels. There is no need to expand. We need to use less. There is already an oversupply of oil in the world and the expectation is for the glut to continue as the world transitions away from oil.

Dr. Steven PK Sternberg

320 E Buffalo St

Duluth, MN, 55811

From: Lawrence J Stock
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137
Date: Friday, June 09, 2017 9:20:05 AM

Dear Ms. MacAlister,

There are some simple facts that justify this pipeline, its routing and this DEIS:
1) The US population uses more oil than is produced domestically for its current standard of living therefore it must import oil, or go backwards and reduce its standard of living.
2) If the US does not import oil from Canada it will fill the need from third world countries that have marginal Human Rights and Environmental records.
3) Canada has a proven reserve of $800 Billion of oil located in Alberta, which they will sell. Wouldn't you cash in an $800 Billion winning lottery ticket?
4) The most cost effective route for a pipeline from Alberta to major refineries in Chicago flows through Superior Wisconsin, where the Calumet refinery is located.
5) Not replacing Line 3 will only cause same amount of oil to alternative less environmentally friendly and more costly transportation systems in the US Midwest – rail cars, trucks and tankers.
6) Not replacing Line 3 will increase the cost of petroleum products in the Midwest – including gasoline, jet fuel, asphalt, and wax. Also this will increase the cost of complementary energy sources such as natural gas, propane and electricity in the US Midwest. This increase in energy cost would fall disproportionately on the poor, who use a larger share of their income on energy for transportation and heating.
7) This Line 3 route avoids sovereign tribal lands in respect of their wishes, and utilizes upland areas away from wetlands as much as possible.

Sincerely,

Lawrence J Stock
3400 Greysolon Rd
Duluth, MN 55804
ljs@umich.edu

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
LISA STOCK	218.728.0202	lstock@lenmich.edu

ADDRESS
3400 GREYSOLON ROAD

CITY, STATE, ZIP
DULUTH MN 55804-2011

COMMENTS
I support the Line 3 replacement project. I am a Minnesotan and want to see the environment protected like most others. I believe replacing aging infrastructure like pipelines is imperative to protecting the environment.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: kathleenstoddart@gmail.com
Sent: Sunday, July 09, 2017 7:03 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

To: Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce

I am writing to oppose Enbridge's proposed Line 3 project. I am a part of a family that has held land on the shores of Whitefish Lake, part of the Pine River Water Shed in Crow Wing County, for six generations. I am also a homeowner in St. Paul whose drinking water is affected by water quality of the Mississippi and waters which feed into the Mississippi, which are affected by the proposal. I am a taxpayer who has consistently voted for the Legacy Amendment in Minnesota to ensure protection and preservation of our waters and lands, public and private, from irresponsible and damaging use. This pipeline poses enormous potential for such use.

Last July our lake association featured a Michigan resident who summers on Whitefish Lake. His Michigan home had been part of Enbridge's clear cut as they replaced and rebuilt pipeline after their Kalamazoo River spill in 2010. We saw photos and heard how Enbridge destroyed pristine private and public property, not only for the pipeline itself but for huge tracts as right of way. They met with homeowners before, assured them of meeting their needs and property rights, and then disappeared to be replaced by bulldozers manned not by Michigan job seekers but by Oklahomans and Texans who traveled with the company and destroyed all trees and vegetation in large swaths for miles.

The proposal also is a violation of Native American hunting, fishing and wild rice gathering rights, guaranteed in the Treaty of 1855. The walls of our newly renovated Capitol are lined with excerpts from past treaties as well as historic photos of testimony of violations of those same treaties. We cannot continue to honor agreements only when convenient for domestic and foreign commercial enterprises.

The potential for spills and leaks of both the existing pipeline and its replacement are huge when one looks at Enbridge's record in our state alone, as well as its history as a company. The lands and waters it would pass through are among the least polluted and most targeted for preservation and protection. We can find another route if needed.

Finally, the EIS for the pipeline allows a known polluting and irresponsible company and its affiliated enterprises to prepare their own draft statement. "Caveat emptor!" (Let the buyer beware!) my old Latin teacher would daily remind us. Let us ask and answer questions about this route of those with no past ties to Enbridge and nothing to gain but the health and safety of our land, waters, citizens, and responsible enterprises.

Thank you.

Kathleen Stoddart
942 Fairmount Ave.
St. Paul, MN 55105
Sent from my iPad

Levi, Andrew (COMM)

From: HILLARY STOLTZ <hillbob@arvig.net>
Sent: Sunday, July 09, 2017 10:22 PM
To: MN_COMM_Pipeline Comments
Cc: hillbob.stoltz@gmail.com
Subject: CN-14-916 and PPL-15-137
Attachments: Department of Commerce letter.docx

Please consider my concerns as expressed and detailed on the attached document. If you have any difficulty opening the attachment, please contact me at once.

Please note: I am very concerned about the exclusion of SA04 in the Enbridge DEIS.

Sincere regards,
Hillary Stoltz
702-604-1687

TO: Jamie MacAlister, Environmental Review Manager

MN Department of Commerce

85 7th Place East, Suite 280

St. Paul, MN 55101-2198

Regarding: CN-14-916 and PPL-15-137

Composed: July 9, 2017

Sent by email to: Pipeline.Comments@state.mn.us

To all those responsible for representing the best interests of the citizens of Minnesota:

Having such a short time for reading and reviewing a 6500+/- page Draft EIS document before being given the opportunity to meet with the DOC and other concerned citizens at a public meeting in Park Rapids, MN, I was feeling very rushed and almost blind-sided by the process. However, I am taking this opportunity to express several concerns that I have about the DEIS and the entity(ies) responsible for producing this daunting document.

1. Cardno, who was previously employed by Enbridge for other reports, seems to be less than open-minded and transparent. Throughout the study, there was a slant toward justification of what many of your fellow Minnesotans believe is a flawed premise--that the preferred routes and substantial expansion of the diameter of the Line 3 Pipeline as proposed by Enbridge, is the most viable option.
2. The DNR and the MPCA are educated and expert in these matters and they should certainly be key in the determination of the route and the dangers posed by a Canadian Corporation that stands to make massive profits for many years into the future. They are profit oriented and the Minnesotans will be saddled with extreme risks if there are any spills or leaks into our lakes and wetland areas adjacent and contiguous to the Enbridge preferred route.
3. Tar sands accidents will pose a most terrific risk to our sensitive environmental areas. The traditional wild rice beds of the Native tribes along this pipeline route would be destroyed forever should there be an accidental spill.
4. Any corridor that is being proposed should be limited as to future expansion for additional lines. The DEIS indicates that expansion through these sensitive lakes, rivers, forests is a real possibility. How short sighted is this? You must impose limits for any of your approvals and not leave open the possibility for any future lines. A “real life” negotiator would never allow this open-ended possibility!
5. I did not see any references to the impacts on Itasca State Park, the Straight River trout or other important tourist and local citizens that have valid concerns for these sensitive areas that will be impacted. The frogs, insects (including rare butterflies) and wildlife are dependent on the health and clarity of the pristine areas through which Enbridge’s preferred route runs. In the

event of oil spills, which have proven to be an inevitability for the future, we need to be firm on the location of pipelines to enable access and cleanup feasible. Main roads for access to spills and substantial distance from wetlands and waterways should be a number ONE PRIORITY.

I am clearly opposed and disappointed in the process that has been orchestrated by Enbridge to serve their own financial profit priorities and of our governing entities allowing this process. It was not humanly possible to review the 6500-page DEIS before the public comment meetings. The seriousness of the present and future danger of the expansion of multiple pipelines through our homeland and recreational lake areas in Minnesota requires both clear unrushed study by the experts in this field (that have no hidden agendas) and the planning for approvals by all agencies that are presumably mandated to protect our State's best interests.

Thank you for your serious consideration of my comments on these matters.

Sincerely concerned citizen and permanent resident,

Hillary Stoltz

22334 Glacial Ridge Trail

Nevis, MN 56467

218-652-3970

Levi, Andrew (COMM)

From: emrys stramer <emrys_s@yahoo.com>
Sent: Monday, July 10, 2017 11:46 PM
To: MN_COMM_Pipeline Comments
Subject: Attn: Jamie MacAlister: Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.
I am from Minneapolis, MN. I spend every fall harvesting wild rice or helping friends process hand harvested wild rice up north. It is a staple food in my diet and a crucial food source and an irreplaceable part of the cultures of Indigenous peoples of Minnesota.

The Line 3 Pipeline concerns me because: We have an absolute responsibility to honor treaties with the tribes. This pipeline is a furtherance of colonialism and genocide against the indigenous tribes of this land and is inexcusable. It follows a pattern of structural racism that condemns native and other people of color to "sacrifice zones" in the pursuance of energy extraction infrustructure and profits. Minnesota can and must do better.
The DEIS concerns me because:

- Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "**would have a long-term detrimental effect on tribal members and tribal resources**" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). **This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members**.
- Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "**are part of a larger pattern of structural racism**" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3).

Furthermore despite the above findings, the DEIS does not conclude they are sufficient reson to deny the permit. The DEIS thus states there will be harms to these communities, and that its authors do not care. This conclusion is repugnant.

I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.
Sincerely,
Emrys Stramer

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Harlan Strandlien	1-218-785-2412	deelhes@gmail.com

ADDRESS
26865 - 310th st.

CITY, STATE, ZIP
Shevlin, Mn. 56676

COMMENTS
This pipe line needs to be built soon, to insure safety, by replaceing the old line. It will also provide many jobs and will help lower taxes in Clearwater Co.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Brent Straub	612-388-1175	brent.straub@ unitedpipfins.us
ADDRESS		
CITY, STATE, ZIP		

COMMENTS Let's keep the process moving. this pipeline is vital to MN & the nation

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From:	Jerry Striegel <grstriegel@gmail.com>
Sent:	Monday, July 10, 2017 12:35 PM
To:	MN_COMM_Pipeline Comments
Subject:	Docket Numbers CN-14-916 and PPL-15-137 Public Comments - DEIS Routing Omissions
Attachments:	DEIS L3 Routing Omissions.pdf

Jamie MacAlister, Environmental Review Manager

Minnesota Department of Commerce

Submissions to: Docket Numbers CN-14-916 and PPL-15-137

Subject: DEIS routing omission

I have little doubt that the applicant, Enbridge, has made use of "state of the art" optimal path and routing processes to define the applicant's preferred route - i.e., the proposed new line 3 corridor. After all, the route is part of both pipeline build-out cost and subsequent operating cost. The software or methodology used is undefined and no indication of weighting factors is presented. Can DOC reproduce Enbridge's comparative route claims and what are they based on? Further, the inclusion of alternate pipeline routes in the DEIS does not seem supported by selection methodology nor weighting factors. Methodology and weighting factors seem key elements of a routing selection? What method of comparison will the FEIS dictate to vet these routing options or alternatively locate a better one? Please improve the DEIS by incorporating appropriate and transparent routing selection methods.

Gerald Striegel

400 Beacon Ave.

St. Paul, MN 55104

Jamie MacAlister, Environmental Review Manager

Minnesota Department of Commerce

Submissions to: Docket Numbers CN-14-916 and PPL-15-137

Subject: DEIS routing omission

I have little doubt that the applicant, Enbridge, has made use of "state of the art" optimal path and routing processes to define the applicant's preferred route - i.e., the proposed new line 3 corridor. After all, the route is part of both pipeline build-out cost and subsequent operating cost. The software or methodology used is undefined and no indication of weighting factors is presented. Can DOC reproduce Enbridge's comparative route claims and what are they based on? Further, the inclusion of alternate pipeline routes in the DEIS does not seem supported by selection methodology nor weighting factors. Methodology and weighting factors seem key elements of a routing selection? What method of comparison will the FEIS dictate to vet these routing options or alternatively locate a better one? Please improve the DEIS by incorporating appropriate and transparent routing selection methods.

Gerald Striegel

400 Beacon Ave.

St. Paul, MN 55104

Levi, Andrew (COMM)

From: Edna STROMQUIST <estromquist2775@charter.net>
Sent: Monday, July 10, 2017 7:39 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 support

Dear Ms. MacAlister,

I feel like the safest way to transport oil is through the pipeline. It is imparative that we continue to logically assess our options and not give way to mass hysteria over something this important.

Sincerely,

Edna STROMQUIST
900 W Morgan St
Duluth, MN 55811
estromquist2775@charter.net

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: David K. Strong

Street Address: 2101 Nelson Dr.

City: TRF State: MN Zip Code: 56701

Phone or Email: DKS@MNCABLENET

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I am a Township (NORTH Pennington Co) Supervisor and feel this project is greatly needed and should proceed ASAP. You have my support.

If including additional pages please number them and tell us how many you are providing:_____ pages

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Matt Stuart	(218) 724 6564	Matt.Stuart@unitedpipe.us

ADDRESS: 814 E 10 Duluth MN 55805

CITY, STATE, ZIP:

COMMENTS: Looking forward to improving our infrastructure

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Marcia Stucki
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137
Date: Wednesday, May 31, 2017 9:42:25 AM

I live on my farm in Michigan, just a couple of miles from the Kalamazoo River, where an Enbridge pipeline failed, pouring hundreds of thousands of gallons of heavy oil into our water in 2010. Pipelines are not, and cannot be, 100% safe. Enbridge can make promises, but oil "leaks" are a cost of doing business for them. I urge you to turn down any proposals to place oil pipelines through Minnesota's priceless northern waterways and rice beds. At some point in the future, oil will be obsolete. Water is life.

Marcia Stucki
Cedar Hill Farm
Galesburg, MI 49053

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Jared Stoll

Street Address:

City: Bemidji State: MN Zip Code:

Phone or Email:

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I support either of two options, Either the preferred route, or the southerly alternative. They both meet the needs of enbridge and would replace an aging line. ~~that is~~

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Erin Stutelberg <stutelbe@gmail.com>
Sent: Sunday, July 09, 2017 4:22 PM
To: MN_COMM_Pipeline Comments
Subject: Comments on Draft Environmental Impact Statement (DEIS) for Line 3

Re: CN-14-916 and PPL-15-137

To Whom It May Concern:

I am writing to comment on the DEIS for Enbridge's Line 3. My comments reflect concern for and opposition to the building of this pipeline. While environmental impacts and the long-term effects of a pipeline on flora, fauna, and human life are clearly serious concerns if this project moves forward, my comments today will focus mainly on the tribal impacts of this project. The rights and safety of indigenous people should be the highest priority of the state of Minnesota. Some of my concerns related to the tribal impact of Line 3 include:

- The United Nations international standard for projects that impact Indigenous Peoples is **Free, Prior and Informed consent**. Therefore, tribal consultancy after the project is already proposed and designed is not free, prior, and informed consent. The very process in place violates indigenous rights.
- Most of the issues specific to tribal people and tribal resources are **confined to a separate chapter** that attempts to provide "an American Indian perspective." They are excluded from the main chapters that assess potential impacts. This allows the EIS to **avoid drawing conclusions** about the impacts on tribal people. (Chapter 9) Excluding indigenous people from the other chapters of the report suggests that they are not integral to all that happens to the land and the climate.
- Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "**would have a long-term detrimental effect on tribal members and tribal resources**" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). **This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members**. The treaties must be upheld to protect indigenous culture and life.
- Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "**are part of a larger pattern of structural racism**" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3).
- The DEIS concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) **This alone should be reason to deny the project!**

- Chapter 6 states that Enbridge's preferred route would impact **more wild rice lakes and areas rich in biodiversity** than any of the proposed alternative routes (Figure ES-10). The wild rice lakes are central to indigenous culture and economic livelihood.
- The DEIS acknowledges that "The addition of a temporary, cash-rich workforce **increases the likelihood that sex trafficking or sexual abuse will occur**," and that these challenges hit Native communities the hardest. But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). What experience does Enbridge have planning and implementing an anti-sex trafficking program? How will Enbridge ensure that their program will be empirical, research-based, and effective?

These tribal impacts are just a few of the concerns I have related to the DEIS of Line 3 and continuation of the project. I urge the Minnesota Public Utilities Commission to deny the permits to Enbridge to build this pipeline due to all the potential risks it poses to the indigenous community. The negative consequences of Line 3 far outweigh any possible positive gain from this project.

Thank you for your time and consideration,

-Erin Stutelberg

From: Margaret Sullivan
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137
Date: Thursday, May 18, 2017 12:09:32 PM

I oppose Enbridge's preferred route primarily for the following reasons:

1) **Increased risks for water quality devastation** (Mississippi headwaters, etc.) especially considering their intent to greatly increase the amount of flowage. Costs to the state's economy would be astronomical.
2) **Injury to State Economy:** Rather than repairing/replacing an existing line, there would be more pipelines scarring our landscape – further injuring our economy (lower property values, harms to our tourist economy, etc.).
3) **Poor Long Term Investment:** I strongly believe that in 10 years we will all be wondering why we allowed this expansion, given how fossil fuels are being outpaced by other now cheaper renewable energy sources.
4) **Existing Pipeline Should Be Repair/Replaced:** I do recognize the risk of rail transport, so if we indeed need a new pipeline, Enbridge should only be allowed to repair and/or replace its existing line.

M. Sullivan
Urban Minnesotan

Virus-free. www.avast.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137-1-1

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
THOMAS G. SULLIVAN	218-590-7602	TONSULLIVAN1031@GMAIL.COM

ADDRESS
724 MELLWOOD AVE

CITY, STATE, ZIP
DULUTH MN 55804

COMMENTS
I SUPPORT LINE 3
FOR THE BETTERMENT
OF THE ENVIRONMENT!!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNESOTA

Comment Form

Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Mike Sandin

Street Address: 2002 London Rd Rm 106

City: Duluth State: Mn Zip Code: 55812

Phone or Email: msundin@iupat82.org

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Enbridge Line 3 Comments

The EIS should include factual reasoning that addresses dangers that exist in the current transportation of oil in our state. Public safety will be improved by reducing or eliminating the use of rail tankers to move oil.

Please consider the dangers of continued transportation of oil via rail tankers. History has proven this mode of transporting oil is a danger to both the environment and human life.
A catastrophic fire in Lac-Megantic Quebec Canada claimed the lives of 47 innocent residents, millions of dollars in damage, and untold environmental damage

During Mn Legislative transportation committee meetings it was revealed that of the 79,000 rail tankers traveling the rail roads in the United States only 5,000 are considered safe. The new generation of tankers have reinforced bulkheads and a thicker gauge skin that meets a higher safety standard. This leaves what could be considered approximately 74,000 (time bombs) traveling through communities in the United States. It seems unlikely that the rail industry can replace the substandard tankers fast enough to provide the safety the public should expect.

At the international rail crossing in Ranier Mn, a bridge nearing 100 years old is utilized by hundreds of these substandard rail tankers on any given day. In recent years, only a few miles from that border town, rail traffic was halted due to an old wooden bridge that caught fire. Keep in mind that the water bodies

traversed by these bridges are part of the flowages connected to the Voyagers National Park, the only National Park in Minnesota. The continued risk to people in Ranier, International Falls, and the surrounding environment is unnecessary and preventable.

Until rail infrastructure is dramatically improved and the entire fleet of tank cars has been upgraded, transportation of oil should be prohibited via rail.

The reality of our dependence on petroleum products is undeniable. Until cleaner and equally dependable sources of energy become available, it will be industry's responsibility to move oil in the most efficient and safest way available. Until a safer method would become available please continue your consideration of pipelines as the best method of moving oil.

During transportation committee hearings and on the House floor, I referenced the fruitful cooperation between Enbridge and Carlton County officials in negotiating pipeline routs. I would encourage all parties to engage in a more mature conversation while seeking the most appropriate rout possible.

State Representative, Mike Sundin

Levi, Andrew (COMM)

From: Jessica Sundquist <queenbeeangel74@gmail.com>
Sent: Saturday, July 08, 2017 4:24 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge

Dear Ms. MacAlister,

We need jobs desperately. Enbridge will provide them with project. Replacement of line insures the safety of the environment because replacement is better than dangerousing spillage. My family supports this project.

Sincerely,

Jessica Sundquist
46 Birch Dr
Esko, MN 55733
queenbeeangel74@gmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Faith Suonvieri	218-476-2115	
ADDRESS		
203 E 2nd Ave		
CITY, STATE, ZIP		
Woodward, MN 55736		

COMMENTS

I support Line 3 Replacement Project.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

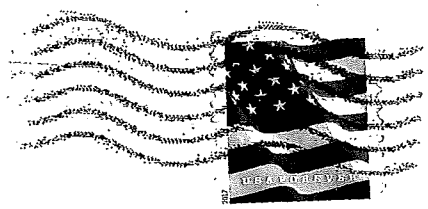

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

SWL&P
AN ALLETE COMPANY

Deborah Amberg
ALLETE Senior Vice President-Chief Strategy Officer
President SWL&P

July 7, 2017

Dockets CN-14-916 & PPL-15-137

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Dear Ms. MacAlister:

On behalf of ALLETE and Superior Water Light and Power (SWL&P), I am writing to encourage the timely acceptance of the Line 3 Replacement Project Environmental Impact Statement (EIS). The draft EIS thoughtfully includes all of the known and potential impacts of pipeline construction, operations and maintenance. The draft EIS also highlights the benefits of this important infrastructure replacement project including the careful consideration of the preferred route alternative and the economic benefits to our region.

For a project of this magnitude there is seldom a route without conflict, but I feel that Enbridge has diligently worked with local agencies, the public and landowners to the greatest extent possible and the resulting route is the best compromise of the competing interests. This route balances existing use, utilizes existing energy corridors and meets the needs of the shippers who will use this line to transport a product vital to our economy.

The Twin Ports of Duluth and Superior benefit dramatically by being the regional headquarters for company such as Enbridge. The multi-billion dollar investment needed to replace the existing Line 3 directly correlates to hundreds of highly qualified and well-compensated engineers, technicians and support personal working directly for Enbridge and many more who work for local engineering, consulting and construction companies in our community.

We urge the Department of Commerce to maintain the statutory deadline of 280 days and approve the Line 3 Replacement EIS without further delay.

Sincerely,

Deborah Amberg
ALLETE Senior Vice President-Chief Strategy Officer for Regulated Operations
President SWL&P

Kaia Svien, MS, 3632 13th Ave S. Minneapolis, MN 55407

Jamie MacAlister
Environmental Review Manager
MN Dept of Commerce
85 7th Place E. #280
St Paul, MN 55101-2198

June 21, 2017

Dear Environmental Review Manager, Re: CN -14-916; PPL-15-137

I am asking that the DEIS for Pipeline 3 undergo further study in response to the many notes of concern that were brought up over the evening of June 16 at the St Paul Public Meeting. I listened carefully to become better informed and am very impressed with the thorough analysis many well-informed speakers gave and the questions they raised on issues of effects on health, inadequate emergency response systems for rural areas if a leak occurs, negative effects on Native American culture and traditional diet, the prostitution and general danger for women and girls that we've seen accompany the arrival of pipeline builders in rural communities, awareness that this pipeline would carry the dirtiest oil known, and the addition to the mounting turmoil due to climate change already underway.

I also listened to the concern of pro-pipeline people for jobs. Of course, jobs for workers and their families are crucial. We need to be creative as a society in finding jobs for these people that do not provide needed income today by forfeiting environmental health for everyone's children and grandchildren

There are amongst us now people who are willing to open their eyes to the devastation that climate change is already bringing. These people are not happy to see that the environment is destabilizing, but they are willing to acknowledge what they perceive and speak to it. It is important to include in the big picture the awareness that these researchers are mostly not earning any pay for their time and concern. They are doing what they do out of a love for safeguarding the future for all of us.

Thank you for giving this matter your time and concern,

Kaia Svien

Kaia Svien, MS

RECEIVED
JUN 26 2017
MAILROOM

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Oliver (Skip) Swanson

Street Address: 16637 140 St NE

City: Thief River Falls State: Minn. Zip Code: 56701

Phone or Email: 218 686 0718 (cell) 218 6815648

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Environmental Protection is important - we all need clean water and clean air - Practicality is also important - having been in County government for 32 yrs - I can testify that Enbridge Pipeline has made every effort possible to be environmental friendly as well as treating the Public with respect. I'd like to see them receive the permits to proceed with the line 3 project

Thank you
Skip Swanson

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: John Swanson

Street Address: 1832 Greystone Street

City: Herman Town State: MN Zip Code: 55811

Phone or Email: johnswanson56@gmail.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

See attached

If including additional pages please number them and tell us how many you are providing: 3 *pages*

John Swanson Department of Commerce Public Meeting Remarks

I want to thank our supporters and Enbridge employees and contractors who are here to demonstrate the importance of this project to the health and well-being of Northern Minnesota and North America. It is also important to recognize and thank the employees and agents of Minnesota Department of Commerce and the collaborating agencies who have labored the past few weeks to hold these hearings and allow interested parties to have a voice and share their views.

This is not a new pipeline. We are replacing the current 1960s-era Line 3 with a new, modern pipeline.

- What's more, this is not a new corridor: From North Dakota to Clearbrook we co-locate with 98% of our existing right-of-way. From Clearbrook to Superior, we follow existing pipelines, high voltage transmission lines and railroad lines for approximately 75% of the route.
- We chose this route for several reasons:
    - The Leech Lake Band of Ojibwe have made their desires clear: the corridor across the reservation is too full. Accordingly, an alternative route was developed.
    - We believe the preferred route provides the best balance, avoiding sensitive resources and minimizing potential impacts to both people and environmental resources while also factoring in LLBO's sovereign authority.
- The existing corridor between Clearbrook and Superior has become congested, with pipelines, railroad, power lines and highway all closely located – and communities such as Bemidji, Cass Lake and Park Rapids have grown around the corridor the past 50 years. It simply makes little sense to construct another line in the current corridor.

Currently, fossil fuels provide about 80 percent of the primary energy supply we use every day for electricity, heating/cooling, cooking and transportation. Even with accelerated investment in renewable generation, it will take time and a huge investment to move solar and wind to major load centers. To fuel our society, there continues to be demand for oil, using it not only for transportation and heating, as well for the many products we have to make life better – from the clothes we wear to the food we grow to the houses and buildings we occupy, the medicines we take and the phones we use, it is, as we say, part of the fabric of our life.

We deeply regret the incident that occurred in Marshall, Michigan in 2010. We have apologized for not meeting the expectations of the public, communities, and our customers. But Marshall also made us a better company and a better industry. We increased investment heavily, enacting many fundamental changes in safety, reliability and emergency response. The revised organization reflects a strong focus to ensure the safety and awareness of our pipelines for our employees, our stakeholders and the general public.

I have personally been to the Kalamazoo River and witnessed the results of the cleanup and can truthfully say the river is better off than before. That, among the commitments to the integrity of the pipeline system we operate, makes me proud to be an Enbridge employee.

It is that same commitment to safety and Integrity that drives Enbridge to replace line 3. To safely operate the current line 3 would require thousands of Integrity digs as well as other operational safeguards in the next 10-15 years, requiring numerous disruptions to communities, landowners and other stakeholders. It simply makes more sense to replace it with a modern system and allow everyone to have peace of mind with regards to safe transportation of oil in northern Minnesota.

With regards to the Draft EIS document,

- We find it, although lengthy, to be a well-balanced document. We are pleased that the document recognizes that this is a replacement project and that leaving large sections in the ground is the least impactful method of deactivating the current line 3.
- I believe the economic benefits of the project are understated, and urge the DOC to evaluate studies undertaken by UMD and other Universities to fully comprehend the economic benefits of such a project.
- Reference to the proposed corridor as 'new is not correct as pipelines and power lines currently reside along most of the route.
- With regards to the statement of Sex trafficking, it, like many other illegal activities, is wrong. However to imply it is a symptom of one industry is a tragically wrong generalization. Our company, our contractors and the unions we use to build these systems strive to have a positive influence on the communities we enjoy, and our expectations are simple – we do not tolerate illegal behavior of any kind at any time. Any thinking to the contrary need not apply.

With regards to some of our opponents claims that these are temporary jobs – Enbridge's line 3 project is one of thousands of infrastructure projects – pipelines, power lines, highways, railroads, waterways, airports and ports, currently active today in the US. Infrastructure projects like these provide the basis for our modern society admired around the world. I, like many others in the room, have made a successful career out of these 'temporary' jobs, and look for generations to come to not only enjoy the benefits of these projects, but enjoy building them as I have.

Enbridge has been here for 65 years, fueling our quality of life in Minnesota, and we are proud to live here. Thank You for the opportunity to speak tonight.

Levi, Andrew (COMM)

From: Ryan Swanson <ryan@ulland.com>
Sent: Monday, July 10, 2017 11:08 AM
To: MacAlister, Jamie (COMM)
Cc: MN_COMM_Pipeline Comments
Subject: Emailing: 20170710110122441
Attachments: 20170710110122441.pdf

Please see attached letter from my mother regarding a proposed reroute of the Line 3 route Enbridge is proposing.

Let me know that you got this email.

Thank you!!

Ryan Swanson

Your message is ready to be sent with the following file or link attachments:

20170710110122441

Note: To protect against computer viruses, e-mail programs may prevent sending or receiving certain types of file attachments. Check your e-mail security settings to determine how attachments are handled.

July 10, 2017

Jamie Macalister
Environmental Review Manager
MN Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Dear Ms. Macalister,

I am writing to you with concern in hearing that a replacement pipeline route is planned so close to my home. Forty five years ago my husband-to-be took me down a beautiful wooded path and said "this is where we will build our new home". Little by little we cleared the trees and started building our home. It took a few years as we would complete things as we could pay for them.

We raised a family of three in this home surrounded by birch trees, deer, bear, chipmunks and birds. We had a wonderful view on our hill and wonderful memories. When it came time to retire, my husband enjoyed about nine months here and then he was diagnosed with a brain tumor at the age of 57 years. We lost him about seven months later. This is why I treasure our home and property in memory of all he did here and I don't want to lose it. I want his children and grandchildren to be able to enjoy this home and woods also.

This is the main reason I do not want this pipeline coming so close to my house. Another reason I am against the pipeline is that we have beautiful trails my brother-in-law built which we use for walking, four-wheeling, and snowmobiling. I have also been told of the danger of explosions and leaks in the pipelines that occur which is a danger to my home and family. The pipeline would be very close to my home (~225 feet from our front door). The value of my home would also decrease with a pipeline that close to it. I have read in the paper that once one pipeline is built on this new corridor that others will follow as the need increases, which those future pipeline runs would get closer to my home and eventually they may have to tear my house down.

I am not against pipelines, but this proposed line is way too close to my home. Please consider rerouting this proposed line to go around all the homes in my area. I have enclosed a map as attachment A that shows a very easy proposed reroute of this line that I ask you to please have Enbridge use if this pipeline gets approved.

Thank you for your time. I can be reached at 218-384-4490 if you have any questions.

Betty Swanson-Peterson
2211 CR 5
Carlton, MN 55718

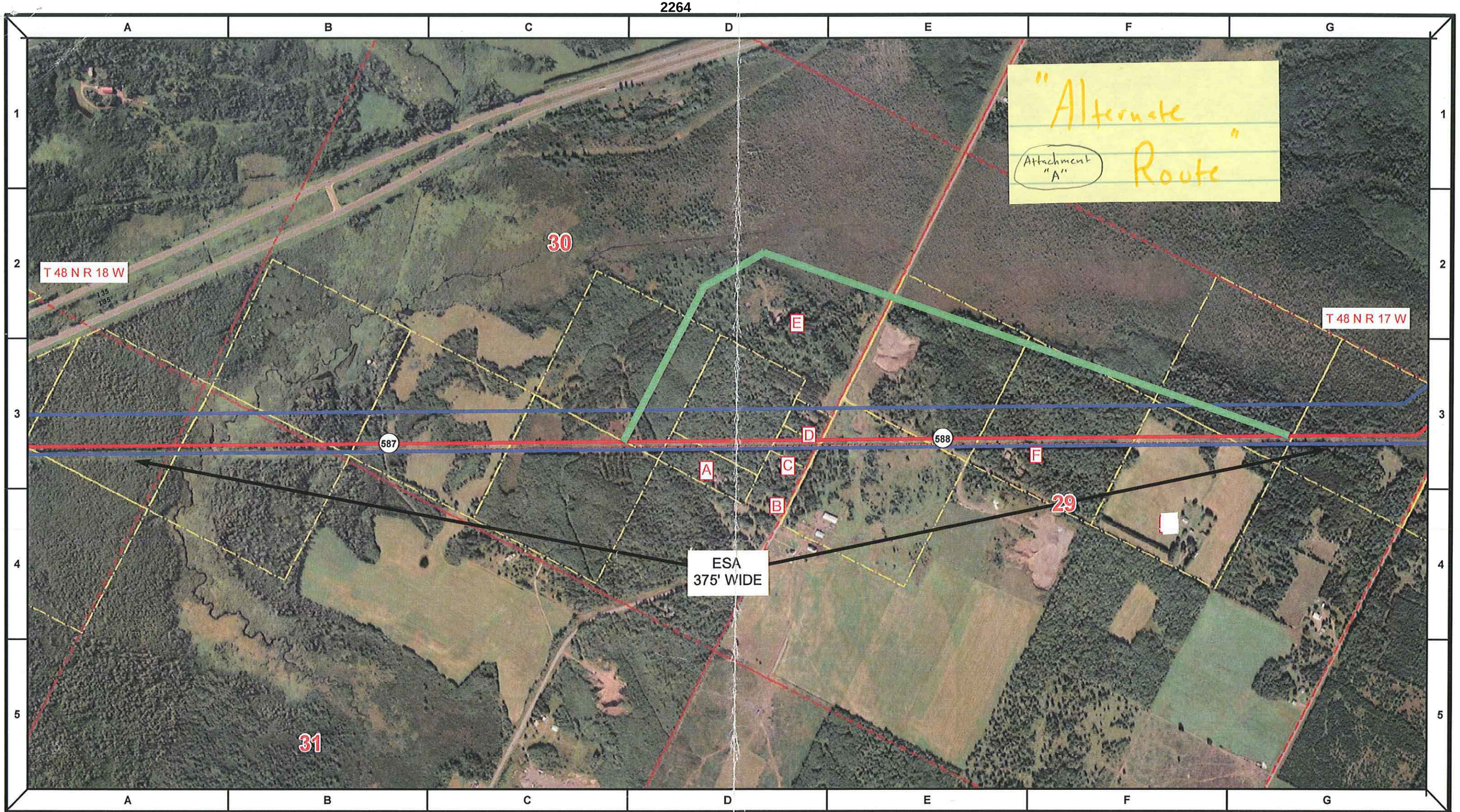

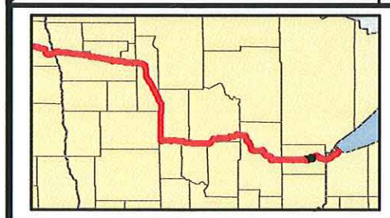

Proposed Pipeline - Line 3
Existing Enbridge Pipelines
Foreign Pipes
Transmission Lines
SPREAD BREAK

Milepost - Line 3
Potential Block Valve
Environmental Survey Area (ESA)

Tract Boundary
Facility Boundary
Previously Sited Facility Boundary
Section Lines

500 250 0 500 1,000 Feet

DRAWN	CHECKED	APPROVED	DATE	REV NO.	DESCRIPTION
MLB			1/29/14	2	PUC Update - Revision D-2 Alignment
MLB			12/19/13	1	PUC Update - Revision D Alignment
MLB			10/10/13	0	PUC Submittal

ENBRIDGE
NORTH DAKOTA PIPELINE COMPANY LLC

PROPOSED Line 3
PIPELINE PROJECT
ROUTE MAP
Carlton County, MN

DRAWN: MLB | CHECKED: --
DATE: Jan 30, 2014 | SCALE: AS SHOWN

Spread:8 | Map: 118 of 123

List of Landowners:

B) Susan Karp
2241 County Road 5
Carlton, Mn. 55718

C) Samuel Anderson
2231 County Road 5
Carlton, Mn. 55718

F) Joel and Debbie Reed
2237 Nendick Road
Carlton, Mn. 55718

D) Ron Peterson and Betty Swanson-Peterson
2211 County Road 5
Carlton, Mn. 55718

A) Brett and Rachel Peterson
2245 County Road 5
Carlton, Mn. 55718

E) Greg and Sherry Reed
2183 County Road 5
Carlton, Mn. 55718

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137-L,R

02 1P $ 000.34°
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Dennis Swenby	715-605-0236	
ADDRESS		
901 Rowley Rd.		
CITY, STATE, ZIP		
Downing WI 54734		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Maria S. Swenson

Street Address: 3311 Windy Hill Lane S.W.

City: Bemidji State: Minn. Zip Code: 56601

Phone or Email: 218-751-1803

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

Call me! If I can help—

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Raymond Swenson <swenseed@gvtel.com>
Sent: Friday, June 30, 2017 6:43 PM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I have lived at this same location since before the first pipeline was built across Northern Minnesota, which was close to 70 years ago. I read that the cleanest waters in the state are in Northwest Minnesota where these pipelines cross the state and that tells me that a lot of oil has been transported without any serious problems to the waters of this area. Small problems ... yes, but it has been my observation that the pipeline operators have good maintenance and safety practices and have been quick to respond to any incident. I am confident that this is the safest method for transporting oil thru our area (safer than Railroads and with less inconvenience to the towns and residents of NW Minnesota). I also understand that the pipelines contribute well to the region thru payment of taxes and employment opportunities.

Sincerely,

Ray Swenson
29667 State Highway 92 SE
Brooks, MN 56715
swenseed@gvtel.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Kerry Swenson	218-820-8550	Kjswenson60@Hotmail

ADDRESS
23179 County 80

CITY, STATE, ZIP
Nevis MN 56467

COMMENTS
This project is a no brainer! Do It!!
Replace before it needs fixing
Another item everyone Knows we need
it, just dont put it in their backyard
Enbridge is trying to be Proactive
rather than reactive to a line problem

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

MINNEAPOLIS MN 554
10 JUL 2017 PM 8 L

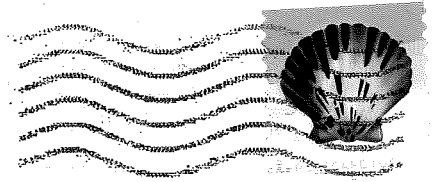

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Arlen R Syverson	218-694-6443	
ADDRESS		
202 Oak Ave. S.W.		
CITY, STATE, ZIP		
Bagley, MINN. 56621		

COMMENTS Better by Far To have a pipe Line in The back yard, Than an oil Train Within 1/4 Mile of The house. Arlen Syverson

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

SAINT PAUL MN 550
25 MAY 2017 PM 2 L

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Candace M. Syverson	218-694-2857	
ADDRESS		
37184 County 7		
CITY, STATE, ZIP		
Bagley MN 56621		

COMMENTS Environmentally there is no safer method to move crude or any other chemical than by pipe. We are a productive Nation Lets not go backward's. Lets be smart and move ahead, Now!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

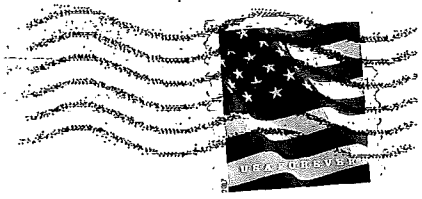

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Paul R. Syverson	218-694-2857	
ADDRESS		
37184 County 7		
CITY, STATE, ZIP		
Bagley MN 56621		

COMMENTS: Lets be smart - the safety of moving the product should be our number one concern. There is only one way the pipeline. Has any body come up with anything better??

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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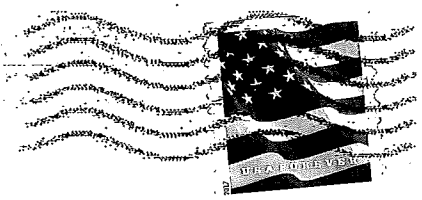

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Joseph Tahdooahnippah <jtec84@gmail.com>
Sent: Monday, July 10, 2017 6:43 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL15-137

To whom it may concern,

This is my comment toward the proposed line 3 route:

Please do not route this pipeline through Ojibwe treaty territories. Basic human respect and recognition of treaty rights and treaty land is long overdue for the indigenous tribes of Minnesota. It is time to take human responsibility and acknowledge the unsustainable nature of fossil fuel projects, as well as the inherit danger and monumental environmental risks that come with such energy projects. Why do the people, especially the indigenous groups of Minnesota, have to bear the risks of a fossil fuel energy project that they want no part of, and are actually actively opposed to such projects? When will these fossil fuel energy companies and corporations be forced to pay for the true cost of their development and operations?, We know that our environment and ecosystems will undoubtedly become victims of the economic externalities that come with such dirty energy projects, yet this aspect is rarely taken into account because many stakeholders are not able to see anything other than massive profit. As the fossil fuel industry continues to wreak havoc on the planet and the environment, I for one will no longer stand on the sidelines and silently witness this preventable destruction. Fossil fuel energy projects exacerbate the already serious global issue of climate change. I have a moral responsibility to future generations and most importantly, my own children, to do what is in my own power to ensure a brighter, cleaner, and more sustainable future for them. I have lived in Minnesota my entire life and I love this amazing, beautiful land and the lakes we have here. I love the wildlife, the green trees, and the clean air. I want a clean, sustainable future for the planet, but my best attempt to support a future such as this, is to start by opposing the enbridge line 3 project right here in my home state. I will continue to be against this pipeline, and will oppose it in all facets until I can rest assured that it will not be built.

Thanks for reading my comment,
Joe

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Beth Tamminen

Street Address: 502 Madison Ave.

City: Duluth State: MN Zip Code: 55811

Phone or Email: bethtamminen@yahoo.com

I spoke to ① in oral comments at FDLTCC hearing.

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

① The Social Cost of Carbon section is a welcome addition to the EIS. However, the calculation is based on a woefully short timeline. The current, older technology pipeline has lasted close to 60 years. That would be a minimum timeline for the EIS calculation. However, the science of climate change tells us that impacts will outlast the lifetime of the pipeline itself. The Duluth region, for example, is still paying for costs incurred due to the major flood of 2012. In addition, it needs to be clear that part of the cost of carbon for this project is the facilitation of expanding the extraction of tar sands oil - the dirtiest oil on earth, with the highest GHG emissions, and oil which is extracted by methods that are devastating large regions of fragile northern ecosystems.
This section of the EIS needs to be expanded.

② The long-term consequences of leaving abandoned pipelines in the ground under private and public lands need to be addressed. Does a corporation have the right to leave its detritus in the earth forever? This is not a precedent we wish to establish, for the interests of current and future citizens of our state and nation. A separate EIS may be needed.

③ Only 1% of the water on earth is fresh and available for human use. As this pipeline crosses major fresh water resources in northern Minnesota (some of the cleanest water in the nation) and lies in proximity to Lake Superior, it is critical that the value of that water without toxic contaminants be determined for the survival of human life and many other species on which we depend. It could be that there is no dollar price that can contain that.

If including additional pages please number them and tell us how many you are providing:_____ pages

0483

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Nicholas Tangen	612-730-3180	Tangen.Nick@gmail.com

ADDRESS
1024 evergreen Tr

CITY, STATE, ZIP
Linolakes MN 55014

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

USA FOREVER

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Fred Tanner	218-244-2261	fredstitanner@cam

ADDRESS: 25543 Cty Rd 10

CITY, STATE, ZIP: BOVEY MN 55709

COMMENTS: totally support Line 3 replacement.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Anthony Alden Isason	218780-7166	tonyt1986@outlook.com
ADDRESS: 114 MN AVE West		
CITY, STATE, ZIP: Gilbert Minnesota 55741		

COMMENTS I support it because it makes Jobs and supports the economy.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Valerie Tero		
ADDRESS		
CITY, STATE, ZIP Palmer, MN 55811		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
WILLIAM MARTIN TERRY	218-491-5770	u074200@gmail.com

ADDRESS
5792 MUNGER SHAW ROAD

CITY, STATE, ZIP
SAGINAW, MN 55779

COMMENTS

DECLARE THE EIS ADEQU[illegible] WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Casey Teschner		Caseyteschner@gmail.com

ADDRESS
366 Garfield ave.

CITY, STATE, ZIP
Duluth, MN 55807

COMMENTS
I support Line 3. I support Line 3 because I use plastic. I use transportation. I wear clothing. I use a cellphone. I eat groceries. I drink water pumped to my house. I support people heating their homes. I support modern day life. Anyone who doesn't support Line 3 but utilizes any of the above amenities is a hypocrite. They're also leftists.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Amy Eisenberg, Ph.D.
To: MN_COMM_Pipeline Comments
Subject: Honor Earth and Respect Life
Date: Thursday, June 01, 2017 2:24:41 PM

We support the Ojibwe in defending their wild rice beds, lakes and rivers:

While Native food sovereignty advocates are promoting wild rice and other indigenous foods overseas, they are also waging a battle to protect their land and water. The proposed Line 3 Pipeline would transport tar sands oil over 1,000 miles, from Hardisty, Alberta, to Superior, Wisconsin, cutting through the heart of Anishinaabe territory in Minnesota, and threatening precious lakes and wild rice beds.

On May 15, the State of Minnesota released its Draft Environmental Impact Statement (DEIS) for Enbridge's proposed new Line 3 pipeline—which directly threatens Minnesota, home to one-ffth of the world' s fresh surface water supply, according to Honor the Earth. The State of Minnesota will hold 22 public meetings in June 2017, all over Minnesota, to gather public comment on the DEIS. In theory, they will use the public comments to make improvements before issuing the Final EIS later this year.

Honor the Earth is a Native-led organization, established by Winona LaDuke and Indigo Girls Amy Ray and Emily Saliers, in 1993 to address the two primary needs of the Native environmental movement: the need to break the geographic and political isolation of Native communities and the need to increase fnancial resources for or ganizing and change.

"Our wild rice beds, lakes, and rivers are precious – and our regional fsheries generate $7.2 billion annually, and support 49,000 jobs. The tourism economy of northern Minnesota represents $ll.9 billion in gross sales (or 240,000 jobs)," writes LaDuke, who also founded the White Earth Land Recovery Project to preserve the land, the harvest, as well as language fuency , community development, and strengthening the Ojibwe spiritual and cultural heritage.

"The proposed route endangers three of the continent's major watersheds including the Great Lakes, home to one ffth of the world' s fresh water. It would also pierce the heart of Ojibwe treaty lands, where members of signatory bands retain the rights to hunt, fsh, gather , hold ceremony, and travel. It is our responsibility as water protectors to prevent this. We will not allow Line 3 to desecrate our lands, violate our treaty rights, or poison our water," LaDuke states.

The $7.5 billion Line 3 Pipeline is the largest project in Enbridge's history that would be one of the largest crude oil pipelines in the continent, carrying up to 915,000 barrels per day.

Preserve native lands and resources.
Respect Life and Livelihoods of First Nations People who are on the front lines of climate change.

Clean water and lake beds are healthy for the environment and human health.

Dr. Amy Eisenberg

Amy Eisenberg, Ph.D.
Licensed Researcher
The Hopi Tribe Cultural Preservation Office
11848 North Labyrinth Drive
Tucson, Arizona 85737
USA
907-843-0708
907-414-5934
dramyeis@yahoo.com
https://independent.academia.edu/AmyEisenbergPhD
https://www.facebook.com/amy.eisenberg.716
www.pbase.com/jamato8
http://www8.nau.edu/hcpo-p/

United We Stand with Standing Rock Defenders of the Sacred Source of Life

From: Amy Eisenberg, Ph.D.
To: MN_COMM_Pipeline Comments
Subject: TAKE RESPONSIBILITY AND CLEAN UP THE MESS
Date: Thursday, June 01, 2017 2:08:41 PM

STOP LINE 3

DO NOT ABANDON THIS.

RESPECT NATIVE HERITAGE AND KEEP OIL IN THE GROUND.

IMPEACH

Native Nations are on the frontlines of climate change. They live in a closely aligned reciprocal relationship with nature therefore their homeostasis is dependent upon clean water and land that sustains their lives and livelihoods.

NO TO THIS PIPELINE.

TAKE RESPONSIBILITY AND CLEAN UP THE MESS. INVEST IN PRESERVING MOTHER EARTH AND RENEWABLE ENERGY. OUR LIVES DEPEND ON THIS.

WISE USE OF NATURAL RESOURCES.

BE FORWARD THINKING. HONOR EARTH
RESPECT LIFE and LIFE SYSTEMS.

NATIVE LIVES MATTER.

LINE 3 is a catastrophe.

PRESERVE LIFE. PRESERVE MOTHER EARTH.

RENEWABLE ENERGY IS THE WAY FORWARD.

REGARD FUTURE GENERATIONS. THIS IS THE NATIVE AMERICAN WAY AND CONSERVATION ETHIC THAT IS BUILT INTO THEIR CULTURES.

Amy Eisenberg, Ph.D.
Licensed Researcher
The Hopi Tribe Cultural Preservation Office
11848 North Labyrinth Drive
Tucson, Arizona 85737
USA
907-843-0708
907-414-5934
dramyeis@yahoo.com
https://independent.academia.edu/AmyEisenbergPhD
https://www.facebook.com/amy.eisenberg.716
www.pbase.com/jamato8
http://www8.nau.edu/hcpo-p/

United We Stand with Standing Rock Defenders of the Sacred Source of Life

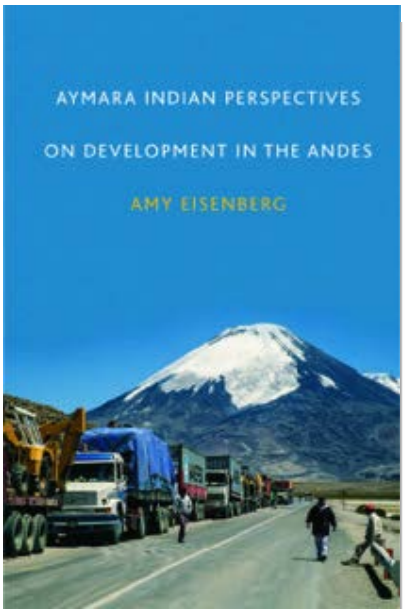

Begin forwarded message:

From: Winona LaDuke <info@honorearth.org>
Subject: ACTION ALERT: Comment on Draft EIS for Line 3 Pipeline
Date: May 30, 2017 at 7:16:02 PM PDT
To: Amy Eisenberg Ph.D. <dramyeis@yahoo.com>

Honor the Earth

ACTION ALERT: COMMENT ON DRAFT EIS FOR LINE 3

Amy --

The State of Minnesota recently released its Draft Environmental Impact Statement (DEIS) for Enbridge's proposed new Line 3 pipeline. This massive new tar sands pipeline threatens our territories and our survival as Anishinaabe people. It would poison our water and bring more climate chaos. And we don't need it - now is the time to move to clean energy, and create a future for those who come after us.

This 5000+ page document is an attempt to analyze the potential impacts of the project on Minnesota's environment, public health, tribal resources, climate, etc, and to compare Enbridge's proposed route to several alternatives. The MN Public Utilities Commission is supposed to use it to decide whether or not to grant Enbridge permits for the project.

Attend Public Meetings: The State of Minnesota will hold 22 public meetings all over the state, from June 6-22, to gather public comment on the DEIS. In theory, they will use the public comments to make improvements before issuing the Final EIS later this year. Click here for the detailed schedule with times and venue addresses, etc.

Send Written Comments: You can also submit written comments on the DEIS. The deadline is July 10, 2017. Make sure to include the docket numbers (CN-14-916 and PPL-15-137) on all comments. You can submit them 3 ways: email to Pipeline.Comments@state.mn.us, fax to 651-539-0109, or mail to: Jamie MacAlister, Environmental Review Manager Minnesota Department of Commerce, 85 7th Place East, Suite 280 St. Paul, MN 55101-2198.

For more background information, guidelines on how to write powerful, strategic

comments, and suggested talking points based on our initial read of the document, please click here.

winona_epic_scolding_shot.jpeg

This Draft EIS is the result of years of battle in the regulatory arena between Enbridge, the MN state agencies, and grassroots groups working to protect the water - battles that began with the Sandpiper pipeline in 2013. The State of MN tried its best to avoid doing an EIS for this project at all, but a grassroots-funded lawsuit by Friends of the Headwaters overturned that decision. In 2015, the MN Court of Appeals revoked the permit for the Sandpiper and ruled that the MN Public Utilities Commission was required by law to start over and prepare an EIS. In August 2016, Enbridge announced its plans to cancel the Sandpiper project, and invested in DAPL instead. We followed them to Standing Rock and fought on the frontlines. Now we have turned our focus back to the Great Lakes, where Line 3 threatens to destroy us.

We will not let that happen. We are water protectors, and we are everywhere. This Draft EIS for Line 3 shows how far we have come, and also how far we have yet to go. Please, add your voice by attending a meeting or submitting written comments. For the most thorough and updated information on our campaign to defeat Line 3, and ways to take action, please visit www.stopline3.org, and follow the Stop Line 3 facebook page. As always, we invite you to support our work with a donation or, better yet, a commitment to stand with us each month, even if it's just a few dollars.

It's spring in the north, and our resistance is blooming. Please stand with us.

Miigwech,

winonas_signature.jpg

Winona LaDuke

http://www.honorearth.org/

MAKE A DONATION TODAY!

BECOME A SUSTAINING MEMBER!

VOLUNTEER TODAY!

Paid for by Honor the Earth

Honor the Earth · United States
This email was sent to dramyeis@yahoo.com. To stop receiving emails, click here.
You can also keep up on Facebook.

Created by Mosaic Strategies Group • Built with NationBuilder.

From:	Amy Eisenberg, Ph.D.
To:	MN_COMM_Pipeline Comments
Subject:	Fwd: ACTION ALERT: Comment on Draft EIS for Line 3 Pipeline https://www.democracynow.org/2017/5/31/private_mercenary_firm_tigerswan_compares_anti
Date:	Wednesday, May 31, 2017 5:30:30 PM
Attachments:	Standing Rock.zip

IMPEACH the President who is corrupt and devalues Native American sacred lands and our National Monuments. He has conflicts of interest with these pipelines.

Native American peoples are in a reciprocal relationship with their resources therefore this must be acknowledged. The deforestation in Minnesota is second in the nation and the impacts to water are immense.

Water not oil. Leave it in the ground.

Renewable energy is the way to proceed sustainably using our natural and cultural resources wisely and judiciously. Listen to the First Nations who are directly dependent on these resources and who are experts on the impacts. They notice the detrimental changes first hand because of their knowledgeable familiarity with the resources. They are the expert observers who live sustainably and in harmony with Mother Earth who gives us everything and sustains all life.

We must go forward in a positive direction considering future generations. First Nations will lead us in this struggle to preserve the very resources that sustain us all. First Nations are on the frontlines of climate change and these people suffer and commit suicide because they cannot sustain their agricultural livelihoods and families without water. This is a reality that we must face yet the foolish and misguided Chump Administration is relaxing regulations such as permitting poisonous toxic pesticides that cause neurological damage and spoil the soil ecosystems.

Renewable sources of energy are viable and the way forward. We are forward thinking. This administration is not forward thinking but considers immediate and unsustainable gain for the one percent and large corporations. Chump is the enemy of Mother Earth and First Nations. We will not tolerate this.

He violated NEPA EIS process at Standing Rock. We will not allow this to happen here. This process is lawful and set down during the Nixon administration.

IMPEACH. Save our natural and cultural heritage resources and life-sustaining Mother Earth. This is serious. Corruption and abuse of natural and cultural resources will not be tolerated. This is
disgraceful: https://www.democracynow.org/2017/5/31/private_mercenary_firm_tigerswan_compares_anti

No to corruption. No to desecration of Native American sacred sites and heritage resources.

Dr. Amy Eisenberg

Amy Eisenberg, Ph.D.

Licensed Researcher
The Hopi Tribe Cultural Preservation Office
11848 North Labyrinth Drive
Tucson, Arizona 85737
USA
907-843-0708
907-414-5934
dramyeis@yahoo.com
https://independent.academia.edu/AmyEisenbergPhD
https://www.facebook.com/amy.eisenberg.716
www.pbase.com/jamato8
http://www8.nau.edu/hcpo-p/

United We Stand with Standing Rock Defenders of the Sacred Source of Life

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Date: May 30, 2017 at 7:16:02 PM PDT
To: Amy Eisenberg Ph.D. <dramyeis@yahoo.com>

Pipeline.Comments@state.mn.us

KEEP IT IN THE GROUND
DEFEND + PROTECT + RENEW
INDIGENOUS ENVIRONMENTAL NETWORK

ienearth.org ~ indigenousrising.org
Water is Life
Protect the Sacred

PIPELINE INCIDENTS SINCE 1986

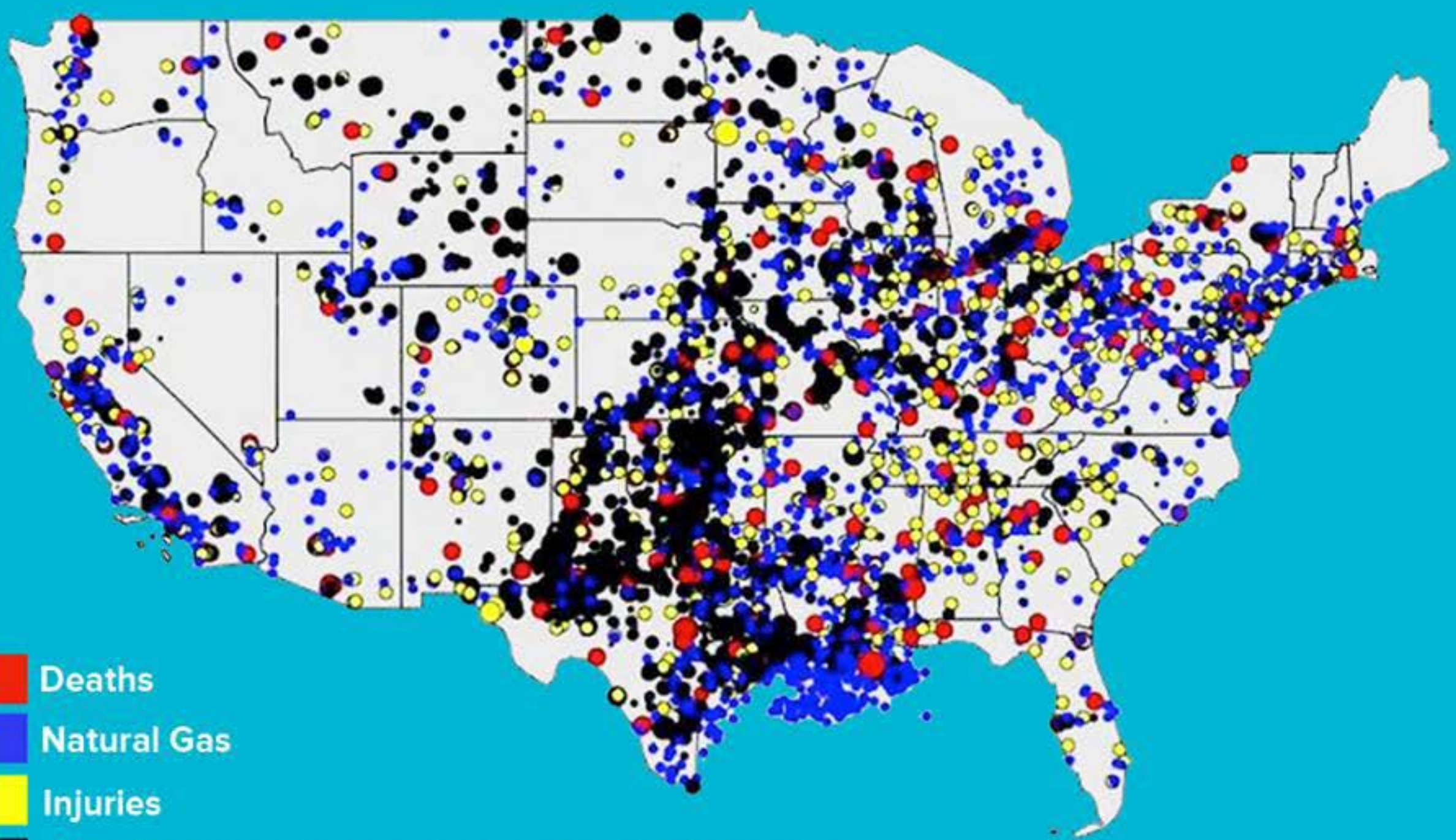

- Deaths
- Natural Gas
- Injuries
- Hazardous liquids (mostly oil), scaled by spill size

$6,838,019,931
PROPERTY DAMAGE

7978
INCIDENTS

2360
INJURIES

512
FATALITIES

"AS NATIVE PEOPLES, WE HAVE BEEN KNOCKED DOWN AGAIN, BUT WE WILL GET BACK UP, WE WILL RISE ABOVE THE GREED AND CORRUPTION THAT HAS PLAGUED OUR PEOPLES SINCE FIRST CONTACT. WE CALL ON THE NATIVE NATIONS OF THE UNITED STATES TO STAND TOGETHER, UNITE AND FIGHT BACK."

- DAVID ARCHAMBAULT II

STANDING ROCK SIOUX TRIBAL COUNCIAL CHAIR

STANDING ROCK SIOUX TRIBE

JULY 1873

WE ARE HERE TO
PROTECT
WATER
IS LIFE
WATER
PROTECT

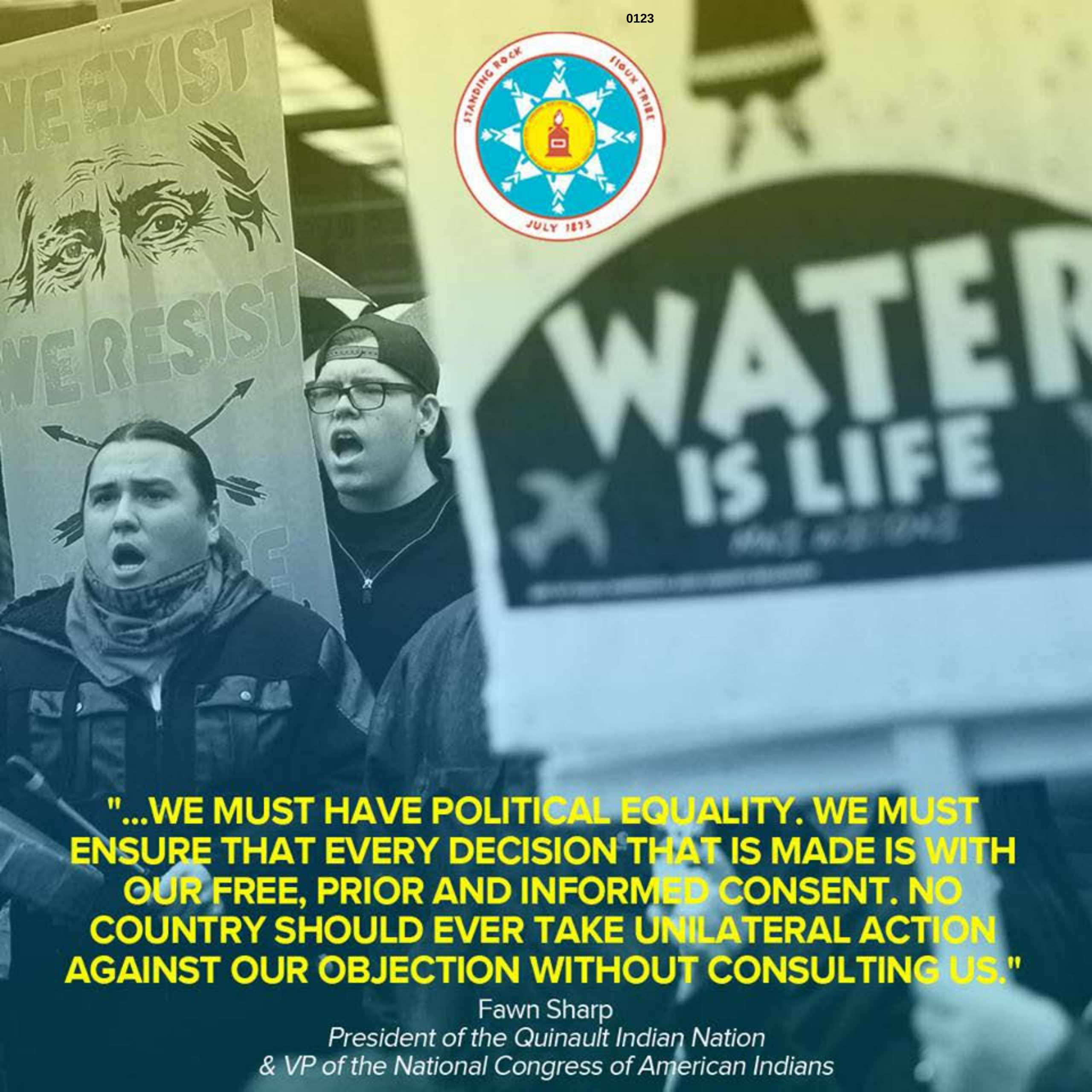

"...WE MUST HAVE POLITICAL EQUALITY. WE MUST ENSURE THAT EVERY DECISION THAT IS MADE IS WITH OUR FREE, PRIOR AND INFORMED CONSENT. NO COUNTRY SHOULD EVER TAKE UNILATERAL ACTION AGAINST OUR OBJECTION WITHOUT CONSULTING US."

Fawn Sharp
President of the Quinault Indian Nation
& VP of the National Congress of American Indians

"ONCE AGAIN THE FEDERAL GOVERNMENT IS PUTTING OIL INDUSTRY PROFITS AHEAD OF THE RIGHTS OF NATIVE AMERICAN COMMUNITIES, CLEAN WATER AND COMBATTING CLIMATE CHANGE. WE MUST STOP THIS PIPELINE, UPHOLD OUR COMMITMENT TO NATIVE AMERICANS AND PROTECT OUR PLANET FOR FUTURE GENERATIONS".

- SENATOR BERNIE SANDERS

BURY MY HEART AT OCETI SAKOWIN

"TRUMP AND HIS FRIENDS AT BIG OIL HAVE NOT WON. TODAY'S RULING DOES NOT HURT THE STRENGTH OF OUR LEGAL ARGUMENTS CHALLENGING THE ILLEGAL EASEMENT APPROVED BY THE TRUMP ADMINISTRATION."
- CHAIRMAN DAVE ARCHAMBAULT II

DEFEND
THE
SACRED

NO TANKERS
NO PIPELINES
NO ENBRIDGE
NO PROBLEM
NOT OIL
STANDING ROCK
SIOUX TRIBE
JULY 1873
I STAND WITH STANDING ROCK

INDIGENOUS PEOPLES
EXIST RESIST RISE!

STANDING ROCK
SIOUX TRIBE
JULY 1873
"NO MATTER WHAT THEY EVER DO TO US, WE MUST ALWAYS ACT FOR THE LOVE OF *OUR PEOPLE* AND THE EARTH. WE MUST NOT REACT OUT OF HATRED AGAINST THOSE WHO HAVE NO SENSE."
-John Trudell
Actor, Poet & Political Activist

12,000,000

PEOPLE ENGAGED ONLINE EVERY MONTH

590,000

PETITION SIGNATURES + EIS COMMENTS SUBMITTED

15,000

CALLS MADE TO THE WHITE HOUSE + ARMY CORPS

7,000

PEOPLE MOVED TO CAMP IN 2016

....AND TRUMP SAYS *NOBODY* SPOKE UP

RECOGNIZE INDIGENOUS PEOPLES RIGHTS
WE RESIST
WE RISE
Mni Wiconi
NoDA

Joe Brusky/flickr

Reminder that DAPL was re-routed through Standing Rock because Bismarck's residents feared it could poison their drinking water.

The Sioux are literally being forced at gunpoint to accept ecological risks that North Dakota's white residents refused.

Samburu
Stands with
Standing Rock
#NoDAPL

"It is time we stand up and demand and our rights and considerations be treated with the respect and deference afforded any other sovereign. We are on the cusp of real change. You stood with Standing Rock and now I ask you to stand with our Indigenous communities around the globe. Together, we rise."
INDIGENOUSRISING
Indigenous Environmental Network
NATIVE ORGANIZERS ALLIANCE

From: Cathy TImmerman
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137
Date: Friday, June 02, 2017 9:40:04 AM

Dear Ms. MacAlister,

I support the replacement project. There has been enough delay.

Sincerely,

Cathy TImmerman
2514 6th Ave E
Hibbing, MN 55746
cathy@plan-itonline.com

Levi, Andrew (COMM)

From: PatnJess Tobin <jess.ahgduluth@outlook.com>
Sent: Monday, July 10, 2017 10:13 AM
To: MN_COMM_Pipeline Comments
Subject: Pipeline comments for Line 3 draft EIS

Hello,

I'm writing to express my support for the draft EIS for Enbridge's Line 3 project. This project has my full support and I know Enbridge's commitment to safety. My husband and I were at the Bemidji meeting, and he spoke, but I'm emailing my comments.

This is energy everyone uses, no matter how much people speak about using less energy, or using other forms of energy (solar, wind, etc.). The reality is we all use oil and oil products and we will be for decades in the future. I know many people spoke about other energy forms at the Bemidji meeting. I would encourage them to become engineers and work on that technology to help be part of the solution.

Replacing Line 3 makes sense for safety. Nothing lasts forever, and Line 3 needs to be replaced. If people care about pipelines leaking, they should be excited about this replacement, not protesting it.

Thank you for all of your hard work. We appreciated your professionalism and hard work.

Jessica Tobin
218-390-9562

Levi, Andrew (COMM)

From: Kari Tomperi <ktomperi@wcta.net>
Sent: Sunday, July 09, 2017 8:13 PM
To: MN_COMM_Pipeline Comments
Subject: Effective and full review of such a large EIS document is being limited by such a short review timeline...

I am thankful that Line #3 “Replacement” EIS process has begun. However, I am concerned about the source of the data when mostly supplied by Enbridge. Definitely a conflict of interest as I see it. I am concerned there is not enough review time for all involved to make an educated decision or if needed, time to request more information if some appears to be lacking. I am very concerned about the claim that this is a replacement pipeline when it clearly follows a new and clearly never before used energy corridor for pipelines. I am concerned about the width of the installation of the pipeline and disappointed the EIS focuses on width after installation and not during. Clearly there are wide swathes of land affected by implementation and even whole watersheds affected by installation when placed through rivers, lakes and wetlands. I have seen how bitmous can seal a retention pond, it rendered it useless. The contents of this new pipeline are dangerous chemicals.

I am concerned we are giving a foreign country access to cross our precious water rich vulnerable sands for profit. I believe we have enough pipelines and DO NOT need more. We should maintain and take care of the ones already in existence. Like where line 3 already exists. To abandon and build new should not be an option. If it is that in need of repair it should be rebuilt to higher safety standards where it lies. No new pipelines We should be transferring to safer more sustainable renewable energy sources and saving the oil for as long as we can for the serious uses it does have.

Virus-free. www.avast.com

Levi, Andrew (COMM)

From: Susan Tomte <stomte@gmail.com>
Sent: Thursday, July 06, 2017 11:34 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

Environmental stewardship is important in Minnesota. Pipelines have safely co-existed with our natural resource for many years. The safety practices and attention to detail that the pipeline companies have regarding natural resources is evident, especially in the reports showing that the Mississippi River Watershed has some of the cleanest waters in the state of MN.
Replacing the aging infrastructure is an important part of the process to deliver needed oil resources to end consumers. Pipelines are the most reliable, energy neutral, safest delivery system available in the near-term and must be monitored and maintained. Using existing pipeline & transmission line routes for the Line 3 Replacement has the least impact on the environment and population.
The regulatory process must be followed and not delayed. Please maintain the schedule and release the Final EIS on time, so that the process can move forward.

Sincerely,

Susan Tomte
214 Main Ave N
Park Rapids, MN 56470
stomte@gmail.com

Line 3 Replacement Project DEIS

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- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

02 1P $ 000.34
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Wayne Torgerson	218-766-8110	
ADDRESS		
160 Robert st. NE.		
CITY, STATE, ZIP		
Clearbrook Mn. 56634		

COMMENTS
I am very much in favor of this line

DECLARE THE EIS ADEQUATE WITHIN 28[illegible] DAYS

Levi, Andrew (COMM)

From: John Tornes <jbtornes@hotmail.com>
Sent: Thursday, June 29, 2017 7:03 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

docket numbers CN-14-916 and PPL-15-137 My wife and I fully support the replacement pipeline. We live within 1/4 mile of the pipeline, have never had an issue with it and believe it is the safest way to transport energy. We are also close to the railroad and highway 2. Rail and truck are the most dangerous way to transport energy. The jobs created would also help local and state economies. The DEIS has been well-prepared and that the regulatory timeline should continue on schedule.

Sincerely,

John Tornes
48706 US Highway 2
Deer River, MN 56636
jbtornes@hotmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Gary Y Towne	218-879-8649	GTowne1356@AOL
ADDRESS 300 Jackson Ave		
CITY, STATE, ZIP Cloquet MN 55720		

COMMENTS We need the pipeline

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

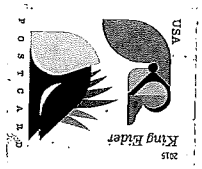

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME: Linda Towne

PHONE NUMBER: 218 391 5983

EMAIL: whatsupdoc99@aol.com

ADDRESS: 300 Jackson Ave

CITY, STATE, ZIP: Cloquet MN 55720

COMMENTS: Its safe and I agree this should go through!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

From: Julia Travers
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline comment
Date: Wednesday, May 31, 2017 8:06:31 AM

Helo,

I oppose Enbridge's proposed new Line 3 pipeline.This pipeline would threaten our Anishinaabe territories. It would endanger our water and climate. We don't need it -- we need clean energy.

Thank you,

Julia A. Travers

Levi, Andrew (COMM)

From: Greg Trettin <greg.trettin@enbridge.com>
Sent: Tuesday, June 13, 2017 8:33 AM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I am a lifelong resident of the Twin Ports and have worked for Enbridge as either a contractor or employee for the past 10 years. I love this area which is why I chose to stay for college, as well as, to pursue my career and start my family here. Like a lot of people in the area I often take for granted the abundance of natural resources we have. Every day I get the chance to drive by the largest body of fresh water in the world and often don't think twice about it. I do realize though, how blessed we are and as much as anyone, would like my children and future grandchildren to be able to enjoy all that living here has to offer. That's why it pains me to hear when pipeline opponents (many of whom don't live in the area) say that Enbridge is a greedy foreign corporation that doesn't care about our environment. For decades, Enbridge has had several active pipelines running through pristine areas of the state where beautiful forests, rivers and lakes are found. Even with all of the active pipelines and a tank farm in Superior, WI, I hadn't heard of Enbridge until I started working for them, despite having lived here my entire life. I believe this goes to show how well pipelines and the environment can coexist together.

When I began looking for a job after finishing school I kept getting the same response after interviewing. Everyone was looking for more experienced workers. Instead of following in the footsteps of quite a few of my friends and moving to the Twin Cities or to Madison I chose to stay and continue looking around the area. Almost a year after school had finished I was able to land a job as a contractor at Enbridge. Enbridge is one of the biggest employers in the Twin Ports and one that helps the area keep their skilled workforce around, whether they are young or old. Enbridge's pay to employees is also second to none in an area with many low pay low skilled jobs. While job creation alone doesn't warrant complete replacement of line 3, it is a huge added benefit. The real reason to replace line 3 is because I believe it is the right thing to do to protect our natural resources. The current line 3 is an aging pipeline that requires a lot of maintenance and upkeep in an area of great environmental significance. The pipeline industry has made several technological advances since the original line was built so why not have these incorporated in a new pipeline instead of using the old outdated line, all while creating new highly skilled jobs?

I can agree with pipeline opponents that we need to move away from fossil fuels and make a shift towards renewables. Unfortunately, technology is not at that point yet. Our society still relies heavily on oil and without it our living standards would take a huge step backwards, more than most people realize. We all know that due to demand oil is going to get to market one way or another. Right now the most environmentally friendly way to get that oil to market is via pipeline. To move the amount of oil needed to run our society safely via rail or truck is just not feasible. According to PHMSA, pipelines are the safest way to get oil to market. Moving oil by pipeline is also more cost effective, a savings that is in part passed on to the customer. Replacing line 3 is the responsible thing for Enbridge and state legislators to do. The people of Minnesota deserve it.

Sincerely,

Greg Trettin
2107 E 7th St
Superior, WI 54880
greg.trettin@enbridge.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Karl Elvin Trimble	218-556-1478	
ADDRESS		
9701 Trimble Ct. N.E.		
CITY, STATE, ZIP		
Tenstrike, MN 56683		

COMMENTS

The pipeline is the safest & most efficient way to transport products. The Jobs are certainly needed in the area

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Kevin F. Trimble	218-368-6216	

ADDRESS
9758 Trimble Ct. NE.

CITY, STATE, ZIP
Tenstrike, Mn 56683

COMMENTS
I fully support the pipeline
We need the work to support
the system

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: jennifer trotter
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137
Date: Tuesday, May 16, 2017 3:50:25 PM

Comment submitted for

CN-14-916 and PPL-15-137

I believe no good can come from this! The destruction of our Country's natural resources for the profit of the elite is unacceptable! Fossil fuels are old technology! Why would a country invest in its own destruction when there is so much that can be made threw renewable energy sources. The citizens of this country deserve the best, newest technology available! Please don’t allow this corporation to fart its solution at us

Levi, Andrew (COMM)

From: jennifer trotter via YouTube <noreply@youtube.com>
Sent: Sunday, July 09, 2017 10:25 PM
To: MN_COMM_Pipeline Comments
Subject: jennifer trotter sent you a video: "Standing Rock Oct. 27th"

jennifer trotter has shared a video with you on YouTube

Standing Rock Oct. 27th

by Mike Fasig

The Lakota Nation, joined by their allies from all over the world, stood up to militarized police and DAPL mercenaries on the Standing Rock Reservation and treaty territory, to protect one of our country's largest fresh water supplies, the Missouri river, from the eventual contamination from the Dakota Access Pipeline. This video details footage of the events of October 27th, wherein numerous events unfolded; the 134 Bridge Action, the exchange between an armed DAPL mercenary; and the raid of North Camp, one of the subcamps of the No DAPL encampments, which also included Sacred Stone Camp, Oceti Sakowin Camp, and Rosebud Camp.

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Levi, Andrew (COMM)

From: Bill And Sandy <wmsandy@comcast.net>
Sent: Monday, July 10, 2017 12:18 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-196 / PPL-15-137

Re: DEIS for proposed Line 3 Enbridge oil pipeline.

I am writing to tell you to deny the permit for a new Line 3 and require Enbridge to clean up the old one. There is currently a glut of oil on the market. We do NOT want or need Canadian oil to be piped across our beautiful northern Minnesota land. I understand that the DEIS fails to discuss the profound ecological and cultural violence taking place at the point of extraction in the Alberta tar sands. The impact to Minnesota's environment with the inevitable spillage and leakage is horrifying to imagine. And I have read that the international standard of obtaining the Free, Prior, and Informed Consent of impacted tribal communities, as outlined in the U.N. Declaration on the Rights of Indigenous People, has not been met. Spills would violate treaties with the Ojibwe tribes that protect critical resources and the right to hunt, fish, and gather on ceded territories.

Consequently, this pipeline should NOT be built and Enbridge should be forced to clean up the existing line 3.

Sandra Trudeau
410 62nd St
Lino Lakes, MN 56014

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Luke Thomas Trust	218 360 9062	

ADDRESS
PO Box 2787

CITY, STATE, ZIP
Walker MN 56793

COMMENTS
I support it

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Janine Trutna <jtrutna@inkbig.com>
Sent: Friday, June 23, 2017 5:53 AM
To: MN_COMM_Pipeline Comments
Subject: Pipeline 3

Dear Review Manager MacAilster:
I am writing with concern over about the possibility of Line 3 being built, the docket numbers CN-14-916 and PPL-15-137. Concern for the world's environment and even more for Minnesota inspires me to write. Pipelines are divisive. More and more people are seeing them for what they are - a real threat to the area in which they cross - and ultimately supporting global warming by providing structure to burn fossil fuels. I am often proud of the state of Minnesota and the positions we take. I have become a more active citizen because I feel it's important to be part of the decision making. I strongly urge you to not support the new pipeline. The old one already shows us there are always leaks. And the route of the new one goes right through the heart of many beautiful areas and Indian land. I will strongly protest any support for it. Thank you for your service and consideration. Janine Trutna, St. Paul MN

JANINE TRUTNA
Marketing Director
www.inkbig.com
651.688.8070

Levi, Andrew (COMM)

From: tuckerb317 <tuckerb317@gmail.com>
Sent: Monday, July 10, 2017 3:09 PM
To: MN_COMM_Pipeline Comments
Subject: Comment Regarding docket numbers CN-14-916 and PPL-15-137

Below please find my public comment regarding docket numbers CN-14-916 and PPL-15-137

The Minnesota Public Utilities Commission website states that "[t]he Commission's mission is to protect and promote the public's interest in safe, adequate and reliable utility services at fair, reasonable rates." https://mn.gov/puc/about-us/ (accessed June 25, 2017). It further describes that "[o]ne of the key functions of the commission in performing this mission is to balance the private and public interests affected in each docket, and to make decisions that appropriately balance these interests in a manner that is 'consistent with the public interest.'" *Id.* The costs of the Line 3 pipeline in any of its proposed configurations greatly outweigh the benefits to Minnesota's citizens, natural resources, and to tourists like me, who come to the area precisely because of its unique and unspoiled environment. Indeed, the people of Minnesota benefit from this project no more or less than the people of any other state and would benefit equally from a pipeline running south along the state's western border to the Joliet, Illinois station. The Line 3 pipeline in any of its proposed configurations requires Minnesotans to bear economic, environmental, and cultural costs and risks vastly disproportionate to any benefit that they might receive. Even without considering the potential for a catastrophic oil spill, this project is not in the public interest.

As "A Guide to the Line 3 Project Public Meetings for the Draft Environmental Impact Statement EIS" clarifies, the PUC "first considers the underlying economic need for the proposed pipeline." *See* p. 7. There is little to no economic need to the state for constructing Line 3. Specifically, Line 3 does not meet the requirements of section C of the Minnesota Administrative Rules Part 7853.0130. When considering the four sub-categories of section C, the consequences to society of granting the certificate of need are not more favorable than the consequences of denying the certificate. Line 3 is not necessary to meet the overall energy needs of the state, and the pipeline is not inducing future long-term development, particularly not future economic development. When comparing "[t]he effect of the proposed facility . . . upon the natural and socioeconomic environments [ ] to the effect of not building the facility," it is clear that the result weighs in favor of denying the Certificate of Need. Minn. Admin. R. Pt. 7853.0130(C)(2). The project will have significant adverse impacts on the natural environment and, potentially, on the socioeconomic environment, particularly in the event of a leak or spill. The DEIS further indicates that there is no benefit to the socioeconomic environment: "[O]peration of the pipeline would have no measureable impact on local employment, per capita household income, median household income, or unemployment in the [study area]." DEIS Section 5.3.4.3.1. Additionally, the final sub-category of section C is also unmet. Line 3 presents no "uses to protect or enhance environmental quality." *Id.* at 7853.0130(C)(4). And, in fact, the project has a high potential of for degrading environmental quality. (The not-yet-fully-operational Dakota Access Pipeline's April 2017 spill contaminating a stream comes to mind. *See* https://www.theguardian.com/us-news/2017/may/10/dakota-access-pipeline-first-oil-leak). For these reasons alone, the Certificate of Need must be denied.

In addition to the project's not fulfilling the requirements set forth in section C of the Minnesota Administrative Rules Part 7853.0130, the DEIS itself is deficient. It makes broad statements about potential impacts rather than addressing actual impacts of the pipeline's construction and operation. The DEIS acknowledges, for example, that "unavoidable impacts on wetlands may require compensatory mitigation," *see* DEIS Section 5.2.1.3.3, but continues, stating that "site-specific compensatory wetland mitigation has yet to be

identified." *Id.* With these statements, the DEIS acknowledges that wetlands would be irreparably destroyed by construction and normal operation of the pipeline, but does not identify where such wetlands would be lost or the size of the wetland destruction. It could be that wetlands are irreparably destroyed in any number of areas, including in the federal-and state-identified conservation and protected areas, critical habitats, and endangered plant locations. (In Minnesota, there are 22,721.8 acres of wildlife conservation lands within the 0.5 mile radius of Enbridge's preferred route. *See* Table 5.2.4-3.) It is completely unclear from the DEIS the extent to which compensatory wetland mitigation would be required in any location, let alone on lands designated as protected. As there are areas along the proposed routes that contain highly sensitive ecologies, it is important for the PUC to be able to consider whether such locations will be destroyed by the project. This information is critical to the decision-making process and must be included in the EIS.

As another example, the DEIS states on three occasions:

If rare species are located in disturbed areas of projects constructed in close proximity to one another, the cumulative potential effects could be detrimental to individual rare communities. Field surveys would be required, however, to confirm the presence of rare species in the respective project rights-of-way prior to construction. If species are found, the permittee would be required to coordinate with the U.S. Fish and Wildlife Service (USFWS) or Minnesota Department of Natural Resources (Minnesota DNR) regarding avoidance or mitigation.

DEIS Sections 12.3.1.4.5, 12.3.1.5.4, & 12.4.3.3.4.

Again, the DEIS completely avoids carrying out its purpose – to provide information on and address the environmental impacts of the project alternatives. Without examining where and to what extent rare species might be impacted along the proposed routes, the information in the DEIS does not apprise the PUC of the actual impacts of the project alternatives. The PUC cannot make an informed decision without having specific information regarding impacts. Again, the EIS must include such information for each of the proposed project alternatives.

The DEIS further evaluates the impacts on the sensitive aquatic resources in the project area. It states that construction impacts are not anticipated or are "expected to be short term and negligible to minor." DEIS Section 5.2.4.3.1. This section also addresses impacts during normal operation. It states that "habitat fragmentation during operation of the Applicant's preferred route would cause permanent minor to major impacts on wildlife, depending on the location and species," but again does not identify the affected locations, species, and whether the impacts are minor or major. *Id.* The DEIS also does not examine the impacts along each of the various proposed route alternatives, nor does it define what "minor" and "major" mean in the context of impacts on wildlife. This is yet another example of the DEIS's failure to examine or explain in any meaningful way the environmental impacts of the project alternatives.

For all these reasons, the PUC must conclude that the potential costs and risks of this proposed project either outweigh the negligible potential benefits or are this point still unknown. Either way, this project is not in the public interest.

Thank you,

Danielle Tucker

Levi, Andrew (COMM)

From: Cathy Velasquez Eberhart at CARS Twin Cities <saferailstwincities@gmail.com>
Sent: Monday, July 10, 2017 10:25 PM
To: MN_COMM_Pipeline Comments
Subject: Comments on Draft EIS for Enbridge Line 3 - docket numbers CN-14-916 and PPL-15-137

In response to the draft Environmental Impact Statement (EIS) for Enbridge Energy's proposed Line 3 tar sands oil pipeline (docket numbers CN-14-916 and PPL-15-137), the Twin Cities Chapter of Citizens Acting for Rail Safety respectively submits the following comments.

Citizens Acting for Rail Safety is a non-partisan, grassroots advocacy group that works with residents, legislators, and agency officials to improve rail safety to benefit the health and security of people, wildlife and the environment. Formed in response to the exponential growth of crude oil and ethanol transportation by rail over recent years, Citizens Acting for Rail Safety strives to bring the citizen voice to bear on issues associated with high hazard freight trains going through our communities.

In October 2016, our Midwest group with five chapters in Minnesota and Wisconsin adopted the following statement against new oil pipelines which we submit at this time in opposition to the Line 3 Pipeline project proposed by Enbridge Energy.

Citizens Acting for Rail Safety – Statement Against New Oil Pipelines
Oil industry statements promoting new pipelines as the solution to the hazards of shipping oil by rail(1) are misleading and undermine efforts to improve public safety. Citizens Acting for Rail Safety opposes new oil pipelines because:

- **More pipelines will not stop the movement of oil by rail.** Rail and pipelines are not interchangeable and play different roles in our energy infrastructure networks. Shippers and refineries will continue to take advantage of the speed and flexibility that freight rail transport offers over pipelines.
- **Expanding oil transportation infrastructure dilutes limited safety resources.** Presently, there are not enough independent inspectors to ensure the safety of existing rails, tankers and pipelines. Rather than building new structures, current limited resources should focus on reducing risk to communities from the existing rail and pipeline infrastructure.(2) Pitting oil trains against pipelines is a false choice that may distract communities from pursuing efforts to improve rail safety through common-sense regulation, while absolving oil and rail industries and regulators of their responsibility for rail safety.
- **Expanding oil transportation infrastructure increases risk to more communities**. Pipelines and oil by rail are both dangerous to the communities they impact. Rail may be more likely to spill, but pipeline ruptures are typically larger and more expensive to clean up. Residents, local governments, water resources and the environment are all threatened — starting at the well heads and all along the rail and pipeline routes, through our prairies, wetlands, watersheds, agricultural lands, native lands, cities, towns, and industrial areas, across our rivers and streams, all the way to the destination refineries and port facilities.
- **Building additional oil infrastructure that will soon be obsolete is short sighted.** The United States has a record-breaking glut of crude oil in storage because more is currently extracted than is being used worldwide. Demand for oil is unlikely to reach levels equal to supply as our society transitions to a cleaner economy run on safer and more affordable renewable energy. Many communities across the country are already successfully resisting efforts to expand oil processing and export facilities served by either pipelines or oil trains.(3, 4, 5, 6)

Citizens Acting for Rail Safety therefore encourages communities to focus on improving safety and reducing environmental risk inherent in both pipelines and oil by rail, and on holding oil companies, railroads and regulators responsible for protecting the environment and public safety in an era of fundamental change in world energy markets.

Footnotes

1 Dakota Access Pipeline: Police remove protesters; scores arrested by Marlena Baldacci, Emanuella Grinberg and Holly Yan – CNN (October 27, 2016) http://www.cnn.com/2016/10/27/us/dakota-access-pipeline-protests/index.html
2 Report on the Improvements to Highway-Rail Grade Crossings and Rail Safety. MNDOT, December 2014. http://www.dot.state.mn.us/govrel/reports/2014/CBRCrossingStudy-December2014/ReportonHwy-RailXingsandRailSafety-2014.pdf
3 Vancouver City Council Bans Crude Oil Terminals by Washington Chapter of Sierra Club (July 2015) http://www.sierraclub.org/washington/vancouver-city-council-bans-crude-oil-terminals
4 Maine port city's ban on crude exports prompts oil industry threats by Neela Banerjee, Los Angeles Times (July 22, 2014) http://www.latimes.com/nation/la-na-maine-oil-sands-crude-20140722-story.html
5 Fighting dangerous oil trains in Baltimore, Chesapeake Climate Action Network http://chesapeakeclimate.org/maryland/fighting-crude-oil-by-rail-in-baltimore

6 State denies permit for Baltimore crude oil terminal, by Jeff Barker, Baltimore Sun (June 3, 2015) http://www.baltimoresun.com/business/bs-bz-crude-oil-20150603-story.html

Cathy Velasquez Eberhart
Citizens Acting for Rail Safety - Twin Cities
saferailstwincities@gmail.com

Levi, Andrew (COMM)

From: Deb McMillan <deb@twinwest.com>
Sent: Monday, July 10, 2017 4:40 PM
To: MN_COMM_Pipeline Comments
Subject: Support Advancing Line 3
Attachments: Line 3 Support Letter.doc

Please find attached our letter of support for the advancement of Line 3. Thank you.

Deb McMillan, IOM
Director of Government Affairs
TwinWest Chamber of Commerce
10700 Old County Road 15, Suite 170
Plymouth, MN 55441
Phone: 763.450.2220
Direct: 763.450.2225
Fax: 763.450.2221
E-mail: deb@twinwest.com

TwinWest CHAMBER OF COMMERCE

July 10, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Dept. of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101

Dear Ms. MacAlister:

The TwinWest Chamber of Commerce was formed in 1984 out of the merger of several smaller, local chambers of commerce in the West Metro area. Today, our members make up a variety of businesses and industries, ranging from national and internationally renowned corporations and manufacturers, to home-based businesses and companies involved in the service and professional sectors.

TwinWest Chamber of Commerce has long been an advocate of thorough, yet efficient and predictable regulatory review. I am writing today to urge the Dept of Commerce to advance the regulatory approval process toward an ultimate decision that will allow the replacement of Enbridge's Line 3 with a new state-of-the-art petroleum transportation pipeline system.

Line 3 replacement is an important infrastructure project that stands to benefit the entire state of Minnesota, the upper Midwest and the nation as a whole. A new Line 3 will bring thousands of needed jobs to northern Minnesota and to the suppliers and vendors involved with the $2 billion plus project from around the state.

Our railroads are congested with oil trains creating issues for other industries reliant upon rail to get their products to market. Line 3 will help alleviate some of that congestion. Line 3 replacement will be a safer more efficient transportation option, benefiting the economy and the environment. The regulatory scrutiny applied to Line 3 replacement has been thorough and informative.

We urge the completion of the regulatory review of Line 3 replacement, a project that is clearly important to the economy of State of Minnesota.

Sincerely,

Debra McMillan, Director, Government Affairs
Twin West Chamber of Commerce

Sent via e-mail: Pipeline.Comments@state.mn.us

10700 Old County Road 15, Suite 170 • Plymouth, MN 55441
Phone: (763) 450-2220 • Fax: (763) 450-2221 • www.twinwest.com

Levi, Andrew (COMM)

From: Gerald Tyler <gmtwalleye@gmail.com>
Sent: Thursday, July 06, 2017 3:02 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

It is safer to move oil by pipeline with the new technology to be employed. The construction jobs will aid us here in the North. The property taxes the pipeline will pay for the next 40 years will aid the counties across which the line p[asses. There is no facts that support the opposition to this pipeline upgrade.

Sincerely,

Gerald M. Tyler
1142 S 3rd Ave E
Ely, MN 55731
gmtwalleye@gmail.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Anna Theis		
ADDRESS		
CITY, STATE, ZIP		
Cobban, MN 55335		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
James Theis		

ADDRESS

CITY, STATE, ZIP

Gibbon MN 55335

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 120 DAYS

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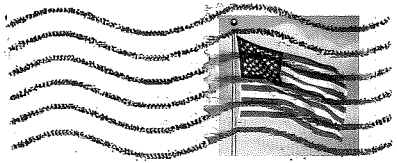

Line 3 Replacement Project DEIS

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

55 Docket numbers: CN-14-916; PPL-15-137

Levi, Andrew (COMM)

From: Rose Thelen <rosethelen@frontiernet.net>
Sent: Monday, July 10, 2017 11:04 AM
To: MN_COMM_Pipeline Comments
Subject: deny the pipeline

Please please have the political courage to deny the pipeline…the future of the planet depends on it… thanks Rose Thelen 15510 Huber Ave. NW, Clearwater MN, 55320

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Howard A. Thibault	218-606-0778	
ADDRESS		
66 118 186th Pl.		
CITY, STATE, ZIP		
Jacobson MN 55752		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Thief River Falls Convention & Visitors Bureau

THIEF RIVER FALLS
Convention & Visitors Bureau

Thief River Falls Convention & Visitors Bureau
102 Main Ave. N
Thief River Falls, MN 56701

June 13, 2017

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, MN 55101

To Whom it May Concern:

This letter is in support of the Enbridge Line 3 Replacement Project. The Thief River Falls Convention & Visitors Bureau is funded by the 3% lodging tax that is paid by overnight visitors and collected at all seven hotel properties in Thief River Falls, as well as our city campground. We are supportive of any project such as this that will bring overnight visitors to our community and positively affect our economy. This project would have significant economic impact on our lodging properties, restaurants and retail stores. This kind of boost will be felt around the entire community.

On behalf of the Thief River Falls Convention & Visitors Bureau Board of Directors, I offer our support of this project. We feel confident that our city has the facilities necessary to accommodate the pipeline workers; from our 315 hotel rooms to our wide range of dining and retail amenities. This project would have substantial economic impact on Thief River Falls, as well as the state of Minnesota, so we are hopeful that it is approved as soon as possible.

Sincerely,

Laura Stengrim

Laura Stengrim, Executive Director

RECEIVED
JUN 16 2017
MAILROOM

Sincerely,

Lisle Thielbar

12510 58th Ave N.

Plymouth, MN 55442

Levi, Andrew (COMM)

From: June Thiemann <june@visi.com>
Sent: Monday, July 10, 2017 11:08 AM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

As a conscientious citizen, I will certainly do everything I can to physically protest and alert my family, friends, and social media community to the backwardness of this project if it goes forward. Why would we as a society continue to support projects which invariably end up failing, leaking, and costing us more than any financial gain they temporarily bring? We wouldn't approach home improvement projects this way. Why are we so reckless with an immensely bigger piece of earth?

Sincerely,

June Thiemann
5153 Beard Ave S
Minneapolis, MN 55410
june@visi.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Tom Thompson		
ADDRESS		
10728 Weston Bay Rd		
CITY, STATE, ZIP		
Eden Prairie		

COMMENTS

I 100% Support the line

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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MAILED FROM ZIP CODE 55419

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Lindsey Thompson	6128613321	lindsey.thompson@lejeunesteel.us
ADDRESS		
118 W. 60th St.		
CITY, STATE, ZIP		
Minneapolis, MN 55410		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Cat Thompson <cat@emote.ws>
Sent: Monday, July 10, 2017 1:24 PM
To: MN_COMM_Pipeline Comments
Subject: Docket numbers CN-14-916 and PPL-15-137

This pipeline is a BAD idea for many reasons. Here are a few:

New supply and weak demand is pushing down oil prices globally, threatening to make costly US shale extraction uneconomic. Limited pipeline capacity and overproduction of natural gas in the Marcellus shale has pushed prices down, making it hard for producers to turn a profit. Drillers are taking on ever increasing amounts of debt to finance their operations. And there may not be as much shale oil and gas as the US government forecasts, according to a new report from the Post Carbon Institute, a California-based think tank that promotes sustainable energy. (Christian Science Monitor)

The international standard of obtaining the Free, Prior, and Informed Consent of impacted tribal communities, as outlined in the U.N. Declaration on the Rights of Indigenous People, has not been met. Spills would violate treaties with the Ojibwe tribes that protect critical resources and the right to hunt, fish, and gather on ceded territories.

The meager chapter on environmental justice concludes that "disproportionate and adverse impacts would occur to American Indian populations" (11.5) and acknowledges that those impacts "would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities," documented in the Minnesota Department of Health's 2014 study as "part of a larger pattern of structural racism" (11.4.3).

And the project would create zero permanent jobs, but contribute significantly to climate change, as well as degradation of vital wetlands, agricultural lands, and tourism.

Do the right thing. Deny the permits. Stop the pipelines.

Cat Thompson
cat@emote.ws
612-405-0165

"Everything you can imagine is real."
— Pablo Picasso

Levi, Andrew (COMM)

From: Elle Thoni <elle.thoni@gmail.com>
Sent: Monday, July 10, 2017 10:57 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Comment

The Mississippi and Lake Superior watersheds are the life-blood of Minnesota's human and non-human eco-systems. These resources are far more important to life and livelihood than a pipeline carrying foreign oil. Enbridge has failed to guarantee the safety of these pipelines in the past, and is not proposing a fast enough response time to prevent a spill from causing devastating damage. Please do not endanger Minnesota's land, water, wildlife and communities and reject the draft Environmental Impact Statement (docket number **CN-14-916 and PPL-15-137)** for the Line 3 pipeline.

--
elle thoni
*playwright * performance-maker * public artist * cultural producer*

ellethoni.com

Levi, Andrew (COMM)

From: C.A. Thysell <cthysell@gmail.com>
Sent: Monday, July 10, 2017 11:12 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Pipeline

Concerning: CN - 916 and PPL 15 - 137

Please reexamine plans to lay a new pipeline through our state.
Do not allow Enbridge to leave old pipeline in the ground.

This is the "Land of 10,000 Lakes". We should be protecting our water at all costs.

Signed,
Charles Thysell
1305 NE Monroe
Minneapolis, MN 55413

Levi, Andrew (COMM)

From: C.A. Thysell <cthysell@gmail.com>
Sent: Monday, July 10, 2017 1:41 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Pipeline

Concerning: CN -14 -196 and PPL 15 -137

Please reexamine plans to lay a new pipeline through our state.
Do not allow Enbridge to leave old pipe-line in the ground.

We live in the "Land of 10,000 Lakes". We should be protecting our water at all costs. Pipelines leak. Oil and water truly do not mix.

Protect our environment

Signed,
Charles Thysell
1305 NE Monroe
Minneapolis, MN 55413.

From: Wanda Ulseth
To: MN_COMM_Pipeline Comments
Subject: Enbridge"s Line 3 Replacement Project
Date: Saturday, June 03, 2017 6:12:55 PM

Jamie MacAlister:
We are in favor of Enbridge's Line 3 Replacement Project. We believe Enbridge is a responsible energy company, seeking a safe way to transport energy. We are residents of Itasca County. The potential employment possibilities for the construction of the project, as well as the future of industry in our region, depend upon safe, affordable energy, which this project will provide. We also support energy independence for our country. We strongly urge the DOC to allow the Line 3 Replacement Project to go forward.
Sincerely,
Ronald L. Ulseth
Wanda R. Ulseth

Levi, Andrew (COMM)

From: Wanda Ulseth <ezstreetrw@gmail.com>
Sent: Saturday, June 24, 2017 1:08 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Replacement Project

Dear Ms. MacAlister,

My family and I fully support this project. It will greatly benefit our community!

Sincerely,

Wanda Ulseth
1508 Timber Ridge Ln
Grand Rapids, MN 55744
ezstreetrw@gmail.com

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Paul Utke

Street Address: 15666 Deerwood Loop

City: Park Rapids State: MN Zip Code: 56470

Phone or Email: paulutke@unitelc.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

It is time to move this project forward. Any further delays are unexceptable. The APR route is a reasonable plan. Please support the APR and move this process forward. Pipelines are the safest and most effecient way to move oil and gas.

If including additional pages please number them and tell us how many you are providing:_____ pages

Levi, Andrew (COMM)

From: Gary Valine <gwvaline@gmail.com>
Sent: Thursday, July 06, 2017 10:09 AM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

This is in reference to docket numbers CN-14-916 and PPL-15-137: Northern Minnesota is where I grew up, my parents live there and my family vacations there, and I'm currently living in Superior, WI. In Superior my house is not far from the Enbridge terminal, and I want to see Line 3 replaced as it was installed in the 60's. It's very important to protect our environment with new pipelines and new equipment, and it's very good practice that a thorough Draft EIS has been prepared and a public comment period is part of the process. I'm in favor of the selected route along existing utility corridors and to avoid cities and towns where possible. I'm also in favor of keeping the 280 day EIS timeline, so the project can begin. Minnesota's and Wisconsin's environments need to be protected and replacing Line 3 is important to being responsible caretakers of our beautiful area.

Sincerely,

Gary Valine
615 37th Ave E
Superior, WI 54880
gwvaline@gmail.com

Levi, Andrew (COMM)

From: Patricia Van Duyn <pattyshealingcomedy@mac.com>
Sent: Monday, July 10, 2017 3:01 PM
To: MN_COMM_Pipeline Comments
Subject: Stop line 3!!!

I am from Southern California.

The Line 3 Pipeline and the DEIS concerns me because I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground as it is NOT SAFE! We have new technology, renewable energy and windmills to fill up (overflow) any gap.

Sincerely,

Patricia Van Duyn
Sent from my iPhone

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Joe Vene	218.556.5478	veneti@paulbunyan.net

ADDRESS
1415 Birchmont Drive

CITY, STATE, ZIP
Bemidji, MN 56601-2628

COMMENTS
Productivity and safety for all.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

From: Erika Vickerman
To: MN_COMM_Pipeline Comments
Subject: Pipeline comment
Date: Wednesday, June 07, 2017 1:28:28 AM

CN-14-916
PPL-15-137

To Whom It Concerns,

I am writing to you concerning our clean MN waters that my four children love to play and swim in, just as I did as a young child. The idea of Endbridges Tar Sand Pipeline, which would endanger the headwaters and the clean lakes of MN, is awful. PLEASE protect Minnesota's clean water and Minnesota's future! No risking oil in our waters!!

Erika Vickerman

Line 3 Replacement Project DEIS

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- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

USA FOREVER

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Mr+Mrs Ronald Victor	218-444-3216	
ADDRESS		
213 Lakewood Dr. NW		
CITY, STATE, ZIP		
Bemidji, Mn. 56601		

COMMENTS

yes, We support Line 3 replacement project. it will give lots of Jobs to workers which we badly need & get some people off Welfare and back to work. Sure makes sence to us.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Mike Villa	218-428-8411	mike.villa@ipaug.us
ADDRESS: 4433 Howard Gnesen Rd		
CITY, STATE, ZIP: Duluth, MN 55811		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Todd <tvr@centurylink.net>
Sent: Monday, July 10, 2017 12:02 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge proposed Line 3 Pipeline

To whom it may concern,

I submit my opposition to the construction, re-routing and capacity increase of **Enbridge Energy's proposed Line 3 Pipeline, docket numbers CN-14-916 and PPL-15-137**.

Bad enough it would be an oil pipeline. But even worse, it would continue to transport tar sands oil.

The immediate risk of water and land pollution, in addition to the global environment/climate warming impact, is too great to support the intensely polluting tar sands oil processing & transportation systems.

Again, I oppose the re-routing and capacity increase of the pipeline.

Thank you for your attention.

Sincerely,

Todd von Ruden
8424 Monroe ST NE
Spring Lake Park, MN 55432-1124

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Norm Voorhees	218-724-5073	
ADDRESS		
1321 104 AVE W		
CITY, STATE, ZIP		
Duluth, MN 55808		

COMMENTS
pipeline is the safest way to transport its A NO BRAINER lets get it DONE!!!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Richard Voss	651 309-8873	rgbvoss@gmail.com

ADDRESS
356 James court

CITY, STATE, ZIP
Mahtomedi, MN 55115

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Penny Voss <golfing1045@msn.com>
Sent: Saturday, July 01, 2017 6:38 AM
To: MN_COMM_Pipeline Comments
Subject: This project should be implemented asap!

Dear Ms. MacAlister,

New materials and technologies will protect the environment in the future.

Sincerely,

Penny Voss
26104 Hillview Rd
Nevis, MN 56467
golfing1045@msn.com

From: Wendy Vyskocil
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137
Date: Wednesday, May 31, 2017 4:30:05 PM

Dear Ms. MacAlister,

I am a Minnesotan and want to see the environment protected like most others. I believe replacing aging infrastructure like pipelines is imperative to protecting the environment. The MPCA has recently released the Mississippi River Watershed report that shows the cleanest waters in the state are in northern Minnesota. Energy infrastructure and clean waters can co-exist. The public expects pipelines to operate in a safe and reliable manner. Replacing Line 3 is part of Enbridge's on-going pipeline maintenance program that will reduce the amount of future maintenance activities and landowner disruption otherwise required to maintain safe operations.

Enbridge has found a route that follows existing utility corridors. Pipelines are everywhere in Minnesota, according to the Environmental Quality Board's report. I'm familiar with pipeline right of ways in northern Minnesota around Bemidji, Grand Rapids, Cass Lake and Alexandria. Pipelines and natural resources have gone hand-in-hand in northern Minnesota for decades.

As a resident of Minnesota, I've watched the regulatory process for more than 2 years for the Line 3 Replacement Project. I feel there has been ample time for public comment and urge the Department of Commerce to move the process forward to replace Line 3. No further time or study is needed to evaluate the environmental impacts due to the thorough and well-prepared EIS.

I hope that you will show your support for this important energy transportation project that will ensure access to abundant supplies of North American crude oil, that are cost effective relative to other sources of imported crude oil and move America closer to energy security. It will also offer additional economic benefits to communities along the right-of-way with tax revenues and patronage to local businesses by employees and contractors of Enbridge. The prompt replacement of Line 3 is an essential project for Minnesotans that will ensure the safety and environmental protection of our important natural resources as well as the continued safe transportation of crude oil to refineries in Minnesota, the Midwest and beyond. The project will also restore the line's original carrying capacity of 760,000 barrels per day (bpd), from its current 390,000 bpd.

Sincerely,

Wendy Vyskocil
14418 87th St NE
Otsego, MN 55330
wgvyskocil@q.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Peter T Wagener	612-501-899	pthwent@hotmail.com
ADDRESS		
8555 JASON AVE NE		
CITY, STATE, ZIP		
MONTICELLO MN 55362		

COMMENTS

WHY WOULD'T A NEW PIPELINE TO REPLACE THE OLD ONE BE A GOOD ONE? THERE'S NO REASON THAT IT WOULDN'T BE!!!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Don Wagner <dwagner531@hotmail.com>
Sent: Sunday, July 09, 2017 9:25 PM
To: MN_COMM_Pipeline Comments
Subject: Please approve pipeline number 3

Sent from Mail for Windows 10

Levi, Andrew (COMM)

From: Kirsten Wahlberg <kmw98589@gmail.com>
Sent: Saturday, July 08, 2017 3:48 PM
To: MN_COMM_Pipeline Comments
Subject: "Public Comment: Line 3 Project (CN-14-916 and PPL-15-137).

I believe that it is important to prioritize Enbridge's removal and remediation of the old line 3 before beginning any new projects. It is possible to go around the lakes that would affect state forests and lakes which we need to preserve. Enbridge needs to be a good neighbor, and therefore should provide the lowest risk of updates for their new pipes possible.

Thank you

Levi, Andrew (COMM)

From: Kalene Walker <kalewalk@gmail.com>
Sent: Monday, July 10, 2017 10:31 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 - DEIS Dockets CN-14-916 and PPL-15-137

To: Jamie MacAlister,

Regarding Line 3 - DEIS Dockets CN-14-916 and PPL-15-137.

Please hear and respect the voices of those who have articulated valid and important reasons for the Department of Commerce to DENY THE PERMIT for the proposed Line 3. Also, please shut down the old line and remove it from the ground.

Thank you,

Kalene Walker

San Diego - CA

Levi, Andrew (COMM)

From: Rachel Walker <rachel@robandrachel.org>
Sent: Monday, July 10, 2017 11:18 PM
To: MN_COMM_Pipeline Comments
Subject: CN14-196 and PPL15-137

I object to this pipeline project. Our environment will be at risk. The recent leaks of the pipeline in North Dakota despite assurances that the water would not be harmed are a clear signal that we should not expand, build, or add pipeline. Please stop line 3.

Rachel Walker
Minneapolis 55417

Sent from my iPad

Levi, Andrew (COMM)

From: Greta Wallgren <gmckeand@gmail.com>
Sent: Friday, July 07, 2017 12:29 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Enbridge pipeline

I oppose the new replacement line Line 3. I've examined the current path proposed and I am very concerned about several things:

- There are several creeks and rivers that this line proposes to go over, including the Mississippi.
- The land development needed in order to build and maintain the line
- The risk of spilling into drinking water and natural resources used heavily by all Minnesotans for sport and recreation
- The old line will be abandoned rather than cleaned up and removed, restoring the land

Those are just a few of my concerns. Please reject this new line and force the old line to be cleaned up.

CN-14-916 and PPL-15-137

Greta Wallgren
Shakopee MN
native to the central MN area the pipeline is proposing to cross over

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Jeanette Walsch

Street Address: 424 S. Markley ave

City: Thief River Falls State: MN Zip Code: 56701

Phone or Email: 681-8984

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

It seems to me everything has been well planned. I trust the line will go where it is the best place. It appears that the alternative line will be good. ~~[illegible]~~ Whichever route works the best.

If including additional pages please number them and tell us how many you are providing:_____ pages

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME: Cynthia Walsh
PHONE NUMBER:
EMAIL:
ADDRESS: 12424 Tamarack Rd
CITY, STATE, ZIP: Floodwood, MN 55736

COMMENTS

I support the line 3 replacement project

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Daniel Walter <mdmwalter@hotmail.com>
Sent: Friday, June 30, 2017 12:17 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

Dear Ms. MacAlister,

As a retired power company employee who used to work with Enbridge, I found them to be good citizens.

Line 3 runs within about 200 feet of my home west of Bemidji MN and if they say it is time to replace it, I respect their judgement.

Enbridge does not build lines just to build lines, rather to do the job needed. Their job is moving some of the product which we use in our lives.

Sincerely,

Daniel Walter
3515 Johnsville Ln NW
Bemidji, MN 56601
mdmwalter@hotmail.com

Levi, Andrew (COMM)

From: Mary Jo Walters <waltersmaryjo@gmail.com>
Sent: Monday, July 10, 2017 7:18 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

I live in Wisconsin and do not support the Enbridge line 3 being used at all.

Mary Jo Walters

Levi, Andrew (COMM)

From: Larry Wannebo <wannebo@uslink.net>
Sent: Friday, July 07, 2017 4:40 PM
To: MN_COMM_Pipeline Comments
Cc: Larry Wannebo
Subject: CN-14-916 and PPL-15-137

Dear Ms. Jamie Macalister July 7, 2017
Environmental Review Manager
CN-14-916 and PPL-15-137

To protect the waters of Minnesota, the best alternative route for Enbridge should be SA-04.

The only red mark SA-04 gets is for "drinking water areas of interest" because: 1.) it covers more miles, 2.) it crosses the Mississippi on which the TC metro depends for water, 3. it ends up near the heavily populated area south of Chicago. How can this one red mark trump all of the other concerns that directly impact the health, safety and welfare of all Minnesotans? (Much of SA-04 is outside of our state. If we share the oil, shouldn't we share the risk?)

As an alternative, Enbridge can replace in the current Line 3 footprint by removing the old Line 3 entirely. This is likely an issue across the country. It is time for the oil transportation industry to create new installation technologies to replace the old lines that are crowded into the narrow ROWs.
They need smarter technology, not smarter lobbyists.

With names like Big Trout Lake, Pine River, Loon Lake, and with the Mississippi River flowing through the heart of Minnesota, how can anyone in their right mind approve an oil pipeline that threatens the motto of the State of 10,000 lakes.

Most fifth graders know that oil and water don't mix. This is the only science that you need to justify denying the applications for all oil pipelines In Minnesota.
How can a bunch of educated adults in our state agencies prove to the kids and the public that oil and water do mix?

With millions of Minnesotans investing to protect the surface and ground waters, our elected officials and agencies should not be acting in any way to endanger these waters. Oil pipelines are a threat to theses waters.

It's time for the state agencies to shrug off the political threats and do your job to protect our natural resources at all costs…be a professional advocate, not a partisan party lackey. In doing your job right, you will help hasten the swing to a more open and sustainable natural resource-based economy.

Think long term.

"I believe there is only one conflict, and that is between short-term and long-term thinking. In the long term, the economy and the environment are the same thing. If it is unenvironmental it is uneconomic. That is a rule of nature." *Mollie Beattie (1947-1996, former director U.S. Fish and Wildlife Service)*

Thank you for allowing me this bottom-line perspective of Enbridge Line #3…the science still says that oil and water don't mix.

Larry Wannebo

Larry & Marilyn Wannebo
39911 County Road 66
Manhattan Beach, MN 56442
218-543-4622

Levi, Andrew (COMM)

From: Larry Wannebo <wannebo@uslink.net>
Sent: Friday, July 07, 2017 10:27 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

I am resubmitting my comments as I neglected to include the document numbers on my original submission.

Attn: Jamie Macalister, Environmental Review Manager
RE: CN-14-916 and PPL-15-137

I am opposed to the proposed route of Enbridge line 3.

I find myself wondering when we became such a blasé society that we have allowed common sense and human welfare to be overridden by personal and corporate greed.

Regarding the proposed Enbridge #3 pipeline, I realize they are looking for the most economical (and consequently most profitable) route for placement. We have been told repeatedly about the economical gain in jobs with this installation, but we know that these jobs will be the lower paying and temporary positions of construction. The professional engineers and pipefitters will not be local nor will they be permanent to the areas.

Why don't we hear from Enbridge about the economic impact to these communities when a major leak contaminates their source of drinking water? Or makes their lakes so polluted that tourists no longer arrive? I believe these impacts are a much bigger negative than the positive one created by providing a few temporary jobs.

Leaks will happen, it's just a matter of when and the consequences can be disastrous for years, decades or generations. We all know that cleanup is expensive, time consuming and sometimes impossible leaving it to Mother Nature to try and recover for eons.

Yet here we are trying to convince you to not allow this pipeline through our State's most pristine waters. Can you honestly say you don't see the foolishness of what's being proposed? They do have other viable options. It may cost more but take a look at their financials…they can afford to make a concession to protect our waters.

As for the current line 3 which they have, rightfully, opted to no longer use or replace, it should be removed. They cannot blow out all the residual oil and it continues to degrade allowing for more seepage. There is also the possibility of a future explosion.

They claim they will continue to monitor this pipeline, but since many of the leaks they have previously had were found not by their monitoring but by residents affected by the leaks, this option is not comforting.

Please consider carefully all the comments you receive as your decisions will affect all of us for generations to come. We cannot afford to continue losing our waters to contaminations.

Without clean waters, oil will have no value to anyone.

Thank you,

Marilyn Wannebo
39911 County Road 66
Manhattan Beach, MN. 56442

Submitted July 7, 2017

Levi, Andrew (COMM)

From: Larry Wannebo <wannebo@uslink.net>
Sent: Friday, July 07, 2017 12:55 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Project

Attn: Jamie Macalister, Environmental Review Manager

I am opposed to the proposed route of Enbridge line 3.

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Please consider carefully all the comments you receive as your decisions will affect all of us for generations to come. We cannot afford to continue losing our waters to contaminations.

Without clean waters, oil will have no value to anyone.

Thank you,

Marilyn Wannebo
39911 County Road 66
Manhattan Beach, MN. 56442

Submitted July 7, 2017

Levi, Andrew (COMM)

From: Tammy Warcken <twarcken@gmail.com>
Sent: Thursday, July 06, 2017 12:26 PM
To: MN_COMM_Pipeline Comments
Subject: Proposed Enbridge Line 3 pipeline

To Whom It May Concern:

I am writing in opposition to the above stated pipeline. I find it hard to believe that this pipeline is being considered in these locations, putting our beautiful waters of Minnesota at risk. With its more than 80 river crossings, plus the other impacts to lakes and wetlands, the environmental impact of the maintenance alone will have severe consequences. A possible spill could be devastating. Enbridge's track record regarding spills - over 800 - is not good. Their handling of the Kalamazoo River spill and clean up is proof of that.

Specifically, DEIS Chapter 5.2.1.4, where Enbridge plans to store hazardous chemicals 100 feet from surface waters during the pipeline's construction and during its maintenance is inadequate. 100 feet is nothing in these areas, which will drain into those precious waters.

Also, DEIS Chapter 10.4.1 in regards to the 10 mile Region of Interest that is being proposed is also woefully inadequate. The Kalamazoo River spill is a prime example of that inadequacy, considering that spill's impact was 35 miles. The ROI should include at least 35 miles if not more. It is my understanding that this propose pipeline is going to be bigger, allowing Enbridge to pump twice as much tar sands oil than its old pipeline, and under greater pressure. That leads me to believe that the impact area will be large if and when a spill occurs.

I remember the Kalamazoo River spill and how Enbridge's methods for cleanup did not work for heavy tar sands oil. Because of that, the oil sunk to the bottom of the river bed, polluting the entire ecosystem of the river. Is this what we want for Minnesota's waters? I don't think so.

Thank you for allowing me to express my opposition to this pipeline and its proposed location, and my opinion on how it is detrimental to the health and safety of Minnesota's waters and people.

Sincerely,

Tamara Warcken

Levi, Andrew (COMM)

From: Wendy Ward <wwbike63@gmail.com>
Sent: Thursday, July 06, 2017 3:26 PM
To: MN_COMM_Pipeline Comments
Subject: dockett numbers CN-14-916 and PPL-15-137

Jamie
As a St Croix River resident and policy analyst, I would suggest, among multiple other weak points, the following EIR portions as inadequate.

1) DEIS Chapter 10.2.4.1.1
the report states: "The annual probability of a spill incident for the Applicant's preferred route was estimated as 0.249 incidents per year with a recurrence interval of 4.0 years."
Mathematically that means that every year there would be a 25% risk of an oil spill, which means a risk of one spill every four years. This high and frequent risk should not be accepted.

2) The risk from Line 3 is in conflict with several of Minnesota Statutes:

1. MN Statute 103F.305 Scenic River Protection Policy
https://www.revisor.mn.gov/statutes/?id=103F.305

2. MN Statute 116D.02 Declaration of State Environmental Policy
https://www.revisor.mn.gov/statutes/?id=116d.02

Please record these public positions,
Thank you
Wendy Ward

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Mike Warner

Street Address: 40589 Golden Ave.

City: North Branch State: MN Zip Code: 55056

Phone or Email: mwarner@liunagroc.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

The draft EIS meets and exceeds environmental requirement.
The DEIS goes above and beyond what the law requires, with a nearly 5,000 page comprehensive review ~~of~~ of the potential environment impacts of the line 3 replacement and proposed alternatives.

Thank You.

If including additional pages please number them and tell us how many you are providing:_____ pages

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Mike Warner

Street Address: 40589 Golden Ave.

City: North Branch State: MN Zip Code: 55056

Phone or Email: mwarner@Liunagroc.com

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I support Line 3 replacement. Line 3 is out of date, and the proposed replacement is the best option to protect Minnesota's lakes, rivers, and streams by reducing spill risks significantly. Pipelines are the safest and most efficient way to transport oil.

If including additional pages please number them and tell us how many you are providing: 1 *pages*

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Matthew Watkins	218-766-0722	mjwatkinl@hotmail.com

ADDRESS
44225 US Hwy 71

CITY, STATE, ZIP
Laporte, MN 56601

COMMENTS
The L3 Replacement project will provide a well deserved shot in the arm to boost local economies along the selected route by providing wellpaying jobs for many pipe line workers and allowing smaller businesses an opportunity to fulfill their needs for food, lodging, clothing and entertainment.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: James Watts <jwatts76@live.com>
Sent: Monday, June 26, 2017 5:55 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

As a resident of Northern MN. , I have watched the regulatory process go on for more than 2 years. I think there has been ample time for review and public comment and the DOC should move forward to replace Line 3. The EIS is thorough and well done. The DOC should keep the EIS timeline to the statutory deadline of 280 days.

Sincerely,

James Watts
520 S 66th Ave W
Duluth, MN 55807
jwatts76@live.com

Levi, Andrew (COMM)

From: Andrew Weatherly <andrewweatherly@mail2world.com>
Sent: Monday, July 10, 2017 10:48 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 comments

Follow Up Flag: Follow up
Flag Status: Flagged

Jamie MacAlister,
I oppose Line 3. Here are my reasons.
The United Nations international standard for projects that impact Indigenous Peoples is Free, Prior and Informed consent. Tribal consultancy after the project is already proposed and designed is not free, prior, and informed consent.

Most of the issues specific to tribal people and tribal resources are confined to a separate chapter that attempts to provide "an American Indian perspective." They are excluded from the main chapters that assess potential impacts. This allows the EIS to avoid drawing conclusions about the impacts on tribal people. (Chapter 9)

Chapter 9, "Tribal Resources," states that ANY of the possible routes for Line 3 "would have a long-term detrimental effect on tribal members and tribal resources" that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). This does not acknowledge the treaty responsibilities the state of Minnesota has to the tribal members.

Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "are part of a larger pattern of structural racism" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3).

The DEIS concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) But it also states that this is NOT a reason to deny the project!

Chapter 6 states that Enbridge's preferred route would impact more wild rice lakes and areas rich in biodiversity than any of the proposed alternative routes (Figure ES-10).

Most of the analysis of archaeological resources in the path of the pipeline rely on Enbridge's surveys. For some reason, only 3 of their 8 surveys are available, and the 5 missing are the most recent! In those, Enbridge found 63 sites, but claims that only 3 are eligible for protection under the National Register of Historic Places. (5.4.2.6.1). Honor the Earth has had the studies we have been able to see reviewed, and there are numerous flaws in their methodology.

The DEIS acknowledges that "The addition of a temporary, cash-rich workforce increases the likelihood that sex trafficking or sexual abuse will occur," and that these challenges hit Native communities the hardest. But the DEIS dismisses this problem quickly, saying that "Enbridge can prepare and implement an education plan or awareness campaign around this issue" (11.4.1). What experience does Enbridge have planning and implementing an anti-sex trafficking program? No, I don't live in Minnesota: I live in North Carolina. this

concerns me anyway.
Best--Andrew Weatherly

Get the Free email that has everyone talking at http://www.mail2world.com
Unlimited Email Storage – POP3 – Calendar – SMS – Translator – Much More!

Levi, Andrew (COMM)

From: Mr. & Mrs. Anthony Weber <anweber@gvtel.com>
Sent: Saturday, July 08, 2017 7:43 AM
To: MN_COMM_Pipeline Comments
Subject: Comment CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

We would like to see the Line 3 Replacement Line done. Transporting oil through the pipeline is a much safer method than rail or trucks. We have lived by the pipeline for the last 55 years. Through that time only 2 leaks and 1 accident have occurred. The leaks were dealt with quickly with no after effects. The accident like most accident were unnecessary and possible neglect on someones part. As for the old pipe being left in the ground we think as long as it is cleaned as was discussed at the meeting we attended it should be left undisturbed.

Sincerely,

Anthony & Virginia Weber
37121 270th St SE
Trail, MN 56684
anweber@gvtel.com

Levi, Andrew (COMM)

From: Corey Weber <corey.weber@westwoodps.com>
Sent: Friday, July 07, 2017 11:09 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Replacement Project DEIS CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

July 7, 2017

Department of Commerce
Ms. Jamie MacAlister, Environmental Review Manager Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

Re: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I wish to voice my full support for the Enbridge Line 3 Replacement. I believe it is in the best interest of the State of Minnesota and fellow Minnesotans for this project to move forward. Pipelines have been proving to be a far safer and a more environmentally friendly way to transport product. As much as the replacement of aging infrastructure is imperative to protecting our environment, increasing capacity of this infrastructure allows the United States to continue to strive to become the world's energy leader.

As a long-time professional in the pipeline industry, I have watched the pipeline construction and operation regulations and the industry response evolve to level of commitment and sophistication that makes transportation of liquids both safe and efficient. The stringent standards of Title 49 CFR Part 195 and the formation of the USDOT Pipeline and Hazardous material Safety Administration (PHMSA) in 2004 have created a structure and culture of safety and standards that ensure that ANY plan accepted and ANY route chosen will yield an infrastructure asset that is dependable, reliable, and safe. Advances in corrosion protection and operational integrity measurement and documentation also ensure that continued operations will pose little or no threat to both affected landowners and the environment. Weighing the minimal risks against the undeniable benefits of a facility such as Line 3, the choice is clear. Secondly, to continue to strain highway and rail infrastructure furthering the harmful economic effects to other businesses and industries when there is a sensible and dependable alternative is clearly ill-advised.

Enbridge has demonstrated through its commitment to acquiring social license within the communities it operates and an industry leading safety record that it is a responsible corporate citizen. Enbridge has earned our support in its efforts to contribute to energy security and make the United States and North America a standard bearer in the global energy arena.

Due to the thorough and well prepared Draft Environmental Impact Statement, there should be no need for additional time or study to evaluate any environmental impacts. It is with this knowledge that I strongly urge you to keep the EIS timeline to the statutory deadline of 280 days.

Corey Weber
Director, Westwood Professional Services, Inc.

Sincerely,

Corey Weber
7699 Anagram Dr
Eden Prairie, MN 55344
corey.weber@westwoodps.com

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

We do NOT NEED a tar sands pipeline. Current information suggests that pipeline companies and politicians are overbuilding tar sands pipelines by 2.4 million barrels a day. More oil is being pulled out of the ground than is being consumed.

SINCERELY, Bradley Weberg
1304 E. 88th
Bloomington, MN

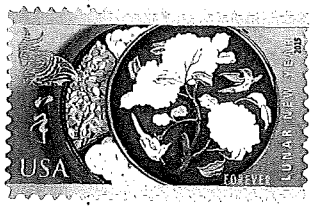

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Levi, Andrew (COMM)

From: Mr. & Mrs. Scott Weems, Sr <joycelweems@hotmail.com>
Sent: Friday, June 23, 2017 2:00 PM
To: MN_COMM_Pipeline Comments
Subject: Can we help?

Dear Ms. MacAlister,

We live 12 miles north of Clearbrook, if you need to come through our land your welcome to.

Sincerely,

Scott and Joyce Weems
53497 199th Ave
Clearbrook, MN 56634
joycelweems@hotmail.com

Levi, Andrew (COMM)

From: Darril Wegscheid <djwegscheid@earthlink.net>
Sent: Monday, July 10, 2017 12:06 AM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Docket Numbers: CN-14-916 and PPL-15-137
Attachments: PUC Comments Jul 9 AM rewrite.docx

Ms. MacAlister - Good day,

Here is focused feedback on the lack of adequate analysis of potential – and real – oil spills and their impacts and the absolute need for idependent and impartial assessment.

Regards,
Darril

July 9, 2017
Re: Docket Numbers: CN-14-916 and PPL-15-137

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

Good day,

The Executive Summary – page ES-12 – begins a very naïve and simplistic (and gross misrepresentation / under representation) of potential oil spills – their occurrence, magnitude, disersion, spread, scope of damage and duration of impairment and virtually all factors related to such an event.

I have an advanced degree in Computer / Mathematical modeling and an employment history spanning nearly 40 years (see vita attachment), most of which was directly (and/or supervising experts) doing "computer modeling" of economic and operational scenarios.

This operation, like the HMS Titanic has multiple and complex vulnerabilities, which cannot be addressed with platitudes (as Enbridge is attempting to do here) – ala 'Not even God can sink this ship'! The eventual disaster was – and here would be – a series of simultaneous and cumulative failures of equipment (pipes, valves, pumps, etc.), a summary lack of understanding / misunderstanding of conditions (changing conditions that are 'ignored, 'explained away', or 'presumed to be irrelevant'), etc., etc.

Enbridge would lead the public, and the PUC / DOC to be comfortable with the use of AVERAGES to compare "spills" – and lose people in the details. This must be corrected in the EIS so there are honest and independent values and impacts to evaluate for the environment, etc.

The manner in which the applicant is comparing a pipeline spill versus an oil tanker or rail spill is a false comparison. The use of averages is misleading, and self-serving in that it is false and significantly understates the potential of any / all large-scale releases from a pipeline. Applicant needs to produce expert independent modeling analysis of the system and known rates of component failures, and the rare – but real – combinations of concurrent failures.

To clarify:
This Line 3 – even if it only operated at the 'proposed initial 760,000 bpd' – is moving roughly 10,000 gallons per minute! Or 600,000 gallons an hour. Or nearly 14,400,000 gallons in a day – and could be STILL flowing out of control if equipment, procedures, personnel and nature "failed" sequentially or concurrently in ways that they all can. There is no 'physical limit', once certain failures begin.

By comparison, a 'uni-train' of 110 cars, each carrying full loads of oil (and for a TOTAL release of the entire train) would be a disastrous total spill of about 3.5 million gallons. (At 55 gallons per barrel, that is about 64,000 **barrels**. The entire train failing is unlikely, but could be a possibility.

And in reality, a tanker truck can ONLY leak 'just so much' as it is limited to its capacity – about 11,600 gallons. And MOST truck spills are at the load or unload station, and modest in size. And a truck-load could be a disaster, if it happened in a pristine environmental area or crossing a major river.

The applicant's failure to properly model the complex components of this proposed pipeline system, and this DEIS presentation suggesting that there is no way that multiple / concurrent / simultaneous failures are possible along a pipeline is nearly 'sheer idiocy' - not even to mention sabotage risks.

The size and impact of these pipeline spills are NOT a 'normal' distribution. They are a "long tail" distribution, certainly with quite low probability of a "huge / extremely large spill", but nonetheless it is a FINITE possibility. That risk, given the enormity of one of those spills, cannot be allowed to go without independent and comprehensive analysis.

The ONLY way to calculate spills and resulting size and impacts of a complex system is with stochastic modelling of the components, under honest, independently verifiable and public review. If there is any concern for 'trade secrets', they would be addressable with non-disclosure agreements. Not a reason to skip this – it is too essential.

The stochastic simulation must be required to run / "tested" under various weather / time-of-year parameters. Again, Murphy's Law, things that can go wrong will go wrong, and at the worst possible time. That is the reality of disasters – multiple and concurrent failures.

I would professionally suspect that the probability of timely 'sensing a slow leak' in winter, deep in the back woods and or underground leaking into an aquafer would be quite varied based on the season. The farmer in North Dakota who only discovered the underground leak when oil shoed up on his equipment's wheel, for example.

Likewise, the ability to 'dispatch repair crews' into some very remote / wilderness areas in the middle of a blizzard, or tornadic winds, would impact that 'back-up service call' for a repair crew trying to 'address' a corrupted pump or failed shut-off valve. Meanwhile, the line could be pumping that 10,000 gallons per minute . . .

The size of the release will for certain dictate the size of the actual spread, impact, and all related duration issues. These are NOT simple averages, they are interdependent aspects that can only be assessed in a stochastic and dynamic model.

A key part of a proper assessment of the 'spill and recovery' scenario - and costs to humans, wildlife, woods, and waters - MUST consider the cumulative factors of the release(s) OVER TIME AND for months after the spill. Those impacts must reflect the very size and 'relative location' of the release.

Based on Kalamazoo, and the follow-up to that disaster, the spill release extended FAR, FAR down the flowage – well beyond the assumption here of "10 miles" and "aligned with the center line" of the flowage. The applicant simply makes self-serving assumptions.

As Dilbit, much of that spill settled to the bottom of the Kalamazoo river, and is still residing there.

Since 2010, it is still releasing toxic components that flow much further down-stream than this 'presentation' has estimated.

This DEIS report ignores all those factors and presents naïve and unprofessional "averages" for spills and impacts.

A specific, but nowhere near exhaustive example:

Spire Valley (near Outing, MN) is home to the MN DNR trout hatchery. I believe it provides trout to MN and some other states, and has no comparable MN site.

The hatchery there is possible due to 'natural spring' that feeds the hatchery. That spring arises due to ground water flowing laterally rather than down into the aquifer. The 'barrier' to that downward infiltration would be threatened by drilling, boring and disruption in the area.

Minnesota used Federal Dingell-Johnson funds to establish it decades ago. As I understood in 2010, MN fisheries receives about $5MM per year SO LONG AS the state of MN controls that area. This oil pipeline crossing can only be considered a significant threat to that funding, and to the very hatchery itself.

Spire Valley flows into North Roosevelt in Cass County. Lake Roosevelt is a "Northern Cold Water / Tullibee Lake". It is a priority water for much of the DNR fisheries efforts.

It is approximately 6 miles long. Like others of the many water crossings in this 'relatively pristine' and definitely unique aquatic zone in Minnesota, a spill the likes of the Kalamazoo spill would literally destroy the lake, its aquatic bounty – and the watersheds that it flows to and through, the Whitefish Chain, Brainerd via the Mississippi and onto the Twin Cities.

This proposed oil pipe would be about 850 feet from the water of North Roosevelt. That is less than the length of three football fields – and flowing at 10,000 gallons a minute!

Like other water crossings 'above' and through the Headwaters of the Mississippi, there is no professionally defensible data or analysis in this report that addresses that potential (albeit rare) "Titanic" or "Deepwater Horizon" series of events that turns an "average release" into a monumental disaster for the environment and citizens who live / recreate in it and depend on it.

Lest applicant seek to dismiss this approach, simply recall the Titanic, and the arrogance that allowed "too few" live boats, an disregard of safety that did no training for an "abandon ship" reality, a reckless instance that ignored warnings of 'unusually heavy iceberg fields', and lack of quality control that - when built – failed to realize they had been 'swindled' by low-quality rivets that left the hulls weak and vulnerable.

The presumptions in this self-serving report, nearly as I can read, are blindly advantageous to the applicant, have not been tested by impartial experts and honest models, and need serious work in an honest EIS.

There are so many 'self-serving statistics' in the DEIS, apparently chosen to prop-up a misguided belief that Minnesota should 'donate' to Enbridge an entirely new corridor for oil pipelines.

A new corridor, through a broad swath of northern forests and wetlands for their use and profit.

A corridor for new devastation of the environment in a wide ranging critical environment and economy – while they propose to simply abandon their "experience" of the spills and releases along their existing corridor. And if that succeeds, based on the lack of clarity and honesty from a thorough assessment of the spills and impacts, the other 5 lines are due to be joining this corridor very soon.

The "Deep Water Horizon' reportedly started as a 'management call' to bypass rising pressures. After explosions, deaths and 'initial disaster', a follow-on catastrophic failure of THE valve to close deep underwater allowed oil to flow for days.

The Titanic was “directed” to try to set a speed record on its maiden voyage. There were any number of ‘disaster-generating’ aspects that spun out of control – which makes an “incident” a “disaster”. This presentation provides no reviewable assessment of any professional modeling of the risk factors and consequences of combinations of failures.

To check on reality, how many HOURS OF EMPLOYMENT to Minnesota workers / citizens will this proposal actually provide, rather than “jobs” that will be gone as the sections are completed?

And how many REALLY new HOURS OF EMPLOYMENT are actually created on an ‘ongoing’ basis, since Line 3 exists already – and is being monitored, and maintained (we assume)? Break down the use of the word “jobs” that implies anything other than “passing construction”.

The agency has a responsibility to the citizenss, environment and economy of Minnesota to see that is done honestly and correctly, with expert independent review.

Ignoring such an assessment should NOT happen for the EIS, even as ‘spiffy’ as the applicant tries to make their simplistic averages sound in this draft.

Darril Wegscheid
PO 251
Emily, MN 56647

- VITA:
- Bachelors in Mathematics
- Masters in Operations Research and Statistics
- 31 years of Logistics Modeling at a Fortune 100 international8 years of Operational Modeling at a top-5 USA airline
- 6 years in MN State Senate – 1982- 1986
    - Commerce and Economic Development Committee
    - Agriculture and Natural Resources Committee
    - State and Local Government
    - Government Operations
    - K-12 Education

Levi, Andrew (COMM)

From: MacAlister, Jamie (COMM)
Sent: Wednesday, July 19, 2017 12:01 PM
To: MN_COMM_Pipeline Comments
Subject: FW: Enbridge Docket Numbers: CN-14-916 and PPL-15-137
Attachments: PUC Comments Jul 9 AM rewrite.docx

Jamie MacAlister
Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280, Saint Paul, MN 55101
P: 651-539-1775

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From: Darril Wegscheid [mailto:djwegscheid@earthlink.net]
Sent: Sunday, July 09, 2017 12:23 PM
To: MacAlister, Jamie (COMM) <jamie.macalister@state.mn.us>
Subject: Enbridge Docket Numbers: CN-14-916 and PPL-15-137

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Darril

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Minnesota used Federal Dingell-Johnson funds to establish it decades ago. As I understood in 2010, MN fisheries receives about $5MM per year SO LONG AS the state of MN controls that area. This oil pipeline crossing can only be considered a significant threat to that funding, and to the very hatchery itself.

Spire Valley flows into North Roosevelt in Cass County. Lake Roosevelt is a "Northern Cold Water / Tullibee Lake". It is a priority water for much of the DNR fisheries efforts.

It is approximately 6 miles long. Like others of the many water crossings in this 'relatively pristine' and definitely unique aquatic zone in Minnesota, a spill the likes of the Kalamazoo spill would literally destroy the lake, its aquatic bounty – and the watersheds that it flows to and through, the Whitefish Chain, Brainerd via the Mississippi and onto the Twin Cities.

This proposed oil pipe would be about 850 feet from the water of North Roosevelt. That is less than the length of three football fields – and flowing at 10,000 gallons a minute!

Like other water crossings 'above' and through the Headwaters of the Mississippi, there is no professionally defensible data or analysis in this report that addresses that potential (albeit rare) "Titanic" or "Deepwater Horizon" series of events that turns an "average release" into a monumental disaster for the environment and citizens who live / recreate in it and depend on it.

Lest applicant seek to dismiss this approach, simply recall the Titanic, and the arrogance that allowed "too few" live boats, an disregard of safety that did no training for an "abandon ship" reality, a reckless instance that ignored warnings of 'unusually heavy iceberg fields', and lack of quality control that - when built – failed to realize they had been 'swindled' by low-quality rivets that left the hulls weak and vulnerable.

The presumptions in this self-serving report, nearly as I can read, are blindly advantageous to the applicant, have not been tested by impartial experts and honest models, and need serious work in an honest EIS.

There are so many 'self-serving statistics' in the DEIS, apparently chosen to prop-up a misguided belief that Minnesota should 'donate' to Enbridge an entirely new corridor for oil pipelines.

A new corridor, through a broad swath of northern forests and wetlands for their use and profit.

A corridor for new devastation of the environment in a wide ranging critical environment and economy – while they propose to simply abandon their "experience" of the spills and releases along their existing corridor. And if that succeeds, based on the lack of clarity and honesty from a thorough assessment of the spills and impacts, the other 5 lines are due to be joining this corridor very soon.

The "Deep Water Horizon' reportedly started as a 'management call' to bypass rising pressures. After explosions, deaths and 'initial disaster', a follow-on catastrophic failure of THE valve to close deep underwater allowed oil to flow for days.

The Titanic was “directed” to try to set a speed record on its maiden voyage. There were any number of ‘disaster-generating’ aspects that spun out of control – which makes an “incident” a “disaster”. This presentation provides no reviewable assessment of any professional modeling of the risk factors and consequences of combinations of failures.

To check on reality, how many HOURS OF EMPLOYMENT to Minnesota workers / citizens will this proposal actually provide, rather than “jobs” that will be gone as the sections are completed?

And how many REALLY new HOURS OF EMPLOYMENT are actually created on an ‘ongoing’ basis, since Line 3 exists already – and is being monitored, and maintained (we assume)? Break down the use of the word “jobs” that implies anything other than “passing construction”.

The agency has a responsibility to the citizenss, environment and economy of Minnesota to see that is done honestly and correctly, with expert independent review.

Ignoring such an assessment should NOT happen for the EIS, even as ‘spiffy’ as the applicant tries to make their simplistic averages sound in this draft.

Darril Wegscheid
PO 251
Emily, MN 56647

- VITA:
- Bachelors in Mathematics
- Masters in Operations Research and Statistics
- 31 years of Logistics Modeling at a Fortune 100 international8 years of Operational Modeling at a top-5 USA airline
- 6 years in MN State Senate – 1982- 1986
    - Commerce and Economic Development Committee
    - Agriculture and Natural Resources Committee
    - State and Local Government
    - Government Operations
    - K-12 Education

From: Purrcival
To: MN_COMM_Pipeline Comments
Subject: Please do not build the pipeline
Date: Friday, June 02, 2017 1:01:48 PM

Hello,
I received an email about the pipeline and I would like to voice my opinion against it. It will bring harm to the environment and cause trouble for Native Americans. Please protect and preserve how wonderful Minnesota is.
Thank you,
Sarina Weinstein

Levi, Andrew (COMM)

From: Irene Weis <ilweis@arvig.net>
Sent: Monday, July 10, 2017 9:08 PM
To: MN_COMM_Pipeline Comments
Cc: Irene Weis
Subject: Proposed Line 3 Pipeline Project CN 14-916. PPL 15-137

Please accept this as a written comment against the route proposed by Enbridge for its Line 3 replacement. The possibilities for severe and long lasting pollution of water resources, including the Mississippi River, drinking water aquifers, wild rice beds, critical wetlands and state forests which are valuable to waterfowl and other wildlife.

The Friends of the Headwaters proposed alternate route SA-04 protects Minnesota's important natural resources. It is well know that the Enbridge preferred route is the cheapest to build. If the stakes weren't so high, with so many possibilities for a disaster, that might be fine. However, the risk is too great. If the state of Minnesota is going to allow our neighbor to the north pipe the diluted bitumen over our resources, it better make sure the damage can be better managed by locating the pipeline in areas which are less sensitive.

Another concern I have is that it is my understanding that in the E I S data was supplied by Enbridge. That seems to me to be "bad science", or certainly questionable. I would think that the data would be independently gathered.

This has gone on long enough. Do the right thing. Locate the pipeline where the least damage will be done, or don't build it.

Irene L. Weis
18937 County 40
Park Rapids, MN 56470

Sent from my iPad

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: Douglas Weiss

Street Address: 3148 Bungo Creek Lane SW

City: Pine River State: MN Zip Code: 56474

Phone or Email: weiss005@umn.edu

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

RA-07 has the advantage of ① recycling the steel in the old line

② Permitting a careful study of the environmental impact of pin hole leaks over the life of the pipeline

③ Permitting undected oil leaks to be cleaned up.

the data obtained from this study would be invaluable in the planning of future pipelines.

If including additional pages please number them and tell us how many you are providing:_____ pages

June 16, 2017

Dear Jamie MacAlister, Environmental Review Manager:

My name is Dale J. Weistroffer. I own LaMonts Resort on the north side of Lake Waukenabo. Enbridge's current construction plan for Line 3 project consists of building a pipeline pumping station at a location which is only ¾ mile east of Sitas Lake. The pipeline then proceeds south from that location along MN 169 and passes less than ½ mile from Lake Waukenabo.

This current routing is a clear environmental danger to Lake Waukenabo, Sitas Lake, and West Lake identified as Lake N.E. on the township map. Sitas Lake drains into Lake N.E. which drains into Lake Waukenabo. I cannot believe a different route away from our Lakes area cannot be found. Many pipeline leaks have occurred in the past and to assume this line will not leak is a reckless assumption. Why take the risk? I am certain a route can be chosen that does not pass less than a ½ mile from our recreational and fishing lakes.

Sincerely,

Dale J. Weistroffer

Dale J. Weistroffer

RECEIVED

JUN 21 2017

MAILROOM

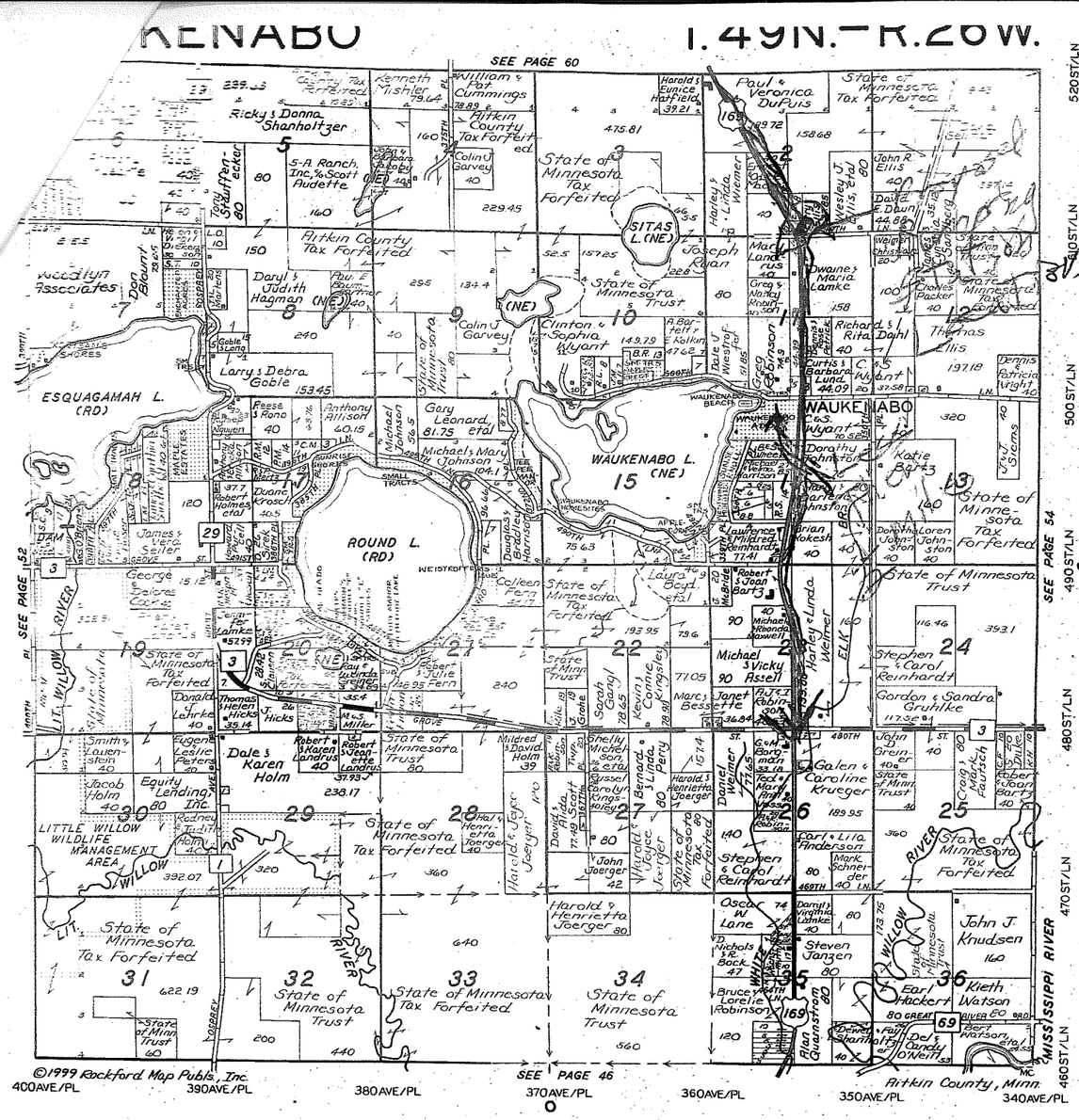

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19 JUN 2017 PM 6 L

Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Attn: (Jamie MacAlister, Environmental Review Manager)

Levi, Andrew (COMM)

From: Janie Wells <user@votervoice.net>
Sent: Wednesday, June 28, 2017 2:43 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3

Dear Ms. MacAlister,

The infrastruction in this country is well passed repair, Enbridge Line 3 is a part of this infrastructure.
Please let's start repairing or replacing pipelines before they break and cause disarray or death. Thank you.
I have done 3 pipeline jobs for Lakehead/Enbridge and they are a wonderful company to work for and safety is their priority.

Sincerely,

Janie Wells, Ashland, KY
1616 Maryland Pkwy
Ashland, KY 41101
djswells@aol.com

From: Eric Wendlandt
To: MN_COMM_Pipeline Comments
Subject: I support the Line 3 project
Date: Thursday, June 08, 2017 8:47:08 AM

Dear Ms. MacAlister,

I support Enbridge's Line 3 replacement project. It will create much needed jobs and tax add Tax base in counties wher it is very much needed. In addition any project that replaces aging energy infrastructure with new materials and technology should be seen in a positive manner.

Sincerely,

Eric R Wendlandt
6541 Grand Lake Rd
Saginaw, MN 55779
ewendlandt@reagan.com

From: Eric Wendlandt
To: MN_COMM_Pipeline Comments
Subject: I support the Line 3 project
Date: Thursday, June 08, 2017 8:47:08 AM

Dear Ms. MacAlister,

I support Enbridge's Line 3 replacement project. It will create much needed jobs and tax add Tax base in counties wher it is very much needed. In addition any project that replaces aging energy infrastructure with new materials and technology should be seen in a positive manner.

Sincerely,

Eric R Wendlandt
6541 Grand Lake Rd
Saginaw, MN 55779
ewendlandt@reagan.com

Levi, Andrew (COMM)

From: Tami Wenthold <wentnorth2001@yahoo.com>
Sent: Monday, July 10, 2017 8:53 AM
To: MN_COMM_Pipeline Comments
Subject: Comment DEIS Line 3 Pipeline Project
Attachments: PUC Pipeline July 10.docx

The attachment serves as comment on DEIS Line 3 Pipeline Project.

July 10, 2017

To: Jami MacAlister, Environmental Review Manager

Minnesota Department of Commerce

85 – 7th Place East, Suite 280

St. Paul, MN 55101

Re: Comments on DEIS Line 3 Pipeline Project

Docket Numbers: **CN-14-916** and **PPL-15-137**

We live and own property in the area of the proposed route selected for Line 3 proposed Pipeline Project. We are members of local conservation efforts, have attended the Straight River Groundwater Management Plan meetings and are involved in monitoring river water quality through native fresh water mussel surveys with the DNR for the past 11 years. The DNR has just completed a 2 year mussel survey project encompassing all of the Crow Wing Watershed with additional supporting information.

MN State "special concern" species currently struggle to survive in the Shell and Crow Wing Rivers where the pipeline project threatens to contaminate them at least three crossing areas under the rivers if breached or ruptured. Two mussel species are identified from the Club mussel survey summary results below.

Species	Common Name	State Status	Collected Live by DNR/Shell City	Expected to be present	MCC/SWCD 2005 Shell City	MCC/SWCD 2006 Shell River at Twin Lakes	MCC/SWCD 2007 Confluence Shell/Crow Wing	MCC/SWCD 2008 Shell City	MCC/SWCD 2009 Shell River at Twin Lakes	MCC/SWCD 2010 Confluence Shell/Crow Wing	MCC/SWCD 2012 Shell City	MCC/SWCD 2013 Confluence Shell/Crow Wing
Anodontoides ferussacianus	Cylinder Papershell	None	2	x	1	1	0	0	0	1	0	0
Lampsilis cardium	Pocketbook	None	27	x	22	154	116	374	152	191	327	91
Lampsilis siliquoidea	Fat Mucket	None	179	x	21	931	345	464	467	340	267	72
Lasmigona compressa	White Heelsplitter	None	0	x	0	0	0	0	0	0	0	0
Lasmigona compressa	Creek Heelsplitter	Special Concern	38	x	3	2	2	21	8	1	7	8
Ligumia recta	Black Sandshell	Special Concern	6	x	0	53	8	19	83	8	28	5
Pyganodon grandis	Giant Floater	None	208	x	0	290	10	5	28	0	0	3
Utterbackia imbecillis	Paper Pondshell	None	0	x	0	10	5	0	0	0	0	0
Strophitus undulatus	Creeper	None	22	x	1	4	0	2	0	0	0	0
?	?				0	1	0	0	0	0	0	1
# Hours =	# divers x 15 minutes x # of sites				3	20	18.25	16.5	8.75	10.25	15.5	9
# of Divers					12	12 to 20	21	16	12 to 15	10 to 22	7 to 12	9 to 12
# of Sites					1	6	4	4	3	2	6	3

The Pineland sands area we live in is evident throughout the north central state of Minnesota. The soils are sandy loam and till, which are coarse textured and rapidly permeable. The glacial geology and area well logs indicate the aquifers contained in this area are quaternary **unconfined** water table aquifers (QWTA) which is extensive in this part of the Pinelands Sands aquifer extending throughout Becker, Cass, Hubbard, and Wadena counties. The surface water resources in this area are in the form of streams, lakes, and wetlands. The soils in this area are primarily outwash sands and gravels which are excessively drained and have high saturated hydraulic capacities. Studies have shown that shallow groundwater and surface water in this area is interconnected and because of the interrelatedness of the surface water and groundwater, there are no hard groundwater flow divides set by lakes or rivers. There are also no bedrock groundwater divides as bedrock is 400+ feet in depth in this area. A leak from a pipeline that runs into the watershed of the Mississippi or a wetland fed aquifers would contaminate the drinking water of many people in addition to devastating the economy of the lake areas from tourist dollars that are crucial in northern Minnesota.

The alternate pipeline route of SA-04 through the agricultural areas of southwestern Minnesota where there are clay soils, areas that are easily accessible with relatively few stream crossings may make the route longer but will protect our pristine watersheds of northern Minnesota which provide drinking water for millions.

Sincerely,

Tami & Randy Wenthold

Menahga, MN 56464

RECEIVED

JUN 21 2017

MAILROOM

Dear Mr. Jamie Macalister
Environmental Review Manager
MN Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101-2198

I want to voice my strong objections to Enbridge's appeal to create a new Line 3. I am gratified to note that most of those present at the Saint Paul June 13th meeting spoke eloquently in favor of defending the environment against the degradation this pipeline poses to our land and water. I share their detailed concerns. What follows, in bullet fashion are my major concerns and objections:

- *Stewardship and Responsibility*: Why aren't we holding Enbridge responsible for funding and removing all of the original pipeline before granting them permission to lay an alternate line? Also, if Enbridge is issued a route permit, why isn't Enbridge required to set aside funds in escrow to cover potential mishaps and disasters while its pipeline exists on our lands? Individual landowners should not be expected to pay for the clean-up of potential Superfund sites left behind by companies like Enbridge, which may go bankrupt or dissolve or otherwise change – and so escape accountability for the problems such projects will create.

- *Guidelines and Definitions:* At the state level, we should establish abandonment guidelines and definitions for intrastate crude oil pipelines. Those guidelines should make clear what Enbridge's responsibility is for the pipelines it already has in place and for any future pipelines it creates in Minnesota. This should be done before any further construction occurs.

- *Risks of Profound Environmental Damage*: Pipeline 3 and the alternate route both pass through vulnerable wetlands, so pose a grave risk to these environments. Tar sands oil is very dirty and heavy, so a ruptured or leaky pipe could devastate these waters, including the Saint Louis River watershed and Lake Superior. Enbridge's history of good stewardship is not encouraging. Need I site the 1991 spill that dumped 1.7 million gallons of oil near Grand Rapids? Along with this are numerous other leaks and spills throughout that pipeline's history. Tar sands oil mining is horribly destructive and unnecessarily serves a dying industry at the expense of the wider population and the land itself. We should not support such a ruinous enterprise. We need to invest in cleaner energies that will not contribute to climate change as significantly as this new pipeline would.

My closing statement is that we should refuse Enbridge's request for a pipeline permit. The risks to the common good of the state are too high, and all to profit a mining industry with a dismal record of operating responsibly and transparently.

Sincerely yours,

Lisa Wersal
4525 Birch Ridge Rd
Saint Paul MN 55127-3624

MINNESOTA

Comment Form
Line 3 Project Draft EIS Public Meeting

Please provide your contact information. This information and your comments will be publicly available.

Name: TRENT WETMORE

Street Address: 4395 GROUSE RIDGE DRIVE

City: Hermantown State: MN Zip Code: 55811

Phone or Email: 918-285-0386

Please share your comments on the Line 3 Project Draft EIS. What could be improved in the EIS? What is missing?

I FEEL THAT the DRAFT EIS IS WELL DONE & VERY THOROUGH. I BELIEVE that SOME OF the JOBS DISCUSSED IN the DOCUMENT NEEDS REVISED & REVIEWED.

The ROUTES (Preferred) SELECTION FOLLOWS EXISTING CORRIDORS & AREAS that Have ALREADY been IMPACTED BY UTILITIES. THIS Recommendation SHOULD Be CHOSEN

ENBRIDGE IS DOING The RESPONSIBLE THING BY REPLACING THE LINE AS IT WILL HAVE MUCH LESS OF AN IMPACT ON THE ENVIRONMENT.

If including additional pages please number them and tell us how many you are providing:_____ pages

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

02 1P $000.34
0000879328 JUN 27 2017
MAILED FROM ZIP CODE 55811

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Gordon Wetterlund Jr	218-201-0218	
ADDRESS		
23819 280TH AVE NW		
CITY, STATE, ZIP		
Warren Mn 56762		

COMMENTS I support the Replacement pipe as it is needed and its the safest and most cost effective way to move crude

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Ben Whalen <bwhalen520@gmail.com>
Sent: Thursday, June 29, 2017 3:59 PM
To: MN_COMM_Pipeline Comments
Subject: comments

1. Some of the dirtiest oil in the world, the pipeline will account for over 2.2 megatons of CO2 spewed into our air every week. The science is in. We are metaphorically sitting in a car, parked in a garage with the motor running and the garage door closed.

2. A recent report by 14 scientists at the University of Iowa, Ames indicates that Midwest corn, soybean and wheat crop yield will be reduced by 49%, 40% and 22% over the next eighty years. Corn yields in particular decrease 0.6% for every day over 86 degrees Fahrenheit.

3. The Des Moines Register, “By the end of the century, the average Midwesterner likely will suffer through 22 to 77 days a year of temperatures above 95 degrees, compared with only three on average the past 30 years.”

4. If we don’t do anything, crop losses in Minnesota will be $470 million over the next decade not including losses from droughts.

Who is going to pay for this and why is it not accounted for in the DEIS? We have better alternatives.

From: Allyson Whipple
To: MN_COMM_Pipeline Comments
Subject: Comment on docket numbers CN-14-916 and PPL-15-137
Date: Thursday, June 08, 2017 3:28:36 PM

To Whom It May Concern,

I am an environmentalist and teacher who has serious reservations about Enbridge's proposed Line 3 pipeline.

The pipeline is a bad idea on three fronts. First, it's yet another assault on the environment. What is the point of having more and more oil if we're not going to have a planet left on which to use it? We need to be focusing on how to preserve our environment, not tear it apart.

Second, this pipeline is an assault to indigenous rights. I think our government has done enough damage to native people. We need to respect their agency, and the sacredness of their tribal lands.

Third, it would be a better financial investment to focus on greener, cleaner forms of energy. That's where the real money is. The renewable energy industry generates billions of dollars. A focus on that isn't just good for the environment, but it makes better financial sense.

Thank you for the time to read my comments.

Sincerely,
Allyson Whipple

Levi, Andrew (COMM)

From: Brianne Whitcraft <bresist999@gmail.com>
Sent: Monday, July 10, 2017 1:28 PM
To: MN_COMM_Pipeline Comments

Please do not approve this pipeline. Docket numbers (CN-14-916 and PPL-15-137. See the Minnpost article below for reasons why I do not support this pipeline or visit: https://www.minnpost.com/community-voices/2017/07/reading-between-lines-minnesota-s-draft-eis-enbridges-line-3-pipeline. It will negatively affect our environment, Native lands, and doesn't even make financial sense. Stop the pipeline.

Thank you,
Brianne Whitcraft
4408 33rd Ave S
Minneapolis, MN 55406
763-568-8094

Reading between the lines of Minnesota's Draft EIS for Enbridge's Line 3 pipeline

By Thane Maxwell | 07/07/17

Residents of the Great Lakes area should submit comments on the State of Minnesota's Draft Environmental Impact Statement (DEIS) for the proposed Line 3 oil pipeline before the public comment period ends on July 10. But be warned, the DEIS is not designed to inform a rational, science-based policy decision; it is designed to approve the pipeline without getting sued. We are witnessing a performance of good governance, not the real thing.

Given the history, this is not surprising. Let's not forget that grassroots environmental groups dragged the State of Minnesota to this EIS kicking and screaming. The Minnesota Public Utilities Commission (PUC) rubber-stamped the Sandpiper pipeline in June 2015 without doing an EIS, and when that permit was revoked by the Minnesota Court of Appeals in September 2015, Enbridge and the attorney general appealed the decision to the Minnesota Supreme Court, where it was upheld. Let's also not forget that in the face of common sense and a crystal clear docket of testimony in May 2016 outlining why the study should be conducted by the state's environmental agencies, the state insisted on putting it in the hands of the Department of Commerce instead.

Alternatives that really aren't alternatives

Now the public is asked to comment on a Draft EIS that is missing critical information. Despite the DOC's vehement objections, Enbridge is so far successfully fighting to withhold spill volume estimates from the public, for "security" reasons. There is no analysis of the economic need for the pipeline. There is no plan for addressing the contamination they will inevitably find when they shut down the existing Line 3. Indeed, only 16 of the 5,000+ pages are devoted to the issue of pipeline abandonment — just enough to acknowledge all the liabilities we pass on to our grandchildren if we let Enbridge walk away from its mess. Frankly, this is a public policy crisis for Minnesota, as Enbridge has three more ancient lines waiting to be abandoned and rebuilt in a new corridor.

The most astonishing magic trick in the DEIS, however, is the choice of alternatives to which it compares the proposed pipeline. The DEIS considers seven project alternatives, but each one is defined in a way that makes it utterly unreasonable. The “rail alternative” would require the construction of a new rail terminal at the Canadian border, where 10 trains a day would transfer product from a new but partial Line 3, to the pipeline terminal in Superior.

This is ridiculous — Enbridge would never do that. The “truck alternative” is similar but even more absurd (4,000 trucks a day), as are the two hybrid alternatives. The “use of other pipelines” option is simply not considered, based on the unsubstantiated claim that other pipelines “have been (or would be) evaluated in other jurisdictions (4.2.4).” One different pipeline proposal is considered that would go to Joliet, Illinois, instead of Superior, but very little analysis is offered except the repeated point that at double the length, it would have double the impact and carry double the risk. And the “no-build” option is defined incorrectly as “continued use of existing Line 3,” despite a recent U.S. Department of Justice Consent Decree ordering Enbridge to shut it down. Clearly the DOC wants everyone to simply throw up our hands and say, “Oh, well, I guess Enbridge’s plan is the only option!”

Glutted oil market ignores public need

The underlying assumption is that if Enbridge says it can sell X amount of additional Canadian oil, it is our responsibility to figure out a way for it to do that, and assume all the risk. The entire process prioritizes the corporation’s “right” to make profit, and ignores the real questions of public need and purpose. There is a glut of oil supply everywhere, global demand is declining, and so is Minnesota’s.

This oil is meant for export. Plus, prices have been too low for profitable tar sands extraction for years, and major oil companies are withdrawing their investments. The tar sands industry is a house of cards propped up by billions in taxpayer subsidies, and unfathomable debts that may never be repaid. Meanwhile, renewables are skyrocketing, and electric car infrastructure will dominate world markets in a matter of years. Any rational discussion of energy policy would consider these factors, but you won’t find a single one mentioned in the DEIS.

Impacts to Natives and the environment

Also missing is a discussion of Enbridge’s track record in complying with regulation, despite state law requiring that consideration before issuing the permit (Administrative Rules Part 7853.0130 (D)). Many of the environmental impacts and plans for mitigation are copied and pasted directly from Enbridge’s permit application without any evidence of compliance. And since Minnesota agencies don’t have the jurisdiction or capacity to monitor construction, the DEIS proposes that the fox watch the henhouse: Enbridge inspectors will have stop-work authority, and “third-party monitors” that relay information to the agencies will not (2.7.1.1).

The DEIS also fails to discuss the profound ecological, cultural, and sexual violence taking place at the point of extraction in the Alberta tar sands. Tunnel vision like that relies on the myth, easily refuted, that new infrastructure has nothing to do with new extraction. This oil comes from

somewhere, and if Minnesota approves this pipeline, it will also approve the poisoning and murder of the Dene and Cree communities in the Athabascan River Basin.

Despite all these blatant omissions, the DEIS nevertheless contains all the data necessary to deny the permit. The international standard of obtaining the Free, Prior, and Informed Consent of impacted tribal communities, as outlined in the U.N. Declaration on the Rights of Indigenous People, has not been met. Spills would violate treaties with the Ojibwe tribes that protect critical resources and the right to hunt, fish, and gather on ceded territories.

The meager chapter on environmental justice concludes that “disproportionate and adverse impacts would occur to American Indian populations” (11.5) and acknowledges that those impacts “would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities,” documented in the Minnesota Department of Health’s 2014 study as “part of a larger pattern of structural racism” (11.4.3). And the project would create zero permanent jobs, but contribute significantly to climate change.

This is a political process, not just a regulatory one. Any child can see the right thing to do: deny the permit for a new Line 3 and require Enbridge to clean up the old one. But the false assumptions, glaring omissions, and twisted framing of alternatives in the DEIS show that the state’s morality and common sense are still blinded by the temptation of temporary construction jobs and tax revenue. It is our job to demand better.

Thane Maxwell is an organizer with Honor the Earth, a Native-led environmental organization based on the White Earth Reservation in Northern Minnesota and directed by writer, activist, and economist Winona LaDuke. He holds a master’s degree in regional planning from Cornell University.

Levi, Andrew (COMM)

From: Stephanie White <stephwhite86@gmail.com>
Sent: Monday, July 10, 2017 12:16 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline Comment

Dear Environmental Review Manager:

I would like to know, in the final EIS for Line 3, what Enbridge's plans are if their preferred route is approved? Will it be just the one pipeline, or will they eventually move all six pipelines to the new corridor? This would have a huge effect on how people feel about Enbridge's preferred pipeline route. Being a resident in the Crow Wing Watershed District, which would be implicated in the preferred route, this is a very important consideration. This needs to be addressed in the final statement.

Thank you,

Stephanie White
515 N. 8th St.
Brainerd, MN 56401

Levi, Andrew (COMM)

From: Stephanie White <stephwhite86@gmail.com>
Sent: Monday, July 10, 2017 12:18 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline Comment

Dear Environmental Review Manager,

I am curious, who were the private contractors used to compile the EIS? Do they have previous work histories with the Applicant? If so, was "conflict of interest" considered in their employment? Where they hired by the State of MN or Enbridge? This information should be included in the final EIS.

Thank you,
Stephanie White
515 N. 8th St.
Brainerd, MN 56401

Levi, Andrew (COMM)

From: Stephanie White <stephwhite86@gmail.com>
Sent: Monday, July 10, 2017 12:14 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline Comments

Dear Environmental Review Manager:

There is nothing in the DEIS for Line 3 about the general economic picture for Minnesota if this project is approved as Enbridge prefers. Minnesota lakes are the source of revenue for fishing, water recreation, fisheries, and tourism in general. Where is the analysis of how a pipeline through some of the best lakes country in Minnesota will affect the fishing, tourism, and recreation industries (and others) in Minnesota? How would the towns along the route be affected (positively or negatively)? Does this pipeline provide enough benefits for Minnesota to balance the risk? I don't see anything about this in the DEIS. There must be an economical analysis for the EIS to be complete.

I am also concerned about the Mississippi River Basin Watershed, as a whole entity, and the money being invested to our local watershed districts to clean up existing pollution. Many funds are directed to the Upper Mississippi River Watershed from downstream communities. It seems counter intuitive to these clean up efforts to consider the risk of an oil pipeline through the headwaters. We owe it to those invested to continue trying to clean up the Upper Mississippi Watershed, not putting it at additional risk. I have not seen any mention of accountability regarding the investment into those cleanup efforts.

Thank you,
Stephanie White
515 N. 8th Street
Brainerd, MN 56401

From: Signa Whitley
To: MN_COMM_Pipeline Comments
Subject: Pipeline3
Date: Tuesday, May 30, 2017 9:36:28 PM

To Whom it may Concern,
My single statement is this.
What kind of WORLD are you leaving your Children and Grandchildren?
One where oxygen masks are a fact of life? Or one where they have clean water and air, life's TWO most valuable resources. The Truth is anyone involved with these pipelines DOES NOT Love or Care about their Children or Grandchildren. It does not matter to me, I have no Children and no Grandchildren to worry about. My descending line ends with me. But can you say the same thing.
There is no place to go, either take care of this world now or prepare for your descendants to die horrible deaths.
Nature finds a way to correct Human corruption. The world has restarted six times, go ahead, I DARE you to force a finial solution. It's not me you hurt but your family, your friends. THE PEOPLE have survived before, They will again.
But I doubt many others will. No amount of money will save you, only the Native People's know the way.
May Father take mercy on you and yours for Nature will not.

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
DANIEL S. WICHTERMAN	(218) 964-5012	
ADDRESS		
15805 160TH ST. S.E.		
CITY, STATE, ZIP		
RED LAKE FALLS, MN 56750		

COMMENTS GOOD JOBS FOR THE $12. SUPPORTS USA INDUSTRIES.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: marylwick@gmail.com
Sent: Sunday, July 09, 2017 7:26 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline 3 cleanup

My comment is that those in charge need to be protectors of the environment. If Embridge is hesitant to cleanup, because it's close to a new one they want to build, how would they ever clan that up in the future? We need to look ahead. Oil is on the way out and MN needs to stand up for itself to protect the beautiful water and land for the future. Mary Wick, landowner close to the pipeline on beautiful Lake Roosevelt.

Sent from my iPad

E Wick Mary 07.09.17

Levi, Andrew (COMM)

From: Stacia Wick <stacia.wick@gmail.com>
Sent: Monday, July 10, 2017 1:24 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

To Whom it May Concern,

My name is Stacia Wick, I live in St. Paul, MN, and I am writing to comment on the proposed Enbridge Line 3 Pipeline Replacement Project.

First and foremost, I would urge you to carefully consider whether this project is truly needed to address "known integrity risks, reduce apportionment...and restore flexibility". In my opinion, this project is driven by Enbridge's desire to increase its own current and future profitability rather than the company's stated concerns about safety and concern for the environment. The starting point for this conversation shouldn't be is a new pipeline 'better' than the current one. Of course it is more safe than the current one, it would be brand new! However, the question I believe the MN PUC must focus on is whether the proposed change is a wise decision in light of the environmental risks a new pipeline would pose. More capacity in the new line means more risk of high-capacity leaks. Tar sands oil is energy-intensive and environmentally damaging in the first place. Furthermore, my own family, neighbors and community are committed to reducing fossil fuel use overall in order to protect the planet from the impact of unchecked climate change (for example, we have been a 1-car family for the last five years, we chose to live near our children's schools and our own workplaces so that we can walk and bike daily, and we elect to purchase/participate in Excel Energy wind power program to power our home's electricity). The MN PUC should consider the efforts of its citizens in this regard as it makes this decision about Line 3.

Second, as a Minnesotan who respects and the historically ignored/silence voices of Native American/tribal neighbors and friends, I believe it is important for the MN PUC to weigh the risk to the tribal people, waters, and land that Line 3 presents. As was demonstrated at Standing Rock, tribes and tribal waters have for too long been asked to bear unfair oil pipeline (and other environmentally damaging or risky) burdens. My sense is that MN tribal member and their allies are willing to put their lives and bodies on the line if Line 3 is approved. This could be averted by you now.

Finally, as a member of a family that owns land along the proposed Line 3 (my parents own a lake cabin in Cass County on Lake Roosevelt near Outing MN) I object to the re-routing on behalf of those of us who pay taxes, vacation, and spend considerable tourism-related dollars annually along the path of this line. The reason my family (from South Dakota) choses to spend time and money in Cass County is precisely because of the pristine lakes, streams, and entire watershed region that this project puts at risk.

Thanks for your consideration,
Stacia Wick

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Steve Wiczek		SWICZEK@NISSWAMARINE.com
ADDRESS		
CITY, STATE, ZIP		
NISSWA MN --		

COMMENTS

Infrastructure Replacement is very critical

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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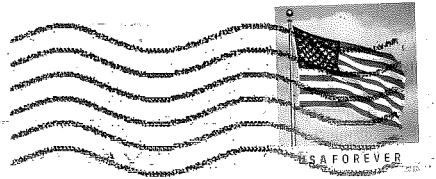

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

55101-2198

Levi, Andrew (COMM)

From: Terra Cotta <mncowpunk@gmail.com>
Sent: Monday, July 10, 2017 9:36 PM
To: MN_COMM_Pipeline Comments
Subject: Public Comment CN-14-916 & PPL-15-137; Enbridge Line 3

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Re: Enbridge Line 3 EIS; CN-14-916 & PPL-15-137

My name is Tara Widner. I am Pembina Band Anishinaabe (Ojibwe) from the White Earth Reservation. My ancestors have been on this land called Minnesota since well before it was recognized as a state or even a territory. Like my ancestors, I am a ricer. I canoe through the clean lakes and rivers of this state to hand harvest manoomin/wild rice each autumn.

Manoomin is sacred to the Ojibwe. Prior to colonization of the U.S. & Canada, the Ojibwe were led by a prophesy to migrate from the east coast of North America to the Great Lakes region to live where the 'food grows on the water' and that food was manoomin. Manoomin is central to our culture, spirituality and all religious practices.

Manoomin is the first food to be eaten by Ojibwe babies, it is served at meals throughout our lives, until it is served during our funeral ceremonies. The manoomin harvest continues to be central to Ojibwe families for it's spiritual, nutritional and economic value.

This pipeline and expansion run through the 1855 and 1837 Treaty areas in Minnesota. These Treaties are recognized as the highest law of the land in the 6th Amendment to the U.S. Constitution. The Treaties guarantee that the Ojibwe retain the right to hunt, fish, trap and gather within the boundaries of both the unceded land on the Reservations and the ceded land. In order to maintain healthy harvest the water and land must remain unpolluted. A bitumen spill from this pipeline would prevent the Ojibwe from exercising those rights by destroying whole ecosystems supporting those harvests.

The first time I took part in the manoomin harvest we travelled off the beaten path, deep in the woods of the Leech Lake Reservation. It was far from the highway, there were huge beaver dens and a crane rookery. At one point we had to get out of the canoe, stand on a pipeline and pull the canoe up and over the pipeline to continue down the stream to the manoomin. The freezing and thawing of the ground during our harsh Minnesota winters move rocks and pipelines. It is not a question of if the pipeline breaks, but when.

This EIS is inadequate. The oil passing through the line is not crude oil but tar sands bitumen that is more toxic. There is no supplemental review of this project from the Chippewa National Forrest to consider the increased flow of more toxic tar sands bitumen, nor is the U.S. Army Corps doing a Federal EIS. This is a delicate ecosystem with a high water table, wetlands and considerable amount of clean surface water.

The SEIS recognizes the environment justice issue of passing this pipeline through Treaty land but rates the impact as “negligible” and “minor”. The pipeline runs through the heart of Ojibwe Reservations and Treaty areas, land the Ojibwe and many others consider sacred. When the pipeline fails, the impacts will be devastating to the Ojibwe people that have lived off this water and land for hundreds of years. The water is sacred. The manoomin is sacred. Allowing an increase flow of tar sands bitumen would put countless foods, medicines and livelihoods of the Ojibwe people at substantial risk, the impact would be devastating.

The most toxic tar sands bitumen is being moved through the most pristine waters in Minnesota to be exported. Where is our benefit? We don’t get cheaper gas, a foreign company is moving this tar sands bitumen through our waterways to be exported overseas. There is no job creation, the bitumen is being mined in Canada and processed overseas. We get no of the benefits from this project but carry the risks.

As an Ojibwe Ogichidaakwe, I am tasked with protecting our water. I would respectful request that you to protect the water and reject this proposed Enbridge Line 3. Anything that threatens both our sacred water and manoomin is simply unacceptable.

Sincerely,

Tara Widner

Levi, Andrew (COMM)

From: Barb Wiebesick <sunhands@arvig.net>
Sent: Sunday, July 09, 2017 10:54 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916, PPL-15-137

First, you need to address the issue of Enbridge leaving the old pipeline inn the ground. This ground is already contaminated from myriad leaks, and Enbridge wants to just leave it? Why would we allow that? NOT ACCEPTABLE! We clean up our own messes!
Second, your EIS is deeply flawed because you relied on Enbridge to supply the data, and they are not known for their truthfulness. Inaccurate, incomplete and biased data, false assumptions, glaring omissions, twisted framing of alternatives riddle the whole statement, making it worthless. Don't buy into Enbridge's lies!
We live in the area affected, but this is not just about us. The Native American population is deeply affected by this, and their views were not adequately taken into account. Are we really going to just steal their land again? This is extremely dirty oil going into lots of inaccessible areas, and WHEN (not if) it leaks, they won't be able to clean up these pristine wild rice lakes that the natives rely on.
Millions of tourist dollars flow into this area, just to enjoy our pristine lakes also. Water here is much more valuable than oil. Those construction jobs will be quickly gone, and there will be zero permanent jobs. Yes, you will be getting tax revenue from Enbridge, but is that worth losing all the tourism income? We certainly don't think so.
This is a Canadian company. Why would we allow them to pollute our beautiful state?

Barb and Roger Wiebesick
24164 200th St
Nevis, MN 56467

June 9, 2017

Jamie MacAlister, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

Re: Comments pertaining to Docket Numbers CN-14-916 and PPL-15-137

I appreciate the ability to provide comment on this matter and I am writing to support the efforts all parties have taken in the development of the Draft Environmental Impact Statement including proceeding as soon as possible with the Line 3 Replacement Project. Based on my knowledge of the process and result, I feel the DEIS is well prepared and the regulatory timeline should continue according to the current schedule. I also believe that moving the process forward with the good work that has been done can help insure the Project is able to begin in a timely manner and afford stakeholders a myriad of benefits associated with the replacement. I believe the following two points underscore why this project should move forward as soon as possible and in accordance with schedule requirements:

- The L3 replacement project will help ensure that both environmental and economic benefits accrue to the State as well as other stakeholders and landowners along the right of way. From an economic perspective, the billions of dollars that will be spent completing this project will directly impact many communities along the ROW as well as individuals working on the project. When the Alberta Clipper project was built, businesses from café's to grocery stores, hotels, and merchandise stores both large and small benefited. These impacts were real and appreciated by many. In addition, the State and communities also benefited from sales tax collections as well as increased property tax allotments. Environmentally, replacing an older line with a new state of the art line and facilities will help ensure the integrity of the system and process and the protection of the environment. In addition, the new line will be more energy efficient, a goal of the state for both business and homes.
- The L3 replacement project will ensure safety for the public while meeting the nation's and Minnesotan's requirements for energy. According to PHMSA, use of a pipeline is the safest most effective way to transport crude oil. It is safer than trains or trucking oil. In-fact, if this is not built, the decision would be a "double whammy" to many communities who would both lose out on the economic benefits to them and have to deal with increased safety concerns due to added train traffic through their communities. Safety is a guiding principle of Enbridge and by approving this project as soon as possible, safety for many in Minnesota can be maintained and enhanced.

I respectfully urge you to approve the route that Enbridge has proposed as well as adhere to the schedule for orchestrating this project to ensure that safety, the environment and economic benefits to Minnesotans, their communities and the State can be promoted. Thank you for your consideration.

Jeff Wiklund
6705 McQuade Road
Duluth, MN 55804

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Levi, Andrew (COMM)

From: Tom Wilczek <tom_wilczek@yahoo.com>
Sent: Thursday, July 06, 2017 6:26 PM
To: MN_COMM_Pipeline Comments
Subject: Figure ES-4

I think it is important to have a graph of what percentage of oil is released in incidents involving the three main modes of transporting the product. If someone would divide the released oil by tho total volume transported, we may get a better picture of the risk involved.

Tom Wilczek
Little Falls, MN

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Jeremy Wilhelm	218-256-6014	
ADDRESS: 911 NW 1st Ave		
CITY, STATE, ZIP: Grand Rapids MN 55744		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

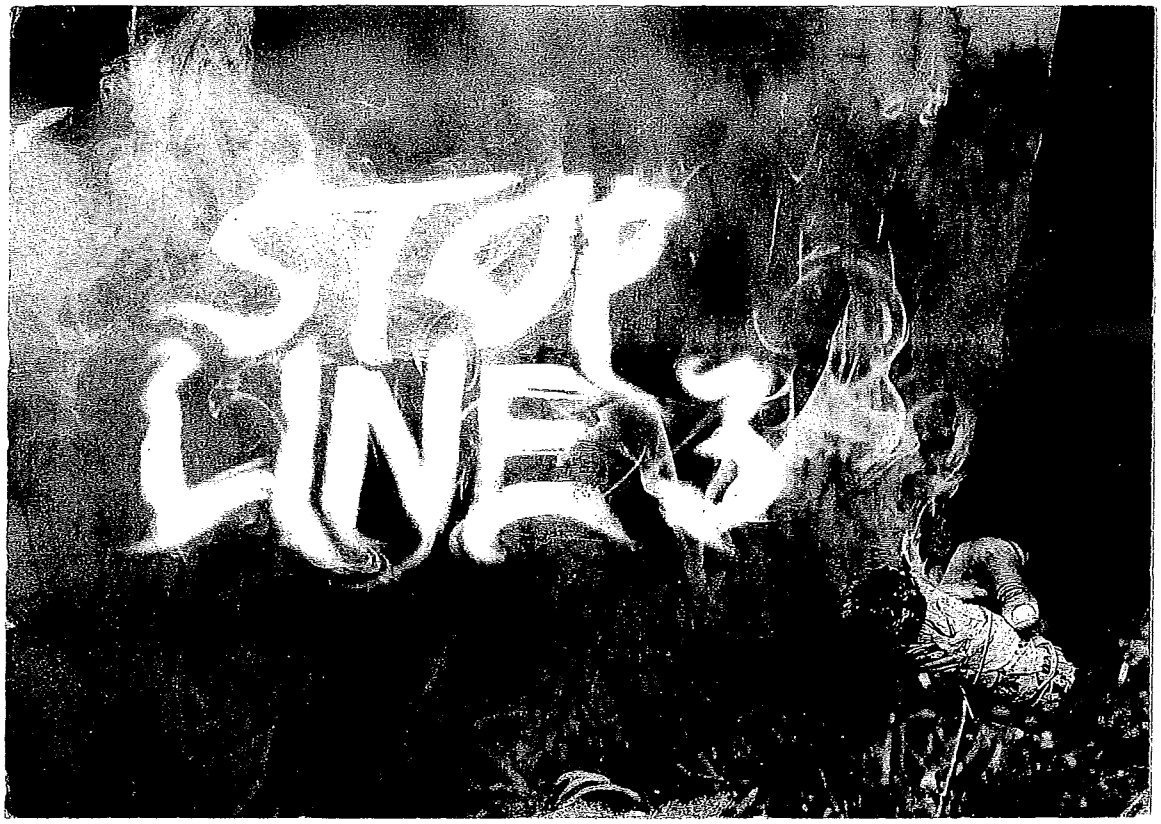

DEAR DEPARTMENT OF COMMERCE,
PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR
LINE 3 IN DOCKETS CN-14-916 AND PPL-15-137:

ST PAUL MN 550
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Climate Change,
sink holes,
lakes becoming dirtier
each year, Lake Michigan
was clean & beautiful as
a kid; now its dirty w/
dead fish.
This is God saying
Keep it in the Ground &
Love water
not oil

SINCERELY,
Charlynn
E.
Williams

USA
FOREVER

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST, SUITE 280
ST. PAUL, MN 55101-2198

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
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Docket numbers: CN-14-916; PPL-15-137

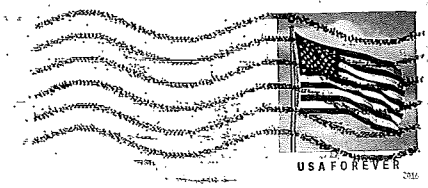

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Eric Alan Williams	(218)590-5272	
ADDRESS		
207 Oshkosh Ave		
CITY, STATE, ZIP		
Duluth MN, 55803		

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Gail Williams <gail009@sbcglobal.net>
Sent: Thursday, July 06, 2017 5:15 PM
To: MN_COMM_Pipeline Comments
Subject: Re Enbridge Line 3 Project -- Docket (CN-14-916 and PPL-15-137)

July 6, 2017

TO: Pipeline.Comments@state.mn.us

RE: Comment on the DEIS for the Enbridge Line 3 Pipeline

Docket CN-14-916 and PPL-15-137

This letter is in regard to the State of Minnesota Draft Environmental Impact Statement for the Enbridge Line 3 Project (CN-14-916 and PPL-15-137)

As a citizen of the United States concerned with the future health of our planet and all who reside here,

I strongly oppose allowing Enbridge to build the Line 3 pipeline.

These are some of my reasons:

1. This project violates Treaty Rights

The US government has a responsibility under federal law to honor the rights guaranteed to tribal members in their treaties. The proposed Line 3 corridor would violate the treaty rights of the Anishinaabeg by endangering primary areas of hunting, fishing, wild rice, and cultural resources in the 1855, 1854, and 1842 treaty territories. The US Supreme Court has upheld the rights of native people to hunt, fish, and subsist off the land.

Line 3 threatens the culture, way of life, and physical survival of the Ojibwe people. This is unjust and unacceptable.

2. This Project, and previous Enbridge Projects are poorly constructed, dangerous and polluting. Why should we trust that this one will be safe?

The steel and coatings are defective on other Enbridge lines. Many spills have already happened on the other lines Enbridge has built.

Data shows that for a given pipeline in any 10-year period, there is a 57% chance of a major spill. It's not a question of if these pipelines will poison water and destroy life, but when. That is unacceptable.

Enbridge has NO Legal Right to continue this destruction; and how can they in good conscience continue? Their only motive seems to be making a lot of money. The citizens of Minnesota and the rest of the United States do have legal rights to health and safety.

I am sick and tired of fossil fuel corporations in the U.S. and globally, putting their profits before the health and safety of people, animals, plants and Mother Earth. It's time to think about the future and health of ALL life.

3. This project makes only negative impacts on all concerned.

Enbridge should be making positive contributions to the state of Minnesota like job creation via clean energy development.

There is a real opportunity here for Enbridge to create jobs by maintaining, cleaning up, and dismantling their old lines. There are also many ways for them to invest in creating clean and sustainable energy systems: solar, wind, etc.

The State of Minnesota needs to insist that Enbridge invest their huge amounts of money in these positives. It's time for a win-win for everyone.

Sincerely,

Gail Williams

San Francisco, CA 94110

gail009@sbcglobal.net

Levi, Andrew (COMM)

From: Robert Willis <yooperbear@hotmail.com>
Sent: Thursday, June 29, 2017 2:32 PM
To: MN_COMM_Pipeline Comments
Subject: Draft Environmental Impact Statement for Line 3 Replacement CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I believe that pipelines are the safest and most economical way to transport needed energy for the United States.
I support the Enbridge Line 3 replacement project.
I believe that the DEIS has been well prepared and that the regulatory timeline should continue on schedule.
This is my comment on docket # CN-14-916 and PPL- 15-137

yours truly,

Robert Willis
Eveleth,MN

Sincerely,

Robert Willis
219 Adams Ave
Eveleth, MN 55734
yooperbear@hotmail.com

From: Molly Willms
To: MN_COMM_Pipeline Comments
Subject: NO to the pipeline!
Date: Tuesday, May 30, 2017 9:31:19 PM

M. MacAlister,

I am a Minnesota resident and I'd like to register my strong dissent on the new Enbridge pipeline.

Oil pipelines leak. It's what they do. As I'm sure you're aware, the controversial and illegal Dakota Access Pipeline has already had multiple leaks even before it has even reached full capacity.

Every day we non-Indigenous people spend on this land, every step we take on stolen soil, we owe to the brutality of our ancestors. Colonizers who raped and murdered people for the sake of money.

It is a tradition I'd as soon eliminate.

But this pipeline only continues that bloody, greedy terror that settlers started hundreds of years ago and continue in ever more insidious ways.

If you value humanity, the earth, goodness in any form, you will see that this project goes no further.

Please contact me with any questions or comments.

Regards,
Molly Willms
218-310-6032
--
Molly Willms
218-310-6032

Levi, Andrew (COMM)

From: Cheryl Wills <cjwills2006@yahoo.com>
Sent: Monday, July 10, 2017 8:25 PM
To: MN_COMM_Pipeline Comments
Subject: Pipeline (CN-14-916 and PPL-15-137)

To: Jamie MacAlister, Pipeline.Comments@state.mn.us

Please include this comment on the Line 3 DEIS in Dockets CN-14-916 and PPL-15-137.

I am from: Lakeville, MN 55044

The Line 3 Pipeline concerns me because the negative impacts to our environment far outweigh the benefits. I believe we should be working to build renewable energy infrastructure instead.

The DEIS concerns me because:

- Chapter 11, "Environmental Justice," acknowledges that pipeline impacts on tribal communities "**are part of a larger pattern of structural racism**" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. It also concludes that "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities" (11.4.3).
- The DEIS concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) **But it also states that this is NOT a reason to deny the project**!
- Chapter 6 states that Enbridge's preferred route would impact **more wild rice lakes and areas rich in biodiversity** than any of the proposed alternative routes (Figure ES-10).

  I want the Department of Commerce to deny the permit for the proposed Line 3, shut down the old line, and remove it from the ground.

Sincerely,

Cheryl Wills

Levi, Andrew (COMM)

From: leslie wilson <lesliekj@msn.com>
Sent: Monday, June 19, 2017 10:20 AM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137

Dear Jamie MacAlister,

I understand the corporate and economic argument for placing a pipeline in a path which reaches a delivery port on Lake Superior in the most expeditious fashion. It would be interesting to approach this decision from the perspective of how it affects humans, the wildlife and environment in Minnesota 150 years from now. It is certainly possible that Enbridge will exist in 150 years, but it is more probable that it will have either folded into another corporation or have been completely dissolved. Our descendants will most certainly be here, as will the land.

Creating and maintaining jobs is of vital interest to citizens of Minnesota. Not only those which will oversee the construction and maintenance of a pipeline, but also those which already exist and depend on the pristine resources which are at the center of the conflict. Whether it be outdoor guides, summer camps, native American wild rice production, national parks, camp sites, motels, supply stores, restaurants, etc. Those jobs, and countless others, depend on a pristine environment and will not exist without one.

There is no need to provide you with a list of spills from other piplelines, as you are certainly educated in your field and well aware of them. We can all agree that it is not a question of *if* a pipeline leaks, spills, gushes or ruptures, but a question of how to react and protect the environment *when* it does so. The safest route for the pipeline is the alternative recommendation of SA-04. This route will support local economies and create jobs on a route which is more accessible.

You are in a unique position to be able to make recommendations and take decisions which will benefit future generations of Minnesotans, both economically and environmentally. In a perfect world we would not need the resources this pipeline transports and some day we will not. Until that day arrives it is essential we all work to protect the resources which make the great state of Minnesota unique and spectacular. This decision will live long beyond our time. I implore you to please do your part to ensure the state lands on the right side of history on this issue. Our children and their children depend on you.

Thank you for your time.

Levi, Andrew (COMM)

From: Alisha Wilson <wilson.alisha8@gmail.com>
Sent: Sunday, July 09, 2017 5:55 PM
To: MN_COMM_Pipeline Comments
Subject: Opposition to the Enbridge Line 3 proposal Docket numbers (CN-14-916 and PPL-15-137)

To whom it may concern,
I am writing today with great concern for the citizens of Minnesota, those who live in the Great Lakes region, and the country as a whole. The Enbridge oil pipeline, Line 3, is 56 years old and runs underneath Lake Superior, putting North America's largest source of fresh water at risk. The aging pipe has ten times more corrosion anomalies per mile than any other Enbridge pipeline in the same corridor, yet Enbridge wants to abandon this contamination in the ground, walk away, and build an entirely new corridor through Anishinaabeg treaty territories. This new pipeline would destroy Minnesota's best lakes and wild rice beds. Not only would it negatively effect the Native American populations whose land would be disturbed and water quality degraded, but a spill or leak would negatively impact all those who depend on Lake Superior for their drinking water. The DEIS contains no spill analysis for tributaries of the St. Louis River or Nemadji River, where spills could decimate Lake Superior and the harbors of the Twin Ports. This is a huge oversight that needs to be addressed. Especially given Enbridge's history of continually violating permit conditions in this state and others.
I am also concerned about the effects a new pipeline would have on the people living on tribal lands. Treaty rights are one of many problems for Enbridge with this proposal. The state of Minnesota has treaty responsibilities to tribal members that are neither acknowledged or addressed. **Chapter 6** states that Enbridge's preferred route would impact more wild rice lakes and areas rich in biodiversity than any of the proposed alternative routes (Figure ES-10). **Chapter 9, "Tribal Resources**," states that ANY of the possible routes for Line 3 "would have a long-term detrimental effect on tribal members and tribal resources**"** that cannot be accurately categorized, quantified, or compared (9.6). It also acknowledges that "traditional resources are essential to the maintenance and realization of tribal lifeways, and their destruction or damage can have profound cultural consequences" (9.4.3). **Chapter 11, "Environmental Justice**," acknowledges that pipeline impacts on tribal communities "are part of a larger pattern of structural racism" that tribal people face in Minnesota, which was well documented in a 2014 study by the MN Department of Health. As well as, "the impacts associated with the proposed Project and its alternatives would be an additional health stressor on tribal communities that acknowledges that "The addition of a temporary, cash-rich workforce increases the likelihood that sex trafficking or sexual abuse will occur," and that these challenges hit Native communities the hardest. The DEIS ultimately concludes that "disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project" (11.5) *But it also states that this is NOT a reason to deny the project!* For these reasons and more this pipeline proposal needs to be rejected and renewable energy alternatives need to be explored!

Thank you for taking the time to read my concerns and to consider them carefully along with concerns from all the other citizens.
Sincerely,

Alisha Wilson
722 S Broadview
Wichita, Kansas, 67218

Sent from Mail for Windows 10

Levi, Andrew (COMM)

From: Mr. & Mrs. Robert Winkler <winklerbk@juno.com>
Sent: Monday, July 10, 2017 8:53 AM
To: MN_COMM_Pipeline Comments
Subject: Line 3, Oil Pipe Alignment

Dear Ms. MacAlister,

As I read the proposed Enbridge Pipeline stories it appears that the northernmost parts of the route for the pipeline are following the old in-place locations (replacing the old pipe with a new pipe in the existing trench). This seems like the right thing to do. However, as the alignment follows to the south and east a new alignment (not following the pipe in-place trench) is proposed. This seems wrong. If the pipe can be replaced up north in the existing trench why not in the south? I don't believe the logic that excavation in some areas would be too disruptive to other utilities. However, if that is the case, a temporary shut-off of the possibly-affected utilities might be the answer, if possible.

Also, I hope the materials to be transported in the new pipe do not include the more corrosive oil from tar sands. Why should the pass-through states be expected to accept this risky accelerated wear-prone pipeline technology?

Sincerely,

Robert J. Winkler
4924 Colorado St
Duluth, MN 55804
winklerbk@juno.com

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
KEN WOJTYSIAK	218-216-3470	KenaWojtysiak@gmail.com

ADDRESS
426 St. Louis River Rd

CITY, STATE, ZIP
Proctor, mn. 55810

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

POSTCARD
2015 King Fisher USA

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Val Wojtysiak	218-390-8886	val@reliablemn.com

ADDRESS
426 St Louis River Rd.

CITY, STATE, ZIP
Proctor MN 55810

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 260 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

Levi, Andrew (COMM)

From: Jill Wooldridge <jwool17@gmail.com>
Sent: Monday, July 10, 2017 8:16 PM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL15-137

Please Do not build the Line 3 pipeline!
It adversely affects the Native American community and directly threatens watersheds.
Thank you,
Jill Wooldridge
4716 13th Ave. S.
Minneapolis, MN 55407

From: Nina
To: MN_COMM_Pipeline Comments
Subject: Enbridge Line 3 Pipeline docket numbers (CN-14-916 and PPL-15-137) - AGAINST
Date: Wednesday, June 07, 2017 2:27:51 PM

None of Enbridge's proposed pipelines are safe for children or other living things. The safety record of existing oil pipelines is abominable. Nobody has any business building any more of them.

Sincerely,

Nina G. Wouk
1259 El Camino Real #215
Menlo Park CA 94025
nwouk@ix.netcom.com
650-329-9083
650-906-1779 (cell)
415-276-2087 (fax)

RECEIVED
JUN 26 2017
MAILROOM

JAMIE MACALISTER
ENVIRONMENTAL REVIEW MANAGER
MN. DEPT. OF COMMERCE
85 7TH PLACE EAST SUITE 280
ST. PAUL, MN. 55101-2198
RE: ENBRIDGE PIPELINE
IN WRITING IN REFERENCE TO DOCKETS:

CN-14-914 PPL-15-137

WHY IS THIS SITUATION ANY DIFFERENT THAN THE SANDPIPER PIPELINE THAT WAS GIVEN UP? ALL OF THE SAME CONCERNS FOR LIFE AND PROPERTY DAMAGE IS THE SAME:
AND ALL ABOUT MONEY FOR THE BIG CORP ENBRIDGE!

PLEASE, PLEASE REALIZE THE AREA THEY "COVET" IS PART OF THE NATURAL BEAUTY AND REASON MANY FROM OTHER STATES VISIT & CONTRIBUTE TO THE ECONOMY IN GENERAL,

AND THE LIVELYHOODS OF RESIDENTS.

LAKES, WETLANDS, WATERSHEDS, WILD LIFE, WILD RICE,

RECREATION AND QUALITY OF LIFE TO MILLIONS IS ~~AGAIN~~

IN JEOPARDY ONCE AGAIN:

1991 RECORD SPILL OF 1.7 MILLION GALS. AT GRAND RAPIDS, MN
2002 RUPTURE NEAR CONASSET
2009 EXPLOSION AND FIRE NEAR CLEARBROOK – TWO DEATHS.

DID ANY AMOUNT OF MONEY OFFERED BY ENBRIDGE COVER THE AFTEREFFECTS? LIVES CANNOT BE BOUGHT OR REPLACED!!

I LIVE IN THE PINE RIVER AREA, THE WHITEFISH CHAIN AREA AND THE MISSISSIPPI RIVER AREA WHICH BEGINS IN ITASKA STATE PARK, MN.

ALL OF THESE PROPERTIES AND MANY OTHERS ARE LIKELY TO LOSE VALUE, VISITORS AND PEOPLE.

FRANKLY, IT FEELS ABSURD TO HAVE TO PLEAD FOR THE SAFETY AND HEALTH OF OUR SURROUNDINGS!! ENBRIDGE SHOULD NOT HAVE THE RIGHT TO DESTROY AGAIN.

Thank You.

Joanne Woytcke
12048, HARBOR LN. CROSSLAKE, MN.

Ms Joanne Woytcke
12048 Harbor Ln
Crosslake, MN 56442

210 MINNEAPOLIS MN 554

21 JUN 2017 PM 1 T

JAMIE MACALISTER, ENV. REVIEW MANAG
MN. DEPT. OF COMMERCE
85 7th PLACE EAST SUITE 280
ST. PAUL, MN. 55101-2198

55101+2143

Levi, Andrew (COMM)

From: Deb Yanker Black <blacks@themoon.net>
Sent: Thursday, July 06, 2017 10:56 AM
To: MN_COMM_Pipeline Comments
Subject: pipeline

docket numbers CN-14-916 and PPL-15-137

Please do not build the new pipeline under our dear St. Croix, Totogatic and Namekogen rivers. They are a treasured resource that deserves protection, not exposure to such risk.

Sincerely,

Debbie Yanker
20588 Quinnell Ave. No.
Scandia, MN 55073

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
- **Years of environmental study:** Enbridge conducted more than 1,200 meetings with local stakeholders over four years and has spent thousands of hours studying the replacement route.
- **Infrastructure replacement:** As a maintenance project, the time is now to replace and modernize Line 3.

Docket numbers: CN-14-916; PPL-15-137

USA FOREVER

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Nicholas Ylitalo	218-252-5971	nick.ylitalo@vercoinc.com

ADDRESS: 45 11th St SE

CITY, STATE, ZIP: Menahga MN 56464

COMMENTS

We are also a commercial contractor and are interested in any of your building needs.

Thank You! Nick Ylitalo Vercon Inc.

AYS

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
CHARLES N. YOUNG		—
ADDRESS: 1121 N. CENTRAL AVE		
CITY, STATE, ZIP: DULUTH, MN. 55807		

COMMENTS For replacing and modernizing Line III For Enbridge's pipeline - I thought the "DEIS" was planed out very well!! I whole heartedly support the pipeline!!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

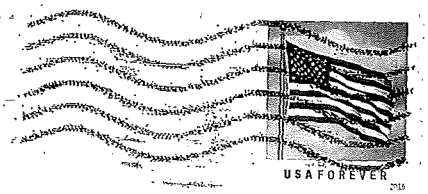

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Sheri Young	6125590137	sheristtitanic@yahoo.com

ADDRESS
P.O. Box 262

CITY, STATE, ZIP
Floodwood, MN 55736

COMMENTS

I support

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Beth Youngdoff <bbaraka10@gmail.com>
Sent: Monday, July 10, 2017 2:25 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Comment

Another tar sands pipeline is the last thing this planet needs. In addition, there are legal and ethical and moral issues that have been ignored that have great bearing on this proposal.

1. It is incumbent on the State of Minnesota and the pipeline company to receive free, prior and informed consent of all the tribes affected by the possibility o f this pipeline within the boundaries of the 1855 Treaty Territories.

2. This pipeline would have a disproportionate environmental impact on the indigenous communities so affected, while non-indigenous communities are left untouched. This is the epitome of environmental racism and to allow this to occur is an ethical and moral atrocity on the part of Enbridge and the State of Minnesota.

3. We are already all too familiar with the profound ecological and social devastation that the Alberta Tar Sands have caused, not only to indigenous communities, but to the land, the water and the fauna of Alberta. A once-pristine area has been turned into a foul and poisonous environment that will take thousands of years to recover. The State of Minnesota must refuse to be a part of spreading such disasters to the still-functional areas of its wild lands.

4. Enbridge has refused to take responsibility for their existing pipelines, which they have allowed to deteriorate to a state that endangers any community near or through which they run. They must prove that they are conscientious about the maintenance or safe removal of current pipelines before any consideration is given to allowing future construction. It is unacceptable that they should be allowed to take profit from their destruction without any regard for remediating the damage they have caused and will continue to cause.

It is no longer to be accepted that the only concern of Enbridge - and other firms of their ilk - be allowed to reap all the profits and abandon their responsibility for the cost of those profits to the communities and governments that have historically been left with the job of cleaning up their mess. Our taxes should not be used to let them off the hook for the massive damages they have brought into our communities and our planet. Your actions in refusing to allow this construction will serve as fair warning that they MUST change their model to accept responsibility for ALL aspects of their operations, not just the ones they can take to the bank.

Thank you for your consideration.

Beth Youngdoff

* * * * * * * * * * *

Three things cannot be hidden:
The sun, the moon, and the truth.
– Buddha

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Emily Zahn	218-244-2581	emily@willetransport.com

ADDRESS
38249 Deer Lake Way

CITY, STATE, ZIP
Grand Rapids, MN 55744

COMMENTS

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

ST PAUL MN 551
14 JUN 2017 PM 6 T

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3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Thomas Zahn	218-360-2581	tomcwilletransport.com

ADDRESS
38249 Deer Lake Way

CITY, STATE, ZIP
Grand Rapids, MN 55744

COMMENTS
The pipeline has been helpful to our Local economy

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

ST PAUL MN 551
JUN 2017 PM 8 T

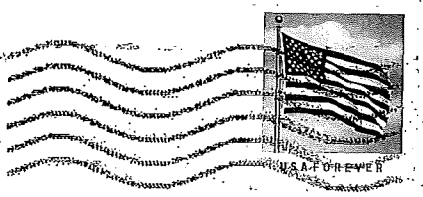

3 Replacement Project DEIS

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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

From: Mari Zaragoza
To: MN_COMM_Pipeline Comments
Subject: Protect
Date: Wednesday, May 31, 2017 3:37:59 AM

Mother Earth needs to be respected and honored. Please protect our only home!!

Sent from my iPad

Levi, Andrew (COMM)

From: szekowski@me.com
Sent: Thursday, July 06, 2017 5:29 PM
To: MN_COMM_Pipeline Comments
Subject: Comments on docket numbers CN-14-916 and PPL-15-137: Line 3 EIS

I am writing as a concerned citizen, a resident of Mendota Heights in Dakota County, to urge that this pipeline not be approved. My position is based upon:

1. Tar sands oil is the dirtiest in terms of carbon impact.
2. Pipelines are not safe. They leak (e.g., see links below). Perhaps "safer" than other modes of transporting oil, but not safe.
3. The carbon impact will be felt for decades and IS IRREVERSIBLE.
4. The surrounding environment will be immediately and adversely affected by the construction project.
5. Minnesota needs a full-force approach to fighting climate change. Resources must be used for clean energy. While much of this goes on in the private sector, state government can promote our values and provide incentives to do the right thing (invest in truly clean energy) and disincentives for destructive pursuits.

I am worried that my adult sons and future generations will live in a world that is less inhabitable, all because of the short-sighted, foolish, and greedy decisions our generation has made.

Sincerely,

Steven Zekowski

http://www.cnbc.com/2016/12/12/pipeline-spills-176000-gallons-of-crude-into-creek-about-150-miles-from-dakota-access-protest-camp.html

https://www.ecowatch.com/energy-transfer-partners-stock-2442760591.html

Levi, Andrew (COMM)

From: Nathan Zerbe <Nathan_Zerbe@msn.com>
Sent: Monday, July 10, 2017 10:55 AM
To: MN_COMM_Pipeline Comments
Subject: Comment on Draft EIS Line 3 Project

There is no long term benefit to Minnesota's economy, and more broadly, the United States does not need the increased petroleum capacity that would become available if this proposed replacement pipeline would be built and operated. There might be limited upside from the sale of excess petroleum to markets outside North America. On the other hand, any upside is far outweighed by environmental costs to the state of Minnesota and its citizens.

Nathan Zerbe
2696 Horseshoe Lane
Woodbury, MN 55125

From: JM
To: MN_COMM_Pipeline Comments
Subject: CN-14-916 and PPL-15-137
Date: Wednesday, May 31, 2017 11:03:24 AM

To Whom It May Concern:

The fact that we are considering another pipeline, with the Enbridge Line 3, is very troubling. Like all of the pipelines currently being pushed ahead in the current administration, the economic value vs. negative impacts to the environment and public health and well-being are greatly overlooked. Pipelines leak oil, no matter what. This will damage the immediate environment and poison the public waterways along the line. Pipelines are also built through Native American reservation land, which is a gross insult on top of injury to a people that our ancestors have double crossed and harmed over and over throughout our history and these pipeline actions show no remorse for this history.

America does not need oil pipelines. Oil and other fossil fuels are going the way of coal and the energy dinosaurs before them. Pipelines will leave a people indebted to an energy source going out of style for a time period where it will end up being more wasteful than necessary or beneficial, financially or otherwise.

I implore you to look at the research and where the world is moving in the energy arena. Green is just as profitable, useful, and sustainable and America, once a world leader on so many important issues, is now falling pathetically by the wayside. Don't let the greed and desperation of a dying fossil fuel industry to affect your decision. There are no winners in these debates. They too are holding on to tightly, when they should be making the shift to green energy, for the benefit of themselves and the American people.

Sincerely,
JohnMichael Zervoulei

Levi, Andrew (COMM)

From: Ben Zimmerman <zimme003@umn.edu>
Sent: Tuesday, June 20, 2017 12:01 PM
To: MN_COMM_Pipeline Comments
Subject: Enbridge Pipeline

These oil companies never have enough. To me, we are just beating around the bush. Besides rejecting just another route (Pipeline 3) the public must no longer put up with our oil addiction. Other sources of energy are available. Let's invest our funding in wind and sun.

Ben G Zimmerman (against CN-14-916 and PPL-15-137)

Levi, Andrew (COMM)

From: Mike Zipko <mzipper@gmail.com>
Sent: Tuesday, June 20, 2017 11:29 AM
To: MN_COMM_Pipeline Comments
Subject: Draft EIS for the Line 3 Replacement Project CN-14-916 and PPL-15-137

Dear Ms. MacAlister,

I support this project and the work that has been done to plan and assess the impacts going forward. I trust state regulators to enforce Minnesota rules and know that this an important part of our state's energy infrastructure.

Minnesota has strong rules and effective public sector review for projects like this.

Sincerely,

Mike Zipko
275 4th St E
Saint Paul, MN 55101
mzipper@gmail.com

Line 3 Replacement Project DEIS

- **The Draft Environmental Impact Statement (DEIS) is an in-depth analysis** that took more than 15 months and 27 public meetings to scope and develop.
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Docket numbers: CN-14-916; PPL-15-137

Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
Troy Zubke	218-536-0324	Tzubke7@Gmail.com

ADDRESS
37715 Cass line Rd

CITY, STATE, ZIP
Laporte MN 56461

COMMENTS
I would like to see Line 3 Replacement Project go thru!

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Line 3 Replacement Project DEIS

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Docket numbers: CN-14-916 PPL-15-137

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Jamie MacAlister
Environmental Review Manager
Department of Commerce,
85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198

I SUPPORT THE LINE 3 REPLACEMENT PROJECT

FULL NAME	PHONE NUMBER	EMAIL
CHRIS & TERESA ZUPANCICH	218-340-3223	ctzupancich@gmail.com
ADDRESS		
323 E LOCUST ST		
CITY, STATE, ZIP		
DULUTH, MN 55811		

COMMENTS: We support Enbridge's committment to replacing the aging L3 pipeline with a new pipeline. Enbridge has met the requirements for environmental studies and the State of MN must complete their reviews in a timely manner without further delay.

DECLARE THE EIS ADEQUATE WITHIN 280 DAYS

Levi, Andrew (COMM)

From: Christof Zweifel <christofzweifel@gmail.com>
Sent: Sunday, July 09, 2017 5:09 PM
To: MN_COMM_Pipeline Comments
Subject: pipeline comment

To whom it may concern,

I am very worried about the effect proposed Pipeline 3 would have on Minnesota communities. I am concerned that this pipeline will facilitate further fossil fuel use and the mentality of building infrastructure for short term gain. By granting Enbridge this pipeline, MN would be propping up the expiring fossil fuel industry and delaying progress towards greener and more efficient energy. As a young person heading off to college I would hope that my state would plan in order to ensure a livable future for younger generations. I am also worried that Pipelines have consistently threatened Native lands and culture by threatening the health of critical lake and prairie ecosystems. I hope that Minnesota will have the foresight to step away from harmful environmental practices and the doomed fossil fuel industry and towards a renewable future.

-Christof Zweifel
406 Highland Ave Northfield, MN 55057

CN-14-916
PPL-15-137

Levi, Andrew (COMM)

From: Erica Zweifel <ericazweifel@gmail.com>
Sent: Sunday, July 09, 2017 5:36 PM
To: MN_COMM_Pipeline Comments
Subject: Line 3 Pipeline DEIS Comment

To whom it may concern,

I am a of Minnesota and a local public servant. I am a member of the Government Alliance on Race and Equity (GARE) Elected Officials cohort for 2017. I am deeply committed to advancing racial equity. It is time for Minnesota to stop the disproportionate impact of negative environmental consequences on our minority populations. This is an outright explicit bias against native Minnesotans and quite frankly "racist".

While the DEIS does conclude that “disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed Project” (11.5), it also states that this is NOT a reason to deny the project. I think that disproportionate and adverse impacts on one racial group are an excellent reason to deny the project and I request that the final EIS contain language to the effect.

Sincerely,
Erica

Erica Zweifel
406 Highland Ave.
Northfield, MN

(CN-14-916 and PPL-15-137)

DEIS MEETINGS - 14-916 15-137

GRAND RAPIDS, MN - JUNE 6, 2017 - 6:00 p.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916

OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

IRA Civic Center
1401 NW 3rd Ave
Grand Rapids, Minnesota

I N D E X

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FACILITATOR: Welcome everybody. Thank you for coming out tonight. We're going to start with the public comment period in about two or three minutes, so if folks want to get settled, that would be great. We should have plenty of chairs for everybody, and we have extra.

We ask that people put their name on an index card if they want to make a verbal public comment, and we have 11 so far.

If you didn't put your name on an index card to make a verbal comment and want to, all you need to do is raise your hand, we'll bring you a card and make sure you're in the hopper to make a comment. And it also lets us know how many people want to comment so we can allocate the time accordingly.

We'd like to get started. So thank you all for coming tonight. My name is Patrick Field. I'm with the consulting team and just facilitating tonight's conversation.

I want to actually turn it over to Bill Grant, who's Deputy Commissioner for Energy for the Department of Commerce for the State of Minnesota, to welcome us and say a few

words as we get started.

DEPUTY COMMISSIONER BILL GRANT: Thanks, Pat, and thanks everyone for coming. If those of you who are still milling about could take your seats or at least quiet down so everyone can hear, that would be great.

Thanks again for coming, and -- so starting with what to expect at today's public meeting, you've been around to see the poster boards throughout the building, and all of these poster boards, of course, describe various aspects of the Draft Environmental Impact Statement.

So if you've had the chance to make that tour, even though you might not yet have had the chance to read the document, this will at least give you a broad overview of it.

The Environmental Impact Statement that we've drafted is really for informing decision makers who are going to need to make a decision about whether or not to grant permits for this project.

The Public Utilities Commission is the principal decision maker, although there are other permits that are going to be

required, if the PUC grants.

Two things, one, a Certificate of Need, and if they grant the Certificate of Need, then a route permit for the specific route that would be authorized.

There are going to be numerous opportunities throughout this process for people from the public to make comments, starting with this Draft EIS. Once we have a final EIS, there will be a second comment period, followed by public hearings this fall, once we move into the Certificate of Need phase of the case.

We expect the PUC to make a decision on this sometime in the spring of 2018, so in just a little under a year from now.

So all of the comments that you make today, whether you do it verbally, in writing, whether you speak to one of the court reporters who are over here or speak in front of the full group, all of those comments will be considered equally.

All of those comments are going to be compiled and shared with the public once

the comment period is closed.

What we're really seeking tonight, what would be most helpful to us, would be substantive comments on the Draft EIS.

For example, is there information that's missing from this draft? Are there places where it's unclear at all? What could be improved about it? And so those comments will then inform in the development of the Final EIS, which we intend to finish by mid-August of this summer. So -- and as I said before, this is what will help inform the PUC's decision about whether to grant these permits.

So I'm going to turn it back over to Pat to go over some of the ground rules for the public comment phase.

Thanks very much for coming, and we look forward to all your comments.

FACILITATOR: Thanks, Bill. Just a little bit about the procedure for tonight, and we'll dive in.

So what we're going to do is we've got a number of folks who want to comment so we're going to allocate up to five minutes per commenter. You don't have to take that

long, but if you want to take that long, you can.

Andrew here is going to run a little timer on screen so you can see how you're doing, and when five minutes hit, we'd like you to finish. If you keep going, I'll gently help you finish so we give everyone a chance to speak who wants to.

A few rules of the road for tonight. Please allow others to speak, too, so when the commenter is speaking, if people would listen and hear them out about whatever their view might be of some of the issues about the Draft EIS, that would be most appreciated.

We'd ask the folks who are commenting to honor the time limit so that everyone has an opportunity to speak.

People may not agree in the room. I suspect they don't in some cases, but we ask you to be respectful of each other about a different range of opinions. So certainly, if you want to be affirmative for someone's comment, that's fine. We'd ask people not to be negative about other people's comments.

State agency's role -- and I want

the state agency folks who are here today from various agencies and departments to raise their hands so folks know in the room. There's a number of folks from Commerce, of course, the lead on the EIS, DNR and others. The Pollution Control Board actually helped, assisted in a number of ways.

All those folks are here to talk with you informally. They're here to listen tonight, so their role during the comment session is to listen. So they're going to be listening.

And most importantly, we've got a court stenographer who's going to be taking every word of the comments and recording them. So when you do come to comment -- and we'll show you different ways you can do that -- actually, we just need you to state your name and spell it so we have the proper name and spelling of the person who's commenting, and then we'll start the timer for your five minutes after you do that.

We do need to end roughly on time, which is 9:00 o'clock, because of the facility and the like.

Just a few things to note. As you might know, as we came in, the State gave you two things. If you do want to do a written comment tonight, there's a longer form. You can fill that out and there's boxes right over here you can put it in by the end of the night, and you can fill that in if you wish to.

There's also kind of a guide, not only to the meeting tonight but also the EIS, which is this document here, which you're welcome, of course, to take home as well. And the Draft EIS is enormous. It's sitting over there if you want to look at it. We ask you do not take that home, and you probably don't want to because it's so big. But this hopefully will be a helpful guide to that piece tonight.

So I think with that, Andrew, why don't we pull up the clock. What I'm going to do is just -- I've got these -- I just pulled the cards out of the box. I've got the order. And what we've got, folks, is -- what we'll do with the mic is we can -- if you want to sit where you are or stand where you are, we'll bring you a mic. We've got wireless ones.

If you prefer to come up to the

side of the room, that's fine. Don't stand too much in front of the speakers, because there will be feedback, so watch that.

Again, our first commenter tonight is Russell Hess.

Russell, just as a reminder, say your name and spell it.

MR. RUSSELL HESS: My name is Russell, R-U-S-S-E-L-L, Hess, H-E-S-S.

First, I want to emphasize how thorough and complete we feel the DEIS is. We also want to thank the Department of Commerce for keeping the process on schedule so far.

Second, we see in a few areas where the DEIS could be improved.

First, employment impacts based on an assumption that zero workers will be local is way off base. My union and others have agreements in place that will ensure local workers will be working on this project.

All along the route we have guys and gals from Minnesota that are working in other states now. They want to be in Minnesota, working on pipeline projects. This will help them come home and work close to

their families.

We also feel that the DEIS should take into account other benefits of high quality union jobs and career pathways other than just working on the pipeline directly, and we believe that the lack of discussion of the risks of moving crude oil on rails, including the very present accident risks, should also be more fully addressed in the DEIS.

Finally, we would like to note that proposed Line 3 replacement reduces estimated spill risks by 40 percent, and that the proposed route exposes fewer high consequence areas to spill risk than any of the alternatives. Thanks.

FACILITATOR: Thank you, Russell. All right. Next, I've got, and if I mispronounce your name, please forgive me ahead of time. I'm sure I'm going to do that. I've got Todd Rothe.

MR. TODD ROTHE: Okay. It's Todd Rothe, T-O-D-D, R-O-T-H-E. I live in Duluth near Hermantown. I own a construction company in Superior. We've been doing work on Enbridge projects for 20 years, at least in my career.

And I just think there's many things to say about the project -- a lot of people will say about the economic benefits for the state and for the people that live here and work here and need these kind of high quality, high paying jobs.

But I also want to touch on the fact that Enbridge has always and continues to train every person that works on their project about the importance of safety, not only toward their people but our people, our company, they care about.

And they also care greatly about protecting and doing their projects with the least impact to the environment as possible.

So that is drilled down on every project, large and small. I worked on many very small projects. I've been involved with some very big projects, but it's all the same. They intend to do things the right way, and I've seen it and witnessed it firsthand for, again, 20-plus years.

So with all of the other points being made about -- you know, the benefits, I -- you know, stopping a pipeline like this

does nothing, because Canada is going to produce it, and they're going to sell it to some other country if we don't take it.

If Minnesota doesn't want this route or doesn't want this pipeline in their state, well, perhaps North Dakota and South Dakota and Iowa and Illinois and Indiana, or whoever, they will all receive the tax benefits to the counties. And I know there's some counties in Minnesota that are in desperate need of the tax revenue after this pipeline is built once it's shipping materials.

Anyway, I'd just like to conclude by saying I do know firsthand that the project will be done safely and in the most environmentally friendly way possible.

Thank you.

FACILITATOR: Thank you. We'll keep track of that mic. Winona LaDuke is next. Bring her the mic.

Name and spelling for the court reporter.

MS. WINONA LADUKE: (Indiscernible). My name is Winona LaDuke, and I'm from the White Earth Reservation, and I'm a

traditional harvester, and I'm also the executive director of a national organization called Honor the Earth, and I'm an economist by training.

I was asked to kind of give that description a little bit more clearly. And I'm with everybody here. This is our territory, and I'd like to make sure that the -- I can still have good water here a long time from now.

So what I wanted to say is a couple of things.

First, I have to ask the Department of Commerce why we don't matter. That's what I have to ask. I have to ask that, although all of the study and all of the discussion and all the testimony and all the crying we presented about the duress in our communities, you acknowledged it, and you said, "We understand that you guys are in really rough shape. We understand that your people are dying at really 44 years of age. We understand you all have diabetes. We understand that you can't get out on your land. We understand that you have health stressors,

and we understand that this project is going to stress out the people of White Earth."

It's going to add more stress to all of our communities, Leech Lake, Fond Du Lac and Mille Lacs, East Lake.

"But we don't think that that is enough of a reason to stop the project."

So I want to ask the State of Minnesota why we don't matter. That's what I want to say, is, why don't we matter, because this is the only land we have. And it is really -- you know, it's disheartening to see that you would not just say, "This is too tough."

This is the part that hits the most wild rice lakes. It will take our most precious territory.

So that's the first thing I have as a comment on the DEIS.

The second thing is, what about abandonment?

You know, we all know that Line 3 is in a weeping state. We all know that. Enbridge says that it's in a state of deterioration. I know that that's because it's

a really old pipe, and I know there's a bunch of other really old pipes there.

What I'm trying to understand is why we don't have a full EIS on abandonment.

What I want to know is why there's only 14 pages on abandonment. And I want to know how we're going to deal with this problem, because this is not just a Minnesota problem, it's a national problem.

And what I know is that cleaning up the mess of hydrocarbons weeping for 50 years into our ecosystem is a big mess.

I know there are leaks all along this line. Ten thousand anomalies is what they are talking about, and I drive over here and there's like burping substations and all kinds of stuff.

So what we're saying is we'd like a cleanup.

If you got an underground tank in the state of Minnesota, you gotta clean it up. How come you don't gotta clean up your pipeline? How come the liability is left for all of us?

And then what's the plan for the

other four lines, or five lines, and what's the plan for the next corridor?

We need some pipeline abandonment regulations. We need to be sure that things are cleaned up. And there are five times as many jobs in that than in just throwing down new pipe.

That's what we should be talking about, is infrastructure that's going to protect our water and protect our people.

The third thing I want to talk about is the cumulative impact assessment. Our staff and I reviewed a lot of this.

It's a very long report, you know, and I know people worked really hard on this report. There is no question.

We have a lot of comments on things that were a little short in it, but I really feel like -- you know, I'm looking at this and this is an eagle feather, and this eagle feather is from Lake Athabasca, which is in the middle of the tar sands.

What I know is the people up in that territory are dying from the tar sands. Their water is contaminated. Their food

systems are contaminated. Their animals are dying, and they have bile duct cancer. These people are dying at a very fast rate.

And I know that corporations are not investing in more and more tar sands production for a lot of reasons.

But what I want to know is what's fair about tar sands? What's fair about the dirtiest oil in the world coming our way? What's fair about all the health effects on poor communities upstream, and what's fair about the people that live, whether they're in Detroit or whether they living down there in New Orleans, around that area, next to refineries that are dirty?

Don't tell me it's because we need the oil, because we all drive around. I got that. I've lived in the fossil fuel era my whole life, but what I want is a graceful transition out of it. I don't want to choke on it. I don't want everything contaminated. This is our chance. This is our chance to change that.

I want a full assessment of the cumulative impact. We did a little bit of math

on the carbon. You know, how are you going to pay for $262 billion, you know? How you going to do that, Enbridge? Who's going to pay for the carbon impact of all this on our environment? So I want a full assessment.

And the last thing is, really, this no-build option. I think you are very weak on the no-build option. You act as if it was like, well, it's just going to like fall apart. I'm like, Enbridge got a brand new line in a few years ago. You guys worked really hard to build that line, and that line is probably pretty tight and pretty good, as pipelines go.

I know people worked really hard. I get that Line 3 is not the same thing as the clipper, but all I want to say is, look, they twisted the regulatory process to get in that line. You got in a brand new line.

I'm saying the no-build option is close down the leaking line. Close down the leaking line. No new corridor. Just close down the line, because the fact is is that between Canada and the United States, Trump and Trudeau, they have approved 2.4 million barrels

a day, more pipeline capacity than there are pipelines.

That's between TransCanada, the Keystone Excel, Energy East, and Line 3. Globe and Mail, Toronto Globe and Mail says pipeline capacity approved is 2.4 million barrels a day more than they're ever going to get. That oil is not going to come out of the tar sands, and there is no reason to put us all in jeopardy for that. That's it.

Thank you. Miigwech.

FACILITATOR: Next we have Laura Turman. Laura, raise your hand.

LAURA TURMAN: Laura Turman, L-A-U-R-A, Turman, T-U-R-M-A-N.

I work as a millwright out of Union 1176. I earn my money from welding on pipe to actually mostly working in the pumping stations at Fern Lake maintenance and mechanical repair.

However, we need to look beyond that, the bigger picture. My salary is nothing compared to water and lakes and the environment and the climate change. I think that's way more important than my job, even.

The jobs in Minnesota tourism that stand -- that are at risk also. I guess, that's just -- with that, thank you.

FACILITATOR: And next we have Vern Simula.

MR. VERN SIMULA: My name is Vern, V-E-R-N, Simula, S-I-M-U-L-A.

I have two concerns. One deals with the Certificate of Need, and the other concern is one that has already been expressed, the issue of abandonment of existing Pipeline 3.

Regarding Certificate of Need, my first comment is -- it's kind of an editorial one, kind of tweaking. I find that there is much more discussion of Certificate of Need in the executive assembly than there is in Chapter 5. I think much of the charts and everything else in the executive summary should be put in where it really belongs where people can really see the relationships between the various options that the PUC has to offer.

My big concern is on the criteria, which are expressed in part 2168, and that is that -- which reads something to the

effect that would the denial, would the denial of the Certificate of Need adversely affect the future adequacy reliability and efficiency of energy supply to the applicant, to the applicant's customers, but mainly to the people of Minnesota.

And I am guessing that this criteria, criterion, was established or thought of in the days before our huge concern about what fossil fuels are doing to our climate.

And I think -- I urge that the MPUC really revisit their assumptions about what this will in effect do for the state of Minnesota, for the people of Minnesota, in terms of continued carbon impact, fossil fuel use, on our climate.

But not just on our climate, because as our climate changes, I think the first thing it's going to affect is our food security, our food supply. I kid you not, I think it's going to dramatically impact corporate farming, and for that matter, family farming.

So that's an issue.

There are a number of ways in

which the continued use of fossil fuels and the transport of fossil fuels is going to affect us in terms of our quality -- not just our quality of life, but just even our -- as Winona mentioned, our health as well as our well-being.

And the other quick comment about abandonment is that, to put it simply, there are no laws. There is no administrative rules and no mechanisms for enforcement for dealing with abandonment, and so I think this is a huge issue that needs to be an integral part of the EIS. Thank you.

FACILITATOR: Next is John Munter.

MR. JOHN MUNTER: I'm John Munter from Warba; J-O-H-N, M-U-N-T-E-R. W-A-R-B-A, by the way.

And I'm -- several of us developed a group here called Minnesotans for Pipeline Cleanup, because we're really concerned about the abandonment issue. Personally, I don't think Enbridge wants to have a redo of Line 3 down the old tracks, because of the possible legacy contamination

under it and various other reasons, and the tribes don't want to either.

So I think abandonment is really a big issue for this area. And I found a lot of discrepancies in DEIS that tells me that the PCA and the DNR and the DOC and -- never really came up here and looked at the pipes that they're talking about. They have no idea.

I found this one -- one diagram, this is in Chapter 4. It's called, "Typical Right of Way Configuration of Enbridge Main Line System." It's got Line 2, and then Line 13, and then Line 3, and then Line 4.

So Line 3 and Line 4 up here are next to each other, if you examine your pipes, but Line 13 is not next to Line 3. It's Line 1.

And we did a study on this, Wawina up to Grand Rapids, 14, 15 named roads that we checked the pipelines on, so there is obvious errors like this.

And plastered throughout the DEIS is the assertion that, oh, they're only 10, 15 feet apart. Well, if you check your pipes in this area, they're way more than that, way

more.

In fact, our study here says between Lines 1 and 3, the average is 18 feet apart. And the average between, distance between Pipes 3 and 4 is actually 30.6 feet apart.

If you just check your pipelines in your area and maybe come to the next hearings in Cass Lake or Floodwood and support me on this, we'd appreciate that.

But, you know, I mean the DEIS didn't even get right the information from Enbridge, actually.

They only cover about 13 pages in Chapter 8, which is kind of a bastardization of Enbridge's material, which is 86 pages in appendix B.

If you look there, they say that the pipes are actually -- a majority are between 7 and 18 feet, okay.

And so how do you collapse the discrepancy between those numbers?

Well, chances are you'll find a lot of close numbers, close distances between Lines 1 and 3, and that's where you get the

51 percent plus some close distances on Lines 3 and 4.

And so there should be plenty of opportunity for Enbridge equipment to go down in between the Lines 3 and 4 and remove pipe.

And so that's what we're asking for is landowner choice on this.

There is a false choice between, oh, it's all this or all that. It's all take it out or leave it in.

No, there's landowner's choice. There are some landowners who may want to leave it there, because the pipes are close together and they're scared about what might happen, whatever, so fine.

But in the majority of cases where there's plenty of space, then the pipes should be removed, because we're looking towards the future. Once you don't have that heavy oil there, you've got the pipes rising in the field like a rock in a field there, and how much more exposed pipe we're having.

They also don't even talk about exposed pipe much.

They quote their study from eight

years, nine years ago, I think it was, which is like one-fifth the timeline of Line 3. And what they should do is look at Google maps. You'll find a lot more exposed pipe there.

With all of that heavy oil there, though, of course it's going to rise in the future, and there's no study of how much is it going to rise year-by-year. We have no idea what the impacts of not having that oil in there is.

And so pipeline -- oil pipeline owners, I mean, have -- I'd like to know what the property value discrepancy is between having a rusty oil pipeline that's rising in your field, it's not being used, compared to not having it there.

I mean, let's calculate that for the landowners, the landowner value.

So that's all I have to say at the moment.

FACILITATOR: Vicki Andrews, do you want to raise your hand. Vicki is right here.

MS. VICKI ANDREWS: My name is Vicki Andrews, and I'm from -- V-I-C-K-I,

A-N-D-R-E-W-S, and I'm from Grand Rapids, Minnesota.

First of all, I'd like to speak a bit about the pipeline abandonment issue, because that's a big issue here in Grand Rapids. Enbridge would like to abandon Pipeline 3 and leave it in the ground. It is old and has had many structural anomalies, as we've been hearing. There has likely been oil leaked into the area that we're not even aware of.

There also can be problems from the proposed treatment chemicals in the pipeline coating and their degradation, and possible PCB contaminations from lubricants.

Over time there can be shifting of the abandoned pipeline into unplanned water conduits, which can cause a natural drainage of water deep underground.

The abandoned pipeline can also begin to rise toward the surface at watercourse crossings in wetlands and in locations where soil density is high. What do we do with them, then, as they're lying on the ground deteriorating and rusting in place?

How will these abandoned pipelines, whether line exposed or still buried, affect current and future landowners?

If Enbridge is not required to remove the pipeline and restore the damage to ecosystems, there may never be a full accounting of the ongoing and future contamination surrounding the area. And we have no idea of future problems that may occur.

It's my understanding that this will set a precedent for leaving -- for abandoning a pipeline and leaving it in place in the whole United States. And I don't want Minnesota to be the one setting this precedent that could lead to all kinds of damage and destruction.

Regarding the proposed route for the new Line 3, I believe that the pipeline you are considering adding to northern Minnesota will do nothing to improve life for Minnesota residents. It will put billions and billions of dollars into the hands of the wealthy owners, stockholders, and CEOs of Enbridge and their partners who make their fortunes from fossil fuels.

Chapter 5 of the document states that, "Line 3 will create zero permanent jobs," and that, "Existing operation staff would be able to operate the pipeline," and that, "Few additional employees would be hired to assist the staff."

It also states that, "All workers would relocate to the area and zero construction jobs will go to Minnesotans. The pipeline would have no measurable impact on household income or unemployment," it goes on to say. "On the other hand, we need to realize the enormous number of jobs that can be made available in the green energy sector in the coming years.

"In fact, if we were to truly make a commitment to changing from a fossil fuel economy to an economy fueled by solar wind and hydro, we could provide many good paying jobs now and into the future.

"It's obvious that building new routes through Minnesota is only going to destroy more forests and endanger more wetlands, rivers, and lakes."

Regarding the proposed route for

Line 3, the DEIS concludes that, "Disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed project."

It also states that, "Enbridge's preferred route would impact more wild rice lakes and areas rich in biodiversity. It also runs very close to the headwaters of the Mississippi River." Think of the disaster if a leak were to occur there.

It's my understanding that the proposed pipeline will carry approximately twice the capacity of the pipeline it is replacing, and it will be carrying tar sand oil, which is the most damaging and destructive oil in so many ways.

I hope that everyone here has given some thought to the future we are handing down to our children and grandchildren. If we continue on our present path, in the very near future, whether it will be 20 years in the future, 25 or 30, our children and grandchildren are going to be suffering tremendously from the havoc of climate change, and they will know that we, at this time in

history, could have done something to turn things around, and we, for whatever reasons, chose not to.

We are a very intelligent and creative people, and we are capable of turning this entire situation around if we put the money, the jobs, and the technology into turning from a country dependent on oil, gas, and coal to a country run on renewable energy. Our children can inherit a world that they will survive and thrive in, and they will know that we did choose to do something to secure their future.

Thank you.

FACILITATOR: Thank you, Vicki.

Brian Hanson, Brian, right there.

MR. BRIAN HANSON: Good evening, my name is Brian Hanson, B-R-I-A-N, H-A-N-S-O-N.

Tonight I want to speak to the Draft EIS, and in my opinion it supports Line 3 replacement Certificate of Need and also the applicant's preferred route.

I'm going to speak from two different points of view here. One of myself,

a person who grew up here in Grand Rapids, lives in Duluth, avid sportsman. I spend a lot of time in the outdoors.

I'm also going to speak from my more professional point of view, which is as an economic developer and the impact of this project on our region.

So let's start with the outdoorsman side of me. I support the protection of resources. I'm a person who's involved in recycling. I ride my bike when I can. I do what's right for this environment, and I also rely on petroleum products every single day. I relied on them to get here today for this event. Like most of us, as was pointed out earlier, we all do.

I also rely on it just for this bottle right here, for my soda, or your water, as most of us are relying on it today.

We need the oil. We need it right now. We can work our way out of this, sure. But it's going to take time.

So based on -- then we look at what's the exposure to our community of oil moving through it in different ways, and I

think that the table -- most of us picked up a booklet when you walked in. If you look at page 17 and table ES 2, the least exposure of any of the alternatives comes from the applicant's preferred route.

That's with all these different impacts taken into account. The least exposure is the preferred route selected by the applicant. We need this stronger infrastructure to defend our environment. The new replacement for Line 3 will do that, and we should follow the safest route, which has been outlined.

Next, I want to just speak to the economics of this, and I appreciate the impact that this project will in fact have on our region.

$7.5 billion invested, first of all, to protect the environment and to move this needed commodity. $1.5 billion of that spending happening right here in the state of Minnesota.

8,600 jobs. As Russell pointed out, we believe that the vast majority of those jobs will be from people in this state.

The good news is even for the jobs that are coming from people from outside of the region, they're going to come here. They're going to live here. They're going to spend to the tune of $160 million in hospitality and lodging, which supports another 2,800 jobs here in this region, which is included in the 8,600 that I mentioned earlier.

A side note on these construction jobs, because I really get tired of people saying, "Oh, they're just temporary construction jobs."

Every project for a construction person is a temporary job. They do the project and they move on to the next one. For the people who live in this region and work on pipelines, this is a luxury. They're going to be able to stay in the state of Minnesota.

They're not going to be chasing off to places like Ohio and leaving their families for a two-year period. They're going to be able to be here, and that alone is a very positive impact for our region.

So I just want to conclude by saying I do applaud the questions that are

being asked tonight. I think they're good questions. I think this is a good process, and I applaud the thorough review that the folks from the State have done to this point.

But I think that that review points out that this project is safe, the safe way to move energy in our state, that the time is right to do this project, and that we should move forward.

Thank you.

FACILITATOR: Next we have Bud Stone.

MR. BUD STONE: Hello, my name is Bud Stone, and I am the president of the Grand Rapids Area Chamber of Commerce. Our offices are located at One and NW 3rd Street in Grand Rapids, Minnesota. The spelling of my name is B-U-D, S-T-O-N-E.

The Grand Rapids Area Chamber of Commerce would like to go on record as a supporter of Enbridge's Line 3 Replacement Project. Enbridge has been a great asset to the economy of Minnesota, and especially in the Grand Rapids area during the recent recession.

It was our fortune that during

that turndown in the economy, that Enbridge was in the process of doing a major maintenance project in our area. And the economic impact of that project had direct results on our ability to deflect the negative impacts of that recession.

Line 3 is greatly needed to transfer crude oil from the oil fields to the refineries.

Today, many of our businesses and communities are suffering the negative effects of oil being transported by rail, and that trend will not get any better until adequate supplies of crude can be moved by pipeline rather than strangling our commodity exchanges by using the rail.

Green, coal, raw unfinished products from our businesses can't use a pipeline. They need the rail. Some people will actually state that Line 3 will do nothing to create jobs or have positive economic impacts in the State of Minnesota, and nothing could be further from the truth.

If you don't believe me, just ask the people who work for Enbridge, a lot of them

in this room today, or the people who collect the taxes that Enbridge pays.

The Line 3 project is also about national energy security.

Minnesota needs to step up to the plate and do what we can to ensure that we have adequate energy resources for the future available.

Remember, your military runs on oil. We also need to do our part to make sure that we have adequate transportation infrastructures in place to move raw materials to the places they need to be, and that includes pipelines.

Lastly, if you've done your homework, you know that recently the U.S. Justice Department announced a consent decree with Enbridge that specifically states that Enbridge shall replace Line 3. And I think that action addresses the Certificate of Need issue.

I want to thank you for the opportunity to comment on this important project. Thank you.

FACILITATOR: Bill Hamm is next.

Bill, do you want to raise your hand.

MR. BILL HAMM: Bill Hamm, B-I-L-L, H-A-M-M. I'm the loudest spokesman for OUFDA; old, ugly, fat but determined activists.

I have several concerns about this project. Number one is why would you so deeply disturb the soil in a brand new area when you can dig up the original pipeline and put the new one in that place? That's the only thing that makes sense here, if you do put the pipeline in.

At the same time, then, you can address some of these other risk issues like cleaning up the mess that's there underneath that pipeline instead of issue number 2, leave it for all the local communities who own property or who are parts of -- or have parts of that pipeline in 'em.

You're leaving a disastrous liability to every individual township, county, in this -- that's involved with this pipeline. This liability is not being addressed, and the hillier the country, the worse this liability becomes.

And lastly, putting this pipeline in a new place opens up the possibilities for a new anomaly for the pipeline to run into.

My grandmother's house, my grandparents' house was built on a quicksand pit. That quicksand pit extended for at least a quarter of a mile. The house finally had to be destroyed because it kept tipping into it, the more water we pumped out from under it.

These anomalies exist out there. We've seen them. We can look at one between here, right at the Itasca county, Aitkin County line going toward Duluth, on the south side of the highway, a whole swamp cut in half by such an operation, six to nine foot deep within the soil.

This is the kind of thing that we can produce by taking this new route. We've already done it along the existing route. There's absolutely no sense whatsoever in exposing a new route to these dangers.

Thank you.

FACILITATOR: Rod Struble. Name and spelling for the record.

MR. ROD STRUBLE: Hello. My name

is Rod Struble, R-O-D, S-T-R-U-B-L-E. I live in Warroad.

I'm not an environmentalist or an activist. I'm a landowner with an Enbridge pipeline easement right through my property. I'm here to state for the record that I'm adamantly opposed to the deactivation abandonment of Line 3 in place.

I will be adversely affected, both financially and physically, by the abandonment of Line 3. It will financially affect the value of my property resalability, and when it's closed, a potential fire; that my property contains a rusting hulk of environmental hazard lies just below the surface, exposed to which I nor anyone else would be able to counsel a prospective buyer about.

It will become a physical hazard after the first winter, because once they deactivate and it stops producing heat, the frost will push it to the surface.

The easement that is -- that they are using now was granted in 1949. Easements of this type were granted for the betterment of

our communities and our country, not through the pipeline company to make money.

My easement specifically states, "Grants right of way of easement for the purpose of lane maintaining, operating, patrolling, altering, repairing, renewing, and removing, in whole or in part, a pipeline for the transportation of crude petroleum, its products and derivatives."

Nowhere is it stated or implied that once a pipe is deemed unsafe or financially undesirable, that they could shut it down and leave the rusting hulk of industrial waste on our lands.

This will only benefit Enbridge, not our community or our country. To even consider allowing them to leave this rusty environmental hazard in the ground is just wrong, not to mention the fact you don't have the right to circumvent an easement that has been in effect for 68 years.

If Enbridge is not going to use the area of easement, of which Number 3 lies, the pipe should be removed, the land released back to the landowners. If it needs to be

replaced, it should be replaced utilizing the same trench. They have the means, just not the incentive. It all boils down to the money and their greed to keep it.

It is your job, the Public Utilities Commission, to protect our land and our environment. Do it.

Thank you.

FACILITATOR: Bill Whiteside.

MR. BILL WHITESIDE: Bill Whiteside, B-I-L-L, W-H-I-T-E-S-I-D-E, in Hibbing, Minnesota.

I support the new route for the proposed pipeline. I'd also like to address a little bit about carbon demonization.

Some of this oil that might be going through this pipe comes from Canada. And Canada is one of the largest natural oil spills in the world.

It's a huge oil spill that's being cleaned up by men and women and being shipped out. Of course, there are hazards involved in everything. But you know this is -- it's really something, if you look at it that way.

Another thing is carbon dioxide, carbon fuels, it's got a dirty name. But carbon fuels have provided us with a luxury that we have of living a long life in a wonderful environment, that allows us to eat well, and have a wonderful education for our children, live in a peaceful society where we feel at ease amongst each other. We aren't scrambling for resources.

This has been a benefit of carbon fuels.

Some of the things, also, that carbon fuels have brought us, as opposed to the common perception, is cleaner water.

According to the World Development Bank indicators, we have -- we've seen more fossil fuel usage. We've also seen an increase in clean water.

Energy allows us to have cleaner water. This is a huge deal. And not just in the developed world, but in remote places in the world where people are suffering every day, where they're struggling to live, where they're struggling to find clean water. Fossil fuels, coal, oil, these are the lifelines for these

people for their future.

So that's a little bit about that. And we are looking, you know, for alternatives; wonderful. Let's look for alternatives that can be comparable to the great benefits that carbon has produced for us.

We like the idea of being able to use the sun. That's terrific. You know, wind, sun, it would be wonderful, the more we can utilize our resources, the better.

However, what we're ignoring, to our detriment, is the huge devastating costs that are being left on the lands of China to mine the rare earths for the neodymium and other rare earth metals that are necessary for our windmills and such; huge, wastelands that we're leaving there, and we're responsible for that.

And yet we're calling this clean energy. Carbon is a clean energy. It's extremely clean, and we need it very seriously.

I think we have, you know, the opportunity here to replace an aging infrastructure that's shown its weakness.

And we need to move forward with

replacing that in a timely manner so that we don't suffer the foreseen costs of ignoring the intelligent management of our infrastructure.

And so that being the case, we need to replace that infrastructure, whether we clean that pipe and leave it in the ground, the owners have the responsibility of making sure that the landowners are whole in the end and that our waters are preserved and protected.

And so basically, that's pretty much what I have to say about that.

So thank you very much.

FACILITATOR: Thank you, Bill.

I've got James Hietala.

MR. JAMES HIETALA: Thank you for the opportunity to address this. My name is James Hietala, H-I-E-T-A-L-A.

I look at this Environmental Impact Statement, and one thing concerns me right off the beginning, and it's already been mentioned, and that's the option of not building or replacing the line. How can we have an environmental impact statement that doesn't address the most beneficial option for our environment?

The president, I congratulate him, he said our emissions were going to cause problems for future generations, and he said we needed to take action now. I really appreciate what President Lyndon Johnson said in 1965. We've had -- that's over 50 years, start changing our economy. And we haven't done it. Enbridge is an energy expert. They have the option to pursue more environmentally conscience options.

They haven't. They're looking at tar sands oil. You look at pictures of tar sand oil extraction. It's devastating. It's horrible. I want Minnesota to have nothing to do with that.

The existing Pipeline 3, actually a number of Enbridge lines cross my property in Warba. I want nothing to do with more greenhouse gas emissions. We owe it to our children and grandchildren to have more respect for them and their future. We can do better. We've had plenty of time to do better. We've got to act now, and the EIS needs to look at the option of no tar sands oil.

That would also help to be the

best option for no leaks; no oil, no leaks.

When we look at the existing line, as I said, their line crosses my property.

When they get the Certificate of Need, they get the right for eminent domain. As a small landowner, I know first hand, you're pretty much powerless. They're going to get what they want.

Now they're abandoning that line. They've operated, they've maintained, they have the rights. Now that they're abandoning it, let's respect the landowner for the first time in the history of that pipeline and let them decide what gets done.

Those are my comments, thank you.

FACILITATOR: Thank you, James.

I have Leroy Watson.

MR. LEROY WATSON: Leroy Watson, L-E-R-O-Y, W-A-T-S-O-N.

I pulled up here tonight, I didn't see too many people walking, didn't see very many people riding a bike, but I did see a lot of cars. And you look out on the highway on Friday night and things are plugging along

pretty good in this town, it'll look like you're in downtown New York.

So I know that we need the petroleum, and there are people in this community that whine when the price of petroleum gets a little too high. Ten cents difference between here and Hibbing starts firing their buttons. So we know that they need the oil.

And a lot of people in town here have their houses hitched to natural gas, so we know they're working off of petroleum.

When you look at their houses, when you look at the paint and the plastic boxes and all that other stuff they have, most of it's made out of plastic, and that's all petroleum.

Even the clothes on your back, it says, "Polyester, nylon, rayon, acetate," that's petroleum. That pretty much sounds like I'm for this pipeline, and in a sense I am, but I also want them to do it right. And I'm not sure that they're fully prepared to do that.

They say Line 3 is bad, so when they get through with the new line they should

be digging it up. And better yet, why not put the new line right alongside the old one. Then there won't be any law issues, no surprises.

Thank you very much.

FACILITATOR: Jason George, Jason's right here.

And again, if anybody else wants to comment, just make sure you give Stacy your card. She'll write your name on it.

MR. JASON GEORGE: Jason George, J-A-S-O-N, G-E-O-R-G-E.

I work for the International Union of Operating Engineers, Local 49. Just a couple of comments. One in particular, it's been said, but I think it's worth reiterating. The jobs estimates that are in the EIS are just woefully wrong. To say that there's going to be zero jobs created locally in the building of this pipeline is just, quite frankly, a joke.

There's -- I know personally hundreds of 49ers that built the Clipper. Personally, I know them. These are the same people that are going to build Line 3 when it gets permitted. They live around here. So to say that there's no impact is just not at all

accurate. There's people in the room that built the Alberta Clipper here tonight.

Just wanted to put that on the record, make sure you get that right. That needs to be changed immediately.

The second point is more of a process point. There is a statutory process timeline. I'm not talking about whether you're for the pipeline, against the pipeline. I'm just talking about the process. There are laws on the books that outline how long this is supposed to take. They were not followed for the Sandpiper project. I would strongly encourage the Department of Commerce, the PUC, to stick to the law. Follow the science. Whether or not you're going to determine this project is good or bad, at least the people in this room and all around the state deserve a timely answer.

So I really would encourage folks to -- the department, PUC, to follow the law, the statutory timeline, stick to the process.

When -- I believe the company will show that this project meets the requirements, and when it does, the Department

of Commerce should recommend a permit, and the people in this room should get to work.

Thank you very much.

FACILITATOR: Shirley Loegering.

MS. SHIRLEY LOEGERING: Shirley Loegering, S-H-I-R-L-E-Y, L-O-E-G-E-R-I-N-G, and thank you for this opportunity. I live in Grand Rapids.

I think we can all agree that we all use fossil fuel and we want to keep getting around the way we do, but we are lucky enough to live in a time when we do have choices about where we get that fuel, and if we don't start making the choice to go to a more sustainable route, I guess I'm concerned.

But my one comment is I'm concerned about the abandonment of the line, and if there are any regulations or rules about disclosure of chemicals that will be used when they abandon the line, and when they clean it, and what about the life expectancy of the other line, and what the plans are for those.

Thank you.

FACILITATOR: Thank you, Shirley.

Dave Rowe.

MR. DAVE ROWE: My name is Dave Rowe, D-A-V-E, R-O-W-E.

I'm here tonight as a landowner. I have the unique position of having Enbridge pipeline and TransCanada on my property, and I want you guys to know how it affects me. It causes me no stress at all. Water was tested when I bought the place. They are very responsive to issues I have, whether it be settling of the property or use of my driveway. Any time I contact them, they're out there immediately.

I think that if we're going to use oil, and we all, like we agreed, drove here, we have to look at how we're going to get it, and the pipeline is the cheapest, safest way of transporting this.

We can ship it by rail if we want it, but those of you that are in support of that, go out and look at a railroad locomotive in the winter. It runs all winter. They never shut it off, whether it's moving or not. There's no antifreeze in it. It stays on.

Train cars derail, it spills, it's inefficient. You're moving a little bit

at a time. You guys don't water your gardens a bucket at a time. You put it in a hose and pump it out there. It's the way to move a liquid.

If we look at shipping it by road, we have to be cognizant of the fact that it's more wear and tear on the roads. It's more traffic, more accidents, more chance of spills over a distant area.

Road maintenance isn't shared equally by all. There's people that pay less tax based on where they live than others in the state.

And I think we have to be aware of the fact that change takes time.

For now, the pipeline is the way to do it. We can conserve. We can try and say that there's no other way to do it, but you know, I think the pipeline is the way to go. We have to be aware of how it affects other things in our community.

If you're shipping oil by railroad car, then you're not shipping coal, you're not shipping taconite pellets. We've come to this problem. It also affects my job

here. When the oil is moved by the rails, coal cost more. It's hard to get through. It's hard to negotiate a contract with the railroads.

I understand Warren Buffet wants to go all by rail. That's because he makes money on it, not because it's good for you.

So I guess, for now, I support the pipeline.

FACILITATOR: Thank you, Dave.

Annette Humphrey, and spelling for the record.

MS. ANNETTE HUMPHREY: Thank you. Annette Humphrey, A-N-N-E-T-T-E, H-U-M-P-H-R-E-Y.

Thank you for allowing us to speak tonight.

(Indiscernible)

I'm from Leech Lake, born and raised there, and when I talk to groups like this, I feel like I have to give my résumé kind of like Winona did. I have a college degree. I served four years in the Marine Corps. I graduated Police Academy in Southern California, I have three kids and I'm a

grandmother, so I don't know, I like saying that when I talk to groups like this.

I agree with Vicki Andrews, thank you for your words.

I also agree with the gentleman over there, so we got to get out, and it's not going to happen tomorrow or next year, but we have to make that change.

And I think a lot of us are in agreement, whether you want the pipeline or not. That's something we are agreed upon.

So I'm a landowner, and I live in Deer River, and the pipelines run less than a mile from my house. And I know that they all don't -- don't all run south. The one that runs north, I'm concerned about, too, because that's carrying a lot of harmful chemicals that are needed to thin the tar sands to get through a pipeline.

Now, I don't know what that pipeline is, but I'd really hate for water to start causing cancer if that particular line did break.

So I'm encouraged, I'm encouraged that a lot of people are saying we need to get

out. I'm encouraged by people who say, "For now, I support the pipeline." That just means we have open minds.

And my son, he worked for Enbridge and he felt bad, but I said, "Don't worry, son, you gotta make a living, as do we all." And I agree with James, you know, tar sands, I agree that should be considered as part of this Environmental Impact Statement.

I also -- I'm listening, and I'm encouraged by the thoughts that we have in common and the worries we have.

And Winona also said we don't seem to matter, and it feels like that an awful lot.

But we can keep putting oil pipelines in the ground and just keep it growing, get the industry growing, keep it growing, you know, let it grow bigger and bigger like Lorax, bigger and bigger, and some day we'll all just cry together, right.

So let's just keep a heart for one another, whatever your stand is. I think we all should stand for the earth and for our grandchildren and the generations that are

coming. We can't just look at that, you know, these short-sighted goals, you know.

I use oil. I drove here in a car. No one's arguing that. That's never the argument, but we can do better. Enbridge can do better. They have a lot of money, and they know all about solar and water power, so I think we can do better and get out of this fossil fuel area.

Thank you.

FACILITATOR: Thank you, Annette.

Thane Maxwell next.

MR. THANE MAXWELL: Hi, I'm Thane Maxwell, T-H-A-N-E, M-A-X-W-E-L-L. Thank you for the opportunity to speak.

I live in Minneapolis, and I work with Honor the Earth. I have basically given my life to stopping these projects, not because I don't want any of you to have a job, but because we don't need them and because they hurt people.

I've been reading through the EIS for the last few weeks. 5,000 pages is a lot to get through in three weeks, but we did our best. We do have some highlights over here, if

anybody wants to come check them out, you can see what we're interpreting in the data.

I wanted to point out a few questions that we're going to comment on -- or that I'm going to comment on in my written comments, but I wish there were a forum here to ask questions and get answers to these.

You know, I realize people worked really hard on this document, spent a lot of time on it, and there's a lot of improvement to the past few years of the process, I really appreciate that, but there's, you know, of course, in 5,000 pages you're going to have holes.

So, for example -- I'll just throw out a few examples.

In all of the impact calculations, the assumption for the life span of the pipeline is 30 years. And that's really confusing to me because Enbridge has a number of pipelines running right through this town that have been here for 50 or 60 years, sometimes 65 years, so I'm wondering where that calculation comes from.

Another question I had is why is

there no spill analysis at all for the St. Louis or Nemadji rivers, which dump right into Lake Superior as the pipeline reaches the Twin Ports there.

Why is there no discussion of what the impact would be on Lake Superior? The Great Lakes hold 20 percent of the world's fresh water, and we're not even looking at that. We're not even looking at the impact on the harbor in the Twin Ports and what the impact would be, what it would really look like to clean up a tar sands spill in that harbor.

It's confusing there's no meeting in Duluth for folks in that community to talk about that.

Another question I had is in the spill section, this one over here, "Accidental Releases." Some of the numbers are confusing to me. It says -- it gives annual probabilities of spills in Minnesota, so it calculates what the chances are each year of a spill, and it breaks them down by size.

And it says, "The chance of a small spill is 107 percent in one year." So basically, we can expect more than one small

spill or about one small spill a year.

It then gives a separate number for just the overall chance of any kind of spill, any size, and it says, "25 percent a year." So we can expect one every four years.

I don't understand how that makes sense. How could the chance of a small spill be 107 percent and the chance of a spill of any size be 25 percent?

So I think there's some math wrong there that we need to look at.

The other thing that I find very confusing or problematic in the EIS is the alternatives that are considered.

For example, the rail alternative that is considered involves building a rail terminal at the border of Canada and the United States and bringing the oil from the partial pipeline that Enbridge would build by rail to Superior.

Now we all know that Enbridge would never do that, so I don't think that's a reasonable alternative to consider.

Similarly, the truck option looks at trucking the oil from the border from a new

truck terminal to Superior, and we know Enbridge would never do that.

So we need to have realistic alternatives if we're genuinely considering alternatives.

Another alternative that someone has mentioned before me is the no build alternative. The no build alternative is defined in the EIS as, "Continued use of Line 3."

But that -- that's a distorted way of framing the question, because there are other ways of not building it, right, and the question really is about need, and there is no discussion of need.

I find this sign over here, the Certificate of Need Alternatives very problematic because it outlines the considerations that the PUC will go through to determine whether to grant the Certificate of Need or not. It list two out of three. There are actually three.

The two that are listed over there, it says they will consider the economic need, which by the way, there's no analysis of

in the EIS.

And two, they will consider alternatives. The one that's missing is the most important. The one that's missing is that the PUC also must consider, by Minnesota statute, also must consider whether the pipeline is in the best interests of society. So I think you should add that to that sign.

Similarly, on the impacts boards over here, you have two different impact boards; one for the Certificate of Need and one for the routes. And both of them have a socioeconomic section, but neither of them mention that there will be zero permanent jobs created by the project.

That's a big question that you see in the media a lot and the decision makers really want to know. I think that should be included there.

The other thing not included there is there's no discussion of the property tax that counties would lose when the existing Line 3 is abandoned. It states that counties that have the new line put in would receive property tax benefits, but it doesn't discuss

the loss.

My last point is also about abandonment. There's a lot of people in this community really concerned about abandonment, and I agree, it is a really huge deal.

A couple things that I just wanted to pick up on that other people were saying and just clarify a little bit, in case you didn't get it.

The DEIS says that when you stop flowing oil through a pipe, you don't have that weight in it anymore, it starts to rot. Okay. So, what, 300 miles of pipe around here is going to start to lift itself out of the ground. A lot of it is already exposed, as people are saying. I've seen it. I've walked on it.

There should be more than 14 pages on abandonment. There should be an analysis of how fast that's going to happen, where is that going to happen, what is it going to cost.

Similarly, there should be a discussion of the effect on people's property values, and there should be a discussion of the

liability. What happens if some of the risks --

FACILITATOR: Can you wrap up soon? It's been about six minutes, so if you could wrap up soon.

MR. THANE MAXWELL: I'm almost done. Thank you.

What happens when one of the things that's listed as a possibility over here, like contamination or the flooding of a farm field, when that pipe breaks down and serves as a conduit and drains a lake? Who pays for that? What protection is there for landowners? The PUC has the power to do something about that and ensure that.

The other thing I really think needs to be included in the abandonment section is an economic analysis. What kind of jobs could we create? Maybe we could partner on that with some of the unions here.

Maybe we could look at the numbers here and see what kind of jobs we would create if we clean up the old mess before we make a new one.

FACILITATOR: Thank you, Thane.

Next, Abbie, do you want to raise your hand. Name and spelling for the record.

MS. ABBIE PLOUFF: Hello, my name is Abbie Plouff. That's spelled A-B-B-I-E, P-L-O-U-F-F, and I am here to just talk about some research that we've done.

The Minnesota Environmental Partnership -- I'm with the Minnesota Environmental Partnership, and we put out a poll fairly regularly on a wide variety of environmental issues across the state, and this year we asked a question about tar sands.

And our question was: "Would you favor or oppose increasing the flow of tar sands oil through Minnesota?" So we asked this of people across the state. We did an extra sampling in rural and greater Minnesota, and our results show that 61 percent of people that responded to the question opposed increasing the flow of tar sands oil for Minnesota. 61 percent, and that is specific to tar sands oil, which Line 3 would be running through.

So I just wanted to bring that information to the room. Thank you all very much.

FACILITATOR: Thank you, Abbie.

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DEIS MEETINGS - 14-916 15-137

GRAND RAPIDS (CONTINUED) - JUNE 6, 2017 - 6:00

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

IRA Civic Center
1401 Northwest 3rd Avenue
Grand Rapids, Minnesota

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FACILITATOR: Kathleen Blake. Kathleen. Name and spelling for the record.

MS. KATHLEEN BLAKE: My name is Kathleen Blake. K-A-T-H-L-E-E-N. Blake is B-L-A-K-E. I'm a resident of Grand Rapids.

I'd like to speak to the decommissioning. Many people have spoken to that already, so I don't think I have to go into detail about the dangers. However, I do want to say that when I was growing up, my mother used to say clean up your mess before you start a new project. And I said the same thing to my children. Now, I'm not Enbridge's mother, but I say clean up your mess before you start a new project.

And, finally, I want to say that the slogan for our community in Grand Rapids is: It's in Minnesota's Nature. What would that slogan be if there is a huge spill or abandoned lines releasing all kinds of chemicals into our environment?

Thank you.

FACILITATOR: Eric Wright. And name and spell it for the record.

MR. ERIC WRIGHT: Hello, my name is Eric Wright. E-R-I-C. W-R-I-G-H-T. And I'm a special pipeline representative for the Operating

Engineers. I'd like to thank you all for the opportunity to comment.

I've spent over half my career working in the pipeline industry. For those of you who don't know, we're the heavy equipment operators, and we support the Line 3 project.

The pipeline skill trade unions have been working in this industry for years now, and several things have changed when it comes to constructing a safe and reliable pipeline.

To get petroleum product from its natural source reliably, I know that Enbridge will go above and beyond to meet local, state, and federal regulations when it comes to construction and do their best to see to it that this pipeline operates safely.

I've heard some opinions that there will be a negative impact on the wildlife, due to the aftermath of construction.

FACILITATOR: Here, let's bring you -- Eric, hold on one second. Let's bring you a mic that works.

(Off the record.)

MR. ERIC WRIGHT: I know that Enbridge will go above and beyond to meet local, state, and

federal regulations when it comes to constructing and do their best to see to it that this pipeline operates safely.

I've heard some opinions that there will be a negative impact on wildlife, due to the aftermath of constructing the Line 3 project, but I beg to differ. My family has a relatively large amount of property that has pipelines crossing it, and I've hunted on these pipelines for years. As far as I can tell, it hasn't interrupted wildlife at all.

These pipelines cross two small streams on the property that feed into a pond where I regularly take my family to fish. In all the years I've never seen any oil residue or discoloration on the water.

Pipelines are clearly the safest way to move petroleum products from A to B. Everyone uses petroleum products, whether it be components of your cellular device or your shoes. We've all heard it here before. It's been brought up. It's in many consumer products, and it's not going anywhere.

I understand that environmentalists are fighting to stop this pipeline project due to worries about spills. I'm here to tell you that

each weld on this project will be inspected visually and x-rayed. There will be state-of-the-art valves installed along the route to shut it down in case of an emergency.

In short, the Operating Engineers, along with its 400,000-plus membership, requests approval for this project. Thank you.

FACILITATOR: Josh -- I'm definitely going to mispronounce your last name. Josh Pergenhauga (phonetic).

MR. JOSH PURREMHAGE: Yeah, you mispronounced it.

FACILITATOR: I knew I did.

MR. JOSH PURREMHAGE: That's all right. It's Josh Purremhage. P, as in Paul, U-R-R-E-M-H-A-G-E.

First of all, I'd like to thank all of the people from the State of Minnesota. This has got to be a grueling tour, and nobody has thanked you enough for all the work that goes into this.

A lot of these questions are economic, engineering, biological impacts to the community. But I thought I'd take a little bit different approach on why I think this pipeline needs to be replaced.

So I looked at what the world looked like when it was installed, just for a little check. Average income at the time was $7,300 a year, and cost of gas was 33 cents a gallon. Muhammad Ali was dodging the draft and had his title taken away at the time. The National Transportation Safety Board was just created at that time; and they came up with innovative safety requirements for vehicles, including headrests and seatbelts. The Beetles came out with their Quintessential Sergeant Pepper's album.

This pipeline has been there a long time, and I don't understand the opposition to upgrade it. The civil engineer report card was recently updated this year, and we maintained a D-plus. It hasn't changed since 2013. Our infrastructure needs to be updated and upgraded.

One of the specific recommendations from the civil engineering report card is to, quote, promote usage of accepted engineering standards for, among other things, pipelines to help ensure safety and reliability.

This line won't be in service until we can replace it with a better quality pipeline, and I don't understand why we push against that.

Thank you.

FACILITATOR: Anybody else want to comment? Make sure you give your card with your name on it to Stacey.

So Lois Bendis. Lois. Oh, right here, Lois is right here in the yellow shirt.

MS. LOIS BENDIS: My name is Lois Bendis, L-O-I-S, Bendis, B-E-N-D-I-S. I have the honor of being a great-grandmother to two young boys. For those -- I think that -- I came here in my car. I think we all need oil. I feel that if I look -- we looked at in history, though, we have had a lot of Superfund bailouts of some bad situations where chemicals were being dumped into rivers and lakes, and that got cleaned up because people were concerned about the environment.

I don't think that you can run railcars full of oil that can explode through a community. That's not a safe way to do it.

What I do question is why we are requesting rerouting part of this pipeline. I think that it could be done alongside, the old line can be taken out, and the thing cleaned up.

If you go on Google and Google how many oil spills there have been in the country,

you -- the whole -- the whole country is red. So it happens.

Engineering now will be much better. There's a lot of men in this room that I can tell work for the pipeline, and they're concerned about their jobs, and why wouldn't they be? We've got to look toward cleaner fuel, but in the meantime we have to live.

So I'm just saying do we have to -- do we have to do it and run this very crooked line all over the place, instead of following the route that it is now?

Thank you for allowing me to speak.

FACILITATOR: Thank you, Lois.

Bernadine Joselyn.

MS. BERNADINE JOSELYN: Thank you for the opportunity to speak. I'm a resident here in Grand Rapids. Tonight I have the honor to speak on behalf of the management committee of Camp UniStar. Camp UniStar is a family of religious-affiliated camp Unitarian Universalist Association of Congregations in the United States. And since 1963 the camp has been operated on Star Island.

I've been asked by the management to make this statement on behalf of our community here

tonight.

As stewards of the land that we are privileged to manage on Star Island on Cass Lake, the management committee of Camp UniStar urges the decision makers to ensure that the State of Minnesota honors fully all of the relevant rights and obligations it has undertaken with the Anishinabe people in its deliberations on the certificate of need.

As neighbors of the Leech Lake Band of Ojibway, we note with alarm the conclusion of Chapter 9 on tribal resources that, quote, Any route, route segment, or system alternative could have a long-term detrimental effect on tribal members and tribal resources.

In your deliberations we urge you to weigh the long-term social and environmental impact of the proposal just as strongly as the near-term economic impacts.

Thank you.

FACILITATOR: Kylie Lemley? Kylie. Name and spelling for the record.

MS. KYLIE LEMLEY: Hello, my name is Kylie Lemley. That's K-Y-L-I-E, L-E-M-L-E-Y. I've heard a lot of hypothetical talk about children,

grandchildren, and what our children would want. I think I can be a pretty good stand-in for right now, considering the fact that I could be most of your child or grandchildren. So I would just like to give you a couple of things -- a couple of comments on things I've heard today, just based upon my own experiences and research.

So the first thing I want to talk about is jobs, because that seems to be what's on everybody's mind. So I've heard a lot of, like, minor figures tossed around that, oh, I promise Minnesotans are going to get jobs on Line 3; no, swear to god. And that's great, but why aren't we talking about green economy jobs? There's a lot more of them. In just 2014 the green economy created over 5,000 jobs just in Minnesota alone, and that's just temporary jobs. Line 3 is estimated to create 1,500 total jobs. That's everywhere, not just in Minnesota.

And if we want to talk about jobs, why aren't we talking about cleaning up the pipeline that's already there? That would create so many more jobs that Enbridge is just completely ignoring.

Kind of brings me to my next point, is I've heard a lot of talk about Enbridge is giving

tax benefits to Minnesotans. I'm not sure how many of you are aware of this, but about two months ago, in March, Enbridge actually sued Minnesota for tens of millions of dollars worth of tax. So counties like Clearwater County, for example, are going to be sued for 7.2 million. That's more than they make in one year in property taxes alone. I don't consider that to be beneficial to the Minnesota economy, personally.

The third thing I wanted to talk about is I have not heard any commentary from anybody about -- well, maybe a few people, but for the most part it's been very greatly ignored, the fact that there's a disproportionate affect on tribal land on reservations. And I personally was not born on a reservation. I don't live on a reservation. That doesn't mean I don't care. It still matters to me. We're all people. Right? I think it's something worth looking into there. I mean, I'm not going to give you all the facts that we have. We have bountiful literature about it. But I think that we should all educate ourselves just a little bit more.

For example, in areas where pipeline work goes up, sex trafficking goes up. And I'm not, you know, blaming anybody in particular, but this is

a fact. This is a proven fact. And it hits native communities the hardest, native women in particular. And as a woman I'm very concerned about that. And the DEIS kind of glosses over that. It just says that Enbridge will be providing, you know, basically little counseling sessions, saying, hey, don't go out and traffic women, which I don't think is particularly effective. I think it's a serious discussion that needs to be had.

My last point -- I'm sorry, I know we've all talked about this a lot, but climate change. It's a real thing. I want to begin by saying that I'm not -- I know we all use oil. It's obvious. Of course I drove here today. But I'm not asking for immediate cessation of petroleum use. I'm just asking for a transition out of it. We can't do that while building more pipeline. We keep acting like Line 3 is the only pipeline anywhere, and that's not true. This is an increase of tar sands production, flat and simple, and we don't need that. If we want to move to a more sustainable economy, increasing tar sands production is not going to do that at all.

Just my final point that I'd like to make, just because it's something I read recently.

So there's something called climate departure or a climate change tipping point. And what that means is that essentially every year after certain cities' tipping point, or whatever you want to call it, every year past this point will be hotter than its hottest year from 1850 through 2005, so the last -- all of modern history as we know it. That's kind of a big deal.

And if anyone's interested, Washington, D.C., New York City, for example, their tipping point is expected to be reached by 2047. That might sound like it's a long way away, but that's 30 years away. That's nothing. I'm not even going to be as old as some of you when that point comes.

So I don't want to just talk about hypothetical children or grandchildren. This is my life too, and I think we should all really, really consider some other option. If we took this money and put it towards sustainable options for which the technology already exists, then I think we can make a real difference. We've been trying to transition for 50 years. Let's actually do something about it now.

Thank you.

FACILITATOR: Thanks, Kylie.

Irene Folstrom. Irene? And just name and spelling for the record. The reporter right now is right behind us.

MS. IRENE FOLSTROM: I'm Irene Folstrom. I-R-E-N-E. F, as in Frank, O-L-S-T-R-O-M. Is that slow enough? Where is the recorder?

I am actually with the Minnesota Environmental Partnership. I'm the Great Lakes Public coordinator. I'm also a Leech Lake tribal member and was born and raised in Cass Lake. So I guess by some measures I'm a local. I currently live in Duluth.

And I want to touch a little bit on both aspects of the DEIS, as it affects the tribal resources and as it affects the community and our environment.

I guess first I'll start out by saying that -- I actually -- the draft is proposed to go through the 1855 Treaty territory, and it costs us some of our sensitive wild rice and wetlands -- wetland habitat in Minnesota.

I think that whether you are from Grand Rapids or you're a Leech Lake tribal member,

we should all be really concerned about the risks that the project proposes to the water, land, and the climate.

Clean water is a way of life in northern Minnesota. The proposed route would threaten some of Minnesota's most important water resources, including the tributaries of rivers that lead into Lake Superior. There is no spill analysis for tributaries of the St. Louis River or the Nemadji River. And considering that most of my work is related to protecting the Great Lakes, and in particular Lake Superior, this is really concerning.

I think somebody mentioned it a little bit earlier -- perhaps it was Thane -- there's no sort of -- there's not even a mention as to what a spill into that harbor would do to that economy either and to -- the devastating effect it would do socially.

The project also presents the risks to the people of north Minnesota along two different -- two separate corridors. First, there are risks to water quality from the new pipeline. And, second, the abandoned pipe poses risks to our water and land that haven't been adequately examined, as we've all pointed out, in the DEIS.

There's not enough analysis presented in the DEIS of the environmental impact of the abandonment. The DEIS states that Enbridge has indicated that it would develop a contaminated site management plan to identify, manage, and mitigate historically-contaminated soils and waters found during abandonment or removal of existing Line 3, but does not include the plan for long-term contaminated site management.

And most importantly to me, Line 3 is routed through the heart of the 1855 Treaty territory. The pipe that would be abandoned crosses two reservations. The DEIS recognizes the disproportionate impact the pipeline would have on tribal communities, but then goes on to conclude that this is not a reason to deny the project. Ludicrous. This is an egregious example of environment racism. There's just no way around that. It's racism.

To note the disproportionate impact tribal people face but to still recommend routing a pipeline through the Treaty territory is completely unacceptable.

Thank you.

FACILITATOR: I've got Bali Humphrey

next. Bali Humphrey. Okay. Then just name and spelling for the record.

MS. BALI HUMPHREY: Bali Humphrey. B-A-L-I. H-U-M-P-H-R-E-Y. Well, first I want to say I'm not like -- I'm not an expert on pipelines, and I'm not an expert on any of it. But I do have some comments, and I do recognize and realize the threats that it poses.

Just some numbers that I found were, in 2015, 2016 solar alone produced 374,000 jobs, which compared to fossil fuels that -- this combines all fossil fuels, which is the coal and oil and all that combined -- fossil fuel employed 187,117 jobs. That's like twice as much in renewable energy. That seems like the big argument here is jobs. But with those numbers, it doesn't really make any sense how fossil fuels is, like, the big one on producing jobs, because it doesn't.

And then I heard somebody mention how safe this pipeline would be and how a lot of people believe so. But in 1991 the largest eminent oil spill was here in Grand Rapids Itasca Community College, and that spilled 1.7 million gallons of oil. The response time to that was seven minutes. In seven minutes 1.7 million gallons of oil was

spilled.

This reroute is right next to the Mississippi Headwaters. Could you imagine if 1.7 million gallons of oil was spilled in seven minutes? That does not only affect Minnesota, but all the states that the Mississippi River would touch. Tar sands is the dirtiest oil. How can they clean that up? I don't know. It doesn't make much sense to me.

So I just want to make it very clear I oppose Line 3, I oppose the abandonment of Line 3, and I oppose pipelines in general.

FACILITATOR: Thank you, Bali.

Christina Bowstring? Christina? Christina?

MS. CHRISTINA BOWSTRING: Hi, my name is Christina Bowstring, and I've been hearing a lot of this talk around everywhere. And when I think about the pipeline and the things that come with it, I think of what are we sacrificing? Mankind is the only thing on this planet that is completely and totally destructive. It doesn't matter what nation you come from, there is something terribly wrong when we think it's okay and all right to destroy the land and the environment for progress and economic

sustainability.

We as human beings haven't acted responsibly as a whole with regard to preserving the environment in a way that will be beneficial to future generations.

Have you really thought about what we're doing now? How is that going to affect your grandchildren or their grandchildren? All of these things, does anybody even think about that? Yeah, it might create jobs right now. Yes, it will be very economic beneficially for everybody right now. Not for the future.

We sacrifice so much to be so destructive. Each time we make decisions that contribute to imbalance in nature, thinking it will be good in some form for the people, we sacrifice our future, we sacrifice a healthy environment, a healthy nature.

I ask you do you all sacrifice your generations so easily to cause damage to the earth and devastation to the environment? And I beg you all to think about these things, because it's not just me as a native person that it's going to have an impact on; it's going to impact everybody everywhere.

Those are the things that we need to be thinking about. Thank you.

FACILITATOR: Christina, could you just spell your last name for the record, please. Sorry about that. Spell your last name for the record.

MS. CHRISTINA BOWSTRING: Spell my last name?

FACILITATOR: Yeah. Thank you.

MS. CHRISTINA BOWSTRING: My last name Bowstring, B-O-W-S-T-R-I-N-G. And, no, I do not own the lake, but it is named after my family.

FACILITATOR: Thank you.

That's all the index cards I have for comment. So to let you know, the court reporters are going to stay after. If people want to go give a comment to them, they can. There are also chances to write written comments over here by the EIS, if you want, in the boxes. We're collecting all the comments.

The last of the public comment period will end on July 10. So any comments you want to send after tonight should come in by July 10 so the State can consider them, as they move to drafting the final EIS to submit to the Public Utilities

Commission.

So thank you for your good comments, your thoughts, your participation, and your constructive engagement. Safe travels home, and thank you very much.

(Meeting concluded.)

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DEIS MEETINGS - 14-916 15-137

GRAND RAPIDS - JUNE 6, 2017 - 6:00 P.M.

(PRIVATE COMMENTS WITH COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

IRA Civic Center
1401 NW 3rd Avenue
Grand Rapids, Minnesota

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(GRAND RAPIDS)

MS. DARLENE FREEMAN: My comment is with the abandonment. What type of laws and regulations are set up in the state of Minnesota for this? If they do not have any, why are we not addressing that now?

And then the other thing is the abandonment is really the wrong way of doing it. I think that they should go back and clean it up and bring their pipe through that process instead of going another route that has no way of making it feasible for them. Because the people, especially the Indian communities are being affected so dramatically and it seems like that's always the easy way for a business to do that.

Thank you.

MR. JOE ABEYTA: My name is Joe Abeyta, J-O-E, A-B-E-Y-T-A.

And the only comment I want to make is that the technology has seriously changed over the years when it comes to pipe lining. The equipment is better, more high-tech, we have better safety measures and monitoring processes for it.

And you take examples of oil spills from 1991 and try to make them relevant to today is

not possible. The oil spill the lady spoke of in '91 happened 50 yards from the house I currently live in. And my house has well water and we've had it tested and it is safe and it is drinkable and we do drink it, including my 10-month old daughter. Our water is safe.

And just the technology today is way more advanced than the pipeline that they want to replace. So to replace it with today's technology is the best thing to do.

So I strongly support the technology we have putting in this pipeline. It puts food on my table, it feeds my family, and I feel safer for my kids in the future 'cause I know what technology is out there.

I think that's probably all I want to say on that. Thank you very much. I appreciate it.

MR. WILLIAM SWEENEY: William Sweeney, S-W-E-E-N-E-Y. I just would like to comment. Any business entity in the U.S. is not allowed to abandon an empty tank with oil in it, and I don't understand how they could abandon a 300-mile tank with oil still in it. It's going to have oil in it. And once you empty it out, you enter the interphase of the tank, the area between the liquid and the

air. And those erode like crazy very quickly. And I don't understand how they can leave that in the ground.

I'm not opposed to the pipeline. I just think they could rip the old one out.

MR. GARY BURT: My name is Gary Burt. First name G-A-R-Y. Second name same as Burt Reynolds' first name, B-U-R-T.

Enbridge is not in the oil business. Oil is just a facade or the stage on which their business is played out on. Enbridge, like every other system based on patriarchal male values, is in the addiction business. Enbridge and the people who run it are addicted to money and power, and they use oil to gain and maintain that money and power and the social status that comes with that money and power.

The patriarchal male system is based on four myths. The first and primary myth is that the patriarchal male system is the only system that exists.

The second myth is the patriarchal system is innately superior to any other system that could exist.

The third myth is the patriarchal

system knows and understands everything. This is important because, to believe it, means that anything that is not understood by the methods and technology of the patriarchal system theoretically doesn't exist. This myth defines what knowledge is and what is worth learning. This all -- this myth also defines large areas of learning information out of existence.

The fourth myth is that it is possible by the patriarchal males to be totally logical, rational, and objective.

The patriarchal system surrounds and envelopes us, but does not feel like home. In order to survive within it, we must adjust our values, language, and thinking and the way we view the world. We must deny our own reality and surrender our personal power in order to gain a minimum sense of acceptance.

This current socioeconomic system does not reward ability and achievement, as much as it is geared to reward two things. One, capital. Two, the willingness to sacrifice any ethical concerns in order to gain capital or serve those who have capital.

These choices are presented to all of

us again and again. If you're not -- if you're not born with capital, the chances are you are a wage slave to someone with capital.

Demands are made to sacrifice personal ethical standards to serve the designs of capital. Those who do so with skill and ruthlessness succeed in this society.

The super rich don't actually want the free market to work, because it tends to reduce prices and, therefore, profits. They much prefer, like the railroad and steamship tycoons of the 18th Century, to create artificial means to stop the market from working and to extract units, as economists would say.

In a perfectly-functioning free market, which is impossible outside a thought experiment, everyone earns basically the same small profits. Think family farming for a real-world example. Does anyone think Enbridge CEOs want to live like family farmers?

Big business in general and many oil companies in particular don't want the truth about global warming to get out and be believed. Even if it destroys the world, it's bad for business. Yes, we need business and jobs, but the first job of

government is to protect the people and the earth. For corporations, however, the first job is to protect assets and the bottom line, even if doing so will destroy the world.

The choice is clear to anyone with any kind of moral standards or standards that are not based on being addicted to money, power, and status.

Man is the only animal that can make this kind of problem or this kind of -- I forget the word. Anyway, man is also the only animal that can clean it up.

(End of Grand Rapids private comments.)

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DEIS MEETINGS - 14-916 15-137

PARK RAPIDS, MN - JUNE 7, 2017 - 10:00 a.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Park Rapids High School Cafetorium
401 Huntsinger Avenue
Park Rapids, Minnesota

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FACILITATOR: All right, everyone, welcome. If everyone could take a seat. We want to make sure people are comfortable. We've got a number of seats at the tables. We've got chairs in the back. We've got those less than cushy seats in the back, and if you want to really see us, you can sit on the comfy couches in the back.

We want to get started. My name is Patrick Field, and I'm the facilitator for today. Just hoping to hopefully run a good meeting. I work on behalf of the consulting team working with the State to run and assist and support these meetings.

I want to first turn the meeting over to Bill Grant, Deputy Commissioner of Energy for the Department of Commerce for the State of Minnesota, who's going to welcome us and give a little bit of background on the process, and then we'll dive into the comment period.

DEPUTY COMMISSIONER BILL GRANT: Thanks much, Pat.

Thanks everyone for coming out today. So I want to start by giving you a

sense of what it is we're trying to accomplish here today. As you know, the Department of Commerce has prepared, in cooperation and collaboration with our two sister agencies, the Pollution Control Agency and the Minnesota Department of Natural Resources, a Draft Environmental Impact Statement on the proposed Line 3 project.

The purpose of the Environmental Impact Statement is really to inform decision makers, other agencies that also need to issue permits, and all of you, the general public.

It is not intended as a decision document, so it doesn't make recommendations, per se. It is for decision makers to take into account as they make their decisions.

And the Minnesota Public Utility Commission, who is the decision maker in this case, will make two decisions. One, whether to grant a Certificate of Need, and if they do, then approval of a route permit.

In other words, which route should the approved project follow.

There are going to be a number of opportunities for public comment along the way.

This is the third in a series of I believe 23 public meetings that we're holding throughout the project area over the course of the next three weeks.

Once we have assembled all of the comments that you've given us, both today orally and in writing, we will be preparing a final Environmental Impact Statement.

It will incorporate all of the comments that we've received, and it will respond to those comments that need to be addressed as part of the final EIS.

There will also be, then, another round of public hearings after the final EIS has been submitted to the PUC.

We expect the PUC to make a decision on Certificate of Need, and as I said, then, perhaps on a route, in the spring of 2018, so just a little less than a year from now.

So some things to know about what you're saying and doing here today. All of the comments that we receive are going to be considered equally, whether they're offered verbally here today or in writing. Both --

either here or at the meeting or shared with the public.

There are a couple of different ways, if you want to make oral comments today, to do that.

One is, I believe the people have submitted cards to Pat for an opportunity to speak, but we also have court reporters in the back of the room who could take your comments one-on-one, if you don't want to make your comments publicly to the full group.

So either approach is fine. Both would be considered equally as comments on the EIS.

We're really seeking substantive comments on the EIS itself. That's what would be most helpful to us at this point is to get your reactions to whether there's information that's missing from the EIS, whether there are parts of it that are not clear and need to be clarified; generally, what improvements could be made to it.

Once we have the comments, it will, as I said, inform the development of the final EIS, and we expect to submit that final

EIS to the Public Utilities Commission in mid August.

Written comments on the draft, the final day that we'll take written comments from the public will be July 10th, so that's the date to keep in mind if you're planning on submitting comments.

So with that, I will turn it back to Pat, and thanks very much, again, everyone for coming.

FACILITATOR: Thank you, Bill.

Just a few preliminaries, and then we'll get started.

Just, you know, obviously, exit right there if anything were to happen in terms of safety in the building. Bathrooms are kind of down the hall and to the left.

There's two things that the State handed out for you to have. One is the information booklet, which is essentially of a sense, an executive summary of the EIS. The EIS is actually on the tables in the full format. It is thousands of pages there.

In addition, if you actually want to take it home, you don't have to take that

book home. At the registration table there's either a flash drive, if you want one, so you can take one when you head out, if you don't have one. Or it's also on CD.

So if you do want the full EIS, there's a way to take it electronically home, if you want to.

And also, there's a longer comment form. If you want to do written comment, there's a form here that you can do, and there's boxes along the side that you can put in.

Just a few things about how we're going to run the comment period so folks know. The first thing, if people can turn your cell phones to do not disturb, silence, or whatever, that would be most helpful so we don't hear annoying rings in the middle of things we're doing.

What we're going to do is I have about 25 cards for people to sign up, so if we give up to five minutes for those 25, that will take up the full comment period time. So five minutes is a fair amount, but it also gives people who want to say a little bit more a

chance to do it.

But if you could be shorter and more succinct, we would encourage you to do so. And I'll keep pretty good time. We'll explain that in just a second.

When people speak, we want to ask people to listen respectively, not interrupt them. Let them say their peace. If someone likes some of what the speakers said, at the end, they're welcome to be affirmative.

We do ask people to not be negative about other people's comments. People have a range of views and that's what the public process is about. We don't ask that you necessarily agree with others, but will be respectful of others as we have the conversation, particularly, obviously, of each other in the room.

The agency's role in the comment period is to listen. So agency folks who are maybe behind me, raise your hand, agency folks in the room. Bill's here, some of the folks are over here, some of the folks are standing by posters.

They're going to be listening

very carefully to the good comments that are coming over these mini meetings.

And we actually have a court reporter, who's going to capture every word that the commenters say. That's going to go into the record, just as if it was written, emailed in. And the State's going to review all those comments at the end of the comment period on July 10th to help draft the final EIS.

When you do speak -- and we're going to bring you the mic, so I'll say a name. We will run the mic to you. You can stand or sit, whatever is good for you and make your comment right there.

As you start your comment, please state your full name and spell it, and that way our court reporter will have a good record of who the commenter was, and I'll remind you of doing that as well.

Do you want to pull up the timer?

We have a friendly reminder timer for every speaker. So we'll pull it up and show that to you. We'll keep it lower down on the screen so you don't have to stare at it the

whole time.

That's a running stopwatch. I will get out of the way once you get you settled. I'll sit over there. Make your comment, and when that thing hits five, please stop. And if it's getting close to five, you'll start seeing me standing and getting up here, and then if I need to, I'll politely encourage you to wrap up, just so we provide time for everyone who wants to comment to comment. We've got 25, so we've got a full load today.

And I'll also try to check towards the end; if there's a few other folks who didn't give a card who want to comment, I'll try to make a bit of time for that just towards the end.

Okay. With that, I think we're ready to go.

And as I pronounce your name, I will likely mangle half of them, so I apologize in advance, and you can correct the record when you state your name and spell it for us.

So Rose Ragole.

SPEAKER FOR ROSE RAGOLE: Rose

Ragole, and that is R-O-S-E, R-A-G-O-L-E. Rose is a seasonal resident. She lives in South Carolina.

She wanted information on how many gallons per barrel there are, but her biggest question is on page 14. There is a statement that says, "They would have construction impacts and introduce new risks of spills in northern Minnesota where the watersheds are, in general, very healthy and water quality is very good.

"So why, with the 2008 Legacy Amendment, would this even be considered, this route be considered?

"Minnesota has passed legislation for responsible practices in thinking about cherished resources for future generations. So therefore, the people have already spoken."

FACILITATOR: Thank you very much. I have Steve Gilbertson. Thank you.

MR. STEVE GILBERTSON: Thank you. Steve Gilbertson, S-T-E-V-E, G-I-L-B-E-R-T-S-O-N.

I'm a supporter of the pipeline. I feel that the pipeline is the best way to

transport oil these days, and I believe that we do need the oil. We're still very dependent as a way of movement.

I'm actually from Grand Rapids, and I can see the -- the economic impact that we will miss out on if the preferred route is taken.

I guess I do understand that a lot of people have looked at this and thought this was the best route.

So I know Enbridge is a very good steward. They're a very safe company and very hard-working and have been a great neighbor.

So if the preferred route is taken, that's great. If it's not, we welcome them through Grand Rapids again.

FACILITATOR: Thank you, Steve.

I have Maureen Buric next.

MS. MAUREEN BURIC: My name is Maureen Buric, M-A-U-R-E-E-N, B-U-R-I-C.

I have property up on the North Twin that has been in my family for about four generations. My husband and I have just built our retirement home up there.

My question is this: If Hubbard County's geological survey hasn't been completed, how does an accurate EIS study get done, since you don't have all the info yet?

FACILITATOR: Thank you, Maureen.

We have Mason Redwing next.

MR. MASON REDWING: My name is Mason Red Wing. I'm from the Crow Creek Sioux Tribe out in South Dakota. I'm 20 years old, and I'm not really a big fan of these pipelines. I brought my little brothers and my nephew with me today, because, you know, they don't really have a say in any of this. They don't get to say, "We don't want this pipeline." They don't have a say or a vote or nothing.

So I'm doing this for them. I'm speaking their opinion.

And they say the economic development that the pipeline brings is good and stuff, but I was up in North Dakota -- I'm sure you guys all heard of the Dakota Access pipeline up there, and they made a big deal about all the out-of-state residents that went to camp there and opposed the pipeline.

They said some, I don't know, 70 percent of them were out of state, you know, people that were camping there, but they didn't ever really tell us how many out-of-state workers that the pipeline had. There was over 90 percent of the pipeline workers were out of state.

What was that helping North Dakota? I just want to say thank you for letting me speak here. I'm a real young man. I'm real nervous right now. But all I can say is with this pipeline coming through, we're going to be here as much as we can to help prevent another disaster, cause we've seen it all over the world.

Thank you, guys. You guys have a good day. I love you. M-A-S-O-N, R-E-D-W-I-N-G.

FACILITATOR: Next I have Charlotte Hughes. Charlotte? We'll come back to her.

Danny Hughes. State your name.

MR. DONNY HUGHES: Hello. (Indiscernible). My name is Donny Hughes, actually. D-O-N-N-Y, H-U-G-H-E-S. I also go

by the last name of Medicine Horse.

I'm from the Standing Rock Sioux Tribe, as well as the Crow Agency Tribe of Montana, south of Billings. And I was at Standing Rock, one of the first few up there, to resist this pipeline and prayed for help, pray for brothers, ask that He bless you and -- Mason Redwing here is my buddy. I met him up there, and he's one of the closest brothers that I have nowadays.

And once again, you know, speaking up for the people that -- the animals -- like the animals, they can't speak for themselves, horses, buffalo, the winged, they can't say, "We don't want this to go through." That's what we're here for. We're here to speak up for them, because they're the ones that can't be heard, more or less won't be heard.

But like you said, if the pipeline goes through, then more or less you'll be seeing me a lot more. That's all I have to say.

FACILITATOR: Thank you.

Lorna Hanes.

MS. LORNA HANES: My name is Lorna, L-O-R-N-A, Hanes, H-A-N-E-S, also (indiscernible). I come from Saugeen, First Nation's territory. I'm dual citizenship, not by my means, but dual citizenship of the United States and Canada.

I believe my region, Anishinaabe territory, has been under attack, same with my other half of me, which is Cree, to the tar sands area.

So I would just like to say that I love my land and I love the people, too. So don't get me wrong, but I think it's very important that you have to think about what you're doing.

Just the other day was a spill up in Cass Lake area that was not reported to anybody. It's all burnt off now. So I'm just kind of worried about things like that that we're not told.

We have 10,000 lakes. We have the most pristine waters here; some that you can actually drink right out of our lakes.

The treaty territories have to be recognized, because it is the supreme law,

above all the laws that you have come up with since.

But anyways, I would just have to say, you know, don't get me wrong, I love life. I love peoples and all that, but the decisions of some people are wrong and probably should be stood up to and tell them, "No, we don't accept this," because your grandchildren and their grandchildren, everybody, all the walks, everything that lives in the water and air are going to be affected, if not already.

We've always been here and we always will be. And all of us can be. So I really want to ask that you would really think about what you're doing.

And we do horse rides. We ride against the current. We're not like trying to like be all wish everybody go away or anything like that. No, it's like, you know, pray for the land, for the water, for the people. And so the Horse Nation is the only one that can carry us all across the lands just to pray, to ride with our ancestors of all of it, all life.

So I honor the Horse Nation to the most, and I'm very glad that they helped us along this way.

Also our community, the waters, we can go wild ricing on all the rivers here. They're all connected. We can go from lake to river, to lake to river, hunt and gather on the way, berries, medicines that could help you with your head issues or just your body issues, whatever could go wrong with you, or whatever.

I would say, please, think about your decisions. And there's no reason why Enbridge or any of them other companies cannot do better than what they're doing.

They could be into solar, wind, things like that. So hopefully, we can make a great decision for our (indiscernible) to all life, all relations.

Thanks.

FACILITATOR: Thank you.

Barbara Courneya. Just name and spelling for the record.

MS. BARBARA COURNEYA: My name is Barbara Courneya. I'm from Pine River.

It's C-O-U-R-N-E-Y-A.

My husband and I have owned property on a lake for over 30 years in Pine River.

There are scores of reasons why the proposed route for the Line 3 pipeline should not be constructed across the pristine lakes, rivers, and wild rice beds, but I'm just going to talk about three of them.

First, across the Pine River watershed that the federal government considers one of the most important watersheds from the Mississippi River to the Atlantic Ocean, according to the U.S. Department of Agriculture Forest Service, of all the watersheds in the state, they feel the Pine is the most valuable of our water resources as far as quality, quantity, and its ability to provide drinking water.

Second, the proposed pipeline will carry the dirtiest form of oil, tar sands. It is more sand than oil. So a variety of toxic chemicals must be added to the tar stands to even allow it to flow through the pipeline.

This poisonous concoction travels through a 36-inch pipeline, under a pressure of 1,000 pounds per square inch, more than 30 times the pressure in a car tire. It will transport 760,000 barrels of oil per day.

At that pressure, even a tiny crack or fissure in a well will spew out gallons of oil in minutes.

Other spills have proven that it could not be detected until it was too late to prevent damage to the land, or, more importantly, the water it traverses.

Tar sands' oil can't be skimmed from the water. The toxic chemicals immediately enter the water while the tar sands form a heavy sludge that sinks to the bottom and is moved downstream by the river current.

In the summer of 2010, one million gallons of tar sands oil gushed from an Enbridge pipeline near Marshall, Michigan, resulting in the most costly clean-up effort in U.S. history; also, the largest in-country spill ever. After $21.5 billion had been spent, the EPA allowed the cleanup to halt

after admitting that the rivers and streams polluted could not be returned to their former clean condition.

After significant dredging efforts, it was stated that further efforts would not improve the results.

Spills are inevitable. Hundreds of spills happen each year in the United States. Please look at Enbridge's checkered history in this regard.

Third, let's talk about the economic ramifications of the Line 3 pipeline. Enbridge promises that the pipeline will bring tens of thousands of jobs to Minnesota. What it doesn't tell you is that less than a dozen of them will be permanent Minnesota jobs. The rest will be temporary jobs to build the pipeline, and the majority of those jobs will likely go to experienced pipeline builders from outside Minnesota.

Let's think of the hundreds of thousands of jobs in our multi-billion dollar tourist industry that would be endangered by a spill like the one that happened in Michigan.

Far more permanent jobs would be

created from renewable energy production in Minnesota. Germany recently announced that it now produces 80 percent of its energy from renewables. Oil companies see the writing on the wall and want to continue to build infrastructure to give the illusion that they are not in the middle of an oil bubble that could burst at any moment.

Consider that the cost of processing tar sands to useable oil is half of what a barrel of oil sells for today with the price seen here.

Does that sounds like good economics to you? This is Canadian oil that will be exported to foreign countries. As a result, it would not improve the price of oil for Minnesota or the rest of the United States.

Given the importance of the Pine River watershed to our drinking water and tourist industry, the idea of putting them at risk with the pipeline makes absolutely no sense.

By the way, shouldn't we be holding Enbridge liable for the pollution they

have already created with the current Line 3 pipeline? That path has already been irreversibly damaged, and Enbridge wants to just abandon it with no cleanup.

Seems like the right thing to do would be to demand they clean up the existing Line 3 and repair or replace it along the already damaged route.

FACILITATOR: Charlotte Hughes.

MS. CHARLOTTE HUGHES: Hello everyone. My name is Charlotte Hughes, C-H-A-R-L-O-T-T-E, H-U-G-H-E-S.

And I'm commenting on the pipeline as a younger person in this room. I see throughout the years that people have been putting pipelines in the ground. People -- actually, not people. Corporations have been putting pipelines in the ground, and we haven't seen very many benefits. We've seen a lot of toxic waste in our areas. We've seen a lot of biospheres being destroyed. We've seen a lot of animals being destroyed.

I don't see in this EIS any chance that there actually is very many economic opportunities out of this, and that

is their main push here. They are saying that there will be jobs. There are less than a hundred construction jobs and zero permanent jobs.

They are saying that we don't get any benefits, but really, what are we seeing? We're seeing a lot of dead pipelines in the ground, and they're abandoning them for us to clean up in future generations.

Well, I'm the future generation here, and I will not be able to clean up this pipeline. And we cannot let them continue to put pipelines in the ground right here, because we already have ones leaking all the time.

And they're saying we need 4,000 sites need to be cleaned up from Line 3 right now. We need to get rid of Line 3, and we need to not build any more pipelines here. We need to move to clean energy. That is the future.

Thank you.

FACILITATOR: I've got Sharon Natzel, Sharon.

MS. SHARON NATZEL: Sharon Natzel, S-H-A-R-O-N, N-A-T-Z-E-L.

I'm talking about the new route

for the proposed Line 3 pipeline, which I believe threatens Minnesota's clearest lakes, and that's our fresh water.

This proposal would really establish a new pipeline corridor, which just south of Park Rapids, Minnesota, all the way to Superior is really a totally new corridor.

It would cross the Mississippi River in multiple spots, also. And this is a water rich environment in that new corridor, and some of the sandy soils are very permeable, and also some of the aquifers are connected.

The oil spills could pollute and endanger these fresh waters for our drinking, for our recreation, and our wildlife during the project's lifetime, which we know, because of this replacement project, is at least 50 years.

So this would be 50 years of potential pollution. The Mississippi River does provide drinking water for St. Cloud, Minneapolis, and St. Paul.

We also need to consider, in the Yellowstone River 2015 pipeline spill, which

happened under the ice, it was near Glendive, Montana, and there the drinking water had to be replaced with truckloads of fresh water that was brought into Glendive.

We know that from our ice-out contests around the area, that we have at least three months of frozen ice here.

The United States Geological Service, in November of 2010, did a national research program document entitled, "Water Security, National and Global Issues," and they referenced a United Nations' environment program document.

In that document it states that, "By 2025, our global fresh water stress that owes to the increasing population on water use, will increase significantly." And we know that overseas that will happen, but even in the United States.

And the document projects that by 2050, nearly 5 billion people will be affected by fresh water scarcity.

"By 2025," the document states, "Across the United States the water withdrawal as a percentage of total available is

projected to be 20 to 40 percent."

And we know that even in Minnesota we're starting to look at groundwater management areas because of the amount of fresh water available, and our straight river groundwater management area is now in that.

The EPS also states that Lake Superior is 20 percent of the entire global fresh water.

The pipeline corridor goes to Lake Superior. The USGS document also explains that the amount of fresh water is finite, and that fresh water makes up only 2.5 percent of all the water on earth.

So we need to consider, when we're placing a pipeline corridor, just where our waters are and the soils that we're placing the pipeline in.

If we need to have pipelines, we need to also consider our fresh water. All of our water is connected and it's needed for life.

Thank you.

FACILITATOR: Greg Johnson.

MR. GREGORY JOHNSON: My name is Gregory Johnson, G-R-E-G-O-R-Y, J-O-H-N-S-O-N. I'm a board member of the Pine River Watershed Alliance, and, Barbara, I'm going to come and recruit you. That was good.

You said most of what I could say about the watershed, with the exception that a very large portion of the watershed where the pipeline is proposed to go is co-located with high powered transmission lines in highly conductive soils called wetlands.

And I issued or entered into evidence a report from Little Falls about the extremely high risk of cathodic protection failure in exactly these types of soils, and so I did not see any of that, other than a very quick reference by Enbridge that they would use cathodic protection, but nothing about the much higher risk of failure of cathodic protection.

These wetlands are some of the last native pristine wetlands in the state. And by bridging them and putting pipelines in, I didn't see anything about disruption of

natural flow through those wetlands into the White Fish and Pine Ridge watershed.

I'm very concerned that this DEIS is just fancy paper over Enbridge's data. I don't think it's taken into account enough of the input from MPCA and DNR.

In addition, over here was -- it's a corridor. Let's not talk about a pipeline. We know Enbridge has at least two other aging pipelines along Route 2, and Sandpiper could be revised.

So we could be looking in the future at three or four more pipelines going through the same corridor, and I think we need to address the entire system, rather than taking it piecemeal, one at a time, one state at a time.

The oil will eventually go to Patoka, so why not put it through SA-04, get it into lands that are away from our waters and through the very most pristine part of the state. Thank you.

FACILITATOR: Thank you, Greg.

Alfred Kleinke.

MR. ALFRED KLEINKE: My name is

Al Kleinke. That's spelled K-L-E-I-N-K-E. I would like to speak to this issue in a little different perspective.

I would like to talk about the economic benefits of moving crude oil in a safe and efficient manner.

Our family has owned land in Wadena County for over 100 years. We've owned land in Hubbard County for over 50 years, and I know, as most other people that have been here for a long while, that availability and affordability of carbon-based fuels is absolutely essential and critical to the future of the northern half of the state of Minnesota.

Just to name a few, carbon-based fuel fuels are agricultural industry. Whether it's potatoes, whether it's corn, whether it's grain or soybeans, it's absolutely critical that we have carbon-based fuels for the foreseeable future. And we're looking out maybe 50 to 100 years, at least, where we will need that fuel in the northern half of Minnesota.

If you want to look a little bit

further, our educational system in the northern half of Minnesota is dependent on a bus system. Those buses are fueled by carbon-based fuels. It's critical that it be available and also that it be affordable. If we look at our fire and police protection, you will see the same thing again.

Every village, every city, every county, we need fire and police protection. We need fuel to fuel those vehicles for fire and police protection.

If we go a little bit further, how about the tourist industry, the boating industry in this half of the state -- very important to us. The ATV industry, the boats that are built over in a village not too far from here, New York Mills. Potato plant, right here in Park Rapids. All of that depends on one important ingredient, and that is availability of fuel at an affordable cost.

The future of the northern half of the state of Minnesota depends on it.

So the real question is, what is the best way to move crude oil from which all these products that are so needed will become

available.

And this question has been looked at and reviewed very carefully, not here just in Minnesota, but also in the rest of the world. In Europe, Asia, all over, they had the same question as we're looking at today.

Their conclusion has been pipelines are in fact the most safest way to move crude oil and have it refined, that's a fact. That's not an opinion.

Also, it is the most efficient way to move crude oil to market, to have it refined, and make it into products that people can have to support their way of life.

In Europe, for example, everything is now moved through pipelines. They no longer move crude oil by train or any other method, because it is the safest and it is the most efficient, and it does support a modern day way of living.

I really believe we need to look at this in terms of benefiting future generations beyond my generation. Will they have a way of life in northern Minnesota that

we enjoy today and perhaps even better?

Now, of course, there are alternative sources of energy. But all the various uses for carbon-based fuels will remain for at least 50 to 100 years. Yes, we will be able to use other forms of energy, but that's primarily for heating.

In terms of actually providing a way of life and living in a place to live and raise a family, we do need carbon-based fuels, and the safest way to bring that to market is in fact pipelines.

So I support, very much, the methodology that's being used today to build safety into moving the crude oil with modern technology, x-ray, welding, and all of the other surveillance capability that we have.

There is nothing that we can do in moving any kind of products that doesn't have some risk, that's true.

But the decision that should be made is what in fact is the most efficient way and in fact the most safest way to move crude oil to market.

And it definitely is pipelines

versus the alternatives.

Thank you.

FACILITATOR: We have Deanna Johnson next.

MS. DEANNA JOHNSON: D-E-A-N-N-A, J-O-H-N-S-O-N.

My comment is kind of based on questions, and there's nobody here to answer questions. So it kind of complicated it a little bit.

I want to know what the approximate percentage of the DEIS is developed from information provided by Enbridge, Cardinal, and BAR Engineering. Is anybody able to answer that question for me?

FACILITATOR: During this comment period, it's only comments, but we're taking them closely, and there are folks afterwards that you may be able to informally ask as well.

MS. DEANNA JOHNSON: What are Cardinal and BAR Engineer's previous connections to Enbridge? Was there an independent review of their work? What is the nature of participation in the development of this document by the Minnesota Pollution

Control Agency and the Minnesota DNR?

This document bears no resemblance to their work on such issues in the past. Itasca State Park and Mississippi headwaters are given little attention in this EIS.

Itasca Park is not listed as a Minnesota historic resource in the document. What entity made the decision to not list Itasca as historically significant, despite the fact that it is Minnesota's oldest state park established in 1891.

It's a source of one of the world's largest rivers. It has a bison kill site, which is 8,000 years old, and the area hosts prehistoric site from early native American Elk Lake culture.

Given that the Upper Mississippi River Monitoring and Assessment Study by the MPCA, in January 2017, found the Mississippi headwaters to be a largely healthy river in its northern reaches, and the river is in great shape, and the study states, "The headwaters are an exceptional resource that should be protected."

Why is there no assessment of the upper Mississippi watershed in the DEIS?

What entity made the choice of which watersheds would be evaluated? What entity made the decision to list the Mississippi waterway crossing near the headwaters as impaired water?

This is found on table G2, page 21. Where was the information found? It is not listed on the 2016 list of impaired waters.

I find it very disturbing that Enbridge, BAR Engineering, and Cardinal are driving the information provided in this document. How would we as citizens expect these entities will have our natural resources and our local economy as a priority, as this document is prepared? Where is there evidence provided that unbiased evaluation of their work is provided?

Both of these companies have worked for Enbridge in the past, and both have provided remediation services to Enbridge, which, if they're assisting with the preparation of the DEIS, and they have had --

do work for remediation, they could also find more work if there's a leak or a spill into our resources after it's all said and done.

Would both these -- I guess I'm going to repeat this. Would both these companies quite possibly be hired in the event of a rupture, spill, or leaks to assist Enbridge if the pipeline were constructed?

It is absolutely unconscionable that the MPCA and the DNR agencies, who protect Minnesota's environment, are apparently pushed aside in the major development of this document.

Instead, Enbridge, Cardinal, and BAR are heavily involved in providing information for this document; corporations who come to the table with prospects of huge financial gains.

FACILITATOR: Florence Hedeen, Florence.

MS. FLORENCE HEDEEN: Florence, F-L-O-R-E-N-C-E, Hedeen, H-E-D-E-E-N.

The question always in my mind is why this absolute necessity for this Line 3 to go in. There are other alternatives to

energy that will not be developed in the way that they could be as long as we assume that the only energy source that we can exist with is fossil fuels.

Those energies can be left in the ground, and we can be using energies that come from the wind, come from the sun, come from water power.

We are not dependent on energy from the ground unless we choose to live that way. And I am just saying we can make other choices.

Thank you.

FACILITATOR: Thank you, Florence.

Maurice Spangler.

MR. MAURICE SPANGLER: Maurice, M-A-U-R-I-C-E, Spangler, S-P-A-N-G-L-E-R.

I've typed up comments that I'll turn in to the court reporter and just read some excerpts, and I've tried to concentrate on Chapter 10 of the DEIS. This thing is nearly 6,000 pages long, but I was looking at Chapter 10.

There is a report by the

National Academy of Science that says, "It's extremely important to mitigate tar sands oil leaks within a few days before the weathered diluted bituman sinks."

And I couldn't find anything specific in the DEIS about how these spills can be rapidly dealt with in the wintertime when immediate access to the spill is difficult and the oil is under ice and snow.

Also, the DEIS report says that, "Using the present Line 3 will require 267 integrity digs per year, 4,000 for the next 15 years, and then it will be much cheaper for Enbridge to monitor a brand new pipe in a new location."

But all new pipelines eventually become old pipelines, and I couldn't find anything about the estimated number of integrity digs that will be needed on the applicant's preferred route as the decades go by or if additional pipelines are added to the corridor.

Next thing I was concerned about are pinhole releases.

The DEIS reports that, "Pinhole

releases can remain undetected for long periods of time, eventually releasing volumes of oil that would constitute medium or large releases," but there's nothing mentioned as to how to prevent pinhole leaks or otherwise deal with them.

The other thing is a statistical issue that -- I'm not a statistician, but when the DEIS compared the annual probability of pinhole leaks for the applicant's preferred route and then compared it first on one table to SA-04, and then at another table to RA-08, the numbers for the annual pinhole leak probability is different from one table to the next. And I don't understand that.

The other thing I was puzzled by, it seems like the annual estimates of small, medium, large, and catastrophic spills seem to imply that the risk remains the same over the life of the pipe.

And maybe I'm reading this wrong, but certainly a new pipe with better coatings should not leak right away. But eventually, in 10, 20, 30 years, it's going to wear out.

The Second Law of Thermodynamics is still operating and everything eventually wears out. I would think the risk of leaking would increase annually rather than be static.

And the final thing I'm concerned about is it's estimated -- and I looked at Bloomberg and Wood Mackenzie, that the demand for U.S. oil consumption may start to go down after next year, and that worldwide consumption and demand may start going down in another 10 years due to electric cars, a variety of things, clean energy.

And you know that Enbridge says they will diligently monitor the pipelines for leaks, but if the demand for oil goes down and Enbridge finds that they're not making as much money on oil transport, maybe they'll get into other energy transports.

But if they're not making as much money on oil transport, wouldn't it be logical for them to cut back on their expenses for monitoring pipelines?

This is something that concerns me. I didn't see anything about it in the report.

Thank you.

FACILITATOR: Thank you, Maurice. Richard Smith is next.

MR. RICHARD SMITH: Hi, everybody. My name is Richard Smith, R-I-C-H-A-R-D, S-M-I-T-H.

Sometimes I can't even say my last name properly, but I am president of Friends of the Headwaters, and I would like to give you just a tiny bit of history here.

We formed in January of 2014, because we were very concerned about these pipeline projects that were proposed for our headwaters lake country. From the very beginning, Friends of the Headwaters has advocated a robust, comprehensive environmental impact study be done on a large scale industrial project as this one is.

The State didn't agree with us in the beginning. The reason that we can be at this meeting right now is Friends of the Headwaters made a decision to take the State to court in the fall of 2014.

Nine months later, our court case got a unanimous victory by the Minnesota

Appellate Court in September of 2015, ordering the State to do an EIS. We put a brake on the whole process as it had been proceeding at that time.

Enbridge has complained during this whole process that we have deliberately tried to slow down their process. They need to assume some of the blame in that. We won a unanimous victory. They chose to appeal that court ruling to the Minnesota Supreme Court. Three months later, the Minnesota Supreme Court said, "We stand by the Appellate Court ruling."

Therefore, the Public Utilities Commission basically was ordered by the courts to conduct an environmental impact study on this whole process. That's why we can stand here today and see what the State has done regarding this process.

Do we at Friends of the Headwaters think this is a perfect document? By no means. I'll applaud their effort. They've never done one before. This is the first ever environmental impact study on a large diameter pipeline in the history of Minnesota.

How many oil pipelines do we have going through this state? Why have we never done that before? We are working very, very hard, us folks at Friends of the Headwaters, and with some experts that we use, to analyze this report and to notify the State where we think there are problems.

There are problems. One thing that's important here is we need access to all of the information that was used to put this proposal together for us to analyze.

Enbridge is trying to predict some data that is critically important for the public to analyze and comment on this report. We all know the reason why we're here is we are very concerned about having tar sands pipelines going through our headwaters country.

We should be concerned. One thing that Friends of the Headwaters has done is we're not an anti pipeline group. We don't oppose a pipeline. We just oppose where they want to put it here.

We think that there's a better place, if -- and by the way, as time has gone by, that it gets larger and larger, whether or

not we really need this pipeline.

By the way, part of this EIS is supposed to address the need, the overall need for this pipeline; not the company's need, our need, Minnesota's need for this pipeline.

That is not being addressed in this EIS properly. We intend to comment on that.

The largest factor, though, and 25 percent of this EIS -- and it is a huge document, 5,597 pages. The box -- I almost had to hire a teenager to come pick up the box for me when it came to my house.

I had a grandmother -- one of my grandmothers made the most amazing molasses cookies you could ever imagine, and we would all ask for the recipe, and she'd give us the recipe and we never could match that cookie. She was hiding some little part of it.

Why do I say that? Because Enbridge is withholding a piece of information that we need to do a proper analysis of the oil spill data that's in this report.

Why are they protecting this? They want to be friends of us in our community,

but they're withholding information.

I'm almost done. This is bitumen, you add a little rock to it, you heat it up, and you flatten it, it becomes asphalt. This is what will be going through the primary product that is going through the Line 3 pipeline.

Obviously, to get this through a pipe, you have to dilute it. What they use to dilute it is as toxic as the bitumen itself.

Why is Enbridge concerned about maybe withholding information from us and us having access to it? This is the simple report. It was only 125 pages that the National Academy of Sciences produced after Enbridge's infamous Kalamazoo River spill in the summer of 2010.

The key takeaway from this report by the National Academy of Science is don't put diluted bitumen or Canadian heavy crude through our water rich environment.

Enbridge, you need to step up, and you need to give us that information.

Thank you very much.

FACILITATOR: I've got Allen

Richardson next.

MR. ALLEN RICHARDSON: My name is Allen Richardson, A-L-L-E-N, R-I-C-H-A-R-D-S-O-N.

I'm an organizer. I'm doing a little work with an organization called Minnesotans for Pipeline Cleanup. We're just primarily concerned with the issue of what will become of the abandoned Line 3 pipeline.

I want to talk to the workers in the room, organized labor or unorganized labor, as the case may be. Here's an anecdote for you. I once organized a pro jobs rally in Duluth with the AFL/CIO, and we were making a little noise advocating for changes in federal policy, and some people were driving by, people who didn't like us apparently, and somebody yelled out the window, "Get a job."

And I'm like, okay. You know, that struck me as a little weird. Here's something else that strikes me a little weird. Labor guys, you talk a lot about jobs, it's practically the only thing that you talk about.

I'm all for the dignity of labor. A couple of points here. I thought it was a

little weird last night in Grand Rapids when I was talking to some 49ers who had just got back from a press conference with Jobs for Minnesotans.

We were talking about this issue of how many jobs could be had digging up the old abandoned Line 3 pipeline. And we know that there is some disagreement about the new route and that whole question, but there is a ton of common ground to be had on this question of abandoned pipelines. So I really want to encourage you guys and your people you work with to think about this.

But the 49ers who had gotten back from this press conference were under the impression that Enbridge had agreed -- that Enbridge, by saying that they were going to take care of it, take care of the abandoned Line 3 pipeline, that that meant that Enbridge had agreed to dig up the abandoned Line 3 and that those jobs would be provided to laborers and pipeline workers.

My point is this: That is not the case. You know, as much as we all want to work together for job creation, I guess I'd be

surprised if you all allowed Enbridge just to say, "No, we're just going to leave that in the ground." Even though your communities stand to benefit from the work, it's cheaper for them just to leave it there.

So the real point I'm trying to make is if you really do want those jobs, you're going to have to publicly, vocally, find some solidarity with the landowners who are saying that they don't want to be stuck with abandoned pipeline on their land. And if you do not do that, you are not likely to get those jobs. And so I guess I don't understand why you wouldn't do that.

But if you need some help finding your courage to maybe confront Enbridge a little bit on that point, some people from the water protecter community would be happy to help you with that.

So that's it. But I'm serious when I say we really would like to work with you, because you are -- we all agree that you are the people who are qualified to do that work. So let's work together to get that done.

Thank you for your time.

FACILITATOR: John Munter.

MR. JOHN MUNTER: John Munter, J-O-H-N, M-U-N-T-E-R. I'm from Warba. Also with Minnesotans for Pipeline Cleanup, here.

There are huge discrepancies in the DEIS, and we found one of them here with our study of the distances between Line 3 and Line 4. For example, in the DEIS, it says, "Generally, the pipes are all 10, 15 feet apart." You see that sprinkled out throughout the document in many places.

Our study from Molina to Grand Rapids, 14, 15 named roads we studied, so you don't have to go on somebody's private property to verify this with the reporter or the DNR or something. We found the average distance was 30 feet from Line 3 to Line 4, and also from Line 1 to 3 is actually 18 feet or so.

So what I want to talk about now is something that really torqued me about I found in the DEIS yesterday. This is from chapter 4. "The majority of the economic analysis and other technical information for the Certificate of Need decision will be

provided by the applicant, other parties, and the public that are participating in the contested case hearing like in November."

What? You're telling me we don't have all the information in the DEIS now? We have to wait after the public hearings, after we all give our input here, and then they're going to come up with more economic analysis and hire an economic expert that will tell us at some point -- who's maybe got his degree studying updated economics 15 years ago, who works for the IEA or something, who have been wrong on the projection of renewables in our economy for many years, and who may be able to get his next job with the oil companies or something, who will tell us, "Oh, okay" -- after we've all given our global warming inputs or something, he'll tell us, "That doesn't matter at all, because oil is going to be $80 a barrel by 2020, and it's going to keep rising until 2040, so therefore, looking into my crystal ball, I predict we're going to need this oil and therefore, there's a need."

Well, that's just ridiculous.

Oil is not going to be $80 a barrel by 2020, or ever again, ever. There's many reasons for that. One is, if you check Art Berman's column, who's the guru of oil projections, he says the world economy is too poor for $80 a barrel oil. You can't run on that.

I mean, we had the economic collapse in 2008. We had here in this country, we have China who hit a bubble that collapsed the economy.

They make too much stuff. We can't buy all their stuff, and so it's a poor world economy, and he's convinced that -- even a $50 barrel of oil, he says historically is too high, really, for oil, and $80 a barrel is not going to be working.

Secondly, there's the argument from many astute commentators that say that we're going to be in a declining world oil demand in the 2020s. Michael Hsueh, from Deutsche Bank, for example -- H-S-U-E-H -- predicts that we'll begin dropping in about 2024, the world demand.

The rating agency Flitch, for example, suggests, "Plummeting cost of EB

batteries could put the oil industry into a death spiral."

The World Energy Council has chimed in, saying, "World peak demand could arrive in 2030, rather than 2040, with rapid technological advances."

Michael Liebreich of Bloomberg's New Energy Finance estimates the oil demand crash could come as early as 2023 to 2028, if current trends don't soften.

Even Shell's chief financial officer, Simon Henry, is quoted as saying the peak oil demand could rise somewhere between five and fifteen years hence.

The nearest data of peak world oil demand comes from carbon tracker and the Grantham Institute in a report published in February of 2017, which concludes it will arrive in 2020, and then plateau out during the 2020s.

So that means we have Saudi oil. It's really going to be enough for the world at a low price, at 21 percent less carbon intensive nature. And we live in a world market, so there's no reason why we can't use

Saudi oil for quite a while.

Why are these people saying this? Because we're going to the electric vehicle market.

India, for example, has a government program to be 100 percent EV by 2030, India. They've got three of their leading car companies, they're all going in, you make this part, you make that part, we'll all make this part, right. So we got a plan in a government program.

We have China who spent $13 billion, for example, in jump starting their EV industry, and they don't want all the air pollution, they don't want to import oil, so they're going for that.

And Europe is -- Europe as well is fast going to electric vehicles.

Now, there are other uses for oil, they'll make the argument. Well, you look at Virgin Atlantic, for example, it's using fuel from steel plants. They've made a lot of fuel, and they're trying it out this year. They think it will decrease the carbon emission to 65 percent if they do that.

So we need to look for the future. Maybe make estimates on how much it would take to import more oil from the Saudis into Pad 2 rather than just how much we do currently import there for one projection.

Thank you.

FACILITATOR: Thank you, John.

We have Frank Orton next.

MR. FRANK ORTON: My name is Frank Orton, F-R-A-N-K, O-R-T-O-N. I'm also part of the Minnesota Petroleum Market Association, as well as operate convenience stores in Northwestern Minnesota.

To not go into a long rendition about the economic impact of cheaper gasoline to both the consumer as well as freight people that haul our food and the like, to limit to the economic impact study in front of us, I guess some things that I see, or my observations are, we presently have a pipeline that's hauling crude out of North Dakota in the oil sands Line 3. There have been studies as to continuation of that product and that pipeline with no changes.

Other routes, routes -- the

current routes supplemented with truck and rail, and if you reference page 17, short of having no crude come through at all, it's either going to come through via pipeline, via truck, or via rail. And depending on how much we bring out, if the current pipeline can't handle it, it would be supplemented by truck and rail.

So if you reference page 17, "Existing pipeline supplemented by rail and truck," seems to be the least palatable solution from an environmental impact study standpoint.

Likewise, if you were to turn to page 22, and again, considering alternatives, I think that's here what the environmental impact study is to figure out today is what is the best solution in alternative, if there is one.

Continue what we're doing today, supplemented by rail and truck, does not seem very palatable. As the gentleman next to me alluded to, pipelines get older as they're used.

The one we're using today is old and probably needs some repair. So if you

reference back to 17, it appears to me that, at least based on this study, the preferred route is the most palatable and least impact on the environment.

Unfortunately, there is no way to have zero impact on the environment, no matter which way you choose, whether it's rail, truck, pipeline. And short of some new technology that doesn't exist today, I don't know that we're going to be crude oil energy independent in the very near term future.

So with that in mind, with that said, we are supportive of the pipeline to make sure that we do get the crude to market so that we do have competitively priced products, not only for petroleum marketers, but also for the consumers and the other industries as it relates to freight transportation.

Obviously, as you saw the foreign corridor crude and diesel price, that impacts a lot of things besides just what we see at the pump.

FACILITATOR: Thank you, Frank.

I have Mary Adams next, Mary.

MS. MARY ADAMS: Hi. Mary,

M-A-R-Y, Adams, A-D-A-M-S.

I'm a retired school administrator. And I'll tell you, when the paper copy arrived in Park Rapids on Tuesday of 6,500 pages in our library, some of us scurried over there to read that. And I know about reading a lot of stuff, but I found it daunting, to say the least.

My comments are thus, in Volume I, what is the need for this project anyway? It had been mentioned earlier today. It had mentioned the need for the project would not be addressed in the DEIS. But you know, it's kind of like putting the cart before the horse. You put the pipeline before you have determined a need for the pipeline, and worldwide oil use is down. In Minnesota it's really down, the prices are down.

So as a retired principal, I'm going to ask you to do your homework. I have a few questions. Please describe in detail how you, meaning Enbridge, can justify further extraction of fossil fuels, when the need is not proven to be there.

Also, in Volume I, Chapter 5, I

read about the greenhouse gas emissions, the heavy western Canadian sedimentary basin, which is the tar sands coming in from Canada. We cut down a lot of trees that were mentioned in this DEIS. Trees are there for the removal of carbon sequestration.

What are the social costs of plowing through this lake country, removing the trees, bringing in this tar sands oil that is diluted with filthy chemicals and made in order to make it move through the pipes.

So I have a question for you -- continued homework. I'd like to know in detail how you intend to restrict carbon emissions. In the DEIS you mentioned that you are working on renewable and alternate energy projects. That's not good enough for me.

Volume I, Chapter 5, I noticed in the DEIS, you mention the number of acres in Aitkin County and Cass County, and where's Hubbard County in this regard? Why didn't you mention the Itasca Park, the first park ever established in our state, that tourists come and we frequent a lot during the summer, fall, winter, and spring.

Also the trout streams, I was sitting over there with a friend. He's looking through the maps of the trout streams. He said, "Well, look at this, Mary." I said, "What do you want me to look at, Tony?" He said, "It says unnamed streams." Do you know that that unnamed stream was going through this marvelous wetland, the Straight River, the primary brown trout river that's coming through Park Rapids area.

So my question is, what drilling, what drilling fluids are you using if you have to cross under the Straight River? It's harmful to wildlife. It damages the vegetation. When you're driving under those streams in the river bed, what are you putting in there? Some of us would like to know.

Volume 3, "Accidental Crude Oil Releases." Question, to what extent would the EPA, the Army Corp of Engineers, DNR, and the PECA be involved in the permitting process?

When I read through the DEIS, it says, "Oh, we'll get a permit from DNR, and then we'll get another permit from DNR; DNR, DNR, DNR. I'd like to know the extent that

you're going to rely on all of these organizations to prove what you're doing.

I have another question -- I'm almost finished -- are the standards that are set by the Federal Pipeline and Hazardous Materials Administration for the extraction of fossil fuels and building -- for the building and maintenance of oil pipelines, is that adequate? Why; why do you think it's adequate? Why not?

We have a lot of wonderful pristine water up in this country. It's not compromised water. What research and preparedness is made to respond soundly when a tar sands spill occurs? How will our aquifers be protected?

The MPCA said, quote, "Difficulty of responding to remote spills due to swamp land inaccessibility of the preferred route."

How crucial is that finding? Why is that so important?

And lastly, the Yellowstone River in Montana a couple of years ago, there were 40,000 gallons spilt into the

Yellowstone, but the cleanup wasn't hampered by winter weather conditions. That stuff sinks to the bottom.

So I'm asking Enbridge what's the key takeaway from the spill in Montana considering the uneven terrain and the winter conditions?

So I'm finished. I have 4,000 more pages to go through. Join me. Get a comment in to DOC by July 10th. Please, please, please help us.

Thank you so much.

FACILITATOR: Thank you, Mary.

I have Charlie Burns. Charlie's in the back, so Eric can bring him the mic.

MR. CHARLIE BURNS: Charlie Burns, B-U-R-N-S, last name.

Now, you people add to oil. You're sitting on it. Every chair, every bench in this room is made out of oil. You depend on it, and don't even know it. That's what I find. I've lived in this area since 1946. The first pipeline, April 15, 1954, went down through here, I worked on it, almost to St. Paul. But living in Eagan, got to be a

hassle. Was it quality controlled then? They didn't know what the word meant.

When they wrapped that line, they hauled it out raw, dropped it in the ground -- or on the ground -- and then they scraped it off because there was dirt on it, wrapped it on the job.

When they crossed the mighty Mississippi, right now, there's 300,000 barrels per month going under your feet. 71 twice -- Highway 71 twice, Highway 34, and across the Mississippi. Three pipelines, they're virtually in my backyard. The first one, they slowed it down a little bit, because I talked to the Koch people, and they don't know what they're going to do, but eventually, they say they'll probably eliminate it.

The other two, they don't even touch them. With an intelligent pig, is what they call them, they got a machine that goes through that pipe and x-rays it from the inside out. And that's how they know what the conditions are.

When they used to work on that,

they had an ugly old drag line -- they did not have backhoes with surgical gloves to pick it up. That didn't exist. And everything about the first one that went through to now, there's no comparison of quality control. It doesn't exist.

And yet, people say, "Well, the quality control, environmental issues." Well, environmental issues, I've worked construction all my life, doesn't happen until it happens, and then you correct it.

But most of the time they could see ahead. 1954, they didn't see nothing, they just dug a trench and dropped it, and it's still pumping oil. Call Koch refinery in St. Paul and they'll tell you how much oil is pumping. Because I called them this winter.

And the other two, now, one person mentioned about better keep the pipelines in one area, and I think that's a good idea. Don't have them going east and west and north and all over the place, because then you got them scattered all over.

Now, why do we want to keep the pipelines running north to south? Specific

gravity has a lot to do with the pressure. People don't even know what that means. There are a few of you that do, but that helps on pushing that oil.

And right now, that oil is helped by that factor. And those three pipelines are a thousand feet behind my house. Been there, the first one, since '54. I don't even know it's there. The other two is '07 or '11, something in there. They're virtually up to date. The other one is up to date, but the way it was put up to date -- so I don't know what the problem is.

Oil for now is not for me. I got grandkids and going to have great grandkids. Some day they're going to need this oil, and if you don't need it, if you got it, it's there to use. You don't have to rustle up oil, goes a hundred dollars a barrel.

Right now, when you go home today wherever, you're going to cross a pipeline and not even know it, and there's going to be thousands of barrels per month going under your feet. And that is something

that's got to be expected. You don't want rail hauling pipe -- or oil, not in this country, because 30 below to 100 above, rail cannot handle that.

There's no end to it. But I don't think that these pipelines, the first one, 1954, Koch is up there, or engineers, they're always checking it out, because they got the intelligent and the electronic systems to do so, and they keep right on it. And there's never been a spill, that I know, from Clearbrook to St. Paul.

So I don't know what the big hassle is. Then they talk about it upsets the wildlife. 1954, when the first pipeline went through this guy's 80 acres, he had to stand guard because the deer were just in there like sheep and hunters were just drooling over that, because they planted it in alfalfa and clover, and that was a deer paradise.

And now it's a different owner. He still keeps it mowed and planted, and that's where he hunts his deer, stands right a hundred yards from his cabin and shoots down the pipeline. Deer cross it and feed on it

all the time.

So it is not an issue of environmental. It's an issue of who's getting the most money. That's the way I see it.

Now, I see people that have --

FACILITATOR: Charlie, it's been about five minutes.

MR. CHARLIE BURNS: This piece of paper, if that paper is not stamped by a certified engineering firm or signed off by somebody in the know, it's just an Internet piece of paper. That's all it amounts to.

Thank you.

FACILITATOR: Thank you, Charlie.

So we've got about ten folks left on the cards, and about 50 minutes, so it works out, I think, just right for the math to try to finish on time, so if people can keep it to five.

And I've got Phil Cline next, so Phil's right here.

MR. PHIL CLINE: Thank you very much. 64 years -- first of all, P-H-I-L, C-L-I-N-E.

I'm enjoying my 64th year on the

north shore of my beloved Fishhook Lake. Not quite true. There were a couple of years when the Army was stuffy about it, and they wouldn't let me off.

But my sense is we've not paid enough attention, nor have the documentation to date to Enbridge's spill ratio, which my understanding is a significant one, significantly higher than the industry norm.

Thank you.

FACILITATOR: Thank you, Phil.

I've got Neil Jordheim, Neil. And the name and spelling, and you'll probably be correcting my pronunciation as well.

MR. NEIL JORDHEIM: My name is Neil Jordheim, N-E-I-L, J-O-R-D-H-E-I-M.

I live in a condominium over by Rocky's Pizza, so I could walk over here today, except it was raining. And I am a summer resident here, not a year-round resident.

I live in Fargo, and I live in a condominium in Fargo, and there's a pipeline that runs probably about a hundred yards behind my house. And like the speaker over here, it's never caused me any concern or anybody else.

But I'm not here to talk about whether or not we should have a pipeline. I'm here to talk about where is the proposed pipeline going to go?

First of all, I probably should tell you I'm the president of the Fishhook Lake and River Association, so I'm a little biased in what I'm doing, because the water that's flowing by me is flowing by all of the members of our association as well.

This Enbridge Line 3, they're calling it a replacement line. I can't believe that we can call it that because it's got twice the capacity of the old pipeline. It has a totally new route, and if we were doing a replacement pipeline, we would only be talking about taking out the old line and putting in a new line in its place.

This is not a replacement line.

Now, the quality of the oil that is coming through that pipe, or will be coming through that pipe, was already demonstrated earlier, much more graphically than what I can state.

But the tar sands that are coming

out of Canada are very caustic. It's an ugly product, and they're going to be putting it through this pipeline at extremely high pressure, so if there is a leak, even a pinhole leak, it's going to be a significant damage.

Like I said, I'm from North Dakota, and -- Tioga, North Dakota, which is hundreds of miles from my house had an oil pipeline leak in a cornfield several years ago. It went totally undetected. Nobody really knows for how long, but it was identified by somebody that was flying by with their airplane and they spotted it in the middle of that cornfield.

Now, they were able to go out there, stop the leak, and in a cornfield, if you've got oil in a cornfield or if you've got oil in a gas station that leaks, you can go out there and you can take that soil, lay it out in the sun, let the petroleum evaporate, roll it over with a maintainer, let it evaporate, keep on doing that, pretty soon you can put that soil back in the same place again and you're done.

But if you put oil into our

wetlands north of here, how are they ever going to get it out? And in the wintertime, or even in the summer, how are they ever going to find exactly where that is leaking? That's my concern.

We live in a place where we have some of the highest quality lakes, rivers, wetlands and forests in the nation.

We have a fabulous ecosystem. I do a little bit of bird watching. I've been out in some of these areas. People are flocking here from all over the world to see what we have, and we're putting it at risk just because of poor route selection.

The route crosses some of our cleanest Minnesota lakes and rivers. The route crosses an area with high susceptibility for groundwater contamination.

We're already dealing with groundwater contamination here in Park Rapids because of farming practices. And we know what that means when the good well has to be turned off, the bad well turns back on; all of a sudden, you can see it in your plumbing. You can taste it in your water. You can see it.

We have the wild rice lakes, and half of the wild rice that is harvested in this country is coming from the very area that they're talking about going through.

We've got critical wetlands for our waterfall and wildlife. Look at the economic impact of all of the hunting and fishing that goes on here. We've got eight state forests with Minnesota's biggest tourist attractions and the headwaters.

We've got friends that are coming to see us in a couple of weeks, and they've been to 48 of the 50 states, Minnesota and North Dakota the last two, and we're going to make sure that they see them. My wife said, "Where should we take them?" And I said, "We're going to take them to the headwaters."

Everybody knows about the Mississippi River. That is a beautiful spot. I would hate to see it polluted.

When we look at all of the different things that we have here, and we look at the fact that there's already an established pipeline corridor running across the state of North Dakota and the state of Minnesota, I

think that their best alternative is to pull out Line 3, not leave it behind for the next generation to have to clean up. Pull out Line 3, put in a new Line 3 in the same place and be done with it.

Thank you.

FACILITATOR: Thank you, Neil.

Fred Nordstrom.

MR. FRED NORDSTROM: My name is Fred, F-R-E-D, Nordstrom, N-O-R-D-S-T-R-O-M.

You know, Neil said a lot of wonderful things right now, which made me kind of rethink what I was going to say to you, but my background, I'd like to share. Fortunately, I work for a large company and had the opportunity to make investments.

And when you make investments, you have to consider several things. You have to consider what we call the P&L, a profit and loss. You had to consider something else that the gentleman in the red brought up, risk, R-I-S-K, risk. And so when I made these recommendations to the -- my board of directors, there are those things that I looked at.

Now, as I look here in this wonderful area of northwest Minnesota, what about the P&L? Well, for the businesses here, they're obviously doing quite well, thanks to what Neil just talked about, and all of us visitors who have come here -- I'm a transplant from Iowa, for example. These P&Ls should also be considered, in my opinion, by the Public Utilities Commission.

Now, what do I mean by that? Well, let's say you are the Commission, and you think about, what exists in northwest Minnesota? Why is this guy Nordstrom from Iowa coming up here, for God's sake? Could there be some profit in doing this? Yes, there certainly is.

I know in talking to the Chamber of Commerce last year, that they didn't appreciate my comments at all, because they said, "Look what's going to happen to our P&L when we put this pipeline in." Yes, sure, they're going to hire a few more people and they're going to have more business as a consequence.

But what are the risks in this

investment? Well, I got to thinking about that, and I finally decided, I guess I'll go to Google, and I'll ask them what's the risk? What about this company, Enbridge, and what is their experience? Have they risked any areas?

And I suppose you know that already in February of this year, 2017, they've had a couple of spills. One in Blue Ridge, Texas. I didn't look on the map where that is -- 600,000 gallons of oil in February of this year.

They also had another spill in Alberta, Canada, but Google didn't tell me much about that one. And I thought, oh, risk. If you were on the Public Utilities Commission and you're thinking about that, is there a possible risk there to what Neil described as to what we enjoy in this beautiful area?

Then I looked further in Google. I couldn't believe this. Between 1999 and 2010, were there 100 spills? Were there 300 spills? Were there 500 spills? There were 804 spills in 11 years.

Now, sure, some of you who work on pipelines say, "Well, we're doing a lot

better now. We know how to weld," blah, blah, blah, and I understand that.

However, I also understand what someone just said about more pressure that goes through this line, and the more gallons that are going through it and things that -- specific gravity and things that I don't really understand.

But in 11 years Enbridge, just Enbridge, they spilled 161,475 barrels.

So you're on the Public Utilities Commission, and I'm saying, boy, we got to build this pipeline, and then you look at the risk and the history, and I think of the profit and loss that you now have in northwest Minnesota, and then you, the board of directors, the Public Utilities Commission, do I want to take this risk that presents itself with the recommendation for their pipeline?

Oh sure, they should have a pipeline. I'm not against that, but maybe they should put it in an area where there's a little less risk for this P&L.

So I guess I close my comments

by saying, do they know what the investment is up here in northwest Minnesota, and what could happen to that investment, and what might be the result?

Oh, I forgot to tell you, I never heard of Romeoville, Illinois, but in 2010, there were over 6,000 barrels spilled, and I imagine you all read about in 2010. Also, Kalamazoo, there was a suit and Enbridge paid $177 million.

With that history, are you going to approve, you on the Public Utility Commission, the present plan for a pipeline through this wonderful area of northwest Minnesota?

I thank you.

FACILITATOR: John Weber.

MR. JOHN WEBER: John, J-O-H-N, Weber, W-E-B-E-R.

Recognizing that of the three-hour time block set aside for this meeting, only a few minutes will actually be available for comments on the DEIS, I will make only a few comments today.

Though issued on May 15, 2017, a

paper copy of the DEIS did not arrive at the Park Rapids Library until Tuesday, May 30, just a week before today's meeting.

No one today can deny that it is not a massive document. In fact, a librarian was quite happy to let me lift it out of its shipping carton.

However, even as massive as the paper copy was that I lifted, I understand that 1,100 pages of oil spill analysis was not printed, nor at least another 300 pages. I ask why not?

Figure 3-1 on page 3-2, contains a timeline for the Line 3 process. I question how a meaningful analysis, and emphasize meaningful analysis, and appropriate, emphasizing appropriate, response to questions, issues, et cetera, raised during the comment period that ends July 10 can be addressed and incorporated in the final EIS slated to be issued a near month later on August 10th. How can this be accomplished?

In closing, I'll add that I will be spending more time reading the DEIS -- certainly not light summer reading -- at the

library and mailing my written comments to meet hasty July 10 deadline.

I do ask if the unprinted paper copy pages will be provided to the Park Rapids and other libraries on a timely basis.

Thank you.

FACILITATOR: Thank you, John.

Raymond Peterson, Raymond. We'll come back to Raymond.

I've got Jami Gaither.

MS. JAMI GAITHER: Hi. My name is Jami Gaither, G-A-I-T-H-E-R, first name, J-A-M-I. I'm a three-year now resident of Minnesota. We moved here primarily because you have clean water. We looked at Arizona. The water war started 15 years ago down there. We have water here, and we need to take care of it.

We live about a mile north on County 2 of where the Line 3 runs now, and found out recently -- very, very glad -- that we installed cisterns for water catchment instead of drilling a well, because it looks like RA-05 could go literally through our backyard.

We've not been contacted by Enbridge in any way up until about a week ago. We had guys coming on to our property thinking they have a right-of-way.

I explained to them, "People up here don't like you coming on our property without notice. And some of them shoot first and ask questions later, so you guys should be real careful about this."

I really can't say enough about the fact that this DEIS is almost a -- an insult is a good word. I read some of this stuff last night about -- when you read it, you think, wow, really? And there's so many things to focus on, but I'll stick to -- I'll stick to one that I thought was particularly interesting.

I lived in Alexandria right off I-94 for a very short period, and it says here that the company considered an alternate route of the pipeline going down I-94 as too dangerous because of the possibility of pipe failure and crude oil flooding the highway, causing accidents in its routing through populated areas.

What about the population up here? You know, I went yesterday to the meeting in Rice Lake, and I felt like I had to come today, because I was there as a reporter yesterday and I couldn't stand up and speak. And today I felt I really needed to speak.

On the way home from that meeting last night, my husband and I were driving down County 2, and a couple of Sandhill cranes walked right across the road in front of us. We saw them in time to stop.

And the male is in front, the female behind, they got across the road, and we thought, oh, great, we can go. Well, immediately the female ran back across the road, and there was a baby coming behind, and the baby needed to get across the road, too.

The father came at our car, flapping wings, ducking his head, looking as big as he could. And even after we let them pass, we stopped and watched. And I filmed it. It was so beautiful.

And I think about the fact that this is where a lot of our migratory birds are born. If we ruin these waters, we're not going

to be able to enjoy the Sandhill cranes. There's a great migratory pass down at Jasper Pulaski State Park where thousands of these birds come, and it's a beautiful thing.

If we screw up and take money and oil over water -- you know, I get the jobs. Let's put the jobs into removing the old stuff, cleaning up the mess that we're leaving our kids.

I'm old enough. I don't need all this oil, all these new pipelines. And really, how much of it is there left?

You know, Al, I get your point. We all are oil dependent. We all needs tons of it. We use it every day. I drove down here in my little smart car, but yeah, I used oil to get down here. I thought about it. I really thought about whether I needed to come down and make comments, because that's important to me.

And I'm doing other stuff down here in PR because I consolidate trips to save oil.

We've got to be thinking about this stuff, people. Do you want a job, or do you want to be able to drink water, cook food,

brush your teeth, take a shower? What's more important?

There are alternatives and there's only so much fossil fuel left. Realistically, 50 to 100 hundred years from now, Al, we ain't going to have oil left. Why do you think we're pulling tar sands out? Do you know how hard that stuff is to get? 25 to 1 ratio for oil efficiency. Tar sands is like, what, 1 to 3?

We put more energy into the ground to get this stuff out of the ground than we practically get from it when we use it.

In the meanwhile, we're destroying our planet. We're destroying our wildlife, our waters, our land, and people are dying. Yesterday I asked a question -- I'll finish with this. I don't know what my time is, because I can't see the clock.

I asked on the tribal resources, you know, are we giving more precedence to the tribal resources over maybe some of the long-haired back stuff on the -- the environmentalist is like, "Oh, no."

And I was flabbergasted. Really?

People, human beings, the very people who gave up their land in treaties to us so we actually have a place to put a pipeline. We don't value their lives more than we value animals?

Yeah, I'm a animal lover. I told you my Sandhill crane story. But I think we need to be thinking about where these pipelines are right now and how many lives they're already destroying before we start destroying more.

Thank you.

FACILITATOR: Thank you, Jami.

Next I've got Winona LaDuke.

MS. WINONA LADUKE: (indiscernible). My name is Winona LaDuke, W-I-N-O-N-A, L-A-D-U-K-E.

You know what, I just want to start by saying I'm really proud of the people from our territory for coming out. It takes a lot of courage to stand up to big corporations and to say it's not right what they want to do.

And you know, even discussing this whole process, I think it is a really fair criticism to say that we are operating

under the guidelines and the timetables set by a corporation, and I don't think that's fair to us. I don't think it's fair to drop an EIS that's so long on people and ask them to comment a week later.

We're the people who live here, all of us. And we're the people who know these lakes and we value this land and this water, and I think it's an unfair process.

And I think there's a lot of things missing in the DEIS that we're talking about here, and I think the process should be extended significantly to address those issues, because rushing through is not fair.

It's too significant of a decision. People have spoken really well. I was really heartened to hear what everybody said, and I understand a lot of these pieces.

I was asked by someone yesterday to explain -- I'm an economist by training. I went to Harvard. I direct a national organization. But I live here. This is where I live, and this is the land that my ancestors are from. This is the land all my children and descendents will be from, just like all of

you.

So the first thing that I have to ask is why we don't matter? Why you could do a full DEIS and say tribal people are already in tough shape, you're dying at 44 years of age. I'm one of the few grandmothers around. I'm 57.

I'm the same age as a lot of you, but we're dying, we're under duress, we aren't eating right, we're stressed out, we've got every disease you don't want to have.

It's very clear this pipeline runs through the heart of Anishinaabe territory. The DEIS says that we are the most impacted. It says that this is where all the rice lakes are, and that's the heart of our people. There's no rice anywhere else in the world, and we have no place else to go.

What I don't understand is that although the DEIS concludes that the disproportionate and adverse impacts would occur on American Indian populations, it is not a reason to deny the permit.

So I really don't get why we don't count.

You know, I feel like, don't question my patriotism. We just want good decisions to be made, and we feel that we should be fairly treated, and this is not fair.

And the rest of the people who live here, you're going to be treated just like Indians in this one. We're all in the same place. This is where we live.

The second thing I want to talk about, you know, just spoken to last night. This is a feather from Lake Athabasca, in the middle of the tar sands. It's from an eagle. It was given to me by the people up there because they understand that what we are doing here affects them. They are already dying from tar sands mines. They're dying.

Those people didn't ask for that. They're Cree people that are just trying to live the same life as their ancestors, and they're victims of the tar sands industry. They're poisoned all around them.

It's not just the people that are dying. It's all of the animals that are

dying up there and all of the birds that are dying. It's a death zone. It's a national sacrifice area.

For the life of me, I can't see why we are trying to justify that and to make sure to figure out how to get that oil down here.

You know, as an economist, what I'm going to tell you -- and a lot of people in here know this -- is that the writing is on the wall that it's the end of tar sands time.

We're in extreme extraction. That's when you get to the bottom of the barrel and you keep scraping, rather than trying to figure out the solution.

And the bottom of the barrel is the tar sands, and the bottom of the barrel was the fracking proposal that we all defeated last time. You know, when you blow up the bedrock of Mother Earth, put 602 chemicals in there and pretend it's going to work out for you all. It's not going to work out for anybody.

Up there, those people, it is not included in the DEIS the destruction of

people, the destruction of ecosystems in the tar sands area. It is super destructive oil, and those people also have a right to live.

And so when you talk about the cumulative impact of the pipeline, everybody in this room knows that it is not from one border of Minnesota to the other border. It comes from someplace that they are turning into hell, and it goes to someplace that they are turning into hell.

The last round of hearings, we brought in people from Detroit tar sands communities who are dying, black community right next to the Marathon refinery. They are dying.

So what I want to understand is, you know, people here talked about the cumulative impact. We already got widespread agricultural contamination. Our water is already in danger.

I also want to say, as an economist, I don't understand, and I think a lot of people here don't understand, is why the no-build option is not considered in this proposal. It's super dismissive.

And the reason that you would have a no-build option is, one, because of the economics of it. The fact is that, you know, tar sands capacity is projected to diminish, and they are projecting to overbuild pipelines, between Trump and Trudeau, by a factor of 2.4 million barrels a day. They've approved more permits than there are a need for pipelines.

So the no-build option would be leave that guy, start cleaning it up. Clean up the abandoned pipeline. You know, they already got that pipeline through them, the Alberta Clipper. They could use that one for now. It's a new line.

So I just want to say we really feel that the no-build option should be rigorously reviewed. The cumulative impact should be expanded to both ends.

There is no way to justify the destruction of our people. There is no way to justify that.

And finally, as I look to the future, the stranded asset that this is going to be a liability for our communities, when

they bring five more lines down here, or whatever they're going to do, and then they abandon them. That's a huge economic disaster for all of us.

I just want to thank everybody for coming. I'm really proud to be from this area. Thank you.

FACILITATOR: I've got Chuck Diessner.

MR. CHUCK DIESSNER: Thank you. I don't know how I'm supposed to follow that.

C-H-U-C-K, D-I-E-S-S-N-E-R.

I'd like to applaud everybody that's here today. But I have a challenge for everybody. Next time we get together, get three of your friends and neighbors. We need to expand this group. If we are going to win this battle, it's not going to be done by a few. It's going to be done by everybody.

I was so naive when I got involved in this, and I've been to every PUC hearing. I thought, when I read the mission statement for the Department of Commerce, it says, "We are going to act in the best interest of the public," yay. I sat through

all the hearings. I never saw one damn thing the Department of Commerce stood up and did that was for the best interest of the public.

What they view as the best interest of us is more jobs. How many here want more jobs as opposed to a pipeline? How many want more jobs? Okay, DOC, we don't want more jobs.

Big question for all of us in this process, what is the truth? Do we even know?

MS. LORNA HANES: Right here, the Anishinaabe, the original people. We are the truth.

MR. CHUCK DIESSNER: Do we really know the truth? I'd like the EIS to address this question. What have you done to verify the statements in Enbridge's application and the statements that they have made publicly in hearings or otherwise is true?

We know, as a matter of fact, we didn't get the truth from Enbridge. They said a pipeline has to go through Clearbrook and it absolutely has to go to Superior. Guess what? That was false. Where are they now? They're

over at the Dakota Access, and their line is going to Illinois.

How many other things have we not heard -- or how many things have we heard that are not correct?

I seriously question the voracity of Enbridge. Let me read something to you. That's the basis of what we're all dealing with today.

This is the Public Utilities Commission statement in December about the EIS. "Everything possible must be done to ensure that the new process, the EIS, in considering the applications is robust, comprehensive, high quality," here's the word, "independent," here's another word, "fair and avoids further delay," et cetera.

Let's go back to what to look at whether or not we're meeting that standard. Let's talk about independence, and let's talk about conflict of interest. I've raised these and numerous comments. Never once did I get a reply.

The EIS, as I understand it, relies on reports submitted in certain areas by

Enbridge and does not contain independent study. What the hell? What would Enbridge be doing if the report had reports that was relied on by Friends of Headwaters or any of the tribes?

They'd be jumping it down and yelling and screaming.

But yet, we let Enbridge have the DOC rely -- I told you -- on the reports. I want to be politically correct, but bullshit.

Every -- EIS should be marked, the EIS should be marked on every single part that was relied on based on only what was submitted by Enbridge, and you should get an independent study for every one of those areas.

I think, as mentioned before, we need a list of the consultants. You'd be very interested if you looked at the web of the consultants. The DOC hired the vice president of BAR Engineering to lead this study.

BAR Engineering is the environmental consultant for who? Enbridge. And then DOC hires who to run most of the report? Cardinal. Well, who's Cardinal? Somebody that has worked for Enbridge on

numerous consulting deals.

This all needs to be addressed and sorted out.

Next, the request -- the DOC was not required to have the DNR and the MPCA involved in the EIS -- only to the extent they wanted them.

I would like the EIS to address and include every area that the DNR and the MPCA were not asked to participate, and if they were asked to participate, like the DNR and MPCA, to note what they disagreed with that was in the report -- or that's in the report and why.

And one final comment. I'd like the DOC to go back and do a study of the applications and the statement made by Enbridge on the corridor that contains Line 3 as to what they said at the time they were putting multiple pipelines in that corridor.

I betcha it says they're all safe, and if there's a problem, they can go in there and solve it without disturbing anybody else.

So let's look at what they

promised in the Line 3 corridor and see how it relates to what people have said. And I support remove the old line and put in the new one.

I don't give a dam, and I don't think any of us give a dam about the profit and loss statement for Enbridge. If it costs more to do that, that's just too bad. That's the price of doing business.

FACILITATOR: Thank you.

So we have three more. We need to make sure we give folks enough time to finish up.

So we've got Nicolette Slagle is next. Give your name and spelling, if you could.

MS. NICOLETTE SLAGLE: Nicolette, N-I-C-O-L-E-T-T-E, Slagle, S-L-A-G-L-E. My name is Nicolette Slagle, and I'm the research director for Honor the Earth.

I'm not really going to talk too much about our stance on the pipeline. I'm sure everybody knows that. I'm sure the DOC has heard that already from us.

I do have some specific

comments, specific on the DEIS, but I did want to address something that I heard numerous time here and Grand Rapids and other places, which is what a great neighbor Enbridge is. And I sometimes wonder if it's a completely different Enbridge than the one that I know of, because the one that I know of has numerous safety violations. They have one of the worst spill records, one of the highest incidences of spills.

The industry average is about three spills per thousand miles of pipeline per year. Enbridge's average is 3.19 spills per thousand miles of pipeline. Enbridge has about 8,009 miles of pipeline in Minnesota, which means that there's an average of 25 spills in Minnesota every year.

Now, these vary in sizes and these are reportable spills, but this is the average.

Over in our little display area, we also have this corporate research project profile on Enbridge. It's their corporate rap sheet, and it's a little out of date. We're working on trying to update it and do a better

summation, but it has a record of their various violations and spills.

Just two that I want to pull out for you guys, and then I'll get on my comments on the DEIS, is, "In 2004, the US Pipeline and Hazardous Material Safety Administration, PHMSA, proposed a fine of $11,500 against Enbridge Energy for safety violations found during inspections of pipelines in Illinois, Indiana, and Michigan. The penalty was later reduced to $5,000.

"In a parallel case involving Enbridge pipeline operations in Minnesota, an initial penalty of $30,000 was revised to $25,000."

And I'm sure this didn't have to do with the reanalysis of the impacts of this bill. I'm sure it had something to do with some back-door dealings.

Another one, this is more recent. "In 2008, the Wisconsin Department of Natural Resources charged Enbridge Energy with more than 100 environmental violations relating to the construction of a 320-mile pipeline across much of the state.

"The agency said that Enbridge workers illegally cleared and disrupted wooded wetlands and were responsible for other actions that resulted in discharging sediments into waterways.

"In January 2009, the company settled the charges by agreeing to pay $1.1 million in penalties.

"In March 2010, the PHMSA proposed a fine of $28,800 against Enbridge Energy Pipelines, LLC for safety violations in Oklahoma."

So I'm just wondering, is this Enbridge that's such a great neighbor, a different Enbridge, or are these the ones that have numerous safety violations and numerous fines across this country?

Specifically related to the DEIS and some of its weaknesses, I did notice in there that in the abandonment section they have a price tag at $120 billion to remove the pipeline. There's no indication of where that number came from, other than an estimate of Enbridge at $855 per foot as the removal cost.

But there's no breakdown of what

those costs entail, how much of it is for removal of the pipeline, how much of it is for sediment cleanup, how much of it is for putting in new clean fill, how much of it is for restoration of the environment.

And in Canada, Enbridge was required to complete a full abandonment assessment for part of Line 3. We have no idea how the numbers from what they've told Canada it would cost versus what they told the DOC, because we don't have any of that record, so we can't compare that.

Another question is, again, on to the jobs. So we're saying that everybody needs jobs. It's going to cost $120 billion to clean up this pipeline. If Enbridge isn't going to pay for that, who is going to pay for that?

We also know the restoration economy jobs, for every million dollars invested, 10 to 39 jobs are created. So if you're investing $120 billion, how many jobs are you going to create into the restoration economy? It's going to create a whole new industry for Minnesota and for the region.

Enbridge also says that there's going to be a 30-year life span for this new pipeline. What's their abandonment plan for that pipeline?

I have a question for the DOC and the PUC. Through this whole process, you've gotten a lot of comments from people. Is there any analysis of those comments, like how many are for, how many against. The ones that are against, why are they against it? The ones that are for it, why are they for it? You know, I think that would kind of help all of us to kind of see where we're all kind of falling on this, and if there is some kind of shared ground that we can come to an understanding of, what is the best way to move forward.

Which brings me to the next comment, that in the beginning of this document it says that this document is not here to talk about policy implications of renewable versus fossil fuels; this, that, and the other thing.

But the question is, when is that time to make those decision? We're right

here on this precipice of investing into a dying industry.

Yes, we need oil. Yes, we're all using oil, but saying that if we build a pipeline, we're going to have oil for our grandchildren? We're probably going to run out of it in 20 to 30 years. And I know most of the youth that I know don't want to be relying on fossil fuels, and we want to transition to clean energy. We also know that there's ways to make all of the plastics and all of the fuels that we currently use out of hemp and other materials.

FACILITATOR: Wrap up if you can. Thank you.

MS. NICOLETTE SLAGLE: Another thing, like we've talked about this before, is kind of the lack of response information. I've tried myself to get Enbridge's integrated regional response plan or whatever they call it, but they only give it out to emergency first responders.

So we can't even look at that and see how much they rely on local first responders to respond to these spills, which

history has shown that's how it goes.

So what Enbridge does is they come into these communities, give communities grants so they can buy response equipment, and then Enbridge uses that equipment in their response plan, saying, "Oh, well, we've got it covered. This local fire department just bought this huge truck or whatever, and they'll all be able to respond to this, no problem."

FACILITATOR: Can you wrap up in the next few minutes.

MS. NICOLETTE SLAGLE: I guess the last thing I have to say is the projections of the needed demand for this pipeline. A lot of these projections have been shown to be inflated, and a lot of the projections are based off of growing global demand.

And what we've seen is that a lot of the countries that they're saying the demand is going to come from are leapfrogging over fossil fuels and going right to renewable energy, so we really need to take that into account.

Thank you.

FACILITATOR: Thank you.

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DEIS MEETINGS - 14-916 15-137

PARK RAPIDS - JUNE 7, 2017

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Park Rapids High School Cafetorium
401 Huntsinger Avenue
Park Rapids, Minnesota

I N D E X

SPEAKER	PAGE
THANE MAXWELL	3

(Change in court reporter.)

FACILITATOR: Then I have Thane Maxwell. Just a name and spelling, please.

MR. THANE MAXWELL: All right. Thank you for the opportunity to speak. My name is Thane Maxwell, T-H-A-N-E, M-A-X-W-E-L-L.

UNIDENTIFIED: Pull the mic close, please.

MR. THANE MAXWELL: Okay, thank you. Is that good?

I gave some comments yesterday in Grand Rapids. Don't worry, I'm not going to comment at all 22 meetings, I promise.

But I just really wanted to say a few things today because I'm really moved by how many people from the community came out here today, I can see you are very concerned about this, and I wanted to support you as you stand up and protect your community here.

So I've been looking at the EIS for the past few weeks, ever since it was released, and I wanted to share some of the things that I've seen and share some of my interpretations of it.

You know, as you notice, I feel it is really unfair to you all to ask you to comment on a

document that doesn't have some of the most important things in it. That doesn't have the economic need analysis in it. That doesn't have spill modeling information in it. That doesn't have the contamination plan that Enbridge promises to give us later for the contamination that they find when they abandon Line 3 or remove it. Hopefully remove it.

So, you know, here's something that is also not in the EIS that you can say. When someone stands up here and tells you that it's a fact that pipelines are safer than rail, okay, well, when someone stands up and tells you that, that is actually not a fact. There is no way to compare two different kinds of violence like that. Pipelines spill less frequently, but they spill more volume each time they spill, okay. So pipelines are more likely to spill in a rural area where you're going to affect someone's water sources, the aquifers, the lakes, the rivers, the farmland, that sort of thing. The places where people are more immediately dependent on the health of their natural resources. Rail is more likely to spill in an urban area and blow up and kill somebody. How do you compare those two things? You cannot. That's not in the EIS and

I think it should be.

The other thing I wanted to point out in the EIS is understanding the probabilities of spills. There's two different numbers in there. One gives the annual probability of a spill in Minnesota on Enbridge's preferred route that says 25 percent. So every four years we're going to have spills in Minnesota on Enbridge's lines. But then it gives a different set of stats and it breaks it down by the size of the spill and it gives totally different numbers which to me seem mathematically incompatible. I'm confused about the data and we need check on them.

But those numbers are the following: The chance of a small spill each year in Minnesota is 107 percent. So at least one a year, a small spill. The chance of a medium size spill, 8 percent. The chance of a large spill is 6 percent. And the chance of a catastrophic spill is 1.1 percent. So I did a little math. If this pipeline runs 50 years, and keep in mind that some of these old ones are running 60, 65 years already. Let's say it runs 50 years. We can expect 14 pinhole leaks, 54 small leaks, four mediums, three larges, and one catastrophic spill. So that's what we're

signing up for. And that's the risk you're asked to assume.

When they say on the tribal resources map over there that tribal communities will be disproportionately impacted, and the tribal resources that are essential to the survival of these people will be disproportionately impacted. That's what we're talking about. That's the risk we're talking about.

And we talk about the risk of the headwaters, that's what we're looking at, 76 spills in the lifetime of this pipeline. And that's according to their data, which I was just getting at. When we look at the data of Enbridge's history we find much higher numbers.

The other question I'm really thinking needs to be answered. And we're in Grand Rapids, there are a lot of people who are very concerned about this abandonment question. A lot of people really don't feel that Enbridge should be able to leave that in the ground and walk away.

So we commented a lot last night about all of those things that actually should be in the EIS, the impact of that and assess the risk, but one thing that I think is really important for this

community here is what are they going to do with the other three ancient lines they have in that pipeline corridor? There is absolutely no mention of that. And it's not like Enbridge hasn't thought of it and doesn't have a plan. Those three lines are also just about done. They all in a state of deterioration. Are those three lines coming over here, too? Are you being asked to accept one pipeline or four? I think that needs to be in there.

The other thing, I want to encourage you to question and look at more closely is the alternatives that are offered and compared to Enbridge's preferred route. So in the certificate of need permit decision, which is what this is all about, the PUC decides whether Enbridge gets the pipeline, the certificate of need.

They compare the preferred route to several alternatives. Seven of them, actually. And some of them, quite frankly, are absurd. The rail option assumes that they would build a new rail terminal at the border.

I'll wrap up in a second.

They would do a new rail terminal at the border and ship everything by rail from the

partial new pipeline that they built through Canada. They would never do that. Similar for the truck option, they would never do that. And the no-build option, which we've mentioned already, is defined as continued use of Line 3. You can't let them distort your options that way. They don't get to decide what the options are based on Enbridge's ability to sell something. That's just unreasonable.

So I encourage you to push back on that. What we want is we want the no-build option and shut down Line 3 'cause it's poisoning people right now. That's what we're asking for. And the way that we do that is we call them the third certificate of need consideration, which is very conveniently not listed on the sign over there. The sign over there says when they consider the certificate of need that they think about two things. One, the need of the pipeline; and two, the alternatives, the alternative routes. The third thing that by Minnesota statute they have to consider, is the pipeline in the best interest of society. They left that out.

And that's what we're looking for here. No build. Shutdown of Line 3. It's in the best interest of society.

Thank you very much.

(Clapping.)

FACILITATOR: Is it Raymond Peterson? Raymond, are you here?

Okay. He left. Thank you.

So it is at our time at 1:00 so I'm just going to talk about next steps.

Again, there are comments for written comments over here in the comment box. All will be incorporated in the public comment process which the agencies will consider. If you want to send in written comments later than today, July 10th is the deadline in which you can do that.

Thank you for your time, your comments, we were glad to see each other. Thank you and have a safe trip home.

(Meeting concluded.)

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DEIS MEETINGS - 14-916 15-137

CASS LAKE - JUNE 7, 2017 - 6:00 p.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Palace Casino Hotel
16599 69th Avenue NW
Cass Lake, Minnesota

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FACILITATOR: Good evening, everyone. We'd like to get started with the next part of our evening which is the public comment period.

So if folks want to begin to take a seat at the tables in the next minute or two, we'll get people seated, and then we will have some opening remarks, and then we'll dive in. Please come take a seat.

All right. We would like to get started, so if folks want to come take a seat, we're going to start the public comment period in about a minute.

Come on down.

So welcome, everybody. My name is Patrick Field and I'm working with the consulting team assisting the State in this process.

Thank you for having us. I want to actually turn it over to District 3 Representative Fairbanks to help us open the meeting, and appreciate the Leech Lake Band of Ojibwe hosting us, and I'll turn it over to Councilman Fairbanks to get us started.

MR. FAIRBANKS: I'll be brief.

We have to hurry up, because we got to get bingo started in here in a little bit, so if you all want to stick around, play some Bingo, we'll hand out some dollars after the meetings here. Just kidding.

I'm the District 3 representative for the Leech Lake Band of Ojibwe, and we welcome you to the Palace Casino and Hotel. We actually just recently passed a referendum from the vote of the people to reconstruct the facilities in a different location here around town. So hopefully, in a couple of years we'll be hosting meetings at a new location.

But I would like to welcome you guys, and we have a few council members who are out of town who had travel pre-planned well in advance of the date selection for this meeting here. And they would love to be here, so I'm here representing the council on behalf of Leech Lake to welcome everybody here.

So we're in the Third District in Cass Lake, and the Third -- District 3 is the most western part of the reservation, basically kind of a Cass Lake, north Cass

Lake, down 371, the (indiscernible) area is District 3.

And then District 2 is the most center part of the reservation, Bena, Federal Dam down towards Kego Lake, Smokey Point.

And then District 1 is the western part of the reservation, Deer River, Ball Club, Inger, S. Lake area.

So a lot of information here at the booths here. I hope everybody gets around and just -- there's at least some information here. That's kind of one of the things that I asked is that there's going to be somebody presenting the whole process, the -- establishing the EIS and the Draft EIS, the public comment, and then what's the next steps after that, so people are informed for the people who haven't necessarily -- you know, reading through all of the documentation, through the Department of Commerce's work.

And so hopefully people leave here with some information and learn something, but also people participating here and giving the comments and how they feel about these projects.

I for one, I'm very grateful that a lot of people who have been around these projects probably visited the Standing Rock Dakota Access issue that was going on in North Dakota last year, and so I'm not confident that a lot of the processes of consultation and, you know, commenting on draft EISs and getting through the whole process and really allowing the people to be heard, I'm not sure if that actually happened over there.

So I'm grateful that it's happening over here and people are being able to be heard.

And we have an open-house format where people are able to get information, but there's also a public comment period for people to stand up and voice their concerns, because that's what it's about, is hearing from the people how they feel about infrastructure projects in and around their communities.

Is there any Enbridge employees, can you stand up, please? No, I'm just kidding. I wouldn't put you on the spot. I

always have to have humor with what I do, when I'm speaking.

So I'd like to welcome everybody here today and hope to hear some good comments on how everybody's feeling about the EIS, so miigwech.

FACILITATOR: Thank you very much, and thank you again for hosting us, really appreciate it.

So Bill Grant, Deputy Commissioner for Energy from the Department of Commerce is going to, again, just as the councilman said, give a little lay of the land for process. We'll talk about the public comment period, and then we'll dive in.

DEPUTY COMMISSIONER BILL GRANT: Thanks very much, Pat, and thanks very much, Council Member Fairbanks, for the nice welcome to everyone here.

I do want to cover briefly why we're here tonight and what this is going to be about.

The Environmental Impact Statement, that's what we're here for. We've prepared a Draft Environmental Impact

Statement. It's not final yet. Your comments, along with comments from Minnesotans from all along the project area, will be helping us turn the draft document into a final document.

But it's really intended to inform decision makers in this case, primarily the State Public Utilities Commission, other permitting agencies like the Army Corps of Engineers, and you, the public. That's really what it's for.

When we finalize the document, which we expect to in mid August, it will go to the PUC, and it will help inform two decisions that they need to make.

One is about whether the project is needed, and if they decide that it is, they will grant what's called a Certificate of Need.

And the second is if they decide there is a need, they will then consider what route the project should follow.

And so on the boards that you see in the back, it describes both the Certificate of Need process, and the

alternatives that were considered as part of that analysis, and also the various route alternatives and where they are and how they have -- how they would affect the environment, the economy of the area and so forth.

There will be numerous opportunities for public comment along the way, in addition to this process that we're involved in now, and this is, I think, the third or fourth public meeting that we've had, and there will be over 20 by the time we get done over the next couple of weeks. So that's one opportunity.

The next will be after the draft has been put final, there will be a round of public hearings, again, back in the project area, and the local newspapers is another vehicle that will be announcing the dates and places for those.

And then once all of that is concluded, we would expect the PUC to be making a decision sometime in the spring of next year, so a little less than a year from now.

So while you're here tonight,

there are a variety of ways of giving us comments. I notice some people writing their own comments out and they can certainly submit those. I believe there's a comment box to deliver those to.

Secondly, you can go talk to one of the court reporters privately over here, and thirdly, you can make comments to everyone that's attending, and we'll start that process in just a moment.

All of those comments will be considered equally. There's no one better or worse way to do it.

If you are going to make written comments, the deadline for us to receive those comments is July 10th, just so you have that date in mind.

All of those comments that we receive will be compiled and shared with the public. It will be part of the final document. We will also indicate how the comments that we've received have affected the final document. In other words, the changes that we've made to the document from when it was a draft to when it goes final.

We're really primarily hoping that people will comment on the document itself. That's what would be most helpful as we, again, move from draft to final.

So is there information that's missing? Did we get some things wrong? Did we mischaracterize things? What could be generally improved about the document? That's what we're hoping.

But we also understand that people may want to just say how they're feeling about the project, generally; perfectly fine, too, and we will receive all those comments tonight.

So with that, I think I'll turn it back to Pat so that we can start through the public comment process.

FACILITATOR: Okay, so just a few words about the comment process and we'll get started.

So if we have a group that -- we have more folks, we have to allocate the time more carefully. We've done that kind of by the number of commenters in the time we have.

We have a smaller group tonight,

so we're going to be relatively loose on the time. We will have a clock running in the corner, and seven or eight minutes might be a good chance to wrap up to hear comments from other people, and we can come back to you, because we'll probably have time for that with our smaller crowd.

Just a few things about the public comment. Again, when someone's speaking, if people would listen and let them remark. Everyone has a chance to voice their issues, concerns, ideas, and so I want to make sure that people listen and are respectful of the person commenting. And then when they're done, you're welcome to be affirmative if you want.

People have a range of views and we want everyone to express their view, whatever it is, so we prefer people not be negative. If you want to be affirmative about comments, that's great. Obviously, being respectful of your fellow citizens in the room.

The State agency's role during the comment period is to listen. You may have

comments, you may have questions. You can state all of those.

The State at this point is taking it in, listening carefully, and we have a court reporter who's recording every word that you say. That will be entered into the record. That will be one of the things of all the comments they receive that the State will have to look at as they move to their final EIS. And these transcripts also will be posted with all the public comments that are received in writing sometime after July 10, just to let you know.

If you have cell phones, just put them on do not disturb or the like. That will be helpful.

Given our smaller crowd, I think it will be very easy to end on time.

So a few things, I do have six comment cards, and then I'll look for a raise of hands for others in addition who may also want to comment at that point as well.

A few other things; as you probably know, restrooms are in the back, exits are obviously out that way, but there's

an emergency exit over here, just to let you know in case that's an issue.

If people want the Draft EIS, which is many volumes, it's in the back there. If people actually want their own copy, we have CDs and flash drives, and the registration desk can provide that to you if you would like that to take home. It's much easier to carry than the hard copy version as we go.

I think with that, I think we'll get started.

So what we'll do is we can bring you the mic, and so just raise your hand. We've got Eric and Leslie around somewhere to help bring you the mics.

And so Debra -- if I mispronounce somebody's name, let me know. When you also go to speak, just state your name and spell it for the court reporter.

And I've got a Debra Grandma Topping. Debra, you want to raise your hand, Debra.

There's a mic, and we'll turn it over to you.

MS. DEBRA TOPPING: Boozhou, Boozhou.

As he said, my name is Debra Grandma Topping. I am a grandma of three -- D-E-B-R-A, Topping, T-O-P-P-I-N-G.

So I came a long way from (indiscernible), from Fond du Lac, to be able to voice my opinion in the pipeline Line 3.

I believe that we do not need it. It's a Canadian-built company. It's bringing all of the dirty tar sands, all of the dirty oil into our community, into what we have, who we are, what we stand for. For generations we have been here.

So no, we don't need this here. It's coming through our waters, our wild rice, and it just needs to stay in Canada, right. Actually, it needs to stay in the ground, for real. So that's all I have. Miigwech.

FACILITATOR: Next I have Annie Humphrey, Annie. And just state your name and spell it just for the court reporter.

MS. ANNIE HUMPHREY: Boozhou. Annie Humphrey, A-N-N-I-E, H-U-M-P-H-R-E-Y.

Thank you for giving me this

opportunity to talk. (Indiscernible), and I was born and raised on this reservation.

The abandonment of Line 3, I've read it, I read the process, how it's going to be capped off, and it's going to be deemed safe.

But when such a pipe is capped off, they kind of become tanks. We never leave gas tanks in the ground. When gas stations close down, they have to take them out of the ground, and a capped-off piece of pipeline becomes a tank.

So I think this impact statement needs to address that. Because they need to be taken away and all the contamination cleaned up. And it talks about, you know, a chance of further contamination by moving it. Well, either way, kind of the hand and the foot.

This Environmental Impact Statement, the draft, states within it that these pipelines coming through tribal lands are detrimental to the tribal communities, and it's just briefly mentioned on one of these boards, too.

There's a really nice graph somewhere. This one, I think, yes, with the wild rice picture. So we have a graph in the middle that will show the effects on wild life, the environment, and it would be nice to see a graph like that that would talk about wild rice.

Because we have been to other meetings here in Minnesota, other meetings just like this, and a lot of the people stand up and say, "I'm an avid sports fisherman. I appreciate the water just like everybody else, but it's different for someone who rices and eats fish, you know, several times a week."

So it's -- for me, the water is more important, I feel, than sports fisher people pulling fish out of the lake. And the understanding isn't there. So this cultural understanding thing isn't quite stated in this document. Because in order to understand, you know, this cultural way of life, you need to come and visit the communities and be in the communities, and that doesn't happen.

I haven't seen anyone on my block asking about the culture and observing

how people live on Leech Lake and Fond Du Lac and Milacs.

So I feel, you know, being at these meetings, that we're forced to understand -- we're forced to try to understand the document, we're forced to try to understand these points of view, and we're forced to follow this regulatory process, and we are trying our best to follow the regulatory process, really hard.

That's why I'm here. That's why a lot of us are here, because we, you know, it's kind of put upon us to do that.

I think that, too, Enbridge does have millions of dollars tied up in -- I don't know if they research. I don't think they're developing it, but there's research, or they call it a portfolio on renewable energy, like several million -- millions of dollars. I'm not sure what that really means and how far that goes, if it's just words.

But I know that in Minnesota and nationally, that jobs in renewable energy are some passing fossil fuel jobs.

So I know employment is a big

concern to people who want the pipeline, but there are more jobs in energy, and there's more jobs in the cleanup.

So -- and I drove a car here. That's never the argument. We all drive cars. We always will, and I've heard people say that, "We have to have it. We have to have the oil because our future generation depends on it." That was a statement I heard today. "We have to have fossil fuel oil because our future generation depends on it," and I cannot disagree more with that twisted way of thinking.

But I also heard a lot of -- there was a lot of common ground, too. People who worked for the pipeline also were acknowledging that we do need to move out of the fossil fuel era. We do need to move out.

It's not going to happen tomorrow, but we do need to start working on it, because -- my grandson is turning four in a couple of weeks. If we do start now, maybe by the time he's older -- maybe you all might have grandchildren, too -- that I think having clean water is very important for our future

generations. More than having fossil fuels, because if you think about it, our ancestors lived without it and we can, too. It's not the only way. Fossil fuels are not the only way.

So I'm encouraged because people made statements for the pipeline, but they also said within that same statement, "We need to get out of this era," so I'm very encouraged by those words from people who support putting in more pipelines.

But also, you know, our -- the oil coming from the tar sands up north in Canada, it's up -- it's detrimental to those folks, too, the northern people. We can't just think about ourselves in Minnesota, because I went to Canada and I talked with these people who come from the northern communities there, and they are so desperate, because they still speak their language, they still hunt, they still trap, they still live in that way.

We don't do that down here. So they're losing their way of life really, really fast, and it's really devastating them

and their kids.

So people don't really think about that. We don't think about what's happening at the source, because there is a source.

So just things to think about. We are taking part in this process, and -- but I expect you all to understand that there's treaty law, there's treaty land. Over there there's a map -- there's maps that show where the treaty lands are. This one is a really good one right here.

You know, you're on Indian land right now. And it doesn't matter where you're from, in Minnesota you'll still be in Indian land. So these treaties are federal law, they're laws between nations and people, and that's what we have going for us is we have that, treaty law.

And I will act within that, and I'll recognize that before I recognize this document. So miigwech.

FACILITATOR: Thank you, Annie.

Next we have Sarah Wells Headbird; Sarah?

We'll go back to her.

Nancy, I'm going to mispronounce this last name, Nancy Beaulieu. If you could state your name and spell it, and pronounce it correctly, as I did not, sorry.

MS. NANCY BEAULIEU: Nancy, N-A-N-C-Y, Beaulieu, BEAULIEU.

I'm from Leech Lake, and I reside on the reservation, and I have concerns, what brings me up here today.

And I had a question earlier, and it was more directed for the Army Corps of Engineers. If you look around in the room, we don't have their presence.

And I feel because they issue those permits along the way, that maybe, probably be a good idea if they can come for the next meetings and answer some of those questions like I might have or the next person.

But I guess what concerns me the most is what I seen from Standing Rock. I was out there six times, and I always felt for some reason we had a good, strong support from the Army Corps of Engineers. And then we got

the Trump administration. And then we got all this chaos in the White House, and we got our environmental -- animals, our waterways, our air, it's all in question now because of our president.

So back to Standing Rock. We fought in a good way. We fought with prayer. We stood by each other, even when we felt we were afraid. Once we got together, we were no longer afraid, because there was strength in numbers.

We felt we -- we accomplished what we went there for.

We celebrated too soon, and Trump was voted in. So then when Trump got voted in, all of a sudden, nothing mattered anymore.

What mattered was a handful of people trying to make a profit. Trying to take oil from Canada, run it through our livelihoods. Our food is in our rivers. It's in our watersheds, and water is the basic right to life for any person.

So what I kind of -- what I'm concerned about is what will this Trump

administration do? Is it going to be influenced to this federal agency, the Army Corps of Engineers?

And I think as a people, that we need to start educating each other, and showing some resistance in a good way. And we need to start paying more attention to some of these reports, and making sure to make those phone calls and whatnot.

And what Lynn pointed out earlier, and we actually talked about this. We did a walk with Marty on Line 3 sometime ago, about six weeks ago, and what we're doing is looking for anomalies, because they're not accurately reported to us. So we have to go seek this for ourself.

So we were out there that day, and what was brought to our attention is the abandonment of Line 3, might be called abandoned, but they might -- if you look here, I have to put my reading glasses on. I'm getting old -- the ability of existing Line 3 to serve as a water conduit, including -- or leading to potential impacts to water resources.

So what Marty recommended that day, as we, stewards -- it's everybody's duty to be a steward. That means to protect our environment -- is to pay attention to our watersheds, watch our water levels. We have to protect our water, because the Trump administration ain't going to do that, and we can't trust the Army Corps of Engineers, especially after what happened at Standing Rock.

So I encourage people to pay attention, help spread the word, and tell Enbridge we don't need Line 3, because we are about that renewable revolution. We have wind power. We have solar power. We also know that almost a hundred percent of everything that we buy and that we consume is made from oil.

So as we're coddled in our consumerism, we need to reflect back at our carbon footprint, and that's part of this. Not only should we stop this pipeline, we need to consider individually our carbon footprint.

You can go to bar soap, forget that plastic bottle. I don't use paper towels

anymore, so guess what, that's less manufacturing, that's less coming, too. So if everybody in this room quit using paper towels and everybody else, that's less manufacturing, that's less oil, and things like that.

So we need to pay attention to everything we do in our everyday lives. Like Annie mentioned before, yes, we drove here, but we're also coddled in consumerism with our trends.

We have to get away from trends. Clothes are getting piled up high. And these are manufactured. That's part of the carbon that's going into the air. It's everything we do when we leave this room. It's everything about that plastic sitting there. So I encourage people to think green, to live green. And think about your carbon footprint and say no to Line 3.

FACILITATOR: Thank you, Nancy.

Sarah, are you ready? Sarah is right there.

Just state your name and spell it for the court reporter, if you would, thank you.

MS. SARAH WELS: Boozhoo. My name is Sarah Wells, S-A-R-A-H, W-E-L-S. I'm also known as Headbird, H-E-A-D-B-I-R-D.

I am a member of the Leech Lake Band of Ojibwe. I moved back home in 2010, and I've been working ever since to find out exactly what's going on here with the people of my home.

I made a decision in life that I wasn't going to be a part of the problem anymore, that I wanted to be a part of the solution.

My child deserves that, all of our children deserve that. It's there for future. It's not about us. It's about our children and their future. What are they going to be drinking in 20 years?

If we have poison water right now from the productions around the world, what is going to happen in 20 years?

In Flint, Michigan, they cannot drink the water there. What are their children going to be doing in ten years if they already cannot drink the water?

We're not far behind. Here in

Leech Lake -- actually, not even Leech Lake, in Minnesota, in Wisconsin, because it's not a problem with -- all of us are going to die. It doesn't matter what color we are.

Line 1, 237,000 barrels. Line 2B, 442,000 barrels per day. Line 3, 390,000 barrels per day. Line 4, 796,000 barrels per day. Line 13, 180,000 barrels per day. Do you want me to continue, because I'm only halfway through.

Line 65, 186,000 barrels per day. Line 67, 800,000 barrels per day. Line 81, 210,000 barrels per day.

That's the existing lines. That's what we have right now, with a max capacity of 2.38 billion barrels of tar sands per day that's pumping through Minnesota. That's going straight down to Lake Superior where the refinery is, where it's another large fresh source of water.

Let's not forget, the Line 3 replacement project would add on another 760,000 barrels, thousand barrels per day on top of 238, so 238 and 760, I don't know if I can add that high anymore.

I live here on the reservation. I drink this water. I watch the children play in the water down by the rest area.

I see a burp valve that sits less than 25 feet from where our town's children jump and play in the water all summer long. All four pipelines go through that water.

Maybe they can go on the other side of the road and go onto Leech Lake, but you know what, line 2 and Line 1 go through Leech Lake over on the other side. So where are our children going to go to swim safely?

Because these pipelines do leak. It's not a matter -- it doesn't -- it's not about when or if. It's when.

We already have one pipeline that has 900 anomalies, pinpoint holes, so if we took a straw that we drink from McDonald's and we poked 600 holes in that and we tried to drink that, how much water would come through that? Would that water make it through that straw? Probably not, because it would leak out through those pinpoint holes.

So what is the safety of this

line that has these pinpoint holes? I would like to know that, Enbridge. How safe are these pinpoint holes in a 36-inch pipe, in a 32-inch pipe, in a 16-inch pipe, in a 38-inch pipe; how safe are holes in a pipeline? Because those pinpoint holes leak into the ground, and it might take 10 years, it might take 20 years, it might take, what has it been, 60 years, these pipes have been in the ground, 50 to 60 years. All of them are starting to leak.

They have to increase the burp valves because they have to release the pressure. When I asked what a burp valve was, I was told, "Well, if you go to the ER and you get an IV in your arm and that IV gets an air bubble, you could blow up your heart."

"If you get an air bubble in the pipeline, boom." That's the purpose of a burp valve is to release that pressure.

That scares me, because when I'm out there, and I'm walking the (indiscernible), which came from Enbridge, which goes on top of four pipelines here in Cass Lake -- thanks for that.

So when we're trying to be healthy and go on this nice paved pathway, are we breathing chemicals from those four pipelines? Because it's coming through the earth. It's coming through the water.

On October 28th, I found a beach that was black. That wasn't normal. We have birds that are just dropping dead because they're eating the fish that comes out of the water. We are known for our fishing. We are known worldwide for our fishing, for our walleye, for our trout, whatever it might be.

I'm not a fisherman, but we have a lot of people that come here and fish.

If the birds are dying from the fish, how many humans are dying from that fish, because those fish swim in that water where that pipeline is.

You can go on Google Earth and you can see the pipeline, how it just lays in the bottom of our beautiful Leech Lake.

It's not under the water bed. It's not underneath the bottom of our lake. The pipeline is simply laying on the bottom of our lake.

Check it out. I didn't believe it until I seen it with my own eyes, either. It's really scary.

It's not about me. This is about all of us. Our kids are going to die. We are going to die if that doesn't change, because this goes through our water, it goes through our wetlands, it goes through our water table.

Right now, we are less than half a mile from the south pumping station that Enbridge put in, where there is 22 wells inserted in the ground to monitor the oil that is in the water table over there.

The oil spill wasn't extracted. It didn't go away. The oil is in the ground over there, and there's 22 wells that can be seen on the web. Enbridge has it on their web page, 22 wells at the south pumping station that monitored the oil.

What are they monitoring? Did it move an inch to the right? Did it move an inch to the left? What is the oil doing in the ground? What are these wells? If we're not pulling the oil out of the ground, what

are we doing? It's sitting in the water table less than a quarter of a mile from town. That scares me.

What are the people of Leech Lake, Cass Lake, Minnesota drinking, if that's in the water table, because it doesn't matter which side of town we go on, we have poisons. If we go into town, we've got the Superfund site. There's another poison that people have to deal with that's not being cleaned up or remedied.

We've had enough of the poison. Enough is enough. No more pipelines. 2.38 billion barrels per day at a max capacity is more than enough. Stop. (indiscernible).

FACILITATOR: Allen Richardson next. Allen, name and spelling for the record.

MR. ALLEN RICHARDSON: My name is Allen Richardson, A-L-L-E-N, R-I-C-H-A-R-D-S-O-N.

Let's see, there's some polling data recently released about if people asked about what do they think about an oil pipeline going through rural oil territory, and they rephrased the question, "What do you think

about a tar sands pipeline going through oil territory?" People had a much more negative visceral reaction to tar sands mining, and rightly so.

I think there should be a big graphic of a tar sands mine up there. It looks like Dante's Inferno to me. It looks like hell on earth. Tar sands mining is an abomination. It's not a casual thing. We need to be responsible and say, "That's not good enough."

We're not going to endorse people on the other end being a sacrifice zone just so we can have our lights and boaters, because it's wrong. Are we going to kick that can down the road?

So that's my personal opinion that tar sands mining is abominable, and therefore, we should not embrace it.

I was talking with some of my labor union brothers and sisters over the last couple of meetings, and I will say that as someone who's worked with organized labor -- but I'm a clean water guy. I really don't like being in opposition to pipeline workers,

you know, union members. It's one of my least favorite things, but sometimes it's just what you have to do.

And you know, they used to use the term solidarity a lot more often. I don't know if it's still in vogue in organized labor circles.

But you know, I think we should all think about the idea of solidarity. I want to express solidarity with the people on the other end of this pipeline, and I would encourage pipeline workers, regardless of your background, to give that some thought and to express solidarity with those people for real. What are they going through?

Let's see, regarding jobs, though, right, we know that there's a fair amount about this project that we, that there is disagreement about.

But there is one area where there should be wide agreement, and I think we should focus on what common ground we can find, and I'm referring to the jobs that would be created by removing abandoned pipeline.

I would like to see the

Environmental Impact Statement include more detailed information about how many jobs would be created if we went that way.

I would say that I want to encourage the workers to be a little less timid on this question, which is to say they'll tell you that they want the jobs, but it's -- really, it's not at all clear that the workers would do anything. If Enbridge gets their way, they're going to leave that pipeline in the ground.

I guess my question is, would the workers who would be doing that work of removal, would you just take that line down? You're just going to shrug your shoulders and look at your shoes?

You know, because there's a whole mountain of jobs to be had. And we know that we're setting a precedent here on the question of pipeline abandonment, so we can also establish a precedent for digging those pipelines up where it's safe.

We want to be a science-based people. We don't have a science-based administration in Washington, D.C. right now,

which is a shame, but perhaps we can fix that by -- at least at the local level and state level we can take pride in not being afraid of the science.

To that end, the Draft Environmental Impact Statement makes some pretty sweeping statements about how close the pipelines are to each other in the context of whether or not it's safe to take -- you know, to remove them. You know, would it be possible to remove an abandoned pipeline relative to its proximity to hot lines.

Well, John Munter over there took it upon himself to measure some of the distances between the pipelines in the Grand Rapids area, and there's quite a bit more space there than we've been led to believe from the Draft Environmental Impact Statement, which is to say that there is certainly ample room to remove large sections of pipeline.

So maybe the complete -- the final Environmental Impact Statement could have more detail. You know, let's measure the whole thing. Let's get some soil samples going in there, right.

You know, again, back to the workers, some people will tell you Enbridge is a great neighbor. Well, I've spoken to a lot of landowners out there, working with this organization, Minnesotans for Pipeline Cleanup, and most of the folks that I have spoken to do not want to be left with a section of abandoned pipeline on their private property.

You know, sometimes it's a mixed bag. Sometimes there's one section where they definitely want it up, and there's another section where maybe it would be better to leave it there because of what the process of removing it would do to an already delicate ecosystem.

But the point there is to embrace, for everyone to embrace this idea of landowner choice.

You know, there's so much common sense embedded in this idea, that I'm confident that we can find a whole lot of common ground on this question.

So that's basically it. I just want to reaffirm that, you know, pipeline

workers, people who stand to benefit from those jobs, you're going to have to publicly assert your solidarity with the landowners who are saying we want landowner choice. Don't let Enbridge just walk away from this and say it's all good.

So we need those workers to support the landowners, and then society at large, I think we need to take a good long look at tar sands mining and extreme extraction and realize it's time to take things in another direction.

Thank you very much for your time.

FACILITATOR: Thank you.

Jordan Morgan next.

MR. JORDAN MORGAN: Thank you. My name is Jordan Morgan, J-O-R-D-A-N, M-O-R-G-A-N.

I want to start by saying thank you for hosting this event. It's an honor to be here this afternoon with my neighbors. I think that it's incredibly important that when we're considering projects that are going to impact our backyards and communities, that we

have an opportunity to voice our concerns. So thank you for facilitating that today.

I also want to start off by saying that we should not grant the Certificate of Need for this particular project, and the reason for that is if you look at the social demand within the state of Minnesota, our demand is not going up for oil.

What the demand that this project is citing is Enbridge wants to sell this Canadian oil on the global market, and to do that, they think the best way to do that is to put pipe through our backyards.

What that means is that we would have to incur that social risk of a potential spill and not get a lot of the social benefits since we don't really need more oil to begin with, if you look at our economy.

So as a community, as a state, we should not have to incur the economic externalities that are associated with this project.

Instead of investing in more pipeline, what we should be doing is investing in green renewable technologies. There are

already more green energy jobs than there are fossil fuel jobs in this country, and it's for a fraction of the price.

I would like to move on and start talking about some more of the actual content of the DEIS. I'd like to take a moment and talk about the social cost of carbon.

According to the DEIS, this preferred route would emit 452,496.6 tons of greenhouse gases per year. And that accumulates to $673,365,050 of social costs over the next 30 years.

I think that alone should be grounds to not give a Certificate of Need. I will also say that I don't think that's adequate. I think that when we're looking at the social cost of carbon, 30 years is not long enough of a time table. I'm 23 years old. I plan to be very much alive in 30 years.

And I'm going to have to be dealing with the impact of this project, if it passes, in 30 years and likely longer.

So we should be doing social

carbon cost projections up to 50 years, 100 years, and perhaps even farther to really capture the true social cost of this project, which 30 years cannot.

I would add that the DEIS also says the preferred route is the most impactful and disturbing to wildlife beds and other areas of rich biodiversity found in northern Minnesota. And that that would add to the negative mental, spiritual, and physical health impacts already suffered disproportionately by American Indian populations.

Again, this, which is already stated in the DEIS, is grounds to not give Certificate of Need, but again, I would add is not thorough enough. I guess I would like to see the environmental justice section expanded. In this 1,800-page document, there's only 16 pages devoted to environmental justice.

I think that is not thorough enough, and there's a lot more information there that is not represented in the DEIS that could be. So I would very much support

expanding the environmental justice section of the DEIS.

Next, I'd like to say that we should not allow Enbridge to abandon this pipeline. That's bad for Minnesotans. It's bad for our environment.

And I would like to use an analogy of saying that you just gotta clean up after yourself. My mom raised me that if I make a mess, I have to clean up after myself. If I get up in the morning and I want to make some eggs in my frying pan, I better clean the pan from the day before. You know, that's just common sense. That makes sense to me.

If they want to build this new pipeline, if Enbridge wants to build this new pipeline, they need to clean up the old one.

And like folks who said previously, we should absolutely support landowner choice. If a landowner wants that pipe removed from their land, Enbridge should be required to do that on their own dime. Our neighbors and our community should not have to deal with the lingering effects of having pipe in their ground, abandoned, if they don't want

to. That's just fair for everyone.

And since I'm supporting that we do remove it, basically what I'm saying is let's put hard-working Minnesotans to work. Let's give them those jobs. They're good for our economy to clean up the pipeline. It's good for the environment. It's really a win/win for our entire state.

The only person that wouldn't benefit would be Enbridge, because they would lose some money, but they've already profited billions of dollars off this pipeline's lifespan. So I think that it's economically fair to ask them to spend that money cleaning it up and creating jobs for our hard-working Minnesotans.

I also want to remind everyone that this pipe carries tar sands oil from Canada, and tar sand oil is the most carbon intensive oil on the market.

If we really are concerned about climate change, if we're really concerned about limiting our emissions, tar sands oil is the last oil we should be burning. We should be burning less carbon intensive oils while we

transition to a green economy.

And really, tar sands oil should be a last case scenario that really needs to stay in the ground and not be burned. That's the right thing to do. That's what we should do with this project.

I want to end by saying it is our responsibility as Minnesotans to protect our most valuable resource, and our most valuable resource is our clean water. Our clean water is great for our economy. Our clean water is great for our health, both mental, spiritually and physically.

It is one of the greatest ways that Minnesotans recreate, whether it be fishing, whether it be boating, or a variety of other ways that we can enjoy our pristine water.

If we can protect our clean water, we will preserve our Minnesotan way of life. Thank you.

FACILITATOR: Thank you, Jordan.

Levi Brown is next, and he's a Leech Lake board member, and he's also environmental director, I believe. So, Levi,

state your name and spell it for the court reporter.

MR. LEVI BROWN: Levi Brown, L-E-V-I, B-R-O-W-N.

I wasn't going to speak tonight, but I think that we have to tell a different story than what I see walking around here.

So my comments tonight are mostly aimed at the individuals who will be sharing these as you go through the next month, different agency folks that will be representing what you see here.

And what I'd like to start off with is self determination. Tribes, you know, have been telling states that forever, and also working along federal agencies and other partners that maybe are out there, but in this case I see not really a partnership. I don't know what I see. And what I'm talking about is self determination.

Leech Lake did a Certificate of Need. We already did ours. And they said we didn't need it. I don't know if some of you have noticed our solar garden is in the back of the casino here, just finishing up a few

panels to go on there. That's our direction. That's our right to self determine where we'd like to be and what we see for our future.

As state officials, I hope you recognize that you sit on trust land, treaty land. This is ours forever. As long as the grass grows and water runs, it's here. It's ours. And I don't see that represented here.

I see this as a discussion being made by somebody who has no skin in the game.

And what I mean by that is you look at the route alternatives, with two routes going through Leech Lake, and the tribal government was up front, very clear, "Don't come through. You're not coming through here."

Yet -- told the State, "Don't do it. Don't put it on there." You still see it today, R7 -- RA-7, RA-8. How much more clear do we have to be? "You're not coming through."

And I don't know if that is just a misrepresentation or not knowing what our goals are here at Leech Lake, but our goals are probably in common and in line with most

of your citizens in the state of Minnesota.

We believe the Land of 10,000 Lakes, the clean water, that's how we're making our decisions.

When I look at the environmental justice component of this document, I find it hard to believe that it's not mentioned on any of these billboards here.

You have two alternatives out of the four right on Leech Lake; not one mention that Leech Lake Tribal Council passed a resolution saying, "There will be no pipelines, new pipelines, running across Leech Lake."

Where's that up there? Why is it did not being told? Why is there not a self determination section saying that the tribe in Leech Lake is saying, "No"? I want to see that up there.

And so when we think of, well, what does that mean? That's true government-to-government conversations. A tribal government is telling the state agency and the state government in those states that are analyzing these routes, "It's not an

option. Respect that part," but yet there are two still.

What kind of relationship is that? One where you're just not recognizing that right here, there's no taxes. There's no state, you know. There's a tribal police officer back there. Those are ours, paid by us. What does that say? Who's the majority within the boundaries?

As you move on and you look at the tribal resource map, I was talking to an elder that was here looking at that. What does that dot represent? A dot on one of the fourth largest lakes in Minnesota, where we literally have 15 wild rice beds, 10,000 acres of wild rice are on that watershed. One dot doesn't represent that.

And you look at social economic impacts that are back here; is it told? I don't see, really, wild rice on there. Leech Lake is the wild rice capital.

No offense to some of my cousins from other -- but we are. That's where it is.

How can I say that, because the numbers don't lie. And I have said that to

the State. We average 280,000 pounds a year, green rice. Times it up by fish, you're talking millions of dollars. Millions of dollars that go into tribal members' pockets, tax free, because guess what? Those boundaries, they don't get to tax within there.

Self determination, the tribe is telling you something. Listen, or there will be conflict, and I don't understand why people don't see that the tribe is being very respectful right now.

But as state agencies tell that story -- and I don't see it on these boards -- and I do appreciate some of the staff's willingness to update these boards as the process goes on, as we get comment.

But to go on to the tribal resources. Leech Lake has exclusive authority over wild rice. That's not a resource. That's a right to determine how that resource is impacted or how it will be impacted. That's not even up there. Tell the story for what it is, not for what you want it to be.

And the accidental true

releases, I don't see anything about how harsh it would be if those watersheds, the leach watershed, the upper Mississippi watershed, if that 49 miles where that Line 3 crosses, or the proposed Line 3, Route 7 -- and that watershed is like a heartbeat across that line -- if it were to release anywhere in there, that affects the Mississippi channel of Leach River. All those rice beds, those millions of dollars, that should be what's analyzed in there.

And there's just a lot of things that I don't like in the messaging, and I wasn't going to take a whole lot of time tonight, because we do get the big microphone working for the tribal government, but at the same time, I think, as agency folks, tonight if you get together as a team, really take a hard look at what story you're telling, because it ain't lining up when you come here.

FACILITATOR: Thank you, Levi.

I think Lorna Hanes is next. Lorna, state your name and spell it for the court reporter, please.

MS. LORNA HAINS: Hello. My

name is Lorna Hanes, L-O-R-N-A, H-A-N-E-S. I walk around and I see these words -- things, and I don't know, they're pretty tricky, I think. I don't know if they're telling the whole thing.

So I'm Saugeen First, Manitoba, Canada. I'm also Three Nation as well.

You've devastated the Cree side of who I am, and that ain't cool. I never did anything to any of you.

And I see the Indian whisper over there. Don't come my way. And I don't think that's cool at all. I think it's -- I think you know what you're doing, and you're trying to obliterate us. You're just doing your homicidal, genocidal crap on us. And my little great great grandniece was at the last hearing, and she took her first couple of steps at your meeting. She was headed towards the mic because she wanted to tell you, "No pipelines."

Also, jobs, is that your job to destroy the planet? And you're getting paid menial little teeny peanuts and little tiny coins and whatnot, and some krinkles in your

pocket; for what?

And the union, I was in the union. I'm a lifetime union member, but I built the green. I built outside of my community, and I also built for my native communities. I can manage green jobs in the native communities, and now I'm seeing them being built.

It's a real shame that you're so narrow-minded that you can't ask the same for your families and your future generations. It's absolutely selfish, and you're just committing suicide on yourselves.

Tar sands, that's where I come from, and you just have devastated my lands forever. You took all my moose. You took my fish. You took all my berries, and my medicine. And you completely destroyed them.

How are you going to fix that? Are you going to be here to fix that? Ten minutes, there's somebody who's already dead, ten minutes. Somebody's dying right now. Somebody's dying, and in ten more minutes, somebody else is dying.

And now you want come down here

and do the same shit? You want to put your shit through our lands. You're out of your mind.

And I'd -- I'll be the first one on the line right there, me and my horse, we'll be there waiting for you.

The missing and murdered women and children throughout Canada and the United States, did you have a part in that, union people?

I don't see you smiling now like you were earlier or at the other meetings in Park Rapids.

There's over 4,000 of them missing. There's a young man missing here. His mother is sitting right over here. What did you do to him?

Standing Rock. Standing Rock, so put the Line 3 over here and bought into the (indiscernible), 28 percent.

So after that, we went to -- a couple days later, after we were done riding against the current here, found out that they bought into that. So a couple of days later, we all headed out to Dakota Access. Some of

our members were out there way earlier up in April. Some even February.

We were out there for ten months. Some of us are still out there.

I got shot by your rubber balls. I got tased. I got maced. I got all these chemicals that were thrown at me, and helicopters were flying over us, contaminating us. I have a cough that I can't get rid of. Where's your smile now? I want to see your fucking smile.

When you go home and you tell your grandchildren you love them, you're a liar.

Also, the brutality over there, that's a lot of people, 10,000 people are affected by that. Even now, more millions are going to be affected by your bullshit and your lies.

There's no media coverage out there. Where were you? Where were you? What if that was your kid? What if that was you?

There are other ways in dealing with what you need to do. I'll tell you the advantages. You have land, water, air.

Doesn't take a brilliant mind to figure that out.

My people have lived here forever. Eighty years prior to that, we didn't need your Goddamn pipelines. We didn't need your fuel. We got by with what we had. We took what we needed and that was it.

And to this day, I feed my elders in whatever community I'm living in, that I hunt and gather, whatever.

I barely get nothing at the end of the year because I hand it out to my community members, wherever I'm at, or gifting it to maybe some people that don't even know what wild rice is.

And that's hard work. Now that's work. And that feels good in my spirit and my soul, because that's what I'm supposed to do. And so are you.

So I say no to Enbridge. I say no to your pipelines, to your mining, to your fossil fuels, your extreme extraction. It's going to end here, and we are still going to be here, no matter what. And shame on you.

FACILITATOR: I have Irene

Folstrom, Irene.

MS. IRENE FOLSTROM: I'm Irene Folstrom, I-R-E-N-E, F-O-L-S-T-R-O-M, and I am actually with the Minnesota Environmental Partnership. We are an organization out of St. Paul, a coalition umbrella group with about 70 member organizations that primarily do environmental work in Minnesota.

I'm also a Leech Lake tribal member, and I was born and raised here in Cass Lake.

I had to write down my remarks, because I've had difficulty talking about this, I guess, in front of other people, because it's -- unlike other policy issues that I sometimes have remarks on -- I've done environmental policy -- this issue is very close to home. So I'm easily distracted.

I haven't cried yet, though, but those that know me, I'm a big cryer.

So I guess I want to comment, want to comment on the DEIS, I guess, twofold.

The first, I guess, wearing the hat of my title at the Minnesota Environmental Partnership, and our position on the DEIS is

that the environmental justice section, which wasn't even listed as a chapter, it's put at the back of the DEIS as an appendix.

So Commerce didn't even have the balls to put this section as a chapter to have it included in the entire DEIS, which is just degrading, and it's insulting, and it's racist.

And not only is that racist, along with if you read through the environmental justice section, that's not a chapter that is at the back of the DEIS, the citations are incorrect, there's different fonts used. It is so insulting, and it's humiliating, to be quite honest.

So whoever prepared this DEIS, whoever wrote this, and whoever did the environmental justice section, shame on you. Shame on you.

And shame on you, for Commerce, for putting this together and having the balls to bring this to my community and ask us to read it. And when we go through it, we see the section where we're talked about, where our resources are discussed, my culture, my

people, my community, and it looks like crap. It's unprofessional.

It's clear that someone did not -- who didn't know my community and know my people or our ways, wrote it, or tried to write it.

With citations such as historicaltrauma.com listed as a citation, a fact, an apparent fact with an in depth document; Historicaltrauma.com, if you go to that, it says, "This URL website does not exist." It's not even an active website. I mean, you could have got that right.

Maybe I'm being a little hard on you, but -- so that's my position professionally. So personally, it's about the same, and I -- yeah.

I haven't been shy about keeping my professional and personal opinion on this issue melded together, because I don't know how you can separate it.

But I guess I should also say with my professional hat on, work -- I do a lot of the Great Lakes regional policy work based out of Duluth. And I was also really

disturbed, you know, besides the environmental justice section being ridiculous, there was no spill analysis for the Twin Ports area in Duluth. There's no discussion whatsoever, what if something should go haywire, or even a little leak, what happens to Lake Superior?

I mean, what happened to Kalamazoo, right, same thing.

That's a huge error, as far as I'm concerned. I'm sure that there are others out there who love Duluth and appreciate our Great Lakes, especially Lake Superior, which is also very spiritual and important to us as a people, but wasn't mentioned in the environmental justice section either.

I think that's -- that's why I usually have to stick to my remarks now. I've kind of been going off. But that is pretty much all I want to say, and I really sincerely hope that the pipeline is not attempted to be put through my community, because it won't happen. We will not allow it to go into the ground, and take the one we have in the ground out. Thanks.

FACILITATOR: Thank you. The

next one I have is Andy Pierson, Andy.

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MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
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MR. ANDY PEARSON: Thank you very much. My name is Andy Pearson. A-N-D-Y. P-E-A-R-S-O-N. And I'll make a few comments tonight.

First of all, let's just agree on the face of it that the Line 3 replacement project is absurd. Can we just agree on that; that this is completely nuts that we're even considering at this time, this time of climate chaos, right, just building in our world, right, we're considering building a pipeline -- a three-foot-wide pipeline to carry the dirtiest oil in the world when we don't even need that oil here anymore? Can we agree that that's absurd?

I'm asking for a few considerations. I'm asking that the Environmental Impact Statement, a document that's supposed to consider rules, both in statute and rules as a matter of policy, I am asking that it be updated to reflect the recent decision by Minnesota Governor Mark Dayton to commit Minnesota to following through on the Paris Climate Agreement, following the absolute lack of leadership displayed at the federal level in withdrawing us from that international agreement.

Now, let's be real here. This

project, as analyzed in the current draft Environmental Impact Statement, carries a social cost of carbon of $287 billion. And that is billion with a B. That is a staggering amount. That's the number that includes the environmental cost of the oil that the pipe would transport, as well as the number, which I know was read earlier, 673 million. Just to be clear, that's only the impact of the infrastructure of the pipe itself. It doesn't even include the oil inside.

$287 billion is the number in the DEIS that includes the oil, and that is not even a comprehensive number; that is only over a 30-year time span. And we know that there's pipe in the ground right now that's been pumping for over 60 years. If we double that number, that would be a closer approximation. And let's know there are people here in the room today that are barely even going to be middle-aged 30 years from now. That number needs to be extended. We need to have calculations that go out to, at a minimum, 60 years social cost estimates.

And please revise the climate section, taking into account its compatibility with Governor Dayton's decision to stay with Paris. It is crystal

clear that the only viable option, if he is serious about sticking to the Paris agreement, is to not build this new pipeline at all, to be very clear about that.

Second thing I want to mention is the alternatives analysis. You know, one way to make a bad project look like the only way forward is to remove all the other alternatives one by one or make them look bad. And that is what was done in this document. It was done just in a way that surprised even me. And I didn't know what I'd find, but I am surprised.

We have a proposal from the Department of Commerce's document that Enbridge might actually choose to build a rail-loading terminal in Canada just on the other side of the U.S. border after, you know, a thousand miles of pipe; and then they would put the oil onto trains, ship it across Minnesota to another rail-loading terminal to go down the rest of the way to the Gulf where this oil is headed. I mean, is that done anywhere in the world? This is one of my questions: Is there a rail bridge between two pipeline terminals anywhere in the world? These alternatives are supposed to be reasonable and prudent. Right? There is -- there is no way that

that can possibly be met. That's why I have no idea why it's in the document.

There are viable potential rail alternatives which could at least be studied that would involve the rail being loaded up in Canada and shipped to refineries. That's the way Canadian oil moves by rail when it moves by rail, which is rare. This absolutely must be changed.

The same goes for the truck alternative. By the way, 4,000 truck trips per day in the DEIS, a pipeline on trucks? Again, this is not the case anywhere in the world. You are reading a work of fiction here. This isn't even based on remote fact, this alternatives analysis.

And then we have what Levy brought up, where two of the route alternatives goes through Leech Lake, when Leech Lake has made it absolutely clear that that is not a possibility. Again, that is not reasonable and prudent.

The alternatives section is a work of fiction, and it's got to be treated like that. And we can't make decisions based on a work of fiction. We need to make them based on a work of fact.

Last point. Where is the oil going, once it gets to Superior, Wisconsin? Now, Enbridge

has pipelines that cross down Wisconsin. It's my understanding that Enbridge plans to use those pipelines. It's also my understanding that the current flow rates on the pipelines going into Superior and out of Superior do not allow for the extra capacity which the Line 3 expansion would bring.

Now, in Wisconsin, Enbridge has gone back and forth about whether or not they plan to build a brand-new pipeline across that state to carry extra oil coming from Minnesota. That line has been at some points referred to as Line 66 or the Line 61 twin. That is not referenced in the draft Environmental Impact Statement, as far as I can see; and it must be, because if that line is part of what could potentially move this oil, if it is necessary to move the volume transported by the Line 3 project, then it is a connected project, and it must be included within the scope of this EIS for the study. The fact that that was not included and there's no discussion of it, that Enbridge's numbers on potential flow rates are omitted from the document, are censored from the document that we don't even know where this oil is going once it leaves the state, we cannot make a decision based on

that.

So I don't think what I'm asking is too much here. I don't think it's crazy. I don't think it's totally unreasonable. I think what I'm asking for is basic facts. You know, we have some of those in the document already, and that's good, and I appreciate where the facts have been followed and where they've been drawn out; but there's a heck of a lot of places where they haven't been and they need to be.

Thank you so much.

FACILITATOR: So that is all the cards I have for comments. So I just want to see if there's anybody else that wants to make a comment. Just raise your hand or bring me a card. Either one is fine.

So the gentleman right in the back. And anybody else? Gentleman right here in the hat. And then I think right here. Thank you very much.

In fact, you know what, you came up, so we'll let you go first. And then we'll get to the gentleman in the hat and the gentleman in the back.

If we could actually -- let's see, why don't you -- sir, why don't you go ahead. You have

the mic. Why don't you go first, state your name and spelling it.

MR. JOHN MUNTER: Thank you. My name is John Munter. J-O-H-N. M-U-N-T-E-R. I'm from Warba. As you see, we have tremendous holes in this DEIS, tremendous discrepancies and deceptions.

And one thing we found here -- I'm with the Minnesota for Pipeline Cleanup. And south of you here and throughout the DEIS, we find the phrase, the pipes are generally 10 or 15 feet apart, generally 10 or 15 feet apart here and there and everywhere. And that's really a huge deception here. We found a study that on the 14, 15 named, the roads between Rowena and Grand Rapids, the average distance between Line 1 and 3 is 18 feet; the average distance between 3 and 4 is 30.6 feet. And so this makes the point that for pipeline cleanup and pull up, we're making the argument that it should be land over choice and also tribal choice and city choice and county choice. Whoever owns the land, they should be involved. It's not one size fits all.

These pipelines go in and out and everywhere, and there's all kinds of crazy things going on with them. Some are maybe real close

together, fine. But it should be choice.

Beyond that I wanted to talk about the criteria addressing the certificate of need. There's basically four sections that they talk about here. Number one talks about the future adequacy, reliability, efficiency of energy supply of the Applicant, da, da, da, and talks about that.

B talks about more reasonable and prudent alternatives. The proposed facility has not been demonstrated by parties other than the Applicant. And so these have been discussed.

But C and D have not really -- the first two that are proposed in them, there's a lot of economic data that's being withheld until later. There's no spill data that we're happy with at all. And in terms of alternatives, they are very poor.

Number C, the consequences of society granting the certificate are more favorable than the consequences of denying the certificate. Well, that's not discussed at all on this whole document, that I can find anyway, and it should be addressed there.

And, D, it has not been demonstrated that the design, construction, or operation of the proposed facility would fail to comply with relevant

policies, rules, or regulations of other federal, state, or local agencies. And this is the one I want to address that has not been addressed by anyone anywhere. So let's be first here in Cass Lake.

When we ask somebody for a job interview and the Applicant is there with the interviewer, the interviewer would ask about their past history, they would go online to see if they made any nasty comments about their past employer, they might look for any DWIs they might have, they look at a whole wide range of aspects. And Minnesota as the employer, so to speak, of Enbridge here, the response of Enbridge, should be doing a wide ranging search of issues with Enbridge.

This has relevance, because of our First Amendment rights. In the First Amendment there is the ability to petition for redress of grievances. And so we should be dealing with the past grievances, because this PUC process is really the only opportunity that we have to say, you know, you got to clean this up, Enbridge, before we're going to permit this pipeline. And this -- there's a range of different grievances that we can talk about here.

Now, petition for redress of grievances is not only a federal thing that you all march in front of Washington, D.C. and ask them to do something; it applies to state and regulatory agencies of state governments. So we should be able to come to the PUC and ask for a petition for redress of past grievances as well.

And on the local level, you have many landowners, for example, who own land that's been damaged by Enbridge over -- maybe disputes between, you know, they lost trees or there's water flow differences, and maybe weeds have been planted instead of alfalfa planted, which hurt the cattle, and different issues, disputes between, you know, pro and con of these -- of these agencies. And so this should be mediated somehow. There should be a process in the EIS to -- DEIS to call for mediation of these processes, before the PUC advocates or approves a pipeline. And there should be mandatory adjudication of this so that, you know, if the approval goes through, then the landowner and Enbridge are locked into a process where an independent adjudicator can say, yes, you're right or you're right or we'll go halfway in between or something like that so there's some justice done for

all these various issues that come up with people and pipelines.

And then there's the larger issues. Like the Bad River Band of Wisconsin, for example, it has not had a permit since 2013. And, you know, what's the situation there? Is Enbridge going around Bad River or negotiating with them? And this is a legal situation where are they going to treat it just like Red Lake and negotiate for 65 years and maybe finally come up someday with a permit? I mean, that's just not acceptable, and there should be some answers here for some of these larger issues.

Then there's the issue of damaging pipes as well -- or defective pipes. There were a lot of defective pipes that were imported by Enbridge about a decade ago, according to the Canadians, and they want to know where the sales receipts are and where those pipes go. And as far as I know, they have not found out where those pipes went. So this is another issue where Enbridge should come up and make clean with what's going on with those defective pipes.

And then as actually -- many people are starting to complain now about the damage it's

having to the First Nation's north of the tar sands. Winona a couple of times the last couple of days and other people here. So the tribe -- the First Nations north of tar sands can't hunt, fish, or gather anymore safely. And it's a really genocidal situation. And we're all basically complicit in that situation by importing oil.

And this really goes back to the Nuremberg trials, where they even put industrialists on trial, for example, a couple dozen of them even, for making the gas that went into the gas chamber and that type of thing, you know. And half of them were acquitted; half of them spent some time in jail. But this is a society problem, complicity with this genocidal situation.

And even though it's up in Canada, it's not in Minnesota, I don't think that will pass muster. I mean, there's a lot of excuses that a lot of people made in Germany after World War II, ex post facto law that was made after we committed crimes. No, sorry, that doesn't work. Or we're just following orders, you know, that type of thing. So this should be addressed by the DEIS.

And that's all I really have to say at the moment. Thank you.

FACILITATOR: And I will not pronounce your Ojibwe name well. So I will turn it to you to spell it and say it. Eric will bring you the mic.

Thank you so much.

MS. DAWN GOODWIN: (Speaking Ojibwe.) My name is Dawn Goodwin, my English name. I come from White Earth. Yes, I come from that way. It doesn't mean that this isn't my home also. This is the 1855 Treaty area. My family lives here. My sister lives a mile away from the pipeline. My mother lives a mile away from the pipeline in Bagley.

So one concern that came to me that I did not address yesterday at our Rice Lake meeting was, if there was a spill, what about the exposure? What would my loved ones and my community people be exposed to that's lacking in this? It looks great, looks really thorough, whatnot; but it's a bunch of fluff.

And like Irene said, the chapter on tribal resources really -- it went in length about our history and treaties and whatnot, but -- and then it just got really loose at the end and thrown together and, oh, well, yeah, yeah, whatever. But from what I got out of that, at the end it says --

just kind of thrown together there that, oh, yeah, the natives think this way and they all think that way, and they don't really have much to say about this or that or whatnot, don't want to address, they're outside of the scope, blah, blah, blah.

And what I come from out of that is, yes, us native people, we're standing together. We have one voice, as we know we want to protect our environment and our people and our water, the animals, the air. We want to protect that. That's one voice, and we want you to hear that here.

Sure, you might not see a lot of our tribal members here. There wasn't a lot of tribal members at ours. And it makes me wonder, makes me worry. But whoever's supposed to be here tonight is here. And I want to explain a little bit maybe why they aren't here.

And there's a section there in the DEIS talking about the historical trauma. And I met this gentleman when we challenged the state on our ricing rights, which we did win. And he was talking about -- to a reporter about historical trauma. And he said what, historical trauma; that don't exist. And I looked at him, and I'm like what? He's like, no, it's not historical; we're still living it. So

now I'm calling that contemporary trauma.

We talked about this a little bit yesterday, that this is traumatizing to us. A lot of the people that I know that I want to come and be heard can't come here. It's too much. It's too emotional. So much anger. And to me this is traumatizing.

I vow to learn my language. I wanted to just put everything into learning my language. And then I started learning about tar sands and trade secrets and loopholes and whatnot. So I just had to combat that with doing my homework here about Line 3 and tar sands and combining that with my Anishinabe. That's the only way I could cope.

So, yeah, I'm being traumatized. I've been traumatized for many years now, just completely out of my mind. I have important work to do with my community. We have people dying from heroin overdoses, suicides. We just had a young girl two nights ago commit suicide. I can't be worried and so entrenched in trying to figure out how we're going to beat Enbridge and Line 3 when I have so much more important work to do. And it's really sad that my love and care for my people is being taken away because I have to concentrate on this.

So I say I'm speaking for many people. I'm part of a group called Anishinabe Nago. It's the gatherers, the berry pickers. We're gathering to save what we have left. So I represent them. I represent the gatherers, the harvesters. We're trying to continue our way of life, but this is impeding on it. And we don't want to stand for it anymore. We're not going to stand for it anymore. And I take solace in knowing that there are many people out there that have our backs. They know what's important in life.

I'll talk a little bit more about some of the DEIS. Yeah, there -- it was lacking in information about tar sands and what kind of fumes and whatnot are coming from that. So I worry about my family members that live close by. But one thing I do notice, all the way from Clearbrook to Bagley to Bemidji, Cass Lake, BugONayGeShig School -- and I don't know if the schools further on -- they're all in the path of the pipeline. They're all next to it. Our children, if there's any spills, are going to be exposed to that.

And I felt also it was lacking the scientific knowledge of what bitumen is, what dilbit is, what's in it. And as I looked up some -- you

can't really find too much information as you're just generally going on the Internet about what is in tar sands because of trade secrets. But what I did find, it was like emulsifiers and -- which are probably chemicals, I imagine. And then they put water in there. Then it's an electric charge just to get the tar sands to flow through the line. So it's lacking some of that very important information.

Also, Enbridge, I believe that the certificate of need should not be granted. It should be denied because Enbridge cannot 100 percent guarantee that a major or minor dilbit spill will not happen. Now, I read that awhile back, when I was reading some criteria for certificates of need, and I couldn't find that. But I did notice at one time. And then when I went back to look for it, I couldn't find that. But, yeah, you can't 100 percent guarantee that there's not going to be a spill. So I believe that the certificate of need should be denied upon that.

And along with that, the failure of technology and human error has caused spills, and those are on fairly new pipelines. So I do not trust the technology.

Another thing I would like to mention is the Clearbrook hub. Not a very good idea, I don't think. And I hope a lot of other people agree with me.

I want to create an animal for you. Especially the Anishinaabemowin people, you'll get a vision in your head. This animal I created, it starts in Clearbrook. It's the Ezigaaginebigowi. That's a wood tick snake. Scary sounding, a wood tick snake.

So with all that being said, a lot of people covered very many different facets here. We know that it's very poisonous. We know that it's going to harm the people in this region; not just the native people, but the people that live here. Here, you don't want to leave it in the ground.

We're asking for a full environmental impact study and removal of the old Line 3 in the 1855 area. We'd like an impact study done to the earth below that line. We want to know what's been going on there.

We also want a complete environmental impact study of the -- I'm not going to say replacement; I would say that would be a -- I lose my words sometimes -- a relocation of Line 3. It's

not a replacement. It's a relocation and a rebound.

FACILITATOR: Just a quick time check. It's been about 11 minutes.

MS. DAWN GOODWIN: All right. Just like yesterday, I like to talk. Surprisingly, I don't -- I'm not a talker. I don't like to be up here, but I need to be.

So directly or indirectly you'll be committing genocide, and it's negligent.

And for one last comment here, I want to talk about the Minnesota Pollution Control Agency. There's a mission here: Protect and improve the environment and enhance human health.

This is MPCA's mission statement, so you might want to listen. Their vision: Clean water, air, and land, support healthy communities and Eco systems and a strong economy in Minnesota.

Core values: Number one, people. We value and support a motivated, talented, and diverse workforce. Hashtag, PCA people.

Leadership: We set a vision of environmental and human health protection in an open, ethical, and accountable manner. Hashtag, PCA leads.

And then the next one is

collaboration -- I'm not going to go through -- and then outcomes: We measure our success by our environment and public health outcomes achieved. Hashtag PCA outcomes.

Then there's -- they're data driven and a learning organization.

DNR, their mission is to work with citizens to conserve and manage the state's natural resources in a way that creates a substantial quality of life. Same goes to Army Corps of Engineers.

If you support this DEIS, you're going against your mission and your vision and your core values.

So with that being said, I want you to think about water and how you've used it and even the role water plays. And I want you to look, when you're watching an important meeting somewhere, what's the star of the evening? Water out on the tables.

So I want you to think about what's in your body. What percentage of water are you? 66 percent of your cells are water.

So with that being said, (speaking Ojibwe).

FACILITATOR: Thank you. I believe we have one more commenter, that gentleman in the hat. So we'll bring him the mic.

And just state your full name and spelling for the court reporter. And our court reporter is over here now. She's very carefully catching all the comments.

MR. ALEX KMETT: All right. My name is Alex Kmett. That's Alex, as you would expect it to be spelled. K-M, as in Mary, E-T-T.

(Speaking Ojibwe.)

My name is Alex Kmett. I'm from -- I'm living in Cloquet at the moment on Fond Du Lac Reservation. My family is here in Cass Lake, related to probably half the town or so.

I should not have to bring attention to the 1855 Treaty between the United States Government and the Ojibwe Nation, which reserves refractory rights to hunt, fish, and gather in ceded territories all across that treaty land right there.

I should not have to bring up my opposition to this pipeline for the -- for the sake of the tour season, the wildlife, the trout, which is all laid out on this draft EIS impact/certificate of need poster.

I should not have to mention that I also oppose this pipeline not just for all those reasons, but everything else that we hunt, fish, and gather within these ceded territories and all the other treaty territories that we occupy.

In addition to this, where the tar sands are being extracted up in Canada in Alberta, those are our relatives up there too, the Cree people that are suffering.

I shouldn't have to mention, you know, spiritual, political, environmental, and economic opposition to all this.

I also want to bring up the Enbridge Cass Lake leak that happened in 2001. If you look up the website that they have, Google enbridgecasslake.com, something like that, they have a timetable spread out on there. About ten years after it leaked, it still says that they're -- what does it say here -- free product renewal continues over a ten-year period, you know. Groundwater monitoring happening ever since. You know, 2015 or so is the last update on here. It's two years later. We haven't heard anything more. You know, what's up with all that? What's going on?

Let's see. Also the economic benefits

of Line 3 removal, I just wanted to restate that, as the gentleman stated earlier, as well as should this pipeline leak anywhere around Leech Lake, any of these northern lakes up here, what kind of economic impact is that going to have on the tourism industry, which pretty much supports the economy, it supports the casino.

I know you guys want to hear all about the economic impact, so here we go. (Speaking Ojibwe.)

That's all I want to say for right now. Angry. I got the shakes. I gotta pee, so I'll catch ya later.

FACILITATOR: Thank you.

So we're about to bring this evening to a close. But I want to see if there's anyone else who wants to make a final comment.

There's a gentleman right there. We'll bring you the mic. And just name and spelling for the record if you could. Thank you.

MR. MIKE SCHMID: It's hard to find a place to stand where you don't have your back to somebody. (Speaking Ojibwe.)

My name is Mike Schmid. M-I-K-E. S-C-H-M-I-D. There's no T. I apologize if I say

things that have already been said tonight. We got here late.

I've lived amongst the Anishinabe here for 45 years, and I've learned a little bit about Leech Lake history. And I just want to give you my view of what I see that is happening.

The first pipelines went through here, I'm assuming in the '60s and '70s. During those times tribal governments were just beginning to have some power. They were still politically weak. They had virtually no choice but to accept whatever the pipeline companies said to them.

Now we fast forward to now. The balance of power has changed, and reservations are saying no, we don't want those here anymore; we want you to take them out. That's really hard for oil companies to understand. It's been a long time coming.

I think what a lot of outsiders don't understand is that from where I -- from where I come from, from what I can see, the Anishinabe do not just care about what happens on their reservation, protecting their land on the reservation, they don't just care about the Treaty area -- a lot of talk about the '55 Treaty area. That's very important.

But they care about the earth. And it doesn't matter what boundaries you put on it, they don't want the pipelines.

And I agree. (Speaking Ojibwe.)

FACILITATOR: So for folks in the room, the formal public comment period ends on July 10th. So if you didn't make a comment today or you didn't enter your comment in the box or didn't make a comment to one of the court reporters, you can certainly send your comment in by mail or email. Just make sure it's in by July 10th, which is the final date of the public comment period.

And after that, again, the State will take all those comments, they will actually work on them to effect the final EIS. And the comments will be posted online after July 10th so the public can see all the public comments that were made.

So thank you all for the comments and the thought and the heart tonight. And we appreciate all that. Safe travels home and good night.

(Meeting concluded.)

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DEIS MEETINGS - 14-916 15-137

CASS LAKE - JUNE 7, 2017 - 6:00 P.M.

(PRIVATE COMMENTS TO COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Palace Casino Hotel
16599 69th Avenue NW
Cass Lake, Minnesota

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MR. CHESTER BANDEMER: Chester Bandemer. C-H-E-S-T-E-R. B, as in boy, A-N-D-E-M-E-R.

I talked to the Trelipe Town Hall -- Town Board, and they're totally in favor of the pipeline. This pipeline runs through the south end of Cass County through Trelipe Township, and they're all in favor. And the reason is we've got this oil train that's coming down from North Dakota to Iowa; and I think I figured out it's 52 towns that they pass through, villages and stuff, and it runs along the river. So if there's a wreck, there's a possibility for real major damage. And the trucks are worse yet.

So if we can get that pipeline in the ground, it's really safe and it's a lot cheaper.

(End of Private Comments.)

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DEIS MEETINGS - 14-916 15-137

FLOODWOOD - JUNE 8, 2017 - 10:00 a.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Downtown Fair Building
107 W 7th Avenue
Floodwood, Minnesota

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FACILITATOR: Good morning everybody, and welcome. Thank you so much for coming out this morning.

My name is Patrick Field, and I will be the moderator for the public comment session. I'm part of the consulting team which is working on behalf of the State of Minnesota in helping arrange these public meetings as we go across the northern part of the state regarding the pipeline.

So I want to turn this over to Bill Grant, Deputy Commissioner of Energy, Minnesota Department of Commerce, who's going to welcome us and lay out the process that we're engaged with.

DEPUTY COMMISSIONER BILL GRANT: Thanks, Pat, and welcome to Floodwood everyone. Some of you have been with us at previous public meetings that we've been having this week, and that will be -- and that we will be having over the next couple of weeks. So welcome again if you're here for a second or third time.

So I want to start just by laying out for those of you who haven't been involved

yet what these meetings are about, why we are holding them, and give you a little bit of an orientation to what we're going to be doing the rest of the morning.

So the reason for having these meetings is the Department of Commerce has drafted an Environmental Impact Statement for the Line 3 project, and the purpose of the EIS is really to inform decision makers. In this case, the decision maker will be the Public Utilities Commission.

There are going to be other permits required of this project if the PUC grants the approvals that it would make.

And then, of course, you as members of the public, are also the audience for the draft and final EIS.

The PUC, as I mentioned, will make two decisions. One, whether to grant what's called a Certificate of Need, and as the name implies, it really is the determination of whether the project is needed or not.

And secondly, whether, if the Certificate of Need is granted, whether to issue a route permit, and so several staff are

standing over there by the alternative board there, and that describes the routes that are under consideration during this process.

There will be numerous opportunities for public comment starting with, of course, being here today on the draft EIS. Once the draft becomes final, there will be another opportunity through a series of public hearings that will be held in September and October of this year; again, largely in the project area.

So the PUC then would be expected to make a decision on whether to grant the Certificate of Need sometime in the spring of 2018. So just a little under a year from now.

So this is the State's meeting. This is our opportunity to receive feedback from all of you. This isn't the applicant's meeting.

All comments that we get on the draft EIS are going to be considered equally, and it doesn't matter how you make those comments, whether you offer them verbally here today, in writing after the meeting, or there is a comment box where you could submit them in

writing today.

All of the comments that we receive will be compiled and shared with the public, so you will know what all of your fellow Minnesotans have said about the project.

And then we will compile those, and where necessary, make changes to the draft before it becomes final.

Some of the things that we're really seeking from people here today and throughout the next couple of weeks is, A, whether there's information that's missing from the document, whether it's unclear, whether things need to be clarified, and just in general, what could be improved about the document overall.

So what would be most helpful to us would be to receive comments like that really directed at the document itself.

As I said, this will then inform the movement from a draft EIS to a final EIS, which will ultimately then inform the PUC's decision about whether to grant the permit, and if so, where to route the project.

So with that, I will turn it back

to Pat for some ground rules, and then we'll get started with public comments. Thank you.

FACILITATOR: So let me just kind of lay out how we're going to handle the public comment period. As Bill said, whether your comment is given verbally now, you give it to the court reporter, you put it in writing, you send it in by July 10, all those count the same.

However you comment is great, and will all be kind of taken into account and treated the same in terms of the State's review of them as the State prepares the final.

We have a pretty small crowd, so -- if we have a larger crowd, we have to kind of be more diligent about the timekeeping, but we have a smaller crowd, so I think we can be a little more loose. We'll throw up a little timer here in a little bit so you can see how long you've been speaking for.

And given our small crowd size, generally kind of seven, eight minutes is probably a good time. At that point I'll stand up and suggest you want to finish up. You can always come back if we have time, which we

probably will, if you feel like your statements weren't finished.

The way we do it is, one, we want to make sure the folks speaking are heard. So we do ask if someone speaks, everyone listen, because we want to give them a chance to voice and express their viewpoints to be listened to.

We have a court reporter who's taking every word down, and that will go into the public record. Those reports, the transcripts, along with the written comments received, will actually be available as part of the process after July 10, just to let you know.

So one, please don't interrupt the participants. And we ask the folks to honor time limits. Again, we can do more with a little smaller crowd today.

Really important; people may have a range of views here about what should or shouldn't happen or whether you like or don't like parts of the Draft EIS. What we do ask is on behalf of all, for you to be respectful of each other. And the meetings have been really terrific in that way, but it's very difficult

if you aren't respectful of each other's comments.

So we ask you to do that, and please do direct comments to the issues, the project, organizations, but not the individuals, because we want everyone to feel comfortable in the room, if we can.

The State agency's role is really to listen during this part of the comment process. State agency folks, raise your hand so people can see people who represents various agencies of the State of Minnesota. So they're going to be listening.

And again, the official part is we're going to have a transcript of your comments really word-for-word during this period.

If you have cell phones, put them on do not disturb or vibrate or whatever so we don't break up people's comments.

We'll end on time, because we have another meeting to get to tonight, but I don't think that will be too much of a challenge.

A few other things, if you want a

copy of the EIS, you do not have to carry a large paperwork document of many volumes. There's actually CDs and flash drives that you can get from the folks at the registration desk if you want to, and then make sure everybody did register if they didn't.

What I did is we asked people to put their names in the speaker comment box. I've got six folks who signed up to talk. We'll go to those folks first, and after we get through those, if there are other people who want to comment, I'll just look for a show of hands, and then we'll kind of call on people one-on-one.

Let's get started.

Allen Richardson, you're first up. Also, just for the record, again, state your name and spelling for the court reporter.

MR. ALLEN RICHARDSON: Good morning. My name is Allen Richardson, A-L-L-E-N, R-I-C-H-A-R-D-S-O-N. I'm with an organization called Minnesotans for Pipeline Cleanup.

Let's see, our primary focus is the question of what will be the fate of the

old Line 3 if Enbridge basically gets the new route, or let's proceed from the assumption that whatever happens with the new Line 3, that it is not going to be in its current location.

So the Draft Environmental Impact Statement says generally that most of the existing pipelines are 10 to 15 feet apart. They're basically making the case that they -- they are not inclined to remove the old abandoned pipeline.

Mr. John Munter of Warba took it upon himself to actually measure the distances in the area of Warba and around Grand Rapids and found that there is, in fact, ample room, particularly the space between Lines 3 and 4 is well beyond 10 or 15 feet.

Let's assume that it's technologically possible on a given piece of land if the soil conditions are appropriate. It's a straightforward question. I really want to give it to the folks in the room as compared to the State or the applicant.

If a given property owner wants -- a property owner who has graciously hosted Enbridge's Line 3 on their property for

decades, if now in the face of decommissioning and abandonment, if a specific property owner wants that old pipeline removed from their property, who is liable for it? Is it Enbridge or is it the landowner?

So I would ask you to think about that. You know, it's one or the other.

And beyond that, there's a lot of talk about jobs across the board. Personally, I've worked with labor unions in the past doing political work, advocating for job creation, and I do not enjoy being on the opposite side of an industrial project against my labor brothers and sisters.

But I wish you would take me at face value when I say that myself and many other people really would like qualified union professionals to get that work.

We agree with you, you all are the demographic that has the qualifications to pull that abandoned pipeline out. What I'm saying is that Enbridge has every intention of leaving it there.

So the general public should support landowners -- should support landowner

choice, and people who stand to benefit from getting the jobs that would result from removing abandoned pipeline, you're not going to get those jobs unless you publicly align yourself with landowners who want to get rid of that old pipeline.

There's a whole bunch of jobs to be had. Let's keep in mind we're establishing a precedent here for pipeline abandonment. If they get away with abandoning this one, they're likely to go on to abandon the rest of them.

Well, if we establish a precedent for creating jobs to remove abandoned pipeline where the soil conditions are appropriate, we'd also be establishing a precedent to do the same with future pipelines.

So there's jobs to be had. There's a mountain of jobs in that equation, but people get surprisingly cagey when you bring this up to them, even in the context like this.

It's really pretty straightforward. There's a lot of common ground on this particular question that -- you know, there's less common ground on some of

these other areas.

So with that in mind, I would like to see the Final Environmental Impact Statement have much more specific data about the distance between these pipelines, about how many jobs would potentially be created removing abandoned pipeline, and that's it.

Thank you very much for your time.

FACILITATOR: Next up we have Sheila Lamb.

MS. SHEILA LAMB: Hello. Good morning, everyone. My name is Sheila, S-H-E-I-L-A, Lamb, L-A-M-B.

I come with a very unique perspective, not just as a mother and grandmother. My husband was a pipeliner. My husband has serious health issues. My husband is a union worker. He's at work right now, so I'm speaking on behalf of both of us.

And what happens to these pipeline workers is horrific. The health impact on them, what happens to them from a; psychological basis.

My husband left for two reasons.

After watching his third friend killed working on a pipeline and picking his foot up in his boots still, he carries those scars.

The answer to these pipeline companies is we'll just go to a bar and get another one. They don't care about us. They care about their money. They want to sit and do another pipeline when Minnesota ends up utilizing less of this oil than any other state or nation, but yet they want to contaminate our area. Why?

Why are we going to hurt our pristine lakes? We are sitting here with Lake Superior, which is 10 percent of the fresh surface water on the face of the earth, and they want to abandon one and do another one.

What about our fishing, our wild rice lakes? What about our maple trees? They will be gone, because we are facing a crisis with global warming. It's very real. We have the scientific data. What we are as Minnesota will be gone.

They tell us there's going to be so many jobs. The lasting jobs are not going to be there. These pipeliners come in and they

go back to Oklahoma and the rest of their states with their money while we lose our tourism, our farming, our wild rice, our maple sugar, and everything else for somebody else to line their pockets.

And as a homeowner and as a taxpayer, I cannot afford, with minor children still at home and two college tuitions to still pay for, to have to be the one as a taxpayer that is going to take care of the burden of their cleanups.

Enbridge has spilled here in Minnesota alone, if I can find my papers real quick -- I guess they got moved -- I believe it's 7 million gallons here in Minnesota.

You want to know another big slap in the face? They're going into our elementary schools, fifth graders were the latest ones, telling them there's two to three pipeline spills a year. They're giving color changing cups. They're telling them how safe it is.

They're indoctrinating their philosophies in something that should be taught in our homes about our environments, because Minnesota has so much to be proud of right

here.

We live in one of the absolute most gorgeous states there is. Our waters -- I love to do photography. I'm always taking pictures of the water, the beauty it contains alone. We are the ones that are going to suffer.

Our union workers are going to suffer. I agree with Mr. Richardson, let our union workers get the money to pull it out, clean it up.

If you insist on doing it, if you will not hear our voices fully and stop this pipeline, then make it get pulled up, make them take up the old one and put it in the same place. And too bad that there's a strong economic impact for them, because our children and our grandchildren and our health is more important.

Our livelihoods, our homes, with all the eminent domain and everything else, should take a priority.

We are also in an area where we deal with trafficking. It's horrible in Duluth, where our children, ages 13 and up, our

daughters, our granddaughters are trafficked. These man camps are very real. Like I said, my husband worked pipelines.

What they dump -- do you want to know what they do with their equipment? They want to change their oil, it keeps running, they let it run on the ground, they start pouring it until it starts to run clean, and they screw it back up.

They don't care about us at all.

They're already coming after Minnesota for millions of dollars in back tax money that they say they're owed. Guess whose shoulders that falls on? Ours -- yours, mine. What do we do with our homes? How many of our homes are going to go into foreclosure because we can't pay this?

How many times are we going to have to look at our children with increased cancer rates and so forth, especially among natives? Are any of you willing to risk that -- your son, your daughters, your grandson, your granddaughter, your husband, your wife? I'm not.

One in four children in the next

15 years are not going to have access to clean water. Is it going to be our children, or are we going to stand up and leave a legacy here in Minnesota where we set the example and the lead.

You want jobs. Give our union workers top priority for training. Get them in the fastest growing industry, the longest lasting industry there is, in renewable energy.

One of the things in the Rice Lake hearing that was thrown out, oh, if we bring in hemp to stop all these plastics, the farmers won't grow food. Give me a break. The government pays them not to grow at times.

That opens up more jobs for people that want to farm.

There's no drug involved in it. It's safe. It's renewable. It's recyclable, it's biodegradable. We have alternatives.

And if you look back to when the pipeline started, Rockefeller, Edison and Tesla. Look at your history. Rockefeller invested in kerosene. He fought Tesla and tried to destroy Tesla with electricity in order to run his kerosene and his first

pipelines. It went to the money, to the 1 percent. Not to us.

And I'm normally a pretty conservative person, but I don't waiver on this on any level. I've seen too much. I've felt too much, and I love my state and my people too much not to speak out. And I ask that you do the same, and you go home and you look at those little ones in your family and ask yourself, is it worth any risk to our children on any level?

Because we're all getting older. What are we leaving for them? And who's going to be next that loses their home?

Let's face it, the bonds that they have for these pipeline spills -- and Enbridge is way ahead of the national average for these spills -- the bonds do not cover the cost to clean up. It's going to come to us. It's going to hurt us on every single level, from tourism on. It's a domino effect.

I am definitely adamant that Line 3, over 900 anomalies that they know of, it needs to be removed. There are contaminants. We have seen increased carcinogens and everything else. If they know there's 900,

what is it that we're not seeing?

Why do we want to leave in our pristine land here to contaminate? Why would we do that? There's no -- I can't even fathom why someone would risk our waters here. The crude oil in the pipelines, by the way, 45 percent is over 50 years old. Think about that, too. Nothing man-made is made to last. Everything man-made is going to fail.

They can tell us they're safe all day long, but you tell me, if your car continues to constantly run, your washing machine, your dishwasher, your hot water heater, they're going to fail.

Thank you.

FACILITATOR: David Barnett. Name and spelling.

MR. DAVID BARNETT: Good morning. My name is David Barnett, B-A-R-N-E-T-T. I'm the national representative for the welders, plumbers, and pipefitters and the helpers that will be constructing this project, if it receives the needed permits.

I'm here on behalf of our members in Minnesota and throughout the United States

who work daily to bring energy to our nation, something each and every one of us uses every day.

I do disagree with the EIS conclusion that the labor benefits would be temporary or minor.

The jobs are neither negligible nor minor and happen to be very important to the union workers who will construct this project.

I have -- I'm a 41-year member of my union. I've built pipelines all my life. Started in 1976, on the Trans-Alaska Pipeline. Thirty years in the field. I guess I'm one of the fortunate ones, because I'm still fairly healthy. And to me, I've had 55 projects that I've worked on in the field throughout my career.

Now, every one of them may have been looked at as temporary, but it made a livelihood for me and my family over that 30-year period, and continues today.

I don't have as many jobs today, because I represent, as I said, the workers.

Something else that bothers me is

these made-up and fictitious notions that pipeline workers in these areas increase sex trafficking and abuses, and that's ludicrous. It's made up of issues that are absolutely false.

When the 2009 Keystone project spread work in Norfolk, Nebraska, the town gave them a city-wide appreciation event for what they brought to that community, and I can show you more towns just like them. I think that speaks volumes to what our members do when they construct the pipelines.

Our workers are drug-tested, subject to alcohol testing, must be on their jobs every day, six to seven days per week, 10 to 12 hours each day. They are craftsmen and women who take their jobs seriously.

Also, the EIS should acknowledge the environmental benefits of replacing aging infrastructure with new pipelines built using modern materials, designs in construction techniques. I believe replacing aging infrastructure like pipelines is imperative to protecting the environment.

This is a thorough and

well-prepared EIS concerning the environmental impacts, and acts in keeping with the EIS timeline and on schedule.

SA-04 is not a reasonable alternative and would increase costs, construction impacts, GHD emissions, and does not meet the needs of customers or refineries.

Pipelines are the safest way to move crude oil and other liquids according to PHMSA. We hold that record, and it's improving every day with more new pipelines that we are installing and removing the other ones.

Just like the vehicles we drive, if you stepped out of your newer vehicle today and got into a 1960s vehicle, you'd have a noticeable difference. A lot of changes have been made. It's the same with pipelines.

The original Line 3 was built in the '60s. Technology just wasn't there. We have different welding technologies today, different hardnesses of steel, better coatings and better processes.

Continuing to operate existing Line 3 with all of the integrity issues that it has is not the best decision.

The intelligent decision is to move ahead with the approval of a Line 3 replacement.

As we all leave here today and we get in our vehicles to travel to our next destination, we may or may not have to stop at the gas pump and fuel our vehicles. But eventually, most of us will. And remember, when you do that, because no one ever stops to think that is made possible by pipelines throughout the United States.

And I thank you for your time. That's all I have.

FACILITATOR: Thank you, David.

John Munter is next. And also, I'll get to these cards and other folks who want to speak.

UNIDENTIFIED SPEAKER: I was just wondering if I could ask the gentleman a question.

FACILITATOR: Generally, we'll have each person comment, and then if you want to comment, you can raise additional questions as you like. We try to let them make their comment and not --

John, over to you.

MR. JOHN MUNTER: I'm John Munter from Warba, a retired guy, and I'm working with Allen here on the pipeline cleanup. We've been really concerned about the abandonment issue as one huge major issue for us in the Line 3 corridor.

And we did some data here, throughout -- the DEIS is plastered -- the pipes are generally 10, 15 feet apart, you know.

So we did some data here and found that from Wawina to Grand Rapids we had pipelines. On the average, on the average one in three are about 18 feet apart, and on the average, three in four are about 30.6 feet apart.

So it makes the point that the pipeline should be able to be pulled up by Enbridge and we're advocating one size does not fit all. There should be more choices here.

There may be some people with pipelines that want to leave them there, that they may be seven feet apart, and they're worried about damaging the next pipe over if

they replace it or take it out. But we think that it's ample opportunity for a lot of these pipelines to be pulled out, and it should be the opportunity for the tribe to make their own choice or the city or the state or the county or a landowner to make their own choice about whether they want the pipeline out or not based on maybe the best scientific data from the PCA and DNR and whoever they want to consult with that.

So this is one example of really the huge holes in the DEIS that we found. There's no spill data probably ever we're going to get, because everybody thinks it's private information; which will hurt our risk assessments or damages.

There's the economic data. A huge amount of it won't come until after the public hearings, and so it will be difficult to make our arguments that way.

But just looking at some of the basic facts in there like this one -- and then I found on this one -- typical right of way configuration of Enbridge main line system, and they have Line 13 next to Line 3. On the other

side is Line 4.

Well, Line 3 and 4 are together here between Wawina and Grand Rapids, but 13 is not. It's in the same corridor, but it's actually Line 4.

So there's lots of these things that need to be fixed, and Department of Commerce has come up to me personally and said they're really interested in working on some of these issues and verifying my data that we collected here. I really appreciate that, and kudos to them to be proactive about looking into some of the things that we found.

And I have a lot of things to say, but I'm going to focus today really on the issue of exposed pipe.

There's no discussion of how fast an exposed piped will degrade in the DEIS.

Enbridge only has the worst case -- now, in terms of finding this information, the official DEIS chapter on abandonment is Chapter 8. It's only about 13 pages or so.

If you want to read a lot more of it, go to appendix B, that's like 86 pages, on

abandonment, so I congratulate Enbridge actually for at least putting the pages together for the abandonment issue, even though I disagree with them on things.

So in terms of the exposed pipe, the worst-case scenario of degraded polyethylene tape and no cathodic protection on presumably buried pipe where penetration of the pipe may happen in 25, 50 years. That's kind of the worst case, in 25 to 50 years, you'll get a break through there.

This is a study from 2011. So therefore, in 19 years from now, then, the worst-case scenario is you could get exposure.

Enbridge, in appendix B, ignores the question of exposure, citing a 2008 study showing less than 1 percent of the pipe was exposed in 2008.

That was like nine years ago, and that's like one-fifth of the age of the entire pipeline. And so we know that there's a lot of -- go on Google Earth, they could do it or we could do it, shows many exposed area of pipes in Fond du Lac, or go to Grand Rapids, Cass Lake, and further north.

So what's the up-to-date thing, percentage now of exposed pipe, is really a question we have.

In addition, while it's acknowledged that pipes will rise in the ground without the heavy oil in them, there is no effort made to graft per year or estimate what percentage of the pipes will become exposed.

Will they experience an initial bump up in the soil when the pipe leaves and then gradually continue rising forever? Is there an expected date when most of the pipe will be exposed that isn't under, say, a depressed road or railway or with aggregate or something on it? So that could be studied.

As the pipe becomes gradually exposed and the polyethylene tape degrades, wrinkles can form in allowing water seepage, which tends to disbond the tape. This then can render to no effect the electric current cathodic protection that helps preserve the pipe.

In 1996, Enbridge found 15 disbonded coatings of polyethylene tape on pipe, though, that was presumably buried in

this period or before Enbridge experienced a handful of leaks. Two of these were from external wear from "external, general, and pitting corrosion," and also, "narrow axial external corrosion."

However, these were explained away with the excuse that there were pipe defects involved.

The level of pipe defects possibly present to aggravate external corrosion was never explained. Actually, Line 3, when it came from the factory, it had defects, you know, and so that's why they reduced the pressure from 760,000 barrels a day to 390,000 barrels a day, fearing a giant break in the pipe at some point.

So we know there are defects in this, and it could well be asked, what's the worst case expected penetration of a pipe or exposure for exposed pipe versus half exposed pipe versus the 25, 50-year possibility for a buried pipe?

And these are very real issues to landowners here, I think.

The issue of exposed pipe is a

big one since it not only affects degradation rates. So the pipe -- the landowner issues. Exposed pipe can hinder water flow like a beaver dam, which might kill trees.

It could be a constant source of maintenance if Enbridge has to keep arriving on landowner's property to replace polyethylene tape, which would also maintain cathodic protection even -- if they cared to, and we'll have to see about that. It may be an eyesore. It may hinder property resale. An exposed pipe will hinder lake traffic across it.

I can quit there for now. Thanks.

FACILITATOR: Thank you, very much. Thank you, John.

Next we have Beth Bartlett.

MS. BETH BARTLETT: Beth Bartlett, B-E-T-H, B-A-R-T-L-E-T-T.

I'm going to go from written remarks just from my own sense of covering what I wanted to.

So good morning. My name is Beth Bartlett, and I come from a land of polluted waters in Ohio, but I've been in Minnesota most

of my life, so I know what polluted waters do when my nearby river caught on fire.

I'm a recently retired professor of political theory and ethics and public law at UMD, so I wanted to focus my remarks on the legal and ethical issues raised in Chapters 9 and 11 of the EIS about environmental justice and tribal resources.

As noted, the proposed Line 3 pipeline would cause receded territory where the Anishinaabe retained rights in hunting, fishing, and gathering sensitive wild rice lakes. And many other bodies of water would be crossed, putting at risk the traditional cultural property of the Anishinaabe, as well as one of the main sources of food and income.

As noted, among other things, just the construction of the pipeline could introduce invasive species, increase turbidity and sedimentation that would forever change the ecology of the lakes. Not to mention the devastation caused by a potential leak.

As Enbridge themselves admit, the current Line 3 has over 900 structural anomalies caused by such natural occurrences as

frost heave.

I've been to many of these meetings over the past few years. I am a union member, have been for nearly 40 years, and I have great sympathy for the pipeline workers who see this pipeline as providing needed jobs. But the creation of these temporary jobs would also permanently endanger the economic livelihood of those who live on this land.

It seems to me that we can do better. We don't have to pit worker versus worker, economy versus economy, environment versus the environment.

There are plenty of pipeline jobs that can be had by the safe removal of Line 3 for needed water, sewer, infrastructure, and has recently been done by forward thinking corporations around the world. The corporation could retool and retrain its workers for jobs in renewable energy.

The EIS notes several economic detrimental impacts to the Anishinaabe living on the pipeline route, but I also want to stress the very serious issue and very well documented issue of the increase in sexual

assault and sex trafficking that has routinely occurred with the influx of temporary cash-rich workers.

Anishinaabe women and girls already suffer the highest rates of sexual assault and sex trafficking of any group in the United States, and this would increase that potential for harm, which is life long, and is passed on to subsequent generations.

Imagine your own daughters being sexually assaulted, being trafficked.

Finally, while the EIS claims its effects would be on the lakes and the land would be minor and temporary, it also goes on, and I quote, "Water bodies at risk from the proposed pipeline include any water directly downstream from a pipeline crossing.

"Pollution of these waters from a petroleum spill would create a significant hardship to traditional lifeways and spiritual needs of the people. The risk of harm to the people who depend on these waters for sustenance of physical and spiritual needs is greatly magnified by the presence of traditional food sources such as wild rice and

walleye pike. American Indian communities and individuals have unique health issues associated with historical trauma and structural racism."

I appreciate that these issues are raised by the EIS, and we must give these issues their due attention and respect.

Certainly, the proposed pipeline violates ceded territory rights outlined in the treaty of 1854, and as citizens of Minnesota, it is all of our duties to ensure that those treaty rights are upheld.

I firmly believe that those of us who are settlers, such as myself, living here by the generosity and goodwill of the Anishinaabe through that same treaty, also have an ethical responsibility to do everything in our power to do no further harm to Anishinaabe land, people, and religious and spiritual practices.

And whenever possible, to do what we can to support the restoration of these, which compels the rejection of the construction being proposed, Line 3 pipeline. Thank you.

FACILITATOR: Thank you, Beth.

Jeanne Fahlstrom is next.

Name and spelling for the record.

MS. JEANNE FAHLSTROM: Hi. It's Jeanne, J-E-A-N-N-E, F-A-H-L-S-T-R-O-M, F-A-H-L-S-T-R-O-M.

I have a cabin along the northern alternative route of the pipeline, and it has been causing me a lot of stress, and I would just like to say that I think of my parents who have passed, and they bought the land, they built the cabin for their children and grandchildren.

And now I'm a grandmother, and I'd like it to be -- to have the water and the forest clean. And hopefully, they will be able to have grandchildren some day and come there.

I think a lot of people in Minnesota can understand keeping the water clean, and keeping our forests and the animals, the people safe.

I think of Enbridge company as a guest here in Minnesota. We invite them. We keep inviting them back. This time, they want to cut down, as far as I can tell from the EIS -- it's a little unclear -- 750 feet swath

all along the pipeline corridor.

The part that's unclear, it's in Chapter 2, page 1, the difference between the construction right of way, the construction work space, additional temporary work space, and construction work area.

It's real unclear which is which, and are they going to just cut down and deforest or come across everyone's land for the whole 750 feet? And I think it would be great if that were clarified and specified in the EIS.

Also, we invite them -- they have their pipeline coming through Line 3, and in Chapter 2.2, Enbridge says that there's a high amount of corrosion and long seam cracking. This is the same thing that caused the spill in Kalamazoo.

And so we are allowing our guest to run this pipeline, and they're running dirty -- well, right now it's not, but they're running the tar sands pipeline through. Their new pipeline wants to be dirty tar sands that can't be cleaned up like in Kalamazoo.

I think that as guests they

should shut down Line 3 and fix it so that we don't have a huge spill here.

Let's see, also as guests, they should clean up their mess. The Line 3, as they say, is corroded and cracking and has over 900 anomalies, so it is likely leaking, yes, and Enbridge says in the Draft EIS that they have tested a 12-foot section in Canada.

I believe that it would be appropriate to have a test -- any company knows this -- where the pipeline is, where they plan on cleaning it and abandoning it here in Minnesota, preferably larger than a 12-foot section, preferably a section that has the cracks and corrosion so we can see if their cleaning process leaks into the soil, and they can test that.

It's also a bit unclear, the cathodic protection. They say there's going to be a lining. I'm not sure if they're adding a lining, which sometimes happens, and what that lining will be, or if they're counting on the old lining that's already on the pipeline that is cracked already.

So if -- it would be good for

that to be specified so we know if that would even work and have it tested here in Minnesota.

So the other things, they've already talked about buoyancy control. The thing I worry about is there's so many areas already. There's no specification of when they will clean up or take out the mitigation for the buoyancy when the pipeline rises. There already is buoyancy here in Minnesota, and Enbridge knows that and they have not fixed that.

So there needs to be a time limit set. Maybe they can tell us how soon they will clean up and take out those sections or fix them.

Otherwise, the EIS, what I've noticed, there's a total lacking -- of course I couldn't read it all because it's really long, but of the mention of the positive impact of removing Line 3 instead of abandoning it. I would like to see in it the amount of jobs and money it will generate and have that evaluated.

And other than that, I would like to just say that for the public utility commissioners and the people working on this,

Department of Commerce, you have this job to regulate things, and it's a short time that you are hired to do these things.

When people, including our legislators, are trying to take away your power -- you have the power to regulate. You need to step up and regulate. We need to step up and stand up, listen to the indigenous people, and for once, do what they say. Honor them.

Could -- including these people who will regulate in the pipe workers, who I totally understand, you want jobs. This pipeline is not a for-sure thing. If Enbridge is telling you it is and you're going to get jobs, it's not a for-sure thing. Keep that in your mind.

One thing that would be for sure is to take out the old pipeline and insist that you get the jobs.

Could any of you live with it if the source of the Mississippi River gets polluted? This is dirty tar sands oil that can't be cleaned. It would catastrophic to Minnesota.

That's all. Thank you.

FACILITATOR: Thank you.

Laura, you're up next. We'll bring you the mic, and state your name and spelling.

Generally, also, if we have comments that go to institutions, agencies, issues, certainly raise questions as well as comments, but other folks may choose not to respond.

MS. LAURA EUSTICE: Thank you. Good morning, everyone. My name is Laura, L-A-U-R-A, E-U-S-T-I-C-E. I grew up in Hibbing. Currently, right now, I'm looking at different properties around the area to start a farm business. Some friends of mine and I are starting a business in the Cromwell area that will also rely on local farm suppliers, and we are all very, very worried about what this will do to our lands and waters.

It could stop us from doing business. It could stop our partners from doing business, making a living, sending their kids to school, so besides the labor issue here, which I completely agree with

Mr. Richardson and the Minnesotans for Pipeline Cleanup, there's a huge impact on our local economy and not a good one, as far as our woods, our waters, our tourism, our farms, despite the fact that seasonal jobs put a huge strain on our economy.

There is also the issue of trafficking, which the gentleman representing the welders told you does not happen, but it does. I'm a masters level social worker. I've seen this with my own eyes. Not only here in Minnesota, but I have colleagues in North Dakota that have well documented this.

It's a huge issue in our profession, and so if it didn't exist, I don't know why we would talk about it all the time as social workers.

The only other thing I wanted to say is that I also have experience in archaeology. I worked with the Duluth Archaeology Center and the Superior National Forest for quite a while, and the cultural resource management impact statements in this EIS are laughable.

If I had done that as a student,

I would have gotten an "F" on that report.

So it's just -- to me, with my own personal knowledge, with my knowledge of the area, with the personal impacts this will have on me, or all of us really in the area, this is really just a corporation coming in with a bad deal, thinking that we are too ignorant to recognize that, and thinking we are too poor to do something about it. And that is all.

FACILITATOR: That's all the cards I have, so are there other -- other individuals who want to make a comment, raise your hand so I know, and we'll --

MS. HOLONA ROMERO: My name is Holona, it's H-O-L-O-N-A, Romero, R-O-M-E-R-O.

I didn't come here to say anything. I pretty much just drove 12 hours to come and sit with you guys. Me and my children are not from this area. We have never been to Minnesota, let alone this far up.

So thank you guys for the ones that did invite us here.

I have never seen any of you guys's lakes, and we are getting an opportunity

to see them, and it's a shame to see that they're going to be laced with oil.

Have any of you guys seen oil on top of water? Have any of you guys been part of the cleanup crew to clean it back?

I am not that old, but I've actually literally had to get in hands deep and help the wildlife. You know, it's ugly. I mean, I literally went through a test with this scientist friend ours from NASA. He came into a thing for my boys at school, and he tried to get us to breathe through an oil mask, and we couldn't do it.

So can you imagine the fish that you guys all rely on, apparently, from what I'm hearing from everybody, the fish, the rice, all this and that. But the living creatures, how can you breathe through that? You suffocate. It's like they put a bag on our face, and I couldn't breathe through it. It was ugly.

I also wanted to ask you, what was your name again -- David? I don't know this woman. I don't know any of these people, but I do know firsthand about man camps. I literally had to go get someone in North

Dakota.

We have a decorated police officer from my reservation that went and was working at the one in North Dakota. She's a well-decorated officer, and she came back and she told our people, because then there's a pipeline that's trying to come through our land.

And my biggest thing, too, is why are all the pipelines like these ones coming through the reservations, you know, or even on the lining of it?

I'm not trying to be disrespectful to anybody here that's for it, but let that stuff come through your yard. Let that come through your backyard. I want to see how you feel. This really bites.

You know, we're trying to protect the land for everybody, protect the water for everybody, not just for native children, not just for animals and everything, for everybody.

I have all different races of family members that we adopted into our family or have been married into, and it's a shame that people want to break it right away. Well,

it's just natives that are having this issue. It isn't. It's an issue for everybody.

I myself am trying to protect all the unborn. Everybody here in this building right now is responsible for what is happening to (indiscernible), Mother Earth, we are all responsible. We did this to her. I am no exception.

I take responsibility for my vehicle and the pollution that I do and everything, but we need to say, "Enough." When is it time to say enough?

It's going in our backyard. I'm not Ojibwe or anything, but it's going through our backyard.

The governor, everybody, they want this pipeline, then have it go through their damn backyard. Have it in their swimming pool.

I'm very, very thankful to drink water from my tap. I worry about my grandchildren and so forth, that they're going to see -- I went to Flint, Michigan, and I got to sit with people, and I turned on their sinks, and I was like, "Do you have to let it

run for a while?" And they said, "No, that's every day," you know, and it's sad that we ourselves are destroying it.

I feel bad for the farmers here. You know, you guys, that's your life. You know, whoever the farmers are, you know, that's your guys's life. And I'm thankful for food. I like food, you know, and stuff, but I feel bad.

And then I'm sorry, sir, I don't know your position. You're probably like one of the boss guys that run the crews and everything. My brother, one of my brothers is a pipelayer, so we have conflict. And he tells me stuff.

He says -- I don't get in the middle of that -- yes, they do do drug tests, I do know that, but they're random drug tests, and the majority of time they are notified that they're going to have a test.

A lot of the times they do get the drugs, it's not for their ingestion, it's for their person that they bring and everything like that. I'm not trying to say nothing against you or be disrespectful to you or

anything, but that does happen.

I want to say thank you for the guys that did invite us to Minnesota, thank you, and I hope I can come back again and enjoy you guys's beautiful land up here. It's really beautiful. Thank you.

FACILITATOR: Thank you.

So anybody else who hasn't spoken who wants to make a comment, and then I'll go back around to the folks who may want to make a second comment.

Name and spelling for the record.

NICOLETTE SLAGLE: Hi. Nicolette Slagle, N-I-C-O-L-E-T-T-E, S-L-A-G-L-E. I'm with Honor the Earth, I'm their research director.

And, David, right? I'm sorry, I'm terrible with names.

FACILITATOR:: Make remarks on the projects, but to single out individuals makes them uncomfortable. I want to make sure everyone's comfortable.

NICOLETTE SLAGLE: I don't want to come at anybody or anything like that. I just do want to say these issues that we bring

up, we have plenty of research and documentation of the numbers for them.

I have a list here of, let's see, 2014, the ILO, which is the International Labor Organization, did a study that showed that trafficking is exponentially higher near points of extraction and worker camps.

From the Dickinson paper, assaults in Dickinson were up 300 percent, and in North Dakota alone, 17 percent from 2011 to 2012.

Between March and May of 2014, 11 men were charged with offering up children for sex. Two were prosecuted for prostituting immigrants in Minot, and two others were attempted sex trafficking in Dickinson.

In August 2014, the Department of Justice Office of Violence Against Women funded $3 million in grants to address the issues in the Bakken area.

The 2009 report by the Minnesota Indian Women's Resource Center showed that the Twin Ports have been part of a trafficking ring from Thunder Bay to the Bakkens.

Most of these numbers

disproportionately are native women, which may be why it's not reported so much.

Now, aside from that -- and again, like I said, I don't mean to come at anybody, but you know, anything that we say here, we have documentation and we have backup for. I'm not pulling numbers out of nowhere. I have reasons for why I choose all of these numbers for coming up with trying to understand the full environmental cost of the oil industry.

And I know that we've said -- you've said time and time again that this isn't the time to ask questions of the DOC, of the DNR, of the MPCA. And before, when we were doing those meetings, before or after the application and Enbridge was there, and you know, we were having a little bit of conflict with them, and again, like that was not the time to ask those questions of them.

Time and time again it's not the time to ask these questions. It's not the time to have a dialogue. We have to learn how to talk together to people with each other without like feeling like it's combative and we're

coming at each other, because we're not.

When is that time that we can all get together and talk about these issues?

That's all. Thanks.

FACILITATOR: Anybody else who hasn't made a comment? I think there are two folks who haven't spoken. If you want to state your name and then also a spelling.

MR. JIM WOEHRLE: My name is Jim Woehrle, W-O-E-H-R-L-E.

I live in Wawina, about -- just down the line from Floodwood, lived there with our family for about 40 years.

And the pipeline has been part of our community. It goes through the entire length of -- the width of Wawina.

And one of the things, this spring is about as wet as you've ever seen in Wawina. High water, high groundwater, and I've often wondered what would ever happen if there was a leak in the swamps of Wawina. How would you ever, right now, get in there and stop it? It would be a total mess. I can't imagine what that would look like.

Now, the removal part, to abandon

that pipeline in the swamps in our community, what would be the end result of that?

If there was ever a break in that pipe, if it rusted through, it would be monitored forever. I mean, all of these things.

What happens -- what happens when that pipe turns into a culvert, and how fast -- how much water could you move in one hour? How much water could move in 24 hours? It would be absolutely stunning to see what could happen, what could drain, what could move, and where would it move to?

And what would be in that water, would it empty?

The idea of the MPCA monitoring and keeping track of abandoned pipelines forever is beyond the imagination. It's not going to happen.

Anything could be mitigated on paper, anything. They can get through, "Environmental review. Will be monitored forever. Don't worry, we're on top of it." Once it's built, who's going to watch it until something bad happens?

I've seen it time and time again. This is a paper process that doesn't have a lot of reality built into it after the fact. That's the problem.

Who's going to regulate this down the road? You know, 50 years is a long time. What's it going to look like? And the idea of, in our community, putting a new pipeline in along the old, along Highway 2, the old route; well, you know, it's been there forever, and a new one could be there forever, too.

I mean, another 50 years, not forever, but the idea of putting in a tar sands pipeline through the same area in our community -- I'll mention our community, but this is not unlike any other community down the line or up the line; the headwaters in the Mississippi Anishinaabe lands that -- in the ceded territory.

I mean, its impacts with tar sands oil, that has been said before, is very, very difficult to clean up, if it can be.

So I guess my final thought would be just realize that this is a paper mitigation. It's, a lot of times, to get

through the political process right now what's in front of you, and after the fact is what we'll all have to deal with. Thank you.

FACILITATOR: And the gentleman here in the blue shirt is next. Name and spelling for the record.

MR. DAVID ZARICH: Hi, my name is David Zarich, Z-A-R-I-C-H, and I live ten miles east of Hibbing in Cherry Township. And I've never heard so many complaints about a pipeline. I think about the safety and how many trucks that are hauling on the highway and tipping over and dumping their load of oil or gas or whatever it may be.

And how about your rail cars that are derailing and tripping and spilling their oil all over the ground? We don't think of things like that.

Then we talk about hazards. Work in the mining companies like I did for 35 years. You got asbestos. I was just lucky that I never had a problem with it. And the same thing with your hearing. If you don't wear ear plugs, you're going to lose your hearing sooner or later.

So this is what I looked at when I came here, and I'm looking at the safety of it. And you have to look at all the complaints and all the things that happen and compare them to other transportation.

So that's what I have to say about it. And we have to take a gamble in life no matter what we do. I took a gamble working in the mines. Your husband took a gamble working on the pipelines. Probably he got -- probably he's maybe one out of so many that got sick. This is chances that we take.

That's all I got to say.

FACILITATOR: Thank you, sir. Anybody else who hasn't spoken yet who wants to make a comment before I go back to two folks who want to add to their comments. I think you were up next. Name and spelling.

MS. SHEILA LAMB: It won't be eight minutes this time. I do have somebody looking up real quick.

Actually, rail is safer, and there are the facts and, you know, the numbers are out there showing there's a reduction in what oil goes into the environment by rail

versus the pipelines, and hopefully, he'll have that up in a minute.

I have to look in the eyes of children 13 to 18 years old every week that are trafficked youth. I have personal friends that have suffered at the hands of these men.

I extend an offer to anyone. I'm sure this young lady that's a social worker and Honor the Earth will do the same. If you want to know, the police records, the statistics, the research, the numbers, this is real. And with 13 and 14-year-old daughters at home you're doggone right I'm going to worry, especially when I have to look at these children every single week that have suffered because of this.

It's not rhetoric, it's life, and we don't want to think out of our boxes because it's very painful and it's very frightening.

We can be the generation that moves towards positive change. We can preserve not only our environment but the future for our children, grandchildren, and generation after generation.

Please do your research, and just

don't buy the rhetoric that's also being handed to our fifth graders in our elementary schools. The information and facts are there. They're indisputable, the police records, the science, the statistics. It's all there.

Like the gentleman that spoke a few minutes ago in his area, and he worries about what's going to happen and how much water will flow.

The fact that those pipelines, when they leak, can travel a mile in either direction before they see the leak. It's a fact.

Pipeline spills are inevitable. Pipeline spills release much larger amounts of oil than spills from any other mode of transportation. From 2004 to 2012, pipelines spilled three times the oil that trains did over the same period of time.

The ten-year average, 2004 to 2013, is 631 pipeline incidents per year with 97,263 barrels; over four million gallons per year spilled resulting in four million, nine hundred -- I'm sorry, $494 million per year in property damages alone.

Those are the facts. Those are the numbers. That's the proof. It's the statistics. And that was done by Friends of the Headwaters. They were the ones that found that information. Thank you.

FACILITATOR: Thank you.

MR. DAVID BARNETT: My name is David, I think as everyone already knows. I'm glad to know there's another David in the room -- B-A-R-N-E-T-T, Barnett.

Firstly, I want folks to know, there's no way -- I don't condone or agree with the abuse of women or trafficking, okay. I raised three daughters. I have four granddaughters. I'm as concerned as anyone. I want to change that myself.

Now, I want to go to the facts about camps, construction workers, and what you -- or was acknowledged in the room in North Dakota.

Less than 5 percent of the work, oil-related, in North Dakota was done with union members. It was vastly done with open shop nonunion workers from all over the United States. Where they got 'em, I don't know. And

I cannot speak for those folks.

But I can stand right here before you today and speak for my members, and we do not condone that. We do not agree with that. We have a code of ethics. And anyone -- anytime someone finds that one of our members is involved in anything, I want to know about it, because I represent them from coast to coast.

And I just want to go on record and say that, because it's a very real issue. I'll do everything I can do to help with that issue, but it's not my members doing it, okay. That's why I can stand here and say it's not going to happen.

Enbridge is committed to building this pipeline with our members, okay. I know our members. I am a member. I've been out there with our members all my life, and, you know, if you got something different to bring to me individually, I'll be glad to hear it.

Next, the facts that were just read off concerning pipelines spill more oil than rail. Now that's a broad statement, and if you just listen to that statement, yeah, you

might come out of here thinking pipelines are less safe. But if you look at the amount of oil that's transported through pipelines versus rail, there's a thousand times more oil each year transported through pipelines than by rail.

So when you take that into context, that's why pipelines come out as the winner of the cheap -- of the chief transportation mode and the safest for us and our environment, bar none.

Thank you.

FACILITATOR: Thank you, sir.

We appreciate people's efforts to make good rationale here, arguments, and being respectful in doing so. I appreciate that.

Anybody else who wanted to make a comment? Name and spelling for the record. We'll bring you the mic.

MR. JOHN MUNTER: My name is John Munter from Warba again. I'm retired.

And perhaps the talk of property values would be in order here as well. Appreciate some of the comments that were made regarding pipes and swamps.

Yeah, there will be more buoyancy there and more danger for exposed pipes and the heavy oil on them. And offering as a water conduit from here to there, we're real concerned about that.

And also the toxicity of the coatings on these pipes. That's got to be a question for Department of Commerce, maybe ask Enbridge, is, before 1980, how much of the pipes were coated with asbestos, for example, and maybe something else, PCBs or whatever.

In terms of the property values, in Chapter 8, we have a quote, "In the near term, impacts on socioeconomics are anticipated to be minimal."

Well, what about the landowner, though? There's no talk of landowner property values. Why would anybody in their right mind want to buy a piece of property, all things being equal, with a rusting oil pipeline going through it?

Even if it's buried, you know, and if you have to honestly admit that you have a buried pipe that's down there and it's not being used and it's going to be rusting out and

there could be legacy contamination under it when the oil goes through it, potentially dangerous to children, and fire equipment if it's above ground, can serve as a water conduit, as we said, rusts out, brings water from pond to pond.

Already there are many, many areas of exposed pipe from Fond Du Lac to Warba to Grand Rapids to Cass Lake and beyond, that can be easily seen from Google Earth. How much more exposure will there be without the heavy tar sands keeping it down and no company to rebury the pipe?

Reburying pipe for Enbridge is a risk assessment. It's not a given deal or anything. It's easy to find plenty of excuses about disrupting the ecology to avoid reburying pipes.

Now, Enbridge quotes in appendix B, "The Canadian Energy Pipeline Association, CEPA, Pipeline Abandonment Matrix," which it takes as the standard for industry practice of abandonment. "The CEPA land use guidelines recommend abandonment in all cases except if agriculture can be disrupted or if a future

development is projected."

Enbridge argues that since Line 3 is in the middle of a suite of other pipelines, that developments in agriculture won't be issues. So therefore, abandonment is the logical option. Enbridge ignores a number of key points, however.

Number one would be that the other pipelines, 1, 2, and 4, most closely aligned with Line 3, would be mostly probably be deactivated in the next few years and moved to maybe the lake country preferred corridor, if that's what's chosen by the PUC, if the company gets its way, since they were built in the '50s and '60s as well.

A study should be done regarding the proximity of Line 3 to Line 67, that was just activated in 2010. There could be considerable distance between them at some points and a waste of land between them.

Once again, one size does not fit all situations.

Line 67 could even be deactivated in decades to come as the world demand for oil falls and as the tar sands production becomes

uneconomic.

So we're seeing in the 2020s, a lot of very important commentators are thinking that the world oil demand is going to start declining, and so at that point, the Saudi oil will be all that will be needed to suffice for the world supply of oil. It won't be the 21 percent dirtier oil from Canada at that point, either, so we won't be seeing a lot of new projects going into Alberta.

Right now all of the major oil companies are getting out of Alberta and they're selling off to local Canadian companies.

Number two, the allowance for agriculture and industry as mitigating factors for removing pipelines opens the door to other important considerations. The wide open spaces of Canada are another one size does not fit all situation, since Line 3 in the U.S. often passes near residences of small farmers and landowners who are denied use of their property by prohibitions of crossing pipes with heavy machinery.

They also have the worry of pipes

rising above grade without the oil in them to divert water flow and impede light travel and depress property values as well, if you have it in your front or backyard.

Thirdly, legacy oil contamination will not be found if the pipe is not dug up. That may potentially slowly seep into the groundwater or a nearby well. If you try to sell your property, it's like, "Well, there might be legacy contamination in there, but we don't know, because," you know, so --

And then fourth, well, the overall structural integrity of the pipe may last for quite a long time. Spot corrosion could wear through it here and there making it a conduit for water flow and diversion anyway, especially with the rising of the pipe in the soil.

So I could quit there for now. Thanks.

FACILITATOR: Anyone else want to make a comment as we begin to close this section? Again, there's written comments possible, comments submitted online or in mail by July 10 as well.

MS. KYLIE LEMLEY: Hello my name is Kylie Lemley, that's K-Y-L-I-E, L-E-M-L-E-Y. Thank you for allowing me to speak to you guys today. I appreciate you taking the time to listen. I'll try to be brief.

Mainly what I wanted to come here to say is I wanted to talk about chances, like this gentleman over here. We definitely do have to take chances, obviously. But what I often find, in especially hearings like this, is that we don't talk about the chance of moving toward renewable energy, aside from just a hypothetical question.

We act like the technology for it doesn't exist yet. It's not a feasible option for us to move toward it. And that's simply untrue. All of the technology is there.

The job market alone speaks toward it. We have twice as many jobs right now in renewal energy than we do in the natural gas and oil industries and stuff like that.

So if we want to talk about taking chances, why can't we talk about the chance of not putting in a new pipeline, just using the pipelines that we have.

Since we all drove here, we all use gas. And just trying to make our sustainable options more viable for long-term use, and let's get rid of all of this natural gas and oil because we don't need it anymore. We don't need it.

I'm from an area where it's very economically depressed. It wasn't always this way. We have lots of beautiful rivers. I'm just south of Pittsburgh. We were known for our rivers, and we made the decision to use coal as our main form of industry, as our livelihood.

So the coal industry died around the 1980s, which is when we started going broke, and we had kind of two options. We had to take out loans in order to continue on and not just all give up entirely.

We could move towards sustainable energy, which was very, very young in the 1980s, certainly.

Or we could move forward in the next -- the best option, I guess, which was fracking in the oil industry.

So now the Pittsburgh area, and

Pennsylvania in general, is one of the highest sources of fracking in the country.

And our parents kind of made that decision, thinking it would be best for us. They wanted to send us to college. They wanted to be able to have homes to raise us in and food to feed us. It seemed like the best option because it gave them jobs.

We all need to have a job, absolutely. But it didn't work. I myself couldn't finish college. I couldn't afford to. My grandfather was an oil worker, and there was nothing he could do.

So this is the same story for a lot of people my age from my area. Pretty much nobody from my high school got to get complete college. I see lots of peers from other areas who did, so I'm happy for them, but it's frustrating for me personally, because we made a choice and we made the wrong one.

We need to move towards something sustainable, not just for my children so my children can go to college, but also for all future generations.

I know, we're sick of hearing

this, but please, consider that in 30 years, for example, we're kind of at a time -- global warming is happening. We're going to be reaching climate tipping points in which the coldest year for certain cities in the U.S. will be hotter than all of the hottest years combined over the last 150 years or so.

That's a big deal. We have been talking about this for 50 years now and we are out of time.

So if we want to talk about taking chances, if we want to talk about jobs, if we want to talk about moving forward, let's talk about the chance of moving forward with something that's actually going to be sustainable for longer than 15, 20 years at a time. Let's talk about moving forward so we can send our kids to school.

That's all I wanted to say. Thanks for listening, guys.

FACILITATOR: As we begin to close, any final folks who haven't commented?

Again, if you want to stick around, you're welcome to do that. Write comments, put them in a box. If you want a

copy of the DEIS, we have flash drives and CDs over there. July 10 is the final date for submitting written comments in email or writing, and on your packet there's a good place to do that in there.

Thank you very much for your comments and conversation and safe travels.

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DEIS MEETINGS - 14-916 15-137

FLOODWOOD - JUNE 8, 2017 - 10:00 A.M.

(PRIVATE COMMENTS TO COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Downtown Fair Building
107 W 7th Avenue
Floodwood, Minnesota

I N D E X

SPEAKER	PAGE
SHAWN CARR	3
FRED TANNER	3

MR. CARR: Shawn Carr. S-H-A-W-N. C-A-R-R.

My concerns are, of course, water quality. No pipeline is safe.

Other general concerns are with the line abandonment. Since there doesn't seem to be a real plan to get rid of the pipes -- I know they want to section them off, and that would be making them individual containers. And I know when you abandon a gas tank, say, for a gas station that the old tank has to come out before the new one goes in. So that's a major environmental concern.

Another concern I have with large construction projects like this, the impact on sex trafficking and the drug industry and the impact it will have on local regions that they'll be located in and the stress it will put on law enforcement in those areas.

MR. TANNER: Fred, F-R-E-D. Tanner, T-A-N-N-E-R. Address is 25543 County Road 10, Bovey, B-O-V-E-Y, Minn. 55709.

I own property that Enbridge has gone through with their pipeline, two separate properties; and they've always been very good and forthright in what they're going to do.

I also was on the Trout Lake Township Board for nine years, and we had their pipelines going through private property, and they worked very good with the township.

Line 3, I believe, is a needed project. We need to replace the old pipeline, and I highly recommend that it goes forward.

(End of private comments.)

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DEIS MEETINGS - 14-916 15-137

BRAINERD - JUNE 8, 2017 - 6:00 P.M.

(PRIVATE COMMENTS WITH COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Central Lakes College
501 West College Drive
Brainerd, Minnesota

I N D E X

SPEAKER	PAGE
EDWARD DALLAS	3
ED DOUCETTE	3
LISA LAASCH	4

(BRAINERD.)

MR. EDWARD DALLAS: My name is Edward Dallas, E-D-W-A-R-D, D-A-L-L-A-S.

I can just talk. I'm just concerned here about something that's not being expressed here is the tar sands themselves. How much environment has to be destroyed in Canada to get to the tar sands and then to make them liquid enough, the oil in there, to move through this pipeline. And I just think that that's a wrong thing to do. Because I know how much they have to rip off the surface of the ground, the forest and everything else, to get, literally get to the tar sands. And then to take them out, heat them up enough to make it liquid enough to, quote, move through a pipeline. And that's something that I don't see discussed here in Minnesota, is the degradation of the environment in Canada to get this oil just to come through Minnesota to Superior, Wisconsin. And, thank you.

(End of comment.)

MR. ED DOUCETTE: Okay. First name is Ed, E-D, last name is D-O-U-C-E-T-T-E.

I would rather see oil transported via pipeline than rail or truck. Because it is safer environmentally speaking.

What else could I add?

And as far as the route alternatives are concerned, I am in favor of abandoning and replacing the existing Line 3.

That's about it.

MS. LISA LAASCH: Lisa, L-I-S-A, Laasch, L-A-A-S-C-H.

One of my chief concerns with this pipeline route is that we are living in the Mississippi watershed area that affects roughly a third of the United States as water going southward from here. Contamination on this level, if there were any kind of leakage, would affect a huge percentage of the United States' population, let alone our own lake here where we're enjoying our clean water for drinking and bathing and swimming. I don't feel like this is safe for our families. And I don't feel like it's safe for our country. And I don't feel like it's -- what would be a good word -- kind to the Native Americans who would be impacted severely by the route as well.

Thanks.

(End of comments in Brainerd.)

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DEIS MEETINGS - 14-916 15-137

WADENA - JUNE 9, 2017 - 11:00 A.M.

(PRIVATE COMMENTS TO COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Maslowski Wellness & Research Center
17 5th Street Southwest
Wadena, Minnesota

1 I N D E X

2 SPEAKER PAGE

3 JOE RADERMATHER 3

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MR. JOE RADERMATHER: Joe Radermather, J-O-E, R-A-D-E-R-M-A-T-H-E-R.

It seems to me like some people ought to really think about what they're saying. They had to get here somehow. They had to use oil to get here. It doesn't matter if you use an electric vehicle or what you use, you still got to use oil. If you don't have the oil you're going to go hungry.

And they ought to give a little bit of thought to that before they start protesting some of these things. Pipelines are a much safer way than by running it by rail or other methods.

That gets to the point. I would say -- I'm going to say what I think. They're nuts.

B

bit (1)
3:9

E

electric (1)
3:6

G

gets (1)
3:13

H

hungry (1)
3:8

J

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3:1,1
J-O-E (1)
3:2

L

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3:9

M

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3:6
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3:12
much (1)
3:11

N

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3:14

O

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3:5,7,8
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P

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3:3
Pipelines (1)
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R

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3:1,1
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3:2
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3:12
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3:4
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S

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3:11
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3:4
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3:3
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3:5
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3:10
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3:7

T

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3:10

U

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V

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3:7

W

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3:11

DEIS MEETINGS - 14-916 15-137

HINCKLEY - JUNE 12, 2017 - 10:00 A.M.

(PRIVATE COMMENTS TO COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Grand Casino - Hinckley
777 Lady Luck Drive
Hinckley, Minnesota

I N D E X

SPEAKER	PAGE
Ramiro Herrera	3
Rick Cannata	5

MR. RAMIRO HERRERA: My name is Ramiro, R-A-M-I-R-O, last name Herrera, H-E-R-R-E-R-A.

Yes. I'm opposed to the pipeline for a few reasons. Main, they cannot guarantee they wouldn't spill. And when they spill, to clean the area, which I found out they just cover over the oil so our land is being polluted anyway.

And for jobs, I was a construction worker so I can understand work. But can a company like ENRON guarantee the people that work in there a lifetime job? It's only temporary jobs so you lose out on that.

And what was the other thing? Where is the paper I wrote it down about this?

Oh. They said -- one of them, they paid $30 million a year for taxes. But one oil spill will cause 10 times that amount. An oil spill will. So the 30 million they pay in taxes doesn't do nothing.

If a pipeline like come as they say, if a oil spill happens and goes into the waters, it don't stay there. Especially in the rivers here in Minnesota, it goes down the whole state. One oil spill can cause a big problem. And Enbridge is not going to be liable or take responsibility if it

happens 'cause they're a Canadian company.

And to build it, which I oppose, they should go through Canada. Why bring it through the great state of Minnesota? We have a lot of lakes, a lot of water, a lot of farmland that will be ruined by that.

So I oppose it. And I served in the military, protect our country. It means protecting our state, our U.S.A. Meaning, when the oil spill happens, they're killing people. So that's like I will protect my state as a ex-military member because they are committing murder. If the oil spills happen, it's going to kill people. So they commit murder. Just because they have all the money, it doesn't mean they can kill innocent kids, because they eat and drink the water. That's wrong. Very wrong.

So I hope the State of Minnesota says no to it and close the other pipeline. I didn't know it was since in the '60s, I didn't know we had a pipeline through here. I came to the U.S. in '66 so that was built before I came.

And, like I say, I'm opposed to the pipeline and hope Minnesota knows it is wrong for our state and for the people in the state of

Minnesota.

Thank you.

MR. RICK CANNATA: My name is Rick Cannata. R-I-C-K. C-A-N-N-A-T-A. I represent the Laborers Union, plus I'm the mayor of Hibbing, Minnesota.

One thing in the study that isn't accurate is it says no one in the area will have the jobs, working. It puts a lot of our members to work that live in the areas of the pipeline.

So that's one thing that needs to be changed in the draft EIS, is that the jobs will go to local people out in the union halls. Plus, it puts people to work in the restaurants and the hotel business too. And that's one of the comments that I wanted to put down.

And, otherwise, our workers, we need the pipeline and oil because we travel long distances to the jobs. So the only way we get there is by vehicle and truck.

So that's all I needed to say.

(End of private comments.)

$

$30 (1)
3:16

A

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5:8
amount (1)
3:17
area (2)
3:6;5:8
areas (1)
5:10

B

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3:24
bring (1)
4:3
build (1)
4:2
built (1)
4:22
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5:15

C

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5:12
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3:5
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4:14
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4:12
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3:9;4:1
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3:8
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4:8
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3:6

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5:18
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3:14,23;5:16
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5:12
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4:16

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4:16
EIS (1)
5:12
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3:24
End (1)
5:22
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3:10
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3:22
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4:11

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4:5
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3:4
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3:21,23
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4:4
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5:13
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4:13
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3:1,2
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3:2
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5:5
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5:14

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4:15
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4:13,15
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4:10
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4:4
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3:2
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3:25
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5:10
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5:18
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3:11
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5:5
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4:15
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4:9
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4:8
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5:9
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4:15
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5:21
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5:11

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3:25
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4:5

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4:13
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3:22
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5:7

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3:11
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3:17
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5:18
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5:20

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5:5,13
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3:21
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5:19
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5:17
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3:17

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3:18

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DEIS MEETINGS - 14-916 15-137

MCGREGOR - JUNE 12, 2017 - 6:00 P.M.

(PRIVATE COMMENTS TO COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Mille Lacs - East Lake
Community Center
36666 State Highway 65
McGregor, Minnesota

MR. JOHN TURONIE: John. Last name is T-U-R-O-N-I-E. And I live in McGregor.

So my comment would be approximately a year ago we went to a similar discussion concerning the Sandpiper line. And after both sides presented their testimony, at least initially Governor Dayton sided with building the Sandpiper line, saying it was a safer way to transport oil versus truck or rail. And I would say that we should look to that as a precedent going forward.

So I wholeheartedly support Line 3 as it shows on the map.

And I guess that's all.

(Comments concluded.)

A

ago (1)
2:4
approximately (1)
2:3

B

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2:5
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2:7

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2:3
Comments (1)
2:14
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2:4
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2:14

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2:6
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2:4

F

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2:10

G

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2:13

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2:6
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2:2
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2:9

M

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McGregor (1)
2:2

N

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2:1

O

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2:8

P

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2:8
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2:8
TURONIE (1)
2:1
T-U-R-O-N-I-E (1)
2:2

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2:8

W

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Y

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2:4

3

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2:11

DEIS MEETINGS - 14-916 15-137

MCGREGOR - JUNE 12, 2017 - 6:00 P.M.

(PRIVATE COMMENTS WITH COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

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PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Mille Lacs/East Lake Community Center
36666 State Highway 65
McGregor, Minnesota

I N D E X

SPEAKER	PAGE
Terrance Roy	3

MR. TERRANCE ROY: My name is Terrance. My last name is Roy, R-O-Y, Junior, T-E-R-R-A-N-C-E.

My message is that the Line 3 replacement project needs to change its method of decommissioning to require Enbridge to take the pipe out when they put the new one in.

I feel that the minimum standards of federal guidelines are inadequate for Minnesota and eventually that pipe is going to leak. It's going to rot away and leak, even with cathodic protection and monitoring. It may be awhile, but that pipe will rot away and what's ever inside or what it's made up of will be in the ground.

And I think the need of pipelines is strong. We just need to make it safer and better for the environment and people of Minnesota.

(Comments concluded.)

A

away (2)
3:11,13
awhile (1)
3:12

B

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3:16

C

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3:11
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3:5
Comments (1)
3:18
concluded (1)
3:18

D

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3:6

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3:6
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3:17
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3:11
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3:10

F

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3:9
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3:8

G

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3:14
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3:9

I

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J

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3:5
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3:7
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3:7

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3:17
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3:5
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3:14

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3:13

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DEIS MEETINGS - 14-916 15-137

CLOQUET - JUNE 13, 2017 - 10:00 A.M.

(PRIVATE COMMENTS WITH COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

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PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Fond du Lac Community College
2101 14th Street
Cloquet, Minnesota

I N D E X

SPEAKER	PAGE
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Mr. John Fisher-Merritt	5
Mr. Galen Sillampa	6
Mr. Arnold Collman	7
Mr. Chuck Nelson	7

MR. JEFFREY DAVEAU, SR.: My name is Jeffrey Daveau. J-E-F-F-R-E-Y, D-A-V-E-A-U. And I'm a senior. I live at 6260 Seville Road, Saginaw, Minnesota 55779?

I'm here as a resident of Minnesota and also an officer of the Duluth Building and Construction Trade and a member of the Plumbers and Steamfitters Local 11, representing 700 members just in the plumbers and steamfitters.

We work in northern Minnesota, northern Wisconsin. These projects are very financially beneficial to the men and women I represent on the installation, fabrication, and maintenance of these systems.

I want to voice my support of the proposed Line 3 pipeline replacement project in Minnesota. The need for the pipeline has easily been shown by the demand for fuel used in transportation. One example is people that came to the hearing to speak in favor and opposition drove cars and trucks that used the very fuels that are in question.

The American economy is still very dependent on fossil fuel; and until that changes and we have a real alternative to fossil fuels that can

be used by all, we will be transporting these fuels by one means or another.

The concern for spills of the pipeline is continually being addressed by Enbridge by using smart pigs checking the pipelines; new, improved materials that last longer for the pipes; and the coatings on any of the new installations.

The safest and most economic means of transporting fuels is by pipeline. The Line 3 replacement is a needed project to continue a safe means of sending oil that would not be a burden on the taxpayers, unlike updating the railroad infrastructure that we'll be asking the taxpayers to help subsidize the much needed improvements to try to keep rail traffic safe.

The pipelines very seldom run through very populated areas, unlike railcars and trucks that are also transporting the fuels. If an accident happens while a train or a truck is going through a town or near a school, the loss of life and injuries could be huge where, on the other hand, the pipe may have a leak; and with the newly-updated systems on the pipeline, it would have minimal health and danger of life as a result. The cleanup would be the burden of the pipeline company and not

the taxpayers.

I also feel that Enbridge is being a good steward for our environment by replacing the pipeline before it has leaking issues by cleaning the existing pipeline in the ground and abandoning the old pipeline in place. It is less evasive to the area that the other pipelines are currently running through.

As a homeowner in Minnesota and a representative of Plumbers and Steamfitters Local 11, I ask to please approve the much-needed project not only for work of my members, but also for the safety of the State of Minnesota.

Pipelines are the safest means of moving the projects across the country.

MR. JOHN FISHER-MERRITT: My name is John Fisher-Merritt. J-O-H-N. F-I-S-H-E-R, dash, M-E-R-R-I-T-T.

Okay. I'm a farmer in Carlton County; and I originally got into this fight, attempting to prevent the Sandpiper from crossing my organic farm. But I think the stakes are higher than my first real concern. I think that the DIS -- or is it the DEIS -- okay -- falls short of addressing the impact of the proposed Line 3 expansion and relocation.

You notice I didn't say replacement.

In terms of the social cost of carbon, a 30-year time span would result in costs around 287 billion, according to the EIS, proposed EIS. However, many pipelines operate for 60 years. Therefore, the DEIS should include climate costs that assume a 60-year or greater lifespan, more like $600 billion instead of 287.

The DEIS should not take Enbridge's word for it that the pipe would be monitored indefinitely. I think the pipe, which is a major concern of tribes and landowners, the old Line 3 pipe, would be ignored indefinitely, instead of monitored indefinitely.

And that's all I wanted to say. I could talk on more and more, but I know that time is of the essence.

MR. GALEN SILLAMPA: Galen Sillampa. G-A-L-E-N, first name. Sillampa, S as in Sam, I as in issue, L as in Larry, L as in Larry, A as in apple, M as in Mary, P as in Paul, A as in apple.

Please consider expanding the pipeline. We all need to pray to our highest power for guidance in all that we do, trusting in him to do his bidding. There is sufficient oil in this

country so that we do not have to rely so heavily on foreign imports.

MR. ARNOLD COLLMAN: Arnold Collman, C-O-L-L-M-A-N. I'm retired from the county highway department. I worked there 30 years. To me it's a no-brainer. If I worked for Enbridge -- this is if -- I would shut all the pipelines off, down completely, because that's what I'm hearing here. We don't -- people are saying we don't need pipelines. Shut them off; then see what happens. But our whole society runs on petroleum.

And I made a comment in the Pine Journal at a meeting similar to this, that if you live in the woods, ride a bicycle to town, you don't need oil.

But I got a question. How many bicycles do you see in the parking lot? I see one. The rest are cars and trucks.

Okay. Pipelines move oil pretty safely. And until something better comes along, there isn't much of a choice, is there?

That's it.

MR. CHUCK NELSON: The name is Chuck Nelson, C-H-U-C-K, N-E-L-S-O-N.

Another pipeline proposal -- it seems to

me Minnesota is crisscrossed with pipelines. No doubt some have been necessary. Today, however, we are entering a time when renewable energy -- when renewables, energy efficiency, and conservation are clearly demonstrating a wiser course.

At this time, rather than risking Minnesota land and waters to allow investors to profit from the tar in Canada, let us be prudent, deny the permit for Enbridge 3, encourage safer renewables. In ten years there will likely be pipeline removal proposals.

(Comments concluded.)

$

$600 (1)
6:8

A

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5:5
accident (1)
4:19
according (1)
6:4
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5:15
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DEIS MEETINGS - 14-916 15-137

ST. PAUL - JUNE 13, 2017 - 6:00 P.M.

(PRIVATE COMMENTS TO COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Intercontinental Hotel
11 East Kellogg Boulevard
St. Paul, Minnesota

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MR. TRISTAN MICHAEL MERINO: Tristan, T-R-I-S-T-A-N, Michael, M-I-C-H-A-E-L, M-E-R-I-N-O.

And I oppose the pipeline because I don't believe that oil creates as many jobs as they say they will. I don't think it'll be permanent jobs, rather than like if we invested all that money into clean energy, I think it would create more long-term careers rather than short-term jobs. And I wish we were moving away from oil, it's a dying industry.

MR. RON WETZELL: The name is Ron, R-O-N, Wetzell, W-E-T-Z-E-L-L.

In the closing days of the 2017 Minnesota legislative session, legislation regarding Enbridge's Line 3 proposal was inserted into the omnibus bill. The language stipulated that Enbridge should be relieved of the requirement to obtain a certificate of need from the State of Minnesota and that no function, office, or person in the state of Minnesota should be allowed to consider alternative routing of this pipeline from what Enbridge wants.

In short, Enbridge asked for relief from meeting Minnesota's regulation for this project. Whose need is being served here? Will the environment be served? Well, no.

This DEIS estimates that the line will contribute directly and indirectly 450 tons of CO2 per year into the atmosphere. It estimates that the project will add $267 billion to our climate costs in 30 years.

In addition, Enbridge plans to leave current Line 3 in the ground, which will contaminate and degrade our environment even further.

Will the Indigenous nations in the vicinity of this project be served? Well, no.

The DEIS is clear. Line 3, quote, would have a long-term detrimental effect on tribal members and tribal resources. Traditional resources are essential to the maintenance and realization of the tribal life ways. And where destruction or damage can have profound cultural consequences. Disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed project, end quote.

There is more. Chapter 11, quote, acknowledges that pipeline impacts on tribal communities are part of the larger pattern of structural racism that tribal people face in Minnesota per a 2014 Minnesota Department of Health study. The DEIS acknowledges that Line 3 would be

an additional stressor to these communities.

17 wild rice lakes would be in jeopardy from this project. There is not now available a comprehensive survey of the archaeological resources that are endangered by this project.

Will the Minnesota economy be served? Well, no. Enbridge states in its application per Chapter 5 that their existing operations would be able to operate the pipeline and that few additional workers would be hired, end quote. In addition, the Department of Commerce expects that, quote, zero construction jobs will go to Minnesota and there would be no measurable impact on the local employment per capita household income or unemployment, end quote.

With regards to the matter of alternative routing, why is it that Minnesota would allow a corporation to dictate to the state what routing the corporation consists on without being willing to entertain realistic alternatives including a no-build option? Why would the State of Minnesota allow a corporation to abandon a mess, i.e., current Line 3 that they have already made, will not clean up, and just go on to create another

mess?

A corporation is asking for permission from the state, right? In the end, this project really should have started at the beginning. The United Nations has stipulated that projects which impact on Indigenous nations should require free, prior, and informed consent. In addition, the State of Minnesota has treaty obligations to the Indigenous nations involved to protect their rights to hunt, fish, and gather on their territory. Have these conditions been met? Does the project encroach on these agreements?

In reference to the question of whose need this pipeline project satisfies, it is clear that it does not serve the interests or the needs of the environment, it does not honor our agreements to respect the rights of the Indigenous nations in the state of Minnesota impacted by this project, it does not benefit the state economy. Who this project does benefit is a corporation that wants to use the state of Minnesota as a resource for their own profit. The State of Minnesota needs to rule in favor of the environment and Indigenous nations rather than in the favor of a corporation looking for its own profit. The State of Minnesota needs to

reject this project.

MS. EMILY JARRETT HUGHES: It's Emily Jarrett Hughes. E-M-I-L-Y, J-A-R-R-E-T-T, H-U-G-H-E-S.

So I am very concerned about the environmental impact of this proposed pipeline. I'm super concerned that the company be responsible for the cleanup, not the government. Very concerned that there will be insufficient monitoring of the pipeline because when it's in rural areas and there's less watching it. And it's a violation of some treaties. And the role of the government and the evaluation board is to make sure that we have clean water for future generations and that's the first thing that should be considered.

That's it.

MR. TOM ANDERSON: My name is Tom Anderson, A-N-D-E-R-S-O-N.

And I'm very much opposed to the building of this pipeline because, one, I hate to see those dirty tar sands being brought down here. And I feel like usually these things are shortsighted in terms of they build it for very short-term interests and then they have very little ability to detect leaks in it. And then the

companies that build them make their profit and leave and we're left with the environmental damage for generations to come.

So that's sort of about what I have to say.

MR. DAVID MOSEMAN: David Moseman. D-A-V-I-D, M-O-S-E-M-A-N.

I think in addition to the basic environmental issues, there are additional issues such as the fact that fossil fuels are no longer needed as evidenced by the persistent low price of fossil fuels and gasoline. And that, thus, Enbridge and other fossil fuel companies are actually going bankrupt. They have a legacy of leaving messes behind. We need to be sure there is a bond adequate to clean up the worst case mess they leave behind.

They have already abandoned other pipelines and propose to abandon one line now. So we need good performance bonds to clean up an EXXON Valdez-type spill. And I want to be sure that this is addressed adequately.

MR. ANDY SCHEIDEL: My name is Andy Scheidel, A-N-D-Y, S-C-H-E-I-D-E-L.

I live in Duluth, Minnesota. I enjoy the outdoors immensely. I hunt, I fish, I kayak, I

spend a lot of time on all of our waterways and in the woods.

I truly believe that the safest way to transfer oil from anywhere to anywhere is with a pipeline. And I believe that our infrastructure at this current time is required to use petroleum as a product for energy. Just like everyone's home has natural gas running into it to turn on the heat and gas stations have gasoline to get peoples' cars to where they need to go for their jobs and their lives. And I believe that this pipeline is a replacement -- can you redact, or no?

Okay. So, A, not only do I believe that the pipelines are the safest way to transfer petroleum, but this is actually a replacement of a line so it's improving what is already there for many, many years to come of safer transfer of oil.

Thank you.

MS. ROWAN GLASER: Rowan Glaser, R-0-W-A-N, G-L-A-S-E-R.

I'm wondering why the Department of Commerce is in charge of this. Wouldn't this be something more appropriately put up for vote to the citizens since it's going to impact every single person in the state? Whereas, if Commerce is in

charge of it, just by their name, they're in charge of trying to build money. So it's the wrong department to be doing this. This should be more each individual or a selection of different departments, all that have a vested interest, not just one.

Thank you.

MR. JAMES GJEPKEMA: My full name is Jim, or James, Gjepkema. The last name is spelled G-J-E-P-K-E-M-A.

I'm feeling that this pipeline shouldn't be built at all. It's coming from Canada, bringing tar sands oil out across Minnesota. And the tar sands oil is devastating the area where it's being extracted. And we don't need more oil right now, we need to have more efforts put into the energy sources that are fossil fuel free. So Line 3 is one of a number of battles all over the country trying to make it clear that it's time to get off fossil fuels and stop building pipelines to carry that fossil fuel out of the oil fields, stop extracting the oil from the oil fields.

We know that for the time being we can't be completely without fossil fuels, but building more extensive infrastructure to bring

fossil fuels out isn't needed now. We need to cut back on the infrastructure for fossil fuels, not increase it.

There's a lot of environmental impact of pipelines. And one person told me that the pipeline of this size is one of the biggest impacts on the environment of any project that could be done in Minnesota. So it's very important to have a very complete environmental impact study. And I'm not the one who is examining every detail of the report, but I know other people are and I support them doing that and I think they should be very careful to be sure that they also notice all the damage that it can do to the environment with a pipeline like this.

I guess that's it.

MS. CAROLYN FELDMAN: Carolyn, C-A-R-O-L-Y-N, Feldman, F-E-L-D-M-A-N.

I'm here to oppose the Line 3 pipeline being built in northern Minnesota. Beyond the environmental risks from many spills and destruction of lands that as the pipeline is getting put in to meet the bigger issue, just addressing the issue of our oil dependence in general and the climate change that's being caused by it and the use of all that oil. And I think we need to, as we're working on

big construction projects, focus on things that are going to be sustainable to last in the future and have a healthy planet.

MR. KRISTIAN NYBERG: Okay. Kristian Nyberg, K-R-I-S-T-I-A-N, and the last name, N-Y-B-E-R-G.

I think that they should not approve the pipeline and do a more thorough EIS. The United Nations International standards for projects that impact Indigenous people as free prior to an informed consent tribal consultancy after the project is already proposed is not free, prior, and informed consent. So I think that there should be much, like, the focus of both the state, the government should be on the Indigenous population. This is stolen lands and they should listen to Indigenous communities and not allow this pipeline to come through.

That's all I got to say. Thank you.

MR. SAMUEL SPARHAWA: Samuel, S-A-M-U-E-L, S-P, as in Paul, arhawa, A-R-H-A-W-A.

I work for the pipeline. I provide a job that supports my family. It supports not only my family but extended family. I'm able to contribute to the community because of the

opportunities I have right now. Not only does the pipeline provide for me, but I believe it provides cheaper energy so that we can enjoy life.

Thank you.

MR. STEVE ZUPON: Okay. I'm just going to make it short, sweet, and simple. My name is Steve Zupon, S-T-E-V-E, Z-U-P-O-N.

And I'm in favor of the pipeline. They create good jobs and the old pipe that's in the ground needs to be replaced.

That's all I have. Thank you.

MS. ABBY LOUCKS: My name is Abby Loucks, A-B-B-Y, L-O-U-C-K-S.

I support Line 3. I'm a lover of nature and all things outdoors, but pipelines are the safest mode of transportation, plain and simple. Line 3 is going to have a great impact on our local communities, our economy. It's going to create many jobs. And I definitely support it.

MS. ASHLEY STALVIG: Ashley Stalvig. A-S-H-L-E-Y, S-T-A-L-V-I-G.

So I'm here in support of the Line 3 project. I work for a pipeline contracting company. And I just want it to be on record that our company makes an effort to financially and charitably

support every community that we work in. And I think the energy industry gets a bad rap a lot of the times, but we're just real people, too. We're working in places where we want to support the community, we want to make a livelihood. We want to impact in a good way the people and the places there, do it in a safe way and preserve the environment when we're there.

The last thing that I would like to say is I'd like to see the process followed in the timelines that are laid out according to how the process is supposed to run.

Thank you.

MR. RIFF YEAGER: Okay. My name is Riff, R-I-F-F, last name is Yeager, Y-E-A-G-E-R.

And here's my comment. I think in all of the discussion here we need to be aware of secondary consequences. My example is this: If for some reason the Line 3 replacement isn't built, there are two consequences that in my mind are negative. One is there's a likelihood that that oil may be moved by rail instead of by pipeline and rail is less safe than pipeline. And two, as we learned in 2014, if oil needs to be moved by rail, that may get in the way of moving grain by rail as it was in

2014, as I said.

And according to, as I understand it, from the Minnesota Department of Agriculture, farmers lost about $100 million in three months in 2014 'cause they couldn't move their freight because those same trains were being used to move oil. So it seems to me common sense would say let's not move oil by rail, let's move it by an upgraded Line 3 replacement so that the trains are free to move the grain to market.

Thank you.

MS. ELEANOR DVORAK: My name is Eleanor, E-L-E-A-N-0-R, Dvorak, D-V-O-R-A-K.

And I strongly oppose the proposed Enbridge pipeline project.

So I am here to talk about the proposed abandonment of the existing Line 3. The problems associated with leaving Line 3 in the ground will not disappear over time and may in fact worsen. While Enbridge says they will monitor indefinitely, Enbridge might not be around in 100 more years. But, if abandoned, the pipeline and its continuing impact on our lakes, rivers, agricultural and residential lands will be there.

In Section 8.3.1.1.1, the DEIS states

that Enbridge has indicated that it would develop a contaminated sites management plan to identify and mitigate contaminated soils and waters found during the abandonment of Line 3. We want to see that plan.

In Section 8.3.1.2, the risks to critical habitat as a result of the aging pipeline creating typological connections are stated. While Enbridge proposes segmentation to mitigate the risk, they also admit that the potential need for more segmentation requires further study. And the DEIS states that state, federal, and tribal agencies may require more segmentation. These studies need to be done now and be included in the EIS.

Section 8.3.1.4 addresses a risk of buoyancy and resulting leaks into water, and admits that Enbridge's plan does not address this issue in detail. It needs to be researched and included in the EIS.

Table 8.3-1 in Appendix B states that the abandonment of existing Line 3 could negatively affect communities with potential environmental justice impacts. Quote, Due to ongoing stress or anxiety related to the presence of the pipeline and ongoing risks related to water flow, soil and water

contamination, end quote. I see no remedies for this proposed in the DEIS.

The decision on Enbridge's request to abandon Line 3 would set a precedent. Yet there is no mention of the potential abandonment of the three other aging pipelines in Enbridge's existing mainline corridor across Minnesota. Those are lines 1, 2, and 4, which Enbridge might then next attempt to abandon. Nor is there any discussion of the abandonment of the new Line 3 in 50 to 60 years. We don't know whether Enbridge will still be around in 50, 60, or 100 years, and if they're not, we would put a costly burden on future generations, risking their health and right to clean water and land.

Line 3 abandonment alone can bring huge costs to Minnesota. But there are many other aspects of the proposed replacement pipeline that I have not addressed, including the fact that Enbridge's new Line 3 would breach the 1837 and 1855 Native American treaties that were upheld in 1999 by the Supreme Court and affirmed in 2015 and the fact that spills will occur and will likely do permanent damage to pristine lakes and lands.

Finally, I think we need to take a hard look at the fact that the demand for oil is

declining, posing the question of whether building new, increased capacity infrastructure for a declining energy source at a very high risk to our environment makes sense for Minnesota.

Please deny the certificate of need.

MS. MEERIM MILAND: My full name is Meerim Miland. It is spelled M-E-E-R-I-M, and Miland, M-I-L-A-N-D.

I do support proceeding with the building of the pipeline. I love earth and nature and I'm all about, you know, keeping the planet basically for the generations. And I have my child and I would never work in the industry if i knew that it's, you know, doing something horrible to our future. But working for it, I do believe in the quality of what we do and it's the safest way to transport fuel and fuel for our civilization and for our life. It's important.

There is -- if there was another way to do it, we would have gone that way. But, you know, those who protest, they drive cars, they, you know, have boats, wear clothing and wear shoes and use phones. All of it takes fuel and oil and the industry and there's just no other better way to do it as of right now. And I think we have to do it

the safest way possible and that is why I support it.

MR. BRYCE PURCELL: My name is Bryce Purcell. B-R-Y-C-E, P-U-R-C-E-L-L.

Well, I think that solar and wind energy are both great things, but they can't provide power around the clock. And for that we need something else. And along those lines, natural gas is significantly better than coal, and pipelines are also significantly more reliable and safe than moving natural gas by rail or truck.

That's about it.

MS. GABRIELLE ELISABETH PILLMANN: My name is Gabrielle Elizabeth Pillmann. G-A-B-R-I-E-L-L-E, E-L-I-S-A-B-E-T-H, P-I-L-L-M-A-N-N.

As a mother and a citizen I am opposed to any kind of pipelines through the state of Minnesota.

So then I would just like to say that due to our environment, which is maybe -- to me, the preservation of our natural resources is more important than oil pipelines. And we can get energy from solar and wind.

That's it.

MR. ROBERT HARLAN HULL: My name is Robert Harlan Hull, H-U-L-L.

The world has 78 percent water. We're 78 percent water. 2.5 volts of electricity changes water into hydrogen-oxygen. The technology has been here since 1938 where the first hydrogen fuel cell came about. I've been around the world and I've seen hydrogen cars, hydrogen engines, combustible hydrogen engines, as well as fuel cell electric. It's been blocked from the United States. The UK has a hydrogen solar tandem membrane that they can use on their roof. It takes the moisture out of the air for the water and it changes into hydrogen through solar electricity. They can burn their furnaces and their cars and their stoves off of hydrogen.

When we burn hydrogen we force oxygen into it, creating drinkable water. NASA has been using this technology since 1960. Every rocket ship that goes up burns hydrogen that seeds the air to makes it rain. NASA told me that Americans are addicted to oil and that we're too careless to be able to use hydrogen, but they use it in the hospitals in the UK.

In Europe it's child's play for

children to change water into hydrogen and use it for making balloons and other experiments. Where our children don't even know the quality of the water that they drink.

The technology has been here. It's just been hidden and blocked by the oil companies, and in Detroit, the car companies, and our corporate government.

So we can get rid of this oil. We have in reserve over a 10-year supply for the United States. We don't need this oil. If we're going to ship oil, we should have a quality control, no crude oil.

The Gulf, with BP, that oil leak they had down there, I believe it was on purpose. They did that in Columbia as well for 10 longer months than what we had our oil leak.

Oil floats on water and the crude drops to the bottom and all they had to do was suck up the oil. It was less expensive for them to separate the oil in the water from the crude than it would be for them to refine it and have to clean up the ocean afterwards. And our president approved of that. Obama.

Okay.

MS. JACQUELINE RODKEWICH: Jacqueline, J-A-C-Q-U-E-L-I-N-E, Rodkewich, R-0-D-K-E-W-I-C-H.

So before I begin my comments on the draft of the environmental impact statement I need to share my experience in getting the draft of the environmental impact statement.

So in order to make a comment I had to call the Minnesota Department of Commerce. I called the Minnesota Department of Commerce, I was transferred four times before I was disconnected. Then I decided, because it was important to me, I would call the Public Utilities Commission. They gave me all of the information, the draft, and the phone number and the email for the Minnesota Department of Commerce on the EIS.

After I waited for a little bit and I sat with that and I thought, you know, I'm really not comfortable seeing other constituents going through what I did, so I called the Minnesota Department of Commerce again to make sure the situation improved. It had not, so I called my state representative and then the Commissioners' office. After speaking to the Commissioners' office, I had left a message, and four days later I still hadn't heard back. I left another message

which I heard back from the next day. So this whole process took three weeks at this point.

I want to contrast that with the situation where the Minnesota Department of Agriculture was taking public comment on a groundwater issue. I called them, they called me back within an hour and a half, I had all the information I needed to make a public comment.

I'd like to know, what is the plan of action to improve communication and access for the constituents of Minnesota regarding this issue, the pipeline?

Moving on to the DEIS. As a whole, I found the DEIS unprofessional and lacking. It reads more like a soft sell for the pipeline than an environmental impact statement. If we need to expedite the process due to the emergent need of the pipeline being compromised, needing to be replaced, then I suggest that we shut down the pipeline until a viable route or alternative energy corridor can be found. I question the oversight or lack thereof resulting in this emergent situation.

I feel Line 3, replacing Line 3 is incongruent with item 3, subdivision 2 of 116D.02, and that's the declaration of state environmental

policy and it reads as follows: Discourage ecologically unsound aspects of population, economic, and technological growth and develop and implement a policy such that such growth only occurs in an environmentally acceptable manner.

I want to see a no pipeline action in the draft of the environmental impact study. I also would like to ask how many Enbridge pipelines have never failed. And by failed I mean pinhole leaks, weeping, unreported spills and reported spills.

There are 139 counties nationwide where the bee population is at serious risk. 17 counties of these counties are in Minnesota. There is some overlap between the route and these counties. And I'm quoting an article from BlueStem Prairie, which is quoting Aaron Sidder, who is an ecologist and writer.

I know that Enbridge has proposed to use herbicides which may or may not contain neonicitonoids which will further jeopardize our bees. So I'm concerned with the herbicides. I'm concerned if the herbicides contain neonicitonoids. This will further jeopardize our bee population or pollinator population.

Again, I'm citing the law, the

statute, 116D.02, same subdivision, but the item is number 7 this time. In parentheses, the state may, end parentheses, define, designate, and protect environmentally sensitive areas.

In summary, I believe that the EIS needs to include a no pipeline option and it provides only superficial information regarding environmental impact. If need be, I hope Enbridge Line 3 will be shut down until all options have been thoroughly researched in order to prevent a cursory decision or rush job which would be deleterious for Minnesota.

MS. MAUREEN HACKETT: My name is Maureen Hackett, M-A-U-R-E-E-N, H-A-C-K-E-T-T. I do have an M.D., I don't know if you want that.

Okay. I'm against any expansion of Line 3. I think if they have to do something, they should choose the SA-04 option. So it's S-A-04. I truly believe that even though it does go through crop land, there isn't going to be much more motivation to stop a spill faster. But, frankly, I don't think we need it at all and I don't think the state of Minnesota is going to benefit at all if it's going to actually bear the risk and the costs to the water and the forests where they want to put

the expansion.

I know firsthand there's no cleanup of oil. There is none. I went down to the Gulf oil spill in 2010 and I witnessed large cranes carrying oil boom. And I asked where is that oil boom going. And it was going by railway car up to the Midwest to be buried in the ground. There is no cleanup of oil. Once it's taken out of the ground, the only option to dispose of it is to burn it, and that's the best option. And that was the best option during the Gulf oil spill. Putting it in water, bury, there's nothing you can do once it's spilled. Oil doesn't want to be contained. Naturally, oil is not to be contained, it needs to stay in the ground.

I also know that the oil companies do not have the interests of the people or the land once the land is spoiled by an oil spill. I witnessed what happened at the Gulf oil spill, which was the media was kept out, the land was fenced in with chain link fences, the people were given water in the local areas. But mostly the company spent their time hiding the quantity and the destruction from the media and from the people and they hid it by using dispersants. Dispersants, like the effluent, E-F-F-L-U-E-N-T, in the oil of the

pipeline are made of a formula that is secret. Even during the Gulf oil spill, even the president of the United States wasn't going to be able to find out what was exactly in the dispersants' corexit, C-O-R-E-X-I-T. If you got the hazard, the data hazard sheet, it didn't tell you what was in it. It did tell you don't let it touch your skin or eyes or anything or don't breathe it. But they were dropping it by airplanes over marinas and everything to hide the oil spill.

So the goal is to hide and to continue production. And right now the goal is to just keep the production of the Bakken oil out -- sorry. Another corridor, another 10 years. I mean, that's the whole goal. This is not about anything other than keeping the production going.

I am absolutely against the expansion. I visited the place where they are going to expand and it is in a pristine watershed in northern Minnesota in forested streams and rivers that all eventually pour into the Mississippi watershed and feed the wild rice beds.

Wild rice is wild food and we don't have hardly any pristine wild food left. The fish are poisoned by mercury. You know, the amount of

game animals, they're getting disease too. But here we have wild rice. It has six to seven grams of protein in a quarter cup.

The Native American people absolutely need the wild rice. We are the largest place in the world to produce this. This is a very unusual product. And the final thing is you cannot eat money. You cannot drink oil. You need water. Try to live a couple days without water. All these jobs people are talking about, they're not going to mean anything if the land is spoiled. They're not going to want to live there. They won't be able to drink the water.

The BP, Beyond Petroleum, whatever they call it, they either lied to the president of the United States or they were inept. But they told him they couldn't shut down the Gulf oil spill. They had the whole country believing they couldn't close the hole. They closed the hole and I know how they did it and it was doable from day one. They just wanted to keep it open so they could have another corridor, another 10 years of profit from a gusher that they had found.

And their goal was stated on BBC news in late April after the spill, but before the oil

rig collapsed. Their goal was to spray dispersants and drill a relief well. The relief well was going to help them keep drilling in that reservoir without having to pass another environmental review. They lied to the president, they lied to the country.

This is what we're dealing with with pipeline companies and oil companies. We are dealing with deception and ineptitude. They don't care about our climate, our water. I'm sure if you talk to them behind closed doors you'll hear some pretty -- anyway. You can strike that.

Okay. So the bottom line is, Governor Dayton, please, this is the time that you do have the power. And once you sign over that permit, you don't have the power anymore, and neither will any other governor after you. And the people won't have power either. When you get a spill you will get chain linked fences and bottled water and you will have to walk into the area with an I.D. and they will use military to keep you out. 'Cause that's what they did in the Gulf oil spill and I saw it.

MS. LAURA DESHANE: My name is Laura, L-A-U-R-A, Deshane, D-E-S-H-A-N-E. I'm a Minnesota resident and I want to speak today in opposition of this pipeline.

I've been to a number of hearings and meetings over the past few months both on the issue of pipelines and more generally on environmentally-related issues.

And as an overarching note, I've been appalled by the consideration given to the environment. The air we breathe and water we drink has an -- an understandably difficult to assess -- sorry, is understandably difficult to assess on a monetary level. It is a fundamental resource and as such it is important. It is important to us and yet we are quick to put it at risk to satisfy the wants of an industry.

We've heard repeatedly that the existing Line 3 pipeline is too dangerous to continue using and I absolutely trust that assessment. The existing Line 3 clearly needs to be shut down, cleaned up, and the land restored. What troubles me is what happens in 30 years? What will become of the now proposed line?

If we are not taking out the existing Line 3 and restoring the land now, how can we have any assurance that the new Line 3 will be cleaned up once it is also obsolete. Do we all gather in a room and be told yet again that it just isn't

possible to return to a life of reduced fossil fuel consumption?

So with that in mind, my question becomes what do we need to do to make these pipelines unnecessary? What do I need to sacrifice? Can all of us make this choice possible? I'm hoping that there would be a study on this somewhere to tell us how we can live such that we would not need these pipelines at all.

I am very concerned about the information provided on the accidental crude oil release handout. First, it states clearly that pipelines have much, much larger spills than any other method of transportation. But what I'm not seeing on the sheet is what each gallon of oil will do to a lake or to land once it is spilled. How many gallons need to be spilled in order to make a waterway poison to the wildlife and people who drink from it?

A few people speaking in support of the pipeline warrant that other methods of transportation would bring this oil close to city centers and as such that should convince me to support a new pipeline. Because it would force the oil to travel closer to other people further away

from me. Why should population size really be of any importance? If it is dangerous to us here in the city, surely it is also dangerous to those in smaller communities. I cannot value my safety over theirs.

It is not just -- it is not just or prudent to keep building these pipelines. It is a mistake to go forward with Line 3. We must shut down the old Line 3 and then, finally, we must work towards other alternatives to fossil fuels at every opportunity.

(Comments concluded.)

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DEIS MEETINGS - 14-916 15-137

ST. PAUL - JUNE 13, 2017 - 6:00 P.M.

(PRIVATE COMMENTS WITH COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Intercontinental Hotel
11 East Kellogg Boulevard
St. Paul, Minnesota

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MR. CHUCK NELSON: The name is Chuck Nelson, C-H-U-C-K, N-E-L-S-O-N. Another pipeline proposal -- it seems to me Minnesota is crisscrossed with pipelines. No doubt some have been necessary.

Today, however, we are entering a time when renewable energy -- when renewables, energy efficiency, and conservation are clearly demonstrating a wiser course.

At this time, rather than risking Minnesota land and waters to allow investors to profit from the tar in Canada, let us be prudent, deny the permit for Enbridge 3, encourage safer renewables. In ten years there will likely be pipeline removal proposals.

MS. AIMEE MERINO: My first name is Aimee, A-I-M-E-E. Last name is Merino, M-E-R-I-N-O. I'm from Woodbury, Minnesota, and I'm here today because I oppose the pipeline.

For one thing I think that in this time where climate change is a major issue facing the planet, that it's not in anyone's best interests to continue to promote fossil fuels.

But also, I'm very concerned about the effect that this could have on our drinking waters and our creational waters because of persistent

problems with leaks or other pipelines across the country.

And then additionally, while I appreciate the fact that building pipelines does create some temporary work, pipelines typically do not create a lot of long-term jobs, whereas transitioning our energy into green energy doesn't just make short-term jobs, but makes full-time careers, and I think it's ultimately better for our economy.

MR. JOHN LANDRETTI: My name is John Landretti, J-O-H-N, L-A-N-D-R-E-T-T-I. I'm a Roseville resident. I'm here to voice my strong opposition to the alternate pipeline.

I believe that, as a business, Enbridge owes it to the common good to clear out the old pipeline 3, practice good stewardship, and not simply abandon the line, which I consider irresponsible and unethical, and against the common good and public legacy.

I am deeply concerned about the abandonment of pipeline 3, because of the pollution risks to the environment.

Regarding the new proposed alternate line, I believe that Enbridge's reputation and track record does not justify their claims that the line

is safe.

I cite the 1991 massive oil spill that dumped 41 tanker cars worth of fuel and oil into the river and numerous other locations.

In addition, I support the Native American position to honor treaty rights and their wishes that these pipelines not cross vulnerable wetlands in their area.

Again, I've come here at considerable effort because of the strength of my feelings based on what I've read and what I've heard from other people. Thank you for this opportunity.

MS. REGINA BIRCHEM: I read the Executive Summary and select parts of the DEIS for Enbridge's Line 3 proposal.

I am absolutely opposed to a new Line 3. I'm opposed to abandoning and even continuing to use the present Line 3.

The DEIS lists and sometimes provides data on many important issues, such as: Impact on wildlife, water quality, soil -- water quality, soil and air, social and environmental justice, treaty rights, climate change.

In spite of identifying these critical issues, the overall bias of the statement is to

accept another pipeline as inevitable, even though it impinges negatively, economically and socially, on the people of Minnesota and beyond.

Challenges and perils of rapidly changing climate and political situations -- never faced previously by the people of Minnesota -- are speedily coming upon us with both certainty and unpredictability.

My four points: We really don't need any more oil. Processing Canadian heavy tar sands crude oil is not currently profitable.

Number 2, based on unclear and conflicting data in Chapter 5, estimates of life-cycle greenhouse gas emissions for heavy crude transport by Line 3 over the span of 30 years is shockingly high.

Just for greenhouse gas emissions, $287 billion.

The present Line 3 has been in place about 50 years. So if Enbridge is still viable, it is likely that a projected new line would be used longer than 30 years.

Number 3, if Enbridge cannot or chooses not to remove the old Line 3 pipeline safely, then why install a larger Line 3 carrying even more

hazardous heavy crude.

Enbridge claims it will monitor the abandoned Line 3 indefinitely. How long will Enbridge exist? The cost of removal of Line 3 is estimated at $1.28 billion. The cost of abandoning it is $85 million.

What about all the old pipelines? Who will pay for their removal and mitigation of damage.

The fourth point, the applicant's preferred route will lead to a permanent destruction and fragmentation of forested and wetland habitats in northern Minnesota, an area already challenged markedly by climate change.

This is stated clearly as permanent damage to the forest in the executive summary and is stated clearly in the EIS.

In closing, a week ago I stood, as many of you have, on the North Shore of Lake Superior in awe of the vastness and beauty of the world's largest body of fresh water.

Minnesotans share an enormous responsibility to protect water and our priceless resources. We can no longer employ destructive processes that can not be reversed for short term monetary gain by any company or individual.

University of Minnesota scientists throughout the state, including in Ely, Minnesota, are trying to assess the unexpected effects of climate change, such as, for example, high horizontal winds that can remove a whole forest in a short time. The forests do not recover.

MR. ROWAN GLASER: My name is Rowan Glaser, R-O-W-A-N, G-L-A-S-E-R.

I'm an artist and author, and I would like to say that I would appreciate an environmental impact study on abandoning the other line, the old line. We don't need anything else besides that. It would be nice to find out how they're planning to dispose of that line.

Last year the Sandpiper pipeline was rejected because it was hazardous to the citizens of St. Paul, Minneapolis.

This new Line 3 that's proposed is no less hazardous, especially to the people that live up north.

Besides, it will cross both the Mississippi and the St. Croix Rivers, and I know the Mississippi River is the drinking source for both St. Paul and Minneapolis.

MS. JOAN HUGHES: Joan Hughes. This is

my concern: We have alternatives for energy that are cost effective now. Examples would be solar and wind, and they're also safe for the environment.

If you poll people, they're all for renewable energy. What we don't have an alternative for is our lands, our water, our air, and the effect of leaking pipes, and also the use of them that leads to climate change.

The use of fossil fuels, and especially the tar sands, because the amount puts more CO2 into the atmosphere than other forms.

So I'm very worried about our loss of precious resources in central Minnesota having pipelines going through. It's beautiful territory.

And I spend a lot of time outside.

I think we as Minnesotans could do better, and I think there should be a lot more thorough investigation from an Environmental Impact Statement.

MR. BRIAN QUINLAN: Enbridge provides very good employment in the community and enables their employees to -- I just want to say that Enbridge provides -- Enbridge is a good employer to the community. They stress safety, integrity, and respect, and I'm very proud to work for them.

MS. LAURA DEAN: Laura Dean, and I am a public health student at the U of M in nutrition, and I'm concerned about the impacts, the environmental impacts of this pipeline. And I believe that the statement is written biased toward Enbridge. I would like to see it geared more towards the environment. I think it directly impacts indigenous people in the land, and I think we need to look at that more seriously.

And the EIS actually gave several clauses for Enbridge in addressing potential spills but they seem to also leave an option for them to not address it all.

And I don't believe that the same considerations are given on an environmental stance in terms of the impact on the wetlands and wetland restoration, and I think that a spill is too risky.

It's one-fifth of our water, if one were to get into Lake Superior, and I think we need to protect our long-range vision of the environment and our health as a state, the people in the state, and the people on the land.

I'll guess that's all I'll say -- I also believe this means -- I'll just read this: Table 12, the spill sites' comparison, is measuring the

risk for trained spills, based on data from 2007 to 2017.

The EIS should more accurately measure the comparative risk of these three methods of oil transportation by considering improvements in rail technology, safety, and regulation that will inevitably proceed the lifetime of a new pipeline that assumes risk of train transportation is likely to change.

In addition, spill data for pipelines should include data specific to the applicant's history.

Chapter 2, section 8.33, in regards to spill response training. The DEIS states that Enbridge has indicated that their training programs exceed the standard.

I recommend that the statement be stricken from the EIS as it is partial to the applicant, or that if that statement remains, more details in reference to examples be given.

In addition, this section of the EIS should look at previous spills in the applicant's pipelines and the correlating response statistics, and that includes -- that would include a spill in 1991, in Minnesota, which is the largest inland

spill, as well as a spill in Kalamazoo, Michigan.

Another concern was the time period in which these permits go forward. I believe it's 30 years. They look at 30 years, and many of the pipeline catastrophes that happen are just beyond 30 years.

So I believe the reference range should be a lot wider and look at more time.

I think more examples need -- more specifics should be included in the EIS about the soil restoration of the wetlands and in terms of the top soil management, and the impact of the wetlands.

And I believe that the process should more directly involve the native communities on the lands that do not just mention them and check the box, but actually respect that this breaks the treaty on two -- at least two native reservations in northern Minnesota.

MR. DWIGHT ENGEN: Dwight Engen, Chaska, Minnesota.

I'm in favor of the proposed Line 3 pipeline. One, I think it's for the economy.

I believe that we need to move more towards energy independence, and I think having safe, well-maintained pipelines is the answer for

that future independence.

Also, these are great construction jobs. I work in the construction industry and our people that I work with make a lifetime off of building pipelines and maintaining them so they're the safest and the most reliable form of energy, as far as oil and natural gas.

So in a nutshell, I would urge that the PUC and the decision-makers move forward on the project and don't waste too much time, as I think time is of the essence.

Minnesota is blessed to have access to refineries such as the Enbridge refinery but also we have the Koch refinery plant, which I think is called something else. It's called -- the Koch refining plant, and these are really good jobs for Minnesotans. And I believe having the refineries here gives us better control of our future for energy.

MR. JOHN SQUIRES: My name is John Squires, and I'm here to oppose the Line 3 pipeline specifically because it endangers water and indigenous sovereign treaty rights.

I think that one of my big suggestions is that there be an option to say no to the new

pipeline and to remove the old one.

It seems like the only option so far is to either leave the old one in the ground and keep using it or build a new one.

It seems like there should be an option to stop the old nasty one and not replace it at all.

Because tar sands is so toxic, and we're living in a dying planet and adding more tar sands in a pipeline is just going to make it worse. That's all.

MS. ALYSSA WHITING: Alyssa Whiting.

Why move forward with outdated technology when we have sustainable sources to advantage instead? Why move forward with a project that only benefits a small group of people at great cost to the rest of us and the environment.

Line 3 represents another major environmental impact before it's even begun. Tar sands' landscapes are completely irrecoverable. Minnesota waterways must be protected.

We now have renewable profitable sources of energy. We should not use this dirty, outdated source.

MS. MARGARET KIELTY: My name is Margaret Kielty.

I have several comments, I guess. One is for my husband, who asked me to ask about this. Does the management have a quality assurance plan to maintain corrosion protection for preventing leakage.

Electric DC current, are they going to implement it? Are they going to guarantee to monitor it? He's worried about the safety of the pipeline.

My comment is I'm not -- I have two comments. Enbridge is a Canadian company. Why don't they run it across Canada and out that way? Why run it through Minnesota? I think they should just run it through Canada, if they want to do that.

The other thing is we have some farmland up in that area. It's beautiful. We put it in all conservation and natural wildflowers for 20 years, and it would be devastating if it damaged the area. The area is so beautiful.

They have no right to do that. Our farm has been in the family for a hundred years. I want to make sure it's not trashed. So I feel very strongly not to do it. And if they have to do it, do it through Canada.

My husband wants to make sure they're

totally up with all their safety precautions, not have any leaks.

MS. EMILY MOORE: Emily Moore. I live in Minneapolis.

What I want to say is that I tried to study the documents that the hearing is about, and I especially focused on the Certificate of Need information. And I may not have read everything.

This is what I want the Public Utilities Commission to know. I may not have read everything, but my understanding is the Certificate of Need -- do you need the project? Not just which route it's going to take.

Do you need a pipeline, to begin with? And that is where the Public Utilities Commission should begin.

Now, I'm feeling that the people that established the Public Utilities Commission had in mind that their, the Commission would consider environmental and economic issues, having to do with utilities.

And in this day and age, when we know -- when we as a society know if we pay attention to the science, we know that we cannot continue to use oil, and especially not the oil that eventually would

come to this pipe, to Line 3 from Canada.

We cannot use that resource and still have a climate that people can live in, let alone -- we don't know who would be able to -- what species will even be able to survive climate change if all of the tar sands are just willy nilly used without being responsible. And to build a pipeline that can last for 50 years, with the company that built it expecting to send oil through it, is just -- I just cannot wrap my mind around how the Public Utilities Commission could faithfully and responsibly execute their duty and still not consider, not even have that part of the Certificate of Need process.

Do we need this at all? You can tell already that my opinion is that we do not need it. Because we know that wind and solar are already dropping so far in price that the oil that's coming through the pipeline will not be able to compete with electricity and wind driven modes of transportation.

And I should also say that I'm sure the Commission is aware of this. I'm aware of how much improvement there has been in battery storage, and that is going to wipe out the argument that, "Oh, we need this other fuel because the sun doesn't always

shine and the wind doesn't always blow."

The storage is amazing, potential for batteries is amazing, and therefore, that makes a potential stranded asset of this big pipeline with nowhere, nothing to carry.

And that doesn't even touch -- nothing that I've said has even touched the damages of oil, to begin with, being transported at either place.

I want us to put our money -- I want the world to be investing in the new technology of batteries, wind, solar, and all of the technologies that are available to us in energy efficiency.

We have not begun to tap into the efficiency that all of our buildings and our homes could experience.

So I implore the Commission to be the responsible service that they have pledged to be and consider that the Certificate of Need also extends to whether we need the oil at all.

MR. BRADLEY BLACKETT: My name is Bradley Blackett, and I'm from Apple Valley, Minnesota. I'm here today as a guardian of future generations.

We are here to ensure that you perform your public duty to ensure ecologically healthy land, water, and air for the benefit of future

generations.

We protect what we deem most important -- our children, your children, and our grandchildren. The critical responsibility of government is to protect the public trust, because we have good government, bad government, efficient government.

We have governments of different philosophies, but the U.S. is a democratic society, and we pride ourselves on that, but too often we think of our government as three branches: The executive, the judicial, and the elected legislative branch.

But the most important branch that barely gets attention is the fourth branch, which is the people. And so I want to make sure that we live up to the true democracy and that we live up to that responsibility.

I'm going to return to the script. Maybe the argument isn't whether government should be big or small, but whether they can fulfill this duty, this duty of protecting the commons.

When the economy and the corporate profits become more of a focus than the health of the environment, we become concerned.

It isn't the basis -- isn't it the basis

of a healthy economy, a healthy planet with healthy people? And when the air and the waters become more and more polluted and we destroy our lands, what is our future? What legacy are we leaving to our children.

We the people need you to be a guardian, a public trustee, a morale force, hold sacred our public health and well-being. Your role is to protect the common spaces so we can breathe clean air and drink clean water.

Proposals for pipelines are evaluated on the alleged environmental model. The public has to pay for the gambles of business when they pollute the environment.

I'd like to share a concept called the precautionary principle, which is used widely across Europe and other developed countries.

When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.

That is, in the face of harm and scientific uncertainty, we must take action to prevent harm. The precautionary principle tells us

to act ethically and protect future generations; not wait until the evidence is complete.

The question in the case of Line 3 is, do we know enough to act? The answer is, of course, yes. True democratic engagement requires the free prior informed consent of a community affected by a decision.

The community should have the right to say yes or no to things that affect their future. And we say no to this pipeline.

So as you consider the proposal before you, make it your responsibility to take into account how it affects everything -- excuse me, every being's right to clean air, water, healthy land, no matter what our race, ethnicity, or social economic status.

On behalf of all future generations, we thank you for standing on the side of love or justice.

MS. LAURA TRIPLETT: My name is Laura Triplett. I'm a professor of geology at Gustavus Adolphus College.

I am concerned that this EIS -- this DEIS does not take into full account the impacts of increased green earth gas emissions.

Specifically, it doesn't think broadly enough about economic costs of warming. Those costs need to be assessed both in Minnesota, but more broadly, at the national and planetary scale, and at a length of time beyond 30 years.

I understand it's difficult to partition warming into one pipeline versus other missions sources -- emission sources.

The DEIS acknowledges an increase in CO2 emissions, but doesn't take the next logical step to assess the true cost to our state and country.

As a geologist, I study climate change all the time, and have stepped beyond my comfort zone as a scientist to begin advocating for what I think is a more rational and sustainable policy future.

Building this pipeline is not a more rational and sustainable policy future for Minnesota.

MR. MIKE BUBALO: Mike Bubalo. I believe the pipeline will create many good paying local jobs, will put a lot of Minnesotans to work.

The laborers and the 49ers have state of the art training centers that are training hundreds and hundreds of hours each year on pipeline safety

and pipeline work.

MR. STEVE LELCHUK: My first name is Steve, S-T-E-V-E, Lelchuk, L-E-L-C-H-U-K.

So I want to address chapter 10, section 5, which is Spill Prevention Preparedness and Response, and my question is, to what extent will this pipeline be vulnerable to cyber attack, which could cause a catastrophic accident.

Number one, pipelines are industrial scale systems run in large part by sophisticated hardware and software technology. I specifically have in mind in this case, something called supervisory control and data acquisition or SCADA.

According to Wikipedia, and I quote, "Supervisory control and data acquisition is a controlled system architecture that uses computers, network data communications, and graphical user interfaces for high level process supervisory management, but uses other peripheral devices, such as programmable logic controllers and discrete" -- and this is all caps -- "PID controllers to interface to the process plant or machinery.

"Stuxnet" -- that's spelled S-T-U-X-N-E-T -- "the cyber attack on Iran's nuclear enrichment systems, that came to the world's attention in 2010,

was directed exactly against their SCADA system.

"Many of the components of that malware have since escaped into the wilds of the Internet, available to any reasonable savvy computer user."

And in fact according to a 2016 article on the website, security intelligence, and I quote, "Attacks targeting industrial control systems increased over 110 percent in 2016, over last year's numbers as of November 30th.

"Furthermore, in March of 2017, on the website, cbr online, Eugene Kaspersky, the founder of Kaspersky Lab, noted that of 13,000 industrial control systems connected to the Internet, 90 percent have known vulnerabilities and 30 percent of these are in the U.S."

Now, in the Draft EIS, section 10.5.2.3, there is a reference to, "The existing Enbridge supervisory control and data acquisition system, which can automatically initiate pump station shutdowns to maintain safe operating pressures."

So we know Enbridge is using these industrial control systems and we know they are vulnerable to attack.

It seems to me that the Draft EIS needs to directly address this serious potential threat to

the pipeline's integrity. No doubt Enbridge is working hard to plug any holes in its cyber security, as are we all.

However, we all know this is somewhat of an ongoing slug fest between cyber good guys and cyber bad guys.

I find myself quoting Dirty Harry, "Do you feel lucky."

MR. DAN BRADY: Dan Brady. The Enbridge Line 3 replacement, it's not about adding a new line, it's about replacing an old line that is substandard.

We're not going to be doing anything besides replacing a line that is at a greater risk to the general public and to the environment with improved technology and improved design.

In the meantime, that will add members' jobs. And I represent over 10,000 members.

We also do things from all sources of energy, whether it be solar, wind, natural gas. We've got members that do all of these different things.

We're all for alternative ways to get things done. Unfortunately, the way it sits now, petroleum is very much a part of our lives and will

continue to be because of the products that we use.

Everybody here used petroleum in some way or form to get here, whether it be on a car, a bike, whatever the case, they still used some type of petroleum -- whether it was the asphalt that they got here on, that they drove on, the pens that they're using to take notes, the cell phones that they're using to do research on what everybody else was saying.

I am for this pipeline because it's a better way to get oil from one spot to another, the safest way to get oil from one spot to another.

And the original Line 3 needs to be replaced. For too long this nation has always thrown Band-Aids over things that needed a complete repair. We see it all the time just in Minnesota's infrastructure, whether it be roads, bridges, highways, streets, throw a Band-Aid on it.

Just fill the pothole up with some hot tar and call it good, instead of addressing the real problem behind it. It sits there and after a little while that hot tar comes out and you got a bigger pothole now.

Why not create new versus keep throwing Band-Aids on things? It never seems to get done.

MR. JOEL SMITH: Joel Smith. I'm with the Laborers International Union of North America or just Laborers Union.

I'm for the pipeline. It brings better technology, newer technology, makes it safer than the existing line, safer for the environment. It creates well-needed jobs in the northern part of the state.

All the mines have closed so there's a lot of welding and good paying jobs it would create for that area. It will make it safer to transport oil.

MS. JESSICA MONETTE: Jessica Monette. I am the proud daughter and sister of the people of the Turtle Mountain Band of Chippewa, an Anishinaabe from North Dakota, who had the privilege to assist the other courageous mothers and sisters that lobbied the cause to make our tribe the first sovereign Indian nation to legally divest as a tribal entity against any and all practices related to the industrial activity of fracking.

We joined Pennsylvania and the country of France as the first three government entities banning the dangerous, archaic, and ultimately unnecessary activity.

We saw firsthand how it decimated our brothers' and sisters' resources at the Ft. Berthold reservation, as we exported millions of dollars of our own subsidized water to aid them when their aquifers were polluted by the Bakken, costing this tribe tens of millions of dollars where no surrounding jurisdiction or corporate entity offered any due recompense because they weren't legally obligated to do so.

The fact that our jobs as Anishinaabe, as native American neighbors coexisting in and of our environment, to protect the water is a reality that has been exploited in this conversation to distract away from what the real issue is here at work: The rights of corporate personhood over the Human Rights of the people and the rights of the surrounding environmental resources.

While the police forces from my present home county, Hennepin, gladly took an interest-free loan for tens of millions of dollars in exchange for the opportunity to practice war drills via the frivolous enactment of EMAC in October 2016, on our peaceful protectors at Standing Rock, Energy Transfer Partners continue to illegally build -- Energy Transfer Partners continued to illegally

build on in the dark of night while the trope of the, "beaten noble savage," played out in the foreground.

I'm currently in charge of both my parents' tribal probates in Turtle Mountain, which includes trust lands in Montana or what's left of the legacy of divesting from federal government treaties as a descendent of the Chief Little Shell Clan.

Despite constant weekly management of all activity on my parents' properties, I was notified four months after the fact, via a random email that I found in my spam, about activities that would be -- that I would find to be in preparation of drilling and setting pipe in Montana; skirting all federal and state mandates regarding the legal protocols appropriate for engaging tribal heirs.

It's no secret that pipeline projects such as Line 3 are MLPs or master limited partnerships. Complicated investments involving numerous large scale investors, i.e. big banks, were the main quantifier of ensuring ROI is merely to continue the pipelines build-out.

This isn't a question of creating jobs -- it's not a question of creating jobs. Move that

labor train towards green energy, fixing our crumbling infrastructure. There's plenty of work to be had there.

Is Minnesota going to be the next casualty allowing corporate America to senselessly steamroll in legacy because money convinced them to.

LAURA HUEPENBECKER: Laura Huepenbecker, L-A-U-R-A, H-U-E-P-E-N-B-E-C-K-E-R. Good evening, thank you for the opportunity to speak. I'll focus my testimony on the contemporary need of Line 3.

I was born in 1997. According to climate data collected since 1880, the ten hottest years on record have occurred since I was one years old. I haven't known anything but global warming and climate change, so I suppose I'm coming to testify with a bit of a learning curve.

But I've also been born into a period of an unprecedented rate of change and an exponential technological growth.

Ever since elementary school, I was told my generation boasts a new title of digital natives. The first batch of learners who grew up with digital technology who are bringing creative and technological expertise to tackle our world's challenges in a way we have never seen before.

Minnesota's future employees, managers, engineers, and policymakers have quite literally been wired to constantly consider modern solutions while being forced to recognize the global implications of our immediate actions.

I'm here representing a generation of enthusiastic and practical citizens who look to change the future instead of duplicating the antiquated and unrealistic ways of the past. Tar sands pipelines are a tool of the past.

Minnesota has no need for this pipeline. We are already importing more than we need to satisfy oil demand. The U.S. has begun to export oil, in fact.

Specifically in Minnesota, fuel demand was down 19 percent in 2016, compared to its 2004 peak.

Tools of our future, like higher efficiency cars and alternative energy, are truly driving our market.

We do not need to violate treaty rights. The United States and Minnesota have had a long history of violating rights and oppressing native Americans.

Line 3 will take us back to the shameful

past instead of leading us to a future of inclusivity and respect for the law.

I am speaking as a young voice, but I'm also representing the voice of our technological, corporate, and political future. We do not need foreign tar sands oil to fuel our cars and heat our homes.

Growth of renewable energy continues to outpace fossil fuel additions, at the same time consumers are paying less.

We have sparked solutions today that protect our waters, protect our rights, and sustain a secure energy future.

Line 3 moves us backwards to the industrial revolution of the 18th century in a unique and exciting time where we do not need to replicate the past to be energy secure.

I urge the Department of Commerce to not grant a Certificate of Need and consider more realistic and practical energy choices that acknowledge what our current market and citizens demand.

MR. RAYMOND DEHN: I am a member of the Minnesota House of Representatives. I currently represent, in my district, 45,000 people.

One of my primary concerns is the more than 1.5 million people that actually get their drinking water from the Mississippi River and the impact that they -- even a medium-sized incident could have on those individuals as far as clean drinking water.

I think it's critical that the DEIS should include as part of its scope the removal and the restoration of land of any abandoned lines, and ultimately include in the analysis the future costs of removing of the new lines which may be constructed.

Also, that Enbridge should be required to carry a bond or escrow dollars for those future removal of lines should a time come when they will not be using the line anymore.

In addition, the State requires that the Department of Commerce -- State requirements require the Department of Commerce to use an independent evaluation in much of the existing DEIS cites, primarily Enbridge analysis of the impact of the line.

We heard that the firm that is hired to prepare this DEIS has stated that the study does not adequately address the scope of this analysis and

what that should be.

So I would ask that the Chamber of Commerce in the state reconsider the status of this DEIS and go back in and completely scope the project and do the analysis necessary for not only the impact on indigenous lands but also the impact that it could have on fresh water, the life for many people in the state of Minnesota.

DR. TIFFANY BECKMAN: I'm Dr. Tiffany Beckman, and I'm an enrolled member of the Leech Lake Band of Ojibwe, and I'm a descendent of the White Earth Nation, and an adopted member of the Mille Lacs Band of Ojibwe.

I'm also a physician and the first American Indian adult endocrinologist in the nation and board-certified in general internal medicine as well.

So I have deep concerns about the health of current and future generations with regard to the pipelines. I also have quite a bit of tax and trust land that my name is on in northern Minnesota on Leech Lake reservation.

My trust land is held in trust by the United States Department of the Interior, and therefore, there may be some jurisdictional issues

here that need to be resolved.

I want the existing pipeline removed from Bena, Minnesota, where my land is and I don't want any more pipelines to go through the entire state of Minnesota.

It is not acceptable just to go around the reservations. I don't think there should be any more pipelines here in Minnesota. The health concerns are obvious. Leukemia, lymphoma, cancer, diabetes, just to name a few.

I think we need to preserve our 10,000 lakes in the land and the manoomin, the wild rice.

There is no money that will ever make me change my mind, and it would be unlawful not to get my consent, being a landowner, on the pipeline issue. If there is a violation of my wishes, the United States Department of Interior will be contacted, as will my lawyers.

I already have a lawyer working on the case. Thank you.

(Comments concluded.)

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DEIS MEETINGS - 14-916 15-137

ST. PAUL - JUNE 13, 2017 - 6:00

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: CN-14-916

OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137

OAH DOCKET NO: 65-2500-33377

InterContinental St. Paul Riverfront
11 East Kellogg Boulevard
St. Paul, Minnesota

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FACILITATOR: All right. So our first speaker will be Margaret Breen.

And, Mahyar Sorour, okay, you'll be second.

Margaret Breen. Right over here. And who is Mahyar? If you could raise your hand so -- okay. We will bring you the mic to be second. So you'll be on deck.

All right. So please remember to state your name and spell it, and then you can begin your comments.

MS. MARGARET BREEN: Hello. My name is Margaret Breen. M-A-R-G-A-R-E-T. B, as in boy, R-E-E-N. I'm 19 years old and a lifetime resident of the state of Minnesota.

While I have many concerns with the draft of the Environmental Impact Statement, for the purpose of this testimony I will focus on my primary concern, which is that it only analyzes the environmental impact of the pipeline for the last 30 years.

Being that the old line has been in the ground for 50 years and Enbridge plans on leaving it in the ground indefinitely, I am confused as to why the environmental impacts beyond 30 years

aren't being considered. This is of particular concern to me because I intend on residing in Minnesota for much longer than 30 years.

Thank you.

FACILITATOR: Thank you. So we know that we're asking you to fit a lot into a short time. And if you could speak a little bit slowly, it's a little easier for our court reporter as well.

So Mahyar will be next. And Sara Suppan, if you could raise your hand.

MS. MAHYAR SOROUR: Okay. Hi. So Mahyar Sorour. M-A-H-Y-A-R. S-O-R-O-U-R. And I am a member of the Minnesota Pollution Control Agency Environmental Justice Advisory Group. I'm here today as a St. Paul resident, as a lifelong Minnesotan, concerned with the inadequacy of the Draft Environmental Impact Statement for the proposed Line 3 Pipeline Project.

Every summer when I was growing up, I had the honor of going up to the Boundary Waters, swimming in Lake Superior, enjoying the pristine natural resources of the land. Now, as a St. Paul resident, I have the honor of living right by the the Mighty Mississippi River.

The DEIS contains no spill analysis

for the tributaries of the St. Louis River or the Nemadji River, where spills could decimate Lake Superior and the harbors of the Twin Ports. A spill in Lake Superior not only affects the communities who reside near the water, but all Minnesotans, as the Mississippi River is connected. All of our water is connected.

As someone who has spent their life working on environmental justice, this project is a clear example of environmental racism. In the environmental justice chapter, Chapter 11 of the DEIS, which might I add is less than 20 pages long out of a 5,000-page document, it acknowledges that pipeline impacts on tribal communities are part of a larger pattern of structural racism that tribal people face in Minnesota, which was well documented in a 2014 student by the Minnesota Department of Health. It also concludes that the impacts associated with the proposed project and its alternatives would be an additional health stressor on tribal communities that already face overwhelming health disparities and inequities.

The injustices of cumulative impact is an aspect that must be acknowledged, but is clearly forgotten in this Draft Environmental Impact

Statement. You are proposing a pipeline on environmental injustice communities that already have to live with a number of disparities, and cutting off access to water, where native communities hunt, fish, and gather wild rice is environmental racism. This is just not right.

The Draft Environmental Impact Statement concludes that a disproportionate and adverse impacts would occur to native populations in the vicinity of the proposed project. Therefore, to honor our environmental justice communities and not perpetuate the cycle of structural and environmental racism that's so clear in our country today, we cannot move forward with this project

Thank you.

FACILITATOR: Thank you. Sara Suppan. And next will be Frank Hornstein. Frank, if you can raise your hand. Right here in the middle.

MS. SARA SUPPAN: My name is Sara Suppan. That's S-A-R-A, S-U-P-P-A-N. I am a volunteer with MN350, and I appreciate the opportunity to testify today.

I am concerned that a new major oil pipeline in Minnesota will result in a new major oil spill in Minnesota. I will focus my testimony on

accidental crude oil releases.

The premise that there is a need for a new pipeline is flawed. The DEIS discloses that between 2002 and '17 there were seven known pipeline failures in the existing Line 3. Remember that Enbridge continues to operate pipelines they know are at risk. Line 3 is not even their oldest pipeline in operation; it is their third oldest. It should also be acknowledged that this analysis misses an obvious alternative to the proposed route. It's called no pipeline at all.

Now I will list several points missing from the DEIS. First, the Terrestrial Wildlife Risk Analysis does not include the bee population. My understanding is that there will be herbicides used around the pipeline. If so, there must be consideration of which herbicides will be used and what scientific literature says about how these will affect one of our most important pollinators.

Second, the effects on aquatic life section does not discuss the effects of spills on algae and other microorganisms in the water, nor the long-term effects of removing oxygen from the water.

Third, this should cover what effective steps Enbridge will take to prevent

intentional third-party damage. In a corridor with multiple pipelines, it seems plausible that a terrorist could strike all at once and cause a multi-catastrophic event. The topic of a public awareness program indicates only what measures will prevent accidental third-party damage.

Fourth, I am confused by the assertion that the risk of a spill would not be different whether Line 3 operates at the current capacity or at the proposed capacity, which is almost double. This document does not consider the pressure required to force thick crude through pipe, and the potential to exacerbate weaknesses in the pipe with high pressure and pressure cycling. More oil, more pressure, more risk.

Finally, it is acknowledged that the risk of this pipeline is largely placed on rural communities and that those communities won't have easy access to the promised rapid response tech and crew.

However, the Remote Area analysis is a four-sentence placeholder where there should be a spill response strategy for areas with difficult access.

I am not convinced at all that

Minnesota will benefit by this massive pipeline project. Both the DEIS content and the unconsidered factors outlined here, reflected against the cases on the record where Enbridge has failed as a corporate citizen, demonstrate that Enbridge is unprepared for and undeserving of yet another pipeline. This pipeline is transporting the thickest, dirtiest, and least-profitable stuff. It has higher concentrations of heavy metal and, because it does not flow easily, requires higher pressure and more diluent chemicals. This pipeline is guaranteed to leak, supposedly once every four years.

Why does Minnesota need the risk?

FACILITATOR: Frank Hornstein, and next will be Doug Cain. Where is Doug?

MR. FRANK HORNSTEIN: Good evening. I'm Frank Hornstein. I am a state representative. My district includes part of downtown and southwest Minneapolis, Minnesota House of Representatives.

Thank you for giving me the opportunity to speak this evening. While I also have shared many of the concerns that have already been raised this evening, I want to focus a little more broadly on the fact that the EIS does not talk

broadly enough about the global impact to climate change. And under the Minnesota Environmental Policy Act, the Department of Commerce EIS can and should talk more broadly about this issue.

In fact, the interagency report on pipelines that was released by the Environmental Quality Board in 2015, which the Department of Commerce signed off on and is a part of, states the following: Whether oil transported in pipelines through Minnesota is burned in Minnesota or elsewhere in the globe, the greenhouse gas contribution from combustion will contribute to climate change, impacting the entire world's pollution, including Minnesotans.

And while we address climate change, you do it in an inherent way on the various modes of oil transportation. It needs to be done in a much broader context, particularly because tar sands oil burns dirtier and 17 percent dirtier than other forms of oil. So the climate effects are magnified.

So I urge you to take a much broader look at the climate impact, and I would further encourage you to (indiscernible) DEIS, main issues that have been raised here. Whether it's the climate, whether it's the (indiscernible), whether

it's the spill response, all of these issues need to be addressed before this EIS can be deemed adequate.

FACILITATOR: If you give us your prepared remarks, we can give them to the court reporter to make sure she gets it all.

So Doug Cain. And next will be Algin Garyt Goodsky. Algin is up there.

So Doug Cain.

MR. DOUG CAIN: D-O-U-G. C A I N. (Indiscernible) share a passion for Minnesota and rivers (indiscernible) camping. And (indiscernible) rain and headwaters of the Rain River. And I've seen the abuse that my people have put on resources throughout my lifetime, and I have great concern that it will continue exploitation of the environment at the risk for our water, our woods, our native life, all the species that do not have a voice here tonight, our muskrats and birds, the indigenous people in the Mille Lac area who have thousands of years. The Lakota have villages up, and the Anishanabe moved in a few years later. You know, half the nation passed through.

We've had a long history here, and hopefully a long future to plan for. And if we're not planning for that, we will have more and more

contaminated lands, river ways. I'm terribly afraid that the Line 3 current route will be left in the ground and not environmentally restored. And building another one with the tar sands rushing through it endlessly is a recipe for more fatal accidents and very troubling to me.

So that's why I'm here tonight. And I want to echo all the ones that have prepared speeches (indiscernible), and the rest of you with your own hearts sharing what your tradition is for our nation.

(Off the record.)

FACILITATOR: Say your name and spell it. Thanks.

MR. ALGIN GARYT GOODSKY: Algin Garyt Goodsky. A-L-G-I-N. G-A-R-Y-T. G-O-O-D-S-K-Y.

First off I'd like to say that I'm a permanent resident of the homelands of my grandparents and the ancestors before them. And second off I'd like to take a minute to acknowledge who I am in my culture and my tradition and in my language.

(Speaking Ojibwe.) What I just said there is my name, where I'm from. My mother is here present with me and my father, who is no longer

here.

Some things that I'd like to talk about today is, first off, I'd like to say that I come humbly to -- brief reminder -- brief reminder to people of things of all traditions, so to speak, not only in certain cultures and certain ethnicities, but traditions as human beings, recognizing the moral standings of everything. And to take a minute to realize how -- how much this greed affects us, this need for something that's materialistic.

If you take a -- you take a good look -- take a good look at the people around you that you're sitting around. That's not materialistic. Those are live human beings, and they want to do the things that you would want to do; and that's live until the very end, until you can't live no more. But how are we going to do that with dirty water? I mean, honestly, if I drink a cup of water -- or oil, not water, I'd probably end up, you know, with a bad body. You know, something would be wrong with me.

But the true concern that I have with all of this is that people are not realizing that we're becoming something that we were never meant to

be. It's like we've taken a step back in the chain of evolution. But I do believe -- I believe strongly that together, with the work of every single body, every single person in this room, every single person all across this nation, state, wherever, that we can all work together for a truly better future, one where you don't have to rely upon the money in your pocket, but rely upon the work that you put in that day.

I remember there was an old saying that used to say, you know, put food on the family -- put food on the table for the family. And to me it appears that all that went out of the window. Now it's put money in you pocket so we can live. Honestly, that sounds too materialistic to me. Now, if I went and put in a hard day's work hunting, gathering and practicing my own rights --

FACILITATOR: That's five.

MR. ALGIN GARYT GOODSKY: -- I could have --

FACILITATOR: You can stop now.

MR. ALGIN GARYT GOODKSY: -- my family. (Speaking Ojibwe.) Thank you.

FACILITATOR: Next will be Sue Menter.

MR. THANE MAXWELL: Okay. So first

I'd like to request that the court reporter take a brief, well-earned rest, because I've already submitted my comments in entirety in written form. So, therefore, please just take a rest while I proceed to read my comments.

To my fellow citizens and to the Department of Commerce, my modest proposal is to require Enbridge to completely remove the abandoned line and restore the entire area to the satisfaction of all parties prior to allowing standing to Enbridge and all other companies to propose any new pipeline.

Meanwhile, we could proceed as if we believed we had a future, rapidly transitioning away from the dirtiest energy and toward conservation, retrofitting public planning and transit, wind, solar and renewables.

I hope the reasonableness and the justice of this proposal won't prevent its consideration and joyful implementation.

Thank you.

FACILITATOR: Thank you. So Sue Menter is next, and after that will be Jason George. Jason George, if you can raise your hand.

MS. SUE MENTER: Hello, I'm Sue

Menter.

FACILITATOR: Sorry, if you could spell your name.

MS. SUE MENTER: Sue, S-U-E. M-E-N-T-E-R. I'm a Minnesota resident for my entire life, and I also have worked in the environmental field most of my life, and I'm extremely concerned about this proposal for this new pipeline. I've seen many things in my career where a company will commit to something, and they walk away when there's an environmental event, and they don't clean it up, and it ends up going back to the state to clean up. Once that happens, things are left unmitigated for years, decades. And this is what I'm really afraid of.

With the price of oil going down so much, I see -- from a cost benefit analysis, I can't understand the logic to even doing this new project.

And that's all I want to say. Thank you.

FACILITATOR: Thank you.

Jason George will be next. And after that will be Gerald Striegel. Right over here.

MR. JASON GEORGE: My name is Jason George, G-E-O-R-G-E. I'm with the International

Union of Operating Engineers Local 49. We are strongly in support of the Line 3 project, and we believe it is a necessary project to replace the existing pipeline and move oil safely in this state.

I just want to talk about a couple of different points specifically to the EIS, the DEIS, that aren't maybe mentioned, and I think they should be.

One is training. I'm not sure how many people are aware, but our union, labor union, is here today; and UAA Teamsters, other unions that work on pipelines, spend millions of dollars a year of our members' money training specifically on pipelines to make sure that we do this right. I don't know if that gives anybody in here comfort, but it should. We know how to do this, do it well.

I would also like to say that right now there's pipeline training happening at our training center in Hinckley with directors from the tribes and the state of people that might actually get to go work on this project, which I think is a good thing. It's something that we try to do all the time. So I just wanted to point that out.

Oil trains I wanted to touch on briefly. Every ounce of -- every amount of oil that

doesn't travel through a pipeline is going to travel on rail. That's just a fact. And people that live in this community should be extremely concerned about that, because a lot of that oil traffic goes through St. Paul, Minneapolis, through neighborhoods. I think it's much better served for the public to be put in the pipeline underground. That's just the fact of the matter dictates that that's safer.

Also, lastly, in the DEIS it mentions that there will be zero local jobs created by this project. That's just absolutely false. I know hundreds of 49ers personally -- some of them are sitting at this table -- that worked on the Clipper project. These same folks will build Line 3 as well. Hundreds of 49ers, hundreds of laborers will work. Local Minnesota residents will build this project. People need to know that as well. It's not addressed in the DEIS.

Lastly -- I still have a little bit of time -- I just want to say to the Commerce Department that I really encourage you to stay on track with this process. We deserve answers on these issues and on -- you know, the company deserves an answer yes or no with the PUC in a

timely fashion. I believe this process is going better than it did for the Sandpiper project, which unfortunately went down. We hope to see this project built for the safety of Minnesota. We hope to see the jobs as well. They're good-paying jobs in a region that desperately needs it.

Thank you.

FACILITATOR: Thank you.

Gerald Striegel. Next to speak would be Jeffrey, Susu. Right here in the middle.

MR. GERALD STRIEGEL: Hi.

FACILITATOR: Start by spelling your name.

MR. GERALD STRIEGEL: Gerald Striegel. G-E-R-A-L-D. Striegel, S-T-R-I-E-G-E-L. Hi.

I'd like to focus on the greenhouse gas emissions associated with the materials to be pumped through the proposed pipeline. Although the Draft EIS identifies potential shipping variations, the corresponding lifecycle emissions are not quantified adequately. In the final EIS document is -- if the final EIS document is to provide heat-trapping contribution of the transported material lifecycle, greenhouse gas emissions must be thoroughly identified.

In Section 10.3.1.1.2 both heavy crude and dilbit are listed. They are unique substances. But Table 5.2.7-10 lists only heavy Western Canada sedimentary basin crude, with a range of 584 through 632 kilograms of CO2 equivalent per barrel. We're going to call it WCSB basin from here on out. It's an expansive area and contains both conventional and tar sands formation.

So what material is being identified? Page 5-440 states that lifecycle analysis or greenhouse gas tracks the total production of greenhouse gases from their extraction from the earth to the end-use combustion of the refined petroleum products or by-products. So in the case of dilbit, is the inclusion of Petcoke -- is that inclusive of Petcoke, and what emission content is applicable?

Given the expanse of the tar sands fields and the waning life of conventional basin assets, it seems that a worst-case scenario, dilbit and associated Petcoke products, would be an appropriate baseline. I would like to see those numbers identified and applied to the subsequent discussion.

Independently, the proposed pipeline

and its lifetime distributions to atmospheric CO2 could be dismissed as insignificant, if all other considerations are ignored, an approach foolishly applied to many discussions today. It adds up. It's cumulative.

When we consider this or any pipeline servicing the tar sands formation, it's critical to recognize not just the destructive contribution of the proposed pipeline, but also those already existing. It's important to understand there are roughly 170 billion barrels of recovered tar sands material. And when burned, it will add 25 billion metric tons of carbon to the atmosphere.

FACILITATOR: Thank you. You can hand in your written statement. Thank you.

Susu Jeffrey. And next will be Jaci Christenson. Where is Jaci? Right here. Great.

MS. SUSU JEFFREY: Susu Jeffrey. S-U-S-U. Jeffrey, J-E-F-F-R-E-Y.

My comments are addressed to the appointed, not elected, Public Utilities Commissioners. Since I'm a poet, it's in the form of a poem, which is dedicated to my nephew, Peter, the National Cancer Institute's poster person, for 17 years of chemotherapy survival.

The Process: The earth is a body, and a governor at his desk said, you, man or sir, you get to decide that hours away on ancient cretaceous bedrock on land you've never walked with veins of pure water running through, moving, always moving, you get to decide that somebody else can rip a hole in the skin of the body of the earth, insert in that, cut a tube to carry toxic liquified dead matter hundreds of miles away across the Hudson Bay, Mississippi, and Great Lakes/Lawrencian mother waters, to refineries, to bake black buried matter to poison the air and water for profit.

Remember the body is mostly water. Remember the body of the earth is not just your body to decide to cut into with scalpels the size of dinosaurs for black fecal waste that should not see light of day. We breathe what runs all the wheels in and out of our bodies like water. We did not volunteer to be Job.

Who pays you for your decision to allow somebody else to cut open the body of the earth? Who calls this passing-the-buck service? Remove the self serve. It is simply vice.

I am on death watch for Peter. Why me? Why mine? I call this agony. And I call you,

on your decision on the body of the earth and the bodies of Peter's children, on the making of the future, the future of the earth and everything that lives and grows and casts a shadow upon her, because you do matter in this matter of life and death.

Constant growth is the cancer model.

Thank you.

FACILITATOR: Katy Lowry? No. Brian Brunette? Brian Brunette.

Okay. Start by spelling your name. Thank you.

MS. JACI CHRISTENSON: Jaci Christenson. J-A-C-I. C-H-R-I-S-T-E-N-S-O-N. Minnesota is uniquely rich in clean water; and it is the resource we, every one of us in this room, are dependent on for our survival. This Draft Environmental Impact Statement should be our assurance that that water be protected, and it is not.

In looking at the DEIS, I found at least 80 times where Line 3 crosses flowing waters. These are just rivers, streams, brooks. But I put on a poster board, and it's hard to even fit them all on. That does not include our other waters, our marshes, our lakes, and our very important wild rice

beds.

So during the construction of this pipeline, what it says in the DEIS is that surface water may become contaminated from small spills or leaks of lubricants, gasoline, oil, dot, dot, dot, other hazardous chemicals.

To protect the surface water resources, the Applicant would store petroleum products, hazardous chemicals, etcetera, in upland areas of -- at 100 feet from surface waters.

I question if this DEIS is considering seriously the impacts of Line 3. When I go to the Boundary Waters and I wash my dishes with biodegradable or nonbiodegradable soap, I wash them at least a hundred feet from the water's edge. These are chemicals, and we're allowing them at 100 feet. The U.S. -- the U.S. Department of -- the Forest Service is saying we need 150 feet for soap. This is not right.

Regarding the accidental oil release spills, in Chapter 10 -- and I have everything documented here for you -- the overall annual probability of a spill at any given time on this route is .249, which means that there's a 25 percent chance of there being an oil spill on Line 3 in one

every four years. This is an absurd risk to Minnesota's water. We do not accept this high risk when we go to our faucet to take a drink of water.

Regarding oil spills, the DEIS uses a ten-mile region of interest for downstream. We know those impacts can be felt at least 35 miles downstream, for example, with the Kalamazoo spill.

Also, little research has been conducted on the dilbit toxicity, the organisms. And we have no idea what we are actually even dealing with, because Enbridge will not release the chemical composition. It's considered trade secret.

And so one other just final example is the DEIS does not adequately look at alternative routes. There's a clean energy alternative, and that needs to be included in the DEIS.

Thank you.

FACILITATOR: Again, we encourage you, if you have written remarks, to hand them in.

Brian Brunette is next. After that is Ruth Lindh. Ruth?

MR. BRIAN BRUNETTE: Good evening. My name is Brian Brunette. It's B-R-I-A-N. B-R-U-N-E-T-T-E. I'm with the Minnesota Laborers, but most of all I'm a proud Minnesotan.

I'd like to just point out a few things. There are many reasons why I support this project, but I'm just going to hit on just a few of them.

I support this project for environmental protection. Line 3 is old and out of date. The proposed replacement is the best option to protect Minnesota lakes, rivers, streams by reducing spills by nearly 40 percent.

Protecting the natural environment is important to our members, because so many of us hunt, fish, and enjoy the outdoors. We are committed to having pipelines operated safely.

Number two, reliable fuel supplies. Minnesota depends on Line 3 for the fuel that keeps the state moving. If anything happened to the pipeline, our members and contractors would be hardest hit. Construction workers often drive long distances to reach job sites. The fuel is a major factor in construction costs.

Number three, jobs for northern Minnesota. The pipeline industry employs engineers, inspectors, and technicians, marketers. The Line 3 placement will keep our pipelines operating safely and effectively so we can keep northern Minnesota

working.

Thank you.

FACILITATOR: Thank you.

Ruth is next. After Ruth is Mike Neaton. Mike? You can raise your hand. Great.

So, Ruth, if you could spell your name.

MS. RUTH LINDH: R-U-T-H. L-I-N-D-H.

There are numerous flaws in this draft of the EIS. Start with the document title. This is not a replacement for Line 3; it is a mostly new and different route pumped up and supersized. It endangers Minnesota waters, lands, and wildlife.

This EIS is a huge document, but the troubling part is what is missing. First, to abandon the old crumbling pipe in place with only the vague reassurance that it will be monitored indefinitely is not sufficient. We need specifics: Dollars, time frame, guarantees. What if Enbridge has gone out of business or morphed into a new entity, who pays then?

Second, we know that the heavier tar sand oil, when leaked or spilled into bodies of water, have never been successfully cleaned up once it has sunk. What would happen if a spill made its

way into Lake Superior?

Minnesota should be very uncomfortable with the fact that Enbridge classifies their worst-case scenario spill data as trade secret, so it cannot be reviewed by the public.

Third, we are in the brink of enormous changes in this 21st Century economy. How can any 30-year projection of costs not include consideration of rapid advances and demands for renewable energy, declining oil prices, and the growing scarcity and value of clean water?

Here are three snippets from the news this past week, and I cited the sources in my written testimony. Coal is dead and oil faces peak demands, says Jim Barry, the global head of BlackRock Infrastructure Investment Group, the world's largest, with 5 trillion in assets. The thing that has changed fundamentally is that renewables have gotten so cheap. In short, the smart money is headed away from fossil fuels and towards clean energy.

(Cheering.)

FACILITATOR: Please do not interrupt.

MS. RUTH LINDH: Headlines: Minnesota steps up to the plate on climate. Now more than

ever Minnesota needs to continue to make the case that moving away from fossil fuels is not just a moral imperative, but is also politically feasible and economically advantageous.

Headline: Water shortage looms. UN Secretary General warned that by 2050 global demand for fresh water is projected to grow by 40 percent. Strains on water access are already rising in all regions.

It is fool hearty to grant this permit without consideration of these issues.

FACILITATOR: We need you to finish. Thank you.

MS. RUTH LINDH: A legitimate option of not building a new pipeline must be but carefully maintaining the Line 3 --

FACILITATOR: Thank you. We need you to finish now.

MS. RUTH LINDH: -- most prudent choice.

FACILITATOR: Thank you.

Mike Neaton. And next will be Chuck Nelson.

MR. MIKE NEATON: Mike Neaton. M-I-K-E. Neaton, N-E-A-T-O-N.

I'll just make a comment regarding the Minnesota Statute of 116D.02, declaration of state and environmental policy. I won't read the whole thing, because it's a little bit long-winded.

But the Subdivision 1, Policy: The Legislature, recognizing the profound impact of human activity on the interrelations of all components of natural environment.

If I then skip to Subdivision 1, State Responsibilities: In order to carry out the policies set forth in Laws 1973, Chapter 412, it is the continuing responsibility of the state government to use all practicable means, consistent with other essential considerations of state policy to improve and coordinate state plans, functions, programs, and resources to the end that the state may.

Amongst the things that it lists are number 7, which says define, designate, protect environmentally-sensitive areas. Number 10 says, preserve important existing natural habitats of rare and endangered species of plants, wildlife, fish, and provide for the wise use of our remaining areas of natural habitation, including necessary protection measures where appropriate.

The only point that I particularly wanted to make with this is that, given that this area in Minnesota is the only place on the planet that has wild rice, I point to the number 10, stating that preserve important existing natural habitats of rare, endangered species of plants will be a failure. This risk is a rare plant, critical plant to the native culture and livelihood. And also that essentially we are vulnerable to another Kalamazoo River, probably of even a greater magnitude.

So my conclusion is that we cannot afford to be risking our environment with a pipeline or the products that we're putting through it.

FACILITATOR: Thank you.

Chuck Nelson is next. And after that will be DeCourcy Squire.

MR. CHUCK NELSON: For the recorder, I've already read this into the recorder -- reporter. My name is Chuck Nelson. C-H-U-C-K. N-E-L-S-O-N.

Another pipeline proposal. It seems that Minnesota is crisscrossed with pipelines. No doubt some have been necessary. Today, however, we are entering a time when renewables, energy

efficiency, and conservation are clearly demonstrating a wiser course.

At this time, rather than risking Minnesota land and waters to allow investors to profit from the tar in Canada, let us be prudent; deny the permit for Enbridge 3, encourage safer renewables. In ten years there will likely be pipeline removal proposals.

Thank you.

FACILITATOR: DeCourcy Squire is next. And after that is Nicolette Slagle. Nicolette. Great.

MS. DECOURCY SQUIRE: DeCourcy Squire. D-E capital C-O-U-R-C-Y. And last name is S-Q-U-I-R-E.

And I'm here not as an expert, but as a concerned citizen. And I've read parts of the Draft EIS, especially Chapter 10, and as well as the reports by Stantec that were commissioned to the EIS on pinhole releases and on assessment of accidental releases and also the 2015 report by the Department of Public Safety on Minnesota's preparedness for an oil transportation incident, because I'm extremely concerned about the risk the proposed pipeline may pose to the environment if there are spills. And

what reading the draft report has left me with are some questions. So here are 12 of them.

The DEIS acknowledges in the introduction to Chapter 10, Section 10.1, the probability of release of some type along the entire pipeline during its lifetime is not low. The consequences of a large release can be significant.

Enbridge commissioned the two studies that I mentioned earlier. The one on the large release redacts the estimates of how much the potential leaks could be. Why is this not considered public information?

Stantec, et al., estimates the probability of leaks based on past history. And I realize we cannot always predict the future, even though my financial advisor is always saying past performance isn't a guarantee of the future.

What they did is they took the number of incidents, which were 80, over a period of 14 years, from 2002 to 2015, and they divided that on miles per year using the miles of the pipeline, roughly 2,000 miles. And that was Tables 2.4 and 2.5 in the report, Line 3 Replacement Project, Assessment of Pinhole Release.

In the DEIS Section 10.2.5.3, the

probabilities are figured by miles per single year, using the length of new Line 3 route only. But to get a better prediction one also needs to look at the expected lifetime of the pipeline to see how many incidents there might be, so multiplying by the number of years, although this does not take into account that the older the pipeline gets, the higher the probability of leaks. It's also becoming more difficult to estimate weather dangers, as we are seeing some changes in average temperature, severity of storms, et cetera.

The lifetime of a pipeline can be expected to be about 60 years, according to Petroleum News in the week of February 14th, 2010 newsletter, although catastrophic spills have occurred when pipelines were less than 30 years old, as with the old Line 3. So how long is the new Line 3 expected to last? And when it gives out, will it too be left in the ground to corrode and leak?

Reports cite to --

FACILITATOR: Time's up. Thank you very much. And written comments can be handed to the court reporter. Thank you.

We have Nicolette after that is Sally Downing. Sally? Right there. Great.

Nicolette.

MS. NICOLETTE SLAGLE: Hi. Nicolette Slagle. N-I-C-O-L-E-T-T-E. S-L-A-G-L-E. And I'm with Honor the Earth. I'm their research director. And I just wanted to talk a little bit about the process and choices.

Back in around 2006, 2005, New York State had a decision to make, and this decision was whether they were going to follow in the footsteps of Pennsylvania and allow fracking in their state and under what regulations. After a seven-year process of environmental impact statements and public comments and public concerns, they decided to ban fracking.

And I'm bringing this up because the state of Minnesota is in a similar position to make a similar decision, not to allow fracking on their lands, but to allow the continued expansion of tar sands, because that is what we are talking about. We're not -- yes, it's one pipeline, but it's a much bigger -- it's part of a much bigger picture, and that picture is what is happening to the people up in the area of Athabasca, what is happening to the people in Detroit and around other refining communities? What is happening to the global

population because of climate change, and what is going to happen to the future generations.

So we really need to spend a lot of time and energy thinking about this decision that we're making. We also need to think about Enbridge and their liability and what's going to happen when they want to stop using all of their pipelines because they've gotten every last drop of oil out of the ground. Are they going to be able to just leave those in place like the current regulations allow or is there going to be funds set aside for the removal and cleanup of these legacy sites? We need to look at that. We probably need an entire Environmental Impact Statement on the abandonment issue, because we know after this pipeline gets abandoned, there's going to be other ones abandoned too.

I also want to talk about this idea that if not by pipeline, then by rail or by truck. This is a false choice. Our choices are really are we going to continue down the path of destruction or are we going to transition to a new energy future?

I'm almost out of time. But I just want to say quickly also, Enbridge is not a good neighbor. We know that they've had at least $1.1 million fines from pipelines that they've built

in Wisconsin in 2008. I heard they had fines here when they built the Clipper. I just heard about that. They have -- they had a penalty back in 2004 for $30,000 in Minnesota. And, also, they like to start building before they have permits in place.

FACILITATOR: Thank you, Nicolette.

MS. NICOLETTE SLAGLE: You're welcome.

FACILITATOR: Thank you.

All right. Sally Downing. And after Sally is Kyle Samejima.

All right. Sally.

MS. SALLY DOWNING: Hi. My name is Sally Downing. S-A-L-L-Y. D-O-W-N-I-N-G.

And I think the previous speaker must have looked at my notes, because she said exactly what I was going to say. So I'm done.

FACILITATOR: Thank you.

Okay. Kyle, you're up next. After Kyle is Katy Lowry. Katy?

MS. KYLE SAMEJIMA: My name is Kyle Samejima. That's K-Y-L-E, S-A-M-E-J-I-M-A.

And I am here as a resident of Minnesota grappling with this complicated process and DEIS and believe firmly, first and foremost, that this dirty oil should stay in the ground. And

for those who want to significantly ask, well, how did -- did you use oil to get here tonight, well, even when we want to lose weight, we need to eat. And sooner or later we need to get completely off our diet of fossil fuels.

So my questions are these: Were the wetlands, forests, and farmland assessed not just for their climate change mitigation part of the sequestration role, but for their natural capital value, for the value beyond the bottom line that they provide?

Second, does the certificate of need assess the need for this oil, as it relates to renewable energy and energy efficiency standards and goals of Minnesota?

And, third, I reiterate the call for an alternative that includes no new pipeline and clean up of the old one.

And, four, how does this PUC compare the bottom line of Enbridge with the creatures and living systems that we depend on no matter where you stand on the political spectrum that have no voice and we are their voice?

And does the employment impact take into account the jobs that will be lost in tourism

and the hundreds of jobs that can be gained in renewable energy jobs, one of the fastest-growing industries all over the country.

FACILITATOR: Katy is up next. Do we have Katy at the mic? Okay. And then after Katy is going to be Angela Ronayne. Angela.

Angela, stay right there; we'll bring you the mic.

Katy.

MS. KATY LOWERY: Hello, friends and neighbors. I'm Katy Lowery. That's K-A-T-Y. L-O-W-E-R-Y. I'm a lifelong resident and citizen of Minnesota.

The job of my government is to ensure that the interests of Minnesotans be balanced and that all the impacts of the proposed pipeline are entirely considered and paid for.

I'm here to speak to the inadequacy of the EIS, but I understand that there are other legitimate interests. Safety and jobs have been mentioned, and I think those are legitimate.

My concerns -- well, I have many. But one concern is that the EIS does not assign a funding source for all the social and environmental costs. Not assigning a funding source for

inevitable costs is inadequate.

My second concern is the abandonment of the old existing pipeline in place is not adequate. Abandoning the old, inadequate line in place leaves the public and people near and downstream inevitable -- vulnerable, the inevitable problems of an end line.

Surely the interests of safety and jobs would be advanced and all our interests would be advanced by mandating removal and restoration before replacement.

Thank you.

FACILITATOR: So thank you.

Angela is next. And after that is Steve Buck. Steve? Great. Make sure we bring Steve the mic.

MS. ANGELA RONAYNE: Hi, my name is Angela Ronayne. A-N-G-E-L-A. R-O-N-A-Y-N-E. I'm a shareholder with --

FACILITATOR: Could you hold the mic a little bit closer?

MS. ANGELA RONAYNE: I'm a shareholder with Merjent, an environmental consulting firm based in Minneapolis that works with both public and private entities and mainly within the energy

industry. I'm also a registered professional engineer in the state of Minnesota.

Enbridge retained Merjent early in the project planning process to conduct environmental and cultural resource surveys, advise on resource avoidance and minimization strategies, participate in the development of permit applications, and engage in discussions with federal, state, and local permitting agencies.

My role on this project is the engineering interface and data management lead. I work with Enbridge environment department staff and Enbridge staff from other departments in data management and environmental permitting and analysis efforts.

My work on the project began in 2014. Since May of 2013 Merjent has coordinated several types of environmental and cultural surveys for Enbridge within the environmental survey area, which completely contains the route considered in the DEIS, referred to as the Applicant's preferred route.

I have reviewed portions of the DEIS and read in several sections about how DOC used Enbridge's survey data to inform certain analyses

when comparing route -- the route to alternatives.

I would like to emphasize the survey information that our scientists have gathered regarding Enbridge's route is much more specific than the information presented on any alternatives; and I would like for the DEIS to make this clarification, when necessary, so the public is informed of the extensive work that has gone into studying the proposed route.

And while I appreciate our survey information is represented in some places, I would like to speak to the completeness of the environmental information that our scientists, as well as those of several specialized firms that we have subcontracted, have gathered on the preferred route and how it has informed the route that Enbridge is proposing.

Over the past five survey seasons, our team of scientists have gathered information on over 29,600 acres of land covering 430 miles in Minnesota alone. We surveyed 99 percent of wetland and water bodies; 98 percent of geomorphic stream surveys have been completed; 95 percent of protected flora surveys have been completed; 100 percent of northern long-eared bat surveys have been completed;

98 percent of cultural resources surveys have been completed.

These are just a few examples of the extensive information we have gathered on the proposed route. We have also gathered information on bald eagle and osprey nests, grassland habitat and butterflies, protected mussels and invasive species.

FACILITATOR: Thank you very much. We greatly appreciate it. And, again, written comments can be handed in to the court reporter.

Steve is up next. And then it's Todd Rothe. You want to raise your hand? Right there. Great. Okay.

MR. STEVE BUCK: Hi. My name is Steve Buck. S-T-E-V-E. B-U-C-K. I'm a member of the laborers union. I represent roughly 10,000 laborers who build all types of infrastructure, including pipelines.

To me the importance of this pipeline is to replace an old, unreliable pipeline with the newest state-of-the-art technology that will provide the most safe and reliable transport of needed crude oil to refineries. So it's really more about replacing an existing pipeline than creating new

pipelines.

I wish we were to a point where we could flip a switch and go to renewables. Our members build all of that infrastructure also. Wind farms, solar farms. We do it all. But we're not in a position to flip a switch and make it change tomorrow. So as we move towards new technologies, there's still a need for the old technology.

I'll finish up quickly with -- to the point that the first speaker tonight made about the bees. As a beekeeper, I can assure you that my bees face a much larger threat from the people that grow our food than the people that build our pipelines.

Thank you.

FACILITATOR: Todd is up next, and then Mary Theresa Downing. Mary Theresa?

Thank you, Mary Teresa. You'll be next.

Okay. Todd.

MR. TODD ROTHE: My name's Todd Rothe. T-O-D-D, R-O-T-H-E. I'm a lifelong Minnesotan as well, born in Thief River Falls. I come from (indiscernible). My family and I love Minnesota. We love and respect the environment. We love and appreciate the recreational opportunities that

Minnesota has to offer.

I also need to work, or should I say I prefer to support my family here in Minnesota. And on behalf of my 80 employees at my company that basically do construction jobs, we rely on projects like this to support our families and pay our taxes in Minnesota.

So what concerns me a little is that, you know, the nation of Canada, the state of North Dakota, the state of Wisconsin can approve all these projects, and here we are sitting in Minnesota waiting for perhaps another year. So that to me is offensive.

Many people, however, will speak to the economic benefits of this project; but I'd also just like to take a minute and focus on the environment and the environmental impact, because Enbridge is a company I've been involved with for 20 years on various projects of various sizes. And from the inside of working on these projects, I can assure you that the commitment to safety is paramount. It is the number one priority, not just for the people, including our construction people, but for the environment.

Enbridge is committed to preventing

accidents or injuries of any kind, including those to the environment. And that is stressed to an extent that I've not seen working for other industries. So I'd just like to say that, you know, this proves to me and should prove to you that their commitment is there to do this project right.

That being said, there's probably -- common sense to me that says there's probably not very many practical alternatives to ourselves, you know, using something other than oil to fuel our way of living in the United States. And if there were, I think those projects would be economically funded. However, they just presently do not exist. The technology is just not there yet. I personally would love to not have to put fuel in my truck, but that's not where we are at today. The Line 3 replacement project is simply a way to make it safer than alternatives and is the most practical way of doing it.

Regarding the deactivation of Line 3, it seems to attract all this attention. Just seems to me another diversion tactic to obscure and delay the process which is being applied for and tended to. So I would encourage the State of Minnesota to stick to their regulatory guideline and approve the

Draft EIS.

Thank you.

FACILITATOR: Thank you.

We have Mary Theresa, and then we have Tim Andersen. Tim Andersen. Tim's over here.

Okay. Mary Theresa.

MS. MARY THERESA DOWNING: Mary Theresa Downing. M-A-R-Y. T-H-E-R-E-S-A. Downing, D-O-W-N-I-N-G.

And I'll probably repeat things that other people have already said more eloquently, but a statement of this type needs all kinds of very good data. And it seems like quite a few pieces are missing, and then the analysis isn't always the best.

For example, in Chapter 10 it's stated that immediate abandonment costs and annual monitoring costs are quantified, but there's no estimate or commitment for what would happen in the future if there was a leak and a cleanup. And we all know what happens when there's a cleanup after somebody has, oh, gone bankrupt. Isn't it amazing they're no longer around to pay for it? And you know who gets to pay for that, don't you? We do.

And it's really unfortunate that this

line would be handling fuel that people use. But we're not using it. It's tar sands. It's much dirtier than anything else that's going through the state right now. Not a good idea. Not a good idea to put it near water either, and that's where it would go.

So I think that's something we have to look at very, very carefully. Thank you.

FACILITATOR: Thank you.

After Tim we have Sarah Harper. Sarah? Okay. Sarah is right there. Great.

MR. TIM ANDERSEN: Hi. My name is Tim Andersen. T-I-M. A-N-D-E-R-S-E-N. Thank you for the opportunity for me to speak tonight.

Everywhere I look around here tonight, I see things that are made out of oil. You know the list, from cellphones to sunglasses to pharmaceuticals. Like it or not we cannot live without petroleum. Until we develop the technology to replace petroleum, we have to face the fact that if we want to live the lives that we've built for ourselves, we need oil.

Now, the question is how do we reliably and responsibly transport it safely using the best-available technologies while balancing our

concerns for the environment with our reliance on oil?

We live in a world of risk. We need to be honest with ourselves. Are we willing to give up everything petroleum brings to us to make our lives better, healthier, safer? We know the trade-offs. If not, how do we limit the risks of bringing this vital resource to our benefit? Safe pipelines.

Thank you.

FACILITATOR: All right. So Sarah is up next. And then Ann Manning. Ann? Okay. Great. Ann's right here. Great.

So, Sarah, you're up next.

MS. SARAH HARPER: Okay. Hello, my name is Sarah Harper. That is S-A-R-A-H, H-A-R-P-E-R.

I would first like to thank you for allowing me to comment today. The pipeline and the considerations being made for its proposed construction are a big deal to me. I spend every summer up north at my family farm, enjoying the spectacular lakes our state has to offer. And I would love to share these traditions with others. But with the new Line 3 breathing through regulatory

approval and our bordering states and Canada, I'm worried this may not be possible.

The current state of this DEIS reflects what will be taken into account for something far less potentially detrimental to our state, priceless land, lakes, rivers, and wetlands. It is clearly rushed and inconsistent.

As previously mentioned, the possibility of permanently decommissioning Line 3 for good with no alternative was not considered in any of the sections. This is a huge problem. The false trichotomy of either relying on the old Line 3, building a new one, or implementing poorly-thought-out and even infeasible alternatives,indicates an unmistakable preference for Enbridge's profitability over any other concern.

I would hope that all the decision makers know that there is an option to shut down Line 3 entirely by gradually diminishing the use of economically, ill-advised tar sands oil. But they won't know what benefits or downsize there are to this unmeasured alternative if it isn't analyzed sufficiently or at all. Lately this dirty oil is about as difficult to make a profit off of as it is to clean up, and much of it is selling at a loss.

It is stated in Section 3.1.1C that the Commission must determine whether or not the consequences to society of granting a certificate are more favorable than the consequences of denying it. And how can they accurately decide without being given the full range of options?

I see that in Section 4.2.2 it states that the Applicant should reasonably be expected to meet shipper demand through other means, but I don't see any comprehensive analysis of projected demand relating specifically to this project.

The scoping document promised much more. In fact, what I do see in Section 5.2.7.3 regarding overall energy consumption in the U.S. remaining relatively flat through 2040 would lead me to believe that upping the capacity is not a critical need. If this is the case, how do we know if it even is necessary to approve Line 3, which will be the largest project in Enbridge history?

It also states in this section that approval or denial of any one crude oil transfer project is unlikely to significantly impact the rate of extraction in the oil sands. This is inconsistent with what the executive summary says, which is that the project will have an increase in

extraction over what would have occurred if demand was met instead with light crude oil. This is misleading and --

FACILITATOR: Thank you.

MS. SARAH HARPER: -- makes me wonder how carefully this document was put together.

FACILITATOR: Thank you very much.

We have Ann next, and then we have Chelsea DeArmond. Chelsea? Great.

Ann.

MS. ANN MANNING: Ann Manning. A-N-N. M-A-N-N-I-N-G. I lead the Women's Conference For Future Generations.

I am here to ask that a full and complete EIS be conducted that takes into account the rights of future generations to a clean and sustainable world. The rights of future generations must be considered as a primary feature of any new review.

We all know that we're at the precipice of an environmental disaster. Adding new pipelines is a risk we should not be taking. We all care about our children, our grandchildren, our great-grandchildren, and they are the ones we must consider today.

Implementing the precautionary principles, looking at cumulative impacts, and considering the impact of climate change to burning this dirty fuel must be considered far more seriously than it has been outlined in the current DEIS.

I also want to talk about environmental justice. Minnesota prides itself on being an open, caring place. Yet when I read the material on the pipeline planning, I can only conclude that the rights of native people are not being included equally, as they should be.

There is, quote, low-impact rural areas with low diverse -- low density -- I grew up in rural America -- are not sacrificed zones. And in this case Line 3 represents a threat to the water that we all need, that we all find precious. The risk is too great.

And I know how much good jobs mean. I live in an area -- or I grew up in an area that was economically deprived. And I believe that we need a government that really believes that we can transition to a new economy and bring everybody along, that doesn't abandon anybody. And right now we don't have a government. We say you're on your

own. That's not okay.

And, lastly, we have to remember that the economy is a wholly-owned subsidiary of mother earth. But we treat it as if the economy is the owner and the earth is the subsidiary. No, it's not. And the earth bats last.

Thank you.

FACILITATOR: Chelsea is here. And then Elan Pochedley. Elan.

Okay. Chelsea.

MS. CHELSEA DEARMOND: First I would like to say thank you to -- that we have this opportunity to even have a public discussion about this environmental impact study. And I say thank you to the Friends of the Headwaters for intervening in the certificate of need process, to Honor the Earth and the Anishanabe Band who've taken a leadership in this, Minnesota 350, the Sierra Club, and many other grassroots organizations and volunteers who have helped raise awareness about the impact pipelines have on our water sources, communities, and way of life.

This draft environmental impact state study raises more questions than answers for me. By the DEIS's own conclusions, construction of the Line

3 preferred route would not create any permanent jobs for Minnesotans, and temporary jobs would be filled by people who relocate. That's in Chapter 5, Section 3.4.

It would also perpet-- perpetuate structural racism by disproportionately affecting indigenous populations, including an increase in sex trafficking. That's in Chapters 9 and 11.

It would have at least one catastrophic spill in the next few decades. As a resident of St. Paul, I get my drinking water from the Mississippi River, and this concerns me.

And it would contribute to climate change to the tune of costing society an estimated $478 billion over its life span. And that's in Chapter 5, Section 2.7.

This Draft EIS does not realistically consider a no-build option, does not adequately analyze potential spills, and devotes only 18 pages out of thousands to the responsibility for cleaning up the existing pipeline that Enbridge will abandon.

Another concern that I have that isn't addressed in the Draft EIS is enforcement of compliance. This is important to me because I spent time trafficking bills at the Capitol during this

legislative session, and I learned that the oil and gas industry lobbied our state to specifically exempt pipelines from the certificate of need requirement. And thankfully this provision did not make it into law.

But doing a quick -- okay. And there's also -- besides these lobbying efforts, there's also PR campaigns to convince Minnesotans that pipelines are safe and that Enbridge cares about our communities. But doing a quick Google search on Enbridge's safety and compliance record reveals a very different story. And, of course, there's the 1.7 million gallon spill right here in Minnesota, and the notorious Michigan Kalamazoo River spill.

We have an opportunity here to say no to a multinational fossil fuel corporation who wants all the rewards of faster, bigger profits without taking the responsibility. When we say no to pipeline profiteering, we say yes to the value of --

FACILITATOR: Thank you.

MS. CHELSEA DEARMOND: -- our fresh water, we say yes to leadership of First Nations people who are protecting this water --

FACILITATOR: Thank you.

MS. CHELSEA DEARMOND: -- we say yes to permanent jobs for Minnesotans in the renewable --

FACILITATOR: Thank you very much.

MS. CHELSEA DEARMOND: -- energy specter, we say yes to our safe commitment to resisting climate change.

FACILITATOR: You can provide the written statement --

MS. CHELSEA DEARMOND: We say no --

FACILITATOR: -- to the court reporter.

MS. CHELSEA DEARMOND: -- to profit for a few, and yes to what is priceless for all of us.

FACILITATOR: Thank you.

Elan is next. And Kevin Pranis is next. Kevin? Kevin Pranis? Great.

All right. Elan.

MR. ELAN POCHEDLEY: Elan Pochedley. E-L-A-N, P-O-C-H-E-D-L-E-Y. (Speaking Ojibwe.)

Hi. I'm Elan Pochedley. I'm a grad student at the University of Minnesota and an enrolled member of the Citizen Potawatomi Nation.

Pipelines increase violence against

native women and their communities. Involved in the oil fields, for example, rape, assaults, and trafficking of native women have skyrocketed in the last few years.

Enbridge has a vested interest in the Bakken oil fields as of 2016, investing $1.5 billion. The question I have is why should we reward what manifests from these infrastructure development projects with more trust, with faith in something that doesn't benefit our futures, our families, and our communities?

The protection of Manoomin beds, or wild rice beds, is also vital to the Ojibwe communities of Minnesota. Corporations have historically altered the water levels of these beds, often flooding them.

Infrastructure development should prioritize the interests of communities and not capital. Capital is vital for creating jobs, but at the same time we must weigh that against the interests of current citizens and the citizens coming after them. Essentially I'm trying to say that creating or assisting creating a toxic environment needs to be rethought.

Miigwech.

FACILITATOR: Thank you.

We have Kevin, and then we have Ellen Pajore (phonetic). Ellen? Ellen, where are you again? Up here. After Ellen, we have Dave Cooley. David. Okay.

MR. KEVIN PRANIS: Kevin Pranis. K-E-V-I-N. P-R-A-N-I-S.

So I'm also with the laborers union representing the skilled construction workers. We're proud to work in a range of industries, including pipeline, but also, as Steve mentioned, renewables.

A couple of points. One, I want to thank the Department of Commerce for the tremendous amount of work that went into the Draft Environmental Impact Statement. I wouldn't say it's perfect, but it is the most comprehensive study that's ever been done, to my knowledge, on any pipeline in Minnesota and gives us a great basis for moving forward with a decision.

I'd also say that preventing spills has to be a top priority. It's a top priority for us, just as it is, I think, for everyone in this room. That's actually why we support this project, because simply by replacing an outdated line that

was built with outdated technologies that are no longer in use and shouldn't be, we can reduce the risk of spills by nearly 40 percent. Because, folks, we're not talking about whether to have a pipeline; we're talking about the difference between building a safer, newer pipeline and the existing pipeline.

The decision to not go forward with a replacement won't mean there's no pipeline. All it will mean is that we're still using the existing line. And we can't keep Band-Aiding that forever, although I think our members do a good job. We get lots of work out of it, but it's not a long-term solution.

I would also say that the climate change is also essential. That's why we're involved in building wind and solar, natural gas, replacement of coal, reducing carbon emissions. All those are great things to do. Those are climate investments. Stopping a pipeline is not a climate investment. It makes virtually zero impact on climate, because the truth is the oil moves by other means. If you're going to invest in electric cars, that's a different story. But that's not what we're talking about here. We're talking about whether the oil moves

safely through a newer pipeline, whether it moves through the old pipeline, or whether it moves through rail, which is much more unsafe.

In terms of the Environmental Impact Statement, while it's overall excellent and it's 5,000 pages, you know, incredibly comprehensive, there's one big glaring hole on construction job impacts. An assumption was made, sort of for purposes of the report, that there will be zero local jobs. It's acknowledged that's not based on anything, and that's completely inaccurate. As all of us know, in fact, our agreement that will cover this contract require that half of the workforce be local workforce. And we've seen that on project after project. So we're talking hundreds and thousands of jobs for local people, not only existing members, but also new career opportunities for people for whom this would be a first chance to get into a family-supporting career that can last the rest of their lives.

Also, I think it's important to look at the public safety of the rail alternatives. There is no discussion of the actual public safety risks of rail not only from derailments and explosion, but also at at-grade crossings. In fact,

the Keystone report that the U.S. State Department did showed that you're talking about additional deaths and injuries as a result of moving those volumes by rail instead.

Last, I think that it's important to look -- to look at the -- Line SA04 we think is a waste of time, because ultimately all of this feedstock fuels Minnesota's refineries. The gas only moves --

FACILITATOR: Thank you.

MR. KEVIN PRANIS: -- to get here. That all comes from this pipeline.

FACILITATOR: Thank you.

MR. KEVIN PRANIS: We have to find a safer alternative.

FACILITATOR: Thank you very much. Did we find Ellen Pajore? Ellen Pajore.

Okay. David.

MR. DAVID COOLEY: My name is David Cooley. D-A-V-I-D. C-O-O-L-E-Y. I'm against this pipeline being built, period. I want to (indiscernible) as being a realist. And since there's already pipe on the ground laying up there up north and has been for a while, I want to make sure that Enbridge is paying for removal of the old

pipeline before the new one being laid.

I also want to make sure that there's a provision made by the State that we have upfront escrow for the future removal of this Line 3 in case Enbridge disappears off the map in the future or whatever. So when it's no longer of service, it can be taken out.

I don't want private property owners, whether they're native or nonnative, to be on the hook to pay for removal of old Line 3, nor future removal of the new Line 3 whenever that period comes to be.

How is a private property owner, whether they're a businessman, a farmer, a homeowner, a cabin owner, going to deal with an abandoned pipeline on their property? How are they going to -- who's going to buy it? How are they going to deal with lower property values? This has got to be dealt with up front. The EIS needs to address removal of the old -- new -- old and new Line 3 up front.

Another point. Minnesota is joining states and cities to support the Paris Climate Accord. This Line 3 is in dec-- is counter to the whole idea of preventing climate catastrophe on down

the line. And all of the line -- all the training that has been done by people installing a pipeline has not done anything to make Enbridge other than a bad pipeline manager, since they have such a bad record of pipeline spills.

So you guys can put your pipelines in the ground, but they're going to spill, and we're going to end up with it in our water. Okay?

Now, just this past week I heard a program on MPR. It took 13 years to go from horses to horseless carriages. 13 years. We're going to put this pipeline in the ground. It's going to maybe take a year or two to get in there, if they do that. And then another seven, eight years down the road, there's going to be far reduced demand for the oil. Yes, I acknowledge that we're going to need some oil along the way. But should it be tar sands oil?

Another thing that hasn't been brought up here tonight, the effluent that brings -- think of bricks being --

FACILITATOR: Thank you.

MR. DAVID COOLEY: -- shipped down here through that pipeline --

FACILITATOR: Need you to wrap up.

MR. DAVID COOLEY: The effluent is --

FACILITATOR: Thank you.

MR. DAVID COOLEY: -- highly toxic and --

FACILITATOR: Thank you.

MR. DAVID COOLEY: -- can't be taken out of the ground.

FACILITATOR: Thank you.

Okay. Thank you.

So we have a lot more cards than we do time. We just want to say the court reporters are still out in the hall. If you do want to go and give an oral statement, they will write it down for you. If your card is picked, you can still come in and take your turn. So wanted to remind people that option is there.

Next is going to be Lee Stocking. Lee?

And then the person after that will be Steve Clemens. Steve, if you could raise your hand. Okay. So Steve will be next.

So, Lee, you're first. And if you can spell your name. Thank you.

MR. LEE STOCKING: Well, it's either Lee or Hobart Stocking. What were my parents

thinking? I'm a -- that's Hobart spelled like dishwasher, and Stocking like you wear on your foot. I'm a lifelong resident of Minnesota. I live in St. Paul.

I went to the University of Minnesota, where I studied chemistry and physics and graduated in chemical engineering. So you get a little bit of a nerd spin on this.

My wife is a lifetime resident of Minnesota and grew up on a Minnesota farm. No farmers' daughters from here.

My point is I'd like to see more detail in the Environmental Impact Statement on the impact of climate change with respect to Minnesota crop production. Three simple points here.

Line 3 is going to be responsible for spewing into our atmosphere over two megatons of CO2 per week. The science is in. We understand the impact on global warming.

I read a report that was published last year by 14 scientists at the University of Ames in Iowa on the impact of temperature change on our crop production in Iowa and Minnesota. In Minnesota the corn yield will be decreased by 49 percent by the end of the century, soybeans by 40 percent, and

wheat by 22 percent.

So why is that? Well, it's for every degree day over 86 degrees Fahrenheit, the crop production is reduced by 6/10ths of a percent. What does that mean in economic value to Minnesota farmers? Well, it means that if this happens -- and it's predicted to happen, because over the next 30 years we've been experiencing that we expect to see 22 to 70 days over 95 degrees Fahrenheit in Minnesota, whereas in the last 30 years we've seen only 3 days on an average over 95 degrees. The economic impact of that is $470 million over the next 10 years. And that's a very conservative estimate.

So what I want to know is what are we smoking? Who's going to pay for that? We -- we have better alternatives. We have cleaner energy where there's more jobs. We don't need this pipeline. And I'd like to see the crop impact added to the EIS.

Thank you very much.

FACILITATOR: Thank you. After Steve Clemens, it's Cameron Winton. Cameron, if you could raise your hand. Cameron's over there. Great.

Steve.

MR. STEVE CLEMENS: My name is Steve Clemens. S-T-E-V-E. C-L-E-M-E-N-S. I've been a resident of Minneapolis for 27 years. My family now gets 100 percent of its residential electricity from solar, a community solar garden in Minneapolis. I drive a hybrid car, and I'm on the list to buy an affordable electric car later this year. I rode a nice bicycle to this hearing.

I've attended numerous PUC hearings in the past three to five years on oil pipelines, and I have toured the existing pipelines in northern Minnesota with a staff member of the indigenous environmental network. And I have seen Enbridge oil pipelines, which are supposed to be buried, now completely out of the ground. I've visited sites of past oil spills that still have not been cleaned up.

I want to speak on behalf of the water. I've walked some of our rivers and creeks with a local Ojibwe woman, who is commissioned by tribal elders to pray for the rivers.

I want to speak on behalf of my children and our future generations and all living things. My main concerns about this Draft Environmental Impact Statement are these: It does not adequately address the climate chaos caused

primarily by the burning of fossil fuels. The extraction of tar sands is enormously damaging to both the land and the Athabascan people who live in Alberta.

It does not adequately address the treaty rights of the Ojibwe Nation within our state, especially how this pipeline jeopardizes lakes where wild rice grows.

The proposed placement of Line 3 continues a practice of environmental racism. Our fresh, clean water is priceless and must not be jeopardized for corporate profit, especially foreign corporations with a track record of oil spills.

We need the Department of Commerce to support infrastructure development in Minnesota for renewable clean energy, not the old, dirty oil ripped from mother earth.

Redo this EIS with a clear recommendation that the PUC deny the permit. No pipeline at all.

Thank you.

FACILITATOR: Thank you.

Cameron Winton. And after Cameron will be Mary Kowalski. Mary is right here. Great.

Cameron.

MR. CAMERON WINTON: Hi. Good evening. My name is Cam Winton. I'm with the Minnesota Chamber of Commerce. The Minnesota Chamber is comprised of 2,300 companies of all sizes all across our state, and those employers between them have 500,000 employees. It's my honor to speak on behalf of those companies this evening.

A quick note to the gentleman who spoke in his native tongue at the beginning of his comments. Thank you. That was a moving experience to hear that, with the Mississippi River through the windows there.

To the woman who shared her thoughts in the form of a poem, I'll admit I've never testified in the form of a poem before. That took guts, and I appreciate that.

And to the spirit of dialogue about our state and how we can chart that shared future, to borrow a phrase that someone over here used, I want to share a few thoughts in support of the Line 3 replacement.

First of all, the Draft Environmental Impact Statement is thorough. It took more than a year. It runs through thousands and thousands of pages. It took dedicated experts intense work to

create. It considers routes and alternative routes. It considers impacts and potential mitigants. It deserves to have good impact, good input factored in to be polished up and finalized, and then the Public Utilities Commission needs to move ahead promptly with the certificate of need and route permit process.

I do want to echo some of the points that have been made here. Unfortunately, the Draft Environmental Impact Statement fails to account for all of the local jobs that would be created. Regarding those jobs, it was noted that these are, quote, unquote, just temporary jobs. And I say this with respect to the person who said that, but I think it's very important to note that when we call jobs just temporary jobs, that ignores the reality of how everything we see that's been built by human hands is built, and it disrespects the livelihoods and the life work of the men and women we see here and over there and over there and their families. These are not just temporary jobs; these are jobs; these are good jobs.

Regarding Enbridge, Enbridge is a member of the Minnesota Chamber of Commerce. And if you talk to the thousands of landowners and

employees and local businesses whose livelihoods are supported by the company, they say that Enbridge is a darn good neighbor. And I've had the opportunity to meet with dozens and dozens of Enbridge employees over the past year, as they have gone to countless meetings, much like this one. And I believe that they are striving their very best to be good neighbors and chart that shared future for us.

And in closing, in my remaining 17 seconds, I direct you to page 17 of the booklet that we all have. It compares different methods of moving petroleum, petroleum products that we all need.

And just in closing, I direct your attention to cultural resources area of interest. 48 acres are impacted by the Applicant's preferred route and, in contrast --

FACILITATOR: Thank you.

MR. CAMERON WINTON: -- 85,000 -- 84,000 are impacted by the --

FACILITATOR: Thank you.

MR. CAMERON WINTON: -- alternatives.

FACILITATOR: Thank you. All right.

MR. CAMERON WINTON: Let's approve this pipeline.

FACILITATOR: Thank you.

We have Mary Kowalski next. After that is Sierra Osimoatutu (phonetic). Sierra Osimoatutu? Is she here?

MS. MARY KOWALSKI: Good evening. M-A-R-Y. K-O-W-A-L-S-K-I.

Water and oil is my primary concern. Tar sands oil, the dirtiest, most greenhouse gas intensive, with no proven cleanup, pumping through communities at about 760,000 barrels per day, being pushed through pipes by a company whose safety records are missing from the DEIS, a company reported to have 800 spills in its history gives me pause. Why would we permit this archaic infrastructure to be built at all?

Given the cost to produce tar sands oil that is 80 to $100 a barrel, with the profound risk to Minnesotans and excess capacity now in pipeline construction, why should the line be built?

The Department of Commerce notes the Applicant's preferred route would cross more wild rice lakes than any other proposed route. This area has the highest concentration of the most pristine aquatic ecosystems and some of the shallowest aquifers that can have irreversible damage done by

the Applicant's preferred route.

An example. The Applicant's preferred route runs very, very close to Spire Valley, the source stream that provides trout to all the fresh water streams in Minnesota. It could be taken out by the construction of the pipeline. If during construction they disrupt the geological structure that creates the natural springs, they have destroyed the hatchery forever. There is no recovering it. The hatchery has served the state since the 1950s. There is no return from this strategic error.

As a concerned citizen, taxpayer, and property owner affected by this process, I expect the DNR, the PCA, the DOC to negotiate a route that would be the least harmful to the citizens of the state, and especially to our water resource.

While it is my preference to not build another pipeline, if the replacement is permitted, use a route that would protect Minnesota citizens.

I want to make two points about the route. It's clear there are differences among the routes economically and ecologically. Those differences need to be weighted for the preservation of water, especially water that is the most pristine

in the state.

It appears that SA O4 is the least destructive to our state natural resources. It is the most direct to the final destination. It travels mostly over land. It is farthest removed from our clearest water, wetlands, and natural habitat. Please give serious consideration to SA O4 or a route that is the least potentially --

FACILITATOR: Thank you.

MS. MARY KOWALSKI: -- destructive to our life in Minnesota.

FACILITATOR: Thank you.

And again, a reminder, please give your statements over. You can give them to the people who are bringing the mic to you as well to give them to the court reporters.

Sierra Osimoatutu? Did she come in? She's not here. Thank you.

Okay. We're going to go with Molly Wilbur-Cohen. And next will be Ellen Pajore. Is Ellen here? I called her before. Just thought we'd try one more.

So we're going to go with Molly Wilbur-Cohen. And next will be Allen Richardson. Is Allen here? Okay. Thank you.

Molly.

MS. MOLLY WILBUR-COHEN: Thank you for this opportunity. My name is Molly Wilbur-Cohen. M-O-L-L-Y. W-I-L-B-U-R, hyphen, C-O-H-E-N.

I am a volunteer with Minnesota 350 and have been a health professional for more than 20 years. I am testifying about the problems and misguided statements in the Draft EIS.

In Chapter 10, Section 4.2.2.1, it states that little research has been conducted on the toxicity of diluted bitumen or tar sands oil to organisms, although the dilbit contains many potentially toxic materials.

Further into the chapter, at 10.4.1, it reads, quote, long -- excuse me, longer-term health effects of oil spills aren't well documented, but components of crude oil are known carcinogens. Spills have been shown to have limited correlation to cancer. And it says this is from the International Agency for Research on Cancer in 1989.

I'm going to speak about some following articles which show a very high correlation to cancer. In a 2017 article by Paul Goldstein, professor of toxicology at the American Medical Forensic Specialist website: The target

organs for contact with crude oil are the blood-forming system, nervous system, and reproductive system. Long-term exposure via inhalation and skin, which can be a few days or weeks, can cause central nervous system problems; can cause damage to blood and organs, such as kidneys and livers, according to Centers for Disease Control and Prevention.

There's also significant risk of cancer because tar sands crude oil isn't biodegradable, and effects of exposure to this toxin can follow generation to generation. What appears to be a small exposure may prove to be catastrophic.

In a July 2014 Financial Post article, oil tar sands pollution was linked to an increase in cancer rates for Chippewa in Alberta, Canada. Research conducted in collaboration with the Athabasca Chipewyan and Mikisew Cree First Nation and the University of Manitoba, they found unusually high concentrations of contaminants emitted during extraction and upgrading of bitumen. There were 23 cases of cancer reported among 94 persons interviewed over a three-year study.

And I am against this building of the pipeline and --

FACILITATOR: Thank you.

MS. MOLLY WILBUR-COHEN: Okay.

FACILITATOR: Thank you very much.

Allen Richardson. And next will be Jason George. Jason George? Is he here?

MR. ALLEN RICHARDSON: My name is Allen Richardson. A-L-L-E-N. R-I-C-H-A-R-D-S-O-N. I'm an organizer, and it's been my great privilege to work with an outfit called Minnesotans for Pipeline Cleanup.

Door knocking landowners along the old Line 3, the central question coming from landowners is this: If a private property owner who has been graciously hosting Enbridge's Line 3 pipeline would like it removed from their land in the face of Enbridge's desire to decommission or abandon that pipeline, who's on the hook for that financially? Is it the private property owner or is it Enbridge? And I can tell you this: That thus far I haven't spoken to anyone who thinks that the landowner should be on the hook for that.

The second point is that the Draft Environmental Impact Statement makes a rather blithe assertion that the pipelines are, in general, 10 or 15 feet apart. Mr. John Munter of Warba took it

upon himself to walk the distances of the public thoroughfares between Rowena and Grand Rapids and found that, amongst other things, on the -- the distance between Line 3 and Line 4, there is on average 30 feet rather than 15, which is certainly ample room to get some heavy equipment in there.

This next observation goes out to my brothers and sisters in the labor movement. Hello, laborers. How is it going for you, 49ers?

The Draft Environmental Impact Statement doles out this statistic: That Enbridge estimates the cost of removing Line 3 at approximately $1.28 billion. My question is this: How many jobs can you get for $1.28 billion? What it boils down to is this, is that it would be great if our brothers and sisters in the labor community would publicly and vocally throw their lot in politically with the landowners who are asking that these pipelines be removed.

Specifically, we're talking about landowner choice. If someone is indifferent to having a piece of abandoned pipeline on their property, well, then, no harm, no foul. But there are certainly no shortage of landowners who would really appreciate it if Enbridge would just take

that with them. And we all agree that you are the ones who are qualified to do that work. And $1.28 billion sounds like a pretty good job creation program to me, particularly because we know that Enbridge intends to abandon the rest of those pipelines as well, and we are in the process of establishing a precedent on this question.

Finally, I observed that the DEIS says that removal of the existing Line 3 could positively affect these communities by removing stress or anxiety related to the presence of the abandoned pipeline and ongoing risks to related water flow, soil, and water contamination and subsidence. Sounds like a win-win to me, labor guys, to --

FACILITATOR: Thank you.

MR. ALLEN RICHARDSON: -- get a piece of that 1.28 billion to help out those communities.

FACILITATOR: So we have John Muehlhausen next. John here? There's John.

And next will be Stan Sattinger. Stan here? Stan's over there.

Okay. So John.

MR. JOHN MUEHLHAUSEN: Thank you. Thanks for this opportunity to comment on Enbridge's Line 3 replacements project. My name is John

Muehlhausen. That's spelled J-O-H-N, M-U-E-H-L-H-A-U-S-E-N. And I'm a founding partner of Merjent, Inc.

Merjent is an environmental consulting company that serves a variety of energy projects. Merjent helps project proposers and regulating agencies fulfill their environmental obligations under the law.

Merjent is neither an advocate for nor an opponent against specific energy projects or energy policies. Rather, we are an advocate for the environmental review process, a process which is implemented in response to state and federal energy policies and the projects that the marketplace identifies. This is a process which allows for substantial stakeholder input, impartial scientific analysis, and sound decision making.

Merjent works on projects all over North America, but is headquartered here in the Twin Cities in Minnesota. Merjent presently employs about 72 full-time staff, most of who are environmental scientists or engineers.

Our scientists' and engineers' specialties range from air quality to aquatic biology and hydrogeology to historic archeology,

among many other disciplines. We also employ 10 to 50 additional field staff during the field season, which is typically every spring, summer, and fall.

Our field staff gather important information on wetlands, water bodies, endangered species, historic sites, and many other resources in the vicinity of energy projects.

Our scientists have been studying the environmental impacts of the Line 3 replacement project since the project was announced in 2014. We have been working with Enbridge staff to support a detailed and objective scientific review. Information we have gathered has been shared with state and federal regulators, such as the Public Utilities Commission, the Department of Natural Resources, and the Army Corps of Engineers, to supplement their environmental reviews and collectively build a more robust record of environmental resources in Minnesota.

I'm sure you have heard other people comment that energy projects such as the Line 3 replacement project are job creators. The environmental review process also is a job creator. We are obliged to this process not only because it allows public input, independent review, and

sensible decision, but also because it keeps our scientists here in Minnesota and elsewhere employed and yields vast amounts of important scientific information, such as the discovery of new archeological sites, identification of previously --

FACILITATOR: Thank you.

MR. JOHN MUEHLHAUSEN: -- unknown species -- thank you for the opportunity to comment on this.

FACILITATOR: Thank you.

We have Stan Sattinger. And next is Martin Malecha? He's right there.

Stan.

MR. STAN SATTINGER: I'm Stan, S-T-A-N, last name Sattinger, S-A-T-T-I-N-G-E-R. I have a copy -- detailed copy of my testimony that I can furnish.

Okay. So I'm a resident of South Minneapolis. I'm a registered mechanical engineer and past employee of Westinghouse Electric Corporation, where I worked on the design and testing of mechanical systems.

My five-year-old grandson comes to vacation with us up north in Minnesota each year, and I want to do my part to ensure that together we

can enjoy waters that are uncontaminated by crude oil spills. So I've reviewed the analysis of the likelihood of spills from the proposed line replacement, as presented in Chapter 10.

Section 10.2.1 outlines how the probabilities of failures were put together at a number of water crossing sites per the route using historic data on failure incident. No rationale is offered for taking the presence of a water crossing or any other feature as a basis for determining the likelihood of a rupture.

Pipelines are typically operated over wide ranges of flow rates, so there are up-and-down cycles of pressure on the pipe wall. The pipe wall fatigue damage that results from these -- from this pressure cycling causes ruptures, which tend to occur at close distances from pump discharges.

The National Transportation Safety Board established that fatigue played dominant roles in the 6,000-barrel rupture of Enbridge Line 4 at Cohasset in 2002 and in the 20,000-barrel rupture of Enbridge Line 6B in Marshall, Michigan in 2010.

In my opinion, using historic failure data to make valid failure probability predictions would require taking into account the distances from

the nearest pump discharges where the actual historic failures occurred and where the predictions are to apply in the new system.

On page 10-17 of the DEIS appears a statement that, quote, the risk of an accidental spill on an existing pipeline in the Enbridge system in Wisconsin or elsewhere would not be materially different whether Line 3 operates at the current capacity of 390,000 barrels per day or at the proposed 760.

FACILITATOR: Thank you very much. You can turn in your statement to complete it. Okay. So thank you very much.

We are coming very close to 9:00. The State has agreed that we can continue on, with a hard stop at 9:30. So we can fit in a few more public comments.

The staff is going to start taking down the posters, because we're going to need to be able to clear out of here before 10:00, and it takes some time. So they will be doing some dismantling in the background.

The court reporters are still out in the hall in the atrium area, if you'd like to give your statement there. But we will continue on, for

those who do still want to make their public statement, for up to 30 minutes more. We need to stop by 9:30 to leave the room, the venue, in time.

So, with that, Martin Malecha is next. And after that we have Kathy Hollander. Kathy is still here? Okay.

So, Martin.

MR. MARTIN MALECHA: My name is Martin Malecha. M-A-R-T-I-N. M-A-L-E-C-H-A. I'm a lifelong resident of Minnesota, and I'm here tonight to talk about the LaSalle Lake State Recreation Area, a 1,000-acre parcel in Hubbard County. The recreation area includes the second deepest lake in the state at 213 feet, and it's adjacent to a cold water stream, a 200-acre scientific and natural area on pristine strips of the Mississippi River.

The landscape has been identified by the Minnesota County Biological Survey as an area of high and outstanding biodiversity significance. Surveys of the area have identified over 90 species of trees and shrubs and more than 140 species of vivacious plants, including 12 species of orchids. Numerous rare, threatened, endangered, and special-concerned species of plants and animals have been identified there.

The LaSalle Lake recreation area was purchased by the State of Minnesota in 2011 for $8.5 million and has since then been developed further. The area now offers swimming, boating, fishing, camping, with plans for further development. The LaSalle Lake's recreation area is located 233 miles northwest of Minneapolis-St. Paul and 8 miles north of Itasca State Park. It is also located almost next to the Applicant's preferred route. LaSalle Lake itself is only one-and-a-half miles from the proposed pipeline.

Upstream of the LaSalle Lake are Little LaSalle Lake and Big LaSalle Lake. All three lakes link to each other at the Mississippi River by LaSalle Creek. The proposed pipeline crosses LaSalle Creek, a designated trout stream, about one-half mile above Big LaSalle Lake.

In addition to heavily forested and steep terrain in the area, for the pipeline to cross LaSalle Creek, it would go through a large wetland area, a process that will unavoidably be hugely disruptive to this sensitive ecological area.

Along with many other dangers, any trenching and other construction activity may well lead to silk-laden water entering into LaSalle

Creek. Not good for the trout. These concerns about the terrain, the ecology, the wetlands apply even more so in the event of a spill. Not only would damage to this pristine area be enormous, but the terrain and other will make getting to the spill, containing it, and remediating it a much more difficult job than in other areas with other topographies.

Unfortunately, we know from prior experience that pipeline spills are catastrophic, and the areas affected by the spill never really recover. Just look at the Enbridge spill on the Kalamazoo River.

After this significant recent investment by the State of Minnesota to purchase the area, exposing the LaSalle Lake State Recreation Area and adjacent land and water to disruption and damage from pipeline construction and the catastrophe of a spill --

FACILITATOR: Thank you.

MR. MARTIN MALECHA: -- are not justified in this case. Thank you.

FACILITATOR: Thank you.

Kathy Hollander.

And next will be Jean Ross. Jean Ross

here? Thank you.

MS. KATHY HOLLANDER: Good evening. My name is Kathy Hollander. Spelled K-A-T-H-Y, H-O-L-L-A-N-D-E-R.

My speaker next door to us, next-door table, mentioned that MPR had a very interesting show last weekend. I listened to it twice. The first speaker was a Dr. Amory Lovins of the Rocky Mountain Institute. He mentioned two photographs of the New York Easter Parade. In one, taken in 1900, you could barely see an automobile, so numerous were the horses in the parade. The second was taken in 1913, when barely even one horse was visible, so numerous were the automobiles.

In just 13 years society had changed rapidly, even though gas stations and repair shops had to be built all over the country, and the economics of the transportation by horse industry were affected.

We're on the cusp of another change now, from inefficient gasoline engines fueled by fossil fuels to efficient electric ones. Yet the DEIS does not consider the upcoming shift to electric vehicles as an alternative that would further drive down the worldwide demand of

transportation fuels.

The original first cars were electric, and there were -- it was a very popular electric car produced by GM and subsequently killed by GM in the late 1990s called the EV1. Yet the alternative of just not transporting the oil is never considered in the EIS.

EIA reports that the prime supply of sales from crude oil dropped 19 percent in Minnesota between 2004 to 2016. And there was also a drop in regional and U.S. a worldwide demand. But the Draft EIS refuses to consider the need for a foreign company to rip apart acres of our state by the largest infrastructure project in energy we have ever seen, to satisfy the needs of its customers, the refineries.

There is a worldwide glut of oil and refined products sitting in storage. This is why oil prices are so low. We are pulling more oil out of the ground than we are using worldwide. And China was filling its strategic oil reserve in 2015, which further artificially inflated demand.

This Draft EIS just assumes all this oil is going to go somewhere. Where is it going to go or the resultants refined petroleum products? We

are even exploring into storage overseas.

India just announced a goal of all electric cars by 2030. In Norway one-third of the cars are electric. Last year China sold more electric cars than were sold in the whole world in the last two years.

FACILITATOR: Thank you.

Jean Ross. And after that is Lois Norrgard. Is Lois here? Lois is next.

MS. JEAN ROSS: Jean Ross. J-E-A-N. R-O-S-S. The DEIS has glossed over the environmental impacts of Enbridge's preferred route for Line 3, quote, unquote, replacement. And the DOC hasn't addressed the fact that the DNR and the Pollution Control Agency came out last year advocating for a southern route to the Illinois refineries on farmland rather than through Minnesota's water-intensive lake country.

The memorandum of understanding between the DOC, the DNR, and the PCA has muzzled cooperative agencies' peer review and comment. The public has no way of knowing what the DNR and the PCA experts think about the DEIS's assumptions, analyses, and conclusions, or even if they've had very much input at all.

The fact that the DOC's consultant relied heavily on Stantec and Barr Engineering testimony and results would lead us to believe the study is slanted. The recent docket submitted and discussions with the administrative law judge regarding the DEIS modeling suggests that little, if any, cooperating staff from the DE -- DNR or PCA review of the DEIS modeling was done.

For these reasons, we, the public, need to have direct access to all communications between the MOU partners and any other agencies' discussions, such as with the Department of Health and Ag. As a guardian of the comments, I implore the DOC to do a thorough and transparent EIS and not gloss over those facts so that Enbridge can build their pipeline.

With current projections this pipeline project will be obsolete by 2025. I ask the DOC to factor in that we are quickly transitioning away from fossil fuel economy, because we have to. The fossil fuel industry has been a bad corporate citizen and destructive to the liveability of our planet for future generations and most living things.

I beg the DOC, as the RGU on the

biggest and possibly last fossil fuel project in our state yet to be built, to honestly consider the alternative route through farmland that will be easily accessed when spills occur. And as a guardian of comments, I challenge the DOC to put up a no-build option and be part of the future and not the past.

As decision makers you have the opportunity to be on the right side of history. Don't make Minnesota make a bad decision here and --

FACILITATOR: Thank you.

MS. JEAN ROSS: -- we'll have to pay for getting rid of this pipeline --

FACILITATOR: Thank you.

MS. JEAN ROSS: -- when Enbridge abandons it, because they have no money to clean up their mess.

FACILITATOR: Thank you.

Lois Noorgard is next, and then Kelly Jewitt. Kelly, are you in the room? Kelly? If not Kelly, I've got Laura DeShane. Laura? Okay.

MS. LOIS NORRGARD: Hi. Lois Norrgard. L-O-I-S. N-O-R-R-R-G-A-R-D. And, again, thank you for the time to comment this evening.

I have many concerns over the Draft

Environmental Impact Statement, but I'm just going to concentrate on one thing right now and submit a lot more through writing by July 10th.

Abandonment is one of my major concerns. But, very importantly, why does the company request a 750-foot-wide buffer? I'm really concerned about that buffer, what land clearing, what impact of chemical treatment, tree removal, and other environmental disturbance would occur with that corridor? If this width is for additional pipeline corridor or just an additional future pipeline, this must be analyzed in this DEIS. That would be a connected action identified and reviewed and studied now.

One missing alternative that merits analysis and review in this DEIS would be a Line 3 continued use for an extended period of time, with a planned sunset and then a transition to alternatives. We need an alternative that takes a very hard look at perhaps three more years or some assessed future continued use, then decommissioned with a sunset date. Not abandonment. That's not an option, for all the reasons laid out in the summary document.

The summary shows that continued use

of this pipeline is possible at this time. I advocate only allowing this, with a comprehensive and robust analysis and a plan put in place that ratchets down our use of the toxic tar sands that travel through it, a plan to transition to clean energy, (mic cutting out), and alternative transportation choices.

This review has been started in the Climate Pollutions and Economic Subsidies Report (mic cutting out) from 2016. While this framework would require heightened integrity work and progressive decreases in operating (mic cutting out), continuing this operation is possible in Line 3. Abandonment is not an answer.

In addition, Line 3 is over 60 years old and has integrity problems. We know it is a problem. The pipeline is breaking down. We cannot leave it to taxpayers to clean up the mess. Enbridge has had the benefit of operating and profiting on this line for many years. They should take the responsibilities, fulfill a commitment to the state, and properly (mic cutting out).

FACILITATOR: All right. What we're going to propose -- is the mic working now? Like 30 more seconds. So it's going to keep us to -- ah.

40 more seconds to you. Thank you.

MS. LOIS NORRGARD: I don't remember where I left off anyway. So the benefits of proper decommissioning far outweigh any risks from the actual process to do so. In Minnesota, for the protection of our amazing natural environment and water resources, we must require a proper decommissioning process that reflects the process done in Canada.

Climate change is another big impact. And a lot of people talked about that this evening, so I will have comments on that. But the project is the wrong direction for Minnesota. I urge us to look to the future and our need to stop using fossil fuels, if we want to have a healthy planet for us as well as our fellow creatures.

I urge the State to take a hard look at a greater range of realistic and doable alternatives, alternatives that do not lock us into a future of more high-capacity, extremely-risky, way-too-expensive fossil fuel infrastructure that may well be or should be obsolete in ten years. We need to ramp down our use of fossil toxic tar sands and move to alternatives.

FACILITATOR: Thank you so much. And

thank you for your patience as we got the mics working.

Laura DeShane is next. And after Laura is Darril Wegscheid. Darril is next after Laura.

MS. LAURA DESHANE: Hello. My name is Laura, L-A-U-R-A, DeShane, D-E-S-H-A-N-E.

I am a Minnesota resident, and I want to speak today in opposition of this pipeline. I've been to a number of hearings and meetings over the past few months, both on the issue of pipe lines and more general environmental issues.

As an overarching note, I've been appalled by the considerations given to the environment. The air we breathe and water we drink have an understandably difficult -- are understandably difficult to assess on a monetary level, yet industry is so quick to risk our most fundamental resources for the benefit of their own profit.

We've heard repeatedly that the existing Line 3 pipeline is too dangerous to continue using, and I absolutely trust that assessment. The existing Line 3 clearly needs to be shut down, cleaned up, and restored.

What troubles me is what happens 30 years from now. What will become of the proposed new line? If you're not taking out the existing Line 3 now, how can we have any assurance that this new proposed line will be cleaned up once it becomes obsolete? Do we all gather in a room and be told again that it just isn't possible to return to a life of reduced fossil fuel consumption?

So with that in mind, my question becomes, what do we need to make these pipelines unnecessary? What do I need to sacrifice? What can all of us do to make this choice possible? Is there any study that can tell us what would actually need to be done to make these pipelines obsolete?

I am very concerned about the information provided in the accidental crude oil release handout. First, it states clearly that pipelines have a much, much larger -- have much, much larger spills. But what I'm not seeing on that sheet is what a gallon of oil will do to a lake or on land once it is spilled. How many gallons need to spill into a waterway to poison that water for the wildlife and for the people who drink from it?

A few people speaking in support of the pipeline warned that other methods of

transportation would bring this oil close to city centers, as though it should convince me to support the pipeline because it would keep the oil away from me. To that I question why should the population size be so important? If it is dangerous to us here in the cities, surely it is dangerous to those small communities as well. I cannot value my safety over theirs.

If it is not -- it is not just or prudent to keep building these pipelines. It is a mistake to go forward with Line 3. We must shut down the old pipeline and finally work toward alternatives to fossil fuels at every opportunity so that we no longer need new pipelines.

Thank you.

FACILITATOR: Thank you. Again, I'm just going to remind folks we have very few minutes left. So, again, the court reporters are out there. So if you're not getting your comment in and want to talk with them, there's a little bit of time to do that.

We have Darril, then Adam Hutchins. Adam, are you in the room? All right. Troy Trulian? Troy? All right. And then what about Steve Luchuck? Steve?

UNIDENTIFIED SPEAKER: He left.

FACILITATOR: Okay. Darril can go. We'll check for other names after you go, Darril.

MR. DARRIL WEGSCHEID: Thank you. Thanks all of you. Name is Darril, D-A-R-R-I-L. Last is Wegscheid, W-E-G-S-C-H-E-I-D.

Background: Former state senator from the mid '80s. Relevant background: I have a bachelor's in mathematics and a master's in computer economic and operational modeling, which I'm going to go to primarily.

I have a home on Lake Roosevelt, which is right on the border of Cass and Crow Wing County, and our lake is about 300 feet from the right-of-way of the preferred route, coming between us and the DNR lake fish hatch-- or trout fish hatchery, which it more than likely would destroy because it's a natural spring hatchery and it would more than likely bust the bowl that makes that a natural spring hatchery. And that has got to be worked around.

Overall, compliment the PUC and the staff that put this together. I would hope that in the final EIS, for the sake of transparency, with footnote credibility of where the different

information is coming from. I find it very difficult to just look at this and say is that something I agree with or not. If the DNR and PCA have reviewed it, I'm going to feel a lot more comfortable. I look forward to their comments as well.

So, anyway, as a modeler for 31 years, practicing good building computer and operational models, I will remind everybody the Titanic was not a single-event disaster. There were a whole series of things that went wrong. As a modeler, you don't model averages; you model ranges of things or what's called stochastic variables, and you look at the possibility of a combined combination. For example, on the Titanic -- many ships hit icebergs. Okay? This one became a disaster because about seven factors went wrong at the same time. Didn't have enough life rafts, separate factor. The captain tried to avoid the iceberg and took it on the side rather than head on, an operational disaster. And you string those together, that's the concern of the modeling system that is complex.

And I would dare say that modeling is in need of some repair. For example, when you look at spills and the comparison, a truck only carries

about 11,000 gallons of petroleum, 11,700 to be specific. The worst disaster you can have from a truck, therefore, is 11,700 gallons. And, in fact, the average look at the chart, it's about 10 gallons. So those high frequencies are usually setting up and setting transfers of fuel.

A full train of 110 cars carrying petroleum would potentially release something in the range of -- excuse me, read my numbers -- about -- if the whole train went down -- again, probabilities is what you're modeling -- the worst case would be 3.5 million gallons. That's substantial. This pipeline, if it were to rupture, would produce 1.7 billion gallons per hour. Okay? That is 30,000 gallons a minute. If you don't have instantaneous recovery, you're going to have a problem in terms of being --

FACILITATOR: Thank you.

MR. DARRIL WEGSCHEID: One last comment.

FACILITATOR: Appreciate it. Thank you.

MR. DARRIL WEIGSCHEID: The cost is one --

FACILITATOR: Thank you.

MR. DARRIL WEIGSCHEID: -- mill per gallon of petroleum transfer. For one mill --

FACILITATOR: Thank you. Thank you.

All right. Kelly Jewitt? Adam Hutchins? Troy Trulian? Steve Lochuck? Is Steve here?

UNIDENTIFIED SPEAKER: He left.

FACILITATOR: Okay. Thanks. Bob Chunberger.

UNIDENTIFIED SPEAKER: He left.

FACILITATOR: Dr. Tiffany Beckman? Ron Ledko?

UNIDENTIFIED SPEAKER: He left.

FACILITATOR: John Munter? John, you're up. And Debra Matson, if she's here, will be next.

MR. JOHN MUNTER: Anybody wants a copy, they can get one afterwards. Name is John Munter. J-O-H-N. M-U-N-T-E-R. Retired from Warba.

The Department of Commerce has been given an impossible task. The DEIS cannot be fixed. The only option is no build.

For number one, the complete economic analysis has not been provided to these meetings, as required by MEPA.

Secondly, no good peer-reviewed groundwater or spill analysis has been done not paid for by Enbridge.

Three, the routes all go through ceded territory where tribes have reserved rights to hunt, fish, and gather in perpetuity, not until an oil pipeline destroys wild rice or until Applicant causes in part. Global warming destroys rice beds.

Number four, both the DNR and PCA last year advocated a farmland route over the lake country route. I don't know how people can get around that.

Number five, relying on the EIA forecast, which has been historically prejudicial against renewables, of rising oil demand by 2040 is faulty. Since other analysts from Deutsche Bank, Carbon Tracker, Bloomberg's New Energy Finance, and Simon Henry, Shell's chief financial officer, all predict world oil demand peaking in the 2020s, since China, India, and Europe are rushing to electric vehicles.

Next, the alternatives section under the no-build option did not consider Saudi oil, which is 21 percent less carbon intensive, according to the Line 67 EIS. And then there's the oil boom

in the Permian of Texas, which is keeping the coffers full in New Mexico; and the possible Trump potential to do offshore oil exploration. This is why all the majors are fleeing Alberta and signing off their holdings to the local Canadian companies. And so all future oil coming down there is probably going to be sold for a loss, again, to defray bad debt.

Number seven, genocide issues were not considered in the connected actions of First Nations downstream of the tar sands and environmental justice issues around Detroit, Michigan and Port Arthur, Texas refineries, as well as the lack of the lease for the Bad River Band in Wisconsin on Line 5, as well as placing a higher priority on Minnesota.

The DEIS did not consider the potential to stop or delay other pipeline projects, like the Sandpiper was stopped, the KXL was delayed, as well as others delayed in Canada.

It does not consider the Minnesota statutory greenhouse gas emissions goals or value of holding Minnesota to a higher standard than surrounding states and Canada.

I'll quit there. Thanks.

FACILITATOR: Thank you, John.

We have time for just two more.

Debra Matson. Are you here, Debra?

UNIDENTIFIED SPEAKER: She left.

FACILITATOR: Thank you.

Joe Nanihoss? Joe Nanihoss?

UNIDENTIFIED SPEAKER: He left.

FACILITATOR: Jay Dawn?

All right. We're going to keep going. Robert Potter?

UNIDENTIFIED SPEAKER: Left.

FACILITATOR: He left. Thank you.

Alicia Borback? Borack? Emily Knorr? Ron Wetfoe?

All right. We're going to keep going. Let's see. Carolyn Ann?

UNIDENTIFIED SPEAKER: She left.

FACILITATOR: Abatha -- Anvaya Ajay? Lynn -- oh, we have one.

MR. ANVAYA AJAY: My name is Anvaya Ajay, I'm 13 years old, and I am part of the generation that will build -- that will receive the full effects of this pipeline. We are the generation that will receive the polluted water, while Enbridge receives their profits.

We are the generation that could

receive clean water and job opportunities, if we invest in renewable energy.

We are the generation that is already suffering. My cousins in Tamai -- the city of Tamai was flooded last year, and I didn't know if they were safe. It was terrible, but it could be prevented. This kind of thing could be prevented, if we can step up and not invest in fossil fuels and stay away from climate change.

The DEIS does not take into account the full economic -- the full social cost of carbon emissions. It does not account for climate change properly. It does not account for how climate change will continue to affect the world on a -- for a long, long time.

Thank you.

FACILITATOR: Thank you. And, Anvaya, if you could just spell your name for the record. If you could just spell your name for the record, sir, that would be greatly appreciated.

MR. ANVAYA AJAY: A-N-V-A-Y-A, space, A-J-A-Y.

FACILITATOR: Thank you.

Lynn Weeka? Lynn? Claudia A? Onancya Aushe (phonetic). Whoop, we got -- okay.

Great. And this will be our last speaker, because we're just past 9:30.

MS. CLAUDIA ALTHOEN: Hello, my name is Claudia Althoen. C-L-A-U-D-I-A. A-L-T-H-O-E-N. I have lived in Minnesota my entire life, and I'm a student here. And I'm part of the generation that will have to deal with the consequences of climate change, as well as this pipeline if it is built.

And as a young person, making my way in the world and pursuing a path to create positive change, it's greatly concerning that there are people here trying to keep us, pull us, and bind us back into the past.

It's time for Minnesota to take a stand and divert completely from fossil fuels. And there is no reset button. Minnesota is not the sandbox level of a video game, in which you can do whatever you want without consequences and just erase what you've done.

This is the real world. There are consequences. And we don't want to deal with the consequences of short-term thinking, such as this pipeline.

And someone said earlier that the current pipeline is old and out of date. Well, so

is using fossil fuels. We know that, as was also mentioned, that the current pipeline is not a long-term solution. Of course, it's not. Renewable energy is the long-term solution.

And I ask that a new pipeline not be built and the current pipeline be removed. It's time to embrace the future, a green future, a future powered by renewable energy.

DEPUTY COMMISSIONER BILL GRANT: With that, thank you very much, everyone, for coming. A reminder that if you would like to make written comments on the Draft EIS, those comments will be due by July 10th at the close of business.

There are still public meetings throughout the project area to attend through next week. Please see our website for those dates and times.

Thanks very much for coming.

(Off the record.)

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DEIS MEETINGS - 14-916 15-137

STAPLES - JUNE 14, 2017 - 11:00 A.M.

(PRIVATE COMMENTS WITH COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Staples Community Center
122 6th Street NE
Staples, Minnesota

I N D E X

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MS. JUNE WEITEMIER: June, and it's W-E-I-T-E-M-I-E-R.

I'd like to say that I'm for the pipeline, and I'm especially for putting in new pipes replacement. And most of my family -- there's like 75 of us, with just my brothers and sisters and children. And 75 out of 5 [sic] are for, and we're trying to train the young ones. Because if they can put a cable on the ocean floor from England to the United States of America for the telegraph, this is a lot easier. Plus, they have the technology, the engineers to go and check and to see where the placement of rivers, creeks, pipes, and that kind of thing are, you know, for safety purposes.

So I'm definitely for it, because I think that the engineers and the chemists are smart enough to know how to do it. They're not just regular people.

So, yeah. And I think it would stop some of the problem with the railways, you know. So, I mean, I love trains; but I think we need to have safety, safety first. And I know, you know, every city has a city underground of pipes, sewers, electrical wires, you know, in any decent-sized city. So this would be almost nothing, you know,

for Enbridge to do.

So I'm in favor of it.

I know there was something else I was going it say, but I can't think of the other thing.

MS. KIMBERLY PILGRIM: Kimberly Pilgrim. K-I-M-B-E-R-L-Y. P-I-L-G-R-I-M. And I would like to make a comment that I think the Department of Commerce has done a terrible job of advertising and getting the message out for the public to comment on this.

And, for example, I work at the Community College in Brainerd, Minnesota; and we accidentally found out about it last Monday and that there was -- it was just -- it was pretty quiet. So it wasn't like -- I think that something this significant needs to have better advertisement.

And I spoke with a lot of community members in Staples that weren't aware that this was happening here. I think that the big posters and -- it's not accessible to just -- I mean, it doesn't make sense to the common person, and it can be intimidating. And I think the State should be using universal design, and I think that the information should have been more interactive.

And so I feel like the Minnesota

residents, the Department of Commerce has really let them down by not being more aggressive in promoting this community input.

I also feel like my first choice would be for a Canadian-owned company is to run their pipeline through Canada and not Minnesota and compromise Minnesota water.

Given if we don't have a choice, then my choice would be replacing existing lines. And I realize that that's not the preferred choice for Enbridge, because it's more expensive. Well, if a Canadian -- I mean, if another country wants to use our land to pump crude oil through, it really doesn't matter.

I mean, and they also need to be -- there needs to be money in escrow from this Enbridge company for cleanup. And I also think Enbridge needs to do more -- more significant monitoring of their oil pipelines.

MR. BENJAMIN OWALEON: First, name is Benjamin, B-E-N-J-A-M-I-N. Last name is Owaleon, O-W-A-L-E-O-N. I feel that this DEIS meeting was really crippled because of inadequate notification and lack of information adequately disseminated to the

public, I felt, including detailed maps that needed to be reviewed more than just a few minutes before the DEIS meeting.

(Comments concluded.)

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MR. BENJAMIN OWALEON: First, name is Benjamin, B-E-N-J-A-M-I-N. Last name is Owaleon, O-W-A-L-E-O-N. I feel that this DEIS meeting was really crippled because of inadequate notification and lack of information adequately disseminated to the public, I felt, including detailed maps that needed to be reviewed more than just a few minutes before the DEIS meeting.

Thank you for your time.

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DEIS MEETINGS - 14-916 15-137

LITTLE FALLS - JUNE 14, 2017 - 6:00

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: CN-14-916

OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137

OAH DOCKET NO: 65-2500-33377

Initiative Foundation
405 First Street Southeast
Little Falls, Minnesota

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FACILITATOR: Welcome, everyone. Good evening. This is the Line 3 Project Draft Environmental Impact Statement public meeting. To get us started -- this is going to be the public comment period.

To get us started, I'm going to give this to Jamie MacAlister, who can give us a little bit of an overview to get us started.

MS. JAMIE MACALISTER: Good evening, everyone. Thanks for coming. Before we get started in our oral comment period, I just want to go over a couple of things with you all.

First of all, hopefully you've gone around, seen the posters, you've had a chance to talk with agency staff that are here. We have staff from the Department of Natural Resources, the Pollution Control Agency, Public Utilities Commission, and those of us from Commerce here.

And we're here today to get your comments on the Draft EIS. So we hope that you've been able to get a look at the posters, even if you haven't been able to fully comb through the thousands of pages in the draft, to get a sense of what you might want to comment on.

And just to remind everyone, that the

draft EIS is not a decision-making document; it's an informational document, and it is what the Public Utilities Commission will use to help inform their decision on this project.

They have two decisions to make. They need to make a determination on the certificate of need, and they also need to make a decision for the route. So the need will determine if the project is needed in the state of Minnesota. The route permit will determine where the project would go, if a certificate of need is issued.

I had someone here request that we make more clear what happened to the comments that folks have provided, if you've been following this process for a long time. So about a year ago we held scoping meetings for Line 3 and what was kind of a companion project in the corridor, the Sandpiper project.

As you may know, if you've been following these projects, the Sandpiper project was withdrawn. But many people commented on both the Sandpiper project and Line 3. All of the comments that were submitted for the Sandpiper project and the Line 3 project were used to develop the scope for this EIS. So your comments will have been used

to inform this scope. They're still available. We've compiled all those comments. They have not gone away. So if you're concerned about those comments, we did use those. And hopefully you will see those comments reflected in the draft EIS.

But let's take a look at where we are now. We prepared the scoping document. The scope was used to inform the draft EIS, which is what we're here to get your comments on.

Once the comment period closes on July 10th, we will be releasing a final EIS, roughly August 10th. And once that document is released, there will be another part of this process, the contested case hearings. Those will be administered by a law judge, and you will be able to advocate for your position with the judge. You will be able to talk to other parties, ask questions of the other parties, including Applicant. The judge will prepare a report.

All of that information that has been gathered throughout this comment period, the contested case proceeding, will be submitted to the Public Utilities Commission. And that entire record and body of work is what they will pull from when they deliberate. And the permits, if they are

issued, are not expected until sometime in 2018.

So we are here tonight to get your comments on the draft EIS. Specifically, what we are interested in is whether or not there's information missing from the document, if there's information that is unclear, or if there are things that we can improve in the document before we prepare the final.

So tonight we will accept written and oral comments. You can also submit your comments by email or regular mail at your leisure. As long as they're postmarked by July 10th, we will take those comments.

We will be compiling all of your comments; and they will be posted not only on our website, but they will also be posted on the Public Utilities Commission's website and the docket, and they will be used to help us prepare the final EIS.

So it's important to know that all comments are equal. This is not a vote. It's not about how many people are for this project, how many people are against the project, whether you provide us with written or oral comments, the comments are all treated equally when they come in to us.

With that, I'm going to turn this back

over to Stacy. She will run through the meeting guidelines with you, and we'll open it up for comments.

FACILITATOR: Great. Thank you so much.

Okay. So just a little bit about how we will proceed with this public comment period. I have a couple of names of people who have signed up and said that they would like to speak. So we will start with those people. We will ask you to limit your comments to seven minutes or less so that we really do make sure everybody gets a chance to speak.

So we'll start with the people on the cards. And then, after that, we'll take people's hands. When you are called on to speak, one of our staffers will come over to you with the mic so you can speak from your seat. You can stand up if you'd like. But we want to bring it to you, rather than have people all try and make their way forward in this crowded space.

We do ask you to be respectful of each other. We have different views in the room. We want everybody to get a chance to be heard. We want everybody to feel like their voices are welcome. So

we ask you to please be respectful, not interrupt.

If you would like to express approval of a perspective or something that you've heard, we ask you to wait until that commenter has completed their full comment and then you are welcome to show approval with some applause.

If you disagree with what you've heard, we ask you to keep that in, because we don't want to, again, make people feel uncomfortable. We really want all the comments and everybody's voices to be welcome and to be heard.

We also ask that you do not direct your comment toward any individuals. If you'd like to directly address issues, that's really helpful. If you'd like to speak to organizations, that's okay too, but not to individuals and not to have comments that are meant to denigrate any other individuals or the things that they've said personally in the room.

In the room we have a number of state agencies. Their role here is to listen. The state agency folks want to just raise your hands. And you all have been talking to them during the poster session. So they're here to listen.

And just a couple of other logistics is, if you can silence your cell phones so we don't

hear the unique songs that everybody chooses for their ringers these days.

And we do want to end on time. I don't think that should be a problem. And I think we should have plenty of time for everybody to speak.

When the microphone is brought to you, if you can state your name and spell your name. Our court reporter here is going to be transcribing what you say, and so spelling your name is very helpful for her. So I'll try and remind you each time I go through.

Okay. With that, our first speaker tonight is Tom Watson.

We'll pull up the timer. Excellent. So there's our timer. So seven minutes or less. At around a little before seven minutes, I will stand up to sort of give you the signal that your time is approaching, and at seven minutes I will ask you to conclude.

MR. TOM WATSON: So when am I on the clock? Now?

FACILITATOR: No, after you spell your name.

And just one last thing. If you are

reading from prepared remarks, if you wouldn't mind giving a copy of those to the court reporter, just to help reinforce and make sure she didn't make any errors in transcribing, that would be great.

MR. TOM WATSON: Thank you.

FACILITATOR: So you're welcome.

MR. TOM WATSON: Tom Watson is the name. T-O-M. W-A-T-S-O-N. I'm a resident of Crow Wing County and also representing the Whitefish Area Property Owners Association in Crow Wing County, and I'm their president. And for the record, we're 1,200 members and basically involved with the northern part of Crow Wing County and the very southern part of Cass is our district.

I appreciate the opportunity to speak to this matter. I want to begin by a couple of items that I would ask Jamie to reinforce as we do this. I served as an elected official in local government, in city government, so I've been through an EIS as part of the responsible government unit. This is a difficult task.

The important thing to remember on a certificate of need, to be real clear about that, is to describe a process that is to result, thus, in a decision that evaluates the benefits to the

residents of Minnesota. Not the residents of Brainerd, Little Falls, Cass Lake, Aitkin; the benefits to Minnesota versus the costs to the residents of Minnesota. Everybody. This is not a vote on Enbridge. It's not a vote on any of those kinds of matters. It's really -- as I've said to somebody the other day, take a piece of paper, strike a line down the middle; on one side put pluses, there's your benefits; on the other side put minuses. And when you're all done, take a look and see whether you've got more pluses or minuses, because ultimately that's the decision the Public Utilities Commission is going to have to make.

I'm not going to repeat some things. I did testify in Brainerd. But I do want to address some items that specifically are not in this particular document. As Ms. MacAlister indicated, it's important to describe things not whether you're for or against, but what's not in this document that would help make that decision for you or any other reasonable individual.

Chapter 4 is a chapter in the draft EIS relative to alternates. There needs to be a section that very clearly describes what happens when the benefits do not exceed the costs to the

public. It's called a no-build option. What happens in that case?

Enbridge has been mailing out literature and postcards and communications to taxpayers throughout all of these areas in which these hearings are being held. They're giving them $20 gas certificates in Park Rapids, for example, and indicating but for them they wouldn't be buying gas in Park Rapids. That's just hogwash.

And so that no-build option really needs to define what happens. Are we going to be leaving people in Park Rapids and Cass Lake and Little Falls, et cetera, without a gas station? Because that's kind of the implication.

Chapter 5 covers a lot of conditions. And the argument that I have with that -- I made it in Brainerd and I'll repeat it here -- the document, in a sense, indicates that Enbridge and the Applicant will provide all the data relative to current conditions; current environmental conditions, current economic conditions, current employment conditions, et cetera, et cetera. That's fine. I'm glad they're doing that.

The problem is that the law on environmental impact statements, the document is to

be prepared by the State of Minnesota as an independent body. It doesn't mean that all of us can't contribute to this. Enbridge can contribute to it. But the document needs to be prepared by an independent body. Enbridge, unfortunately, is not an independent body, and they need to put that data out there.

And to give you an example, I've been along on this thing for about three or four years. One day I hear that they're going to employ a thousand people and they're going to generate $2 billion worth of economic benefit to Minnesota. The next day I hear it's 2,500. The next day I hear it's $20 million. The next day I hear it's $200 million. The State's job is to figure out exactly what that data means.

I'll give you a comparison. In our area, for example -- and if I include Morrison County, if I include Cass, Crow Wing, Hubbard, Aitkin County, travel tourism second home owners, the income associated with people who visit up here, who live here, who reside here, who own second homes in this area, the economic benefits -- and I can give you all data; comes from the State of Minnesota itself -- the economic benefit in those areas is

only exceeded by Hennepin and Ramsey County. Tax revenue, jobs, primary and secondary jobs. So this is somebody who lives here who works at the hardware store, is a cashier at the bank, et cetera. They have a job in many cases because there is the primary visitor who also spends money in the area. It's significant.

Water resources, in my opinion, is not well described in this particular document for two reasons. There is no section specifically on the hydrology of the area, which is a mistake. The critical thing about hydrology, at least in our area in northern Crow Wing County, the water table is at 30 and 40 feet. It's all sand. Any kind of product that will spill into the ground or anything else will be in your drinking water system, in your well, you'll be using it for human consumption, you'll be taking a bath in it, you'll be washing your vegetables and preparing your foods with that particular material. I suspect you don't want to do that.

If you were living in the Twin Cities, it's different. You got a rock orgini-- rock operation in that ground condition down there, you got aquifers that are 200 feet down. That's not the

case up here.

Number 3, in this particular section -- and this would apply both to Chapter 5 and 6 -- there's a corridor from Park Rapids to Carlton County that is -- right today is essentially a wooded area. There's wetlands in that area, there's habitat for migratory birds, et cetera.

This particular document has sprinkled through all 5,000 pages information to tell you -- if you can figure it out and you got enough patience and you're going to live long enough to finish reading it, tell you what's going on from Park Rapids through Backus on to Outing on to Carlton County. It's an area in which there is no pipeline corridor today. It's 120 -- about 110 or 120 miles. Enbridge has proposed to run Line 3 preferred route that's 334 miles. In other words, this a third of the distance.

I've asked the State that there needs to be a separate chapter in which all of the cultural, historic, environmental, economic, water resources conditions are fully disclosed, rather than have to pick and choose. I don't know about you, but I've been reading at this sucker, and I'm not very far along, and I can't -- I can't do that.

FACILITATOR: Thank you.

MR. TOM WATSON: Thank you very much.

FACILITATOR: Thank you.

Sarah Gorham? If you can say and spell your name.

MS. SARAH GORHAM: I do have prepared remarks I can give you.

My name is Sarah Gorham. S-A-R-A-H. G-O-R-H-A-M. Thank you for being here this evening and taking public comments about the DEIS. I'm sure it's been interesting to hear how the residents of this area feel about the project. Sorry.

This project is being called the Line 3 replacement. It would more truthfully be described as a brand-new corridor for oil pipelines through some of the cleanest and most abundant sources of fresh water in the country. We are being asked to put our water at risk for a pipeline project carrying tar sands oil from northern Alberta to the Great Lakes.

Enbridge is a large Canadian energy company that seeks to generate profit. That's what companies do. They have a commodity. They wish to pipe this commodity through Minnesota and bring it to market. This commodity may or may not benefit

Minnesota after being refined; but we are being asked to put at risk our waters and lands, our lakes, streams, rice beds, drinking water aquifers, wetlands, forests, wildlife and, of course, the Mississippi River. 760,000 barrels a day of sludgy tar sands oil. That is 32 million gallons every day, and all pipelines leak.

Yes, I drove a car here, burning fossil fuels. I understand that. But I'm also ready to move on. I would love to have more choices, as far as the energy and fuels available for me to use in my daily life. If the new pipeline corridor does not happen, it's not going to end our use of oil and gas in our cars. We will still be able to drive to SA or Holiday and fill up our tanks.

It has not been shown that this pipeline is critical to our future energy needs. Additionally, there are safer alternative routes, according to the DEIS.

I have a lot of questions. What are Enbridge's future plans for this proposed new pipeline corridor? What other pipelines will they wish to put in the proposed corridor in the future? Do they plan to abandon the other pipeline in the

existing corridor? What are the chemicals used to dilute this sludgy oil so that it can be pumped through a pipeline?

I am not anti-union. I raised my kids on a union paycheck. It seems obvious that many jobs would be created by the excavation, removal, and possible replacement of the pipeline in the existing corridor.

This is our land. This is Minnesota. I was born and raised here. Wild rice and walleye is my favorite meal. Minnesota is a special place, and we care about our environment. I've canoed several times on the Pine River where the new pipeline corridor would be crossing. The Pine River, of course, is lovely. It empties into the Whitefish Chain.

There is a sort of wide spot in the river type of lake there called, at least by the locals, the Ding Pot. When you paddle quietly into the Ding Pot, you are treated to the sights and sounds of thousands of birds in an unspoiled habitat. Every sort of duck imaginable, geese, swan, herons, bald eagles, they are all at risk. The Ding Pot is very near the proposed crossing of the new pipeline corridor, and all pipelines leak.

Our clean waters belong to future generations of Minnesotans. This project asks future generations to accept a risk so that a private company can move their product to market. I am a grandmother. I have grandchildren named Harvey and Alice. I wish to pass a healthy, clean environment on to them and their children. Alice and Harvey, ages two and eight months, have a stake in the environment of northern Minnesota, and I am here to speak for them.

The climate is changing. 97 percent of the world's scientists tell me this: The need for the Alberta tar sands oil to come to market is highly dubious. We need to move on from projects like this. We need to move towards a future of cleaner and greener energy projects, a future not dependent upon the dirty fossil fuels that Enbridge wants to pipe through our waters and lands. We have the science for cleaner energy now and more is coming.

I would like to see Minnesota develop the technology and labor force that will move us into a more environmentally-responsible future. We will be able to move into that future when we are willing to invest towards that goal, rather than

continue our dependence on oil.

Your grandkids, my grandkids, and the 21st Century do not need this antiquated, risky, and potentially disastrous project.

FACILITATOR: Thank you.

Stan Hagan? Stan? Back here.

MR. STAN HAGAN: I'm just going to listen. There's lots to digest in there. I threw my name in there just in case, but I'll pass.

FACILITATOR: We'll come back to you if you'd like, if you decide.

Tom Wilczek? If you can just say and spell your name.

MR. TOM WILCZEK: Yeah. T-O-M. W-I-L-C-Z-E-K. And I'm a resident of Morrison County here. And from what I've heard, it's surprising that we have an environment left in Minnesota with all these pipelines that are presently crossing our waters. It's surprising there's any clean water left.

But one thing I want to point out is that I'm glad to see that Enbridge wants to update a line, rather than have 1,000 railcars a day transporting that oil. Because the oil is going to come here or through Minnesota one way or another,

and a hundred thou-- or 1,000 railcars a day to me poses a much greater risk than the pipeline does.

And as far as cleaner energy goes, I did some calculations the other day. On the energy needs, if we wanted to supply it all with wind, would take 300,000 windmills in this country. And I would imagine there would be a lot of protests for that many windmills going up in anybody's backyard.

Thank you.

FACILITATOR: Thank you.

Eric Wright? Eric. Over here.

MR. ERIC WRIGHT: Hello. My name is Eric Wright. E-R-I-C. W-R-I-G-H-T. And I'm a pipeline representative for the International Union of Operating Engineers.

I'd like for you all to take into account that if this pipeline is not built, the U.S. will not use less energy, as some unrealistically claim. We'll just import more oil from other countries like Venezuela and the Saudis. I believe it would be better to get it from Canada.

We wholeheartedly support growth of clean energy; however, take into consideration that in order to have wind turbines and solar energy generation, the methods still require the use of

bi-products that come from petroleum.

Here are some examples: The coatings on wiring; the conduit that wires run through underground; insulators; personal protective equipment, also known as PBE, that is required in order to maintain cleaner energy sources. So you see, the need for petroleum is always going to be around hands down.

I mean, with all due respect, even if hemp is found to be a viable alternative to petroleum bi-products, I can't see where this country or any other country for that matter can produce enough hempel (phonetic) or fiber at a level that it would render petroleum obsolete.

We know there is a need for this pipeline, in order to continue production of fuel, consumed products, and other things needed to make the world go round.

Thank you for the opportunity to comment.

FACILITATOR: Thank you.

So that's all the cards we have. So I want to open it up, if there's others who would like to speak. We will still keep it to seven minutes; but then if there's, you know, room, you can

continue on. We just want to limit to seven minutes at a time.

Is there anyone else who would like to make a comment or a statement?

So if you start with your name and spell your name, Eric will give you the mic.

MR. ANDY PEARSON: Thank you very much. So my name is Andy Pearson. A-N-D-Y. P-E-A-R-S-O-N. And one area in the DEIS that I think really does need some improvement -- it was a valiant effort to start out, and I appreciate it a lot. I'm so glad we have an EIS even beginning on this pipeline project, since it's the first one in Minnesota that's had one.

But one area that needs improvement is the alternatives analysis. And this was -- this was brought up, but I want to dig into a little bit more detail on it for just a minute, because this assumption that the oil is going to flow anyway, taking that for granted and going through the alternatives, assuming that at the end of the day the oil's going to flow, I simply don't see the data to back it up. And, in fact, there's a lot of data that contradicts that, and I don't see that in the DEIS.

For example, the largest parallel pipeline project to this one, in terms of a modern-day parallel, would likely be the Keystone Xcel project, a pipeline of exactly the same diameter, carrying exactly the same project, that for the last few years kind of appeared to be on the rocks and was eventually denied. Now it seems to be back on the table; but for a while it appeared like it was going to be stopped, and then it was stopped. And during that time, when it seemed like Keystone wasn't going to be built and then once it was canceled, we saw a massive cancellations in tar sands mining projects up in Canada. Over a two-year period, in 2014 and 2015, there were five massive mines canceled, worth $37 billion of projects up in the tar sands region. In every single one of those closures the company cited lack of takeaway pipeline capacity as one of the major reasons why they were not choosing to continue building that pipe product.

So the fact is that the oil did not flow anyway. When Keystone was stopped, we didn't see massive amounts of oil trains and trucks begin to cross Nebraska. We simply saw that oil staying in the ground. Over that time we saw Minnesota's consumption of oil drop dramatically. We're down to

18 percent in the last decade, in terms of our petroleum product consumption here in this state; and we're seeing the country move along that same pace, although I like that Minnesota is ahead of the country in this way. The rest of the country hasn't had quite an 18 percent drop, but they're getting there.

The point is that this assumption that the DEIS does use, that the oil will flow anyway regardless of the means, is simply inaccurate, especially in a low-oil-price scenario. And to look at how oil pricing impacts how the oil travels, you can dig into the Environmental Impact Statements that have been produced by the U.S. State Department, which in some cases have a higher quality analysis of alternatives and oil flow than this DEIS does, and I think there's lots of good material there.

In the Keystone Xcel DEIS there was an analysis that found that an oil price scenario below $70 per barrel, taking away pipeline capacity or not building new, would effectively stop that oil from flowing, because at that price point it's not viable by any other means. And that's the scenario that we're in here.

So to me the analysis of oil flows is quite lacking, because this is a really key point. I mean, I don't want oil trains either. I want to be very clear about that. I don't want the oil coming by oil trains. I don't want it coming by trucks. I agree that that's dangerous to our communities here, so let's not do that. But that's not what we're advocating here, and I don't think that that's what the data shows is going to happen. So let's be real about what we're talking about here. It's not magically going to flow, you know, with -- by any means -- by any means, you know, necessary here, if that's not what the economics support. And the reality is that they don't appear to.

That's all I want to say. Thanks.

FACILITATOR: Thank you.

Anyone else like to make a comment?

Thank you.

MS. NICOLETTE SLAGLE: Hi, Nicolette Slagle. N-I-C-O-L-E-T-T-E. S-L-A-G-L-E.

I'm Honor the Earth's research director. I'm not going to talk about oil use or the need to transition off of it or anything of that. I'm going to speak specifically about a

couple of issues with the Draft Environmental Impact Statement.

One of them is the issue of cathodic protection along the pipeline, and this is a -- it's like a charge or a current that's applied to -- and I could be describing it wrong, but it's basically a charge or current that's applied to the pipeline to counteract both microbial activity that causes corrosion on the pipelines and also helps like ground the current that can be created between a pipeline and high-voltage transmission lines when they share the same corridor, which it does. The proposed -- the Applicant's proposed preferred route, for at least a segment of it, shares the same corridor with a high-voltage power line.

And in the impact statement it states that this cathodic protection isn't going to be installed for a year after the pipeline is put in the ground. And there's really no examination of what can happen when it's sitting underneath power lines for that long without this protection being put in.

When part of the original Keystone Xcel was put in the ground through an area that it shared a corridor as a power line with, they started

to get a lot of pinhole -- pinholes. They didn't actually put the oil through it, so it didn't get to the leaking point. But they did get pinhole corrosion pits from having the pipeline in the ground in the same corridor as the power lines, without having the cathodic protection in place.

Also, along with that, I don't know -- I don't think they started to do it down here as much. I know that over by Cloquet, up by Lake George, a couple of places up by Lake George, they have already started stockpiling pipes. They've had those pipes in those yards for several years now. And there is research out there about the fact that UV rays can corrode pipes when they sit out for that long, because they're not designed to be exposed to UV rays; they're designed to be under the ground. And there's no analysis in the impact statement about what is the potential impact of UV pipes that have been stockpiled for years.

Also, with the cathodic protection is the abandonment of the existing Line 3. And, again, you know, they say that they're going to maintain the right-of-way and they're going to keep monitoring it and they're going to keep the cathodic protection in place so that it won't -- you know, if

they shut it off, then that will allow the pipeline to crumble quicker, which could lead to ground subsidence or water conduits being created. But a lot of the issues with this existing line is from the coating that they used on it. And in places that coating has disbonded from the pipeline, so it's not attached to it anymore. And that cathodic protection is now also removed from the pipeline.

So if you already have a system that isn't working and you're not going to go in there and fix the system, how would that system keep working after you stop using that pipeline?

So, yeah, I think that's all that I have on the cathodic protection. But I'd also like to see in the DEIS international standards used for some of this analysis, especially where it comes to tribal and indigenous people's rights and consultation.

So there's a few different international standards. The International Labor Organization passed the convention C169 that addresses indigenous rights when it comes to planning and siting and implementing new projects. There is the UN Declaration of Indigenous Rights, and there's also the equator principle, which is

used by financial institutes for examining the impacts of projects. And all of these different standards use the standard of free prior informed consent, which means that indigenous need to be -- need to have free prior informed consent, which basically means that indigenous communities are consulted before a project is planned and permits are applied for, not consulted afterwards.

And just along with that, like I'd like to remind everybody that consultation does not equal consent.

Thank you.

FACILITATOR: Thank you.

Is there anyone else who hasn't spoken who would like to speak?

MR. GEORGE SANDY: Yeah, I'd like to make a comment.

FACILITATOR: If you could say and spell your name for the record.

MR. GEORGE SANDY: Good evening, everybody. I'm George Sandy. I'm a resident here of Morrison County, Little Falls Township. George, G-E-O-R-G-E. S-A-N-D-Y.

I currently live on an old pipeline. It's a corridor that goes from somewhere up north

down -- I think down to the Twin Cities. I've been living on it for 15 years. And I guess I'd just like to let people know, you know, they don't put the darn thing in the ground and then walk away. I mean, I've got people going through there -- there I am walking outside, and there's a guy walking through my yard. He's out there marking the pipeline, you know, doing stuff.

They're always sending things. I get notifications. I get mail from Koch Pipeline probably once a month over the course of a year. So they don't just put pipe in the ground and walk away and say, well, we're good to go here, you know.

And, furthermore, on Tom's comments on the rail trains here in town, I can remember years ago when a rail train derailed up in Cushing, and it -- railcars of anhydrous. You know, you look at all the small towns these trains go through in North and South Dakota, Minnesota, Iowa, and all the liability that is there for these trains, all the danger to people and communities and water and the Mississippi River.

So I guess, you know, we need to -- we need to look at the best alternative for transporting crude oil. I mean, everybody drove

here tonight, including myself.

So thank you very much.

FACILITATOR: Thank you.

Anyone else who has not yet commented?

Okay. And we ask you to say your name again.

MS. SARAH GORHAM: Okay. I'm still Sarah Gorham. S-A-R-A-H. G-O-R-H-A-M. I only prepared five minutes, because last week in Brainerd we only got five minutes. And so -- and I worked hard.

Anyhow, one additional thing. If Enbridge is allowed to abandon their existing pipeline in the existing corridor, the plan is for the company to monitor and maintain the old pipeline indefinitely. I hardly find this plan to be reassuring.

So the other night I did a Google news search on Enbridge, and up popped a Bloomberg news story with the headline: Enbridge Struggles to Fix Its Payout Cash Cow. This article was just from June 9th, last Friday. And it reads, the first paragraph: Enbridge, the Canadian pipeline giant that dominates crude shipments in North America, has spent most of this year trying to fix its flagship

partnership unit. Investors are not buying it. Enbridge is trailing all but one of its peers, after slashing its distribution -- that is its dividends -- nearly in half, and giving shareholders little hope that the payout will rebound much any time soon. The master limited partnership has been dogged by troubled businesses and project delays. The cut in its dividends was the death nail for the stock, says Bloomberg intelligence analyst, Michael Kay.

Michael Kay said, now is kind of a wait-and-see game with them. Where will they find new avenues of growth over the next year or so in order to propel the stock, end quote.

What a good question. Where will Enbridge find new avenues of growth? It sounds to me as if they are looking for new avenues of growth through some of the most abundant and clean waters in the United States; Mississippi Head Waters, Pine River, Whitefish Chain. You know the story, avenues of growth.

Enbridge is on a potentially rocky financial footing. They tell us they will monitor indefinitely an abandoned pipeline. And they may not be around forever.

I have many questions. What happens if this company is bought out? What happens if Enbridge merges with another major energy company? If that happens -- and those things seem to happen all the time -- their obligation to monitor indefinitely now means what? Would a buyout or merger let them off the hook for an abandoned pipeline? What damage to our environment could result from an abandoned pipeline? Who is responsible for future damage from the inevitable leaks into our lands and water?

FACILITATOR: Thank you.

Any other comments?

MR. TOM SCHUMACHER: Is there anyone here --

FACILITATOR: We're going to bring you the mic.

MR. TOM SCHUMACHER: I'm sorry.

FACILITATOR: Just one second. And if you could just state your name.

MR. TOM SCHUMACHER: Is there anyone here from Enbridge? One representative from Enbridge? Tom Schumacher, S-C-H-U-M-A-C-H-E-R. Little Falls. I agree with some of the points that many of you put. I disagree with some of the

others. I look at it as nationwide. Right now they're trying to put a pipeline across here that I have no idea in the world why they would not put two pipes down instead of one in case of war, which no one seems to think about, in case of conflict. We're earthquake free up here pretty well, so they can get by with one. However, we should be prepared so that they could switch from one to the other in a matter of a day or two.

Leakage seems to be the biggest problem in this room. I look at it as -- we just heard from one of my neighbors -- this is the safest way to transport crude. And when you look at some of the things that are going on nationwide, I have a Navy partner or a former partner from one of my ships who every day comes out of Corpus Christi, Texas and goes out to 5 to 25 ships that are in the bay and services them with food and anything else they want.

Those ships are being paid 100 to $150,000 a day to sit there because they can't go up the causeway up to Houston. And we think shipping is safe. There's more plastic bags in the ocean than there are in every store in the United States. There's islands of plastic bags, residue. We don't

see that situation here with the pipeline.

I see it as a good thing. But if somebody was here from Enbridge, I would ask them why in the doley devil why wouldn't you put two lines in at the same time instead of one so that you do have a reserve or a backup or something on that order? You're looking at 90 percent -- I think my union men could put that together -- in labor and so forth.

I notice that they figured out a way to get past the Red Lake -- or Leech Lake Indian Reservation, which is good. And we're in a pristine area here with a lot of water and things. But I feel pipelines are quite safe today, even though we've heard about running it. Now they're going to -- they've changed it to go into -- between 40 and 60 miles they will be running high power line easement to go through there.

So I know I'm in contrast to many of you that are speaking, because you think this is the world's worst thing. I'm afraid I have to turn it around. I won't live long enough to see us away from oil, and I'm quite sure half of us in this room probably won't. But we will see a change from oil to a different type of energy. Sure, we're going to

see flying cars, I know. We can all dream.

You're looking at yesterday; I'm trying to look at tomorrow. And if we're going to have tomorrow, let's prepare for it. And if somebody was here from Enbridge, I'd tell them to tell those suits to put two lines down instead of one so that you've got a backup in case that you do need it.

I've been here at the motel for years, and I've watched these crews come and try to put a pipeline underneath the Mississippi River. And I told them there was rocks in there bigger than Volkswagons, and they didn't believe me; but they found out in a quick hurry. There was twice they had to make four and five different runs to get a pipeline underneath the Mississippi River.

I don't want to see the pipeline aboveground. I would like it to continue being below ground. But between 80 and 90 percent of the cost of putting that pipeline down is not the pipe; it's the way they do it, the easements and the payoffs.

So I would ask to have an open mind for the next 10 to 15 years, as our energy starts changing. We will start seeing cars that will not

run on fuel. It's not that far off. And I hate to see this thing down in Houston where you've got ships from overseas that are sitting there for sometimes two to three weeks and more because they can't unload them in Houston. They can't do the -- I think they call it a causeway. They can't run up the causeway. They can only do three ships a day or two ships a day. And there's between, like I said, 5 and 25 ships in that bay all the time. And to me that's a lot more dangerous than having a pipeline run through Minnesota.

I'll be here afterwards, if you'd like to comment. I don't feel poorly about your comments. Please believe that. But I believe this is the best possible way that we can keep up with today.

Thank you very much.

FACILITATOR: Thank you.

Appreciate everybody's respectful tone and acceptance of each other's differences and points of view.

Yes, sir. Again, state your name and spell it.

MR. TOM WATSON: Again, Tom Watson, Pine River, Minnesota, president of Whitefish

Property Owners Association in Crow Wing County.

I have a couple, three, four more items that I want to address. But I want to start by saying let's remember one of the decisions hopefully the State will make in this particular matter, which is our environmental policy. Let me just read it, because I think it's important that we all have a context for that decision.

And that is: To create, maintain conditions under which human beings and nature can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations of state's people.

That's one of the requirements of the Public Utilities Commission in making this decision. And I trust that Jamie would say that that's obviously farmost in the minds of their staff, as they're working on preparing an Environmental Impact Statement.

What I want to comment on is two other items that I think belong in Chapter 5 and, by extension, would obviously continue into Chapter 6, which is -- 5 is really dealing with the certificate of need in current conditions; 6 is really dealing with the routing question.

In Minnesota there's a little fish called a walleye and some cold water fish that we know pretty well. Any fishermen in the room? Anybody goes, eats walleye, catches fish? What you might want to know is that one of the largest fish reproduction management centers is Brainerd, Minnesota. A large walleye stripping operation, the stripping operation on the Pine River, which somebody mentioned earlier actually, this proposed pipeline crosses two forks of the Pine River, the north and the west and would be within about three to four miles literally by the way the crow flies -- I didn't measure the curves in the river -- from that stripping operation. 75 million eggs are produced and about 50 million of those turn into fry and/or fingerlings that get introduced into our lakes. That's every year for a period of about two, three weeks. It's significant.

The hatchery isn't sitting at the mouth of the Pine River. The eggs are transported to Brainerd, they're transported to St. Paul, and they're grown there. The report doesn't have a single word on that subject. Not a single word. That's an important resource in Minnesota to identify who we are.

Hell, we even had a governor on Time Magazine holding up a northerner, for god's sake, if you remember long enough.

Mr. Schumacher, you and I would remember those things, because we're just a little over 47 years old, aren't we?

MR. SCHUMACHER: Try about 77.

MR. TOM WATSON: The report does talk about Spire Valley. It does talk about a couple others, which are known for raising lake trout, steelhead, et cetera. But the hatchery is right there, and this pipeline would go just south of that.

And my question in this case isn't opposed to pipelines. The question really is a serious question about do we have a need; does it benefit Minnesota? That's the question. It's not a question of whether we're going to be driving cars and all those kinds of things. The benefit is to Minnesota and how does that compare to the costs?

My organization is not opposed to using pipelines. The piece I can't figure out, Enbridge will offer a $2 million economic benefit to Minnesota during a couple of years of construction, 18 months, whatever. The industry that I mentioned

earlier is three-quarters of a billion dollars a year already. That's the people who come and visit up here. Why do they come here? It's the same reason my six-year-old -- five-year-old granddaughter says, I go to see grandma and grandpa because of the water; I get to swim; I can't do that in Minneapolis.

We have a lot of people that get to come up here. There's 18,000 jobs that are created that are seasonal, related to travel, tourism, and people coming up for conventions and going to a fishing tournament, et cetera.

Do you know what the impact is on Mille Lacs Lake at the moment, as a result of all the nonsense and disaster we've got over there with fishing problems and god knows what AIS is in that lake, even what's been found and what's not? I've already taken a look at property values in the six communities on the south end of Mille Lacs Lake -- so that would be East Shore, Isle, and around to Kathio, Wahkon, South Shore. Tax year '14, paid '15, compared to tax year '15, paid '16, those six communities -- let me tell you what the bad news is. The entire Mille Lacs County, which goes all the way to Princeton, properties that's commercial and

residential seasonal dropped $8 million. Those six communities dropped 30 million. 30 million. And what those -- that is the basis of real estate transactions of people buying and selling homes and businesses and other ways. We don't want that kind of thing in Minnesota.

So, by extension, are we willing to take the risk? A section that's not in this report is a section on risk analysis. I heard somebody talk about, you know, is Enbridge going to be around and do all these kinds of things. You guys know how they organize these companies? Enbridge is not a single company owning pipeline. Enbridge has a zillion little subsidiary corporations that owns sections of pipelines in Minnesota. The corridor from Calgary, Alberta, to south of Chicago, the last I checked, has about six different little companies. In other words, if something goes wrong, what you do in the United States is you go visit the federal bankruptcy court. And guess who pays for that? I think we need a section here on risk.

We are going to have some risks. I'm not being negative about it. I'm a businessman. But we sit down and look at risks when we're looking at benefit, isn't that one of those costs.

I've got two other things to say. Somebody talked about paddling the Pine River, and I know probably where you are. This report does not have a study such as this in it. Doesn't address it at all. This (indicating) happens to be called A Sensitive Shoreline Survey, which was done for us in the Whitefish Chain and finished up in March of 2012. The work was done in 2011. Last I know there's probably ten of these done in Minnesota. Don't ask me right now what all of them are. I can't tell you that. But what it's doing is it is doing an inventory on every piece of plant and wildlife, animal or otherwise, that exists around lakes in Minnesota. It's addressing the migratory birds. It's addressing frogs. It's addressing fish. It's addressing plant materials. I think there should be an inventory of that in the current situation section when we're talking about need, when we're talking about routing.

Very last comment. Every one of these lakes in Minnesota -- I don't care whether you're in Morrison County or where I grew up in Koochiching County or Crow Wing County or any other, we are now trying to manage watersheds. This report doesn't have a single word on watersheds. We're trying to

manage a half a million acres of watershed, which is what surrounds the Whitefish Chain itself. Half a million acres of land and water, 40 percent of which is water. But we're trying to manage upstream flows and otherwise to try to manage the runoffs into our lakes. So we filter them.

I don't care who you are in Minnesota, but every one of our public bodies of water, the water quality isn't improving. If it is, it's only because you got overabundance of zebra mussels that have eaten all the plant materials so the clarity really looks good. The phosphorus won't be very attractive, however.

So we need a section on that whole watershed piece, because that's as critical to this thing and to sustaining water in Minnesota as is it to managing roads and building bridges.

FACILITATOR: It's been eight minutes.

MR. TOM WATSON: Oh, did I say that? Old politicians can't shut up. Thank you.

FACILITATOR: Did you want to speak? If you would state your name and spell it. Thank you.

MR. GREG BROWN: Greg Brown. G-R-E-G. B-R-O-W-N. Just picking up the risks, we have a

poster board showing risk of transport. I've heard it say that pipeline is the safest form of transportation for this crude oil. Well, according to the statistics here, it looks like the risk of spills per barrel -- or spills is like ten times that of any other railroad or trucking. And, you know, my question is why is that? Why is it -- even if it's about half as many incidents, it's got ten times as much spills. And where does all that -- how much more does that cause effect on the environment?

You know, they say they want to bring jobs. Like I say, temporary jobs, 18 months out, say. How about jobs -- where is the proposal for jobs to, like I say, truly monitor these things? You say you have people walking across your land and monitoring these things. How -- what's the proposal, the statistics for that of -- I guess the question is why is it so much more spill? It's because nobody -- could be out in the middle of nowhere underground; nobody knows what's going on until it's too late.

So I'd like to see in the draft maybe some ideas of some better monitoring plans, maybe some cost analysis for some jobs for someone to keep

a better eye on these things. And if -- like I say, if the Department determines that it is needed -- which, again, there's questions on that, you know, again is it needed -- what's the benefit in Minnesota?

Just like to see -- it just kind of looks like it's red and blue right in front of us that pipelines is the most at-risk form of transportation when it comes to spills and affecting the environment.

FACILITATOR: Thank you.

Other comments?

Yes. Spell your name for the record.

MR. STAN HAGEN: Stan Hagan from Little Falls. First name is S-T-A-N. Last name is Hagen, H-A-G-E-N.

The former speaker, I got to agree with him a little bit. That -- the page 16 that shows the bar graph there, there's some data that's missing there. Sure, the pipelines show the blue graph is considerably higher than the other two. But what isn't -- what's missing here is the number of miles of pipeline compared to the number of cars on the track going up and down. That's -- that's -- that's what kind of skews the -- when we look at

this, we don't know that. There's -- if you could just go online, Google a map of the U.S. of all the pipelines, it's a massive spider web. And then -- then do the one of the railroad tracks, and then how many tracks -- how many trains are on a certain segment of track.

Jumping to concerns of leaking causing damage to the environment. I worked on a pipeline for 11 years in multiple states. Been to some cathodic protection schools. There's a good cathodic protection school down in the University of West Virginia that most of the people go to. There's engineers there. They all throw us in scenarios, you figure out all the different utilities that could be in one -- one block, and you got to come up with plans to provide the necessary cathodic protection so that you protect every single utility's product in there. So it can be done. I know that.

As far as the pipeline, not just the construction -- sure, there's a lot of labor there -- but after that's built, up and running, you got mechanics, you got electricians that are -- that are working on that line continually. You got pump stations about every 30 miles. So there's a lot

of -- lot of jobs to be had right there.

There's a lot of information on that pipeline itself that's fed -- that's collected electronically that's fed through SCADA systems right to the operator's screen, wherever he happens to be sitting. It might be the Twin Cities. It might be Wichita. He knows what's going on. He knows the pressures there.

There's another department, Department of Pipeline Safety. One would be up and down the pipeline constantly. Every so many months you have to verify the integrity of your pressure transmitters. And so he knows exactly what -- that operator knows exactly what's going on. And you can have your parameters built up in your software so if there's any changes, you've got bells and whistles going off that something's not right, check it out.

On the line you've got your pump stations, you've got bells there. You've got block bells in between stations, so if there were a leak, he could -- the operator can send them block bells shut, isolate that spot where he knows there's a pressure differential, so you minimize the leak.

There's also what they have, smart pigs. But the technology they had these last years,

which they did not have back when Lakehead or Enbridge was doing that Line 3. These smart pigs now, they'll send them down the lines. You know -- you're listening to them go down the line. They collect data using -- using electronics. They will measure the wall of that pipe all the way around, as they're going down the line, down the whole line; and when -- there's batteries in it, so every so often you got to pull the pig out. All that information, all that data is downloaded. Engineers look it over. That smart pig will find a pinhole in that -- I mean, not a pinhole; but, I mean, if there's a little scrape or any deviation, if it's a 3/16th weld pipe, if it doesn't 3/16th, it will let you know exactly where the gouge is. It will give you the mile marker. You can go right back, pretty much dig here, you can dig it up and replace that section.

There's new coating on the pipe now. In the old days in Line 3, they had -- it's like basically tar. Put it on and then wrap it with a -- like a paper base or cardboard-based wrap on top of that. Nowadays I think it's 3M that's got it. If you see a car -- you see the pipe going up and down on the railroad, that pipe has got a -- sort of an

aqua green color to it. It's a special powdered stuff they spray on electronically. Much better than the old stuff.

But you've got to submit these -- you've got to take your readings, you've got to turn them in to the Department of Pipeline Safety. You've got people checking on you. So there's a lot more than just throwing the pipe in the line -- in the ground and walking away. There's a lot of maintenance that keep that line up and running.

And I'm originally from a little town of Clearbrook. That's another spider web. There's a lot of crude lines. There's a lot of natural gas lines. I've walked a lot of the Minnesota line, from Clearbrook down to Cottage Grove. And, incidentally, now -- in the old days they'd have to dig through the water, the river bed, put the pipe in. Now you just bore right underneath the whole river. I happened to be in on the bore jet line underneath the -- it was the Minnesota River. And they're way underneath the river. But they pulled the whole -- I forget what size bore through there, and pulled the line through for the jet fuel terminal at the end of the Minneapolis-St. Paul airport.

So they're way underneath the river bed. But there's a lot of protection of that pipe so that the oil stays in the pipe and not coming out.

FACILITATOR: Thank you.

Other comments?

Yes. If you can say and spell your name.

MS. JACCI HATFIELD: My name is Jacci, J-A-C-C-I, Hatfield, H-A-T-F-I-E-L-D.

I really hadn't planned on speaking tonight. This is my fourth one of these that I've attended. And I just had a -- this gentleman right here that just spoke, if we -- Enbridge has all these bells and whistles that they're so proud of, why did they ignore Kalamazoo for 15 to 17 hours, when all these bells and whistles were supposed to be going off?

So, no, don't -- don't even think that they're really paying attention. There's a lot of human error, and there's a lot of things that are ignored.

And the other thing I wanted to say is, as far as trains versus pipelines, you know, you're -- even Enbridge has admitted they're not

going to slow down these pipelines. They're going to have as much rail going through Minnesota as they do now, if not more. And that really is what they have already admitted.

And that's, I think, all I want to say this evening. Thank you.

FACILITATOR: Thank you.

Another comment. We'll bring you the mic. Again say your name.

MS. NICOLETTE SLAGLE: Hi. Nicolette Slagle. N-I-C-O-L-E-T-T-E. S-L-A-G-L-E.

Along with other things that Enbridge has admitted, their CEO, Al Monaco, has also said that Enbridge needs to transition away from fossil fuels. And both the CEO of Enbridge and TransCanada have also publicly stated both to the Canadian legislature and in public articles that if all of the major pipeline proposals that are on the table get permitted, there will be one too many pipelines. So there's three major pipeline proposals on the table; Line 3 here, KXL, and TransCanada. And so if they're already publicly admitting that three will be too many, you can probably guess that two is probably too many and most like actually one is too many.

And another thing to watch out with Enbridge is that their existing Line 13, which is right now bringing dilutants up from I believe the Illinois refinery up to tar sands to dilute the tar sands to push it through the pipes, they've explored the idea of reversing that and bringing tar sands down from Canada and through that existing route.

So, I mean, they do already have other options that they're looking at. So don't think that Line 3 is the end-all and be-all of oil transportation.

FACILITATOR: Thank you.

Okay. We'll end our public comment period. There's still opportunity to come and talk to staff. We will stay as long as anybody is interested in talking, up until the meeting close time. So please don't feel rushed.

We really appreciate all of your input, and we hope you have a great night.

Thank you.

(Off the record.)

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DEIS MEETINGS - 14-916 15-137

NEWFOLDEN - JUNE 20, 2017 - 10:00 a.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Marshall County Central Schools
310 West Minnesota Avenue
Newfolden, Minnesota

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FACILITATOR: Good morning, everybody, welcome. My name is Patrick Field, and I'm with the consulting team and just moderating this morning's public comment session.

I first want to introduce Jamie MacAlister. She's the project manager for the DEIS and EIS. She works for the State of Minnesota for the Department of Commerce, and she's going to share with us a little bit about the process and the way forward and then we'll go to public comment.

MS. JAMIE MACALISTER: Good morning, everyone. I hope everyone has had a chance to go around the room, talk with the agency and staff that we have here.

We have folks from the Pollution Control Agency, the Department of National Resources, Commerce staff, Public Utilities Commission, if you have questions that you need to discuss with them.

We assume you came here to give us some information on the Draft Environmental Impact Statement.

As you know, the Minnesota

Public Utilities Commission will be the body that makes the decision on this project, and they have two decisions that they need to make.

They have to first determine whether or not to issue a Certificate of Need for this project, and then they must determine whether or not to issue a route permit, and if they issue the route permit, where should the route be located.

Many of you have been following this process for quite some time. We were here last spring scoping for the Draft Environmental Impact Statement. All of the comments that you provided last year, and in some cases the year before, helped inform the scope of this document.

We are now in the Draft EIS comment period phase. The comments that we receive while we're out at these meetings will help us finalize the final EIS, and once that document is final, the whole process moves over to the administrative law judge and the Public Utilities Commission for the contested case hearings that will be coming up in the

fall and then the decision on this project in the spring of 2018.

So this morning we're hoping that you are going to give us comments on the Draft EIS. Specifically we're interested in whether or not there is information that is missing, if the document is not clear, or if there are other areas in the document that we can improve upon for the final.

So today, just a note on the comments. You can provide your comments orally here. You can submit them in writing here. You can also submit them to me via email or regular mail so long as they are postmarked by July 10 of 2017.

We will be looking at your comments and reviewing them for the Final EIS.

And a final note on comments, we want you to know that your comments are treated equally whether or not they're given to us orally or in writing. It doesn't matter if we have hundreds of comments for a project or hundreds of comments against a project, each comment is treated individually.

This is not a vote. Your time

to advocate for the project or a route is during the contested case hearings. So that will be the time for you to let the judge and the Public Utilities Commission know if you're for or against this project.

The comments that we're looking for really are on the Draft EIS.

So with that, I'm going to turn this back over to Pat and he's going to give you a little bit more information before we move into the comment portion of this meeting.

FACILITATOR: Thanks, Jamie.

Leslie is going to be our mic runner. So we will bring the mic to you, if you want to make a public comment. We have a great court reporter here who will be capturing your every word.

The key to that is when you get the mic, speak into it like this because that's the way the mic works best.

When you start, just state your name and actually spell it for the court reporter so we have it for the record.

So just a few things about the comments. We want to make sure when a person

comments, everybody listens, and they have their chance to say their piece. So we do ask that other people listen when that commenter speaks, if you can.

At the end if you want to do affirmation, that's fine. We do ask that people not be negative about people's comments.

We have a small group so we're not going to worry very much about time limits. We do have kind of a timer we can put up for people just to give a sense of how long they're going, so we will go ahead and run that this morning to be fair across these meetings.

Probably at six or seven minutes you probably covered a lot of what you want to say. So I might give people a little reminder if it goes much more beyond that.

We do ask that -- people have a range of views which is totally fine. If we would be respectful of each other's differences, so we ask that you not direct specific comments to an individual in the room or a comment to organizations, agencies, about

the issues, about the EIS, about the project.

That's all fair game, but please don't direct folks individually in the room because that can make people uncomfortable.

State agency folks, do you want to raise your hands? Their job for this portion of the meeting is to listen. So the State's going to be in a listening mode. If you have questions, we won't be answering them at this time, but you can certainly state them for the record.

And hopefully we'll be able to have some good informal conversation around the poster boards as well.

Put your cell phones on do not disturb, on vibrate, do not disturb, so we don't disrupt the meeting as we go.

Also, just to let you know, if you don't want to make the comment publicly in terms of a larger crowd, two possibilities: You can write your comment down in the box. There's plenty of comment forms on the table.

And Janet is also in the back. You can also go talk to her and she can take your comment directly there individually, if

you're less comfortable talking in front of a larger crowd.

I think that covers everything. So if I can get a show of hands for how many people want to make a public comment, just so I can see how many folks want to make a statement for the record. One -- two. One gentleman here. We can get started with you.

So just name, spell your name for the record.

MR. GLENN RIVARD: Thank you. My name is Glenn Rivard.

I wrote mine out so I'll just read it.

I would like to express my support of the pipeline expansion project by Enbridge Energy.

As a landowner with pipeline easements and a business in the county of Marshall, I experience first hand the economic impact the pipelines have on our communities.

Here are some assets that come to mind as I reflect on the 40-plus years that I've been in business in the area.

Property taxes paid: The

pipeline that goes through Marshall County contributes over a million dollars per year for the county alone, plus school districts that happen to have pipeline access.

Since these easements are based on value of product flowing through our county, it is quite obvious an additional pipe will add to the volume of product and henceforth additional revenue for our governments or at least sustain the present levels should older lines become obsolete, which is part of the this project.

Economics of low cost energy: And I believe that low cost energy is by transferring the stuff as economically as possible to where it has to be consumed or processed.

Agricultural-based economy relies on a high input of energy to produce, process and transport our production to market.

The 500 horsepower tractors and combines that till and harvest our fields will not be replaced in the near future by the alternative energy, but is fueled by what flows through those pipes to refineries and back here

to our producers.

When you consider the transportation site of agriculture, we only need to look back three years to see how much our area was affected by the baseless change by shippers when the railroad converted many trains to hauling crude oil from the Bakken and raised their freight rates to the shippers by over a dollar per hundred weight.

The basis change equates to 40 cents per bushel on wheat, $24 per acre on average county yield of 60 bushels. The basis change equates to 95 cents per bushel on soybeans at $33.25 per acre on average county yield of 35 bushels.

Many of you are producers in here and will probably agree with that.

Corn, 50 cents per bushel on corn, $62.50 per acre on average county yield of 125 bushels.

Total impact on Marshall County alone was a loss of revenue in excess of $16.7 million per year according to 2012 acreage census. That's the only one I could find on the Internet this morning.

Our country, state, and county have succeeded in part by having access to low cost energy to compete with the world economy. We must not give up that competitive edge.

Another point I'd like to bring up is safety. My business is located across the street where a train derailment took place back in the 1980s.

I still remember how the building shook when one of the rail cars hauling grain hit the Farmers Coop elevator. Had that been tanker cars similar to those that exploded near Casselton three and a half years ago, the elevator and possibly my business and all who were at work would have perished.

I still have memories of that day each time I am the lead car waiting near the tracks as the train passes by.

We were told the cold winter day caused the rail to crack under stress.

I know there are hazards in all energy transportation, but keeping it below ground just makes me feel safer.

Please consider these assets when assessing the impact of Enbridge's proposal.

Our communities are depending on it. Thank you.

FACILITATOR: Is there anyone else who would like to make a public comment this morning?

People certainly can do written comments in the boxes and you can also talk to Janet directly if you want.

Anyone else at this time who wants to make a public comment?

Okay, state your name and spell it for the record and keep the mic kind of like this and talk right into the top of it.

MS. JOYCE JOHNSON: My name is Joyce Johnson. I'm from Viking, Minnesota. My husband's name is Willis.

The pipeline has crossed our land for -- I can't even tell you how many years. It must be 20 to 30 years. There was a break in the land, in the pipeline.

One of our neighbors punctured it with a Catepillar somehow.

Anyway, the pipeline came over to our house, asked us to evacuate, put us up in a motel that night. They were very, very good to

us. I appreciated their help. We were able to go home the next day.

They've always been very polite to us. We always know when they're crossing our land. We always know when they're going to mow or whatever they're going to do. If they're just checking, they always let us know. We're very pleased with the pipeline.

FACILITATOR: Others who would like to make public comment? We've got the posters around, we've got state staff people. You may want to gather informally and chat.

In 30, 45 minutes we'll make one more call, one more chance, in case people do want to make a public comment and we can provide one more time while we're here.

If people want to mingle informally -- you can write stuff down. Again, Janet is in the back for public comment.

Again, we'll come back in about a half hour, 45 minutes, in case anybody else does want to make a public comment to everyone here before we close.

Thank you all for coming.

(Proceedings recessed.)

FACILITATOR: All right, I just want to give folks another chance, if you would like to make a public comment. So I just want to check to see if anybody wants to raise their hand and go on record in this setting to make a public comment.

Again, if not, there are written comments in the comment box. Janet remains in the back.

Anybody else? Okay, we'll be around here. We'll be here for a bit. So thanks very much.

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DEIS MEETINGS - 14-916 15-137

NEWFOLDEN - JUNE 20, 2017 - 6:00 P.M.

(PRIVATE COMMENTS WITH COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Marshall County Central Schools
310 West Minnesota Avenue
Newfolden, Minnesota

I N D E X

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MR. WILLIS ANDY JOHNSON: Willis Andy Johnson. W-I-L-L-I-S, A-N-D-Y, Johnson.

Well, I've got along good with the Lakehead for, I don't know, it's 30 years, I suppose. And I know they were real helpful to me one time. I got stuck out in there and the crew came by and unhooked the big machine and helped me get out of the mud hole. And they said no charge. And I offered to pay them, but they said no way. They just done it. And I've never had no trouble with them. Never.

That's about it.

MR. JOHN SENS: My name is John Sens, S as in Sam, E-N-S. I live at 101 East 6th Street in Newfolden, Minnesota 56738.

I am completely in favor of the pipeline going through because, in my opinion, all forms of transportation of goods or people involves some degree of risk. I walked down here today, I guess I took a risk crossing the highway.

My experience before I retired, I was a lawyer handling the defense of civil cases. They involved airplanes, motor vehicles, cars, trucks, in one case a river boat. But I've never seen much having to do with pipelines.

And I've been experienced with pipeline people since about 1946 when I was in school as a first or second grader in a little town in northeast Missouri. To me, the most important consideration for this pipeline is public safety. And based on my experience and based on what I'm reading, I feel that transportation of oil or whatever this pipeline is going to carry is much safer than any other form of transportation that might be used, such as railroads, which have derailments all the time, tanker trunks, which have accidents all the time, or any other forms that might come up. So for those reasons, for safety, for public safety, that is the reason I totally support this pipeline effort.

Thank you.

MR. JAMIE KYLE NELSON: Jamie Kyle Nelson. J-A-M-I-E, K-Y-L-E, N-E-L-S-O-N.

Since 1999 I've lived right across the road from the Viking pipeline station. And the pipeline has always been courteous. The workers have been great to me, they have been good neighbors.

I support the new pipeline, proposed pipeline. I think they're great for the community of Viking, they've donated vehicles and money. They

paid a huge amount of taxes and I think it would be a shame for the state to deny the pipeline to go through.

I would like to see on that chart that shows the accidental crude oil releases, I would like to see a chart that showed the amount of gallons released for, you know, like per million barrels pumped, so that I could compare the amount of gallons that actually leaked between the rail, the pipeline, and trucks based on how much oil is actually transferred so you can see the amount released per million barrels, or however they wanted to do it. I think that would be helpful, to see the comparison between rail, pipeline, and trucks.

So, and that's all on the comments, I guess.

Thank you.

MS. JILL HALL: I'm Jill Hall. I grew up, Lakehead Pipeline went right through my dad's farm. And we've never had a problem with it. And I live by a highway and a railroad track that has an awful lot of tanker trains going by and my opinion is that you can't replace the pipeline with trucks and railroads because it's not possible. There would be too many trucks on the road and it would

ruin the roads and kill people, accidents.

So anyway, I'm in support of it. Because as long as people want to use oil it's going to get from one place to another and I think the safest combination can figure out it's the best deal. And so I guess that kind of sums it up.

And it's already there. We're not going to take it out. I mean, somebody's idealist thinking, we don't need to transport oil or use oil anywhere, but they're using it themselves. So, anyway, I guess that pretty much sums my opinion on it.

And I've been to a lot of pipeline safety meetings where they explain how they keep tabs on and check their lines and it's very interesting. And they ask for people to report if they do see anything unusual or, you know, in their right-of-ways and stuff. So as far as I can remember, what few accidents I remember were usually man, caused by man that dug a little too deep or something. Yeah.

So I guess that pretty much sums up my opinion.

(Comments concluded.)

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DEIS MEETINGS - 14-916 15-137

HALLOCK - JUNE 20, 2017 - 6:00 P.M.

(PRIVATE COMMENTS WITH COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Hallock City Hall
163 3rd Street SE
Hallock, Minnesota

MR. DENNIS WINGE: Dennis Winge, W-I-N-G-E. I have lived my entire life, 66 years, about one mile from the Enbridge line number 3. I also own and farm land Enbridge line number 3 crosses. It's about a mile of pipeline right of way.

There are six large pipes running parallel with number 3 in this corridor. Damage I have seen to the land and the environment in the last 50 plus years has been none.

Common sense tells us pipelines are the safest way to transport crude oil and other petroleum products to protect both the public and the environment. Thank you.

(Comments concluded.)

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DEIS MEETINGS - 14-916 15-137

THIEF RIVER FALLS - JUNE 21, 2017 - 10:00 A.M.

(PRIVATE COMMENTS WITH COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

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PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Ralph Engelstad Arena
Imperial Room
525 Brooks Avenue North
Thief River Falls, Minnesota

I N D E X

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MR. RENAE LOUISE MARQUIS: My full name is Renae, R-E-N-A-E, Louise, L-O-U-I-S-E, Marquis, M-A-R-Q-U-I-S.

I would just like to say that I firmly believe that God gave us this beautiful earth with resources to take care of ourselves. And in these resources we have oil under the ground just like we have water under the ground. I feel that we should utilize the resources God gave us. I feel that Enbridge handles it safely and wisely.

I am not an Enbridge employee. I have a husband that has worked many years construction. He is safely trained, he goes to his jobs. My fear is not how people are doing their job, my fear is people who entice to create problems for people out there like my husband doing the job.

I strongly encourage we work together. I strongly encourage that we utilize the resources God gave us. I strongly encourage that we don't pick one aspect of a resource is stronger or better than another.

Thank you.

MR. CURTIS COBB: My name is Curtis Cobb. C-U-R-T-I-S, C-O-B-B. And I'm a retired engineer.

I am concerned about the environmental

impact of the processing of the oil sands in Canada. It is leaving behind a toxic residual that is poisoning a huge portion of the planet and especially that portion of Canada. They have 176 square kilometers of toxic residual fluid ponds left behind and it is poisoning the groundwater for thousands of square miles in that area. And also it is killing any wildlife that touches that water.

So the problem is not the pipeline hauling it, but the -- it's the toxicity of the product which the pipeline will be hauling. And Enbridge is aiding and abetting one of the biggest environmental disasters on earth.

That's my statement. My concern is not the environmental impact of the pipeline going across the state of Minnesota, it is with the product with which it is hauling, of which it is hauling.

MR. GORDON WETTERLUND: My name is Gordon Wetterlund, Jr. G-0-R-D-0-N, W-E-T-T-E-R-L-U-N-D.

What I'm here for, I farm, I live in McCrea Township. I have three parcels of land in Foldahl Township, section 20, section 17 and section 7 that the pipeline goes across. And I also have two parcels of land in section 33 and section 34 of

Viking Township that I rent land that the pipeline goes across. And I guess I'd just like to make my comment in favor of this pipeline.

And the main reason, the land that I own, I have owned since 1997. They have come across and they put in the new pipe, they were fair with me, they have also done two dig-ups to patch the line. They've called ahead and, you know, they've paid me for crop damage so they've been fair there.

But the one thing that I'd really like to express is they have been, from a safety standpoint, they're almost overly anal on their safety. I mean, they are -- it looked like a little town out there, there's so many people to watch. And this is the one thing that a lot of people that don't own land and don't see, you know, firsthand, how they conduct themselves. And each, almost each year I'll get a phone call and saying they are going to walk the lines and check for anything. And these are just things that I wanted to express, the fact that, you know, from a landowner standpoint, they've been fair. And also I think they are very, very diligent in their safety aspect.

And I guess that's my comment.

MR. JOHN FIELD: My name is John Field,

J-O-H-N, F-I-E-L-D.

And I just came here today as a landowner in Marshall County, Minnesota. I've been working with Enbridge for several years on projects, different maintenance projects, line projects. And I just wanted to make a few comments.

First of all, I'd like to state that I'm 100 percent on board with what they are doing. The projects they do I see as very necessary to the economy in general. I like that it supports oil production in North America. I like the economic impact it has on the local communities. When the projects go through it creates several jobs. It's wonderful for businesses.

And as far as the environment goes, Enbridge has always been great to work with with the environment. They're working very hard to replace the ground and the conditions as they were and in many cases improve it for the future. All my interaction with their employees has been positive. Very nice employees, very accommodating to their employees. So that's been very positive as well.

So that's probably it. I think that summarizes it pretty well, but we're very on board with what they're doing. I see it as a necessary

project, necessary business, and the minor inconveniences that come with the construction and the project itself are far outweighed by the benefits.

(Comments concluded.)

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DEIS MEETINGS - 14-916 15-137

THIEF RIVER FALLS - JUNE 20, 2017 - 10:00 a.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

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PUC DOCKET NO: PPL-15-137
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Ralph Engelstad Arena
Imperial Room
525 Brooks Avenue
Thief River Falls, Minnesota

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FACILITATOR: Good morning, everybody, and welcome. Thanks for coming out. We're going to start the public comment period in about a minute or two.

So if you want to begin to gather at the tables, grab some coffee or food, there's plenty, and we'll start with a brief presentation and the public comment period in about a minute or so.

My name is Patrick Mansfield, and I'm part of the consulting team working on behalf of the state of Minnesota.

Just a few quick things that you may know. Bathrooms are right in the back, very handy. Exits are either left or right outside of the door, and then they are actually on the other end of the building, and stairs in the middle as an exit as well.

So I want to introduce Jamie MacAlister. She is the project manager for the Environmental Impact Statement for the Line 3 project, and she works for the Department of Commerce for the State of Minnesota. She's going to share a brief presentation before we do the public comment.

MS. JAMIE MACALISTER: Good morning, everyone, welcome.

As Pat mentioned, I'm Jamie MacAlister with the Minnesota Department of Commerce, and we are here hosting this meeting with some of our other state staff counterparts.

We have staff here from the Minnesota Pollution Control Agency and the Minnesota Department of Natural Resources as well, and the Public Utilities Commission.

I hope you had an opportunity to walk around the posters, get some additional information, talk with the staff that we have on hand.

As you probably know, the Minnesota Public Utilities Commission will be the agency making a decision on these permits. They have to make two decisions, the first being a decision on the Certificate of Need for this project. The second being whether or not to issue a route permit.

As you may know, we've been at this for quite a while. We held scoping meetings here in the project area in the spring

of 2016, and published a scoping document in December that used all the comments that we received during the scoping meetings to inform the Draft Environmental Impact Statement.

So once the comment period closes that we're in right now, on July 10th, we will issue a Final EIS in August, and these materials will then get forwarded on to the administrative law judge in the Public Utilities Commission as this process moves into the contested case hearings.

Those hearings are scheduled to begin in the fall of 2017, and they will be presided over by the administrative law judge.

And any decision on these projects is not expected until 2018.

So we are here today to get your comments on the Draft Environmental Impact Statement. Specifically we're interested in whether or not there is information missing from the document that we need to include.

We are interested in knowing if the EIS is unclear or if there are other areas or improvements that we can make to the document before we publish the Final EIS in

August.

All of the comments from this meeting and all of the previous meetings will be available online on our website. We will compile all of the written comments, and all of the transcripts from these meetings will be available. You'll be able to see your comments and your neighbors' comments as well as the comments from all the other locations from these meetings.

So just a quick word about the comments. All the comments are treated equally, whether or not they're received in writing or presented verbally.

And just a reminder that the EIS itself is not a decision-making document. The EIS helps the Public Utilities Commission make a decision on this project, which is why it's really important for us to get any missing information or clarify information in the EIS so that the Public Utilities Commission has the best information available to them as they begin considering a decision.

I feel like there's something that I'm forgetting to say about your comments;

notably that it's not a vote. Your comments here are to help inform the Final EIS. So if we get hundreds of comments for or against the project, that's not how those comments are treated. Each comment is treated individually so we want you to know that.

Really, the time to advocate for your position on this project is during the contested case hearings.

With that, I'm going to turn it over to Pat and he'll give you a little more information before we move into the next phase of today's meeting.

FACILITATOR: Thank you.

So I just want to go through a few rules of the road for the public comment period. First, I want to make sure that people who are commenting are heard and listened to, so we ask if people be quiet and listen as they speak, it would be most helpful.

We have a court reporter who does a terrific job of capturing all the comments and writing every word the person is saying.

A few things about that, when you start, say your name and spell your name for the court reporter.

The way our mics work is hold them like this so you can be heard. If you do this, they don't work as well. So try to hold the mic right there, if you can.

We have a pretty small crowd. I have four folks who signed up to speak. We're not going to worry too much about time limits.

Just to be fair across meetings, we have a timer just to let you know how long you're going. Six or seven minutes is probably pretty good for most folks. About that time I'll stand up and just give you a little hint that you might want to begin to wrap up if you do go that long.

We recognize people may have a range of views on the pipeline, the EIS, the issues, and so that's totally expected and fair. But we do want to make sure people are respectful of each other, so we ask that you're quiet when people speak.

If you do want to be affirmative when people are done, that's great. We ask

that people not be negative about peoples' comments.

And we do ask people direct their comments to the pipeline, the project, the issues, the organizations, the agencies, the EIS, but not the individuals in the room, because we want people to be comfortable in this room.

And it can be very uncomfortable if someone kind of points someone out individually after they make their comment.

State agency folks, do you want to raise your hands? There's a number of state agency folks here, as you know, who are staffing the poster boards. Their job here now, as folks come up here, is to listen. So their job is to listen.

We're going to have great notes that are going to be part of the transcript, going to be part of the record, going to be something the State considers as they move from the Draft to the Final Environmental Impact Statement.

But for right now, the State folks are going to be listening. If you have

questions, you can state them. There just won't be any responses during the public comment period.

We do ask that you silence your cell phones, if you can, or put them on vibrate, whatever, so we're not disturbed during the comments.

Also, to let you know, if you didn't when you came in, we do have flash drives and CDs of the Draft EIS. So if you want the Environmental Impact Statement in full, you can actually take one of those flash drives or CDs as you leave the room. Those are available for all people we have here. Okay.

So the other thing is Leslie -- well, she's right in the back, Leslie will bring you the mic so you can be right at your table. You can stand or sit as you comment. That's really up to you.

And I'll just call the names in the order I pulled the cards out of a hat. So it's Curtis Cobb. Curtis, great, and Leslie will bring you the mic right there. And again, just state your name and spell it for the record, and remember to hold the mic like this.

MR. CURTIS COBB: I'm Curtis Cobb. My concern -- I have two concerns. One is --

FACILITATOR: Curtis, could you just spell your last name for the record.

MR. CURTIS COBB: Cobb, C-O-B-B, like corn on the cob, two Bs.

The pipeline is meeting federal standards for thickness and strength. As an engineer, I am always concerned with is that enough?

Most civil engineers, when they design structures in this country, they actually multiply the stress, and they triple it to make sure bridges and structures in this country are strong enough.

My question is, is this pipeline really going to be strong enough to withstand some of the stresses that the earth and the environment and the fluid itself puts on this pipeline?

I understand that the pressure in this pipeline is over a thousand pounds a square inch. That's quite a bit. While that's a normal pressure, steel always has its

weaknesses.

So that's my concern, is, number one, is the pipeline strong enough?

As far as the environment goes, pipelines are the most efficient and safest way to transport most fluids. We have a huge number of pipelines in this country and they all do pretty well. That doesn't mean they don't break, but it's pretty good.

Issue number one, is the pipeline strong enough.

My other concern is the -- this pipeline aids and abets one of the biggest environmental disasters going on in this earth, and that is the processing of the oil sands in Canada.

A Canadian friend of mine did a six-month study of what was going on up there. And what happens is as they process these oil sands, there's always a toxic residual. That toxic residual just gets put into ponds.

Those ponds now cover 176 square kilometers. That's about 100 square miles of poisonous fluid ponds.

If a bird lands in the pond,

it's instant death.

These ponds are between 30 and 100 feet deep. They are designed to leak this poison into the ground, which they are doing at about 1 percent per year. It is poisoning square miles, thousands of square miles of groundwater in Canada.

We do not need this oil. It is all there to take advantage of a relatively, you might say, unusual form of oil residual.

The -- there's been a huge amount of money spent in doing this. I think there's been over $11 billion spent on building oil refineries there. It employs about 50 or 60 thousand people.

So this pipeline really aids and abets that environmental disaster.

So I have no objection to the pipeline, just what it serves.

FACILITATOR: Thank you, sir.

Next we have Ashley Nerhus. Again, just name and spelling for the court reporter as we start, and speak directly into the mic.

MS. ASHLEY NERHUS: My name is

Ashley Nerhus, that's spelled A-S-H-L-E-Y, and then N-E-R-H-U-S.

I'm the executive director for the Thief River Falls Chamber of Commerce, and on behalf of the Thief River Falls Chamber of Commerce board of directors, I'm here to express our support for the Enbridge Line 3 replacement project.

The Chamber believes that this project is a necessary step in creating a safer pipeline for our community and for the environment.

Line 3 serves as an important link to safely transfer crude oil to the refineries. By replacing the line, Enbridge will have less maintenance and would be able to increase the amount of oil being transferred through the pipelines rather than by using rail cars or tanker trucks.

This will hopefully free up space on our railways and roads to better suit other business transportation needs such as grain and other products that cannot be transported by a pipeline.

The new line will also provide a

safer and sounder means to transport the oil.

The Chamber also believes that this project will have a strong positive impact on not only our local economy but the State's economy as well. This project will create jobs and business opportunities that will be sure to boost our economy.

In the past, Thief River Falls has seen tremendous positive economic impact from the pipeline. We hope to see a similar impact with this project from the purchasing of local products and materials as well as the use of local hotels, restaurants, and services during the project's design and construction process.

Our local and state economy will also benefit from the long-term property taxes that they will receive due to the project.

The Chamber supports the approval of this project to help not only Thief River Falls but the entire state of Minnesota.

Thank you for your time and the opportunity to speak.

FACILITATOR: Thank you, Ashley. And, Ashley, your written comments, is it

possible we can give those to the court reporter just so we have them? That would be great. It just helps make sure we get the record just right.

Okay, and next we have Allen Richardson.

MR. ALLEN RICHARDSON: Good morning. My name is Allen Richardson, A-L-L-E-N, R-I-C-H-A-R-D-S-O-N. Thank you for the opportunity to speak with you this morning.

I'm an organizer by trade, and I've been working for a citizens outfit called Minnesotans for Pipeline Cleanup, and we're concerning ourselves primarily with the fate of the old Line 3.

And so we start that with a question, hypothetical question, which is, if a given landowner who has generously hosted Enbridge's old Line 3 for decades, if they would like to have that old pipeline removed, not just decommissioned -- I mean pulling the pipeline out of the ground, and it's safe to do that -- who should be on the hook for that financially? Should it be the property owner

or should it be Enbridge?

This is one of the questions I've been asking people, you know, door knocking, the old pipeline. I haven't spoken to anybody yet who thinks that the property owner should be on the hook for removing the old pipeline.

So a couple other considerations. If you look at the environmental review documents, there's a statement that the pipelines are in general 10 or 15 feet apart, and it is stated that there is the potential, that it's potentially dangerous to remove the old Line 3 because of its proximity to hot or active lines.

Well, we took the liberty of walking the lines on public thoroughfares between Wawina and Grand Rapids and found the average distance to be quite a bit more than that. And at least between Lines 3 and 4, it averages 30 feet.

So in support of our -- I guess, our remarks about the environmental review documents, we would like to see more and more science about exactly how far apart they are.

And the environmental review

document said this as well: That the cost to Enbridge -- that Enbridge estimates the cost of removing Line 3 at approximately $1.28 billion. Our question is, how many jobs can you get out of $1.28 billion? I'd even wonder what the Chamber of Commerce's opinion on that question might be.

And let's not lose sight of the fact that we're establishing a precedent here. We know Enbridge is going to likely want to abandon the rest of their old pipelines here before too long, and so essentially, we're encouraging labor members, union members, laborers, 49ers, to publicly sort of throw their support to the landowners who are only asking for a landowner-choice option.

They're not demanding the whole thing be removed. But any landowner that wants it removed, let's do right by them, Enbridge, you know, take your old pipeline with you.

If there's a question about the safety, well, then, take your time. Do it right.

We absolutely believe that our union members are the ones who are most

qualified to do that work, so we've got a lot of confidence in your ability to do that work right.

And finally, the environmental review documents state this -- this is in chapter 8.4.1. It states that, "The removal of the existing Line 3 could positively affect the communities -- referring to communities who are on the receiving end of environmental justice impacts -- that, "The removing of the existing Line 3 could positively affect these communities by removing stress or anxiety related to the presence of the abandoned pipeline and ongoing risks related to water flow, soil and water contamination, and subsidence."

So I guess that sounds like a win-win to me. Like if you could get a job digging up an old pipeline to the tune of $1.28 billion that would do right by these affected communities, why would you not throw your lot in for these landowners who are asking for your support?

Thanks for your time.

FACILITATOR: Laura Stengrim.

And again, just name and spelling of your name.

MS. LAURA STENGRIM: Hi, my name is Laura Stengrim, L-A-U-R-A, S-T-E-N-G-R-I-M.

I have a letter in support of the Enbridge Line 3 replacement project. This is from the Convention and Visitors Bureau Board of Directors, which I'm the executive director of. This letter is in support of the Enbridge Line 3 replacement project.

The Thief River Falls Convention and Visitors Bureau is funded by the 3 percent lodging tax that is paid by our overnight visitors and collected at all seven hotel properties in Thief River Falls as well as our city campground.

We're supportive of any project such as this that will bring overnight visitors to our community and positively affect our economy. This project would have significant economic impact on our lodging properties, restaurants, and retail stores. This kind of boost will be felt around the entire community.

On behalf of the Thief River Falls Convention and Visitors Bureau Board of

Directors, I offer our support of this project. We feel confident that our city has the facilities necessary to accommodate the pipeline workers from our 350 hotel rooms to our wide range of dining and retail amenities.

This project would have substantial economic impact on Thief River Falls as well as the state of Minnesota, so we are very hopeful that it is approved as soon as possible.

FACILITATOR: Thank you. Do you mind sharing your written comments for the court reporter?

So that was the four folks who signed up to comment. We have plenty of time. Are there others in the room who want to make a comment? Just raise your hand so I can get a sense of the count. We can collect those comments as well.

Anybody else?

All right, so why don't we start here. Just name and spelling for the record, and then dive in.

MR. ANDY PEARSON: Thank you. My name is Andy Pearson, A-N-D-Y,

P-E-A-R-S-O-N.

I want to speak to just a couple of points in the DEIS today. But first I want to just recognize a change that the Department of Commerce has made to one of these display boards. I happen to know that at some other meetings it was brought up that the display board on Certificate of Need actually left out a couple of the key criteria for assessing Certificate of Need, one of which is whether the cost to society at large is greater if the project is built (indiscernible) if it isn't built.

And I wanted to give a real positive shout-out that that was added to the display board, and I saw it yesterday, and thank you, because I know a lot of the reason we're here is for better decision-making, and I think having all the criteria that are necessary up on the board actually leads to better decision-making.

So going off of that note I want to talk about one of those in particular -- actually two, the cost to society and the compliance with existing laws and regulations

for just a minute.

So in the DEIS document, one of the areas that I was impressed by in many ways was the area that looked at climate change impact. In particular, the fact that they did study the life cycle impacts of this pipeline.

That means the total climate change impact that it would cause by being built through both the oil transported in the pipeline and the pipe itself. And that number, as listed in the DEIS, is that it would have a cost to society of $287 billion, with a B, to society at large by building it over a 30-year time span.

And I believe that that time span should actually be more consistent with the length of time that these pipes have historically operated and are operating now, which is 60 years. I would encourage the DOC to actually double their time estimate for pipeline life.

It says in fact at another point in the DEIS, it says 30 years is the minimum expected life of the pipeline. I think it's probably not best practice to just study

minimum probabilities but to study the range, and maybe to have the default be more of the median than the minimum, so I would encourage that to be changed.

I also know that something happened in our state in the time since the DEIS was released that the DOC could not have anticipated, so I don't blame them for not anticipating that our governor, Governor Dayton, would commit Minnesota to upholding the Paris Climate Agreement and those carbon reduction goals.

Again, no fault to the DOC that that's not included in the document, but it needs to be included in the final version of the document, because the governor saying that and committing the state agencies to it makes it a matter of state policy.

So to that second point on the Certificate of Need, we need to be assessing this project and its $287 billion dollar cost to society. We need to be assessing it for its compliance with relevant state laws and regulations, which includes the governor committing the state to reductions under the

Paris Accord, and which includes other state policy around carbon reduction, including renewable energy standard and carbon reduction goals at the state level in Minnesota and also at many cities.

So I would encourage that be assessed as well specifically in the Environmental Impact Statement document as it's a document designed to inform a Certificate of Need decision.

These carbon analyses need to be in there a little bit more than we're seeing right now, although I respect and appreciate the work that's gone into getting us to the level of analysis that we have in the document.

Just looking to kick it to the next step up so that the Commission is able to use it to make a fully informed decision as we're looking at whether to go forward with building this project.

Thank you.

FACILITATOR: And you're up next. Just name and spelling for the record.

MS. NICOLETTE SLAGLE: I'm Nicolette Slagle, N-I-C-O-L-E-T-T-E,

S-L-A-G-L-E.

I'm with Honor the Earth. I am their research director, and I wanted to thank you for bringing up the issues of the oil sand or the tar sands up in Alberta, because as our stance with Honor the Earth, we are wholly opposed to anymore expansion of the tar sands industry for a number of reasons. And so I really appreciate you also stating some facts about how terrible of an industry it is.

One of the things that I've been working on, researching a lot in the last two years is this issue of abandonment. And as you may know, that this line is coming from Canada, and the Canadian National Energy Board is also facing the abandonment of the existing Line 3 up in Canada. So a lot of the information that I have learned about what the potential impacts of abandonment is comes from the research that the NEB has done.

A few interesting things about that is that I was able to speak yesterday with some representatives from the Canadian Association of Energy and Pipeline Landowner Association. So this is a group that was

started by a Canadian landowner that had a pipeline running through their yard that was concerned about what would happen if that pipeline was abandoned.

And what I learned is that back in 1985, the National Energy Board actually had on their books seven different regulations related to pipeline abandonment, and their preferred method for dealing with abandonment was complete removal.

Now, some politics changed up there, a lot of those regulations got removed from the books, but the CAEPLA organization is working to get some of those back on there, including landowners' choice of what happens to pipelines that run through their yards.

So it is possible to completely remove pipelines and it is an expense that most likely somebody will bear. And we want to make sure that it is the company that is bearing those costs and not society.

Now, as it relates back to this, the issues here in Minnesota, and this document in particular, I'm going to read a couple of things and I will tie them together. This is

from the CAEPLA's summer 2016 magazine. It's an article about aging pipelines, what are the risks. And it's an article about independent research that is co-sponsored between Enbridge and CAEPLA.

"Enbridge has acknowledged that the extensive disbonding of the Line 3 polyethylene tape pipe coating will render cathodic protection ineffective to prevent corrosion and has estimated time to through wall penetration at 25 to 50 years.

"Progressively greater agricultural surface loads increase the potential for pipeline collapse and ground subsidence. In addition to health and safety concerns and related costs and liabilities, topsoil loss upon ground subsidence will result in permanent long term production losses."

So I read that and I was thinking back to myself, okay, I don't really remember that being stated as clearly in the DEIS. I have tried to read as much of it as possible, and I did manage to read the entire section on abandonment because it was about 14 pages.

So in here, in section 8.3.1.2,

"Existing Line 3 as a Water Conduit," so this is one of the issues that if there is through wall corrosion, water can get into the pipeline and it can move through the pipeline into different areas.

So yeah, basically says that this could happen but cathodic protection in cementing the pipeline would minimize the effects on water resources. And it says here that -- yeah, over time -- well, basically it says cathodic protection is going to limit that from happening.

And so I was interested to see -- again, they didn't give any numbers, just that the cathodic protection is going to stop that from happening.

But if you then go into appendix B, which is the appendix to the abandonment section, so it has more of the technical documents and additional information that were used to -- I'm assuming, used to create the section on abandonment.

So from that, on page 26 of appendix B, Line 3 is externally coated with polyethylene tape. A Gas Research Institute

report published in 1992, provides information that, "The most common problem reported by the pipeline operators who had used tape coating on their pipeline systems were poor field application, failure of adhesive, poor resistance to soil stress and high susceptibility to shielding the current of the cathodic protection system."

There's some more talk about what's happened over the years. The end of the second paragraph, "Once the wrinkles form, water is able to seep under the disbonded coating and is carried along the pipeline's steel surface by capillary action. Permeation of the CP current is limited due to high dielectric strength of the polyethylene tape shielding the current."

Which, long story short, basically they're saying that, well, the cathodic protection is already disbonding from the pipeline. So again, I really want to understand how their cathodic protection is going to protect this pipeline when it's not even functioning now.

So then they have a lot of

assessments, of corrosion rates, and some charts here, how long it may take.

Page 29, and so there's a graph, "Based on this information, the worst case time to failure from the original installation is estimated at 51 years. Based on this, it would be assumed that the pipeline is already penetrated or is likely to be within the next five years considering an in-service date of 1968."

Now, it does say, "This demonstrates the over-conservative nature of the corrosion rates presented in the PTAC Model when compared to the corrosion rates experienced on Line 3."

Okay. So what -- based on the existing corrosion rates, what time frame are we looking at? "Figure 4.8, yields estimates of time to through wall penetration based on the PTAC Model between 25 to 50 years from 2011."

So finally, after digging through all of that, we see that, yes, actually 25 to 50 years is how long we could have through wall corrosion because of the limited functioning of

the cathodic protection system.

FACILITATOR: Been about seven minutes.

MS. NICOLETTE SLAGLE: Okay. So I just would like the abandonment section to be a lot more clear about the fact that these issues are not going to happen sometime in the far away future, they're going to happen within people's lifetimes. And I really do think that the State needs to complete an entirely separate Environmental Impact Statement on the issue of abandonment, because, as Allen said, this is not the first -- well, it is the first major pipeline, but it is not going to be last.

Thank you.

FACILITATOR: Thank you.

Other folks who want to comment this morning?

Yes, name and spelling for the record.

MS. KYLIE LEMLEY: Hello, it's Kylie Lemley, K-Y-L-I-E, L-E-M-L-E-Y.

I just have a couple of points I wanted to talk about today. I would first

like to mention that Enbridge's track record in terms of safety is atrocious.

This is to say nothing against the pipeline work, the unions themselves, the people who put them together. I thoroughly appreciate these people. I understand their need for a job. I understand that they do their jobs well.

I'm talking about the corporation Enbridge themself. In fact, in 2010, the Pipeline of Hazardous Materials Safety Administration, or PHMSA, they actually held Enbridge up as an example for what not to do in terms of safety.

They've been fined so many times that I don't even want to get into it for violations. We have fact sheets on that.

Another thing I'd like to mention is if we'd like to talk about benefits received for this pipeline, the answer is we don't have any. In terms of tax benefits, as I've heard mentioned today, Enbridge is currently appealing for five years of taxes that they've given us for previous pipelines being built.

So this means that a huge

percentage of the benefits that we've received in the past from them are going to have to be paid back by, you guessed it, us as taxpayers.

So this means that we will foot the bill for tens of millions of dollars, if their appeal is granted, and it means that some counties such as Clearwater or Red Lake will likely go bankrupt attempting to pay Enbridge back for the benefits that they've received.

I'd also like to mention that we are not receiving the oil coming through this pipeline -- this really scary, dirty oil, but we'll get to that, and pipelines are not the safest mode of transportation.

Though they spill less frequently, just based on the amount of oil that they give, they do not spill less frequently overall. They also tend to spill much more oil and do much more damage than other modes of transportation such as rail or truck.

So another thing that should be noted is that it's been shown in the past that not building a new pipeline does not mean that the transport by rail or by truck increases.

This is just not something that happens. In fact, oil sand extraction tends to slow down when you don't build pipelines.

This is a good thing. We don't want to keep extracting this dirty, scary oil, which is so water intensive, the process -- the energy we put into extracting this oil is almost negligible compared to the amount of energy we get out.

So another huge secret is that we have a lot of oil right now. Our reserves are practically overflowing. Right now there are boats filled with large stores of oil that are just circling around because they have no idea where to put the oil. They have nowhere to put it and no one wants to buy it.

Expansion is not something we need to be doing right now. We have a reserve of oil.

And I've heard -- you know, multiple people can agree with me that the fossil fuels are not in our future. Even if we want them to be, they can't be. There's a reason we call them nonrenewable energy.

We need to begin our transition

not for our great grandkids or -- I mean, I could be most of your grandchildren. So it's time to transition now. We don't want to be lagging behind.

Another point I'd like to make is we need to begin thinking in a global way when discussing our environment. When Trump announced his plan to withdraw from the Paris Climate Agreement, there was outrage. I mean, nobody was happy about that one. We as Minnesotans actually announced our intention to uphold the Agreement anyway.

So the climate agreement was first enacted to unite countries in the battle of the quickly approaching climate change. We all agree this is happening and it's a problem.

By signing, we agreed that we need to do our part globally in reducing carbon emissions. We all need to work together on this. This is not something one country or one area can do.

Expanding the extraction of tar sands oil is the exact opposite of that, so we in the United States agreed to reduce our carbon emissions by about 28 percent of their

(indiscernible) numbers.

Extracting tar sands creates almost double our goal of carbon emissions, and I understand that this happens in Canada so it's not right in our backyards and why should we care. Maybe just move the pipeline somewhere that's not in our backyards.

And to that I would respond, where is a good place for a pipeline? Where is a good place to have your environment destroyed?

So I also recently read an article written by the president of United Steel Workers who represents a bunch of different labor unions, especially one that has to do with the building of pipelines, and the president was saying, "If we don't start working harder to maintain our environment, we won't have any jobs anywhere. Our country will be uninhabitable and we need to work together to uphold the Climate Agreement, to uphold our environment, to uphold our homes and where we live."

I understand that jobs are important. I understand that, but there are

other jobs that are not quite so detrimental to us.

I don't want to cease using oil. News flash, I drove here today. My clothes are made of blended fabric that's likely created using oil. I get that. Of course, society at large needs oil, and here we agree, but we need to move on from all of this.

This transition cannot happen by expanding the extraction of tar sands. Our transition cannot happen with this expanded pipeline.

So that's kind of everything I wanted to talk about. Thank you for listening.

FACILITATOR: Thank you.

Anyone else who wants to make a public comment at this time?

Name and spelling for the record.

MS. RENEE MARQUIS: Thank you. This is my second comment, Renee, R-E-N-E-E, last name Marquis, M-A-R-Q-U-I-S, and I'm from Goodrich.

I'm a consumer of oil and gas products. I love them. I love heat in my

house, especially when it's 40 below. I love oil. I love gas. I use it.

I realize other people use the product, too. Other people need the product, too. I do not live in the world of "me." I live in the world of "we." We have a neighbor who needs gas. We have a neighbor who needs oil.

I want to say we are stewards of our land in Highlanding Township. And we have deer, we have trees, we have ponds, we have acreage, and I also have a husband that has worked many years construction.

And I want to thank him for doing pipeline work. I want to thank him for doing the job that everybody can say is so awful, but he lives in the world of "we" so we want to give to everybody.

Thank you.

FACILITATOR: Thank you.

Anyone else who would like to make a public comment at this time?

Name and spelling.

MR. WILLIS MATTISON: Thank you. My name is Willis Mattison. I now live down

by Detroit lakes.

FACILITATOR: Spell your name.

MR. WILLIS MATTISON: Willis Mattison, M-A-T-T-I-S-O-N, first name is Willis, W-I-L-L-I-S.

I'm a hometown boy. You mentioned you're from Highlanding. I lived down in Pennington, Red Lake county line about eight miles south of Highlanding. Went to school in Plummer. Graduated there in 1961. That school gave me a great education, got me interested in science and particularly in biology. I was given a scholarship at my school, and I went to Bemidji State University, and I got a degree there in biology and chemistry.

I went on to teach science. I did that for several years but then got interested in environmental protection because I'd learned in college that what we live in our environment, we need to use our environment, we also need to protect it.

Many of us don't understand that the kinds of things we use are to our own detriment. Oil is one of those things. Oil

has served us well. Still can serve homes, still fuels our cars. But we recognize that like an addiction, some chemicals turn out to be not good for us in the long run.

I want to come back home and serve my community in Plummer where I went to school, and I consider Thief River Falls and Pennington County part of my home, and I want to serve you. I want to return the favor you did to me by educating me and sending me off to school and forming these things.

We have a foreign company, Enbridge, that wants to make money. If there wasn't money in oil, they wouldn't be doing this. They wouldn't be investing $7 billion in a project to transport something we can no longer depend on.

The young lady ahead of me made a very good case. Many of you may not believe in climate change. That's okay. Climate change is not something you believe in. Climate change is something you know and you experience.

Your snowmobile manufacturers here in town sold out. I was here in the 1950s

when Artic Cat was being created, and we had wonderful winters for snowmobiles. Whatever happened to those? Why can't they sell as many snowmobiles as they used to? Why did they sell out to an out-of-state corporation?

I read the paper, and the president said it's because people aren't buying snowmobiles anymore because they can't use them like they used to. That's climate change, folks.

So we need to do something different. The Public Utilities Commission and the Department of Commerce are state agencies. State agencies are regulatory agencies to serve the public. There's no need to have regulatory agencies if industries would behave themselves without supervision. They don't.

I was in the Pollution Control Agency for 28 years. I know that given their druthers in order to make more money, they will cut corners and they will cut corners at the expense of our health and our environment. So a regulatory agency is supposed to do this.

This enormous Environmental Impact Statement that you're looking at is

supposed to answer one primary question, why is this project in the public interest? We know it's in the company's interest to make money. That's a given, and we don't mind people making money. That's the American way, for enterprise.

We work hard, we earn money, we do things. But we should do things in a way that doesn't harm our neighbor.

You're talking about not wanting to harm your neighbor. I don't want to harm my neighbor. These regulatory agencies are supposed to ensure that these companies are not harming their neighbor.

But if you read this foot-high document, nowhere in there will you see how this project serves you and your long-term interest or your children's interest.

I have read almost three fourths of it. It's taken me three weeks. I'm not all the way through it. I would guess that few of you, if any, will read it, and I understand that. I would not put you through that torture.

An environmental impact statement

should not be torturous to read. By law it is not supposed to be encyclopedic, but it is. It's forebodingly encyclopedic so you will not read it. But I'm going to. So trust me. I'm a hometown kid. I'm not going to come here and lie to you.

This document does not demonstrate that this project is in the public interest.

It is, in fact, against our public interest. So if you want to know more and why, I'm going to be putting on some educational sessions between now and then, the comment period, and I will help you understand the fine teeth in there.

But this document is so huge that the truth is hidden in all of those pages, and you can't find it unless you know where to look for it. I can help you know what to look for.

Regulatory agencies have, over time, been virtually taken over by the industries that they are supposed to regulate. You don't see in this document that they're -- the Department of Commerce is recommending the PUC make their decision based on the need for

the project as dictated by the economics, the market drivers for oil.

They say that the need for the project will be to determine whether the pipeline company can sell the oil or ship the oil if somebody wants to buy it.

That's kind of like saying a drug dealer should be in business if they've got someone who will buy the illegal drugs.

That's not the right test for whether this project is needed. We don't need fossil fuels anymore. We need to convert our homes and our businesses and our vehicles and our industry to alternative forms of energy.

But does this document say that that is a reasonable choice? No, it says a reasonable alternative is to put a whole line of trucks on the Canadian border and haul oil to Superior.

What reasonable person would have said -- if we look at alternative ways to do this job, would have said, "Let's consider putting a line of trucks on the highway and haul that oil?"

FACILITATOR: It's been about

seven minutes.

MR. WILLIS MATTISON: Please don't insult my intelligence. I will finish up as soon as I can.

So this document does a lot of busy work proving, setting up straw men and knocking them down. Instead, we should be talking seriously about what does the nation need, what do we need.

We need clean energy. Fossil fuels have outlived their usefulness. We know this. It's served us well, but we found out they have a problem so we're in transition.

Sixty-year or more investment in infrastructure and a pipeline here is not going to be the bridge we need to transition to our new clean energy future, folks.

So insist that the Department of Commerce revise this document to talk about how do we transition into a clean energy future? We're going to spend $7 billion. Wouldn't it make sense to spend $7 billion --

FACILITATOR: It's been about eight minutes.

MR. WILLIS MATTISON: -- on

something that will sustain us into those future years?

Thank you very much.

FACILITATOR: Name and spelling for the record.

MR. CURTIS COBB: I'm Curtis Cobb, C-U-R-T-I-S, C-O-B-B.

I support his comment. I just want to expand on it for a couple of minutes. We are going to have free energy. It was designed and developed in the 1920s and 30s by Nikola Tesla, who was a scientist then. We do not have it now, because JP Morgan, the financier, found out that as he was financing Tesla to build this generator, which he did, he would have to give away the energy free.

Morgan pulled back all the financing and the generator was dismantled and Tesla was murdered in 1943, to stop him from releasing any further inventions.

There have been 76 other inventors that have come out with free energy devices. They have all been murdered. Not by accident (indiscernible).

But we will have them. We are on

the verge of having free energy, and we will have a much cleaner environment.

So here we are beating ourselves to death about a pipeline, which will -- go ahead and build it. It will eventually be obsolete. That's basically it.

Carbon dioxide, I've been studying this thing for about two years now, and they call carbon dioxide a greenhouse gas. And my question is, how can you have a greenhouse gas, or how could carbon dioxide be a greenhouse gas when it doesn't exist at greenhouse elevations?

Carbon dioxide is a very low elevation gas. You get up to 5,000 feet, 25 percent of our air disappears. That includes carbon dioxide. You get up to 10,000 feet, 40 percent of it disappears. How could it be a greenhouse gas?

On top of that -- this goes for all the plants in the world. The plants in the world have increased 1.1 percent over the last ten years because we increase carbon dioxide.

Interesting feature, the -- our satellites -- talk about global warming, this

is a point. I'll get back to carbon dioxide in a minute. We've had 15 weather satellites whirling around this earth for 31 years. It measures the heat going into the earth and the heat going out of the earth.

For 31 years, every 13 minutes, there has been no global warming.

Have we had climate change? Sure, but the climate's been changing for a billion years, so has the climate changed? Sure.

But anyway, getting back to carbon dioxide. The reason we've had an increase in CO2 from 300 parts per million to 400 parts per million for the last hundred years is because we've cut down a few billion trees. Not us, it's what we do with our environment. And so that's pretty much stabilized.

The United States farm belt, of which we're a part, produces about 28 percent of the oxygen in this world. The Brazilian Rain Forest, another 20 percent.

And what we found out was when our satellites were whirling around the earth,

the astronauts noticed a green glow coming from Central America -- I mean, from basically the Rockies to the East Coast, and they couldn't figure this out, why a green glow that comes through the atmosphere when you're 200 miles up.

What they found out is our corn crop, our corn crop is producing so much oxygen in this world that it produces 20 percent more oxygen than the Brazilian Rain Forest.

So we're getting plenty of oxygen and the carbon dioxide has been used up quite readily, so stop worrying about it. That will get fixed, too.

That's all I've got to say.

FACILITATOR: Thank you.

Others who have not spoken yet who would like to make a public comment? Anybody else?

Just a reminder, if you do want to do a written comment, there are boxes there and a paper form that you can fill out.

A court reporter in the back, Janet, is here raising her hand, if you want to make an individual comment to her. It will

be treated exactly the same as if you made it to the full group here. Janet will be in the back for the period of the time that we're here to take that comment as well.

State staff will be here for the next bit until our finish time at 1:00 o'clock, roughly; if there are any questions, conversations and the like.

Again, just to note, your comments will go into the record. Ultimately it will be gathered up and actually put online on the state website, and they will be considered by the State as they move from the draft to the final EIS, the Environmental Impact Statement.

Thank you very much for your time. We're going to be around, so feel free to mingle.

For the comments across the broad spectrum, thank you very much, and thank you for coming out today. Thanks.

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DEIS MEETINGS - 14-916 15-137

PLUMMER - JUNE 21, 2017 - 6:00 P.M.

(PRIVATE COMMENTS WITH COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Plummer Senior Citizen Center
185 Minnesota Street
Plummer, Minnesota

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MR. DONALD STENBERG: My full name is Donald Stenberg, S-T-E-N-B-E-R-G.

Well, I am all in favor of getting it replaced because we have farmed over this line ever since it went in. I haven't had any bad experiences. But eventually everything wears out, and if they can replace it with something bigger and safer, that's exactly what I'm in favor of.

There's been some falls -- we do -- I farm. We do run short on diesel fuel once in a while and hopefully this might help correct that too.

I feel that the people that are opposed to this line shouldn't be using fossil fuels themself. They should ride their horse or a bicycle or walk. If they really genuinely don't want fossil fuel used, then they shouldn't use it. I feel very strongly on that.

MR. JOHN LEROHL: John, J-O-H-N, Lerohl, L-E-R-O-H-L. I'm a county commissioner for Red Lake County. And Enbridge has my full support.

I think the company is a good company and it does a good job and it worries about safety. It worries more than any other individual that I know of. And I think that this replacement is a

necessity. It should have been done a couple years ago.

I see how the crews are out working, and they're working, I think a lot of it is on that pipeline. And they're out there constantly going and it's costing a lot of money and it's not a good deal.

Pipelines are without doubt the safest way to ship oil. We've had a car right outside of town here that got hit by a truck and it started on fire. It didn't explode, but two cars down was another big car that had some others on it and they said that that would have wiped out Plummer if they'd have hit that car, that Plummer would have went and they would have felt it and heard it in Bagley.

So I don't like to take a chance with that, you know. These oil trains that have been going through, sooner or later one is going to go off in Fargo or Moorhead or some large city and it's really going to hurt, you know.

So I'm really in favor of pipelines, that's the best way to go.

(Comments concluded.)

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DEIS MEETINGS - 14-916 15-137

BEMIDJI - JUNE 22, 2017 - 6:00 P.M.

(PRIVATE COMMENTS WITH COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Sanford Center and
George W. Nielson Convention Center
111 Event Center Drive NE
Bemidji, Minnesota

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MR. DAVID BUTCHER: My name is David Butcher, D-A-V-I-D, B-U-T-C-H-E-R.

Okay. Well, you know, it's hard to know what particular aspect of this particular project to pick on because there's so many things wrong with it. I mean, you know, an 800-pound relic in the living room is climate change. I mean, we've added 10 more parts per million of carbon in just the last four years. We're now 410 and the goal is 350 so we're already 60 over the goals. We're adding, you know, 10 parts per carbon, you know, 10 parts per million of carbon every four years. It's not going to take as long before we're going to make this planet totally uninhabitable. I don't know what we can even consider expanding oil lines, you know.

I understand Enbridge seems to think there's a need to replace this particular oil line because it's, you know, carrying oil, which is apparently refined and then used, but they also want to expand the capacity, which is my understanding, which just adds more.

So I think we need really a further study on how much, you know, more expansion we can take. And I don't think we can take any, to be honest with you. We should be shutting down oil as much as

possible because there are alternatives. I mean, we're in the middle of a transition in energy, an energy transition, if we're smart, to renewables. Which I think, you know, if we get serious about it can be used to replace a lot of what we use our fossil fuels or oil for.

And, you know, the oil that comes out of Alberta, the tar sands oil is some of the most carbon dense oil that there is. I mean, I read that it produces 17 to 30 percent more carbon just in the process of getting it out of the ground and refining it and whatnot, than normal. So, I mean, it's a dirty oil, you know.

And then, you know, plus you've got, you know, speaking of dirty oil, I mean, you know, you look at how it affects the people in Alberta, the Indigenous people there. I mean, we're so cautious about wanting to placate our Indigenous people here, which I think makes sense, I mean, they have a long cultural history here and things that they rely culturally and even economically on, like wild rice. But, you know, if we were really serious about this, we wouldn't even let that oil get across the border because the people, the Indigenous people in Canada are treated so harshly. I mean, they've had their

land essentially raped. People, you know, the people that have to live in the vicinity of this tar sands oil are getting higher rates of cancer, you know, they're dying. There are more still births. I mean, just everything under the sun where, you know, people are exposed to this, and they very often don't have the alternative of moving, you know. So if we were really serious about, you know, climate justice or environmental justice, we wouldn't even let this oil into the country the way, you know, the way the Indigenous people are treated in Canada with the extraction of tar sands oil.

You know, the big oil companies are saying, you know, it's wasted assets. They have assets they can't use now because there's such a glut of oil on the market. And, you know, and for the foreseeable future, because we have other countries coming on line with their oil like Libya and Iraq, you know, they're expanding their oil. And with the fracking in this country in places where we thought we couldn't, you know, get at the oil before, now we can, the lighter oil. You know, that glut is going to continue on for the foreseeable future and if we're smart we'll be replacing fossil fuels with renewable energy.

And, you know, I just read today that renewable energy has increased something like 139,000 percent in the last 20 years, or something like that. Which compared to like the Internet or to the Smart phones, which have increased about 30,000 percent, so you can see that solar, you know, renewable energy is really taking off. And they'll get better, as technologies evolve and as technologies to address particular problems, like storing current or whatever.

But, you know, I think that's kind of a queue to -- you know, my fear is that, you know, there's going to be a pipeline to nowhere. They're going to build this pipeline and they want, what, two and a half football fields, 750 yards corridor? Which is just a humongous scar on the earth. Right through the most iconic waters in Minnesota, which is the Mississippi headwaters, you know. And not only that scar, but the service roads have to be built.

I mean, it sounds to me like they're planning for more than one pipeline, you know. Why, I don't know, because you certainly don't need 750 yards for one pipeline to go through, to build a corridor, unless you're planning on putting in more

than one pipeline in eventually. You know, there was the whole Sandpiper thing.

But, you know, and it's not only, you know, the scar on the land, but it's if that pipeline goes through there's going to be leaks. I mean, there is not an oil pipeline in the world that does not leak eventually. The Dakota Access pipeline, which is new in, has already had two leaks. It's a brand new pipeline, for God's sake, you know.

So, I mean, when you add it all up, you know, really the only alternative is no pipeline. You know, I think if it's absolutely necessary then it should be put in a corridor that already exists, not a whole brand new one, which is going to disrupt more, you know, the environment of the country, the people who live, you know, in that particular area where they're suggesting the corridor should go, the Line 3 corridor. But any way you look at it, in the big picture it doesn't make sense.

Like I say, how long can we keep fiddling around? I mean, 410 parts of carbon per million, that's an increase of 10 parts in just the last four years. And, you know, Climate 350 is an environmental group, which it said, you know, we

need to get to 350 if we're going to keep this planet decently habitable. I mean, at the way we're going we're going to hit 500. And a large part of this planet is going to be uninhabitable, I mean, people just aren't going to be able to live.

In the long run it's going to cause a lot of problems because people are going to be migrating, there are going to be droughts, you know, they're going to be looking for other places to live. In fact, I think there was a study put out, some department within the Pentagon, that said that climate change is our number one national security problem for the foreseeable future because it's going to result in, you know, people migrating, being in conflict, or water, land, and, you know, all the things that can lead to war. And which, you know, I'm sure we'll find a way to try and get involved in.

So, I mean, it just doesn't make sense. I mean, at some point in time we got to say no. We've got to be looking at the future, we can't stop fiddling around. We've got to get serious about it.

Thank you very much.

MR. DAVID JEROME MANUEL: Okay. My name is David Jerome Manuel, D-A-V-I-D, J-E-R-O-M-E,

M-A-N-U-E-L. I'm a citizen and resident of the state of Minnesota. I live up in the Red Lake Indian Reservation.

And I am opposed to the new pipeline because I hunt and fish and harvest the wild rice along the new proposed pipeline. My favorite ricing river is the Moose Horn River near Cromwell, Minnesota, where the pipe, the proposed pipeline is going to go through if it's approved.

I believe that the new proposed pipeline route is -- it goes through too many wetlands and wild rice rivers, and lakes, too close to our natural resources that are enjoyed by all Minnesotans. Regardless of race or class, you know, sex. I think that our natural resources here in the state of Minnesota need to be protected at all costs.

And while I am not against consumption of energy for commerce or recreation, I believe that our emphasis should be put on clean energy and solar and wind and other forms of energy. And we need to start thinking about the finite resource that oil is. It's not infinite, there's just a limited amount, and the environmental cost of extracting that and the risks that we take going through a

pipeline I think are too great to allow and that's why I am not in favor of the new pipeline route.

MR. MATTHEW WATKINS: Matthew Watkins. M-A-T-T-H-E-W, W-A-T-K-I-N-S. And I'm here as a business agent for Local 49 who was involved in the pipeline before becoming an agent with Local 49. And I fully feel that these projects are beneficial to the economic status of Minnesota and society overall. We have to look at the entire picture, not just what affects Minnesota and our local economy. The global market and demand for oil has not decreased and there's no reason for the state of Minnesota to lose out on their share of the economic benefits of the oil industry.

I also believe it can be done safely and effectively and believe the timeline should be followed as far as the letter of the law in regards to the process.

And that's really all I got to say today. I'll keep it short and sweet.

MS. ERIKA BAILEY-JOHNSON: My name is Erika, E-R-I-K-A, and my last name is hyphenated, it's Bailey-Johnson, B as in boy, A-I-L-E-Y, hyphen, Johnson, O-N.

So I am going to read this part, but then

I have just little pieces I'm going to augment with.

Okay. We do not need any more pipelines running through Mother Earth risking soil and water quality and climate stability for future generations. It is not a question of whether there will be a spill but when. Minnesota and the tribal nations residing within its borders pride itself on our lakes and rivers, our sacred waters.

Small pipeline leaks are difficult to detect and clean soil and water are infinitely more valuable than oil. Broader arguments exist about the impacts pipelines have on treaty territory, the degradation of habitat, and what to do with pipelines when they are decommissioned.

One of the questions that I asked the people inside the room was what the options were for the pipeline. And one of the options I feel should be that there is no new pipeline and that the old Line 3 is removed. Our energy, transportation and agricultural infrastructures are based upon a finite resource. We need to figure out how to transition, and the sooner the better, as fossil fuels have resulted in negative impacts and tremendous risk on our quality of life and the interconnected web upon which we depend.

There is no perfect solution to facilitate the transition, but we can certainly do better. We can certainly increase conservation efficiency and renewable energy projects. We can certainly work to change our default settings and not allow more fossil fuel infrastructure to become established.

One of the examples of this is the amount of food wasted in the United States each year. The U.S. Department of Agriculture estimates that about 27 percent of food is wasted in the U.S. each year, which equates to approximately 350 million barrels of oil.

It's important to notice the emphasis on the relationship of food and energy. Agricultural productivity has increased dramatically thanks in large part to the adoption of new technologies and inputs, chemical fertilizers, which are all based on fossil fuels. This has led to substantially higher yields through much less human labor. This agricultural transformation from human and animal power to chemical power has left the food industry entirely dependent on fossil fuels.

From my perspective, wasting 30 percent of our food and agriculture industry is something

that we can do, something that we can -- it's something that we can have an impact on in a much broader way than building a new pipeline. And a much better way than building a new pipeline. Instead of building more or bigger pipelines, we should be working to create less demand for this limited resource and in fact removing pipelines. Conservation and efficiency measures, more fuel-efficient vehicles, as well as sensible renewable energy installations can go a long way to slow the demand for oil. Currently there are no substitutes for many products made from oil. In fact, it takes oil to make non-oil technologies, like solar panels and wind turbines. We know we must transition to a new fossil fuel-free era, while using oil responsibly to produce systems that eliminate the need for oil makes good sense.

It is typical the pipeline and fossil fuel companies to assume that their projects will be approved. They purchase pipes before final approval. They build sections of the pipeline before the entire line is approved. This is arrogant and deceitful. This line risks clean air and water, healthy soil, and a stable climate for several generations, which are all worth more than

any drop of oil. Reducing the oil is far more important than creating more oil infrastructure.

All of the jobs that have been touted by the creation of this pipeline are short term. So the big question is is this project needed for Minnesota and my answer is a simple no. It's time to transition away from a fossil fuel era and that's good.

I'm trying to think if there is anything else. I talked to her about three questions that I had inside.

So one other point I want to make is about the Canadian pipeline abatement procedure that they already have on the books. And it's a very, like, highly complex system that they have for pipeline abandonment. So instead of there being an option A, which is leave it in the ground, and an option B, which is remove it from the ground, they encourage like multiple techniques. So it would be, depending on where the pipeline is, if it's under a lake, it's really difficult to remove it without some substantial risk, and so I think there should be a combination of removal and abandonment procedures that take place similar to what Canada has already established.

Yeah. So I guess, finally, just the certificate of need, I feel that this is not necessary for Minnesota and poses risks and short-term jobs.

And then as far as the environmental impact for Minnesota, it is more than I am willing to risk for my kids.

The end.

MS. BRANDY LARSON: Brandy, B-R-A-N-D-Y, Larson, L-A-R-S-0-N.

I'm just a concerned citizen. And I would like to see the EIS address more of pipeline abandonment issues and address the economic impact of employing local people to remove the pipeline.

MR. JOHN PECHIN: John Pechin, J-O-H-N, P-E-C-H-I-N.

I just want to make a statement that I feel -- I've read the draft environmental impact statement, I feel it's a well done, comprehensive document, that should help inform the Commission on the decision-making.

MS. LORNA HANES: Okay. Lorna, L-O-R-N-A, Hanes, H-A-N-E-S. G-I-I W-E-D-I-N-O-O-K-W-E, Gii Wedinookwe, Anishinabe.

My biggest concern, I guess, would be

what is standing out at Standing Rock, also what's going on in the Alberta tar sands area. My biggest concern are the missing, murdered women and children that go along with this pipeline and the extreme extraction.

I kind of called out on the -- the brotherhood, or whatever you want to call that, you know, union guys. And I was told that I had fake numbers. My numbers are not fake. There are over close to 4,000 missing murdered women to this date and the numbers are still growing.

I would like to know, there is only just a few sentences of what they're going to do about the problem with the sex trafficking and the sexual abuse of women and children and also men too. So I would like to have that be more of what is their plan.

I can name numerous women's groups that would be more than happy to help them out with that, see what they want to do with all that. We've got the Minnesota Women's Sexual Coalition, we have the Missing Murdered Women's Coalition. I mean, there's so many, many groups out there that have all the facts and, you know, and I have had numerous friends of mine missing and murdered too. Those are my

concerns.

I also was sexually attacked through Morton County police and that wasn't good, but that's what I am. I'm a water protector, if you want to call me that. I'm a -- I'm just not going to stand back and let that happen. I have little ones at home, nieces and nephews and stuff that I'm worried about. Things like that.

I don't know, like I told them before, that I will be out on the line. I have been out on the line. I have been riding my horse out on the line and I will continue to do so. And I see you out there, we're going to have a little talk about what you're doing out there and stuff like that.

I would personally like to see myself how they build and construct pipelines. I would also like to see Enbridge, if they're going to do these drastic things, if they can come out of the fossil fuel industries and go into the, you know, the alternative energies, that would be great. But for the most part I would like to see Enbridge hire me and some of my crew for, like, you know, just walking the line and just being overseers of our lands and our territory. And I'm for them to clean up their mess. And I'm not for another pipeline

whatsoever.

We have the most pristine waters here, we have the most pristine lands here, and I've watched Enbridge ruin everybody around the world and I'm not going to do that here. So I will be out there and I will bring all 10,000, 15,000 of my friends, and I'll times that by 10 and we'll see you all on the front line. This isn't Standing Rock, this isn't Morton County, this is Anishinabe territory and they're not going to get away with it.

You tried to take away our hunting and gathering rights and we took you to federal court and it cost them $11 million. We will do the same with Enbridge. We will hold them up as long as we can. And you bring this bull crap to my door, of course I'm going to go into a warrior mentality and that's what you're going to get.

But I'm a very peaceful women and I would rather everybody would live in peace and just be a community together and honor the gift that the creator has given us, is this land, this precious planet. This is all we have. There's not going to be moving on this marsh shit and all this other crap. It's really sad that they want to ruin the earth. It's really so pathetic.

I'm tired of hearing all these old people, all these elder white people talking about how they want this and that. Their whole generation has ruined this land and the water and the people and it's time to stop. They're already on their way out the door. They could give a shit what happens to us here. They could give a fuck of what happens to us here. And that's really pathetic. And I do not look at them as my elders, I will have nothing to learn from them. And they have a lot to learn from us and I hope that the future generation can understand that and live with us and be the stewardship that we need them to be. Or else.

(Comments concluded.)

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DEIS MEETINGS - 14-916 15-137

BEMIDJI - JUNE 22, 2017 - 6:00 P.M.

(PRIVATE COMMENTS WITH COURT REPORTERS)

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Sanford Center and
George W. Nielson Convention Center
111 Event Center Drive NE
Bemidji, Minnesota

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MR. MEL OLSON: Mel, M-E-L, Olson, O-L-S-O-N. I live in Duluth, Minnesota, and I'm here to show support for the Line 3 pipe replacement. I do so because pipeline transportation of petroleum products is the safest, most efficient method hands down without debate. We have an aging infrastructure, and it's the prudent thing to do, to replace the line and replace that aging infrastructure.

MR. MATT JOHNSON: Matt Johnson, M-A-T-T, J-O-H-N-S-O-N, and I'm from Duluth, Minnesota.

My name is Matt Johnson. I'm the General Manager and Director of Risk Management for J.R. Jensen Construction. I'm a graduate of Bemidji State University and have been working in the industrial and energy industry for the past 14 years.

Throughout this time, I've completed numerous projects with Enbridge across the Midwest and can say they are the most professional, environmentally conscious, and safety-driven companies we work for. Enbridge practices and promotes industry-leading safety and environmental policies and procedures.

They proactively work to eliminate hazards to people, property, and the environment on all their sites. Lessons learned are communicated throughout North America to ensure opportunities for improvement, and hazard corrections are implemented immediately. Enbridge truly practices what they preach and strongly enforce their policies and procedures.

The replacement of Line 3 is needed for two main reasons. One. There is still a huge public need for oil and petroleum-based products in our communities today. Regardless if you don't consume a drop of gasoline, you're still a consumer of oil. Everyday items we take for granted, such as clothing, footwear, eyeglasses, contacts, hunting and fishing equipment, carpeting, appliances, and building materials, all require oil.

Renewable energy sources, such as solar and wind, have come a long way but are still not self-sustaining. If we don't utilize oil from North America and we rely on purchasing from countries overseas, where it is extracted, refined, and transported with much lower standards for safety and environmental regulations.

Number 2. Pipelines are currently the safest and most efficient way to transport oil. They utilize the latest technology to move, monitor, and maintain oil throughout the transportation system. Once installed, their use poses no direct safety hazard to the public.

In comparison, tanker trucks put a direct and unnecessary risk to public motorists. They cause significant damage to our roadways, resulting in increased maintenance costs to the taxpayers of our state. Numerous accidents were caused in North Dakota by the increase in tanker truck traffic due to overbooked rail lines, public demand for oil, and the lack of pipeline infrastructure.

Rail traffic also puts the public in direct risk. Rail lines often run directly through towns, residential neighbors, cross hundreds of roads, waterways, and travel across old bridges. An increase in oil traffic also affects the transportation costs of other consumable goods. When oil transport out of North Dakota increased, the cost and availability of items typically shipped by rail were affected. This directly affected the average consumer and negatively

impacted our local economy.

In the safety industry, there are two ways to handle hazards and risk. The first has historically been that of reactivity. Learn from past mistakes so to not repeat them. Recently proactive thought processes have been the area of focus. Correct all known and potential hazards before they have the opportunity to become an incident.

In my opinion, Enbridge is taking a proactive approach with their plan to replace the aging Line 3 with a new line built to today's standards. Allowing Enbridge to upgrade their existing Line 3 to a safer and more efficient system is a smart choice for the state and is in the best interests for the citizens of Minnesota. I am proud to work with Enbridge and value the service they provide to my family, community, and business. Thank you for your time.

MS. MARY ACKERMAN: Mary Ackerman, A-C-K-E-R-M-A-N. Mary, M-A-R-Y. I live in Hackensack, Minnesota. Zip code, 56452. I have four points to make.

Point 1. The seven spill sites addressed in the draft are not representative of

the very sensitive and biodiverse land and waters of this route. They do not address wild rice wetlands, the St. Louis River tributaries, the Nemadji, N-E-M-A-D-J-I, river tributaries, and the Mississippi River or Lake Superior. All will be impacted by the inevitable spills, leaks, anomalies.

One thing we know for sure, pipelines spill. Not if, only when. And the product, tar sands, proposed for this Line 3 cannot currently be cleaned up. There is no technology to clean up water spills of this kind. None.

My first point. Expand the modeling for water spill sites.

Point Number 2. The Enbridge permit application cites what they would do to minimize environmental impact. Nowhere does the draft identify what outside entity will monitor these promises and/or what regulations are in place to ensure these promises are contractual.

My point. Name the outside entities we can look to and show the contracts for this critical process.

Point Number 3. In Chapter 11, titled "Environmental Justice," the draft

acknowledges that any of the alternative routes would be detrimental in the long-term for the tribes impacted. This is Point 9.6. It says there will be "profound cultural consequences." If this route went through a town or city, would this still be an option? Would it? Disproportionate and adverse impacts is the language used in 11.5 of that chapter.

My point. Choose a route that does not have detrimental impact on the tribes of Minnesota.

My Point 4. The preferred route also impacts "more wild rice lakes and areas of rich biodiversity than any of the other routes." This is from Figure ES-10 in the draft. Why would Minnesota risk that for a Canadian company's profit? And I'm quoting again from Chapter 5, 3.4. "All workers to construct the line would be relocating to Minnesota." There will be "no measurable impact on local employment, per capita household income, median household income or unemployment." Need I say, this doesn't track.

My point. The jobs argument put forth by Enbridge does not hold for short- or long-term employment for our unions.

The line risks some of our most pristine wild rice lakes and areas of rich biodiversity.

Get serious about another route now. Thank you.

MS. ANNE DUNN: Anne Dunn, A-N-N-E, capital D, U-N-N. I've lived on Leech Lake Reservation for most of my life, and I'm in agreement with our Native American DNR forest representatives and land and water concerns of the reservation, and we don't want any more pipelines going through the reservation, and we also want the old ones to be removed that aren't any good.

We think they're probably pretty faulty after 60 years, but my main concern is that a lot of the people don't actually really understand our situation from a cultural point of view, so I just want to be on the record as saying that we are an old people. We're an ancient culture. We have many traditional values that we feel are not being adequately addressed.

One of the things that I was told by my elders is that there would be coming a time of chaos, a great deal of eruption, and perhaps we're even coming into that time. The comforting thought

is that when we go through the chaos, whether it's political or environmental or both or all, we will come out on the other side restored.

However, this restoration might not include humanity, because we have become such a desperately, destructive people. In the old times, there were what you might call, I want to say, like first law. Our Creator left laws, standards to be observed by the rest of us. When Creator first made this beautiful earth, he went around looking at it, taking a close look at everything to see if it was good, and it was good.

It was all good and it was all beautiful, but before Creator went on this tour of the earth, he left instructions, and it was like, I think, in a specific place on Turtle Island. I don't know the specific place. I always feel it was in Tennessee, but it could have been in Minnesota.

And he said he would leave the animals in charge and that they should observe certain rules while he was gone on this tour, and one of the things was that they should not pull up the plants, should not even turn over a stone, should not cut down the trees, and should not dig

any holes.

Well, it didn't work out that way. All those things were violated. In particular, the digging of holes. And the first one who dug the holes was the raccoon, because raccoons are hungry all the time. They want to eat all the time and they can't be satisfied, because they're so hungry.

So that raccoon was sitting there feeling his hunger come upon him, and he said to himself well, you know, I'm just going to dig a little hole and Creator won't even notice it. So he dug a little hole, and he found a little bit of something to eat. And he was still hungry so he dug another hole, and he could not be satisfied. He had to keep digging holes.

And so, of course, Creator came back and discovered that he had done this. That was a huge mistake, and it made an impact on the earth, even at that time. Even at that time. So that's the end of that little bit of comment.

And then the other thing that we were told is that as Anishinaabe people, we came from the east, and it was the grandmother of the water, grandmother of the sea, that brought mankind up on the earth, up out of the water, in a leather

bag. Brought all mankind in that bag up on the shore of the east part of Turtle Island and she couldn't breathe.

She was a water woman, so she couldn't live on the earth, so she was wondering what she was going to do when she saw a wolf, a very young, strong wolf. And she said, hey, come on over here. I need help. And so the wolf went over to find out. She said you have to take this bag of humanity to the good land. He said, "I can do it." He was overly confident, because he was young and strong. "I can do it."

So she said now be sure that on this journey to the good land you do not open this bag of humanity. Because if you open it, they might escape and they'll be in a land that's not prepared for them and they'll become pathetic. Pathetic people. So don't let that happen.

So this young wolf vowed. He pledged that he would not do it. And but as he went along carrying that bag day after day and resting when he could to carry the bag and resting, he would hear mumbling inside of that bag, and he could see something moving in there so one night as he was resting his curiosity, it became extreme.

And so he thought, well, I'll just open the bag a little bit and I'll peek inside and no one will even know.

So he did this. He opened it, and some of the people come running out. They just came scrambling out and he couldn't catch them. They just disappeared and he couldn't catch them. They were gone. So they became the pathetic people.

The other people were still in the bag, and he felt ashamed of himself. So another wolf, an old wolf, that was kind of tired and ragged-looking come along, and he said I saw what happened and I know that you did the wrong thing, but I want to help you out. I'll take the bag to the good land.

So that old wolf actually was the one who succeeded in bringing humanity to the good land, and they had been told at the beginning of the journey by the grandmother of the water there were things, clues. There were things to look for; that they would come to a land of water and there would be great shining water and there would be lots of good life in that water and very pure and good and the people would thrive there.

There was plenty of game and plenty of fish, and the other thing they were to look for were the trees, the white birch trees, that would be in abundance, and then the other thing they would find would be a red stone, a certain red stone, and it was actually an agate. They would find an agate.

So when all of these things appeared out of the landscape, they knew they were in the good land, and it became their responsibility to keep it good, to protect the environment and the resources, and we don't want to lose our resources now. Everything is under threat, and we feel a great deal of challenge, and I don't think that our view is actually being addressed.

And we want to raise our children here, and we think they have a right to a good future, and we look to the seven generations that our generation should not make one single decision without -- without understanding, comprehending the impact that decision today has on the seven generations that are still trying to get here, and I think we owe it to the future to keep everything as good as we can and not to allow this pipeline to come in.

Well, you know, they say it's safe. Well, no, it isn't, because there's many places where it's already had trouble, and we don't want it to have trouble. We don't want it to have trouble anywhere, but this is our homeland, and we have to do what we can to protect it. And, you know, like the thing these people used to say, we will not compromise in defense of our homeland. Amen.

MR. WILL NAJJAR: My name is Will Najjar, N-A-J-J-A-R. Okay. I have to start this by referencing World War II, which was the greatest and biggest war in the history of the world. Somewhere between 70 and 80 million people died as a result of the war. The beginning of the war was our attack by the Japanese at Pearl Harbor on December 7, 1941, was in part caused by our conflict with them where their adventures in Southeast Asia and in China required oil.

As a result of those adventures, we froze their assets in America and blockaded their ships as ill-prepared as we were. We were officially called the enemy.

In Europe, Hitler after trouncing all the low countries, headed for Romania where the

Ploiesti oil fields are. We defended them heavily, and we used it as a high-valve target. Initially it's doubtful if any of the planes ever made it back to England, many of them diverting to North Africa.

The Germans enslaved the Romanian engineers. One of them was the father of a friend of mine. Another friend of mine two years out of high school was a captain of a B-24 bomber that bombed Ploiesti and was the first one to ever make it back to England without getting shot down.

In the United States, we have what's called the Strategic Oil Reserve where there is about 700 million barrels of crude oil, which is estimated to last about 41 days. It would seem to me that having a pipeline coming from a friendly country to the heart of our country with oil is a substantial plank in the defense of our country. If the unthinkable -- and we've had several of them -- were to happen, that oil line might be our lifeline.

I'm not pitting oil against renewable energy. As a matter of fact, I support renewable energy, but it's a long way off. Hopefully some morning we'll wake up and find out

that solar has found a way to power us that will knock your socks off, but that is not in the cards at the present time. Even the most optimistic estimates 20 years down the line show that only three percent of our cars will run off of electricity.

Currently, my daughter has a car, electric and gas, and she gets 40 miles to the gallon. My Buick get 30 miles to the gallon; and if you're lucky enough to have an older Buick, you probably get 34, 35 miles to the gallon. Consequently, at this time there's not a great deal of difference.

I'd like to repeat that I think that pipeline should be built, providing Enbridge meets all the requirements of their permits, monitors the line, and is not negligent. That's the end of it.

MR. RANDALL BURG: Randall, R-A-N-D-A-L-L, R. Burg, B-U-R-G. 1826 Monroe Avenue Southwest, Bemidji, Minnesota 56601-8255.

The pipeline renovation represents an investment in a moribund -- that's M-O-R-I-B-U-N-D -- energy technology (fossil fuels). Each dollar invested in the pipeline is a dollar diverted from the development of

sustainable, clean energy sources for the future (solar, wind, tidal, geothermal).

If the pipeline renovation is approved, it should be conditioned upon placing all revenues from the pipeline's operation in escrow to be released only for the following purposes or on the following conditions:

One. Remediation (cleanup, restoration) of all environmental damage caused by spills or leaks.

Two. Removal of the pipeline and restoration of the right-of-way at the end of the pipeline's useful life or at the expiration of 100 years, whichever occurs first.

Three. Payment of damages to parties injured in person or property by accidents or harmful occurrences caused by the pipeline.

MR. ROBERT PANTHER: Robert Panther, P-A-N-T-H-E-R, from Bemidji. My wife and I have lived in North Dakota for 20 years, and I have a comment about the job creation involved in pipeline and oil field work. We've seen what that meant to western North Dakota firsthand. There were a considerable number of jobs, a lot of new jobs created, high-paying jobs. Most of them went to

people that came in from out of state, and they took all commerce.

They needed the help, and the social problems were tremendous. Most of the money went out of state. They were predominately employees, high-paid employees, that came, and western North Dakota did not benefit. It was -- right now it's pretty much a wasteland in my view seeing what it was before and what it is now, and that crowd of high-paying -- that the crowd of high-paid individuals that came there to work, they're gone. The money has left North Dakota, and there's a lot of destruction left in its wake. A lot of social ills that that brought in.

So the promotion of the pipeline, based on the number of jobs created, is a very deceiving claim. It is not all rosy as it sounds.

MS. ERICA HARMSEN: My name is Erica Harmsen. Erica is E-R-I-C-A. Harmsen is H-A-R-M-S-E-N. And I oppose the Line 3 pipeline, because I have two young daughters, and I want to protect the water for their future.

MR. MARC OLSON: Marc Olson, M-A-R-C, O-L-S-O-N. I'd like to speak on behalf of. I'm totally in support of the project. I'm a

city of Bemidji landowner with the Line 3 pipe is adjacent to my property, which I have no problems with. I think Enbridge is completely safety oriented. I've never had any issues, and they've always been very professional in every way, shape, and form.

MR. AMOS LaDUKE: Amos, A-M-O-S. L-A, capital D, U-K-E. Okay. So I just want to say as an indigenous person, who is opposed to resource extraction pipeline projects, a common question that we're asked is, "Do you drive a car?" or, "Do you put gas in your car?" So my answer is "yes" all the time.

Yes, I did fill my tank up, but that's because we live in a vertically-integrated socioeconomy where the oppressors own the means of production, and the only systems offered to people run on fossil fuels. So we have no choice but to participate unless we want to fall further behind in our own struggles

And in our community, there's a line that goes right underneath our community; and if there's a spill or a problem with that, then you notice the children that run around our community, they are going to get sick, and that's what we're

trying to convey is there's these risks, and the people who are in support of pipeline projects they wouldn't want that in their communities is what I'm saying. End of comment.

MS. SUSAN KEDZIE: My name is Susan Kedzie, S-U-S-A-N, K-E-D-Z-I-E. I live in Bemidji, Minnesota. I'm a plant ecologist and have been for over 20 years. I've worked at Leech Lake Division of Resource Management as a plant ecologist during the Alberta Clipper Pipeline Project.

I'm speaking today on behalf of my daughter, my partner, and others who are unable to be here. I am not representing any agency or organization.

I will by speaking today using science as my foundation, not opinions. I'm opposed to Line 3 on moral and scientific grounds.

We have a moral obligation to reject this project and others like it due to the numerous direct and immediate negative impacts to the people, plants, wildlife, and water along the route; as well as the direct, indirect, and long-term negative impacts to people, plants, wildlife, and water not adjacent to the route, as to the state of Minnesota, region, and planet.

Morally, we have a responsibility to listen to climate change scientists. Ninety-five to 97 percent of them are in agreement. Climate change is occurring and we are causing it. Anybody who tells you otherwise is being paid or has been deceived by those who are being paid. To address climate change, we need to keep the oil in the ground and transition to green renewable energy by 2030.

Regarding economics, Line 3 will create an estimated 13,000 short-term jobs but with a huge cost to 9 billion other people. The largest profits for this project will go to the millionaires and billionaires, the top one percent of society whose livelihood is very secure. Whereas, jobs in green renewable energy sector are outgrowing fossil fuels and provide sustainable long-term opportunities with quality pay. This is our future.

Line 3 will cause massive disturbance to native plants communities, which increases invasive species, disrupts and impairs ecological services of native plants communities, and negative impacts -- and negatively impacts the quality and quantity of traditional plant resources

used by Anishanaabe people. It will increase the loss of rare, threatened, and endangered plants and animals who depend on those things.

Ecological services that healthy native plant communities provide are numerous and include: filtering and cleaning water, providing oxygen for all of us to breathe, providing food sources for fish and wildlife, creating structure and habitat for fish and wildlife, for attenuating flood events, maintaining shorelines.

So when healthy plant communities are compromised, so are the ecological services they provide. Since we all depend on these services on a daily basis, we must reject this pipeline.

We have a moral responsibility to reject Line 3 as it will negatively impact traditional resources. Since plants are a critical part of traditional lifeways, impacts to plants create impacts to traditional foods, medicines, and spiritual practices.

Impacts to land, water, plants, and animals represent a direct impact to the spiritual rights of many Anishinaabe people. As it does for other non-Christian people who share similar

beliefs, this is religious freedom and is protected by the First Amendment. For Christians, particularly Representative Grossell, G-R-O-S-S-E-L-L, Jesus would be accountable to the earth, the children, the women, and the least among us, not to corporations or wealthy donors.

I am morally opposed based on historic grounds. I refuse to be party to the continuing historic trauma experienced by Native people by state and federal governments, politicians, and corporations. Morally, we must reject this project, because it continues the historic pattern of violence, resource grabbing, and oppression experienced by people with the least power available to them.

Finally, I ask that our local politicians, members of the city council, and the city mayor that you have a moral obligation to reject this pipeline and embrace the goal of 80 to 100 percent green renewable energy by 2030; to protect the future of our community's human health, abundant natural resources, and water-based economy, and to help stimulate the industries and job creation resulting from transitioning to green renewable energy and associated products.

We need your leadership. Your leadership is needed by ordinary people and the health of our natural resources. Thank you for hearing me.

MS. STELLA WAKONABO: Stella Wakonabo, S-T-E-L-L-A, W-A-K-O-N-A-B-O. And I just want to say yeah, you know, it's all great and grand that people have jobs through the pipeline. That's wonderful, but I live with pipelines going through my property. I won't be able to sell any of it. Because of the pipelines, it's worth nothing.

Then you have the issue of the closure of this Line 3, and it's -- to me I believe it's the pipelines' responsibility to take that pipeline out and put a new one in, that's fine, but take the old out. I don't think it's very good responsibility for the pipeline to go ahead and just leave it there and let it disintegrate and all this other stuff and you haven't solved anything. You're closing the pipeline, because it's incinerating, and then you are going to leave it there to incinerate some more? It doesn't make any sense. It's not good business sense.

The other thing is I believe the

pipeline could be removed, because it's just basically good responsibility as a company, and chuck it up to doing business. It's a business expense. Take it out.

For example, my brother-in-law wants to sell his property. And on his property, there is a family dump that's been there for years. And he can't sell the property, because he has to go ahead and clean it up. Well, to clean it up, it's going to cost him more than to sell it. So it's his responsibility, and I believe the pipeline put the pipe in the earth, the pipeline can take it out and be responsible for it.

I mean I -- and then the other issue that I have with this is if you leave the pipeline in the ground and if something happens, then I'm supposed to be responsible for the cleanup? I don't think so. That is just not good business sense. You put the -- Enbridge put the pipeline in the ground, then Enbridge is responsible for it. And that's my feelings.

(End of Bemidji private comments.)

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DEIS MEETINGS - 14-916 15-137

BAGLEY - JUNE 6, 2017 - 10:00 a.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Rice Lake Community Center
13830 Community Loop
Bagley, Minnesota

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FACILITATOR: Hello, everybody. We would like to actually turn it over to the tribe to welcome us with an opening prayer and a few songs. You may stay where you are. You may sit, if you would like, and I'm going to turn it over to our host to welcome us.

MR. MERLIN DEEGAN: Good morning, everybody. My name is Merlin Deegan, and I work for the tribe, culture coordinator. So every time we come together on (indiscernible), we always try to start out with opening with our pipe and our (indiscernible) and our drum.

Right here to my left we have the (indiscernible) singers. They're a local drum group. And one thing about our (indiscernible), we all try to live a good way of life and do things in good ways.

And so with that, I'll smoke the pipe, and then the drum group here, they're going to sing two songs, and then we're going to start up again at 11:00. But we just want to say welcome (indiscernible).

(Singing and drums played.)

So we just want to say miigwech

and welcome here to White Earth, and hopefully we'll all learn a lot of things about what's going on here. And one thing that we, as Anishinaabe, we try to do, is we always try to welcome people in a good way and start off in a good way, and we always try to talk to (indiscernible), as we understand the creator, like our (indiscernible) here. We say that's the heartbeat of our mother, (indiscernible) Grandmother Earth or Mother Earth.

So that's why our (indiscernible) on our drums are really important and so are our (indiscernible) Anishinaabe, who they say that we should speak a little bit of our language in a good way and ask for guidance so that the decisions that we make as a whole is universal.

We forget about the unspoken language of the universe, the universe of the earth, the universe of the stars. They have a language and they have an understanding.

Because in our belief systems they say that we, as Anishinaabe people, if you hear our creation story, our creation story says that we come from the stars; that

that's in our creation story.

And in our migration story we came from the East Coast to present day where we are today. We were guided by the (indiscernible). And one of the things in which that was given to us was Mahnomen, our wild rice.

So that a long time ago when we migrated, we were told to go until the food grows on the water. And back then we had a hard time comprehending, "Food grows on the water?" So it come to be Mahnomen.

So that's why Mahnomen is very, very important to us as Anishinaabe people of (indiscernible).

FACILITATOR: Thank you so much for the welcome.

We have people at the poster board sessions. Talk to people, learn a lot more about the project and EIS in particular.

Right at 11:00, 11:15, we'll gather as a full group here, a few more welcoming songs, and we'll have a very short presentation and public comment period.

So learn more, gather around the

posters, and we'll return together around 11:00, 11:15. Thank you.

And also, court reporters are available. If you want to give a comment now, court reporters are on either end of the room and we'll have them take your comment as we speak during this poster board session.

(Meeting recessed and resumed.)

FACILITATOR: All right. Welcome everybody. We'd appreciate it if you would come forward. For tribal members and community members, please take a seat at the table, if you can find space. We've also got some chairs a little bit around the perimeter. Come take a seat.

We're going to open this next part of the meeting around a very brief opening, a welcome from the chairman, some opening songs, and then a public comment period.

So if people want to come down, come take a seat, we do want to get started, if we could. So if everybody could come take a seat.

Welcome. I would ask the chair

of the White Earth Nation to come forward and welcome us, and we are really appreciating the tribe hosting us here today.

MR. TERRANCE TIBBETTS: We do welcome everybody. This is a pretty historic event for us here at White Earth, to get our word out there and start discussing these pipeline issues that have been surrounding us here for many days, many months.

It's -- we should be looking at this as a meaningful consultation also with the Department of Commerce and everybody else that's involved here.

So I want to say thank you to everybody for coming out, putting up your PowerPoints and presentations. Thank you to the tribal members, my brothers and sisters here for having the drum and the pipe, doing the pipe ceremonies for us, opening in a good way.

Is Merlin available? Is he going to be able to do a prayer for us?

This is just the beginning, you know, and as the fight goes on, you know, we want to touch base with everybody that we can,

to collaborate with everybody that we can to keep these things out of our region, you know.

What we're looking at is pristine waters, keeping our wild rice healthy and feasible for us to use through our ceremonies and for our food stuffs. You know, this place was put here for a reason. You know, the migration story that comes along with it is that we would transform, follow the Great Lakes back to where food grows on water.

And this is where it's at, on the White Earth Reservation in the state of Minnesota. And the White Earth Nation still remains strong in opposition to these pipelines and without our consultation.

So that's what we're doing here today is to go ahead sit down and talk, and hopefully that we can find a way of rerouting these things around our reservation so they're not going to affect our wild rice and our clean water.

There are many, many things that go on underground with these pipelines and leakages back into our water systems, and we're looking at health-related causes, and

just to keep our environment as clean as possible for those -- our young kids ahead of us, our seven generations. These are the ones that we're trying to protect and guide and help in a good way.

So with that, we say thank you and miigwech to everybody for coming. I know that we have two other tribal council members here, Kathy Goodwin from District II and Umsy Gene Tibbetts from District III, so if you guys want to come up and say something, now is your time.

With that -- all right, (indiscernible). I guess the pipe has already been done and also the prayer, so we look forward to having these meaningful consultations, you know. It's been a long time since we sat down and talked one-on-one with each other and had this meaningful consultation.

I know the EPA was up in Duluth and we talked about sulfide emissions in the state of Minnesota, you know. And that was intended to be a consultation hearing, but it was more or less them sitting down and telling

you what they were planning on doing in northern Minnesota without anybody's consultation.

We're not just talking about the reservation here. Also, we're talking about the ceded territories that we gave up in the past years here, to the 1855 ceded territories, 1854, in 37 areas. These are big areas with a high population of Anishinaabe, our original people.

So with that, you know, we hope that everybody has a chance to get up here and speak what's on their mind and say it in a good, peaceful, meaningful way, I hope in which -- thank you.

(Drums playing.)

FACILITATOR: Thank you very much. I first want to introduce Bill Grant, who's Deputy Commissioner of Energy for the Department of Commerce, who's going to give us also a short welcome from the State and give us a bit of information. And then I'll explain the procedure for the public comment.

DEPUTY COMMISSIONER BILL GRANT: Thanks very much. Thanks, everybody, for

coming, and thanks, Chief Tibbetts, and to the drum circle, a very warm welcome for us here today. Thank you very much.

So the purpose of being here today is to take comment from you, the members of the public, on the Draft Environmental Impact Statement.

There are going to be several opportunities along the way as the EIS moves from being a draft to a final.

And once it is final, that will be submitted to the Public Utilities Commission, and they are the decision makers in this matter.

As I mentioned, there will be several opportunities along the way to provide public comment.

In this instance we're taking your comments here today, but if you'd like to prepare written comments, we will take them in that fashion as well. And I believe those will be due on July 7th. So a number of opportunities for comments along the way.

And as I mentioned, Department of Commerce is the agency that's been assigned

to prepare the draft. We want to provide as much objective information as possible about the impacts of the proposal to build a pipeline in this area.

And you'll see in the back of the room there are documents that we brought. There are several copies of the nearly 2000-page document.

You're welcome to look at that while it's here. We also, I believe, have copies of the document on CD and flash drives, so you can take that with you if you'd like to review it in more depth after the meeting here today.

As I mentioned, this is the first public meeting that we're doing in this phase of commenting. We'll be doing another 20-odd public meetings over the course of the next three weeks. Join us tonight in Grand Rapids if you'd like to be involved with this process as we go forward.

Thanks again very much for coming. I'll turn it back to Pat.

FACILITATOR: Thank you very much, Bill.

Thank you again for coming, for spending time at the poster boards, for talking with some of the staff at the state agencies and for being here.

My name is Patrick Field. I'm a facilitator, and I'm working with the consulting team working with the State.

So just a few things about how the process works. We'll try to speak over the jackhammering in the back.

Whether you offer your comment today verbally, you put it in the box in the back in a written comment, or you email it in later or send it in the regular old mail, all the comments will be equal, however you deliver them. We want to stress that. However you deliver them, all comments will be taken seriously and treated equally. They'll be compiled and shared with the public at the end of this public comment process.

I know if you've been following this project for a long time, there's lots of stages and steps, and we are at the Draft Environmental Impact Statement step, where we're looking at the different routes, the

Certificate of Need, and their potential impacts across a number of issues from environmental justice, tribal impacts, water, cultural, and other. So we hope you can focus your comments on those.

Again, these comments will help inform the Final Environmental Impact Statement, which the Department of Commerce will produce after receiving all these comments; taking a rather hefty draft, which is the set of volumes in the back there and revising it per the public comment as needed to issue a final as it goes to the Public Utilities Commission.

So for today, the way we want to do the public comment period is just take a second here and we need a show of hands for how many people want to comment so we can allocate the time accordingly.

We have two meetings a day for about three weeks, so we have to stay on time and use as much time as we can for people who want to comment. We just want to allocate it according to the comments.

A few basic rules of the road.

We want to make sure that everyone who wants to give voice has a chance to speak. So we ask when people are speaking, we listen and don't interrupt them. We are going to keep track of the time just to kind of be fair to everybody. And we want to honor the time limits just to give everyone, again, a chance to speak.

Not everyone will agree. We understand that. That's part of what the public process is about. What we do ask is people be respectful of different people's view, whatever it might be. You don't have to agree with it, but we ask you to be respectful.

We would ask people to take their cell phones and put them on vibrate or do not disturb or whatever so we don't have sound ringers happening in the middle of the comment period.

We will end the meeting on time, which is 1:00 today, just because we have to get to our next meeting in Grand Rapids.

Also, before -- in a minute here we're going to first see if any elders --

we're going to give them the floor first. But first I know three people put their name in the box to comment.

People who want to comment, raise your hands just so I can get a number of people who want to comment. Just hold your hands up for a second so I can get a sense of how many people.

All right. So we're going to be able to give people, I think, plenty of time to comment.

So what we're going to do -- given that we only have maybe less than ten commenters, we're going to track the time religiously. We do have a clock, which we'll pay attention to just to give the speakers, you know, given that few of speakers, probably six or seven minutes at most just to keep on track. That should be plenty of time. We'll just keep that up there when you start.

As you comment, it's important -- we have court reporters who are recording your every word, so speak slower than I do. Speak clearly into the mic, which Stacy will bring to you when we start

commenting.

Please state your name and also spell your name for the court reporter as we start. I know that's kind of a hassle, but that way we make sure we know exactly, for the record, who spoke, and we won't start your timer until after you do that.

So first I want to give any elders in the White Earth community who want to speak -- we're paying no attention to time for the elders, by the way. If any elders want to speak, I want to provide this time for them to make any comment they might wish to. Any elder in the community who would like to speak, we will bring you the microphone.

We can provide that time at the end as well.

Secondly, if anybody from tribal council wants to speak, we want to provide that for them first, so if there is anybody on tribal council who wants to make a comment to start, we'll bring you the mic first.

Okay. Let me start with the three names I have, and we'll go to the other folks who raised their hands, so Anita Reyes.

Anita, are you here? Anita -- we'll come back to her.

Next was Marty, I'm going to not say the last name.

Are you Anita? Good. Again, state your name and spell it for the record. Thank you.

MS. ANITA REYES: My name is Anita. Reyes is the last name. It's spelled R-E-Y-E-S. First name is spelled A-N-I-T-A.

I was looking at some of the posters that they got written, and they talk about how they need a proof of a need. The only need that Enbridge has is to increase their profits. The state of Minnesota needs to protect the environment, our life, our water source, our wildlife. That is the need of the Minnesotans.

You're talking about employment. I remember being here at a meeting last fall and the Public Utilities Commission was here. Their business chambers conference was here. I remember Enbridge bringing out the fact that they were going to bring millions into the community, and I saw the wide eyes light up

with greed when they heard the sound of the millions mentioned.

Those millions will not undo irreversible damage that these spills will cause.

The pipelines that are in line that we have now are in the same condition that the pipelines at Kalamazoo were in. Yet Enbridge wants to keep these pipelines operational while they construct a new pipeline.

They want to abandon that pipeline, leave it in the ground. The chemicals that are used, the thin -- the oil that is the tar sands that is coming through there is cancerous. This area, for over 28 years, a doctor told a woman it is the highest that he's ever seen.

That cancer rate continues. In the last year I've lost three first cousins, and in the month of April I lost my sister to cancer.

I once was at the college and there was a man there, he was from the Army Corp of Engineers, and just he and I were

standing there, and I said to him, "Where is this cancer coming from?" And even though we stood alone, he looked around and then he answered me, and he says, "We think it's in the water."

These pipelines leak, and either the system that monitors the flow of the pipelines does not -- either doesn't show that there's a leak when it's small, or the company doesn't care if there's a leak unless it involves a huge monetary loss for them.

My thoughts are Enbridge needs to prove a need. We don't have to prove a need. We know what happens when there's a spill. We know that the damage caused is irreversible. We know oil companies do not have the technology to undo the damage. If you go to Kalamazoo today, you put down a spade shovel, pull up that shovel, you will have oil.

So it is obvious I'm against the pipeline. I'm against the expansion. I'm against the abandonment of the old pipeline. And just today, I was approached by someone who wanted to speak to me, and I won't bring

up her name, but she said to me, she said, "Well, you know Enbridge is trying to get this pipeline off Indian country." And I looked at her, and I said, "This whole country is Indian country."

FACILITATOR: Thank you, Anita.

We know the sound is not great, so what I'd ask -- I know if you're kind of in the middle of the room and front, I think you can hear, but if you're in the back, you cannot. We want to make sure people can hear people's voices, so if you can't hear in the back, bring your chairs up close. We want to make sure people can hear the speakers.

If you're in the back, please pull your chairs forward. We want to make sure that the speakers can be heard.

Okay. Let's see, a few things. Let's move the clock in the right-hand corner bottom.

And then our next speaker, if we can bring the mic to you, is Marty, I'm not going to say the last name right -- Marty?

MR. MARTY COBENAIS: Marty Cobenais, last name is C-O-B-E-N-A-I-S. I am

with the North Star chapter of the Sierra Club. I'm an executive committee member. I'm also a soil and water conservation supervisor here throughout the county.

So this is kind of to you guys. The first question, are you guys willing to have a new pipeline go through your property, have it abandoned, and left in your backyard? That's basically what you guys are asking of us to have done. So are you willing to do that yourselves?

I'll get back to that question. That will be my final one.

Oil consumption in the USA is down 18 percent level past -- since 2009. The main reasons -- fuel efficient cars, people driving less, airlines flying less. And yes, we still need oil. We all came here today in clothes. We still need oil. Thank God we still have oil, otherwise we'd all be sitting here naked.

Way back in the beginning, Harry Ford -- Henry Ford had an option between two fuels in his automobiles. First, crude oil, the second was hemp oil. Hemp oil -- yes, I

said hemp oil, a renewable. So would we really be here in 2017, if we had hemp oil as our main fuel?

We wouldn't be. We wouldn't be having this conversation about pipelines, and it would be safe to fall on railroads and everything else, and it's renewable. Once again, it's renewable. Not like this stuff. We are getting off of this stuff because we're running out of it.

And we probably wouldn't have Enbridge. Some of us would probably be happy with that.

Speaking of Enbridge, they say that they need this pipeline to bring oil to us. But remember that in 2008, they also said they need the Alberta Clipper. And nine months before they started the Alberta Clipper, the oil companies said, "We don't need that. We actually told you not to build it." They tried to get Enbridge not to build Alberta Clipper.

Last year, we just had the Sandpiper, and due to different regulations and everything else, they said, "Well, we

don't need the Sandpiper now, either. We're going to throw that away and we're going to go invest in Dakota Access over in North Dakota." So do they really need this pipeline?

Those are two questions for the DEIS. Enbridge states that they remain committed to the environment. In both the Bemidji and Duluth papers, Barry Simonson, the project director, stated that they anticipate over 6,000 integrity digs in the next 15 years for just Line 3 alone, so it's in their best interest to just replace it and abandon it in the pipeline corridor.

So if you already have over 6,000 integrity digs planned, is it really in the best interest to not have -- it's just going to make an environmental nightmare. If you already say that it has rust and cracks and everything else in it, to just leave it in the ground? That doesn't make sense.

I also got to hear Barry on the radio station the other day, and he states that the pipes would be capped, purged, and filled with nitrogen. It also says that in the draft EIS.

However, there would be no electronic monitoring like you do in current pipelines for pressure loss, but they would fly the route for leaks.

This is interesting now. Considering that they're going to fill it with nitrogen and they have to fly the routes anyways to monitor it if there's any other leaks, how do you know when nitrogen is in the air?

You guys look like farmers. Do you know nitrogen -- when you put nitrogen out on your field, do you see it? More of a gas. You don't see it, so you're not going to see if there's a nitrogen leak.

Thus, remember that all pipelines leak. Tar sand is also the fuel efficient -- the worst fuel efficiency. It takes six barrels of water to make one barrel of oil, which then they dilute to put chemicals in to make it go through the lines.

So it's probably only about four gallons to make that -- or four barrels to make that half a barrel, just to go through the lines.

One of the other things that they talked about is that they're going to use dams and stuff like that on different rivers and different spots along the route to divert the water around different areas.

And yet they say that they're environmentally friendly, but I don't know any of us that can really replace a river as is. So if you're going to divert on the river so you can dig a trench in it, you're not going to replace it as it is.

So I guess I would tell them that they need to directionally go underneath all waterways, not just the ones they feel are important like the Mississippi and stuff like that, but that they need to go underneath all, and in the depth of up to at least 15 to 20 feet, triple wall it, make it efficient.

The other part that they also talk about is that when they go through swamps, they like to bury it, the buoyancy part of it. What they did with Alberta Clipper is they put four inches of concrete around it when they went through the swamps to keep it weighted down.

And that's a lot of concrete, because we have lots of swamps up here.

The interesting part -- and I know I'm running over my time -- is that it's funny that we have the Minnesota Pollution Control Agency here, because I have one of their pages here about temporary and permanent closure of underground storage tanks.

After five years, a gas station that is closed is required to remove their tank or fill it full of inanimate objects. So concrete or fill it full of dirt, and fill it in, or they're supposed to remove all their pipes, their tanks, and everything else.

Earlier I said they're going to cap the end of these pipes. It's going to make basically a tank for them or tanks underneath there. So it doesn't make any sense not to also make them -- require them to remove these pipelines. It's going to do the same damage.

Finally, there's going to be some talk about jobs, tax money, and I'm sure today or even some of these booths are talking about jobs and stuff, and I know in the EIS it

does.

Currently Enbridge is in the Minnesota tax court system asking for money back; says the State overtaxed them. In Clearwater County alone, they're asking for over $7 million from Clearwater County -- that says Clearwater County has to repay them.

I know there's some different opinions out there and saying that -- they're trying to get the State to say they're going to pay it back, but in the end, it's going to end up hurting all of us.

So basically what I'm asking is to not allow this pipeline, that I think this pipeline should not go through anywhere, as do some of the tribes in the area. I believe Joe Palmer has already sent that to you guys, resolutions from tribes.

So what they should do is turn off Line 3, as it is a safety hazard, and remove it from the ground permanently.

So at the end, again, I ask, are you guys willing to have this pipeline go through your backyard or leave a pipeline in your backyard? Thank you.

FACILITATOR: Thank you. Again, try to keep within seven minutes, so we can get everybody in.

So Bill Paulson. Bill, are you here?

MR. BILL PAULSON: William Bezhig Biosh, B-E-Z-H-I-G, B-I-O-S-H. (indiscernible). Thanks for letting me speak here. I'm known Englishly as Bill Paulson, William Paulson, W-I-L-L-I-A-M, P-A-U-L-S-O-N.

For tracking purposes, I am, according to '55 treaty, a recognized descendant of the treaty. My daughter is here. She is also a descendant of the treaty. I represent nine voting members of the White Earth Nation within the MCT, and I'm concerned that we have not been properly addressed within the EIS.

I believe it is our right to be acknowledged from government to government, and I don't understand, when you are speaking with the State of Minnesota concerning our treaty area, you are not coming to us.

I want to know why we're in a building that resonates so loudly that we

cannot properly be heard.

When we go forward with this EIS, I'm concerned that we have not had time to properly look at the waterways and how they will affect our area within the '55 treaty; the hunting, the fishing, the gathering, and most importantly, the wild rice.

Our water flows everywhere, and to date, the pipeline industry does not have the technology to prevent leaks. There's a lot of shortcuts, and there has been no ability to prove that this is going to be safe for what we're looking for for our future.

Currently, you are overbuilding. You are putting pipes in this size that will contain, hopefully, what we're looking at, the boom of oil to continue to be able to fill them.

I agree with renewable alternative energy, whether that is hemp or something else that the scientists can figure out.

But I think it is important that we look at our future, the future of my children, the future of their children, and as

established within the 1855 treaty.

I get more time.

I consider myself a cultural participating member of the Mississippi Band Anishinaabe with an 1855 treaty.

Everybody that is not here today with me -- I brought six people with me, representing (indiscernible) Turtle Island Camp. We're spending a lot of time researching what we can do to preserve our culture.

As you move forward, I no less than demand that everybody affected by the 1855 treaty be acknowledged and be visited with so we can speak as a whole, not as one.

When you're looking at small meetings and you're considering the consent of approval, the Anishinaabe should be able to be pulled together as one voice; then we would represent a majority that has a stake in this, according to the treaty.

For those that are living within our treaty areas, I ask their support as we protect your rights to clean water and good life.

Those are my concerns today. I thank you for your time.

FACILITATOR: I think we have a comment right here, I believe you wanted to make, so we'll bring in the mic and get his name and the spelling and the like.

MS. DAWN GOODWIN: (indiscernible). My name is Dawn Goodwin. My Anishinaabe name is Gaagige yaashiik, G-A-A-G-I-G-E Y-A-A-S-H-I-I-K.

I stand before you today, I speak for many people, and I thank all of you that came here today. This is very important. I don't even know where to begin. I'm going to start with the Draft Environmental Impact Statement that was put out. I agree that it doesn't even barely -- it barely touches the surface of who we are as a people.

There's some part that stuck out with me as I was reading chapter 9 dedicated to the tribal resources. And as I was reading that, I come to one and it says, "Historically birch bark, cedar was used." I'm telling you, we are here. We're not a was. We are is. We use birch bark for our lodges, for our canoes,

for food serving, for whittling our wild rice in the traditional way. We use these things. We pick our medicines. We go out and harvest our foods.

Granted, right now I'm not doing that as much as I would really like to. On Sunday I could have been out picking birch bark, I could have went to the pow wow to celebrate life and each other.

But no, I was at home. I was reading the DEIS. I was reading this federal Indian law book, Federal Indian law, our 1855 treaty. Our treaties are the supreme law of the land. And it needs to be respected. Our people are hurting. We're tired of being stepped on. Look at when these first pipelines were put through, 1949, we're talking. We have two corridors of pipelines.

Where were our people then? Does anybody know? Other than the native people, we know. We know what was happening to our people then. We were being relocated.

So we're tired of this. These pipelines got to go through during that time. Our people couldn't defend themselves. They

didn't know that they are putting these pipelines through. My mom was eight years old in 1949. Did she have much of a voice? Probably not. She grew up in Bagley. I grew up in Bagley.

I want you to take -- look, we are in Clearwater County. Doesn't that resonate anything to you? Clearwater County. Three rivers start here. We have the Wild Rice River that flows south and west. That would mean crossed under by Enbridge pipeline.

We already worry about what are there from the Koch brothers.

There are spills there that haven't been cleaned up. We know this. There is a lady that had a spill back in 1980. It was never properly cleaned. And she may have settled out of court with the Koch brothers. We'll find out. I know it was up two years ago.

So we have Wild Rice River, which flows, and then to Mahnomen's source of drinking water. It goes through all our communities. Our children fish and swim in the river. We rice this in the fall. We pick

berries in July, right down from the Mississippi River where Enbridge would cross again.

So here's another river that starts in Clearwater County; the Mississippi. That's considered the heart of Turtle Island. And you want to put a pipeline under that and also underneath the Clearwater River, which starts over -- was it First Lake or Third Lake there?

So we got three major rivers starting in Clearwater County, which would all be in danger of pipeline. Not to mention all the streams and creeks, not to mention the Continental Divide. So we got water going this way, water going that way.

We have rights. We have water rights. This book here tells us all about it, the rights we have. In Arizona they just won a water rights trial -- a case.

So as we gather, no, I'm not for this pipeline. It needs to be -- the old one needs to be taken out, and the new one does not need to exist. It's full of tar sand, which other people have said is very

carcinogenic.

I made lots of notes here. I looked at the Draft EIS, too, and I seen in there -- it was a misprint -- it said the Land of 1,000 lakes, so we need to make a change in that. We are the Land of 10,000 lakes.

And I believe that the Certificate of Need should be denied because it would adversely affect us. The consequences to our society is less favorable.

And to also address, does the project comply with other laws? Well, like I said, 1855 treaty, the Clean Water Act. How about sulfate levels? Well, I guess we'll change the laws and try to irradicate those, or change the sulfide levels in the midst of all of this. It's wrong.

So we learn the rules of the game and then you change the rules while we're playing the game. That doesn't make sense.

I want to know how many -- how much oil is really used per day in our country. How much domestic oil do we use daily, how much imported oil is used on a daily basis, and what is this oil used for,

other than fuel for cars and buildings?

Are the alternatives to plastic being produced? Of course they're there. Are we using alternatives to plastic?

We need to change as a people what we're choosing to do. And we need to figure out how to reduce the use of oil, not perpetuate the dependency upon it.

I want to speak about the section about climate change. Locally, we have noticed a drop in our water levels, and I'm going to mention the Buckboard Hills. The Buckboard Hills are on the eastern border of this pipeline.

Very important area, I don't know. It's considered a geologic anomaly, the Buckboard Hills. Do people know that? I don't know if they know that, but it is.

And a geological anomaly is considered because the glacier didn't scrape it away and pushed it up and stopped there and began to recede.

So in our Buckboard Hills, where many people still practice the traditional ways of gathering, hunting, they've noticed a

ten-feet drop in water in some of their lakes.

So speaking to climate change, we're seeing it. We've seen it as harvesters, the fluctuation and change. There's been years where we have bumper crops, various, and then the very next year, very few.

We talked also about -- also carbon trading credits. Canada doesn't have to do anything about their tar sand oil. They don't need to address it. It's dirty, very dirty oil, extreme extraction. Puts a lot of extra CO2 in the air. They don't have to because of carbon trading credits.

So I really encourage people to take the time to really understand the whole picture here. For instance, when I talk about the carbon trading credits, because Canada can say, "Well, we're doing this hydroelectric," so they're trading -- "so then we're cutting down on carbon."

So -- which makes it easy for them just to continue on with their tar sand project.

And another thing I want to mention is climate change. In the climate

change there was mention of some electromagnetic storms that take place, and this is a concern.

Also, we are a major flyway for birds, so the majority of our migratory bird population, they're born here in this area.

I also noticed what was missing, too, is there's no mention of endeavors for prairie restoration, wildlife habitat and water restoration.

Just down the river from where it crossed over by County 2 it says, "Save the Stream"; Coffee Pot Landing, "Save the Stream." I said, "Okay. I will save the stream."

All right, and thank you everyone for listening. I will -- I guess I promise I will write a statement, and I plan to attend other meetings. Thank you.

FACILITATOR: Thank you very much.

So next we have Bewaush or Ricky Smith.

MR. RICKY SMITH: (indiscernible). I'm from Pine Point. My

name is Bewaush. They call me Ricky Smith.

I have three points that I want to make sure that these people -- for a thousand years our people migrated here to this place. The Anishinaabe people moved from the coast to be here because of a prophecy that sent us here to a place where the wildlife or the food was so abundant that our food would even grow on the water.

That's our tradition. That's our people. That's who we are. It's all tied together. These wild rice beds that we have here in these lakes, that's who we are. That's our tradition. It's our religion. It's our identity. That's who Anishinaabe people are.

And this pipeline, this oil, this toxins, they threaten all of that. They threaten our identity, our food, our tradition, our religion. They threaten Anishinaabe people in general.

Without the wild rice, we have no identity. Wild rice won't grow in any pollutants. We know that. If a lake is polluted at all, the rice won't come back.

It'll die. When the rice dies, we die.

My second point today I want to make to all the people here that don't rely on rice, that those rice beds, these animals, our medicines, you don't rely on that for your life.

But I tell you what, the money, if you follow the money train, who's making money on this deal, they make money on the Saskatchewan. They pump them toxins through here, through our backyard, and they pump it to Wisconsin, Superior, Wisconsin. They put it on a boat, and they take it out of here.

We don't get anything out of this deal. There's no positive outcome for us as a community, native, nonnative. There is no positive in this.

Only negative outcomes that may not happen tomorrow, may not happen next week, but I tell you what is happening, it's happening -- it happened this weekend. There was a leak on a line over by Leech Lake.

That's going to happen here. It's inevitable.

My daughter is 10 years old.

I'm 40 years old, as I stand here before you. My daughter is 10. She can't come here and talk to you about how this will affect her life, but I can speak to it.

In 20 years when there's problems with this line, I'll be 60 years old. I'll be 60 years old and there won't be anything we can do about it.

My daughter will be 25, 30 years old and having to deal with the fact that our rice beds, our way of life, is being affected by something that her dad could have stopped. Her dad had an impact in that. He could have said something.

Like I said, this won't be -- it won't be my problem. If this line goes through, it won't be my problem. I'll be 60 years old. Hopefully I'll be living in Florida on a beach soaking up the sun.

But I tell you what, I'll still be eating wild rice, blueberries, because that's who I am.

So I worry about my daughter. I worry about my grandkids and those kids, because this is our home, no matter what. If

we up and left because there was a problem here in our rice, our water was polluted, and we had to go someplace else, it wouldn't matter. This would still be our home. Because for a thousand years, thousands of years, this is the home of the Anishinaabe people.

That lake out there, that lake out there, might seem like it belongs to these people here that live right here. It doesn't. It belongs to all of us. On the other side of the lake there's a landing, Ponsford Landing, because our people from (indiscernible), our people from Ponsford came to that landing, and that's where we harvested our rice for years; years and years and years.

I ask that you look inside of yourself, you look inside of the eyes of those children and the people who are going to be affected by this, and you don't take the selfish look at it and say, "Well, 20 years, I'm going to be dead and gone."

You know what? In 20 years, them kids will still be here. 20 years, my grandkids will hopefully be here. And we'll

be out there in the Landing, and she'll be teaching her kids how to rice, because that's who we are.

FACILITATOR: So if I could see a show of hands for those folks who haven't commented and want to.

So four. Try to keep it to roughly seven minutes if you can. Come forward and spell your name for the court reporter, if you would.

MR. ANDREW STRUSS: Can everyone hear me? My name is Andrew Struss, A-N-D-R-E-W, S-T-R-U-S-S.

I am now part of the Camp Turtle Island here of White Earth. I was recently forced out of Standing Rock at gunpoint. I would like to remind everyone that a good idea does not need to be enforced with violence; that a prayer camp, that our religious freedom is being infringed upon by people with guns, and it's not in the name of public interest. It is in the name of greed. It is profit and that is simply it.

Our politicians have sold out because the lobbyists have given them enough

scraps of paper to satisfy their need.

And what we need to do is realize the important things here cannot be bought, and the people with integrity need to lead the community. I ask our tribal council members to stand with the greatest of integrity, to stand and say no to the money, to take the threats, the threats of violence, the threats upon your family, and I want you to stand up defiantly in the face of this greedy monster.

It's really -- we don't need the oil. We know there are plenty of alternatives. It does not take a rocket scientist to figure out that God's sun can provide all the energy we need, right, and that hemp and other things mentioned before are renewable, sustainable, and with our wonderful, arable farm land, we stand to have fields of green gold. So Minnesotans, native Minnesotans, it's in our name, sky-colored water, so let's keep our water clean.

We have so much of a vested interest in our water, in our waterways. When it comes to fishing, angling, we have -- when

it comes to the Department of Natural Resources, we look at the licensing, the fees, and all of these things can stimulate an economy, right, and with us, we can grow our economy. We can literally grow our economy.

We can use buffer crops growing hemp along the watersheds to remediate the soil to leech some of those toxins out of water.

With this pipeline, they're risking not just this community but everything around the watershed. And they are so shortsighted that they don't understand the impact of their actions. They don't understand the lasting impact that these things have.

Abandoning the line; they have no plans to remediate the soil. This is ridiculous. This is preposterous. They do not need the oil, as simple as that.

If we return to the natural, sustainable ways, we will see that we can generate our own prosperity. We plant seeds for our children's prosperity, for our future generations; that God has given us everything

we need and we have a bounty in front of us.

If we do not preserve -- we must be conservative with our natural resources. We must preserve them at all costs. Oil is a finite resource, and you cannot make infinite profit off of finite resource. The business model will collapse upon itself.

So end the greed. End the -- money is -- it's fake. It's debt-based currency. It's scraps of paper. You are selling your souls out for a piece of paper. There's nothing tangible attached to that. Remember that, that you're selling out future generations for a temporary satisfaction.

Please just keep this in mind. Thank you.

FACILITATOR: I think there's a commenter right here and to my left here. Give your name, and if you could spell it for the court reporter.

MS. NICOLETTE SLAGLE: Nicolette Slagle, N-I-C-O-L-E-T-T-E; Slagle, S-L-A-G-L-E.

So I have a number of comments and concerns about the impact statement. I

think Jamie and everybody else knows where we stand in general on the pipelines.

And we've been compiling -- we've been busting our ass trying to get through these 5,000 pages of technical information and try to make sense of it and summarize our comments and concerns. And we do have one draft of our comments and concerns right now back here on our back table.

We're going to be editing this and revising this as we go through these meetings and hearing what other people are saying, and we will be sharing that on our stopline3.org website.

On top of that, though, what we have in our highlights reel, there's some specific concerns that I have, is that this whole document seems to be taking what Enbridge says at face value.

There's no analysis of the fact that well, maybe, just maybe, they won't actually follow the requirements of their permits.

Again and again in the document it says there could be all of these different

impacts, we know of all these different impacts, but Enbridge will be able to develop a mitigation plan to stop those impacts. But what we've seen through the history of Enbridge's operations is they don't follow their mitigation plans, and they end up making things worse.

In fact, I was laughing because I didn't read through all the sections, another colleague read through a section, and I'm just going to read this one because I can't believe it, "The DEIS acknowledges that the addition of temporary cash rich workforce increases the likelihood that sex trafficking or sexual abuse will occur. This will hit Native American communities the hardest."

But the DEIS dismisses this problem quickly, saying that, "Enbridge can prepare and implement an education plan or awareness campaign around this issue." Because Enbridge has so much experience dealing with sexual trafficking and abuse, I'm sure their mitigation program would be super.

In addition to the fact that this realization that Enbridge is constantly

violating the terms of their permits and their mitigation plans, is the fact that the abandonment section is approximately 14 pages, and while there is a short analysis of the potential impacts of abandonment, there is not a full plan for what Enbridge needs to do to get that pipeline out of the ground, and what it's going to cost, and what it's going to take to restore that corridor.

Because that is what these people need in this area, is that pipeline needs to be out, because it goes through tribal lands, and they have said they want it out, and that's what's going to have to happen.

In addition to that, Enbridge isn't going to be able to come in and hire outside contractors and come in and clean it up and do whatever they want to do, however they want to do it, normally.

No, Enbridge is going to have to establish a fund that they're going to train the tribal members on how to do this cleanup.

Some other sections, their restoration practices after the development of

this corridor. It's laughable what they think that they're going to be able to do.

Basically they have this diagram where they're going to be taking off the top soil and piling it on site, and vehicles may or may not be driving over it.

There will probably be equipment put on it at some point in time. This will compact the soil greatly, in which they then plan to just dump back into the trench and tap it down more and then throw some oats on it. And that is their restoration plan for wetlands.

Even in areas where wetlands have been restored using state-of-the-art practices, even a hundred years after the time that they have been restored, they're still not fully back to their original ecosystem functioning. So how is Enbridge going to just throw some oats and completely fix the problem?

Another thing we realized is that there's no analysis of what might happen in Duluth if there's a catastrophic spill in Superior.

In fact, Duluth isn't even having a meeting at all on this impact statement. And let me tell you, we just spent a couple days in Duluth. They're not too happy about that.

You know, I don't even know how much I want to get into this whole section about the tribal impacts and how the impact statement addresses the fact that, yes, there will be disproportionally large impacts on the native communities.

But again, Enbridge's great mitigation practices will, you know, settle them down a little bit.

Let's see, I think that they had a cost. I want to talk a little bit about the cost and the greenhouse gases and how you analyze that.

You used a number of the social cost of carbon, which I believe you used like the mid range EPA numbers, which was like about $39 per metric ton per year or something.

So I've been working on this analysis for a couple years now of what is

really the cost of this pipeline corridor going through Minnesota. I've used a number of different measurements, and I will be submitting a full documentation of where I got these numbers.

But the first two rows are the cost to remove carbon from the atmosphere once it's already in there. And we have to realize we cannot just let these oil companies do whatever they want and let massive amounts of carbon into the air, because that is not the right decision for the future of this planet.

The second two measurements is a measurement of the destruction of the Boreal Forest up in Canada. And this is, again, just a starting estimate of the land impacts of tar sand. This number is from the area of the tailing ponds that are created through the tar sands mining and the in-situ.

So those tailing ponds take at least 40 years to settle, and then even after that, they're not really so sure how they're going to restore those areas.

The numbers that I have attached to that is from the Pembina Institute,

calculating the cost of Canada's ecosystems, and it is a value for the carbon storage of the Boreal Forest and the other ecosystem services that the Boreal Forest provides to the people in that area.

Then I also have the estimated acres of wetlands that will be destroyed through the building of the new corridor, which is probably low because I haven't recalculated that in a couple of years. But the price of that is $5,625 per acre wetland destroyed.

And then the last two lines are the social cost of carbon, and we actually went with the $220 per ton based on the best international research, is the number that really should be used, because the EPA's number of 39 or 13, or whatever it was you guys used, I don't remember, is pretty low.

So if Enbridge is going to be able to pick and choose their numbers and choose the best case scenario for things, well then, we're going to go on the other side and pick and choose the worse case scenario for things, because we need to have a full

understanding of what the real potential impact of this is.

Well, I think that that's most of it. Most of our other issues and concerns are in our DIS highlight reel, and I will probably see you guys later in Grand Rapids, too, so I can make some of my other comments.

FACILITATOR: This gentleman right here. Name and if you could spell it for the court reporter.

MR. NEAL ILLIES: My name is Neal, N-E-A-L, Illies, I-L-L-I-E-S. I'm a county commissioner for Clearwater County. I'm in District III. Most of the new preferred route going through Clearwater County will go through my district.

I have talked to many, many of my constituents, the townships. As far as answering Marty's question, they want this pipeline in their backyard.

53 percent of our local levy is paid by the pipelines. That includes services down in this area, law enforcement, medical services, different food services. Social service is paid by pipeline. So yes, there is

a lot of money that comes down in this area and throughout the county, thanks to the pipelines.

I wasn't going to speak so I didn't have anything prepared, but we need to look at the facts. And the facts are the pipeline is the safest way to do this. There hasn't been any major spills in this area that would affect any of the wild rice beds or anything like that.

And we can't go on these what-ifs and could-bes. We need to look at the facts. I guess that's all. Thank you.

FACILITATOR: State your name and spell that for the court reporter.

MS. SARAH WELLS: (indiscernible). My English name is Sarah Wells, S-A-R-A-H, W-E-L-L-S. I'm a Leech Lake Band of Ojibwe member. I am also from the White Earth Band of Ojibwe.

I am coming from a spiritual standpoint. We all start as a droplet of water. That's what this is all about. This is about the water.

I was over in Leech Lake

yesterday doing some investigating. We got some things going on actively in Leech Lake right now.

On February 10, I have documentation of an integrity dig that was less than ten miles outside of Cass Lake. Our Cass Lake Band of Ojibwe members were not notified of the integrity dig. We have pictures of regular ground sand on one side and it's solid black on the other side, and the pipeline is lifted up out of the ground three feet. We have pictures.

These are real things that are happening to our people. This is coming through the wetlands. Last night I stood in prayer and sang the water song for some water that is now solid black and blue and burnt and smells badly of gas, it smells like methane.

I reported it as a spill to Enbridge last night. It's in the middle of a swamp. We were standing in knee-high water, and I was told that it was reported as a grass fire. I would like to know how a grass fire happens to combust in the middle of a swamp that is knee-high water unless that water has

chemicals in it which combusted.

This was less than a quarter of a mile from town. I walked 56 steps to one of my elder's house who is 72 years old, and he drinks that water every day.

I've been to Kalamazoo in 2014. We did water ceremony for the children over there. When we did water ceremony for them, their hair was falling out of their head. We stood with hair, gobs of their hair in our hands, because we were praying for them for sacred water for the people of Flint, Michigan for the Kalamazoo oil spill.

But what's failed to be mentioned is that Grand Rapids, Minnesota, in 1991, was the largest oil spill in the United States. The oil spill in 1991 in Grand Rapids supersedes the one in Kalamazoo, but nobody hears about the Grand Rapids oil spill. Millions and millions of gallons, billions of barrels that spilled into the Grand Rapids River.

There was no plan. Enbridge does not have a plan of action for ice spills.

We all live here in Minnesota.

How many months out of the year are we under ice? How can they not have a plan for a spill that is going to happen on the ice when we are, six months out of the year minimally, an ice-filled state?

Where does that oil go on top of the ice? Where is the impact statement on ice spills? Because I've never heard of one, I've never seen one. We talk about the land spills, we talk about the spills that are in the wetlands when the water is free and it's flowing, but what about that oil that's on the ice, in the land of ice?

I don't want my child to lose his hair. I don't want your children to lose their hair because they're drinking the water that has been contaminated by tar sand. I don't want our children to have kidneys that are full of blood.

I know of an eight-year-old little girl that died. Her kidneys failed on her, eight years old, because she drank the water. The kidneys of the people in the reservations are failing. The dialysis units are rising. All these brand new fancy

dialysis units are because the people's kidneys are failing, because of the contaminants that we are drinking from the tar sands. We are drinking it. It's in our water.

I can't speak for White Earth. I'm sorry, because I don't know what's going on here, but I know what's going on in Leech Lake. And the fact is is that what we have on paper by Enbridge is that their max flowing capacity is 2.38 billion barrels per day through the state of Minnesota.

That's not through the United States. That's through Minnesota.

That's not including the dilutant in line 13, which flows from south to north, with 267,000 barrels of chemicals that they ship to the tar sands in Canada.

All of that is going through our water tables. We're drinking that in our water.

You can go on the websites and you can see where the oil plumage is in the water tables in Cass Lake underneath the south pumping station. It's on Enbridge's web page.

It shows the oil, the 22 wells that they've inserted into that oil spill that monitor what the oil is doing. The oil is not coming out of the ground. The oil is not being extricated. It's being monitored. We have wells that are being dug to monitor what the oil is doing in our water table.

In the meantime, we have children, pregnant women, elders. It doesn't matter what color we are, because we all drink the water. We all live on this land. We're all going to die from it. It has to stop. It has to change. The time is now. We'll all die if this doesn't change. (indiscernible)

FACILITATOR: One gentleman wants to make a comment -- just aware of the time. Anybody else? We can get final comments.

MR. BILL CROWELL: Bill Crowell, B-I-L-L, C-R-O-W-E-L-L. I'm from Pine Point on the southern part of the White Earth Reservation. I was born in the White Earth Union Hospital in 1955.

And I wasn't going to speak here today, but it's sort of interesting that a

Clearwater County commissioner comes here, and he's the only person that speaks for this pipeline, and then he starts talking about social services money that's going to come.

You know something, I've been a logger all my life, since I was ten years old. And most of the money that comes into Bagley, the county seat of Clearwater County come off this White Earth Reservation, and it didn't come by native loggers like myself. Probably come from his relatives.

Whenever I log in Clearwater County, I want to tell that gentleman -- and I can take him out not too many miles from here -- when I log tribal wood throughout the county, I find these BIA survey pipes, and over here is a Clearwater County land.

But the pipe's over there and the logger cut over here. And every time I tell my White Earth Forester, BIA people, "What are you going to do about that, their trespass?" Nothing happens.

So don't sit here and tell me about social services and how this pipeline's going to help Clearwater County help any

native person.

Now I'm going to get to what I really want to tell you about. This lake out here, this wild rice, when I was a young man over a half century ago at Pine Point, our people, all of our Anishinaabe people, loved the fall. It's a special time of the year.

Because when we come to this big lake and we go out there in the ponds for landing that my friends spoke of, some of those people, some of my ancestors, my relatives -- some still around, some gone -- they made over a half of year's income, rice from that lake out there.

We're finding out our tribe now, they say they'll pay them two bucks a pound for green rice, so we got a living wage. For one month out of the year we can make a living wage. No thanks to Clearwater County.

If this pipeline starts to leak, and I said it, I said it over at the TEC of MCT, I'd like to take a sloop, maybe one that that gentleman owns, and I'd like to plant a few plants of wild rice in there, and then let's introduce this tar sand in there.

And I know Winona jumped all over me about it, but if you get the right sloop, I can clean it up. They used to do it out in the oil patch all the time, all day. They dig a pit. They clean it up.

So it can be done. But clearly, we won't know -- I know somebody spoke about it. They said if it gets in there, it probably is going to kill the rice.

And if they cross where they're talking about up here, on the one that they want, that's going to go into Upper Rice. It's going to come down through here in this aquifer, ready for Cass Lake.

Those deep aquifers, when I log in a swamp in the wintertime, you can walk out there in 40 below, and those trucks are going like that. What does that tell me? That water's 60 to 80 feet below me. And if that contamination gets in that water, you're not stopping it, you're not cleaning it up.

So they can take their oil pipelines and they can keep them in Canada, because if they need to get rid of Canadian oil, do it in Hudson Bay. They don't need to

come over here to Superior, Wisconsin. I don't need it. It ain't going to do me any good.

You know, I paid my way, all my life. But this pipeline, like that gentleman said, it ain't going to bring nothing to Clearwater County. It ain't going to bring nothing to the White Earth Reservation except maybe it may end our wild rice.

And if it does, like that gentleman said, my friend from Pine Point, our -- we're dead. If it kills the wide rice, it kills us. There's nothing about this pipeline that's worth taking that chance.

I was up in the oil field in 2008. By 2010, both my kidneys were down to 10 percent, and that's what I did. I hauled dirty water for Missouri Basin Trucking. I'm telling you right now, you don't want to mess with it, because I'm just now getting back on my feet.

So don't tell me what it can't be or what it won't be, because I've seen it. I've seen the dirty part of it. I've seen the financial part of it, and there's no gain for

us as a people at White Earth, Leech Lake, all the way over to Fond Du Lac.

My good friend who's the chairman of the Fond Du Lac Band, he's also the president of the Chippewa Tribe, he knows there's no future in this for us as native people.

We got to fight this every way we can. There is just no way that we need or want this. Thank you.

FACILITATOR: So as we begin to bring this to a close, anybody else who wants to make a public comment besides the gentleman in the red cap, and then we're just coming back here. So the gentleman in the red cap first, and then the gentleman in the white baseball cap second.

MR. DENNIS RITTS: My name is Dennis Ritts, D-E-N-N-I-S, R-I-T-T-S. I've logged around this country for 30 years. And I'm not a speaker. But after I quit logging, I've been driving truck over the road, so I've been in all 48 states and all the other Canada provinces since '07.

A few things, I've hauled stuff

for the pipeline and oil fields and stuff. They're real fussy about their equipment, paint in their pipes and stuff. If I haul pipe, I can't get a scratch on it because it's newer stuff than what they used to have. I haul a lot of stuff for them.

Another thing, last year in 2016, there was more vehicles traveling more miles and worked more fuel than ever in our history last year, in 2016.

Okay, another thing, too, that I've observed renewable fuel. Okay. It takes fuel to grow crops. To use renewable fuel, to me, it's taking food away from people, because a lot of this stuff that they make renewable fuel out of is food that they would use for livestock feed, which of course, goes to food for people.

There's oil on this pipeline now. The way I understand, it would be from Saskatchewan down to Superior. That would be refined there, and unlead fuel would be used locally, and would be all shipped overseas, is the way I understand it.

They had a proposal about taking

it to the West Coast, which would be over the mountains. That's just what I've heard.

Another thing, climate change, I'm the same age as the last guy that was up here. When I was a kid, we used to have awful deep snow in this country and it got terribly cold. It's a lot warmer now than it was when we were kids.

Part of this -- I don't know about the pollution stuff and everything, but when you drive through big cities where it's all concrete and buildings and highways and stuff, my temperature gauge in my truck, it'll go up two, five degrees warmer in cities.

And so, to me, I've seen just a tremendous amount of stuff being blacktopped, pavement, and more people. To me, that's got a lot to do with our climate, you know. But it's so huge, I have no idea for sure.

I have 160 acres over there, which has a pipeline that runs through it now. There's four lines there. One of the lines was put in in the early '60s. And last year -- within the last two years, they dug up sections of that pipe four different times,

and they planned on replacing that one, and basically, yes, their stuff has a life limit to it.

So the line going across Line 3, I believe it should be shut down, because I know where it moves now. I don't think they ever got permits in what we have in the way of restrictions now, and I don't know where it should be. But I know that they looked about coming across my land on one side or the other -- property lines.

They spent two years looking at frogs and bats and birds and every other thing. There's always trespassing on the place, you know. But they always ask permission to go out there and stuff, so --

People have a right to be concerned about pollution, the likes and stuff, but they tell me that they have pumping stations. They can tell if there's a leak by the pressure drop, which is recorded all the time, but yes, there's going to be a leak.

The most dangerous way to transport oil is by truck, because there's all kinds of goofy drivers out there that try

to -- but of course, you're just going to have one truck that's -- I don't know what you consider a small spill -- I think 12,000 gallons.

Or in a train, but they had a train caught on fire out in North Dakota I think three years ago, and they just made the ruling on it. The trunnion, the wheels on the thing, they were too light for the rail car, and then they built the rail car too light of material, so they burnt through, and then of course it burnt a lot of cars.

So they -- all the new rail cars you see out there, they're going to fill out the rail pretty soon.

So that's just a few of my views and opinions. Thank you.

FACILITATOR: I think we have one more gentleman right here. State your name and spell that, please.

MR. LAWRENCE FAIRBANKS: (indiscernible). L-A-W-R-E-N-C-E, Fairbanks, just like the capital of Alaska, F-A-I-R-B-A-N-K-S.

Request for everybody to support

to not have this pipeline come through. I listened to a lot of good words here today, and I think all these words come from, right from our own heart.

If you look at the four elements of life that we need to survive that the creator gave us -- and one of them is water, air, fire, and all the animal kingdom and plants, two-legged, four-legged, winged ones. I don't know how many people are hunters or fishermen. A lot of us depend on the animals to live. They call North America and South America Turtle Island.

If you look at it, it resembles the Mikinak. If you look at the Mikinak, if you look at the back, it has 13 squares all around to make that turtle's back. And then there's other little small segments that go around that turtle, that represents our days.

That 13 segments represent the 13 rivers that flow here on Turtle Island, there's 13 of them. Off those 13, they branch off into little rivers. Kind of like your vein in your arms or your legs, all through your body is like the veins. It's like our

blood that we have pumping through our bodies. When one of those arteries gets taut, we find that there's complications in the human life.

Out of those 13 rivers, you notice that we have the dams that they made years ago. If you think about it, if you have a loved one that had heart implications, they put stents, and they fix those veins to make you live.

That's what they did in those rivers. They put stents in them to hold back the water. All of ours is different watersheds that gives us everything we need for life. That's what I was told by the elders.

We're all affected by this. Not just here, White Earth, but all over, and what you've seen over the years, you know, pollution. It's not just from the oil, but it's from manufacturing companies to, you name it, farming, and all this flows into the water, and pretty soon we're not going to have any water.

Our wild rice preserves are all over from Wisconsin, Minnesota, up into Canada

a little ways. That was part of our prophecy when we came from the East Coast, like my friend Ricky explained. That was a vision that was for us to migrate over this way, like you said, to where we would come across where the food grows on the water.

For years and years and years, that's where the Anishinaabe people used to eat, and sometimes that's probably all we had to eat.

So I just want to have everybody take a good look -- especially Enbridge -- really think about how you're going to affect not just native people but non-native people as well.

We're talking thousands of people, from the elders all the way down to the ones that are not even here yet.

There's a reason why the creator put all the water here for us. If he didn't, we wouldn't even be having this meeting. If I was to take a cup of water from where the headwaters start, I could probably drink it and feel pretty good about myself, but if I were to go all the way down to the end of the

Mississippi and I was to take a cup of water, I probably wouldn't be able to drink it.

Remember, there's a time long ago where you could probably stick your hand in a mud puddle and cup that water and drink it.

But now we go to the store and depend on water to give our babies, ourselves, to drink, and even put money on that water. So now it even costs us money to live and drink that water.

It's even more expensive than gas. Who would have ever thought that that would happen? So when we look at the whole picture, how many natural clean aquifers are left? Not many.

So we really need to take a good look at what's more important, to live or not to live.

FACILITATOR: Any final folks who want to comment before we begin to close?

MS. MAIINGAN IKWE: M-A-I-I-N-G-A-N, I-K-W-E. Thank you for allowing me to talk today. I talk not as a resident or a community -- can you hear me

more like this with the echo? Or can you hear me better down here?

I am grateful to come here and be at Camp Turtle Island. I was not born here. I was not raised here, but I have seen the effects here, and I've been asked to come here.

That's sad, when we have a fight, that we have to ask people to come in.

Because people are dying. We have had the opportunity to go down to Flint, and from their water there we have seen babies come out dead. We have seen babies come out with issues, with problems, and it sounds like that's what's happening at Leech Lake. So what happens when it happens here, where we see cancer already rising?

I do not know the full history of here. I wasn't born here, but I only hear what people have said and the facts that I have researched, and it's not okay.

I look over here, and I see that throughout all routes are going to be circling water. Well, isn't Minnesota the land of 10,000 lakes? Isn't when it hits one water,

it hits all of it?

So what happens here? Me walking in both worlds, and I see natives here that will all perish because of the wild rice. And not only natives do I see dying, I see white folk dying, too. I see Flint coming here. And I don't know if you guys have really heard of Flint, but it is so sad. It is so sad, and that's what I see happening here.

So please, Neal, please rethink the words that you said, because your words are going to kill everyone. Money will come from other places. It's amazing what happens when solar energy and wind is involved, and when you can get money from other things.

But what's important is that the money to give Social Security, what happens when there's no humans to give that Social Security money to?

So from someone outside looking in, please rethink your statement, because it's going to kill everyone here.

And thank you for letting me talk to you guys today. I wasn't going to

talk. As you can see, I'm shaking, because I'm shaken up by what is happening here.

Thank you all for being here to talk about your community, and to talk about what's happening, and thank you for letting me learn more, because I don't see anymore meetings happening after this when everyone's dying of water. So what happens then when it's too late?

FACILITATOR: We're running toward the end of our time together for this meeting. Is there anybody else who wants to make a final comment?

DAWN GOODWIN: (indiscernible) I want to make one last final comment. G-A-A-G-I-G-E Y-A-A-S-H-I-I-K. Everlasting Wind is my name.

So I'd like to leave with you this: I noticed in the DEIS, it talks about historical trauma. A friend of mine said, "Yeah, things happened to us in the past, but historical trauma doesn't exist." And I looked at him and he said, "We're still living it."

The people that aren't here

today, our fellow tribal members, they're experiencing contemporary trauma. They can't handle this. They leave it up to us. They trust us. I speak for many people that are not here; hundreds, thousands.

Our Minnesota Chippewa Tribe has 42,000 members. So we're living contemporary trauma. This is traumatic to me. I made a vow to learn my language. I can't even touch the surface. I'm still at elementary level, because my mind is so filled in how I'm going to beat Enbridge.

That's what I do for fun, my spare time. I'm reading about the environment. I'm reading about water. I'm reading about what's coming from the air, what's being sprayed on our fields. It's coming from all directions.

To allow this to go through is not right. So everybody in this room, you have an obligation to protect the people, protect that baby back there, their future.

So I tell you, you need to look -- this has become an ethical and moral issue. Don't continue to traumatize us as a

people. We've had enough. The time is now to change, to make amends with.

We made those treaties in 1855 so that we could live in peace. And if you look at the state seal, we have a native on a horse and we have a farmer with his plow, plowing through the fields.

We need to be able to live side-by-side. We need to quit making bad business ventures, venues, whatever. I will not need to start thinking -- they were talking about we needed to end our dependency on oil 50 years ago, over 50 years ago, and here we are again, talking about it again.

So if we were talking about it 50 years ago, why didn't anything happen? Why are we back here again talking about it? And I think we need to really get over dollar signs. Once you get passed the dollar signs, then that truth comes out.

What's more important? Water, I want you to think about it. How did you use water today? I'll tell you how I used water. I got up, I was thirsty, very, very thirsty. I needed to have a drink, so I went to my tap

and I got a drink. Some people can't do that. I went to the bathroom. I brushed my teeth. I took a shower. I made coffee. I gave the dog and the cat some water.

I was sitting here, got a little thirsty, I went back there, tried some water. I could taste that it was some chlorine or something in there. But we have a spring on the other side of the lake where we can -- it's a flowing well. We can go and get water.

Last year, here in Rice Lake, we had two storms that took out the electricity and in the rest of Clearwater County, too. Some people were out of electricity for days, weeks, and what did we find was most important? Water.

It was the most important. So I want to leave with you that.

Miigwech.

FACILITATOR: We have time for one more, so you're it. If you could state your name and spell it for the reporter, that would be very helpful.

MR.SAM CROWELL: Sam Crowell, C-R-O-W-E-L-L.

My brother spoke awhile ago. We grew up on a lake about 15 miles south of here, Long Lost Lake, and he was talking about water. We didn't have -- all we had was an outside pump. In the wintertime we had to get our water from the lake, and I remember my sister went down in the morning to chop the ice out of the lake and she chopped it, went in the water, and my dad got mad because our water was contaminated.

And like the lady said, when you lose your water, you lose everything.

Now, I live down in the southwest part of the reservation, the southeast corner of the reservation. Farmland contaminants down there. Most of the people down there -- the roads are contaminated, they have to buy water. I buy 12 gallons of water a week just to drink, because I can't -- the wells are contaminated.

That's what can happen if you get this oil and they have a major spill, but -- and I would like to state, state to people that are here today, I have a firm belief that it isn't going to matter what

these 22 meetings come up with, because I think the decision's already been made.

If you go to the lake, the pipe's already piled there. They bought land all the way through. They're not going to give that up. I'd like to talk to the State, prove me wrong.

After these 22 meetings, show me that they have not already changed their mind and made a decision for them. Thank you.

FACILITATOR: Last speaker.

MS. IRENE AUGINAUSH: My name is Irene Auginaush, A-U-G-I-N-A-U-S-H. I'm a former White Earth tribal council member for 18 years. I was elected, and I want to -- I want everyone to know that I am adamantly against this pipeline coming anywhere near our Rice Lake.

Our lake is the biggest lake with rice in the country. And we -- this is our culture. This is our cultural food. This is our traditions. My grandpa and other relatives used to sit down at the bridge. We had planks put in in the river at the bridge so that we'd have water to grow the rice, and

they knew when to take the planks out.

They sounded the shotguns because the people down the river, I don't know where it all goes out towards Ada, that way, those farmers would sneak up and pull the planks out trying to ruin our rice.

So they sent them with shotguns, and they fought to save our rice and our Rice Lake, and we are going to fight to save our rice again, just like our ancestors did.

Miigwech.

FACILITATOR: Thank you, everybody, for the time that you spent today learning, talking, and commenting. Again, the court reporter has captured all the comments today and that will be part of what all the state folks who will be working on this will be reviewing and thinking about regarding the revision for the draft for the final.

I think we said July 10th is the end of the formal public comment period, so if you want to send in a written comment, you can do so until July 10. And that will be the deadline, and we'll take those in and proceed with the analysis of all the comments from

these meetings and everything we receive in writing as well.

So I think with that, we thank everybody. We thank the White Earth Nation for hosting us, for the marvelous music and drumming, and we'll look to you guys to close.

(Singing and drums played.)

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DEIS MEETINGS - 14-916 15-137

BRAINERD - JUNE 8, 2017 - 6:00

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Central Lakes College
501 West College Drive
Brainerd, Minnesota

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FACILITATOR: All right. Welcome, everybody. Thank you for coming out on such a beautiful night, for coming tonight.

My name is Patrick Field, and I'll be facilitating this evening's public comment session. I'm part of the consulting team, working on behalf and with the State of Minnesota in running these public meetings and efforts around the draft EIS.

So what I want to introduce is Bill Grant, who's Deputy Commissioner Energy at the Department of Commerce for State of Minnesota. He's going to welcome us, say a few words.

Before I do that, I just want to recognize -- are there any state, county, or local elected officials who just want to be recognized?

I believe we have a state rep here. Thank you for coming, sir. We're glad you're here. Excellent.

Any other elected officials in the room?

Bill.

DEPUTY COMMISSIONER GRANT: Thanks, Pat.

Thanks, everyone, for coming. And as Pat said, it's a beautiful night. So being inside

may not be your first choice, but thank you for coming.

I want to go over a little bit about what this is about and just orient people, particularly those who haven't been to any of the previous public meetings that we've had so far this week.

Over the course of the next three weeks, we will have no less than 22 public meetings in locations throughout the project area and in St. Paul. And you're welcome to attend any and all.

What we're here to talk about tonight is a document that the Department of Commerce prepared, with assistance from the Pollution Control Agency and the Department of Natural Resources, about a proposed project that has been proposed by Enbridge Energy to build a pipeline through northern Minnesota. It is a crude oil pipeline.

The EIS is really to inform decision makers. It is not a decision document in and of itself. It does not make recommendations about whether the project should be built or not. It is intended to provide the kind of information the decision makers will need and will have to evaluate in making that decision. In this case the

decision-making body is the Minnesota Public Utilities Commission.

There are other permitting agencies who will also be informed by the document. For example, the Army Corps of Engineers and all of you, as members of the public.

There are two decisions that the Public Utilities Commission will make and that Enbridge would have to have approval on in order to move forward.

The first is a certificate of need. And as the words suggest, it is a decision about whether the project is, in fact, needed.

If the Commission grants the certificate of need, their second task would be to issue a route permit. And perhaps some of you've already been along through the boards here and have seen the route alternatives, in addition to the route that's been proposed by Enbridge, that are being studied as part of this EIS process.

There are going to be a number of opportunities to comment. This first opportunity, now that the draft is out, is obviously one such opportunity. When the final EIS is released, there will be a second opportunity and another round of

public hearings in the project area in September and October of this year. And so there will be notices being sent out about those, as those get scheduled.

And the Public Utilities Commission expects to make a decision on this project sometime in the spring of 2018. So just a little less than a year from now.

For tonight all of the comments that we receive will be treated equally, whether you give them orally in front of the whole group, whether you talk to my good friend Janet, the court reporter over here, and you want to just do that one on one with her, or in written form. Either give those to us tonight; or if you're preparing more substantive comments, perhaps, the deadline for those comments will be July 10th and would need to be received in our office close of business on July 10th.

All of the comments that we receive, again either orally or in writing, will be compiled and shared with the public. It will be part of the final document. And we will indicate in the document how the comments that we've received have resulted in changes to the document itself.

What we're seeking tonight are really comments on the draft EIS. Is there information

that's missing? Are there things about it that aren't clear? What can be improved about the document? Those are the kinds of comments that would be most helpful to us. But you're free to make whatever kind of remarks you would like to.

And, as I said, the comments will inform the development of the final EIS, which will then in turn inform the PUC's decision about whether to grant these permits.

So, with that, I'm going to turn it back over to Pat for some ground rules for tonight, and then we can get started.

FACILITATOR: So first the preliminaries. The exits, as you know, just, you know, for safety's purpose, you can go either this way or this way. You can actually go out the building that way.

Bathrooms are a little -- actually a little hard to find. But if you go to the front door and that way, there are bathrooms. And if you go behind the poster board and keep walking and walking, then you pass a fish pond and you go to the next county, there are some bathrooms there as well. But bring a granola bar. You might get hungry. So they're there as well.

So thank you all for coming tonight. I'm just going to walk through how we're going to handle the process for the public comment.

So we want to make sure that everyone who wants to comment has a chance to do so. So we have about 15, 16 cards of people who wrote their name down in that box back there. So I'm just going to kind of walk through those individually.

Crowds about this size, we give up to five minutes, if people want to comment that long. You don't have to comment that long, but we'll give that. But we do want people to kind of finish right at five minutes so we can allow others to speak. And we'll explain the timer in just a second that we'll show you.

One thing to do is we want everyone to have a chance who wants to to comment and be listened to. So we do ask that people respectfully listen when someone comments. Certainly as someone finishes and you want to be affirmative or thank them for their comments, you're clapping, that's fine.

We ask people not to be negative about people's comments. People may have a range of views. And on a complicated product like this, it

is understandable that there is going to be a wide range of views. And what we're going to do is, so everyone in the room is comfortable stating however they feel, being respectful of that view, not necessarily agreed with, and we can have respect with that agreement.

So the other thing to know, that we really ask people to direct their comments towards agencies, organizations, the project, the issues, the draft EIS. Please don't direct your comments to individuals, because that can make people feel pretty uncomfortable in this setting. So we really ask you to direct your comments to the issues, the project, agencies, or organization.

The role of the State here today. The State folks want to raise their hands who represent state agencies, just so you know? A lot of them are at poster boards, as you know. Their role tonight is to listen. So they'll be listening. And, really, many of them are going to be at almost all these meetings to really absorb the range of views and comments and issues that people raise around the draft EIS.

We have a very talented court reporter here, who will be taking your every word. When you

do come up to speak -- or we'll actually bring the mic to you -- sorry, I'll explain that -- just state your name and also spell it for the court reporter, just so we have the right, accurate spelling and the like.

And when I call you up -- or I call you to speak, I'm sure I will mispronounce your name frequently, so you can correct me as well.

Also, cell phones, please just take a second, put them on do not disturb, vibrate, whatever. We always have one that likes to go off with a nice little ring sometime during our meeting as well.

A few other things to note. There's also -- as Bill said, there's written comment forms. So if you prefer to write your comment, you can do that. There's comment boxes right over here. We have, again, Janet and other court reporters who can take your comments individually at the end, if people prefer that way.

If you want to submit your comment in writing, you have until July 10th to do that via email or regular mail as well.

What we'll do, partly because we have some feedback problems with the speakers, we will

bring the mic to you. So Eric right there has got a mic. Leslie's got a mic over here. And what I'll do is I'll call your name on the card, raise your hand, we'll bring the mic to you, and then you can either sit or stand where you are, whatever's most comfortable for you.

Okay. Andrew, do you want to pull up the timer, just so we can show people?

So a little friendly reminder about timing. So we've got this nifty little stopwatch up here. We'll just start it running after you state your name and spell it and then go. And about 15 seconds before 5 minutes, I'll just send you a little signal by standing up. That's a hint to wrap it up. And if you keep going a little bit longer, I will very politely encourage you to finish, just so we can allow others to speak too.

Okay. With that, I think we are ready to go. So -- and we'll bring the mic to you, Charles Krysel. Charles, just raise your hand. Right over there.

And just name and spell it for the record too.

MR. CHARLES KRYSEL: K-R-Y-S-E-L, Krysel. My comments are regarding the abandonment

section, I think like Section 8.3. Can you hear it?

FACILITATOR: There we go. You just turned it on. That's better. Right here (indicating) is about right. You want to just spell your name one more time so we --

MR. CHARLES KRYSEL: Charles Krysel, K-R-Y-S-E-L.

FACILITATOR: Thank you.

MR. CHARLES KRYSEL: So my comments are in regard to abandonment, primarily. But to summarize my concerns, if the pipeline is to be replaced, if it's -- if the decision is made to replace the pipeline, I think it should be replaced in place, in the existing location in the mainline -- I think you call it the mainline corridor, whatever it is.

And I think it's technologically possible. Surely it must be. It should be able to be done. And it's merely a cost issue, I imagine, for the company.

It's already a sacrifice some for the purpose and with the impacts already in place. A new route would only add impact and sacrifice an area that we don't need in the state.

And regarding monitoring and

maintaining the abandoned Line 3, Enbridge -- the language states that Enbridge will continue to monitor and maintain the abandoned Line 3 right-of-way in accordance with PHMSA regulations indefinitely. Indefinitely? Will Enbridge exist in 5 years, 50 years, or a hundred years from now? There's no guarantee.

I don't think the State of Minnesota and the citizens should be responsible for the damage and impact that this pipeline has created. It's a risk Enbridge owns and needs to deal with.

FACILITATOR: Thank you, Charles.

Okay. So Nancy Palmer? You just want to raise your hand, Nancy, and we'll bring the mic to you. Great, right over there. Great.

MS. NANCY PALMER: Hello. I didn't plan on speaking, but here I am. I'm really --

FACILITATOR: And, Nancy, if you just --

MS. NANCY PALMER: Oh, yes.

FACILITATOR: -- state your name and spell it. Thank you.

MS. NANCY PALMER: Nancy Palmer, P-A-L-M-E-R.

I'm really concerned about the

environmental justice aspect of this pipeline and what it's going to do, because no study is being done that exactly says the impact that it's going to have on water systems all the way down our watershed, as far as the cities or wherever else it is. And all I know is that it costs a lot more to clean things up than it does to do them right in the first place.

And Enbridge's track record, as far as cleaning up oil spills, has been not very good. I don't think they can even keep up with the amount of spills that are happening. And, you know, what I read, it seems like it's not when it's going to -- if it's going to break; it is going to break. And I think we need to be prepared for that, because it lasts forever, once the oil is in the water. And this kind of tar sands oil does not separate.

So thank you.

FACILITATOR: Thank you, Nancy.

So we have Richard Smith. Richard is right there.

MR. RICHARD SMITH: Hi, everybody. I'm Richard Smith. R-I-C-H-A-R-D. S-M-I-T-H. The reporter's going to be bored, because she's going to hear this speech over again. I'll leave off the

molasses cookies this time.

I am president of Friends of the Headwaters, and I want to give you just a quick bit of history. The reason we're sitting here tonight is because of an action that Friends of the Headwaters took back in the year 2014 when all this pipeline stuff started.

From the very beginning, our organization has stated that we wanted a robust, comprehensive, and independent environmental impact statement or study done on this large-scale project. When we realized that the State was not going to do that, we took the State to court in December of 2014. The Minnesota Appellate Court heard our case, and in September of 2015 they gave us a unanimous verdict.

Enbridge wasn't happy with that, and our Attorney General's Office wasn't happy with that; and they appealed the case, and it went to the Supreme Court. And the Supreme Court looked at the Appellate Court ruling and said, this is absolutely fine; we don't need to hear this; we believe in what those three judges said.

That's why we can be here tonight. The PUC was ordered by the Minnesota Appellate Court

to do a robust, comprehensive, independent EIS. The DOC has started an okay job, but they have a lot of work left to do on this.

And I just want to point out one particular issue. And, actually, to credit the Department of Commerce, they are defending you and me and the citizens of this state on this particular issue.

More than -- about 25 percent of the almost 5,600 pages in this report is about accidental oil releases and pinhole oil spills. An independent company was contracted to do this work for the Department of Commerce. The company that contracted this independent contractor is Enbridge. This company that did the work has a previous working history with Enbridge.

In the process of doing the oil spill analysis, the methodology for this report, it turns out there's some information that's being withheld from you and me. So we can't look at this information and do our own reliable and justifiable analysis of the methodology that they used, because they left out an ingredient for us: How much oil was used to calculate these spills?

Why is this important? And you might

wonder why Enbridge doesn't want us to know this. This lady over here mentioned tar sands oil. You all recognize this (indicating). We drove on it to get here. This is bitumen. Otherwise known as asphalt, if you add some rocks to it, you heat it up and flatten it onto a road. Imagine trying to get this through a pipe.

Now, when it comes out of the ground where they strip mine it in northern Alberta, it's sticky. It's like a handful of peanut butter. So they have to dilute it. Diluted bitumen is called dilbit in the jargon of the industry. That word is in the EIS, but you won't see it very often. The company either calls it heavy crude, Canadian heavy crude, or they have a really cute little name for it called cold lake blend. Now, who the hell would know what that is, you know?

So -- and we all know from the infamous Kalamazoo spill what happens to dilbit when it goes into a water environment. The diluents evaporate -- very carcinogenic -- and the bitumen goes to the bottom, because it's sticky; it sticks to everything.

Why do we know that? This is easy reading (indicating), if you want to spare yourself

the 5,600 pages. This is the National Academy of Science's report on dilbit that was written, drafted after the Kalamazoo River spill in Michigan in 2010. It's still nightmare'ish reading, but the key take-away from this report is a dilbit pipeline should never be put through a water-rich environment called Minnesota.

So we need to defend the DOC's efforts to force the company to give us the information that was used in this project.

And thank you very much. Appreciate your time. And I see a lot of faces that have supported Friends of the Headwaters here. I appreciate it very much.

FACILITATOR: Thank you.

Okay. We'll bring the mic to you, Larry Ness.

MR. LARRY NESS: Right here.

FACILITATOR: Larry, great. And we'll -- Eric will bring the mic right to you, Larry. And, again, just name and spelling for the court reporter.

MR. LARRY NESS: I met this gentleman before the meeting started; and I would like to let him have the mic, because he's much smarter than I

am.

Do you have anything you want to...

MR. KEITH BLOMSTROM: Yeah. Thank you very much. Keith Blomstrom. K-E-I-T-H. B-L-O-M-S-T-R-O-M. I have worked on pipeline issues since 2006 with the National Wildlife Federation and others, lobbying in Washington DC and St. Paul, Minnesota.

One time I went with people from Kalamazoo, Michigan; we went to the U.S. Congress, the EPA, and the State Department. The Kalamazoo spill was 1.3 million gallons and was considered the largest spill in the Continental United States.

But since that time I have learned that the spill in Grand Rapids was probably bigger. I've heard up to 1.7 million gallons. That's 85 miles north of here, not too far away. That was in the Mississippi River.

But the MPCA is just down the street here. I used to stop there not more than once a year, because I didn't want to bother them. They were very receptive to my questions; and they told me ten years after the spill they were still working on cleanup. And some of you here might know a lot more about this than I do. I never heard it until I

talked to the MPCA. It happened in town; a lot went down the storm sewers; and I believe it went on top of the ice, which made the cleanup a lot easier. We were very lucky in Minnesota.

That's the Mississippi River there, I believe, in Grand Rapids. And, you know, 1.7 million gallons could have messed up water for a lot of people.

The Kalamazoo spill cleanup -- I haven't heard within the last year or so -- is over $1.3 billion, and 30 percent of it will never be cleaned up. This oil is very toxic, as Richard said.

If you want to see more information, go to Youtube on the Internet and watch the videos put on by John Bolenbaughs. Bolenbaughs, B-O-L-E-N-B-A-U-G-H-S. He worked for the pipeline company, I think it was Enbridge, that was responsible for the spill. He was sent out to clean it up. Supposedly they said cover it up with sand. John said, no, we're going to clean it up. And they got rid of him; they got rid of his relatives at the company. It's a long story. John explains it very well in the video. You got to watch it. And he shows how toxic this stuff is.

There also was a large spill at Cohasset, Minnesota 82 miles north of here, and there are others. There was a spill in Staples a few years ago. I believe that was over 250,000 gallons. I went over there, and you couldn't get near it. It was out in a big wetland. Never heard any more about it, just like we didn't hear much about the one in Grand Rapids.

The pressure on these pipelines can go as high as 1,200 to 1,600 pounds per square inch. And I was a contractor and a plumber and put in a lot of things and stuff. That's a lot of pressure. Air conditioners now are up to over 300 pounds, and that's very difficult to work with. I don't know how -- it's pretty smart people that do this; but they have problems, like blowouts at Kalamazoo.

We told the State Department, and we told the Pipeline Safety Commission: Improve your standards on the installation of these pipelines and lower the pressure on them and replace Line 3 in place. It can be done.

FACILITATOR: Thank you. Thank you very much.

I've got Jerry. I'm not going to say the last name right. Jerry Rodecki. Okay. I

destroyed it. Leslie will bring you the mic right here. And if you can pronounce your name correctly and spell it, it would be very helpful.

MR. JERRY RAEDEKE: Did you say Jerry Ruddy Ducky?

FACILITATOR: I hope not.

MR. JERRY RAEDEKE: Jerry Raedeke with a J. R-A-E-D-E-K-E. Nisswa, Minnesota. I don't think there's any argument in really all the country that we have the purest, best water in the United States. That's just a known fact.

When you talk to Enbridge, they're very confident that no matter what kind of spill -- they call it a release, but it's a spill -- that they can handle it.

I want to talk just a moment about a spill in -- on Yellow Stone River near Glendive, Montana, January 2015. The reason I want to talk about that one is because they weren't able to clean it up. There were over 40,000 gallons of oil spilled, and they were only able to retrieve about 200 -- a little over 200 barrels of that oil. And they had oil that ended up all the way in Williston, North Dakota. Now, they -- and Glendive, too, because of some of the things that are combined with

the oil to make it move through the pipeline. They had benzene, a very serious carcinogenic substance, in their water in Glendive.

The reason that they couldn't clean it up is that it was in the wintertime and the oil went under the ice. So it just went down the river. How do you clean things when the water is moving and it is taking the spill down the waterway?

Now, all of the routes that we have in Minnesota through our lake region cross many -- many different rivers, creeks, and some of them very large wetlands and rice beds. And even a rice bed, in order to function, has moving water in it.

It may not seem like it, but some of these are huge areas. Now, if you have a spill in that area, a lot of these areas are inaccessible with the amount of snow. You can't even get there. Well, Enbridge said -- I raised that; and they said, well, we have a helicopter. Well, what is that going to do when you have oil moving through a water system downstream and you have a helicopter?

This -- you know, in these water areas that we have -- all of the routes that I saw in our water-rich area of Minnesota really are not good routes. Water right now and in the future is going

to be worth much more than oil.

And even in our -- in our economy they talk about jobs. And I understand the union people went to some of the other hearings. You have to feel sorry for a lot of these people that are really seriously struggling for work. But the few permanent jobs that are involved in that are nothing compared to the tourist economy that we have, property values in these areas. All of these things are easily damaged.

And then you look at the Native Americans and their rice culture and the oil damage that can happen just with a spill in some of these -- some of these really critical, precious areas.

I hardly know what to say. But I think that the Yellow Stone spill near Glendive, with oil ending up all the way in Williston, shows that any kind of confidence they show us that we can handle it, they can't. They can't. There are spills that they will not be able to retrieve. They retrieved only a little over 200 barrels out of the 40,000 gallons of oil that went into Yellow Stone River. These are -- these are tragic. These are tragic.

And I hope that Minnesota stands up and says this is important to preserve our heritage, our state, our Native American culture and also our economy.

Thank you.

FACILITATOR: Thank you, Jerry.

Okay. Allen Richardson? Okay. Name and spelling for the reporter. Thanks.

MR. ALLEN RICHARDSON: It's Allen Richardson. A-L-L-E-N. R-I-C-H-A-R-D-S-O-N. Afternoon, folks. I'm with the organization called Minnesotans for Pipeline Cleanup. I just want to again speak to the abandonment issue.

We're taking exception to the DEIS's sort of blithe assertions that most of the pipelines in the mainline corridor are, in general, 10 or 15 feet apart. We took it upon ourselves -- Mr. John Munter over there took it upon himself to walk some of these lines to measure the distances between them. And we'd love it if the PUC and Friends, DOC, or whoever, would confirm that we're correct, basically that there is ample room to remove abandoned pipeline.

So basically we're here to advocate for landowner choice. And I think this really

speaks to what I'm going to call Minnesotan common sense. There is a lot of common ground to be had on this question of abandonment. And so we should look at it strongly. I think we should embrace it.

I've said this a few times over these meetings, and I'll say it again to my brothers and sisters in the labor movement, that if -- if you want to benefit from the jobs that would come from digging up abandoned pipeline, it's my opinion that you're going to have to publicly assert your solidarity with landowners who have made it clear that they don't want to be stuck with abandoned pipeline on their land.

And I'll take it a step further; that, you know, regardless of what happens with the proposed new route, that this project should not move forward in any way, shape or form until this question of abandonment is conclusively settled.

Would love it for the final Environmental Impact Statement to have some really solid data about the distance between these pipelines, about how many jobs would be created pulling out those pipelines. We know that a precedent is being established on this question.

We know that Enbridge has every

intention of abandoning this line. They do not want to dig it up. So they're, you know -- may have to apply some pressure to them and the PUC on this point.

They are likely to abandon the rest of those pipelines in the mainline corridor eventually. So to take the long view, if we can, you know, continue to look for common ground on this question. There are long-term economic benefits to be had to the pipeline workers, who are definitely the ones who are qualified to do that work.

So thank you for your time.

FACILITATOR: Thank you.

Okay. Next I have Keith Blomstrom?

MR. KEITH BLOMSTROM: That was me.

FACILITATOR: Keith. Okay. You're all set?

MR. KEITH BLOMSTROM: He's already got it.

FACILITATOR: You're all set to comment or not?

MR. KEITH BLOMSTROM: He got it.

FACILITATOR: Okay. What he said. Good. All right. Very efficient.

Mark Persons or Pearson?

MR. MARK PERSONS: No comment.

FACILITATOR: No comment. Okay.

Kevin Miller? Okay. And, Kevin, we'll bring you the mic. Eric is right there bringing you the mic.

And just name and spelling for the court reporter. Okay. Thank you.

MR. KEVIN MILLER: You don't to want hear me sing. Kevin Miller. K-E-V-I-N. M-I-L-L-E-R. Thank you for the opportunity to speak tonight.

My name is Kevin Miller. I'm a special pipeline representative with the International Union of Operating Engineers. Real quickly. We represent approximately 400,000 members, most of which reside in the construction industry. But narrowing it down more specifically and why I'm here tonight, because I'm speaking on behalf of thousands upon thousands of Local 49ers, known locally here in Minnesota, North Dakota, and even South Dakota, that would love to be here themselves and speak in favor of pipeline jobs such as Line 3, but right now they're all -- most of them are actually occupied with their other temporary jobs and going to work on those and complete those

so that they can take care of their families, build their retirements, and earn their solidified health insurance for the same so they don't have to depend on any state care.

That thing about temporary jobs, real quickly. A dentist, that's a temporary job. He goes from one client, the equivalent of a construction worker on one project. You're done. You move to the next client. Then you move to the next construction job. It's the same thing. So temporary, it just gets really old hearing it pounded day after day. And poor construction workers. No, not union construction workers.

This morning I heard the most absurd stuff that, just roundabout kind of putting it, that a pipeline job of this magnitude may incite child sex slave trade and intense drug abuse of some nature. And I'm actually appalled. Whatever went on in North Dakota, as my fellow brother from the United Association rebutted this morning with, we have approximately 4 or 5 percent maximum of anything that went on in North Dakota. There's a whole gamut of different things aside from pipeline. We had 4 percent of that, for whatever reason. I don't even -- I couldn't tell you where the other

96 percent even came from, to be honest with you.

Just like the United Association made a point, the Operating Engineers in absolutely no fashion will ever condone anything like that. I'm a father of three. Most of us have families too. Be an awfully cold-blooded bastard to ever even think that that would happen.

We have -- and I'm going to give you an example. Somebody please -- and if -- by all means, if we've had this child sex slave labor and this huge drug-run thing coming through with our projects, by all means please speak up and show me the facts.

But just a few jobs in the country -- 22 years in this industry, I've been all around the country, and we've seen and built tons. These are just a few: The Albert Clipper, the MinnCan, the Rockies Express, the Ruby Line, the Southern Lights project, the Keystone Phase I, the Bison, the Current River Lines 1 and 2. Nobody knows of any drug trafficking, no child sex slave labor shit going on, because neither do I.

There are dozens and dozens and dozens of other projects. I can't speak for any nonunion, but I can guarantee you the Operating Engineers are

not going to take that. We will never accept it. And if we ever found if we had some bizarre ass piece of crap member that was involved in something like that, we would take care of that in a legal manner, because that is not acceptable in America or anywhere else.

That's an emotional one. Wow.

I need clarification on one thing, because I keep hearing the word abandoned, and people are beating it and beating it. But I asked my brother, I said, hey, I thought the word was decommissioned. I see it in this Minnesota guide the word is abandoned. And I'm no scholar, but I have a little dictionary on my phone also, and decommissioning and abandoned are two different things.

Well, I went back to Enbridge's website for specifically the Line 3, and the word's still decommissioned. So they're two totally different. So, please, if I'm missing something, though, that Enbridge has changed, I would like to know, or if it was misspoken. But as far as I understand, and following that in Enbridge's website, the word is still decommissioned, which is fully taking responsibility, and it says for life.

Abandon means thrown to the curb.

FACILITATOR: A little bit over five minutes.

MR. KEVIN MILLER: Okay. Well, okay. That one part got my emotion. So for now I'm good. Thank you again for your time.

FACILITATOR: Thank you very much. Thank you, Kevin.

Next we have Tom Watson. Tom. And we'll bring you -- Eric will bring you the mic.

And just name and spelling for the reporter.

MR. TOM WATSON: Good evening. My name is Tom Watson, spelled T-O-M, W-A-T-S-O-N. I'm here on behalf of the Whitefish Area Property Owners Association, of which I'm the president. For the record, it's the largest lake association of its kind in Minnesota. 50 years old. You know it up in the Crosslake area. It's 14,000 acres of surface water; part of the Pine River Watershed, which is half a million acres of land and water.

I want to be clear that we're not opposed to using pipelines to transport oil. We are opposed to putting pipelines in a water-rich area that, as Mr. Raedeke pointed out very correctly --

he took half my words -- is the essence of the economy of the northern part of Crow Wing County, Southern Cass, Hubbard, Aitkin County, et cetera.

Comments specifically about the DEIS. I don't know how many years it's going to take to get through 5,000 pages, but I'm trying to read fast. But a couple of comments on the content of the document.

Section 116(d)(04), which is the description of the law covering environmental impact statements, speaks to the fact that these documents are supposed to be analytical, not Encyclopedic. This document is full of Encyclopedic information to tell me how to define soil, how to define a walleye, how to define water. The analytical part is to take the current experience and apply it. And this document is woefully inadequate in doing the analytical piece.

But we have a lot of redundancy, so I know -- I now know how to define a certificate of need. Commissioner Grant hit that one very quickly, in terms of the process. But just for the public to understand, a certificate of need actually requires the RGU, which in this case is the Minnesota Public Utilities Commission, to actually make a decision to

determine that the benefits to the public of Minnesota exceed the costs associated with this project. The costs of this project include the things that are negative, oil spills, et cetera.

Let me comment on section -- throughout this document, but particularly Chapter 4, Section 4.1, which has a reference to it that talks about the fact that the economic and -- economic analysis and the technical information relative to jobs, employment, tax revenue, etcetera, will be provided by the Applicant, other parties, and the public that are participating in the contested case hearing. I'm sorry, the law says that the independent body retained to consult and advise the Public Utilities Commission is to do that work. You don't ask the Applicant to do that.

If it looks like a postcard that's arrived in our area, the data is totally misrepresented about how much revenue they're going to generate, etcetera -- this document talks about $100 million worth of tax revenue. The postcards I've seen are numbers that are two and three times that. So you don't want the Applicant to do that. You know, they've got a dog in this battle. We need the independent bodies be doing that.

I want to speak to Section 5 on water resources. A comment was made earlier about the amount of water we've got in the district. We're part of the Pine River Watershed, which is in the south end of Hubbard, a small part of the south end of Cass, most of northern Crow Wing, and a little bit of Aitkin County. 5,400 acres of land and water. It turns out in that particular area 40 percent of it is wetlands, open rivers, creeks, and streams. 51 percent is land. Others are roads and matters such as that.

The critical thing that I find objectionable in this document is that of the 338 miles of pipe that are being proposed with the Company's preferred line, 100 miles of that -- about 110 goes through an area that's never had a pipeline through it before. We have no research. We have no data. That goes from Park Rapids essentially to about ten miles east of -- or west of Duluth.

What we have in that area is a high-voltage power line. We have a lot of water. We have a number of things in that particular area. If I had the time, I'd show you a map. But a part of that I want three things to be touched on real quick.

Groundwater is totally inadequate in this area in the report. It doesn't address the fact that a vast majority of people in that particular area depend on groundwater for consumption, for bathing, for a variety of human use.

I've been a mayor in the Twin Cities, and I went through an environmental spill, and I know what that's like to deal with that with the public.

The other thing that's not in this document is addressing watersheds. This area is rich with watersheds. It's important to understand why watersheds exist. We have a report that I'm happy to provide the Department of Commerce produced by the DNR. It's called lake trout -- Protection Strategies for Big Trout Lake, which is one of the few lake trout lakes away from the Canadian border. In the report we have decreasing water quality. Their researcher, Pete Jacobson out of Park Rapids, indicated that we should have 2,000 -- 250 acres of private forested land under protection to manage that rainwater that's flowing into these bodies of water. Can you imagine what that would do with a pipeline spill in that area?

Very last comment. The document does not tell you anything about the Enbridge history with oil spills. We have an awful lot of engineered data in there about the probability of spilling occurring at certain times.

Let me tell you what the experience is in their annual report. From 2004 to 2015 --

FACILITATOR: Tom, it's been six minutes.

MR. TOM WATSON: -- they talk about 850 spills in an 11-year period. I'm a dumb kid from International Falls, but I can tell you it turns out to be 1.6 spills a week. And that was 160 barrels per spill. Translated, that's two spills a week. That's 300 barrels a week in 11 years. These are not the de minimis spills. These are not the little spills.

FACILITATOR: Tom, if you could wrap it up.

MR. TOM WATSON: These are the spills reported to the EPA and the state agencies, etcetera.

Thank you.

FACILITATOR: Great. Thank you very much. Appreciate it. Thank you, Tom.

Next I have Darwin Dyce. Darwin. Great. We'll bring -- Eric will bring you the mic.

Name and spelling for the reporter.

MR. DARWIN DYCE: Yes, I'm Darwin Dyce, Darwin Charles Dyce. Last name is spelled D-Y-C-E. From southern Minnesota where many of our own lakes are so full of nitrogen and phosphorus and algae that you can't even safely swim in them, let alone try to get drinking water from them at some point.

Now, despite the reassurances we hear from industry, which says it's safe to send highly-toxic tar sands oil through pipelines across pristine land, over and under rivers, over precious aquifers, all because they use the best-available technology, well, such terms are really best characterized as our latest mistake. So clearly I'm here to express my opposition to yet another tar sands pipeline.

Now, you've heard from Native Americans and historians about how such projects are yet another violation of treaty rights. You've heard from scientists and excellent testimony tonight in this crowd documenting the dangers of the toxic soup contained in tar sands and what happens

when, not if, the pipeline breaks and contaminates our soil and water.

We've also heard from economists who point to the vast number of jobs that will be created if we actively pursue a clean energy future, and those can well be good union jobs. And as a former union member myself, that's pretty darn exciting.

Well, I'd like you to just hear for a bit from me. I'm a guy who right now works with our elders in assisted care facilities and a nursing home. The world they live in has become increasingly toxic, thanks to the reckless pursuit of profit at any cost. This is not -- this is not the world they want to leave for their children's children, nor do I.

What good is stockholder profit when the air and water can no longer sustain us? There's a reason Enbridge calls it crude oil. The need to move away from carbon-based energy and embrace a clean energy future is critically essential. And I truly hope that the result of these hearings will bear this out.

Thank you.

FACILITATOR: Thank you, Darwin.

I think Chuck Diessner is next.

And Leslie will bring you the mic. And name and spelling for the reporter.

MR. CHUCK DIESSNER: Chuck, C-H-U-C-K. Diessner, D-I-E-S-S-N-E-R.

I'm here from Park Rapids. I got involved in this with Richard back when this all started. I've been to all of the hearings or I've watched them on TV. I am here to give you a little bit of insight into what's going on.

The bottom line is we need everybody in this room -- it's great that people are talking. We need everybody in this room and to get three friends to write the Department of Commerce and give them comments. If we don't pull our weight with them, it doesn't end up at the Public Utilities Commission.

And let me tell you, for going to all of those hearings, I was so naive when I started this process. My background is a lawyer in environmental area and real estate development. And when I got involved, I thought, well, I'll go look at the Department of Commerce. I didn't know anything about them. I thought, oh, here's their mission statement.

They are here, believe it or not, to act in the best interests of the public. I'm here to tell you that that's bullshit. Their definition of the best interest of the public is jobs. They don't care that we sacrifice the environment; it's just jobs.

How many people here want jobs as opposed to our clean environment?

Mr. Grant, so noted. Nobody here wants jobs if it sacrifices our environment.

Bottom-line question for all of us is what's the truth? We don't know. I can tell you that Enbridge isn't telling us the truth. We all know that.

Sandpiper, where did it have to go? Enbridge said absolutely Clearbrook, Superior, cannot go anywhere else. Where are they now? Dakota Access. They're not even going to Superior. They're not going to Clearbrook.

So I ask the Department of Commerce to put in the EIS what, if anything, they have done to verify the veracity of what Enbridge is saying. You cannot take them at their word.

Now let's talk about -- let's talk about the process that we're in. Where did that

come from? It came from the court decision that Richard referred to, but it also came from the Public Utilities Commission. Let me read what came from the hearing on December 17th. This is the Public Utilities Commission: Everything possible must be done to ensure that the new process, the EIS, in considering the application is robust, comprehensive, high quality -- here's the big word -- independent -- this is not independent -- fair -- it's not fair -- avoids further delay, et cetera, et cetera.

Okay. Let's go back and take a look at what the Department of Commerce has done. First of all, they have portions of the report that are solely based on reports submitted by Enbridge. I ask that the report point those out. If there are any -- there are any analysis in decisions, if it's based solely on Enbridge and not based on an independent study, the EIS should solely note.

What do you think Enbridge would be saying if Friends of the Headwaters could submit the environmental information and the Department of Commerce would rely on it and they had nothing to say about it? I mean, they thought we were a bunch of sleepy old people here, and they were just going

to walk in. They've never faced this before. Enbridge has never fought anything like this before in their lives. So they're struggling for their lives. Oh, my god.

Okay. List of consultants, all sorts of conflicts. I want the consultants listed and their prior dealings with Enbridge.

Big conflicts of interest. Vice president of Barr Engineering -- Barr Engineering is the consultant for Enbridge; was hired by the Department of Commerce to run this study. Oh, that's great. That's independent. You think this guy's going to taint the report that's going to conflict with and dispute what Barr Engineering has said?

Final point, if you would indulge me for a little bit more.

FACILITATOR: 30 seconds.

MR. CHUCK DIESSNER: Final -- final point. Department -- the Department of Commerce has, since day one, day one, the first hearing, they have ignored the Department of Natural Resources and they've ignored the Minnesota Pollution Control Agency. I was there. They were to recommend to the PUC what should be studied. They ignored the

letters from both those agencies that were 25 to 30 pages apiece.

FACILITATOR: Chuck, it's been six minutes.

MR. CHUCK DIESSNER: Okay. I apologize. Please get involved, write, or this is just going to roll right over us.

Thank you.

FACILITATOR: Thank you, Chuck.

Kathy Gilchrist. Kathy. Right there.

And just name and spelling for the record. And Leslie is right behind you with the mic. She'll bring it right to you.

MS. KATHY GILCHRIST: My name is Kathy Gilchrist. It's K-A-T-H-Y. Last name G-I-L-C-H-R-I-S-T.

I hadn't planned to speak tonight, because I didn't have anything prepared in advance. But I just wanted to say a couple of things.

We really need to protect the value of our water. The gentleman who talked about the value of water in the future was correct. It's been predicted that future wars will be fought over water.

In terms of abandonment, I do not feel

that Enbridge should be able to walk away and abandon the current pipeline. It's one of the ways that large corporations are able to privatize their gains and socialize their losses, and they make the rest of us pay for their expenses and losses.

In terms of pipeline safety and not spilling, where I was told that they won't spill, the Dakota Access Pipeline has already had multiple spills, even before it's fully operational. We do need energy. We do need jobs. But we can get that energy and jobs by investing in green energy, renewable energy, creating jobs. We can get the jobs we need that will be better jobs that will be cleaner for the environment.

You know, in terms of jobs -- and I feel like a lot of people are trying to protect those pipeline jobs, because they do need jobs. But we had jobs in the past with telegraph. And if we had fought to protect those telegraph jobs so hard, we wouldn't have the telephone. The same with cars; if we were fighting for those horse-and-buggy jobs, we wouldn't have cars.

So we do need to move forward. There's always progress, and we need to be smart about moving forward. We will have jobs, just being

brave in that progress.

And there's one thing that convinced me to speak up tonight. On one of these posters out here, the tribal resources one, from the EIS Chapters 9 and 11, there's a sentence in it that says, From a tribal perspective, any of the route segment or system alternatives would have a detrimental effect on tribal members.

When I was growing up, I feel like I learned a very whitewashed version of the history of our country. And I find myself now in my 40s learning some of the real history of our country. And the more I learn about the history of our country, the more it horrifies me.

And so I read this sentence, and any of these routes is going to have a detrimental impact on tribal members. There are treaty rights. We need to respect these treaty rights and not violate them. That's the integrity, our own integrity, the integrity of our country. We should not be violating these treaty rights.

There's historical trauma for indigenous people that I feel like -- as much as I might research and find out, I feel like I'll never be able to fully wrap my head around that historical

trauma. And we don't have the power to go back and change those events in the past. We didn't do that, but the ancestors, the founding fathers of this country did. And we don't have the power to go back and change them, but we do have the power to impact what we're doing now. We have the power to stop this pipeline. We have the power to stop doing those traumatic events to the indigenous people in the country. We need to protect our water, our environment, not just for ourselves, but for everyone.

Thank you.

FACILITATOR: I have John Munter next. And, John, Eric will bring you the mic. He's right there. Just name and spelling for the record.

MR. JOHN MUNTER: My name is John Munter. J-O-H-N. M-U-N-T-E-R. Retired guy from Warba. And as Allen was saying, there's huge discrepancies in the DEIS we found when we were doing our pipeline study.

In the DEIS, for example, they're saying generally the pipes are 10, 15 feet apart, just plastered all over the document. And we found in our study that, on the average, from Rowena to Grand Rapids and 14, 15 named roads, that they're

actually 30 feet apart from Line 3 to Line 4 and Line 1 to 3 is 18 feet apart. And to their credit, though, the Department of Commerce has come up to me and said, we want to look into that data and verify it and maybe ask Enbridge some questions. And so I'm gratified that they're responsive to that.

And we need all of your responses, all of your eyes on the document, because the more you look at it, the more holes you'll see and the better this document will be.

There's four criteria they use for assessing the certificate of need. The first is basically the need. And the problem with this is we're not being given all the economic data. And it won't be available. They're in the process of hiring an economist right now, and all this stuff won't be available till after all of the public comments are made. And it's not a fair process to not have complete disclosure here, because this meeting involves both the route and the need itself. They're combined.

Secondly, in terms of the routing, it's been amply talked about earlier that there's real active water studies and a big problem with Enbridge not wanting to disclose how much oil is

flowing at certain point. So we can't do proper risk assessments, which is just ridiculous. They're using the idea that, oh, there might be terrorism, so we can't, you know, disclose where the most oil is flowing through. Well, just call up the pipeline, and you'll probably find it. But all you have to do is -- for a terrorist is to go up Highway 2 and find Line Number 3 there on the road or you can go into a substation or you can find all the exposed pipe, you know, in all these places along Highway 2 and everywhere.

So it's not -- it's just a ridic-- and you wouldn't, you know, stop voting because a terrorist might blow up your voting booth someplace. You know, this destroys democ-- really destroys the democratic process.

So the third criteria is -- most of the third and fourth, which has not been dealt with at all by the DEIS anywhere: The consequences to society of granting a certificate of need are more favorable than the consequences of denying the certificate of need.

So we've heard a lot about the negative stuff, but they're not putting this in a chapter heading, like, well, here's the positive

stuff; here's the negative stuff; let's compare, you know. You can't have a real debate, unless you're going to provide both sides to it.

I mean, for example, could it be cheaper if we don't have oil coming down from Canada? Possibly. You know, what happens if we import all the oil from farther south or farther east or refineries outside of our area? Is is 3 cents cheaper? 10 cents cheaper? Is that a benefit? Well, that should be discussed here pro and con. Right?

Reliable supply. That's been in past documents we've read that Enbridge has put out rationales, you know, about reliable supplies from Canada, all this stuff. We don't really see it in there, as far as I don't see it anyway.

But, you know, there's -- this goes back to the oil embargo days. Now we have an oversupply, so we're in a whole different environment of oil. But oil is a global commodity. And so even if we stopped buying Saudi oil and just relied on tar sands, it wouldn't change anything. The price might skyrocket.

Well, the world is really going to EB vehicles. And, actually, a lot of important

commentators are saying that there's going to be a decline in the world oil demand in the 2020s and -- which is only going to be a few years away. Because even India has a goal by 2030 to be 100 percent electric vehicles, for example.

So then the fourth criteria talks about it has not been demonstrated the design, construction, or operation of the proposed facility would fail to comply with relevant policies, rules, or regulations of federal, state, and local agencies.

So we ask -- when people come for a job interview, you know, they check out their job history, they go online and see if they said anything nasty about their prior employers, they look at their DWIs. And are we doing this with Enbridge? Are we really looking at all the various issues of genocide up in Canada?

And Bad River Band up in Wisconsin doesn't have a permit since 2013. What is Enbridge going to do with Line Number 5? Are they going around Bad River? Is it going to -- and what about all the landowners up here who just have issues with Enbridge?

So these should be mediated before the

PUC grants anything. And it could be a forced mediation, where it doesn't have to happen before the PUC makes the decision. But there should be some process so all of these issues are dealt with before the final judgment of the PUC because, otherwise, there won't be anything happening afterwards, we know.

FACILITATOR: Thank you, John, very much. Thank you, John.

I have Don Wedll next. Don. And, Don, Eric will come over and bring you the mic.

Ah, you're right there. Leslie will. Where's Leslie? We'll bring -- oh, there she is. We'll bring you a mic.

And, Don, just name and spelling for the record. Thank you.

MR. DON WEDLL: Don, D-O-N. Last name is W-E-D-L-L.

Good evening, everyone. I've been involved with this process for a little while, probably since it started. But tonight I was -- I started reading the draft EIS, and I'm concerned about the process that the Department of Commerce has undertaken for the implementation of this. And, in particular, what Richard had talked about was the

Supreme Court of Minnesota stating that they had to complete the EIS before they could produce a certificate of need. One of the issues involved in the Supreme Court ruling.

And tonight, if you look back there, you'll see draft EIS impacts, certificate of need. They're put right together. And we are being led down the road that that's okay; that it's okay -- that the Supreme Court said no, you have to do an EIS before you do a certificate of need; but we are being told it's okay to do them simultaneously, because there won't be a problem with conflict if the EIS says one thing that conflicts with the certificate of need. That's wrong. That's not how this process should work. It's not how a general EIS is supposed to be conducted. So that's a problem that the Department of Commerce has with this issue.

The second issue is that when the Department of Commerce did public notice about Line 3 and at that time the Sandpiper, it was done in a combined public notice format. It said that they wanted to consolidate those two things because those two things were going to occur simultaneously.

About three months into that process,

Enbridge said, oh, by the way, we're -- we're pulling out of the Sandpiper; we've got other options for that, even though they said they had no other options. But they did say, we have other options so we're pulling -- withdrawing the Sandpiper.

Department of Commerce did not change the public notice requirement. They did not come back and relist that the public notice would now -- on the EIS would only consist of Line 3, which is another error in this process. These are fundamental errors at the start of the process. This is not how you would conduct an EIS. You would have to redo the public notice, because the comments that people submitted were submitted for both the Sandpiper and Line 3. And I know personally myself, I devoted much more energy to the Sandpiper implementation than to Line 3. And as a result now, those comments on the Sandpiper are not being in the process, because Line 3 is what's being reviewed. So that's another error in the system that needs to be somehow corrected.

And I know that there are people out there saying, well, we've looked at those and we picked out the things that apply to both. That's

not fair, because when I wrote my comments, I was having to write for two things, two lines, Sandpiper and Line 3. And Sandpiper is no longer part of it, but it took most of my comments. And so it really isn't a fair way of implementing an EIS. So that's another process problem.

I think in the EIS -- and I know some people think about abandonment -- that no permit should be issued until we have decided in Minnesota and within the tribal government how abandonment will occur. We shouldn't leave that for our children. No one thought about that 60 years ago when these lines went through who was going to take care of this at the end. But anybody who's been involved in environmental law knows that the landowner is the ultimately-responsible party for any environmental degradation or irregularities that are occurring. And Enbridge knows that too. They can say we'll perpetually watch this, we're decommissioning this; but the bottom line is the landowner is the one that's responsible. And that should be clear and known to everyone who's involved in this.

I guess my time's up. Thank you.

FACILITATOR: Thank you, sir.

Lindsey Ketchel. Lindsey. Oh, okay. We'll bring -- Leslie we'll bring you the mic. Just name and spelling for the record.

MS. LINDSEY KETCHEL: My name is Lindsey Ketchel. L-I-N-D-S-E-Y. Last name is K-E-T-C-H-E-L. And I get the honor to serve as the executive director of a nonprofit called the Leech Lake Area Watershed Foundation. And for the last 20 years we have worked incredibly hard to protect the amazing lakes in this region.

And one issue that I do have with this proposal so far is that we are not valuing -- and this has come up earlier -- the true value of really good lake quality, really great lakes. There are very few in the United States. Upper Minnesota is one of the very few regions in the United States that still has this. This should be something that is elevated within this document, honored not just for its economic value, but its cultural value to what it means to us in Minnesota. Not to also mention it's essential to our economy.

And to the pipefitters, yes, we want you to have jobs. I drove here. I'm a realistic. Yes, we're going to use fossil fuels for a little while. It is -- we're in a transitional period. I

am a realist. But this document, this EIS, I've had 20 years experience in Alaska, Vermont, and now Minnesota involved in EISs and EAs. Typically it is very easy for the average individual to easily identify a no-build alternative, to find their voice. It's easy to organize around it, and we become strong and we can make a difference. They have purposely made it impossible for us to find our voices. There are so many different alternatives, whether we're going to truck it, bus it, bike it. All this is craziness.

So, please, Bill -- sorry, I wasn't supposed to say names. These are good people too. I'm not getting -- these are good people on all sides, Enbridge folks, Department of Commerce people, lots of people here. So let's make it easy for our voices to be heard.

Separating the certificate of need with the alternative is crazy. We have got to make it very easy so that a no-build alternative is easy for us to articulate. And I'm saying this because this is not the place for a pipeline. There are other places. And we will be building pipelines, and we'll be supporting pipelines that will be built in the right place. This is not the place to do it.

This is all about negotiating risks. Right? Trade-offs. We have to make hard, hard trade-offs not for our generation, but our grandchildren and their grandchildren. That's what this document is supposed to be able to provide us, the knowledge to understand those trade-offs. But to then say, we're sorry, you won't really understand what a major spill is going to look like?

Let's think about Valdez, folks. How many people are familiar with the Valdez oil spill? How many people are aware of how that oil company treated that region? How many people know that the fisheries in that region have tanked, that economy has tanked? So many people have committed suicide, it's beyond my wildest imagination. An oil spill creates major, major heartache for communities. And I for one want to ensure that that doesn't happen to this region and to my brothers and sisters of all economic statuses. We have to understand that for that trade-off. And for you to tell me that the general public will never have that knowledge, how are we going to understand that trade-off? That is a glaring hole in this document.

I will also say this -- and I'm probably running out of time; and I don't mean to be

a jerk. I really don't -- but when I started reviewing this document -- and I used to work for a nonprofit where I had a lawyer on staff; we took cases all the way to the Supreme Court. I think they're baiting us to sue them. And I'm like why? Why not write the best draft EIS to make Minnesota proud, to make Minnesota proud that we value and respect our natural resources, our native cultural resources.

This document is so full of inconsistencies, I'd go on, I'd hit a point that's supposed to go to another document. The link would go to nowhere. I'd look up citations that didn't exist in other documents. This looks like -- not cheap; this wasn't cheap -- a clip-and-paste job, guys. We deserve better.

I will also say that I may not even be providing comments, though, because we as a nonprofit have for the last three years provided comments on everything, just like Richard and other organizations do, and they disappear. You look on the website, oh, they're there; they're gone. I am so afraid that the process is so flawed that so many comments are going to get lost. Our voices are getting lost. Whether it's just a bad website or a

really difficult way of maneuvering it, it shouldn't be. It should be the opposite. We should make this easy, because this will allow all of us to create a culture where we're going to value and respect our natural resources versus fighting a horrible document and a horrible process for our voices to be heard.

Thank you.

FACILITATOR: Thank you.

I have Wendy Nielsen. Wendy. Right there. Eric, Wendy is right here, I think. Right?

I think, Wendy, do you want to raise your hand one more time. Thank you. She's preparing her comments as we speak.

Okay. Thank you. Wendy, just name and spelling for the record.

MS. WENDY NIELSEN: W-E-N-D-Y. Nielsen, N-I-E-L-S-E-N. I grew up in Minnesota, know all about it, and especially the fact that we are the water base for one-quarter of America's water. Of all the water that comes out of Canada, Mexico, United States, one-quarter of it comes out of the ground in Minnesota.

I live in Fairbanks, Alaska. I work in pipeline. I work as a union operator, a side

boom operator, anything they tell me to operate. That's the nature of the beast and what have you.

However, in Alaska, with the pipeline crossing and we've got earthquakes to contend with, where sometimes after an earthquake, northbound and southbound lanes are in line. That's on the roads.

I have been involved in making ice roads; and we're real proud of our ice roads, because we have to make ice roads over rivers. So we start putting the water -- or the ice on the side, on each side; and we keep going through, because as the ice goes, it keeps coming down. So it's kind of like the Mississippi River there in St. Paul where they've got that span bridge, right, only ours is made out of ice. And I've been privy enough to be involved with some of those ice bridges that we have had the highest consistency of no air or leaks, because they do testing constantly.

The bridge itself is probably, say, about this wide (indicating). And after it's done -- and I'm talking about the length of the river wide. Okay? And after it's done, this wide (indicating) is the width that anybody can cross. And once they're all done -- and we've been driving across them way back building them. Two-and-a-half

miles an hour is what we move our rigs on.

We take water to make our ice roads. We have to do all the remediation for the wintertime. We do all the remediation -- I've been involved in remediation. In fact, I got a BP gold coin safety award running double-side dumps on the ice roads before the ice road truckers then came out with the women. And it wasn't funny, because when they gave the coin, they said they have women up here. Well, I was the only women.

But I grew up here in Minnesota on a dairy farm with hay wagons. Fair enough? However, our pipeline goes across the Yukon River, we go across all kinds of the wetlands, and wildlife flourishes in our areas where the pipeline is. Because of the roads and things like that, we have no problems with it messing up any of our wildlife.

And with regard to Valdez, excuse me, I didn't know we had a pipeline called Valdez.

UNIDENTIFIED SPEAKER: Oil spills.

MS. WENDY NIELSEN: Exactly. But that was a ship. So what about that ship in the east that the guy decided to get close to honk or wave at somebody and they tipped the whole ship over? There was no pipeline there either. Those were driver

errors. One, I think Valdez was drunk. Okay? So let's make sure we're worrying about and being right about what we know.

And I'm not going to negate anything when somebody says we got good water. However, my mom and dad were in Prior Lake. We buy bottled water and filter that because Prior Lake water is so bad. That's pretty sad.

However, I just want to make those kind of comments, because I have worked with BP, I've worked with Alyeska, I've worked with ConocoPhillips and such, and we all -- most of our unions are the ones that we've been trained, we've been safety checked, we check-check. And almost every job I have ever worked at, any one person has the right and ability and authority to shut down a job. Get it?

Now, I worked with BP at a refine -- at a shut-down in Washington State. There was just a few of us. Of course, we're crane operators working it. We had a crane operator in a seat, and we had the assistant. The so-called trainer, per se, was another fully-certified crane operator. I think we had close to 30 crane operators -- fully-certified crane operators on that job. Union.

Unfortunately, BP made a big push, because they had just had 15 years no accidents, no injuries, whatever else. They had a lot of these nonunion people -- some people call them right-to-work type people, right to work.

I grew up on the dairy farm. We had the right to work too. You better be working, and you had the right to live in this house.

FACILITATOR: Great. Thank you very much.

So that is all the names of folks on cards that I have. So I just want -- if anybody who has not commented would like to make a public comment now -- I want to get a show of hands how many folks. I'm going to go right to left to get everybody.

So I'll start with this gentleman here. Eric will bring you the mic.

And just state your name and, again, spell it for the record. Thank you. And I'll kind of work my way across the room.

MR. FRANCIS LEMKE: Good afternoon. Francis Lemke, L-E-M-K-E. I am a pretty practical guy, and I've listened to all these comments here and stuff. And I guess if, and it's a big if, this

project is truly needed, then if we're going to build it, I am for putting it in the same place that it is right now. I am for digging it up, taking the old pipe out all the way from one end to the other, and putting a new pipe in. I'm not for getting a new route across the southern end of this whole area and going across probably twice as much water and wetlands as the Highway 2 route.

And I just can't see leaving old pipe in the ground. If they -- if they don't have the money to put the pipe -- to take the pipe out of the ground, then they probably -- well, I don't know. I don't think the -- I don't think the landowners want to take it out. They don't want to pay for that. And, besides that, leaving that pipe in the ground invites trouble, because those pipes are not totally level. There's going to be dips, and those dips are going to accumulate moisture, they're going to accumulate whatever oil residue is left in that pipe, and it will rust. Guarantee you it will rust.

I used to live up here in Laporte, about 90 miles up from where we're at here, and they had a gas station there. In fact, they had three of them along the highway. And one of them, anyway, they closed it up back about 1950s or thereabouts.

And they used a bulldozer; they dug a big hole, they pushed the building and stuff into it, and covered it up with dirt and left it. They left the tanks in the ground. Well, 30 years later those tanks, being all steel, they rotted out. And the residue in that tank, the gasoline they couldn't pump out, that leaked into the groundwater, and it polluted the whole south end of Laporte. And it worked its way down underneath Garfield Lake there, went down underneath and came up on the other side of the lake. And those people who lived over on the east side of the lake, they started having petroleum residues in their drinking water.

Now, you can't leave pipe and tanks in the ground. They will rust out eventually, and that's the kind of problems you're going to get. So that pipe, if Enbridge put it in the ground, Enbridge ought to take it out of the ground and put the new pipe right in on top of where their old pipe used to be. That's the proper way to do this job.

And I guess I don't know why that -- why they would swing that pipeline new route down way south here. And then there looks like there's a branch going all the way down to the Twin Cities. Does anybody know if that branch pipeline is in? I

got no idea whether there's a branch pipeline that goes all the way down to the Twin Cities or not.

But I guess that's all I've got to say this evening. I just want to see it done in the best possible way, safest possible way. And if Enbridge can't do that, then I don't think we should let them build it.

FACILITATOR: Thanks a lot.

Ma'am, did you want to make a comment?

MS. EMMA NEEDHAM: Yeah.

FACILITATOR: Okay. Because you have a young child, I want to give you a chance to make a comment, just in case you need to go. So why don't we bring you the mic.

And if you just state your name and spelling for the record, that would be great. Thank you.

MS. EMMA NEEDHAM: Hello, everyone. My name is Emma, E-M-M-A. Last name N-E-E-D-H-A-M.

You know, I wasn't sure if I was going to speak tonight. But after hearing all these wonderful speakers tonight, you know, I hope to maybe add a little bit and summarize some.

I come from the Red Lake Band of Ojibwe, and we're taught to honor the next seven

generations. So her and her children and her children -- their children, so on and so forth. And what I've seen in all of these meetings that I've attended is that Enbridge and these companies say over and over they cannot quantify the damage that may happen for future generations because, they say, this would never happen; in the event of a spill, there will only be so much leaked. But they can quantify the money that they will make. And I find that horrifying, that their children are even to be affected by this, and they do not care.

What does Minnesota stand to gain from this pipeline? This is a Canadian company. Are they going to hire Minnesotans to do this pipeline or are they going to bring in people from Alberta? There's a very limited number of permanent jobs. There's nothing in the EIS that states what kind of economic impact that this is going to have to benefit Minnesota.

At what costs are we willing to put our lakes and rivers and water and wetland and everything at risk to build a few nonpermanent jobs? We have better options in clean energy.

With the Headwaters of the Mississippi being in Minnesota, we stand and we must set an

example to have clean water in this state. Everything that we could do to the water, everything that happens in the Mississippi will hit the Gulf of Mexico and runs all the way down right down the middle of this country. We need to be aware that what we decide here, what happens with this pipeline, is going to affect the rest of the country.

Do we want to look back on this in the future when something happens, not if, and know that there could have been something done, when the rest of the country is looking at us?

My daughter is here with me because this is important. And I'm honestly sad to see not a lot of young faces here. So I implore all of you when you go home, talk to your children, talk to your grandchildren. Just because they're small does not mean they don't understand water and what it means. Teach them not to be wasteful. Limit your own waste. Be conservative. Do whatever you can. The littlest bit helps.

And as somebody else said it, get yourself to write a comment and get three other people. We have until July 10th. We don't want this to train roll over us like they did for the

DAPL. They held some of these meetings for DAPL, and nobody showed up. We're not going to let that happen here.

Thank you.

FACILITATOR: All right. So we'll go back to this side of the room. This gentleman right here in the red shirt, I think. Eric will bring it.

Your name and spelling for the record. Thank you, sir.

MR. PALMER DREWS: My name is Palmer Drews. That's P-A-L-M-E-R, D-R-E-W-S.

I have no particular reason to like or dislike a pipeline or any other method, except for one thing. It seems to me that if they're going to move 765,000 gallons of crude to port every day, they're going to do it whether it's by truck, by rail, or by pipeline. And to me the pipeline is the safest way to go.

Now, if somebody wants to pass a law that says Canadians can't move oil through Minnesota, then tell them to build a road or a pipeline all the way to the Great Lakes, that is the Lake Superior on the Canadian side, and you've solved your problem. But until then all you're doing is kicking the can down the road, because

they're still going to move that oil.

Thank you.

FACILITATOR: I think the next hand was here, then here, and we'll kind of work our way. So here and there.

Name and spelling for the record.

MR. DAVID BARNETT: All right. Thank you. Good evening. My name is David Barnett, B-A-R-N-E-T-T. I represent the welders, pipefitters, and helpers that will construct this pipeline. I'm a national representative across the United States for the United Associations of Plumbers and Pipefitters, Sprinkler Fitters and HVAC. In that we have our pipeline division, which I am -- which I oversee for the nation through our local unions and through our members.

Our members very much want to build this pipeline. They want the jobs that go with it. I hear a lot of talk about, you know, clean energy jobs. And it's almost like folks think that a job is a job is a job. These jobs, because Enbridge has committed to doing them union, our welders will make $55 an hour. They get great benefits. They have pensions. Helper -- an entry-level helper will make 25 bucks an hour, plus the benefits. Those jobs you

don't go out and get every day.

And so we don't see wind and solar or clean energy jobs paying that kind of money; and we don't see very many of them being union, just to be honest.

The United Association of Plumbers and Pipefitters, we truly view ourselves as water protectors. Our union was created -- yeah, laugh if you want.

FACILITATOR: Please let him speak.

MR. DAVID BARNETT: Our union was created in 1889, and we've been protecting water since 1889, plumbers, pipefitters, HVAC. Think about it. My grandfather built pipelines, my father built pipelines union, I build pipelines union, my son-in-law builds pipelines union. It's meant a lot to my family. And I could use all the concerns in this room tonight to use on why we should replace this old pipeline with a new pipeline. If we're going to have oil transport, let's put it through a new pipeline like it's proposed.

The no-build alternative I hear talked about, that would mean continuing to transport oil through the old pipeline. That doesn't make sense. Not in a common-sense society, it does not make

sense.

We're all going to get in our vehicles and leave here today. If we need fuel, we're going to stop at the service station and fuel them up and not once thinking about the fact that it came to us through a pipeline.

For years as energy industry we prided ourselves in bringing industry to your front door silently. The less -- the less noise we made, the better. That was our job. That's what we'd do. That's why we're having to come out and educate folks on the fact that there's over 6,000 products made from oil. We depend on oil and we use oil and we need oil. And as long as we need oil in this country -- and it's going to be for some time. I mean, I think the auto industry had record sales over the last two years selling combustible engine automobiles. So that should tell us it's not going to happen overnight.

I'm all for innovation. But as we sit here today, we need oil. And the best way to do it is through pipelines.

I hear talk about -- that spill that was over in Montana. And the way that line crossed that river, it laid right in the water. And it's no

doubt it should have been replaced way before it ever broke. We don't even cross water body crossings that way anymore. We directional drill them. We put them hundreds of feet below the water level. We put pipe in that's twice the thickness of the regular-lined pipe. There's so many safety mitigations built into our water crossings on horizontal directional drilling that folks don't dig into to look at.

So I just want to say that I know a lot about pipelines, and; I sit on PHMSA's advisory board for Liquid Pipeline Committee, appointed by Anthony Fox, Secretary of Transportation. So it's not like I don't know anything about the quality of pipelines. I don't know anything about what a lot of you guys do, and I don't expect you to know a lot about pipelines. But I can tell you new pipelines with harder pipe, better coatings, better welding technology, they're better today than they've ever been, just like the automobiles you drive.

So I want to thank you for your time.

FACILITATOR: The gentleman right here. And we'll -- Eric will bring you the mic, and we'll -- and again, name and spelling for the record.

MR. ANDY PEARSON: Hello. Thank you very much. My name is Andy Pearson. A-N-D-Y. P-E-A-R-S-O-N.

You know, I know it's hard to be up here today for the Department of Commerce. I'm sure it is, because it's hard to sit and listen to people criticize something you put a lot of time into. And so I want to just first recognize that and say that I think all of us here are here because at some level we believe in science and we believe in process; we're trying to make it better. And I hope that you see it that way. I really think it's intended in a good way. I want to say that.

I also want to say that I have -- I would love at some point -- I would love at some point in my life to see folks who work on pipelines, of whom I've heard many testify at this meeting and others and on other projects, to address the climate issue in an honest way. I would love that, and I have never heard it.

What I hear is that we're a group of individuals who want to make money over the health of us all. Because that is effectively the words that are being said to me, when the climate issue is not addressed explicitly. When you don't look it in

the eye and say that I know that we must transition off of fossil fuels as quickly as we possibly can because that is what the best science in the world tells us we need, and you still get up and say -- and if you stand here and you testify and you do not say that, you must forgive me if I choose to not trust you or your words or what you're saying. You must forgive me for that, because it is a choice that I will make.

To speak to a couple of other things that have been brought up tonight. Pipeline abandonment is called abandonment in this EIS because that's what it is called in Minnesota statute. We don't have to adopt Enbridge's terms, if the state law uses different ones. And the state law happens to call it abandonment. That happens to also be accurately what it is here.

And to go to a point that somebody else mentioned today, that question of indefinitely is a really big one. What does indefinitely mean here? The paragraphs in the EIS about abandonment are more or less lifted out of Enbridge's material, or at least the intent is. And I would hope that the Department can push Enbridge a little bit harder on what indefinitely means. It's real tough to make

definite, long-lasting decisions based on indefinitely.

To the thought that many of us have, well, what if we don't build it; won't the oil move by truck or by rail? All the alternatives in the analysis assume that it will. I want us to think about Keystone Xcel. Right? For many of us that feels like a second coming of a bad idea to have that now on the table again. But let's note it was off for a while. Right?

Did we see huge increases in truck and rail transportation of crude oil out of Canada, when Keystone Xcel got denied? You know, you might not have looked at the data, but I have, and I can tell you we did not. Instead, what we saw over the two years that was politically contentious was five massive mining projects in Canada canceled, all of them citing no take-away pipeline capacity and changing oil economics. And so that oil, the dirtiest oil in the world, is staying in the ground, instead of coming here to fuel our cars. And I got to say we still have what we need to get by in Minnesota, in terms of our fuels. Right?

This is not like we're about to run out here in Minnesota, but we must begin

transitioning down and doing it gracefully. I like to think about it this way. Ever been on a high diving board at a pool? You have the choice -- if I had the choice of being on a high diving board, I had the choice about whether I wanted to leap off myself and take a graceful dive or have somebody push me off when I wasn't expecting it, I'd choose to dive. That's where we are on the climate issue here.

Let's be very clear about this. We must transition. It's not a question of whether we can or whether we can't, whether we will or we won't. We will and we must. Do we do it on our terms or do we do it on somebody else's terms? Right? That's what's at stake here.

The last thing I want to bring up is human error, because that is important. I would ask everybody to consider what a BP safety certification might mean, given what happened in 2010. And I want you to also think about Enbridge. In 2010 we had two major disasters. We had oil gushing into the Gulf of Mexico. A lot of us probably saw that video. Horrifying stuff. And they couldn't close it off.

Around that same time, the month of

July, we had the biggest tar sands oil spill in the country in Kalamazoo, Michigan. In that case that was user error. So just like how tankers can run aground because of user error, pipelines can. And for anybody who doesn't know, that pipeline gushed for 17 hours because the people in the control room thought it was an air bubble, tried to pop it by turning the pressure up, and did that for 17 hours. User error can happen here too.

And that's all I have for today. Thank you.

FACILITATOR: Folks, hold your hands up that wanted to speak, just so I can keep track. Who else wanted to speak? Here. Here. I think there was someone over here well.

Okay. So we'll bring the mic. Eric is right here.

Just name and spelling.

MS. ANDREA HOLMES: My name's Andrea Holmes. I grew up in the Fargo-Moorhead area.

FACILITATOR: Andrea, could you just spell your last name?

MS. ANDREA HOLMES: Yep. Andrea, A-N-D-R-E-A. Holmes, H-O-L-M, as in Michael, E-S. I'm probably going to make one big point here

tonight; and for me that's the fact that, for the first time in my life, I'm a union worker. I work for the AFSCME Union, and that just began for me one year ago. I love unions. I'm a big fat booster.

That, however, does not mean -- just like when I say that I am a past president of American Legion Unit 255, it does not mean that I believe every single thing that the union or the legion or the auxiliary will tell me. And that's because we're not homogenous.

There are lots of us who love water in Minnesota, and we think about all these issues differently. There are lots of us who love unions in Minnesota and all over the country, and we think about these things differently. And just because you love union jobs and high pay for your neighbors does not mean that you have to go through this process without what wonderful and articulate people in this room have asked for you to; do, and that's to have a fair, equitable process for getting your information. And you cannot let anyone rush you, and you must make them stop and pay attention to every single one of your questions.

But I wanted you to know that I appreciate so much how well-thought all of you are

here tonight and your presence here. Thank you.

FACILITATOR: All right. Yes, in the back right there. Leslie, want to bring -- great. Thank you.

MS. CANDICE ESTEY: Hello, everybody. My name is Candice Estey. C-A-N-D-I-C-E. E-S-T-E-Y. I just want to thank everybody for coming tonight.

Much like the meetings here, each time I come to a meeting, I learn something new. And I may be here holding the youngest in the room. I'm speaking for my unborn child, as well as my two children I have at home, which I educate very much about the pipeline, about the spills, Dakota Access, et cetera.

I can tell you that my five year old knows that water and oil don't mix. And, you know, for this pipeline to -- you know, the certificate of need, do we need it? No.

I think that the existing pipeline, Enbridge should be held accountable to clean it up and take care of it. I agree with the comment that, you know, if they don't have the money to clean it up, then why put another line in?

It concerns me very much for our

pristine waters in Minnesota to be contaminated with oil, which eventually would happen. And to me that is very concerning, as well as, you know, my family.

So -- and I think we should honor, definitely, about the next seven generations. And, you know, we need to think about the future. And, you know, do my children really want to have dirty water? Absolutely not, you know, plain and simple.

I just wanted to keep it short and sweet, and I just have six words: The planet and people over profit.

FACILITATOR: Anybody else over here? I think there was a hand over here earlier. So Leslie will bring you the mic.

Just name and spelling. Thank you.

MR. HOLDEN HOLLISTER: Hello. I'm probably the least-informed person who will speak today. But I was speaking with --

FACILITATOR: Sorry. Just name and spelling.

MR. HOLDEN HOLLISTER: Oh, sorry. Sorry. Holden Hollister. H-O-L-D-E-N. H-O-L-L-I-S-T-E-R. And I was speaking with -- I know a couple engineers, and one of them floated the idea why not just build a tunnel around the

pipeline. I mean, it's what, like, 36 inches in diameter. It won't be much of a -- I don't know. Anybody's been on the subway, it's pretty simple technology.

We keep hearing people talk about all this research, more higher-tech pipelines, but we've got tunnels down. And -- okay. And then you could let engineers monitor the pipeline, maintain it as needed. You could run, you know -- you might not be able to do the entire pipeline, but you can probably do important waterways, wetlands, things like that.

And I just thought that was an interesting idea, and all I wanted to do was put it out there in the world. And if there are any engineers here who would like to weigh in on it, I'd like to hear from them.

So that's it.

FACILITATOR: Thank you, Holden.

Oh, there's a gentleman that wants to comment back here, so Eric will bring you the mic. Gentleman in the white shirt.

And name and spelling for the record. Thank you.

MR. PETER MANN: My name is Peter Mann, M-A-N-N. I am absolutely amazed at the number

of informed people and the quantity of people that are here tonight.

I did not come to speak. But having listened, I've decided that I do want a pipeline and I do want the union to build it. I want it to be where the present pipeline number 3 is.

And some gentleman spoke earlier, how is it that we require a defunct gas station to remove their storage tanks? I believe that's a state law. Some of you can help me. How can we not have a state law to remove a pipeline? And in so removing that pipeline, I assume the unions have expertise to do that.

MS. WENDY NIELSEN: Called mediation.

MR. PETER MANN: I'm sorry?

FACILITATOR: Please let him speak. Go ahead, sir.

MS. WENDY NIELSEN: It's called remediation. We do it with all our projects. Make it look like nothing ever happened.

MR. PETER MANN: Okay. So where are we on considering a state law to remove pipelines, if indeed we have a state law on the books to remove gas station storage tanks? And doesn't this get back into the superfund, that at my age I remember?

I'm not sure who paid for the superfund. I think we all did. We all did.

So if we don't get to replace pipeline number 3, how about we require a superfund paid for by Enbridge called an S corp?

Thank you.

FACILITATOR: Thank you, sir.

So we're beginning to come to the end of the public comment. But if there's anyone else who does want to comment -- anybody who has not commented yet. And then if there's a quick comment anyone has, we'll go to that.

So anybody else who hasn't commented, final comment tonight? Yeah. Okay. We'll bring you the mic. Eric will come around, sir.

And, again, just name and spelling for the record, please.

MR. JESSE BLEICHNER: Hi, my name is Jesse Bleichner. J-E-S-S-E. B-L-E-I-C-H-N-E-R.

Just wanted to keep it real short and sweet. I'm also a union worker, local through Brainerd, Local 242. I'm an electrician. I know several big solar jobs going on, and just wanted to say something to the fact that I heard that a lot of these solar jobs aren't good jobs. I'm a union

worker. I can vouch for all my brothers and sisters. We get paid very well.

FACILITATOR: There's a comment right over here. And Leslie will bring you the mic. She's right behind you there.

Name and spelling for the record. Thank you.

MS. NATALIE BOYD: Thank you. My name is Natalie Boyd. N-A-T-A-L-I-E. B-O-Y-D.

And I just wanted to say something about the fact that we are going to drive away in our combustible fuel vehicles today. But I don't think it's fair to say that we don't think about where that comes from. I don't want anybody to say to me or tell me that I don't think about that, because I do every day, and it informs just about every decision that I make.

The fact that we do this, that we drive cars, it's not because, you know, it's something that we want to do; it's because we have a lack of alternatives. And we have a lack of alternatives not because the technology isn't there; the technology's definitely there and the innovation is there and science and everything. There's lots that people can do now to move past combustible

fuel.

I remember five, ten years ago my dad saying, I think combustible engines have gone about as far as they can go, which was probably true 20 years ago. But the reason that we're still using these is because of the fossil fuel industry, because it is in their best interests to make us use them.

And the reason that construction jobs and pipefitters and whatever cannot make money in renewable energy jobs is because it's not in the best interests of the fossil industry to allow these new technologies and innovations the room to grow and become what they need to be. If these industries were allowed to become what they need to be, then those jobs would be there.

And, you know, corporate oil is in control of everything. And they're controlling how much these people get paid, and they're going to control how much we're not going to get paid and how technology moves forward and how renewable energy does or doesn't survive. And for someone to say that it is better for us to stick to something that's old, old technology, that's really just not even pertinent anymore. Because they're being paid

well for it portrays that they're making it an economic issue rather than an environmental one, which is what this is.

Everything about this EIS and these statements that are being made with information that is coming from Enbridge where we know the bottom line is about how much money they can make is suspect information.

And just know that, yeah, we are going to drive away in our cars and we're going to fill up at a gas station, but it's not because we want to. We know there are alternatives and that change has to happen. We do think about it, so please don't tell us that we don't.

FACILITATOR: Thank you.

You've not spoken before, I think. So why don't we bring the mic to you.

I see two hands who have spoken before. I'll try to get to you quickly before we close.

Just name and spelling.

MS. WENDY ULRICH: My name is Wendy Ulrich. W-E-N-D-Y. U-L-R-I-C-H. I live a little part time up here, part time down in the Twin Cities. I've been involved -- I'm sorry, I wasn't

planning on speaking tonight. I was going to plan -- preparing to speak at the hearing down in St. Paul. So I've just been actually writing some remarks here just in the last 15 minutes here. So it's not going to be real organized.

But I'm -- I'll speak on a couple of different things. But I'm -- because I've lived up here and worked up here in the resort industry, I understand how important these lakes are to all of us. Rivers, trails, clean air. This state is really reliant on tourism.

And, number one, I guess I -- I just am fearful for this environment being ruined. I was looking at this from an economic point right now. And that isn't my be-all and end-all point here, but we all like to talk about economics, so...

We have a culture here of loving our pristine lakes. These pipelines are going to go through some of those most pristine lakes, wild rice lakes, some of the most permeable soils in the state. In fact, I've read that the most favored route will go over two branches of the Pine River north of here, which people -- the Whitefish Chain, which is one of our biggest tourism areas of the state.

I -- like I said, my remarks aren't real well thought out and planned here. But there are people that say that, well, we're going to move the oil anyway, so we might as well just go ahead and let it be done; in other words, let's just go with the flow. Well, first of all, there is an oversupply of oil that's being stored right now. We don't really need this oil.

We -- sorry. We -- we need to make the transition, as Andy Pearson said. We need to start making a dramatic move towards transitioning to fossil -- to nonfossil fuel sources. I see Minnesota as being basically a conduit for the oil companies, letting them use our pristine properties here as a -- as an avenue for their pipelines. But I don't see that we benefit -- here again, economics -- very much. We get some property taxes, but I hear that they're even fighting the property taxes in one or two of the counties. And if they do get these property taxes back, through the payback, it's going to be a huge impact to those counties. And, I'm sorry, I can't recite which ones they are.

But the price of oil is down now. Why is that? It's because we have these reserves because there isn't a need for this oil. If we have

reserves and we want to make a transition, isn't this a good time to start cutting back on the amount of oil that we move? And especially this tar sands, which is -- requires more energy to process it. It's more dangerous for the environment. As other people said, they need to dilute it with chemicals that are harmful to the environment, to us, to be able to move it. And then when it -- when it leaks, these chemicals are -- evaporate into the air or we have them seeping down into these -- imagine them seeping down into the wetlands.

We drive from the Brainerd lakes area over to Brainerd once a year, so we go through all these wetland areas. I can't imagine oil leaking down into these. They look like no-man's land to a lot of people, but this is part of the Eco system. This cleans our water.

Regarding leaks to the system, most of the leaks are found by citizens I found out. There's a technology that Enbridge has to detect leaks, but it only goes down to 3 percent of the flow rate. So anything -- any smaller leak than that is not detected. But who detects it? Us. Isn't it terrible that we should have to be the ones who have to detect the leaks? And a pinhole-size

leak can leak 28 barrels a day. That's a lot. I mean, who's going to find that pinhole leak?

Okay. I'm coming up to my time.

Anyway, I want to say that we don't need to move this oil. We just need to make a dramatic stand and act for the future. We need to have clean, natural environment water here and a clean emotional environment for all of us, for the native people to honor their treaty rights.

We don't need to step on people anymore that we've made agreements with. We need to honor those rights. We need to honor all of us and keep this pristine cultural heritage that we have here in our clean areas of the state.

That's it. Thank you.

FACILITATOR: John here I think wanted to make a final remark. So we'll go to John. I think Chuck did over there. So then that will begin to wrap up.

So Eric's right behind you, John. And, again, just name and spelling for the record.

MR. JOHN MUNTER: John Munter. J-O-H-N. M-U-N-T-E-R. From Warba. And Iowa really has the only law in the nation, as far as I'm aware, that if there's a pipeline not being used for five

years, the pipeline owner can request the pipeline company to pull the pipe out.

In terms of our practical situation, the PUC is really the only last arbiter of pulling the pipe out. So we need your comments there to the PUC and the Department of Commerce to request them to remove the pipe because, you know, lobbying the state legislature may happen someday. We need to be able to get the legislation through, but this is really it.

I've been an activist, a climate activist, actually since 1984. So I was bird-dogging prejudicial candidates in the 1984 caucuses. And so I've followed these issues closely for a long time. And I realize also that we're addicted to oil, and it's a big issue.

My view on the pipeline 3 is that we don't need a new one; we don't even need the old one. We need to transition down out of this. And part is an economic reason; follow the money. All the big oil companies are getting out of Canada, and they're selling off to smaller Canadian companies. And they see that there's no future $8 barrel oil going on. So all the oil coming down from Canada is going to be sold for a loss to pay off debts and

abandoned investments. It's better than getting no money at all for them.

And so we have a lot of production right now from the Saudis. We have a lot of production from the Permian down in Texas and Mexico. That's why we still have a glut of oil in this world. The Saudi oil should carry us through.

There's a lot of intelligent observers who are saying the day for peak oil may be 2020 even. Carbon tracker says that.

Michael Seeley from Deutsche Bank, analyst, says 2024 will be the year for peak oils. So the Saudis and the Permian and probably -- you know, there will be more offshore oil, because of Trump. And so we have plenty of that stuff. We don't need carbon coming down from Canada that's 21 percent more intensive than this other oil that we're currently using.

So thanks.

FACILITATOR: Leslie, do you want to hand Chuck there behind you?

And, Chuck, spell your name one last time.

This will be the last comment, as we're approaching 9. So if people could keep it to

a few minutes, I could get Chuck and this gentleman in on time.

Please keep it short, again.

MR. CHUCK DIESSNER: Chuck Diessner, D-I-E-S-S-N-E-R. I have one comments that I wasn't able to make earlier. A lot of people have made an excellent point about Enbridge cleaning up. Let me clarify something.

Enbridge is not liable, based on its organizational structure. Its organizational structure, you need a Ph.D. to understand. It goes down and down and down, and every layer is a separate limited liability organization of some sort. And when you get down to the owner of Line 3, it's not Enbridge. Enbridge is the parent that owns the subsidiary that has no liability.

So all of us should look at that very carefully. When we worked on Sandpiper, we talked about -- somebody mentioned a superfund. And I would ask that the EIS -- because the liability and the commitments by Enbridge relate to finances, that the EIS include an organizational chart so we can all see what we're buying into and an analysis of the extent to which the ownership of Line 3 is liable and the extent to which anybody else is

liable. I think you'll find that the only thing you can look at is the balance sheet of the limited liability organization that owns the pipeline.

Thank you.

FACILITATOR: Name and spelling for the record.

MR. TOM WATSON: Tom Watson. W-A-T-S-O-N. President of the Whitefish Property Owners.

I wanted to conclude with a couple of comments that I didn't get time to do before, and ties into this lady's comments back there before.

Traveling tourism in the four counties that is part of this new corridor, from Park Rapids to Lincoln County, including Cass and Crow Wing, is basically a $750 million, $800 million industry per year; employs about 28,000 people, about two-thirds of whom are directly in related industries.

A lot of cases everybody assumes that's the bartender and the server at the bar are making, you know, $9.67 an hour. The truth of the matter is the biggest occupation as a result of that are people who are second homeowners who are hiring builders and remodelers and home improvement and people making and selling new electric systems and

new heating systems, et cetera. It's not buying booze at the grocery store -- I mean, at the bar and milk at the grocery store, although that's a major piece of it. That industry in those four counties is only exceeded by Hennepin and Ramsey County. Only exceeded by Hennepin and Ramsey County.

Number two, I have taken a look at what is the impact on property values. I know it's getting late, or is it early?

FACILITATOR: Early. The rooster is crowing.

MR. TOM WATSON: I have taken a look, for those that care, what's happening to Mille Lacs in terms of property values, what's happening to properties around Mille Lacs as a result of all the fishing problems, all the nonnative AIS issues we've got on Mille Lacs. I can tell you exactly. And I'm going to be looking at part of Aitkin County next.

In the four tax districts on the south end of Mille Lacs, that is Isle, Wahkon, South Shore, East Shore, and Kathio, property values from two years ago, taxes paid in '15 and valued in '15 paid in '16 dropped $29 million in those six districts. $29 million.

Now, what does that mean? It means

that when people are buying and selling properties, they're selling them for a lot less than they probably paid for them. And in many cases, if they've got mortgages or otherwise, they may be under water on those mortgages.

In terms of how the state tax system works, I want the Department of Commerce to put in two things into their study that's not in there. I want to know the negative impact of putting a pipeline through this area. Spills are going to occur. I told you that before. 1.6 a week on the Enbridge system. That includes the Lakewood system, which they purchased.

I also want you to know that SA-04, which is the alternative the Friends of Headwaters proposed, if you're looking for jobs, more of them, SA-O4 is your candidate. There's more miles in Minnesota. There's more miles in Minnesota. The only reason they want to do the preferred route is because it's the shortest route; it's got the least capital investment for Enbridge. It's called profits.

But I want them to analyze those spills. I want to look at the impact of property. And the other one that I want Commerce to take a

look at in this area in Minnesota, because it's significant, the economic impact of the value of second homeowners. But the research says -- and I can show you the University of Minnesota piece of work -- is second homeowners pay -- in the eight districts that are in the Pine River Watershed, which includes Breezy Point and the Lake Fish Chain, 42 percent of the property that's seasonal rec is in those districts. And in those six districts -- or eight districts, that represents about 60 percent of the property values upon which taxes are paid. These are people that don't get to vote there. In other words, they're second homeowners. It's a significant industry.

And what happens is those people sell their homes in the Twin Cities, they move up here, they live here. And what comes with that? Healthcare, more senior housing, more need for services of a highly-professional, well-paid industry.

There's nothing in this DEIS talking about the second homeowner industry. There's nothing in there talking about the negative impact. I suspect Kalamazoo, Michigan, if I knew the county and could figure it out, I could probably find some

decreased values there as well.

Thank you.

FACILITATOR: So just a reminder that the end of the comment period is July 10th. So you need to get your comments in after tonight by July 10th, email, writing. In your booklet there's information about how to do that.

Thank you for your comments, for listening to each other. Appreciate your time and evening. Have safe travels home tonight.

Good night.

(Meeting concluded.)

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DEIS MEETINGS - 14-916 15-137

WADENA - JUNE 9, 2017 - 11:00 a.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Maslowski Wellness & Research Center
17 5th Street Southwest
Wadena, Minnesota

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FACILITATOR: Good afternoon, everybody. Please come down to the tables. We'd like to get started with the public comment period. So if everybody wants to gather here in the next minute or so, we will get started.

We're going to start the public comment period in about a minute. If you folks want to come take a seat at the table, we'll get started soon.

Good morning, everybody. Thank you so much for coming out on such a beautiful day. The good news is we're air conditioned inside here.

My name is Patrick Field. I'm the facilitator for today's public comment session, and I'm part of the consultant team working on behalf of the State of Minnesota.

What we want to do is we have a very short slide show, just a few slides, to kind of set the stage, and then we're going to open it to public comment.

So first I want John Wachter -- he's the manager of Environmental Review for the Department of Commerce from the State of

Minnesota. He's going to give us a short welcome and introduce us to the process and where we're at. I'm going to hand the mic to him. I know the acoustics are a little tricky, so we'll do our best here.

MR. JOHN WACHTER: I'm going to do about a two-minute overview of what we're doing here today and then I'm going to turn it back over to Patrick.

The reason we're here is because Enbridge applied for -- I'm going to talk louder. All right. This is really awkward, but this is what I'm supposed to do.

So Enbridge has applied for two permits from the Public Utilities Commission.

The first one is the certificate of need. The second one is a route permit. The first one is a determination of whether the project is needed at all. That's a yes or no, more or less. They can put conditions on it, but more or less, a yes or no.

The second one, if it's needed and the Commission makes a decision that it is needed, then where should it go. That's the two decisions with the two permits that

Enbridge has applied for from the Public Utilities Commission.

Before the Commission can make a decision on either of those permits, they have to do, they have to do an Environmental Impact Statement on the project, where we try to look at the environmental impacts of the proposal, of the potential alternatives, whatever mitigation, whatever things could be done to reduce the impact of the project, and that's where we are now in the process.

Before the Commission can make the decision, we're doing the Environmental Impact Statement. The Environmental Impact Statement covers both decisions in one project. So it's a little bit complicated because of that reason.

We've got -- part of the EIS covers the alternatives that are going to be looked at in the Certificate of Need process, and part of it looks at the alternatives that are on the route permit decision process.

So the process, as it goes through, the application comes in. We have to do -- the Public Utilities Commission

delegated the EIS to the Department of Commerce.

We're working closely with the Pollution Control Agency and the Department of Natural Resources on the EIS.

Once that's done -- we're in the draft EIS stage right now. That's what we're talking about today. We've got a draft EIS out. We're looking for input on the draft EIS, and I'm going to talk about that in a little bit more detail in a minute.

Once the draft EIS comment period is over on July 10th, we'll go back, make the changes that we think are needed to the document, and then we'll release it as a final EIS.

And then after that, there's a formal contested case hearing that's conducted by an administrative law judge, who will do a formal hearing with more public comment.

There's another chance for public comment during the hearing process. And then that's going to be this fall.

The hearing process will be starting this fall, and then after that the

judge will make a recommendation on both permits for the Public Utilities Commission for their final decision.

We expect that decision to be sometime in the spring of 2018.

So the one thing I forgot, the chances, the opportunities for public comment are now. It happened during the scoping process, now during the draft EIS process.

When the final EIS comes out, there's a two-week comment on whether we did a good job of adequately capturing the information the Commission needs to make their decisions.

During the hearing process the administrative law judge will also allow comment. This process is all about do we have the information right.

The EIS process is not -- we're not here to make any decisions today. The EIS doesn't say anything about what should be done. We're just trying to make sure we've got the information the Commission needs to make their decision right.

But the hearing process that

comes this fall will be about what's the best thing to do.

So if you want to make arguments about what the decision should be, it's really more at the hearing.

Today's more about do we have the information right.

So there's lots of different ways to make comments on the Draft EIS. You can make them -- you can do them verbally today and Patrick's going to facilitate an open mic verbal comment period in a minute here. You can give your comments.

If you'd rather not -- a lot of people don't particularly enjoy public speaking. If you want to give your comment to a court reporter, there's a court reporter outside the door that can take it privately, if you want to do that.

There's comment forms throughout the room here that you can fill out. You can always, of course, email, mail, and use our online tool to submit comments through July 10th. You know, we're looking -- formally, we're looking for comments on the

EIS.

For most people it's pretty tough to read a 3,000-page document and have a lot of comments on it. So if there's things that you -- if you haven't had a chance to study it -- if there are things that you think are important to you that you want to make sure that we know about, that's certainly something we can talk about, too, today.

I'm going to turn it back to Patrick.

FACILITATOR: So I see the room is actually shifting this way so I'll come through over here.

I'm just going to walk through the process for the comments. As John said, we have a court reporter. If you want to give your individual comments, she's happy to take your comment and it'll go right into the record to the full public.

Written comments go in the boxes there and I'll be submitting that after today.

So for today, the way that we have generally handled public comments is we ask for people to put their name in the

speaker registration. I've got about five or six cards.

We allocate the time we have across that. So people can probably speak up to six or seven minutes. I'll show you a clock in just a second. We do ask people, as best they can, to direct their comments towards the draft EIS; things you like, things you don't like, things you think are missing or that should be improved.

We ask that people be respectful of the speaker. Anybody that wants to speak, we want to make sure they have a voice and they are listened to.

So when the commenter is speaking, if folks could listen, that would be most appreciated.

If people want to be affirmative about a speaker, that's fine. We ask people to not be negative about a comment. We may not agree, but that's okay. You probably don't.

But it's important that we allow everyone to give their opinion and have respect, whatever it may be.

We do ask that people direct their comments at the the EIS, at the issues, at organizations, agencies, et cetera, but not at individuals.

We want everyone in the room to feel comfortable, so we prefer you not direct comments to specific individuals in the room but really to the issues at hand.

The State Agency's role for this comment period is to listen. So as you know, there are folks sitting in chairs now at the poster board sessions. People are here to listen.

Raise your hands, folks, to see who's in the room.

And we've got a terrific court reporter who's going to capture your every word that's going into the record.

After July 10th, the transcripts of these comments will be available online for all of you. And of course, they go through the process of the state as they analyze and move forward from the draft to the final EIS.

Take your cell phones, put them on do not disturb, vibrate, whatever it is,

just so don't hear your lovely ring right in the middle of the meeting.

And I don't think we'll have any problems finishing on time.

With that, I'm going to read off the names, and be mindful of the basic ground rules.

Andrew is going to pull up a clock, a small timer, and you can see how you're doing. It's a little smaller crowd, we can go a little longer, somewhere around six and a half minutes.

If you're still talking, I'll stand up. That'll be the signal to begin your wrap-up, to try to encourage you to finish up.

The acoustics are not perfect so if we can't hear you, we'll let you know. Leslie, right there, is going to help run the mic for us. We'll bring the mic to you so you're comfortable. You can stand or sit as you comment, no problem. We'll bring the mic to you.

State your name and spell it for the court reporter, if you could. And sometimes when I pronounce names, I pronounce

them terribly, so you can correct me, as you will say your name better than I can.

So the first commenter, state your name and spell it for the record, sir.

MR. LEOFWIN LINDBLOM: L-E-O-F-W-I-N L-I-N-D-B-L-O-M.

I have a background in chemical engineering, and I was responsible for the International Falls treatment system some years ago.

I am concerned about petroleum getting into swamp lands, wetlands, and ultimately getting into aquifers.

Once the petroleum gets into an aquifer, it's there forever. And from the spill it can move many miles in the aquifer, and the only way to handle the taste and odor of petroleum in the aquifer is activated carbon. And very few units, treatment units, have activated carbon systems involved. And if they had to install activated carbon, it would be a long delay.

One way to avoid a spill getting into a wetland would be double containment. And OSHA is working on getting double

containment in all the chemical plant systems.

And double containment would double the cost of the pipeline and give a double cost of petroleum for a pipeline regardless of just the material cost.

And self containment would be an additional cost for the instrumentation to determine if a leak occurred.

FACILITATOR: Thank you, sir. Appreciate it.

I'll speak into this one. We have Judy Carpenter. We'll bring the mic right to you, and state your name and spelling for the record.

MS. JUDY CARPENTER: J-U-D-Y, last name, C-A-R-P-E-N-T-E-R.

I'm speaking on behalf of the Ottertail County and (indiscernible) group, a pro clean energy advocacy group.

My concern regarding the Draft Environmental Impact Statement for the proposed expansion and reroute of the Line 3 pipeline is that it fails to establish a need for the proposed project as well as account for numerous risks this project possesses to

the environments in Minnesota.

The DEIS fails to adequately account for the climate impacts of extracting and burning an additional 400,000 barrels per day of tar sand.

A recent National Academy of Sciences report found that cleaning up a tar sand spill in a waterway is much more difficult and up to 14.5 times more expensive than cleaning up a non-tar sand oil spill.

Enbridge has a history of spills and greater scrutiny is needed for spill cleanup. Permanent damage to waterways impact Minnesota's economy and is a threat to the Ojibwe wild rice rights.

I reviewed the applicant's preferred route map online and three of the route alternatives that they have online. I've also looked at the ones on the posters today.

Many of these routes would cross and jeopardize Minnesota's irreplaceable water sheds and waterways.

The Canadian company Enbridge should create a route to transport the oil sludge across Canada. Minnesota should be

focused on growing our economy by developing clean energy and renewable resources.

I urge the Minnesota Department of Commerce to reject all pipeline construction in Minnesota.

FACILITATOR: Karen Heller. Name and spelling for the record.

MS. KAREN HELLER: K-A-R-E-N, H-E-L-L-E-R.

Has anyone seen the map that shows where the proposed new Enbridge pipeline would cross Wadena County? I tried to get one at the zoning office on Wednesday, but they didn't have one.

But there is one over on the table here, and it shows you that it does go through Wadena County right near Huntersville. I live on the Koch pipeline that already goes through Wadena County. It has four lines there.

Enbridge has six already going through up north.

For the last 48 years we have been very happy with the company that takes care of it. They go out of their way to treat

the landowners right. They check and repair potential weak spots every year. But you don't get that with Enbridge Energy. They have one of the worst records for environmental degradation in the business.

They care very little for the people affected by their hasty workmanship resulting in destruction of property, bullying attitudes, and disregard for cultural values.

Also, there's some manipulative tactics such as trying to avoid Line 3 by just abandoning it and moving to a new clean place.

The only environmental issue Enbridge is worried about is the business climate through the project area.

So what is a Certificate of Need? Do we in Wadena County need their business?

No. We need them to stay out of our wilderness, camping areas, lakes, rivers, and quality groundwater reserves.

And what is the route permit? Enbridge should be mandated to clean up the existing Line 3 before getting anymore permits to pollute.

And in conclusion, all the data

and paperwork in the world cannot clean up a spill of toxic tar sand slurry from a pristine wetland.

FACILITATOR: Thank you, Karen.

I have Steve Roe.

MR. STEVE ROE: My name is Steve Roe. S-T-E-V-E, last name R-O-E.

I'm here on behalf of the Pine River Watershed Alliance today. I live on the Whitefish chain of lakes. And I am probably ten miles south of the proposed route.

The route north of me crosses very sensitive flow leak areas. There are no less than 13 creeks, rivers, streams, flowages that flow from the pipeline route into the Pine River through the Whitefish chain of lakes.

I am a professional engineer, educated at the University of Minnesota. I'm civil. I learned about hydraulics, hydrology, and pipe stress while I was in school, which it was kind of interesting to resurrect some of that education.

I will say, and I will make a claim, that the pipe that they intend to use

is an inadequate design for the pressures that they intend to run in.

It's somewhere over twice -- they're running the pressure at over twice what it probably should be.

When you read about the failures, the incidents, the stress cracks, and so forth, and they don't repair them, the stress cracks represent structural failure of the pipe.

I'm sorry, but I really get upset when I think about what we might do to ourselves.

All spills occur along the pipeline and the frequency is alarming.

Many of them occur in the pump stations, but somewhere along the line, every 15 to 30 miles, there is a spill every year. You can prove that by going in and looking at the PHMSA reports.

We develop tremendous safety protocol around pipelines because spills and ruptures have become the norm.

Why do we accept that? We can run these pipes at probably half or less of

pressure and have a much better outcome.

I believe that in most cases in the state of Minnesota, public buildings, public structures, structures that occur in the public domain are required to have a Minnesota registered professional engineer sign off on them.

Why is that not true with this pipe?

By the way, those engineers should not be either retained or employed by the pipe owner.

Good judgment -- everyone says to me, well, it's designed according to the federal specification. One thing in the federal spec that is implied is good judgment. And I think that this product should be installed with good judgment.

The other issue is that they're going to run it in the proximity of a high voltage power line. The induced current in this pipe could be life threatening to the people that are maintaining the line.

I have already witnessed a dairy farmer put out of business by stray voltage

because of the pipelines and transmission lines which changed a product, i.e., electricity.

I thank you all for listening, and I'll talk to you another time.

FACILITATOR: Thank you, Steve.

And Allen Richardson next. Allen, name and spelling for the record.

MR. ALLEN RICHARDSON: Good morning. My name is Allen Richardson, A-L-L-E-N, R-I-C-H-A-R-D-S-O-N.

I'm here to speak on the issue of pipeline abandonment as regards to the overall political scenario that we find ourselves in.

You know, there's a lot of common ground to be had on this particular question, and I've delivered these remarks several times over the course of the week.

And I'm gratified to the Duluth Tribune for having a nice article in today's paper on that topic.

What it boils down to is that there are many landowners in Minnesota who have graciously hosted Enbridge pipeline for

decades, and many of them are saying that if Enbridge Line 3 is to be decommissioned, that Enbridge should be liable for removing, physically removing that pipeline.

And so that's really the central question. What we're advocating for is landowner choice, and so basically in a situation where the soil conditions and the ground conditions are appropriate.

If it's physically and scientifically possible to remove a piece of abandoned pipeline, then it should be up to the landowner, individual, private property owner or state county tribal land, that they should be able to have that pipeline physically removed at Enbridge's expense.

Pretty straightforward to ask. I think it speaks to Minnesotan common sense. And you know, we know that there are a lot of union jobs to be had out there doing that work. Certainly we agree that that is the community that is most qualified to do that work with those pipelines.

I will say that I don't think the DEIS has done this process any favors by

sort of issuing this blanket statement that in general the pipelines are ten to fifteen feet apart.

Mr. John Munter of Warba took it upon himself to measure the distances between those pipelines in the proximity of what we know to Grand Rapids on publicly named thoroughfares and found on average there's 30 feet of space between lines 3 and 4.

So from what we're hearing, I think we're seeing, in this question, the profile of this particular part of this public debate is only -- is only going up, which is to say we heard a lot of support for the idea of this question of what to do about abandoned pipeline to be conclusively resolved before any permitting takes place.

So you know, we're going to need some more scientific data on the proximity of these pipelines to each other. What is actually technologically possible, based on the best science that is available?

And so we're asking for the support of the general public and we're hoping that PUC and related entities will provide a

substantial amount of additional data on this question.

And that's it. Thanks for your time.

FACILITATOR: Thank you, John. Those are the cards I had. We want to make sure if there are others who want to speak, that this is the time to do so. So if there are others who would like to make a public comment, just raise your hand and I'll call you forward -- name and spelling of your name as well.

MR. ANDY PEARSON: Thank you -- hello. My name is Andy Pearson, A-N-D-Y, P-E-A-R-S-O-N.

Thanks for the chance to comment. So I have two points today that I want to make. One is the technical and one is a little less so.

To start with the technical one, one of the things that I really appreciate about the Draft Environmental Impact Statement is the climate modeling section where it does calculate out the social cost of carbon as being $50 something billion and $287 billion,

depending on the displacement of oil in the pipeline, as in how much oil this pipeline offsets that's currently being transported now by other means.

I will say, and I've said this before, that the 30-year time horizon is short and that it needs to be at least 60 years, because there's strong precedent in Minnesota for Enbridge operating that line. So I believe the numbers are understated right now.

But the second point about that, is that in addition to changing the timeline, I would encourage the Department of Commerce to explore modeling with partial displacement, because I believe that that is what the Enbridge company is actually proposing here; unless I am confused.

It appears that Enbridge is proposing to stop the operation of the current Line 3 and to begin a new pipeline, which would, in theory, carry some amount of the oil that's currently going on Line 3; essentially what Line 3 is carrying now plus an additional 370,000 barrels per day of primarily heavy crude.

And I didn't see that addressed in the climate section. I saw only no displacement or full displacement, when it appears the company's been, in fact, proposing from the beginning partial displacement.

So I would encourage a partial displacement model in the climate section and for it to be modeled on a 60-year social cost of carbon, again, given precedent in Minnesota. So that's a technical comment.

The less technical one is I had a wonderful conversation earlier today with one of the state employees here and we talked about public process, because this is really cool what we're doing here.

It's really cool that the State has said, "We will be open and we will listen and we will make a commitment to have 22 meetings and to hear voices."

I know that it's tough to sit up there or stand up there and essentially hear your work criticized, and I want to say that I think all the speakers share a belief that good process can lead to good outcomes and good science. So that's where this is coming from.

Now, the thing that came out of this conversation this morning, I want to say to everybody in the room, including all the state employees, is I think maybe in some people's minds it's a little bit of a lack of understanding of the importance of this particular decision.

Because what I heard was that, hey, it feels great. We're in kind of a new moment here with a lot of groups coming out and participating. We're seeing a lot of young people at many of these meetings.

We're seeing a lot of indigenous people really committing their time to this process. And what I heard this morning was that that would probably continue and it's really cool to see this kind of future we're heading into where people feel they have a voice in government this way.

But what I want to say is that that isn't automatic, and I am more sure of this than I am sure of virtually anything.

The outcome of the decision on this project is what is going to determine the way that the State interacts on environmental

issues with young people and indigenous people for the next 50 years.

If we go through this process with all this openness and positive discussion, good science and the project is built anyway, that will absolutely shut that off. That will shut that off.

You do not get to make that decision and then keep the collaboration going forward, because it will have been a slap in the face to the hundreds and hundreds of people who have come out, voiced their opinion, been heard or felt like they were heard in that way.

This is thus extending a hand in cooperation and goodwill times 22. You're in a lot of meetings. But it is not going to be there forever and it is especially not something that can be kept automatically, regardless of the decision made on this project.

It is dependent on an outcome that's based in the science and on a strong environmental impact statement being the end result here.

And I would encourage everybody

to just realize the gravity of the decision that's upon us and how it's going to impact the way that so many constituencies interact with the State of Minnesota for decades to come and how they feel. Thank you.

FACILITATOR: Are there others who would like to make a public comment to the group at this time? Again, there's also the written form and a court reporter out in the hallway at this time. Anybody else at this time?

Name and spelling for the record.

MS. NICOLETTE SLAGLE: Hi, I'm Nicolette Slagle, N-I-C-O-L-E-T-T-E S-L-A-G-L-E. And I just kind of wanted to support a little bit of what Allen was saying, and bring up this issue again of the abandonment and the cost estimates that Enbridge has in there.

For anybody in this room who hasn't read through the abandonment section, it's actually quite short, which is pretty disturbing, because we know that this is not their only line here.

And so if they do get to kind of just decommission it, abandon it, and leave it in place, their estimated costs for the removal of that pipeline is $120 billion.

So if Enbridge is not required to pay that, who is going to pay that?

Because the tribes are not going to want those pipelines left on their land, and I'm sure there are some homeowners that aren't going to want the pipelines left on their land or the contamination left in their soil.

If Enbridge is not required to pay for this, who is?

That's only their first pipeline. Let's think about the fact that they want to build this whole new corridor and put in a new pipeline that they're estimating will have a lifetime of 30 years.

I'm going to have to disagree with Andy and I think Thane also, but Thane's not here anyway. I don't think that we should think that they're going to use that pipeline for 60 years when they say they're going to use it for 30.

What that says to me is they know

they're not going to have oil to put through the pipeline for more than 30 years. And if they're saying 30 years, it's probably actually 20.

We know the oil industry is being divested from on a massive scale. Numerous international corporations have pulled out of the tar sands. The Saudi government is even looking to what is next after the oil industry.

So if we have these two major producers looking at the end of the oil industry, we have to think about are we going to allow this company to get their final last gasp out of the oil industry, or are we going to say no, and we want to keep our lakes and areas clean and want them to clean up the mess.

And we don't want them to leave us with six pipelines that somebody else is going to have to pay for.

I also want to talk a little bit about the integrity of Line 3 and just the integrity in general.

Back in March or April, I don't really remember what it was, but Enbridge had submitted a whole bunch of testimony on Line 3.

And one of it was the testimony about the integrity of Line 3. And it's pretty shocking how bad that pipeline is and that's for a number of reasons.

The manufacturing process that they use to make this pipeline is -- it's -- basically what they did is took a flat sheet of steel and rolled it, and then that seam, that longitudinal seam is prone to cracking. So there's a lot of those issues.

There's a lot of issues from the wrapping that they put around it, disbonding from the surface, which means the cathodic protection can't actually protect the pipeline.

And so they say that, "Oh, you know, we're going to maintain it forever." We already know they have to do so many integrity digs per year, like 600 or something.

And they're projecting that they're going to have to do that into the future.

So now, if they're stepping away from that and saying, "Well, we're going to maintain it," but they're not going to be going in there -- you know, if an area of the

pipeline does subside, are they going to go in there and fix that now? Or are they just going to maintain the cathodic protection that isn't even connected to the pipeline anymore?

Also, in that testimony about the integrity, there's this very interesting comment that states that, "Since 2003, Enbridge themselves have had an internal review committee about the need to replace this pipeline."

I think it was 2003, or maybe it was -- I think it was 2003 that the MPCA wrote a letter to PHMSA about this pipeline and all of the failures that they've had on it.

So they've known for that long that this pipeline needs to be replaced. But what they did is they waited and they drug their feet and decided to just commit to integrity digs until the cost of replacing the pipeline in place, building a whole new pipeline in the corridor were equal.

So they didn't want to do anything until they could get a whole new pipeline, because that's how they make profits for their shareholders -- is making new

projects.

Which is why they're pushing so hard for this one. Because Al Monaco himself, the CEO of Enbridge, stated that Enbridge is going to be transitioning out of fossil fuels and that if all of the three major pipeline project proposals that are on the table right now get approved, there will be too much oil. There will be more pipeline capacity than oil coming out of the tar sand.

We know the tar sand production numbers are not going to increase. If you go to the Alberta provinces, big projects in Alberta website, and you look through there, all of these projects that the tar sand industry has been projecting that are going to come online, if you actually dig into those projects, most of them are idled or stalled, where people are divesting from those projects.

So why are we going to let Enbridge come in here, put in a whole new pipeline that then they're going to abandon in 30 years and then we're going to have the existing corridor that they're abandoning, the new corridor that they're abandoning, for a

project that's -- what did they say, $2.8 billion?

Well, do a $120 billion project, and clean up their mess and shift out of the oil industry now, not in 30 years, and scrape every last dollar out of there you possibly can.

FACILITATOR: Thank you.

Anyone else who wants to make a public comment for the full group?

MS. LAURA COLON: Hi, I'm Laura Colon. That's L-A-U-R-A C-O-L-O-N.

I'm just a private citizen, but I also am a member of (indiscernible), and I didn't have as much information as I wanted coming into this meeting, except for my visceral reaction looking at the project and the maps and the routes.

And knowing what I know from doing my own personal research about energy and that it seems pretty plain to me, touching what the last speaker spoke on, that the newest technology in energy is not fossil fuels, it's not oil.

We need to move on to other

things, because we know that's a finite resource.

Just my own general layperson reaction looking at this project, it doesn't make sense to put so much money into older technology. Why are we not putting money into the new renewable technology, especially for a country like America?

We want to be leaders. We need to lead with energy. We need to move away from fossil fuels. Thank you.

FACILITATOR: Anyone else who wants to make their comment for the group?

So again, there are written comment forms if you want to take some time to write afterwards.

The court reporter can take a verbal comment, if you want to give it individually. State folks will stick around and we can continue to have the conversation. If people want to submit written comments, we'll be here for a bit afterwards if people want to do that.

We have plenty of food so eat it on the way out.

Comments are due on July 10th. So if you want to submit them, do them by July 10th. The State will take those comments and be responding to them.

We appreciate you all coming out. Thank you for your time and your comments and constructive and respectful conversation. And have a great weekend and safe travels home. Thank you all.

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DEIS MEETINGS - 14-916 15-137

HINCKLEY - JUNE 12, 2017 - 10:00 a.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Grand Casino Hinckley
777 Lady Luck Drive
Hinckley, Minnesota

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FACILITATOR: Welcome everybody. We would like to get started with the public comment period.

My name is Patrick Field. I work with the consulting team on behalf of the State of Minnesota, and I really want to hand the mic over to Jamie MacAlister, who is the project manager on this project on behalf of the State and the Department of Commerce, who's going to open with some remarks regarding the orientation to the process.

We'll explain how the public comment process works and dive in.

MS. JAMIE MACALISTER: Good morning, everyone. I'll give everyone just a moment here to take their seats. Good morning.

We're going to go ahead and get started here with the oral portion of our meeting.

I am Jamie MacAlister, from the Department of Commerce. I want to run through a few things with you before we open it up for comment.

So as you know, this meeting is being hosted by the State of Minnesota, and our

goal here today is to get your comments on the Draft EIS. The Minnesota Public Utility Commission has two decisions to make on this project.

One, whether or not to issue the Certificate of Need, and also, whether to issue a route permit for this project. And we have multiple state agencies here to help represent the work on this project and help inform the Public Utilities Commission's decision.

Let's briefly go through the background and the timeline. This project began in 2016, after submittal of applications to the Public Utilities Commission.

The EIS is anticipated to be completed by the late summer of 2017.

We have gone through scoping meetings. We are currently in the Draft EIS comment period. We will then release a Final EIS, and once the final is issued, sometime after that, in September, there will be contested case hearings that are administered by a judge, and those proceedings are separate, yet connected to these meetings.

They will help inform the Public

Utilities Commission. The judge will take comments and write a report, and all that information gets handed over to the Public Utilities Commission for them to consider in their decision.

It's not expected that this project will be permitted until sometime in 2018.

So what are we hoping to get out of these meetings today? First, we're really looking for substantive comments on the Draft EIS. We really would like to know, is there information missing, is the information unclear? Are there improvements that we could make to this document?

That will help the Public Utilities Commission in their decision making.

Hopefully everyone has had a chance to go through the posters and had an opportunity to talk with agency staff.

We are seeking, today, written or oral comments. If you submitted a speaker card, there are comment boxes here. You can leave a comment with us here before you leave. You are also welcome to send your comments in

via email or regular mail.

All of the comments will be organized and posted online for you to see. So you'll get to see your comments and everyone else's comments. And they will also be reviewed by the EIS team to help us make changes to the Final EIS.

Let's just talk briefly about the comments that we'll be getting. We want you to know all the comments are considered equally, whether they're offered to us orally today or in writing.

We also want you to know that the EIS itself is not the decision making document. The EIS is what informs the decision makers, and your comments will inform the development of the Final EIS, which again, as I stated, will help inform the Commission's decision.

I'm going to hand this over to Pat, who will be our meeting facilitator, and he will run through the meeting guidelines with you. And thank you again for joining us.

FACILITATOR: Thank you, Jamie. Again, thank you everybody for coming out today. I'm going to run through the process of

the public comment.

So we ask people to fill out their names on the note card. I have only about five or six.

So what we do is we allocate the time according to how many folks want to comment. So we have a little bit more time. We'll give people six or seven minutes.

After I go through the five or six folks with their names written down, I'll also see if anybody else wants to comment; you can raise your hand and we'll go through any remaining folks who want to comment.

A few things to note is we want to make sure anyone who wants to comment today can. There are multiple means. Write it down, say it to the court reporter, or say it here in the room. We have a terrific court reporter who has been through all these sessions and will be actually taking your comment today and verbatim will be capturing it so we have it for the public record.

All the public comments, whenever they're given, will end up in kind of a grouping. They will be shared online. The

State will review them as they move from their draft to the Final EIS, and will all be considered equally and taken seriously.

So for today we ask that when someone is commenting, we want to give them the floor. So we ask that people listen when that person comments and please don't interrupt them. Let them say their peace, whatever it might be. I would ask that the commenter stick to the time.

So after about six minutes, I'll stand up and give a little signal to begin to wrap it up, and then if you need to keep talking, I'll help you slow down there a little bit around seven minutes.

We recognize you may have a range of views in this room about what they think should happen, what they think is missing from the EIS. What impacts they're concerned about, whether they do or don't want the pipeline and where. We know there's a range of views.

Again, the State is trying to draft a terrific EIS; not take a stand at this point on the pipeline. Probably you have a view. We want you to be able to voice that,

but we also want you to be able to respect people who have different viewpoints, we would ask for you to be respectful of your fellow participants.

If someone's done, you want to be affirmative and clap, great. What we ask people to do is not be negative. Everyone's going to have a range of views and we want you to be comfortable speaking.

We actually ask that people speak to the issues, the document, agencies, organizations, but not to other individuals in the room. We don't want people to be uncomfortable in that way. We want people to be able to comment.

The State's role is to listen. As you know, they've done a lot of work. They're going to continue to do a lot of work in the coming months.

State agency folks, raise your hands. A number of them are here. They're really here to listen. We're going to capture through the court reporter and the like. So that's their role today.

Cell phones, put them on vibrate.

I'm sure your ring is lovely but we don't want to hear it in here.

There's emergency exits. Bathrooms are out down the hall that way and then kind of back around, just to let you know.

And we'll probably end around 1:00, if not before. And even if we end early during this part, people will stick around. If people want to mingle, that's fine.

When I call your name, we'll bring the mic to you. So John up in the front and then Leslie towards the back will bring the mic to you so you can be comfortable. You can sit or stand and we'll bring it to you.

So state your name and spell your name for the record. And the best thing to do about the mic is kind of speak like this. That projects the most.

Our first speaker, and we'll bring the mic to you, is James Mark. Just name and spelling for the record.

MR. JAMES MARK: James Mark, J-A-M-E-S, M-A-R-K.

This is a pretty important infrastructure project we're talking about here

today, and it's going to put a lot of people to work -- Minnesotans to work, a lot of pipeline hands to work.

A lot of people I know weren't around this weekend for their kid's graduation because they're out in the East Coast working.

We need to bring these people back here to work, back with their families, sleeping in their own beds. I'm heading out this afternoon to go to the East Coast to work. I want to spend my money at home in Minnesota.

Enbridge is putting the money up to replace this pipeline. They're not taking it out of your pockets like when they built that stadium down in the cities. They're putting the money up to build it.

I'm taking their money. They'll put it in my bank account. This project has been in review for many years. It's time to get it done, time to build it, time to put us back to work. God bless the pipeline, God bless America, God bless the union halls.

Thank you.

FACILITATOR: Thank you very much.

Next I have Dan McGowan. Name and spelling for the record.

MR. DAN MCGOWAN: Dan McGowan, D-A-N, M-C-G-O-W-A-N. I'm with the labor union, and overall, we'd like to thank the Department of Commerce today for putting together an environmentally safe Environmental Impact Statement that on its face goes above and beyond what the law requires.

Five thousand pages of facts and analysis on every aspect of the project makes it the most carefully studied pipeline in state history from an environmental perspective.

We also want to thank the Department for its commitment to keeping the process moving so the Public Utilities Commission has the information it needs to make a decision within the 280-day time period set by state law.

The Draft EIS badly underestimates the positive socioeconomic impacts of the estimated 4,800 construction jobs created by the project, based on the flawed assumption that the project will employ

zero local workers. That assumption is dead wrong.

The project will be built under labor agreements that require contractors to employ laborers, operators, and teamsters referred by local unions, including both current members and new recruits.

Our union and contract partners have historically put thousands of local residents to work on various pipeline projects.

Minnesota has a plethora of skilled pipeline labor. We have hundreds of members who pipeline across the country that live in northern Minnesota and welcome a chance to work close to home.

For these reasons, locals will likely account between a third and a half of the construction workforce, and a majority will be Minnesota residents.

We recommend that the Department reanalyze the population and impacts of the project based on this more realistic estimate of local construction employment.

We believe that the use of a

more accurate local employment figure will highlight the significant contribution that these high quality jobs make to household incomes, tax received, et cetera.

The Draft EIS also underestimates the positive socioeconomic impact of the estimated 4,800 construction jobs created by the proposed Line 3 replacement by failing to fully account for the value of the jobs and associated benefits, as well as the long-term career building opportunities created by the project.

Pipeline projects, on a scale of the Line 3 replacement, create opportunities for locals without prior union construction to pursue family supporting construction careers.

Many current members got their start on similar projects and chose to either continue in pipeline work or branch out into building other civil construction.

The project will also help us to fund the unlimited free skills training available to our members to build their careers.

Union pipeline workers -- union

pipeline construction workers receive high quality family health coverage that typically lasts well beyond the length of a project.

Thousands of area union and family members would be covered as a result of the project at no cost to taxpayers.

Union pipeline construction workers also will see pension contributions that help provide financial and retirement security for local union households, in addition to helping sustain local economy.

We would be happy to explain the mechanics of union (indiscernible) to the team working on the Final EIS to ensure that it accurately captures the full impact of the project and the alternatives.

The impacts of construction expenditures for a major pipeline project on area small businesses are anything but minor.

The Draft EIS fails to address the public safety impacts of rail alternatives, which include injuries and fatalities at rail crossings as well as the risk of a major fire explosion caused by a derailment.

Overloading Minnesota rail lines with oil tanks would expose cities and towns across the state to public hazards.

The Department should incorporate the finding of MNDOT 2014 Crude Oil Safety Reform and the U.S. Department 2014 Keystone XL Analysis. It's estimated that the rail alternative would result in 49 injuries and six deaths versus a single injury for the pipeline.

The Draft EIS devotes too much attention to so-called system alternative, which is useless because it wouldn't reach the refineries that rely on Line 3 to refine the fuel that millions of Minnesotans depend on for daily life.

In summary, I would say Line 3 replacement is the best way to protect the environment. Replacing Line 3, as proposed by Enbridge, is estimated to reduce the risk of a spill by nearly 40 percent.

That is a conservative estimate because it's based on the averages for old pipelines, and Line 3 faces above average integrity challenges.

Integrity digs keeps lots of labor employed, but in the case of Line 3 there's no substitute for a pipeline built using modern technology and construction.

Thank you.

FACILITATOR: Thank you, Dan.

Tara Mach.

MS. TARA MACH: I'm a proud native Minnesotan with two wonderful daughters, two step daughters and one step son.

Since childhood, I was taught the importance of respecting our lands and our precious waters, whether it's here in Minnesota or anyone else. My husband and I continue to teach our children the importance of being environmentally responsible.

My husband and I are small business owners in Pine County, and I have been a registered nurse for about 12 years and a proud member of the Minnesota Nursing Association.

Our small business's success is quite dependent upon the clean and quality environment which we live in.

From the information I have come across over the past few years, it seems that of all of the pipeline or oil companies, in this state anyway, that I would entrust or I would trust, Enbridge, not because they're perfect, but because Enbridge seems to be the only pipeline company that seems to confront their mistakes and does not try to hide or place the blame on someone else.

I find that kind of action responsible and admirable.

As an RN, I adamantly agree that someday we need to wean ourselves off of oil. But until there becomes a viable replacement for petroleum by-products that are found in so many life-saving medical supplies, such as sterile medical packaging syringes, oxygen, IV tubing, medications, ointments, orthotics, prosthetics, CT and MRI scanners, just to name a few; that it is absurd to believe we can just turn off the old switch.

I don't want anything to jeopardize our waters and lands, but it is vital that we make sure lawmakers ensure that all energy companies, both large and small,

adhere to laws set forth.

I support a safely built Line 3 project.

FACILITATOR: Thank you, Tara.

MS. MELANIE WEBERG: Hi, my name is Melanie Weberg.

It's M-E-L-A-N-I-E, and the last name is W-E-B-E-R-G. I just have some bullets I'm going to go through here real quickly.

I own property both in Minnesota and Wisconsin. I am opposing Line 3, as it's a threat to our climate, our planet's water resources, indigenous treaty rights, and the wildlife habitat destruction that it brings.

80 percent of the oil that fuels North American comes through Minnesota.

Our precious Minnesota lands are taking all the risk for Enbridge's profit, and on top of it, Enbridge is looking at primarily exporting this Line 3 oil.

Right now, more oil is being pulled out of the ground than is consumed in Minnesota. Oil consumption is down 19 percent and the outlook is flat for the future.

It's a known fact that tar sands

are not viable economically unless oil prices go sky high. We are on the cusp of an alternative energy takeover. There is no need for an oil pipeline.

60 percent of surveyed Minnesotans oppose tar sands pipelines, and it's in my opinion that if they all knew the risks, it would be much higher than 60 percent.

Tar sands pipelines, let's see, current information suggests that pipeline companies and politicians are overbuilding tar sands pipelines by 2.4 million barrels per day.

A couple other things I'm concerned about; Enbridge has asked for a 720 foot wide permit throughout Minnesota. This 720 foot wide permit concerns -- is concerning to me.

It's not been made clear how many lines would go in there, and furthermore, it's my understanding that Enbridge couldn't get to some of these areas if they began to leak as they are so remote, and 7,000 barrels a day could leak without detection.

All the tribes have rejected this pipeline. Property owners have not been consulted or given a say in this process. They currently are responsible for taking care of the old Line 3, which is exposed in many places across the state.

Let's see -- no plan to protect the Great Lakes. Enbridge has chosen the route with the most rice beds and pristine lakes.

And I'm going to end here by just saying a personal experience I had yesterday with the hail storm. I'm exhausted personally daily with the burdens of climate change to our planet.

For the first 45 years of my life I can't recollect a hail storm in June, July, or August. I have experienced two enormous hail storms in the last four years in Minnesota and Wisconsin. Yesterday was the second.

All of the wildlife habitat and food for them that I have provided on my property is wiped out for the year, for the year, due to the extreme hail.

Wildlife in general was producing itself in late spring until the hail storm was devastating.

Additionally, all mitigation that I and the town had done was not enough to sustain a resulting severe runoff from a nearby agricultural field into the small 65-acre pristine lake that I live on.

I am reminded daily of the devastation that this Line 3 represents to our planet.

I am wholeheartedly opposed to this pipeline. Thank you.

FACILITATOR: For folks who actually have written their statements down, it would be very helpful to be able to give those to the court reporter, if you have an extra copy.

She's recording it, entering it into her way of typing, but if you have an actual written statement, you can bring that to her, too. That is helpful.

Next comment is Justin Smith.

MR. JUSTIN SMITH: Hello, I'm Justin Smith, J-U-S-T-I-N, S-M-I-T-H. I am

only a descendent of Mille Lacs Tribe. I'm not a member, but I come here because of my children. They're the next generation, next in line to take care of (indiscernible).

They keep talking about these 4,800 jobs, construction jobs that it would create, and they're only temporary jobs; like these 4,800 jobs will not be permanent jobs. These facts you guys are giving us, they're not legitimate facts.

We don't have a Planet B to go to.

So these people that we're bringing home to work will eventually be outsourced again and brought somewhere else to work on the pipeline, whereas our infrastructure should be revamped, rebuilt into sustainability, like solar.

We're the Land of 10,000 Lakes. Why don't we look into harnessing, say, the hydro-powered, you know, the pumps and the fans and the current powered power.

Taking an excerpt from a book called, "Touch the Earth":

"I wonder if the ground has

anything to say. I wonder if the ground is listening to what is said. I wonder if the ground would come alive in what is on it.

"Though I hear what the ground says, the ground says it is the Great Spirit that placed me here. The Great Spirit tells me to take care of the Indians, to feed them all right.

"The Great Spirit appointed the routes to feed the Indians on. The water says the same thing. The Great Spirit directs me. Feed the Indians well. The grass says the same thing. Feed the Indians well.

"The groundwater and grass say the Great Spirit has given us our names. We have these names and hold these names. The ground says the Great Spirit has placed me here to produce all that grows on me, the trees and fruit.

"The same way the ground says it was for me, man was made, the Great Spirit in placing men on the earth desired them to take good care of the ground and to do each other no harm."

And that is from the -- the

speech was in an Indian Council in the Valley of Walla-Walla in 1855, presided over by Isaac Stevens, governor of Washington Territory and General Palmers, Superintendent of Indian Affairs for Oregon.

Governor Stevens' objectives were to set up three reservations, one for the Cayuses, the Walla-Wallas, and the Umatillas; the second of the Nez Perces and a third for the Yakimas.

Young Chief of the Cayuses opposed the treaty and grounded his objections on the fact that the Indians had no right to sell the ground which the Great Spirit had given them their support.

He gave the following speech before signing away the land.

FACILITATOR: Justin, we can't hear you -- could you make sure to talk right into the mic like that; that would be great.

MR. JUSTIN SMITH: These new terms that you guys are coming up with every time, all these facts -- the pro pipeline people.

What about the epidemics that

have been facing my people for years? My people are trying to stand up for those plans since you guys came here, since you washed up on our shores, invaded our territories.

I'm still here. My kids are still here. Their kids will be here one day to take care of all of this. I would like more eyes to be open to this, more people being aware that this isn't needed.

I totally stand against this pipeline. I know I got here and gassed up and (indiscernible), but I'm looking to the future. You know, solar panels are available. Hemp is a much cleaner oil producing substance or element. We don't need this pipeline.

Sorry for the shaking voice. This is my first time doing something like this in public. But I strongly disagree with the facts that you guys are imposing.

I believe your abandonment removal board needs to be way bigger. You need a little more facts. You know, stuff that you guys got here, this isn't -- this isn't facts.

I'm not finding anything here

worthy to say I should support this pipeline. Enbridge gave -- but look what happened with Standing Rock and Energy Transportation Department.

Within months of that being put through, there was -- already there was no teams in play that come in to stop these. If it does run by rail or by truck, at least they're able to control the amount of the spill. I'm sure it's running through our towns and people are going to be exposed.

They're going to put pipeline in our backyards and hope that we survive and hope our water -- I still get water from the stream where I come from. I get my water from the ground. Water from the tap smells funny.

I'm here to stand up for my children, for my people. It's a little sad that I see so few faces, I should say.

FACILITATOR: Those are the comments cards I received.

Are there others who want to make a -- I see a comment here, a comment in the back of the table. I see a comment back there. Name and spelling for the record.

MS. WINONA LADUKE: (Ojibwe). My name is Winona LaDuke, W-I-N-O-N-A, L-A capital D-U-K-E. I'm a tribal member and I'm also the executive director of Honor the Earth.

I came here for a number of reasons. We've been following this for a long time, but first I want to say this feather was given to me by people from the Athabasca River, the tar sands, the middle of the tar sands, Fort McKay. And they say first you should remember us.

We're talking about this oil that they're trying to put in this pipeline, the dirtiest oil in the world.

I feel like one of the very large shortcomings of the EIS, which is a super lengthy document, is the lack of impact of the oil.

It comes from someplace where people are destroyed, our whole ecosystem is being destroyed. Our animals are all poisoned. People are all sick. They all got cancer up there in the tar sands.

So why are we justifying bringing the dirtiest oil in the world here? Why are we

justifying the death and destruction of those people, the people of the north?

They gave me this feather to say, "Don't forget us when you're down there."

That's the first thing I want to say.

The second thing is we're looking at the question of why we don't matter as native people.

The whole DEIS process reviews the significance. It says, throughout it, that this will be a major detriment to native people.

It says -- it recognizes that this is our only place in the world to live. We can't go off someplace to the East Coast. We can't go someplace else. This is the place the Creator put us.

And in the DEIS it acknowledges that we've been through a lot of duress and stress.

Our community is really stressed out right now. We got suicides in my community, two this last week.

We got everybody super sick, and

there's a lot of just duress in our community, and the DEIS acknowledges that there's an amount of duress in our community.

And then it says it's going to get worse if you have a pipeline. That's -- my question is, why does it not matter?

This pipeline most significantly impacts the tribal community. Why do we not matter? Why does that not constitute the no-build option? That's what I don't understand.

Why is there no recommendation of a no-build option based on the deaths that's going to occur in our communities?

How do you quantify that? That's what I want to know.

The third thing is we look here at the whole issue of abandonment, and everyone in here has an abandonment issue. You know, looking at it, I'm looking at -- you got 14 pages on abandonment and the Enbridge company says it's going to be a hundred billion dollars to remove the leaking Line 3, which, you know, according to their own integrity, you know, review is, everybody agrees, is in a state of

deterioration.

Our suggestion is you close down Line 3, Enbridge. Close it down. Figure out what's in there, because it's leaking all over the north right now. We're already stressed out about that. And then Enbridge says it's very hard to remove it, because it's going to cost them a hundred billion dollars.

That's the figure in the DEIS. So one, that's a lot of jobs for all you guys. That's a lot of jobs in cleaning up and removing old pipe, a lot of jobs in that, and I think that's what we should be doing.

The second thing is if Enbridge doesn't pay that now, who's going to pay it, the hundred billion? Who's going to pay that for the next five lines they're going to remove? Who's going to pay for this, Minnesota?

And the problem of abandonment must be dealt with prior to any discussion of a new corridor. What's your plan, Enbridge? Who's going to pay for it?

That has a very, very significant impact on all of us.

Finally, this, really -- the responsibility of the State of Minnesota to look at the no-build option. You know, every review of this by anyone who is not linked to oil money would say, "Time to clean it up. Time to question this."

And I feel like that this is our opportunity, Minnesota. It's not just -- I understand. I come from -- my grandparents were union workers, too. You know, I totally get it. I totally get that people deserve jobs with dignity, but there's a difference between making a living and making a killing.

This pipeline is about making a killing and we cannot do that to each other. We need to be about making infrastructure for people, not for oil corporations.

I have a lot more I could say, but I wanted to thank the people who come and just to say be courageous, be courageous, our people, because everybody is counting on us. Everybody is counting on us. And all the little ones are counting on us.

And all those ones that can't be here, whether it's the big-eared bat, or all

them fish, all them animals, you know, they're all counting on us, because we already destroyed a lot of the ecosystem.

They're hanging on, too, and they start putting these lines through the new corridor, it's going to be very unlikely that those animals are going to make this next round.

That's all I got to say right now, but I want to thank you again.

FACILITATOR: We'll take the comment. Did you have your hand up?

MS. NICOLETTE SLAGLE: Nicolette Slagle, N-I-C-O-L-E-T-T-E, S-L-A-G-L-E. I'm with Honor the Earth. I'm their research director. And I'm originally from Pennsylvania, and I tell you that is a place that we have let industry run roughshod over.

It's been clear-cut, two or three times, the birthplace of oil industry, birthplace of coal industry. Now fracking is out of control there. Our water is not drinkable in much of the state.

And we shouldn't let that happen here. We shouldn't let that happen anywhere.

I want to talk a little bit about a couple of things specifically related to some of the analysis that I've been trying to do on this project and its potential impacts.

Just this weekend I ran a little analysis on potentially impacted wild rice beds, and in the state's DEIS they have indicated 17 wild rice lakes directly impacted by potential Line 3 routes for the preferred route, Enbridge's preferred route, 17.

That's actually the highest of any of the routes. I went a step further and looked at wild rice watersheds, because we know wild rice is a very sensitive plant and it changes even the levels of water, the amounts of silt, climate can all impact it.

So I think that looking at the wild rice watersheds is a more reasonable metric to see how many potential impacts there are.

What I got was 41 watersheds that would be potentially -- wild rice watersheds that would be potentially impacted by Enbridge's proposed route.

While I, of course, respect everybody's need to have a job and respect the union immensely, I also really respect the right for tribal communities to exist and survive. If we destroy these wild rice beds, they won't be able to.

Along with -- again, I know that this process isn't necessarily the process for talking about these large scale, long-term energy infrastructure needs.

But again, I've asked this before, like if this isn't the time, when and where will that be? How often are we going to be in a room with employees from the MPCA, the DNR union guys, tribal people, nonprofits, both us and MN350.

I mean, if any of us tried to set up something like this, it would be a very one-sided conversation.

We do know that there are alternatives to oil. There's hemp, which Henry Ford built a car completely made out of hemp which ran on hemp fuel. There's numerous renewable ways to develop electrical cars.

Public transportation, that is a

major issue that we are missing in the United States. A lot of the oil, if you look at the charts of who consumes the oil and where and for what, a lot of it's consumed in the south, in urban areas, because they don't have public transportation.

Why should we be allowing this pipeline to come through, full of the dirtiest oil on the planet, to fuel people's vehicles in the South because they don't have public transportation or they don't want to take a bus.

I'm not going to talk about the abandonment cost and how many potential jobs there are with that. It's well known within the oil and gas industry that they have like max 30 years left of economically viable extracted oil. And I don't consider the tar sands economically viable.

So what that means is in 30 years we have to be ready to be off of oil.

So are we going to build another pipeline and push the time that we start that transition until the next 15 years, the next 20 years, so that in 30 years, when we're

completely out of oil, everybody is going to be like, "Oh, what are we going to do now?"

Our vehicles are going to stopping running. We need to prepare for that now.

That is a major lacking in the EIS, that there's no addressing the issues for future generations.

There's all of this talk about potential impacts and potential benefits, but it's all for now. It's not what is this going to create for the long term?

Real quick, I've also been doing some calculations on what are the environmental impacts of this potential line and the oil industry as a whole.

And, you know, of course, yes, it's going to create some jobs, but it also creates at least $41 billion in social costs from the carbon. We've estimated at $170 billion for the removal of the carbon from the atmosphere.

So those two numbers are different. One is about the impacts that increasing carbon will have on people,

including climate change and things like that.

The other one is the cost to remove the carbon from the atmosphere. Because not only do we have to stop our carbon emissions, but we need to get the carbon out. It's impacting the environment now.

Annual cost, Boreal Forest lost 315 million wetlands in the right-of-way, $3 million, and those are ecosystems services cost.

So wetlands provide a number of services, including water filtration, flood control, biodiversity. And so we would lose $3 million annually from the right-of-way and $315 million from the loss of Boreal Forest.

And I can talk to people more about that later because I'm running low on time.

Just to close, I want to also say that I know you've been trying to do a much better job with consulting with the tribes. But consultation is not consent. Thank you.

FACILITATOR: Thank you.

Harvey Goodsky next. Name and

spelling for the record.

MR. HARVEY GOODSKY: (Ojibwe). My name is Harvey Goodsky, Junior; H-A-R-V-E-Y, G-O-O-D-S-K-Y.

I'd like to ask for forgiveness for my outburst for speaking in this non-native language, and I would like to say that I am here as a member of the Mille Lacs Band, just a member.

I come from the Second District of Mille Lacs, which is up north around the Big Sandy area, which is on this little map here.

I would like the Enbridge company to think and really release the information of how much shale petroleum is left, and really ask yourself, is that a renewable resource?

What is and is not a renewable resource is the importance of that resource.

I'm pretty sure that oil cannot clean itself. Oil is not clean in its own natural state.

Water has the ability to renew itself. The more garbage that we throw in the water makes it harder for the water to renew itself. And if you know about yourself, you

need water in whatever form that you take it.

I would like for you guys to think about these comments, because it's about resources, it's about money. It's about living. My infrastructure is completely different from all of yours; maybe the hand-selected few that came.

My infrastructure grows on the water. The way I live grows on water. That's why I -- because you guys want to run oil, which is not a renewable resource, through this renewable resource that is brought to us.

I am so glad that you guys have appreciated your stay when you got here in 1492. But please, take into account that we want our water to be here, and oil will run out one day, we'll see it. Thank you.

FACILITATOR: Tania is next. Name and spelling for the record.

MS. TANIA AUBID: (Ojibwe). My name is Tania Aubid in English for you -- T-A-N-I-A, A-U-B-I-D. I come from East Lake area. As my son has said, I come from the area where you want to put the Line 3 proposed alternate route.

Today I still say no to that pipeline coming through or say no to the replacement, to any more new pipelines or the replacement of the pipeline.

I am thankful for the union guys to be here today. Thank you so much for being able to come here and stand forward and say, "Yes, I do work on those lines."

But can you guarantee to me that these pipelines will not leak?

Over the course of the days here I have watched numerous stories throughout the news, like over in media country over there, saying that there have been pipelines that have been leaking, not only from Enbridge, but from other oil pipeline carriers.

I've had professionals tell me, "Hey, nothing lasts forever." Can you guarantee me that these pipelines will last forever with no leaks?

You think it's the safest. But yet continuously we see over the years that these pipelines do leak.

These pipeline company carriers and all these people, they show us the toys

that they have; these bobcats, these kayaks, these lawnmowers, these boats. They have the nerve to come up and ask me, "Why is there so much garbage on your lot?"

Why is there so much garbage in my backyard that's full of all these machinery, the boats that no longer work. And you tell me that is progress in today's standards?

That is not progress. We are killing ourselves with all of these things that are out there.

And these dumps. I'm happy for the nurse that came forward and said what she had to say, because if we take a look in those dumps also, you find all the plastic garbage, the needles and everything else that comes along with the plastic tubing and whatnot that helps sustain our lives in that way.

We keep these waters clean in Minnesota. Yes, we can sustain a longer life. Personally, myself, I was out at the Standing Rock Reservation out on the front lines out there.

And I seen what pipeline workers do. I've seen how they operated within their

own vehicles.

The biggest question that has come to me, or a pleading came to me, stating that they do not want to see a Standing Rock type situation here in Minnesota.

I ask you all to think about that. You do not want that here. I do not want these gentlemen to also have to place their lives on the line.

I was on a 28-day hunger strike out there, fighting for the lands, our people, the fishes, those animals that live in the water. I gave them a voice to say, "No more." If you take a look at the marine life, really look at 'em, what do you see on them? Sometimes you pull up three legs, two heads, no fins. Sometimes you see stuff on their bodies. Makes you wonder if that's cancerous or not.

That boils down to the numbers of what's in that water now. Especially after these little leaks that these pipelines have told us was not going to leak, but they call them anomalies.

With these anomalies what have they done to the wildlife there? Chronic

wasting diseases. Do we -- I fear -- my fear is that's what's going to happen to us. I worry because I prayed for the people so that we can work together one day to be able to say no to these things and to have a healthy future for our children, our great grandchildren, the ones that have not yet been born.

Yes, I seen the stresses out there. To this day I have PTSD from that for fighting, for standing up for our lines and the waters.

At night I can't sleep because of the nightmares, because of those things that have happened to us out there; the dogs, the guns, the military. It's no joke. When you're out there, you're praying and saying, "Creator, please protect the water. I am only a water protector to stand here and say no to these pipelines." And for that, that's when they came at us.

So to the State of Minnesota, to the governor of the state of Minnesota, keep your promises of a water legacy person and say no to these pipelines.

Until this day I still pray for

all of us, that we can be able to stay awake and say no to these lines, because our future depends upon them. If you look at them. Your own children may not be here, your grandchildren may not be here, but look at them. Do you want them to be healthy?

With that, I say miigwech and please clean up your own mess, your own garbages, kayaks, boats, snowmobiles, lawnmowers, all those things, too.

You say you want us to clean up our garbage, you have to clean up yours, too. Miigwech.

FACILITATOR: Thank you. I think I saw a few other hands in the back.

MS. JACI CHRISTENSON: My name is Jaci Christenson, that's J-A-C-I, C-H-R-I-S-T-E-N-S-O-N, and, Justin, my eyes have been opened, and I'm trying to open everybody else's eyes that I can.

So Minnesota is uniquely rich in clean water. It is the resource, as so many people have spoke to, that we are dependent on for our survival.

One would hope that this Draft

EIS would be our assurance that this water will be protected. What I learned, spending as much time as I could in three weeks in Chapters 5 and 10, is that this DEIS provides inadequate information, and when the information is sufficient, it only reiterates the risks of running a line through the heart of Minnesota's water.

So in establishing how water rich Minnesota is, in case some of you don't know, very quickly, as was said before, 192 water bodies, 39 sensitive or specially designated surface waters, 17 designated trout streams and their protected tributaries, 7 rivers with multiple crossings so really that would be 9 federally protected river crossings.

The Kettle River, not so far from here, which is a tributary to our wild and scenic St. Croix, and that is crossed twice, and wild rice, which has been addressed, and I must say the DEIS is absolutely reprehensible to our native communities.

We also know it will impact three major watersheds, which is the Red River to the north, Mississippi, and Lake Superior. Also,

critical drinking water sources for everybody along the way. So this is iconic Minnesota.

The construction of what Enbridge calls the -- the construction, I'm sorry, and what Enbridge calls accidental crude oil releases, oil spills, are a threat to all of these waters.

So I tried to focus in my time at the DEIS, in chapters 5 and 10, on how it -- as it impacts our flowing water, river, streams, creeks, et cetera.

So with regard to the proposed preferred Line 3 route, the construction impacts. Before this thing is even running -- and this is a quote from chapter 5, page 69, with all of the necessary information that I'll turn in, but "During construction, surface water may become contaminated from small spills or leaks of lubricants, gasoline, oil, other fuels, coolants, transmission fluid, or other hazardous chemicals."

Further, "To protect surface water resources, the Applicant would store petroleum products, hazardous chemicals, lubricating oils," et cetera.

"And perform concrete coating activities in upland areas more than 100 feet from surface waters."

Has anybody been to the Boundary Waters? The Boundary Waters, for your information, there is -- when you spend time in the Boundary Waters, there is a U.S. Forest Service rule that you wash your dishes, biodegradable, non-biodegradable, at least 150 feet from shore.

We are talking about all of these said chemicals within 100 feet of our water bodies.

That is not right. That needs to be changed. With regard to construction as well, changes in the stream flows from water withdrawals and discharges.

There's over 100 million gallons of Minnesota's precious waters will be used for hydrostatic testing, dust control, trench watering.

In addition, an undisclosed amount of water will be used for Horizontal Directional Drilling or HDD.

Further, when this HDD goes awry,

a frac-out or spill of the drilling fluid, the release can cause long-term impacts on the aquatic ecosystem.

No worries, though. Enbridge has a response plan, and that is, "At in-stream locations an observer will document and monitor the release. In general, however, containment is not feasible for in-stream releases."

That is from the Enbridge Drilling Mud Containment, Response, and Notification Plan, Chapter 4.3 of page 3.

So this preferred line across flowing water, more than 80 times in the -- and when the HDD is used, this horizontal drilling, and there's a frac-out, Enbridge will monitor it but will not contain it, because it is not feasible. That's a problem.

Even if we escape the frac-out, we still face routine pipeline construction practices that alter and degrade aquatic habitat through increased sedimentation and erosion.

That is from chapter 5, page 70, of the DEIS. So to summarize, the pipeline is not running yet. We have hundreds of millions

of gallons of Minnesota's fresh water used, more fresh water at risk or to be impaired during routine construction practices when the HDD goes awry in a frac-out; then what?

So all of this -- and there's no tar sands.

So then I turned to, well, what does happen in the accidental oil release or a water spill, and I found that according to a table on page 10, chapter 17 -- again, everything's documented -- that the overall annual probability of a spill incident at any given place with a preferred route is .249 with a recurrence interval of 4.

So each year there is approximately a 25 percent chance there will be an oil spill on preferred Line 3, one oil spill every four years. That's an absurd risk to Minnesota's water.

We would not accept a 25 percent chance of poison water every time we walk to the faucet for a drink. If we do not accept this high probability in our daily lives, why do we accept it in this DEIS?

"It is impossible," and this is a

direct quote, chapter 10, page 1, "It's impossible to predict where a spill would happen, the quantity of oil involved, how far the impacts would extend, or exactly what resources would be affected. In part, this is because there are so many incident specific factors involved."

This is not the original Line 3 that was put in in the '60s. We are no longer ignorant to spills.

One only needs to turn to Enbridge's history of 800 spills in the last 15 years, including the largest inland oil spill in U.S. history, 1.2 million gallons, into the Kalamazoo in 2010.

We have brilliant engineers. Let's put them to work and make it possible.

FACILITATOR: It's been about seven minutes.

MS. JACI CHRISTENSON: Okay. Would you like me to stop?

FACILITATOR: If you could wrap it up, I'd greatly appreciate it.

MS. JACI CHRISTENSON: Thank you for that.

So the risks are many and long, and I haven't even gotten through the rest of the spills.

I will just close by saying that this DEIS really truly demonstrates the risk. It does not provide us with the assurance that we need to keep safe and clean drinking water. I know we can do better than this, and we will.

Clean water is what connects us all, all of us, wherever we come from. And we must all work together to protect it.

Thank you.

FACILITATOR: Thank you.

Other folks who want to make a comment?

MS. NATALIE BOYD: Hello, my name is Natalie Boyd, N-A-T-A-L-I-E, B-O-Y-D. I'm a Mille Lacs band member. And there's two things that I want to say.

The first thing I want to talk about is the fact that some of the first things that the EIS says, kind of repeatedly, touches on at the very beginning of the document, is that it can't speak to larger issues of energy policy.

It claims that talking about climate change and these broader issues is beyond its scope.

And I respectfully disagree, because whatever decisions are made based on this document are going to set a precedent. And whatever happens with this is definitely about climate change. And it is about broader issues than the energy policy.

It's grossly irresponsible to claim otherwise. That was the first thing that I wanted to speak about.

The second thing that I wanted to talk about, I just wanted to say, before somebody else brings out the old tired argument that we're all going to get into our cars and drive away and possibly get fuel in our oil guzzling machines, and we're not going to think about where that comes from, before somebody does that, please don't. Just don't, because we do think about it and we're tired of hearing that we don't.

If this EIS that we're talking about today, if this is a debate about need, if that's what we're talking about, then

everything in this EIS is highly suspect, because the need for this pipeline does not exist, aside from what other people have said about there not being the demand for oil that Enbridge claims there is. Aside from that, the fact is that the technology exists for alternate forms of energy.

From transportation to electricity, in general, the technology exists. And the only reason we can't use the alternative technologies is because they're suppressed by the petroleum industry. Oil pipelines do this to protect their profit.

And for people who are worried about their jobs and how much they can make working for the pipeline industry, just be aware that you're being held hostage, and all industries are being held hostage by the oil industry.

They are doing this -- they do this all to protect their profit. We're all being held hostage by the oil industry.

So, yeah, we are driving oil-powered vehicles. But it's not because we don't think about it, and it's not because we

want to. It's because we're prisoners of the system that we're in.

FACILITATOR: Next, just name and spelling for the record.

MS. KAREN HULSTRAND: My name is Karen Hulstrand, H-U-L-S-T-R-A-N-D.

I live on the St. Croix River, which at first look you might not think is on this pipeline. But this pipeline crosses the Kettle River, which goes into the St. Croix River, which goes to my house -- near where my house is, and then the St. Croix River goes into the Mississippi, and the pipeline actually crosses the Mississippi.

So one of my points is that we are all really in the watershed. The water is universal. I am a physician. So my concern after learning from all these people in the Environmental Impact Statement is about the chemistry and the chemicals.

I found out that there are a hundred different chemicals in crude oil, and we know that tar sands oil is much dirtier and thicker and more problematic than regular oil. And so because of that, they have to dilute

the oil with more chemicals.

So there's a big chemical mixture going down these pipelines, and I wanted to know what chemicals are in there. Because as a physician, I want specifics.

Well, they couldn't tell me, so I think the Environmental Impact Statement needs to list all the chemicals, and then I want to see the research on what happens if those chemicals get into the water, into the wildlife, into the plants.

And as people, we're sort of at the top of the food chain and chemicals actually accumulate in our bodies. And the people that suffer the most are pregnant women and children.

So we really need to think about our future generations, and is this a risk we want to take, to room Canada in the tar sands area, which is an environmental disaster, to ship oil across our state so it can go to refineries elsewhere.

Are a few jobs worth that? I say no.

FACILITATOR: Just name and

spelling for the record, thank you.

MS. JANE BURNES LEVERENZ: Good morning, everyone. My name is Jane, J-A-N-E, Burnes, B-U-R-N-E-S, Leverenz, L-E-V-E-R-E-N-Z.

I'm a local yokel. Been an activist for about 51 years. I think I've researched this inside and out the other. I basically wanted to let all of you know that we are on the gateway of the largest aquifer in North America called the Hinckley aquifer.

We have multi-levels of parallel situations that are occurring when we impact Mother Earth.

We can't recklessly run these pipelines. We can't recklessly not realize -- the bottom line is here. We are the stewards of the quality of life from this moment forward.

Since 1986, there have been 9,000 pipeline leaks in the United States. There have been approximately 400 fatalities, human fatalities, not to mention the 9,000 mini ecosystems that were destroyed.

You cannot bring back the

environment once the oil has spilled. We have had between 1,400 and 1,500 people who were permanently injured. I mean permanently, not temporary.

We have such a gift -- been given such a gift. We were born onto what's here. We take -- when our species came here, and I'd probably say we've been here 400 years.

In Minnesota, my family has been here almost 200 years, and when you just take -- when our species got off the boat, my brothers and sisters said, "We don't recognize you." They created a new language. They called it Witiko.

I'm not Witiko. I've not been Witiko since in the 1960s, when I discovered going to the Department of Natural Resources was not to help the natural resources. It was to manage it.

Whether I approved or not, they took over my rights as a citizen of Minnesota, and I have struggled and worked and demonstrated and stood -- and it doesn't matter what the weather or whatever it is, I have done that. We all need to start doing that. This

isn't funny, and it's -- to me, it's a challenge to understand the logic.

Now I'm going to go economically. There is no basis -- the pipeline system is obsolete. There's absolutely not one economic basis to build or prepare or reuse any more pipelines. We have many other ways to route.

By the way, if you don't know this, they're already working on another pipeline coming down east of us, going down to Ohio. They've already got plans in the works to -- if we succeed in unceding this situation -- and as a matter of fact, I think this possibly is a distraction, which I cannot say for sure, but they're already working on other pipelines.

They don't need us, and quite frankly, the pinnacle thing that I cannot understand is these people that are doing the pipelines, that are doing the tar sands. It's their world, too.

What are they going to do when the last breath of air, the last drinking water is available? What are they going to breathe? Because you can't breathe money.

It just behooves me that we're still in this position of even considering making any kind of an impact on our planet, let alone the sensitivities that we have here, the gift that we have been given here, the water, the wild rice, the lifestyle, the culture. It's all here.

If you did not know this, the amazing thing about Minnesota is that water flows in both directions. Once you get up further north, water flows up into Canada as well as south.

We've already had the Hinckley aquifer violated. It was violated when they built the IDS buildings and many of the other tall buildings in the Twin Cities area. They've been siphoning it off as a way to get cheap air conditioning, and that's instead of recycling water with some (indiscernible), they just send it through the sewer.

It's the most anti-productive thing to do with water that I've ever seen, and again, it's done by very wealthy people who have corporate status and gained more, not less. They own more of us, not less, and I'd

like to see us all come together and realize we do have the power.

And I have a lifetime friend here who had an organization called Drive Easy. Drive just ten miles slower and it helps, and electric cars -- we have, now, in the Hinckley area, we have plug-ins. Pine City, we have plug-ins. There are alternatives.

We can make a difference, individually, as human beings. We can step up to the plate and take steps of doing -- making less of an impact on the planet.

So I bless you all. I thank you all for coming. I'm so proud of you for being here, and I'm sorry I was late. Thank you.

FACILITATOR: Just, again, name and spelling of your name.

MS. KAREN HULSTRAND: Karen Hulstrand, H-U-L-S-T-R-A-N-D.

The additional comment I wanted to make was I was told that there's an addendum to the EIS of what would be the consequences of a catastrophic spill. However, it's been done by Enbridge, as a consultant of Enbridge, and I think we deserve

an independent scientific study of that, not done by the corporation.

As a physician, there's been a lot of drug research done by the companies, and a lot of times it's suspect. So I think we deserve an independent analysis.

FACILITATOR: Name and spelling for the record.

MR. JAY HANSON: My name is Jay Hanson, and I'm local also. And good words, Jane. Excellent. I wanted to just kind of talk to some of my union brothers and sisters.

I'm a Teamster, background, and I just wanted to share something that perhaps might shed a little light on what we're talking about on a grander scale.

I did some activities with the Ford plant when the Ford plant was closed, down at the union hall, and we wanted to restructure the Ford plant and be able to keep jobs, keep grinding out cars down there.

Well, that closed and they took out the Ford plant, which is fine. That's the way the economy worked. But I'm also very concerned about the community.

There's a group of people in that area of St. Paul, and I'm not sure where the mayor stands on that, but they're trying to build a residential area where the Ford plant was.

Right now they've got years of digging out the extracts and the remnants of the Ford industry, of manufacturing down there.

This is just one small area, and they're putting in millions of dollars. They have a lot of jobs.

If you're looking at jobs with extraction of digging these pipelines out, would be good money and a long-term job, but they're trying to resurrect an area -- I grew up about two miles away from there.

They're trying to resurrect an area of the earth, and that is so polluted. They cannot put residential houses in there, and they probably never will be able to.

Kids will go outside and want to play, and they can't go outside and play. This is what we're dealing with. If that can happen in St. Paul, and they will spend the money to try to do this.

But at the same time, you can't put a garden in there. You won't be able to have a little park for the kids to play in. It's going to be a long-term resurrection of a small piece of land in order to make that habitable for humans and anything else going on.

So my contribution -- and I heard about this meeting at 2:00 o'clock in the morning, so I wanted to come over here. I thought it was a whole -- just a small gathering of people that were really concerned about doing pipeline construction at all.

I am really opposed to anything that has to do with jeopardizing what's going on or what we have in Minnesota.

But I'm also opposed to the one that they've got coming all the way down from Canada right now, which I think would be multiple economic boom for people to pull that sucker out of the ground. Because actually, the dependency on oil is being reduced and people are developing alternatives.

So anyhow, that's my statement for the day.

FACILITATOR: Thank you, sir.

MR. ALGIN GARYT GOODSKY: (Ojibwe). My English name is Algin Garyt Goodsky, that's A-L-G-I-N, G-A-R-Y-T, G-O-O-D-S-K-Y.

And I'd just like to say that the whole oil situation, the whole situation itself, I find is highly rhetorical. Like has been said multiple times in this room, there are multiple different ways of sustaining supplemental things, things that are supposedly needed.

You know, hemp being a good one. Just like take a good look at this hat. It's a hemp made hat. Some of the clothes is hemp made. A lot of the clothes is hemp made nowadays. If you haven't taken a good look around in the economic society, there are different type of things.

If you think about it, you can use your fancy phones and all, what are you going to use to charge those fancy phones? You know, plug it into the wall, that's electricity.

There have been advances in the

technological area. Like wearing clothes that will charge some. Am I right? Electrical vehicles.

And I just want to state the facts that there has been statistically proven, in multiple different ways and propaganda so to speak. It's been said in movies. It's been said in music. It's been said in art itself, that we don't have very much longer left on this earth.

That's not to say that our next generation will not be able to live as long as we have, because of the things that have been statistically proven.

But what we still can do is make a better living for them, show them a better way. Show them that living that greedy life of having been a necessity for money -- because money itself, it's an issue. We all need it. Who don't?

I know for a fact I can reach in my pocket and not pull out a single dollar, but does that make me mad, does that make me sad? No, it don't, because in my heart and my mind, money cannot buy happiness. The betterment of

the people buys my happiness.

You know, when my family gets sick and have chest problems and hard breathing, you know, things that are wrong with them, I know where to go in the woods and go find that stuff, find the medicine, find the herbs.

I don't need to go to no Goddamn store and buy liquid in a bottle. Because that's not how reliant I am on money, on oil, on all those things.

I bet you I could take a month out of my life to go live in the ways that we used to live and strive properly.

You know, just a while back I was watching TV, and what they were doing on TV is they were trying to live without any of that things. Live without a computer, live without a car, live without a house, and it really dawned upon me, if they were so interested in living that way, why haven't we gone back to it?

They talk about re-using these old methods, old ways of doing things. Why don't you take a look at the righteous one

instead of the greedy-filled one?

I don't know if it's only human nature for all of us to feel the way we feel about the situation at hand. But instead of being selfish in one's mind, look to the younger ones. Look to the ones that have yet to live their life. A lot of them still haven't lived a life that is filled with happiness, filled with things that should be there.

I can tell a lot of house homes it's hard for a lot of people to do these things, live a happy life.

If it wasn't so filled with all this need and necessity to be somewhere and do something, you could actually take the time to sit down and love your family and enjoy your family. With all that, I'd like to say miigwech, thank you.

FACILITATOR: Other hands of the folks who want to speak? Anybody else who hasn't spoken, would like to make a comment?

There's a comment right up here, so Leslie will bring you the mic. State your name and spelling for the record.

MS. MARY MANGAN: I am Mary M-A-R-Y, M-A-N-G-A-N, and I'm currently a Pine City resident. I have a hard time speaking.

So to make a long story short, basically, what I would like to know, what is any of this meeting going to do? Just like in North Dakota, they have the meetings, they went to court and Trump put it right through. Even Obama said, no, they couldn't do it. Trump put it right through, so what difference is all of this going to make? They're going to put it through anyway, you know. Why are we wasting our time?

They're going to do it, because, you know, (indiscernible) I believe the oil from like Kentucky Fried Chicken, McDonald's, to drain the oil and use it in your diesel cars, right. That was free oil. Nope, can't do that anymore.

The solar power, no, not anymore. Put an end to that.

So it's like why do we have to put a pipeline through? To me, that seems so stupid. It's not really going to create any permanent jobs.

Not only that, they're going to truck that oil all the way downtown. We got three refineries down in St. Paul, in the lower part of Minnesota. Why are they going to go all the way downtown with it? Go -- it don't make sense to me. That's all I got to say. Thank you.

FACILITATOR: Thank you. Anybody else who hasn't spoken? And a final comment then from over here. Again, just name and spelling for the record as we begin to wrap up.

MS. JANE BURNES LEVERENZ: Jane Burnes, B-U-R-N-E-S, Leverenz, L-E-V-E-R-E-N-Z.

Three things. One is history says that pipeline spills don't get cleaned up. They get covered up. So you cannot depend on that. Getting a list of chemicals is not a bad idea. You triggered my brain to think of that.

Number two, I wanted to thank the woman that was up there talking about other jobs. There are a zillion job opportunities out there right now in any alternative field, from sustainable agriculture, regenerative

healing earth, I could go on and on. We don't need the economic job status.

We need to move much, much faster into programmers, and -- in order to make automation not kick us down as far as it is at this point.

Now I have forgotten the third one.

Anyway, it's -- there's an answer. For every single problem that we have, there is a solution. There's not one thing that is not solvable. We just have to be open to change, and it's called transition. And I know that we can do it, you know, and don't have to sacrifice anything.

It's just thinking differently, thinking differently, how we live with a living organism called Mother Earth, planet earth, our sister, our brother, that's what it is. It's going back to living with it.

And if it's not good for all, including a micro organism in the ground, it's not good for us either. We're on a tipping point here, folks, and if we don't stop it, we're not going to have the quality of life for

the other generation. And that's been my basic for living most of my life.

So, again, peace and love and think, think before we do things. We do not have to accommodate business. I think that's how we got into this mess was accommodating, all the time thinking jobs. That's a monetary system. Money doesn't work anymore.

Look around the world. India right now is planning on a gold bath, electronic money. Does that send a message to any of you in the direction in which we're going? I'd rather be hugging trees than hugging a basket of gold.

Sorry, guys, it doesn't do a thing for me.

So take care. Thank you.

FACILITATOR: So for the remainder of the time until 1:00 o'clock, people will be -- agency folks will be at the poster boards if people have additional thoughts, questions, or comments.

Again, court reporters are here at this table right here. Here and actually out in the lobby area. If you want to make an

individual comment, you can write your comment.

Thank you so much for coming today. I appreciate your comment and your views, and it will all be captured during this process.

Thank you. Enjoy the rest of the day and safe travels.

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DEIS MEETINGS - 14-916 15-137

MCGREGOR - JUNE 12, 2017 - 6:00

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: CN-14-916

OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137

OAH DOCKET NO: 65-2500-33377

East Lake Community Center
36666 State Hwy 65
McGregor, MN

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FACILITATOR: All right, everyone, welcome. Thank you so for coming out tonight.

Thank you very much to the Mille Lacs Band hosting us as well. We greatly appreciate it.

So if folks want to take a seat, there's chairs here, there's a few chairs around here. We've also got chairs around the outside if people want to sit. I would like to get us started with the public comment period.

So, first, what I'd like to do, as people settle, is introduce Jamie MacAlister, and she is with the State of Minnesota for the Department of Commerce and is the project manager for the Environmental Impact Statement. And, again, just want to stress this is a meeting hosted by the State of Minnesota, who's overseeing the Environmental Impact Statement.

I'll hand it over to Jamie to say a few words to get us started, I'll run through meeting procedures, and then we will hear from an elder and then begin public comments.

MS. JAMIE MACALISTER: Good evening, everyone. Welcome. I'm Jamie MacAlister with the Minnesota Department of Commerce, and we are pleased to have so many of you come this evening.

I just want to give you a brief introduction to what we're going to be doing here this evening, and then I will turn this back over to Pat. We know that you came here, in part, to provide us with your verbal comments. We want to make sure you have the time to do that.

First of all, we would just like to remind everyone that this meeting is a State of Minnesota meeting and that we are here primarily to hear your comments on the draft EIS. We want to make sure that it is clear that we are not here representing the Applicant in this case. We are here to gather your comments on the draft EIS and all the analyses that have gone into it.

We would also like to remind everyone that the Minnesota Public Utilities Commission will be making two decisions on this project. They will be making a decision on the certificate of need, and they will also be making a decision on whether or not to issue a route permit for this project.

And hopefully everyone has had an opportunity to visit the posters and to talk with the agency staff that we have here tonight. We have folks here from the Minnesota Public Utilities Commission, the Department of Natural Resources, and

the Pollution Control Agency, as well as the Department of Commerce.

And just another reminder that the EIS is -- we are not making a decision here tonight, but that the EIS helps to inform the decision makers as they deliberate on this.

So we'll just quickly go through a little bit of the process and the timeline. The draft EIS was prepared based on the scoping document that was prepared last fall. We are now in the draft EIS comment period. And as you can see, there will be a final EIS issued towards the end of the summer, and that will initiate another process that is run separately from this process but helps inform. That will be the contested case hearing. Those will be run by the administrative law judge. And folks will have an opportunity to talk to the parties at those meetings and to provide their comments to the judge regarding their position on the project.

It is not expected that a permit or any decisions on this project will be made until sometime next year, in 2018.

So if you don't get your comments here in the upcoming public meetings, you will have

another opportunity to provide comments on this project during the contested case hearing in the fall.

So what we are here for this evening and asking you to do with us is to provide us with substantive comments on the draft EIS. We would like to know if there's information that is missing from the document, if the information that is there is unclear, and if there are things in the document that could be improved. That's what we're looking for from you as we go through these meetings.

State agency staff, as we said, are here to discuss some of those analyses with you, if you have questions. And you are welcome to submit comments to us verbally here this evening, in writing, or you're welcome to send them in by mail or email at your leisure.

Once the comment period closes on July 10th, we will be compiling all of the public comments and be posting them online. So you will have an opportunity to see your comments, as well as the comments of others from each of the meetings that we've held.

So let's talk about the comments here briefly. We want you to know that all the comments

are considered equally, whether they're offered to us verbally or in writing. And, again, a reminder that the EIS is not the decision-making document. It is what helps to inform the decision makers, as they deliberate on this and, furthermore, that your comments will help us prepare the final EIS.

I'm going to hand this back over to Pat, who will talk to you a little bit about our general meeting guidelines and open it up for your comments. Again, thank you for joining us this evening.

FACILITATOR: Thank you very much.

First, if we could just do a quick round of applause for your cooks tonight. I think they're still back there. We really appreciate it. So thank you so much.

Okay. So I've got the folks who have signed up to speak. And after I've gone through these cards, I'll give a chance, if other folks who didn't sign up and want to and we have time, we'll go to that as well.

So how we'll run the meeting is this: Generally with a crowd about this size, we give up to five comments per commenter. So we will run a little stopwatch. We'll show you in a second here

about how to do that. And we do ask people to stay on time so we get everybody's comments. But given the crowd size, we should be able to easily accommodate everybody within the five-minute limit. And you're certainly, of course, free to speak less than that.

When people are commenting, we want to make sure that everyone has a chance to voice their opinion. So we would ask that people here listen as the commenter comments. At the end, if you want to be affirmative, that's great. What we do ask is for people not to be negative about comments. We know there's probably a wide range of views in this room about the environmental impact statement, about the pipeline, about a range of issues. And what we want to do is recognize people are going to have different views and still be respectful. So just ask that people be affirmative at the end of any comments.

And, again, please don't interrupt when people are speaking, of course.

It's important that people -- we ask that people actually direct their comments to the EIS, to issues, to organizations, to agencies, but not the individuals in the room. And that's

primarily so that everyone can feel comfortable and anyone can make a comment who wishes to make it, and we kind of keep it civil for everyone. So feel free to make comments about the issues, the organizations, but not the individuals in the room.

The role of the state agencies is to listen. State agency folks, do you want to raise your hands who are here tonight? Okay. So we've got a number of folks, as you know, around the poster boards. Their job tonight is to listen.

We have a terrific court reporter, who is going to capture every word that you say for the record. And the comments, as Jamie said, they will all be compiled, considered, and reflected upon as they move to the final EIS. And they'll also be compiled and posted on the State's website as well once they're all gathered up.

It's really important that the court reporter can hear you. So don't talk as fast as I do. If you hold the mic like this, that's actually the best way to actually hear in this meeting and she can hear. And if she can't, she'll let me know, and I'll give people a little bit of prompt as we do that.

Cell phones, if you put them on do not

disturb or silence or vibrate, just so we don't have your interesting ring in the middle of someone's comments, that would be much appreciated.

As you know, the bathrooms are right there, and there's an exit that way out in the hall, just for safety purposes, and out that way as well.

We are going to -- again, we'll go to the clock. What I'll do is when -- we have a little stopwatch that'll show up on the screen in just a second. When you speak, state your name, spell it for us so that the court reporter can hear that, and then we start the timer for up to five minutes.

We will bring the mic to you. So when I actually call out your name, just raise your hand, we'll bring you the mic. You can speak sitting or you can speak standing up. Totally up to you. But we want you to be comfortable; we'll bring the mic to you as we do this.

But before we start that, we do have an elder in the Band who would like to speak, Dale Green. So I'd really like to hand the mic over to him and honor him and appreciate that he's opening the comment period with his presence and comments.

MR. DALE GREEN: My name is Kaavaak. K-A-A-V-A-A-K, and it means ruffles.

I wanted to speak to some of the listeners to voice my comment and my opinion. I'm 84 years old, and I have seen a lot of changes. What I see now, Corporate America is ruining our mother.

Our mother is our earth, is our life. She gives us everything. You must realize that. Everything that you have today comes from mother. You're digging in her flesh. You're leaving scars. You're releasing poisons. Everything that -- she has given you many warnings, you see the warnings, but nobody's paying attention.

Iron ore and oil, I'm sorry to say that, but that's what's running your war machines. 70 percent of your oil and iron ore goes through the -- to make the war machines run and build. It seems like corporations have lost all respect for life.

I'm just wondering right now, you've got a bounty on the wolf, who's next? A human being?

There's a lot more I could say, but I think I've said enough now. I just want to remind you think of mother earth, life. We are earth. We are mother earth.

That's it. Thank you.

FACILITATOR: Thank you.

Okay. We're going to pull up the timer and get folks ready for the comments.

Okay. So, again, just a reminder, we'll bring you the mic. State your name, spell it for the court reporter. Hold it kind of like this, pretty close, so that we can hear you.

And, Scott Kramer, you are up first after our elder. Scott? And we'll -- Leslie will bring you the mic right there.

Is just name and spelling for the court reporter.

MR. SCOTT CRAMER: I'll have to remember there's people behind me and in front of me and everywhere. Scott Cramer. Cramer, C-R-A-M-E-R. I first started coming up here 27 years ago. I had hair then, it was brown, and it went away. And a lot of things are going away in life.

I've spent most of my life between the cities and coming up here. The last seven years we've had a major garden. So I didn't come as a farmer today; I came looking like pretending I had a lake property instead of a garden. And the garden depends on water.

And in Aitkin County we may think mosquitos are our most precious natural resource, but they're not. There's one other. It's water. This county is blessed with an abundance of water. And one thing we've learned through all the years of working in renewable energy is that there is no alternative to water.

And I have solar panels, and I work renewable energy fairs, and I've been involved with energy issues for most of my life. But the water is what it's all about. We and the planet are about 70 percent water.

So when the people in Bismarck, North Dakota last year heard they were going to have a pipeline put just across the Missouri River on top of them, above them, they said no, no, we don't want it. So DAPL, the Dakota Access Pipeline, said no problem, we'll put it where nobody cares; we'll put it on top of the Standing Rock Reservation. If you follow that issue at all, you'll know what happened at Standing Rock last year, because people as usual, in deciding where to put something, where will it be the cheapest to do it. And it would be right on top of that reservation.

So now we have a pipeline proposed

here, which we stopped one here. Remember that? Two years ago, the Sandpiper, we stopped it. And it was stopped because it had a worthless Environmental Impact Statement. And they've done a much better job on this one, but the fact is it's still a problem in what this -- all these beautiful surveys here don't talk about is the reality of the future.

Renewable energy is here now. Coal jobs are not coming back, not because somebody hates coal; it's because it's cheaper to do wind, and it's getting cheaper to do solar. And we'll be living in a renewable world sooner than you think. It's happening all over the country and the planet already.

So if we put this money into a pipeline for a resource that, in fact, we're killing ourselves by using too much of it and heating up the planet, we leave ourselves no opportunity to use that money where it should be, on renewables. This -- you see it right in our newsletter from Lake Country Power last month where they're very happy where they don't have to shut any coal plants down. They call it stranded costs.

So this pipeline, which nobody needs right now, really, and the other ones, the DAPL one

that's going through that really has no oil to go in it right now, because the prices are so low because there's so much oil on the market right now, is a great crossroad. This is an opportunity to say put the money into technologies of the future, not of technology of the past.

This planet developed coal, gas, and oil over hundreds of millions of years. In 200 years, the industrial revolution till now, we've managed to burn up about 25 or 30 percent of it. More of the oil. Less of the coal. But we can't keep doing this, and that's the problem. And there are alternatives. 30 years ago there weren't. The solar industry, the wind industry, they were minuscule. They're not anymore. They're huge. There's more jobs being created in those fields than any other area of energy developed. That is the present, and that is the future.

So if you study the past to understand where we are today, to understand where we will be tomorrow, you don't have to do like the Iroquois Confederacy, look seven generation forward for your inactions. I ask you look two generations. Look at your grandchildren. They have names. They have faces. You know who they are. What world will they

live in when they reach our point as elders? What will be left for them if we don't change what we're doing now?

Thank you.

FACILITATOR: And just a reminder, at about 4:45 I will stand up, and that will be a signal to the speaker that you're at about your five minutes.

John Munter. John. Leslie will bring the mic to you. And name and spelling of name for the record. Thank you.

MR. JOHN MUNTER: My name is John Munter, M-U-N-T-E-R. Department of Com-- I'm from Warba, by the way. I'm a retired guy.

The Department of Commerce has been given an impossible job here. I don't think the DEIS can be fixed. There are four criteria for the PUC to judge adequacy. The Department of Commerce has just now gotten agreement from the Public Utilities Commission to hire an economist. That means that the economic data will be coming someday in the future, after all your public hearings are done. And so if you want to get the full story, you have to go online and go to these other hearings, and then comment on that. I'm not sure that's been

clear to people.

So that's a problem for the MEPA process where route, rote, and need here should be combined in this public engagement process. As it is, the Department of Commerce relies on the Energy Information Administration, the EIA, of the United States, which has been very wrong by factors of seven and ten on projections of renewable energy, Jeff St. John at Greentech Media says, for four reasons: One, the EIS doesn't track falling cost of renewables; two, they underestimate the performance of current facilities, renewable facilities' improvements; and, third, there are future low costs of renewables; and, fourth, the rise of solar is missed as well. Consequently, the EIA projects world oil demand rising 5 percent through roughly 2040. This conflicts with present reality, unfortunately. All major oil companies are fleeing Canada with Saudi oil and Permian oil flooding the market. The big boom in the Permian is why we still have a glut of oil, and it's going to go on for a while.

This is why many economists and astute observers are saying that we're going to be hitting peak oil demand very soon. Carbon tracker says in

2020. Michael Liebreich at Bloomberg Energy Finance says between the 2023 and 2028. Michael Seeley of Deutsche Bank, 2024. Simon Henry, who was a shell chief financial officer, actually, 2022 to 2032. The World Energy Council, 2030. The ratings agency Fitch suggests pumping electric vehicle batteries could be the death spiral for the oil industry, actually.

This is why the second criteria -- alternative is problematic, because it doesn't consider the Saudi and Permian oils as alternatives. Instead, it talks about trucks and trains coming from Canada. And if that was reasonable, we would have seen that happen after the KXL was defeated, and that didn't happen. I mean, why not have wagon trains and horseback and mule trains coming down with oil, I mean, the U.S. carbon emissions and you have to subtract the burps and that type of thing.

But -- so this is why the second criteria is problematic. You're not dealing with reality here, but options that are really not going to happen with trucks and trains.

Thirdly, there's no discussion of consequences to society are more favorable to granting the certificate of need than denying it.

We've heard a lot about all of the dreadful consequences about what is the benefit. Is there going to be a drop in gasoline prices? Is there any benefit, actually, to putting this project through, really? I don't see that discussion in the DEIS.

Fourthly, would the proposed facility comply with relevant policies, rules or regulations of other federal, state, or local agencies? And I don't believe that it complies with Minnesota greenhouse gas goals. There's the Alberta First Nation genocide issue of the First Nations north downstream from the tar sands. There's the environmental justice issues around Detroit refinery and the Port Arthur refinery, and little bit connected action of the Bad River Band in Wisconsin of Line Number 5. It doesn't have a lease since 2013. I consider that an environmental justice issue as well.

So I'll quit there. Thank you.

FACILITATOR: I have Sandra Skinaway. Sandra, you want to just raise your hand? Thank you. Sandra. Just name and spelling for the court reporter.

MS. SANDRA SKINAWAY: Boozhoo. Hello, everybody. My name is Sandra Skinaway. I'm here

from the Sandy Lake Ojibwe Tribe, located just north of McGregor here on Big Sandy Lake; and I'm here to submit a few comments, just verbal comments. But I have yet to fully read the DEIS. And so far I'm looking at bits and pieces of it.

But I have provided testimony many times before at these public hearings, you know, for the Sandpiper. So, you know, it's basically the same thing. It's only 25 feet from -- Line 3 is 25 feet from the Sandpiper. That was gone. It's gone now, which was good. But now we have to deal with Line 3.

And all my other public comments are basically the same. But I just want to add something here. And it's been kind of bothering me a lot more, because it's becoming more apparent with the climate change that we need to -- everyone needs to focus on our future. We all know it; but pipelines, they all leak. They eventually will leak sooner or later. But we need to start thinking about our future and protecting it for those yet to come.

Now, I understand that in the future that we're probably going to most likely have like famine, food shortages. Overpopulation is really a

serious issue. And I'm worried about the future for those yet to come. And I think we all need to start thinking about that and working now to try to protect what we have.

And this pipeline coming through our water-rich area here with wild rice, I mean, this is our life-giving food. This is the reason why we're here. And so I think we need to protect that.

And I really would suggest you get a different alternate route away from our water-rich areas and lakes, you know, where fish are, the wildlife, the waterfowl, birds. I mean, we need to start protecting them as well.

Instead of doing a shortsighted future on monetary gain for companies, we've got to start thinking about the future and our children's and their children's future. We're looking at the seven generations ahead. I'm not looking at just two. So I think we all need to start doing that now.

Miigwech.

FACILITATOR: Thank you, Sandra.

We have Richard Draper next. Richard, want to raise your hand? Great. And we'll just bring you the mic. Eric is going to bring you the mike.

Richard. And just name and spelling for the record. Thank you.

MR. RICHARD DRAPER: Draper, D-R-A-P-E-R. Between the 1820s and the 1850s there existed an Ojibwe village on the northeast side of Esquagamah Lake in Aitkin County. It was one portage away from Moulton Lake, which is the headwaters of Mud Brook.

Mud Brook runs down through Bass Lake, Lows Lake, and what's left of Birchdale Lake, after the DNR all but destroyed it. I talked to the wildlife biologist responsible for that debacle. Mud Brook runs to the Little Pine River, which it joins, and then on to the Big Pine River and southwest to the Mississippi. These streams and rivers were the highways and back roads the Ojibwe used.

Esquagamah means end of the trail in Ojibwe. About three-quarters of a mile as the crow flies northeast of the Esquagamah Wakiagun or village is a high ridge of sugar maples, now bisected by Aitkin County Road Number 1 where the village Sugar Camp was, directly east of White Elk Lake.

One mile as the crow flies further to

the northeast lies Moose Lake, a first-class state wild rise bed. This is where the Esquagamah Village gathered in their Manoomin, their good berry, their source of bread carbohydrate prior even to fry bread.

I knew a man, now deceased, from Swatara who liked to wander the woods as a young lad who told me of seeing six or more birch bark canoes stored on the southwest side of Moose Lake that appeared to him to be very old and in poor repair.

Moose Lake is listed on a large Minnesota map showing significant native activity centers. This map is found in the basement map room in the Wilson Library on the University of Minnesota campus.

Moose Lake is a first-class wild rice bed because the rice produced there is consistently a grade A quality wild rice. As an example, Blind Lake in Aitkin County would rate a D or D minus, as they produce mostly chaff. Although Moose Lake is not a large bed, it is an early-ripening gem of the a lake when it comes to quality and percentage of beautiful ripe rice.

We declare small libraries, even in Aitkin, historical preservation sites. We declare

wooden houses heritage sites, because some famous person lived in them, and yet we propose to put a pipeline, which is guaranteed to leak -- let me say that again, guaranteed to leak -- near an Ojibwe heritage site that will someday be spoiled beyond recovery. Wild rice is also an indicator of water purity, and there is no going backwards.

The Dakota Access Pipeline has already leaked over a hundred gallons, according to the Minneapolis Tribune newspaper. The article went on to say that, quote, from 2006 to 2016 there were 3,032 significant pipeline spills reported, at the cost of $4.7 billion. In December 2016 a pipeline leaked 176,000 gallons of crude oil into a creek in western North Dakota, only 150 miles from the Dakota Access Pipeline, end quote.

Cost cannot just be measured in dollars. To abandon a pipeline and carve a new route is arrogance, coupled with greed on a level that makes all the parties complicit to the outcome. If money talks, then big arrogant money curses as it swaggers on.

A Cree prophecy from the 1800s said this, quote: When all the trees have been cut down, when all the animals have been hunted down, when all

the waters we can no longer drink from, when all the air is too sick to breath, only then will you discover, white men, you cannot eat money, end quote.

I will not come out to protest your pipeline, although I understand why people do. There is much vanity mixed in there. But I promise I will pray against you, for I fear the God of heaven, the creator of all the earth, and everything in it. I will ask God to judge all those who take part in this evil plan. In the back -- in the book of Proverbs, Chapter 1, Verse 19, and Chapter 15, Verse 27, it says, quote, So are the ways of everyone who is greedy for gain, it troubles their own house and takes away the life of its owners, end quote. This is the word of God.

It will be easier to choose carefully, to make reasoned choices based on your true hearts rather than succumb to pressure and influence and go to the grave regretting destroying this food-producing Ojibwe heritage site forever.

FACILITATOR: Thank you, Richard.

And for Richard and anyone else, it would help if the court reporter actually has your written statement, if you have one and you have an

extra copy, you can just hand that to the court reporter. For anybody who does that, that's super helpful to have. You don't have to, but we would appreciate it if you can. You can put it right up on the table.

Thank you, Richard.

Next I have John Cyrus. John.

MR. JOHN CYRUS: Here.

FACILITATOR: Okay. We'll bring you the mic. And, John, just -- Eric is going to bring it to you. Right behind you.

And name and spell it for the record.

MR. JOHN CYRUS: My name is John Cyrus, C-Y-R-U-S. I'm the mayor of City of Tamarack. And being the mayor of the City of Tamarack, we are in favor of the new corridor for Pipeline 3. The reason, in the Environmental Impact Study, if we do not have a new Pipeline 3, they possibly could use the rail line to transport that amount of oil. Now, the oil as of now goes down the rail, goes through St. Cloud. But this would cause ten trains, possibly -- I think in the environmental study it states something like ten trains could be coming through the City of Tamarack, and that would be a lot more impact on the environment than the

pipeline would be. There's more accidents with rail than there is with a pipeline.

And that will end my -- I'm very short here, but that's all I've got to say. Thank you.

FACILITATOR: Thank you, John.

I have Keenan next?

MR. KEENAN GONZALES: Hold on. Hold on, please.

FACILITATOR: Okay. Keenan, I can also put you in the next line, if you want to. You bet. We'll come back. No worries.

Next will be Janet Hill. Janet? Okay. And we'll have Leslie bring you the mic.

Name and spelling for the record.

And, Keenan, we'll get to you when you're ready. Let us know.

MS. JANET HILL: It's Janet Hill. J-A-N-E-T. H-I-L-L. I'd like to cover some specific parts of the draft EIS.

Page 2-38 discusses the merits of the SCADA system, a computer system that will monitor Line 3 to detect leaks. There are lots of assurances about this computer system in the EIS, but nothing about what happens when it's compromised or hacked.

A quick Google search brings up all kinds of information on how attacks on the SCADA systems are on the rise, and there should be a section in the EIS on what measures are in place to deal with hacking.

On page 2-41 are assurances that Enbridge inspects and monitors its pipelines. And that's really great; but, again, we need to know what they do to fix those problems when they find them.

Just two weeks ago it was reported that Enbridge had been in noncompliance with Michigan law for years for insufficient supports along their Line 5 pipeline running under the Mackinac Straits of the Great Lakes. In northwest Minnesota on the Tamarack River, erosion has exposed a 100-foot section of pipe, leaving it vulnerable to whatever comes floating down the river. To fix the problem, Enbridge simply added legs to the pipe to stabilize it. This kind of duct tape solution is a real problem.

In twenty -- a 2013 study by the Pipeline and Hazardous Materials Safety Administration found that depletion of cover, which is what happened at the Tamarack River, was a factor

in 16 significant pipeline spills at river crossings in the past 25 years. The two examples I just gave underscore why Enbridge's assurances mean little. Given their history, they need to do more work to assure us that they'll fix problems properly, before we should entrust them with our lakes and rivers.

The EIS also requires more information on the effects of peat acidity on pipes. In Aitkin County much of the pipeline would lie in peat bogs -- apparently forever -- and this could be a big problem for this area. The pipeline lies in the watershed of the Big Sandy Lake, a ten-mile square of lake that's the backbone of our local economy.

Enbridge claims that the oil from Line 3 will benefit of U.S. But as long as any part of this oil is being used to shore up the U.S. oil reserves, which in turn enables companies to sell surplus oil to foreign markets for a profit, then Enbridge's claim is untrue, and their main reason for needing this Line 3 is false.

Then I have one last comment. Today half of Norway's auto sales are electric cars. India has a goal to have all electric cars by 2030. And that's the direction we're headed in the United States.

One of Minnesota's electric utilities, Xcel, already has the technology to borrow electricity from cars being charged on the grid. That's the state of green energy technology right now, one of the fastest-growing job sectors in the country.

Enbridge's temporary Line 3 jobs pale in comparison to the good-paying, permanent jobs we can create if we focus on infrastructure of renewable -- of renewable clean energy. If we allow Pipeline 3 to be built through Minnesota, we'll be stuck with a permanent aging pipeline running through the best parts of our state and slowly leaking oil into our water for years to come. The EIS needs to include the option to close Line 3 and not rebuild it.

Thank you.

FACILITATOR: Thank you, Janet. And if you have written comments, you can give to the court reporter. That would be great.

Keenan, are you ready? Okay. All right. And Leslie will bring you the mic. Just name and spelling for the court reporter.

MR. KEENAN GONZALES: (Speaking Ojibwe.) How are you doing today? And my name

Keenan Gonzales. That's K-E-E-N-A-N, G-O-N-Z-A-L-E-S. And his Anishinabe name is Biidaaban, B-I-I-D-A-A-B-A-N. That means the coming of the dawn.

I'd like to talk about where oil kind of came from and how they said -- how in school they said that it came from the dinosaurs, and they said it was like all the nutrients and the biomass. Now, the biomass is interesting because, you know, we all got biomass, you know, whatever number. But trees have more biomass. You know, obviously the trees are bigger. And then you know like how all the scientists and the teachers said that the plants were way bigger, bigger than the dinosaurs. You know dinosaurs are pretty big in their own right too. But plants are way bigger, you know, beyond comprehension, you know, mega force, super force. And so with the superior biomass, that's what created those big huge oil reserves.

Now, what do plants need? Sunlight, check. Water, check. Now, without water there would be no plants; and without the plants, there would be no oxygen for us to breathe and stuff. And without those plants, there would be no oil. Now, without that oil, though, we wouldn't have the car--

we wouldn't have to worry about global warming.

And then another thing we also got to take into consideration is, after the meteor hit from Pangea or whatever how that goes, all the continents went spreading around, you know, in all different directions. So right now our continent is moving. You know, you can prove this geographically and, you know, all kinds of other studies.

And what about this pipeline? You know, this pipeline is built to stay there, stay where it is and, you know, it's going to get damaged just by the continental drift.

And, you know, where are we? You know, like everyone says -- and my grandfather, you know, rest in peace, always said, you know, this is a wetland, you know. And some of you might not know, but this is a swamp. You know, you just go walking out there, and they'll say you hit marshes, swamps.

You know, now, this in particular -- blah. This area in particular was floodplain, you know, by the local Minnezeebee (phonetic) Band of Ojibwe. As my auntie said earlier, we lived over there by the refuge, you know. So not only that, you know, so we were river people. We had bitch

bark canoes and pretty much that thing would be light. For example, this woman could pick it up and be like, hey, this is light, you know, which it was, and it could go through the water with ease and stuff, you know. If that was our highway, then that means water is life -- more life for us, especially, and especially if you're in the desert and whatnot.

But, you know, this is stuff we all kind of really got to consider and think about, not let it go over our heads and, you know, let old squabbles reopen our wounds and whatnot and -- you know, because climate change, you know, it's going to affect us in a way. You know, I can't tell, but, you know, from -- years later, you know, after looking back at history, you can tell. You can see it. You don't know what's going to happen. You can just tell, you know.

But, you know, this is my 2 cents on the issue. And thank you for listening.

FACILITATOR: We have Jean Prickett, if I said that right, next. Jean.

Great. We'll bring you the mic. And just name and spelling for the record. Thank you.

MS. JEAN PRICKETT: Yeah, Jean Prickett. J-E-A-N. P-R-I-C-K-E-T-T.

First of all, I second Mr. Cramer's remarks and also Janet's remarks about the oil pipeline is obsolete technology. First of all, all of the profits go to Canada. We would get a few jobs here in the state, in Minnesota, but they would be short lived.

In general, pipelines are safer than rail hauling of oil, but pipelines leak. And for that reason -- if for some reason the Minnesota agencies decide that we should go through -- should have this pipeline, it should not go through northern Aitkin County or Cass or Crow Wing where we have all of the -- not only the wild rice, but just water. Clean water is going to be more precious than oil sometime during this century for many people.

And Enbridge has been talking a lot of -- talked a lot about how safe their new lines are, they're wonderfully put together, and they have this wonderful little thing pig that goes through the lines and takes pictures. But just in the last two years there have been two major spills that I've read about. And I don't do a lot of research. I just -- these showed up in the Brainerd newspaper. Two major spills in the Dakotas. They were both

small leaks, but they eventually put out several thousand gallons of oil. Enbridge did not know it was happening. It did not affect the line pressure, so they didn't know this was happening. Eventually the oil came to the surface. It was found by the local landowner, the farmer. And these were both new lines with all of the bells and whistles that they claim.

No one in Aitkin County routinely goes out and checks the condition of the local bogs and swamps and wetlands. That's open land; and if a small spill happens that doesn't show up on their radar, it's going to just keep leaking and leaking, until all of the sudden one of us in this room will see an oil sheen on the creek going by our house.

And I highly recommend to all of you who are opposed to this pipeline a very well-written, well researched article in a magazine called The Bent. This is a quarterly magazine of the Engineering Honor Society Tau Beta Pi. The author of the article is Trudi Bell. And it's all the about pipelines, and it's in the winter issue 2015 -- yeah, winter issue of 2015 by Trudi Bell, all about pipelines.

And I strongly recommend that this

pipeline, if it's built, should go somewhere down the western part of the state where the land is dry and solid and someone gets out there to keep track of it.

FACILITATOR: If you do want to provide your written comment to the court reporter, that would be most helpful, if you can.

Next I have Kaavaak or, I think, Dale? Okay. We'll bring you mic. Eric, you want to bring the -- is it -- do I have that right, Kaavaak? Right here? No. All right. Do we have -- I think it's either Dale -- all right. We'll come back to that. All right.

All right. Next I have Lynn Derby? Lynn.

THE WITNESS: Over here.

FACILITATOR: Great. Great. We'll bring you the mic.

Just name and spelling for the record. Thanks, Lynn.

MS. LYNN DERBY: Hi, I'm Lynn. I don't usually speak in groups. As a matter of fact, I'm loving hiding in the woods, because I've lived in the city too long. So usually when I get in front of a group like this what I want to say

disappears, so it will probably sound like a story and a little abstract.

So I grew up in southern Minnesota. My favorite memory was grandmothers and their sisters walking in the woods. It changed my life. I'm turning 60 in just a couple of weeks. Both of my grandmothers died at 60. And so I'm really living my dreams. I love water. I think what saved me as a little girl was standing and filling my pool up with water.

I live up by Savannah. I've spent the last 40 years trying to figure out what's happened to the native community by Isanti. If you all don't know that story, you should research it.

I didn't research what I want to say. I'm grateful to those who did. What I want to say has changed my life. I was teaching art in north Minneapolis with 650 kids a week. I tell people I almost died. Some people wonder how could you teach 650 kids a week. Well, 25 classes 25 times a week. It was tiring.

What changed my life was a group of us -- and, truthfully, I don't know how it happened. But Katrina happened. And we said, we're Minnesotans, we've got water. So we took a big

26-foot truck. It was beautiful. It was magic. It was a $38,000 McKnight Foundation Grant art project that was called The Famine Project. So we took water and 38 loads of food to rural Mississippi and Louisiana.

I'm just going to shift for a minute. My closest friend since then is a -- actually, she's a 300-pound African American woman in New Orleans. I call her the Dalai Lama of the black community, because she's taught me to slow down and I've taught her to move.

What I want to say about this pipeline is I don't believe we need it. And I say this because the craziest thing I did during Katrina was when others went home, and I thought, hum, I wonder what's out on Grand Isle. So I took a load of food and water, and the Jewish Community was filling this 26-foot truck to Grand Isle. I met the sheriff there. He's from Superior, Wisconsin and ended up in Grand Isle, because he married a Cajun woman when he was in the Coast Guard. And if you've ever been to Grand Isle, it destroys the Florida Keys. And this friend of mine Thomas' son runs the oil, the Fuchs (phonetic) and the oil rigs, and he's worked in every part of it.

And if you've ever been to Mississippi, Louisiana, and over to Texas where it says don't get out of the car here, the lands are destroyed. And I actually just kept going back to Mississippi and Louisiana, because the people are so alive there. They get mad, and they live in destroyed lands.

Probably almost my time, so I better say what I want to say, which is I don't believe we need this oil. I know there's huge storages of oil in places like Mississippi and Louisiana for years and years. And I just think our water is too precious here, and we need to have the conversations to figure out the alternative, and we need to listen to our indigenous communities.

And I'm so grateful to have this reason to come to East Lake. Thank you.

FACILITATOR: Thank you.

John Cirilli, if I pronounced the name right. John?

UNIDENTIFIED SPEAKER: Can you come back to him?

FACILITATOR: Yeah, I sure can.

Robert Peterson? Robert?

Great. Eric will bring you the mic

right there. And just name and spelling for the record. Thank you.

MR. BOB PETERSON: Bob Peterson. Bob with an O. Peterson like the other half of the Petersons in the state.

Are there any employees or representatives of Enbridge here? Any subcontractors? Nobody? My question is for them.

UNIDENTIFIED SPEAKER: Over here. Over there.

FACILITATOR: For the record -- sir, for the record, if you could just address the comment or issue or question, no problem. We ask you to address organizations, not individuals. So go ahead.

MR. BOB PETERSON: Okay. My concern is personal. My home and my property are immediately adjacent to one of the alternative routes where the pipeline might go underneath the Mississippi River. And if that happens, I promise you that I don't look forward to the process whatsoever, not the construction process, not the protest that will inevitably happen. It will be a major description.

I moved here from the cities 15 years

ago for peace and quiet. I didn't sign up for what's liable to happen. Even though this is my personal concern, I'm sure I speak for other property owners in the area who might be affected.

There will surely be aboveground visible infrastructure related to the pipeline, and my concern on a personal level is that it will have a major impact on my property value. It's tough to sell property in Aitkin County as it is. The county's been losing population for 15 years. If that pipeline happens, I don't know who would want to ever buy that property.

That's my concern. I thank you for listening.

Regarding the Environmental Impact Statement, I can't really -- I looked at a number of publications. I'm very impressed with the process. I'm glad we live in a Democracy where we have meetings like this. And I hope everybody's voice is taken into consideration.

Thank you.

FACILITATOR: Thank you, Robert.

All right. I have Jim Butcher next. Jim. Okay. Right up here.

And, Leslie, Jim's right here.

Bring you the mic, and just name and spelling for the record.

MR. JIM BUTCHER: Jim Butcher. J-I-M. B-U-T-C-H-E-R. I apologize for the accent. Retired mechanical engineer. I worked in the power generation industry, so I understand energy can be a complex topic.

I guess I'll just sort of lay my cards on the table. I think, unfortunately, we do need petroleum products. They go into so many things we take for granted. However, I think tar sands are a very, very destructive way to go. I don't think that's the way to produce petroleum products. In my opinion, we'd be better off using natural gas using processing to help propose at least coal-fired power products.

Having said that, this certificate of need, is it really to Minnesota's benefit? We're basically shipping stuff. We're just a conduit mainly, aren't we? It comes from Canada. A lady said earlier, that's where most of the profits are going to go. And then we ship it to Superior, which I believe is in Wisconsin. And so what's Minnesota get out of this?

And if Line 3 is built, what is the

payback period. I mean, North American oil consumption is dropping. You know, we have a (indiscernible) for 80 miles. We've now got a Chevy Volt at 238 on a good day. And my personal belief is we're making progress. We get 400 miles range on an electric vehicle. We're going to reach a tipping point on our need for petroleum. Liquid fuels will drop dramatically.

And we've all heard about Murphy's law: What can go wrong will go wrong eventually. We don't design airplanes to fall out of the sky. Occasionally they do. Pipelines will leak. We know they'll leak.

And one of my questions would be is there sufficient funds, contingency funds, to basically repair all the environmental damage when they do leak? And are there also punitive damages? If there aren't, why aren't there?

I've read recently that 22 percent of pipeline leaks are reported by the general public, so much for sensor technology.

That's basically, I guess, all the comments I have to make.

Thank you.

FACILITATOR: Thank you.

Next I have Terrance Roy, Jr. Terrance.

We'll bring you the name right there. And just name and spelling for the record.

MR. TERRANCE ROY: Good evening. Terrance. Last name Roy, R-O-Y.

And my comment tonight is, you know, I worked in the steel industry, I was a union iron worker for 34 years. And abandoning that pipe is not the option. Steel isn't made from just pure taconite. It's made from crushed up cars, refrigerators. Whatever they can combine with taconite to come up with a certain grade, that's the steel.

So in my concern, I think that's why it's failing. They're using inadequate steel. And I don't understand how them welds can be failing and these pipes are leaking, but it must be human error.

We need to take them pipelines back out. They put one in; they take it out. And that's my comment.

FACILITATOR: And then I have Harry Hutchins. Is there a Harry Hutchins who wants to comment?

Let's see. Gordon Prickett, if I said

that right. Gordon? Great. We'll bring you the mic.

And just name and spelling for the record. Thank you.

MR. GORDON PRICKETT: Gordon Prickett. P-R-I-C-K-E-T-T.

And I'll start my comment saying, if we put it in, we take it out. I believe we should remove the worn out 65-year-old Line 3 pipeline and put in a replacement for the Line 3 that is there in the same trench. Do not leave a damaged pipeline in place. Take it out and replace just the Line 3 going through, from Alberta to Clearbrook to Superior along Line 3 in the same trench.

As for the certificate of need, in today's energy economy there is no need for additional pipelines to carry tar sands crude oil from Alberta or fracked Bakken crude oil from North Dakota along the former Sandpiper route across central Aitkin County from Clearbrook terminal to Superior terminal in Wisconsin. There is no need for this oil, as we've heard how the energy economy is moving away from fossil fuel.

FACILITATOR: Thank you, sir.

And, again, if you have written

comments and want to give them to the court reporter, that will be helpful.

Harvey Goodsky, Jr. Harvey? Oh, there you are. Great.

We'll bring you the mic. And name and spelling for the record.

MR. HARVEY GOODSKY, JR.: (Speaking Ojibwe.) My name is Harvey Goodsky. H-A-R-V-E-Y. G-O-O-D-S-K-Y.

And my personal opinion is environmentally we do not need a pipeline going through our pristine lake -- our water areas. Environmentally we do not need a Canadian company telling us we need something. Environmentally this is our homeland, so you should be listening more to us.

This is like the fourth or fifth time that we've been here doing this. And when is it going to be enough for you to understand that that's not what we want here? I am only a tribal member. I am no chief. I have no more say than what I am saying right now. And what I am saying right now is that there is no need for that in this area. We need more ricers. We need more -- we need more lake area. But oil is not what we need here. Plain and

simple.

I hope that, you know, this big Canadian oil company will stop targeting our rice beds and start going to places where they do need pipelines. Maybe in Canada. Maybe Canada needs more pipelines, but Minnesota does not need anymore pipelines. Minisinaakwaang does not need a single pipeline going through it.

That's all I have to say. (Speaking Ojibwe.) Miigwech.

FACILITATOR: I have Veronica Skinaway next. Veronica.

Name and spelling for the record. Thank you.

MS. VERONICA SKINAWAY: Okay. Veronica Skinaway. V-E-R-O-N-I-C-A. Last name Skinaway, S-K-I-N-A-W-A-Y. Boozhoo. My name is (speaking Ojibwe). That's for Thunderbird Woman.

And I'd like to start out by saying that my family has been in the Sandy Lake area since the 1730s, since the great migration for the food that grows on water, Mahnomen wild rice. And, you know, throughout the times, the French, the British, and the Americans have all come here; and we all grew to love the -- and of course, you know, the

British -- or the French, the British, and the Americans, when they came here, we shared our love for our wild rice; and soon we connected. And, you know, the -- our guests here had learned to love the Mahnomen as well. You know, as you can see, everyone stayed here. You know that they loved it too.

But, yeah, we traded, we connected, and we all learned to coexist here together. And, you know, it's a real extraordinary thing, given, you know, we are survivors from an indigenous holocaust. That's unspoken within the United States, within the education system.

And I just want to say that I've been a harvester of wild rice for the last four years; and it's a very natural way of life, to coexist with the wildlife, because the water is alive itself. And it's not just life; the water is alive. Okay?

So when something is living, you know, and living itself, you know, we need to care for it, our living beings, our spirits. Water is our greatest spirit here, the greatest most powerful spirit here on this earth; and we have to protect it, take care of it, because we all wouldn't -- we all wouldn't exist without it.

I also want to say that I, you know, providing -- I provide for many communities with my rice that stretch from, you know, across the Upper Midwest, from the Red Lake -- stretching from the Red Lake Reservation, Fond Du Lac Reservation, Mille Lacs, Sandy Lake, East Lake. I provide for many communities. You know, it's -- Mahnomen is probably the most healthiest food on this earth. I'd like to say, you know, it's a -- it's not a grain; it's a water seed.

And, you know, one -- I experience -- you know, last -- in the last four seasons -- you know, it takes me awhile to adapt out there when I'm on the water and I'm harvesting that Mahnomen wild rice. So as I'm out there, you know, there are many things that we have to coexist with out there, you know, such insects, you know, there are various insects that come out. One of them being rice worms. You know, early season there are white rice worms.

And so as -- you know, it takes me awhile to adapt to my surroundings. Right? I'm skittish a little bit, a little squirmy, keep hearing splashes around the canoe. Right? Like what is that; oh, my goodness. I keep knocking --

even though I'm scared, I don't know what's behind me, but I'm hearing splashing. And here my ricing partner, my boyfriend, he observes me; he says, you know what, the fish are following our canoe like it's a meal ticket because of the word rice worm.

But here -- and then we have like other bigger splashes around us. Right? So there was a -- there was a muskrat. There was the beaver. I've seen the fish. And then there were the eagles, you know, surrounding us? So it's -- You know, it's really ecological here, you know, and how we all coexist.

And that's why I -- you know, I want to conclude with my -- with my speech, you know, by saying I am against it. And my family has been here for, I want to say, over 300 years. You know, we're still not going anywhere. I'm a nonremovable Sandy Lake Band member. I'm here to protect -- this is my daughter, Jasmine. She's going to be 14. She's a harvester already, you know. And I want to be able to -- and I -- and I'm going to be here to ensure that my grandchildren are going to be able to provide. They're going to be able to love that wild rice. You know, that's my dream, and that was my ancestors' dream.

So that's why I'm saying, no, you can't have any pipelines here, because this water is too great; our lives are too important. We don't need marble courthouses in Aitkin County. Right? We're just fine with how we are right now. You know, we make do with -- we make do with what we have, and we don't need the pipeline.

Thank you.

FACILITATOR: Thank you very much.

Next I have Russell -- I'm going to mispronounce your last name, I'm sure -- Shabash (phonetic). Russell.

MR. RUSSELL SHABAIASH: Right here.

FACILITATOR: And name and spelling and correct pronunciation for the court reporter as well. Thank you.

MR. RUSSELL SHABAIASH: My name is Russ Shabaiash. I'm an elder and a dancer. I dance for the kids so they don't get sick; young women, young men that don't get sick. This is one of my dreams, one of my visions that came to me. After I sun dance with peers, everything was for the (speaking Ojibwe), the baby, the (speaking Ojibwe), the boys and girls.

We are all together as one. We don't

have our babies at the baby-sitter, the kids at the movie hall, youngsters at the dance, the mom and dad all that they're doing and they leave the little baby, the old man at home or in an old folks home that's like this.

Native people, we're always together. We're like this (indicating). We're one. We're not spread apart like society is today.

I want to tell you my name, (speaking Ojibwe). I'm from Mille Lacs. My spirit is ice bear. My name, Sandy, my native name. And all this stuff we want to hear about, it all started back in 1492 when that boat came and started digging up everything, bones, lives that were lost years before that.

And you tried to say we're going to do this for you because it's in the best interests of you. We don't see no interest. We don't see the best in it. If any of them are dark -- look at thousands, thousands of our relatives. It could be an ant, it could be an spider, all of them are life. They help us. All these animals out in the woods help us.

We want a deer, we want a large (speaking Ojibwe) for our family, we don't just go

out and shoot it. We put out the (speaking Ojibwe). We ask that of (speaking Ojibwe) if we could have his body to feed our family. When we put out (speaking Ojibwe), these are the things that happen.

We are traditional people. We don't know anything about what happened at the 1492. We're still trying to fight terrorism that came in 1492. So these things that you have, you want to build pipeline, you want to do this and do that, think of all of the things that you're killing, mass murder. (Speaking Ojibwe), the ones that crawl. (Speaking Ojibwe) our finned relatives. (Speaking Ojibwe), our four-legged. (Speaking Ojibwe), our winged relatives. (Speaking Ojibwe), the trees that grow around you, that's life. (Speaking Ojibwe), water, we have to protect our water. (Speaking Ojibwe), we need that purified, everything that we drop to fight pollution.

So we have an interest in this, a big interest I would say. Since 1492 we've had an interest. (Speaking Ojibwe.)

FACILITATOR: Thank you, Russell. And, Russell, if you could spell your name just for the court reporter. Is that okay? Thank you so much. Thank you, sir.

MR. RUSSELL SHABAIASH: My last name is spelled S, as in sand, H-A-B-A-I-A-S-H. Shabaiash.

FACILITATOR: Thank you.

Toni Moore. Toni? Toni is right back there. Okay.

And just name and spelling for the record, please.

MS. TONI MOORE: Toni, T-O-N-I. Moore, M-O-O-R-E. And I don't have a lot to say. I agree with so much everybody has said. But I do have to ask where is the oil coming from? Are we fracking to get this oil? Because if it takes three gallons of water to get a gallon of oil, I can't drink oil, and I'd rather have my energy than a car's energy.

Thank you. That's it.

FACILITATOR: Winona LaDuke? Winona. There she is. Okay. Good.

Eric will bring you the mic, and then name and spelling for the record.

MS. WINONA LADUKE: (Speaking Ojibwe.) White Earth Reservation is where I'm from. Executive director of Honor the Earth. Been to a lot of these hearings like Sandy, huh? And I don't

really -- I mean, basically no means no is what I want to say.

So first thing I'm trying to understand is the timetable that we are looking at is accommodating basically the request of a Canadian pipeline company.

We're asked to look at 5,000 pages in a month. A lot of the information is entirely incomplete, like the spill analysis, that's not complete. An explanation of why native people should bear the brunt of this, and then the determination in the EIS that says mitigation pretty much might work out for you. That's pretty incomplete.

Questions about where the oil come from -- that lady just asked that -- it comes from the tar sands. So this feather was given to me by the Dene people from the tar sands, and they asked me to remember them. And they understood that what we were doing here meant a lot to them because they can't drink their water. Their lakes are poisoned. Their people are dying from bile duct cancers. Cancers that nobody ever heard of up there. Their whole villages are sick, and all around them there is pollution. And so they really want to know, you

know, why that's supposed to work out like that for them?

So the impact of this oil ecologically is huge. The social impact of this oil is not addressed in the EIS. It is unethical to destroy an area the size of Florida to stuff it in a pipe for the benefit of a Canadian pipeline company.

So I think that the cumulative impact assessment needs to begin at the beginning, with the people who are dying in the ecosystem that is being destroyed for this oil. And then it needs to go all the way down pipe, all those Ho-Chunk people who Enbridge already went over their sacred mounds once and wants to take another 80 feet or 200 feet, cut into more of their sacred mounds. All those people in Detroit who can't breathe, who live next to the Marathon refinery, they don't think it's okay. And I wonder why that full cost accounting -- that's what it is called -- is not included in the EIS. Full cost accounting; I'm going to count. I'm an economist, that's what I was trained as.

So then I have to ask some of the questions that other people are asking. Where are you here? You know, a lot of you may never have been here before. I've been here. I come from a

village that is not unlike this. I come from the White Earth Reservation, and the other tribal community that is most affected is Rice Lake. Now, let me just tell you last week on my reservation we had two suicides. One person drank themself to death and another person died of cancer. Small communities. That's across the board of any of these communities. We're under a huge amount of duress already. We're already in rough shape. The water in Rice Lake is barely drinkable.

And if you all pay attention when you walk in here, you'll see a set of signs that say they need housing, there's a food shelf, chemical dependency, violence against women, violence against elders, foster care, suicides and, again, water testing. That's what it says when you come in here. There's a bulletin board that's full of those signs. So that would mean that this community is under a lot of duress already. The EIS clearly says that we will expect more stress and more duress. So how are we supposed to work that out?

This is a community like my community of survivors. We made it through somehow. We made it through all our people dying on the way to Sandy Lake, where at Sandy Lake 400 people buried up

there. We made it through the glaucoma. We made it through the TB. We made it through the poverty. We made it through the relocation program, and we're still here. And now you're asking us to swallow this one and try to deal with it. That's really unfair, Minnesota. That's really unfair. And I'm trying to understand what the difference is between this and Standing Rock, quite frankly. Now, what I know is we fought the Sandpiper, and that's the reason that that did not go ahead. It did not go ahead. But what I think is that Enbridge purchased 28 percent of the Dakota Access Pipeline and instead we understand to Standing Rock.

And when the dogs are put on our people by Dakota Access Pipeline, security, and we were bitten by security forces and when 1,200 police came out there and they shot rubber bullets at us and when they maced us and when they shot water cannons at us and our people stood, a lot of people here were there. NonIndian people and tribal people were there. We were all there. And what happened is that I called Enbridge, because Enbridge has had a set of people to talk to, Linda Coady. I called her, their sustainability director out of Calgary, and I said you need to stop that; if Enbridge wants

to pretend like it is a good citizen, you need to quit sending dogs after us, you need to quit shooting rubber bullets at us, you need to quit macing us, you need to quit pouring water cannons on us, you need to quit arresting us. 840 people were arrested, because we ain't going to forget that, and Enbridge did nothing.

Enbridge had an opportunity to stop of violence in North Dakota. So I'm going to tell you, frankly, I'm pretty stressed out by what I just saw Enbridge do in North Dakota. This is not Morton County. This is not North Dakota. We have no oil interests here; what we have is a lot of risk.

So I'm really concerned about why I'm asked to be -- review a proposal or an EIS 5,000 pages, short set of comments, good luck to you all. It's really unfair and unjust. And Minnesota needs to stand up for its people. It needs to stand up for its water, because we have that, and we don't have the oil interests.

FACILITATOR: It's been about six minutes.

MS. WINONA LADUKE: And then I just want to say a couple other quick things. Enbridge somehow -- and the EIS says it's $120 billion to

clean up Line 3. I want to know where that math came from. I want to know -- I understand that that's super expensive for Enbridge. That's a lot of jobs, though. Man, that's a lot of jobs in cleaning up a big mess like that. You got to clean up your old mess before you make a new mess. That's what I tell my kids.

But I just want to say one thing on that. If it's so high for Enbridge, that 120 billion, how are we supposed to be expected to pay for it? That would be of the five lines they've got up there that they're going to want to abandon and throw down here. Precedent-setting time. Time to stand up, Minnesota.

FACILITATOR: Been about seven minutes.

MS. WINONA LADUKE: Yeah. I just want to thank you, you know, everybody for coming out. I just want to say that the earlier hearing today was at Hinckley, and it made me think of them fires they had there. Remember that? Everybody here remembers that. Remember the Fort McMurray fire they had last year in the middle of tar sands? $9 billion. Climate change makes fire. So think about it. This is our chance to stop something bad from happening

and do the right thing. Thank you.

FACILITATOR: Thank you.

I have Ken. I'm going to -- Ken Gray? Ken? Ken, want to raise your hand? Okay. Great, we'll bring you the mic, sir. Eric is going to come around to you.

Just name and spelling for the record. Thank you.

MR. KEN VRAA: Ken Vraa. And Vraa is spelled V, like in Victor, R-A-A.

In regards to the EIS on page 19, there's a short section on groundwater. I'm hopeful that the full document addresses groundwater a little bit more thoroughly. This seems to be very short.

What I'm concerned about is the people in this area in this county have a lot of shallow wells, sand point wells, and I'm concerned that any proposed construction activity will disrupt those groundwater to those people and these wells. And I'm not so certain that the EIS, at least from the executive summary, addresses that thoroughly. So I'm hopeful that it does and that my time here is just being wasted. But I certainly would hope that you would take a good look at those flows in terms

of are the flows being disruptive, both qualitatively and quantitatively, to those wells that people use.

Thank you.

FACILITATOR: Thank you.

I have Michaa Aubid. Great.

We'll bring you the mic, and name, pronunciation, and spelling for the court reporter. Thank you.

MR. MICHAA AUBID: Hello. Boozhoo. That's Michaa, M-I-C-H-A-A. Aubid, A-U-B-I-D.

I guess I just want to start by saying Miigwech for everyone for coming here to East Lake.

I guess the bathrooms looked a little bit out of order. So I guess in the setting up here, the meeting, you know, that was a bit overlooked. But I'm glad everybody was able to come here today.

The local Indian people here, you know, have made a lot of their points clear. And usually, you know, it's pretty understood, as someone said, you know, no means no, way back to when these Sandpiper meetings started there in McGregor, maybe a couple years back now.

But, you know, for us -- just

highlighting it again -- you know, from the north there at Sandy Lake down here to East Lake, you know, the Indian people here are scattered throughout our reservation here. And, you know, this proposed Line 3, you know, cuts it right in half. You know, literally right there south of the flowage and across the Sandy River down here to Sheriff Lake, between Little Sheriff and Big Sheriff Lake. So, you know, all of those reasons, you know, and plus what all the people here have been saying about the wild rice and the water, you know, I want to highlight those just a little bit.

But what I also want to talk about is what someone was mentioning, risk. Now, I confess I haven't been able to read the entire impact statement. But on the areas that I have, you know, been able to brief myself on, you know, it seems terribly inadequate for the people here of Aitkin County who are bearing the brunt of this risk that someone talked about.

So, you know, when I was looking into it, you know, so what is in it for us here as members of Aitkin County? And they said, well, it's $20 million, you know. So I thought there a little bit; and, you know, $2 million a year for ten years

on the property taxes. So that's kind of the pitch that's been pushed out there. And, you know, to me just, you know, an average person here living in the county, you know, that seems like a pretty, you know, lowball price, you know, on what the risks are. The cleanup costs, not to mention the stigma of our great county here being known as, you know, the pipeline capitol of the world there with, you know, Line 3, one of the biggest pipelines in North America. I'm not too sure of the exact statistics. But it must be one of bigger ones.

So we go from, you know, the Land of 10,000 Lakes here in Minnesota, especially in Aitkin County, all of our beloved lakes, to the world's biggest pipeline. You know, to me that's not a very good attraction to bring people to our beloved county.

Now, the other thing I just wanted to address here, as I check the time timer there, is that, you know, in the newspapers we heard here that Enbridge was suing some of these counties up in northern Minnesota to get some money back that they had been, you know, paid.

So we're going to get $20 million over ten years here for the county, which, you know,

$20 million would be a good thing for the county. But, you know, how do we know they're not going to come back years later and say, well, hey, somewhere there was some kind of accounting error there; we're going to come back there on some of that money.

Now if we look at what's happening to the people who are living up on Line 3 right now, they're saying, well, you know, back when you guys put it in, I guess we didn't think about you guys just taking off and leaving it here.

I really had to laugh at that line there from Winona there where she told her kids, you know, clean up after themselves when they leave their mess. You know, really, you know, that was a powerful statement there because, you know, so they're going to leave that one and come down and put one here, and eventually this become the new corridor, you know, where all of them are going to run through. And then when inevitably, you know, oil becomes, you know, off on the side, as we're changing over to new things, they're going to abandon the pipelines here then. So then we're going to be the people dealing with the abandoned pipeline in the future.

So, you know, and that integrity of

the pipe, issue that that steel worker brought up, you know, that was pretty interesting to me. That was new. So I'm glad to come here to listen to all you people and all of the opinions and thoughts and research that you all have put into this issue here.

You know, so all of these factors here for me, you know, besides, you know, like they said, this long litany of issues that the Indian people here continue to bring up, to me, you know, it just doesn't seem worth it, especially to the Indian people; but, you know, as a citizen of the county and a citizen of Minnesota.

Miigwech. Thank you.

FACILITATOR: Thank you.

John Cirilli? John? And Eric will bring you the mic. He's right behind you.

Just name and spelling for the record.

MR. JOHN CIRILLI: John Cirilli. J-O-H-N. C-I-R-I-L-L-I. I came here tonight to argue for what I think of as the actual replacement plan; go in, take out the old Line 3, put in a new one. And I had some really good stuff to argue for; not just a bigger project, more jobs created, more money from the southeast in Minnesota. But instead of building by pristine lakes, rivers, wetlands,

aquifers, building on land that's already ruined, thanks to decades of oil spills, useless for any other purpose.

And I went over to talk to the ladies at Honor the Earth and tried to get them on board, and I didn't convince them. They convinced me. They reminded me that any pipeline is going to go through somebody's home. It's going to be carrying tar sands petroleum that should never, ever, ever be coming out of the ground.

And there isn't a civilized option here. There isn't a civilized pipeline. The best version of this is the lesser of two evils when, by definition, nothing actually good is going to happen. And we all know how much we like that kind of choice.

And they also told me something I didn't know before; that not only is the proposed pipeline not necessary for the demand for moving petroleum, that the CEO of Enbridge has actually said, Enbridge has to move away from the fossil fuel business. It's coming to an end.

So basically this is just trying to get the biggest possible bite of the pie before it hits its expiration day, which is kind of like

rushing to Africa to shoot the last elephant before someone else does. It's selfish and small, and in the end everybody loses. It's like in the movie War Games, the game of global thermal nuclear war; the only way to win is not to play.

And it might be easy to say, well, if we don't go for that oil, someone else will. Just like we could say, well, if I don't kill that elephant, someone else will. But that isn't true. It doesn't have to be true. Whether or not it's true is a matter of what each of us chooses to do, what we all choose to do.

And, frankly, given all the terrible things that can go wrong with a pipeline, and bottom line the devastation of the climate that's going to happen if nothing goes wrong with the pipeline, the only way to win is not to play. We Minnesotans, government agencies, hard-working Americans who need work, and Enbridge, we all need to start playing a better game.

That's it.

FACILITATOR: Tonia Aubid. Tonia. We'll bring -- Leslie will bring you the mic.

Name and spelling for the reporter. Thank you.

MS. TONIA AUBID: Boozhoo. (Speaking Ojibwe.) My English name is Tania Aubid. T-A-N-I-A. Last name A-U-B-I-D. I want to thank everybody for coming out here tonight.

I have a question -- a few questions here or something that I would like to bring up. What will happen to the -- what will happen to the landowners who have already accepted monetary gains for their lands? Will they be asked to return the cash when this Line 3 replacement will not be done? Will the land be returned to the native people? That is my question for you.

From my historical training and education is that these lands, once the person or the landowners give these lands up, that these lands automatically go back to the Native American people. Just like these leases that have gone -- that have gone on -- or not on, but had been -- their times have gone up from them. Those lands should have been gone back to the native people.

That's my question for you, Minnesota, is will the landowners, who've already accepted monetary gains for these lines, will they be expected to pay that back? I'm not asking just for Native Americans, but for all landowners, because

they have accepted that money. And what are we going to do? Are we going to be expected to pay that back, even though they put us through all this degradation and mental stress? And I'm sure many of you understand that.

Back in 18 -- or 9 -- not 1850s, but the 1950s when they first put in the Enbridge line, from our chiefs back then, they told us that there was only going to be an 18-inch pipeline that were going to be put through here; no bigger and no less. What happened to that?

Minnesota, are we going to be -- are we going to -- are we going to go back on these original plans of having the 18-inch lines put in? Why the 750-foot-wide corridor that they want to put through there? How big are those pipes now? I know that we probably could fit maybe a family in there in just one segment of the pipelines, from what I have seen of that Dakota Access Standing Rock.

I was on a 28-day hunger strike, fast. And I'm glad that you pipeline workers are here, because I want a guarantee from you that these pipes will not leak. I'm sure that you're very professional in the installation of those, but I want a guarantee from you that these pipelines will

not leak.

I want to know what the integrity of the pig system is, their safety -- safety protocols are on these lines. I know at 90-degree turns -- like from some of these pictures on the map here, Enbridge has told me that they will not be able to put in a -- put in a pig system at those 90-degrees places. And just right over here on the sample land, they have one of those that are going around that piece of property, and there's a 90-degree turn there where they will not be able to put a pig system in. Pig system is going to be able to let us know when there's a leak. Like they told us, it could take anywhere from three hours to three days to check that oil -- oil leak. But then, again, it could be anomaly in their eyes.

So I would like to have information -- more information about the integrity system of the pig -- of the pig system that they want to put in place.

Also, a reminder to you, although this may not be what they claim to be a legal -- legal item, it's the Declaration of the Indigenous Rights. The Declaration of Indigenous Rights was spelled out a long time ago, even before we were here. And

those are the words from the creator to be able to take care of these lands. In the Declaration of Indigenous Rights it is spelled out from the memories of our ancestors of what we are to protect here on this planet, on these lands.

Since 1492 -- I can actually say that my family has been here for more than 10,000 years. And those words that we have lived by through that Declaration of Indigenous Rights, the government wanted us to spell out what we believe in our heritage, what we go by, what our rules are.

When I was out on Standing Rock, I understood and I see what those pipeline workers did in order to maintain their integrity on the line to be able to get that pipeline through. I faced them, and it was not a pretty sight. And I'm happy that our sheriff here -- Turner is here, because I too have those same fears about this turning into another Standing Rock. And I'm sure none of you would want that, especially our veterans who have been out there on the front lines facing those things, facing those people, and understanding that you're out there to protect that corporation to put those pipelines through, to ship the oil out of our country and nothing to gain from it.

We can take a look at climate change; but if we took a look at mother earth, she's already speaking volumes through volcanic eruptions --

FACILITATOR: Tonia, it's been about six minutes.

MS. TONIA AUBID: -- earthquakes and just by the climate change itself.

These are the questions that I would like to see have answered in the final EIS.

Thank you and Miigwech.

FACILITATOR: Thank you.

So I have two other names and, again, I read earlier. Is there a Harry Hutchins? Okay. And, again, I'm not sure if I'm pronouncing it right.

I think it's Kaavaak or Dale Green something. I'm not for sure I have it right. Is that gentleman here? Okay. Our elder already spoke as we started. So thank you.

So is there -- we have a little bit of time left. So is there anyone else who would like to make a public comment? I just want to see hands raised, and then I can call on folks. We've got two.

Okay. Why don't we go here and then

here? And if you can stand up and just say your name and spelling for the record. Thank you.

MS. NATALIE BOYD: Hello. My name is Natalie Boyd. N-A-T-A-L-I-E. B-O-Y-D. I guess I have a few things I wanted to say.

The first thing is that this is not an Environmental Impact Statement. This is an economic impact statement. The Department of Commerce, like Enbridge, is interested in the monetary impact of this pipeline. When they discuss the negative and the positive impact, it's in the context of dollars. How much revenue and employment revenue will this pipeline bring to our economy? And, conversely, how much monetary costs would there be in the event of an accidental release.

The concern is couched in environmental terms, but it's not actually about how it would affect our health or the health of our environment. So I just want to just make a point to say that the term Environmental Impact Statement is a misnomer.

I also just wanted to ask a question of whether or not the pipeline will be the direct responsibility and liability of Enbridge or if there's going to be any subsidiary limited liability

company that's going to own the pipeline? Because, if so -- and if so, will that subsidiary company have the resources to deal with it when the pipeline fails? Because this was not the case in most of the things that happened in North Dakota. When there was a failure, when there was a problem, it was a shell corporation basically, and they just went bankrupt and people, the taxpayers, had to deal with it and it was a problem.

I will say that the alternatives that we're shown in the statement aren't really alternatives that are viable. And, you know, a lot of people say, well, it's good that you could maybe go somewhere where it's not in our pristine lakes and rivers. But it's not -- that's not really an option either, because it's passing over aquifers. When you go further south, you're going over aquifers that are really, really important to everybody else.

So as an indigenous person from here and a Mille Lacs Band member, I demand to see more exploration of a no-build option. I demand to hear about not pursuing any expansion.

At previous meetings I've spoken about how I believe there's no need for any new fossil

fuel infrastructure. I know a lot of people have talked about that tonight. Enbridge clearly feels otherwise, and they reported that in the EIS. I don't know how we're verifying this information, this plan that they have that there's a demand for oil when everything indicates there's not.

The EIS admits that tribal communities have been disproportionately affected in negative ways by industrial developments, but it claims it can't quantify or determine a better alternative to deal with the harm that will come from this project. And, actually, for once I agree.

There is so much hurt that's going to come from this, and there is no better option. If they do this, they will hurt us. Our -- this project would irrevocably harm tribal communities, whether it's new construction on tribal land or somewhere else.

Consider the events that surrounded Dakota Access Pipeline. They took place in another state; but as a lot of people here can tell you, we all felt the trauma. I felt the trauma. Before I even went there, I felt the trauma. And I did go there, and I wasn't even on the frontline. I was just there to support people. And I have trauma.

And --

FACILITATOR: It's been about five minutes.

MS. NATALIE BOYD: If you need to witness trauma closer to home, go to Hibbing and go to Hull-Rust Mine and overlook the mine there and see the scars that we put there; the wounds are there; and know that it's the same industry. It's the same mineral extraction industry. And if something -- when something happens, the rest of our state is going to look like it. It's all the same industry and the same trauma. It's the same crimes against the earth, and there's continued acts of genocide and violence in its native communities. You cannot dismiss these issues the way that they have been dismissed in this EIS.

Thank you.

FACILITATOR: Thank you.

Eric, we have one more comment right here. Just name and spelling -- right behind you, Eric.

Name and spelling for the record, please.

MR. DAVID BARNETT: Good evening. My name is David Barnett, B-A-R-N-E-T-T. I'm here, I

represent the pipeline, welders, and fitters and helpers that have been given this project to construct it, if and when it receives its permit.

I represent the welders on a national basis for the United Association of Plumbers and Pipefitters. I take a little bit of offense to the term in the EIS on temporary jobs. These are segments of careers for these individuals. They're good-paying jobs. They run around the country and build pipelines, moving energy for the United States, as we all need and use energy.

The question was asked could I guarantee or we guarantee there would not be a leak. There's no way I could make that guarantee, nor can anyone in this room guarantee me when we're not going to need oil, because we use it every day in 6,000 products and transportation.

These temporary jobs, just to give you an idea, I'm on my 57th employer in my career, 30 years in the field, 11 years representing our workers. And those 57 different pipeline projects, union, all union, fed my family very well and made my career. And they're very important to a lot of individuals out there right now making their living for an honest day's work for an honest day's pay.

Just to let you know, this year the fifth generation of my family began building -- constructing pipelines. So when you say -- you know, I hear, you know, what are you going to tell your grandchildren. My grandfather started this deal. My great-nephew started this year. So there's a lot of history with pipeliners too, and especially union pipeliners.

We do quality work. We drug test on every job we go on. Our welders have to test to prove their skill sets every day. Every weld they make is 100 percent x-rayed. If they make bad ones, they go down the road. That's just the way it is. It's a tough life, but it's a life they've chosen.

I know that if you're going to have a pipeline, the best pipeline to have is a new pipeline. This pipeline is designed with dense steel, X70. They're going to weld it with a wire process which is state of the art. The coatings are better than they've ever been. And it will be hydrostatic tested at a pressure much higher than it will ever operate. That's more than we can say about 50 percent of the pipelines around this country today, because they were grandfathered in and there's no maximum allowable operating pressure

that's ever been tested. The new pipelines have one.

And this pipeline, if it's approved, will be built by, as I said, union members. Enbridge has promised to build this with union construction workers, many in Minnesota. Many of my members live in Minnesota. So because I have an accent and I'm not from here, I merely represent them on a national basis. A lot of our members here in Minnesota will reap the benefits of these jobs.

And, as I said, if you're going to have a pipeline, no matter what you're carrying through it, the best pipeline to have is a new pipeline.

Think about the day that we never have to face the fact that because of oil -- what oil does for us in our communities, you pick the phone up, you call an ambulance for a loved one, you never think about the fact that fossil fuels brought that ambulance to your door to take care of that individual. It saves a lot of lives. We always talk about what it costs, but there's a lot of benefits to it as well. And I think to have a balanced conversation, you have to look at both.

My first project was the Trans Alaska

Pipeline. We heard a lot of the same arguments before that pipeline was built. It's transported products for 40 years safely, and that environment is still pristine. You have a pristine environment here. I value your water. Water is life. That's why I want products transported through new pipelines and replace the old ones.

Thank you.

FACILITATOR: Thank you.

So we have just a few minutes left. So anyone who hasn't commented who would like to make a comment? So Leslie will bring the mic to the gentleman in the cap right there.

And just name and spelling for the record. Thank you.

MR. WILLIAM REED: My name is William Reed, R-E-E-D.

You know, this isn't a question of whether it's going to be a good pipeline and whether we need oil or not. Sure, we need oil. Whether they make things out of oil. Of course, they do. It's a question of where we put this pipeline. And employment can be had wherever the pipeline is eventually put, just as it can here.

This area is the epicenter of the

Ojibwe nation. They have been -- Native Americans in general have been pushed around for hundreds of years, and one of the most notable in recent is the 1850 tragedy here at Big Sandy. And they just keep getting pushed around; and they try to go through their reservations, whether it's out in the Dakotas or here.

And for clear representation here, I'm part Anishinaabe, but I'm mostly European. And we owe them some kind of deference in getting this pipeline out of the wild rice country, the lake country that these people have enjoyed as best they could for hundreds of years. We owe them that, and we owe it to ourselves too.

I've been coming up here 66 years. I love this country. The day after I retired, December 31st, 2003, I was on an airplane coming up here to find a place to live. I just think this is the greatest country in the world. If I get to come around again, I want to be born here. City kids are deprived.

But back to the important part, we need to consider the area we're going through with this pipeline and the risks. Pipelines do break. They leak. Somebody raised the point -- I think two

people raised the point, there have been two leaks in the Dakota pipeline already, and it hasn't even started up.

We need to think about some of the things that were said here by the real stakeholders, the people who have been in this country for hundreds of years, been pushed around and pushed around and pushed around, and this is kind of a -- just another insult. You need to put it somewhere where it isn't going to have the impact that it would here.

Thank you.

FACILITATOR: So we have a comment here. Just name and spelling for the record.

MS. OPIDCHEE MUSHKOOUB: (Speaking Ojibwe.) NonIndian people, friends of the refuge and friend of Indian people, my name is Opidchee Mushkooub. That's Mushkooub, M-U-S-H-K-O-O-U-B. And my first name is Opidchee, O-P-I-D-C-H-E-E.

And first off I'd just like to say, you know, my great-grandfather drank water. I drink water. My little daughter, she drinks water. And everyone of you I know, everyone of you in this room -- not singling out anybody, so don't feel like I'm discriminating against anybody -- but you woke

up this morning and you drank water. You used the bathroom, you made water.

This water is precious. You see where it comes through; it comes through, and it hits all the major ricing lakes and water tributaries to, you know, this great America here, this great state of Minnesota.

Now they keep telling us, you know, you got to have a new one; you can't use that old one, you got to use a new one. Well, how many more times do we got to have a new one? You know, they say -- 1950, they only last about, you know, two, tree years, you know. And us people here, we know that there's leaks, you know. And if they tell you no, they don't, we have all this stuff here, well, we know they leak, and we know they leak on the tribal land into our ricing lakes.

You know, just this past year, you know, us Indian people, we heard about it from our other relatives who were right there; they said that line was leaking. Nobody did anything about it. They cut everybody off. They said, you can't go there; nobody can go there; you're trespassing, on our own tribal land. How can we be trespassing on our land? That was ours first. We're trying to

protect it for everybody here.

And I hear everybody talking about the water, but nobody said anything about the fish. The fish, the waterfowl, all these birds and, you know, the winged creatures, the fishes -- you know, the fish, everything comes through here through East Lake out there on our refuge, that major migratory path. All of those things, you know, you've seen it, migratory birds, you know, everybody knows about that, all the songbirds, you know. Where's their certificate of need? How is this going to affect, you know, greenhouse emissions? You know, the accidental crude oil releases, nobody's telling us what's happening to them.

You know, we're supposed to be the stewards of this earth. As Minnesotans, stewards. We're supposed to protect it. Look at that, up by the Boundary Waters all over, this looks like an act of war on our environment, our animals, our people.

And all we see, you know, this EIS statement, yes, we heard some people saying this is an economic statement, and it is. All this is going out. You know, is any of it -- nobody said anything about how it's going to help our state of Minnesota, how is it going to help us, how is it going to help

our waters? What about those birds? What about this migratory bird path? All those walleye, what going to happen then when we can't even go up and here fish.

You see this out on 65, cars sounding like a river, an ocean of people coming up to enjoy this beautiful country. And you want to, you know, replace this? How can you replace that out there? How can you put a price on that? Where is that economic statement? Where is it?

You know, my people are still going to be drinking water, you know, seven generations, three, four generations. My great-nephews are going to be needing water. My great-grandfather drank water. You know, my children need water. You know, they want to still see walleye, we want to still rice, and we're not even sure -- I don't know if this little girl is going to be able to go out there and rice. That little girl over there in toboggan, is she going to rice? Is she going to be able to go throw her net like her dad and her mom, her grandma?

Everybody's scared of something like Standing Rock going on here. You know, we should be glad that something like that would happen here, that our people would fight for that land, this

water, those fish. You know, because it's not even about the economic estimate, you know. And that's what I see there.

All right. Thank you. Thank you for listening.

FACILITATOR: Thank you.

So we've come to about the end of our session, 9:00. I see your hand up, and I know you made a comment earlier, and maybe you could be very, very brief, because we are coming to an end, and I want to close out on time if we can for the respect of the facility.

So name and spelling for the record. And keep it brief, if you can, please.

MR. JOHN MUNTER: John Munter from Warba, again. And I feel like a 21st archeologist reading this DEIS document, looking at the 20th Century, because there's so many defects in there, we can't figure out if there's any good water studies in there that aren't paid for by Enbridge, for example. And we don't see good peer review data in there, and comments from professionals of the past have been ignored. And it goes even down to my research. I live up in Warba. We did a study from Rowena to Grand Rapids that we found the pipes from

Line 3 to 4 were actually 30 feet apart and not 10, 15 feet apart, as the DEIS said. There's a vast discrepancy there, for example. So the more you dig, the more you'll find.

And so this makes the argument -- and to the Department of Commerce's credit, they are looking into that and want to verify my numbers. But this was in 15 named road between Rowena and Grand Rapids. That pipeline can be pulled up. And so that's where people can being employed, is cut up that pipe and put it on trucks and haul it out. And so that's what should be done. So thanks.

FACILITATOR: So just a few reminders as we come to a close, written comments, if you have any additional, can go right into one of these boxes here. You have until July 10th to submit a written comment to the Department of Commerce, either in email or regular old mail. And information in your packet where to send that is actually on that.

We appreciate everyone's comments and thoughts tonight. Appreciate your time and effort. Safe travels home.

And thank you for hosting us for the Band.

Thank you.

(Off the record.)

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DEIS MEETINGS - 14-916 15-137

CLOQUET - JUNE 13, 2017 - 10:00 a.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Fond du Lac Community College
2101 14th Street
Cloquet, Minnesota

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FACILITATOR: All right, everyone, I'd like to invite you to come on down to the front section here, and I'm going to -- we're going to have a drum song before we begin our public comment.

JEREMY: (Ojibwe) I'd like welcome everybody here and I'm hoping in a good way that you're all enjoying your time here so far. We are singers. This drum that we have here is the Tribal Community College drum, which is for our students and for our people here as well, that come and join us.

It's certainly an honor each time to see -- and it's certainly an honor to have Elgin and Harvey and Timmy, and my friend here, President Anderson, to join us on the drum, along with myself, Jeremy.

And we're grateful and honored to be a part of this event. We'd like to thank the dancers who joined us today, especially the young one. We know that that ensures that our cultures and ways of life are being carried on. That's a good thing to see.

On behalf of the (indiscernible) -- that's the name of this drum here, he's

our grandfather, and that's the way we talked about drums, like they're one of us, because they are. They do so much for us.

And the songs that we're singing, a lot of those side steps, you know, social advances, and also they are also like alongside the healing part of what (indiscernible) those songs go right along with that.

Those songs were passed down to us for quite a few generations, and it's an honor to be able to sing those songs.

So we're going to be opening up with a drum song here, and we'd like to say miigwech you for your time today to join us.

Thank you.

(Drum and song playing.)

FACILITATOR: Thank you so much. Thank you to the drummers, the singers, the dancers. Thank you to the college for hosting this. Thank you to the Fond Du Lac Tribe for your expertise -- your expert input on the Draft EIS.

I'm Stacie. I'm part of the consulting team working with the State to get

comments and input on this Draft EIS.

I'm going to hand this over to Jamie MacAlister from the Department of Commerce. She's the project manager, and she'll give you a little bit of overview of the EIS and today's process.

MS. JAMIE MACALISTER: Good morning, everyone. Welcome to the Line 3 Draft EIS meeting. So first, we would like to be clear with everyone. We know that there's some confusion as to who is actually hosting the meeting, and we want to let you know that the meeting is being hosted by the State of Minnesota. This is not an Enbridge meeting.

So that's the first point we'd like to make.

The second is that we are really hoping to get your comments on the Draft EIS. We realize that many of you are here to express your opinion one way or another about the project. That, however, does not help us finalize the Draft EIS. So we would appreciate it if you could direct your comments towards the draft EIS.

And also we would like you to

know that it is the Minnesota Public Utilities Commission that will make, be making the decisions for this project.

The Public Utilities Commission is responsible for determining whether or not to issue the Certificate of Need, which is required before Enbridge could build any sort of pipeline.

And hopefully you've had a chance to stop by the posters and talk to the agency staff. We do have staff here from the Minnesota DNR, the Minnesota Public Utilities Commission, the Minnesota Pollution Control Agency, as well as the environmental quality board.

So we hope that you've been able to go to the posters, talk with staff, and if you have any questions, please be sure to let one of us know.

Many of you have probably been following this process for a long time. You've been to a lot of meetings, and we are here at the Draft EIS meetings for Line 3.

These meetings and your comments on the draft EIS will help inform the Final

EIS, which we anticipate to be released later this summer.

And shortly thereafter, there will be a series of public hearings, and those hearings will be presided over by an administrative law judge. And that is the point in the process where we encourage you to go to those meetings and to advocate one way or another for your project and make your feelings known about the project.

That is what the administrative law judge does throughout these proceedings. She takes those comments. She will write a report, and she will submit that along with all of your comments and all of the information in the Final EIS to the Public Utilities Commission for their consideration.

So it's still going to be awhile before any permits would likely be issued in this project. Before this project -- those likely would not be done until the spring of 2018.

So what we are hoping to get today from all of you is substantive comments on the Draft EIS.

We need to know, is there information and things that we need to include? Is the EIS unclear? We've heard several comments about the maps and some of the things that are lacking on those maps, and we will be fixing those for the Final EIS.

These are the sorts of things that are important for us to get so that we can make those changes for the final EIS.

And lastly, just what can we improve in the EIS? It's a big document. We understand that. We know most of you haven't had time to go through it, and it's difficult to perhaps provide comments right now.

However, if you have those comments today, that's great.

If you're not prepared to give us any comments today, you can send them in to us by mail or email. We will take those until July 10th, the close of the comment period.

So you do have time to make sure that your comments are in by July 10th.

Once we receive all the comments, we'll be compiling them and we will alphabetize them. You'll be able to find your

comments, and you'll be able to find the comments of your neighbors.

There will also be transcripts of those meetings that will be posted so you will have access to those.

So what we also would like to stress is that all the comments are considered equally. We are not reading any of the comments -- 50 comments by an organization do not get more weight than a single individual's comments, so that's important, too.

Again, the EIS itself is not a decision-making document. It is a document to help inform decision makers. That's why we need your help in identifying any gaps or things that are unclear in this document so that we're providing the best information available to those that will be making a very difficult decision.

So, with that, I'm going to turn this over to Stacie. She'll run through the meeting guidelines and we will get started with the oral portion of our meeting.

FACILITATOR: Thank you. Thank you, Jamie.

So just a little bit more information about this public comment time. As you heard, comments are all weighted equally so those submitted into the comment box, those that are said directly to the court reporters, those who email, send in later, and these public comments as well.

For time, we're going to ask you to keep your public comments to no more than five minutes. We'll put a little timer up on the screen.

We have a lot of people who want to speak, so we want to make sure everybody gets a chance to speak.

Please do not interrupt. We're going to -- we have some people who will come and bring the microphones to you so you can speak from your seat. You can stand up and speak there, but you can just stay where you are and they will bring the microphones to you.

So when I say your name -- I'm going to read the names on the cards. I'm going to do my best with pronunciations, and they will bring the microphones to you.

The first thing we'll ask is for you to say your name and spell it, and that's so our court reporter can get the right spelling of your name, and to speak slowly into the microphone, and she will be able to document what you are saying.

If you also have a written version of your oral comments and you want to hand those in to the court reporter, that will be very helpful. It's not required, but if you'd like to do that, that would be great.

We're going to ask that everybody be respectful. We know people come with different points of view, and our job is to really make sure we get everybody's voice and all those points of view spoken.

Feel free to share affirmative positive responses to comments after the commenters are finished.

We ask you not to share negative responses to comments, to keep those inside.

We also ask, please, don't direct comments to any individuals. That can make them feel very uncomfortable. We ask you to focus on the document, on agencies or

organizations is okay, but just not on individuals.

The state agency staff who have been here staffing in the back of the room, if I can ask them to raise their hands here. So they're still here. They're mostly in the back of the room.

They are all here in listening mode. They're not going to be answering any questions directly at this time. But they're here all to listen.

Just a few logistical things, if you can silence your phones, put them on vibrate so they don't interrupt. The bathrooms are right over there, and we do need to end on time for the sake of the space. So we will try and keep to our time limits as much as we can.

Okay, so I will go through and pull up the timer here.

All right. I'm going to read the names. At about four minutes -- about 15 seconds or so before your five minutes are up, I will stand up and that hopefully will be a reminder to you that your time is up, the

timer will be up here as well, and I'll ask you to wrap up your comments in about five minutes.

So Lyz Jaakola. Say your name and spell it for the court reporter.

MS. LYZ JAAKOLA: My name is Lyz Jaakola. My name is spelled L-Y-Z, J-A-A-K-O-L-A, and my daughter is going to sing a little love song for us.

(Little girl singing)

The words to that song are: "Water, I love you. Water, we thank you. Water, we respect you." Many children know that song. You did a real good job. Thank you.

(Applause)

And many people understand that the pipeline threatens our water, not just for us but for our children and our children's children and the many generations to come.

Before this moment in time, our ancestors took care of this water for us so that we could enjoy this water, so we could enjoy the water that was shared with us today.

At this moment in time, it is up

to us to make the right decision so that this little girl and your little girls and your little boys and their grandchildren can have water, because water is what sustains us.

Nothing else can replace water. Whether it's oil or any other chemicals, it does not replace water. There's not another substitute. And so it is rather absurd to me to think that we are here having this kind of a conversation when it is our very lives at stake.

It is not an Indian thing. It is not just a tribal nation thing. It is a human issue, our lives are at stake. So to have this conversation is absurd.

However, we know this conversation has been going on for a long time, and we know that there are many people having similar conversations, and we know the United States Declaration of Rights of Indigenous Peoples gives us -- allows us this perspective to know that indigenous people have these rights that are on par with -- I'm going to read a little bit of the article.

Article 26 says, "States shall

give legal recognition and protection to these lands, territories, and resources. Such recognition shall be conducted with due respect to the customs, traditions, and land tenure systems of the indigenous peoples concerned."

My question to this group here, as we proceed in looking at that Draft EIS, why have the tribal peoples and indigenous peoples and nations been given such little consideration in that EIS?

We are but a small portion of those 5,000 pages. Our rights have been mentioned only a few times.

We have what you might call the owner's manual to this place. Why are we not being considered in much more equal status?

Why are individual native people, tribal nations, not being considered to be as important as the rights of the oil corporation? That is the question. Why?

So miigwech, miigwech for listening to my daughter, and I'll conclude with that.

FACILITATOR: Laura Turman, Laura?

MS. LAURA TURMAN: Hi. My name is Laura Turman, L-A-U-R-A, T-U-R-M-A-N resident -- long-time resident of Minnesota. Just like to say I'm an active union tradeswoman. I've done work on the pumping station for the pipelines. I know how nice the jobs are. However, we need to be looking at the bigger picture here.

Even if the jobs' economic impact were permanent, it's not as permanent as our earth and our water needs to be.

Somehow along the way we seem to have forgotten how to look ahead into the future. There's many people coming behind us who want to use this earth and its natural resources. And we seem to have lost our ability for care and concern about those to come.

I really hope we can instead focus our attention on the numerous jobs and economic and environmental benefits of renewable energy resources, so that those to come who are going to be depending on this earth and our abilities to preserve the natural resources for them.

I guess that's it. Thank you.

FACILITATOR: Thank you, Laura.

Beth Tamminen.

MS. BETH TAMMINEN: Beth, B-E-T-H, Tamminen, T-A-M-M-I-N-E-N.

And I wanted to address two sections on the EIS. The first is the social cost of carbon, and I think from earlier, as I recall, this wasn't addressed and I appreciate it being addressed, but I think it's really woefully inadequate in the timeline.

There's a 30-year timeline for a pipeline that's replacing an older technology pipeline that's already lasted over 50 years, so why are we seeing a comparison for only 30 years? I'd like it to reflect that it's been a lifetime of that pipeline.

And the other thing I think we need to understand is that climate impacts last well beyond the incidence.

We are still in Duluth dealing quite heavily from damage from a flood five years ago, and to take seriously the cost of continuing to pour more carbon and methane into our atmosphere, it takes a really

long-term look.

The other thing, I think, I don't know if it's clear in there, is that this project, apart from any immediate needs or other problems, has facilitated the use of the dirtiest, most high greenhouse gas oil extracted on earth.

And it's also destroying large sections of fragile northern ecosystems in Canada. That's not in our nation so I don't know that that's in this EIS. This is a Canadian corporation that is involved in facilitating that, so I think that also needs to be addressed.

Seriously, that's a region which saw a devastating fire that required the evacuation of a town the size of Duluth just last summer.

These are not abstract results. These are -- climate disruption is affecting millions of people across the earth and many people in our own regions, but I think that that section is seriously in need of expansion.

Thank you.

FACILITATOR: Scot Bol.

MR. SCOT BOL: My name is Scot Bol, S-C-O-T, B-O-L.

I want to speak for a sustainable future for all our sisters and brothers and for our way of life, and that future most definitely includes decent jobs for all.

In the land of 10,000 Lakes building more fossil fuel pipelines through our wetlands is a destructive, extremely short-sighted idea.

In this world we are all sisters and brothers under the sun. Imagine if we cared for our people and our way of life more than money.

We need to agree to a deal that helps us have jobs that are safe and sustainable. Its exciting to think about what we can do.

I'm most definitely against the pipeline. I'm very concerned about climate change. We need to move away from fossil fuel as quick as we can.

To have a green new deal is so

exciting. We could help graduation rates. We could have people working in the parks and schools, coaching in theater and music. It would be beautiful. We could have students helping with the math skills and reading skills and -- the math and reading skills, and then they would have an hour of wonderful theater or music or coaching or softball.

There are so many ways to employ folks, give them decent jobs. Our future is we're becoming automated. We're going to need less and less laborers. We have to take care of the people. There has to be a vision.

We have for a future where we care for people more than allowing 20 people to hoard more than half of our nation, as they say, in Forbes Magazine.

This is so broken. We need to care for people. Yes, folks are desperate in Minnesota and the Iron Range and Duluth for jobs.

I work part time at a food shelf. I see a lot of folks that are just hurting for jobs and money and an income. We need to care for people more than money, and

that means that there needs to be some way of having these basic -- a basic income or a green new deal.

There's better ideas. Let's have these jobs. There's so many ways we can create jobs that are taking down some of the old pipelines and make pipelines and make opportunities for folks in this transition, start training folks more for solar installation and for insulating homes, transition into a better idea.

We absolutely need to take care of our workers. We need to care for all of our brothers and sisters. There are so many better ideas. We need to have a longer range vision that's sustainable.

FACILITATOR: Thank you.

Julius Salinas. Say and spell your name.

MR. JULIUS SALINAS: Julius, J-U-L-I-U-S, Salinas, S-A-L-I-N-A-S.

I oppose the pipeline because I think there's a lot -- much better ways that we could be putting our energy, our technology, and our direction into renewable

energy sources.

Congratulations, Minnesota. Look at all the extreme weather events we've already had. We've seen flooding, hail in June where they have the plows out, and some fishermen just pulled out a 60-pound Asian carp, invasive species.

I've heard this referred to as creepy normalcy. I've been around for a little while and I've seen things change. I used to have bees just covered my flowers in my yard. They looked like the ground was moving. I haven't seen any bees yet this year.

I don't know where you guys are at. I haven't seen any mosquitoes. That's the bottom of the food chain. I do not like mosquitoes, but something's happening, folks. The climate is changing and it's our fault.

There's alternatives to all of this.

What happened to winter? I'm a scuba diver. I have been in the waters around here. I've been in the waters in the Caribbean. The reefs are down. The water is getting warmer. It kills the reefs. When that

reef dies, the ocean dies.

Thank you very much, Minnesota Power, you just gave me $4,000. I put in a solar array in my house, and last month instead of paying them money, they paid me money. That's fantastic.

The solar industry and wind industry need workers. We're not eliminating people's jobs. The jobs are just changing. We need to get adaptable. That's part of life. That's part of the world.

Creepy normalcy, folks. The young people don't see the differences. The young people think that they're going to get hail in June. Young people think that invasive species and carp jumping out of the water and hurting people, that that's normal.

That's not normal, and we need to take a stand on this. My generation and the generations before caused this problem, and our generation needs to take responsibility to change it.

Thank you very much.

FACILITATOR: Thank you.

Brenda Shillow. Brenda, you're

passing?

Bill SHARRATT.

MR. BILL SHARRATT: I think you got my name right, Bill Sharratt, S-H-A-R-R-A-T-T.

I'd like to speak in favor of this project, particularly from the perspective of safety. And the reality is that we all need crude oil. Renewable energy is something that is still being developed, and however it's developed, it will not replace much of the need that we have for crude oil and natural gas.

Our clothes, our plastics that we're sitting on today, comes from crude oil, and we need them. I dare say that none of us walked here this morning. We drove our cars here, and it takes crude oil and natural gas in those vehicles that we have.

So put down a safety program. The existing line has some defects, and the optimum solution to that, in my belief, is to replace it, and replace it with one that is up to date as far as technology and construction practices and the technology that we have to

operate the line.

I believe that it will provide greater safety for the water that's been concerned about here this morning, and in light of the renewable energy, water is a -- probably one of the most renewable things that we have.

It's in the life cycle of water. So I would urge the PUC to grant the Certificate of Need and the right-of-way for the route that is proposed.

Thank you.

FACILITATOR: Thank you.

John Iversen. Spell your name.

MR. JOHN IVERSEN: Yeah, I'm John Iversen, J-O-H-N, I-V-E-R-S-E-N, for all the Norwegians. I'm also a Canadian, and I'm enrolled at the Bois Forte Nation at Nett Lake.

I want to speak to two things -- Lake Superior. Two Harbors is home to the same Lake Superior Association. This lake was threatened once before by Reserve Mining Company. I think it's Republic Steel or U.S. Steel at this point, the taconite plant at Silver Bay, which was dumping, 24/7, taconite

containing asbestos fibers into Lake Superior.

And I worked at Reserve a couple summers, and what you saw was a waterfall of death. It was about 30 yards long, 15 yards deep, just all that crap going into our lake.

And we have Walt Sai who is still living. He's 89 years old. He's a commercial fishermen. He told me a story last summer at the Sons of Norway waffle breakfast in Two Harbors, and he's going to be in the Lake County Historical Society oral history project, as am I.

But also, I don't know how many of you read Naomi Klein's book "Climate."

The other part of that, Walt organized commercial fishermen. There are, you know, tourism is now big on Lake Superior. If we hit a spill, what is going to happen?

And it's not -- it's not if or where or when, you know, it's going to happen.

Wreck of the Edmund Fitzgerald, come on. It's not only to save Lake Superior, it's to keep tar sands out of all the Great Lakes.

Enbridge has a plan to avoid us,

because we are going to keep them off Lake Superior, and that plan is Line 61, slashing through Mother Earth in Wisconsin, going to Rockford, Illinois, where Enbridge has a facility, and two pipelines in Chicago and Lake Michigan.

And, boy, do they want to ship that crap, sludge, out the St. Lawrence Seaway to other countries.

Now, I want to speak about the jobs issue. This is a red herring. How many railroad jobs are going to be lost for what, 30 sustainable jobs on the pipeline? Come on.

How many semi truck drivers are going to lose their jobs for 30 sustainable jobs? I tell you, the building trades would throw their grandmother under a bus for, you know, 30 jobs.

The railroad brother's rights and the Teamsters really need to get on the ball here because they're going to be losing thousands of jobs if Enbridge gets its way.

And, you know, they want to be on the lakes. They're all about what's the cheapest way to get the sludge out of here.

And the cheapest way, of course, is oil tankers. That's why they want them on the lakes. That's why we kept them off Lake Superior with Winona winning the Sandpiper for us.

We will not have them on Lake Superior ever, over our dead bodies.

And so I want everyone here to join on Facebook -- we have a couple groups -- Save Boundary Waters, Save Lake Superior Association, Our Revolution, Lake Superior Group, and we are organizing groups on all the other Great Lakes.

There are 34 million people in Canada and the U.S. who live on or near the Great Lakes. Enbridge, just stop it. Just stop it. It's not going to happen.

Thanks a lot.

FACILITATOR: Elgin Goodsky. Elgin, thank you.

MR. ELGIN GOODSKY: Boozhoo (Ojibwe).

Hello everybody. My name is Elgin Goodsky. I'm representing Mille Lacs Band along with (indiscernible).

And some things I'd like to say is it really would be nice for big companies and corporations like Enbridge and Dakota Access and so on and so forth, many other corporations, it would be really nice for them to open their eyes to look at the beauty of the nature we all live in. Look at the life that we really live, and look at the way things really are instead of seeing all the fine and dandy things that they supposedly boast.

When I take a look outside, I look in the backyard, I see nothing but green trees, green grass, green everything. Whatever happened to living that type of life instead of living in this concrete jungle?

I know it's hard trying to break away from something that we're so used to using such as oil and many other products that are made for petroleum.

What about coal winds, what about living life of honor and respect and having all of these (applause interruption).

With that being said, I'd like to thank you guys, everybody here, for your

time listening to me. Miigwech.

FACILITATOR: David Johnson. If you can spell your name.

MR. DAVID JOHNSON: David Johnson, and I think everybody knows how to spell David, Johnson is J-O-H-N-S-O-N.

It's really nice being here in this beautiful building today. First time in a week I haven't been investigating wood tics crawling all over me.

I live in Kalevala Township in Carlton County. Enbridge wants to run a pipeline through my 4A. My place is a slightly raised island in a vast forested wetland. The wetland goes for miles.

Much of it is covered in oak, ash, maple, alder, and spruce. To the southwest and north of me is wild state land. Very few people, very few roads or homesteads. It's a beautiful and isolated place.

For the record, I don't think there is a need for this pipeline. The price of oil is down below profitability for tar sands. There's a glut of oil right now. Demand for oil in the worldwide market is

down. There is talk in the financial world of stranded oil assets.

This oil will not benefit Minnesota. It will go to Illinois, and from there, who knows.

Long-term jobs are not in the picture. Thirty or so permanent jobs are not enough to endanger the future of our clean water and wilderness.

The many jobs that Enbridge brags of are temporary construction jobs, many of which would be filled by out-of-state workers who follow pipeline construction projects wherever they are.

These people, both in state and out, could be put to work cleaning up and removing the existing pipeline.

Enbridge has a history of trying to recover taxes they have already paid to places like Clearbrook, potentially bankrupting small towns who supposedly benefit from their pipelines. That's Enbridge, your good neighbor.

The EIS implies that water and land affected in southern Minnesota on the 4A

is equivalent to water and land affected on the northern route; not so. Wilderness cannot be replaced. It can't be compared to farmland. Farmland can be replaced. The waters of southern Minnesota are already polluted.

Wilderness once gone is gone forever. Assigning a dollar value to everything is what has got us into the mess we're in today. Doing the same thing will not get us out. Wilderness has a value that cannot be measured in dollars and cents.

Spiritually, its loss would be devastating. Do we want it said by our kids and grandkids that we sold it for a few pieces of silver? Don't they deserve to enjoy a clean and wild state of 10,000 Lakes?

Thank you.

FACILITATOR: Thank you.

Doretta Reisenweber.

MS. DORETTA REISENWEBER: Good morning. My name is Doretta Reisenweber, D-O-R-E-T-T-A, R-E-I-S-E-N-W-E-B-E-R. I am from Duluth and I'm here to speak against permitting Line 3.

The earth will take care of us

if we take care of it. Problems happen when we misuse what the earth provided us.

Since pipelines were first constructed, they have leaked, contaminating soil and water along the routes. Nonetheless, Line 3 is routed across surface waters 192 times and across hundreds of acres of wetlands.

Have we learned nothing? All the monitoring in the world is no guarantee against future pipeline breaks or leaks of the abandoned line.

Minnesota, Land of 10,000 Lakes, home of Lake Superior with 10 percent of the world's fresh water. What failsafe methods exist for the removal of toxic tar sands oil from ground water from our wells, from wetlands, rivers, streams, Lake Superior? Water is life unless -- until it is contaminated.

The notion of cleaning up tar sands oil is mythical thinking. Allowing more such pipelines would be unconscionable. Please do not permit Line 3.

Thank you.

FACILITATOR: Thank you.

Allen Richardson.

MR. ALLEN RICHARDSON: A-L-L-E-N, R-I-C-H-A-R-D-S-O-N.

Good morning. My name is Allen Richardson, and I'm an organizer. It's been my privilege to do some work with an outfit called Minnesotans for Pipeline Cleanup. I've been speaking to landowners who have hosted the Enbridge, the old Line 3 pipeline, for decades.

And so that the question arises, a question I've been asking a lot of people, assuming that it is safe to remove, assuming that the best science and soil conditions and all that has been addressed. If a private landowner wants old Line 3 removed from their lands, who is financially responsible? Is it the property owner or is it Enbridge?

And I'll tell you this, no one thus far has said, "Oh, well, the property owner should definitely be on the hook for that."

So the Draft Environmental Impact Statement gives the kind of blank

assertion that the pipelines in the main line corridor are, in general, between 10 and 15 feet apart.

Mr. John Munter of Warba took it upon himself to measure the distances between those pipelines on public thoroughfares between Wawina and Grand Rapids, and found that, at least between Line 3 and Line 4, there is, on average, thirty and a half feet.

So it becomes a question of the technical capacity to remove abandoned pipeline.

We hear some folks infer that it is not safe to remove it because it's a proximity to hot lines.

I see here -- I don't know why this is just catching my attention, but the Draft Environmental Impact Statement is a terribly long document -- is that according to this cost Enbridge estimates -- Enbridge estimates the cost for moving Line 3, approximately $1.28 billion.

Well, the first question, and I'm looking over at my brothers and sisters in the labor movements, a lot of orange shirts,

the well diggers, pipe union 49ers, a lot of other trades and friends, how many jobs, how many jobs are wrapped up in that figure of $1.28 billion?

And I guess my question is, since they put a dollar figure on it, doesn't that mean that the technical question of whether or not it can be done at all has already been answered? That it's really not a question of their ability to do it but rather just the convenience and the expense.

So I'd like that clarified.

I know that -- we would like to see some more science and better data on exactly how close these lines are. We'd love to see some technical specifications about their ability to remove old Line 3, where it sits, and for some reason, just seeing.

Speaking to the question of environmental justice on this abandonment question is that the removal of the existing Line 3 could positively affect these communities by removing stress and anxiety related to the presence of abandoned pipeline and ongoing risks to water flow, soil, and

water contamination and sustenance.

Which is to say that if my brothers and sisters in the labor movement would side with the landowners and not Enbridge, kind of assert yourselves a little bit, since we all agree that you all are the ones who are qualified to remove the pipelines, you know what I'm saying, you guys could potentially get the benefit of $1.28 billion removing old pipeline that would have the additional benefit, not only of supporting you in your communities, but removing the stress from communities who are bearing the burden of the abandoned line in the first place.

That's strikes me as a win-win, something we should all think real hard about, particularly given that we are establishing a precedent, right.

So if we can establish a precedent that a property owner who wants that pipeline removed, that it should be removed at Enbridge's expense. And that will also be the case for future pipelines which Enbridge presumably intends to abandon.

Thank you very much for your time.

FACILITATOR: Thank you.

Linda Herron.

MS. LINDA HERRON: My name is Linda, L-I-N-D-A, Herron, H-E-R-R-O-N.

I want to preface my remarks with just an observation. I agree a hundred percent with almost everything I heard today, with the one exception of the person who was against -- actually, I should say was for the pipeline. So I am not for the pipeline.

As a Minnesotan concerned about the legacy we are leaving to future generations and the health of the planet in the broader sense, I am opposed to replacement of Enbridge's Line 3 pipeline and urge the Minnesota Department of Commerce to oppose as well.

And I also urge the Public Utilities Commission to require Enbridge to remove the leaky, environmentally dangerous and now to be abandoned old Line 3 pipeline.

A proposed new Line 3 tar sands pipeline will further our dependence upon the

dirtiest of fossil fuels and reflect away from more environmentally friendly energy sources such as wind, solar and hydro.

Moreover, the new proposed corridor line would run through the Anishinaabe territory and its lakes and wild rice beds.

This new proposed line corridor threatens soils, aquifers, and the headwaters of the Mississippi River should there be spills.

I understand the tribal governments and community members are against this new pipeline as well. Since there is no state mandate to require Enbridge to clean up the old Line 3 pipeline, it falls upon the Public Utilities Commission to enforce cleanup.

Enbridge must be required to remove the old pipeline and restore the damaged ecosystem.

Landowners in the local communities should not bear the burden of future contamination from this now hazardous pipeline with over 900 integrity anomalies by

Enbridge's own estimates.

In summary, I urge you to reject Enbridge's proposal for a new pipeline and to require Enbridge to take responsibility for the removal of the old Line 3 pipeline. Minnesotans are depending on you to do the right thing.

Thank you for providing for this public commentary.

FACILITATOR: If you have written statements and you'd like to give them to the court reporter, feel free. You're not required to do so.

Arnold Collman.

MR. ARNOLD COLLMAN: Thank you. My name is Arnold Collman, and I got a couple of comments.

I would lake all of us just to imagine for a couple, three seconds what we would do without petroleum. What would happen? What would happen if all the pipelines were shut down tomorrow? What would happen? Think about that, if we shut down the pipelines. I see a lot of cars and trucks in the parking lot, I see two bicycles.

Pipelines move oil, and until, until we get a better way, I think we're stuck with pipeline.

I would like to go back maybe to the environmental ways when there was bees. I don't have any bees, either, and maybe that's chemicals, I don't know, but -- so our community then runs on petroleum, whether we like it or not.

I could go back to the old ways. I still know how to run a handsaw. We raised a big garden. So I haven't heard much here today about conservation. How much are each one of us willing to cut back -- don't make that extra trip to town.

You know, I've been around awhile, and the thing is, I see things that are cleaner, the St. Louis River, the sewer systems. The town up the river used to run raw sewage into the St. Louis River. That doesn't happen anymore. When I used to work at Duluth, I come over to Duluth in the middle of winter, you couldn't see Duluth because of the oil furnaces and the coal burning.

So we are making progress. And

I don't know how many of you have seen this, the Environmental Impact Statement. There's a lot of good stuff here, and I think Enbridge is trying to do a good job for us, and until -- like I said, until we find another way, I'm stuck with petroleum. Thank you.

FACILITATOR: Sheila Lamb.

MS. SHEILA LAMB: Boozhoo. Sheila, S-H-E-I-L-A, Lamb, L-A-M-B.

I always come as an indigenous woman first, as a mother, as a grandmother. And I've heard a lot of wonderful comments on their tribal perspective today, so I'm not going to touch a lot on that. But what I'm going to hit on is some hardcore facts.

Right now, sitting in Carlton county are pipes made in Canada. The trucking company, Dime, that's moving these pipes, they're out of Texas. The pipefitters union, Oklahoma and Texas.

We're getting sold a bill of goods about our jobs, and we have documentation proving, including on the website that list (indiscernible) in Line 3.

If we're in the middle of a DEIS

and EIS of the hearings, why are these pipes sitting here? They'll try to tell us it's tax issues, it's something with the taxes.

Anyone, especially here in this college that has a fantastic business degree program, will tell you that's not very economically feasible.

We do have 10 percent of the fresh surface water in the earth, 10,000 Lakes, but Duluth, in this region, has been forerunners nationally at making change, being progressive in healthy ways.

The governor of Minnesota said we are going to follow the Paris Climate Agreement. So what, we're going to just throw that away so we can have pipelines coming through here for oil that not only isn't going to Minnesota; we're lower consumers than most places nationally.

Why are we taxing those who drive electric cars another $50 to be sustainable?

We have had the ability to run electric, which Rockefeller, back in the days of Edison and Tesla, wanted to get rid of

because of kerosene. There's where the pipelines came from.

We have had the ability for solar and wind energy since the 1800s. We have the ability to make plastics and so forth out of hemp, which is sustainable. It creates more jobs, it's a cleaner way of going about it, it's more biodegradable.

Stop with the excuses. We need to get out of our comfortable little boxes and our easy way of life and create change or our children and our grandchildren and their children and so on will have nothing.

Within the next 15 years, one out of four children will not have any drinking water, one out of four. So if anybody can tell me what price you're going to put on the life of this little one, this little one, this little one, or any other child, let me know now, because my children, my grandson are invaluable.

You cannot put a price on their heads or the future generations in my family.

We have rain falling right now, yeah, okay. It's a renewable source, but you

destroy the Great Lakes, our beautiful Lake Superior, even renewable energy can go away eventually. You can block out the sun with smog. You can do all kinds of things if you are not responsible in your actions and to care for our Mother Earth.

I've heard the rhetoric. I graduated with more than one degree from this college right here and went on to UWS. I know how to research and look up information as well as every person sitting here or listening to this on live feeds. We cannot sit and listen to the same repetitive rhetoric time and time again and let them think we are ignorant and we're going to fall for it.

We got told in Floodwood, "Oh, our pipefitters union, they're going to drug test and we drug test randomly, but we let them know we're coming."

We have a trafficking issue here. We need to protect our children, especially native children. We need to stand together and protect our homes right here. It's foolproof. It's going to be on our backs.

Miigwech.

FACILITATOR: John Munter. Spell your name.

MR. JOHN MUNTER: If you want a copy of my remarks, I can hand you a copy.

My name is John Munter, J-O-H-N, M-U-N-T-E-R. I'm from Warba.

The Department of Commerce has been given an impossible task. The DEIS cannot be fixed. The only option is no build.

The complete economic analysis has not been provided to these meetings as required by MEPA.

Secondly, no good peer-reviewed groundwater or spill analysis has been done not paid for by Enbridge.

The routes all go through the ceded territory where the tribes have reserved rights to hunt, fish, and gather in perpetuity, not until some oil pipeline destroys wild rice or until applicant caused in part global warming destroys rice beds.

Number 4, both the DNR and PCA last year advocated a farmland route over the lake route. Not sure how we can get around

that -- how they can get around that.

Relying on the EIA forecast, which has been historically prejudicial against renewables of rising oil demand to 2040, is faulty since other analysts from Deutsche Bank, Carbon Tracker, Bloomberg's New Energy Finance, and Simon Henry, Shell's chief financial officer, all predict world oil demand peaking in the mid 20/20s since China, India, and Europe are all rushing to electric vehicles.

The Alternatives section under the no-build option does not consider Saudi oil, which is 21 percent less carbon intensive according to the line 67 EIS.

Then there's the oil boom in the Permian in Texas and New Mexico, and the Trump potential to open off shore oil exploration, which is why all the majors in the oil companies are fleeing Alberta and selling off their holdings to local Canadian companies.

Genocide issues were not considered in the connected actions of the First Nations downstream from the tar sands, and environmental justice issues around Detroit, Michigan and Port Arthur, Texas, as

well as the lack of a lease for the Bad River Band in Wisconsin on Line 5.

These are all environmental justice issues, as well as placing them -- not placing them a high enough priority in Minnesota.

The DEIS does not discuss, and maybe cannot discuss adequately, Criteria C, "Consequences to society are more favorable granting the CON than, the Certificate of Need, than denying it."

That should be a big chapter heading and it's gone.

The DEIS did not consider the potential to stop or delay other pipeline projects, like the Sandpiper was stopped, KXL was stopped for a long time and delayed now, as well as otherwise delayed and stopped in Canada.

The DEIS does not consider Minnesota's statutory greenhouse gas emissions goals or the value of holding Minnesota to higher standards than the surrounding states and Canada.

Greenhouse gas emissions should

be calculated over a longer period of time than the deceptive 30-year figure, which is probably an industry return on investment or a depreciation figure at some point.

But calculate the lifespan of the current tar sands projects since there would be no new ones, assuming oil stands under $80 a barrel and assuming tar sands will keep being imported as a loss to defray poor capital investments.

Maybe we're looking at another 120 years or something more realistically for the pipeline.

We also need to clean up old Line 3, as Allen was talking about earlier. We did find out in our study that the -- the pipeline study that we did, 50 named streets, it was roads from Rowena to Grand Rapids. It was 18 feet on average between Line 1 and Line 3. And one side 30 feet between Line 3 and Line 4 on the other side.

So apart from landowner choice, tribal choice; city, county, state choice about what happens to that pipeline to be pulled up -- it may be possible that there are some

tribes or people that think their pipeline is too close together, too dangerous to pull out, fine, they can make that decision. But for the most part, we need to pull it out because there could be legacy contamination under these pipelines.

Gas stations are required to do that. Lines are required for mediator sites, and so should Enbridge here. This sets a precedent for a new corridor of $1.28 billion for one project, but Lines 1, 2, and 4 were also built in the '50s and '60s.

(Indiscernible) -- So we need to make construction jobs possible for those as well, when their time comes.

Thank you.

FACILITATOR: Keenan Gonzales.

MR. KEENAN GONZALES: Hello, I'm Keenan Gonzales, K-E-E-N-A-N, G-O-N-Z-A-L-E-S, and I'm from the Mississippi Band of Ojibwe over in East Lake.

I spoke the other day, and I'm also a Fond Du Lacer on my grandma's side.

And I'm here pretty much directly opposed to the pipeline all together,

because my personal philosophy is if the cons outweigh the pros, what is the point?

You know, all you big oil companies have is all the money you'd ever need and ever want to support your family, your grandkids, and yet you want more. All for what? Just think about that. All for what?

While all us poor people here are struggling for jobs. Most of us had to use money to get here. We had to use money to feed us. If I want to go to school, I need money. Just think about that.

Go back just 250 years ago, Africa, North and South America, Indonesia and Australia, all these indigenous peoples never had money. We would just barter, just trade. And let's say your family isn't good at hunting, oh, well, I'll share my hunt, my catch with you. I get nothing out of it. I'm just helping my community members.

This is a sort of the beauty for my ancestors, his ancestors long ago -- we had peace and harmony. And a great man once said, and I quote, how did it go? It was the, quote,

"Empty your mind, be formless, shapeless, like water. If you put water in a cup, it is the cup. You put water in a teapot, it becomes the teapot. Water can flow and it can crash. Be water, my friend."

In other words, he said, without saying it, water is life. We're 70 percent water. We're more water than oil.

You know, I went to all these different oil pipeline things or whatever, I forget what they're called, but they always say, "You're oil, that's oil, this is oil." Well, oil can't -- well, they say oil came from the dinosaurs. Well, the dinosaurs wouldn't be alive without water. They wouldn't get so big without water.

But that's -- let me point out something we didn't think about. The plants, the plants are bigger than us. But then if the plants are bigger than us, and then they were bigger when the dinosaurs were around, wouldn't that mean the plants were bigger than the dinosaurs?

So going by that, the plants have more biomass than us and the dinosaurs.

In other words, the so-called fossil fuel -- yes, it is a fossil fuel, but it came from plants, and the plants give sunlight, and the plants need water. Without water, there would be no oil, there would be no petroleum, there would be no plastic. We would have to use something else.

Picture this: My grandfather was Mushkoouv, M-U-S-H-K-O-O-U-V -- sorry, I get a little stage fright. But he told me, you know, just like everyone said before me, this is marsh, wetlands, so what does this marshy wetlands do? It soaks up the water like a sponge.

So if it soaks up the water like a sponge, what will happen when oil is introduced? It's going to soak that up. You're going to kill the plants, you're going to kill off the animals.

The deer, do you like meat, sir? I like meat, too. Wouldn't you like to hunt? That's one bullet. Think of all the savings you could do, because there's more deer in Minnesota than people. There's more turkeys in Minnesota than people.

What does the U.S. government want you to do, get a license, a license to fish and a license to hunt. In other words, to me, that sounds like I can't get what I want to feed my family without the government knowing, back seat driving, you know, and remember, water flows, water flows downstream. The oil will do the same.

So -- and look at how big is Lake Superior? Lake Superior is the largest lake in the world -- area.

Guess who has the deepest lake in the world? The Soviets, the Russians. Now, my teacher, he was an older gentleman, he said, "In about a decade or so, there's going to be a war for fresh water." We're just in the bloody middle east for oil, poppy; gold, oil, drugs. God.

Now, let's think about that. A world with fresh water. That could be my kids or grandkids, great grandkids. I want to live to be an older man, just like these gentlemen over here.

Just think, in their heyday, in the 1950s, '60s, '70s, if I were to make a time

machine and go back and tell you, "Hey, in a couple of years now water is going to be sold in bottled water in the convenience store next to the Coke," you would say I'm full of shit and I'm crazy.

Well, look at the world we live in now, bottled water. There's water companies taking water from our lakes and selling them overseas in the desert. That's our water. You know, just think about that. You got that nice cabin lakeside. That's going to be gone pretty soon.

And then I remember watching some videos on that Facebook about up in Canada, some of their waters and rivers are running discolored. Now picture that, a brown disgusting hue, in the U.S.

You know, just think, those oil companies will think, "Oh, yeah, that's (indiscernible)."

Her dad, my great grandpa, he was the first one to do that wild water shake back when they were trying to dump uranium about 20, 30 miles north of where I live. That's a rough estimate, but he was the first one --

FACILITATOR: It's been six minutes.

MR. KEENAN GONZALES: Let me just finish that little bit about my great grandfather. He brought in an empty bottle of water, plastic, right. He went in one of the bathrooms, filled it up with tap water. He went there and said, "You said that water's drinkable? Well, I went over there. Here is that water. Drink it." We didn't drink it. We didn't call my great grandpa's bluff.

Thank you. Miigwech.

FACILITATOR: John Fisher Merrick?

Jeff Wiklund, spell your name.

MR. JEFF WIKLUND: J-E-F-F, W-I-K-L-U-N-D, Jeff Wiklund.

I'll leave these comments with you afterwards.

I appreciate the ability to provide comments on this important project, and urge the DOC and the MPUC to move ahead in accord with the current schedule, and most important, utilizing the route proposed by Enbridge.

I request this for the following reasons: The Enbridge route has been studied by experts for several years and is based on preferred practices for citing energy infrastructure.

Perhaps more importantly, the input from landowners has been considered in determining this route. These comments and related landowner input should be reflected in the final EIS.

I have lived in northeastern Minnesota the vast majority of my life and am an avid outdoorsman, stream trout fisherman, inland lake fisherman, and a big and small game hunter.

I love our lakes and woods. I believe that Enbridge's focus on safety and the environment helps ensure that Line 3 can safely and reliably ship its products.

It is in Enbridge's best interest to focus on safety and the environment. Its employees demand this and Enbridge is committed to both of these responsibilities.

Last, I am proud to say I am an employee of Enbridge. I left Minnesota Power

after 27 years with them and came to Enbridge to work on the Alberta Clipper project, a project that was good for hard-working men and women of Minnesota and the communities that we live in.

I believe what Enbridge does is good for America and is good for Americans. That includes the replacement of Line 3.

Enbridge works to develop projects in a manner that minimizes impact to landowners and the environment and ensures that controls are in place to protect both.

Enbridge employees are committed to safety, the environment, and ensuring the integrity of our lines and our facilities.

Again, as a Minnesotan and an outdoorsman who lives to be on the water, wading a stream, or walking a trail in the North Woods, I urge you to move ahead with the good work that has been done on the route.

I also hope you will stick to the schedule, because replacement of this line will help ensure both safety and environmental integrity.

Thank you.

FACILITATOR: I ask everyone to please be respectful so everybody's voices can be heard.

Kathryn Wegner.

MS. KATHRYN WEGNER: Thank you. My name is Kathryn Wegner, K-A-T-H-R-Y-N, W-E-G-N-E-R.

And first of all, I would like to say thank you for having this. This is really wonderful that we all get together and actually have a voice in this process.

I think about something as fundamental as I want Enbridge to take their pipeline out, both the abandoned ones and the new ones.

First, on the abandoned lines, when I go camping, I am told that by law I must pack up my stuff and leave the area as good if not better than when I walk in. I ask that Enbridge follow the same law.

Second, in terms of new lines, I believe that this is the last gasp of a dying industry, and they're trying to extract one more drop of profit, when in fact everybody knows that fossil fuels are on their way out,

that this is not a viable solution for not only today but for our future.

And to the gentleman who says that we don't have an alternative to petroleum, I respectfully say that we do.

We have not only the traditional solar and wind and whatever else, hydroelectric, but we also have industrial hemp, which can in fact produce anything that petroleum now produces. And that is jobs. That is sustainable. That is everything that is the opposite of what we do.

So I just respectfully ask that we just stop this nonsense and move on for the sustainable environment that is healthy and diverse and growing and wonderful, and quit with this dying, dying industry, please.

Thank you.

FACILITATOR: Hunter Jaakola. Spell your name.

MR. HUNTER JAAKOLA: Hunter Jaakola, H-U-N-T-E-R, JA -- J-A-A-K-O-L-A.

I oppose the pipeline and Enbridge in general. But they don't seem to want to -- they don't want to respect that.

And the no build alternative is never generally considered in any of the -- any of the EIS. And that's unfair. It's unjust, unAmerican, and it's unnegotiable.

My life is being put on the line. My relatives' lives are being put on the line, whether they want to or not, so will have to stop it anyway I have to.

My relatives are watching me, all of them. We are spokespeople for our ancestors that have lived here before America. And they understood, they understand that there will be hardships and continuous disregard for our Mother Earth, and this is another one.

The EIS needs to be respectful in how we live and how we are. We are the experts. We are indigenous peoples, but it's not just us; everyone.

FACILITATOR: Jason Mangan.

MR. JASON MANGAN: Jason Mangan, J-A-S-O-N, M-A-N-G-A-N.

I'd like to speak specifically about the impact this project has on the local economy. I am a lifelong resident of Crow Wing County. I'm engineering manager at LHB,

an engineering architectural firm headquartered in Duluth, and have worked in the pipeline industry in northern Minnesota for approximately 20 years.

LHB routinely provides engineering services to oil, gas and propane pipeline companies including Enbridge and numerous others with pipelines and facilities in Minnesota and neighboring states.

Myself, along with LHB's 250 employees, are evidence of long-term jobs created by the pipeline industry. Enbridge's investment on this and similar projects has enhanced the economic development outlook in increasing employment for service providers, construction companies, and suppliers used along this route.

It is this project, along with numerous others, that have allowed me to remain and raise my family in my hometown.

Thank you.

FACILITATOR: Sarah Agaton Howes. Spell your name.

MS. SARAH AGATON HOWES: Sarah, S-A-R-A-H, Agaton, A-G-A-T-O-N, Howes,

H-O-W-E-S.

I'm a proud member of the community. I'm from Fond Du Lac, and as a person of the land, I want to talk about -- ask about like when the EIS says you need tribal impacts, I feel like we have a lot of really smart people who work for the tribe, who, I feel like, can articulate the unique effects a lot better than how it's written in the statement up there. It's kind of vague.

It's like we can't really say what the long-term or short-term effects would be. And I know we have even our scientists right here who work for the tribe who could articulate really well what the long and short-term effects would be of the dangers of this for our community and for our race and for our health.

In relationship to the jobs, I think it would be good to articulate that we are the largest employer in Carlton County, so when we talk about jobs, we're employing Carlton County. So I think we need to make sure that that's understood, also.

And when we talk about

landowners, we are also people of the land. We don't call ourselves landowners, but we are those people.

I think with the statement the way it's written, it sounds really vague. It's not really saying -- what I said before is I think it could be articulated a lot better, but there's a lot of people that most of us could be directly in touch with that could tell you exactly what the long and short-term effects could be on our health, wellness, jobs, water, wild rice, the earth, fish, you name it.

So miigwech.

FACILITATOR: Thank you.

Tempe Debe.

MS. TEMPE DEBE: My name is Tempe, T-E-M-P-E, Debe, D-E-B-E.

I'm a Lake Superior Band Chippewa, and I've lived on this land for 77 years, 9 months and 20 some days. But I've been gifted with long life and a long memory.

And I remember when reserve mining came in, and their fine gentlemen in suits came and told us if there was ever any problem whatsoever, just let us know, we will

be here, we'll take care of it.

And I watched Lake Superior, the water levels, the whole water getting warmer. I remember the day when we couldn't drink the water in Duluth because it had too much asbestos in it.

Superior was all right because theirs was filtered through sand, but the point of that being is it's still with us. We need to really look at that.

I know -- I live maybe a mile or so from the pipeline. I live in Sawyer, and I lived on -- it runs between me and the lake, and it's all wetlands. And for those who don't know, we live on top of one of the biggest pure water deposits in the world.

And I want that pipeline out of there. When it came in several years ago, none of us really knew what was happening and what to do about it if something goes wrong. I worry about that all the time. I'm sleeping just down the road from that.

If there's a disaster, who's going to come and take care of it? Nobody I know on the reservation, so it's got to come

from somewhere. But if that pipeline breaks in that area, it's irretrievable. We drink that water. We have pure water wells in that area.

And we need to pay attention to our lives, to our children, and for those who have not been here for many years and left us to ourselves, we survived, many times on very, very little; knowing how to work with the land and to preserve it.

For me, personally, I want you to think about if you want to live on this earth, at some point you're going to have to make a decision about that. You're going to have to learn how to make your home in the woods and to learn how to help each other and to care about each other.

Because we don't have that much time here before you're gone, too, and who's coming after you?

But please, at least from my perspective, having a pipeline running through wetlands is extremely dangerous. Dumping into Lake Superior, with all that's already in there, they can't even clean the asbestos out, and all the other ways.

They tried to retrieve St. Louis Bay. Every time they did, they come up with something else under there.

Let's not forget years of the outdoor nuclear bombing in the southwest, and where did all that go? It settled on the land. It's in our land. If you dig down deep enough, be careful, and that's for all the miners, too, because there's something there.

(Indiscernible) and nuclear tides, cocktails of all type of destructive manner. We're already contaminated. Don't bring any more.

I want the pipeline and every piece of it off the reservation.

Thank you.

FACILITATOR: Jami Halder, Jami.

MS. JAMI HALDER: My name is Jami Halder, J-A-M-I, H-A-L-D-E-R.

I'm from Duluth, Minnesota. And I just want to comment on a few points or lack of a few points in the DEIS.

There's no analysis on Enbridge's safe detection system or their ability or inability to respond to major

emergencies.

Also, that the southern sites chosen for -- with the spill model are still modeling and not representative of the locations and resources put at risk along the entire corridor.

I'd ask that a more thorough analysis of different locations be proposed or that they're needed; for example, what about Lake Superior? The DEIS contains no spill analysis for tributaries of the St. Louis River or Nemadji River where spills could decimate Lake Superior.

So basically, I'm just in opposition of this pipeline, and the EIS is lacking necessary information for the public to be approving or disapproving at this time.

Thank you.

FACILITATOR: John Dugan.

MR. JOHN DUGAN: My name is John Dugan, J-O-H-N, D-U-G-A-N.

I'm a U.S. citizen residing in Metro Minnesota. I oppose the expansion of energy sources from fossil fuels such as oil, carcinogenic oil, natural gas, and coal.

I support development and expansion of renewable resources such as solar, wind, and hydro.

The production and transport of oil causes degradation of the environment and endangers natural resources such as water and forest.

Job creation and alternative energy sources is growing. In many areas of our country more and more people are turning to renewables.

My wife and I have solar panels installed in our residence in order to supply our needs with a self access back to the utility company.

Putting in a new pipeline continues the reliance on an energy source that should be rolled back in favor of renewables.

Thank you.

FACILITATOR: Thank you.

Tonja Albet.

Kylie Lemley, spell your name.

MS. KYLIE LEMLEY: Hi, my name is Kylie Lemley, K-Y-L-I-E, L-E-M-L-E-Y.

And before I begin my whole speech here, I just want to say that the comment that Enbridge is in the business of protecting the environment is a lot like saying that Trump bombed Syria a couple of months ago because he's in the business of protecting our international relations.

So first, I'd like to speak on the issue of abandonment. If you feel that we really truly need this pipeline endangering Minnesota's waterways and peoples, I'd like you to ask yourself why you support this particular group. Is it because you believe Enbridge's best route is the one that endangers over a dozen natural rice beds and Mississippi headwaters?

The route is nearly exactly the same as the already defeated Sandpiper pipeline. If that one is gone, why are we approving this one? Do you truly support the (indiscernible) whole line, leaving it in the ground for landowners and future generations such as myself or your children to deal with?

The cost for cleaning up the lines has been estimated at $1.28 billion.

Who is going to pay for that? I'm not going to pay for that.

So 14 pages in the DEIS are dedicated to the issue of abandonment. In my mind, this is a huge issue, 14 pages out of approximately 6,000. I mean, that's insane.

We have never dealt with this topic of abandonment before. So we require, we demand an entirely separate environmental impact statement on the topic of abandonment. We need to know the full consequences of abandoning 50-some year old pipeline and all the ones I'm sure will be abandoned after it.

We need to know the full risk that we're accepting by allowing Enbridge to leave the mess behind.

Next, I'd like to mention even if we do need oil today, like I've heard mentioned a couple times in the entire argument, "We all drove here today. We're sitting on plastic. Our clothes are made from oil." We have maybe 20 or 30 years to figure out how to move away from it before we don't really have a viable way to continue to get oil.

What are we going to do in 20 or

30 years? I don't know about you guys, but I intend to be around in 20 or 30 years. I'm asking now, we've been talking about it for the last 50 years. What are we going to do when we run out of oil?

Do we just have no options to move forward because we spent the previous 70 years knowing we're running out of time but milking the earth for every last drop we can scrape from it?

We have welding jobs, electrician jobs, very similar to what all of our union guys over there are representing, green energy economy. The technology does exist, no matter what you might hear.

Natural fibers, hemp-based plastic and concrete exist. Electric cars, cars that run on vegetable oil, all of these things are things that are viable. There are options. There are more than double the jobs in the renewable energy resources economy than there are in the oil and natural gas industry nationwide.

The only reason that we believe we need petroleum to exist, and the only

reason, is because the money wielding corporate giant has distorted facts to make things seem that way.

We have options. We are moving forward. Do we, as Minnesotans, want to be left behind; because I don't.

Lastly, I'd like to pose a question for all of you to consider privately, the DEIS specifically states that indigenous communities will be adversely impacted disproportionally so compared to others.

It also acknowledges that native peoples are already economically adverse impacted compared to other communities.

If we (indiscernible) the sensitive natural rice bed that takes up most indigenous yearly income, and if we kill the water that we all need to survive, we kill our native people, too.

Ask yourself why pipelines always seem to snake through reservations no matter what the people who live on them say. Ask yourself why.

When Bismarck residents said they didn't want the Dakota Access pipeline near

their water sources out of fear of the risks it presented, the pipeline was rerouted to the Standing Rock reservation. Ask yourself why.

If this Line 3 doesn't affect you or your family personally, or you don't think it does, you just don't care.

That's all I have to say. Thank you for listening.

FACILITATOR: Xander Ripley-Jaakola.

MS. XANDER RIPLEY-JAAKOLA: Hello. My name is Xander Ripley Jaakola. It's spelled X-A-N-D-E-R, R-I-P-L-E-Y, Jaakola, J-A-A-K-O-L-A.

I -- I don't know. I don't like pipelines. I know that if the pipeline keeps running and it's not taken out, my friends, me, my children, are not going to have water. And we won't like that.

If water is gone, all life is gone. We can't depend on apple juice, it's water. It's with apples. We can't depend on Coke, because that's made with water, too. It's made with water. And deer, they need water, and we need their meat.

So if the pipeline goes through, it -- it could break and spill all over Lake Superior, and that's where most of our water comes from.

And the earth will -- the earth, it won't be there, because water is our life, and I know that.

Thank you.

FACILITATOR: Darek DeLille.

UNIDENTIFIED VOICE: You are our fight, little man. Thank you.

MR. Darek DELILLE: Boozhoo. (Ojibwe).

My name is Southern Spirit Bird, and I'll tell you a little story about my name, firstly. It mentions the south direction, and that's for our people, all things are important to us. And that direction is a direction of love.

So I was told a story that goes along with that name that not only was me, at that time I recognized that name when it was given to me. And I knew it was me.

Not only that, but I became that name more and more and more as time went on.

And I was told I was going to blow a warm breeze upon the people and I believe that.

So I come to you firstly, all of my relatives out here, every single one of you, I'm not talking only to my native people. I'm talking to all of you. I speak with love today.

First, I'm pretty sure that all of us that have stood up here today, my native peoples, we didn't really want to step up here and talk. But as a native people, we respect the ones that have passed on, and all of my ancestors say, "Go, Darek," and we acknowledge that past, that strength, and we draw upon that.

So I have to speak, and I wanted to speak about the ones with the jobs on those pipelines. And I'm so sorry that your jobs are going to discontinue, because you're not coming through here. This is where my family lives. You're not going to do it.

We have native peoples, went through trails of tears. I don't want to hear about a loss of a job. People will adjust. If you lose this pipeline job, just like every

other person, you're going to adjust.

I know we all need gas right now, but we need to keep moving on, and without gas, we're all going to adjust. I want to mention that one more time, how many people of mine, all of my people that were taken off of these lands -- when you ride through these lands, you go through that Chippewa National Forest, there is no denying that is native country.

We don't claim to own it, but you'll know if you take a ride through, tell me you don't feel it. It's a feeling. I'm not sure how many people out here are spiritual, but I'm pretty sure it's a good deal of you.

We as native people are taught to do things with intent, with the best of intentions. We've been taught this since before we can remember, all of our ancestors. We put our intentions out firstly.

This business of pipelines, firstly, it's a business; that only a boardroom of people is going to get real rich.

All you other workers is getting

paid peanuts. I'm sorry to inform you of that. And what are the intentions behind those men and women in that boardroom? They're not good.

You look at all the drugs and alcohol out here. Why is it doing bad to the people? Because of the intentions and how that stuff was made.

I ask everyone today to have good intentions and talk from your heart and be about the heart and be about your family. Think about the future. Think about all the grandchildren and the great grandchildren.

And remember that water. That water is living, that water is our life.

Miigwech.

FACILITATOR: So we have five more cards, names of people who want to speak. We have a little under 20 minutes, so I ask people to be as concise as you can.

Tara Wels -- Sarah.

MS. SARAH WELS: Boozhoo. My name is Sarah Wels, S-A-R-A-H, Wels, W-E-L-S. I'm also known as Headbird, H-E-A-D-B-I-R-D.

I'm a Leech Lake Band of Ojibwe

band member, and I'll be real quick.

On June 5th, I was -- I went back home to Leech Lake, and I was asked to talk to some people about the Superfund site and the six pipelines that run through my town.

While we were on the Superfund site and those six pipelines that run through our town, we came across what very likely is a spill. I called in that spill to Enbridge on June 5th.

At 9:30, on June 5th, I called in a spill to Enbridge. I sat at that site. I breathed at that site. I walked through that water. I walked through that swamp, which was burnt. I stood in knee-high water that I was told was a grass fire. I would like to know how grass starts on fire in the middle of a swamp.

There's reeds in the middle of a swamp. There's cattails in the middle of a swamp, but there's not grass in the middle of a swamp. Kind of need to drag your ass about a grass fire (indiscernible).

This high, the water, to my knee,

as I stood there on the phone with Enbridge, "I need to report a possible spill. Can I get somebody here immediately? I am standing in the middle of the black."

And he said, "What does it smell like?" I said, "Well, it smells like gas." He said, "Well, if you're concerned, maybe you should call 911."

So I grabbed another phone. I had Enbridge on one line, I had 911 on the other line. "Oh, that's just a grass fire. Don't worry about that."

Enbridge, are you coming? Enbridge, do you care about our environment? Enbridge, I just walked 55 steps. I have some pretty small feet. I took 55 steps from where this spill was to an elder's house, who was 73 years old. He drinks that water every single day. So do his great grandchildren who are six and eight that he provides for. So does the family next door that has nine children in their house.

I sat and waited at that swamp until 2:30 that morning waiting for Enbridge to show up, because Enbridge cares about our

environment, right.

Enbridge never showed up. They never showed up. So then I was asked to go on a pipeline water walk on June 8th. But as I -- hold on, I'm going to go to the Rice Lake public comment period and see what Enbridge has to say, where they're coming from on their environmental impact statement, where do they sit at, what they're going to do for our wetlands, what they're going to for our kids in 20 years.

So I went on June 6th, and I kept my mouth shut during the public comment period about what I found the day before.

I wanted to scream at the top of my lungs, "Enbridge, why don't you care about our environment, why didn't you come out there and prove me wrong? I am begging you to prove me wrong. Prove me wrong, Enbridge. Prove to me that that is not a spill that my elders and those kids are drinking 55 feet away."

Oh, wait, I did the water walk, too. We started in Grand Rapids, Minnesota, where the largest oil spill in history in the United States happened, in 1991, but nobody

talks about that. Nobody talks about the Grand Rapids oil spill because it happened on ice.

Wait a minute, Enbridge, you care about our environment? Where is the spill cleanup for ice? Enbridge, we've been waiting for that answer for years. Still waiting to hear where that ice cleanup spill is, because here in Minnesota, we are underneath ice six months out of the year. But you don't have a plan to clean it up, your oil on ice?

But that's caring for that environment? How do you care for the environment when you do not even have a cleanup plan for a spill that will happen on the ice? How is that possible?

June 8th, we started that walk, in Grand Rapids, Minnesota, biggest oil spill. We went from Grand Rapids to Ball Club to Deer -- oh, Cohasset.

We stopped and got water samples at every single place. We watched the water and how it changed.

Deer River, where there was an oil spill and where they burned it off in the swamp. Sound familiar?

The water was brown, with brown clumps in it. We have those water spills -- the water samples, excuse my language. We have those samples. We took water samples all the way to Bemidji, Minnesota, because we walked 70-plus miles along Enbridge's six pipelines that pump 2.38 billion barrels at a max capacity for us Minnesotans into Wisconsin people's land.

That's 2.37 billion barrels too many, and they put it in barrels, because, guess what, one barrel is actually what, 43 gallons, I think, approximately.

FACILITATOR: Sarah, it's been six minutes.

MS. SARAH WELS: Yes, I understand.

I want to know how Enbridge can say that they care for our environment, because on June 6th, I did the public comment in Rice Lake, Minnesota. It is now June 12th. It has not even been a week. I walked 70 miles of their pipeline, and I have on phone, I have on camera, I have on samples, and I have water samples of three possible

spills that were all reported to Enbridge, and they did not respond.

That's not including the three spills that are active in Cass Lake, which they've inserted 22 wells to monitor. That is documented on the website as they are monitoring what the oil is doing. They don't care about what is happening to us.

FACILITATOR: Sarah, can I ask you to wrap up, please.

MS. SARAH WELS: So less than a week, I as an individual have been out there walking 70 miles of pipe to see what I could find, not for me, but for everybody that's here, including Enbridge, including those union workers and your kids and your babies and all those pipeline workers.

Because we're out there praying for your water every day. We're praying for your kids' water, and when your wives are pregnant, your babies are inside of water. We have to protect our water. We have to.

FACILITATOR: Thank you.

Harvey Goodsky.

We have four more people who

want to speak, and we're running out of time.

MR. HARVEY GOODSKY: (Ojibwe), I think that was quick enough. My name is Harvey Goodsky, H-A-R-V-E-Y, G-O-O-D-S-K-Y.

I am a member of the (indiscernible) Spanish tribe, and along with that, since all of the other union workers like to talk about their job description, my job description, I carry up (indiscernible), which means pipe for all the non-native language speakers.

My duties are to protect my friends, family, and loved ones. My job and my duty right now is to ensure that every one of you are okay, that you guys make it home safe. Now, these are the duties that was entrusted upon me. I cannot change my duties. I cannot change my job. I barely even get paid for protecting everyone.

But that's beside the point. That's beside job descriptions, what you do or how good you do it. Beside all that.

Environmentally, we don't need pipeline to head straight that way through the village that I grew up in, the village that my

mother grew up in, or the village that her father grew up in, the village that his father grew up in.

You guys are messing with our lives. You're messing with our heads.

I think you guys do know that. These are my comments about this Environmental Impact Statement, because there's no other reason why we're all here besides the environment.

You guys can talk about jobs. You guys can talk about money. You guys can talk about the infrastructure and how it's crumbling. There's a reason why it's crumbling, because of all these trees and wetlands. You cannot build on these marshes.

These pipelines that are in place, the reason why they're cracking is because the earth is moving. The earth is alive. These pipelines are snakes and they're dead. Go ahead and feel proud about that big black piece of metal that you make. It's not that impressive.

When we go through these days and we see our babies smiling, laughing,

having a great time, enjoy that. Those are the real pictures that bring joys to life, not this piece of paper that you make out of a tree. That takes away from our oxygen, our H -- our 02.

I don't want to hear anymore about anymore jobs, anymore money, because it's an Environmental Impact Statement. There is no job situation in the Environmental Impact Statement. There is no money in an Environmental.

These trees, they don't care how much money you have. This water, it doesn't care how much money you're going to make off of it. I am not going to see a single penny from this Line 3 replacement.

I am not going to see a single, little bitty drop of tar sands oil that's going to go down to Illinois. I'm not going to see that at all. Therefore, I should not have to worry about it.

Therefore, you can take it down south to where there is no wetlands, marshes, and trees, where there isn't all this water.

You know, I have been to the

past few, and you know what, I know about the (indiscernible) week.

So go ahead and talk about how professional you are. Just tell them the road is that way.

There has been a leak. Fire was coming out of the ground. Fire, actual fire coming out of the ground, and that's not natural. That's something that man makes. Or a volcano, and I don't see any volcanoes in here.

Besides that point, besides all of that, let's think about the environment here. Let's think about what's going on out here. Let's think what the yellow stuff is right there, because that's all right here, right now.

I really don't want to hear anything more about jobs and money, because that's not part of the environment. It is not.

Along with being -- carrying (indiscernible) to ensure our safety every day, I get along on the drum, a ceremonial drum, so go ahead, all you union workers and

pipeline fitters, belittle all of us. You don't know half of what we're dealing with.

But right now, as you look at it, as you look towards me, I will be there as your construction -- constructing that pipeline. I will be there with the drums of resistance. Because in --

(Applause interruption.)

Stop. We can take it down south.

Miigwech.

FACILITATOR: Thank you.

Tanya Aubid.

MS. TANYA AUBID. Tanya, T-A-N-Y-A, Aubid, A-U-B-I-D.

Boozhoo, (Ojibwe.)

Forgive me, the (indiscernible) foreign language of this (indiscernible). I spoke my first language that I learned when I was growing up, and I just want you to know that that board up there that says, "Tribal Resources," I understand that the U.S. government has been slowly using genocide on us. This is another form of genocide to have come through Minnesota to wipe us out.

I was over at Standing Rock, yes, I have seen a lot of the things that goes in to putting that pipeline in. I was there along with the trucks of resistance, standing there, telling them, "We do not want these pipelines through here."

When we take a look at our tribal resources, please get the facts straight.

I know that you are here listening, and I know that there's representatives from the government here that are listening. Get the facts straight.

We are here up in northern Minnesota. Thankfully, the government is down south where they can't see us. They can put us on the back burner and just go through with their normal lives. That's not how it happens here in the northlands.

I was able to talk to railroad people that work on the railroads and asked, "Well, how has the railroads this year been?" Man, they were crabby. They were like all over the place. "We are still repairing those railroads."

I would like to say that the pipelines are safe, but I got confirmation yesterday from a union pipeline worker that lost his job. I said, "Hey, do you think you can guarantee me that these pipelines won't leak? Can you tell me? Can I have it in writing as a guarantee that these pipelines won't spill?"

Their answer to me was, "We don't have any guarantees that these pipelines won't spill or leak."

Why would you want to keep pushing forward and having these pipelines here when they, too, know that they fail?

As an indigenous woman here in this healing dress, I call for healing of our peoples throughout the land, to be able to learn from one another and to be able to positively work forward instead of always desecrating our lands.

I just want you to remember that you are standing, breathing, living on stolen lands from 1492. We've had 500 years -- over 500 years patiently seeing what the healthy, better, positive way of life is, and from what

I've seen so far and what my ancestors have had to live through, has not been a betterment of our lives.

Back then we were able to just stop by a river stream to able to take a drink out of there without no worries about having the black stuff underneath there. We didn't haven't to worry about going out and catching a deer and wondering if it has chronic wasting disease. We didn't have to go out there by a fishing lake, some of you avid fishermen guys like to do, and not have to worry about pulling up something that has tumors on it.

When I was out in North Dakota, I seen what was going on. You couldn't even -- I took a drink out of the Missouri River, and I could taste what was in that river. The diesel I taste, that lasts within me for three days.

Like the pipeline workers say, "We got the best in the field. We can be able to have a safe pipeline through here." But then again, they just told me yesterday that these pipelines do leak, even if they put in good work on it.

So to honor lawmakers here, that

are standing here, please know that this tribal resource person here is against these pipelines, and none in the future. Miigwech.

FACILITATOR: Thank you. We are out of time, but we have two more comments, so let's take the comments of Pat Farrell.

MS. PAT FARRELL: Pat, P-A-T, Farrell, F-A-R-R-E-L-L.

First of all, I'd like to thank the sweet one who started these comments with that beautiful song about water.

I'd like to address a couple of points. The first is that I think it would be completely irresponsible for the PUC to allow another pipeline to be installed without addressing the issue of safely removing the old pipeline. If there is no technology for removing pipelines to deal with legacy soil and water contamination, there should be no new lines installed.

My second point is that the DEIS states, "From a tribal perspective, any of the route segments and system alternatives would have a detrimental effect on tribal members," and, "Any of the routes would have a

disproportionate and adverse impact on tribal resources and tribal members, even if the route itself does not cross near residences."

If the DEIS and the Public Utilities Commission is giving anything more than lip service to indigenous rights, then an alternative, a no-build alternative, must be one of the alternatives considered.

The third point I'd like to make is that I just returned from Honduras, meeting with community organizers like many of you here, who are being murdered with total impunity for speaking up against projects like pipelines and hydroelectric dams; Berta Cacines, being one of those murdered community organizers.

And it says to me and to all of us white settlers and indigenous people alike how important it is for us to speak up and resist.

Thank you.

FACILITATOR: Lyn Clark Pegg.

MS. LYN CLARK PEGG: Thank you. I am understanding the time, and I'll speak quickly. My name is Lyn Clark Pegg, L-Y-N,

C-L-A-R-K, P-E-G-G.

I'm here speaking also, along with Pat and my other colleague Becky, from the point of view of the global perspective on extraction and so-called development projects.

We were in a delegation in Honduras, and I'd like to say Witness For Peace is an international human rights organization that promotes and advocates for peace, justice, and sustainable economies in the Americas.

We care about South America, Latin America, and North America, and that's where our work is. In this delegation we visited various communities that are resisting corporate international takeovers of the lands that are being misplaced and where our land is being destroyed. We saw blockades that they were putting up against these corporations, often resulting in the death of the leaders.

They asked us to carry back their -- carry back to the U.S., when we returned, and bring along the spirit of their resistance to these so-called unjust development projects.

They certainly need our international solidarity, but they also need us to resist here in our local communities against corporate exploitation and greed.

They said, "People, not profits. People, not greed."

Water is life. It's life here, it's life there, it's life all over the world, and we have to respect that.

FACILITATOR: Thank you.

So one more person had her name before us, has not been called on, so if you'd like to speak.

UNIDENTIFIED SPEAKER: Ho, relatives, I see the crowd has left. I have stayed at one of you guys's big lakes here that we have never seen. I had to head out. We are guests here. We were invited here by a couple people, and we pay homage to them every day when we pray.

Me and my children have the privilege to sit here and go around and see a bunch of the lakes. They are gorgeous. I am a little bit jealous of you guys. You guys have beautiful waters up here. You know, we

are (indiscernible) and we come from the plains -- we got rolling hills, that's what we got. And so I'm very grateful to able to be camping out.

You know, I heard a thing about petroleum and we have to get away from that. Well, me and my children have been camping a lot of places. During the wintertime we was up there fighting (indiscernible) and everything. We stood for three months, me and my ten-year-old. We stood there and everything. We fought with them through the blizzard and everything.

If you guys can't do that, then there's something wrong. It's not really that hard.

He's got some solar flashlights. They cost a little bit, but they're really good. Put them out in the sun, you got flashlights. You don't worry about batteries and everything, you know.

And I'm just really upset that all these little meetings are happening. I didn't understand them, but that's a division that they're creating.

If you guys can't see that, for some of you guys, that's a division. They should have one big area and have everybody come together. That is how they're dividing everybody, and pitting each other against each other.

I'm a guest here. You know, we are learning the ways of the Anishinaabe, and I really respect your way, and your guys's ways are similar to ours. We are relatives. You know, I met a lot of (indiscernible).

You know, he showed my family nothing but hospitality, nothing at all, and it would be a damn shame to see these lakes polluted.

If a lot of you guys don't know exactly where these pipelines are going and where they're feeding to, you really, really need to take a look at that.

All of it is going through the majority of indigenous lands, because nobody wants it in their yard, nobody.

I made a comment the first meeting, we drove five hours to be there, and I told them put it in the governor's backyard,

see how he likes that. None of them want it.

I respect the farmers. Like you said before, I love food. You know, I have never tasted a lot of your guys's food, and the community have really come together for me and my little ones.

And it's a damn shame that all these little meetings are happening, and I'm not from here, and I apologize if my tongue kind of gets away from me.

But you guys got to stop with all these little meetings. You need to push Enbridge and all the rest of them to do it all in one and everything so they can hear it.

Sheila said that there's pipes that are getting dropped off. I seen it. I seen it, and that stuff pisses me off.

This is not my land. This is your guys's land and everything, and I pray hard. I pray hard and everything that you guys can really fight this. We lost two of 'em already, you know.

And they're going to try to come back through. They're going to try to come back through our land, and we have a bunch of

grandmas that are still alive and standing on the road. My grandma put her chair in front of a semi and she sat there in Rosebud. She wouldn't let them pass. She said, "I don't care if I die today," she said, "I lived a good long life, but I'm going to protect this water for all the unborn." That's why we came up here.

I apologize. You guys are wanting to leave and everything, but I didn't get to see all 10,000 lakes yet. And I just want to be able to come back and say thank you guys. Thank you twice for bringing the drum. It makes me feel so good to see that there.

Thank you, guys.

FACILITATOR: So thank you to everyone for being here, for giving your comments, some really valuable comments.

And the meetings will continue. There will be another meeting this evening in St. Paul. There will be meetings the rest of the week and next week as well.

To close, did you want to play a song for us? Thank you so much to everyone.

(Song playing at this time.)

$

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DEIS MEETINGS - 14-916 15-137

STAPLES - JUNE 14, 2017 - 11:00 a.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Staples Community Center
122 6th Street NE
Staples, Minnesota

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FACILITATOR: Good morning, everyone. I want to invite you to come on over, fine if you want to stay at the tables.

We're going to open up the public comment portion of our meeting.

Welcome. Again, this is the Line 3 Project Draft Environmental Impact Statement meeting, hosted by the State of Minnesota. I'm going to hand this over to the project manager from the Department of Commerce, Jamie MacAlister.

MS. JAMIE MACALISTER: Good morning, everyone. Welcome, thank you for coming. As Stacie mentioned, I'm Jamie Macalister with the Minnesota Department of Commerce.

I just want to go over a few things quickly before we move into the oral comment portion of our meeting.

We just want to remind everyone that we are here today to get your comments on the Draft EIS. Hopefully you've had an opportunity to check out the posters, look over some of our material.

If you haven't had a chance to

pour through the thousands of pages of the document, maybe you've got enough information to provide us a comment today or send one in in writing.

We do not make -- the Minnesota Department of Commerce is not making any decision on the Draft EIS or the permitting for these projects. That is done by the Minnesota Public Utilities Commission, and they will determine first whether or not to issue a Certificate of Need. And second, whether or not to issue a route permit for this project.

This Environmental Impact Statement has been prepared with a handful of other state agencies, including Minnesota Department of Natural Resources and Minnesota Pollution Control Agency.

And agency staff are here to help you find information in the Draft EIS if you need assistance.

So if you've been following the process for a while, we'll just quickly give you a run-through of where we're at.

We are currently at number 3

with the Draft EIS comment period and meetings, and we will be preparing -- once we get all of these public comments, we will be finalizing the EIS, and that will move this phase of the process into the contested case hearings with an administrative law judge.

Those are scheduled to begin sometime in late September, and the administrative law judge will take comments, take testimony, and prepare a report which will be sent to the Public Utilities Commission, along with the record, and that will help inform their decision.

There is not expected to be any decisions made on this project until sometime in 2018.

UNIDENTIFIED SPEAKER: Are you taking questions from the floor?

MS. JAMIE MACALISTER: We are not taking questions from the floor, but we are taking comments on the Draft EIS. That's why we're here. That's what we're hoping you came here for is to give information and comments on the draft.

What we need to know is if

there's information missing from the EIS. Is there information in the EIS that is unclear that we need to further clarify and make it easier to understand?

And we need to know what else could be improved in that document. So that's what we're here for.

You can provide your comments today orally. You can write them and leave them in the box. You can take your time and send them in to me later. You can do that by mail or email, whichever you prefer.

And all of these comments will be shared with each one of you. They'll be posted on our website. There will also be transcripts from these meetings. If you provided oral comments, you will be able to see them online as well.

So what is important to remember about this is that all of these comments are treated equally. This is not an up or down vote. We're not taking sides here. We're looking for information on the draft.

If we get thousands of comments for this project and thousands of comments

against this project, those are not what makes the decision for this.

And furthermore, the EIS itself is not a decision-making document. The EIS is an informational document that helps the decision-making body, the Public Utilities Commission, make their decision.

So with that, I'm going to turn it back over to Stacie and she will begin the oral comment portion of the meeting.

FACILITATOR: Thank you so much, Jamie.

So a couple of ground rules to get us started and to make sure our meeting -- this portion of the meeting is effective.

Our goal, as you heard from Jamie, is to allow everybody to speak, to share your ideas, those who want to give public comments. We have a court reporter here who will be creating a transcript of what we say.

If you are reading from prepared remarks that are written, if you could give those to us for the court reporter to double-check as she goes through making the

transcript, that would be very helpful. So we would appreciate that.

A couple of ground rules. We need everybody to work together. We're a fairly small group, but we do want to make sure everybody who wants to speak gets a chance to speak.

We're going to ask you to keep your comments to seven minutes or less, and we're going to put a timer on the screen that's going to remind you of that.

As we start to get towards seven minutes, I will stand up to give you the signal, the time, and when it's at seven minutes, I will ask you to conclude.

And that's so that we make sure everybody who want to speak gets a chance.

Right now we have I think twelve people who put their names in the box and are wanting to speak. If we get through all of those and we still have time, then we can go on hands, if there's additional time, for additional people who want to speak.

And we'll still keep comments to seven minutes.

If you do have questions that you want to ask, in your comments you can do that. There's not going to be an opportunity for a response to those questions now. But you could get those in. Those questions could helpful as they're revising the EIS as well.

We ask you to be respectful of others. Please do not interrupt. If you want to show appreciation or affirmative support for something that somebody has said, please hold that until the end of their comments and then feel free to express that.

If you have a negative reaction to something that somebody said, we ask you to just keep that inside. Because we really do want people to have a chance to feel safe to speak.

It's really important to get everybody's views out. That's what this process is all about.

When you're making your comments, if you can also focus on the issues. The more substantive, the better, in terms of the EIS; that really is helpful to the agencies.

Focus on the issues. You can

talk about organization, but please do not direct comments towards any individuals. That makes people feel very uncomfortable. So please don't do that.

In the back we have a number of members. Maybe you've have a chance to speak with them earlier. If you all can raise your hand for a moment, State Agency Folks.

They are here at this point in listening mode. They're here to listen and to hear what you have to say.

Just a few logistics. If you can silence your cell phones so we don't hear cell phone rings, that would be great. Feel free to step out if you need to use the restrooms or have refreshments. They've asked us not to have refreshments in the room.

We are going to end the meeting on time. A couple other things, the sound in here is a bit echoey. You might have noticed.

One thing that will help. Leslie will be bringing the microphone to you. So when I call your name, you don't need to stand up and come up front. She's going to bring it to you and you can speak from your seat or you

can stand up and speak from there.

It's going to be helpful if you hold the microphone -- this one's a little bit different, but the cordless ones, if you hold it like this, fairly close to your mouth -- you don't have to smother it. It's going to be really helpful for everybody to hear you so try to speak somewhat slowly. That will help as well.

And I think I've covered it. So with that -- I don't know if you want to pull up the timer. So as I call your name, what I'd like you to do when you start is to say and also to spell your name. I apologize in advance if I pronounce anybody's name wrong. You can correct me.

So, Dennis Thompson, please start by saying and spelling your name. And we'll start our timer after you're done spelling your name.

MR. DENNIS THOMPSON: Thank you. My name is Dennis Thompson, D-E-N-N-I-S. Thompson, T-H-O-M-P-S-O-N. First of all -- I've got a couple of things here in terms of where we're going.

I'm a former state park ranger at Itasca State Park. Many years ago, we lost all of our red and white pine up there at the Itasca Canadian headwaters. And today those red pine and white pine are over 200 years old.

At the time the park commissioner park manager was named Gibbs. He died in office back in 1906, I believe it was. And his daughter took over for him. The governor appointed her.

And Itasca Park, you know, is the oldest state park in the state of Minnesota. It is the second oldest park in the country. Back in 1906, when she was appointed, the park rangers, they had some lumber companies up there taking a bunch of timber and then damning the headwaters up there.

She was informed by St. Paul to go and make sure that that dam was released so that water would not be out in front of the headwater there and killing trees.

She went up there with the constable by the name -- I can't remember his particular name, but went up there with the constable and told them that the laborers were

going to have to be pulled, and the superintendent of the logging company said anyone that pulls their hand in those waters will be shot.

The constable stood there, and all 110 pounds of her, put her hands in the waters (indiscernible) to pull those waters. The superintendent realized that this woman was serious, and decided -- told him to pull those. That saved those red pines and white pines.

Here we are, 114 years later, trying to defend the Itasca State Park.

We shouldn't have to do that. We know better. The White Earth Indian reservation is sacred to them; the hunting, the white waters, and the fishing.

How many times do we have to keep (indiscernible) treaty with them? I think, folks, it's time Americans can stand up to those of us -- we should be able to stand up against Enbridge. Thank you for your time.

FACILITATOR: Thank you.

Karen Heller. And, again, if you can hold the mic parallel and say and spell your name to get us started.

MS. KAREN HELLER: I hope you all know that the preferred new Line 3 will not go through Staples. It would cut off up at Hubbard, go through Huntersville Forest, and on through the lakes to Superior where no pipeline has ever been before.

Some lucky people were paid a lot of money to develop and produce all these signs and papers. They've been working for months, gathering data for these 5,000 pages, and were paid very well for it, I'm sure.

Some people here will make a little money selling diesel to truckers, but it's probably not from Enbridge Energy oil.

Who from central Minnesota will actually get a job from this project? Option 3 will go through Staples.

In 2008, a fourth pipeline was installed through Staples, where MTM is already planning an expansion.

And I have seven questions that you guys need to answer or send in the answers of these questions.

One, did any local people actually work on the installation or get work

because of it? This is in 2008, I'm asking.

Did any businesses here receive increased income from it?

Three, was there less unemployment in the area because of the pipeline construction?

Four, are we getting more business income or jobs because the pipeline is here?

Five, how much in taxes do our counties receive from the pipeline company for using the land? And what are they doing with it?

Six, did the lump sums paid to the landowners truly offset their loss of productivity?

Seven, in 1954, when this pipeline first cut across the country, how did the land values change; and also, for each additional line after that.

Please send your answers to these questions to the Department of Commerce on these forms before July 10th.

Thank you.

FACILITATOR: Thank you.

Andrew Struss.

MR. ANDREW STRUSS: Hello, my name is Andrew Struss. I'm an Air Force veteran of eight years, honorably discharged, and have traveled across five different continents, a dozen different countries.

I was a national park ranger at Wind Cave in Kid National Park when I separated from the military, and I have a vested interest in our national parks, our state parks, our wildlife and our natural resources.

I think if Teddy Roosevelt were here, he would argue that we should be conservative with our national resources and we should protect these beautiful places for future generations to be able to be inspired and then be able to appreciate their natural beauty.

We have these pipelines which really are unnecessary, and they are taking the path of least resistance.

They're taking the path of least financial burden. They're really buying out our people and our people are being coerced. They're being threatened and they're being

forced to sell.

And I encourage every person here to stand for the highest integrity, to tell them no, to tell your public utility commissions to say no to this project, that it is injurious to public interest; that our drinking water in this watershed is part of our tourism, is part of Minnesota's economy, and it grows our commerce by having people come here to see this beautiful part of the world.

We have the crossroads of fresh water here. We have the Saint Lawrence Seaway, we have the Mississippi River. This is literally the crossroads of fresh water.

This is where drinking water comes from the earth, and we have several lines zig-zagging, criss-crossing, going unnecessarily repeatedly over bodies of water.

When it comes to energy and things like that, we have -- look at the water. We have hydroelectric power at our disposal here. None of this oil is actually for Minnesotans.

So as Minnesotans, this Minnesota sky-colored water, it is our intention to keep

it that way. All of this oil will be exported. None of this is domestic. This is coming from a foreign company, right.

So let's keep in consideration who is trying to push this through. It is not Minnesotans. This is not benefiting our economy. This is not creating jobs, right.

The reason they want a pipeline is so that it will reduce the number of jobs in the oil industry, right, so they can have a more expeditious method of transferring this oil.

And all they want to do is get it out to the Saint Lawrence Seaway. We can't afford to have an Exxon Valdez-like spill in Lake Superior. 10 percent of the world's drinking water that's not blocked from the (indiscernible) is their, right.

Our Great Lakes and the whole thing stands in jeopardy. Minnesotans have the greatest -- they have the most to lose.

We have excellent trade opportunities. We have excellent -- these are old waterways. We have trade partners all the way down the Mississippi. This is stuff you

can revitalize, revive; not to mention our renewable sustainable ways to create and produce energy.

We have God's sun above us that can power everything that we could possibly need.

We have renewable crops like hemp that we've grown as buffer crops to help remediate existing damage that's been done.

And to abandon this and to allow a rerouting and more pipelines is just to repeat the same mistakes of the past.

Have we not learned from all of these anomalies that we're going to relive and revisit this again, and it will be seven generations that pay for this.

So if you are so short-sighted as to not understand the immediate and the long-term ramifications for our actions, you're selling out your soul, you're selling out your people, you're selling out your children's future.

What we have here is -- we have what's already needed here in Minnesota. We have the water. We have the arable farmland.

We have what we need. We can produce everything that we need. We can create plastics from hemp that are biodegradable. We can run on hemp as Henry Ford had the model.

This is common sense, and to really produce jobs and really grow our economy, we plant seeds for our future generations' prosperity. That's what we do here in Minnesota. We honor the earth.

We look at the state -- we look at our flag. We have a native American on horseback and we have a farmer tilling the land.

To be a good steward of the land is doing God's work. So let's respect what the Creator has given us, right, and not be so short-sighted as to sell ourselves out. And to give up our sovereignty to a public utilities commission to make a decision for all of us, I think is absurd.

We all should take a vested interest in this. If you're a Minnesotan and you live here, this is where you fish, this is where you hunt, this is where you live. This is where you can live off the fat of the land.

And you should be able to reap the fruits of your labor. We should not have all of this greed -- it's greed. They're trying to make an infinite profit off of a finite resource.

The business model will collapse upon itself; if not today, sometime in the future.

Eventually there's going to have to be a shift. If not immediate, through attrition. So by removing a pipeline here through attrition, one pipeline at a time, we can remediate the soil. We can restore this,right.

If they want the soil, they can send it in a different direction. Why don't they refine it in North Dakota where they get it from, right?

No, because it's for export. It's to be refined in Texas or wherever or shipped abroad, right. We have public meetings and these same companies are on an international scale. We're talking pipelines from Minnesota to Afghanistan. And I've been there and I've seen it.

Don't tell me we're still there for other reasons. It's really greed.

And that's only a symptom of the real larger problem. Oil is a quick fix. The government -- if there was a greedier way, if there was a way to make more money, believe me, the politicians would do it.

So we need to realize that the oil is just a quick fix to the financial problem. It is just a quick injection to the economy, and it's not going to sustain itself.

Because as the debt continues -- and this financial debt-based currency, financial reserve system has got our country bent over a barrel.

We have federal agencies now that are going to try to trump over our state's rights, our 10th Amendment rights.

None of this is outlined in the constitution. Nowhere does it say the federal government's allowed to run pipelines through our national forests, our state parks, and trample over our state's rights.

So I would encourage our governor and people within the government to take a

stand or we will secede from the Union, if we have to. Not for the reasons of old, but so that the federal government cannot come in and trample over our state's rights.

If we have to do so and enact that and revert back to the Republic of Minnesota, so help me, we will work with the Native American communities here and we will show the rest of the world a new way, a sustainable way.

People will come from all over the world to see this.

Thank you.

FACILITATOR: Thank you.

Bill Paulson.

MR. BILL PAULSON: Bill Paulson, B-I-L-L, P-A-U-L-S-O-N. (Ojibwe.)

Thanks everybody for being here. Thanks to everybody for being so polite and let everybody get in their comments.

There's a couple of issues that I'd like to address today. On page 11, we talk about how do tribal and federal approvals affect the route decision?

The pipeline crossing two

reservations with the pipeline 3 replacement; what they're not acknowledging is that they're going through ceded territory. 1855 treaty, almost the entire thing.

The thing that concerns me is it says they'll get tribal permission, but they're not talking about the individuals covered underneath the treaty.

My one concern is that I believe this should go up for public vote for everybody concerned on the ceded territory and the reservation boundaries.

We're listed under Minnesota Chippewa tribes. That means we recognize the six bands tied together. We are six bands tied together within our own treaty rights.

The White Earth Nation is under the 1855 treaty and has control, according to the treaty, of our waterways, our fish, our game, and our right to survive.

We need to be consulted. It is not a suggestion. It is not a request. It is a demand that the people of the 1855 Treaty are considered underneath this (indiscernible) across from the table.

The other thing I'd like to point out is on page 16, they give us a nice little graph, shows how many incidences that we've had by truck, by railway, and by pipeline. And they did a pretty good job making it look like this.

What we're not looking at when we're looking at the blue line there, the railways really show they have very few incidences but the incidences are highly volatile.

The spills on the pipelines are not detected. They are putting in detectors up along the pipeline, but they are not in working condition time and time again. We see that the pipelines are leaking and that the response time is not enough.

We're also looking at what kinds of tar sand oils that they are pushing through these pipelines. We are looking at highly volatile liquids being forced through a pipeline.

Currently pipeline Line 3 was splash welded. I am an engineer. I work in the manufacturing industry. I'm a six-year

military vet, heavy equipment operator, diesel mechanic, and welder/driver.

Do we need oil? Unfortunately, currently, yes. We can't just shut 'em down. But we have the alternative of renewable energy. We're looking at all the billions that we're spending on this pipeline.

And the reason we're spending all this money on a pipeline is because it's going to cost too much for a company or an industry or a corporation to transfer all of the money they've made into creating renewable energy. That's the fear.

They've got money in the banks, they've got money in the politicians' pockets that want to push this through, but creating a new corridor will not do it.

I would request that you look at the EIS on environmental impact by having the unions of Minnesota do any work that is transpiring.

I would say that if we want to create jobs in Minnesota or when we're talking about creating jobs, that we demand 30 percent of the work force be Minnesotan; that we turn

around and we take that work force and we remove the existing Line 3. It is a time bomb waiting to happen.

If they want to put the new one anywhere, put it next to the sticks that are traversing northern Minnesota, so that when we do have a leak, they know where to go.

Why (indiscernible), everybody looking around for leaks? Why don't we turn around, put it into the trucking industry and transport it? Because it is proven that the trucking industry can transport it more safely than the pipeline.

When we talk about the railway being dangerous, it's because they transport so much oil on faulty carriers, faulty equipment. That has been changed. They're now coming out to higher standards.

When we look at the EIS, we need to actually consider the impact to the people who are learning to live sustainably, the people that are waking up to the GMO destruction, to the realm of destruction, to the corporation destruction, to the world destruction; telling them we need to grow more

food, to provide more food to feed the hungry.

In reality, we're growing something that is not sustainable and it's killing our people.

So as we return to nature to look for a way to survive, as they look to a natural diet to learn how to survive, when they finally get there and realize there's a better way of life, then we have to deal with pipelines. Then we have to deal with oil contamination.

It's not about doing what's best for the United States of America. It's doing what's best for the corporations, and that needs to also be looked at.

We need to take a look at our people, the people that are here, the treaty rights that gave us the right to live, and we need to figure out how to do this together.

But we need to take that money out of their pocket as a corporation, and actually take a look at this EIS and understand it is not about us.

It is about a corporation and a government control system that wants to tell us that it is about us. But they're not bringing

us out to the table. The EIS needs to be thrown out and started again.

They want help -- they need to sit down with people, the citizens, the groups that are going forward. My own gathering (indiscernible) Honor the Earth, union loggers, everybody, the tribal entities, bring us all to the table. Miigwech.

FACILITATOR: Dan Brady.

MR. DAN BRADY: Dan Brady, D-A-N, B-R-A-D-Y. I'm with the Laborers Local 563. I represent approximately 10,000 members. Of those 10,000 members, I've had a couple conversations of whether or not it should be built and built locally.

It'll have approximately 50 percent of the local Minnesotans building this pipeline. This isn't just about a pipeline. This isn't just about big oil.

My members build solar farms, winds farms and everything in between. My members get enough work maintaining broken pipelines. This isn't about a new pipeline. This is about replacing a pipeline that is broken.

For too long in this state all we do is put bandaids over bridges, over roads that have a breakdown. A year later, two years later, more problems and more road work.

For once, we're talking about brand new technology, best possible to move oil from point A to point B. No longer will we be chasing down leaks on a bad pipeline through bad areas. Thank you.

FACILITATOR: Wendy Ulrich.

MS. WENDY ULRICH: My name is Wendy Ulrich, W-E-N-D-Y, U-L-R-I-C-H. We, as a nation, have a history, right up to this current time, of not honoring our pacts, agreements, and treaties.

We are learning that when this happens, our consciences compel us to take out of the ordinary action to turn around policies and decisions that we don't agree with and are not right.

I am not of indigenous heritage so I do not speak for the original people on this land.

I speak as a citizen and a benefactor of our collective history who is

learning about and observing our native neighbors' historic relationship with Federal and Minnesota government.

In Table ES-1 titled, "Certificate of Need, Alternatives and Criteria," of the DEIS, a series of questions are shown at the top which the Public Utilities Commissioner will use in making the decision whether to grant a Certificate of Need to Enbridge, and if granted, to decide on method of oil.

So then this process is about granting a Certificate of Need, and if that need is granted, then to decide how oil will be transported.

One final question at the top of this table asks, "Does the project comply with other laws?"

At this point there is an omission in this table. It does not include the similarly important question, "Does the project comply with state and federal governments -- does the project comply with state and federal treaties with affected indigenous groups?"

Our nation, in this case by way of Minnesota government, must abide by the 1855 Treaty signed by the federal government with the Ojibwe people.

From Honor the Earth -- we saw their stand near the back of the room -- from their organization's, "What we need to know," Line 3 resource. The pipeline, "threatens critical resources on Ojibwe treaty lands where tribal members retain the right to hunt, fish, gather, and hold ceremony, and travel." That is in the treaty.

Destruction of forested and wetland habitat and lakes within the 1855 Treaty area will result from oil spills, habitat fragmentation due to the construction which affects animals, birds, and vegetation and develops micro-climates.

This is stated in the booklet that we've all gotten here today called the, "Guide to the Line 3 Public Meetings for the DEIS - Executive Summary," and it's on page 32.

All of Enbridge's proposed routes and virtually all of their preferred routes go through the 1855 treaty lands of

north-central -- and that spans all the way from the east to the western border of our state -- northern and all northeastern Minnesota above Lake Superior.

All these areas include pristine wild rice lakes important to our neighbors' culture.

I'm going to ask this question: Is it right to construct a treaty back in 1855 saving hunting, fishing, gathering, wild ricing for indigenous people, then alter the land, rivers, lakes, and wetlands by practices that leave them less useful ecologically and culturally -- sorry -- that leave them less useful ecologically and culturally and environmentally harmful?

I support the Ojibwe people in opposing the Line 3 oil pipeline.

I believe there is an omission in Table ES-1 of the DEIS used in the decision-making criteria granting a Certificate of Need for Enbridge's Line 3 tar sands oil project.

We must honor our treaty with the Ojibwe people.

Thank you.

FACILITATOR: Lisa Kajer.

MS. LISA KAJER: I represent Fish Trap Lake Property Owners Association. Fish Trap Lake is one of the open water sources on one of the proposed alternatives. As an association, we are concerned about our lake.

We also have railroad tracks running near them with many oil trains running daily.

If the pipeline proposed alternative goes by Fish Trap Lake, we increase our chance of an environmental disaster.

We are concerned about the safety of people on the lake and protection of our water.

Thank you.

FACILITATOR: Thank you.

Peter Klick.

MR. PETER KLICK: Peter Klick, P-E-T-E-R, K-L-I-C-K. I came up here today trying to get information about this and see what was going on.

To be honest with you, I've learned a lot of things, but I did have one question. Is there anybody here that didn't drive here today? One person -- two? Probably live in Staples, right.

I really think -- I mean, if we look at what's going on, we need oil in this country and that's what this country runs on. Until we come up with a better idea, we're going to need oil.

And granted, this pipeline, we're not going to get any oil from it, but if we don't take -- we use oil, and if this oil goes somewhere else -- if it doesn't, those people are going to need oil that we need.

So I look at all this, and, you know, the least damage that we can do is by running it in a pipeline. It's the safest way, and I think a new pipeline has a lot better technology than the old pipeline has.

And, you know, we can transport it by truck, which then we hear about this truck turned over and it did all this environmental damage; and we can transport it by train, and we hear about the derailment and

it did all of this damage.

And the pipeline, I know if you got a spill, you have more oil that spills out. But I think there's a lot more safeguards nowadays in the pipelines than we're used to.

I think fuel keeps our country running. And we do have alternative fuels. I heard a lot of people mention alternative fuels.

So if we look at them, we've got electric, hydroelectric mentioned, and I'd be all in favor of damming rivers and having hydroelectric power. But I got news for you. If we try damning a river in this country nowadays, it would never happen.

It's just like if we want to build a nuclear power plant. It don't happen.

So I looked at the route here, and I'm color blind, so maybe I'm missing something. Maybe these people can tell me if I'm wrong. But it looks like this route turns south at Clearbrook and goes over towards Backus, Palisade, Cromwell into Carlton.

If that's the new route that's proposed, I don't see that going through any

native American land. I don't see it going through any state parks.

And the old pipeline does go through quite a bit of the Native American land.

I talked with a gentleman here about removing the old pipeline, because, to me, that seems like a good alternative. But then when you find out all the statistics about it, you find out that the old pipeline runs along other existing pipelines.

So we got the problem, what happens if we cut one of the other pipelines? We have oil spills.

And we also have the problem, environmental problem of taking that old pipeline out, we disturb all (indiscernible), and that's going to cause environmental problems.

So for me, I think -- I mean, I look at the new route. The one I see here is right. I don't see a problem with that, and I think it's a better alternative. If we run a new pipeline, it's got better technology than what we have right now.

FACILITATOR: Thank you.

Amy Bond.

MS. AMY BOND: My name is Amy Bond, A-M-Y, B-O-N-D.

And to me, replacement means take out the old and put in new. Keep it in the same place. If that's not possible, because it's in the middle of two other pipelines, put it on the side. You've already taken 750 feet.

Now you want to move it down to another area, disturb more farmland, woods, lakes, and rivers and highways to put in a different route down south.

If you can stick with the same route, maybe a third of the way, stick with it the whole way, go alongside of it.

People don't want to give up their land and their woods, because then what happens? They get shoved off on eminent domain. Whether they want to lose their land or not, they take it. The rail company takes it.

So they don't have a lot of choice when it comes right down to it. You

either sell it or you lose it, one way or the other.

In Iowa a lady got shoved off of her land. They arrested her and removed her because she didn't want to give it up after eminent domain.

Another thing; we have a lot of lakes and rivers, and if this pipeline or any other pipeline leaks or spills, then you're losing fish, you're losing wildlife, all of the environment around it is damaged.

And there is an example. Back in 2010, Enbridge had the biggest oil leak ever in the Kalamazoo River. It was a six-foot split under the river. It did so much damage, it took 'em four years to clean it up so the EPA would even approve that.

I just think replacement means take out the old and put in the new. Stop taking people's lands and damaging their farms and their timber.

And also, the more oil they ship from Canada, it comes across all of our lands and goes to Lake Superior and Duluth. It gets shipped over to China. We only use maybe

10 percent of the oil that we're digging out of Canada.

So I say it's time to put a stop to this. If they want to replace it, replace it in the same spot.

Thank you.

FACILITATOR: Thank you.

Tony Wicken.

MR. TONY WICKEN: Tony Wicken, T-O-N-Y, W-I-C-K-E-N.

I'd like to thank everybody for being here today. Obviously, we all have our own reasons for being here. Some of us work on the pipeline, some of us respect the land and other things like that.

I grew up about an hour from here, so I know the waterways and native people. I myself am an avid outdoorsman.

The union put a lot of people to work on the pipelines. No matter if we're building them, replacing them, maintaining them, so forth.

Bear with me a moment, I'm sorry. Stop and realize Line 3 is roughly 63 years old. Think of the technology when that was

first put in versus the technology that will be put in a new line today.

So you gotta stop and think about the impacts, new versus old.

Everywhere this pipeline runs is already mandated -- local jobs, local labor (indiscernible) union jobs, local communities for the people out of work -- possibly getting a life-long career.

Biggest thing I would like to say, the State can't afford to sit and wait any longer on this line. Replacing Line 3 is critical to the safety and reliability of Minnesota pipeline infrastructure. We need to keep the process moving forward so the Commission can make a decision.

FACILITATOR: That's all of the sign-ups we had, but we still have others.

Start by saying your name and spelling it. Thanks.

MR. PHILLIP WALLACE: Phillip Wallace, P-H-I-L-L-I-P, W-A-L-L-A-C-E, and I'm here today to speak in support of Line 3 replacement.

First of all, is there a need

for this pipeline, and I say yes. There is a need to get this old pipeline out of service, you know, everybody -- you know, we don't want another Kalamazoo River.

We want this old pipeline out of service and a brand new pipeline.

Do we need that? Yes, we do need that. Minnesota has benefited from the since 1963. This Canadian crude has been coming through here since 1963 in this pipeline. So we need to get that one out of service.

You know, this creates an opportunity in Minnesota -- any good. That's not clear. It comes back to you as gasoline diesel fuel, jet fuel, heating fuel, and many other products that's byproducts of crude oil.

There's a lot of concern about the old pipeline being decommissioned and removed. I've been in the pipeline and welding business for 41 years. I've taken out many lines; lines that were out of date -- and the way we decommission these lines, the first thing we do is we run pigs through the pipeline.

This is a cleaning tool, and we pressurize them with air pressure behind them and we push all the fluids out of the pipeline, you know, until it's completely cleared of all fluids.

And then we will put a nitrogen purge on this to push out all the explosive gases, and we will fill this line with a low pressure nitrogen.

Then we will take the mainline valves that you see above ground. The pipeline comes up, you see the valves. We dig that up. We cut those valves out. We remove those valves. We weld plates on the open ends. Where there's no open ends, they're buried.

The road crossings, the road crossings are dug up on each side. We cut those, oscillate that road section, the section that goes underneath the roads and the creeks and the water pumps.

We cut those, oscillate 'em, fill 'em with concrete or grout, so they will not corrode and cave in in these areas.

As far as taking the line up, yes, I agree that thing needs to be taken up,

but I do know there is some sensitive areas, that it's more unsafe to try to get it removed than it is to leave it in place, in certain areas.

So there's a lot of concern about these jobs. But, you know -- well, these are temporary jobs. For people like myself and many others in this room that are pipeline construction workers from all trades, this is not a temporary job. This is our lifetime career.

This is my 41st year of being a pipeliner, and I've done that from the Alaska pipeline all the way down to the oil fields of Venezuela in my career, and I'm pretty proud of that. It's not a temporary job to me.

We have over 2,000 UA skilled pipe trades members in the state of Minnesota. And these -- you know, our members here in Minnesota, they make their living working for Enbridge, not just on pipelines, but tank farms, pump stations, facility work.

But they make their living with Enbridge and they have their whole career, and there's not a lot of work in Minnesota right

now. Most of these people are up in the northeastern states. We need to get this pipeline approved for Minnesotans to come back to work at home.

That's pretty much -- Enbridge has committed their work to the skilled union laborers here and in all the work on all the pipelines.

And like I said, this Kalamazoo thing, that was a terrible tragedy. We don't want that here. So let's get rid of this Line 3 and get a brand new pipeline in its place.

Thank you.

FACILITATOR: Anyone else?

MR. ANDY PEARSON: My name is Andy Pearson, A-N-D-Y, P-E-A-R-S-O-N.

One comment today, but first a thought that's been, I guess, bubbling up for me over this and other meetings is that, I think we all know this, if we think about it, that abolitionists still wore shirts made from cotton picked by slaves.

And yet, if you listen to some of the comments I've been hearing, which reminds me I do in fact own a car, believe me, I

haven't forgotten that, I think you might hear between the lines that we should still have slavery.

I want to remind everybody that existing outside of the system, trying to change that system, usually is impossible and says to me the system shouldn't still be changed. So I'll leave it at that.

I want to talk about external costs for just a second. We know external costs are costs that are not borne by essentially the party that has caused them to be incurred by society, but borne by the societies at large.

One of the biggest external costs with this project is the cost to our earth's climate system. And that cost is listed in this document as $287 billion over 30 years of climate damages, and that's a cost that there's no assumption in this DEIS that Enbridge is at any point going to potentially pick up any of that cost to society.

I ask, as a person who's younger than many in this room, why we would ever consider building a project under those

circumstances, when we know those costs are going to be incurred in a way they're being passed onto future generations.

And one way the EIS could improve on this would be to run those costs out over a timeline that's longer than 30 years. If you look at the document, it says 30 years is the shortest imagined life span for the project.

Now, that's per Enbridge. So I'm a little bit surprised that the DOC decided to take the shortest possible time estimate and only calculate the costs out to that point, when we know there's pipelines operating in Minnesota right now on the main line corridor that have been in place for over 60 years and still operating, still pumping oil.

We should see, at a minimum, a 60-year timeline for the social process.

Another externalized cost is that of abandonment that the DEIS lists a number of $1.28 billion total cost to remove this pipeline. Now, if they're able to list a cost, that does seem to indicate that it is a possible thing to do, that it is possible to remove this pipeline, if you're able to get a

roughly accurate number, a cross number put on removable.

I don't see an assumption of the DEIS that Enbridge is expected to bear that cost of abandonment in any way, not on the old Line 3, because they're planning to leave in place instead of removing it, which is what the figure refers to is removal.

And I don't see that worked into estimates about the new line that they would build, and that should be built in as an additional cost down the road, right.

Because we know it's going to have to be incurred at some point. I think many of us are probably not under the delusion that these lines will permanently, for the life of the earth, stay in the ground and either harmlessly disintegrate or just stay put, stay in place.

I think we know that at some point these lines are likely to be removed, whether it's now, whether it's several years down the road, maybe several decades down the road, in case of the new line that they want to build.

Doesn't mean the costs are not going to have to be borne by somebody, and in a fair society we should ask that the costs are borne by the party that caused it to be incurred, which in this case is Enbridge Energy.

So we should be making processes to hold Enbridge accountable, and the DEIS should be quantifying those costs and setting an expectation that they be included in Enbridge's responsibility.

And I wish I saw it in the document, and I hope the final version puts it up more clearly.

Finally, I question where this oil is going once it is the end of the line in Superior, the end of the projected -- project that Enbridge has proposed.

We know that there's pipelines that run from Superior across Wisconsin, Line 61, at least two others.

But those pipelines are relatively full right now. Enbridge has ultimately proposed and then walked back the proposal to build a twin line that would also

cross down through Wisconsin to carry this oil.

Now, currently that project is off the table. But if you add up the oil flow numbers, they don't appear to have enough capacity to put the oil from an expanded Line 3 on their current lines across Wisconsin.

Now, there's some oil that will flow across the upper peninsula of Michigan, Line 5, and across and straight to that line, crossing this. Absolutely terrifying, if you have underwater footage, because it's in such bad shape because the pipe isn't down there.

Thank God it hasn't had a major leak because it would contaminate three great lakes if it did.

A few points there, if Line 66, this proposed twin pipeline across Wisconsin is part of the Line 3 plan, it must be disclosed and it must be considered in the DEIS as a connected project, because that's the law that the DEIS is operating under, is connected projects need to be considered in the DEIS.

If it is not on the table as a project, we need a better explanation from Enbridge where exactly this oil is going once

it leaves Superior, because this may be an attempt to just avoid having to consider a connected project.

It creates substantial impacts in Wisconsin that would otherwise be included in the DEIS.

Another option, of course, is putting some of that on Line 5, but I will note that right now on Line 5 Michigan is working very hard to shut down that pipeline.

There's a very solid chance that that line would be shut down or scheduled to be shut down before Line 3 ever becomes operational, and I didn't see any consideration of that in the DEIS.

What happens if one of the Superior take-away lines that right now is carrying a substantial volume ends up not being able to carry that volume?

Because the most plausible scenario right now in Michigan is showing that line is leaking or being shut down.

And the last thing I want to say is that the other option would be moving this on boats from Superior. We know Enbridge has

had a proposal to do this on the table and they have taken that proposal off the table for now.

Will it come back? Will they be putting tar sands in our Great Lakes? I don't think that any of us wants that. So we need answers on where this oil is going.

Thank you so much.

FACILITATOR: In the back -- state your name and spell it.

MR. MEL DANIELS: My name is Mel Daniels, D-A-N-I-E-L-S, from Staples.

I live north of Staples and the pipeline, and my comment is oil is going through town on railroad. At times you see six, seven oil trains in here, plus two or three old trains in here.

What really concerns me is if we had an issue here, it would literally melt the town of Staples. To me, that was more scary than living next to the pipeline. Thank you.

FACILITATOR: One comment up there.

MS. KYLIE LEMLEY: Hi, I'm K-Y-L-I-E, L-E-M-L-E-Y.

So first of all, I heard the

technology comparison time and time again between the old Line 3 and the proposed new project.

When we talk about leaks here, we are not solely talking about leaks from the 60-some-year-old Line 3.

We're including leaks from brand new pipelines with the same brand new technology that you continue spouting, and in fact, compared to other decades, we are currently on track to become the decade with the highest amount of pipeline spills ever in the U.S.

So keeping in mind that around half of all pipelines today were built in the '50s, and that these new lines that we're building today can hold double the capacity that the old ones that are currently running, we're set to double the amount of oil running through Minnesota.

I'd like to say that I for one am not okay with the 40 percent reduction in spill risk that I heard with new technology. I am not okay with just a 40 percent promise that maybe it will leak a little bit less.

If we want to keep our waters and lands safe here, we need to have no risks of spill.

I'd also like to speak on the issue of abandonment. I would like to mention if we want to actually replace the old pipeline -- this is being called a replacement project -- we can't just abandon the old line and create an entirely new route and an entirely new corridor. That's not at all replacement. I don't see how that's sustainable.

So if you are talking about abandonment, the cost of cleaning up the alleged line is estimated at $1.28 billion. Obviously, I'm not going to pay for that.

I hope to God you are planning on paying for that. Enbridge should absolutely have to pay for that.

So 14 pages in the DEIS are what have been given to the topic of abandonment. Fourteen pages out of 6,000. That's absolutely insane. This has never been done before. We don't just abandon our pipelines.

We need to have an entirely

separate Environmental Impact Statement on abandonment. We deserve to know what happens to our land, the risks we're willing to accept if we decide to put this project through.

I'd also like to mention that even if we didn't have oil today, et cetera, we all drove here today, blah, blah, blah. Even if we do need oil, we have 20 or 30 years to figure out how to move away from it before we can't extract oil portably anymore here in the U.S.

Let me let you in on a secret. The reason that Line 3 is represented in DEIS as running for maybe 30 years is because that's all the amount of time we have left in terms of extraction, okay.

The reason they're extracting tar sands, which are the most expensive to extract, are because we're scraping the bottom of the barrel. There's nothing left for us. There's nothing we can do here.

So what do we do when we run out in 30 years? Do we have just have no options to move forward, because we spent the previous 70 years knowing that we're running out of

time, milking the earth for every last drop of dirty oil we can scrape from it?

We have jobs, welding jobs, electrician jobs, skilled labor jobs in a renewable energy economy. The technology exists.

As you've also heard people say today, electric cars, cars that run on things like vegetable oil or hemp oil, they exist, the technology is all there. We just need to make it available for people like you and me.

There are also more than double jobs in the renewable resources than there are in the oil and natural gas industry nationwide right now.

The only reason we need petroleum to exist is because a corporate giant has distorted facts to make things seem that way.

We are moving forward, whether people want to or not. Do we as Minnesotans want to be left behind? And lastly, I'd like to pose a question for you all to consider privately.

As mentioned earlier today, the

DEIS specifically states that indigenous communities will be adversely impacted disproportionately.

The DEIS has also acknowledged that native peoples are already very much economically depressed. I think (indiscernible), the very sensitive natural rice beds and kill the water. We absolutely are going to be killing the native people, too.

Ask yourself why pipelines seem to snake through reservations, seem to go through the 1855 ceded territory, which is currently a law still in effect, by the way.

Ask yourself why when Bismarck residents said they didn't want the Dakota Access pipeline near their water sources out of fear (indiscernible), the pipeline was rerouted to the Standing Rock reservation.

Ask yourself why if this Line 3 doesn't affect you or your family personally, you just are not interested.

Those are my comments, and thank you for listening.

UNIDENTIFIED SPEAKER: I have a

couple of questions. First, I look around this room and this is a project that will be affecting every person in several counties. I see only a handful of people.

How much information is being put out so the people know this meeting is going on? I, by chance, found out no one that I talked to knew that this meeting was happening.

My other question is tar sands do not flow. They're thick, they're heavy. What are you mixing? What other chemicals are going to be in our waters when that pipeline breaks?

And I'm not saying if, I'm saying when, because they do break. The old one has broke several times here.

Thirdly, what is your spill -- what is the reaction time on a spill? How long before you show up? How long before it's stopped? How long before it's repaired if it's running into our lands and waters?

FACILITATOR: Were there any others?

MS. JUNE WEITEMIER: Hi, I'm June Weitemier, J-U-N-E, W-E-I-T-E-M-I-E-R.

I'm from Long Prairie, and I did

drive here. But I also worked in Texas over 20 years, and a lot of those oil fields have been shut down and they should not have been. It cost a lot of guys, engineers, their jobs and that was not a good thing.

We should be independent of foreign oil. I am against foreign oil. We need to take care of our people here. We also need to take care of the water, yes.

One of the things is -- well, you can tell I'm older, but I have been recycling for 48 years on my own; trying to keep the water clean, watching my garbage, watching what I use and what I don't use, and passing that on to my children.

And that's me, my individual responsibility, but I pass on to my grandchildren.

I said to someone here today I represent at least 75 people just in my family, 70 for the pipeline, five against.

In my family my father worked for the First Nation people. We had a lot of people that lived in the Staples area. My dad lived at (indiscernible) Prairie, and so we

respectfully -- with hunting and the fishing, and I love to fish.

But there again, I feel I'm responsible for keeping the waters around me clean and not to pollute it. And I started that 48 years ago, how I wash my clothes and what I wash my clothes in to keep our waterways clean.

You go further down the Mississippi, it's really dirty, and people need to start to be responsible for what they use it for in their homes, to keep it clean, and pass it on to our children.

But if you're talking about quantifying cost, I think that's an excellent thing. We need to do that with all our resources, whatever we use.

I am for solar. I am not for the wind mills. They do not quantify the costs that you're going to have to do to replace it.

Now, the other thing is oil. What are we going to do when the oil runs out? The United States of America is coal wealthy. We are also engineer wealthy, and it's time for our young people, some of whom are very

brilliant, to start learning the chemistry.

In my family on my mother's side, it was through uranium, and that chemistry was kept secret in how to use and make all types of uranium.

Even out of the Saturday mornings with the channels that they have to teach our young people, I found it was very interesting. I did not realize that the telegraph was sent from England to the United States of America somewhere in the 1800s or before that, and it's all piped under ground and had to have the most excellent copper.

Michigan has copper and the best copper in order for that telegraph to be able to transmit and resonate underneath the water.

So you can understand, some of you will remember, but the young ones won't. The Woodstock music festival out northeast, pretty riotous, and they had a lot of fun, right.

It's costing them almost 50 years to clean up that mess. And I called and asked -- I think it's okay to have fun, but how much does it cost everybody else to clean it

up?

Another thing is, do you know the plants and trees need the carbon dioxide we give off? It is for their life. I believe that we are personally responsible for everything, and we do have coal, we have great engineers.

And I think it's time for the young people in college to learn how to take care of these things and to use their brilliance toward this.

And I'd be right out there, because there's anarchists running in our country. We need to keep them out. We need to keep extreme socialism out of our country. This is the United States of America we were founded on the constitution.

We need to respect all of our peoples, and I'm saying be careful, be cautious, but like they say, be careful who you allow in your fox hole.

Thank you.

FACILITATOR: Do we have other comments? Anyone who hasn't spoken? If you can spell your name again.

MR. BILL PAULSON: Thank you. Bill, B-I-L-L, Paulson, P-A-U-L-S-O-N.

Just a couple things that came to mind while I'm sitting here, listening to everybody. Maybe we need to look at also one thing I'm not seeing in the DEIS is past history performance.

When we go back and average out what has happened in the past with the pipelines, then we could give them perspective of what we can look at in the future. We have, what is very well stated, 40 some years in the pipeline industry. We have new safety measures and everything, Dakota Access to the pipeline in North Dakota, and prior to even getting it fully implemented had a leak.

We keep stating these lines are safer, stronger; they're still leaking, so where's the quantification on that?

When they are connected to the other pipelines, we need to look at all the connecting issues. As was stated, where is it going?

When he said that none of these pipelines are touching the reservation, that is

untrue. According to the 1855 Treaty, ceded territory, these pipelines go directly through our controlled areas for our right to fish, hunt, and be sustainable. That is a given right. That's a federal law, law of the land.

So when you look at that, they're going through, directly through lands that are controlled by the Native Americans of Minnesota, Wisconsin, and further on.

So those things need to be addressed. We need to look at the qualification of the pipeline, where are the materials coming from.

If it was U.S. made, stringent, stringent, stringent guidelines to create this thing, and we -- we just had an administration say come from Canada, Russian ties, inferior metal. What are the anomalies in this metal? Who is going to foot the bill when it comes to cleanup and everything else?

We're looking at who is going to foot the bill. You're outsourcing jobs to Minnesota and other states. Minnesota will not receive the money.

When you are not paying taxes in

Minnesota, Minnesotans do not get a benefit.

Miigwech.

FACILITATOR: One more.

MS. AMY BOND: Amy Bond, A-M-Y B-O-N-D.

One thing I forgot to mention is not only did Enbridge have the worst oil spill ever recorded, they also have -- are going to put in the longest pipeline ever recorded. That's another problem.

Another thing is all the oil is coming from Canada. Why don't they pipeline their own country, instead of destroying America? And we are sending all this oil mostly out of country. 10 percent stays here. 90 percent goes to China or whatever country is needing it. Then we turn around and buy some back.

Why is that? It's more taxes for the people and more money for the companies.

Thank you.

FACILITATOR: Sir, if you can repeat your name and spell it.

UNIDENTIFIED SPEAKER: Yes, I just want to add one thing here I want to

comment on. We gotta have this crude to survive. I want my grandchildren to live in a sustaining green world, but, you know, we're not there yet. We're working on it.

And as far as the comments I've been hearing, even last night in St. Paul, there's a lot of people -- you know, let's just move it on a train, move it on a truck. That's the -- you talk about safe transport here, you know.

If you got laptops, I want you to go home and research this. July the 6th, 2013, I can't remember the name of the town in Quebec, Canada. There was 74 car-loads of crude. It was hauling actually oil out of North Dakota that crashed in that town at 1:15 a.m. and killed 42 people.

It burnt -- it was a runaway train. It had parked on the side rail a few miles out of town, bricks gave way. And that train crashed in that town and just totally destroyed the whole town, 42 people, and there was five more unaccounted for.

So you know what, let's do the smart thing here, let's put in the pipeline,

keep it off the railroads. Because the railroads -- I grew up in a town. All small towns are built around the railroads. These railroads pass right by your houses.

Let's keep it off the railroad. Don't even consider that being a safe way to travel.

Thank you.

FACILITATOR: I really appreciate -- we have one more. We have had a really good, civil conversation. I appreciate people being respectful and listening to each other's point of view, sharing your views.

We'll take one more comment and close out the public comment.

MS. NANCY TERHARK: My name is Nancy, N-A-N-C-Y, Terhark, T-E-R-H-A-R-K. I live in the city of Park Rapids just north of here.

I have many concerns with the Enbridge relocated and expanded Line 3 pipeline, but my testimony today will be primarily about the part of the pipeline that goes through the Pineland Sands Straight River Aquifer.

The water from this already compromised aquifer is the main source of water for the City of Park Rapids as well as the source of many private wells, much agricultural and irrigation and various industries in the area.

Enbridge hopes to relocate and expand Line 3 and bring tar sands/build this/coal lake blend oil not only through the lakes, rivers, and waters that make Park Rapids the destination of many tourists, fishermen, and outdoor enthusiasts, but also through the source of drinking water the Park Rapids residents consider vital to their lives.

Those of us who live in Park Rapids have been through changes in our water quality and the cost of treatment for these changes have been added to our water bills for the past two years.

The Pineland Sands Straight River Aquifer has recently come under study by the Minnesota DNR and ECA.

In February of 2015, the DNR Commissioner Tom Landwehr said he was ordering the study of water and wildlife impacts in the

Pineland Sands Aquifer.

A quote from the Star Tribune on February 5th, 2015, he says, "We simply have to get a better handle on what's happening with the water use and quality of this very, very, very important aquifer."

He also spoke about the already compromised aquifer and how some municipalities were having to invest in deeper wells, and the area was home to a number of unique species.

In October of 2016, another Star Tribune article quotes MPCA Commissioner John Linc Stine, "What we do to our land, we do to our water."

The article, "Minnesota's Threatened Rivers," talks about the dangers of continuing to pollute the upper Mississippi watershed, which includes the Pineland Sands Straight River Aquifer, which feeds into the Crow Wing River and continues onward to the Mississippi River.

Most recently, the Minnesota DNR has designated the Straight River groundwater management area that's one of three compromised areas that the DNR put at the top of their list

for a plan to be sure that the groundwater aquifers remain sustainable.

Sustainable cities included in the mapping area include Park Rapids, Osakis, and Hansford.

My questions, to go along -- a couple to go along with that and a couple that don't -- with all the studies being done by the Minnesota DNR and Minnesota Pollution Control Agency, I'm just wondering if any of the information was included in the DEIS? Were the DNR and the MPCA truly involved in it, and if so, in what capacity?

Why was the Pineland Sands Aquifer, an already compromised at risk aquifer system, passed over when selecting the still study sites? There were seven still study sites, but that was not one of them, and a more thorough analysis of different locations is needed.

There's some horizontal drilling under streams and river beds that contain additives that are toxic to aquatic wildlife and vegetation.

The Straight River, a nationally

known brown trout stream, suffered a frac-out during (indiscernible) four project. The public needs to be given a list of these additives to adequately comment.

BAR Engineering, here to testify as an advocate for Enbridge during the Sandpiper hearings. They referred to the groundwater south of Park Rapids as insignificant because it was already polluted.

How can they be trusted to be objective and to behave differently? Enbridge and their contractor prepared the entire report on oil releases and pinhole leaks.

Obviously it works to their benefit to downplay risks and damages. How can we trust them to write an objective report? Why was this not done by an independent expert reviewer?

More questions: Who are the private contractors used to compile the EIS? Do they have a work history with the applicant who hired them, State of Minnesota or Enbridge?

And last, but not least, this came to my computer yesterday, I believe it was. It's the definition of regulatory

capture, which is a question I have in the Minnesota DOC.

And the definition is: "Regulatory capture is a theory associated with George Stigler, a Nobel Laureate economist. It is the process by which regulatory agencies eventually come to be dominated by the very industries they were charged with regulating. Regulatory capture happens when a regulatory agency, formed to act in the public's interest, eventually acts in ways that benefit the industry it's supposed to be regulating, rather than the public."

And I ask the Minnesota DOC if they have become a regulatory agency that has fallen victim to Enbridge.

Thank you for your time.

FACILITATOR: Thank you.

MS. NICOLETTE SLAGLE: Hi, Nicolette Slagle, N-I-C-O-L-E-T-T-E, S-L-A-G-L-E, Honor the Earth research director.

I just have a suggestion for you guys for the Final EIS in disseminating information a little bit more.

We as Honor the Earth, have started a website called stopline3.org, and on that we have just a simple Google Earth map with some of the information that we've collected about this project.

And I think that that might be a very helpful way for people to be able to look into the information that the DOC and you guys have compiled.

Because I know I personally have a lot of questions of people about like where is this pipeline going. I want to see a more detailed map, and those map books are pretty hard to navigate through.

So if you had something that was interactive posted on the website, you can zoom in and see some of these different analyses and just where different routes go.

Especially when people are concerned about how close to the property or their lakes or their different options and those kind of things. That's it; thanks.

FACILITATOR: Thank you.

So I want to thank you all, again, for being here. The displays, the

posters will still be here, and the staff will be here.

If you have additional questions -- some people ask questions during the session -- there are some staff members who may be able to answer some of those questions so feel free to go back and talk to them.

As you heard, public comments are accepted through July 10th. If you want to review further, there are copies of the EIS. They're very long. We have them there. They're on jump drives as well as on CDs at the registration table.

So if you'd liked to grab a copy to bring home, you can do that.

And thank you again to everyone for being here and for your participation.

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DEIS MEETINGS - 14-916 15-137

FOLEY - JUNE 15, 2017 - 10:00 a.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Henry's Catering and Banquet Hall
210 MN-25
Foley, Minnesota

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FACILITATOR: Good morning, everyone. We're going to get started with our public comment, oral public comment period. So I invite people to come on over here.

Before we start with the comments, I'd like to introduce Jamie MacAlister from the Department of Commerce. She's the project manager, and she will give you a little orientation and overview.

MS. JAMIE MACALISTER: Good morning, everyone. Thank you for joining us. As you hopefully know, and you all came here to provide us comments on the Draft EIS, this meeting is being hosted by the State of Minnesota.

We have staff from the Department of Commerce, the Pollution Control Agency, the Department of Natural Resources, and the Minnesota Public Utilities Commission staff; not the Commission themselves, but staff.

And it's the Minnesota Public Utilities Commission that will be making the determinations for this project.

First, they will decide whether

or not the Certificate of Need should be issued, and then they will decide whether or not to issue a route permit.

Some of you have been following this process for quite awhile, and as you can see, it's got its twists and turns.

About a year ago, we routed scoping meetings in the project area and the comments that we received during scoping helped inform what is written in the Draft EIS.

We are currently at step number 3, we're here at the Draft EIS comment meetings. We will be taking comments until July 10th, and we will be issuing a Final EIS in August of 2017.

Sometime this fall there will be some additional process and public participation opportunities, when the contested case hearings begin.

The contested case hearings will be presided over by the administrative law judge, and that is really your time to advocate for and against the project and provide comments to the judge.

The judge will then take those comments and all of the information that she has collected in the record and write a report and give that to the Public Utilities Commission. The Public Utilities Commission will then base their decision on all of the information in the record.

And if permits are issued, they are not likely to be issued until 2018.

So we are here to collect your comments on the Draft EIS, and specifically we're interested in whether or not there is information that is missing in the EIS, if there are things that are not clear in the EIS, or if there are things that you feel could be improved.

Those are the comments that will help us finalize the EIS.

We're going to be able to take your comments today orally, you can submit them in writing, you can submit them by email, you can send them in to me.

As long as your comments are postmarked by July 10, we will take them.

All of your comments will be

compiled. They'll be posted online. They'll be posted on the official docket for these projects. They will also be posted on the Commerce Line 3 web page, so you'll able to find your comments and those of any others at these meetings.

There will also be -- the transcripts from these meetings will also be available as well.

We think it's important for everyone to know that your comments are treated equally. It doesn't matter if you provide them in writing or orally, it doesn't matter if we get a thousand comments from one group and 250 from another, all comments are treated equally.

Just because you give a thousand comments from one group, that does not give them more weight than others. Each comment is looked at on its own.

It's also important to note that the EIS itself is not the decision-making document.

The EIS is a neutral document that lays out the facts and compares the applicant's route to the other alternatives

that are being considered for this project.

It is ultimately up to the Public Utilities Commission to take this information and make a determination on the project.

With that, I'm going to turn this back over to Stacie. She's going to run through some information on the meetings and we will get started with your comments. Thank you.

FACILITATOR: Thank you, Jamie.

So as Jamie said, my name is Stacie. I am the moderator of today's meeting, so my role is to help make sure that everybody gets a chance to make their comments, to give their views, because this is really going to be important for the State as they finalize this EIS.

A couple of ground rules that will help us be as productive and efficient as possible. We're going to have one person speak at a time. We're going to bring you the microphone.

I'm going to use these cards where people have said they'd like to speak and I'll call on you from these. And then our

staff will bring a microphone to you at your seat.

We will have a timer and that will be on the screen, and it's -- we're going to ask you to keep your comments to seven minutes or less, and that should ensure that everybody gets a chance to speak.

So at a little before seven minutes I will stand up to sort of signal to you. You'll have the timer up here, but I'll stand up to signal to you that it's seven minutes and I will ask you to conclude your remarks.

It's really important to be respectful of other people's comments. You might not all agree with each other. People have different points of view and that's okay.

That's actually important and it's great. And the State really needs to hear all of the different points of view.

So if somebody says something that you really agree with, I just ask you to hold your affirmations until after they've concluded their remarks. And then when they conclude their remarks, if you'd like to show

your affirmation of their comment, feel free to do that with some applause.

If you disagree with what a speaker is saying, I ask you to keep that in, because we really don't want to make people feel uncomfortable or unsafe to state their points of view. We want everybody's point of view to be able to be heard.

We also ask you not to attribute your comments to any individual. Do not direct your comments toward any individual, and even if you want to respond to something somebody said, please focus on the issue. Don't focus on the person and what they said.

You can direct comments toward issues, toward institutions, or organizations, but not toward any individuals. That will help people feel free to make their comments.

So the state agency's role at this stage is to listen.

If the state agency representatives can raise your hands in the back.

As Jamie mentioned, you have a number of different state agencies that

participated in helping to put this report together and staff from the PUC who are helpful in the process, as well. Their role at this stage is to listen to your comments. And as you heard, the PUC will be the recipients of all of these comments.

The state agencies will read through all of these comments and listen to these comments and that's going to help them as they finalize this report.

Lastly, some logistics. I think you might have seen the bathrooms are over there. Feel free to use them as needed, and there's refreshments. If you can silence your cell phones, that will be really helpful, then we won't hear everybody's cell phones ringing during other people's remarks.

We do plan to end on time. If we conclude the comments that we have on the cards and have time to spare, which I anticipate that we will, then we'll take comments based on people putting up their hands after we go through the names on the cards, and we'll take comments from people who haven't spoken before.

We will also take repeat comments from people.

So when you are given the microphone, what I'll ask you to do is start by stating your name. I'm going to read your name from the card. I may pronounce it wrong. I hope you'll forgive me in advance for that. You can state your name and spell your name for the record.

We have one of our court reporters up here and she's going to be transcribing your remarks for the record. So if you can spell your name, that will be helpful for her.

Also, if you are reading from prepared remarks, if you could give those to us after your speech, then we can give them to the court reporter and she can use those to fact check and make sure that she got everything correct as she was transcribing your remarks.

I think that covers everything. So with that, if we want to go to the timer.

Our first speaker will be Marlene Haider. If you could raise your hand.

MS. MARLENE HAIDER: My name is Marlene Haider, M-A-R-L-E-N-E, Haider, H-A-I-D-E-R. I'm a Benton County resident, live in Sauk Rapids, Minnesota.

My family has a farm closer to the pipeline here in Benton County, but I'm concerned for a number of reasons.

I'm concerned about the climate change in general and the impact this will have, because the tar sands is a very heavy, dirty oil, and we're kind of at near peak oil anyway.

So why are we trying to mine all this oil and why are we putting it into the U.S. versus leaving it in Canada?

And I read, and I could be right or wrong, is that Canada has a carbon tax on it, but when they bring oil back in, then it's not. So does Minnesota have a carbon tax? Can we put a carbon tax on the oil that flows through all these pipelines?

From what I can see, other than the few construction jobs in the beginning -- which many go to out-of-state people anyway, because it is a skilled job. You need to know

what you're doing.

We get property taxes, but now Enbridge is suing the counties because they say they paid too much, and the money that they win in court is more than they collect from everybody else.

So how does that benefit Minnesota? I read that these pipelines, that if we move it out of the state, our gas prices in the Midwest actually go up. That's fine, because then we'd use less and then we'd help carbon, I guess.

I'm concerned about the abandonment, and -- so you abandon the pipeline. How well do you watch it? Do you sell it off to somebody and will they have the resources? Are all of these things being considered when we abandon it? Is there enough liability insurance?

There are a lot of things I just probably have to look at, but for now I'm done.

Thank you.

FACILITATOR: Pat Fillmore.

MS. PAT FILLMORE: Pat, P-A-T, Fillmore, F-I-L-L-M-O-R-E.

The crude oil, why do we have to have crude oil from another country, Canada, go through Minnesota to get to Lake Superior when it can go through Canada and get to Lake Superior? I don't understand.

Life in Minnesota, at least to me and I think a lot of people, it isn't because most of us just adore that way below zero weather.

It's because of the trees and the water and the animals and the fish. Clean air and water are important. They're important to my grandchildren.

And St. Cloud, as a matter of fact, drinks the water from the Mississippi. That pipeline goes through the Mississippi twice.

And unfortunately, unless we have some alternative truths embedded in our newspaper, the lead comments seem to be, "Well, we didn't -- nobody saw the leak so we didn't bother with it," or, "We didn't get that information in time."

Well, if they needed to, they could. And I think they should.

Thank you for your time.

FACILITATOR: Thank you.

Beth Balmanno.

MS. BETH BALMANNO: I have a prepared statement, so --

FACILITATOR: If you could start by saying and spelling your name.

MS. BETH BALMANNO: Beth, B-E-T-H, Balmanno, B-A-L-M-A-N-N-O. Like I said, I have a prepared statement so I'm happy to bring them up to you.

I am a resident of Elk River. I also vacation in Crow Wing County. My family has a cabin there, and I'll go ahead and read my prepared statement.

Tar sands oil is thick and must be diluted with chemicals so that it can be transported through pipelines. It is among the dirtiest fuels on earth.

A study conducted by the University of Manitoba and University of Saskatchewan has shown that tar sands oil has been linked to environmental contaminants in

wildlife as well as increasing incidences of cancer, birth defects, and genetic damage in people living in Alberta.

What does this mean for Minnesota? The same oil will be running through the proposed pipeline dangerously close to our waterways. Millions of Minnesotans either live or vacation near these waters.

We boat and swim in these lakes and rivers, and we consume the fish that live in these waters. There is no reason to believe that we won't find ourselves in the same situation.

I want clean lakes and rivers for myself, for my family, both now and in the future and for everyone who spends time near or in these waters.

I want fishermen to continue to enjoy their sport and to know that their catches are safe to eat. I want children to be able to swim in these waters without fearing what lurks unseen. And I want the indigenous people of Minnesota to have the pristine lakes and lands that they deserve, the lands that they are owed.

The proposed route travels through some of the most pristine rice and fishing lakes in the state.

Rather than spending time and money to bring dangerous fuel that will damage and pollute our communities, perhaps irreversibly slow, why can we not focus on clean energy alternatives?

The oil will dry up eventually. We will need alternative sources of energy, if we haven't been poisoned by the contaminants in our water and our food supply first.

Thank you.

FACILITATOR: Ann Burns.

MS. ANN BURNS: My name is Ann Burns, A-N-N, B-U-R-N-S. I live in Monticello Minnesota. I want to thank you for hosting this meeting here. It's the closest one to my home, and I was able to get here easily today.

My concern, among many, is that we haven't adequately talked about the need for this oil, period, in the state of Minnesota, so I'm speaking as a resident of Monticello, a landowner in northern Minnesota -- I own property in Itasca county, which is not

necessarily impacted by this pipeline but is impacted by others -- as a citizen of Minnesota and of the United States.

We know that in Minnesota the consumption of oil and oil products has declined since 2004 by 19 percent. And then from 2015 through the current date, has sort of been sustained at that low level.

We know that the consumption of oil and oil products is likely to stay low because people really are taking climate change seriously, so the need for this oil is a question for me.

This pipeline is not just a replacement. It's increasing in size. It's a bigger pipeline, and it's designed to move more oil and more quickly.

And I question that need. I also question the need for it to be in Minnesota, because most of this oil is not going to stay here. It's going to terminals that are not in Minnesota, to be refined in refineries that are not in Minnesota, and much of that, and an increasing amount of that, is going to be exported. It's not going to be used in the

United States.

So the need for this oil, I question. The need for it here in Minnesota, I question, and I also question the consideration of alternatives.

Since demand is flatlining and declining -- even in the United States it's declining. In Minnesota in particular, it's declining. We should be considering as one of the alternatives, and the EIS doesn't consider this, that it not be replaced, period.

That it be removed and not replaced. For Minnesota we don't need this pipeline. The construction jobs are going to be staffed by people who, for the most part, are brought in. They're not going to be hiring people locally because they do need to be skilled, and the management jobs when this pipeline is constructed, are going to be jobs that are already existing. So there won't be new jobs. There wouldn't be new sustained pertinent jobs in our state.

And now I'm done. Thank you.

FACILITATOR: Thank you.

Susan Scherr. State and spell

your name.

MS. SUSAN SCHERR: Hi, my name is Susan Scherr, S-U-S-A-N, S-C-H-E-R-R.

Thanks to the folks who spoke. I agree with what many of them have said.

My story today is just a little more personal. Somehow last fall, at 71, I got involved in the Standing Rock oil situation, and -- a life changing experience, absolutely life changing, and as a person my age sometimes I'm with friends and, you know, they've got funds for their kids, and the kids are going to get all this when they die.

My husband and I haven't done so well at that planning, so our kids are going to get the earth and the water and the land, and that's something I feel at this point in my life I intend to work to preserve for them, even though there's some other things I can't do for them.

My son and I were passing through on a trip to look into California this fall, and he had been corresponding with someone who was at the Standing Rock camp, and -- just over the Internet, and he said, "We're going to stop

there, mom. I want to see what's going on."

Before this I haven't really thought a lot about oil, every day of my life, about -- I am pretty good at recycling. I live in a small house and try not to overuse the environment, but as far as the big issues of things like oil and everything else, but we stopped by, and we visited our friends, and we saw the camp. And I thought, oh, my gosh, I want to go back out there, but I didn't think -- how am I ever going to do this, you know, an old lady going out to North Dakota, get a tent, whatever.

Well, a couple of weeks later, there was a thing on the Internet that a group from Minnesota was going out, and I got on the trip at the last minute. I heard about it at 10:00 in the morning, and I was heading to Minneapolis by 1:00 o'clock that day. And my husband said, "Well, you know, I know you're going to do it so enjoy yourself."

Here I am. I'm not the big camper of all time, but it's November, I'm sleeping in a sleeping bag in a tent in the middle of 5,000 other people in North Dakota.

And the experiences that those people gave me and the knowledge I got was just tremendous. That we have to respect our native brothers and sisters.

I'm an immigrant. I'm only a second generation American, so I'm an immigrant way more than those people are immigrants to our country. Clearly the pipeline was moved away from Bismarck, North Dakota to the Indian land because Bismarck didn't want it going around their town, and I can understand them for not wanting to do that.

The stories you hear from their -- I'm a sub teacher. The other day in school someone said, "Oh, you're one of those people that left that mess out there." No. I've never been to a place where -- the bathrooms were cleaned every day. People collected garbage, people chopped wood. We helped each other. We shared food, we dialogued. We taught each other about the environment in a way that I had not really talked about before.

I just think we have to do something. We were recently on a trip to Iowa

where my daughter lives. Over 30 percent of the power in the state of Iowa is now wind power, and you could see it going as we drove across the state.

I just wanted to thank the people that helped me get out to Standing Rock, learn some stuff.

And I also want all of you to just think about -- I'm not going to probably be here -- I plan to be 102, so I've got 30 years. But short of that, I'm not going to be here, none of us are going to be here in -- a lot of us, in 50 years.

What kind of environment are we really leaving to our children and grandchildren? Isn't that one of the biggest things we can leave them?

Thanks a lot, guys. Sorry this wasn't more intellectual, but you know.

FACILITATOR: Thank you so much.

Darlene Haus.

MS. DARLENE HAUS: Thank you. Good morning, and you do not have my permission to take my picture, please. Thank you.

I'm a farmer.

FACILITATOR: Darlene, I'm sorry, could you spell your name?

MS. DARLENE HAUS: D-A-R-L-E-N-E, H-A-U-S. (Indiscernible) a city council meeting. I'm a farmer from Wright county.

I came up here from St. Michael. I had a heck of a time getting through the traffic because there was so many roads being tarred and repaired, and I looked at those guys out there with those good jobs, getting sun burned and breathing those fumes day in and day out. And I think of the three really close friends of mine that had those good jobs and they're all dead, because they got exposed.

And I believe that the need for this pipeline is negligible at best. We are criss-crossed, our state, four branches of the Crow River, within 20 miles of the Mississippi, have the MinnCan pipeline running across them right now and they're proposing to upgrade their pumping stations.

One leak, hundreds and hundreds

of miles of river irreparably soiled. We're already at extreme extraction levels on the plant. The time is long past overdue for us to implement newer, cleaner transitional strategies.

I don't think there's a person in this room who doesn't love their kids. I never had any, but I got nieces and nephews, little ones coming up. My God, is it fair for the sake of a foreign corporation to come through our state, through the most pristine valued resource we have, and endanger that for the sake of a few short-term jobs and the foreign corporation for profit? Is that worth it?

And Minnesota has the opportunity to become a global leader, a shining example of water, air powered, wind, solar. We have the opportunity to be a world leader.

And if they took one small fraction of the money that they spent fighting with citizens who overwhelmingly oppose these projects, and the money they spent in court and taking land and destroying the earth, one small little fraction of that, and you could have a completely transformed, permanently purer safe

environment for all of our future little ones to come.

And I just don't see the need for it. And I look at these beautiful displays, and the amount of paper and the amount of locations, and I'm sincerely grateful for everyone who is participating today. And I look at the cost of these little soirees. Just one of them is more than what I make in a whole year as a farmer.

And I just can't believe that we can't do better as a state and as a country, all of us.

Thank you very much.

FACILITATOR: Ellen Hadley.

MS. ELLEN HADLEY: Ellen Hadley, E-L-L-E-N, H-A-D-L-E-Y. Good morning.

I'm from Anoka, Anoka county, and I live about two blocks from where the Rum River meets the Mississippi, and our drinking water comes from the Mississippi River, which as you've already heard, is at great risk from several different pipelines.

Yesterday a federal judge decided that the Environmental Impact Statement that

North Dakota did for the DAPL pipeline was incomplete. They had ignored the voices of the Standing Rock Tribe and the Cheyenne River Tribe regarding their hunting and fishing rights, and they had ignored the environmental justice component, the voices of the people.

I hope that in Minnesota we don't follow their lead. And today, I would like to be a voice for the voiceless.

I'll start with my friend Diane, who like me, to make extra money in the summertime deliver the St. Paul Pioneer Press newspaper. One morning before dawn she parked her car alongside a curb in Moundsview, where she could see a little water running down the gutter. She grabbed a couple newspapers from the passenger seat and jumped out her car door, shut the car door, and bam, it wasn't water, it was oil. An oil leak that had not been noticed. The explosion sent her a hundred feet and engulfed her in flames.

My other friend Beverly lived with her husband Don about three houses down. The explosion shook their home. They ran from their beds and grabbed their two little

children. Don ran out the back door with the little one, but Bev, in her panic, ran out the front door, was standing right into a 30-foot wall of flames.

They were dead within two hours. I'd like you to hear their voices today.

I also want to be a voice for my grandpa, Curly Holden, and his father, Warren Holden, and my great grandfather, Tom Tie, and my uncles, Ike and Mike and Tom, my father Tom, my cousin Joe, my cousin Terri, who all live up between Backus and Pine River, between the Bedoura State Nursery and Backus and Pine River, where that jog in the highway goes.

They have fought forest fires there in those wetlands and swampy muskogee foot lands and potholes for a hundred years.

I can remember forest fires almost every fall of my life. The thing about that land is when lightening strikes a tree and starts it on fire or when a fall forest fire comes rolling through, the fire follows the tree and the plant roots down into the soil, and the soil is peat and the peat burns, and those fires continue to burn for years

sometimes.

I've driven by in the winter and seen smoke coming up out of the snow because the ground where they want to run the pipeline is still burning from a fire 18 months earlier.

My cousin Joe is a DNR forester there near (indiscernible), near where the pipeline wants to come through. I don't think it's a really safe environment to have an oil pipeline so close to where fires burn indiscriminately for long periods of time.

I also would like to be a voice today for the 4,000 missing or murdered indigenous women of Canada. Since the introduction of the oil industry in the Athabascan tar sands region and the fracking industry and the pipeline industry, more than 4,000 women have disappeared with no trace. They have been murdered or drugged, assaulted, lost.

Enbridge promises to educate their workers by creating some curriculum that will help them understand they shouldn't do those things when they come to Minnesota. Kind of like asking Roger Ailes to clean up Fox News

sexual harassment.

The health of the Athabascan people is also a voice I'd like to represent today. The people where this tar sands originates are facing extreme illnesses because of their exposure, not just to the tar sands but, as Beth said, to the chemicals that are added to the tar sands.

Now they are finding it changes the genetics in the person. Some of you remember Agent Orange and the effect that that had on our Vietnam vets. What we learned 20 years later when they started having children and their children grew, is that those kids who weren't even born during Vietnam suffered genetic effects from Agent Orange. Came down with cancers as children and as young adults because their fathers or mothers were exposed to Agent Orange. That's what the tar sands is doing to the people of Canada.

I would also like to be a voice for our ancestors who signed the treaties of 1855 in which our ancestors promised that our indigenous neighbors, our Ojibwe people of this area, could be hunting and fishing from Fargo

to Duluth, from International Falls to Mille Lacs Lake, forever.

They were forced onto small reservations but promised that they could hunt and fish and gather there forever. I want to honor the voices of our ancestors who signed those treaties.

I also want to honor my thousands of students who protested against climate change and asked adults, "Please do something to stop climate change." This is our chance.

Thank you.

FACILITATOR: Thank you.

Haley Hoskins.

MS. HALEY HOSKINS: H-A-L-E-Y, H-O-S-K-I-N-S.

I'm an intern at Avery Pipeline Services. I strongly believe that the pipeline industry is very important to our country. The energy and natural resources that the pipelines carry through the units is what keeps our country running.

While there are some alternative options to creating energy, the amount of energy carried through the pipelines is much

greater than what the alternatives can do. If we were to use only alternative options for energy, the cost of the services that we use every day such as electricity and fuel would increase.

Pipelines are not put in the ground to damage nature with oil. They're put in the ground to provide heating and cooling, run equipment, and provide services that we all use in our daily lives. Safety is not taken lightly by the pipeline industry. Enbridge goes above and beyond standards to ensure pipelines and workers are safe.

There are many benefits that come with the pipeline industry. Economic growth is a major outcome. The Line 3 pipeline is projected to create 1,500 construction jobs. On top of that, there will be increase in revenue along the pipeline route due to the need of goods, services, and equipment.

Many members of this area work for pipeline companies such as Minnesota Limited, Precision Pipeline, and Michels.

I think it is important, for this generation especially, to stop listening to

what we want to hear and listen to what we need to hear to develop a knowledgeable opinion.

Each day pipelines transport, on average, 19.63 million barrels of oil. In Minnesota alone, Enbridge provides approximately 80 percent of our refinery capacity needed. Going Line 3 pipe will provide jobs, revenue, economic growth, and most importantly, the energy that we have relied on Enbridge for since 1949.

Thank you.

FACILITATOR: Thank you.

Lori Schott.

MS. LORI SCHOTT: Hi, I'm Lori Schott with Avery Pipeline.

I'd like to thank my intern this summer, Haley, for having the courage to speak up for our business.

Again, Lori, L-O-R-I, Schott, S-C-H-O-T-T. I am the owner of Avery Pipeline Services based out of Milaca, Minnesota. Our company provides construction management, pipeline inspection, environmental and safety personnel to the energy industry.

We also provide work to clients

in the wind energy and natural gas sector.

I am here today to stand up for the voice of the pipeline industry that I think is so lacking, and I'm here to support Enbridge's Line 3 project. I'm here to stand up for our small business located in Milaca, Minnesota, and for the millions of people that are out here using oil-based products for our everyday lives.

You see, my family moved here to Minnesota from Colorado. I married a pipeliner. I was a farm girl from southwest Iowa who married a pipeliner, but my education was in agriculture.

My whole family is tied to soil, water, earth, and that's what my professional training was in, but I married a pipeliner and I opened up a whole new world of opportunity for me and my family.

We are one of those families that arrived here in 1997, in an RV with our little kids. We parked down south of the cities, and we've been here to this date. We decided to call Minnesota home because it gave us an economic opportunity.

You see, neither my husband or I came from money. We were farming families from down south, so this gave us an exciting field to be in to.

We called Minnesota home. We called Milaca, Minnesota home. We bought a farm. We also purchased property up north in this lake, wood areas where the pipeline is going to go through.

And I feel very confident and passionate about what I'm speaking about today.

Our kids were educated in the Milaca school system. We stayed here because of the pipeline industry.

And Avery Pipeline has a viable presence in this community. We support our schools, our businesses, 4H, FFA, our churches, and our company employees local members of this community. We do business with Bremer, we secure professional services.

We spend the money in our community and feel like we give back. That is why, for this reason, I support Enbridge's Line 3 project, because it's given us this vast opportunity.

We construct pipelines because there is consumer demand. I don't think anybody says Enbridge just wants to put that pipeline in just to have a construction project going through northern Minnesota. There are over 2.4 million miles of pipeline in the United States.

And these things, even though we strive to construct new technology and clean fuel production, which we also do in the wind energy sector, there are more than 263 million vehicles on the road today using gas and diesel utilized by pipeline movement.

And the vast amount of pipelines running underneath our feet, underneath our waterways, these pipelines deliver products safely 99.9 percent of the time.

While we never hear negative media activists talking about pipelines the way we are today, this pipeline for the Line 3 project should be constructed exactly for those reasons. It is to replace a line that was built in 1960 to have a safer mode of transportation.

If the pipeline isn't built,

they're going to utilize rail and trucks to move the products.

Our company also provides services, as I said, in the green energy sector. I'm happier than heck to see Foley putting in solar energy, and those Iowa wind turbines that you talked about, you were a part of that, every single one of those, in Iowa.

And I'll tell you here and now, we're feeling pushback in the renewable energy sector in that venue. We're having problems with construction of wind turbines in Iowa. If you drive through Cherry county, Nebraska, it'll say, "Keep the wind turbines out of there."

So I think in this vast, exciting energy field there's all sorts of levels or places at the tables for us to work in the construction field and do things safely and prosper.

Avery pipeline supports the Line 3 project as being constructed to replace a line constructed in 1960. If we are talking pipeline safety and environmental protection, it just makes sense.

If not utilizing this pipeline as I said, it'll be moved via trucks and trains. Wisconsin has approved pipeline projects. North Dakota has approved the pipeline construction project. Now it's Minnesota's turn to follow the legislative process in a timely and predictable manner. Provide our small business some assurance that the legislative process will keep this project moving forward.

Thank you.

FACILITATOR: Thank you.

William Haider.

MR. WILLIAM HAIDER: Hi, William Haider, that's B-I-L-L, H-A-I-D-E-R, and I'm from Sauk Rapids, Minnesota.

My concern isn't primarily about pipelines in general. I know there is a need for them.

My concern is about the stuff that's going to go through this new pipeline, and that's the tar sands oil from Canada. There's lots of problems with that. We've known that when those tar sands pipelines do leak, it's a terrible problem because that tar

sands oil is very hard to clean up.

We know in Kalamazoo, Michigan, back in 2010, one of the Enbridge pipelines did leak, and it leaked somewhere around 800,000 gallons of oil into a tributary of the Kalamazoo River, and I don't think that's been cleaned up yet today.

The stuff they're pumping through the pipeline is like the -- your driveway, the asphalt on your driveway. They have to add solvents to that.

Firstly, when they frac it up in Canada to get it thin enough to run it through those pipelines, and then again in the pumping through the pipelines they add additional solvents. First the fracking of it and then the solvents to get it through the pipelines.

When those pipelines leak, there's lumpy bits of tar that get into the water supplies and the river.

First they float so they go down the river, like they did, into the main, the Kalamazoo River, and then they sink to the bottom all over the river, so very difficult to clean up.

And then secondly, the concern that was briefly touched on, is what's happening in Canada, in Alberta. The Boreal Forest up there is being torn up to get at the tar sands that are in the ground. They're using steam to liquefy this enough that they can actually pump it out of the ground.

And it's destroying the Boreal forest. It's polluting the Athabasca River, and it's sickening the First Nation peoples in Canada who live in the area.

They get their water out of the Athabasca River that is being polluted by the residue from the tar sands operation.

And we should think of the fact that allowing this pipeline to go through Minnesota is actually facilitating this destruction in Canada and the families that it's going to these First Nations people.

I intend to submit a comment, a written commentary to the Public Utilities Commission, and you can find these on the tables around the area today. You can do that. You can submit a lengthy detailed response, and this is due by July 10th.

And I'd like to thank the people from the DNR, the Public Utilities Commission, the Commerce Commission, who have come out here today and provided us with all this great information about the pipeline.

Thank you.

FACILITATOR: Samuel Harms.

MR. SAMUEL HARMS: My name is Samuel Harms, H-A-R-M-S. I'm from Sauk Rapids.

And I support the construction of a new pipeline, a 36-inch pipeline, and it's -- for several reasons. We need -- we're on an energy consumption path that is going vertical. Our children were using a lot more energy today than we did ten years ago, and ten years from now, we'll be using even more energy.

And so the energy is important for our society, and oil is an extremely important source of energy, but it's also used in a lot of other uses. It's used to make urethane foam. It's used to make all kinds of plastic.

Today plastic is used

extensively in cars, in the home, and they're all oil -- they're all oil derivatives.

So the -- and another major point in regard to a pipeline is the fact that it's a lot safer than transporting it by rail or transporting it by truck. In fact, the comparison on it is enormous. So you want to distribute and pipe oil by pipeline rather than taking all the risk in trucks and trains.

It's also much more economical. And that's really what we want. We want more energy at a lesser cost.

We talked with -- we go to Florida in the wintertime and we've talked with couples in Canada that were really disturbed because what they got forced on them in their homes is that they -- their energy bills doubled when they went heavily with the windmills, because the windmill energy is several -- it's an increase by a large percentage when -- as compared with, for example, coal, which you're producing a kilowatt for about 3 cents a kilowatt, whereas the windmills can go up to 17 cents.

So they had to -- in their tax

bills they had to subsidize the windmills and then subsidize the production of the energy from the windmills, and it nearly doubled their cost. And they were just up in the air about it.

And so I see the need of -- on all fronts, whether it be alternative energy or oil itself, that we try to -- we try to produce, at the safest way possible, cheap energy.

I also know, because I work in the fireproofing market, and I've talked with our division leader out of Houston who works with these engineering companies that built refineries and petro chemical plants, and they've got proposed a whole string of refineries and petro chemical plants and industrial plants along the pipeline. These are going to be permanent jobs, and it's because it's convenient.

This idea that they're just going to build a pipeline and then once that pipeline is in, the jobs are no longer there, that's not true at all. They've got -- he's working with them continually because we had -- actually do

the fireproofing for a lot of the -- anything that's energy related or chemical related. They've got strict rules on the protection of those plants. Most of the time it's up to three hours protection, which is a lot of fireproofing I have.

I'm not in the industrial field, but I just know that that is a fact.

But anyway, the -- with solar, with wind, with oil, coal, you'd just be working on all fronts, and this pipeline is just one way to reduce risk.

It's also a way to produce an economical product and we're going to be needing more and more and more energy. It's just spiking because everything we -- everything we use today, whether it's flipping a switch to get the lights on or watching television or spending an enormous amount of time on cell phones, it all takes energy, and --

But anyway, because of that, I support the pipeline. I think it's a wise thing to do. I think it's a wise thing not to depend on an old line that is in risk of

leaking oil or having a spillage.

Let's get up to the modern days, and hopefully some day there will be a new energy source, and -- just like we did 20 years ago. We didn't know about the ways to produce energy as we do know today, and the same thing will happen in the next 20 years. We won't recognize what we're doing today.

And I think it's going to be improved, and so let's go with the pipeline, and I think it's -- I think we can -- we've got issues and we've got problems, but we can solve them.

FACILITATOR: So that's all the cards I have. I want to open it up for those who have not yet gotten a chance to speak who would like to give a public comment.

MS. KATHRYN TASTO: First name is Kathryn, K-A-T-H-R-Y-N. Last name Tasto, T-A-S-T-O. I'm from Becker, Minnesota. Thank you for hosting this opportunity.

I did not prepare a statement so I'm talking off the top of my head, but what came to me in listening to the comments today is I'm thinking about -- I'm 61 years old and

so I've seen changes through my lifetime, as we all have. But the older you get, the more you realize how much change happens. And I'm thinking back to the '50s, before it was found that tobacco causes cancer and it was not a big deal back then to light up a cigarette, and look how far we've come since we've learned that nicotine does cause cancer and that tobacco -- smoking tobacco, using tobacco causes cancer.

I also look at the distance we've come with wearing helmets on motorcycles. People -- riders on motorcycles, we've learned how many lives are saved. Seat belts, airbags, car seats for children.

So I want you to imagine that you have a small child and you're in a car and ready to take off and you do not buckle that child. Now the chances are you and that child are going to arrive just fine wherever your destination is, but in that moment when you do not buckle that child, you are ignoring the potential of what could happen. It's an unnecessary risk.

And that's the way I see this

pipeline. It is an unnecessary risk. What you measure that risk, small or large, personally, I measure it as a very large risk, but it's still unnecessary.

It's not smart, and in the moment that we decide that this pipeline is okay, we are denying all of the possible consequences that could happen as a result of constructing it.

My vote is so clear -- my view is so clear, let's get out of the fossil fuel. It's outdated. It's like everything else that we've come through in the last 40, 60 years. Stuff gets outdated, change happens. And you have to let go of that stuff when it's time, and the time has come. It has come. We need to get rid of fossil fuels. We need to start relying totally on renewable and sustainable energy.

The life of the planet, the life -- all of our lives is at stake. The plant is going to be fine, right, the plant is going to survive. We're the ones who might not survive. We are the ones who need healing, not so much the planet.

Thank you.

FACILITATOR: Thank you.

Others? Yes, sir. State and spell you name.

MR. DAVID BARNETT: Good morning. My name is David Barnett, D-A-V-I-D, B-A-R-N-E-T-T.

I represent the United Association of Plumbers and Pipefitters, who will be the welders, pipefitters and helpers that Enbridge has committed to have build this pipeline once it does receive the needed permits.

The Energy Information Administration, which is the leading research technology arm of the federal government predicts -- well, first of all, in 2016, American people used 20 million barrels of oil per day. And that's their fact numbers. Of that 20 million barrels, there were net imports of 25 percent, meaning taking into consideration of what we exported and imported, we're still importing 25 percent of our oil as of 2016.

For me, Canada is the right

choice to get that imported oil. Ninety-two cents out of every dollar we spend in Canada comes back to the United States. Research has shown 22 cents out of every dollar we spend overseas comes back to the United States.

Canada always has been our favorite neighbor, and I think we have a relationship that speaks loud to where we should be importing our oil from.

Pipelines are the safest mode of transportation, by far. That's been proven time and time again.

I would like to call attention to the EIS and the handout on page 16 that reflects the number of incidents as well as the amount of spill of the incidents. There's something missing from that chart, and what's missing is the volumes that each one transport each year.

Because once you put the volumes into that chart, that's where it jumps out to you that pipelines are the safest mode of transportation. So I would like to request that in the final EIS, those volumes be included in that chart description.

There's another important factor that -- the only one I have to reach to is the work and safe (indiscernible) the Keystone XL. They did research that if the pipeline were not built and the oil went on a train or truck, they would predict 43 individuals would lose their lives as a result of that. Compared to zero loss of life with a pipeline.

I think that's a big factor we need to put into this equation as well, the public safety. Public uses oil and they deserve to live safe around oil.

I'm all for wind energy, but the last study I just viewed -- I hear talk about foreign imports of oil. Don't think for a minute that wind energy is not foreign owned either. I saw a study the other day based from the state of Oklahoma, 37 percent of the power payments and the subsidy payments are going to five countries overseas.

So it's not something that if we go wind, America is going to be the big winner of it. I think it's a balance.

And as the individual before me spoke, and I think he said it perfectly, is

that I think we need all of the above. In fact, that's my organization's policy, all of the above energy so that we have a rounded portfolio.

Pipelines by far have the least DAC emissions of any transportation mode for oil. That's a fact. And that speaks loud for the environment as well, and I think it should be considered.

The pipeline trades in Minnesota have been committed to this project from Enbridge. That commitment on Enbridge's part is a large commitment. They pick the right folks to build this pipeline onces it's constructed.

The trades involved in constructing the pipeline are the best pipeline builders in the world, and as the trades, we stand ready to build a new pipeline for Minnesota that has the highest quality of any pipeline in the world.

Thank you.

FACILITATOR: Are there other comments?

Yes, sir.

MR. RANDY EOLSCHLAGER: My name is Randy Eolschlager, R-A-N-D-Y, E-O-L-S-C-H-L-A-G-E-R. I'm with the Labors Local 563 out of Minneapolis and North Dakota.

I've worked on several pipelines myself.

I'm not going to take up a lot of your time, but I've been sitting in on these meetings for the last two weeks, and I've heard the pros, the cons and the stats.

I'm just going to tell you a little bit about myself. All I wanted to say is I grew up in Hubbard county where the line is proposed to go. My family lives there. We've lived there for hundreds of years. I have cousins, uncles, aunts, everybody.

I also now moved to Pequot Lakes, which is in Crow Wing county. I'm raising my family there. That's where the line is supposed to go as well. I'm an avid outdoorsman, as well as my friends and family, boating, hunting, and fishing. We all enjoy these things like you guys do.

I don't have a problem with this line coming through where I live, where my

family lives, or any of that. If Line 3 goes through the proposed route, I have to believe everything done on this line will be done in a microscope. They're going to watch what's going on through these wetlands, (indiscernible), these farmlands, these woods.

It's not going to go unnoticed. They're going to do it in the safest and most environmentally friendly way there is possible. Being a family man, an avid outdoorsman, and a union man, I believe that the proposed Line 3 should be a go. Thank you.

FACILITATOR: Other comments?

Sir.

MR. ANDY PEARSON: Hello, my name is Andy Pearson, A-N-D-Y, P-E-A-R-S-O-N.

You know, in the past I've occasionally made a challenge to some of the good folks at these meetings who have been involved in the construction trades and the pipeline industry.

My challenge has been that I would just once like to see somebody open a comment with acknowledging the reality of climate change and approaching their testimony

in favor of the project from a standpoint that is consistent with the best scientific information that we have on what that problem is and how to deal with it.

And so far I have not heard that once, so I would encourage us to think about the testimony that we may be hearing in favor of the project and just say, "How does this sit with what we know about our world right now?"

Because I don't hear that being addressed. Instead what I hear is all of the above, and all of the above sounds great, doesn't it? In a lot of ways we don't really have to choose if we do all of the above, but if I took an all of the above approach to say that spread of food over there, I'd be eating the brownies, I'd be drinking the coffee, I'd be eating the table cloths and the flowers and the trays.

All of the above gets stupid if you do it without adding any sense of discretion of what it is that you're actually choosing to use.

So I want to be super clear that

taking an all of the above approach when we have information that very clearly says in this country right now that there are energy sources that will help us get to a better place and energy sources that will take us to a worse place, all of the above is not a neutral choice, and it's not a smart one, and we shouldn't fool ourselves into thinking that it is.

I have a specific comment on the DEIS, thinking about the mining projects up in Canada and the extraction projects, that steam assisted gravity drainage, I believe, two types of getting the tar sands out of Canada, thinking about what's happening up there in the Athabasca region in northern Alberta.

I want to propose that some of the mining projects that are on the books in Canada right now might fall under consideration as connected projects to this pipeline.

I'll say a couple of words about why, but I would propose to the Department of Commerce that some projects, not all, not many, but some, either be considered as connected projects or we need justification in the DEIS

about why they're not.

The reason is because referring back to some earlier conversation about the Keystone XL Environmental Impact Statement and some of the scenarios there, one thing that's critical in that statement is that in certain oil price scenarios, whether pipeline capacity exists or not, is a determining factor on whether or not mines get built and oil gets extracted, shipped, and burned. And that's why these pipelines have such a substantial climate impact.

That number from the federal study is $70 a barrel of oil, and we're below that. We've been below that for a while here in this country. So at that price number -- this oil actually doesn't flow by rail or by truck if there's no pipelines to move it.

During that period of time where Keystone was being considered, we saw five mining projects worth about $37 billion of extraction up in Canada be taken off the books, be canceled completely. The companies pulled out because there was not enough pipeline capacity to move the oil. It was cited in

every single withdrawal of the project as one of the major reasons.

So if we build this pipeline, we expand it, we give Enbridge 370,000 barrels per day more capacity in Minnesota, and it's actually larger than that because of the amount that now opening this pipeline back up to carrying heavy oil, to carrying tar sands.

Again, we need to be considering what is this on locking in terms of carbon deposits, because there are mining projects up there that are proposed.

And I think you can make a very good case that some of these projects fall under the scope of a connected project in the oil price scenario, that we are specifically in now, where building this pipeline could cause that project to be built as a shipper -- a customer of Enbridge projects.

So I would ask that it be considered or that there be justification in the document for why it was not considered.

Thank you so much.

FACILITATOR: Other comments, people who have not spoken.

MS. NICOLETTE SLAGLE: Hi, Nicolette Slagle, N-I-C-O-L-E-T-T-E, S-L-A-G-L-E.

I'm with Honor the Earth as research director, and I just wanted to thank everybody for coming out and speaking your voice. I know it's not always easy, especially in such a high emotion situation, and I personally want to thank you guys over here for standing up for our indigenous brothers and sisters.

That's one thing that I want to be really clear about right now is no means no, okay. Most of us in this room are immigrants to this country and as you said, when our ancestors came over, we signed agreements or made agreements with the people that were here that we should share this land with them. And through our history we have broken a lot of those promises. And still, the tribe still say -- they're still hoping that some day we're going to stand up and commit to a group to doing what we said we would do.

And in the case of this project, that means that we will allow them to hunt,

fish, and gather in the treaty areas from the 1855 treaty.

And what that means is that we need to be able to protect the wild rice in those areas, and we need to protect the environment to be able to support the hunting, fishing, and gathering that they need to be able to do in those areas.

All of the tribes have said no. This project would be an unacceptable risk to our areas, the Draft Environmental Impact Statement states that. And we need to stand up and say we are going to finally abide by the terms of these treaties and work with our neighbors to make sure that these lands are protected.

And it's not just the tribes in Minnesota, okay. "There is 122 First Nations and tribes that have signed the Treaty Alliance Against Tar Sands Expansion stating the official opposition to the expansion of the Alberta tar sands and barring the passage of proposed tar sands pipelines and rail projects including their associated tanker traffic.

"The signatories are working

collectively to enforce the ban, which covers the following pipeline projects which threaten our waters and our coasts and which would fuel catastrophic climate change effects."

Kinder Morgan, Line 3, Keystone XL, Energy East, and Northern Gateway, these are the major pipeline and tanker proposals that are on the table to get the tar sands oils out of Alberta into the coast so they can go to China and other refineries in the U.S.

Tribes have had enough. No means no, okay. We really even shouldn't be here because everyone has already spoken their feelings about this project, and so if we have to stay in this energy economy where all we use is crude oil, you're going to have to figure out how to get it out of the ground without disturbing First Nation's people and Native Americans.

The second thing that I want to talk about is Enbridge. I would please, please, please just somebody give me some studies that show how great Enbridge's safety standards are, because in the research that I have done in the last two years, all I have

seen is their horrendous safety standards.

PHMSA, the Pipeline Hazardous Safety Materials Agency, has enforced a record civil penalty of $3.7 million against Enbridge Energy, which it said committed a lack of safety culture, okay.

I mean, you guys may build the safest pipeline there is, but Enbridge, the operating company, has the worst safety record of any other pipeline company. I mean, they're -- you guys have their -- I don't remember which board it is, the crude releases, the annual failure performances. I have it over here, too. I got this data from the Clipper, the state's Environmental Impact Statement from the Clipper project.

It has the industry average for spills per thousand miles of pipeline and Enbridge's average of spills per thousand miles of pipeline.

In every category, except medium spills, Enbridge's spill records are higher. Catastrophic spills, industry average, .01 per thousand miles of pipeline. Enbridge, .03. Small spills, industry average 2.75.

Enbridge's, 2.8.

Okay, so maybe -- I mean, maybe the state department's and my research has been completely wrong and there's some magical other research out there that shows how great Enbridge's record is, because I have just not seen it.

I know people that work in the engineering industry that has worked on Enbridge projects, and they tell me, "Yeah, I worked on this project, and Enbridge didn't even have the permit in place before they started building it."

Is this the kind of company we want to continue to have a relationship with in Minnesota? I don't think so.

The EIA projections, the energy agency in the United States, okay, a few things. First of all, their projections historically have way overshot how much energy they think we're going to use. There are studies on the website that you can download and read that shows that they've gone back and looked at their projections and what the actual usage was. They always over project.

Other international oil agencies that project our energy usage, they also over project. Their projections are not as high as the oil usage that the United States energy agency is projecting. That agency also doesn't incorporate into the projections the changing technology and how quickly that can be adopted.

So we already know that we have faulty projections. We already know that other international projection agencies have lower projections of what the United States projections are, and we also know that the two big major countries that they're basing all of these massive projections of increasing usage, China and India, are leapfrogging over fossil fuels, because they know it's a bad investment. They're investing in solar panels. They're investing in other renewable energies.

Why are we going to base our future of clean water in Minnesota and our agreements with the people that were here before us off of these crazy projections that don't actually have any standings in reality? It's just crazy, okay.

And that's all I have for today.

Thank you.

FACILITATOR: Other comments?

Yes, sir.

MR. JACK FULTON: My name is Jack, J-A-C-K, Fulton, F-U-L-T-O-N.

A lot of people have -- I mean we all are energy users. The point has been made. We use our phones, we hit a light switch, we get in our cars, but I would point out we also turn on a tap and get clean water.

And that would be sufficient reason to oppose this, because tar sands oil. The oil from North Dakota, all that extraction, relies on shooting clean water down and it's foul, and we're not going to have water to drink.

I understand the need for jobs. I like to work, too. I like having a paycheck and paying my bills and being able to go out and have a little of fun, but if I don't have water to drink, that doesn't mean anything.

You can't -- there's no substitute for clean water. There's not an all of the above when it comes to clean water.

So I think that's reason enough,

reason enough in itself to oppose this pipeline, to help discourage this sort of an extraction. Thank you.

FACILITATOR: Any other comments?

MS. KYLIE LEMLEY: Hi, my name is Kylie Lemley, K-Y-L-I-E, L-E-M-L-E-Y. For once, I actually just wanted to comment on the DEIS.

So the impact statement as it sits does not seem to place any particular weight on any actual alternatives to building the pipeline or options and just to the preferred route as listed by the applicant.

It strikes one as more of a reiteration of the proposal by Enbridge instead of an actual critical assessment of what will occur in any case aside from the line being built on the preferred route and never having any major issues.

A couple of issues I have with it is the restoration section. I'm sorry, I know somebody must have tried, but it's laughable. The plan to seed disturbed wetlands with just oats, why oats? Unless otherwise directed by landowners or regulatory agencies, it's just

ridiculous. I mean, there are so many reasons why.

But anyway, wetlands are extremely sensitive and tenuous areas, and the Final EIS should much, much more thoroughly cover a plan to restore these areas, if it's even possible, and explain in detail what will be lost if the wetlands are not properly restored.

So I'm, once again, going to mention the section on abandonment. It's woefully inadequate, 14 pages out 6,000 is just not enough to cover the entire issue.

To name just a few unexplored topics, there's no talk of landowner property values and what will happen if one of the pipelines is abandoned on their land. No talk of the exposed pipe, because there's a lot of it already, and how fast it will degrade or what will happen when it does. It doesn't discuss buoyancy in any detail. It doesn't explore the possibility of the industry that could be created out of pipeline removal.

While it does say the impact on human and natural resources are anticipated to

be minimal in the near term, it doesn't explore that they absolutely could be significant in the long term. This is just, again, super inadequate.

Because of these, and like many other unmentioned issues, we need to demand an entirely separate impact statement, a whole new one for the topic of abandonment. Minnesotans deserve to know the risks they're accepting for Line 3, if it's allowed to be abandoned in place, and they can't do that with the very small amount of information provided.

Another thing, the DEIS states that, "The addition of a temporary cash rich workforce increases the likelihood that sex trafficking or sexual abuse will occur. Increases in sex trafficking, particularly among native populations, is well-documented."

This is all in the DEIS, but don't worry, everybody, Enbridge will take care of everything. They always do. They'll prepare and implement an education plan around this issue and consider it taken care of. They're just going to talk to people and say, "Hey, maybe don't sex traffic other people,"

all right, problem solved.

There is obviously a really serious concern. Why is it dismissed with such a simple solution? Where is the data showing the effectiveness of their education plan? Enbridge is not an expert in the field of mitigation of sexual abuse. Why are they the ones to prepare an awareness campaign. This is, again, woefully inadequate.

And the last thing, real quick, it doesn't explore -- the DEIS does not explore what will happen if, as proposed, the (indiscernible) protection isn't installed until a year after construction.

First of all, I'd like to know why, why it's not going to be installed until a year later or what they're going to do with it. It's been shown that a lack of protection near high voltage lines can cause pinhole leaks, and can cause pinhole leaks. None of this is explored and I'd like to know why. I think that information should be in the final DEIS.

I think that's it.

FACILITATOR: Additional comments?

Anyone who has not spoken want to speak?

Yes, sir.

MR. JERRY KOSTREBA: My name is Jerry Kostreba, J-E-R-R-Y, K-O-S-T-R-E-B-A.

Now, I live in Rice and Benton county, and there's a pipeline running through there. I've been there 50 years, and we've never had a problem with that.

And the people that are speaking against this, I wonder, did they pull up to the gas station and fill up their car with gas and then drive here, or did they get in their electric cars?

And great, that's coming out of Washington to Chicago and that would take the fuel tanks off the trains and put electric batteries in there, I wonder how far they'd get with that.

And the trucks run the nation. To take the fuel trucks -- tanks off the trucks and put batteries in them, how far would they get before they have to keep charging them? We need the fuel.

And I have a cabin in Clearwater

county, and I'd like to see this go through, because Enbridge has got one of their stations in Clearwater county, and I think it's a good tax base for us there. It's going to create jobs for us and I'm not afraid of any pipeline.

So that's all I'm going to say.

FACILITATOR: Thank you. Anyone else? Yes.

MS. BRENDA GRAVES: My name is Brenda Graves, G-R-A-V-E-S.

I will be brief, because I came here today because of a concern I had, which was raised by a telephone survey that I answered two days ago, three days ago. A woman called me and she said, "I'm doing a survey for Enbridge, and they want to build a pipeline and it will bring 13,600 jobs, and it will be safer because it will be bigger," and she told me how much bigger. And I said, "Wait a minute, what's going through this pipeline? I don't know," she said. "I think gas." And she said, "Can you support this?"

That was the survey, so I want you to know that. If you see a survey of X

number of people are approving the pipeline, done by a survey company, that's the kind of survey it was.

A person doing the survey did not know anything except that it would be safer, that it would create jobs. She didn't know what was going through it. She was well meaning. She probably needed the job.

But she didn't get correct information. She just gave a little tiny bit of information before she asked me if I could support it.

Then I got online. I did some research, called some friends.

That's why I came today. Thank you.

FACILITATOR: Thank you. Anyone else?

If you've already spoken and you'd like to say words further, just -- say your name and spell it.

MS. DARLENE HAUS: It's Darlene, D-A-R-L-E-N-E, Haus, H-A-U-S.

I'm from St. Michael, Wright county, and I know I didn't use nearly seven

minutes.

What I didn't talk about was pipeline abandonment. And that is a big concern to me, and I think that before any new permits are issued, they should clean up the old one. Even if it's going to have to end up going on the existing route.

I don't support any of the routes, especially the ones that go through the most pristine native lands.

And I also have great faith in American ingenuity and American drive, and men of your stature who have taken these high risk, difficult, ass-busting jobs, you have the potential to do all kinds of incredible other jobs. There will not be a shortage of jobs. You have so many multiple skillsets.

And as Americans, we have to think about who's downstream from Minnesota.

We're all downstream, and we have the capacity now -- okay, we might have some transitional time but it's going to have to happen sooner or later. We have to get to a cleaner standard of living, all of us. We do.

We love our trucks, our cars, our

boats, our snowmobiles, our jet skis. I don't have any of those things. It blows my mind how many people have cabins and second homes and second properties and how much fossil fuel it takes to get to these places.

Maybe we all need to reexamine how much fuel we use mindlessly, and maybe we need to reexamine this fear of not having jobs, pipefitters, welders, we're going to need you guys in every sector.

I think instead of arguing, we try to find some more common ground and start to realize how can you sleep at night when you're part of something that has the potential to cause such catastrophic destruction? Can you really in your deepest heart of hearts support that kind of filthy, dirty, and everything that's associated with it? The social, the racial injustices, can you really -- how would you liked that, if --

You know, like, I'm a farmer and I gotta pay extra every year on my insurance for agricultural drift. And we have not sprayed any chemicals on my farm for over 70 years, but I can't get insurance unless I pay

for agricultural drift.

And I also have to watch where any of my manure goes because it might pollute a local little glacial pothole, little aquifer. So I have to watch and I'm bound by covenants on my land in order to receive a better tax benefit for being agricultural, because you're not taxed at that high residential use when you're a farmer, but you have to abide by covenants that ensure that your going to use clean soil practices.

By God, if somebody came up with an electric tractor I would be the first one to mortgage the farm to get one.

So thank you.

FACILITATOR: I just want to remind everyone to focus on the issues and not on people, and individual people and each other's comments, okay. Any other comments?

MS. MARLENE HAIDER: Again, Marlene Haider, M-A-R-L-E-N-E, H-A-I-D-E-R.

I want to first say that I just want to comment on there's been talk about wind and the cost of energy and how we can't afford it, yet I'm going to quote from -- I

gotta get the name right -- Ben Fowke, F-O-W-K-E, he's the Excel -- Excel CEO. He said wind energy is now cheaper than fossil fuel alternatives, and I know we're driving cars but we can get electric cars.

I think that overall the climate change will be a factor, the water factor, but how about the food factor? I've heard comments that say we need to produce as much food now, in the next 33 years, so between now and 2050, as we've produced in the last 10,000.

And so while we think that we need all this energy, we also have to think about if we have climate change and climate change disruption, either droughts, floods, how are we going to manage that?

And we can't eat oil. I know we need the oil for the farming and everything, but we do have to not make it easier to use some of the dirtiest oil on the plant.

FACILITATOR: Yes, sir.

Say and spell your name again, please.

MR. WILLIAM HAIDER: I'm William Haider, B-I-L-L, H-A-I-D-E-R. And I'm from

Sauk Rapids.

And somebody mentioned cars, we drive cars, we use gasoline, and how we need this oil, and I'd like to point out that already driving an electric car is cheaper per mile than driving a gasoline car, and significantly so.

The reason everybody isn't driving it -- driving them, why I'm not driving one, is because the batteries do not produce the wind that most people need for their lifestyle. They're coming, GM is introducing the Bolt this year, which actually gets 230 miles on a charge, so it's coming, and electric tractors will be here soon.

Trucks, in a lot of uses it's cheaper to use an electric battery than a diesel engine for long-range transfer.

So those things are coming.

Thank you.

FACILITATOR: Yes.

MS. LORI SCHOTT: Lori Schott, L-O-R-I, S-C-H-O-T-T.

I appreciate everybody's opinions here. Like I said, I come from a

very heavily agricultural based community and background, and my family now is in the pipeline industry. But I'm going to be a testimony right here and now to the things that I think are misinformation.

When they say Enbridge is going after tax base in Minnesota, that's not true. The evaluation was done incorrectly by the state, so they're just making it right. If my tax bill was wrong, I'd be the first person in the courthouse wanting to rectify it.

The other things I want to say is our little company started at our farm. We produce cattle and hay, and my husband said, look -- came home one day because he was in the construction business and pipelines and said, "Let's start a pipeline business. I'm really encouraged to do it." So we took a leap of faith with our little local bank down here in Milaca and they gave us a chance.

From that, we took a leap of faith, and we are in the state of Minnesota. We talked about leaving, going down south where other companies were. We stayed in Minnesota because of Enbridge, exclusively.

Yes, we do work in renewables in Iowa and other places, but Enbridge has been such a great client for us and they've supported us.

We competed to be a preferred provider for Enbridge out of large conglomerations that are exchanged on the New York Stock Exchange and every else, and we're one of the three providers. They picked us, kind of like the Sally Fields award acceptance speech, they like us, they really like us. But we like their philosophy, too.

My husband and I were raised grass roots, down earth, tell it as it is people, and they're the same way. We wouldn't work for them if they weren't. I have sat there and personally seen them go through these communities. I have been in Canada where we worked on pipelines that cross into the United States, where people came up to me and said, "We're so happy you're here giving back to the community. The parks have a chance. Our tax bases are better."

I've seen them go out to work at Bentleyville and volunteer. I've seen them go

out to the United Way and give back to these communities. I have sat at (indiscernible) meetings that have just done nothing but drive home that they want to leave these communities in a better situation than when they came to start this construction.

I have seen them stop construction projects to go around and nesting of birds that are migratory and after they fled their hatch and come back and construct pipelines.

So I get pretty vigilant about it, because I have such an adoration for a company that big that can appreciate our little business in downtown Milaca, Minnesota that's giving jobs to this state.

Thank you.

FACILITATOR: All comments are welcome. All your views are welcome. The focus of these meetings of course is on the Draft EIS.

And I know that it's also an opportunity for you to be able to dialogue with each other.

I just want to remind you that

the focus for the State is on comments around the Draft EIS. Anybody in particular who has comments that are substantively about how to make this report better, we welcome those in particular, but all comments are welcome.

Anybody else have a comment?

MS. ELLEN HADLEY: Ellen, E-L-L-E-N, Hadley, H-A-D-L-E-Y.

I'd like to comment on the DEIS, about the section about abandonment. I think abandoning Line 3 and leaving it in the ground as is Enbridge's proposal -- I'm glad to hear that Enbridge is so concerned about safety in Milaca, and we can all see why they would want to join with your company, Lori, because you're just an awesome leader of your company.

But Enbridge wanting to abandon Line 3 all across hundreds of miles of northern Minnesota and leave it in the ground is absolutely deplorable.

My husband and I bought two homes in our lifetimes, and we had fuel oil tanks in the ground at both of them. We had to have them professionally removed and have the soil professionally removed and scrubbed in order to

sell one home and move to the other. It's a huge, huge expense.

Not only is their Line 3 across Minnesota, but also all the other lines that run parallel to that along Highway 2. There are I think five or make six lines that run across, Line 1, 2, 3, 67, and -- they have several different numbers.

The new route is actually setting a precedent of having all of those lines move through the new route. The new route, as I understand it, would be 750 feet wide swath of forestland cut. There could be lots of nesting birds in that area, 370 miles across Minnesota, and 750 feet wide.

Some of you have probably carried a football and run from one end zone to another, I never have, that's a really long distance, two and a half football fields wide, that they want cleared.

The EIS states they would need to build 128 new roads to get in to that land, to construct the pipeline. That's a lot of construction jobs, and I really value our excellent construction workers here in

Minnesota. Thank you for all the great construction projects that you have done.

I am a union member myself as a teacher in Minnesota. So I really understand the valve of our unions, and I really respect your work.

But the abandonment, I totally agree needs a whole additional EIS. Because this is the precedent of not just abandoning Line 3 across Highway 2, which is now weeping oil. So many structural anomalies that it is actually weeping. But all those other lines would be moved into this other route as well.

That doesn't make any sense to me.

And over the weekend, if any of you like to watch movies, anybody here like movies about horses, like I do, our cars, I love cars, there's a really great movie called "Seabiscuit," and in -- I used to show it to my students to show my kids how suddenly sometimes you can realize you're in a whole different world. Something happens where you realize, oh, my gosh, this is a new era.

In the beginning of that movie

there's a guy played by one of the Bridges brothers who's working at a bicycle shop in New York City and he can't stand it, so he moves to San Francisco and opens a bicycle shop.

Who in San Francisco would ride a bicycle up and down those hills? It's worse than Duluth. So he falls asleep in front of his store because he has no customers.

When he wakes up, there's an old Stanley Steamer pulled right up to him, and it's blowing steam and it's like something's wrong with his car. And the rich owner gets out and says, "Can you fix it?" And he goes, "Yeah."

He takes it all apart into a million pieces, has no idea what a car even hardly is and then suddenly puts it back together again and realizes his life as a bicycle manufacturer is over. He needs to go into the car industry.

Meanwhile, there's a cowboy out riding his horse, and he's taking down wild horses, and he suddenly comes upon a barbed wire fence, and he realizes his cowboy days are over. He's got to do something different with

horses.

Those two get together -- it's a great movie, "Seabiscuit" -- but right at those moments their world changes.

Our world is changing so fast. And our pipefitters and our wonderful construction guys are caught in a really scary time. I understand that. And I'm sorry, the fossil fuel industry and the industrial age was awesome. We all had a great time. Loved those '57 Chevies, the Mustangs, and all that.

But we're in a new time, and we have to switch faster. I know that doesn't pertain to the EIS, sorry.

Thank you. So go see Seabiscuit, watch it on Netflix, and imagine for yourself what new career could you create in this time?

Thank you.

FACILITATOR: Sir.

MR. JAMES HART: My name is James Hart, J-A-M-E-S, H-A-R-T.

I have been a little concerned about the comments on the automobiles. I just want to let you know that sometime about 1988, '89, I had a Honda, got 30-miles to the

gallon, and I was real proud of that. And the year 2000, at 175,000 miles, I sold it to my cleaning lady whose husband used it for a winter beater, and I don't know for how long after that.

But I bought the first Honda Insight, and this is one year before the first Prius, and I got about 40 miles to the gallon. And as you know, it was a first attempt at a hybrid. And then in 2012, I bought a Honda -- or a Prius, and I'm now getting about 47 to 48 miles to the gallon.

I think that you need to pay attention, that the, at least for the present time, I believe that the current goals for new automobile construction mileage is up in the 50s. I think it's about 54, which is a goal we're supposed to hit at sometime in the near future.

And then my final observation on this is that if you read the stock page on the papers yesterday, you might have seen what happened to Tesla. I think it went up 75 percent. I think we need to bear in mind in terms of our projections on usage of fossil

fuel, and particularly of petroleum, that this is changing a great deal.

There is more public transportation being built, as you know because we just had two light rail installations in the last seven or eight years in Minneapolis, and just we are -- I think as a nation, we are just backpedaling on petroleum consumption. We want cars that get way more milage than the old -- my first car was a 1952 Chevy, and it got 20 miles to the gallon, and now look where we are in 2017.

So my point would be, one, is that the projections I think should more accurate when you reflect the projected petroleum usage in the next couple of decades before we think about building another pipeline to bring Canadian oil to China.

FACILITATOR: Thank you.

Yes.

MS. JUDI HARMS: My name is Judy Harms, J-U-D-I, H-A-R-M-S.

And I just have a question. I want to be sure I understand it correctly, because I was really totally unaware of the --

what is occurring to these women. Did I understand this right that thousands of women have disappeared where the pipeline workers have been putting the pipeline through? I have not heard that ever on the news, and where can I go to read on the Internet or find out something more about that? How many did you say there were that have disappeared?

MS. ELLEN HADLEY: 4,000. It's a recent report in "The Guardian."

MS. JUDI HARMS: Well 4,000 women disappearing. That is more people than were killed in the World Trade Center, and why don't we know more about that?

MS. ELLEN HADLEY: Because it's in Canada and it's indigenous women.

MS. JUDI HARMS: That would sound like cereal killers and mass murders. But 4,000 women who suddenly disappear where they don't know them. So if I'm looking for more information on that, you said, what, "The Guardian"?

MS. ELLEN HADLEY: Mm-mm.

MS. JUDI HARMS: What is "The Guardian"?

MS. ELLEN HADLEY: It's a news agency. I can talk to you later.

MS. JUDI HARMS: We have to leave, but I just want to know, if I got on the Internet, where would I find it?

MS. ELLEN HADLEY: You can Google, missing and murdered indigenous women. Missing and murdered indigenous women.

MS. JUDI HARMS: Okay, and I'm so surprised that the news -- I do quite regularly watch the news, and I'm so surprised that CNN and MSNBC and all those news agencies are not getting us information.

MS. ELLEN HADLEY: I know. I couldn't agree more.

FACILITATOR: So maybe it would be better if you two can step over there and have this conversation. Thanks.

Thank you.

I know dialogue is valuable. Unfortunately, the set up of this meeting isn't ideal for that. I do think we've been having a fair amount of dialogue and back and forth within the format and the structure that we have here.

Do we have any other comments?

Well, I want to thank everyone for all of your comments, particularly comments about the DEIS are going to be really helpful to the State as they finalized, and I hope you have a wonderful afternoon.

Thanks.

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DEIS MEETINGS - 14-916 15-137

MILACA - JUNE 16, 2017 - 6:00

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: CN-14-916

OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137

OAH DOCKET NO: 65-2500-33377

Phoenix Hotel & Banquet Center
210 MN 23
Milaca, Minnesota

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FACILITATOR: Okay. Good evening, everyone. Welcome to the Line 3 Draft Environmental Impact Statement public meeting hosted by the Commerce Department of the State of Minnesota.

So this is going to be an opportunity for oral public comments. Before we begin, I want to hand it over to Jamie MacAlister, who's the project director from the Department of Commerce.

MS. JAMIE MACALISTER: Good evening, everyone. I'm Jamie MacAlister with the Minnesota Department of Commerce.

Is that any better? Oh, there we go. I think somebody just made an adjustment for me. Great.

Well, thank you for coming out tonight. And we're going to try and not keep you from other activities this evening, but we are happy to have you come and share your comments with us on the Draft Environmental Impact Statement.

As you know, the Minnesota Public Utilities Commission will be making two decisions on this project. First, they will need to determine whether or not to issue a certificate of need for this project. The second decision will be whether or not to issue a route permit for the project.

You've had a chance to walk through the room and visit the boards. Hopefully you've also spoken with other agency staff this evening. We have folks here from the Minnesota Department of Natural Resources, the Minnesota Pollution Control Agency, the Minnesota Public Utilities Commission, as well as staff from Commerce.

If you've been following this project at all, you know that there's a lot of process involved. About a year ago we were out along the route alternatives hosting scoping meetings. The comments that we received during scoping were then used to develop the Draft Environmental Impact Statement that you're reviewing today.

After we host these 22 meetings on the Draft EIS, the Department of Commerce will prepare a final Environmental Impact Statement, and this whole process will move into the contested case hearing. The contested case hearings are a continuation of this process. Those hearings will be administered by a law judge, and you will have an opportunity at that point to advocate or oppose the project, advocate for a route. And you will have an opportunity to discuss the project with Enbridge's subject matter experts.

Once those hearings are over, the judge will prepare a report, and all of that information that has been gathered during these meetings, the final EIS, and the contested case hearing will all be summarized and put into a report and submitted to the Minnesota Public Utilities Commission, and all of that information will then be used by them to make a decision on this project. It's expected that a decision will be made sometime in the spring of 2018.

So tonight we are asking you to provide us with comments on the Draft Environmental Impact Statement. Specifically, we're interested in whether or not there is information missing from the document that we need to include for the final, we would like to know if the EIS is unclear, or if there are other ways that the document would be improved.

So this evening you can provide us with your oral comments, you may submit comments in writing and stick them in the comment box, or you can email them or send them in to me at your leisure, so long as they are postmarked by July 10th, 2017.

All of the comments that we receive

will be available online. They'll be posted on the Department of Commerce's Line 3 website. They will also be posted to the Public Utilities Commission eDocket they use for these projects, as well as all of the oral transcripts from the meetings. So we are visibly working on compiling any comments that we have received to date and getting the transcripts posted so you will be able to see those comments and the comments of your neighbors.

We also want to remind everyone that the comments are all viewed equally. We do not -- it is not a vote. It's not how many comments we receive for or against a project. It does not matter whether or not your comment is presented orally at one of these meetings or whether or not you submit them in writing. All -- all of the comments are considered equally when they come in to us.

Furthermore, the Draft EIS is not a decision-making document. It is the document that is used to help inform the decision makers on this project.

So, with that, I'm going to turn this back over to Stacy. She'll run through a few elements about the meeting.

And, again, thank you very much for your time and for coming this evening.

FACILITATOR: Thank you, Jamie.

So my name is Stacy Smith, and I am your moderator for this meeting. So my role is really to help make sure that everybody gets a chance to share their perspectives and to do so in a way that makes people feel welcome and comfortable. So that's what we're going to do.

And for that I have -- we have a couple of ground rules that we ask you to follow. So right now we don't have that many names of people who have signed up to speak. I'll start by reading the names from the cards. And then once we've gone through those comments, I'll take people's comments as you raise your hands. And we can go as long as the time allows, in terms of having comments. But in order to make sure that people really all get chances to speak, we will limit comments to seven minutes or less. All right? If we have additional time after everybody has spoken and people have additional things they'd like to say, we can go around for a second round. But we want to make sure to limit the comments to make sure that everybody gets a chance to speak.

We ask you while other people are speaking not to interrupt. If you'd like to show affirmation for something that you're hearing, you like what you're hearing, please hold your applause or your affirmation until after they've finished their remarks so that we don't have a lot of interruptions and we don't take away from their time.

After someone is finished speaking, if you'd like to show your support, feel free to do that by applauding. If you don't like what somebody said, we ask you to keep that to yourself, because we really want people to feel safe and comfortable sharing their view. This is all about getting all the views out, all the perspectives out, and particularly any comments you have about how to improve this Draft Environmental Impact Statement.

So we have different perspectives in the room. People come from different experiences. We want everyone to be treated with respect. So, please, when you're making comments, you can direct them towards the issues at hand, the components of the draft impact statement; you can talk about organizations or entities, but do not direct your comments or speak about individuals. All right?

And that does include other individuals who've made comments. So if you want to refer to something that has been raised by another commenter, focus on the comment, not on the commenter. Okay? Please don't call out any particular person and say, oh, what you said. Focus on the issue. This issue was raised; I'd like to address that issue. Okay?

So the state agency's role at this point is to be listeners. So if the state agency representatives can raise their hands. They're all back here in the back of the room. They're the ones you were talking to as you went around to the posters. So their role now is really to listen; and it's your turn, your chance to speak.

Yeah, my last point is that we do need to end on time for the respect of the space. But we will take comments -- as many comments as people have up until that time within our time limits.

So when I call your name, whether it's when I call your name on the card or when I point, if you raise your hand, we have a few staff members who will come around with microphones. They'll bring the microphones to you. You don't have to come up. You can stand if you'd like. You can stay sitting if you'd like. The microphones are

a little bit tricky, but it's important to adjust the microphone so that everybody can hear you, and particularly our court reporter up here in the front. She's going to be documenting all of the statements that you make. So speak slowly, speak clearly. We may have to just interrupt and say we can't hear you, can you adjust the microphone. So I hope you'll forgive us if we do that. We just want to make sure that your comments are captured for the record.

When it's your turn to speak, we'll ask you to start by stating your name and spelling your name. And that's also for the court reporter, for the record. And if you have prepared remarks, things that you're reading that you've written down, if you'd like to give those to us afterward, after you do your statement, that's really helpful for the court reporter as well, to make sure that she's captured everything you've said as accurately as possible. Okay?

So, with that, we will go to the timer. So we're going to have this timer here on the screen, and it's just going to count time. We're going to ask you to keep your comments to seven minutes or less. When you get to a little

before seven minutes, I'll stand up and I'll give you a little signal, if you weren't watching the timer, that your time is almost up. When we get to seven minutes, I will ask you to conclude your remarks.

Okay. So I'll start with the names I have on the cards. And, again, forgive me if I get your name -- if I pronounce your name wrong.

Gertrude Lambert? If you can raise your hand. Okay. And one of our -- she's up here. Leslie will bring you the microphone. And the timer will start after you spell your name.

MS. GERTRUDE LAMBERT: It's okay to start it. My name is Gertrude Lambert. G-E-R-T-R-U-D-E. L-A-M-B-E-R-T. I just learned in The Mille Lacs Messenger that Mille Lacs County was in the route for a pipeline. I thought it was still further up north. So I was very concerned and wanted to be here tonight.

I didn't know it was just going to be the -- from the state's part. I thought maybe it would be some Enbridge corporation folks here too, because some of my -- basically those are my questions. So I'll say the first one.

I did take time earlier today to get

on the Internet and just find out a little bit more about the spills and violations of the Enbridge pipelines in the United States. And this is what I learned: Enbridge's own report back in 2010 was that there were 804 spills occurred between 1999 and 2010. 161,745 barrels of crude oil spilled into the environment. In July in 2002, 6,000 barrels near Cohasset, Minnesota spilled. In 2006, 67 reportable spills of 5,663 barrels. This is Minnesota. In 2007, 65 spills of 13,777 barrels of crude oil. November of 2007 two workers were killed in a fire at Clearbrook, Minnesota. The pipe leaked two weeks before any repair was done.

January 2007 pipeline between Superior, Wisconsin and Whitewater, Wisconsin cracked open, a spill of 50,000 gallons of crude oil on farmland and drainage ditches. The same pipeline was hit by a construction crew in Rusk County, spilling 201,000 gallons of crude oil. Some of that oil filled a hole 20 feet deep and contaminated the local water table.

2009 Enbridge paid $1.1 million to settle lawsuits by the State of Wisconsin for 545 environmental violations affecting streams and wetlands throughout various watersheds.

January 2010 a line ruptured near Neche, N-E-C-H-E, North Dakota, releasing 3,784 barrels of crude oil. July 2010 Kalamazoo River oil spill, more than 1 million gallons of oil in southwest Michigan -- spilled more than 1 million gallons of oil in southwest Michigan, causing the largest inland spill in Midwest history. 7 million -- excuse me. The cost of the cleanup was $36.7 million as of March 2013. Enbridge knew of a defect in the pipeline five years before it burst.

And the last one I have is September 2010, a rupture near Romeoville, Illinois released approximately 7,500 barrels of oil. And this excludes any spills in Canada.

So one of the questions I had was -- of the Enbridge corporate management boards: How close do any of them live to a pipeline?

And there was reference in the brochure that came out about how would Minnesota benefit. And one of them was that once the project is complete, Enbridge will pay $19.5 million in property tax that will benefit communities along the pipeline. That will never cover the cost of cleanup.

Thank you.

FACILITATOR: Thank you. Thank you. Next is John Andrew Boyd. Am I getting that right? John Andrew Boyt? Is he here?

MR. JOHN ANDREW BOGGS: How do you spell that? How do you spell the last name?

FACILITATOR: Well, it's not entirely clear from the writing on here. B -- I think it's B-O --

MR. JOHN ANDREW BOGGS: Yeah, that's me.

FACILITATOR: Is that you? Okay. Thank you. Sorry about that.

If you could start by saying and spelling your name. Thanks.

MR. JOHN ANDREW BOGGS: I seen that in that report there that we might as well just close the thing down and shove it off to the Canadian border -- putting oil in that matter. But I don't really have any comments to make on the sources of energy. That is another discussion.

And those who oppose the use of this type of energy, how many have converted to electric cars, that sort of thing? I don't know how you keep warm at the house anymore. But if you have made personal decisions to alter your lifestyle for this

lack of oil -- nonuse of oil, oil out of a pipeline to satisfy your energy needs for the foreseeable future, more power to you.

But this is -- this pipeline I totally support; and there's a couple reasons, called railroads and ground transportation in the form of trucks. Pipelines are at least covered by federal inspections, state inspections, but I'm not so sure that the rail lines are really -- have really reasonable good inspection controls itself. So I see a need for this source of energy to be needed for the end of the -- for the foreseeable future.

And I've been impacted personally by things called strip mining, and I opposed that. This -- there's so many pipelines crisscrossing Minnesota that I don't know how many are as defective as the description just given there. But I'm sure we at least do inspections. Use something we already have, what we're living with.

And the nice thing is I don't have that many more years to be concerned about this situation. I've been through my lifetime a number of things that were not so good for me personally and the country itself. So I really like the pipeline, not just because -- it's not personal

reasons; it's just this is what we have. And what I see being developed, it sounds good, but it doesn't seem to serve a lot of people over a long -- a broad specter of the United States. It's a bit of this and that, and everything from personal generators to -- what were we talking about just a few minutes ago about? Geothermal. And this is great. And Iceland and other places that really benefit. Their energy supply's clean, it's great. I wish the hell we had it here, and I would like to see it develop. We walk in on one of their energy-producing stations, you could eat off the floor. Just beautifully, clean energy. And it's sustainable, and it's managed right. It's one of the better things we could have as a source.

Okay. That's enough.

FACILITATOR: Thank you. Sir, can I ask you to -- sir, can I ask you to say and spell your name for the record, if you don't mind.

MR. JOHN ANDREW BOGGS: Am I on? Yes. My name is John Andrew Boggs, B-O-G-G-S.

FACILITATOR: Thank you.

MR. JOHN ANDREW BOGGS: And I'm from West --

FACILITATOR: Thank you.

MR. JOHN ANDREW BOGGS: -- by god, Virginia.

FACILITATOR: Mary Ann Straka? Mary Ann's over here. Leslie will bring you the microphone.

If you would start by saying and spelling your name. Thanks.

MS. MARY ANN STRAKA: Hi, my name is Mary Ann Straka. M-A-R-Y. A-N-N. S-T-R-A-K-A. And I mostly have some questions that I would like to know the answers to.

As I understand, this will be tar sand oil that doesn't just flow through that pipe. And I want to know for sure what the names of the chemicals are that they're mixing with the tar sands to get it to flow.

My understanding is that it's Benzine and Tulazine (phonetic), which are cancer causing, to help heat up the tar so that it will flow. And pumping wells, how far apart? How many acres will be needed for pumping stations? How large is the pipe, and how far apart are these wells going to be? How frequent are the shutoff valves? What pipe using -- what pipe are they going to use? I've heard rumors that up north in North Dakota they are

using pipes that have come from China and it's full of asbestos.

And if you have any CDs or anything to answer these questions, I'll be glad to take those. And I would like a copy of the EIS study.

Thank you.

FACILITATOR: Thank you.

Of all those, the one thing I can answer is there are copies of the EIS study. They're on CDs or on flash drives. So you're welcome to -- anyone is welcome to take those home.

Lori Schott?

MS. LORI SCHOTT: Hi, everybody. I'm Lori Schott. L-O-R-I. S-C-H-O-T-T.

I'm here tonight as a resident of Mille Lacs County and Milaca. My husband and I, who's sitting here tonight, own Avery Pipeline Services. Our company provides construction management, pipeline inspection, environmental and safety personnel for pipeline projects, wind projects, and natural gas projects in the Upper Midwest. And I'm extremely proud that our little business, based here in Milaca, Minnesota calls Enbridge one of our clients.

I'm here today to stand up for the

pipeline industry. I want to be that voice. We want to be that voice, because we've worked for Enbridge and we support Enbridge's Line 3 project.

I'm here today to support our business. I'm here today to support our employees, who rely on employment such as these pipeline projects that are occurring in our state. And I'm here to encourage the Minnesota Department of Commerce to continue moving forward with this process.

My family moved to Minnesota from Colorado in 1997. You see, I married a pipeliner. We were hooked onto that RV, we came up, thought we were going to put in natural gas pipeline, and we decided to call Minnesota home. My family's been here for over 20 years. Our kids attended school here in Milaca. They were involved in 4H and rodeo in this community. And we have turned ourselves into starting a small business on our farm in north Milaca that now does work for a large energy company, Enbridge.

Avery Pipeline has been a viable presence in this community, and I'm proud of that. Avery and I both believe that if you give, it comes back to you threefold. And through our work with

Enbridge, we're allowed to do that. We've given to 4H and FFA. Our company employs local members of this community. And in the last six years we have seen some of our employees move from Texas and Oklahoma and Idaho to work on projects specifically related to Enbridge Energy. Enbridge has given our tiny little company in downtown Milaca a chance.

You know, we talk here tonight, but we construct pipelines, everybody in this industry, because of consumer demand. We are the end users, us here, not Enbridge. They're meeting a need because of what we're asking for. So we need to keep that in mind; that every day, 24 hours, 7 days a week, 365 days a year Enbridge is meeting that need by supplying over 80 percent of Minnesota and 70 percent of the Upper Midwest refined capacity so we can get in our cars and drive and fly out of Minneapolis airport.

There are over 2.4 million miles of pipeline that crisscrosses the United States. And while we strive -- and even in our business as Avery Pipeline, we support wind energy projects in Iowa and in Colorado, we're still striving to find a nice energy balance, and there's room at the table for all types of energy usage. But there are more than

263 million vehicles on the road today using gas and diesel, and these are fueled by pipelines.

With the vast amount of pipelines running underneath our feet, underneath our rivers, throughout our towns, these pipelines have statistically proven to deliver these products safely 99.9 percent of the time.

Enbridge is a leader in energy transportation. We do stub our toe. There are spills and things that come along the way. But it's meeting a need that we're all demanding.

We hear the negative media and activists talking about antipipeline and think the project such as Line 3 should never be structured, while in truth there is no plan on the table right now for an infrastructure that could support what our reliance is on oil petroleum products. But we do as Avery Pipeline support all venues.

Avery Pipeline also provides services in the renewable sector, as I said, the wind farms in Iowa, some in Nebraska and Colorado; but they're also seeing push-backs in permitting land ownership and things. But this is an interesting industry, and we're going to need to have all venues to be able to meet the needs of the United States.

In closing, Avery Pipeline strongly supports the Line 3 project as it's being constructed to replace a line that was constructed in 1960. Through the review process and over thousands of pages of documentation, experts in environmental and safety aspects have been taken into consideration for this Draft Environmental Impact Statement. Consideration for this project needs to be taken into account that pipeline safety and environmental protection is the main concern, and this pipeline makes sense.

If not utilizing the pipeline, oil will be moved via trucks and trains, which it is documented in the Draft Environmental Impact Statement is the least safest mode of transportation.

I would also like the Department of Commerce to reconsider their sections on jobs. If these are temporary jobs, my husband's had one for 20 years in this state working in the pipeline industry.

North Dakota has approved pipeline construction. Wisconsin has approved pipeline construction. And now it's Minnesota's turn to take suit. Provide our small business, located two

blocks away, some assurance that the legislative process in Minnesota will keep this project moving forward.

Thank you.

FACILITATOR: Thank you.

Christina Thurston. Christina's over here.

If you can start by saying and spelling your name. Thanks.

MS. CHRISTINA THURSTON: My name is Christina Thurston. That's C-H-R-I-S-T-I-N-A, T-H-U-R-S-T-O-N. And I'm a resident of Rowena Township. I'd like to preface what I say with I'm a believer that fossil fuels are -- they're on the way out as a source of energy. We have to commit to renewables. That's the future.

I am happy that pipelines have provided jobs for our local business. I think that's wonderful. But how many people, really? When you weigh it against the risk of the pristine waters of Minnesota, I feel it's just too great. This particular type of oil is very dirty, as you have said. It has lots of chemicals in it used in the extraction process that are extremely toxic. Extremely toxic. And I feel that running these

pipelines under rivers, under lakes, just to me makes no sense.

What I would like to see, though, we're not talking -- I understand your comments. You wanted comments towards the improvement of the Environmental Impact Statement. What I -- I would like to see is a more thorough spill analysis. I would like -- for instance, looking at this graph here, risk to transport comparing pipeline to rail to trucks, I feel it's a bit misleading, because you see, yes, trucks have more incidents, but the size of the spill is minute compared to fewer incidents but larger spills, as Ms. Lambert just explained to us, by the pipeline. It's like comparing, you know, to a child -- how many have done this before to a kid, you know, would you rather have 500 pennies or 50 $10 bills? You know, it's the same comparison. But the graph here shows -- if you look at it and glance at it and don't pay attention to what the details of the graph are, it's misleading, because it makes it like trucking is way worse than a pipeline.

So what I would like to see is some kind of accountability in who this pipeline serves. I understand it's a Canadian company, is that right,

whose oil is being transported? I'm not exactly sure the name. Who does it serve? And I would like to see who is served. I would like to have them pay for reuse of the pipeline. I would like to have them be accountable for cleaning up the -- along with Enbridge, the abandoned pipelines. And also fees toward monitoring of our water systems and also mitigation, of course, of any spills.

As we have heard, the track record of Enbridge is not good, and I just feel that the risk to the pristine Minnesota waters and to the wells and to people downstream, which we're talking millions of people, we're talking going under the Mississippi River, we're talking about going under perhaps the Run River should that route be chosen, are just far too great for an energy source that is on its way out.

Do we really need to extract the very last drop? And who does that money go to? It goes towards the corporations. And is this oil -- I know that it was expressed that this oil benefits Minnesotans. But, really, does this product come back to the state of Minnesota in a usable form in gasoline or diesel that we use? I want to know the answer to that question too.

Thank you.

FACILITATOR: Thank you.

So that's actually all the cards that we have. So at this point, if there are others who would like to make a public comment, if you raise your hand. Sir.

Stephano, if you can bring him the microphone.

And if you start by telling us your name -- back there, Stephano -- by telling us your name and spelling it for us. Thank you.

MR. HARLEY HAGGEN: Thank you. My name is H-A-R-L-E-Y. Last name is H-A-G-G-E-N. I'll be very brief. I didn't come with a prepared document. I just want to comment a little bit on what Lori Schott has said, and I'll let her speak to the safety of the pipelines. But we have two things involved. Point A we have the crude oil out in North Dakota and Canada, and then point B we have the investor cities in Chicago and in Detroit. We need to move the product from point A to point B, and the pipeline is certainly the best way to do it. And they're going to replace an aging pipeline that needs replacing with all the new safety factors in it.

Also, historically, we are now energy independent. We can go back probably 20 years ago. I've been in the oil business all my life. But, anyway, we had gas lines, we had $4 gas, the oil embargo, and we made the unfriendly bargaining of powers that controlled all that. Now we have the capacity in our own country to do all this. So thank you for your -- two minutes of your time.

FACILITATOR: Thank you.

Is there another -- yes, sir.

MR. CHARLES LIPPERT: Good evening. My name is Charles Lippert. C-H-A-R-L-E-S. L-I-P-P-E-R-T.

I have reviewed the draft impact -- Environmental Impact Statement. And overall I have found the information very user friendly, compared to other EIS and DEIS. However, there is one area that I'm noticing that is missing, and that is the cumulative impact of potential route changes up to either a new corridor of the system preferred route or the system alternative 4 or the other system alternatives that are listed.

If our pipeline ages and we need to replace them within the next 20 to 30 years and we reroute lines 1, 2, 4, and 13 and others along the

new corridor, as long as we don't have that cumulative impact information, we really don't have the correct picture of what our future pipeline future may look like.

And I'd like to close my comments with that. Thank you.

FACILITATOR: Thank you.

Other comments?

MR. ANDY PEARSON: Thank you. My name is Andy Pearson. A-N-D-Y. P-E-A-R-S-O-N. And I want to make a couple of specific points about the DEIS, which in a lot of ways is a very good document. It has a lot of information that we maybe didn't have before.

One of the pieces that was the most shocking to me to see was that the climate change social impact of the project is projected to be, over 30 years, up to $287 billion, which is an awfully staggering number. However, pipelines have been currently operating that are -- have been in the ground for over 60 years; and I think that that number needs to be extended in terms of studying the long-term impacts, to cover the full length of how long some of these pipelines have been operating. So I wanted to make that point.

I also want to say specifically the analysis of the alternatives, the truck and the rail alternatives, assumes that out of Clearbrook, Minnesota there is going to be takeaway capacity dropping south to the Minnesota refineries on Minnesota pipeline -- the Koch Brothers operate the pipeline network that serves Twin Cities refineries -- equivalent to the full takeaway capacity of those pipelines. And I don't believe that that's an accurate assumption, and I want to push back against it. And I would encourage the DOC to analyze that more fully, because there are several pipelines that are capable of delivering that oil right now.

Among other pipelines that Enbridge has, there's 1, 2, 4, and the Alberta Clipper Line 67. And, in particular, Line 4 and 67 are capable of carrying the type of heavy crude, the diluted bitumen, that the Minnesota pipelines, the Koch refineries, take and take away. And this is relevant because the alternatives that have been proposed in the document all assume that any potential project needs to supply the full capacity of those pipelines going down to the Twin Cities.

I haven't seen information that

suggests that Line 3 is currently doing that or that it would need to do that in any building scenario, even if the pipeline is to be constructed in a different location or in the present location.

So I would encourage the final version of the DEIS to examine what the takeaway needs are and how else it could be supplied out of Clearbrook for the Twin Cities area refineries and not make an automatic assumption that Line 3 has to provide all of that. I believe it does not.

The other thing is I want to read a small section of the DEIS about the minimum lifespan of a pipeline. It says, The Applicant anticipates that the physical life of the pipeline, i.e., the number of years the pipeline will be capable of transporting crude oil, would be indefinite, given appropriate construction, maintenance, and integrity systems.

Now, I know that pipelines can last a long time, and we have pipelines in Minnesota that have lasted a long time. But I don't think it's an exaggeration to say that nothing is indefinite, nothing is infinite, nothing is going to keep being able to be repaired forever. And I would encourage and expect that a final version of this document

would dig into that a little bit more. What does indefinite actually mean here? What's the maximum lifespan we can assume from a project? When are we going to have to start looking at the eventual cleanup and potential removal cost of this project, and what generation is that going to fall on? Because it's going to fall on somebody. It's going to fall on somebody. And in the document it does list the projected pipeline removal cost, if Enbridge was to do it, at $1.28 billion. So I don't think it's unfair to ask what generation this cost will be falling on. We need to know what indefinite means.

There's too many uncertainties in the document where Enbridge is allowed to get away with terms like indefinite, when, in fact, there are numbers, there is data, there is historical precedent in Minnesota and elsewhere for how long these things can last, and we can make better decisions if we have the specifics.

Thank you.

FACILITATOR: Thank you.

Other comments?

MS. NICOLETTE SLAGLE: Hi. Nicolette Slagle. N-I-C-O-L-E-T-T-E. S-L-A-G-L-E. I'm with

Honor the Earth. I'm their research director. And I have a couple of comments related to the response information within the DEIS.

So a little bit about leak detection. Pipeline operators are not required to have electronic leak detection systems. Instead, they use a system of weights and balances to determine if their system is losing volume. Part of this management system is also the smart pigs that inspect the pipelines from inside out. Currently, regulations do not govern a standard response time for leak detection. Small leaks are the most difficult to detect. Even the best leak detection systems may not be able to detect small leaks under 3 percent of the volume or the flow-through of the pipeline.

Integrity management is a set of rules that require operators of transmission lines to identify and assess all threats to a particular pipeline segment, whether from internal or external corrosion, flooding, landslide, excavation damage, weld or construction defects, etcetera, and to produce an integrity management plan designed to routinely assess those threats and undertake any necessary repairs or replacements, improve cathodic

protection, or take other actions necessary to maintain the pipeline safety.

These rules only apply to pipelines that affect a high-consequence area in the event of a spill. For liquid lines high-consequence areas include defined densities of populated areas, unusually sensitive areas like drinking water sources, and commercial or recreational fishing areas and commercially-navigable waterways.

Nationally about 44 percent of all hazardous liquid pipelines fall within high-consequence areas, so are covered by this program. I would like to see somewhere in the EIS an explanation of what percentage of Enbridge's pipeline, proposed pipeline and existing pipeline, run through high-consequence areas and which are the areas that they tend -- that they are required to actually perform this integrity management.

Second, response resources. I'm going to read a little bit about the PHMSA regulations, 49 CFR 194.153 -- or 115. And this requirement requires only that a pipeline company identify a first wave of equipment that it claims can arrive at the scene of a spill within six hours after identification of the spill.

Here's the full text of the regulation: Each operator shall identify and ensure, by contract or other approved means, the resources necessary to remove, to the maximum extent practicable, a worst-case discharge, and to mitigate or prevent a substantial threat of a worst-case discharge. An operator shall identify in the response plan -- sorry, I just lost my place. The operator shall identify in the response plan the response resources which are available to respond within the time specified after a discovery of worst-case discharge or to mitigate the substantial threat of such a discharge as follows.

So there's three different tiers; there's tier 1, tier 2, tier 3. Two different volume areas; high-volume areas and all other areas. In the high-volume areas in tier 1, that is the six-hour response time. In tier 2 it's 30 hours. In tier 3, 54 hours. Now, in all other areas that are not these high-volume areas, in tier 1 they have 12 hours; in tier 2, 36 hours; and in tier 3, 60 hours.

So I would also like to see in this Environmental Impact Statement what percentage of the pipelines run through these different tiers and

different volume areas.

Furthermore, I would like to remind everyone that the regulation clearly states that a pipeline operator need only identify available resources that can respond within the specified time frame. The response time frame starts only when the company officially discovers a spill, and this can be hours or even days before this actually happens. Moreover, neither this regulation or any other PHMSA regulation specifies the amount of resources even to respond to a worst-case discharge. The PHMSA regulations leave this decision entirely up to the pipeline company.

And if you look in the DEIS and see what it says under response plans, their response plan is that initial response will be on local first responders. So I would also like to see an analysis of the ability for local first responders to respond to this kind of catastrophe.

There is a report back in -- there is a report back in 2014 that was talking about the lack of adequate response time to an oil disaster in Minnesota. But the Public Safety Commissioner, Mona Doman, told the House Transportation Finance Committee members that firefighters and other first

responders are not ready for such disasters. Firefighters simply do not have the equipment and training needed to fight crude oil fires. If an oil disaster occurs in Minnesota, Parsons say, it is quite likely to result in loss of life and property loss on a massive scale. An oil disaster is low-frequency, high risk.

Preparing for such disasters is especially hard for volunteer fire departments that sometimes only have a few firefighters on duty during the day. Fire officials said that in such cases about all they can do is evacuate anyone who might be in danger and wait for help from nearby communities and the state.

Again, I would like to see a complete analysis of the ability for first -- local first responders to respond to a dilbit spill that even -- even in a high-density population area by the Kalamazoo cannot adequately respond to it. What are these rural communities out in the wetlands going to do when there is a spill?

Thank you.

FACILITATOR: Thank you.

Other comments?

Yes, sir. Start by stating and

spelling your name.

MR. PHILLIP WALLACE: My name is Phillip Wallace. Phillip with two Ls. Wallace, W-A-L-L-A-C-E.

And I'm here tonight to speak in support of this Line 3 replacement. You know, this pipeline, Line 3, was built in the early '60s, and there was no PHMSA, DOC regulations back when this was built. Technology's so much different.

Enbridge -- you know, everybody wants to bring up the Kalamazoo. And that was a tragedy. Kalamazoo spill was a tragedy. I doubt very serious if they knew of the defects five years before it did spill. But, you know, we don't need that. We don't need these spills. We won't see those spills.

There was some other meetings that we've been going to that, you know, they -- I'm in the pipeline welding business, so I represent the welders in Minnesota. And we've got about 10,000 welders, pipefitters that work in the pipeline, pipe trades industry, and that live in Minnesota and/or they make their living with Enbridge.

And Enbridge is -- you know, they're going to -- they want to take up the old and bring in the new. You know, our technology is so much

different today when we lay pipelines.

But I've been in this temporary job business for 41 years now, and that's my career. I've got a 41-year career in this. It's not a temporary job.

But -- you know, we've got -- we've got to look after this earth. We really do. You know, we need clean water, clean air. And hopefully our great-grandchildren, you know, will wean their self off this crude oil. But the State of Minnesota, whether you know it or not, you've been running on Canadian crude for years. You know, they've been pumping Canadian crude through this pipeline since 1963, the old A-CAD system. You know, the MinnCan, the MinnCan pipelines, that's Canadian crude that goes straight to the refineries in -- the Koch refinery in Minnesota.

You know, this is not new. You know, it's not new to bring Canadian crude here. And me for one, you know, I would -- I would a lot rather get it from our friends and neighbors to our north than our enemies in the Mid East, third-world countries that we've been getting our oil from, and we still get like -- I think we import about 25 percent now.

You know, do the right thing here, you know. Let's get rid of that old pipeline, because it does leak. Let's get rid of it. I've got people working on that pipeline right now patching it, trying to stop it from leaking. But the pressure -- Enbridge has lowered the production of that down to about 30 percent of capacity. You know, they're doing everything they can; but we still got to have that oil, whether you like it or not. You know, just think about this: What if we didn't have any pipelines in the morning when you get up? Where are you going to get your heating oil, your gas for your vehicles? I mean, it's -- I would love to see a green earth. We're just not there yet. Someday I hope we will be.

But, you know, that's all I got to say for now. Thank you.

FACILITATOR: Thank you.

Yes.

MS. LINDA ROTHER: Thank you. My name is Linda Rother. L-I-N-D-A. R-O-T-H-E-R. And I live out by the Schotts in Mille Lacs County. I haven't done enough research on this project to really give a yes or no yet. But I think one of my biggest concerns, of course everyone's, the

environment. And if it is going to go through, I don't see any statistics on how much of the pipeline materials will be coming from Minnesota. We have family that work in the steel industry up north, and we don't want to see a bunch of cheap imported steel.

So if we are going to move forward with this, I think there should be something addressed as to what materials they're using, what the quality of where they're getting it from, and maybe even have a thing that says we have to have so much percentage from the United States or even Minnesota.

I also think that should apply to employees. And I think that if we're going to have a line that does go through, there should be a stipulation that a certain percentage of Minnesota's people will be employed by that so that we can really see a benefit if it does go through that would help not only our community but our United States.

Thank you.

FACILITATOR: Thank you.

Other comments? Yes, sir.

MR. RICH MYCUE: Hello. My name is

Rich Mycue. R-I-C-H, M-Y-C-U-E. I don't have any anything prepared in specifics, but I've been in the petroleum business for 35 years. Probably closer to 40 years now. And if I deal -- all of us are end users in the pipeline. I use a pipeline in my business every day, 7 days a week, 365 days out of the year. We transport petroleum products. We have a company, former ag director out of Milaca here, now called Molo Petroleum. We employ 10 to 15 people out of the Milaca area. A lot of my employees went to school in this building. And a pipeline to us is very important. Our business is highly regulated, and so is the pipeline industry. We take those regulations extremely serious. We haul 15 to 20 loads of petroleum a day in transport.

There's a huge exposure on the highway, as you see today, and also on the rail systems. Pipelines are safe -- environmentally safe, they're regulated; and they're cleaned up properly if there is an issue, just like land.

Pipelines do wear out. Obviously, this pipeline is 600-some years old. It was built in the '60s, I guess. So it's important that we replace that equipment to maintain our supply and have cheap energy here in the Midwest.

I commend Enbridge for wanting to upgrade their pipeline system and keeping it safe. Again, I think it's important that we have companies like that that know that they need to produce -- or find a particular area where they can run a pipeline safely and get it most efficiently to us, the end user.

You folks that live in Milaca, like I say, I was born and raised in this town. We have a pipeline going through, a natural gas pipeline that was here when I was just a kid. You drive over it every day if you go south on 169. Haven't had an incident. Some of you probably don't even know it's here. It's an important part of our world to have that natural gas. It's a great thing for our community. We all use a pipeline every day. Turn your switch on in your oven, you're using a pipeline. You got propane gasoline, you got pipeline. Propane tank to your house. It's safe and it's reliable.

Thank you.

FACILITATOR: Thank you.

Additional comments? Anybody who hasn't spoken yet first; and then if not, we can go back around. Anybody who hasn't spoken want to make

a comment?

Okay. We can take a second round -- oh, would you like to make a comment, sir?

MR. DAVID OSLIN: She can go ahead.

FACILITATOR: She's already spoken, so we'll go to you, sir. Just state your name and spell it, please.

MR. DAVID OSLIN: Thank you. I'm David Oslin. D-A-V-I-D. O-S-L-I-N. I'm a resident of Mille Lacs County, and I just want to interject a little different perspective here.

In my mind, common sense tells me that we're much safer putting oil in a pipeline and putting it underground to transport it than other methods.

But the perspective I want to put on this is, as one person that worked on installation of these lines, I had the privilege of working for three different pipeline companies for a period of three years. I actually dug for quite a few miles right alongside the old pipeline in reference. We installed a new line 15 feet away, and we had to be very careful because of the age of that line.

But during my tenure working for the pipeline companies, I learned a whole different

perspective on construction. Been in the construction trades for 35 years, done a lot of digging in a lot of neighborhoods, and most folks have no idea what they're walking over every day, what's in the ground. And these things have been in the ground for years, whether it's gas lines, pipelines, sewer lines; and there's not as many incidents as you would think.

But back to the pipeline industry. I got to work and meet a lot of folks from different states. A lot of the southern folks came up. They're very skilled at pipeline installation. And I was amazed at a couple of things. One is the environment -- the environmental cautions that they take, and the other was the safety. It was admirable, to say the least. Again, I've been in construction for many, many years, and there is nothing that even comes close to it when you talk about those two aspects.

One thing about pipelines, there's -- in my view there seems to be a big checkbook there, as there should be in case there are cleanup costs or whatever. But if you're working for someone that's got a big checkbook, things get done right. There's no -- there's no corners cut. These folks

seem to have image in mind at all times, because that is their livelihood. They do need permits. They need right-of-ways. They do things right.

I referred to the big checkbook. When we would be out working on the line -- and we were monitored steady, by the way, by satellite, by airplane. There was nothing that was missed. And, also, we were monitored by folks like Avery here in the inspection services. There's an inspector for every -- absolutely every crew that's out there watching what you do.

But back to the way they do things in that industry. Everything is done for the least amount of impact. And the old saying with the pipeline is: When you go through, make it look like we were never here. And believe me, they do. When the project's over, it was like no one was ever there. There's no expense spared to do it the right way and to be very safe.

I'll give you one example from the construction industry point. If we had a task on a particular day for a period, if it would require three workers, if you're working pipeline, you will get five workers to do that job, because they take care of their people also. That's part of the

safety.

I can tell you that there were times we went through organic farms, we went through the Chippewa National Forest, very pristine. And I was even amazed at the wash stations, that the equipment has to be washed before you go through those. And it's cleaner than when it sits on Caterpillars' lot. But also the fellows that were working with me, some would smoke, some would chew. Those guys couldn't even take their cigarettes or their snuff with them when they went in through that farm.

But I wanted to interject that aspect. It was very admirable to me to see the way things were done. I was proud to be part of it and with those folks. And, again, I'm still amazed at the care they take in what they do. So I wanted to state that publicly today.

Thank you.

FACILITATOR: Thank you.

Anybody else who has not had a chance to speak that would like to make a comment?

Okay. Nicolette.

MS. NICOLETTE SLAGLE: Hi. Nicolette Slagle. N-I-C-O-L-E-T-T-E. S-L-A-G-L-E.

I just wanted to read another little

letter here that does directly relate to the DEIS. Enbridge has actually lobbied aggressively against responsible spill response regulations in Minnesota.

In an October 2014 letter to the Environmental Quality Board, a number of Minnesota legislators pointed out Enbridge's resistance and determination to thwart any safety regulations by the State of Minnesota.

This letter, from Minnesota Senators Steve Dribble, John Marty, and Representatives Frank Hornstein and Jean Wagenius stated, Enbridge and the pipeline industry were unwilling to agree to: Provide a qualified company employee to advise public sector incident commander by telephone within one hour of a major pipeline oil discharge; provide monitoring equipment within three hours of the discharge or to develop an annual plan to deliver monitoring equipment to a discharge site to comply with the provision; provide qualified personnel to advise incident commanders at the discharge site within three hours of a major spill.

Now these are things they refused to agree to, okay, not things they agreed to:

Provide containment booms from land across sewer outfalls, creeks, ditches, and other

places where oil and other hazardous substances may drain in order to contain leaked materials before it reaches those resources; to have capability to deliver containment boom boats, oil recovery equipment, and trained staff within eight hours of a confirmed discharge to recover 10 percent of a worst-case discharge, including protection of listed sensitive areas and potable water intakes within one mile of a discharge site; delivery equipment to protect sensitive environmental areas and drinking water intake within 60 hours of a major spill -- again, what they refused to do -- provide updated disaster prevention and response plan to the Pollution Control Agency every three years.

Where is this concern from state agencies represented in the impact statement? I must have missed it. Have you seen it? No. Okay. I'm just hoping that it will be in the final impact statement, because this is ridiculous.

FACILITATOR: Thank you.

Any other additional comments?

Yes, Andy.

MR. ANDY PEARSON: Are you all getting sick of hearing from -- oh, great, you can hear me. Great. I will keep my comments very brief here.

Sorry to speak a second time.

FACILITATOR: If you would just start with your name and spelling it.

MR. ANDY PEARSON: Absolutely. Thank you. Yes, it's Andy Pearson. A-N-D-Y. P-E-A-R-S-O-N. And I wanted to respond to one issue that was -- one honest question that was raised during the discussion tonight, which I think some of us may share the question of where the pipe is from. I appreciate that the format allows us to have a little bit of a discussion where we can respond to issues that were raised.

So I wanted to just respond briefly to that issue, to be clear about the pipe that would be used and that would be built. Enbridge mills almost all of their pipes in Canada, and it is foreign steel. And the pipe for Line 3 is currently being delivered and is essentially already made. So this is not a project that supports, by and large, the Minnesota steel industry. And they do not build the pipe here. It is foreign steel, and it's milled in Canada. And they're already bringing it in, because the company is that certain about eventually getting the approval, despite the fact that they have no permit to begin building in Minnesota right now.

So I just wanted to clear that up for anybody else who might be wondering what the status of the pipe is.

And that's all. Thank you.

FACILITATOR: Thank you.

Any final -- yes, ma'am.

MS. DEBBIE BLUE: My name is --

FACILITATOR: Hang on. Let Leslie bring you the microphone. And if you can state and spell your name.

MS. DEBBIE BLUE: My name is Debbie Blue. D-E-B-B-I-E. B-L-U-E. And I just want to say that I know about the gas pipeline, because it runs through my backyard. And I want to sort of counter the idea that these companies really take care of their spaces. They come and mow, and they mow bigger and bigger swaths. And when I call and say why are you mowing a bigger and bigger swath, I never get a response. So I feel like the idea that these fossil fuel companies are super responsible is just not accurate.

And in terms of the statement, I think that it needs to consider the alternative no pipeline at all.

FACILITATOR: Thank you.

Any other comments?

Okay. I want to remind you that you have until July 10th to submit comments. You can stay here and write comments and put them in the box.

Do you have a comment?

MS. SHARON STEVENS: I have a question.

FACILITATOR: Okay. Hang on one second. I don't know if anyone can answer your question, but you're welcome to make the comment. If you could just state your name and spell it.

MS. SHARON STEVENS: My name is Sharon Stevens. S-H-A-R-O-N. S-T-E-V-E-N-S. And my question is are there lobbyists from Enbridge or any of the other companies at the Capitol, at the Minnesota State Capitol? Thank you.

FACILITATOR: Thank you. There may be people who will be able to answer your question for you after -- after the session.

So as a reminder, we're accepting comments here. If you have more questions for the state administration staff, they are here and the posters are here. And we will stay up till 9, if you continue to have questions. If people are all

done with questions, we may begin to take down early. But we'll be here, if you still have questions and want to speak with staff.

If you want to speak with the court reporter, you're still able to do that, and she'll transcribe your statements.

And we want to thank you all for being here. We know there were other exciting events in town tonight. We really appreciate having you here and hearing your comments. Have a good evening.

(Off the record.)

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DEIS MEETINGS - 14-916 15-137

MORA - JUNE 16, 2017 - 10:00 a.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

The Grand Event Center
2025 Rowland Road
Mora, Minnesota

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FACILITATOR: We're going to get started in a couple of minutes. So if you have more questions for staff, you can ask them, and then we're going to come together.

If you do want to make a public comment, please write your name on the index card and put it in the speaker box. Thank you. Good morning, everyone.

So we will now open the public oral comment session of the meeting. I'd like to invite folks to come on over and sit down.

Welcome to the Line 3 project Draft Environmental Impact Statement public meeting and the public comment period.

Before we get started on public comments, I'd like to introduce Ray Kirsch from the Department of Commerce to give you a little overview of the process.

MR. RAY KIRSCH: Thanks, Stacie.

Good morning, everyone. Good to see you here. Welcome to today's meeting for the Draft EIS, the Line 3 project. I will spend just a few minutes with you talking about the Draft EIS and put it into context of the State's environmental review and permit

process.

So today's meeting is hosted by the State of Minnesota. The Draft EIS is a State of Minnesota document prepared by the Department of Commerce in cooperation with the Minnesota Department of Natural Resources and the Minnesota Pollution Control Agency.

The role of the DEIS is to inform decision-makers so that they can make informed decisions about the Line 3 project.

The Minnesota Public Utilities Commission is one of those decision-makers. There are also other agencies who have permitting authority that will make decisions about the project, and the Draft EIS is also a document to enable the public to know about the project and to give guidance to the decision-makers so they can make decisions.

The Public Utilities Commission has two decisions before it. One is the Certificate of Need, whether the project is needed. And, two, if it is needed, what's the most appropriate route for the project, and that will be called the route permit.

So two decisions for the Public

Utilities Commission, and both are addressed in the Draft EIS.

This process began in 2015, when Enbridge Energy applied to the Public Utilities Commission for a Certificate of Need and a route permit for the project.

Last year, 2016, we were out there scoping, asking you all, "What do we need to know about this project? What are the potential impacts, and what are the possible mitigation measures we should look at in the Draft EIS?"

And you gave us that information and then we started working on the document.

The Draft EIS came out on May 15th of this year, and there's a comment period on it through July 10th. So we're here today as part of that comment period, having this meeting, and you can submit comments through July 10th.

All the comments we receive on the Draft EIS will be looked at and considered and used to create the Final EIS. The Final EIS is anticipated to be coming out in August of this with year, and we will have all your

comments in there and all the responses to your comments in the document.

There will be a comment period on the Final EIS. You'll have a chance to say whether you think the document is adequate or whether it's still missing something and needs something else to be done with it.

Following the Final EIS, there will be public hearings out in the project area.

So the administrative law judge, Judge O'Reilly, will come out here and she will be looking for your guidance.

The EIS is the fact document; doesn't make decisions. It just lays out what are the facts about the project.

The public hearings are an opportunity for you to say to the judge, "Judge, here's what I think we should do based on the facts, here's the decision the State of Minnesota should make about this project based on those facts."

These hearings are projected to be this fall. Ultimately the judge will write a report with findings, conclusions, and

recommendations that goes to the Public Utilities Commission, and the Public Utilities Commission will then make a decision on the Certificate of Need and the route permit.

And that's anticipated to happen in early spring 2018. So that's the schedule going forward right now.

Today we're looking for your comments on the Draft EIS, what's missing, what's unclear, what needs to be explained in a different way.

If there's a graph that's confusing, if there's text that's confusing, if there's something we missed completely that you think needs to be in there, we'd like to know about it.

This is a public document. We're creating it together. You gave us initial information. We worked on it, we're bringing it back to you, you give us more information, we create a final document.

So in a sense it's all of our document. You play an important role in giving us your comments and what it needs to have in there.

You can submit comments in a number of ways, as Stacie has already mentioned. You can submit oral comments today. You can submit comments in writing. You can email. You can fax comments.

All of this information is on the handout and on the notice for today's meeting, and you have to have them in by July 10th. That's the key date.

All modes of commenting are equal. Doesn't matter if you say it or email it or fax it. They're all considered equal. So however you are most comfortable making your comment, make it in that fashion.

You can make multiple comments. You can make a comment here today and look at the EIS and send us another comment when you've had more time to look at it and consider it. You have until July 10th. So please take that time. It's a lengthy document. It's a big document.

We have it available online, but we also have CDs and flash drives which you can use on your computer, if that's helpful to you.

So I encourage you to take a look

at it the best you can. Focus on the areas you're most concerned about.

As I mentioned before, it's not a decision-making document. It informs the decision-makers, and we'll leave it at that.

I'll give it back to Stacie to give some general meeting guidelines.

FACILITATOR: Thank you, Ray. Okay. So we're going to move into oral public comments. I want to just walk through the process with you and a couple of ground rules.

So this is an opportunity for you to share your thoughts about the Draft EIS, as Ray said.

And we're going to start with the names of the people who put your names on the cards, index cards, and then when we go through all of the names on the cards, if additional people have comments, I'll just take people who raise their hands and we can go through as long as we need to for the time we have in the meeting.

To make sure that everybody really gets a chance to speak, we will ask you to keep your comments to seven minutes or

less, and we'll put a timer on the screen so that you'll see how the time is flowing. As seven minutes gets close, I'll stand up to indicate your time is running out, and when we get to seven minutes, I'll ask you to conclude.

A couple of other things to make sure that we make space for everyone to feel comfortable making their comments.

We ask that you not interrupt anybody else. If you agree with something that you're hearing, just hold your affirmation until they finish their remarks, rather than in the middle, so you don't take up their speaking time.

And then when they conclude their remarks, if you would like to show your agreement or your affirmation, feel free to applaud.

If you disagree with something someone is saying -- people come here with very different points of view, but we really want to keep this respectful, and we want everyone to feel comfortable speaking. So if you disagree, we ask you to hold that inside.

If during your comments you'd like to say something about an issue brought up by someone else or opinions that you've heard that you disagree with, focus on the issue, focus on the idea.

We ask you not to comment about any individuals, whether they be other people who have spoken or whether they be state staff or others. We ask you to please focus on the issues, the ideas. You can talk about institutions or organizations, but not any individuals, please.

The state agency's role here is to listen. They're here to answer questions at the posters, and now at this stage they're here really to listen to the comments that you have to say.

If all the state folks want to raise their hands. So you see, we have a number of staff from the state agencies who have worked on this draft report. They're really here to hear your comments at this point.

A couple logistical things. If you could silence cell phones, put them on

vibrate, that would be great. And we do need to end our meeting on time. I think we should have plenty of time for everyone to make their comments and still be able to end on time.

When I do call on you to speak from either the cards or if you raise your hand, we have a couple of staff members with microphones. They will bring the microphones to you so you don't have to come up front. They will bring them to you.

You can make your comments sitting down, or you can stand up, whichever you prefer.

We do want to make sure -- the microphones are a little bit sensitive, sometimes too loud, sometimes too quiet -- we do want to make sure that our court reporter is able to hear everything you say because she is transcribing your statements directly into the public record.

So if I do need to stop you to ask you to hold the microphone a little bit differently, please forgive me in advance for that.

We just want to make sure we

capture all of your comments for the court reporter.

And when it's your turn to speak, if you can just start by saying your name and spelling your name for the record. When I read your name, I may pronounce it wrong so I just want to apologize in advance for that. I'll do my best.

I think that's our ground rules. If you want to bring up the timer.

Paul Larson is our first speaker.

MR. PAUL LARSON: Good morning. Yes, I'm Paul Larson. I live in this community in the county, and I presently am the chairman of the Mora Housing and Redevelopment here in Mora. So I'm interested in the routing that is being proposed.

I'm not really opposed to the pipeline, but I do want to bring attention to the location, especially as it -- as I review the map over here on the right side of the building.

The location of that pipeline is about a quarter mile away from our present

Eastwood campus. This campus is located on the east side of Mora. Presently we have about three or four buildings there -- a low rent senior housing building, an Eastwood senior healthcare facility, which has approximately 30 rooms that house assisted living and memory care, and we have another building that's going to be coming up starting this fall.

I'm a little bit concerned about the nearness of the location of that proposed pipeline to our campus.

So I would like to suggest, and I will put some of this in writing when I have an opportunity to do so, along with a map, to point out that if there's flexibility in the location of that pipeline that will come through here, that it be located further east.

And maybe that's about all I need to say about that, I guess.

I have a concern. To relocate people in the case of a major event, wherever that might be, would be very difficult, especially with assisted living people.

I had one other concern that I

already visited with a gentleman about, over here in the corner, that talks about the aquifer. The sandstone aquifer that's located east in Mora, I think needs some consideration as well.

But I don't have a lot of facts on that so I'll just let that go by for now.

So that's really all I want to say.

FACILITATOR: Thank you.

John Munter.

MR. JOHN MUNTER: My name is John Munter, J-O-H-N, M-U-N-T-E-R.

There is huge holes in the Draft Environmental Impact Statement that I think require a no-build option, but today I'm going to address the routing.

All the routings, except for one, go through the lake country, go through Clearwater, and snake various ways into Superior, Wisconsin.

There is one routing, however, that does not. It goes down the North Dakota border, cuts through southern Minnesota, and then Joliet, Illinois.

If people want to choose that routing, the PUC chooses that routing, they can't actually do it without going to a no-build option because it doesn't meet Enbridge's requirements of going through Clearwater and through Superior.

So then Enbridge would have to reapply, resubmit a new proposal to go to Joliet through that southern routing.

And before the -- when the proposals were merged together, the Sandpiper and Line 3 last year, last couple of years, the Department of Natural Resources and the public -- and the PCA, put in comments suggesting that the southern routing was much preferable because it didn't go through lake country.

This is not being reflected in the DEIS, and I just want to read off some of what I found here, depending on how much time I have.

But, for example, this is what the DNR said in January of 2015.

"Using the report in combination with DNR resources and professional judgment,

with a limited amount of review time, the DNR is able to provide input regarding the least environmentally impacting System Alternatives.

"Within Minnesota, more southern routes, south of I-94 corridor, have less concentration of natural resources, regardless of the length, within the two-mile corridor.

"Therefore, there is a greater opportunity for avoidance of resources with the more southern system alternatives. While the DNR lacks expertise to undertake a market or economic analysis of the southern routes, from a national resource perspective, the more southern routes appear to be feasible and prudent system alternatives that merit consideration.

"MN Rules 7853.0130, Subpart B, requires consideration of reasonable and prudent alternatives to proposed facilities as part of certificate of need decisions.

"Testimony of Adam J. Heinen, submitted by the Minnesota Department of Commerce Division of Energy Resources (DER) January 6, 2015 and January 21, 2015, state that only system alternative - 03 (SA-03),"

which is actually SA-04 in our parlance here, because they added another northern route. So SA-03 and our current SA-04 are the same thing. And then SA applicant is the other focus. SA applicant is the preferred route of Enbridge.

"When only comparing the two routes found reasonable by DER, SA-03 and SA-Applicant, SA-03 appears to impact less natural resources than SA-Applicant.

SA-applicant features that would incur impacts greater than those identified for SA-03 are: Forest and wetland acreage, river and stream segment crossings, and crossings of public lands.

"Cultivated lands and occurrence of already-impaired waters are greater along SA-03, indicating the developed state of lands along this route.

"Our analysis is described further in the Supporting Information section of this letter.

So one of the aspects some us are worried about is when you have a spill, and you will have spills, because all pipelines leak eventually -- you just can't clean them up

through the water crossings if -- in the water area.

But farmland, that can be scooped up and remediated one way or another there.

"The DNR conducted a focused review of SA-03" -- I guess I did that already.

"Minnesota Statutes 116D.04, Subdivision 6, prohibits state actions that are likely to cause pollution, impairment or destruction of natural resources as long as there is a feasible and prudent alternative.

"The statute also clarifies that economic considerations alone shall not justify such an action. As SA-Applicant and SA-03 are both considered reasonable, environmental impacts of routing from a natural resource perspective would be a key criterion in the decision regarding the most reasonable and prudent system alternative," et cetera.

"Testimony submitted by Heinen with the DER January 21st, 2015, suggests analysis of SA-03 and SA-Applicant in the routing docket. The routing docket would include a level of environmental data helpful in comparing these two routes, along with the

route alternatives already scoped into the routing process.

"For example, a comparative environmental analysis might include an estimated alignment within a larger route.

"If further analysis is completed, the DNR requests the opportunity to provide input and review a draft environmental analysis document."

So they're very interested, and the PCA has similar comments I believe, too. So if you want to have a real impact, try to read the DEIS and suggest that we have a no-build option so we can have Enbridge resubmit for a southern route that is more environmentally friendly.

So thanks.

FACILITATOR: If you are reading from prepared remarks and you are willing to give those over to the court reporter, that will help her cross-check and make sure she gets everything you say accurately.

Valerie Raivo.

MS. VALERIE RAIVO: Valerie Raivo, V-A-L-E-R-I-E, R-A-I-V-O, and I'll just

be very brief because I don't have a prepared statement.

But I'm just adamantly, I'm just adamantly opposed to the pipeline in general. I feel it is a, for lack of a better word, just a dinosaur as far as our energy, and we should be focusing on the solar, the wind, what is in the future instead of harming our environment as the pipelines have done and will continue to do.

Thank you.

FACILITATOR: Thank you.

Melody Morrell.

MS. MELODY MORRELL: My name is Melody Morrell, M-E-L-O-D-Y, M-O-R-R-E-L-L. My son is Ryan Smitke-Morrell, R-Y-A-N, S-M-I-T-K-E hyphen M-O-R-R-E-L-L.

I'm going to speak first.

I definitely feel that abandonment of existing Line 3 has received little attention in the document. I would like to abandon Line 3 and at the same time not build a new pipeline.

I feel like there's no current final state regulations regarding pipeline

abandonment that I'm aware of, and the DEIS appears to simply take Enbridge's words that they will clean and indefinitely monitor the abandoned line.

Given a cursory look at Enbridge's past actions, their word does not suffice. The proposed cleaning of the line is not a proven method for such a long stretch of pipeline. This also needs more attention in the DEIS.

Finally, will future issues with an event in Line 3 be discovered? What responsibility will Enbridge actually have? Given their word, which is worth nearly nothing, I'm just curious as to what will they do should there be a spill down the road or should there be a drained lake down the road.

Should any of these things happen, what will Enbridge do?

I've seen them do nothing, or worse, or try to encourage citizens to waive their rights to sue.

That's what I would like you to consider.

My son would like to say a few

words.

MR. RYAN SMITKE-MORRELL: I'm Ryan, I am part of the younger generation. This shouldn't be put on my generation to do, to clean up after this. This doesn't start with us. We didn't ask for this.

I don't want us -- if it just ends up like this, there is nowhere for us to go.

FACILITATOR: Thank you.

Jim Kutil, is he here?

Wade Pilgreen.

MR. WADE PILGREEN: My name is Wade Pilgreen, W-A-D-E, P-I-L-G-R-E-E-N.

I've been a proud member of Pipeliner's Local Union 798 for 37 years, and I would like to thank the Minnesota Public Utilities Commission for allowing me to speak today on this very important issue.

In my opinion, most residents and landowners are concerned about the safety of pipelines.

I personally have welded on thousands of miles of pipelines throughout this country, and I, as well as my fellow union

brothers and sisters, take pride in our work and are acutely aware of the importance of making safe welds.

We are required to pass a vigorous welding test prior to the beginning of each project, and during the project every single weld is x-rayed and must pass inspection.

I'm a family man with children, and I would not put anything in your backyard that I would not put in my own. Pipeline Local 798 trains the best welders, journeyman, and helpers in the industry, and we take pride in and take our work seriously, because we realize our welds must hold to safely move product from the consumers to the pipeline.

Safety is our number one priority and we demand everyone work safe, not just when it is convenient at the time.

We believe the quickest way to do anything is to do it right the first time. Our standard of excellence is not limited to the project site and the right-of-way.

We have a code of conduct that has been passed from previous generations: show

up on time, be drug free and alcohol free, helping fellow members in time of need, support unionism and the oath of obligation.

Pipeline etiquette is making others feel comfortable by the way you behave, and thinking of others before yourself, because people will remember the way you feel, either good or bad.

We practice this belief on and off the right-of-way, and we strive to treat others with respect and kind in our dealings with others.

It has been brought to my attention some members of your community are concerned about increased crime and sexual assaults because of pipeline workers being in your area.

As I stated earlier, I have been doing this kind of work for 37 years and our members are like you, honest men and women earning a living for our families.

Many of our members travel with their families and they value the same living environment just like you do. We have zero tolerance for any type of sexual harassment,

whether it's on the right-of-way or in the community.

In closing, I hope my comments today can alleviate some of the misconceptions you have heard about pipeline workers, and I urge the Commission to give the approval for Line 3 project.

Thank you again for your time and consideration.

FACILITATOR: If you want to submit those comments, that would be helpful.

Martin Carlson.

MR. MARTIN CARLSON: My name is Martin Carlson, and I live about four miles west of here, M-A-R-T-I-N, C-A-R-L-S-O-N.

I think there is one overarching consideration that was really brought to our attention by Ryan. If we keep investing in oil pipelines instead of accelerating our use of solar and wind energies, the earth will continue going forward being unfit for the lives of our grandchildren and great grandchildren, and those that come after that. That's not so distant in the future.

Global warming evidence is the

most important science information in the history of humankind. Rising sea levels are already frequently in the huge coastal river delta areas, causing mass exodus and international strife.

We should be against building this pipeline for the same reasons we should be against building any other pipelines.

Thank you for this chance to comment.

FACILITATOR: Thank you.

Karen Longerbone.

MS. KAREN LONGERBONE: You know what? I can't do --

FACILITATOR: Would you like to wait?

MS. KAREN LONGERBONE: Yeah.

FACILITATOR: So that's all our cards. We'll come back to Karen.

Are there others who didn't put your name in but who would like to make a public comment?

MS. NICOLETTE SLAGLE: I'm with Honor the Earth. I'm their research director.

I just want to clarify one thing

first. When the issue of sex trafficking and sexual awareness has been brought up, it's in the context of the extraction zones. They're the primary issue areas; that the workers coming in from out of town have increased the rates of sexual trafficking and assault.

So we by no means are saying that if the Union comes in, these rates go up.

But we do have to realize this pipeline is part of the larger, especially oil sands industry, and regarding the oil sands, I'd like to read a little bit of a statement from about a hundred different international scientists that have signed off for a moratorium on oil sands development.

"Decisions about the development of the vast oil sands deposits in Alberta and elsewhere in North America are among the biggest we face as Canadians and Americans.

"There are consequences for our national economies and shared environment that will last decades to centuries. These decisions transcend the boundaries of scientific disciplines in ways that challenge accurate summary in media and debate.

"Ten Reasons for a Moratorium: Reason 1, Continued expansion of oil sands and similar unconventional fuels in Canada and beyond is incompatible with limiting climate change to a level that society can handle without widespread harm.

"Reason 2, Oil sands should be one of the first fuel sources we avoid using as society moves to non-polluting forms of energy, not the next carbon-intensive source we exploit.

"Reason 3, Current oil sands environmental protections and baseline data are largely lacking, and protections that exist are too seldom enforced.

"Reason 4, Contaminants from oil sands development permeate the land, water, and air of the Canadian boreal landscape and many of these impacts are difficult to mitigate.

"Reason 5, Less than 0.2 percent of the area affected by Canadian oil sands mining has been reclaimed, and none restored to its original state."

And there's this document which is available online that has the citations for

all of these reasons and the data and reports that back up those conclusions.

"Reason 6, Development and transport of oil sands is inconsistent with the title and rights of many aboriginal peoples of North America.

"Reason 7, What happens in North America will set a precedent for efforts to reduce carbon pollution and address climate warming elsewhere.

"Reason 8, Controlling carbon pollution will not derail the economy." I'm going to read all of this to you guys.

"Most leading economists now agree that limits on carbon pollution - using mechanisms such as carbon taxes, cap-and-trade systems, or regulations - can facilitate a transition over several decades to low-emission energy without a dramatic reduction in global economic growth.

"Reason 9, Debates about individual pipeline proposals underestimate the full social cost of the oil sands, and existing policies ignore cumulative impacts.

"These are not simply business

decisions. Responsible policies should address the interwoven, system-wide impacts of oil sands development, from mines and refineries to pipelines, rails, and tanker traffic, to impacts on economies in the global climate system.

"Current laws, regulations, and policies are not kind to assess cumulative impacts.

"When oil sands development is viewed as an integrated whole, the cost and benefits of individual decisions can be evaluated responsibly.

"Reason 10, A majority of north Americans want their leaders to address climate change and they are willing to pay more for energy to help that happen."

"The time is now. We believe that the time has come for scientists to speak out about the magnitude and importance of the oil sands issue in an informed and international public dialogue.

"Working together, we can solve the energy problems before us. It is not too late but the time to act is now."

Thank you.

FACILITATOR: Thank you.

Karen, are you ready?

MS. KAREN LONGERBONE: Karen Longerbone, K-A-R-E-N, L-O-N-G-E-R-B-O-N-E. I'm going to read this. The no-build alternative is not generally considered. It is framed as continued use of existing Line 3 in chapters 3 and 4, but nowhere is the shutdown option through Line 3 considered.

There is no discussion of renewable energy, conservation, or the rapid development of electric car infrastructure.

There is no assessment of the decline in oil demand.

The entire study assumes that society needs X amount of oil simply because Enbridge says it, so that they can sell it.

That assumption ignores the massive fossil fuel subsidies and debts that make Enbridge's profits possible and avoids the moral question of what is good for people in the plant.

We know we must stop burning fossil fuels. And for people that work on the

pipeline, I think there would be other jobs for people they would be retraining for returning to where they talk about all this solar energy jobs. And I see the windmill parts being driven down the highways all the time. And we know it's happening.

And there would be other jobs, and there would be -- for Enbridge -- I wish they were here. I would think they would want to be innovators and heroes and profit from a clean energy revolution, and not be looked at like the tobacco industry.

Why would they want to be the reason that bad things happen to good people?

I just think it would be better to clean up the environment and work with the sustainable force of energy, solar, and wind, creating jobs and profit for Enbridge with a clear conscience.

I just want to say also, looking at the history of Enbridge, using data from Enbridge's own reports, the Polaris Institute calculated that 804 spills occurred on Enbridge pipelines between 1999 and 2010.

These spills released

approximately 161,475 barrels of crude oil into our environment.

We could be next. And there's a list of all the spills. So I don't know. I just think no-build is the answer. You could avoid oil spills by not building.

Thank you.

FACILITATOR: Thank you.

Has Jim Kutil come in?

Others who have not spoken who would like to speak?

MS. JACI CHRISTENSON: Jaci Christenson, J-A-C-I, C-H-R-I-S-T-E-N-S-O-N.

My comments first of all, to the next generation, I am going to fight until the last day I have on this earth for you.

Today I address the concerns of horizontal directional drilling, otherwise known as HDD. It's kind of a mouthful. I had no idea what this was until I started delving into the impacts on our Minnesota rivers with regards to this line.

It is used to cross pipelines under rivers.

According to the DEIS, HDD would

be the method of choice in many rivers in this preferred Line 3 route, including two of our wild rice waters, Hay Creek and Shell River. This is from Chapter 5, page 49.

So what is this HDD, which I sat shaking my head as I was reading the DEIS. Well, here's a direct quote from the DEIS: Chapter 5, page 71, "During drilling, fluid which comprises water, bentonite clay, and possible Minnesota PCA-approved additives, is circulated through the drilling pipe to lubricate the drill bit, remove drill cuttings, and stabilize the open hole.

"The potential exists for an inadvertent release or frac-out of this drilling fluid to occur when pressurization of the drill hole is beyond the containment capability of the overburdened soil material, which would allow this drilling fluid to flow to the ground or river bed surface.

"Although bentonite clay is nontoxic, drilling mud can smother aquatic wildlife and increase turbidity in affected surface waters. Additives may be mixed with the fluids, mud for viscosity for lubricating

reasons."

There is no gentle way for me to say this? For me, HDD rapes our earth, and when our earth tries to reclaim itself, it is choked with drilling mud.

Is this honestly our best? At the very least, this DEIS must disclose these additives and their effects on our ecosystem.

HDD will be used under some of our most pristine, most sensitive waters and anywhere there's flowing moving water. That's from chapter 5, page 712.

Guess what? That description comprises pretty much all of the water in this preferred route of Line 3.

"Specifically regarding those wild rice waters of Hay Creek and Shell River," the DEIS states, "if HDD frac-out," this is a direct quote, "introduction of contaminants, introduction of invasive aquatic plants and non-native strains of wild rice and altered lakebed conditions occur as a result of the construction, impacts would be major."

We cannot approve a route that comes with a major risk of taking wild rice

from its people. I wasn't around when we killed the bison, but I am not going to stand back and watch us kill wild rice, too.

I was able to find an additional source cite in the DEIS footnotes regarding frac-out impacts. This comes from the Interstate Natural Gas Association of America. I have the website documented here.

"Additionally, the effects of HDD crossing construction have not been well studied. A better understanding of potential environmental impacts from HDD crossings is required for balanced evaluation crossing techniques and their application to specific water crossings."

We do not even have the information to proceed with this project.

By Enbridge's own admission, from the Enbridge Drilling Mud Containment, Response and Notification Plan, chapter 4.3, page 3, direct quote, "Containment is not feasible for in-stream releases."

HDD will be used rather extensively on Line 3, so how often can we expect a failed HDD or a frac-out under our

rivers?

Well, like much of this DEIS, the answer to these serious questions is, "It can be difficult to predict." That is the direct quote from this DEIS.

I do not accept that, and I know we can do better than this. We are brilliant. This is a cop-out. I was able to find one case study cited in the DEIS regarding the frequency of these frac-outs.

This is from Slade 2000, Stockbridge to Freedom Junction, Michigan, on the Enbridge line. Direct quote from the DEIS 5.2.1.2.4, Chapter 5, page 73, "It can be difficult to predict the probability of an occurrence. Longer crossings and HDDs passing through glacial tills, boulders, and gravels have a higher risk of failure.

"Slade 2000 studied a pipeline construction project from Stockbridge to Freedom Junction, Michigan. This was a 35-mile, 16-inch crude petroleum pipeline using 11 HDDs to cross through wetlands, streams, and state recreational areas.

"Results determined multiple

relatively minor releases regarding less cleanup and two major frac-outs, resulting in significant volume, location, and ecology issues."

35 miles, 11 crossings, multiple minor releases and two major frac-outs? Line 3 will cross flowing water, rivers, streams, creeks, brooks, more than 80 times over this 337 miles.

How many major frac-outs should we expect? If we use the case study, one major frac-out for every 5.5 river crossings.

And concluding, after spending three weeks, basically every spare moment that I had, trying to pour over this DEIS and how it will impact our rivers -- which, by the way, for the record, this process is very unfair to the public.

Really, the core component missing here is, and throughout this whole DEIS, is morality. We have a lesson to learn from our native communities. They live with morality and they know how to relate to our earth and one another.

Let's follow their lead.

FACILITATOR: Name and spelling.

MR. PHILLIP WALLACE: My name is Phillip Wallace, P-H-I-L-L-I-P, W-A-L-L-A-C-E.

I'm here to support a Line 3 replacement. I represent the union pipeline welders, welder helpers, pipefitters, and pipe trade construction workers who are Minnesota residents that live here and make their living working for Enbridge, building pipelines, pump stations, and tank farms.

Enbridge is committed to using the very best skilled labor from the United Association, International Laborers, Operating Engineers and Teamsters to build the best and safest pipelines in the world.

Line 3 was constructed in the early '60s when there were no rules and regulations that we build pipelines by today.

Enbridge wants to take this old pipeline out of service and replace it with a new state of the art pipeline.

There's a lot of argument about the need of this new pipeline and what benefit would it be to Minnesota?

Not just Minnesota, but this

country needs this pipeline to bring Canadian crude to refineries in Superior, Chicago, and then on the eastern and southern states so the American consumer can have cheap gasoline and diesel fuel.

A lot has been said that this country has too much crude oil stored, and I say you can't have too much energy. Two dollar gas at the pump is good for everyone.

Gasoline prices in Europe this morning range from five dollars to seven dollars per gallon.

If the American farmer had the high fuel costs to raise crops to feed this country, what do you think the food prices would be?

So yes, there is a need for this crude oil pipeline. This project will create thousands of jobs with great wages and benefits for Minnesota pipeline workers and their families.

Local economies will be stimulated by construction workers with the need of housing, food, and all sorts of goods they will buy at the local stores.

Millions of dollars will be paid in local and state taxes. The old Line 3 will be taken out of service and decommissioned by running internal pigs to push all the oil out into holding tanks.

When all these liquids are removed, a nitrogen purge will be injected to remove all explosive gases so there will be no danger of fire or explosion.

The pipeline will be dug up at all the road crossings and cut on both sides of the road and caps will be welded on all open ends.

The road section will be filled with grout or concrete to keep roads from falling in. All the mainline valves will be dug up and removed with caps welded on all ends before we bury it.

This pipeline will be safely decommissioned.

Pipelines are by far the safest and most economical way to transport any petroleum product. Put it in a pipeline, keep it off the rail and roads.

This country cannot survive

without petroleum at this day and time. Someday our grandchildren will be less dependent on fossil fuels by using renewables. The future is in wind power, solar power, and other methods not even discovered yet.

But now we need crude and the best place to get it is from our friends and allies to the north.

America needs to stop sending our hard-earned dollars to the OPEC countries.

A lot has been said about these jobs, thousands of jobs right here in Minnesota. "Well, they're just temporary jobs." Any construction job is a temporary job, and I'm pretty proud of my temporary construction career.

I've been doing this for 41 years, and to me, that's a career. That's not a temporary job. That's all I got to say today.

Thank you.

FACILITATOR: Any other commenters?

MR. GORDON HEIM: I am Gordon Heim, G-O-R-D-O-N, H-E-I-M.

And I've lived the first ten years of my life right where they're pumping the oil now, up at Williston, and so on. And I've been living in this community since 1953, and I barbered here in Mora for 60 years so I know a lot of you.

But this pipeline is the cheapest, safest route to go. And it's definitely safer than by rail, and/or by truck. And the oil is being produced so it's going to be transported one way or the other, and the pipeline is the safest, best way.

For your information, our natural gas was brought into Mora starting in 1958, '59, and '60, '61.

Those lines have now been running gas through them. They're more dangerous to us than this new pipeline that's going to be laid. And taken all into consideration, it is the safest, cheapest way to transport that oil that they're going to produce one way or the other.

Thank you.

FACILITATOR: Thank you. Any other comments?

MS. MARY DISCH: My name is Mary

Disch, M-A-R-Y, D-I-S-C-H. And I have a background -- I have a degree in geophysics and worked one summer, in 1975, in the oil industry in Texas, and then decided that wasn't where I wanted to be and changed careers.

But one of the things I guess I point to in my life, I believe that no route is the best route. One of the things -- what I learned in geology, anything erodes. No matter what we do at the beginning, everything erodes. So there is going to be leakage. There is no safe way unless no way -- is the only safe way.

And I think having low gas prices also discourages other alternative and healthier ways to produce energy for us and to use more.

And I find one of the things I notice is air pollution, or water pollution, or earth pollution is very -- you can't touch it. You don't see it. The earth is very permeable. Everything flows. There is no way to contain anything.

The idea they talked about, nuclear waste. Nothing can be contained, everything moves. And everything finds a way

of breaking down and moving.

Do we want to continue to have to clean up things that we can't even detect? How do I know this water is clean? Even in Flint, Michigan, where it's very visible, they have struggled for three years to clean up an issue.

This is ongoing, the repercussions. I mean, to look in the long future, the repercussions of building a line are huge.

And I have extreme concerns for the native people who continue to have lines in their land, their water polluted, their sites plotted, their -- because they don't have a say. They don't a voice.

But their voices are getting louder, and that they depend on the rice. And the rice is not a moneymaker, but it's their livelihood and it's in their treaties. And I don't think we can continue to discount them and their needs and our treaties.

You know, the dirty sands, the fracking, we do not understand the repercussions.

There are earthquakes happening

in Oklahoma. We do things without research, without knowing repercussions, and then our children's children will have to clean up after it.

So I would say I don't support it. We are this land of water, and we want to run through these things that are so detrimental to life. And I think every time we throw a chemical down our sink, you don't realize the end of that. And they're talking about very deadly chemicals and very deadly things to clean up.

Thank you.

FACILITATOR: Any other comments from people who haven't spoken yet?

MR. JOHN MUNTER: My name is John Munter, J-O-H-N, M-U-N-T-E-R.

I want to say first, the major oil companies are all getting out of Canada. They don't see a future for (indiscernible) barrel of oil anymore and they're rushing into the (indiscernible).

The Saudis are cranking out all the oil we need for the next few years. That's why we're still so backlogged with oil from

these sources, up until about the 2020s, and the world oil demand will start to be tanking.

If you look around, you'll see India and China and Europe are all going to electric vehicles and that's going to tank the oil. So we'll have all we need rather than depending on oil from Canada, which is 21 percent more carbon intensive and polluting.

I'd like to talk about the abandonment issue that was brought up earlier because I live near Line 3, and that's a huge issue for property owners, for property values, for one, for possible contamination.

What's under the pipe if they don't pull it out? That needs to be discovered. What happens to the pipe once the heavy oil is not there; it starts rising in the ground and becomes a hazard and could change the water flow, become a water conduit.

So that needs to be pulled out. It can be done. In the DEIS, it said that the pipes are 10, 15 feet apart. And that's the argument for not pulling the pipes out.

That's actually the Department of Commerce's version of what Enbridge actually

said. Enbridge actually said there's 17, 18 feet, if you look in appendix B. Even that's kind of deceptive.

We did a study from Wawina to Grand Rapids on 15 named public roads, can verify, and we found that the space between Line 1 and Line 3 is 18 feet on the average, and the space between 3 and 4 is 30 feet on the average, 30.6 feet. There's no argument should be a landowners' choice to pull it out.

Other land is on tribal land, county land, state land. That should be county, state, and tribal choices. You may find pipes that are close together. Fine, if they want to keep their pipes in, fine.

But for the most part, landowners want them out, and this is what we do with gas stations that are no longer operating. They're forced to take them out. This is what we do with mines in Minnesota. They're forced to remediate them.

The same thing should be true for pipelines.

And so this will create a $1.28 billion cleanup job or deconstruction

project. A lot of jobs for people in northern Minnesota, cutting up the pipe, throwing it on a truck, driving it out, and this is what we should be focusing on for jobs in northern Minnesota.

So thanks.

MR. DWIGHT PILGREEN: My name is Dwight Pilgreen, P-I-L-G-R-E-E-N.

I just want to comment on a few things that have been said here today. One of them, the lady was talking about these lines will erode. We ought to be thanking God that Enbridge is taking responsibility to replace a line with a new line and get the old line out of service that they know is ancient and needs to be replaced. That's one of my comments.

The other comment is on the directional drilling. Years ago, when we'd go to put a pipeline across a river or rice land or wetland, we'd dig straight through. What disaster is that compared to the directional drilling?

This is the new modern method to protect the environment, is directional drilling. We do it all over the country. I

guarantee within a mile of here or two miles you can see fiberoptic lines, cable lines. It's going on all over the country. Your Internet lines are put in by directional drilling, to save the environment, to clean up the disaster, if it was open trench.

So that's my response on the HDD drilling. Removing that to protect the environment and make it a better way.

FACILITATOR: Thank you.

Are there any other public comments, anybody who has not -- anyone who has not spoken?

MS. DEBRA TOPPING: My name is Debra Topping, D-E-B-R-A, T-O-P-P-I-N-G.

I have a few issues. So when this first started, I went up to Cass Lake, and bought me some blueberry plants, and so I was out there and I'm looking at them and I'm gardening them and talking to them so I can make a really good blueberry pie.

And so I notice that they're starting to flower.

As we're going up to Cass Lake -- everybody knows the road to Cass Lake is

nothing but (indiscernible), right, and as I'm out there looking, driving through that, I see nothing but blueberry flowers all over for miles and miles and miles, just blueberry flowers. And I can't wait to get out there and pick them.

However, I may have to argue with a bear or two, but that's all right. I'm willing to do that. And I will even argue with a pipeliner or two, if I have to.

So anyways, it's a Draft Environmental Impact Statement study, right. We're talking about the environment of money, of having jobs, but what about the blueberries? What about them eagles and woods, right? What about all the mosquitoes and wood ticks, right? There's the environment. What about them turtles?

I know I will stop at any kind of sign of a turtle and make everybody else stop behind me, and that's just a turtle, one turtle.

Now, I'm talking about my son's generation and I will stand up and I will stop, anyways. I've been to five of these, and it

really makes me smile here, because that sign over there, take a look at the last one. It says, "Accidental crude oil releases."

What really does that mean? You know, there's another law in the book that says if I drop something, that it's littering. And I can get a ticket for that.

But can I say hey, hey, hey, hey, hey, wait a minute. That's an accidental paper release. Can I get away with that? Will the judge said, hey, I'm right, you're right, you know.

Because Enbridge can do that. How much is my fee going to be, $2,000? How much is their fee going to be? Do they have a fee for that? I don't know. Anyways, I'll pick this up because it's my notes.

The DEIS, I'm a visual learner. I'm 58. I made it to 50, but I can't really go on my phone and try to read this 5,000 page DEIS.

I'm not computer savvy enough to be able to figure it out on the laptop there. So last week I thought when I first went to the Y, because they had it, they had the 5,000

paper, it was here somewhere; wasn't it? It's over there.

So I thought yes, all right, where's my copy? And they all laughed at me and said, "Here, you can have this flash drive or you can have this disc." But wait, I need to bring something home so I can sit down, as I want to read this.

Well, you can go down to your library and read it. Well, as a visual learner, you're not down at the library quite a bit.

So I thought well, all right, let's see. So I called the Cloquet Public Library, and I said, "Hey, do you have a copy of the DEIS?"

"Oh, yeah, we have one from way back when."

No, no, no. When I talked to the lady, she said that they're at every public library, even at my tribal library. So I thought, well, I'll call the public library first.

They didn't have it. Okay. So I didn't make these rules. I'm just trying to

figure them all out, right. What's next? The Duluth Public Library. Yes, they said they had it -- yay, Duluth.

My thoughts on that is that if this is a public comment period, why is it not given to the public? It says it cost $1,300 to make copies of those. That's not my problem. And that's not the community's problem, right.

Who's getting the bill for this? Enbridge? I don't know. But it's, you know, let's figure this out.

So with that, the other thing I wanted to say is, again, the draft environmental, you know, how many of you can live without water? Anybody, let's see a show of hands. Anybody can live without water?

One more time. One more time. Anybody here that can live without water? Even the pipeliners, woo hoo, can't live without water. We've got grandmas here. We have little kids here. We have elders. We have educated people. We have pipeliners. None of us can live without water.

FACILITATOR: If I can ask you not to refer to individuals.

MS. DEBRA TOPPING: That's the way it is. We all have to live with water and that's it. That's the environmental impact study.

Within five minutes of waking up, everybody goes to the bathroom. Everybody goes to get a drink of water. Everybody goes to -- you have to live with water. What can you do without water?

Miigwech.

FACILITATOR: Are there other comments?

MS. NICOLETTE SLAGLE: Nicolette Slagle, N-I-C-O-L-E-T-T-E, S-L-A-G-L-E.

So just two things. One, I actually have been living in Europe for the last year and a half, and yeah, the cost per liter is quite a bit higher there. Actually, even if you go into Canada, the cost of oil is a lot higher there.

Let me tell you, things are not falling apart in Europe. In fact, they might be together a little bit better.

Food costs, they may be a little bit more expensive, but it's not like breaking

anybody's bank. The farmers are able to continue to do their farming. They actually probably use a lot less petroleum, because a lot more pesticides and other chemicals are regulated over there.

So they're not just indiscriminately spraying all kinds of petroleum-based products all over their food.

They also have this amazing thing in Europe. You guys may have heard about it. It's called public transportation. I haven't had a car for a year and a half that I've been living in Finland and I can get around just fine. I can take electric trains in and out of the city. There's trams around.

They're even considering putting in electric buses. I actually took a bus. It was like an hour and a half, out in the country, so I could meet with these guys that are starting a hemp refining industry. Yes, that's true. They're even farming and starting to refine hemp over there to be used as a fuel replacement.

The national oil company in Finland is also studying the development of

biofuels as in other places around the world.

We could get off petroleum. I have faith we can do it. I have seen it happen, so let's not be afraid. We can do it.

The second thing, treaties, let's just talk about the treaties for one second. There's this thing called treaty-protected resources. And there are specific, usually food sources, that are reserved and protected through the treaties that our ancestors signed with the ancestors of the people that were there before we came over.

So tribes out on the West Coast with salmon. So there's a certain amount of salmon that the tribal members are supposed to have access to to be able to continue living their traditional lifestyles.

Or in many cases, trying to give back to their traditional lifestyles, because 500 years of genocide and colonialism has pretty much destroyed their ability to live traditional lifestyles, but that does not mean they do not have the right to go back and reclaim their land and reclaim their traditional lifestyles.

Deb and I were talking about wild rice. The wild rice is a treaty-protected resource for the tribes in Minnesota. Through it, through the area that this preferred route goes through is the heart of the 1855 Treaty zone.

It is also through the heart of the wild rice in Minnesota, treaty-protected resource in Minnesota, okay.

I know -- I mean, I don't know as many tribal members as Deb does, but the ones I know that are harvesters and gatherers can actually -- most of them support their family for an entire year off of the amount of rice that they harvest over about like a month period.

So this isn't some kind of like ideal -- idea that like the nature -- they're going to go back to what they used to do.

No, they have been continuously and they will continue to support their families and feed themselves off of the wild rice resources.

Okay. I'm looking at the enrollment numbers. Fond du Lac, 4,200; White

Earth, 19,000; Leech Lake, 9,509. These are enrolled members. So it's not necessarily an exact representation of the amount of people that are supported by wild rice harvesting.

But just to give you an idea. So these are the numbers of people that we were talking about to be able to sustain their traditional livelihoods.

So when we're talking about the need for oil, the need for jobs, this, that and the other thing, what about the need for us to stand by and fulfill our side of these treaties and to allow a people not only to continue to exist but to reinvigorate their traditional lifestyles?

I mean, there has been an awesome movement since the '70s, since it was actually legal for native Americans to practice their traditional religions.

It was illegal for hundreds of years for native Americans to practice their traditional religions. It's only been since about the '60s and '70s that there has been like an ability of native American communities to even start to think that they can meet and

reestablish their traditional lifestyles because they've been so traumatized by the 500 years of genocide.

And now we're going to say we don't want -- that doesn't really matter, because we need these dirty oils to come from Canada, to kill the people up there, to go to the refineries, to kill the people there so we can continue to have the fuel guzzling pickup trucks and crap like that.

I don't mean to get emotional. I'm going to stop now before my language gets out of control. But this is a treaty rights issue, and all of the tribes have said, "No, we are not accepting the risk this pipeline is going to put on our people. And we want the old ones out and we want them cleaned up, and we want to be the ones saying what are the concentrations that are left in the soil."

Okay. The tribes have their own regulations for the amount of contamination that can be left in the soil. And those regulations are the ones that Enbridge needs to abide by.

Not MTCA's. Not saying anything

bad about MTCA. Of course, I'm just saying the tribes have higher regulations and we need to follow those. Thank you.

FACILITATOR: Thank you. Any additional comments?

MR. DAVID BARNETT: I'm David Barnett, D-A-V-I-D, B-A-R-N-E-T-T. I work with the United Association of Plumbers and Pipefitters, representing pipeliner workers across the United States.

The United States Association of Plumbers and Pipefitters have been protecting water since 1889. We bring the water to you. No one works harder than our members do at preserving water, 340,000 members across the United States.

I want to go on record right here to say water is life, water is precious. We all need water, and no one works harder in this industry to protect water than the people that construct the pipelines in today's union sector.

The drinking water that I heard talked about, first thing in the morning for the majority of us in this room, it comes to

you through a pipeline. Pipelines have been, and for who knows how long, will be the accepted best practice, most economical way of transporting what we need to transport from point A to point B.

What we're talking about here in this EIS is a transportation mechanism, and the decision is going to have to be made on how to transport the product.

By far, pipelines have been accepted and are accepted, and statistics will show you that they have the record of being the safest way of transporting anything that we can transport through.

The United Association and the crafts that Enbridge has committed this project to be built by stand ready to build the best pipeline that could be built in the world for the state of Minnesota. Thank you.

FACILITATOR: Thank you. Any other comments?

MR. ANDY PEARSON: Hello, my name is Andy Pearson, A-N-D-Y, P-E-A-R-S-O-N.

I just wanted to put a few thoughts in. I have one specific comment today

as well for the DEIS and a few thoughts on the conversation here today.

I guess I want to open up by thinking about and speaking broadly for a second about what it means to respect a place and people, and a place that you're coming in to, and thinking about it in the context of allowing really good comments like we've heard today from everybody who has spoken about a desire to protect water and protect this place and respect and serve the people who are here and who have been living here.

And I'm also hearing what I might describe as a dissonance between that desired tact, and what happens when the people who may have been here the longest say, "Well, that's actually not what we want. Doing that wouldn't be protecting and serving us."

That's actually the opposite of what would be protecting and serving us. And when you push for it anyway, to me, that feels like saying one thing but meaning something that's actually entirely opposite of it.

So I would put that thought out there. I'm not sure that's there's a real way

to incorporate it in the DEIS. So my apologies if this is a little bit off topic, but I wanted to get that out there.

I do want to talk for a second about what would happen if the oil doesn't come out of the ground in Canada to go in the pipelines, and instead the train and truck alternatives that are on some of those boards here are studied.

One change that I do think we need in the DEIS is to go back to the studies that have been done by various organizations, including the U.S. State Department about how the price of oil affects extraction, and that if it's set under $75 a barrel, that you shouldn't expect to see tar sands oil from Canada extracted and moved.

So the highest likelihood, because we are below that price of oil now, is without this pipeline project, a lot of the oil would be staying in the ground instead and actually wouldn't be moving by any means, including rail or truck.

You didn't see that with Keystone XL when that project was stopped. Instead they

saw five mining projects up in Canada canceled. So we should be thinking about it that way.

I do believe that everybody in this room respects the need to have pipelines and respects that there are very many good people who build these pipelines.

Well, I don't think it's the pipelines that are the problem here. I think it's the oil. And as much as the DEIS can focus on the oil being the issue, I think that's important, I think it's very important, and I'll leave it at that for today.

FACILITATOR: Yes, sir.

MR DALE GAGNER: I'm Dale Gagner, D-A-L-E, G-A-G-N-E-R. I grew up in Red Lake County and graduated in 1960, and so it's 57 years ago.

My superintendent, Mr. Mike Bauer (phonetic) told our senior class, "Someday water will be more important to you than oil." And it didn't make sense to us at the time.

But I think as we see what's going on in the world today, not just here, but throughout the world, how important water is, and what we're using in our aquifers, here in

the United States and in many places.

And I just came from Phoenix, Arizona, with my brother-in-law, and he was showing me some of the places where there is no longer water running in the rivers and creeks because it's being taken out by some of these big corporations, bottled, and shipped to us. And it's in our gas stations here in Minnesota.

Global warming is having an effect here and everywhere throughout the world, and we're going to be -- everywhere, there's going to be a need for less chemicals and chemical-free water. And I think we should be paying more for our gas here, and also taxes for our roads and bridges.

And I drove over the bridge by Minneapolis about five days before the bridge went down, and my brother had driven over it just shortly before that. And when he was driving over on that, I thought, "How could I get ahold of somebody here on the -- in the construction business or through the state and tell them they have way too much weight on this while they're repairing it?"

And I didn't do that and I feel

sorry I didn't. And there's been other circumstances in my life where I thought I should have maybe done something and I didn't.

And I don't know what we should do here and how we should be helping other people. We need the oil, but I don't think we need as much as we say we need.

And I was also in construction so I understand your -- our needs for jobs for our families.

So I don't know the best way to do it, but I just think that all of us have to be more aware of how important water is today and how important it's going to be for our children and grandchildren.

Thank you.

FACILITATOR: Any other comments? Okay. Thank you all for being here and for giving us your comments.

There's still an opportunity to fill out comment forms if you'd still like to have your comments transcribed into the record; or ask any questions of state agency staff, you're welcome to do that.

Comments will be accepted until

July 10th, and I thank you so much for being here today.

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ability (2)
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able (9)
12:4,18;17:2;37:4;38:8;53:23;57:1;58:16;60:7
aboriginal (1)
30:5
accelerating (1)
26:19
accept (1)
38:6
accepted (4)
63:3,11,11;68:25
accepting (1)
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access (1)
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Accidental (2)
53:3,9
According (1)
34:25
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across (3)
50:19;62:10,15
act (1)
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DEIS MEETINGS - 14-916 15-137

HALLOCK - JUNE 20, 2017 - 6:00 p.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Hallock City Hall
163 3rd Street SE
Hallock, Minnesota

I N D E X

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FACILITATOR: I think we're ready to start the public comment. So just a few things. My name is Patrick Field, and I'm with the consulting team working on behalf of the State of Minnesota for the Department of Commerce.

Jamie MacAlister is the project manager for the Department of Commerce. She's going to open up with some general words about the Draft Environmental Impact Statement, the process, where it's been and where it's going.

I'll talk about how we'll do the public comments and then we will dive in.

So, Jamie, I'll turn it over to you.

MS. JAMIE MACALISTER: Good evening, everyone. Welcome. We are here tonight to get your comments on the Draft Environmental Impact Statement.

We hope that you had an opportunity to look at our poster boards, to speak with other agency staff that we have here. We have folks from the Public Utilities Commission, the Department of Natural Resources, and the Pollution Control Agency,

as well as Commerce, to give you some information on the Draft EIS and answer some questions for you.

As you probably know, the Minnesota Public Utilities Commission is the agency that is tasked with making the decision on this project and they must make two decisions.

First, they must decide whether or not to issue the Certificate of Need, and once they make a determination on that, they have to decide whether or not to issue the route permit for this project.

If you've been following this process for a while, you've probably attended one of our meetings. About a year ago we were out in the project area, getting scoping comments.

Those comments were used to develop the scoping document, which was then used to write the Draft Environmental Impact Statement.

So today we are here checking comments on the Draft EIS. The comment period closes on July 10th. Shortly thereafter we

will be issuing a Final Environmental Impact Statement, and your comments will be used to help inform that final document.

This whole process gets turned over to the administrative law judge and the Public Utilities Commission. There will be another series of meetings with an administrative law judge in the fall.

That will be the time for you to advocate your position for the project in support or in opposition to it or to provide the judge with other comments that you think are necessary for this project.

And a decision is not expected until sometime in the spring of 2018.

So tonight we are looking for your comments on the Draft EIS. Specifically we are interested in knowing if there is information that is missing from the document, if there's anything that we missed, is the EIS unclear, or are there other things that we can do to improve the quality of the document.

You are more than welcome to submit oral comments here this evening. You can also submit written comments. There's

comment sheets on the tables and boxes that you can drop them into. You are also welcome to submit them by email or regular mail at your leisure so long as they are postmarked by July 10th. We will be looking at those.

We also want to remind you that all these comments that we receive are looked at equally. This is not a vote on the project.

It doesn't matter if we have a hundred comments for the project, a hundred projects against the project, form letters. We look at each comment individually.

All of the comments will be put online. They will be on our website. They will be on the Public Utilities Commission E-Dockets web page for these projects, and you will be able to see your comments, and your neighbors' comments, and the comments that were made at other locations while we held these meetings.

And then just to remind everyone that the EIS itself is not the decision-making document. The EIS is an information document, and it looks at the impact of all of the alternatives that are being considered.

And with that, I'm going to turn it back over to Pat and get the oral portion of our meeting underway.

FACILITATOR: So here's just a few rules of the road for our public comment period. Just a few announcements first. As you may know, bathrooms are in the basement.

If anybody has the need for a handicapped elevator, we will help you operate. Just let us know. We'll be happy to help. There's plenty of food in the back. Exit out the back, obviously, as you know.

For the public comment period, we've had smaller meetings like this. We've had very, very large meetings and in between. So we've tried to be somewhat consistent as to how we do this. So just kind of letting you know a few of the procedures.

If anybody wants to make a public comment -- and I have at least two folks who put their names down -- so we'll start with those two and then we'll see if there's others.

We want them to make sure they get their voices heard. So when they speak,

if people could listen and not interrupt, that would be helpful.

We have a terrific court reporter who will be here capturing every word. When you do speak at the start, state your name and spell it for the court reporter, if you could, so she captures that accurately.

We're a small group so we're not going to be worried too much about how long people talk, though our suspicion is by six or seven minutes at most you can probably get most of your points in.

We do run a clock, which we've done at all meetings, just to be consistent and to let you know how you're doing for time. We have plenty of time tonight for people to talk a little bit longer, if they want to.

We do ask -- we may have a range of views in the room so we ask that people be respectful of people's views and opinions even if they're different than your own.

At the end of a comment, at the end, as someone's finishing their time, if you want to be affirmative, we're happy to do that. But we ask people not be negative.

The one other thing we ask is that people not speak to individuals in the room, but comment to agencies, organizations, the project, the documents, the issues.

Because obviously, if you're talking to somebody individually in the room, that can make people uncomfortable and we want everyone here to be comfortable.

The State's job during the comment period is to listen. So they won't be answering questions, but they will be taking questions if you have them. And we'll certainly be taking comments.

Again, the court reporter will be capturing those.

State agency folks, do you want to raise your hands so we know who in the room are our state agency folks from different parts of the state of Minnesota who have been helping out. So they're here to listen.

Cell phones, please put on vibrate or do not disturb, just as a reminder, so we don't have your interesting ring.

If you do have something that you're reading as you comment, it will be very

helpful to the court reporter if we can take the written statement when you're done just so we can match that with the transcript for the words that you spoke as well. That would be very helpful.

So with that, I'll get the timer set up.

So the first person here to speak is Todd Johnson. Todd, do you want to raise your hand?

MS. JAMIE MACALISTER: Todd is not here. He will be providing written comments.

FACILITATOR: The next person is Mr. Carlson. We'll bring the mic to you, and please state your name and spell it for the record.

I don't represent Wikstrom Telephone.

MR. JUAL CARLSON: My name is Jual Carlson, J-U-A-L. I live at Karlstad, Minnesota, and the pipeline doesn't go through Karlstad, but it goes through Kittson County. It goes through Marshall County.

I'm interested in maximum

economic benefits for Kittson County, Marshall County, and the state of Minnesota.

I'm interested in maximum safety. I'll sit down so I get closer to the paper. You all can see I'm not running for political office, but I just wanted to make an introduction. Thank you.

At this point I'm very neutral, and that's what I've said. But again, I say we need maximum benefits from this pipeline. That's -- we should keep that in mind on all sides. And we need maximum safety, too, as much as possible.

So how do we get that? I think we need an alternate route. And I'll explain why as I go along.

But the alternate route will correct some past mistakes, probably when the pipeline was put in. But I'm not -- it won't be an alternate that covers the whole route; just the northern part.

And I think it's very curious -- I'm curious why this book doesn't go further north. Because the way I understand it, that's where the oil is going to come from, from

Canada. It isn't going to come from North Dakota.

The North Dakota oil will be going on the other side of the border, on the west side of the border. So actually, they'll be a competitor. It'll be Canadian oil coming here through Kittson County, Marshall County, and beyond.

The North Dakota oil, as I understand it, will go on the west side of the border. They'll be competitors and that's good. We need competition for the good of all the users. And I'm a user.

Why do we need maximum economic benefits? Because in Kittson County, we got a small population, for one thing, and we need better roads. That seems to be the number one thing that we need.

And we can get this with an alternate route. And the problem with this route as it sits here, it goes -- the problem is mostly at the north end.

So in all of the maps here it hits Kittson County pretty much on the south, but when it goes north, it crosses the Red

River.

So is that maximum safety? No, it isn't, because if you had a leak in that pipe, that water is going to go to Winnipeg -- or the oil, I mean, is going to go to Pembina. It's going to go to Winnipeg, because the Red River runs north.

And where is the biggest problem I can see on this map? It's also in North Dakota, where it crosses from Canada. That seems to be a problem also.

And so that's why I believe there should be an alternate route going from Donaldson, straight north across the Canadian/U.S. border, all the way north in Winnipeg or equivalent to Winnipeg, and then across the Red River and catch that Canadian crude.

I guess the reason for that alternate is definitely safety, but it's also -- I'll repeat, it's good economic benefits; in particular, to Kittson County, and that's where I'm from.

I'm not -- we got a little land in Marshall County and a little less in Kittson

County. But we definitely stand in need of economic benefits and safety for the whole route.

So when you consider the time element and you consider the distance, it isn't a whole lot of money. I mean, when you consider the number of years that it would be in service, no.

So if you look on all of these maps, that pipeline should go straight north from Donaldson all the way passed Winnipeg and then to the west.

I thank you very much for the opportunity to speak.

FACILITATOR: Thank you, sir, very much.

MR. JUAL CARLSON: I want to point out, too, I think it's very peculiar that all of these maps -- none of them show Canada. They just end right there.

I think that's kind of strange that they don't show that.

And in fact, even here on the tribal map, they show Swampy Creek or something. But it isn't Swampy. It's north of

the border there, because I've driven east and west there on the Canadian side. And there isn't much swamp there.

FACILITATOR: Thanks very much. If you want to draw anything on the map and put it in the comment box, you're welcome to do that, too, sir.

Are there other folks who would like to comment? Raise your hand so we can get a rough count of people who want to comment and we'll take folks one at a time. Anybody else who wants to make a public comment to the crowd here tonight in addition to written comments you can do?

We'll bring you the mic, and, again, name and spelling for the court reporter.

MS. KATHY HOLLANDER: My name is Kathy Hollander, K-A-T-H-Y H-O-L-L-A-N-D-E-R. Partly I stood up to make it easier for other people to make comments, because I know it's hard to stand up and make a comment. It's not Minnesotan.

It's certainly not Lutheran and especially not common for a woman to do it in

front of a group of strong men that I see in front of me.

So I'm going to try to and take a chance.

Today was a rough day for the price of oil. I don't know if you happened to notice some of the news reports, but energy stocks and oil had a tough time, toughest time since March. The price of oil kind of tumbled, today, down to about $44 a barrel.

Why is that? I think it's because of supply and demand. I don't know if people know that the world, the entire world, is pulling more oil out of the ground than what we are using right now.

And I don't know if people know that there's a glut of oil inventory, both in the United States and in the world.

There's even been a report that they're starting to store oil in tankers again. They put oil in tankers and put them on the oceans and they use diesel fuel to drive those tankers driving oil around because there isn't a place to offload it.

I'm sorry to take your time, I'm

sorry if I'm burdening you, but these things are on my heart.

I am a person of faith and I believe in the care of creation. And I would like to mention we have a state environmental policy. We have laws that say that our state has the responsibility to serve as trustee of the environment for succeeding generations.

I think about my child, and I think about my future grandkids. We also are supposed to minimize wasteful and unnecessary depletion of nonrenewable resources.

I would say it is wasteful to pull more oil out of the ground than what we need. It's wasteful for future generations that might need that precious oil. It's wasteful right now to drive oil around in tankers in the ocean because nobody needs it.

I don't know if people know -- some people are here for the first time -- that there are seven pipelines coming down from Canada to Clearbrook, Minnesota, six that go on from there, and there's one pipeline that comes in from North Dakota into Clearbrook.

If we didn't replace one

pipeline, it's not like more oil wouldn't continue to flow.

There are existing other pipelines. The Minnesota refineries are sufficiently fed with the oil that's in those pipelines right now. It's not like Minnesota would simply not have enough gas.

Do people know that demand for oil products is down 19 percent in Minnesota? Minnesota -- sorry for my "O" accent. I am a Minnesotan. Minnesota is using less oil.

Compare that to Wisconsin who hasn't dropped their oil demand, and yet our gross domestic product per person in Minnesota exceeds that of Wisconsin.

We've essentially decoupled use of petroleum in our state from economic growth. I just wanted to share that with people, if they didn't know.

Also, I'd like to share a story with you. I recently heard about a person at the Rocky Mountain Institute who compared two photographs. They were of the New York City Easter parade.

In 1900, there wasn't a car to be

seen. The mode of transportation in the parade, Easter parade, was all horses and carriages. Thirteen years later in 1913, there was nary a horse to be seen and they were all automobiles.

That's how rapidly society could transition. Electric combustion, electric cars are so much more efficient than gasoline cars. They may not work up here.

But if they work in densely populated areas for people who take short trips, hurrah.

I know, as a woman, when I go to a gas station and I fill my car up with gas and my hands reek of gas, if I didn't have to do that anymore, if I could just get in my car and plug it in at night in my garage, I know that would be an advantage.

I know the kids in my car would prefer not having to stop at a gas station.

When the price of an electric car comes down to the price of a gasoline car, I think society is going to transition, and that's what we see coming.

The Chevy Bolt, with a B, is

coming out with a 243-mile range. I think people will like that, and I think they will switch to it.

If you've been in electric cars, they're fun to drive. They're zippy. I know Representative Garofalo from Farmington in the state capital has gotten several speeding tickets inadvertently, because the cars are so much fun to drive. They accelerate so rapidly.

So I know it's hard to change, but I know how quickly we changed in computers.

I used to work in computers -- how much smaller they got. When I worked in computers, they filled the whole room. Now this computer is as powerful as the first computer that I worked on -- look at the size of it.

I've seen society change. I think we will change to electric cars and with car sharing.

Thank you for listening to me and I hope I made it possible for other people to stand up and say what's on their heart as well. Thank you.

FACILITATOR: Thank you. Other

folks who want to comment? Anybody else who wants to make a public comment at this time?

And again, if you're more comfortable, a written comment in the box is treated equally and the same -- and speaking to the court reporter as well.

Mr. Carlson.

JUAL CARLSON: The one thing I missed was I hope this isn't a drag-out process. That will hurt us all, and that's pretty much my simple thing. Because if it goes on for years and years, that's no good for anybody. So hopefully it'll be taken care of in short order. Thank you for the extra possibility for comment. Thank you.

FACILITATOR: Thank you. Okay, seeing no other hands at the moment for comment, again, we will -- there's plenty of food. Go around the poster boards, 7:30, 7:35, we'll check back to see if there's anybody else who would like to make a public comment.

Again, thank you for coming out tonight and we'll informally gather for a little bit.

(Meeting recessed.)

FACILITATOR: Good evening. I just want to check one more time in case there's anyone else who would like to make a public comment, publicly, verbally, to the room. Again, people can also make a written comment if they wish.

Anybody else who wants to make a verbal comment tonight?

I see no takers tonight. So again, written comments are welcome. We'll her here for a bit. Enjoy the posters, have a conversation and thanks for coming out tonight.

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DEIS MEETINGS - 14-916 15-137

PLUMMER - JUNE 20, 2017 - 6:00 p.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Plummer Senior Citizen Center
185 Minnesota Street
Plummer, Minnesota

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FACILITATOR: Good evening, everybody. We would like to start the public comment session in just a few minutes. So in one or two we'll get started with the public comment period.

Thank you, everybody, for coming out. We appreciate it. We are going to start with a short presentation by Jamie MacAlister. She's the project manager for the Draft Environmental Impact Statement for the state of Minnesota, and she's going to share a bit about the process and the like, and then we're going to say a little bit about public comment, and we'll take public comments for those who want to make them verbally and publicly to the group.

Jamie, we'll turn it over to you.

MS. JAMIE MACALISTER: Good evening, everyone. Welcome. We're having some good discussion around the boards tonight. I hope you all have been able to walk around, talk with agency staff that are here, get some questions answered.

The meeting this evening is put

on by the state of Minnesota. We have all of the agency staff here this evening to answer some questions, talk with you about the Draft EIS. We have staff from the Pollution Control Agency, the Department of Natural Resources, Public Utilities Commission, and of course, Commerce, as well as our consulting staff here.

We're here primarily to hear comments on the Draft EIS. Those comments are going to help inform the Final EIS, which will be used by the Commission to make two decisions.

First, they will make a decision regarding the Certificate of Need for this project, and they will also be making a determination on the route permit and whether or not to issue the route permit.

We were here about a year ago scoping in the project area. Those comments were put into a scoping document, which was then used to write the Draft EIS that we're here to get your comments on. So we are currently in the Draft EIS comment period here at number 3.

We will take the comments that we get from these meetings and prepare a Final EIS. And the Final EIS will be turned over to the Public Utilities Commission and the administrative law judge.

And from there will be a series of contested case hearings in the fall. And all the information that is developed from this process will be used by Public Utilities Commission and their decision on the permit.

So what we are asking for tonight is for your comments on the Draft EIS. We are interested specifically in knowing some information that is missing from this document. Is there information that is not clear or information that we can improve upon for the understanding -- better understanding of this document.

We want -- this document needs to be the best document that it can be for the decision-makers, because they will be using it to make some very difficult decisions.

So tonight, if you can provide us with your oral comments, you can write your comments and put them in the comment boxes.

You can submit your comments by email or regular mail at your leisure, so long as we get your comments postmarked or time stamped by July 10, 2017, they will be used to inform the Final EIS.

So all the comments that we receive this evening as well as all the written comments will be compiled and will be posted on our website as well as on the project dockets, on eDockets. So you'll be able to see your comments, as well as the comments of your neighbors, as well as the comments that have been made at the 22 meetings that we're having.

The EIS is not a decision-making document. The EIS is what the decision-makers will use to make their determination, which is why it is vitally important that we get information on whether or not there are things missing and things that we need to improve in the document so the Commission has that available to them.

All of your comments will be considered equally whether or not they're provided in writing or orally. This is not a vote. We want to make sure that you understand

this comment period is not a vote. The time to advocate for your position on this project will be during the contested case hearings.

So with that, I'm going to turn back over to Pat and he's going to give you a little more information and then we will open this up for your comments.

FACILITATOR: And just so you know, I'm Patrick Field, and I work with the consulting team for the state of Minnesota. I'm the moderator tonight for the public comment period.

We just want to go through procedures for the public comments. In a minute here I have people who want to sign up, we have one card. We'll start with Allen, and also if there are other folks in the audience who want to make comments.

Generally, when the speaker is speaking, we want to give them their chance to express their viewpoints, so if people could listen when they do that, that would be terrific.

We have a great court reporter who will capture every word and be able to

capture what they said. And one thing, when you start, state your name and spell your name for the court reporter.

And the mics we have are best if you use the mic like this. By the way, I'll have to remind you if you can't remember that part of it; that's important.

We have a small crowd tonight so we don't have to worry too much about time, but we do have a timer just to remind you of how long you're talking.

Most people can cover most of the things they want to cover in six to seven minutes. People commenting to about six and a half minutes, I'll stand up, that's your signal to begin to maybe wrap up your comments and give someone else a chance to comment.

We ask people be respectful of each other's comments. We have a range of views, understandable in a project like this. We just ask that you be respectful.

When someone's done, if you want to be affirmative and clap or whatever, that's great. We do ask that people don't be negative about other people's comments.

We also ask that people comment to the project, to the EIS, to the issues, to the agencies, to the organizations, but not individuals in the room because we don't want to make individuals feel uncomfortable.

The role of the state agency during this is to listen. The state agency folks, do you want to raise your hand? There's a number of them here tonight from some of the different agencies from the state. They'll be listening.

Again, the court reporter will be recording. It will all be assembled along with written comments, comments given to the court reporter individually, that will be written carefully. It will be made available on the website.

People will have their comments made, they will be influencing and contributing and helping them finish the draft into the Final EIS.

Make sure you silence your cell phones if you can so we don't disturb the public comment. If you do want a copy of the EIS, there's flash drives and CDs in the back.

So if you want to take the whole thing home without carrying it, you can actually put it in your pocket. We have flash drives and CDs in the back if you want to take that. Of course, we have that smaller book that's sort of an executive summary as well.

With that, I think we'll get started. We've got -- Leslie back there will run the mic. The first commenter is Allen Richardson.

Allen, if you want to come up, we'll get started with your name and spelling of your name.

MR. ALLEN RICHARDSON: Good afternoon. My name is Allen Richardson, A-L-L-E-N, R-I-C-H-A-R-D-S-O-N.

I'm an organizer. I'm doing a little work with a citizens group called Minnesotans for Pipeline Cleanup, and some of this may pertain more to communities who are south of Clearbrook. But nonetheless, these questions pertain to the overall subjects of jobs -- job creation is always a big topic across the state -- property rights, technical capacity.

So the question on our minds is what is the fate of the old Line 3 that is slated to be abandoned?

And I've spoken to a number of landowners, and the question that emerges is, is it reasonable, one, for a landowner who has generously hosted Enbridge's old Line 3 on their property for decades, is it reasonable for them to ask Enbridge to remove it? Meaning take the whole thing out of the ground, not just flush it out and leave it there.

And certainly, that it be done safely, which is another question.

And who should be on the hook for that? Should it be the property owner or should it be Enbridge? I have yet to speak to anyone who thinks that the property owners should be on the hook financially for removing pipeline from their own land, but perhaps there are people who do think they should be liable for that.

So the question is, is it possible at all? Will the environmental review documents state that?

In general, the pipelines, the

main line corridor, are between 10 and 15 feet apart, and it is suggested that there is some risk that would come from removing the abandoned pipeline from a corridor where it is between two hot or active lines.

It was observed by a couple of my associates here on the way down that Line 13, they managed to install that between Lines 2 and 3 over there, if I'm not mistaken, just nestled snugly in between there. Which, to me, seems to be a pretty good indicator that if you can get a new pipeline between existing pipelines, you can start pulling old pipeline out from in between those functioning pipelines.

The other thing is this whole question (indiscernible) to backtrack. We took the liberty of walking the spaces between the lines on publicly named thoroughfares between Wawina and Grand Rapids, and we found more space, in general, from 10 or 15 feet; particularly between Lines 3 and 4, there's an average of 30.

Which, again, tells us that it would be technically possible to remove an

abandoned line.

The question of environmental justice, we know that there are certain communities who point to the impact of the line's presence. The document states that, "Removal of existing Line 3 could positively affect these communities by removing stress or anxiety related to the presence of the abandoned pipeline and ongoing risks related to water flow, soil and water contamination, and subsidence."

That seems like a motivator in and of itself, if that would be possible, to do right by those communities.

It further says that, "Enbridge estimates the cost of removing Line 3 at approximately $1.28 billion," which, again, to me, means that the technical feasibility of removing that old line has already been established and they can do it, and it would cost them $1.28 billion.

My question is, how many jobs would that produce in a place where people are always hungry for jobs?

Keeping in mind we're

establishing a precedent on this question of abandonment, knowing that Enbridge would prefer to leave it in the ground because they don't want to spend the money and they are likely to find contamination from the fact that the line is in bad shape right now.

So which is to say -- basically, I want to encourage the labor community to throw in their lot politically with the landowners who are asking for a landowner choice option, which is not the same thing as demanding that the entire line be pulled up.

But it is stating simply that any private property owner who has hosted that pipeline, if they want it removed, they should have the option of having it removed, and that Enbridge should pay for it. Upside for workers is they would get the jobs.

But what that means is that the laborers are going to have to throw their support in, if the landowners are asking for that, and may have to stand up to Enbridge on that question.

I believe that's all I've got. Thanks for your time.

FACILITATOR: Thank you, Allen.

So are there other folks who would like to comment? Please, can I see a show of hands so I can see if there's other people who want to comment tonight publicly.

And again, people can also write their comments for the record.

Gentleman right there. We'll bring you the mic. Name, spelling, and we'll go here.

MR. BRIAN SHEA: Thank you. My name is Brian Shea, B-R-I-A-N, S-H-E-A.

I'm going to be very specific about comments in the draft where info is unclear in the EIS.

On page 16 in the summary, if you go look at the chart. There is, "However, risks of accidental oil release. Pipelines in rail (indiscernible). So there are a couple of things about this figure, right, how often are there spills via different modes of transit.

And then for the spills -- so first thing that -- it's a little hard to read this because there are two parallel axis, and

that they're supposed to refer to different things.

If you go to the bottom of the page, you can't actually tell that the (indiscernible) pipeline spills. It says, "The average size of the accidental release, that's 462 (indiscernible)," according to the text. It's just on the wrong axis.

So what actually happens is it goes from, "Oh, my God, why is that kind of small," to, "Oh, that was sort of big." So the scale is just wrong there, which would probably be something to fix.

The other concern would be, I think what you're actually looking for is two components to a single idea, which is how much profits is spilled when there's -- when it is accidentally released, how much is released? That's the problem with these two numbers.

If you have the average number of incidents and the average volume per incident, then you just -- it is time to pipe an area.

Where you're actually looking at, the area for the pipelines is approximately ten times the size of the area for rail or for

truck, so the actual volume still annually is in the order of magnitude; larger in the case of pipeline, which is probably something that is supposed to be captured in this figure but is actually obscure. So that's unclear.

That's my comment.

FACILITATOR: Thank you.

A comment right over here. Name and spelling for the record, and mic like this.

MR. WILLIS MATTISON: Thank you. My name is Willis Mattison, W-I-L-L-I-S, M-A-T-T-I-S-O-N.

Some of you may recognize my name. Plummer is my hometown. My grandfather homesteaded here in the 1890s. My parents had a farm out east of town. My grandfather's homestead was on the banks of the Clearwater River. It's in this scenery that I learned to hunt and fish and enjoy the outdoors.

In this very building, in the basement, where the Plummer Sportsman's Club used to meet. It's here where I learned about the outdoors, sports, conservation, and conservation ethics.

I graduated from the school across the street from here. Came back and taught high school science here.

I owe a lot to this community because this community supported me through school and gave me a small scholarship to go on to college. Encouraged me to -- I studied science, biology, and chemistry, environmental science. Got a master's degree, taught in high school chemistry.

And I worked for the Minnesota Pollution Control Agency for 28 years. Came back up to Northwestern Minnesota, a place I love.

One of the jobs I had with the Pollution Control Agency was to respond to pipeline spills. In 1979, I had the difficult task of responding to a major leak in a pipeline now in (indiscernible).

An enormous catastrophic rupture of that pipeline spilled hundreds of thousands of gallons of crude oil, and for years of effort and different attempts and different technology, all kinds of contractors, consultants.

I revisited that site two years ago and was there with the consultants testing and monitoring wells. 700 yards downstream of the spill sat two feet of crude oil on the groundwater table. It's still there. Technology will not recover it.

Pipelines have risks. And what this Environmental Impact Statement is supposed to do is assess those risks and balance those against the benefits, and not the benefits to the company. The benefits to the company are obvious. They make money by shipping oil.

No problem with that. Industry and business thrives on making money by doing business. But the great pipeline companies, powers of eminent domain across property, and we give them permits to imperil our resources because there's supposed to be some public benefit that balances that risk.

This Environmental Impact Statement is -- even though it's a couple feet thick, somewhere in there should be a clear definitive answer of what are the benefits to the public that are balanced against the threat to public resources, such as the groundwater

(indiscernible.)

We have not seen the last pipeline leak or spill. I don't care how new and how great the technology is. I owe my science background to this school here, Bemidji State University, and St. Mary's College.

I have read this EIS. The science used in this EIS, if I were still a teacher, I would give this EIS a failing grade because of its poor science.

It does not portray the risks, nor does it well describe the potential damage that will come as a result of that risk against which we are supposed to balance some public benefit.

I would like to ask publicly here -- I've asked privately in other venues -- where in the EIS do I find a clear statement that summarizes that public benefit?

I have yet to find it. I'm only about three-fourths of the way through, so I may not have come to it, but I could use some guidance. Because if there's no balancing public benefit to be derived, it's hard to tell citizens that we should be putting our

environment at risk, especially when it turns out that our nation, our state, and our neighboring states don't need this oil.

We are up to our gullet in oil. Yes, it's still expensive, oil, so the price doesn't come down more than about two dollars, but when you've got more of something that you don't need because of fossil fuel and climate change, it's time to consider the alternative.

Line 3 should be removed from service because it is too risky to continue to operate, and it should be a part of our scaling down of the amount of fossil fuel, because largely the oils are going to satisfy foreign markets anyway. They are no benefit to us.

So if you have the time -- and the document itself is foreboding, if you have seen it -- how many in this room have or think they will read that document?

I didn't think so. Oh, we have one. A devoted person over here is going to read that whole document, but this is supposed to be your public document to inform you, to help you advise your decision-makers on making sound decisions.

And if it's a nonreadable document, it has failed out of the gate to do what it's supposed to do. The Department of Commerce has three agencies, need to go back and write a readable document that clearly compares the benefits against the risks. This document does not do that. They need to go back and start over.

Thank you very much.

FACILITATOR: Other individuals who would like to make their public comments?

MR. WADE WESTLAKE: Wade Westlake, W-A-D-E, W-E-S-T-L-A-K-E.

And I guess I'm here on behalf of the Plummer Fire Department where I'm currently assistant chief. And our department has gone through some oil transportation safety awareness training that was done in the fall of 2015.

And throughout that training it was made clear to us that oil transportation by pipeline is the safest and offers less risks, particularly to our community here, and I can speak firsthand.

Our department has a very good

working relationship with Enbridge, and I've seen their safety firsthand. They're very good to work with. We've got donations on safety equipment. There's two pickups donated by them that's in our firehouse currently, which aid in the response of emergency situations.

They're always just a phone call away. You know, they offer site tours, make us aware of their plans. So they were very involved in safety training planning.

Also, in this training, you know, we are going through some stats and stuff, and in our particular protection area, the pipeline is away from the population center of Plummer. We don't have that exposure to -- for loss of life like what the railroad has.

The railroad runs right through town, and for those of you that don't know, crude oil has an evacuation blast of half a mile. If there was a train derailment through town here with a fire, that would potentially affect the whole town.

We do not have that exposure with the pipeline. It skirts north of town. It will not expose the town to the same level of

potential loss of life like the railroads would.

And that would be -- the oils would flow one way or another, and if it isn't on the pipeline, it would be by train, and that is the not safe route to go.

So I guess on behalf of the Plummer Fire Department, I would like to pledge full support to the approval of this project with the proposed route.

FACILITATOR: Thank you, sir.

Other folks who want to comment?

MS. KATHY HOLLANDER: Hi, everyone. Kathy Hollander, K-A-T-H-Y, H-O-L-L-A-N-D-E-R.

I have a couple of questions, and then I know this gentleman mentioned some of them. The first one is, do we really need this oil?

They're talking about proposing doubling the capacity, basically, of the amount of oil that would be flowing on new Line 3 versus old Line 3. For some reason, the Environmental Impact Statement does not address the question of need. Do we need this

oil?

And I would echo that there's a glut of oil right now in the world. There's more oil being taken out of the ground than what is being used by the world.

We have a law in the Minnesota books that talks about being efficient in our use of energy resources.

And as a person of faith and as a person who believes we should be following our law, I do not believe it is efficient to pour more oil out of the ground than what we need, especially because we'll have grandkids and grandkids will have grandkids.

And this oil is precious, and I think we should leave some for generations to come and use alternative sources of energy when we can. So that's one question. Do we really need this oil?

People, I'm sure, are aware that the OPEC nations are voluntarily getting together now and trying to throttle back production. Why are they doing that? It's because they know there's too much oil being pulled out of the ground.

The price of oil is plummeting. The last couple of days have been hard on the price of oil. It's down to $43 or $42 a barrel. Why is that? It's because too much oil is being taken out of the ground.

Whenever OPEC hops back, then the Bakken type oil, the Bakken shale, the North Dakota or the Texas shale is picking up. So everyone is trying to get the last dollars that they can out of the ground, and I'm talking now about excess dollars, excess money, trying to pull more oil out.

There's reports -- again, we've mentioned it, another hearing of -- again, they have tankers in the ocean that are full of oil with nowhere to go, and they're floating around the ocean using diesel oil to fuel those tankers because there's too much oil being produced.

So I have to ask, do we really need this oil?

I have to also ask, where's the oil going? I've mentioned some of it is adrift at sea. I don't know if people know in general we're using about 19 million barrels a day in

the United States, and do people know that about 5 million barrels a day is going for export? This is a chart. The purple shows the rapid rise in exports of refined products.

Our refineries, especially on the Gulf Coast, are trying to find us oil because money is to be made in refinery. So people believe in, you know, domestic should be used.

I remind you that this is Canadian oil, and about 5 of 20, about a fourth of what we're using is going for exports. So how is that domestic or keeping what we'd like to keep in the United States? I don't see it.

My third question is, what is the overall plan for Minnesota? This company is not being honest in the sense of they're not sharing with Minnesotans. What are they doing overall with other pipelines when they become aged, too, and need replacement?

Line 3 is the third oldest pipeline that Enbridge has. What are they going to do with their first oldest and their second oldest, Line 1 and Line 2?

And they also have trouble with Line 4. Line 4 has been running at pressure

restrictions, so we know they're having trouble with that, too.

So I think they should be honest as a company, and if they're really saying they need a new route, are they planning to put these older line replacements in that new route as well?

I think people, landowners, should know that if they're thinking they may be signing over to this Line 3 replacement.

I'd like to say, too, if the oil is needed, if it's determined through the Public Utilities Commission that Minnesota needs this oil, then I think Minnesota has the right to choose the route.

It says in the EIS that the route permit process is -- determines where it should be located. That's in chapter 3, Regulatory Framework, but the way it really works is a company comes into the Public Utilities Commission with a route already predetermined.

They've already contacted landowners, even though there's rules and regulations saying they shouldn't do that until after there's a route permit. So they've

already kind of made up their mind where the route is going to go.

What does Minnesota have to say about that? This is the first time that citizens are saying in this decade Minnesota should have a right to choose the route.

There's been comments made about oil by rail. Oil by rail still (indiscernible) -- we're talking about loss of life is certainly very significant, but Bakken North Dakota oil is extremely volatile. That's what blew up at Lac-Megantic when 47 people were killed.

The oil coming down from Canada is a much thicker kind of oil. It's bitumen. It's used in the making of asphalt. Very thick. It's as solid as a hockey puck at 55 degrees.

We've already had a derailment in Parkers Prairie, Minnesota, in 2013, where I think three rail cars spilled this bitumen.

I went and talked to the Pollution Control Agency when I first started getting interested in pipelines and crude oil and what's happened to our country, and the

Pollution Control Agency told me it was winter, the oil was so stiff that they could roll it up like carpeting.

This is not the volatile oils that we're seeing out of North Dakota, so it's not a risk a human life like that oil is.

I'd just like to say this oil is harming people. We're seeing increased rates of asthma along freeways where kids are living, and we know that fossil fuels are causing harm with our atmosphere.

So I'm up here asking us not to build a cigarette factory, too, or a string of cigarette factories across Minnesota, because we know cigarettes hurt our lungs. And I don't want our kids smoking, if at all possible. I don't really want them smoking diesel fuel either.

Thank you for listening, and those are some of my questions.

FACILITATOR: Thank you.

Other individuals who haven't commented who would like to make a comment. Name and spelling.

MS. NICOLETTE SLAGLE: Hi,

Nicolette Slagle, N-I-C-O-L-E-T-T-E, S-L-A-G-L-E.

I'm with Honor the Earth. I'm the research director, and I wanted to add a little bit to Kathy's statement, and again, reflect on something that should be included in this Impact Statement.

And that is the impact of the tar sands oil, the extraction and what this oil is doing to the people in the Athabascan region, and that it could potentially do to the planet as a whole.

What you guys may or may not know is that this is oil coming from the tar sands, this is the dirtiest oil, the most expensive oil, and the least return on investment oil.

So when this project -- when Enbridge first started looking at the Sandpiper, when Enbridge first started looking at their new expanded Line 3, oil prices were somewhere around $80 to $100 a barrel, and they're currently trending at about $40 a barrel. And the cost to produce a barrel of tar sands oil hovers around $74 a barrel.

So what we are seeing is an

atmosphere where even economically it does not make sense to continue to extract oil from the Canadian tar sands area. In fact, in the last several years, we have seen a number of international oil corporations that were invested in that era pulling out.

The Norwegian government has done it. Shell Oil has done it. I believe Exxon has done it or is in the process of negotiating it now.

So the only companies that are currently still invested in that area are the Canadian companies, because, kind of, they're like betting their last buck on this, and like a few Chinese corporations, which don't generally have the best environmental ethics.

Maybe not somebody that you want to look at as a model of industry that we want to invest in.

About the energy that's used, they use an extreme amount of natural gas also to power the extraction process. And at the end of the day, the amount of energy produced that we get out of the tar sands once it's extracted, upgraded, pushed through the

pipelines, refined, and finally combusted -- and are very inefficient internal combustion engines -- the amount of energy that we have yielded is microscopic in terms of the amount of energy that we put into it.

So that's two things about the tar sands.

The third thing about the tar sands is that it's kind of like new oil, okay. A lot of the oil that is conventionally produced oil is much cheaper, and it has gone through many more geologic eras than the tar sands oil which is Boreal Forest. It's basically oil on its way to becoming oil.

And so because of that, it's very carbon intensive oil. It's about 122 percent higher than -- that chart is not very clear.

But it is the most carbon intensive source of oil there is, also.

And this Impact Statement needs to look at those facts, that this investment, this allowance of this company, Enbridge, to come through here and put in this new pipeline is investing in a dying, outdated process, outdated system.

Also, what you guys may not be aware of is this is not the only big tar sands pipeline project on the table.

Keystone XL, which you may or may not have heard of, TransCanada, Trans Mountain Pipeline; there is three to four major pipeline projects coming out of Canada that both the CEO of Enbridge and the CEO of TransCanada have stated that if all of those pipeline projects get built, there will be one pipeline too many.

If there's that amount of backstabbing between those companies saying there's going to be one too many, you can almost kind of guarantee that there's probably two too many and probably four too many.

And also, Al Monaco, the CEO of Enbridge, has stated that Enbridge needs to transition away from fossil fuels. So he has said that Enbridge needs to transition away from fossil fuels, and there will be too many pipelines if all these pipelines get built.

So what I want to know is why should the people of Minnesota and the native people in the 1855 Treaty area bear the burden of risk for Enbridge to get their last and

final petroleum pipeline put through?

Thank you.

FACILITATOR: Thank you.

Other comments individuals want to make tonight?

There's a gentleman right here, so we'll bring you the mic. Name and spelling.

MR. JOHN LEROHL: Hi, my name is John Lerohl.

I'm the county commissioner here in Red Lake County, and I think we're mixing apples and oranges here. It seems to me what we're here talking about is a replacement line.

There already is a line in the ground that is already pumping oil. It's just that it's not in good shape. So they want to replace it with a new one, and better.

I think the oil that's coming in through here is going to keep coming. It's coming now and it'll come next week and next month, next year. We can just make it a little safer if we go with the replacement line.

To me, the pipeline is still the best way to ship oil. It's the safest and most economic.

That's all I have to say.

FACILITATOR: Could you spell your name for the reporter.

MR. JOHN LEROHL: L-E-R-O-H-L, John.

FACILITATOR: Next.

MR. CHUCK SIMPSON: I'm Chuck Simpson. I'm also a Red Lake county commissioner.

I didn't see any bicycles when I pulled up here today. That tells me that we all need this oil. As far as we're concerned, in Red Lake County it helps us taxpayers.

That's all I got to say. And I'm in support of the pipeline. Thank you.

FACILITATOR: Commissioner, can you spell your last name, please.

MR. CHUCK SIMPSON: S-I-M-P-S-O-N.

FACILITATOR: Other people who would like to comment tonight?

Anyone else who would like to

comment tonight?

Again, there's gonna be -- people can write down written comments. They can go right into the box there.

Janet, raise your hand. She will take comments directly.

Again, as Jamie said, the public comments, and then you can send written comments in. There's actually an email address on the back of the brochure that you were handed out as you came in.

They're due by July 10th.

People will be here tonight, posters, folks will be here; ask questions, have a conversation.

There's plenty of food in the back.

Thanks for coming out tonight. We appreciate everyone's comments, and we'll be here for a bit. Thank you.

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DEIS MEETINGS - 14-916 15-137

GULLY - JUNE 21, 2017 - 10:00 a.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Gully Community Center
120 Main Street
Gully, Minnesota

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FACILITATOR: Thanks for coming out. My name is Patrick Field and I work for the consulting team on behalf of the State of Minnesota and I'll be moderating the public comment period today.

But first we wanted to start with a short presentation really to talk about the process. And Jamie MacAlister, who is the project manager from the Department of Commerce for the State of Minnesota is going to share with us a bit about the process; where we've been, where we are, where we're heading.

I'll then talk about how to handle the public comment and we will dive in.

Jamie, over to you.

MS. JAMIE MACALISTER: Good morning, everyone. Thank you for joining us. Hope the coffee is not too bad. We were having some trouble, but I think we got that figured out.

I hope everyone has had a chance to walk around the posters and talk with the agency staff that are here today to answer questions, and hope you find information in

the Draft EIS.

We have folks here from the Minnesota Department of Natural Resources, the Pollution Control Agency, and the Public Utilities Commission.

So we are here today to talk about the Draft EIS. The Draft EIS is not the decision-making document, but it is the document that informs the two decisions that the Public Utilities Commission needs to make.

And the first of those decisions is the Certificate of Need and the other decision is the route permit.

So we are still in the middle of a very long process. We were out here about a year ago in the project area, scoping for this project, and your comments during scoping were used to develop the scoping document that was used to develop the Draft EIS that we're here to discuss.

And currently we're in the comment period phase for the Draft EIS. That closes on July 10th.

Once we get all those comments in, we will be preparing a Final EIS, and the

Final EIS and this entire record then gets transferred over to an administrative law judge and the Public Utilities Commission, and they run a series of contested case hearings.

Those will be held in the fall of this year, and once those are complete, the judge will write a report and submit that information to the Public Utilities Commission for consideration in their deliberations.

And that is expected to take place and -- final determinations are expected to take place in the spring of 2018.

So today we're here to get your comments on the Draft EIS. And what we're looking for from you is to find out if there is information that is missing from the document, if there is information that we could make more clear, or if there are other things that we can improve in the document to help us write the final and make sure that the Public Utilities Commission has the best available information for them to make their decisions with.

So just a word on comments. All of the comments that we have are treated

equally. This is not a voting session. We will take your comments orally. We will take them in writing today. You can send them in or email them in at your leisure, so long as they are postmarked or time stamped by July 10th. We will use those in developing the Final EIS.

All of your comments will be available online from this meeting as well as from other meetings. So you'll be able to go and see your comments or your neighbor's comments or any of the other comments that were made at these meetings that we've been having over the past few weeks here.

So with that, I'm going to hand it back to Pat. He's going to get us started on the oral portion of our meeting. Thank you.

FACILITATOR: Thanks, Jamie.

So I just want to cover a few of the procedures for the public comment and we'll go from there.

A few things: If you do want to take a copy of the Draft EIS home, the Environmental Impact Statement, we've got

either a flash drive or CD you can take home.

So it's right there at the back at the registration desk in case you want one of those. So we've got those for you.

So the way we do public comments is I've got folks who put their names in the box, so I'll call on them first, and then I'll check for a show of hands for others who want to comment.

Typically, we have a bigger meeting, we're a little more tight around time. Here I think we've got a smaller group so we not particularly picky about the time.

We'll run a timer. If people can keep their comments to five, six minutes. Around six, six and a half, I might stand up and then that's a signal, if you're still talking, to maybe wrap it up. Because usually people can get their key points in that period of time.

When people do comment, we want to make sure that they are able to give voice to their viewpoints. So we ask that when people do comment, other people listen during that time so that they can speak.

We have a court reporter here who is capturing every word. It is important to use the mics and kind of hold it here -- sometimes people get distracted and then our court reporter can't hear. So we do ask that you do that.

When you start, say your name, spell it for the record, and then the floor is yours to make your comment as you do it.

We do ask that people be respectful of a range of opinions. People in the rooms may have a range of opinions about the DEIS, about the project, et cetera. That's to be expected in a public process. We just ask that people be respectful.

For someone who has spoken, if you want to be affirmative with applause or whatever, that's great. We just ask that people not be negative about people's comments.

We also ask that people direct their comments to the document, to the issues, the agencies, organizations, but not to individuals in the room, because we want everyone in the room to be comfortable and not

in any way feel singled out.

The State's role, State folks, do you want to raise your hands here, State agency people. So their role during the public comment period is to listen.

So again, through this, through written comment, people submitting comments by July 10th, they will gather all that, they will think about that, they will take that under advisement as they produce the final.

And so this is a time for them to really listen and hear the comments that people raise during the public comment period.

I do ask that people turn their cell phones on vibrate or do not disturb, so we don't have that kind of disturbing us in the middle of the comments.

The last thing, Leslie is going to be our mic runner today. She's going to bring the mic to you. So you can be comfortable in your seat. You can stand or sit, however you want it, but we'll bring the mic right to you and then we'll have you go.

Once you start and state your name and spelling, we'll start the clock.

It'll be up there on the screen.

So with that, I think we are ready to go. So the first person I have to comment is Tom Anderson.

MR. TOM ANDERSON: My name is Tom Anderson, spelled T-O-M, and last name, A-N-D-E-R-S-O-N.

I'm a life-long farmer, farm right next to Clearbrook. I'm a third generation farmer and I have a son that farms with me, and I also have grandchildren that are active in 4H with agriculture and livestock projects.

I'm a former county commissioner. I think I've always been active in my community, and I'm currently on the board of directors of the Northwest Minnesota Foundation.

I would say my roots in this area are about as deep as they can possibly be. And I feel my life's work has demonstrated a commitment and concern for the future of this area.

It's only by chance that I happen to have a close involvement with Enbridge.

Like most farmers, I ended up farming close to the area where I grew up.

The first land that we purchased was in 1975, and it just happened to include right of ways for both Enbridge and Portal, which is now called North Dakota Enbridge.

Over the years we've added to the farm and now have approximately three miles of right a way, with some parcels having as many as eight pipelines buried.

The point I'm trying to make is I have never felt the least bit insecure or apprehensive living in such close proximity to all the pipeline activity.

They've always been good neighbors and do their best to treat landowners with respect. To me, it's obvious the most sensible, safe, and efficient way to transport oil is by means of underground pipelines.

No system is without risk, but nothing compares to the safety and efficiency of an underground pipeline.

The economic benefits to the area are almost immeasurable and have been mentioned many times.

In comparison to many other small towns in the area, our small town of Clearbrook has remained relatively healthy. Increased tax base, employment opportunities, and ongoing construction and maintenance contribute greatly to our area economy.

Much has been said about the need for this project. I see it as very necessary for I have seen firsthand the number of integrity repairs done on our farm and the surrounding area.

To me, a new line properly installed and inspected is much safer for the environment than an aging line with deficient steel.

Also, I prefer to see the old line left in the ground. To me that is much less invasive to the environment and to the existing pipelines that are right alongside of it but in the same corridor.

And to claim that we don't need the oil, I would argue the opposite. Even if it would mean the country would have a small surplus, this would be a huge factor in stabilizing oil prices, ensuring that we aren't

held hostage pricewise by the OPEC nations.

Finally, as to the carbon footprint, I'm as concerned as anybody about this issue. I would hope that the final route selected follows the existing utility right of ways, thus providing for more efficient surveillance and maintenance.

When a plane flies over our farm, it surveys eight pipelines. And to me that's pretty darn efficient. Hopefully in the future alternative forms of energy will come on board and help meet the growing demands by population growth and modernization of undeveloped countries.

One of the most rewarding things to me as a farmer is observing how, over the course of my farming career, modern agriculture has improved the efficiency of production to where we can now produce higher yields with just a fraction of the energy of fuel used years ago.

A stable and reliable fuel supply is extremely important in helping us as farmers continue to improve in our efforts to feed the world.

Thank you.

FACILITATOR: Thank you. The next commenter is Allen Richardson.

MR. ALLEN RICHARDSON: My name is Allen, A-L-L-E-N, Richardson, R-I-C-H-A-R-D-S-O-N.

Good morning. Thank you for the opportunity to speak with you. I am an organizer by trade and I've worked for labor organizations and I've worked for environmental groups.

And I just want to say that I don't enjoy being on the opposite side of an issue against labor.

But it's been my privilege here recently to do some outreach with an outfit called Minnesotans for Pipeline Cleanup.

I think there's a lot of common ground to be had here. So I'm going to talk about some of the particulars with the environmental impact statement, but my point here is about jobs, it's about property rights.

And again, I think there's a lot of common ground to be had.

So to start with a question. What we're advocating for is a landowner choice option, so we're not even suggesting that the entire old pipeline be removed. And I'm talking about the old Line 3, south of Clearbrook.

So the question is, if a landowner, a private property owner who's hosted that pipeline for decades, if they want the pipeline removed from their own property, lock, stock, and barrel, not just flushed out, is that reasonable?

If it's technically feasible to do that, is that a reasonable request? And if it can be done, which I believe that it can because, of course, Minnesota's got the qualified labor to do that kind of work, who should foot the bill for that?

Should it be the landowner, or should it be Enbridge?

And I've spoken to different people on every side of this issue, but to date no one has ever told me that the property owner should be on the hook financially for a situation like that.

So the next question is, is it technically feasible to remove those lines in a situation like that? The environmental review documents suggest that there is some potential danger, given the proximity to the abandoned line to hotlines.

I just want to say that, again, the documents claim that in general, the pipelines are 10 or 15 feet apart.

We took it upon ourselves to walk the distances between pipelines between Wawina and Grand Rapids on publicly named thoroughfares and found there is quite a bit more room there between Lines 3 and 4. There's an average of 30 feet.

So we would like to see some more clarification on the technical capacity to removing lines and exactly how far apart they are.

We observed last night that Line 13 is nestled snugly between Lines 2 and 3 and what amounts to about a 12-foot gap. So that tells me if you can get a new pipeline between two existing hotlines, you should be able to take out an abandoned line between two hot

lines.

Really, this question of safety has already been determined since Enbridge estimates the cost of removing Line 3 as approximately $1.28 billion and there's a good chance that figure has been lowballed.

So I guess my question is, how many jobs would that make? I think it would probably be a lot. I think we want to get on the right side of this precedent.

We're establishing a precedent vis-a-vis pipeline abandonment. We know that Enbridge is likely to want to abandon the rest of their older pipelines.

So I'm basically encouraging the labor community to publicly throw in their lot with landowners who are asking for this landowner choice option.

And you know, finally, the documents, also on the question of environmental justice, it says, "Removal of the existing Line 3 could positively affect these communities by removing stress and anxiety related to the presence of the abandoned pipeline and ongoing risks related to overflow,

soil and water contamination, and subsidence."

So if you could do right by landowners in these affected communities and tap into $1.28 billion in potentially economic stimulation, taking the long view to get yourself some work on these other pipelines which are slated to be abandoned, why would you not do that?

Thanks for your time.

FACILITATOR: Thank you, Allen. So those are the two names I had in the box, but there may be others who want to comment.

If there are others who want to comment, raise your hand and I'll work through the folks who want to comment.

Other folks in the audience who would like to make a public comment? Don't be shy. We're happy to hear it.

MR. DANIEL STENSENG: My name is Daniel, D-A-N-I-E-L, Stenseng, S-T-E-N-S-E-N-G. I didn't plan to speak today, but I'm a commissioner in Clearwater County, just across the line here.

And by way of disclosure, I have no interest, personal or financial, in any

pipeline, any railroad, any power line or trucking firm. My interest is my people, their jobs, and our economy.

The loss of a $2 billion project like Sandpiper really hurts, really hurts in northern Minnesota.

Now, I farm on property that is crossed by the Koch pipeline. Enbridge runs through my son's property, and I'm personal witness to a spill just across the road from his place.

And Enbridge took out the oil, purged out the oil that was there, and then they excavated the soils that were there. They brought in new soil, replaced that soil, and I can tell you that every creature, every plant that was there is there. Every insect, every reptile, every mammal, every bird, everything that was there is there today. It's been cleaned up.

So it's not like it doesn't happen, but they know how to take care of it.

There's a thing over here called Environmental Justice, and in Clearwater County it refers to the White Earth Reservation, and

it refers to the Census Bureau, the census.

Now, when we did the census, the reservation was censused separately from the rest of the county. So I'm not sure how that really works there. I think there needs to be some other explanation on that.

Thank you.

FACILITATOR: Thank you, sir. Other individuals who want to make a comment?

Name and spelling for the court reporter, and then the floor is yours.

MR. JOHN MUNTER: My name is John Munter, J-O-H-N, M-U-N-T-E-R. I'm from Warba, retired guy, and I want to make a comment that this DEIS is terribly slanted towards Enbridge's preferred routing.

I've got this little show and tell here of part of the DEIS from the executive summaries. Probably very few people will do anything more than read the executive summaries. That's why it's so important.

We have this handy dandy little graph here. Red on the side is bad. Green is good. And Applicant's preferred route here on the right is all green, as you see.

And the system alternative SA-04, the third one over, it's got some red, it's got some orange. It's not so bad, but it's not preferred by this executive summary as the preferred route is.

We see -- we'll go deeper. The reason why it's red and orange and that type of thing is because drinking water areas of interest, it's got a lot more wells. It's got a lot more people.

What it doesn't say is -- I mean the wells and the people are on thick topsoil.

If you look down a little bit further, biological areas of interest, you see 99,000 or 102,000, actually, in the Applicant's preferred route for acres, 369 acres for system alternative four.

So the lakes, the forests, the rivers, the wetlands and all this, 102,000 you're going through in the biological areas of interest for the Applicant's preferred route. And only 369 -- so that's like one-third of 1 percent -- has the biological diversity and the streams, forests, and rivers and all this.

And that should be way -- much,

much more there.

And commodities of interest, commodity production areas, too, the preferred route is 37,000 compared to 191. This is probably all wild rice you're talking about here.

Now, the DEIS is leaving out a lot of data from the last couple of years.

One is the Minnesota Pollution Control Agency's letter of January 23, 2015, which they recommended the southern route as opposed to the preferred route going through lake country.

And they have eight reasons why and I'll see how many I can get through here.

"1: The adverse impacts to high quality surface waters, the waters that are listed as impaired along the SA-Applicant route are likely to be higher quality.

"50 impaired waters of the Applicant preferred corridor may not be so on the lower standards of SA-03-04 agricultural land.

"2: Significant environmental damage would occur from a release at or near a

water crossing extending up to at least a distance of ten miles from the point of release.

"SA-Applicant has many areas of limited access, increasing the risk of extended impact of surface waters."

So SA-Applicant is the preferred routing we're talking about here. They use different terminology. Instead of SA-04, the southern route, they call it SA-03 in this document.

"Number 3: Potential damages during pipeline construction and testing are greater for SA-Applicant than other alternatives.

"During the Alberta Clipper/Southern Lights diluent project, for example, Enbridge exceeded agreed-upon maximum discharge rates on 15 of its hydrostatic testing discharge operations.

"During these hydrostatic testing operations, as much as 4,000 gallons of water per minute can be discharged from valves." And this is during construction.

"Placement of the new terminal

construction west of the proposed Clearbrook location as suggested by MPCA will assure that future pipelines are located west and south of these pristine areas."

This is one of the resources the state is spending millions of dollars on to protect.

"Number 4: The threats to groundwater and potential drinking water supplies from SA-Applicant are difficult to assess but appear to pose more significant risks than the system alternatives, including SA-03.

"What is most important to understand about the soils along the SA-Applicant route is that the complexity of moraines in the area creates a significant degree of localized changes in groundwater movement that are very difficult to predict, as opposed to some of the flatter lands to the west and south.

"Number 5: SA-Applicant threatens a greater percentage of wild rice and native forests than any of the proposed alternatives, including SA-03.

"Number 6: SA-Applicant has a greater potential for impact on ecoregions than other alternatives, including SA-03, 4."

"The SA-Applicant preferred route has more locations" -- number 7 -- "with poor access in the event of a release than SA-03 or other alternatives."

And then number 8: "SA-03 and 04 and other system alternatives follow existing corridors to a greater extent than does SA-Applicant."

One other really discriminatory passage I wanted to bring up here in the system alternative is under "ground water."

Here it only has two paragraphs, and the second one, the last one is, "SA-04 is the only Certificate of Need alternative that crosses vulnerable (indiscernible) topography which involves fractures, joints, sinkholes, cavities, caves, and stuff like that.

Well, it doesn't say that it's really covered by topsoil, too. And it's not just opposed to the problems of the preferred route, which have a lot of definition in their topography so water flows a lot faster, and

you've got lakes and rivers and (indiscernible) put an aquifer and not just possibly threaten somebody's well.

You're talking about polluting larger bodies of water in the glacial marines that make it very difficult to figure out where the water is going.

So this is a very prejudicial executive summary and it should be drastically changed from what it currently depicts.

Thank you.

FACILITATOR: Other individuals who would like to make comments?

There are comment boxes back there. If you want to do a written comment, you're more than welcome to do that.

We also have a court reporter who's sitting on the edge of the comment table who can also take your comment individually, if you prefer talking one-on-one.

It looks like we've captured the comments people wanted to make publicly. State staff will be here for some time. If you want to go back around the posters and ask questions, great.

If you want to sit in the back and write a written comment or talk to a court reporter, that will be terrific. We're going to be here past noon and up to potentially about 1:00 o'clock.

So appreciate you coming out, stick around, have some food, visit. We did have some conversations about some of these different posters and we appreciate the comments that were made.

So thank you very much.

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MEETINGS - 14-916 15-137

BEMIDJI - JUNE 22, 2017 - 6:00 p.m.

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916
OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Sanford Center and George W. Nielson Convention Center
1111 Event Center Drive NE
Bemidji, Minnesota

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FACILITATOR: Good evening, everybody. We would like to start the public comment period, so we ask people to get settled. There are a few scattered chairs at the tables. We're going to try and bring in some chairs around the outside as well.

So bear with us one second as we do a little bit of moving things around to accommodate the terrific turnout that we have tonight.

Just a few words. As you know, for safety reasons there's exits in the way that you came, of course. There are actually exits here right here, the doors as well there, and those are the exits. The bathrooms are actually out here back towards where you came in and then back down that hallway as well.

My name is Patrick Field. I'm working with a consulting team with the State of Minnesota, and I'll be moderating the public comment period tonight, which I'll say a little bit more about in just a bit.

But I first want to turn the mic over to Bill Grant, who's the Deputy

Commissioner from the Department of Commerce from the State of Minnesota, and he's going to walk a bit through the process of where we've been, where we are, and where we're going with the Draft EIS.

DEPUTY COMMISSIONER BILL GRANT: Thanks very much, Patrick, and thanks everyone for coming tonight.

As Patrick mentioned, this is a great turnout and we really want to try and accommodate everyone who wants to make a public comment tonight.

So bear with us both as we make sure that everyone has seating who wants it and that we move through the comment cards just as quickly as we're able to.

So to be clear, tonight's meeting is hosted by the State of Minnesota. And we're here today to take your comments on the Draft Environmental Impact Statement for the Line 3 project.

The Minnesota Public Utilities Commission will make two decisions.

First, whether to issue a Certificate of Need in this matter, and if

they do, then they would need to also issue a route permit for the route that they decide to move forward with.

Multiple state agencies have been involved in the preparation of the draft Environmental Impact Statement. In addition to the Department of Commerce, the Minnesota Pollution Control Agency and the Department of Natural Resources have played a major role in assisting us in developing the draft.

The EIS is not a decision-making document. It is designed to inform decision-makers as they consider environmental impact, socioeconomic impacts, and all the other issues associated with the proposed project.

I'm not going to try and go through the whole timeline here, but the process began in 2016, after the submittal of an application by Enbridge Energy for an application to the Minnesota Public Utilities Commission.

The Final EIS will be prepared and delivered to the PUC later this summer, and there will be a number of opportunities,

both before and after that, to comment on the Certificate of Need and route permit in hearings that will be held in many of the same locations as the public meetings that we're just now wrapping up.

And those will be in September and October of this year, and there will be ample notice about the location and timing of those as those dates approach.

We're here to seek your substantive comments on the Draft EIS. What we would like to know is is there information that's missing from the document, is the document unclear in any way, and what could be improved about it.

Once we've received all of your comments, state agency staff -- I'm sorry, state agency staff are available, as you know already, have been throughout the evening so far to answer questions about specific sections of the draft at the various posters here.

Written and oral comments can be submitted in a number of ways and they're all treated equally. And all of those comments

will be compiled and shared with the public.

We're reviewing comments now and we'll continue to receive comments after tonight in written form until July 10th. So that is your opportunity to comment on the Draft Environmental Impact Statement.

As I mentioned, there will be future opportunities as the process moves forward.

So with that, I'm going to turn it back to Patrick.

FACILITATOR: So just a few words about the comments themselves. There's multiple ways you can comment. You can, of course, make a verbal comment tonight. You can make a written comment. There's boxes scattered over on this side of the room, and there are these two court reporters outside who can take your comment individually all during the evening as well.

And as Bill said, you can turn written or emailed comments in by July 10th. And all of those comments, regardless of how you submitted them, are treated the same.

Just to let you know, all the

comments will be compiled in the transcripts from the 22 meetings. This is 22 of 22. All the transcripts will be compiled, along with all of the public comments written and received.

Those will be posted online, and those will be considered by the State as we move from the draft to the Final EIS.

A few words about tonight. So one, thank you for coming. We know the room is full. We really appreciate people being patient with the crowded space. Appreciate folks as we came in -- it's a facility requirement that security search bags and backpacks. So we appreciate people's patience as we did that as well.

A few words about how we're going to have the public comment. We've got anybody who wants to make a public comment put their name in here. We've got a bundle of folks.

Because of the number of people who want to comment, we're going to have to limit it to three minutes. I'll explain that routine in just a bit.

If you want to make a longer comment, again, you can write it, talk to the reporter individually as well.

If you are reading from a statement, it is very helpful to the court reporter, our terrific court reporter up here in front, Lisa, if she actually has the written comment as well as what is spoken.

So if you have the written comment, it would be great if you spoke it. So if you have written comment and are willing, it would be great if you'd hand it to the microphone holder as you finish, just so we can have it for our court reporter.

So here's the ground rules for managing the public comment period: One, we want to make sure anybody who wants to comment, we'll do our best to hear the comment. Everybody wants to. We can't promise we can with the numbers, but we're going to do our best with the three-minute time limit.

When someone is speaking, we ask the room be quiet. We have some people who are standing. If it gets uncomfortable, we

are actually mic'ing the sound out into the lobby.

Even though I know you think you may be whispering when someone else is talking, we actually can hear you. So don't whisper. If you need to have a conversation, take it outside, just so we make sure we hear everyone who wants to speak.

When the person is speaking, we ask people don't interrupt. It's their three minutes to give their voice and their opinion, whatever it may be. We ask that people listen, be respectful.

At the end of that comment, if people wish to be affirmative with applause, that's fine.

We ask that people not be negative about other people's comments, whatever they may be. We do ask again that you honor the time limits. So we'll show a clock up here, you'll be able to see as you speak, just to give you a little visual reminder wherever you are.

About two minutes, 45 seconds, if you're not finished, I'll stand up. That will

be the signal to finish. And then at three I'll say, "Thank you," and ask you to wrap up; only to make sure we provide time for as many people as possible.

We recognize there's going to be a range of views about the project, about the EIS in this room, and that's the way it works. And we want to accommodate all of those views.

What we do ask, though, is that people be respectful of the various views even if you don't agree with them. And we do ask if people make comments, they make them to organizations, agencies, issues, the document, but not to individuals in the room.

We ask people not speak to individuals in the room as it makes people very uncomfortable. So we ask that your comments be generally given to the crowed as a whole, on the issues, on the subjects of the project and/or the EIS.

The State agency's role during this period is to listen. So State agency folks, do you want to just raise your hands so people can see the number of folks in the room.

Their role tonight and during all

of these sessions for public comment is to listen.

Again, it will be recorded by the terrific court reporter and that will go into the record and will be considered. Their job is to listen tonight.

We do ask that people put their cell phones on do not disturb or vibrate, so we don't interrupt people when they are speaking as well.

One other quick note: If you want a copy of the EIS, you don't have to take that home. There's actually flash drives and CDs available at the registration desk.

You can grab one on the way out if you want. You can take that home. It has the entire Draft EIS on it, including the map books as well.

The way we're going to handle the mics is we're going to bring you -- we've got mic holders. Just raise your hand so we can see you.

What we want you to do -- if I call your name, what we want you to do is raise your hand, and I'm going to call two in a row

so you know the person who's up next.

And then the mic person will bring you the mic. You can sit or stand, whatever makes you comfortable. Actually, if you can stay where you're sitting. This room is crowded, and it will be hard to move around. And just state your name and if you would spell it for the court reporter, and then you can begin your comments and it will start the clock so you can see your three minutes.

Why don't we pull up the clock, Andrew. If we can get the clock up and running, that would be good. Nikki's going to hand me two or three cards at once. If I mispronounce names, please forgive me; you can correct it for the record immediately.

I've got Debra Topping. I don't see her hand right now. The next is Annette Humphrey.

MS. ANNETTE HUMPHREY: Annette Humphrey, A-N-N-E-T-T-E H-U-M-P-H-R-E-Y.

I grew up here on Leech Lake, and my comment is about the resources and the effect on tribal land and its people with the expansion of line -- the Alberta Clipper and

also the abandonment and reroute of Line 3.

We know Line 3 is 63 years old and we know it's not suitable to be transporting oil anymore. So we all agree on that. That's good.

I think the detrimental effects on the tribal people on reservations isn't really covered very well in this document.

There's this thing called historic trauma, but it's not really historic, because we're starting all over on the new issue, and it's more, as Don Goodwin said, it's temporary trauma.

Because I've been thinking about this, I wake up thinking about it, and my kids got to deal with it.

And so the effects on our people can't really be put in words anyway. And I know it's hard to understand the importance of these lakes, and you might think it sounds really corny, but we really truly are lake people in Minnesota.

There is a lot of water in Minnesota, and my reservation is 50 percent water.

And actually the borders of my reservation and the treaty lands aren't just within the boundaries of Leech Lake or White Earth or Red Lake. There's a map here, a Minnesota map that shows the treaty land; which we're on Indian land right now.

I am a veteran and I'm a grandmother and I have a college education. I'm a landowner. I pay my taxes and I don't drink. And I feel like I gotta say those things because sometimes people look at me and all you see is the Indian.

But I'm here with my grandson, that's a generation. My daughters, that's a generation. I'm a generation, and my mother -- mom, raise your hand -- and my mother is here -- our generations, and we've been using these same waters.

And we really, really have to have a real guarantee that -- and I'm not going to take any chances on water here. I want to know that we have water for my grandson's needs. And no one in this room can guarantee that. We've talked about technology, but you can't guarantee that.

So I feel like our people are -- we need to be here and be part of this regulatory process. And I'm here being part of it, as you all are, because it's our right as Americans, right, to say we have freedom of speech here.

I'm glad we're all here doing that, and I'm glad we all agree, too, that the oil is going to run out and we have to find other ways. I'm not saying shut the oil faucet off tomorrow. I drive a car. We all drive cars --

FACILITATOR: Thank you.

MS. ANNETTE HUMPHREY: But we can do better, guys. The sun, earth, and wind -- so if we can come together somewhere in the middle, that would be awesome.

Thank you. Miigwech.

FACILITATOR: Thank you.

I have Jane Kettle and then Charlotte Hughes.

MS. JANE KETTLE: My name is Jane Kettle. I feel really passionate about protecting our water. It's for our younger generations.

All we have to do is, you know, stop the oil, stop the pipelines for our reservations. We're at the reservation now, and it's very important that we look to our younger kids, because they are our future.

And we have the water spirits. Everything has a spirit, even the table you're sitting on, the chairs you're sitting on, even this microphone I'm holding. It's very sacred.

The waters, the long line for our mother, Mother Earth, is to protect our water.

Thank you.

FACILITATOR: Charlotte is next and then Andy Pearson.

MS. CHARLOTTE HUGHES: My name is Charlotte Hughes, C-H-A-R-L-O-T-T-E, H-U-G-H-E-S. And I'm coming from a younger generation here, and I would like to say that our generation is envisioning a clean, safe energy future.

We all want a safe energy future, but I want to say what we can envision that is. We want renewables. We want things that will not leak, that will not spill, that will not create toxins in our environment.

So I'd like to say about this Draft EIS, I'd like to say that we would like to see no abandonment. We would like to see a no-build option as a serious consideration here.

When I look at these options, I see different options of running the line and different options of abandoning or not abandoning, but I want to be able to see that we need to have these clean energy jobs for sure.

And one of those is by cleaning up this pipeline which would create way more jobs than actually building it.

And so I would like to see those jobs for all of us, and I would like to see this clean energy future. Because we have to go forward. We cannot go back. We will poison ourselves.

Thank you.

FACILITATOR: Andy Pearson, and then I have Nancy Beaulieu.

MR. ANDY PEARSON: Hello, thank you.

My name is Andy Pearson, A-N-D-Y,

P-E-A-R-S-O-N. Some of you may know me as the person who offered you a sticker when you walked in about opposing the pipeline project.

I have been to all 22 of these meetings, and I think it's important to say that those of us who are opposing this project, even those of us who may have been on the road for a while, are coming from a lot of different places as well.

And we were not -- we're not all, you know, just here to say no pipeline and that's what we've been doing all our lives.

My own example, I have worked for a union, and I have worked for the Minnesota Chamber of Commerce. Those might be things you didn't expect about somebody standing up here with a sticker. So I wanted to say that first.

Now, let's talk about the Draft Environmental Impact Statement. This is a document that was made with a lot of good intentions. I really do believe that. This is also a document that has some deep flaws that need to be addressed, some of which are real tricky to find; others of which maybe aren't that tricky.

So I'm going to do a little exercise here. I'm going to ask anybody who's willing to open up the book that you got when you walked in to page 16, and I'm going to refer back to a piece of paper I have over here. It's a big piece of paper; hopefully you all can see it.

Now, that's a graph that's on page 16. That's the relative spills of pipeline versus other modes of transportation. It's simply been made wrong, and the proof is in the little blue line for spill size, average spill size for pipeline spills. Thank you -- my lovely assistant will hold the sign here.

For pipeline spills, what the Department of Commerce did, they wrote a line right below that, that that number should be 462. That's the number.

But they measured it using the scale on the left, not the scale on the right, for purposes of making this graph. So this line is half as tall as it should be.

I think any of you with at least a couple of years of any type of education will see that. Anybody who graduated high school

should be able to see that right away. As soon as you look at the document, you'll see they made it wrong.

I believe there are many places in this document where that level of care was applied. That is what I trust, and I hope, that we will be seeing revised and improved in the next version of the Environmental Impact Statement.

The line should be twice as tall, exactly twice as tall. Look at it there. This is the better way to visualize the information. You can see how much pipeline spill compared to rail and truck. I want better visuals, better information.

I'm almost out of time, and I'm not a particularly spiritual individual. Not as much anyway as many others in this room. But I want to close by saying that by God, if there ever was a time when future generations were screaming at us to do the right thing, it is now.

Thank you.

FACILITATOR: I have Nancy Beaulieu and Hannah Smith is next.

MS. NANCY BEAULIEU: Nancy Beaulieu, N-A-N-C-Y, B-E-A-U-L-I-E-U.

I'm from Leech Lake. I'm actually a returning student. I'm in the nursing program. And just like Andy had mentioned, we have families, we pay taxes.

That's our land, and I understand with your alternative routes you guys have two passing through Leech Lake, and I know my tribe said no. So that would be a flaw in your system.

And our culture is discussed in the back. We should be first. It's our land. I drove here. Yes, I did, but you know what? I know a lot of things are made from oil, a lot of things, plastic. Our consumerism is killing us.

So I gave up body wash in a plastic container. I'm on a bar of soap. I do not use paper towels anymore. I use rags so there's less manufacturing. I use green bags. I travel less, and I'm very conscious about how I spend my money.

So instead of following trends, which will smother us in the next 10 to 20

years, I decided to live green and clean.

It is about the carbon footprint. Oil is old. That's old school. It's time for a renewable revolution. So everybody has to make a conscious decision every time you go out and shop.

I just recently gave a speech on climate change for my ethics class. And we're in bad shape. So until we stop coddling ourselves with consumerism and giving in to that demand for oil, we're all in trouble.

We have a future to think about. If you loved your grandkids, you would support not buying stuff that's made from oil. Almost a hundred percent of everything is made from oil.

So you need to stop coddling yourselves with consumerism. And when they say our economy is going well, well, guess what? Mother Earth is paying. She's paying the price. So it is time to go green and clean.

So, yes, I drive, but I gave up a lot of things. I even make my own soap, works great. I save $65 a month, and I have less plastic. Again, I don't use dryer sheets

because my soap doesn't create static. So there are better ways.

And you know what, just like at Standing Rock, they let that permit go without the EIS as soon as trucks came in.

So is that going to happen here in Minnesota? No, because we're going to resist, and we're going to resist all the way to the end, because we are the green and clean revolution.

So if you love your kids and your family enough, you would think about what you're throwing away, about your individual carbon footprint, and realize oil is nothing but our death. It's our slow death.

It's time for solar, wind, and water -- a long time ago already. So if you want to think about your children, look them in the eye and tell them you love them, clean up the earth for them.

They're going to be here a lot longer than you ever will be. Just because we're getting old doesn't mean we can't care. They have a long time left. So water is life.

FACILITATOR: Thank you. Hannah

Smith, and then after Hannah it's going to be Corey Masa.

MS. HANNAH SMITH: Boozhoo, hello. Hannah Smith, H-A-N-N-A-H, S-M-I-T-H.

I really appreciate everyone coming out here and voicing their opinions. I think that's a very good use of your time as citizens, and I believe that some of the processes that we're going through, such as putting out an EIS that is 5,000 pages long and then having a few weeks to look it over as citizens, that's really difficult to do. So that's my first point.

The second thing I want to say is that there are a lot of issues going through, and I'm hearing those here today. Some of the little technical problems about the numbers, and I believe that it would be irresponsible for us to use this Environmental Impact Statement as a true analysis of what this pipeline will do to our ecosystem.

That's it. Miigwech, that's it.

FACILITATOR: Thank you. Corey Masa, and then Natalie Boyd, Natalie?

MR. COREY MASA: Hello, my

friends. I started this path that I'm on when I kind of realized --

FACILITATOR: Corey, can you spell your name for the court reporter?

MR. COREY MASA: C-O-R-E-Y, M-A-S-A.

Yeah, so I realized how implicit I was in kind of like the world destroying machine, we'll call it, like half the species are dead in the last 30 years.

The climate's kind of crazy. My grandparents died early of cancer deaths because of the crazy poisonous extractive lifestyles.

And then I -- it kind of made me sick also, and I completely surrendered to Great Spirit or Holy Spirit, and it's been a really magical path. And I've lived in communities that they don't use fossil fuels at all.

And yeah, they're really forced to, like, play with the kids and have theater class and grow their own food. And that village, kind of like tribal lifestyle, is really beautiful.

And that's only possible -- living without fossil fuels is only possible if you come together as a community and organize and really see the water as your grandmother.

When you look at the water like that, then you don't want to put pipelines in because they always spill.

So to really shift to a creative culture requires a lot of cooperation and ingenuity and creativity, but we definitely don't need anymore oil extraction.

And so building a new pipeline doesn't make sense.

But I would encourage you to take bold steps towards a regenerative life, you know, for healing and health and happiness.

FACILITATOR: Thank you. Natalie Boyd, you're up next, and then it's Debra Topping.

MS. NATALIE BOYD: Hello. I've come to understand that people like to hear a specific section mentioned when we're talking about these things.

So I'm going to talk first about section 11.2, where they say, "Based on

recommendations from the MPCA, low income populations are individuals with income below 185 percent of the poverty level."

And I just want to say that no matter what metric you use to measure what low income is, we are all low income compared to oil companies. We will never have the resources that these companies have to push through their agenda. That's just one small thing I wanted to say.

In section 3.6.3.7, Enbridge will seek a utilities exemption from the Wetland Conservation Act in the wetlands replacement requirements.

First of all, I wanted to know by what standards Enbridge and this pipeline are classifying themselves as a utility. And second of all, what does this say about Enbridge's commitment to the environment and clean building; that they would say that they don't have to replace wetlands that they destroy like everybody else is supposed to.

In section 3.6.3.4, "Consultation with the Minnesota State Historic Preservation Office encouraged but not required." Likewise,

the Applicant is only encouraged to consult with the Minnesota Mississippi Headwaters Board."

And I want to know why these organizations don't have the same weight as others. Why is consultation with these organizations not required?

In 9.4.2, "Cultural Corridors. The MIAC recommends a survey of the proposed route prior to start of construction to identify areas of historical or spiritual or cultural significance."

But this hasn't happened yet. It is still an afterthought rather than an actual factor in the decision-making process.

These things will happen, if they happen at all, when the process has already been approved. This illustrates the continued negligence of native communities.

While there's a lot of language in the EIS talking about native communities, there is no, virtually no meaningful action proposed.

FACILITATOR: Thank you for your comment. Thank you very much.

Debra Topping, Debra?

Aaron Camacho. After Aaron, it's going to be Phillip Wallace.

MS. AARON CAMACHO: My name is Aaron Camacho, A-A-R-O-N, C-A-M-A-C-H-O. I'm part of the Potawatomi. My native name is (indiscernible). It means Returning Thunder Woman. I actually reside in the state of Minnesota -- not Minnesota, but Wisconsin. I actually live -- if you know where Winona is, I live right across the bridge in Wisconsin.

I'm in Minnesota every day. And I'm fully aware that this EIS statement does state that the pipeline will go from a certain point in Minnesota to Superior, Wisconsin.

That's an issue for me. It's an issue for my family. It's an issue for anybody that drinks water south of where you all live. The privilege that is being manipulated is disturbing.

You all have family, right. You all have fellow U.S. citizens south of the state of Minnesota. You're responsible for what happens to them.

If you allow this pipeline to

come through, you're going to have blood on your hands, children with defects, and genetic -- just anomalies, right.

It's not fair. How can you do this to them? How can you do this to the people in Iowa? How can you do this to the people in Missouri and Kansas, all the way to the Gulf? We all know the Gulf is in big trouble. It's sick. It's sick. We are killing our earth.

If we think for a minute that we can survive without it, we don't deserve to be here. And I'm fully confident that the earth will continue on, the animals will be here, and the water will recover.

But we won't be here. You all are going to have to, for better or for worse, be accountable for what happens to people in the future.

Look at what happened in Michigan with Kalamazoo. Look at what happened with all these pipeline spills and what we're seeing. People are sick in Canada. They have sores all over their bodies and lesions.

The animals around the pipelines,

and the Bakken fields that the pipelines allow, it's just sickening. How can you do that? In your soul, how can you do that? Are you willing to sell it for black water?

I say this with love, right. I know it's loud and it's forceful, but it's my heart speaking to you.

With the 40 seconds left over, I really need you guys to be aware that in the state of Michigan, people, legislators, lawmakers are facing manslaughter charges, manslaughter charges, because they were neglectful of the population that they were in charge to protect.

You have a chance to protect. Really think about it. Miigwech.

FACILITATOR: Thank you.

Phillip Wallace next. And then I've got Nick Kaneski.

MR. PHILLIP WALLACE: Phillip Wallace, P-H-I-L-L-I-P, W-A-L-L-A-C-E, and I'm here today in support of this pipeline project.

I represent the UA pipeline, welders, fitters, and helpers that live in Minnesota, and many of them right here in the

Bemidji area, that have made their living working on Enbridge pipelines, pump stations, and storage tank farms for many years.

Enbridge has committed their construction jobs to highly skilled and trained union craftsmen to build the best and safest pipelines in the world. That is the very reason Enbridge wants to replace the old Line 3.

This pipeline was built in the early '60s, and it has outlived its life. Public safety is number one priority with union craftsmen and Enbridge.

In 1963, the 262-mile pipeline, Line 3 pipeline, was put into service to transport Canadian crude to refineries in Superior and other refineries and put back into the Minnesota markets the gasoline, diesel, jet fuel, and heating oil and many other petroleum products we use every day -- the petroleum products we use every day.

Whether you know it or not, Minnesota, Wisconsin, and Iowa and many other states have used Canadian crude for over 60 years. It's nothing new.

Now Enbridge wants to take the 282-mile Line 3 out of service and replace it with 340 miles of new pipeline. The extra 58 miles were added to reroute to avoid sensitive areas that the old line is in now.

No one wants a Kalamazoo or Yellowstone River disaster. Let's get rid of the old infrastructure and build a new, safer, and more economical energy system.

Someday I pray our grandchildren can live without crude, but we are several generations from that coming to pass.

A lot of questions have come up about the need for this pipeline. I say yes, we do need this to keep the gas prices down at the pumps where we can afford our energy.

Our military uses about 150 million barrels of crude a year and everybody knows we need our military to keep this country safe.

The decommissioning -- I'm out of time, but the decommissioning of this -- I've worked on many decommissionings. This line will be safely taken out of service.

Thank you.

FACILITATOR: Thank you.

Any clapping is terrific. If people can yell a little bit less.

Nick Kaneski. Nick is next and then Akilah Sanders-Reed.

MR. NICK KANESKI: Hello, my name is Nick Kaneski. It's N-I-C-K, K-A-N-E-S-K-I.

I am here in complete support for the Line 3 replacement project, and I have reviewed the Draft EIS. Probably not as extensive as a lot of people in the room, but I have reviewed it fairly thoroughly and I am a hundred percent in support of how it's written at this point.

I have worked in the Duluth area, alongside Enbridge and with Enbridge for the past ten years, and I've also worked with many contractors over the ten years since I graduated from college.

And what I can say -- what I've learned in ten years is, hands down, I have never seen a safer company operate their assets like Enbridge has.

In regards to their integrity program, how they build their new projects, how

they try and keep lines completely safe from everybody, all communities, and more importantly, the environment.

This replacement project is a direct example of Enbridge trying to replace an asset that they feel is -- it's time to be replaced. It's not safe.

And that's a complete example right there of what kind of values Enbridge has.

I have a lot of friends and family that work in Minnesota on the pipeline corridor. And Enbridge has a lot of value it provides to communities. Not just money or volunteer work that they provide, but it provides value to the state, the whole state of Minnesota, in the form of taxes, in the form of jobs created, in the form of essentially safety of our existing pipelines because of their great inspection programs and just everything Enbridge does.

And I completely support what they do. And I am very happy. I'm seeing there's a lot of people in the room that feel the same way.

It sounds like there's a lot of people who don't feel that same way, but if you look at Enbridge statistics, safety statistics, and what they do for the environment and -- there's so many topics that you could go into.

Renewables is another item. Enbridge is really a -- it's one of a kind company that you could be extremely proud to have that pipeline in your backyard.

Thank you.

FACILITATOR: I ask that people be affirmative, but please keep negative comments to a minimum. Akilah Sanders-Reed and then Pat Tobin is after that.

MS. AKILAH SANDERS-REED: Hi, my name is Akilah Sanders-Reed, A-K-I-L-A-H, last name S-A-N-D-E-R-S dash R-E-E-D. Thank you all for being here and thank you for listening. I'm going to read off my handwritten notes.

I spent two years researching the impacts of climate on severe weather patterns in St. Paul. I spent three years following the pipe processes here in Minnesota. I spent seven years involved in climate and clean energy work, and I've spent a grand total of 23

years on this earth.

I'm really glad that Minnesota is, at long last, requiring an Environmental Impact Statement on the construction of oil pipelines. It is long overdue. But this document is woefully inadequate.

As a young person looking at this analysis, I feel utterly forgotten. First, Enbridge claims the cost of removing the current Line 3 pipeline is $1.28 billion and that that's cost prohibitive.

If that's true, why on earth is $287 billion an acceptable cost to society in climate impacts?

And those climate impacts don't just come in dollars. They come in destruction, health impact, and loss of life. That's the number in the DEIS, $287 billion.

But even that astronomical figure is only over the next 30 years. Do you know how old I'll be in 30 years? I'll be 53. I sure hope in 30 years I have decades ahead of me.

And the DEIS also states that 30 years is the minimum expected operating

lifetime for this pipeline. Any analysis under 60 years is clearly and offensively inadequate.

In addition, the long-term monitoring of the abandoned Line 3 is entirely up to Enbridge's discretion in the DEIS, and their spill history and business practice gives me no desire to leave any oversight over my future in their hands. One moment.

Second, as a recent college graduate, I can tell you my professors would never have accepted work of this quality. The titration lakes are broken, the basic numbers on the current oil flowing through certain pipelines are outdated, the conversion of product volume from pipeline to rail cars is wrong. And the alternative section is laughable.

Everyone keeps saying this pipeline is needed because it's better than the alternatives. I don't see how it's better than removing the current decrepit pipeline and building a renewable energy economy, but for some reason, that alternative hasn't been studied.

Whether or not you believe this

is the right choice compared to that, that should be in the analysis and it is not.

What is included is an illogical scenario in which a pipeline is built on either side of Minnesota and 4,000 trucks are used to carry the oil across the state, 4,000 trucks.

If I wanted to write stand-up comedy about government studies, that's the kind of thing I'd come up with.

Finally, I want to uplift and emphasize the treaty rights and EJ issues, environmental justice issues, brought up today by community members here today. Those deserve far more space in this DEIS than they have been given.

In conclusion, this DEIS is seriously lacking in its scope and is a direct insult to anyone hoping to see more than 30 years on this planet.

We can do so much better.

FACILITATOR: Thank you.

MS. AKILAH SANDERS-REED: I moved here five years ago because I thought Minnesota could be a leader in climate justice, sound science, and a renewable energy

economy.

Prove me right.

FACILITATOR: So I have Pat Tobin. And then I have Erika Bailey-Johnson next.

MR. PATRICK TOBIN: My name is Patrick Tobin, P-A-T-R-I-C-K, T-O-B-I-N.

I'm in support of the Line 3 project. This line will ensure a continued supply of reliable energy we all need every day, utilizing the safest means of transportation.

As a Minnesotan, I appreciate the effort Enbridge has taken to protect the environment and be a responsible corporate citizen.

This project is needed and will benefit the people of Minnesota.

Thank you.

FACILITATOR: I've got Erika next, and then I've got Brandy Larson.

MS. ERIKA BAILEY-JOHNSON: Boozhoo. Erika, E-R-I-K-A, Bailey-Johnson, B-A-I-L-E-Y - J-O-H-N-S-O-N.

I would like to point out a

couple of things first before I begin. One is on this chart. One of the questions says the Certificate of Need determination is whether the project is in the best interests of the people of Minnesota.

And I would like to saw no. I definitely think that we can do better, that we have a lot of options for how to take out the old pipeline and not build the new one.

The second point I want to make is about the abandonment and removal, and I feel that abandonment -- Canada actually has a really great abatement policy, and that we should be examining that because there's some places where it makes sense to remove the pipeline and some places where it makes sense to actually leave it in and cap it.

We do not need anymore pipelines running through Mother Earth, risking soil and water quality and climate stability for future generations.

It is not a question of whether there will be a spill, but when. Minnesota and the tribal nations residing within its borders pride itself on our lakes, our rivers, our safe

water.

Small pipeline leaks are difficult to detect and clean soil and water are infinitely more valuable than oil.

Broader arguments exist about the impacts pipelines have on treaty territory, the degradation of habitat, and what to do with pipelines when they are decommissioned.

Our energy, transportation, and agricultural infrastructures are based on a finite resource. We need to figure out how to transition, and the sooner the better, as fossil fuels have resulted in negative impacts and tremendous risk on our quality of life and our interconnected web which we depend.

There is no perfect solution to facilitate the transition, but we can certainly do better. We can certainly increase conservation, efficiency, and renewable energy projects. We can certainly work to change our default settings and not allow more fossil fuel infrastructure to become established.

Currently, we waste nearly 50 percent of our energy at this point.

Instead of building more or

bigger pipelines, we should be working to create less demand for this limited resource, and in fact removing pipelines.

Conservation and efficiency measures, more fuel efficient vehicles as well as sensible renewable energy installations can go a long way to slow the demand for oil.

And yes, I do drive an electric car. And yes, I do have solar panels on my house that charge it.

Currently there are no substitutes for many products made from oil. In fact, it takes oil to make non-oil technologies like solar panels and wind turbines.

We know we must transition to a new fossil fuel free era, so using oil responsibly to produce systems that eliminate the need for oil makes good sense.

This line risks clean air and water, healthy soil, and a stable climate for several generations, all worth more than any drop of oil.

FACILITATOR: Thank you.

MS. ERIKA BAILEY-JOHNSON:

Miigwech -- thank you.

FACILITATOR: Thank you.

So Brandy Larson. Brandy, are you in the room? We're going to go next then to Erica Harmson, Erica? Okay, we'll keep going then.

Kathy Hollander.

MS. KATHY HOLLANDER: Hi. Kathy Hollander, K-A-T-H-Y, H-O-L-L-A-N-D-E-R.

As I walked here today, I noticed the wind and the sun outside made a powerful testimony today. They show us the true alternative sources of power.

When I look about new pipelines or I hear about new pipelines, I hear that Keystone won, which isn't all that old and has had 14 leaks. I hear there are many integrity digs on the brand new Flanagan south.

I would request that the Environmental Impact Statement address also the need for this additional oil that would be brought through a new Line 3.

Demand for refined petroleum products is down 19 percent since 2004, according to EIA statistics. This can be

verified. It's down in the region. It's down across the USA.

I would like to note that even the Wall Street Journal mentioned in February of this year that we've had the highest amount of storage -- of refined gasoline in storage in 27 years. We have a lot of oil in storage. We are producing more worldwide than we are using.

I'd like to note that in 2016, China sold more electric cars than the entire world did two years earlier. India has announced a goal of all electric cars by 2030. Norway, one-third of the cars are electric.

The future of electric transportation is before us, achingly close. This is not addressed in the EIS.

I would also like to see the EIS address likely related impacts. What is Enbridge's plan for pipelines even older than Line 3 -- like Lines 1 and 2? What is the plan for Line 4 that has a capacity restrictions?

What about in Wisconsin? What is the plan for additional pipelines that would be needed to transport additional oil if Line 3 is expanded?

It is often said that this oil will move regardless of whether or not this pipeline is built. But I notice when Keystone XL was denied, we didn't see 4,000 trucks crossing North Dakota or Minnesota. We didn't see rail increased.

And when Exxon Mobile had to disclose financial information to the Security Exchange Commission, they had to admit that $3.4 billion assets, $3.4 billion assets will be stranded if the price of all does not rise above $60.

We all know that right now the price of oil is in trouble. This Line 3 replacement will have a huge impact on Minnesota. 172 new roads, over 5,000 affected acres. 192 surface water crossings, in addition to the 199 that are already constructed.

I think Minnesota deserves this EIS and it should be a good EIS.

Thank you.

FACILITATOR: Thank you. So just to note for folks in the lobby, we actually can hear a little bit of noise and it makes it hard

for people to hear.

Next is Kristin Neises, and then Scott Russell.

MS. KRISTIN NEISES: Kristin Neises, K-R-I-S-T-I-N, N-E-I-S-E-S.

I'm working with a friend who is passionate beyond belief for the water.

So I'm going to start with old Line 3. I grew up in Cass Lake. Obviously, I haven't been tuned in all my life, but I am now, and I actually walked on one of those pipelines. And it's breaking apart, and it's gross on top, and it's sticking up. And there's beautiful foliage and plants right underneath it and I'm sad.

I don't trust Enbridge to clean, take out, and plot the old pipelines. Enbridge has never been completely honest with people. They've been proven to lack integrity at other times.

There are leaks in Cass Lake.

So the MPCA needs to monitor and report the pipelines to a much greater extent; hold them to their word, actually verify the amount of spills, et cetera.

There should be scientific studies done regarding soil samples and water samples. Enbridge should be forced to clean those up before they think about new projects; wouldn't that be novel?

The old corroded leaking pipes should be totally removed. If Enbridge doesn't want to pay $1.2 million to clean it up, who will?

Removal will create many temporary jobs as well. The jobs created by a new Line 3 will disappear to zero, will be down to zero.

Yes, it will create jobs but they're temporary after proposed Line 3 is finished.

Proposed new Line 3 is most impactful to disturbing wild rice beds and other areas of biodiversity. It goes right under the beginning of the Mississippi River.

I cannot believe that is even an option. One of Minnesota's claims to fame is we're the headwaters of the Mississippi.

And we're going to put a pipeline. One leak will ruin the river and

potentially all the way down to the Gulf of Mexico. The 30-year social cost of carbon, something, something, is greater than $670 million.

Instead of pumping dirty oil, why doesn't Enbridge pump money into further sustainable world and clean energy?

There are several broken links in the DEIS, including a link regarding impact to natives. There's a disproportionately negative impact to native Americans.

This is my part of the speech and it's coming from my heart.

I'm a true believer that I'm a water child and I know this is killing us. It's literally killing us. I like my wild rice. It's the only place in the world real wild rice is grown, and we're going to put a pipeline right through it.

Miigwech.

FACILITATOR: Thank you. And if you could have your written comments for the court reporter, that is most helpful, if that's possible.

So I've got Scott and then

Joanne Panther.

MR. SCOTT RUSSELL. Thank you. Scott Russell, S-C-O-T-T, R-U-S-S-E-L-L.

The most important thing for me to comment on today is treaty rights. If you look in sections 9 and 11, there is language that says that, "The pipeline," quote, unquote, "crosses treaty lands, or," quote, unquote, "has impacts on treaty lands."

It is not explicit as to whether in the view of the Department of Commerce Line 3 proposal violates treaty rights, and you need to be explicit about that.

In section 11, page 7, the Draft EIS appears to leave wiggle room. It says, "All routes, including the Applicant's preferred route, would cross treaty lands that are off-reservation; these lands may be used for traditional tribal uses such as fishing, hunting and trapping, and/or agricultural activities."

And then it goes on to say that, "These treaty rights and tribal resources are important to the Indian tribes as both natural and cultural resources."

So my commentary is if the EIS says treaty rights are, quote, unquote, important to Indian tribes and that kind of phrasing trivializes really what treaty rights are and gives an inadequate assessment for what is required.

Treaties are not just important to Indian tribes, they're important to me, they're important to the state of Minnesota, and they are the law of the land.

This makes it sound like treaty rights are optional, something that's important but not required by federal law. So either the state of Minnesota nor Enbridge can unilaterally break treaty rights by offering some form of mitigation if they deem appropriate.

So the EIS does not -- what the EIS really needs is a leak look-in and a clear answer on what your view is on how Line 3 impacts treaty rights.

If you're not clear on that, you're, again, putting the burden on the Anishinaabe people to go to court to defend their rights, a cost they should not have to

bear.

If your conclusion is that Line 3 violates treaty rights, that should be the end of the story.

Second, I'd like to say that I would like to ask the EIS include direct quotes from Anishinaabe people, not just summaries of what has been gleaned from interviews. It's really important how this narrative style works. If there are no personal stories, no direct quotes, it really robs people of the power of their voice.

And I'll give one example, this is from section 11, page 11 of the EIS: "American Indian communities and individuals have unique health issues associated with historical trauma and structural racism. Data from the Minnesota Department of Health indicate that American Indians in Minnesota have greater health disparities and poorer health outcomes compared to other racial and ethnic groups.

"The impacts associated with the proposed Line 3 and its alternatives would be an additional health stressor on tribal

communities that already face overwhelming health disparities and inequalities."

So my common sense is words like historical trauma and health stressors are kind of bureaucratic terms that really don't get to the point of the pain that's been suffered. So please add the voice of the Anishinaabe people to your report.

Thank you very much.

FACILITATOR: Thank you.

I've got Joanne Panther, and then I've got John Swanson.

MS. JOANNE PANTHER: Joanne Panther. Hello, my name is Joanne, J-O-A-N-N-E, Panther, P-A-N-T-H-E-R.

And I'm here because I'm an old lady that doesn't want to give up, okay. I'm reading from a portion of the Honor the Earth Line 3 DEIS highlight reel, and in Chapter 11, it talks about environmental justice, and one of the paragraphs says, "The DEIS concludes that disproportionate and adverse impacts would occur to American Indian populations in the vicinity of the proposed project." That's in quotes, 11.5.

But it also states that this is not a reason to deny the project. And then on the next page it continues and -- in the same area of concern, environmental justice, the DEIS acknowledges that, "The addition of a temporary cash-rich workforce increases the likelihood that sex trafficking or sexual abuse will occur," and that these challenges hit native communities the hardest.

But the DEIS dismisses the problem quickly saying that, "Enbridge can prepare -- can prepare and implement an educational plan for awareness campaign around this issue."

How do we know they'll do that? And whatever happened to human rights? Think about it.

Thank you very much.

FACILITATOR: So we've got John Swanson.

MR. JOHN SWANSON: John Swanson, J-O-H-N, S-W-A-N-S-O-N, and I'll be reading prepared comments.

I want to thank our supporters and Enbridge employees and contractors who are

here to demonstrate the importance of this project to the health and well being of northern Minnesota and North America.

It is also important to recognize and thank employees and agents of the Minnesota Department of Commerce and collaborating agencies who have labored the past few weeks to hold these meetings and allow interested parties to have a voice and share their views.

Line 3 replacement is not a new pipeline. We are replacing the current 1960 Line 3 with a new modern pipeline.

What's more, it's not in the corridor from North Dakota to Clearbrook; we collate with 98 percent of our existing right-of-way.

From Clearbrook to Superior we follow existing pipelines, high voltage transmission lines and railroad lines for approximately 75 percent of the route.

We chose this route for several reasons. One, the Leech Lake Band has made their desires clear. The corridor across the reservation is too full. Accordingly, an alternative route was developed.

We believe the preferred route provides the best balance, avoids sensitive resources, and minimizes potential impacts to both people, environmental resources, while also factoring in LLB's sovereign authority.

The existing corridor between Clearbrook and Superior has become congested with pipelines, railroads, power lines, highways, all closely located, and communities such as Bemidji, Cass Lake, and Park Rapids has grown around the corridors the past 50 years. It simply makes little sense to construct another line on the current corridor.

Currently, fossil fuels provide about 80 percent of the primary energy supply we use every day for electricity, heating, cooling, cooking, and transportation. Even with accelerated investment in renewable generation, of which we have invested about $5 million to date, it will take a huge investment and time to move solar and wind to major load centers.

To fuel our society, there continues to be a demand for oil. Not only for transportation and heating, as well as the many

products we have to make life better, from the clothes we wear to the food we grow to houses and buildings we occupy to the medicines we take to the phones we use. It is, as we say, part of the fabric of our life.

A lot of times the Marshall spill is used against us. I've personally been to the Kalamazoo River and witnessed the results of the cleanup and can truthfully say the river is better off than before. Nobody is getting sick, either.

That's the one commitment to the integrity of the pipeline system we operate; makes me proud to be an Enbridge employee. I invite everyone to go see the Kalamazoo.

It is a commitment to safety and integrity that drives Enbridge to replace Line 3.

To safely operate the current Line 3 would require thousands of integrity digs as well as other operational safeguards over the next 10 to 15 years, requiring numerous disruptions to communities, landowners, and other stakeholders.

It simply makes more sense to

replace it with a modern system and allow everyone to have peace of mind with regard to safe transportation of oil in Northern Minnesota.

With regard to the Draft EIS --

FACILITATOR: Thank you.

Just a few reminders. Again, if you want to be affirmative at the end, that is welcome. We ask people not be negative about comments, and each person has three minutes, whatever the viewpoint, so we ask that you respect that, if you could. Thank you so much.

Paul Meneghini is next, and then, where's our next person Lowell Schellack.

MR. PAUL MENEGHINI: Thank you for the opportunity to present my comments. My name is Paul Meneghini, P-A-U-L, M-E-N-E-G-H-I-N-I, and I'm an employee of Enbridge.

My following comments are solely my personal views based on my education and professional experience.

I'm a licensed professional

engineer in the state of Minnesota and have earned an MBA with a concentration in environmental management.

Although I'm not currently working on the Line 3 replacement project, my position at Enbridge over the past ten years has primarily been working on other large pipeline expansion projects.

As correctly noted in the DEIS, projects like this, either directly or indirectly, employ thousands of people before, during, and long after construction is completed.

This North American produced oil clearly has the least socioeconomic impacts to the U.S. and Canadian policies on humanitarianism. This could be addressed or noted in the final EIS.

Today I'd like to focus my comments based on my experience prior to being employed by Enbridge. I used to be an environmental consultant and dealt primarily with various clients during Brownsfield's redevelopment and distressed property cleanup.

Most of these sites were

unfortunately impacted by petroleum contamination. Based on a quick search of the MPC's online leak site database, over 20,000 petroleum leaks have been reported in the state of Minnesota since the early 1980s when reporting requirements were implemented.

A large majority of these leaks were at retail gasoline service stations. What many may not know is that gasoline is much more hazardous, more volatile, immobile, in soil and groundwater than crude oil if leaked in the environment.

In addition, most gas stations tend to be located in urban areas, naturally where their customers, you and I, live, which can create additional human exposure pathways.

My point of referencing this information is to request the Final EIS further attempt to explain to the general public that petroleum releases do not mean widespread devastation and loss of land use forever.

Below ground impacts from petroleum releases typically travel only a few hundred feet maximum in soil or water. From there, naturally occurring reactions take place

and the impacts cease to migrate further and reduction occurs.

In addition, with today's reporting, cleanup standards, and risk-based management approaches, petroleum releases typically cause very little long-term damage to the public or the environment. The notion conveyed by many as part of these comment meetings that even a small crude oil leak threatens water quality and drinking water quality to millions of people downstream is simply false, based on science.

In conclusion, risks are associated with anything we do in our lives. One purpose of the EIS process is to evaluate the potential human and environmental affects of approving the project. In other words, what are the risks?

We all took a risk by coming here tonight, whether driving, biking, or even walking. Something could have happened along the way outside of our control which could have had a bad outcome on our health, the environment or our general wellbeing.

If we had stayed home, we could

have avoided these risks, but in order to live our lives and express our opinions tonight, we successfully managed those risks by using our seat belts, obeying traffic signs, following the speed limit, and even wearing a helmet if we biked.

Pipelines in general, even more specifically, the route proposed by Enbridge as assessed in the DEIS, indicates that it's the best route by balancing and controlling the risks presented.

FACILITATOR: Thank you, and you can your handwritten comments to --

We have Lowell next, and then we have David Manuel.

MR. LOWELL SCHELLACK: My name is Lowell Schellack, and I do have written comments and I've already turned one in to the comment box. My name is spelled L-O-W-E-L-L, last name is Schellack, S-C-H-E-L-L-A-C-K.

I've had an opportunity to review the DEIS for the Line 3 replacement project as proposed by Enbridge and I have the following observations and comments: I'm extremely disappointed that two system

alternatives were not considered in the DEIS.

They are SA-03, as proposed by Minnesota DNR and PCA during the Sandpiper review process, and SA-04.

I find all the routes considered in the DEIS are unacceptable, namely, RA-06, RA-07, RA-08, RA-03N, and the Applicant's preferred route. They all cross water influenced areas of Minnesota and impact pristine waterways.

SA-03 circumvents many of the clearest lake areas and still delivers oil to Superior. It must be considered in the Final EIS.

The DEIS recognizes there are 0.03 incidences of catastrophic failure per 1,000 miles annually. A catastrophic failure of over 420,000 gallons is therefore predictable over the estimated 30-year life of the pipeline.

If that failure happens in our lake country, it would be totally unacceptable. Just ask the people in Marshall, Michigan when in 2010, over 800,000 gallons of tar sands were spilled into the Kalamazoo River. It never has

been totally cleaned up.

SA-04 must be considered as a system alternative. It has been dismissed because of the slate and greater chance of spill incidents. But the number of spill incidents alone cannot be the sole criteria in route selection. It must be recognized that the affects of spills differ greatly, depending on the spill location. Spills in water-influenced regions are transported and dispersed much more rapidly than in nonwater influenced regions.

Also, the ability to access spill sites is much easier and faster in nonwater-influenced regions. Many potential spill sites along the studied routes are 1,000 feet or more from any road access.

Building access roads to the spill sites would cause environmental damage as well as the damage from the spill itself and subsequent cleanup activities.

SA-04, according to the DEIS, would not cross any aquifers designated by the -- and sole source aquifers.

FACILITATOR: Thank you. You can

hand your written comments to the person there. We'll have the complete set for the court reporter.

We're going to go next to Richard Smith.

MR. RICHARD SMITH: My name is Richard Smith, R-I-C-H-A-R-D, S-M-I-T-H, and I am a president of an organization, which is the reason why we're all sitting here this evening. I am with Friends of the Headwaters. We are a northern Minnesota group, Hubbard County primarily, Becker County, and -- up here.

From the very beginning of this process in 2014, we urged this state to do an environmental impact study on this large industrial scale project. When we realized that it wasn't going to happen, we took the state to court and we won the first ever EIS on an oil pipeline project in the state of Minnesota.

We asked from the very beginning for a robust, competent, comprehensive, and independent EIS. I want to commend the DOC for getting a good start. We've never done one in

this state before, so they worked very, very hard.

But we're not done yet, and that's why we're having this conversation tonight to make sure that we all do this right.

Friends of the Headwaters is not an anti-pipeline group. I support your T-shirt, we want safe energy transportation, too. We just want it to be in the safest place across this state.

That's why Friends of the Headwaters came up with SA-04 for the Sandpiper route and also for Line 3. It gives you more work, if you're a pipeline worker. And it also protects our water resources, which are the most valuable thing.

One critical flaw in the DEIS is a flaw that's being created by Enbridge. 25 percent of this report is about oil spills. The data that went into this report on oil spills came from Enbridge.

I can't do an effective analysis of the oil spill data in this thing because Enbridge is withholding information from us, the public.

The public version of the DEIS oil volumes were redacted from that form. Is that the right way to do an EIS? I don't think so. That means it's not comprehensive. It means it's not competent.

One other factor, the two companies that did most of the oil spill work on this thing have previous working relationships with Enbridge.

I think that brings into question the independent nature of the information in this project. That's the most critical flaw in the DEIS, and we are hoping to get that fixed.

Thank you very much.

FACILITATOR: So we'll go to Heidi Mave. Is Heidi in the room?

MR. ALLEN RICHARDSON: My name is Allen Richardson, A-L-L-E-N, R-I-C-H-A-R-D-S-O-N. I'm going to read the comment on behalf of Robert and Heidi Mave from Bemidji and so these are your --

FACILITATOR: Can you please spell the last name?

MR. ALLEN RICHARDSON: Certainly, it's M-A-V-E.

Directed at the state: Question one, our 70-foot deep well is about a hundred feet from your leaking pipe. We are very concerned that we are drinking contaminated water. With half of our neighborhood families getting cancer, we question if there's a connection. Could you test anyone's water to ensure that the water isn't contaminated?

Question two, why should we have to pay to test our water?

In the interest of time, I'm going to move to my own comments here. I'm with an organization called Minnesotans for Pipeline Cleanup. The core question is this: If a property owner, private property owner, who has generously hosted the old Line 3 pipeline for decades, if they want that pipeline removed in the face of decommissioning or abandonment, one, is that a reasonable request if it's technically feasible to do so?

Assuming that it is, who should be on the hook for that financially? Should it be the property owner, or should it be Enbridge?

I've spoken to people out there who have all sorts of views on this question, but thus far, no one has suggested that it be the property owner who should pay for such a thing.

That leads to the question of is it technically feasible to do? The environmental review documents say that in general, the pipelines are 10 to 15 feet apart. We took the liberty of walking the distance between the pipelines on public thoroughfares between Wawina and Grand Rapids, and I found quite a bit more space there.

Namely, there's an average of 30 feet between Line 3 and 4.

And now, just last night in Plummer, it was observed that Line 13 has been nestled snugly between Lines 2 and 3 with 12 feet on either side, which tells me if you can get a pipeline between two hot pipelines, our qualified labor brothers and sisters here should be able to remove an abandoned pipeline from between a couple of hot lines.

And I wanted to correct something that one of the other speakers said.

I believe she cited the figure as $1.28 million. It's actually billion with a B. So my question would be, how many jobs can you make for $1.28 billion, a figure which has, in all likelihood, been lowballed.

So this is a property rights question.

I want to refer to section 8.4.1 of the DEIS on the question of environmental justice, that the removal of existing Line 3 would do right by tribal communities by removing the stress or anxiety related to the presence of the abandoned pipeline and ongoing risks related to --

FACILITATOR: Thank you.

MR. ALLEN RICHARDSON: Do right by those communities and get billions of dollars --

FACILITATOR: Thank you.

MR. ALLEN RICHARDSON: Thank you for your time.

FACILITATOR: Mary Adams next, Mary?

After Mary is Kristine Janiksela, if i said that right.

MS. MARY ADAMS: Mary, M-A-R-Y, Adams, A-D-A-M-S.

I came in here this evening and I sat at this table and I was looking at these folks that I hadn't met before, with these fantastic green T-shirts, and I said, "I agree with that. I do support safe energy in transportation." And so they generously said, "Do you want one?" Which I said, "Then people would see me wherever I am and wherever I go."

I'm concerned. Yes, this document someone else had mentioned is 6,500 pages.

I have been in my public library in Park Rapids hour after hour trying to decipher it. And when I leave, I feel dizzy and I can't see the forest for the trees. But I would go back and I would go back and I will go back, because there are some discrepancies in that, quite a few, but I have no time.

I'm concerned about the Cardinal who was hired by Enbridge to do the Draft EIS. And you wonder, "Why is she concerned about that?" I know they have been employed by Enbridge. I would like to know how they were

employed. Why were they chosen for this? Were they totally independent of mind when they did this?

In the Draft EIS, also, there was a blank page, a little bit on the top, a couple lines saying Cardinal did this EIS, blah, blah, blah, blah, blah. Above that, it said, "DNR and the Minnesota Pollution Control Agency, assisted."

Well, I would like to know, if they assisted -- when I think of DNR and I think of Minnesota Pollution Control Agency, I think they are there to protect fisheries, and forests, and wildlife, et cetera, to present, make possible recreational opportunities, but what does that mean, assisted?

Because when I read through this stuff, piles and piles of stuff, there it is. Did they -- how much time did the Minnesota Pollution Control Agency spend putting this together; 10 percent, 5 percent, 60 percent? How about DNR, 80 percent, 3 percent, 4 percent?

I expect DNR and Minnesota Pollution Control Agency to look out for our

surroundings.

I'm concerned about this pipeline, and I say, "Why am I here, I should be home with my feet up, watching Netflix or something." But I am here again. It's because I treasure these wetlands, I treasure these forests, I treasure these waters. I want it for my kids, I want it for my grandkids.

I want you guys to have a pipeline. I want you guys to have jobs, and gals to have jobs.

FACILITATOR: Thank you.

MS. MARY ADAMS: Please consider route 4, alternative route 4.

FACILITATOR: Thank you.

MS. MARY ADAMS: It's a longer route and you work longer. Jobs will be great.

FACILITATOR: Thank you.

FACILITATOR: Kristine is next and then Debra Topping is after Kristine.

MS. KRISTINE JANIKSELA: Hello, my name is Kristine, K-R-I-S-T-I-N-E, last name Janiksela, J-A-N-I-K-S-E-L-A.

I'm a young Minnesota

middle-class resident. I enjoy the outdoors and the Minnesota environment, and I support pipelines.

Pipelines are the safest mode of transportation for oil, and the preferred route offers the lowest level of emissions to any other alternatives, as noted in the booklet you received tonight on page 22.

I support the Line 3 replacement project, the preferred route, and the Certificate of Need in the Draft EIS as written.

Thank you.

FACILITATOR: Thank you.

So Debra Topping is next and then Susan Kedzie.

MS. DEBRA TOPPING: Boozhoo, Debra Topping, D-E-B-R-A, T-O-P-P-I-N-G.

I only have a few things to say, if you can imagine that.

So everybody is talking about progress, progress, you know, we need more jobs. We need -- but this is a draft environmental, right? Environmental, what's environmental? Water, wild rice, air, right?

So I get that we all need jobs, which is economic and not environmental.

Adding pollution to our water is not progress, right? And maybe we should all say that together. Adding pollution to our water is not progress.

I would also like to see the decision makers, the policy makers, attend and go out and walk this line so you can have a visual, a hearing, a touching, a smelling. That's what you need to do. That's where that comes from.

Publicize, this is supposed to be for all Minnesotans to be here. I don't know how many have we had at all of these meetings, 1,500, maybe 2,000. So nobody else cares about the water? It's just 2,000 people?

I know a deaf gentleman who loves his water. But he is not here because he didn't know about it. So whose job is it to tell the deaf people about this issue? So can we add that in there, too?

Why isn't this live-streamed to all public broadcasting, to all radios, so the

deaf people also can hear this?

So, miigwech.

FACILITATOR: Thank you.

Susan Kedzie.

After Susan is Brian Meier.

MS. SUSAN KEDZIE: My name is Susan, S-U-S-A-N, Kedzie, K-E-D-Z-I-E. I live in Bemidji, Minnesota. I'm a plant ecologist and have been for over 20 years. I once worked at the Leech Lake division of research management as a plant ecologist during the Alberta Clipper project era.

I'm speaking today on behalf of my daughter who's 14. She will be inheriting this earth long after I'm gone.

I'm here on behalf of my partner who's working, and he is a strong advocate for fishing in unpolluted waters. He's working and he can't come.

I'm here also on behalf of tribal members that I have known as a previous employer at Leech Lake and are unable to make it here because of transportation issues.

I'm not representing an agency or an organization or a corporation. I will be

speaking using science as my foundation, not opinions.

I'm opposed to Line 3 on moral and scientific grounds. I believe that we have a moral obligation to reject this project and others like it due to the numerous direct, immediate negative impacts to people, plants, wildlife, and water directly along the route, as well as the direct, indirect, and long-term negative impact to people, plants, wildlife, and water adjacent to the route in areas of -- the other areas of Minnesota, the region, and the planet.

Morally, I believe we have a responsibility to listen to climate change scientists. 95 to 97 percent of them are in agreement, climate change is occurring. It's anthropogenic; that means we're causing it.

Anybody who tells you otherwise is being paid and has been deceived by those being paid.

To address climate change, we need to keep the oil in the ground and we need to transition now to green renewable energy by 2030. We can do it. We can. That's where the

jobs are.

Speaking of jobs, according to the DEIS, Line 3 will create 13,600 jobs, probably really well paying jobs. But they're short term, most of them.

And there's a huge cost to 9 billion other people, okay, 9 billion, including my daughter.

The largest profits for this project will be going to the millionaires and billionaires, the 1 percent of society who already have a livelihood that's very, very secure. They might have even bought you a shirt.

Well, the jobs, where are they going? They're going to green renewable energy, and it's outgrowing the fossil fuel section. Why not jump onboard, provide some sustainable long-term opportunities with high-quality pay? We can do it now.

I got three hours of sleep last night so I hope this is cohesive.

FACILITATOR: Thank you.

MS. SUSAN KEDZIE: One more thing.

FACILITATOR: Thank you.

MS. SUSAN KEDZIE: As an ecologist --

FACILITATOR: Thank you.

MS. SUSAN KEDZIE: -- there are many ecological services that we rely on.

FACILITATOR: Thank you. You can hand the written comments to the person there and we'll be able to get them all to the court reporter.

MS. SUSAN KEDZIE: We all depend on those ecological services every day for clean water and air, food, resources, attenuating --

FACILITATOR: Thank you.

MS. SUSAN KEDZIE: I just want to let you know the list is long and I appreciate you listening. Thank you.

FACILITATOR: Thank you. I've got Brian Meier, Brian, and then I've got Jordan Morgan.

MR. BRIAN MEIER: Brian Meier, B-R-I-A-N; Meier is M-E-I-E-R.

I get the privilege of working on the right-of-way with a lot of folks here

in this room and it is a great thing to see. When I come on the right-of-way, the first thing we're talking about is safety. Right behind that, we're going to talk about the environment, how are things going, making sure everything is well.

For the people that you see here, the gentleman that spoke earlier, we all very much care about what's happening on the right-of-way as it's going through all the landowners' property.

We want to make sure that we're respectful of the landowners and make sure that as we go in, we return the site to as good or better than -- when we leave.

And so I realize when the draft statement came out, it talks a lot about the environment impact, et cetera. I can tell you from everyone that I work with, we care very much about the environment.

We care very much about the landowners whose land we go through, and we intend -- people that I work with intend to keep it that way.

And so this involves contractors,

engineers, people in the office, people in the field. I do want to tell you I believe in Enbridge. I believe in what we're doing for the community, and I believe that we'll continue to do that.

Thank you.

FACILITATOR: Thank you.

Jordan, and then I have John Munter after Jordan.

MR. JORDAN MORGAN: Hello, my name is Jordan Morgan, J-O-R-D-A-N, M-O-R-G-A-N, and I'm a resident of Bemidji, Minnesota.

The point of this DEIS is to determine Certificate of Need. Well, I'm here today to tell you that we don't need this project and we don't need this pipeline, and the fact of the matter is, the DEIS states very clearly that this project will create zero permanent jobs. Let that sink in, folks. Zero jobs are going to be permanently created by this project.

And yet, if we do this project, we will see none of those jobs. What we will see is long-term environmental and social

liabilities that are coupled with the impacts of pipelines.

So the economic impact has a longevity, what the pollution and the environmental impacts do. I think that's an important thing to realize.

Also, I want to note that here in Minnesota we virtually have no fossil fuel reserves. So every time, if we are paying the utilities, we turn on a light switch, we're sending that money over the border; we're sending it to North Dakota or Canada, wherever it's coming from. It's not coming from here.

We're not getting the fossil fuels from our own economy. We're importing it. We're buying it instead of continuing this perpetual investment in a research that we don't have.

We should support and invest in clean renewable technologies. It's great for our economy. It's great for the environment, and it's great for our energy independence.

I'm sick and tired of throwing my money across the border when we could build the infrastructure right here, give our

hard-working Minnesota jobs, and it would be great for the economy and the environment at the same time. This is the future I envision.

I want to take a moment to talk about climate change. As a young person, I care a lot about climate change. I'm 24 years old. My birthday was on Friday.

I always like to point out that the tar sands, which would be transported to Line 3, is the most carbon intensive oil out there. It is the worst option with the climate perspective that we could choose, and that all those carbon emissions from burning those fossil fuels will go into the atmosphere.

I want to remind everyone, we think the atmosphere is a huge place. We look outside, it looks so big. It is ten miles, folks. If you get into your Prius or electric car or when you get into your truck and you drive ten miles, you just drove the entire length of our atmosphere.

We've been filling that up for over a hundred years with our carbon emissions. The DEIS states that there is $673,365,150 of social cost of carbon over 30 years.

That's inadequate because the pipeline's pacing is over 60 years old, so I don't think that's an accurate representation of the actuals we can expect.

Additionally, climate impacts are exponential, not linear. The longer we wait to act on this, the impacts of the carbon are going to be more and more every year. It's not going to be the same. The longer we wait, the harder it is going to be to fix this mess and the less of a chance my grandchildren are going to have an opportunity to live, thrive, and survive on this planet.

Thank you.

FACILITATOR: Thank you.

Just to let you know, we're going to do our very best to get through the comments we have. We may not be able to get to everybody, so if you want to be assured your verbal comments got through today, there are court reporters out there. You can go talk to them directly, they'll capture the comment.

If your name comes up and you're out there, we'll keep it, we'll call it a

little bit later in case your name does come up.

So I've got John Munter next, and then Jim Reents after that.

MR. JOHN MUNTER: My name is John Munter, J-O-H-N, M-U-N-T-E-R.

I'm a retired guy from Warba, and the Public Utilities Commission needs to render a judgment of no build on this project because the PCA and the DNR both submitted letters January 23rd, 2015, into these past dockets saying if the pipeline is to be built, it should be built (indiscernible) of I-94, should be what they called SA-03, now it's SA-04, which currently goes down the North Dakota border and then cuts through southern Minnesota and goes to Joliet, Illinois.

The current project has to be rejected before they can resubmit for that one, but they have done some analysis. By comparison, this is the DEIS here, part of it, the executive summary, is very deceptive by comparison.

You see here, this graph, red means bad and green means good, and so

Enbridge's project is here on this green side. SA-04 is two over. It's got some red in it, some orange in it.

If you look at it more in a detailed manner, it's drinking water areas of interest, which is bad, SA-04. And drinking water sources, well, yes, they have a lot more wells in SA-04 because they have a lot more people, two and a half times more people, and they have a lot more farmland, so of course.

But if you look farther down to biological areas of interest under preferred route of Enbridge, through the lake country, you see 102,000 biological areas of interest as opposed to 369 system alternative SA-04.

So that means there's one-third of one percent, so the biological areas of interest in the system alternative, SA-04, and that should be weighted a whole lot more.

In fact, there's a whole lot of commodity production areas of interest or 37,000, and in the -- which is, I would assume, wild rice there, but only 191 acres in the system alternative. So It's a very deceptive section.

Two pages over, under, "Ground waters," the second paragraph, SA-04 is the only Certificate of Need alternative that crosses vulnerable karst topography, which they call fractures, joints, sinkholes, cavities, caves.

Well, they neglect to mention it's a limited area that can't be gone around very easily with exceptions as they are planning to do in the lake country corridor.

And by comparison, there's no discussion of a glacial marine in SA-04, which PCA makes a big deal about, that you can't tell where the water is going, the oil is going to flow.

There's more topographical distances. So you see a lot more fast water flow, and so you have pollution of bigger bodies of water like lakes and aquifers instead of a well.

So thank you.

FACILITATOR: Thank you, John.

I have Jim Reents, and then I've got Dan Sauve after that. Jim.

MR. JIM REENTS: Jim, J-I-M,

Reents, R-E-E-N-T-S. I'm with the Northern Water Alliance of Minnesota's Pipeline working group.

I have four points to make today.

FACILITATOR: Jim, sorry to interrupt. Could you please move closer to the mic.

MR. JIM REENTS: I have four points to make today. The seven spill sites addressed in the draft do not adequately represent the very sensitive and biodiverse lands and waters of this route.

Additionally, with Enbridge withholding much of the information, as Richard said, it can't be analyzed. They did not address wild rice wetlands, the St. Louis River tributaries of Lake Superior, the Nemadji River tributaries, the Mississippi River. All will be impacted by inevitable spills, leaks, or anomalies.

One thing we know for sure, pipelines spill. It's not if, it's when. And the product proposed for this Line 3 primarily dealing with tar sands oil cannot currently be

cleaned up, and in fact, according to the National Science Foundation, there is no current technology to clean up this type of oil in a water environment.

Expand the modeling for water spill sites, and I would recommend that the ten-mile impact range for the analysis should at least be doubled to match the analysis that was done for Line 67 by the State Department.

The Enbridge permit application cites what they would do to minimize environmental impact. Nowhere does the draft identify what outside entity or agency will monitor these commitments, supervise the permits, and what regulations are in place that these promises become contractual.

Name the outside entities that we can look to and show contracts for this critical process.

In Chapter 11 of the EIS, Environmental Justice, the draft acknowledges that any of the alternative routes would be detrimental in the long term for tribal impact.

FACILITATOR: Thank you. If you

have written comments, you can hand them in. That would be very helpful. Thank you.

We have Dan, and then we have Mary Ackerman, Mary.

MR. DAN SAUVE: Hello, my name is Dan Sauve, and I just want to comment in support of the Enbridge Line 3 replacement project. I'm a professional engineer, and I am the Clearwater County engineer.

I have been the Clearwater County engineer for the past 20 years. Prior to that, I worked as an environmental engineer in hazardous waste-site investigations and cleanup.

I live in Beltrami County, work in Clearwater County. I've seen at least three new pipeline installation projects come through Clearwater County during my term as county engineer. I've been in this area most of my life.

I support transporting oil by pipeline because it is the safest, most environmentally friendly way to transport the oil into market. I hate to see all this oil being transported by truck or train.

Transporting oil by truck or train would have a great safety impact to our community, would increase the train/truck traffic, and increase spill potential.

I hear comments from a few people that say we should quit using oil. At this time it's simply not possible to quit using oil. It is used in so many products.

I'd like to give an example of our little county highway department. We use, on average, 800,000 gallons of oil products each year. About 70 percent of that consists of bituminous material that we use in our roads. We mix it at about 5.8 percent with sand and gravel to make an asphalt surface we all drive on. It's out in the parking lot if you want to see what it looks like.

I hear comments -- I'm sorry, oil spills are a concern, but from what I witness, Enbridge has always taken the responsibility to restore the environment.

Recently, I've been made aware of a large spill that has occurred in our area, in 1979, where over 440,000 gallons of crude oil spilled from a pipeline. I've driven by this

site and never knew it existed.

Cleanup activities resulted in removal of more than 75 percent of the oil, meeting the environmental standards in place at the time. The environmental standards today are much stricter.

After further evaluation, Enbridge is going to clean up the site further, but the regulatory agencies, in cooperation with Enbridge, wanted to use it as a research site.

The research site has greatly expanded the understanding of continuation of biodegradation of crude oil in the environment.

They also found that the oil impacted groundwater plume, moved much less than expected, and a greater degree of that continuation biodegradation was occurring.

There's a large spill in our area that most of the people do not know about and it does not have a wide detrimental effect.

Point is that all modes of transportation can cause a spill, spill can be remediated, and Enbridge has shown response to clean it up.

Enbridge has been very supportive of our community and they pay a large share of our property taxes.

FACILITATOR: Thank you.

We have Mary next, and Vicki Bibeau, Vicki.

MS. MARY ACKERMAN: I'm Mary Ackerman, and I'm part of the Northern Water Alliance of Minnesota.

I want to make a couple of comments about the Draft EIS, not about necessarily the company, not necessarily about pipelines in general, how much we all depend on oil, we know that. This is about the Draft EIS.

I do want you to expand the modeling for the water spill sites. They don't include many of the sensitive areas that need to be included.

I want you to name the outside entities that we can look to so we can show that the promises made by the company creating this line will be kept. There's nothing in the draft that ensures that to the public.

In chapter 11, I want to talk

about "Environmental Justice." That's the title of the chapter. The draft acknowledges that any of the alternative routes, any, would be detrimental to the long term for the tribes impacted. This is .9.6. It says, "There will be profound cultural consequences." That's a quote.

If this route went through a town or a city of ours, would we still be sitting here talking as we are? "Disproportionate and adverse impacts," that's the language in the Draft EIS for the consequences to tribes.

Think about it, guys. We don't want this on our consciences. Choose a route that does not have detrimental impact on the tribes of our state of Minnesota.

The preferred route also impacts, quoting again, "more wild rice lakes and areas of rich biodiversity than any of the other routes." I'm quoting. Really? Why would Minnesota risk that for a Canadian company's profit?

And I'm quoting again, Chapter 5, 3.4, "All workers to construct the line would be relocating to Minnesota," quoting again,

"There will be no measurable impact on local employment per capita household income, median household income or unemployment." I'm quoting.

The jobs' argument put forth by Enbridge does not hold for short or long-term employment for our unions.

I'm a union supporter, guys. I want you guys to get jobs. Get a different route. It's longer, more jobs, that's better, and then look to some of the renewable energy stuff. They're employing lots of people, and they're good jobs.

Thanks.

FACILITATOR: Thank you.

We have Vicki next, and then we have Jerry Perkins, Jerry.

MS. VICKI BIBEAU: My name is Vicki Bibeau, V-I-C-K-I, B-I-B-E-A-U.

I drove here today, I didn't come by bus or from somewhere else because I live here. I lived half my life bordering the Chippewa National Forest. I'm a block away from the Mississippi River and a block from the original Line 3 that runs along Highway 2

to Duluth.

I have seen the Enbridge fires in Cohasset burning off the oil spill with huge black smoke for days floating west in the sky. I'm aware of the oil spill in the Prairie River in Grand Rapids. That was a major disaster and still is.

We should all know about the recent oil spill near Clearbrook while there was still snow on the ground.

I'm sorry, but I, too, have been to the Kalamazoo River, and I don't believe a lot of things that were said today, and when I looked up and looked at my Enbridge friends, they refused to look me in the eye after somebody spoke tonight.

It is a known fact that Enbridge and the Department of Commerce have no answers on how they plan to restore the many wild rice beds when an oil spill or a leak occurs.

Do you understand that wild rice is harvested by two people in a canoe in our lakes and rivers with long sticks to knock each single grain into the canoe? You know that, right?

And you know the people that live up here eat that rice several times a week, if not daily, to supplement their existence. It is one of the oldest and most traditional foods known on this continent, and it grows here in Minnesota in our lakes and rivers, totally natural. We don't plant it.

You cannot drink or eat oil or money. Water will get you through times of no oil, but oil will not get you through times of no water.

Certificate of Need sounds more like certificate of greed. The Department of Commerce has a long-standing role in protection of life and property from environmental hazards and in the stewardship of natural resources. It's up north.

We live up north. Even Bemidji, with its 60,000 residents and university, we have clear lakes, we have pristine rivers. We have natural hand harvested wild rice, not the black rice you find in the Twin Cities. We want to keep it clean. We plan on keeping it clean and we will fight to keep it clean forever.

There are eight pipelines in the ground up here. When is enough enough? Greedy, anyone?

The list of spills and accidents by Enbridge is overwhelming. I suggest you Google it. There are so many. I beg you to look it up and check it out. Especially the cleanups.

There's plenty of maps and there's plenty of information so you don't have to rely on anybody in this room. You can find out this information yourself.

It's pretty outrageous when you think about the water in Minnesota. The value of water and rivers in Minnesota is unmeasurable. Especially the wildlife on both --

FACILITATOR: Thank you.

MS. VICKI BIBEAU: Both Lines 3 needs to go and be cleaned up.

FACILITATOR: Thank you. If you can hand in the written comments, that would be great.

Next we have Pam -- okay, Pam will be next.

MR. JERRY PERKINS: I'm Jerry Perkins, J-E-R-R-Y, P-E-R-K-I-N-S. No relation to Glenn, unfortunately.

In the interest of full disclosure, I will say that my brother and I own property on a lake very close to the proposed preferred Enbridge route. We are not -- although we pay property taxes to Minnesota, we are not legal residents. We live in Baja, Minnesota; that you might know as Iowa. We're summer Minnesotans. We've been coming up here since we were both babies.

We love it up here. We love the water. In fact, I can't tell you how much I'd much rather be out on my lake right now than talking to you.

But I've got a point of view that I haven't heard tonight, and that is those of us who aren't legal residents of Minnesota, you want to be very, very proud of your state government for what it's doing.

I saw the Dakota Access pipeline rammed down the throats of Iowans because our state government isn't as responsive as your state government. You ought to be very proud

of these folks and all the work they're going through.

The EIS -- I'll just speak my peace real quick and then I'm going to sit down. The EIS is flawed in many ways. When the Public Utilities Commission gets ready to discover it or to look at the Certificate of Need, it ought to consider the fact that this pipeline is not needed.

Enbridge wants to build a pipeline, I suggest they build the pipeline, provide all the jobs, moving ethanol from Minnesota, Nebraska, Iowa, and Illinois to the East and West Coast where it's needed more than in the Midwest. That's a Certificate of Need.

Secondly, on the routing permit, putting a pipeline of this size through the Mississippi headwaters is just insane. It can't -- it can't be done, folks.

If it does -- and it inevitably will spill -- you're looking at people like me who will go back to Iowa, and say, "Sorry, Minnesota, we've got our own polluted water in Iowa that I can drink and try to boat in."

I much prefer your pristine

waters. You have got a beautiful, beautiful system up here. Please keep it pristine.

Thank you.

FACILITATOR: Thank you.

So we have Pam Lemm next.

MS. PAM LEMM: Hi, thanks for letting me speak. I'm Pam Lemm, P-A-M, L-E-M-M.

I am a grandma, that's my favorite title. I'm also a teacher. I teach in Cass Lake-Bena, elementary kids, and children are so important to me. Now, I'm speaking from the heart because my friend Kris already read what I wrote.

So my grandchildren are so important to me. I grew up in the Cass Lake area. I ran around in the woods. I swam in the lakes and the rivers. I went fishing. I went hunting. I'm a native of this area.

And it was clean, and it still is. I want my grandchildren to be able to grow up and show their children the same childhood that I saw as a child.

I went on a pipeline walk. I went and saw different areas of the pipelines,

and I walked on this old corroded pipeline that's sticking up out of the ground in this beautiful bog, and it's next to pitcher plants and lady slippers. And if that old corroded pipeline bursts, what's going to happen to that bog? The lady slippers won't grow back.

There are also pipelines, I don't know if you people know this, but they're right on the bottom of Cass Lake. They go right across Cass Lake. They were put in probably the same year I was born back in the 1960s.

And if one of those bursts, what's going to happen? It's going to kill our lake. I just -- I'm speaking from the heart. I'm not speaking facts about the DEIS, but I just want you all to know I haven't heard anybody mention those pipelines.

If you go on a boat on Cass Lake, you can use your depth finder and find those pipes that are -- you can see them from the air. If you look on geo maps, you can see the pipelines going across the lake.

I just think it's ridiculous that they want to put pipelines under the Mississippi River, under the mouth of the

Mississippi River.

We need to move more towards sustainable energy. I know a lot of people have said that, and I know we can't do it all at once. I also drove my car here.

But we need to start somewhere, and somewhere isn't building new and bigger pipelines. Somewhere is cleaning up the old pipelines, getting them out of the ground. That's how you can provide your temporary jobs. Get those pipelines out of the ground and restore the area the way it was.

And don't put in the new pipelines. I just -- we need to do something different. We need to go forward, not backwards.

I guess that's all I have to say. Thank you.

FACILITATOR: Thank you.

After Lindsey it's going to be Andrew Struss. Also, just to let you know it's about ten to 9:00. We were officially scheduled to finish at 9:00. I checked in with Bill, the facility will allow us to stay until 9:30.

And we have about 15 to 18 cards left, and, Bill, is it okay if we go until 9:30, which I know we have to finish, have a hard stop then because of the facility requirements.

So, Lindsey, you're next, and then, Andrew, you're after that --

MS. LINDSEY KETCHEL: My name is Lindsey Ketchel, L-I-N-D-S-E-Y, last name is Ketchel, K-E-T-C-H-E-L. And I live in Woodrow township in Cass County.

I live about 15 miles from where the preferred route is being proposed. I also get the distinct honor to serve as the executive director of the Leech Lake Area Watershed Foundation.

And for 21 years we have actively been a part of helping to preserve our critical lake, hunting and fishing and deep appreciation for these amazing lakes up north. I'm very proud of what my organization does. We have lots of folks from Iowa who come up, I promise you.

I know all of us collectively, in green shirts or not in green shirts, we do

care about our lakes, we understand how important it is to this rural economy, and this is a very poor rural economy. I try to make a living. It's almost impossible.

I can't imagine how difficult it is for everybody else here, so I am completely sympathetic to all of us who are trying to find a solution.

I am not necessarily an anti-pipeline person, but I aggressively want to transition to better renewable energy in the long term.

What I'm deeply concerned about is this flawed Draft EIS. I've had the honor to evaluate and work with EISs in Vermont and Alaska and now in Minnesota. And I will tell you, this is probably one of the most worst, most convoluted, difficult processes to participate in, track, and honestly find your voice, and provide thoughtful feedback to the DOC.

I was a part of the scoping of an EI for Sandpiper many, many years ago. And for all of you in green who want this decision to be made quickly, if all you had done is just

asked for an EIS at that moment, we would have had a decision.

And then we could have focused on more important things that we need to do to create a viable, thoughtful rural economy up here.

Please understand, my concern is also because of my livelihood. My little rural economy, if there is a spill, as the gentleman from Iowa said -- and I didn't stage this -- they are going to leave.

If you can imagine what it's going to feel like to not have the second homeowners here, to not have people want to come up here to do the best hunting and fishing in this region, we're crazy to take this risk, folks.

Now, I will also say, my experience in Alaska where there's a tendency to believe that any spill can get fixed or any wrong can get righted, I was involved in providing comments for a mine that was going to annihilate wild salmon spawning areas -- and if anybody knows anything about spawning wild salmon, it is one of the most magical parts of

a stream.

Every part requires enormous delicacy to keep it going. And they said, "No problem, in 20 years, we can completely recreate it."

Some things can't get recreated, they have to be protected.

Thank you.

FACILITATOR: Thank you.

Next up after Andrew is Maria Swenson.

Maria is next.

MR. ANDREW STRUSS: My name is Andrew Struss, A-N-D-R-E-W, S-T-R-U-S-S.

I'm a United States Air Force veteran of eight years. I've traveled on five different continents, over a half a dozen different countries. I've traveled around the world.

And I've noticed there is an ongoing theme from pipelines in Minnesota to pipelines in Afghanistan, that this is all being pushed with violence, with greed. And anyone -- maybe some of you here were in North Dakota at Standing Rock and understand the

great lengths that these evil people, greedy people, will go to in order to obtain their goals. They go through unethical transgressions in order to obtain this.

Now, let's think about the objectivity within this DEIS. There is no objective third party reviewing any of this. They're providing their own biased data. This cannot honestly go forward as being rushed through. There's not enough information being provided.

Even in their own Certificate of Need they say this pipeline will not provide the supply to meet the demands that they require.

So replacing this, and for the least invasive route which they proposed is their preferred route, I don't understand how that is least invasive when you are now affecting a number of new property owners.

And it involves our state rights, it involves our property rights, our private property rights, and you do not have the authority -- no Public Utilities Commission can take our sovereignty away and

make the decision on behalf of all Minnesotans.

I want to speak to the Minnesotans here, not the people from out of state, but I want to encourage you, those that are visiting our state, to look at our flag, all right. We have a Native American on horseback. We have a farmer tilling the land.

And as a good steward of the land, we should take care of our natural resources and take care of the earth. We must honor the earth and protect its waters for our future generation sons and daughters.

There are seven generations that will pay for this. And just because we cannot think of a better way, this is the most expedient or the most cost effective way?

You're not looking at the long-term effects here. It's so short-sighted of you to take our livelihood and forsake it for your own personal gain, for your own greed, right, to sell your services, right, for money, right. You're selling out your fellow human beings.

This is our state. It's called

Minnesota, and its sky-colored water, and it's my intention to keep it that way.

I don't want to see anyone here say the solar or wind is not a viable option, right. If you say the sun doesn't shine every day, you do not understand how the solar system works.

So let's think about this. There's hemp. There's renewable, sustainable things. We can plant hemp everywhere. We plant seeds for our future generations of prosperity. I say, "Hemp, hemp, hurray," and we should plant (indiscernible) remediate the existing damage you've done to our soil.

There's over 900 anomalies that are leaking constantly. Fix what's existing now before you try to propose something. Why don't you fix the leaking pipeline and then come back to the table, right, because we have alternatives.

We have so many more creative minds here that can be inspired to -- for future needs, so I'm talking -- seven generations' safety.

FACILITATOR: Thank you.

Maria, and after Maria is Jake --

MS. MARIA SWENSON: Hi. I had an argument with a horse and I lost so that's why it's hard for me to stand and walk around, but I wanted to talk about --

FACILITATOR: Maria, sorry, could you spell your last name?

MS. MARIA SWENSON: Oh, I'm sorry, I thought that was easy, S-W-E-N-S-O-N. There's only about 10,000 of us in the state.

Anyway, I'm a landlord and a property owner. And they say if you want to get to know someone really well, live with them.

And I lived with seven pipeliners of various jobs on that pipeline. And I've never met such wonderful men that were so job-oriented, and their bosses above them were just wonderful.

And they had an epic, and they took me out to show me the welding scenes, and they said, "This is not going to go away easily. We may have a little spill here and there but we're right on it."

And the new one that they're proposing now for Sandpiper -- and they're even more rule-orientated than ever before.

Now, if Enbridge was spelled Hershey and chocolate was flowing through these pipes, you'd have protestors hollering because their water tastes like chocolate, and their power tasted like chocolate, and it was all because of the spills, even in areas where there wasn't any.

There's some hidden agendas that I heard tonight that are overpowering your thinking. And all of these things are not going to -- they're proposed. They probably will never happen.

In the meantime what they want, you can't put ketchup on that. These jobs are needed, especially around Bemidji, and I saw, firsthand, grown men cry when the pipeline left, because the business that they did were cars and tires and -- the restaurants literally cried.

We are the most poor county, other than Appalachia, and we don't even make good quilts to sell. So we don't have that to

rely on. But you can't put ketchup on what might be.

And believe me, these people from the top bosses down, they're on it, and I've never had one complaint about their ethics at all.

FACILITATOR: Thank you very much.

So again, real quick, we're going to try to get everybody. We may not. If you want to ensure you get your verbal comment in tonight, the court reporters are outside to reinforce that.

So Jake --

We go next to Marty Cobenais. Marty? Name and spelling for the record.

MR. MARTY COBENAIS: Marty Cobenais, M-A-R-T-Y, C-O-B-E-N-A-I-S.

I am an excom member with the Minnesota Sierra Club. I am with the (indiscernible) County Soil and Water. I think that's most of them. I've worked against pipelines for probably about the last ten years, so I kind of know a thing or two about pipelines and Enbridge and everything

else.

First off, I want to say that I say no to the pipeline.

But this DEIS is about a replacement, so if you look in the dictionary or anything, it says replacement. You put it back in where you got it, not reroute it. That is not replacing. You also don't replace with a bigger pipeline; you replace with the same size pipeline.

So if you guys with the 49ers are thinking about it, wouldn't it make more sense for you to put it back in the same hole? You don't get paid more. And Enbridge, I would think you'd want to do that anyways because it's a shorter route. So it doesn't make any sense to me that you guys are telling us that we can't do that.

As a soil and water officer or supervisor, AIS is very important to us, aquatic invasive species. I know that there is a comment put into the DEIS about it. Sounds like you have to wash off the machines.

When in -- in fact, when I was talking with one of the DNR ladies today, she

said that a transmission line company had to do it, and when they came out of the water, they had to hose it down and their equipment had to sit for up to a week to dry off.

Anyone who's a boater, you have to do all this with your boat. Why can't this company also do that with their equipment?

One of the other things that I talked about in one of the other hearings is directional bore. You should be able to directionally bore under all waterways: Swamps, rivers, lakes.

Yes, it's going to cost more. It should be 15 to 20 feet below the bottom of any lake or waterway and at least triple-lined to prevent any damages.

In talking with an Enbridge official tonight, he said that that couldn't happen because damning would sometimes be more environmentally friendly. Well, I say no pipeline would actually be more environmentally friendly.

Some people have talked about the taxes. I know how many of you guys are Minnesotans or live in Beltrami County or

Clearwater County, but Enbridge wants to sue us basically through tax court to reclaim their money.

If they're really a good friend, they should actually just say, "We're not going to do this and we're going to try to proceed with this pipe anyways."

FACILITATOR: Thank you very much.

Bali Humphrey, Bali Humphrey?

Okay, we'll go on to the next, Sarah Stahelin. No -- all right. We'll go to the next, Rita Chamblin. Name and spelling for the record.

MS. RITA CHAMBLIN: My name is Rita Chamblin, R-I-T-A, C-H-A-M-B-L-I-N. I live in Bemidji, Minnesota.

To begin, the spill response information in chapter 10 is inadequate. It doesn't have any examples for the wetland areas in Enbridge's preferred route.

The Commission should identify for the public the portions of the DEIS that have been independently verified versus the portions that have been reviewed versus the

portions that have been incorporated directly from Enbridge. For example, see tables in 10.4.

The Kalamazoo oil spill, aka the Dilbet disaster, spilled over a million gallons of tar sands oil into a creek that flowed into the Kalamazoo River.

Enbridge made commitments to the State of Michigan about the conditions, spill response, and cleanup, but did not live up to those commitments. We need a chapter to address how and why we should be confident that Enbridge will fulfill its promises to our communities, given its past history.

The Commission should make all of the input public, as they said, but also include the Commission's answers and responses to the questions and comments that have been posed at these public meetings when they publish the EIS.

For example, in the Park Rapids' meeting, I was shocked to learn that the Department of Natural Resources and Minnesota Pollution Control Agency were not fully consulted and included on this project.

Comments and input from DNR & PCA need to be fully incorporated in the EIS.

As a unitarian universalist, as a person of faith, I'm called to act in support of environmental justice for the protection of natural systems and the health of people and communities.

Chapter 1 says the EIS doesn't determine either the need for this project or the need for fossil fuels, which is confusing on its face.

Then in chapter 3, one of the criteria for granting the Certificate of Need is, are the consequences to society of granting the Certificate of Need more favorable than the consequences of denying the certificate?

The DEIS acknowledges Line 3 would contribute to climate change. Clearly, the consequences to society of granting the Certificate of Need are not favorable.

We are being asked to sacrifice the future of northern Minnesota for pipeline leaks and the future of our life on this planet from climate change. We are being asked to be complicit in exploiting creation. That is

immoral.

While our state's use of renewable energy is climbing, it would climb even faster if we didn't provide so many subsidies to the fossil fuel industry.

Abandonment is one of those fossil subsidies allowing old infrastructure cleanup and remediation costs to fall back on the landowners and local and state governments long after profits have been upstreamed out of the communities.

How can we consider a new pipeline when Enbridge isn't even willing and/or able to remove the old pipeline?

Further, chapter 12.2 leads me to expect Enbridge to move all of their pipelines now in the main line corridor to their preferred new route.

We need to journey together and have -- we have a holy obligation, as we do so, to choose a just and moral path so that all may thrive.

Thank you.

FACILITATOR: Thank you. If you do have written comments --

So we have Bali, and then Matt Johnson, Matt Johnson is next. Bali and then Matt.

MS. BALI HUMPHREY: My name is Bali Humphrey, B-A-L-I, H-U-M-P-H-R-E-Y. So I don't know all the facts about the pipeline. I'm not an expert on them, but I do have a little bit of common sense.

I am 17 years old and I want to go on record, I am in opposition of the replacement of Line 3. I'm in opposition of the abandonment of the current Line 3, and I'm in opposition of oil pipelines in general.

One of the numbers that I always like to throw out is that the current Line 3 that is in the ground, in 1991, the largest inland oil spill occurred in Grand Rapids, Minnesota.

In seven minutes, 1.7 million gallons of oil were spilled right on the campus that I go to college at. The response time, according to the firefighters who was there, it was a seven-minute response time.

So this pipeline that you're trying to put next to the Mississippi

headwaters, you're trying to put next to Lake Superior, can you imagine if in seven minutes 1.7 million gallons spilt there? That would ruin the land. I don't understand why anyone would think that's okay.

Another thing that I read, which I thought was kind of interesting, we call earth our Mother Earth because we're connected to her and she provides for us. She is our mother.

This is directed to Enbridge. I would like you to look at our Mother Earth as unborn baby earth. Would you be okay with pumping chemicals into an unborn baby earth? Would you be okay with raping your unborn baby earth? Because what you're doing when you're putting in these pipelines is you're raping our mother. You know it's not okay.

So I guess I would hope that you wouldn't be okay with that. And by putting in these pipelines, the ones you've already put in, you've taken away my voice for a clean environment, and you're continuing to take away my voice for a clean environment.

And you're also taking away the

voice of animals by putting these lines in. We speak for them, and you take that away from them.

I've also heard multiple comments that we need this oil. I don't know if anyone has read the EIS, but from my understanding, the majority of the oil that's being extracted is also being exported out. We do not get this oil. It's being sent out.

So why do we need this oil if we don't even use it? It's not for us sitting in this room, doesn't go into our cars. So get with the program.

Lastly, the EIS clearly states multiple times that the indigenous people will face detrimental long-term repercussions from this proposed line. How in the hell is this okay? Like it doesn't make any sense to me.

To me, it sounds a little bit like maybe some systematical genocide, because, as you can see, all of the proposed other lines -- or other routes for this line still go through treaty territory, still go through indigenous lands, still affect indigenous people.

Does that make any sense to anybody in this room? This all affects indigenous people. Are you okay with that?

FACILITATOR: Thank you.

MS. BALI HUMPHREY: I am in opposition of all lines.

FACILITATOR: We have Matt Johnson next.

MR. MATT JOHNSON: Good evening. My name is Matt Johnson, M-A-T-T, J-O-H-N-S-O-N.

I'm the general manager and director of risk management for JR Jensen Construction. I'm a graduate of Bemidji State University, and I've been working in the industrial and energy industry for the past 14 years.

Throughout this time I have completed numerous projects with Enbridge across the Midwest, and I can say they're the most professional environmentally conscious and safety driven company we work for.

Enbridge practices and promotes industry leading safety and environmental policies and procedures. They proactively

work to eliminate hazards to people, property, and the environment on all of their sites.

Lessons learned are communicated throughout North America to ensure opportunities for improvement and hazard corrections are implemented immediately. Enbridge truly practices what they preach and strongly enforces their policies and procedures.

The replacement of Line 3 is needed for two main reasons. One, there is still a huge public need for oil and petroleum-based products in our communities today.

Regardless if you don't consume a drop of gasoline, you are still a consumer of oil. Everyday items we take for granted such as clothing, footwear, eyeglasses, contacs, hunting and fishing equipment, carpeting, appliances, building materials, all require oil.

Renewable energy sources such as solar and wind have come a long way, but they are still not self-sustained. We need oil. If we don't utilize oil for North America, we are

liable to purchase it from countries overseas where it is extracted, refined, and transported with much lower standards for safety and environmental regulations.

If we truly care about the environment, we need to think about the world environment.

Number two, pipelines are currently the safest and most efficient way to transport oil. They utilize the latest technology to move, monitor, and attain oil throughout their transportation system. Once installed, their use poses no direct safety hazard to the public.

In comparison, tanker trucks put a direct and unnecessary risk to public motorists. They cause significant damage to our roadways resulting in increased maintenance costs to taxpayers of our state.

Numerous accidents were caused in North Dakota by increased container truck traffic due to overbooked rail lines, public demand for oil, and a lack of pipelines for structure.

Rail traffic also puts the public

at risk. Railways often are directed through towns, residential neighborhoods, cross hundreds of roads, waterways, and travel across old bridges, and increases in rail traffic also affect the transportation costs of other consumable goods.

When oil transport out of North Dakota increased, the cost of availability -- availability of items typically shipped by rail were affected. This directly affected the average consumer and negatively impacted the local economy.

In the safety industry there are two ways to handle risk. The first has historically been that of reactivity. Learn from past mistakes so as to not repeat them.

Recently, corrective thought process has been area focused. Correct all known or potential hazards before they have an opportunity to become an incident.

In my opinion, Enbridge is taking a proactive approach through their plant to replace Line 3 with a new line built to today's standards.

FACILITATOR: Thank you.

Next I have Sarah and then I have Bob Schoneberger.

MS. SARAH STAHELIN: My name is Sarah Stahelin, S-A-R-A-H, S-T-A-H-E-L-I-N.

I wasn't really intending to put my comments verbally today but my daughter forced me to stay and do this.

And I think that's an apt thing because she's one of the main reasons I'm here doing this. My daughter Phoebe, she's an enrolled member of the Leech Lake Band of Ojibwe, and she's very proud of that and I'm very proud of that for her.

I care very much for the native neighbors that we have, the native communities, and that's my main concern.

I have a lot of concerns for the Draft EIS as written. I'm concerned that the no build alternative was not given due consideration.

I'm concerned that the shutdown of Line 3 completely was not considered.

I am very concerned that the life span of impact on -- of the project is too short. My daughter is six years old.

You look in 30 years, she'll be younger than I am today. That's not long enough.

I'm concerned, of course, of the increased effect on climate change, and I'm also, of course, concerned with spills and the effect on water and wildlife.

As I said, my main concern is social justice. I don't understand how the Draft EIS can say that it will have a disparate impact on native communities that will affect wild rice beds, the most wild rice beds, this alternative, and I don't understand why that didn't just close the door on this project.

I think it's about time that we as a society stop putting our progress and our economic comfort on the backs of native communities and people of color.

I think we have to make the conscious choice to do it differently, and I think this is where we start, and I think we can.

I think jobs are important, but to hear that none of the jobs are permanent jobs, and to also know that none of the jobs

are coming to these native communities that are disproportionally affected by poverty and unemployment, I don't understand why we are proposing projects that bring no benefit and only greater and greater and greater harm, adding to harm.

So they talk about how the effects of climate change are exponential, and they grow upon, grow with carbon in the atmosphere, but I feel the effect on native communities also do the same thing.

Every little decision that is unjust and risks the future of my child and all other children and the people that are here now, that that grows, historic trauma, which is actually current trauma, grows upon trauma.

It's time we stop, not only for our own selves to be proud of who we are and stand by our neighbors, but for these children that look for us to lead, for these waters that don't have a voice and for the animals, like the 17-year-old said, not -- but they don't have a voice, and that's what we're doing here.

So that's all I have to say. Thank you.

FACILITATOR: Thank you.

So we have Bob S., and then Brandy Larson. Is there a Brandy Larson in the room?

MR. BOB SCHONEBERGER: I'm Bob Schoneberger, B-O-B, S-C-H-O-N-E-B-E-R-G-E-R.

I support the Line 3 replacement and the preferred route as it's laid out by Enbridge for a litany of environmental reasons.

First of all, crossing anywhere in northern Minnesota with any sort of transportation project, you will impact water in some form. Doing so in a sound and safe way is important to me. I know that countermeasures exist that will minimize those impacts, too.

I know that moving oil by pipeline is the cleanest, safest way when preparing like statistics to any other mode of transportation. I know that transporting petroleum products of any kind by pipeline leaves the smallest carbon footprint of any mode of transportation, and I like that.

Regardless of what you may hear

or read, the transportation industry is an extremely responsible industry. Their efforts ultimately touch every American in a positive way, whether it be providing fuel to get to their jobs, heat for their homes, put bread on their tables; everyone's affected in a positive way by the work the pipelines do.

Coal will not get delivered to our power plants if it were not for the fuel for the locomotives. Factories would not produce if it were not for the fuel to keep them going. Farmers would not farm if it were not for the fuel for their tractors.

Pipelines are the safest mode, commodity of transportation, and there is no debate on that point. Not only as it pertains to our personal safety but safety for our environment as well.

When pipelines are built, you do not see them and maybe that adds to the mystery. I don't know. They do not leave towering structures along the horizon. They're out of sight.

They do not cover acres and acres of ground and work only at certain times

of the day or year. They work around the clock, 24/7, 365 days a year without a break and provide the energy we all need to live.

Wind cannot do that. Solar cannot do that. The combination of these two cannot do that.

You never read in the news, daily, about 18 million barrels of oil that were successfully delivered to you that day, but when a gasket leaks and 20 gallons hit the ground, all hell breaks loose.

A lot has been said here about the no build option. I might say that is not an option. The recent Federal Department of Justice consent decree to Enbridge requires the replacement of Line 3 by law.

To those who oppose them, you may want to direct your attention to the Department of Justice and become familiar with the consent order drafted under the previous administration.

All this is done to keep the environment clean.

I also might add that the no-build option to replace Line 3 with trucks

between oil fields of western Canada and Superior and back would put another 25,000 tanker trucks on the road to do that today. Or it would put fifty 100-car trains on the tracks that do not exist today.

The oil will move, and here we have an opportunity to have a say in how it's moved. Highway traffic, we have no say. Rail traffic, we have no say. I think Line 3 replacement is a better option.

Thank you.

FACILITATOR: Thank you.

Brandy Larson, Brandy? Next I've got Erica Harmson, Erica?

Next we've got Dawn Goodwin, Dawn?

MS. DAWN GOODWIN: (Ojibwe). One thing about the DEIS, you forgot wolf plan in there. We are leaders and we care about our people. I'm part of that (Ojibwe).

I'm here today representing the White Earth Counsel of Elders. They could not be here tonight. I also represent (indiscernible). We are a group of gatherers in the White Earth area. I also represent the

1855 Treaty Authority, Wild Rice Committee, and I represent myself and my family and my friends. I speak for both lines.

We are against the relocation of Line 3, we'll call it. It's not a replacement. It's a relocation. It's near my reservation. It could affect our watershed because the water comes towards us.

I live on the lake that is connected directly to the river that -- an area that it would cross under. We have a spring, a flowing well right near that lake that we use every day. I actually go and bring water to my family in Bagley because their water is no good.

So this is just in Bagley, and I live 20 miles from Bagley. I bring them water. My sister came from Staples and said, "Wow, this water's good." I said, "Yeah, I just brought it to mom. Got some extra, you can take some home." She said, "Yeah." So here she is, happy as can be, loading this water up, bringing it to Staples for her to drink.

I want you to really think about the importance of water and how you've used it

today and how important it is for us to keep it clean.

We're in the greatest fresh water area you could ever dream of, and I want you to think, our elders have approved a resolution that they will present via mail before July 10th.

We do not want this line to go through our area, through Bagley. It's the 1855 Treaty area. We prohibit any new pipelines in our area. Line 3, we want it out. We want it -- a study in that area, and then what goes forth from there, I guess that would be a new plan.

So we are very much so against this, and my time's running out.

Thank you.

FACILITATOR: Thank you.

So we have time for one more, and we're not going to get to everybody so just reminding folks of the court reporters out in the hall.

And our last person up is Lea Foushee. Lea, are you here?

MS. LEA FOUSHEE: I am. My name

is L-E-A; F, like Frank, O-U-S, like Sam, H-E-E.

I'm the environmental justice director for the North American Water Office. I'm also on Commissioner John Linc Stine's Minnesota Pollution Control Agency Environmental Justice and Advisory Group.

My degree from the University of Minnesota, graduated summa cum laude, was in environmental justice before the words were coined, so I know something about environmental justice.

And so I will talk about Chapter 11, Chapter 11, bankrupt justice. Bankrupt justice, get that.

This is not justice. This is racism. This is genocide. And this is the corporate right coming for the people, and we're not going to stand for it. Not going to stand for it.

You have declared war on indigenous people. You have declared war on the rights, on every traditional gatherer, medicine person alive. Alive.

You want more? You've got it.

You've got it. But, you know, you men, you men, you like Indian women a whole lot. I know because we've got numbers of the rapes, the abuse, and what you do to us. You kill us, and you lay us in a ditch to die.

You don't do that. You do that, you will get something that you won't like. So you going to educate these men? I want to know who is that, that is going to write that curriculum? Who gets to decide it? Who? I want the name. I want the data on what that is, because you don't know what you're doing.

And Enbridge cannot write it. Enbridge cannot write it. And neither can the DNR, the Pollution Control Agency, or any other state government agency.

The people suffering from that need to write it. The women need to write it, the women.

You got some other really nasty things in here, but what it is is 525 more years of genocide. You have never stopped. You've never stopped trying to eliminate indigenous people, because you want the land, you want the water, you want the natural

resources, you want the oil, you want the gas, you want everything. You want the copper, you want the rare metals.

And you're going to try to get it all, and you will just have to suck it up.

Thank you.

FACILITATOR: I just want to remind folks that if you want to submit any written comments, it's by July 10th.

Thank you very much for your comments and your participation.

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DEIS MEETING - 14-916 15-137

FOND DU LAC - JUNE 27, 2017

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Certificate of Need for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border.

PUC DOCKET NO: CN-14-916

OAH DOCKET NO: 65-2500-32764

In the Matter of the Application of Enbridge Energy, Limited Partnership for a Route Permit for the Line 3 Pipeline Replacement Project in Minnesota from the North Dakota Border to the Wisconsin Border

PUC DOCKET NO: PPL-15-137
OAH DOCKET NO: 65-2500-33377

Fond du Lac Band of Lake Superior Chippewa
Community Center
1720 Big Lake Road
Cloquet, Minnesota

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MS. JAMIE MACALISTER: Okay. Well, first of all, thank you for inviting us here, having a meal with us.

I'm Jamie MacAlister with the Minnesota Department of Commerce and I am one of the project managers for this project. And with me is Danielle Oxendine Molliver, our tribal liaison for the Department of Commerce.

And we also have Janet here, the court reporter. She will be here to take down your comments and record this meeting for us.

We're here in part because we were invited here and to help facilitate comments that you may have on the draft EIS. So what we have brought with us tonight, we have some hard copies of the draft EIS, we have some comment forms which you can fill out and leave with us tonight, if you like, or you can send them in at your leisure.

There is also a little handout that we brought with. And what's in the handout, the meeting guide, it contains the executive summary for the draft EIS. So that is -- its primary utility here with us this evening is to provide the executive summary, it might help you think about some of your comments. And if you're not going to

have time to read all those thousands of pages, it's a nice little snapshot of what's in the DEIS.

So, with that, obviously, this is very informal. We are here to have a conversation, take your comments. And I'll leave it at that.

MS. DEBRA TOPPING: What is that over there, did you say?

MS. JAMIE MACALISTER: The draft environmental impact statement.

MS. DEBRA TOPPING: How many pages is it?

MS. JAMIE MACALISTER: Thousands. Thousands of pages.

MS. DEBRA TOPPING: Thousands of pages.

MS. JAMIE MACALISTER: Thousands of pages, when you include the appendices, the maps. It's a large document.

You may have also noticed when you came in that we do have a map that shows some of the significant cultural resources and the treaty lands, in addition to the reservation boundaries. And we have been working with all of the tribes to develop this map. So if there are other things that you would like to see on that map or that you think that

we have missed -- we received a few comments on the map already, some things that we need to correct -- we are happy to take those comments as well. We want that map to reflect the issues and concerns that you have.

MS. DANIELLE OXENDINE MOLLIVER: So, again, I'm Danielle Oxendine Molliver, I'm the tribal liaison with Commerce.

And the only thing I was going to add is just to reiterate that the meeting, or the -- I should say not the meeting, per se, we're here to be together and hear your comments. But it is being recorded so that it can go into the record. And the idea is that the comments are, you know, focused on the draft environmental impact statement. 'Cause we have done a great amount of consultation with all of the Minnesota tribes and sent as well an invitation to Wisconsin. We will also have all of your comments to end the process.

But as you know, your story, as far as your traditional knowledge, your lands, your resources, your ecological knowledge, that really isn't something that third parties can look up or necessarily gather. So the idea is that we really have this document, we're really here to take

comments so that we can make this the best draft that it is. So that it does cover all of those things that you feel that people need to know better.

So as much as we can, also, just in the process, there will be other opportunities on record to advocate. So when the public hearings come, that's the time when we really hear testimony about, you know, the general pipeline and those types of things.

Obviously your comments are welcome on anything, but the most helpful would definitely be how we can make this impact statement a better document and more reflective of your rights and your needs.

MS. JAMIE MACALISTER: If you would like to speak, ask questions, raise your hand, let us know.

I'm sorry, I'm being remiss here. For Janet's purposes, we will ask you to state and spell your name so that she gets it correct in the record. These will be posted, this transcript will be posted online. So your comments, you can see your comments, other people can see your comments. You can also see the comments that anyone else made

during the previous meetings that we've attended.

MS. SHEILA LAMB: Sheila, S-H-E-I-L-A, Lamb, L-A-M-B. I'm going to check my notes here for a few things.

The first item on the list is, to the best of my knowledge, there's nothing written into the DEIS in regards to damage done to our infrastructure, our roadways, from the trucks and equipment. That means our taxpayers have to foot the bill for it.

Trucks have been running up 210 hot and heavy at a high rate of speed, definitely going over the speed limit, those types of things. When they're on two-lane roads they're going to do more damage. If they're on 35, they're on roads that are recently paved. So that's something that is neglected in the DEIS. Enbridge needs to foot the bill for that one. That is item number one.

Number two, the DEIS is set for November. In Carlton County there are hundreds of pipes, hundreds on any given day that you can see. I've got about 500 pictures and I've been asked to go public with this.

There are staging areas already. The newest one is between Kettle River and Rice. It is

a huge fenced area with barbed wire on top, the whole nine yards, where they're taking the pipes to. We're talking trucks running every 10 to 15 minutes carrying in pipes. As of yesterday there were 35 carloads of pipes just that we could count sitting right in Carlton.

Who's paying for the police? Both the state police and Carlton County Sheriff's Department are doing traffic control. Why is there no mention of things like that either in the DEIS and why should that be on the taxpayers' backs? It's also creating road hazards because, again, they're not obeying the speed limits, they're flying with these heavy loads down rural roads. So that impact needs to be taken into account as well.

Fond du Lac Reservation in Cloquet are all on well water. So these pipelines going through anything that is affecting our watershed directly affects our well water. With Enbridge's history of leaks, well over 800 in, I believe it's the last eight years, something to that effect, they can sit in and use their rhetoric that it's two to three little spills per year. Well, even a cup full is too much, in my opinion. But that is not their record. And that's just reported spills, that's not

those that they don't have to report. One of the worst spills of all times was right here in Minnesota.

There is another component that we know that the bonds do not fully cover. Their cleanup costs. There needs to be a protection put in there because they are going to leak. They're going to leak. Whether it's the old Line 3 or the new, they're both going to have a problem. And are the reservations going to have to clean it up? Because the old Line 3 goes through most of them. Are we going to have to clean it up? Where does that come from? That needs to be spelled out very, very clearly in the DEIS.

And when you look at overall economic impact, the cost of cleanup and road wear and tear along pretty much states they should be null and void. It does not quantify this supposed jobs, especially when we're seeing them directly come in from Texas and Oklahoma.

Our union workers can gain $1.20 billion, roughly, to take Line 3 out and clean it up. You want to make jobs for Minnesota? There's where we do it, while cleaning our environment up. And then going to renewable energy. Be in the

forefront like Minnesota and the Duluth region usually are.

They've admitted themselves, including Enbridge, that fossil fuel is on its way out. So instead of milking it all, instead of putting our waterways, especially Lake Superior in danger, we need to stop this and we need to stop it now. What's best for Minnesota is not to put our environment, our watershed, our beautiful, pristine areas in danger on any level.

We already have the highest cancer rates of any people on our reservations here. Introducing more carcinogens, allowing the old Line 3 to stay in place releasing toxins and so forth is a detriment to our health but, more importantly, to the future generations' health as well.

So, you know, we need to see a lot more in there regarding the health impact on those that would be in or around any of these pipelines. The old and the new.

Also, the next generation is in effect and exists here in Minnesota. And that law requires that we continue to reduce our emissions for future generations. Putting this pipeline in and leaving

that old one in there to disintegrate is not going to help us to meet that next generation law.

MS. JAMIE MACALISTER: Thank you, Sheila.

Is there anyone else?

MR. BUSTER KILLSFIRST: Buster Killsfirst.

And I just want to know how much money will be going, potentially, or actually towards the type of mercenaries that we seen over in Standing Rock? And where exactly do you intend to bring law enforcement officers to protect the pipeline for a corporation against the American people?

MS. JAMIE MACALISTER: All right. Well, first, let's make a clarification. Our job here is to evaluate the environmental impacts of Enbridge's projects. We are not here on behalf of Enbridge. We don't work for Enbridge. We're here on behalf of the State of Minnesota and our job is to evaluate the impacts of the project that Enbridge has proposed, as well as to evaluate the impacts of any of the other alternatives that have been proposed throughout this project.

So that means that roughly a year ago there were several scoping meetings and there were a

number of alternatives that were proposed. Those can be seen on the map that we brought here. You can also see them fairly clearly in the map books that go with the draft EIS.

So that's our role. Our role is to evaluate the impacts. We don't do anything else beyond that.

MR. BUSTER KILLSFIRST: That would have an impact on the community.

MS. JAMIE MACALISTER: Which?

MR. BUSTER KILLSFIRST: Just bringing the pipeline in and dealing with all the consequences and not just eliminating some of the consequences because you don't want to think about them.

MS. JAMIE MACALISTER: Well, if your suggestion is that that is something that's missing in the draft EIS, then that would be good for you to make a comment directed more towards the EIS.

MR. BUSTER KILLSFIRST: I'd like to see that in the EIS.

MS. JAMIE MACALISTER: Restate that and say clearly what you think the DEIS is lacking.

MR. BUSTER KILLSFIRST: I'd like to see in the DEIS figures on potential and actual

impacts. And to law enforcement and corporate mercenaries on the community financially and otherwise.

Thank you.

MR. SCOTT KRETZ: My name is Scott Kretz, K-R-E-T-Z, a landowner here.

And I've been working with this for awhile. And what appears to me is a perfect opportunity to find out what the exact environmental impact is by removing the old Line 3. Then you could test the soil, you could sample it and get an actual report instead of a study. Which is wishful thinking a lot of times. But that way, as we vacate it, you find out what you have to do. And with the new line coming in, you could also maybe even preempt some of the things.

Since Paul Stamens is a microbiologist, I believe is what he is, he grows mushrooms and everything else. And he's one of the ones who have to take care of the spilled oil. So, I mean, you could preemptively put that in the new line corridor so when the new leaks come out of the new one, that you're already mediating the problem. But we need a report on what the actual impact has been on the Line 3. That's the only way you'd know.

So, for on the record, I propose that we get a report instead of a study.

MS. JAMIE MACALISTER: Anyone else?

MR. JEFF SAVAGE: My name is Jeff Savage. I'm a Fond du Lac Band member.

And some of my concerns on this pipeline is, first of all, is if there is even a need for it. On the certificate of need, I feel that this is an unnecessary pipeline. The company, Enbridge, should be looking towards the future and alternative energy sources to be using. So I see no need for the pipeline in the first place.

And as a tribal person and on my reservation right now, the Enbridge line literally cuts my reservation in half. It is disrupting to my use of my reservation for cultural uses, religious uses, and for gathering food, et cetera. The pipeline is already here and it's already disrupting my use of my reservation.

And the destruction of sacred sites that are here now and also along the present whole line of Enbridge and also along the proposed lines. There are many sacred sites that I still use to this day all along these corridors. And Enbridge and its fossil fuels are disrupting my right to use my

religion and to use my resources in a sacred manner.

Wild rice. I'll use wild rice. Wild rice is my life. In these waters, they are sacred to me. I can go back orally for eight generations, just my family talking about us harvesting wild rice for those eight generations. Wild rice is a sacred food to me. This is the first food besides mother milk that goes into my babies and my grand babies' mouths. I can take my phone out and show you a video right now of my four-month, six-month grand baby eating her first mouthful of food that isn't mother's milk and it is wild rice. It is a sacred food to us. It is the basis of our migration to this area. And these pipelines disrupt that.

The soil, as the fellow was just speaking about, is disturbed and being filled with toxins. The waters, if there's a spill, destroys those sacred foods of ours. 90 percent of our wild rice has already been destroyed due to mining and other fossil fuel and timber and over development. It's getting harder and harder for me to feed my family every year due to these industrial pollutions.

This will be my 53rd year in a row of harvesting wild rice. And in them 53 years I have

watched our wild rice beds disappear. There's no more wild rice in St. Louis Bay. When I was a young boy it used to be covered in wild rice, now you cannot even find one plant.

These pipelines are unnecessary. With the rate of technology going today, oil is obsolete. The price right now is over 50 percent less than it was just several years ago. And any company that's forward thinking would not be thinking in the fossil fuel business, they'd be thinking of alternative energy sources.

And, again, my major concern is the disruption of my right to use sacred sites, our sacred foods, and our sacred lands. And they are being defiled and it is unacceptable to me.

Thank you.

MS. JAMIE MACALISTER: Thank you.

MR. JEFF SAVAGE: I tried to get a little more technical for you.

MS. JAMIE MACALISTER: Anyone else? Technical, nontechnical? We'll take any.

We can take a few minutes, let folks finish eating and come back.

MS. DANIELLE OXENDINE MOLLIVER: You mentioned the cards and that equal weight will be

given. So whether they talk today or whether they write it. And you have until July 10th and it's the same amount of weight.

MS. LYZ JAAKOLA: I have a question. So a number of us have gone to a number of meetings. So how are our statements made? Like every time I attend a meeting and fill something out or speak, is that entered in the same, like, if I do that all 22 meetings or whatever, would there be 22 messages from me?

MS. JAMIE MACALISTER: Yes, there will be. If your 22 messages all say the same thing, they'll count just one.

And partially that is -- it is not uncommon for organizations to send thousands of postcards in. And those postcards all have the same message and those thousand post cards do not carry any more weight than anyone else's comments.

So the point being, all comments are treated individually and weighted equally, it's not that we get a thousand postcards from this group and five thousand postcards from this group. But all of your comments that you've provided at any other meeting will be available, they all go into the record, and we will look at each one of them

individually.

MS. LYZ JAAKOLA: So who decides whether it's the same thing or not?

MS. JAMIE MACALISTER: We have a big job of going through all of these comments and responding to the comments and looking for substantive comments that can help us flesh out additional information. Either information that's missing in the draft, additional information, or trying to make things clear. And our goal is to make sure that we are capturing all the missing information between the draft and the final.

MS. DANIELLE OXENDINE MOLLIVER: So, Jamie, I think when you're saying it counts, because we also are responding back to the comments that are made and explaining, you know, helping track the changes so that people can see that it is reflected. So when we say count as one, it just means, for example, everyone would be on the record, but we might only address it one time. If that makes sense.

MS. SHEILA LAMB: Maybe you two ladies could address what was just talked about. I made the statement, is this for nothing. They're already bringing in the pipes. Is this already a done deal?

And I'm hearing others wondering that. So maybe if you could answer that the way you did for me, so that people know that it's not a done deal, that this isn't for nothing.

MS. JAMIE MACALISTER: Right. From our perspective, from the state's perspective, it is not a done deal.

The Public Utilities Commission is -- they've received a copy of the draft, they are reviewing the draft. They are going to have a very difficult decision to make further down the line, in about a year, not quite a year, but sometime in early, mid 2018.

I would say that, yes, the perception of having pipes stacked up all across northern Minnesota leads to the perception that a decision has already been made. But the decision has not been made and that is one of the reasons why we have an open and transparent process. We're here to show you how we've addressed this information, dealt with concerns that you have provided to us during scoping and that we will continue to address through the draft.

Additionally, we would expect any of you that still have the energy to go to the

contested case hearings, to go to the contested case hearings and keep putting your concerns on the record. The Commission needs to know that. The Commission, that's our job and that's what these meetings are for.

These meetings are really to help us gather the information so that the decision-makers have the best information available to them. They don't know that there's pipes stacked up out here. In fact, I didn't know there was pipes stacked up out here until I came to this meeting. So that is information that the decision-makers are not aware of.

So, yes, I can see how the perception of having all of this pipe stacked up across the northern portion of the state leads one to believe a decision has already been made and Enbridge gets to go through. Enbridge does not have any permits. They're not allowed to do any construction until they receive those permits. It would be a violation for them to start doing any construction without any permits.

And, furthermore, anything that Enbridge does prior to receiving any permits, if they do receive permits, is at their own risk. That

is not a risk that the state is assuming. If Enbridge does not get the route that they want, if they don't get the permits, whatever comes out of this process, any work that Enbridge has done up until this point is at -- Enbridge is taking that risk.

Okay. Oh, my gosh, a firestorm here. Let's start here.

MS. KOREY NORTHRUP: Korey Northrup, K-O-R-E-Y, N-O-R-T-H-R-U-P.

I'm from Fond du Lac, I'm a Fond du Lac Band member. I'm an actually enrolled Fond du Lac Band member.

My first question is what is the punishment for Enbridge if they construct the pipeline without permission? Is it just like a fine or something?

MS. JAMIE MACALISTER: I don't know.

MS. KOREY NORTHRUP: I mean, like, do we get to talk about what we would want to see if they did that? 'Cause that's, like, something that's super common. Like, I remember they told me the story of how the aerial lift bridge came. And they told me that somebody went in the middle of the night and blew it up, so then it's already blown up,

so then there's no decision to be made because it's already gone, the canal is already in there, we don't have a choice. We don't have an environmental impact statement or any comment period for them.

So I would like to know what the punishment is if they get caught constructing without a permit. And if it's just a fine, I don't feel like that's enough. So there's that.

Let's see. What else do I have on my paper?

The other thing I'm concerned about is they talked a lot about abandonment, they talked about pipeline fatigue. And I was kind of, like, walking my dog the other day, 'cause I got this, like, new dog, and I just happened to, like, walk down where these proposed parts are. And it seems like there's quite a bit of pipelines already in the corridors that they want to put this replacement line in. So what is the impacts of that? Like, how many pipelines is pipeline fatigue if that corridor has more pipelines than the one where it exists already? That's my question for that.

And then my other one is, in your draft EIS, I haven't had a chance to look at it since I just, like, received your -- whatever you

call it, today. But my main concern is, like, other medicines. We talked a lot about wild rice and things like that, and like sugar bush and some of these, like, real common ones. But there are a lot of medicines that are out there that aren't, like, you know, particularly known as medicines, or that we want people to know are.

What kinds of things do we have for that? Like, you know, let's say we use trillium for tea, you know, what about that? Like, what is the impact of the trillium and all the tiny little plants and roots and nuts and berries that we use? Because we don't use like a little bit, we use every single thing that's out there. Every piece of leaf, every branch is utilized in what we do to, like, you know, do our Indian stuff, our secret Indian stuff.

So I really want to know about that. Like, the damage to the ecosystems and stuff like that. 'Cause we have all kinds of different stuff out there and we want to protect everything equally.

So the other thing that I want to know is, you know, when you destroy the ecosystem, that also takes the people with it. Like, a lot of what we believe and know is what we see around us. So when you take those things away from us, like, what

about us as people, like, what are we going to do when you, like -- when our plants are extinct, our medicines are extinct and our animals are extinct, and all those things that we rely on in nature to, like, help keep us balanced as humans. You know, that to me, you know, is like a forced extinction of who we are as people. Like, not only just taking our lands, but taking the things around us, and taking away, like, things that can't ever come back. Like, we just can't grow a new Anishinabe people. They don't just come out of the woodwork. That's just what we have.

And I'm concerned mostly that if pipelines push their way through, that they will just push us out and then there will be no more of us. And that is, like, my main concern, you know. We are a part of this ecosystem, and for it to be sustainable, our presence here is very important.

And I guess that's all I got to say about that. Thanks for listening.

MS. DANIELLE OXENDINE MOLLIVER: I think there is someone in the back here that wanted to speak as well.

But just to speak to your point, Korey, because I understand that lots of folks

haven't had the time to look at it and we are here to talk to it. But just to give a little background on, you know, the consultation, or potentially where you want to focus in the draft if you can't start at 5,000 pages. There is a section called Tribal Resources, which in that is both cultural and medicinal. And then there is also a chapter on Environmental Justice. And there is a Tribal appendix, which has, you know, pretty much every Band has passed a resolution that relates to Line 3. You know, MIAC, there's other organizations and other resources that are in the appendix.

And we did write those. We are clear and we're going to continue to be clear in the draft that we have consulted. That doesn't mean that we have the consent of the tribes, but through the consultation there was those chapters, the Environmental Justice and Tribal Resources was exchanged with some of the technical staff at DNR and to folks. So, you know, I'm sure there is some information there from the staff that is above and beyond maybe the general knowledge of some of the medicines.

But, you know, I would urge you to, if you need to kind of do a quick read, to maybe focus

on that and maybe you can see if there's an overlook and put that into a comment.

MS. KOREY NORTHRUP: All right.

MS. JAMIE MACALISTER: Let me try and unpack a couple of your questions there. The first being about a fine. I don't -- I will have no satisfactory answer for you on a couple of these things.

I don't know how the fines or what the ramifications are, actually, for Enbridge, if they start constructing without permits. I don't know what that is. To my knowledge, they haven't started construction. If they have started construction someplace, that is definitely something that we would want to know about and that is something that the Public Utilities Commission would want to know about.

So that is the first one. Remind me of your second.

MS. KOREY NORTHRUP: I think --

MS. JAMIE MACALISTER: Oh, the corridor fatigue. And, again, the concept of corridor fatigue is subjective, to some extent. What constitutes corridor fatigue? I don't know. It's a term that is used in a number of different

ways. Is five pipelines too many? Is seven pipelines too many? I personally cannot say that constitutes corridor fatigue.

But some of the things that would be looked at, at least that we're looking at in the draft EIS is looking at what's going on in the mainline corridor. Because we obviously know that there are a number of pipelines in the mainline corridor. There's looking at, you know, what does it mean if you put the pipeline in a new corridor and what does that look like, what are those impacts, and how do you look at those impacts compared to the impacts that are already in the existing mainline corridor.

So I think those are good questions and, again, I don't have a satisfactory answer for you because there is no real definition of what corridor fatigue is.

MS. KOREY NORTHRUP: Can we have a clear definition of what that is so that we can all be on the same page of what that means? Because if it's used as an excuse for a replacement and they try to put it in a place that has more pipelines, that doesn't sound like it makes sense to me. So I don't know if you need to call them up or whatever,

but I feel like we all need to have a clear definition of what corridor fatigue means and what it entails and what it's about.

MS. JAMIE MACALISTER: Okay. In terms of corridor fatigue, corridor fatigue has been used by several different parties. You know, one way the corridor fatigue is looked at is can any areas sustain, if you will, a certain number of pipelines. As it relates to the mainline corridor, Enbridge is arguing that there is not room in some places within the existing mainline corridor to put an additional pipeline in. That's their preference, that's why they're saying they can't do it, saying there's not room in the existing mainline corridor to squeeze another pipe in there. The other option that's being looked at is the removal of old Line 3 and replacement in the same trench. So those are the two things that are being evaluated.

I think the comments on what -- how do you define corridor fatigue is a fair comment to put in, as you have. I can't -- I don't have a definition for what corridor fatigue is.

MS. KOREY NORTHRUP: So we'll get right on it?

MS. JAMIE MACALISTER: I'll see what I

can do.

COURT REPORTER: I can't hear you.

MS. KOREY NORTHRUP: She was saying she wants it in five-year-old English. Because a lot of us are bilingual, you know, when they use like really big, fancy words in the English words, a lot of us can't follow along because we're bilingual.

MS. SHEILA LAMB: It's the PR language, instead of language to the average person, it's PR. We don't want a commercial, we want it clear and understand it.

MS. JAMIE MACALISTER: I hear what you're saying. If I think about what corridor fatigue means, I get your point, yes.

There was someone in the back.

MS. DEBRA TOPPING: Joyce?

MS. JOYCE LAPORTE: Well, my concern is to get just a printout of Chapter 9, if I could? If there's some way that I can give you my email and you can email it to me? I just want Chapter 9.

UNIDENTIFIED: We can't hear you.

MS. JOYCE LAPORTE: Yeah. Joyce LaPorte. J-O-Y-C-E, LaPorte. So I need a copy of just Chapter 9. And I'm sure some of the rest of us

sitting here also would like that.

MS. KOREY NORTHRUP: What's the topic of Chapter 9?

MS. DANIELLE OXENDINE MOLLIVER: Tribal Resources. So she's asking for a copy of just the Tribal Resources section, like a paper copy.

MS. JOYCE LAPORTE: Or send it to my email.

MS. JAMIE MACALISTER: I can give you an electronic copy right now.

MS. JOYCE LAPORTE: Oh, okay.

MS. DANIELLE OXENDINE MOLLIVER: Actually, there's electronic copies on a DVD or that little flash drive.

MS. JOYCE LAPORTE: I got it.

MS. DANIELLE OXENDINE MOLLIVER: But if you need it in --

(All talking at once.)

MS. KAREN DURFEE: My name is Karen Durfee. K-A-R-E-N, D-U-R-F-E-E.

I only have one question. And I was just wondering, if they do happen to put that pipeline in, do they plan on, like, fining, some of the counties? Yeah, the taxations and the fining,

that it's going to cost some of the people millions?

MS. JAMIE MACALISTER: I can tell you what I know about that, which is not a whole lot. But that is that Enbridge does pay counties -- sorry, pays taxes to the counties where the pipeline goes through. I don't know how those taxes are set. Some of it is based on what the assessment of the asset is and what goes through the pipe. And so that's details and not something that I deal with.

However, Enbridge has filed to have repayment of those taxes that they have paid. They have filed to have those taxes returned because they feel like they are paying too high of a tax rate. So some of those counties are being asked to return fairly large sums of money.

MS. KOREY NORTHRUP: What does fairly large mean?

MS. JAMIE MACALISTER: Well, more money than they bring in in taxes. So some of those counties got more money from Enbridge than they do from their tax base. They are now being asked to repay more money than they bring in and return that money to Enbridge.

MS. KOREY NORTHRUP: What happens if they can't pay them?

MS. JAMIE MACALISTER: If they can't repay them?

MS. KOREY NORTHRUP: Yeah. What if they don't repay them? Do they dissolve the county, take all the county land, like --

MS. JAMIE MACALISTER: I don't know how that works. To my knowledge, I don't know if -- my understanding is that Enbridge, this is the first time they have asked that of the counties. So essentially what they're arguing is, I pay taxes on my house, my house has been overassessed and I should be paying lower taxes. It's something similar to that. We don't -- our office does not deal with that. The Public Utilities Commission does not deal with that issue. That issue, if I am not mistaken, has gone to court.

MS. KOREY NORTHRUP: Like a real, legitimate court?

MS. JAMIE MACALISTER: Oh, yeah. Um-hum.

MR. RUSS NORTHRUP: My name is Russ Northrup, Fond du Lac Band member.

My question is, say they abandon Line 3, that reverts back to the landowner, the previous landowners, the reservation? So say we

want to do some farming in that area, who's responsible for taking that pipe out of the ground? Who is responsible for disposing of that property? And getting that groundwater and getting that ground tested to see if it's feasible to work as a farmland?

MS. JAMIE MACALISTER: Again, I'm not going to have a great answer for that, other than to say that we know that abandonment is a significant concern not just here but all across the route. And for the reasons that you've mentioned, you know. The state has not had to wrestle with this issue previously. Or at least not in the fashion that it has come up now.

Many of these lines are old, they were permitted a long time ago, and the state just has not -- this is really the first time that a company has come in and said, well, here's our plan, we want to build this new line and we want to leave this other one. We want to clean that out and just leave it in place. So that is one of the issues.

We don't know. We don't have -- according to federal rules, Enbridge can do that. They are allowed to leave that pipe -- well, that is the issue. In this case, what Enbridge has said is

they will continue to monitor and take care of the abandoned line and they will do that in part because it sits in the middle of a large corridor that they will continue to be monitoring and maintaining.

MR. RUSS NORTHRUP: No, say the landowners, taking out one section, I ain't talking about the whole section --

MS. JAMIE MACALISTER: I understand.

MR. RUSS NORTHRUP: -- that Joe wants to farm.

MS. JAMIE MACALISTER: Right now there is no provision, there is no state law that says Enbridge or any pipeline company here has responsibilities.

MR. RUSS NORTHRUP: So I would be responsible for the disposal of that pipe?

MS. JAMIE MACALISTER: We don't know. And part of the reason why we do not know is that in the federal regulations this concept of abandoning -- if you abandon your right-of-way, there's some different connotations there. In this case, it's not clear -- the right-of-way is not technically being abandoned because they have all these other pipelines in the mainline corridor. So that is one of the confusing elements that we are

dealing with. And I think this question that is coming up is something that the Public Utilities Commission has not had to wrestle with previously.

And I believe that this will be a very large discussion not just now, but going into the hearings. Because if a permit is issued, there will be permit conditions that get put in place with that permit. And what happens with the abandoned pipe I suspect will become one of those things to be addressed if a permit is issued. Right now there is nothing that says, Enbridge, you have to go work with this landowner and figure something out about what to do with that line.

MR. SCOTT KRETZ: My name is Scott Kretz, K-R-E-T-Z.

Going to the point of where the landholder, or the one that granted the easement to Enbridge to run this through, this is no longer functioning, according to the original context. So whether or not Enbridge cleans it up, the property owner should have the ability to go in and do it at their own expense and remove and assess and return the property back to the state that they'd like. And that's what I hope to see come up in discussion here, too. Is where all the tribal areas, the tribe

can get together and say we want to see this clean, and put the crews together and go out and do it. And forget about what the costs are, you know, we can bill Enbridge later. And they may or may not pay or they might extort the money out of those counties where they paid too much money and then want it back.

So, I mean, I feel bad for those homeowners out there that now pay taxes in that area and it goes straight to Enbridge, right. That would be terrible. But those legal issues should be something that should be addressed here.

On the abandonment issue, the tribe would probably have the right to go out and return the property to its original state. They should have the ability.

MS. JAMIE MACALISTER: Well, I would like to say something that I forgot to say early on. Which is the EIS itself, it's not the decision-making document. The EIS looks at impacts. And we can raise these sorts of issues in the EIS, but, again, these issues really need to come back into the hearing. In part because the hearing, the contested case hearings are where Enbridge witnesses will be, and other witnesses, and you will have an

opportunity to cross-examine and ask questions of those witnesses.

So for that reason I strongly encourage you to go to those hearings and make those types of comments and that you'd like that opportunity. Because the EIS is not going to be able to resolve that. The EIS can raise it as an issue that we don't have certain regulations for this, we don't have precedent for this, things of that nature. But the hearing is really where you want to go to advocate and to make these points to the Judge.

UNIDENTIFIED: So where and when are these contested case hearings?

MS. JAMIE MACALISTER: Currently there is a tentative schedule for the contested case hearings. Those hearings will start roughly the end of September. September 26th. There we go. Jill has a copy of the tentative schedule. That schedule is also available on eDockets. If any of you go to eDockets, the docket numbers for the project, if you go to eDockets, that's the official record for this project.

So all of the communications between the Judge and the parties, everything is on

eDockets. And the schedule is on eDockets. And the schedule has not been approved yet, but right now the hearings are scheduled to start on September 26th. There will be some the end of September, the beginning of October. And then there will be -- there will be a week-long series, a week-long meeting in St. Paul where all of the parties cross-examine one another and that will happen in November.

So, again, some of these things are very important to get on the record still. I wish I didn't have to stand here and say that there are more meetings for you to attend. And you don't have to go to those meetings necessarily, but you can write your comments and make sure you get those in during the comment period. That's another avenue, if you're having meeting fatigue.

MS. DANIELLE OXENDINE MOLLIVER: Just so you know, the Administrative Law Judge, to my understanding, granted the tribes' -- you know, tribal governments, if they would like to request to have one of those hearings, you know, at a tribal location, or close to that. So I know several of them have. Fond du Lac has intervened as a party and I know that they will want to make sure the

numbers are participating. And so that is something that you could advocate with your government or follow up on and find out, you know, if that's something of interest or if it's being done.

MS. LISA LAWRENCE NORTHRUP: Lisa Lawrence Northrup. L-I-S-A, L-A-W-R-E-N-C-E, Northrup.

And I just want to say, we're talking about the line that's being abandoned and that the environmental study, Enbridge says that they're going to monitor. Well, they didn't even know that there was tree roots growing into a pipeline that was -- that's on the rice here. They didn't know how bad that line was being exposed to the elements.

So when they say they're going to monitor, I don't believe that. So for me to live here on this land where the pipeline is going through, what I want to see is I want to see that pipeline out. Whatever they got to do, however much it's going to cost, for them to do that.

And I've been at a meeting before where they said the stability, or it'll be compromised with other pipelines. But there's a way, if they can get a way to get the pipelines in there and be stable and monitor them, they can take

that out. 'Cause I want to see -- oh, they say they're gong to monitor this, you know, do a better job than what you're doing right now. Those pipelines shouldn't even be in the ground, is what I'm saying.

There is ways that -- they hauled oil for many years on train tracks, and then they say, oh, no, we can't do that because it's a public -- it'll hurt the environment. Well, putting a pipeline in disturbs the environment even more. And if something happens, it's going to destroy the area around it even more because of billions of gallons of oil are going to go through before they find that leak. I'm saying they shouldn't even be putting that in.

And this is not my reservation, but growing up here, or being here and having my kids grow up here, this affects their lifestyle. They rice. They use these waterways too. And, you know, I'm from Standing Rock. So I know what the impact is of having a pipeline come through and for it to have residents say that they don't want it here, but they want it over there? I'm done. I'm done with these pipelines. And something else needs to be thought of, something else needs to be done.

This is what's going to wreck the land. People are not understanding. The people that aren't coming to these meetings, they're not understanding how this is going to affect them. It's going to affect them for many generations after this. And we need to figure out a different way. These pipelines are not the future.

And yet they want to put these pipelines in and then say, oh, we're going to monitor them. No, like I said, I don't believe that. And, also, I remember when I was in second grade, I had a really good teacher. And she had talked about, when it comes down to, you know, when the oil is starting to run out, and we talked about greenhouse stuff and everything. When she talked about when the oil is going to start running out, they're going to use this shale area and it's up in the Canada area, it's a big area. So I remember, when they started talking about this, this big area, my teacher, my second grade teacher, many years ago, that was like in the '70s, for her to have that, to be able to tell us second graders that, you know, when they start using that oil, it's going to be the last of the oil. It's going to be really hard to get out, it will be the most expensive oil, so

they'll save that for the last. You know, when it comes down to when there's going to be no oil hardly left, they're going to be using that. That's what's going on now.

They need to start doing something different. They need to start figuring out different ways to have energy. You know, use the sun, use the wind, use geothermal, use the waterways. Use ocean currents. It's just crazy that they keep doing this. And I just want to say that, about that much, that they need to do something different. I don't want to see these pipelines anymore.

Miigwech.

MR. JIM NORTHRUP, III: Boozhoo. (Ojibwe). Jim Northrup, III.

I was thinking about that, 'cause already Enbridge has already gotten in the way just this spring. I wanted to go tap trees in the woods and youth was there and they put concrete barriers in the way right on the corridor. And they made it almost like they were trying to make it so that we can't do the cultural things.

These things, our reservation is a little bit different. All the reservations are a

little bit different because of the way we talk and visit is different than everybody else. Our values are different. We take pride in trying to fix things, make things nice. And we use this nature. This nature is alive and it's something that that's where we get our food.

And then by Enbridge doing that to me, that really, really upsets me. And there, I can see that you don't have my best interest. This way of life, the seasons, that's what it is, it's a way of life and we live it to see all these plants. And it starts in the spring, that's the first one. Then that was upsetting to a lot of our youth. And a lot of people count on me to do those things, people that bring their children out there and do this.

So I'm thinking that you're talking about abandoning these lines, like abandoning a car. That means you can still use that car. So are they just going to sell it, sell it to another place? That's my question.

And then at the same time, why is it that they're not helping the communities when they're coming through? Sounds like they're hurting other communities, too, the county people, the taxpayers, they're trying to lower their tax so that

they can get that money back. I don't know what's going on, but it sounds like they're hurting other people, not only Ojibwe people.

And I just think that there's a way. If you want native people to come over here, you're going to have to talk to them real kind, real nice. Not just to go stand in the office and throw a flier up and those kind of things, but to really talk to somebody and visit them, talk to them and be kind to them. And come in here and say, well, basically, technically speaking, so therefore, well, that's good enough, let's go. That's what it seems like to me.

When you're asking questions, when they're asking you questions, the good one is like your fall back. It looks like your fall back, oh, I don't know, I don't know, I don't know. But I seen you way back when you came here before. And you didn't even learn nothing from then till now.

I think that, you know, being that you have a real nice office, office job, probably make a real lot of money and all that, I don't know. But I'm just saying that I think you would have studied this or looked at some of the stuff, you know, that you're going to be talking about easy questions.

All these questions are real easy.

So I'm just thinking this looks like a game to me, you know, just come through, everybody. They're already getting the pipes lined up, ready to go, just jump through the hoops, let's go, let's go, let's go. I don't know, but that's just the way I feel because they're already stopping me from working with our children here and I don't know why. I just think that it looks like Enbridge doesn't even care about hurting people in the communities. That's just the way I feel.

I'm just worried about that if they're going to leave that line, I know we don't want it here on the reservation, I'm sure they're going to probably -- our leaders are going to make them take it out. I'm worried about the other communities, the other leaders, are they going to flash some money and leave it there? At the same time, those people need to hunt, those people need to fish.

Then I look at the whole route, wherever it goes, it looks like there was an old route, and then it looks like they're almost trying to, like, Enbridge is just trying to hit the rest of the rice lakes. It looks like they're going, all right, let's get another one going. That's what it

looks like.

So abandon, if you abandon the one and get this other one going, then it's like an abandoning party, just start it back up again, you know. But those are things that I'm thinking, you know, I'm just sitting here watching, listening.

This real calm kind of person, I like to be in the woods with others, with their children, with the families. That's what I like. And I just see it looks like somebody is going to hurt my people, you know. And I love them, you know, I take care of them, do what I can do. I don't even have a job. That's what my mother and my father, they told me, they said just help our people. And I have a wife and I have children, I have grandchildren. And that's what I'm worried about. I'm worried about all of people.

They come in from somewhere else, here, there, laughing, having a good time. It's not that way, you know, it looks like, you know, somebody is trying to pull the wool over somebody's eyes or something here.

I'll give you your mic back.

MR. HUNTER JAAKOLA: Hunter Jaakola, H-U-N-T-E-R, J-A-A-K-O-L-A.

So she was talking earlier about the pipelines that are being brought up and just kind of lined up there. And she talked about how the road, or the impact of the road and the places along the route that they take, how they would be impacted. But to maybe put more thought into that, kind of in the strategy that they're using, where bringing that up and putting them there, like, I guess, like a child, where they're placing themselves in a position to be ready for it to happen regardless.

But to put more thought into that, is what other impacts would that create of their readiness and their -- their just condescending values they are showing by bringing the pipes through. They're not putting them in place, of course, because that's against the law, but they're on edge, they're waiting. And what impacts are they creating along the way? The roads and the nature along the way. You never thought of that in the DEIS.

MS. LYZ JAAKOLA: Lyz Jaakola.

So listening to everybody talk, I've been trying to gather my thoughts. So I'm just going to read them and then hand them to you.

The Tribal perspective has not been

adequately represented in the draft EIS. All and each tribe in Minnesota has sovereign rights to say what happens in ceded territories. The proposed routes are through multiple treaty territories. So where in this DEIS do we see acknowledgment of tribal treaty rights? There's a lot of statements from tribes in there and a lot of consultation, but not consent.

So given the state's negligence in regard to the MnDOT catastrophe at Highway 23, it stands to reason that there would be heightened attention to tribal perspective. And a few pages of the 5,000-page document is not enough to fully address the concerns of the sovereign nations.

It's not just rhetoric nor nostalgic prose, but Indigenous sovereign rights and life ways that predate the state of Minnesota. We have non-negotiable rights, inherent rights, human rights. And so until the tribal rights are the starting point of an environmental impact statement, it's going to be flawed, because we're the keepers of the land. And the maps and the resources, that I had a chance to look at some of them, they neglect to show where tribal cultural resources or sites are located. None of that is documented on any of those

maps. How can the PUC see that if it's not presented to them?

There are written statements, you know, from each of the tribes, but those, the content gathered from those meetings, I don't see represented visually. I don't see them having equal weight as the other hundreds of pages that are given to other entities. So this type of a study and the information, that cultural resource information is held in tribal communities. Just like other people have stated, that there is a way to get that information to the PUC and that the way that it has thus far happened is not satisfactory and it takes a different approach. So the DEIS needs to reflect that knowledge and it doesn't.

And those cultural resources, if this is the game we're playing, need to be quantified in order to balance out that value. And I guarantee when that study is done, it will show that it is an immense value that cannot be outdone by any corporate value on a pipeline or oil. How do you value life? There's no way to really do that.

The current DEIS does not offer or support the do-not-build option. That should be the first choice offered and supported.

And I guess last, my thought last is where is the tribal input and participation on the Public Utilities Commission? Why is there not a tribal seat on the PUC? That baffles me. When we are -- we have a relationship with the federal government, so the state, all of those state boards should have a tribal voice. It should be a given.

MS. JAMIE MACALISTER: Anyone else?

Well, I'm not stumped, I think those are great questions. And some of those issues, when I say that I don't have an answer to them, I don't have an answer to them. I, you know, I don't truly have an answer to many of the questions that you have raised. And it's not because I'm hiding something, it's not because I'm secretly backing Enbridge, it's because I really don't know the answer to the question.

I will make one comment on the maps. And it is sensitive and, you know, we have had many discussions with tribal resource staffs and THPOs, and what information do you want to see displayed on a map 'cause there's a lot of information that you probably don't want to have displayed on a map. And we are certainly open and have made this offer repeatedly, we will work with the Bands to represent

any information that they would like us to represent, recognizing that much of it is sensitive and you may not want to have it represented. How we do that, I don't know what the best way to do that is. But we are certainly willing to figure out a solution to that.

The map that you see here is an attempt to at least illustrate the vast number of resources just at a high level look. If you look at that map you can see that there's a lot going on and that is at least the first attempt at trying to let the Public Utilities Commission know that, yes, how we typically depict information on those maps does not look like that.

So while I would not necessarily disagree that there isn't more mapping that we could do, the question is how do you think that mapping is best done and how do we do it in a way that's sensitive to everyone and protects your resources as well. That was first on our mind. It's not an issue of not being able to show it, sure, we could do that, the issue is what do you want to see there and how can we do that.

MS. DANIELLE OXENDINE MOLLIVER: Just to piggyback on that, Jamie, and also because

unfortunately most folks haven't been part of or seen the whole evolution of the process. But with the maps, like Jamie said, the most helpful thing would be where to go next. Because through consultation, when we really started looking at the maps, you know, it was the reservation boundaries and treaty areas. You know, but then through consultation we were told that -- for example, Sandy Lake. Sandy Lake was a community and a place on the map. Unfortunately, historically for a long time it's been left out, but which has now been incorporated, you know.

And there was consultation with MIAC, which is the Minnesota Indian Affairs Council, and they went through for us county by county, route by route, identifying in as general a way as they could to identify it, but yet not divulge anything the tribes wouldn't want us to know. And so that information was correlated and put together to show the cultural resources map.

Your Band also encouraged us and we did expand the map to include the Wisconsin Bands as well.

So there has been some layering, but as Jamie said, I think the best way would be, you

know, what's missing that can actually be visually represented.

MS. JOYCE LAPORTE: So that's what's missing from the DEIS exactly. There are a number of things missing. So if you need to assess the DEIS, there's a lot more that needs to be reflected. Which could take years. So then let it take years and get the pipes off of our property, off of our ceded territories.

MS. DEBRA TOPPING: Boozhoo. My name is Debra Topping, Fond du Lac enrolled Band member. I make it sound so boring. All right. No, really.

So thinking back on this, when we're going when we first started just these hearings, I ran up to Cass Lake, and I talked about this before, about the blueberries. Everybody knows where that bog is where all the blueberries are, right. And so my husband got me these blueberry plants and because now I know when they're flowering and what they look like. So when we were going up to Cass Lake, I saw nothing for miles and miles and miles of those blueberry flowers. Oh, my God. I should be taking pictures so I remember where all these blueberries are going to be.

Anyways, so we live by the season,

right. And as people have alluded to or witnessed or whatever. So blueberries is just the beginning of the spring, you know. Then I had one elder say, you know, let's learn how to go get manoomin. Well, wait a minute. What part of that do you want to learn? Because it's not just go out there and get it. You know, do you want to learn how to gather the birch bark and to be able to make a basket and whatnot.

And so when you're talking about this environmental impact statement study on Anishinabe, it's just so much more than that. Right now we're out gathering birch bark. My husband said he put his knife in there and it just popped, it's ready to gather, you know. And so how we know these things is because of what we've been told for generations. Is that when the horse flies start to bite, you know, is when it is. And so the horse flies is the smallest part next to the bees and the mosquitos and, you know, the things that rely on all of that.

So it's just one big circle here. Anywhere there's birch bark is my land, regardless if there's a line there that says it is or not. Right? That goes with the wild rice. Wherever there is wild rice to be gathered, whether the state

says I can or cannot, the creator says I can and cannot. So if you can supersede that, you know, by all means.

But that's my right as an Indigenous person. And that's everybody's right just as people, to be able to have clean air, clean water. And to have our wild rice the way it is right now. In seven generations, how will it be different? How will it genetically be different? And that's not -- that right there, even asking that question, is genocide. And it's just that simple, plain and simple.

We want maps. I want maps that show which way the water flows. I want maps that show the elevation of the land, the depth of the water. Because what grows in that water at certain different depths, right, we know that wild rice only grows at this depth. We know that must live at this depth. We know turtles live at this depth. So that's what I want to know, so when we do have that draft environmental impact statement, I want to know what the impact is on all of that. On my birch bark trees. On the horse flies. I would like plant identification for all of this, not only for the proposed, but for the current.

As everybody may or may not know, we do have our -- there is the wild parsnips, that is on the pipeline right now, and we have paperwork that shows that documentation and whatnot. And how dangerous that is. You know, it's coming into the communities now, into the neighborhoods where babies are running out into the woods and they can get second degree burns. And these last forever, you know, and these are bad burns. So, you know, people need to know on our reservation, on the pipeline route that this has been an issue.

I also want to know that if there should be an oil -- what is it, oil weepage, is that what they're calling it now, I want to know which way it will flow, the oil will flow if something should happen.

So that's all I have to say for now. Miigwech.

MS. JAMIE MACALISTER: Anyone else?

MS. JOYCE LAPORTE: Yeah. So it isn't just plants, it's the turtle eggs. I mean, you know, we know enough to just take like ten of them and leave the rest so they can go and get into the water and do what they do and live on. But, I mean, we as people gather those eggs and we eat them. You

know, we gather every plant that's out there. We gather.

So I don't -- I don't see, without somebody there to constantly be a representative to the people, every step, every shovel that they dig into the ground is disturbing my place that I live and gather.

MS. DEBRA TOPPING: With the recent upheaval of the burial grounds on 23, that has been on everybody's minds and so who, if anybody, native person would be on hand when and if they just are digging? On hand, not just available.

MS. JOYCE LAPORTE: Every step of the way.

MS. DEBRA TOPPING: Yeah. I think that, absolutely. Hopefully it won't get that far, but that's what I'm saying.

MS. JOYCE LAPORTE: Can't the Minnesota Indian Affairs Commission designate a person to do that like they do now but only when something happens?

MS. JAMIE MACALISTER: If Enbridge were to receive a permit, that would be something that definitely belongs in the permit condition, that they have to have someone on hand. For

precisely those reasons.

MR. JIM NORTHRUP: Criteria for getting a job, you know, they should have some empathy or something at the end. You know, a guy that drinks and he's not going to really care, like already I saw, they ended up picking up people down here 'cause they are there again. They just don't care. They're just trying to get through there, but there are people that seen all that. Hopefully they can get a person on site, maybe, and somebody with background.

MS. DANIELLE OXENDINE MOLLIVER: And so, you know, Jim Jones, who is a member of Leech Lake and is also on -- my actual specialty is cultural and historic places. So both as a member and then wrote a letter and it's incorporated into the draft. This is pretty much what you just said. Which is that the third-party, whether it be the state, whether it be Enbridge, should compile a team. It needs to have not only native, but it would be Ojibwe who understands just, for example, the woodlands, which is different from prairie, which is quite different from the south. So that has been contemplated.

Maybe, as Jamie said, maybe not

necessarily over highlighted as something for a condition, but has been in there. Perhaps, you know, after you people look at it and say it's not strong enough language or hidden in the wrong place, that would be rearranged, but it has been recommended.

MR. JIM NORTHRUP: My name is Jim Northrup continuing on.

I'd even volunteer my wife to help here, highly educated. But then if you maybe have somebody that's going all the way along, don't have people that have an investment, and knows the people, some of these families have been here for generations, my family, before the Caucasian people were here. I don't know what to call you guys -- I don't want to offend you or anything, I don't want to call you white people, you know, I don't know what to say. I'm sorry.

So that's what I'm thinking. That, you know, somebody that's just like local, that goes right on through this area or something like that. That is not just picked out of anywhere. Maybe the community could come with them and go with them and open the door. It's not like they send a guy through, oh, that's good. Let's go kind of like

taking it and making it a good thing.

Imagine, for all these years all these people have been living here. And everything moved, changes throughout time. It's like over there, Standing Rock, where my wife is from, she lives -- her mom just lives 30, 40 miles away from where they just put DAPL, just put their line under the water. Then it's an area where it's real special, because all them great rivers came together, that's why they call that one area Cannonball, they rolled the big giant boulders perfectly round, big as this table, all the way round. So there's all these things, all these people.

And we told them about where the burial sites were and they still came right through it. I was there. I was there at my wife's homeland there. I wanted to be there and I went through it all. I stood there and all the mace, tear gas, all the things that they did. They shot my friends, they hit children, they done all those things. And all we were doing was praying. We were praying. And they brought in all kinds of military, National Guard, all these things. And, you know, I seen what they did. Enbridge was in on that too.

So there again, here they are hurting

people again, you know, that's the way I look at it. And this happens. This place where they went through, that's a very sacred place for Lakota people.

And even the day of the dog attacks, the time that they bulldozed those -- bulldozed those burial sites up there, and that was the same day that I seen one of the elders down there and she was crying and I says what's the matter? What's the matter, are you okay? She says right now, right now it's time. Every person from Cannonball you see here, they tried to exterminate all of us. Everybody you see here, all of you see here, Cannonball, what the government tried to do. And then they all come to do that on those graves. My grandma was leaning right in this area somewhere in here. So I felt bad for her.

So I can see if a corporation and all the people within it, they don't have any respect for native people. I don't see it. They're just going to hurry up and get this done. So I just feel real bad for that. I know that they're going to come through here again, the other side of this imaginary line, called the reservation. Then there was no lines, they're just imaginary. Hey, watch

out, don't go over that line. But here it is, they're imaginary lines.

Our native people, they lived all up and down here. We could have somebody watch out for the burial sites. I think it would be good to have the community, encourage them, feed them, talk with them, visit with them. Be kind. We're like that. Those are our relatives. What if we did that, you know, went to town and did that? We just took care of them, put them somewhere safe. We're going to make a park there. We're not that way, we have respect, the native people.

So I just want Enbridge to do the right thing and have respect for our past generations too and have respect for the children, the up and coming.

My grandchildren, they're small, they're small, and I don't want all this. It's already, like our elder said a little bit ago, our rice used to be in all these lakes, all these rivers, it's not there anymore. What little bit we have, and here they got to bring this whole pipeline right through the middle of the Ojibwe reservations who have treaty rights and it just goes all through it all. I'm hoping that they have respect.

Maybe they could even move it, move all of it. Put it somewhere where they can watch it and take care of it. This is the world's -- ten percent of the world's fresh water is right here. And they are trying to put more and more pipelines through it. It's not right. I think it's not right.

So I think Enbridge needs to have some respect. I don't say too much, because certain things are real hard, they touch my heart and bother my people. Thank you.

MS. JAMIE MACALISTER: Anyone else?

Well, we'll be here for a little bit longer if you want to come and speak with us or come and speak with Janet.

I personally appreciate having these meetings because there are issues out here that we know cannot necessarily be resolved by the draft EIS. But that doesn't mean that they don't need to be resolved. I don't know what the best way necessarily is to resolve them. But I am here to say that we have this process and utilize the process.

It's very easy to think you've been to a meeting, you've made your comments. And I can

simply say that if you can provide written comments, go to more meetings, I strongly encourage you to do that. The process is long. And I know many of you have been to multiple meetings. I know it's difficult. But I would like to say to you to continue to use these meetings, use the opportunities that you have to make the comments and to help the Judge and help the Public Utilities Commission understand these things.

MS. DANIELLE OXENDINE MOLLIVER: I spoke earlier with respect to feeling frustrated and like it's a done deal and maybe the state, you know, somehow is pushing it forward. And Jamie addressed some of those concerns, which obviously, you know, aren't the state, you know, it doesn't have those intentions.

But I think I mentioned as well that those of you who, you know, there was legislation proposed by a couple of things in energy, but one of the proposals was, by Senator [sic] Garofalo, Garofalo, I don't know how to spell it.

So anyway, that proposed legislation in the middle of the night that had support from most county commissioners along the pipeline was basically to allow Enbridge to start and get rid of

the process and the permit process. Which is where we're at, we're kind of like the technical staff putting together the environmental impact statement. So, yes, so that was part of the legislation, which would be to remove the permit process and not require that and allow Enbridge to begin its route.

And people don't realize that each state has its own way with dealing with these applications, you know. And unfortunately, with DAPL, there was no environmental impact statement. There are states, like some of the Dakotas or Texas where literally applicants can come in, file a permit without this kind of review and just do their thing.

So while it's super frustrating, Minnesota is progressive in the sense that we try to have a process. Whether it's as good as it should be or it feels like it's just checks, but there's definitely a checks and balance in there. And both Governor Dayton and several other agencies and Commerce made the public statement about how terrible, you know, such kind of legislation would be and how we need to stay committed to a transparent process.

Hopefully, that, you know, I don't

know that I'll take away the fear that it's a done deal or might happen, but hopefully that highlights that the state is committed to the process. At least Commerce and the other agencies that are cooperating. And the Governor.

MS. JAMIE MACALISTER: We'll be here for a little bit. Come talk to us. Talk to Janet. Write a comment, if you're so inclined. And email the comments, send them in the mail, write them tonight, talk to Janet. We will take your comments however you want to get them to us so long as they are postmarked or time stamped by July 10th.

(Comments concluded.)

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